



Pre- and Post-Collisional Convergence in the Himalayan Orogen

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During Cretaceous and Early Cenozoic time a north-dipping subduction boundary extended from the eastern Mediterranean to Indonesia. East and west of the Himalaya this subduction boundary collided with continental areas at ~80-95 Ma and the domain between India and Eurasia included a small oceanic plate bounded to the east and west by transform boundaries. Quantitative modeling shows that the anomalously rapid convergence of India and Eurasia, which reached rates of 130-180 mm/a at 70- 50 Ma, can be explained by slab pull along two coupled subduction zones (one intra-oceanic and one Andean) and that rapid convergence ends when Indian continental lithosphere enters the intra-oceanic subduction zone at 50 Ma - not when India collides with Eurasia at 40 Ma. Post 40 Ma convergence of India and Eurasia is marked by atypical subduction as indicated by a “cloud” of fast P-wavespeeds beneath the western and central Himalaya. These do not typically descend below ~400 km depth, suggesting that the subducted material has neutral density. We suggest that post-collisional convergence was accommodated largely by subduction of greater India beneath the central and western Himalaya and eastward extrusion of Tibetan lithosphere occurring behind the eastern Himalaya.

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