

## **Halogens in garnet eclogites from Western Norway: implications for subcontinental mantle metasomatism**

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Exhumed, subducted crustal terranes record the most extreme metamorphic conditions that continental rocks are known to experience. Fluid flow and fluid-rock interaction during eclogite facies subduction, is evidenced by vein-associated garnet websterites in the Western Gneiss Region (WGR), Norway. Our study focuses on the metasomatism of ultra-high-pressure (UHP) rocks in the WGR; in particular, on determining the signature, source and recycling of halogens at the interface between crust and mantle. Samples analysed are from eclogite facies mafic-ultramafic bodies hosted within the WGR country rock. Anhydrous (garnet, quartz, olivine) minerals contain halogens at levels exceeding depleted MORB mantle concentrations, with the major fraction of halogens hosted in multi-phase inclusions. These results are consistent with a previous study of halogens in eclogite facies fluid inclusions in Norwegian eclogites [1]. The halogen compositions show similarities to brine inclusions in diamonds [2] and mantle peridotite xenoliths from Siberia [3]. Subcontinental mantle metasomatism may be associated with UHP, supercritical fluids derived from subducted, eclogite-facies, continental crust, rather than oceanic crust, as the continental crust is a greater source of halogens and water which characterise mantle metasomatism. [1] Svensen et al (2001) *J. Met. Geol.* 19, 165-178. [2] Johnson et al (2000) *GCA* 64, 717-732. [3] Broadley et al (2018) *Nat. Geo.* 11, 682–687.