



Peridotites from the Khoy ophiolitic complex, NW of Iran: Evidence for mantle beneath a supra-subduction zone setting

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The Khoy ophiolitic complex as part of the tethyan ophiolites is exposed in the north-western of the Iranian Azerbaijan province, extending to the Anatolian ophiolites in southeast Turkey. Geochemistry and microstructural studies of residual mantle exposures in the Khoy ophiolites provide important information on petrogenesis and deformation conditions of the mantle and melt – mantle interaction processes in the oceanic lithosphere. Ultramafic tectonites consisting mainly of lherzolites and cpx-harzburgites. These peridotites can be classified into two groups: 1- peridotites type-(I) contain Al – rich spinels (Cr# of 0.16 – 0.26, Mg# of 0.64 – 0.76 and $\text{TiO}_2 < 0.12$ Wt %) with generally smooth LREE – depleted and fairly flat MREE – HREE profiles. They resemble fertile abyssal peridotites. 2 - peridotites type-(II) contain Cr – rich spinels (Cr# of 0.31 – 0.88, Mg# of 0.51 – 0.89 and $\text{TiO}_2 = 0.13$ to 1.03 Wt %) with U – shaped REE patterns indicative of interaction between LREE – depleted mantle peridotites and LREE – enriched extracted melt. They are depleted abyssal or supra – subduction zone peridotites, which show evidence for interaction between melt and mantle. Peridotite fabrics demonstrate dislocation creep of olivine on the (010) [100] slip system, plus subsidiary slip along the (001) [100] slip system. These systems, as well as coarse and fine – grained porphyroclastic textures, indicate deformation at temperatures of $\sim 1000^{\circ}\text{C}$ to 1250°C . The observed subsidiary (001) [100] slip system is induced by elevated H_2O activity and represent that deformation took place in a wet subduction zone origin. The results illustrate that the peridotites type-(I) has probably originated as the residue from less than 15% partial melting at a slow-spreading oceanic ridge, and subsequently modified to peridotites type-(II) by interacting with

IAT arc magmas. The geochemical and microstructural data suggest that the Khoy ophiolitic mantle is consistent with a supra-subduction zone environment.

Key words: Mantle peridotites, Deformation conditions, Supra – subduction zone, Khoy ophiolitic complex, Iran