India-Asia collision timing

The contribution of a previously undescribed model by van Hinsbergen et al. (1) to on-going debate on the India-Asia collision is welcomed and will certainly spur further investigation on this important topic. Recognizing the extent of Greater India (GI) is constrained in Gondwana reconstructions by the Wallaby–Zenith plateaus, van Hinsbergen et al. (1) proposed a radically "telescoped India" to reconcile the disparity resulting from an assumed pre–50-Ma India-Asia collision timing and a restricted GI. Although addressing some important issues, their scenario is inconsistent with observed geology and beset by at least two serious flaws.

Location of the Magmatic Belt Associated with 52- to 25-Ma Subduction of 2,350 km of Oceanic Lithosphere, Which Floored the Greater Indian Basin

Magmatism in the Gangdese Belt is widely regarded to be genetically related to subduction of Neotethyan oceanic lithosphere. This igneous activity was continuous (2) over the proposed 52-Ma timing (1) of "Tibet Himalayan block" (THB) collision with Eurasia and continued until ≤38 Ma. Post–52-Ma elements of this magmatism were presumably interpreted (1) in the context of GI Basin subduction along the southern THB margin, yet they remain concentrated in the same narrow belt associated with prior Neotethyan subduction. Global studies show subduction-related magmatism (the magmatic front) is located above descending slabs at a depth of 150 km. Thus, the consistent locus of Gangdese magmatism from 65 to <41 Ma (2) seems highly anomalous if a minimum of 175 km [north-south distance Yarlung Tsangpo suture zone (YTSZ) to Main Central Thrust] was added to southern Eurasia by collision of the THB. This implied arc-trench gap seemingly requires flat subduction. Along the Andes, this is commonly associated with aseismic ridge subduction, resulting in the development of magmatic gaps. Paradoxically, across southern Tibet, it is marked by the Linzhizong magmatic flare-up (2).

Misinterpretation of Sediment Source Characteristics

Despite alternative interpretations (1), no clastic detritus requiring a Lhasa terrane source occurs in Paleogene sedimentary units (*i*) along (Liuqu conglomerates), (*ii*) immediately south of [Zheya Formation at Sangdanlin (3) or Rilang Formation northeast of Gyantse (4)] or (*iii*) more distal to [Zhepure Shan (5)], the YTSZ. Both paleontological and detrital zircon data indicate these units are late Paleocene rather than latest Cretaceous. Thus, a 70-Ma intraoceanic island arc collision (1) is not supported by the stratigraphic data. Moreover, the detrital content of these units contains distinctive serpentinite clasts and intraoceanic island arc-derived Cr-spinels, indicating an ophiolitic rather than continental-arc source. The age range of detrital zircons in these units bridges the duration of a well-documented magmatic gap in the Gangdese arc, suggesting an alternative source, such as an active intraoceanic island arc (5). Furthermore, heavy minerals characteristic of a continental-arc source, particularly hornblende, are absent. Notably, Paleogene units in the foreland basin south of the Himalaya also contain similar suprasubduction zone ophiolitic detritus.

It is difficult to envisage how the model by van Hinsbergen et al. (1) can accommodate these important matters, let alone be reconciled with models that invoke sub-Himalayan channel flow.

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