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Fluid-assisted remobilization of major and trace elements in rodingites from their formation on the seafloor to high-pressure dehydration of enclosing serpentinites (Cerro del Almirez, southern Spain).

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Three types of metarodingites are enclosed in the antigorite serpentinites and chlorite harzburgites of Cerro del Almirez (Betic Cordillera, southern Spain), i.e. at both sides of the antigorite-out dehydration front of subducted serpentinites. These mafic lithologies record the evolution of igneous rocks during prograde metamorphism from seafloor rodingitisation to the dehydration of host Atg-serpentinites at high P (∼1.6-1.9 GPa), and later during retrograde amphibolitisation. The igneous precursors of Type 1 Grandite-metarodingites underwent intense seafloor metamorphism in a fluid-dominated system, causing the removal of alkaline metals (Na, K, Rb, Cs), Si, Sr, Ba and Pb, and enrichment in Ca. On the other hand, the igneous fractionation of rare earth elements (REE) was preserved during rodingitisation. The Fe_2O_3/FeO ratio increased during subduction up to the formation of Type 2 Epidote-metarodingites from precursor Type 1 upon dehydration of host Atg-serpentinites. The formation of Type 2 led to strong enrichment in Si, Sr, Pb and Ba, slight enrichment in Na, K, Fe^{3+} and Mg, and depletion in Ca and Mn, whereas REE were immobile. Type 3 Pyralspite-metarodingites are enclosed only in dehydrated Chl-harzburgites and show depletion in Ca, Si, Fe^{3+} and Sr and enrichment in Mg and Fe^{2+} compared to Type 2. Finally, all types of metarodingites experienced retrograde amphibolitisation at different degrees, leading to Ca and Si leaching and enrichment in alkaline elements (Na, K, Rb, Cs), Mg, Mn, Fe^{2+}, U and Ba. These geochemical variations support the exchange of major and trace elements between different subducted lithologies (serpentinites, rodingites, metasediments) promoted by fluids released through dehydration reactions in an open system.