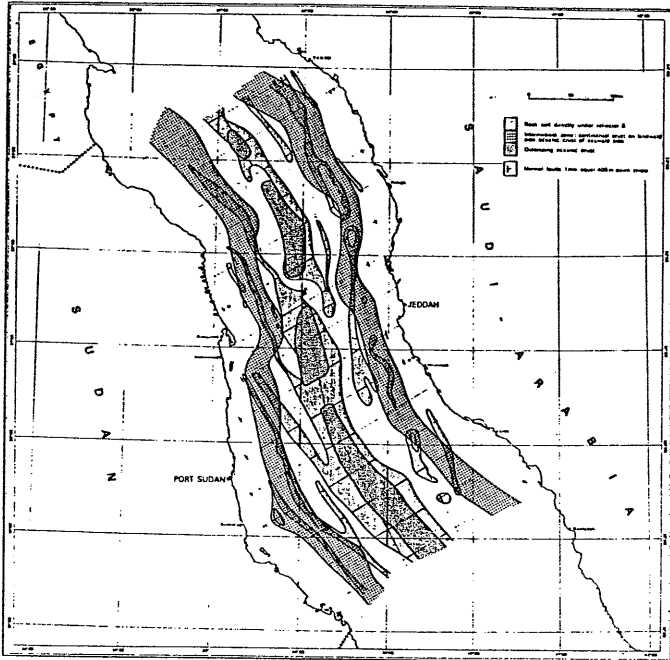


**Seismic, Gravity and Magnetics Surveys
in the Central Red Sea :
their interpretation and Implications
for the structure and evolution of the Red Sea**

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While there is unanimous agreement that the axial part of the Red Sea has witnessed seafloor spreading since the early Pliocene, opinions diverge considerably with regard to the situation in the main trough and shelves. New, high-precision data comprising palaeomagnetic, seismic, gravity, magnetic, and bathymetric measurements from the central and northern parts of the Red Sea have been examined to discriminate between the earlier proposed hypotheses, and to formulate an evolutionary model for the Red Sea. The results show that oceanic crust extends for at least 80 km (at 19°N) on each side of the spreading axis. Symmetrical seafloor spreading magnetic anomalies are recognized out to: anomaly 3A (6 m.y.B.P.) between 18°30' and 19°45'N; anomaly 2A between 19°45' and 20°N and near 21°N; anomaly 2 near 22°N and only anomaly 1 near 23°30'N. Although anomaly 3A is the oldest recognizable magnetic anomaly, the extent and configuration of the oceanic basement as determined from seismic measurements indicate that spreading has occurred and continued without a hiatus since 10-12 m.y.B.P.



Seismic interpretation map: results from 21 coast-to-coast multichannel seismic reflection profiles showing boundaries of the different types of basement and belts of rock salt. Crosses indicate intermediate crust which separates definite continental from definite oceanic crust. Outcropping oceanic crust is hatched, whereas belts of rock salt are stippled.

The definite continental crust is restricted to an approx. 30 km wide stripe along the Red Sea coastlines. The area of "intermediate crust", separating the well defined types of crust, is that of maximum sedimentary coverage, which was elucidated by wide angle reflection and refraction profiles in early 1988. Those results indicate that on the western flank off Sudan the nature of this intermediate crust is oceanic.

**Crustal structure of the Central and Southern Red Sea.
New seismic data**

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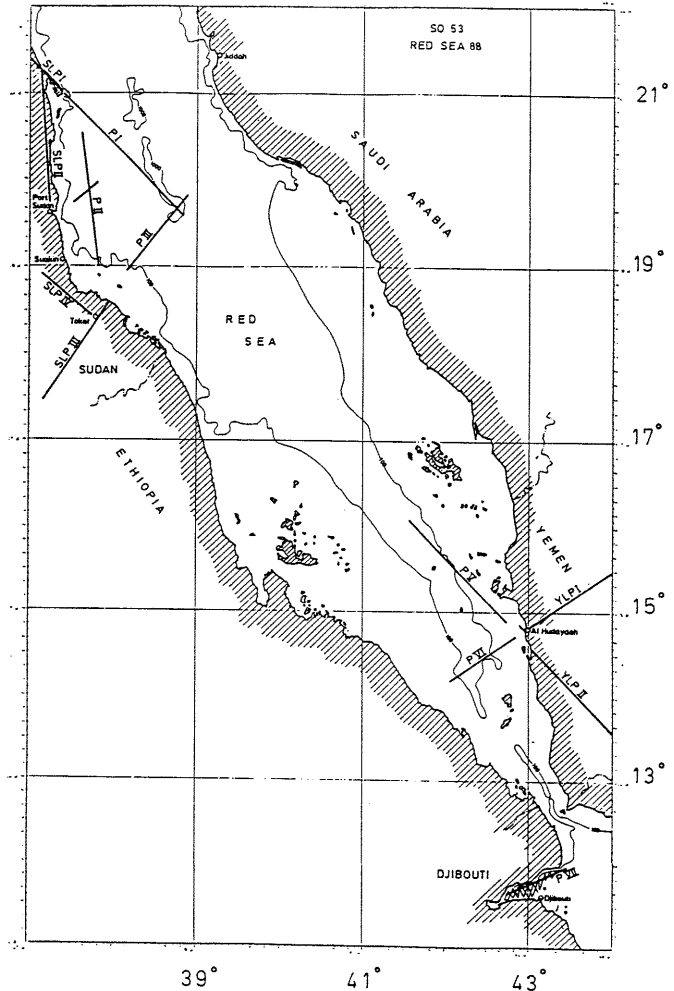
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**Crustal Structure of the Central and Southern Red Sea -
new Seismic Data**

In early 1988 an onshore/offshore geophysical experiment was carried out in the central and southern Red Sea. Main areas of interest were the western flank off Sudan and the eastern flank off the Y.A.R. In both areas seismic profiles crossed the entire structure from the newly formed oceanic crust in the axial trough into the old continental blocks of the African and Arabian Shield. Energy was generated using explosives and a large airgun array. Evaluation of wide angle reflections and refractions permitted in both areas precise delineation of ocean-continent transition. The results show that

- the axial Red Sea Trough is floored by young oceanic crust,
- the western flank offshore Sudan contains a major portion of older oceanic crust, overlain by thick sedimentary series. A significant part of these sediments lies below the mid-Miocene evaporites and is characterized by low p-wave velocity,
- the eastern flank offshore Yemen is made up of stretched continental crust and does not show sediments of pre-evaporite age.



A microseismic array of eleven units had been deployed in the Suakin Deep (axial trough offshore Sudan) covering an area of approx. 400 km². The evaluation revealed an astonishing high microearthquake activity of approx. 100 events per day. Localisation of hypocenters permitted exact delineation of active fault and fracture systems.