EGU21-3319, updated on 03 Dec 2021
https://doi.org/10.5194/egusphere-egu21-3319
EGU General Assembly 2021

Rodingitization of mafic rocks from Central Evia (Greece) associated with serpentinite exhumation: Evidence from Petrological, Geochemical and Isotopic data

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In Central Evia island (Aegean-Greece) serpentinized ultramafic rocks appear as elongated thrust sheets or in the form of olistostromes incorporated within Maestrichtian-Paleocene flysch. These are crosscut by well-developed rodingite dykes that were derived from four main protoliths that include i) Boninites, ii) Island-arc Tholeiitic Basalts and Gabbros, iii) Alkaline basalts and iv) Calc-alkaline basalts. They mainly comprise of minerals that include (hydro)garnet + chlorite + clinopyroxene ± vesuvianite. Accessory minerals include spinel ± calcite ± prehnite ± amphibole ± orthopyroxene ± olivine ± quartz ± opaque Fe-Ti oxides. Rodingites that were formed at the expense of boninites and island-arc tholeiitic rocks were likely formed within a single rodingitization stage, since garnet is mainly grossular-rich and relict primary clinopyroxene has been preserved. The rodingitization of the alkaline and calc-alkaline basalts seems to have occurred as a multi-stage metasomatic process that occurred during the exhumation of the mafic-ultramafic mantle wedge complex. This resulted in the development of late-stage andradite, vesuvianite and in some cases of chlorite during derodingitization. In this case, successive reaction zones with variability in the participating mineral phases were developed. Geochemical results reveal remarkable rare earth element (REE) enrichments, especially in the inner zones, likely being the result of successive diffusion and element transfer. Few rodingites are characterized as calcite-bearing, whose stable ^{13}C-^{18}O isotopic data points to the restricted involvement of late-stage mixed hydrothermal and seawater-related carbonation processes.