Figure F1. Cenozoic changes: global cooling and glaciations (Zachos, 2001), Oligocene atmospheric pCO_2 drawdown (Beerling and Royer, 2011) possibly related to a change in the balance between erosion and volcanic input of CO_2, Oligocene rise of seawater $^{87}Sr/^{86}Sr$ (Koepnick et al., 1985) likely reflecting the erosion of radiogenic formations analog of the modern Himalaya, and Eocene slowdown of the Indian plate motion following the collision and Tibet uplift (Copley et al., 2010). Right: extent of existing sedimentary records in the Bengal Fan and Himalayan foreland.

Figure F2. Map of the Himalayan erosion system showing the position of existing DSDP and ODP sites documenting the Bengal and Indus Fans or the monsoon history. Box = location of Expedition 354 transect at 8°N. Star = position of SO93-117-120KL levee record at 16°N (Hübscher et al., 1997). Bengal Fan sediment isopachs (blue lines; in kilometers) are simplified from Curray et al. (2003) and represent the total sedimentary and metasedimentary rocks above the oceanic basalt as interpreted from seismic reflection and refraction data.

Figure F3. A. Seismic Profile GeoB097-020/027 showing the positions of Expedition 354 drill sites in relation to regional fan architecture. The tops of the Pliocene and Miocene, as well as the 10 Ma horizon, are traced through the profile based on results from DSDP Site 218 (Moore et al., 1974). The distinct unconformity in the east penetrated only by the deepest part of Site U1451 is inferred to represent the Eocene onset of fan deposition. CMP = common midpoint. B. Interpreted line drawing of Profile GeoB97-020/027 showing the later stage channel-levee systems, regional unconformities, and faults. Modified from Schwenk and Spiess (2009). VE = vertical exaggeration. Horizontal scale = CMP, CMP distance = 20 m. Naming of channels follows Curray et al. (2003).

Figure F4. Location of Expedition 354 drill sites.

Figure F5. Compilation for the upper 250 m of the seven-site drilling transect at 8°N from west to east, comprising subbottom depth axis, core numbers and recovery, and major and minor lithologies for the deepest hole at each site. Geographic longitude is given for each hole.

Figure F6. Compilation of the three deep holes of the drilling transect at 8°N from west to east, comprising subbottom depth axis, recovery, and major and minor lithologies for each site.

Figure F7. Estimated age span of Bengal Fan sedimentation vs. distance from the present apex or source of the fan. Shaded area at each site = known age span of fan sedimentation. The duration of the apparent hiatus was short near the source and long in the lower and distal fan. This plot is oversimplified because the distance from the fan apex changed through time with convergence of the Indian and Eurasian plates and with progradation of the delta in Bangladesh. IB ranges = Indo-Burman ranges, A-N Ridge = Andaman-Nicobar Ridge. DSDP and ODP numbers are sites.

Figure F8. Map showing proposed Expedition 354 drill sites of on top of multibeam bathymetry. Available seismic lines from R/V *Sonne* Cruises SO125 (black) and SO188 (red) are indicated. Profiles crossing the sites are highlighted. See Site summaries and appendix figures in France-Lanord et al. (2014) for seismic data at each proposed site.

Figure F9. Core recovery, lithostratigraphic column (von der Borch, Sclater, et al., 1974), and carbon isotopic composition of total organic matter showing the transition from C3 to C4 photosynthetic plants around 380 mbsf (Galy et al. 2010), DSDP Site 218.

Figure F10. Accumulation rate (Gartner, 1990), clay mineralogy (Bouquillon et al., 1990), Nd isotopic data (Derry and France-Lanord, 1996; France-Lanord et al., 1993; Galy et al., 1996), and TOC isotopic composition (France-Lanord and Derry, 1994), ODP Holes 717C and 718C. Ages recalculated using timescale of Cande and Kent (1995). Low sedimentation rates, smectite-kaolinite clays, and organic carbon derived from C4 plants characterize the interval from 7.4 to 0.9 Ma. Nd isotopic composition does not change during the entire time recovered, suggesting the eroded source of material is not significantly changing. Biostratigraphic constraints on sediment accumulation are uncertain for the early Miocene. The apparent increase in sedimentation rate near 12 Ma could be an artifact of poor biostratigraphic control prior to that time.

Figure F11. Actual and planned Expedition 354 operations.