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Age Evolution of Gold Concentrations in Metamorphic Rocks

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The results of examination of gold-bearing rocks in Achaean, Proterozoic and Oligocene metamorphic complexes are presented below. The territories under study are located within the blocks of the basement and the folded frame of old platforms (the Siberian platform, the East–European platform) and the Oligocene folded structure of the Eastern Pamir (Central Asia). The distribution of gold in metamorphic rocks depends on the next regularities.

The oldest super-crustal metamorphic rocks of the granulite facies are characterized with higher concentrations of gold in comparison with clark (12.18 – 55.3 ppb). Charnokites formation, granitization, migmatization and diaphthorezis in the granulite series lead to gold carrying out – 20-55 ton / km^3. These series could be one of the sources of metal for Proterozoic and Phanerozoic mineral deposits.

Gold concentration in the Proterozoic and Phanerozoic metamorphic complexes is 2-5 times more than concentration in the surrounding aleuropelite sedimentary rocks. Gold is introduced with deep fluids into the metamorphism area.

Rocks of the amphibolite facies of zoning metamorphic belts are characterized with the lowest concentration of gold (2.92-4.5 ppb). Double exceeding of gold grades is typical for the greenschist facies (4.25-6.19 ppb) and epidote-amphibolite facies (4.4-6.7 ppb) in comparison with the amphibolite facies. Accumulation of gold takes place under marginal P-T conditions of metamorphism, in the rocks near the boundaries between facies or subfacies (8.21-24.00 ppb).

The distribution of gold in the zoning metamorphic Oligocene rocks of the S-E Pamir is similar to Proterozoic rocks, but gold grades in these units are more than 20% higher in comparison with Proterozoic series.