Geophysical Research Abstracts, Vol. 7, 08007, 2005
SRef-ID: 1607-7962/gra/EGU05-A-08007

Crustal structure of the rifted margin northeast of the Seychelles Bank, western Indian Ocean

Collier, J. S.[(1)] ; **Hall, F**.[(1)]; Sansom, V.[(1)]; Minshull, T. A.[(2)] ; Whitmarsh, R. B.[(2)] ; Kendall, J.-M.[(3)]; Vardy, M. E.[(2)]; Lane, C. I·[(2)];

(1) Dept. Earth Sciences and Engineering, Imperial College, Prince Consort Road, London, SW7 2BP United Kingdom

(2) Southampton Oceanography Centre, European Way, Southampton, SO14 3ZH United Kingdom

(3) Department of Earth Sciences, University of Leeds, LS2, United Kingdom

Two of the main factors that determine the nature of a rifted continental margin are rheology and magmatism during extension. The Seychelles-Laxmi Ridge conjugate margin pair formed by rapid rifting (59mm/a half-rate), with the oldest unequivocally identified oceanic crust formed just before chron 27 (62-63 Ma). Rifting took place $\sim$1000 km from the centre of the Deccan plume, but basaltic rocks with Deccan affinities have been sampled onshore in the Seychelles. We present results from three research cruises conducted in a $\sim 10^5$ km^2 area northeast of the Seychelles Bank during 2002-2003. Swath bathymetric data reveal that the Seychelles Bank is bounded by a steep scarp down to an abyssal plane at 3.5-4.5 km depth, which is broken up by a series of elongate, apparently fault-bounded blocks parallel and oblique to the margin. Dredging on three of these blocks recovered highly vesicular trachytic basalts. Whole-rock major and trace element analyses suggest that the two more seaward blocks have E-MORB affinities, while the basalts from the landward block has a more continental affinity.

Normal incidence and wide-angle seismic data were acquired using a 3890 cu.in. airgun source, a 96-channel, 2.4 km hydrophone streamer, 31 ocean bottom hydrophones/seismometers, and 21 land stations across the Seychelles archipelago. Seismic reflection data reveal a few hundred metres of sediments overlying a relatively

smooth basement surface. A strong, continuous Moho reflection is imaged ∼2 s below oceanic basement and dips down towards the continental rise. Arcuate seaward dipping reflectors interpreted as lava flows are imaged on some profiles. Initial ray-trace modelling of wide-angle data indicates an oceanic crustal thickness of ∼6 km, increasing to ∼26 km beneath Seychelles Bank. Onshore data reveal an enigmatic high-amplitude wide-angle reflection that lies at 50-60 km depth beneath much of our survey area.