CONCENTRATIONS OF TRACE ELEMENTS IN ROCKS OF THE LOWER LAYERED HORIZON OF THE WEST-PANA INTRUSION

Groshev, N.Yu., Rundkvist, T.V., Korchagin, A.U. & Ivanov, A.N.

Geological Institute KSC RAS, Fersman Str. 14, Apatity, 184209, Russia
e-mail: nikolaygroshev@gmail.com

ABSTRACT. The Lower Layered Horizon (LLH) of the West-Pana intrusion and associated horizons of PGE mineralization were formed as a result of one or several additional magma injections (Korchagin & Mitrofanov, 2010). Its composition 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 (GI KSC RAS) and ICP-MS trace-element data (IGG UB RAS) through a detailed section of the LLH were obtained in an attempt to find some differences in the composition of the magmas.

According to the borehole 23 (fig. 1), four rhythmic of the LLH with a total thickness of 21.5 m lie on the mesocratic gabbronorite containing rare 5-cm interlayers of leucocratic rocks. Approaching the base of the horizon from below, rock composition becomes leuco-mesocratic, and blue quartz appears. The bottom of the LLH (and the bottom of its first thickest cycle) is a layer of fine- to medium grained melanorite. Interlayering of gabbronorites and leucogabbronorites is observed in the middle of the cycle. Mottled rock of leucogabbronorite-anorthositic composition with relatively distinct spots caused by amphibolization and saussuritization occurs at the base of the leucocratic part of the unit. There are leucogabbronorites with relatively thin layered mesocratic and olivine-bearing varieties at the top of the cycle. 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. Sporadic grains of olivine also occur in leucogabbronorites at the top of the first and of the second cycles. The overlying unit is represented by homogeneous fine-medium grained gabbronorites with rare interlayers of coarse and medium grained varieties.

PGE mineralization in the LLH (Fig. 1) 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.

The most important aspects of analytical data are shown in Fig. 1. According to these 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 etc.; not shown) and rare earth elements. Of note are also the relatively high anorthite component in plagioclase in the LLH and the positive Eu anomaly in the LLH and in the overlying unit.

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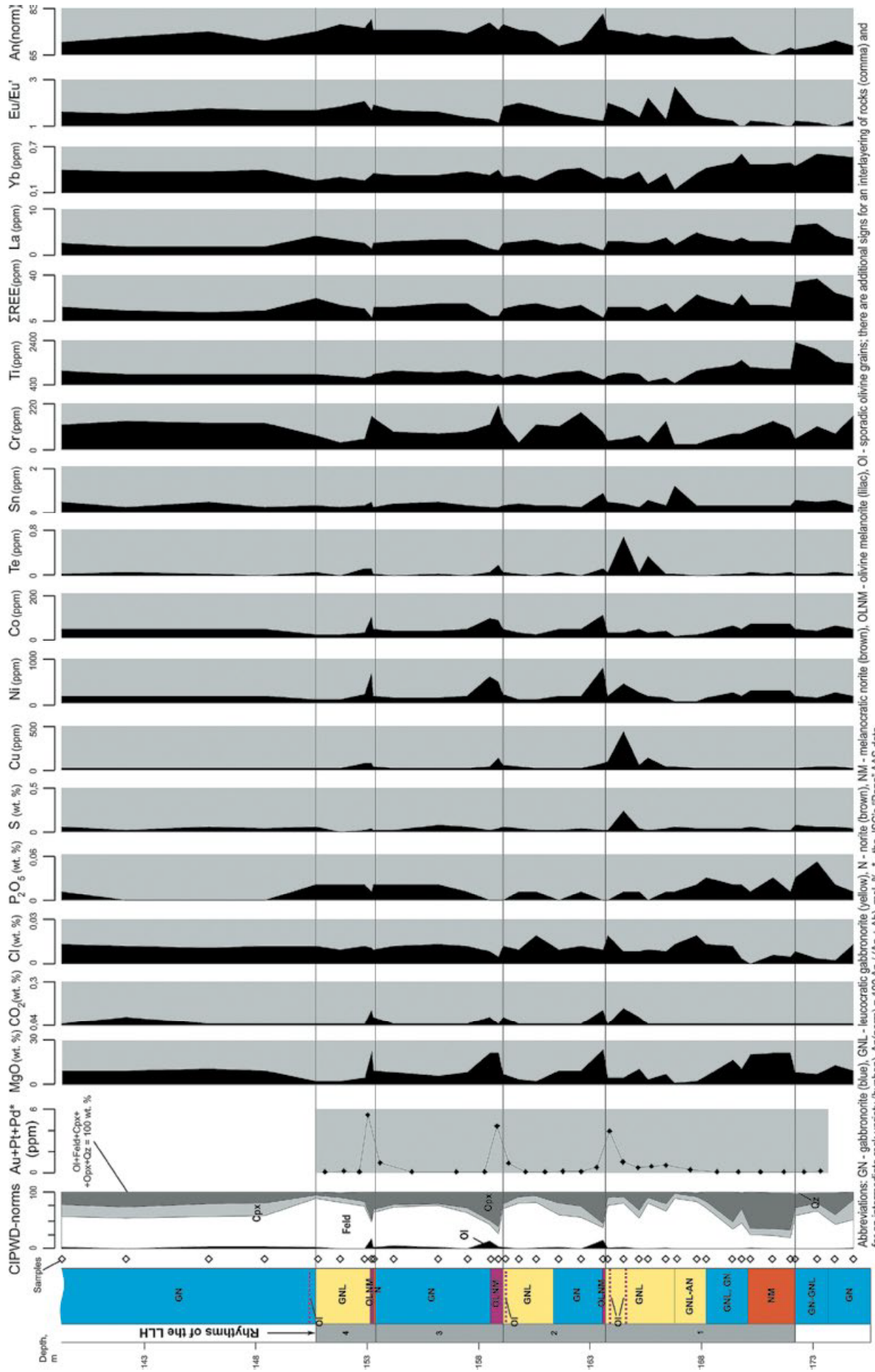

Fig. 1. Distribution of PGE mineralization and compositional variations of rocks through the section of the LLH (borehole 23, Kievey Deposit)