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COSMOSTRUCTURAL FEATURES AND STRUCTURAL-TECTONIC ANALYSIS OF THE MALGUZAR SQUARE (MALGUZAR MOUNTAINS)

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ANNOTATION

The work was carried out using digital space imagery materials Landsat (ETM +, OLI), Aster TERRA, QuickBird and modern software products ArcGIS-10.5.4, ENVI-5.4 based on GIS technologies. Effective methods of forecasting, prospecting and prospecting for mineral resources, the use of space survey materials are firmly included in the practice of geological exploration and the use of GIS technologies is becoming mandatory.

KEYWORDS: ***interpretation, remote sensing of the Earth, ring structures, structurally decoded complexes, intrusive complexes, criteria, prospective areas, tectonics, interpretation, digital processing, color anomalies.***

DISCUSSION

The Malguzar Mountains are a continuation of the North Nurata ridge, stretched in the southeast direction for 100 km from the river. Sanzar before joining the Turkestan ridge. The southern slope is short, relatively gentle, the northern one is long, steeper, plunges under the Quaternary deposits of the foothill depression (the western part of the zone of "depressions of the 40th parallel", according to V.N. Weber) and is cut by a system of submeridionally located river valleys and gorges [1 , 2].

The ridge is composed of a stratum of Lower and Middle Paleozoic terrigenous-carbonate deposits, collected in the mega-anticline of the same name, which is complicated by fine folding and a series of large faults of northwestern, sublatitudinal, meridional and northeastern striking.

To identify linear structures and lineaments in the study area, we used Quick Bird satellite images and a radar satellite image obtained from the SRTM satellite, and for mineralization zones, Aster and Landsat-8 satellite images. ASTER is the first multispectral spaceborne sensor to distinguish and identify alteration minerals in the short-wave infrared (SWIR) range of the electromagnetic spectrum [5]. ASTER satellite images are used to map mineral zones of hydrothermal alteration associated with the mineralization of porphyry copper and epithermal gold, for lithological mapping and detection of mineral changes associated with gold, mapping of host rocks associated with porphyry copper-molybdenum mineralization [6, 7].

When searching for mineral deposits, the main objects of interpretation in space images are lineaments (linear structures or faults) and ring structures.

Solving problems of identifying geological structures precisely by classifying them according to certain criteria is a time-consuming process. It consists in creating a common class for one structure, since when designating one class, the classification algorithm produces certain groups of values of several pixels that are not related to the target object.

It has been established that most of the gold deposits of this type are fractured, their prospects are associated with the scale of ore-bearing fractures or the development of numerous small fracture faults grouped into a single ore-bearing zone (system). The connecting element of ore-bearing fracture systems are orecontrolling faults. Their interposition and development determine the location of ore formation [3].

Fractured zones with an increase in the number of lineaments are noted within the Paleozoic formations, under conditions of openness and semi-closed surface, which is noticeable when they are rarefied in flat areas. With the removal of the relief, the number of structural units on the identified linear structures decreases. As a result, a digital elevation model is formed with the boundaries of structurally decipherable complexes.

The results of processing by automated methods make it possible to map all structural units, as well as new and assumed faults, zones of regional fracturing of sub-latitudinal strike, ring structures, wedge-shaped blocks, etc.

By tectonic zoning, the Malguzar Mountains belong to the Malguzar-Nurata subzone of the Nuratau-Turkestan zone of the Southern Tien Shan. According to the radar satellite image from the south, the subzone is limited by the North Turkestan, from the north - by the North Nurata regional deep-seated faults. By the nature and features of the morphology of the gravitational field, the area is attributed to the Nuratau-Alai zone and is characterized by a reduced level of the gravitational field and alternating anomalies consistent with the general strike of the zone.

The establishment of the main structures that determined the tectonic structure of the Malguzar Mountains took place in the Silurian, under conditions of general compression. The first-order plicative structure is the Malguzar synclinorium, composed of terrigenous, carbonate-terrigenous and carbonate sediments of the Silurian and Carboniferous. It consists of a series of simple, isoclinal anticlines and synclines of the II order, complicated by symmetric and asymmetric folds of the II-IV orders, which, in turn, are crumpled to the point of flattening in the cores of the structures. The width of the larger ones is 300-1000 m, the length is from 1-3 km to the first ten. In the zones of influence of large faults, small isoclinal near-fault folding is developed, thrown back to the north or south.

Discontinuous structures are represented by subconcordant oblique and transversely cutting disturbances. Regional deep faults, according to the radar satellite image, with a viscous nature of dislocations, manifested in several stages. They are represented by numerous sutures of mylonites, cataclasites with a large number of intensely sheared or crushed boudins of host rocks. The thickness of the seams is from the first meters to the first hundred meters, the length is up to hundreds of kilometers, the total capacity is up to the first kilometers. Superimposed mineralization - pyrite, pyrrhotite, chalcopyrite, etc. - is often noted in Budins. The strike of the zones is sublatitudinal, northwestward (290-310º), the dip is subvertical with declination to the south or north.

Large faults of the second order on the northern slopes (from south to north) are: sublatitudinal - Kurpin upthrust, Lyaylyaguyin normal fault, Zambar uplift and northwestern - Ardakshan upthrust. They can be traced practically along all northern slopes and in the west-north-west they go under the modern sediments. The first two are represented by zones of close sutures of cataclasites, mylonites with a thickness from the first m to 100-200 m, dip to the south and north (respectively) at angles of 70-80º. The named faults limit the Bakhmal field from the north and south. The Zambara and Ardakshan faults are poorly studied due to poor exposure; according to the available information, they represent zones of intense crumpling.

Small, northwestern faults are also represented by zones of mylonites, cataclasites, intense shearing with a thickness from the first meters to the first tens of meters, up to the first kilometers.

Fractures of the northeastern direction on the surface are weakly manifested, only in the area of the Bakhmal deposit are they clearly recorded by intensive sheeting of diabase porphyrites and transverse folding in the Silurian shales and Devonian limestones. The regional cross-cutting structure of this direction is the West Tien Shan deep fault, the main seam of which runs along the northwestern end of the Malguzar mountains. Its influence extends to a significant part of the mountains, which is expressed by areas of increased fracturing or transverse micro-folding, superimposed on longitudinal macrostructures. Undoubtedly, he had a certain role in the localization of industrial mineralization at the Bakhmal deposit. The combination of the above violations of different directions gives the block structure to the Malguzar Mountains region. Most of the ore occurrences of the Malguzar Mountains are associated with large zones of shear, however, the most significant (Bakhmal, Etymtau, Shaibek, Yulsay, Karasu) are localized in the fractures of brittle deformations or their junction points with viscous deep faults.

Processing of Earth remote sensing materials was performed in the ENVI software. For this, methods were used to determine structural units with the maximum information content of the processed image. As a result of the revealed lineaments, a tectonic density map was constructed.

The development of cross-cutting faults of various strikes is characteristic of the study area. The faults of latitudinal, northeastern striking are actively manifested. So, faults of azimuth 320 are manifested in the valley part of the region with a constant step and follow (from south-east to north-west) through points along the lake. Tudakul and further to the southwest; along the northern side of the river. Zarafshan.

The final processing of the identified territories is carried out in the software for processing vector information such as ArcGIS, where, using the functions of statistical processing, the final generalization of polygonal objects (selected territories) is carried out. In addition, structural elements and faults were found that did not appear in the original satellite image.

Thus, in the course of the work, it was established that the main role in the distribution of mineralization in structures II-III and higher orders is relative to the deep fault. The identified potentially promising zones were identified based on the results of the integration of the available information and the ratio of satellite imagery channels, as well as on the spectral signature of minerals and rocks. In addition, as a result of the research carried out, two potentially promising areas have been identified, which are recommended for further more detailed geological prospecting work.

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