PERMAFROST-THERMAL CONDITIONS OF KIMBERLEYTE TUBES OF YAKUTIA.

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The effective development of the diamond deposits, placed in the regions with the permafrost, are possible only under the preliminary investigations of the heat state of the cryolithozone and of the underlying thawed rocks. The results of the investigations of the permafrost-thermal state of the kimberleyte tubes (Aykhal, Sytykan, Yubileynaya, Mir and Internationalynaya), taking part in the Daldyn-Alakit and Malo-Botuobiya diamond provinces of the eastern part of the Siberian platform (Devyatkin, Shamshurin, 1978, 1980; Devyatkin, Gavrilyev, 1981; Devyatkin, Balobaev, 1984) are adduced in the report.

In this region the permafrost has a continious spreading up to the depth of 500-1500 m and is characterized by the temperatures of from -8 to -2°C on the depth of 20 m to 5-16°C on the depth of the lying of the crystal foundation (1700-1800 m) with the small values of the geothermical gradients (1-10 mK/m) and the heat flow of 8-30 mW/m^2 in the frozen and in the underlying rocks.

The characteristic feature of the Anabar and Nepsko-Botuobiya antyklines (in limits of which are placed the diamond deposits) is the low temperature of its entrails and the anomally low heat flow. The spacious most raised and ancient part of the Siberian platform, made up by the crystal and sedimentary carbonate rocks of Proterozoic and Palaeozoic, generate the heat flow, which is not more than 30 mW/m^2. This fact is confirmed on the whole number of regions and has the explanation, firstly, by the long-time tectonic passiveness of this part of the platform and, secondly, by the presence of the thick high-heat-conducting carbonate salted rocks and, thirdly, this part of the platform is placed in the subpolar region and is subjected already to the intensive cooling during several millions years. The deep

penetration of the negative temperatures into the rocks connect with the low heat flow. The geothermical data, obtained in the studing diamond region confirm the justice of taking the central part of the Siberian platform with the Anabar antykline to the most ancient blocks of earth core with the stabilized tectonic regime (Balobaev, Devyatkin, 1983).

The cryolithozone has the two-layer structure. The rocks of the lower layer have no ice, their pores and cracks are filled in by the pickles of the top concentration with the negative tamperature, that have been restricted the depth of the development of the kemberleyte bodies by the quarry way So fas as the hydrogeological condition had been formed in the region long before to the deep freezing of the rocks, it should be to consider the upper layer as one of the free water-change, being now in the frozen state. In the Malo-Botuobiya diamond province the their low limit has been conditioned by the geological condition and is placed approximately in the limit of the foot of the upper-lena suite and of the proof of the first water horizone (later is lay on the depth of 200 to 400 m according to the hydrogeological investigations). The thickness of the rocks with the negative temperatures, as showed the geothermical observations, changes from 320 to 820 m. The analoguous regularities of the distribution of the frozen and cooled rocks with the negative temperatures have been observed in too the Daldyn-Alakit diamond province, where the cryolithozone has the thickness of 800 to 1500 m.

By the geothermical investigations had been revealed the negative temperature anomalies, arising above the kemberleyte bodies in consequence of the differentiation of the heat conductivity of the kemberleyte and the containing rocks. So, above the kemberleyte body of the Sytykan tube had been fixed (on the depth of 20 m) the temperature of 3° below than one in the containing rocks. With the depth and with the decreazing of the tube size the indicated difference is decreased noticeably. So, for instance, on the depths of 200 and 300 m this difference are 1.5 and 0.5° accordingly (Devyatkin, Shamshurin, 1978). The most low temperatures are timed to the central part of the kemberleyte

body, but the most high are to the near-contact zone and its containing rocks.

Taking into account that moderm geothermical technique allow to fix the temperature of the rocks with the error up to ±0.05° it is obvious that the geothermical method has the possibility for the search and contouring of the kemberleyte bodies (Dmitrieva, Kulagin, Lakhtionov et al., 1979).

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