Figure F1. Shaded bathymetric map of the Arabian Sea and the surrounding landmasses from GeoMapApp (Ryan et al., 2009). Yellow circles = sites drilled during this expedition. Red stars = earlier scientific drilling sites. Pink line = approximate extent of the fan after Kolla and Coumes (1987). Yellow dashed lines with question marks are the speculated locations of the continent/ocean boundary depending on whether Laxmi Basin is floored by oceanic or continental crust. Gray lines with numbers indicate magnetic anomalies from Royer et al. (2002). Box shows location of detailed map in Figure **F2**. Numbers indicate Chron numbers.

Figure F2. Shaded bathymetric map of the region around Laxmi Basin showing the location of Site U1457 in relation to other major bathymetric features, especially Laxmi Ridge. White dashed lines indicate various possible locations of the continent/ocean boundary, depending upon whether the crust in Laxmi Basin has continental or oceanic affinity. White line shows seismic profile Line IODP-04, with orange bar showing the portion of the profile illustrated in Figure **F3**. 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. Seismic reflection profile Line IODP-04 with location of Site U1457 and main seismically defined divisions described in text.

Figure F4. Uninterpreted (top) seismic reflection profile Line IODP-04 and interpreted (bottom) seismic sections with location of Site U1457 (see Figure **F5** in the Expedition 355 summary chapter [Pandey et al., 2016b] for seismic line locations).

Figure F5. Lithostratigraphic summary, Site U1457. See Figure **F6** in the Expedition 355 methods chapter (Pandey et al., 2016a) for lithology legend. A. Hole U1457A. B. Hole U1457B. (Continued on next page.)

Figure F5 (continued). C. Hole U1457C.

Figure F6. Synthesis lithostratigraphic log for Site U1457 showing combined recovery in Holes U1457A–U1457C.

Figure F7. Dominant lithologies of Units I–V, Site U1457. A. Nannofossil ooze (Unit I; U1457B-3H-2, 16–34 cm). B. Nannofossil-rich clay (Unit I; U1457A-1H-2, 75–92 cm). C. Silty clay (Unit II; U1457A-8H-7, 38–58 cm). D. Nannofossil chalk (Unit III; U1457C-68R-1, 105–125 cm). E. Nannofossil-rich claystone (Unit III; 47R-1, 105–125 cm). F, I. Silty claystone, (F) Unit III; 58R-3, 27–44 cm; (I) Unit IV, 76R-7A, 48–68 cm. G. Silty sandstone, (Unit III; 41R-1, 55–70 cm). H. Claystone (Unit IV; 71R-3, 66–84 cm). J. Dark greenish gray claystone (Unit V; 93R-4, 7–27 cm).

Figure F8. Microscopic observation of smear slides in Units I–IV, Site U1457. A. Nannofossil ooze (Unit I; U1457A-4H-1, 80 cm). B. Nannofossil-rich clay (Unit I; 4H-4, 93 cm). C. Silty clay (Unit II; 10H-2, 91 cm). D. Nannofossil chalk (Unit III; U1457C-53R-3, 21 cm). E. Nannofossil-rich claystone (Unit III; 50R-3, 72 cm), F, I. Silty claystone; (F) Unit III; 39R-3, 36 cm; (I) Unit IV; 73R-4, 97 cm. G. Silty sandstone (Unit III; 42R-1, 118 cm). H. Claystone (Unit IV; 73R-4, 62 cm).

Figure F9. Main sedimentary features of Units I–IV, Site U1457. A. Pyrite (Unit I; U1457A-8H-6, 5–23 cm). B. Stacked turbidites (Unit II; 9H-1, 39–59 cm). C. Wood fragments (Unit III; U1457C-41R-1, 77–95 cm). D. Black staining (Unit III; 44R-1, 52–72 cm). E. Parallel lamination (Unit III; 49R-5, 22–42 cm). F. Burrows (Unit III; 51R-2, 13–33 cm). G. Slickensides (Unit IV; 74R-2, 110–125 cm). H. Tilted bed (Unit IV; 76R-4, 48–68 cm).

Figure F10. Heavy-mineral assemblages, Site U1457. A. Sillimanite (U1457C-28R-1, 0–5 cm). B. Fibrolite (54R-1, 63 cm). C. Garnet (28R-1, 0–5 cm). D. Etched diopside (65R-1, 74 cm). E. Allanite (28R-1, 0–5 cm). F. Fe-glaucophane (64R-1, 70 cm). G. Hornblende with retrograde metamorphism to actinolite (67R-1, 111 cm). H. Chloritoid (43R-1, 67 cm). I. Anatase (U1457B-4H-3, 65 cm). J. Brookite (4H-3, 65 cm). K. Magnetite in biotite (U1457C-28R-1, 0–5 cm). L. Chlorite (53R-1, 137 cm).

Figure F11. XRD patterns of clay fraction selected from Units I–III, Site U1457. Chl = chlorite, Ilt = illite, Qz = quartz, Fsp = feldspar, Cal = calcite, Sme = smectite.

Figure F12. XRD patterns of bulk sediment from Unit V, Hole U1457C.

Figure F13. Correlation of lithologic units between Sites U1456 and U1457.

Figure F14. Age-depth plot for the section above 1000 mbsf at Site U1457. Note that the figure does not illustrate the ~30 m of lower Paleocene sediment recovered below the base of the mass transport deposit and above the igneous basement (1062.2–1092.33 mbsf).

Figure F15. Sponge spicule dissolution (U1457B-1H-CC; 3.27 mbsf).

Figure F16. Growth of the CCSF depth scale with respect to CSF-A depth. Red circles mark depths of core tops from Hole U1457A, and blue circles mark core tops from Hole U1457B. The red line is the best fit through the top depth of each core, and the black line represents a 1:1 correspondence between the two depth scales. Linear correlation is used to estimate a compression factor to convert CCSF depth to CSF-A.

Figure F17. Core images and magnetic susceptibility (MS) for 0–50 m CCSF for Holes U1457A and U1457B, with the assembled splice at the top. Yellow lines mark the beginning of a sediment interval included in the splice, and blue lines mark the base of the splice interval.

Figure F18. Core images and MS for 50–100 m CCSF for Holes U1457A and U1457B, with the assembled splice at the top. Yellow lines mark the beginning of a sediment interval included in the splice, and blue lines mark the base of the splice interval.

Figure F19. Core images and MS for 100–150 m CCSF for Holes U1457A and U1457B, with the assembled splice at the top. Yellow lines mark the beginning of a sediment interval included in the splice, and blue lines mark the base of the splice interval. A composite section could only be constructed down to the depth at which the coring strategy changed from continuous coring to alternating between coring a 4.7 m HLAPC and drilling ahead 4.8 m.

Figure F20. Core image and MS detail of the transition between lithologic Units I and II, Site U1457. At depths shallower than 80 m CCSF, changes in MS are large and highly correlatable. Deeper than 80 m CCSF in Unit II, MS is weak, and individual dark silt layers are hard to correlate between holes. The correlation in Unit II uses general patterns of silty dark beds to best match between holes.

Figure F21. A. Plagioclase-phyric basalt (U1457C-97R-1, 30–38 cm). B, C. Clinopyroxene-plagioclase phyric basalt (97R-2, [B] 61–69 and [C] 96–104 cm). D. Carbonate/zeolite-filled lens (97R-3, 37–44 cm).

Figure F22. Basalt thin sections, Hole U1457C. A. Moderately olivine-clinopyroxene-plagioclase phyric basalt with phenocryst phases of plagioclase (Pl), clinopyroxene (CPX), and olivine (Ol) with groundmass containing plagioclase laths and mesostasis (97R-1, 128 cm; TS 13). B. Sparsely olivine-clinopyroxene-plagioclase phyric basalt with glassy to cryptocrystalline groundmass (96R-3, 11 cm; TS 11). C. Subophitic intergrowth texture in massive basalt (98R-1, 67 cm; TS 19).

Figure F23. Vesicle and vein fillings in basement basalt, Hole U1457C. A. Vesicle fillings of carbonate/calcite, clay minerals, zeolite, and other minerals (97R-3, 37 cm; TS 17). B. Typical vein fillings with secondary minerals of calcite/carbonate and Fe oxides (97R-2, 122 cm; TS 16).

Figure F24. Igneous rock classification total alkali-silica diagram (Le Maitre et al., 2002) showing Site U1457 basement rocks plot in the basalt field.

Figure F25. A. AFM diagram (after Irvine and Baragar, 1971) showing relative proportions of $Na_2O + K_2O$ (A), $FeO + Fe_2O_3$ (F), and MgO (M) in Site U1457 basalt samples. Dashed line = demarcation between calc-alkaline and tholeiitic basalt. B. Alkali index (AI) vs. Al_2O_3 illustrating the tholeiitic nature of Site U1457 basalt.

Figure F26. Variations of selected major oxides and compatible trace elements (Cr, Ni) vs. $Mg/(Mg + Fe^{2+})$ in Site U1457 basalt.

Figure F27. A. Zr vs. Ti (after Pearce, 1980). Site U1457 basalt plots in the island-arc basalt (IAB) field. B. Ti vs. V discrimination diagram used to distinguish tectonic setting of erupted basalt lavas. Demarcation lines are after Vermeesch (2006). Site U1457 basalt plots in the IAB field, indicating subduction-related characteristics. OIB = ocean island basalt (intraplate).

Figure F28. Methane, ethane, and C_1/C_2 ratios. Dashed lines indicate lithologic unit boundaries.

Figure F29. Total carbon, CaCO3, TIC, total sulfur (TS), TN, TOC, and TOC/TN. Yellow line = boundary between the contribution of predominantly marine organic carbon (<8) and terrestrial organic carbon (>12) (Müller and Mathesius, 1999). Red arrows indicate three distinct intervals with high TOC/TN (>18). Dashed lines = lithologic unit boundaries. Gray shaded areas = discrete intervals of higher values of $CaCO_3$ (up to 50 wt%) within Unit III.

Figure F30. Interstitial water alkalinity, sulfate, ammonium, and phosphate variations. Gray lines = average seawater concentrations. Green lines = lithologic unit boundaries.

Figure F31. Interstitial water salinity, pH, chloride, sodium, and bromide variations. Gray lines = average seawater concentrations. Green lines = lithologic unit boundaries.

Figure F32. Interstitial water calcium, strontium, lithium, magnesium, and potassium variations. Gray lines = average seawater concentrations. Green lines = lithologic unit boundaries.

Figure F33. Interstitial water silicon, barium, manganese, boron, and iron variations. Gray lines = average seawater concentrations. Green lines = lithologic unit boundaries.

Figure F34. Meiofaunal organisms observed at 500× magnification, Hole U1457A. Arrows indicate unidentified meiobenthos. All images taken with plane-transmitted light. A. 3H-5, 140–145 cm. B. 9H-5, 140–145 cm. C, D. 7H-5, 140–145 cm.

Figure F35. Fungal assemblages observed at 500× magnification, Hole U1457A. Arrows indicate fungal specimens as (A, B) single hyphae and (C, D) branching hyphae. All images taken with plane-transmitted light. A, B. 9H-5, 140–145 cm. C, D. 11H-2, 140–145 cm.

Figure F36. Results of pass-through magnetometer measurements at 20 mT demagnetization step of archive halves and least-square analysis on discrete samples in Hole U1457A. In the interval between ~120 and 145 mbsf, a lithologic control by greigite on the magnetic polarity inclination (black = normal, white = reverse) is strongly suspected. Between 80 and 110 mbsf, greigite apparently is associated with both polarities, thus ruling out an evident lithologic control. Green shading = intervals containing greigite.

Figure F37. Results of pass-through magnetometer measurements at 20 mT demagnetization step of archive halves and least-square analysis on discrete samples in Hole U1457B. Note the different scale compared to Figure **F21**. The polarity of the upper 100 m has been interpreted on the basis of SRM data, which between 60 and 80 mbsf indicates an undefined magnetozone (gray shading on magnetic polarity column; black = normal, white = reverse). Lithologic control by greigite on the magnetic polarity is not very evident. Green shading = intervals containing greigite.

Figure F38. Equal area projections of specimen directions from APC cores. The outer rim is the horizontal plane, and the center of the plot is the vertical plane. Tick marks are at 10° intervals. Dashed circle marks 50° to the horizontal. Orientation adjustments were made by using the Icefield orientation tool.

Figure F39. Histograms of measured inclinations from (A) the three holes cored at Site U1457 and (B) theoretical values obtained by the TK03 paleosecular variation model of Tauxe and Kent (2004). Dashed lines in B mark the 5° to horizontal. Inclinations in this range should not be regarded as reliable for magnetic polarity determination.

Figure F40. Magnetostratigraphy. Polarity and timescale (GTS2012; Gradstein et al., 2012): black = positive (normal) inclination, white = negative (reverse) inclination; zones based on single specimens are shown as short bars on the polarity column. As a result of the plate tectonic motion of Site U1457 from the Southern (Cretaceous–Paleocene) to the Northern Hemisphere (since the Eocene), positive inclinations at the bottom of the core reflect a reverse polarity. Red lines = tie points from Table **T21**; blue arrows = missing time intervals.

Figure F41. A–H. Physical property measurements. Horizontal black line indicates lithologic unit boundary. Blue arrow in H is peak in NGR in Unit I.

Figure F42. A–D. Physical property measurements. Horizontal black lines indicate lithologic unit boundaries. Red arrow in A is drop in bulk density in Unit III. Blue arrow in D is drop in NGR in Unit III. Gray shaded bars indicate intervals of consistently low NGR; pink shaded bar indicates basalt.

Figure F43. Relationship between MAD bulk density and $CaCO_3$ content (measured by coulometer), Sites U1456 and U1457. Regression line is based only on data from Site U1457.

Figure F44. Relationship between L* measured by the SHMSL and $CaCO_3$ content (measured by coulometer), Sites U1456 and U1457. Regression line is based only on data from Site U1457. Regression line for all data points combined together is not significantly different than that for the individual sites.

Figure F45. MAD discrete sample density, porosity, and void ratios; thermal conductivity; and automated vane shear strength, Holes U1457A (red), U1457B (orange), and U1457C (green).

Figure F46. APCT-3 temperature-time series, Hole U1457A. Unshaded area indicates time interval over which there is an exponential decrease in temperature. Open circles at right indicate extrapolated formation temperatures for three cores.

Figure F47. Plots of heat flow calculations, Hole U1457A. A. Sediment temperature. B. Thermal conductivity data from Holes U1457A–U1457C with calculated thermal resistance (solid green line). Shaded area indicates region over which heat flow was calculated. Gray line indicates average thermal conductivity values used for calculations. C. Bullard plot of heat flow calculated from a linear fit of temperature data.