Figure F1. Bathymetric map with locations of Site U1522, 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 U1522 on seismic-reflection Profile I06290-Y2 (Figure F2). Bathymetry from Arndt et al. (2013).

Figure F2. Top: multichannel seismic-reflection Profile I06290-Y2 across Site U1522 (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 2005–2006 (Böhm et al., 2009) with a 2 × generator-injector (GI) gun array (11.6 L). Data were acquired with a 600 m streamer (48 channels; first offset = 50 m and last offset = 650 m). SP = shotpoint. Bottom: interpretation of key seismic reflectors in Profile I06290-Y2.

Figure F3. Single-channel seismic-reflection Profile PD90-30 crossing Profile I06290-Y2 near Site U1522 (see inset in Figure F1). Profile collected by Rice University (USA) in 1990 (Anderson and Bartek, 1992) with a GI air gun (2.4 L).

Figure F4. Top: multichannel seismic-reflection Profile BGR80-007 parallel to Profile PD90-30 shown in Figure F3 (see inset in Figure F1). Profile collected by Bundesanstalt für Geowissenchaften und Rohstoffe (BGR, Germany) in 1980 (Hinz and Block, 1984) with a 24–air gun array (23.45 L). Data were acquired with a 3000 m streamer (48 channels; first offset = 250 m, last offset = 2600 m). Bottom: interpretation of key seismic reflectors in Profile BGR80-007.

Figure F5. Lithostratigraphic summary, Site U1522. GRA = gamma ray attenuation, MAD = moisture and density. Magnetic susceptibility (MS) and NGR are shown with a 50-point running median equivalent to 1.25 and 5 m, respectively.

Figure F6. Primary lithologies, Hole U1522A. A. Diatom-bearing/rich sandy mud to muddy sand (Unit I; 1R-1A, 5–23 cm). B. Diatom-bearing clast-rich diamictite (Unit I; 10R-1A, 29–46 cm). C. Diatom-bearing sandy to muddy diamictite (Unit II; 35R-2A, 73–91 cm). D. Sharp contact between diatom-rich sandy diamictite (Unit II) and muddy diatomite (Subunit IIIA; 45R-2A, 51–70 cm). E. Diatom-rich clast-poor sandy diamictite (Subunit IIIA; 46R-2A, 100–107 cm). F. Diatom-rich clast-poor muddy diamictite (Subunit IIIA; 49R-3A, 12–24 cm). G. Diatom-bearing clast-poor sandy diamictite (Subunit IIIB; 53R-6A, 2–21 cm). H. Basalt clast (arrow) in diatom-bearing sandy diamictite (Subunit IIIC; 68R-2A, 98–102). I. Sharp contact (arrow) between muddy diatomite and diatom-bearing sandy diamictite (Unit IV; 71R-3A, 30–43 cm).

Figure F7. Sedimentary structures and diagenetic features, Hole U1522A. A. Washed cobbles in diamict matrix resulting from drilling disturbance (Unit I; 10R-1A, 103–122 cm). B. Faint stratification in muddy diamictite (Subunit IIIB; 53R-6A, 5–13 cm). C. Shell fragment (Subunit IIIB; 57R-CC, 3–10 cm). D. Mud clasts (arrows; Subunit IIIA; 50R-1A, 104–112 cm). E. Carbonate nodule (Subunit IIIA; 51R-3A, 135–139 cm). F. Pyritized burrow (arrow; Subunit IIIA; 48R-1A, 46 cm). G. Carbonate-cemented mudstone with common clasts (Subunit IIIB; 52R-3A, 13–29 cm). H. Physical intermixing (Subunit IIIB; 56R-4A, 26–41 cm). I. Vein network (Unit IV; 73R-CC, 8–17 cm).

Figure F8. Lithology and sedimentary structures, Site U1522. Downhole profiles represent the occurrence of a described lithology or lithologic feature.

Figure F9. XRD patterns, Hole U1522A. Bulk mineralogy is uniform downhole, although minor changes in intensity are indicated by changes in relative peak heights.

Figure F10. Micropaleontology summary, Site U1522. Diatom and radiolarian biostratigraphic zonations are defined by the first appearance datum (FAD) and/or last appearance datum (LAD) of corresponding marker species. The last appearances of two radiolarian stratigraphic marker species remain questionable (blue). LCO = last common occurrence.

Figure F11. Selected diatom, radiolarian, and dinocyst distribution, Site U1522. Data demonstrate the difficulty of assigning ages because of inferred reworking (vertical dashed lines).

Figure F12. Radiolarians, Hole U1522A (45R-CC, except D). A–C. *Desmospyris rhodospyroides*. D. *Phormacantha hystrix*/*Plectacantha oikiskos* group (mudline sample). E. *Trisulcus nana*. F–G. *Prunopyle titan*. H. *Spongotrochus* sp. A Abelmann. I. *Spongotrochus glacialis*. J. *Eucyrtidium pseudoinflatum*. K. *Lithelius minor*. Scale bar = 100 µm.

Figure F13. Radiolarians, Hole U1522A. A. *Lampromitra coronata* (fragment; 45R-CC). B. *Spongoplegma* sp. (45R-CC). C, D. Noncellular membranes, probably originating from seaweed (61R-CC). E. *Rhizoplegma boreale* (mudline sample). Scale bar = 100 µm.

Figure F14. Palynomorphs, Hole U1522A. A–E. *Selenopemphix bothrion* (A–C: 68R-CC; D: 70R-CC; E: 72R-4, 91–92 cm). F, G. *Selenopemphix* spp. (F: 70R-CC; G: 45R-CC). H, I. *Selenopemphix antarctica* (45R-CC). Scale bars = 20 µm.

Figure F15. Shipboard age model, Site U1522. See Table T5 for biostratigraphic datums. Pink shading = uncertain age, blue boxes = core numbers.

Figure F16. Paleomagnetic data, Site U1522. MS: black circles = WRMSL, red triangles = SHMSL, yellow stars = Kappabridge. Intensity, declination, and inclination: gray = initial NRM, 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 U1522 is in the Southern Hemisphere, and positive inclination corresponds to a reversed polarity interval. See text for discussion of polarity Zones R1–N5. GPTS from Gradstein et al. (2012).

Figure F17. Representative AF demagnetization behavior of oriented discrete samples, Site U1522. From left to right for each sample: Zijderveld diagram with peak AF fields and initial NRM, equal area projection of directions during demagnetization (solid gray circles = lower hemisphere, open circles = upper hemisphere), and fractional magnetization (normalized to initial NRM) during AF demagnetization. A. Sample from reversed polarity zone. B. Sample without stable remanence from which no ChRM direction is estimated. C, D. Samples from a normal polarity zone.

Figure F18. Anisotropy of magnetic susceptibility, Site U1522. 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 F19. MS and NGR, Hole U1522A. Arrows = repeating cycles of an ~20 count/s downhole decrease.

Figure F20. GRA and MAD bulk density, grain density, and porosity, Hole U1522A.

Figure F21. Discrete *P*-wave velocity, Hole U1522A.

Figure F22. Color reflectance spectroscopy, Hole U1522A. Data are plotted with a 5-point smooth.

Figure F23. Physical properties summary, Hole U1522A. Dashed lines mark intervals with distinctive physical property characteristics that correlate with lithostratigraphic units.

Figure F24. Headspace gas concentrations, Site U1522. Note axis break on scale for the methane/ethane ratio. See Table T2 for lithostratigraphic unit information.

Figure F25. Interstitial and mudline water sulfate (yellow squares) and salinity (blue circles), manganese (purple circles) and ammonium (black squares),

and silicon/silica (black squares = ICP-OES, open circles = ion chromatography) and barium (green circles) throughout the upper 215.40 m CSF-A at Site U1522. Stars = mudline water concentrations, dashed line = sulfate concentration of modern seawater.

Figure F26. Bulk sediment TOC, calcium carbonate ($CaCO_3$), and TOC/TN ratio, Site U1522. Note axis scale break for $CaCO_3$. Dashed horizontal lines mark lithostratigraphic unit boundaries (see Table T2).

Figure F27. Element ratios derived from handheld pXRF scanning, Site U1522. Dashed horizontal lines mark lithostratigraphic unit boundaries (see Table T2).

Figure F28. Downhole log data summary, Hole U1522A. Downhole logging data are on the WMSF depth scale, whereas core data are on the CSF-A depth scale, with small depth discrepancies (usually <2 m) between the two scales. See Table T10 in the Expedition 374 methods chapter (McKay et al., 2019a) for tool and measurement acronym definitions. V_P = *P*-wave velocity, V_S = *S*-wave velocity.

Figure F29. (A) NGR, (B) *P*-wave velocity, and (C) MS data comparisons, Hole U1522A. Downhole logging data are on the WMSF depth scale, whereas core data are on the CSF-A depth scale, with small depth discrepancies (usually <2 m) between the two scales.

Figure F30. FMS image examples, Hole U1522A. A. Mottled and patchy resistivity expression of various diamictite lithologies. B. Intervals of alternating low-resistivity diatom-rich mudstone and high-resistivity intervals with mottled and patchy textures typical of diamictite lithologies. Depths are meters WMSF.

Figure F31. Core-log-seismic integration, Hole U1522A. Line I06290-Y2 is a multichannel seismic-reflection profile collected by Istituto Nazionale di Oceanografia e Geofisica Sperimentale (OGS, Italy) under Programma Nazionale delle Ricerche in Antartide (PNRA) in 2005–2006 (Böhm et al., 2009). Source was a 2 × GI gun array (11.6 L), and data were acquired with a 600 m streamer (48 channels; first offset = 50 m, last offset = 650 m). CDP = common depth point. MSS = downhole MS (IU), DSI = downhole sonic velocity (m/s), HNGS = downhole NGR (gAPI). A–C = seismic units.