

european GEOPARKS

UNESCO & GEOPARKS

A big step forward

network
European Geoparks Magazine • Issue 9



Foreword

Magazine 9 presents an overview of the range of activities and achievements of the European Geoparks Network between 2010 and 2011. These include the European-wide festival European Geoparks Fortnight 2011, the successful 10th European Geoparks Conference, the recommendations of the 36th UNESCO General Conference for the future of the Global Network of Geoparks, activities and initiatives within geoparks and the increased membership of the European Geoparks Network from 43 to 49.

The 10th European Geoparks Conference entitled "Sustainability through Knowledge - Communicating Geoparks" hosted by Gea Norvegica Geopark (16 - 20 September 2011) included two days of lectures and poster sessions followed by field excursions in the Geopark's unique and beautiful landscape. Four parallel sessions involving approximately 100 lectures addressed seven themes: Aspiring Geoparks; Interpretation and Communication; Geo-conservation and Sustainable Development; Education and Research; Geotourism; Geopark Management; Geoparks and International Collaboration. This wide range of subjects provided 240 delegates from 35 countries with a substantial agenda for lively discussions and debate. Seven European and three Asian Geoparks were welcomed into the Network during the Conference.

In this issue twenty four articles demonstrate how European Geoparks contribute to conservation, education and the promotion of sustainable development through geotourism. In these articles Geoparks share experiences of working with local communities, communicating information about their territories and using these interrelated activities to create enjoyable and memorable experiences for their inhabitants and visitors. English Riviera Global Geopark illustrates the design of a park based on its geological history by the Paignton Geopark community project. Cabo de Gata-Níjar Geopark describes the initiation of an inter-territorial and transnational project using geodiversity as a source of employment. Adamello Brenta Geopark's Junior Ranger Programme shows how geoparks contribute to recreational activities and local economies. Arouca Geopark achieves similar aims through annual school contests. TERRAvita Geopark's "Three-Mountains-Project" introduces "Energy and Climate", "Biological Diversity" and the "History of the Earth". Rokua Geopark initiated an annual challenge race to raise awareness of the Geopark. The Night of Museums and Galleries celebration introduced over 1400 visitors to the values of the Novohrad- Nograd Geopark. The Basque Coast Geopark proposes the need for developing a common perspective through using the Internet. Bohemian Paradise and Shetland Geoparks demonstrate the use of digital technologies for communicating information. In 2011 Madonie Geopark utilized its geology as an inspiration for art, sculpture and theatre. Secondary school pupils produced two films exploring the landscape and geology of North Pennines AONB Geopark. The "International Day of Biodiversity" provided a stimulus for Eisenwurzen Geopark to celebrate its forested landscape. The Lesvos Petrified Forest Geopark's "Earth Festival" exhibited newly discovered fossil animals, the inhabitants of a 20 million year old subtropical forest ecosystem. Contributions from Croatian and Italian Geoparks focus on aspects of their archaeology. The importance of industrial history and archaeology is highlighted in articles by Geopark Harz Braunschweiger Land Ostfalen, GeoMon Geopark and the Tuscan Mining Geopark. Magma Geopark introduces "The Nordic Geo Guide School" initiated to provide education for geopark guides. Naturtejo and Subbeticas Geoparks describe the development of a tour and geological trails respectively. Geopark Swabian Albs shows how it informs its visitors through a network of 17 Infostations.

The expansion of the European Geoparks Network is reflected by the inclusion of articles from six new Geoparks. The growth of the Network produced a shift in the location of the world's northernmost Geopark from Finland to Iceland, and the inclusion of the new transnational Muskau Arch Geopark which unites territories in Germany and Poland.

The possibility of formalizing the current Geoparks initiative and transforming it into a UNESCO Geoparks Programme or Initiative as recommended in Draft Resolution 36 C/14 of the 36th UNESCO General Conference represents a milestone in the development of the Global Network of Geoparks. Geoparks now need to focus, over the next two years, on improving the prospects of realizing an International UNESCO Geoparks Initiative.

Tony Ramsay, Member of the Editorial Board



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The 36th UNESCO General Conference which took place in Paris

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The 36th UNESCO General Conference and Geoparks

UNESCO determines its policies and main lines of work through a series of biennial General Conferences. During the 36th UNESCO General Conference which took place in Paris from October 25th to November 10th 2011, the cooperation between UNESCO and the Global Geoparks Network, was examined.

Exhibition open UNESCO

Touch screens, specially created for the General Conference and subsequently destined to become part of a permanent exhibition at UNESCO, provided delegates with a wealth of information concerning Geoparks, Man and the Biosphere, and World Heritage Sites.

Science Commission

The Draft Resolution 36 C/14 on Geoparks which was adopted by the UNESCO

Executive Board in September 2011 was presented during the session at the Science Commission by the Assistant Director-General of the Sciences Sector Gretchen Kalonji, who said "Geoparks are one of the most efficient initiatives of UNESCO with incredible outreach!" This approach provides a sound basis for further development.

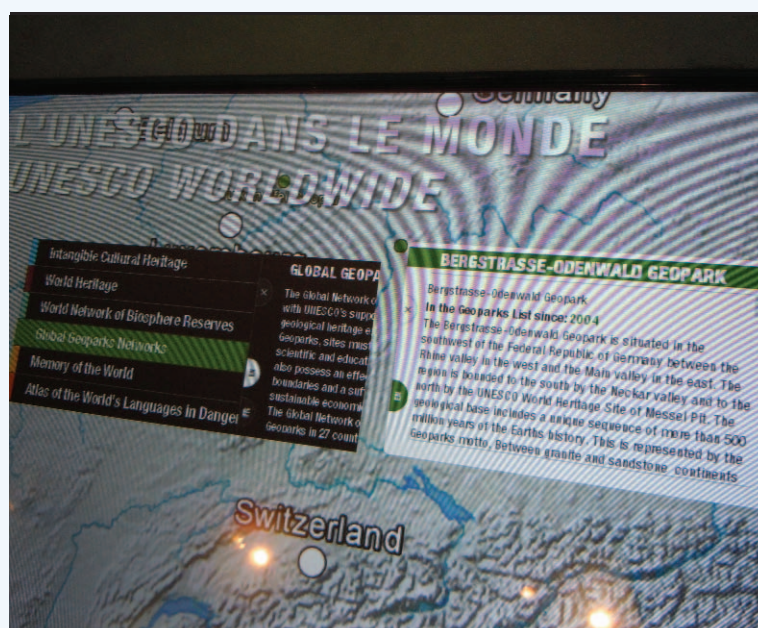
Delegates from twenty-four countries took the floor: Australia, Ireland, Chile, Poland, Italy, Kenya, Greece, Switzerland, France, Republic of Korea, Uruguay, Vietnam, Malaysia, Netherlands, Slovenia, China, Argentina, Dominican Republic, United States of America, Mexico, Germany, Botswana, United Kingdom of Great Britain and Northern Ireland and Honduras. The Coordinators of the European Geoparks

Network, N. Zouros and P. Mc Keever, who represented Greece and the Republic of Ireland respectively, described the activities of the Global Geoparks Network and replied to comments. During the ensuing debate, the Botswana delegate stated that the Geoparks initiative is one of the very few and the most successful "bottom-up" initiative in UNESCO and thus UNESCO should continue supporting it!

At the end of the session, the Draft Resolution of the document 36 C/14, see below, was adopted by the Science Commission without amendments and subsequently endorsed by the plenum of the General Conference. Geoparks have made significant progress, but now need to work with even greater enthusiasm within the next two years to develop further the out-

Example of a touch screen image at the UNESCO General Conference

The EGN's Coordinator, **Nikolas Zouros** and Vice-Coordinator **Patrick McKeever** using one of the touch screens created for the UNESCO General Conference





Delegates at the Science Commission session of the 36th UNESCO General Conference

comes of the 36th UNESCO General Conference in order to improve their chances of achieving an International UNESCO Geoparks Initiative.

Conclusions

In closing the 36th UNESCO General Conference, the Director-General I. Bokova drew three conclusions for UNESCO from the General

Conference: to assume greater leadership across its entire mandate, to focus on innovation by tackling new issues in new ways with new partners, and to keep up the pace of change and build on the first results of reform. "Our mandate is ambitious, so must be our action. Expectations are high. I am determined we must meet them...Uncertain times call for more UNESCO. They call for a better UNESCO."

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RESOLUTION 36 C/14

Background: Looking back on 11 years of Global Geopark activities and the increasing profile of the Global Geoparks Network, which as of September 2011 has 87 members in 27 countries, the need to further define the role of UNESCO has become apparent. During the deliberations at the joint meeting of the Programme and External Relations Commission and the Finance and Administration Commission at the 187th session of the Executive Board, a number of Member States reconfirmed their interest in Geoparks and carried out modifications to the draft decision of document 187 EX/6 Part VI regarding the report by the Director-General on cooperation between UNESCO and the Global Geoparks Network.

Purpose: The General Conference is hereby invited to approve the resolution recommended by the Executive Board at its 187th session (187 EX/Decision 6 Part V) which aims to further explore possible means on how to define the future role of UNESCO in assisting Member States and in cooperating with the Global Geoparks Network.

1. The activities of the Global Geoparks Network focus on the key aims of building sustainable economic development through strong community-based activities including education at all levels and exploring and celebrating the links between geological heritage and other aspects of natural, cultural and intangible heritage.
2. At the 187th session of the Executive Board, a number of Member States confirmed how useful Geoparks were for enabling communities and contributing to sustainable development and education. Delegates highlighted what Geoparks have already achieved, and further noted that UNESCO is the only United Nations specialized agency dealing with the earth sciences, and therefore Geoparks had no other United Nations "home". After the examination of document 187 EX/6 Part VI, the Executive Board modified the draft decision which is noted below to explore further possible means on how to define a future role for UNESCO in assisting Member States and in cooperating with the Global Geoparks Network.



3. The General Conference may wish to adopt the resolution recommended by the Executive Board contained in paragraph 2 of 187 EX/Decision 6 Part V reproduced below:

The Executive Board:

1. Having examined the document 187 EX/6 Part VI,
2. Recommends that the General Conference adopt the following draft resolution at its 36th session:

The General Conference,

Welcoming the positive impact of Geoparks on education, sustainable development and cultural identity of a region, and the considerable progress of the Global Geoparks Network,

Highlighting the important contribution of geology and Geoparks to climate change and geological hazards mitigation,

Recalling the need to assist Member States in establishing Geoparks in their countries, especially in developing countries and ensuring strong capacity-building in Latin America and the Caribbean and Africa,

Bearing in mind that Geoparks activities have been performed successfully for 11 years and have developed into a global network with 87* members in 28** countries with the full support of the International Union for Conservation of Nature (IUCN) and International Union of Geological Sciences (IUGS),

Further recalling the Geoparks initiative contributes to enhancing UNESCO's visibility while at the same time having low operating and secretariat costs and the potential to bring extrabudgetary funds to the Organization,

Requests the Director-General:

- (a) to continue to improve cooperation between UNESCO and the Global Geoparks Network (GGN) and strengthen global development of Geoparks while improving the quality standards they have already developed,
- (b) to ensure a reference to Geoparks in document 36 C/5,
- (c) to explore in consultation with Member States the possibilities of formalizing the current Geoparks initiative, inter alia, examining the possibility to transform it into an international UNESCO Geoparks Programme or Initiative, including financial and administrative implications,
- (d) to that end to consult in a cost-effective manner with Member States, GGN, experts and all concerned parties, including relevant UNESCO sectors and their programmes to carry out the following actions:
 - (i) examine the feasibility of establishing a possible UNESCO Geoparks Programme or Initiative building on the existing success and experience of the GGN and Geoparks,
 - (ii) discuss and formalize the baselines of such a programme or initiative, its working methods, questions of competency, representativeness, involvement of relevant official partners as well as qualified persons,
 - (iii) explore fundraising opportunities and modalities which would allow UNESCO to strengthen international networking and assist emerging Geopark projects in developing countries, with a special focus on LAC and Africa,
 - (iv) assess options for arrangements for a formal partnership with the GGN,
 - (e) to report back to the Executive Board at its 190th session.



11TH EUROPEAN GEOPARKS CONFERENCE

19 > 21 Sept 2012
Arouca Geopark
Portugal

smart
inclusive
sustainable
growth

The Arouca Geopark Association (AGA) and the Municipality of Arouca are very pleased to invite you to participate in the 11th European Geoparks Conference. This event will be held in Arouca Geopark and Oporto City from the 19th to 21st September 2012. The motto of this conference is "Geoparks: a contribution for smart, inclusive and sustainable growth" and during this event all of you are invited to share, discuss and learn about these issues in Geopark territories.



The theme of the conference follows the growth strategy of the European Union until 2020. Thus the main topics for discussion will focus on Geoparks as territories that generate regional growth and jobs and help address social challenges by:

- developing and actively supporting education by encouraging people to learn, study and update their skills;
- supporting research and innovation;
- creating new products and services;
- fostering the digital society through the use of information and communication technologies;
- stimulating sustainable growth by encouraging the protection of the environment through the development and installation of green technologies;
- ensuring the development of a network which provides cooperatives and local SMEs with additional competitive advantages.
- promoting inclusive growth by stimulating the local economy to ensure economic, social and territorial cohesion.

Participation is open to all persons interested in one or more of these broad topics, and we particularly encourage the participation of people from Africa and Latin America in order to discuss the situation and opportunities in their countries.

**All are very welcome to the Arouca Geopark,
in the northwestern region of Portugal!**

For more information on the conference please check our homepage
<http://www.geoparquearouca.com/egnconference2012>
or contact

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The European Geoparks Week 2011

Celebrating Earth Heritage

The European Geoparks continued to promote and celebrate their regions as destinations where nature provides outstanding insights into the geological and geomorphological development of landscapes through the European - wide festival 'European Geoparks Week 2011'. In numerous events Geoparks all over Europe highlighted the influence of the regional geology on land use, architecture and culture as well as emphasizing geo-conservation, geo - tourism and educational activities in Geoparks. The common motto of the European Geoparks Week 2011 was "Celebrating Earth Heritage".

From 21 May to 5 June

2011, the geoparks celebrated through a variety of events ranging from public lectures and conferences emphasizing the scientific significance of their territories, guided walks and alpine trekking in which participants were introduced to interpreting landscapes, visits to mines and geological training courses. Children could experience earth history for the first time through workshops and entertaining competitions. Visitors and Geopark residents were attracted by concerts, sports activities, photo exhibitions and markets selling regional craft products. The inauguration and opening of new geological trails for public use is still a significant compo-

nent of the Geoparks Week.

Since 2008, the number of trans - European activities and events has increased steadily from 450 to 620, and the number of visitors and participants has increased from 37, 500 to 108,000. These figures show that the European-wide festival 'Geoparks Week' is increasingly successful in promoting the sustainable use of our geological heritage, in relating geology to culture and in demonstrating to the general public the potential of Geoparks for bringing sustainable development to local communities.

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10th European Geoparks Conference in Norway

Sustainability through knowledge - communicating Geoparks



Opening of the Steinvika Geosite

Gea Norvegica Geopark hosted the 10th European Geopark Conference in September, 2011. In variable autumn weather, 240 delegates from around the world met for five days in scenic Langesund. A total of 35 nations were represented, and there were so many lectures from aspiring Geoparks that they contributed to sessions throughout the programme. It is wonderful to see the enormous interest in the Global Geoparks Network and the European Geoparks Network. The delegates, who arrived in good time before the conference, had the opportunity to visit Langoya outside of Langesund with the Geopark Guide Roger Normann, who

introduced the geology, botany, cultural and coastal history of this limestone island. The introductory sessions consisted of three lectures: Mona Holte from Gea Norvegica took the dele-

gates on a virtual tour through the Geopark, while Lars Erikstad from NINA spoke about protection of our geological heritage in Norway and Europe. Sven Dahlgren, regional geologist and Gea Norvegica



The fiddle-player Johanne Flottorp and singer Ingebjorg Lognvik Reinholdt performing at the Opening session



The new members of the growing EGN and GGN family

Geopark's - founder, delivered an engaging lecture about a catastrophe that struck a protected geological site. The Steinvika Ordovician fossil locality was covered in oil when a shipwreck occurred just off the coast in 2009. Today, the fossils are preserved and the area has been almost totally recovered, as the delegates were able to see for themselves later that day. Following the Opening Ceremony, there was an excursion to Steinvika, where the area was officially opened as a new Gea Norvegica Geopark geosite. Representatives from the owner municipalities of Gea Norvegica Geopark were

present at the Opening Ceremony, and the conference was officially opened by Mayor Jan Pieter Flolo from the host - municipality Bamble. There were also opening speeches from the Telemark county authority, Telemark Governor, and representatives from the GGN, EGN, IUGC and UNESCO. The Langesund School Music Corps played at the opening ceremony, while part of the cultural programme was provided by folk musicians Ingebjorg Lognvik Reinholdt and Johanne Flottorp. The professional programme consisted of four parallel sessions, with poster presentations during coffee breaks. Both conference days began

with a plenary session of keynote lectures. Among these was an interesting presentation by the leader of the Norwegian National Commission for UNESCO, Professor Peter M. Haugan, about the Geoparks' role in education, communication and culture in connection with climate change. The following seven sub-themes were addressed in approximately 100 lectures: Aspiring Geoparks, Interpretation and Communication, Geo-conservation and Sustainable Development, Education and Research, Geotourism, Geopark Management, and Geoparks and International Collaboration. In addition to the session on Aspiring



Gea Norvegica staff and some of the politicians wearing traditional Norwegian folk costumes at the Ceremony introducing new Geoparks



The use of water as a source of energy and for transportation. The lock systems at Ulefoss, the Telemark Canal, part of Gea Norvegica Geopark

Geoparks there were many talks on the themes of education and interpretation, and geotourism. A festive Conference Dinner was held on Saturday evening, and was preceded by a formal ceremony introducing 10 new geoparks. The new geoparks welcomed included: Apuan Alps Geopark, Italy; Massif des Bauges Geopark, France; Burren and Cliffs of Moher Geopark, Ireland; Katla Geopark, Iceland; Muskauer

Faltenbogen, Germany and Luk Muzokowa, Poland (transborder Geopark); Sierra Norte de Sevilla Geopark, Spain; Villuercas-Ibores-Jara Geopark, Spain; Hong Kong Geopark, Hong Kong S.A.R. China; Muroto Geopark, Japan; and Tianzhushan Geopark, China. The conference concluded with two days of fieldtrips in the Gea Norvegica Geopark. Many delegates participated. On the first day, 160 guests chose between two boat

trips: one sailed along the coast to Jomfruland Island, and the other went inland to Ulefoss along the Telemark Canal. On the second day of fieldtrips, 90 guests chose between bus tours combining various nature and cultural experiences. Visits were made to all the owner-municipalities of the Geopark, eight in total, all of them participated in this part of the programme.

Kristin Rangnes



Field excursion to the island Jomfruland, part of the late Quaternary end moraine. A site with an important coastal history

GEO-EMPLOYMENT

Geodiversity as a source of employment

In the European Geoparks Network (EGN) one of the most pressing concerns in these financially difficult times is its capability to generate economic benefits and establish a development strategy to reinforce the local economies. In order to address these issues, Spanish, Portuguese and Rumanian geoparks have joined with local and rural development groups to provide their expertise

Poster for the Geo employment project



Geoempleo:
La Geodiversidad como Yacimiento de Empleo



and counselling in an inter-territorial and transnational cooperation project called "GEOEMPLEO: La Geodiversidad como Yacimiento de Empleo" (Geo-employment: Geodiversity as a source of employment). This project has, among its members and collaborators, fifteen rural and local development groups, nine geoparks from Spain and Portugal, and Spain's High Council for Scientific Research, the Tourism Institute and the Geological Survey.

The main goals of Geo-employment are to preserve the Geodiversity and Geological heritage, enhance Geotourism in the Iberian Peninsula and to create and support employment at local levels. The project is divided in two phases over a period of four years (2011-2014). The first phase is dedicated to developing the project's programme and to establishing the requirements of each member. The subsequent execution phase is expected to have the following outcomes:

- Consolidate the National Iberian forums of Geoparks in Spain and Portugal.
- Develop the Geopark Guide initiative to promote the Geological heritage and boost the local economy.
- Enhance environmental education with

emphasis on Geodiversity and Sustainability.

- Develop high quality Geotourism through implementation of the European Charter for Sustainable Tourism and the creation of a quality brand.

The legal frame of the Spanish law 42/2007 that recognizes Geoparks for the first time at a national level as internationally protected areas is worth mentioning. At the regional level the Andalusian Strategy of Integrated Management for Geo-diversity provides the framework for the protection and evaluation of Geodiversity. Finally, Geo-employment is an example of how the EGN and the National forums of Geoparks are recognized as role models for the conservation of the geological heritage and for the regional development of a territory.

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The July meeting of Spanish and Portuguese Geoparks



A spectacular columnar basalt on the Reynisfjara coast, near the village Vik in Myrdal, Katla Geopark, Iceland



Nordic Geoparks will train guides

In 2011 the project "The Nordic Geo Guide School" was launched in Norway, Iceland and Estonia with the aim of providing quality education for geopark guides. It is the first initiative of its kind in the Nordic countries and has been awarded a grant from the Nordplus Adult Framework Programme. It will also be supported by the Regional Development Programme of Rogaland County (Norway), Vocational Education Fund (Iceland) and the Environmental Investment Centre (Estonia). The project is targeted at members of local communities. An intensive 36 hour training programme will be developed by the University of Stavanger (Norway). It will provide in-depth knowledge about geology, culture, nature, ecology and wildlife, teach how to interact with the environment and will dis-



A school class visiting Blafjell abandoned mine, walking on pure Ilmenite in Magma Geopark, Norway

cuss issues concerning climate change, the impact of man's activities, protection and conservation and the role of tourism in destination development. This project will enable Nordic geoparks to deliver better services and become better visitor attractions. It is being created and developed by three organisations representing present and future geoparks.

The leading organisation is Magma Geopark (Norway). In March 2010, Magma Geopark became the second EGN Geopark in Scandinavia. The Icelandic partner organisation, University Centre of South Iceland, was founded in December 2007 and is situated in Katla Geopark. This became the first Icelandic EGN member in September 2011. The Estonian partner organisation, Saaremaa Local Governments Association, represents the interests of local governments on the island of Saaremaa. The aspirational Silurian Islands Geopark has been established and is currently involved in producing an application for membership in the EGN. Saaremaa aims to become the first EGN Geopark in the Baltic countries.

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The 21m high Panga cliff on the west-coast of Saaremaa island (Saaremaa Geopark Project, Estonia)



Elea - Velia: an UNESCO Geo-archaeological site

Cilento e Vallo di Diano Geopark

The internationally important archaeological remains of the Greek city of Elia (= Roman Velia) in southern Italy, is also a geosite of primary and paleoenvironmental importance. An analysis

of sediments from this site allows the reconstruction of the environmental changes of this area during the past 3,500 years. In 540 B.C. the Phocaeans founded the city of Elea, which became

renowned for its Philosophical School, established by Parmenides and the philosopher Zeno who became a member of this School. Originally the city was divided into three sections, two of these are still recognizable and contain a military port, an "agora", a



A view
of the
Acropolis
at Velia

thermal bath, a Sanctuary, an Acropolis and a small theatre. The "Porta Rosa", the jewel of the ancient city, is the most important Greek civil monument to be found in Magna Graeca (Great Greece) the name given to the coastal areas of southern Italy colonized by the Greeks. It consists of a huge front wall with a central arched entrance. For these reasons this geo-archaeological site was declared a "World Heritage" site by UNESCO.

It's possible to distinguish five main phases in the environmental evolution of the area of Elea-Velia:

VI century B.C. The Southern Quarter was established in a coastal zone on alluvial sediments and on dune and beach deposits. The Acropolis was located on a coastal promontory separating two bays. The coastline was located 700 meters land wards of its current position.

V-IV cent. B.C. (climatic phase cold-humid) The urban area was influenced by the deposition of approximately 4 metres of alluvial sediments. This resulted in the elevation of the ground

surface and the retreat of the shorelines. The bays became lagoons in response to the formation of an off-shore sand bar which lapped onto the promontory of the Acropolis.

IV cent.B.C. and V cent.A.D. The area was no longer affected by floods and/or invaded by the sea. Re-building of the new city in the Southern Quarter.

V-VIII cent. A.D. (climatic phase cold-humid) Flooding of the Southern Quarter and all the coastal areas of Velia was accompanied by the advance of the coastline.

VII-XIV cent. A.D. The rebuilding of the area during this period demonstrates favourable environmental conditions between the 8th and 11th centuries A.D. In the period between the 11th and 14th centuries A.D. we recorded aeolian sands similar to those found in many archaeological sites in the Mediterranean which are attributed to the medieval heat wave.

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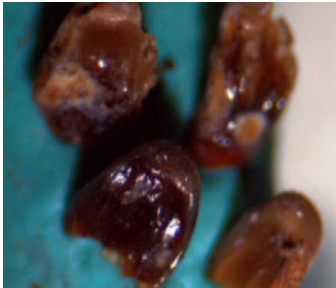
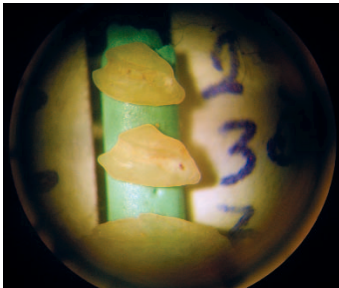
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The evolution
of the coastline
at Elia-Velia



New discoveries in the Lesvos Geopark

The new microfossils through the microscope



In August 2011, during the "Earth Festival", the annual summer celebrations in the Lesvos Petrified Forest Geopark, significant new discoveries were presented for the first time. A small temporary exhibition with explanatory posters and a presentation entitled "New discoveries of animals from the Petrified Forest" were prepared, both introducing the fossil micro-inhabitants of the Petrified Forest to the visitors of the Natural History Museum of the Lesvos Petrified Forest. The audience attending the presentation on the 3rd August, as well as visitors to the museum during August, had the opportunity to become acquainted with the snails and fish of the great lake that covered NW Lesvos about 20 million years ago, the terrifying alligators which hid and captured their prey in the lake waters, the ham-

A poster exhibition introduces children to the animal fossils



sters, moles and insectivorous small mammals living around the lake, the dormice constructing their nests in the trees and the bats flying in the night sky above the subtropical forest; a peaceful setting full of life. Nothing could foretell the onset of the disastrous volcanic eruptions that devastated the area approximately 20 million years ago. During the exhibition, visitors had the unique experience of observing the new tiny fossils of all these animals using special stereoscopic microscopes. Even though the plant fossils of the Lesvos Petrified Forest have been known for centuries, its animals have only recently begun to be revealed. In 1999, the first animal fossil was found: the lower cheek teeth of a deinother, one of the oldest proboscidean fossils found in Europe. During subsequent years studies in the area

unearthed more animal fossils. Finally in 2007, a layer of sediments was located in NW Lesvos containing fossil lake gastropods and isolated remains of fresh water fish, small reptiles, small lizards and micro-mammals. The new discovery is of great importance, since it reveals some of the oldest vertebrate fossils found so far in Greece and can provide information concerning the migration of mammals between Asia and Europe, as well as contributing to more accurate reconstructions of the subtropical forest ecosystems of the eastern Mediterranean area 20 million years ago.

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The micro-inhabitants of the Lesvos Petrified Forest

Observation of the new microfossils through microscopes





**Aerial view
of tumulus III
at Kaptol -
Cemernica**

THE PRINCES FROM KAPTOL

Iron Age Burial Mounds in Papuk Geopark

The occurrence of a large and prosperous fortified settlement, rich grave goods from elite burials, which include exclusive and prestigious goods from distant areas, highlight the immense scientific and cultural potential of Kaptol in the Pozega Valley (Croatia), as one of the most important Central European Early Iron Age sites. This is why the southernmost cultural group of the Hallstatt Cultural Complex was named after this site. The earth mounds covered wooden chambers surrounded by dry stone walls, containing rich cremation burials. Sometimes these constructions reached monumental proportions with long ceremonial passages. Fewer than 20 of these monuments, reserved for the Early Iron Age elite, are known in continental Europe, and one of the largest and probably the best preserved was discovered a few years ago in Kaptol.

The power and glory of Kaptol warrior-princes was primarily reflected in their weapons: spears, axes, whetstone-sceptres (a status symbol in Balkans area), as well as horse equipment, a universal status symbol of the ruling warrior class in the

Hallstatt Culture. The extreme importance of Kaptol became obvious following the discovery of two princely graves with unique sets of defensive weapons. Among other luxurious items they contained two Greek helmets.



**Pot ornamented
with bull-heads -
Tumulus - Kaptol -
Gradci**

metals, the northernmost finds of Greek helmets in Europe! One of the most important graves from the Hallstatt culture was discovered in 2005 revealing almost thirty richly ornamented pottery vessels as well as bronze situla (bucket shaped containers) and armour including a burned bowl-shaped helmet and the hubcubs from the wheels of a chariot! However, the most astonishing finds were two rich sets of

weapons spears, battle axes, extremely rare swords together with horse equipment.

The unique shapes and exquisitely decorated pottery, such as pots with bull-head decorations discovered at Kaptol, are defining characteristics of the Kaptol Group of the Halstatt culture during the Early Iron Age in central Europe. Most of the fine pottery is coated with graphite which gives them a special metallic sheen. One of the important sources of wealth and power of the Kaptol princes must have been the graphite mines which were still active in the mid-20th century.

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**Grave goods
from the
princely burial
in Tumulus X.**

Discovering
the secrets
around
the Mizarela
Waterfall



Arouca Geopark: an Educational and Geotouristic Destination

Education is a main key-word in the range of activities promoted in Arouca Geopark. Since the 2008/2009 school year the Educational Service of Arouca Geopark introduced educational programmes and projects. Various educational programmes which are developed every year, always involve the holistic perspective of the Geopark concept. Geology, biology, history, geography, culture and sports provide the themes explored in several fieldtrips and workshops. These have already brought thousands of pupils and their teachers to the territory all eager to experience new challenges through activities involving learning and discovery. During the school year

2010/2011 several activities were developed to address the scope of the International Year of Biodiversity. The exhibition of "Biodiversity in the Paleozoic" provided the main theme for a colourful and fun carnival parade organized by the schools in the territory. The annual school contests project was developed in partnership with the Portuguese Commission for UNESCO under the auspices of the UNDESD - United Nations Decade of Education for Sustainable Development (2005-2014) and the Portuguese Geoparks Forum. This noteworthy project aims to raise awareness among school students, teachers and local communities about Geoparks.

In a territory famous nationwide for its pursuit of adventure sports (rafting, canoeing, canyoning and rock climbing), and with a network encompassing 14 trails, 10 with significant geotouristic interest, the visitors can discover and become acquainted with the majority of the geosites, enjoy breathtaking landscapes, meet local people and experience local traditions. The

training course "Arouca Geopark Interpreters", consisting of four training modules about "Geodiversity and Geological Heritage", "Cultural Heritage", "Biodiversity and Natura 2000 Network" and "Tourism and Sustainability", was initiated to increase the expertise of individuals who work or will work in the tourism sector of the Arouca Geopark territory. The organization of the International Congress "Arouca 2011 - Geotourism in Action", the highlight of 2011, provided a forum where the concept and scope of Geotourism and its relevance for the regional sustainable development was discussed and analyzed.

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**White-water rafting
and adventure sport
which raises the
adrenaline level**



The flight of the
Carboniferous
dragonfly
Meganeura



The Junior Ranger project in the Adamello Brenta Geopark: Schools adopt the territory

"Young people are at the heart of the local communities living in and around protected areas. They are also the future advocates, guardians and potential employees of these areas. By providing young people with opportunities to participate in their work, protected areas fulfill their educational role whilst enhancing individuals understanding of their aims and appreciation of the natural and cultural resources they protect." (Federico Minozzi, www.europarc.org).

With a strong belief in the above statement, the Adamello Brenta Geopark joined the Junior Ranger Programme in 2008. Hundreds of children have already participated in this programme which was initiated by EUROPARC, the "Federation of Nature and National Parks of Europe", in 2002.

The project aims to educate young people about the role that Parks play in the conservation of protected areas and

their importance for recreational activities, for employment and the local economy and in increasing environmental awareness.

The children, together with their teachers, adopt a study area inside the Park associated with their home municipality. In a project which lasts for a whole year, the children discover how human activities within the Park interact with geology, flora and fauna, history and legends. Consequently they will become aware of the rules that everyone should follow in order to safeguard and preserve the territory (both inside and outside the Park). The project starts at the beginning of the school year, when the children meet the Park Ranger at school, who talks to them about the Adamello Brenta Geopark and the role of the Rangers. Following this, they spend a whole day outdoor discovering the study area. In the following days, the Park's environmental educator helps them to process the data col-



lected during the excursion and to organize the research programme which they, together with the teacher, will pursue during the following months

At the end of the school year, there is a big award ceremony to which the families, the local administrators and Park's authorities are all invited: the children will be their guides and will receive their Junior Ranger certificates. In this way the young people learn to take responsibility for protecting their own territory.

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Junior Rangers during the award ceremony with their family, local administrators and the Park's authorities

A future "Junior Ranger" studying the geology of the Brenta Dolomites

The schoolchildren with a Park Ranger explaining the rules inside the protected area helped by "Osvoldo Bear", the Park's mascot



Dried flowers from hay packed into small bags are reminiscent of the scent of delicious herbs of farm orchards



Celebrating the International Day of Biodiversity in the Eisenwurzen

In 2011, the International Year of the Forests, the Day of Biodiversity on 20 May was dedicated to Forest Biodiversity. More than 70% of the Nature - and Geopark Eisenwurzen is covered by forests. It was therefore necessary for the team of the Nature and Geopark to contribute to this important day together with the

Forest Administration of the province of Styria and other partners. Booths set up in the main square of St. Gallen conveyed a broad range of topics to children and adults. Interactive presentations introduced the various trees of the forests, the animals which live in them, working with wood and, last but not least, security measures for those strolling through the forests. The demonstration of microscopic animals living in forest soils by forestry school students was a special source of fascination for the participants. Food products from the natural landscape served by Nature Park Partners contributed to the overall success of the event.

Over the whole summer a miniature forest erected on the market square of St. Gallen was a reminder of the importance of forests for the global climate and for the region in particular. Small slices of tree-trunks, cut and polished by stu-

dents were attached to the trees with messages of their desires for the future of the region and expressed special concern for the conservation of nature and the quality of life in the Eisenwurzen region.

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Working with wood needs special skills



Children attach slices of wood with their desires for the future of the Eisenwurzen region to twigs of the miniature forest

Geopark Shetland, North Pennines AONB Geopark and Chablais Geopark work with aspiring Geopark de Hondsrug on the HINT Project



Tourists explore a digital trail

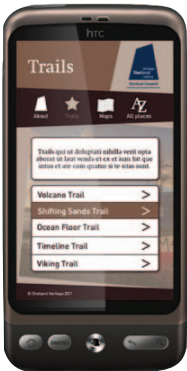
'HINT' (Heritage Interpretation using New Technologies) is a two year cooperative project, partly funded by LEADER, a European funding programme. Geopark Shetland, North Pennines AONB, Chablais Geopark and the aspiring de Hondsrug Geoparks are exploiting recent developments in digital technology to add to 'panel/exhibit' type interpretation and take an innovative approach to communicating with a range of audiences. Each partner is undertaking a practical pilot project to trial a particular approach in their own region. Lead partner Geopark Shetland (Scotland) is build-

ing a Smartphone application using Google maps linked to mobile phone GPS system. The application introduces users to Geopark Shetland and helps them to explore the islands through a range of interpretive information about geological heritage sites and trails. North Pennines AONB Geopark (England) is using new technology to allow visitors to access information when a local visitor centre is closed. A unit accessed by mobile phone allows users to download webpages, walks and essential tourist information. This information will also be accessible through technology which turns a window

into a touchscreen. Chablais Geopark (France) is developing a 'Geo Route' using flash code technology. An infrared beam from a Smartphone reads a bar code at each site along the route to access interpretive information.

A series of downloadable / phone accessible itineraries is also being created. Aspiring Geopark de Hondsrug (The Netherlands) is developing a 'digital table' to tell the story of the Hondsrug area. The table is a computer with a touchscreen which can be used simultaneously by several people to obtain information and exchange ideas. It can be updated with new information via an internet connection.

An exchange of knowledge and ideas, along with partnership meetings and practical workshops is helping the partners to develop best practice in the use of these new technologies. A key project aim is to share the lessons learned with Geoparks across Europe. The progress of the pilot projects can be followed at www.hintproject.eu. It is hoped that this information will help others who wish to develop similar projects. The partners aim to give a presentation on their progress at the 2012 EGN conference in Arouca Geopark, Portugal.



Design mock-up for Geopark Shetland Smartphone app



The digital table

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La Nava polje is one of the most important and spectacular geosites in the route "El Rio Bailon"

The design of geological routes in Sierras Subbéticas

Since becoming a member of the EGN one of the main goals of the Sierras Subbéticas Geopark was to design comprehensively interpreted routes that focused attention on the Geopark's geological heritage. Recently, two geological trails were established: "El Rio Bailon" and "La Tinosa", which provide a basic infrastructure for the development of geological tourism in this territory. A series of basic steps have been adopted for the design and interpretation of the geological routes.

Choosing the content:

- Geological Heritage should be the main factor in selecting points of interest along the trail (views of unique or outstandingly beautiful and scapes and interesting outcrops). It is strongly recommended that natural or cultural sites should also be included.
- The selection of ecologically or geologically vulnerable sites should be avoided, or at least managed by limiting the maximum number of visitors per day/tour.
- If the route coincides with already existing trails then maximum use should be made of pre existing information and infrastructure.
- Guarantee the general acceptance of landowners who may be affected by the

creation of the route.

- A clear interpretation of the trail is essential, as a basis for the creation of interpretative panels, the design of leaflets and booklets in order to provide basic information for the Geopark's guides and managers.

Interpretation of geological heritage:

- Review the existing scientific literature, select of the most interesting geosites and present information in terms that are understandable to the non specialist.
 - Search for and emphasize the relationships between geological heritage and aspects of natural history, culture and daily life.
 - Search for features in the natural environment (rocks, plants and animals), as evidence of processes that may provide clear and suitable examples for interpretation.
 - Identification of current geological processes in order to prove that geology involves on going processes and is not simply a record of past events.
- The opening of these two geological routes occurred during European Geoparks Week 2011. They complement the activities on offer in the Sierras Subbéticas, respond to the demands by the local population to gain a more in depth knowledge



The presence of the caddis fly in its protective case indicates the purity of water. The variety of grains in caddis fly cases reflects the geodiversity of the sediment sources



Carbonate precipitation in a stream produces tufa. The processes and the product can be observed in the route La Tinosa

of their natural environment and enhance the significance and visibility of the Geopark.

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The Mountains Tour:

Organizing tourism resources on offer in Naturtejo Geopark

Oleiros, one of the 6 municipalities within Naturtejo Geopark, Portugal, has produced a tourism map - the Mountains Tour which

of at least 150 million years of erosion, the mountainous region of Oleiros provides evidence for events during the Alpine orogeny. This region, which is an important source for many rivers, a land of extensive forests where "living" fossils still persist and a barrier which led to the isolation of a distinctive culture, only opened to tourism in very recent times. Thus, the tourism strategy for this region of the Geopark needs to embrace the mountainous landscape, biodiversity and culture. The 100 km-long road tour invites the visitor to organize his/her time according to personal interests. Therefore the map highlights only the best experiences together with available services in the municipality (accommodation, restaurants, information points, health care and petrol stations).

By providing the locations of Geo-monuments, viewpoints, native forests, fluvial beaches, monuments and hiking trails, together with the sources of handicrafts and local products, the Mountains Tour is designed to encourage tourists to enjoy extended visits and contribute to the wider economy of the region. For marketing purposes the region's image focuses on the figure of a local hero, Antonio de Andrade, a Jesuit priest who climbed the Himalayas in 1624 to reach the Kingdom of Guge in Tibet. His pioneering descriptions had a significant impact on the Europe

of that time. The slogan used for the Mountains Tour is "The avoidance of sameness". Four agro-products are also being used with remarkable success to promote Oleiros: the roasted lamb and the historical wine "Calum" (unique in Portugal), the strawberry-tree and chestnut fruits (products of the native forest). These products of the mountain are the basis for thematic fairs and gastronomy weeks that became part of the cultural calendar of Oleiros and foster the local economy. The Mountains Tour is the first stage in a more ambitious project, the Mountain Museum, which is considered strategic for the whole of Portugal's Central Region and is hoped will serve as a bridge between nature and culture in mountain communities all around the world.

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Week of the Chestnut and Strawberry Tree: local restaurants serve thematic menus (Maria Pinha)



Living Fossils at Fraga da Agua d'Alta geosite (Prunus lusitanica lusitanica)



Mountains Tour, a demonstration of making seats of cork (tropecos)

The Renaissance Fair during European Geoparks Week, community celebrates the travels of Antonio de Andrade

organizes the territorial resources and the available tourism facilities within a single document. Within the Geopark's Mostly pen-plained territory, the product



Infostations - an internal network within the Geopark Swabian Alb

With a surface of 6400 square kilometres the Geopark Swabian Alb is a relatively extensive Geopark with a large variety of geosites ranging from Mesozoic to Pleistocene in age but dominated by sites from Jurassic times. One of the most ambitious tasks is to provide visitors with information concerning the necessary aspects of all geosites within the Geopark. This is

The infostations, which are increasing in number, are established mostly in museums, but also in caves, castles, in companies producing regional food or material for medical treatment, in an old train station and in a biosphere centre. The opening of the latest infostation on 4 October 2011 was accompanied by a Celebration in the castle of Brenz on the southern border of the Geopark. Each infostation has a main theme, e.g. diversity of fossil life in the Jurassic, effects of a meteoritic impact, volcanic activity, cave formation, the influence of Karst on hydrology (karst wells), building stones, the impact of the subsurface on agriculture and

ties. General information concerning the Geopark includes publications and a geotourism map of the Swabian Alb. The homepages of the info stations are linked with

**Info station
Castle
Katzenstein:
a panel
demonstrating
the different
types of rocks
and fossils
in the Geopark**



achieved through a system of 17 infostations distributed across the area of the Geopark.



**Map of the
Geopark Swabian Alb indicat-
ing the locations
of the 17 info stations.
Green colour: area of the
Geopark.
Yellow colour: the districts
which contribute
to the Geopark**

(archaeology), development of the landscape and the interdependence of soil and vegetation. We aspire to provide the info stations with a common design, which is adapted to the local conditions. Part of this design is a panel demonstrating the different types of rocks from the Swabian Alb, a display providing local information and information for the other info stations including a leaflet explaining their special quali-



**Opening ceremony
at Brenz Castle**

those of the Geopark to guarantee the most efficient flow of information. Each year the annual Geopark Festival is organized by a different info station.

The system of info stations is crucial for the development of the Geopark. The representatives of each station meet regularly to discuss problems, to exchange ideas and to organise programmes such as the European Geoparks Week. Their enthusiasm is one of the driving forces of the Geopark.

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**The Infocentre
at the Centre
for Protection
of Nature
at Schopfloch**



World's largest copper mine supports a new Geopark project

The main opencast mine on Parys Mountain; the colours are mainly due to oxidized iron from the roasting of sulphides ores, prior to leaching out of the copper vitriol

Parys Mountain, the world's largest producer of copper at the turn of the 18/19th centuries, was so important in the local economy that it was permitted to mint its own coinage that was accepted as legal tender on Anglesey and in London. This is the only company ever to be granted this privilege in England and Wales.

The mine is a Kuroko type exhalative deposit on the periphery of a Silurian volcanic structure comprizing mainly copper and lead sulphides but also traces of many other metals. It has been exploited since Bronze Age times, during the Roman occupation, but mainly during the 17th, 18th and 19th centuries. A large opencast mine remains together with traces of renewable power systems and a fine harbour constructed specially for the export of copper ore.

Large numbers of miners are reputed to have moved into

the area to work the mines, some from Cheshire and inevitably some from Cornwall. There is a long tradition of Anglesey farmers working over the winter in mines in Snowdonia and returning home to their farm in summer. All pretence at mining ceased long ago and the local town, Amlwch, dwindled in importance. A new EU INTERREG project is resurrecting the story of the miners; GeoMon staff will be working to document the genealogy of the local area, track down any incoming miners in local records and find out if these incomers have left a legacy within the local community. We will also develop trails showing the geology, industrial archaeology and mining legacy of Parys Mountain, and train local people to guide interested visitors around their heritage.

This project is led by the Royal Commission on Ancient and Historic Monuments

Wales in association with Copper Coast Geopark in the Republic of Ireland, Glendalough and Pentir Pumlumon. It aims to examine whether there was a 'trade' in miners across the Irish Sea, as the prosperity of the various mines waxed and waned and, to investigate the legacy the miners have left behind. Local people will be trained in genealogical and archaeological research, and in leading guided walks. It is hoped that various businesses will be revitalised by the project and already pottery and glass are being made using pigments and materials from the mine.

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The summit of Parys Mountain is capped by a large windmill, one of over a 100 on the island, which was used to power winding engines and drain the mine prior to the building of a coal fired steam engine

Porth Amlwch, constructed for the export of copper ore along a natural inlet in the Cambrian green schists



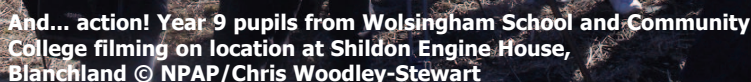


The head of Expressive Arts, Andrew Fowler, who championed the project from the beginning, said:
"The project has really

Student stars shine at film premiere

As well as discovering about their local landscape and geology, the pupils learned many technical aspects of film-making as they had to do all the work themselves. They were responsible for camera work, voice-overs, presenting, animation, continuity and all the different skills required in the production of a film. The work, supported by the Heritage Lottery Fund and the aggregates industry, and film-

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**Paignton
Community
Geoplay park
design**

Paignton Geoplay Park

A Community Project in the English Riviera Global Geopark



The Paignton Community Partnership has shown great strength of support and belief in the Geopark which led to a successful, community driven funding application to create a Geopark themed play area in a central seafront location in the town of Paignton. The whole design of the park is based on the English Riviera's geological history. The toddler area represents the Devonian Period when the area was south of the equator and under tropical coral seas. Toddlers will be able to ride on a trilobite or goniatite seesaw and enjoy coral shaped spinner bowls and trampoline. The junior area has a giant climbing

net symbolising a time during the Carboniferous Period when two major continents collided and the Geopark was caught in the middle of the collision. A major mountain range was formed - hence the mountain shaped net. The sand and water play area represents the Permian Period when the Geopark was just north of the equator and all of our red sandstone and breccia rocks were formed. Flash floods occurred after violent storms in the distant mountains and giant millipedes crawled around! This area has a purpose built water channel for children to pump and dam water and digging equipment and tables for sand play. Then onto the Quaternary Period which is the teen play zone and links with Kents Cavern from a geological perspective. The Neanderthals and early humans who sheltered in the caves would have had to exert themselves physically to survive and the idea here is that our young people are challenged by their environment in a similar way.

The Park is a project costing

half a million pounds. The majority of the funding - £447,000 - is being provided by the Big Lottery Community Spaces Grant Fund. Torbay Council are contributing £50,000 of match funding and the Community Partnership is making up the small balance. Melanie Border, Geopark Coordinator said "The partnership has shown great determination and commitment to the project and we are all now very excited that the project build has started on site. We can't wait to see the children playing!"

Melanie Border

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Winners of the Geoplay Park Colouring competition
whose pictures now decorate the hoardings around the site where the park is under construction



Members of Paignton Town Partnership, local authority councillors and the contractors doing the first dig at the Geoplay Park site



The Upper Harz Water Supply System new World Heritage Site

The Lower,
Middle and
Upper
Pfaunteiche
(Peacock
Ponds)

The Upper Harz was once one of the most important mining regions in Germany. The famous Rammelsberg mines are the only mines in the world which were in uninterrupted operation for over 1000 years. Together with the medieval Old Town of Goslar they were placed on the UNESCO World Heritage List in 1992. Major mining products included silver and lead, followed by copper, iron and zinc. In the eighteenth century the Upper Harz generated more than 50% of the total German silver production. The taxes raised from this contributed significantly to the revenue of the princely houses in Hanover and Brunswick-Wolfenbützel and helped to secure their positions of power and influence within the Holy Roman Empire. This generation of wealth justified a high commitment in terms of investment and effort. Thus the Upper Harz mining industry produced a considerable number of innovations and inventions, including such important advances as the man engine, an ingenious method using linked pumping-rods and interchangeable movable and fixed platforms for descending into and ascending from the mine. The man engine replaced a system involving ladders and did not require the use of a cage and cable.

The mineralization in the Upper Harz occurs in water bearing veins which follow



The Rehberg Ditch

zones of structural weaknesses, i.e. mining these veins was always connected with the problem of keeping the mines dry. The only energy available to pump out the water, was derived from water wheels using surface water. Therefore a sophisticated system of integrated dams, 143 dammed ponds, 500 km of ditches, 31 km of tunnels or aqueducts was built to supply the main mining area with the energy required for pumping. From the Middle Ages onwards this system provided the major source of energy for over 800

years and was historically the world's largest and most important mining water management system. It was granted UNESCO World Heritage status in 2010.

Due to the sheer number of structures and the length of the ditches the Water System is best explored on foot. A large number of waterside footpaths, the so-called "Wasserwanderwege", have been created in recent years. Visitors can learn about the typical elements that make up the Upper Harz Water Supply System from the information panels along the clearly marked routes. With a few exceptions, most of the ponds can be used by swimmers during the summer months. The Upper Harz Water Supply System is included in the Geopark Harz. Braunschweiger Land. Ostfalen website (<http://www.geopark-harz.de>).

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Entrance to the Upper
Hasenbacher Tunnel



Equipment for regulating
the flow of water

The geology of the Madonie Geopark: a source of inspiration of art, sculpture and theatre

One of the salt statues created to facilitate geo-touristic enjoyment of the Wonders of the mine: "cui prodest?" Many visitors have answered the same question, "who does it benefit?", with "why, our community"!



The first international biennial exhibition of rock-salt sculpture, "SALT ... DESIRE FOR ART", was conceived and presented in the Madonie Geopark from 12 to 21 August 2011. It was a unique event of its kind during which the village of Petralia Soprana was turned into a sculpture studio for the ten artists who each carved a block of rock-salt. The sculptures, following their appreciation by thousands of visitors, were finally placed inside the mine to join three permanent art installations representing the genesis of the mineral through the movement of water, how

man extracts salt from water with the help of solar energy and the nature and risks involved in mining. The event, was organized and supported by the Madonie Geopark and made possible through the cooperation between the "Art and Memory of the Territory" association in Milan and the local "Under Salt" association. It was designed to initiate geotourism and provide an enjoyable underground experience in a salt mine in the Madonie Geopark. Another source of artistic inspiration, based on the theme "MAKING THEATRE: ECOLOGICAL FABLES -

Puppets and marionettes at the Sicilian Puppet Museum (MOPS)", resulted in the creation of workshops for eighty young students, led by the Master Puppeteer Angelo Sicilia and by Sicilian Folk Puppetry, from 18 July to 5 August 2011, at the Civic Museum in Caltavuturo. The children created and staged a number of different stories after building the little theatres and marionettes, and the puppets from leftover material. The characters including rocks, trees, drops of water, the sun, the mountain and forest animals, became the subjects for skilful games, theatre, manual ability, drawing and stagecraft. The authorities present at the final performance were thus inspired to initiate, through a special draft agreement, a programme of Environmental Education open to all schools in Sicily that will involve MOPS/ the Civic Museum in Caltavuturo and the Madonie Geopark Museum in Petralia Sottana for the school year 2011-2012 and for the years to come. What can one say? It was a great success!

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Permanent artistic installation highlighting the geological processes that have formed salt that is 99% pure and man's attempt to imitate this by extracting salt from sea water that is much less pure



The Master Puppeteer A. Sicilia (right) and P. Li Puma (left), in one of the workshops with marionettes and puppets to represent and narrate ecological and geological fables

Xtreme sports in a unique landscape

The first Rokua Geopark Challenge adventure race took place in July 2011. Almost 200 competitors from all over Finland gathered in the unique landscape of Rokua Geopark for a race consisting of two parts, Xtreme and Adventure. In both parts the competitors were involved in a combination of sports: Running, roller skating, orienteering, kayaking/canoeing, swimming, diving, mountain biking events, climbing and a variety of other tasks demanding both skill and knowledge.

Rokua Geopark Challenge

The 24 hour and 240 kilometres long Xtreme component was designed for competitors looking to test the limits of their endurance and performance. The 6 hour and 60 kilometres long adventure component was for competitors looking for a unique experience in adventure racing. Before the race the competitors had to familiarize themselves also with basic information concerning the Geopark since some tasks included questions about the special natural features of the area.

The Rokua Geopark Challenge race was the most important adventure competition in Finland during 2011 and received extensive media coverage before and after the event. The race was broadcast on the nationwide television Channel Four and its sub channels as a one hour long summary. The broadcast included an interview with the Rokua Geopark personnel as well as a presentation of the Rokua



Geopark and the European and Global Geoparks Networks.

Rokua is Finland's first and only European Geopark, and was accepted as a member of the EGN network in October 2010. The name and concept of the Geoparks Network is new to Finland and requires considerable effort and publicity to get it more widely recognized. Events like the Challenge Race are very important in raising the awareness of our unique area and the role of the EGN.

Rokua Geopark consists of three landscape areas. The 2011 race took place mostly in the Rokua Esker and dune area in the middle of the Geopark. In 2012, the race will be based on the lake Oulujarvi area and in 2013 it will be situated in the Oulujoki river valley. The three competitions will enable Rokua Geopark to present the possibilities for enjoying and using the Geopark's landscapes to an audience interested in outdoors pursuits and sports. The broadcast can be seen on Youtube.

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Almost 200 competitors took part into the two series, Adventure and the Xtreme

A competitor jumps into a river from a 4 meter high cliff





Geothermal Area of TUSCAN MINING GEOPARK

Geothermal activity in the Biancane area

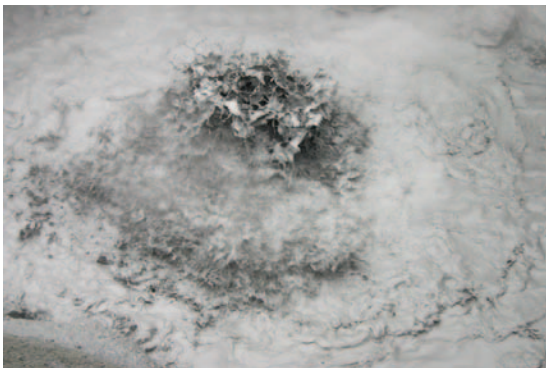
Geothermal landscape

The Tuscan Mining Geopark is located in the northern sector of the Grosseto province in Tuscany, central Italy. The Geopark's geothermal area is situated in a complex landscape with a geological heritage of international significance and the remains of the first industrial production of electricity using heat from the Earth. In this area there is significant evidence for and examples of recent and present geothermal and hydrothermal activity. These processes have created a unique geologically and visually significant landscape in which pipelines for steam generated by geothermal activity together with alum quarries are distinctive features. Biancane is one of the most interesting geologi-

cal areas. It has a network of footpaths which provide access to sites of geological and ecological interest and information panels are also provided.

Geology of the Biancane

The "Biancane" is characterized by geothermal fluids contained in evaporitic - carbonate - siliceous rocks (Mesozoic) overlain by Tertiary impermeable rocks. This geosite covers a surface area of approximately 0.8 km², and has a preferential SW-NE orientation which follows the direction of the main local fault system. In addition to dislocating the rock succession, the fault system provides a conduit through which hydrothermal fluids with a temperature over 100°C ascend to the



A crater and mud spring, "lagone", At Biancane

surface. These fluids consist of 95% water vapour, 5% carbon dioxide, hydrogen sulphide, boric acid, and other minor components. The Mesozoic radiolarian cherts (Diaspri Formation) have temperatures of around 60°C. The gaseous emissions are acidic due to the presence of hydrogen sulphide and have, over time, bleached the surrounding rocks which are now characteristically white in colour. At the surface the gas emissions are associated with deposits of native sulphur and other minerals and by mud springs which occupy small craters approximately 3m in diameter called "lagone". These pools are fed by upwelling thermal waters, reaching temperatures between 100 and 150°C.



Rocks bleached white by gaseous acidic emissions

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Heading for Tagging



An example of a traditional information panel

Precise, quick and interesting landscape interpretation is at the core of the geopark concept. Consequently, in some respects the traditional interpretation panels made of wood, metal or other materials are becoming obsolete and outdated. Firstly, their message is limited in size and language, and maintaining or updating panels is neither easy nor cheap. Secondly, the visitor has the choice either to select which kind of information she/he wants to access or to decide that she/he doesn't need any information at all. Finally, in the absence of panels, the character of the landscape remains undamaged and unchanged. The internet is becoming laden with geodata and location based services, and electronic documents are now a widespread component of the traditional media space. Electronic readers and mobile phones capable of

internet browsing are becoming common; the technology of mobile codes makes accessing information with a mobile device a one-click affair by fast linking to the vast array of online digital information. When a visitor with a mobile phone equipped with a camera and internet access enters a particular area the phone can be used to retrieve all Uniform Resource Locators (URLs) associated with that area by using the tag picture. Therefore, conventional information panels for visitors can be extended with or even replaced by so called taglists with the aim of attracting geotourists to discover less-known sites within the geopark. It adds an exciting dimension to traditional interpretation. Taglists are easy to use and understand, very cheap to produce, they can be printed on almost any material including textiles and due to their small size they also can be fixed to almost any surface. Tagging expands the possibilities of map/location data and enlarges the information framework for visitors and

local people to discover the landscape. Tags are simple smart pictures with a piece of metadata that can convey a more meaningful experience. Tags information is easily accessible and portable because it can be loaded and kept for later use, shared with family, friends or with the public through all social media channels. By exploiting the current boom in social media, tagging can extend the possibilities for visitors to share their observations and experiences. The Bohemian Paradise Geopark has begun to use this device extensively within its territory within the framework of the UNESCO supported project Information technologies for Geotourism development in Bohemian Paradise - European Geopark together with a financial assistance from the Ministry of the Environment of the Czech Republic.

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The distribution of Tag sites in the Bohemian Paradise Geopark

Bohemian Paradise Geopark



Downloading a Tag image

Creating a Geopark website

Information and Communication Technology lies at the heart of the new economic strategies across Europe. The Internet is growing very fast and currently has around 2,000 million users worldwide (30% of the global population). Online information is now the primary influence on consumer decisions in nearly all major markets. The Internet has promoted many existing initiatives as well as creating new ones within the areas of communication, social movements, culture and environmental protection. Attention should also be drawn to another phenomenon: the emergence of social networks and User-Generated Content (UGC), in addition to the arrival of Web 2.0. Thus, we can conclude that the

Internet may prove to be a great ally for the development of geoparks in general and of many of their potentials in particular.

In 2008, a successful geotourism thematic route was created within the Basque Coast Geopark territory, together with a new website. After joining the EGN and the GGN in 2010. The geopark is now working on a new website, with broader scope and objectives. However, the planning process for this website has raised many important questions that need to be addressed. For example: What kind of public should the website target - a local or an external one? Should it be a tourist destination website and as such promote and sell geotourism and local products, for instance? Or should it try to promote other aspects such

as the dissemination of geological, natural and cultural heritage, and the education of the general public and students? Or should it focus on promoting the involvement of the local inhabitants in the Geopark and local development? In short, all these questions related to objectives and the public, and thus to the content, highlight the complexity of creating a website for a geopark.

Although every geopark is different, they have common objectives and it would be useful if geoparks could share a common perspective with regard to making the most of the Internet. This could be a great opportunity for establishing common working parameters for geoparks.

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BASQUE COAST GEOPARK

From Zumai to Deba, a boat tour along the geopark's famous Flysch Route



Promoting the geo-archaeological heritage in Beigua Geopark



Details
of cup-marks
engraved on a
rock surface

Several papers and research reports show that the major complex of rupestrian inscriptions within the Beigua Geopark territory provides a valuable record of the distribution of ancient settlements in the area and is of significant value from a scientific and geo-archaeological point of view. The presence of these rock inscriptions adds further value to the exceptional wildlife and geological heritage of Beigua Geopark. These important inscriptions are a subject which requires a thorough study and an accurate inventory, not only for their protection, but also for using these engravings in the rocks as a new tourism attraction.

Therefore Beigua Geopark has launched a specific conservation project with the scientific collaboration of the University of Genoa - DIPTERIS, the technical support of the International Institute of Ligurian Studies and the supervision of the Liguria Archaeological Heritage Department. The project aims to preserve and to enhance the Geopark's geo-archaeological heritage through a scientific survey

which involves cataloguing by using a specialised method already practiced at a national and international level.

The project is divided into three main actions:

a) Inventory of rupestrian inscriptions in the Beigua Geopark territory in order to implement policies for their protection and raising interest in these features from a touristic point of view

b) Create educational and information materials to raise public awareness of the crucial role played by geo-archaeology in reconstructing the distribution of ancient human settlements in the Beigua territory

c) The production of casts of the most significant rock engravings to be placed along a new geo-archaeological thematic trail. Thus the disturbance and destruction of the original sites will be prevented by observing methods of good practice that have proved successful in other areas in Italy and abroad.

This project for cataloguing and conserving the engraved rocks of the Geopark Beigua is designed to provide the regional and local agencies and public bodies, responsible for the protection of sites of geo-archaeological value, with knowledge which is currently unavailable. This knowledge is crucial for programming, planning and managing the geo-archaeological heritage of the area. It will also provide the basis for promoting new forms of geo-archaeological tourism of major importance in contributing to the sustainable

economic development of Beigua Geopark.

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Engraved stone
in the Piampaludo
geo-archaeological site



Ancient grooves discovered
in Sassello area

TERRA.vita Geopark: The "Three-Mountains- Project"

Imagine exploring the ground together with hamsters and moles, tracing the history of coal mining with helmets and lamps, discovering exotic plants in the house of the tropical rainforest or investigating the exciting phenomenon of nature like a scientist. All these things are possible in the Town of Osnabrueck, or more precisely on the 3 Hills Schuelerberg, Westerberg and Piesberg. The "3 Mountains-Project" in Osnabrueck, is managed by TERRA.vita and consists of a network of 8 institutions, which play an active part in environmental education and sustainable development. The aim and the function of the network is to give people an understanding of nature and the environment, and raise awareness of the necessity for the protection of biological diversity and develop the required skills for future actions. For this purpose the associate part-

ners were chosen for their expertise in developing and providing education and leisure programmes. In these programmes the associate partners pool their expertise and knowledge to extend the provision of education and publicise their individual contributions. The education - and leisure programmes invite pupils, holiday makers or families to discover the key topics "Energy and Climate", "Biological Diversity" and "History of the Earth" which are interdisciplinary components in every institution of the network. Additional services such as accommodation and catering are offered in cooperation with local youth hostels. All activities are suitable for one-day fieldtrips or prolonged visits and can be booked individually. Visitors are invited to discover the institutions with the aid of GPS-Navigation. A special audio-visual GPS-

Guide offers diverse information about nature, climate change and geology. This exemplary collaboration was honoured with the acceptance of the "3 Mountains - Network" as a project of the UN-International Decade 2010 /2011 "Education for sustainable Development". Partners of the Network: Natur - und Geopark TERRA.vita, Museum am Schuelerberg, Zoo Osnabrueck, Botanischer Garten und Biologisches Schuelerlabor der Universitat Osnabrueck, Zentrum fur Umwelt kommunikation der DBU, Museum Industriekultur, Kultur - und Landschaftspark Piesberg der Stadt Osnabrueck. For further information about the network and its partners check www.3-berge.de

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Schoolchildren experience a coal mine in a full scale model in TERRA.vita Geopark



An exhibition provides an insight into aspects of natural history



Erika Anderkova,
Janos Lposka
and Attila Agocs
(director of the
Castle Museum
of Fil'akovo)
greet the
visitors

Record Interest in the Night of Museums in Fil'akovo

During the evening of 14th May 2011 more than 1400 people entered and spent four hours in the torch lit grounds of Fil'akovo Castle, Slovakia, during the "Night of Museums and Galleries", an event organized for the fourth time this year. The programme concentrated on the values and contribution of the Novohrad - Nograd Geopark.

The evening was opened by Erika Anderko and Janos Loska, the Slovakian and Hungarian directors, who jointly control the operation of the Novohrad - Nograd Geopark. They opened a permanent palaeontological exhibition entitled "The Remnants of Petrified Life in the neighbourhood of Fil'akovo", and Erika emphasized the strength of the relationship between the Geopark and the Castle Museum of Fil'akovo. Janos Loska discussed the ideals of the Geopark and in his presentation stated that "If becoming a member of the EGN was good only for gathering so many people here today - even then it was worth it"! His speech concluded by enumerating the geological values of the

Geopark and by comparing these and the aims of the Geopark with the castles of Eger and Fil'akovo. He stated that the well-known quotation: "the power of the walls lies not in the stones but in the souls of the defenders" can also be applied to Novohrad - Nograd Geopark. Visitors to this celebration enjoyed the castle's exhibitions and events, attended the scientific and educational lectures and became familiar with the geological values of the Geopark as well as with the procedure involved with becoming a member of the EGN. During the opening of the new permanent palaeontological

exhibition people had an opportunity to visit the only casemate (vaulted chamber) that remains intact in the lower castle. Dr. Lajos Gaal, who is a geologist, used this romantic underground site to deliver a lecture about the quarries containing shark teeth, mastodon and other prehistoric animal bones. In the middle part of the castle the visitors were lectured to by members of the Volcanological Department of Eötvös Lorand University, who described the occurrence of former volcanoes in the region.

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Tibor Koblicek -
master in folk-
luthiering



4 billion years of Earth History to serve tomorrow Welcome to the European Geoparks Network



Fifty European Geoparks working together on the conservation and the appreciation of their geological heritage for sustainable territorial development, are pleased to welcome you.

We hope that you will enjoy a visit.

European Geoparks Network





A classic limestone pavement by the Burren's Atlantic coast, with the magnificent Cliffs of Moher in the background

WELCOME

european
GEOPARKS

Burren and Cliffs of Moher Geopark

The Burren and Cliffs of Moher Geopark joined the European and Global Geopark Network in September 2011. The word 'Burren' comes from the word Bhoireann, an Irish (Gaelic) word meaning 'a place of stone'. The Burren is located on Ireland's western Atlantic coastline, in the administrative regions of County Clare and County Galway.

The Burren and Cliffs of Moher Geopark comprise an area of approximately 530km², with over 100km of coastline. The spectacular Cliffs of Moher make up 8km of this coastline. Over 8000 people live in the Geopark. Population census data for 2006 showed that tourism (13%) and agriculture (13%) employed equal numbers of people, and demonstrated the importance of these activities to the economy of the Geopark.

The Burren comprises a landscape of fossiliferous Carboniferous Limestone, overlain by Namurian shales and siltstones, succeeded by a series of Namurian mudstones, siltstones and sandstones. The limestone contains an abundance of coral, brachiopod, crinoid, and gastropod fossils. Goniatite and brachiopod fossils are present in the Namurian shale. With over 100km² of Atlantic coastline, the effects of coastal erosion (cliffs, arches, stacks, sea-caves) and deposition (dunes, storm-beaches) are evident along the coastline.

The glacio-karst landscape of the Burren is characterised by vast expanses of limestone pavement, hundreds of dolines and poljes

(enclosed depressions), limestone gorges, springs, swallow-holes, dry valleys, turloughs (disappearing lakes), karren, and hundreds of kilometres of caves. The legacy of the Ice Age is evident in the abundant glacial striations, glacial boulders and erratics, drumlins and moraines.

Local phosphorite deposits were mined on a small scale from the 1920s to the 1940s to provide fertilizer. Small deposits of calcite and fluorspar were also exploited in the Burren, as were mineral veins containing lead, copper, zinc, galena, chalcophyrite, malachite, and sphalerite, particularly in the 19th century. The Geopark contains over 2,700 recorded archaeological monuments dating back over 6,000 years to the Neolithic Period and has been described as 'one vast memorial to bygone cultures'.

The flora in the Geopark includes 75% of the plant species recorded in Ireland. The Burren's unique flora includes plant communities consisting of Arctic/Alpine species found growing alongside Mediterranean species. The limestone hills have long sustained the region's farming culture. The Burren's farming traditions are unique, particularly in the practice of 'overwintering', whereby cattle graze the hillsides in winter, enjoying a relatively warm, dry, source of calcium and mineral rich fodder.

Management of the Burren and Cliffs of Moher Geopark is provided by Clare County Council, with the support of the Geological Survey of Ireland, and the Shannon

Regional Development agency. The Geopark Management Group comprises a Steering Group of statutory and regional stakeholders, and an Advisory Group of local community representatives.

Environmental conservation designations and initiatives in the Geopark include the Irish Geological Heritage Programme, Special Areas of Conservation (SACs), Special Conservation Areas, the state-run Burren National Park and nature reserves, and National Monuments Service managed sites and monuments. Other environmental conservation initiatives include the Burren Connect Sustainable Tourism Project, the Farming for Conservation Programme and the Burrenbeo environmental volunteer initiative. The Burren Eco-tourism Network and Farm Heritage Tours Co-operative represent two of the many innovative initiatives in tourism and sustainable economic development in the Geopark. There is also an active network of visitor centres and learning environments in the Geopark.

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**A New
Atlantic-
Edge
Geopark
in Ireland**

**The 6000 year old
Portal Tomb at
Poul nabrone is one
of the 2700+
archaeological sites
and monuments
found throughout
the Burren**

**The Burren's
calcium rich
grasslands
support a
unique farming
culture.
Traditional
farming
practices are
key to
conserving
biodiversity**





A view from the
Santa Lucia
Syncline

THE VILLUERCAS - IBORES - JARA GEOPARK

The 2.544 km² Villuercas-Ibores-Jara Geopark is situated in a mountain range in the south-east of the province of Caceres (Extremadura, Spain). Villuercas-Ibores-Jara has nineteen municipalities and twenty-six residential centres and a population of 14.658 inhabitants.

Las Villuercas has a mountainous core surrounded by ancient peneplains, and is characterized by a series of parallel ridge-and-valley systems aligned in a northwest-southeast direction. The rocks of the region were folded during the Hercynian Orogeny leveled by erosion during the Mesozoic and Cenozoic eras, and rejuvenated by fracturing with the formation of horst

and graben during the Alpine Orogeny. Finally, the establishment of the current river network in this intensely folded and fractured territory resulted in the characteristic topography of the region, which is generally referred to as an "Appalachian relief".

The fossils and rocks bear witness to one of the main events in the evolution of life: the Cambrian explosion. The limestone deposits include abundant examples of the genus *Cloudina*, a fossil characteristic of the Ediacaran Period between 635-542 million years ago. *Cloudina* is the earliest animal with a mineralized exoskeleton. The Ediacaran deposits are complemented by the fossil rich Ordovician rocks (Great Ordovician Radiation). The Ordovician sediments include fossil-bearing layers with an abundance of trilobites, brachiopods, bryozoans, echinoderms, mollusks (bivalves and cephalopods), and graptolites.

Forty - four catalogued geosites include ridges, hills and mountains, mines, faults, river valleys, fossil deposits or areas with special geomorphological features such as synclines and anticlines.

Remarkable features of geological significance include the peak of La Villuerca, the Santa Lucia Syncline or the Pena Amarilla. Many geosites are also of cultural interest and are associated with rock shelters and cave paintings. The Costanaza mine in Logroñan is representative of the old mining industry in the

region and Castanar de Ibor cave with its impressive formations of aragonite crystals was declared a natural monument in 1997.

Its natural heritage has been recognized by the European Union Habitat Directive: eight Sites of Community Importance and seven Special Protection Areas for Birds. They give the opportunity to observe species such as the abundant cranes and raptors linked to the quartzite outcrops of the sierras, griffon, black and Egyptian vultures, black storks, eagle owls and golden eagles. More than forty cultural sites and events also provide significant attractions for visitors to the region. The Royal Monastery of Guadalupe is of special significance and was designated as a UNESCO World Heritage site in 1993.

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Aragonite
crystals in the
Castanar
de Ibor cave



A rock shelter
in the Pena Amarilla geosite



Massif des Bauges Geopark: the northern French Alps is home to France's third Geopark



**The perched
syncline
of Arclusaz**

The Bauges Massif Geopark, with a surface of 856 km², is located in the northern French Alps, astride the Savoie and Haute-Savoie departments. The population of more than 60 000 inhabitants unevenly distributed between the populated outer crown and the sparsely populated inner mountainous core. The Bauges Massif Geopark is also a dynamic rural mountainous area with peaks rising to heights above 2000m bordered by populated valleys at altitudes of approximately 250m above sea level.

The Geopark is administered by the Regional Nature Park which through its charter aims to preserve its natural and cultural heritage and promote sustainable local economic development.

Geologically, the geopark is located within the subalpine massifs and is characterized by limestone and marls dating from the Mesozoic and Cenozoic eras. In the western part of the massif the tectonic structures create a conformable relief. The inverted relief of the eastern area is characterized by perched synclines. The erod-

ed limestone is associated with a subterranean karst network and numerous deep and narrow canyons and waterfalls which supply water to the two largest natural lakes in France (Annecy and Bourget).

Climatically, the massif is subjected to three influences: to the west, hill zone temperate climate species are well represented including roe deer, deer, grouse, lynx or erythrone (leaf hopper) and cyclamen. The higher altitudes of the eastern side, are characterized by subalpine and mountain species such as blue thistle, Potentilla, chamois, black grouse and the short-toed snake eagle. On the southern side, species such as Osyris (sandalwood), bladder senna or the green lizard and cicada express the Mediterranean influence.

The rural character of the Bauges Massif has influenced the landscape considerably and is associated with a very special architecture and lifestyles. During the harvest, families leave the core of the Massif to live in "Sartos" and Grangettes in the southern foothills. During the summer they still relocate to chalets at different altitudes to follow the grazing herds.

Natura 2000, and biotop decrees protect the richness of the natural heritage of the territory. A national hunting and wildlife reserve includes 6 areas of special protection where no access is allowed. Pedagogical activities, conferences and scientific research promote knowledge and the conservation of geo-heritage.

Agriculture, the timber indus-

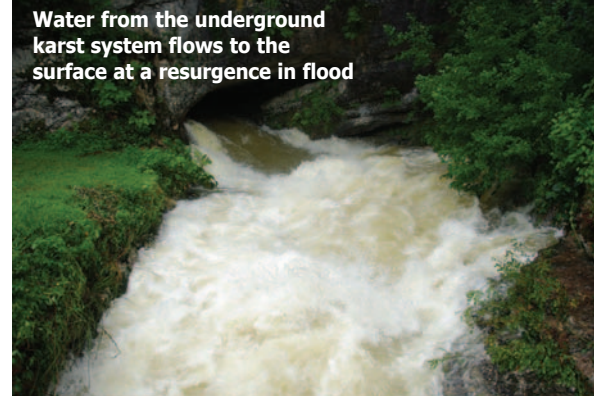
try and tourism contribute to the economic development. Local cheeses and wines are particularly known for their quality, and are labelled respectively with the "Tome des Bauges" and "Vins de Savoie" and "Vignoble et d?couverte" denominations of origin. The timber industry also is an important resource and a balance is maintained between exploitation and biodiversity. Tourism is the major activity with attractive destinations such as Annecy or Aix-les-Bains. The territory has 4 traditional family ski resorts including the first French site for cross-country skiing.

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**Water from the underground
karst system flows to the
surface at a resurgence in flood**



**Chalets situated
within a pasture**

The Apuan Alps Geopark opens a window on Geodiversity

The Geopark is situated in central Italy in the mountainous Apuan Alps and it coincides with the territory of the homonymous Regional Park, for about 500 km², including 20 municipalities in the provinces of Lucca and Massa Carrara. The Geopark has approximately 16,150 inhabitants and an average population density of 32.7 inhabitants/km².

The Geopark's geological heritage is particularly significant because the tectonic window in the centre of the Apuan ridge displays the oldest geological formations of the whole Apennine range. Its complex geological history is responsible for the great diversity of rocks, tectonic structures and minerals in the territory. The approximately 200 minerals recorded from the area include 19 mineral species which were first discovered and described from the Apuan Alps. Moreover, the importance of the geological heritage is evident in the karst phenomena, especially the hypokarst features created by water at depth, in the signs of major climate changes, and in the archaeological and historical-cultural remains linked to mining and quarrying activities. The Geopark's 253 geosites vary

in significance. The twenty-nine categories in which these sites fall under have been selected as representative of the main geological processes.

The biological diversity of the Apuan Alps is also remarkable. Almost half of the seven thousand Italian plant species grow in this area and for this reason the Geopark contains as many as 10 Sites of Community Interest, together with a wide and often overlapping area of Special Protection, and a Site of National Interest protected by Italian legislation.

The Apuan people survived for a long time on subsistence agriculture. Farming was accompanied by industrial activity. The intense search for metals and marbles, initiated during the Middle Ages, fuelled the industrial activity which declined during the 20th century. Numerous abandoned mines and quarries bear witness to this "industrial age".

The Apuan Alps area includes more than 200 small villages which developed during the Middle Ages. The Geopark also contains several monuments of architectural value, such as churches, castles, fortified villages, towers and bridges. The ancient marble and sandstone sculptures on the facades of many buildings reflect the significant heritage of stone culture in the Apuan Alps territory.

The Geopark is an organization within the Tuscany Region and is subject to Regional legislation. Its management structure consists of approximately 50 people from political and other administrative organizations. The Geopark uses a wide



A beech forest in a doline during autumn

variety of ways to establish a basis for encouraging tourism activities as well as for the promotion of education about natural history and the environment.

The Geopark's main facilities include the Corchia Underground System and Palaeontological Park of the Caves of Equi terme with speleological trails, quicksilver mines, marbles underground quarries, museums, caves of palaeontological and palaeontological interest and karst and thermal springs.

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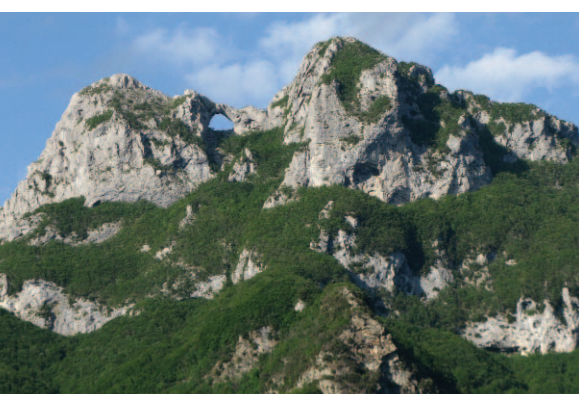
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Educational activity in a pot-hole in Equi Terme



The natural arch of Mt. Forato



The magnificent outdoor life of the dynamic Katla Geopark

Langisjör-
a popular
area for
hiking and
fishing

The Katla European and Global Geopark was formally established on November 19, 2010. Its purpose, among others, is to protect and develop the region's geological assets in order to promote sustainable economic development. Currently this magnificent area of approximately 9542m², i.e. almost 10% of the islands surface, is occupied by an aging and decreasing population of only 2700 people. The establishment of the Geopark is the inhabitants' response to demographic changes in the population. Therefore it was agreed by the governments of the three local municipalities, Rangarthing eystra, Myrdalshreppur and Skaftarhreppur, to unite in working towards reversing this trend by making use of at least three active volcanoes, glaciers and the exciting history of the area. The groundwork for founding Katla Geopark was initiated in 2008 with a project led by the University Centre of South Iceland and later was partly funded by the Growth Agreement Project for the Southern Region of Iceland.

View from the
shore in Vik



The geological history of the area is interesting and

diverse. The region is characterized by landscapes that have been sculpted by glaciers and volcanic activity which has had an immense influence on human habitation. Katla Geopark, for example, contains the infamous Eyjafjallajökull volcano which disrupted air traffic around the globe when it erupted in 2010. Although this event was unplanned by the marketing team of Katla Geopark and postponed the formal establishment of the Geopark for months, it was a great way to make the area well known to the public. Living conditions at the time were unfavourable and for months falling ash covered every inch of the area. However, the ash has proved to be a good fertilizer for grass and barley.

Nature, in its various forms, is the main attraction of Katla Geopark. International tourists and people from other parts of Iceland come to enjoy nature by sightseeing and also by engaging in various outdoor activities. There are a few very popular hiking trails in the area, for example Fimmvorduhals, a 21 km long route across a ridge between two glaciers, Eyjafjallajökull and Myrdalsjökull, ascends from Skogar and ends in Thorsmork. Following the eruption of Eyjafjallajökull Volcano in the spring 2010 the trail now crosses the new lava flow between the two new craters Modi and Magni. The Laugavegur trail, which is by far the most popular hiking trail in Iceland, traverses part of the area. The Laugavegur

trail is a 55 km long hike from Landmannalaugar to Thorsmork. There are numerous huts for accommodation en route. Sveinstindur to Holaskjöl is a 40 km long hike in the eastern part of Katla Geopark, near Langisjör and not far from Lakagigar. This trail is becoming increasingly popular as it is more remote and demanding than the other trails. In addition to these longer routes there are many shorter walking and hiking trails for the whole family to enjoy.

During summertime people from all over Iceland and from abroad enjoy fishing for salmon, char and sea trout in the area's rivers and lakes. In the fall and winter people also come from other parts of Iceland for bird hunting. Glacier walks and ice climbing in Solheimajökull are available all year round. Trips for four wheel drive jeeps on designated routes in the highlands of Katla Geopark are also popular throughout the year. Katla Geopark offers, without a doubt, an unequal experience for every type of tourist.

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Eyjafjallajökull eruption 2010

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GEOPARKS

Sierra Norte de Sevilla

The "Sierra Norte of Seville" Natural Park and Geopark, in the province of Seville, was declared a Natural Park by the Parliament of Andalucía in 1989. It is one of the largest natural parks in Andalucía, covering 1774.84km² and includes, either totally or partially, ten municipalities that are home to more than 29,000 inhabitants.

The Geopark is located in the mountain ranges of Sierra Morena, between the geological zones of Ossa-Morena and Sudportuguese (in the western area). The geology consists predominantly of rocks of Precambrian, Palaeozoic, Permian and Lower Triassic ages, with some Miocene sedimentary rocks in the south-eastern area. The Geopark's rich geological, archaeological and mining history has resulted in the recognition of at least 32 sites of geological interest and several geotouristic routes and include the following:

- Precambrian and Palaeozoic rocks of the Ossa-

Morena and Sudportuguese zones.

- The karst and mine complex at El Cerro del Hierro Natural Monument includes a spectacular palaeokarst originating from Middle-Upper Cambrian erosion of a Lower Cambrian limestone.

- A site containing the highest concentration of impressions of Lower Cambrian jellyfish, recorded in the Iberian Peninsula.

- The Valley Syncline: Ordovician to Devonian sedimentary rocks with an abundance of pelagic fossil species.

- The beautiful crag-land landscapes in the Geopark's abundant igneous rock outcrops.

- The "Beja - Acebuches" amphibolites representing the remains of an ancient ocean floor and a suture between tectonic plates.

- Permian and the Triassic continental deposits with an abundance of fossil plants.

- The waterfalls and travertine deposits in the Hueznar River.

- Mines and quarries, with over 30 ancient and recent mines.

The geopark's lowland vegetation is adapted to a Mediterranean climate with dry, hot summers and mild winters, the holm oak and the cork oak are the most characteristic species. Upland areas are characterized by more wet-loving species such as the gall oak and the Pyrenean oak. The black stork and the Spanish imperial eagle, both threatened with extinction, build their nests in the Sierra Norte landscape. The highlands are characterized by their gentle topography and consist of hillocks, typical of old massifs subjected to erosion over a long period of time. The Viar, Retortillo and Hueznar rivers contribute to the geopark's drainage sys-

tem.

Since ancient times, the western part of Sierra Morena was an area of important economic activity due to mining. It was situated in close proximity to the Roman Way known as the "Silver Route" and, owing to its strategic location served as a defensive position during the Late Middle Ages. This region linked the west of Andalucía and Castile and served as a conduit for population migration and for the transfer of cultural ideas from the north. The Geopark is also rich in archaeological sites: dolmens used as burial places, castles, buildings and churches, as well as numerous settlements and cemeteries from Roman times.

The Natural Park and Geopark is managed by the Department of Environment, and has a fixed budget from the Regional Government: the Junta de Andalucía. A manager, together with a team of 11 people, is responsible for the management of the Natural Park. Several action plans serve as guidelines for the next years including frequently organized activities promoting conservation of the geological heritage and the development of a sustainable economy based on geotourism.

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Landscape in the upper section of the Viar river

General view of the karst and mine complex at El Cerro del Hierro Natural Monument



Geological excursion at the Green Way (old railway) in the Seville Geological-Day of 2010

GEOPARK CONFERENCES

12 - 15 May 2012 5th International UNESCO Conference on Geoparks
Japan - Unzen Geopark
www.geoparks2012.com/

2 - 10 August 2012 The 34th International Geological Congress (IGC)
Brisbane, Australia.
www.34igc.org

19 - 21 September 2012 11th European Geoparks
Conference -
Arouca Geopark Portugal
www.2012egnconference.com



September 2013 12th European Geoparks
Conference in Cillento e Valle Diano Geopark - Italy

September 2014: 13th European Geoparks Conference in Marble Arch
Caves Geopark -
N. Ireland & Republic of Ireland

September 2015: 14th European Geoparks Conference in Rokua
Geopark - Finland

European Geoparks Meetings

September 2012: Arouca Geopark - Portugal

March 2013: UNESCO - Paris France

September 2013: Cilento e Valle Diano Geopark - Italy

March 2014: Sobrarbe Geopark - Spain

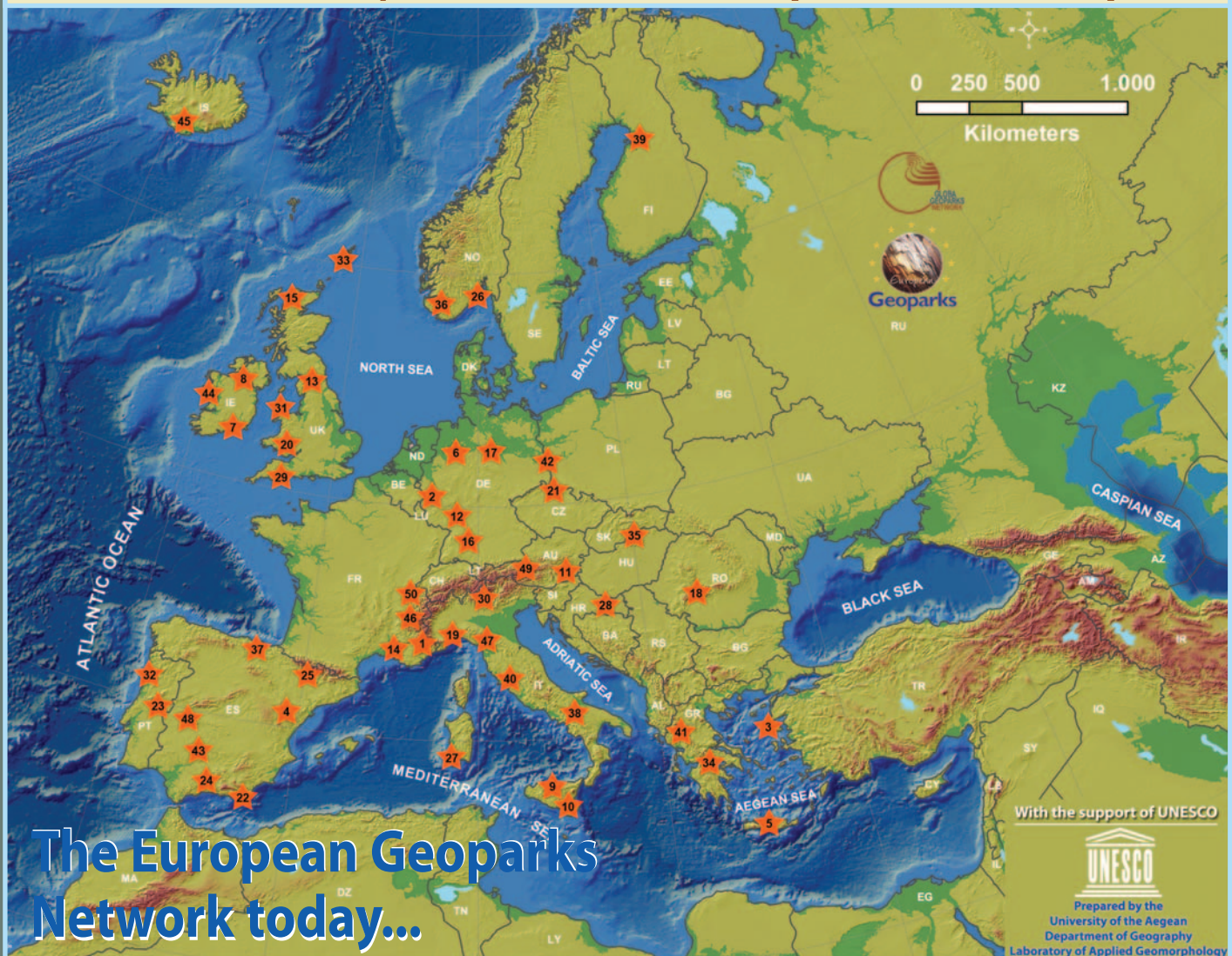
September 2014: Marble Arch Caves Geopark - N. Ireland & Republic
of Ireland



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GEOPARK CONFERENCES

The Network consists of 50 Geoparks in 18 European countries (March 2012)



The European Geoparks Network today...

1. Reserve Geologique de Haute - Provence	FRANCE	27. Geological, Mining Park of Sardinia	ITALY
2. Vulkaneifel European Geopark	GERMANY	28. Papuk Geopark	CROATIA
3. Petrified Forest of Lesvos	GREECE	29. English Riviera Geopark	ENGLAND, UK
4. Maestrazgo Cultural Park	ARAGON, SPAIN	30. Adamello - Brenta Nature Park	ITALY
5. Psiloritis Natural Park	GREECE	31. Geo Mon	WALES, UK
6. Terra.Vita Naturpark	GERMANY	32. Arouca Geopark	PORTUGAL
7. Copper Coast Geopark	IRELAND	33. Shetlands	SCOTLAND - UK
8. Marble Arch Caves European Geopark	NORTHERN IRELAND & IRELAND	34. Chelmos Vouraikos	GREECE
9. Madonie Geopark	ITALY	35. Novohrad - Nograd Geopark	HUNGARY & SLOVAKIA
10. Rocca di Cerere Geopark	ITALY	36. Magma Geopark	NORWAY
11. Naturpark Steirische Eisenwurzten	AUSTRIA	37. Basque Coast Geopark, Pais Vasco	SPAIN
12. Naturpark Bergstrasse Odenwald	GERMANY	38. Parco Nazionale del Cilento e Vallo di Diano, Campania	ITALY
13. North Pennines AONB	ENGLAND, UK	39. Rokua Geopark	FINLAND
14. Park Naturel Regional du Luberon	FRANCE	40. Tuscan Mining Park, Toscana	ITALY
15. North West Highlands	SCOTLAND, UK	41. Vikos - Aaos Geopark	GREECE
16. Geopark Swabian Albs	GERMANY	42. Muskau Arch Geopark	POLAND & GERMANY
17. Geopark Harz Braunschweiger Land Ostfalen	GERMANY	43. Sierra Norte de Sevilla Natural Park, Andalucia	SPAIN
18. Hateg Country Dinosaurs Geopark	ROMANIA	44. Burren and Cliffs of Moher	REPUBLIC OF IRELAND
19. Beigua Geopark	ITALY	45. Katla	ICELAND
20. Fforest Fawr Geopark	WALES, UK	46. Bauge	FRANCE
21. Bohemian Paradise Geopark	CZECH REPUBLIC	47. Apuan Alps	ITALY
22. Cabo de Gata - Nijar Natural Park	ANDALUCIA, SPAIN	48. Villuercas-Ibores-Jana	SPAIN
23. Naturtejo Geopark	PORTUGAL	49. Carnic Alps Geopark	AUSTRIA
24. Sierras Subbeticas Natural Park	ANDALUCIA, SPAIN	50. Chablais Geopark	FRANCE
25. Sobrarbe Geopark	ARAGON, SPAIN		
26. Gea Norvegica Geopark	NORWAY		

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