



Geophysical survey of the Arabia-India-Somalia triple junction: First results of the AOC cruise (Aden-Owen-Carlsberg) in the NW Indian Ocean

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The AOC triple junction is located in the mouth of the Gulf of Aden in the NW Indian Ocean. It connects the Owen Fracture Zone (OFZ) to the Carlsberg and Sheba ridges. In September 2006, the *BHO Beautemps-Beaupré* conducted a geophysical survey (12 days) of the triple junction encompassing bathymetry, gravity, magnetic, and 3.5 kHz mud penetration profiles. Bathymetry data reveal the existence of a major N10°E-trending active fault at the southern end of the OFZ, which cuts across the bathymetric highs fringing the OFZ and displays a right-lateral offset of ~12 km. This fault terminates to the south in a rhomboedral pull-apart basin bounded by active N70°E to E-W normal faults. The basin is associated with a high negative gravity anomaly suggesting a thick sedimentary infill. Further south, the seismically quiet part of the OFZ does not exhibit any evidence of active deformation. Consequently, the AOC triple junction is not located at the junction between the OFZ, the Owen transform fault, and the Sheba Ridge, and is not a FFR (transform-transform-ridge) triple junction. Further west, small basins in the oceanic crust show evidences of predominantly strike-slip recent deformation. The connection between these basins and the Sheba Ridge is not clearly delineated, suggesting that the triple junction corresponds to a diffuse deformation zone. The axial rift of the Sheba Ridge is sinuous and not affected by transform faults. Its depth progressively decreases from SE to NW and it is bounded by megamullions in its southeastern part. Gravimetry and magnetic data show thickness variations of the oceanic crust, which is about 3 km thicker to the

NW than to the SE. Magnetic anomalies have been identified from An 2A to An 6 on the northern flank of the Sheba Ridge, giving an age of 20 Ma of the start of oceanic spreading in the eastern Gulf of Aden.