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ECOLOGICAL CHARACTERISTICS OF A SERIES OF MUD VOLCANOES INCLUDED TO THE MUD VOLCANO GROUP STATE NATURE RESERVE

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Abstract

The landscape complexes of 10 of the 43 mud volcanoes included in the State Nature Reserve (Shorbulag, Gulbakht-Sarinja, Pilpili Garadag, Garadag Akhtarma, Torpagli Akhtarma, Otman-Bozdag, Shahgaya, Chapilmish, Kirdag, Buransiz-Chulga) and their surrounding areas has been investigated in the article.

The inclination degrees, relief, vegetation, and soil cover composition of the area were studied by using images obtained from Google Earth software, DEM (Digital Elevation Model) files, and literature materials. Maps, tables and graphs were also prepared based on the obtained results.

Keywords: reserve, mud volcanoes, landscape complexes, relief, soil cover, vegetation, ecological feature.

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1. Introduction

The fact that more than 350 of the total number of existing mud volcanoes and manifestations in the world are located in the territory of our republic and 43 mud volcanoes are included in the Mud Volcanoes State Nature Reserve have increased the actuality of this research object. Also, currently, the Ministry of Ecology and Natural Resources is conducting work on the new status of the territory as a "GEOPARK" in the future, which has determined the importance of research in all directions on the research object. [2, 3]

2. Research method

The research method includes analyzes conducted in ArcGIS software based on DEM - Digital Elevation Model files prepared on the basis of satellite observations and aerospace materials made in recent years (relief, inclination, etc.), analysis of existing map materials and comparison with Google Earth software, new maps and schemes preparation. Literature materials, atlases and maps about Mud Volcanoes group State Nature Reserve and surrounding areas were analyzed and used in the article.

3. Purpose

The purpose of this work is to conduct a scientific analysis and to study of the landscape complexity (relief, soil, vegetation, etc.) of the mud volcanoes and their surrounding areas included in the Mud Volcanoes group State Nature Reserve.

4. Discussion of results

The area of 12322.84 ha covered by 43 mud volcanoes located in the territories of Baku city and Absheron district was declared a reserve by the Order of the Cabinet of Ministers of the Republic of Azerbaijan No. 294s dated September 29, 2011. Research was conducted in the area of 488 km^2 covered by 10 mud volcanoes (Shorbulag, Gulbakht-Sarinja, Pilpili Garadag, Garadag Akhtarma, Torpagli Akhtarma, Otman-Bozdag, Shahgaya, Chapilmish, Kirdag, Buransiz-Chulga) and their surrounding areas included in the group of mud volcanoes group State Nature Reserve.

Figure 1. Location of the research area

Table 1. Area of mud volcanoes located in the research area

	Name of mud volcanoes	**Area covered by mud volcanoes (hectares)**
	Shorbulag	584.62
	Gulbakht-Sarinja	180
	Pilpili Garadag	12
	Garadag Akhtarma	107.07
	Torpagli Akhtarma	224.73
	Otman-Bozdag	1061.54
	Shahgaya	99.91
	Chapilmish	107.13
	Kirdag	271.97
0	Buransiz-Chulga	24.68

The research area, especially its northwestern part, has a complex geomorphological structure. We can say that more than half of the area is mainly 100-250 m (Gulbakht-Sarinja, Garadag Akhtarma, Shahgaya, Chapilmis, Buransiz-Chulga), 0 -100 m (Shorbulag, Pilpili Garadag, Torpragli Akhtarma) in some places 250-350 m (Otman-Bozdag, Kirdag) and -21-0 m and 350-436 m absolute height consists of plains and lowlands, based on space images, analyzes carried out in electronic databases, materials obtained from literature materials and observations made in nature.

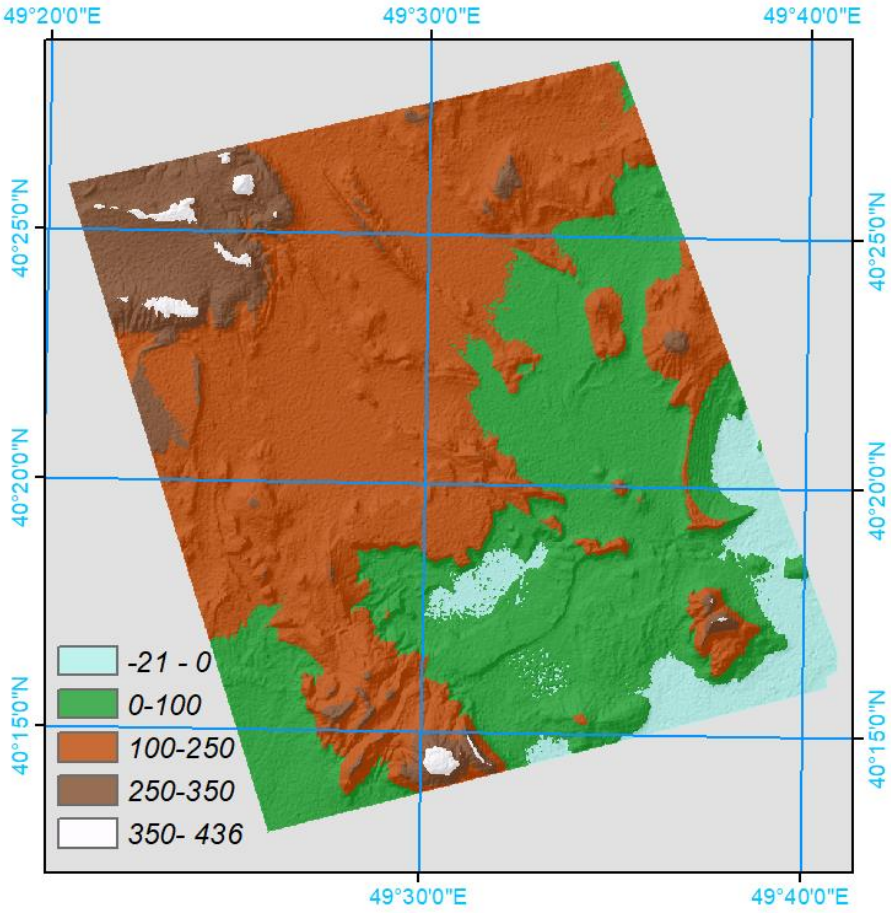

Figure 2. Relief description of the research area

The altitude varies from approximately - 21 m to 436 m (near Otman-Bozdag, Kirdag mud volcano) on the coast of the Caspian Sea. Areas located below sea level account for 11% of the research area, areas with an altitude of 0 to 100 m account for 34%, 100 to 250 m for 41%, 250 to 350 m for 13 %, and the areas located above 350 m make up 1%.

There are mainly abrasion-accumulative and abrasion-deflation plains relief form in the area. If we look at the altitude zones, the area can be divided into a plain-lowland vertical zone, and in some parts of the north and northwest, a low mountainous zone. [1, 3]

The majority of the research area is made up of low inclination areas according to the results of the analysis of tendency on the territory. Thus, 65.8% of the territory is 00-50, 20.5% is 60-100, 7.4% is 110-150, 4.8% is 160-250, 1.5% is 260-530; these are sharply sloped areas.

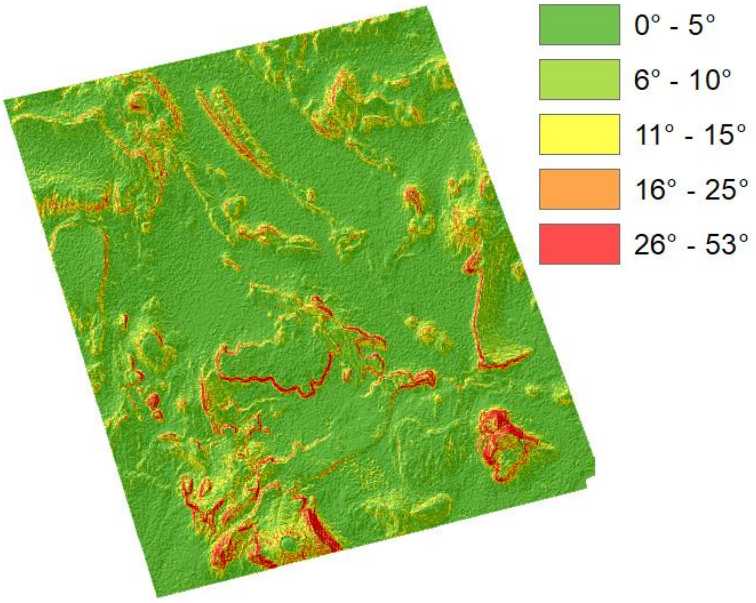

Figure 3. Slope description of the research area

If we look at the climate of the area, the semi-desert and dry-desert climate with mild winters and hot summers is characteristic. Due to the topography, the quality of the soil cover, and the areas covered by vegetation are a minority. Desert and semi-desert plants and coastal sandy plants (psammophyte and liforol vegetation) are sparsely distributed on the territory. Vegetation can be found in and around the Garadag Akhtarma, Otman-Bozdag and Kirdag mud volcanoes. [1]

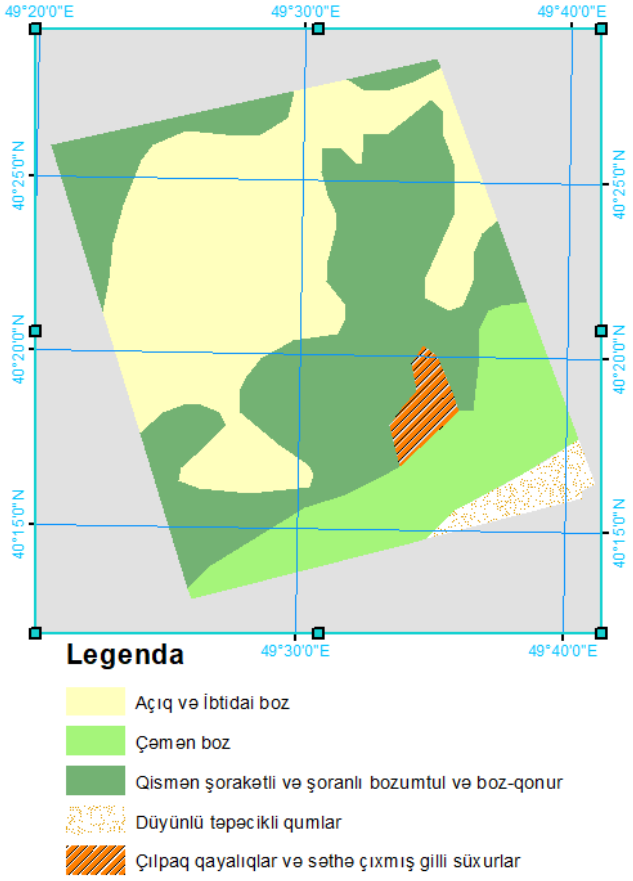

Figure 4. Soil map of the research area

If we look at the soil cover of the area, mainly light and primitive gray, grass gray, partially saline and saline grayish and gray-brown, nodular hilly sands, bare rocks and exposed clayey rocks are spread. [4]

40% of the research area is partly saline and saline grayish and gray-brown soils, 38.5% is light and primitive gray soils, 16.5% is grassy gray soils, 2.8% is nodular hilly sands, 2.2% is bare rocks and surrounded by exposed clayey rocks.

5. Conclusion

It was studied that the relief form of the area consists of abrasion-accumulative and abrasion-deflation plains and covers the area at a height of 0-200 m as a result of the researches. The terrain consists of gentle slopes and plains. Areas with steep slopes are rare. The area is sparsely covered with vegetation, and green areas have been decreasing even more in recent years. Desert and semi-desert plants and seaside sandy plants (psammophyte and liforol vegetation) are common in the area. The soil cover of the area consists of light and primitive gray, grass gray, partially saline and saline gray and gray-brown, nodular hilly sands, bare rocks and outcrops of clayey rocks.

Reference

[1]Geology of Azerbaijan, volume II. Baku, Elm, 2015. 372 p.

[2]Geography of the Republic of Azerbaijan. volume I. Physical geography. Baku, 2014. 530 p.

[3]Rahmanov. R.R. Mud volcanoes in Azerbaijan. Baku, 1960. 42 p.

[4]Republic of Azerbaijan: ecological atlas. Baku, 2009. 156 p.

[5] https://opentopography.org/