Figure F1. Regional bathymetry and seismic reflection lines near Site U1506. Representative seismic section (Figure F2) is shown (upper left). Stars = Expedition 371 sites, dots = DSDP sites.

Figure F2. Representative seismic section from northern Lord Howe Rise showing an upper seismic unit characterized by low-amplitude, continuous or semicontinuous reflection and a lower seismic unit (bottom left) characterized by high-amplitude, semicontinuous reflections. Contact between seismic units is a reverse polarity reflector in most places; however, local truncation of underlying unit was observed, and high-amplitude positive reflections on this interface are interpreted as hard erosion surfaces on older rock beneath. CDP = common depth point.

Figure F3. Local bathymetry (meters) and seismic reflection lines near Site U1506 (white dot).

Figure F4. Seismic reflection Lines TAN1409_LHRN_06 and TAN1409_LHRN_13, which cross at Site U1506.

Figure F5. Lithostratigraphic summary of sediments and volcanic rocks, Site U1506. cps = counts per second.

Figure F6. Subunit Ib/Ic and Unit I/II boundaries with annotated interpretation.

Figure F7. Common Unit I sedimentary lithologies, Site U1506. A. Pliocene white nannofossil ooze with foraminifers. B. Upper Miocene white nannofossil chalk with foraminifers crosscut by *Zoophycos* burrows. C. Upper Oligocene pale yellow nannofossil chalk. D. Middle Eocene grayish green glauconitic nannofossil chalk.

Figure F8. Common sedimentary lithologies, Site U1506. A, B. Nannofossil (nanno) ooze with foraminifers (frm), Subunit Ia. C, D. Nannofossil chalk with foraminifers, Subunit Ib. E–H. Glauconitic (glc) nannofossil chalk with foraminifers, Subunit Ic. I, J. Iron oxide (ox)–rich laminated layer, top of Unit II. PPL = plane-polarized light, XPL = cross-polarized light.

Figure F9. Major biogenic and lithologic constituent abundances in sediment based on smear slide analysis, Site U1506. D = dominant (>50%), A = abundant (25%–50%), C = common (10%–25%), R = rare (1%–10%), T = trace (>0%–1%).

Figure F10. Pyritic elements from Subunit Ia, Site U1506. A. Dark gray bleb of framboidal pyrite. B. Opaque pyrite framboids. C. Framboidal pyrite blebs. D. Vertical pyritized burrow.

Figure F11. Repeated sequences (4 or 5) of alternating reddish brown microcrystalline amygdaloidal basalt and massive fine-grained dark gray basalt from Unit II, Site U1506. Sequences are numbered on fine-grained dark gray facies that represent the center of the sequence, whereas sequence boundaries are not clearly visible.

Figure F12. Representative crystalline rocks from Unit II, Site U1506. A. Facies 1; reddish brown microcrystalline amygdaloidal basalt with varied shapes of vesicles, filled and empty, and thin calcite veins. B. Facies 2; dark gray fine-grained massive basalt. C. Facies 1; reddish brown microcrystalline amygdaloidal basalt with 2 cm thick neptunian dike filled with carbonate sediment containing bryozoan and algal fossils.

Figure F13. Representative crystalline rocks from Unit II, Site U1506. A, B. Facies 1; altered microcrystalline amygdaloidal basalts with calcite (clc)-filled vesicles. V = void. C, D. Facies 2; dark gray fine-grained basalt dominated by plagioclase (plag) with common pyroxene (prx) and iron oxides (FeOx). E. Bioclastic (bcl) packstone filling neptunian dike in basalt sequence.

Figure F14. XRD results from the two main volcanic facies in Unit II, Site U1506. A, B. Calcite interferes with pyroxene peaks when amygdaloidal fillings are present. C, D. Pyroxenes are clearly recognizable in fresh basalt where calcite is absent.

Figure F15. Microfossil biozonations, Site U1506.

Figure F16. Microfossil abundance and preservation, Site U1506. Abundance: D = dominant, A = abundant, C = common, F = few, R = rare, P = present, tr = trace, B = barren. Preservation: E = excellent, VG = very good, G = good, M = moderate, P = poor.

Figure F17. Early Eocene or younger calcareous nannofossils recovered from carbonate neptunian dike (371-U1506A-31R-2, 53–55 cm).

Figure F18. Preservation state of planktic foraminifers. A. Good (371-U1506A-4R-CC). B. Very good (7R-CC). C. Excellent (9R-CC).

Figure F19. Two end-members of benthic foraminifer preservation states, Site U1506. Scale bars = 100 µm unless otherwise noted.

Figure F20. Summary of ostracod preservation, abundance, and main assemblage composition and paleodepth estimates, Site U1506.

Figure F21. Trachyleberidids (A) with and (B) without ocular structure (371-U1506A-29R-2, 88–91 cm; 264.54 m).

Figure F22. Radiolarians of tentative Mesozoic and Paleozoic affinities. A–F. 371-U1506A-25R-CC. G–K. 28R-CC.

Figure F23. Macrofossils in carbonate neptunian dike (371-U1506A-31R-2, 53–55 cm). A. Charophyte green algae (G). B. Potential bryozoan (B) and mollusk (M) fragments. C. Red algae (R).

Figure F24. Pass-through paleomagnetic data, Site U1506. Black dots = NRM intensity and inclination, gray dots = inclination after 20 mT AF cleaning interpolated by 10-point moving average (black line), red dots = inclination of ChRM directions from discrete sample analysis. Magnetic polarity: black = normal, white = reversed, gray = unidentified.

Figure F25. Inclination values from pass-through superconducting rock magnetometer data, Site U1506. Paleomagnetic data were categorized into three intervals: (A) nannofossil ooze, (B) chalk, and (C) volcanic. Gray = NRM inclination, black = inclination after 20 mT AF cleaning. *N* = number of data points.

Figure F26. Detail of paleomagnetic results for chalk interval between 243.5 and 269 m, Site U1506. Magnetic polarity stratigraphy are correlated with the geologic timescale (GTS2012; Gradstein, 2012). Black dots = inclination data after 20 mT AF demagnetization, red dots = inclination of ChRM directions from discrete sample analysis, red wavy lines = hiatuses. Magnetic polarity interpretation: black = normal, white = reversed, gray = unidentified.

Figure F27. Vector endpoint demagnetization diagrams (Zijderveld, 1967) for four representative discrete samples, Site U1506. Open squares = projections onto vertical plane, solid squares = projections onto horizontal plane, blue lines = components fitted using selected data points (red squares).

Figure F28. Bulk density, grain density, porosity, and *P*-wave velocity, Site U1506. Red dots = MAD and PWC measurements, black dots = GRA density and *P*-wave velocity (PWL) measured on whole-round section. Porosity measurements are compared with an exponential decay curve (line) with a decay constant of 1800 m. Horizontal line = lithostratigraphic unit boundary, dashed horizontal lines = subunit boundaries.

Figure F29. Magnetic susceptibility (MSL and MSP), NGR, and L*, a*, b*, Site U1506. Horizontal line = lithostratigraphic unit boundary, dashed horizontal lines = subunit boundaries.

Figure F30. Magnetic susceptibility (MSL and MSP), NGR, and L*, a*, b*, Site U1506 lithostratigraphic Unit II. Horizontal line = lithostratigraphic unit boundary, dashed horizontal lines = subunit boundaries.

Figure F31. Shear strength measured by (A) automated vane shear and (B) pocket penetrometer, Site U1506.

Figure F32. Alkalinity, pH, and major, minor, and trace element profiles and ion concentrations in interstitial water samples in uppermost 261 m, Site U1506.

Figure F33. Bulk sediment profiles of $CaCO_3$, TC, TIC, TOC, and TN, Site U1506.

Figure F34. Sedimentation accumulation over time, Site U1506. A. Core recovery. B. Shipboard biostratigraphic and magnetostratigraphic datums and interpreted age-depth model. C. Compacted LSR and total mass accumulation rate (MAR). Horizontal line = lithostratigraphic unit boundary, dashed horizontal lines = subunit boundaries.