

A POSSIBLE K/T IMPACT SITE AT THE INDIA-SEYCHELLES BOUNDARY. S. Chatterjee, The Museum, Texas Tech University, Lubbock, TX 79409-3191

A revised reconstruction of the position of India at the K/T boundary is presented for the first time which is paleontologically well constrained and corroborated by magnetic anomalies, basement ages, and fracture zone lineations (Fig. 1). The reconstruction places the western coast of India against the Seychelles-Saya de Malha Bank. At the KTB time, the rifting between India and Seychelles was accompanied by the outpouring of massive Deccan flood basalts, the onset of the spreading of the Carlsberg Ridge, and the development of the proto-Owen Fracture Zone, the Amirante Ridge, and the western rift basins of India. The array of simultaneous tectonic and volcanic features of western India and the Arabian Sea strongly argues for a causal relationship (1). It has been proposed that a large meteorite collided with the earth during this crucial time (2), but the actual site of putative impact remains elusive. Various tectonic and volcanic features, when restored at the Seychelles-India boundary, strongly suggest the possible impact location in this region (3, 4). The arcuate Amirante Ridge is interpreted as the western rim of the crater; the eastern rim of the crater was fractured and obliterated and was filled with flood basalt to become the overflowing lava lake of the Deccan Plateau, similar to a lunar mare. The recovery of shocked quartz immediately beneath the Deccan lava (5), together with the presence of a positive gravity-anomaly and high heat flow in the Deccan plateau (6) support this impact scenario. The impact was strong enough not only to create an enormous crater approximately 900 km in diameter, but also to induce radial fractures in the stressed lithosphere to form the plate boundaries and continental rifts. The rift zones became the main feeder channels for the extrusion of the Deccan flood basalts. The ridge generated a new ocean floor between India and Seychelles. The trench and transform faults produced the Chagos-Laccadive-Mascarene Plateaus. The lack of a ringed structure in the east side of the crater and the associated off-center relation of the radial rift zones suggest that the K/T crater may have been formed by oblique impact (Fig. 2).

REFERENCES: [1] Courtillot, V. et al. (1986) Earth Planet Sci. Lett., **80**, 361. [2] Alvarez, L. W. et al. (1980) Science, **208**, 1095. [3] Hartnady, C. H. J. (1986) Geology, **14**, 423. [4] Alt, D. et al. J. Geol., **96**, 647. [5] Basu, A. R. et al. EOS, **69**, 1487. [6] Mahoney, J. J. (in press), in Continental Flood Basalts, (ed.: MacDougall, J. D.), D. Riedel.

Fig. 1. India-Seychelles fit; the Amirante Arc may represent the western-half of the putative crater rim; the eastern-half of the crater was elongated by oblique impact and was filled with flood basalt.

Fig. 2. Detailed tectonic features associated with the K/T impact site at the India-Seychelles boundary; the Amirante Arc, the Carlsberg Ridge, and the Chagos-Mauritius Trench were formed within the crater rim; most of the rift basins of western India were formed outside the crater rim; these rift basins acted as the main feeder channels for the eruption of the Deccan flood basalts. Ray patterns of the fracture zones suggest oblique impact at an angle of about 45 degrees; arrow indicates meteorite trajectory.

A POSSIBLE K/T IMPACT SITE, Chatterjee, S.

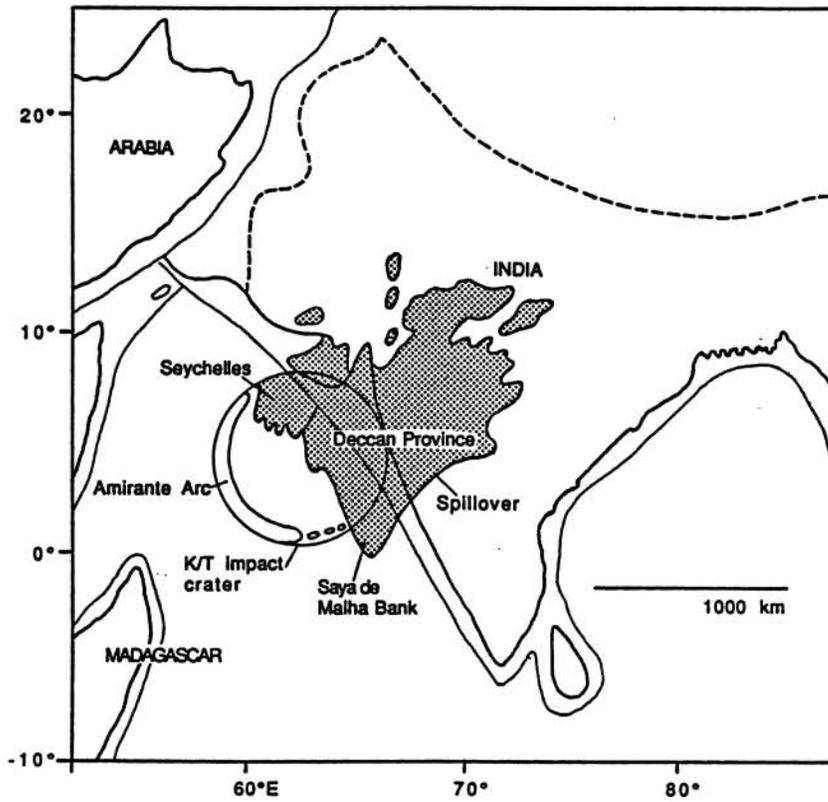


Figure 1

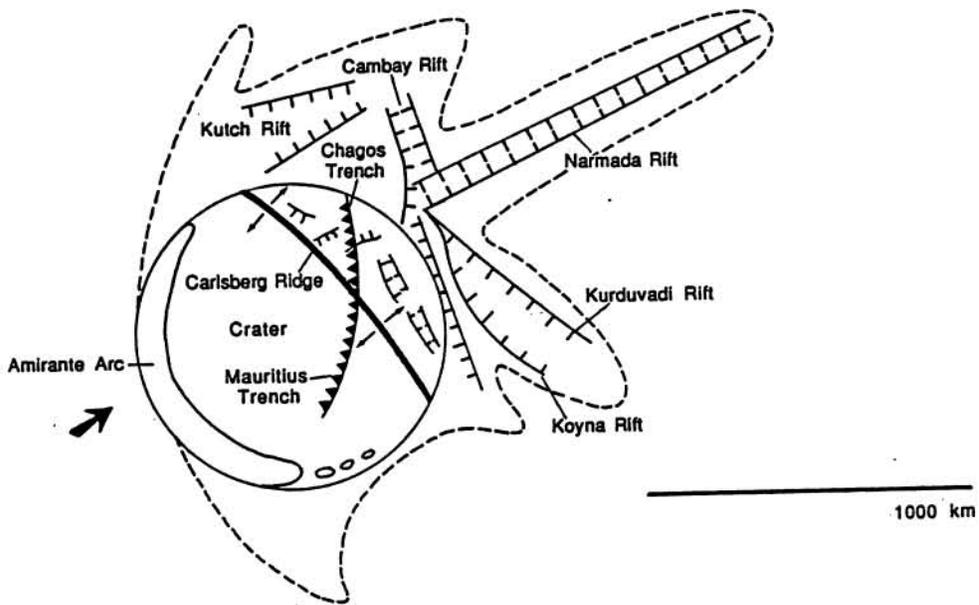


Figure 2