

Ni-Cu-PGE Deposits of Northern Transbaikalia, Siberia, Russia: Geodynamic Setting and Ore-Forming Processes

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The Northern Transbaikalia Ni-Cu-PGE province is located in Buryatia (southeast Siberia) and is part of the Baikal-Muya volcano-plutonic belt. It is known for its numerous Ni-Cu-PGE-bearing mafic-ultramafic intrusions of Neoproterozoic age formed in various geodynamic settings.

The Ioko-Dovyren layered and Avkit metamorphosed rift-related intrusions are hosted by the Synnyr rift of the northwestern belt. Contamination by country rocks played an important role in the formation and localization of Ni-Cu mineralization. The reduced Cl-rich fluids transported and concentrated the PGE, forming the low-sulfide mineralization.

The Chaya, Gasan-Dyakit, and Nyurundukan concentric-zoned syncollisional intrusions are part of the Kichera-Mama ophiolite terrane in the central belt. Ni-Cu mineralization, related to serpentinites, is a result of interaction between ultramafic and mafic rocks.

The Marinkin concentric-zoned intrusion of island-arc origin is in the Muya segment of the eastern belt. The Ni-Cu mineralization it contains has not been well studied.

All these various deposits can be regarded as a single Ni-Cu-PGE ore cluster located near the Kholodninskoe Pb-Zn deposit, which is ready for mining. In addition to these, there are less studied small dike-like bodies with sulfide mineralization, which formed in a rift setting and may be enriched in Ni, Cu, and PGE. Individually, those bodies are of poor commercial value, but they are located relatively close to each other (<30 km) and can therefore appear profitable for mining companies. In conclusion, the North Baikal Ni-Cu-PGE province needs additional geological exploration work, targeted at the northeastern Synnyr rift, hosting numerous small subvolcanic bodies with Ni-Cu sulfide mineralization.