



Trace Elements in the Section of the Kievey PGE Deposit (Kola Peninsula, Russia)

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The Kievey reef-type PGE deposit located in the Lower Layered Horizon (LLH) of the West-Pana intrusion was formed as a result of one or several additional magma injections (Korchagin & Mitrofanov, 2010). The composition of the magma was essentially similar to the saturated tholeiite basalt assumed to be a parental magma for the West-Pana layered intrusion in the Kola Peninsula (Latypov & Chistyakova, 2000). In the present study, whole-rock and ICP-MS trace-element data through a detailed borehole section (37 samples) of the LLH were obtained in an attempt to find some differences in the composition of the magmas.

The section of the LLH includes four rhythmical units with a total thickness of 21.5 m lying on the mesocratic gabbro-norite containing rare 5-cm interlayers of leucocratic rocks. The bottom of the first cycle is a layer of fine- to medium grained melanorite. Interlayering of gabbro-norites and leucogabbro-norites is observed in the middle of the cycle. Mottled rock of leucogabbro-norite-anorthositic composition with relatively distinct spots caused by amphibolization and saussuritization occurs at the upper leucocratic part of the unit. In comparison to the first cycle of the LLH, the upper cycles are thinner and have more simple internal structures. Well-expressed thin layering is rare, and a mottled structure is weakly developed. Relatively thin (15-55 cm thick) coarse grained olivine melanorite layers at the base of these units are a characteristic feature. The overlying unit is represented by homogeneous fine-medium grained gabbro-norites with rare interlayers of coarse and medium grained varieties.

PGE mineralization (3 levels about 4-6 ppm Pt+Pd+Au) in the LLH occurs near the lower margins of the upper cycles and is associated with interstitial irregular disseminated sulfides (up to 0.5 vol. % of pentlandite, chalcopyrite and pyrrhotite). Disseminated sulfides are most abundant in the upper part of the first cycle, whereas they are hardly visible in the upper cycles.

According to obtained analytical data it appears that additional magma injections, with similar concentrations of compatible elements to the parental magma, differ from the latter by lower concentrations of Ti (and also Th, Pb, Hf, Zr, Ta, Nb) and rare earth elements. Of note are also the relatively high normative anorthite component in plagioclase in the LLH and the positive Eu anomaly in the LLH and in the overlying unit.

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