Figure F1. Seismic Line AWI-98015 showing Site U1580. Preliminary interpretation of seismic units according to the drilled lithologic units is shown. The marked bright green reflection corresponds in structure to Reflector M of the precruise seismostratigraphic model (see Figure F4 in the Expedition 392 summary chapter [Uenzelmann-Neben et al., 2023b]), the magenta reflection to Reflector LE, and the blue reflection to Reflector LO. CDP = common depth point, TWT = two-way traveltime. ZS = zeolitic silicified sediments.

Figure F2. Lithostratigraphic summary, Site U1580.

Figure F3. Major lithologies of Lithostratigraphic Units I and II, Hole U1580A. A. Foraminiferal ooze with nannofossils (1R-1, 60–70 cm). B. Nannofossil ooze with foraminifera (2R-5, 48–58 cm). C. Nannofossil chalk with clay (7R-4, 35–45 cm). D. Nannofossil chalk (17R-2, 130–140 cm). E. Reddish brown nannofossil chalk with clay (22R-3, 60–70 cm). F. A highly bioturbated interval of reddish brown clayey calcareous chalk with *Zoophycos* traces (30R-1, 90–100 cm). Lithologies are also representative of 392-U1580B-2R through 5R.

Figure F4. Major lithologies of Lithostratigraphic Units III–V, Hole U1580A. A. Dark green zeolitic siltstone with glauconite showing sharp contact between layers and bioturbation (32R-1, 120–130 cm). B. Dark green zeolitic siltstone and sandstone with glauconite and an inoceramid fragment (35R-2, 70–80 cm). C. Light green clayey calcareous chalk (40R-1, 80–90 cm). D. Calcareous siltstone with glauconite (40R-4, 76–86 cm). E. Calcareous siltstone and chalk (42R-3, 29.5–39.5 cm). F. Calcareous siltstone (46R-1, 34–44 cm).

Figure F5. Major lithologies of Lithostratigraphic Units VII–XIII, Hole U1580A. A. Calcareous limestone (48R-4, 63–73 cm). B. Black chert (51R-3, 13–23 cm). C. Silicified limestone (56R-5, 10–20 cm). D. Black nannofossil-rich claystone overlying calcareous chalk (57R-1, 16.4–26.4 cm). E. Calcareous chalk with black clay (60R-1, 28–38 cm). F. Laminated siltstone (62R-1, 1–11 cm).

Figure F6. Major sedimentary lithologies, Site U1580. Left: plane-polarized light (PPL), right: cross-polarized light (XPL).

Figure F7. Abundance compilation, Site U1580. 0 = not present, T = trace (0%–1%), R = rare (1%–10%), C = common (10%–25%), A = abundant (25%–50%), D = dominant (>50%).

Figure F8. Paleocene/Eocene boundary, Site U1580.

Figure F9. Bulk sediment XRD. A. Clayey calcareous chalk. Dominant mineral is calcite. B. Dark greenish gray zeolitic sandstone. Dominant minerals are montmorillonite and clinoptilolite (Na, Ca). C. Grayish green zeolitic sandstone. Dominant minerals are montmorillonite, clinoptilolite-Ca, and heulandite. D. Greenish black zeolitic siltstone. Dominant minerals are montmorillonite, clinoptilolite-Na, clinoptilolite-Ca, heulandite-Ca, ferrous celadonite, and glauconite.

Figure F10. Examples of mass movement, Hole U1580A. A. Clasts of white calcareous clay in a matrix of greenish gray calcareous chalk. B. Fining-upward deposit, showing normal grading, ranging from coarse sand to silt. C. Fining-upward deposit showing normal grading and ranging from gravel to fine sand. Images (A, B) have been enhanced for brightness.

Figure F11. Core images of the K/Pg boundary, Hole U1580A. The annotations in red are based on micropaleontological observations and the green annotation is the location of the K/Pg boundary based on distinct color banding patterns and correlation with Hole U1579D.

Figure F12. Examples of soft-sediment deformation encountered, Hole U1580A. A. 33R-1, 35–42 cm. B. 36R-1, 38–44 cm. C. 35R-7, 86.5–92.5 cm. D. 33R-5, 39–45 cm. E. 36R-5, 4.5–11.5 cm. F. 37R-1, 65.5–72.5 cm. The images in these panels have been enhanced for brightness.

Figure F13. Microfaults, Hole U1580A. A. 40R-2, 78.5–87.5 cm. B. 31R-4, 34.5–43.5 cm. C. 38R-7, 65.5–80.5 cm. D. 39R-4, 138.5–147 cm. E. 39R-7, 48.5–55.5 cm. The images in these panels have been enhanced for brightness.

Figure F14. Stratigraphic summary of the lowermost ~130 m of Hole U1580A compared with corrected downhole logging MS results. ? = unverified unit thickness.

Figure F15. Igneous rocks, Hole U1580A. A. Olivine pseudomorphs (red dashed lines) (50R-1, 12–15 cm; XPL). B. Subophitic clinopyroxene (several bladed plagioclase crystals fully or partly enclosed by a large clinopyroxene crystal) (52R-2, 132–135 cm; XPL). C. Subophitic clinopyroxene (59R-1, 143–146 cm; XPL). D. Olivine pseudomorphs (66R-3, 0–3 cm; PPL).

Figure F16. Defining characteristics of Igneous Subunits 10a–10c (Lithostratigraphic Unit XIV), Hole U1580A. Top row: outside (drilled) surface of the split section half of representative samples. Middle (XPL) and bottom (PPL) rows: thin section images. Red dashed lines = plagioclase glomerocrysts in Igneous Subunit 10a and subophitic clinopyroxenes in Igneous Subunit 10c.

Figure F17. Idealized profile (not to scale) of a typical igneous unit in Hole U1580A. Specific features discussed in the text are indicated.

Figure F18. Overview of the preservation and abundance of nannofossils, planktonic foraminifera, siliceous microfossils and palynomorphs studied at Site U1580. Abundance: B = barren, P = present, Tr = trace, R = rare, F = few, Fr = frequent, C = common, A = abundant, D = dominant. Preservation: P = poor, M = moderate, G = good, VG = very good, E = excellent.

Figure F19. Calcareous nannofossil abundance, zones, and distribution of biostratigraphically important taxa, Site U1580. Dashed lines show epoch boundaries. Undulating lines represent inferred unconformities. Abundance: B = barren, R = rare, F = few, C = common, A = abundant.

Figure F20. Selected Paleogene and Cretaceous calcareous nannofossils, Hole U1580A. Scale bars = 10 µm. A. *Rhomboaster cuspis* (7R-4, 5 cm). B. *Rhomboaster bramlettei* (3R-CC). C. *Tribrachiatus contortus* (4R-3, 151 cm). D. *Tribrachiatus orthostylus* (1R-3, 134 cm). E. *Ellipsolithus bollii* (7R-CC). F. *Ellipsolithus macellus* (1R-3, 134 cm). G. *Toweius callosus* (1R-3, 134 cm). H. *Coccolithus pelagicus* (1R-3, 134 cm). I. *Discoaster salisburgensis* (7R-4, 5 cm). J. *Sphenolithus editus* (1R-3, 134 cm). K. *Toweius gammation* (1R-3, 134 cm). L. *Discoaster araneus* (4R-CC). M. *Marthasterites furcatus* (32R-6, 65 cm). N. *Reinhardtites levis* (25R-CC). O. *Eprolithus floralis* (32R-6, 65 cm). P. *Kamptnerius magnificus* (23R-CC). Q. *Lithastrinus septenarius* (31R-2, 95 cm). R. *Gartnerago segmentatum* (46R-1, 66 cm). S. *Quadrum eneabrachium* (31R-2, 95 cm). T. *Axopodorhabdus biramiculatus* (=*Axopodorhabdus albianus*; 60R-CC).

Figure F21. Selected Paleogene and Cretaceous planktonic and benthic foraminifera, Hole U1580A. A (1–3). *Chiloguembelina wilcoxensis* (scanning electron microscopy [SEM] P1: 392-U1580A-1R-CC). B (1–3). *Globanomalina australiformis* (SEM P4: 392-U1580A-1R-CC). C (1–3). *Acarinina subsphaerica*. (SEM P24: 392-U1580A-6R-CC). D (1–3). *Acarinina pentacamerata* (SEM P29: 392-U1580A-7R-CC). E (1–3). *Muricohedbergella sliteri* (SEM N5: 392-U1580A-22R-CC). F (1–3). *Planohedbergella subcarinatus* (SEM N12: 392-U1580A-22R-CC). G (1–5). *Archaeoglobigerina cretacea* (SEM N17: 392-U1580A-32R-CC); (4, 5) show the unique preservation of specimens. H (1–3). *Nuttallides truempyi* (SEM O25: 392-U1580A-6R-CC). I (1, 2). *Tappanina* sp. (SEM M2: 392-U1580A-6R-CC). J (1–3). *Gavelinella* sp. (SEM M7: 392-U1580A-7R-CC). K (1, 2). *Bolivinoides* sp. (SEM).

Figure F22. Selected dinocyst species from Hole U1580A. Scale bar = 50 µm. A. *Balteocysta perforata* (38R-6, 66–67 cm). B. *Canningia reticulata* (40R-3, 21–24 cm). C. *Circulodinium distinctum* (38R-CC). D. *Codoniella campanulata* (34R-2, 133–134 cm). E–H. Continuum between *Conosphaeridium abbreviatum* and *Conosphaeridium striatoconus*; (E) 40R-3, 21–24 cm; (F, H) 34R-2, 133–134 cm; (G) 38R-6, 66–67 cm. I. *Coronifera oceanica* (34R-2, 133–134 cm). J. *Cyclonephelium floreticulatum* (36R-4, 19–20 cm). K. *Florentinia deanei* (40R-3, 21–24 cm). L. *Heterosphaeridium spinaconjunctum* (34R-2, 133–134 cm). M. *Isabelidinium glabrum* (38R-6, 66–67 cm). N. *Odontochitina costata* (38R-CC). O. *Palaeohystrichophora infusorioides* (34R-2, 133–134 cm). P. *Pervosphaeridium truncatum* (40R-3, 21–24 cm). Q. *Pterodinium cingulatum* (34R-2, 133–134 cm). R. *Satyrodinium haumuriense* (34R-2, 133–134 cm). S. *Senoniasphaera rotundata* (34R-2, 133–134 cm). T. *Valensiella reticulata* (36R-4, 19–20 cm).

Figure F23. Color variation of specimens of *Odontochitina costata*, *Hapsocysta dictyota*, *Oligosphaeridium complex*, *Heterosphaeridium* spp., and *Conosphaeridium striatoconus* from Hole U1580A. Scale bar = 50 µm. Transparent (A1–E1), brown with rust colorations (A2–E2), and dark brown to black (A3, C3, D3). A (1) 34R-2, 133–134 cm (322.74 m CSF-A); (2) 35R-CC (339.38 m CSF-A); (3) 60R-1, 51–53 cm (481.11 m CSF-A). B (1) 38R-6, 66–67 cm (365.7 m CSF-A); (2) 40R-3, 21–24 cm (381.33 m CSF-A). C (1) 40R-3, 21–24 cm; (2) 35R-CC (339.38 m CSF-A); (3) 60R-1, 51–53 cm (481.11 m CSF-A). D (1) 4R-2, 133–134 cm (322.74 m CSF-A); (2) 35R-CC (339.38 m CSF-A); (3) 60R-1, 51–53 cm (481.11 m CSF-A). E (1) 34R-2, 133–134 cm (322.74 m CSF-A); (2) 35R-CC, 25–30 cm (339.38 m CSF-A).

Figure F24. Magnetostratigraphic results, Hole U1580A. Dark blue dots = NRM intensity and inclination before AF demagnetization. Cyan dots = NRM intensity and inclination after 15 mT AF cleaning of archive halves. Black line in inclination column = 15 point moving average, red dots = discrete samples. The magnetic polarity plot is generated from the moving average: negative (up-pointing) inclination indicates deposition during a normal geomagnetic polarity field (black bands). Gray bands = intervals without paleomagnetic measurement (e.g., core gaps) or intervals where polarity could not be confidently constrained. Preliminary correlation with the GPTS of Ogg (2020) (GPTS2020) is shown (blue bands).

Figure F25. Magnetostratigraphic results, Hole U1580B. Dark blue dots = NRM intensity before AF demagnetization. Cyan dots = NRM intensity and inclination after 15 mT AF cleaning of the archive halves. Black line in inclination column = 10 point moving average. Cores 2R–5R deliberately targeted the Paleocene/Eocene boundary, which lies in the ~3 My long Chron C24r, and we therefore observe no magnetic reversals.

Figure F26. (A) SIRM, (B) HIRM, (C) *S*-ratio, and (D) MS (*k*), Hole U1580A.

Figure F27. AMS analysis of discrete samples from Lithostratigraphic Units II and III, Hole U1580A. A. Equal-area projection from all samples. B. Average AMS tensors calculated from 1000 bootstrapped data sets. C. Cumulative distribution of the eigenvalues V_1, V_2, and V_3 associated to the 3 eigenvectors of the AMS tensor, calculated from the bootstrapped data set; V_3 is statistically distinct from overlapping V_1 and V_2, as expected in compacted (and undeformed) sediments. D. Diagram of P' and T; red dots = sediments, blue dots = igneous rocks. E, F. Stratigraphic variations of P' and T in the sedimentary units. All panels: the k1 ≥ k2 ≥ k3 axes or eigenvalues V_1, V_2, and V_3 of the AMS tensor are represented by red, green, and black symbols, respectively.

Figure F28. Discrete sample demagnetization analysis, Hole U1580A. A–C. Representative vector endpoint diagrams (left panels), equal area projections (round panels), and a graph showing natural magnetization (M) decay during demagnetization from Lithostratigraphic Units II–III (top right panels). D. Representative vector endpoint diagram (left panel), equal area projection (round panel), and a graph showing natural magnetization (M) decay during demagnetization from igneous rocks (Lithostratigraphic Unit VIII) (top right panel). Vector endpoint diagrams: white symbols = projections onto the vertical plane, black symbols = projections onto the horizontal plane, X and Y = axes of the working halves, and Up = vertical up-pointing (–Z-)axis of the core. Equal-area projections: open symbols = negative (up-pointing) directions, black symbols = positive (down-pointing) directions. All plots: red symbols = steps used to determine the characteristic remanent directions. E. Equal-area projection with all down-pointing (reversed; solid symbols) and up-pointing (normal; open symbols) paleomagnetic directions. Average inclination and 95% confidence boundaries are indicated in the inset (N + R = combined normal and reversed directions). F. Results from quantile-quantile analysis used to attest the uniformity of measured declinations; if $\mu > 1.207$, the null hypothesis of a uniform distribution of declination can be excluded at a 95% certainty (Fisher et al., 1987; Tauxe, 2010); the uniformly distributed declination values support the lack of pervasive drilling-induced magnetic overprints.

Figure F29. Histogram of all magnetic inclination data after 15 mT AF demagnetization, Hole U1580A.

Figure F30. Correlation of NGR data measured on cores (orange) to HSGR data from downhole logging with the HNGS (black) on separate, equally scaled horizontal axes (left) and overlapping, differently scaled horizontal axes (right), Site U1580. Dashed gray lines = tie points to individual cores. cps = counts per second.

Figure F31. Age-depth model and average sedimentation rates, Site U1580. Numbers for bioevents correspond to those in Table T5. Numbers for magnetic reversals correspond to those in Table T11.

Figure F32. Alkalinity and pH, Site U1580.

Figure F33. IW sulfate, chloride, sodium, magnesium, calcium, and potassium, Site U1580.

Figure F34. IW lithium, strontium, boron, and iron, Site U1580.

Figure F35. Total carbon, calcium carbonate, and organic carbon, Site U1580. Organic carbon is calculated as the difference between total and inorganic carbon.

Figure F36. SRA results, Site U1580. (A) HI – OI and (B) HI – T_{max} plots. Red solid symbol = 392-U1580A-57R-1, 17.5–18.5 cm. SRA-derived TOC percentages are presented.

Figure F37. Sediment aluminum, calcium, iron, potassium, sulfur, and silicon, Site U1580.

Figure F38. A. Total alkali vs. silica diagram (normalized to 100% on a volatile free basis) with alkaline/tholeiitic boundary after MacDonald and Katsura [1964] and B. Mg/Zr vs. Ti/V from shipboard ICP-AES analyses of igneous units (all data calibrated with liquid standards). Discrimination lines for rock types in (B) are taken from Shervais (2022). All samples plot as tholeiitic basalts. Reference data from dredged samples from neighboring Mozambique Ridge (MOZR) taken from Jacques et al. (2019). Data from the Southwest Indian Ridge (SWIR) from Le Voyer et al. (2019) and references therein. OIB = ocean-island basalt, MORB = mid-ocean-ridge basalt, SWIR = Southwest Indian Ridge.

Figure F39. Downhole variations in basalts for MgO (normalized), Ti/V, and Ti/Zr (liquid standard calibration), Site U1580. No significant systematic variation with depth is observed.

Figure F40. Physical properties, Hole U1580A. All plotted data sets omit data points of poor quality such as from section ends and cracks in the cores. Dotted lines = lithostratigraphic boundaries. cps = counts per second.

Figure F41. Physical properties data spanning the depth interval with basalt lithologies, Hole U1580A (~380–530 m CCSF). All plotted data sets omit data points of poor quality such as from section ends and cracks in the cores. Dotted lines = lithostratigraphic boundaries. cps = counts per second.

Figure F42. NGR and K, Th, and U abundances from deconvolution of the total NGR energy spectra, Holes U1580A and U1580B. Black lines = 25 point moving averages, dotted lines = lithostratigraphic boundaries.

Figure F43. MAD and thermal conductivity results, Hole U1580A. Dotted lines = lithostratigraphic boundaries.

Figure F44. MAD results, Hole U1580A. A. MAD bulk density vs. thermal conductivity. B. Porosity vs. thermal conductivity. C. Porosity vs. MAD bulk density. D. MAD bulk density vs. MAD grain density (vertical dashed line = grain density of calcite). Thermal conductivity data were paired with the closest MAD measurement from a maximum depth offset of 3 m.

Figure F45. Bulk density, Site U1580. A. GRA bulk density vs. MAD wet bulk density. B. GRA bulk density vs. MAD dry bulk density. MAD data were paired with the closest GRA bulk density measurement from a maximum depth offset of 2 cm. The plotted GRA bulk density data omit data points of poor quality such as from section ends and cracks in the cores.

Figure F46. WRMSL density and *P*-wave velocity, Site U1580. All plotted data sets omit poor quality data points such as from section ends, cracks in the cores, or poor contact between the core and core liner.

Figure F47. Downhole wireline logging results, Hole U1580A. Right column shows 50 traces of Seismic Line AWI-98015 in two-way traveltime (TWT) around Site U1580, located at common depth point (CDP) 5695. HLRT = High-Resolution Laterolog Array.

Figure F48. Data crossplots from core samples vs. downhole observations (150–500 m WMSF). A. Porosity. B. Bulk density. C. *P*-wave velocity. NGR spectroscopy results: D. Potassium. E. Uranium. F. Thorium. Downhole elemental abundance data are from the HNGS log of Hole U1580A through the sedimentary lithologies at depths shallower than 400 m WMSF. On the uranium and thorium content graphs, some points are negative. This is an artifact caused by noise in the data and low abundances.

Figure F49. High-resolution downhole wireline logging results for the lower part of Hole U1580A. FMS images span about 30° in each direction, and the darker color corresponds to lower resistivity. EDTC = Enhanced Digital Telemetry Cartridge. API/5 = gAPI units divided by five plotted on the same axis as K, U, and Th abundances. HLRT = High-Resolution Laterolog Array. Dashed red line = size of the drill bit, solid red line = caliper borehole size, gray shaded regions = recovered core intervals.

Figure F50. Crossplot of Th vs. K abundance data from the HNGS log, Hole U1580A. Sedimentary lithologies from depths shallower than 400 m WMSF are shown.

Figure F51. High-resolution UBI and resistivity along with density and MSS logs for igneous units, Hole U1580A.