Ministry of Science and Higher Education of the Republic of Kazakhstan
K.I. Satbayev Kazakh National Research Technical University
K. Turyssov Geology and Oil-gas Business Institute
Department of hydrogeology, engineering and petroleum geology

Kyrykbayev Kuanysh Kosamanuly

Analysis of geological and geophysical data and construction of an geological model on the productive horizon of the South side of the Pre-Caspian sedimentary basin.

THESIS PROJECT

Programme 6B07202 – Geology and exploration of mineral deposits

Almaty 2023

MINISTRY OF SCIENCE AND HIGHER EDUCATION OF THE REPUBLIC OF KAZAKHSTAN
K.I. Satbayev Kazakh National Research Technical University
K. Turyssov Geology and Oil-Gas Business Institute
Department of Hydrogeology, Engineering and Petroleum Geology

ALLOWED TO DEFENCE
Head of the Department of
Hydrogeology, engineering and petroleum geology,
Dr. PhD, Professor
_____________T. A. Ensepbayev
«02» 06 2023 y.

THESIS

Topic: « **Analysis of geological and geophysical data and construction of an anisotropic model on the productive horizon of the deposit of the Southern side of the Caspian sedimentary basin** »

6B07202 – Geology and exploration of mineral deposits

Student
K.K.Kyrykbayev

Reviewer
____
(Science degree, position)
_________ M. Ikamen
Signature *Full name*

Research supervisor
____
(Science degree, position)
_________ Kenessary.A.Zh
Signature *Full name*

Almaty 2023

MINISTRY OF SCIENCE AND HIGHER EDUCATION OF THE REPUBLIC OF KAZAKHSTAN

K.I. Satbayev Kazakh National Research Technical University
K. TuryssovGeology and Oil-gas Business Institute
Department of hydrogeology, engineering and oil and gas geology

Programme 6B07202 – Geology and exploration of mineral deposits

«**Approved»**
GEaOGG head of the department, doctor PhD, professor
___________T.A.Ensepbayev
"__02__" __06__2023 y.

Thesis work

TASK

Student : *Kyrykbayev Kuanysh Kosamanuly*
Theme : *Analysis of geological and geophysical data and construction of an anisotropic model on the productive horizon of the deposit of the Southern side of the Caspian sedimentary basin*
University rector *2022years " 23 " November №408* approved by order
Submission of completed work*2023 years "2" June*
List of issues to be considered in the thesis
a) geographical, geological, research history, stratigraphy, tectonics, physico-chemical characteristics of hydrocarbons, geological structure of the region
б) 3D Geological modeling
List of drawing materials (mandatory drawings must be shown accurately)
List of drawing materials 15 (mandatory drawings must be shown accurately)
Recommended main literature is 11 titles
1. Fieled report for 2021 year

Preparation of the thesis

TABLE

Name of sections, list of issues to be considered	Deadlines for presentation to scientific supervisor and advisors	notice
Geological part	25.11.2022	done
Speacial section Geological modeling	25.11.2022	done

Дипломдық жұмыс бөлімдерінің кеңесшілері мен норма бақылаушының аяқталған жұмысқа (жобаға) қойған **қолтаңбалары**

Name of sections	Consultants, name, patronymic, surname (scientific degree, title)	Data signed	Signature
Geological part	Research supervisor Kenessary.A.Zh.	31.05.23	[signature]
Speacial section Geological modeling	Research supervisor Kenessary.A.Zh.	31.05.23	[signature]
Normative control	Sanatbekov M.E. Magister. assistant	22.05.23	[signature]

Research supervisor ____________Kenessary.A.Zh..

Prepared by ____________Kyrykbayev.K.K

Date "_31_" _05_ 2022y

CONTENTS

АҢДАТПА

Бұл дипломдық жұмыста кен орнының өнімді қабаттарының геологиялық моделін одан әрі құрумен Каспий маңы ойпатының оңтүстік жағындағы кен орнын талдау жұмыстарының нәтижелері берілген. Жұмыс барысында соңғы бағдарламалық қамтамасыз етуді пайдалана отырып, геологиялық модельді құрудың әртүрлі тәсілдері қарастырылды. Жүргізілген жұмыстардың нәтижесінде егжей-тегжейлі анизотропты геологиялық модель алынды, оның негізінде жобалық ұңғымалардың орналасу орындары ұсынылды.

Диссертациялық жұмыстың бірінші бөлімінде зерттелетін аумақ пен кен орнының геологиялық құрылымы, сонымен қатар тектоникасы мен литологиялық-стратиграфиялық сипаттамалары зерттелді.

Арнайы бөлім толығымен геологиялық модельге арналды. Геологиялық модельді құру процесінде барлық белгісіздіктерді ескере отырып, анизотропты модельді құрудың соңғы алгоритмдері қолданылды. Үш өлшемді модель негізінде жоспарланған ұңғымалардың оңтайлы нүктелері анықталды.

Дипломдық жұмыс аннотациядан, мазмұнынан, кіріспеден, үш бөлімнен, қорытындыдан, пайдаланылған әдебиеттер тізімінен тұрады.

АННОТАЦИЯ

В данной дипломной работе приведены результаты работ по анализу месторождения в Южном борту Прикаспийской впадины с дальнейшим построением геологической модели продуктивной толщи месторождения. В ходе работы рассмотрены разные подходы в построение геологической модели с использованием новейших программных обеспечений. В результате выполненных работ получена детальная анизотропная геологическая модель, на основе которого предложены точки заложения проектных скважин.

В первой части дипломной работы изучены геологические строение исследуемого района и месторождения, а также тектоника и литологостратиграфическая характеристика.

Специальный раздел был полностью посвящен геологической модели. В процессе построения геологической модели были использованы новейшие алгоритмы для создания анизотропной модели с учетом всех неопределенностей. На основе трехмерной модели были определены оптимальные точки проектный скважин.

Дипломная работа состоит из аннотации, содержания, введения, трех разделов, заключения, списка использованной литературы.

ABSTRACT

This diploma thesis presents the results of analysis of a field in the Southern margin of the Caspian Depression, followed by the construction of a geological model of the reservoir. Various approaches to constructing the geological model using stateof-the-art software were examined throughout the study. As a result of the work conducted, a detailed anisotropic geological model was obtained, based on which proposed locations for the planned wells.

In the first part of the thesis, the geological structure of the study area and the deposit, as well as tectonics and lithological and stratigraphic characteristics, were studied.

A special section was entirely devoted to the geological model. In the process of building a geological model, the latest algorithms were used to create an anisotropic model, taking into account all the uncertainties. Based on the three-dimensional model, the optimal points of the design wells were determined.

The thesis consists of an annotation, content, introduction, three sections, conclusion, list of references.

INTRODACTION

The topic of the thesis: "Analysis of geological and geophysical data and the construction of an anisotropic model for the productive horizon of the deposit of the Southern side of the Caspian sedimentary basin".

Geological modeling based on geological and geophysical data of oilfield. The results of modeling are reserves estimate and a new point for projection wells.

Goal of work are:

- Geological and geophysical data analysis;
- Stratigraphy analysis;
- Anisotropic geological modeling;
- Determination of design points for project wells based on the results of a geological model.

Results of this work: anisotropic geological modeling for the productive horizon of the field, recommendations for choosing the location of project wells.

Input data:

- Structural maps of productive horizons;
- Well coordinates;
- Stratigraphy; - Well log data.

1 Overview

1.1 Overview of the region

Oilfield located in the PreCaspian sedimentary basin. Its main territory (about two-thirds) belongs to the Republic of Kazakhstan, the rest to the adjacent regions of the Russian Federation.

In regional tectonic terms, the PreCaspian Basin is the southeastern deepsubmerged part of the ancient East European platform.

The Caspian basin is unique in that the ancient Precambrian crystalline basement in its center is submerged to a depth of 22-24 km (geophysical data). From the center to the sides (east, north, west and south), the foundation surface gradually rises to depths of 6-7 km.

West Kazakhstan, Atyrau and Aktobe administrative regions are completely located on the territory of the PreCaspian petroliferous province.

These areas are all oil and gas producing, but their importance for the economy Kazakhstan's oil and gas business is different.

The PreCaspian petroliferous province on the postsalt and presalt structural and lithological floors is a classic territory of salt dome tectonics, where there are over 1300 salt dome uplifts (salt domes).

All of them can be considered potential traps for oil and gas. The postsalt lithological complex is composed mainly of terrigenous sandy-clay deposits with a subordinate presence of carbonate rocks in the Upper Jurassic and Upper Cretaceous.

To date, several dozen, mainly oil fields have been discovered in the postsalt deposits, with a smaller number of gas-oil and gas fields.

Regionally, the oil and gas complexes of the postsalt floor are Triassic (PermianTriassic), Middle-Upper Jurassic, Lower Cretaceous and Neogene.

There are single deposits with industrial oil and gas potential in Upper Permian deposits, as well as Upper Cretaceous and Paleogene deposits, where oil migrated from the underlying regionally oil and gas complexes.

The total hydrocarbon reserves of the postsalt deposits are incomparably small compared to the presalt deposits, and most of the deposits identified in the postsalt deposits belong to the category of small (recoverable oil reserves of less than 10 million tons and gas reserves of less than 10 billion m3).

Along with this, it should be particularly noted that many deposits located north of the Emba River (Dossor, Makat, Sagyz, Baychunas, Koshkar, etc.), contain oil oils of unique quality. They are sulfur-free, have a low content of paraffin, resins, contain almost no gasoline fraction, but are characterized by a high content of high-quality lubricating oils (especially low-cretaceous), which begin to solidify at a low negative temperature (-25 C-30 C), which causes them high demand and price.

The main type of deposits above the salt floor are deposits of postsalt, complexly constructed and broken up by numerous discontinuous tectonic disturbances (discharges) into separate wings, fields and blocks, the distribution of oil and gas content within which is also extremely complex.

Most postsalt have the form of dome-shaped uplifts and brachiantic lines. As a rule, they have a central downthrown blockin the vault, having a strike synchronous to the strike of the salt core. The central downthrown block is bounded on both sides by the main discontinuous faults-discharges, radially adjacent to which at different angles are minor ruptures that divide individual wings into smaller fields and blocks.

Therefore, the leading type of salt-dome uplift deposits is a reservoir tectonically shielded deposit, limited in its head (graben) part by the main tectonic disturbance of the central downthrown block. Formation vaulted deposits, stratigraphically and lithologically shielded by the slope of the salt core, are much less widespread. In the Triassic sediments, sub-cornice deposits (strata shielded by cornice salt) have been identified.

The oil and gas-bearing reservoir rocks in the postsalt section are entirely terrigenous (sand-siltstone) rocks with good reservoir properties.

The above-salt structural floor has over 1300 salt dome elevations, each of which is a potential trap and a possible oil and gas field, but exploration work, unfortunately, was carried out only on 200-300 salt domes, and more than 1000 salt dome elevations are waiting for their exploration.

Several dozen deposits of salt dome uplifts have been discovered, most of which are being developed. Some deposits have been mothballed due to small hydrocarbon reserves (Chingiz, Kubasai, Baklaniy, etc.)

Field under consideration deposits are geographically located in the south-east of the Ural-Volga interfluve, in the coastal northern zone of the Caspian Sea. By administrative division, they are located within the Isataysky district of the Atyrau region of the Republic of Kazakhstan. The nearest settlement is the district center village called Akkistau, located to the northeast of the deposits.

Economically, the district is quite developed. The deposits are located in the area of oil fields being developed, such as Zhanatalap, S.Balgimbayev, Gran, Zaburunye, Novobogatinsk SE and others

1.2 Overview of the field

The postsalt deposits have an almost oval shape in plan. According to drilling and seismic data, the salt in the vault lies at a depth of 370-400 m. According to the structure of the salt sequence of sediments, the field is a three-winged salt-dome structure. Its dimensions are 5x6.5 km. The north-western, south-western, and eastern wings correspond to the slopes of the salt and are separated from each other by a threebeam downthrown block.

There are no productive horizons for oil in the postsalt section of the southwestern and eastern wings. The object of the operational work is the north-west wing.

The north-western slope of the salt is the steepest (the angle of pitch is up to 4050 ^{0}) and is traced by seismic exploration to minus 300 meters.

Structurally, it is an anticline, divided by faults into separate fields and blocks. The long axis stretches in a north-easterly direction for 4 km, the short one – 1.8 km. Within the wing, the north-western, central and south-eastern fields are distinguished. The north-western field is drawn on structural maps with a semi-closed structure, bounded from the east by the fault.

The strike of rocks from the southwest to the northeast. The incidence angle varies with depth, in Jurassic they are 15 ^{0} - 16 ^{0}, in the Neocomian and Aptian – 1012 ^{0}, and in the deposits of the Albian and Upper Cretaceous – 5-6 ^{0}.

Faults are recorded by the fallout of bundles of rocks, which is revealed by a detailed comparison of geological and geophysical sections of wells. At the same time, cases of capacity reduction caused by intra-informational washouts (inside the alba, between the Upper Cretaceous tiers), which are characterized by consistent and regular changes in capacity by area, as well as regional washouts and disagreements that are observed between Neocomian and Jurassic, Aptian and Neocomian, Albian and Aptian, Turonian and Albian, are excluded.

The number of oil and gas horizons identified in the uncovered section is only 21: of these, 3 horizons are in Permian deposits, 10 horizons are in Middle Jurassic and 8 are in Lower Cretaceous deposits. Productive horizons are combined into VII development objects:

- I-object – I Upper Albian horizon - oil;

II Middle Albian horizon - oil and gas;

II Middle Albian – lentil 1 - oil;

II Middle Albian – lentil 2 - oil;

- II-object – Aptian horizon - oil and gas;

Neocomian Horizon - Oil;

III and IV Neocomian horizons - oil;

- III-object – I $_{1}$, I $_{2}$, I $_{3}$ Middle Jurassic horizons – oil;
- IV-object – I $_{4}$, I $_{5}$ Middle Jurassic horizons - oil;

V-object – II- lentil 1, II-lentil 2 and III Middle Jurassic horizons - oil; VI-object – IV and V Middle Jurassic horizons - oil;

- VII-объект – I, II и III Permian - oil. *Middle Jurassic deposits.*

Middle Jurassic deposits have been uncovered on all wings of the structure. Lithologically, the deposits are represented by a thickness of alternating sandy and clay layers. Clays are brown, dark brown, gray, brownish-gray, sandy with separate layers enriched with carbonaceous matter.

The sands are gray and dark greenish-gray. In the section there are interlayers of light gray sandstones, strong, on calcareous cement. There are interlayers (up to 0.5 m) of brown coal. The deposits of the Middle Jurassic are the main productive strata of the field, where, as noted above, 10 oil horizons are established.

The maximum uncovered thickness of the Middle Jurassic deposits is 370 m , the minimum is 65-75 m . The roof of the Middle Jurassic deposits within the field, according to GIS data, lies at depths from 413 m to 669.5 m, the sole from 637.1 m to 1010.4 m.

These collectors have a continuation in the muld zones bordering the domes, which is very favorable from the point of view of burial and gives the probability of their use as underground reservoirs.

This is followed by an assessment of the possibility of burial of associated extracted waters in the aquifers of the Middle Jurassic sediments on the territory of the Kamyshitovoye Southwest field, therefore, an analysis of the study of only the Middle Jurassic reservoirs is given.

Neocomian deposits.

Three oil horizons have been established in the Neocomian deposits: the Neocomian, III and IV horizons. I and II Neocomian horizons are saturated with water and are found only on the periphery of the northwestern field. In most of the territory of the northwestern slope, the Neocomian deposits are eroded from above by the Aptian, and in some cases by the Albian transgressions. The depth of the roof of the Neocomian according to logging is fixed at 379.8-650.2 m, the soles at 389.6-659.7 m. At the same time, the thickness of oil-bearing reservoirs ranges from 3.4 m to 26.1 m .

Lithologically, the deposits are represented by green clays, greenish-gray, silty, slightly micaceous, with charred plant remains, with interlayers of sands, sandstones, less often marls. The sands are fine-grained, greenish-gray, micaceous. Sandstones of the same shades, fine-grained, micaceous, slightly cemented. There are interlayers of marl greenish-gray, strong. The thickness of the Neocomian deposits varies from 0-10 to 140 m, in most wells within 40-70m.

Neocomian deposits cannot be considered as injection reservoirs due to their relatively insufficient depth of occurrence and the absence of a tire.

The study of drill sample.

In total, 90 wells were drilled at the field with drill sample: 17 operational, 43 explorations, 30 crelius.

In general, 9610.1 m were passed through the field with drill sampling, the total linear removal was 3734.14 m or 38.9% of the penetrating. A total of 1,195 samples from 80 wells were analyzed.

For the period 2013-2018, the core was selected and analyzed in exploration with a total penetration of 150 m and core removal of 119.55 m (i.e. 79.7% of the penetrating) and in the amount of 92 samples. All core analyses were carried out in the petrophysical laboratory of rocks of the Branch of LLP "SRI TDB KMG "CaspiMunaiGas" in Atyrau.

The complex of studies included the determination of standard parameters such as open porosity, density, permeability, granularity, carbonate content, as well as special core analyses to determine the oil displacement coefficient by water, relative phase permeability in the oil-water system, capillary pressure by the semipermeable membrane method and wettability.

According to the Jurassic deposits, the penetrating was 2317 m and the core removal was 671.27m or 28.97% of the penetrating. 713 samples were selected for analysis, 597 of them characterize productive horizons (I_1-J_2, I_2-J_2, I_3-J_2, I_4-J_2, I_5J_2, II-J_2, III-J2, IV-J_2, V-J_2). The number of conditioned samples is 429 units.

Measurement of porosity. The porosity of rock samples was calculated by the formula, where the main components are the length and diameter of the sample. *Measurement of absolute permeability of samples.*

The absolute permeability of the samples was measured using gas (nitrogen) on calibrated ULTRA-PERM 600 equipment equipped with the latest mass flow meters and pressure sensors. The software performs calculations using the Darcy and Klinkenberg equations to calculate the gas permeability and the inverse of the average pressure.

Calculations for the determination of water and oil saturation were calculated on the basis of Lambert's law, using the linearity of the semi-logarithmic dependence of X-ray radiation based on the base scanning points.

The dependences of the porosity parameter on the porosity coefficient and the saturation parameter on the water saturation coefficient.

For Jurassic sediments, they are described by the equation:

$$FF=0.43\ Phi^{-2.29}\ RI= Sw^{-1.98}.$$

According to the data of drill sample from Jurassic sediments, the dependences of the formation factor on the porosity FF = (Phi) and the saturation parameter on the water saturation coefficient RI = f(Sw) were constructed in a laboratory way:

As a result of the work, the dependencies FF = f (Phi) and RI = f (Sw), constructed by the selection method, acquired the form. non-collectors were carried out according to the boundary values of their physical properties: porosity, permeability, clay content, etc. At the same time, permeability plays a decisive role, since the main property of the collector is its ability to pass liquids and gases through itself. That is why, when justifying the boundary parameters of the reservoir rock, first of all, the limit values of permeability are established. The lower limit of permeability is assumed conditionally to be 1 md based on the classifications of reservoir rocks known from literary sources (classification of Teodorovich G.I., as well as 30 experiments conducted in the laboratory of the Moscow Institute of National Economy and GP by scientist Gudok N.).

In addition, this value is confirmed by the results of special studies on the core of well, where residual water saturation and residual oil saturation were determined. Using these data, the dynamic porosity was compared with the absolute permeability. The dynamic porosity is calculated using residual oil and water based on the results of modeling the recovery coefficient in the oil–water system: Efficiency= Phi*(1-ConCov).

To determine the boundary value of porosity, integral porosity distribution curves are constructed for classes with a permeability of Cpr<1 mD and Cpr>1 mD.

Lithological and physical characteristics of collectors.

The reservoirs of the deposit are represented by fine- and fine-grained sandstones, clayey and strongly clayey, carbonate, aleurite and siltstones, as well as loose sands.

Rocks of the Jurassic productive strata are represented by sands with subordinate layers of clays and sandstones. The sands are gray, multi-grained, compacted, clayey, with quartz pebbles and interlayers of gray, dense clays, with charred plant residues. The sandstones are gray, medium-grained, strong, on calcareous and clay cement. Clays are brown, dark brown, gray, brownish-gray, sandy, with some enriched with carbonaceous matter.

Horizon J_2 - I_1 is represented by a core of 16 wells and 34 samples from 9 wells. The porosity of reservoir rocks for 25 conditioned samples averages 28.8%, permeability – 340.3 mD, change intervals of 20.1-36.3% and 1.6-1625.7 mD.

The horizon J_2- I_2 is most illuminated by drill sample analyses. 188 drill samples were studied. Conditioned - 126 units. According to the analysis, porosity varies between 19.7-42.7%, permeability – 1.3-10080 mD, averaging 32.1% and 869.8 mD.

102 samples from 15 wells were studied in the horizon J_2 - I_3. Conditioned collectors average 31.6%, permeability – 1251.6 mD, change intervals of 18.2-39% and 1.1-5550.9 mD.

Horizon J_2 - I_4 is illuminated by drill sample from 18 wells and 80 drill sample analysis from 12 wells. Conditioned - 58 units. According to the analysis, porosity varies between 19.5-38.5%, permeability – 1.2-3232 mD, averaging 30.5% and 527.3 mD.

The horizon J_2 - I_5 was studied by 71 samples. 53 are conditioned. The values of porosity along the horizon vary from 19.4 to 39.5%, permeability – from 1.4 to 5941.3 mD.

Horizon J_2-II- layers I and II are illuminated by a drill sample of 12 wells and a total of 35 analyses, 24 of which are conditioned. The porosity of reservoir rocks in lenter I averages 27.8%, permeability – 92.2 mD, change intervals of 19.8-33.5% and 1.1-735.4 mD and in lenter II porosity – 23.9%, permeability - 17.1 mD.

54 samples from 8 wells were studied in horizon J_2-III-. The conditioned ones are 44 units. According to the analysis, porosity varies between 16-34%, permeability – 1.9-2151.1 mD, averaging 25.8% and 212.3 mD.

Horizon J_2-IV was studied by 25 samples from 5 wells. Conditioned - 13 analyses. Porosity varies in the range of 16.2-31.5%, permeability – 1.2-1253.4 mD, average values of 24.2% and 293 mD.

The J-V 2 horizon was studied by 4 drill sample analyses from wells. Collectors of this horizon are not characterized by conditioned samples

2 Geological part

2.1 Lithological and stratigraphic characteristics of the field

The geological structure of the deposits under consideration involves a complex of sediments typical of salt domes, ranging from halogen sediments of the Kungurian tier of the Lower Permian to the Quaternary inclusive. The lithological description, electrocarotage and microfaunistic characteristics of individual stratigraphic complexes are given on the consolidated geological and geophysical section.

Permian system - P Lower Permian Series - P_1 Kungurian stage - P_1 k

The most ancient deposits uncovered by wells are the hydrochemical sediments of Kungurian tier skogo tier. The deposits of the Kungurian tier are divided into two parts: the upper – caprock and the lower – salt. Caprock is lithologically represented by gypsum, anhydrite, overlapping with terrigenous rocks. Halogen deposits are represented by white crystalline salt. The exposed thickness of the deposits of the Kungurian tier on the field ranges from 2m to 150m.

Permian - Triassic – PT (undifferentiated strata of Triassic and Upper Permian sediments)

Permian deposits were uncovered by drilling on all wings of the structure. Lithologically, the deposits are represented by alternating sandstones and clays with low-power layers of sands, limestones, marls and gypsum inclusions.

Clays are dark green, green, greenish-gray, dark gray, dense, sandy. Sandstones are gray, greenish gray, dense, sandy. The sandstones are gray, greenish-gray, fine- and medium-grained, strong, on clay-carbonate cement, sometimes with the inclusion of brassil. The thickness of Permian-Triassic deposits in the wells of the field ranges from 8-169m.

There are 3 oil horizons – I-PT, II-PT and III-PT - installed in Permian-Triassic deposits on the field.

Jurassic System – J Lower Series – J_1

On the blurred surface of the Permian, the Lower Jurassic deposits are unconformably deposited. By drilling, they are opened on all wings of the structure. Lithologically represented by sands with subordinate interlayers of clays and sandstones.

The sands are gray, multi-grained, compacted, clayey, with quartz pebbles and interlayers of gray, dense clays, with charred plant residues. The sandstones are gray, medium-grained, strong, on calcareous and clay cement.

The thickness of the Lower Jurassic deposits along the wells of the varies from 8 to 95 m.

Middle Series – J_2

Middle Jurassic deposits have been uncovered on all wings of the structure. Lithologically, the deposits are represented by a thickness of alternating sandy and clay layers. Clays are brown, dark brown, gray, brownish-gray, sandy, with separate layers enriched with carbonaceous matter. The sands are gray and dark greenish-gray. In the section there are interlayers of light gray sandstones, strong, on lime-clay cement.

There are interlayers (up to 0.5 m) of brown coal. The deposits of the Middle Jurassic on the field are the main productive strata of the field, where 10 oil horizons are established (I $_1$-J $_2$, I $_2$-J $_2$, I $_3$-J $_2$, I $_4$-J $_2$, I $_5$-J $_2$, II-J $_2$-lentil 1 , II- J $_2$- lentil 2, III-J $_2$, IV-J $_2$, V-J $_2$).

On the field, the thickness of the Middle Jurassic sediments traversed by wells throughout the section varies within 44-369 m, the minimum uncovered is 6 m.

Upper Series – J $_3$

On the field, Upper Jurassic deposits in the vaulted parts of the structure are eroded and are found only on the periphery of the northwestern wing in wells Lithologically, the deposits of the Upper Jurassic are represented by dense marls and clays. Marls are dark gray, gray with a greenish tinge, with fragments of fauna. Clays are dark gray, gray, calcareous, slightly sandy.

The uncovered thickness on the field - 17 is 63m,

Cretaceous system – K Lower Series – K $_1$

The deposits of the Lower Cretaceous are represented by the Neocomian Upper tier, the Aptian and Albian tiers.

Neokomian superstage - K $_1$ nc

On the Kamyshitovoye SW field, Neocomian deposits with erosion and angular disagreement occur in the Upper and Middle Jurassic. From above, they are eroded by the Aptian, and in some cases by the Albian transgressions. The deposits of Aptian and Albian fall inconsistently on different horizons of the Neocomian. It is not possible to divide the Neocomian into the Barremian and Goterivian tiers. The description of the Neocomian strata is given as a whole.

Lithologically, the deposits are represented by green clays, greenish-gray, silty, slightly micaceous, with charred plant remains, with interlayers of sands, sandstones, less often marls. The sands are fine-grained, greenish-gray, micaceous. Sandstones of the same shades, fine-grained, micaceous, slightly cemented. There are interlayers of marl greenish-gray, strong.

There are 3 oil horizons (To $_1$ nc, III-nc and IV-nc) on the field in the Neocomian deposits, and

The thickness of the Neocomian deposits on the field varies from 0-10 to 140m, in most wells within 40-70m,.

Aptian stage - K $_1$ a

The Aptian deposits with erosion and disagreement fall on various horizons of the Neocomian. They are opened by deep exploration, operational and structural exploration wells. Lithologically they are mainly represented by dark gray, almost black clays, dense, greasy to the touch, silky with fragments of fauna. Among the clays there are marls, lenses of sand.

At the base of the apta lies a basal horizon of fine-grained sands with pebbles. The power of this horizon is variable, ranging from 0 to 10m. This horizon corresponds to the upper bundle of the Aptian-Neocomian oil and gas horizon. The thickness of the

Aptian deposits on the field ranges from 0-8 to 81.5 m, in most wells– within 30-40m,

Albian stage - K_1 al

The deposits of the Alb tier have been uncovered by all drilled wells. Conventionally, the Albian deposits are divided into two stratas, one of which is represented by an undifferentiated bundle of Upper Albian-Cenomanian age, the other is of Lower-Middle Albian age.

Lower+Middle alb - K_1 al $_{1+2}$

The Lower-Middle Albian deposits lie on the eroded surface of the Aptian and Neocomian deposits.

Lithologically, the Lower-Middle Albian deposits are represented by dark gray, silty, dense clays with interlayers and lenses of gray, light gray, fine-grained, micaceous sand.

Oil and gas horizons (II-al $_2$, II-al $_2$-1pl, II-al $_2$- lentil 2) are located on the field in the middle part of the section. The thickness of the Lower-Middle Albian deposits ranges from 132 to 197m.

Upper Alb+Cenomanian - K_1 al $_3$+s

Lithologically, this stratum is mainly represented by dark gray, gray, dense, noncarbonate clays, with small charred plant remains and fragments of fauna. In the clays there are nests and layers of gray, micaceous sand, sometimes layers of fine-grained, strong sandstone.

On the field, the Upper Albian oil horizon (I-al $_3$) is confined to the sole of the Albian-Cenomanian strata.

The thickness of the Albian-Cenomanian deposits varies from 27.2 to 90.9 m.

Upper Series- K_2

The Upper Cretaceous deposits have been uncovered by all wells and are represented by rocks of the Turonian-Conacian, Santonian, Campanian tiers, in the downthrown block there are deposits of the Maastrichtian tier.

Turonian-Conacian stage - K_2 t+k

The deposits of the Turonian-Conacian tier lie inconsistently on the blurred surface of the Albian Cenomanian. Lithologically they are represented by greenishgray marls, dense, with fragments of thick-walled shells, with layers of grayish-white chalk, grayish-green limestone, strong. At the base of the Turonian-Conacian deposits lies a phosphorite horizon containing phosphorite pebbles of good rolling.

On the field, a small oil horizon is noted in separate wells No. 55, 66, 79 and 99 in the sole of the Turonian. The thickness of the horizon is 3-7.5m, the resistance is 47.50 mm. The horizon is not ubiquitous and occurs in the form of individual lenses that do not have industrial significance. The thickness of the Turonian-Conacian deposits on the field ranges from 9 to 52 m.

Santonian stage - K_2 st

Lithologically, the deposits of Santon are mainly represented by light gray, greenish, dense marls, white chalk with the inclusion of pyrite. The thickness of the Santonian deposits ranges from 2 m to 56 m per the field and from 50m to 90 m.

Campanian stage (K_2km)

Campanian deposits are represented by marls greenish-gray, light gray. There are fragments of shells, crystals of pyrite, layers of white writing chalk.

The thickness of the Campanian deposits on the field ranges from 0-2m to 28m, on the Flat from 50 to 90m.

Maastricht stage (K_2m)

The Maastrichtian deposits are exposed in the downthrown block by structural wells. Lithologically they are represented by white chalk, writing and marls grayishgreen, clayey, dense with fragments of fauna and powdery pyrite. The exposed thickness of the Maastrichtian deposits ranges from 8 to 120 m.

Neogene-Quaternary deposits (N+Q)

Neogene-Quaternary sediments occur transgressively on various Mesozoic sediments. Lithologically, the deposits are represented in the lower part by dark green, gray, dark gray, dense, calcareous, sandy, sometimes with limestone interlayers, with fragments of fauna, and in the upper part by brown, brown, dark gray, gray with a greenish tinge, silty, calcareous and grayish-yellow sands, mixed-grained.

In Neogene deposits at depths of 70-80 and 90-100 m, a low-power gas horizon is traced in many wells, which does not have a continuous distribution..

The thickness of the Neogene-Quaternary deposits ranges from 122 to 152 m.

2.2 Tectonics

The area of the studied area is located in the southwestern part of the Estuary block and in the relief of the foundation belongs to the North Caspian uplift within the Astrakhan-Aktobe uplift system. Within the North Caspian uplift, Astrakhan, Oktyabrskaya, Novobogatinskaya, Baksay anti-wedge structures are distinguished. The area under study is located on the northern slope of the Novobogatinsky Mesocainozoic.

Regional uplift. The Novobogatinsky uplift is located to the east of Oktyabrsky and represents a sublatitudinal oriented object. At the same time, a significant part of the uplift along the foundation is located within the water area of the Caspian Sea. The elevation is contoured with a structural contour –9500m. The arch of the elevation is fixed at –9000m. The dimensions of the structure within the land part are 100x40 km.

A characteristic feature of the salt domes on the work area is the relatively shallow (150-600m) occurrence of salt massifs and the penetration of the above-salt complex of sediments with salt up to the level of Neogene-Quaternary precipitation.

The area under consideration is confined to is confined to the salt dome structure complicating the southern slope of the Novobogatinsky uplift.

According to the structure of the postsalt complex of sediments, the uplift of the field is a three-winged salt dome structure measuring 5x6.5km.

The north-western, south-western, and eastern wings correspond to the slopes of the salt and are separated from each other by a three-beam downthrown block.

On the wings and in the downthrown block, Jurassic and Cretaceous deposits of various ages, overlain by Neogene-Quaternary sediments, come to the daytime surface.

A 3D seismic survey carried out in 2005 illuminated the north-western wing, within which oil and gas deposits were developed. Oil and gas content has not been established on the south-western and eastern wings. The structural plan for the roof of the reflecting horizon VI corresponds to the roof of the Kungur stage of the Lower Permian deposits, represented by a saline formation, sometimes overlain by gypsum, anhydrite with layers of terrigenous rocks. This structural plan shows one positive structure in the southern part of the square. Its dome part is located south o. The amplitude of the structure along the closing structural contour -1100m is 730m. In the central part of the square, the salt dome is complicated by a structural nose extended in a northerly direction from wells. Within the investigated area, the salt dome does not close and, apparently, most of it is located to the south.

Above the roof of the saline formation, deposits of Permian-Triassic age are deposited.

To the south of wells, the structure is broken up by subparallel tectonic disturbances of the northeastern strike.

Reflecting horizons associated with the roof of the productive layer I_1-J_2 and the roof of the Middle Jurassic sediments (III OG), are traced over the Permian sediments. During the deposition of the Middle Jurassic sediments, a significant structural restructuring took place. So, the form of the positive structure has changed somewhat. If in the Permian sediments it was a dome of a fairly simple shape, inheriting the features of the salt formation and in the southern part bounded by a salt dome cutting zone, then in the Middle Jurassic sediments it is a brachianticlinal fold elongated from the southwest to the northeast. The dome part of the fold is shifted in a north-westerly direction in comparison with the underlying horizons. Apparently, such a structural adjustment is associated with the activation of salt dome tectonics. At the time of the beginning of the accumulation of sediments of the Middle Jurassic age, the depression near the salt dome, which arose as a result of the intensive movement of the salt mass into the dome arch, was compensated by sedimentary material. As a result of the subsequent alignment of the pack of the saline formation over the pre-existing depression, a positive fold was formed, which persisted in subsequent geological time until the Cenozoic era. Otherwise, the structural plan is inherited. Just as at the level of the reflecting horizon along the roof of Permian deposits, in the Middle Jurassic strata, the structure in the eastern part of the area is represented by a structural nose. From the features of positive structures observed on structural maps on the roofs of the Middle Jurassic strata, it can be noted that the main brachianticline fold is elongated in a northnorth-easterly direction along the line of the main discharge to the northwest of it. At the northern end of this structure, a structural nose begins, which is extended to the east

Previously, this feature of the structural structure of the area was not identified, and therefore, this area of the area has not been studied by drilling. The structural nose is divided by a series of tectonic disturbances into blocks that may contain isolated hydrocarbon deposits that are not affected by the development of the main deposits. Up the section to the roof I_1 of the Middle Jurassic horizon, the structural plan is being flattened, which indicates a calm tectonic regime and sedimentation trends towards compensation of the basin. In the arch of the structure, the Middle Jurassic deposits are partially eroded. The reflecting horizon along the roof of the productive horizon I_1-J_2 practically repeats the roof of the Middle Jurassic Tectonically, in the Middle Jurassic sediments, all the established faults are traced, dividing the structure into 11 blocks. In addition, according to drilling data, several violations have been identified, which are the basis for the allocation of additional blocks.

Neocomian deposits with angular and stratigraphic disagreement lie on the eroded surface of the Jurassic.

Reflecting boundaries along the roof of productive horizons of Lower Cretaceous age are traced higher along the section: III Neocomian horizon, AptianNeocomian horizon, Upper Albian deposits. Structurally, the structure of these horizons is inherited, i.e. the main geomorphological features described for the Middle Jurassic deposits are preserved in the interval of the Lower Cretaceous deposits. At the same time, the conditions of sedimentation and burial of rocks in this interval of the section were somewhat different. A feature of the structure of the Lower Cretaceous age strata is the presence of more extensive washouts in the dome part of the brachianticlinal fold.

By the beginning of the Albian, the Aptian-Neocomian deposits were formed, partially eroded in the arch part, which are the sole of the Albian deposits.

This boundary is the boundary of angular and stratigraphic disagreement. The structural plan constructed according to this reflecting boundary is significantly flatter compared to the underlying horizons. There is some structural restructuring in the central part of the square. If at the lower boundaries the highest area of the fold was located to the northwest of the main discharge, then at the horizon level by $_1$ a the amplitude of disturbances decreased significantly and in hypsometric terms the southern part of the structure was dominant.

In addition, the elevation associated with the salt dome in the southern part of the square becomes more significant on the square. The remaining structural elements described earlier are preserved, becoming less relief and more gentle.

All tectonic disturbances established by seismic materials are traced within the Aptian-Neocomian deposits.

In the Albian sediments of the section within the area, a reflecting horizon was traced, confined to the roof of the Upper Albian productive horizon. With respect to the boundary of the sole of the Albian deposits, these surfaces become more flat, and the amplitude of tectonic disturbances decreases from bottom to top.

The arched part of the anticline shifts to the southwest. Now the dominant position in the plan is occupied by the area in the center of the square to the south of the main fault.The reflecting boundary of K_2 st is traced above along the section, corresponding to the roof of Cretaceous sediments of Santonian age. The structural plan is significantly flatter compared to the underlying reflecting horizons. There are no pronounced positive structures observed in Cretaceous, Jurassic and Permian sediments. A chain of uplifts stretches from the southwest to the east, which can be associated with the brachianticlinal fold observed on the underlying horizons. The structure is sinking in a northwesterly direction.

The Rovnoye structure is confined to the Southern slope of the Novobogatinsky uplift and to the salt spur stretching from the salt core of the Kamyshitovoye square towards the salt dome structure of the Martysh. The depth of the salt surface is minus 1400-1600 m.

According to the above-salt deposits, the structure is an anticline fold with dimensions: 4.5 x 2 km (minus 900 m in the structural contour). The northern, relatively elevated wing is distinguished, and the southern – lowered, separated from each other by downthrown block.

The northern wing has an anticline structure. The extension of the anticline is sub latitudinal. The lowest absolute mark of the III reflecting horizon in the arch is minus 780 m, the amplitude of elevation is 120 m. The V reflecting horizon (PermianTriassic surface) can be traced at a depth of minus 1200-1900 m.

The rocks of the northern slope are immersed in the muld, separating the structure of the Level from the structure of the Gran. In the center of the muld there is a mark III of the reflecting horizon minus 1100 m. The southern slope is limited by the discharge of the downthrown block F_1. Industrial productivity at the deposit under consideration is established in the Aptian and Neocomian deposits on the northern wing of the structure

3 Special section

3.1 Geological modelling

Reservoir modeling is a powerful reservoir management technique. It allows the engineer to understand the geology of the reservoir and predict its forecasting under various development scenarios. Reservoir forecasting prediction can be used to solve problems associated with planning, operation and diagnostics at all stages of field development.

The main purpose of the geological modeling of the field is to create a basis for further modeling of the movement of fluids in this field. Of course, the geological model is also used to calculate geological reserves, but this is not its primary task, since in most cases reserves can be calculated with a sufficient degree of accuracy using methods that are simpler than geological modeling.

Along with the fact that modern geological modeling allows you to get a 3D understanding of the reservoir structure, the nature of the distribution and variability of its parameters and fluids saturating it, it also makes it possible to assess the uncertainties that inevitably arise when trying to model a real geological setting.

Modern geological modeling makes it possible to evaluate and take into account in the model the uncertainties caused by the lack of knowledge about the structures and properties of the reservoir outside the wells. One of the main tools of geological modeling that allows you to do this is geostatistics.

Schlumberger's Petrel software package was used to build a 3D geological model. The main stages of geological modeling are (picture 3.1):

-Data analysis and preparation of needed information, data download;

-Structural modeling;

-Facies modeling;

-Petrophysical modeling; -Reserves estimate.

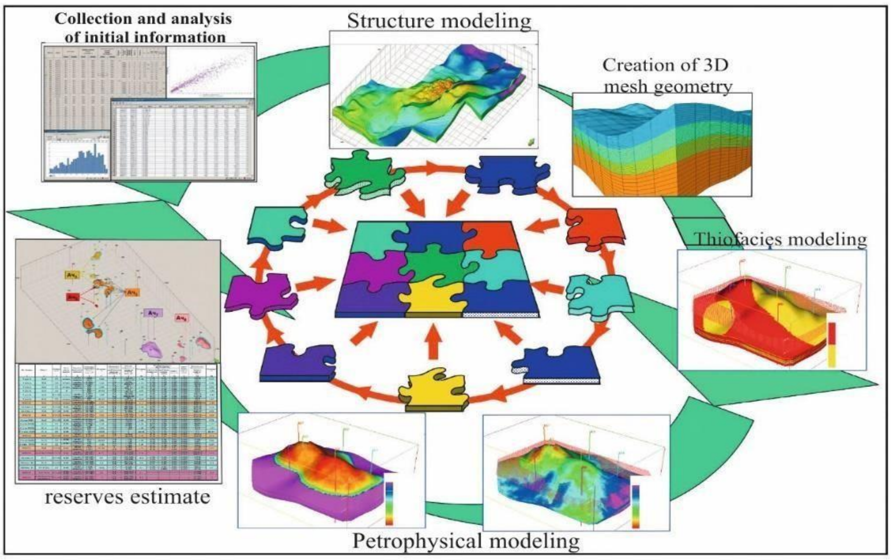
These materials used in project:

-Well information (coordinates, altitude, MD);

-Structural maps;

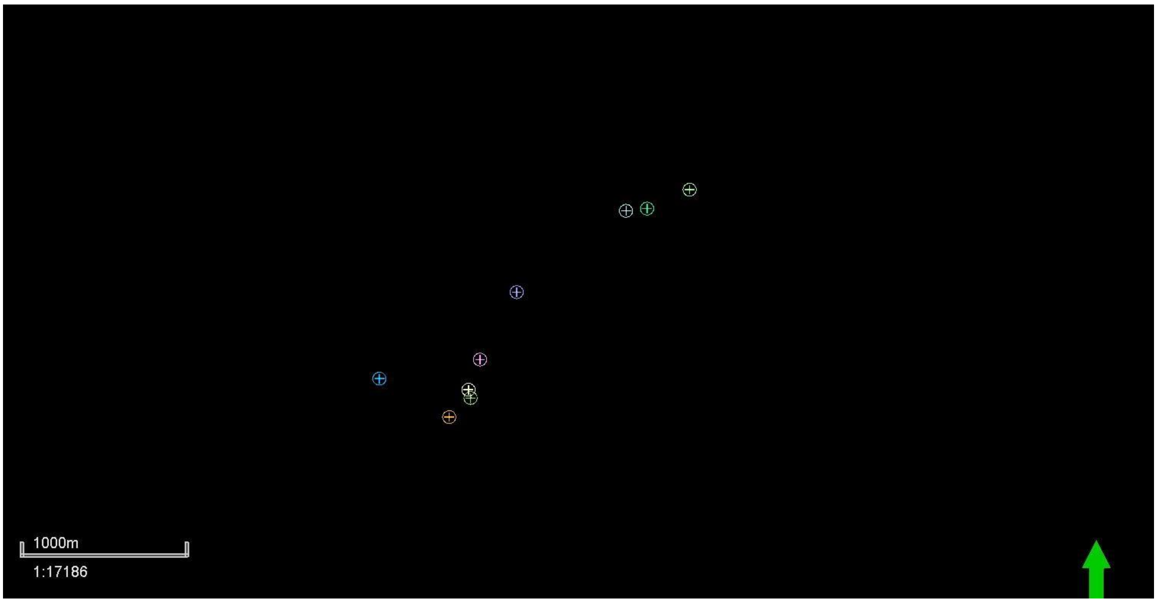
-Well log interpretation results (clay, porosity and oil saturation, water saturation);

-Stratigraphy of wells.

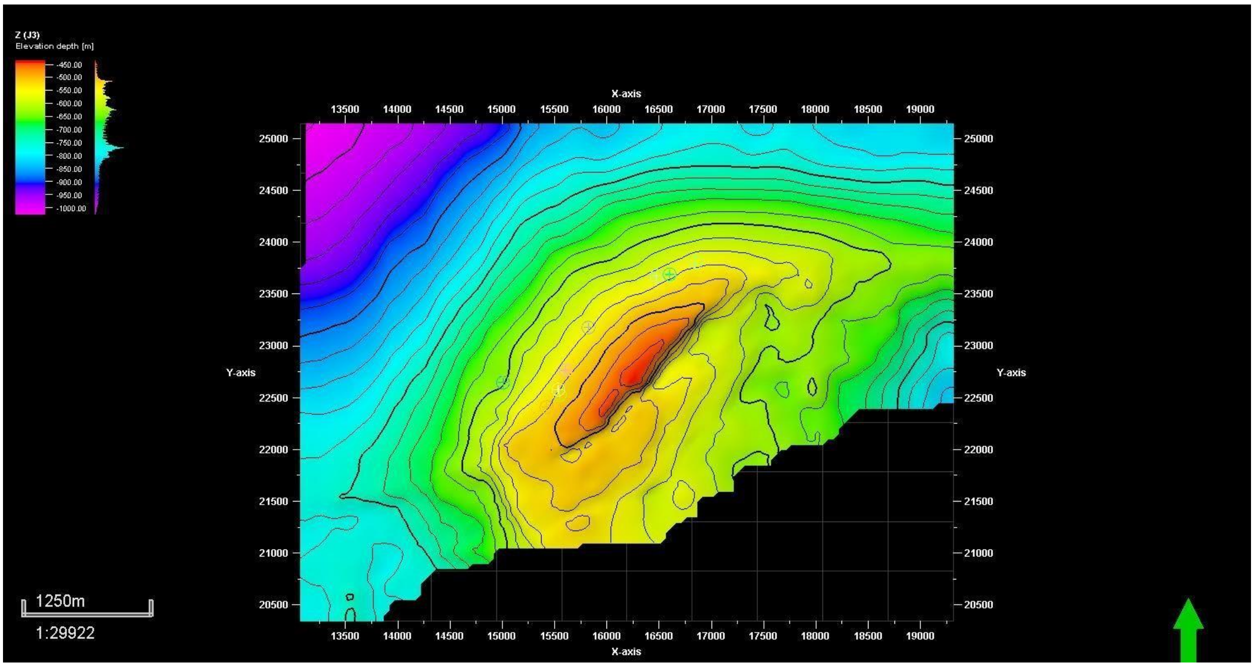


Picture 3.1 - the main stages of creating a digital geological model 3D

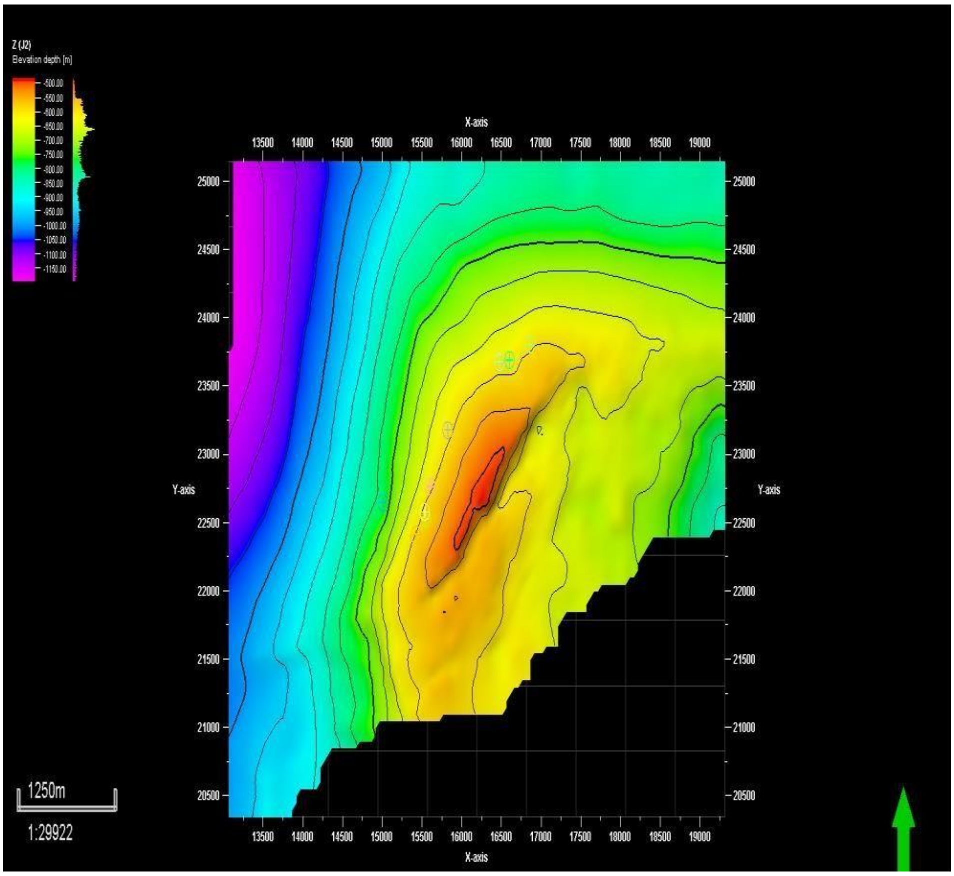
After loading all the available data into the Petrel, work was carried out to verify the materials for their conditionality. Based on the work, it was noted that all materials for 8 wells are conditioned and it is possible to perform work on geological modeling. The pic. 3.2 shows well’s location in the Petrel 2D window.



Picture 3.2 – Well map



Picture 3.3 - Structural map of top of productive horizon

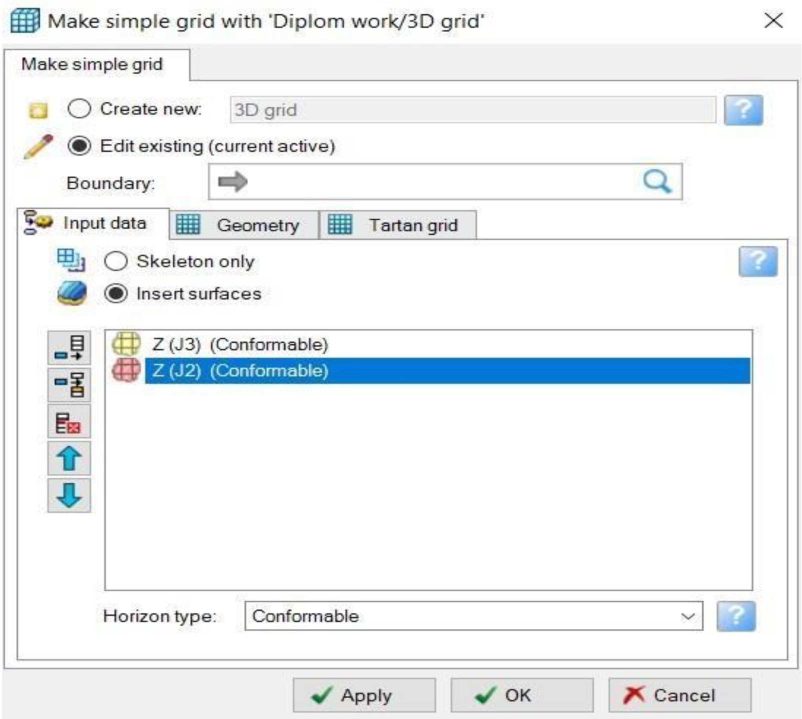


Picture 3.4 - Structural map of bottom of productive horizon

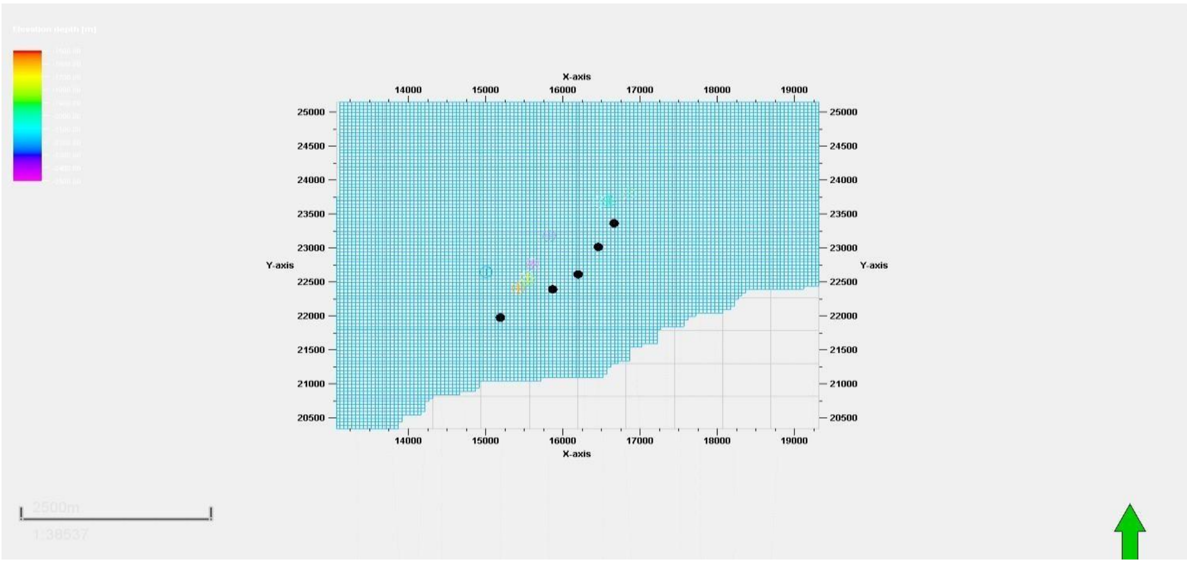
At the initial stage of the work, stratigraphy for productive formations were analyzed through the well correlation window (well section). As a result of the updated tops, structural maps were rebuilt based on seismic maps and stratigraphy (pic. 3.3. and pic 3.4).

Building a structural frame.

The simple grid process was used to build the structural frame based on structural maps of J2 and J3 (pic 3.5-3.6).

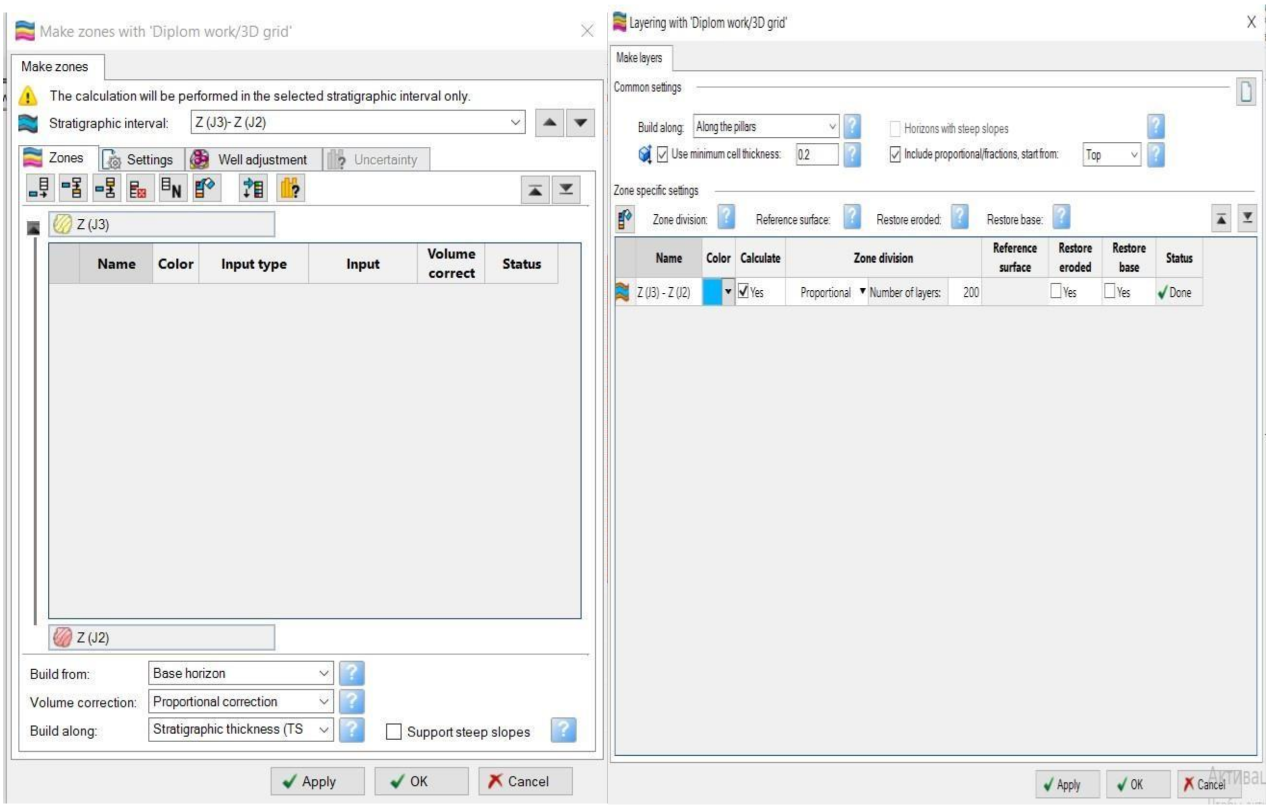


Picture 3.5- Process of simple grid



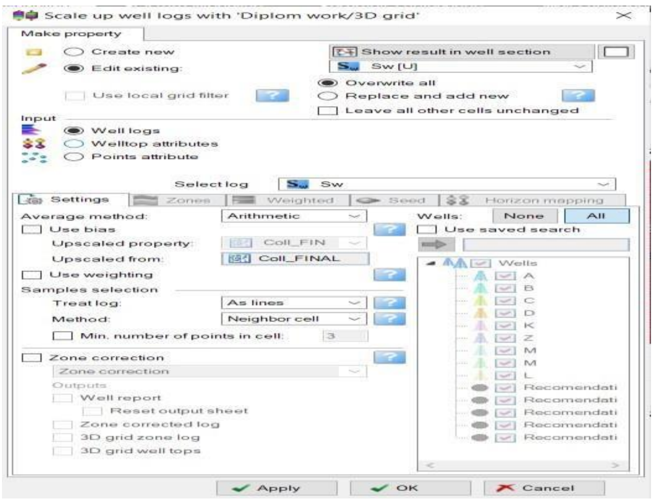
Picture 3.6- 2D view of model grid

After obtaining grids of 50×50, next step was choosing parameters of zones and layering. Zone of interesting doesn’t have additional zones, so zones are not changed and set by default. Well log dates have high resolution (20 cm), so layering choosed as proportional with 200 cells (pic 3.7-3.8).



Picture 3.7-3.8 – Zone and layering process

After the structural framework, the Well log upscale procedure was performed – rescaling of well data into grid cells (pic. 3.9).

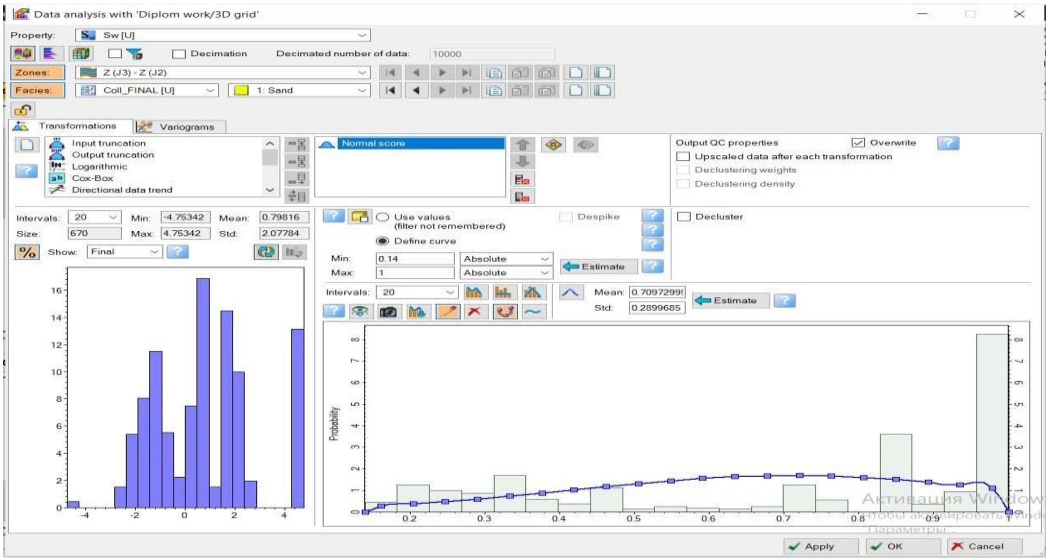


Picture 3.9 – Well log upscaling for water saturation

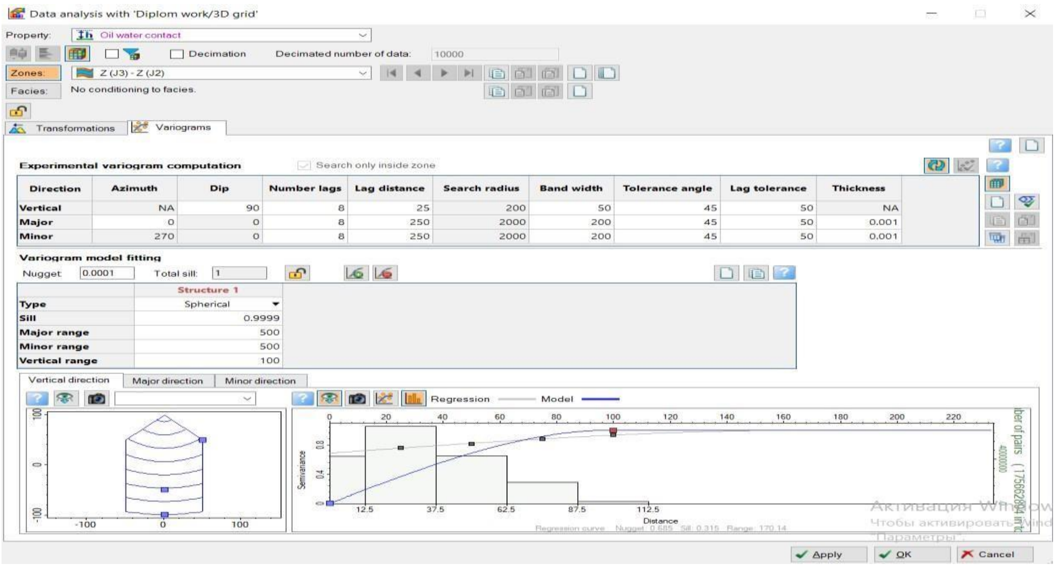
The arithmetic method was used for averaging continuous well curves of clay, porosity and water saturation into grid cells. This means that all values that correspond to one cell in the interval of 0.2 meter will be arithmetically recalculated into a single value. The most of method was used for the lithology curve, because lithology curve has discrete format. This means that of all the values that fall into the depth of the cell, the largest value in the cell will be selected.

Data analysis.

The next step in building a geological model is to determine the method of distributing petrophysical properties within the grid. In other words, it is necessary to calculate the mathematical relationship between all the wells. For this purpose, the Data Analysis module was used, which allows the construction of a variogram depicting the dependence, where the direction of distribution (major and minor), its azimuth, and vertical resolution are determined (pic. 3.10-3.11).



Picture 3.10 – Data analysis process

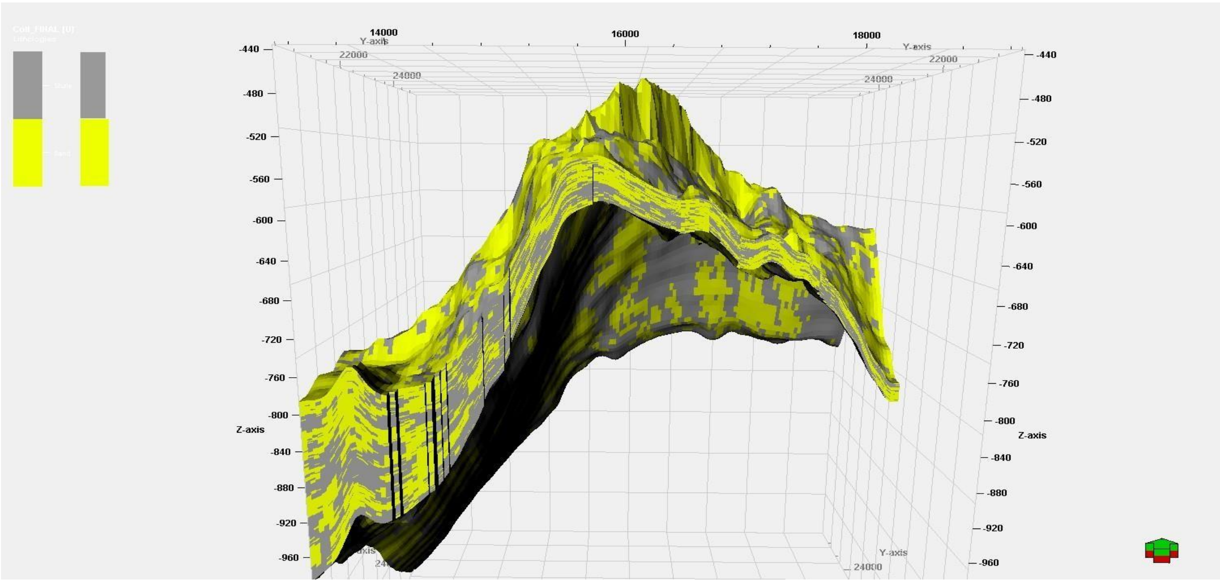


Picture 3.11 – Variograms process

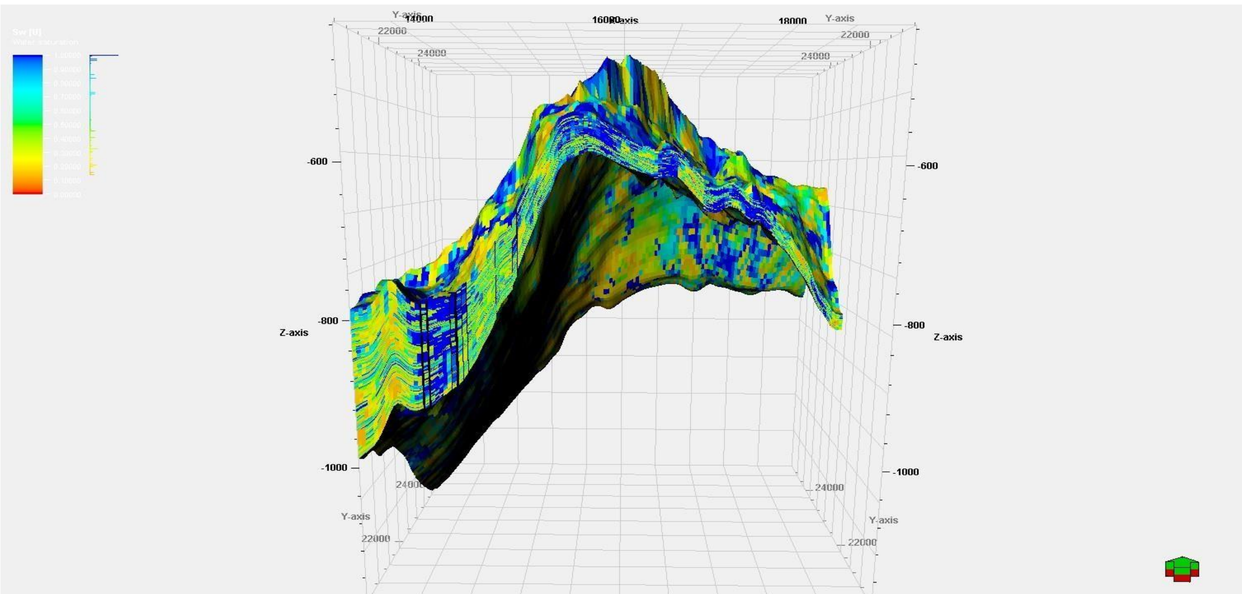
Petrophysical modeling

The next step in the workflow was the construction of a lithology cube (pic. 3.12), which was distributed using the Facies Modeling module. The SIS (Sequence Indicator Simulation) method was utilized for the lithology distribution.

After the above-mentioned tasks were completed, the main part of geological modeling began, which involves the petrophysical distribution of properties across the studied area. The Petrophysical Modeling module was used for property distribution. Petrophysical modeling in this study is based on Gaussian Simulation. This means that porosity and saturation (3.13) properties are distributed using Gauss Simulation and with the lithology cube.



Picture 3.12 – Lithology 3D cube



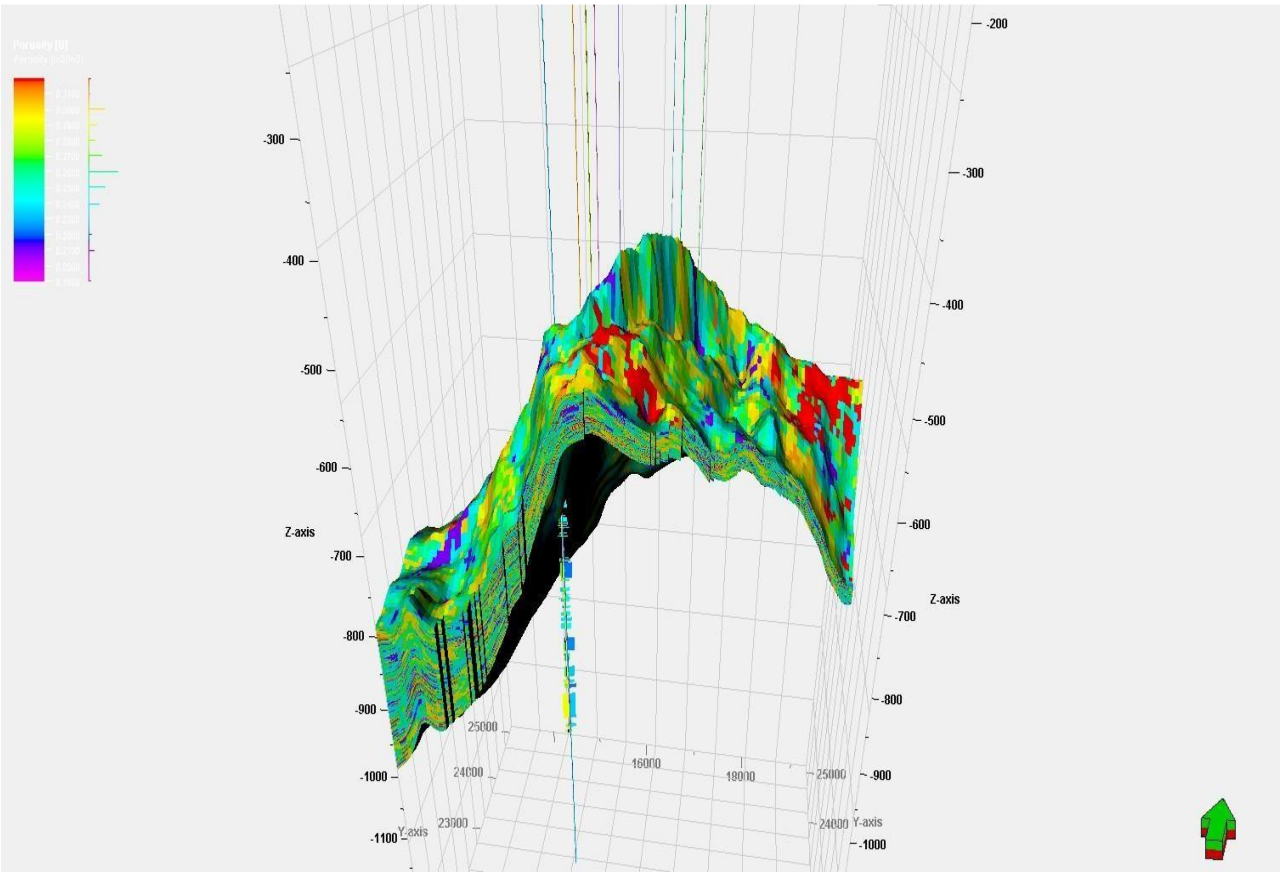
Picture 3.13 – Water saturation 3D cube

The initial data for building cubes of petrophysical parameters were the results of well log interpretation. The porosity cube is constructed using petrophysical modeling by SIS interpolation of well log interpretation data in reservoir intervals. The saturation cube is constructed by SIS interpolation of well log interpretation data.

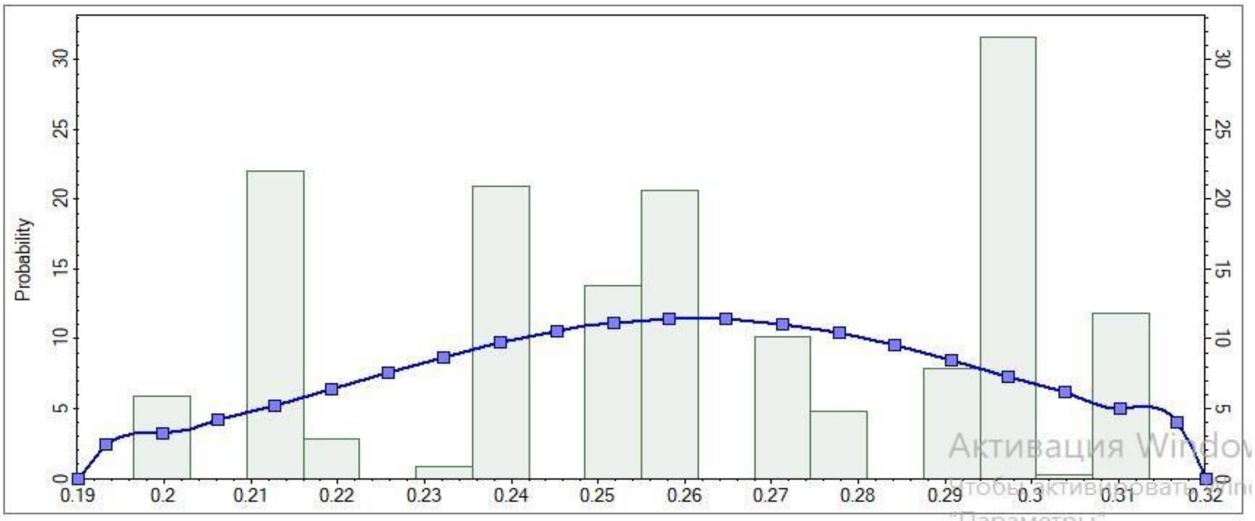
The SIS algorithm is a stochastic modeling method that performs the following actions:

- Sequentially traverses points on the grid with unknown values along a random trajectory;
- Determines what values and with what probabilities the parameter can have at this unknown point according to the known values of this parameter (wells);
- Implements the obtained probabilities randomly and puts them at the point under consideration;
- The value placed at the point is added to the number of known data and can be used to find values at new points.

Quality control of the building of the porosity and saturation cubes was carried out by comparing histograms of the distribution of values over a 3D cube and according to well log data.

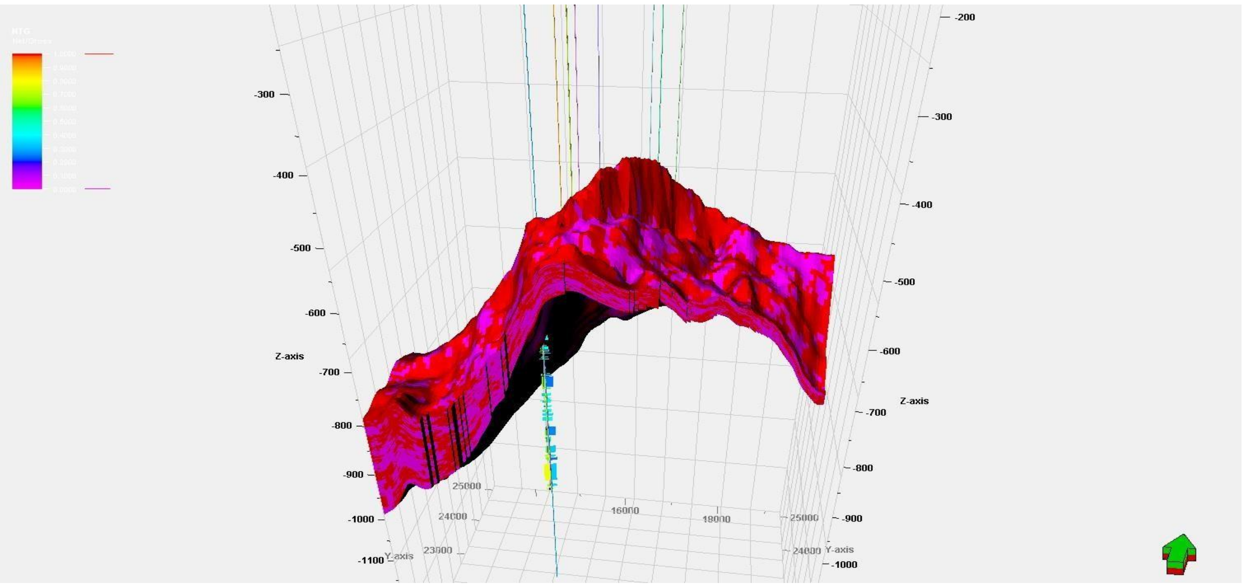


Picture 3.14 – Porosity 3D cube



Picture 3.15 - Porosity distribution diagram

Based on the results of lithology cube was built the net to gross (NTG) cube by the mathematic calculator – NTG=lithology cube.

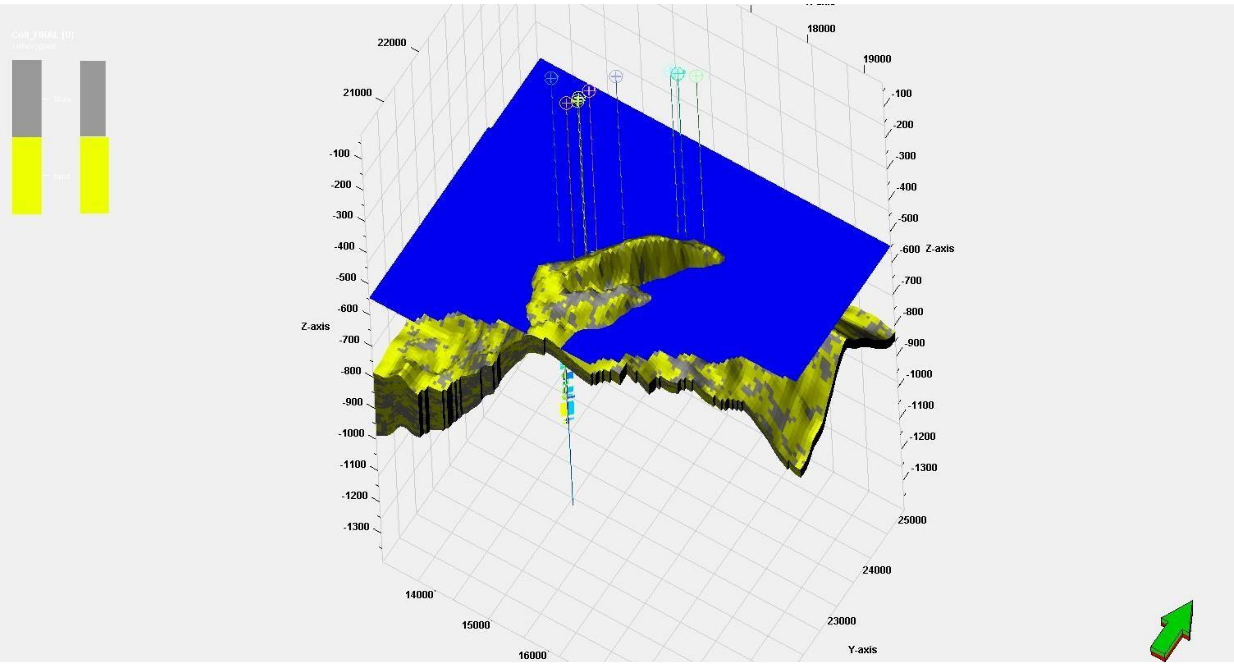


Picture 3.16 - Net to gross 3D cube

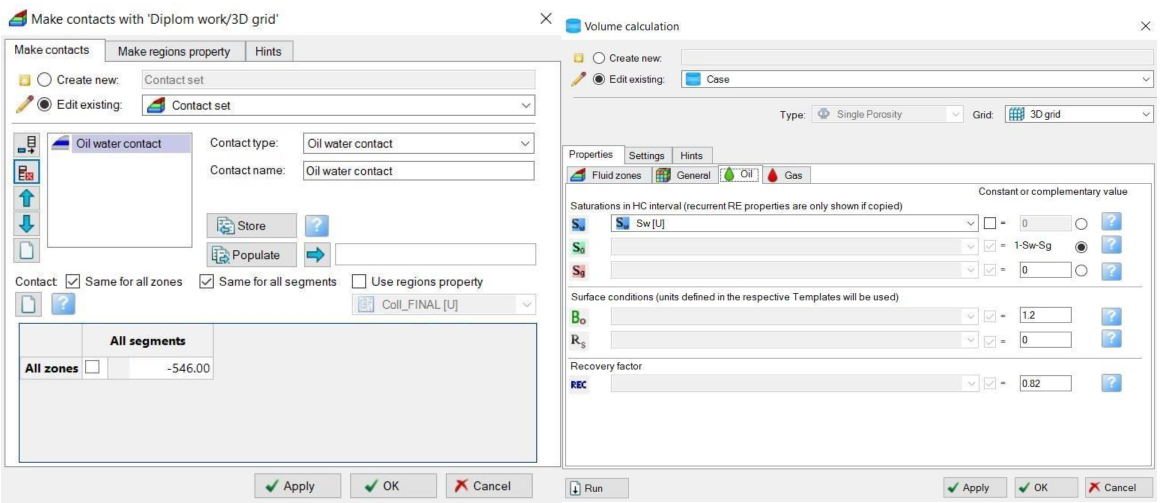
After obtaining the geological model, calculations can be performed to assess the hydrocarbon reserves. It is important to have the value of the oil-water contact (OWC) for reserve estimation. In this study, the OWC is chosen at a depth of -546 m (pic. 3.17). These data are incorporated into the geological model using the Contacts module (Pic.3.18).

The next step involved resource assessment based on the constructed anisotropic geological model. This stage was performed through the Volume module (pic. 3.29).

Since the Petrel software provides resource calculation results in volume, the Volume stage included the addition of the oil density value (820 kg/m3) and a formation Volume factor (1.20). After inputting all the values, the calculation process was initiated, and a table of resources for each reservoir was obtained. According to the results of preliminary calculations of the 3D geological model, the total initial oil reserves of the studied field is 3 million tons.

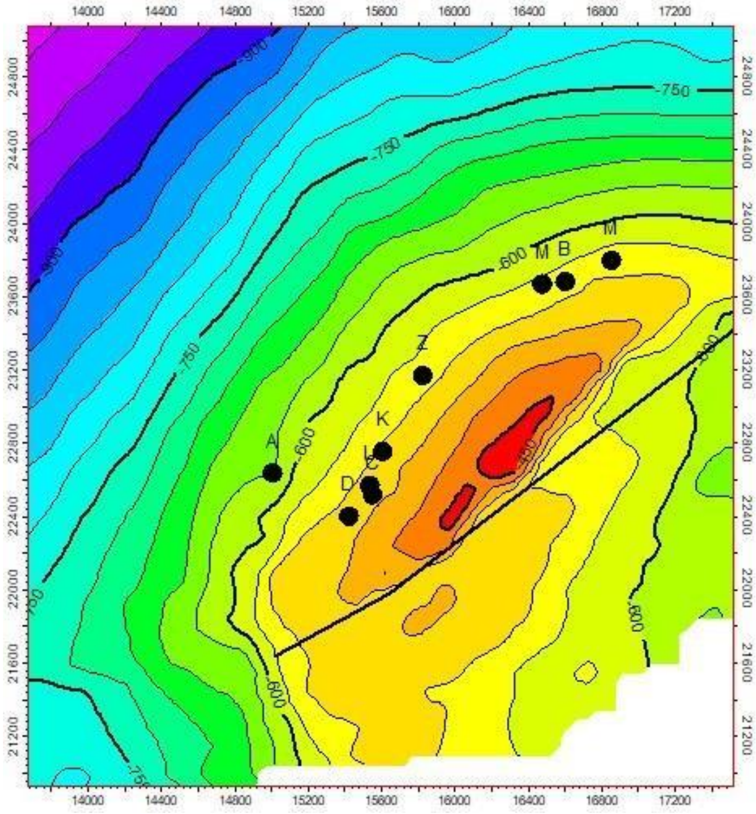


Picture 3.17 – OWC on lithology cube

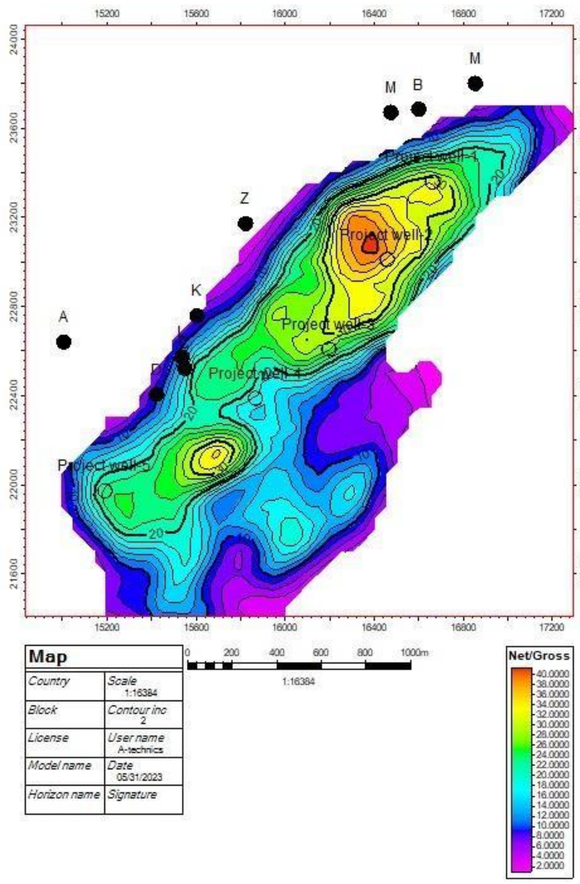


Picture 3.18-3.19 – Volume and Contact process

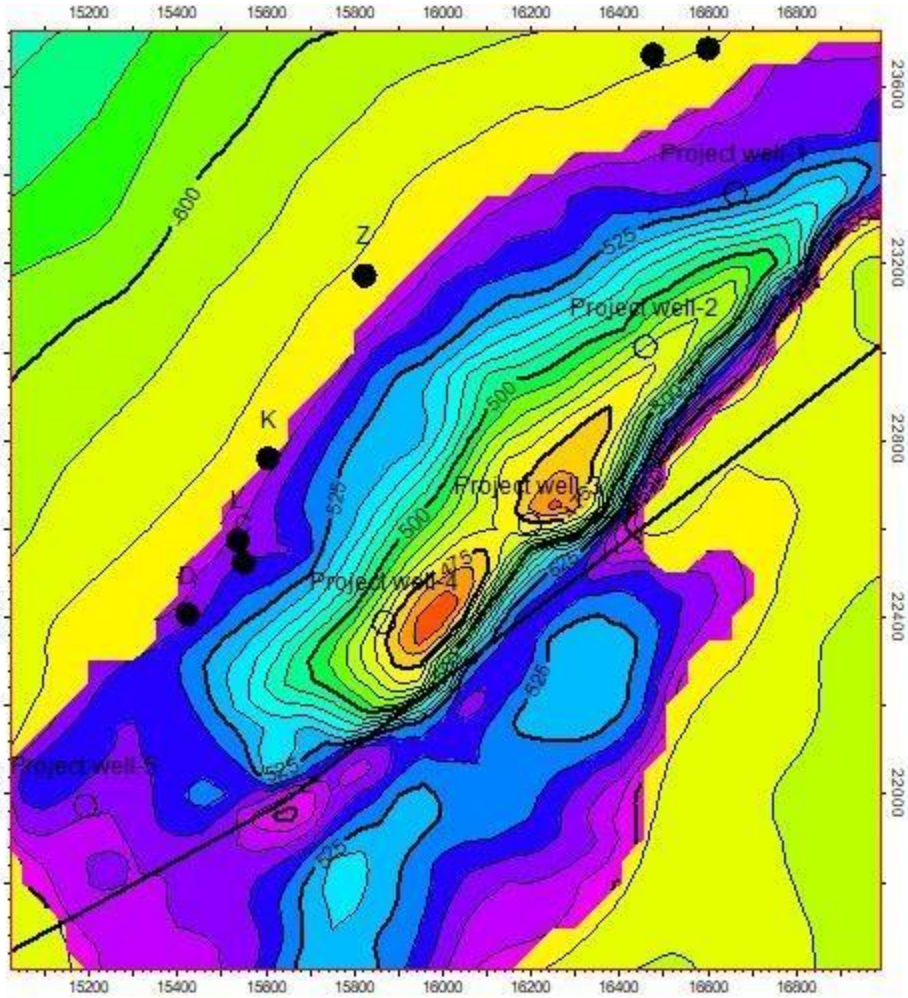
According to the geological model I picked new points for project wells.



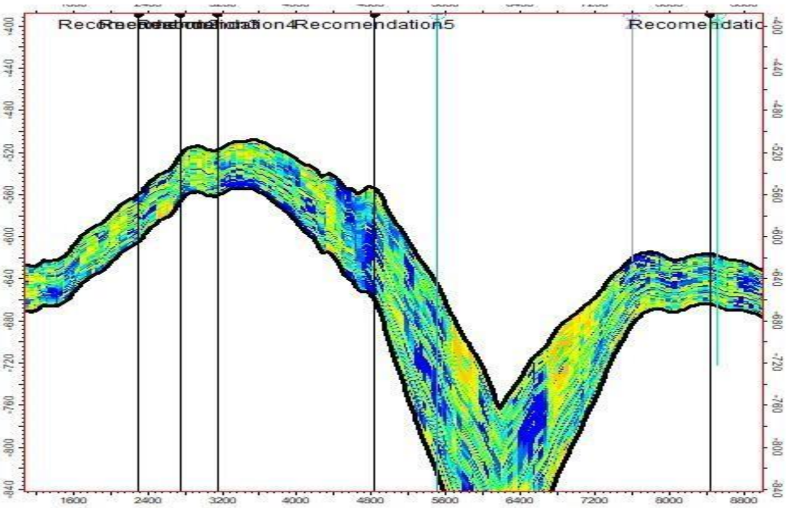
Picture 3.20 - Structural map of J2



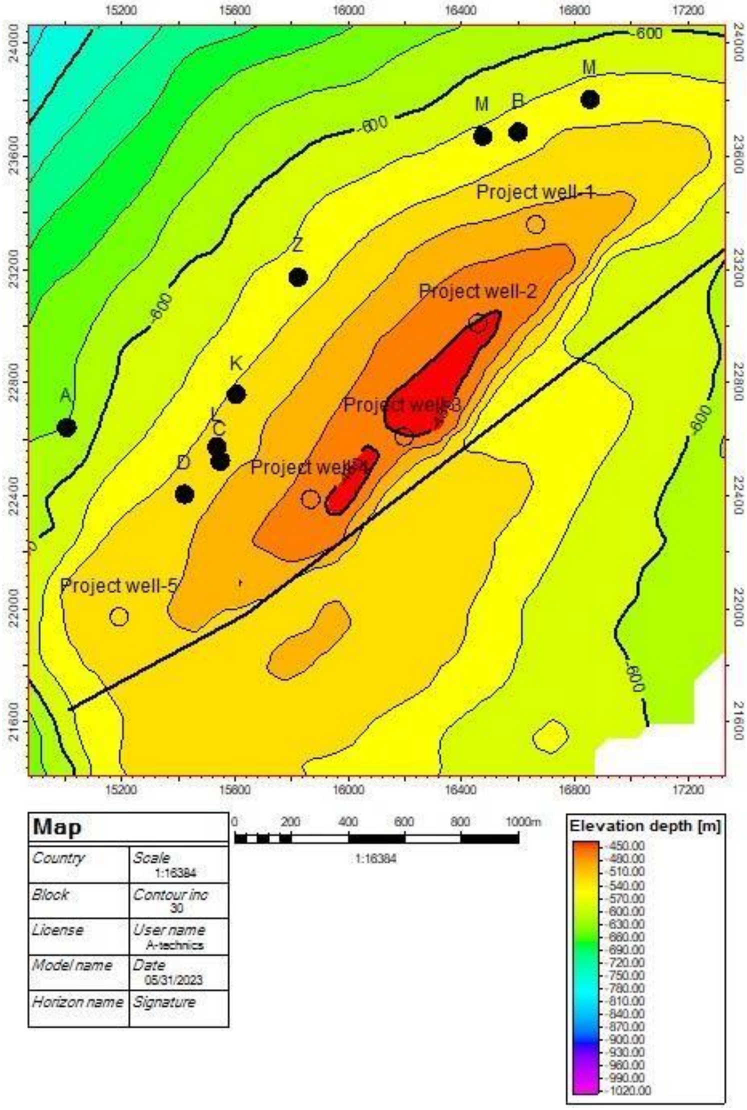
Picture 3.21 - Oil saturated map of J2



Picture 3.22 – Oil saturated map on the Structural map of J2



Picture 3.23 - Project wells on intersection profile of Water Saturation cube



Picture 3.24 - Project wells on structural map

CONCLUSION

In this project, work has been done to construct a geological 3D model with subsequent selection of locations for drilling wells. During the work, updates were made to the stratigraphic markers of productive horizons, structural maps were rebuilt, and an anisotropic geological model was constructed using new algorithms for property distribution. Petrel software was used for these tasks.

During the work, a new understanding of sedimentation patterns in the productive horizons of the Middle Jurassic deposits was obtained, which helped apply the correct distribution of properties across the study area.

Based on the results of the completed work I have the following recommendations:

1. Do a special core analysis on drilled wells to determine petrophysical properties;
2. Do additional research on sedimentation based on well log data, core analysis, and seismic surveys;

3. Drill additional wells in the uplifted part of the structure, which has a tectonic trap;
4. Adhere to a proper well spacing pattern during drilling operations;
5. Conduct specialized types of well log analysis in the newly drilled wells to enhance the resolution of the geological model;
6. Update the geological model based on the new wells.

USED MATERIAL

1. Work report by Gulshat Imasheva to 2021 year
2. Zakrevski K.E. “3D Geological modeling” p22
3. Ababkov K.V. Suleimanov D.D “Fundamentals of 3D digital geological modeling” P4
4. Petrel brief manual (2017)
5. Lamotte A.F., Lamotte D.F., Leturmy P., Souloumiac P. “Geological objects and structures in 3D. Observation, interpretation and building of 3D models”
6. Zaxarov A.A. “Models, algorithms and programs that develop the technology of 3d modeling of oil and gas fields”

Протокол

о проверке на наличие неавторизованных заимствований (плагиата)

Автор: Қырықбаев Қуаныш Қосаманұлы

Соавтор (если имеется):

Тип работы: Дипломная работа

Название работы: 2023_БАК_Қырықбаев Қуаныш Қосаманұлы.docx

Научный руководитель:

Коэффициент Подобия 1: 2.3

Коэффициент Подобия 2: 0

Микропробелы: 5

Знаки из здругих алфавитов: 0

Интервалы: 0

Белые Знаки: 0

После проверки Отчета Подобия было сделано следующее заключение:

☑ Заимствования, выявленные в работе, является законным и не является плагиатом. Уровень подобия не превышает допустимого предела. Таким образом работа независима и принимается.

☐ Заимствование не является плагиатом, но превышено пороговое значение уровня подобия. Таким образом работа возвращается на доработку.

☐ Выявлены заимствования и плагиат или преднамеренные текстовые искажения (манипуляции), как предполагаемые попытки укрытия плагиата, которые делают работу противоречащей требованиям приложения 5 приказа 595 МОН РК, закону об авторских и смежных правах РК, а также кодексу этики и процедурам. Таким образом работа не принимается.

☐ Обоснование: Заимствования, выявленные в работе, является законным и не является плагиатом.

Дата 01.06.23

Заведующий кафедрой

Протокол

о проверке на наличие неавторизованных заимствований (плагиата)

Автор: Қырықбаев Қуаныш Қосаманұлы

Соавтор (если имеется):

Тип работы: Дипломная работа

Название работы: 2023_БАК_Қырықбаев Қуаныш Қосаманұлы.docx

Научный руководитель:

Коэффициент Подобия 1: 2.3

Коэффициент Подобия 2: 0

Микропробелы: 5

Знаки из здругих алфавитов: 0

Интервалы: 0

Белые Знаки: 0

После проверки Отчета Подобия было сделано следующее заключение:

☑ Заимствования, выявленные в работе, является законным и не является плагиатом. Уровень подобия не превышает допустимого предела. Таким образом работа независима и принимается.

☐ Заимствование не является плагиатом, но превышено пороговое значение уровня подобия. Таким образом работа возвращается на доработку.

☐ Выявлены заимствования и плагиат или преднамеренные текстовые искажения (манипуляции), как предполагаемые попытки укрытия плагиата, которые делают работу противоречащей требованиям приложения 5 приказа 595 МОН РК, закону об авторских и смежных правах РК, а также кодексу этики и процедурам. Таким образом работа не принимается.

☐ Обоснование: Заимствования, выявленные в работе, является законным и не является плагиатом.

Дата

01.06.23

проверяющий эксперт

ҚАЗАҚСТАН РЕСПУБЛИКАСЫ ҒЫЛЫМ ЖӘНЕ БІЛІМ МИНИСТРЛІГІ
«Қ.И. СӘТБАЕВ АТЫНДАҒЫ ҚАЗАҚ ҰЛТТЫҚ ТЕХНИКАЛЫҚ ЗЕРТТЕУ УНИВЕРСИТЕТІ»

Қырықбаев Қуаныш Қосаманұлы
(аты-жөні)
6В07202 - Геология және пайдалы қазбалар кенорындарын барлау
(мамандығы)
Каспий маңы шөгінді бассейнінің оңтүстік бүйірлік Ровное кен орнының геологиялық-геофизикалық мәліметтерін талдау және өнім горизонтының геологиялық моделін құру.
(дипломдық жобаның тақырыбы)
тақырыбындағы дипломдық жобасына

СЫН – ПІКІР

Дипломдық жұмыс екі негізгі бөлімнен тұрады: Бірінші бөлімі қарастырылған кен орыннын толық мәліметі, екінші бөлімі геологиялық анизантропты модель құру.

Дипломдық жұмыстың бірінші бөлімі толықтай қарастырылған кен орынның жалпы сипаттамасы, геологиялық құрылысы, жүргізілген геологиялық-геофизикалық жұмыстары, литолого-стратиграфиялық сипаттамасы. Аталған бөлімдер жан-жақты қарастырылып, жұмысты жазу барысында тек оқулықтарды ғана емес геологиялық фонды мәліметтеріне сүйене отырып жазғаны айқындалады.

Дипломдық жұмыстың арнайы бөлімі Қаратұрын кенорынының мұнайгаздылығы мен өнімді қабаттарының қабаттық қасиеттерін зерттеу тақырыбына арналған.

Жоба бойынша ескерту:

Жобаны тексеру кезінде, ескертукел пайда болмады

Жұмысты бағалау

Ұсынылған дипломдық жұмыспен танысу және талқылану негізінде Satbayev University – нің «Геология және пайдалы қазбалар кенорындарын барлау» мамандығы бойынша түлегі Қырықбаев Қуаныш аталғыш мамандық бойынша «бакалавр» академиялық дәрежесін беруге лайық, ал дипломдық жұмысты 90% бағалауға болады деп санаймын.

Рецензент
Пікір беруші
«Техникалых ғылым магистры, ЖШС
У.Ахмедсафина атындағы Гидрогеология
және геология институт» ғылыми қызметкері

_______________ Итемен Н.М.
қолы
«2» маусым 2023 жыл

КАДР БӨЛІМІ

Ф КазНИТУ 706-17. Рецензия

ҚАЗАҚСТАН РЕСПУБЛИКАСЫ ҒЫЛЫМ ЖӘНЕ БІЛІМ МИНИСТРЛІГІ
«Қ.И. СӘТБАЕВ АТЫНДАҒЫ ҚАЗАҚ ҰЛТТЫҚ ТЕХНИКАЛЫҚ ЗЕРТТЕУ УНИВЕРСИТЕТІ»

Қырықбаев Қуаныш Қосаманұлы
(аты-жөні)
6В07202 - Геология және пайдалы қазбалар кенорындарын барлау
(мамандығы)
Каспий маңы шөгінді бассейнінің оңтүстік бүйірлік Ровное кен орнының геологиялық-геофизикалық мәліметтерін талдау және өнім горизонтының геологиялық моделін құру.
(дипломдық жобаның тақырыбы)
тақырыбындағы дипломдық жобасына

ҒЫЛЫМИ ЖЕТЕКШІНІҢ ПІКІРІ

Дипломдық жұмыстың бірінші бөлімі толықтай қарастырылған кен орынның жалпы сипаттамасынан, геологиялық құрылысынан, жүргізілген геологиялық-геофизикалық жұмыстарынан, литолого-стратиграфиялық сипаттамасынан тұрады.

Дипломдық жұмыстың арнайы бөлімінде зерттеп жатқан кен орынның геолого-геофизикалық деректерін талдау, өнімді горизонттың стратиграифясын қарастыру, барлық геофизикалық декректерді Petrel бағдарламасына еңгізу, анизотропты геологиялық моделді құру және алынған нәтиже бойынша жаңа ұңғымаларды проектеу жұмыстары көрсетілген.

Ұсынылған дипломдық жұмыспен танысу және талқылану негізінде Satbayev University – нің «Геология және пайдалы қазбалар кенорындарын барлау» мамандығы бойынша түлегі Қырықбаев Қуаныш аталғыш мамандық бойынша «бакалавр» академиялық дәрежесін беруге лайық, ал дипломдық жұмысты 85% бағалауға болады деп санаймын.

Ғылыми жетекші
_______________ Кенесары А.Ж.
қолы
«02» ____06______2023 жыл

StrikePlagiarism.com SATBAYEV UNIVERSITY

Дата отчета 6/1/2023

Дата редактирования ---

Отчет не был оценен.

Метаданные

Название

2023_БАК_Қырықбаев Қуаныш Қосаманұлы.docx

Автор

Қырықбаев Қуаныш Қосаманұлы

Научный руководитель / Эксперт

Подразделение

ИГиНГД

Оповещения

В этом разделе вы найдете информацию, касающуюся текстовых искажений. Эти искажения в тексте могут говорить о ВОЗМОЖНЫХ манипуляциях втексте. Искажения в тексте могут носить преднамеренный характер, но чаще, характер технических ошибок при конвертации документа и его сохранении, поэтому мы рекомендуем вам подходить к анализу этого модуля со всей долей ответственности. В случае возникновения вопросов, просим обращаться в нашу службу поддержки.

Замена букв	ß	0
Интервалы	A→	0
Микропробелы	·	5
Белые знаки	ß	0
Парафразы (SmartMarks)	a	9

Объем найденных подобий

Обратите внимание!Высокие значения коэффициентов не означают плагиат. Отчет должен быть проанализирован экспертом.

2.30% (2.30%) КП1	0.00% (0.00%) КП2	0.43% (0.43%) КЦ
25 Длина фразы для коэффициента подобия 2	**7400** Количество слов	**45599** Количество символов

Подобия по списку источников

Просмотрите список и проанализируйте, в особенности, те фрагменты, которые превышают КП №2 (выделенные жирным шрифтом). Используйтессылку «Обозначить фрагмент» и обратите внимание на то, являются ли выделенные фрагменты повторяющимися короткими фразами, разбросанными в документе (совпадающие сходства), многочисленными короткими фразами расположенные рядом друг с другом (парафразирование) или обширными фрагментами без указания источника ("криптоцитаты").

10 самых длинных фраз

Цвет текста

ПОРЯДКОВЫЙ НОМЕР	НАЗВАНИЕ И АДРЕС ИСТОЧНИКА URL (НАЗВАНИЕ БАЗЫ)	КОЛИЧЕСТВО ИДЕНТИЧНЫХ СЛОВ (ФРАГМЕНТОВ)	
1	5.08 Urmanova spe-manuscript-template-eng.docx 8/6/2021 Satbayev University (ИГиНГД)	11	0.15 %
2	Каспий маңы бассейінінің оңтүстік-шығысындағы тұз үсті шөгінділердің тектоникасы, мұнайгаздылығы және Шығыс Мақат кенорны бойынша қосымша барлау жобасы.docx 4/26/2018 Satbayev University (ИГиНГД)	11	0.15 %

3	https://internationalaffairsreview.com/2021/05/19/un-general-assembly-unanimously-supports-initiative-of-the-president-of-uzbekistan-regarding-development-of-the-aral-sea-region/	11	0.15 %
4	Каспий маңы бассейінінің оңтүстік-шығысындағы тұз үсті шөгінділердің тектоникасы, мұнайгаздылығы және Шығыс Мақат кенорны бойынша қосымша барлау жобасы.docx 4/26/2018 Satbayev University (ИГиНГД)	11	0.15 %
5	Каспий маңы бассейінінің оңтүстік-шығысындағы тұз үсті шөгінділердің тектоникасы, мұнайгаздылығы және Шығыс Мақат кенорны бойынша қосымша барлау жобасы.docx4/26/2018 Satbayev University (ИГиНГД)	10	0.14 %
6	Анализ исходных, геолого-геофизических данных и построение фациальной геологической модели месторождения Южного Мангышлака6/3/2021 Satbayev University (ИГиНГД)	10	0.14 %
7	Building and optimization of geological and hydrodynamic model of field «X» 5/16/2020 Satbayev University (ИГиНГД)	10	0.14 %
8	Тектоническое строение, нефтегазоносность и анализ физико-химических свойств и состава нефти и газа место-рождения Кара Арна5/19/2020 Satbayev University (ИГиНГД)	9	0.12 %
9	Каспий маңы бассейінінің оңтүстік-шығысындағы тұз үсті шөгінділердің тектоникасы, мұнайгаздылығы және Шығыс Мақат кенорны бойынша қосымша барлау жобасы.docx4/26/2018 Satbayev University (ИГиНГД)	9	0.12 %
10	Каспий маңы бассейінінің оңтүстік-шығысындағы тұз үсті шөгінділердің тектоникасы, мұнайгаздылығы және Шығыс Мақат кенорны бойынша қосымша барлау жобасы.docx4/26/2018 Satbayev University (ИГиНГД)	9	0.12 %

из базы данных RefBooks (0.08 %)

ПОРЯДКОВЫЙ НОМЕР	НАЗВАНИЕ	КОЛИЧЕСТВО ИДЕНТИЧНЫХ СЛОВ (ФРАГМЕНТОВ)	
Источник: Paperity - abstrakty			
1	Slump structures in quaternary slope sediments of the northern Derbent Basin (Caspian Sea) L. I. Lobkovskii, A. G. Roslyakov, L. R. Merklin,V. E. Verzhbitskii;	6 (1)	0.08 %

из домашней базы данных (2.07 %)

ПОРЯДКОВЫЙ НОМЕР	НАЗВАНИЕ	КОЛИЧЕСТВО ИДЕНТИЧНЫХ СЛОВ (ФРАГМЕНТОВ)	
1	Каспий маңы бассейінінің оңтүстік-шығысындағы тұз үсті шөгінділердің тектоникасы, мұнайгаздылығы және Шығыс Мақат кенорны бойынша қосымша барлау жобасы.docx 4/26/2018 Satbayev University (ИГиНГД)	84 (11)	1.14 %
2	Анализ исходных, геолого-геофизических данных и построение фациальнойгеологической модели месторождения Южного Мангышлака 6/3/2021 Satbayev University (ИГиНГД)	22 (3)	0.30 %

3	5.08 Urmanova spe-manuscript-template-eng.docx 8/6/2021 Satbayev University (ИГиНГД)	18 (2)	0.24 %
4	Тектоническое строение, нефтегазоносность и анализ физико-химических свойств и состава нефти и газа место-рождения Кара Арна 5/19/2020 Satbayev University (ИГиНГД)	14 (2)	0.19 %
5	Building and optimization of geological and hydrodynamic model of field «X» 5/16/2020 Satbayev University (ИГиНГД)	10 (1)	0.14 %
6	Диплом Увакова Сауле.doc 5/17/2020 Satbayev University (ИГиНГД)	5 (1)	0.07 %

из программы обмена базами данных (0.00 %)

ПОРЯДКОВЫЙ НОМЕР	НАЗВАНИЕ	КОЛИЧЕСТВО ИДЕНТИЧНЫХ СЛОВ (ФРАГМЕНТОВ)

из интернета (0.15 %)

ПОРЯДКОВЫЙ НОМЕР	ИСТОЧНИК URL	КОЛИЧЕСТВО ИДЕНТИЧНЫХ СЛОВ (ФРАГМЕНТОВ)	
1	https://internationalaffairsreview.com/2021/05/19/un-general-assembly-unanimously-supports-initiative-of-the-president-of-uzbekistan-regarding-development-of-the-aral-sea-region/	11 (1)	0.15 %

Список принятых фрагментов (нет принятых фрагментов)

ПОРЯДКОВЫЙ НОМЕР	СОДЕРЖАНИЕ	КОЛИЧЕСТВО ИДЕНТИЧНЫХ СЛОВ (ФРАГМЕНТОВ)