Geophysical Research Abstracts,
Vol. 10, EGU2008-A-00821, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-00821
EGU General Assembly 2008

Processes in the mantle wedge: evidence from clinopyroxene and olivine geochemistry of mantle section rocks from Voykar Ophiolite (Polar Urals).

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Mantle section rocks of Voykar ophiolites (Polar Urals) could be subdivided into residual harzburgites, dunite channels and pyroxenitic dykes of various compositions. All these rocks display very low degree of alteration. We used precise clinopyroxene and olivine trace element compositions coupled with geological observations to trace signatures of mantle processes on melts and residual rocks. Our data represents case of supra-subduction mantle and therefore, can give important information on processes of melting of residual mantle in hydrous conditions and interaction of mantle wedge residual rocks with percolating melts and/or fluids derived from subducting slab.

Clinopyroxene from residual harzburgites display enrichment in LREE similar to forearc harzburgites (Parkinson and Pearce, 1998). Comparable enrichment in LREE coupled with HFSE (e.g. Nb and Zr) depletion and relative LILE (e.g. Sr) enrichment which are typical subduction zone signatures are distinctive for clinopyroxene from pyroxenitic dykes.

As mechanism for dunitic channel formation we suggest dissolution of clinopyroxene from mantle harzburgites by percolating melt as it is widely accepted for areas of MORB generation (e.g. Kelemen at al, 1995), but composition of the melt is different due to the hydrous melting conditions (Wood and Blundy, 2002; Gaetani et al, 2003). Furthermore, based on composition of olivine and clinopyroxene from pyroxenitic dykes we suggest that they represent channels for sublithospheric transport of olivine-undersaturated melts derived from partial melting of olivine-free pyroxenitic

lithologies. Such pyroxenitic lithologies are believed to represent reaction products between high-Si melts or fluids from slab and mantle peridotites, formed by mechanism similar to described in (Sobolev et al, 2007).