



Geological and Geochemical Criteria for the Estimation of the Area of The Lesser Hinggan for the Endogenous Gold Mineralization (The Far East, Russia)

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The Area of the Lesser Hinggan in the middle of the XIX century has been known as one of the Gold areas of the Far East. Exploration of gold in different years were engaged by P.K. Yavorovskiy (1904), E.E. Anert (1928), G.V. Itsikson (1961), V.A. Buryak (1999, 2002, 2003), A.M. Zhirnov (1998, 2000, 2008), L.V. Eyrish (1960, 1964, 1995, 1999, 2002, 2008) and many others. But despite the abundance of factual materials in the problem of the gold metallogeny of the Lesser Hinggan are more aspects that still have not received a answer. Among them is the key issue about indigenous sources of the gold.

First for the Lesser Hinggan area, structural-geochemical zoning at 1:200 000 scale was carried out based on the results of the precise analyses of over 2,600 soil and sediment stream samples. Three anomalous geochemical zones and nine anomalous geochemical clusters in their contours specialized for gold mineralization were revealed. Regional clarkes (fersms) for 19 chemical elements were calculated. Geological formations geochemically specialized for gold and their role in endogenous ore-forming processes were defined. Geochemical criteria for endogenous gold mineralization and its ore-formational affiliation were defined as well.

Thus, from the geological and geochemical data, are the following signs of the gold mineralization of the Lesser Hinggan:

1. Some geological formations are geochemical specialized by the gold (carbon ("black") schists and ferruginous quartzite Vendian-Cambrian Hinggan series). They're considered as a source of the gold, involved in younger epigenetic processes of mobilization and redistribution of this element;
2. Contrasting geochemical anomalies of the gold and elements satellites in the secondary halos and stream sediments displayed in the contours of the geological formations of a wide age range - terrigenous-carbonate rocks of the Hinggan series, the Paleozoic granitoid massives, the Cretaceous volcanic fields ;
3. Samples of the native gold intergrown with quartz, pyrite, arsenopyrite, galena in areas of intensive dislocation metamorphism and quartz-vein formation, accompanied by hydrothermal-metasomatic alteration of the bedrock in the mineral facies propylite, beresites and argillisites;
4. The transition some alluvial gold from lowland to the talus slope approaching the watershed areas;
5. The structural-geological similarity the area of the Lesser Hinggan with the gold mining areas of China and the northwestern part (Russia) of the Bureya array (Tandzhigou (Juanjiegou) (China), Noninskoe (Russia), Prognoznoe (Russia) and others).

The Projected endogenous gold mineralization on the Lesser Hinggan include gold-quartz (including low-sulfide component) ore-formation type in the form of thin and not sustain the strike quartz veins in the surrounding strata (for example, gold deposit Lysoya Gora) and genetically related to the Early Cretaceous Hinggan-Olonoy complex of the subvolcanic felsic small intrusions .

The ore-formation types associated with gold-bearing weathering crusts, carbon ("black") schist and ferruginous quartzite are the perspective in the area of the Lesser Hinggan also.