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# Orogenic gold deposits of eastern Yakutia: Dwarfs on the shoulders of giants?

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There have been more than 2000 gold-bearing occurrences identified in the terrigenous complexes of the Verkhoyansk-Kolyma fold system of eastern Russia. Some of these have been recently studied in greenfield and brownfield projects. It was expected that brownfield boundaries of existing orebodies would expand due to the halos of veinlets and disseminated sulfides, similar to the Natalka deposit. In some cases, drilling operations have confirmed such new bulk-tonnage mineralization (Drazhnoe, Pavlik, Upper Hakchan); in other cases, they have revealed halos of vein-disseminated mineralization with sub-economic gold contents (Degdekan, Polarnik). Most often, the boundaries of known orebodies have not changed, despite a significant decrease in the cut-off grades.

Criteria for distinguishing small targets with high gold grades from large targets with low grades were identified on the basis of a comparative analysis of the structural position of the Adychansky, Zhdaninsky, and Taryn ore districts. Target types in the Adychansky district were defined as gold and bismuth-tungsten-gold mineralization in small veins (Sorevnovaniye, Temny - 3 tons of gold with 10-15 g/t average grade), stockwork (Lazo - 10 tons of gold with 5 g/t) and in disseminated arsenopyrite - pyrrhotite and quartz veinlets halo (Deluvialnoye - 167 tons with 2 g/t). Quartz veins with native gold and trace amounts of arsenopyrite, galena, and buornonite are typical for the Zhdaninsky district. Veins have gold reserves and resources ranging from 1.2 to 1.6 tons with grades of 15.2 to 22 g/t. The largest and most studied target in the Tarynsky ore district is the Dragnoye deposit. The reserves and resources of gold amount to 127 tons with an average grade of 5.6 g/t. Gold is concentrated both in disseminated pyrite and arsenopyrite and in quartz veinlets with trace amount of galena and boulangerite.

The main structural elements of the gold-quartz deposits are shear zones, typically with brittle fracturing, from an early tectonic collisional stage, and concordant and transverse strike-slip faults from later in the collisional stage. The halos of vein-disseminated mineralization with sub-economicl gold grades are confined directly to the shear zones. Large targets with combined vein and veinlets-disseminated mineralization (Natalka) or veinlet-disseminated mineralization (Dragnoye) are connected with similar zones by sinistral strike-slip faults. Small gold-bearing veins are formed above those shear zones. Shear zones controlled the vertical permeability of the sedimentary sequences. They provided a long-term conduit for preservation of the metamorphic fluid and accumulation of such fluids with their ore components. Features of mineralogical and chemical composition of ores, as well as data on the study of fluid inclusions and stable isotopes, indicate the uniformity of fluid sources. The deposition of gold was simultaneous with development of the strike-slip fault events.

Large gold targets can be found within accreted terranes of continental crust between the subduction zone in the east and the decratonized part of the Siberian continent in the west. Small

gold veins mark the possible position of large halos of disseminated ores, but developed above these.