# WHOLE-ROCK AND MINERAL COMPOSITION OF ABYSSAL PERIDOTITES FROM HARMANCIK-BURSA (NW-TURKEY)

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Whole rock major and trace element abundances and mineral phases of rock samples from Harmancik, NW-Turkey are investigated to understand the formation of the ultramafic rocks which are supposed to be remnants of lithosphere of Neotethys Ocean. MgO concentrations correlated negatively with $SiO_2$, $Al_2O_3$, CaO, V, Sc, Yb and Lu. $Al_2O_3$ and CaO abundances are between 0.75-2.21 and 0.01-2.31 wt%, respectively and increase with the increasing of clinopyroxene abundances. Olivine compositions range from $Fo_{0.89}$ to $Fo_{0.92}$ and show no chemical zoning. NiO contents vary between 0.27 and 0.53 wt.%, and MnO contents reach up to 0.20 wt.%, indicating compositions similar to mantle olivine. Orthopyroxene has high Mg-number (0.89-0.92) and contains thin exsolution lamellae of clinopyroxene in some cases. Composition range between $En_{86–91}$ $Wo_{0–5}$ and $Fs_{8–11}$, with low content of CaO (0.23–2.65 wt.%). $Al_2O_3$ concentrations show a wide variation between 1.47 and 4.95 wt.%. The $Al_2O_3$ contents in clinopyroxene vary between 1.88 and 6.09 wt.% and $Cr_2O_3$ contents between 0.45 and 1.27 wt.% with a Mg-numbers comprised in the range of 0.90 and 0.95. They also contain up to 0.17 wt.% $TiO_2$ and 0.64 wt.% $Na_2O$. Spinel grains are generally rich in Al, with the Cr- and Mg-numbers ranging from 0.18 to 0.56, and 0.5 to 0.79 respectively. Mg-number of spinel is usually higher in clinopyroxene-rich harzburgite than those of more depleted harzburgite and inversely correlated with the Cr-number. The $Al_2O_3$ contents of orthopyroxene and clinopyroxene in the Harmancik peridotites correlate negatively with Cr-numbers of coexisting spinels. The $Al_2O_3$ contents in orthopyroxene and clinopyroxene from clinopyroxene-rich harzburgite is high and Cr-number in the coexisting spinel is low falling within the abyssal field, whereas orthopyroxene and clinopyroxene in the more depleted harzburgites have lower $Al_2O_3$ contents for a given Cr-number of spinel and plot within the lower end of abyssal field, clearly following a depletion trend. Whole rock MgO and V concentrations, as well as mineral chemistry imply that these rocks formed by different degrees of partial melting (%5-25). The clinopyroxene rich samples have higher REE abundances than those of clinopyroxene poor ones and all samples are depleted with respect to chondrite showing convex-downward patterns. Olivine-spinel equilibration temperatures are low in Harmancik ultramafics (670-765 $^oC$) and oxygen fugacity values between $\Delta\log^{FMQ}$ -0.88 to +0.72. Oxygen fugacity, temperature, mineral chemistry and whole rock abundances, as well as lack of abundant chromite deposits in the investigated area, reflect that ultramafic rocks of Harmancik are similar to the abyssal peridotites and have not been affected intensively by percolating melt if SSZ origin is considered for the formation of these rocks.