Figure F1. Bathymetric map of the Arabian Sea and surrounding landmasses from GeoMapApp (Ryan et al., 2009). Yellow circles = Expedition 355 sites, white lines = major rivers and tributaries, red stars = earlier scientific drilling sites that have sampled the Indus Fan, pink line = approximate extent of the fan after Kolla and Coumes (1987), yellow dashed lines = speculated location of the continent/ocean boundary, depending on whether Laxmi Basin is oceanic or continental, gray lines with numbers = magnetic anomalies from Royer et al. (2002), white box = location of detailed map in Figure **F2**.

Figure F2. Bathymetric map of the region around Laxmi Basin showing the location of Expedition 355 sites in relation to other major bathymetric features, especially Laxmi Ridge. White dashed lines = possible locations of the continent/ocean boundary, depending upon whether the crust in Laxmi Basin has continental or oceanic affinity. Magnetic anomalies (yellow lines) from the Arabian Basin are from Miles et al. (1998), whereas those in Laxmi Basin (green lines) are from Bhattacharya et al. (1994). Contours (black lines) are in meters below sea level. Bathymetric data from GeoMapApp (Ryan et al., 2009).

Figure F3. Uninterpreted seismic reflection profile Line W06 (top) and interpreted (bottom) seismic sections with location of Site U1456 (see Figure **F5** for seismic line locations). Orange bar = proposed penetration at Site U1456, white box = actual penetration.

Figure F4. Uninterpreted (top) and interpreted (bottom) seismic reflection profile Line IODP-04 sections with location of Site U1457 (see Figure **F5** for seismic line locations).

Figure F5. Multichannel seismic grid (orange and red lines) in the eastern Arabian Sea. Blue squares = industry wells, green stars = locations of existing shallow cores. Cores with published data include Core ABP-25 (Gupta et al., 2011); Cores 2491, J7, 2506, and 3268G5 (Bhushan et al., 2001); and Core SK17/MD76-131 (Singh et al., 2011). Red stars = Expedition 355 sites, blue shaded area = area surveyed by high-resolution multibeam bathymetry (see Figure **F7**). RS = Raman Seamount, PS = Panikkar Seamount, WG = Wadia Guyot.

Figure F6. Locations of all seismic profiles (white lines acquired by the Ministry of Earth Sciences, Government of India; black lines acquired by Directorate General of Hydrocarbons, India) in the Arabian Sea. Site U1456 is located on Line W06 and Site U1457 is located on Line IODP-04 (not shown).

Figure F7. High-resolution multibeam bathymetry data acquired around the Expedition 355 drill sites. Contours (white lines) are in meters below sea level. Black lines are seismic lines with shotpoint numbers around site locations shown in white.

Figure F8. Depiction of the channel flow model, as described by Beaumont et al. (2001), in which surface processes in the form of erosion driven by focused precipitation along the mountain front allows deep-buried rocks from within the partial melt zone under southern Tibet to be brought to the surface in the Greater Himalaya. Uplift of the Indian foreland is expected to accompany enhanced erosion of the Himalaya, resulting in inversion of the foreland basin and loss of the erosion record onshore during this critical time (Clift and VanLaningham, 2010). STD = South Tibet Detachment, MCT = Main Central Thrust, MBT = Main Boundary Thrust.

Figure F9. Lithostratigraphic and physical properties (Holes U1456A and U1456C–U1456E) summary for cored section, Site U1456. Downhole measurements are from Hole U1456C. WRMSL core data (dots): green = GRA bulk density, blue = magnetic susceptibility, purple = *P*-wave velocity. Red dots = core logger NGR. Black dots = discrete MAD bulk density and *P*-wave caliper (x-axis) data. Gray lines = downhole measurements from end of pipe at ~81 mbsf. Natural gamma ray (in gAPI) plotted from downhole measurements continuously from open hole, through pipe to seafloor.

Figure F10. Age-depth model for Site U1456 created by synthesizing nannofossil and foraminifer bioevents with magnetic chron assignments. Top = last occurrence, base = first occurrence.

Figure F11. Lithostratigraphic and physical properties (Holes U1457A–U1457C) summary for the cored section at Site U1457. WRMSL core data (dots): green = GRA bulk density, blue = magnetic susceptibility. Red dots = core logger NGR. Black dots = discrete MAD bulk density and *P*-wave caliper (x-axis) data. Note log scale for magnetic susceptibility.

Figure F12. Age-depth model for Site U1457 created by synthesizing nannofossil and foraminifer bioevents with magnetic chron assignments. Note that the age depth model only extends to 1000 mbsf due to a long hiatus near the base of the cored section, with the top of lithologic Unit V at ~1062 mbsf dated to the early Paleocene. Top = last occurrence, base = first occurrence.

Figure F13. Heat flow map of the Arabian Sea from the compilation of GeoMapApp, together with the two new measurements derived from Expedition 355.

Figure F14. Close-up (left) and interpretation (right) of seismic Profile W06 showing the location of Site U1456 and the major seismic units identified. Note in particular the major cut-and-fill channels and the body of strong chaotic reflectors in the mass transport deposit (MTD) that the drill site intersects.

Figure F15. Close-up (left) and interpretation (right) of seismic Profile IODP-04 showing the location of Site U1457 and the major seismic units identified. Note that the mass transport deposit (MTD) is much thinner at this location compared to Site U1456. The drill site appears to cut the edge of one of the large channels in the Pleistocene section.

Figure F16. Heavy minerals from Site U1456. A. Augite (U1456A-11H-7A, 20 cm). B. Tourmaline (U1456A-8H-4A, 35 cm). C. Epidote (U1456A-51F-3A, 60 cm). D. Glaucophane (U1456A-50F-1A, 70 cm). E. Kyanite (U1456A-56F-1A, 30 cm). F. Hypersthene (U1456A-60F-1A, 40 cm). G. Spinel (U1456D-30R-1A, 16 cm). H. Hornblende (U1456E-19R-3A, 70 cm). Scale bars = 100 µm.