

# IRAN, the Center of Geotourism Potentials

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## ABSTRACT

Nowadays, geotourism is one of the fields of specialization of tourism, which identifies attractive geological phenomena and their tourism merit. Given its climatic and geological conditions, Iran has multiple geosites of novel geological phenomena such as the biggest salt cave of the world, the largest Kaluts of the world, beautiful mud volcanos and... If, in an area, there are several geosites with historic, cultural works and different living natures (ecosystems), that area is called "geopark". Naturally, these regions are Iran's geotourism potentials. Attribution of "geosite" and "geopark" to each region requires such necessary infrastructures to be provided as efficient management, training of local individuals, tourist attraction based on education of geological-recreational concepts and protection of phenomena. Given numerous talents of Iran in this field, this research, after providing theoretical concepts, introduces and describes the features of those regions which are potentially ready to become geosite or geopark, and provides suggestions for geotourism development and achieving the above goals. Certainly, through providing the necessary infrastructures, a long step will be taken towards presenting invaluable geological heritage of Iran to geotourism enthusiasts in the world. This also will have direct effect on geotourism development and sustainable development.

**KEYWORDS:** Iran, Geotourism, Geosite, Geopark, Sustainable Development.

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## 1. INTRODUCTION

Technology progress in twenty-first century causes more free time for human being and increasing wealth as well as spends more time to leisure. Indeed, this century should be called the era of tourism (Papeli, 2011, p 6). Therefore, in recent years, tourism has become one of the main principals from different aspects especially economic interests while a lot of experts believe that tourism will be the dominated industry in the next years and will have several social and economic effects (Bayati Khatibi, 2010). Geotourism is also a sub-sector of tourism that is considered as a new method in providing tourism attractions (Servati & Ghasemi, 2008) and assigns an important art of tourism studies. Iran has beautiful nature, diverse climates and areas with unique phenomenon of geology and it seems that surveying these attractions is necessary for their further understanding and development of Geotourism (Yazdi, 2012, p 35). Iran's special tectonic and climate situation causes diverse sights of tectonic and geomorphology (that creates Geosites and Geoparks) in different parts of the country. If they are introduced correctly in international era, Iran will be one of the major poles of Geotourism in the world. Therefore, we introduce and study these geomorphologic and tectonic attractions.

## 2. RESEARCH METHOD

This article is applicable and developing survey and the research method is descriptive-analytical. Accordingly, various kinds of library –documentation studies, interpretation as well as satellite images analysis of some studied areas, field studies, direct observation and survey of phenomena are used particularly from geotourism perspective.

## 3. THEORETICAL RESEARCH

### 3.1. Geotourism Concept

Geotourism or land tourism is considered a relatively new concept in tourism industry that has gained a considerable growth and attention in the recent decade. Geotourism has defined boundaries that geological tourism is on its spotlight (Newsome & Dowling, 2006, p4) and surveys the problems and complications associated with the land, geomorphologic situation, tectonic phenomena as well as their tourism capacity. From the viewpoint of Gates (2006), Geotourism means "Tourism in geological perspectives". In Newsome and Dowling words, Geotourism is a part of land associated with geology, geomorphology and natural landscape resources as well as available forms on the land surface, fossil-containing layers, rocks and minerals according with the emphasis on understanding the underlying and shaping processes of these complications (Newsome & Dowling, 2006, p5). Moreover, it can be said that Geotourism is an informed and responsible tourism in the nature with the aim of observation and understanding of geology processes and phenomena as well as learning how they shape and progress (Amri Kazemi, 2009).

### 3.2. Relation of Geotourism and Ecotourism

Some consider the professional branches of Geotourism as one of the Ecotourism sub-branches but from the viewpoint of the writer, these two kinds of tourism are based on the nature and are parallel not subset. If we divide the

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nature to two sections of animate and inanimate, Ecotourism includes the study of animate nature and its attractions and Geotourism studies inanimate nature and its attractions. Therefore, tourism can be divided to two sub-branches of Geotourism and Ecotourism. According to the above matters, it is determined that these two kinds of tourism are a set of tourism that is dependent to the nature which are not sub-branch of each other. The main difference of these is that Ecotourism is focused on the living organisms and plant and animal living environment. But Geotourism mostly involved with geomorphology and geology phenomena and indeed the inanimate nature and its evolution.

### 3.3. Concept of Geosite

Geosite is a place with rare forms and attractive processes of geology and geomorphology. This is while the tourism infrastructures such as accommodation, access roads to Geosites, and the related management to that attraction and so on are considered for that area.

Geosites are mainly divided to two groups: those that outcrop as natural or synthetic forms of special geology and geomorphology within the open boundaries limitations (Hose, 2006) and the other is Geotourism access centers in confined spaces like Earth Sciences Museum and etc. The other term that is equivalent to Geosite is German word of Geotope (Sturm, 1994).

### 3.4. Concept of Geopark

Geopark means Geology Park in word and it is said to a geographical area with determined borders in concept that has one or more special or unique geology phenomena as well as significant natural and cultural attractions in the available area. This set should affect the economic development of the region and has special protective measures and programs as well as complied management plans (Amri Kazemi, 2006). Also, in the range of Geopark, we can find a group of Geosites.

Geoparks are a part of universal net and can have an important role in the country's economy and have a vast effect on sustainable development with tourism boom especially Geotourism. Therefore, each country or area that has ancient history and attractions as well as geology effects, will has a suitable potential in development of this industry.

### 3.5. Geosites, Geoparks and Sustainable Development

Universal commission of environment and development was held in 2009 in the conference of "Our Common Future" and defined sustainable development as: a development that meets the needs of the current generation with no harm to the need of the next generations (Khosh Raftar, 2012, p21). Sustainable development is a new era that pays attention to politic, culture, economy and business simultaneously (Bahram Zade, 2003) and stresses on economic, commercial and industrial boom.

Sustainable development is one of the important requirements that have a main role in tourism programming. According to a Declaration of WTO, this growing industry has gained the third rank in 2000 international trade (Yavari, 2011). Therefore, countries that have various geomorphological and ecology affects and do the necessary affairs for universal record of their potential Geosites and Geoparks in the universal heritage list of Geoparks, can be more successful in attraction of tourist as well as its economic returns.

## 4. Discussion

Geotourism researchers divide geology phenomena according to the formation method and nature in different ways. Amri Kazemi grouping is as: magmatism, erosion, tectonic, environmental and engineering geology, sedimentology, archeology-geology.

Moreover, some areas like salt domes, salt caves and their surrounding hot springs are rare geology phenomena that tourists pay attention to them from the view of tourism-therapy (salt-therapy, crystal-therapy and etc.) (Bayat, 2009).

### 4.1. Iran potential Geosites

As it is said at the part of Geosite concept, Geosite is said to a place that has wonderful geomorphology affects and forms if tourism infrastructures are provided on that area. Some effective elements in providing tourism platform in an area are suitable access roads, accommodation and welfare, security, signposts, proper supervision and management over the collection and etc. According to the above descriptions, it can be said that a potential Geosite becomes a real Geosite when it has the abovementioned situations. Therefore, we express the geology attractions that are in the list of Amri Kazemi and Mehr Pooya (2008) attractions as Iran potential Geosites.

**4.1.1. Mud volcanoes:** in general, the major areas of Iran mud volcanoes are at the southeast of Caspian Sea in Turkmen desert steppes as well as Iran southeast means the Coast of Oman Sea between Minab to Govatr port that includes numerous diapirs and active, semi-active and off mud volcanoes. The most important ones are Napag, Ayin, PirGel, Borborok, Tang and Naftelije (Fig. 1) (Yazdi, 2012).

**4.1.2. Basaltic prisms:** sometimes it is seen that in area of basaltic rocks, the pile of these rocks are separated as hexagonal columns that are very beautiful. Samples of it in Iran are Maku, Damavand and Birjand basaltic prisms (Fig. 2).

**4.1.3. Volcanic craters:** Iran is a country that has several volcanic cones and naturally interesting craters that each one is important in its place. For example, 14 volcanic craters are available in Rayen area that the biggest one has a diameter around 1200 meters with 300 meters deep (Fig. 3).



**Figure 1.** Created bubbles in Tang mud volcano output muds, around Chabahar



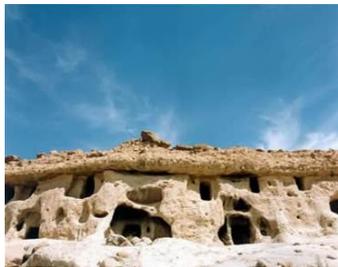
**Figure 2.** Created charters in Damavand Mountain basalts



**Figure 3.** Image of Hasan Ali castle's crater in Rayen of Kerman

**4.1.4. Volcanic villages:** houses located in Meimand villages in Kerman province and Kandovan in East Azarbaijan have been dug via natives within volcanic rocks that are interesting and unique (Fig. 4&5).

**4.1.5. Salt domes:** Iran is a country that has a lot of active and semi-active salt domes. The most focused centers are southern Zagros Mountains, southern Alborz, Central Iran, Qeshm, Larak and Hormoz islands (Fig. 6). In the south of Semnan province and northern margin of the great desert, a set of about 40 salt domes are available that are the best samples of the world (Amri Kazemi and Mehr Pooya, 2008, quoted by Jackson, 1990).



**Figure 4.** Meimand cliff village.



**Figure 5.** Kandovan cliff village.

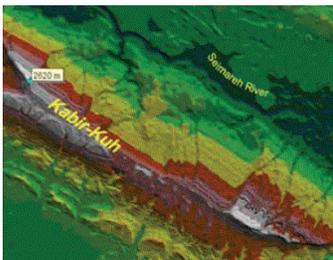


**Figure 6.** Dashti salt dome, Bushehr.

**4.1.6. Landslides:** the greatest world landslide that is famous to Seimareh is happened with the extent of 600 square kilometers and wide of 50kilometers in the west of the country at the foot of Kabir Kooch Mountains (Fig. 7). Meanwhile, some landslides are available at the areas of Zagros Mountains. Also, in the north of East Azarbaijan, Lilab landslide is available with the extent of 15 kilometers (Nekoe Sadri, 2008).

**4.1.7. Waterfalls:** main Iran waterfalls are in Alborz and Zagros Mountains. The highest waterfall of Iran is located in Lorestan province with the height of 80 meters with the name of Shovi (Tele Zang). Besides, Bishe and Margon waterfalls are considered as important Geosites of Iran (Fig. 8).

**4.1.8. Canyons:** canyons or craters that are created in karst environments are seen in three areas of Iran very well. A long spiral-shaped canyon with the length of 4 kilometers is located at the southeast of Fars that its depth is more than 300 meters in some places. A canyon with 400 meters depth is available in the northern slopes of Alborz Mountains and some interesting canyons are created in the southeast of Iran because of erosion(Fig. 9).



**Figure 7.** Seimareh Historical landslide.



**Figure 8.** View of Shovi waterfall, Lorestan.



**Figure 9.** Grand Canyon, between the towns of Ghir and Karzin in southwest of Jahrom.

**4.1.9. Lava flows:** because of volcano eruption of Ararat Mountain and flow the lavas as well as placing some of them in Maku area, a beautiful shape of lava flows is displayed (Fig. 10). These beautiful forms have been observed in Damavand and Sabalan volcanos, too.

**4.1.10. Hot springs:** many hot springs are available in Iran that is divided to low-temperature heat, relatively warm and super-hot according to their temperatures. These springs are mainly collated in volcanic areas or active geology areas and their heat source is naturally related to magmatic activities. Some important springs are Meshkin-Shahr, Sar-ein, Larijan, Geno and Ramsar hot spring (Fig. 11).

**4.1.11. Travertine Park:** because of travertine deposition, a series of formations with the shapes of cone, dome, shield, spiral walls and water ponds are created in the old springs at the area of Azar-Shahr and around Sahand Mountains (Fig. 12). These formations according with several active spring alongside available in Iran like Yazd active travertine-making spring.



**Figure 10.** Makoo ropy-shape lavas.



**Figure 11.** Sarein's Gavmish Goli spas.



**Figure 12.** Cone debris of Travertine-maker spring of Azar Shahr, East Azarbaijan.

**4.1.12. Caves:** caves in different varieties are available in Iran like limestone (karst), salt, and archeology (human-made). Limestone caves usually includes different multi-floor forms like river, lake and complete holes like Katala Khor cave in Zanjan that is the longest and most beautiful one in Iran. Moreover, Ali-Sadr Cave of Hamadan is another sample of water limestone caves. Karaftoo is also one of Iran ancient caves. Salt cave of Namakdan located in Qeshm Island is the biggest salt cave of the world (Fig. 13&14).

**4.1.13. Doline:** a form that is mainly created in limestone (karst) areas. Biggest doline or collapsed pit of Iran is located in Rafsanjan that is like a big funnel. The span of this big doline is 60 meters (Amri Kazemi and Mehr Pooya, 2008). Haft Hoz doline of Mashhad is another doline of Iran (Fig. 15).



**Figure 13.** Namakdan salt cave, Qeshm.



**Figure 14.** Katala Khor cave of Azarbaijan.



**Figure 15.** Mashhad's Haft Hoz Devlin.

## 4.2. Iran potential Geoparks

As it has been said, Geopark has one or several geology heritage natures that is important from scientific dimension and has unique aesthetic, archaeological, ecological, historical and cultural values. While Geoparks are managed with UNESCO organization's programs, they are effective via economic and social view on the development of human situation in the area of Geopark. A lot of areas in Iran have the potential to become a Geopark. Therefore, a lot of fans measure the potentials of these areas that some of them are listed in the works of other researchers like Amri Kazemi (2012) that are described below.

4.2.1. **Lut Geopark:** The unusual landscapes of kaloots, nebkas, and Aeolian sands offer an attractive touring site. Lut is homes the Earth's hottest point, as well as rare examples of desert and Kavir textures on the vast plain (Fig. 16,17&18). A geopark with the ancient town of Shahdad at the center promises to be a world-class geopark, with four geological and geographical word records (Yazdi, 2012).

4.2.2.



**Figure 16.** Lut Desert's sand pyramid.



**Figure 17.** Lut's amazing Yardangs.



**Figure 18.** The world's greatest Nebkha in Lut Desert.

**4.2.2. Damavand Geopark:** Damavand is a sacred and legendary mountain, and has historically been the emblem of Iran's glory and grandeur. This extinct volcano is one of the world's loftiest conical summits (the second) and may be the world's highest intercontinental volcano (Based on the oral interview with Dr. Jamshid Hassanzade) The wonderful natural landscapes and ancient historical sites surrounding Damavand form a rare collection of attractions to be introduced as a world geopark(Fig. 19).

**4.2.3. Sabalan Geopark:** Sabalan volcano, the legendary mountain of Azaryspeaking people, the fresh water crater lake at the altitude of 4800 m, the wonderful valley of Shirvan, the many mineral hot springs, the biological diversity and natural landscapes along with the culture and local ceremonies will undoubtedly bring the Ardabil Province the gift of a world geopark(Fig. 20).

**4.2.4. Makran Geopark:** High wave-cut cliffs, very scenic erosion land-scapes, many mud volcanoes, a mangrove sea forest, fossils of whales and various other local plants and animals have made it possible to introduce a striking geopark within the southern limits of Sistan and Baluchistan Province (Fig. 21).



**Figure 19.** Damavand volcanic mountain.



**Figure 20.** Sabalan Crater Lake.



**Figure 21.** A beautiful view of merrikhi Mountains.

**4.2.5. Dashti Geopark:** The Dashti salt dome, which may be Iran's most beautiful salt dome, can be chosen as a focal point for a geopark (Fig. 22). Scenic erosion phenomena, the beautiful coastlines of the Persian Gulf, biological diversity, and historic charm of the area surrounding this dome have enhanced its value and chance to be chosen as a geopark. Dashti's proximity to the Mand protected zone as well as the national park of Nayband are among the other factors contributing to its consideration as a geopark.

**4.2.6. Sahand Geopark:** Sahand, Iran's widest volcano, holds many geological and natural phenomena around it which make a valuable treasure worthy of establishing a geopark; among such phenomena one can name the volcanic craters series, various widespread pyroclastic deposits, the historic village of Kandovan, surrounding mineral and travertine springs (Fig. 23&24), numerous fossil sites, rare ecosystems, and scenic landscapes in the surrounding valleys.



**Figure 22.** Dashti Salt Dome, Bushehr.



**Figure 23.** Azarshahr's Travertine-maker spring.



**Figure 24.** Beautiful nature of Sahand.

**4.2.7. Kallat Geopark:** Kallat region in the north of Khorasan Razavi Province features striking geological phenomena. Geotectonic and sedimentary outcrops, landscapes and fossil sites are among the valuable phenomena in this region. Also, the significant natural and historical places make this region's specifications suitable to be introduced as a new geopark.

**4.2.8. Koohdasht Geopark:** In shirez valley in the western part of the Koohdasht, Lorestan Province, the ancient cave of Humian, the stone images of Mirmalas, the intact natural vegetation and fauna and striking habitat diversity make this a wonderful geopark for this region with rare landscapes (Fig. 25&26).

**4.2.9. Oshtorankooh Geopark:** The beautiful mountain chain of Oshtoran Kooch and its natural glaciers and surrounding untouched scenic valleys, Gahar Lake and cascading waterfalls in the whole region has given a high potential for this beautiful protected zone in Lorestan Province for introducing a geopark (Fig. 27).



**Figure 25.** Shirez valley, west of Koohdasht.



**Figure 26.** Stone carving of Mir Malas cave.



**Figure 27.** Beautiful nature of Oshtoran Mountain.

**4.2.10. Makoo Geopark:** Makoo city and its surrounding region host a permanent exhibition of volcanic phenomena. The basalt flows, the basalt river of Zangmar, basalt Makoo and the natural beauty of the region, along with the inviting landscape of the southern side of Ararat volcanoes, both the big and small, have provided this region with the possibilities of being introduced as a geopark.

**4.2.11. Hormoz Geopark:** Hormoz Island has always been known as the paradise of mineralogy and petrology. This island which is, in fact, a salt dome peeping out of the Persian Gulf waters has exposed a thorough series of phenomena and structures related to the salt dome and enjoys a thousand-color pictur-escape landscape due to the existence of a wide diversity of stones and ores (Fig. 28). The native plants and animals, historical places and long-lasting (time-worn) culture of the dwellers in this island are among the other specifications making the establishment of a geopark worthwhile.

**4.2.12. Arasbaran Geopark:** Arasbaran protected zone has various natural and biological landscapes. Scenic geological phenomena can be seen in this region; the nephelin-syenite mass on which Babak fortress has been built as well as the fossil sites of vertebrates recently discovered near Varzaqan are of such phenomena. The big copper mine of Sungun and remnants of old mining craft in its sur-roundings are among the other valuable features in the region which contribute to the introduction of a geopark (Fig. 29&30).



**Figure 28.** Hormouz thousand-color landscape.



**Figure 29.** Sungun copper mine, Arasbaran.



**Figure 30.** Beautiful nature of Arasbaran.

**4.2.13. Kabirkooh Geopark:** In Kabirkooh, Ilam Province, there exists a match-less phenomenon that is the super landslide of Seymare. Also in the east side of this mountain, striking structural and erosion phenomena can be found (Fig. 31). The existence of widespread natural landscapes and numerous historical places has made it possible to introduce a new geopark in this region.

**4.2.14. Nakhlak-Anarak Geopark:** The time-worn mine of Nakhlak is Iran's best place to introduce a mine geopark (Fig. 32). This mine with its brilliant history of mining, old and modern, shines like a gem amid its surrounding desert landscapes. Nakhlak mine along with the historical mining town of Anarak is a significantly valuable choice for establishing a new geopark in Iran.

**4.2.15. Jandaq-Khoor Geopark:** In the region amid the historical cities of Koor and Jandaq, some beautiful landscapes of Kavir plain can be found. As Kavir plain has a wide area, Jandaq-Khoor region can mostly exhibit much of the typical deserts and Kavir phenomena existing in this plain. The Kavir villages of Garme, Mesr, Aroosan, and Choopan are among the scenic places in this region (Fig. 33).



**Figure 31.** Beautiful landscape of Kabir Kooh.



**Figure 32.** Nakhlak old mine.



**Figure 33.** Tourism and desert complications Border of Mesr village.

**4.2.16. Golestan Geopark:** In Golestan Province, a variety of climates and landscapes can be seen: dense forests, beautiful seacoasts, vast plains, and ancient and historic places. The mud volcanoes in north of Iran are most densely populated in this province. The widespread loess deposits and numerous water-falls are among the geological phenomena in this region. By choosing an area to be introduced as a geopark in this region, the beauties of this province can be kept and preserved while simultaneously becoming more known to the public.

**4.2.17. Ekbatan Geopark:** The igneous mass of Alvand and the metamorphoses that have taken place in its surroundings have created a vast exhibit and laboratory for carrying out lithological research (Fig. 34). The ancient places in the vicinity of this mountain and the beautiful nature of the region have given it great potential for introducing a geopark in Hamedan Province. The well-known cave of Alisadr can be regarded as a geosite outside the limits of the geopark which will add to its attraction.

**4.2.18. Genou Geopark:** The protected zone of Genou in the north of Bandar Abbas, in addition to enjoying natural specifications and significant biological diversity, also has valuable geological phenomena (Fig. 35). Mineral hot springs, geotectonic phenomena. Mineral hot springs, geotectonic phenomena such as the sheared anticlines and numerous scenic salt domes are among these phenomena.

**4.2.19. Urmia Geopark:** Urmia Lake is one of the biosphere reserves as well as an international basin (lagoon) which has been placed on the list of Iran's national parks. Apart from the biological specifications of this lake, Urmia Lake also has a significant value from the point of view of geological phenomena. This lake has a good chance to be introduced as a geopark.

**4.2.20. Maraqe Geopark:** The existence of one of the world's rarest vertebrate fossil sites near Maraqe city has given this region a high appeal for the introduction of a geopark. Of the other phenomena adding to the potentialities of this region, one can name the historical places in the city, Goshayesh valley and its geysers as well as Kabutar cave (Fig. 36).



**Figure 34.** Alvand igneous mass.



**Figure 35.** Geno spa and tourism area.



**Figure 36.** Goshayesh valley, Maraqe Geopark.

## 5. Conclusion

Accuracy in economic performance of countries that are successful in tourism field, we realize that tourism can have a huge impact on income and economic growth of the country and sometimes it acts more successful than the important industries. Therefore, tourism development as well as Geotourism is one of the effective ways in the country's economy dynamics. Geotourism can have the most harmony with sustainable development and all economic, cultural, social and environmental dimensions. Therefore, the necessary infrastructures should be provided for Geotourism development and paving the way to achieve the above goal.

Iran land has the most diverse landforms and new geology phenomena according to its climates and geology situation. Availability of these tourism natural areas besides ancient cultural and monuments facilitates the situation for Geotourism development. In this regard, introduction and creation of Geosites and Geoparks can be effective in adding scientific contents and making the tourism professional as well as local economy and creating job besides preserving geology heritage and prevention of land conservation and environmental elements related to industrial societies. Proximity of a lot of Iran potential Geoparks to monuments, cultural, biological phenomena as well as coordination of this situation with UNESCO index cause the situation suitable for providing the necessary infrastructures for record and list of UNESCO universal heritage. According to the increasing development of the world Geoparks and competition in attracting tourists via countries that have Geoparks, responsible persons of the related organizations should try to provide necessary infrastructures for universal record of Iran Geotourism potentials at the list of UNESCO organization's Geoparks with more programming, management and proper acknowledgment and do the necessary affairs for development of Geotourism, attraction of foreign exchange and sustainable development.

## 6. Suggestions

To achieve the abovementioned goals as well as Geotourism development, some strategies are suggested as follows:

- Identify study and introduce of Iran geology attractions and adding them to the country's Geosites list.
- Introduce of historical, ancient, cultural, health centers and etc. for Geosites.
- Surveying the effective factors on phenomenon to protect them and prevent of their damages.
- Do the necessary affairs for universal record of Iran potential Geoparks in UNESCO Geopark list.
- Providing tourism infrastructures such as access roads, accommodation and welfare, security, signposts and etc.
- Introducing Iran geology attractions to tourism fans in national and international era via advertising.

- Creating and developing tourism land tours in tourism agencies by training the managers and employees of these centers.
- Support surrounding residents of Geoparks and Geosites in establishment welfare facilities, shopping centers, entertainment places and etc.
- Promoting the aboriginal culture and education of Geosites in providing guidance and appropriate services to tourists.
- Establishment of Geotourism exhibition and introducing Iran capabilities in different places of Iran.
- Providing the necessary infrastructures for producing and providing of local products surrounding Geosites.
- Attention and promotion the healing properties of some Geosites such as mud volcanoes, salt domes, hot springs and etc.
- Allocation of budget and support of active researchers in this field.

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