

LOW TEMPERATURE EARTH MANTLE XENOLITHS FROM SIKHOTE-ALIN, FAR EAST RUSSIA

Blümel, A.¹, Ntaflou, T.¹, Ashchepkov, I.², Prikhodko, V.S.³ & Gregoire, M.⁴

¹University of Vienna, Department of Lithospheric Research, Althanstraße 14, 1090 Vienna, Austria

²Institute of Geology and Mineralogy, SB RAS, Ac. Koptyuga ave. 6, 630090 Novosibirsk, Russian Federation

³Institute of Tectonics and Geophysics, Far-East Branch RAS, Kim Yu Chen Street 65, 680000 Khabarovsk,
Russian Federation

⁴Géosciences Environnement Toulouse, Observatoire Midi Pyrénées, Université de Toulouse, Toulouse, France
e-mail: andrea.bluemel@hotmail.com

The study area, located in the Sikhote-Alin fold belt, comprises mantle xenoliths from Tuttochi, a locality close to Khabarovsk. The xenoliths are spinel lherzolites, their sizes vary from 3 to 8 cm in diameter and they are exceptional fresh. The most striking feature is the fact that part of the xenoliths show heavy infiltration of melts. These melts, undersaturated but rich in alkalis, circulate intergranular and react with the neighbor minerals creating veinlets with variable thickness consisting of glass and new forming minerals such as hydroxyl-apatite, apatite and ilmenite. According to their modal composition the xenoliths are fertile spinel lherzolites as also can be inferred from the compositions of their constituent minerals. Olivine is forsteritic with Fo varying from 89.3 to 90.0. The Mg# of orthopyroxene and clinopyroxene vary from 0.895-0.904 and 0.904-0.915, respectively and the Cr# of spinel varies around 0.100, indicating equilibrium conditions.

Model calculations have shown that the lithospheric mantle in this area has experienced 1-5 % batch melting. Also the calculated equilibrium temperatures for the xenoliths at 1.5 GPa are relative low and range from 780 to 940 °C. According to the REE abundances in cpx the spinel peridotites could be divided into three groups; group 1 with $(La/Sm)_N = 0.11-0.53$, group 2 with $(La/Sm)_N = 0.64-1.05$ and group 3 with $(La/Sm)_N = 1.85$. While the chondrite normalized LREE abundances in cpx demonstrate variable enrichments and depletions, the HREE do not show significant differences among the three groups. Their overall $(Dy/Yb)_N$ ratios vary from 1.05-1.16.