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Origin of wind deposits Sistan plain using GIS

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Abstract: Plain plains of the interior plateau, which is an average of 475 to 500 meters above sea level. The alluvial plain of the Helmand River Delta and the current old and floods around it covered. The land of the plain and smooth the sides of the eastern border of the post. Highlights of this plain, there is a plain wetlands. This lagoon, due to geographic location, and the almost constant presence of fresh water, the eastern parts of the plateau is the most important wetlands. Plain square in 8117, has a dry climate is unfavorable and storms move sand dunes of factors is threatening it. To determine the origin of the sediments in the plain, evaluation and comparison of aerial photographs and satellite images with different time periods, morphology and location of the winds in the area include the study of geomorphology, sediment and mineral samples, is required. The origin of the sediments in the plain on the results, in which the erosive winds north to northwest direction at an angle of 330 to 360 degrees (120-day winds of Sistan) and the faces harvest and farm lands abandoned poor, sandy marsh lands and fields and puffy salty lake bed plain and northern regions (Afghanistan), respectively. In order to identify and classify units of satellite Landsat ETM + satellite images and Google (Google earth) and the results of studies in rats were plain and navigation.

Key words: Wind sediments; Lake plain; The origin of sediments; Plain

1. Introduction

The origin of the issue, determine the critical wind erosion and Tasyranha focus on the region. Field studies, suggests that the origin of the sediments of the region, with the promise of sediments and lake sediments, litter dry Hamvnhay current and delta deposits of Sistan River with tens of meters in thickness, the area covered. The lack of precipitation in the region, the ecological diversity is reduced and the low density of vegetation, on which it is located. Poverty vegetation, soil erosion caused by wind easily and move soil. There are the wind, the three areas of erosion, transport and deposition. Prevent sediment movement in the fundamental conception and construction work should be concentrated in the region. Rule of wind erosion, accumulation and movement of sand particles into the villages, farmlands, irrigation canals, roads, etc. enters the heavy damages should always check the authorities and those involved in the region.

Sistan immunogenicity of storm centers in the world, where the average annual dust storms are more than 70 days (Washington et al., 2003). An important part of understanding the dynamics of sand, identify their origin (Mush, 2000). (Pease et al., 1999) and (Giresse et al., 2008) also studies the origin of sediments and sedimentary processes on the western border of Algeria recent and conducted in late Holocene and effect of wind on the quartz grains by (Mazzullo, 1992) was studied. Plain, alluvial and fluvial sediments because of the fine, have a lot of erosion, which is due to winds of 120 days and dry area, the particles are easily displaced and cause the dunes there are many different forms. Plain soils, most of the deposits are associated flood plain has moved far away from where they were deposited, the sediment logical point of deltaic sediments, lake and river can be divided. Deltaic sediments, in many parts of the plain, fine to medium texture and are made of clay. River sediments, as most soils formed around the basin have been formed with medium texture.

2. Geographic location of the study area

Plain in the northern province of Sistan and Baluchestan, Iran East longitude 61 degrees 31 minutes east and latitude 30 degrees 55 minutes north the climate is hot and dry. Highlights of this plain, there is a plain wetlands. This lagoon, due to geographic location, and the almost constant presence of fresh water, the eastern parts of the plateau is the most important wetlands. The lagoon has three regions in the west and southwest Helmand plain, plain, plain Hamoon Pouzak in the northwest and northeast of Sistan is (Fig. 1).

3. Geological area

East region alluvial plains and flood plain land around the lake is formed post. Sistan region morphology has a relatively simple structure, including the highlands and valleys in the West that

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the West is drawn. In the form of thousands of valley in the hills of East conglomerate seen the vast alluvial plain that leads to our land border posts. Almost all parts of a class Sistan soft sediment mixed with sand to be seen. Clayey and sandy sediments of sand in there that are below the soil surface is uneven and mixed. Heavy and hard soil around the lake, and the lake farther we get from the soil becomes hard and heavy. Filiaşi deposits are devoted to major geological formation of Sistan (Fig. 2).

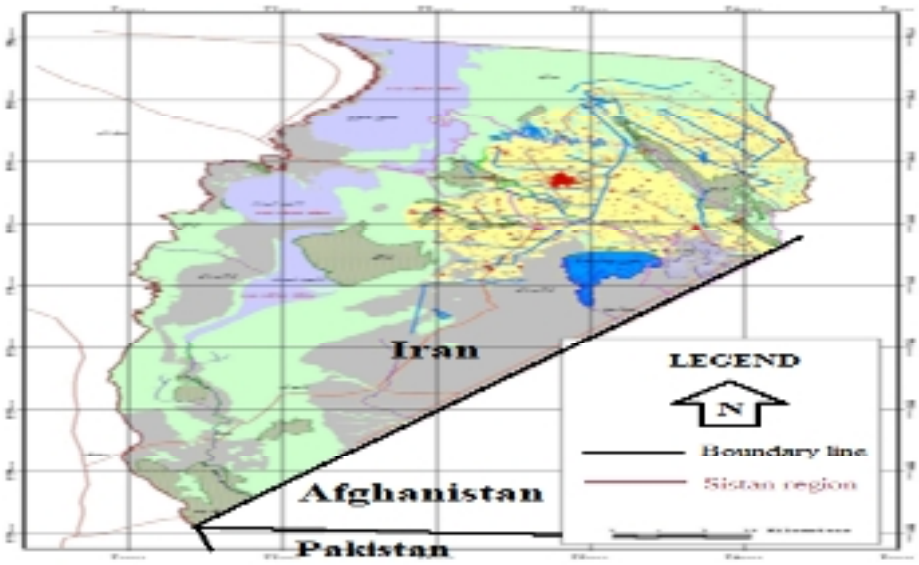

Fig. 1: Location of the Sistan plain and Hamoon wetlands

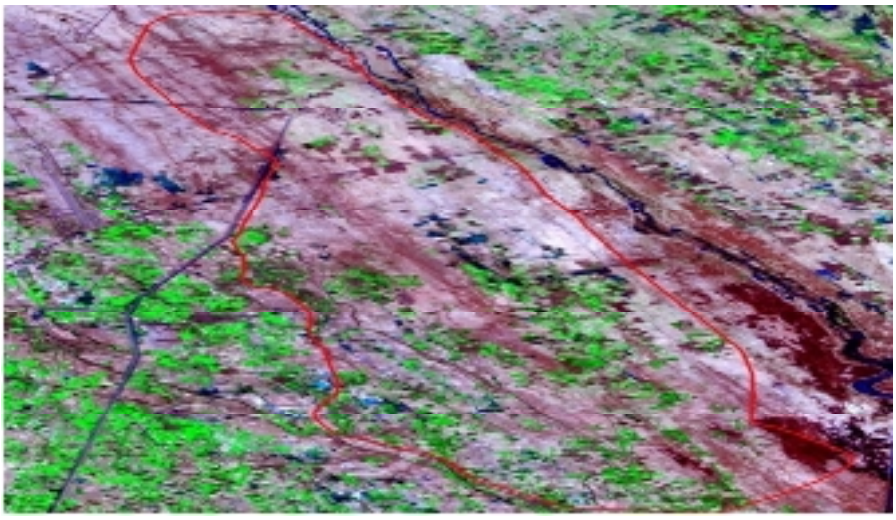

Fig. 2: Landsat ETM + satellite image of the study area (741 color combinations)

4. Regional climate

4.1. Rainfall

The main precipitation in winter and rainfall occurs in the summer is zero. Seasonal distribution of precipitation in the region, suggests that 75% of the annual rainfall in the months of December, January, February and March are the other months, the amount of rainfall in the region is minimal. The rainfall regime in this area, as in most parts of the country, the Mediterranean diet and the major rainfall occurs in the cold season, and in summer, the lack of precipitation in the region. Fig.s 3 and 4, and the percentage distribution of monthly precipitation in the period indicated.

4.2. Wind

Several factors such as the characteristics of the particles, moisture, vegetation, surface roughness and the presence of salts in the soil, moving sands in Sistan influence, one of the most important trade winds in the dry season is 120 days. Basically, the wind in the area, arid the destruction; and every year brings irreparable damage. Wind in this region, which is known to be 120 days Sistan, in summer, the undisputed dominance of the plain, with the

speed of 148 kilometers per hour, it sometimes seems.

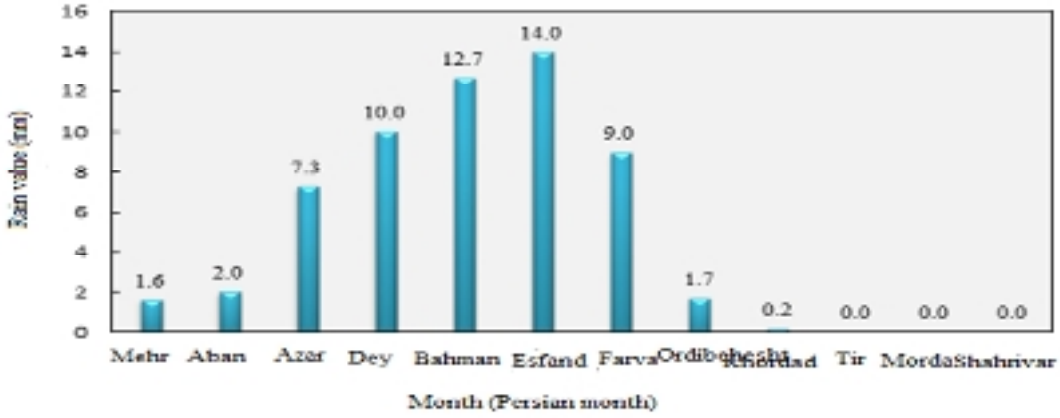

Fig. 3: Monthly changes in precipitation in the region, according to information Zabol station

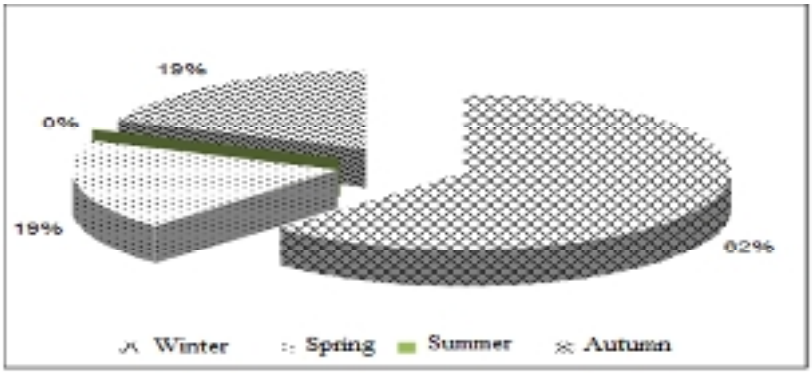

Fig. 4: Percentage distribution of seasonal rainfall in the area, according to information Zabol station

In recent years, due to drought, water withdrawal Helmand River, monsoon winds in Sistan and 120 days, harvested dry lake bed sediments started as a result of the occurrence of sand storms, the earth and the sky area (Fig. 5) and The sequestration of the rivers, agricultural lands, 9421 house etc., so that the area of hills and plain sand, Drgstrh research before the drought, 9421 acres, but the recent drought until 1385 about 14,353 hectares each year Brhjm increased, the extent of the risks can be added. Wind due to the formation of an antioxidant may also be red.

5. Materials and methods

In the study area, the transportation of harvested area was sampled possible. Northern corner of the province is located. Vast territory of Iran and Afghanistan on the covers. Khash rivers in the North East, Farah to the north and west of seasonal reed - mostly in southern Khorasan - our decisions are in the water. (Gleick: 1993) provides the maximum amount (rate) of the Helmand River flood, 1700 to 2000 cubic meters per second, respectively. The extent of the drought reaches zero and therefore the location of the deposition of sediments. (Figs. 6 and 7 show the wind direction sequestration Helmand River). In order to determine more precisely, the neighboring district of Nimroz province, Afghanistan and Pakistan Mirjaveh studied.

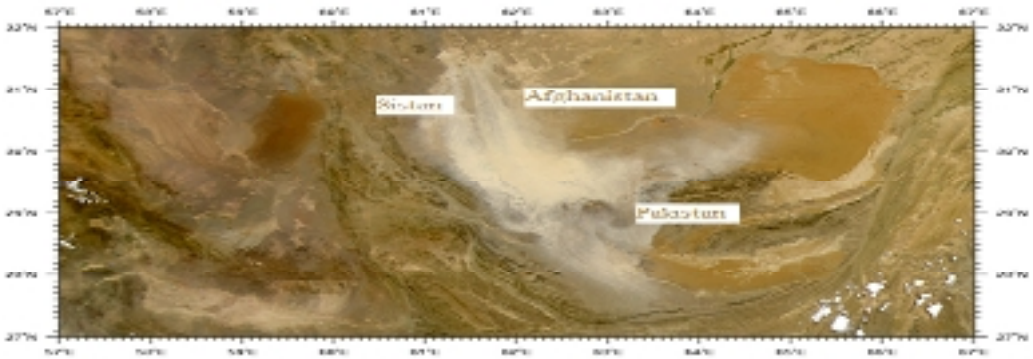

Fig. 5: Satellite image of the dust region

Our reality through the desert in Iran, the value is multiplied by a certain role, particularly Akvssytm is formed. Sistan and especially our current zone Chalh suggest a tectonic basin of faults and fault Hryrvd on

the West Lawn of the East. Plain and eastern parts of Afghanistan, the Helmand River Delta, the last geological period, the accumulation of sediments and alluvium derived from running waters, particularly in Helmand and the present form has been filled.

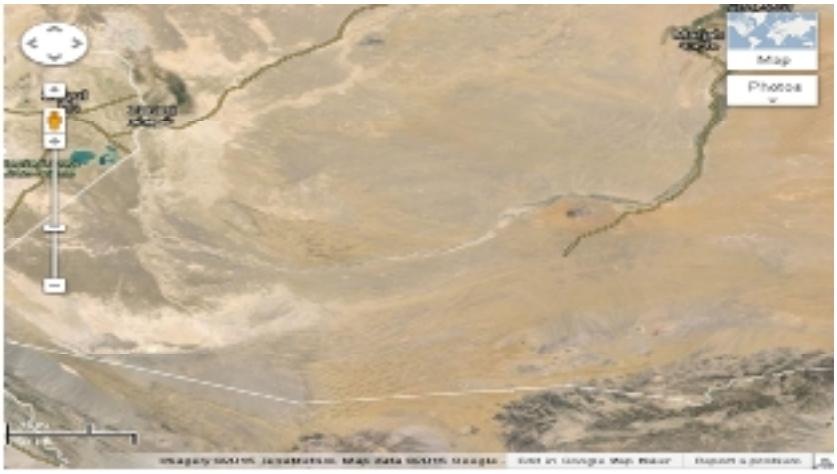

Fig. 6: The Helmand River and sequestration wind

Fig. 7: The Helmand River and sequestration wind

Much of our infrastructure in the form of fine sediments and suspended solids space mollase plain scattered by the winds of 120 days. Senjedeh MODIS image of the spatial distribution of these materials and their Humvee during a storm Mnsha'gyry dust settles from the shows (Fig. 8). Land-cover change in them.

Fig. 8: The bed dry and dusty plain in Antshargrd (image sensor MODIS)

Sampling and analysis of physical and chemical residues.

To determine the origin of the sediments from different parts of the Plains, a total of 8 samples were taken and then grading operations, mineralogy and statistical indices calculate the relative position of the harvest was estimated. The results of the aggregation are as follows:

These samples are part of the North, Northeast and Southwest has taken the following characteristics:

Examples 1 to 8

A-1. The sample has a specific weight of 83.2 grams per cubic centimeter, and the mean values of clay, silt and sand, respectively 15, 73 and 12 percent respectively. Average particle diameter (MD) 006/0 mm and the sample contain a small amount of lime and organic material.

A-2. Of this sample has a specific gravity of 2.47 grams per cubic centimeter, and the mean values of clay, silt and sand, respectively 41, 55 and 4 percent respectively. Average particle diameter (MD) 006/0 mm and sample contain 19 mg of calcium and 2.5 mg organic material.

A-3. In this example has a specific gravity of 2.67 grams per cubic centimeter, and the mean values of clay, silt and sand at 47, 51 and 2 percent respectively. Average particle diameter (MD) 0025/0 mm and 2.53 mg samples contain 17 mg of calcium and organic material.

A-4. The sample has a specific gravity of 2.36 grams per cubic centimeter, and the mean values of clay, silt and sand, respectively, 16 and 32 and 52 percent respectively. Average grain diameter MD 06/0 mm and sample contain 5.16 mg and 1.38 mg of calcium organic material.

A-5. The sample has a specific gravity of 2.43 grams per cubic centimeter, and the mean values of clay, silt and sand, respectively 13, 32 and 55 percent respectively. MD 06/0 mm diameter grains contain 5.16 mg samples of limestone and 38/1 mg organic material.

A-6. This example has a specific gravity of 2.07 grams per cubic centimeter, and the mean values of clay, silt and sand, respectively, 11 and 40 and 49 percent respectively. Average grain diameter MD 06/0 mm and sample contain 5.16 mg and 1.38 mg of calcium organic material.

A-7. The sample has a specific gravity of 2.71 grams per cubic centimeter, and the mean values of clay, silt and sand, respectively 63, 30 and 7 percent respectively. Average grain diameter MD 06/0 mm and sample contain 5.16 mg and 1.38 mg of calcium organic material.

A-8. The sample has a specific gravity of 2.34 grams per cubic centimeter, and the mean values of clay, silt and sand, respectively, 17 and 32 and 51 percent respectively. Average grain diameter MD 06/0 mm and sample contain 5.16 mg and 1.38 mg of calcium organic material.

Table 1: Characteristics of the sample

Sand	Silt	Clay	Specific Gravity	Sample No.
12	73	15	2/83	N-1
4	55	41	2/47	N-2
2	51	47	2/67	N-3
52	32	16	2/36	N-4
55	32	13	2/43	N-5
49	40	11	2/07	N-6
7	30	63	2/71	N-7
51	32	17	2/34	N-8

6. Conclusion

Data analysis showed that the 120-day winds of Sistan from late May to late September flows play an important role in the movement of sand dunes area, in other words we can say that a direct relationship between wind speed and the amount of advance sand dunes in the region. Although in recent years due to drought, wind causes damage to the area, but could potentially be considered as a great source of new energy extraction. It is a place of dunes harvest.

Based on field studies, 3 types of precipitation in the region is extensive. Sediment (in the South East of Sistan) average deposits (between river and lake sediments) and finer grained lake sediments, that the farther we are from lake sediments become finer. Sand deposits due to lack of precipitation, dry climate, poor vegetation, fine-grained soil activity and high winds are moving quickly (Compilation, 1387).Day is entered Afghanistan and Pakistan.

- Advancing sand dunes resulting in the destruction of vegetation, lack of rainfall, wind speed, there are several hills to prevent the advance of the main action should be taken, providing fodder for livestock, the efficient use of water, sand stabilization mental trees and salt tolerant.

- With wind erosion control projects in the region such as afforestation, land reclamation of saline or planted, build barriers around fields, and protect our lakes is proposed in this work. - The wind causes sand storms, droughts and irregular agricultural operations and development projects in the area of sand dunes and as a source of sand and sediment water wells are part of Helmand, dry bed of the plain, plains in north Afghanistan agricultural lands, abandoned lands and rangelands are degraded.

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