

## ULTRAHIGH-PRESSURE METAMORPHISM OF GARNET PERIDOTITES FROM POHORJE MTS. (EASTERN ALPS, SLOVENIA)

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New evidence for ultrahigh-pressure metamorphism (UHPM) in the Eastern Alps is reported from garnet peridotites of Pohorje Mts. in Slovenia. In this area, an eo-Alpine UHPM has been recently documented in the eclogites (JANÁK et al., 2004). These eclogites are closely associated with meta-ultrabasites - predominantly serpentinised dunite and harzburgite with garnet peridotite remnants. The country rocks of eclogites and metaultrabasites are amphibolites, orthogneisses, paragneisses and micaschists. All these rocks belong to the Lower Central Austroalpine basement unit of the Eastern Alps, exposed in the proximity of the Periadriatic fault.

Ultramafic rocks have experienced a complex metamorphic history. At least four stages of recrystallization have been identified in the garnet peridotite based on an analysis of reaction textures and mineral compositions.

Stage I is a high-temperature protolith assemblage of olivine + orthopyroxene + clinopyroxene + Cr-spinel. Aluminous pyroxenes occur as inclusions in garnet, chromian spinel is preserved in the matrix.

Stage II – an ultrahigh-pressure stage is defined by matrix assemblage garnet + olivine + orthopyroxene + clino-pyroxene + Cr-spinel. Garnet contains up to 67 mole% of pyrope, olivine has 90 mole% of forsterite, orthopyroxene is low in Al<sub>2</sub>O<sub>3</sub> (~0.8 wt%) and spinel has a Cr\* ~50.

Stage III – a decompression stage is manifested by formation of kelyphitic rims of high-Al orthopyroxene, aluminous spinel and paragonitic hornblende replacing garnet. Due to retrogression, garnet shows a decrease in MgO.

Stage IV – is represented by formation of tremolitic amphibole, chlorite, serpentine and talc.

*P-T* estimates based on geothermobarometric calculations of a) Fe-Mg exchange between garnet, olivine and orthopyroxene thermometers, b) the Al-in-orthopyroxene barometer indicate that the peak of metamorphism (stage II) occurred at ~820 - 900 °C and 3 - 3.5 GPa. This is consistent with previous estimation of very high *P-T* conditions in meta-ultrabasites by HINTERLECHNER-RAVNIK et al. (1991) and the associated eclogites (JANÁK et al., 2004). These results suggest that the mantle fragment (garnet peridotite) and the crustal fragment (eclogite) in the Pohorje Mts. both experienced a common UHPM during the Cretaceous orogeny. We propose that UHPM resulted from deep subduction of a continental slab which incorporated peridotites from an overlying mantle wedge.

### References

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