

MAGMATISM AND ORE DEPOSIT OF THE CAMBRIAN ISLAND ARC OF THE CENTRAL PART OF THE ALTAI-SAYAN FOLDED AREA (SOUTH SIBERIA, RUSSIA)

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Early-Cambrian island-arc magmatic complexes are widely spread within the central part of the Altai-Sayan folded area (ASFA). They are genetically linked to formation of base metal, gold and porphyry copper-gold deposits. New evidences of the link between island-arc magmatism and ore deposits of the Tannuola-Ulugoy folded zone of the ASFA are presented here.

The lowest part of the island-arc complex consists of the volcanogenic-sedimentary rocks of the Early-Cambrian age (kadvoyskaya and serligskaya series). Volcanogenic rocks form a uniform differentiated basalt-andezite-riolite tholeiitic seria, in which mafic rocks are prevailing. Basalts are characterized by slightly-sloping positive REE-spectra with $(La/Yb)_N$ ratios from 1,2 to 2,6 and without Eu-minimum. Spider diagrams for basalts of kadvoyskaya and serligskaya series reveal negative anomalies of Ta and Nb, gentle Zr-minimum and positive anomalies of Ba, Rb, K, Pb and Sr. These are typical features of volcanic rocks genetically related to subduction settings. Classification plot shows basalts localized within island-arc tholeiitic and calc-alkaline fields. Paleontological age of these rocks was determined as late Pre-Cambrian – Early Cambrian. Formation of hydrothermal-volcanogenic gold-bearing polymetallic sulphide mineralization is related to island-arc volcanic rocks.

Intrusive rocks of the island-arc complex are represented by gabbro-plagiogranite rocks of sodium low-alkaline series (mainsky complex). Plagiogranites REE-spectra show enrichment in LREE comparing to HREE ($La/Yb_N=1,5-6$) and negative Eu-anomaly. Spider diagrams plotted for mainsky plagiogranite have distinct positive anomalies of K and Rb and increased Sr, but minima of Ta, Nb, La, Ce, P and Ti. The location of plagiogranite points on the classification diagrams points towards their similarity with island-arc granites. Plagiogranites intrude into rocks of the serligskaya series. The U-Pb ages of zircons (SHRIMP II) from plagiogranites are within the range between 534 ± 3 and 518 ± 3 Ma. Mainsky complex development is linked to the formation of quartz veins with gold, pyrite, chalcopyrite as well as origin of skarn with gold, magnetite and chalcopyrite.

Assessment of the island-arc magmatism and metallogeny of the Tannuola-Ulogoy folded zone allows to identify three ore districts with deposits of gold, copper, lead, zinc and iron: East-Tannuola (iron-base metals-gold), Kaa-Khem (gold) and Ulugoy (gold and base metals).