

A geochemical gradient along the North Mid-Atlantic Ridge revisited: New Hf and Pb isotope data

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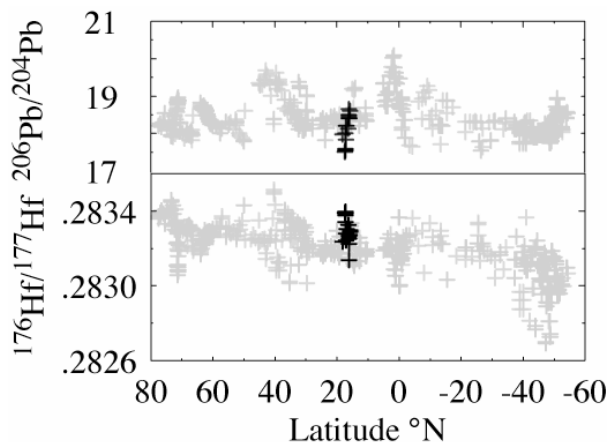
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Basalts dredged along the Mid-Atlantic Ridge north of the 15°20'N fracture zone and the so-called 14°N anomaly (Bougault *et al.*, 1988), from 15° 44' to 17° 28' show a well documented gradient from enriched to depleted chemical characteristics (Dosso *et al.* 1991) where Sr isotopic compositions vary from 0.70288 to 0.70217, respectively.

We will present new Hf and Pb isotope data for this region of the MAR. Preliminary results show that the Hf and the Pb isotope ratios range between the ambient local MORB mantle source that defines the 14°N bathymetric and C-like (Hanan and Graham, 1996) geochemical anomaly and an extremely depleted mantle source unlike any other so far recognized along the North Atlantic ridge. The results will be discussed in terms of the regional tectonic framework.



References

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Detection of biomarkers in oils using ToF-SIMS

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To identify biological traces in geological samples molecular biomarkers are widely used. Traditionally GC-MS (Gas chromatography-mass spectrometry) has been used for the analysis. In recent years when concentrations of target compounds were low surface sensitive ToF-SIMS (Time of Flight – Secondary Ion Mass Spectrometry) analysis has been applied. We present the results of a study using GC-MS and ToF-SIMS for the characterization of biomarkers in oils and oil extracts, aiming to prepare for the analysis of smallest quantities in oil samples recovered from fluid inclusions.

The biomarkers steranes and hopanes were characterized using polyatomic primary ion source (Bi_3^+) ToF-SIMS. These compounds were present in hexane extracts from natural oil samples by GC-MS analysis. The same extracts were analyzed by ToF-SIMS, allowing identification of individual biomarkers in this complex sample extract. This information was then used to interpret ToF-SIMS spectra derived from the crude oil by direct analysis. Although these spectra show the presence of a vast variety of components and compound fragments, the target biomarker components could be identified.

This initial study was done in preparation for the investigation of oil-bearing fluid inclusions in rocks from different environments and of different ages. Fluid inclusions may provide a wealth of yet undiscovered information due to their isolation from the environment. The capability to characterize smallest biomarker quantities from oil-bearing fluid inclusions contributes to the understanding of the environment in which the oil was formed and could provide insight into the biodiversity of early Earth.