

THREE SERIES OF KIMBERLITE BODIES FROM THE DALDYN-ALAKIT REGION OF WESTERN YAKUTIA

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While studying the geological structure, tectonic position and composition of kimberlites bodies of the regions three series of kimberlite bodies were separated. We understand a series as a group of relative kimberlite bodies formed at the single tectono-magmatic stage of activation of one magmatic source. Kimberlite bodies of one series are characterized by parallel differentiation trends from the first intruding phase of porphyry kimberlites (PK) to the second volcanic phase of autolithic kimberlite breccia (AKB). The typical trends were estimated according to the content of main rock-forming minerals (xenomorphic deep-seated olivine, kimberlite euhedral olivine, pyrope, Cr-spinel, picroilmenite), major rock-forming oxides (Si, Ti, Fe, Mg, Ca, Na, K, and CO), minor elements (Cr, Ni, Co, V, Sc, Ba, Sr), and finally diamond content.

Typical features of the *first series* kimberlite rocks are:

- commercial content of diamonds,
- higher diamondiferousness of AKB relative to PK, moderate picroilmenite content,
- highest pyrope (the Komsomolskaya pipe) and Cr-spinel (the Aikhal pipe) contents,
- highest portion of xenomorphic olivine (as serpentine or serpentine/carbonate pseudomorphs),
- highest portion of ultramafic and metamorphic rock xenoliths, ultramafic garnet domination among other garnets,
- weak contrasting differences between intrusive and volcanic phases according to the major and minor element composition (PK are richer in Cr, Ni, Co, V, Sc),
- volume PK/AKB ratio is 1: 3 (the Yubileynaya pipe) to 1: 10 (the Komsomolskaya pipe),
- identical secondary mineralization of both intrusive and volcanic kimberlite rocks.

Specific features of the *second series* kimberlite rocks are:

- very low diamond content in both intrusive and volcanic phases (intrusive phase rocks are slightly richer),
- very low content of indicator minerals (< 0.05 kg/t) such as pyrope, picroilmenite and Cr-spinel (picroilmenite content is somewhat higher in PK under equal PK and AKB pyrope contents),
- very low portion of xenomorphic olivine (1.5 to 6 %),
- full absence of ultramafic xenoliths or nearly so,
- over 60 % of garnets correspond to those from basic (crustal) assemblages,
- PK and AKB are clearly different in petrochemistry (PK are enriched in Mg, Fe, and Ti, AKB is richest in Ca),
- contrasting minor element composition of intrusive and volcanic phases (Cr, Ni, Co, V, Sc and Sr, Ba contents are higher in PK and AKB, respectively),
- volume intrusive/volcanic phase ratio is 1: 50,
- secondary mineralization of kimberlite rocks of intrusive and volcanic phases is differing.

The *third series* kimberlite rocks are characterized by:

- low to moderate diamond content, intrusive rocks are richer in diamonds compared to volcanic rocks;
- highest picroilmenite content (up to 3.5 %) and ten times lower pyrope content, moderate portion of xenomorphic olivine of 10-17 vol. %,
- moderate portion of ultramafic and metamorphic rock xenoliths being slightly higher in PK,

- garnets are represented by the pyropes of ultramafic assemblages,
 - moderate difference between PK and AKB major and minor element compositions (PK are richer in Mg, Fe, Ti, and AKB in Ca),
 - volume PK/AKB ratio varies from 1:1 to 1:50,
 - moderate difference between the secondary mineralization of intrusive and volcanic rocks.
- Within the region the pipes of three distinguished series are grouping into clusters and chains.