

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

Figure F2. Contoured bathymetric map showing the location of Site U1485 on seismic Line RR1313-WP7-2, ~2000 m northeast of the cross-point with seismic Line RR1313-WP7-5. Location of Site U1484 and piston core RR1313 PC32 are also shown. Seismic lines collected during R/V *Roger Revelle* 13-13 cruise. Bathymetry is based on EM122 multibeam survey collected during same cruise. Contour interval = 50 m.

Figure F3. Seismic Line RR1313-WP7-2 with location of Sites U1484 and U1485. Location of crossing seismic Lines RR1313-WP7-5 and RR1313-WP7-6 are shown with dashed lines at top. CDP = common depth point. Seismic data available at <http://www-udc.ig.utexas.edu/sdc/cruise.php?cruise=rr1313>.

Figure F4. Boreal (A) winter and (B) summer precipitation for 1979–2009 and (C) winter and (D) summer precipitation anomalies during the 1997–1998 El Niño event (IRI Climate Data, Lamont Doherty Earth Observatory, Columbia University: <http://iridl.ideo.columbia.edu/maproom/Global/Precipitation/index.html>). DJF = December, January, February; JJA = June, July, August.

Figure F5. Lithologic summary, Site U1485. cps = counts per second, MS = magnetic susceptibility, WRMSL = Whole-Round Multisensor Logger.

Figure F6. Main lithologies, Hole U1485B. A. Clay (2H-2A, 1–15 cm). B. Silty clay (13H-7A, 61–75 cm). C. Sand (16H-3A, 41–55 cm). D. Nannofossil-rich clay with pyrite (47H-1A, 111–125 cm).

Figure F7. Main sedimentary components, Site U1485. A, B. Nannofossil-bearing clay. C, D. Nannofossil-bearing silty clay. E, F. Silty clay. A, C, and E: plane-polarized light (PPL); B, D, and F: cross-polarized light (XPL).

Figure F8. Sand and silty sand layers, Hole U1485A. A. 10H-2A, 20–35 cm. B. 16H-5A, 40–55 cm. C. 13H-5A, 113–128 cm. D. 12H-5A, 62–77 cm.

Figure F9. XRD results, Site U1485. A. Nannofossil-rich clay. B. Pumice. C. Iron carbonate concretion.

Figure F10. Tephra layers (arrows), Site U1485.

Figure F11. Scanning electron microscope photomicrographs of selected tephra samples showing vesicular glass fragments and bubble wall shards, Site U1485. A, F. Vesicular glass fragments. B. Bubble wall shards. C, E. Micro-pumice. D. Pumice.

Figure F12. Calcareous nannofossils, Hole U1485A. A. *Gephyrocapsa oceanica* (18H-CC). B. *Umbilicosphaera sibogae* (19H-CC). C, D. *Calcidiscus leptoporus*; (C) 19H-CC; (D) 2H-CC. E. *Emiliana huxleyi* (1H-CC). F. *Florisphaera profunda* (1H-CC). G, H. *Gephyrocapsa oceanica*; (G) 1H-CC; (H) 39F-CC. I. *Helicosphaera carteri* (1H-1, 0 cm). J. *Pontosphaera multipora* (2H-CC). K. *Pseudoemiliania lacunosa* (39H-CC). L. *Rhabdosphaera clavigera* (1H-CC). M. *Tetralithoides symeonidesii* (1H-CC). N. *Umbellosphaera irregularis* (1H-CC). O. *Umbilicosphaera sibogae* (1H-CC). A–C: SEM; D–O: XPL. A–C scale bars are 2 µm; D–O are at same magnification (5 µm scale bar in D).

Figure F13. Foraminifer preservation states, Site U1485. 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 F14. Age-depth plot for calcareous nannofossil and planktonic foraminifer biohorizons, Site U1485. Dashed line shows the indicative mean long-term sedimentation rate. The age at the bottom of Hole U1485A is constrained between 0.44 and 0.60 Ma.

Figure F15. Archive-half NRM intensity after 10 mT AF demagnetization, discrete sample χ and SIRM, and discrete sample $\chi_{ARM}/SIRM$ and IRM_{300mT}/IRM_{1000mT} ratios, Hole U1485A.

Figure F16. A–D. Discrete sample AF demagnetization results, Hole U1485A. 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 F17. NRM intensities before and after 10 mT AF demagnetization, WRMSL MS, maximum angular deviation (MAD), and inclination (dashed lines = predicted values assuming a geocentric axial dipole [GAD] field for normal (−5.7°) and reversed (5.7°) polarity for the site latitude) and declination (red = azimuthally corrected values for APC cores, dark red = manually rotated values for HLAPC cores) after 10 mT AF demagnetization, Hole U1485A. Black squares = discrete samples.

Figure F18. NRM intensities before and after 15 mT AF demagnetization, WRMSL MS, and inclination (dashed lines = predicted values assuming a GAD field for normal (−5.7°) and reversed (5.7°) polarity for the site latitude), and declination (red = azimuthally corrected values for APC cores, dark red = manually rotated values for HLAPC cores) after 15 mT AF demagnetization, Hole U1485B.

Figure F19. NRM intensities before and after AF demagnetization (15 mT for U1485C, 10 mT for U1485D), WRMSL MS, and inclination (dashed lines = predicted values assuming a GAD field for normal (−5.7°) and reversed (5.7°) polarity for the site latitude), and manually rotated declination after AF demagnetization, Holes U1485C and U1485D.

Figure F20. Physical property measurements, Holes U1485A and U1485B. GRA bulk density and magnetic susceptibility data were measured on the WRMSL. Detrended GRA bulk density data are not included because they show comparable trends. WRMSL P-wave data are shown in Figures F21 and F23. cps = counts per second.

Figure F21. A. NGR and WRMSL GRA bulk density, magnetic susceptibility, and P-wave velocity overlaid on core photos between 1 and 14 mbsf, Hole U1485B. cps = counts per second. B. NGR and WRMSL GRA bulk density and magnetic susceptibility overlaid on core photos between 95 and 130 mbsf, Hole U1485B. Core photos generated using Code for Ocean Drilling Data (CODD) (Wilkins et al., 2017). Pink diamonds = MAD bulk density.

Figure F22. Comparison of major physical property parameters (WRMSL and NGR), Sites U1484 and U1485. Calcareous nannofossil and planktonic foraminifer biohorizons identified at both sites (red lines): 1 = top *Globorotalia flexuosa* (0.07 Ma), 2 = base common *Emiliana huxleyi* (0.09 Ma), 3 = top *Globigerinoides ruber* (pink) (0.12 Ma), 4 = base *Emiliana huxleyi* (0.29 Ma).

Figure F23. Discrete and whole-round P-wave measurements, Holes U1485A and U1485B. Data indicating the degradation of z-axis velocity quality before measurements were stopped are circled in black.

Figure F24. MAD discrete sample dry, bulk, and grain densities and porosity, WRMSL GRA bulk density, and thermal conductivity, Hole U1485A.

Figure F25. Comparison of thermal conductivity mean measurements (blue diamonds) and cleaned NGR data, Hole U1485A. cps = counts per second.

Figure F26. WRMSL MS data for Holes U1485A, U1485B, and U1485D divided into 50 m intervals. Upper panel shows the MS splice constructed by combining data from all holes. (Continued on next three pages.)

Figure F26 (continued). (Continued on next page.)

Figure F26 (continued). (Continued on next page.)

Figure F26 (continued).

Figure F27. Spliced L*, NGR, and WRMSL MS and GRA bulk density data, Site U1485. Gray shading = intervals with gaps, cross-hatched bars = lower section of the splice with a few gaps and uncertain tie points. cps = counts per second.

Figure F28. Spliced MS data plotted on spliced core image (generated using CODD; Wilkens et al., 2017) for Holes U1485A (red), U1485B (blue), and U1485D (green).

Figure F29. A. Comparison of mbsf and composite depth scales in the Site U1485 splice. B. Comparison of the growth of cumulative depth offset and the mbsf depth scale.

Figure F30. Methane, ethane, propane, and C₁/C₂ profiles, Hole U1485A.

Figure F31. CaCO₃, TOC, TN, and C/N profiles, Hole U1485A. Ranges of marine and mixed marine/terrestrial organic matter based on C/N are indicated by annotated bars at the base of the C/N profile.

Figure F32. Interstitial water concentration profiles, Hole U1485A. Black stars = mudline samples, dashed line = SMTZ, gray shading = interval of most intense anoxic silicate weathering, brown shading = interval of sand- and silt-rich sediments, brown line = transition to clay-rich Subunit IB, blue shading = interval of nannofossil-rich clay.

Figure F33. Interstitial water concentration profiles, Hole U1485A. Black stars = mudline samples, dashed line = SMTZ, gray shading = interval of most intense anoxic silicate weathering, brown shading = interval of sand- and silt-rich sediments, brown line = transition to clay-rich Subunit IB, blue shading = interval of nannofossil-rich clay.