Figure F1. Northern margin of Papua New Guinea showing location of Sites U1484–U1487 (yellow circles). Contour interval = 500 m.

Figure F2. Contoured bathymetric map showing location of Site U1487 (yellow circle) on seismic Line RR1313-WP6-5, ~1.4 km southwest of the intersection with seismic Line RR1313-WP6-3a collected during the R/V *Roger Revelle* 13-13 cruise. Piston Core RR1313 PC26 was collected very close to the Site U1487 location. Bathymetry is based on EM122 multibeam survey collected during same cruise. Numbers along seismic lines (black) are common depth points. Contour interval = 50 m.

Figure F3. Seismic Line RR1313-WP6-5 showing the location of Site U1487. Location of crossing seismic line shown with dashed line at top. CDP = common depth point. Seismic data available at http://www-udc.ig.utexas.edu/sdc/cruise.php?cruiseIn=rr1313.

Figure F4. Hydrographic profiles of temperature, salinity, and dissolved oxygen northeast of Papua New Guinea along the path of the New Guinea Coastal Current (Y. Rosenthal, unpubl. data). SPSTW=South Pacific Subtropical Water, AAIW = Antarctic Intermediate Water, UCDW = Upper Circumpolar Deepwater.

Figure F5. Lithologic summary, Site U1487. cps = counts per second, MS = magnetic susceptibility.

Figure F6. Characteristic lithologies, Hole U1487A. A. Subunit IA: clay- and nannofossil-rich foraminifer ooze (1H-3A, 50–70 cm). B. Subunit IB: ash-rich foraminifer and nannofossil ooze, (7H-5A, 50–70 cm). C. Subunit IC: nannofossil- and foraminifer-bearing volcanic ash, (13H-4A, 40–60 cm).

Figure F7. Main sedimentary components, Site U1487. A, B. Nannofossil-rich foraminifer ooze (Subunit IA). C, D. Nannofossil-bearing ash-rich foraminifer ooze (Subunit IB). E, F. Nannofossil-bearing foraminifer-rich ash (Subunit IC). A, C, and E: plane-polarized light (PPL); B, D, and F: cross-polarized light (XPL). V = volcanic glass, Sc = scoria.

Figure F8. A–D. XRD results from tephra layers in Subunits IB and IC, Site U1487. Note the change in the *x*-axis scale for D.

Figure F9. A, B. Physical properties data indicating distinct tephra layers, Hole U1487A. Red box = 10H-3A, 22–31 cm; yellow box = 10H-3A, 106–118 cm; blue box = 13H-6A, 50–70 cm.

Figure F10. SEM photomicrographs of tephra layers in Subunits IA and IB, Site U1487. All imaged tephra layers are composed entirely of volcanic glass shards. Shard size reflects explosiveness, with larger shard sizes produced during more explosive eruptions. A and C depict relatively small glass shards, whereas B and D show larger shard fragments.

Figure F11. SEM photomicrographs of tephra layers in Subunit IC, Site U1487. All tephra layers are composed predominantly of microscoria, with trace amounts of volcanic glass. Microscoria sizes are larger at Site U1487 than at Site U1486. Microscoria pieces in B are >3 mm.

Figure F12. Tephra layers produced by the same volcanic event identified at (A) Site U1487 (U1487A-9H-1A, 18–53 cm) and (B) Site U1486 (U1486D-15H-3A, 38–71 cm).

Figure F13. SEM images of *Gephyrocapsa* and *Reticulofenestra* species (U1487A-1H-4, 60 cm, and 2H-6, 61 cm).

Figure F14. Coiling patterns in *Pulleniatina*, Hole U1487A.

Figure F15. Downhole foraminifer preservation states, Site U1487. A. Light microscope images to assess the extent of fragmentation and staining and whether the tests are glassy or opaque. B. SEM images of selected specimens (*T. trilobus* and *P. wuellerstorfi*) as whole tests, umbilical side upward. C. High-magnification images of outer wall surfaces to examine additional features such as spine holes, pustules, etc. D. High-magnification images of wall cross sections to find original microgranules or diagenetic crystallites. E. High-magnification images of inner wall surfaces, focusing on evidence for internal overgrowth and cementation.

Figure F16. Age-depth plot for Site U1487 showing integrated biomagnetochronology for Hole U1487A. Sedimentation rates average ~3.5 cm/ky above 60 mbsf and ~15 cm/ky below 60 mbsf. The age of the oldest recovered sediment is estimated at 2.65 Ma based on extrapolation of the age-depth trend. PF = planktonic foraminifer.

Figure F17. Archive-half NRM intensity after 15 mT AF demagnetization, discrete sample χ and IRM, and discrete sample χARM/SIRM and IRM_{300mT}/IRM_{1000mT} ratios, Hole U1487A.

Figure F18. A–F. Discrete sample AF demagnetization results, Hole U1487A. Left plots: intensity variation through progressive demagnetization steps. Middle and right plots: NRM vector measurements after each AF demagnetization treatment on orthogonal (Zijderveld; blue = horizontal projections, red = vertical projections) and stereographic (solid squares = positive inclination, open squares = negative inclination) projections, respectively. MAD = maximum angular deviation.

Figure F19. NRM intensities before and after 15 mT AF demagnetization, WRMSL MS, maximum angular deviation (MAD), and inclination (dashed lines = predicted values assuming a geomagnetic axial dipole [GAD] field for normal [−3°] and reversed [3°] polarity for the site latitude) and azimuthally corrected declination after 15 mT AF demagnetization, Hole U1487A. Black squares = discrete samples, asterisk = problematic subchron boundary interpretation. Magnetostratigraphy and GPTS shown at right. Black = normal polarity, white = reverse polarity, gray = no magnetostratigraphic interpretation made from the data.

Figure F20. NRM intensities before and after 15 mT AF demagnetization, WRMSL MS, and inclination (dashed lines = predicted values assuming a GAD field for normal [−3°] and reversed [3°] polarity for the site latitude) and declination (red = azimuthally corrected values, dark red = manually rotated values for HLAPC cores) after 15 mT AF demagnetization, Hole U1487B. Asterisk = problematic subchron boundary interpretation. Magnetostratigraphy and GPTS shown at right. Black = normal polarity, white = reversed polarity, gray = no magnetostratigraphic interpretation made from the data.

Figure F21. Physical property measurements, Holes U1487A and U1487B. GRA bulk density, magnetic susceptibility, and *P*-wave data were measured on the WRSMSL. Yellow shaded area indicates values artificially offset due to obstruction of the magnetic susceptibility loop. cps = counts per second.

Figure F22. Comparison of major physical property parameters, Holes U1486B and U1487B. Red lines = calcareous nannofossil and planktonic foraminifer biohorizons identified at both sites: 1 = top *Globigerinoides ruber* (pink) (0.12 Ma), 2 = base *Emiliania huxleyi* (0.29 Ma), 3 = top *Pseudoemiliania lacunosa* (0.44 Ma), 4 = top *Globigerinoidesella fistulosa* (1.88 Ma), 5 = top *Discoaster brouweri* (1.93 Ma), 6 = top *Discoaster pentaradiatus* (2.39 Ma), 7 = top *Discoaster surculus* (2.49 Ma). cps = counts per second.

Figure F23. MAD and WRMSL bulk density, WRMSL MS, NGR, and WRMSL *P*-wave velocity overlaid on core photos (generated using Code for Ocean Drilling Data [CODD]; Wilkens et al., 2017) from Hole U1487A between 62 and 92 mbsf. Core photos were altered (lightened) to highlight sediment structure and lithologic change. cps = counts per second.

Figure F24. Discrete and whole-round *P*-wave measurements and comparison with NGR data, Site U1487. cps = counts per second.

Figure F25. MAD discrete sample dry, bulk, and grain densities and porosity, WRMSL GRA bulk density, and thermal conductivity, Hole U1487A. Arrow = high GRA bulk density data point (see text for discussion).

Figure F26. APCT-3 temperature-time series, Hole U1487A. Unshaded area = time interval with exponential decrease in temperature.

Figure F27. Heat flow calculations, Hole U1487A. Green line = calculated thermal resistance, gray vertical line = average thermal conductivity value used for calculation of thermal resistance, solid diamonds and dashed line = corrected thermal conductivity, open diamonds = uncorrected thermal conductivity.

Figure F28. WRMSL MS data for Holes U1487A and U1487B divided into 40 m intervals. Because the WRMSL data for Core U1487A-13H consist mostly of negative values, we replaced them with SHMSL data, which have absolute values similar to those at the equivalent depth in Hole U1487B. Upper panel shows the MS splice constructed by combining data from both holes. (Continued on next page.)

Figure F28 (continued).

Figure F29. Spliced SHMSL L*, NGR, and WRMSL MS and GRA bulk density data, Site U1487. cps = counts per second.

Figure F30. Spliced MS point data for Holes U1487A (red) and U1487B (blue) plotted on spliced core images (core photo generated using CODD; Wilkens et al., 2017).

Figure F31. A. Comparison of mbsf and composite depth scales in the Site U1487 splice. B. Comparison of the growth of cumulative depth offset and mbsf depth scale.

Figure F32. Methane and $CaCO_3$ content profiles, Hole U1487A.

Figure F33. Correlation between $CaCO_3$ content and bulk density, Hole U1487A. Polynomial regression is expressed by $CaCO_3$ (wt%) = $3.96 \times D^2 - 0.00695 \times D + 1.80$, where D = bulk density and $n = 49$.

Figure F34. Interstitial water concentration profiles, Hole U1487A. Black stars = mudline samples. Fe and Ba mudline concentrations were below detection limit and are not shown.

Figure F35. Interstitial water concentration profiles, Hole U1487A. Black stars = mudline samples.