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## Geochemical specialization of geological complexes in the northern part of the Kamchatka Peninsula

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The study area (4350 km<sup>2</sup>; 58°00'-58°40'N 161°00'-162°00'E) is located within the Kamchatka-Olyutorsk integumentary fold zone. The eastern part of the area is occupied by structures of the Litken rift; formations of the superimposed Neogene-Quaternary Central Kamchatka volcanic belt are developed in the central and western parts. Volcanic rocks of the Umuvayam complex (N<sub>1um</sub>; α, ζ, λζN<sub>1um</sub>) are widespread in the study territory, Tolyatovayam (N<sub>1-2tl</sub>; λζ N<sub>1-2tl</sub>), Veemgetver (N<sub>2vm</sub>; ζN<sub>2vm</sub>), Emiyayam (νδ,δ,qδ, δπ, μ-γδ, qμ, qμ-qδ, γδ, εγ-δ N<sub>1e</sub>) volcanic complexes, lava sheets and intrusions of the basic composition of the Quaternary age spread to a less extent. Geological formations and associated ore objects were developed during three mineragenic epochs: Late Cretaceous-Middle Paleogene (volcanic intraoceanic sediments and terrigenous complex of the oceanic shelf), Middle Paleogene-Neogene (terrigenous complex of the oceanic shelf) and Quaternary (andesite complex of the back-arc rift zone, island-arc complex and terrigenous complex of the back-arc basin of the active continental margin). Mineragenic epochs correspond to five structural-facies zones: Mid-Kamchatka-Koryak, Litken-Central-Kamchatka (Q<sub>E-I</sub>-Q<sub>H</sub>), Central Kamchatka, Litken (Q<sub>2</sub>-Q), Kamchatka-Olyutorsk (K<sub>2</sub>-Q<sub>2</sub>).

In order to identify geochemical criteria for the ore content and potential metallotects for all geological formations.

In general, the structural-material complexes show the chalcophilic type of geochemical specialization. Mid-Kamchatka-Koryak structural-facies zone has a spectrum W<sub>5,0</sub>Ag<sub>4,4</sub>Bi<sub>2,8</sub>Mo<sub>2,5</sub>Sn<sub>2,2</sub>Zn<sub>2,0</sub>Cu<sub>1,8</sub>, Litken-Central-Kamchatka As<sub>11,0</sub>Mo<sub>5,0</sub>Ag<sub>2,9</sub>Co<sub>1,5</sub>, Central Kamchatka Ag<sub>6,0</sub>W<sub>5,2</sub>(Bi,Mo)<sub>3,3</sub>Cr<sub>2,2</sub>Cu<sub>1,9</sub>(PbSeSn)<sub>1,8</sub>V<sub>1,7</sub>Zn<sub>1,6</sub>, Litken (SnV)<sub>3,0</sub>Cr<sub>2,4</sub>Sc<sub>2,0</sub>Cu<sub>1,9</sub>(SeZnGa)<sub>1,8</sub>Ag<sub>1,7</sub>Pb<sub>1,6</sub>(CoGe)<sub>1,6</sub>, Kamchatka Olyutorsk Ag<sub>4,2</sub>Cr<sub>3,8</sub>V<sub>2,5</sub>Sc<sub>1,7</sub>Cu<sub>1,6</sub>(ZnGa)<sub>1,5</sub>.

The following metallotects can be distinguished in the study area:

The rocks of the Umuvayam, Emivayam, and Tolyatovyam complexes are part of the Central Kamchatka structural-facies zone, which occupies the largest central part of the study area. Epithermal silver-gold objects of the adularia-quartz formation are formed due to the invasion of intermediate and acidic phases of these complexes, postmagmatic activity, and metasomatic transformations of rocks. The averaged spectrum of accumulation of chemical elements, derived for the rocks that make up the Central Kamchatka structural-facies zone, is characterized by a

wide range and demonstrates the siderophilic-lithophilic-chalcophilic type of geochemical specialization. Silver, copper, lead, and zinc included in the spectrum are indicators of the known and predicted mineralization of silver-gold adularia-quartz and polysulfide formations, and the presence of molybdenum indicates the possibility of detecting copper-molybdenum-porphyry ore objects. Thus, the geochemical data fully confirm that the Central Kamchatka structural-facies zone is highly promising.