Recycling of W, Sb and Mo in Subduction Zones

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Tungsten, Sb and Mo are part of the high field strength element (HFSE) group which is traditionally regarded as behaving relatively immobile in subduction zone fluids. We present new high-precision W, Nb, Ta, Zr, Hf concentration data for lavas from various arc settings obtained by isotope dilution and MC-ICP-MS. Antimony and Mo were analysed in combination with other incompatible trace elements by conventional quadropole ICP-MS measurements. Glasses from the UPL suite from Troodos, Cyprus permit to evaluate the mobilization of HFSE by fluids derived from subducting sediments (Cameron et al., 1985). The HFSE budget in these magmas is compared to that in Solomon arc lavas, the sources of which have only been overprinted by fluids and melts derived from subducted oceanic crust (Schuth et al. 2004). Measured Ta/W in both suites are lower ($<$2.9) than values for MORB (ca. 5), indicating that W is more mobile in subduction components than Nb and Ta. Correlations between Ce/Pb, Sb/Ce and W/Th support an effective mobilization of Sb and W by slab-derived fluids and clearly resolve a more pronounced W and Sb enrichment in slab fluids originating from subducted sediments, reflecting the higher initial abundances of both elements in sediments. Tungsten and Mo abundances correlate well in the Solomon arc suite where negligible amounts of pelagic sediments were subducted, whereas both abundances are decoupled in the Cyprus suite with subducted pelagic sediments present in their sources. This difference possibly reflects variable redox conditions and a different fluid salinity during dehydration processes in subducting oceanic plates.

References

Cameron W (1985) Petrology and origin of primitive lavas from the Troodos ophiolite, Cyprus, Contrib Min Petrol 89: 239-255

Schuth S, Rohrbach, A, Münker C, Qopoto C (2004): Geochemical constraints on the petrogenesis of arc picrites and basalts, New Georgia Group, Solomon Islands, Contrib Min Petrol 148: 288-304

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Abs. No. **141**
Meeting: **DMG 2008**
submitted by: **König, Stephan**
email: **stephan.koenig@uni-bonn.de**
date: **2008-05-30**
Req. presentation: **Vortrag**
Req. session: **S05**