^{226}Ra activities and ^{226}Ra/Ba ratios on the Kerguelen plateau, Southern Ocean (KEOPS project)

M. BOURQUIN[1], P. VAN BEEK[1], J.-L. REYSS[2], M. SOUHAUT[1], S. JACQUET[3], F. DEHAIRS[3], M. CHARETTE[4] AND C. JEANDEL[1]

[1]LEGOS, Observatoire Midi Pyrenees, av. Edouard Belin, 31400 Toulouse, France (michael.bourquin@legos.obs-mip.fr)
[2]Laboratoire des Sciences du Climat et de l'Environnement, 91198 Gif-sur-Yvette, France (reyss@lsce.cnrs-gif.fr)
[3]Vrije Universiteit Brussel - Analytical and Environmental Chemistry Department –Pleinlaan 2, B-1050 Brussels, Belgium (sjacquet@vub.ac.be)
[4]Woods Hole Oceanographic Institution, Woods Hole MA02543, USA (mcharette@whoi.edu)

High biological productivity takes place on the Kerguelen Plateau in the Indian sector of the Southern Ocean known to be a HNLC region. Natural iron fertilization is suspected in that area. One goal of the KEOPS project is to understand the mechanisms controlling iron fertilization. Ra isotopes that are produced in the sediment and diffuse in the water column may be a good analogue for tracing the input of sedimentary iron and its fate on the Kerguelen Plateau. We measured all four radium isotopes during KEOPS (^{224}Ra, ^{223}Ra, ^{228}Ra and ^{226}Ra) in seawater in order to provide information on the water mass pathways on the Kerguelen plateau. We also measured dissolved Ba concentrations, Ba being a chemical analogue of Ra. Here we report ^{226}Ra activities and ^{226}Ra/Ba ratios obtained during repeated visits of station A3 located in the middle of the bloom area on the Kerguelen Plateau. We compare these data to those obtained outside the plateau, in the HNLC area. We observe a pronounced temporal variability in the ^{226}Ra activities and ^{226}Ra/Ba ratios found at station A3 suggesting that the dynamic system has changed during the repeated visits or that biological activity significantly impacts ^{226}Ra activities and ^{226}Ra/Ba ratios.

Geochemistry of primary magmas of St Vincent (Lesser Antilles Arc) tracked by melt inclusions

A.-S. BOUVIER[1], N. MÉTRICH[2] AND E. DELOULE[1]

[1]CRPG-CNRS, Nancy, France (abouvier@crpg.cnrs-nancy.fr; deloule@crpg.cnrs-nancy.fr)
[2]LPS, CNRS-CEA, Saclay, France (nicole.metrich@cea.fr)

The Lesser Antilles arc volcanism results from the subduction of the Atlantic plate beneath the Caribbean plate. Lavas are dominantly andesitic, but MgO-rich basalts are found in the south part of the arc (St-Vincent, Grenade islands). Major, trace elements and isotope geochemistry on whole rocks, as experimental works, suggest that magmas are generated by the melting of a N-MORB type mantle source contaminated by at least two components, involving fluids derived from subducted oceanic crust and sediments. However, the nature and the relative influence of each components and the importance of the crustale contamination are still debated (Macdonald *et al*., 2000). In order to discriminate the importance of these different contributions, we undertook the analysis of melt inclusions trapped in olivines of basaltic scoriae (MgO> 12.5 wt%) of St-Vincent. Major elements of more than 200 melt inclusions are measured by electron microprobe SX50, and H_2O, Li, B, Cl, F, δ^7Li, δ^{11}B, δ^{18}O of 50 melt inclusions are determined by SIMS 1270. Chemical and isotopic characterisations point out a broad variability for all the analysed elements. Major elements indicate a differentiation trend, and a second trend with lower SiO_2 and higher CaO than whole rocks. B, Cl and H_2O are variably enriched compared to MORB. δ^7Li values range from -10 to +7‰, δ^{11}B from -16 to +12‰, and δ^{18}O from +3 to +10‰. These variations reflect addition of contaminants. Melt inclusions provide new data which confirm that primary magmas of St-Vincent are generated by melting of a N-MORB type mantle source weakly affected by the addition of fluids derived from the dehydration of AOC and the melting of sediments.

References

Macdonald, R., Hawkesworth, C.J.; Heath E., 2000, *Earth-Science Review*s, **49**, 1-76.