



Identification of hyper-extended crust east of Davie Ridge in the Mozambique Channel

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Davie Ridge is a ~1200 km wide, N-S trending bathymetrical high in the Mozambique Channel. Today, it is widely accepted that Davie Ridge is located along a fossil transform fault that was active during the Middle Jurassic and Early Cretaceous (~165-120 Ma). This transform fault results from the breakup of Gondwana, when Madagascar (together with India and Antarctica) drifted from its northerly position in the Gondwana Supercontinent (adjacent to the coasts of Tanzania, Somalia and Kenya) to its present position (e.g. Coffin and Rabinowitz, 1987; Rabinowitz et al., 1983; Segoufin and Patriat, 1980).

The southward motion of Madagascar relative to Africa is constrained by the interpretation of magnetic anomalies in the Western Somali Basin, located north of Madagascar (e.g. Rabinowitz et al., 1983). According to Bird (2001), sheared margins share typical characteristics and a common evolution: 1. The transition from continental to oceanic crust is relatively abrupt (~ 50-80 km). 2. Along the continental side of the margin, complex rift basins form that display a wide range of faults. 3. Prominent marginal ridges form along the sheared margin that probably originate from the propagation of the oceanic spreading center along the plate boundary (Bird, 2001).

In February and March 2014, a dense geophysical dataset (multichannel seismic, magnetics, gravimetry and bathymetry) with a total of 4300 profile km along the sheared margin was acquired with the R/V Sonne by the Federal Institute for Geosciences and Natural Resources (BGR). A special objective of the project, amongst others, is the characterization and interpretation of the continent-ocean transition seaward of Davie Ridge in the Mozambique Channel.

Seismic profiles located east of Davie Ridge in the Western Somali Basin reveal a wide sequence of half-grabens bounded by listric normal faults. We tentatively suggest that this crust is of continental origin and results from rifting between Africa and Madagascar during the breakup of Gondwana. This implies that the continent-ocean transition is located at least ~ 150 km east of Davie Ridge.

References

- Bird, D., 2001. Shear margins: Continent-ocean transform and fracture zone boundaries. *The Leading Edge*, 150-159.
- Coffin, M. F., und Rabinowitz, P. D., 1987. Reconstruction of Madagascar and Africa: Evidence from the Davie Fracture Zone and Western Somali Basin. *Journal of Geophysical Research: Solid Earth*, vol. 92, no. B9, 9385-9406.
- Rabinowitz, P.D., Coffin, M.F. and Falvey, D.A., 1983. The separation of Madagascar and Africa. *Science* 220, 67-69.
- Segoufin, J., und Patriat, P., 1980. Existence d'anomalies mesozoïques dans le bassin de Somalie. Implications pour les relations Afrique-Antarctique-Madagascar: *C.R. Acad. Sci. Paris*, v. 291, p. 85-88.