

Figure F1. Location of Site U1515 on the northern margin of the Mentelle Basin.

Figure F2. Time-migrated Geoscience Australia reflection seismic Profile s310_05 with location of Site U1515 along seismic shotpoints.

Figure F3. Lithostratigraphic summary, Site U1515.

Figure F4. Primary lithologies and sedimentary features, Site U1515. A. Calcareous ooze, Subunit Ia. B. Calcareous chalk with parallel laminations and chert, Subunit Ib. C. Arkose, Subunit Ib. D. Glauconitic sand and sand, Sub-unit IIa. E. Pyrite nodule and silty sandstone, Subunit IIb. F. Silty sandstone with convolute bedding, Subunit IIc.

Figure F5. Sediment constituents in Subunits Ia, Ib, and IIa–IIc, Hole U1515A. A. Calcareous ooze with radiolarians and sponge spicules (plane-polarized light [PPL]). B. Calcareous chalk with clay (PPL). C. Zircon (cross-polarized light [XPL]). D. Glauconitic silty sandstone (PPL). E. Siltstone (PPL). F. Siltstone with clay (PPL).

Figure F6. Characteristic plant debris and organic material in Subunits IIb and IIc, Hole U1515A (PPL). A. Jurassic spore, *Contignisporites* sp. (likely *Contignisporites glebulentus*; Mesozoic with first occurrence in the Early Jurassic; Helby et al., 1987). B. Trilete spore, *Gleicheniidites* sp. (likely *Gleicheniidites senonicus*; Mesozoic with first occurrence in the Early Jurassic; Helby et al., 1987). C. Algal cell, *Leiosphaeridia* sp. (not age diagnostic). D. Wood fragment.

Figure F7. A–E. XRD results, Site U1515.

Figure F8. Paleomagnetic results, Hole U1515A. Intensity: blue = 0 mT AF demagnetization, red = 20 mT AF demagnetization. Magnetic susceptibility (MS): green = whole round (20 IU offset), red = point source.

Figure F9. Vector endpoint diagrams (Zijderveld, 1967) of section halves, Hole U1515A.

Figure F10. Vector endpoint diagrams (Zijderveld, 1967) for representative discrete samples, Hole U1515A.

Figure F11. Magnetostratigraphic results, Hole U1515A. Inclinations are after 20 mT AF demagnetization. Polarity/Chron: white = normal, black = reversed, gray = uncertain.

Figure F12. Whole-core physical properties, Hole U1515A.

Figure F13. Whole-core NGR data, Hole U1515A. U/Th ratio: vertical dashed line = 1/1.

Figure F14. Density, porosity, thermal conductivity (bars = 1σ standard deviation), and *P*-wave velocity, Hole U1515A.

Figure F15. Interstitial water alkalinity, pH, and element and ion concentrations, Site U1515. Lith. unit: shaded areas = no or exceedingly low recovery.

Figure F16. Carbon and total nitrogen (TN) contents and total organic carbon (TOC)/TN ratio, Site U1515. TOC and TN values are near the detection limit. Lith. unit: shaded areas = no or exceedingly low recovery.

Figure F17. Source rock analysis (pyrolysis) results, Site U1515. Data from duplicate samples are not plotted.

Figure F18. Site U1515 summary. Red wavy line = unconformity inferred from seismic and physical property data.