

PSILORITIS GEOPARK: PROTECTION OF GEOLOGICAL HERITAGE THROUGH DEVELOPMENT

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Abstract: Psiloritis is not only the highest mountain of Crete but also the only area where all rock units of Crete outcrop. It is also an area with many geomorphological and tectonic features, such as gorges, caves, plateaus, fossils, folds, fault planes, valleys and high mountain tops. Culture and civilization follow their own paths for thousands of years adapted and inspired by a unique natural environment, which is enriched by a rich endemic flora and fauna.

The area is also one of the less developed in Crete, even though big tourist attractions (Knossos palace, Heraklion and Rethimno towns) are close. Agro-tourism and eco-tourism are the only tools for development. Recently, the geological heritage of an area extending almost in the whole of central Crete was combined with history, culture and environment giving rise to the Psiloritis Natural Park. As part of the European Geopark Network, the park aims to develop geo-tourism by attracting in the area all-season tourists who are also interested in the culture, history and tradition of Crete. A special kind of educational tourism seems to be realistic as many universities and school classes are visiting the area every year. Thematic courses related to speleology or to target groups (tourist guides, teachers etc.) can also be established.

Such kind of development seems to be the only tool for protection and maintenance of geological heritage in areas where legislation is not so strong, but it is also an action consistent with the tradition and culture of Crete.

INTRODUCTION

It is maybe only geologists who know how long it takes soft sediment to become a rock, a fold to be created, or buried wood to petrify. However, all of us know how quick a mountain can be totally excavated, a new road can be constructed or a coalmine can be increased. The development of our civilization is based on natural resources and on speed.

Unfortunately, rocks host most of the natural resources and most human constructions are founded on rocks. Therefore, rocks are facing a great amount of human pressure, having also the disadvantage that they are not alive. If the natural environment is regarded in our days as one of the greatest values on earth, this is mainly because animals and plants are alive. It is however obvious that if man hadn't gained a tolerable living level he wouldn't even think that animals are living creatures. After centuries of efforts we are pleased to say (at least in places) that we have become developed and civilized. We can think of the value of any living creature and we are willing to offer the money needed for its protection, but can we think the same about rocks? In Crete once, someone was accused of cutting a stalagmite in a cave. The court asked for scientific assistance and the only question from the judge was: "How much does the broken-piece cost?" This indicates how the value of geological heritage is underestimated or even ignored in Greece, as well as how the geotopes are treated.

The value of geological heritage had no sense over a few decades and was the major problem in thinking of its protection. It was mainly a problem for geologists that they couldn't present the value of a rock to the community and in some cases they couldn't even estimate it. In our days the

value of geological heritage can be estimated in local, national or international level; it is well considered as an important parameter of an area and thus can be protected and preserved (Page 1999, Reimold 1999, Zouros 2001). Isolation from nature, urbanism, easy access to information and educational purposes have assisted the great to the establishment of a value for rocks.

The value of geological heritage in Psiloritis Mountains, occurring in southern Greece is still a matter of consideration. Located in one of the less developed countries in EU, and bearing a fantastic geological heritage, the mountainous Psiloritis area is facing serious development problems. Protection of this heritage is of high priority and a synthetic way has been found to strike a balance between development and protection of geological heritage.

STATE OF LEGISLATION

In Greece ecological awareness was growing fast over the last decades but still is not comparable to other north European countries (Modinos 2001). Country or local legislation however, don't follow at the same rates. Even though protection of natural environment (living environment) is at a good level the same is not the case for the geological heritage (Fassoulas 2001).

Geotopes can only be protected through the law for "The protection of Natural Environment" (1650/86), characterized either as National Park, Natural Monument, Aesthetic landscape or else. The process is however so complicated, mainly because it is based on the ideas for protection of the living environment, that it is actually impossible to go on. A second possibility is through the law for "Sustainable Development" (2742/99). This gives the right to the Secretary General of a Region to nominate an area as

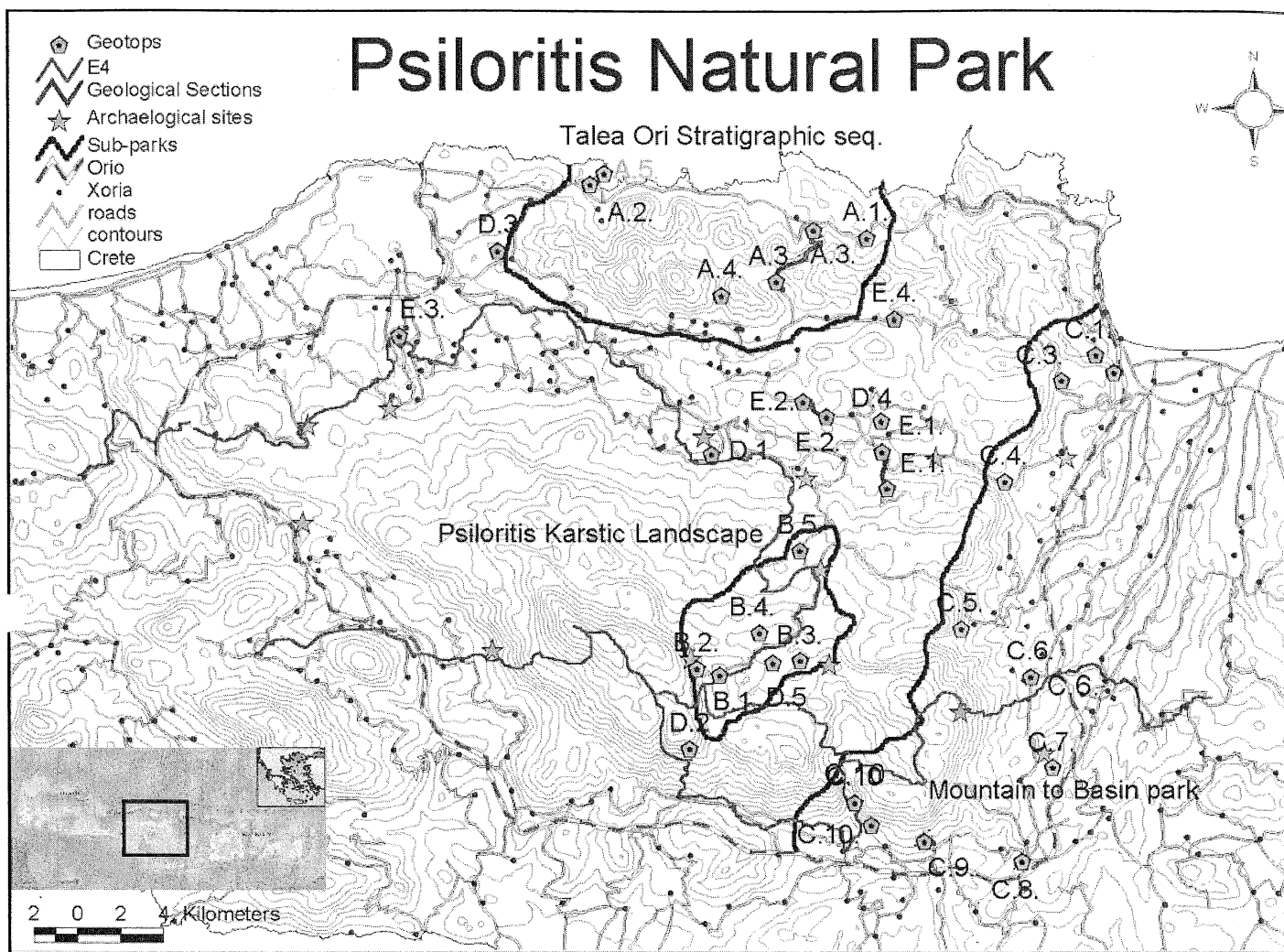


Figure 1. Location and main features of Psiloritis Geopark.

Special Protected Area due to Environmental reasons'. In cases where geotopes are related with archaeological sites or are located within forestry lands, these can be protected through the Archaeological or the Forestry Services laws.

ractically, no geotope has been protected yet in Crete except the Samaria gorge, which has been nominated as National Park due to its individual endemism. Olympus Mountains in northern Greece and the Petrified Forest of Lesvos Island are the only protected geotopes in Greece (Katsadorakis 1999).

THE PSILORITIS GEOPARK

Psiloritis Natural Park is located in Central Crete, Greece, covering the Psiloritis Mountain chain and its northern hills (Figure 1). It is a mountainous area with many specialities and problems. Inhabitants are mainly engaged with agriculture and cattle raising. Even though the area is in the neighbourhood of the main archaeological sites of Crete (Knossos, Phaistos, Eleytherna), the main towns (Heraklio and Rethimno) and the main tourist centres of the island, it faces serious development problems. Since 2000 the park is member of the European Geopark Network. AKOMM-Psiloritis S.A., a local development association, is responsible for the management of the Geopark and Natural History Museum of the University of Crete is scientifically supporting the park.

Within the territory of the Geopark, the whole nappe pile of Crete, which consists of seven individual nappes, and the majority of the petrologic types of the island are presented in excellent outcrops and sections. All kind of geological structures are visible, from microscope to regional scale. Big faults with excellent and imposing fault surfaces, caves, impressive gorges hosting many endemic species of the island, unique fold associations and geomorphologic structures are feeding the culture, tradition and customs of the inhabitants for thousands of years.

As the Geopark covers a huge area geotopes are subdivided into sub-parks each one presenting a major geological feature of the area. Psiloritis Karstic Landscape is located at the Psiloritis tops comprising structures and features related to the uplift of the mountains and the karstic weathering. Furthermore, the main tectonic structures formed during nappe emplacement also outcrop. Talea Ori Stratigraphic sequence located at the northern coast offers a journey to the early geological history of the island. The whole stratigraphic sequence of the Plattenkalk series is exposed only in this area in an inverted form. Rock types, folds and fossils comprise the geotopes of this sub-park. The Basin to Range Park located at the eastern slopes of Psiloritis Mountains offers a unique opportunity to study the development of the Neogene basins of Crete in respect to the high mountains. SpeleoPark is planned to be organized at the Psiloritis Mountains as an individual park in which the main aspects of speleology will be properly demonstrated in order to

be experienced by the visitors (cave development and speleothems, archaeology, history and folklore, cave biology, adventure of exploration, etc).

Many other geotopes located within the geopark were assigned as individual sites presenting main features of the geological history of the island: the Gonies section presents along a short road-cut of 2 km almost all nappes of Crete, the "Sculptures of Nature" near Chonos (Figure 2) is an

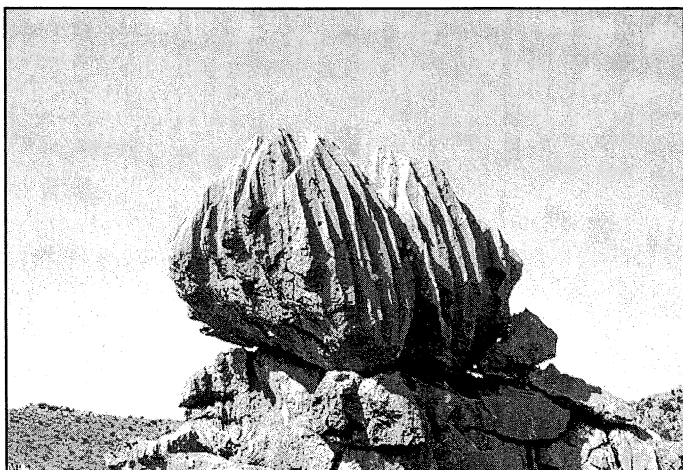


Figure 2. "Sculpture of Nature" in the area of Chonos village.

area where karstic weathering and erosion of carbonate rocks has formed unique-shaped rock formations and landscape, and the Almyros spring is a unique example of the complex ways the underground water follows to reach the sea, having also a huge capacity.

All these areas are suitable for every educational activity (higher or lower level) that is related to weathering processes, tectonic activity, petrology and landscape development. This is the reason that many universities from all over the world have chosen Crete and Psiloritis mountains for their field trips. On the other hand, several geotopes can be characterized as unique and rare because of their appearance and preservation. The Messinian evaporites preserved in our days at an altitude of 500 metres give one of the

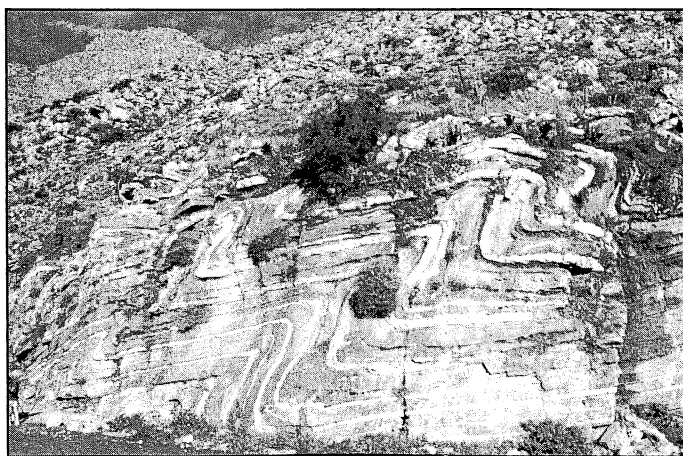


Figure 3. The Vossakos folds near the northern coast.

fastest uplift rates in the world; the Vossakos folded layers (Figure 3), which have been formed deep in crust under high pressure conditions, appear today in every scale; the "high pressure fossils" were living 300 million years ago and now are excellently preserved within the high pressure metamorphic rocks in Fodele area, and; the Ideon Andron cave is one of the most important archaeological sites of Crete, as Zeus the king of the ancient Greek gods is believed to have grown up there.

DEVELOPMENT OF THE GEOPARK

Geological heritage is not such an important feature of the island as is archaeology and culture. A model for the promotion and protection of the geological heritage in Crete has to encompass all the aspects that are related with it (Fassoulas 2001). Tradition, customs and songs are inspired by the landscape and environment; history and civilization were based on the natural wealth.



Figure 4. Information table in the area of the Psiloritis Mountains.

The main idea for the development of Psiloritis Geopark is to combine all the important and characteristic features of the area with the geotopes and the Geological heritage, presenting the natural and human environment as a whole. The establishment of the Geopark as an important value for the area has to be the first and most important target that will enforce local people's awareness and respect for the geological heritage.

Sustainable development of the Geopark is based on two main activities: education and eco-tourism (or geo-

tourism). Education can be achieved by vertical and horizontal actions. The vertical actions can be related with the development of special courses and field trips addressed to universities and groups with special interests (speleologists, botanists, tourist guides etc.). Horizontal actions include general geology field trips, school projects, entertainment events and other activities for the public.

Eco- and geo-tourism are development activities that fit to the main targets of the Geopark and to the features of the area. The Geopark can be an attractive reason for visitors who want to combine culture, traditions and the unique environment of mountainous Crete. Establishment of such tourism will support many of the Leader initiatives that have been undertaken and will improve many of the living parameters of the area.

Basic infrastructure for the development of the Geopark (Tables, pathways, signs, information centres etc.) and information products (books, leaflets etc.) have already been studied and proposed for funding through EU programs (Leader+, Intereg, etc.), whereas signs and information tables have already been placed in several geotopes (Figure 4).

In addition, a serious effort has been taken for the implementation of special management plans in some areas of the Geopark that participate in the Natura 2000 network.

CONCLUSION

During the last decades, development and protection of natural environment are two concepts conflicting with each other. However it is true that both are necessary for our community. Development offers jobs and the right of the people to live at their birthplace. Protection of natural environment is obvious as being the result of the intense degra-

dation of the environment, but also because it offers a qualitative way of living and is a duty of the humans. It is thus necessary to find the best way to combine these concepts in such a way that the one can benefit from the other.

Development of the Psiloritis Geopark is based on the promotion of geological heritage and its relations with culture and tradition of the area. Success of this effort will assist and improve the local economy and knowledge of the geological heritage. Therefore, the value and respect for the geotopes will be increased, resulting finally in a higher possibility for preservation and protection and probably can lead to the improvement of existing legislation.

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