Unique amphibole-rich mantle beneath the Leningrad kimberlite pipe, West Ukukit field, NE Yakutia

IGOR ASHCHEPKOV1, SVETLANA BABUSHKINA2, OLEG OLEINIKOV2 AND NIKOLAI MEDVEDEV3

1Istitute of Geology and Mineralogy SB RAS
2Institute of Geology of Diamond and Precious Metals, Siberian Branch, Russian Academy of Sciences, Yakutsk, Russia
3Nikolaev Institute of Inorganic Chemistry 3, Acad. Lavrentiev Ave.3, Novosibirsk, 630090

Presenting Author: igora57@mail.ru

In subcratonic mantle beneath Leningrad pipe, West Ukukit field, Yakutia garnet thermobarometry (Ashchepkov, 2017a) give division to 7 horizons (paleosubduction slabs). Cr-bearing amphiboles are changing from Cr- hornblendes to pargasites, edinites, K-richterites with increasing pressure determined with new version of amphibole thermobarometer (Ashchepkov, 2017b). They are divided in to 9 groups according to major trace elements and amphibole thermobarometry tracing all branches of the garnet geotherm from 0.8 to to 7.5 GPa. The Cr pargasitic hornblendes of Fe or- types are covering the 2.5-0.8 GPa interval. The Cr pargasites refer to 40 mw/m2 geotherm in middle SCLM from 2.5 to 4 GPa. The edinites are found from 4 to 6 GPa also give LT and HT branches. The richterites of 3 types tracing different PT branches from convective to LT are found in 6 to 7.5 GPa interval. The eclogites compile dense branch in the middle part of mantle column with the highly inclined P-Fe# trend.

Pargasitic hornblendes with inclined concave REE patterns and Eu, HFSE troughs show Ba, U, Th peaks. The high- T varieties (Gr2a) have less inclined LREE, La (10/C1). Pargasites 3a and 3b have straight line REE and bell like - La to Sm patterns. The Gr3b with Eu minima show La_n ~ 140/C1. Zr-Hf troughs The Gr3b have HFSE maxima high Ba low U. The Gr3c minima in HFSE, high Rb, low, Th U. Edinites Gr4 –Gr5, Gr 6 show slightly inclined REE pattern (Gd/Yb)_n ~ 70 -50. The samples from Gr5 reveal rotation of the La-Sm and inclination from the negative to flat. The richterites Gr 7-9 in the LAB show the highly inclined and enriched TRE patterns with high LILE, Sr, Rb and troughs in Nb, Pb. The Na- rich have Rb, Ba, variable Th peaks and essentially lower REEE with the MREE depressions (created in harzburgites). Clinopyroxenes show Th, U, Sr peaks related to carbonatites.

The amphibole-rich mantle was farmed at the margin of the craton where subduction – related Na and K (silica-rich) fluids percolated through mantle with abundant eclogites causing amphibolization in several stages. Supported by RFBR grant 19-05-00788a