Figure F1. Drainage configuration and oceanography of southern Africa. The Zambezi and Limpopo are Africa's largest rivers draining into the Indian Ocean, draining 44 and 33 Mt of sediment annually (Milliman and Meade, 1983). Sediment from those rivers could be transported to Site U1474 first by the Mozambique Channel (MC) eddies transporting 15 Sv (Ridderenkoff et al., 2010), and ultimately by the strong Agulhas Current (AC) (Lutjeharms, 2006). The Tugela River and other smaller rivers drain the Drakensberg Mountains, flanking the southeastern African Margin. The mountains are composed of dominantly sedimentary rock of Paleozoic age called the Karoo Supergroup (Johnson et al., 1996). These sediments could all be deposited into the southwest-northeast–striking Natal Valley (NV), the location for Site U1474. Yellow rings = MC eddies. SEC = South Equatorial Current. SEMC = South East Madagascar Current.

Figure F2. Raw XRF data by depth for (A) Al, (B), Si, (C) K, (D) Ca, (E), Ti, and (F) Fe. Pale colors = 2 mm, 2 s data set. Dark colors = integrated 2 cm, 20 s data set. Shaded vertical bars = anomalously low counts.

Figure F3. Raw XRF data by depth for each element normalized to Ca counts: (A) Al/Ca, (B) Si/Ca, (C) K/Ca, (D), Ti/Ca, (E) Fe/Ca. Pale colors = 2 mm, 2 s data set. Dark colors = integrated 2 cm, 20 s data set. Shaded vertical bars = anomalously low counts (which do not stand out when presented in ratio form; see Figure F6).

Figure F4. Calibrated XRF data by depth for (A) Al_2O_3, (B) SiO_2, (C) K_2O, (D) CaO, (E) TiO_2, and (F) Fe_2O_3. Circles = calibration sample concentrations. Squares = Calcium oxide percent derived from $CaCO_3$ percent data.

Figure F5. Calibrated XRF data (wt% oxide) by depth for each element ratio, normalized to CaO: (A) Al_2O_3/CaO, (B) SiO_2/CaO, (C) K_2O/CaO, (D) TiO_2/CaO, (E) Fe_2O_3/CaO. Data are expressed in wt% oxide. Circles = calibration sample concentrations.

Figure F6. The XRF scanner experienced problems during the scans of four core sections: 361-U1474D-4H-1, 8H-3, 11H-4, and 11H-5. All panels: orange = signal from Section 8H-3, blue = adjacent sections. Left: when only the signal intensity is plotted, Section 8H-3 has low counts that do not fit the depth series. Right: element ratios are contiguous with the adjacent sections in depth series.

Figure F7. Comparison of counts derived from the XRF spectra to the concentration ratios from the calibration samples after each step in the XRF data reduction procedure provides a quality check. Shaded intervals = 95% confidence interval regression model computed by bootstrapping the data 1000 times. A. 2 cm, 20 s data set, unprocessed. B. Log ratios of both concentrations and counts. C. Calibrated ratios. Generated using the Python package Seaborn's regplot function.

Figure F8. Comparison of XRF data to calibration samples using individual element concentrations. Shaded intervals = 95% confidence interval regression model computed by bootstrapping the data 1000 times. A. Before calibration. B. After calibration. Generated using the Python package Seaborn's regplot function.

Figure F9. Comparison of CaO concentration derived by XRF core scanning and CaO concentration calculated from percent $CaCO_3$. Squares = Expedition 361 shipboard measurement, circles = postcruise measurements. Error bars = precision at 1 standard deviation, estimated by replicates. Black line = 1:1 line.