Geophysical Research Abstracts
Vol. 18, EGU2016-12429-1, 2016
EGU General Assembly 2016

Melting and refertilization history of the mantle peridotites from the SSZ-type Guleman ophiolite

Samet Saka (1), Ibrahim Uysal (1), and Recep Melih Akmaz (2)

(1) Karadeniz Technical University,Turkey, (uysal.ibrahim@gmail.com), (2) Bülent Ecevit University,Turkey, (rmelihakmaz@gmail.com)

Guleman ophiolite from the eastern Turkey, is composed of mantle peridotites and overlying ultramafic to mafic cumulates and diabase dykes. Mantle peridotites is represented by varying degrees of serpantinized dunite and harzburgite. TiO_2 and Na2O (<0.02 wt.%) as well as $Al2O_3$ (0.18–1.07 wt.%) and CaO (0.03–2.27 wt.%) contents were depleted compared to the primitive mantle. Modal composition of clinopyroxene is less than 4 vol.%, and some samples were observed to contain amphibole with tremolite-hornblende in composition. Forsterite values of olivine range between 87.7 and 92.8. Spinel has Cr# values varying from 44 to 73 and generally contain low TiO_2 (<0.1% wt%); however spinel in some samples are represented by up to 0.23 wt.% TiO_2. Primitive mantle-normalized whole rock Lantanum Group Elements (LGE) patterns reflect melting histrory of the samples at different pressure conditions such as spinel (Group-1 samples) and garnet+spinel (Group-2 samples) stability fields. Heavy LGE patterns of Group-1 samples show slight depletion towards middle LGE. However, heavy LGE patterns of Group-2 samples show rapider depletion towards middle LGE. Heavy LGE to middle LGE patterns of the Group-1 samples follow the melting lines produced by various degrees of fractional melting in spinel stability field and they are modeled ∼16–20 fractional melting in spinel stability feld. However, heavy LGE to middle LGE patterns of the Group-2 samples do not follow the melting lines produced by various degrees of fractional melting in spinel stability field. These samples require melting started in garnet stability field and followed in spinel stability field with a total depletion of ∼17 to 30%. Cr# values of spinel of the Group-1 and Group-2 peridotites reflect partial melting degrees between %20-40, and these numbers are found to be inconsistent as the partial melting degrees obtained by LGE modeling are lesser. This might indicate a various degree of enrichment of LGE after the depletion of the samples. The presence of amphibole (tremolite-hornblende) in some samples, TiO_2 enrichment in some spinel minerals and enrichment of light LGE especially in Group-1 samples show that the investigated samples were enriched by melt/fluids related with subduction processes.