Figure F1. Location of Site U1514 on the northern margin of the Mentelle Basin.

Figure F2. Time-migrated Geoscience Australia reflection seismic Profile s310_17 with location of Site U1514 marked along seismic shotpoints.

Figure F3. Lithostratigraphic summary, Site U1514.

Figure F4. Unit boundaries with dominant lithologies, Site U1514. A. Subunit Ia/Ib boundary. B. Subunit Ib/Unit II boundary. C. Unit II/Subunit IIIa boundary. D. Subunit IIIa/IIIb boundary.

Figure F5. Sediment constituents in Units I–III, Holes U1514A and U1514C. A, B. Nannofossil ooze, rare clay, quartz, mica, and sponge spicules (A: plane-polarized light [PPL]; B: cross-polarized light [XPL]). C. Sponge spicule–rich nannofossil ooze with radiolarians (PPL). D. Dark pyritized sponge spicules and radiolarian fragments in burrows in nannofossil-rich clay (PPL). E. Biogenic pyrite in claystone with nannofossils (PPL). F. Plant debris and calcite in claystone with nannofossils (PPL).

Figure F6. A–E. XRD results, Site U1514.

Figure F7. A–H. Sedimentary characteristics, Site U1514.

Figure F8. Age-depth plot, Site U1514. The interval corresponding to ~400–460 m CSF-A is structurally disturbed and yields no meaningful estimate (NME) for the sediment accumulation history.

Figure F9. Selected planktonic foraminiferal taxa across the Cretaceous/Paleogene boundary interval in Chron C29R, Hole U1514C. 1. *Pseudotextularia elegans* (23R-2, 23–25 cm). 2. *Gublerina rajagopalani* (23R-2, 23–25 cm). 3. *Zeauvigerina waiparaensis* (23R-1, 101–103 cm). 4. *Chiloguembelina midwayensis* (23R-1, 101–103 cm). 5. *Praemurica nikolasi* (23R-1, 101–103 cm). 6. *Eoglobigerina eobulloides* (23R-1, 101–103 cm). 7. *Eoglobigerina*? sp. (23R-1, 101–103 cm). 8. *Eoglobigerina* sp. aff. *E. eobulloides* (23R-1, 101–103 cm). 9, 10. *Antarcticella pauciloculata* (23R-1, 101–103 cm).

Figure F10. Paleomagnetic results, Hole U1514A. Blue squares = discrete samples. Declination: red = samples from oriented APC cores. Intensity: blue = 0 mT AF demagnetization, red = 20 or 30 mT AF demagnetization. Magnetic susceptibility (MS): green = whole round (20 IU offset), red = point source.

Figure F11. Paleomagnetic results, Hole U1514C. Intensity: blue = 0 mT AF demagnetization, red = 20 or 30 mT AF demagnetization. Magnetic susceptibility (MS): green = whole round (20 IU offset), red = point source.

Figure F12. A–F. Vector endpoint diagrams (Zijderveld, 1967), Hole U1514A.

Figure F13. A–F. Vector endpoint diagrams (Zijderveld, 1967), Hole U1514C.

Figure F14. A–F. Vector endpoint diagrams (Zijderveld, 1967) for representative discrete samples, Hole U1514A.

Figure F15. Magnetostratigraphic results, Holes U1514A and U1514C. Inclinations are after 20 or 30 mT AF demagnetization. Polarity: white = normal, black = reversed, gray = uncertain.

Figure F16. Left: age-depth model for Site U1514 based on magnetostratigraphic results from Holes U1514A and U1514C. Right: age-depth model for the uppermost ~96 m of fully oriented APC cores from Hole U1514A. Numbers indicate approximate duration of hiatus. Wavy lines = sedimentary hiatuses.

Figure F17. Physical properties, Hole U1514A. Black data curves = 101-point moving average.

Figure F18. Whole-core NGR data, Hole U1514A. Black data curves = 101-point moving average. U/Th ratio: vertical dashed line = 1:1.

Figure F19. Whole-core physical properties, Hole U1514C. Black data curves = 101-point moving average.

Figure F20. Whole-core NGR data, Hole U1514C. Black data curves = 10-point moving average. U/Th ratio: vertical dashed line = 1/1.

Figure F21. Density, porosity, thermal conductivity (bars = 1σ standard deviation), and *P*-wave velocity, Hole U1514A.

Figure F22. Density, porosity, thermal conductivity (bars = 1σ standard deviation), and *P*-wave velocity, Hole U1514C.

Figure F23. Downhole logging main pass results, Hole U1514C. LCAL = caliper diameter; HSGR = total NGR, HSGR-d = NGR from downlog, HFK = potassium content, HTHO = thorium content, HURA uranium content, RHOM = density, VCO = compressional sonic velocity, VS1, VS2 = sonic shear velocity, RT HRLT = real-time resistivity.

Figure F24. Headspace gas methane concentration, Site U1514.

Figure F25. Interstitial water alkalinity, pH, and element and ion concentrations, Site U1514.

Figure F26. Carbon and TN contents and TOC/TN ratio, Site U1514. TOC and TN values are near or below detection.

Figure F27. A. Source rock analysis (pyrolysis) results, Site U1514. B. SRA sample locations in the OAE 1d–correlative interval. Data from samples with low TOC$_{SRA}$ (<0.8 wt%) are not plotted. In each photo, black and green couplets are shown; dark burrow mottling is also visible in lighter intervals as well as an inoceramid (U1514C-34R-7, 69 cm). Green circles indicate position of samples taken from green layers, and white circles indicate position of samples from black layers.

Figure F28. Correlation of core NGR data from Holes U1514A and U1514C to wireline logging NGR data from Hole U1514C. Correspondence between both sharp peaks and longer scale trends in NGR are obvious. The downhole NGR plot shows an expanded scale (gray) for the upper portion of the hole where the tool string was still within the drill pipe. Specific proposed tie points are listed in Table T21.

Figure F29. Site U1514 summary. Hole U1514B (~15 m) was sampled completely on the catwalk. NGR and carbonate: blue = Hole U1514A, green = Hole U1514C. Yellow shading = floating spliced interval.