ANNOTATION

Dissertation for the degree of Doctor of Philosophy (PhD)
in educational program 8D07201 – Geology and exploration of mineral deposits

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STUDYING THE GEODYNAMIC POSITION OF ULYTAU- ARGANATA ZONE

The relevance of this work is determined by the need to obtain new geological information on the geodynamic position of a unique and complex geological object, which is the geological structure of the Ulytau-Arganata zone(UAZ).

The priority direction in forecasting mineral resources is to decipher the geodynamic evolution and mineragenic zonation of the geological structure of the studied areas. In this regard, special attention is paid to retrospective reconstructions of the geodynamic development of folded belts and active continental margins, as well as the development of a scheme for their mineragenic zoning, identifying the main stages of formation and localization features of mineral deposits, which make it possible to determine the prospects and mineragenic potential of the territory.

The generalization, analysis and systematization of materials from regional geological studies conducted after the publication of the first-generation State Geological Map-200 made it possible to compile the legend of the series in a zonal version at six age levels, covering strata of different ages of the general stratigraphic scale from the Neoproterozoic to the Upper Ordovician in accordance with the new International Stratigraphic Scale 2019.

The aim of the dissertation work is to identify the patterns of formation and placement of geological formations and the geodynamic position of the territory of the Ulytau-Arganata zone.

To achieve this goal, the following **research tasks** were solved:

1. Study of UAZ stratotypes and petrotypes based on analysis

geological structure and tectonic conditions for the formation of structural and formational zones.

2. Establish the patterns of formation of geodynamic conditions.

3. Analysis of metallogenic specialization of Proterozoic and Early Paleozoic rocks.

The assigned tasks were solved in three stages:

- at the first stage, collection and analysis of stock and published materials on the region was carried out;

- second stage - field and laboratory studies were carried out to study stratotypes and petrotypes, tectonic conditions for the formation of structural and formational complexes of the UAZ

- the third stage – systematization and analysis of the results obtained in the process of performing work on the topic of the dissertation; a pattern of formation was identified, in which the geodynamic conditions and their metallogenic specialization and regimes of territory formation were reconstructed.

During geological studies in the Ulytau – Arganata zone and adjacent structures of the Paleozoic folded region of Central Kazakhstan in the 70-90 years, increased concentrations of some metals were noted, but the area was determined as unpromising. With the development of new exploration technologies, as well as the demand for new types of mineral raw materials, this area is of scientific and practical interest.

Methods: The methodology of scientific research is based on the scientific developments of highly qualified specialists in the field of geology, prospecting, exploration of mineral deposits and computer technologies of the Republic of Kazakhstan, Russia, etc. Differences in the stratigraphic volume, thickness and formation composition of sediments require a new methodological approach to solving regional problems modeling its structure, predicting lithological characteristics.

Were held:

field work, sampling to study the mineral composition of stratotypes and petrotypes of the Ulytau-Arganata structural-formational zone;

mineralogical and petrographic studies of thin sections of metamorphic rocks composing the Ulytau zone and subzone;

analysis of published, stock literature to justify the identification of a structural-formational zone of tectonic zoning of the Ulytau sialic massif.

Scientific novelty of the research:

1. A geological zoning scheme has been developed based on the identification of structural-formational **Scientific novelty of the research:**

zones covering strata of different ages from the Neoproterozoic to the early Paleozoic.

2. For the first time, from the standpoint of accretionary tectonics, a block model of the structure of the Ulytau-Arganata structural-formational zone has been formulated, which determines the metallogenic zoning (ore levels and belts).

3. Within the identified metallogenic zones, rock complexes were identified that were promising for non-ferrous, rare and rare earth elements to justify prospecting exploration work.

Protected scientific positions are:

The patterns of structure, distribution of material composition, conditions of formation of lithostratigraphic complexes composing the Ulytau-Arganata sialic massif were studied, which made it possible to create a block model of the Neoproterozoic (up to the Late Riphean inclusive) complex metamorphic basement and an unevenly metamorphosed Ediacaran-Cambrian cover.

The conditions for the formation of structural-formational complexes have been established, which, by their characteristic features, rock paragenesis and chemistry of igneous rocks, are characteristic of certain stages of the geological development of the earth's crust. The formation of the modern appearance of the

tectonic structures of the region is due to very complex and long-term geological processes.

Within the studied Ulytau-Arganata structural-formational zone, ore nodes of mineralization confined to tectonic fault zones have been identified.

The time sequence of intraplate intrusions of calc-alkaline high-potassium petrochemical series of the Ulytau-Arganata massif with rocks of the volcano-plutonic belt, with which mineralization is associated (copper ore, gold ore, rare metal), has been established.

The practical significance of the work lies in establishing the spatiotemporal position of each of the eight mineragenic zones in which elevated mineral contents were identified, which is important for basic prospecting characteristics associated with the characteristics of the stratotypes and petrotypes of the Neoproterozoic complexes of the Ulytau-Arganata Federal Zone.

The composition of the main mineragenic zones has been determined, and the idea of the conditions for their formation has been substantiated.

The research results obtained indicate favorable conditions for the formation of large concentrations of rare metals and rare earth elements.

The research results were introduced into the production of Azimut Geology LLP, as well as into the educational process, during lectures and practical classes at the Department of «Mining, Metallurgy and Natural Sciences of JSC Zhezkazgan University named after O. A. Baikonurov».

The author's personal contribution consisted of collecting, processing, systematizing, summarizing and interpreting factual material; in conducting field work with sampling for analytical studies; in summarizing the results of laboratory studies in the study of geochemistry and minerageny of the Ulytau-Arganata SFZ(structural-formational zone).

Approbation of work and publications

The main provisions of the dissertation work were reported:

– at seminars of the department “Geology and exploration of mineral deposits” of KarTU named after Abylkas Saginov;

– at the seminars of the department “Mining, metallurgy and natural science” of JSC “Zhezkazgan University named after. O.A. Baikonurov";

- at the international scientific and practical conference “XV Saginov Readings. Integration of education, science and production" (Saginov Readings No. 15), (Karaganda, 2023).

– at the State Institution “Institute of Mineral Resources” of the University of Geological Sciences of the Republic of Uzbekistan, (Tashkent);

– at international conferences.

Completed scientific internship in the period from 04/17/2023 to 04/30/2023. at the State Institution “Institute of Mineral Resources”, University of Geological Sciences of the Republic of Uzbekistan, (Tashkent), where consultation was received on the topic of the dissertation from Doctor of Geological and Mineral Sciences, Professor R. Kh. Mirkamalov. and a certificate of successful completion of a scientific internship.

The main provisions of the dissertation work were published in 13 scientific works, 3 of which in publications recommended by the Committee for Quality Assurance in Education and Science of the Ministry of Education and Science of the Republic of Kazakhstan; 3–in the proceedings of republican and international conferences; 3–articles included in the Scopus/Clarivate Analytics/Web of Science database; 2-Eurasian invention patent, 2-SIS.

Factual material

The work is based on the author's field research materials, the results obtained during geological survey work (GDP-200, GGK-200, GMK-200) in 2019-2021, as well as materials from scientific research and thematic works, stock materials geological reports on the study of the geological structure and minerageny of the UAZ territory.

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