

by Nickolas Zouros

# The European Geoparks Network

## *Geological heritage protection and local development*

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*The European Geoparks Network was established in June 2000 by four regions of different European Countries—France, Germany, Spain and Greece—with similar natural and socioeconomic characteristics. These four regions are rural areas, with a particular geological heritage, natural beauty and high cultural potential, all facing problems of slow economic development, unemployment and a high level of emigration. Faced with these problems, the managing authorities of the geological parks and museums in these regions have decided to strengthen their collaboration, and as a result the European Geoparks Network has been established. Its main objective is to cooperate on the protection of the geological heritage and the promotion of sustainable development in their territories. The European Geoparks Network was built up with the support of the European Union initiatives.*

*The founding members of the European Geoparks Network are: Réserve Géologique de Haute-Provence—France, The Petrified Forest of Lesvos (Natural History Museum of the Lesvos Petrified Forest, Island of Lesvos)—Greece, Geopark Gerolstein/Vulkaneifel—Germany and Maestrazgo Cultural Park—Spain. These four geoparks signed a convention on Lesvos Island, Greece in June 2000 declaring the creation of the European Geoparks Network. Together they own the "European Geopark" trademark, which is registered within all member states of the European Union. The purpose of this general designation would be to share information and expertise, and to define certain common tools in areas of common interest.*

### The initiative

The idea of creating a network of geoparks, which would collaborate to protect and promote the European geological heritage through the sustainable economic development of their territories, arose in 1996. The idea came up in a discussion between G. Martini and N. Zouros at the 30th International Geological Congress held in Beijing during the symposium on the protection of the geological heritage. Although a massive amount of work concerning the protection of the Earth's heritage has already been carried out in different countries, especially after the Digne congress in 1991, this was the first time that serious effort was undertaken to serve both the scientific issue of the protection and conservation of the geological objects as well as the needs of the society in which these geological objects are found. The idea behind the initiative is that true sustainable territorial development can be achieved through the protection and promotion of

geological heritage for scientific, educational and touristic activities. Furthermore, this was the first time that the sustainable development of a territory was considered as a presupposition for the success of a conservation strategy.

The main guidelines used in this effort were those of UNESCO's Division of Earth Sciences for the creation of UNESCO geoparks, an initiative that started in 1997 as UNESCO Geoparks Program.

### Geopark's definition

The definition of a geopark was created after a long period of meetings and discussions concerning the appropriate characteristics, structure and function of such an institution. According to this definition, a European Geopark is a territory which combines the protection and promotion of geological heritage with sustainable local development. It has the following main characteristics:

First, a European Geopark has to encompass a particular geological heritage, with specific geological, mineralogical, geophysical, geo-morphological, palaeontological or geographical features. It must comprise a certain number of geological sites of particular importance in terms of their scientific quality, rarity, aesthetic appeal or educational value. The majority of sites found within a European Geopark must be part of the geological heritage, but their interest may also be archaeological, ecological, historical or cultural.

Second, the local authorities of each Geopark have to agree to the promotion, with the financial support of European Union, of a sustainable territorial development strategy for the development of the area of the Geopark. A European Geopark must have clearly defined boundaries and sufficient surface area for true territorial economic development.

Another important characteristic is that the sites in a European Geopark must be linked in a network, and benefit from protection and management measures. A European Geopark is obliged to defend the values of geological heritage conservation and thus no destruction or sale of geological objects from a European Geopark may be tolerated.

A European Geopark must be managed by a clearly defined structure, organized according to the national legislation of each country and able to enforce the protection, enhancement and sustainable development policies within its territory.

### Tool for environmental protection, education and local development

A European Geopark has to play an active role in the economic development of its region through enhancing the general image linked to the geological heritage and the development of geo-tourism. The Geopark must work with local enterprises to promote and support the creation of new by-products linked to the geological heritage.

One of the main goals for all the European Geoparks is to improve and enlarge the recognition, protection, conservation and promotion of the geological and geomorphological features contained in them. To achieve this, the Geoparks must continuously develop, experiment and enhance methods for preserving the geo-

logical heritage and supporting the development of scientific research in the various disciplines of the Earth Sciences.

The European Geoparks also aim to improve society's recognition of the importance of protecting and conserving the unique heritage of the Earth. Further activities undertaken by the Geoparks include the protection of endangered geological heritage sites for future generations and the education of the public at large in matters concerning geological sciences and the environment. The Geoparks take an active role in organizing and hosting education and training activities at all education levels in Earth Sciences, in the enhancement of the natural environment and in sustainable development policies.

A European Geopark needs to have a direct impact on the region in which it is situated by influencing its inhabitants' living conditions and environment. The aim is to enable the inhabitants to re-appropriate the values of the area's heritage and to actively participate in the region's cultural revitalization as a whole.

## European geoparks network

The European Geoparks Network is an open European association governed by the representatives of all members.

Five years after its foundation the European Geopark's Network managed to accept certain operational rules for the Network, with respect to the open and democratic spirit that characterized its creation.

The European Geoparks Network has formed two operational structures. The Coordination Committee is responsible for the operation and management of the Network while the Advisory Committee gives advice on the development and expansion of the Network within high quality standards.

Coordinator and Vice Coordinator are elected by the Coordination Committee members in order to support the Network's activities in-between two successive Coordination Committee meetings.

**Coordination Committee:** The Coordination Committee operates the network in collaboration with the partners. The Coordination Committee is made up of two representatives from each partner in the European Geopark Network, one is a specialist on geological heritage protection and the other is specialist on local development. Its headquarters are at the Reserve Geologique de Haute-Provence in France, and meets regularly, at least twice a year, each time in a different geopark, to discuss the Network's progress. The Coordination Committee examines applications for European Geopark status and is solely empowered to grant such status to the applicant zone.

**Advisory Committee:** The Advisory Committee is made up of specialists in sustainable development and the enhancement of the geological heritage. These specialists are either representatives of the zones having initi-

ated this programme or elected members and representatives of international structures working in the area of enhancement of the geological heritage (UNESCO, IUGS). This Advisory Committee provides advice on all issues concerning the nomination and integration of new zones within the network.

Today 17 Geoparks from nine E.U. countries are ordinary members of the Network.

All activities undertaken by the Geoparks have to be in a spirit of complementarity with the other members of the European Geoparks Network. Especially in the fields of common geotouristic packages and the creation of new by-products linked with the geological heritage, all European Geoparks have to work together in order to improve their common profile as special tourist destinations and attractions.

Each member will be entitled to use the European Geopark logo and graphic charter in its communications, thereby contributing over time to creating a common image of quality, linking enhancement of the geological heritage and sustainable development.

In April 2001 the Network and UNESCO (Division of Earth Sciences) signed an official agreement of collaboration.

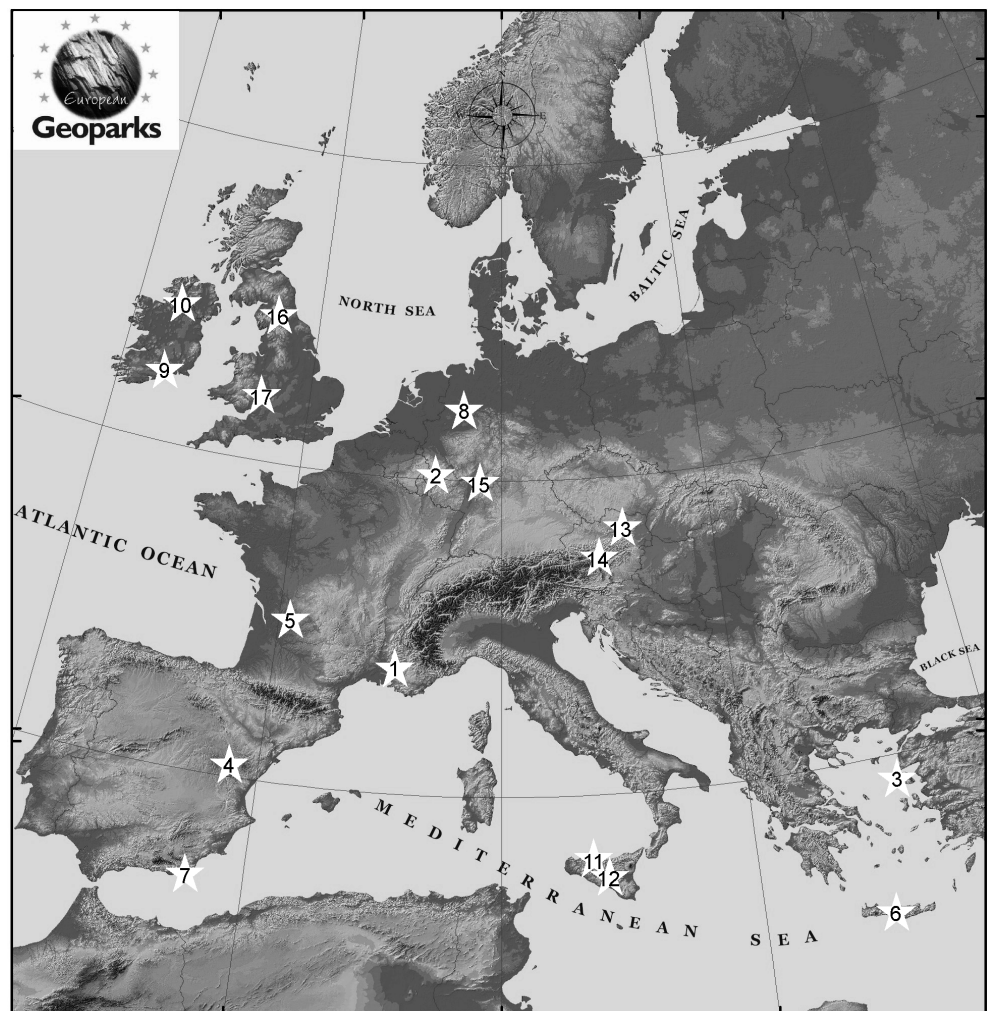


Figure 1 Map showing the location of the members of the European Geoparks Network.

1. Reserve Geologique de Haute Provence—FRANCE; 2. Vulkaneifel European Geopark—GERMANY; 3. Petrified Forest of Lesvos—GREECE; 4. Maestrazgo Cultural Park—SPAIN; 5. Astobleme Rochechouart Chassenon—FRANCE; 6. Psiloritis Natural Park—GREECE; 7. Parque Natural Cabo de Gata Nijar—SPAIN; 8. Terra Vita Naturpark—GERMANY; 9. Copper Coast Geopark—IRELAND; 10. Marble arch caves & Cuilcagh mountain park, Northern Ireland—UK; 11. Madonie Nature Park—ITALY; 12. Parko Culturale Rocca di Cerere—ITALY; 13. Kulturpark Kamptal—AUSTRIA; 14. Eisenwurzten Naturpark—AUSTRIA; 15. Naturpark Bergstrasse Odenwald—GERMANY; 16. North Pennines AONB—UK; 17. Abberlay and Malvern Hills Geopark—UK.

## Network activities

There are many common activities including meetings, creation of promotional tools, publications and organization of common events.

### Annual Meetings

An open annual meeting of all European Geoparks Network members is convened every year in a different member country. The 1st European Geoparks Network Meeting was successfully concluded in Molinos Maestrazgo, Spain, in November 2000, with the participation of more than 20 Geoparks. Three successful meetings followed in Lesvos (Greece) in 2001, in Kamptal (Austria) in 2002, and in Anogia, Crete Island (Greece) in 2003. In 2004, the 5th Meeting will be organized by the Madonie Geopark in Petralia Sottana in Sicily (Italy) from 27 to 31 October. These meetings enable the various members to become acquainted with each other, exchange experiences, design new products and define future common strategies.

### Organisation of common events

The European Geoparks Week was organised for the first time in 2004. In the first week of June each Geopark organised several events in order to promote geotouristic attractions and activities. The program of the events was available in all Geoparks.

### Promotional tools

The European network has promotional tools (a website, magazine, publications, information points) for enhancing the profiles of each of its members.

**EGN-Website** A common website ([www.europeangeoparks.org](http://www.europeangeoparks.org)) has been developed with links to all European Geoparks in order to promote their services and geotouristic products. The site is managed by the Network Coordination Committee.

**EGN Magazine** The European Geoparks magazine is published annually, with articles on the Networks activities, on geo-tourism, on geological preservation and protection and educational activities in Geoparks. It also contains the profiles of the member Geoparks.

**EGN Information point** Information points for visitors have been created in each Geopark providing information on the Network and its members' common activities in the protection and promotion of the European geological heritage, the possibilities of geotouristic activities in the Geoparks, the educational activities, programs and tools of the Geoparks as well as the geotouristic products of the geoparks members (casts, books, leaflets, museum-kits, etc.).

**Common publications** Information material such as leaflets, posters, stickers, calendars, postcard set, etc. has been published in different languages to promote the Network and its activities as well as the activities of the geoparks members. Among them is the book of the proceedings of the 2nd Geoparks Network Meeting.

### Educational tools

The creation of common educational tools has been discussed within the Network as most of the partners have their own educational tools and publications. The need of common tools is obvious as it will help the strengthening of co-operation in educational programmes in geoparks. There is a proposal for the creation of a common museum kit that will be realised in the near future with the support of the Leader+ project.

## How to become a new member

Any region wishing to become a "European Geopark", or is in need of advice on how to enhance its geological heritage or how to validate its developments in the area of Geo-tourism may contact the Coordination Unit.

All requests for recognition as a "European Geopark" must be accompanied by a dossier, prepared on the model of the application dossier for nomination as a "European Geopark". This application dossier must be completed and submitted by the organisation in charge of managing the area where the Geopark is to be located. This

application dossier must be sent directly to the Coordination Unit: Cellule de coordination du reseau des Geoparks Europeens, Reserve Geologique de Haute-Provence in Digne-les-Bains, France.

The dossier submitted must be concise and comprehensive. It cannot exceed 30 pages, not including appendices, and must be written in English and in the National language. Should there be a need for further assistance, or to refine development strategies in connection with Geo-tourism, the region may request help from an expert within the European Geoparks Network.

The dossier must include precise information on the following points:

- Identification of the zone
- Scientific description
- Arguments justifying nomination as a European Geopark
- Overall economic situation of the zone
- Sustainable development policy instituted and the importance of Geo-tourism in this context
- Official application for nomination signed by the competent authority.

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## UNESCO—Global geoparks network

According to national and international initiatives, like the "International Declaration of the Rights of the Memories of the Earth" (Digne, France 1991), the IGCP, IUGS, ProGeo, Malvern Group, UNESCO's Division of Earth Sciences and the Council of Europe, an international group of experts on Geoparks recommended to establish a "Global Network of National Geological Parks (Geoparks) seeking UNESCO's assistance" in order to promote the three goals of conserving a healthy environment, educating in Earth Sciences at large, and fostering sustainable economical local development.

In February 2004, the UNESCO international group of experts assembled in Paris where they discussed and decided the following: a) The establishment of a Global UNESCO Network of Geoparks; b) The acceptance of the Operational Guidelines for application on the global Network; c) The foundation of a Coordination Office of the Global UNESCO Network Geoparks at the Ministry of Land and Resources in Beijing, China; d) The invitation to new Geoparks to send their applications (respecting guidelines and criteria) to UNESCO's Division of Earth Sciences that will forward it to the International Advisory Group, e) For Europe the already established cooperation agreement between UNESCO's Division of Earth Sciences and the European Geoparks Network, shall serve as the mechanism for the integration of national Geoparks through the label of European Geoparks into the Global UNESCO Network, f) The Division of Earth Sciences is encouraged to confirm or initiate agreements at a regional (continental) level using the cooperation agreement with the EGN as an example.

It was also decided to include the existing 17 European Geoparks and 8 new Chinese Geoparks in the Global UNESCO Network of Geoparks.

The "First International Conference on Geoparks" was held in Beijing, China from 27 to 29 June 2004, in order to promote the establishment of a worldwide network of national Geoparks with the contributions from the international governmental and non-governmental community.




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## Representative European Geoparks

Representative European Geoparks will be presented. The selection of the examples is based on geographical criteria. The selected geoparks show the geodiversity of Europe and the development of geo-tourism infrastructures and activities in Europe.

## Réserve Géologique de Haute-Provence (France)

The Geopark covers an area of 200,000 hectares of the southern Alps in France incorporating a total of 55 communities. It can also be regarded as Europe's biggest geological open-air museum with numerous fossil-rich sites and fascinating rock formations. Sign-posted discovery trails around the different sites can be reached from a series of interpretive centres within the reserve. Fossilised footprints of birds can be found in the reserve as well as fossilised plants. An extraordinary monument occurs within the attractive, wooded area of Saint Benoît two kilometres north of Digne. Here a huge rock shelf is covered with ammonites. More than 1,550 ammonites are preserved on a limestone wall 320 square metres in size. Guided tours are provided to sites where, for example, the skeleton of an *Ichthyosaurus* can be found, while the Verdon gorge offers the opportunity to discover the beautiful landscape of Haute Provence. Verdon is a most spectacular of the French canyons with a length of 21 kilometres and cliffs of up to 700 metres height. On discovery tours and educational trips, students learn about the need for, and the meaning of, geological heritage and protection. Information centres and exhibitions also offer guided tours and special publications for all visitors. The museums in Digne les Bains, Sisteron and Castellane are widely opened and also act as places where art and science meet. Frequent exhibitions are organized illustrating how themes of contemporary art are influenced by the relation of the artists to the natural environment. The "Réserve Géologique de Haute Provence" acts in association with local enterprises that work together for a systematic development of tourism in zones which have so far been ignored by the public. An example has been the establishment of footpaths in three different valleys with the support of the Leader II program.



Figure 2 The limestone wall with an enormous amount of ammonites, near Digne.

## Marble Arch Caves and Cuilcagh Mountain Park (N. Ireland—UK)

Cuilcagh Mountain Park opened in 1999 and is managed by Fermanagh District Council in conjunction with Marble Arch Caves. The Park was developed to protect this internationally important area of blanket bog and to increase public awareness of related Earth Science issues. An area of 2,500 hectares was successfully brought under favourable conservation and the landscape was opened up for sustainable tourism and environmental education. In addition to being one of Ireland's best tourist attractions, the Marble Arch Caves European Geopark offers a wide range of environmental education and field studies to schools, universities and adult groups. The Marble Arch Caves visitor centre contains an audio-visual theatre, exhibition area, gift shop, restaurant and is located beside a woodland nature reserve. Fermanagh District Council works closely with government agencies and wildlife charities in both Northern Ireland and the Republic of Ireland to develop sustainable tourism in the region. In the late 1990's, Fermanagh co-operated with both the Geological Survey of Northern Ireland and the Geological Survey of Ireland to

develop Landscapes From Stone, a tourism initiative based on the superb diversity of the landscape and geology in the northern half of Ireland.

Over the years Marble Arch Caves have attracted international recognition for their management approach that successfully combines conservation, development, and education with tourism. These efforts were rewarded in 2001 when Marble Arch Caves and the Cuilcagh Mountain Park became the first European Geopark in the United Kingdom.



Figure 3 Underground boat trip in the Marble Arch Caves.

## Madonie geopark (Italy)

The Geopark of Madonie is situated in the Province of Palermo along the Southern Apennine Mountains Chain. Within its territory there are 22 local councils, and the majority of them (15) are part of the regional natural park of Madonie as well. This territory in Sicily is among those with the most beautiful landscapes and with a special interest from a geologic and geomorphologic point of view as well as from a didactic point of view. The oldest Sicilian mountain and traces of the complete geological history of the island can be also found in this area. This mountain territory is mainly composed of limestone and limestone-dolomitic with interesting morphologies of karstic nature and presents a very rich and rare cultural and natural heritage. The area became part of the European Geoparks Network in 2001 after the candidature was presented by the local LAG with the full support of the Natural Park of Madonie. Both local entities are coordinated to deal with this issue. The Geopark activities are managed by a coordination group (both presidents of LAG and Natural Park, one geologist and one expert of local development). This group is also supported by the Department of Geology and Geodesy of the University of Palermo, which is giving scientific support for what concerns didactic and promotional activities. In this phase the Madonie Geopark is fortifying its didactic structure by opening a little geological museum especially dedicated to young people, and is intensifying its promotional activities.

## Naturpark Eisenwurzen (Austria)

The Naturpark Eisenwurzen, located in the Austrian province of Styria, is part of the Northern Calcareous Alps. Geotourism has a long tradition in the area. As early as in 1892 the Kraus Cave of Gams, one of the most splendid gypsum-bearing caves of Europe and the first one in the world with electric light, was opened to the public. In recent times, the adventure of experiencing 250 million years of Alpine history has given new impulses to tourism in the region which has suffered from extreme depopulation in the past decades.

Scientists have been aware of the magnificent geology of the region since the early 19th century. It might be mentioned that one geological time interval (about 235 to 230 million years ago) of the Triassic period has been named the Anisian stage after a section of rocks close to the Enns River, which was called Anisius fluvius in Roman times. Geotouristic activities are the domain of GeoLine, the geological branch of the Nature Park. These comprise two permanent exhibitions: The museum of the Second Vienna Water Supply Line, which benefits from karstic springs in the area, and the Geo-Centre of Gams, which provides an overview of regional geology. The GeoTrail and GeoBike, a demanding bicycle trail, provide in-situ evidence of geological phenomena: rocks, fossils as well as formations reflecting the incredible forces at work during the building of the Alps. Traces of the Great Ice Age are pervasive. The Water-

loch Gorge, which originates at a large karstic spring, provides deep insight into the geological activities of water. This most powerful of all geological agents may be explored in the Water Park of St. Gallen and at GeoRafting, which combines science with adventure. The GeoWorkshop serves all activities related to the preparation of geological items. Recognition as a member of the European Geoparks Network in 2002 has provided new impulses for the park.



**Figure 4** *The Geozentrum Gams. Section of the formation of jet and jet mining.*

### North Pennines Area of Outstanding Natural Beauty (U.K.)

The North Pennines Area of Outstanding Natural Beauty (AONB), one of the most beautiful, remote and unspoilt places in England, became in June 2003 Great Britain's first European Geopark. The rocks and landscapes of the North Pennines have amazing stories to tell, of moving continents and tropical seas, of molten rock and ice sheets and of minerals and the men that mined them.

This is a high, wild landscape of open moorland, tumbling rivers and green dales, stretching across 2000 square kilometres of County Durham, Cumbria and Northumberland. It is the second largest of the 41 AONBs in England and Wales, landscapes recognised by Government as the equal of the National Parks. It is noted for its diversity of wildlife and for its nationally recognised scenic qualities, but it also has a world-class geological heritage. This geological interest, coupled with past and planned effort for its conservation, led to the Geopark designation being conferred on the area. In the year since designation, the North Pennines AONB Partnership Staff Unit, which manages the Geopark designation locally, has been working closely with the British Geological Survey to produce the first Geodiversity Action Plan (GAP) for a UK protected landscape. As well as being



**Figure 5** *The Great Whin Sill at High Cup Nick above Dufton on the Pennine Way.*

the first comprehensive audit of the geology of the North Pennines AONB, it sets out a framework for action for the conservation and interpretation of many of the area's key sites and features of geological interest. The plan identifies a series of 'North Pennines Geodiversity Sites', which will be monitored by the AONB Partnership and conservation action taken where required. The AONB Partnership Staff Unit has also been working with local organisations from across the North Pennines to develop the area's first 'geology festival' and is developing transnational and local projects which will further conserve and interpret the area's rich geological heritage.

For more details about the North Pennines AONB European Geopark, please contact the AONB Partnership on [north.pennines@durham.gov.uk](mailto:north.pennines@durham.gov.uk)

### The Petrified Forest of Lesvos (Greece) as case study

The petrified forest covers an area of 15,000 ha on the western part of Lesvos Island located in the NE of the Aegean Sea in Greece. Within this vast area several unique palaeobotanical sites showing high concentrations of fossilized tree-trunks have been discovered. The formation of the Petrified Forest is directly related to the intense volcanic activity in the Eastern Aegean area during the late Oligocene-middle Miocene period. The fossilisation was perfect and therefore, the morphological characteristics of the tree trunks and the internal structure of the wood are preserved in excellent condition.

The high proportion of upright petrified tree trunks with well-preserved fossilised roots in the pyroclastic rocks, allows us to infer that the petrified forest of Lesvos Island represents a complete autochthonous (fossilised in situ) ecosystem.

In order to protect the petrified forest and ensure its proper management, the State declared it as a Protected Natural Monument by a special Presidential Decree (1985). In 1994, the Natural History Museum of the Lesvos Petrified Forest was established with main aim to undertake scientific research on this natural monument as well as to manage, protect, preserve and promote the rational utilisation of the petrified forest. Since 1997, systematic excavations in the region have been conducted (Velitzelos and Zouros 1998, 1999, 2001) with particularly impressive results. In 1988, the Petrified Forest Park was established, becoming the first organised visiting site in the area. Two important fossil sites became later the Sigri Geopark and the Plaka Geopark.

Covering an area of 30 hectares, the Petrified Forest Park constitutes a unique natural monument. The numerous perfectly pre-



**Figure 6** *The most typical standing petrified trunk of a conifer in the Petrified Forest Park belongs to the species of *Taxodioxyylon gypsaceum*.*



**Figure 7** A huge standing trunk of a petrified tree that can be found in the Petrified Forest Park. It belongs to the species of *Taxodioxyton gypsaceum*. Its height is 7.02 m and its circumference 8.58 m.

served standing trunks that constitute a complete petrified ecosystem immediately impress the visitor. Small-scale interventions were made in order to effectively conserve the fossil sites and to facilitate visitor access. These include protective low stonewalls and wooden fences that have been designed and built to guard the petrified trunks from run-off water and erosion, stone shelters with water fountains that have been built along the trails, and cobblestone pathways, stone bridges and stairs that were carefully added to the trail system.

The Museum, covering an area of 1597 m<sup>2</sup> includes permanent and temporary exhibition halls, an audio-visual room, library, laboratory, snack bar and museum shop. The permanent exhibitions include "the Petrified Forest Hall", which presents the evolution of plant life on earth from the appearance of the planet's first single cell organisms to the developed plant life and the creation of the petrified forest. The flora of the petrified forest is presented with fossil remains of over 40 different species found and identified in the broader area of western Lesvos. "The Evolution of the Aegean Hall", presents the various geological phenomena and processes associated



**Figure 8** Standing petrified trunk of a precursory form of pine whose root system has been uncovered in the Petrified Forest Park of Lesvos. Next to it, a slim-trunked conifer which could not withstand the violent volcanic explosion was broken off from its root system and carried off by the pyroclastic materials whose onrush flooded and covered the forest.



**Figure 9** University students visit a fossil site in the Petrified Forest Park.

with the creation of the Petrified Forest and the general geological history of the Aegean basin over the last 20 million years.

Rational management of the Petrified Forest area presupposes the development and promotion of all the elements that comprise the geological heritage of the area, the natural and cultural resources, the economic resources, as well as the human capital of the region. The strategic plan for the sustainable development of the area has been designed to link all the spot interventions and infrastructures already existing in the area. The plan concerns the protection and promotion of the Petrified Forest and its integration in the existing economic activities in an area with sufficient dimensions to support true territorial development.

Part of this strategy is the creation of "Lava Paths": footpaths that link the various sites of interest throughout the western peninsula of Lesvos island. The main concept is to invite the visitor to follow the path of the lava from the main volcanoes to the Petrified Forest. Information panels along the footpaths provide information about the different volcanic structures that the visitor will encounter along the way.

Over the last few years, the creation of the "Western Lesvos - Petrified Forest Geopark", has had an important effect on the development of the local economy.

In order to attract people to visit the "Western Lesvos-Petrified Forest Geopark" several scientific and cultural events are organised during the year, both in the Museum and the open air visiting parks. These include natural history exhibitions, lectures, book presentations, exhibitions of sculpture, painting and photography, music concerts, theatre performances and several other cultural happenings.

The Museum also organises special thematic events to celebrate special days (i.e. Museums International Day, Day of Monuments, Day of the Earth, Day of the Environment, European Heritage Days, music events on the August full moon night). It also participates in the pan-hellenic promotional campaign of these events which is



**Figure 10** The Natural History Museum of the Lesvos Petrified Forest in Sigri.

organised by the Greek Ministry of Culture along with other cultural organisations and museums.

Another important contribution to the local economy instantiated by the presence of the Museum is the increasing number of scientific congresses and meetings organised in the Museum congress hall. Such events bring scientists from all over the world to the Geopark, helping the Petrified Forest to become well known in the academic community as well as to promote the existing infrastructure for the hosting of academic and educational activities (i.e. research groups, educational visits, students field work). As a result, several universities have started to organise student visits and field work in the Geopark.

One of the main themes of the Geopark's activities is the organisation of environmental education programmes for elementary and high school students during the spring and autumn periods. Such visits by schools outside the main tourist periods also help in raising the awareness of the local society as to the importance of our natural monuments and the conservation of the Earth's heritage.

The creation of the "Western Lesvos - Petrified Forest Geopark" has also had an important effect on the unemployment of the region. Since 1995, 25 new young employees find seasonal employment (8 months per year) in Museum activities. This has to be added to the 5 existing places of work in the Petrified Forest Park. But what is even more important for the employment in the area is the number of other employment opportunities which have been created in tourist enterprises, small hotels, guest houses, restaurants and other activities connected with the increase of tourist flow in the Geopark's area. Several other local artisans, such as makers of handicrafts and ceramic fossil casts, carpenters, and blacksmiths, are permanent collaborators with the Geopark.

Furthermore, in collaboration with nine agro-tourist women's cooperatives, the Museum has established an agro-tourist festival during the summer period in order to promote the quality local products, food and drinks prepared using the old recipes from the women of the villages in the Geopark area. In this way visitors come in contact not only with the rich natural heritage of the area and sites of high ecological and aesthetic value, but also with the tradition, culture and local production of the Geopark's area.

## References

- Eder, W., 2004. The Global UNESCO Network of Geoparks, Proceedings of the first international conference of Geoparks, Geological Publishing House, Beijing, p.1-3.
- European Geoparks Network Magazine. 2001. No1.p.
- Fliche, P., 1898. Note sur les bois fossiles de Metelin. In L. De LAUNAY, Etudes géologiques sur la Mer Egée. Ann. Min. 2.
- Frey, M-L., 2003. Geopark Vulkaneifel: Geopotential, touristic valorization and sustainable development, Proceedings of the 2nd European Geoparks Network Meeting, Lesvos 3-7 October 2001, p. 29-44.
- Katsikatsos, G., Migiros, G., Triantaphyllis, M., and Mettos A., 1986. Geological structure of the internal Hellenides (East Thessaly-southwest Macedonia, Euboea Attica northern Cyclades islands and Lesvos) I.G.M.E. Geology and Geophysical research, Sp. issue, 191-212.
- Kelepertsis, E., Velitzelos, E., 1992. Oligocene swamp sediments of Lesvos Island, Greece. *Facies*, 27, 113-118.
- Krausel, R., 1965. The petrified forest of Lesvos. (Report)
- Martini, G., 2003. Presentation of the Reserve Géologique de Haute Provence, Proceedings of the 2nd European Geoparks Network Meeting, Lesvos 3-7 October 2001, p. 25-28.
- North Pennines AONB partnership, 2004. North Pennines Area of Outstanding Natural Beauty: A geodiversity Audit and Action Plan 2004-09. p.132.
- Patzak, M., 2003. UNESCO and geological heritage, Proceedings of the 2nd European Geoparks Network Meeting, Lesvos 3-7 October 2001, p.22-24.
- Pe-Piper, G., 1978. Cainozoic volcanic rocks of Lesvos island. Thesis, Univ. of Patras, p.365.
- Pisano, A.C., 2003. Madonie Geopark, Proceedings of the 2nd European Geoparks Network Meeting, Lesvos 3-7 October 2001, p. 98-106.
- Seraides P. Kralis F. and Zouros N., 2001. Petrified forest management. The creation of the Petrified forest park. Proceedings of the International symposium "Protected areas management-natural monuments" Lesvos 1998, 143-151.
- Suss, H. & Velitzelos, E., 1993. Eine neue Proto-Pinaceae der Formgattung Pinoxylon KNOWLTON emend. READ, P. parenchymatosum sr. nov., aus tertiären Schichten der Insel Limnos, Griechenland. Feddes Repertorium, 104, 335-341.
- Suss, H. & Velitzelos, E., 1994a. Ein neues fossiles Koniferenholz, Taxo-coxylon biseriatum sp. nov., aus tertiären Schichten der Insel Lesvos, Griechenland. Feddes Repertorium, 105, 5-6, 257-269.
- Suss, H. & Velitzelos, E., 1994b. Zwei neue tertiäre Holzer der Gattung Pinoxylon KNOWLTON emend. READ aus dem Versteinerten Wald von Lesvos, Griechenland. Feddes Repertorium, Berlin, 105, 7-8, 403-423.
- Velitzelos, E., 1993. Neue palaofloristische Daten zu kanophytischen Floren Griechenlands. Doc. nat., 78, 1-17.
- Velitzelos, E., Petrescu, I., Symeonidis, N., 1981. Tertiäre Pflanzenreste von der agaischen Insel Lesvos (Griechenland). Cour.Forsch. Inst. Senckenberg, 50, 49-50.
- Velitzelos, E., Gregor, H.-J., 1990. Some aspects of the neogene floral history in Greece. Rev. Paleobot. Palynol. 62, 291-307.
- Velitzelos, E., and Zouros N., 1997. The petrified forest of Lesvos - Protected Natural Monument. Proceedings of the International Symposium of I.A.E.G., Marinos, Koukis, Tsiambaos, Stourmaras Eds, Balkema, 3037-3043.
- Velitzelos, E., and Zouros N., 1998. New results on the petrified forest of Lesvos. Proceedings of the 8th International Congress of Geological Society of Greece, Bulletin of the Geological Society of Greece, vol.XXXII/2, 133-142.
- Velitzelos, E., and Zouros N., 2000. The petrified forest of Lesvos. Topio publications, Athens, p.142.
- Velitzelos, E., Zouros N. and Velitzelos, D., 2001. Contribution to the study of the palaeoflora of the petrified forest of Lesvos. Proceedings of the International Congress "Protected natural monuments and environmental education", Lesvos 24-26 September 1999, 160-169.
- Watson, R., 2003. Marble Arch caves and Cuilcagh Mountain Park, Proceedings of the 2nd European Geoparks Network Meeting, Lesvos 3-7 October 2001, p. 107-108.
- Woodley-Stewart, C., 2003. North Pennines AONB partnership: Application dossier for nomination as a European Geopark.
- Zouros, N., 1998. Natural monuments and geotouristic trails in the Aegean region and in Thrace, Greece. PROGEO '98, BULGARIA June 98 Abstract volume p.76.
- Zouros, N., 2003. The petrified forest of Lesvos-Greece: Principles and problems for a sustainable management. Proceedings of the 2nd European Geoparks Network Meeting, Lesvos 3-7 October 2001, p. 45-63.
- Zouros, N., Velitzelos E., and Seraides P., 2001. Petrified Forest of Lesvos: New findings on the palaeoflora support the uniqueness and the global importance of the natural monument. Proceedings of the "Protected areas management-natural monuments" International Symposium Lesvos 1998, 34-48.
- Zouros, N., Kontis E., and Tzeveleki G., 2001. Petrified forest and environmental education. Proceedings of the International Congress "Protected natural monuments and environmental education, Lesvos 24-26 September 1999, 69-75.
- Zouros, N., Martini G., 2003. Introduction to the European Geoparks Network. Proceedings of the 2nd European Geoparks Network Meeting, Lesvos 3-7 October 2001, p. 17-21.
- Zouros, N., Martini G., Frey M.L. (editors), 2003. Proceedings of the 2nd European Geoparks Network Meeting, European Geoparks Network - Natural History Museum of the Lesvos Petrified Forest. Lesvos, Greece, 3-7 October 2001, p. 184.

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