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***Research Article***

# LITHOFACIES ANALYSIS OF SUZAK LAYERS (EARLY EOCENE) DISTRIBUTED IN THE FERGANA BASIN AND THE TASHKENT REGION

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**ABSTRACT**
The article describes the results of studying the peculiar lithological, petrographic, stratigraphic and facies features of the Paleogene deposits common in the territories of the Fergana depression and the Tashkent region, as well as their prospects for non-metallic minerals based on data obtained from numerous boreholes drilled in recent years.

***Keywords:*** *Ferghana Basin, Paleocene, facies, paleogeography, Paleogene, facies belt, lagoon, facies-paleogeographic map, suzoq, oloy, sumsar, isfara*

## INTRODUCTION

When carrying out lithological-facial analysis, a comprehensive study of the composition, thickness, distribution, structure and textural-facial features of sedimentary deposits formed in the geological past is the key to restoring landscapes in geological time and space.
According to D.V. Nalivkin (1955), the diversity of landscapes is reflected in sedimentary facies. Therefore, reconstruction of past facies helps to determine the paleogeographic features of a certain period of geological time. Specific features include mineralogical composition, rock structure, relationship with underlying and overlying rocks, presence of organic remains, color, inclusions, etc.
Paleogene deposits are divided into shallow-marine, shallow-marine, marine-coastal, sometimes brackish-water, shallow-marine facies. The group of mixed-facies complexes includes submarine-plain and submarine-deltaic facies.

### *Study Area*

Lithology, stratigraphy, facies-paleogeographical characteristics, oil and gas content and prospects for deposits of various minerals of Paleogene deposits scattered throughout the Fergana Basin and the Tashkent region were analyzed by V.I. Popov, A.M. Gabrilyan, R.F. Gekker, A.I. Osipova, T. N. Belskaya, G. A. Belenkiy, S. Kh. Mirkamalova, O. M. Akramkhodzhaev, M. Z. Zokirov, Sh. S. Saidkhodzhaev, B. I. Yusman, P. S. Although she studied by Sultanov and a number of other researchers, almost no importance was attached to it. to the analysis of the facies conditions of these two regions by comparing lithological and facies conditions.
Therefore, below, based on the results of research conducted in recent years to study the Paleogene sediments scattered in these areas, and data from many drill holes, a review of the lithologic-facies conditions of the study area and unique lithological features is made. petrographic, stratigraphic, tectonic and lithologic-facies features of the Paleogene period are presented, and the study and analysis of prospects for mining are considered pressing issues.

## MATERIALS AND METHODS

According to the dynamic principle of facies analysis developed by V.I. Popov, underwater deltas, tidal waves and shallow bays are distinguished on the lithologic-facies map of the study area within the facies complex of the coastal sea plains.
When carrying out scientific work, traditional lithological methods are used (geological routes, lithological sections, measurement of the elements of occurrence of layers, sampling), the material composition of samples using various analytical methods (mass spectrometer ICP-MS, DRON-3, Nikon

ECLIPSE LV100N POL). ) determination, using the results of field and laboratory work, lithofacies sections and maps were created using ArcGIS software.

## RESULTS AND DISCUSSION

***Submarine delta fascial belt.*** The dynamics of the underwater deltaic facies belt are progressive, like all surface and underwater currents. Genetically, this belt is connected with the above-water delta of the plain-valley belt and is its direct underwater continuation. In the southern part of the study area, at the early stages of the formation of the Suzok formation, a fairly stable underwater deltaic facies environment is observed; this facies area is composed of poorly differentiated sandy-siltstone and clayey deposits.

Here there is an alternation of well-sorted siltstones, consisting of millimeter-thick layers, with fine clays composed of mica aggregates. The thickness of the sediments of underwater deltas reaches 10-50 meters. Sedimentary rocks laid down in such conditions are sometimes separated from each other, sometimes connected to each other by narrow and wide belts stretching for tens of kilometers from west to east.

The underwater deltas of the region under consideration were formed in the sea or bay zone, where, like modern deltas, the sources of deltas begin from lowland rivers and penetrate deeply into water basins. This indicates that the submarine deltas of the Paleoisfara, Paleokhodzhabakirgan, Paleosokh and Paleoksu rivers were relatively homogeneous in time and space in the southern part of the Fergana basin. During the Suzog period, they merged with each other and formed a single zone of underwater deltas in plan.

***Tidal wave facies belt.*** It includes all coastal areas with a predominance of shallow sea waves in the Fergana basin and the regions of Tashkent. The composition of sediments in this facies area is varied. Also rich in textures and organic debris. Siltstones, clays, marls, limestones and dolomites are widely developed here. In the fast zone of the tidal facies belt, on the slopes of the paleocomposite and in the Khojand Strait, mainly sandstones developed due to wave action.

Fragmented and somewhat rounded armor plates are found in this zone. Symmetrical wave crests are observed (the distance between the crests is 4.5-5 and 10-11 cm).

In the southern part of the Fergana Basin and in the regions of Tashkent, siltstones and pelosiltstones with organic remains were formed in the stagnant zone (depth 150-200 meters) of the tidal wave facies belt. Their color varies from dark gray to black and they contain lumpy bitumen and iron sulfides.

***Shallow axillary arch of the face.*** It consists of shallow bays, lagoons, harbours, estuaries, fjords, separated by various barriers and piles in the main water area of the sea. Here, large clastic rocks are found only at the confluence of rivers. In this facies area, clays, carbonates, manganese and iron oxide ores are predominantly developed. The total thickness is several meters.

***Facies of shallow bays (lagoons).*** D. V. Nalivkin, N. M. Strakhov, V. I. Popov, S. D. Makarova, M. E. Egamberdiev and others describe the conditions for the separation and formation of facies of shallow bays. In his opinion, shallow bays or lagoons are semi-enclosed bodies of water with shallow water, formed as a result of the separation of the bulk of water by barriers in the coastal part of the sea. If there is a significant influx of fresh water into a closed body of water, the water of the lagoon can be fresh, and vice versa, if the contact with the sea is short-term or insignificant, it can be salty.

The early Eocene climate was similar to the Eocene climate, but precipitation may have increased. Otherwise, it is impossible to explain where a large amount of fine material was deposited, which contributed to the accumulation of layers of clay 30-40 meters thick or more.

Analysis of the thickness of the Lower Eocene sedimentary layers (Fig. 1) shows that the deepest part of the basin bottom was located in the northwest in the area of the Alimtovsky Mountains, as well as in the Angren valley. In the Ishan-Kurgan uplift, the subsidence of the seabed slowed down, which caused a decrease in the thickness of the Middle Eocene sediments. But the conditions for sediment accumulation did not change, since clay deposits accumulated in these places.

Middle Eocene period. In the Fergana Basin and the Tashkentoldin region, the illumination zone of the tidal wave facies belt prevailed. It is formed in the coastal part of the reservoir, parallel to its shores, and covers all areas of the reservoir. The main method of movement in it is the movement of water waves. Wave dynamics depend on the size of the reservoir.

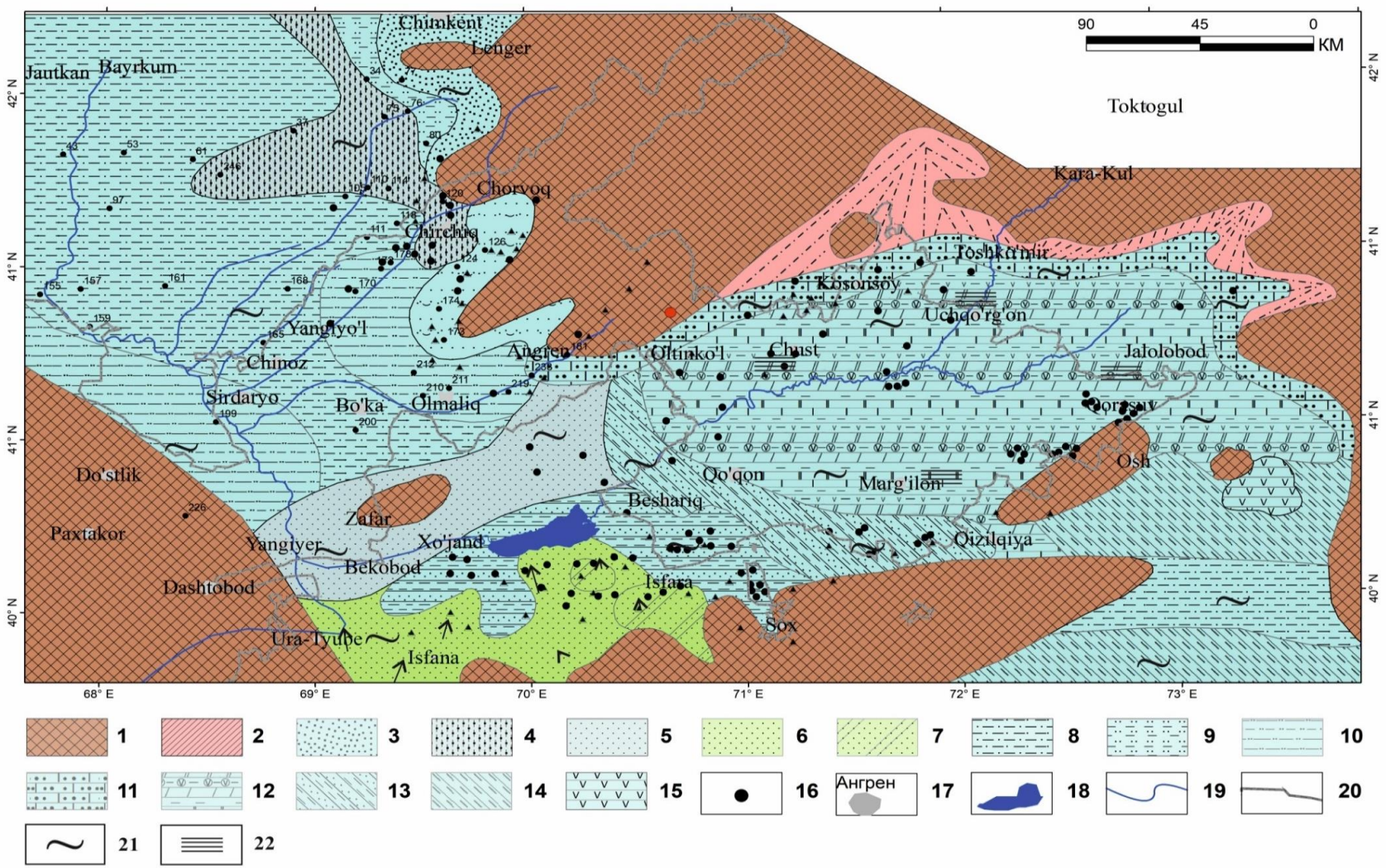


**Figure 1. Lithological-facies map compiled for the Paleogene sedimentary layer (time of sediment accumulation), distributed in the Fergana basin and the Tashkentoldi region. Scale 1:200,000. Compiled by: B.F. Meliboev (according to R.F. Hecker et al., 1962, G.A. Belenky, S.Kh. Mirkamalova, 1965, P.S. Sultonov, 2017) 2021 year.**

*1. Pre-Paleogene deposits, 2. Red sedimentary facies of the continental plains, 3. Quartz sands, 4. Sandstone layers, 5. Gray sandstones, 6. Sedimentary sandstone layers, 7. Sandstone, clay and limestone layers, 8. Siltstones and siltstone sandstones, 9 - quartz siltstones and sandstone interlayers, 10 - siltstone and sandstone interlayers, 11 - sandy-limestone deposits, a mixture of pebbles and gravelly sands with small pits and detrital limestones, 12 - marl, dolomite, gypsum and clay interlayers, 13 - sandstone layers and clay. Submarine deltaic facies zone., 14- clayey siltstones, 15- gypsum, 16- wells, 17- cities, 18- lake, 19- Syr Darya, 20- border of Uzbekistan, 21- lagoon belt facies, 22-year wave facies. facial zone belt.*

The depth of the impact of waves on the bottom of a reservoir is usually no more than 175-200 meters, sometimes on the open coast of the World Ocean it reaches 400 meters. The width of the belt depends on the nature of the coast, the size and depth of the pool, as well as the strength of the wind. The tidal belt is characterized by oscillatory movements of water masses. Its deposits are characterized by good sorting of material and roundness of grains. Under the influence of waves, sand layers form inclined layers, as evidenced by the symmetrical traces of wave ripples on the surface of limestone layers, as well as the uneven arrangement of organic remains, etc.

This belt is usually associated with transgressive stages of sedimentation and contains most of the sediments of the Suzok-Aloy, Aloy-Turkestan, Rishton-Khanabad rhythmic complexes formed on the seabed and in lagoon basins.

Coastal currents. This belt is formed as a result of rises and return movements of water levels and is characterized by the accumulation of predominantly hydromorphic carbonate, clayey, sandy facies found in the facies of the submarine delta and shallow bays.

The water of the Lower Suzok lagoon, inherited from the Bukhara period, was also relatively highly saline. The thickness of its deposits is 1.5-10.0 meters or more; they are composed of green-gray, bluish, yellow-green clays, very poor organic remains. Clusters of diagenetic pyrite are sometimes found in clays. The composition of the clay is predominantly palygorskite, partly composed of montmorillonite, dolomite and quartz are also found.

Such conditions for the formation of lagoons in the Fergana Gulf of the Paleogene Sea were realized under the influence of the two Khojand and Aloy straits. The bright blue clays of this facies belt occupied predominantly the central part of the Fergana basin. The high content of palygorskite clay mineral in these clays (up to 70-80%), the absence of gypsum and sometimes terrigenous substances in the clay composition indicate the promise of this facies for palygorskite clays.

The formation of facies is associated with regressive stages of subsidence and is entirely subject to paleogeographic conditions, as evidenced by the narrowing of the Khojand Strait and the difficult connection of Suzok Bay with the open sea to the west of the basin. and to the east there was no communication in the area of the Oloy Strait. Therefore, the silty layers here are composed of coarse-grained gypsum sandstones and brown-red clays of mixed composition in the paragenesis.

## CONCLUSİON

The prevailing arid and hot climatic conditions, the shallowness of the basin, the high level of brightness compared to the influx of water, the alkalinity of the environment, as well as the fact that the clay composition includes predominantly palygorskites, indicate the existence of a shallow facies environment of the bay during this period.

On lithologic-facial maps, facies belts and their zones are identified, which determine the conditions of formation, material composition, the scale of useful mineral raw materials associated with different layers of Paleogene deposits, and are the basis for forecasting and delimiting promising areas. .

It has been proven that fossils belonging to Paleogene deposits are stratigraphically confined to certain facies belts. In particular, the facies of shallow lagoon-type bays includes thick-layered gypsum of the Gaznov formation, palygorskite clays, dolomites and travertines of the Suzok formation, and the underwater delta facies includes quartz sands of the Srednesuzok formation.

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