Figure F1. Regional bathymetry and seismic reflection lines near Site U1507. Stars = Expedition 371 sites, dots = DSDP sites.

Figure F2. Local site survey data near Site U1507.

Figure F3. Seismic Section TAN1409-NCTN-11 through Site U1507 and perpendicular to Norfolk Ridge. Reflectors A–H are correlated with cores and downhole data (see text). Reflectors A–C are mass transport complexes in a packet of reflectors that onlaps the basin margin. High-amplitude reflector at 5.82 s TWT below Site U1507 is interpreted as the base of sedimentary fill. CDP = common depth point, VE = vertical exaggeration.

Figure F4. Lithostratigraphic summary, Site U1507. Solid circles = Hole U1507A, open circles = Hole U1507B. cps = counts per second.

Figure F5. Major biogenic and lithologic constituent abundances in sediment based on smear slide analysis, Site U1507. + symbols and darker colored lines = Hole U1507A, x symbols and lighter colored lines = Hole U1507B. D = dominant (>50%), A = abundant (25%–50%), C = common (10%–25%), R = rare (1%–10%), T = trace (>0%–1%). For intervals with closely spaced samples, relative abundances overlap due to scale of graphical representation.

Figure F6. Common Subunit Ia sedimentary lithologies, Site U1507. A. Pliocene nannofossil ooze with foraminifers. B. Pliocene nannofossil ooze with foraminifers with slumped strata. C. Lower Miocene sharp-based, normally graded, planar-laminated foraminiferal limestone. Note the significant core biscuiting and fracturing due to XCB drilling. D. Upper Miocene nannofossil-rich clay with ash. The lowermost laminated interval with coarser grained ash underlies massive bioturbated clay.

Figure F7. Common Subunit Ia sedimentary lithologies, Site U1507. A, B. Pliocene nannofossil ooze with foraminifers (frm). nanno = calcareous nannofossil. C, D. Pliocene nannofossil-rich clay with ash. Note the green clay minerals (authigenic glauconite? [glc]), Fe oxides (ox), and altered glass (gls). clay = clay minerals, bt = biotite. E. Upper Miocene foraminiferal limestone; lithology is dominated by planktic foraminifers in a micritic (mct) matrix. F. Planktic foraminifer with framboidal pyrite (py) crystals. PPL = plane-polarized light, XPL = cross-polarized light.

Figure F8. XRD diffractograms of selected powdered sediment samples, Site U1507. A. Four green nannofossil-rich clay intervals. Black = Subunit Ia, red = Subunit Ib, blue and green = Subunit Ic. B. Two tuffaceous sandstone layers, Subunit Ic.

Figure F9. Common Subunit Ib sedimentary lithologies, Site U1507. A. Upper Oligocene disrupted clayey foraminiferal chalk with scattered volcanic clasts and rip-up clasts of foraminiferal chalk. This section is part of a very thick, strongly disrupted bed. B. Upper Oligocene clayey foraminiferal chalk with rare volcanic clasts displaying wispy planar laminations. C. Upper Oligocene sharp-based, normally graded clayey tuffaceous sandstone with rippled and convoluted laminations. D. Upper Oligocene sharp-based, normally graded, planar-laminated clayey tuffaceous siltstone.

Figure F10. Common Subunit Ib sedimentary lithologies, Site U1507. A, B. Upper Oligocene clayey tuffaceous sandstone. Note the common glass (gls) fragments and rare quartz (qtz) grains. frm = foraminifer. C, D. Upper Oligocene clayey tuffaceous sandstone. Note the sponge spicule (sp) fragments. E. Lower Miocene disrupted clayey foraminiferal chalk. F. Upper Oligocene clayey foraminiferal chalk with silt-sized volcanic material.

Figure F11. Distribution and thickness of calcareous turbidites (foraminiferal ooze/chalk/limestone) and volcaniclastic turbidites (volcanic breccia, tuffaceous sandstone, and tuff), Site U1507. Open symbols = beds interrupted by core gaps or whole-round samples (which thus represent minimum bed thickness), solid symbols = beds where both top and bottom were observed.

Figure F12. Common Subunit Ic sedimentary lithologies, Site U1507. A. Lower Oligocene tuffaceous conglomerate with vesicular basalt clasts and common nannofossil chalk rip-up clasts. B. Lower Oligocene massive to faintly planar-laminated tuffaceous sandstone. C. Lower Oligocene planar-laminated tuff sharply overlain by bioturbated clayey nannofossil chalk. D. Lower Oligocene planar- to ripple-laminated tuffaceous sandstone.

Figure F13. Common Subunit Ic sedimentary lithologies, Site U1507. A. Lower Oligocene clayey foraminiferal (frm) chalk with volcanic clasts. mct = micrite, prx = pyroxene, plag = plagioclase. B. Lower Oligocene tuffaceous sandstone. C, D. Upper Oligocene tuff. Note the isolated pyroxene grains, microcrystalline basalt clasts with plagioclase, and an altered (reddish brown) vesicular clast. ox = oxide. E. Lower Oligocene clayey foraminiferal chalk with volcanic clasts and a bioclast of possible shallow-water origin (gastropod?). F. Upper Oligocene tuff with a shallow-water coral or bryozoan.

Figure F14. Common Unit II sedimentary lithologies, Site U1507. A. Upper Eocene bioturbated clayey nannofossil chalk with *Zoophycos* and *Planolites* burrows. Note the light green laminations and heavily bioturbated foraminiferal limestone between 42 and 43 cm. B. Middle Eocene green nannofossil clay with relatively low bioturbation. Stratigraphic datums suggest this represents the upper part of the MECO (see Biostratigraphy and paleoenvironment). C. Middle Eocene ripple- to planar-laminated foraminiferal limestone bed.

Figure F15. Common Unit II sedimentary lithologies, Site U1507. A. Middle Eocene nannofossil chalk with foraminifers (frm). mct = micrite. B. Middle Eocene foraminiferal limestone with recrystallized foraminifers.

Figure F16. Apparent decimeter-scale cyclicity in Unit II middle Eocene clayey nannofossil chalk, displayed in NGR and color reflectance a* records (371-U1507B-41R).

Figure F17. Biozonations, Hole U1507A.

Figure F18. Biozonations, Hole U1507B.

Figure F19. Microfossil abundance and preservation, Site U1507. 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 F20. Nannofossil datums constraining Miocene/Oligocene and Oligocene/Eocene boundaries, Hole U1507B. *S. delphix, S. capricornutus*, and *C. subdistichus* are in crossed nicols; *D. saipanensis* and *D. barbadiensis* are in parallel light.

Figure F21. Nannofossil and planktic and benthic foraminiferal datums and their respective ranges across recovered MECO event compared with the species' documented ranges in complete MECO sections, Hole U1507B. B = base, T = top. CN = calcareous nannofossil.

Figure F22. Preservation state of planktic foraminifers. Scale bars = 50 µM. A. Very good (371-U1507A-1H-CC). B. Good (371-U1507B-35R-CC). C. Moderate (25R-CC). D. Poor (13R-CC).

Figure F23. Summary of ostracod preservation, abundance, and assemblage composition, Hole U1507A.

Figure F24. Pass-through paleomagnetic data, Hole U1507A. 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. Pass-through paleomagnetic data, Hole U1507B. 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. Correlation with GPTS2012 is shown.

Figure F26. Inclination values after 20 mT AF demagnetization from pass-through paleomagnetic data. *N* = number of data points. A. Hole U1507A. B. Unit I in Hole U1507B (0–682 m). C. Unit II in Hole U1507B (682–855 m). *N* = number of data points.

Figure F27. Vector endpoint demagnetization diagrams (Zijderveld, 1967) and AF demagnetization behavior for two representative discrete samples, Site U1507. Open squares = projections onto vertical plane, solid squares = projections onto horizontal plane, blue lines = components fitted using selected data points (red squares) by PCA (Kirschvink, 1980).

Figure F28. AMS data for discrete samples from (A) Hole U1507A and (B) Hole U1507B. Left: stereoscopic plots. Blue squares = κ_{max} axes, green triangles = κ_{int} axes, purple circles = κ_{min} axes. Mean directions of κ_{max} (open square), κ_{int} (open triangle), and κ_{min} (open circle) axes, shown along with their 95% confidence ellipses. *N* = number of samples. Right: corresponding lineation ($\kappa_{max}/\kappa_{int}$) vs. foliation ($\kappa_{int}/\kappa_{min}$) data from each hole.

Figure F29. Bulk density, grain density, porosity, and *P*-wave velocity. Large dots = MAD and PWC results, black lines = wireline logging bulk density and *P*-wave velocity, small dots = whole-round section GRA density and *P*-wave velocity (PWL) (pink = Hole U1507A, orange = Hole U1507B). Red horizontal line = change from APC to XCB drilling in Hole U1507A. Black horizontal line = lithostratigraphic unit boundary, dashed horizontal lines = subunit boundaries. For porosity, best-fitting exponential decay curve (line) is shown (see text for details). WMSF scale is for logging results; CSF-A scale is for core results.

Figure F30. Wireline logging data for hole size, gamma ray, density, resistivity, *P*-wave velocity, and *S*-wave velocity, Hole U1507B. HSGR = total spectral gamma ray, HNGS = Hostile Environment Natural Gamma Ray Sonde. mbsf = meters below seafloor.

Figure F31. Magnetic susceptibility (MSL and MSP), NGR, and L*, a*, b*, Site U1507. Black lines = wireline logging measurements of magnetic susceptibility and NGR (scales at bottom). Horizontal line = lithostratigraphic unit boundary, dashed horizontal lines = subunit boundaries. WMSF scale is for logging results; CSF-A scale is for core results.

Figure F32. K, Th, and U contents and Th to K ratio computed from HNGS tool data, Hole U1507B. Horizontal line = lithostratigraphic unit boundary, dashed horizontal lines = subunit boundaries.

Figure F33. Heat flow. Note the vertical scale unit changes. A. APCT-3 temperature with depth profile, Hole U1507A. B. Thermal conductivity with 95% confidence interval estimate with three repeat measurements shown as error bars, Hole U1507A cores. C. Bullard plot (see Petrophysics in the Expedition 371 methods chapter [Sutherland et al., 2019a]) showing thermal resistance (Ω) vs. measured temperature. D. Thermal conductivity with error bars as in B, Hole U1507A (red) and U1507B (orange) cores.

Figure F34. Strength, Site U1507. A. Shear strength measured by automated vane shear. B. Compressive strength measured using pocket and needle penetrometers.

Figure F35. Borehole data to MCS data tie, Site U1507. A. Impedance calculated from combined rebound-corrected velocity data from cores and wireline log *P*-wave velocity and density data vs. TWT. Horizontal line = lithostratigraphic unit boundary, dashed horizontal lines = subunit boundaries. B. TWT calculated from depths below seafloor, rebound-corrected PWC *P*-wave velocity data (0–70 m), and in situ wireline log *P*-wave velocity (70–860 m WMSF). Numerical solution for TWT (t) with depth (z) is given by $z = 306.57t^2 - 823.43t$. Circles = positions of strong reflectors shown in C and D (red = strongly correlated, open = not correlated), dashed lines = fit between seismic survey data in D and synthetic trace in C. C. Synthetic trace (red) and MCS trace data at Line TAN1409-NCTN-11, CDP 4020 (black). Seismic Reflectors A–H and seafloor (SF) are labeled. D. MCS data.

Figure F36. Salinity, alkalinity, pH, and major, minor, and trace element concentrations in IW samples in uppermost 497 m, Site U1507.

Figure F37. Bulk sediment profiles of $CaCO_3$, TC, TIC, TOC, and total nitrogen (TN), Site U1507.

Figure F38. Depth correlation between overlapping intervals of Holes U1507A and U1507B based on NGR (blue) records and confirmed with magnetic inclination (black) and core images. The overlapping interval was XCB cored in Hole U1507A and RCB cored in Hole U1507B.

Figure F39. Depth correlation between Hole U1507B core data and wireline data based on NGR records. A. Subunit Ia/Ib boundary. B. Subunit Ib/Ic boundary. C. Subunit Ic/Unit II boundary. Green = whole-round core NGR data on CSF-A scale, blue = shifted NGR core data on WMSF scale, red = wireline logging NGR data.

Figure F40. Depth correlation between Hole U1507B core data and wireline data based on MS records. A. Subunit Ia/Ib boundary. B. Subunit Ib/Ic boundary. C. Subunit Ic/Unit II boundary. Green = MSL core data on CSF-A scale, blue = shifted MSL core data on WMSF scale, red = wireline logging MSS data.

Figure F41. Sedimentation accumulation over time, Site U1507. A. Core recovery. B. Shipboard biostratigraphic and magnetostratigraphic datums and interpreted age-depth model. C. LSR and total MAR. Horizontal line = lithostratigraphic unit boundary, dashed horizontal lines = subunit boundaries.