

Figure F1. Location map of Site U1478 with main surface currents (arrows) in the southwest Indian Ocean and atmospheric circulation over southern Africa during austral summer (December, January, February) with approximate position of the Intertropical Convergence Zone (ITCZ) and Congo Air Boundary (CAB) (dashed lines; adapted from Reason et al., 2006). AL = Agulhas Leakage, AC = Agulhas Current, SEC = South Equatorial Current, SEMC = South East Madagascar Current, NEMC = North East Madagascar Current, EACC = East Africa Coastal Current, TB = Transkei Basin, ARC = Agulhas Return Current. Purple shading = Zambezi Catchment, green shading = Limpopo Catchment, gray double-headed arrows = main pathways of moisture supply to the African continent from the northwest Atlantic (through Congo) and the northwest and southwest Indian Ocean.

Figure F2. Geomorphologic and oceanographic features near Site U1478, Delagoa Bight, northern Natal Valley. The Limpopo Catchment is indicated by the lighter green shaded area along with the main course of the Limpopo River. Black dotted arrows = slope-parallel coastal current, red arrow = Delagoa Bight Lee Eddy (DBLE), yellow arrows = main surface currents.

Figure F3. Selected maps of SeaWiFS chlorophyll-a (Chl a) concentration and NOAA AVHRR sea-surface temperature (SST) during May and June 2004 with a drifter track depicted in black (from Lamont et al., 2010). The leading edge of the track is depicted in red.

Figure F4. Multiproxy records from marine sediment Core MD96-2048 adapted from Dupont et al. (2011). A. Stable oxygen isotopes of benthic foraminifers (Caley et al., 2011). MIS = marine isotope stage, VPDB = Vienna PeeDee belemnite. B. Cumulative end-member abundance (EM1 = rather humid mountainous *Podocarpus* forest, EM2 = open mountain vegetation [ericaceous shrubs], EM3 = combined pollen taxa from woodland and forest with those of coastal vegetation) (Dupont et al., 2011). C. Summary pollen diagram from Dupont et al. (2011). D. Sea-surface temperature (Caley et al., 2011). E. Pollen concentration (Dupont et al., 2011).

Figure F5. Seismic Line M753-Geob08-230 across Site U1478. Reflectors identified from Preu et al. (2011). SP = shot point.

Figure F6. Seismic tracks and bathymetry at the Inharrime Terrace. Seismic lines shown with common depth point annotation.

Figure F7. Seismic Line M753-Geob08-230 at Site U1478.

Figure F8. Parasound data for seismic Line M753-GeoB08-230 across Site U1478. Between 17,000 and 21,000 m offset, the seafloor is rugged, indicating bottom-current interaction. The high reflectivity band in the upper 20 ms decreases in thickness upslope, which is a hint to more pronounced winnowing.

Figure F9. Core recovery, Holes U1478A–U1478D.

Figure F10. Lithostratigraphic summary with selected physical properties and geochemical data. Hole U1478A. (Continued on next three pages.)

Figure F10 (continued). Hole U1478B. (Continued on next page.)

Figure F10 (continued). Hole U1478C. (Continued on next page.)

Figure F10 (continued). Hole U1478D.

Figure F11. A–I. Representative lithologies per interval. Section-half (left) surfaces and smear slide photomicrographs taken under plane-polarized (middle) and cross-polarized (right) light, Site U1478. Scale bars = 100 µm.

Figure F12. A–D. Sediment deformations and disturbance, Site U1478.

Figure F13. A–C. Relative percentages of major compositions of sediment determined by smear slide observation, Holes U1478A–U1478D.

Figure F14. Comparison of CaCO₃ content determined using measurements on discrete samples and biogenic carbonate proportions estimated in smear slides, Holes U1478A–U1487D.

Figure F15. Color reflectance, Hole U1478A. Parameters were filtered to remove outliers.

Figure F16. SHIL RGB color data, Hole U1478A.

Figure F17. NGR and magnetic susceptibility, Hole U1478A. Black lines = WRMSL measurements, red circles = SHMSL measurements.

Figure F18. P-wave velocity and bulk density, Hole U1478A. Black lines = WRMSL measurements, red circles = MAD measurements.

Figure F19. Porosity, grain density, and thermal conductivity, Hole U1478A.

Figure F20. Spliced bulk density, WRMSL magnetic susceptibility, NGR, and b* color reflectance, Site U1478.

Figure F21. Biochronology in Hole U1478A with the locations of significant planktonic foraminifer and calcareous nannofossil events. Upward arrows indicate the base (B), base reentrance (Br), base common (Bc), and base acme (Ba) occurrence events for nannofossils and the B occurrence events for planktonic foraminifers. Downward arrows indicate the top (T) and top common (Tc) occurrence events for nannofossils and T occurrence events for planktonic foraminifers.

Figure F22. Calcareous nannofossils, Hole U1478A. Scale bars = 5 µm. 1–3. 1H-CC; 6.67 m CSF-A; (1) *Florisphaera profunda*; (2) *Gephyrocapsa oceanica*; (3) *Helicosphaera carteri*. 4. Small *Gephyrocapsa* spp. (5H-CC; 44.93 m CSF-A); (5) *Scyphosphaera recurvata* (9H-5; 80.2 m CSF-A). 6, 7, 10H-4; 87.98 m CSF-A; (6) *Calciosolenia murrayi*; (7) *Reticulofenestra asanoi*. 8–10. 10H-CC; 92.76 CSF-A; (8) medium *Gephyrocapsa* spp. (>4 µm); (9) *Pseudoemiliania lacunosa*; (10) *Ceratolithus telesmus*. 11. *Braarudosphaera bigelowii* (12H-CC; 111.42 m CSF-A). 12. *Scyphosphaera globulata* (16H-5; 147.01 m CSF-A). 13, 14. 20H-5; 184.49 m CSF-A; (13) *Coccolithus pelagicus*; (14) *Calcidiscus macintyrei*. 15. *Discoaster triradiatus* (20H-2; 180.38 m CSF-A). 16. *Discoaster brouweri* (24F-1; 206.6 m CSF-A). 17, 18. 27F-2; 222.41 m CSF-A; (17) *Discoaster pentaradiatus*; (18) *Hayaster perplexus*. 19. *Discoaster deflandrei* (28F-1; 225.7 m CSF-A). 20. *Sphenolithus* sp. (28F-3; 228.44 m CSF-A). 21. *Discoaster challenger* (29F-3; 233.14 m CSF-A). 22. *Discoaster tamalis* (31F-1; 239.85 m CSF-A). 23, 24. 32F-CC; 248.64 m CSF-A; (23) *Helicosphaera sellii*; (24) *Reticulofenestra pseudoumbilicus*.

Figure F23. Representative assemblages of benthic foraminifers in Sample U1478A-31F-CC (244.1 m CSF-A). Scale bars = 100 µm. 1, 6. *Siphonodosaria lepidula*. 2. *Cibicides corticatus*. 3, 4. *Discorbina bertheloti*. 5. *Praeglobobulima* sp. 7. *Planulina retia*. 8. *Parafissurina caledonica*. 9. *Spirolucina excavata*. 10. *Chrysalogonium breviloculum*. 11. *Praeglobobulima* sp. 12. *Planulina ariminensis*. 13. *Melonis affinis*. 14. *Orthomorphina jedlitschkai*. 15. *Nodosaria radicula* var. *glanduliniformis*. 16. *Orthomorphina perverse*. 17. *Pseudonodosaria comatula*. 18. *Cibicidoides bradyi*. 19. *Uvigerina interrup-tacostata*. 20. *Uvigerina peregrina*. 21. *Glandulina ovula*.

Figure F24. Representative assemblages of planktonic foraminifers, Hole U1478A. Scale bars = 100 µm. 1–3. *Globigerinoides extremus* (31F-CC; 244.1 m CSF-A). 4, 5. *Globigerinoides elongatus* (31F-CC; 244.1 m CSF-A). 6–8. *Globigerina apertura* (21H-CC; 196.1 m CSF-A). 9–10. *Dentoglobigerina altispira* (21H-CC; 196.1 m CSF-A). 11–13. *Globigerinoides tenellus* (5H-CC; 44.8 m CSF-A). 14–15. *Dentoglobigerina altispira* (21H-CC; 196.1 m CSF-A). 16. *Pulleniatina primalis* (31F-CC; 244.1 m CSF-A). 17. *Globorotalia margaritae* (31F-CC; 244.1 m CSF-A). 18–20. *Globorotalia pseudomicenica* (19H-CC; 177.6 m CSF-A).

Figure F25. (A) S-ratio, (B) HIRM, (C) SIRM, and (D) magnetic susceptibility (red circles = discrete sample measurements, gray line = SHMSL measurements), Hole U1478A.

Figure F26. Inclination summary, Site U1478. Dashed line = present-day inclination. Blue circles = orientation-corrected declinations. Solid black line in inclination panels refers to a 15-point running average.

Figure F27. A–D. Downhole inclination, declination, intensity, and magnetic susceptibility, Site U1478. Gray lines = data, dashed line = present-day inclination, colored circles = data without the last and first sections of each core (prone to drilling disturbance), black squares = discrete sample data. Blue circles = orientation-corrected declinations. Polarity chron ages after Gradstein et al. (2012).

Figure F28. Magnetic susceptibility records, Site U1478. Scale applies to all offset data from individual holes. (Continued on next page.)

Figure F28 (continued).

Figure F29. Composite spliced records of magnetic susceptibility, NGR, and RGB red values, Site U1478.

Figure F30. Concentration profiles, sedimentary carbonate TOC contents, and magnetic susceptibility, Hole U1478A. Blue bars highlight the sustained lows in magnetic susceptibility associated with the deep iron and manganese peaks.

Figure F31. Headspace gas profiles, Hole U1478A.

Figure F32. Dissolved magnesium, potassium, sodium, and chloride profiles, Holes U1478A (blue) and U1478B (red). Small circles = replicate Cl measurements.

Figure F33. Alkalinity, dissolved phosphate, and pH profiles, Holes U1478A (blue) and U1478B (red).

Figure F34. Dissolved iron, manganese, sulfate, and barium, Holes U1478A (blue) and U1478B (red). Samples with values below the detection limit are plotted as zeros. The open circle represents a single sulfate measurement outlier.

Figure F35. Dissolved calcium and strontium profiles, Holes U1478A (blue) and U1478B (red).

Figure F36. Dissolved silicon, lithium, and boron profiles, Holes U1478A (blue) and U1478B (red).

Figure F37. Sedimentary major and trace element concentrations versus aluminum oxide content, Hole U1478A.

Figure F38. Calcium carbonate and TOC, magnetic susceptibility, and bulk sediment elemental ratios, Hole U1478A.

Figure F39. Age-depth relationships based on planktonic foraminifers, calcareous nannofossils, and magnetostratigraphy from Hole U1478A. Line segment fits through parts of the record reflect a series of different choices for interpreting the combined chronological information.