

Bazangan Lake a potential area for creating a geopark

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Abstract

In according to definition, geoparks are places which have natural and cultural attractions and use to development of tourism, training and researches. The advantages of creation and development of geoparks are protection of natural and cultural heritages, economic expansion with development of tourism industry, public and specialty training in this field and connecting to global network geoparks of UNESCO (united nations educational scientific and culture). with respect to creation and establishment of the first geoparks of Iran in Gheshm Island, offered complex, Bazangan lake that located in 130km to east of Mashhad, as a largest natural lake in north east of our country and as a result of having geotourism attractions can be considered to potential area for establishment of a geopark. The establishment of its in addition to making permanent occupation can be stimulate other region of country and moreover can be used advantageous of connection to global network geoparks of UNESCO.

Key words: Geopark, Geotourism, Bazangan Lake

Introduction

Geoparks are one of the ways of incoming that in recent years have been pursued and invested. Iran vast territory with laying on Alp-Himalaya orogenic belt, is a place of collision of ancient continental plates and this cause to laying different continental fragments besides others and extensive range of rocks, structures and divers geological events discover adjacent of another that on the whole they can attract many geologists, geosciences researchers and environmentalist from inside or abroad in each year (Nadimi 1384). Preparation and presentation of 4×10^9 year of geological history as a new invention is effective way for attention of international society to this region. The geoparks of under preservation of UNESCO is a region with quite definite restriction that must be including of arrangement of geological nature with combination of scientific characteristics, beautiful scene (Aesthetic) and exhibition of geological time. In this paper has been tried to explain the importance of establishment of this regions after introducing of Baznegan Lake and geological position, with indication to some properties.

Introducing of Bazangan Lake

Bazangan Lake (Kol BiBi) is the largest natural national lake with marine water characteristics in northeast of Iran that located at latitude $36^{\circ}19'$ and longitude $60^{\circ}29'$ in 130km to Mashhad-Sarakhs road and Sarakhas county domain in distance of 5km to Bazangan village. Average elevation of lake from sea level is nearly 850m and approximately area of $69 \times 10^4 \text{ m}^2$ (69 hectare). Deepest point of lake is 12m and average depth is 8m (Fig.1,2,3).

Geological position

The study area is located at east part of sedimentation basin and between rigid and resistant heights of Kalat formation and loosely and none consolidated sediments of Pesteligh formation.

Importance of establishment of Bazangan Lake of geopark

-Occurrence of outcrops of Mesozoic and Cenozoic formation

Kalat formation

This formation (Fig.4a) is belonged to Maastrichtian that it has been included of bio-deterial sandy limestone, shard stones, pea color limestone and slightly shale which lay on Neyzar formation isoclinally and it outcrops in south to southwest corner of lake. Moreover is mentionable though this formation nomenclature derived from Kalat Naderi town but major extension of its located on southeast of Bazangan Lake in adjacent of Tang Neyzar and accessing to type section is easily for enthusiast of geoscience.

Neyzar formation

This formation is belonged to Maastrichtian that it has been lithologically included durable green glauconitic sandstone and shale that exposed on southwest part of lake. Type section of this formation situated on southeast of lake in adjacent of Tang Neyzar. It is mentionable that sedimentary structures such as flute cast, flute mark and in especially honeycomb erosions can be seen in this formation.

Pesteligh formation

This formation (Fig.4b) is belonged to Paleocene that it has been lithologically composed of red and brown shale, claystone, sandstone, conglomerate and evaporate rocks that have a weak outcrop in north part of lake. Shale and marl layers of this formation associated with a part of marl layer of Kalat formation spread beneath the lake and cause to impermeability of rock floor. It is mentionable that type section of this formation located at northwest of lake in adjacent of Shorlough village.

Possessing of typical fossils

Existing of some macrofossils as an example a type of bivalve known as Hipporites (Fig.5) and a gastropod entitled Otostoma that their frequency, specially about Hipporites increase in south and southwest of the lake at Kalat formation. It is mentionable that such microfossils from Globotruncana family and also such species of Bryozoa, Rotaliidae present in this formation.

Lake forming mechanism

Bazangan Lake located on southern hillside of a syncline that formed by tectonical activity, but lithological differences between Kalat and Pesteligh formation and creation of flat topography have played basic role. In reality carbonate rocks of kalat formation due to their high resistibility in opposite of erosion has created heights, while marl and shale layers of Kalat and Pesteligh formation due to finer grain and laminar segregation have a lower

durability opposite of erosional processes and have been caused to forming flat topography in this region, that can be considerable.(Adabi M.H , Mohamadzadeh H)

Situating of lake at boundary of two major geological times

One of the most important characteristics of this region is position of above-mentioned lake in boundary of two major geological times (i.e. Mesozoic and Cenozoic). In fact this lake shows Mesozoic and Cenozoic boundary region, that it can be considerable and favorable for geologists and geosciences researchers.

Special and excellent natural scene

Existence of a lake with a green color (related to the presence of phytoplanktons) in adjacent of aforementioned rock exposures and different species of different plants specially everglades of this region (Fig.6,7a)and aquatic birds, colonist and other animals have given special elegance to this region as this region can attract and receipt naturalist and pro-natures. Moreover fishing (7b)or boating are the cases can be important in attraction of tourists, too.

Vicinity to Silk transit road

The lake has located at 6km distance from Silk Road and accessibility is too easy. This is a strength point due to we can introduce this region to domestic and foreign tourists that transit from this road and attract them. Other factors that intensified importance of establishment of this geopark are development of tourism, increase of regional incoming and poverty removing.

Conclusion

Throughout Iran country is rich of natural attractive events that it has a lot of interesting and beautiful regions which can invite several domestic and foreign tourists per years and Bazangan Lake proposed complex don't differ from others so that it can be appropriate site for establishing of geopark because of presence of natural scenes and geotourism attractions. With doing of complementing studies, appropriate investing and resolving of defects and obstacles, it can attract tourists and geologist in national and international levels.

References

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- Adabi M.H., Mohamadzadeh H., Mechanism of formation and hydrological characteristics of Bazangan Lake situated on east of Kopeh Dagh.



Figure 1- Sattelite image of lake

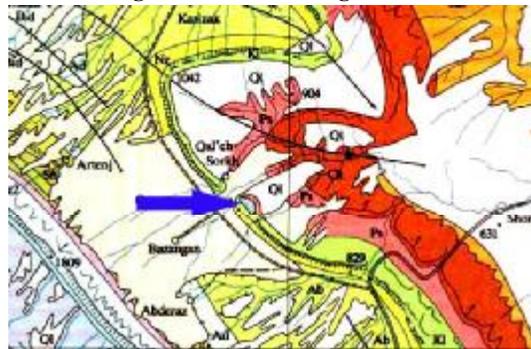


Figure 2- Geological map of region (Lake in the center of map)



Figure 3- General view of Bazangan Lake



Figure 4a- The outcrop of pesteligh formation in in south of the lake



Figure 4b- The outcrop of kalat formation east of the lake



Figure 5- a sample of Hippurites



**Figure 6- Vegetable covering of Kalat formation in
prospection view of Mozduran formation**



Figure 7a- verglades in the margin of the lake



Figure 7b - Fishing in the lake