



## **Evolution of the Mascarene Basin with respect to the Reunion hotspot inception in the Deccan**

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Located between Madagascar in the west, the Mascarene Plateau in the east and separated from the Madagascar Basin by the Mauritius fracture zone in the south, the Mascarene Basin is marked by conjugate magnetic anomalies separated by a fossil ridge. In agreement with previous studies, the opening of this basin is dated to  $\sim 85$  Ma by anomaly 34. Spreading rate has increased from slow between 83 Ma (A34) and 74 Ma (A33y), to intermediate between 74 Ma (A33y) and 68 Ma (A31y), and to fast between 69 Ma (A31y) and 63 Ma (A28), before the extinction of the ridge at  $\sim 60$  Ma (A27y). Free air gravity data derived from satellite altimetry reveal a rather complex structure of the oceanic crust, with many fracture zones showing a trend evolving from  $N50^\circ E - N60^\circ E$  on the basin margins to  $N30^\circ E - N40^\circ E$  in the centre. These fracture zones segment the basin in seven main compartments and many small corridors.

In the southernmost compartment, in the vicinity of Reunion Island, the isochrones shows two distinct orientations,  $N120^\circ E - N140^\circ E$  and  $N90^\circ E - N110^\circ E$  in the central and eastern part of the compartment respectively. We explain this observation by the presence of the Indian Ocean Triple Junction in this compartment between 74 and 64 Ma (A33y to A28o). Furthermore, a ridge jump at 62 Ma (A28y) has isolated a double anomaly 28 on the southern flank. This point, suggested by the observed magnetic anomalies, is further substantiated by the small  $N40^\circ E - N50^\circ E$  trending volcanic ridges south of Reunion Island, which seems to be also present on the northern flank of the A28 fossil spreading centre but are absent on the more recent crust emplaced between A28 and A27. This suggests that the hotspot- ridge interaction that may have created these ridges was active before A28 – maybe a far-field effect of the Deccan Trap volcanism?

In the two central compartments, seafloor spreading is rather symmetrical and regular, with magnetic lineations perpendicular to the fracture zones. In the northern compartments, south of Agalega Island, several structural lineaments oriented  $N5^\circ E - N25^\circ E$  cut across the northern flank of the basin between  $10.5^\circ S$  and  $13.5^\circ S$ . The magnetic lineations A28 to A31 (and maybe A32) still trend  $N120^\circ E - N140^\circ E$ , oblique to these structural lineaments which may postdate the oceanic crust and may mark the connection of the southern part of the dying spreading axis with the newly established one north of the Seychelles Bank. The multiplicity of these lineaments suggest a wide zone of deformation, an observation reinforced by the difficulty to build consistent plate reconstructions from the magnetic anomalies picked on both conjugate flanks of the basin. Seafloor spreading may progressively transfer from the Mascarene Basin to the proto-Carlsberg Ridge as a consequence of the hotspot activity.