V14A-01: Temporal and geochemical evolution of the Afanasy Nikitin - 85° E Ridge, Central Indian Ocean, R/V SONNE cruise SO258/1

Monday, 10 December 2018
16:00 - 16:15
Marriott Marquis - Liberty I-K

The Afanasy Nikitin Ridge forms the central portion of the so-called 85°E Ridge in the Indian Ocean. This N-S trending structure runs parallel to the nearby Ninetyeast Ridge and comprises: 1) The Buried Hills (3°-5°N), 2) Afanasy Nikitin Ridge (2°-6°S) and 3) the “Southern Seamounts” (6°-11°S). The few samples previously available from the Afanasy Nikitin Ridge reveal the strongest Enriched Mantle I-type geochemical signature reported thus far in oceanic basalts (Mahoney et al., 1996, Geology 24; Borisova et al., 2001, J. Petrol. 42) and indicate a complex magmatic evolution with at least two magmatic stages (at ~75 and ~67 Ma; Krishna et al., 2014, J Earth Sys. Sci. 123). Overall, the origin of the ~1500 km long and discontinuous 85° E Ridge is controversial and could either be related to a mantle plume (e.g.; Crozet; Mahoney et al., 1996, Geology 24) or shallow processes (e.g. faulting of the ocean crust; Kent et al., 1992, Geology 20). Currently, it is even unclear if the Afanasy Nikitin Ridge is genetically linked to the previously unsampled Buried Hills and Southern Seamounts or a re-activated portion of the 85°E Ridge (Krishna et al., 2014, J Earth Sys. Sci. 123). New major and trace element data have been generated from magmatic rocks dredged during SO258/1 INGON at 28 sites dispersed along the entire 85°E Ridge. Our new results show that the various units along the 85°E Ridge are characterized by high Ba/Rb, Ba/Nb, La/Nb and low (Ce, Nd)/Pb ratios indicating a common source with a contribution of lower continental crust or subcontinental lithospheric mantle. These trace element signatures are distinct from the nearby Ninetyeast Ridge or Crozet hotspot lavas, which may exclude a direct relation to one of these hotspots. We also will present new Sr-Nd-Pb-Hf-Os isotope and age data, which will provide further insights into the origin of the enigmatic 85°E Ridge.

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