

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 U1484 on seismic Line RR1313-WP7-2, ~900 m southwest of the cross-point with seismic Line RR1313-WP7-5. Seismic lines were collected during R/V *Roger Revelle* 13-13 cruise, and bathymetry is based on an 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. Seismic Lines RR1313-WP7-5 and RR1313-WP7-6 shown with dashed lines at top. CDP = common depth point. Seismic data available at <http://www-udc.ig.utexas.edu/sdc/cruise.php?cruiseIn=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 DJF = December, January, February, JJA = June, July, August. (IRI Climate Data, Lamont Doherty Earth Observatory, Columbia University: <http://iri.ldeo.columbia.edu/maproom/Global/Precipitation/index.html>).

Figure F5. Lithologic summary, Site U1484. cps = counts per second, MS = magnetic susceptibility, WRMSL = Whole-Round Multisensor Logger.

Figure F6. Clay-rich intervals in Unit I, Hole U1484A.

Figure F7. Interbedded clay- and sand-rich layers in Unit I, Hole U1484A.

Figure F8. Sand-rich intervals in Unit I, Hole U1484A.

Figure F9. Main sedimentary components in Unit I, Site U1484. A, B: Clayey silt. C, D: Silty sand. A and C: plane-polarized light (PPL); B and D: cross-polarized light (XPL). Ch = chlorite, Cl = clay, Fs = feldspar, Gl = glauconite, Py = pyroxene.

Figure F10. Typical sedimentary structures in Unit I, Site U1484. A. Fining-upward sand layer (U1484A-2H-6A, 40–60 cm). B. Coarsening-upward sand layer (U1484B-4H-2A, 70–90 cm). C. Sharp contact at the base of sand layer (U1484A-2H-3A, 80–100 cm). D. Mixing between sand- and clay-rich layers by bioturbation (U1484A-4H-3A, 20–40 cm).

Figure F11. Sharp boundary between sand and clay layers (U1484C-12H-4A, 20–30 cm).

Figure F12. Unit I accessories, Site U1484. A. Coquina containing large shallow-water benthic foraminifers (U1484B-11H-4A, 35–55 cm). B. Large piece of wood (U1484B-8H-7A, 50–70 cm). C. Pumice in clay-rich layer (U1484A-21H-4A, 110–130 cm). D. Ash layer (U1484A-18H-4A, 115–135 cm).

Figure F13. Tephra layers (arrows), Site U1484.

Figure F14. SEM photomicrographs of tephra layers showing vesicular glass fragments and bubble wall shards, Site U1484.

Figure F15. XRD results from clay, Site U1484.

Figure F16. Glauconite particle and frambooidal pyrite, Hole U1484C (4H-8, 64 cm).

Figure F17. Calcareous nannofossils, Hole U1484A. A. *Gephyrocapsa* sp. coccospHERE (27H-CC). B. small *Gephyrocapsa* sp. (20H-CC). C. *Gephyrocapsa oceanica* (24H-CC). D. *Gephyrocapsa protohuxleyi* (20H-CC). E. *Syracosphaera lamina* (20H-CC). F, G. *Calcidiscus leptoporus*; (F) 34H-CC, (G) 5H-2, 50 cm. H. *Gephyrocapsa oceanica* (1H-CC). I. *Gephyrocapsa oceanica* (1H-CC). J. *Gephyrocapsa* sp. coccospHERE (16H-CC). K. *Helicosphaera wallichii* (3H-CC). L. *Helicosphaera carteri* (1H-CC). M. *Pontosphaera discopora* (5H-2, 50 cm).

N. *Pontosphaera* sp. (1H-CC). O. *Pontosphaera* cf. *P. multipora* (3H-CC). P. *Algiosphaera robusta* (3H-CC). Q. *Umbellosphaera irregularis* (3H-CC). A–E: SEM; F and H–Q: XPL; G: CPL. A–E scale bars are 1 μm; F–Q are at same magnification (5 μm scale bar in F).

Figure F18. Benthic foraminifers, Hole U1484A. A, B. *Rotalinoides compressiusculus* (15H-CC); (A) ventral view, (B) dorsal view. C. *Elphidium advenum* (5H-CC). D, E. *Planularia australis* (8H-CC). F. *Bulimina marginata* (11H-CC). G. *Peneroplis planatus* (15H-CC). H. *Coscinospira arietina* (15H-CC). I. *Amphisorus hemprichii* (15H-CC). J. *Operculina complanata* (15H-CC). K. *Bolivinella quadrilatera* (4H-CC). L. *Bolivina robusta* (4H-CC). M. *Bulimina aculeata* (3H-CC).

Figure F19. Downhole foraminifer preservation states, Site U1484. A. Light microscope images to assess the extent of fragmentation and staining and whether the tests are glassy or opaque. B. SEM images of *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 F20. Age-depth plot for calcareous nannofossil and planktonic foraminifer biohorizons, Site U1484. Dashed line shows the mean long-term sedimentation rate. The age at the bottom of Hole U1484A is estimated to be 0.29 Ma based on the average linear sedimentation rate of 75 cm/ky. Biohorizon numbers correspond to those in Table T3.

Figure F21. 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 U1484A. Orange circles = sand-rich layers discussed in text.

Figure F22. A–D. Discrete sample AF demagnetization results, Hole U1484A. Left plots: intensity variation through progressive AF 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 F23. NRM intensities before and after 10 mT AF demagnetization (dashed lines highlight decreasing intensity with increasing depth), WRMSL magnetic susceptibility (MS), maximum angular deviation (MAD), inclination (dashed lines = predicted values assuming a geomagnetic axial dipole [GAD] 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 for HLAPC cores) after 10 mT AF demagnetization, Hole U1484A. Black squares = discrete samples.

Figure F24. NRM intensities before and after 10 mT AF demagnetization (dashed lines highlight decreasing linear trend with increasing depth), WRMSL MS, inclination (dashed lines = predicted values assuming a GAD 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 U1484B.

Figure F25. NRM intensities before and after 10 mT AF demagnetization (dashed lines highlight decreasing linear trend with increasing depth), WRMSL MS, inclination (dashed lines = predicted values assuming a GAD 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 U1484C.

Figure F26. Physical property measurements, Holes U1484A and U1484B. 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 F27A and F29. Yellow shading = clay-rich intervals.

Figure F27. A. WRMSL GRA bulk density, WRMSL MS, NGR, and WRMSL *P*-wave velocity overlaid on core photos (generated using Code for Ocean Drilling Data [Wilkens et al., 2017]) between 8 and 15 mbsf, Hole U1484B. B. WRMSL GRA bulk density, WRMSL magnetic susceptibility, and NGR overlaid on core photos (generated with CODD) between 75 and 105 mbsf, Hole U1484B.

Figure F28. Comparison of cleaned WRMSL magnetic susceptibility data, Holes U1484A (red), U1484B (green), and U1484C (blue curve). Yellow shading = intervals of low magnetic susceptibility. Thick black lines = 250-point running mean.

Figure F29. Discrete and whole-round *P*-wave measurements, Site U1484.

Figure F30. MAD discrete sample dry, bulk, and grain densities and porosity, WRMSL GRA bulk density, and thermal conductivity, Hole U1484A. Yellow shading = clay-rich intervals. Black arrow = low thermal conductivity value excluded from further analysis.

Figure F31. APCT-3 temperature-time series, Hole U1484A. Unshaded area = time interval with exponential decrease in temperature.

Figure F32. Heat flow calculations, Hole U1484A. 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 F33. WRMSL MS data for Holes U1484A–U1484C divided into 50 m intervals. Upper panel shows the MS splice constructed by combining data from all three holes. (Continued on next two pages.)

Figure F33 (continued). (Continued on next page.)

Figure F33 (continued).

Figure F34. Spliced SHMSL L*, NGR, and WRMSL MS and GRA bulk density data, Site U1484. Gray shading = intervals with gaps and uncertain tie points.

Figure F35. Spliced MS data for Holes U1484A (red), U1484B (blue), and U1484C (green) plotted on spliced core images (core photo generated using CODD; Wilkens et al., 2017).

Figure F36. A. Comparison of mbsf and composite depth scales in the Site U1484 splice. B. Comparison of the growth of cumulative depth offset and the mbsf depth scale.

Figure F37. Methane, ethane, propane, and C₁/C₂ profiles, Hole U1484A.

Figure F38. CaCO₃, TOC, TN, and C/N profiles, Hole U1484A. Red circles = samples taken from sandy intervals, blue circles = sample taken from a clay-rich interval. Ranges of marine and terrestrial organic matter based on C/N are indicated by annotated bars at the base of the C/N profile.

Figure F39. Interstitial water concentration profiles, Hole U1484A. Mudline ammonium concentration was below detection limit and is not plotted. Black stars = mudline samples, dashed line = SMTZ, gray shading = interval of anoxic silicate weathering.

Figure F40. Interstitial water concentration profiles, Hole U1484A. Black stars = mudline samples, dashed line = SMTZ, gray shading = interval of anoxic silicate weathering.