

Constraining precisely the timing of the India-Asia continental collision by provenance change

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Placing precise constraints on the timing of the India-Asia continental collision is essential to understand the successive geological and geomorphological evolution of the orogenic belt as well as the uplift mechanism of the Tibetan Plateau and their effects on climate, environment and life. Based on the extensive study of the sedimentary record on both sides of the Yarlung-Zangbo suture zone in Tibet, we review here the present state of knowledge on the timing of collision onset, discuss its possible diachroneity along strike, and reconstruct the early structural and topographic evolution of the Himalayan collided range. We define continent-continent collision as the moment when the oceanic crust is completely consumed at one point where the two continental margins come into contact. The timing of collision onset was directly dated by the provenance change from Indian to Asian recorded in deep-water turbidites near the the Yarlung Zangbo suture zone. This method allowed us to constrain precisely collision onset as middle Palaeocene (59 ± 1 Ma). Marine sedimentation persisted in the collisional zone for another 20-25 Ma locally in southern Tibet, and molassic-type deposition in the Indian foreland basin did not begin until another 10-15 Ma later. Available sedimentary evidence failed to firmly document any significant diachroneity of collision onset from the central Himalaya to the western Himalaya and Pakistan so far.