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THE GEOLOGICAL STRUCTURE OF THE BOZTOV SITE AND THE IMPORTANCE OF TECTONIC STRUCTURES IN GOLD MINING

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Abstract: This article analyzes the geological structure of the Boztov site located in the Central Bukanov region and the role of tectonic structures in gold mining. The study shows that the tectonic structure of the site is related to the Boztov brachyanticline, which developed in the dome part of the Zhelsoy-Okjetpes regional anticline. It was determined that the Proterozoic and Paleozoic complexes, as well as Cretaceous and Paleogene deposits, participate in the stratigraphic structure of the area. It is also based on the fact that the overthrusts developed in the brachyanticline core and the earth's faults in different directions create favorable conditions for brecciation of rocks and migration of hydrothermal solutions. As a result, it was determined that these tectonic fault zones are one of the main geological factors controlling gold mining in the Boztov site.

Keywords: Boztov, Zhelsoy-Okjetpes anticline, overthrust, tectonic fault, Bukanov, Kokpatas suite, fold, brachyanticline.

Annotatsiya: Mazkur maqolada Markaziy Bukantov hududida joylashgan Bo‘ztov uchastkasining geologik tuzilishi hamda oltin ma’danlashuvida tektonik strukturalarning roli tahlil qilingan. Tadqiqotda uchastkaning tektonik tuzilishi Jelsoy–Oqjetpes regional antiklinalining gumbaz qismida rivojlangan Bo‘ztov braxiantiklinali bilan bog‘liqligi ko‘rsatib berilgan. Hududning stratigrafik tuzilishida proterozoy va paleozoy komplekslari hamda bo‘r va paleogen davr yotqiziqlari ishtirok etishi aniqlangan. Shuningdek, braxiantiklinal yadrosida rivojlangan ustsurilmalar va turli yo‘nalishdagi yer yoriqlari tog‘ jinslarining brekchiyalanishi va gidrotermal eritmalar migratsiyasi uchun qulay sharoit yaratishi asoslangan. Natijada ushbu tektonik buzilish zonalari Bo‘ztov uchastkasida oltin ma’danlashuvini nazorat qiluvchi asosiy geologik omillardan biri ekanligi aniqlangan.

Kalit so‘zlar: Bo‘ztov, Jelsoy- Oqjetpes antiklinali, ustsurilma, tektonik yoriq, Bukantov, Ko‘kpatas svitasi, burma, braxioantiklinal.

Аннотация: В данной статья анализируется геологическая структура Бозтовского месторождения, расположенного в Центрально-Букановской области, и роль тектонических структур в золотодобыче. Исследование показывает, что тектоническая структура месторождения связана с Бозтовской брахиантиклиной, сформировавшейся в купольной части региональной антиклинали Жельсой-Окетпес. Установлено, что в стратиграфическую структуру района входят протерозойские и палеозойские комплексы, а также меловые и палеогеновые отложения. Также установлено, что надвиги, сформировавшиеся в ядре брахиантиклины, и разломы земной коры в разных направлениях создают благоприятные условия для брекчирования пород и миграции гидротермальных растворов. В результате установлено, что эти тектонические зоны разломов являются одним из основных геологических факторов, контролирующих золотодобычу на Бозтовском месторождении.

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Ключевые слова: Бозтов, антиклиналь Жельсой-Окетпес, надвиг, тектонический разлом, Буканов, Кокпатасская свита, складка, брахиантиклина.

Introduction. Geological and tectonic structures play an important role in the formation of gold mining areas. Especially large breaks, folds and thrusts create favorable conditions for the movement of hydrothermal solutions and the accumulation of ore minerals. The Boztov site is one of the promising gold fields in the Central Bukantov, and the study of its geological structure and tectonic features is of great scientific and practical importance in determining the laws of gold mineralization and determining prospective prospecting directions.

The Boztov prospect is located in the domed part of the large regional Zhelsoy-Okjetpes anticline of the Central Bukanov, on the border of the Boztov tectonic trough, which is visible in the form of a brachyanticlinal fold. It was identified in 1953-1955 during geological surveying and exploration work on a scale of 1:100,000 under the leadership of K.K. Pyatkov. The geological structure of the described area includes rocks of the Proterozoic, Paleozoic complex, deposits of the Cretaceous and Paleogene periods. Proterozoic and Paleozoic rocks consist of various metamorphic, carbonate, volcanogenic sedimentary deposits and magmatic formations. Deposits of the Cretaceous and Paleogene systems developed in the plain part of the area and formed a platform cover. In the Boztov area, the Kokpatas formation is widespread, mainly developed in the northwestern pereclineal part and on the flanks of the brachioanticline of the same name. The formation section includes siliceous rocks, carbon-siliceous shales, sandstones of various compositions, and siltstones.

Literature review. In the study of the geological structure of the Boztov site and the laws of gold mining, the scientific researches devoted to the geological development of Central Bukantov, Qizilqum and Western Uzbekistan serve as an important theoretical basis. In these studies, the stratigraphic structure of the area, tectonic development, magmatic processes, and geological factors controlling gold mineralization are widely covered.

The main lithological complexes in the area, their age and stages of tectonic development were described in the research conducted by M. A. Ahmedzhanov and co-authors on the structure of the Paleozoic foundation and the stratigraphy of the Paleozoic and Dopaleozoic deposits of Kyzylkum. These scientific results are an important source for determining the geological location of the Kokpatas and Koksoy suites scattered in the Boztov area [2, 3].

Z. M. Abduazimova analyzed the modern directions of studying the Docambrian and Paleozoic deposits of Western Uzbekistan, justified the need to improve stratigraphic schemes and comprehensive assessment of lithological and tectonic features. This approach serves as a methodical basis for the systematic study of the geological structure of the Boztov site [4].

T. N. Dalimov, I. N. Ganiyev and X. D. Ishbayev analyzed the magmatic development and tectonic evolution of the Chatkal-Kurama region, and showed that magmatic processes are inextricably linked with hydrothermal activity and mineralization. These scientific views are important in the interpretation of tectonic processes and hydrothermal changes in the Central Bukantov region [5].

L. V. Sedelnikov, A. A. Tusmitov, S. O. Jumayev and T. N. Turayev evaluated the prospects of expanding the mineral-raw material base of oxidized gold ores in Central and Southern Bukantov and noted that the main part of mineralization is connected with tectonic fault zones and hydrothermally

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altered rocks. These conclusions confirm the ore-controlling significance of the outcrops and brecciated zones observed in the Boztov section [1].

M. S. Karabayev's researches analyzed geochemical characteristics and metasomatic changes of gold-rare metal and gold-silver mineralization in Bukantov and Auminzatau regions. The author shows that the development of metasomatites, quartzization and sulfidization processes are closely related to gold mineralization. These conclusions are an important scientific basis for the interpretation of the geological nature of the hydrothermal changes identified in the Boztov site [6, 7].

Thus, existing scientific studies show that brachyanticlinal structures, thrusts, tectonic faults and hydrothermal changes developed in the Boztov site are the main controlling factors of gold mineralization. These scientific sources serve as a theoretical and practical basis for studying the geological structure of the Boztov field and evaluating its gold prospects.

Methodology. The study used complex geological survey methods to determine the geological structure and tectonic structures of the Boztov site and their significance for gold mining. The geological structure, stratigraphy and tectonic features of the area were analyzed based on geological maps, fund materials and available scientific literature. During the study, the lithological composition of the Kokpatas and Koksoy formations, brachyanticlinal structures, overthrusts and discontinuous tectonic faults were studied using comparative geological and structural analysis methods. The data obtained were summarized and the relationship of tectonic fault zones with hydrothermal processes and gold mining was assessed.

Results and discussion. The eastern, i.e., contact of the Kokpatas Formation developed along the overthrust is covered by rocks of the first and second layers of the Kokpatas Formation. The overthrust surface has a slope of 20-25o, and horizontal displacement is not noticeable. The Kokpatas Formation deposits, which lie in line with the Kokpatas Formation deposits, formed openings in the northeastern parts of the brachioanticline in the study area. They are composed of carbonaceous sandstones, siltstones and shales. The contact between the formations is clearly expressed and it is observed that the upper horizon of the Kokpatas Formation overlies the siliceous rocks. The rocks developed in the central part of the Boztov anticline and largely completely covered by Meso-Cenozoic deposits are combined into the Juszduq Formation. They consist mainly of limestones. Stratigraphically, the limestones are not associated with older rocks in the area. The contact with the Kokpatas formation is tectonic and is everywhere in contact with each other. The Boztov section, like the Kokpatas ore field, is included in the South-Bukantov structural-formational zone. One of the main devices that created its tectonic situation is the Boztov brachyanticline, which complicates the dome part of the Zhelsoy-Okjetpes regional anticline[8].

The axis of this structure changes from a submeridional direction in the southeastern part of the section to a sublatitudinal one in the northwestern part. The wings of the brachyanticline are inclined and have an undulating hinge. In the core of the anticline lie limestones of the Juzkuduk formation, surrounded by rocks of the first unit of the Kokpatas formation. Rocks of the second and third units of the Kokpatas formation are developed on the wings of the structure. The slopes of the wings are quite steep (20º-30º), in some places complicated by higher-order folds. Two types of discontinuous tectonic structures are observed in the area: overthrusts and steep faults. Overthrusts are widely developed in the core of the Boztov brachyanticline, where the Kokpatas Formation deposits were thrust over the limestones of the Juzhkuduk Formation, and as a result of subsequent geological processes, the above-mentioned deposits were washed away, forming a “tectonic hole” in the core of

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the structure. Overthrusts in the northeast direction on the Boztov brachyanticline flanks adjoin the northern and western flanks of the Kokpatas Formation rocks. Steep faults in the northwest direction have developed in the fold core.

These discontinuous structures may be adjacent branches of the Kokpatas Fault, which runs parallel to the axis of the Zhelsoy-Okjetpes Anticline. In addition, there is a series of sublatitudinal faults. The widths of the faults, which are 2-4 km long, are in the range of 50-200 m. All fault zones are well distinguished in the relief due to the fact that the rocks are fractured, brecciated and covered with iron hydroxides. Conclusion. The conducted analyses show that the geological structure of the Boztov site was formed under the influence of the Boztov brachyanticline associated with the dome part of the Zhelsoy-Okjetpes regional anticline in the Central Bukantov area. In particular, the uplifts observed in the brachyanticline core and the formation of a tectonic hole are associated with the tectonic deformation of the rocks. These discontinuous and folded tectonic structures created favorable conditions for the movement of hydrothermal solutions and the development of mineralization processes in the rocks. Therefore, gold mining in the Boztov site was formed mainly in genetically related to these tectonic structures.

Conclusions and recommendations. Analysis of the geological structure and tectonic features of the Boztov site showed that brachyanticlinal structures, thrusts and tectonic faults are important controlling factors in the formation of gold mineralization in the area. Breccia zones and hydrothermal changes developed in the rocks of the Kokpatas and Koksoy formations created favorable geological conditions for the movement of ore solutions and the accumulation of gold mineralization. Therefore, the Boztov site is considered one of the promising gold mining areas of the Central Bukanov.

In the future, it is recommended to continue detailed geological mapping along tectonic faults in order to identify promising zones of gold mining in the Boztov site, expand geochemical and mineralogical studies, and conduct additional drilling in promising areas. It is also advisable to use modern structural-geological analysis and 3D geological modeling methods to clarify the structures controlling the ore.

References

1. Седельников Л.В., Тусмитов А.А., Жумаев С.О., Тураев Т.Н. Перспективы расширения минерально-сырьевой базы окисленных золотосодержащих руд в месторождениях гор Центрального и Южного Букантау // Горный вестник Узбекистана. – 2006. – № 1. – С. 3–6.
2. Ахмеджанов М.А. и др. К стратиграфии допалеозойских и палеозойских образований Кызылкумов // Узбекский геологический журнал. – 1970. – № 2. – С. 13–18.
3. Ахмеджанов М.А. и др. Строение и состав палеозойского фундамента Узбекистана. – Ташкент: ФАН, 1967.
4. Абдуазимова З.М. Актуальные направления в изучении докембрия Западного Узбекистана. Принципы разработки стратиграфической схемы // Геология и минеральные ресурсы. – 2002. – № 5. – С. 3–15.
5. Далимов Т.Н., Ганиев И.Н., Ишбаев Х.Д. Чаткало-Кураминская горячая точка и история развития магматизма // Геология и минеральные ресурсы. – 2003. – № 5. – С. 3–14.

HSR (LONDON),
HOUGHTON STREET REVIEW JOURNAL
ISSN: 2058-5519|Impact factor-15.9
http://houghtonstreetreview.com/index.php/hsr

6. Карабаев М.С. Геохимические особенности золото-редкометалльного и золото-серебряного оруденения Букантау и Ауминзатау, их прогнозное значение // Горный вестник Узбекистана. – Навои, 2017. – № 2. – С. 83–88.

7. Карабаев М.С. Метасоматиты золото-редкометалльных и золото-серебряных месторождений гор Букантау и Ауминзатау и их взаимоотношение с оруденением // Горный вестник Узбекистана. – Навои, 2017. – № 3. – С. 70–79.

8. Конеев Р.И., Халматов Р.А., Мун Ю.С. Золоторудные месторождения Узбекистана: минерально-геохимический стиль, закономерности размещения и формирования // Геология и минеральные ресурсы. – Ташкент, 2009. – № 4. – С. 11–24.