

PGE-Cu-Ni deposits of the Noril'sk-Talnakh region: ore components, their distribution peculiarities, sources and modes of accumulation

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Data on the distribution of essential ore components along the length of the Talnakh sulfide-bearing gabbro-dolerites intrusion and in its vertical section are presented. The intrusion is considered as having evolved from a more than 20 km long magmatic channel of variable cross section (50 to 250 m thick and 500 to 2000 m wide). Principal sulfide ore types include: disseminated ore in the picritic, taxitic and contact horizons, massive ore and veins at the lower endo- and exocontacts of the intrusion, and impregnated exocontact ore. The bulk of sulfide accumulation is confined to boundaries between narrow and wide intervals in the channel. The distributions of Ni, Cu, Pt, Pd, Rh and Au are oscillatory, with increasing enrichment ore metals from the rear (northern) to the frontal (southern) part of the intrusion: Pd and Au concentrations increase especially sharply, Pt and Cu concentrations increase moderately, and Ni and Rh change relatively little along much of the intrusion. There is a substantial difference in composition between disseminated ores within the intrusion and massive ores: the within-intrusion disseminated ores are relatively enriched in Cu, Pt, Pd and Au. Evidence of accumulation of ore components from disseminated ores within the intrusion to massive and exocontact ores is absent, but there is evidence of transfer of ore components from massive to exocontact ores. Preferable concentration of the ore components in certain parts of the intrusion is considered a result of immiscible sulfide liquid settling from a silicate melt in those intervals where magma flow slowed, and of repeated replacement of magma in the channel in a running or reciprocating mode. It is believed that the ore components came from the outer Earth's core, whence they could have been transported by a thermal plume (Likhachev, 1993; Walker et al., 1997).