

Report of the Dissertation Council on Geology, Hydrogeology and Geophysics at KazNITU named after K.I.Satbayev on decisions on awarding (refusal to award) the degree of Doctor of Philosophy (PhD) in the specialties 6D075500-Hydrogeology and engineering geology, 6D070600 –Geology and exploration of mineral deposits, 8D07205 - Geology and exploration of solid mineral deposits, 8D07104 – Oil and gas and ore geophysics, 8D07206 - Geology of oil and gas for 2024.

1. The number of meetings held.

The Dissertation Council in the specialty 6D075500-Hydrogeology and engineering geology, 6D070600 –Geology and exploration of mineral deposits, 8D07205 - Geology and exploration of solid mineral deposits, 8D07104 – Oil and gas and ore geophysics, 8D07206 - Geology of oil and gas held 9 (nine) meetings.

2. The names of the members of the dissertation council who attended less than half of the meetings – no one.

3. List of doctoral students with indication of training organization.

| № | Full name of the doctoral student | Organization of training |
|----------|--|----------------------------------|
| 1 | Tazhiev Sultan | KazNRTU named after K.I.Satbayev |
| 2 | Urmanova Dilyara | KazNRTU named after K.I.Satbayev |
| 3 | Zhumagulov Almas | KazNRTU named after K.I.Satbayev |
| 4 | Aliakbar Madiyar | KazNRTU named after K.I.Satbayev |
| 5 | Kurmangazhina Madina | KazNRTU named after K.I.Satbayev |
| 6 | Tleuova Zhanna | KazNRTU named after K.I.Satbayev |
| 7 | Zhanserkeyeva Ainura | KazNRTU named after K.I.Satbayev |
| 8 | Sanatbekov Miras | KazNRTU named after K.I.Satbayev |
| 9 | Baikadamova Ainur | KazNRTU named after K.I.Satbayev |

4. A brief analysis of the dissertations reviewed by the Council during the reporting year

During the work, the Dissertation Council reviewed 5 (five) papers in 3 (three) specialties. The names of dissertations in the context of specialties are given below:

| № | Full name of the doctoral student | Subject of the work | Cipher and the name of the specialty |
|----------|--|--|---|
| 1 | Tazhiev Sultan Rysniyazovich | Groundwater resources of the Kazakhstan part of the foothills of the Kyrgyz Alatau: formation, state and prospects for use | 6D075500 - Hydrogeology and engineering Geology |
| 2 | Urmanova Dilyara | Assessment of the hydrocarbon potential of the sedimentary complex of the south of the Precaspian Basin (including the water area of the Northern Caspian Sea) based on the results of basin modeling and determination of prospects | 8D07206 - Geology of oil and gas |
| 3 | Zhumagulov Almas | Geological structure and prospects for oil and gas content of the Middle-Upper Paleozoic deposits of the Tasbulak trough based on geological and geophysical data | 8D07104 – Oil and gas and ore geophysics |

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|---|----------------------|---|---|
| 4 | Aliakbar Madiyar | Petrophysical modeling in study of prospects of the over-salt complex of the southern margin of Caspian depression | 6D070600 – Geology and exploration of mineral resources |
| 5 | Kurmangazhina Madina | Study of three-dimensional model constructions of Syrymbet ore field deposits as a basis for predicting rare metal mineralization | «8D07205 - Geology and exploration of solid mineral deposits» |
| 6 | Tleuova Zhanna | Implementation of Remote Sensing and GIS in hydrogeological investigation of Makhtaral irrigated lands in the Turkestan region | 6D075500 - Hydrogeology and engineering Geology |
| 7 | Zhanserkeyeva Ainura | Geological setting and evaluating the hydrocarbon prospectivity of the Paleozoic complex based on basin modeling results for the eastern margin of the Precaspian Basin | 8D07206 - Geology of oil and gas |
| 8 | Sanatbekov Miras | Geodynamic and hydrogeological criteria for assessing the hydrocarbon potential of the Balkhash and Alakol depressions | 6D075500 - Hydrogeology and engineering Geology |
| 9 | Baikadamova Ainur | Assessment of thermal energy resources of thermal waters of the Zharkent Depression | 6D075500 - “Hydrogeology and Engineering Geology” |

4.1 Analysis of the subject of the considered works

4.1.1 Brief analysis of the dissertation of Tazhiev Sultan on the topic: “Groundwater resources of the Kazakhstan part of the foothills of the Kyrgyz Alatau: formation, state and prospects for use”, on the speciality 6D075500 - Hydrogeology and engineering Geology
- *analysing the topics of the reviewed works;*

The main goal of the work is the scientific substantiation of the effective development of groundwater resources in the Kazakh part of the foothills of the Kyrgyz Alatau for the development of rational management decisions on the use of their resource potential for the sustainable development of urban and rural areas of the Zhambyl region.

To achieve this goal, the following tasks were solved:

- 1) the hydrogeological features of the study area were clarified based on the collection, analysis and systematization of the results of previously carried out work;
- 2) the current state of exploitation of explored groundwater deposits and self-flowing hydrogeological wells, as well as hydrogeochemical indicators of groundwater were assessed based on ground-based route surveys with sampling and laboratory analyses;
- 3) transboundary aquifers were characterized and the risk categories of transboundary problems affecting the groundwater resources of the Kazakh part of the foothills of the Kyrgyz Alatau were clarified;
- 4) natural (capacitive and elastic) reserves, natural (renewable) and forecast resources of groundwater in the foothills of the Kyrgyz Alatau of Zhambyl region were clarified;
- 5) a geoinformation database was formed and an information-analytical model of groundwater resources and reserves was developed in the foothills of the Kyrgyz Alatau of Zhambyl region;
- 6) the prospects for using the resource potential of groundwater in the foothills of the Kyrgyz Alatau to ensure the socio-economic development of the southern part of the Zhambyl region were assessed.

4.1.2 Brief analysis of the dissertation of Urmanova Dilyara on the topic:

"Assessment of the hydrocarbon potential of the sedimentary complex of the south of the Precaspian Basin (including the water area of the Northern Caspian Sea) based on the results of

basin modeling and determination of prospects," in the educational program 8D07206 "Geology of oil and gas."

- *analysing the topics of the reviewed works;*

The purpose of the work. To determine the oil and gas development potential on the basis of a comprehensive study of hydrocarbon systems of the Upper Paleozoic subsalt complex of the southern side of the Precaspian basin and to assess the state and prospects of oil and gas potential on the basis of oil and gas geological zoning.

Research objectives. In accordance with the set goal, the following tasks were solved:

1. Collection, systematization and study of the geological and geophysical study of subsalt deposits of the southern flank, comparison of lithological and stratigraphic sections of wells and the study of sedimentation models;

2. Study of the tectonic position of the southern flank and the structural and formation structure of the subsalt complex, analysis of the tectonic structure and geothermal conditions;

3. Collection, generalization and analysis of geological and geochemical characteristics of the section and potential source rocks, study of the type and thermal maturity of organic matter, conducting the latest pyrolytic RockEval studies, conducting analyses on the artificial maturation of potential source rocks;

4. Study of hydrocarbon systems for subsalt deposits of the HCS, study of the process of maturation of hydrocarbons, analysis of models of generation and migration of hydrocarbons based on the concept of hydrocarbon systems;

5. Analysis of oil and gas potential, clarification of oil and gas geological zoning and identification of promising areas of oil exploration in the research area.

4.1.3 Brief analysis of Zhumagulov Almas dissertation on the topic: " Geological structure and prospects for oil and gas content of the Middle-Upper Paleozoic deposits of the Tasbulak trough based on geological and geophysical data ", specialty 8D07104 – Oil and gas and ore geophysics.

- *analysis of the topics of the reviewed works;*

The purpose of the research is to study the geological structure and prospects for oil and gas content of the Middle-Upper Paleozoic deposits of the Tasbulak trough using a geological and geophysical dataset.

Tasks to be solved:

- collection, analysis and systematization, preparation and quality control of geological, geophysical and geochemical data;
- creation of a digital database (digitization of seismic profiles and well logs, well data and geological and geophysical maps) and loading them into Petrel 2021 software;
- reinterpretation of digitized CDP-2D seismic data;
- petrophysical correlation of digitized logging data in modern software;
- analysis of the spatial distribution of anomalies of magnetic and local gravitational fields;
- multidimensional geological modeling using drilling, logging and seismic data CDP-2D;
- construction of maps of oil and gas geological zoning and substantiation of recommendations for further exploration.

4.1.4 Brief analysis of the dissertation of Aliakbar Madiyar on the topic: "Petrophysical modeling in study of prospects of the over-salt complex of the southern margin of Caspian depression", on the speciality 6D070600 - Geology and Exploration of Mineral Resources.

- *analysing the topics of the reviewed works;*

Development and creation of the scientific and methodological foundation for petrophysical modeling of heterogeneous terrigenous reservoirs to enhance geological informativeness and

reliability in constructing geological and technological models of the oil and gas to achieve the goal, the following tasks are envisaged:

1. Review of the current state and identification of trends in modern petrophysical research for studying the properties and evaluating the parameters of terrigenous reservoirs.

2. Creation of a database of initial geological-geophysical data to facilitate the study of the detailed geological structure and the construction of petrophysical models of reservoirs in Kazakhstan.

3. Development of methodological support and justification of the technique for identifying the properties of terrigenous reservoirs with varying filtration characteristics based on petrophysical modeling of well data.

4.1.5 Brief analysis of the dissertation of Kurmangazhina Madina on the topic: "Study of three-dimensional model constructions of Syrymbet ore field deposits as a basis for predicting rare metal mineralization", on the speciality «8D07205 - Geology and exploration of solid mineral deposits».

- *analysing the topics of the reviewed works;*

The purpose of the research is to identify promising areas within the Syrymbet ore field based on the analysis systematization and supplementation of ore-controlling factors of ore localization and forecasting and prospecting criteria.

To achieve the goal, the following tasks are envisaged:

- generalization and systematization of complex geological data on the Syrymbet ore field;
- the study of the mineral composition of bedrock, weathering crusts, and the material composition of ores, as well as the isolation of the main minerals-carriers of rare earth mineralization;

- construction of three-dimensional models of the Syrymbet field with visualization of their structural features;

- study of ore-controlling factors and their supplementation with new data;

- identifying promising areas within the studied objects based on the analysis, systematization of ore-controlling factors and three-dimensional model constructions and. The work was carried out on the basis of analyses of physical fields, models of the Earth's crust and mantle along the lines of DSS, GEPM-DSS profiles, gravel and magnetic surveys, existing concepts of geodynamics of the region's development.

4.1.6 Brief analysis of the dissertation of Tleuova Zhanna on the topic: "Ecological problems and pollution of drinking groundwater of South Kazakhstan", on the speciality 6D075500 - Hydrogeology and engineering geology.

- *analysing the topics of the reviewed works;*

The main purpose of the research is to study geoecology and the quality of drinking groundwater in the territory of Southern Kazakhstan.

To achieve this goal, the following tasks have been solved:

1) The foreign and domestic scientific and applied published materials on ecological hydrogeology and the qualitative composition of drinking-quality groundwater are summarized and analyzed;

2) The main patterns of resource allocation and the characteristics of the qualitative composition of drinking groundwater in the region, potential sources of pollution have been clarified, taking into account the natural protection of the former from the surface of aquifer;

3) The analysis was carried out using modern chemical analytical equipment and software components of the chemical composition of fresh groundwater in the region, which determine its choice for domestic drinking water supply and the state of its contamination;

4) The current state of groundwater use for domestic drinking water supply and prospects for sustainable drinking water supply to the population of the region are analyzed;

5) Measures are recommended which can help in solving the problems of pollution and reduction of subsurface water resources, negative anthropogenic impact on groundwater and water supply of water-deficient areas of the territory.

4.1.7 Brief analysis of the dissertation of Zhanserkeyeva Ainura on the topic: «Geological setting and evaluating the hydrocarbon prospectivity of the Paleozoic complex based on basin modeling results for the eastern margin of the Precaspian Basin», on the educational program «8D07206 - Geology of Oil and Gas»

- analysing the topics of the reviewed works;

The Aim of the Work. To determine the petroleum potential through comprehensive investigation of hydrocarbon systems within the Upper Paleozoic pre-salt complex of the eastern margin of the Precaspian Depression, and to assess the status and prospects of oil and gas potential based on refined petroleum geological zoning.

Research Objectives:

1. Collection, systematization, and study of the geological-geophysical characteristics of the pre-salt deposits of the Eastern PCB, comparison of lithostratigraphic sections of wells, and examination of sedimentation models.

2. Investigation of the tectonic position of the PCB and the structural-formational framework of the pre-salt complex, analysis of tectonic structure, and geothermal conditions.

3. Compilation, synthesis, and analysis of the geological-geochemical characteristics of the sedimentary succession and hydrocarbon source rocks, examination of the type and thermal maturity of organic matter, conducting advanced RockEval pyrolysis studies, and investigation of genetic relationships between oils and source rocks based on biomarker analysis.

4. Study of hydrocarbon systems in the pre-salt complex of the PCB, investigation of organic matter maturation processes, analysis of hydrocarbon generation and migration models based on the petroleum system concept.

5. Analysis of hydrocarbon potential, refinement and updating of the petroleum-geological zoning, and determination of prospective directions for hydrocarbon exploration in the study area.

4.1.8 Brief analysis of the dissertation of Sanatbekov Miras on the topic: " Geodynamic and hydrogeological criteria for assessing the hydrocarbon potential of the Balkhash and Alakol depressions ", on the speciality 6D075500 - Hydrogeology and engineering Geology.

- analysing the topics of the reviewed works;

The purpose of the study is to study in detail and conduct a comprehensive analysis of the factors affecting the hydrocarbon potential of the Balkhash-Alakol depression.

To achieve the goal, the following tasks are envisaged:

1. Collection and analysis of geological data on the Balkhash-Alakol depression. To study the facies distribution of precipitation, as well as the conditions and stages of their accumulation, in order to determine the key geological factors affecting the oil and gas potential of the region.

2. Study of the geodynamic history of the region. To analyze tectonic events and their influence on sedimentary processes, which will help to understand the role of geodynamics in the formation of hydrocarbon systems.

3. Investigation of hydrogeological conditions. To assess the factors influencing the migration and accumulation of hydrocarbons, including the interaction between reservoir waters and oil and gas parent rocks.

4. Assessment of the hydrocarbon potential. To calculate the volume of hydrocarbons and provide recommendations for further study, including the selection of promising sites for exploration.

4.1.9 Brief analysis of the dissertation of Baikadamova Ainur on the topic: "Assessment of thermal energy resources of thermal waters of the Zharkent Depression ", on the speciality 6D075500 - Hydrogeology and Engineering Geology.

- analysing the topics of the reviewed works;

The main objective of the study is to assess the thermal energy potential of the thermal waters of the Zharkent Depression and to develop proposals for their integrated development. The objectives of the work include:

1. Analysis of world experience in the use of hydrogeothermal resources in order to understand the key aspects of application and opportunities for the region.
2. Assessment of the geological structure and hydrogeological conditions of the Zharkent Depression in order to identify the features of the occurrence and characteristics of thermal waters.
3. Conducting a hydrogeochemical analysis to determine the genesis and qualitative characteristics of thermal waters, including gas-chemical composition.
4. Assessment of the thermal potential of thermal waters for heat supply and the possibility of their use for recreational and balneological purposes.
5. Development of a feasibility study for the use of geothermal resources and recommendations for the implementation of technologies aimed at the efficient and sustainable use of resources.

4.2 Connection of dissertation topics with the directions of science development, which are formed by the Higher Scientific and Technical Commission under the Government of the Republic of Kazakhstan in accordance with paragraph 3 of Article 18 of the Law "On Science" and (or) state programs;

4.2.1 The work on the dissertation was carried out at the Institute of Hydrogeology and Geocology named after U.M. Ahmedsafin within the framework of grant and program-targeted financing of scientific research.

The author's personal contribution lies in setting the goals and objectives of the dissertation; processing and analysis of the results of previously performed studies; in carrying out expeditionary ground route work with inspection and testing of production and self-flowing hydrogeological wells; generalization and analysis of the results of field and laboratory research; formulating conclusions and main provisions submitted for defense; preparation and publication of scientific articles on the topic of the dissertation.

The author of the dissertation participated as the main executor in the implementation of the grant project "Assessment of promising fountain (self-flowing) exploitation of groundwater for the sustainable development of territories in the Zhambyl region." Currently he is taking part in research on the target programs: "Assessment of fresh groundwater resources as the main source and long-term reserve of sustainable drinking water supply for the population of the Republic of Kazakhstan" and "Heat-energy, mineral raw materials and therapeutic and health potential of thermo-mineral and industrial groundwater Kazakhstan. Assessment of the state and trends in changes in hydrogeochemical parameters of groundwater under the influence of natural and climatic changes and anthropogenic loads."

4.2.2 The topic of Urmanova Dilyara dissertation fully complies with the strategic objectives set by the state and makes a significant contribution to the development of science and technology in the Republic of Kazakhstan. The author of the dissertation participated in the grant project of the Ministry of Education and Science of the Republic of Kazakhstan, IRN 00025 "Development of a regional digital model of the geological structure of the territory of the Caspian sedimentary basin of Kazakhstan" (2020-2022) as a responsible specialist (senior researcher).

4.2.3 The topic of Zhumagulov Almas Serikbayevich's dissertation fully complies with the strategic objectives set by the state and makes a significant contribution to the development of science and technology in the Republic of Kazakhstan. It is closely aligned with the key directions of science development formed by the Higher Scientific and Technical Commission under the Government of the Republic of Kazakhstan, as well as with state programs,

including the Program for the Development of the Gas Industry of the Republic of Kazakhstan for 2022-2026. This alignment is reflected in the following aspects:

1. Alignment with Science Development Priorities

In accordance with Article 18, Paragraph 3 of the Law "On Science," the dissertation addresses the following priority areas:

- **Rational Use of Natural Resources:** Research on geological structures and assessment of hydrocarbon potential contributes to the efficient and sustainable utilization of natural resources, aligning with the goals of increasing energy efficiency and environmental sustainability in the extraction industries.

- **Development of the Geological Exploration Sector:** The use of innovative modelling and data analysis technologies enhances the quality of geological exploration, which is critical for the discovery of new deposits.

- **Digitalization of Science and Industry:** The use of advanced software to create a digital database and 3D models demonstrates the integration of digital technologies into science.

2. Alignment with State Programs

The research topic is directly connected with the implementation of:

- **The Comprehensive Plan for the Development of the Gas Industry for 2022-2026:** The dissertation results help expand the natural gas resource base and justify the prospects for extraction in previously underexplored regions.

- **The State Program of Industrial and Innovative Development of the Republic of Kazakhstan for 2020-2025:** The study promotes the development of high-tech approaches in geological exploration, including digitalization and the use of big data.

- **The Science Development Program for 2022-2026:** The dissertation focuses on generating new knowledge about the prospects of hydrocarbon systems in Kazakhstan, contributing to the strengthening of the country's scientific potential.

3. Practical Relevance and Contribution to Science

- Justifying the resumption of geological exploration in the Tasbulak depression creates potential for attracting investments to the gas industry.

- The research findings can be utilized in educational and scientific environments to train highly qualified specialists in oil and gas geophysics.

4.2.4 Aliakbar Madiyar Manarbekuly was directly involved in the following research projects:

The author was directly involved in the research for the scientific project No. 757 MES. GF.15. RIPR.32 "Collection and analysis of geophysical data for the formation of a database and creation of digital models of hydrocarbon fields in Kazakhstan," under the grant funding program of the Ministry of Education and Science of the Republic of Kazakhstan, carried out by the staff of the Department of Geophysics and Seismology at KazNITU named after K.I. Satpaev in 2015-2018.

4.2.5 The scientific and practical significance of the completed research of **Kurmangazhina Madina** The dissertation is based on the materials collected and analyzed during the implementation of the project on the topic: BR10264324 "Micro- and nanomineral components of ores as a resource for replenishing mineral reserves of Kazakhstan for the development of technologies for their development" for 2021-2023. The actual stone material was selected by the dissertator during field geological studies, route observations of outcrops and core documentation of exploratory wells, as well as geological materials of other researchers published in the press, both in Kazakhstan and abroad.

During the office period, the Adam Mickiewicz University (Poland, Poznan) and the Institute of Geological Sciences named after K.I. Satpayev analyzed and described transparent (more than 50 pieces) and polished (more than 70 pieces) sections. Sample preparation (crushing, abrasion), preparation of thin sections and thin sections, spectral, atomic absorption analysis, electron probe

microanalysis, X-ray analysis to study the material and elemental compositions of the selected stone material were carried out at the laboratory base of the Institute of Geological sciences named after K.I. Satpayev.

Based on this, the structural and tectonic structure of the ore field, the patterns of spatial distribution of mineralization, the main parameters of the formation of the deposit were studied: the material composition, technological properties of ores. The main mineral associations and types of ores were studied by mineralogical, petrographic and geochemical methods.

After summarizing and analyzing the materials of previous work carried out by geological production and scientific organizations, three-dimensional models of the Syrymbet deposit were built at these facilities using the computer program Micromine and Leapfrog Geo in order to identify the most promising areas for exploration.

4.2.6 Tleuova Zhanna Tursynkyzy was directly involved in the following research projects:

1. 2018-2020. "Assessment of changes in hydrogeochemical conditions of groundwater deposits in Kazakhstan under climatic and anthropogenic impacts", Institute of Hydrogeology and Geoecology named after U.M. Akhmedsafin.

2. 2021-2023. "Assessment of fresh groundwater resources as the main source and long-term reserve of sustainable drinking water supply for the population of the Republic of Kazakhstan". Institute of Hydrogeology and Geoecology named after U.M. Akhmedsafin.

The practical significance of the conducted research is associated with the increase in water withdrawal in a number of groundwater deposits that supply water to such megalopolises and large cities of Southern Kazakhstan as Almaty, Shymkent, Taldykorgan and Taraz; both actual and potential areas of pollution have been identified in the area of 5 previously listed regions of Southern Kazakhstan.

In order to protect the environment and water resources in the territory of Southern Kazakhstan, measures have been developed and recommended that help solve the problems of water supply to water-deficient areas of the territory, reduce pollution processes and reduction of subsoil water resources, and negative anthropogenic impact on groundwater.

Further research should be aimed at developing an automated monitoring system for exploited fresh groundwater deposits for prompt assessment of their exploitation status and prevention of depletion and pollution, as well as creating information and analytical models to justify and make effective management decisions.

4.2.7 Zhanserkeyeva Ainura took part in the grant project of the Minister of Science and Higher Education of the Republic of Kazakhstan, No. 00025 "Regional basin model and the geological structure of the territory of the Precaspian sedimentary basin of Kazakhstan" (2020-2022) as a responsible specialist (senior researcher).

4.2.8 Sanatbekov Miras was directly involved in the following research projects:

The author participated in the implementation of the program-targeted financing project No.AR05133073 "Geodynamic evolution and assessment of oil and gas potential in the intermountain basins of Eastern and Southeastern Kazakhstan (Alakol, Balkhash and Ili)" for 2018-2020.

4.2.9 Baikadamova Ainur was directly involved in the following research projects:

Setting up and conducting experiments and research, generalization and interpretation of the results, writing articles.

Based on the results of the completed research work, 8 articles were published and 3 reports were made, of which 1 work was presented in international

publications included in the Scopus and Thomson Reuters databases, and 3 articles in scientific publications recommended by the KOKSNVO RK.

4.3 Analysing the level of implementation of dissertation results into practical activities.

4.3.1 The practical significance of the research carried out is associated with the scientific justification for increasing the volume of available water resources, aimed at the sustainable socio-economic development of the Zhambyl region, including the agricultural sector in the conditions of climate change and anthropogenic loads. Sustainable development of rural areas contributes to employment of the region's population and an increase in the range of food baskets.

Further research should be aimed at developing a groundwater monitoring system to assess the state of its exploitation and prevent depletion and pollution, the emergence of transboundary threats, and the creation of hydrodynamic models for making management decisions.

The research results were introduced into the implementation act No. 1 dated August 7, 2023.

Publications. 9 articles have been published on the topic of the dissertation, including: 2 articles in an international journal included in the Scopus database (NEWS of the National Academy of Sciences of the Republic of Kazakhstan, Series of Geology and Technical Sciences); 5 reports were published in proceedings of international conferences; 2 reports published in the proceedings of regional conferences

4.3.2 The conclusions and results of the dissertation research are of considerable interest to petroleum geologists when planning exploration and are recommended for further application in order to improve the quality of scientific support for exploration. Based on the current state of geological and geochemical knowledge, oil and gas geological zoning of the southern side of the Precaspian basin has been updated. The systematization and generalization of disparate data on the geological and geochemical characteristics of subsalt deposits and associated liquid hydrocarbons in the research area were carried out.

The author independently collected and studied literary works in Russian and English on the topic of the dissertation and defined the tasks of the work. The results of the structural and facies zoning of the subsalt complex are summarized, indicator diagrams of geochemical parameters are constructed and an assessment of the catagenetic zonation of potential source rocks is carried out. The scheme of oil and gas geological zoning of the southern side of the Precaspian Basin has been updated. An assessment of the promising geological resources of the structures of the Northern Caspian water area has been carried out.

The author, with the advice of Professor John Humphrey (King Fahd University of Petroleum and Minerals), conducted geochemical studies of the Tasym area for the first time. The author participated in the discussion and interpretation of the results during an overseas research internship at the King Fahd University of Petroleum and Minerals.

The author, in consultation with Professor Raymond Michels (University of Lorraine), for the first time conducted analyses of artificial maturation of the Tasym area samples. The author participated in the discussion and interpretation of the results during an overseas research internship at Lorraine University.

Based on a comprehensive analysis, the author carried out reconstructions of the thermal history of well-studied well sections, carried out calibration of modeling results, and analysis of the results obtained.

The author of the dissertation research directly participated in the selection and sample preparation of samples and conducting geochemical studies together with laboratory specialists, as well as in the laboratory of Tomsk Polytechnic University and conducted active scientific work on the topic of the dissertation for publication of the results. The author, together with scientific supervisors, has prepared scientific conclusions and recommendations on the realization of the

hydrocarbon potential of subsalt deposits of the southern flank of Precaspian basin.

Approbation of research results and publications. The results of the dissertation research were reported and discussed at the SPE Annual Caspian Technical Conference 2021, international geological and geophysical conference "GeoEurasia-2022. Exploration Technologies: Science and Business" (Moscow, 2022), as well as the International Geological Forum and Conference "Features of carbonate Rocks and Reservoir Modeling issues" (Turkestan, 2022). 7 publications have been published on the topic of the work, including six in publications recommended by The Committee for Quality Assurance in the field of Science and Higher Education of the Ministry of Science and Higher Education of the Republic of Kazakhstan, and one publication in the peer-reviewed journal Scopus with the Q3 quartile.

4.3.3 The results of Almas Serikbayevich Zhumagulov's dissertation research demonstrate a high level of practical implementation, as evidenced by the following aspects:

1. **Creation of a Digital Database:** A significant volume of data (seismic sections, well logging diagrams, and drilling data) was digitized, ensuring accessibility and usability for further research and development.

2. **Application of Modern Technologies:** Advanced software products, such as "Petrel 2021" and "tNavigator 22.4," were utilized for geological modelling, data interpretation, and structural complex analysis.

3. **Development of 3D Models:** For the first time, multidimensional static and structural models were built, including 3D maps of rock thickness, reservoir and cap rock distribution, and predicted carbonate (reef-type) structures, allowing for more accurate identification of prospective areas for exploration.

4. **Practical Application:** The necessity of resuming geological exploration in the Tasbulak depression was substantiated, enhancing the region's investment attractiveness and contributing to effective planning of hydrocarbon field exploration.

5. **Data Reliability:** The results are confirmed by systematic analysis, the use of data from national and international databases, and factual materials from drilling, logging, and laboratory analyses.

6. **Recommendations for Geological Exploration:** Based on the developed petroleum-geological zoning maps, clear guidelines were provided for further research, including the prediction of zones with the highest probability of hydrocarbon accumulation.

These achievements emphasize the applied nature of the research, its contribution to the development of the exploration industry, and its alignment with the objectives outlined in Kazakhstan's national gas industry development program.

4.3.4 The practical significance of the work of Aliakbar Madiyar Manarbekuly:

1. Detailed petrophysical studies can improve the stability of parameter predictions for terrigenous reservoirs in salt dome complexes when solving inverse geophysical problems, especially for fields in the late stages of development, peripheral areas of fields, poorly studied regions, and new areas in Kazakhstan.

2. The petrophysical models of terrigenous reservoirs of Jurassic and Triassic oil and gas-bearing horizons of the S. Nurzhanov and Western Prorva fields presented in the work can be used for the estimation and assessment of residual oil reserves in these fields.

3. The developed methodology for the comprehensive interpretation of well data for Jurassic and Triassic terrigenous reservoirs of the Prorvinskaya group fields can be applied to study sections in other oil and gas-bearing provinces with similar sedimentary conditions.

4.3.5 The research carried out by **Kurmangazhina Madina** The main provisions of the dissertation were discussed at the meetings of the Department of Geological Survey, Prospecting and Exploration of Mineral Deposits of the Institute of Geology and Oil and Gas Engineering

named after K. Turysov of Satbayev University, reported. The results of mineralogical studies are reflected in the scientific report on the Program: "BR10264324 "Micro- and nanomineral components of ores as a resource for replenishing mineral reserves of Kazakhstan for the development of technologies for their development" (2021-2023).

Publishing.

Based on the results of the scientific research, 6 articles and reports were published, including 3 papers in an international scientific journal included in the Scopus database and having a percentile above 35

- L. Issayeva, K. Togizov, A. Duczmal- Czernikiewicz, M. Kurmangazhina, D. Muratkhanov. Ore-controlling factors as the basis for singling out the prospective areas within the Syrymbet rare-metal deposit, Northern Kazakhstan (article). *Mining of Mineral Deposits*. Volume 16, Issue 2, Dnipro (Ukrainian) 2022y. P.14-21. ISSN 2415-3435. <https://doi.org/10.33271/mining16.02.014> (General Engineering/procentile 70).

- Z. Ablessenova, L. Issayeva, K. Togizov, S. Assubayeva, M. Kurmangazhina. Geophysical indicators of rare-metal ore content of Akmai-Katpar ore zone (Central Kazakhstan). *Naukovyi Visnyk Natsionalnoho Hirnychoho Universytetu*. 2023, (5): P.34-40, ISSN 2071-2227. <https://doi.org/10.33271/nvngu/2023-5/034> (General Engineering/procentile 41).

- K. Togizov, L. Issaeva, D. Muratkhanov, M. Kurmangazhina, Maciej Swęd, , A. Duczmal- Czernikiewicz. Rare Earth Elements in the Shok-Karagay Ore Fields (Syrymbet Ore District, Northern Kazakhstan) and Visualisation of the Deposits Using the Geography Information System (article). *Minerals*, Volume 13, Issue 11, 2023. P.1-17 ISSN 2075-163X. <https://doi.org/10.3390/min13111458> (Geology/procentile 70. Q2).

Articles in scientific journals recommended by the Committee for Quality Assurance in the Field of Science Higher Education of the Ministry of Science and Higher education of the Republic of Kazakhstan.

- M. Kurmangazhina. Some features of the formation of tin ore mineralization at the Syrymbet deposit. *Proceedings of the University (KarTU)*. 2023. №1 (87). pp. 95-99 https://DOI 10.52209/1609-1825_2023_1_95.

- M. Kurmangazhina, Y.K. Arshamov, A.A. Antonenko. Tin deposits of the Kokshetau ore region and prospects for expanding the mineral resource base of tin in the region. *Proceedings of the University (KarTU)*. 2023. №3 (87). pp. 199-205, https://DOI 10.52209/1609-1825_2023_3_199.

Materials of international scientific and practical conferences:

M. Kurmangazhina. The Syrymbet and Shokkaragai deposits are reference objects of the rare-metal and rare-earth type of mineralization in Northern Kazakhstan. *Satbayev readings – 2021*, Volume 1. pp. 117-121. 2021. ISBN 978-601-323-246-1.

4.3.6 8 articles have been published on the topic of Tleuova Zhanna Tursynkyzy's dissertation. Including 2 articles in an international journal included in the Scopus database ("News of the national academy of sciences of the Republic of Kazakhstan. Series of geology and technical sciences" and "Water MDPI"); 1 article in the republican specialized publication recommended by the Committee for Control in the field of Education and Science of the Ministry of Internal Affairs of the Republic of Kazakhstan ("Mining Journal of Kazakhstan"); 2 articles in other scientific journals and publications ("Geology and protection of the subsoil" and "Bulletin of KazNITU"); 2 reports and 1 thesis published in the materials of international and regional conferences.

4.3.7 The practical significance of the work of Zhanserkeyeva Ainura:

The research results of the dissertation were presented and discussed at the SPE Annual Caspian Technical Conference 2021 and the series of international geological and geophysical

conferences "GeoEurasia-2020: Modern Technologies for the Study and Development of Eurasian Subsoil," "GeoEurasia-2021: Geological Exploration in Modern Realities," and "GeoEurasia-2022: Geological Exploration Technologies: Science and Business" (Moscow, 2020, 2021, and 2022). Additionally, the results were also presented at the International Geological Forum and Conference "Features of Carbonate Rocks and Reservoir Modeling" (Turkestan, 2022).

Regarding publications, 7 papers have been published on the topic of the research. Six of them were published in journals recommended by the Committee on Control of the Ministry of Science and Higher Education of RoK, while one publication appeared in a peer-reviewed Scopus-indexed journal with a Q2 quartile.

4.3.8 The practical significance of the work of Sanatbekov Miras:

This dissertation is of great importance for the oil and gas industry of Kazakhstan. The results of the study will help to improve the methods of hydrocarbon prospecting, as recommendations for conducting prospecting and exploration in the Balkhash-Alakol basin will make them more efficient and economically feasible. The obtained data on geological and hydrogeological conditions will also help in planning scientific research. The research will enrich scientific knowledge and become the basis for future work in the field of geology and ecology. In addition, the assessment of conditions will help to avoid contamination of groundwater during exploration, which is important for environmental protection.

Large initial forecast and prospective hydrocarbon resources are concentrated on the territory of South-Eastern Kazakhstan. But their main share falls on the Zaisan oil and gas lowland. In addition, the territories of Balkhash-Alakol are characterized by uneven exploration. And at the moment it is estimated as a low-potential area for the discovery of hydrocarbon resources. In the context of dynamic changes in the energy industry and the increasing importance of ensuring the sustainability of the energy sector, research in this region is becoming a priority in the scientific field.

Therefore, forecasting and prospecting for oil and gas in vast poorly explored territories using advanced hydrogeological methods in combination with traditional geological, geochemical and geophysical methods remain an urgent task of the work.

4.3.9 The practical significance of the work of Baikadamova Ainur:

- An application has been submitted for the commercialization of RNTD.
- the influence of geological and lithological factors and the depth of circulation of thermal waters on their chemical and gas compositions, their genesis based on isotope studies has been clarified;
- both natural and predicted resources of formation thermal waters of the Cretaceous deposits of the Zharkent Depression, as well as their heat and energy potential have been assessed;
- a feasibility study has been carried out for the integrated development of the water-energy potential of formation thermal waters of the Cretaceous deposits of the Zharkent Depression;
- recommendations and process flow charts have been developed for the practical use of thermal waters of the Zharkent Depression using the example of a pilot section of well 3T.

5. Analyses of reviewers' performance (with examples of the most poor quality reviews).

Reviewers of dissertations of doctoral students for the degree of Doctor of Philosophy (PhD) were appointed in accordance with the requirements of the Standard Regulations on the Dissertation Council.

In order to ensure compliance with the requirements of the Standard Regulations on the work of the dissertation council, a memo was sent to each reviewer with the requirements for the content and design of the review of the dissertation work.

All reviews were submitted on time and in accordance with the requirements of the Committee for Quality Assurance in the Field of Science and Education of the Ministry of Internal Affairs of the Republic of Kazakhstan.

There are no negative reviews.

6. Suggestions for further improvement of the system of scientific training – to ensure high-quality review of the work at the seminars of the department.

7. The number of dissertations for the degrees of Doctor of Philosophy (PhD), doctor by profile in the context of specialties (areas of training):

| | Specialty 6D075500- Hydrogeology and engineering geology | Specialty 6D070600 -- Geology and exploration of mineral deposits" | Specialty 8D07205 - Geology and exploration of solid mineral deposits | Specialty 8D07104 – Oil and gas and ore geophysics | Specialty 8D07206 - Geology of oil and gas |
|--|--|---|--|---|---|
| dissertations accepted for defense (including doctoral students from other universities) | 4 | 1 | 1 | 1 | 2 |
| dissertations withdrawn from consideration (including doctoral students from other universities) | - | - | - | - | - |
| dissertations that received negative reviews from reviewers (including doctoral students from other universities) | - | - | - | - | - |
| dissertations with a negative decision on the results of defence (including doctoral students | - | - | - | - | - |

| | | | | | |
|--|---|---|---|---|---|
| from other universities) | | | | | |
| Including from other training organizations | - | - | - | - | - |
| With a negative decision based on the results of the defense | - | - | - | - | - |
| Including from other training organizations | - | - | - | - | - |
| The total number of defended dissertations | 4 | 1 | 1 | 1 | 2 |
| Including from other training organizations | - | - | - | - | - |

**Chairman
Dissertation Council**

**Scientific Secretary
of the Dissertation Council**

