*International Journal of Geology, Earth & Environmental Sciences ISSN: 2277-2081*
*An Open Access, Online International Journal Available at http://www.cibtech.org/jgee.htm*
*2025 Vol. 15, pp. 16-20/Yusupov and Rahimov*
***Research Article***

# THE MINERALIZATION FORMED AS A RESULT OF THE MISKON REGIONAL TECTONIC FAULT

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## ABSTRACT
The Olmaliq ore field is located in the mountainous regions of Tashkent Province and is primarily composed of rock formations from the Lower Paleozoic, Mesozoic, and Cenozoic systems. The Qolmaqir, Kauldi, Sarecheku, and other deposits within the Olmaliq ore field were formed under tectonic and magmatic conditions, hosting valuable minerals such as gold, copper, silver, and lead, as determined through scientific geological research. Identifying the tectonic and mineralogical characteristics of the Miskon tectonic fault and its associated deposits is critical for the efficient future development of the region's valuable mineral resources and holds significant strategic importance.

## INTRODUCTION
Miskon tectonic fault, region's, Kolbulak, Agalmatoid, Kurgan, Chashlinskiy, Avjaz, Gushsoy, gold, albite, Olmaliq, Pistali-Qirqiz, Qalqonota.

The Miskon tectonic fault stretches in a northeast direction, extending over 40 km, and trends southeast at an angle of 55–75°. Its width ranges from 100–200 meters to up to 1,000 meters. This tectonic structure exhibits vertical uplift amplitudes of 700 meters and horizontal displacements of 2–2.5 km. The elevated section of the Miskon tectonic fault has been studied for the Saricheku porphyry copper deposit.

The southwestern part of the Miskon tectonic fault is considered the central block of the Northern Olmaliq ore field. This area hosts the Kauldi gold deposit, which has been mined for gold since 1974. Geological mapping and observations have revealed various tectonic processes within this region.
The Upper Olmaliqsoy site features geological complexity, where the Miskon, Boshtovoq, and Kolbulak fault zones intersect. These tectonic faults define the natural geological boundaries of the area and determine the distribution of sedimentary-metamorphic and magmatic rocks within it.

The Miskon regional tectonic fault forms a complex geological structure that integrates with minor and major tectonic faults in the area. This system of faults plays a significant role in the geological development of the region and the formation of mineral deposits. Minor faults are connected to major tectonic faults, and their combined impact is of great importance in mineralization processes. These faults include:

**Boshtavoq Tectonic Zone:** The Boshtavoq tectonic faults exhibit a complex structure. This area is characterized by fractured and metasomatized rock formations. The fault widths vary from 500 to 800 meters. Due to tectonic processes, metasomatism and quartz veins are observed within the fault zones.
In the Boshtovoq tectonic fault zone, four mineralized zones are identified: 1 - Upper, 2 - Northern, 3 - Central, and 4 - Qoraqiya. The Central.

Gold-bearing rocks consist of quartzized, sericitized, pyritized, and kaolinized fragments of pyritized andesite-dacite at the base, hosted within subvolcanic andesite-dacite clastolavas. Additionally, the rocks contain remnants and xenoliths of biotite-quartz-hydromica schists from the Sardoba suite and andesite lavas and tuffs from the center of the block, the clastolavas are intruded by a columnar body of biotite dacites (Fig.1).

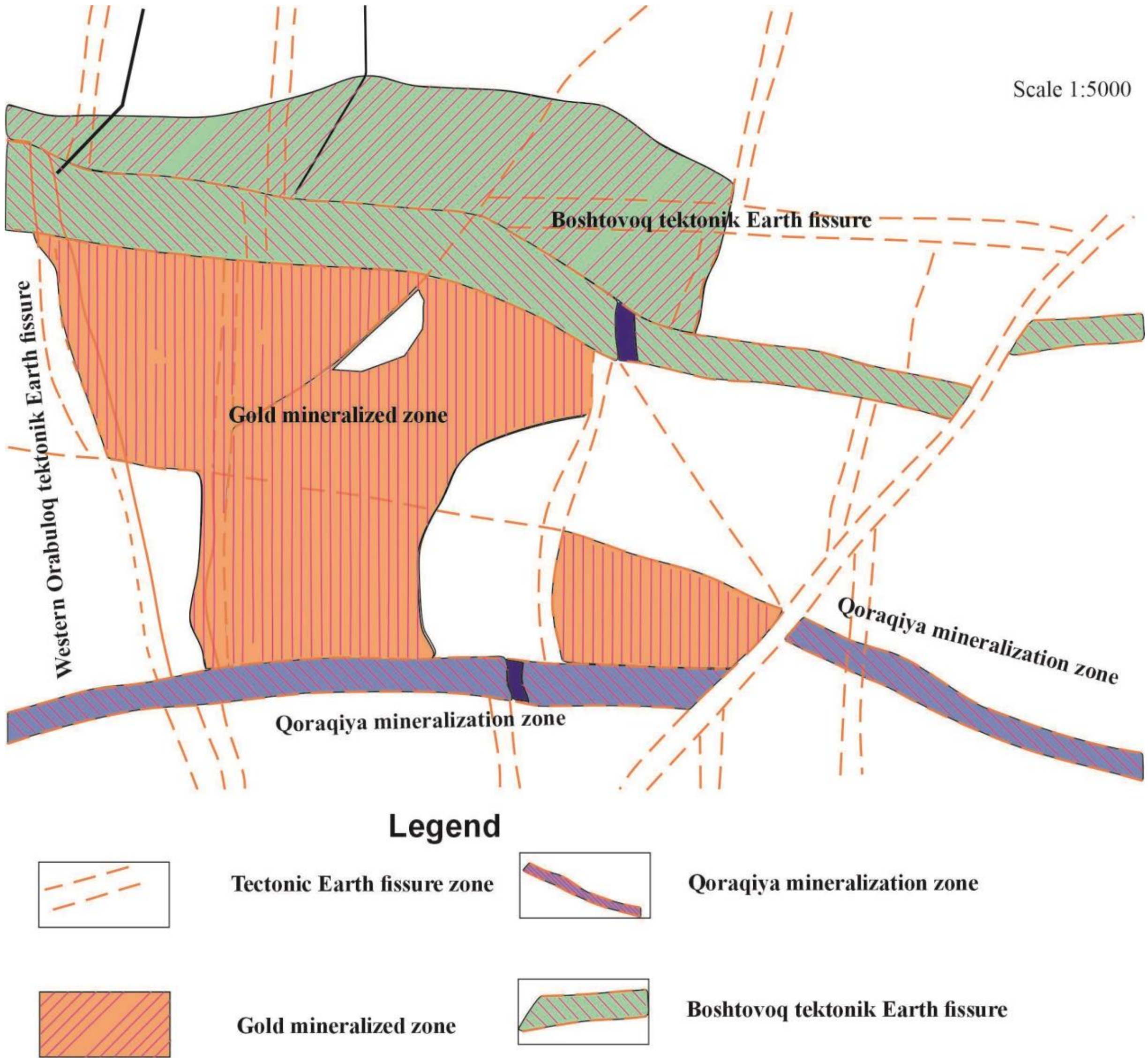


**Fig.1: Miskon tectonic Earth rift south west intersecting tectonics faults.**

**Kolbulak Tectonic Zone:** The Kolbulak tectonic fault stretches nearly parallel to the latitude and is oriented northward at an angle of 65–85°. The metasomatized and fragmented rocks in this zone include marbleized limestones and Lower Paleozoic formations. These faults contain a high abundance of quartz veins and altered rocks. The main faults are the Western Arabuloq meridional fault and the Ishakashsoy northeastern fault. Rock formations in the area are divided into blocks where mineralization processes have been observed. The region is characterized by the richness of its mineral resources. Gold-bearing layers are mainly associated with pyritized andesite-dacite rocks. Copper and silver often occur alongside gold and are located in hydrothermal fault zones. Additionally, other minerals such as kaolin, sericite, and quartz are also present.

The northeastern part of the Miskon regional tectonic fault intersects the Avjasoy area. The movements along this fault have shaped the tectonic structure of the region and triggered large-scale regional geodynamic processes. The fault and the associated deformations shape the geological development through the fracturing and movement of the rocks in the area. The observed tectonic activity in the Avjasoy region has facilitated mineralization processes and the accumulation of geothermal resources, making this area significant from the perspective of geological resources. Faults and fracture zones also create conditions for the development of hydrothermal activity, which marks promising sites for mining and other geological investigations.

The continuation of the Miskon tectonic fault is the Agalmatoid tectonic fault, which extends in the southwest-northeast direction across the Avjasoy region. This fault crosses the Kurgan and Terakli areas in the northeastern part. In the Kurgan area, Devonian system sediments form lithological layers with carbonaceous volcanic rocks. The alterations caused by the Agalmatoid tectonic fault have led to the formation of gold mineralization in the Kurgan area. The gold mineralization occurs in fine-disperse form within the carbonatized and argillized rocks.

The Kurgan area is located at the intersection of the Avjas meridional structure. Due to the significant alteration of the rocks in the tectonic zone, it is difficult to distinguish the primary rock layers. Primarily, metasomatic rocks are encountered. Additionally, quartz veins cut through the andesite-dacite dykes (Vokal V.I., 2001-2005).

According to data from well No. 5 drilled in the western flank of the Avjas meridional tectono-structural zone, which is near the water basin, the gold content ranges from 0.1 n 1 n, with an average distribution. The anomalous gold content is located in the quartz-sericite metasomatics above the limestone layers and is associated with silver content. Similarly, the same association of Zn, Pb, and Cu is observed in the Kurgon deposit as well as in the profile of wells No. 2139-2142.

If we accept the hypothesis regarding the genesis of the Kurgon deposit, the anomalous distribution of elements, especially gold, can be explained by the lithogeochemical alteration of the limestone layers.

Taking into account the materials of previous geological researchers, a schematic geological map at a scale of 1:2000 has been created for the southern Kurgan area. The geological structure of the region is represented by the underground rocks of the Qalqonota volcanic complex, which consists of biotite rhyolite-porphyry, and the Shavg‘z limestone that has been brought to the surface due to erosion along deep cuts. These limestone layers are oriented at a 70-degree angle. The main part of the area is occupied by the volcanic structures of the Chashlinskiy volcanic complex. The volcanic facies consist of tuff, andesite tuff breccia facies are represented by andesites, covering 65% of the area. The rocks of the Chashlinskiy volcanic complex are intensively metasomatized into quartz-sericite metasomatic rocks. In the western part of the area, near the Pistali-Qirqiz water basin, the metasomatism is weaker and weakly chloritized compared to the volcanic rocks.

In the area, two andesite-dacite sedimentary rocks of the Akchinskiy volcanic complex are observed. They are up to 20-30 m thick and have a northeastward strike, gently dipping to the north (50-60°).

**a) b) c) d)**

**Fig.2: Aglomerate samples taken from the tectonic stress zone of the Earth's crust (a-metosamatite, b-dolomite, c-ferrous metosamatite, d-dyke).**

The upper reaches of the Avjaz fault are observed at Observation Point No. 1, located 450 meters southeast of the Kurgan site. At this observation point, basal exposures of dolomitized limestones belonging to the Devonian period are present (Fig.2).

This observation point is located 15 meters southeast of the first observation point. At this location, Devonian dolomites form a thermal contact with Gushsoy-type granites.
The thermal contact zone is 3.5 meters wide. Determining the length of the thermal contact is challenging due to the northern-western part of the Avjasoy fault being covered by Quaternary loose sediments. The thermal contact zone is composed of metasomatized and completely altered rocks.
In the metasomatites, high gold mineralization is observed. The thickness of gold-rich intervals within ore-rich layers ranges from 6–15 m to 23–45 m. The metasomatites contain hypidiomorphic grains of pyrite transitioning into allotriomorphic segregations, crystallized in cubic symmetry within fractures. Pyrite grains or crystals are surrounded by fine-grained aggregates and form sequential crystals in association with marcasite.
In the metasomatites, pyrite forms veins, thin veinlets, and striped segregations in fractures 0.5–1.5 mm thick. These segregations exhibit alternations of pyrite-marcasite compositions. Rare clusters of marcasite are predominantly replaced by pyrite crystals. In the metasomatites, galena occurs as thin ribbon-like segregations formed sequentially with pyrite and marcasite. The voids between the grains are filled with small chalcopyrite, galena, and sphalerite. Microscopic droplets of mineral inclusions, measuring 0.1–0.2 mm, are evenly distributed in the metasomatites' primary mica-rich and quartz-mica textures, as well as in thin cellular-quartz segregations.
Chalcopyrite, sphalerite, and galena mostly exhibit allotriomorphic forms and often form clusters. Pyrrhotite occurs in claw-shaped, plate-like, hexagonal, and rounded forms.
Additionally, in the upper boundary of the contact zone within metasomatite rocks, chalcopyrite, sphalerite, and galena are found as fine grains (0.05–0.5 mm or smaller), often within carbonate rocks as granular formations.
Propylitic alteration is minimally developed. It is characterized by the coatings of various-aged volcanic rocks, where dark-colored minerals are predominantly present in the composition. These formations typically have a brownish-pink color due to intense pigmentation by iron hydroxides. The initial types exhibit moderate changes with the association of new formations, including iron-bearing carbonates, albite, and light-colored micas. Sometimes, such associations develop in small bodies and diorites, where the primary porphyritic structure of rocks is lost, and they take on a rust-like, soil-like appearance. In these rocks, biotite is sparsely replaced by muscovite along the flakes, sericite along the clusters, and carbonates, albite, and weak sericite develop along the matrix. Overall, the degree of alteration in the rocks generally does not exceed 50-70%.

## CONCLUSION

The Miskon tectonic fault plays a crucial role in shaping the geological structure of the region, which is essential for the development of mineral resources. Stretching over 40 km with significant vertical uplift and horizontal displacement, it is a key structure in the Olmaliq ore field. The geological impact of the Miskon tectonic fault is evident in the formation of mineral deposits, such as gold, copper, silver, and lead, which are distributed across various structural zones. The intersection of the Miskon fault with smaller tectonic features, such as the Boshtovoq and Kolbulak zones, has led to the formation of mineralized areas, often rich in quartz veins and altered rocks.
Important areas such as the Kauldi gold deposit and the Saricheku porphyry copper deposit highlight the significant role of the Miskon tectonic fault in mineralization. The Miskon fault has shaped the structure of the region and created conditions for the development of various minerals, often associated with hydrothermal processes. The mineralization in these zones has formed gold-enriched rocks, pyritized andesite-dacite formations, and quartz veins.
The northeastern part of the Miskon fault, intersecting the Avjasoy region, has triggered significant geothermal changes. The continuation of the fault in the Agalmatoid zone, particularly in the Kurgan area, has led to gold mineralization in fine-disperse forms within carbonatized and argillized rocks. Alterations caused by the Agalmatoid tectonic fault have created favorable conditions for the accumulation of gold and

other elements, such as zinc, lead, and copper. Altered limestone layers and metasomatic rocks also contain significant amounts of gold, with metasomatic rocks, particularly pyrite, sphalerite, and galena, exhibiting high mineralization.

Studying the Miskon tectonic fault holds great strategic importance for future mineral exploration and extraction.

**REFERENCES**

**Arapov V.A. (1983).** Volcanism and Tectonics of the Chatkal-Kuramin Region of Uzbekistan. Tashkent. Publishing House "*Fan" of the Uzbek SSR*, p.184.

**Abdullaev Kh.M (1965).** Magmatism and Ore Deposits of Central Asia. Tashkent, Uzbekistan *SSR "Fan" Publishing House*, p.198.

**Akbarov Kh.A., Umarkhodjaev M.U., Ismatullaeva L.A (1981).** Geological and Structural Conditions of Ore Distribution in Polymetallic Ore Fields of the Tien-Shan. Tashkent: Fan.

**Dalimov R.I., Kurbonov A.A., Dalimov N.R., Esenbaev A.G (2017).** Alkaline-ultrabasic Dykes of the Shavazsoy River Basin. *Geology and Mineral Resources*. No. 6. pp.17-21.

**Koneev R.I (2006).** Nanomineralogy of Gold in Epithermal Gold Deposits of the Chatkal-Kuramin Region (Uzbekistan). - St. Petersburg: Delta, 220p.