Petrogenesis of meta-peridotites in the Takab area, NW Iran

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The Takab meta-ultramafic rocks of north western Iran crop out in association with a variety of metamorphic rocks including mafic granulites, amphibolites, calc-silicates, granitic gneisses and pelitic schists. The protoliths of the Takab meta-peridotites were mainly harzburgite and dunite with subordinate lherzolite. All peridotite varieties contain primary Cr,Al-spinel. The peridotites were modified by metasomatism under low-grade conditions and later amphibolite-facies metamorphism, the thermal peak of which occured at temperature of 410-530ºC, corresponding to an orogenic setting.

Chemical compositions of the porphyroclastic olivine, pyroxene and spinel in the investigated meta-peridotites give temperature of 1000-1200ºC; clinopyroxene barometry yields a pressure of 24±2.7kbar, corresponding to a depth of ca. 72km.

The results are consistent with oceanic lithospheric upper mantle origin (i.e. in an ophiolitic setting) of the meta-ultramafic rocks in the Takab area. Similarities in the stratigraphy, lithology and age data (relative and isotopic ages) of the protoliths of the Takab complex and equivalent units from the Central Iran Zone suggest that the Takab complex has a Neoproterozoic-Early Cambrian age and experienced the Pan-African orogeny. The strips of the ultramafic rock in the study area are remnants of the Proto-Tethyan oceanic lithosphere.

Li isotope fractionation in the subducted slab – A case study from the Raspas complex, Ecuador

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Lithium isotopes are a potentially powerful geochemical tracer of subducted material due to significant isotopic fractionation on the Earth's surface and the fluid-mobile behaviour of Li. To improve our ability to track recycled Li in the mantle, and to understand the transfer of Li from the slab through the mantle wedge to the volcanic arc, it is important to constrain the Li isotopic composition of subducted material and the isotopic changes that may occur during the subduction process.

Here, we report results from a detailed geochemical and Li isotope study on the now exhumed part of a subducted slab from the Raspas complex (Ecuador), which comprises serpentinites, eclogites, blueschists and high-pressure metapelites. Eclogites show MORB-like trace element signatures and are LREE-depleted. They are characterized by a light Li isotopic composition with δ^7Li ranging from 0 to -13. These values are considerably lower than those of fresh and altered MORB (δ^7Li = +3 to +14; Chan *et al*., 1992), but they overlap with those of Alpine eclogites (Zack *et al*., 2003). In contrast, blueschists and metapelites, as well as the serpentinites that are interpreted to represent the mantle portion of the subducted slab, have Li isotopic compositions in between the eclogites and MORB. A negative correlation between δ^7Li and Li/Dy for the eclogites suggests that influx of Li from an external source may have been responsible for decrease in δ^7Li in the eclogites. Moreover, the elevated Li concentrations in some of the eclogites (up to 94 ppm) are difficult to reconcile with Li loss during dehydration alone. Although none of the associated lithologies is particularly rich in Li, eclogite-facies fluids that may contain up to 438 ppm Li (Svensen *et al.*, 2001) could provide a suitable source of Li. These results suggest that fluid-assisted kinetic isotope fractionation (Teng *et al*., 2006) may have played a role in causing the light Li isotope composition of the eclogites, as also suggested by Marschall *et al.* (2007).

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