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LINEAMENT TECTONICS AND MINERALIZATION OF THE HISSAR MOUNTAINS (ON THE EXAMPLE OF SANGARDAK AND HARKUSH FIELD)

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https://doi.org/10.5281/zenodo.7192543

ARTICLE INFO

Received: 01st October 2022
Accepted: 05th October 2022
Online: 13th October 2022

KEY WORDS

cosmogeological studies, remote sensing, geochemical anomalies, satellite, pectral curves of minerals.

ABSTRACT

This article presents the results of cosmogeological studies of the territory of Southern Uzbekistan on a scale of 1:100,000. According to the established geological task, the interpretation of remote sensing materials was carried out using various processing methods for lineament analysis and mineral indices, taking into account previously carried out work.

Mineralization zones and, accordingly, favorable positions have been identified based on the ratio of satellite image channels and changes in the spectral curves of minerals.

The results of processing satellite images through various algorithms cause climatic conditions and terrain complexity to achieve economic efficiency, allowing mapping of minerals, their satellite elements, and gitrothermal altered zones associated with mining in areas where traditional geological mapping is difficult.

It is known that the human eye does not have the ability to see all wave radiation in nature, the range of vision is located between the wavelength of 0.36-0.78 micrometers. All material objects present in nature, including mountaineers and minerals, have their own proprietary spectrum property, such as light refraction and light return, a feature that allows remote mapping of aerospace images by processing them in our Republic at present, and satellite images such as Landsat-7, 8 Aster, Sentinel, Spot are widely used in the world-wide geology research experiment.

The ASTER sensor was created in collaboration with American satellite technologies and Japanese researchers, released in 1999 into solar synchronous orbit (705 km). The ASTER system is designed to capture images in three spectral ranges, which are: VNIR (visible and near infrared range) image quality indicator 15m; SWIR (short wave infrared range) image quality indicator 30m; TIR (thermal infrared range) image quality indicator 90 m this satellite is also capable of obtaining multispectral as well as stereoimage.

When decrypting, direct and indirect (landscape-indicative) signs were used. Direct decoding signs of faults are identical on the materials of satellite images of all types and scales, and on exposed areas they are manifested both by particular signs of a

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fault and by their combination. Faults and structural-decoding complexes (SDCs) are clearly deciphered in a situation when rocks and SDCs of different types in composition, structure, color, genesis are brought into contact along the fault, or there is a sharp change in the pattern of the photo image of the contacting objects, and in layered rocks the sign of a fault is the displacement of bundles. Landscape-indicative signs serve as indicators of faults within the development areas of the Mesozoic-Caynozoic SDC.

A characteristic feature of the buried foundation within the platform part of the study area is the alternation of buried foundation elevations in the form of weakly expressed meridionally elongated shafts in relief, fixed by garlands of meridionally located CS with a diameter of 20-30 km (Yu.S.Savchuk, A.K.Glukh), located within the zones of regional fracturing. The peculiarity of the area is the overlap of 60% of its area by a powerful cover of Mesozoic-Cenozoic platform sediments and the distribution of the latter depending on the differentiated movements of the foundation blocks, emphasizing the connection of the structure of the cover of the Mesozoic-Caynozoic, modern relief and the structure of the foundation, due to the inherited nature of the development of neotectonic structures from the structures of the ancient. The convergence of uplifts and valleys, the change in their strike is determined by the position of secant, often hidden, faults diagonal with respect to the strike of the folded strike system and established only through the decryption of satellite imagery materials.

As a result of decoding radar satellite images of the regional level of generalization, a map of the deep faults of the Hisar Mountains was constructed (Fig. 1).

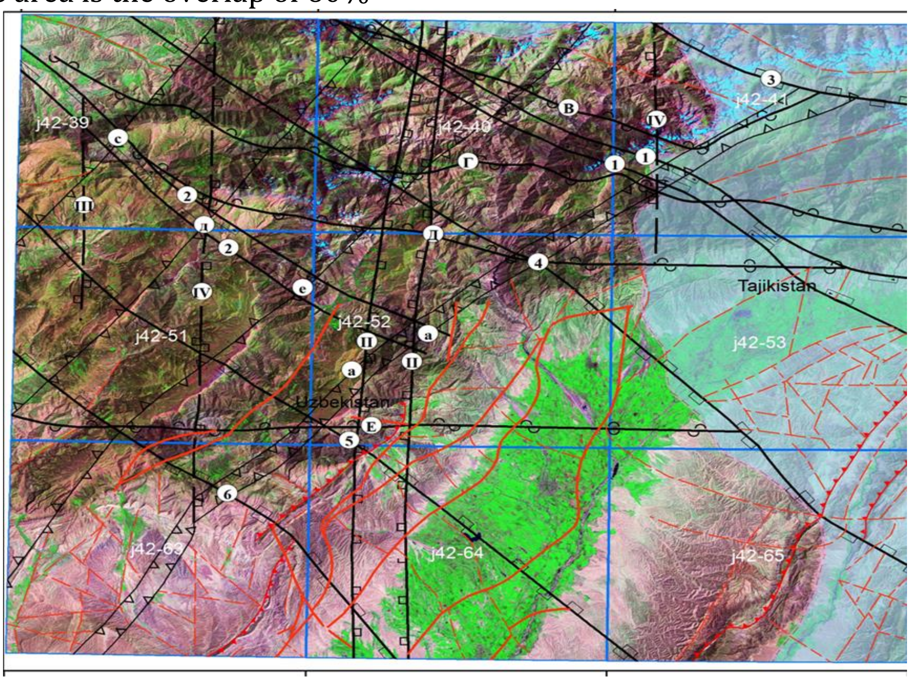

Fig.1. Lineaments based on the data of decoding radar satellite images of the regional level of generalization.

Symbols: names of deep faults **1-LATITUDINAL:** A-the southern limit of the zone of the North-Hissar fault; B-the zone of the South-Hissar fault; C-Khodzhabuzbarak; G-Bogain; D-Hissar-Baysun; E-South-Surkhantau; W-Sayat-Bandyhansky; **2-NORTH-WESTERN:** 1. Artushgar; 2.Kuldara-Khandiza; 3.Aksu; 4. Chapukh-Machetli; 5. Dimalek; 6.Kayrak; 7.North-Kugitang; 8.Chuyankan. **3-MERIDIONAL:** I.Here Amata Pashkhurd II.Surkhantau III.Zarmas IV.Kharkush V.Obizarang. **4-**

NORTHEAST: a-Sherabad-Yangakly; b-West Yakkabag; c-Vari; d-Chakchar; e-Kugitang-Baysun. 5-Lineaments corresponding to thrust structures; Isolated discontinuous disturbances of late quaternary tectogenesis: 6-Macroblock; 7-Microblock.

Comparison of lineament analysis results with geochemical anomalies. The analysis is based on the map of primary secondary halos of the elements of indicators of gold mineralization of the Hissar region compiled by G.N. Korobeynikoavm and K.A.Akhunova (1978). Taking into account the uneven geochemical study of the part of the research area under consideration, more attention was paid to the main areas within this territory

Along the channels of the Sutshar and Tamshush rivers, lead halos were noted, timed to the development of a structurally decipherable complex of granites-granodiorites C3. Another field of Pb anomalies, on the starboard side of the Tankhyzdarya river near K.Donarnur, is timed to the contact of basaltoid SDK C2b and is noted together with Ag anomalies. for more than 20km. Along the Shatrut river (in years.Dogainx by contact of the terrigenous-volcanogenic complex O2-3 and basaltoids C2B. In the upper reaches of the Palkhazar River, in volcanites C1V, Pb halos coincide with Ag Au halos. High concentrations of Ag are observed in the area opposite the village of Chepuh, in the upper reaches of the river.Kyzyldarya, Pb halos with a high concentration class repeat the boundary between Jurassic and Paleozoic sediments. Halos of high concentration are observed in the upper reaches and south of the Almaly River among volcanites of the main composition C2b and among carbonate SDK D-C

To the southwest of P.Tatars, for more than 22 km, at the foot of the mountains, deciphered the SDK of tectonic crowding, expressed by the intermittency of subvolcanic linearly (latitudinal) oriented bodies of granite porphyry and terrigenous-volcanogenic SDK C1V. Search operations are recommended within the complex. This recommendation is emphasized by the placement of high concentration Pb and Ag halos. There is a technical error on the concentration map (silver halos "are cut off on the north-western part of the research contour.

In addition to the geochemical map, a map of minerals 1:200 000 (D.A.Rubanov A.A.Rubanov KGPE 1978) is considered, which reflects the halos of the placement of the results of the dressing testing. It is characteristic that Au, W, Sn are more clearly reflected in the dressings and lead and zinc are less clearly reflected. The latter are manifested within the complex of Cretaceous and Jurassic rocks (the basin of the Kyzyl-Darya), and in the central part of this square there are halos of Au,W.

Dressing halos of W, Pb are placed in the pool of p .Talha-Zor, in the upper reaches of the Almaly River basin, where it connects with the halo along the Kyzyl-Darya. On the area bounded by the points Madmon–Tamshush-to the meridian of the village of Jauz. The mercury halo is confined to the field of development of the carbonate SDC (Aspi-Dukhtar district).

In the area of the Khandiza deposit, Pb anomalies have a meridional orientation consistent with the stretch of the deciphered zone of the Jilau-Taror-Khandiza. and along the Baysun uplift-thrust of the north-eastern strike. A large anomaly of Pb arc shape stretches from the Handiza to the east-southeast and is located in the deposits of the Proterozoic.

A large anomaly Ag was noted to the north of Khandiza, on the border with the Jurassic deposits in the formations C2 and is subject to the stretch of the above-mentioned meridional through-character zone. Fig.2

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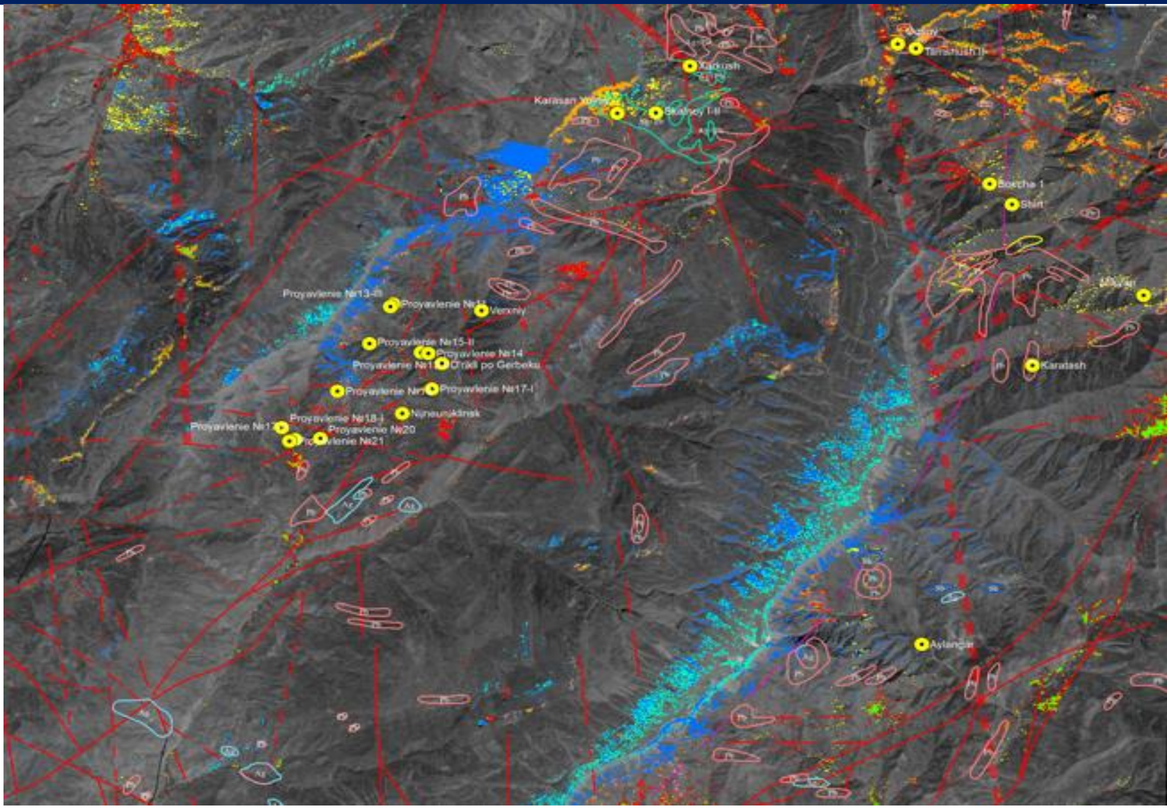


Fig.2. Comparison of the results of automated detection of mineralization zones in the infrared range with halos of the map of geochemical anomalies.

In recent years, satelitte images from the ASTER satellite have been widely used in the exploration of mineral deposits. ASTER is considered to be very effective for the separation of mountaineers and minerals, which has changed due to the adoption of space images in a wide range. For example, considering that the kaolin mineral is considered a modified mineral and is associated with gold and copper deposits, as a result of mapping the areas where the kaolin mineral is distributed, it will be possible to distinguish between gold and copper mining zones.

ASTER space images can be reproduced with a qualitative initial, combining its channels, mapping the distribution of changed mountaineers and minerals as a result of the calculation of mineral indices. Such minerals include iron oxide, silicon rocks, carbonate rocks, cerisite, illite, alunite, kaolinite and others.

The table below (Figure 1) presents methods for calculating mineral indices, which are used for Aster space images, developed by foreign specialists. These indexes were experimented with on the example of the territory of our Republic in the ASTER space images taken in the Bukantov mountains in Central Kyzylkum.

Mineral indexes on ASTER space pictures.

indexes	Kannals attitude
Alunite-gaalinite-pirafillite	(4+6)/5
Carbonate-chlorite-epidote	(7+9)/8
Dolomite	(6+8)/7

Ferrum	Fe3+ 2/1
ferric	Fe2+ 5/3 + 1/2
Kaolinite	7/5
MGO-carbonate	(6+9)/8
Muscovite	7/6
Fengit	5/6
Serisit-Muscovite-illit-smektit	(5+7)/6
Abundance of quartz	13/10
Plants	(3–2)/(3+2)

Fig. 3. Mineral indexes applied for ASTER space images

These space images were processed in ArcGIS, ENVI, Global Mapper, Geomatica PCI and Erdas image software. We have developed a geological, geophysical and cosmogeological database by area, processed into space images by special methods. Preliminary analytical work is carried out by processing multispectral space images, and an initial cosmostructural scheme is drawn up on the territory of the study. Through the relationship of the channels of the Aster multispectral satelitte, minerological, hydrothermal, structural and 3D analyses of the area are carried out.

These aggregated data are checked in field conditions. The results of cosmogeological studies carried out through new methods with the results of the geology-search work carried out before this are summarized. From the results of the research work carried out, promising fields were allocated, which were mined for gold and related elements. The results obtained will help to form the basis for the correct organization and orientation of the field geology-exploration work of the Sangardak and Harkush fields.

Research in this direction we applied within the framework of our cosmogeological studies carried out in the Sangardak and Kharkush fields located in the Sariosiyo district of Surkhandarya region, and as a result, we mapped the mineralization zones (fig.4)

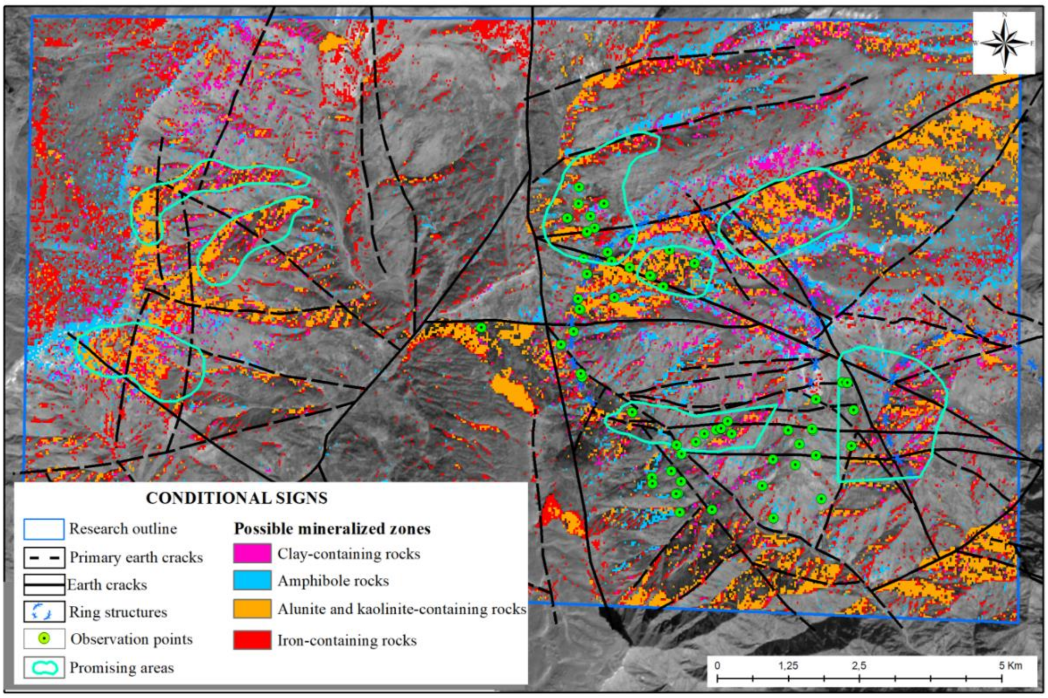
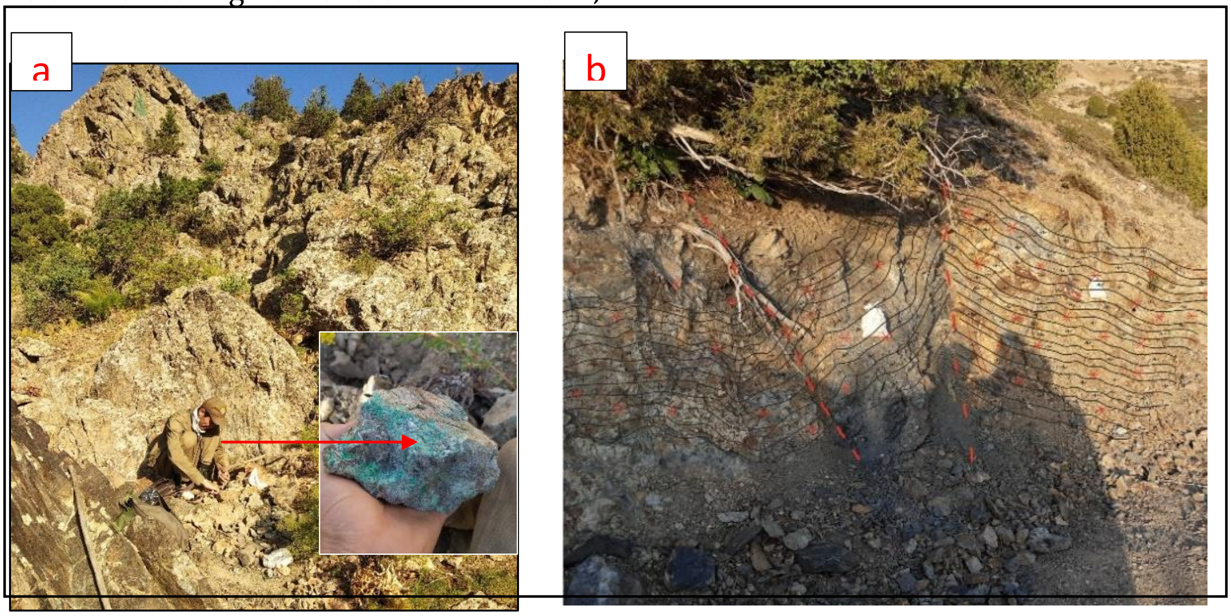


Fig. 4 Map of clay-containing, amphibole-containing, alunite-kaolin-containing, and temitr-containing mountainjins and minerals automatically separated from Aster multispectral SM in Kharkush and Sangardak field.

It can be seen from Figure 2, multispectral ASTER satelitte in automatic mapping of altered mountain rocks and minerals in Sangardak and Vari fields has a very high chance of mapping minerals such as new promising gold copper. In particular, field monitoring of areas with kaolin, alunite, silicate, iron-containing and Silicon rubble and minerals were carried out. In the process of observation, the presence of hydrothermal altered mountains rocks and minerals scattered in the feild found its confirmation at a high level(fig.*5)*



As a result, the exposed rocks are oxidized by water, and then a green zone is formed (a-apparently containing copper-rich rock, b-modified andsulfidized siltstones under the influence of tectonic force). Fig.5

In conclusion:

As a result of the application of Aster multispectral space images, geologo-structural laws of mining were determined, so new promising areas were allocated to Clay-containing blackening, amphibolitalization, alunitalization, kaolinization, polymetals-rich and other mineralized zones.

Currently, geological exploration work in huddu is carried out on gold, copper and polymetallic and other elements.

According to the results of cosmogeological studies, the cosmostructural elements of Sangardak and Harkush meido were determined. As a result of a comprehensive analysis of the results of cosmogeological studies with data from geologo-structural, Geophysical and tectonic studies, it makes it possible to increase the reliability of forecasting and the effectiveness of search activities.

As a result of the study, new promising areas were identified. In the identified promising areas, field examination work was carried out and geochemical samples were taken. The collected samples were analyzed in laboratory conditions by the method of spectral semi-quantitative analysis. The results obtained showed high content for the following elements Au-06 g/t, Ag-15 g/t Cu-1,475%, Pb 0,083% and Zn-0,043%.

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