

Supplementary Material for

Quantifying the erasure of earthquakes in desert landscapes

Malinda G. Zuckerman^{1,*}, Alba M. Rodríguez Padilla^{2,3}, and J Ramón Arrowsmith¹

¹School of Earth and Space Exploration, Arizona State University, Tempe, AZ 85287, USA.

²Division of Geological and Planetary Sciences, California Institute of Technology, Pasadena, CA, 91125, USA.

³Now at Department of Geosciences, Utah State University, Logan, UT 84322, USA.

*Corresponding author: mgzucker@asu.edu, malindazuckerman@gmail.com

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Introduction

The Supplementary Material contains the following information:

Section S1: Additional material on the Quaternary Faults and Folds Database.

Section S2: Additional results.

Section S1: Additional material on the Quaternary Faults and Folds Database.

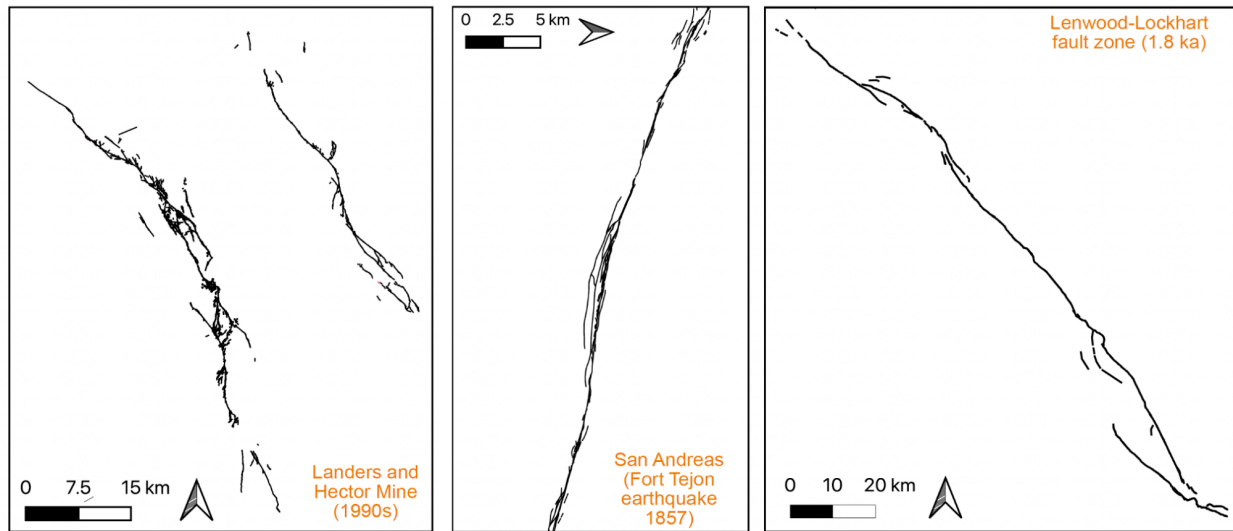


Figure S1. Fault traces from the Quaternary Fault and Fold Database for the faults with a range of elapsed times since the most recent event (Bryant & Sander, 2008). Left: Faults involved in the Landers and Hector Mine earthquakes in the 1990s and mapped immediately after. Middle: Section of the San Andreas most recently ruptured in the 1857 Fort Tejon earthquake. Right: Lenwood-Lockhart fault zone in the Eastern California Shear Zone, with the most recent event at 1.8 ka.

Section S2: Additional results

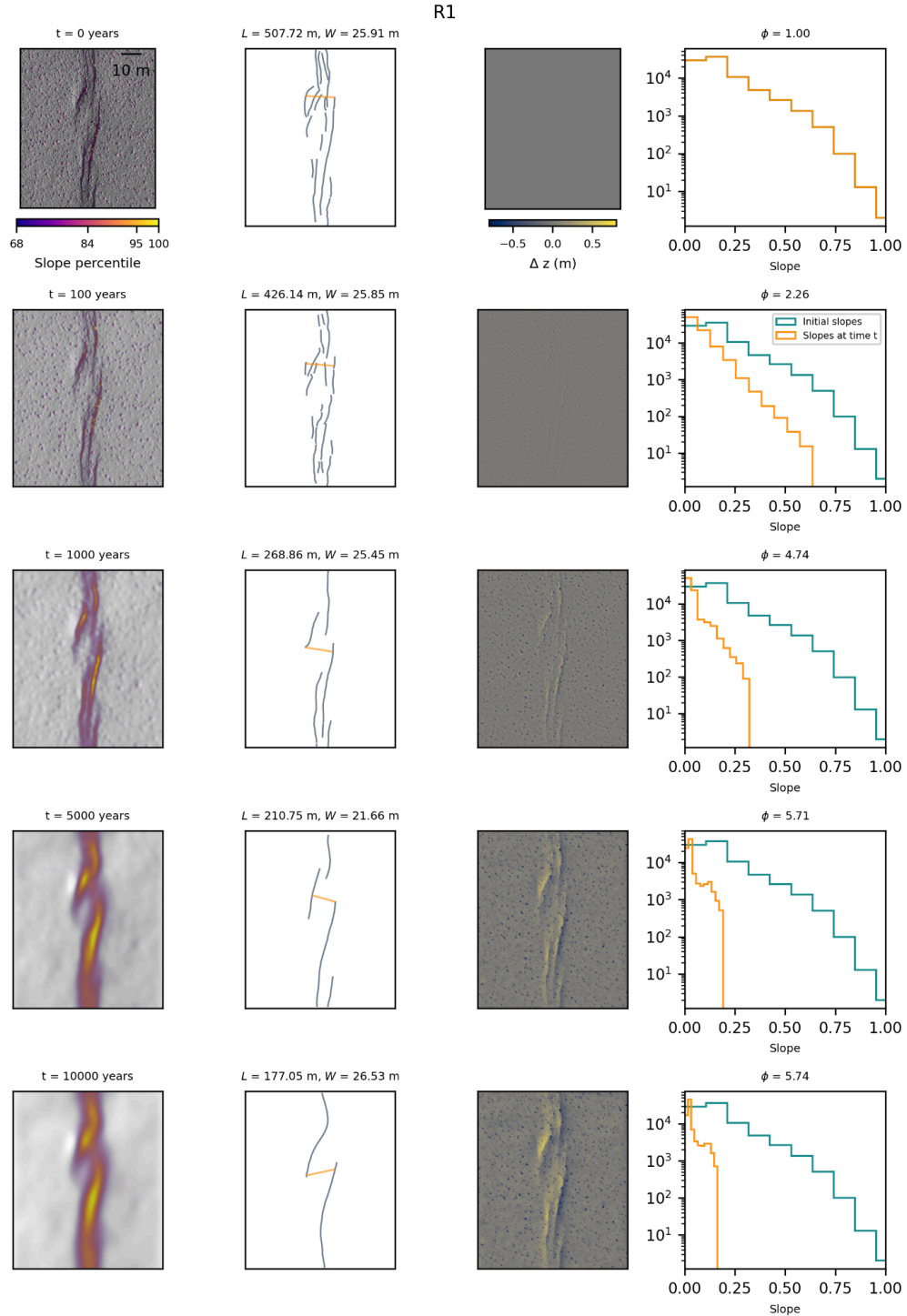


Figure S2. Landscape R1 from the M7.1 2019 Ridgecrest earthquake (see location in Figure 2). Columns from left to right: degraded hillshade with slopes above the 68th percentile highlighted, mapped line length and fault zone width, elevation change, and slope change (including ϕ). Rows represent time steps at which landscapes were linearly diffused. A minimum fault zone width of 0.1 m was imposed to avoid undefined values on the logarithmic scale in later analysis.

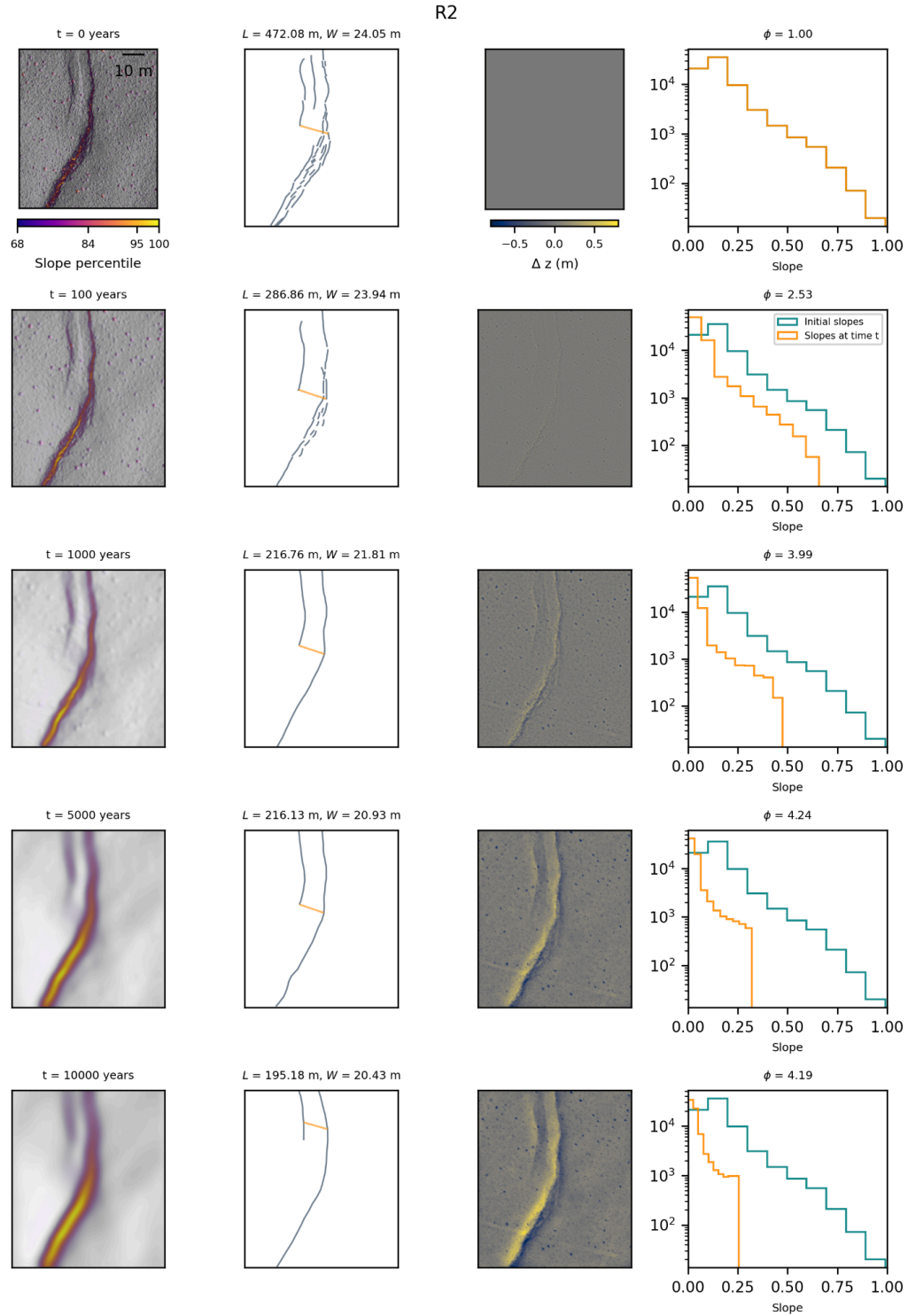


Figure S3. Landscape R2 from the M7.1 2019 Ridgecrest earthquake (see location in Figure 2). Columns from left to right: degraded hillshade with slopes above the 68th percentile highlighted, mapped line length and fault zone width, elevation change, and slope change (including ϕ). Rows represent time steps at which landscapes were linearly diffused. A minimum fault zone width of 0.1 m was imposed to avoid undefined values on the logarithmic scale in later analysis.

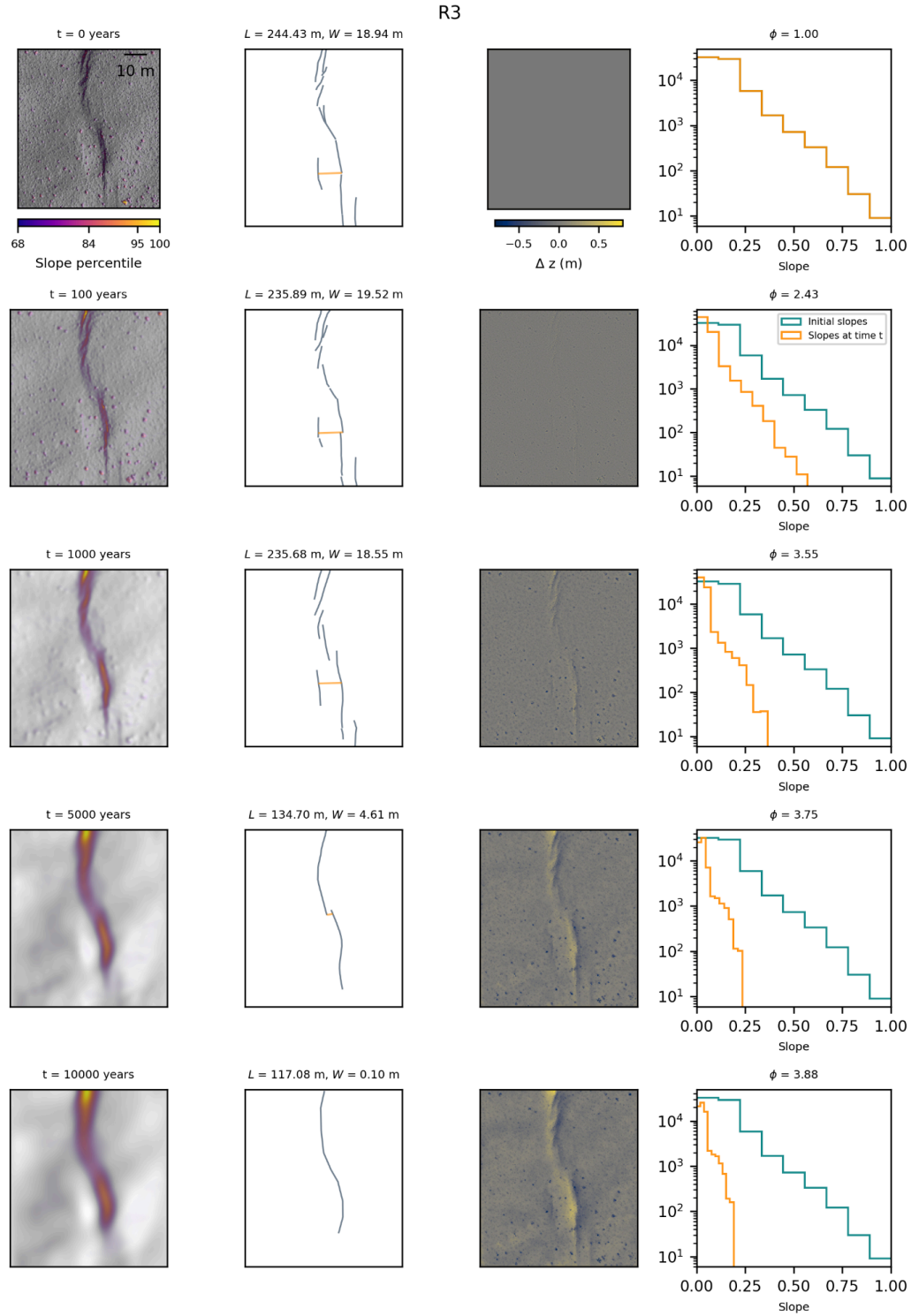


Figure S4. Landscape R3 from the M7.1 2019 Ridgecrest earthquake (see location in Figure 2). Columns from left to right: degraded hillshade with slopes above the 68th percentile highlighted, mapped line length and fault zone width, elevation change, and slope change (including ϕ). Rows represent time steps at which landscapes were linearly diffused. A minimum fault zone width of 0.1 m was imposed to avoid undefined values on the logarithmic scale in later analysis.

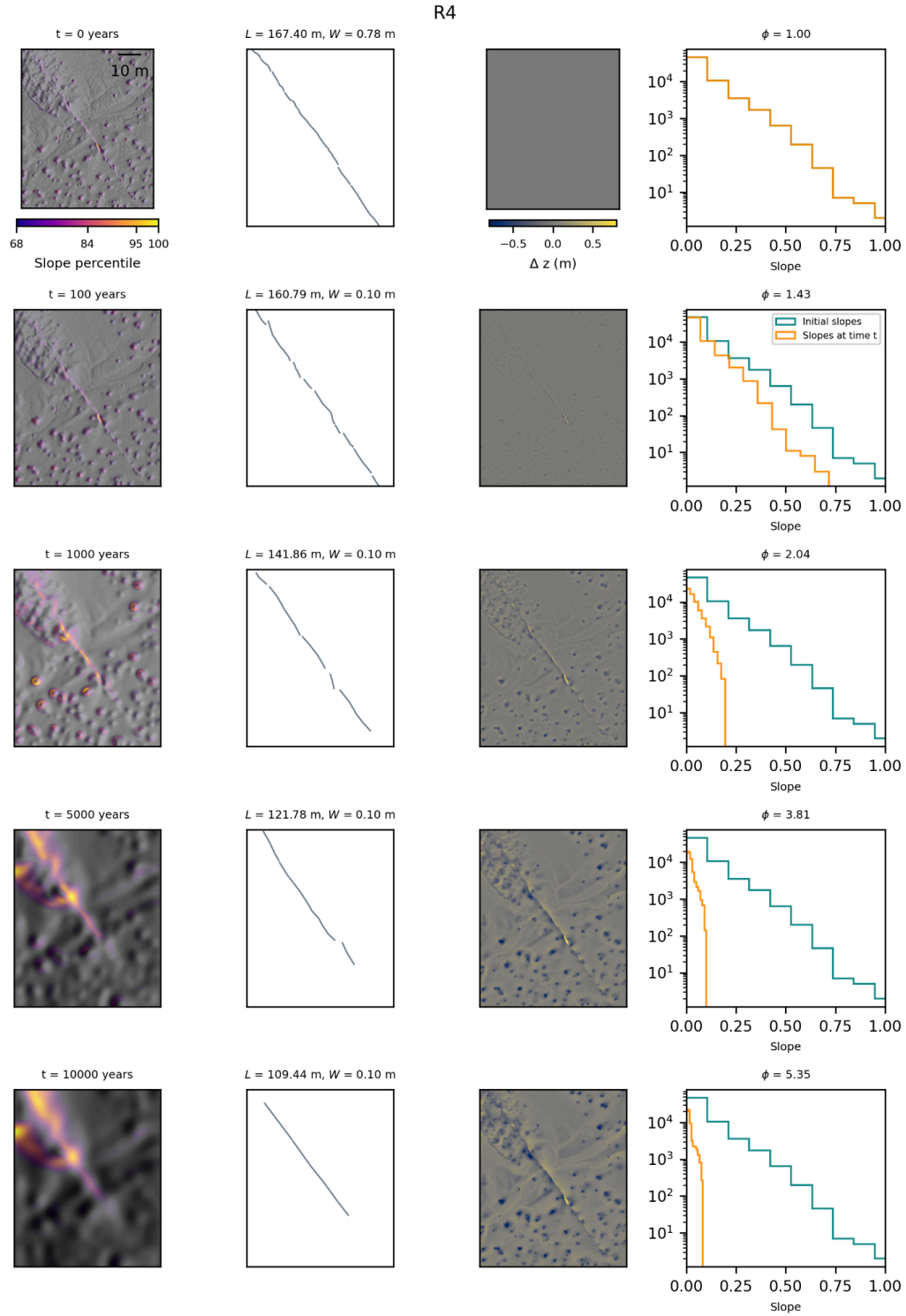


Figure S5. Landscape R4 from the M7.1 2019 Ridgecrest earthquake (see location in Figure 2). Columns from left to right: degraded hillshade with slopes above the 68th percentile highlighted, mapped line length and fault zone width, elevation change, and slope change (including ϕ). Rows represent time steps at which landscapes were linearly diffused. A minimum fault zone width of 0.1 m was imposed to avoid undefined values on the logarithmic scale in later analysis.

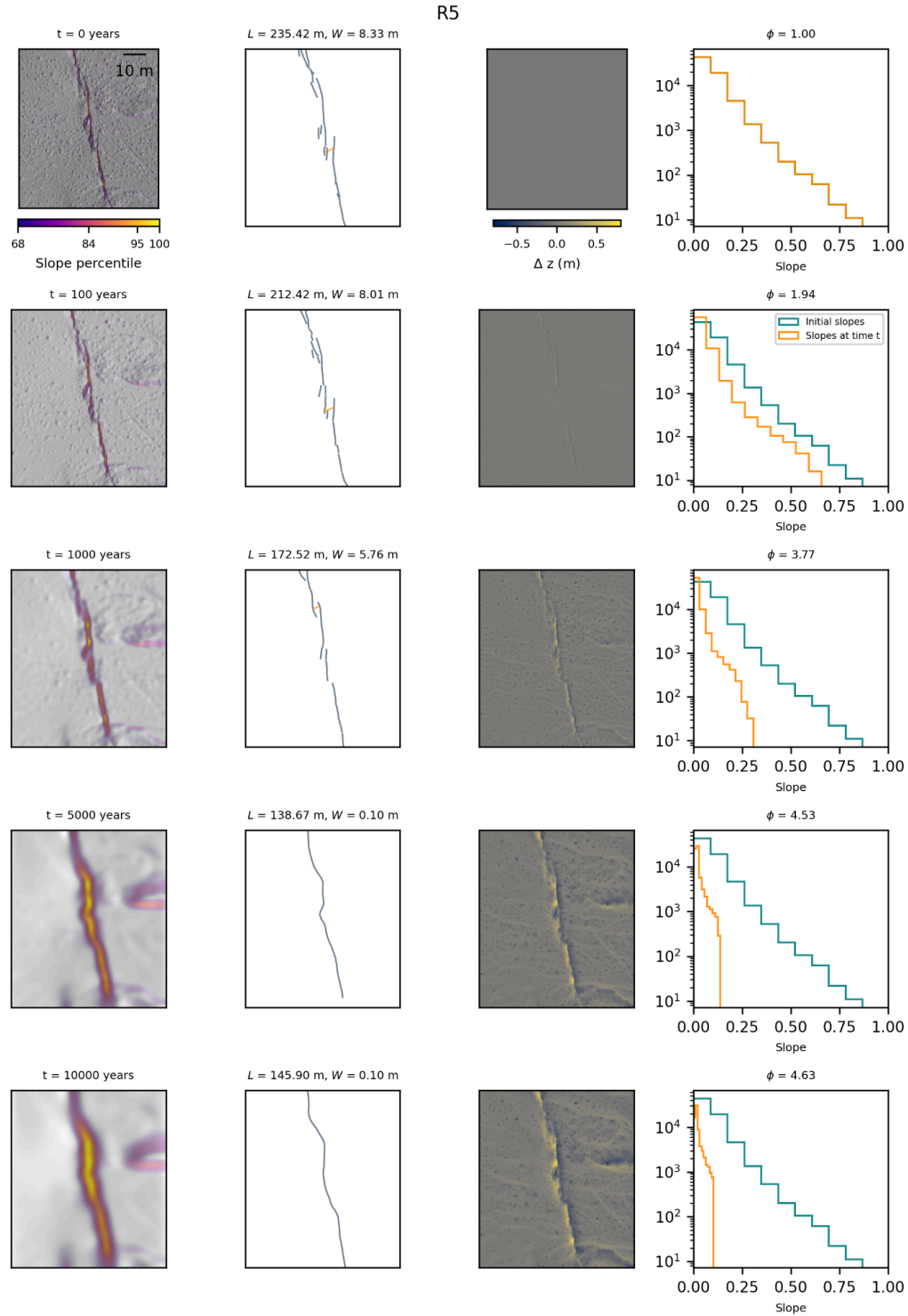


Figure S6. Landscape R5 from the M7.1 2019 Ridgecrest earthquake (see location in Figure 2). Columns from left to right: degraded hillshade with slopes above the 68th percentile highlighted, mapped line length and fault zone width, elevation change, and slope change (including ϕ). Rows represent time steps at which landscapes were linearly diffused. A minimum fault zone width of 0.1 m was imposed to avoid undefined values on the logarithmic scale in later analysis.

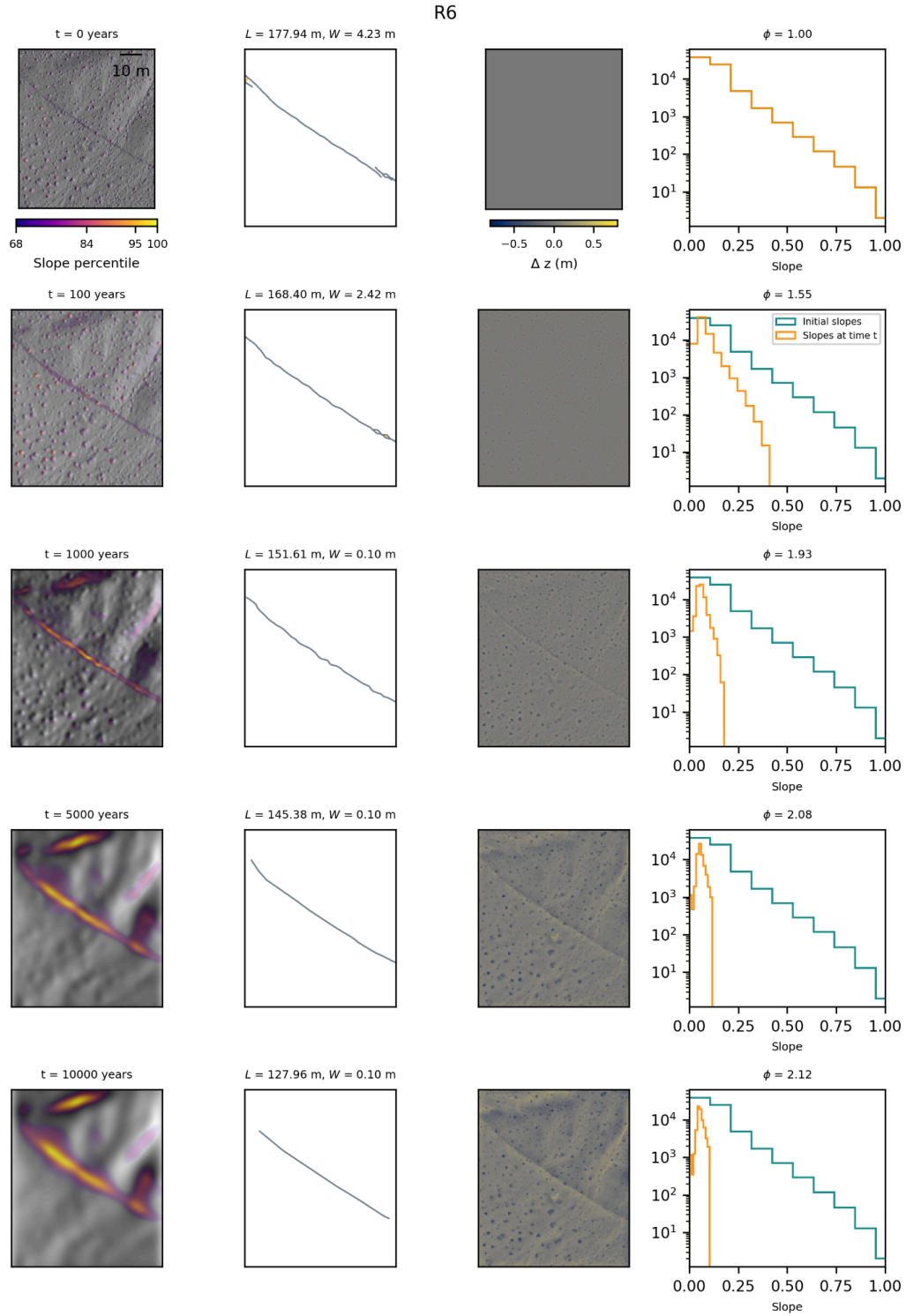


Figure S7. Landscape R6 from the M7.1 2019 Ridgecrest earthquake (see location in Figure 2). Columns from left to right: degraded hillshade with slopes above the 68th percentile highlighted, mapped line length and fault zone width, elevation change, and slope change (including ϕ). Rows represent time steps at which landscapes were linearly diffused. A minimum fault zone width of 0.1 m was imposed to avoid undefined values on the logarithmic scale in later analysis.

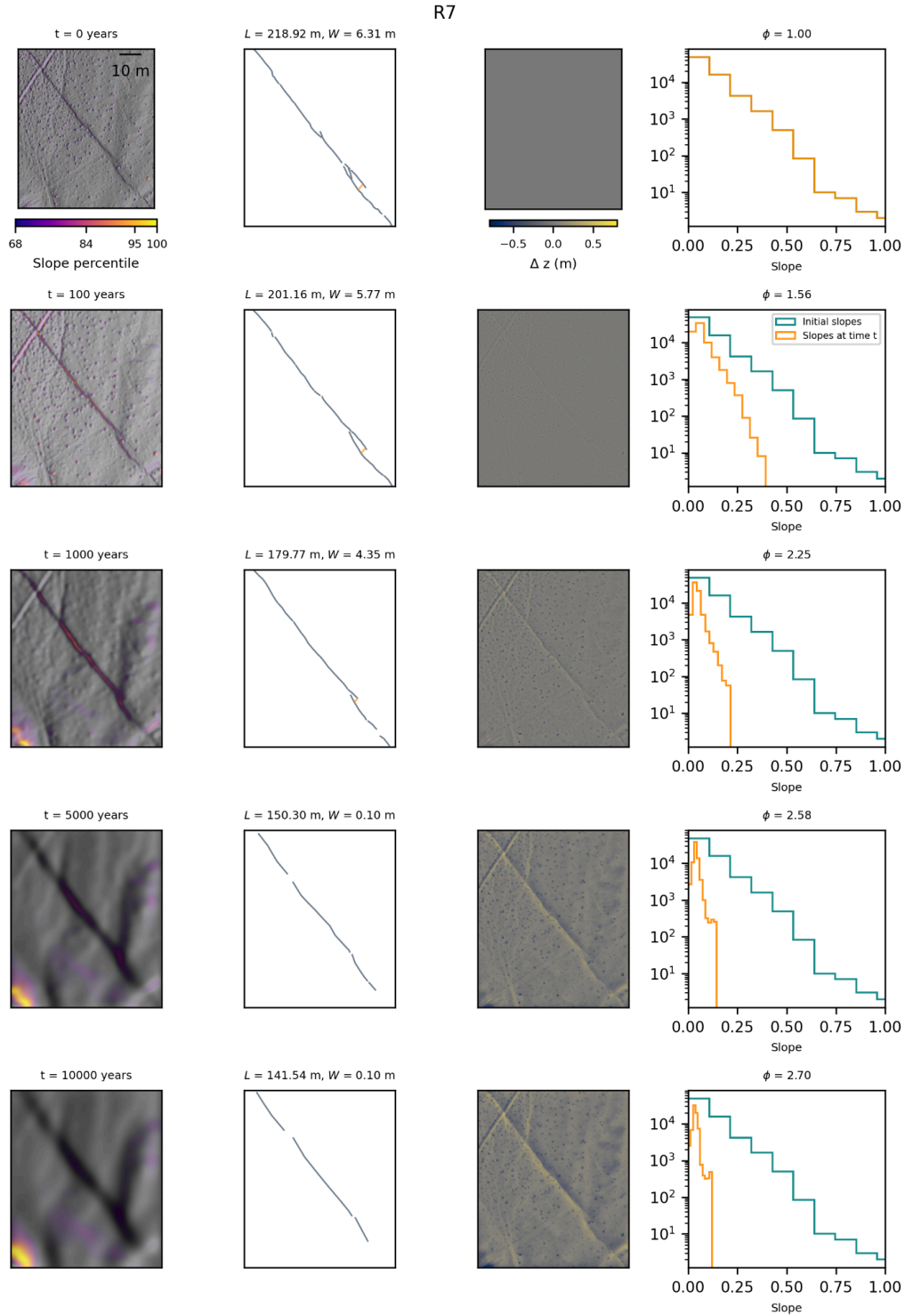


Figure S8. Landscape R7 from the M7.1 2019 Ridgecrest earthquake (see location in Figure 2). Columns from left to right: degraded hillshade with slopes above the 68th percentile highlighted, mapped line length and fault zone width, elevation change, and slope change (including ϕ). Rows represent time steps at which landscapes were linearly diffused. A minimum fault zone width of 0.1 m was imposed to avoid undefined values on the logarithmic scale in later analysis.

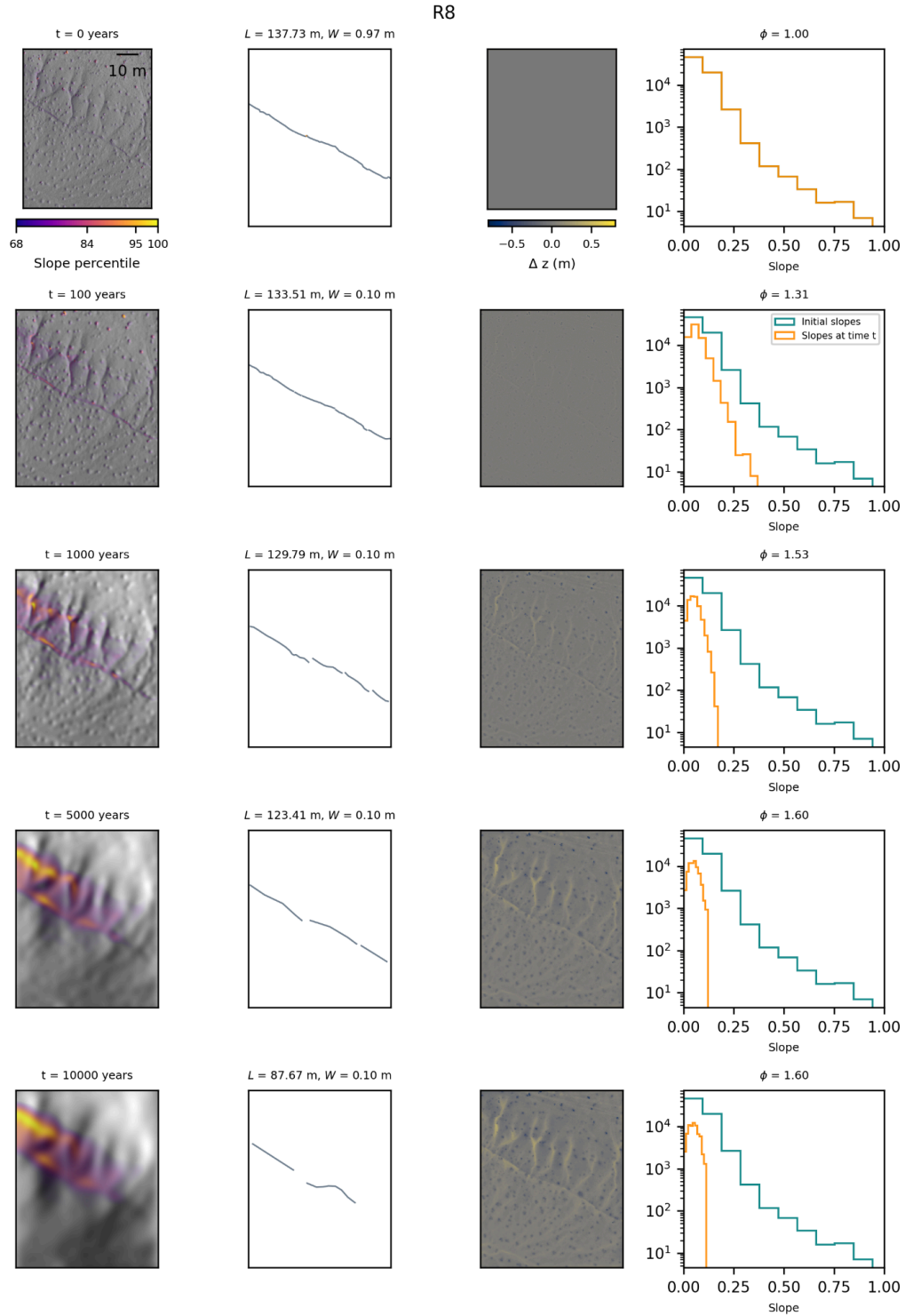


Figure S9. Landscape R8 from the M7.1 2019 Ridgecrest earthquake (see location in Figure 2). Columns from left to right: degraded hillshade with slopes above the 68th percentile highlighted, mapped line length and fault zone width, elevation change, and slope change (including ϕ). Rows represent time steps at which landscapes were linearly diffused. A minimum fault zone width of 0.1 m was imposed to avoid undefined values on the logarithmic scale in later analysis.

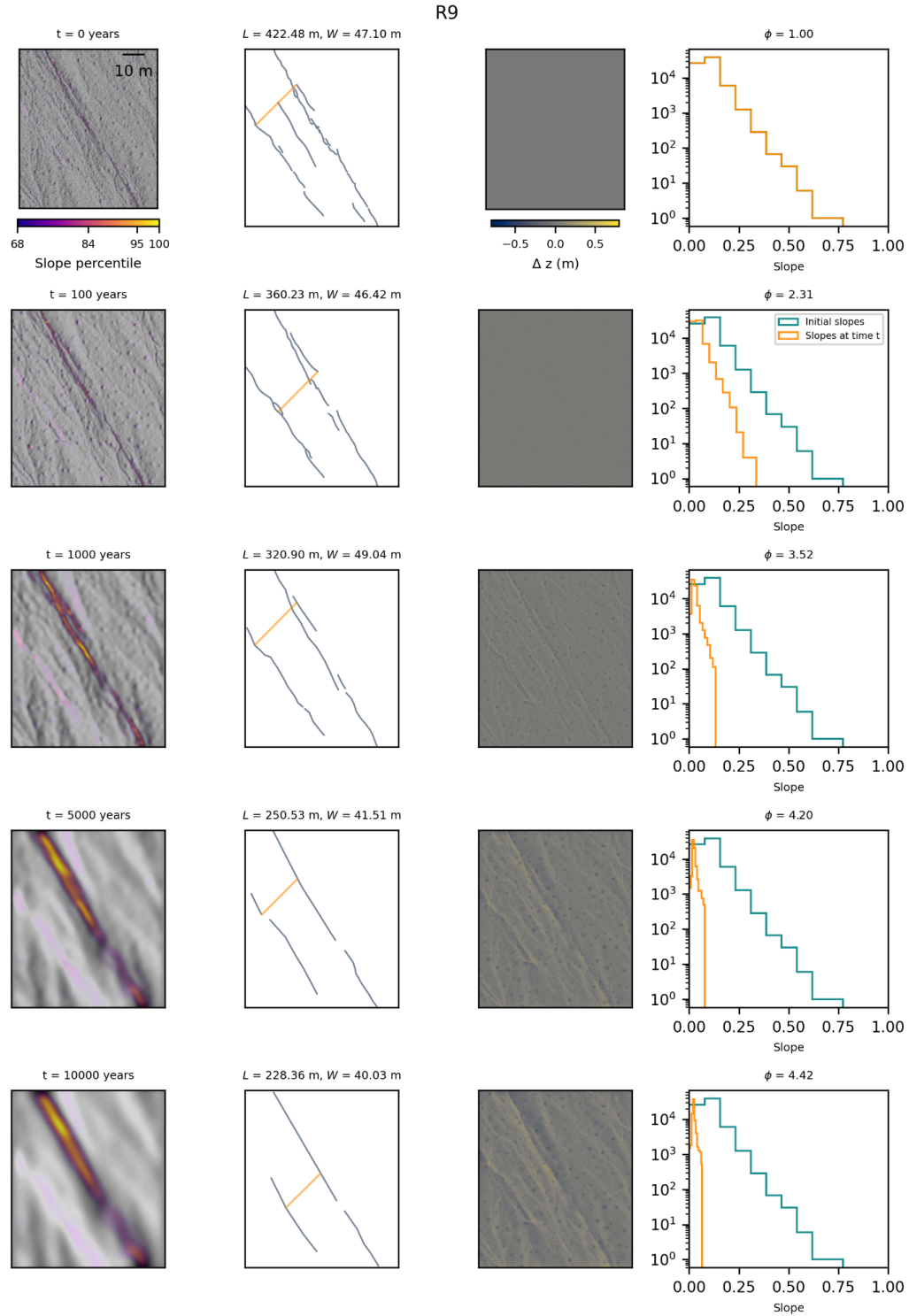


Figure S10. Landscape R9 from the M7.1 2019 Ridgecrest earthquake (see location in Figure 2). Columns from left to right: degraded hillshade with slopes above the 68th percentile highlighted, mapped line length and fault zone width, elevation change, and slope change (including ϕ). Rows represent time steps at which landscapes were linearly diffused. A minimum fault zone width of 0.1 m was imposed to avoid undefined values on the logarithmic scale in later analysis.

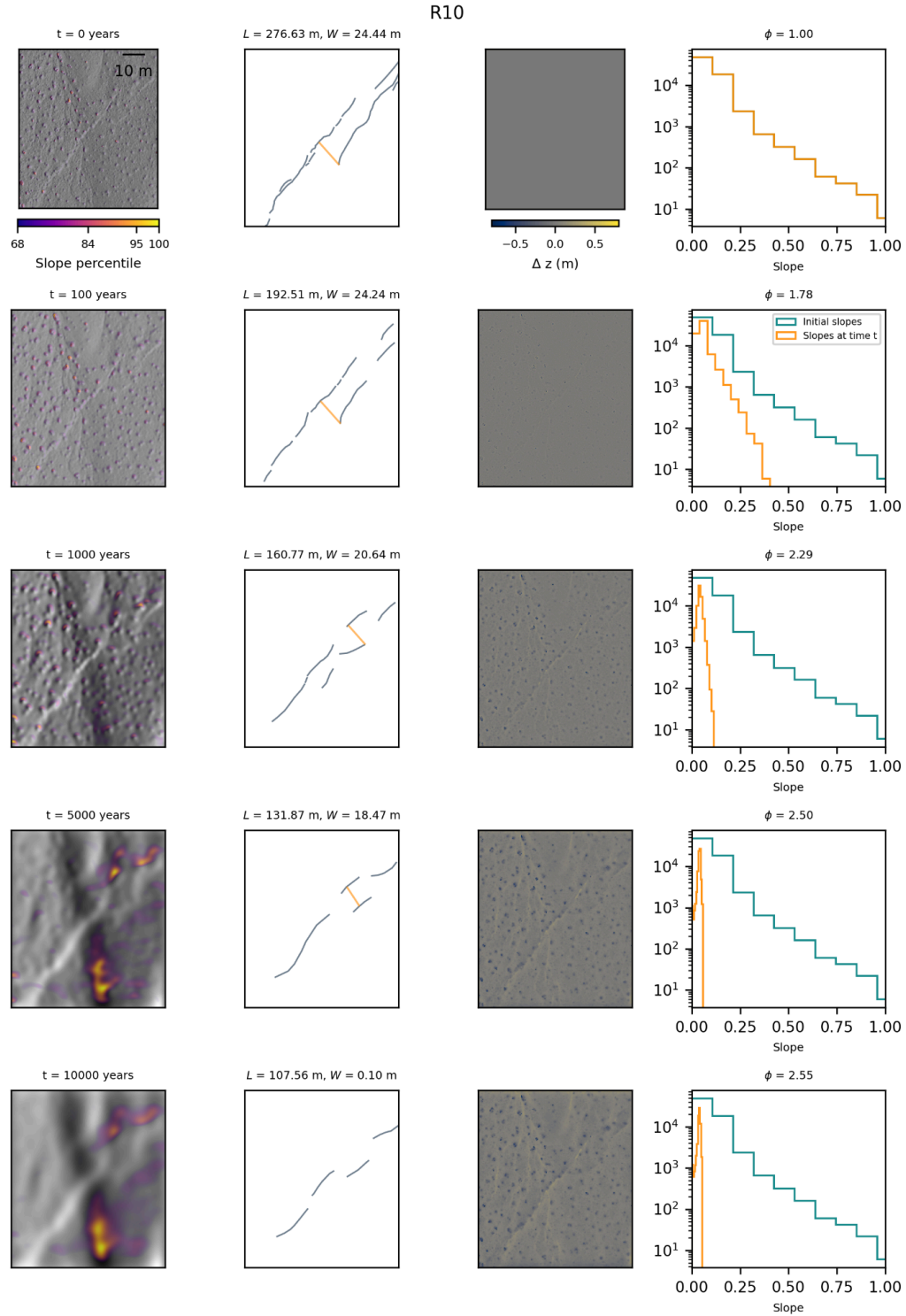


Figure S11. R10 from the M6.4 2019 Ridgecrest earthquake (see location in Figure 2). Columns from left to right: degraded hillshade with slopes above the 68th percentile highlighted, mapped line length and fault zone width, elevation change, and slope change (including ϕ). Rows represent time steps at which landscapes were linearly diffused. A minimum fault zone width of 0.1 m was imposed to avoid undefined values on the logarithmic scale in later analysis.

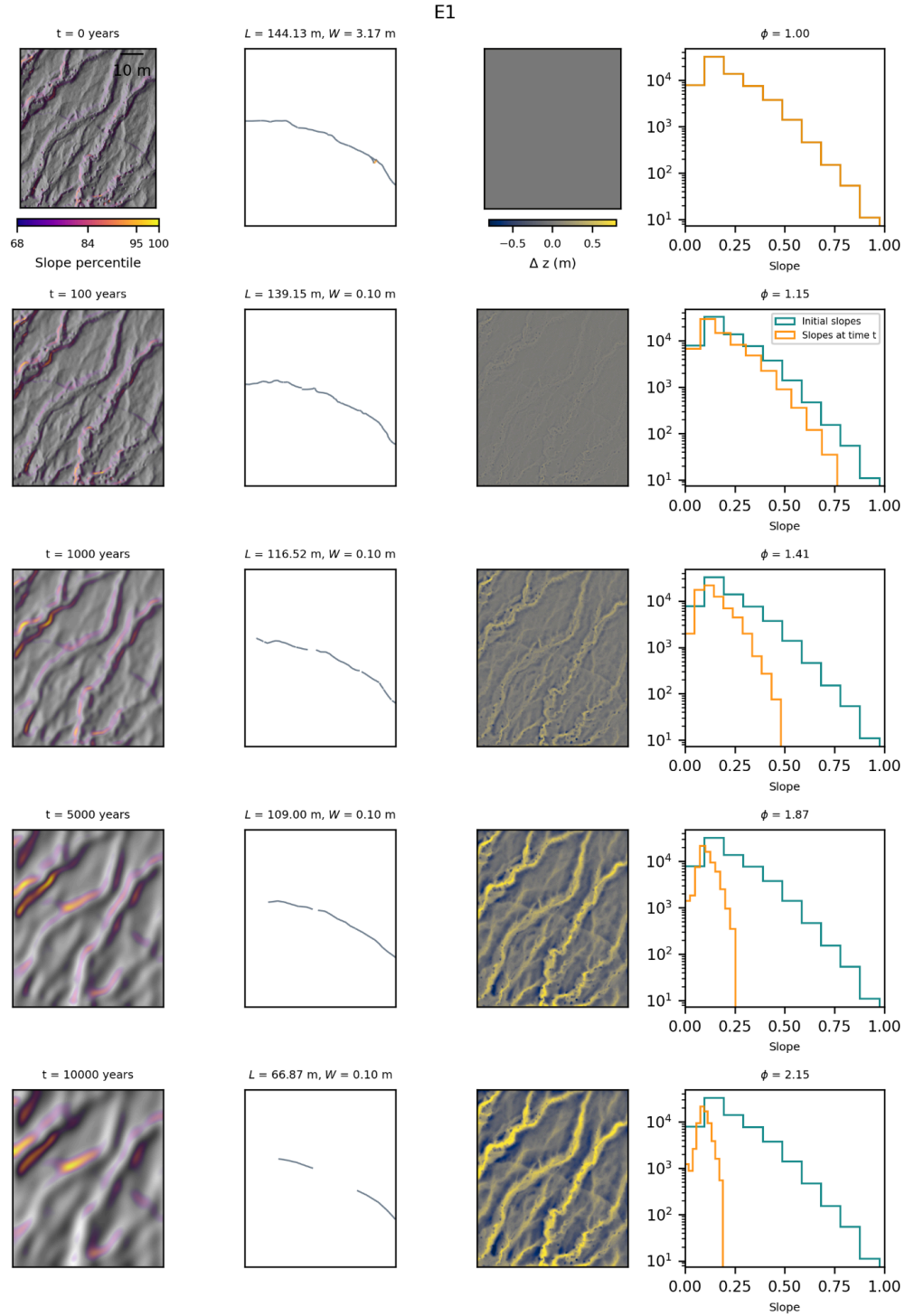


Figure S12. Landscape E1 from the 2010 El Mayor-Cucapah earthquake (see location in Figure 2). Columns from left to right: Degraded hillshade with slopes above the 68th percentile highlighted, mapped line length and fault zone width, elevation change, and slope change (including ϕ). Rows represent time steps at which landscapes were linearly diffused. A minimum fault zone width of 0.1 m was imposed to avoid undefined values on the logarithmic scale in later analysis.

E2

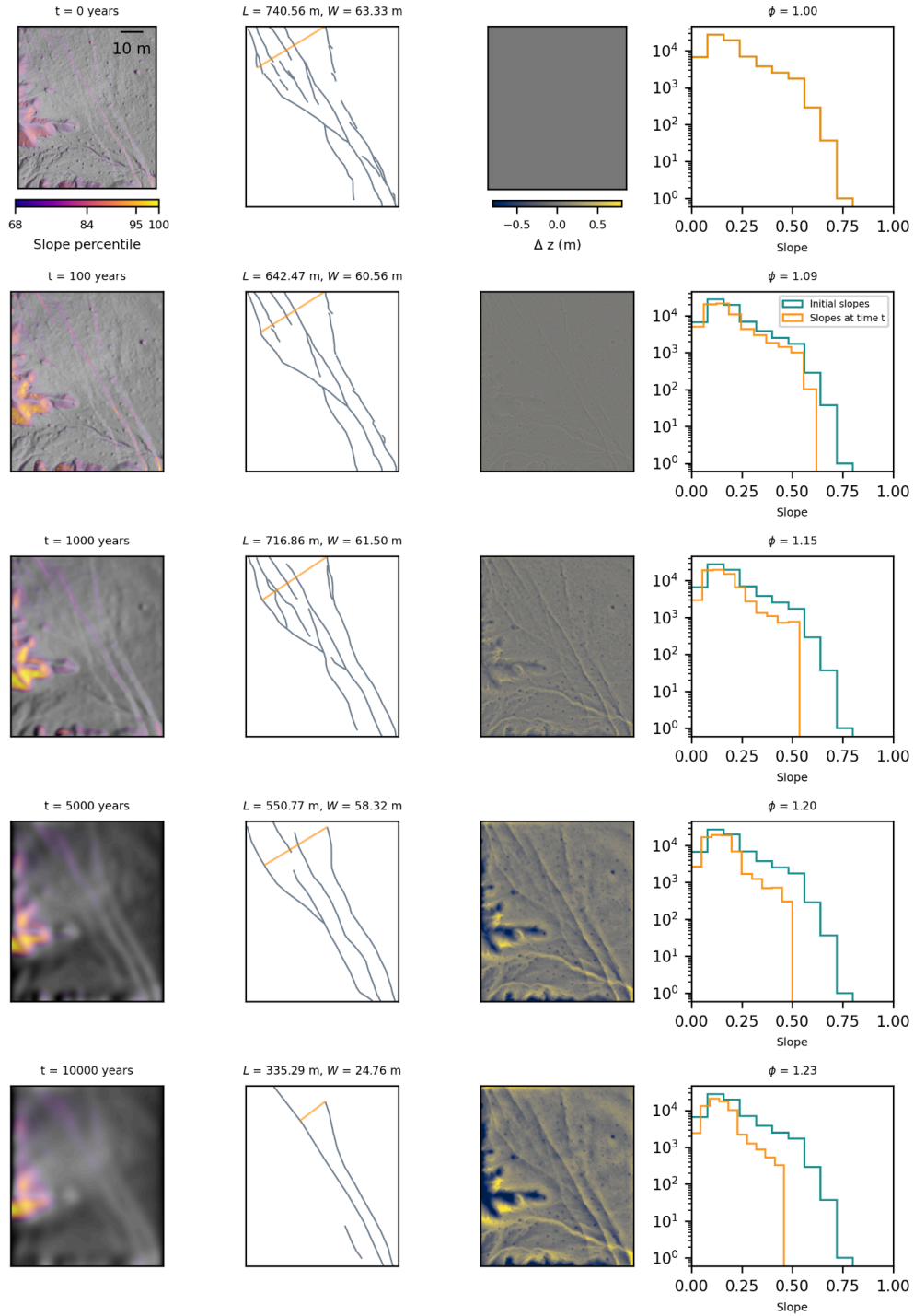


Figure S13. Landscape E2 from the 2010 El Mayor-Cucapah earthquake (see location in Figure 2). Columns from left to right: Degraded hillshade with slopes above the 68th percentile highlighted, mapped line length and fault zone width, elevation change, and slope change (including ϕ). Rows represent time steps at which landscapes were linearly diffused. A minimum fault zone width of 0.1 m was imposed to avoid undefined values on the logarithmic scale in later analysis.

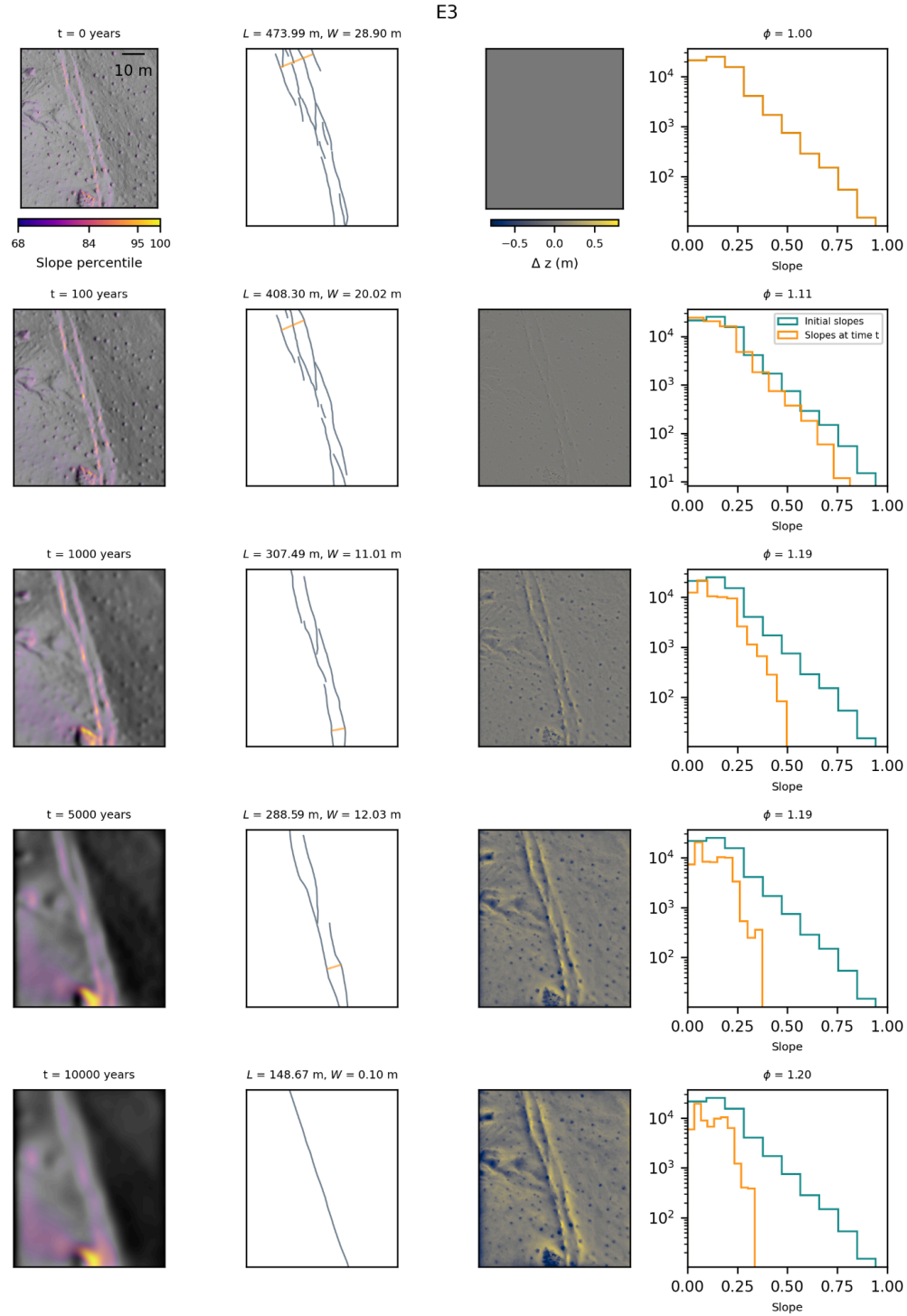


Figure S14. Landscape E3 from the 2010 El Mayor-Cucapah earthquake (see location in Figure 2). Columns from left to right: Degraded hillshade with slopes above the 68th percentile highlighted, mapped line length and fault zone width, elevation change, and slope change (including ϕ). Rows represent time steps at which landscapes were linearly diffused. A minimum fault zone width of 0.1 m was imposed to avoid undefined values on the logarithmic scale in later analysis.

E4

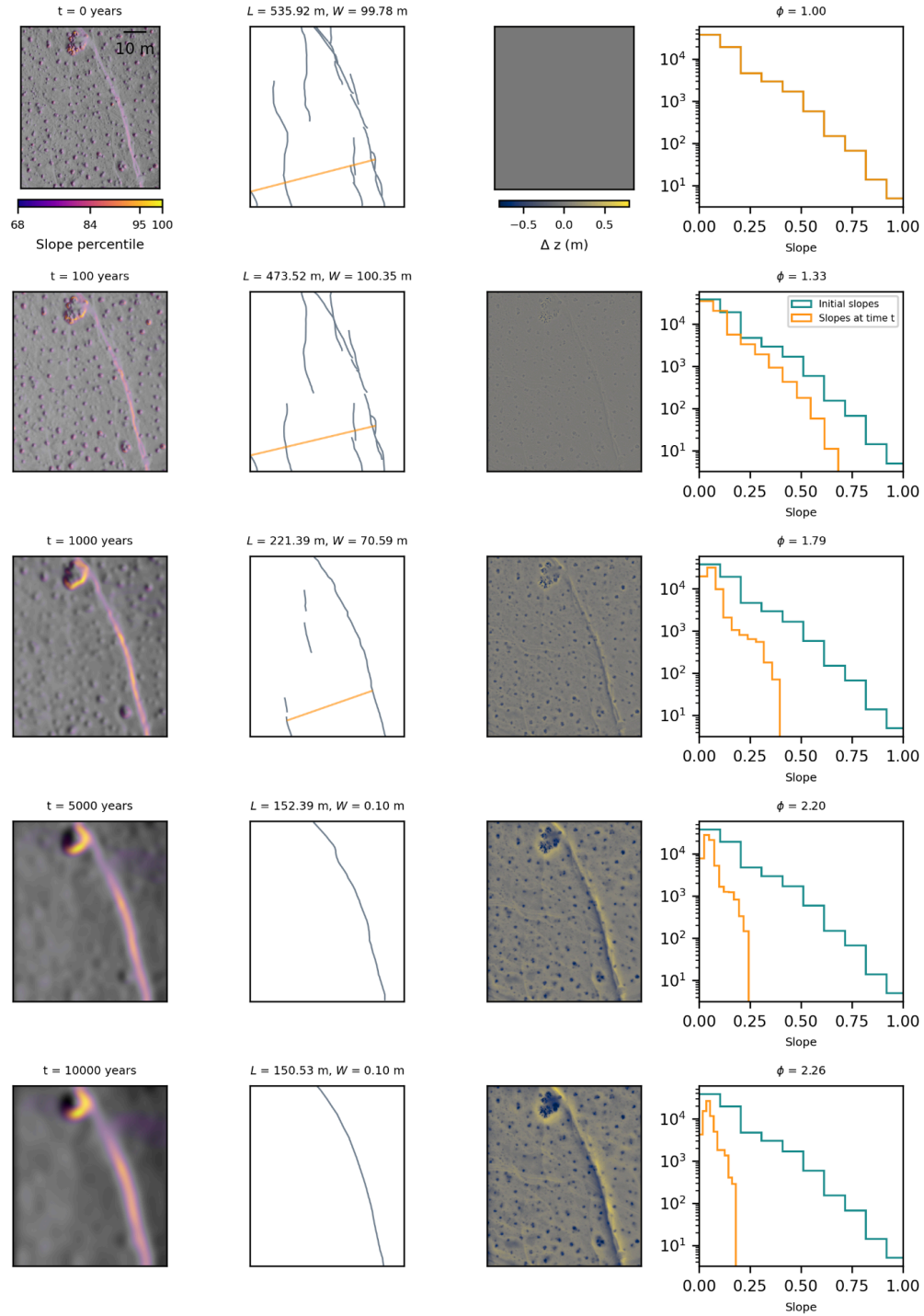


Figure S15. Landscape E4 from the 2010 El Mayor-Cucapah earthquake (see location in Figure 2). Columns from left to right: Degraded hillshade with slopes above the 68th percentile highlighted, mapped line length and fault zone width, elevation change, and slope change (including ϕ). Rows represent time steps at which landscapes were linearly diffused. A minimum fault zone width of 0.1 m was imposed to avoid undefined values on the logarithmic scale in later analysis.

E5

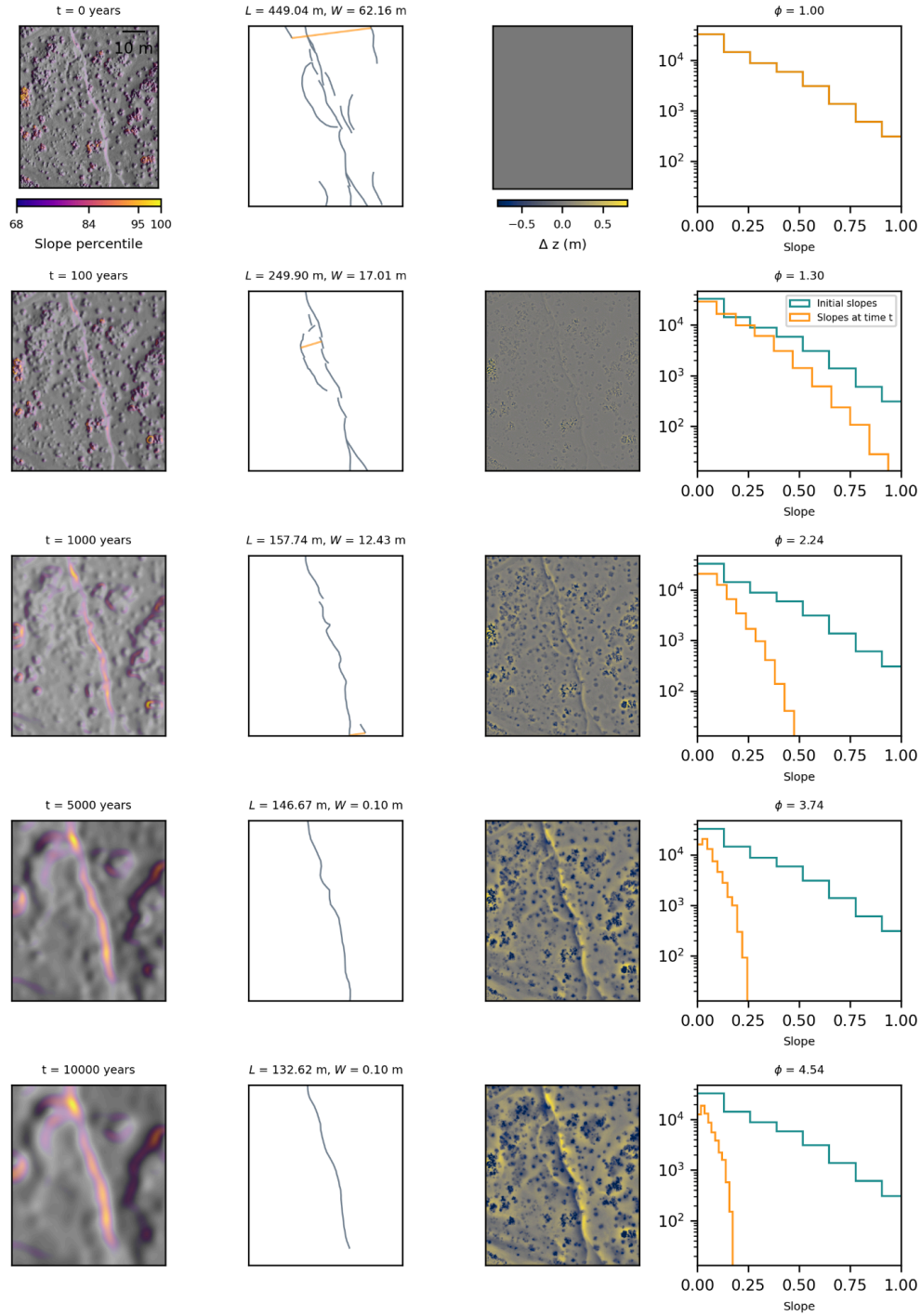


Figure S16. Landscape E1 from the 2010 El Mayor-Cucapah earthquake (see location in Figure 2). Columns from left to right: Degraded hillshade with slopes above the 68th percentile highlighted, mapped line length and fault zone width, elevation change, and slope change (including ϕ). Rows represent time steps at which landscapes were linearly diffused. A minimum fault zone width of 0.1 m was imposed to avoid undefined values on the logarithmic scale in later analysis.

E6

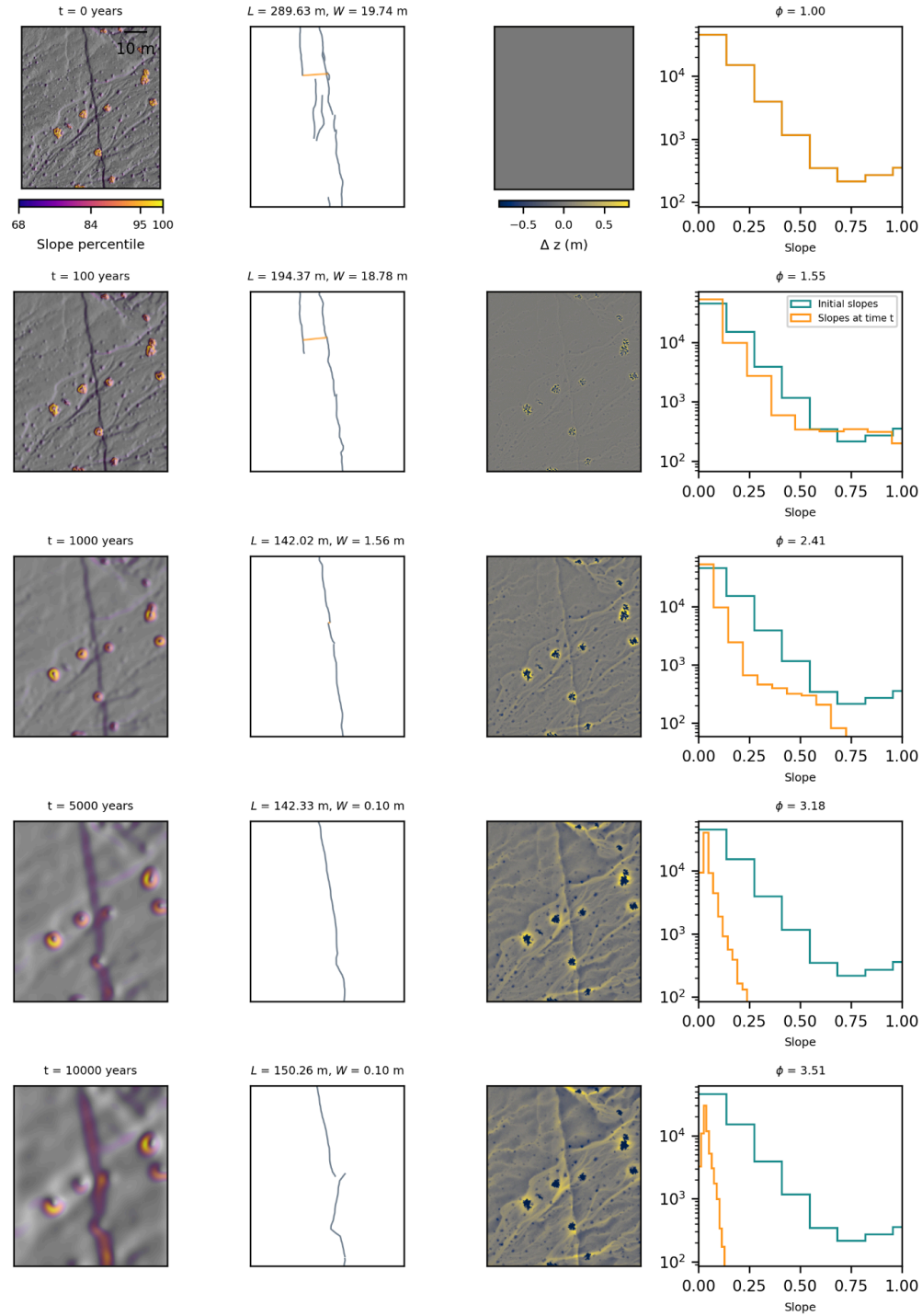


Figure S17. Landscape E1 from the 2010 El Mayor-Cucapah earthquake (see location in Figure 2). Columns from left to right: Degraded hillshade with slopes above the 68th percentile highlighted, mapped line length and fault zone width, elevation change, and slope change (including ϕ). Rows represent time steps at which landscapes were linearly diffused. A minimum fault zone width of 0.1 m was imposed to avoid undefined values on the logarithmic scale in later analysis.

E7

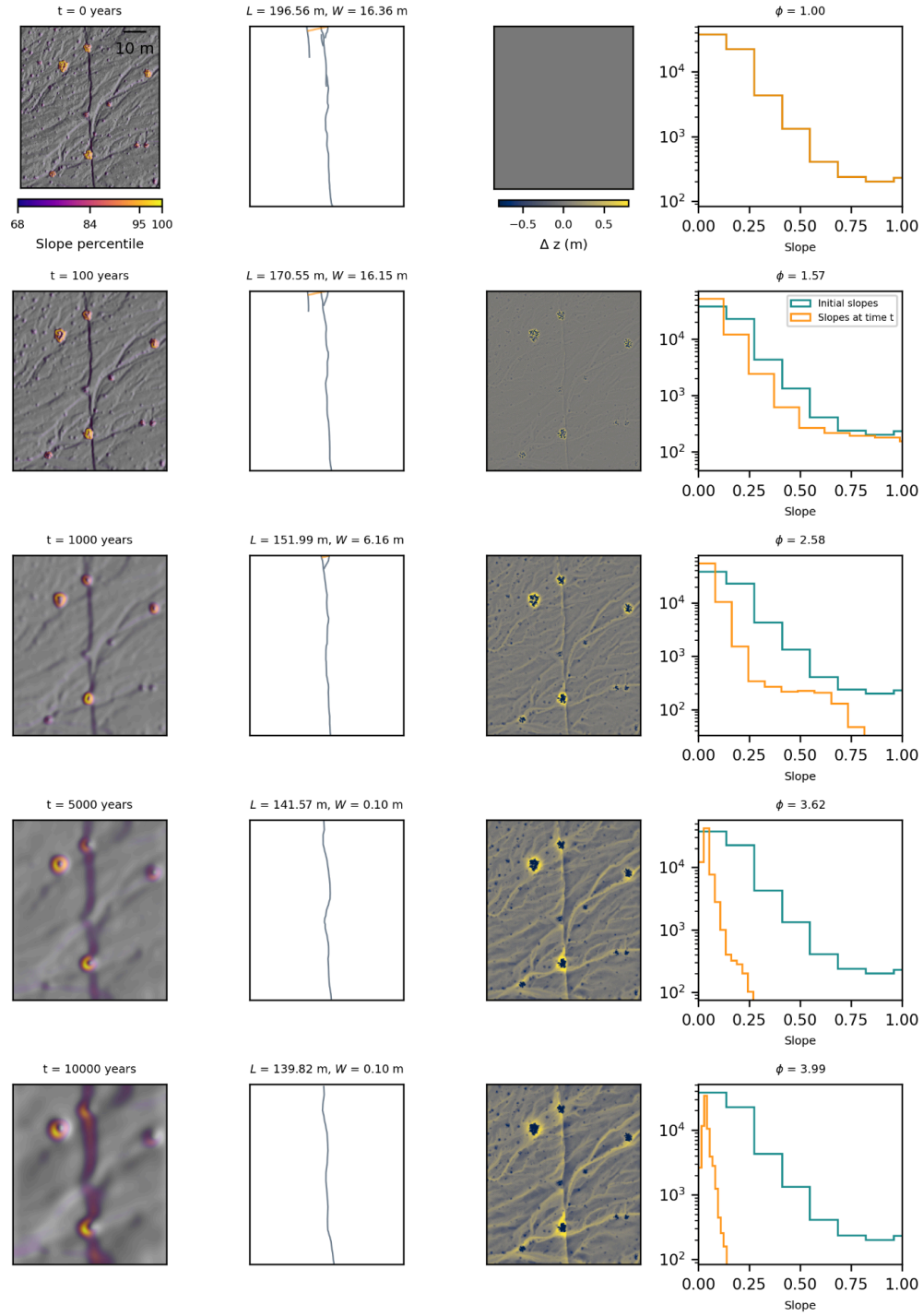


Figure S18. Landscape E7 from the 2010 El Mayor-Cucapah earthquake (see location in Figure 2). Columns from left to right: Degraded hillshade with slopes above the 68th percentile highlighted, mapped line length and fault zone width, elevation change, and slope change (including ϕ). Rows represent time steps at which landscapes were linearly diffused. A minimum fault zone width of 0.1 m was imposed to avoid undefined values on the logarithmic scale in later analysis.

E8

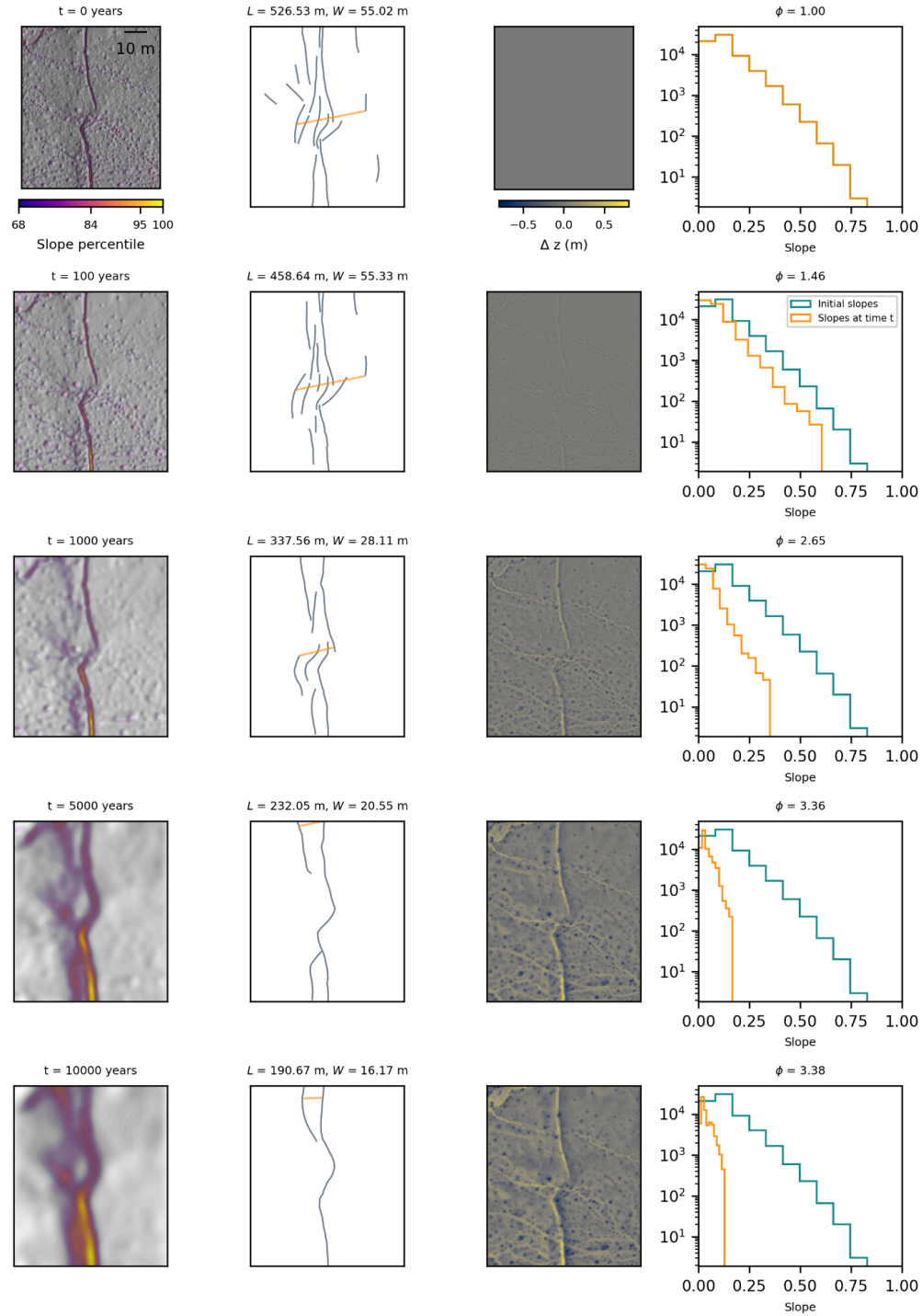


Figure S19. Landscape E8 from the 2010 El Mayor-Cucapah earthquake (see location in Figure 2). Columns from left to right: Degraded hillshade with slopes above the 68th percentile highlighted, mapped line length and fault zone width, elevation change, and slope change (including ϕ). Rows represent time steps at which landscapes were linearly diffused. A minimum fault zone width of 0.1 m was imposed to avoid undefined values on the logarithmic scale in later analysis.

E9

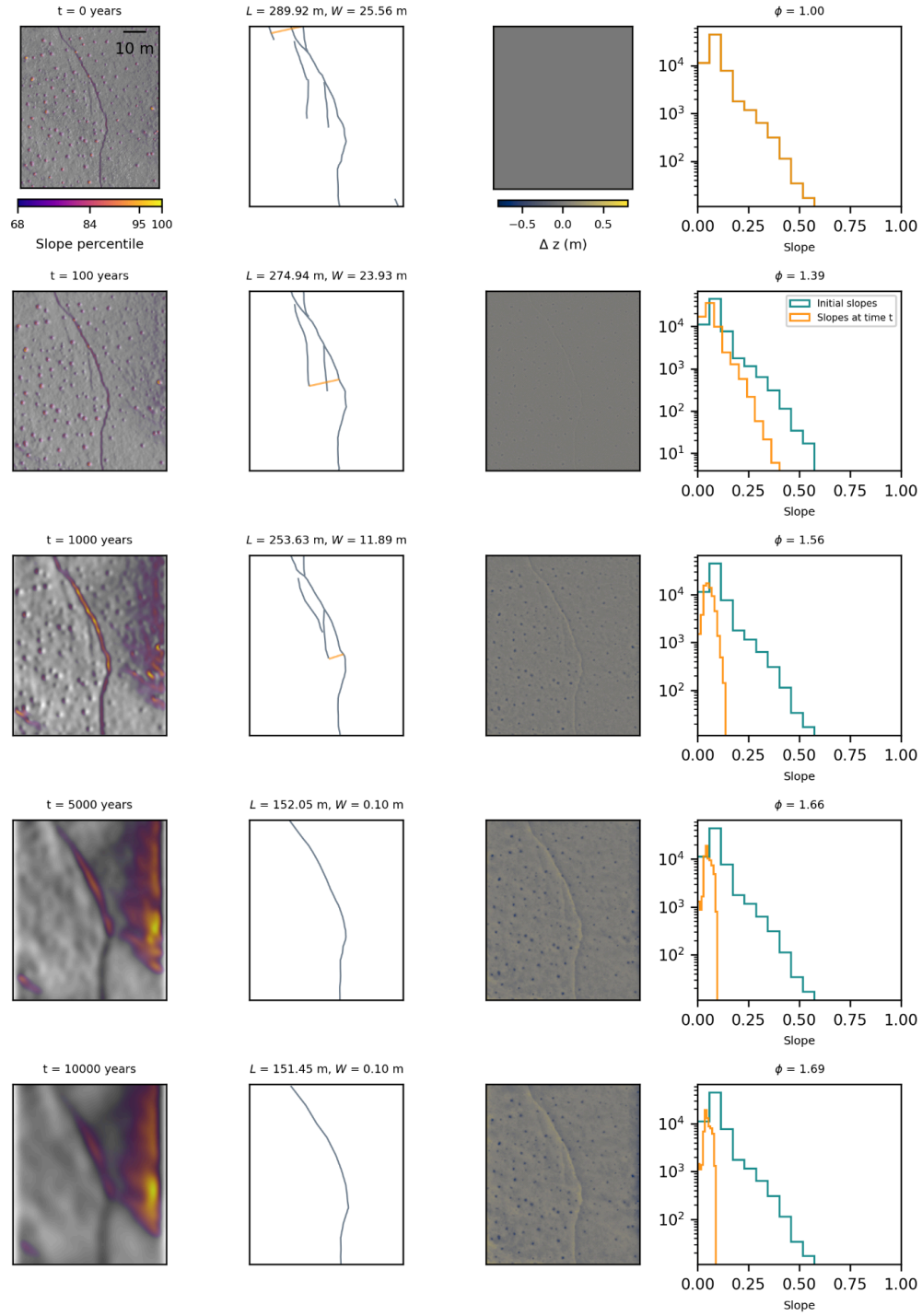


Figure S20. Landscape E9 from the 2010 El Mayor-Cucapah earthquake (see location in Figure 2). Columns from left to right: Degraded hillshade with slopes above the 68th percentile highlighted, mapped line length and fault zone width, elevation change, and slope change (including ϕ). Rows represent time steps at which landscapes were linearly diffused. A minimum fault zone width of 0.1 m was imposed to avoid undefined values on the logarithmic scale in later analysis.

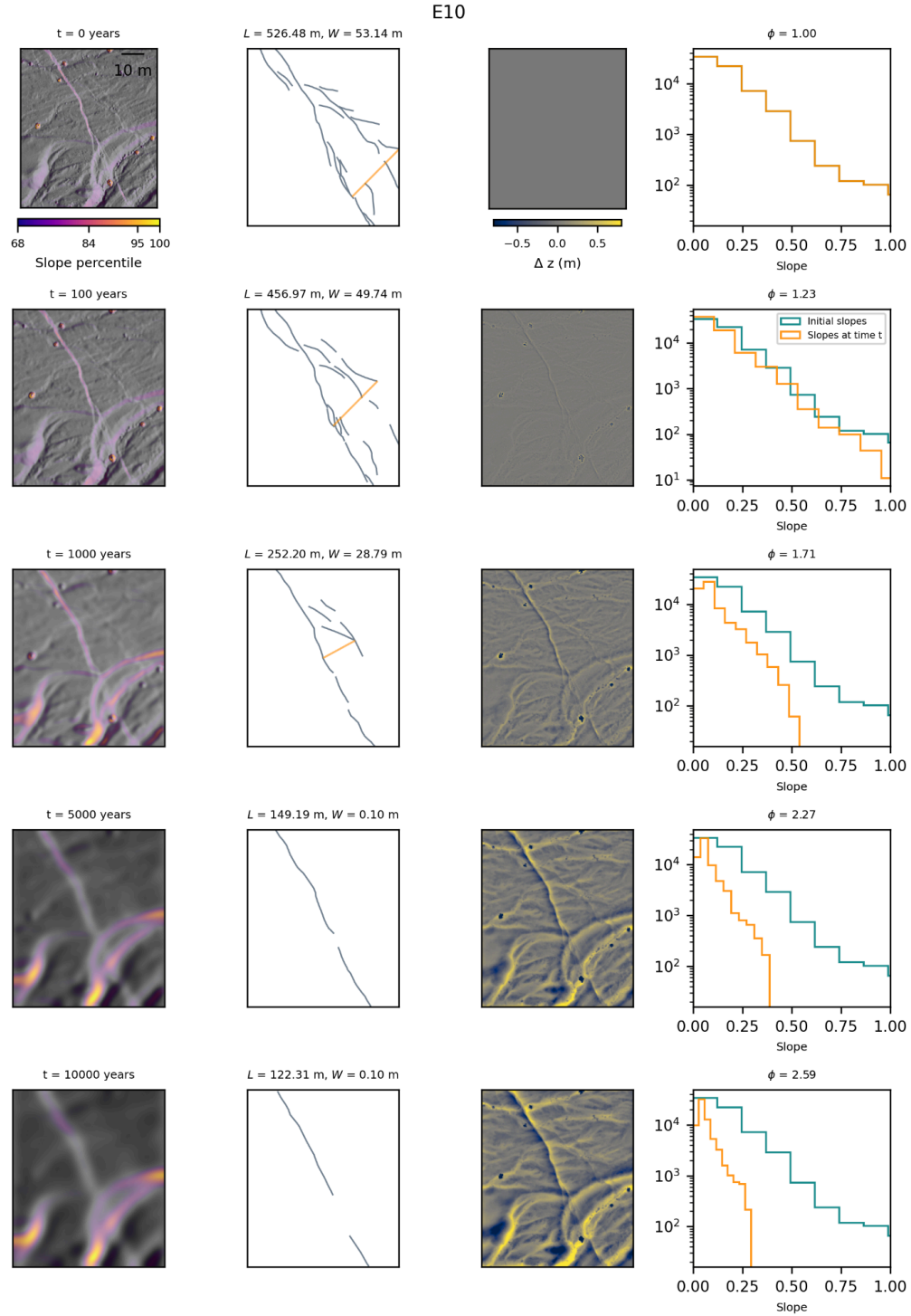


Figure S21. Landscape E10 from the 2010 El Mayor-Cucapah earthquake (see location in Figure 2). Columns from left to right: Degraded hillshade with slopes above the 68th percentile highlighted, mapped line length and fault zone width, elevation change, and slope change (including ϕ). Rows represent time steps at which landscapes were linearly diffused. A minimum fault zone width of 0.1 m was imposed to avoid undefined values on the logarithmic scale in later analysis.

References

Bryant, W. A., & Sander, E. F. (2008). National Quaternary fault and fold database data complication for the State of California [USGS Earthquake Hazards Program Grant Final Report]. U.S. Geological Survey.
https://earthquake.usgs.gov/cfusion/external_grants/reports/05HQGR0117.pdf