

Discussion of

K-T magmatism and basin tectonism in western Rajasthan, India, results from extensional tectonics and not from Reunion plume activity

by

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Sharma (this volume) summarizes some aspects of Cretaceous-Tertiary (K-T) magmatism and basin tectonism in western Rajasthan. He criticizes the existing idea that K-T magmatism in western Rajasthan is a consequence of the Reunion plume and provides an alternative model, that crustal development during the K-T period in western Rajasthan is a manifestation of a plume-unrelated extensional tectonic regime.

Sharma (this volume) presents a broad lithological description of the stratigraphic units and reviews existing geochronological data from the magmatic rocks that will be useful to readers. However, the geochemical aspects of the magmatic rocks, particularly those of the Sarnu-Dandali complex are under-emphasised. Sharma (this volume) refers a Ph.D dissertation that is largely inaccessible to the interested readers. Uplift by a mantle plume in a sedimentary basin has many significant consequences (such as palaeogeographic shallowing, diversion in sediment dispersal pattern, occurrences of penecontemporaneous deformation structures etc.) on the sedimentation system that, in turn, can help geologists to identify the influence of plume-induced uplift on Earth's surface processes from stratigraphic records (cf. Rainbird and Ernst, 2001 and references therein) if there are any. This requires detailed sedimentary facies analysis, determination of palaeogeographic setting, and mode of sequence-building in terms of sea level change and contemporary basinal tectonics. From the sedimentological and stratigraphic account of the K-T basins of western Rajasthan, as presented by Sharma (this volume), it is unclear however, whether such effort has yet been made. If not, detail sedimentological analysis is essential to resolve many key issues and thus, of paramount importance to prove or disprove the plume model.

Needless to say, researchers will gain valuable insights from Sharma's review in this volume, to argue for plume-induced or plume-unrelated extensional basin tectonics and K-T magmatism in western Rajasthan. I congratulate the author on his effort.

30th January, 2007, Kamal Kant Sharma

Rajat Mazumder points out that uplift by a mantle plume in a sedimentary basin has many

significant consequences on the sedimentation system. Basin development and magmatism occurred during K-T time in western Rajasthan, and are considered to be the Reunion-plume pre-outburst phase. It is thought that the main outburst phase resulted in uplift and volcanism in the Deccan province. K-T basin development initiated in western Rajasthan prior to Reunion plume interactions and continued to the end of the Tertiary. Surprisingly, the Bikaner Tertiary basin, which developed under continental conditions with lignite deposits, is also related to plume activity. K-T sedimentary basin development has a complex evolutionary history. The Jaisalmer basin is a part of Indus tectonism and represents horst and graben features such as the Shahgarh and Kishangarh sub-basins. The Barmer-Sanchor rift evolved along with the Cambay basin.

The K-T basins of western Rajasthan are engulfed in vast desert sands and much facies analysis work has not yet been done. In my chapter (this volume) I referred an unpublished thesis in order to communicate the original source of the work. However, it has also been published in the form of different papers and as a book section, and citing all these would have been repetition. I thank Rajat for his comments on my chapter.

References

Rainbird, R.H., Ernst, R.E., 2001, The sedimentary record of mantle plume uplift, in R.E. Ernst, K.L. Buchan (Eds.), *Mantle Plumes: Their identification Through Time*, Geol. Soc. America Spec. Paper 352, pp. 227-245.