



Eclogites and Garnet Peridotites as recorders of partial melting and metasomatism during continental subduction: Examples from Pohorje Mts., Slovenia

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Kyanite eclogites and garnet-olivine websterites are part of the Eo-Alpine UHP nappe exposed in the Pohorje Mts, Eastern Alps, Slovenia. The rocks occur as lenses and boudins within high-grade, continental basement rocks and a serpentinized ultramafic complex. Estimated peak P,T conditions vary from 800°C at 3 GPa for eclogites to 900°C at 4 GPa for peridotites.

Low-TiO₂ (<0.5 wt%) eclogites are characterized by positive Pb, Sr and Eu anomalies (Sr*=2.1-17, Eu*=1.1-2.5) and enrichment in alkalis and Ba. REE show a considerable range in HREE (Yb_N=1-8) with concave slightly MREE-enriched patterns, comparable to those of gabbroic cumulates from mid-oceanic ridges. Strongly LREE-depleted patterns (Yb_N/Ce_N= 5-74) are only observed in serpentinite-hosted eclogites. They probably reflect low-degree partial melting during decompression and exhumation. Garnet peridotite trace-element patterns largely mirror eclogite patterns, including positive Eu and Sr anomalies. These rocks could represent depleted mantle that became refertilized within the plagioclase stability field before tectonic incorporation in the subducting continental slab or carry the signature of metasomatism by melts/fluids derived from a plagioclase-bearing source. Alternatively, they were cumulates from magmas similar to those that formed the eclogite protoliths, but with a higher proportion of ferromagnesian minerals.