

 Research Article

## THE GEOECOLOGICAL ZONING OF THE KYZYLKUM DESERT

Submission Date: February 22, 2022, Accepted Date: March 10, 2022,

Published Date: March 22, 2022

Crossref doi: <https://doi.org/10.37547/ijasr-02-03-05>

Journal Website:  
<http://sciencebring.com/index.php/ijasr>

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### ABSTRACT

The problem of natural geographical zoning is one of the most ancient problems, and it is still a topical issue that has not lost its essence. This direction in natural geography and landscape is improving from year to year and serves as a basis for the emergence of various aspects of zoning and their solution.

### KEYWORDS

Natural geographical zoning, geoeological zoning, Kyzylkum desert, geoeological situations, natural resources.

### INTRODUCTION

The nature of the Kyzylkum Desert, its richness in natural resources, extremely low population

density, and the fact that it has been poorly studied in relation to river valleys, foothills, and

intermountain basins under the influence of human activities require a more thorough geographical and ecological study [1-3].

**AIM AND OBJECTIVES OF THE STUDY.** Natural geographic zoning is the final stage of landscape research conducted in any region and at a selected site. The main task of geo-ecological zoning of the Kyzylkum desert is to divide the area into separate parts based on similar and different features. In the study of any area from a landscape perspective, the main task is to pay close attention to the geo-ecological condition of the environment and to study it thoroughly, which is a topical geo-ecological problem arising from the requirements of the time. In particular, the geo-ecological situation in the Kyzylkum Desert requires comprehensive analysis. It requires the collection of reliable data on the positive and negative changes in landscape complexes under the influence of human production and economic activities, the assessment of the current ecological status of geo-complexes, the consistent implementation and implementation of mapping and geo-ecological zoning [4-7].

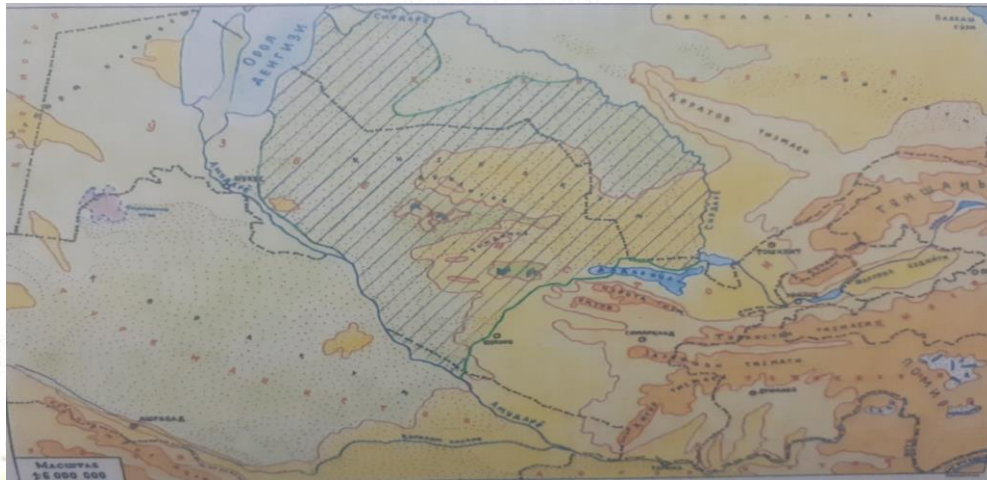
## RESULTS AND DISCUSSION

The Kyzylkum Desert is located in the arid indoor basin of the Eurasian continent, in the central part of the natural lowlands of the Turan Plain, between the Amudarya and Syrdarya, the largest rivers in Central Asia. Its territory is bounded on the north and northeast by the Syrdarya Valley, on the east and southeast by the Nurata

Mountains and the Zarafshan Valley, and on the southwest by the Aral Sea. The widest part of the Kyzylkum Desert stretches 650 km from north to south along the Jusali-Farob meridian, and from west to east the Sultan Uvays Mountains and the Chordara Reservoir 600 km wide [8-11]. The total area is 300 thousand sq. Km. This figure is 3 times smaller than the area of the Gobi Desert in Central Asia and 20 times smaller than the Sahara Desert in northern Africa. A large part of the Kyzylkum Desert administratively belongs to the Navoi, Bukhara, Khorezm regions of the Republic of Uzbekistan and the Republic of Karakalpakstan and the rest of the north-eastern part to the Republic of Kazakhstan. The surface of the Kyzylkum desert has a generally flat relief character, with an average altitude of 200-300 m above sea level. The total slope of the land surface decreases from 300-350 m in the southeast to 70-100 m in the northwest and 53 m on the shores of the Aral Sea. However, the flat relief shape and structure of the desert landscapes of the Kyzylkum are markedly different from the Karakum desert landscapes, where the arid subsurface landscapes are much more complex with the sandy eroded lowland and foothill proluvial plain landscapes. Among the sandy and saline landscapes, which occupy a large area of the Kyzylkum, there are low Paleozoic low mountains, which are not very high and separate from each other [12-15]. Their absolute height ranges from 473m to 922 m. Most of the low mountains are located in the central part of the Kyzylkum Desert. These are: Tomditogh (922m), Kuljuqtogh (785m), Bokantogh (764m), Aristontogh (698m), Ovminzatogh (695m),

Etimtogh (565m), Kazaktogh (613m) and others. Only Sultan Uvays Mountain (473m) is located on the right bank of the Lower Amudarya. These mountains were twisted in the Paleozoic era, and they later became solitary low-lying massifs. In the Kyzylkum desert, closed low-lying landscapes

separating lowlands, foothills and sand massifs are also common. The largest of them are Mingbulak, Ayoqogitma, Karakhotin, Mullali. The surface of the Mingbulak basin is -12 m below sea level.



**Figure 1. The object of research - the Kyzylkum desert.**

It should be noted that the geographical location of the Kyzylkum Desert within the Eurasian continent is between 39 and 64 degrees north latitude. The fact that its territory, which has a complex relief shape, is located inside the mainland, away from the seas and oceans, has created a direct opportunity for the emergence, formation and dynamic development of typical desert ecosystems with arid climates. The nature of the Kyzylkum Desert, its richness in natural resources, extremely low population density, and an extremely little study of river valleys, foothills, and intermountain basins under the influence of human activities have long attracted the attention of naturalists and tourists. Our current perceptions of its natural conditions and

resources have been formed, shaped, and perfected through the hard work of several generations of research geographers. The problem of natural geographical zoning is one of the most ancient problems, and it is still a topical issue that has not lost its essence [16-19]. This direction in natural geography and landscape is improving from year to year and serves as a basis for the emergence of various aspects of zoning and finding solutions to them. For example, landscape-ecological or geo-ecological method, landscape-reclamation, landscape-reaction, landscape-construction, zoning for agricultural purposes. Natural geographic zoning is the final stage of landscape research conducted in any region and at a selected site. It is a process of

identification, separation and delimitation of territorial natural geographical units that exist objectively in nature and acquires important practical and scientific significance in modern natural geography and landscape. The main task of natural geographical zoning is to divide the regions into independent parts, depending on their similarities and differences.

L.S.Berg (1913, 1958), R.I.Abolin (1929), V.M.Chetirkin (1947, 1960), E.M.Murzaev (1953, 1958), P.S.Makeev (1956), N.L.Korzhenevskiy (1960), L.N.Babushkin, N.A.kogay (1963,1964), N.A.Gvozdevskiy (1965), P.V.Zvonkova (1965), F.N.Milkov (1977), A.A.Abdulqosimov, S.B.Abbasov (1997) and others dealt with the problem of natural geographical zoning of the desert regions of Central Asia, including the Kyzylkum [20-27].

The importance of the principle of dividing territories based on the landscape was recognized in 1913 by L.S. Berg. In his "Experience in the division of Siberia and Turkestan into the landscape and morphological regions" he emphasizes the possibility of zoning each natural geographical area, which aims to divide the landforms, based on the following two principles:

1. To be based on the principle of the landscape;
2. To be based on the principle of relief forms;

Based on the first principle, L.S. Berg considers the Turkestan (Turan) plain as a desert landscape zone. Based on the second principle, the Turkestan lowlands divide the Caspian Karakum,

Kyzylkum, Amudarya delta, Aral Karakum, Moyinkum and other regions.

In natural geographical and geo-ecological zoning, changes in geosystems under the influence of human economic activity and adherence to the emerging anthropogenic principle are of great scientific and practical importance. The essence of the anthropogenic principle and its importance in natural geographical zoning is widely covered in the scientific works of AA Abdulkasimov (1982), VI Fedotov (1972, 1985) and others. They admit that the anthropogenic principle can be applied both in natural geographical and geoecological zoning and in landscape-typological mapping.

This principle requires a comprehensive account of anthropogenic changes in the landscape but also serves to reveal the differences between natural complexes and anthropogenic complexes. Adherence to the anthropogenic principle in natural geographical and geoecological zoning is the recognition of anthropogenic complexes that exist objectively in the landscape and have their genetic range. This is because, along with natural resources, anthropogenic resources also play an important role in the development of the landscape sphere.

The problem of geo-ecological zoning of the territory of Uzbekistan, including the Kyzylkum desert understudy, is still given little attention by geographers.

The work done in this direction is also limited to some regions of the country.

For example, A.A. Abdulkasimov and S.B. Abbasov (1997, 2001) conducted landscape ecological research in the Central Kyzylkum and identified landscape-ecological regions such as Bukantov-Etimtov, Mingbulak-Yamonkum and Tomdi-Kuljuqtog in its territory [28-33].

A.A. Abdulkasimov, D. Jurakulova and Q. Yarashevs (2004) analyzed the geo-ecological situation in the landscape complexes of the Surkhandarya basin under the influence of anthropogenic factors and divided its territory into 4 geo-ecological regions:

1. Weakly polluted and degraded Termez-Surkhan valley geoecological region;
2. Lower Surkhandarya oasis-desert geoecological region, strongly degraded due to deflation and salinization,
3. Middle Surkhandarya oasis-desert geoecological region contaminated with chemical compounds;
4. Upper Surkhan oasis-steppe geoecological region contaminated with metallogenic dust.

Following the basic principles and methods of natural geographical zoning in the geo-ecological zoning of the Kyzylkum desert, based on factual materials collected as a result of many years of research, landscape-typological and landscape-ecological maps and taking into account the ecological situation in recent years under natural and anthropogenic factors it is appropriate to distinguish the following geoecological regions. These are: North Kyzylkum, Bokan-Etimtog, Mingbulak-Yamonkum, Tomdi-Kuljuqtog, Gazli, South-West Kyzylkum, Sultan Uvays, Aral Sea

West Kyzylkum, East Kyzylkum, Bukhara-Karakul oasis geoecological regions.

#### **The North Kyzylkum geoecological region.**

This geoecological region is located between the northern foothill proluvial plains of the Bokan-Etimtog lowlands and the Syrdarya valley, and most of its territory consists of plateaus plains consisting of Pliocene-Lower Quaternary deposits. These ancient deposits served as the main source in the formation of sand massifs occupying large areas.

#### **The Bokan-Etimtog geoecological region.**

The territory of the geoecological region consists of Paleozoic low mountains such as Bokantog, Etimtog, Tokhtatog, Oyimtog, Kokpatas and the foothill proluvial plains that surround them in the form of a ring. The district stretches 340 km from west to east. Its width decreases from 150 km to 15 km from west to east. The area is 12800 km<sup>2</sup>. The main part of the region is occupied by the array of Bokantog.

#### **The Mingbulak-Yomonkum geoecological region.**

The region is located in the lower part of the Central Kyzylkum. It is bordered on the north by the Bokantog, Etimtog, and Tokhtatog massifs, and on the south by the Tomditog, Ovminzatag, and Kazakhtag massifs. The territory of the region consists mainly of Mingbulak and Mollali streams and the Yamonkum plain. The total area is 13,800 km<sup>2</sup>.

#### **The Gazli geoecological region.**

This region includes the alluvial-delta plain of ancient Zarafshan in the south-western Kyzylkum region. It is bordered on the north by the foothill

proluvial plains of Kuljuktag, on the east by the Bukhara and Karakul oases, and on the southwest by the Amudarya valley.

The Sultan-Uvays geocological region. The region covers the Sultan Uvays mountain range on the right bank of the Amudarya Valley and the adjacent foothill proluvial plains. Territorially, it is an integral part of the Kyzylkum natural geographical district.

## CONCLUSION

Analysis and mapping of the interdependence of geographical components, their zonal, regional and vertical stratification in space on the basis of a systematic approach, the study of desertification and dynamic changes in the geological process of desertification under the influence of natural and anthropogenic factors. As a result of research on issues such as zoning and environmental optimization, some theoretical cases have been developed, based on which the following scientific conclusions have been made and practical recommendations have been made:

- Structural analysis of the Kyzylkum desert landscapes shows that its territory is very complex compared to the territory of morphologically adjacent regions, large-scale mapping of its colourful arid landscape complexes is of scientific and practical importance.
- The group of mainly natural and anthropogenic factors plays a leading role in the desertification and dynamic change of modern arid landscape complexes.

- The fragile nature of desert geosystems, the degree of interdependence of geographical components and the emptiness of the linkage mechanism, the growing influence of natural and anthropogenic factors do not allow them to develop more efficiently. This results in geocological situations of varying severity.
- Based on the law of zonal stratification of desert landscape complexes of the Kyzylkum, its territory is divided into three zones: northern desert, typical desert and southern desert zones. On the basis of landscape-typological mapping, 8 types of places were identified, including 10 geo-ecological zones as a result of hundreds of settlements and geo-ecological zoning. A comprehensive description of all land types, their characteristic features and geocological areas was given.
- Kyzylkum landscape complexes are stratified not only in the horizontal direction but also in the vertical direction. Here the vertical stratification of landscapes is manifested in two different variants.
- In the geo-ecological optimization of desert landscapes and the application of measures developed on a scientific basis, in particular, in the implementation of phytomeliorative work, it is necessary to approach each type of landscape differently. Because each landscape type has its character, historically formed local geo-ecological conditions and unique features.

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