

Figure F1. Bathymetric map with locations of Site U1525, other Expedition 374 sites, DSDP Leg 28 Sites 270–273, and ANDRILL Cores AND-1 and AND-2. Red box = location of inset map with Site U1525 on seismic-reflection Profile IT94AR-127 (Figure F2). Bathymetry from Arndt et al., 2013.

Figure F2. Top: multichannel seismic-reflection Profile IT94AR-127 across Site U1525 (see inset in Figure F1). Profile collected by Istituto Nazionale di Oceanografia e Geofisica Sperimentale (OGS, Italy) under Programma Nazionale delle Ricerche in Antartide (PNRA) in 1994 (Finetti et al., unpubl. data) with a 2×20 air gun (74.8 L). Data were acquired with a 1500 m streamer (120 channels; first offset = 164 m and last offset = 1664 m). The seismic reflection stack profile is available for scientific purposes through the Antarctic Seismic Data Library System. Reprocessing for Expedition 374 was done by Riccardo Geletti (OGS, unpubl.). SP = shot point. Bottom: interpretation of key seismic reflectors in Line IT94AR-127.

Figure F3. Lithostratigraphic summary, Hole U1525A. GRA = gamma ray attenuation, MAD = moisture and density, magnetic susceptibility (MS), and natural gamma radiation (NGR) are shown with a 50-point running median equivalent to 1.25 and 5 m, respectively.

Figure F4. Primary lithologies, Hole U1525A. A. Diatom-bearing/rich sandy mud (Unit I; 2H-1A, 110–119 cm). B. Muddy diamict (Unit I; 5H-4A, 27–36 cm). C. Diatom-bearing/rich mud overlain by muddy diamict (Unit I/II contact; 10X-1A, 9–25 cm). D. Diatom-bearing mud with silty sand laminations (Subunit IIA; 17H-4A, 102–115 cm). E. Bioturbated diatom-bearing mud (Subunit IIA; 13H-1A, 131–145 cm). F. Diatom-bearing mud with clasts (Subunit IIA; 17H-6A, 49–55 cm). G. Foraminifer-bearing sand (Subunit IIA; 17H-4A, 76–82 cm). H. Diatom-rich mud with silt laminations (Subunit IIB; 20F-2A, 53–63 cm). I. Contact between diatom-bearing/rich mud and diatom-bearing sandy diamict (Subunit IIB; 18F-3A, 67–78 cm). J. Diatom-rich mud (Unit III; 27X-4A, 139–145 cm). K. Sandy mud to diamict (Unit III; 22F-2A, 87–96 cm).

Figure F5. Sedimentary structures and lithologic accessories, Hole U1525A. A. Gradational contact from diatom-bearing clast-poor muddy diamict (upsection) to clast-rich muddy diamict (Unit I; 2H-5A, 80–91 cm). B. Tilted laminations and soft-sediment deformation (Subunit IIA; 17H-2A, 9–23 cm). C. Postdepositional fault (Subunit IIA; 11F-3A, 57–70 cm). D. Draping and deformation of silt laminae in mud caused by clast (Subunit IIB; 21F-1A, 138–143 cm). E. Mud with silt laminations and diamict clast (Subunit IIB; 20F-2A, 38–41 cm). F. Mud with silt laminations (Subunit IIB; 20F-2A, 43–48 cm). G. Soft-sediment deformation of silt laminae in mud (Subunit IIB; 20F-2A, 90–106 cm). H. Faulted and deformed laminations (Unit III; 23F-3A, 49–59 cm). I. Faceted clast in diatom-rich diamict (Unit III; 30X-2A, 87–93 cm). J. Sandy diamict clast in mud (Unit III; 31X-7A, 107–112 cm). K. Sand stringer in diatom-rich diamict (Unit III; 22F-2A, 21–28 cm). L. Diatom-rich mud with bioturbation (Unit III; 30X-5A, 58–63 cm).

Figure F6. Lithology and sedimentary structures, Hole U1525A. Downhole profiles represent the occurrence of a described lithology or lithologic feature. Bioturbation intensity: 0 = no apparent bioturbation (<10%) to 4 = complete bioturbation (>90%).

Figure F7. Micropaleontology summary, Hole U1525A. Diatom and radiolarian biostratigraphic zonations are defined by the first appearance datum (FAD) and/or last appearance datum (LAD) of corresponding marker species.

Figure F8. Shipboard age model, Hole U1525A. See Table T5 for biostratigraphic datums and codes. See Paleomagnetism for discussion of paleomagnetic results. Polarity: black = normal, white = reversed, gray = unrecovered or uncertain. Wavy lines = interpreted hiatuses, yellow shading = interpretation of Site U1525 normal polarity results to the geomagnetic polarity timescale of Gradstein et al. (2012).

Figure F9. Selected diatom and radiolarian distribution (see Table T4), Hole U1525A. Dashed vertical lines = reworked occurrence. Numbers next to lines indicate FAD and LAD ages in millions of years.

Figure F10. Radiolarians, Sites U1524 and U1525. A. *Actinomma popofskii* (U1525A-1H-1, mudline). B. *Sphaeropyle robusta* (U1524C-8R-CC). C. *Actinomma leptodermum* (U1524A-1H-CC). D, G, J. *Spongostrochus glacialis* (D: U1524A-1H-CC; G, J: U1525A-27X-CC). E. *Velicucullus* sp. cf. *Velicucullus oddgurneri* (U1524C-12R-3, 75–78 cm). F. *Pseudodictyophimus gracilipes* (U1524A-28H-CC). H. *Octodendron* spp. (Keany) spine (U1524A-34X-CC). I. *Peripyraxis circumtexta* (U1524A-1H-CC). K. *Cycladophora pliocenica* (U1524C-10R-CC). L. *Ceratocyrtis mashae* (U1525A-27X-CC). M. *Acrosphaera australis* fragment (U1524C-12R-3, 75–78 cm). N. *Cycladophora conica* (U1524C-9R-CC). O. *Pseudodictyophimus planctonis* (U1524C-8R-CC). Scale bar = 100 μ m, except D and J = 200 μ m.

Figure F11. Planktonic foraminifers, Hole U1525A. A, B. *Globoconella inflata* (16H-CC; A: umbilical view; B: edge view). C. *Globigerina bulloides*, broken specimen (22F-CC). D–F. *Globigerina falconensis* (22F-CC). Scale bar = 25 μ m.

Figure F12. Dinocysts, Hole U1525A. A. *Lejeunecysta* sp. (20F-CC). B, C. *Brigantedinium* sp. (27X-CC; A: textured wall; C: smooth wall). D–G. *Selenopemphix* sp. 1 (27X-CC). H, I. *Brigantedinium* sp., paratabulated (27X-CC). Scale bars = 20 μ m.

Figure F13. Calcareous nannofossils (U1525A-17H-3A, 82 cm). A, B. *Reticulofenestra minuta*. C. *Calcidiscus leptoporus*. D. *Coccolithus pelagicus*. Scale bar = 10 μ m.

Figure F14. Paleomagnetic data, Hole U1525A. GPTS from Gradstein et al. (2012). MS: black circles = WRMSL, red triangles = SHMSL, yellow stars = Kap-pabridge. Intensity, declination, and inclination: gray = initial NRM, red = after 10 mT peak AF demagnetization, blue = after 20 mT peak AF demagnetization, yellow stars = discrete samples. Polarity: black = normal (N), white = reversed (R), gray = uncertain or no recovery. Note that Site U1525 is in the Southern Hemisphere, and positive inclination corresponds to a reversed polarity interval. See text for discussion of polarity Zones N1 through Sub-zone R3.2.

Figure F15. Representative AF demagnetization behavior of oriented discrete samples, Hole U1525A. From left to right for each sample: Zijderveld diagrams with peak AF fields and initial NRM, equal area projections of directions during demagnetization (gray solid circles = lower hemisphere, open circles = upper hemisphere), and fractional magnetization (normalized to initial NRM) during AF demagnetization. A, C. Samples from normal polarity zone. B, D. Samples from reversed polarity zone.

Figure F16. Anisotropy of magnetic susceptibility, Hole U1525A. Degree of anisotropy (P) is approximated by the k_{\max}/k_{\min} ratio, in which $P = 1$ indicates no anisotropy and $P > 1$ is more anisotropic. Mean magnetic susceptibility is the average of k_{\max} , k_{int} , and k_{\min} .

Figure F17. MS and NGR, Hole U1525A.

Figure F18. GRA and MAD bulk density, grain density, and porosity, Hole U1525A.

Figure F19. P -wave velocity, shear strength, and thermal conductivity, Hole U1525A.

Figure F20. Color reflectance spectroscopy, Hole U1525A.

Figure F21. Physical properties summary, Hole U1525A. Dashed gray lines mark intervals with distinctive physical property characteristics that correlate with lithostratigraphic units (see Table T12).

Figure F22. Core-seismic integration, Hole U1525A. Seismic-reflection Profile IT94AR-127 is a multichannel reflection seismic profile collected by Istituto Nazionale di Oceanografia e Geofisica Sperimentale (OGS, Italy) under Programma Nazionale delle Ricerche in Antartide (PNRA) in 1994 (Finetti et al., unpubl. data) with a 2×20 air gun (74.8 L). Data were acquired with a 1500 m streamer (120 channels; first offset = 164 m, last offset = 1664 m). Reprocessing for IODP Expedition 374 was made by Riccardo Geletti (OGS, unpubl. data). NGR = core NGR (counts/s), MSL = core MS (10^{-5} SI), PWC-PWL = archive-half and whole-round *P*-wave velocity (m/s), GRA = core bulk density (g/cm^3), SS = shear strength (kg/cm^2). CDP = common depth point.

Figure F23. Headspace gas concentrations, Hole U1525A. Dashed lines mark lithostratigraphic unit boundaries (see Lithostratigraphy; Table T2).

Figure F24. Interstitial water alkalinity, ammonium, and sulfate, Hole U1525A. Stars = mudline water concentrations.

Figure F25. Interstitial water lithium, calcium, magnesium, and silicon, Hole U1525A. Stars = mudline water concentrations. Dashed lines mark lithostratigraphic unit boundaries (see Lithostratigraphy; Table T2).

Figure F26. Bulk sediment TOC, calcium carbonate (CaCO_3) and TOC/TN ratio, Hole U1525A. Dashed lines mark lithostratigraphic unit boundaries (see Lithostratigraphy; Table T2).