



Growth of the Afanasy Nikitin Seamount, Central Indian Ocean - the product of short-lived hotspots

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The Afanasy Nikitin seamount (ANS) is a major structural feature in the Central Indian Basin. An understanding of its evolution using multibeam bathymetry, magnetic and seismic reflection data provides new insights on growth of the seamount through time, emplacement of the 85°E Ridge in the Bay of Bengal and deformation of the lithosphere in the equatorial Indian Ocean. The seafloor morphology and internal structure of the ANS show that the seamount consists of extensive plateaus extending from 2°15' to 5°30'S in water depths of 3000-4500 m, numerous elevated features (seamount highs) pierce through the northern part of the seamount plateau reaching up to 1600 m water depth and faulted blocks up to 1.0 s TWT throw in the southern part of the seamount plateau. Model studies of magnetic profiles suggest that the main plateau of the seamount was emplaced during the normal magnetisation period between the formation of seafloor spreading anomalies 33-32n.2 (79-73 Ma) and that the seamount high was formed in a reverse magnetisation period later than the main seamount plateau formation. Integrated geophysical results clearly demonstrate that the ANS was constructed in two phases, initially coeval with the formation of the oceanic crust during 79-73 Ma, and later at about 55 Ma in an intraplate setting. Based on present geophysical results and published plate reconstruction results of the Indian Ocean from Late Cretaceous to Early Cenozoic, we believe that the Conrad hotspot has emplaced the main plateau of the ANS and Conrad Rise during the period 79-73 Ma in an on-ridge setting, after which the hotspot has continued its activity in Antarctica plate leaving the main plateau of the ANS as an isolated feature on the Indian plate. Subsequently another hotspot that formed the 85°E Ridge and buried hills in the Bay of Bengal has rebuilt the existing main plateau of the ANS at around 55 Ma and eventually the hotspot became defunct in the vicinity of the ANS.