Trace element composition of clinopyroxenes from the Kızıldağ ophiolite (S-Turkey): Implication for multi-stage fractionational melting in a SSZ setting

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Trace-element composition of clinopyroxenes from the mantle peridotites of Kızıldağ ophiolite (Hatay, S-Turkey) were determined by laser ablation ICP-MS to better understand the geochemical processes and the formation of the ophiolite. The peridotite sequence is composed of tectonized harzburgite and ultramafic cumulate rocks representing refractory mantle source and Moho Transition Zone (MTZ), respectively. Harzburgites contain spinel with Cr# 47-70 and Mg# 37-66, indicating that they are residue of high degrees of partial melting. Ultramafic cumulates are mainly dunite and wehrlites. Tectonized harzburgites show two different types of compositions. First type of harzburgites are refractory and have primary pyroxene crystals with ductile deformation signs. Second type of harzburgites are more fertile and have interstitial clinopyroxenes showing similar characteristics with rocks from MTZ. Chondrite-normalized rare earth element (REE) patterns of clinopyroxenes from Kızıldağ ophiolite are clearly depleted in light REE (LREE) ($[Lu/La]_N>100$), and have slightly similar patterns with clinopyroxenes of abyssal peridotites from normal mid-ocean ridges (MOR). Interstitial clinopyroxenes in MTZ dunites have flatter patterns ($[Lu/La]_N\sim10$) comparable with those from other dunites of all the Tethyan ophiolites (e.g. Oman, Troodos). Clinopyroxenes in tectonized harzburgites having extremely downward REE patterns, characterized by a strong depletion from heavy REE (HREE) to middle REE (MREE), suggest that they are residue of first stage fractional melting in the garnet stability field in a MOR setting. Interstitial clinopyroxene from impregnated harzburgites have more enriched REE patterns than those of depleted harzburgites, indicating spinel field melting in a SSZ setting where melts can percolate within upwelling mantle.

The possible source mantle and magma genesis of basalts from Pitcairn island: Implication from highly siderophile elements and Os isotope ratios

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It is well known that recycled materials are involved in producing the chemical and isotopic heterogeneities observed in oceanic island basalts (OIB). The type of recycled material present in the Enriched Mantle 1 (EM-1) reservoir has been widely debated. Oceanic crust with pelagic sediment (e.g., Chauvel *et al*., 1992), delaminated subcontinental lithospheric mantle (SCLM) (e.g., Hauri and Hart, 1993), subducted oceanic plateaus (Gasperini *et al*., 2000) and just single melting process involving pristine mantle (Collerson *et al*., 2010) have all been invoked as contributing to EM-1 source. The chemical composition of EM-1 is characterized by radiogenic Sr, unradiogenic Nd, unradiogenic Pb and radiogenic Os isotope compositions compared to the depleted mantle.

We measured Os isotope ratios and highly siderophile elements (HSE) abundances in basalts from Pitcairn Island, south Pacific, which represent strong EM-1 flavor to identify the possible source components of these magmas. The Os isotope ratios (0.138-0.161) have similar to or slightly higher range than, those measured in previous studies on EM-1-type basalts (~0.150). The HSE patterns normalized by chondrites are characterized by fractionation between IPGE (Os, Ir, Ru) and Pd. Among IPGE, Ir abundances of some basalts are depleted compared to Os and Ru. Pt abundances of most basalts also show depleted pattern from Ru and Pd. These characteristics are similar to some picrites from Hawaii (Ireland *et al*., 2009). However the abundances of HSE in Pitcairn basalts are clearly lower than those of Hawaiian picrites with similar range of MgO. The Os isotope ratios of Pitcairn basalts are higher than those of picrites. We will discuss the components of the source mantle of EM-1 and the magma genesis of Pitcairn Island basalts combining our data with previous studies.

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