Geophysical Research Abstracts
Vol. 18, EGU2016-1332, 2016
EGU General Assembly 2016

The chronology of the India-Asia collision

Eduardo Garzanti (1) and Xiumian Hu ()

(1) University of Milano-Bicocca, Department of Earth and Environmental Sciences, Milano, Italy (eduardo.garzanti@unimib.it), (2) University of Nanjing, State Key Laboratory for Mineral Deposit Research, Nanjing, China (huxm@nju.edu.cn)

Markedly diverging interpretations and incompatible scenarios have been proposed for the early stages of the Himalayan Orogeny. One view is that the northern Indian passive margin may have been involved in ophiolite obduction, arc–continent, or continent–continent collision as early as the Late Cretaceous. A different view is that India may have not come into contact with Asia until as late as the Oligo-Miocene. Ages assigned to the India-Asia collision have thus ranged rather freely from as old as 70 Ma to as young as 25-20 Ma, allowing researchers to select in remarkable liberty the age that fitted best with their lines of reasoning. In recent years, however, a growing body of stratigraphic evidence has constrained the chronology of collision with increasing accuracy and precision.

Provenance analysis has ruled out early collision or ophiolite-obduction hypotheses, indicating that renewed terrigenous supply in the Maastrichtian to Danian (72-62 Ma) was derived from India in the south - rejuvenated by magmatic upwelling during the Deccan event - rather than from Asia or from an obducting ophiolite in the north (Garzanti and Hu, 2015). Integrated biostratigraphy and detrital-zircon chronostratigraphy has demonstrated that the first continent-continent contact and consequent disappearance of Neotethyan oceanic lithosphere at one point in south Tibet took place in the Selandian (59 $\pm$ 1 Ma; DeCelles et al., 2014; Wu et al., 2014; Hu et al., 2015). A major disconformity documenting tectonic uplift of carbonate platforms all along the Tethys Himalaya from the Gamba and Tingri areas of south Tibet to the Zanskar Range of the NW Himalaya, allowed dating the arrival of the orogenic wave in the inner part of the northern Indian passive margin around the Paleocene/Eocene boundary (ca. 56 Ma; Garzanti et al., 1987; Li et al., 2015). Shallow-marine seaways linked with Neotethys persisted in the Himalaya until the mid-Ypresian (ca. 50 Ma), when they were finally filled by volcaniclastic to ophioliticlastic fluvio-deltaic sediments derived from the uplifting Asian margin (Najman et al., 2010; Hu et al., 2012). Tethys Himalayan successions were finally involved in tectonic deformation and very low-grade metamorphism around Lutetian times (47-44 Ma; Garzanti and Brignoli, 1989; Bonhomme and Garzanti, 1991).

CITED REFERENCES

Bonhomme M., Garzanti E. 1991. Geologic Alpine Memoirs 16:15-16.
DeCelles P.G., Kapp P., Gehrels G.E., Ding L. 2014. Tectonics 33:824-849.
Garzanti E., Baud A., Mascle G. 1987. Geodinamica Acta 1:297-312.
Garzanti E., Brignoli G. 1989. Eclogae). Eclogae Geologicae Helvetiae 82:669-684.
Garzanti E, Hu X. 2015. Gondwana Research 28:165-178.
Hu X., Sinclair H.D., Wang J., Jiang H., Wu F. 2012. Basin Research 24:520-543.
Hu X., Garzanti E., Moore T., Raffi I. 2015. Geology 43:859-862.
Li J., Hu X., Garzanti E., An W. Wang J. 2015. Journal of Asian Earth Sciences, 104:39-54.
Najman, Y., Appel, E., Boudagher-Fadel, M., Bown, P., Carter, A. et al. 2010. Journal of Geophysical Research 115:B12416 doi:10.1029/2010JB007673.
Wu F.Y., Ji W.Q., Wang J.G., Liu C.Z., Chung S.L., Clift P.D. 2014. American Journal of Science 314:548-579.