Lithium isotope signatures of mantle domains

M.-S. KRIENITZ[1]*, C.-D. GARBE-SCHÖNBERG[1], R.L. ROMER[2], A. MEIXNER[2] AND K. HAASE[3]

[1]Institut für Geowissenschaften, Universität Kiel, 24118 Kiel, Germany (*correspondence: krieni@gfz-potsdam.de)
[2]Deutsches GeoForschungsZentrum, 14473 Potsdam, Germany
[3]GeoZentrum Nordbayern, Universität Erlangen-Nürnberg, 91054 Erlangen, Germany

Lithium isotopic compositions of submarine oceanic island basalt lavas were determined with the objective to define the Li isotope characteristics of mantle reservoirs and to gain additional insights into the role of material recycling in the development of mantle heterogeneity. A total of 33 lavas from nine hotspot locations being representative for different mantle end-members (e.g., HIMU, EM1, EM2) were analysed.

δ^7Li values of the lavas vary between 2.4‰ and 4.8‰. Although these values are indistinguishable within error from an average MORB value of +3.4‰ ± 1.4 [1], significant inter-group variations indicate that the mantle is heterogeneous in terms of its Li isotopic composition. Lavas with HIMU affinities show tendencies to higher δ^7Li values suggesting a heavy Li isotopic signature (>4‰) for this mantle component. Li isotopic values of EM1 lavas are somewhat lower averaging about 3.3‰, whereas EM2-type lavas analyzed in this study have more variable compositions ranging from about 3.2‰ to 4.4‰ suggesting an elevated δ^7Li signature for this mantle domain.

Variations of δ^7Li along with correlations with Sr, Nd and Pb isotopic compositions of the lavas support a model that the source regions of these lavas contain recycled material. Our observations are in line with earlier suggestions that recycled altered oceanic crust will produce heavy Li signatures, while recycled sedimentary material will have δ^7Li values similar to or slightly below MORB values.

[1] Tomascak *et al.* (2008) *GCA* **72**, 1626-1637.

Tropical Indian Ocean temperature and salinity variations during the last 280,000 yrs

MOTURI S. KRISHNA[1], DAVID M. ANDERSON[2], NITTALA S. SARMA[1] AND SK.G. PASHA[1]

[1]School of Chemistry, Andhra University, Visakhapatnam-530003, India
[2]NOAA, University of Colorado, Boulder, Colorado, USA

In the tropical Indian Ocean, sea surface temperature and salinity variations during the last 280,000 yrs. have been reconstructed using oxygen isotopic composition of surface dwelling planktonic foraminifer *Globigerinoides sacculifer* and Modern Analogue Techniques on relative abundances of thirteen planktonic foraminiferal species in the core sediments collected from the tropical Indian Ocean (Lat: 3°N and Long: 77°E) at a water depth of 4057 meters. During the last 280,000 yrs, sea surface temperature changes are very small and varied from 27°C to 28.24°C with a minimum temperature (27°C) in the oxygen isotope stage 5d & 5e and 8 whereas salinity recorded broad variation from 32.1 ‰ to 35.9 ‰ with higher salinity in the OIS 5 and 8. Sea surface salinity and temperature in this region is largely controlled by mixing of high salinity water from the Arabian Sea and low salinity water from the Bay of Bengal and this process is directly linked to the intensity of the Indian monsoon. Changing Evaporation – Precipitation (E-P) balance also plays major role in controlling sea surface salinity and temperature in this region. Our results demonstrated that precipitation was low during oxygen isotope stages 5 and 8 in the tropical Indian Ocean.