

Geotop of Lut Playa: Quaternary Geomorphologic Evidence and Civilization

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Abstract: The cultural and geomorphological heritages in Playas as a key address to find out past fluctuations called geotop. Iran is strategically located on an important trade route (Silk Road) between four cradles of civilization namely, Babylon, Mesopotamia, Indus and Yangtze (Chinese). Iran is grafting point of four human civilizations which creates Persian civilization about 4,000 years ago. The Lut Desert and Dasht-e Kavir located the central and eastern Iran have been focal points for human settlements since 7,000 years ago. The geoarcheological findings on the Siyalk hills of Kashan located in the Dasht-e Kavir and Jiroft region located in the Lut desert are confirmations for human settlement since more than 7,000 years ago. Shorehzar that is a Persian equivalent word for Arabic word of Sabkha is considered as a Playa geomorphic type which involves precious evidences of quaternary fluctuations. In this article, geomorphological and paleoenvironmental investigations are integrated to provide a framework of environmental change for the late Pleistocene and early-mid Holocene periods in the main deserts of Iran, Lut. In this article based on main geotops of Lut, the quaternary evolutions have been discussed. The investigations are showing that Playas were bed of civilization in Iran Deserts.

Key words: Geotops, playa, sabkha, shorehzar, quaternary, Lut.

1. Introduction

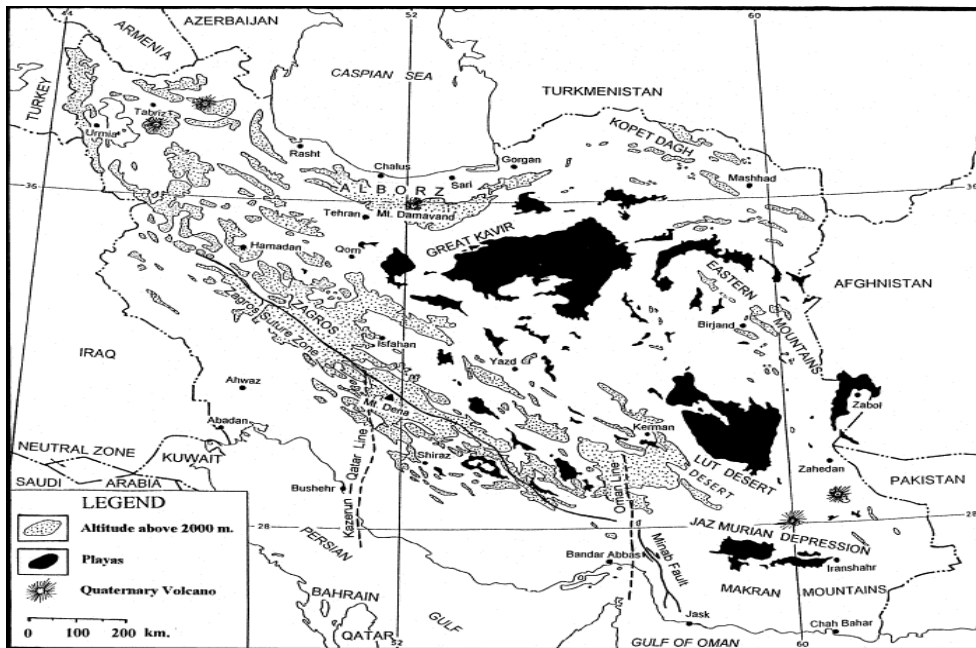
Playas are important geomorphic features of the Iran's arid regions and are considered to be very sensitive to hydrologic and climatic changes. Those classified as a geomorphologic unit of Iran desert areas. Playas are diverse in size from very small depressions of a few tens of m² to massive tectonic basins, which may extend up to 10,000 km². According to the given the range of origins and scales, displays wide range of variability in morphology, hydrology and sedimentology. Playas are a fundamentally different environment from dry desiccated deserts, and identification of playas has significant implications for the planet's hydro-climatic

history.

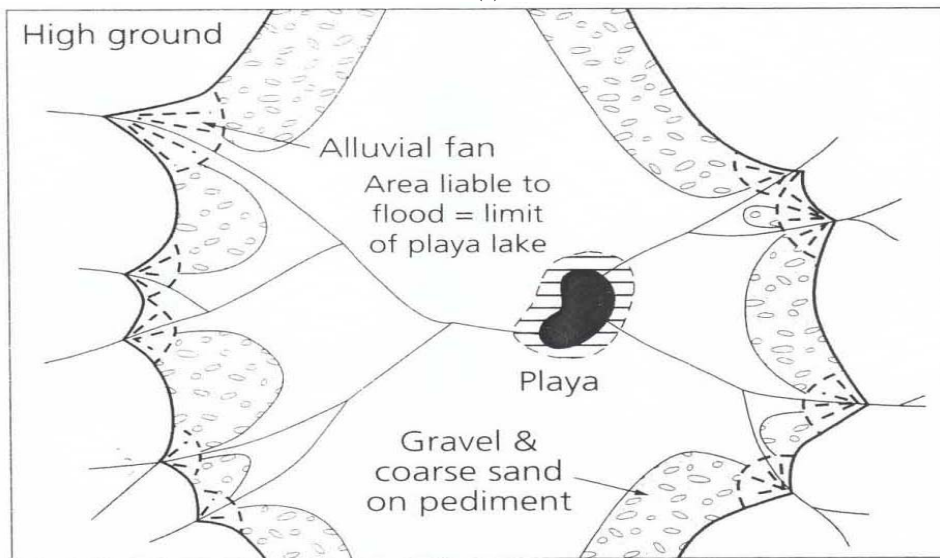
A playa in desert and arid regions of Iran can be determined as flat area at or near the lowest point in the desert basin and many playas flood from time to time (Fig. 1b). The main geomorphologic facies and types of Iran Playas are Kavir, Sabkha, alluvial fans, salty lake and clay pans. While the landscape and drainage in playa catchments provide a qualitative assessment of climatic and hydrological regime in the past, playa sediments preserve a wealth of palaeo-environmental information. Fig. 1a shows a schematic image of Iran Playas location of Iran desert areas. According to Krinsley [7], Iran includes more than 60 playas. In this paper, the definition of playa by Rosen [11] as an intercontinental basin where the water budget of the playa lake is negative involving precipitation, surface and ground waters flows and evapotranspiration has been adopted.

During the late quaternary, the climate of Iran playas specially the playas located in the central desert

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(a)



(b)

Fig. 1 (a) Position of Playas of Iran located in two big deserts: Lut Desert and Dasht-e Kavir (Playas are distinguishable by dark areas [7]); (b) a schematic image of Iran Playas position which can be determined as flat area at or near the lowest point in the desert basin and many playas flood from time to time [11].

of Iran have fluctuated between periods of higher rainfall and fluvial activity, dominated by the influence of the drier and arid conditions under the wind and water erosion processes. These fluctuations have been led to create a coarse face of deserts with landforms from wind and water processes. This has left a rich legacy of landforms from which temporal

and spatial patterns of environmental change are reconstructed. The landforms and desert geomorphologic features and landforms have been developed during quaternary changes. The playas are remained coasts of quaternary lakes in the desert areas which have received enormous attention due to their significance as indicators of climate change and

palaeo-hydrological reconstruction.

Iran deserts considering the central Iran have been a focal point for human settlement since 7,000 years ago. The geoarcheological findings on the Siyalk hills of Kashan located in the Dasht-e Kavir and Jiroft region located in the Lut desert are confirmations for this claim.

The Geotopes are the meeting places of elements recording the geological history of each region. Those are the irrefutable witnesses of an everlasting evolution of life on earth, such as volcanoes, caves, gorges, fossilized areas, large geological rifts, ancient mines, geological formation or landscapes chiseled by natural forces throughout the geological ages.

The geomorphologic types of playa such as Kavir, salt lake and morphologic facies, have been caused the playa as a unique entity for geoarchaeology studies in Iran. In addition, all of geomorphologic facies of playa and desert are clues to understating the evolutions of region, a geotop. Kavir is a Persian word considered as a type of playa unit in geomorphology which involves several geomorphic facies such as Lake of Kavir, Dagh (clay plain) and Kavir Fan. Sabkhas are supratidal, forming along arid coastlines and are characterized by evaporate-carbonate deposits with some silici-clastics. Sabkha in Persian called Namakzar or Shorehzar, which means salty area or land covers with salt sheets with high vulnerability to wind erosion.

Iran in addition to having such regions have different geotop areas, including glacier stone, dyke and sill, erratic rocks, deserts and playas. Iran having more than 60% desert environments has vast expanse areas of playa units. Central Iran with a wide section of the Lut desert can be a good sample of playa landforms which are an evidence for geoarchaeology and also with high potential for geo-tourism activities. This tectonic playa involves one of the biggest ergs in the world. In this research, the main landforms of Lut desert, hottest point in the world, which are geotops of Lut to realize quaternary period have been

investigated.

Also, in this article, the geoarchaeological role of Playas as a cradle of civilization in Iran where developed the cities and old culture of Iran has been considered. The geomorphology and climatology evolutions of famous playas in Iran have been discussed to investigate quaternary fluctuations.

Playas in Iran in fact are holes that have been water in the past and coming as large and small lakes. The dominant periods of colder and wetter, the water level has increased.

Equilibrium level of water in these lakes with a beach after a while has created a special beach-form that called Lake Terraces. Lake terraces are observed on the sidelines of today's deserts and that depending on how many of them exist in the desert, developments and changes in regional water balance is characterized. In the margin of this terrace is usually found handmade ancient hills, that this cultural phenomenon, clear many of the features on beach's civil population.

The range of landforms in Iran desert and playas is diverse, reflecting extremes of climate during the quaternary. Until recently the evolution of the physical landscape of Iran deserts was poorly understood. The geological, geomorphological and palaenvironmental work of Krinsley [7], for first time as integrated research, however, has addressed large gaps in this knowledge. Terrestrial evidence is available from dunes, lacustrine sediments, terraces, alluvial fans, inselberg, sabkha, kavir, clay pans (Dagh), dry and salty lake and playas facies.

The desert of Iran is pivotal for understanding late quaternary climate behavior and ecosystem response in the low-latitude regions. During Holocene, the Iran Playa has undergone a number of important changes in vegetation, fauna, and human occupation and utilization of the landscape largely driven by changes in the regional climate.

In Iran, deserts where saltine environments are generally called "Kavir". Such environments cover a

considerable area in central Iran and are closed drainage basins typically occurring within fault bounded depressions. Playas or continental sabkhas develop in the central parts of these arid to semi-arid closed drainage basins, where the water table is close to the surface and evaporation exceeds input from atmospheric precipitation. This scenario is commonly associated with the precipitation of evaporate minerals and/or saline crusts and soils. Desert sedimentary and geomorphologic systems typically comprise a variety of sub environments including ephemeral fluvial rivers of the distal parts of the alluvial fans, aeolian dunes/inter dunes, sand sheets, salt/mud flats and playa-lakes. These are highly sensitive to internal and externally imposed environmental changes. Respective sub-environments of a desert system interact closely and undergo sedimentary and morphological adjustments in response to environmental modification, such as change in climatic and tectonic regimes.

2. Area Descriptions

Iran's geography consists of a plateau surrounded by mountains and divided into drainage basins. Iran is a high plateau bordered by several mountain ranges including the Alborz Mountains in the north, Kopeh-Dagh Mountains in the northeast, Azerbaijan Plateau in the northwest, Zagros Mountains extending from the northwest to southeast, Makran Mountains in southeast and the dispersed high massifs like the Massif of Kerman in east-central and the Massif of Shir-Kuh in central Iran. Deserts of Iran surrounded in these mountains belts, Alborz in north and Zagros in the west and south which have been hidden many Playas within. These resistant mountain shields avoid from moisture entrance to central parts which has been led main desert regions forming of Iran, Lut and Dasht-e Kavir.

Lut Desert with the extent of 100,000 km² is the most arid area in the Iranian central plateau where is considered to be one of the direst places on earth Lut

Desert is one of the largest of desert basins, 480 km large and 320 km wide, a large salt desert in southeastern Iran and is the world's 25th largest desert (Fig. 2). The lowest elevation in Iran (250 m asl) is located in the center of this desert. Soils of the area are gypsiferous and/or saline, but no scientific data on the soils, especially origin of salts, are available. Krinsley [7] conducted on the playas of Iran, including Lut playa is still the most valid scientific report about the area.

The Lut Desert of southern Iran contains classic mega-Yardang [7] developed in Pleistocene basin fill deposits (silty clays, gypsiferous sands), with an estimated thickness of 135-200 m. The area involved is ca. 150 km long and 50 km wide. The ridges (kaluts) run from the northwest to southeast and attain heights of 60-80 m. They extend for tens of kilometers. At their downwind end, there is a large dune field (Fig. 3).

Measurements of MODIS (moderate resolution imaging spectra radiometer) sensor from 2003-2005 testify that the hottest land surface on earth is located in Lut Desert where land surface temperature reaches about 71 °C. In other study of seven years (2003-2010) of global land surface temperatures as measured by satellites, the Lut Desert is ranked as hottest point in five of the years (2004, 2005, 2006, 2007 and 2009).

Fig. 2 shows a portion of the Lut Desert in Iran by ETM⁺, Landsat 7. The image is a pseudo color and was acquired on July 6, 1999 by ETM⁺.

3. Methods and Material Studied

The studied regions were identified from air photographs and the Google Earth satellite imagery onto published topographic maps 1:50,000 and 1:25,000.

To determine playas and geomorphological, the ETM⁺ and TM Landsat imagery and field checking for detail and accuracy in some regions were applied. The findings and results of research of Krinsley [7] under studying Iran Playas were used to investigate changes fluctuations in Lut Desert and reconstruct conditions in the playas.

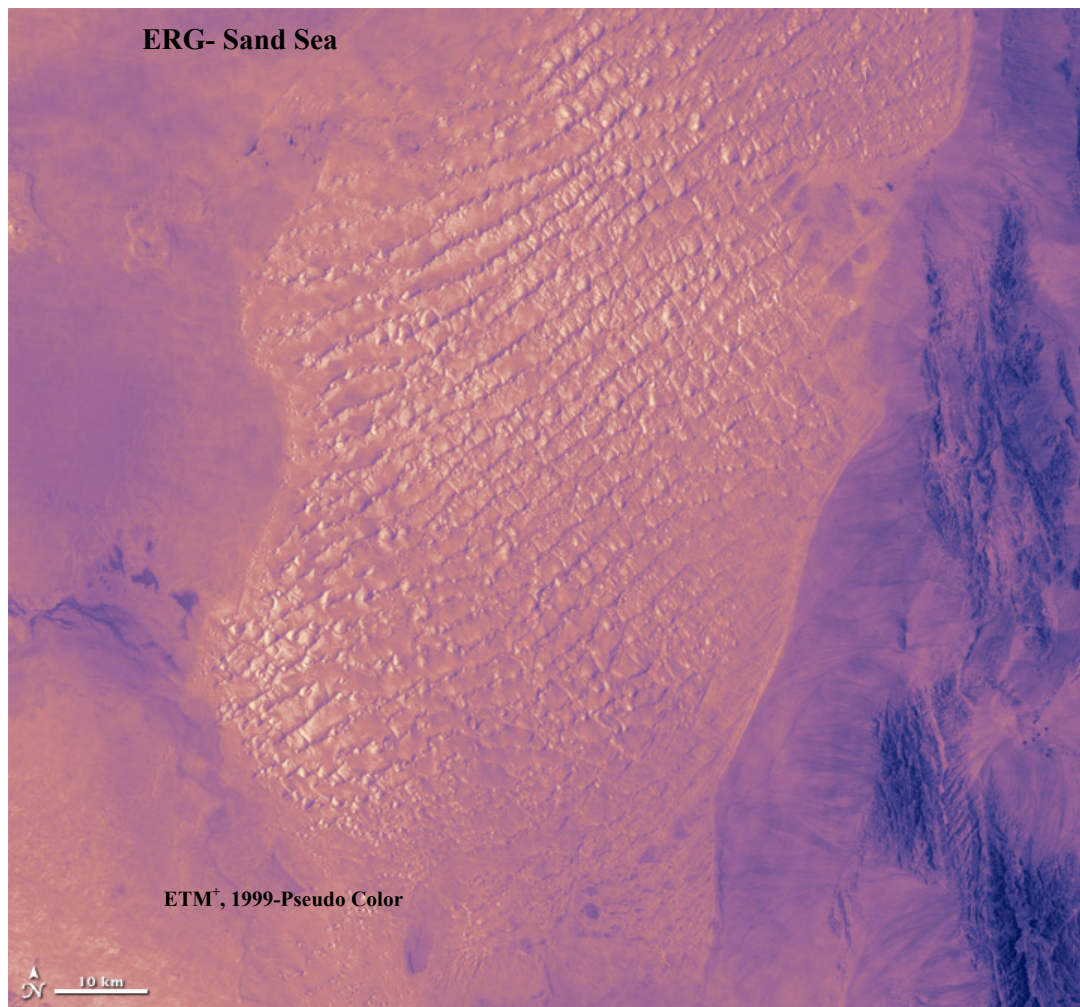


Fig. 2 The Erg of Lut Desert, the hottest point in the world with average temperature 70 °C for August month.

Analysis of landform evolutions provided details for vegetation change and dating for past periods. Based on the role of geotops of investigated playas in Lut deserts of Iran, the correlation between playas and civilization development has been assessed.

4. Results and Analyses

Geomorphological, palaeoenvironmental and archaeological geotops from Lut playa and deserts is presented below based on the key playa and geotop regions present in the study area.

4.1 Mega-Yardang and Kalut

The eastern part of Lut Desert is a low plateau covered with salt flats. In contrast, the center has been

sculpted by the wind into a series of parallel ridges and furrows, extending over 150 km and reaching 75 m in height. These ridges in Turkmen language called Yardang. This area is also riddled with ravines and sinkholes. The southeast is a vast expanse of sand, big erg, with dune more than 400 m high, among the tallest in the world. These big dunes that are consequence of water and wind operations in Persian called Kalut (Fig. 3).

Mega-yardangs probably tend to occur in trade wind areas with unidirectional or narrow bimodal wind directions, as is made evident by their association in some cases with barchans, a dune form that only occurs where winds are relatively constant in direction.

It is only with such constant wind directions that forms can develop that are parallel to the prevailing wind. They sometimes occur upwind of sand seas, in areas where sand transport occurs (e.g., the Lut). There is some evidence in the case of the Lut that winds there may be relatively variable in direction, but there is very little reliable data on wind characteristics in that area. However, Liu et al. [10] have suggested that there is severe topographic channeling of winds and the formation of a low-level jet in the area, and this appears to coincide in alignment with that of the yardangs.

There is very little evidence as to the age and rate of formation of mega-yardangs developed in hard rocks, although there is some evidence that smaller yardangs can be excavated to depths of some metres in lacustrine and swamp deposits of mid-Holocene age [3, 9, 13]. Mega-yardangs may be old and persistent features that have been shaped over millions of years, not least by high velocity glacial age trade winds [6]. The Mega-yardangs of Lut, for example, are yardangs that originated in pre-Pleistocene times, possibly in the Miocene or earlier, and in these regions there has been a protracted time available for yardang formation.

4.2 *Nebka and Rebdo (Vegetation Dune)*

Nebka is a vegetation mounds, commonly found on sand plains, are large clumps or clusters of small trees and shrubs such as *Acacia* (*tarfa*) and *Tamarix* (*tamarisk*) with accumulations of sand at their bases, trapped by the vegetation. These plants catch the grains of sand with their branched boughs. If the plants grow the nebka also rises up. In this respect they are similar to very large, solitary coppice dunes, or to parabolic dunes. They differ, however, in size and distribution. These accumulations are caused by the presence of a rock, plant or other obstacle in the path of sand particles in movement. In the Lut Desert, there are two types of nebka: sand arrow nebkas, which are small ovoid dunes (50 cm in height, 150 cm in length and 40 cm in breadth) lying in the direction

of the prevailing wind; and bushy nebkas, similar to sand arrow nebkas, but capable of reaching a height of 2 m and a length of 3 m to 4 m (Fig. 4).

The research approved that increase in height of the canopy is accompanied with an increase of nebkas height and the consequently increase of nebkas areas.

According to the formation of nebkas of Lut, seems the age of nebka's Lut back to the mid Pleistocene through to the late Holocene.

4.3 *Erg (Sand Dunes Sea): Linear and Transverse Dunes*

The desert landscape of Lut is dominated by mega linear, Barkhan and transverse sand dunes of Tertiary and Holocene ages with reactivation during the late Holocene (Fig. 5). Mega-dunes of the Lut Desert are the largest and tallest dune field in the world, reaching over 475 m in height and covering an area approximately $50 \times 150 \text{ km}^2$. The dunes appear to be the resting place for all the sand and silt excavated by winds that carved the adjacent Lut Desert Yardang field.

The morphology, provenance and origin of the dunes of Lut are complex and controversial. Using ASTER (Advanced Spaceborne Thermal Emission and Reflection Radiometer) imagery, it has been determined that they are longitudinal dunes shaped under a former wind regime and now being reshaped by transverse wind. The geological layer which has been shown in Fig. 6 indicates the wetter conditions of earlier holocene. Exiting Barkhan dunes shape is reason for sand abundance.

The spacing and relief of dunes are contributing factors to the shapes of dunes. Low relief causes less turbulence in the air stream that high relief, and therefore less change in dune form.

The equilibrium of a sand dune is a delicate chemical state of equilibrium; the slightest change in the conditions involves changes in the state of equilibrium.

Hence, considering the biological and geological

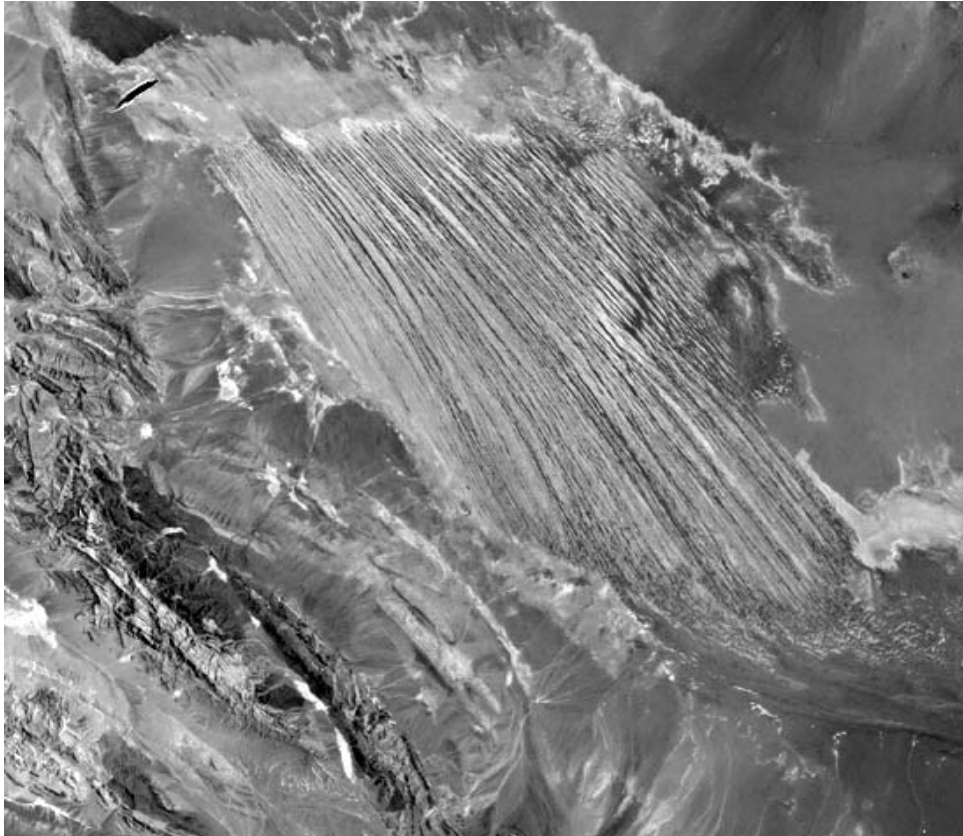


Fig. 3 Landsat image of the Lut Desert, Iran, at ca. 30°09'35" N and 57°41'03" E showing 80 m high kalut features running northwest to southeast. They have developed in basin fill deposits that are probably of Pleistocene age (scale bar = 20 km).

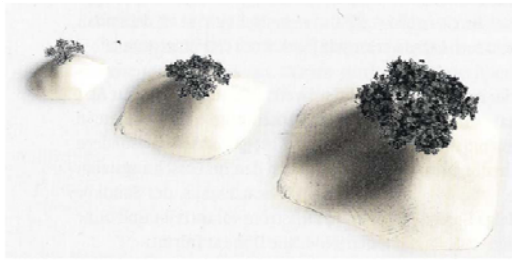


Fig. 4 The Nebka feature of Lut Desert with age of about Holocene Period, a geotop of Lut.



Fig. 5 Mobile sand dunes carry eroded silt from the yardang field of the Dasht-e Lut to the mega-dune field in the SE of the Lut basin.

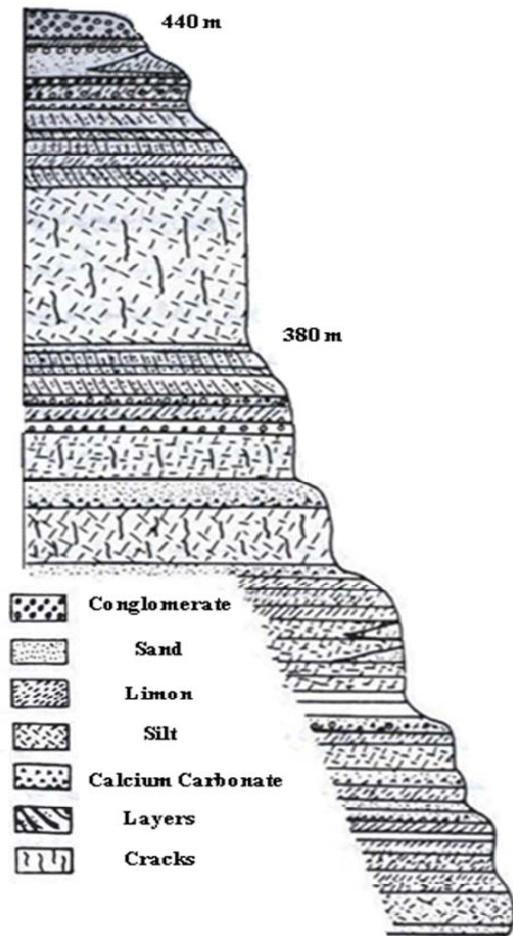


Fig. 6 The geological layers of central Lut shows wetter conditions of earlier Holocene.

evidence of Lut, we can talk about the increasing drought and desertification in Lut Desert, in the present age and wetter conditions in the past, and Pleistocene toward early and middle holocene period and this stage of the situation in Lut can be matched with the stages of imbalanced living conditions, i.e., the Rhexistacie in geology. These conditions are in conflict with Biostasy or balanced living conditions in geology.

In the Rhexistacie stage, lessening and loss of biodiversity are accompanied by limited ability to create a critical mass and loss of plant cover effects by wind and water erosions rising temperatures, increased solar radiation, high evaporation and increased salinity in groundwater and soil, and the evolution of the soil and simultaneously increase in

the mechanical degradation. This may be due to the construction activities or climate change to increase stiffness. At this time, in a normal process, and under the impact of these factors such as solar radiation, desertification feature appears in central Iran and factors such as overgrazing or deforestation (Human-agent or Anthropology) are in a secondary concern; the emphasis put by officials on these subsidiary phenomena as the main cause of desertification in central Iran could not be true scientifically.

The Biostasié stage is accompanied by increased biological activity and increased ability to create critical mass and fast compensation of organic materials and natural forests, relative tranquility of earth with increasing humidity and low evaporation and reducing soil and water salinity as well as decomposition of minerals and the formation of soils and finally, a rise in sea chemical sediments. So, the current situation in the central Iran should be known at a stage of Rhegsistasié in which deserts can be further developed.

Obviously, any vital activity and desertification should be based on the geological evolution of the region. The environmental and agricultural officials of the region should deeply understand the Rhegsistasié phenomenon so that they do not experience a second failure in dealing with the environment and material and spiritual forces are not wasted and like all the other talents of soil; in addition, desertification should be considered in routine geological feature of this area.

4.4 Lakes

Lakes are the most important and the widest influential landscapes in the context of civil societies. These hollows are filled with water in cold and humid periods and their coasts were later a location for the establishment of societies.

Though inward lakes differ in depth, salinity, vastness and other features, Krinsley's [7] findings

show that their ratio of F^B/P (the ratio of basin's area to playa's area) are in a number of spectrums and this in turn means that they can be classified based on local and continental conditions. Having said that, the coasts of most lakes in Iran are the primary bed of big and small cities and in a way, Iran's civil potential has an undeniable coincidence with their surfaces. The existence of historical hills in the form of bedrock and the margin of these hollows is an evidence for such claim.

In most of these hills there are some evidence of clays and remnants of pottery baking in historical hills of Shahdad, located in the Lut Desert. The existence of these evidences shows that the margins of these lakes and hollows (Playas) are the residential place of special civilizations and the quality of their water is better than warm periods.

Fig. 7 shows the ensign of Shahdad, the oldest flag of the world (3,000 BC). This flag and similar archaeological evidence show the old civilization of Playa and basin lakes in Iran.

Most of lakes that had not been through tectonic or erosion rupture have evidence of lake terraces in their margins and they are regarded as evidences of wet period governance.

The most important cities of Iran are exactly formed in the coasts of these lakes and though in some there is no trace of water various geomorphologic evidence for such claim exist.



Fig. 7 The oldest flag of the world which was an ensign of Shhadad civilization in Lut Desert.

Although in the northern edge of the central hole of Iran, too much of civil society has not been formed due to the drought and some other things, according to reports there is some evidence to confirm that this is a lake. On the west side of the hole, cities like Naeen, Aghda, Ardekan Meybod, Yazd, are all formed in a line near the beach with the deepest part of the lake on the Siahkooch playa and Naeen city is located on higher terrace of Siahkooch and Aghda is on the second terrace and Ardekan is drawn into its inside and bed. Along the coast, there are often independent holes in which cities such as Yazd, Anar, Rafsanjan, Kerman and Mahan are developed. Tabas is just formed on the edge of a bed of a local lake and its steep cuts are visible in the Ferdows-Tabas Road.

Hamoon hole in Sistan and Baluchistan also has this condition. The highest terrace level of this lake is right located at the entrance of ancient Burnt City. This height illustrates how much Hamoon lake has been extensive in the way that three holes of Saberi, Goodarzeh and Poozak have joined together and the current Zabol has been formed right in the bed of this lake. Four terrace levels are well recognized on the edge of this hole.

Many of the other holes that are the bed for current Iranian cities are only holes whose depth of water was not enough to have a special geomorph in their shores. In other words, it might not be possible to track lake terraces in the edges of these holes but the presence of special sediments show that these sediments are in shallow and stagnant coastal. Yazd, Mahan, Sirjan, Anar, Khash, Birjand are among them.

5. The Influence of Holocene and Late Pleistocene Periods in Iran Considering Lut

In cold periods, the decrease in evaporation, despite a steady rainfall, increased overall moisture in central Iran; though the ice caused the formation of anti-cyclones in regions and on icy areas and their move into areas that are located in more southern latitude.

Overall warming of earth that has led to the increase in wind activity (Kashan-Yazd and Kerman) in recent years is significant with drying and filling valleys by wind sands and generally dry weather in central Iran is more observable in inter-glacial periods [8].

The overlapping terraces show the change in the level of base based on construction activity and more digging of river in order to create a proportional equilibrium profile. The previous glacial in marginal highlands of central Iran, which are low or almost nonexistent today, shows the lower limit of permanent snow and glacial cirque in the past (2,000-3,000 m); while the current limit of permanent snow is about 3,500 m in the mountains of northern Iran and about 4,000 m in the center and south.

These issues point to the more rainy days in the past as opposed to the current time. In the rainfall (glacial) stage, the playa surface expanded and the salinity decreased and sediments were more clay-silt in the center and more coarse in the sides. In the inter-glacial period the playa surface was small, like today, the water salinity was more and the deposits were more evaporative and stone. Some researchers considered these changes as the signs of human civilization.

Bobek [8] announced climate change of Iran using aerial photographs and works of sedimentary and morphological evidence.

In general, during the Pleistocene, the weather has been warmer than today; because there was more time between ice ages and even if it has been accompanied by hot and cold brief periods, its vegetation was with less growth but more erosion. Climate changes during the holocene are like the climate changes in Europe. And though estimating the exact age of rainy and drought periods are not possible, considering the general conditions, the following characteristics can be provided:

(1) From 15 to 12 thousand years BC, air dryness along with the current ice age increased based on the terms of Atlantic Europe and Iran's weather

conditions;

(2) From 12 to 9 thousand years BC, less rainy weather, equivalent to the polar conditions of Central Europe, was ruling, which is associated with the mesolithic civilizations of the East Iran. And from 8 to 6 thousand years BC in Iran, wetter conditions of moist oceanic conditions in Europe could be seen;

(3) From 6 to 3 thousand years BC, with the alternation of warm and cold periods, and in some cases the occurrence of floods and rainfall, such as loot flood stage (probably the Noah's Flood), there was raging in Iran. But from three thousand years until 1800 BC, drought and low lake levels have occurred internally;

(4) From 1800 BC until the beginning of the Christ's birth, there is more moisture in central Iran compared to today and from the year 500 AD, there was drought and then again till 1200 AD, adequate moisture has ruled the region. Then from 1200 AD, the Iranian plateau tended to drought until the 16th century, probably with the little ice age, humidity increased again and from the early twentieth-century drought increased. In this regard [4], maintains that in 621 AD, i.e., the beginning of the lunar calendar, there was a lake in Saveh which was drained and Saveh was set in that place. Iran's neighbors, such as Turkey and Iraq had such conditions. In general, air dryness is accompanied by the loss of plant cover and the destruction of villages and abandoning the ways [4].

Also, appropriate weather conditions could be one of the reasons of the campaign of the attacking countries to the region, like the invasion of Alexander (325 BC) to Iran. According to historians, the Tigris was dried and Mashhad civilization and Lut civilization were developed (4000 BC). In the same year, the Persian Gulf advanced into Mesopotamia up to 150 km with Tigris and Euphrates inclining separately (Today, the Tigris and Euphrates are contiguous near the Persian Gulf). Central Persia in 500 BC had better conditions. And the existence of

single trees on steep mountains of Iran signifies favorable weather conditions prevailing at that time.

Before the Christ's birth, due to favorable weather conditions in Shiraz and because of water flow, Perspolis was chosen as the capital of the country. But now the area is completely dry. General conditions of the Iran desert show that this region was better in the past than today. So that Iranians to celebrate, fired the plant gained from the desert [12].

Abandoning most of the villages inside Lut Desert and Sabzevar in recent years, in addition to economic and urban attractions, are the result of dehydration and low levels of ground water and onshore wind and sand. Thus, we can point to Rhegsistasié stage or stages of imbalanced living conditions, in some parts of the Iranian plateau, which started decades ago and continues. This stage which is accompanied by the severe erosion of heights and degradation, sand storm, the flood and the destruction of vegetation and loss of critical mass and increased salinity fields is well known in the Iranian Plateau. It is natural that Biostasié stages were associated with the flourishing of civilization and the development of life with quaternary history which must be accompanied by periods of high rainfall and wet enough to dampen the glacier margins. The main evidences for this process include:

(1) The existence of a wide alluvial valley that shows there is more water in the past;

(2) Deposition of lower salinity and sweeter aquifers indicate wetter conditions;

(3) Huge sand dunes which result in the filling of the alluvial valley with the wind deposition show the increase in dryness and imbalanced living conditions with a decrease in Biostasié in Iran plateau;

(4) In Iran, the snow line altitude reached 2,000-2,800 m in glacial periods, while today this line is at an altitude of 3,000 m to 4,000 m. The glacial were U-shaped opening valleys in Alborz, in Kerman and Talysh Mountains, but today permanent glacial is only observable in Alamkooh.

6. Conclusions

Most Iranian large and small cities are in the coastal margin of quaternary lakes water whose water level is much higher than present. Redirection of the river on the one hand and mountain glacier fluctuations on the other hand are among the main factors affecting the crystallinity and physical form of civil societies. Formation of civil society in quaternary lake margins have made the physical development of the city toward a convergence point which tends to be a star, the principle that in Europe because of the role of glaciers is completely different from what is seen in Iran and it is a point which should not be neglected by physical and urban planners. Since if the development is toward the center of Playa and the previous climatic conditions be repeated with no doubt most of these cities are flooded with water.

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