

Figure F1. Morphological map of the Christiana-Santorini-Kolumbo rift zone. Gray lines = all available seismic profiles, white lines = seismic profiles in figures below. Bathymetry from Nomikou et al. (2012, 2013, 2018) and Hooft et al. (2017). Coordinate system is UTM Zone 35N, WGS84. Inset: southern Aegean Sea with the South Aegean volcanic arc marked red.

Figure F2. (A) *P*-wave velocity, (B) bulk density, and (C) grain density of oozes (nonvolcanic sediment) and apparent grain density of volcanic ash and lapilli, rift basin Sites U1589–U1592 and U1598–U1600. Sloping lines = linear best-fits to each group of data (dashed lines = lapilli). Isolated vesicles in the pumice lapilli and volcanic ash lower the grain density below that of volcanic glass (around 2.6 g/cm³). Depth scale is CSF-A (Kutterolf et al., 2024b).

Figure F3. Comparison of downhole logging density, Hole U1589C, and shipboard discrete density, Holes U1589A and U1589B. Only samples without reported coring disturbances are included. Depth scale is CSF-A (Kutterolf et al., 2024b).

Figure F4. Comparison of shipboard WRMSL density and velocity data (black dots) with discrete measurements (orange circles), Sites U1591 and U1592. Depth scale is compressed CSSF-D (Kutterolf et al., 2024b).

Figure F5. Core-seismic integration, Site U1589. A. Recovery. B. Bulk density measured with WRMSL (black dots), discrete MAD density measurements (orange circles), and filtered density log (green line). C. *P*-wave velocity measured with WRMSL (black dots), discrete caliper measurements (orange circles), filtered velocity log (blue), and manually modified velocity curve for core-seismic integration (orange line). D. Acoustic impedance: product of (B) filtered bulk mean density and (C) refined velocity curve. E. Synthetic seismogram. F. Extracted seismogram from Seismic Line GEOMAR_5016 at Site U1589 (nearest trace repeated five times). Yellow lines indicate correlations between synthetic and extracted seismograms. G. Lithology of Site U1589. Unit I: volcanic sediments; Unit II: ooze and calcareous mud; Unit III: siliciclastics with shells; Unit IV: oxidized conglomerate, breccia, and sandstone. Archaeos Tuff after Druitt et al. (2024h). Depth scale is compressed CSSF-D (Kutterolf et al., 2024b).

Figure F6. Seismic Profile GEOMAR_5016 crossing Site U1589. Colors indicate lithologies of Site U1589. Unit I: volcanic sediments; Unit II: ooze and calcareous mud; Unit III: siliciclastics with shells; Unit IV: oxidized conglomerate, breccia, and sandstone; Unit V: carbonate rocks. Archaeos Tuff after Druitt et al. (2024h). Horizons after Preine et al. (2022b). VE = vertical exaggeration. For location, see Figure F1. Depth scale is compressed CSSF-D (Kutterolf et al., 2024b).

Figure F7. Core-seismic integration, Site U1590. A. Recovery. B. Bulk density measured with WRMSL (black dots), discrete MAD density measurements (orange circles), and filtered density log (green line). C. *P*-wave velocity measured with WRMSL (black dots), discrete caliper measurements (orange circles), filtered velocity log (blue), and manually modified velocity curve for core-seismic integration (orange line). D. Acoustic impedance: product of (B) filtered bulk mean density and (C) refined velocity curve. E. Synthetic seismogram. F. Extracted seismogram from Seismic Line GEOMAR_3001 at Site U1590 (nearest trace repeated five times). Yellow lines indicate correlations between synthetic and extracted seismograms. G. Stratigraphy of Site U1590. Unit I: volcanic sediments; Unit II: volcanic-rich sediments and calcareous oozes and muds. Depth scale is compressed CSSF-D (Kutterolf et al., 2024b).

Figure F8. Seismic Profile GEOMAR_3001 crossing Site U1590. Colors indicate lithologies of Site U1590. Unit I: volcanic sediments; Unit II: volcanic-rich sediments and calcareous oozes and muds. VE = vertical exaggeration. For location, see Figure F1. Depth scale is compressed CSSF-D (Kutterolf et al., 2024b).

Figure F9. Core-seismic integration, Site U1591. A. Recovery. B. Bulk density measured with WRMSL (black dots), discrete MAD density measurements (orange circles), and filtered density log (green line). C. *P*-wave velocity measured with WRMSL (black dots), discrete caliper measurements (orange circles), filtered velocity log (blue), and manually modified velocity curve for core-seismic integration (orange line). D. Acoustic impedance: product of (B) filtered bulk mean density and (C) refined velocity curve. E. Synthetic seismogram. F.

Extracted seismogram from Seismic Line GEOMAR_5009 at Site U1591 (nearest trace repeated five times). Yellow lines indicate correlations between synthetic and extracted seismograms. G. Stratigraphy of Site U1591. Unit I: volcanic sediments; Unit II: calcareous oozes and muds and partially volcanic-rich sediments; Unit III: evaporites and minor volcanics. Archaeos Tuff after Druitt et al. (2024h). Depth scale is compressed CSSF-D (Kutterolf et al., 2024b).

Figure F10. Seismic Profile GEOMAR_5008 crossing Site U1591. Colors indicate lithologies of Site U1591. Unit I: volcanic sediments; Unit II: calcareous oozes and muds and partially volcanic-rich sediments; Unit III: evaporites and minor volcanics. Archaeos Tuff after Druitt et al. (2024h). Horizons after Preine et al. (2022a, 2022c). VE = vertical exaggeration. For location, see Figure F1. Depth scale is compressed CSSF-D (Kutterolf et al., 2024b).

Figure F11. Core-seismic integration, Site U1592. A. Recovery. B. Bulk density measured with WRMSL (black dots), discrete MAD density measurements (orange circles), and filtered density log (green line). C. *P*-wave velocity measured with WRMSL (black dots), discrete caliper measurements (orange circles), filtered velocity log (blue), and manually modified velocity curve for core-seismic integration (orange line). D. Acoustic impedance: product of (B) filtered bulk mean density and (C) refined velocity curve. E. Synthetic seismogram. F. Extracted seismogram from Seismic Line GEOMAR_5017 at Site U1592 (nearest trace repeated five times). Yellow lines indicate correlations between synthetic and extracted seismograms. G. Stratigraphy of Site U1592. Unit I: volcanic and tuffaceous lithologies and minor oozes/muds; Unit II: calcareous oozes and muds; Unit III: dolomitic siliciclastics with shells. Unit IV: bioclastic limestone; Unit V: limestone and marble. Archaeos Tuff after Druitt et al. (2024h). Depth scale is compressed CSSF-D (Kutterolf et al., 2024b).

Figure F12. Seismic Profile GEOMAR_5017 crossing Site U1592. Colors indicate lithologies of Site U1592. Unit I: volcanic and tuffaceous lithologies and minor oozes/muds; Unit II: calcareous oozes and muds; Unit III: dolomitic siliciclastics with shells. Unit IV: bioclastic limestone; Unit V: limestone and marble. Archaeos Tuff after Druitt et al. (2024h). Horizons after Preine et al. (2022a). VE = vertical exaggeration. For location, see Figure F1. Depth scale is compressed CSSF-D (Kutterolf et al., 2024b).

Figure F13. Core-seismic integration, Site U1593. A. Recovery. B. Bulk density measured with WRMSL (black dots), discrete MAD density measurements (orange circles), and filtered density log (green line). C. *P*-wave velocity measured with WRMSL (black dots), discrete caliper measurements (orange circles), filtered velocity log (blue), and manually modified velocity curve for core-seismic integration (orange line). D. Acoustic impedance: product of (B) filtered bulk mean density and (C) refined velocity curve. E. Synthetic seismogram. F. Extracted seismogram from Seismic Line HH06-44 at Site U1593 (nearest trace repeated five times). Yellow lines indicate correlations between synthetic and extracted seismograms. G. Stratigraphy of Site U1593. Unit I: volcanic and tuffaceous lithologies and minor oozes/muds; Unit II: calcareous oozes and muds. Archaeos Tuff after Druitt et al. (2024h). Depth scale is compressed CSSF-D (Kutterolf et al., 2024b).

Figure F14. Seismic Profile GEOMAR_5017 crossing Site U1593. Colors indicate lithologies of Site U1593. Unit I: volcanic and tuffaceous lithologies and minor oozes/muds; Unit II: calcareous oozes and muds. Archaeos Tuff after Druitt et al. (2024h). Horizons after Preine et al. (2022a). VE = vertical exaggeration. For location, see Figure F1. Depth scale is compressed CSSF-D (Kutterolf et al., 2024b).

Figure F15. Core-seismic integration, Site U1594. A. Recovery. B. Bulk density measured with WRMSL (black dots), discrete MAD density measurements (orange circles), and filtered density log (green line). C. *P*-wave velocity measured with WRMSL (black dots), discrete caliper measurements (orange circles), filtered velocity log (blue), and manually modified velocity curve for core-seismic integration (orange line). D. Acoustic impedance: product of (B) filtered bulk mean density and (C) refined velocity curve. E. Synthetic seismogram. F. Extracted seismogram from Seismic Line GEOMAR_1006 at Site U1594 (nearest trace repeated five times). Yellow lines indicate correlations between synthetic and extracted seismograms. G. Stratigraphy of Site U1594 after Preine et al. (2024). L1: ash, ash-lapilli, and lapilli with a minor amount of mud. L2: lapilli-ash

and lapilli with lesser ash. Correlated with 726 CE Kameni eruption (Preine et al., 2024). Depth scale is CSSF-D (Kutterolf et al., 2024b).

Figure F16. Seismic Profile GEOMAR_1006 crossing Sites U1594 and U1595 in the southern caldera basin of Santorini. L1: ash, ash-lapilli, and lapilli with a minor amount of mud. L2: lapilli-ash and lapilli with lesser ash. Correlated with 726 CE Kameni eruption (Preine et al., 2024). L3: intercalated thin ash, ash lapilli, and tuffaceous mud. L4: heterogeneous volcanic lithologies, including lithic gravels and sands. L5: pumice lapilli, red volcanic ash and lithics. Horizons after Preine et al. (2024). VE = vertical exaggeration. For location, see Figure F1. Depth scale for Site U1594 is CSF-A, and depth scale for Site U1595 is compressed CSSF-D (Kutterolf et al., 2024b).

Figure F17. Core-seismic integration, Site U1595. A. Recovery. B. Bulk density measured with WRMSL (black dots), discrete MAD density measurements (orange circles), and filtered density log (green line). C. *P*-wave velocity measured with WRMSL (black dots), discrete caliper measurements (orange circles), filtered velocity log (blue), and manually modified velocity curve for core-seismic integration (orange line). D. Acoustic impedance: product of (B) filtered bulk mean density and (C) refined velocity curve. E. Synthetic seismogram. F. Extracted seismogram from Seismic Line GEOMAR_1006 at Site U1595 (nearest trace repeated five times). Yellow lines indicate correlations between synthetic and extracted seismograms. G. Stratigraphy of Site U1595 after Preine et al. (2024). L1: ash, ash-lapilli, and lapilli with a minor amount of mud. L2: lapilli-ash and lapilli with lesser ash. Correlated with 726 CE Kameni eruption (Preine et al., 2024). L3: intercalated thin ash, ash lapilli, and tuffaceous mud. L4: heterogeneous volcanic lithologies, including lithic gravels and sands. L5: pumice lapilli, red volcanic ash and lithics. Depth scale is compressed CSSF-D (Kutterolf et al., 2024b).

Figure F18. Core-seismic integration, Site U1596. A. Recovery. B. Bulk density measured with WRMSL (black dots), discrete MAD density measurements (orange circles), and filtered density log (green line). C. *P*-wave velocity measured with WRMSL (black dots), discrete caliper measurements (orange circles), filtered velocity log (blue), and manually modified velocity curve for core-seismic integration (orange line). D. Acoustic impedance: product of (B) filtered bulk mean density and (C) refined velocity curve. E. Synthetic seismogram. F. Extracted seismogram from Seismic Line GEOMAR_1006 at Site U1596 (nearest trace repeated five times). Yellow lines indicate correlations between synthetic and extracted seismograms. G. Stratigraphy of Site U1596 after Preine et al. (2024). L1: ash, ash-lapilli, and lapilli with a minor amount of mud. L2: lapilli-ash and lapilli with lesser ash. Correlated with 726 CE Kameni eruption (Preine et al., 2024). Depth scale is compressed CSSF-D (Kutterolf et al., 2024b).

Figure F19. Seismic Profile GEOMAR_1006 crossing Sites U1596 and U1597 in the northern caldera basin of Santorini. L1: ash, ash-lapilli, and lapilli with a minor amount of mud. L2: lapilli-ash and lapilli with lesser ash. Correlated with 726 CE Kameni eruption (Preine et al., 2024). Horizons after Preine et al. (2024). VE = vertical exaggeration. For location, see Figure F1. Depth scale for Site U1597 is CSF-A, and depth scale for Site U1596 is compressed CSSF-D (Kutterolf et al., 2024b).

Figure F20. Core-seismic integration, Site U1597. A. Recovery. B. Bulk density measured with WRMSL (black dots), discrete MAD density measurements (orange circles), and filtered density log (green line). C. *P*-wave velocity measured with WRMSL (black dots), discrete caliper measurements (orange circles), filtered velocity log (blue), and manually modified velocity curve for core-seismic integration (orange line). D. Acoustic impedance: product of (B) filtered bulk mean density and (C) refined velocity curve. E. Synthetic seismogram. F. Extracted seismogram from Seismic Line GEOMAR_1006 at Site U1597 (nearest trace repeated five times). Yellow lines indicate correlations between synthetic and extracted seismograms. G. Stratigraphy of Site U1597 after Preine et al. (2024). L1: ash, ash-lapilli, and lapilli with a minor amount of mud. L2: lapilli-ash and lapilli with lesser ash. Correlated with 726 CE Kameni eruption (Preine et al., 2024). Depth scale is CSSF-D (Kutterolf et al., 2024b).

Figure F21. Core-seismic integration, Site U1598. A. Recovery. B. Bulk density measured with WRMSL (black dots), discrete MAD density measurements (orange circles), and filtered density log (green line). C. *P*-wave velocity measured with WRMSL (black dots), discrete caliper measurements (orange circles), filtered velocity log (blue), and manually modified velocity curve for core-seismic integration (orange line). D. Acoustic impedance: product of (B) filtered bulk mean density and (C) refined velocity curve. E. Synthetic seismogram. F. Extracted seismogram from Seismic Line GEOMAR_5009 at Site U1598 (nearest trace repeated five times). Yellow lines indicate correlations between synthetic and extracted seismograms. G. Stratigraphy of Site U1598. Unit I: volcanic and tuffaceous lithologies and minor oozes/muds. Archaeos Tuff after Druitt et al. (2024h). Depth scale is compressed CSSF-D (Kutterolf et al., 2024b).

Figure F22. Seismic Profile GEOMAR_5009 crossing Site U1598. Colors indicate lithologies of Site U1598. Unit I: volcanic and tuffaceous lithologies and minor oozes/muds. Archaeos Tuff after Druitt et al. (2024h). Horizons after Preine et al. (2022a, 2022b, 2022c). VE = vertical exaggeration. For location, see Figure F1. Depth scale is compressed CSSF-D (Kutterolf et al., 2024b).

Figure F23. Core-seismic integration, Site U1599. A. Recovery. B. Bulk density measured with WRMSL (black dots), discrete MAD density measurements (orange circles), and filtered density log (green line). C. *P*-wave velocity measured with WRMSL (black dots), discrete caliper measurements (orange circles), filtered velocity log (blue), and manually modified velocity curve for core-seismic integration (orange line). D. Acoustic impedance: product of (B) filtered bulk mean density and (C) refined velocity curve. E. Synthetic seismogram. F. Extracted seismogram from Seismic Line HH06-16 at Site U1599 (nearest trace repeated five times). Note that the seafloor was not recovered at this site. Yellow lines indicate correlations between synthetic and extracted seismograms. G. Stratigraphy of Site U1599. Unit I: volcanic sediments, (organic-rich) ooze, tuffaceous ooze; Unit II: organic ooze and minor ash and tuffaceous. Unit III: organic-rich dolomitic marl. Unit IV: micritic and calcareous sandstones. Archaeos Tuff after Druitt et al. (2024h). Depth scale is compressed CSSF-D (Kutterolf et al., 2024b).

Figure F24. Seismic Profile HH06-16 crossing Site U1599. Colors indicate lithologies of Site U1599. Unit I: volcanic sediments, (organic-rich) ooze, tuffaceous ooze; Unit II: organic ooze and minor ash and tuffaceous. Unit III: organic-rich dolomitic marl. Unit IV: micritic and calcareous sandstones. Archaeos Tuff after Druitt et al. (2024h). Horizons after Preine et al. (2022a). VE = vertical exaggeration. For location, see Figure F1. Depth scale is compressed CSSF-D (Kutterolf et al., 2024b).

Figure F25. Core-seismic integration, Site U1600. A. Recovery. B. Bulk density measured with WRMSL (black dots), discrete MAD density measurements (orange circles), and filtered density log (green line). C. *P*-wave velocity measured with WRMSL (black dots), discrete caliper measurements (orange circles), filtered velocity log (blue), and manually modified velocity curve for core-seismic integration (orange line). D. Acoustic impedance: product of (B) filtered bulk mean density and (C) refined velocity curve. E. Synthetic seismogram. F. Extracted seismogram from Seismic Line HH06-17 at Site U1600 (nearest trace repeated five times). Yellow lines indicate correlations between synthetic and extracted seismograms. G. Stratigraphy of Site U1600. Unit I: volcanic and tuffaceous lithologies, bioclastic ash and lapilli and minor calcareous muds/sands. Unit II: organic-rich calcareous mud/sand with shells, calcareous mud/sand, sandstone and rare ash pods. Unit III: ultramafic rocks. Archaeos Tuff after Druitt et al. (2024h). Depth scale is compressed CSSF-D (Kutterolf et al., 2024b).

Figure F26. Seismic Profile HH06-17 crossing Site U1600. Colors indicate lithologies of Site U1599. Unit I: volcanic and tuffaceous lithologies, bioclastic ash and lapilli and minor calcareous muds/sands. Unit II: organic-rich calcareous mud/sand with shells, calcareous mud/sand, sandstone and rare ash pods. Unit III: ultramafic rocks. Archaeos Tuff after Druitt et al. (2024h). Horizons after Preine et al. (2022a). VE = vertical exaggeration. For location, see Figure F1. Depth scale is compressed CSSF-D (Kutterolf et al., 2024b).