Element redistribution and seawater imprint in UHP serpentinites from Tianshan, China

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Serpentinites play an important role in element and volatile recycling in subduction zones [1]. The behavior of trace elements, especially REE and fluid-mobile elements (FME) was investigated in this study by *in-situ* LA-ICP-MS analysis of the main minerals in serpentinites from the Chinese Tianshan. The serpentinites are part of eclogitized oceanic lithosphere that experienced ultrahigh-pressure (UHP) metamorphism (520±10 ºC, 37±7 kbar) and record different stages of metamorphism with Ti-chondrodite (TiCh) + olivine + antigorite ± diopside as a peak mineral assemblage [2]. The deep subduction (to at least 100 km depth) of serpentinites without full de-serpentinization make these rocks suitable to study the trace element uptake during serpentinization and their parital release during dehydration reactions at sub-arc depth.

Three different types of serpentinites were choosen to study the whole rock geochemistry, and REE, FME and other trace element features in the main minerals. During subduction, REE, HFSE and other trace elements (e.g. Cs, Rb, Ba, Th, U) decrease from lizardite to antigorite, and from clinopyroxene to diopside. Olivine, TiCh and TiCl (Ti-clinohumite) are rich in HFSE (e.g. Nb, Ta, Zr, Hf, Ti) and HREE, and the enrichment is more significant from olivine to TiCl during prograde metamorphism. The enrichment of FME (e.g. B, As, Sb) is observed in all rock-forming minerals, and especially pronounced in antigorite, preserving a geochemical signature acquired during seafloor alteration down to at least 100 km depth in subducted serpentinites.

[1] Deschamps *et al.* (2013) *Lithos* **178**, 96-127.
[2] Shen *et al.* (2015) Journal of Petro. **56**, 1425-1458.