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Compositional variations of whole-rock and coexistings phases with partial melting and melt-rock interaction of peridotite in an upper mantle section from Ortaca area, SW Turkey

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Major and trace element abundances of minerals as well as whole-rock analyses of the Ortaca perditotites from SW Turkey have been prepared to understand processes controlling lithological and compositional variations in the dismembered mantle section, containing clinopyroxene-bearing harzburgite, harzburgite and dunite. Even in a small scale, Ortaca peridotites vary from almost fertile cpx-bearing harzburgite (1.92-2.42 wt.% Al_2O_3 and 2.00-2.64 wt.% CaO) with lower Cr-numbers of spinel ($<$0.24) to depleted harzburgite and dunite (0.17-1.60 wt.% Al_2O_3 and 0.32-1.71 wt.% CaO) with higher Cr-numbers of spinel (0.31-0.76). Systematic variations of major and trace elements within MgO-contents are regarded as varying degree of partial melting by forming of the peridotites. The depleted harzburgite and dunite display LREE enriched chondrite-normalized patterns, suggesting mantle metasomatism probably by fluid-bearing melt, derived from the subducted slab, due to the melt-rock interaction process, whereas cpx-bearing harzburgite show HREE enriched chondrite-normalized patterns. Platinum-group element (PGE) concentrations of peridotite samples scatter from partial melting and fractional crystallization trend, also suggesting that PGE concentration controlled by different processes. Mineral chemistry implies that the refractory harzburgite and dunite experienced higher degree of partial melting (up to 40%) than abyssal peridotites. The Ortaca peridotites have low olivine spinel (519-751 $^{\circ}$C) and somewhat higher two pyroxene equilibration temperatures (707-884 $^{\circ}$C) relative

to abyssal peridotites, because of water-assisted diffusional equilibration in the suprasubduction zone. They are characterized by oxygen fugacities between $\Delta\log^{FMQ}$ -1.61 and +0.74. Clearly, the cpx-bearing harzburgites define an increasing oxygen fugacity with almost constant Cr-number, whereas the refractory harzburgite and dunite show a strong positive correlation between oxygen fugacity and Cr-number.

Within the different mineral and whole rock measurements as well as within the temperature calculations and the oxygen fugacity it can be suggested that the investigated peridotites were subsequently affected by interaction with boninitic melt from which the high-Cr chromitites were formed within the mantle wedge above the suprasubduction zone.