

Heavy mineral assemblage in deep sea sands from IODP Exp. 354, Bengal Fan.

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The Himalayan mountain range has been formed as a result of the collision between Asian and Indian continents. The principal focus of Himalayan research is the study of orogenic process and geodynamic evolution of the Himalaya-Tibetan Plateau system. The thermal modeling using radiometric ages provided variations in the timing, geological structures and rate of erosion in Himalayan orogeny (ex. Sakai et al., 2004). However, it is known that roughly 80% of the material eroded from the Himalaya and there are no complete records in foreland and adjacent basins.

Thus the sedimentary record in the Bengal fan, in where most of the detritus were deposited, provides the most complete record of Himalayan evolution. Among the drilling site that had been set on the north latitude 8 ° on Bengal fan in IODP Exp. 354, the samples obtained from Site U1451 are used in this study. This site reached at the bottom of the Bengal fan deposits and recovered total 1118 m cores ranging from Late Oligocene to present. The sandstone composition and heavy mineral assemblages in the sandy sediments are examined in order to reconstruct the source rock history. Modal composition and mineral assemblage collected from 163 smear slides and 14 thin sections provide the obvious information of provenance change.

The modal composition of the sands shows recycled orogenic provenance reflecting Himalayan source rocks. In the heavy minerals, the dominance of durable grains, such as zircon, tourmaline and rutile, is significant. A small amount of amphibole and garnet grains are included in Lower Miocene section, however, its amount drastically increases in Middle and Upper Miocene sections. In the Pliocene and Pleistocene sections, variation of heavy minerals are increased. Above petrographical data indicates that the onset of the metamorphic source rocks were before Middle Miocene time and rapid increase of the metamorphic detritus occurred around Middle Miocene time. In addition, another rapid increase of source rock variation were started from Pliocene time.

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