Kimberlite-like melts trapped in mantle wedge peridotites in subduction setting

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Ultrahigh-temperature and ultrahigh-pressure (UHP-UHT) garnet peridotites from Saxothuringian basement of the northern Bohemian Massif, European Variscan Belt, contain multiphase solid inclusions (MSI) enclosed in garnet, pointing to metasomatism by crustal-derived fluids in a mantle wedge above subducting slab. Rehomogenization experiments have been run at peak conditions of 1075°C and 4.5 GPa, to homogenize the inclusions and obtain constraints on their origin. The natural MSI are dominated by pargasitic hornblende, barian mica and carbonates (magnesite and dolomite), with minor spinel, clinopyroxene, and accessory apatite, Th-U oxide and Fe-Ni sulfide. Rehomogenization experiments produced no glass but crystals, and numerous voids suggesting that a fluid phase (likely rich in H_2O, Cl, F and Na) was present during the experiment and escaped during subsequent polishing. Presence of carbonates, Ba-mica, Th-U oxide and Fe-Ni sulfide in the experimental products is similar to the natural starting MSI. By contrast, hornblende is absent, whereas newly crystallized garnet (enriched in Ca and depleted in Fe compared to the host garnet) and rare olivine are present. In addition, carbonates have a ternary Ca-Mg-Ba character. The experimental products seem to represent a higher P-T analogue of the natural MSI assemblage which have (re)crystallized at lower pressure (c. 2 GPa). The mineralogy and experimental behavior of the MSI point to a complex hydrous carbonate-silicate supercritical fluid. Preliminary bulk major element composition of the MSI as well as barian mica composition seem to be close to the Group II kimberlites.