

europaean GEO PARKS

network
European Geoparks Magazine • Issue 10

The 190th Session of UNESCO's Executive Board and Geoparks

Outcomes from
11th European Geoparks Conference
at Arouca Geopark (Portugal)

Foreword

Magazine 10 celebrates and provides an overview of the range of activities and achievements in the life of the European Geoparks Network (EGN) in 2012. These include the festival of European Geoparks Week, the highly successful 11th European Geoparks Conference and the addition of three new geoparks, Central Catalunya Geopark – Spain, Bakony–Balaton Geopark – Hungary, and Lesvos Geopark - Greece. The progress in transforming the Global Geoparks Network into a UNESCO Global Parks Initiative is also reported.

The 11th European Geoparks Conference with the theme "Geoparks: A Contribution for a Smart, Inclusive and Sustainable Growth" was held in Arouca Geopark, Portugal, between 19 -21 September, 2012. The conference was attended by 324 delegates from 42 countries. Of the 152 abstracts published in the Conference Proceedings, about 81% were delivered at the conference, and about 29 % were presented as posters. The meeting also included an educational workshop entitled "In & Out", and the event "Geo-expo'12" designed to promote social, cultural and environmental sustainability, ran in parallel with the Conference. On the last day participants had the opportunity to visit some of the most important geosites of the Arouca Geopark.

The European Geoparks Network and the Global Network of National Geoparks (GGN), created under the auspices of UNESCO, share common aims. These are to address socio-economic problems including stagnant economic development, high unemployment and demographic issues created by a combination of ageing populations and depopulation in rural areas. They also aim to educate the wider public about the Earth sciences and to foster sustainable local economic development through the conservation of their geological, natural and cultural heritages.

In this issue articles contributed by three new and two recently created geoparks introduce their territories and demonstrate the progress already achieved in realizing the aims of the EGN and GGN. These articles are examples to aspiring geoparks because they show that these five regions already functioned as geoparks before becoming EGN/GGN members. Articles by 31 of the Network's established geoparks demonstrate how they raise public awareness of the geosciences and the importance of geo-conservation. They also describe their involvement in geotourism linked to scientific research, education, art, working with local communities and business people. The inclusion of the contribution by San Kaigan Geopark, Japan is an example of international cooperation between geoparks in the GGN.

EGN Magazine 9 (2012) reported on how the significant achievements and progress of the Geoparks initiative was acknowledged at the 36th UNESCO General Conference in September 2011 and on the need for additional work required towards the process of converting the Global Geoparks Network into an International UNESCO Geoparks Initiative. The cooperation between UNESCO and the GGN received further consideration at the 190th Session of UNESCO's Executive Board in October 2012. During this session UNESCO unanimously approved Item 5 of the provisional agenda 190 EX/5, Part I ADDENDUM on Geoparks. Encouraged by the progress made in defining a potential structure and mechanism for a UNESCO global geo-parks initiative, the 190th Session of UNESCO's Executive Board in October, 2012 invited the Director-General to review the implications of accepting sites already designated under the existing Global Geoparks Network criteria and to report back to the 191st session in April 2013. The Global Geoparks Network now has approximately four months in which to prepare its final position for transformation into the UNESCO Global Geoparks Initiative.

The past year has been a time for change in the European Geoparks Network Structure. Professor Patrick McKeever, the EGN's Vice-Coordinator was appointed Chief of Section, Global Earth Observation Secretary of the IGCP, EES/GEO, Natural Sciences Sector/Bureau 5.08, UNESCO and Andreas Schüller, Vulkaneifel Geopark, Germany is now the EGN's Vice-Coordinator. We congratulate, Andreas and Patrick and wish them every success in their new roles.

Tony Ramsay, Member of the Editorial Board



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Executive editor:

Nickolas Zouros

Editorial board:

Heinz Kollmann, Tony Ramsay, Jutta Weber, Nickolas Zouros

Contributors:

Tony Ramsay, Nickolas Zouros, Patrick McKeever, Agostinho de Abreu e Sá, Margarete Patzak, Andreas Schüller, Aloia Aniello, Masumi Sakamoto, Martin Koziol, Luis Alcalá, Ángel Hernández, Timo Kluttig, Mike Sweeney, John Galloway, Gandolfo Librizzi, Pasquale Li Puma, Francesco Chiaramonte, Rita Umbriaco, Heinz Kollmann, Irmu Auer, Jutta Weber, Cassian Schmidt, Elizabeth Pickett, Stéphane Legal, Isabel Reuter, Dan Grigorescu, Alan Bowring, Carlos Neto de Carvalho, Helena Couto, Manuel Valério, Baldomero Moreno Arroyo, Alicia Serna Barquero, Melanie Border, Margaret Wood, John Conway, Koumoutsou Eleni, Topouzidis Nikos, Daniela Rocha, Alexandra Paz, Asier Hilario, Leire Barriuso, Zoanetti, V. Masé, G. Bazzoli, Alessia Amorfini, Antonio Bartelletti, Giuseppe Ottria, Eamon Doyle, Vesa Krökki, Alessandra Casini, Riccardo Cinelli, Georgia Kitsaki, Haritakis Papaioannou, Panagiotis Paschos, Jacek Kozma, Manfred Kupetz, Alberto Gil Toja, Rafael Pirez de Guzman Puya, Inmaculada Cuenca Bonilla, Jean-Luc Desbois, Josi M Barrera, Javier López, Gerlinde Ortner, Hans P. Schönlaub, Ferran Climent Costa, Cristina Rubio Segura, Barnabás Korbély, Anna Knauer

Editing: Tony Ramsay

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The 190th Session of UNESCO's Executive Board

UNESCO and Geoparks

The cooperation between the Global Geoparks Network (GGN) and UNESCO was considered at the 36th UNESCO General Conference in September 2011.

The Draft Resolution of document 36 C/14, adopted by the UNESCO Executive Board was presented during the session at the Science Commission by the Assistant Director General of the Sciences Sector Gretchen Kalonji. This meeting recognized the impact that Geoparks have made as initiatives of UNESCO through their outreach and successful "bottom-up approach". The session concluded with the adoption of the Draft Resolution of document 36

C/14 (36 C/Resolution 31), a copy of which was published in European Geoparks Magazine 9 in 2012.

However, despite acknowledging the Geoparks' significant achievements and progress, it was recognized that further work was required in order to improve the Geoparks chances of converting into an International UNESCO Geoparks Initiative.

In the section Requests the *Director-General* of the Draft Resolution it was proposed that options for arrangements for a formal partnership with the GGN should be assessed and reported back to the Executive Board at its 190th session.

New decision

The cooperation between UNESCO and the Global Geoparks Network received further consideration at the 190th Session of UNESCO's Executive Board in October 2012. During this session UNESCO unanimously approved the decision proposed in the new document 190 EX/5, Part I ADDENDUM on Geoparks (190 EX/Decisions). In this document UNESCO's Director-General "*reports back to Member States on the consultations undertaken during the first half of 2012 on how to improve cooperation between UNESCO and the Global Geoparks Network as well as on possibilities of formalizing geoparks within UNESCO*".





The latest developments regarding the establishment of a closer cooperation between the Global Geoparks Network (GGN) and UNESCO were presented during the opening ceremony of the 11th European Geoparks Conference by Prof. Patrick J Mc Keever, Chief of Section, Global Earth Observation of Unesco. On the panel during the opening ceremony members are (from left to right): Melchior Moreira, President of the Porto and North of Portugal Tourism Entity Margarida Belém, President of the AGA- Arouca Geopark Association UNESCO Board of Directors Lino Ferreira, President of the Executive Commission of Oporto Metropolitan Area José Artur Neves, President of the Arouca Municipality Álvaro Santos, Head of Cabinet of the Secretary of State Assistant to the Minister of Economy and Regional Development Katalin Gönczy, Political reporter – European Commission Artur Sá, Chair of the 11th European Geoparks Conference António de Almeida Ribeiro, President of the Portuguese Commission for UNESCO Patrick McKeever, Chief of Section, Global Earth Observation, UNESCO, Nickolas Zouros, Coordinator of the European Geoparks Network

The role of Geoparks and their communities in implementing an innovative strategy of sustainable development through educating the wider public about geological hazards, global climate change and encouraging debate on the conservation and use of the geological, natural and cultural heritages is acknowledged.

However, the fact that the current ad hoc cooperation between UNESCO and geoparks does not allow either organization to capitalize on the potential benefits of a more formalized affiliation is also recognized.

In this respect the potential for increasing the cooperation between UNESCO programmes (Man and the Biosphere, World Heritage Convention and the International Geoscience Programme) and the GGN is acknowledged.

UNESCO is the only United Nations organization working in the field of earth science. It is therefore opportune that UNESCO strengthens the organization's link with the GGN through a UNESCO Global Geoparks Initiative.

By adding no additional costs to UNESCO's existing

programmes, it is recognized that this initiative would continue to be driven by the geoparks' innovative "bottom-up" approach.

Based on the observations above, UNESCO proposes to investigate the possibility of initiating the brands "UNESCO Geopark" and "UNESCO Global Geoparks Initiative" as labels of excellence for areas that meet the criteria of, and join, the UNESCO Global Geoparks Initiative".



It is acknowledged that "UNESCO Geopark" branding would strongly contribute to raising UNESCO's visibility in the world and add value to UNESCO's work. It would allow UNESCO to take the lead in a high quality network of public outreach on sustainable development linked to issues including the environment, geohazards, climate change and the sustainable use of natural resources, thus supporting the delivery

of some of UNESCO's core objectives". This branding would also assist in establishing geoparks in regions where none exist.

Encouraged by the progress made in defining a potential structure and mechanism for a UNESCO Global Geoparks Initiative, the 190th Session of UNESCO's Executive Board in October 2012 invited the Director-General to review the implications of accepting sites already designated under the existing Global Geoparks Network criteria and to report back to the 191st session in April 2013.

The Global Geoparks Network now has approximately four months in which to prepare its final position for transformation into the UNESCO Global Geoparks Initiative.

Tony Ramsay
Fforest Fawr Geopark
Wales, UK

Nikolas Zouros
Lesvos Geopark
GREECE

Patrick McKeever,
Margarete Patzak
Global Earth Observation
Section
Division of Ecological and Earth
Sciences
UNESCO

Outcomes from the 11th European Geoparks Conference at Arouca Geopark - Portugal

The 11th European Geoparks Conference was a successful scientific event. It was held in the Arouca Geopark, Portugal, during September 19th-21st, 2012. This conference was attended by 324 delegates from 42 countries. The highest number of participants came from Portugal (58), France (30), Italy (20) and Spain (21). The 11th European Geoparks Conference also attracted participants from outside Europe's frontiers with 16% of the attendees

coming from Brazil, Africa, North America and the Asian-Pacific region.

The main theme of the conference was "Geoparks: A Contribution for a Smart, Inclusive and Sustainable Growth", reflecting the main aims of the European Strategy 2020. Launched in March 2010, the European Strategy 2020 aims, over the next decade, to help Europe to emerge successfully from the current economic crisis. The 11th European Geoparks Conference



was an opportunity for Geoparks to reflect on a sustainable path for growth that will contribute to prosperity and social progress for the next years

Local residents involvement in folk dancing

Arouca Geopark fieldtrip visits the "Rocks giving Birth to Stones" geosite





Trilobites
 of Arouca



The "Rocks
 giving Birth
 to Stones" geosite

in Europe. In total 152 scientific communications were accepted by the scientific committee and were published in the Abstracts Volume of the Conference Proceedings. About 81% of these were delivered at the conference, and about twenty-nine were presented as posters. In the afternoon of the second day of the conference an educational workshop entitled "In & Out" took place. On the last day of the conference the participants had the opportunity to visit some of the most important geosites of the Arouca Geopark.

The main venue was located in the Arouca Secondary School, in the centre of the town of Arouca. This new facility in the Arouca Geopark was used for the first time as the venue for an international conference. Therefore, students and

teachers were involved in the opening and closing ceremonies of this international meeting. The Cultural Programme of the Conference welcomed the participants at many events outside the main venue of the Conference. Local people joined in the cultural activities and enjoyed the thematic visits, dinners and folk dances.

"Geo-expo'12", aiming to promote social, cultural and environmental sustainability, ran in parallel with the Conference and displays were presented at 51 stands: 16 stands focused on geoparks and other touristic destinations; 28 were concerned with local and regional products; 5 stands involved trades and industries and 2 focused on educational projects.

Daniela Rocha,
Artur Abreu Sá
 geral@geoparquearouca.com



The 30th EGN
 Coordination
 Meeting in
 Arouca
 Monastery



Plenary session
 of the 11th EGN
 Conference



Key Priorities of Europe 2020 Strategy: Application to the European Geoparks

José Manuel Durão Barroso
President of the European Commission

Ladies and gentlemen,

I am very pleased to address all of you on the occasion of the 11th European Geoparks Conference.

And I want to thank the coordinator of the European Geoparks Network, Nicolas Zouros, and the Director of the Agency for the development and Enhancement of Heritage, Hervé Passamar, for their leadership and their strong commitment to preserve and promote European geological and cultural heritage.

The successful dynamic of the European Geoparks Network is really impressive. From 4 territories in 2000, it now includes 43 territories across 17 European countries and attracts increased attention from communities across Europe as well as from the wider geological community.

In fact I am not surprised by such a success. Your active involvement in supporting sustainable economic development of Geopark territories has never been so crucial.

More than ever we need to pool efforts and work together to stimulate growth, to create jobs, to promote regional economic development and to strengthen social cohesion.

We do share the same objective. We want a better future for the young generations. That is a future where everyone will be given a chance to develop one's skills and where everyone will be more respectful of our fragile environment.

Building such a future is about capitalizing on our strengths to help tackle our current biggest problems.

And our geological and cultural heritage is certainly one of these strengths.

It has a positive spill-over effect on a wide range of businesses, as for example in the field of tourism – one of the sectors of the economy that has been performing well throughout the current economic crisis.

It also greatly contributes to the reinforcement of social and territorial cohesion, and the creation of jobs.

That is why the preservation and the promotion of such heritage is a sound investment in a more sustainable, fair and creative future, in line with the objectives of the Europe 2020 Strategy, our European blueprint to get the economy back

on track over the course of the decade.

As you know very well, education, research and innovation are at the very heart of this strategy; which can only succeed if there is a strong sense of shared ownership and active involvement from all the stakeholders throughout Europe.

And the Arouca Geopark that hosts today conference is precisely a good illustration of such an active involvement. It shows how science, education and geotourism activities can improve local economy while reinforcing cultural identity. Indeed, all of you here today, you represent the incredible variety and richness of our natural and cultural heritage.

But all of you here today, you are also demonstrating the solidarity of Europe's territories behind a common objective: to build together a stronger and more united Europe while respecting its diversity.

Your commitments will certainly enable Europe to have a more sustainable, smart and green growth.

And you can count, as always, on the European Commission's support- notably through our cohesion policy- to implement a wide range of projects from protecting cultural heritage and promoting tourism-related activities to protecting biodiversity and developing renewable energies.

Just to give you one example: for the period 2007-2013, the European Regional Development Fund has allocated €3 billion for the protection and preservation of cultural heritage, €2.2 billion for the development of cultural infrastructure and €775 million to support cultural services.

Ladies and gentlemen,

Let me conclude by sending you my best wishes for a very fruitful conference.

Such a gathering is always a good occasion for a reflection on the progress achieved so far, for exchange of experiences and best practices. But most importantly, it is an occasion to reflect on the way forward, on new ideas, new projects, new ways of organizing. And it is exactly what is most needed in these very challenging times: an entrepreneurial spirit, an openness to change while respecting our core values and heritage.

I thank you for your attention.



EUROPEAN GEOPARKS NETWORK

The Arouca Declaration

The modern phenomenon of the highly successful Global Geoparks movement was initiated in Europe in the late 1990's by four geological parks – one each in France, Germany, Spain and Greece – coming together to develop the Geopark model with financial assistance from the LEADER Programme of the European Union and with the support of the Earth Sciences Division of UNESCO.

The Geopark model devised by those four pioneers identified geoparks as a tool for Earth Heritage protection and sustainable local development. The geopark model stipulated that geoparks must contain internationally important geology that was protected and managed to promote geotourism for the benefit of the local economy and to educate people about the evolution of their local landscape.

The European Geoparks concept was presented to a wider audience at a conference held in Maestrazgo in Spain in 2000 when interested regions in Europe were given the opportunity to apply for European Geopark status under the auspices of UNESCO. It was clear almost immediately from the enthusiastic reaction of the conference delegates that the European Geoparks initiative promised to be very successful.

Subsequently, in the following year 2001, eight European regions were the first places in the World to be recognised as Geoparks. These early European

Geoparks proved to be the forerunners of what is today a hugely successful World-wide network of Global Geoparks in many countries, with many more aspiring geoparks in every continental region.

Global Geoparks have continued to operate with the strong support of UNESCO, although not as an official UNESCO programme akin to World Heritage or Man and Biosphere. Many people both within UNESCO and within many international organisations, national governments and geoparks now believe that the time is right to form even closer links between UNESCO and Global Geoparks for their mutual benefit. Consequently, UNESCO is carrying out a detailed review of its relationship with the Global Geoparks Network to identify the best way forward.

Representatives of the 52 Global Geoparks in Europe met recently at the 30th Meeting of the Coordination Committee of the European Geoparks Network in the Arouca Global Geopark in Portugal on 18th September 2012. The Coordination Committee very much welcomed the increasing levels of support for Global Geoparks within UNESCO and hoped that the present strong relationship between them would be strengthened even further in the near future.

In particular, the Coordination Committee advocated that Global Geoparks should be totally and exclusively under the umbrella of UNESCO,

with the Global Geoparks Network and UNESCO working together in tandem to continue the development of Global Geoparks around the world.

At the same time, the Coordination Committee agreed that the core values and established practices that are fundamental to the success of Global geoparks should be perpetuated. The Coordination Committee also agreed that it was important to retain the 'bottom up' approach to developing geoparks that has been fundamental to the successful establishment of Global Geoparks as a world-wide phenomenon that enjoys tremendous grass roots community support.

The Coordination Committee also wished to see the present well-tested and cost effective quality control measures and inspection/revalidation procedures retained for all existing or aspiring Global Geoparks. Lastly, the Coordination Committee were anxious to ensure that future Global Geoparks should only be accepted on merit and not because of any political pressures or any other inappropriate considerations.

Signed on behalf of the Coordination Committee of the European Geoparks Network, which, on 18th September 2012, included the official representatives of the 52 member geoparks from 18 countries.

**European Geoparks Network
 Coordination Committee
 18 September 2012**

EUROPEAN GEOPARKS WEEK 2012



The European Geoparks Week 2012

Raising awareness of climate change, geological hazards and intangible heritage

During late May and early June 2012, the members of the European Geoparks Network celebrated their annual "Geoparks Week" and showed how their regional geology contributes to and can inspire community life in geoparks. Although geology is the focal point for the niche market of geo-tourism, geology and earth history also inspire artists and musicians to work with natural materials or to capture the sound of the Earth. Excursions and special lectures on phenomena in nature and exhibitions which attracted people who want to know more about the processes that created our planet rounded off the activities during the Geoparks Week.

Educational programmes are one of the most important components and many geoparks cooperate with universities and schools to promote

and raise the understanding of landscape - building processes. Increasingly programmes for Geoparks Week deal with the challenges for the future, including climate change, geological hazards and protecting a territory's intangible heritage and many activities were designed to increase awareness of these issues. In some regions people need to know how to protect themselves in case of earthquakes, however, in all regions individuals need to be aware of the potential threats arising from global warming and the contribution they can make to reduce the consequences. A geopark's intangible heritage is frequently linked with its geological, natural and/or historical heritage and for this reason geoparks strive to preserve this gift from the past for future generations. The activities in Geoparks Week 2012 demonstrate

once again the high level of ecological and social responsibility that has arisen in geoparks since the initiation of the geopark concept in 2000.

Participants also learned of the important role that geoparks play in promoting tourism through intensive networking with tourist entrepreneurs, tourist guides and all other tourism service providers in their regions.

The European Geoparks Network provided a total of 760 activities and events during Geoparks Week 2012. Nearly 80.000 people took the opportunity to participate in one of the lectures, exhibitions, excursions or festivals. As in previous years, a large amount of promotional material was distributed to raise the profile of geoparks as regions of sustainable development.

Andreas Schüller

Andreas.schueller@vulkaneifel.de

12th EUROPEAN GEOPARKS CONFERENCE

4 - 6 SEPTEMBER 2013

Cilento and Vallo di Diano Geopark

Cilento and Vallo di Diano Geopark has the honor of hosting the 12th European Geoparks Conference, during a period in which the global development strategies of the Earth Sciences assume an important role in the world. Climate change and associated geo-hazards will affect all human activities and may strongly determine humanity's future. The aims of the 12th European Geoparks Conference, are to show how Geoparks can develop "innovative approaches for raising public awareness of geohazards, climate change and the sustainable uses of georesources".

Therefore, beginning with the concept the Conference "Raising Public Awareness", the Programme will comprise general sessions on the main topics: "Geohazards", "Climate Change" and "Sustainable uses of georesources", each with related thematic oral sessions with invited speakers together

A view of the beautiful Cilento coast



with selected oral presentations and poster sessions on "Research", "Education" and "Dissemination" experienced in or proposed for the Global and European Geopark Network.

The specific aims of the conference are:

1. To confirm how Geoparks can and will focus on the scientific knowledge of these phenomena in the academic community.

2. To understand how Geoparks address these issues in the educational system.

3. To publicize the role of Geoparks in raising public awareness of climate change and geohazards as well as the sustainable use of natural resources.

The 12th European Geoparks Conference will be held in Ascea-Velia-Elea, a village located along the coast of the Cilento, Vallo Diano and the Alburni National Park-Geopark in the Campania region of southern Italy.

Present day, Ascea is a modern, touristic village surrounding the Archaeological Park of the ancient Greek city "Elea", renamed as "Velia" by the Romans, one of the "cradles" of western philosophy and civilization, associated with the philosophies of Parmenides and Zenone, and recently designated as a UNESCO World Heritage Site.

The long and complex Ascea-Velia-Elea history represents the first cultural, social and economic global

"network" in the ancient world and provides a real "paradigm" of cohabitation between human society and geo-hazards. In fact, since its foundation, the town experienced natural disasters due to landslides, inundations, earthquakes, and probably tsunamies which influenced its social and economic development. Tradition tells us how Parmenides, a natural philosopher, understood the nature and dynamics of local geohazards, who as teacher raised public awareness and, finally, as a political thinker suggested planning and design measures for mitigating natural risks.

Cilento and Vallo di Diano Geopark in ITALY is pleased to invite you to participate in this conference.

For more information on the conference please check our homepage:

<http://egnconference2013.cilentoediano.it>

Or contact Aniello Aloia
info@egnconference2013.cilentoediano.it

a.aloia@cilentoediano.it



Sightseeing, Dining, Learning: The Fascinating San'in Kaigan Geopark

The San'in Kaigan Geopark is located approximately in the center of Japan, facing the Sea of Japan. The Geopark's main theme is "geological features, the natural environment, and people's lives related to the formation of the Sea of Japan."

In the San'in Kaigan Geopark, there is a wide variety of geological and topographical features related to the formation of the Sea of Japan. Gembudo, a basalt cave with beautiful columnar joints, is the place where reversed geomagnetic polarity was first discovered. Gembudo Cave is considered as an internationally important scientific site. The area's coastlines are best observed from the sea during boat tours. Heated underground water gushes out through many faults in our Geopark, and the area is home to many hot springs, which attract many visitors. Due to the meeting of cold and warm currents, the Sea of Japan provides great fishing grounds, particularly for snow crab. The region is also known for Tajima cattle, the breeding cattle of the famous Kobe beef. Landslide mor-

phology is utilized for terraced rice paddies, creating a unique landscape and the source of delicious rice. The area is also blessed with pure water used to produce good sake. In addition to these traditional products, local people are also actively trying to develop new "geo-gourmet", food that uses ingredients derived exclusively from the Geopark.

Children receive education concerning the environment and natural disasters. Teaching materials to raise awareness of the Geopark such as karuta (a traditional Japanese playing card) are also being developed. A subsidy system for research fees supports academic research in the San'in Kaigan Geopark. The San'in Kaigan Geopark is laying the groundwork for a system that will promote the protection and conservation of geological resources and the surrounding environment. The breeding and conservation of Oriental White Storks (IUCN Red List) is one of the most remarkable examples of natural conservation. Downstream of the Maruyama River that runs through the Toyooka



Gembudo cave with superb examples of columnar jointed basalt

Basin, the valley narrows forming a bottleneck that prevents the transport of sediments. This provides ideal conditions for marshes. Although these marshes were once home to the storks, they became extinct in Japan in 1971 as a result of the use of agricultural chemicals and other damage to the environment.

However, due to the efforts (organic agriculture, restoration of wetlands) of local citizens and governments, the storks started breeding in the wild again. Now they are effectively used as a model for environmental education, a brand symbol (rice, sake) and tourism. The lower Maruyama River and the surrounding rice paddies were designated as a Ramsar site in July 2012.

Masumi Sakamoto

saninkaigangeoguide@gmail.com

Location of the San'in Kaigan Geopark, Japan



Oriental white storks



Global Geoparks Network capacity building activities

International Intensive Course on Geoparks 2012

The 5th International Intensive Course on Geoparks, was delivered from 3-14 September 2012 in Lesvos under the auspices of the GGN Bureau. This summer school was organised and hosted by the Geography Department of the University of the Aegean and the Lesvos Petrified Forest Geopark.

This year's theme was "Geoparks: nature heritage protection and management, sustainable tourism and local development". The Course was funded by the Operational Programme "Education and Lifelong Learning" of the European Social Fund.

The Course was designed for Geoparks' staff members, postgraduate students investigating Geopark management, geotourism, geoconservation and sustainable development of rural areas, as well as for stakeholders and members of local communities of protected areas and aspiring Geoparks. This year, the participants came from Japan, China, Iran, Turkey, Hungary, Spain, Portugal and Greece and constituted a very interesting and challenging mix with a large variety of professional

Participants visiting and interpreting tectonic geosites during the Intensive Course



INTERNATIONAL INTENSIVE COURSE ON GEOPARKS 2013

25 June – 4 July 2013 – Lesvos island Geopark - Greece
<https://geoparks2013.pns.aegean.gr/>

backgrounds, but with a common passion for conservation and utilization of the special local heritage in their respective areas.

A large number of stimulating lectures were presented by university professors and researchers with long experience in geoheritage, geodiversity management and the development of alternative sustainable geotourism, from France, Portugal, Germany, Spain and Greece. Furthermore, the participants had the opportunity to present their areas and the actions of geoconservation and education in their home institutes and to discuss new ideas and best practices in the sustainable protection and promotion of local heritage and identity.

During several field trips, the participants had the opportunity to see the Lesvos Petrified Forest Geopark and experience its infrastructure and activities, and also to visit the most important monuments of the island's geological, historical, religious and cultural heritage. They walked along the "paths of Theophrastus and Aristotle", where they met with stakeholders and had the opportunity to discuss the important role played by the local communities in the protection of the local natural heritage and cultural identity. The interest shown and the broad international participa-

tion in the courses organised during the past 5 years has resulted in the establishment of Lesvos as the location for an annual International Intensive Course on Geoparks. The Course contributes significantly to the exchange of experience, knowledge and fresh ideas in the fields of Geopark management, geoconservation and promotion of geotourism, between some of the original Geoparks, new members of the European and Global Geoparks Networks, stakeholders interested in these fields and young scientists. Most importantly, this themed meeting of people from all over the world plays a vital role in the development and expansion of the Geoparks Network and in spreading the spirit of cooperation and mutual support among rural regions around the globe.

Nikolas Zouros
nzour@aegean.gr
K. Vasileiadou
lesvospf@otenet.gr

Training the future Geoparks staff in Lesvos Geopark

Visiting the olive oil museum in Agia Paraskevi





(a) Unveiling ceremonies of the Poetic Forest (b) and Redwood panels

Scientific exchange programme between Global Geoparks Mt. Lushan (PR China) & Global Geopark Bergstrasse-Odenwald (Germany)

Huang Tao, Che Ling Chao and Liang Gao Cheng could not hide their amazement – felting rocks from wool, a sea of rocks, forest art, touch and feel boxes, planting activities, planning exhibitions, infrastructure, project development, manned information booths and calligraphy. All this and much more awaited the three invited guest scientists from the Global Geopark Mt. Lushan (PR China) during their visit as part of an international exchange programme. Global Geopark Bergstrasse-Odenwald, has collaborated for five years with their Chinese partner, the Director of the Hermannshof Botanical Garden and the International Forest Art Association.

The collaboration between the participating institutions resulted from intensive contacts with the Chinese partners. In this context, the first international forest art trail "The Poetic Forest" was cre-

ated in China as part of the 3rd International Forest Art Conference. Since then, the trail has become a magnet for Chinese and international visitors. The depth of the friendship between the two geoparks was evident during a visit by a delegation from the Mt. Lushan Botanical Garden. Over sixty years ago, Chinese Redwood seedlings planted in the Hermannshof Botanical Garden, produced a close relative growing in girth and height since the early 1950s. In addition to the comprehensive information and training programme, which took the guests to all corners of the region, the topics "Forest Art" and "Chinese Redwood" also played an important role. An information panel in German, English and Chinese was unveiled in front of the International Centre for Forest Art in Darmstadt, providing visitors to our region with an impression of the "Poetic Forest" on

Mt. Lushan. At the Hermannshof, another information panel was unveiled in the presence of the former gardener in the Hermannshof, who had planted the tender Redwood seedling.

The highlight of the visit was the Geo-Naturepark Day, a festival, attended by 2500 people, involving numerous regional and international partners. Here, together with our Geopark rangers, the Chinese colleagues presented their region and provided a demonstration of the aesthetic art form of calligraphy. The final unanimous verdict on the exchange: fascinating, very instructive and informative!

The exchange programme will be continued and the Global Geopark Bergstrasse-Odenwald will contribute as a tutor in the International Student Summer School on Mt. Lushan.

Jutta Weber
j.weber@geo-naturpark.de
Cassian Schmidt
Ute Ritschel

Felting rocks - a favourite geo-educational activity

Chinese colleagues presenting the International Booth at the Geopark Day





A 3D model of the Rokua Esker

The sites and services of Rokua Geopark

The area of Rokua Geopark was laser scanned by the National Land Survey of Finland in spring 2011. This very accurate elevation data covering the whole area is now used in several information and educational products to explain and promote the Geopark.

The Geological Survey of Finland published the Rokua Geopark Geological Outdoors Guide in May 2012. The guide and its maps were made using the elevation data. The elevation data have also been processed into a detailed panoramic map covering the Geopark area. The panoramic map is used in the

and English in August 2012. The map presents the area together with photographs, video and text. Three inbuilt 3D maps offer the possibility to explore the area and its geological formations in detail. The 3D models cover the core areas of the Geopark, Rokua esker and dune area, rivers Oulujoki and Muhos, and the Lake Oulujärvi recreational area. The Geopark has also initiated cooperation with local schools to provide them with the opportunity to use these products in education. The schools have for example suggested adding short video presentation clips to the interactive panoramic map platform. These new products offer the Geopark numerous ways to explain and promote the



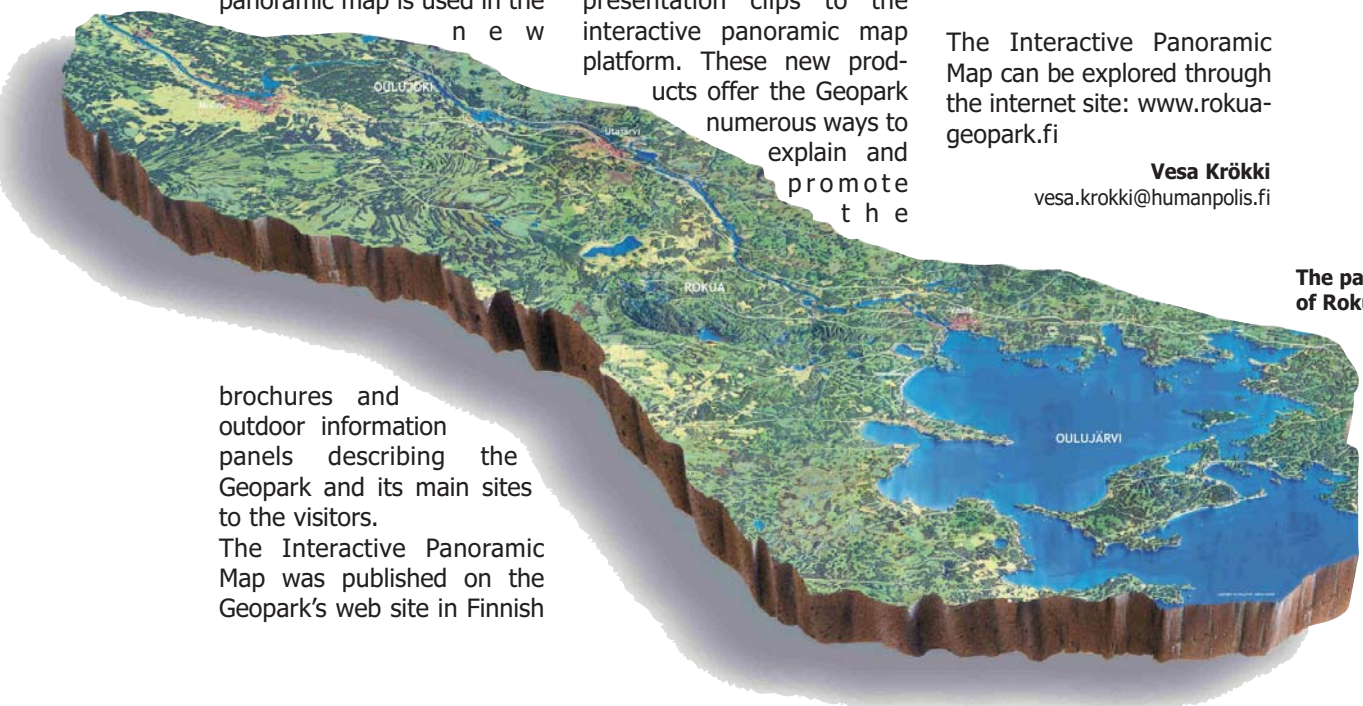
area and its features. The new products also offer the visitors a better way to visualize the area and plan their visit in advance.

An example of an information panel showing the positions of geosites in the Geopark

The Interactive Panoramic Map can be explored through the internet site: www.rokua-geopark.fi

Vesa Krökki
 vesa.krokki@humanpolis.fi

The panoramic map of Rokua Geopark



brochures and outdoor information panels describing the Geopark and its main sites to the visitors.

The Interactive Panoramic Map was published on the Geopark's web site in Finnish

Scottish Geoparks and the Scottish Geodiversity Forum highlight the importance of Geodiversity in the 21st Century

Geopark Shetland and North West Highlands Geopark have been working closely with the Scottish Geodiversity Forum to raise the profile of geodiversity nationally and highlight its importance in facing the challenges of the 21st century.

The Scottish national forum for geoconservation groups and geoparks involves academics, geological societies and other related organizations and interested individuals including the British Geological Survey, National Museums Scotland and the government agency

Scotland's
Geodiversity
Charter

Scottish Natural Heritage. The Forum promotes the role and value of geodiversity in education, community development, health and wellbeing, tourism and the wider economy and seeks to raise the political profile of geodiversity and to influence local and national policy.

Forum Chairman Angus Miller said "Many people had felt for some time that Scotland's geodiversity was consistently underrepresented in, and often absent from government policies on matters where it should be recognised as having paramount importance. And there is also the feeling that Scotland, of all places, should shout about our amazing geodiversity and celebrate its links to history, the way we live now, and the development of geological science.

Consequently the Forum came into being to try to address these issues and encourage people to understand why the value of geodiversity is so significant". We benefit from a range of resources and processes supplied by natural ecosystems with important products like clean drinking water. Whilst biodiversity has a vital role to

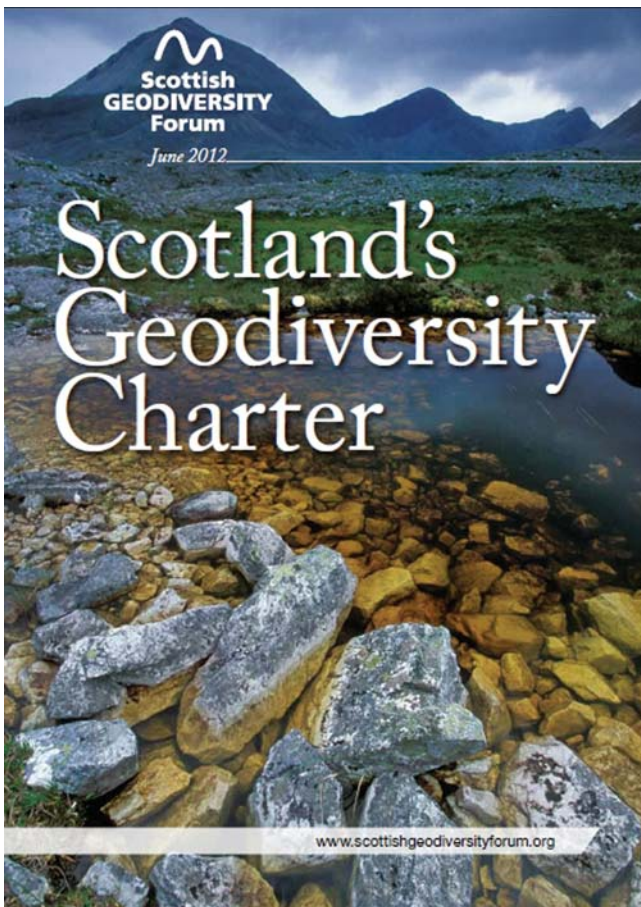
play, and is protected accordingly, geodiversity, which underpins all ecosystems services and is vital to our understanding of how they work and how we can protect them, tends to be overlooked.

To redress this balance, the Forum has developed a 'Geodiversity Charter for Scotland', to raise awareness of geodiversity and to encourage government, local authorities, companies, organizations and individuals to work together to integrate geodiversity into policy, decision making and guidance to deliver sustainable management of land and water. The Charter defines geodiversity as the variety of rocks, minerals, fossils, landforms, sediments and soils, together with the natural processes which form and alter them. It is the link between biodiversity, landscape, people and their culture.

The Charter was launched at Holyrood in Edinburgh in June 2012 by Scottish Minister for Environment and Climate Change Stewart Stevenson MSP and was attended by Shetland MSP Tavish Scott on behalf of Geopark Shetland.

For more information about the Scottish Geodiversity Forum visit <http://scottish-geodiversityforum.org/>

Robina Barton
robina@shetlandamenity.org



The Film Festival on the landscape of the Madonie Geopark 2012, emphasized the relationship between landscape, geological history, tangible and intangible heritage



Film Festival on the landscape in the Madonie Park

The Madonie Film Festival is a unique event of its kind in the Italian national scene, involving the entire population of the Madonie Geopark. It takes place every year, and is organized by the G. A. Borgese Foundation, to appreciate the landscape through interweaving the relationship between literature, cultural heritage and the landscape which is inextricably linked to geological events. This interweaving springs from Giuseppe Antonio Borgese, a well-known antifascist critic, writer and journalist of the first half of the twentieth century. This year, the tenth anniversary of the establishment of the Foundation named after him, marked the 130th anniversary of his birth

and the 60th anniversary of his death. The film competition linked to the event, now in its third year, brought together 55 works, including examples from Nepal, Norway, Switzerland, France and Spain. But participants in the event appreciated the holistic approach, to the past, present and future (defined as PPF by the EGN), which was expressed in the numerous fringe events including excursions, readings, concerts and outdoor performances of plays. The six works selected for the section called "The landscape, to be preserved for the common good", involved videos which concentrated on places and communities and on different interpretations of the landscape in relation to life. These fully expressed the universal concept of every human being's right to beauty. This is a right that the European Geoparks Network and Global Geoparks Network, through all the current 91 members distributed in 27 countries, seeks to affirm through scientific studies and the appreciation of the landscape and nature. The eleven works selected by the section called

"The human face as a landscape that recounts meetings," involved films that recounted meetings between people and gave voice and light to the many human faces of our everyday landscape. Faces are bearers of stories, thoughts and feelings which we all too often choose to ignore, possibly because of differences in race or religion. These differences, however can be the starting points, as they were for those who initiated Geoparks, to further UNESCO's, aim to promote understanding and sharing between peoples.

Gandolfo Librizzi
fondazioneborgese@libero.it
Pasquale Li Puma
uob5@parcodellemadonie.it

The community living in the Madonie Geopark has succeeded in finding, through concerts and theatrical performances in a natural setting, the fundamental principle of UNESCO, aimed at understanding and sharing

Reading and listening to the most beautiful pages by G. A. Borgese on top of the Monte Carbonara (at 1979 metres above sea level) and enjoying the view of the Madonie Geopark





TERRAGenesis 1
– the nature of
the landscape

TERRA.GENESIS

A 3D - Video - Animation explaining the local earth history to a wide public

The geological processes that create a landscape are often difficult to understand for non geologists. The enormous duration of geological periods and the massive changes involved in the nature and geographical position of the landscape through time make it impossible for many people to understand the history of the environment they live in. TERRA.vita has produced a 20 minute 3D computer animation that provides an introduction to the local Earth history by explaining the climatic changes that took place in the region as well as the tectonic movements and erosion processes that formed the land surface. The geology of the TERRA.vita Geopark includes a sedimentary sequence with a detailed record of 300 mil-

lion years of Earth history and a variety of geological structures. The geology is, however, made easily understandable for members of the general public through the provision of explanations which are both simple and of high quality.

The new animation is based on four structural elements: Block diagrams show an oblique aerial view of the wider Geopark area. In this view large scale processes such as flooding, the forming of sediments or the spread of vegetation are explained.

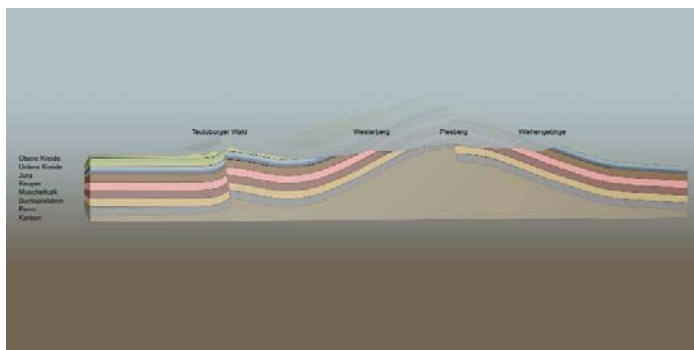
The second element contains landscape impressions. For some geological periods, more detailed presentations were necessary to explain the individual circumstances. For these times, close-ups of plants, animals and rocks are illustrated, sometimes in

films, in other cases as fixed images. The second part of the animation uses a simpler, sketched animation to explain the huge tectonic movements, the selective weathering and the erosion processes, that gave the surface its final shape. Finally, some sequences describe more complex processes, e.g. the forming of an end-moraine. For this reason the production of more precise detailed animations was necessary.

The computer animation is being used in various contexts. It is available on the Geopark's website www.naturpark-terravita.de, and has been given to schools to be used for educational purposes and to museums to show in their exhibitions.

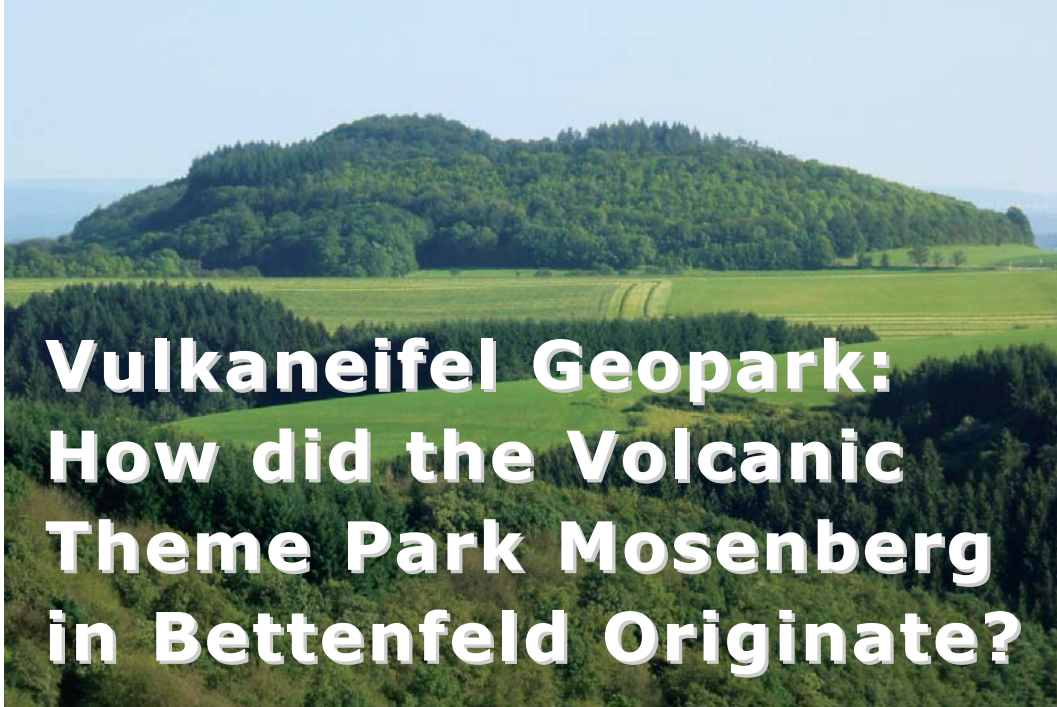
Timo Kluttig
Kluttig@LKOS.de

**A landscape in
the TERRAvita
Geopark during
Cretaceous times**



**A cross-section
showing the
structural
geology and
a topographic
profile in the
Geopark**

A view of the Mosenberg Volcanic Group landscape near Bettenfeld



Vulkaneifel Geopark: How did the Volcanic Theme Park Mosenberg in Bettenfeld Originate?

ACTIVITIES
european
GEOPARKS

Quarrying the volcanic deposits in Mosenberg ended in 1993. According to German legislation, quarries must have an exit strategy to deal with these sites at the end of their working life. This usually involves filling the excavation followed by planting to restore the "original" surface. Natural geological outcrops and quarries are windows into the Earth that reveal fascinating stories about the origin and evolution of the rocks. For geologists such insights are important! Quarrying at Mosenberg exposed volcanic chimneys, lava flows with crystals of various sizes and volcanic slag consisting of fragments of basaltic lava and cinders. Here visitors can see a perfect and large cross-section through a scoria cone! This is so unique that in 2006 the Mosenberg volcano group was included, together with the Meerfelder

Maar, in the list of the 80 best "Geotopes of Germany". In 2000, the community of Bettenfeld together with the municipality of Manderscheid and the Maarmuseum Manderscheid began to consider how to make this quarry accessible for geotourism. Conveniently the "GeoRoute Vulkaneifel around Manderscheid" leads directly to the quarry and the regional "Eifel Trail" and "Lieser Hiking Trail" is not far removed from this site. So in developing the plan it was decided to redirect the GeoRoute directly into the quarry, to make it safe and accessible for visitors and enhance it with geological information panels! The term "re-naturation" was redefined for the first time for this project as "Geological re-naturation". In 2009 we received the welcome news that the

European Union and the state of Rhineland-Palatinate approved and agreed to fund half of this new project as part of their structural support programmes (LEADER / PAUL). The remaining financial support was provided by the municipality because of the regional importance of this site in their approach to tourism.

Construction began in late 2010. The pit was leveled, the slopes secured with big boulders of lava, and some grass paved barrier-free routes were included in the design. In addition, a short trail displaying the volcanic rocks of the Eifel and an outdoor classroom were developed. Together they create the unique Volcano Theme Park Mosenberg in Bettenfeld, an exceptional window into the Eifel volcanism!

Volcanic theme park Mosenberg

Martin Koziol
maarmuseum@t-online.de

The outdoor classroom in the Volcanic Theme Park





The Cretaceous landscape viewed from a site along a geo-trail near Aliaga

Breathing geology for years in Maestrazgo Geopark

Maestrazgo Cultural Park, launched in 1998, includes 43 municipalities in Teruel. There are 13,660 inhabitants on its mountainous 2,622 km² with 5 inhabitants/km², while the average for Spain is 91/km². The territory is defined geographically by the Guadalupe River Basin and geologically by its impressive landscape with folded and faulted Cretaceous outcrops. The Geopark was established in 2000, together with three other European areas sharing a similar vision and founding the European Geoparks Network. The concept "Geopark" defines a "territory which includes a particular geological heritage and a sustainable territorial development strategy". The Geopark also promoted the Spanish Forum of Geoparks, formally constituted in La Cañada de Verich in December, 2011.

The Geopark has a rich and outstanding heritage and 40% of its territory belongs to Sites of Community Importance. Ten villages have been designated as being of historical interest, of the 615 archaeological sites two are designated as UNESCO World Heritage Sites and 48 areas with sites of both geological and archaeological sites/areas

have been catalogued, and four sites are designated as Natural Monuments. Seven dinosaur fossil sites and 20 cultural sites are designated individually as "Property of Cultural Interest" and included as conservation sites of primary importance in the Spanish Heritage Laws.

The Geopark's geology can be enjoyed through free or guided visits to a variety of sites: Dinópolis, a palaeontological park introducing the exciting world of dinosaurs inside the Geopark; Galve (preparation process of dinosaur fossils); Castellote (palaeobotany and palaeogeography); and the exhibition "Water, Time and Land" in Mas de las Matas - which is managed by a Local Action Group. Other facilities are the Geological and Mining Parks in Aliaga and several signposted geological trails. Regular public events within the Geopark include travelling exhibitions, "Geolodía", the Spanish Geology Day (founded in Aliaga), activities celebrating European Geoparks Week, fieldtrips during the annual courses, scientific seminars and other educational activities, are also promoted. To disseminate its geological heritage and to boost the Geopark's Networking activities, it has launched the Geopark



Corner, a weekly section in Diario de Teruel.

Geology holds the keys to fascinating subjects which greatly affect our lives. Teruel Province is characterized by actions such as the establishment of a Geopark leading to an emerging interest in geological tourism and a step forward in disseminating the knowledge of geology to the public and in improving the quality of life of the local communities.

Luis Alcalá

alcala@fundaciondinopolis.org

Ángel Hernández

parquecultural@maestrazgo.org

One of the 120 drawings from the children's contest "What's a Geopark to you?" celebrated during European Geoparks Week 2012 (drawing by A. Antón)

Geolodía 11 (2011), a national geological outreach initiative launched in 2005 in the Maestrazgo Geopark



Hațeg Dinosaurs Geopark, Romania

A place of integrated approaches

The launching of the Geopark concept in 2000 together with the further development of Geoparks as a new type of protected area provide an opportunity for integrating methods which are usually confined to specific areas of management and research in other types of protected areas. Geoparks therefore have an opportunity to integrate their approach to the two fundamental components of nature: the biotic ("biodiversity") and the abiotic ("geodiversity") constituents. Such an approach leads to a better understanding of the links between the various factors within these two parts of nature, thus contributing to the efficacy of actions taken for reducing threats and as a result leading to more effective conservation. In Hațeg Country Dinosaurs Geopark this approach starts in the elementary and secondary schools through the introduction of new programmes for learning and understanding "Nature around the school". It continues with scientific research by students and professional



Students digging for dinosaur remains

researchers on the numerous and specific fossiliferous geosites within this Geopark. The palaeontological studies have the advantage of being undertaken directly on site revealing conclusive data on the abiotic and biotic environments from the past and providing clear and suitable examples for their interpretation.

In order to sustain the integrated study of nature in the Geopark, a new Research Centre, fully equipped for the analysis of biodiversity and geodiversity, was inaugurated two years ago. The studies developed in the Centre have a direct implication for agriculture and rural development in the region.

An integrated approach to the natural and cultural heritage involving sites with these respective attributes which alternate along some of the touristic trails, is also promoted in the Hațeg Geopark. On the "Valley of Dinosaurs" Trail, for example, the points of interest for geology (fossiliferous sites with dinosaur remains and glacial moraines) occur together with cultural sites (a medieval church, an ancient water mill and traditional village houses). Thus visitors have an opportunity to get a more holistic overview of the values of the region.

Dan Grigorescu
dangrig@geo.edu.ro

Looking at and listening to explanations about the geological history of the Hațeg Geopark

The new research centre in the Hațeg Dinosaurs Geopark



Luberon Geopark, SE France

Sustainable development at your fingertips

Climbing in the Luberon Geopark is known all over the world thanks to the famous cliffs of Buoux, an internationally famous climbing site since the early 1980's. The first climbing film that springs to mind is "La vie au bout des doigts" (Life at your fingertips) was filmed by the famous climber Patrick Edlinger in 1982.

In May 2012, a sports association organized the second international meeting on leisure climbing, *Escala 'Buoux*, in partnership with the Luberon Geopark and many other private and public partners. In the outstanding Aiguebrun Valley dominated by 90 metre high cliffs, many activities were proposed: climbing discovery for young people, discussions, entertainment, exhibitions and conferences.

Sculpted by erosion, the impressive marine limestone formation is characterized by fossilized sand waves, burrows and shells. Five thousand years ago, humans set-

tled in a wide cave located near the climbing site. During the 9th century the cliffs were occupied by religious people and a castle was built in the 11th century. Today, the ancient castle is a destination for tourists and the river flowing in the valley is protected because of its unique biodiversity.

The distinctive natural and cultural heritage led the organizing team to connect sport with geology, the environment, archaeology and history. Participants discovered all aspects of this rich site through a trail equipped with temporary interpretation panels. These panels provided concise information about ancient seas and animals, sand deposits, traces of human occupation (like holes in the cliff), the history of climbing activity in Buoux and animals such as dragonflies or crayfish. Guided tours with specialists were provided, and a conference introduced 20 million years of history: "From Scallops to Climbers".

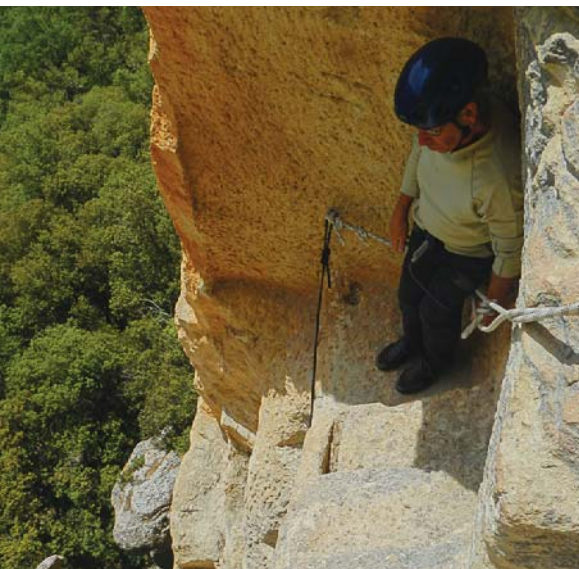
The French Olympic Committee recognized this event as AGENDA 21 because of its environmental responsibility (transport, waste management and biodiversity), its social and economic impacts and its educational values.

Escala 'Buoux was an event showing how sport, geology, nature and culture can combine to produce social and local economic benefits involving local people. It is a perfect example of sustainable geotourism activity.

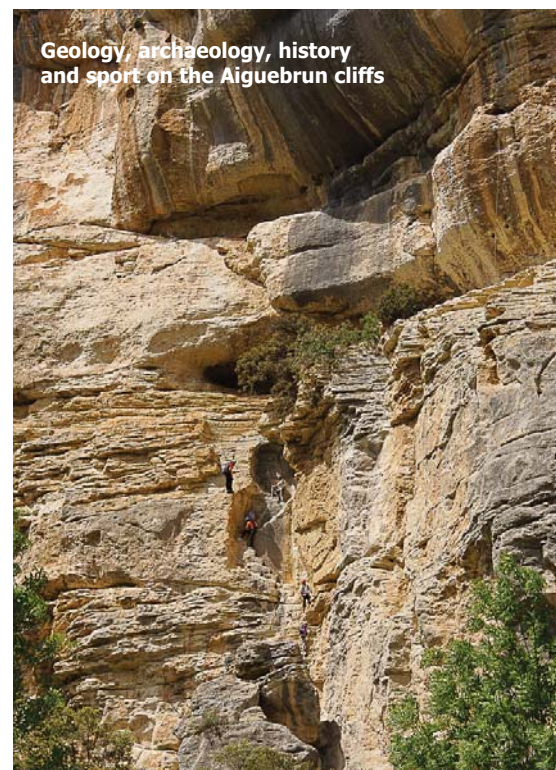
Stéphane Legal

stephane.legal@parcduluberon.fr

Going down
by ancient steps
cut in the rock



Entertainment: poetry and dance on the cliff by Antoine le Menestrel



Geology, archaeology, history and sport on the Aiguebrun cliffs

Massif des Bauges Geopark, France

Exploring the Time on Creusates geosite

(Saint-François de Sales)

Today, the moor hosts 11 protected species as well as ice age relics. Animal breeding activity helps maintain and preserve this unique habitat. Scientific pollen analyses have revealed the moor's 5000-year history including the evolution of vegetation, climate and human societies. The Massif des Bauges Geopark developed, in partnership with the French Ministry of Education and local guides, an educational game based on the natural, historical and geological heritage of the moor aimed at junior high school students. During the game students assume the role of an elected officer, a farmer, a businessman entrepreneur, or a scientist to discuss fictional development plans such as the creation of an adventure walk. This educational activity, a logical contribution to sustainable development, resulted in the Geopark winning the Natura 2000 Prize in 2010.

In 2012 the Massif des Bauges Geopark developed a geotrail to raise public aware-



A view of the moor and Creusates geosite

ness of its geological heritage. Panels provide visitors with information about the moor's origin, biodiversity and exploitation by Man. But why limit the site to thousands of years of geological history? In 2010, a local group suggested developing an astronomical observatory to enhance the Creusates site. It opened its doors in 2012 thanks to the support received from the European LEADER programme. The main target groups for this project are schoolchildren and tourists who can observe the "NGC 2158", an open star cluster in the constellation of Gemini, which is some 1.5 billion years old. It shows us a 12,000-year-old image created during the formation of the moor. Discovering the secrets of the Universe offers another perspective of our planet. Visitors are exposed to another dimension, providing them with a better understanding of the Earth's evolution and the challenges faced by Man as a result of this ongoing change. Visiting the Creusates site

across different eras helps visitors to get a sense of the evolution of our region and the influence and involvement of people who have lived in it. The history of the Earth, the conservation of natural resources, climate change, the workings and evolution of our society are all dealt with on the Creusates geosite, with its great geological heritage, preserved environment and lively activities, all of which enables us to face the future!

Jean-Luc DESBOIS
info@parcdesbauges.com
André Guerraz

The astronomical observatory at the Creusates geosite



Junior high school students participate in an educational game



Three very special Geosites in the Tuscan Mining Geopark

This article describes three of the most important geological sites that contribute to the uniqueness of the Tuscan Mining Park.

Rocce di Poggio al Carpino e Canaloni (Roccastrada)

This geosite provides information concerning the geological evolution of Italy's northern Apennine range. Here, approximately 250 million years ago, marine and terrestrial rocks were formed during the genesis of the ancient Tethys Ocean which led to the separation of two ancient continents named Laurasia (the Euro-Asiatic region) and Gondwana (the Afro-Austro-American region). The closure of the Tethys resulted in the compression, metamorphism, fracturing and uplifting of the rocks to form the Alpine and Apennine mountain chains. Today these metamorphic rocks occur in the valleys of the Torrente Farma (River Farma) at Canaloni, where water erosion follows the lines of major approximately three million year old faults.

Hydrothermal emissions at the Valle del Diavolo (Devil's Valley) geosite



Le Biancane (Monterotondo Marittimo)

The Valle del Diavolo (Devil's Valley) geosite, better known as "Biancane", is characterized by geothermal fluids contained in the at least 150 million year old evaporate-carbonate-siliceous rocks. The Biancane extends over a SW-NE oriented area of around 0.8 km² which follows the direction of the main local rock fracture system in the Apennine chain. These fractures allow high temperature (c. 150° C), acidic hydrothermal fluids to rise to the surface, resulting in whitening of the rock. Formations of native sulphur and hot mud pools frequently occur together with gas emissions. The hydrothermal processes have influenced the flora which adds to the unique charm of this geosite.

Le Roste (Montieri)

Between the late 19th and early 20th centuries, a unique technique was used to extract copper from ore derived from

the nearby Merse chalcopryrite mine using a method, known by experts as the "Conedera method". This involved crushing and smelting of the ore followed by leaching and gravity settling of the pure copper. The distinctive Le Roste badland landscape resulted from the erosion by rain and surface run-off of red coloured mineral rich spoil heaps, the remains of the copper extraction process.

Metamorphic rocks exposed in the bed of the Farma River

Alessandra Casini

parcominerario@comune.

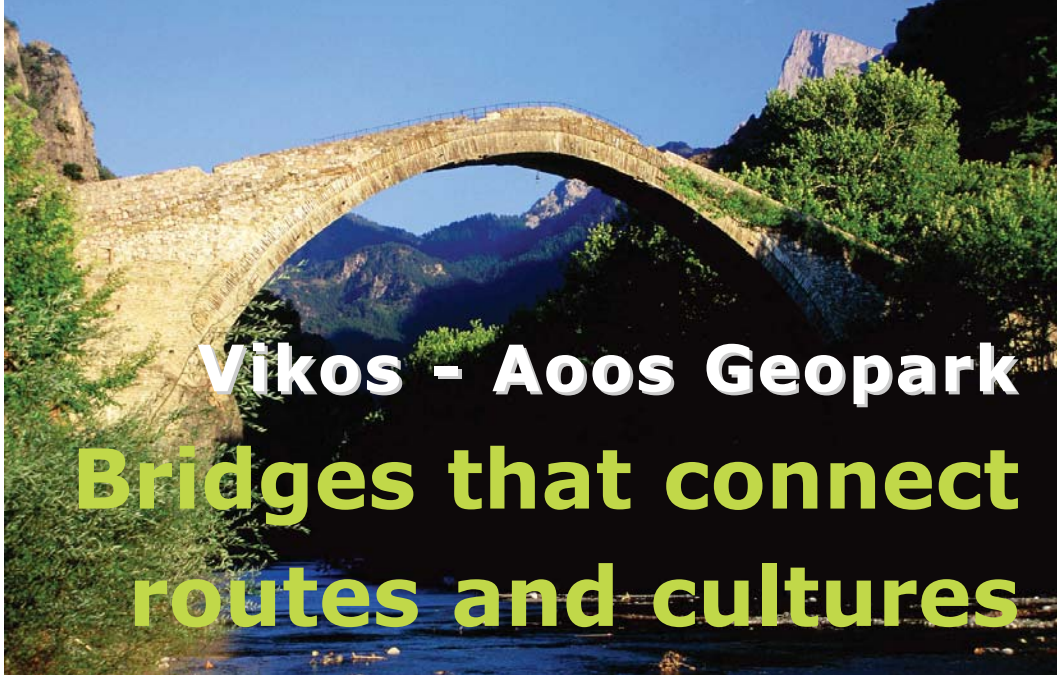
gavorrano.gr.it

Riccardo Cinelli

r.cinelli@provincia.grosseto.it

The distinctive Le Roste badland landscape





Vikos - Aaos Geopark

Bridges that connect routes and cultures

The Konitsa stone bridge over the River Aaos built in 1870

Hidden behind steep mountains, lies Zagori, a small earthly paradise containing 46 villages, which thrived especially during the late 18th and early 19th centuries when commerce was at its peak. Deep gorges and torrential rivers separate Zagori from the picturesque town of Konitsa and its 45 villages located on magnificent forested mountains at the northwestern point of Greece.

Due to the mountainous nature of the region, the construction of bridges was imperative since it facilitated the free movement of the inhabitants from place to place. This involved short trips associated with important livestock-rearing activities to much longer journeys undertaken by organized guilds within and beyond the boundaries of Greece. Many bridges are still in-place, 40 in Zagori and 25 in Konitsa. Half of these bridges are located within the Geopark. The period of bridge con-

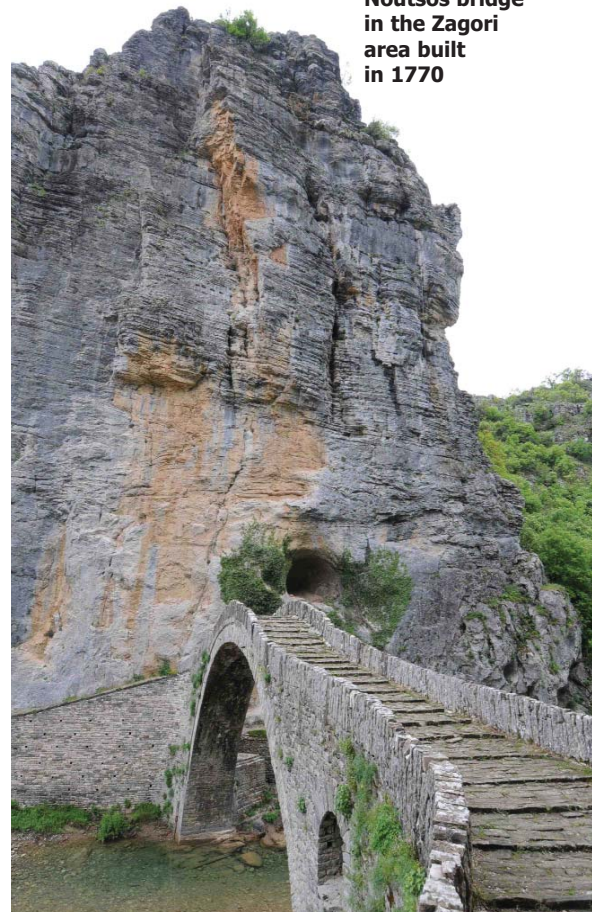
struction occurred in the 18th -19th centuries when Greece was part of the Ottoman Empire. The decision to construct a bridge was taken either by an individual, such as a wealthy citizen or an abbot of some nearby monastery or by a village community. The costs of construction which were extremely high, were the responsibility of the person or the persons who sponsored the project. In recognition of such a service to the community, the bridge would frequently bear the name of its patron.

The bridges were constructed from blocks of limestone and sandstone which are common rocks in the region. The cementing agent was composed of a mixture of crumbled tiles, lime, pumice-stone, water, dried herbs, goats hair and even egg whites were used to provide a greater binding effect. The bridges display different styles of architecture involving the number and

shape of the arches. The arches are either semi-circular in shape or slightly pointed and reminiscent of Gothic or Islamic architecture. Sometimes the craftsmen would paint in some small corner the likeness of a saint who would become the bridge's guardian.

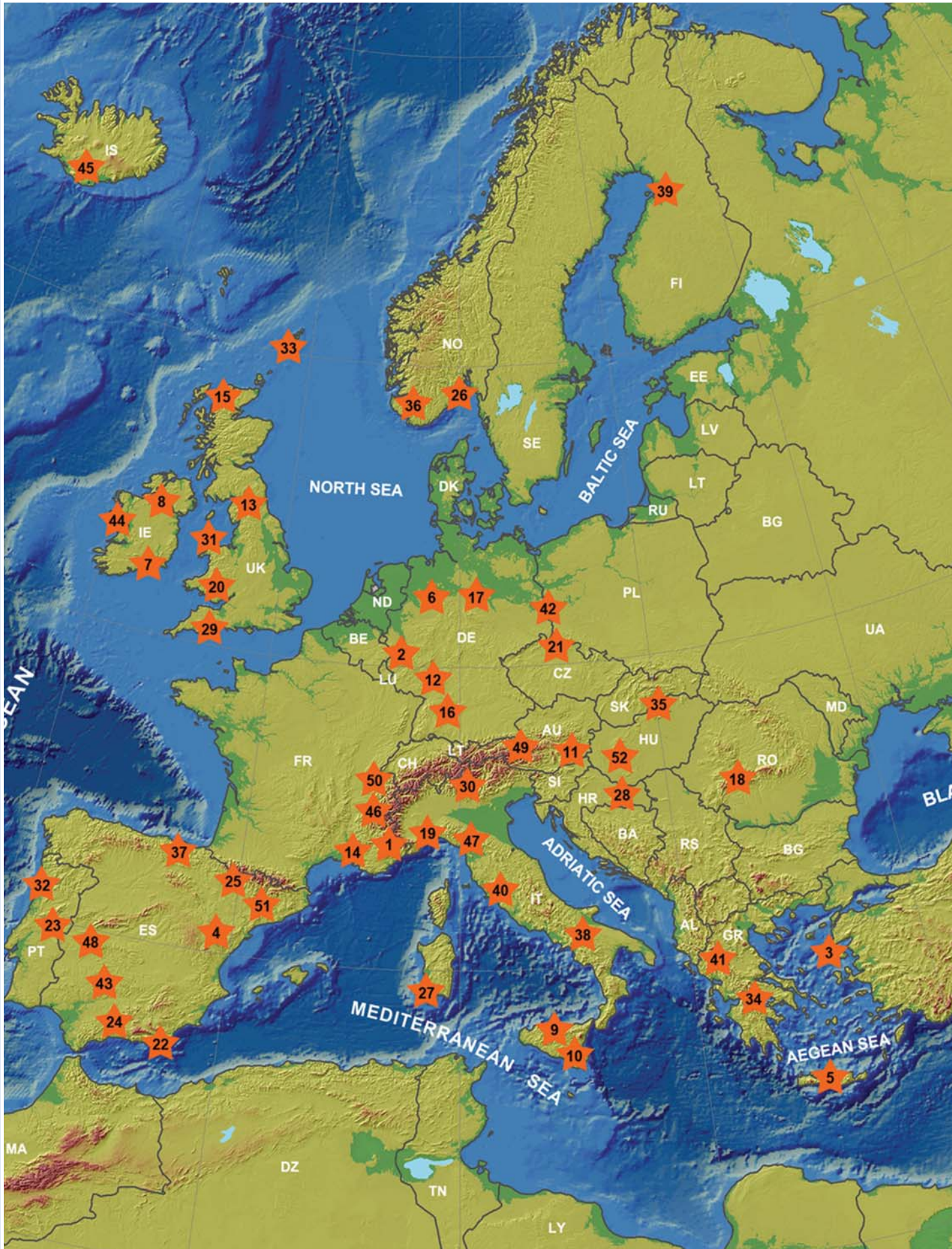
Georgia Kitsaki
gkitsaki@epirusa.gr
Haritakis Papaioannou
h.papaioannou@epirusa.gr
Panagiotis Paschos
paschos@igme.gr

Noutsos bridge in the Zagori area built in 1770



The Kalogeriko bridge in the Zagori area built in 1850

The European Geoparks



The Network consists of 52 Geoparks in 18 European

Network today...



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

countries (April 2013)

www.europeangeoparks.org

Sierra Subbética Natural Park: The role of the Geopark enterprises in the promotion of the geological heritage

A Geopark offers a large variety of possibilities that enable the visitor to enjoy nature and to learn about the geological features of a region and their relationship to every-day life and human culture.

Fascinating landscapes and geosites are interpreted both in the field and through digital and printed information. Besides, local tourism enterprises can be used as one of the most powerful tools for promoting geological heritage to the Geopark's visitors. The valuable heritage of the European Geoparks can be evidenced and disseminated through the development of geologically related merchandising products. Examples include souvenirs or handicrafts in the shape of fossils or containing images of fossils and geological menus in restaurants. Other initiatives for raising and increasing the visibility of the geological heritage and the Geopark's profile include creating information points, incorporating geological and Geopark motifs in the décor of shops, restaurants, tourism providers and businesses.

Handicrafts inspired by the ammonites of Sierras Subbéticas Geopark: the glass lamp screen of Vidriomundo (Cabra); the wooden puzzle of Arteamano (Priego de Córdoba)



In order to promote the geological heritage through enterprises, the Geopark Sierras Subbéticas has developed the following strategy:

Commissioning a geologist with a specialized knowledge in design.

Enterprises are advised both technically and aesthetically. The Geopark supervises these initiatives, guarantees accurate and up-to-date information and provides them with scientifically based designs with texts containing geological information expressed in words that are understandable to members of the general public.

Use of enterprises forum meetings.

Twenty five enterprises in Subbéticas Geopark adhere to the European Charter for Sustainable Tourism. The Geopark's management encourages the forum created by entrepreneurs strongly committed to environmental practices and invites new enterprises to attend these meetings. By delivering talks about the Geopark, on the importance of conserving and promoting the geological heritage and on the benefits of participating in this forum, enterprises are encouraged to create Geopark products and to promote the geological heritage.

Following the success of several meetings in Subbéticas Geopark, the number of enterprises participating in the promoting the geological heritage is increasing rapidly. Their involvement con-



The guesthouse Pensión Guerrero (Cabra) is decorated with Geopark motifs, offers information of the geological heritage and sells Geopark products

tributes to disseminating the geological values of the territory, to raising the visibility of the European Geoparks Network and to strengthening the local identity of a region through its natural heritage.

Baldomero Moreno Arroyo
baldomero.moreno.arroyo@
juntadeandalucia.es
Alicia Serna Barquero
aserna@tragsa.es

The Apartamentos Rurales Los Castillarejos (Luque) have built a very geological swimming pool "The Tethys Sea" and provide information about the precursor of the Mediterranean



The Klaeffer Spring during snow melt: Water pours down from all sides



The best of Eisenwurzen:

Water for the Austrian capital

Could there be a better source for drinking water for a big city than the unspoiled area of a geopark? The annual 142 million m³ water demand for the city of Vienna is supplied, almost completely, from Alpine karst springs. Fifty three percent, 75,4 million m³ of this total water supply comes from the Eisenwurzen Nature and Geopark, some 200 km away from Vienna. The springs are located in the valley of the River Salza at the foot of the almost uninhabited Hochschwab mountain massif which rises up to 2277 m in height. High precipitation rates at low temperatures and the accumulation of several meters of snow during cold winters are the source of the springs.

The Klaeffer Spring, the most important of six



River Salza is an eldorado for rafters from all over Europe

springs, is the largest karstic spring exploited for drinking water in Europe. Its average discharge amounts to 54,000 m³ a day but volumes up to 860,000 m³ per day have been measured after heavy rainfall and especially during the snow melt. Only a fraction of the outflow is used, the majority is released into the Salza river. The spring is especially impressive during the snow melt. There is such an abundance of water that it is discharged from outlets up to 70 m above the valley floor.

The area around the community of Wildalpen is not only an important source of water for the Austrian capital but it also attracts many

visitors. The visit to the Klaeffer Spring which can be approached through a 60 m long tunnel is an absolute highlight. The museum of the Vienna Water Works is also a major attraction. It provides an excellent insight into the geology and hydrology of the area, the history of the water main which was opened in 1910 and its technical background. The River Salza is a major destination for whitewater canoeists and rafters from all over Europe and, as in other locations in the Eisenwurzen, there are well-marked hiking trails within the area of the river valley.

**Heinz Kollmann
Irmi Auer**

heinz.kollmann@nhm-wien.ac.at



The water drop gallery

Fforest Fawr Geopark Ambassadors: Ambassadors for Geo-conservation

One of the field excursion for Fforest Fawr Geopark's Ambassadors exploring the Geopark's industrial landscape



The Brecon Beacons National Park Authority (BBNPA) launched and delivered the UK's first National Park Ambassador Scheme in January 2010. The scheme which aims to support and assist tourism businesses in providing outstanding service to visitors, was initially delivered as part of COLLABOR8 – a programme funded by INTERREG IVB North West Europe from 2008 to 2012 and has since continued with support from Rural Alliances. It involves a series of free workshops designed to provide training and information to local tourism businesses that will enable them to engage with and inspire visitors to explore the Brecon Beacons National Park. Participants attend three

one-day courses delivered over a year to achieve their National Park Ambassador Award. The scheme, consisting of three core courses which are based on 'Sense of Place', 'Park in your Heart' and 'Customer Care', also includes a geology module. By extending the geology module, the training programme also offers a Fforest Fawr Geopark Ambassadors Scheme. This scheme, funded by the BBNPA is open to local businesses that have already completed the National Park Ambassadors scheme. The new training programme includes two one-day workshops over a year and, on completion, local business people will be awarded a certificate and provided with promotional

material. The Geopark Ambassadors Scheme focuses on the Geopark concept, the nature of Geoparks, the requirements of the charters of the European and Global Geoparks Networks and the rigorous evaluation and revalidation procedures which ensure that the Geopark designation stands for quality.

Participants experience how Geoparks raise public awareness of the discoveries in the geosciences which led to our understanding of the dynamic processes responsible for creating the Earth's structure, rocks and minerals and surface landforms. Presentations and field excursions provide insights into the Geopark's superb geology and landscapes, the links between its geological, industrial, tangible and intangible heritage and the need to conserve these for future generations. The Geopark Ambassadors Scheme emphasizes Fforest Fawr Geopark's role in collaborating with local businesses and residents to contribute to sustainable wealth creation by protecting and promoting its landscape for the development of geotourism.

Tony Ramsay
Alan Bowring

enquiries@fforestfawrgeopark.org.uk

Remains of Penwyllt Brickworks which produced refractory bricks for use in the South Wales metal industry



The folded Carboniferous Limestone at Bwa Maen a popular destination for walkers and geologists

The Trilobites Tour in Portugal

Developing the first geotourism itinerary dedicated to palaeobiodiversity



The ecological trail at Valongo Palaeozoic Park

Thematic routes, such as the gastronomical, architectonic or famous writer's tours, are tourism products which make use of natural or manmade attractions. In recent years the number of thematic routes all over the world has increased following a trend involving stronger networking and cooperation between organizations and/or regions. With the advent of Geoparks in Portugal there is an increasing demand for geotourism attractions that can either be fulfilled by utilizing the existing offers or by developing relatively unexploited tourism resources. A thematic route linking geotourism attractions provides a

Guided visits to the Geological Interpretation Centre of Canelas



means for diversifying and improving the quality of the route through a relatively small investment. Increasing the size and quality of the tourism provision has the potential to ensure that holiday makers in geoparks extend the duration of their visits and minimizes the effects of seasonality. The abundance and diversity of fossils, and particularly of trilobites, in the Ordovician rocks of Portugal, combined with the already available interpretive facilities, make trilobites a logical subject for a thematic geotour. Under the agreement between Naturtejo Global Geopark, the Faculty of Science of the University of Porto and the Geological Interpretation Centre of Canelas at Arouca Geopark, the project "Trilobites Route" is being developed. This project joins the three areas in Portugal where trilobites can be enjoyed on-site.

The Valongo Palaeozoic Park (a partnership between the Faculty of Science of the University of Porto and Municipality of Valongo) opened in 1998 as a pioneer geoconservation project. In addition to its diverse geological heritage, the internationally known Ordovician trilobites of Valongo are of particular interest. An interpretative circuit is available to visitors, which follows the Ordovician sequence in a journey through time from the opening of the Rheic Ocean, to the Upper Ordovician Ice Age which

almost led to the extinction of these marine invertebrates. The unique Geological Interpretation Centre of Canelas, also known as the "Museum of Trilobites", enables visitors to discover the giant trilobites that lived in the Ordovician sea. The centre which developed as a private family project, involving two decades of careful fossil collecting and conservation, has been open to the public since 2006. One of the main attractions of Naturtejo Geopark, the Ichnological Park of Penha Garcia introduces the visitor to the modes of life of the long-extinct trilobites. Situated in outstanding scenery, vertical quartzite beds reveal fossil behaviour within a gigantic natural art gallery. The Ichnological Park successfully integrates the classic *Cruziana* trace fossils with local rural life and culture.

Carlos Neto de Carvalho
carlos.praedichnia@gmail.com
Helena Couto
hcouto@fc.up.pt
Manuel Valério
trilobitegigante@gmail.com

The opening of the Ichnological Park of Penha Garcia by the President of the Portuguese Republic, Aníbal Cavaco Silva





A view of Cerro del Hierro Natural Monument from a section of the Green Way

The Green Way of Sierra Norte de Sevilla:

A convenient access to enjoy the landscape and geology of the Geopark

A great attraction of the Sierra Norte de Sevilla Geopark is the Green Way ("Via Verde"), the old branch line that served to transport iron ore from the mines of Cerro del Hierro to Seville or the furnace of El Pedroso. This branch line was built in the latter part of the nineteenth century by The Baird's Mining Co. Ltd. The Scottish Society of "Coto Minero Cerro del Hierro", finished operating in 1970. Subsequently dismantling and abandonment resulted in the collapse of embankments, colonization of the

track by natural vegetation, and the destruction of the branch line's infrastructure including two bridges. In 2002, the Government of Andalusia purchased this important geosite, the Cerro del Hierro mining area, together with the old branch line. In 2004 the government proceeded with the clearing, restoration and improvement of various structures along the track and completed laying an asphalt surface with a painted layer to integrate the Green Way into the landscape. Metal walkways with wooden flooring, guardrails, signposts, tables and benches, and barriers to prevent unauthorized traffic were also installed. One of the houses used by the mining engineers was restored as an Information Centre. This trail contains magnificent exposures of rocks assigned to the stratigraphic unit called "Capas of Campoallá" which consists of mudrocks, sandstones

and limestones of Cambrian age. Other geological features observed along the trail include sedimentary structures especially coastal dunes and rippled surfaces, carbonate concretions, joints, folds, fractures, ancient travertine deposits and part of the modern terraces of the river Rivera del Huéznar.

The Natural Monuments of El Cerro del Hierro and Huéznar Waterfalls are easily accessible via the Green Way.

Nowadays the Green Way of Sierra Norte de Sevilla, with a length of 19.5 kilometres is one of the most popular tourist routes in the Geopark. Fifteen kilometres can be used by disabled people, and some visitors opt for using skates rather than walking. The Green Way provides a location for a variety of activities including geological days and geological excursions.

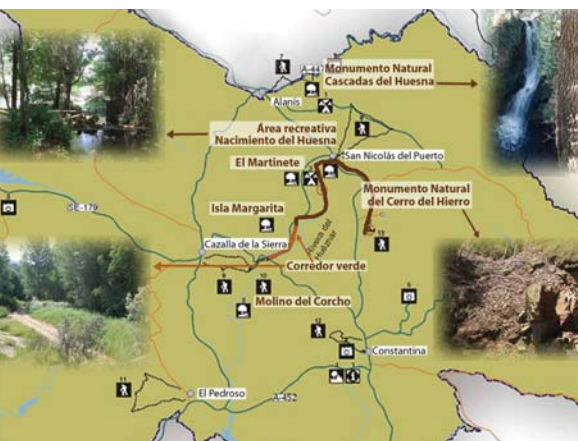
Alberto Gil Toja
agil3@tragsa.es

Rafael Pérez de Guzmán Puya
rafael.perez.ext@juntadeandalucia.es

Inmaculada Cuenca Bonilla
inmaculada.cuenca@juntadeandalucia.es

Attendance at a Geological Day on the Green Way in 2010

A copy of the map of the Green Way



Copper Coast Geopark: The New Community Centre

It was with real enthusiasm that the Copper Coast welcomed the opening of its new Geopark and Community Centre. We started with a former church from the 1840's and with the help of the Leader Partnership and a loan from Clan Credo, were able to tender for the refurbishment of the main building and an extension to include toilets, meeting rooms and offices. A Failte Ireland study indicated that providing a child focused attraction explaining our geology and mining history and their influence on our community, along with a café and shop would place our future development on a sustainable basis. Tourism is expected to provide the bulk of the income, with the centre being used predominantly for community events during the winter months.

So once the builders left the site, it was up to our volun-

teers to do the painting and get the café and shop ready for opening (the exhibition will be prepared during the winter months). Donations of time and material came from many and often unexpected sources. Our first major event was our annual flower show which was a great success.

Despite the building being out of use for much of the year, our educational and outreach programme continued using space donated by the Dunhill Community Centre. We held two international conferences; one on upland archaeology, with the theoretical component being held in a local school. Our second conference was in our new centre and was on the ancient and modern uses of hydropower. It's surprising how much we can learn from the past, particularly when you have enthusiastic practitioners in the community!

During our induction into the schools' seismic programme it was noticed that the Irish Research Array had an important gap right in the middle of our Geopark. So with the enthusiastic help of a local farmer a new research station was set up, we are looking forward to recording interesting information from the deep crust.

Our new centre is rapidly becoming a real social and information focal point for the Copper Coast area while at the same time encouraging pride in the community and opportunities for future development.



Copper Coast Geopark annual flower show 2012

The new Copper Coast Geopark and Community Centre



**Mike Sweeney
John Galloway**

Mike_sweeney@hotmail.com
annestowntoo@eircom.net

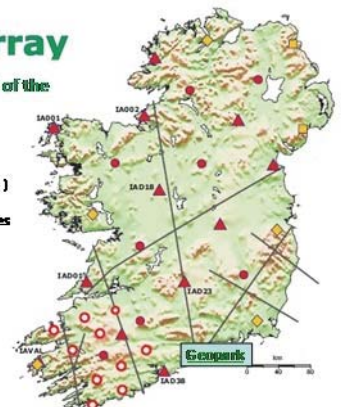
The Irish seismic research array

Ireland Array

2010-2011: deployment of the backbone component

- **2010: 7 stations deployed (named stations on the map ->)**
- **2011: deployment continues**

Planned Station Coverage
 ▲ Island Army Backbone
 ● NIS, example configuration 1
 ● NIS, example configuration 2
 ● Fish Permanent Seismic Network
 ● NIS Seismic Stations
 — Controlled Source seismic profiles



New equipment in the Arouca Geopark: **The House of Rocks Delivering Stones**

The House of Rocks giving Birth to Stones – the New Interpretative Centre



On November 3rd, 2012 the new geological interpretative centre of the Arouca Geopark “The House of the Rocks giving Birth to Stones” (Casa das Pedras Parideiras) was opened to the public.

This new interpretative centre is installed in a renovated house in Castanheira village located in Freita Mountain, in the south of the Arouca Geopark territory.

The Rocks giving Birth to Stones is one of the most important geosites within

The walkway on the outcrop of the nodular granite of Castanheira



Arouca Geopark and is of international significance. From a scientific point of view this geosite is known as the nodular granite of Castanheira. It is a small pluton (1000 x 600m) intruded into late-Proterozoic meta-sediments during the final stages of the Variscan Orogeny. The occurrence of discoidal biotite nodules distinguishes this granite from all other described granites, and it is therefore truly unique. Through weathering, these nodules, stand out from the host granite rock and this is why locally they are well-known as the “rocks that give birth to new stones”. The interpretative centre consists of a two storey building and two external outcrops. The reception area and shop are located on the first floor; the ground floor has an auditorium in which a 3D film: “Rocks giving Birth to Stones: a geological treasure” is projected. Through the film, visitors can take a three dimensional trip to the beginning of

the Earth and view an interpretation of the enigmatic geological phenomenon of the “birth stones”. The main outcrop, located near the building can be visited and interpreted using the available audio-guides which contain extensive information about the Freita Mountain, its geodiversity, biodiversity and history and local culture. It is also possible to visit the “House of the Rocks giving Birth to Stones” through educational and touristic guided visits.

This new facility aims to contribute to the conservation, understanding and interpretation of this important geological heritage and also to contribute to the local development of the remote small Castanheira village.

Daniela Rocha & Alexandra Paz
geral@geoparquearouca.com

The interpretative centre and covered outcrop



The KT and Palaeocene/Eocene boundaries, together with the Paleocene Stratotypes (GSSP) of the section can be seen perfectly from the boat trips offered by the Geopark



Basque Coast Geopark

The importance of geological research for a high quality geotouristic programme

The European Geoparks Network is like a big puzzle formed by pieces that contain the memory of our planet Earth, the variable history of climate and the fascinating evolution of life through time. The history of the Earth is our departure point. We have to be able to manage this heritage responsibly, because it is not renewable and contains a powerful message for the world's population namely that it is necessary to understand the current delicate environmental situation of our planet.

The Basque Coast Geopark contains more than 10 kilometres of beautiful cliffs which expose a continuous sequence through the Cretaceous and Paleogene periods involving 66 million years of Earth history. The sequence contains, world famous exposures of the Cretaceous/Tertiary (KT) and Paleocene Eocene

boundaries. This fantastic outcrop has been investigated for more than 100 years and even today more than 50 scientists work in this place every year. The co-ordination of this intense research activity has allowed us to understand the climatic and biologic evolution through this period of time, especially related to the big mass extinction at the KT boundary (~66 million years ago) and to the thermal maximum at the Palaeocene/Eocene boundary (~ 56 million years ago).

Geologists have recorded evidence for five major mass extinctions during the past 542 million years; the last extinction event was associated with the KT boundary. Some scientists suggest that current global warming could lead to a sixth mass extinction event because the initial stages of at least four of the major extinctions appear to



Prof. Jan Smit
working on the
KT boundary
in the Geopark

have been associated with global warming. Our educational and touristic programme discusses the problems facing modern society and shows that understanding Earth history is the first step to understanding where we are today. Whatever could happen in future has already occurred during Earth history, and Geoparks give us a great opportunity to conserve and present this marvellous encyclopaedia, and its message for the need for a more sustainable development of our society.

Dr. Asier Hilario
flysich@gipuzkoa.net

Leire Barriuso
geogarapen@geogarapen.com

Talking about the KT boundary in one of the geological guided excursions offered by the Geopark



Tal der Heiligen Reiser

A gap in the history of the Earth

Near the centre of Hettstedt, a small town in the east of the Geopark Harz • Braunschweiger Land • Ostfalen, lies the "Tal der Heiligen Reiser" ("Valley of holy travellers"). In this valley a natural monument occurs in an old disused quarry that exhibits an impressive rock sequence consisting of conglomerates, sandstones and claystones. The highlight of the rock sequence in this quarry is that the sedimentary succession was not deposited continuously. The lower strata are of uppermost Carboniferous age (about 300 million years old), while the upper layers were deposited during the upper Rotliegend (about 260 million years old), indicating a gap of 40 million years in the history of the Earth and showing a clear unconformity. Nowadays this geological phenomenon is better exposed, because the Geopark Harz • Braunschweiger Land • Ostfalen encouraged the cleaning of the outcrop, installed an information panel in front of it and designated the "Tal der Heiligen Reiser" as a site of geological

interest in the Geopark-leaflet "Landmark 17 – Mansfeld Castle". In order to demonstrate the variety of geological phenomena of the Harz Mountain and its foreland region, the Geopark developed an area-wide net of landmarks and geological points of interest. Landmarks include well-known sites and sites that are visible over long distances in the Geopark. Geological points of interest allow an insight in the history of the Earth, e.g. old stone quarries.

About 60 visitors took part in the presentation event in the valley and in a geological walking-tour, where more stone quarries could be explored. But, interest in geology is not only confined to adults. The pupils of the UNESCO School Hettstedt (primary school) marvelled at the outcrop. Dr. Carl-Heinz Friedel, an employee of the State Geological Survey of Saxony-Anhalt, explained the story of the rocks exposed in the outcrop, and pointed out that the rocks and minerals in the quarry have a wide range of applications. The children knew that houses and streets are made of rocks, but cars and computers? Even in the manufacture of high-tech products many minerals and raw materials such as copper ore are needed. The region around Hettstedt looks back on an over 800-year-old tradition of copper-shale mining. For the children the "Tal der Heiligen Reiser" was an ideal place to get to know different rocks. With the aid of magnifying glasses and hydrochloric acid they exam-



ined and determined the nature rocks which they collected. In order to understand the development of the outcrop, they playfully re-enacted its history. Finally, each class presented their collection in a picture made of rocks. The cooperation with the UNESCO School Hettstedt, one of the 155 accredited German UNESCO schools, occurred because the school pays special attention to international communication, intercultural learning and environmental education.

For more information about the work and the publications of the Geopark: www.harzregion.de

Isabel Reuter
reuter@harzregion.de

The rock exposure in a quarry in the "Tal der Heiligen Reiser" ("Valley of holy travellers") before the cleaning of the outcrop

A walking tour in the "Tal der Heiligen Reiser" ("Valley of holy travellers") after the cleaning of the outcrop

Children from the UNESCO School Hettstedt study rocks which they collected



Scientific Research in Adamello Brenta Geopark

During the last year Adamello Brenta Nature Geopark has increased its contacts with the scientific world through the collaboration with the University of Rome "La Sapienza" and the University of Turin. Several universities in Italy have initiated PhD studies focused on geotourism and geosites. Geoparks are among the most suitable organizations to test new systems developed by universities for the evaluation of geosites' and to apply new methods in geotourism. Alessia Pica, a PhD candidate from the Earth Sciences Department



Students are introduced to the education project "Dolomites, UNESCO World Heritage" developed in collaboration with Alessia Pica, PhD candidate from Rome



Students observing geological features in the Geopark's landscape

of La Sapienza University (Rome), spent one month participating in Adamello Brenta Geopark's educational and promotional activities. As a result of this collaboration we will submit an abstract at the "8th IAG International Conference on Geomorphology" which will be held in Paris in August 2013. This work focuses on using GIS data processing of geosites in order to create geotouristic itineraries and guided excursions. Moreover we talk about landscape interpretation for students, using new methods such as LIDAR images and interactive whiteboards. Alessandra Magagna, a PhD candidate from the Earth Science Department of the University of Turin, is creating a multimedia product for developing geological itineraries in Italy designed for secondary school students and teachers. Adamello Brenta Geopark was chosen for

the itinerary about Tonalite, a granite-like rock which forms the Adamello Massif. This 670 km² batholith represents molten material which was intruded and cooled below the earth's surface during the Eocene and Oligocene period, i.e. between 42 and 30 million years ago. Based on these studies we are producing a guidebook and geological itinerary for the Fumo Valley, one of the best sites in the Geopark for observing tonalites sculpted by glacial processes. The collaboration with the universities of Rome and Turin provides an opportunity for keeping up-to-date with geological research, for using the latest information to develop new activities and to extend and improve geotourism provision in the Adamello Brenta Geopark.

**R. Zoanetti, V. Masè
 & G. Bazzoli**
 roberto.zoanetti@pnab.it



Healthy, wet blanket bog in the North Pennines AONB and Geopark

Peatland Matters

North Pennines AONB and European & Global Geopark

The wild upland moors of the North Pennines AONB and Geopark are covered in blanket bog, a unique type of wetland. It is made up of peat, an organic soil which forms from moorland plants in cold, waterlogged and acidic conditions. The North Pennines contains the largest continuous area – over 1000 km² – of blanket bog in England. An important Quaternary deposit, blanket bog is special for its wildlife and for the record of past environments and human history preserved in its dark layers. But, in addition to these, it is also of great importance in the mitigation of climate change and for its role in reducing downstream flooding.

The peat in healthy, wet blanket bog is made of partially decomposed plant material which has a high

carbon content. The slow decomposition rate keeps the carbon locked up, acting as a buffer to climate change. Our blanket bog has been storing carbon for 8,000 years, and is estimated to contain 86 million tonnes of carbon. Healthy bog not only maintains the existing store of carbon but also captures new carbon from the atmosphere through the growth of peatland vegetation.

Blanket bog may also play an important role in reducing downstream flooding, which has been a serious issue in northern England in recent years. Blanket bog vegetation acts like a giant sponge, holding water and gradually releasing it into streams and rivers. However, damaged and eroding blanket bog causes fast water run-off, which may contribute to flooding in villages and towns

downstream.

Both carbon storage and the reduction of flooding rely on intact, wet blanket bog. Damage has been, and in some cases continues to be, caused by drainage, overgrazing, and inappropriate burning and development. The North Pennines AONB and Geopark Peatland Programme was developed to study and restore our blanket bogs and raise awareness of their importance. In recent years we have worked with partners to block 6,200 km of drains and have restored over 250 km² of peatland. The programme continues to be successful in building new partnerships and attracting funding to continue to look after our internationally important peatland.

Dr Elizabeth Pickett

elizabeth@northpenninesaonb.org.uk

Blocking drains in North Pennine peatland using plugs of peat



Research and monitoring of issues such as erosion and carbon flux in North Pennine peat



Rocca di Cerere Geopark LEARN GEO..PLAYING

A simple but effective way to know our Geopark

How can one raise the awareness of young students about the Geopark by playing and learning at the same time?

To achieve this aim the board game "Imparare Geo...cando" (Learn Geo..playing) was created to stimulate children's curiosities and help them to acquire scientific information concerning the geological, natural, historical and cultural heritage of Rocca di Cerere Geopark. It is a simple, but effective way to involve its young inhabitants to discover and understand the territory's identity and values.

The board game was created by the CEA (Centro di Educazione Ambientale) von Humboldt Association. It consists of four panels showing the Rocca di Cerere Geopark's territory, the stops along its numbered pathways, two dice, question cards, curiosities and hazards cards. The game is used to support environmental educational activities in local primary schools or directly in the Environmental Education

and Interpretation Laboratory "Villa Zagaria" of Pergusa Lake Natural Reserve.

During the game, students are divided into three teams marked by different signs: a piece of marble, one of clay and another of granite are used to point the way during the competition. Members from each team throw the dice in turn and answer questions on Geopark topics in order to proceed further along the path. Reading and answering questions on the cards such as "Lo sapevi che..?" (Did you know that..?) correctly allows students to proceed to another stop and to discover their Geopark territory while they are playing. The winner is the team that succeeds in collecting all the wooden letters composing the word "G E O P A R K". Unforeseen events such as an eruption or a landslide adds to the difficulty and fun of the contest. This educational and informative tool, realized through the framework of a specific project financed by

LEADER+, has been donated to 20 different primary schools of the Rocca di Cerere Geopark's territory during environmental educa-



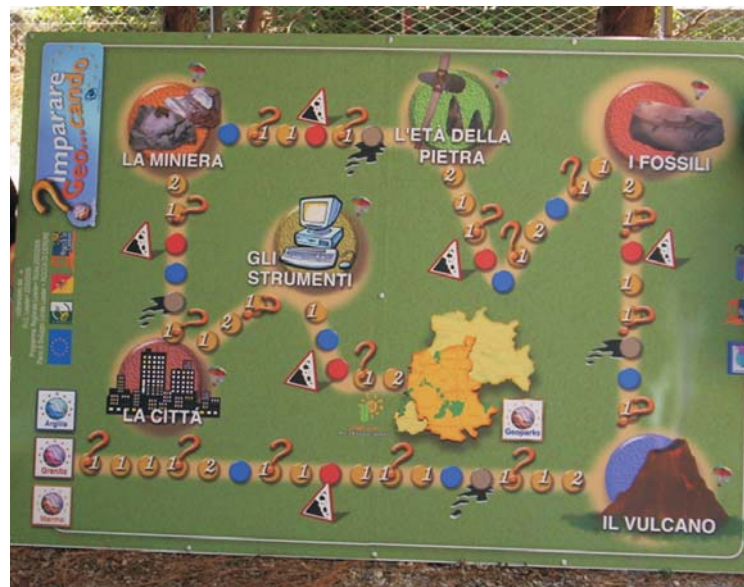
Shows the cards and some details of the board game

tion activities included in the schools' annual programmes. A big metal panel reproducing the board game also allows students and families to include and enjoy the game in their outdoor activities during the spring and summer months.

Francesco Chiaramonte
chiaramonte@roccadicerere.eu
Rita Umbriaco
ritaumbriaco@virgilio.it

The game panel in the Visitor Centre of Pergusa Lake N. R.

Education and Interpretation Laboratory "Villa Zagaria"



GeoMon, Anglesey's Geopark, hosts major Research Workshop

GeoMon organized a research workshop attended by over 40 delegates from around the world in July 2012 to showcase recent research over the last 2 years on aspects of the Precambrian and Palaeozoic geology of the Geopark. Over the two days of the conference, 16 research papers were delivered and 5 poster sessions took place. The first day saw 8 papers and 2 posters given by our Japanese colleagues from Tokyo University and Tokyo Institute of Technology. Professors Shigenori Maruyama and Yukio Isozaki led a field trip with members of their departments who have been researching the geology of Anglesey for the last 10 summers, and local guides from GeoMon. Professor Brian Windley of Leicester University chaired the first day and Professor Maruyama gave the first

day's keynote speech on the geotechnical evolution of the UK. In the afternoon a field visit to Llanbadrig was led by Brian Windley, Shigebori Maruyama and Margaret Wood to examine the mélangé deposits at the World Type Locality for this rock which originated in a thrust-related tectonic environment associated with a subduction zone. Dr Margaret Wood has recently published an invited paper on the mélangé (Wood, M. 2012. The Historical Development of the Term 'Melange' and Its Relevance to the Precambrian Geology of Anglesey and the Llyn Peninsula in Wales, UK. *Journal of Geography, Japan*. 121 (1) 168-180) GeoMon's Dr Rob Crossley chaired the second day featuring a keynote presentation on terrane assembly and Iapetus subduction by Dr David Schofield (BGS), 3



Conference delegates examining the quartzite, Precambrian limestone and ironstones within the mélangé at Llanbadrig, Anglesey

papers from British scientists and 5 papers by our Japanese friends. With new controversial interpretations and an international audience, there was plenty of lively discussion following each session. Dr Tony Barber, in particular, participated in the discussions and his contribution, along with others will be included in the conference proceedings to be published later (details on how to obtain copies will appear on our website www.geomon.co.uk)

Margaret Wood
college@btinternet.com
John Conway
john.conway@rac.ac.uk



Delegates at GeoMon's Conference on the Precambrian Geology of Anglesey and Great Britain

The scientific cooperation in the Villuercas Ibores Jara Geopark



Aragonite formation in the cave of Castañar de Ibor

Some Spanish universities are working in cooperation with the Villuercas Geopark, to improve the Geopark's scientific knowledge and education provision. The University of Extremadura (UEX) is responsible for the Educational & Scientific Committee (ESC) which is directed by Prof. Rodríguez Cancho. The ESC comprises eighteen members with different fields of expertise. In addition, many geologists belonging to the Geological Association of Extremadura (AGEX) participate in Geopark activities which

Biologist E. Pavón is involved in the education of schoolchildren



require geological knowledge. They have produced voluntary contributions such as the descriptions of geosites, training for geotourism companies, the scientific assessment for interpretation centres and have authored several research papers. For example, Prof. Juan Gil has coordinated the dissemination of information for geosites and other activities. The paleontologist Prof. Palacios and his team have described the Geopark's fossils, and particularly, the important *Cloudina carinata* deposits. Prof. Alonso, from the Complutense University of Madrid, is responsible for the research and description of the aragonite cave of Castañar de Ibor. Prof. García Arranz from UEX department of anthropology is investigating the cave paintings in the Geopark rock shelters. Geologist Francis Fernández (AGEX) has been involved in developing the Phosphorite Mine of Logrosan for geotourism. Prof. Corrales, from the UEX Department of Didactic Sciences had designed the education project assisted by primary school or high school teachers such as Pedro Diosdado or Jesús Vázquez. Equal importance has been given to other collaborative projects e.g. Prof. Schnabel - geomorphology, Prof. López Caballero (UEX) -rural development, Prof. Gumiel from University of Alcalá- geological assessment and the biologist Fernando Durán involved in describing the Geopark's

flora. ESC biologists, specialized in ecotourism, e.g. either Blanco or Barrera have contributed to the provision of interpretive materials for geotourism. In addition to their scientific collaboration, the universities also contribute to the Geopark's management. In fact, the Principal of the University of Extremadura is an important member of the Geopark Executive Board. The scientific cooperation is a characteristic part of the Geopark's way of life. It may not be a highly visible part of its everyday life but undoubtedly it provides the foundation for all its activities.

José M Barrera
 jmbarrera@dip-caceres.es
Javier López
 javier@aprodervi.com.es

Prof. Juan Gil contributes to a dissemination of information activity





Children of Shimabara drawing their volcano, they then had fun with using it's profile to create the musical score for one of the new songs



What's a Volcano? Give me some info!

When one of the English Riviera's Geo-collective artists Hugh Nankivell told young children at Homelands School that he was going to visit the Unzen Global Geopark in Japan where there was an active volcano, a multitude of questions followed...

"What's a volcano?"

"Can you go inside a volcano?"

"Who lives on the volcano?"

"How hot is the volcano?"

"Did flames burn down the school?"

For children who live in a relatively geologically stable part of the world such as the UK, it is difficult for them to imagine what living with a volcano on the doorstep, or the threat of an earthquake or tsunami must be like. However, Geoparks can provide great opportunities to raise awareness.

Since 2010 the English Riviera has been working with dynamic and innovative artists, to engage and provoke interest in all ages, inspiring them to think more widely and creatively about the world around them.

The children of Shimabara and Unzen performing their new songs for delegates at the 5th International Conference on Geoparks



Working in collaboration with the Unzen Geopark, attendance at the 5th International UNESCO Conference on Geoparks enabled the English Riviera team to share their creative ways of working through performance on local radio and by running a series of workshops for children and the local community in addition to more formal presentations to the delegates.

The children of Shimabara and Unzen were fascinated by the English Riviera children's questions, the answers to which were so obvious to them.

"Can you go inside a volcano?" "Impossible, you will die!"

"Who lives on the volcano?" "A worm and a mouse and a mole"

"How hot is the volcano?" "800 degrees"

"Did flames burn down the school?"

"Yes, 20 years ago!"

Working together the Geo-collective, children and community groups used these simple questions and answers as the inspiration for new songs which they then performed for the conference delegates. In addition, on return to the UK these new songs have been shared with the children of the English

Riviera Geopark and now more of them have an understanding of what a volcano is! From a management perspective working with the creative sector to explain scientifically based concepts and information could be considered as a risky leap of faith into the unknown, but one that the English Riviera Global Geopark would thoroughly recommend. The Geoquest songs are available for downloading at www.englishrivierageopark.org.uk/geoquestSongs.cfm

Melanie Border

m.border@englishrivierageopark.org.uk

Enjoying one the Geoquest Unzen workshops



Education in Chelmos Vouraikos Geopark

The Environmental Education Centre of Kleitoria, in cooperation with the Management Body of Chelmos – Vouraikos, provides a three-day programme for elementary high school students (E' and F' classes) entitled "Journey to the Protected Area Chelmos - Vouraikos." The aim of this programme is to enhance the understanding and commitment by students to protecting the natural environment. This is achieved through practical experiences that provide an opportunity to understand the various pressures on the protected area, including related social and economic activities. In this way the training programmes contribute to the sustainable management, protection and development of the Geopark.

On the morning of the first day the students are divided into groups and assigned the same activities but tailored to their levels of education. The groups are allocated separate and playful roles chosen from a pool of activities and roles which are common to all groups. During the afternoon the

Students during a visit to the exhibition hall of the Chelmos-Vouraikos management body



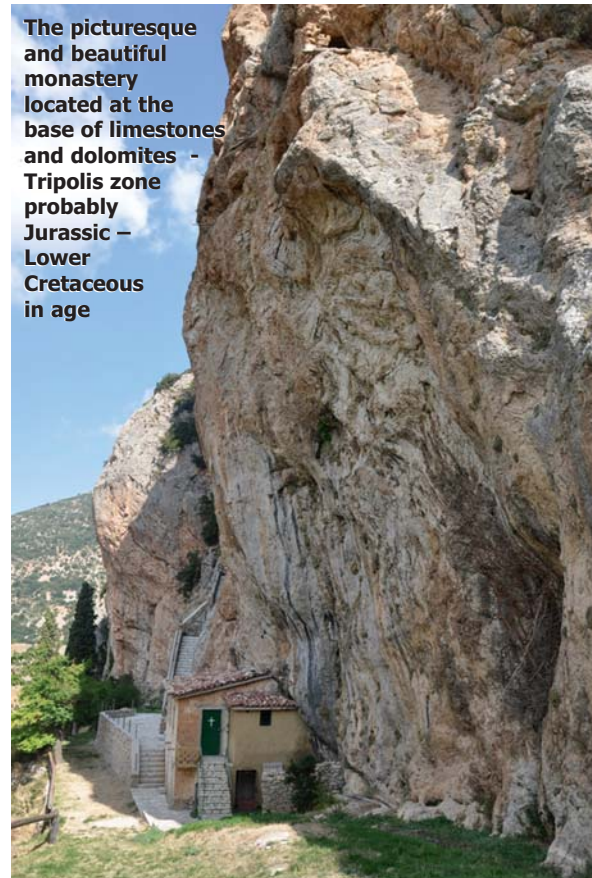
The route around the lake Tsvilou is used for many explorations

students spend time in the laboratories and classrooms and prepare their presentations. Familiar and well known games, together with theatrical games are also used. On the last day the students present and evaluate their experiences and depart from the Environmental Education Centre of Kleitoria.

A different one-day educational programme "The wetlands of Lake Tsvilou for E' and F' elementary high school students combines a field study in the area of the lake with environmental data collected along the path around it. The Tsvilou is a small 80 metres deep mountain lake at an altitude of 700 metres with a surface of less than 200 acres. It was created by a large landslide in 1913 which blocked the nearby River Krathi for almost a year. Today it is a popular tourist destination. This programme aims to increase the knowledge and understanding of the ecosystem of Lake Tsvilou within a context which is not restricted

to the immediate environs of the lake.

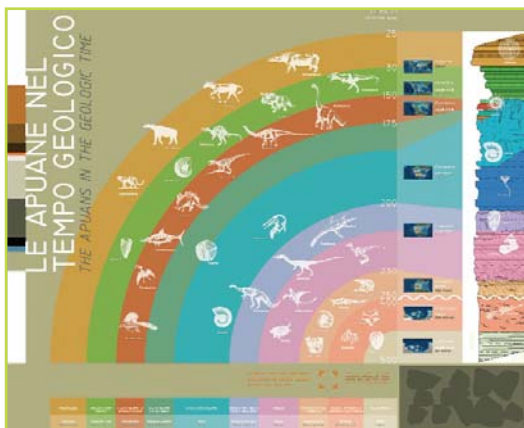
Koumoutsou Eleni
 koumoutsou_e@yahoo.gr
Topouzidis Nikos
 fdxb@otenet.gr



The picturesque and beautiful monastery located at the base of limestones and dolomites - Tripolis zone probably Jurassic – Lower Cretaceous in age

ApuanGeoLab: an educational window on the Earth Sciences

The
geological
record
of the
Apuan Alps



The panel
illustrating
the exhibit
"From
Limestone to
Marble"

The village
of Equi terme
which hosts
the "Apuan
GeoLab"



The Apuan Alps are characterized by a high geodiversity, the interpretation of which provides an insight into many fundamental geological processes. The aim of the Geopark is to disseminate knowledge about its geological heritage and to improve the understanding of the connection between the local

geological evolution and global processes. In order to achieve these aims the Geopark has developed the "ApuanGeoLab", an educational laboratory where understanding concepts in the Earth Sciences, also includes socially relevant issues, such as geological hazards. This interactive museum was conceived as an exhibition hall where mechanical, rather than electronic, exhibits guide visitors along an ideal journey to discover the continuous transformations of Earth in geologic time, from global to local, from "Gaia" to "Apuia".

ApuanGeoLab is located in the village of Equi Terme, in the northern sector of the Apuan Alps Geopark. Between the three communicating rooms, every visitor is a "geologist for a day", starting on a journey that provides an explanation of the physical and chemical mechanisms that shaped and modified the planet. The Earth's interior and convection cells are the key-words in the first room, where the sensory perception of rising heat allows

the visitor to understand and "feel" the inner structure of our planet. The second room is dedicated to plate tectonics and its effects on a global and local scale. It also describes the endogenous and exogenous forces that formed and then shaped the Apuan Alps. This room contains an exhibit in which, by moving fault blocks, the visitor can set off a vibrating platform simulating the release of elastic energy during an earthquake. In the final room the visitor can observe the column representing the Apuan Alps "stratigraphy" in which every rock tells a story connected with different moments during the history of the Earth's changing paleogeography and evolution of the main living forms.

ApuanGeoLab is a structure enriching the "Cultural Park of Equi Terme Caves" comprising a network of tourist facilities based on nearby geosites and archeological sites.

Alessia Amorfini

aamorfini@parcapuane.it

Antonio Bartelletti

abartelletti@parcapuane.it

Giuseppe Ottria

ottria@dst.unipi.it

The Limestone Terraces of the Burren: Steps to climate change education



Typical limestone surface in the Burren

The Burren Cliffs of Moher Geopark in the west of Ireland has wonderful exposures of Carboniferous Limestone. It is an ideal setting for teaching karst geology as well as carbonate sedimentology and glacial geomorphology. The renowned coastal exposures of the overlying Namurian deltaic sediments, spectacularly

exposed in the Cliffs of Moher, make this region the first choice for many undergraduate, postgraduate and corporate geology field trips. The area has a long history of tourism; in the 18th century Lisdoonvarna was already established as a Spa resort and the Cliffs of Moher were noted in travel guides. Local traditional music, surfing and the increasing appeal of walking and outdoor activities in the Burren means there is a large seasonal population of non-geological tourists.

In our role as geological educators we also cater to these groups of tourists as well as the local residents. To communicate with these non-geological groups effectively we need to make geology relevant. The climate change issue has direct economic relevance to most people today and with more people paying 'Carbon taxes' in some form or other, it is an issue which geologists can use to forge a link with non-geologists. Geoparks in particular are ideally suited to take the lead in this area. In the Burren the limestone

terraces form notable features in the landscape. They look like huge steps and provide an excellent opportunity to discuss cyclicity, particularly with respect to past climate change. The terraces are the product of the differential erosion of rocks within cyclic sequences deposited during the Karoo Ice Age approximately 360 - 260 million years ago. Sitting directly on top of the Carboniferous Limestone are abundant Pleistocene glacial erratics; by discussing the relationship between these two events we get a better understanding about the nature of geological time and also the profound connection between the geological record and our understanding of climate change. By walking our audience through a series of educational steps using the limestone terraces we inform and gently guide them to deeper and broader ideas and leave them to form a more educated opinion on past and future climate change.

Eamon Doyle
 edoyle@burren.ie

Burren & Cliffs of Moher Geopark, Ireland location map



Typical limestone surface in the Burren

The Geopark Carnic Alps of Austria

The Geopark Carnic Alps in southern Austria was officially opened in the summer of 2009. Populated by some 20,000 people, the Geopark covers an area of 830 square kilometers on both sides of the Gail Valley. Since the beginning of the 19th century this mountain area has been famous for its fossiliferous Paleozoic rock sequence in the Carnic Alps and the Triassic succession in the Gailtal Alps. These areas are separated by the structurally important Peri-Adriatic Line (PAL) that divides the Southern from the Northern Alps.

Since the introduction of the Geotrail concept in the late 1980s, which comprised five hiking trails in the Carnic Alps with more than 60 geologically interesting geotopes shown on signposts in the field and in thematic books, this programme was expanded by establishing a Geopark. In 2008 this long lasting aim was finally approved by eight regional communities and the Province of Carinthia. The project and its indoor and outdoor activities were funded by means of a Leader+ project. In 2010 the official application to become a European and Global Geopark was submitted to

the European Geopark Network via the UNESCO office and was approved in March 2012.

The main priority was to establish a modern and innovative Visitor and Information Centre, which reflects almost 500 million years of Earth's history in this area and its unique geological heritage. For the interior, a design was chosen which mirrors in stratigraphic order the fossiliferous rock sequence of Ordovician, Silurian and Devonian age covering the floor, the walls and the ceiling. In addition, the rich local fossil heritage is shown by extraordinary examples of fossiliferous rocks displayed on pedestals and in showcases. Also, Roman archaeological objects are displayed which indicate the historical mining activity in this area.

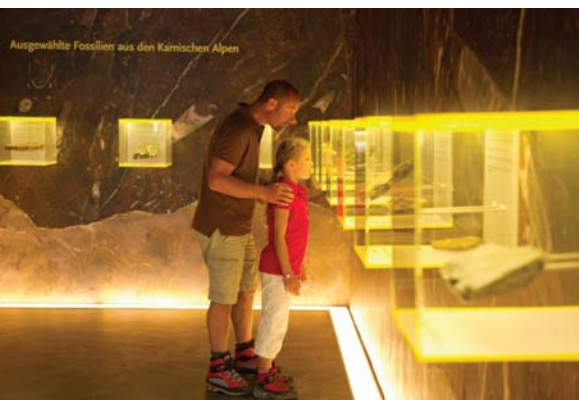
In addition to the usual marketing and promotional material, such as brochures, booklets and maps, the Visitor Centre provides eight touch-screen monitors and a video centre to show films on DVD, as well as computer applications in order to address the local inhabitants, school classes, and foreign guests, who are not familiar with the Earth sciences, the fossil record or the geological time scale. Thus, in cooperation with experts in informatics, five interactive animations were developed that can be viewed and easily understood by individuals not trained in geology. In particular, we are proud to present a set of newly developed animations and simulations, which, among others, show the birth of the Solar System, the formation of the Moon, plate tectonics, life in the sea, the



Chicxulub impact event, and the formation of the Alps. There is a short general version of the accompanying text for those who want to get a quick overview, as well as an extended version with a more scientific background. The evolution of life, the movement of tectonic plates through Earth's history, regional geology, and the global and local fossil record can be selected by pressing specific buttons. The DVD and the accompanying brochure can also be purchased and can be easily adapted for the purposes of other Geoparks. Since their installation, these new IT tools attracted many visitors to the Information Centre of the Geopark.

One of the fossil tree trunks of the petrified forest of the GeoPark Carnic Alps, the only petrified forest in Austria

Families exploring the new Visitor Center in Dellach/Gail

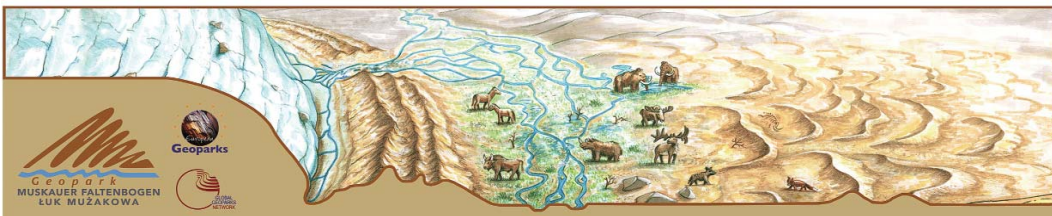


Gerlinde Ortner
gerlinde.ortner@geopark-karnische-alpen.at
Hans P. Schönlaub
hp.schoenlaub@aon.at

Aerial view of the Gail Valley with the Carnic Alps (left) and the Gailtal Alps



Sketch showing the end-push moraine and the Muskau Arch Geopark landscape at the end of the last Ice Age



The German-Polish Geopark Muskau Arch

WELCOME
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GEOPARKS



One of the 300 beautiful lakes in the Muskau Arch Geopark

The name Muskau Arch, "Muskauer Faltenbogen" in German and "Łuk Mużakowa" [wu:g mushak'ova] in Polish is derived from the small town of Bad Muskau and the curved shape of an end moraine. This transnational Geopark includes territories in Germany and Poland which are separated by the narrow 30 m deep river Lausitzer Neiße / Nysa Łużycka valley. The Geopark covers an area of 580 km², has 60 000 inhabitants, and is designated as a National Geopark both in Germany and Poland. Since 2011 the Geopark Muskau Arch has been a member of the EGN / GGN family. The Geopark is administered by German and Polish non-governmental organizations from offices located in the towns of Döbern and Łęknica respectively. The two administrations are linked by a cooperation treaty. However, due to formal and also legal circumstances it is still not possible to form a transnational administration. The landscape of the Muskau Arch Geopark is the product of three ice ages. Nearly 350,000 years ago, during the Elsterian Ice Age, a 20 km wide and 500 m high lobe of the Muskau glacier pushed, thrust and folded soft sediments to create a 400 km² horse shoe shaped push-end

moraine. Later, during the the Saalian Ice Age (200,000 - 130,000 years ago) a glacial valley formed at its southern rim. The end of the Weichselian Ice Age and onset of the Holocene warm period, between 20,000 to 5000 years ago, coincided with the development of extended dune fields. During warm and cold periods mammoths, deer (Megaceros), arctic foxes, horses and other large mammals roamed the Muskau Arch landscape. Compared with other northern middle European Ice Age landscapes the geological history of Muskau Arch is very well documented as a result of centuries of mining and quarrying in which deposits of lignite, alum shale, sand for glass making, building sand, clay for use in the ceramic industry as well as in brick production and pottery, swamp iron ore, peat, and mineral springs were exploited. The phase of intensive mining ended in the 1970's. Now the Geopark's densely wooded territory with approximately 300 to 400 lakes, the legacy of subsurface and opencast mining, as well as clay and sand extraction has been developed for recreation involving an extensive network of cycle routes, hiking trails and the historical railroad "Muskauer Wald-Eisenbahn". Approximately 70% of people assimilate information more readily through images rather than through spoken or written explanations. That is why three wall panels with graphic images were produced to illustrate:

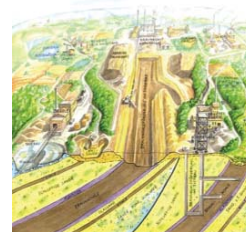
- a simplified figure showing the genesis of Muskau Arch
- the exploitation and use of raw materials

- the historical railroad system "Muskauer Wald-Eisenbahn".

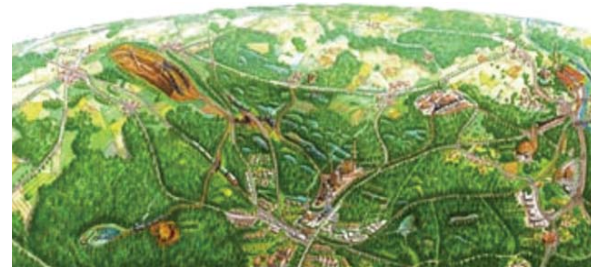
The content of these simple sketches is both accurate and very detailed and is intended for use by school children, adults, and specialists respectively. The images consist of 4 m wide (genesis and railway panels) and 2.5 m wide wall panels at different locations. Educational material for teachers and schoolchildren provide detailed explanations for the "Genesis of Muskau Arch" and "Raw material" panels respectively. Education involving schools is a significant activity in Muskau Arch Geopark. Since 2007 specially themed and shared German-Polish projects have been undertaken annually by school children. The general principle of these projects is to promote the idea of evolution. Evolution in this sense includes long term geological processes, the development of exploration technology and use of raw materials and the Geopark's future in the region. The general concept of the projects is "Everything Changes" and every year the projects focus on a new subject.

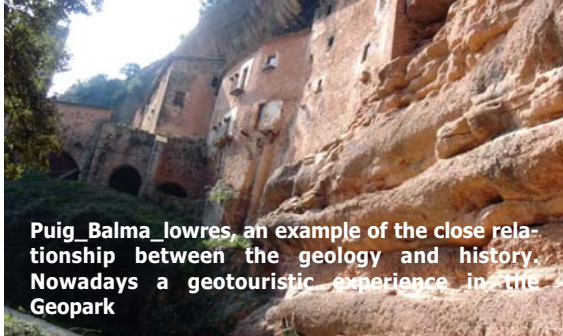
Realizing the recreational and educational potential of an Ice Age and Industrial landscape

Wall panels illustrating the historical extraction and uses of raw material in the Muskau Arch region and a reconstruction of the railroad "Muskauer Wald-Eisenbahn" system



Jacek Koźma
jacek.kozma@pgi.gov.pl
Manfred Kupetz
manfred.kupetz@t-online.de





Puig Balma lowres, an example of the close relationship between the geology and history. Nowadays a geotouristic experience in the Geopark



The Mountain of Montserrat, an ancient coastal fan-delta, dominates the landscape and is one of the main geological sites of interest in the Geopark

The Geopark of Central Catalonia, Spain

The Geoparc de la Catalunya Central has a surface area of approximately 1,300 km² and includes 34 municipalities from Bages County and one, Collbató, from Baix Llobregat County. The territory is situated in the geographical centre of Catalonia in the northeastern region of Spain and has a population of approximately 188,000 inhabitants and a population density of ca. 140 inhabitants per km².

The centre of the region is characterized by extensive flat areas associated with basins eroded by the rivers draining the area. The southern areas are defined by extensive elevated areas reaching heights of 500m or more. These give rise to flat sloping areas, or to important mountain ranges such as Montserrat rising to 1,236m. The northeast is characterized by the Moianès tableland with elevations between 600-700m.

The establishment of settlements as well as industries has been mainly concentrated in the plains and the river valleys. Despite the growth of urbanization by 5%, during the last decades, the traditional character of the

region's forest dominated landscapes has been preserved their traditional character. The territory has a continental Mediterranean climate characterized by a remarkable winter-summer thermal oscillation.

The Geopark includes 15% of the protected area assigned to Natural Parks and Xarxa Natura 2000 and some geological sites are included in an Inventory compiled by the Catalanian Government. The Geopark has produced a manual of best practice that promotes geo-conservation for the various administrations.

The Geopark is managed by a partnership consisting of the Bages County Council, the municipalities of Collbató, Súria and Moià, the Museum of Geology Valentí Masachs (from the Universitat Politècnica de Catalunya) and the Natural Park of the Mountain of Montserrat, which act as the Steering Committee. A Scientific Committee with the participation of the most representative geological institutions and an Advisory Committee with regional stakeholders and community representatives also are part of the Geopark's Partnership Board. An increasing number of local partners create a socio-economic environment that reinforces the project promoted by the Geopark.

More than forty-five catalogued sites demonstrate the great geodiversity within the territory. Different geotourism activities and training at different levels are carried out in these areas by the visitor centres and local companies who

are partners in the Geopark.

The Geopark of Central Catalonia is located in the eastern sector of the Ebre foreland basin. The geology consists of sedimentary rocks ranging from Eocene and early Oligocene ages. These were deposited initially in marine environments, and subsequently in fluvio-lacustrine settings, following the region's isolation from the sea about 36 million years ago. The end of the marine basin, the Catalan potassic basin, is one of the world's most significant examples of the accumulation of evaporitic rocks in a dynamic tectonic setting, creating one of the largest potassium salt mining areas in Europe. Furthermore, the territory also has unique features which are internationally recognized. These include the mountains of Montserrat and St. Llorenç del Munt and karstic sites such as the Salnitre Caves and El Toll Caves associated with important prehistoric and animal remains.

Salt mining in the area which was recorded by Pliny the Elder, was initiated during Neolithic times. Mining and the long history of exploiting clay, limestone and gypsum has created an important heritage.

The continued human presence since Upper Palaeolithic times has provided the area with a magnificent heritage - traditional, cultural and historical - that completes its rich and strong personality.

Ferran Climent Costa
ferran@geoparc.cat
Cristina Rubio Segura
cristina@geoparc.cat

Schoolchildren participate in an outdoor workshop at the prehistoric park of El Toll Caves





Volcanic remnant hills in Tapolca Basin

Bakony–Balaton Geopark: A geological wonderland in western Hungary

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Bakony–Balaton Geopark was accepted into the European and Global Geoparks Networks in 2012. The 3,244 km² Geopark is located near Lake Balaton, the largest lake in Central Europe, at the boundary between four major geographic regions. Therefore it is characterized by a variety of geological, topographic, climatic and hydrological features and by its extensive biodiversity. Altogether 24 of the 45 geosites are located within protected natural areas of national interest (Balaton Uplands National Park, Protected Landscape Areas, Nature Conservation Areas) and/or the geosite is itself protected by law (e.g. caves). The Geopark’s territory comprises 151 settlements – ranging from tiny villages to towns – with 330,000 inhabitants.

Bakony–Balaton Geopark, with its long tradition of geological research is one of the places on Earth where the outstanding geodiversity is not only described in scientific papers but is also beautifully reflected in the landscape. Instead of seeking hidden treasures, just open your eyes to more than four-hundred-million-year old metamorphic rocks, fossil-rich Alpine Triassic limestone sequences, dinosaur-bearing Cretaceous rocks and tropical tower karst, sediments of the former Lake Pannon containing diverse endemic species of molluscs, gorges and karst

plateaux featuring 700 caves, hundreds of sinkholes, a 9-km-long thermal-water maze under a town and more than 1,600 clear-water springs. Here you can see one of the ‘densest’ volcanic fields in Europe. The 3–8 million years old remains of volcanoes with ‘basalt organs’ in the Tapolca Basin offer one of the most dramatic landscapes in Europe. Wandering in one of the ‘seas of stones’ around Káli Basin is a delightful experience for everyone.

Added to this geological and biological wonderland is the legacy of five thousand years of human occupation: the rich archaeological heritage of the prehistoric and Roman times, ruins of medieval castles, old monasteries, the two millennia old but still existing viticulture and beautiful examples of traditional folk architecture. The Balaton Uplands National Park Directorate (BUNPD) is the leading organisation of the Geopark. Why is this leadership optimal? Firstly, geological and nature conservation tasks have been carried out by its experts for decades, as well as ecotourism and environmental education activities. Secondly, BUNPD is the official regional organisation for nature conservation within the entire area of the Geopark. These activities have been widened by making new geosites accessible, launching adventure cave tours, geotour-guide training courses and Geopark educational contests.

To emphasize the Geopark concept, a Geopark Group was formed that delivers the central planning and operative tasks. The Ranger Service and other employed experts of the

BUNPD also support the Geopark programme through their expertise and local knowledge. The stakeholders are involved in the management via the Geopark Commission. Local governments, civil organisations and volunteers have also been involved in geological nature conservation activities that resulted in the development and maintenance of several geosites. Such are key sections and interpretive sites, as the Úrkút Palaeokarst Nature Conservation Area, which is also the “Geological Heritage Site of 2013 in Bakony–Balaton Geopark”.

The geological interpretive sites are managed by local entrepreneurs or by local employees of the BUNPD. Our aim is to sell more local products at these sites to promote a local sustainable economy. Geotourism programmes delivered by local geotour-guides, who have been trained in our geotour-guide courses, are also promoted via the Geopark Facebook site and the website, www.bakony-balaton-geopark.hu.

Barnabás Korbély
korbely@bakony-balaton-geopark.hu
Anna Knauer
anna.knauer@bakony-balaton-geopark.hu

Úrkút Palaeokarst Nature Conservation Area, Bakony Mountains

The Cave Lake of Tapolca: boating beneath a town





The eastern part of Lesvos Island is covered by the olive grove while the western part is created by the volcanic activity

From the Petrified Forest Geopark to the Lesvos Geopark

The entire island of Lesvos has recently been declared a member of the Global Geoparks Network under the auspices of UNESCO and the European Geoparks Network. Creating the Geopark involved expanding the boundaries of the pre-existing Lesvos Petrified Forest Geopark. The decision was taken by the UNESCO's Global Geoparks Network Bureau that met during the 11th European Geoparks Conference in Arouca Geopark and was announced during a special ceremony on the 20th September 2012.

From candidacy to membership

The process began in 2011 with the agreement between the Natural History Museum of the Lesvos Petrified Forest, the Lesvos Municipality and the University of the Aegean to expand the boundaries of the Lesvos Petrified Forest to create the new Lesvos Geopark involving the whole of the island's territory. Subsequently, the application dossier of the Lesvos Geopark was prepared and submitted to the Coordination Committee of the European Geoparks Network and to UNESCO on the 30th November 2011.

The evaluation of the dossier and the on-site visit to Lesvos was made by the GGN experts, Dr. Guy Martini, Director of the Reserve Géologique de

Haute Provence and a member of UNESCO's Geoparks Bureau, and Dr. Andreas Schüller, Director of the Vulkan Eifel Geopark and a member of the EGN Advisory Committee. The evaluators were impressed not only by the extent of Lesvos' superb geological and cultural heritage, but also by the strong support for the candidacy expressed during meetings with the island's authorities, local communities, agents and stakeholders. The final decision was announced on the 20th September 2012.

Lesvos Geopark: unlimited natural and cultural wealth

The Lesvos Geopark application dossier presents the island's complex geological structure and geodiversity. This consists of 92 geosites with a range of characteristics including the occurrence of fossils of plants and animals (16 sites), volcanic structures involving craters, calderas, domes, veins, columnar jointed lavas, laccoliths, ignimbrites and structures produced by the spheroidal weathering of volcanic rocks (25 sites), seven hot springs, quarries, mines and mining galleries, caves and karst structures, waterfalls and gorges, erosional structures, tectonic structures and impressive fault structures, ophiolite nappes, beachrocks and many more. This wealth of geological features testifies to the value of Lesvos for

geological research and education.

The island's abundant variety of natural assets include unique olive groves, salinas, the Kalloni and the Gera Gulf wetlands, the mixed pine forest of Pterounda, the unique *Posidonia oceanica* (seagrass) meadows just off the western shoreline, and the rich flora and fauna combining European and Asian elements. Cultural features include prehistoric settlements, ancient Greek temples, Roman aqueducts, Byzantine castles, churches and monasteries, Ottoman mosques and hammams, museums, traditional villages, the unique architecture of the 19th century mansions, traditional music, dances, the cuisine and art are testimony to the long history of the island and its inhabitants.

The inclusion of Lesvos Geopark in the EGN and the GGN provides a quality label for the island and promotes it as a distinctive destination globally. It therefore constitutes a unique opportunity for the island to develop strategies for the protection and promotion of its identity, to raise awareness of the local inhabitants and visitors to the importance of its natural and cultural wealth and for the improvement of forms of alternative tourism, leading to the socio-economic progress of the island and its people.

K. Vasileiadou
lesvospf@otenet.gr



The Roman aqueduct

A petrified tree of Sequoia



THE EUROPEAN GEOPARKS NETWORK

52 European areas working together to valorize their geological heritage through the integrated and sustainable development of their territories are pleased to welcome you to their common events and activities



Under the auspices of UNESCO



Affiliated Organization



In collaboration with



www.europeangeoparks.org

CALENDAR

25 May - 9 June 2013 – European Geoparks Week 2013

25 June - 4 July 2013 – International Intensive Course on Geoparks
Lesvos island Geopark – Greece
<https://geoparks2013.pns.aegean.gr/>

4-6 September 2013 – 12th European Geoparks Conference
Cillento e Valle Diano Geopark – Italy
<http://egnconference2013.cilentoediano.it>

9-12 September 2013 – 3rd Asian - Pacific Geoparks Jeju Symposium
Jeju island Geopark – Republic of Korea
www.apgn2013.org

March 2014 – European Geoparks Meeting
Sobrarbe Geopark – Spain

May - June 2014 – European Geoparks Week 2014

September 2014 – 6th International UNESCO Conference on Geoparks
Stone Hammer Geopark – Canada

May - June 2015 – European Geoparks Week 2015

September 2015 – 13th European Geoparks Conference
Rokua Geopark – Finland

September 2015 4th Asian – Pacific Geoparks Conference
San'in - Kaigan Geopark – Japan

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

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