



## **Seismostratigraphy, tectonics and geological history of the Ninetyeast Ridge**

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The Ninetyeast Ridge (NER) is a ~5000 km-long, aseismic volcanic ridge trending N-S in the Central Indian Ocean Basin. It is widely accepted that NER formed as a hotspot track created by northward migration of the Indian plate over the Kerguelen hotspot during the Late Cretaceous and Early Cenozoic. High-resolution multibeam bathymetry data and multichannel seismic profiles collected over the NER at seven sites between 5.5° N and 26.1° S during cruise KNOX06RR of RV Roger Revelle with the participation of P.P. Shirshov Institute of Oceanology supplemented ideas about its seismostratigraphy and tectonics to clarify geological history [Sager et al., 2007]. High-resolution multibeam bathymetry data and 2D multichannel seismic data clearly show active faulting along the entire length of the NER. Bathymetry data collected in cruise show significant changes of NER's morphology varies with latitude - from large, individual seamounts in the north segment to smaller, linear, narrow seamounts and ridges in the central segment to high, nearly continuous, and often highly asymmetric with a steep eastern slope and low western slope ridge in the south. Three its distinct morphological segments are characterized also by different internal tectonic structure (faults geometry). The faults have different directions for each segment of NER - they trend to NW-SE less NE-SW in the northern segment, E-W in the central segment and NE-SW in the south. Large near E-W grabens mostly filled by intensively deformed sediments are widespread along the ridge. All three identified types of the faults are extension structures and no compression structures, predictable from the regional stress field, is not observed yet. Additional features were traced within the sedimentary cover of NER as a result of seismic stratigraphy analysis of the multichannel seismic data collected in proximity to DSDP and ODP drill holes (Sites 758, 216, 214, and 253) - eight reflectors: 0, 0A, 1, 1A, 2, 3, 4 and 5 and three seismic complexes: the lower subaerial-shallow water, medium intermediate and upper deep water [Marinova, 2012]. These reflectors marking in some places unconformities and gaps are formed due to changing conditions of sedimentation under reorganization of tectonic or oceanographic regime and the seismostratigraphic complexes reflect different stages of the NER evolution. Seismic stratigraphy analysis allowed to estimate time of faulting and suggest three phases tectonic activity of the ridge during the Paleocene, Eocene, and Late Miocene.

Marinova Yu.G. The structure of sediment cover of Ninetyeast Ridge (seismic stratigraphy). Ph.D. thesis, P.P. Shirshov Institute of Oceanology. 2012. 145 p  
Sager W.W. et al. Cruise Report KNOX06RR R/V Roger Revelle. 2007. pp. 1-82