



Evolution of the mantle beneath the Udzha basin, northern Anabar region near kimberlite Tomtor field, Yakutia

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The northern Anabar region is rich in diamond placers which mainly refer to the eclogitic type but their source is not known. The kimberlite nearest fields Kuranakh and Tomtor – are not rich in the diamonds. The placers in Udzha river basin - the right tributary of the Anabar also contain placer with the Cr- rich (To 14% Cr₂O₃) sub-Ca types and diamonds crystals. Comparison of IKM from the Udzha river basin and right tributary Chamyra shows their similarity and vast variation of proportions of prevailing lherzolitic type.

The upper stretches of the Chimara river in the north east of the region contain high amount of diamonds mainly of eclogitic type. There are three intermediate collectors of Permian, Jurassic and Neogene time and alluvial deposits of the pyropes and ilmenites.

The reconstructions with the monomineral thermobarometry (Ashchepkov et al., 2010) of all the 6 sources of the pyropes and diamonds show that placers from of Anabar and Udzha have similar structures of the mantle roots, starting from 7.5 GPa with the convective branch at the base. The P-Fe trends is slightly inclined what is typical of the Kuranakh field and show the division near 5 GPa. The base of the SCLM beneath Udzha is high in Pyroxenitic garnets. There are 4 types and groups of eclogites from LB to 3 GPa. Ilmenites give extending and stepped trend from 7 GPa at LB to 2 GPa. Low temperature groups of ilmenites coincides with the eclogites in Pt diagram.

The upper stretches of Chamyra river in Permian time the mantle column was typical of the Devonian kimberlites with the high dispersion in Fe I 3-4 GPa and convective branch interval and also from 5 to 6.5 GPa, tending to pyroxenites. SubCa garnets give LT conditions and trend to 7.5 GPa close to those of diamond inclusion, Jurassic source of garnets show sharp division to 5 intervals with the steep rise of Fe# with pressure. Eclogites are abundant in the LB and - in middle SCLM part. Ng garnets have more straight line geotherm with the deep convective branch at the base. The P-Fe# is inclined from 4 GPa. But garnets from the alluvial show the sharp division in three intervals with the inclined P-Fe# in each.

The TRE spiderdiagrams of garnets from Udzha reveal the enrichment in U, Nb, Ta and even the REE are semi rounded and slightly flattened even have hump from Nd to Ce suggesting the interaction with the carbonatitic melts. Ilmenites demonstrate slightly concave and decreasing LREE patterns. The source of the Permian garnets show less enrichment. Thus there are signs of the evident evolution of mantle in four time intervals.

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