Geophysical Research Abstracts
Vol. 20, EGU2018-606, 2018
EGU General Assembly 2018

Fluid fracturing formations of the Nakyn kimberlite field of the Yakut diamond province

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The Nakyn kimberlite field is located in the Middle-Markhinsky area of the Yakut diamond province. There are few kimberlite pipes and dyke-vein bodies. The kimberlite penetrates the terrigenous-carbonate, carbonate rocks of the Cambrian and Ordovician periods. It's overlain by series of poorly cemented Mesozoic deposits composed of sandy-silty-clayey rocks and modern eluvial-deluvial formations. The central part of the Nakyn field, with area about 120 km2, is highly researched by geophysical methods and drill-holles with 400x400 meters measurement grid and even closer.

Actually our research is devoted to mapping, geochemical characterization and systematization of fluid-fracturing formations in the central part of the Nakyn field. It's important to note that in addition to higly recearched kimberlites the Nakyn field includes eruptive breccias of basites, carbonate breccias, and veins of opaque carbonate with an admixture of terrigenous grains (fluidites).

Our research framework is based on the special author's core documentation that covered about 400 thousand meters of drill-holes. As a part of the scientific research there were analysed about 300 thin sections, X-ray methods established the chemical and mineralogical composition samples counted in tens.

Basite eruptive breccias (BEB) distinguishes: brecciated texture; fragments of Middle Paleozoic dolerites and Lower Paleozoic limestones and dolomites; a border of hardening, a hematitization, a chloritization and a carbonatization around fragments of the basite rocks, hyalopilite structure with poorly crystallized glass in the cement and among the fragments; a high concentration of alkalis. Essentially, BEB is assotiated with contact parts of dolerite dykes and grouped in an ellipse area with 20×8 km elongated to the northeast along the fault that controls the position of all known kimberlite bodies. ll known kimberlite bodies are localized in the central part of this area.

Carbonate breccias (CB) of Lower Paleozoic rocks with clay-carbonate cement have a features which indicate their fluid-explosive genesis. CB thickness have formed decimeters to several tens of meters. Contacts are distinctive and tectonic boundaries are not detected. CB were found mainly in Ordovician rocks layers. Also they formed areas that coordinate with the fault zones and spatially associated with BEB and with kimberlites.

Fluidisite veins (FV) have thickness a few centimeters and subvertical or steep dipping. They perform shear fracture and rupture with clear boundaries. FV are folded by a fine-grained aggregate of opaque dirty grey-green calcite and a dolomite with fragments of gravel dimension carbonate rocks, sandy-silty grains of predominantly quartz composition and diverse columnar fine-grained material.

During a research the fluid-disruptive genesis of CB and FV have been confirmed in any case. There is a significant amount (up to 32%) of an X-ray amorphous in their composition, probably pyroclastic substance. Also there have been found a chlorite and a serpentine in some samples.

In conclusion, the results of mapping of different types of fluid fracturing formations on the scale of kimberlite bodies and clusters show the confocal and bifocal ratios of kimberlite and postkimberlite fluid-fracturing formations.

After all, authors suggest a usage of a fluid fracturing formations for the searching for kimberlites.