

On possible formation of near-surface ore manifestations of gold (Kempendyai dislocation)

A. Kazhenkina and Z. Nikiforova

Diamond and Precious Metal Geology Institute, Russian Academy of Science, Siberian Branch, Yakutsk, Russian Federation

Placer gold potential of headwaters of the Kempendyai, Tonguo, Chybyda and Namana rivers located in the zone of Kempendyai dislocation confined to the axial part of the Vilyui syncline is studied. The study area is composed of Paleozoic volcanogenic-sedimentary and Mesozoic sedimentary deposits represented by sandstones interbedded with conglomerates, sands, argillites, and aleurolites. In the zone of Kempendyai dislocation, Mesozoic tectonic-magmatic activity resulted in the formation of fold structures (Tabasyndskaya anticline and 12 small folds), as well as in manifestation of acid volcanic activity.

Nowadays, there are a number of hypotheses concerning possible sources of formation of placer gold in this area. V.I. Timofeev (1965) and Yu.N.Trushkov et al. (1975) concluded that the basic primary sources were Precambrian sedimentary-metamorphosed rocks of berried block uplifts of the Vilyui syncline. Besides, based on the analysis of geological development of this region, the results of study of mineralogical associations of concentrate dispersion halo, as well as petrographic composition of pebble-gravel material, V.I.Timofeev (1965) and V.A.Mikhailov (1990) concluded that the formation of gold ore potential is spatially associated with Upper Jurassic – Lower Cretaceous acid magmatism manifested in the Vilyui paleorift zone (Kempendyai dislocation). Their hypothesis was confirmed by data of Kirina (1966) and Kisilev (1970). They revealed quartz-barite and calcite veins in Early Jurassic and Cretaceous deposits containing up to 1.4 g/t Au. As they stated, the origin of these veins is associated with volcanic activity of Mesozoic age. Also, in the study area Z.S.Nikiforova and G.V.Ivensen (2007) revealed for the first time volcanites widespread on Lower Cretaceous deposits represented by andesite-basalts, acid glass fragments and pumice, as well as by psammitic tuffs. In this connection, they suggested that epithermal gold ore deposits have been formed in paragenetical association with acid volcanic activity.

As a result of study of mineralogical-geochemical features of placer gold in the Kempendyai dislocation zone, we established the following. Gold is represented by flat, lumpy shapes more than 0.25 - 1-2 mm in size, medium and low in purity ranging from 500 to 870‰ with elevated Ag and Hg content (to 47.7% and 1.46, respectively), as well as with microinclusions of quartz, barite, calcite, arsenopyrite, albite, and a wide range of admixture elements, such as Pb, Zn, As, Sb. We note that anomalously elevated concentrations of gold, chalcedony-like quartz, barite, and hematite are observed in fluvial alluvium of these rivers. The revealed indicators of placer gold correspond with well-known deposits of gold-silver formation. Thus, based on mineralogical-geochemical features of placer gold and geological development of the Kempendyai dislocation zone, near-surface deposits of probably gold-silver formation are predicted for the first time.

1. Timofeev V.I. On placer gold content of the Vilyui river basin // Razvedka I okhrana nedr. 1965. No. 6. Pp. 1-5.
2. Trushkov Yu. N., Izbekov E.D., Tomskaya A.I., Timofeev V.I. Gold potential of the Vilyui syncline and its framing. Novosibirsk: Nauka, 1975. 149 p.
3. Mikhailov V.A. Feeding sources of metal-bearing deposits of the Vilyui syncline // Synopsis of thesis, Cand. Geol.-Mineral. Sc., Tomsk: State Univ.,1990. 20 p.
4. Nikiforova Z.S., Ivensen G.V., Filippov V.Ye. Manifestations of volcanic activity in the Lena-Vilyui interfluvium and its association with gold mineralization // International Symposium: Large igneous provinces of Asia, mantle plumes and metallogeny. Novosibirsk: Publishing House of SB RAS, 2007. Pp. 182-184.