Boninites as monitors of subarc enrichment processes in subduction zones

STEPHAN KÖNIG[1,2]*, CARSTEN MÜNKER[1], STEPHAN SCHUTH[1,3], AMBRE LUGUET[1], J. ELIS HOFFMANN[1] AND JONATHAN KUDUON[4]

[1]Universiät Bonn, Germany (stephan.koenig@uni-bonn.de)
[2]Universität Münster, Germany
[3]Universität zu Köln, Germany
[4]Rabaul Volcanological Observatory, Papua New Guinea

Boninites are ideally suited to examine trace element behaviour at the slab-mantle wedge interface because their incompatible trace element budget is virtually entirely dominated by slab components without a significant contribution from the refractory mantle wedge [1].

We re-sampled one of the classical low-Ca boninite localities at Cape Vogel, Papua New Guinea and compare the elemental budget of these lavas with that of high-Ca boninites from Cyprus [2]. For each of the two localities, we obtained a comprehensive dataset including major, trace element, Sr-Nd-Hf-Pb isotope and high-precision HFSE data (Nb, Ta, Zr, Hf, W), covering both boninites and associated arc tholeiites.

Our results confirm previous models in that the boninites constitute second stage melts generated after extraction of the tholeiites. In comparison to the Cyprus suite where subarc enrichment occurred via slab-derived fluids, enrichment processes in the sources of the PNG boninites involve significant amounts of slab-derived melts. Mass balance calculations reveal that in the boninites, the abundances of all investigated HFSE and those of LREE are entirely controlled by the composition of the slab-derived components. It is also possible to calculate compositions of the slab components. Most importantly, these components do not exhibit pronounced negative HFSE anomalies. Furthermore, coupled variations between Mo-W abundances and $^{207}Pb/^{204}Pb$ are observed for the two boninite suites. These systematics together with the different Mo/W in the subduction components may discriminate different compositions and redox states of subducted pelagic sediment in intra oceanic arc magmas.

[1] Cameron *CMP* (1985) **89**, 239-255.[2] König *et al. EPSL* (2008) **274**, 82-92

Organic compounds in hydrothermal fluids from ultramafic-hosted vents of the Mid Atlantic Ridge: An update on composition and origin

C. KONN[1,2], N.G. HOLM[1], J.P. DONVAL[2] AND J.L. CHARLOU[2]

[1]Department of Geology and Geochemistry, Stockholm University, Stockholm, Sweden (cecile.konn@geo.su.se)
[2]Département Geosciences Marines, DRO/GM-IFREMER C/Brest, Plouzané, France

Both serpentinisation and Fisher-Tropsh Type (FTT) reactions occur in ultramafic-hosted hydrothermal systems. Not only, those processes generate large amounts of H_2 and CH_4 but are likely to produce larger organic molecules. Hydrocarbons and oxidized organic compounds have indeed been detected in fluids from the Rainbow and the Lost City hydrothermal vent fields and portion of these compounds have been suggested to be abiogenic. However the question of the origin is still pending, as well as where the reaction zone is.

Several cruises conducted by IFREMER, France – EXOMAR (2005), SERPENTINE (2007), MoMARDREAMNAUT (2007) and MOMAR08-leg2 (2008) – enabled the collection of hydrothermal fluids on the Mid-Atlantic Ridge at various hot vent sites (Rainbow, Lost City, Logatchev and Ashadze). Several laboratories and institutes enabled: GC-MS analyes *(Département Geosciences Marines, DRO/GM-IFREMER C/Brest, Plouzané, France)*, GC-IRMS analyses *(Department of Analytical Chemistry (ANCH), Vrije Universiteit Brussel, Pleinlaan 2, B-1050 Brussels, Belgium)*, amino acids analyses *(Department of Applied Environmental science, ITM, Stockholm University, Stockholm, Sweden)* and experiments under hydrothemal conditions *(CNRS, Institut NEEL, Grenoble, France and UMR 6197, Microbiology of Extreme Environments DEEP/LM2E, C/Brest, Plouzané, France)*. Here we will give an update (i) on the organic content of the various fluids, (ii) on isotopic measurements progress, (iii) on the biogenic/abiogenic question. This work is carried out partly within the MOMARnet (**MO**nitoring deep sea floor hydrothermal environments on the **M**id-**A**tlantic **R**idge: A Marie Curie Research Training **NET**work') framework.