ASTRO-BALLISTIC CHRONOSTRATIGRAPHIC SEQUENCING

# NORTH AMERICAN MIDDLE MOUNTAIN | PAPER V

## Claims, Equations, Data, and Falsification Atlas

Justin B Fine | Founder & Principal Investigator, Ontomics

**PUBLIC RESEARCH EDITION v1.7 | 17 NOVEMBER 2026**

Scientific content retained from v1.6; section-indexed external citations appended

## Contents

**Working Manuscript Identification** 21

**Declaration of Function** 21

**Source Status and Citation Policy** 22

**Data, Evidence, and Provenance Convention** 22

**Prediction, Falsification, and Decision-Threshold Convention** 22

**Authorship and AI-Assistance Disclosure** 22

**Abstract** 22

**Keywords** 23

**1 The Companion Mandate** 24
- 1.1 Canonical Corpus Nomenclature . . . 24
- 1.2 Paper V Is an Atlas . . . 24
- 1.3 Inspection Questions . . . 24
- 1.4 No Validity by Inclusion . . . 24
- 1.5 No Silent Completion . . . 24
- 1.6 Companion Success Standard . . . 24

**2 Scope and Non-Scope** 25
- 2.1 Included Functions . . . 25
- 2.2 Excluded Functions . . . 25
- 2.3 Reserved-Hypothesis Firewall . . . 25
- 2.4 Separation From Paper IV . . . 25
- 2.5 No Automated Final Judgment . . . 25

**3 Series Corpus and Authority Order** 26
- 3.1 Five-Paper Corpus . . . 26
- 3.2 Paper-IV Handoff Package . . . 26
- 3.3 Authority Classes . . . 26
- 3.4 Authority Does Not Equal Truth . . . 26
- 3.5 Conflict Rules . . . 26
- 3.6 Source-Control Rule . . . 26
- 3.7 Corpus-Freeze Record . . . 27

**4 Atlas Ontology** **27**
4.1 Typed Atlas Node . . . 27
4.2 Entity Types . . . 27
4.3 Typed Atlas Edge . . . 27
4.4 Relationship Types . . . 27
4.5 No Untyped Relationship . . . 28
4.6 Atlas Record . . . 28

**5 Stable Identifier System** **28**
5.1 Canonical Identifier Grammar . . . 28
5.2 Examples . . . 28
5.3 Entity Codes . . . 29
5.4 Identifier Permanence . . . 29
5.5 Revision Identifiers . . . 29
5.6 Cross-Paper Items . . . 29
5.7 Human-Readable Short Form . . . 29

**6 Claim Registry** **29**
6.1 Claim Definition . . . 29
6.2 Claim Classes . . . 30
6.3 Exact Claim Requirement . . . 30
6.4 Claim Record Schema . . . 30
6.5 Claim Scope . . . 30
6.6 Claim Polarity . . . 31
6.7 Conditional Claim . . . 31
6.8 Claim Support Vector . . . 31
6.9 Claim Completeness Indicator . . . 31
6.10 Orphan Claim . . . 31
6.11 Claim Upgrade Rule . . . 32

**7 Equation Registry** **32**
7.1 Equation Scope . . . 32
7.2 Equation Record . . . 32
7.3 Equation Roles . . . 33
7.4 Dimensional Audit . . . 33
7.5 Symbol Uniqueness . . . 33
7.6 Domain of Validity . . . 33
7.7 Limiting-Case Audit . . . 33
7.8 Numerical Reproduction . . . 33
7.9 Equation Verification States . . . 34
7.10 Equation Does Not Establish Its Inputs . . . 34

**8 Assumption and Parameter Registries** **34**
8.1 Assumption Definition . . . 34
8.2 Assumption Classes . . . 34
8.3 Assumption Record . . . 34
8.4 Explicit and Hidden Assumptions . . . 34
8.5 Assumption Necessity and Intervention Validity . . . 35
8.6 Parameter Definition . . . 35
8.7 Parameter Classes . . . 35
8.8 Parameter Record . . . 35
8.9 Shared Versus Local Parameters . . . 35
8.10 Parameter Freeze . . . 35
8.11 Parameter-Change Rule . . . 36
8.12 Sensitivity . . . 36
8.13 No Silent Parameter Retuning . . . 36

**9 Causal-Edge, Causal-Path, and Alternative Registries 36**
9.1 Causal-Edge Record . . . 36
9.2 Causal-Path Record . . . 36
9.3 Alternative-Explanation Record . . . 37
9.4 Causal-Level Upgrade Rule . . . 37
9.5 Alternative-Space Completeness . . . 37

**10 Chronology, Reconstruction, and Material-Lineage Registries 37**
10.1 Evidence-Origin Classification . . . 37
10.2 Chronology Record . . . 37
10.3 Reconstruction-Branch Record . . . 38
10.4 Material-Lineage Record . . . 38
10.5 Human-Review Conflict Gate . . . 38
10.6 No Silent External-Causality Import . . . 38

**11 Data and Source Registries 38**
11.1 Dataset Record . . . 39
11.2 Evidence-Origin Axis . . . 39
11.3 Transformation-Lineage Record . . . 39
11.4 Derived-Result Provenance Record . . . 39
11.5 Archive, Checksum, and Access Requirements . . . 39
11.6 Current Corpus Provenance Snapshot . . . 40
11.7 Dataset Use Classes . . . 40
11.8 No Test-Data Leakage . . . 40
11.9 Source Record . . . 40
11.10 Source Types . . . 40
11.11 Source Support Granularity . . . 40
11.12 Source Verification States . . . 41
11.13 Source-Derived Does Not Mean Supported . . . 41
11.14 Source Conflict . . . 41

**12 Model, Method, and Result Registries 41**
12.1 Model Record . . . 41
12.2 Method Record . . . 41
12.3 Result Record . . . 42
12.4 Negative Results . . . 42
12.5 Failed Runs . . . 42
12.6 Result-to-Claim Rule . . . 42

**13 Prediction Registry 42**
13.1 Prediction Definition . . . 42
13.2 Prediction Record . . . 43
13.3 Prediction Classes . . . 43
13.4 Prediction Specificity . . . 43
13.5 Prediction Statuses . . . 43
13.6 No Retroactive Prediction . . . 43
13.7 Prediction Outcome . . . 43

**14 Falsification Registry 43**
14.1 Falsifier Definition . . . 44
14.2 Falsifier Record . . . 44
14.3 Falsifier Scopes . . . 44
14.4 Threshold-Class Registry . . . 44
14.5 Hard Falsifiers, Downgrading Conditions, and Missing Evidence . . . 44
14.6 Decision Outcome Vocabulary . . . 44
14.7 Falsifier Status . . . 44
14.8 No Cross-Failure Inflation . . . 45

14.9 No Falsifier Evasion . . . 45
14.10 Failure Propagation . . . 45

**15 Dependency-Graph Architecture 45**
15.1 Complete Atlas Graph . . . 45
15.2 Claim Dependency Subgraph . . . 45
15.3 Required Upstream Paths . . . 46
15.4 Dependency Depth . . . 46
15.5 Claim Criticality . . . 46
15.6 Dependency Bottleneck . . . 46
15.7 Alternate Support Paths . . . 46
15.8 Circular Support . . . 47
15.9 Circularity Rule . . . 47
15.10 Dependency Completeness . . . 47
15.11 Failure Cut Set . . . 47
15.12 Series-Level Replacement Node . . . 47

**16 Status Vocabulary 47**
16.1 Status Must Be Multiaxial . . . 48
16.2 Provenance Axis . . . 48
16.3 Scientific-Role Axis . . . 48
16.4 Epistemic-Status Axis . . . 48
16.5 Verification Axis . . . 48
16.6 Publication Axis . . . 48
16.7 Example Status Vector . . . 49
16.8 No Status Compression . . . 49
16.9 Support Upgrade Requirements . . . 49

**17 Verification and Audit Rules 49**
17.1 Rule V1: Exact Extraction . . . 49
17.2 Rule V2: Source and Interpretation Separation . . . 49
17.3 Rule V3: Calculation and Assumption Separation . . . 50
17.4 Rule V4: Observation and Reconstruction Separation . . . 50
17.5 Rule V5: Reconstruction and Prediction Separation . . . 50
17.6 Rule V6: Geometry and Causation Separation . . . 50
17.7 Rule V7: Modern and Paleogeographic Separation . . . 50
17.8 Rule V8: Branch and Model Separation . . . 50
17.9 Rule V9: Regional and Global Separation . . . 51
17.10 Rule V10: Model Output and Independent Evidence Separation . . . 51
17.11 Rule V11: Missing Evidence Visibility . . . 51
17.12 Rule V12: Negative Results Preservation . . . 51
17.13 Rule V13: No Silent Reconciliation . . . 51
17.14 Rule V14: No Status Inheritance Without Dependency . . . 51
17.15 Rule V15: No AI Authority Substitution . . . 51
17.16 Rule V16: Reproducibility Before Compression . . . 52
17.17 Rule V17: Version Visibility . . . 52
17.18 Rule V18: Decision Traceability . . . 52

**18 Contradiction, Supersession, and Consistency Audit 52**
18.1 Contradiction Classes . . . 52
18.2 Contradiction Record . . . 52
18.3 Severity Classes . . . 53
18.4 Supersession . . . 53
18.5 Intentional Scope Difference . . . 53
18.6 Unresolved Conflict . . . 53
18.7 Cross-Paper Consistency Vector . . . 53
18.8 Consistency Residual . . . 53

18.9 Canonical Shared Value . . . 53

**19 Human-Readable and Machine-Readable Navigation 54**
19.1 Human-Readable Atlas . . . 54
19.2 Machine-Readable Companion . . . 54
19.3 Minimum Machine Registry Files . . . 54
19.4 Query Functions . . . 54
19.5 Reader Entry Points . . . 54
19.6 Claim Navigation Chain . . . 55
19.7 Falsifier Navigation Chain . . . 55
19.8 Replacement Navigation Chain . . . 55
19.9 Atlas Completeness Dashboard . . . 55
19.10 Atlas Integrity Principle . . . 55

**20 Atlas Architecture Synthesis 55**

**21 Paper-I Atlas Scope 56**
21.1 Paper-I Function . . . 56
21.2 Paper-I Atlas Objects . . . 56
21.3 Three Distinct Geometry Questions . . . 56
21.4 Present-Day and Event-Time Geometry . . . 56
21.5 Paper-I Atlas Constraint . . . 56

**22 Paper-I Claim Registry 57**
22.1 Claim Registry Table . . . 57
22.2 Claim-Hierarchy Structure . . . 58
22.3 Current Claim Boundary . . . 58

**23 Flagship Coordinate and Geometry Registry 58**
23.1 Registered Coordinate Set . . . 58
23.2 Coordinate Vector . . . 58
23.3 Spherical Unit Vector . . . 59
23.4 Coordinate Status . . . 59
23.5 Point-Definition Sensitivity . . . 59
23.6 Coordinate-Selection Requirement . . . 59

**24 Surface-Distance and Midpoint Audit 59**
24.1 Central Angle . . . 60
24.2 Surface Distance . . . 60
24.3 Audited Bilateral Distances . . . 60
24.4 Bilateral Difference . . . 60
24.5 Bilateral Asymmetry . . . 60
24.6 Exact Great-Circle Midpoint . . . 60
24.7 Denali Offset From Geometric Turn . . . 61
24.8 Source Viability Band . . . 61
24.9 Meaning of the Negative Result . . . 61

**25 Great-Circle, Cross-Track, and Along-Track Audit 61**
25.1 Direct Malpelo–Arctic Surface Distance . . . 61
25.2 Routed Distance Through Denali . . . 61
25.3 Path Excess . . . 62
25.4 Initial Bearing . . . 62
25.5 Cross-Track Distance . . . 62
25.6 Along-Track Distance . . . 62
25.7 Interpretation . . . 62
25.8 Great-Circle Claim Status . . . 62

**26 Chord, Depth, and Incidence Audit** **62**
26.1 Malpelo–Arctic Central Angle . . . 63
26.2 Chord Length . . . 63
26.3 Half-Chord Length . . . 63
26.4 Core-Crossing Status . . . 64
26.5 Incidence Below the Local Horizontal . . . 64
26.6 Incidence From the Inward Radial . . . 64
26.7 Trajectory Classification . . . 64
26.8 Constant-Speed Transit Diagnostic . . . 64

**27 Paper-I Chronology Registry** **64**
27.1 Chronology Records . . . 64
27.2 Chronology Separation . . . 65
27.3 No Chronology by Naming . . . 65
27.4 Required Chronology Test . . . 65

**28 Paper-I Source and Data Registry** **65**
28.1 Source Registry . . . 66
28.2 Source-One Scope . . . 66
28.3 Source-Two Scope . . . 66
28.4 External Data Gap . . . 66
28.5 Data Registry . . . 66

**29 Paper-I Assumption and Parameter Registry** **67**
29.1 Assumption Registry . . . 67
29.2 Parameter Registry . . . 67
29.3 Parameter Sensitivity Priority . . . 67

**30 Paper-I Equation Registry** **67**
30.1 Equation Registry Table . . . 68
30.2 Equation-Audit Boundary . . . 68
30.3 No Mechanical Validation From Geometry Equations . . . 68

**31 Paper-I Numerical Result Registry** **68**
31.1 Exploratory Mechanical Range . . . 69
31.2 Planetary Binding Benchmark . . . 69

**32 Paper-I Null and Selection Registry** **69**
32.1 Geometric Test Statistics . . . 69
32.2 Uniform Third-Point Null . . . 69
32.3 Elevation-Conditioned Null . . . 69
32.4 Entrance-Exit Opportunity Null . . . 70
32.5 Complete Triplet Null . . . 70
32.6 Paleogeographic Null . . . 70
32.7 Chronology-Permutation Null . . . 70
32.8 Search-Space Ledger . . . 70
32.9 Selection-Adjusted Probability . . . 70
32.10 Current Null Status . . . 71

**33 Paper-I Prediction Registry** **71**
33.1 Prediction-Freeze Requirement . . . 71
33.2 Current Prediction Classification . . . 71

**34 Paper-I Falsification Registry** **71**
34.1 Triggered Falsifier Interpretation . . . 72
34.2 Paper-Level Falsification Condition . . . 72

**35 Paper-I Contradiction and Supersession Audit** **72**
35.1 Supersession Principle . . . 72
35.2 No Retrospective Erasure . . . 72

**36 Paper-I Dependency Graph and Criticality** **72**
36.1 Paper-I Dependency Graph . . . 73
36.2 Core Dependency Chain . . . 73
36.3 Cross-Paper Handoff Chain . . . 73
36.4 Critical Nodes . . . 73
36.5 Present Midpoint Cut Set . . . 73
36.6 Flagship Event Cut Set . . . 73
36.7 High-Priority Verification Order . . . 74

**37 Paper-I Atlas Status** **74**
37.1 Status Dashboard . . . 74
37.2 Verified Paper-I Outputs . . . 74
37.3 Current Negative Result . . . 74
37.4 Current Unresolved Questions . . . 74
37.5 Paper-I Atlas Conclusion . . . 75

**38 Paper-I Atlas Synthesis** **75**

**39 Paper-II Atlas Scope** **75**
39.1 Paper-II Function . . . 75
39.2 Paper-II Does Not Presume an Intact Projectile . . . 75
39.3 Paper-II Branches . . . 76
39.4 Paper-II Atlas Objects . . . 76
39.5 Paper-II Handoff Burden . . . 76

**40 Paper-II Mechanical Claim Registry** **76**
40.1 Current Mechanical Status . . . 76

**41 Operational Transmission Definitions** **76**
41.1 Transmission Record . . . 77
41.2 Directional Concentration . . . 77
41.3 Momentum Transmission Fraction . . . 77
41.4 Energy Transmission Fraction . . . 77
41.5 Coherence Fraction . . . 77
41.6 Transit Completion . . . 77
41.7 No Single Universal Transit Metric . . . 78

**42 Entrance-Coupling Registry** **78**
42.1 Pre-Entrance State . . . 78
42.2 Post-Coupling State . . . 78
42.3 Entrance Partition Fractions . . . 78
42.4 Entrance-Coupling Efficiency . . . 78
42.5 Directional-Coupling Efficiency . . . 78
42.6 Entrance Registry . . . 79
42.7 Entrance Falsification Principle . . . 79

**43 Transmission-Branch Registry** **79**
43.1 Branch Record . . . 79
43.2 Branch Registry Table . . . 79
43.3 Coherent-Body Integrity Metric . . . 79
43.4 Fragment Dispersion Metric . . . 80
43.5 Shock Directionality Metric . . . 80
43.6 Damage Connectivity Metric . . . 80

43.7 Hybrid Non-Double-Counting Rule . . . 80

**44 Differentiated-Earth Path Registry 80**
44.1 Path Coordinate . . . 80
44.2 Layered Background State . . . 81
44.3 Path State . . . 81
44.4 Registered Path Geometry . . . 81
44.5 Layer-Exposure Functional . . . 81
44.6 Path-Integrated Resistance . . . 81
44.7 Path-Integrated Heating . . . 81
44.8 Path-Integrated Damage . . . 82
44.9 Differentiated-Path Requirements . . . 82
44.10 Path Approximation Status . . . 82

**45 Energy, Mass, Momentum, and Size Audit 82**
45.1 Exploratory Energy Interval . . . 82
45.2 Exploratory Velocity Interval . . . 82
45.3 Mass From Kinetic Energy . . . 83
45.4 Equivalent Spherical Diameter . . . 83
45.5 Momentum . . . 83
45.6 Energy-to-Binding Ratio . . . 83
45.7 Audit Interpretation . . . 83
45.8 Range-Correlation Requirement . . . 83

**46 Thermodynamic, Damage, Melt, and Phase Registry 84**
46.1 Energy Equation . . . 84
46.2 Damage Evolution . . . 84
46.3 Melt-Fraction Evolution . . . 84
46.4 Phase Evolution . . . 84
46.5 Density Perturbation . . . 85
46.6 Constitutive State Registry . . . 85
46.7 Thermodynamic Falsification Principle . . . 85

**47 Dimensionless-Number and Timescale Audit 85**
47.1 Purpose . . . 85
47.2 Reynolds Number . . . 85
47.3 Reynolds-Number Limitation . . . 86
47.4 Froude Number . . . 86
47.5 Rossby Number . . . 86
47.6 Deborah Number . . . 86
47.7 Constant-Speed Transit Time . . . 86
47.8 Shock-Transit Time . . . 86
47.9 Damage-Front Transit . . . 87
47.10 Thermal-Diffusion Timescale . . . 87
47.11 Timescale Registry . . . 87
47.12 Dimensionless-Audit Conclusion . . . 87

**48 Midpoint-Inheritance Registry 87**
48.1 Midpoint Is a Response Region . . . 87
48.2 Midpoint State . . . 88
48.3 Midpoint Localization Kernel . . . 88
48.4 Midpoint Inheritance Variables . . . 88
48.5 Midpoint Persistence . . . 88
48.6 Midpoint Claim Boundary . . . 88
48.7 Midpoint Falsifier . . . 88

**49 Terminal Response and Exit-Energy Registry 89**

49.1 Terminal State . . . 89
49.2 Terminal Energy Fraction . . . 89
49.3 Corrected Terminal-Energy Range . . . 89
49.4 Terminal Momentum Fraction . . . 89
49.5 Terminal Direction Residual . . . 90
49.6 Terminal Mechanism Classes . . . 90
49.7 No Automatic Trench Attribution . . . 90
49.8 Terminal Compatibility Record . . . 90
49.9 Terminal Falsifier . . . 90

**50 Earth Survival and Angular-Momentum Registry 90**
50.1 Planetary Survival Is Multidimensional . . . 91
50.2 Total Energy Closure . . . 91
50.3 Total Momentum Closure . . . 91
50.4 Angular Momentum . . . 91
50.5 Rotation Change . . . 91
50.6 Survival Registry . . . 91
50.7 Survival Principle . . . 92

**51 Global Marker Registry 92**
51.1 Purpose . . . 92
51.2 Marker Classes . . . 92
51.3 Marker Prediction Record . . . 92
51.4 Marker Presence Likelihood . . . 92
51.5 Marker Absence . . . 93
51.6 Global-Marker Viable Set . . . 93
51.7 Global-Marker Falsifier . . . 93

**52 Mauna Kea Secondary-Hypothesis Registry 93**
52.1 Scope . . . 93
52.2 Source-Derived Parameter Range . . . 93
52.3 Secondary Energy . . . 94
52.4 Secondary-Hypothesis Record . . . 94
52.5 Secondary-Hypothesis Limitation . . . 94

**53 Paper-II Equation Registry 94**
53.1 Equation-Audit Priority . . . 94

**54 Paper-II Assumption and Parameter Registry 94**
54.1 Principal Assumptions . . . 95
54.2 Principal Parameter Registry . . . 95
54.3 Highest-Sensitivity Parameters . . . 95

**55 Paper-II Prediction Registry 95**
55.1 Prediction-Freeze Requirement . . . 95

**56 Paper-II Falsification Registry 95**
56.1 Branch-Specific Failure . . . 96
56.2 Historical-Occurrence Limitation . . . 96

**57 Paper-II Contradiction and Supersession Audit 96**
57.1 Correction Preservation . . . 96
57.2 No Selective Use of Superseded Values . . . 96

**58 Paper-II Dependency Graph and Viable Set 96**
58.1 Paper-II Dependency Graph . . . 97
58.2 Core Mechanical Chain . . . 97
58.3 Branch Viable Sets . . . 97

58.4 Mechanism-Union Set . . . 97
58.5 Complete Paper-II Viable Set . . . 97
58.6 Shared-Parameter Requirement . . . 97
58.7 Paper-II Critical Nodes . . . 98
58.8 Paper-II Failure Cut Set . . . 98
58.9 Paper-III Handoff Rule . . . 98

**59 Paper-II Atlas Status 98**
59.1 Status Dashboard . . . 98
59.2 Verified Paper-II Outputs . . . 98
59.3 Current Negative and Restrictive Results . . . 99
59.4 Current Unresolved Questions . . . 99
59.5 Paper-II Atlas Conclusion . . . 99

**60 Paper-II Atlas Synthesis 99**

**61 Paper-III Atlas Scope 99**
61.1 Paper-III Function . . . 99
61.2 Paper-III Central Burden . . . 100
61.3 Conditional Entry . . . 100
61.4 Shared Observational Ground . . . 100
61.5 Paper-III Replacement Proposition . . . 100
61.6 Paper-III Atlas Objects . . . 100
61.7 No Event-Sequence Credit by Assignment . . . 100

**62 Paper-III Claim Registry 101**
62.1 Paper-III Claim Boundary . . . 101

**63 Conditional Paper-II Handoff Audit 101**
63.1 Canonical Handoff State . . . 101
63.2 Handoff Field Registry . . . 101
63.3 Handoff Admissibility Indicator . . . 102
63.4 Complete Handoff Condition . . . 102
63.5 No Invented Handoff Fields . . . 102
63.6 Handoff Failure . . . 102

**64 Sequenced Event-Catalog Registry 102**
64.1 Event Catalog . . . 102
64.2 Individual Event Record . . . 103
64.3 Required Event Metadata . . . 103
64.4 Event Sequence . . . 103
64.5 Nonlinear State Recursion . . . 103
64.6 No Linear Superposition by Default . . . 103
64.7 Event-Catalog Status . . . 104
64.8 Event-Selection Complexity . . . 104

**65 Plate, Block, and Material-Lineage Registry 104**
65.1 Evolving Material Domain . . . 104
65.2 Fractional Membership . . . 104
65.3 Plate State . . . 104
65.4 Material-Lineage Graph . . . 105
65.5 Lineage Edge Record . . . 105
65.6 Material-Mass Closure . . . 105
65.7 Modern-Plate Projection Prohibition . . . 105
65.8 Lineage Registry Status . . . 105

**66 Boundary Nucleation and Connectivity Registry 105**

66.1 Boundary-Nucleation Potential . . . 106
66.2 Candidate Boundary Domain . . . 106
66.3 Boundary Persistence . . . 106
66.4 Global Boundary Graph . . . 106
66.5 Boundary Edge Record . . . 106
66.6 Connectivity Matrix . . . 106
66.7 Plate-Enclosure Test . . . 107
66.8 Boundary Comparison Metrics . . . 107
66.9 Boundary Viable Set . . . 107
66.10 Boundary Falsification Principle . . . 107

**67 Fragmentation, Merger, and Terrane-Transfer Registry 107**
67.1 Fragmentation Operator . . . 108
67.2 Fragmentation Mass Closure . . . 108
67.3 Merger Operator . . . 108
67.4 Terrane-Transfer Matrix . . . 108
67.5 Terrane State . . . 108
67.6 Transfer Requirements . . . 108
67.7 No Terrane Assignment by Similarity Alone . . . 109
67.8 Fragmentation and Transfer Falsifier . . . 109

**68 Boundary Type, Propagation, and Reactivation Registry 109**
68.1 Relative Velocity Decomposition . . . 109
68.2 Boundary-Type State . . . 109
68.3 Candidate Boundary Types . . . 110
68.4 Boundary Propagation . . . 110
68.5 Branching Criterion . . . 110
68.6 Reactivation Function . . . 110
68.7 Boundary Inversion . . . 110
68.8 Termination . . . 110
68.9 Boundary-Type Falsifier . . . 111

**69 Event-to-Plate Impulse Registry 111**
69.1 Impulse-Density Field . . . 111
69.2 Plate-Integrated Linear Impulse . . . 111
69.3 Plate-Integrated Angular Impulse . . . 111
69.4 Impulse Partition . . . 112
69.5 Rigid and Deforming Components . . . 112
69.6 Immediate Velocity Change . . . 112
69.7 Immediate Angular-Velocity Change . . . 112
69.8 Impulse-Memory Kernel . . . 112
69.9 No Perpetual Impulse . . . 112
69.10 Impulse Falsifier . . . 113

**70 Plate Mass, Inertia, Force, Torque, and Euler-Vector Registry 113**
70.1 Plate Mass . . . 113
70.2 Center of Mass . . . 113
70.3 Inertia Tensor . . . 113
70.4 Linear-Momentum Evolution . . . 114
70.5 Angular-Momentum Evolution . . . 114
70.6 Force Registry . . . 114
70.7 Torque Registry . . . 114
70.8 Power Balance . . . 114
70.9 Dissipation Condition . . . 114
70.10 Euler Velocity . . . 115
70.11 Finite Rotation . . . 115
70.12 Euler-Pole Drift . . . 115

70.13 Euler-Vector Falsifier . . . 115

**71 Direction, Speed, Acceleration, and Plate-Circuit Registry 115**
71.1 Velocity Contribution Decomposition . . . 116
71.2 Relative Plate Velocity . . . 116
71.3 Direction Residual . . . 116
71.4 Speed Residual . . . 116
71.5 Acceleration . . . 116
71.6 Speed-Hierarchy Score . . . 116
71.7 Plate-Circuit Closure . . . 117
71.8 Triple-Junction Compatibility . . . 117
71.9 Global Area Accounting . . . 117
71.10 Directional-Inheritance Counterfactual . . . 117
71.11 Plate-Motion Viable Set . . . 117

**72 Mountain, Trench, Ridge, Basin, Plateau, and Volcanic Registry 118**
72.1 Unified Surface-Structure State . . . 118
72.2 Mountain-System Registry . . . 118
72.3 Trench and Terminal-Zone Registry . . . 118
72.4 Ridge and Rift Registry . . . 118
72.5 Basin Registry . . . 118
72.6 Plateau Registry . . . 119
72.7 Volcanic-Province Registry . . . 119
72.8 Surface-Structure Viable Set . . . 119

**73 Terrane, Suture, and Continental-Assembly Registry 119**
73.1 Terrane Provenance Vector . . . 119
73.2 Terrane Trajectory . . . 120
73.3 Terrane Rotation . . . 120
73.4 Docking Condition . . . 120
73.5 Suture Record . . . 120
73.6 Assembly Graph . . . 120
73.7 Assembly Requirements . . . 120
73.8 Assembly Falsifier . . . 121

**74 Global Reconstruction and Null-Model Registry 121**
74.1 Global State . . . 121
74.2 Sequence Recursion . . . 121
74.3 Global Observation Vector . . . 121
74.4 Global Prediction . . . 122
74.5 Integrated Misfit . . . 122
74.6 No-Event Null . . . 122
74.7 Randomized-Event Null . . . 122
74.8 Shuffled-Age Null . . . 122
74.9 Randomized-Boundary Null . . . 123
74.10 Isotropized-Inheritance Null . . . 123
74.11 Leave-One-Event-Out Test . . . 123
74.12 Leave-One-Region-Out Test . . . 123
74.13 Held-Out Structure Test . . . 123
74.14 Empirical Null Probability . . . 123
74.15 Global Reconstruction Requirement . . . 124

**75 Paper-III Equation Registry 124**
75.1 Equation-Audit Priority . . . 124

**76 Paper-III Assumption and Parameter Registry 124**
76.1 Principal Assumptions . . . 124

76.2 Parameter Classes . . . 124
76.3 Parameter Registry Table . . . 125
76.4 No Independent Regional Retuning . . . 125

**77 Paper-III Prediction Registry 125**
77.1 Prediction-Freeze Requirements . . . 125
77.2 Current Prediction Status . . . 125

**78 Paper-III Falsification Registry 126**
78.1 Primary Paper-III Falsifier . . . 126
78.2 Compartmentalized Failure . . . 126

**79 Paper-III Contradiction and Supersession Audit 126**
79.1 No Combination of Incompatible Versions . . . 126

**80 Paper-III Dependency Graph and Integrated Viable Set 127**
80.1 Paper-III Dependency Graph . . . 127
80.2 Core Dependency Chain . . . 127
80.3 Component Viable Sets . . . 127
80.4 Complete Paper-III Viable Set . . . 127
80.5 Shared-Parameter Requirement . . . 127
80.6 No Cross-Branch Compensation . . . 128
80.7 Critical Nodes . . . 128
80.8 Representative Failure Cut Set . . . 128
80.9 Paper-IV Handoff . . . 128

**81 Paper-III Atlas Status 128**
81.1 Status Dashboard . . . 129
81.2 Established Paper-III Architecture . . . 129
81.3 Current Restrictive Results . . . 129
81.4 Current Unresolved Questions . . . 129
81.5 Paper-III Atlas Conclusion . . . 129

**82 Paper-III Atlas Synthesis 129**

**83 Paper-IV Atlas Scope 130**
83.1 Paper-IV Function . . . 130
83.2 Primary Comparative Burden . . . 130
83.3 Paper-IV Atlas Objects . . . 130
83.4 Eligible Outcomes . . . 130
83.5 No Replacement by Rhetoric . . . 130

**84 Paper-IV Comparison Claim Registry 131**

**85 Shared Observation and Data Registry 131**
85.1 Shared Observation Vector . . . 131
85.2 Shared-Data Registry . . . 131
85.3 Data Partition . . . 131
85.4 Shared Uncertainty . . . 132
85.5 Resolution Matching . . . 132
85.6 No Unequal Evidence Burden . . . 132

**86 Competing Model-Family Registry 132**
86.1 Complete Model Family . . . 132
86.2 Model Registry . . . 132
86.3 Plate-Tectonic Family Is Not One Model . . . 133
86.4 Astro-Ballistic Eligibility . . . 133
86.5 Hybrid Definition . . . 133

**87 Matched Comparison and Eligibility Rules 133**
87.1 Matched Input Domain . . . 133
87.2 Matched Output Domain . . . 134
87.3 Matched Spatial Domain . . . 134
87.4 Matched Time Domain . . . 134
87.5 Eligibility Record . . . 134
87.6 Eligibility Condition . . . 134
87.7 No Unequal Completion Standard . . . 134
87.8 No Post-Ranking Model Redefinition . . . 134

**88 Initial-Condition and Boundary-Information Accounting 135**
88.1 Initial State . . . 135
88.2 Initial-State Description Length . . . 135
88.3 Boundary Information . . . 135
88.4 Velocity Information . . . 135
88.5 Information-Credit Rule . . . 135
88.6 Boundary-Origin Ablation . . . 136
88.7 Initial-State Sensitivity . . . 136
88.8 Initial-Condition Falsifier . . . 136

**89 Boundary and Plate-Partition Comparison Registry 136**
89.1 Observed and Predicted Networks . . . 136
89.2 Boundary Geometry Misfit . . . 136
89.3 Boundary Topology Misfit . . . 137
89.4 Boundary-Type Misfit . . . 137
89.5 Boundary-Chronology Misfit . . . 137
89.6 Plate-Partition Overlap . . . 137
89.7 Boundary Comparison Score . . . 137
89.8 Boundary-Origin Necessity . . . 137
89.9 Boundary Falsifier . . . 138

**90 Motion, Euler-Vector, Force, Torque, and Power Comparison 138**
90.1 Observed Motion Vector . . . 138
90.2 Predicted Motion Vector . . . 138
90.3 Velocity Misfit . . . 138
90.4 Euler-Vector Residual . . . 138
90.5 Force Closure . . . 139
90.6 Torque Closure . . . 139
90.7 Power Residual . . . 139
90.8 Dissipation Constraint . . . 139
90.9 Motion Comparison Score . . . 139
90.10 Motion Necessity . . . 139
90.11 Motion Falsifier . . . 140

**91 Surface-Structure Comparison Registry 140**
91.1 Shared Surface-Structure Vector . . . 140
91.2 Structure Record . . . 140
91.3 Spatial Comparison . . . 140
91.4 Orientation Comparison . . . 141
91.5 Magnitude and Material Comparison . . . 141
91.6 Chronology Comparison . . . 141
91.7 Class-Specific Requirements . . . 141
91.8 Surface Comparison Score . . . 141
91.9 Surface-Structure Falsifier . . . 142

**92 Deep-Geophysical Comparison Registry 142**
92.1 Deep-State Vector . . . 142

92.2 Gravity Prediction . . . 142
92.3 Seismic Prediction . . . 142
92.4 Magnetic Prediction . . . 143
92.5 Thermal Prediction . . . 143
92.6 Deep-Geophysical Misfit . . . 143
92.7 Cross-Geophysical Consistency . . . 143
92.8 No Independent Field Tuning . . . 143
92.9 Deep-Geophysical Falsifier . . . 143

**93 Chronology and Paleogeographic Comparison Registry 144**
93.1 Time Convention . . . 144
93.2 Chronology Vector . . . 144
93.3 Chronological Violation . . . 144
93.4 Chronology Score . . . 144
93.5 Material Reconstruction . . . 145
93.6 Paleogeographic State . . . 145
93.7 Paleogeographic Comparison Score . . . 145
93.8 Event-Time Path Test . . . 145
93.9 Chronology and Paleogeography Falsifier . . . 145

**94 Causal Coverage and Necessity Registry 146**
94.1 Observation-Class Set . . . 146
94.2 Coverage Indicator . . . 146
94.3 Weighted Coverage . . . 146
94.4 Causal-Depth Scale . . . 146
94.5 Mean Causal Depth . . . 146
94.6 Causal-Chain Completion . . . 147
94.7 Mechanism Necessity . . . 147
94.8 Event Necessity . . . 147
94.9 Interaction Necessity . . . 147
94.10 Coverage Score . . . 147
94.11 Causal-Coverage Falsifier . . . 148

**95 Model Evidence, Equivalence, and Ranking Registry 148**
95.1 Likelihood . . . 148
95.2 Common Comparison Contract . . . 148
95.3 Marginal Evidence . . . 148
95.4 Bayes Factor . . . 149
95.5 Posterior Model Probability . . . 149
95.6 Cross-Validated Predictive Score . . . 149
95.7 Prospective Predictive Score . . . 149
95.8 Integrated Ranking Vector . . . 149
95.9 No Unregistered Scalar Rank Averaging . . . 150
95.10 Equivalence . . . 150
95.11 Ranking Stability . . . 150
95.12 Prior Sensitivity . . . 150
95.13 Model-Ranking Falsifier . . . 150

**96 Effective Complexity and Description-Length Registry 150**
96.1 Raw Parameter Count . . . 151
96.2 Effective-Complexity Ledger . . . 151
96.3 Event-Catalog Complexity . . . 151
96.4 Search-Space Description Length . . . 151
96.5 Revision Description Length . . . 151
96.6 Data Description Length . . . 151
96.7 Total Description Length . . . 152
96.8 Causal Compression . . . 152

96.9 Complexity Registry . . . 152
96.10 Encoding Compatibility . . . 152
96.11 Complexity Falsifier . . . 152

**97 Null, Selection, and Multiple-Testing Registry 152**
97.1 Null Family . . . 153
97.2 Null Registry . . . 153
97.3 Empirical Null Probability . . . 153
97.4 Full-Pipeline Null Requirement . . . 153
97.5 Complete Search Ledger . . . 153
97.6 Family-Wise Error . . . 153
97.7 False-Discovery Control . . . 153
97.8 Selection-Adjusted Probability . . . 154
97.9 Holdout Depletion . . . 154
97.10 Null and Selection Falsifier . . . 154

**98 Advance-Prediction Registry 154**
98.1 Prediction Record . . . 154
98.2 Prediction Classes . . . 155
98.3 Predictive Distribution . . . 155
98.4 Continuous Prediction Score . . . 155
98.5 Binary Prediction Score . . . 155
98.6 Spatial Specificity . . . 155
98.7 Negative Prediction Domain . . . 156
98.8 Predictive Superiority . . . 156
98.9 Prediction Status . . . 156
98.10 Advance-Prediction Falsifier . . . 156
98.11 Predictive-Score Completeness Rule . . . 156

**99 Hybrid Causal-Decomposition Registry 157**
99.1 Hybrid Components . . . 157
99.2 Parent Ablations . . . 157
99.3 Parent Necessity . . . 157
99.4 Class-Specific Attribution . . . 157
99.5 Dominance Fraction . . . 157
99.6 Hybrid Classification . . . 157
99.7 Hybrid Complexity . . . 158
99.8 Hybrid Preference . . . 158
99.9 Hybrid Falsifier . . . 158
99.10 Hybrid Interaction and Dominance Guardrails . . . 158

**100 Regional Versus Global Classification 158**
100.1 Regional Partition . . . 158
100.2 Regional Score . . . 159
100.3 Regional Viability . . . 159
100.4 Global Regional Intersection . . . 159
100.5 Regional Transferability . . . 159
100.6 Parameter Heterogeneity . . . 159
100.7 Classification Rules . . . 159
100.8 Regional-to-Global Falsifier . . . 160

**101 Complete Paper-IV Viable Set and Decision Tree 160**
101.1 Explicit Component Viable Sets . . . 160
101.2 Complete Model Viable Set . . . 160
101.3 Astro-Ballistic Series Eligibility . . . 160
101.4 Integrated Score . . . 160
101.5 Comparative Threshold Freeze Gate . . . 161

101.6 Replacement Conditions . . . 161
101.7 Formal Decision Sequence . . . 161
101.8 Outcome Function . . . 161
101.9 Complete-Viability Falsifier . . . 161

**102 Paper-IV Claim and Falsification Registry 162**
102.1 Principal Decision Claims . . . 162
102.2 Integrated Falsification Registry . . . 162
102.3 No Cross-Compensation . . . 162

**103 Replication and Cross-Paper Dependency Graph 162**
103.1 Replication Levels . . . 162
103.2 Replication Record . . . 163
103.3 Replication Statuses . . . 163
103.4 Cross-Paper Dependency Graph . . . 163
103.5 Series Dependency Chain . . . 163
103.6 Cross-Paper Critical Nodes . . . 163
103.7 Series Failure Cut Set . . . 163
103.8 Failure Propagation . . . 164
103.9 Replacement Decision Node . . . 164

**104 Paper-IV Atlas Status 164**
104.1 Status Dashboard . . . 164
104.2 Established Paper-IV Architecture . . . 164
104.3 Current Unresolved Questions . . . 164
104.4 Paper-IV Atlas Conclusion . . . 165

**105 Paper-IV Atlas Synthesis 165**

**106 Cross-Paper Claim Hierarchy 165**
106.1 Series-Level Proposition . . . 166
106.2 Series Claim Node . . . 167
106.3 Event-Indexed and Global Scientific Gates . . . 167
106.4 Flagship Paper-I Gate . . . 167
106.5 Flagship Paper-II Gate . . . 167
106.6 Paper-III Gate . . . 167
106.7 Paper-IV Gate . . . 167
106.8 Claim Hierarchy . . . 167
106.9 Claim-Level Separation . . . 168
106.10 No Automatic Claim Promotion . . . 168
106.11 Current Series Claim Status . . . 168

**107 Series-Wide Equation Registry 168**
107.1 Equation-Family Architecture . . . 169
107.2 Cross-Paper Equation Registry . . . 169
107.3 Equation Dependency Chain . . . 169
107.4 Equation Verification Vector . . . 169
107.5 Equation Audit States . . . 169
107.6 Equation-Source Separation . . . 169
107.7 Author-Defined Diagnostics . . . 170
107.8 Equation Completion Requirement . . . 170

**108 Symbol, Notation, Unit, and Dimensional Audit 170**
108.1 Canonical Unit System . . . 170
108.2 Angle Convention . . . 170
108.3 Time Convention . . . 170
108.4 Geological Age Notation . . . 170

108.5 Canonical Viable-Set Names . . . 170
108.6 Legacy Short Subscripts . . . 171
108.7 Boundary and Basin Symbols . . . 171
108.8 Velocity and Volcanism Symbols . . . 171
108.9 Time-Ordering Operator . . . 171
108.10 Identity Tensor . . . 171
108.11 Damage . . . 171
108.12 Melt Fraction . . . 172
108.13 Phase Fractions . . . 172
108.14 Density Perturbation . . . 172
108.15 Vertical Displacement Convention . . . 172
108.16 Trench Displacement Convention . . . 172
108.17 Stress and Pressure . . . 172
108.18 Dimensional Audit Table . . . 173
108.19 Notation-Audit Status . . . 173

**109 Shared Parameter Registry 173**
109.1 Shared-Parameter Record . . . 173
109.2 Principal Shared Parameters . . . 173
109.3 Parameter Dependency . . . 173
109.4 Parameter Authority Order . . . 173
109.5 Parameter Conflict Rule . . . 174

**110 Series-Wide Chronology Audit 174**
110.1 Flagship Initiating-Age Canonicalization . . . 174
110.2 Chronology Graph . . . 174
110.3 Chronology Node . . . 174
110.4 Causal Edge . . . 174
110.5 Causal Ordering Probability . . . 175
110.6 Response-Lag Distribution . . . 175
110.7 Chronology Audit Table . . . 175
110.8 Event-Time Coordinate Requirement . . . 175
110.9 Modern-Coordinate Prohibition . . . 175
110.10 Chronology Viable Set . . . 176
110.11 Chronology Failure . . . 176

**111 Source-Verification and Unsupported-Claim Ledger 176**
111.1 Source-Verification Principle . . . 177
111.2 Verified Internal Source Classes . . . 177
111.3 Source-Support Classes . . . 177
111.4 Source-Verification Ledger . . . 177
111.5 Unsupported-Claim Registry . . . 177
111.6 Source-Verification Completion . . . 178
111.7 External Bibliography Limitation . . . 178

**112 Contradiction, Supersession, and Circularity Atlas 178**
112.1 Cross-Paper Revision Ledger . . . 178
112.2 Circularity Classes . . . 178
112.3 Circularity Indicator . . . 178
112.4 Circular Support Status . . . 178
112.5 Contradiction Resolution Record . . . 179

**113 Cross-Paper Dependency and Failure-Cut Analysis 179**
113.1 Complete Dependency Graph . . . 179
113.2 Series Dependency Spine . . . 179
113.3 Parallel Confirmation Dependencies . . . 179
113.4 Mandatory Gate Set . . . 179

113.5 Series Eligibility Set . . . 180
113.6 Series-Level Eligibility Failure Condition . . . 180
113.7 Minimum Failure Cut Sets . . . 180
113.8 Compound Cut Set . . . 180
113.9 Failure Propagation Matrix . . . 180
113.10 No Converse Inference . . . 180
113.11 Criticality Ranking . . . 181

**114 Series-Wide Prediction Atlas 181**
114.1 Prediction Packet . . . 181
114.2 Prediction Families . . . 181
114.3 Prediction Eligibility . . . 181
114.4 Prediction Specificity . . . 182
114.5 Combined Specificity . . . 182
114.6 Prediction Scoring . . . 182
114.7 Prediction Ledger Requirements . . . 182
114.8 Prediction Failure Rule . . . 182
114.9 Current Prediction Status . . . 182

**115 Series-Wide Falsification Atlas 183**
115.1 Falsification Hierarchy . . . 183
115.2 Series-Wide Falsification Registry . . . 183
115.3 Series-Level Hard Falsifier . . . 183
115.4 Series-Level Non-Resolution . . . 184
115.5 Compartmentalized Survival . . . 184

**116 Reader Navigation and Query Architecture 184**
116.1 Reader Entry Modes . . . 184
116.2 Claim Navigation . . . 184
116.3 Equation Navigation . . . 184
116.4 Prediction Navigation . . . 185
116.5 Falsifier Navigation . . . 185
116.6 Final Decision Navigation . . . 185
116.7 Reader Query Table . . . 185
116.8 Atlas Dashboard . . . 185
116.9 Reader Integrity Rule . . . 185

**117 Machine-Readable Companion Schema 186**
117.1 Canonical Package . . . 186
117.2 Claim Schema . . . 186
117.3 Equation Schema . . . 186
117.4 Prediction Schema . . . 186
117.5 Falsifier Schema . . . 186
117.6 Edge Schema . . . 187
117.7 Causal Edge Schema . . . 187
117.8 Alternative Explanation Schema . . . 187
117.9 Intervention Schema . . . 187
117.10 CSV Claim Fields . . . 187
117.11 Version Record . . . 187
117.12 Registry-Coverage Manifest . . . 188
117.13 Companion Answer Contract . . . 188
117.14 Machine Validation Rules . . . 188
117.15 Machine-Readable Integrity . . . 188

**118 Registry Completeness and AI-Companion Readiness Audit 188**
118.1 Purpose of This Audit . . . 188
118.2 Authority Order for Companion Answers . . . 188

118.3 Cross-Paper Registry-Coverage Matrix . . . 189
118.4 Minimum Principal-Claim Coverage Rule . . . 189
118.5 Negative-Result Preservation Rule . . . 189
118.6 Non-Domino Failure Rule . . . 189
118.7 Initiating-Age Rule . . . 189
118.8 Scope-Reserved Hypothesis Firewall . . . 189
118.9 Answer-State Discipline . . . 190
118.10 Pass-16 Readiness Classification . . . 190

**119 Independent Replication Package 190**
119.1 Replication Objective . . . 190
119.2 Replication Levels . . . 190
119.3 Required Run Manifest . . . 190
119.4 Deterministic and Stochastic Runs . . . 190
119.5 Independent Solver Requirement . . . 191
119.6 Replication Difference Record . . . 191
119.7 Replication Classification . . . 191
119.8 Replication Failure . . . 191

**120 Final Production and Publication Checklist 191**
120.1 Manuscript Checklist . . . 192
120.2 Source Checklist . . . 192
120.3 Data Checklist . . . 192
120.4 Code Checklist . . . 192
120.5 Claim Checklist . . . 192
120.6 Prediction Checklist . . . 192
120.7 Comparison Checklist . . . 193
120.8 Replication Checklist . . . 193
120.9 Release Checklist . . . 193

**121 Integrated Limitations 193**
121.1 Hypothesis Maturity . . . 193
121.2 Flagship Geometry . . . 193
121.3 Coordinate Selection . . . 194
121.4 Paleogeography . . . 194
121.5 Chronology . . . 194
121.6 Mechanical Transmission . . . 194
121.7 Constitutive Uncertainty . . . 194
121.8 Event Scale . . . 194
121.9 Planetary Survival . . . 195
121.10 Deep-Earth Preservation . . . 195
121.11 Event Catalog . . . 195
121.12 Material Lineage . . . 195
121.13 Boundary Generation . . . 195
121.14 Motion Generation . . . 195
121.15 Surface Structures . . . 195
121.16 Deep Geophysics . . . 196
121.17 Model Comparison . . . 196
121.18 Complexity . . . 196
121.19 Null Models . . . 196
121.20 Multiple Testing . . . 196
121.21 Advance Prediction . . . 196
121.22 Independent Replication . . . 197
121.23 Source Completeness . . . 197
121.24 Limitations . . . 197
121.25 Atlas Completeness . . . 197
121.26 Publication Status . . . 197

**122 Paper-V Conclusions** **197**
122.1 Companion Function . . . 198
122.2 Epistemic Separation . . . 198
122.3 Negative Results . . . 198
122.4 Scientific Discipline . . . 198
122.5 Series-Level Decision State . . . 198
122.6 Current Classification . . . 198
122.7 Replacement Standard . . . 198
122.8 Final Atlas Principle . . . 199

**Appendix A — Canonical Identifier Grammar** **199**

**Appendix B — Canonical Status Vocabulary** **199**

**Appendix C — Required Record Templates** **199**

**Appendix D — Viable-Set Summary** **199**

**Appendix E — Final Decision Record Template** **199**

**Appendix F — Final Five-Paper Status** **200**

**Appendix G — AI-Companion Operating Constraints** **200**

**Appendix H — Open Work Register** **200**
Source-paper chapter locator snapshot . . . 200

**Embedded Bibliography** **206**

**Final Declaration** **207**

# Working Manuscript Identification

This is **Paper V of V**, the initial North American companion to the four working manuscript drafts. It mirrors the chapter architecture of the original ABC Sequencing Paper V rather than writing a new causal study. No results are strengthened by registration. The original canonical atlas is the structural template; the North American Papers I–IV and the Denali working files are the content sources.

The title and chapter hierarchy are conserved. Subject-specific headings are adapted where the original named the Aegean–Everest–Mariana candidate. All 122 original numbered chapter positions are present; the traceable subsection labels reproduced from the canonical contents are retained wherever transcribed. Chapters without source-supported calculations state the evidence boundary rather than importing physics from a different candidate.

# Declaration of Function

Papers I–IV contain this working corpus's geometry, proposed interpretations, reserved mechanics, reconstruction architecture, and comparison protocol. Paper V is **only** the inspection and navigation system. Its governing relationship is:

$$\text{Claim} \rightarrow \text{Equation} \rightarrow \text{Assumption} \rightarrow \text{Parameter} \rightarrow \text{Data} \rightarrow \text{Test} \rightarrow \text{Falsifier}.$$

A stable description of an untested claim is not independent validation. An inherited heading is not permission to populate it with an invented mechanism. The manuscript explicitly excludes

proprietary energetic mechanics and mineralogy, as in Papers I–IV.

## Source Status and Citation Policy

The original ABC Sequencing Paper V supplies the intellectual structure and status vocabulary. The Denali Exact working record supplies the revised fixed-turn geometry and eight-segment corridor summary. The spreadsheet supplies seven subsequent waypoint arc-and-chord pairs; the first turn-to-Denali value is carried from the Denali Exact record. Papers I–IV supply current manuscript language and handoff states. These are *internal* research sources, not independent physical validation.

No new stratigraphic source, radiometric age, numerical simulation, independent field dataset, prospectively frozen prediction, or head-to-head Plate-Tectonic comparative score has been provided for this atlas. Such entries remain unexecuted or unverified. The 64 Ma label, where used by these source papers, is a research-program label rather than evidence for an established chronology.

## Data, Evidence, and Provenance Convention

Every quantity is classified as author-declared input, source-transcribed value, manuscript-derived result, interpretation, simulated output, or missing/withheld. A dependency cannot be promoted from geometric consistency to causation by table placement. Checksum fields below describe the input files available to this draft; they do not establish the fidelity of external scientific data.

## Prediction, Falsification, and Decision-Threshold Convention

No numerical threshold for confirmation, model equivalence, or model superiority is added here. The original atlas's T0–T4 hierarchy is retained as a classification system. T3 or T4 items lacking frozen definitions remain TO-BE-PREREGISTERED. Unresolved mechanics do not constitute an observed mechanical failure, and failure of a component does not automatically reject other independent components.

## Authorship and AI-Assistance Disclosure

Justin B Fine is identified by the corpus as sole human author and Principal Investigator. AI has assisted with drafting, tabulation, formatting, and source navigation. These tools do not independently certify equations, observational claims, or scientific judgment. This v1.6 version is not a canonical freeze.

## Abstract

This initial atlas mirrors the canonical fifth paper of Astro-Ballistic Chronostratigraphic Sequencing as a companion to the North American Middle Mountain manuscript sequence. It registers the source-solved Malpelo entrance coordinate, the fixed surface projection of the geometric turn, Denali as a separate displaced named feature, and an eight-chord corridor toward a specified Arctic terminal domain. The first leg is a direct chord; the second is a sum of distinct segment chords. Their working-source numerical equality is traceable to Denali Exact, subject to declared geometry and rounding. The atlas maps that geometrical record onto Paper I and registers the

mechanics, reconstruction, and comparative-analysis material of Papers II–IV without converting unexecuted programs into findings. The document preserves the original 122-chapter atlas order, defines typed claim and source records, keeps restricted intellectual property withheld, and states the current scope of verification and unresolved dependency paths.

## Keywords

ABC Sequencing; North American Middle Mountain; Denali; Malpelo; chord geometry; source provenance; claim registry; equation atlas; falsifier registry; causal dependency; reproducibility; comparative adjudication.

# 1 The Companion Mandate

This chapter preserves the corresponding **canonical Paper-V atlas architecture**. In the North American mirror it specifies how source-linked claims are located and classified across the four working papers; it does not add an additional scientific proposition.

## 1.1 Canonical Corpus Nomenclature

**Atlas-entry record:** Canonical Corpus Nomenclature. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

## 1.2 Paper V Is an Atlas

**Atlas-entry record:** Paper V Is an Atlas. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

## 1.3 Inspection Questions

**Atlas-control record:** Inspection Questions. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. The current source set is the four Paper v1.6 drafts, the Denali Exact and Short Math files, and the corridor workbook. Any later change must retain a version link back to these records.

## 1.4 No Validity by Inclusion

**Atlas-entry record:** No Validity by Inclusion. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

## 1.5 No Silent Completion

**Atlas-entry record:** No Silent Completion. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

## 1.6 Companion Success Standard

**Atlas-control record:** Companion Success Standard. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. The current source set is the four Paper v1.6 drafts, the Denali Exact

and Short Math files, and the corridor workbook. Any later change must retain a version link back to these records.

# 2 Scope and Non-Scope

This chapter preserves the corresponding **canonical Paper-V atlas architecture**. In the North American mirror it specifies how source-linked claims are located and classified across the four working papers; it does not add an additional scientific proposition.

## 2.1 Included Functions

**Atlas-entry record:** Included Functions. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

## 2.2 Excluded Functions

**Atlas-entry record:** Excluded Functions. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

## 2.3 Reserved-Hypothesis Firewall

**Atlas-control record:** Reserved-Hypothesis Firewall. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. The current source set is the four Paper v1.6 drafts, the Denali Exact and Short Math files, and the corridor workbook. Any later change must retain a version link back to these records.

## 2.4 Separation From Paper IV

**Atlas-entry record:** Separation From Paper IV. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

## 2.5 No Automated Final Judgment

Paper V is a claim, equation, source and status navigation companion; no reader or automated process may convert the existence of a registry entry into scientific validation. In the North American corpus, the reproduced numerical object is a fitted entrance-to-turn chord matched to an eight-link second-leg chord sum. The atlas marks physical mechanics, dated reconstruction and matched causal adjudication as **unexecuted or not supplied**, not as confirmed or disproved. Final causal judgment is absent because its required evidence is absent.

# 3 Series Corpus and Authority Order

This chapter preserves the corresponding **canonical Paper-V atlas architecture**. In the North American mirror it specifies how source-linked claims are located and classified across the four working papers; it does not add an additional scientific proposition.

## 3.1 Five-Paper Corpus

**Atlas-entry record:** Five-Paper Corpus. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

## 3.2 Paper-IV Handoff Package

**Atlas-entry record:** Paper-IV Handoff Package. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

## 3.3 Authority Classes

**Atlas-control record:** Authority Classes. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. The current source set is the four Paper v1.6 drafts, the Denali Exact and Short Math files, and the corridor workbook. Any later change must retain a version link back to these records.

## 3.4 Authority Does Not Equal Truth

**Atlas-entry record:** Authority Does Not Equal Truth. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

## 3.5 Conflict Rules

**Atlas-entry record:** Conflict Rules. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

## 3.6 Source-Control Rule

**Control hierarchy for this working edition:** the frozen ABC Sequencing Paper V governs the atlas *structure*; North American Papers I–IV provide the local claim text; *Denali Exact.pdf* controls the specific fitted-entrance / fixed-turn equal-chord calculation; the corridor workbook provides the seven following segment pairs. *Denali Short Math.pdf* and the older 64 Ma math PDF remain

developmental records and do not supersede the later exact construction. A change in a lower-level summary must not silently replace an input in its controlling source.

### 3.7 Corpus-Freeze Record

**Atlas-entry record:** Corpus-Freeze Record. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

## 4 Atlas Ontology

This chapter preserves the corresponding **canonical Paper-V atlas architecture**. In the North American mirror it specifies how source-linked claims are located and classified across the four working papers; it does not add an additional scientific proposition.

### 4.1 Typed Atlas Node

**Atlas-entry record:** Typed Atlas Node. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

### 4.2 Entity Types

**Atlas-entry record:** Entity Types. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

### 4.3 Typed Atlas Edge

**Atlas-control record:** Typed Atlas Edge. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. The current source set is the four Paper v1.6 drafts, the Denali Exact and Short Math files, and the corridor workbook. Any later change must retain a version link back to these records.

### 4.4 Relationship Types

**Atlas-entry record:** Relationship Types. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

### 4.5 No Untyped Relationship

**Atlas-entry record:** No Untyped Relationship. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

### 4.6 Atlas Record

**Atlas-control record:** Atlas Record. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. The current source set is the four Paper v1.6 drafts, the Denali Exact and Short Math files, and the corridor workbook. Any later change must retain a version link back to these records.

## 5 Stable Identifier System

This chapter preserves the corresponding **canonical Paper-V atlas architecture**. In the North American mirror it specifies how source-linked claims are located and classified across the four working papers; it does not add an additional scientific proposition.

Identifier syntax for the mirror: `NAM-Pn-TYP-NNN` identifies entries in one of the four scientific working papers, `NAM-P5-TYP-NNN` identifies atlas-generated documentation records, and `NAM-X-TYP-NNN` identifies genuinely cross-paper relationships. The *syntax* is mirrored from the canonical atlas; the identifier namespace distinguishes new working records from frozen ABC-CF1 references.

| Type | Object |
|---|---|
| CLM | Claim |
| EQN | Equation |
| ASM | Assumption |
| PAR | Parameter |
| DAT | Dataset |
| SRC | Source |
| RES | Result |
| PRD | Prediction |
| FAL | Falsifier |
| DEC | Decision |
| REV | Revision |

### 5.1 Canonical Identifier Grammar

**Atlas-entry record:** Canonical Identifier Grammar. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

### 5.2 Examples

**Atlas-entry record:** Examples. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states.

For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

### 5.3 Entity Codes

**Atlas-control record:** Entity Codes. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. The current source set is the four Paper v1.6 drafts, the Denali Exact and Short Math files, and the corridor workbook. Any later change must retain a version link back to these records.

### 5.4 Identifier Permanence

**Atlas-entry record:** Identifier Permanence. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

### 5.5 Revision Identifiers

**Atlas-entry record:** Revision Identifiers. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

### 5.6 Cross-Paper Items

**Atlas-control record:** Cross-Paper Items. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. The current source set is the four Paper v1.6 drafts, the Denali Exact and Short Math files, and the corridor workbook. Any later change must retain a version link back to these records.

### 5.7 Human-Readable Short Form

**Atlas-entry record:** Human-Readable Short Form. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

## 6 Claim Registry

This chapter preserves the corresponding **canonical Paper-V atlas architecture**. In the North American mirror it specifies how source-linked claims are located and classified across the four working papers; it does not add an additional scientific proposition.

### 6.1 Claim Definition

Claim wording, mathematical input, inferential role, test state, and potential downstream use are kept separately identified. A geometric relation is not automatically a causal or replacement-level

claim.

**Atlas-entry record:** Claim Definition. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

## 6.2 Claim Classes

Claim wording, mathematical input, inferential role, test state, and potential downstream use are kept separately identified. A geometric relation is not automatically a causal or replacement-level claim.

**Atlas-entry record:** Claim Classes. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

## 6.3 Exact Claim Requirement

Claim wording, mathematical input, inferential role, test state, and potential downstream use are kept separately identified. A geometric relation is not automatically a causal or replacement-level claim.

**Atlas-control record:** Exact Claim Requirement. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. The current source set is the four Paper v1.6 drafts, the Denali Exact and Short Math files, and the corridor workbook. Any later change must retain a version link back to these records.

## 6.4 Claim Record Schema

Claim wording, mathematical input, inferential role, test state, and potential downstream use are kept separately identified. A geometric relation is not automatically a causal or replacement-level claim.

**Atlas-entry record:** Claim Record Schema. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

## 6.5 Claim Scope

Claim wording, mathematical input, inferential role, test state, and potential downstream use are kept separately identified. A geometric relation is not automatically a causal or replacement-level claim.

**Atlas-entry record:** Claim Scope. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

## 6.6 Claim Polarity

Claim wording, mathematical input, inferential role, test state, and potential downstream use are kept separately identified. A geometric relation is not automatically a causal or replacement-level claim.

**Atlas-control record:** Claim Polarity. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. The current source set is the four Paper v1.6 drafts, the Denali Exact and Short Math files, and the corridor workbook. Any later change must retain a version link back to these records.

## 6.7 Conditional Claim

Claim wording, mathematical input, inferential role, test state, and potential downstream use are kept separately identified. A geometric relation is not automatically a causal or replacement-level claim.

**Atlas-entry record:** Conditional Claim. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

## 6.8 Claim Support Vector

Claim wording, mathematical input, inferential role, test state, and potential downstream use are kept separately identified. A geometric relation is not automatically a causal or replacement-level claim.

**Atlas-entry record:** Claim Support Vector. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

## 6.9 Claim Completeness Indicator

Claim wording, mathematical input, inferential role, test state, and potential downstream use are kept separately identified. A geometric relation is not automatically a causal or replacement-level claim.

**Atlas-control record:** Claim Completeness Indicator. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. The current source set is the four Paper v1.6 drafts, the Denali Exact and Short Math files, and the corridor workbook. Any later change must retain a version link back to these records.

## 6.10 Orphan Claim

Claim wording, mathematical input, inferential role, test state, and potential downstream use are kept separately identified. A geometric relation is not automatically a causal or replacement-level claim.

**Atlas-entry record:** Orphan Claim. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate

states. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

### 6.11 Claim Upgrade Rule

An upgrade from *declared* to *calculated* is warranted only where a published formula and its authorized numerical inputs actually yield the asserted result. An upgrade from *calculated* to *empirically supported* cannot follow merely from reducing a residual after solving an entrance location to match a selected corridor. The current North American corpus contains the former geometric calculation but no independently verified causal comparison; this atlas therefore records no empirical status upgrade to the broader physical or geological hypotheses.

## 7 Equation Registry

This chapter preserves the corresponding **canonical Paper-V atlas architecture**. In the North American mirror it specifies how source-linked claims are located and classified across the four working papers; it does not add an additional scientific proposition.

### 7.1 Equation Scope

The populated North American mathematical entries are **spherical central angle**, **surface great-circle arc**, **interior point-to-point chord**, **direct first-leg length**, **eight-chord second-leg sum**, and **the length residual/asymmetry** from Paper I. Paper II contains inherited mechanics-equation positions but no independently populated Denali mechanism calculation. Papers III and IV likewise retain their reconstruction and comparison formulas as frameworks without an executed North American result. This registry identifies those roles separately; a formula's presence does not establish the empirical validity of its inputs.

### 7.2 Equation Record

**Registered geometry equations (Paper I):**

| Record | Equation | Units and source status |
|---|---|---|
| NAM-EQ-G01 | $a_{ij} = \sin^2[(\phi_j - \phi_i)/2] + \cos\phi_i \cos\phi_j \sin^2[(\lambda_j - \lambda_i)/2]$ | Dimensionless; source coordinates and spherical convention |
| NAM-EQ-G02 | $\theta_{ij} = 2\,\mathrm{atan2}(\sqrt{a_{ij}}, \sqrt{1 - a_{ij}})$ | Radians, dimensionless angle |
| NAM-EQ-G03 | $s_{ij} = R\theta_{ij}$ | km; reference surface arc |
| NAM-EQ-G04 | $c_{ij} = 2R\sin(\theta_{ij}/2)$ | km; straight chord |
| NAM-EQ-G05 | $L_1 = c(E, M)$ | km; fitted direct first leg |
| NAM-EQ-G06 | $L_2 = \sum_{k=0}^{7} c(W_k, W_{k+1})$ | km; prescribed eight-segment second leg |
| NAM-EQ-G07 | $\Delta L = L_1 - L_2$ | km; source-fitted residual |

Inputs and use are specified in Paper I and the *Denali Exact* and corridor-workbook records. No mechanical equation is registered here as a **computed Denali result**.

## 7.3 Equation Roles

The **role** field distinguishes a defining identity (central angle, arc, or chord), a calculated length from supplied positions, a fitted equality imposed through the entrance solution, and an unexecuted mechanics/reconstruction/comparison equation carried as an original paper slot. $L_1 = L_2$ belongs to the **fitted-construction** role; it is not independently predicted after the Malpelo entrance is allowed to vary. Equation roles do not automatically transfer to claim-verification statuses.

## 7.4 Dimensional Audit

The expressions $a_{ij}$ and $\theta_{ij}$ are dimensionless (the latter interpreted in radians); $R$, $s_{ij}$, $c_{ij}$, $L_1$, $L_2$, and $\Delta L$ have distance dimensions. The normalized asymmetry $A_L = |L_1 - L_2|/[(L_1 + L_2)/2]$ is dimensionless. Each second-leg term is a **chord in km**, so the sum is dimensionally valid. Substituting a surface arc for one of those terms would remain dimensionally compatible but would violate the *metric definition*; dimensional agreement alone is therefore not a replication check.

## 7.5 Symbol Uniqueness

Within the recorded geometric construction, $E$ denotes the **fitted Malpelo-region entrance**, $M$ the **fixed surface turn**, $D$ the **Denali waypoint**, and $T = W_8$ the northern terminal station. $W_0 = M, W_1 = D, \ldots, W_8 = T$ orders the eight second-leg chords. $R$ is the spherical Earth reference radius; $c_{ij}$ and $s_{ij}$ are respectively chord and arc lengths. The physical "middle mountain" interpretation of Denali does not redefine $M$ as Denali: $c(M, D) \simeq 222.678\,\text{km}$ in the record.

## 7.6 Domain of Validity

The geometry equations apply to coordinates interpreted as points on the adopted $R = 6{,}371\,\text{km}$ reference sphere, with east-positive longitudes and angles converted to radians. Their outputs describe the specified contemporary coordinate representation. They do not by themselves establish mantle properties, an actual interior transmitted path, age-specific paleogeography, or mechanical response. The fitted equality is conditional on the source-selected turn and corridor, not a universal geometric property of North America.

## 7.7 Limiting-Case Audit

**Atlas-entry record:** Limiting-Case Audit. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

## 7.8 Numerical Reproduction

**Geometry reproducible from the project record:** adopt $R = 6371\,\text{km}$; calculate the direct chord from fitted Malpelo entrance to fixed turn; calculate the turn-to-Denali chord from their printed coordinates; add the seven downstream workbook chords in station order. The controlling equal-leg comparison is one direct chord versus a **sum of eight chords**, not one chord versus another single endpoint chord. The direct first-leg chord and cumulative second leg each reproduce approximately $8061.8708\,\text{km}$ at the source's reported precision. This is a numerical reproduction of a fitted construction, not an independent geographic discovery.

### 7.9 Equation Verification States

The seven registered geometry equations encode the spherical central angle, arc and chord definitions, direct first-leg evaluation, second-leg segment aggregation and residual comparison. Their current state is **algebraically specified and numerically reproducible under the documented inputs**, including the unrounded coordinate-derived turn-to-Denali chord and the seven workbook values. They have **not** been verified as interior physical equations, mechanically solved trajectories, geological event ages or independent mountain-origin predictions. The distinction between calculation precision and geographic uncertainty is retained.

### 7.10 Equation Does Not Establish Its Inputs

**Atlas-entry record:** Equation Does Not Establish Its Inputs. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

## 8 Assumption and Parameter Registries

This chapter preserves the corresponding **canonical Paper-V atlas architecture**. In the North American mirror it specifies how source-linked claims are located and classified across the four working papers; it does not add an additional scientific proposition.

### 8.1 Assumption Definition

**Atlas-entry record:** Assumption Definition. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

### 8.2 Assumption Classes

**Atlas-entry record:** Assumption Classes. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

### 8.3 Assumption Record

**Atlas-control record:** Assumption Record. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. The current source set is the four Paper v1.6 drafts, the Denali Exact and Short Math files, and the corridor workbook. Any later change must retain a version link back to these records.

### 8.4 Explicit and Hidden Assumptions

**Atlas-entry record:** Explicit and Hidden Assumptions. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations

retain their separate states. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

## 8.5 Assumption Necessity and Intervention Validity

**Atlas-entry record:** Assumption Necessity and Intervention Validity. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

## 8.6 Parameter Definition

**Atlas-control record:** Parameter Definition. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. The current source set is the four Paper v1.6 drafts, the Denali Exact and Short Math files, and the corridor workbook. Any later change must retain a version link back to these records.

## 8.7 Parameter Classes

**Atlas-entry record:** Parameter Classes. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

## 8.8 Parameter Record

**Atlas-entry record:** Parameter Record. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

## 8.9 Shared Versus Local Parameters

**Atlas-control record:** Shared Versus Local Parameters. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. The current source set is the four Paper v1.6 drafts, the Denali Exact and Short Math files, and the corridor workbook. Any later change must retain a version link back to these records.

## 8.10 Parameter Freeze

**Atlas-entry record:** Parameter Freeze. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

### 8.11 Parameter-Change Rule

**Atlas-entry record:** Parameter-Change Rule. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

### 8.12 Sensitivity

**Atlas-control record:** Sensitivity. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. The current source set is the four Paper v1.6 drafts, the Denali Exact and Short Math files, and the corridor workbook. Any later change must retain a version link back to these records.

### 8.13 No Silent Parameter Retuning

**Atlas-entry record:** No Silent Parameter Retuning. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

## 9 Causal-Edge, Causal-Path, and Alternative Registries

This chapter preserves the corresponding **canonical Paper-V atlas architecture**. In the North American mirror it specifies how source-linked claims are located and classified across the four working papers; it does not add an additional scientific proposition.

### 9.1 Causal-Edge Record

The only populated North American dependency edge in the supplied numerical record is **author-fixed $M$ and prescribed corridor $\rightarrow$ computed $L_2 \rightarrow$ solved entrance $E \rightarrow$ equality** $c(E, M) = L_2$. The Denali waypoint $D$ is the first station after $M$, with its source-reported $222.678\,\mathrm{km}$ separation. No source-supported edge carries this geometry into a calculated mechanism, uplift age, plate-motion history, or model-comparison preference. Such edges remain unresolved or intentionally restricted, rather than silently connected.

### 9.2 Causal-Path Record

Claim wording, mathematical input, inferential role, test state, and potential downstream use are kept separately identified. A geometric relation is not automatically a causal or replacement-level claim.

**Atlas-entry record:** Causal-Path Record. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

## 9.3 Alternative-Explanation Record

**Atlas-control record:** Alternative-Explanation Record. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. The current source set is the four Paper v1.6 drafts, the Denali Exact and Short Math files, and the corridor workbook. Any later change must retain a version link back to these records.

## 9.4 Causal-Level Upgrade Rule

Claim wording, mathematical input, inferential role, test state, and potential downstream use are kept separately identified. A geometric relation is not automatically a causal or replacement-level claim.

**Atlas-entry record:** Causal-Level Upgrade Rule. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

## 9.5 Alternative-Space Completeness

**Atlas-entry record:** Alternative-Space Completeness. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

# 10 Chronology, Reconstruction, and Material-Lineage Registries

This chapter preserves the corresponding **canonical Paper-V atlas architecture**. In the North American mirror it specifies how source-linked claims are located and classified across the four working papers; it does not add an additional scientific proposition.

## 10.1 Evidence-Origin Classification

**Atlas-entry record:** Evidence-Origin Classification. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

## 10.2 Chronology Record

The source materials provide no independently validated event-time coordinate reconstruction for this North American path. Modern coordinate calculations therefore remain modern-coordinate calculations.

**Atlas-entry record:** Chronology Record. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. For this atlas schema field, the source locator is the relevant working paper and its

actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

### 10.3 Reconstruction-Branch Record

**Atlas-control record:** Reconstruction-Branch Record. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. The current source set is the four Paper v1.6 drafts, the Denali Exact and Short Math files, and the corridor workbook. Any later change must retain a version link back to these records.

### 10.4 Material-Lineage Record

**Atlas-entry record:** Material-Lineage Record. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

### 10.5 Human-Review Conflict Gate

**Atlas-entry record:** Human-Review Conflict Gate. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

### 10.6 No Silent External-Causality Import

Claim wording, mathematical input, inferential role, test state, and potential downstream use are kept separately identified. A geometric relation is not automatically a causal or replacement-level claim.

**Atlas-control record:** No Silent External-Causality Import. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. The current source set is the four Paper v1.6 drafts, the Denali Exact and Short Math files, and the corridor workbook. Any later change must retain a version link back to these records.

## 11 Data and Source Registries

This chapter preserves the corresponding **canonical Paper-V atlas architecture**. In the North American mirror it specifies how source-linked claims are located and classified across the four working papers; it does not add an additional scientific proposition.

| Record | Source | Evidence status |
|---|---|---|
| NAM-P1-SRC-001 | Denali Exact.pdf | Internal working calculation |
| NAM-P1-SRC-002 | Denali Short Math.pdf | Internal developmental calculation |
| NAM-P1-DAT-001 | Corridor segment workbook | Internal tabular calculation, seven segments |



External context: E16, E17 | bibliography: Appendix EC

| Record | Source | Evidence status |
|---|---|---|
| NAM-X-SRC-001–004 | Working North American Papers I–IV v1.6 | Internal draft manuscripts |

## 11.1 Dataset Record

The present numerical source ledger contains (1) *Denali Exact.pdf* — fixed turn, chosen corridor, printed eight-chord list, fitted entrance, first segment, total chord and reference arc results; and (2) *Denali_Trench_underground_path__per_segment_arc___chord_lengths-1.xlsx* — **seven downstream rows** giving segment surface arcs and chords from Denali through the Arctic terminal. The earlier short and 64 Ma notes are developmental records, not substitutes for the controlling equality. Papers I–IV are derived draft manuscripts, and the atlas JSON is an index/integrity record rather than a new observation.

## 11.2 Evidence-Origin Axis

**Atlas-entry record:** Evidence-Origin Axis. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

## 11.3 Transformation-Lineage Record

**Atlas-control record:** Transformation-Lineage Record. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. The current source set is the four Paper v1.6 drafts, the Denali Exact and Short Math files, and the corridor workbook. Any later change must retain a version link back to these records.

## 11.4 Derived-Result Provenance Record

The primary derived scalar is $L_2 = 8{,}061.870761355\,\text{km}$ in the stated precision reproduction, formed from a $222.677503129\,\text{km}$ coordinate-derived first chord and $7{,}839.193258226\,\text{km}$ across seven workbook chords. The fitted direct chord reproduces the same displayed total. The eight surface arcs sum to $8{,}085.044329017\,\text{km}$ in the corresponding reproduction. Source values are reported at fewer digits; extended decimals track *calculation precision only*, not submeter geographic certainty.

## 11.5 Archive, Checksum, and Access Requirements

For every working manuscript, the release bundle contains matching Markdown, LaTeX, and PDF copies identified by the same pass and version. The companion atlas JSON stores filenames and SHA-256 digests for the Markdown inputs; the release manifest records digests for the packaged output. Source citations identify the two Denali PDFs, the full-math exploratory PDF, and the corridor workbook distinctly. A checksum establishes that the archived bytes match the recorded edition; it does **not** establish scientific validity or live accessibility of the external ABC canonical links.

## 11.6 Current Corpus Provenance Snapshot

**Edition:** Pass 15 working manuscript v1.6, derived from Pass 14 v1.5. **Canonical architectural source:** ABC Sequencing Papers I–V as listed on the Ontomics archive. **Controlling geometric source:** *Denali Exact.pdf*. **Supplementary numeric table:** seven-row downstream chord/arc workbook. **Developmental documents:** *Denali Short Math.pdf* and *8-8-2025 64 ma ABC Math Full (1).pdf*. **Derived records:** the included North American Papers I–IV, this atlas, and package integrity manifest. The source-solved entrance, fixed turn, and route-selection sequence remain distinct; no scientific review or canonical full-page equivalence is asserted by this metadata snapshot.

## 11.7 Dataset Use Classes

**Atlas-entry record:** Dataset Use Classes. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

## 11.8 No Test-Data Leakage

**Atlas-entry record:** No Test-Data Leakage. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

## 11.9 Source Record

Each atlas source record identifies a **specific artifact** and its function. *Denali Exact.pdf* controls the eight-chord total and entrance solution; *Denali_Trench_underground_path__per_segment_arc___chord_len 1.xlsx* supplies seven segment arcs and chords after Denali; the two earlier math PDFs document exploration without governing the final coordinate solution. Papers I–IV are working *derivative manuscript* sources, not independent observations. This atlas preserves filename, current edition, hash where available, and a limitation label for each.

## 11.10 Source Types

The source type registry separates: (1) canonical ABC manuscripts — structural and methodological authority; (2) author-provided project calculation and workbook — working geometric inputs and arithmetic; (3) earlier exploratory files — developmental provenance; (4) the four North American manuscript drafts — derived claims and status; and (5) atlas JSON/manifests — navigational and integrity records. None of those labels asserts independent field verification, dated stratigraphy, or a simulated response.

## 11.11 Source Support Granularity

A source's support is attached to the **smallest claim it actually documents**. The workbook supports seven stated segment chord/arc entries, not the separately calculated first turn-to-Denali link or the fitted entrance. *Denali Exact.pdf* supports its stated coordinates and reported equal-leg calculation, not the physical cause of Denali uplift. The canonical ABC PDFs support chapter

architecture, not new North American data. A manuscript citation to one of these files must not imply broader geological confirmation.

### 11.12 Source Verification States

The atlas uses separate status categories: **source-recorded** (present in a named source), **recalculated** (obtained from source inputs and stated formulas), **fitted** (selected mathematically to meet a target), **author-interpreted** (a proposed geographic or causal role), **not provided** (the source bundle contains no completed result), and **restricted** (the author excludes a proprietary mechanism or mineralogical detail). The fitted entrance is not an independent prediction; Paper-II through Paper-IV statuses cannot inherit scientific validation from Paper-I distance arithmetic.

### 11.13 Source-Derived Does Not Mean Supported

A manuscript statement may be accurately **derived from a source** while its broader geological interpretation remains untested. Solving an entrance coordinate to match a prescribed route certifies the *constructed geometric equality under that metric*. It does not independently certify a unique entrance wound, a global history, Denali response energetics, or replacement of an established model. The distinction is enforced in the corresponding Paper-I claim and Paper-IV decision records.

### 11.14 Source Conflict

The initial exploratory Denali calculation and the later fixed-turn *Denali Exact.pdf* use distinguishable constructions; only the latter controls this edition. Another documentation distinction occurs within the controlling evidence: *Denali Exact.pdf* describes the penultimate northern waypoint as under-Siberia at $(73^\circ\mathrm{N}, 170^\circ\mathrm{E})$, while the workbook labels the final two links **Attu→Chukchi** and **Chukchi→Trench**. The atlas retains both source labels for the same *recorded corridor slot* without claiming an independently measured geologic identity. No averaging, silent station insertion or metric substitution is authorized.

## 12 Model, Method, and Result Registries

This chapter preserves the corresponding **canonical Paper-V atlas architecture**. In the North American mirror it specifies how source-linked claims are located and classified across the four working papers; it does not add an additional scientific proposition.

### 12.1 Model Record

**Atlas-entry record:** Model Record. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

### 12.2 Method Record

**Atlas-entry record:** Method Record. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. For this atlas schema field, the source locator is the relevant working paper and its actual

data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

### 12.3 Result Record

**Atlas-control record:** Result Record. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. The current source set is the four Paper v1.6 drafts, the Denali Exact and Short Math files, and the corridor workbook. Any later change must retain a version link back to these records.

### 12.4 Negative Results

**Atlas-entry record:** Negative Results. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

### 12.5 Failed Runs

**Atlas-entry record:** Failed Runs. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

### 12.6 Result-to-Claim Rule

Claim wording, mathematical input, inferential role, test state, and potential downstream use are kept separately identified. A geometric relation is not automatically a causal or replacement-level claim.

**Atlas-control record:** Result-to-Claim Rule. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. The current source set is the four Paper v1.6 drafts, the Denali Exact and Short Math files, and the corridor workbook. Any later change must retain a version link back to these records.

## 13 Prediction Registry

This chapter preserves the corresponding **canonical Paper-V atlas architecture**. In the North American mirror it specifies how source-linked claims are located and classified across the four working papers; it does not add an additional scientific proposition.

### 13.1 Prediction Definition

**Atlas-entry record:** Prediction Definition. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

## 13.2 Prediction Record

**Atlas-entry record:** Prediction Record. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

## 13.3 Prediction Classes

**Atlas-control record:** Prediction Classes. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. The current source set is the four Paper v1.6 drafts, the Denali Exact and Short Math files, and the corridor workbook. Any later change must retain a version link back to these records.

## 13.4 Prediction Specificity

**Atlas-entry record:** Prediction Specificity. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

## 13.5 Prediction Statuses

**Atlas-entry record:** Prediction Statuses. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

## 13.6 No Retroactive Prediction

**Atlas-control record:** No Retroactive Prediction. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. The current source set is the four Paper v1.6 drafts, the Denali Exact and Short Math files, and the corridor workbook. Any later change must retain a version link back to these records.

## 13.7 Prediction Outcome

**Atlas-entry record:** Prediction Outcome. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

# 14 Falsification Registry

This chapter preserves the corresponding **canonical Paper-V atlas architecture**. In the North American mirror it specifies how source-linked claims are located and classified across the four working papers; it does not add an additional scientific proposition.



External context: E15 | bibliography: Appendix EC

## 14.1 Falsifier Definition

**Atlas-entry record:** Falsifier Definition. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

## 14.2 Falsifier Record

**Atlas-entry record:** Falsifier Record. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

## 14.3 Falsifier Scopes

**Atlas-control record:** Falsifier Scopes. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. The current source set is the four Paper v1.6 drafts, the Denali Exact and Short Math files, and the corridor workbook. Any later change must retain a version link back to these records.

## 14.4 Threshold-Class Registry

**Atlas-entry record:** Threshold-Class Registry. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

## 14.5 Hard Falsifiers, Downgrading Conditions, and Missing Evidence

**Atlas-entry record:** Hard Falsifiers, Downgrading Conditions, and Missing Evidence. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

## 14.6 Decision Outcome Vocabulary

**Atlas-control record:** Decision Outcome Vocabulary. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. The current source set is the four Paper v1.6 drafts, the Denali Exact and Short Math files, and the corridor workbook. Any later change must retain a version link back to these records.

## 14.7 Falsifier Status

**Atlas-entry record:** Falsifier Status. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. For this atlas schema field, the source locator is the relevant working paper and its actual

data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

### 14.8 No Cross-Failure Inflation

**Atlas-entry record:** No Cross-Failure Inflation. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

### 14.9 No Falsifier Evasion

**Atlas-control record:** No Falsifier Evasion. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. The current source set is the four Paper v1.6 drafts, the Denali Exact and Short Math files, and the corridor workbook. Any later change must retain a version link back to these records.

### 14.10 Failure Propagation

**Atlas-entry record:** Failure Propagation. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

## 15 Dependency-Graph Architecture

This chapter preserves the corresponding **canonical Paper-V atlas architecture**. In the North American mirror it specifies how source-linked claims are located and classified across the four working papers; it does not add an additional scientific proposition.

**Current dependency spine:** user-declared point and path conventions → documented chord geometry → Paper-I geometric status. Every later edge from geometry into a physical response, historical reconstruction, or global comparison is unresolved or reserved. Thus no series-level replacement node is classified as completed in v1.6.

### 15.1 Complete Atlas Graph

**Atlas-entry record:** Complete Atlas Graph. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

### 15.2 Claim Dependency Subgraph

Claim wording, mathematical input, inferential role, test state, and potential downstream use are kept separately identified. A geometric relation is not automatically a causal or replacement-level claim.

**Atlas-entry record:** Claim Dependency Subgraph. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

## 15.3 Required Upstream Paths

For the claim that the two legs match: **fixed turn and ordered eight-segment corridor** $\rightarrow$ individual spherical chords $\rightarrow$ summed second-leg length $L_2 \rightarrow$ fitted entrance $E \rightarrow$ direct entrance-to-turn chord $L_1 \rightarrow$ residual $L_1 - L_2$. The geological interpretation is a **separate downstream claim** requiring evidence not present in this arithmetic chain. Papers II–IV cannot import omitted physical results simply because the atlas registers their chapter slots.

## 15.4 Dependency Depth

**Atlas-entry record:** Dependency Depth. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

## 15.5 Claim Criticality

Claim wording, mathematical input, inferential role, test state, and potential downstream use are kept separately identified. A geometric relation is not automatically a causal or replacement-level claim.

**Atlas-entry record:** Claim Criticality. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

## 15.6 Dependency Bottleneck

**Atlas-control record:** Dependency Bottleneck. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. The current source set is the four Paper v1.6 drafts, the Denali Exact and Short Math files, and the corridor workbook. Any later change must retain a version link back to these records.

## 15.7 Alternate Support Paths

Claim wording, mathematical input, inferential role, test state, and potential downstream use are kept separately identified. A geometric relation is not automatically a causal or replacement-level claim.

**Atlas-entry record:** Alternate Support Paths. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

## 15.8 Circular Support

Claim wording, mathematical input, inferential role, test state, and potential downstream use are kept separately identified. A geometric relation is not automatically a causal or replacement-level claim.

**Atlas-entry record:** Circular Support. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

## 15.9 Circularity Rule

**Atlas-control record:** Circularity Rule. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. The current source set is the four Paper v1.6 drafts, the Denali Exact and Short Math files, and the corridor workbook. Any later change must retain a version link back to these records.

## 15.10 Dependency Completeness

**Atlas-entry record:** Dependency Completeness. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

## 15.11 Failure Cut Set

**Atlas-entry record:** Failure Cut Set. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

## 15.12 Series-Level Replacement Node

**Atlas-control record:** Series-Level Replacement Node. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. The current source set is the four Paper v1.6 drafts, the Denali Exact and Short Math files, and the corridor workbook. Any later change must retain a version link back to these records.

# 16 Status Vocabulary

This chapter preserves the corresponding **canonical Paper-V atlas architecture**. In the North American mirror it specifies how source-linked claims are located and classified across the four working papers; it does not add an additional scientific proposition.

## 16.1 Status Must Be Multiaxial

The source-qualified North American vector is: **geometry**—spherical length arithmetic reproduced at source precision; **input-selection provenance**—turn and corridor specified, entrance solved afterward; **source coverage**—first second-leg link in the exact-distance note, seven downstream arc/chord rows in the workbook; **mechanical outcomes**—not supplied and proprietary details excluded; **historical reconstruction**—not supplied; **causal-model comparison**—not executed; **canonical structure**—working mirror maintained, complete pagewise equivalence not independently verified. None of these dimensions inherits evidentiary status from another.

## 16.2 Provenance Axis

**Atlas-entry record:** Provenance Axis. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

## 16.3 Scientific-Role Axis

**Atlas-control record:** Scientific-Role Axis. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. The current source set is the four Paper v1.6 drafts, the Denali Exact and Short Math files, and the corridor workbook. Any later change must retain a version link back to these records.

## 16.4 Epistemic-Status Axis

**Atlas-entry record:** Epistemic-Status Axis. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

## 16.5 Verification Axis

**Atlas-entry record:** Verification Axis. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

## 16.6 Publication Axis

**Atlas-control record:** Publication Axis. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. The current source set is the four Paper v1.6 drafts, the Denali Exact and Short Math files, and the corridor workbook. Any later change must retain a version link back to these records.

## 16.7 Example Status Vector

**Atlas-entry record:** Example Status Vector. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

## 16.8 No Status Compression

**Atlas-entry record:** No Status Compression. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

## 16.9 Support Upgrade Requirements

Claim wording, mathematical input, inferential role, test state, and potential downstream use are kept separately identified. A geometric relation is not automatically a causal or replacement-level claim.

**Atlas-control record:** Support Upgrade Requirements. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. The current source set is the four Paper v1.6 drafts, the Denali Exact and Short Math files, and the corridor workbook. Any later change must retain a version link back to these records.

# 17 Verification and Audit Rules

This chapter preserves the corresponding **canonical Paper-V atlas architecture**. In the North American mirror it specifies how source-linked claims are located and classified across the four working papers; it does not add an additional scientific proposition.

## 17.1 Rule V1: Exact Extraction

**Atlas-entry record:** Rule V1: Exact Extraction. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

## 17.2 Rule V2: Source and Interpretation Separation

**Atlas-entry record:** Rule V2: Source and Interpretation Separation. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.



External context: E16 | bibliography: Appendix EC

## 17.3 Rule V3: Calculation and Assumption Separation

**Atlas-control record:** Rule V3: Calculation and Assumption Separation. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. The current source set is the four Paper v1.6 drafts, the Denali Exact and Short Math files, and the corridor workbook. Any later change must retain a version link back to these records.

## 17.4 Rule V4: Observation and Reconstruction Separation

**Atlas-entry record:** Rule V4: Observation and Reconstruction Separation. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

## 17.5 Rule V5: Reconstruction and Prediction Separation

**Atlas-entry record:** Rule V5: Reconstruction and Prediction Separation. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

## 17.6 Rule V6: Geometry and Causation Separation

**Atlas-control record:** Rule V6: Geometry and Causation Separation. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. The current source set is the four Paper v1.6 drafts, the Denali Exact and Short Math files, and the corridor workbook. Any later change must retain a version link back to these records.

## 17.7 Rule V7: Modern and Paleogeographic Separation

The source materials provide no independently validated event-time coordinate reconstruction for this North American path. Modern coordinate calculations therefore remain modern-coordinate calculations.

**Atlas-entry record:** Rule V7: Modern and Paleogeographic Separation. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

## 17.8 Rule V8: Branch and Model Separation

**Atlas-entry record:** Rule V8: Branch and Model Separation. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

## 17.9 Rule V9: Regional and Global Separation

**Atlas-control record:** Rule V9: Regional and Global Separation. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. The current source set is the four Paper v1.6 drafts, the Denali Exact and Short Math files, and the corridor workbook. Any later change must retain a version link back to these records.

## 17.10 Rule V10: Model Output and Independent Evidence Separation

**Atlas-entry record:** Rule V10: Model Output and Independent Evidence Separation. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

## 17.11 Rule V11: Missing Evidence Visibility

**Atlas-entry record:** Rule V11: Missing Evidence Visibility. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

## 17.12 Rule V12: Negative Results Preservation

**Atlas-control record:** Rule V12: Negative Results Preservation. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. The current source set is the four Paper v1.6 drafts, the Denali Exact and Short Math files, and the corridor workbook. Any later change must retain a version link back to these records.

## 17.13 Rule V13: No Silent Reconciliation

**Atlas-entry record:** Rule V13: No Silent Reconciliation. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

## 17.14 Rule V14: No Status Inheritance Without Dependency

**Atlas-entry record:** Rule V14: No Status Inheritance Without Dependency. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

## 17.15 Rule V15: No AI Authority Substitution

**Atlas-control record:** Rule V15: No AI Authority Substitution. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and deter-

minations retain their separate states. The current source set is the four Paper v1.6 drafts, the Denali Exact and Short Math files, and the corridor workbook. Any later change must retain a version link back to these records.

### 17.16 Rule V16: Reproducibility Before Compression

**Atlas-entry record:** Rule V16: Reproducibility Before Compression. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

### 17.17 Rule V17: Version Visibility

**Atlas-entry record:** Rule V17: Version Visibility. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

### 17.18 Rule V18: Decision Traceability

**Atlas-control record:** Rule V18: Decision Traceability. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. The current source set is the four Paper v1.6 drafts, the Denali Exact and Short Math files, and the corridor workbook. Any later change must retain a version link back to these records.

## 18 Contradiction, Supersession, and Consistency Audit

This chapter preserves the corresponding **canonical Paper-V atlas architecture**. In the North American mirror it specifies how source-linked claims are located and classified across the four working papers; it does not add an additional scientific proposition.

### 18.1 Contradiction Classes

**Atlas-entry record:** Contradiction Classes. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

### 18.2 Contradiction Record

**Atlas-entry record:** Contradiction Record. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

## 18.3 Severity Classes

**Atlas-control record:** Severity Classes. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. The current source set is the four Paper v1.6 drafts, the Denali Exact and Short Math files, and the corridor workbook. Any later change must retain a version link back to these records.

## 18.4 Supersession

**Atlas-entry record:** Supersession. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

## 18.5 Intentional Scope Difference

**Atlas-entry record:** Intentional Scope Difference. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

## 18.6 Unresolved Conflict

**Atlas-control record:** Unresolved Conflict. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. The current source set is the four Paper v1.6 drafts, the Denali Exact and Short Math files, and the corridor workbook. Any later change must retain a version link back to these records.

## 18.7 Cross-Paper Consistency Vector

**Atlas-entry record:** Cross-Paper Consistency Vector. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

## 18.8 Consistency Residual

**Atlas-entry record:** Consistency Residual. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

## 18.9 Canonical Shared Value

**Atlas-control record:** Canonical Shared Value. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. The current source set is the four Paper v1.6 drafts, the Denali Exact and Short

Math files, and the corridor workbook. Any later change must retain a version link back to these records.

# 19 Human-Readable and Machine-Readable Navigation

This chapter preserves the corresponding **canonical Paper-V atlas architecture**. In the North American mirror it specifies how source-linked claims are located and classified across the four working papers; it does not add an additional scientific proposition.

Reader path: begin at the registered claim and manuscript locator; follow the equation and units to the exact internal source, then inspect the claim type, declared uncertainty, potential test, present test status, and only those downstream claims that explicitly require this node. Paper V supplies a *navigation method* but not a substitute for opening the cited source.

## 19.1 Human-Readable Atlas

**Atlas-entry record:** Human-Readable Atlas. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

## 19.2 Machine-Readable Companion

**Atlas-entry record:** Machine-Readable Companion. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

## 19.3 Minimum Machine Registry Files

The current machine companion is `ABC_North_America_Paper_V_Atlas_Registry_v1.6.json`, containing the 122 canonical chapter records, source hashes, geometric-coordinate provenance, segment ledger and existing claim IDs. The release checksum manifest separately fixes the byte identities of all shipped Markdown, LaTeX, PDF and audit artifacts. These are **release bookkeeping** files, not additions to the 122-chapter scientific architecture.

## 19.4 Query Functions

**Atlas-entry record:** Query Functions. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

## 19.5 Reader Entry Points

**Atlas-entry record:** Reader Entry Points. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. For this atlas schema field, the source locator is the relevant working paper and its



External context: E17 | bibliography: Appendix EC

actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

## 19.6 Claim Navigation Chain

Claim wording, mathematical input, inferential role, test state, and potential downstream use are kept separately identified. A geometric relation is not automatically a causal or replacement-level claim.

**Atlas-control record:** Claim Navigation Chain. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. The current source set is the four Paper v1.6 drafts, the Denali Exact and Short Math files, and the corridor workbook. Any later change must retain a version link back to these records.

## 19.7 Falsifier Navigation Chain

**Atlas-entry record:** Falsifier Navigation Chain. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

## 19.8 Replacement Navigation Chain

**Atlas-entry record:** Replacement Navigation Chain. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

## 19.9 Atlas Completeness Dashboard

**Atlas-control record:** Atlas Completeness Dashboard. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. The current source set is the four Paper v1.6 drafts, the Denali Exact and Short Math files, and the corridor workbook. Any later change must retain a version link back to these records.

## 19.10 Atlas Integrity Principle

**Atlas-entry record:** Atlas Integrity Principle. Registration is complete as a *draft organizational act*; supporting measurements, simulations, independent checks, and determinations retain their separate states. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

# 20 Atlas Architecture Synthesis

This chapter preserves the corresponding **canonical Paper-V atlas architecture**. In the North American mirror it specifies how source-linked claims are located and classified across the four working papers; it does not add an additional scientific proposition.

This synthesis chapter uses the evidence/status of its preceding atlas block and neither changes the upstream claim nor assigns a new confirmation status. The present North American source set supplies internal working manuscripts only, and the chapter closes at that source boundary.

# 21 Paper-I Atlas Scope

This chapter occupies the canonical **Paper-I verification block**. The North American record substitutes Malpelo, the fixed geometric turn, Denali, and the terminal corridor for the original flagship point set, while retaining the distinction between coordinates, chord calculations, present geography, and causal claims.

## 21.1 Paper-I Function

**Atlas-entry record:** Paper-I Function. This entry traces to the declared North American coordinate and chord conventions of Denali Exact and Paper I. Its status is geometrical; no physical response or historical causation follows merely from its location. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

## 21.2 Paper-I Atlas Objects

**Atlas-entry record:** Paper-I Atlas Objects. This entry traces to the declared North American coordinate and chord conventions of Denali Exact and Paper I. Its status is geometrical; no physical response or historical causation follows merely from its location. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

## 21.3 Three Distinct Geometry Questions

**Atlas-entry record:** Three Distinct Geometry Questions. This entry traces to the declared North American coordinate and chord conventions of Denali Exact and Paper I. Its status is geometrical; no physical response or historical causation follows merely from its location. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

## 21.4 Present-Day and Event-Time Geometry

The source materials provide no independently validated event-time coordinate reconstruction for this North American path. Modern coordinate calculations therefore remain modern-coordinate calculations.

**Atlas-entry record:** Present-Day and Event-Time Geometry. This entry traces to the declared North American coordinate and chord conventions of Denali Exact and Paper I. Its status is geometrical; no physical response or historical causation follows merely from its location. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

## 21.5 Paper-I Atlas Constraint

**Atlas-entry record:** Paper-I Atlas Constraint. This entry traces to the declared North American coordinate and chord conventions of Denali Exact and Paper I. Its status is geometrical; no physical

response or historical causation follows merely from its location. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

# 22 Paper-I Claim Registry

This chapter occupies the canonical **Paper-I verification block**. The North American record substitutes Malpelo, the fixed geometric turn, Denali, and the terminal corridor for the original flagship point set, while retaining the distinction between coordinates, chord calculations, present geography, and causal claims.

| Claim identifier | Object | Role | Recorded value |
|---|---|---|---|
| NAM-P1-CLM-001 | Entrance coordinate solved within author-identified Malpelo region | Fitted coordinate | 0.448874° N, 81.429273° W |
| NAM-P1-CLM-002 | Author-fixed geometric turn surface projection | Declared point | 62.3843° N, 146.8997° W |
| NAM-P1-CLM-003 | Direct entrance-to-turn chord | Source-derived geometry | 8,061.8708 km |
| NAM-P1-CLM-004 | Eight successive second-leg chord lengths summed | Source-derived geometry | 8,061.8708 km |
| NAM-P1-CLM-005 | Difference between the two leg conventions | Working-source derived | Approximately 0 km (rounding limits apply) |
| NAM-P1-CLM-006 | Denali displacement beyond turn along the second-leg path | Source transcribed | 222.678 km |
| NAM-P1-CLM-007 | Second-leg reference surface arc along same corridor | Source transcribed | 8,085.0443 km |

## 22.1 Claim Registry Table

The present Paper-I claim table contains seven identifiers. NAM-P1-CLM-001 is the *fitted entrance coordinate*, NAM-P1-CLM-002 the *author-fixed turn*, NAM-P1-CLM-003 and -004 the *two differently constructed length totals*, NAM-P1-CLM-005 their reported residual, NAM-P1-CLM-006 the turn-to-Denali segment, and NAM-P1-CLM-007 the segmented corridor's reference surface arc. These are separately addressable records; none is classified as an independently verified physical event.

**Source locator:** *Denali Exact.pdf* for the entrance, turn, first segment and source totals; the seven-row chord/arc workbook for the remaining second-leg segments; Paper I for definitions and limits.

### 22.2 Claim-Hierarchy Structure

Input order is preserved: the turn and ordered northern route are fixed in the working construction; the Malpelo-region coordinate is then **solved** to match the second-leg chord sum. Consequently, the numerical equality in NAM-P1-CLM-005 is conditional on the fitted entrance and cannot be counted as an independent predictive hit. Interpreting the route as a historical event would be a further proposition, not a higher certainty level of the same calculation.

### 22.3 Current Claim Boundary

The source-supported claim is a geometric calculation on the declared reference sphere: $c(E, M)$ equals, to printed precision, $\sum_{k=0}^{7} c(W_k, W_{k+1})$ for the author-selected second-leg stations and the subsequently fitted entrance $E$. Its reproduction does not locate a physical impact event, establish a mechanically transmitting path, derive a mountain-forming response, reconstruct event-time geography or rank alternative geological histories. The atlas does not extend this claim beyond those source boundaries.

## 23 Flagship Coordinate and Geometry Registry

This chapter occupies the canonical **Paper-I verification block**. The North American record substitutes Malpelo, the fixed geometric turn, Denali, and the terminal corridor for the original flagship point set, while retaining the distinction between coordinates, chord calculations, present geography, and causal claims.

| Point or domain | Coordinate / relation | Source role |
|---|---|---|
| Malpelo entrance | 0.448874° N, 81.429273° W | Fitted after turn and corridor definition; numerically solved in Denali Exact |
| Fixed turn surface projection | 62.3843° N, 146.8997° W | Author-fixed in Denali Exact |
| Denali | 222.678 km from the turn along the next segment | Named feature, not identical with turn |
| Arctic terminal | 80.5° N, 140° E | Source-specified terminal waypoint in Denali Exact |
| Under-Siberia / Chukchi waypoint | 73° N, 170° E | Penultimate waypoint in Denali Exact |

### 23.1 Registered Coordinate Set

The east-positive coordinate ledger is: fitted entrance $E = (0.44887422830847457^\circ, -81.42927293513645^\circ)$, author-fixed geometric turn $M = (62.3843^\circ, -146.8997^\circ)$, Denali waypoint $D = (63.0695^\circ, -151.0074^\circ)$, under-Siberia/Chukchi waypoint $(73^\circ, 170^\circ)$, and Arctic terminal $(80.5^\circ, 140^\circ)$. Intermediate names appear in the controlling source's ordered path and downstream workbook rows. The entrance is not an author-fixed coordinate; the turn is not coincident with Denali; the equality is defined on the direct first chord and cumulative second-leg chords.

### 23.2 Coordinate Vector

The latitude/longitude convention is explicit: $\lambda$ is **east-positive**, so the solved entrance is $(0.44887422830847457^\circ, -81.42927293513645^\circ)$ and the fixed turn is $(62.3843^\circ, -146.8997^\circ)$. The corresponding surface-position vector is $\mathbf{r}(\phi, \lambda) = R(\cos\phi\cos\lambda, \cos\phi\sin\lambda, \sin\phi)$ with

$R = 6{,}371$ km and angular arguments converted to radians. This is a coordinate-conversion registry entry for the **recorded** source points; it does not supply an independent subsurface location.

### 23.3 Spherical Unit Vector

**Atlas-entry record:** Spherical Unit Vector. This entry traces to the declared North American coordinate and chord conventions of Denali Exact and Paper I. Its status is geometrical; no physical response or historical causation follows merely from its location. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

### 23.4 Coordinate Status

**Fitted point:** Malpelo entrance, approximately $(0.448874^\circ\mathrm{N}, 81.429273^\circ\mathrm{W})$, solved for the selected chord equality after fixing the turn and route. **Fixed point:** surface projection of the geometric turn, approximately $(62.3843^\circ\mathrm{N}, 146.8997^\circ\mathrm{W})$. **Source-prescribed stations:** Denali and the named northern corridor, ending near $(80.5^\circ\mathrm{N}, 140^\circ\mathrm{E})$. These are distinct provenance classes; none is a verified ancient physical-response coordinate. Source: *Denali Exact.pdf*.

### 23.5 Point-Definition Sensitivity

The point-definition audit depends on which record is altered: changing the fitted entrance changes the first direct chord; changing the turn changes both the first chord and the opening second-leg segment; changing a northern waypoint changes its adjoining second-leg chord contributions. No sensitivity ensemble or numerical confidence interval for these changes is reported in the supplied Denali files. This subsection records the dependency only, without initiating a new search or optimization.

### 23.6 Coordinate-Selection Requirement

The registered equality uses the fitted Malpelo-region entrance at the precision recorded in *Denali Exact.pdf*. A separately fixed entrance would require its own calculation and could not inherit the reported zero residual merely by name. This is a bookkeeping constraint on the existing source construction, not a proposal for further coordinate selection.

## 24 Surface-Distance and Midpoint Audit

This chapter occupies the canonical **Paper-I verification block**. The North American record substitutes Malpelo, the fixed geometric turn, Denali, and the terminal corridor for the original flagship point set, while retaining the distinction between coordinates, chord calculations, present geography, and causal claims.

$$L_1 = 2R \sin\left(\frac{\theta_{AM}}{2}\right), \qquad L_2 = \sum_{i=0}^{7} 2R \sin\left(\frac{\theta_{i,i+1}}{2}\right).$$

Here $A$ is the source-solved entrance coordinate, $M$ the fixed turn, and $\theta_{i,i+1}$ the successive surface-central angles of the stated second-leg waypoint chain. The two constructions are distinct by definition; arithmetic equality does not make the waypoint path a single straight chord.

| Numerical quantity | Source working value | Classification |
|---|---|---|
| First-leg direct chord | 8,061.8708 km | Computed from source-solved entrance and author-fixed turn |
| Second-leg sum of eight chord segments | 8,061.8708 km | Sum from Denali Exact |
| Bilateral difference | approximately 0 km | Rounded working-source result |
| Denali from turn | 222.678 km | First second-leg segment |

## 24.1 Central Angle

For each two-point segment, the source construction uses a spherical central angle $\theta$ calculated from endpoint latitudes and longitudes. Its endpoint chord is $c = 2R\sin(\theta/2)$ and its corresponding surface arc is $s = R\theta$, using the source reference radius $R = 6{,}371$ km. The eight second-leg segments therefore have eight different pairwise angles; there is **no single second-leg central angle** corresponding to their summed chord length. **Locator:** Denali Exact; seven-row corridor workbook; Paper I geometry definitions.

## 24.2 Surface Distance

The second-leg reference **surface arc total** is $8{,}085.0443$ km according to Denali Exact. This is distinct from the **cumulative segment-chord total**, $8{,}061.8708$ km. The source does not equate the second-leg surface arc to the entrance-to-turn surface arc. The working claim is an equality of the first direct chord and the sum of second-leg chords, not an equality of surface distances.

## 24.3 Audited Bilateral Distances

The source reports $L_1 = 8{,}061.8708$ km for the **single direct Malpelo-to-fixed-turn chord** and $L_2 = 8{,}061.8708$ km for the **sum of eight ordered turn-to-Arctic waypoint chords**. The initial turn-to-Denali chord is recorded separately in Denali Exact; the following seven corridor chords appear in the workbook. The two lengths use different geometric constructions, and neither is a directly measured subsurface transit.

## 24.4 Bilateral Difference

With the Malpelo entrance *fitted* to the already specified second-leg total, the rounded numerical difference is $L_1 - L_2 \approx 0$ km. Pass-1 arithmetic reproduced both totals at approximately $8{,}061.870761355$ km using the recorded calculation convention. The residual is a fitted-geometry closure, not a separately observed alignment or a probability-of-chance result.

## 24.5 Bilateral Asymmetry

No independent pre-fit bilateral-asymmetry statistic is supplied for this candidate. Equal rounded chord totals arise after the source solves the entrance position. Consequently, an asymmetry measure computed from those fitted totals would document arithmetic closure but would not quantify independent predictive agreement. **Status: no pre-fit asymmetry measurement registered.**

## 24.6 Exact Great-Circle Midpoint

The source-defined **geometric turn** is at approximately $62.3843°\text{N}, 146.8997°\text{W}$; it is not identified as the great-circle midpoint of one direct Malpelo-to-Arctic chord. The northern leg is piecewise,

and Denali lies $222.678$ km after the turn along its first segment. No separate endpoint-to-endpoint great-circle midpoint calculation is reported as the equality criterion.

### 24.7 Denali Offset From Geometric Turn

Denali is **not** the surface projection of the author-fixed turn. It is the first named waypoint on the second leg, separated from that turn by a reported chord of $222.678$ km (Denali Exact). The remaining route is Denali, Juneau, Unalaska, Adak, Amchitka, Attu, the $73^\circ\mathrm{N}, 170^\circ\mathrm{E}$ waypoint, and the terminal $80.5^\circ\mathrm{N}, 140^\circ\mathrm{E}$. This offset is geometrical; no turn-response mechanism follows from it.

### 24.8 Source Viability Band

For the present release, **geometry inputs** are sufficiently documented to reproduce the declared spherical arithmetic, subject to rounded source coordinates and selected path. **Mechanical and mineralogical inputs** are excluded or absent. **Independent geological time, physical-output and comparison evidence** is absent from the supplied records. "Viability" here is a source-completeness classification for individual recorded calculations, not a geological likelihood or a whole-theory verdict.

### 24.9 Meaning of the Negative Result

A difference near zero after fitting the entrance is **not** a negative physical result or a demonstrated rejection of the candidate. Nor is it an independent successful empirical test. The only demonstrated result in this register is agreement with the construction's numerical closure condition; chronology, material transmission, and geological causal response remain unadjudicated in the supplied records.

## 25 Great-Circle, Cross-Track, and Along-Track Audit

This chapter occupies the canonical **Paper-I verification block**. The North American record substitutes Malpelo, the fixed geometric turn, Denali, and the terminal corridor for the original flagship point set, while retaining the distinction between coordinates, chord calculations, present geography, and causal claims.

The user-declared leg equality compares *interior chord constructions*. No equivalence between that sum and a direct Malpelo–terminal great circle has been stated, and no new great-circle residual is calculated here. Surface arcs are listed separately.

### 25.1 Direct Malpelo–Arctic Surface Distance

The canonical heading is retained, but the controlling Denali equality does **not** use a direct Malpelo-to-terminal great-circle surface distance. Its first value is the Malpelo-to-turn *interior chord*, and the second is the sum of eight *successive chord* lengths. No direct Malpelo-to-Arctic arc is registered here as an independently source-verified equivalent.

### 25.2 Routed Distance Through Denali

The specified route is fixed turn → Denali → Juneau → Unalaska → Adak → Amchitka → Attu → $(73^\circ\mathrm{N}, 170^\circ\mathrm{E}) \to (80.5^\circ\mathrm{N}, 140^\circ\mathrm{E})$. Its **eight-chord total** is $8{,}061.8708$ km and its **summed surface arcs** total $8{,}085.0443$ km, as recorded in Denali Exact. The seven post-Denali pairwise values are separately available in the workbook; the opening turn-to-Denali value comes from the PDF.

### 25.3 Path Excess

No source-defined *path-excess statistic* compares this waypoint corridor against a direct Malpelo-to-Arctic geodesic. Subtracting one from the other would be a different comparison, not the equality originally solved. The heading is preserved but no invented path-excess result is inserted.

### 25.4 Initial Bearing

**Atlas-entry record:** Initial Bearing. This entry traces to the declared North American coordinate and chord conventions of Denali Exact and Paper I. Its status is geometrical; no physical response or historical causation follows merely from its location. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

### 25.5 Cross-Track Distance

The Denali working files do not establish a cross-track displacement of Denali relative to one continuous Malpelo-to-Arctic great circle as a controlling result. The documented $222.678$ km is a **turn-to-Denali chord**, not a cross-track deviation. These quantities must not be substituted for one another. **Source status: cross-track metric not registered.**

### 25.6 Along-Track Distance

The fixed turn-to-Denali segment is the first ordered chord of the northern route, not a projection of Denali onto a single entrance-to-terminal great-circle baseline. The supplied route supplies ordered segment lengths but no separately audited along-track projection under the canonical baseline definition. **Source status: no independently registered along-track result.**

### 25.7 Interpretation

**Atlas-entry record:** Interpretation. This entry traces to the declared North American coordinate and chord conventions of Denali Exact and Paper I. Its status is geometrical; no physical response or historical causation follows merely from its location. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

### 25.8 Great-Circle Claim Status

The working equality is a **source-specified piecewise-chord construction**, not a demonstrated single-great-circle alignment. Its claimed geometric result can be reproduced under the declared sphere, fixed turn, prescribed waypoints, and fitted entrance. No independent spatial-selection or field observation claim is established by this arithmetic.

## 26 Chord, Depth, and Incidence Audit

This chapter occupies the canonical **Paper-I verification block**. The North American record substitutes Malpelo, the fixed geometric turn, Denali, and the terminal corridor for the original flagship point set, while retaining the distinction between coordinates, chord calculations, present geography, and causal claims.

$$L_1 = 2R \sin\left(\frac{\theta_{AM}}{2}\right), \qquad L_2 = \sum_{i=0}^{7} 2R \sin\left(\frac{\theta_{i,i+1}}{2}\right).$$

Here $A$ is the source-solved entrance coordinate, $M$ the fixed turn, and $\theta_{i,i+1}$ the successive surface-central angles of the stated second-leg waypoint chain. The two constructions are distinct by definition; arithmetic equality does not make the waypoint path a single straight chord.

| Segment | Chord length (km) | Surface arc (km) | Numerical source |
|---|---|---|---|
| Turn to Denali | 222.678 | — | Denali Exact (rounded as reported) |
| Denali to Juneau | 1,041.564487 | 1,042.727919 | Workbook |
| Juneau to Unalaska | 2,019.168197 | 2,027.715811 | Workbook |
| Unalaska to Adak | 714.523964 | 714.898971 | Workbook |
| Adak to Amchitka | 192.565167 | 192.572498 | Workbook |
| Amchitka to Attu | 538.553342 | 538.713817 | Workbook |
| Attu to Chukchi / under-Siberia | 2,228.588845 | 2,240.110387 | Workbook |
| Chukchi to terminal trench | 1,104.229257 | 1,105.616087 | Workbook |

The seven workbook entries exclude the turn-to-Denali segment. The turn-to-Denali entry in this eight-row audit comes from Denali Exact. Differences in displayed totals depend on stored versus rounded values; the stated controlling total is 8,061.8708 km.

## 26.1 Malpelo–Arctic Central Angle

The heading is retained from canonical Paper V. **No single Malpelo-to-Arctic central angle is the controlling metric in the Denali record.** The first-leg direct entrance-to-turn chord has one endpoint-pair central angle; the second-leg total consists of eight separate waypoint-pair chords with their own central angles. The supplied equal-leg claim does not identify a direct entrance-to-terminal angle as an equivalent second-leg measure. No such aggregate central angle is substituted here.

## 26.2 Chord Length

The documented comparison is $L_1 = 8{,}061.8708$ km for the **single entrance-to-turn chord**, and $L_2 = 8{,}061.8708$ km for the **sum of eight second-leg chords**, both under the source's stated rounding. *Denali Exact.pdf* provides the rounded turn-to-Denali chord of $222.678$ km; the seven remaining segment chords occur as rows in the workbook. The independent source surface-arc total, $8{,}085.0443$ km, is not substituted into the chord comparison.

## 26.3 Half-Chord Length

This inherited atlas field is **not** evidence that the two legs form equal halves of one uninterrupted straight chord. The first leg is one chord, while the second is a sum of eight separately defined chords. The supplied research contains no single whole-path chord for which a computed half-chord would reproduce this construction. The heading is retained; no surrogate measurement is assigned.

## 26.4 Core-Crossing Status

A verified physical path through the terrestrial interior is not provided by the surface-waypoint and spherical chord arithmetic alone. The Denali source compares geometric lengths, but does not report a demonstrated core-crossing trajectory for the segmented route. **Status: not determined by the supplied research.**

## 26.5 Incidence Below the Local Horizontal

The supplied numerical record does not state a measured entrance incidence below the local horizontal or a validated event trajectory. The geometric direct chord and the segmented waypoint construction should not be silently reinterpreted as measured incidence angles. **Status: not reported in the controlling Denali source.**

## 26.6 Incidence From the Inward Radial

The supplied Denali geometry does not report a measured incidence from the local inward radial. No source-derived numerical value is entered in this atlas field; the heading is retained in its canonical position. **Status: unfilled from the supplied source.**

## 26.7 Trajectory Classification

The source calculation permits one precise *geometric* classification: **a direct entrance-to-turn chord followed by an ordered eight-chord piecewise corridor**. It does not by itself establish an observed subterranean material or energy trajectory, so no mechanical trajectory class is assigned.

## 26.8 Constant-Speed Transit Diagnostic

No transit speed or observed travel time appears in the controlling Denali chord or workbook calculations. The geometric distance totals alone cannot be read as a completed constant-speed transit diagnosis. **Status: not evaluated in the source.**

# 27 Paper-I Chronology Registry

This chapter occupies the canonical **Paper-I verification block**. The North American record substitutes Malpelo, the fixed geometric turn, Denali, and the terminal corridor for the original flagship point set, while retaining the distinction between coordinates, chord calculations, present geography, and causal claims.

The working date label is not a demonstration of timing. No new stratigraphic age correlation, dated response lag, or event-time rotation is supplied for this North American manuscript. Its chronological source status therefore remains an uncompleted component rather than a contradictory observed age.

## 27.1 Chronology Records

The source materials provide no independently validated event-time coordinate reconstruction for this North American path. Modern coordinate calculations therefore remain modern-coordinate calculations.

**Atlas-entry record:** Chronology Records. This entry traces to the declared North American coordinate and chord conventions of Denali Exact and Paper I. Its status is geometrical; no physical

response or historical causation follows merely from its location. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

### 27.2 Chronology Separation

The source materials provide no independently validated event-time coordinate reconstruction for this North American path. Modern coordinate calculations therefore remain modern-coordinate calculations.

**Atlas-entry record:** Chronology Separation. This entry traces to the declared North American coordinate and chord conventions of Denali Exact and Paper I. Its status is geometrical; no physical response or historical causation follows merely from its location. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

### 27.3 No Chronology by Naming

The source materials provide no independently validated event-time coordinate reconstruction for this North American path. Modern coordinate calculations therefore remain modern-coordinate calculations.

**Atlas-entry record:** No Chronology by Naming. This entry traces to the declared North American coordinate and chord conventions of Denali Exact and Paper I. Its status is geometrical; no physical response or historical causation follows merely from its location. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

### 27.4 Required Chronology Test

The source materials provide no independently validated event-time coordinate reconstruction for this North American path. Modern coordinate calculations therefore remain modern-coordinate calculations.

**Atlas-entry record:** Required Chronology Test. This entry traces to the declared North American coordinate and chord conventions of Denali Exact and Paper I. Its status is geometrical; no physical response or historical causation follows merely from its location. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

## 28 Paper-I Source and Data Registry

This chapter occupies the canonical **Paper-I verification block**. The North American record substitutes Malpelo, the fixed geometric turn, Denali, and the terminal corridor for the original flagship point set, while retaining the distinction between coordinates, chord calculations, present geography, and causal claims.

| Source | Document role | Registered limitation |
|---|---|---|
| Denali Exact | Fixed-turn, source-computed equal-leg geometry | Internal working model |
| Denali Short Math | Earlier calculations | Do not automatically override later fixed-turn value |

| Source | Document role | Registered limitation |
|---|---|---|
| Segment workbook | Seven chord-and-arc segment records | Missing turn-to-Denali segment |
| Paper I v1.6 | Scientific narrative and geometry | Working draft, not independently verified |

## 28.1 Source Registry

**Controlling geometry:** *Denali Exact.pdf*, which records the fixed turn, fitted Malpelo-region entrance, full ordered route, displayed first turn-to-Denali chord and rounded total. **Independent numerical table within the supplied project:** the seven-row Denali corridor workbook, beginning *Denali→Juneau* and ending *Chukchi→Trench*, with columns for central angle, surface arc and chord. **Earlier versions:** *Denali Short Math.pdf* and *8-8-2025 64 ma ABC Math Full (1).pdf* document earlier exploratory reasoning and are not an independent confirmation of the final numerical selection. The four current North American manuscripts are derivative draft records, not primary geological measurements.

## 28.2 Source-One Scope

*Denali Exact.pdf* supplies the controlling fixed turn, fitted Malpelo entrance, eight named second-leg chord lengths, chord-sum total of approximately **8,061.8708 km**, separate surface-arc sum of approximately **8,085.0443 km**, and the approximately **222.678 km** turn-to-Denali first chord. Its content is an **internal calculation record**, not an independent observational survey or event demonstration.

## 28.3 Source-Two Scope

The *Denali_Trench_underground_path__per_segment_arc___chord_lengths-1.xlsx* workbook lists the **seven downstream** surface-arc and chord pairs after the turn-to-Denali interval; it does not contain a separate first segment row. The first segment comes from *Denali Exact.pdf*. The workbook is a numerical source for route-sum reproduction, not a mechanical-model dataset or field observation. Earlier Denali notes remain developmental rather than overriding the controlling geometry.

## 28.4 External Data Gap

The provided evidence set does not include an independent contemporary geodetic reference-frame audit of every waypoint, geological dates for the candidate sequence, empirical interior-track observations, a field-observed Denali response, or a separately measured distribution supporting an unusualness score. The working paper therefore registers internal numerical reproducibility only; these missing source classes are not reported as negative observations.

## 28.5 Data Registry

**Registered geometric data fields:** source filename and version; coordinate role (*fixed turn*, *specified waypoint*, *fitted entrance*); endpoint pair or segment index; metric (*central angle*, *surface arc*, *interior chord*); reference radius $R = 6{,}371$ km; printed precision; first-leg/direct versus second-leg/cumulative designation. The source-to-claim map is mirrored in the machine atlas. No new measurements are asserted by these registry fields.

# 29 Paper-I Assumption and Parameter Registry

This chapter occupies the canonical **Paper-I verification block**. The North American record substitutes Malpelo, the fixed geometric turn, Denali, and the terminal corridor for the original flagship point set, while retaining the distinction between coordinates, chord calculations, present geography, and causal claims.

| Parameter | Value or constraint | Source role |
|---|---|---|
| $R$ | 6,371 km | Spherical radius convention used in Denali working calculations |
| $A$ | 0.448874° N, 81.429273° W | Solved entrance |
| $M$ | 62.3843° N, 146.8997° W | Fixed turn |
| $L_1$ | 8,061.8708 km | Direct chord |
| $L_2$ | 8,061.8708 km | Eight-chord sum |

## 29.1 Assumption Registry

**Atlas-entry record:** Assumption Registry. This entry traces to the declared North American coordinate and chord conventions of Denali Exact and Paper I. Its status is geometrical; no physical response or historical causation follows merely from its location. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

## 29.2 Parameter Registry

**Atlas-entry record:** Parameter Registry. This entry traces to the declared North American coordinate and chord conventions of Denali Exact and Paper I. Its status is geometrical; no physical response or historical causation follows merely from its location. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

## 29.3 Parameter Sensitivity Priority

**Atlas-entry record:** Parameter Sensitivity Priority. This entry traces to the declared North American coordinate and chord conventions of Denali Exact and Paper I. Its status is geometrical; no physical response or historical causation follows merely from its location. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

# 30 Paper-I Equation Registry

This chapter occupies the canonical **Paper-I verification block**. The North American record substitutes Malpelo, the fixed geometric turn, Denali, and the terminal corridor for the original flagship point set, while retaining the distinction between coordinates, chord calculations, present geography, and causal claims.

$$L_1 = 2R \sin\left(\frac{\theta_{AM}}{2}\right), \qquad L_2 = \sum_{i=0}^{7} 2R \sin\left(\frac{\theta_{i,i+1}}{2}\right).$$

Here $A$ is the source-solved entrance coordinate, $M$ the fixed turn, and $\theta_{i,i+1}$ the successive surface-central angles of the stated second-leg waypoint chain. The two constructions are distinct by definition; arithmetic equality does not make the waypoint path a single straight chord.

### 30.1 Equation Registry Table

The controlling Paper-I equation set, transcribed into the atlas without changing its definitions, is

$$\mathbf{u}(\phi,\lambda) = (\cos\phi\cos\lambda, \cos\phi\sin\lambda, \sin\phi), \qquad \theta_{ij} = \arccos(\mathbf{u}_i \cdot \mathbf{u}_j),$$

$$s_{ij} = R\theta_{ij}, \qquad c_{ij} = 2R\sin(\theta_{ij}/2), \qquad R = 6{,}371 \text{ km},$$

$$L_1 = c(E,M), \quad L_2 = \sum_{k=0}^{7} c(W_k, W_{k+1}), \quad \Delta L = L_1 - L_2, \quad W_0 = M.$$

Here $E$ is the **fitted** Malpelo entrance and the ordered $W_k$ are the source-prescribed second-leg stations. *Denali Exact.pdf* reports $L_1 \simeq L_2 \simeq 8{,}061.8708$ km; the seven downstream chord/arc pairs are recorded separately in the corridor workbook. The atlas equation entries index only these existing geometric operations, not a new physical mechanism.

### 30.2 Equation-Audit Boundary

For any specified pair of present-day surface stations, the current geometric method uses spherical central angle $\theta$, surface arc $s = R\theta$, and chord $c = 2R\sin(\theta/2)$ with $R = 6{,}371$ km. The first-leg comparison evaluates **one chord** $c(E,M)$ against **the sum of eight chords** $\sum_{k=0}^{7} c(W_k, W_{k+1})$. These equations establish the numerical route construction only; they do **not** calculate underground transit physics, impact energy, physical turning, or a geologic event age.

### 30.3 No Mechanical Validation From Geometry Equations

Neither $c = 2R\sin(\theta/2)$ nor a sum of waypoint chords contains a force law, constitutive relation, boundary condition, propagation time, or material response result. The geometry registry therefore leaves mechanical eligibility to the designated Paper-II status without fabricating its restricted inputs or outcomes.

## 31 Paper-I Numerical Result Registry

**Reproduced full-precision record:** $c(M,D) = 222.677503129\,\text{km}$; $\sum_{\text{seven workbook}} c_i = 7839.193258226\,\text{km}$; $L_2 = 8061.870761355\,\text{km}$; $L_1 = 8061.870761355\,\text{km}$ under the declared $R = 6371\,\text{km}$ convention. The summed second-leg surface arcs are $8085.044329017\,\text{km}$. The rounded-first sum exceeds the original PDF's four-decimal aggregate ($8061.8708\,\text{km}$) by $0.000458226\,\text{km}$, or exceeds the full-precision value by $0.000496871\,\text{km}$; both differences result from display rounding, and the full-precision geometric closure is recovered. This is an internal numerical reproduction of the source-defined corridor and fitted entrance, not an independent observational or causal result. This chapter occupies the canonical **Paper-I verification block**. The North American record substitutes Malpelo, the fixed geometric turn, Denali, and the terminal corridor for the original flagship point set, while retaining the distinction between coordinates, chord calculations, present geography, and causal claims.

No newly computed kinetic-energy, mass, or planetary-binding result is introduced. The original chapter position is preserved but its original Aegean-scale exploratory values cannot be attributed to the Denali corridor.

### 31.1 Exploratory Mechanical Range

No candidate-specific **energy, velocity, or mechanical search range** was established by the controlling Denali chord and workbook sources. The original ABC Paper-I heading is retained, but its Aegean candidate's exploratory values are not transferable as measurements or admissible North American parameters. **Status: not specified in disclosed Denali source; proprietary mechanics excluded.**

### 31.2 Planetary Binding Benchmark

The Denali coordinate and chord source set supplies no numerical planetary-binding budget and no tested energy-to-binding comparison. A spherical length model is not an energy or survival calculation. The heading is retained as an atlas locator only; no planetary-survival result is manufactured from the $8{,}061.8708$ km distance.

## 32 Paper-I Null and Selection Registry

This chapter occupies the canonical **Paper-I verification block**. The North American record substitutes Malpelo, the fixed geometric turn, Denali, and the terminal corridor for the original flagship point set, while retaining the distinction between coordinates, chord calculations, present geography, and causal claims.

The present source corpus does not document a completed selection-aware chance-alignment experiment for this fixed-turn path, nor a frozen count of alternative entrances, turns, waypoint chains, or terminal selections. No p-value appears in this atlas.

### 32.1 Geometric Test Statistics

The currently documented geometric statistic is $\Delta L = L_1 - L_2$, where $L_1 = c(E, M)$ and $L_2 = \sum_{k=0}^{7} c(W_k, W_{k+1})$. In the controlling calculation $E$ is *solved* to make this residual approximately zero at printed precision. The atlas may report this numeric result and its provenance; it does not assign a $p$-value, independent rarity probability, or geological effect-size interpretation without a recorded null process.

### 32.2 Uniform Third-Point Null

**Atlas-entry record:** Uniform Third-Point Null. This entry traces to the declared North American coordinate and chord conventions of Denali Exact and Paper I. Its status is geometrical; no physical response or historical causation follows merely from its location. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

### 32.3 Elevation-Conditioned Null

**Atlas-entry record:** Elevation-Conditioned Null. This entry traces to the declared North American coordinate and chord conventions of Denali Exact and Paper I. Its status is geometrical; no physical response or historical causation follows merely from its location. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

## 32.4 Entrance-Exit Opportunity Null

**Atlas-entry record:** Entrance-Exit Opportunity Null. This entry traces to the declared North American coordinate and chord conventions of Denali Exact and Paper I. Its status is geometrical; no physical response or historical causation follows merely from its location. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

## 32.5 Complete Triplet Null

**Atlas-entry record:** Complete Triplet Null. This entry traces to the declared North American coordinate and chord conventions of Denali Exact and Paper I. Its status is geometrical; no physical response or historical causation follows merely from its location. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

## 32.6 Paleogeographic Null

The source materials provide no independently validated event-time coordinate reconstruction for this North American path. Modern coordinate calculations therefore remain modern-coordinate calculations.

**Atlas-entry record:** Paleogeographic Null. This entry traces to the declared North American coordinate and chord conventions of Denali Exact and Paper I. Its status is geometrical; no physical response or historical causation follows merely from its location. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

## 32.7 Chronology-Permutation Null

The source materials provide no independently validated event-time coordinate reconstruction for this North American path. Modern coordinate calculations therefore remain modern-coordinate calculations.

**Atlas-entry record:** Chronology-Permutation Null. This entry traces to the declared North American coordinate and chord conventions of Denali Exact and Paper I. Its status is geometrical; no physical response or historical causation follows merely from its location. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

## 32.8 Search-Space Ledger

**Known selections:** the fixed turn, the route sequence and the target length; **known fitted value:** the Malpelo-region entrance obtained from the target chord and chosen bearing; **known flexibility:** alternate same-length bearings acknowledged in *Denali Exact*. **Unknown:** a complete history of tried bearings, candidate routes or rejected regional targets. This is an explicit **incomplete selection ledger** and must not be presented as a prospective freeze or controlled discovery trial.

## 32.9 Selection-Adjusted Probability

**Atlas-entry record:** Selection-Adjusted Probability. This entry traces to the declared North American coordinate and chord conventions of Denali Exact and Paper I. Its status is geometrical; no physical response or historical causation follows merely from its location. For this atlas schema

field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

### 32.10 Current Null Status

**Atlas-entry record:** Current Null Status. This entry traces to the declared North American coordinate and chord conventions of Denali Exact and Paper I. Its status is geometrical; no physical response or historical causation follows merely from its location. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

## 33 Paper-I Prediction Registry

This chapter occupies the canonical **Paper-I verification block**. The North American record substitutes Malpelo, the fixed geometric turn, Denali, and the terminal corridor for the original flagship point set, while retaining the distinction between coordinates, chord calculations, present geography, and causal claims.

### 33.1 Prediction-Freeze Requirement

No frozen North American advance-prediction packet or independent prediction outcome is supplied in the current four working manuscripts. The entry is a location and status record, not a reported hit or miss.

**Atlas-entry record:** Prediction-Freeze Requirement. This entry traces to the declared North American coordinate and chord conventions of Denali Exact and Paper I. Its status is geometrical; no physical response or historical causation follows merely from its location. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

### 33.2 Current Prediction Classification

No frozen North American advance-prediction packet or independent prediction outcome is supplied in the current four working manuscripts. The entry is a location and status record, not a reported hit or miss.

**Atlas-entry record:** Current Prediction Classification. This entry traces to the declared North American coordinate and chord conventions of Denali Exact and Paper I. Its status is geometrical; no physical response or historical causation follows merely from its location. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

## 34 Paper-I Falsification Registry

This chapter occupies the canonical **Paper-I verification block**. The North American record substitutes Malpelo, the fixed geometric turn, Denali, and the terminal corridor for the original flagship point set, while retaining the distinction between coordinates, chord calculations, present geography, and causal claims.

### 34.1 Triggered Falsifier Interpretation

The effect of any eventual negative test is confined to its named target and mandatory dependency paths. No rejection threshold, data sensitivity, or completed negative test is invented in this initial atlas.

**Atlas-entry record:** Triggered Falsifier Interpretation. This entry traces to the declared North American coordinate and chord conventions of Denali Exact and Paper I. Its status is geometrical; no physical response or historical causation follows merely from its location. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

### 34.2 Paper-Level Falsification Condition

The effect of any eventual negative test is confined to its named target and mandatory dependency paths. No rejection threshold, data sensitivity, or completed negative test is invented in this initial atlas.

**Atlas-entry record:** Paper-Level Falsification Condition. This entry traces to the declared North American coordinate and chord conventions of Denali Exact and Paper I. Its status is geometrical; no physical response or historical causation follows merely from its location. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

## 35 Paper-I Contradiction and Supersession Audit

This chapter occupies the canonical **Paper-I verification block**. The North American record substitutes Malpelo, the fixed geometric turn, Denali, and the terminal corridor for the original flagship point set, while retaining the distinction between coordinates, chord calculations, present geography, and causal claims.

### 35.1 Supersession Principle

**Atlas-entry record:** Supersession Principle. This entry traces to the declared North American coordinate and chord conventions of Denali Exact and Paper I. Its status is geometrical; no physical response or historical causation follows merely from its location. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

### 35.2 No Retrospective Erasure

**Atlas-entry record:** No Retrospective Erasure. This entry traces to the declared North American coordinate and chord conventions of Denali Exact and Paper I. Its status is geometrical; no physical response or historical causation follows merely from its location. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

## 36 Paper-I Dependency Graph and Criticality

This chapter occupies the canonical **Paper-I verification block**. The North American record substitutes Malpelo, the fixed geometric turn, Denali, and the terminal corridor for the original

flagship point set, while retaining the distinction between coordinates, chord calculations, present geography, and causal claims.

## 36.1 Paper-I Dependency Graph

**Atlas-entry record:** Paper-I Dependency Graph. This entry traces to the declared North American coordinate and chord conventions of Denali Exact and Paper I. Its status is geometrical; no physical response or historical causation follows merely from its location. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

## 36.2 Core Dependency Chain

**Atlas-entry record:** Core Dependency Chain. This entry traces to the declared North American coordinate and chord conventions of Denali Exact and Paper I. Its status is geometrical; no physical response or historical causation follows merely from its location. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

## 36.3 Cross-Paper Handoff Chain

**Atlas-entry record:** Cross-Paper Handoff Chain. This entry traces to the declared North American coordinate and chord conventions of Denali Exact and Paper I. Its status is geometrical; no physical response or historical causation follows merely from its location. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

## 36.4 Critical Nodes

**Atlas-entry record:** Critical Nodes. This entry traces to the declared North American coordinate and chord conventions of Denali Exact and Paper I. Its status is geometrical; no physical response or historical causation follows merely from its location. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

## 36.5 Present Midpoint Cut Set

**Atlas-entry record:** Present Midpoint Cut Set. This entry traces to the declared North American coordinate and chord conventions of Denali Exact and Paper I. Its status is geometrical; no physical response or historical causation follows merely from its location. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

## 36.6 Flagship Event Cut Set

**Atlas-entry record:** Flagship Event Cut Set. This entry traces to the declared North American coordinate and chord conventions of Denali Exact and Paper I. Its status is geometrical; no physical response or historical causation follows merely from its location. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

### 36.7 High-Priority Verification Order

**Atlas-entry record:** High-Priority Verification Order. This entry traces to the declared North American coordinate and chord conventions of Denali Exact and Paper I. Its status is geometrical; no physical response or historical causation follows merely from its location. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

## 37 Paper-I Atlas Status

This chapter occupies the canonical **Paper-I verification block**. The North American record substitutes Malpelo, the fixed geometric turn, Denali, and the terminal corridor for the original flagship point set, while retaining the distinction between coordinates, chord calculations, present geography, and causal claims.

| Paper-I status dimension | State at v1.6 |
|---|---|
| Named geometry | Declared and source-transcribed |
| Chord equality | Numerically recorded for stated convention |
| External coordinate validation | Not certified by this atlas |
| Selection-adjusted unusualness | Not tested |
| Historical event-time geometry | Not established |
| Physical causation | Not demonstrated |

### 37.1 Status Dashboard

**Atlas-entry record:** Status Dashboard. This entry traces to the declared North American coordinate and chord conventions of Denali Exact and Paper I. Its status is geometrical; no physical response or historical causation follows merely from its location. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

### 37.2 Verified Paper-I Outputs

**Atlas-entry record:** Verified Paper-I Outputs. This entry traces to the declared North American coordinate and chord conventions of Denali Exact and Paper I. Its status is geometrical; no physical response or historical causation follows merely from its location. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

### 37.3 Current Negative Result

**Atlas-entry record:** Current Negative Result. This entry traces to the declared North American coordinate and chord conventions of Denali Exact and Paper I. Its status is geometrical; no physical response or historical causation follows merely from its location. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

### 37.4 Current Unresolved Questions

**Atlas-entry record:** Current Unresolved Questions. This entry traces to the declared North American coordinate and chord conventions of Denali Exact and Paper I. Its status is geometrical; no

physical response or historical causation follows merely from its location. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

### 37.5 Paper-I Atlas Conclusion

**Atlas-entry record:** Paper-I Atlas Conclusion. This entry traces to the declared North American coordinate and chord conventions of Denali Exact and Paper I. Its status is geometrical; no physical response or historical causation follows merely from its location. For this atlas schema field, the source locator is the relevant working paper and its actual data dependency; Denali Exact applies only where the field concerns the fixed-turn corridor geometry.

## 38 Paper-I Atlas Synthesis

This chapter occupies the canonical **Paper-I verification block**. The North American record substitutes Malpelo, the fixed geometric turn, Denali, and the terminal corridor for the original flagship point set, while retaining the distinction between coordinates, chord calculations, present geography, and causal claims.

The allowed Paper-I carry-forward is a fixed modern-coordinate geometric candidate and its explicitly defined chord arithmetic. It cannot be treated as proof of transmission, an event history, or superiority over a separate geological model.

This synthesis chapter uses the evidence/status of its preceding atlas block and neither changes the upstream claim nor assigns a new confirmation status. The present North American source set supplies internal working manuscripts only, and the chapter closes at that source boundary.

## 39 Paper-II Atlas Scope

This chapter occupies the canonical **Paper-II physical-eligibility block**. Its slot and relationship to the original manuscript are retained. Restricted energetics, phase/mineral data, constitutive assumptions, and unspecified physical outputs are deliberately not reconstructed from geometry.

### 39.1 Paper-II Function

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate’s values.

### 39.2 Paper-II Does Not Presume an Intact Projectile

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate’s values.

### 39.3 Paper-II Branches

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 39.4 Paper-II Atlas Objects

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 39.5 Paper-II Handoff Burden

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 40 Paper-II Mechanical Claim Registry

This chapter occupies the canonical **Paper-II physical-eligibility block**. Its slot and relationship to the original manuscript are retained. Restricted energetics, phase/mineral data, constitutive assumptions, and unspecified physical outputs are deliberately not reconstructed from geometry.

| Paper-II source object | Status |
|---|---|
| Entrance physical state | WITHHELD/UNPROVIDED |
| Transit constitutive parameters | WITHHELD/UNPROVIDED |
| Material/mineralogy tables | EXCLUDED BY AUTHOR INSTRUCTION |
| Terminal response computation | UNEXECUTED |
| Handoff to Paper III | CONDITIONAL; geometry only |

### 40.1 Current Mechanical Status

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 41 Operational Transmission Definitions

This chapter occupies the canonical **Paper-II physical-eligibility block**. Its slot and relationship to the original manuscript are retained. Restricted energetics, phase/mineral data, constitutive assumptions, and unspecified physical outputs are deliberately not reconstructed from geometry.

## 41.1 Transmission Record

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 41.2 Directional Concentration

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 41.3 Momentum Transmission Fraction

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 41.4 Energy Transmission Fraction

This canonical subsection slot is retained for fidelity. Its subject matter falls within the intentionally withheld mechanics/mineralogy boundary, or requires unprovided physical source data. No surrogate numbers are inserted.

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 41.5 Coherence Fraction

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 41.6 Transit Completion

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 41.7 No Single Universal Transit Metric

The available geometry contains a **direct first-leg interior chord**, eight **second-leg interior chords**, and corresponding second-leg **surface arcs**. It does not include physical speeds or transit times and does not define a universal propagation metric for all those representations. Accordingly none of the reported lengths is converted into a mechanical travel time; the substantive physics is restricted or not supplied.

## 42 Entrance-Coupling Registry

This chapter occupies the canonical **Paper-II physical-eligibility block**. Its slot and relationship to the original manuscript are retained. Restricted energetics, phase/mineral data, constitutive assumptions, and unspecified physical outputs are deliberately not reconstructed from geometry.

### 42.1 Pre-Entrance State

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 42.2 Post-Coupling State

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 42.3 Entrance Partition Fractions

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 42.4 Entrance-Coupling Efficiency

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 42.5 Directional-Coupling Efficiency

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results

are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 42.6 Entrance Registry

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 42.7 Entrance Falsification Principle

The effect of any eventual negative test is confined to its named target and mandatory dependency paths. No rejection threshold, data sensitivity, or completed negative test is invented in this initial atlas.

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 43 Transmission-Branch Registry

This chapter occupies the canonical **Paper-II physical-eligibility block**. Its slot and relationship to the original manuscript are retained. Restricted energetics, phase/mineral data, constitutive assumptions, and unspecified physical outputs are deliberately not reconstructed from geometry.

### 43.1 Branch Record

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 43.2 Branch Registry Table

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 43.3 Coherent-Body Integrity Metric

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 43.4 Fragment Dispersion Metric

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 43.5 Shock Directionality Metric

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 43.6 Damage Connectivity Metric

This canonical subsection slot is retained for fidelity. Its subject matter falls within the intentionally withheld mechanics/mineralogy boundary, or requires unprovided physical source data. No surrogate numbers are inserted.

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 43.7 Hybrid Non-Double-Counting Rule

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 44 Differentiated-Earth Path Registry

This chapter occupies the canonical **Paper-II physical-eligibility block**. Its slot and relationship to the original manuscript are retained. Restricted energetics, phase/mineral data, constitutive assumptions, and unspecified physical outputs are deliberately not reconstructed from geometry.

### 44.1 Path Coordinate

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 44.2 Layered Background State

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate’s values.

## 44.3 Path State

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate’s values.

## 44.4 Registered Path Geometry

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate’s values.

## 44.5 Layer-Exposure Functional

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate’s values.

## 44.6 Path-Integrated Resistance

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate’s values.

## 44.7 Path-Integrated Heating

This canonical subsection slot is retained for fidelity. Its subject matter falls within the intentionally withheld mechanics/mineralogy boundary, or requires unprovided physical source data. No surrogate numbers are inserted.

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate’s values.

### 44.8 Path-Integrated Damage

This canonical subsection slot is retained for fidelity. Its subject matter falls within the intentionally withheld mechanics/mineralogy boundary, or requires unprovided physical source data. No surrogate numbers are inserted.

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 44.9 Differentiated-Path Requirements

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 44.10 Path Approximation Status

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 45 Energy, Mass, Momentum, and Size Audit

This chapter occupies the canonical **Paper-II physical-eligibility block**. Its slot and relationship to the original manuscript are retained. Restricted energetics, phase/mineral data, constitutive assumptions, and unspecified physical outputs are deliberately not reconstructed from geometry.

### 45.1 Exploratory Energy Interval

This canonical subsection slot is retained for fidelity. Its subject matter falls within the intentionally withheld mechanics/mineralogy boundary, or requires unprovided physical source data. No surrogate numbers are inserted.

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 45.2 Exploratory Velocity Interval

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 45.3 Mass From Kinetic Energy

This canonical subsection slot is retained for fidelity. Its subject matter falls within the intentionally withheld mechanics/mineralogy boundary, or requires unprovided physical source data. No surrogate numbers are inserted.

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 45.4 Equivalent Spherical Diameter

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 45.5 Momentum

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 45.6 Energy-to-Binding Ratio

This canonical subsection slot is retained for fidelity. Its subject matter falls within the intentionally withheld mechanics/mineralogy boundary, or requires unprovided physical source data. No surrogate numbers are inserted.

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 45.7 Audit Interpretation

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 45.8 Range-Correlation Requirement

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results

are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

# 46 Thermodynamic, Damage, Melt, and Phase Registry

This chapter occupies the canonical **Paper-II physical-eligibility block**. Its slot and relationship to the original manuscript are retained. Restricted energetics, phase/mineral data, constitutive assumptions, and unspecified physical outputs are deliberately not reconstructed from geometry.

## 46.1 Energy Equation

This canonical subsection slot is retained for fidelity. Its subject matter falls within the intentionally withheld mechanics/mineralogy boundary, or requires unprovided physical source data. No surrogate numbers are inserted.

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 46.2 Damage Evolution

This canonical subsection slot is retained for fidelity. Its subject matter falls within the intentionally withheld mechanics/mineralogy boundary, or requires unprovided physical source data. No surrogate numbers are inserted.

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 46.3 Melt-Fraction Evolution

This canonical subsection slot is retained for fidelity. Its subject matter falls within the intentionally withheld mechanics/mineralogy boundary, or requires unprovided physical source data. No surrogate numbers are inserted.

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 46.4 Phase Evolution

This canonical subsection slot is retained for fidelity. Its subject matter falls within the intentionally withheld mechanics/mineralogy boundary, or requires unprovided physical source data. No surrogate numbers are inserted.

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American

mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 46.5 Density Perturbation

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 46.6 Constitutive State Registry

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 46.7 Thermodynamic Falsification Principle

The effect of any eventual negative test is confined to its named target and mandatory dependency paths. No rejection threshold, data sensitivity, or completed negative test is invented in this initial atlas.

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 47 Dimensionless-Number and Timescale Audit

This chapter occupies the canonical **Paper-II physical-eligibility block**. Its slot and relationship to the original manuscript are retained. Restricted energetics, phase/mineral data, constitutive assumptions, and unspecified physical outputs are deliberately not reconstructed from geometry.

### 47.1 Purpose

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 47.2 Reynolds Number

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results

are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate’s values.

## 47.3 Reynolds-Number Limitation

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate’s values.

## 47.4 Froude Number

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate’s values.

## 47.5 Rossby Number

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate’s values.

## 47.6 Deborah Number

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate’s values.

## 47.7 Constant-Speed Transit Time

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate’s values.

## 47.8 Shock-Transit Time

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate’s values.

### 47.9 Damage-Front Transit

This canonical subsection slot is retained for fidelity. Its subject matter falls within the intentionally withheld mechanics/mineralogy boundary, or requires unprovided physical source data. No surrogate numbers are inserted.

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 47.10 Thermal-Diffusion Timescale

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 47.11 Timescale Registry

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 47.12 Dimensionless-Audit Conclusion

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 48 Midpoint-Inheritance Registry

This chapter occupies the canonical **Paper-II physical-eligibility block**. Its slot and relationship to the original manuscript are retained. Restricted energetics, phase/mineral data, constitutive assumptions, and unspecified physical outputs are deliberately not reconstructed from geometry.

### 48.1 Midpoint Is a Response Region

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 48.2 Midpoint State

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 48.3 Midpoint Localization Kernel

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 48.4 Midpoint Inheritance Variables

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 48.5 Midpoint Persistence

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 48.6 Midpoint Claim Boundary

Claim wording, mathematical input, inferential role, test state, and potential downstream use are kept separately identified. A geometric relation is not automatically a causal or replacement-level claim.

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 48.7 Midpoint Falsifier

The effect of any eventual negative test is confined to its named target and mandatory dependency paths. No rejection threshold, data sensitivity, or completed negative test is invented in this initial atlas.

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results

are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

# 49 Terminal Response and Exit-Energy Registry

This chapter occupies the canonical **Paper-II physical-eligibility block**. Its slot and relationship to the original manuscript are retained. Restricted energetics, phase/mineral data, constitutive assumptions, and unspecified physical outputs are deliberately not reconstructed from geometry.

## 49.1 Terminal State

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 49.2 Terminal Energy Fraction

This canonical subsection slot is retained for fidelity. Its subject matter falls within the intentionally withheld mechanics/mineralogy boundary, or requires unprovided physical source data. No surrogate numbers are inserted.

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 49.3 Corrected Terminal-Energy Range

This canonical subsection slot is retained for fidelity. Its subject matter falls within the intentionally withheld mechanics/mineralogy boundary, or requires unprovided physical source data. No surrogate numbers are inserted.

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 49.4 Terminal Momentum Fraction

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 49.5 Terminal Direction Residual

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 49.6 Terminal Mechanism Classes

This canonical subsection slot is retained for fidelity. Its subject matter falls within the intentionally withheld mechanics/mineralogy boundary, or requires unprovided physical source data. No surrogate numbers are inserted.

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 49.7 No Automatic Trench Attribution

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 49.8 Terminal Compatibility Record

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 49.9 Terminal Falsifier

The effect of any eventual negative test is confined to its named target and mandatory dependency paths. No rejection threshold, data sensitivity, or completed negative test is invented in this initial atlas.

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

# 50 Earth Survival and Angular-Momentum Registry

This chapter occupies the canonical **Paper-II physical-eligibility block**. Its slot and relationship to the original manuscript are retained. Restricted energetics, phase/mineral data, constitutive assumptions, and unspecified physical outputs are deliberately not reconstructed from geometry.

## 50.1 Planetary Survival Is Multidimensional

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 50.2 Total Energy Closure

This canonical subsection slot is retained for fidelity. Its subject matter falls within the intentionally withheld mechanics/mineralogy boundary, or requires unprovided physical source data. No surrogate numbers are inserted.

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 50.3 Total Momentum Closure

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 50.4 Angular Momentum

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 50.5 Rotation Change

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 50.6 Survival Registry

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 50.7 Survival Principle

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 51 Global Marker Registry

This chapter occupies the canonical **Paper-II physical-eligibility block**. Its slot and relationship to the original manuscript are retained. Restricted energetics, phase/mineral data, constitutive assumptions, and unspecified physical outputs are deliberately not reconstructed from geometry.

### 51.1 Purpose

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 51.2 Marker Classes

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 51.3 Marker Prediction Record

No frozen North American advance-prediction packet or independent prediction outcome is supplied in the current four working manuscripts. The entry is a location and status record, not a reported hit or miss.

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 51.4 Marker Presence Likelihood

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 51.5 Marker Absence

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 51.6 Global-Marker Viable Set

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 51.7 Global-Marker Falsifier

The effect of any eventual negative test is confined to its named target and mandatory dependency paths. No rejection threshold, data sensitivity, or completed negative test is invented in this initial atlas.

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 52 Mauna Kea Secondary-Hypothesis Registry

This chapter occupies the canonical **Paper-II physical-eligibility block**. Its slot and relationship to the original manuscript are retained. Restricted energetics, phase/mineral data, constitutive assumptions, and unspecified physical outputs are deliberately not reconstructed from geometry.

The original atlas contains a separate Mauna Kea secondary-hypothesis slot. No corresponding North American secondary target is specified in the supplied instructions; this slot is retained as a **reserved structural location**, not repurposed into a new hypothesis.

### 52.1 Scope

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 52.2 Source-Derived Parameter Range

The exact working files and document-level checksums are enumerated in the source register. This identifies origin and version; it does not itself independently verify scientific claims.

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American

mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 52.3 Secondary Energy

This canonical subsection slot is retained for fidelity. Its subject matter falls within the intentionally withheld mechanics/mineralogy boundary, or requires unprovided physical source data. No surrogate numbers are inserted.

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 52.4 Secondary-Hypothesis Record

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 52.5 Secondary-Hypothesis Limitation

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 53 Paper-II Equation Registry

This chapter occupies the canonical **Paper-II physical-eligibility block**. Its slot and relationship to the original manuscript are retained. Restricted energetics, phase/mineral data, constitutive assumptions, and unspecified physical outputs are deliberately not reconstructed from geometry.

### 53.1 Equation-Audit Priority

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 54 Paper-II Assumption and Parameter Registry

This chapter occupies the canonical **Paper-II physical-eligibility block**. Its slot and relationship to the original manuscript are retained. Restricted energetics, phase/mineral data, constitutive assumptions, and unspecified physical outputs are deliberately not reconstructed from geometry.

### 54.1 Principal Assumptions

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 54.2 Principal Parameter Registry

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 54.3 Highest-Sensitivity Parameters

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 55 Paper-II Prediction Registry

This chapter occupies the canonical **Paper-II physical-eligibility block**. Its slot and relationship to the original manuscript are retained. Restricted energetics, phase/mineral data, constitutive assumptions, and unspecified physical outputs are deliberately not reconstructed from geometry.

### 55.1 Prediction-Freeze Requirement

No frozen North American advance-prediction packet or independent prediction outcome is supplied in the current four working manuscripts. The entry is a location and status record, not a reported hit or miss.

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 56 Paper-II Falsification Registry

This chapter occupies the canonical **Paper-II physical-eligibility block**. Its slot and relationship to the original manuscript are retained. Restricted energetics, phase/mineral data, constitutive assumptions, and unspecified physical outputs are deliberately not reconstructed from geometry.

### 56.1 Branch-Specific Failure

The effect of any eventual negative test is confined to its named target and mandatory dependency paths. No rejection threshold, data sensitivity, or completed negative test is invented in this initial atlas.

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 56.2 Historical-Occurrence Limitation

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 57 Paper-II Contradiction and Supersession Audit

This chapter occupies the canonical **Paper-II physical-eligibility block**. Its slot and relationship to the original manuscript are retained. Restricted energetics, phase/mineral data, constitutive assumptions, and unspecified physical outputs are deliberately not reconstructed from geometry.

### 57.1 Correction Preservation

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 57.2 No Selective Use of Superseded Values

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 58 Paper-II Dependency Graph and Viable Set

This chapter occupies the canonical **Paper-II physical-eligibility block**. Its slot and relationship to the original manuscript are retained. Restricted energetics, phase/mineral data, constitutive assumptions, and unspecified physical outputs are deliberately not reconstructed from geometry.

## 58.1 Paper-II Dependency Graph

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 58.2 Core Mechanical Chain

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 58.3 Branch Viable Sets

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 58.4 Mechanism-Union Set

This canonical subsection slot is retained for fidelity. Its subject matter falls within the intentionally withheld mechanics/mineralogy boundary, or requires unprovided physical source data. No surrogate numbers are inserted.

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 58.5 Complete Paper-II Viable Set

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 58.6 Shared-Parameter Requirement

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 58.7 Paper-II Critical Nodes

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 58.8 Paper-II Failure Cut Set

The effect of any eventual negative test is confined to its named target and mandatory dependency paths. No rejection threshold, data sensitivity, or completed negative test is invented in this initial atlas.

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 58.9 Paper-III Handoff Rule

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 59 Paper-II Atlas Status

This chapter occupies the canonical **Paper-II physical-eligibility block**. Its slot and relationship to the original manuscript are retained. Restricted energetics, phase/mineral data, constitutive assumptions, and unspecified physical outputs are deliberately not reconstructed from geometry.

| Paper | Architecture | Claimed completed scientific test |
|---|---|---|
| II | Draft chapter/section hierarchy present | None asserted for withheld or unprovided domains |

### 59.1 Status Dashboard

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 59.2 Verified Paper-II Outputs

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American

mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 59.3 Current Negative and Restrictive Results

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 59.4 Current Unresolved Questions

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 59.5 Paper-II Atlas Conclusion

**Current recorded state:** STRUCTURE-REGISTERED; mechanics restricted and not evaluated. The corresponding Paper-II chapter supplies the conceptual eligibility slot, but the North American mechanism is outside the public scope. Numerical constitutive, energy, and transmission results are not reported in this atlas. The corresponding upstream manuscript is North American Paper II v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 60 Paper-II Atlas Synthesis

This chapter occupies the canonical **Paper-II physical-eligibility block**. Its slot and relationship to the original manuscript are retained. Restricted energetics, phase/mineral data, constitutive assumptions, and unspecified physical outputs are deliberately not reconstructed from geometry.

This synthesis chapter uses the evidence/status of its preceding atlas block and neither changes the upstream claim nor assigns a new confirmation status. The present North American source set supplies internal working manuscripts only, and the chapter closes at that source boundary.

## 61 Paper-III Atlas Scope

This chapter occupies the canonical **Paper-III sequenced-reconstruction block**. The source Papers I–II handoff is available only as declared path geometry and reserved mechanics; neither a successful global model realization nor an independently observed geological consequence is asserted here.

### 61.1 Paper-III Function

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American

Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate’s values.

## 61.2 Paper-III Central Burden

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate’s values.

## 61.3 Conditional Entry

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate’s values.

## 61.4 Shared Observational Ground

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate’s values.

## 61.5 Paper-III Replacement Proposition

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate’s values.

## 61.6 Paper-III Atlas Objects

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate’s values.

## 61.7 No Event-Sequence Credit by Assignment

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested

event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

# 62 Paper-III Claim Registry

This chapter occupies the canonical **Paper-III sequenced-reconstruction block**. The source Papers I–II handoff is available only as declared path geometry and reserved mechanics; neither a successful global model realization nor an independently observed geological consequence is asserted here.

No new event sequence is added. The Paper-III claim ledger is limited to the named geometry inherited from Papers I–II and the unfilled reconstruction obligations already contained in its v1.6 working draft.

## 62.1 Paper-III Claim Boundary

Claim wording, mathematical input, inferential role, test state, and potential downstream use are kept separately identified. A geometric relation is not automatically a causal or replacement-level claim.

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

# 63 Conditional Paper-II Handoff Audit

This chapter occupies the canonical **Paper-III sequenced-reconstruction block**. The source Papers I–II handoff is available only as declared path geometry and reserved mechanics; neither a successful global model realization nor an independently observed geological consequence is asserted here.

## 63.1 Canonical Handoff State

Canonical Paper III receives **status-qualified mechanical outputs**, not geometric inputs relabeled as mechanical results. The North American Paper-II working draft publicly inherits a specified corridor and reserves energetic/mechanical detail; it does not report a nonempty numerically demonstrated viable mechanical set. Therefore the Paper-II→III physical handoff remains **unfilled**, while the Denali geometric record remains available for navigation.

## 63.2 Handoff Field Registry

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 63.3 Handoff Admissibility Indicator

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 63.4 Complete Handoff Condition

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 63.5 No Invented Handoff Fields

The supplied source permits location, segment order, spherical radius, chord/arc sums, and geometric-role identifiers to be carried into Paper III. It does not permit treating a point as a computed stress field, a waypoint chord as a material transfer path, or the fitted entrance as a time-resolved reconstruction. No momentum, temperature, deformation, phase, or event-history field is inferred from the source geometry.

### 63.6 Handoff Failure

The effect of any eventual negative test is confined to its named target and mandatory dependency paths. No rejection threshold, data sensitivity, or completed negative test is invented in this initial atlas.

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 64 Sequenced Event-Catalog Registry

This chapter occupies the canonical **Paper-III sequenced-reconstruction block**. The source Papers I–II handoff is available only as declared path geometry and reserved mechanics; neither a successful global model realization nor an independently observed geological consequence is asserted here.

### 64.1 Event Catalog

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American

Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate’s values.

## 64.2 Individual Event Record

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate’s values.

## 64.3 Required Event Metadata

The exact working files and document-level checksums are enumerated in the source register. This identifies origin and version; it does not itself independently verify scientific claims.

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate’s values.

## 64.4 Event Sequence

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate’s values.

## 64.5 Nonlinear State Recursion

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate’s values.

## 64.6 No Linear Superposition by Default

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate’s values.

### 64.7 Event-Catalog Status

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 64.8 Event-Selection Complexity

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 65 Plate, Block, and Material-Lineage Registry

This chapter occupies the canonical **Paper-III sequenced-reconstruction block**. The source Papers I–II handoff is available only as declared path geometry and reserved mechanics; neither a successful global model realization nor an independently observed geological consequence is asserted here.

### 65.1 Evolving Material Domain

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 65.2 Fractional Membership

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 65.3 Plate State

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 65.4 Material-Lineage Graph

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 65.5 Lineage Edge Record

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 65.6 Material-Mass Closure

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 65.7 Modern-Plate Projection Prohibition

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 65.8 Lineage Registry Status

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

# 66 Boundary Nucleation and Connectivity Registry

This chapter occupies the canonical **Paper-III sequenced-reconstruction block**. The source Papers I–II handoff is available only as declared path geometry and reserved mechanics; neither a successful global model realization nor an independently observed geological consequence is asserted here.

## 66.1 Boundary-Nucleation Potential

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 66.2 Candidate Boundary Domain

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 66.3 Boundary Persistence

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 66.4 Global Boundary Graph

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 66.5 Boundary Edge Record

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 66.6 Connectivity Matrix

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American

Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 66.7 Plate-Enclosure Test

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 66.8 Boundary Comparison Metrics

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 66.9 Boundary Viable Set

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 66.10 Boundary Falsification Principle

The effect of any eventual negative test is confined to its named target and mandatory dependency paths. No rejection threshold, data sensitivity, or completed negative test is invented in this initial atlas.

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

# 67 Fragmentation, Merger, and Terrane-Transfer Registry

This chapter occupies the canonical **Paper-III sequenced-reconstruction block**. The source Papers I–II handoff is available only as declared path geometry and reserved mechanics; neither a successful global model realization nor an independently observed geological consequence is asserted here.

## 67.1 Fragmentation Operator

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 67.2 Fragmentation Mass Closure

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 67.3 Merger Operator

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 67.4 Terrane-Transfer Matrix

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 67.5 Terrane State

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 67.6 Transfer Requirements

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American

Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 67.7 No Terrane Assignment by Similarity Alone

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 67.8 Fragmentation and Transfer Falsifier

The effect of any eventual negative test is confined to its named target and mandatory dependency paths. No rejection threshold, data sensitivity, or completed negative test is invented in this initial atlas.

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 68 Boundary Type, Propagation, and Reactivation Registry

This chapter occupies the canonical **Paper-III sequenced-reconstruction block**. The source Papers I–II handoff is available only as declared path geometry and reserved mechanics; neither a successful global model realization nor an independently observed geological consequence is asserted here.

### 68.1 Relative Velocity Decomposition

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 68.2 Boundary-Type State

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 68.3 Candidate Boundary Types

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 68.4 Boundary Propagation

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 68.5 Branching Criterion

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 68.6 Reactivation Function

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 68.7 Boundary Inversion

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 68.8 Termination

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American

Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 68.9 Boundary-Type Falsifier

The effect of any eventual negative test is confined to its named target and mandatory dependency paths. No rejection threshold, data sensitivity, or completed negative test is invented in this initial atlas.

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 69 Event-to-Plate Impulse Registry

This chapter occupies the canonical **Paper-III sequenced-reconstruction block**. The source Papers I–II handoff is available only as declared path geometry and reserved mechanics; neither a successful global model realization nor an independently observed geological consequence is asserted here.

### 69.1 Impulse-Density Field

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 69.2 Plate-Integrated Linear Impulse

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 69.3 Plate-Integrated Angular Impulse

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 69.4 Impulse Partition

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 69.5 Rigid and Deforming Components

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 69.6 Immediate Velocity Change

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 69.7 Immediate Angular-Velocity Change

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 69.8 Impulse-Memory Kernel

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 69.9 No Perpetual Impulse

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American

Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 69.10 Impulse Falsifier

The effect of any eventual negative test is confined to its named target and mandatory dependency paths. No rejection threshold, data sensitivity, or completed negative test is invented in this initial atlas.

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 70 Plate Mass, Inertia, Force, Torque, and Euler-Vector Registry

This chapter occupies the canonical **Paper-III sequenced-reconstruction block**. The source Papers I–II handoff is available only as declared path geometry and reserved mechanics; neither a successful global model realization nor an independently observed geological consequence is asserted here.

### 70.1 Plate Mass

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 70.2 Center of Mass

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 70.3 Inertia Tensor

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 70.4 Linear-Momentum Evolution

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 70.5 Angular-Momentum Evolution

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 70.6 Force Registry

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 70.7 Torque Registry

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 70.8 Power Balance

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 70.9 Dissipation Condition

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American

Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 70.10 Euler Velocity

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 70.11 Finite Rotation

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 70.12 Euler-Pole Drift

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 70.13 Euler-Vector Falsifier

The effect of any eventual negative test is confined to its named target and mandatory dependency paths. No rejection threshold, data sensitivity, or completed negative test is invented in this initial atlas.

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 71 Direction, Speed, Acceleration, and Plate-Circuit Registry

This chapter occupies the canonical **Paper-III sequenced-reconstruction block**. The source Papers I–II handoff is available only as declared path geometry and reserved mechanics; neither a successful global model realization nor an independently observed geological consequence is asserted here.

## 71.1 Velocity Contribution Decomposition

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 71.2 Relative Plate Velocity

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 71.3 Direction Residual

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 71.4 Speed Residual

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 71.5 Acceleration

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 71.6 Speed-Hierarchy Score

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American

Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate’s values.

## 71.7 Plate-Circuit Closure

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate’s values.

## 71.8 Triple-Junction Compatibility

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate’s values.

## 71.9 Global Area Accounting

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate’s values.

## 71.10 Directional-Inheritance Counterfactual

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate’s values.

## 71.11 Plate-Motion Viable Set

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate’s values.

# 72 Mountain, Trench, Ridge, Basin, Plateau, and Volcanic Registry

This chapter occupies the canonical **Paper-III sequenced-reconstruction block**. The source Papers I–II handoff is available only as declared path geometry and reserved mechanics; neither a successful global model realization nor an independently observed geological consequence is asserted here.

## 72.1 Unified Surface-Structure State

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 72.2 Mountain-System Registry

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 72.3 Trench and Terminal-Zone Registry

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 72.4 Ridge and Rift Registry

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 72.5 Basin Registry

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American

Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 72.6 Plateau Registry

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 72.7 Volcanic-Province Registry

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 72.8 Surface-Structure Viable Set

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 73 Terrane, Suture, and Continental-Assembly Registry

This chapter occupies the canonical **Paper-III sequenced-reconstruction block**. The source Papers I–II handoff is available only as declared path geometry and reserved mechanics; neither a successful global model realization nor an independently observed geological consequence is asserted here.

### 73.1 Terrane Provenance Vector

The exact working files and document-level checksums are enumerated in the source register. This identifies origin and version; it does not itself independently verify scientific claims.

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 73.2 Terrane Trajectory

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate’s values.

## 73.3 Terrane Rotation

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate’s values.

## 73.4 Docking Condition

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate’s values.

## 73.5 Suture Record

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate’s values.

## 73.6 Assembly Graph

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate’s values.

## 73.7 Assembly Requirements

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American

Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 73.8 Assembly Falsifier

The effect of any eventual negative test is confined to its named target and mandatory dependency paths. No rejection threshold, data sensitivity, or completed negative test is invented in this initial atlas.

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 74 Global Reconstruction and Null-Model Registry

This chapter occupies the canonical **Paper-III sequenced-reconstruction block**. The source Papers I–II handoff is available only as declared path geometry and reserved mechanics; neither a successful global model realization nor an independently observed geological consequence is asserted here.

Global reconstruction, null model, and held-out structure procedures remain not executed for this North American source set. The atlas does not interpret a missing simulation as an observed unsuccessful simulation.

### 74.1 Global State

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 74.2 Sequence Recursion

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 74.3 Global Observation Vector

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American

Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 74.4 Global Prediction

No frozen North American advance-prediction packet or independent prediction outcome is supplied in the current four working manuscripts. The entry is a location and status record, not a reported hit or miss.

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 74.5 Integrated Misfit

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 74.6 No-Event Null

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 74.7 Randomized-Event Null

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 74.8 Shuffled-Age Null

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 74.9 Randomized-Boundary Null

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 74.10 Isotropized-Inheritance Null

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 74.11 Leave-One-Event-Out Test

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 74.12 Leave-One-Region-Out Test

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 74.13 Held-Out Structure Test

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 74.14 Empirical Null Probability

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American

Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 74.15 Global Reconstruction Requirement

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 75 Paper-III Equation Registry

This chapter occupies the canonical **Paper-III sequenced-reconstruction block**. The source Papers I–II handoff is available only as declared path geometry and reserved mechanics; neither a successful global model realization nor an independently observed geological consequence is asserted here.

### 75.1 Equation-Audit Priority

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 76 Paper-III Assumption and Parameter Registry

This chapter occupies the canonical **Paper-III sequenced-reconstruction block**. The source Papers I–II handoff is available only as declared path geometry and reserved mechanics; neither a successful global model realization nor an independently observed geological consequence is asserted here.

### 76.1 Principal Assumptions

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 76.2 Parameter Classes

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American

Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 76.3 Parameter Registry Table

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 76.4 No Independent Regional Retuning

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 77 Paper-III Prediction Registry

This chapter occupies the canonical **Paper-III sequenced-reconstruction block**. The source Papers I–II handoff is available only as declared path geometry and reserved mechanics; neither a successful global model realization nor an independently observed geological consequence is asserted here.

### 77.1 Prediction-Freeze Requirements

No frozen North American advance-prediction packet or independent prediction outcome is supplied in the current four working manuscripts. The entry is a location and status record, not a reported hit or miss.

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 77.2 Current Prediction Status

No frozen North American advance-prediction packet or independent prediction outcome is supplied in the current four working manuscripts. The entry is a location and status record, not a reported hit or miss.

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American

Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

# 78 Paper-III Falsification Registry

This chapter occupies the canonical **Paper-III sequenced-reconstruction block**. The source Papers I–II handoff is available only as declared path geometry and reserved mechanics; neither a successful global model realization nor an independently observed geological consequence is asserted here.

## 78.1 Primary Paper-III Falsifier

The effect of any eventual negative test is confined to its named target and mandatory dependency paths. No rejection threshold, data sensitivity, or completed negative test is invented in this initial atlas.

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 78.2 Compartmentalized Failure

The effect of any eventual negative test is confined to its named target and mandatory dependency paths. No rejection threshold, data sensitivity, or completed negative test is invented in this initial atlas.

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

# 79 Paper-III Contradiction and Supersession Audit

This chapter occupies the canonical **Paper-III sequenced-reconstruction block**. The source Papers I–II handoff is available only as declared path geometry and reserved mechanics; neither a successful global model realization nor an independently observed geological consequence is asserted here.

## 79.1 No Combination of Incompatible Versions

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

# 80 Paper-III Dependency Graph and Integrated Viable Set

This chapter occupies the canonical **Paper-III sequenced-reconstruction block**. The source Papers I–II handoff is available only as declared path geometry and reserved mechanics; neither a successful global model realization nor an independently observed geological consequence is asserted here.

## 80.1 Paper-III Dependency Graph

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 80.2 Core Dependency Chain

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 80.3 Component Viable Sets

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 80.4 Complete Paper-III Viable Set

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 80.5 Shared-Parameter Requirement

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 80.6 No Cross-Branch Compensation

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 80.7 Critical Nodes

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 80.8 Representative Failure Cut Set

The effect of any eventual negative test is confined to its named target and mandatory dependency paths. No rejection threshold, data sensitivity, or completed negative test is invented in this initial atlas.

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 80.9 Paper-IV Handoff

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 81 Paper-III Atlas Status

This chapter occupies the canonical **Paper-III sequenced-reconstruction block**. The source Papers I–II handoff is available only as declared path geometry and reserved mechanics; neither a successful global model realization nor an independently observed geological consequence is asserted here.

| Paper | Architecture | Claimed completed scientific test |
|---|---|---|
| III | Draft chapter/section hierarchy present | None asserted for withheld or unprovided domains |

### 81.1 Status Dashboard

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 81.2 Established Paper-III Architecture

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 81.3 Current Restrictive Results

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 81.4 Current Unresolved Questions

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 81.5 Paper-III Atlas Conclusion

**Current recorded state:** RECONSTRUCTION ARCHITECTURE; empirical reconstruction unexecuted. Paper III retains the named source architecture but no complete independently tested event-to-plate or event-to-surface reconstruction is registered. A modern geometry is not automatically a past-state reconstruction. The corresponding upstream manuscript is North American Paper III v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 82 Paper-III Atlas Synthesis

This chapter occupies the canonical **Paper-III sequenced-reconstruction block**. The source Papers I–II handoff is available only as declared path geometry and reserved mechanics; neither a successful global model realization nor an independently observed geological consequence is asserted here.

This synthesis chapter uses the evidence/status of its preceding atlas block and neither changes the upstream claim nor assigns a new confirmation status. The present North American source set supplies internal working manuscripts only, and the chapter closes at that source boundary.

# 83 Paper-IV Atlas Scope

This chapter occupies the canonical **Paper-IV comparison block**. Inherited Paper-I geometry supplies a declared candidate input, but does not establish the performance of the candidate relative to a Plate-Tectonic model family. Comparative outputs are registered as not yet executed.

## 83.1 Paper-IV Function

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 83.2 Primary Comparative Burden

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 83.3 Paper-IV Atlas Objects

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 83.4 Eligible Outcomes

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 83.5 No Replacement by Rhetoric

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

# 84 Paper-IV Comparison Claim Registry

This chapter occupies the canonical **Paper-IV comparison block**. Inherited Paper-I geometry supplies a declared candidate input, but does not establish the performance of the candidate relative to a Plate-Tectonic model family. Comparative outputs are registered as not yet executed.

| Question | Status |
|---|---|
| Does the geometric equality hold by defined arithmetic? | Working-source value recorded |
| Is the physical path admissible? | Not demonstrated |
| Does it generate observed boundaries and motions? | Not demonstrated |
| Is it favored over a specified Plate-Tectonic implementation? | No comparison executed |
| Does it satisfy a replacement threshold? | No decision made |

This synthesis chapter uses the evidence/status of its preceding atlas block and neither changes the upstream claim nor assigns a new confirmation status. The present North American source set supplies internal working manuscripts only, and the chapter closes at that source boundary.

# 85 Shared Observation and Data Registry

This chapter occupies the canonical **Paper-IV comparison block**. Inherited Paper-I geometry supplies a declared candidate input, but does not establish the performance of the candidate relative to a Plate-Tectonic model family. Comparative outputs are registered as not yet executed.

## 85.1 Shared Observation Vector

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 85.2 Shared-Data Registry

The exact working files and document-level checksums are enumerated in the source register. This identifies origin and version; it does not itself independently verify scientific claims.

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 85.3 Data Partition

The exact working files and document-level checksums are enumerated in the source register. This identifies origin and version; it does not itself independently verify scientific claims.

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 85.4 Shared Uncertainty

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 85.5 Resolution Matching

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 85.6 No Unequal Evidence Burden

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 86 Competing Model-Family Registry

This chapter occupies the canonical **Paper-IV comparison block**. Inherited Paper-I geometry supplies a declared candidate input, but does not establish the performance of the candidate relative to a Plate-Tectonic model family. Comparative outputs are registered as not yet executed.

### 86.1 Complete Model Family

The manuscript records the corresponding Paper-IV requirement without reporting a fit statistic, Bayes factor, superiority decision, or replacement classification. Those quantities are undefined for the current supplied data.

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 86.2 Model Registry

The manuscript records the corresponding Paper-IV requirement without reporting a fit statistic, Bayes factor, superiority decision, or replacement classification. Those quantities are undefined

for the current supplied data.

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 86.3 Plate-Tectonic Family Is Not One Model

The manuscript records the corresponding Paper-IV requirement without reporting a fit statistic, Bayes factor, superiority decision, or replacement classification. Those quantities are undefined for the current supplied data.

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 86.4 Astro-Ballistic Eligibility

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 86.5 Hybrid Definition

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 87 Matched Comparison and Eligibility Rules

This chapter occupies the canonical **Paper-IV comparison block**. Inherited Paper-I geometry supplies a declared candidate input, but does not establish the performance of the candidate relative to a Plate-Tectonic model family. Comparative outputs are registered as not yet executed.

### 87.1 Matched Input Domain

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 87.2 Matched Output Domain

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 87.3 Matched Spatial Domain

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 87.4 Matched Time Domain

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 87.5 Eligibility Record

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 87.6 Eligibility Condition

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 87.7 No Unequal Completion Standard

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 87.8 No Post-Ranking Model Redefinition

The manuscript records the corresponding Paper-IV requirement without reporting a fit statistic, Bayes factor, superiority decision, or replacement classification. Those quantities are undefined

for the current supplied data.

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

# 88 Initial-Condition and Boundary-Information Accounting

This chapter occupies the canonical **Paper-IV comparison block**. Inherited Paper-I geometry supplies a declared candidate input, but does not establish the performance of the candidate relative to a Plate-Tectonic model family. Comparative outputs are registered as not yet executed.

## 88.1 Initial State

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 88.2 Initial-State Description Length

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 88.3 Boundary Information

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 88.4 Velocity Information

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 88.5 Information-Credit Rule

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corre-

sponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 88.6 Boundary-Origin Ablation

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 88.7 Initial-State Sensitivity

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 88.8 Initial-Condition Falsifier

The effect of any eventual negative test is confined to its named target and mandatory dependency paths. No rejection threshold, data sensitivity, or completed negative test is invented in this initial atlas.

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 89 Boundary and Plate-Partition Comparison Registry

This chapter occupies the canonical **Paper-IV comparison block**. Inherited Paper-I geometry supplies a declared candidate input, but does not establish the performance of the candidate relative to a Plate-Tectonic model family. Comparative outputs are registered as not yet executed.

### 89.1 Observed and Predicted Networks

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 89.2 Boundary Geometry Misfit

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 89.3 Boundary Topology Misfit

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 89.4 Boundary-Type Misfit

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 89.5 Boundary-Chronology Misfit

The source materials provide no independently validated event-time coordinate reconstruction for this North American path. Modern coordinate calculations therefore remain modern-coordinate calculations.

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 89.6 Plate-Partition Overlap

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 89.7 Boundary Comparison Score

The manuscript records the corresponding Paper-IV requirement without reporting a fit statistic, Bayes factor, superiority decision, or replacement classification. Those quantities are undefined for the current supplied data.

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 89.8 Boundary-Origin Necessity

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corre-

sponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 89.9 Boundary Falsifier

The effect of any eventual negative test is confined to its named target and mandatory dependency paths. No rejection threshold, data sensitivity, or completed negative test is invented in this initial atlas.

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 90 Motion, Euler-Vector, Force, Torque, and Power Comparison

This chapter occupies the canonical **Paper-IV comparison block**. Inherited Paper-I geometry supplies a declared candidate input, but does not establish the performance of the candidate relative to a Plate-Tectonic model family. Comparative outputs are registered as not yet executed.

### 90.1 Observed Motion Vector

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 90.2 Predicted Motion Vector

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 90.3 Velocity Misfit

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 90.4 Euler-Vector Residual

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corre-

sponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 90.5 Force Closure

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 90.6 Torque Closure

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 90.7 Power Residual

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 90.8 Dissipation Constraint

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 90.9 Motion Comparison Score

The manuscript records the corresponding Paper-IV requirement without reporting a fit statistic, Bayes factor, superiority decision, or replacement classification. Those quantities are undefined for the current supplied data.

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 90.10 Motion Necessity

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corre-

sponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 90.11 Motion Falsifier

The effect of any eventual negative test is confined to its named target and mandatory dependency paths. No rejection threshold, data sensitivity, or completed negative test is invented in this initial atlas.

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 91 Surface-Structure Comparison Registry

This chapter occupies the canonical **Paper-IV comparison block**. Inherited Paper-I geometry supplies a declared candidate input, but does not establish the performance of the candidate relative to a Plate-Tectonic model family. Comparative outputs are registered as not yet executed.

### 91.1 Shared Surface-Structure Vector

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 91.2 Structure Record

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 91.3 Spatial Comparison

The manuscript records the corresponding Paper-IV requirement without reporting a fit statistic, Bayes factor, superiority decision, or replacement classification. Those quantities are undefined for the current supplied data.

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 91.4 Orientation Comparison

The manuscript records the corresponding Paper-IV requirement without reporting a fit statistic, Bayes factor, superiority decision, or replacement classification. Those quantities are undefined for the current supplied data.

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 91.5 Magnitude and Material Comparison

The manuscript records the corresponding Paper-IV requirement without reporting a fit statistic, Bayes factor, superiority decision, or replacement classification. Those quantities are undefined for the current supplied data.

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 91.6 Chronology Comparison

The source materials provide no independently validated event-time coordinate reconstruction for this North American path. Modern coordinate calculations therefore remain modern-coordinate calculations.

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 91.7 Class-Specific Requirements

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 91.8 Surface Comparison Score

The manuscript records the corresponding Paper-IV requirement without reporting a fit statistic, Bayes factor, superiority decision, or replacement classification. Those quantities are undefined for the current supplied data.

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 91.9 Surface-Structure Falsifier

The effect of any eventual negative test is confined to its named target and mandatory dependency paths. No rejection threshold, data sensitivity, or completed negative test is invented in this initial atlas.

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 92 Deep-Geophysical Comparison Registry

This chapter occupies the canonical **Paper-IV comparison block**. Inherited Paper-I geometry supplies a declared candidate input, but does not establish the performance of the candidate relative to a Plate-Tectonic model family. Comparative outputs are registered as not yet executed.

### 92.1 Deep-State Vector

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 92.2 Gravity Prediction

No frozen North American advance-prediction packet or independent prediction outcome is supplied in the current four working manuscripts. The entry is a location and status record, not a reported hit or miss.

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 92.3 Seismic Prediction

No frozen North American advance-prediction packet or independent prediction outcome is supplied in the current four working manuscripts. The entry is a location and status record, not a reported hit or miss.

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 92.4 Magnetic Prediction

No frozen North American advance-prediction packet or independent prediction outcome is supplied in the current four working manuscripts. The entry is a location and status record, not a reported hit or miss.

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 92.5 Thermal Prediction

No frozen North American advance-prediction packet or independent prediction outcome is supplied in the current four working manuscripts. The entry is a location and status record, not a reported hit or miss.

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 92.6 Deep-Geophysical Misfit

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 92.7 Cross-Geophysical Consistency

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 92.8 No Independent Field Tuning

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 92.9 Deep-Geophysical Falsifier

The effect of any eventual negative test is confined to its named target and mandatory dependency paths. No rejection threshold, data sensitivity, or completed negative test is invented in this initial atlas.

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

# 93 Chronology and Paleogeographic Comparison Registry

This chapter occupies the canonical **Paper-IV comparison block**. Inherited Paper-I geometry supplies a declared candidate input, but does not establish the performance of the candidate relative to a Plate-Tectonic model family. Comparative outputs are registered as not yet executed.

## 93.1 Time Convention

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 93.2 Chronology Vector

The source materials provide no independently validated event-time coordinate reconstruction for this North American path. Modern coordinate calculations therefore remain modern-coordinate calculations.

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 93.3 Chronological Violation

The source materials provide no independently validated event-time coordinate reconstruction for this North American path. Modern coordinate calculations therefore remain modern-coordinate calculations.

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 93.4 Chronology Score

The source materials provide no independently validated event-time coordinate reconstruction for this North American path. Modern coordinate calculations therefore remain modern-coordinate calculations.

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corre-

sponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 93.5 Material Reconstruction

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 93.6 Paleogeographic State

The source materials provide no independently validated event-time coordinate reconstruction for this North American path. Modern coordinate calculations therefore remain modern-coordinate calculations.

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 93.7 Paleogeographic Comparison Score

The source materials provide no independently validated event-time coordinate reconstruction for this North American path. Modern coordinate calculations therefore remain modern-coordinate calculations.

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 93.8 Event-Time Path Test

The source materials provide no independently validated event-time coordinate reconstruction for this North American path. Modern coordinate calculations therefore remain modern-coordinate calculations.

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 93.9 Chronology and Paleogeography Falsifier

The effect of any eventual negative test is confined to its named target and mandatory dependency paths. No rejection threshold, data sensitivity, or completed negative test is invented in this initial atlas.

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

# 94 Causal Coverage and Necessity Registry

This chapter occupies the canonical **Paper-IV comparison block**. Inherited Paper-I geometry supplies a declared candidate input, but does not establish the performance of the candidate relative to a Plate-Tectonic model family. Comparative outputs are registered as not yet executed.

## 94.1 Observation-Class Set

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 94.2 Coverage Indicator

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 94.3 Weighted Coverage

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 94.4 Causal-Depth Scale

Claim wording, mathematical input, inferential role, test state, and potential downstream use are kept separately identified. A geometric relation is not automatically a causal or replacement-level claim.

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 94.5 Mean Causal Depth

Claim wording, mathematical input, inferential role, test state, and potential downstream use are kept separately identified. A geometric relation is not automatically a causal or replacement-level

claim.

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 94.6 Causal-Chain Completion

Claim wording, mathematical input, inferential role, test state, and potential downstream use are kept separately identified. A geometric relation is not automatically a causal or replacement-level claim.

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 94.7 Mechanism Necessity

This canonical subsection slot is retained for fidelity. Its subject matter falls within the intentionally withheld mechanics/mineralogy boundary, or requires unprovided physical source data. No surrogate numbers are inserted.

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 94.8 Event Necessity

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 94.9 Interaction Necessity

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 94.10 Coverage Score

The manuscript records the corresponding Paper-IV requirement without reporting a fit statistic, Bayes factor, superiority decision, or replacement classification. Those quantities are undefined for the current supplied data.

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 94.11 Causal-Coverage Falsifier

The effect of any eventual negative test is confined to its named target and mandatory dependency paths. No rejection threshold, data sensitivity, or completed negative test is invented in this initial atlas.

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 95 Model Evidence, Equivalence, and Ranking Registry

This chapter occupies the canonical **Paper-IV comparison block**. Inherited Paper-I geometry supplies a declared candidate input, but does not establish the performance of the candidate relative to a Plate-Tectonic model family. Comparative outputs are registered as not yet executed.

### 95.1 Likelihood

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 95.2 Common Comparison Contract

The manuscript records the corresponding Paper-IV requirement without reporting a fit statistic, Bayes factor, superiority decision, or replacement classification. Those quantities are undefined for the current supplied data.

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 95.3 Marginal Evidence

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 95.4 Bayes Factor

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 95.5 Posterior Model Probability

The manuscript records the corresponding Paper-IV requirement without reporting a fit statistic, Bayes factor, superiority decision, or replacement classification. Those quantities are undefined for the current supplied data.

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 95.6 Cross-Validated Predictive Score

The manuscript records the corresponding Paper-IV requirement without reporting a fit statistic, Bayes factor, superiority decision, or replacement classification. Those quantities are undefined for the current supplied data.

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 95.7 Prospective Predictive Score

No frozen North American advance-prediction packet or independent prediction outcome is supplied in the current four working manuscripts. The entry is a location and status record, not a reported hit or miss.

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 95.8 Integrated Ranking Vector

The manuscript records the corresponding Paper-IV requirement without reporting a fit statistic, Bayes factor, superiority decision, or replacement classification. Those quantities are undefined for the current supplied data.

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 95.9 No Unregistered Scalar Rank Averaging

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 95.10 Equivalence

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 95.11 Ranking Stability

The manuscript records the corresponding Paper-IV requirement without reporting a fit statistic, Bayes factor, superiority decision, or replacement classification. Those quantities are undefined for the current supplied data.

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 95.12 Prior Sensitivity

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 95.13 Model-Ranking Falsifier

The effect of any eventual negative test is confined to its named target and mandatory dependency paths. No rejection threshold, data sensitivity, or completed negative test is invented in this initial atlas.

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

# 96 Effective Complexity and Description-Length Registry

This chapter occupies the canonical **Paper-IV comparison block**. Inherited Paper-I geometry supplies a declared candidate input, but does not establish the performance of the candidate relative to a Plate-Tectonic model family. Comparative outputs are registered as not yet executed.

## 96.1 Raw Parameter Count

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 96.2 Effective-Complexity Ledger

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 96.3 Event-Catalog Complexity

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 96.4 Search-Space Description Length

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 96.5 Revision Description Length

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 96.6 Data Description Length

The exact working files and document-level checksums are enumerated in the source register. This identifies origin and version; it does not itself independently verify scientific claims.

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 96.7 Total Description Length

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 96.8 Causal Compression

Claim wording, mathematical input, inferential role, test state, and potential downstream use are kept separately identified. A geometric relation is not automatically a causal or replacement-level claim.

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 96.9 Complexity Registry

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 96.10 Encoding Compatibility

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 96.11 Complexity Falsifier

The effect of any eventual negative test is confined to its named target and mandatory dependency paths. No rejection threshold, data sensitivity, or completed negative test is invented in this initial atlas.

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 97 Null, Selection, and Multiple-Testing Registry

This chapter occupies the canonical **Paper-IV comparison block**. Inherited Paper-I geometry supplies a declared candidate input, but does not establish the performance of the candidate relative to a Plate-Tectonic model family. Comparative outputs are registered as not yet executed.

## 97.1 Null Family

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 97.2 Null Registry

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 97.3 Empirical Null Probability

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 97.4 Full-Pipeline Null Requirement

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 97.5 Complete Search Ledger

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 97.6 Family-Wise Error

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 97.7 False-Discovery Control

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complex-

ity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 97.8 Selection-Adjusted Probability

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 97.9 Holdout Depletion

No frozen North American advance-prediction packet or independent prediction outcome is supplied in the current four working manuscripts. The entry is a location and status record, not a reported hit or miss.

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 97.10 Null and Selection Falsifier

The effect of any eventual negative test is confined to its named target and mandatory dependency paths. No rejection threshold, data sensitivity, or completed negative test is invented in this initial atlas.

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 98 Advance-Prediction Registry

This chapter occupies the canonical **Paper-IV comparison block**. Inherited Paper-I geometry supplies a declared candidate input, but does not establish the performance of the candidate relative to a Plate-Tectonic model family. Comparative outputs are registered as not yet executed.

### 98.1 Prediction Record

No frozen North American advance-prediction packet or independent prediction outcome is supplied in the current four working manuscripts. The entry is a location and status record, not a reported hit or miss.

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 98.2 Prediction Classes

No frozen North American advance-prediction packet or independent prediction outcome is supplied in the current four working manuscripts. The entry is a location and status record, not a reported hit or miss.

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 98.3 Predictive Distribution

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 98.4 Continuous Prediction Score

No frozen North American advance-prediction packet or independent prediction outcome is supplied in the current four working manuscripts. The entry is a location and status record, not a reported hit or miss.

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 98.5 Binary Prediction Score

No frozen North American advance-prediction packet or independent prediction outcome is supplied in the current four working manuscripts. The entry is a location and status record, not a reported hit or miss.

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 98.6 Spatial Specificity

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 98.7 Negative Prediction Domain

No frozen North American advance-prediction packet or independent prediction outcome is supplied in the current four working manuscripts. The entry is a location and status record, not a reported hit or miss.

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 98.8 Predictive Superiority

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 98.9 Prediction Status

No frozen North American advance-prediction packet or independent prediction outcome is supplied in the current four working manuscripts. The entry is a location and status record, not a reported hit or miss.

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 98.10 Advance-Prediction Falsifier

No frozen North American advance-prediction packet or independent prediction outcome is supplied in the current four working manuscripts. The entry is a location and status record, not a reported hit or miss.

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 98.11 Predictive-Score Completeness Rule

The manuscript records the corresponding Paper-IV requirement without reporting a fit statistic, Bayes factor, superiority decision, or replacement classification. Those quantities are undefined for the current supplied data.

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

# 99 Hybrid Causal-Decomposition Registry

This chapter occupies the canonical **Paper-IV comparison block**. Inherited Paper-I geometry supplies a declared candidate input, but does not establish the performance of the candidate relative to a Plate-Tectonic model family. Comparative outputs are registered as not yet executed.

## 99.1 Hybrid Components

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 99.2 Parent Ablations

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 99.3 Parent Necessity

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 99.4 Class-Specific Attribution

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 99.5 Dominance Fraction

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 99.6 Hybrid Classification

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corre-

sponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 99.7 Hybrid Complexity

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 99.8 Hybrid Preference

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 99.9 Hybrid Falsifier

The effect of any eventual negative test is confined to its named target and mandatory dependency paths. No rejection threshold, data sensitivity, or completed negative test is invented in this initial atlas.

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 99.10 Hybrid Interaction and Dominance Guardrails

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 100 Regional Versus Global Classification

This chapter occupies the canonical **Paper-IV comparison block**. Inherited Paper-I geometry supplies a declared candidate input, but does not establish the performance of the candidate relative to a Plate-Tectonic model family. Comparative outputs are registered as not yet executed.

### 100.1 Regional Partition

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 100.2 Regional Score

The manuscript records the corresponding Paper-IV requirement without reporting a fit statistic, Bayes factor, superiority decision, or replacement classification. Those quantities are undefined for the current supplied data.

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 100.3 Regional Viability

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 100.4 Global Regional Intersection

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 100.5 Regional Transferability

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 100.6 Parameter Heterogeneity

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 100.7 Classification Rules

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 100.8 Regional-to-Global Falsifier

The effect of any eventual negative test is confined to its named target and mandatory dependency paths. No rejection threshold, data sensitivity, or completed negative test is invented in this initial atlas.

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 101 Complete Paper-IV Viable Set and Decision Tree

This chapter occupies the canonical **Paper-IV comparison block**. Inherited Paper-I geometry supplies a declared candidate input, but does not establish the performance of the candidate relative to a Plate-Tectonic model family. Comparative outputs are registered as not yet executed.

### 101.1 Explicit Component Viable Sets

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 101.2 Complete Model Viable Set

The manuscript records the corresponding Paper-IV requirement without reporting a fit statistic, Bayes factor, superiority decision, or replacement classification. Those quantities are undefined for the current supplied data.

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 101.3 Astro-Ballistic Series Eligibility

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 101.4 Integrated Score

The manuscript records the corresponding Paper-IV requirement without reporting a fit statistic, Bayes factor, superiority decision, or replacement classification. Those quantities are undefined for the current supplied data.

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 101.5 Comparative Threshold Freeze Gate

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 101.6 Replacement Conditions

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 101.7 Formal Decision Sequence

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 101.8 Outcome Function

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 101.9 Complete-Viability Falsifier

The effect of any eventual negative test is confined to its named target and mandatory dependency paths. No rejection threshold, data sensitivity, or completed negative test is invented in this initial atlas.

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

# 102 Paper-IV Claim and Falsification Registry

This chapter occupies the canonical **Paper-IV comparison block**. Inherited Paper-I geometry supplies a declared candidate input, but does not establish the performance of the candidate relative to a Plate-Tectonic model family. Comparative outputs are registered as not yet executed.

## 102.1 Principal Decision Claims

Claim wording, mathematical input, inferential role, test state, and potential downstream use are kept separately identified. A geometric relation is not automatically a causal or replacement-level claim.

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 102.2 Integrated Falsification Registry

The effect of any eventual negative test is confined to its named target and mandatory dependency paths. No rejection threshold, data sensitivity, or completed negative test is invented in this initial atlas.

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 102.3 No Cross-Compensation

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

# 103 Replication and Cross-Paper Dependency Graph

This chapter occupies the canonical **Paper-IV comparison block**. Inherited Paper-I geometry supplies a declared candidate input, but does not establish the performance of the candidate relative to a Plate-Tectonic model family. Comparative outputs are registered as not yet executed.

## 103.1 Replication Levels

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 103.2 Replication Record

The reproducible calculation is $L_1 = c(E, M)$ compared with $L_2 = \sum_{i=0}^{7} c(W_i, W_{i+1})$ at $R = 6{,}371\,\text{km}$; $E$ is source-fitted and $M = W_0$ is source-fixed. The eight-segment ledger consists of the coordinate-derived turn-to-Denali chord plus seven later workbook chords; their cumulative total is approximately $8{,}061.8708\,\text{km}$. The same seven workbook rows also contain arcs, with a separate source-calculated first arc contributing to the $8{,}085.0443\,\text{km}$ second-leg arc total. This is **geometric arithmetic replication**, not independent validation of a causal event or Paper-IV model ranking.

## 103.3 Replication Statuses

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 103.4 Cross-Paper Dependency Graph

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 103.5 Series Dependency Chain

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 103.6 Cross-Paper Critical Nodes

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 103.7 Series Failure Cut Set

The effect of any eventual negative test is confined to its named target and mandatory dependency paths. No rejection threshold, data sensitivity, or completed negative test is invented in this initial atlas.

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 103.8 Failure Propagation

The effect of any eventual negative test is confined to its named target and mandatory dependency paths. No rejection threshold, data sensitivity, or completed negative test is invented in this initial atlas.

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 103.9 Replacement Decision Node

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 104 Paper-IV Atlas Status

This chapter occupies the canonical **Paper-IV comparison block**. Inherited Paper-I geometry supplies a declared candidate input, but does not establish the performance of the candidate relative to a Plate-Tectonic model family. Comparative outputs are registered as not yet executed.

| Paper | Architecture | Claimed completed scientific test |
|---|---|---|
| IV | Draft chapter/section hierarchy present | None asserted for withheld or unprovided domains |

### 104.1 Status Dashboard

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 104.2 Established Paper-IV Architecture

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 104.3 Current Unresolved Questions

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complex-

ity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

### 104.4 Paper-IV Atlas Conclusion

**Current recorded state:** COMPARISON ARCHITECTURE; model ranking unexecuted. Paper IV identifies the comparison obligation, not an executed model-ranking result. Shared-data, complexity, uncertainty, prediction, and replication gates remain without completed values. The corresponding upstream manuscript is North American Paper IV v1.6; missing outputs are not silently replaced with the original Aegean candidate's values.

## 105 Paper-IV Atlas Synthesis

This chapter occupies the canonical **Paper-IV comparison block**. Inherited Paper-I geometry supplies a declared candidate input, but does not establish the performance of the candidate relative to a Plate-Tectonic model family. Comparative outputs are registered as not yet executed.

The appropriate Paper-IV classification is **comparison not executed**. Registration does not turn this into failure or success of either model. Paper V must preserve the absence of a comparative outcome.

This synthesis chapter uses the evidence/status of its preceding atlas block and neither changes the upstream claim nor assigns a new confirmation status. The present North American source set supplies internal working manuscripts only, and the chapter closes at that source boundary.

## 106 Cross-Paper Claim Hierarchy

This chapter occupies the original atlas's **cross-paper integration block**. Its role is to link identifiably sourced items and preserve the scope of unresolved dependencies; it cannot fill gaps in the four primary working papers.

| Claim stratum | Necessary prior input | Present source state |
|---|---|---|
| Point and path declaration | Author-fixed coordinates and waypoint order | Available |
| Chord correspondence | Geometry convention and segment sums | Source-recorded |
| Physical response | Specified and tested response model | Unprovided/withheld |
| History and reconstruction | Registered event-time state and outcomes | Not executed |
| Comparative preference | Common data, frozen scoring, fair alternatives | Not executed |
| Global replacement | All preceding mandatory gates | Not adjudicated |

**Existing claim-ID concordance (navigation only).** The following table links identifiers already present in the four working manuscripts; it does not create new claims, alter a claim's evidence level, or assert causal equivalence between papers.

| Narrow claim or inherited question | Paper I | Paper II | Paper III | Paper IV | Present status |
|---|---|---|---|---|---|
| Direct first-leg chord and eight-chord second-leg sum | NA-G03, NA-G04 | NA-P2-G01, NA-P2-G02, NA-P2-G03 | NA-III-C01 | NA-IV-C01 | Source-calculated, with entrance coordinate fitted to the equality criterion |
| Fixed turn distinct from Denali location | NA-G01, NA-G05 | NA-P2-G04 | NA-III-C02 | NA-IV-C02 | Documented geometric relation; does not determine a physical response |
| Candidate historical event and middle-mountain response | NA-H01, NA-H02 | NA-P2-M01, NA-P2-M02 | NA-III-C03 | NA-IV-C03 | Proposed or untested; mechanics not publicly supplied |
| Proposed global boundary-network reconstruc-tion | — | — | NA-III-C04 | NA-IV-C04 | No executed North American re-construction supplied |
| Proposed long-time plate-motion reconstruc-tion | — | — | NA-III-C05 | NA-IV-C05 | No executed North American re-construction supplied |
| Comparative preference over Plate Tectonics | — | — | NA-III-C08 | NA-IV-C06, NA-IV-C07 | No matched comparative adjudication supplied |

The identifier correspondence is a **document-location crosswalk**, not an inference that a later paper has independently verified the earlier one.

## 106.1 Series-Level Proposition

**Series-level record:** Series-Level Proposition. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## 106.2 Series Claim Node

Claim wording, mathematical input, inferential role, test state, and potential downstream use are kept separately identified. A geometric relation is not automatically a causal or replacement-level claim.

**Series-level record:** Series Claim Node. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## 106.3 Event-Indexed and Global Scientific Gates

**Series-level record:** Event-Indexed and Global Scientific Gates. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## 106.4 Flagship Paper-I Gate

**Series-level record:** Flagship Paper-I Gate. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## 106.5 Flagship Paper-II Gate

**Series-level record:** Flagship Paper-II Gate. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## 106.6 Paper-III Gate

**Series-level record:** Paper-III Gate. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## 106.7 Paper-IV Gate

**Series-level record:** Paper-IV Gate. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## 106.8 Claim Hierarchy

Claim wording, mathematical input, inferential role, test state, and potential downstream use are kept separately identified. A geometric relation is not automatically a causal or replacement-level claim.

**Series-level record:** Claim Hierarchy. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

### 106.9 Claim-Level Separation

Claim wording, mathematical input, inferential role, test state, and potential downstream use are kept separately identified. A geometric relation is not automatically a causal or replacement-level claim.

**Series-level record:** Claim-Level Separation. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

### 106.10 No Automatic Claim Promotion

Claim wording, mathematical input, inferential role, test state, and potential downstream use are kept separately identified. A geometric relation is not automatically a causal or replacement-level claim.

**Series-level record:** No Automatic Claim Promotion. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

### 106.11 Current Series Claim Status

Claim wording, mathematical input, inferential role, test state, and potential downstream use are kept separately identified. A geometric relation is not automatically a causal or replacement-level claim.

**Series-level record:** Current Series Claim Status. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## 107 Series-Wide Equation Registry

This chapter occupies the original atlas's **cross-paper integration block**. Its role is to link identifiably sourced items and preserve the scope of unresolved dependencies; it cannot fill gaps in the four primary working papers.

| Equation family | Used for | Claim status |
|---|---|---|
| $\theta = \cos^{-1}(\mathbf{u}_i \cdot \mathbf{u}_j)$ | Central angle | Calculation convention |
| $c_{ij} = 2R\sin(\theta_{ij}/2)$ | Single chord | Calculation convention |
| $L_2 = \sum_i c_{i,i+1}$ | Eight-chord sum | Derived under path |
| $\Delta L = L_1 - L_2$ | Correspondence residual | Approx. zero in source record |
| Mechanical/reconstruction equations | Reserved sections of II–III | No new verified solutions |

| Equation family | Used for | Claim status |
|---|---|---|
| Comparative score/decision equations | Paper IV architecture | No executed fit |

## 107.1 Equation-Family Architecture

**Series-level record:** Equation-Family Architecture. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## 107.2 Cross-Paper Equation Registry

**Series-level record:** Cross-Paper Equation Registry. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## 107.3 Equation Dependency Chain

**Series-level record:** Equation Dependency Chain. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## 107.4 Equation Verification Vector

**Verified within the stated numerical convention:** spherical central-angle evaluation, surface arcs, point-to-point chords, the direct length $L_1$, the segmented sum $L_2$, and their fitted residual (NAM-EQ-G01–G07). **Not verified by this equation set:** an independently located physical entrance, an interior mechanical trajectory, event energetics, a post-event reconstruction, or a preference over another geological theory. A mathematical identity and its input-dependent output are registered separately from any empirical validation.

## 107.5 Equation Audit States

**Series-level record:** Equation Audit States. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## 107.6 Equation-Source Separation

Equation records NAM-EQ-G01 through NAM-EQ-G07 describe spherical definitions and the fitted two-leg construction. The definitions themselves are mathematical; their evaluated numbers depend on the *Denali Exact* positions, $R = 6{,}371\,\text{km}$, and the seven downstream workbook chord entries. An equation being algebraically well formed does not certify coordinate survey precision, geological attribution, or the causal validity of a model. Mechanics-equation headings inherited from Paper II are not populated with Denali event parameters.

### 107.7 Author-Defined Diagnostics

**Series-level record:** Author-Defined Diagnostics. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

### 107.8 Equation Completion Requirement

**Series-level record:** Equation Completion Requirement. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## 108 Symbol, Notation, Unit, and Dimensional Audit

This chapter occupies the original atlas's **cross-paper integration block**. Its role is to link identifiably sourced items and preserve the scope of unresolved dependencies; it cannot fill gaps in the four primary working papers.

### 108.1 Canonical Unit System

**Series-level record:** Canonical Unit System. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

### 108.2 Angle Convention

**Series-level record:** Angle Convention. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

### 108.3 Time Convention

**Series-level record:** Time Convention. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

### 108.4 Geological Age Notation

**Series-level record:** Geological Age Notation. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

### 108.5 Canonical Viable-Set Names

**Series-level record:** Canonical Viable-Set Names. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal

level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## 108.6 Legacy Short Subscripts

**Series-level record:** Legacy Short Subscripts. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## 108.7 Boundary and Basin Symbols

**Series-level record:** Boundary and Basin Symbols. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## 108.8 Velocity and Volcanism Symbols

**Series-level record:** Velocity and Volcanism Symbols. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## 108.9 Time-Ordering Operator

**Series-level record:** Time-Ordering Operator. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## 108.10 Identity Tensor

**Series-level record:** Identity Tensor. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## 108.11 Damage

This canonical subsection slot is retained for fidelity. Its subject matter falls within the intentionally withheld mechanics/mineralogy boundary, or requires unprovided physical source data. No surrogate numbers are inserted.

**Series-level record:** Damage. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## 108.12 Melt Fraction

This canonical subsection slot is retained for fidelity. Its subject matter falls within the intentionally withheld mechanics/mineralogy boundary, or requires unprovided physical source data. No surrogate numbers are inserted.

**Series-level record:** Melt Fraction. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## 108.13 Phase Fractions

This canonical subsection slot is retained for fidelity. Its subject matter falls within the intentionally withheld mechanics/mineralogy boundary, or requires unprovided physical source data. No surrogate numbers are inserted.

**Series-level record:** Phase Fractions. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## 108.14 Density Perturbation

**Series-level record:** Density Perturbation. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## 108.15 Vertical Displacement Convention

**Series-level record:** Vertical Displacement Convention. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## 108.16 Trench Displacement Convention

**Series-level record:** Trench Displacement Convention. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## 108.17 Stress and Pressure

**Series-level record:** Stress and Pressure. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

### 108.18 Dimensional Audit Table

**Series-level record:** Dimensional Audit Table. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

### 108.19 Notation-Audit Status

**Series-level record:** Notation-Audit Status. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## 109 Shared Parameter Registry

This chapter occupies the original atlas's **cross-paper integration block**. Its role is to link identifiably sourced items and preserve the scope of unresolved dependencies; it cannot fill gaps in the four primary working papers.

The values $A$, $M$, $R$, terminal coordinate, waypoint order, and defined chord metric are shared source inputs for the North American draft sequence. Any later change requires a documented version and re-evaluation of dependent lengths. No inferred physical parameters are shared simply because Papers II–IV preserve their slots.

### 109.1 Shared-Parameter Record

**Series-level record:** Shared-Parameter Record. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

### 109.2 Principal Shared Parameters

**Series-level record:** Principal Shared Parameters. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

### 109.3 Parameter Dependency

**Series-level record:** Parameter Dependency. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

### 109.4 Parameter Authority Order

For the recorded equality, the controlling input order is: (1) the reference sphere $R = 6{,}371\,\text{km}$; (2) fixed geometric turn $M$ and the selected ordered northern corridor; (3) the eight-segment chord sum $L_2$; and (4) the Malpelo-region entrance $E$ **solved afterward** to satisfy $c(E, M) = L_2$. The workbook supplies seven segment values and the exact-distance note supplies the first. This

authority order records how the source calculation was constructed, not an optimized geological inference.

### 109.5 Parameter Conflict Rule

**Series-level record:** Parameter Conflict Rule. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## 110 Series-Wide Chronology Audit

This chapter occupies the original atlas's **cross-paper integration block**. Its role is to link identifiably sourced items and preserve the scope of unresolved dependencies; it cannot fill gaps in the four primary working papers.

### 110.1 Flagship Initiating-Age Canonicalization

**Series-level record:** Flagship Initiating-Age Canonicalization. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

### 110.2 Chronology Graph

The source materials provide no independently validated event-time coordinate reconstruction for this North American path. Modern coordinate calculations therefore remain modern-coordinate calculations.

**Series-level record:** Chronology Graph. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

### 110.3 Chronology Node

The source materials provide no independently validated event-time coordinate reconstruction for this North American path. Modern coordinate calculations therefore remain modern-coordinate calculations.

**Series-level record:** Chronology Node. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

### 110.4 Causal Edge

Claim wording, mathematical input, inferential role, test state, and potential downstream use are kept separately identified. A geometric relation is not automatically a causal or replacement-level claim.

**Series-level record:** Causal Edge. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by

reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## 110.5 Causal Ordering Probability

Claim wording, mathematical input, inferential role, test state, and potential downstream use are kept separately identified. A geometric relation is not automatically a causal or replacement-level claim.

**Series-level record:** Causal Ordering Probability. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## 110.6 Response-Lag Distribution

**Series-level record:** Response-Lag Distribution. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## 110.7 Chronology Audit Table

The source materials provide no independently validated event-time coordinate reconstruction for this North American path. Modern coordinate calculations therefore remain modern-coordinate calculations.

**Series-level record:** Chronology Audit Table. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## 110.8 Event-Time Coordinate Requirement

The source materials provide no independently validated event-time coordinate reconstruction for this North American path. Modern coordinate calculations therefore remain modern-coordinate calculations.

**Series-level record:** Event-Time Coordinate Requirement. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## 110.9 Modern-Coordinate Prohibition

**Series-level record:** Modern-Coordinate Prohibition. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

### 110.10 Chronology Viable Set

The source materials provide no independently validated event-time coordinate reconstruction for this North American path. Modern coordinate calculations therefore remain modern-coordinate calculations.

**Series-level record:** Chronology Viable Set. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

### 110.11 Chronology Failure

The effect of any eventual negative test is confined to its named target and mandatory dependency paths. No rejection threshold, data sensitivity, or completed negative test is invented in this initial atlas.

**Series-level record:** Chronology Failure. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## 111 Source-Verification and Unsupported-Claim Ledger

This chapter occupies the original atlas's **cross-paper integration block**. Its role is to link identifiably sourced items and preserve the scope of unresolved dependencies; it cannot fill gaps in the four primary working papers.

| Source ID | Manuscript | SHA256 prefix |
|---|---|---|
| NAM-PI-SRC-001 | Paper I v1.6 | `25ce644f88f12f74711b` |
| NAM-PII-SRC-001 | Paper II v1.6 | `d9f75d0f8c6aa3b1aa5d` |
| NAM-PIII-SRC-001 | Paper III v1.6 | `33acd133cadd8d5cd537` |
| NAM-PIV-SRC-001 | Paper IV v1.6 | `df6bfeb1c9d8cff6189c` |

The exact manuscript filenames and complete SHA-256 hashes are preserved in the included **Atlas Registry v1.6 (JSON)** and its package integrity manifest; they are not truncated in those machine-readable records.

| Working document | SHA256 (first 20 characters) | Use |
|---|---|---|
| Denali Exact.pdf | f0e726a25ea106f90792 | Internal geometric/provenance input |
| Denali Short Math.pdf | 70b0d41fb29cd51355b4 | Internal geometric/provenance input |
| Denali corridor workbook | be6e338e9ba8ea12425b | Internal geometric/provenance input |
| Denali math, 64 Ma | 80f0e0618e9d6c675a8e | Internal geometric/provenance input |

## 111.1 Source-Verification Principle

The available verification is limited to recorded coordinates, documented source-file relationships, and independently rerunnable **arithmetic** on the stated reference sphere. A verified page or reproduced result from *Denali Exact.pdf* remains an internally sourced calculation, not corroboration of a geologic cause. The original ABC source taxonomy is retained; missing external data, dated observations, mechanical outcomes, and comparative scores must not silently inherit the status of the distance calculation.

## 111.2 Verified Internal Source Classes

The registered source roles are **(i)** *Denali Exact.pdf*: fixed turn, route order, source-solved Malpelo entrance, rounded first chord and reported two-leg equality; **(ii)** *Denali Short Math.pdf*: earlier developmental calculations; **(iii)** *Denali_Trench_underground_path__per_segment_arc___chord_lengths-1.xlsx*: seven downstream chord-and-surface-arc rows; and **(iv)** the historical 64 Ma ABC mathematics PDF: development record, not an overriding version of the fixed-turn solution. The five current North American manuscripts are **derivative working documents**, not additional independent measurements of the same equality. The source class is verified as to file identity and calculation provenance, without reclassifying interpretive roles as observations.

## 111.3 Source-Support Classes

For the present corpus, the source class of $R$, $M$, $W_k$, and the solved coordinate $E$ is **specified/model-input or fitted geometric construction**; the class of $c(E, M)$, $\sum c(W_k, W_{k+1})$, and $\sum R\theta_k$ is **computed distance under the supplied spherical metric**; and the class of *entrance*, *middle mountain*, or *terminal response* is **interpretive geographic role**. These labels preserve the original atlas separation of input, calculation, and scientific interpretation. The source materials do not contain a measured physical time sequence or mechanical solution for this route.

## 111.4 Source-Verification Ledger

The exact working files and document-level checksums are enumerated in the source register. This identifies origin and version; it does not itself independently verify scientific claims.

**Series-level record:** Source-Verification Ledger. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## 111.5 Unsupported-Claim Registry

Claim wording, mathematical input, inferential role, test state, and potential downstream use are kept separately identified. A geometric relation is not automatically a causal or replacement-level claim.

**Series-level record:** Unsupported-Claim Registry. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

### 111.6 Source-Verification Completion

Document filenames and SHA-256 hashes establish the reproducible **identity of the working files**, while the spherical arc/chord formulas establish repeatability of the registered arithmetic. The observed equality is **fit-conditional**, because the entrance was solved for the chosen target length. Independent surveying, date constraints, physical solver validation and matched-model adjudication are not completed by these records. The geometric provenance and the unresolved empirical statuses must remain separately reportable.

### 111.7 External Bibliography Limitation

**Series-level record:** External Bibliography Limitation. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## 112 Contradiction, Supersession, and Circularity Atlas

This chapter occupies the original atlas's **cross-paper integration block**. Its role is to link identifiably sourced items and preserve the scope of unresolved dependencies; it cannot fill gaps in the four primary working papers.

The earlier exploratory Denali notes and the later **Denali Exact** fixed-turn solution are distinguished as developmental versus controlling for this draft. This difference is recorded as version lineage rather than silently interpolating the two numerical definitions.

### 112.1 Cross-Paper Revision Ledger

**Series-level record:** Cross-Paper Revision Ledger. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

### 112.2 Circularity Classes

**Series-level record:** Circularity Classes. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

### 112.3 Circularity Indicator

**Series-level record:** Circularity Indicator. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

### 112.4 Circular Support Status

Claim wording, mathematical input, inferential role, test state, and potential downstream use are kept separately identified. A geometric relation is not automatically a causal or replacement-level claim.

**Series-level record:** Circular Support Status. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

### 112.5 Contradiction Resolution Record

**Series-level record:** Contradiction Resolution Record. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## 113 Cross-Paper Dependency and Failure-Cut Analysis

This chapter occupies the original atlas's **cross-paper integration block**. Its role is to link identifiably sourced items and preserve the scope of unresolved dependencies; it cannot fill gaps in the four primary working papers.

The geometric chord claim depends on declared coordinates and selected path. The physical, reconstruction, and comparison stages require separate mandatory evidence not present in this public working set. Consequently no absent calculation is designated a *triggered* series-level falsifier.

### 113.1 Complete Dependency Graph

**Series-level record:** Complete Dependency Graph. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

### 113.2 Series Dependency Spine

**Series-level record:** Series Dependency Spine. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

### 113.3 Parallel Confirmation Dependencies

**Series-level record:** Parallel Confirmation Dependencies. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

### 113.4 Mandatory Gate Set

**Series-level record:** Mandatory Gate Set. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## 113.5 Series Eligibility Set

**Series-level record:** Series Eligibility Set. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## 113.6 Series-Level Eligibility Failure Condition

The effect of any eventual negative test is confined to its named target and mandatory dependency paths. No rejection threshold, data sensitivity, or completed negative test is invented in this initial atlas.

**Series-level record:** Series-Level Eligibility Failure Condition. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## 113.7 Minimum Failure Cut Sets

The effect of any eventual negative test is confined to its named target and mandatory dependency paths. No rejection threshold, data sensitivity, or completed negative test is invented in this initial atlas.

**Series-level record:** Minimum Failure Cut Sets. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## 113.8 Compound Cut Set

**Series-level record:** Compound Cut Set. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## 113.9 Failure Propagation Matrix

The effect of any eventual negative test is confined to its named target and mandatory dependency paths. No rejection threshold, data sensitivity, or completed negative test is invented in this initial atlas.

**Series-level record:** Failure Propagation Matrix. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## 113.10 No Converse Inference

**Series-level record:** No Converse Inference. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

### 113.11 Criticality Ranking

The manuscript records the corresponding Paper-IV requirement without reporting a fit statistic, Bayes factor, superiority decision, or replacement classification. Those quantities are undefined for the current supplied data.

**Series-level record:** Criticality Ranking. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## 114 Series-Wide Prediction Atlas

This chapter occupies the original atlas's **cross-paper integration block**. Its role is to link identifiably sourced items and preserve the scope of unresolved dependencies; it cannot fill gaps in the four primary working papers.

No North American prospective or external-holdout prediction packet is presented in Papers I–IV v1.6. A numerical geometry matched to already selected endpoints is a reconstruction calculation, not prospective prediction.

### 114.1 Prediction Packet

No frozen North American advance-prediction packet or independent prediction outcome is supplied in the current four working manuscripts. The entry is a location and status record, not a reported hit or miss.

**Series-level record:** Prediction Packet. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

### 114.2 Prediction Families

No frozen North American advance-prediction packet or independent prediction outcome is supplied in the current four working manuscripts. The entry is a location and status record, not a reported hit or miss.

**Series-level record:** Prediction Families. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

### 114.3 Prediction Eligibility

No frozen North American advance-prediction packet or independent prediction outcome is supplied in the current four working manuscripts. The entry is a location and status record, not a reported hit or miss.

**Series-level record:** Prediction Eligibility. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## 114.4 Prediction Specificity

No frozen North American advance-prediction packet or independent prediction outcome is supplied in the current four working manuscripts. The entry is a location and status record, not a reported hit or miss.

**Series-level record:** Prediction Specificity. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## 114.5 Combined Specificity

**Series-level record:** Combined Specificity. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## 114.6 Prediction Scoring

No frozen North American advance-prediction packet or independent prediction outcome is supplied in the current four working manuscripts. The entry is a location and status record, not a reported hit or miss.

**Series-level record:** Prediction Scoring. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## 114.7 Prediction Ledger Requirements

No frozen North American advance-prediction packet or independent prediction outcome is supplied in the current four working manuscripts. The entry is a location and status record, not a reported hit or miss.

**Series-level record:** Prediction Ledger Requirements. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## 114.8 Prediction Failure Rule

No frozen North American advance-prediction packet or independent prediction outcome is supplied in the current four working manuscripts. The entry is a location and status record, not a reported hit or miss.

**Series-level record:** Prediction Failure Rule. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## 114.9 Current Prediction Status

No frozen North American advance-prediction packet or independent prediction outcome is supplied in the current four working manuscripts. The entry is a location and status record, not a

reported hit or miss.

**Series-level record:** Current Prediction Status. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

# 115 Series-Wide Falsification Atlas

This chapter occupies the original atlas's **cross-paper integration block**. Its role is to link identifiably sourced items and preserve the scope of unresolved dependencies; it cannot fill gaps in the four primary working papers.

| Scope | Target | Current falsification state |
|---|---|---|
| Geometry | Arithmetic consistency of declared chord definitions | Auditable; source value recorded |
| Mechanics | Specific physical model branch | WITHHELD / UNTESTED |
| Reconstruction | Event sequence to observed geological states | UNTESTED |
| Comparison | Model selection and replacement gates | NOT EXECUTED |

## 115.1 Falsification Hierarchy

The effect of any eventual negative test is confined to its named target and mandatory dependency paths. No rejection threshold, data sensitivity, or completed negative test is invented in this initial atlas.

**Series-level record:** Falsification Hierarchy. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## 115.2 Series-Wide Falsification Registry

The effect of any eventual negative test is confined to its named target and mandatory dependency paths. No rejection threshold, data sensitivity, or completed negative test is invented in this initial atlas.

**Series-level record:** Series-Wide Falsification Registry. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## 115.3 Series-Level Hard Falsifier

The effect of any eventual negative test is confined to its named target and mandatory dependency paths. No rejection threshold, data sensitivity, or completed negative test is invented in this initial atlas.

**Series-level record:** Series-Level Hard Falsifier. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal

level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

### 115.4 Series-Level Non-Resolution

**Series-level record:** Series-Level Non-Resolution. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

### 115.5 Compartmentalized Survival

**Series-level record:** Compartmentalized Survival. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## 116 Reader Navigation and Query Architecture

This chapter occupies the original atlas's **cross-paper integration block**. Its role is to link identifiably sourced items and preserve the scope of unresolved dependencies; it cannot fill gaps in the four primary working papers.

For a reader asking about equal leg length, begin at Paper I, then Paper-V Chapters 22–26, and consult Denali Exact plus the workbook. For a question about physical feasibility or geological reconstruction, open the corresponding Paper-II or Paper-III source and report that the public working record does not establish those results.

### 116.1 Reader Entry Modes

**Series-level record:** Reader Entry Modes. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

### 116.2 Claim Navigation

Claim wording, mathematical input, inferential role, test state, and potential downstream use are kept separately identified. A geometric relation is not automatically a causal or replacement-level claim.

**Series-level record:** Claim Navigation. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

### 116.3 Equation Navigation

**Series-level record:** Equation Navigation. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## 116.4 Prediction Navigation

No frozen North American advance-prediction packet or independent prediction outcome is supplied in the current four working manuscripts. The entry is a location and status record, not a reported hit or miss.

**Series-level record:** Prediction Navigation. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## 116.5 Falsifier Navigation

The effect of any eventual negative test is confined to its named target and mandatory dependency paths. No rejection threshold, data sensitivity, or completed negative test is invented in this initial atlas.

**Series-level record:** Falsifier Navigation. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## 116.6 Final Decision Navigation

**Series-level record:** Final Decision Navigation. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## 116.7 Reader Query Table

**Series-level record:** Reader Query Table. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## 116.8 Atlas Dashboard

**Series-level record:** Atlas Dashboard. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## 116.9 Reader Integrity Rule

**Series-level record:** Reader Integrity Rule. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

# 117 Machine-Readable Companion Schema

This chapter occupies the original atlas's **cross-paper integration block**. Its role is to link identifiably sourced items and preserve the scope of unresolved dependencies; it cannot fill gaps in the four primary working papers.

The JSON companion package emitted with this initial draft contains the chapter list, source digests, point and segment records, and a claim ledger. Its presence is a technical extraction aid. It is not a replacement for the prose manuscript or a new scientific validation system.

## 117.1 Canonical Package

**Series-level record:** Canonical Package. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## 117.2 Claim Schema

Claim wording, mathematical input, inferential role, test state, and potential downstream use are kept separately identified. A geometric relation is not automatically a causal or replacement-level claim.

**Series-level record:** Claim Schema. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## 117.3 Equation Schema

**Series-level record:** Equation Schema. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## 117.4 Prediction Schema

No frozen North American advance-prediction packet or independent prediction outcome is supplied in the current four working manuscripts. The entry is a location and status record, not a reported hit or miss.

**Series-level record:** Prediction Schema. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## 117.5 Falsifier Schema

The effect of any eventual negative test is confined to its named target and mandatory dependency paths. No rejection threshold, data sensitivity, or completed negative test is invented in this initial atlas.

**Series-level record:** Falsifier Schema. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by

reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## 117.6 Edge Schema

**Series-level record:** Edge Schema. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## 117.7 Causal Edge Schema

Claim wording, mathematical input, inferential role, test state, and potential downstream use are kept separately identified. A geometric relation is not automatically a causal or replacement-level claim.

**Series-level record:** Causal Edge Schema. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## 117.8 Alternative Explanation Schema

**Series-level record:** Alternative Explanation Schema. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## 117.9 Intervention Schema

**Series-level record:** Intervention Schema. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## 117.10 CSV Claim Fields

Claim wording, mathematical input, inferential role, test state, and potential downstream use are kept separately identified. A geometric relation is not automatically a causal or replacement-level claim.

**Series-level record:** CSV Claim Fields. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## 117.11 Version Record

**Series-level record:** Version Record. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

### 117.12 Registry-Coverage Manifest

**Series-level record:** Registry-Coverage Manifest. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

### 117.13 Companion Answer Contract

**Series-level record:** Companion Answer Contract. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

### 117.14 Machine Validation Rules

**Series-level record:** Machine Validation Rules. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

### 117.15 Machine-Readable Integrity

**Series-level record:** Machine-Readable Integrity. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## 118 Registry Completeness and AI-Companion Readiness Audit

This chapter occupies the original atlas's **cross-paper integration block**. Its role is to link identifiably sourced items and preserve the scope of unresolved dependencies; it cannot fill gaps in the four primary working papers.

The atlas has full numbered chapter coverage and source-linked status declarations. Its scientific record completeness is lower: private mechanics remain excluded; some empirical and numerical entries are not provided; exact cross-paper numbering will be reverified during the agreed corpus-wide refinement passes.

### 118.1 Purpose of This Audit

**Series-level record:** Purpose of This Audit. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

### 118.2 Authority Order for Companion Answers

**Series-level record:** Authority Order for Companion Answers. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher

causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## 118.3 Cross-Paper Registry-Coverage Matrix

**Series-level record:** Cross-Paper Registry-Coverage Matrix. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## 118.4 Minimum Principal-Claim Coverage Rule

Claim wording, mathematical input, inferential role, test state, and potential downstream use are kept separately identified. A geometric relation is not automatically a causal or replacement-level claim.

**Series-level record:** Minimum Principal-Claim Coverage Rule. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## 118.5 Negative-Result Preservation Rule

**Series-level record:** Negative-Result Preservation Rule. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## 118.6 Non-Domino Failure Rule

The effect of any eventual negative test is confined to its named target and mandatory dependency paths. No rejection threshold, data sensitivity, or completed negative test is invented in this initial atlas.

**Series-level record:** Non-Domino Failure Rule. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## 118.7 Initiating-Age Rule

**Series-level record:** Initiating-Age Rule. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## 118.8 Scope-Reserved Hypothesis Firewall

**Series-level record:** Scope-Reserved Hypothesis Firewall. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

### 118.9 Answer-State Discipline

**Series-level record:** Answer-State Discipline. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

### 118.10 Pass-16 Readiness Classification

**Series-level record:** Pass-16 Readiness Classification. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## 119 Independent Replication Package

This chapter occupies the original atlas's **cross-paper integration block**. Its role is to link identifiably sourced items and preserve the scope of unresolved dependencies; it cannot fill gaps in the four primary working papers.

A replicator can recompute the present-coordinate chord lengths from the provided coordinates and Earth-radius convention, then compare the seven workbook-stored segment values with the first segment listed in Denali Exact. An independent physical replication is not possible from the deliberately restricted materials alone.

### 119.1 Replication Objective

**Current reproducible object:** the direct entrance→turn chord and the eight segment chords, under $R = 6{,}371$ km, with the entrance coordinate fitted to the already prescribed route sum. Replication of these calculations is distinct from independent replication of the geological interpretation, which cannot be performed from the geometric record alone.

### 119.2 Replication Levels

Three states are distinguished without upgrading one to another: (1) **document lineage**, comparing source filenames, recorded numbers, and SHA-256 checksums; (2) **independent geometry recomputation**, reproducing the source formulas from recorded coordinates and segment tables; and (3) **empirical causal replication**, which remains unsupported by the publicly supplied Denali records. The third is not claimed as complete.

### 119.3 Required Run Manifest

The geometry run manifest must identify the controlling **Denali Exact** source, the workbook edition, Earth radius $R = 6371$ km, endpoint coordinates and their fixed/fitted status, ordered waypoint chain, central-angle and chord formulas, unrounded addition convention, and final display rounding. Retaining the entrance's fitted status is necessary to reproduce the actual provenance of the equality.

### 119.4 Deterministic and Stochastic Runs

**Series-level record:** Deterministic and Stochastic Runs. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal

level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

### 119.5 Independent Solver Requirement

**Series-level record:** Independent Solver Requirement. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

### 119.6 Replication Difference Record

The registered arithmetic comparison uses the **full-precision first segment computed from the recorded turn and Denali coordinates**: $c(M, D) = 222.677503129$ km at shown arithmetic precision. The remaining seven workbook chords total $7{,}839.193258226$ km; together they produce $L_2 = 8{,}061.870761355$ km, matching the recorded full-precision direct entrance-to-turn calculation to the displayed digits. Using the three-decimal printed first segment $222.678$ km instead changes the sum by about $0.000497$ km through rounding. This is a **display-precision reconciliation**, not a changed input, route or fitted outcome.

### 119.7 Replication Classification

The present package's **geometric arithmetic** is source-reproduced using the recorded endpoints, the $R = 6{,}371$ km reference sphere, the separately computed first turn-to-Denali chord, and seven workbook segment values. The claim status is restricted to the **defined equal-chord construction**; this registry does not record independent verification of causation, event-time geology, physical transmission, or comparative model performance. Those remain separate paper-specific statuses, as required by the canonical atlas hierarchy.

### 119.8 Replication Failure

The effect of any eventual negative test is confined to its named target and mandatory dependency paths. No rejection threshold, data sensitivity, or completed negative test is invented in this initial atlas.

**Series-level record:** Replication Failure. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## 120 Final Production and Publication Checklist

This chapter occupies the original atlas's **cross-paper integration block**. Its role is to link identifiably sourced items and preserve the scope of unresolved dependencies; it cannot fill gaps in the four primary working papers.

This is the **initial complete drafting phase**, not the final manuscript freeze. Paper V is to be refined together with Papers I–IV in the planned corpus-wide revision cycle; no completed independent replication or publication-ready claim is asserted here.

## 120.1 Manuscript Checklist

**Series-level record:** Manuscript Checklist. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## 120.2 Source Checklist

The source-control checklist for the published geometry is populated as follows: **(1)** original *Denali Exact.pdf* fixed-turn and fitted-entrance record; **(2)** seven-row `Denali_Trench_underground_path__per_segment_ar` with central angle, surface arc and chord in separate columns; **(3)** prior *Denali Short Math.pdf* and *8-8-2025 64 ma ABC Math Full (1).pdf* labeled exploratory; **(4)** the current Paper-I–IV working edition and its SHA-256 source digests. The workbook lacks the first turn-to-Denali segment, which must be retrieved from the controlling PDF. Source presence and hashing do not establish independent observation, source accuracy, or geological causation.

## 120.3 Data Checklist

The exact working files and document-level checksums are enumerated in the source register. This identifies origin and version; it does not itself independently verify scientific claims.

**Series-level record:** Data Checklist. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## 120.4 Code Checklist

**Series-level record:** Code Checklist. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## 120.5 Claim Checklist

Claim wording, mathematical input, inferential role, test state, and potential downstream use are kept separately identified. A geometric relation is not automatically a causal or replacement-level claim.

**Series-level record:** Claim Checklist. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## 120.6 Prediction Checklist

No frozen North American advance-prediction packet or independent prediction outcome is supplied in the current four working manuscripts. The entry is a location and status record, not a reported hit or miss.

**Series-level record:** Prediction Checklist. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely

by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

### 120.7 Comparison Checklist

The manuscript records the corresponding Paper-IV requirement without reporting a fit statistic, Bayes factor, superiority decision, or replacement classification. Those quantities are undefined for the current supplied data.

**Series-level record:** Comparison Checklist. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

### 120.8 Replication Checklist

**Series-level record:** Replication Checklist. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

### 120.9 Release Checklist

**Series-level record:** Release Checklist. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## 121 Integrated Limitations

This chapter occupies the original atlas's **cross-paper integration block**. Its role is to link identifiably sourced items and preserve the scope of unresolved dependencies; it cannot fill gaps in the four primary working papers.

The dominant current limitations are not hidden: proprietary mechanics and mineralogy are excluded; observed past-state geology and temporal sequencing are not independently substantiated by the supplied Denali files; there is no executed comparative ranking or genuine held-out prediction in the current source set.

### 121.1 Hypothesis Maturity

**Series-level record:** Hypothesis Maturity. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

### 121.2 Flagship Geometry

The numerical equality is conditional on an author-fixed geometric turn, a prescribed eight-segment route, and an entrance coordinate **solved to meet the target chord sum**. It is not a claim that Denali is the turn: the source puts Denali one reported **222.678 km chord** beyond it. A single direct first-leg chord is compared with a sum of second-leg segment chords; a whole-path

straight chord, an independently selected entrance, and a physical history are **not** what this result demonstrates.

## 121.3 Coordinate Selection

The author-designated turn $M$ and ordered northern corridor are input selections. The entrance $E$ is the calculated solution used to equal the selected corridor's chord sum; its final six-decimal representation is not a separately measured entrance event. Denali is a named waypoint $222.678\,\mathrm{km}$ (printed chord) beyond the fixed turn, not the turn itself. The present positions are modern geographic references and do not by themselves supply event-time positions.

## 121.4 Paleogeography

The source materials provide no independently validated event-time coordinate reconstruction for this North American path. Modern coordinate calculations therefore remain modern-coordinate calculations.

**Series-level record:** Paleogeography. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## 121.5 Chronology

The source materials provide no independently validated event-time coordinate reconstruction for this North American path. Modern coordinate calculations therefore remain modern-coordinate calculations.

**Series-level record:** Chronology. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## 121.6 Mechanical Transmission

**Series-level record:** Mechanical Transmission. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## 121.7 Constitutive Uncertainty

**Series-level record:** Constitutive Uncertainty. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## 121.8 Event Scale

**Series-level record:** Event Scale. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## 121.9 Planetary Survival

**Series-level record:** Planetary Survival. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## 121.10 Deep-Earth Preservation

**Series-level record:** Deep-Earth Preservation. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## 121.11 Event Catalog

**Series-level record:** Event Catalog. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## 121.12 Material Lineage

**Series-level record:** Material Lineage. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## 121.13 Boundary Generation

**Series-level record:** Boundary Generation. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## 121.14 Motion Generation

**Series-level record:** Motion Generation. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## 121.15 Surface Structures

**Series-level record:** Surface Structures. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## 121.16 Deep Geophysics

**Series-level record:** Deep Geophysics. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## 121.17 Model Comparison

The manuscript records the corresponding Paper-IV requirement without reporting a fit statistic, Bayes factor, superiority decision, or replacement classification. Those quantities are undefined for the current supplied data.

**Series-level record:** Model Comparison. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## 121.18 Complexity

**Series-level record:** Complexity. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## 121.19 Null Models

The manuscript records the corresponding Paper-IV requirement without reporting a fit statistic, Bayes factor, superiority decision, or replacement classification. Those quantities are undefined for the current supplied data.

**Series-level record:** Null Models. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## 121.20 Multiple Testing

**Series-level record:** Multiple Testing. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## 121.21 Advance Prediction

No frozen North American advance-prediction packet or independent prediction outcome is supplied in the current four working manuscripts. The entry is a location and status record, not a reported hit or miss.

**Series-level record:** Advance Prediction. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

### 121.22 Independent Replication

**Index result:** the northbound waypoint geometry is arithmetically reproducible at the reported precision under $R = 6{,}371\,\mathrm{km}$, using one entrance-to-turn chord, the coordinate-derived first second-leg chord and the seven workbook chord rows. This is not independent replication of a causal mountain-origin model: entrance location was fitted to the fixed second-leg sum, and no separate geological or mechanical result is supplied. Paper-IV replication levels R3–R9 remain unexecuted for the present North American record.

### 121.23 Source Completeness

**Complete for the declared arithmetic source trail:** *Denali Exact.pdf* supplies the turn, solved entrance, Denali offset and reported eight-segment total; the companion workbook supplies the seven downstream chord/arc pairs. The first corridor segment is not an additional row in that workbook. **Not complete for physical or geological adjudication:** these files contain no independent measured causal-response field, time-indexed reconstruction, executed simulation or matched observation set. Source completeness is therefore claim-specific, not global.

### 121.24 AI Limitations

**Series-level record:** AI Limitations. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

### 121.25 Atlas Completeness

**Series-level record:** Atlas Completeness. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

### 121.26 Publication Status

**Series-level record:** Publication Status. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## 122 Paper-V Conclusions

This chapter occupies the original atlas's **cross-paper integration block**. Its role is to link identifiably sourced items and preserve the scope of unresolved dependencies; it cannot fill gaps in the four primary working papers.

Paper V completes the five-paper **initial draft architecture**. Its scientific conclusion is narrower than a causal replacement claim: the specified North American chord geometry has an internally recorded numerical correspondence under declared rules, while mechanistic, geological, comparative, and external-verification issues remain unresolved or outside the intended public manuscript.

## 122.1 Companion Function

**Series-level record:** Companion Function. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## 122.2 Epistemic Separation

**Series-level record:** Epistemic Separation. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## 122.3 Negative Results

**Series-level record:** Negative Results. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## 122.4 Scientific Discipline

**Series-level record:** Scientific Discipline. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## 122.5 Series-Level Decision State

**Series-level record:** Series-Level Decision State. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## 122.6 Current Classification

**Series-level record:** Current Classification. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## 122.7 Replacement Standard

**Series-level record:** Replacement Standard. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

### 122.8 Final Atlas Principle

**Series-level record:** Final Atlas Principle. Cross-paper inheritance is conditional: later analysis can use prior defined values but cannot promote them into support at a higher causal level merely by reusing them. No new calculation, confirmatory threshold, or scientific conclusion is created by this indexing section.

## Appendix A — Canonical Identifier Grammar

Identifiers are stable within this working draft, not the original frozen 2026 ABC corpus. `NAM-P1-CLM-003` denotes a Paper-I claim record; `NAM-X-DEC-001` denotes a series-level decision record. A later revision must preserve supersession links.

## Appendix B — Canonical Status Vocabulary

The original atlas distinguishes provenance, scientific role, epistemic status, verification, and publication. The North American draft retains all five axes. In particular **SOURCE-TRANSCRIBED**, **CALCULATED**, **ASSUMED**, **UNTESTED**, **WITHHELD**, **SOURCE-VERIFIED**, and **INDEPENDENTLY-VALIDATED** are not synonyms.

## Appendix C — Required Record Templates

| Field | Required content |
|---|---|
| Identifier | Stable atlas record |
| Exact assertion | The claim as written, not strengthened |
| Paper locator | Paper and source heading |
| Assumption and parameter | Only documented inputs |
| Data lineage | File, version, transformation |
| Result class | Calculation, simulation, observation, inference, or absence |
| Falsifier and threshold | Registered only if provided or explicitly stated by the source |
| Dependencies | Mandatory versus optional |
| Status | Multiaxial classification |

## Appendix D — Viable-Set Summary

Paper I’s geometric relationship is present as a working-source numerical equality. Paper II’s mechanics have no public viable-set calculation; Paper III’s global reconstructions have no registered completed viable-set result; Paper IV’s comparison family has no executable accepted decision result. The five-paper series therefore has no documented replacement-level viable set in this v1.6 mirror.

## Appendix E — Final Decision Record Template

| Decision field | v1.6 entry |
|---|---|
| Target | North American middle mountain research corpus |
| Scope | Public fixed-turn geometry and original corpus mirror |
| Admissible evidence | Supplied Denali files and working Papers I–IV |
| Comparative threshold | Not frozen |
| Decision | NOT EXECUTED |
| Causal conclusion | Not established |
| Downstream status | No automatic promotion |

# Appendix F — Final Five-Paper Status

| Paper | Draft version | Primary role | Atlas status |
|---|---|---|---|
| I | v1.6 | Flagship geometry | Initial draft; source transcribed |
| II | v1.6 | Transmission physics | Initial draft; proprietary scope reserved |
| III | v1.6 | Sequenced reconstruction | Initial draft; physical/empirical completion pending |
| IV | v1.6 | Matched model comparison | Initial draft; adjudication unexecuted |
| V | v1.6 | Verification companion | Initial draft; atlas compiled |

# Appendix G — AI-Companion Operating Constraints

When asked about a claim: cite the exact draft paper and subsection, state whether the supporting source is internal, list the calculation or declared input, preserve unresolved status, and describe the known scope boundary. Do not infer energetic mechanics, mineralogy, source observations, statistical outcomes, or new model predictions. Do not provide completed scientific judgment not contained in the primary drafts.

# Appendix H — Open Work Register

The source registers need continued exact-source verification, final document-level equation numbering, detailed equation-to-claim identifiers, approved public/withheld boundaries, author-reviewed quantitative sensitivities, and complete manuscript-to-atlas locator reconciliation. Those are drafting and audit tasks already implied by the original companion structure, not a new experimental program.

## Source-paper chapter locator snapshot

The following locator list reproduces the top-level chapter names found in the four source manuscripts present at compilation. The line numbers refer to their specific Markdown file revisions and should be regenerated if the files change.

**Working Paper I**

| Line | Source manuscript chapter |
|---|---|
| 89 | The Replacement Thesis |
| 119 | The Flagship Candidate Event Reconstruction |
| 175 | Claim Hierarchy |
| 181 | Scope of Paper I |
| 201 | Formal Definitions |
| 239 | Mathematical Program of Paper I |
| 356 | Audit and Reproducibility Policy |
| 378 | Earth Model and Numerical Conventions |
| 396 | Declared Coordinates and Unit Vectors |
| 420 | Present-Day Pairwise Surface Geometry |
| 466 | Ellipsoidal Distance Check |
| 470 | Audited Interior Chord Geometry |
| 505 | Denali Midpoint Audit |
| 523 | Revised Primary Geometric Finding |
| 544 | Coordinate Sensitivity Framework |
| 564 | Monte Carlo Reconstruction Design |
| 580 | Deep-Time Reconstruction Requirement |
| 600 | Reproducibility Algorithm |
| 623 | Paper-I Geometric Status After Audit |
| 643 | Chronostratigraphic Reconstruction of the Proposed Initiating Event |
| 675 | Material Identity Across Deep Time |
| 719 | Malpelo Entrance Forensics |
| 779 | Denali Middle-Mountain Forensics |
| 839 | Northern Terminal-Domain Forensics |
| 895 | Regional Prediction and Falsification Matrix |
| 934 | Regional Findings and Open Variables |
| 953 | Mechanism Classes and the Meaning of Passage Through Earth |
| 997 | Audited Event-Energy and Momentum Parameter Space |
| 1025 | Entrance Geometry and Coupling |
| 1049 | Interior Transmission Alternatives |
| 1081 | Midpoint Compression and Structural Inheritance |
| 1129 | Exit Excavation and Decompression |
| 1161 | Planetary-Survival and Missing-Signature Constraints |
| 1209 | Mechanism-to-Observation Prediction Matrix |
| 1228 | Statistical Null Models and Selection Effects |
| 1286 | Random Endpoint and Mountain-System Tests |
| 1326 | Paleogeographic Reconstruction Ensemble |
| 1370 | Dataset and Observation Inventory |
| 1404 | Paper-I Claim Ledger |
| 1435 | Complete Paper-I Falsification Matrix |
| 1466 | Independent Replication Protocol |
| 1528 | Paper-I Evidence Architecture Summary |
| 1532 | Downstream Model-Comparison Firewall |

| Line | Source manuscript chapter |
|---|---|
| 1536 | Integrated Discussion |
| 1572 | What Paper I Currently Establishes |
| 1588 | What Paper I Does Not Establish |
| 1592 | Relationship to Plate Tectonics |
| 1624 | Decisive Research Priorities |
| 1656 | Limitations of Paper I |
| 1708 | Conclusions |

**Working Paper II**

| Line | Source manuscript chapter |
|---|---|
| 87 | Mechanical Burden of the Series |
| 142 | Mechanism Branches |
| 187 | Event Parameter Vector |
| 217 | Differentiated Earth Model |
| 247 | Governing Conservation Laws |
| 297 | Chronology and Material-Path Branches |
| 332 | Initial and Boundary Conditions |
| 380 | Required Mechanical Output Fields |
| 415 | Mechanical Viability and Model Selection |
| 445 | Simulation Hierarchy |
| 480 | Mechanical Framework Synthesis |
| 488 | Equations of State |
| 533 | Shock Jump Conditions |
| 583 | Strength, Plasticity, and Damage |
| 638 | Pressure-, Temperature-, and Rate-Dependent Rheology |
| 688 | Phase Transitions, Melting, and Vaporization |
| 743 | Fragmentation, Entrainment, and Column Loading |
| 798 | Path Localization, Attenuation, and Deflection |
| 865 | Branch-Specific Viability Tests |
| 905 | Constitutive and Transmission Synthesis |
| 913 | Entrance Geometry and Oblique Coupling |
| 958 | Atmospheric and Oceanic Entry |
| 1008 | Crustal Penetration and Excavation |
| 1068 | Entrance Energy and Momentum Partition |
| 1103 | Predicted Malpelo Entrance Morphology |
| 1148 | Entrance Melt, Shock, Gravity, Magnetic, and Seismic Predictions |
| 1208 | Entrance Chronology and Preservation |
| 1263 | Entrance Inversion and Falsification |
| 1313 | Entrance-Mechanics Synthesis |
| 1321 | Mechanical Midpoint and Maximum-Response Structure |
| 1374 | Formation of a Persistent Denali Inheritance Node |
| 1429 | Long-Time Amplification Under Later Regional Forcing |

| Line | Source manuscript chapter |
|---|---|
| 1484 | Terminal Approach to the Arctic Region |
| 1545 | Deep-to-Shallow Decompression |
| 1595 | Terminal Excavation, Fracture, and Trench-Scale Response |
| 1650 | Exit Energy, Momentum, and Angular-Momentum Partition |
| 1690 | Oceanic, Atmospheric, Ejecta, and Global Seismic Consequences |
| 1750 | Arctic Gravity, Magnetic, and Seismic Predictions |
| 1800 | Exit Preservation, Overprint, and Falsification |
| 1845 | Midpoint, Terminal, and Survival Synthesis |
| 1853 | Whole-Planet Survival Window |
| 1898 | Thermal, Melt, Ocean, and Atmosphere Constraints |
| 1958 | Rotation, Angular Momentum, and Moment-of-Inertia Constraints |
| 2008 | Global Ejecta and Stratigraphic Marker Predictions |
| 2058 | Unassigned Far-Field Hypothesis as a Secondary Slot |
| 2103 | Nested Viability of Entrance, Path, Midpoint, Exit, and Survival |
| 2162 | Model Evidence, Complexity, and Branch Selection |
| 2217 | Paper-II Claim Ledger |
| 2251 | Complete Paper-II Falsification Matrix |
| 2276 | Independent Numerical Replication Protocol |
| 2361 | Mechanical Eligibility Versus Comparative Preference |
| 2369 | Integrated Discussion |
| 2414 | Limitations of Paper II |
| 2479 | Conclusions |

**Working Paper III**

| Line | Source manuscript chapter |
|---|---|
| 103 | The Causal Replacement Burden |
| 176 | Scope and Central Questions |
| 202 | Paper-II Handoff State |
| 257 | The Sequenced Event Catalog |
| 309 | Global Coordinates and Reference Frames |
| 389 | Chronology, Paleogeography, and Material Lineage |
| 443 | Plates and Tectonic Blocks as Evolving Material Domains |
| 504 | Global Boundary-Network Representation |
| 595 | Event Impulse and Inheritance Fields |
| 663 | Long-Time Governing Equations |
| 759 | Inherited Motion and Ongoing Force Decomposition |
| 827 | Plate-Direction and Speed Prediction |

| Line | Source manuscript chapter |
|---|---|
| 895 | Global Reconstruction Hierarchy |
| 961 | Initial Paper-III Falsification Architecture |
| 1029 | Global Reconstruction Framework Synthesis |
| 1034 | Event-Derived Boundary Nucleation |
| 1109 | Damage Connectivity and Plate Enclosure |
| 1184 | Plate Fragmentation, Merger, and Terrane Transfer |
| 1259 | Boundary Type From Relative Motion and Material State |
| 1341 | Boundary Propagation, Branching, and Termination |
| 1416 | Reactivation by Later Events |
| 1477 | Continental-Margin and Ocean-Basin Inheritance |
| 1566 | Boundary-Network Topology and Graph Metrics |
| 1669 | Boundary-Network Model Comparison |
| 1758 | Boundary Viability and Falsification |
| 1791 | Boundary-Network Synthesis |
| 1796 | Event-to-Plate Impulse Mapping |
| 1878 | Plate Mass, Inertia, and Rotational Response |
| 1960 | Euler-Pole Generation |
| 2042 | Force and Torque Decomposition |
| 2117 | Gravitational and Buoyancy Maintenance |
| 2206 | Boundary and Mantle Coupling |
| 2288 | Velocity Memory and Directional Inheritance |
| 2377 | Plate Acceleration, Deceleration, and Speed Hierarchy |
| 2459 | Relative Motion Across the Global Boundary Network |
| 2534 | Present-Day and Deep-Time Velocity Datasets |
| 2630 | Velocity Inversion, Counterfactuals, and Model Comparison |
| 2747 | Plate-Motion Viability and Falsification |
| 2780 | Plate-Motion Synthesis |
| 2785 | Inherited Compression and Mountain-System Localization |
| 2875 | Mountain Growth, Orientation, and Structural Amplification |
| 2964 | Terminal Zones, Trench Development, and Descent |
| 3044 | Underthrusting, Bending, and Excavation Alternatives |
| 3126 | Ridge, Rift, and Spreading-System Inheritance |
| 3208 | Basin Formation, Subsidence, and Inversion |
| 3304 | Continental Plateaus and Persistent Uplift Nodes |
| 3365 | Volcanic-Province and Melt-Path Localization |
| 3454 | Displaced Terranes, Sutures, and Orogenic Assembly |
| 3543 | Surface-Structure Chronology and Counterfactuals |
| 3639 | Surface-Expression Viability and Falsification |
| 3679 | Surface-Structure Synthesis |
| 3684 | Global Event Chronology and Time-Slice Architecture |
| 3773 | Continental Displacement and Paleogeographic Reconstruction |
| 3876 | Event Paths in Moving Plates and Reference Frames |
| 3956 | Global Gravity, Seismic, Magnetic, and Heat-Flow Predictions |
| 4052 | Resource Provinces and Mineralization as Advance Predictions |
| 4120 | Sequence-Wide Statistical Null Models |
| 4209 | Multiple Testing, Selection Bias, and Model Flexibility |
| 4296 | Global Advance-Prediction Program |
| 4364 | Integrated Paper-III Viability |
| 4432 | Paper-III Claim Ledger |
| 4449 | Complete Paper-III Falsification Matrix |

| Line | Source manuscript chapter |
|---|---|
| 4485 | Independent Replication Protocol |
| 4552 | Reconstruction Eligibility Versus Replacement Qualification |
| 4557 | Integrated Discussion |
| 4639 | Limitations of Paper III |
| 4735 | Conclusions |

**Working Paper IV**

| Line | Source manuscript chapter |
|---|---|
| 92 | The Adjudication Mandate |
| 127 | Conditional Handoff From Papers I Through III |
| 201 | Model-Family Definitions |
| 251 | The Shared Observation Domain |
| 301 | Observational, Kinematic, and Causal Levels |
| 351 | Fair-Comparison Rules |
| 466 | Parameter, Prior, and Model-Input Registry |
| 520 | Likelihood and Observational Adequacy |
| 576 | Physical and Causal Adequacy |
| 631 | Model Complexity and Causal Compression |
| 700 | Predictive Performance |
| 764 | Replacement Standards |
| 837 | The Hybrid-Model Question |
| 882 | Pre-Registration and Model Freeze |
| 912 | Initial Paper-IV Score Architecture |
| 966 | Initial Paper-IV Falsification Architecture |
| 1021 | Comparative Framework Synthesis |
| 1028 | Competing Boundary-Generation Mechanisms |
| 1078 | Inherited Versus Emergent Boundaries |
| 1128 | Initial-Condition Information Content |
| 1183 | Boundary Location and Orientation Comparison |
| 1245 | Boundary Type and Relative-Motion Comparison |
| 1310 | Boundary Age, Reactivation, and Termination |
| 1380 | Global Boundary Graph and Plate Partition |
| 1462 | Continental Margins and Ocean Basins |
| 1527 | Boundary Counterfactuals and Causal Necessity |
| 1612 | Boundary Complexity and Predictive Tests |
| 1702 | Boundary-Replacement Viability and Falsification |
| 1747 | Boundary-Comparison Synthesis |
| 1754 | Competing Plate-Motion Mechanisms |
| 1799 | Initial Impulse Versus Sustained Forcing |
| 1859 | Gravity, Buoyancy, Mantle Flow, and Boundary Traction |
| 1919 | Euler-Pole Generation and Plate Rotation |
| 1991 | Absolute and Relative Plate Velocities |
| 2051 | Acceleration, Deceleration, and Direction Change |
| 2116 | Plate-Speed Hierarchy |
| 2171 | Plate Circuits, Junctions, and Global Closure |
| 2228 | Present-Day and Deep-Time Motion Evidence |
| 2293 | Force, Torque, Power, and Dissipation |
| 2363 | Motion Counterfactuals and Causal Necessity |

| Line | Source manuscript chapter |
|---|---|
| 2468 | Motion Complexity and Predictive Tests |
| 2553 | Plate-Motion Replacement Viability and Falsification |
| 2598 | Motion-Comparison Synthesis |
| 2605 | Competing Mountain-Building Mechanisms |
| 2684 | Trench, Descent, Bending, and Underthrusting Comparison |
| 2764 | Ridge, Rift, and New-Material-Production Comparison |
| 2829 | Basin Formation, Subsidence, and Inversion Comparison |
| 2889 | Plateau Uplift and Crustal-Thickening Comparison |
| 2944 | Volcanic Provinces and Melt-Path Comparison |
| 3009 | Terrane Transfer, Sutures, and Continental Assembly |
| 3069 | Gravity and Geoid Comparison |
| 3129 | Seismic Velocity, Attenuation, and Anisotropy |
| 3194 | Magnetic and Heat-Flow Comparison |
| 3259 | Structural and Geophysical Counterfactuals |
| 3359 | Structural Complexity and Predictive Tests |
| 3449 | Structural-and-Geophysical Replacement Viability |
| 3494 | Structural and Geophysical Comparison Synthesis |
| 3501 | Chronology-Wide Model Comparison |
| 3576 | Paleogeographic and Continental-Reconstruction Comparison |
| 3663 | Causal Coverage and Explanatory Scope |
| 3723 | Model Evidence, Posterior Ranking, and Equivalence |
| 3797 | Effective Degrees of Freedom and Description Length |
| 3862 | Sequence-Wide Null Models |
| 3956 | Multiple Testing, Selection Bias, and Revision Accounting |
| 4011 | Global Advance-Prediction Comparison |
| 4086 | Hybrid Causal Decomposition |
| 4141 | Regional Versus Global Classification |
| 4186 | Complete Paper-IV Viability |
| 4243 | Formal Replacement Decision Tree |
| 4320 | Paper-IV Claim Ledger |
| 4338 | Complete Paper-IV Falsification Matrix |
| 4362 | Independent Replication Protocol |
| 4427 | Integrated Discussion |
| 4497 | Limitations |
| 4582 | Conclusions |

# Embedded Bibliography


- Fine, J. B. (2026). *Astro-Ballistic Chronostratigraphic Sequencing V: Claims, Equations, Data, and Falsification Atlas*. Original canonical source and sole structural template. https://ontomics.com/pdfs/abc-paper-v-ai-atlas.pdf
- Fine, J. B. (2026). *ABC Sequencing Paper I: North American Mirror*. Working manuscript v1.6; local source file `ABC_North_America_Paper_I_Refinement_Pass_15_v1.6.md`.
- Fine, J. B. (2026). *ABC Sequencing Paper II: North American Mirror*. Working manuscript v1.6; local source file `ABC_North_America_Paper_II_Refinement_Pass_15_v1.6.md`.
- Fine, J. B. (2026). *ABC Sequencing Paper III: North American Mirror*. Working manuscript v1.6; local source file `ABC_North_America_Paper_III_Refinement_Pass_15_v1.6.md`.

- Fine, J. B. (2026). *ABC Sequencing Paper IV: North American Mirror*. Working manuscript v1.6; local source file `ABC_North_America_Paper_IV_Refinement_Pass_15_v1.6.md`.
- Fine, J. B. Working source: *Denali Exact.pdf*. Local project source `Denali Exact.pdf`. Internal research provenance; not independent external confirmation.
- Fine, J. B. Working source: *Denali Short Math.pdf*. Local project source `Denali Short Math.pdf`. Internal research provenance; not independent external confirmation.
- Fine, J. B. Working source: *Denali corridor workbook*. Local project source `Denali_Trench_underground_path` Internal research provenance; not independent external confirmation.
- Fine, J. B. Working source: *Denali math, 64 Ma*. Local project source `8-8-2025 64 ma ABC Math Full (1).pdf`. Internal research provenance; not independent external confirmation.


## Final Declaration

The complete first-draft five-paper manuscript architecture has now been assembled in the permitted public scope. The atlas records the actual scientific state at this stage and does not elevate numerical correspondence to physical occurrence, causation, comparison superiority, or replacement. Any final freeze or validation classification remains subject to explicit future author review and the agreed revision process.

# External Scholarly and Data Context

ABC Sequencing V - North American Middle Mountain | Public Research Edition v1.7 | 17 November 2026

**Citation function and limits.** This supplement adds verified external publications and data resources relevant to the named sections of the accompanying v1.6-derived manuscript. These references are **contextual or comparative**, not newly analyzed empirical input, independent support for the proposed passage, or evidence that reserved mechanics or unexecuted model comparisons have been completed. All author-declared coordinates and originally computed chord lengths retain their prior internal provenance.

## Section-indexed citation mapping

| Manuscript section or subject | External reference IDs |
|---|---|
| **Stable identifiers and research provenance** (section 5) | E17 |
| **Data and source registries** (section 11) | E16, E17 |
| **Prediction and falsification registries** (section 13-14) | E15 |
| **Verification and audit rules** (section 17) | E16 |
| **Human- and machine-readable navigation** (section 19) | E17 |

## Source bibliography and declared relevance

**[E17]** Moreau, L., and Missier, P. (eds.) (2013). PROV-DM: The PROV Data Model. W3C Recommendation.
https://www.w3.org/TR/prov-dm/
*Role:* Structured data lineage and provenance relationships; a published standard, not model evidence.

**[E16]** Wilkinson, M. D., et al. (2016). The FAIR Guiding Principles for scientific data management and stewardship. Scientific Data, 3, 160018.
https://doi.org/10.1038/sdata.2016.18
*Role:* Findability, accessibility, interoperability and reusability conventions for datasets and records.

**[E15]** Nosek, B. A., et al. (2018). The preregistration revolution. Proceedings of the National Academy of Sciences, 115, 2600-2606.
https://doi.org/10.1073/pnas.1708274114
*Role:* Study preregistration and advance-declared assessment; not proof that a frozen test has already occurred.

## Release integrity and source-status convention

The document cover and running title have been updated for the present public research release. Original internal reference numbers [1], [2], etc. remain unchanged. External citations are identified separately as E01-E18 and by footer notices on their mapped pages; they do not replace or renumber internal provenance sources. Historical draft language and references to v1.6 or earlier pass stages in the underlying manuscript record the development history and are subordinate to this release notice.

*Scope remains unchanged: no new causal event has been established by this editorial revision; neither missing observations nor proprietary material have been synthesized to fill an empty source field.*