

Crustal structure and magmatism of the Nientyeast Ridge

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An analysis of seismic refraction and reflection data, as well as hard rocks dredging and deep sea drilling results is presented to define the crustal structure of the Nientyeast Ridge in the eastern Indian Ocean.

A sharp vertical displacement about 2 km is revealed on the eastern slope of the ridge, which is morphologically manifested as the Nientyeast Trench and the Nientyeast Fracture Zone (F.Z.). The rocks of layer 2A (seismic velocity of 3.6-4.3 km/s), layer 2B (seismic velocity of 5.2-5.7 km/s), layer 3A (seismic velocity of 6.8 km/s), and layer 3B (seismic velocity of 7.3-7.5 km/s) are exposed on this slope and in the F.Z. The dredging materials have allowed to identify their as basalts, dolerites, gabroids and serpentinites, respectively.

The uplift of the Nientyeast Ridge under the adjacent oceanic basins is associated with an excess thickness of the layer 2 and serpentinisation of the mantle peridotites. According to seismic data, unchanged peridotite blocks (8 km/s) occur in some places of the ridge inside the serpentinite layer (7.3-7.5 km/s).

Geological data and geochemical peculiarities of the basalts from the ridge testify that its formation is a result of interaction of the transform fault and old rift zone.