



Comparison of the mantle modification of the mantle column between two phases of kimberlite intrusion in Dalnyaya pipe, Yakutia

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Dalnyaya pipe is one of the largest in Daldyn field, Yakutia is composed of autolite breccia (AKB) and porphyric kimberlite (PK). Minerals from concentrates of both phases were compared and with the peridotite xenoliths minerals. Cpx from Dalnyaya are showing common tendencies Fe–Ti rise and Cr, Al, Na decrease. Garnets belong to Iherzolite field with more deviation to harzburgitic one for (PK). The chromites show two subtrends for Cr Fe, Ni vs TiO₂. In general the variations of the AKB minerals and dispersion are higher but amount of depleted varieties is higher in PK.

We used >50 xenoliths and ~1200 concentrate minerals for PT reconstructions. Combine PTX diagram show deep SCLM root beneath Dalnyaya with the main heating ~7 GPa. The HT 45mwm-2 branch is traced by some xenoliths from base to 2GPa. Essential inflection and heating detected by PT for OPx ~3GPa referring to Ca- enriched pyroxenitic garnets. Small Fe enrichment for Cpx and Gar found near 6 GPa referring to heated porphyroclastic varieties. Continuous and irregular growth of Fe# for Gar and low Fe Cpx Fe# 6 to 12# suggest that primary mantle layering beneath this pipe was smoothed by the high scale interaction with melts. The refertilization trend with Fe#9-15% rising upward in two branches refer to the Ilm and Cpx parental melt evolutions produced the intergrowth sometimes with garnets.

In the PFO₂ diagrams garnets and Cpx show continuous reduction to the lithosphere base to 4QMF higher for Cpx. Ilm - garnet trend is rising upward between -2 -0 QMF. The PT diagram for the AKB minerals from Dalnyaya pipe is nearly the same with the high dispersion to Fe rich varieties and smaller amount of Mg rich minerals. Since the diamond grade is often determined by the amount of depleted varieties it is higher for the PK.

Trace elements determined for Gar and Cpx from 13 xenoliths from the middle part of mantle section reveal very similar patterns in general. Supported by RBRF grant 11-05-00060.