EUROPEAN GEOPARKS : Geoconservation and Sustainable local development

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ABSTRACT

Established in 2000, the European Geoparks Network (EGN) aims to protect geodiversity, to promote geological heritage to the general public as well as to support sustainable economic development of geopark territories primarily through the development of geological tourism. The network has drawn together territories from across Europe that share these aims and which are now working together in an active and dynamic way to achieve them.
Originally consisting of four territories, the network has, as of September 2007, been expanded to include 32 territories across thirteen European countries.
The network operates primarily by continues electronic communication, frequent coordination meetings and the establishment of common projects through which territories can exchange ideas, experience and best practice thereby supporting each other to fulfil our common goals.
Although geosite and geomorphosite protection and management is always the main focus area in geoparks, network members adopt a holistic approach to the promotion of our natural and cultural heritage. Furthermore all members consider full, local community involvement as essential to our success.
Examples of activities in geoparks include establishing of geological walking routes, education tours, school outreach days and promotion of geological heritage to the wider tourism sector.
In 2001 the European Geoparks Network signed a formal agreement with the Division of Earth Sciences UNESCO whereby UNESCO gave the network its endorsement. A further agreement was signed with UNESCO in 2004 whereby the EGN was given responsibility for regulating membership of the UNESCO Global Network of Geoparks in Europe.
Membership of the EGN is for a period of four years after which membership is reviewed and assessed. The revalidation procedure is one of the main internal procedures of the Network which helps to keep at a high quality level all Geopark operation, infrastructure and services.
Although still less than 7 years old, the European Geoparks Network has made great advances in achieving its aims and is attracting increasing attention from local communities across Europe as well as the wider geo-scientific community.

Key Words: European, Geoparks, Development, Geotourism, Sustainability

Introduction

At the start of the 21st century Earth scientists, can look back over a century that has seen enormous advances in our understanding of how our planet functions. While we might still not be able to predict exactly when an earthquake will happen or exactly when a volcano will erupt, we know why these phenomena occur. We know how and why mountain ranges are formed and we know how the very face of our planet changes over millions of years as the tectonic plates of the Earth's crust continue their relentless move over the surface of the planet.
For centuries, people had no clear understanding of Earth processes. Nevertheless, people were in awe of their landscape and of the planet's natural phenomena and stories, myths and legends arose to help explain them.
Earth scientists have explanations for all these phenomena. However, perhaps we should ask ourselves how successful are we at sharing this knowledge with those with no formal training? Moreover, how good are we at preserving these phenomena and special landscapes for future generations.
Many people today still ask the same questions our ancestors of long ago asked. Yet, all across our planets we have places where the amazing story of our planet can be told to the non-specialist without the need for the use of the esoteric language so often employed by geoscientists. Moreover these places should be conserved for the future. But it should not be our aim to conserve them in a sterile way where only the geoscientist can visit, it should be our aim to conserve in a way that the local communities can take

ownership of these places and where they can feel that these places contribute positively to their everyday lives.
Local communities across Europe, and increasingly other parts of the world, are beginning to realise that their Earth heritage can provide a source of sustainable economic benefit to their area. Rather than exploit this heritage in the non-renewable fashion of the past, there is an opportunity to manage it in a way that conserves it for the future through the development of geotourism. This form of sustainable economic development has the potential to directly impact on those rural areas that have suffered from economic stagnation or demographic decline.
But why should Earthscientists be involved in such activities? In simple terms, we have to demonstrate to the wider public the relevance of geological science in the 21st century. We have to re-build the bridge between our knowledge of the Earth, its history and its landscape and the total dependence of modern society upon Earth's natural resources, a link that was known to generations past.

European Geoparks Network

In June 2000 representatives of four European territories, which had separately been promoting geological conservation and sustainable development, came together in Greece to discuss their common socio-economic problems (stagnant economic development, high unemployment, rural depopulation and an ageing of the remaining population) and how to address these problems through the protection of Earth heritage and the promotion of geo-tourism. The result was the signing of a convention declaring the creation of the European Geoparks Network (Zouros and Martini, 2003).
In November 2000, the four founder members of the network, Réserve Géologique de Haute-Provence (France), Lesvos Petrified Forest (Greece), Maestrazgo Cultural Park (Spain), and Vulkaneifel (Germany) invited interested regions and organisations from across Europe to join them in learning more about geoparks and to apply for membership of the new network. From it's formal beginnings in June 2000, the European Geoparks Network has now expanded from consisting of four member territories to thirty-two members in thirteen countries (Figure 1). The European Geoparks Network is a co-operative organisation. It has a clearly defined internal structure comprised of two co-ordinators, an advisory committee and a co-ordination committee. Membership of the European Geoparks Network is limited to a period of three years for all members. After that, membership is re-evaluated.

Geoparks definition

As specified in the European Geoparks Network Declaration Charter, a European Geopark is not just a collection of geosites, but is a territory with a particular geological heritage and with a sustainable territorial development strategy (in Zouros et. al., 2003). It must have clearly defined boundaries and a sufficient area to allow for true territorial economic development, primarily through tourism. Geosites must be of particular European importance in terms of their scientific quality, rarity, aesthetic appeal and education value. Sites can not only be related to geology but also to archaeology, ecology, history and culture. All these sites in the Geopark must be linked in a network and constitute thematic parks with routes, trails and rock sections that can benefit from protection and management measures.
Geoconservation is implicitly expressed within the Charter of the European Geoparks Network through the strong statement that no destruction or sale of the geological value of a European Geopark maybe be tolerated, except for scientific or educational purposes. Furthermore, a European Geopark has to develop and enhance methods and tools for the preservation and conservation of geological heritage, as well as to support and develop scientific research related to the various disciplines of the Earth Sciences. Education and training on the natural and geological environment comes as a direct consequence of conservation strategies and aims to promote knowledge and value of geological heritage, outlining the concept of geodiversity in the territory.

Figure 1: Map showing the location of the 32 members of the European Geoparks Network as of September 2007. 1. Réserve Géologique de Haute - Provence – France, 2. Vulkaneifel European Geopark – GERMANY, 3. Petrified Forest of Lesvos – GREECE, 4. Maestrazgo Cultural Park – Aragon – SPAIN, 5. Psiloritis Natural Park – GREECE, 6. Terra.Vita Naturpark – GERMANY, 7. Copper Coast Geopark– IRELAND, 8. Marble Arch Caves Geopark– Northern Ireland,UK 9. Madonie Geopark – Sicily ITALY, 10. Geopark Kamptal-Manhartsberg – AUSTRIA, 11. Naturpark Steirische Eisenwurzen – AUSTRIA, 12. Naturpark Bergstrasse Odenwald – GERMANY, 13. North Pennines AONB – England UK, 14. Abberley and Malvern Hills Geopark – England UK, 15. Park Naturel Régional du Luberon – FRANCE, 16. North West Highlands – Scotland UK, 17. Geopark Swabian Albs – GERMANY, 18. Harz Braunschweiger Land Ostfalen Geopark – GERMANY, 19. Mecklenburg Ice Age Park – GERMANY, 20. Hateg Country Dinosaurs Geopark – ROMANIA, 21 Beigua Geopark – ITALY, 22. Fforest Fawr Geopark – Wales UK, 23. Bohemian Paradise Geopark – CZECH REPUBLIC, 24. Cabo de Gata – Nijar Natural Park – Andalucia – SPAIN, 25. Naturtejo Geopark – PORTUGAL, 26. Sierras Subbeticas Natural Park – Andalucia – SPAIN, 27. Sobrarbe Geopark – Aragon – SPAIN, 28. Gea Norvegica Geopark – NORWAY, 29. Sardenia Geominerario Park – ITALY, 30. Papuk Geopark – CROATIA, 31. Lochaber Geopark – Scotland UK, 32. English Riviera Geopark - England UK.

Sustainable development is considered as an essential practice for economic development in the territory and for the strengthening of the management structure and, therefore, for the Geopark itself. Earth heritage is evaluated and considered from the inhabitants' perspective, presence and needs. The contribution of the Geopark is thus seen through the enhancement and promotion of a certain image related to the Earth heritage and the development of tourism with related actions. This should have a direct impact on the territory influencing its inhabitants' living conditions and environment, lead to a revalidation of the values of the territory's heritage and enforce active participation to the territory's cultural revitalization as a whole. Finally, and crucially, a European Geopark has to work within the network for its further expansion and cohesion, collaborate with other geoparks and local enterprises for the achievement of its

objectives, create and promote new by-products linked with geological and cultural heritage in the spirit of complimentarity with the other European Geoparks Network members.

Geopark activities

Typical activities in a European Geopark include the creation of geotouristic infrastructure including the development of pathways linking geosites and placement of interpretation panels, the operation of modern museums and visitor centres, the development of geotouristic and educational activities (walking and cycling trails, the training of local people to act as guides, education courses, provision of information signage and the development of educational and promotional material), the organization of exhibitions, cultural and scientific activities, meetings and events as well as the development of collaboration with local enterprises, producers and cooperatives for the development of services and promotion of local products and handcrafts.

The ultimate aim of a European Geopark is to bring enhanced employment opportunities for the people who live there. These opportunities are now being realised right across the expanding network but they are being created in association with the conservation of the geological heritage of the geoparks. But this conservation is not of the restrictive type. Geoparks use a holistic approach to conservation where all aspects of a geopark's natural and cultural heritage are valued, conserved and promoted under the geopark label.

Network Common Activities

One of the stated aims of the European Geoparks Network is to exchange ideas and expertise on promoting geological awareness and sustainable development. It is with this aim in mind that the members come together twice per year. Once annually the network meets on its own while on the second occasion the network meets a few days in advance of the annual meeting which is open to everyone, members and non-members alike. These meetings promote the use of common tools such as the website (www.europeangeoparks.org), magazines, displays, events but also encourage members to develop exchanges or projects between smaller groups of geoparks.

Once a year all members participate in European Geoparks Week. This is a series of coordinated events (guided walks, talks, guided tours, exhibitions, happenings, activities for children) which occur in the same week in every member of the network and which is aimed at increasing public awareness about Earth Science issues in general and about building awareness of the European Geoparks Network and our great shared geological heritage. Not only is the public in one geopark informed about activities occurring there but they are made aware of the fact that they are part of a much wider series of events that will be happening across Europe.

Transnational networking and sharing of knowledge will mean new concepts, outputs and results for further integration on spatial planning, environmental problems and development issues. The creation of quality standards for geoparks services and products is one of the key aims of the network. As part of this, an evaluation process has been established that will try to measure the level of quality in infrastructure, services and sustainable management in each member of the network. An evaluation dossier has been drawn up and the evaluation process occurs in two parts. Firstly, the geopark subject to the evaluation completes a self-evaluation. This is followed by a visit and an evaluation by an independent referee. A geopark which fails to reach a certain quality level in the evaluation process will loose its membership of the network. To date this has happened to three former members.

EGN and UNESCO

One of the key early successes for the European Geoparks Network was the signing of an official agreement of collaboration with UNESCO (the then Division of Earth Sciences) in April 2001 which placed the new network under the auspices of UNESCO, thereby confirming the network's important contributions to conservation and sustainable development issues in Europe.

Since then, UNESCO has played an important role in the development of the European Geoparks Network and has used the European model as the one to follow as they roll out their Global Network of Geoparks (Eder, 2004). At a meeting in UNESCO headquarters in Paris in February 2004 representatives from the scientific board of the International Geo-science Programme, the International Geographical Union and the International Union of Geological Sciences along with international experts on geological heritage, conservation and promotion agreed to the establishment of a "Global Network of Geoparks under the auspices of UNESCO." Three goals were established for the new global network, i.e. conserving a healthy

environment, education about Earth Sciences to the wider public and fostering sustainable local economic development.

Geoconservation and local development

Although abiotic nature has a profound impact on the evolution of life and intrinsic value of geosites and landscapes for the natural environment is broadly accepted, their recognition as elements for protection and conservation in most European countries is related mainly either to the conservation of habitats and ecosystems or to the protection of cultural sites.

Geosites and geomorphosites do not characterized as elements of value for conservation and management in most European protected areas and they are not mentioned in the management plan of the National Parks, Natural parks as well as from their promotional and educational publications and materials. Geoparks management plans resulted in promotion and conservation of the rich geodiversity within their territories and especially to the enforcement of protection regulation and measures for geosites and geomorphosites of outstanding importance and value. European Geoparks host some of the most significant Earth heritage sites in Europe (Table 1).

Table 1: Prominent geosites within the European Geoparks

European Geoparks	**Prominent geosites and landscapes**
1. Réserve Géologique de Haute - Provence – FRANCE	Amonite slab, Verdon gorge, Structural landforms – "Velodrome", Serenian fossil site,
2. Vulkaneifel European Geopark – GERMANY	The "eyes of the Aifel"- Maar volcanic craters, volcanic geosites, Fossil sites
3. Petrified Forest of Lesvos – GREECE	The petrified forest, Vatousa volcanic crater, Volcanic landforms, Coastal landforms, Tectonic landforms
4. Maestrazgo Cultural Park – Aragon - SPAIN	Structural landforms of Aliaga, Guadalope river valley, "Grutas de Cristal" caves
5. Psiloritis Natural Park – GREECE	"Talea ori" stratigraphic unit, Psiloritis mountain tectonic napes, caves and gorges, Nida plateau doline, "Chonos" karstic features,
6. Terra.Vita Naturpark – GERMANY	"Wiehengebinge" Dinosaur footprints, Carboniferous plant fossils, the "Gattberg – sea of rocks" and "Butterstone" erratic block
7. Copper Coast Geopark– IRELAND	Copper mining heritage sites, Coastal geomorphosites
8. Marble Arch Caves – Northern Ireland UK	Marble arch caves and karstic landscapes of Cuilcagh mountain, Drumlin landscape of Fermanagh
9. Madonie Geopark – ITALY	Raffo-Italkali salt mines, Gole di Tiberio Gorge, Pizzo Dipilo massif – karstic landscape, Isnello gorge, Abisso del Vento cave, Monte d' Oro relief, Piano Zucchi-periglacial deposits, Carbonara tableland, Piano Bataglia polje,
10. Kulturpark Kamptal – AUSTRIA	Granitic erosional landforms
11. Naturpark Steirische Eisenwurzen – AUSTRIA	Glacial valleys and steep gorges in the Eastern Alps, Kraus cave
12. Naturpark Bergstrasse Odenwald – Germany	Messel pit WHS, "Ocean of stone" permafrost landforms
13. North Pennines AONB – England - UK	Lead mining heritage sites, Glacial and fluvial landforms
14. Abberlay and Malvern Hills Geopark – UK	Silurian and Triassic complete stratigraphic sequence, Glacial and fluvial landforms
15. Park Naturel Régional du Luberon – France	Oligocene fossiliferous deposits, Ochre massif, Oppedette and Veroncle gorges
16. North West Highlands –Scotland-UK	Moine thrust zone, Lewsian Gneis complex, "Cnocc and lochan" landscape, glacial valleys and lakes – Glencoul and Glendhu, Cape Wrath rocky coast, Buachaille - sandstone pillars, Karstic features

17. Geopark Swabian Albs – GERMANY	Nusplingen fossil site, Swabian Alb karstic caves – Blautopf spring, Steinheim Meteoritic impact crater, Upper Danube valley, Albtrauf escarpment
18. Geopark Harz Braunschweiger Land Ostfalen Geopark – GERMANY,	Rogenstein stromatolites, Hartz mountains, "Rosstrappe" granitic cliff, "Devil's wall" -Erosional landform
19. Mecklenburg Ice age Park – GERMANY	Mecklenburg ice age landscape
20. Hateg Country Dinosaurs Geopark – ROMANIA	Dinosaur fossil sites
21. Beigua Geopark - ITALY	Alpine Ophiolitic sequence in Beigua massif, "Blocks field"-periglacial geomorphology, Gargassa valley, Masone valley "snake" waterfall
22. Fforest Fawr Geopark – Wales – UK	Glacial and fluvial landforms
23. Bohemian Paradise Geopark – CZECH REPUBLIC	Bohemian Paradise Protected Landscape – rock cities
24. Cabo de Gata – Nijar Natural Park – Andalucia – SPAIN	Cabo de Gata volcanic complex, Almeria bay
25. Naturtejo Geopark – PORTUGAL	Ichnological park of Penha Garcia, Monsanto inselberg, Portas do Rondao epigenic gorge, Erges fluvial gorges,
26. Sierras Subbeticas Natural Park – Andalucia – SPAIN	Karstic depression of La Nava, Bailon river canyon, Los Hoyones donines, Los Lanchares stone field, the Bat caves
27. Sobrarbe Geopark – Aragon - SPAIN	Monte Perdito and Ordesa valley (WHS, MAB)
28. Gea Norvegica – NORWAY	Glacial landforms - fiords, eskers, drumlins
29. Sardenia Geominerario Park – ITALY	Coastal landforms
30. Papuk geopark - CROATIA	Rupnica columnar ryolites, Papuk karst features – abysses, sinkholes and caves
31. Lochaber Geopark – Scotland UK	"Glen Roy" glacial landscape, glacial lakes
32. English Riviera Geopark - UK	Torbay Coastal landforms

Geoparks provide an excellent opportunity for the identification, valorization, interpretation, protection, and utilization of geosites lying within their territories.

A Geopark's management plan is the main tool for their operation. It has been conducted by the Geopark's management structure and approved by the local authorities and stakeholders. The management plan describes the deferent components of the geopark operation and defines goals to be achieved during a certain time period. It includes a geoconservation strategy and certain measures on geosite identification, assessment, documentation, protection and interpretation as well as on the enhancement of the territory's natural and cultural heritage. It also focuses on the operation of natural history museums and interpretation centers, the creation and maintenance of the necessary geotouristic infrastructure (trails, observation points, information panels, car parks, cantinas, etc) and land management, the development of geotouristic, educational and promotional activities, the creation of information and educational publications as well as to geosites implementation, monitoring and review. An integral part of the management plan is the creation of links with local enterprises and cooperatives, the support of local business and contribution to local development.

During the last seven years European geoparks implemented a range of activities aimed at the further improvement of their infrastructure, services, activities and promotion.

The results of the Geoparks operation include broader understanding of Earth heritage issues in their local communities, the public end EU investment on geosite protection, conservation and utilisation, the creation of geotouristic infrastructure, a significant increase in the number of visitors, the enrichment of their museum, interpretation center and open air visiting areas offer and services to visitors, and the improvement of their operations. Geoparks show concrete results in public sensitization on earth heritage and active involvement of the local communities in geosite promotion as a tool for territorial development.

Evaluation and Revalidation

In order to achieve high quality standards in Geoparks operation, the European geoparks Network decided to establish an evaluation procedure for all new applications. Evaluation missions are undertaken by two geopark experts who are sent to evaluate the application on the spot and to discuss the application with the relevant national and local authorities as well as stakeholders and local communities. Further, evaluators are also requested to make comments on integrity and future management of the proposed geopark. These recommendations have been, in many cases, critical to strengthening the success of the application in the long run. The evaluation procedure involves the submission of an evaluation report supported by a questionnaire document (Table 2.)

Wishing to keep high quality in Geoparks operation and services provided to visitors, EGN membership is limited in 4-year time and can be renewed following the same procedure. Every member of the EGN will have their membership reviewed on an on-going 4-year basis. The review will take the form of a revalidation process involving the submission of a revalidation dossier and questionnaire document and a visit by two evaluators nominated by the EGN Coordination Committee and UNESCO, coming from e different state from the revalidating Geopark. The revalidation process involves an examination of progress in geological heritage protection and promotion within their geopark as well as the development of sustainable economic activity within their territory. However it will also take into account the geopark's degree of active participation in the life of the network e.g. attendance at meetings, participation in common projects such as European Geoparks Week, willingness to lead new initiatives etc

Table 2. Main components of the Geoapark's evaluation document

	Category	Weighting	Score
I	Geology and Landscape 1. Territory Geodiverisity - Geosite identification and documentation Geosites with public access Similarities with existing geopark 2. Geoconservation Geosite assessment, Legal protection and regulations, Protected geosites, Mesures against misuse, damage and natural degradation 3. Natural and Cultural Heritage Natural and cultural heritage sites Links between abiotic, biotic and cultural heritage Promotion of Natural and Cultural Heritage	5 20 10	1000 1000 1000
II	Management Structure Management structure and Financial resourses Master Plan Components, Marketing Strategy – Componets Research activities, Measures for geoconservation Measures for geotourism development Infrastructure – Museums – Info centers	25	1000
III	Interpretation and Environmental Education Reasearch programs, Educational programs, Educational material, Promotional material, Published guides, books, videos, etc, Internet site	15	1000
IV	Geotourism Geotourism infrastructure, Sustainable tourism activities Interpretation facilities and services, Guided tours and outdoor activities, Public Access and facilities, Visitor's evaluation	15	1000
V	Sustainable Regional Economic Development Promotion of regional food, products, crafts, Geotouristic products and souvenirs, Links with regional business, Services provided from local enterprises, Local networking	10	1000
	Total Score	100	1000

Conclusions

The European Geoparks Network continues to expand, drawing in new expertise and knowledge from all parts of Europe. Many new membership applications are pending and members from across the network are assisting these territories in their membership bids to ensure the overall high quality of services the network insists on is maintained. The network is still young and the coming years will continue to be one of great challenge.

With our partners in the Global Network of Geoparks, the European Geoparks Network will continue to assist UNESCO in bringing the geopark concept to all parts of the world, especially to the developing world where sustainable tourism, such as that developed within geoparks, could lead to job creation in local rural communities for the benefit of those communities.

References

Eder, F.W., 2004, The Global UNESCO Network of Geoparks, in Zhao, X., Jiang, J., Dong, S., Li., & Zhao, T., eds, Proceedings of the First International Conference on Geoparks: Beijing, Geological Publishing House, pp1-3.

Frey, M-L., Martini, G. & Zouros, N., 2001, European Geopark Charter, *in* Frey, M-L., ed:, European Geoparks Magazine. Issue 1 (2001), 28.

Gray M. (2004) – *Geodiversity, valuing and conserving abiotic nature*. J. Wiley & Sons, Chichester, 434 p

Martini, G. & Zouros, N., 2001, European Geoparks: Geological Heritage & European Identity – Cooperation for a Common Future, *in* Frey, M-L., ed:, European Geoparks Magazine. Issue 1 (2001), 4.

Mc Keever P. and Zouros N. (2005) Geoparks: Celebrating earth heritage, sustaining local communities *Episodes* vol. 28, No 4, p. 274-278.

UNESCO (2004) – *Network of national Geoparks seeking UNESCO assistance*. UNESCO, Paris, January 2004. Internal document, 13p.

Zouros N. (2004) – The European Geoparks Network Geological heritage protection and local development. *Episodes*, 27/3, 165–171.

Zouros, N. & Martini, G., 2003, Introduction to the European Geoparks Network, *in* Zouros, N., Martini, G., & Frey, M-L., eds, Proceedings of the 2nd European Geoparks Network Meeting: Lesvos, Natural History Museum of the Lesvos Petrified Forest, pp. 17-21.