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Himalaya evolution at Paleogene-Neogene boundary unraveled by zircon age spectrum from Arabian Sea Sediments

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Although virtually all the intensive orogenic activities of Himalaya occurred in Neogene, the tectonic evolution of this high mountain range in Paleogene is poorly understood. Investigations of tectonic change pattern at Paleogene-Neogene boundary are important to better understand the interaction between mountain building and climate evolution. Here we present new U-Pb ages of zircon grains from Indus Fan sediments to constrain the orogenic history of Himalaya at Paleogene-Neogene boundary. 11 samples between late Oligocene and early Miocene from ODP 117 cores are dated by the zircon U-Pb technique. We calculate relative contributions of potential sources by counting zircon grains for each sample, and the quantized results indicate Himalaya contributed sediments to the coring site, and an extremely high input from Great and Tethyan Himalaya during late Oligocene-early Miocene. Four samples in Pleistocene are also dated for comparison, which indicates that high proportion of Lesser Himalaya has contributed to the sediment in Pleistocene. Our results suggest that the high contribution of Great and Tethyan Himalaya at Paleogene-Neogene boundary might correlate with the beginning of activity of MCT and extension of STD with leucogranite intrusion along Himalaya, which give rise to the extensive Great Himalaya exhumation. Our study demonstrates that zircon U-Pb dating technique is a good tool to reconstruct erosional history of mountain building on a tectonic timescale.

Key words: ODP, Himalaya, Indus Fan, zircon U-Pb dating, Paleogene-Neogene boundary