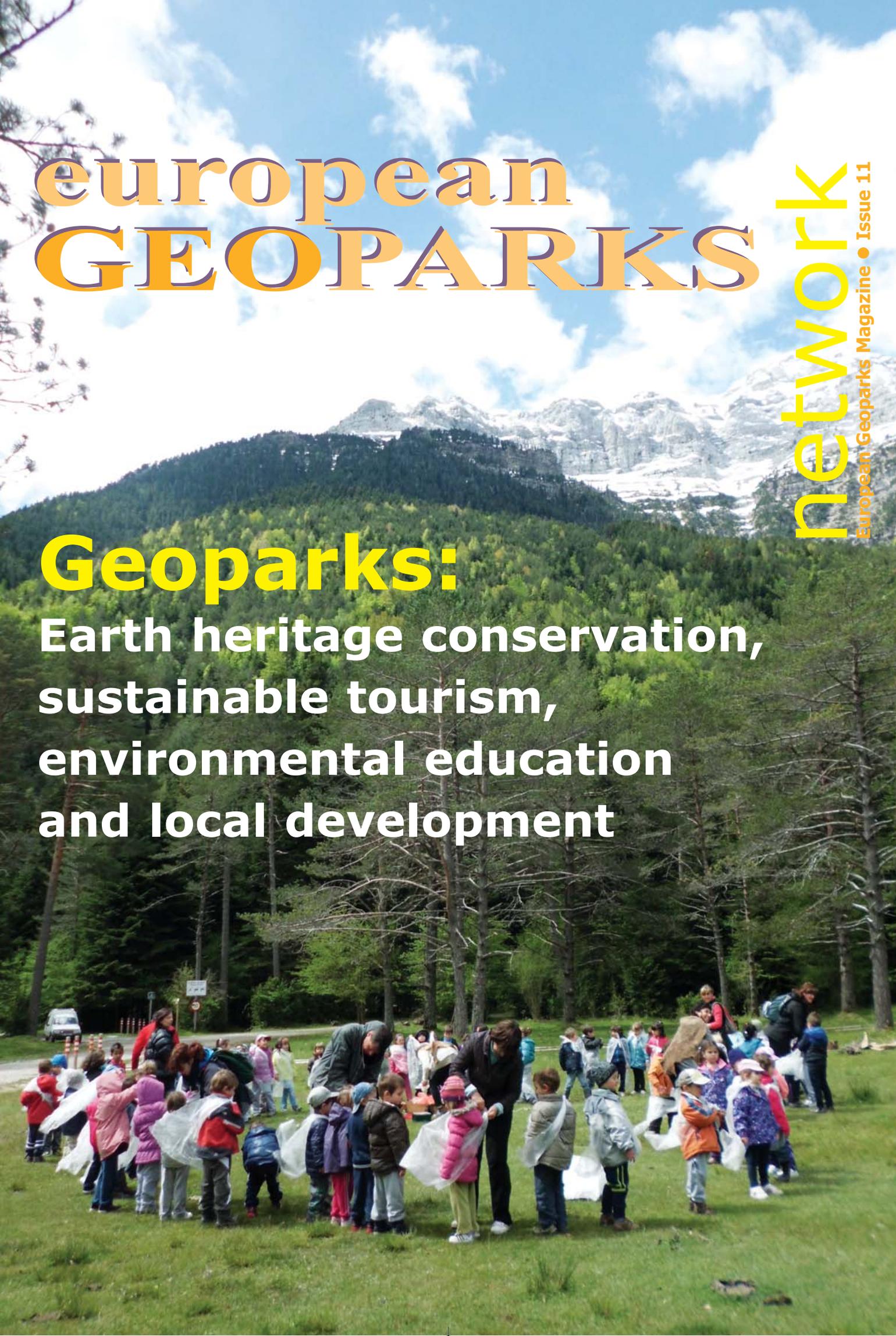


europaean GEOPARKS

network
European Geoparks Magazine • Issue 11

Geoparks:

Earth heritage conservation,
sustainable tourism,
environmental education
and local development



Foreword

Magazine 11 provides an overview of activities and achievements in the European Geoparks Network (EGN) during 2013. These include celebrating European Geoparks Week; the highly successful 12th European Geoparks Conference and progress in discussions between the Global Geoparks Network and UNESCO to develop a UNESCO Global Geoparks Initiative. The inclusion of articles by six new members, Azores Geopark (Portugal); Karavanke/Karawanken Geopark (Slovenia & Austria); Idrija Geopark (Slovenia); Hondsrug Geopark (Netherlands); Sesia-Val Grande Geopark (Italy); Kula Geopark (Turkey) reflects the expansion of the EGN to 58 members.

The 12th European Geoparks Conference entitled "Geoparks an innovative approach to raise public awareness about geohazards, climate change and sustainable use of our natural resources" was hosted by The National Park of Cilento, Vallo di Diano and Alburni - Geopark between 4-7 September 2013. The conference was attended by 400 delegates from 41 countries and more than 150 short articles are published in the Conference Proceedings' E.Book. Selected articles were published in the Rendiconti Online della Società Geologica Italiana. The conference concluded with two days of field excursions providing a choice of four venues.

In this issue 37 articles demonstrate how European Geoparks contribute to conservation, education and promoting sustainable development through geotourism. They show that working with communities and communicating information delivers enjoyable and memorable experiences to their inhabitants and visitors. Methods for developing geotourism include creating a tourism office, visitor centres, a geo-cycle-trail, information panels and managing geosites. Bergstrasse Odenwald Geopark uses its "Geotope of the Year" programme to introduce geology to a wider public. Vulkaneifel Geopark trains guides in nature conservation skills and developing products for tourists. Participants in an eco-Marathon in Madonie experience the Geopark's geology and dramatic landscape. Caba de Gata Geopark uses submarine geological trails to address the effects of "tourism provider congestion", while TerraVITA, describes a new subterranean fossil trail. The GeoPark Carnic Alps is developing a petrified-forest site where the process of fossilization is explained. Geopark Shetland highlights an initiative using geotrails to develop a North Atlantic tourism brand.

Two Geoparks use art for promotion and education. The English Riviera Geopark aims to stage a significant arts festival. Villuercas – Ibores – Jara Geopark introduces its prehistoric rock art heritage to local schools. Archaeological studies in Eisenwurzen and Vikos Aaos Geoparks reveal the activities of their paleolithic inhabitants. Copper Coast Geopark hosts a site described as Ireland's Pompei. Educational activities include Arouca Geopark's use of children's literature; the increase of educational partnerships in the Burren and Cliffs of Moher Geopark; Sierras Subbéticas Geopark's use of trained wardens in schools and Rokua Geopark's use of its Ice Age Landscape. Fforest Fawr Geopark highlights its involvement with Cardiff University in a research project which benefits a local business. The Basque Coast Geopark promotes its products and gastronomic tradition, Sobrarbe Geopark shares the benefits of being a Geopark with its inhabitants and stakeholders. A visitor's response to an event in Madonie Geopark represents a novel contribution to Geopark activities as does the Apuan Geopark Farm's, involvement in introducing new agronomic techniques. Cooperation between Naturtejo Global Geopark and the aspiring Bodoquena-Pantanal Geopark, Brazil, exemplifies international collaboration within the Network. Developing and hosting the travelling exhibition "AEGEAN – The Birth of an Archipelego" is a significant activity of Lesvos Geopark.

The Geopark Harz • Braunschweiger Land • Ostfalen promotes the aims of the project "Natura 2000" through an exhibition. The North Pennines AONB & Geopark team is involved in remediating heavy metal water pollution.

The year 2013 has seen a change in the EGN Structure. Kristin Rangnes, Gea Norvegica Geopark, Norway replaced Andreas Schüller, Vulkaneifel Geopark, Germany as the EGN's Vice-Coordinator. We congratulate Kristin and wish her every success in her new role.

Tony Ramsay, Member of the Editorial Board



European Geoparks Network Magazine

Issue No 11 / 2014

Published by:

Natural History Museum of the Lesvos Petrified Forest on behalf of the European Geoparks Network

Executive editor: Nickolas Zouros

Editorial board: Heinz Kollmann, Tony Ramsay, Jutta Weber, Nickolas Zouros

Contributors:

Alessia Pica, Vajolet Masè, Alessia Amorfini, Antonio Bartelletti, Giuseppe Ottria, Daniela Rocha, Artur Sá, António Duarte, Ricardo Neves, Vera Magalhães, Barnabás Korbély, Anna Knauer, Leire, Asier Hilario, Jutta Weber, Eamon Doyle, José Manuel Quero Fernández de Molina, Pablo Rivas Palomo, Anne Guyomard, Jean-Pierre Fillion, Kirstin Lemon, Aniello Aloia, Angelo De Vita, Heinz Kollmann, Thomas Drechsler, Irmir Auer, Melanie Border, Margaret Wood, Stewart Campbell, Anne Schäfer, David Hull, Tony Ramsay, Tim Jones, Peter Brabham, Gerlinde Ortner, Hans Peter Schönlaub, Steingerður Hreinsdóttir, Nikolaos Zouros, Achim Herf, Andreas Schüller, Stéphane Legal, Charles Diliberti, Pasquale Li Puma, Pietro Casserà, Mario Casserà, Nancy Sauer, Katarzyna Jagiełło, Carlos Neto de Carvalho, Afrânio Soriano Soares, Joana Rodrigues, Sarah Tooze, Elizabeth Pickett, István Kéri, Mikko Kiuttu, Sara Gentilini, Robina Barton, Ana Ruiz Conde, Lourdes Guerra González, Alicia Serna Barquero, Timo Kluttig, Alessandra Casini, Riccardo Cinelli, Eleni Kotjabopoulou, José Julio García Arranz, Hipólito Collado Giraldo, Barnabás Korbély, Fajmut Štrucl Suzana, Rojs Lenka, Bedjanič Mojca, Hartmann Gerald, Vodovnik Primož, Varch Christian, Erdal Gümüş, Selim Aşkın, Eva Lima, Marisa Machado, João Carlos Nunes, Harrie Wolters, Gretha Roelfs, Cathrien Posthumus, Sophie Justice, Anne Guyomard, Natacha Nugue, Ángel Hernández, Mojca Gorjup Kavčič, Bojan Režun, Tullio Bagnati, Edoardo Dellarole.

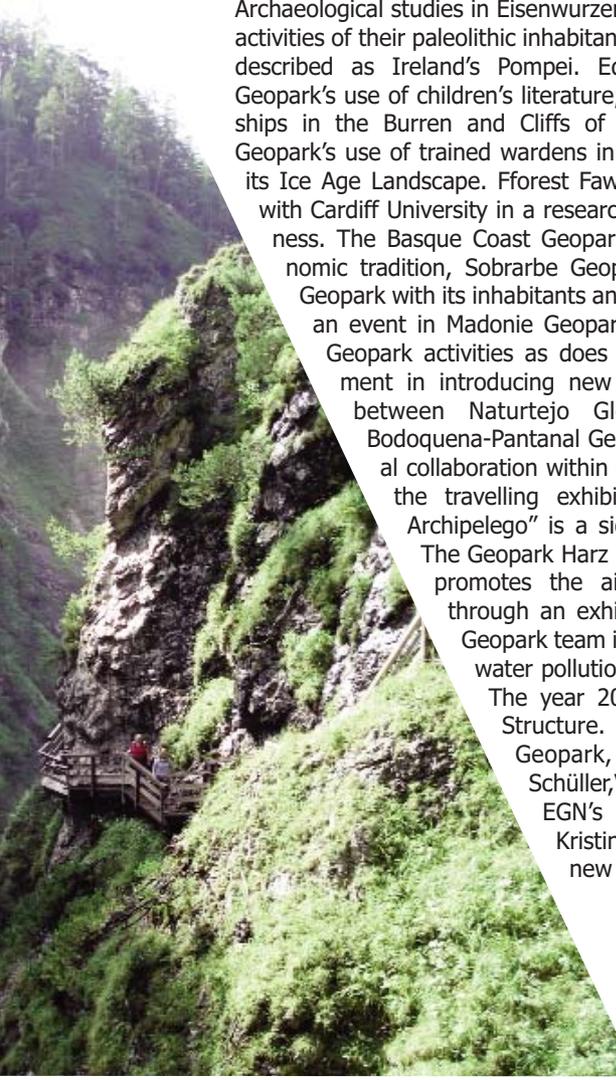
Editing: Tony Ramsay

Publication manager: Antonis Georgiou

Print: Epikinonia S.A

Cover photo: European Geoparks Week at Sobrarbe Geopark

Copyright: The magazine and all the contributions and illustrations contained therein are protected by copyright. No part of this magazine may be copied or reproduced without the written approval of the publishers. This also includes commercial reproduction as an electronic data base and copying on cd rom. c 2014





- 04 UNESCO and Geoparks
Towards the UNESCO Global Geoparks
Initiative - UNESCO's Executive Board and
General Conference
- 08 12th European Geoparks Conference
in Cilento and Vallo di Diano Geopark
- 12 The European Geoparks 2013
Anyone can be a fan of rocks, sustainability
of local products and local traditions!
- 14 Developing strong cooperation in the Year
of Brazil Portugal between Naturtejo Global
Geopark and the Bodoquena - Pantanal
Geopark
- 15 Northern Georoutes: Geoparks develop North
Atlantic tourism brand - Magma Geopark –
Norway, Katla Geopark – Iceland,
Stonehammer Geopark – Canada,
Geopark Shetland)
- 16 A tidal flat from down under TERRA Vita
Geopark, Germany
- 17 A new Visitor Centre and activities
in Bakony Balaton Geopark, Hungary
- 18 The enhancement of a geotourist trail in the
Adamello Brenta Geopark
- 19 "Enjoy the geology"! in the Apuan Geopark
Farm
- 20 Children's literature: an important
educational tool fostered by Arouca Geopark
- 21 New interactive tourism office in Arouca
Geopark
- 22 GeoGourmet, the most select products
of the Basque Coast Geopark
- 23 Earth History for the Public: the Geotopes of
the Year in the Global and European Geopark
Bergstrasse-Odenwald
- 24 Increasing Educational Partnerships in the
Burren and Cliffs of Moher Geopark
- 25 Cabo de Gata-Níjar Geopark steering new
strategies in sustainable tourism:
SUBMARINE GEO-ROUTES
- 26 Geology and Cultural Heritage: Rock Art in the
Villuercas – Ibores – Jara Geopark (Cáceres,
Spain)
- 27 Rewriting the history books: revealing the hid-
den landscapes of the Marble Arch Caves
Global Geopark
- 28 Eisenwurzten New evidence of human
presence 30.000 years ago
- 29 Geopark Festival to be major UK art event
- 31 The European Geoparks Network today
- 32 GeoMôn Launches of Information Boards
and Trails at Cemaes Bay and Llanbadrig
- 33 Beech tree, Natura 2000 and rocks
A new exhibition at Stolberg Castle
- 34 Partnership between Fforest Fawr Geopark and
Cardiff University benefits a local business
- 35 The petrified trees of the GeoPark Carnic Alps
- 36 Regional development for the Eyjafjallajökull
area - Katla Geopark
- 37 Aegean - The birth of an Archipelago
TEMPORARY EXHIBITION – Lesvos Geopark
- 38 The Certified Nature and Geopark Guide
Tourism and Environmental Education in the
Volcanic Eifel Region (Vulkaneifel)
- 39 Ocher by bike - Luberon Geopark, France
- 40 A Visitors' Response to an Alternative Event
in Madonie Geopark
- 41 Ecological Marathon in the heart of the
Madonie Geopark
- 42 Metal Mine Water Treatment in the North
Pennines AONB & Geopark
- 43 Tourism developmental project in the Novohrad
– Nógrád Geopark based on the Hungarian
Government's decision
- 44 Tuscan Mining Geopark, Italy
And now.....CETS!
- 45 Environmental Education in Rokua Geopark,
Finland
- 46 The partner enterprises of Sobrarbe Geopark:
How to share the benefits of a Geopark with
its society and stakeholders
- 47 Training for the protection of the Geopark
Sierras Subbéticas, Spain
- 48 Hunters of the last ice age in the Vicos-Aoos
Geopark, NW Greece
- 49 Garden of Stones: "Geólogo Juan Paricio".
Alcorisa (Teruel)
- 50 'Learning by doing' - especially for young
school children Muskau Arch Geopark,
Poland-Germany
- 51 The Chablais Geopark Georoute:
Multi-stakeholder Mediation Adventure
- 52 The Chablais Geopark Here, the Alps tell
- 53 Azores Geopark Portugal - "9 Islands,
1 Geopark" - Come to visit the Azorean
volcanoes and enjoy an eruption
...of Flavours, Smells and Experiences!
- 54 Geopark Karavanke/Karawanken
- 55 Geopark Idrija - Experience of natural
and cultural heritage
- 56 The Hondsrug Geopark, the first Geopark in
the Netherlands
- 57 Sesia-Val Grande Geopark
- 58 Kula Geopark - From Strabo to Yunus Emre
- 59 Geopark Conferences

UNESCO and Geoparks

**Towards the UNESCO
Global Geoparks Initiative****UNESCO's Executive Board and General Conference**

UNESCO, the United Nations Organization for Education, Culture and Education, is governed by two decision making bodies, the General Conference and the Executive Board.

The General Conference consists of representatives from all Member States. It meets every two years and each country has one vote, irrespective of its size or the extent of its contribution to UNESCO's budget. The Executive Board consists of 58 countries from six parts of the world. It meets twice a year to prepare the work for the General Conference and to ensure that its decisions are properly implemented.

Geoparks have been discussed several times, both by the Executive Board and the General Conference. In 2001, the Executive Board decided to offer "ad hoc" support to individual Geoparks.

However, as the Global

Geoparks Network (GGN), formed on February 12th 2004, has matured and as more Global Geoparks have developed, the case for cooperation with the GGN was considered at the 36th UNESCO General Conference in September 2011 where a Resolution concerning the need to further define the relationship between UNESCO and the GGN was adopted (the results outlined in EGN magazine No 9).

While acknowledging the value of Geoparks, their outreach and successful "bottom-up approach", it was recognized by the Member States, that further work was necessary to consider the possibility of Geoparks becoming an International UNESCO Geoparks Programme or Initiative and to evaluate the opportunities for a formal partnership between UNESCO and the GGN.

UNESCO Executive Board

The outcomes were to be reported back for further consideration at the 190th Session of the Executive Board in October 2012.

In October 2012, the Executive Board approved unanimously the decision proposed (190 EX/Decisions), outlined in Magazine 10, 2013, where UNESCO's Director-General, Irina Bokova, reported to Member States on consultations undertaken to improve cooperation between UNESCO and the GGN and the possibilities for formalizing Geoparks within UNESCO. She emphasized the fact that the existing ad hoc cooperation between Geoparks and UNESCO precludes either organization from capitalizing on the potential benefits of a more formalized UNESCO Global Geoparks Initiative.

Encouraged by the progress made in defining a potential structure and mechanism for the proposed Initiative, the Executive Board invited the Director-General to submit a more comprehensive proposal concerning such an initiative and the formalization of its relationship with the Global Geoparks Network. This included an analysis of budgetary implications, mechanisms for strengthening UNESCO's oversight role, capacity-building and knowledge-transfer dimensions, possible operational guidelines, management of long-term development of the Global Geoparks Network, as well as a review of the consequences of accepting sites already designated under existing Global Geoparks

**Opening ceremony
of the 37th General
Conference UNESCO**



Network criteria and to report back to the 191st session in April 2013.

At its 191st session in April 2013 the Executive Board requested that the Director-General establish a Working Group on Global Geoparks consisting of Member States, the Global Geoparks Network and UNESCO's Secretariat for further discussions concerning the agenda and legal implications of a proposed UNESCO Global Geoparks Initiative and its programmatic and legal implications, with a view to producing recommendations thereon, and to submit a comprehensive proposal on a UNESCO Global Geoparks Initiative to the Executive Board at its 192nd session in September 2013.

This item was also included on the agenda of the 37th session of the General Conference in November 2013.

The Working Group meetings held in 2013 (during June and July) made great progress concerning the possible formalization of Global Geoparks within UNESCO.

The discussions focussed in detail on the proposed operational guidelines and administrative framework of the Initiative. The main issues in revising the operational guidelines were concerned with retaining the GGN's light bottom-up structure while providing Member States and UNESCO with adequate oversight and control. The Working Groups proposed that an international advisory body, similar to the Category V Committee of UNESCO's "Memory of the World" Programme, could provide a suitable structure to consolidate UNESCO's role in Global Geoparks, but that the Director-General's approval would be required.

A Category V Committee would mean that a group of experts would make recommendations concerning new applications etc., but the final

decision would lie with the Director-General.

The Director-General, in her reply submitted to the 192nd session of the Executive Board, expressed her appreciation for the work undertaken by the Working Group on Geoparks but considered that the proposal to create such an advisory body would, in addition to placing undue dependence on her office, also have budgetary implications for UNESCO. She also believed that, given the Organization's current circumstances and the presence of several formal and legal difficulties, it was necessary to examine further

the parameters of a possible UNESCO Geoparks Initiative.

She encouraged further discussions with the International Union of Geological Sciences (IUGS) and closer relationships between Geoparks and Man and the Biosphere Reserves.

At its 192nd session, in October 2013 the Executive Board examined the progress report regarding the possible formalization of Global Geoparks within UNESCO, the recommendations of the UNESCO Director-General and the summary of the proceedings of the meetings of the Working Group.



Global Geoparks Network
The Global Geoparks Bureau

Jeju island, September 10, 2013

The GGB Bureau Jeju Island Statement

The Global Geoparks Bureau examined at its annual meeting, organized during 3rd Asian Pacific Geoparks Network Jeju Symposium, held from September 7-13, 2013 in the Jeju island Global Geopark, Republic of Korea, attended by 560 delegates from 25 countries, the progress and latest developments regarding Global Geoparks and UNESCO.

After deliberation, the members of the Global Geoparks Bureau agreed on the following statement:

We, congratulate the highly successful and rapidly evolving Global Geoparks Network, initiated in 2004 with the support of the Earth Sciences Division of UNESCO, which expanded to include 100 members during the 3rd APGN Jeju Symposium.

Global Geoparks are territories with a geological heritage of significant international importance which implement a holistic, innovative and integrated management strategy that is respectful of local traditions and desires and is holistic aimed at promoting their heritage and sustainable development.

We, fully endorse current efforts made following the decision of the 36th General Conference of UNESCO to improve cooperation between UNESCO and Global Geoparks through the establishment of a UNESCO Geoparks Programme or Initiative.

We very much welcome the increasing levels of support for Global Geoparks within UNESCO, we acknowledge the results of the consultations made by the Working Group on Geoparks formed following the decision of the 191ExB meeting and hope that the present strong relationship between the Global Geoparks and UNESCO will be strengthened even further during the 37th General Conference.

In particular, we advocated that Global Geoparks should be totally and exclusively under the umbrella of UNESCO, with the Global Geoparks and UNESCO working together in tandem to continue the development of Global Geoparks around the World. This is specifically important in those areas of the world with the highest poverty level Africa, Latin America and South and South-East Asia.

Assoc. Prof. Nickolas Zouros
Chair of the 2013 Annual Meeting of the Global Geoparks Bureau

Following its deliberations, the Executive Board adopted a decision which requests the Director-General to further consult with Member States and the Global Geoparks Network on the proposed Initiative and to report the conclusions of the Working Group to the Executive Board at its 194th session.

GGN contribution

The results of the work undertaken by the Working Group on Geoparks, in which GGN representatives actively participated, was also discussed during the 12th European Geoparks Conference held in Cilento e Vallo di Diano Geopark, Italy and the 3rd Asian Pacific Geoparks Network – Jeju Symposium, Rep. of Korea, in September 2013. In Cilento the European Geopark representatives confirmed the principals of the relationship between Geoparks and UNESCO included in the Arouca declaration 2012.

In the Asian-Pacific Geopark Conference the Jeju Declaration was agreed unanimously by the participants

declaring “We very much welcome the increasing levels of support for Global Geoparks within UNESCO, we acknowledge the results of the consultations made by the Working Group on Geoparks following the decision of the 191ExB meeting and hope that the present strong relationship between the Global Geoparks and UNESCO will be strengthened even further during the 37th General Conference.

In particular, we advocated that Global Geoparks should be totally and exclusively under the umbrella of UNESCO, with the Global Geoparks and UNESCO working together in tandem to continue the development of Global Geoparks around the World. This is specifically important in those areas of the world with the highest poverty levels including Africa, Latin America and South and South-East Asia.”

37th General Conference

The General Conference in November 2013 in its capacity as decision making body of UNESCO, while recalling the



Opening ceremony of the 37th General Conference UNESCO

cooperation between UNESCO and the Global Geoparks Network and endorsing the decision taken at the 192nd Executive Board, called on the Director-General of UNESCO to present to the 194th session of the Executive Board in April 2014 recommendations on possible ways to protect and strengthen brand recognition of various designations in particular with regard to Biosphere Reserves, World Heritage Sites and proposed UNESCO Global Geoparks.

During the General Conference at the Natural Sciences Commission a substantial debate took place for half a day, during which more than 30 Member States took the floor, some of them more than once and where a large majority of speakers supported the Global Geoparks Initiative.

The delegates recalled the benefits of Global Geoparks for protecting geoheritage, building awareness of geo-hazards, local sustainable development, women’s empowerment, research and education. Delegates emphasized the substantial progress of the Global Geopark Network in operating as a global platform for cooperation and its expansion, in less than 10 years, to include 100 members from 30 member states.

Several speakers applauded the bottom-up approach of the Global Geoparks Initiative at the local level. Some

Irina Bocova in the meeting of the Science Commission during the presentation of the International Year of water cooperation



Member States' concerns were related to: (1) the need for greater synergies between Geoparks and other UNESCO designated sites, as well as with other scientific programmes such as the IGCP; (2) the financial issue, confirming that the Global Geoparks Initiative was a cost-effective model with no additional financial implications for UNESCO; (3) the issue of branding and quality control to maintain high standards; and (4) the need to expand the model to include countries from all around the world, which was one of the network's main goals.

An amendment tabled by two Member States was debated at length, with the result that the draft resolution was adopted with an amendment calling on the Director-General to report to the 194th session of the Executive Board on possible ways to protect and strengthen brand recognition of biosphere reserves, World Heritage

properties and proposed UNESCO Global Geoparks.

The Resolution

The endorsed Resolution requests the Director-General to further consult Member States and the Global Geopark Network (GGN) on the proposed Initiative based on the draft Operational Guidelines and the draft Statutes of the Board of a UNESCO Global Geoparks Initiative already prepared by the Working Group; also to convene a further meeting of the Working Group on Global Geoparks, in time for its work to be finalized before March 2014, and provide the Working Group with further details of the outstanding issues referenced in the Recommendations to the Director-General at the 192nd Executive Board. It also requests that the Working Group further discusses and reports back to the Executive Board on inter alia: (a) potential changes to the

current Working Group proposal which would address the concerns raised by the Director-General in 192 EX/9, including possible alternatives to the creation of a Category V advisory body; (b) the role of existing and future Geopark partners under an Initiative, including the International Union of Geological Sciences (IUGS) as well as other relevant partners; (c) a closer relationship between Global Geoparks and relevant UNESCO programmes, such as the Man and Biosphere Programme (MAB) and the International Geosciences Programme (IGCP) may be fostered under an Initiative.

Nikolas Zouros

Lesvos Geopark, GREECE

Tony Ramsay

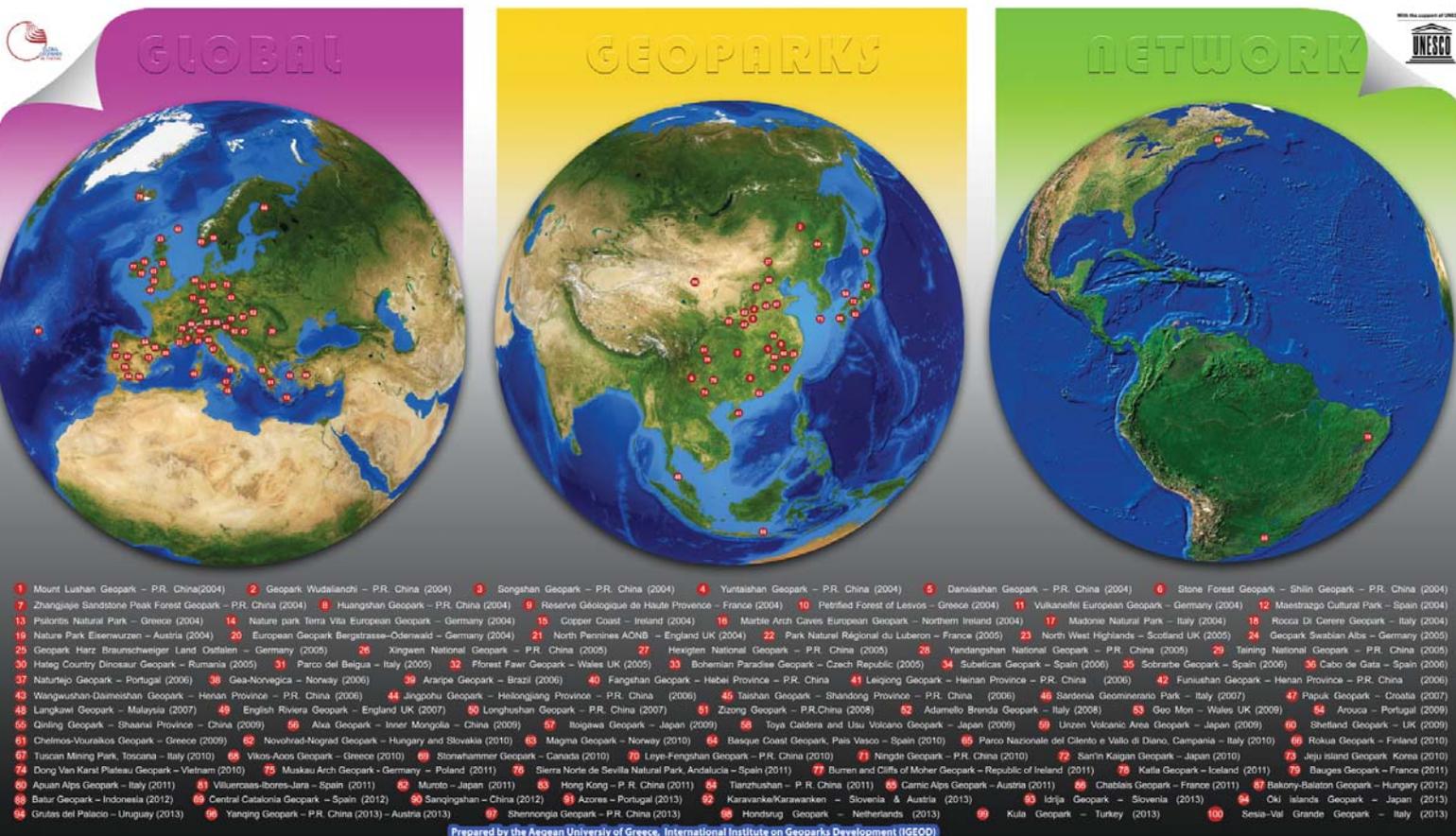
Fforest Fawr Geopark, Wales, UK

Kristin Rangnes

Gea Norvegica, NORWAY

Martina Paskova

Bohemian Paradise Geopark, CZECH REPUBLIC





opening
cerimony of
conference

12th European Geoparks Conference

in Cilento and Vallo di Diano Geopark

The National Park of Cilento, Vallo di Diano and Alburni - Geopark had the honour of hosting and organizing the 12th European Geoparks Conference (4-7 September 2013), which highlighted the strategies developed by the European and Global Geoparks Networks to promote an undersatunding of geohazards and the sustainable use of natural resources.

Geo-hazards and climate change strongly affect all human activities and can severely influence the future of humanity.

In this respect, geoparks and scientists – coming from different backgrounds – can improve society's understanding of how to face natural geo-hazards and to manage the sustainable use of natural resources.

The title of the conference, "Geoparks an innovative approach to raise public awareness about geohazards, climate change and sustainable use of our natu-

ral resources" was chosen to address these issues.

Aims of the conference:

1. To verify how Geoparks can disseminate the scientific knowledge of the academic community concerning these issues;

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

3. To promote the role of Geoparks on the public awareness and sustainable use of natural resources.

The 12th European Geoparks Conference, under the aegis of UNESCO, was held in Ascea, a modern, touristic small town surrounding the Archaeological Park of "Elea", the ancient Greek city renamed as "Velia" by the Romans. This ancient city was one of the cradles of western philosophy and civilization, where the philosophers Parmenides and Zenone founded their school. The success of the 12th EGN

Conference was demonstrated by:

- The presence of 400 delegates from 41 countries from 5 continents (this is a record number of participant at an EGN conference). These countries included Italy, Germany, Norway, Estonia, Austria, Finland, Czech Republic, Portugal, Iceland, Spain, England, Croatia, France, Hungary, Swiss, Wales, Slovenia, Denmark, Romania, Northen Ireland, Ireland, Bulgaria, Poland, Greece, Algeria, Netherlands, Turkey, Iran, Brazil, Senegal, Cyprus, Taiwan, Indonesia, Canada, Morocco, China, Japan, Tunisia, Chile, Saudi Arabia.

- The large number of submissions received. More than 150 short refereed contributions are published in the E.Book of the Conference Proceedings. Selected articles were published in the Rendiconti Online della Società Geologica Italiana, an electronic journal of the Italian Geological Society.



**welcome
 speech by the
 Italian
 Minister of
 Environment
 Andrea
 Orlando**

- The involvement of scientific academies, including Italian and international geological institutions / associations. The professional programme consisted of four parallel sessions over a period of two days with oral presentation and a poster session. These sessions provided the framework and platform for informative presentations on issues such as: Sustainable use of our natural resources in Geoparks; Education and communication in the Geoparks; Geoparks and international cooperation and sustainable tourism;

Geoparks and Geo-hazards; Geoparks and Climate Change; Aspiring Geoparks. The opening Ceremony of the conference was attended by A. Aloia (Chair of the 12th European Geoparks Conference); L. Orlando (Italian Minister for the Environment - land and sea); A. Troiano (President of the National Park of Cilento, Vallo di Diano and Alburni – Geopark); N. Zouros (EGN Coordinator); K. Ragnes (EGN Vice coordinator), P. Mckeever (Chief of Section at the Global Earth Observation Section, UNESCO) and M. Rizzo (mayor of Ascea).

**Keynote lectures:
 The first day began with
 a plenary session with
 the following keynote
 lectures:**

1. Global Geoparks and World Heritage Sites: a comparison.- by P. Mckeever
2. Characteristics of recent geohazards and the roles of geoparks.- by S. Nakada
3. European Geoparks: new challenges and innovative tools towards Earth heritage management and sustainable local development.- by N. Zouros
4. Protected areas as essential tools for the maintenance of ecosystem services: the example of the National Park "Cilento, Vallo di Diano e Alburni".- by A. de Vita
5. The contribution of the geo-scientific community to resource and risk management, education and dissemination in the Cilento, Vallo Diano and Alburni - Geopark (Southern Italy).- by D. Guida.

**Closing ceremony
 of the Conference
 at the geoarcheological
 site of Elea Velia**



The closing Ceremony and festive Conference dinner was held in the fantastic setting of the geo-archeological site of Elea-Velia. During this ceremony six new members were welcomed into the European Geopark Network: Azores Geopark (Portugal); Karavake/Karawanken (Slovenia & Austria); Idrija Geopark (Slovenia); Hondsrug Geopark (Netherlands); Sesia-Val Grande Geopark (Italy); Kula Geopark (Turkey). The conference concluded with two days of field trips in the Cilento and Vallo di Diano Geopark with two options for each day.

Approximately 300 delegates participated in the fieldtrips offered on day one and could choose between one of two options:

1. The karst system of Castelcivita-Ausino - Capodifiume Springs, the Paestum temples and Castelcivita caves including a karst system with springs. The Capodifiume Springs are characterized by highly mineralized water associated with the precipitation of travertine deposits. Paestum is an ancient Greek city founded between VI and VII Century B.C., now recognised as a Cultural Heritage Site by UNESCO.

2. The Bussento River Karst System. This excursion included the Mingardo River Gorge, the ancient abandoned village S. Severino di Centola; the sinkhole of the Bussento River that flows underground for 4 km; the geological virtual museum in Caselle in Pittari; the Bussento Gorge system and the wonderful spring "Venere Hairs" and waterfall; Morigerati Gorge and Bussento River Cave)

Revalidation of Madonie Geopark



Revalidation of gea Norvegica Geopark



Sessia - Val Grande Geopark receives the certificate as me new members of the Global Geoparks Network





Capodifiume spring fieldtrip

On the second day approximately 130 guests were provided with a choice of two options:

1. A bus tour to the Angel Caves in Pertosa-Auletta and Padula Monastery. Padula Monastery, a UNESCO World Heritage Site, was founded in 1306 and hosts an archaeological museum with exhibits from the pre-historic and Hellenistic periods. The monastery is situ-

ated in a typical example of a Middle Pleistocene lacustrine basin.

2. A boat trip along the south Cilento coast. This excursion involved many geosites including the "liguride" rocks, marine terraces, coastal cliffs, natural arches, a coastal landslide, paleoenvironmental geosites and marine caves.

During these fieldtrips the participants met with local inhabitants, experienced their cultural traditions and ate the food of the rural

culture (Mediterranean diet).

The 12th European Geoparks Conference marks a successful development in the geopark concept and signifies an important moment in cooperating to reach the unique objective: that geology is an important component of the economy.

Aniello Aloia

a.aloia@cilentoediano.it

Angelo De Vita

direttore@cilentoediano.it



boattrip along cilento coast

The European

2013



Adamello Brenta Geopark



Katla Geopark

Anyone can be a fan of rocks, sustainability of local products and local traditions!

Geodiversity is one of the most important keywords in the world of geoparks. It is not an exaggeration to say that the rich contribution of European Geoparks Week reflects the diversity of rock formations within our continent. In addition, our landscapes, natural history and intangible heritage and local traditions add many new colours to this huge palette! As geoparks are not just about rocks, the Geoparks Week is not about self-pro-

motion of individual Geoparks, but celebrates links between the local communities and Planet Earth. There are almost an infinite number of ways to strengthen these links. During late May and early June 2013, members of the European Geoparks Network and visitors to their territories were able to demonstrate this successfully. Increasing the awareness in young people of the need for geoconservation is an essen-

tial mission and this theme was included in numerous activities. Many geoparks organized fun-filled educational programmes, "treasure hunts" or organized competitions for pupils and students (or even for pre-school children). During walks, led by dedicated local guides, one could not only get to know geosites but also obtain interesting information, for example, on the geo-archaeological heritage of an area. Adventure seekers could join



Madonie Geopark



Karavanke Geopark



Katla Geopark



Sobrarbe Geopark



Bakony-Balaton Geopark



Magma Geopark

Geoparks week



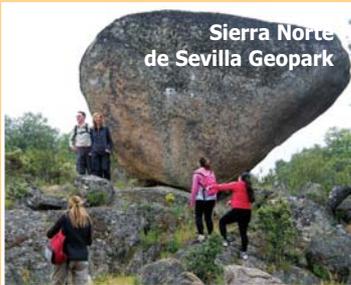
Eisenwurzen Geopark



Naturtejo Geopark



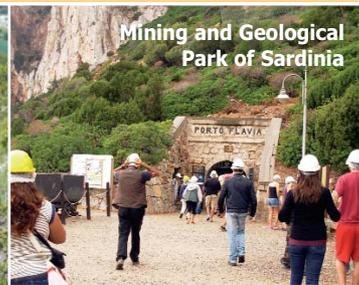
English Riviera Geopark



Sierra Norte de Sevilla Geopark



Catalunya



Mining and Geological Park of Sardinia

various geopark challenges or even try abseiling on a cliff face.

The Geoparks Week is also a great opportunity for meeting people interested in Earth science, geotourism, nature conservation, education and the sustainable production of local products. Disused quarries and mines are far more than just industrial monuments. For many people, they are part of a local communities' past — that is why events connected

with these sites were so popular.

As the United Nations proclaimed 2013 as the International Year of Water Cooperation, several geoparks included activities not just about hydrogeology but included events demonstrating the vulnerability of water supply and aqueous habitats. The more than 1,000 events and activities of the European Geoparks Week attracted nearly 90,000 people in 2013. One of the most

significant tasks of the members of the European Geoparks Network is making themselves "visible" which means not only publishing and distributing tens of thousands of printed materials but a more and more strongly developed and effective on-line presence including web sites, social media and smart phone apps..

Barnabás Korbély
korbely@geopark.hu



Basque Coast Geopark



Sierras Subbeticas Geopark



EisenGea Norvegica Geopark
Eisenwurzen Geopark



Villuercas Geopark



North Pennines Geopark



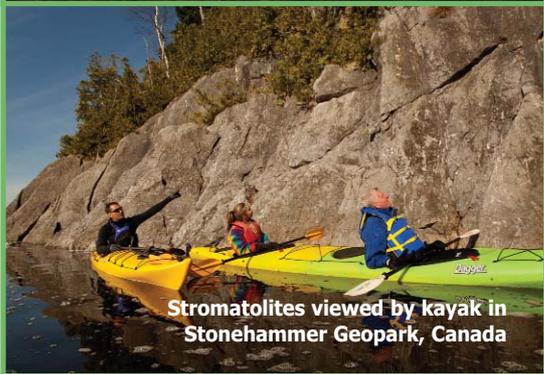
Bergstrasse-Odenwald Geopark

Magma Geopark – Norway, Katla Geopark – Iceland, Stonehammer Geopark – Canada, Geopark Shetland – Scotland

Northern Georoutes: Geoparks develop North Atlantic tourism brand



Hiking on "Magni" – formed in the 2010 eruption of Fimmvörðuháls in Katla Geopark, Iceland



Stromatolites viewed by kayak in Stonehammer Geopark, Canada



"The Migaren" Via Ferrata in Jøssingfjord, Magma Geopark, Norway



North Atlantic storm beach at Grind o da Navir in Geopark Shetland

Magma Geopark (Norway) is leading an exciting tourism based project in partnership with Geopark Shetland (Scotland), Katla Geopark (Iceland) and Stonehammer Geopark (Canada). Funding was secured from the NORA (Nordic Atlantic Cooperation) fund in 2012 to develop a holiday booking system for Geoparks in the North Atlantic Region and connect tourist routes in this area.

This three-phase project aims to capitalize on the unique landscapes and natural assets in each of the four Geoparks to stimulate geo-tourism by developing 3-day tour packages in each area that can be promoted and sold online. Tours are being developed in collaboration with stakeholders in each region and will be enhanced by innovative new tourism products including Geopark SmartGuide and TurfHunt apps.

The overarching aims of the project are to promote the North Atlantic Region as the 'destination of choice' for a niche tourist market through development and promotion of a distinct brand, support local businesses in each Geopark through coordination of tourism activities and contribute to sustainable and affordable global tourism.

The first phase of the project began with a questionnaire to all potential stake-

holders in the partner Geoparks, including accommodation and hospitality providers, tour operators, transport businesses and marketing organisations. The questionnaire aimed to gauge interest in the project, to discover what stakeholders could offer to support the project, and to find out what they would hope to gain from participation. The information gathered was used to work with stakeholders to develop a 3-day themed package for each Geopark.

A 'Northern Georoutes' brand was established, comprising a logo, website with tour search engine, and Facebook page, where the regions and the packages can be promoted. Phase two of the project, launched in Katla Geopark in November 2013 is focussed on the implementation of an online booking system, in accordance with the legal requirements of each country, and development of associated tourism products.

Phase three will involve development of further packages and dissemination of project results to a wider audience – specifically members of the Global Geoparks Network. It is hoped that the Northern Georoutes project could be a precursor to a wider 'Global Georoutes' brand involving Geoparks from around the world.

www.northerngeoroutes.com

Sara Gentilini
 saragentilini5@gmail.com

Robina Barton
 robina@shetlandamenity.org

A tidal flat from down under

TERRA.vita Geopark

In the late sixties, it was one of those more or less legal bathing lakes, where young people met in the summer to swim, relax and have fun. The lake, situated in an old limestone quarry, was deep and mysterious. Stories were told of a submerged British tank, and of someone drowned in some eerie underwater gallery while he was trapped in a cold drift. The lake was known as the "Silver Lake", situated in the Hüggel-Mountain south of Osnabrück.

In the 1980's, the water level started to fall – slowly but continuously with interruptions. In times, when the level was low, the gallery that used to be deep under water became visible.

From then on, bats started to use the limestone adit as a

winter habitat – sometimes with a terrible outcome: Hundreds of bats drowned in some winters, when the water level rose again to reach the ceiling of the tunnel. The hibernating bats had no chance to survive. Consequently it was decided to close the entrance to the tunnel with a grid and deny the bats access to this artificial trap.

Obviously, this decision cleared the way for another idea. In times when the water level was low, visitors could walk through the gallery to take a closer look at the rocks, in this case steeply tilted limestone and dolomite – remains of a Triassic tidal flat.

The TERRA.vita Geopark developed a project to exploit the limestone mine



Experts examine rocks in the tunnel wall

and had to learn, that opening a mine to the public is something that can take several years, even if the tunnel is just 200 meters long. But the decision to do so was mainly taken because of the geological treasures that this mine contained: Sediment filled burrows of former crabs and lobsters, footprints of relatives of the early dinosaurs, traces of horseshoe crabs, ripple-marks, corals and other fascinating relicts of early times can still be found here.

From spring 2014 on, the mine will be ready to be visited during guided tours, organized by the TERRA.vita Geopark.

Timo Kluttig,
Kluttig@LKOS.de



Reconstructions of the small dinosaurs and horseshoe crabs whose traces were found in the tunnel walls

View of the plan for the new visitor centre at Lake Cave of Tapolca



A new Visitor Centre and activities in Bakony Balaton Geopark, Hungary

Bakony–Balaton Geopark is not only famous for its hills which are the remains of ancient volcanoes, Europe’s largest warm lake or the gorges of Bakony Mountains, but is also renowned for its karstic phenomena. There are 700 caves within the Geopark, four of these are open to the public. Balaton Uplands National Park Directorate (BUNPD), the leading organization of the Geopark, has a long tradition of geological nature conservation and interpretation. The most popular site in our National Park and Geopark is the Lake Cave of Tapolca where one can go by boat beneath a town: this geosite attracts 110,000 visitors annually. Via a successful EU project, coordinated by the Department of Ecotourism and Environmental Education of BUNDP, a new visitor centre is being developed which will also be the Western Gate to the Geopark. Wonderful Karst, an interactive exhibition will be installed here (opening is expected in the

summer 2014). While this show cave and Lóczy Cave are open to the general public, there are mazes of underground passages for adventure seekers. In Csodabogyós Cave and Kőlik Cave of Szentgál overalls, helmets and headlamps are provided for the visitors. These tours are guided by trained local cavers, under a contract with the BUNPD. The designation “Geosite of the Year in the Bakony – Balaton Geopark” acknowledges the activities of communities in the conservation and sustainable utilisation of a geosite and promotes the site as a destination for geotourism. In 2014 this designation was given to the geological heritage of Felsőörs, a charming village near Lake Balaton. The spectacular outcrop of Forrás Hill is of international significance. A geological trail interprets the petrified world of the Triassic Sea and volcanic activity. With funds, mostly from the local government, the trail has been renovated and maintained by the local com-



Volunteer students from Steiner Schools at Felsőörs, the Geosite of the Year

munity, the Geopark’s management and students and became a venue for geoactivities. Felsőörs also features a rock ridge, wonderfully preserved travertine dams and a 13th C. church built on beautifully exposed, dipping dolomite strata. Geotours, activity days, a field trip for geological experts draw attention to the Geosite of the Year. The number of geotour-guides increased, thanks to the training course held this spring in the northern, less frequented area within the Geopark. A Geopark Partner, the Friends of Bakonyalja Association, applied and obtained the funding for the course. Another training programme was announced this year in Keszthely Hills in the western region of the Geopark.

Barnabás Korbély
korbely@geopark.hu
Anna Knauer
knauer@geopark.hu

A field trip during the course for geotour guides, Tapolca Basin





One of the selected geosites for the geotourist trail: Campanil Basso

The enhancement of a geotourist trail in the Adamello Brenta Geopark

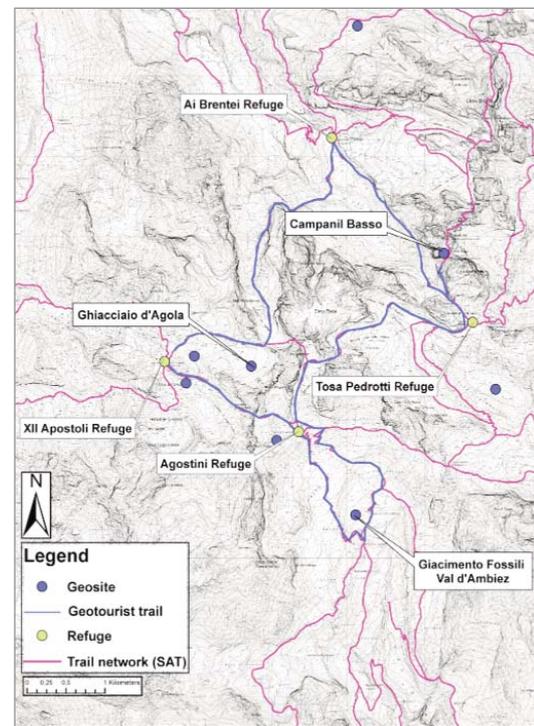


Table 1. Schematic synthesis of the evaluation model.
Table 2. Evaluation results: 10 geosites with medium geotourist value and 3 geosites with high geotourist value

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 of 'La Sapienza' University of Rome, developed a geotouristic trail in Adamello Brenta Geopark applying a new methodology to the 13 geosites in the Brenta Dolomites UNESCO World Heritage Site. The geosites evaluation model, applied to the UNESCO Dolomites geosites, is based on the Geosite Geotourist Value index (VSG):

The relational database for the Dolomite's geosites contains the VSG evaluation results (Tab. 1), which have been processed in G.I.S. applying the procedure devel-

oped by Gregori & Melelli (2005). Alessia Pica used ArcMap to choose 'geosites near shelters, which have a medium or high geotouristic value and are quite accessible', the selection is based on three queries in G.I.S. Using the two tools in G.I.S. 'Select by location' and 'Select by attribute', we decided to select geosites within a distance of 3 km from shelters, with VSG values greater than 14 and within a distance of 0.3 km from paths. The resulting geosites (Agola Glacier, Fossil Bed, Val Ambiez, Campanil Basso) are connected by a circular route consisting of trails for hikers with mountaineering equipment. In fact, the high altitude of the study area and the roughness of the terrain determine the nature of excursions depending on the

seasons and the visitors' ability. The accessibility of geosites is particularly high. Three trails have been proposed for educational projects for high schools and Universities and for Alpine Society of Trentino excursions and training courses. Other means of adding value include the Dolomiti Brenta Trek project (www.dolomiti-brentatrek.it), interpretive panels in the shelters and meetings with the shelters' managers to explain the idea that 'territory=development opportunity'.

The geotourist trail proposed

Alessia Pica
Vajolet Masè
vajolet.mase@pnab.it

References

GREGORI L. & MELELLI L. (2005)- "Geotourism & Geomorphosites: the G.I.S. solution". *I Quaternario, Italian Journal of Quaternary Sciences*, 18(1), Volume Speciale.

Value of a Site for Geotourism		
VSG= RP+ RR+ SCE+ SAC+ AC		
ATTRIBUTES	VALUES	
REPRESENTIVENESS RP		
Ideal model correspondence	5,3,3,1,0	summarize intervals [...]
Peculiarity (lithostratigraphy, carsism, hidrology, paleontology, geomorphology, structural geology, mineralogy)	5,3,3,1,0	
Tipicality	5,3,3,1,0	
Interest plurality	5,3,3,1,0	
RARENESS RR		
Geographical range	local, regional, national, international	two way table
Frequency	5,4,3,1,0	
SCENIC-AESTHETIC SCE		
View points	5,3,1,0	summarize intervals [...]
Cromatic contrast	5,3,1,0	
Landforms queerness	5,0	
HISTORICAL-ARCHEO-CULTURAL SAC		
National restrictions (laws)	3,5 (area, geosite)	summarize intervals [...]
Regional/local restrictions (laws)	1,3 (area, geosite)	
Protected area	3,5,1	
Other (archeol., monum., architett. values; legends, stories, tradition; toponym)	2,2,1	
ACCESSIBILITY AC		
Way to approach the site	5,3,1	summarize intervals [...]
Difficulty to approach the site	5,4,3,1	
Services	5,4,3,1,0	

GEOSITE		Evaluation					VSG		
NAME	INTEREST	RP	RR	SCE	SAC	AC			
Giacimento fossili della Val Ambiez	paleontology	3	0	4	5	3	15		
Grotta Silvia	carsism	3	1	4	5	3	14		
Pozza Tramontana	geomorphology, carsism, structural geology	1	2	3	5	3	14		
Conca dei XII Apostoli	geomorphology	3	1	3	5	1	13		
Ghiacciaio d'Agola	geomorphology	3	2	3	5	1	14		
Morene PEG Gh. d'Agola	geomorphology	3	1	4	4	3	15		
Campanil Basso	geomorphology	1	2	4	4	3	14		
Grotta dello Specchio	carsism	1	2	4	4	3	14		
Fungo del Dos del Clamer	geomorphology	1	1	3	5	3	13		
Frane del Brenta	geomorphology	4	2	4	5	3	18		
Grotta del Castelletto di Mezzo	carsism	3	1	3	5	4	16		
Turion Basso	geomorphology, structural geology, paleontology	4	3	5	5	3	20		
Finestra di Cima Vagliana	geomorphology	3	2	3	5	3	17		
VSG max = 25		GEOTOURIST VALUE		1-8 LOW		9-16 MEDIUM		17-25 HIGH	

People in traditional costumes near the historical building in Bosa di Careggine



“Enjoy the geology”!

in the Apuan Geopark Farm

The Apuan Geopark Farm in Bosa di Careggine is a rural district site used for experimentation. Here it is possible to maintain and look after old and local cultivars and breeds, promote typical agricultural and food products and introduce new agronomic techniques and plant and animal varieties suitable for the specific environmental and climatic conditions. The Geopark Farm’s agronomic mission is aimed at disseminating the results of the introduced changes and the potential economic opportunities to the Apuan Alps area, for the benefit of both old and new businesses. The work is being carried out in an ethical context of organic farming, good practice and the sustainable use of natural resources. This emphasizes the added value that geological backgrounds, soils and landforms can give to the natural and human aspects of the Geopark Farm. The geology of the farm is a prominent recurrent feature in the description of the physical landscapes, the nature route and the museum tour. The geology is evident in the study of the architecture of human settlements, in the

construction of dry-stone walls and in the nature and distribution of agricultural cultivation techniques. Even the choice of crops takes into consideration the geology of the site and its bioclimatic conditions. In Bosa, the best quality performance is sought by paying attention not only to the soil but also to pedogenic processes, to the degree of exposure and angle of slope and to the morphological evolution of the mountain slopes.

In the Geopark Farm, agronomic experimentation which has challenged traditional beliefs by introducing cultivation has demonstrated the close relationship with geology. Due to climate change, vines (*Vitis vinifera* L.) have been planted at 850 metres, at the tolerance limit of the species. A good soil and hence a “good geology” provide us with a good wine. And wine is the product that best incorporates and represents the nature of its geological background. The oenological value of wine is linked to its place of origin and its taste becomes unique and unrepeatable if the vines grow in a limited and defined area.



Drinking Bosa wine is like tasting its geology...and so everybody drink the wine and “enjoy the geology”.

Children during the “Cave Bear” tour

Alessia Amorfini
aamorfini@parcapuane.it
Antonio Bartelletti
abartelletti@parcapuane.it
Giuseppe Ottria
ottria@igg.cnr.it

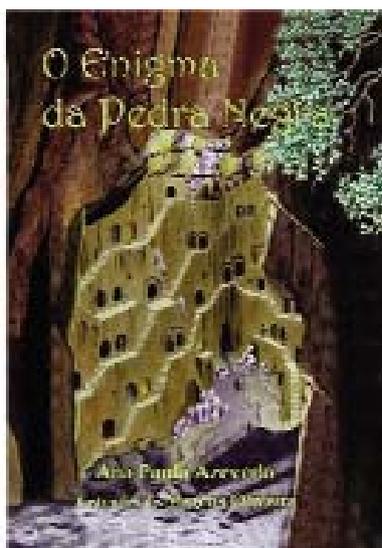
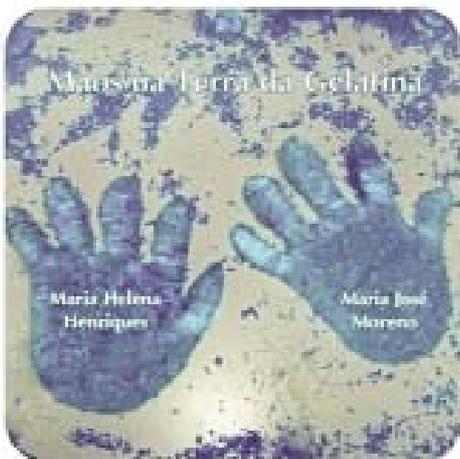
The grape harvest in the Geopark Farm



Children's literature: an important educational tool fostered by Arouca Geopark



During the last decades the issues related to environmental education had a considerable impact on the growth of children's literature. Arouca Geopark has contributed to this trend in bringing geology to society through the publication of the children's books *Hands on the Jelly Land* ("Mãos na Terra da Gelatina") and *The tale of the Black Stone* ("O Enigma da Pedra Negra").



In fact these books allow children to learn about some valuable facts, such as a respect for nature and/or the need for healthy eating. These literary resources can stimulate a child's imagination and creativity by revealing the meaning and significance of situations not directly experienced. Furthermore children and adults reading together leads to the development of mutual understanding between generations.

The book, *Hands on the Jelly Land* relates in a playful and pedagogic way the relationship between "Mrs. Earth" and the "Arouca Geopark" through a set of gelatin recipes that attempt to explain some of the most important geological phenomena in the region. At the same time it tries to promote healthy eating habits. This children's book was written by a geologist and a pharmacist and was presented to the public on 21st of November 2009, during the "Planet Earth Lisbon Event", the official closing ceremony of the International Year of

Planet Earth.

The book, *The tale of the Black Stone* was launched on 8th of June 2013 during the celebrations of the European Geoparks Week 2013. It is a tale about one of the most important geosites of the Arouca Geopark: the "giving birth to stones". This beautifully illustrated book, which is written by a teacher, is intended to raise Children's awareness of the importance of the geological heritage.

Both books were made available to the municipal library and to all school libraries in the Arouca region. Additionally several educational activities, involving more than 3000 children, were promoted in an attempt to instill reading habits and a respect for nature. The Arouca Geopark children's literature which is on sale in the Geopark's Information Centre is an example of good practice in education for sustainable development.

Daniela Rocha

Artur Sá

António Duarte

drocha@geoparquearouca.com





New interactive tourism office in Arouca Geopark

The new 'Welcome Centre - Arouca Geopark' is integrated in the newly developed Regional Tourism Entity Porto and Northern Portugal. It is designed for the promotion of tourism and uses up-to-date technologies in order to publicize regional tourism. This interactive space is based on a strategy of networking involving sustainable tourism with a strong connection with the regional and local economy.

The centre reveals all the potential of the Arouca territory and works as an asset for the region in which its cultural identity is marked by its rusticity, its customs and its communities. Equipped with a set of new technological aids (promotional videos, interactive maps and routes, virtual tours, 3D animation, smartphone applications, among others) it pro-

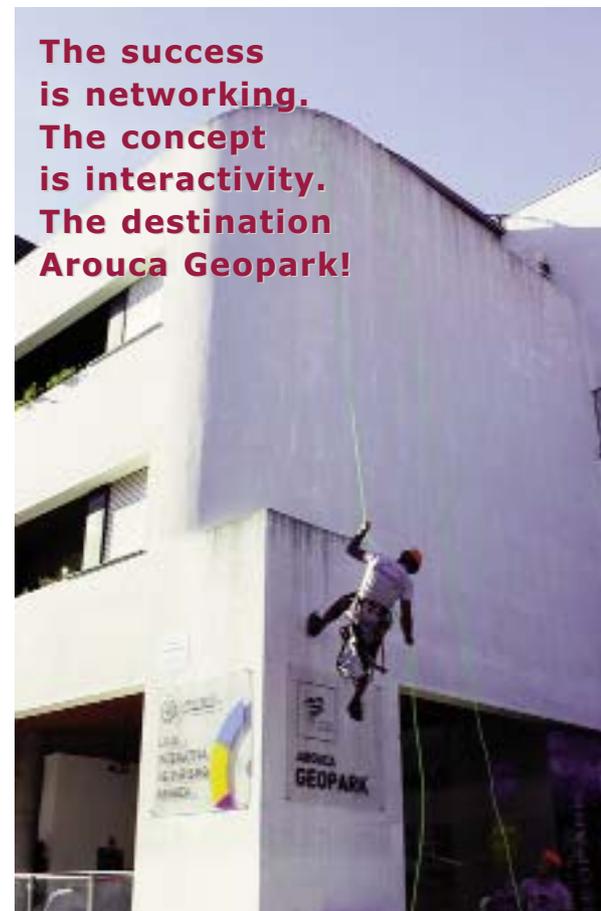
vides an educational and training component, based on the natural and cultural heritage.

This new equipment includes an auditorium, where visitors can enjoy a documentary about the natural and cultural history of Arouca. This new "gateway" for nature tourism in the region of Porto and Northern Portugal was opened on September 19th 2013. The inauguration ceremony was attended by Alvaro Carvalho, Vice President of CCDR-N on behalf of the Minister for Regional Development, Melchior Moreira President of the Regional Tourism Entity Porto and Northern Portugal, Artur Neves Mayor of Arouca, and Margarida Belém President of the Board of Directors of AGA - Arouca Geopark Association. At the end of the ceremony, exhibi-

tions of local and regional products, major activities and equipment and a performance by a traditional chorus introduced attendants at this event to some of the cultural assets of Arouca Geopark, a destination for geotourism.

Antonio Duarte
Ricardo Neves
Vera Magalhães

aduarte@geoparquearouca.com



The success is networking.
The concept is interactivity.
The destination Arouca Geopark!



Latxa sheep,
a native breed

GeoGourmet, the most select products of the Basque Coast Geopark

The Basque Coast Geopark contains a treasure trove of different chapters of Earth and human history. Its natural and cultural heritage takes us on an exiting journey through geological time, in which we can enjoy a cultural landscape full of history traditions and gastronomy. The gastronomic tradition and richness of the Basque Country are known worldwide because of its modern and innovative approach, which is based on fresh, natural and seasonal products. None of this would have been possible without the direct involvement of local , arrantzale and baserritarra (fishermen and farmers) who make up the primary sector of our area and also constitute the main guarantee for the conservation of a unique culture, landscape and language.

**GeoGourmet
selection,
a welcome
present**

Rural development and, specifically, the enhancement of local products, is one of the main aims of our Geopark. Under the name GeoGourmet, the Geopark markets a selection of the most typical food products produced by the farmers and fishermen. The selection includes a "Guide for tasting" in four languages; English, French, Basque and Spanish.

- Latxa sheep's cheese (a native breed) produced in a traditional way and on a small scale with the Protected Designation of Origin, Idiazabal.
- Tinned Tuna from the north in extra virgin olive oil, caught singly in a traditional sustainable way, with traditional fishing tackle and without nets by Basque arrantzale(fishermen).
- Txakoli, a white,

young, fruity semi-sparkling wine produced from locally grown grapes , protected Designation of Origin, Getariako Txakolina.

- Natural ecological cider produced by traditional methods from 100% locally grown apples. Apple growing and cider making has been one of the activities which is most deeply rooted in the culture and economy of the rural environment of the Geopark.

The selections of local products are sold in the tourist offices of Zumaia, Deba and Mutriku and are designed as a wonderful present not only for the Geopark's tourists but also for the townsfolk and local companies.

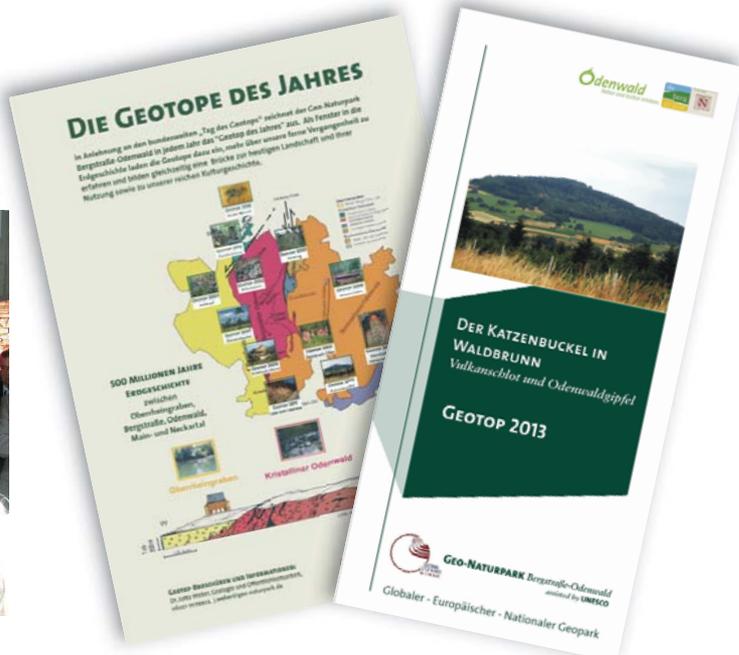
Leire Barriuso
geogarapen@geogarapen.com
Asier Hilario
flysch@gipuzkoa.net

Apple growing and cider making, has been one of the activities which is most deeply rooted in the culture and economy of the rural environment of the Geopark





(Geotop-2010-celebration-2): Participants at the ceremony for WHS Messel Pit as Geotope 2010



ACTIVITIES
european
GEOPARKS

Earth History for the Public: the Geotopes of the Year in the Global and European Geopark Bergstrasse-Odenwald

Geotopes are special windows into our planet's past and provide opportunities to interest and fascinate the general public in Earth history. In response to the "Day of the Geotopes", a German-wide event sponsored by the German Society for Geosciences and the State Departments of Geology, the Geopark Bergstrasse-Odenwald designates, annually, one extraordinary Geotope as "Geotope of the Year". The selection of the geotope is based on a special combination of geological characteristics such as the geological time interval, lithology, genesis, environment, and uniqueness. Additionally, the geotope should show a clear relationship with the natural environment, local history or economic history. Thus, the geotope of the year is a site,

(Geotope-2009-visitors): Field trip to discover the geology, mining history and fauna of the Geotope 2009, a relic of a volcanic eruption 280 million years ago



which reflects the Geopark's holistic approach to Earth history, nature and culture. The geological State Department is involved in the procedure, and the event is listed on the "Day of the Geotope" internet platform of the German Society for Geosciences (DGG). The official celebration during the "Day of the Geotopes" is an event, where representatives from the State Government, partners from universities and politics as well as local stakeholders are invited to give short talks to the public. This official event is also important as an expression of appreciation of the partners' commitment and supports the regional identity of the Geotope. The official activities are followed by an interdisciplinary field trip through the Geotope demonstrating its various geological, natural and cultural aspects. Related to the event, the Geopark presents an official certificate to the local partners, a geotope brochure, and a geotope poster. Additionally, each "Geotope of the Year" is included in the the Geopark's webpage and equipped with an on-site Geopark information panel.

A detailed framework of preparation, organization, publications, and public relations provided by the Geopark ensures, that the event is highly visible in the media, and that the "Geotope of the Year" becomes a well-known and attractive annual event. After 12 years of continuous celebration and presentation, the "Geotope of the Year", is considered as one of the most successful geo-traditions, which have been implemented by the Geopark with high media presence and outreach. The "Geotopes of the Year" are the most popular windows into the geological history of the Geopark and provide the visitor with a fascinating journey through 500 million years involving the dynamic development of our planet.

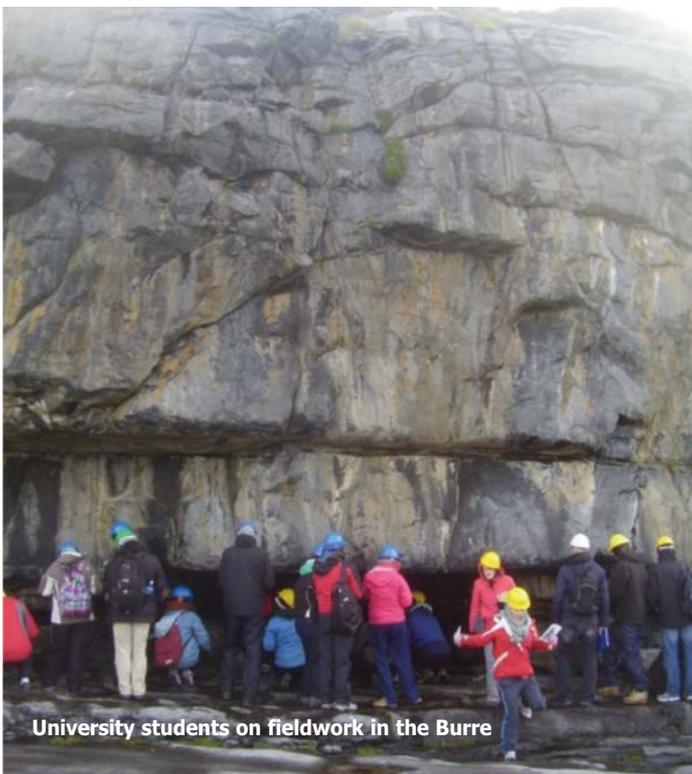
Jutta Weber
j.weber@geo-naturpark.de

(Geotope-des-Jahres-poster): Each year, the Geopark offers a geotope poster with an overview of the awarded geotopes: here the poster highlights the geotopes from 2002 to 2013

(Deckblatt-flyer-geotop-2013): Each "Geotope of the Year" is communicated to the public by an individual brochure, which highlights the geological development of the locality

(Geotop-2013-certificate): Local stakeholders and honorary guests receive the certificate Geotope 2013





University students on fieldwork in the Burre



Adult Evening Course field trip looking at coastal biokarst

Increasing Educational Partnerships

in the Burren and Cliffs of Moher Geopark

Over the last five years the Burren and Cliffs of Moher Geopark has developed a number of education initiatives aimed at promoting Earth Science awareness in the region. These initiatives are aimed at three main categories of stakeholders; the local schools, the general public and visiting research institutions. Integrating these three groups in an interconnected network has been a challenge which involved developing a number of partnerships. The results of these initiatives are taught classes, publications, web-based resources and access to expertise.

Lisdoonvarna Secondary School is the only secondary school within the area of the Burren and Cliffs of Moher Geopark. They have a long history of participation and success in the BT Young Scientist of the Year competition (organized by BT Ireland, a telecommunications company) particularly in the biology category. Over

the last two years we have worked with the school to incorporate more geology-related projects.

This year we will also be working with the school to launch an environmental awareness project aimed at highlighting the sensitivity of groundwater in the Burren karst region as well the impact of littering.

Our Adult Evening Course, "Understanding the Burren Landscape", is an introductory level geology course delivered in collaboration with the Burren Outdoor Education Centre (www.burrenoec.com). The course consists of a series of two hour classes for five evenings with an invited guest lecture on the final night, plus a one-day field trip.

Making the results of research undertaken in the Burren generally available has been a priority. We have just launched the first phase of this process by compiling a database of research arti-

cles, books, reports and maps relevant to the Burren region and making many of them available in full on our website (<http://www.burrengeopark.ie/what-we-do/research-archive/>). We are grateful for the support of the Geological Survey of Ireland (www.gsi.ie) and the many publishers who gave us permission to use their articles.

Eamon Doyle
 edoyle@burren.ie



The Burren is a natural outdoor classroom for school children



Cabo de Gata-Níjar Geopark steering new strategies in sustainable tourism: GEOSUB, SUBMARINE GEO-ROUTES

Cabo de Gata-Níjar, the first Marine and Terrestrial Natural Park in the Iberian Peninsula, an exceptional territory, has gained recognition for its contribution to environmental conservation, Natura 2000, Special Protected Areas (SPA, European Directive on the Conservation of Wild Birds), Special Protected Areas of Mediterranean Importance (SPAMI, Barcelona convention) RAMSAR (Convention on Wetlands of International Importance, 1971), to management models such as Reserve of the Biosphere (MAB) and to tourism e.g. the European Charter for Sustainable Tourism (ECST).

So, what is the role of the Geopark in such territory?

Experience in Cabo de Gata-Níjar Natural Park and Biosphere Reserve demonstrates that the Geopark has a key role in the management of the territory, and is capable of establishing multiple synergies, mainly involving MAB and ECST. Also in motivating the development of innovative solutions for problems arising from a reduction in the competitiveness of local enterprises due to nearby mass touristic destinations. Thanks to its membership of the Global and European Geoparks Networks, Cabo de Gata-

Níjar Geopark's new products such as the columnar jointing route, gold mining route and the alum route are included in the tourism provision of local enterprises.

Through Geosub involving geological submarine routes, Cabo de Gata-Níjar Geopark contributes to the MedPAN (Marine Mediterranean Natural Protected Areas) project of the General Department of Natural Protected Areas of the Andalusia Government to create an innovative geotourism product. Geosub involves four underwater routes delivered by specialized enterprises designated with the "Andalusian Natural Park" and "European Charter of Sustainable Tourism" brands. It represents the first geotourism product focused on the underwater environment, and thus opens a new window for future initiatives. The routes were developed in collaboration with an expert from the University of Granada, at four iconic submarine sites, "The French Cave", "Los Escullos", "Carnaje" and "Orange Tunnel" add to diving activities. Divers explore ancient volcanic eruptions, fossil reefs and exciting submarine tunnels, through an alternative tourism and educational experience. The digital publication of booklet with a guide to the



four routes in Spanish and English is as a clear example on how a Geopark, by widening geotourism provision, promotes and contributes to sustainable economic development and strengthens the relationship with its inhabitants. The brochure can be downloaded from the "Ayuda al empleo" section of the Geopark's website: www.juntadeandalucia.es/medioambiente/cabodegata-nijargeopark

Cover page for the GeoSub booklet

José Manuel Quero Fernández de Molina

josem.quero@juntadeandalucia.es

Pablo Rivas Palomo

pablo.rivas.ext@juntadeandalucia.es

Participants in GeoSub Cabo de Gata Níjar Geopark



Geology and Cultural Heritage: **Rock Art** in the Villuercas – Ibores – Jara Geopark (Cáceres, Spain)

Facilities providing access to the Chiquita Cave rock shelter near the River Rucas, in Cañamero



Rock Art is a cultural heritage connected to the geological and environmental values of a landscape. These paintings and engravings produced by our remote ancestors and drawn on rock surfaces inside caves and natural rock shelters are important graphic images drawn from European Prehistory. The artists created pigments from mineral substances like ochres, hematite, manganese oxide and white quartzs which were found abundantly in the area.

The Villuercas – Ibores – Jara Geopark houses one of the most interesting com-

plexes of Rock Art in the Southwest Iberian Peninsula. These rock paintings and engravings date from the Upper Paleolithic to the Iron Age. The schematic cave paintings occur on rock faces and cavity walls in the quartzite crests of the Geopark's mountain ranges and also at the bases of large blockfields which characterize its granitic landscape.

The area of the Villuercas – Ibores – Jara Geopark became famous in 1916 due to the investigations of the French archaeologist Henri Breuil. However, the rock art was not studied intensively

until the 1980's. During this period the Autonomous Government of Extremadura put their policies into practice and included rock art in the geological, ecological and landscape places to visit in the area. In this respect these actions contribute to the tourism and economic recovery strategies of rural areas and they will be put into practice by the management of sustainable inherited resources.

Some of the most emblematic decorated rock shelters are located in several geosites such as "Cancho de la Sábana", "Cancho del Reloj" and in the "Rucas River Gorge" Others can be found in the Geopark's educational routes and provide additional cultural value. With respect to educational activities, cave paintings are one of the most important subjects taught in schools, both in specific lessons and in art classes which involve reproducing these wonderful images.

José Julio García Arranz
jsturko@gmail.com

Hipólito Collado Giraldo
hipolitocollado@gmail.com

Students from a local school reproducing rock art using motifs from the Geopark

Schematic rock paintings from the Cancho del Reloj, in Cabañas del Castillo



Deciphering the different layers of history found at the site



Rewriting the history books:

revealing the hidden landscapes of the Marble Arch Caves Global Geopark

Plan view of the entire Drumclay Crannóg site



Enniskillen in County Fermanagh is the gateway to the Marble Arch Caves Global Geopark. It is located on an island in the River Erne and has a complex history of settlement, trade and transport. New light has been shed on this history with the excavation of the Drumclay Crannóg, regarded by some

as the most important archaeological discovery of recent years.

Crannógs, or man-made islands are not unusual in Ireland and can vary in age from the Neolithic Period to the early 18th century. Typically they are built by driving a circle of wooden poles into a lake bed and then filling this with brush, stone or timber.

Few crannógs have ever been excavated as they are difficult to access. However, the lowering of the River Erne during the past 200 years has exposed previously submerged land. The location of the crannóg was lost due to the changing urban landscapes of Enniskillen, but the construction of a new road required that its exact position had to be determined. It was only then that the true secrets of this ancient site were discovered.

Archaeologists have determined that the crannóg was occupied continuously from the 8th century to the 17th century leading to its complex layered history. Over 5,000 artefacts have been recovered including the remains of



A decorated bone comb, one of the many fascinating finds from the Drumclay Crannóg excavation

30 wooden houses. Some of the most striking finds are a wooden bowl with a cross carved into its base, parts of wooden vessels with interlaced decoration, and combs made from antler and bone that date from between 1000 and 1100. Many of the finds show international influences indicating that the settlers had links with Scandinavia more than 1,000 years ago. While many of the finds are unremarkable, it is the layered record of settlements that is proving to be so exceptional. The degree of preservation is so good that detailed information about diet, economy, agriculture and social structures can all be extracted. This evidence of everyday life has yielded so much information that it has been described as Ireland's Pompeii and has rewritten the history books on ancient Irish life.

Kirstin Lemon
mac@fermanagh.gov.uk



Work team
 in the
 Arzberg
 cave

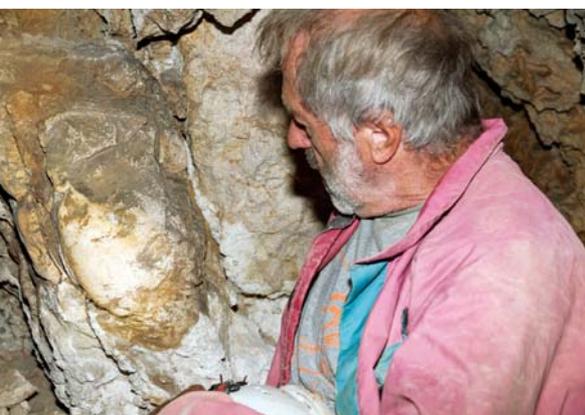
Eisenwurzen

New evidence of human presence 30.000 years ago

The community of Wildalpen located in the spectacular Salza valley is not only famous for its huge springs which provide Vienna with most of its drinking water. The Arzberg Mountain also contains two sites of special geological interest: The remains of an iron mine, active in the 17th century, and the Arzberg cave. This cave, accessible only via a narrow, steep trail, is located in a very secluded area on the steep side of the mountain about 200 m above the valley floor.

The occurrence in this cave of bones of cave bears and rock surfaces in narrow passages polished by the fur of the passing bears have been known for many years. In 2008, Gernot Rabeder,

Gernot Rabeder
 in front of a
 rock polished
 by passing
 cave bears



Professor of Palaeontology at the University of Vienna and his students began scientific excavations in the cave



Scraper from the Arzberg cave

which continued during summer months until 2012. Gernot Rabeder has, for many years, studied the fossil remains of mammals living in the Alpine caves during the Great Ice Age and it was more or less routine for him to conduct excavations in the Arzberg cave. Together with his team he recorded large numbers of skeletal remains of *Ursus ingressus* which characterized the Alpine cave populations during the later Ice Age. It became thrilling when one of the citizens of the village produced a stone tool which he had removed

illegally from the cave about 30 years ago. This provided new impetus for the excavations and has finally resulted in the discovery of a second tool. Both tools were made of radiolarite which is similar to the more familiar flintstone. Numerous traces of chipping at the margins are definitely of human origin. Both tools were scrapers which were obviously used to free skins from the remaining meat and fat.

The size and shape of the scrapers are typical for the late Palaeolithic period (Aurignacien and Gravettien, between 35,000 – 20,000 years ago). Radio carbon dates of bear bones from the same cave have yielded approximate ages of 29,000 and 36,000 years. These sensational finds extend our knowledge of human presence in the Eisenwurzen region for almost 30.000 years. The warm climate which prevailed for a rather short interval within the latest glacial period enabled the bears to inhabit caves at high altitudes in the Alps.

Heinz Kollmann
Thomas Drechsler
Irmi Auer

heinz.kollmann@nhm-wien.ac.at

Geopark Festival to be major UK art event English Riviera

The English Riviera Global Geopark has long recognised the value and importance of using innovative ways to engage with the public, from the imaginative Geoquest project in 2010 that led to the production of the popular Geopark Rock Songs (www.englishrivierageopark.org.uk/geoquestSongs.cfm) to the creation of the children's playpark, the Geoplay Park.

Of course sharing the experience of working with the creative and artistic sector with the rest of the Global Network has been considered essential and thanks to Arts Council for England funding this was possible at the 5th International UNESCO Conference on Geoparks in 2012. A new short film "Geo-Collective goes to Japan" is now available which documents this journey (www.youtube.com/watch?v=5Eo2uXjGcBs). However, the English Riviera Global Geoparks creative work is about to enter a new and exciting phase.

Thanks to further Arts Council for England support, Situations, a dynamic and inspiring South West England based arts organisa-



Using creativity to engage on the English Riviera Global Geopark

tion, have been awarded the contract to develop a world class artistic vision for the Geopark and the Geopark festival for the future. Situations previously worked with the Geopark and the Geo-Collective when they brought "Nowhereisland", a floating island into the Geopark as part of the 2012 Cultural Olympiad. If you "Like" the English Riviera Global Geopark Facebook page you can see photos of the NowhereIsland Project arriving in the Geopark.

Ultimately the shared vision that Situations are helping develop is to stage an internationally significant arts Festival event rooted in the

exceptional landscape and heritage of the English Riviera Geopark – a 'must see' event in the UK arts calendar which will attract new types of returning visitors to the English Riviera as well as engaging local residents to become involved in making and experiencing each event.

The report from this work will advise a way forward, to enable us to make more of, better promote and raise awareness of our Global Geopark Status, alongside having a positive social, cultural and economic impact.

The first of many discussions with Situations to inform the development of a world class artistic vision for the English Riviera Global Geopark Festival

Melanie Border

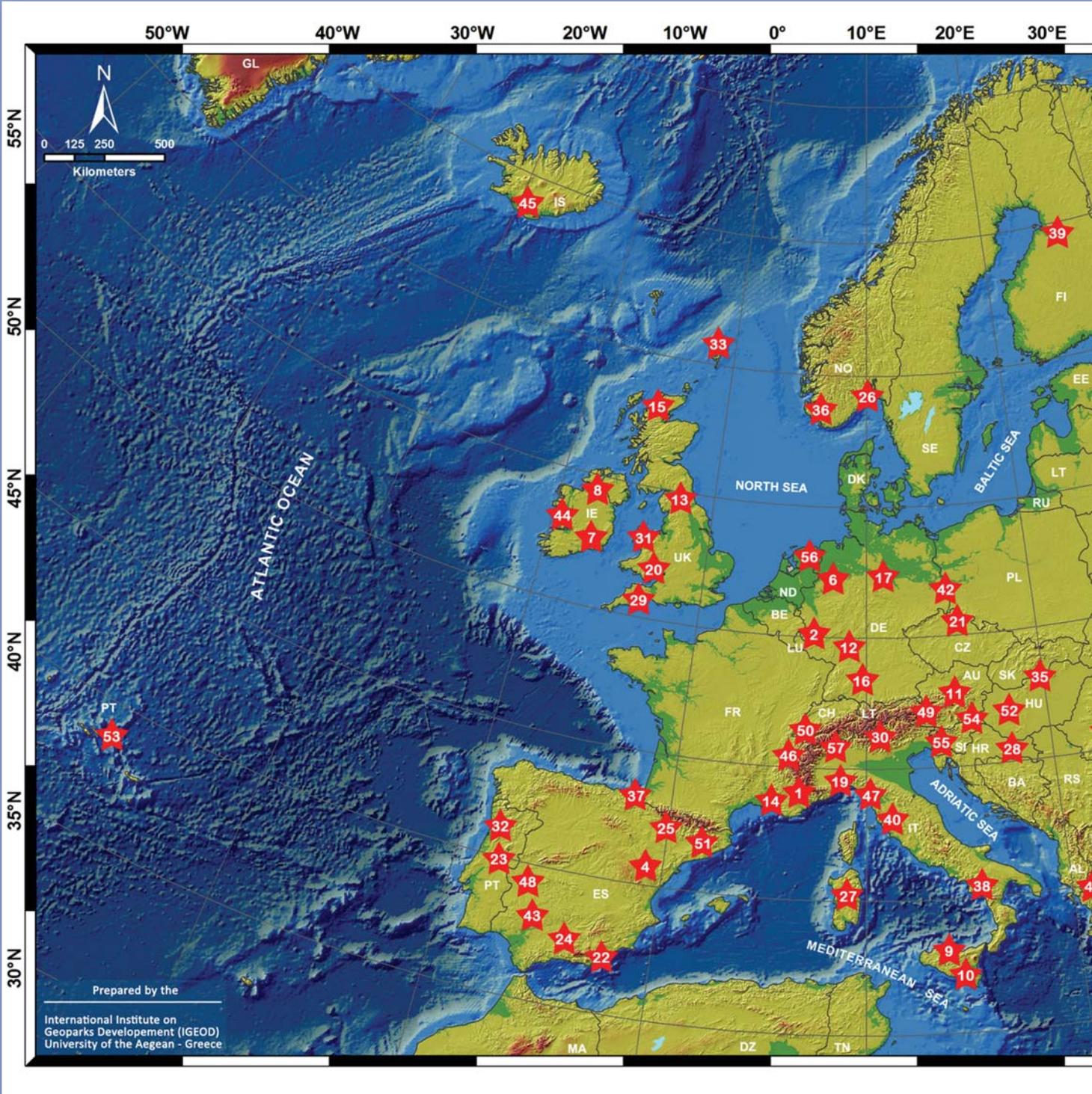
m.border@englishrivierageopark.org.uk



The Geopark welcome for NowhereIsland, one of the 2012 Cultural Olympiad projects



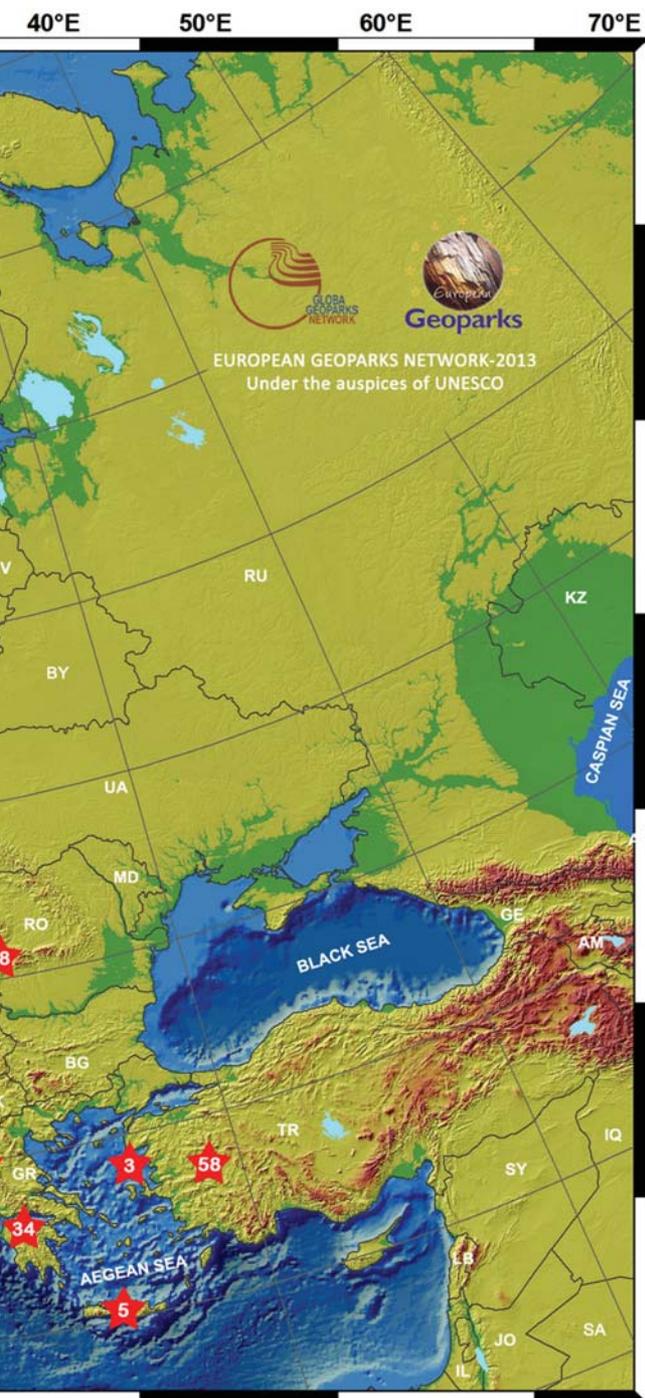
The European Geoparks Network



The Network consists of 58 Geoparks in 21 European

www.europeangeoparks.org

work today...



countries (January 2014)

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 Eisenwurzen	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 Sardinia	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
53. Azores Geopark	PORTUGAL
54. Karavanke/Karawanken	SLOVENIA & AUSTRIA
55. Idrija Geopark	SLOVENIA
56. Hondsrug Geopark	NETHERLANDS
57. Sesia - Val Grande Geopark	ITALY
58. Kula Geopark	TURKEY

GeoMôn Launches Information Boards and Trails at Cemaes Bay and Llanbadrig

A prominent dyke bordered by raised margins of baked limestone, looking towards Wylfa headland

In April 2014 GeoMôn, together with the Llanbadrig Community Council and Isle of Anglesey County Council, shared a triple launch at three iconic Anglesey sites that showcase the best in the island's heritage and geology.

Over the past two years the partnership has worked together to create two trails, one concentrating on the geology at Bonc y Mor, a small headland on the northern end of Cemaes Bay Harbour that exhibits some of the finest British examples of 860Ma stromatolitic limestone clasts contained within a mélange. It also hosts a series of dykes perfect for schools to study the effects of the Caledonian Orogeny. These dykes are bordered by chilled edges with raised margins of baked limestone creating perfect walled trackways.

Horizon, the current owners of the nearby Wylfa Nuclear Power Station, donated a

section of coastal path and foreshore that has been used to create part of the geotrail showcasing all of Anglesey's main rock types. These are exhibited on a series of stone plinths arranged according to their geological period. The site also contains two information boards, two stone tables with benches and four wooden benches, installed by the Community Council, affording splendid views from the headland.

At the eastern side of the bay in Llanbadrig a small stone church, originally built from mud, twigs and stones, was founded by St Patrick in 440 AD. The saint was shipwrecked on Middle Mouse, a small rock in the sea near the headland, during his journey to convert Ireland. Patrick managed to get ashore and lived for a while in a cave close to a well. He built the makeshift church in thanksgiving for his rescue.

The celebratory launch will include the installation and

first chime from a Time and Tide Bell (The St Patrick Bell) in Cemaes Harbour. The bell was made and donated by the sculptor Marcus Vergette and is set in a structure built by apprentices at the Nuclear Power Station.

GeoMôn together with its partners has created a cliff walk with a view of the cave and well. The church contains two rocks found in the rubble of the old church when it was rebuilt in 1884. One, the Ichthus Stone, is a picrite erratic with early Christian carvings of loaves of bread, vines and other markings. Behind the altar and inset beneath an alcove is a well-worn piece of sandstone that shows two carved intertwined snakes, the symbol of St Patrick. This would probably have been sited beneath a statue of St Patrick.

Margaret Wood

college@btinternet.com

Stewart Campbell

margaret@coleg10.freesserve.co.uk

The revalidation team at Bonc y Mor



The viewpoint over St Patrick's Cave and Well, Llanbadrig



Beech tree, Natura 2000 and rocks

A new exhibition at Stolberg Castle

Beech forests growing on gypsum karst form a rare habitat

A well known German saying advises you to seek shelter underneath a beech tree during a thunderstorm. This dubious advice illustrates the long history between man and the beech tree. Germanic tribes carved their first letters into beech wood sticks; the first book was made from bound beech-wood panels. In addition to this mutual history, however, the beech tree *Fagus sylvatica* deserves closer attention. More than 10.000 native plants, animals and fungi thrive in the beech woods on our doorsteps. The conservation of these forests is essential for the preservation of our European biodiversity. The establishment of the European-wide network of nature protection areas - Natura 2000 - represents one approach to achieving this goal.

The picturesque town of Stolberg is surrounded by extensive beech forests

The Regional Association Harz promotes the protection of the natural environment with activities in the Nature Parks of the Harz region and

the Geopark Harz • Braunschweiger Land • Ostfalen. With the project 'NATURA 2000 in the Nature Park Harz' the Regional Association Harz aims to promote the acceptance and awareness for the Natura 2000 sites in the region. From October 2013 the beech tree *Fagus sylvatica* has centre stage within the venerable Stolberg Castle. An exhibition explains the project Natura 2000 and shows the typical birds, insects, plants and fungi of our beech forests, as well as shedding light on the cultural, economic and historical bonds between beech and man. Since there is a relationship between flora and fauna and the underlying geology, the exhibition explains the geology of beech forests and the use and genesis of the various minerals beneath the trees. The native Luzulo-Fagetum beech forests grow on the acid, nutrient-poor soils which overlie greywacke

at higher altitudes in the Harz region. The globally known term greywacke refers to a special kind of sandstone and was first used by miners in the Harz region. The most common beech forest, belonging to the Asperulo-Fagetum type, grows on more nutrient rich loess soils. In the southern Harz the middle-European limestone beech forests of the Cephalanthero-Fagion type grows on gypsum karst. The high solubility of the gypsum creates a unique karst landscape with caves, lakes and karst cones.

Information about the work and the publications of the Geopark is provided on www.harzregion.de

The exhibition at the Stolberg Castle can be visited during castle opening hours: Tuesday to Friday from 11 a.m. to 4 p.m., Saturdays and Sundays from 11 a.m. to 5 p.m.

Anne Schäfer
schaefer@harzregion.de



The minister for the environment of Saxony Anhalt, Dr. Hermann Onko Aeikens (r.), takes a close look at the exhibition

The Welsh Whisky Company's Penderyn Distillery, the only distillery in Wales, is situated in Fforest Fawr Geopark within the picturesque Brecon Beacons National Park. The distillery provides employment and, through its Exhibition Centre with more than 20,000 visitors annually, it contributes significantly to tourism activities in Fforest Fawr Geopark.

In July 2013 the distillery doubled its use of water by

Partnership between Fforest Fawr Geopark and Cardiff University benefits a local business

adding a second still. To ensure that the increased extraction of water is sustainable, the distillery requested a geo-environmental investigation of the surrounding area which was undertaken as a research project by Cardiff University with support and participation by Fforest Fawr Geopark.

The distillery is sited on a narrow, alluvium filled, approximately 40m deep steep-sided channel incised into the Carboniferous Limestone floor of a glacial valley. The distillery draws groundwater from a 39m deep well drilled into the alluvium to create is

blends of world class whisky and spirits.

The steep-sided alluvial channel was probably eroded by a sub-glacial stream flowing at the base of a glacier during the last Ice Age. The channel sediments consist of soil and gravel (3m), gravel and clay with water (6m), sand gravel and silt (19m) clay and gravel (7m) and limestone fragments and sand with water which line the base (1m) and walls of the channel. Groundwater is pumped from sediments below the water table at a depth of approximately 15m below surface. The 19m thick sand gravel and silt layer, probably the main component of the aquifer, stores and transmits water fast enough to supply the pumping well.

The groundwater at Penderyn Distillery has two potential renewable sources of recharge. These are primary water flow to the alluvial channel through bedding planes, joint planes and karst features in the Carboniferous Limestone bedrock. Further study is required to assess the groundwater contribution of a karstic component. Primary flow through the bedrock occurs through vertical fractures and along inclined bedding planes. Field observations suggest that recharge through the bedrock to the alluvium aquifer is minimal. It has been established that the groundwater is recharged primarily through surface waters percolating into the groundwater along the length of the alluvium channel associated with the Nant Cadlan stream. Rainfall in the 12km² catchment area

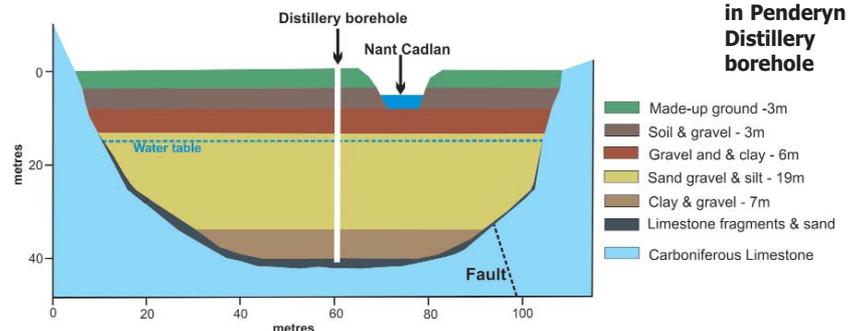
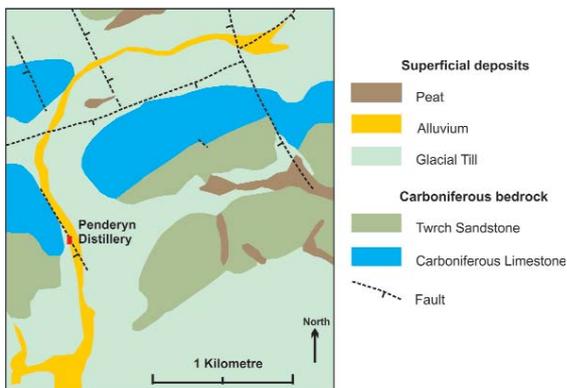


provides localised recharge to the ground and surface waters. The results of the research project show that, based on calculations from a well pumping test, the groundwater flow rate of 166,400m³/day, 60, 745,000 m³/year through the alluvium channel aquifer is sufficient to sustain the distillery's increased use of water through expanding production.

Penderyn Distillery has an informative exhibition centre which, with at least 20,000 visitors annually, contributes significantly to tourism activities in Fforest Fawr Geopark. Through its Icons of Wales Series consisting of individual malt whiskys each one celebrating a person, milestone or event from Welsh history with international significance the Distillery promotes Wales through its world class products.

Water seepage through a vertical joint in the Carboniferous Limestone

Geology of the Penderyn area and the alluvium aquifer



David Hull
d.m.hull90@gmail.com

Tony Ramsay
tonhel@btinternet.com

Tim Jones
JonesTP@cardiff.ac.uk

Peter Brabham
Brabham@cardiff.ac.uk

The sediment sequence in Penderyn Distillery borehole



One of the petrified trees of Laas

The petrified trees of the GeoPark Carnic Alps

Even though petrified forests occur worldwide, they are rare and there is only one site in Austria where such an accumulation of petrified trees occurs. This site is located in the GeoPark Carnic Alps in the small village of Laas.

The first tree trunk was discovered accidentally at the end of the nineteen-twenties, when local people quarried rocks for a hospital. This trunk has a length of about nine meters and is the largest plant fossil recorded in Austria. In the 1960's it was declared a natural monument and therefore

received protection status. Since then this site has also been accessible to visitors.

During the last decades additional fossil trees were discovered. Some close to the first occurrence, some several hundred metres apart. In most cases the few centimetres which protruded from the host rock were not very obvious. In 2012 the GeoPark Carnic Alps initiated a project with the aim of excavating the trees in the vicinity of the first find to improve their visibility and a path linking all the fossil trees was constructed. The University of Innsbruck con-

tributed to the project with a supervised Bachelor Thesis which is available as a download (<http://www.geopark-karnische-alpen.at/fileadmin/geopark/Forschung>). This study showed that the original cell structure of the trees is perfectly preserved and that all pores are filled with quartz which probably originated from volcanic exhalations during the Lower Permian. All trees are assigned to the *Cordaitales* species *Dadoxylon schroliianum* which is related to early conifers.

Two information panels explain the petrification process, the depositional environment and the composition of the trees. The site is now part of the geo-cultural hiking path of Laas, one of the five geotrails in the GeoPark Carnic Alps.

Gerlinde Ortner
 Hans Peter Schönlaub
 office@geopark-karnische-alpen.at



Microscopic image of the petrified trees from Laas: the porous wood tissue is clearly visible

Experts in fossil preparation from the Museum of Natural History Vienna remove excess material covering the petrified trees



An information panel in Katla Geopark

Regional development for the Eyjafjallajökull area

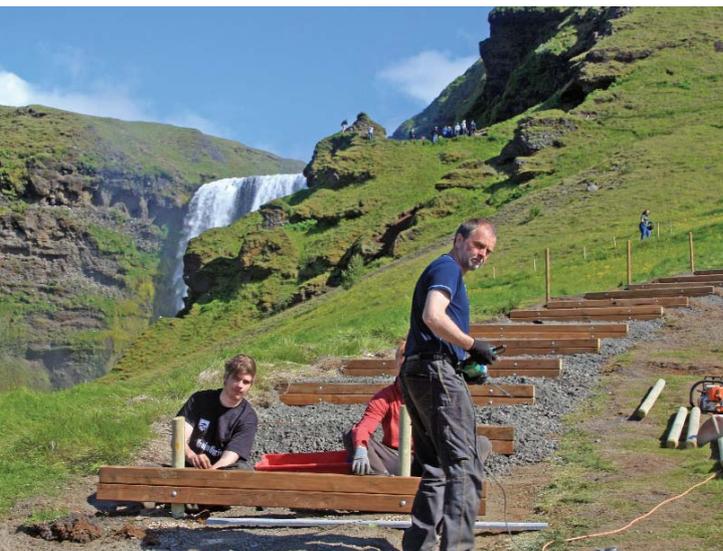
Katla Geopark, Iceland's first geopark, received a grant from the Instrument for Pre-Accession Assistance [IPA] fund from the European Union. During the last year Katla Geopark

has, with the help of this fund, developed 15 geosites with information panels, picnic tables, accessible car parks and hiking routes and provided one geosite with toilet facilities. Over the next 10 months the Geopark aims to develop another 10 to 15 sites. In addition the IPA fund has made it possible for Katla Geopark to work on customized student material as well as promotional material for the area.

The key goals of the Geopark are to protect the natural environment, promote local sustainable development, to introduce local culture to tourists and place a strong emphasis on geo-tourism. Although the Katla Geopark region has experienced important developments in terms of tourism during the past few years, there are some key challenges that need to be addressed. These include diversifying tourism provision as well as strengthening year round activities through a stronger focus on off-peak tourism that will support whole year business opportunities and jobs. One of the most important effects of the project is to be able to promote Katla Geopark as an attractive destination that supports local businesses and uses local

products. In addition to the improvement of the physical infrastructure on the different geosites in the Geopark one of the most important aspects of the IPA project is the development of a management plan including a marketing plan and marketing strategy. The project has already progressed considerably and if everything goes according to plan before the end of the year, Katla Geopark will have a licence to be a travel agency that promotes and sells local products, locally made travel packages with local guides in cooperation with local businesses, local inhabitants, schools, information offices and knowledge centres with the aim to provide a better service.

Improvements to the geotrail at Skógafoss



Steingerður Hreinsdóttir
www.katlageopark.is

Revealing one of the signs in Kirkjubæjarklaustur





Aegean

TEMPORARY EXHIBITION

The birth of an Archipelago

In order to raise awareness of the need to protect and promote the sustainable exploitation of our unique Earth heritage to visitors and residents of the Aegean Islands, Lesvos Geopark presents and supports the traveling exhibition "AEGEAN – The Birth of an Archipelago". The exhibition was organized by the Natural History Museum of the Lesvos Petrified Forest in collaboration with the Universities of Thessaloniki, Crete and the Aegean and under the auspices of the Ministry of Shipping Affairs and the Aegean, the Ministry of Culture and Sport, the Greek National Tourism Organisation and the Hellenic National Commission for UNESCO. It combines exhibits with photographic and audiovisual displays to present the 150 million years record of the evolution of the Aegean islands and the history of the processes that created the islands, their spectacular landscapes and geosites. The exhibition presents in a

comprehensive and appealing way, the creation of the Aegean Sea, the history of processes that sculpted the Aegean islands leading to the creation of beautiful landscapes, and the development of a variety of modern natural ecosystems. Visitors will realize how the continuous interaction between civilizations ranging from prehistory to the present day interacted with the environment creating a series of cultural landscapes, and their senses will be filled with images of the islands and the life of this ancient sea.

The exhibition is divided into three main sections containing impressive topics and interactive presentations: The central section "GAIA MEMORIES: From Tethys to the Aegean", presents the complete geological history of the area from the vast Tethys Ocean that was part of today's Greece, the growth of the single mythical land of Aegaeis and the shaping of today's Greek archipelago.

The second section "The islands of Hephaestus and Poseidon" presents the geodynamic processes of the Aegean, the volcanic and seismic activity that created the archipelago. These processes were repeated through millions of years and continue until the present day.

The third section, "GAIA: from myth to science" pres-

ents the impressive record of biodiversity in the Aegean region which is demonstrated by the richness of plant and animal fossils that bear witness to the fascinating history of the evolution of life and ecosystems in the Aegean basin during the last 150 million years. The islands are home to the fragments of past life that spurred the human mind to seek answers concerning the origins of life and the world from the "Cosmogony" of Hesiod to the "Natural Philosophy" of Aristotle and the treatise "On Stones" by Theophrastus.

This travelling exhibition is currently hosted by the city of Thessaloniki, Greece and is intended to present the uniqueness and beauty of the Aegean Archipelago to the peoples of several countries around the world.

Nikolaos Zouras
nzour@aegean.gr

View of the exhibition "AEGEAN - Birth of an Archipelago"

Lesvos Geopark

"AEGEAN - Birth of an Archipelago". Impressive petrified tree trunk 14 meters long from the Petrified Forest of Lesvos





Successful alumni of the training course "Nature- and Geopark Guides Vulcano-Eifel"

The Certified Nature and Geopark Guide

Tourism and Environmental Education in the Volcanic Eifel Region (Vulkaneifel)

The Vulkaneifel Nature and Geopark, one of the stakeholders in the LEADER region, has defined environmental education as one field of action and one of the mainstays of its master plan. In order to be in a position to convey the contents to the people living in the region and, of course, to the region's guests, well qualified personnel are needed who can act as the interface between the public, the Geopark and the environment.

Within the framework of the EAFRD Initiative "Clever in the Countryside: Learning for the future of rural areas", a

concept has been developed that goes beyond the 170-hour training programme by also addressing marketing and networking by the participants and the Nature and Geopark. Over a period, initially for three years, participants are provided with the knowledge and tools of the trade they need regarding nature conservation. The guides, who are already skilled and well-educated when they join the project, are trained in geology, flora and fauna, and the history of the region, both theoretically and in practical exercises in the field, combined with extensive further develop-

ment of communication skills.

In the course of the project the participants develop products for tourists, such as guided tours and workshops, whose suitability for the market is then assessed in cooperation with the key players in the tourist branch of the region in an evaluation process consisting of a number of stages.

The deployment of the 22 people who have successfully completed the course is not only restricted to the tourist sector - accompanying guided tours and being present at selected Geopark Hotspots during special events - but also in the field of environmental education in schools and kindergartens in the Vulkaneifel. The certified Nature and Geopark guides assist the staff of educational institutions with topics that are in the process of being compiled as part of an environmental education policy and in doing so also contribute to the creation of a regional identity.



Proud to be a part of Nature- and Geopark Vulcano-Eifel

Achim Herf
Andreas Schüller

www.geopark-vulkaneifel.de



A Visitors' Response to an Alternative Event in Madonie Geopark

The small Raffo village, in a rural area of the Madonie Geopark. All around the world, it is easy to discover discover an EGN or a GGN Geopark

On Saturday September 28th 2013, my wife Pam and I, along with our friend Mark Marcelli, were invited to the Premier screening of Children in Folk's presentation of "The Story of Salt" and "The Salt in our Story". To be honest when we first arrived in Raffo, a small village in the Madonie Geopark, we were not sure what to expect. You see we, the three of us, are descendants from this region but were all born in the USA and have a great interest in our ancestral history. The screening, sponsored and promoted by four local social clubs, was given in what was once an elementary school. According to the Raffo Sport Club Association's President the project was started as a way for the children to interact with each other, have some fun, and possibly learn a thing or two, which I am sure they did. When we first arrived we met many friendly people, as is the case in most of Sicily, and greetings were

With a long blue and silky wave and the sound created from blue bottles containing salt crystals children, during their previous brilliant performance in front of about 1000 people, rebuilt the ancient sea the source of the salt, now buried deep within a mountain



beautifully interrupted by dozens of happy children running and chasing each other. As Mark pointed out one of the highlights of the evening was watching the children play and enjoy themselves on screen. Salt,

aged from 6 to 10 reminded us of its great importance, the geological history and countless applications. Throughout the ages salt has been a food enhancer, this we all know, but it was also integral in many aspects of

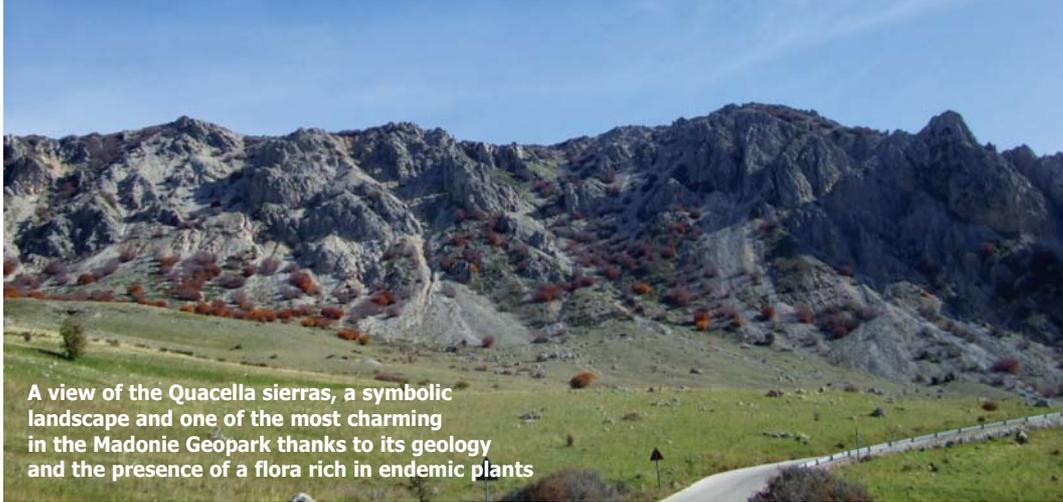


Through song, dance, story-telling and of course acting these future Al Pacino's and Julia Robert's of the world told the "The Story of Salt" and "The Salt in our Story"

one of the most important minerals in the history of mankind, played the starring role in this beautiful and educational presentation. Through song, dance, story-telling and of course acting these future Al Pacino's and Julia Robert's of the world told the story of salt. At this point I need to add that Raffo is located less than a kilometre from one of the largest salt mines in Europe where, for exceptional geological circumstances, the mineral is pure at 99.9%. So, needless to say, there is a special connection with salt in this region. More than 40 children

day to day life, most importantly as a food preservative. Another interesting tidbit of which I was made aware is of salt's use as a deterrent to ill will from others. I was also taught that in Japan, prior to a performance, salt is sprinkled on stage for good luck. Pretty cool. All in all it was a beautiful evening that the Madonie Mountains, Geopark and EGN also can be proud of. Oh, to be a child in a Geopark! Sincerely Charles Diliberti.

Charles Diliberti
chalutz1@msn.com
Pasquale Li Puma
ENTEPA10@parcomadonie.191.it



A view of the Quacella sierras, a symbolic landscape and one of the most charming in the Madonie Geopark thanks to its geology and the presence of a flora rich in endemic plants

Ecological Marathon in the heart of the Madonie Geopark

Today “eco-marathons” are increasing as a specialty in parallel to the usual road marathons. These are events that combine the charm of the race of Pheidippides and the magic of running immersed in natural environments. They are one of the best ways to raise awareness, promote respect, and appreciate the cultural, natural and human resources along routes through the landscapes.

The Ecomaraton Madonie (Eco-marathon of the Madonie Mountains), now in its seventh year, has achieved an international reputation. On Sunday, 9 June 2013, more than 300 contestants from no fewer than 12 countries, Bulgaria, Canada, Estonia, France, Holland, Malta, Peru, Mexico, USA, Ukraine, Hungary and Italy lined up at the start in the historic part of Polizzi Generosa (Palermo Province). The race, by blending the charm of nature



Marathon runners along the natural path of the Madonie Eco-marathon

and the “race of Pheidippides,” along a 42-kilometre route with roads rising and falling hundreds of metres through the scenic Madonie Geopark, showed off its finest sites. These included Piano Noce, Piano Cervi, Timpa da “Miennula” Quacella, Vallone Madonna degli Angeli, Monte San Salvatore, Monte Alto and its shrine, Monte Cavallo, the famous *Abies Nebrodensis* trees that are unique in the world and the famous southernmost European beech forest. A 23-km race (*Abies* Trail) and a non-competitive walk of 14 km occurred at the same time as the 42-kilometre “marathon”. In the enchanting Madonie setting coloured with spring hues heralding the summer, the eco-marathon runners had a chance to absorb the atmosphere of an unknown Sicily.

In about 5 hours they travelled through the 200 million years of geological history in the Madonie Geopark, the basis for the nature of the varied natural landscape. In addition to the charm of the sea, our Sicily, and in particular the Madonie, has a culture involving the mountains, and rural and agricultural areas, which guards treasures and traditions that can surprise you and make you fall in love. The Madonie Eco-marathon produces irrefutable data, thanks to the tireless efforts of firms, Madonie citizens and public administrations. Promoting the territory with sports events of this nature is an excellent recipe for boosting the local economy.

Pietro Casserà
miconazolo@hotmail.it
Mario Casserà
marioc16@hotmail.it

A marathon runner near Vallone Madonna degli Angeli, the last station where the valuable and now very rare local endemic plant *Abies Nebrodensis* grows



The North Pennines is famous for its mineral deposits and long history of mining. Lead mining was the most important industry for centuries but many other minerals, including zinc and iron ores, fluorite and baryte, were also mined at different times. The landscape is dotted with old mine sites, which give fascinating insights into a once-important industry.

However, the advantages of this rich heritage are also associated with some disadvantages. The old lead mines, which were abandoned over 100 years ago, are one of the most significant pollution threats in the North Pennines. The discharge of mine water containing heavy metals such as lead and zinc has resulted in some river stretches failing to meet the water quality targets of the EU Water Framework Directive.

The legal position in the UK is such that no-one can be held liable for the pollution from mines that closed before 1999. In the North Pennines this accounts for all the metal mines. In addition,



Metal Mine Water Treatment in the North Pennines AONB & Geopark

Work along the River West Allen, including efforts to stabilise mine spoil and also protect historic mine remains

the range of legal designations, land rights and interested bodies and individuals adds to the challenge of trying to clean up any pollution. Using our local knowledge, the Geopark team is working with the Environment Agency and The Coal Authority, the organisations tasked with cleaning up heavy metal water pollution. Funding is provided by the government's Department for Environment, Food and Rural Affairs.

The Geopark team is involved in a case study on the River West Allen. Work to stabilise a contaminated spoil heap will be followed by construction of a mine water treatment scheme. The technology to build this scheme is being developed by Newcastle University and has yet to be fully tested. The complexity of the construction is matched by the challenge of obtaining the consents required from government agencies responsible for the protection of the nat-

ural environment and heritage, local authorities, land owners and others with land rights. In addition, it is important to consult local residents and interest groups. For these reasons it is estimated that it will take five years to progress the metal mine treatment scheme. Watch this space and do get in touch if you are interested.

Sarah Tooze

sarah@northpenninesaonb.org.uk

Elizabeth Pickett

elizabeth@northpenninesaonb.org.uk

Old lead mine entrance and spoil heaps at Nenthead

The River West Allen flowing through old 'washing floors' and other lead mining remains



Model of the
 Novohrad -
 Nógrád
 Geopark
 Control
 Research and
 Education
 Centre



Tourism developmental project in the Novohrad – Nógrád Geopark

based on the Hungarian Government’s decision

The Novohrad – Nógrád Geopark’s Management, Nonprofit Ltd., and the Council of Salgótarján, the geopark’s largest city, have a common project with a budget of 614 million Forints (ca. 2,05 million EUR) to develop the areas tourism. Due to the large size of the budget, the Hungarian Government’s decision was needed, especially from the Ministry of Economics and the Ministry of Development. The contract for „GeoTur”, supported by the „ Novohrad – Nógrád Geopark ecotourism development”, was signed on 30.11.2012 by the contracting partners. The expected date for the completion of the project is 30.06.2014.

Lóska,
 director of
 the Novohrad
 – Nógrád
 Geopark
 Nonprofit Kft

With the help of the project,

the Novohrad – Nógrád Geopark will have it’s own centre, just one kilometre away of it’s symbol, the Castle of Somoskő. The centre will govern the park, will control the education, and will be responsible for research/exploration duties. The City of Salgótarján will save a more than 100 years old bulding from devastation, with the help of the project. After the completion of reconstruction, the former headquarters of mining, a symbol of recent mining activity, will be the Visitor Centre.

As a result, we will establish or renew nine study trails on the Hungarian side of the Geopark, according to our standard design. We will make the entrance to an old mine in the vicinity of a small mining settlement within the Geopark’s territory accessible.

Additionally, we will acquire all the equipment and tools are needed for our programmes and tasks, and of course develop marketing strategies. With respect to marketing, we will create a website, and a mobile application, which will be linked at

a future date.

Aspects which could not be included in the budget of the project described above, can be realized with the support of two LEADER projects, with a budget of 100 million Forints (ca. 340 000 EUR). These projects contain Geopark events, information panels in all settlements and other marketing activities.

As János Lóska, director of the Novohrad – Nógrád Geopark Nonprofit Kft. said at the press conference: „The volume of support received for the Novohrad - Nógrád Geopark to date can be viewed with pride for Hungarian and European relations”.

István Kéri
 info@nngeopark.eu



Model of the Novohrad - Nógrád
 Geopark Visitor Centre

Tuscan Mining Geopark. Italy

And nowCETS!

The European Charter for Sustainable Tourism in Protected Areas (CETS) is a practical instrument and an impetus for improving the management of protected areas for the development of sustainable tourism.

The fundamental characteristic of the Charter is the collaboration between all the parties interested in developing a common policy and a plan of action for the enhancement of tourism, starting from an in-depth analysis of the local conditions based on the 10 CETS Principles regarding sustainability. Its aim is to safeguard the natural and cultural heritage and to continuously improve tourism management in the protected area of the environment, for the local population, tourism providers and tourists.

TUSCAN MINING GEOPARK AND CETS

The Tuscan Mining Geopark began to organize the necessary procedures, in order to obtain the Charter, The project was presented to all the invited stakeholders of the Colline Metallifere area involving approximately 800 participants including tourism and cultural agencies, associations, public

bodies, and industries.

All the interested participants (about 60) contributed to producing the Park's Plan of Action and attended a conference on the CETS issues. Apart from the stimulating work of coordination and planning, the results of this of this exercise and conference are clear. The Park now has a better understanding of how it is perceived by the people and the mistakes in communication made in the past. It can therefore now comply with the needs of this "thinking green" issue.

THE ECONOMIC AND SOCIAL STRUCTURE OF THE GEOPARK

Thanks to the procedures required by the CETS in order to formulate the policy document and the Plan of Action, we can now consider and appreciate how much the social and economic structure of the Metalliferous Hills has changed. The mining world – the supporting economic base of the area over the centuries – is at risk, it could be totally forgotten and the Park's role, in this issue is vital. The local population and the economic operators feel the need for a park that engages with them and which protects the envi-

ronment and the wonderful geosites. The three basic concepts on which to develop the plan of action are: CULTURE, HIGH QUALITY AGRICULTURE, SUSTAINABLE TOURISM.

Alessandra Casini

parcominerario@comune.gavorrano.gr.it

Riccardo Cinelli

r.cinelli@provincia.grosseto.it



Federparchi

FEDERAZIONE ITALIANA PARCHI E RISERVE NATURALI



EUROPARC FEDERATION



EUROPEAN CHARTER
FOR SUSTAINABLE TOURISM IN
PROTECTED AREAS



A conference
of CETS



The landscape of the Geopark

Environmental Education in Rokua Geopark, Finland



exploring groundwater in a kettle hole pond during a summer camp

Rokua Geopark explores the heritage of the last Ice Age. The characteristic features of the area are the glacial ridges, pine and lichen-clad heaths and kettle holes with crystal clear ponds. Deep sandy gullies provide unique habitats for many rare plant species. Rokua Geopark also includes fascinating cultural sites which have a history dating back to 8500 years. These natural and cultural environments create a special laboratory for environmental education activities. To enhance these activities, Rokua Geopark initiated an environmental education project during the summer 2013. The project is funded by the Rokua Geopark and the European Union Regional Development Fund. It will continue until May 2015. The project aims to create a model for permanent environmental education activities within Rokua Geopark leading to an increase in knowledge and to strengthening pride in the local identity among students and inhabitants. This work can-

not be achieved without quality educational materials and close cooperation with schools and other educational organizations. During the autumn of 2013 Rokua Geopark organized for example, workshops for teachers, theme days for schools and courses about local history and nature in conjunction with the adult education center. The focus of the workshops has been to distinguish similarities between geopark themes and curricula requirements and to identify the types of materials which are useful and necessary for schools. These materials are currently being developed. During the theme days some materials and methods have been tested together with other organizations. Several tourist companies within the area have been introduced to local environment and geopark themes so that they can impart this knowledge to visitors. Some enterprises are now developing adventure camps for children utilizing the Geopark's

fascinating environment. The development of certain materials is completed and already in use. For instance a board game called "On the traces of the Ice Age – Adventure game in the Rokua Geopark" has been used as teaching material in schools but also as a recreational activity for visitors by tourism providers. In addition, teachers have been briefed to use the interactive 3D models which can be found, like the board game, via the Rokua Geopark website.

Mikko Kiuttu
 mikko.kiuttu@humanpolis.fi
 www.rokuageopark.fi

Teachers trying and practicing the Rokua Geopark board game





Partners attending the training course

tional material in order to complement their tourism provision.

In this partnership, the collaborating organization participates in the training courses organized by the Geopark and guarantees that its activities agree with the Geopark's principles and objectives. The partner organization will profit from the Geopark's national and international promotional activities.

Each partner enterprise has to attend the training courses organized by the Geopark, publicize the existence of the Geopark and its activities among its customers, and present an annual report to the Geopark to demonstrate that the requirements of the agreement for the Partner Enterprises are being fulfilled. Also a supervisor from the Geopark visits each partner annually in order to ensure the fulfilment of the protocol.

The enterprises that have signed the agreement include hotels, camping sites, hostels, rural hotels, restaurants and traditional food producers.

Currently there are 113 partner enterprises and this project has proved to be a great success to publicise the Geopark and its activities, and also to promote awareness of the importance of the Geopark and its geological heritage to Sobrarbe's inhabitants.

Ana Ruiz Conde

administracion@geoparquepireneos.com

The partner enterprises of Sobrarbe Geopark: How to share the benefits of a Geopark with its society and stakeholders

Four years ago the Sobrarbe Geopark initiated a new project called "Partner Enterprises of the Geopark". The aim of this collaborative project was to improve the quality of tourism provision in the area of the Geopark and to promote geotourism, linked to the geological heritage. With this goal, the

Sobrarbe Geopark created a Protocol Agreement for the partnership between the Geopark and the collaborating organizations.

According to the terms of this agreement, the Geopark is committed to promote the organizations collaborating in the Geopark's activities, and to provide them with promo-



Promoting local food products



Signing of the agreement between the partner enterprises

Fieldtrip
of the course
for the Forest
Wardens
on the Geology
of the Sierras
Subbéticas
Geopark



Training for the protection of the Geopark Sierras Subbéticas, Spain

The Geopark Sierras Subbéticas was declared a Natural Park in 1988 by the regional government of Andalucía. This involves the Planning of Natural Resources and a Master Plan for Use and Management, with criteria that ensure the protection of the geological heritage throughout the Geopark.

Teachers from
Primary and
Secondary
Schools in the
Picacho de
Cabra Peak
during the
course
delivered dur-
ing the EGN
Week of 2013

The Geopark has a team of Park Wardens, the authority's agents, who through their surveillance of the territory control and ensure compliance with the environmental regulations and therefore the conservation of natural resources.

The Geopark has organized and taught a course on the geology of the Sierras Subbéticas and its

con-

text within the European Geoparks Network, especially targeted at the wardens in order to facilitate their work. The content of this course is theoretical and practical. It provides information on the geological history of the Sierras Subbéticas and the most interesting geological areas with special emphasis on the Geopark's most vulnerable sites and on identifying potential threats to the geological heritage.

Since 2008, coinciding with the European Geoparks Week, these wardens, together with Geopark staff conduct an awareness environmental education campaign called "The Wardens Visit our School." It scheduled visits to schools in the Sierras

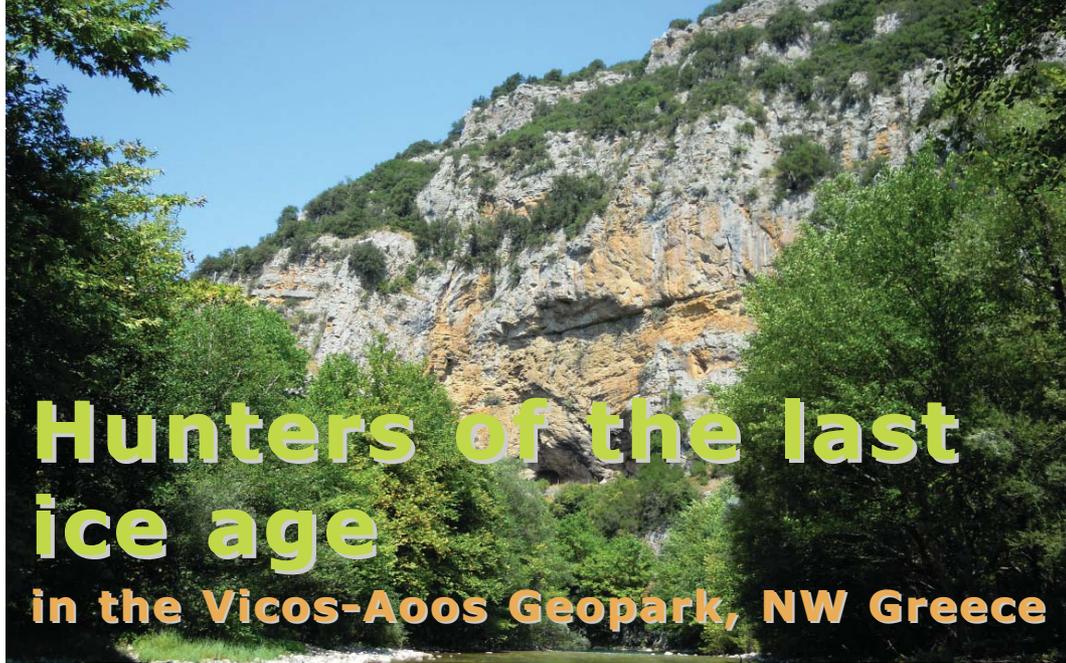
Subbéticas, with talks on the natural and cultural values of the Geopark and highlighted the importance of preserving the geological heritage. Moreover, the activity is enlivened by using feathers, skeletons, animal tracks, rocks and fossils.

A crash course on the Geopark's geological values has also been presented to the local teaching community, which aims to help this group in its task of training primary and secondary school students. This well attended and welcome course has been a great success and is expected to be continued.

Lourdes Guerra González
lourdes.guerra@juntadeandalucia.es
Alicia Serna Barquero
aserna@tragsa.es

**Environmental
education
activities
in a Sierras
Subbéticas
school with the
Forest Wardens
during the EGN
Week of 2013**





The Klithi
Upper
Palaeolithic
rockshelter

Hunters of the last ice age

in the Vikos-Aoos Geopark, NW Greece

In the Vikos-Aoos Geopark, an EGN and GGN member since 2010, archaeologists have unearthed rich evidence about the life of hunter gatherers at the end of the pleistocene period. The fruitful collaboration with other disciplines, e.g. structural and glacial geology, geography and palynology, resulted in an exceptionally detailed reconstruction of palaeoenvironmental oscillations, documenting the dynamic interplay between nature and past cultures in this rugged gorge landscape. During the peak of the last major glacial event (c. 22,000 - 18,000 years ago), ice-sheets capped the summits (> 2500m) and karst plateaus of the western Pindus mountain range enhancing the erosion of the limestone and flysch bedrock and discharging massive volumes of water into the Vikos-VOIDOMATIS-AOOS river system. Consequently natural resources and human activity were limited at this time.

With the gradual amelioration of the climate, melting of the ice and the expansion

of pioneer woodland and of wild animal mountain species, paleolithic bowmen started to explore the new habitat 17,500 years ago. For the next 7 millennia, families and/or hunting groups used fault-controlled rock overhangs (e.g. Klithi, Boila, Megalakkos) at the sidewalls of the gorge as temporary abodes during spring/summer months. There they lit fires for warmth, cooking, company and protection against carnivores (bears, wolves, foxes and lynx). They hunted the steep slopes for agile wild caprids (goat-antelopes) namely ibex and chamois. The latter was valued especially for its soft hide. They also fished in the river and trapped beavers. Equipped with sophisticated technologies, they collected flint (chert) pebbles from the riverbanks or used animal bones to manufacture tools, e.g. arrowheads, knives, scrapers, borers, needles. They decorated clothes and marked their bodies with beads made of fresh water shells and herbivore teeth, and natural red ochre.

As the forest grew thicker

and expanded into the highlands by approximately 9,000 years ago, the gorge environment became less rewarding and the nomadic hunters obtained venison, fat, marrow, antlers and hides from migrating deer herds fording the river in the nearby Konitsa plain. They also traversed ravines seeking resources and adventures beyond the mountain chain.

From 2014, Geopark visitors can follow a designated itinerary with information on the palaeolithic cultures and the pleistocene ecology along the VOIDOMATIS river (Zagori and Konitsa municipalities).

Eleni Kotjabopoulou
ekotzampopoulou@culture.gr

The West
Entrance
of the
VOIDOMATIS
Gorge



Drilled fresh
water shells
(beads) for use
as decoration
(14,000 years BP)

Garden of Stones: "Geólogo Juan Paricio". Alcorisa (Teruel)

Alcorisa is located in the NE of the province of Teruel (Aragón, Spain). It is situated in the eastern area of the Aragonese Iberian mountain range, in the northern part of Maestrazgo Geopark and on the southern edge of the Ebro Basin, where the Iberian (NW-SE and WNW-ESE) and Catalanian (NE-SW and NNE-SSW) tectonic structures are seen to intersect.

The natural and geological heritage of the Geopark is unquestionably of tectonic, stratigraphic, geomorphologic, paleontological, environmental and didactic interest. It is necessary to reveal and explain these for cultural and educational purposes, besides creating an additional tourist attraction. Samples of this heritage include the syntectonic discrepancy from El Calvario of Oligocene-Miocene age and the marine palaeodiversity of the Upper Jurassic which is reflected in 16 new ammonioideos kimmeridgienses taxa which are explained as endemic phenomena.

The "Garden of Stones from Alcorisa: Geólogo Juan Paricio" is regarded as a permanent exhibition of the existing stones in that locality; It is conceived as an



Foto 2
 Simulación de suelo endurecido con restos ammonites de Julio Guillén



Foto 3
 Unidad nº10 en su emplazamiento definitivo de Rosi Casas

informative and didactic area which will complement a recently completed garden area next to the Guadalopillo River (The lake park).

It has been conceived and built to contribute to the geological knowledge and the geological history of the area using only some of the features of the exposed stones.

This Garden of Stones consists of an itinerary with a succession of fourteen samples: twelve sedimentary stones arranged in stratigraphic order and two paleontological sets, one marine and the other continental. The exposed stones, which formed between 210 million

years ago and not more than 1 million years ago, represent all the geological intervals since the end of the Triassic to the present day.

The Garden of Stones has been created in recognition of the local geologist Luis Moliner, with the support and cooperation of Alcorisa's Town Hall, Maestrazgo's Geopark and the altruistic and enthusiastic aid from many people with or without an interest in geology. It is also a posthumous homage to a great person and a great geologist from Teruel, Juan Paricio Cardona.

Ángel Hernández
 parquecultural@maestrazgo.org

Foto 1
 _Montaje del monolito de bienvenida de Julio Guillén



'Learning by doing'

especially for young school children

Muskau Arch Geopark, Poland-Germany

The Ice Age landscape of the Muskau Arch push moraine became heavily wooded with the warming of the climate during the Holocene interval. Human activity involving deforestation of the land for agricultural use, historic mining for lignite and other mineral resources, road building and settlements have changed the landscape considerably. It is therefore difficult but also fascinating to explain the Geopark's landscape to the general public. To experiment, research, read maps, feel, photograph and taste – children always want to experience their environment using all their senses. No idea ... what is that - Natural Sciences? Geology? In the first instance we recommend a visit to the Visitor Centre Döbern with its interactive hands-on provision. Here even very young children, sitting on colourful cushions, can leaf through thematic books specifically designed for children. They can search for small „treasures“ of local stones and minerals in sand boxes or have completely new experiences along the

geological time line. For whom this is not enough, it is possible to look at thin section through a microscope or take part in the „Rock Rally“. The Information Centre in Jerischke or the Visitor Centre of the Forest Railway Bad Muskau also provide interesting geological and historical information about the region.

Since children always want to experience and do something for themselves, German and Polish Geopark Guides organize tours for children, for example to the hills of the end moraine in the Drachenberge, to the old and now flooded clay and gravel pits, to abandoned lignite quarries or to places of former glass production. The children's excursion guide identifies the most exciting destinations in the Geopark, provides ideas for the construction of instruments and experiments, explains geological terminology and has, of course, maps of the landscape to hand. In a project, "Media in the Countryside" supported by the Federal Ministry for Economy, a kit for geological experimentation was developed for working in the field, for instance sieving sand, measuring the pH of water or examining rocks with a hand lens. Work sheets with practical exercises have been developed for geography lessons in schools. As a result of the regular German – Polish collaboration, these materials are supplemented every year. In 2014 this will take place for the 6th time.



Mammoths at Muskau Glacier

Every year this project has a special theme:

2014: "Ice Age erratic boulders" - Rocks and their meaning in the regional cultural history

2015: "From clay to cup, from sand to glass" - Clay and sand as raw materials

These include the Geopark Office, the Polish Institute of Monument Protection, the country hostel for school class visits in Jerischke, the Ice Age Village Krauschwitz, the Vattenfall Foundation for Natural Protection and last but not least the children and teachers.

Nancy Sauer

n.sauer-geopark@amt-doebern-land.de

Katarzyna Jagiełło

The "Sunken Wood", a lake at the site of a former lignite mine "Babina" (grandmother) near Łęknica



A geography lesson in the Geopark Centre of country hostel for school classes in Jerischke



The Chablais Geopark Georoute: Multi-stakeholder Mediation Adventure

The Georoute is a crucial installation within the Chablais Geopark because it is the only physical manifestation of the Geopark. It has been conceived as a unifying action within a territory which involves varied landscape, heritage and stakeholders. Taken as a whole, the 23 geosites tell the complete story of the Chablais and its rich heritage.

Following approval by the Syndicate Intercommunal d'Amenagement du Chablais "SIAC" in 2009, the Geopark team and the consultancy Atemia scoped the Georoute workstreams. Atemia facilitated the selection of the 23 geosites considered to be representative, individual and yet complementary. To a large extent, stakeholder decisions were driven by the deemed "interest" of a particular geosite, as scored using a rigorous methodology within the Geopark geosite database.

For each site the stakeholders together chose the heritage topics, number and type of information panels,

complementary street furniture and site landscaping. A second round of tenders were awarded in 2012 for the manufacture and installation of the information panels, the landscaping, and the new technology aspects of the Georoute.

The Chateau de Ripaille is an example of a typical site. Using the georoute installation the "Fondation Ripaille" has sought to introduce the castle (which is open to visitors), present the site's geology, and its wine making activities. The new public footpath will integrate the chateau into its surroundings, as well as providing disabled access.

The Geopark strived to deliver high quality results that not only cover information content and presentation, but also the production and installation of panels. With over 180 information panels, multiple authors and numerous images, an editorial charter was imposed to ensure content consistency. Over 90% of the project is complete and sites are presented on the Geopark web-

site and the Chablais tourist map. The Georoute acts a resource for our accredited guides and was also featured in the European Heritage Days event

t h i s

September.

During the development of the Georoute, the team reflected on a

number

of obser-

vation:

t h e

choice

of foreign lan-

guages,

balance between

images and text,

quantity of

text, and the general under-

standing of geological terms

compared to the technical

language of other disciplines.

These are being analyzed

and the results will be com-

municated shortly.



The content on the information panel at the Maravant Marsh. SIAC.

The "Totem" at the Lac du Montriond geosite which introduces the Georoute, presents the geosite and highlights themes, site accessibility and duration of the geosite visit. SIAC.



An accredited Geopark guide using a Georoute panel with a school group at the Lac du Vallon, summer 2013. SIAC.





The Chablais Geopark

Here, the Alps tell

The Chablais Geopark is located in the northern part of the French Alps in Haute-Savoie, eastern France and borders Italy and Switzerland between Léman (Lake Geneva) and Mont-Blanc. Extending over 832 km², the Geopark forms a naturally bounded territory at an altitude of 370 - 2400 m. With 126, 834 inhabitants, it has a high population density (152 people/km²).

The Chablais Geopark sits within the "Syndicat Intercommunal d'Aménagement du Chablais" (SIAC). Its mission is to deliver long-term economic development whilst preserving the unique environment of the Chablais by "Offering a high standard of living and a quality environment to the local population and support and promote the economic development of the Chablais."

The region features a strong, mixed economy of around 5000 enterprises: 1% agriculture, 14% commerce, 7% construction, 19% industry, 28% service sector, 24% public services. Principal employ-

A mountain Guide leading a tourist group in the field



ers include SA Evian® Natural Mineral Water and the Morzine-Avoriaz ski area and lifts. Despite the significant numbers who commute daily to positions in Switzerland, over 60% of Chablais activity is related directly or indirectly to tourism.

The Chablais Geopark lies in a remarkable natural landscape which has permeated the culture and life of its inhabitants and numerous visitors. Traditional architecture, the working of the land, the high mountain farms, the stories and legends, the natural riches of the Evian and Thonon mineral waters bear witness to these strong links between man and nature.

Lying within the Forealps of the Alpine mountain chain, the geology of the region underpins the distinct geography, cultural heritage and economic development of the territory. The quality and diversity of the local environment is recognized in the Chablais through the numerous designated sites and biotopes at international (RAMSAR, Natura 2000) and national levels (Natural Reserves).

The following themes governed the evolution of the Chablais Forealps:

- Dominated by marine sediments,
- Deformed underwater (until the late stages of the Alpine Orogeny),
- The emergent Forealps Chablais Massif sculpted by ice and water.

The Chablais has experienced a huge variety of geological settings: continent, rift, ocean, subduction zone and orogen. Each of these phases can be explored through our geosites. Furthermore, the territory is a condensed model of the Alps because it has the very rare presence of an



almost complete succession of Alpine nappes. By unraveling a cross-section of around 50 km we can see over 1000 km of Alpine history. The landscape of the Chablais was reworked during the Quaternary by multiple glaciations giving rise to its truly exemplary glacial landscape and distinctive hydrogeology. We have the remarkable moraine complexes of the Bas Chablais and our "Natural Castle of Water" featuring some of the most unique aquifers of the world famous "Evian Water".

Education and sustainable development are also key activities of the Chablais Geopark. The Geopark's networks are working to develop new geotourism initiatives to diversify the current tourist base. Actions such as the structured training of mountain guides and other tourist professionals have expanded our network to over 84 accredited guides in France and Switzerland. Furthermore, educational workshops approved by the National Education Authority are now available to both local school children and those on field trips at the Museum of Prehistory and Geology, the Discovery Centre of the Valley d'Aulps and the "Gorges du Pont du Diable".

A major new communication tool, the Georoute, contains a series of 21 geosites distributed throughout the territory. Each of these small windows permits the discovery of different aspects of the geological, cultural and natural history of the Chablais. These sites are being equipped with information panels and interpretative aids during 2012-2013.

**Anne Guyomard
Jean-Pierre Fillion**

coordinationgeopark@siac-chablais.fr

Map: The Georoute: 21 Remarkable Geosites

A Traditional Sailing Boat "Le Savoie", on Lake Lemman (Lake Geneva).

The Capelinhos Volcano, an important tourist attraction in the Azores, characterised by its uniqueness, scenic beauty and association with active and historical volcanism



Azores Geopark

Portugal - "9 Islands, 1 Geopark"

The Azores archipelago is a Portuguese autonomous region consisting of nine islands and several islets. The archipelago includes 19 municipalities and 156 parishes with a population of 246,772 inhabitants. The Azores Geopark's exceptional geological heritage supports a strategy that promotes the well-being of the population and maintains respect for the environment. The Azores Geopark has an area of 12,884 km², consisting of 2,324 km² of land, and 10,560 km² of marine geosites. The Geopark is managed by the non-profit GEOAÇORES Association composed of public and private institutions.

Azorean Heritage

Despite the small size of the Azorean territory, the islands have a wide range of landscapes and features (such as volcanoes, calderas, lava fields, thermal waters, volcanic caves, marine fossils and fault scarps) derived primarily from the nature and dynamics of volcanic eruptions, and the processes of weathering and erosion. Its unique geotectonic setting at the triple junction of the North American, Eurasian and African tectonic plates, also contributes to this diversity. The Azores archipelago's rich geodiversity, and important geological heritage contains several sites of scientific, edu-

cational and touristic interest. Given the insular nature of the region, the Azores Geopark supports a network of 121 geosites within the nine islands and the surrounding seafloor, most of them of national or international relevance. This network, i) highlights the importance of the geodiversity that characterizes the Azorean territory, ii) reflects approximately 10 million years of geological history, iii) involves conservation and promotion strategies, and iv) is based on a decentralized management structure with support in all the islands. Of the 121 geosites 57 were selected for developing geo-conservation strategies and promotional activities in the Azores Geopark.

The rich biodiversity, architectural, cultural, ethnographic and intangible heritages are also undeniably significant. The Azores archipelago belongs to the Macaronesia, a biogeographic region that includes the archipelagos of Madeira, Canaries and Cape Verde. The Azores are one of the richest areas of biodiversity in Europe, supporting a significant number of endemic plant species in the different islands, currently protected under the auspices of the Island Natural Parks. The Biosphere Reserves of Corvo, Flores and Graciosa islands and the UNESCO World Heritage sites of the "Historical Centre of Angra do Heroísmo" on Terceira Island and the "Landscape of the Pico Island Vineyard Culture" are also important heritage sites within the territory.

Man and Volcanoes

The Azorean culture, ethnography and architecture are

strongly influenced by the geology of the islands. Since the first settlements in the fifteenth century, the Azorean people learned to live with volcanoes and earthquakes, taking advantage of the fertile soils (e.g. vineyards), geological resources (e.g. thermal areas) and beautiful landscapes, to promote their socio-economic development. The "geological footprint" can be observed in the regional architecture and the use of various building stones, in the food (the famous "Furnas geo-cook"), and also in the intangible heritage.

Amongst the later is worth mentioning the "Holy Spirit Festivities" that affirm the faith of a population faced with catastrophic earthquakes and volcanic eruptions.

Given the islands' rich geodiversity and heritage, a strategy for geotourism in the Azores was implemented under the umbrella of the Azores Geopark. Established geotouristic routes include the Volcanic Caves Route, the Belvederes Route, the Walking Trails Route, the Thermal Route, the Science and Interpretation Centres Route and the Urban Georoutes.

Many of these routes are used by the inhabitants and visitors and in guided tours for educational purposes. Teacher's guides and information for children contribute to raising awareness of the need to protect the environment and for geo-conservation.

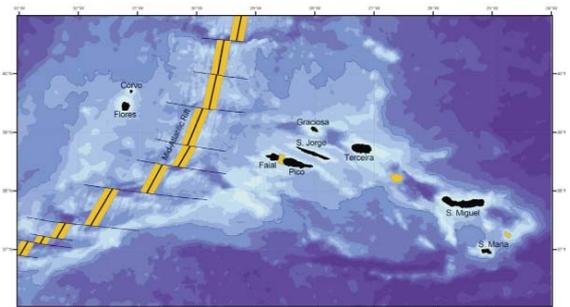
Eva Lima
Marisa Machado
João Carlos Nunes

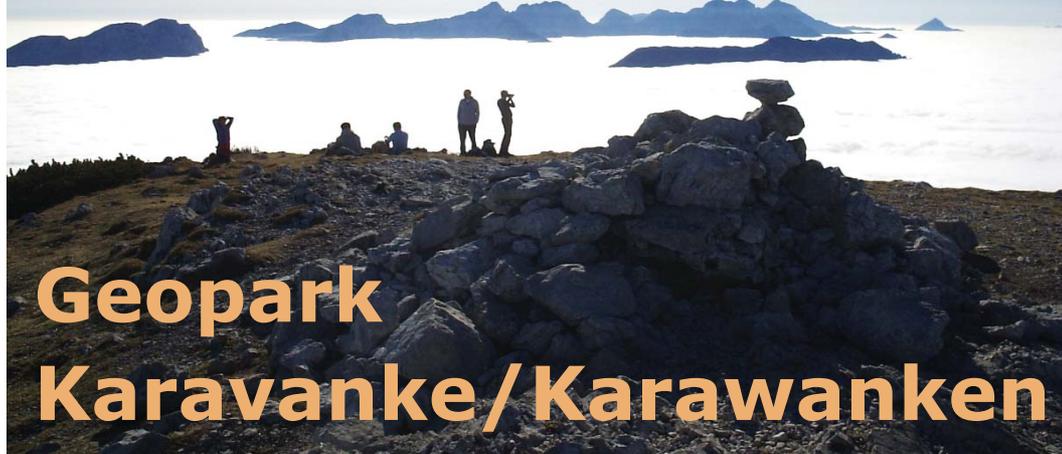
The Azores Geopark includes land areas (e.g. the islands) and submarine geosites

Come to visit the Azorean volcanoes and enjoy an eruption ...of Flavours, Smells and Experiences!

WELCOME
european
GEOPARKS

The typical "Furnas Geo-Cook", where ingredients are cooked in a pot buried in the ground by the heat of the volcano: an unique geothermal use!





On the peaks of the Geopark it sometimes still seems like being on an island in the middle of the Tethys Ocean

The Geopark Karavanke/Karawanken is a cross-border geopark named after the alpine mountain chain, which connects the regions on both sides of the border between Slovenia and Austria. The Geopark area includes 13 municipalities and extends over an area of 1000 km² with a population of 50. 000. It is famous for its extraordinary geological structures and its wealth of geological as well as other natural and cultural characteristics. People settled in the area for its geological resources, i.e. coal deposits and concentrations of minerals including lead, zinc and molybdenum. The "geopark" model seemed to be a good solution for the sustainable development of an area in which mining shaped and formed life on the surface.

The Geopark's geology includes a variety of sedimentary, igneous and metamorphic rocks ranging in age from Ordovician to Miocene which were formed during late Caledonian, Variscan and Alpine orogenic cycles. Some geological features in this area are of extraordinary, even world-renowned scientific importance. The predominant surface exposures of rocks in the Geopark originated as sediments deposited on a late

Triassic Period (Carnian Stage) sea floor between 228 and 216 million years ago. These contain some of the richest accumulations of Carnian crinoids in Europe (Helena Creek Valley) together with ichthyosaurs bones and other abundant remnants of marine life in the ancient Tethys Ocean. The occurrence of Pillow lavas in the Obir Gorge and volcanic rocks in Smrekovec are evidence of submarine volcanism. The collision between the Adriatic and the Eurasian plates resulted in the creation of the Alps and the a several-hundred-kilometre long Periadriatic fault zone. The Geopark also boasts one of the world's five major deposits of dravite, a sodium, magnesium aluminium silicate (tourmaline), the richest wulfenite (lead molybdate) deposits in Europe and one of the most famous in the world. It also contains five major lead-zinc ore outcrops (galena and sphalerite) and early Palaeozoic rocks containing pegmatite (schorlite). Some of these ores were exploited beneath the slopes of the Peca and Hochobir mountains. Today we can admire specimens of these minerals in museums. Coal mining was also important. The coalmine in Leše was one of the largest and most modern coalmines in Slovenia, and fuelled the most important European ironworks. The surface as we see it today has been shaped over millions of years, and subsurface erosion formed the extraordinary karst caves of the Hochobir and the scenic Trögern glen.

The varied geology contributes to a range of habitats, and the Geopark's rich biodi-

versity. Rare habitats have survived due to human activity and provide a refuge for unique plant species such as the endemic Zois' bellflower, Kamnik orchid, Peca meadow oat-grass, Wulfen's primrose and gentian. The Geopark is also important as a sanctuary for birds including endangered species of grouse (capercaillie, black grouse, ptarmigan and hazel grouse). Fens and streams are biologically important as well as sources of clean water.

The geologic features of this area are part of a rich cultural heritage. The cultural heritage is presented in several museums, archaeological sites (Mountain of St. Hemma) and galleries, through everyday customs and practices including traditional local events and oral tradition of fairytales, folktales and legends. The territory is associated with industrial innovation due to the early development of industry and construction of manufacturing plants.

Today, visitors and scientists are drawn to this area by the wealth of minerals in old mines, as well as by its outstanding natural resources and its people. All this is connected, presented and promoted by the Geopark. The existing tourist infrastructure has been upgraded with geo-experiences, geo-education and geo-interpretation and linked to the local economy, culture and nature, which will undoubtedly contribute to further development of the region.

Fajmut Štruel Suzana suzana.fajmut@podzemljepece.com

Rojs Lenka lenka.rojs@zrsvn.si

Bedjanič Mojca mojca.bedjanic@zrsvn.si

Hartmann Gerald gerald.hartmann@lag-uk.at

Vodovnik Primož primoz.vodovnik@rra-koroska.si

Varch Christian varch@hoehlen.at

Geo-experience
in the Mežica mine





Geopark Idrija



WELCOME

europaean
GEOPARKS

Experience of natural and cultural heritage

The 294 km² Geopark Idrija located in the western part of Slovenia includes the Municipality of Idrija with around 12,000 inhabitants. Its centre Idrija, the oldest Slovene mining town, developed concomitantly with its mercury mine. The Idrija mercury ore deposit, the most valuable and unique feature of the Geopark, is the world's second largest ore deposit in terms of mercury concentration, after Almadén in Spain. Its rich and unusual ores include epigenetic and unique syngenetic sedimentary cinnabar ores and native mercury.

Mercury mining started in 1490 when mercury was discovered by a now legendary cooper as he was soaking a wooden tub in a stream. In the second half of the 19th century Idrija had one of the best-equipped mines in the Austro-Hungarian Empire, with the best quality machinery and equipment and constantly improving extraction and refining processes. Idrija and Almadén were recognised in 2012 as a UNESCO World Heritage Site.

The Idrija region is situated at the junction of the Dinaride and Alpine mountain ranges. Its exceptional geoheritage includes a deep gorges with remarkable stratigraphic cross sections, tectonic phenomena and mineral and fossil deposits. Water shapes the landscape with numerous springs, rivers and karst features including poljes, caves and

sinkholes. Within a relatively small area visitors can observe Carboniferous, Permian, Triassic, Cretaceous and Paleocene-Eocene rocks. The Geopark includes individual nappes and intermediate nappe horses as well as normal faults and faults with right-lateral displacement. The most prominent and best known fault is the Idrija Fault. The high Karst tablelands and mountain tops offer beautiful views from the Alps to the Adriatic Sea. The Geopark has an interesting cultural heritage linked to its mining tradition. Many rare and even unique examples of its technical heritage have been preserved. The town of Idrija and its surroundings feature a large number of cultural heritage sites testifying to the significance of this area for mercury production. The old town has a distinct mining character. In the past, most of the buildings were used by the mine, but today house museum collections, lace shops, cafés, and an aquarium. Anthony's Main Road, the oldest part of the Idrija Mine, is open to the public and displays old and modern methods of mining. The 16th century Gewerkenegg Castle, which used to serve the mine for the storage of mercury and as an administrative building, now hosts Idrija's Municipal Museum presenting a comprehensive exhibition of the 500-year long history of the mine and the town. The museum is also

responsible for Idrija kamšt (water pump), a collection of mine machines and devices in Francis' Shaft, and the Miner's house.

In the Zgornja Idrijca Landscape Park, encompassing the upper reaches of the Idrija River and the Belca Stream, the monumental klavže water barriers testify to the unique technology of floating timber for use in the mine. The restored "Idrija lauf" was the first forest railway used to transport timber to the river from where it was floated to Idrija.

Idrija also developed as a town with a range of educational institutions. Mining activities provided jobs for the male labour force, and by developing the craft of lace-making, women provided miners' families with an additional income. Today, Idrija lace is a significant part of the Slovene cultural heritage that has been preserved and developed.

Mojca Gorjup Kavčič
mojca.gorjup-kavcic@geopark-idrija.si
Bojan Režun
bojan.rezun@gmail.com





The first Geopark in the Netherlands



Geopark de Hondsrug
Van alle tijden...



It took a long time before we in the Netherlands dared to apply to join the network of European Geoparks. This is perhaps partly because we often think that the

Netherlands has no geology – that is if we only think of geology as ‘hard rocks’. But in fact the Netherlands possesses some very remarkable geological and geomorphological phenomena and this is particularly true of the northeast of the country, the Province of Drenthe, in the area known as the Hondsrug region.

The region in question is approximately 70 kilometres in length and 15 km wide. It has a surface area of 930 square km and lies in the east of the Province of Drenthe not far from the border with Germany. The region has 180,000 inhabitants living in more than 50 villages within five local authority areas.

The Hondsrug-complex is made up of a number of till ridges (also called megaflores) that trend NW - SE across the province. It is one of the most significant geographic features in Drenthe and the Hondsrug itself is the most distinct of these till ridges. They were formed some 150,000 years ago during the final phase of the last but one ice age, the Saalian. Research has shown that this particular area is an

almost unique geological phe-

nomenon, the only other example being in the Dubawnt area of Northern Canada.

The Hondsrug is dotted with pingo remnants, dead ice depressions and erratics. Push moraines are also present. During the last ice age (Weichselian), cover sand was deposited and meltwater valleys and stream valleys were formed. During the Holocene period, high moor peat deposits and drift-sands were created.

Another interesting geological feature is the stream valley of the Voorste Diep. This is a break through in the Hondsrug, a depression formed by a process of salt tectonics during different geological periods as well as erosional and depositional events during glaciations.

The Hondsrug is only one - albeit important - element of a regional landscape that includes stream valleys, peat reclamation areas and the remnants of the high peat moors. There are many important nature reserves on the Hondsrug which document various aspects of the till deposits, the peat areas and the cover sands.

But it is not only its geomorphology which makes this region important – its cultural history is also very special. Many prehistoric monuments (such as megalithic tombs, burial mounds and celtic fields) are to be found on the ridges, following the lines of prehistoric routes. The

Netherlands can boast of 53 megalithic tombs (called hunebeds in Dutch) and 47 of them lie within the Hondsrug region.

Other examples are the layout of the typical farming villages known as ‘esdorpen’ with their thatched farmhouses and village greens; the way farmers organised themselves into local groups known as ‘boermarken’; the history of the extensive peat industry; local art, nature and modern-day culture; and many other aspects of life. Walking on the Hondsrug takes us past 5,500 years of human history!

So there is a very strong relationship between the cultural history and the far longer history of the formation of the local landscape. And yet there is something strange here. Everyone knows this region, tourists as well as the inhabitants. But the story of the region is far less well known, and there is little awareness or appreciation of any regional identity.

Also, the region faces various problems such as unemployment, a shrinking economy, a decline in the number of young people and an ageing population.

The Geopark offers an excellent opportunity to change this situation.

Harrie Wolters

h.wolters@Geoparkdehondsrug.nl

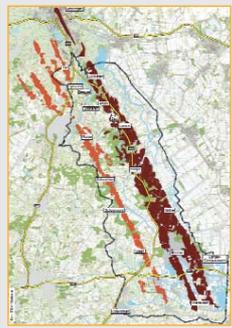
Gretha Roelfs

g.roelfs@Geoparkdehondsrug.nl

Cathrien Posthumus

c.posthumus@Geoparkdehondsrug.nl

We are very proud of becoming the first Dutch member of the European and the Global Geopark Network. The project partners also are of course very pleased. But the partners also realise that this milestone is not the end but only one stage in the process. From now on a lot of hard work will be done to strengthen the sustainable development of the region. We are very aware of what we need to do for the future. We shall focus on promoting the Geopark philosophy, not only here in the Hondsrug region but throughout the Netherlands and even further afield.



The mighty Monte Rosa, the greatest massif in the Alps, as it appears during a sunny sunrise from the Val Grande National Park

Sesia-Val Grande Geopark

WELCOME
european
GEOPARKS

The Geopark is located on the north-east of the Piemonte Region, NW Italy, and encompasses areas of the Verbano Cusio Ossola, Biella, Novara and Vercelli Provinces. Its 213,959 hectares include 85 municipalities with a population of 152,813 inhabitants. Within 60 km the territory ranges from the Gnifetti Peak at 4,554 m. a.s.l. to Lake Maggiore at the 190 m a.s.l. making this the highest and the steepest geopark in Europe.

The geopark's territory has been the object of intense and continuing scientific interest for decades because the association of rocks from the deep, middle and upper crust provide an unprecedented, accessible reference section for interpreting geophysical data involving the structure of the continental crust. These rocks were exposed by the collision, over the past 100 million years, between the continents of Africa and Europe during the Alpine orogeny. The boundary between the continents, the Insubric line, is called the Canavese Line in this region. In the same area, the Supervolcano of the Sesia

erupted approximately 280 million years ago forming a huge caldera, the remains of this and its magmatic plumbing system are clearly visible today.

The accessibility of the area and the organization and infrastructure of the Geopark allow visitors to observe the geological processes that affected the continental crust over hundreds of millions of years. Visitors can walk on fragments of sub-continental mantle, they can visit the contact between a massive gabbro intrusion and the rocks of the deep crust to see how they interacted generating granitic magma. They can visit the roots and roof of a granitic pluton and admire the chaotic breccias produced by the explosive super eruption that formed a caldera at least 15-km in diameter. Thrust sheets of rocks derived from Europe and Africa which were stacked to form the Alps are wonderfully displayed on the Monte Rosa massif and along the lower Val d'Ossola. To the northwest of the Canavese Line, the public can visit outcrops of ultra-high-pressure metamorphic rocks and fragments of the Tethys oceanic crust that once separated Europe and Africa.

Extending from the Po Valley to the peaks of the Alps, the Sesia-Val Grande Geopark allows visitors to observe the effects of climate change involving the Pleistocene geomorphology, the recent retreat of glaciers, and patterns of human settlements dating from the Paleolithic. The Geopark also includes

numerous sites of ecological interest: the Val Grande National Park, the largest wilderness area of the Alps, three regional parks (Alta Valsesia, Monte Fenera, Alta Val Strona) and 12 Sites in the Nature 2000 Network of the European Union.

The occurrence and availability of different lithologies and environments fostered a culture of stone that is reflected not only in the Geopark, but also in the greatest architectural achievements such as the Duomo of Milan with pink marble of Candoglia, or the Basilica of St. Paul Outside the Walls in Rome with granite of Montorfano. Fine examples of the extensive influence of the culture of stone in the arts and architecture can be found in every corner of the geopark, from the small Walser villages around the Monte Rosa, to the medieval boroughs along Sesia and Ossola Valley, terminating with the UNESCO World Heritage sites of the two Sacred Mounts of Varallo and Ghiffa.

Tullio Bagnati
direttore@parcovalgrande.it
Edoardo Dellarole
edoardo.dellarole@tea-group.com

Mysterious carvings on Ceneri gneiss with Lake Maggiore in the background

The dolomitic Monte Fenera arises from the red rhyolites of the supervolcano along the Sesia River





**Sandaldivlit
cinder cone
and its lava
flow**

From Strabo to Yunus Emre

The Kula Geopark is situated in the Aegean Region of Turkey in Western Anatolia, within Manisa Province. The Geopark covers an area of 300 km² and has 50,000 inhabitants.

In September 2013 the Kula Geopark became the first Turkish Geopark in the European and the Global Geoparks Network.

The outstanding volcanic structures in the Kula Geopark area have been known for at least two thousand years. The great ancient Geographer Strabo, named Kula as "Katakekaumene" (fire-born) because of the occurrence of coal black lava. The geological significance as well as the cultural richness of Kula was mentioned by many foreign travellers and researchers.

Kula Geopark area is characterized by high geodiversity representing 200 million

years of Earth history, from the Palaeozoic crystalline rocks and Ophiolitic melange to Holocene volcanism. Kula is the youngest volcanic region in Turkey.

Currently 64 geosites have been identified in Kula Geopark. These include the following outstanding examples of structures associated with volcanic and igneous processes: 8 spatter cones, 5 maars, successive lava flow plains, lava caves and tubes, craters, basalt columns, 79 small monogenetic cinder cones aligned along a fissure, ash deposits, xenoliths and contact metamorphism. The landscape contains waterfalls in volcanic canyons, karst features including caves, badlands with fairy chimneys and mesas. Kula Geopark is the land of miniature volcanoes with cinder cones not higher than 150m. As a result, the geosites are easy to access and visiting the area requires very little risk, effort and time which makes the area excellent for geotourism and geoeducation.

In addition to its outstanding natural and geological heritage, Kula Geopark reveals rich cultural, architectural, historical, archaeological, and paleontological monuments. The prehistoric inhabitants in the Geopark area witnessed the last eruptive period between 12-15 thousand years ago. They left a record of unique fossilised human footprints on volcanic ash and primitive cave paintings. Kula, one of the oldest municipalities in Turkey, was established in 1866 and is situated at the heart of the Geopark. The majority of key geosites are within walking

distance of the town. Kula represents well-preserved monuments from Turkey's 18th century Ottoman urban architecture. Here the houses reflect the architectural style and provide an impression of the social life in Ottoman cities. Today 800 of 3000 historical buildings, including mosques, churches, fountains and famous mansions, are designated as Kula Urban Sites.

The Geodiversity in Kula Volcanic Geopark has deeply influenced the rural architectural style and building materials. Kula Geopark hosts the sacred tombs of the famous Turkish poet and Sufi mystic Yunus Emre and his teacher Tabduk Emre. Kula has, due to the legacy of Yunus Emre, retained its attitude for hospitality and tolerance for centuries. This is reflected in the coexistence of Churches and Mosques.

Kula Geopark offers indoor and outdoor guided tours for tourists and regular geo-education programmes for students via thematic geotrails and the Geopark Visitor Centre "Katakekaumene".

Strabo (63 BC - 24 AD) Geographica:

...After this region one comes to the Katacecaumene country... the whole of it is without trees except the vine that produces the Katacecaumenite wine, which in quality is inferior to none of the notable wines. The surface of the plains is covered with ashes, and the mountainous and rocky country is black, as though from conflagration... There are to be seen three pits, which are called Physse, or breathing holes... Above them lie rugged hills, which are reasonably supposed to have been heaped up by the hot masses blown forth from the Earth...

Kula Geopark Visitor Centre "Katake-kaumene"



Erdal Gümüş
erdalgumus@hotmail.com
Selim Aşkın
info@kula.bel.tr

**Outdoor
geoeducation
activities
at thematic
geotrails**



THE EUROPEAN GEOPARKS NETWORK

58 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

26-29 March 2014: 33rd European Geoparks Meeting

Sobrarbe Geopark – Spain

24 May – 9 June 2014: European Geoparks Week 2014

24 June – 4 July 2014: International Intensive Course on Geoparks

Lesvos island Geopark – Greece

1-6 September 2014: 34th European Geoparks Meeting

Geopark Harz Braunschweiger Land Ostfalen - Germany

19-22 September 2014: 6th International UNESCO Conference on Geoparks

Stone Hammer Geopark – Canada

<http://www.geoparks2014.com/main.html>

March 2015: 35th European Geoparks Meeting

Magma Geopark - Norway

May - June 2015 – European Geoparks Week 2015

23 June – 3 July 2015: International Intensive Course on Geoparks

Lesvos island Geopark – Greece

3-6 September 2015: 13th European Geoparks Conference

Rokua Geopark – Finland

September 2015: 4th Asian – Pacific Geoparks Conference

San'in - Kaigan Geopark – Japan

www.europeangeoparks.org

GEOPARK CONFERENCE



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

**4 billion years of Earth History
to serve tomorrow**

**Welcome to the
European Geoparks Network**

We hope that you will enjoy a visit
European Geoparks Network
www.europeangeoparks.org