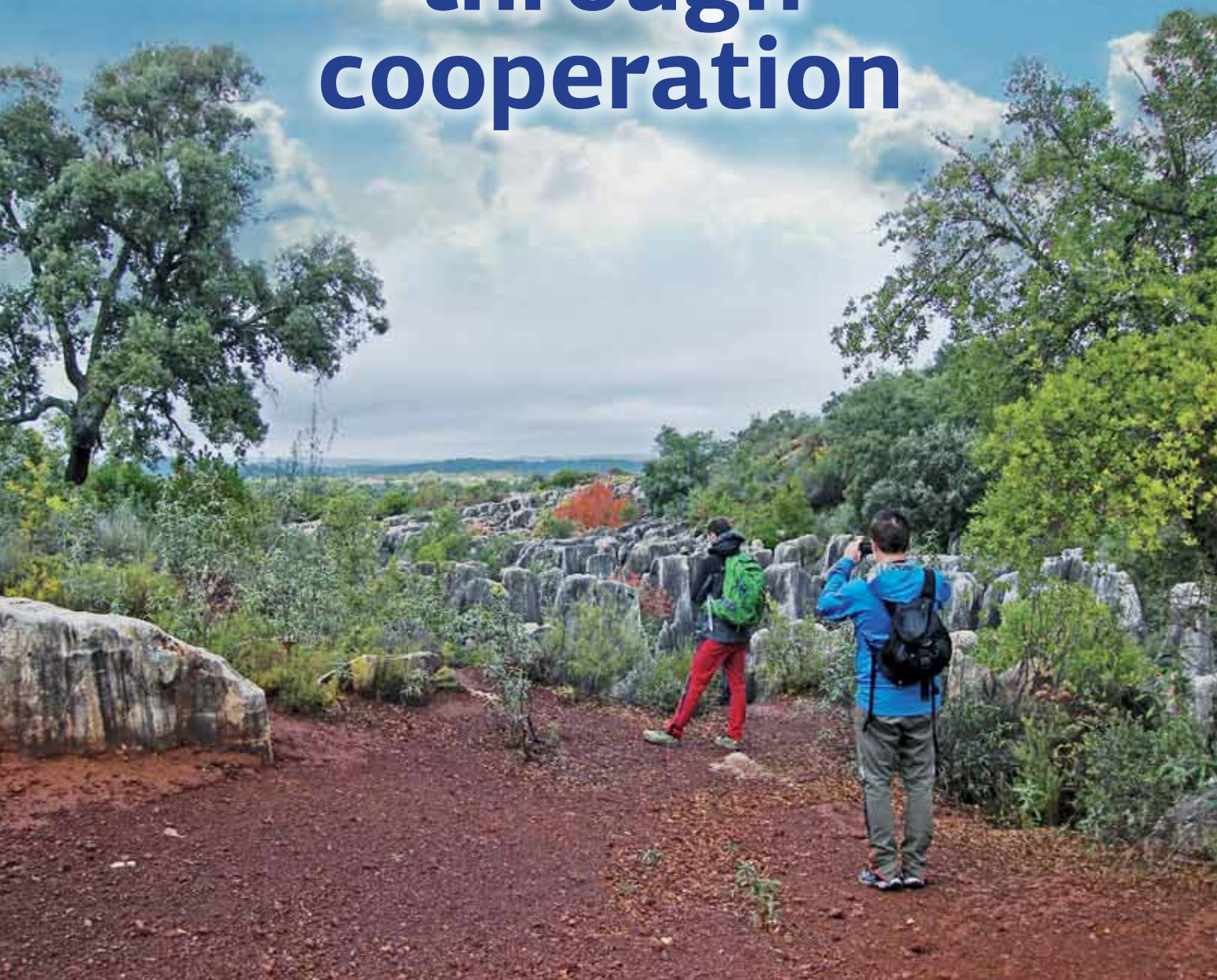


EUROPEAN GEO PARKS NETWORK

European Geoparks Magazine ● Issue 16

GEO PARKS: **Gaining strength through cooperation**



THE EUROPEAN GEOPARKS NETWORK

www.europeangeoparks.org

2019

- 6th -10th March 2019:** Participating in the GGN stand in ITB Berlin
- 26th -30th March 2019:** 43rd European Geoparks Network Meeting, Swabian Albs UNESCO Global Geopark, Germany
- 22nd April 2019:** International Earth Day Geopark Activities
- 25th May - 9th June 2019:** European Geoparks Week
- 31st May - 10th June 2019:** International Intensive Course on Geoparks : UNESCO Global Geoparks – climate change adaptation and natural hazards mitigation Lesvos Island UNESCO Global Geopark, Greece
- 2nd-7th September 2019:** 6th Asian Pacific Geoparks Network Symposium – Rinjani-Lombok UNESCO Global Geopark, Indonesia
- 23rd -24th September 2019:** 44th European Geoparks Network Meeting
- 25th - 27th September 2019:** 15th European Geoparks Conference, Sierra Norte de Sevilla UNESCO Global Geopark, Spain
- 13th October 2019:** International Day for Disaster reduction Geopark Activities
- 28th October – 2nd November 2019:** International Course on UNESCO Global Geoparks, China University of Geosciences Beijing, China
- 12th – 27th November 2019:** UNESCO General Conference – Paris France
- 11th December 2019:** International Mountain Day Geopark Activities

2020

- March 2020:** 45th European Geoparks Network Meeting, Papuk UNESCO Global Geopark, Croatia
- September 2020:** 46th European Geoparks Network Meeting, Hateg UNESCO Global Geopark, Romania
- 14th – 20th September 2020:** 9th International Conference on UNESCO Global Geoparks – 3rd Ordinary GGN Association General Assembly Jeju Island UNESCO Global Geopark, Republic of Korea

2021

- March 2021:** 47th European Geoparks Network Meeting, Katla UNESCO Global Geopark, Iceland
- September 2021:** 48th European Geoparks Network Meeting
- September 2021:** 16th European Geoparks Conference, Sesia - Val Grande UNESCO Global Geopark, Italy



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GEOPARKS: Gaining strength through cooperation

The activities and achievements of the European Geoparks Network (EGN) during 2018 include the very successful 8th International Conference on UNESCO Global Geoparks, 8 – 14 September, hosted by Adamello Brenta Geopark, Italy. In 2018 the EGN added Beaujolais, France, Coca-de Tremp – Montsec, Spain and Fammenne Ardenne, as new UNESCO Global Geoparks to its list of members. Sierra Norte de Sevilla Geopark extends an invitation to participate in the 15th European Geoparks Conference on 23 – 27 September, 2019.

The articles in this issue show how Geoparks use a variety of established activities to foster sustainable development in their territories, sometimes with support from European programmes. New additions to the wide range of activities include the new Soil Atlas produced by TERRA.vita Geopark, and Bergstrasse-Odenwald Geopark's active engagement with the UN's Sustainable Development Goals 2030.

The article about Geoparks Week and contributions by Hateg, Idrija and Styrian Eisenwurzen Geoparks emphasize the outcomes achieved when Geoparks engage in shared programmes or cooperate in European funded projects such as the Interreg Danube GeoTour Project.

All geoparks engage in formal and informal educational projects. Chablais Geopark introduces a newly approved ERASMUS+ project involving French, Finnish and Italian students. Geoparks Week and school programmes in Chelmos-Vouraikos Geopark introduced school children to the territory's natural heritage and to "Biodiversity and Threats to Biodiversity". In Luberon Geopark primary school pupils engaged in protecting a geyser with Lower Cretaceous fossils. Schoolchildren in Arouca Geopark decorated their schools with illustrations of their local natural heritage. The article "Outcomes of ERASMUS+ GEOPARKS (2016-2018)" presents the results of a collaborative project between schools in Arouca, Haute Provence, Las Loras and Lesvos Island Geoparks.

The appreciation and celebration of a Geopark's heritage, highlighting its potential for engaging with the general public and contributing to geotourism, is presented in twelve contributions. The "Stone Made Objects Travelling Exhibition" shows how making objects from rocks and minerals contributes to shaping local identity. The "Gaia Mem-

ories - UNESCO Global Geoparks Greece-Cyprus" travelling exhibition which focuses on geotourism development in insular geoparks also includes information about the regional UNESCO Global Geoparks Networks. Burren and Cliffs of Moher and Geopark Harz-Braunschweig-Westfalen are involved in preserving ancient buildings. A Bronze Age stone circle, possibly associated with a Thing dating back to the Viking Age, is the focus of a project in Magma Geopark. Prehistoric artefacts are described in articles by Kula, Ore of the Alps and Shetland Geoparks. Copper Coast Geopark aims to conserve local crafts through its new annual fair. The festival of Santa Maria di Mezz'Agosto, in the Geological Mining, Historical and Environmental Park of Sardinia, attracts tourists and local people with a procession of candlesticks. Fforest Fawr Geopark presents and interprets traditional Welsh stories. Old Norse folk stories about guardian spirits inspire children in Reykjanes Geopark. Improving and/or developing geotrails and providing tourism facilities are activities common to all Geoparks. Geotrails are highlighted in contributions describing way marked trails in the Apuan Alps, the "Routes of Fire" trail in Bakony Balaton, the weekend trails in Cabo de Gata Nijar Geopark's Winter Geopark project, a mountain tour in So-barbe and the thematic routes project in Vikos Aaos Geopark. The "Geoship Journey", a virtual trail, introduces visitors to geothermal activity in the Tuscan Mining Geopark. Odsherred Geopark introduces two new information points while Dubka Campsite is a significant addition to tourism provision in Papuk Geopark.

Geoparks provide a perfect opportunity for introducing the exciting subject of fossils. The Basque Coast Geopark focusses on producing a replica of a spectacular trace fossil. A star shaped trace fossil resolved the issue of dating a rock formation in the Bohemian Paradise Geopark. Villurcas-Ibores-Jara Geopark introduces the reader to *Cloudina* one of the earliest biomineralized fossils and to new sites with abundant trace fossils.

European Geoparks are frequently recipients of prestigious awards. Vulkaneifel Geopark is to be congratulated on winning the "Successfully Connected in Europe" competition.

Tony Ramsay:
Member of the Editorial Board

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Voices from the 8th International Conference on UNESCO Global Geoparks



The opening ceremony for the 8th International Conference on UNESCO Global Geoparks.

The 8th International Conference on UNESCO Global Geoparks is over and we experienced a choral event created by the managers of the Nature Park and Adamello Brenta Geopark together with the 140 Geoparks of the UNESCO Global

Geoparks Network. Behind the scenes of the Conference, we collected the impressions of solo voices and we tried to understand what the event meant to the local people and local authorities.

The curtain rose officially on the morning of 11th September with the opening show. "Considering the multicultural background of the participants, we needed a story with a narrative understandable to all observers" said the organizer Roberta Bonazza. "Beauty is a universal language, and we decided that it should be the theme of the show". This is why the beauty of the landscapes of the Adamello Brenta Nature Park and UNESCO Global Geopark was the background in every scene, while the background music from Italian Opera enhanced the audiences' emotional response.



ADAMELLO BRENTA GEOPARK
Madonna di Campiglio - Italy

8th INTERNATIONAL CONFERENCE
ON UNESCO GLOBAL GEOPARKS
8-14 SEPTEMBER 2018

The grace of a dancer interpreted the fragile relationship between humanity and nature and the difficult task of balancing the conservation of natural resources with their exploitation. The beauty of lyrical singing and the evocation of the rainbow led

to the solution: The joy of working together for planet Earth and its inhabitants.

After this lyrical introduction to the Conference theme "Geoparks and Sustainable Development", the voices of authority initiated the Opening Ceremony. The President of the Geopark, Joseph Masè, chairman of the Conference, gave his heartfelt welcome to the participants from 65 countries. Nickolas Zouros and Patrick McKeever, representing the Global Geoparks Network and the International Geoscience and Geoparks Programme, highlighted the activities within Geoparks to achieve the goals for sustainability stated in the UN Agenda 2030. They invited all those present to continue to collaborate and to search for political and geographical



Name badges for delegates at the 8th International Conference on UNESCO Global Geoparks.

means to face the difficulties in achieving these goals. Fabrizio Longo, General Manager of Audi Italia, main sponsor of the Conference, said “We have the resources and technology to invest in concrete projects”. He presented the important example of the AUDI e-tron sustainable mobility project in Madonna di Campiglio and the company’s commitment to the Nature Park and Geopark to extend this type of mobility to tourism mobility in the valleys.

During the following three days the discussion of these issues became a real chorus with more than 300 voices presenting scientific contributions. “The Conference, explained Joseph Masè, with 210 oral presentations and 106 posters, selected from over 400 proposals received by the Scientific Committee allowed us to address, at the highest level, very topical issues, such as the planet’s overheating, climate change and natural disasters, and more about conserva-

tion, environmental education and sustainable development. Geoparks have a key role in these issues and thanks to the Global Geoparks Network they are able to share experiences, good practices and strategies working in synergy to spread the culture of respect for the natural and geological heritage”. The Adamello Brenta UNESCO Global Geopark hosted about 1,000 participants in total involving Geoparks’ and institutions’ delegates, land management experts, university researchers and professors, 30 Geofair exhibitors, 40 members of staff, 43 Geopark Ambassadors, mountain guides involved in the field trips, 10 local producers and “Park Quality” operators who attended the Agrimarket, an event dedicated to local products and the encounter between cultures through food.

The Conference was a successful event of great international importance, wide participation and scientific depth as well as environ-



Delegates enjoy one of the conference field trips in the Adamello UNESCO Geopark.



.A chance to say thank you to the conference ambassadors at the closing ceremony of the 8th International Conference on UNESCO Global Geoparks.

mental value thanks to the able management of the Adamello Brenta UNESCO Global Geopark together with the organizational skills of the Tourist Board Madonna di Campiglio-Pinzolo-Val Rendena. Never before, have the Adamello Brenta Geopark and Tourism Board worked so closely to achieve such an important event. The participation of the local Association of Families, Anffas and the Social Laboratory involving people with intellectual and social disabilities, provided a significant and harmonious contribution to the choral event. After the Closing Ceremony on September 14th, Claudia Morelli, responsible parent for Anffas, said: “We will never learn from their voices a description of what they were feeling, but one thing we can say with certainty: the guys considered themselves as protagonists and they lived the occasion with great responsibility”. They were invited to join in the closing ceremony for the Conference to present a video describing their work in creating the “edelweiss pin” and the awards donated to delegates and Geoparks. “They listened silently to the closing ceremony they didn’t understand English but they understood the solemnity of the occasion. It was a great experience and a moment of touching normality and true inclusion! It was an experience of belonging to a territory that has enhanced the skills of people with disabilities receiving in exchange a special view of life”.

Other important voices of the Conference were the Geopark Ambassadors, thanks to the collaboration of two high school partners in the project (Guetti Institute of Tourism and Mountain from Tione and International Languages School of Rovereto). The alternating programme of school work allowed them to be part of this important commitment for their territory. The collaboration consolidated the schools relation-

ship with the Geopark and the Tourist Board. All the students, as Conference assistants, demonstrated their enthusiasm, efficiency and ability to work tirelessly.

By creating the Conference logo, Gaia Ravanelli, from the Pavonian Artigianelli Institute of Trento, made an important contribution to the 8th International conference on UNESCO Global Geoparks. Following a school lesson by Geopark staff about the geological characteristics of the Adamello and Brenta landscapes, a competition was organized by the Geopark to create a logo stylizing the Geopark’s most representative elements. Gaia said “I am proud with my results, above all because it was the first time my work has been recognized, and also for the indescribable emotion I felt presenting my work in the Conference to the international audience”.

“During the Conference” the President Joseph Masè concluded “the inhabitants of the Geopark and Madonna di Campiglio have strongly perceived the positive energy of each participant, and I have to thank this event for giving the locals a sense of pride to be part of the Geopark and to have strengthened their identification with the protected area”.

At the end of this adventure, we want to thank all conference participants for being part of this identity. They contributed significantly to what President Nickolas Zouros and the entire Executive Board of the Global Network of Geoparks recognized as being “THE BEST CONFERENCE EVER!”

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Stone Made Objects: A Travelling Exhibition and Virtual Vault Promoting the Intangible Heritage of UNESCO Global Geoparks

The remains of
brick kilns in
the now derelict
Penwyllt
Brickworks
where
firebricks were
manufactured
from the 1860's
until the 1930's.

Photo by Tony
Ramsay.



A fascinating way to express local geodiversity and its role in shaping local identity is to uncover and tell the stories of objects made from raw materials - from rocks and minerals. Producing most of the objects surrounding us - either valuable or functional items - requires the use of rocks and minerals. The travelling exhibition reveals the

stories involving the relationships between the use of geological resources and man-made objects.

The geological story, concerns the natural processes leading to the formation of specific rock types and minerals. Millions or hundreds of millions of years separate the origin of the raw materials and the moment when people used them



Tripod Cooking Pot from Sitia Global Geopark (Greece). Used by Minoans to cook their food over an open fire in both indoor and outdoor settings (ca. 1900 -1450 BC). The pots were made from clay which occurs in a sequence of interbedded layers of reddish conglomeratic sandstone which formed 8.5 - 10 million years ago.
Photo by Sitia GG.



Fawr Geopark, Wales, UK, the now derelict Penwyllt Brickworks manufactured firebricks from sand and gravel, probably derived from deeply weathered 323 - 315 million year old Carboniferous Twrch Sandstone. The bricks lined the furnaces at iron and steel manufacturing sites in South Wales and throughout Britain during the late 19th and early 20th centuries. They were also exported worldwide.

This exhibition combines the stories of our use of stone with the geological heritage of geoparks within the European Geoparks Network. It reveals how human ingenuity has, by using geological materials, produced objects related to specific cultures and created local, regional or international industries with a socio-economic impact. It highlights how these practices and industries developed, faded and died, or are still alive in a new socio-economic context.

The exhibition is an initiative of the Intangible Heritage Working Group of the European Geoparks Network and currently involves 32 exhibits. It opened for the first time in Adamello Brenta Global Geopark during the 8th International Conference on UNESCO Global Geoparks, in September 2018. It highlights the links between geological and cultural diversity and celebrates the European Year of Cultural Heritage. It will be enhanced by additional contributions from other Global Geoparks within Europe and now, as a travelling exhibition, was opened in Bucharest during the 2nd Creative Tradition Forum. In future the exhibition will travel and be shown in geoparks and in other places. It may also be available as an e-book and a Virtual Vault for anyone who is interested and wishes to experience stories associated with stone made objects.

What further stories might be told by the European Geoparks? What tales could be told if all the world's UNESCO Global Geoparks told their stories about the use of stone!

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Millstone from Hateg Country Global Geopark (Romania). Once upon a time tens of watermills used the mechanical power of local rivers to mill flour. Grinding stones were produced by local manufacturers from sandstones formed 80 - 90 million years ago.

Photo by Dan Palcu.

to create objects.

The anthropological story reveals how local communities used geological resources to create decorative and/or functional objects which express their sense of place and unique identity.

The social story concerns the impact of the production of diverse objects on cultures and economies at local, national or even global scales. In Fforest



The European Geo

Discover the past, inhabitants,



BAKONY-BALATON GEOPARK, HUNGARY



BOHEMIAN PARADISE GEOPARK, CZECH REPUBLIC



TERRAS DE CAVALEIROS GEOPARK, PORTUGAL



AZORES GEOPARK, PORTUGAL



BASQUE COAST GEOPARK, SPAIN



IDRIJA GEOPARK, SLOVENIA



KARAVANKE - KARAWANKEN GEOPARK, AUSTRIA & SLOVENIA



KULA GEOPARK, TURKEY



SITIA GEOPARK, GREECE



APUAN ALPS GEOPARK, ITALY



AROUCA GEOPARK, PORTUGAL

The European Geoparks Week (or Geopark Festival), held annually in late May and early June, is entered in large red letters in every Geopark's calendar of events because this period is one of the most important and effective tools for promoting the work and aim of the Geoparks Network, the Geoparks themselves and the links

between local communities, visitors and our planet.

If the variety of events on offer during EGN Week was presented like a menu in a high-end restaurant, you would discover a creative 'Chef' and would be spoiled for choice.

Hundreds of geowalks, guided by the Geoparks'

parks Week 2018

sound and taste of Planet Earth!



CENTRAL CATALONIA GEOPARK, SPAIN



KATLA GEOPARK, ICELAND



BURREN AND CLIFFS OF MOHER GEOPARK, IRELAND



CAUSSES DU QUERCY GEOPARK, FRANCE



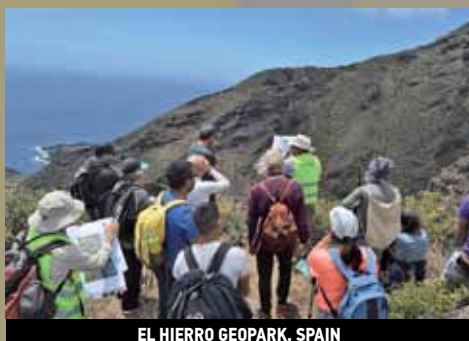
CHABLAIS GEOPARK, FRANCE



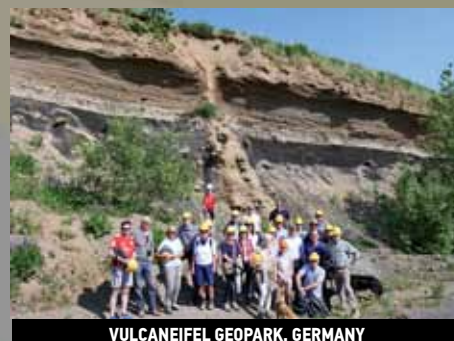
CONCA DE TREMP MONTSEC GEOPARK, SPAIN



COPPER COAST GEOPARK, IRELAND



EL HIERRO GEOPARK, SPAIN



VULCANEIFEL GEOPARK, GERMANY



GEA NORVEGICA GEOPARK, NORWAY



HATEG GEOPARK, ROMANIA



HAUTE - PROVENCE GEOPARK, FRANCE

staff or dedicated local volunteers, invite you to understand the geological history of the territories and to learn about fossils, minerals and landforms. EGN Week is also time for family events, for focusing on children's awareness about the local geo-heritage, for opening new exhibitions and visitor centres and for meeting the Geoparks

partners and stakeholders.

The performing arts enlivened the celebrations, attracted many people and reinforced the message that geoparks are about people. Musical events contributed to the festivities in Arouca Geopark, Portugal; the Tuscan Mining Geopark, Italy. Causses du Quercy Geopark, France staged



LANZAROTE AND CHINIJO ISLANDS GEOPARK, SPAIN



LAS LORAS GEOPARK, SPAIN



SWABIAN ALB GEOPARK, GERMANY



SOBRARBE - PIRINEOS GEOPARK, SPAIN



MADONIE GEOPARK, ITALY



MAGMA GEOPARK, NORWAY



TUSCAN MINING GEOPARK, ITALY



TROODOS GEOPARK, CYPRUS



MARBLE ARCH CAVES GEOPARK, REPUBLIC OF IRELAND AND UK



STYRIAN EISENWURZEN GEOPARK, AUSTRIA



TERRA.VITA GEOPARK, GERMANY



NATURTEJO GEOPARK, PORTUGAL



VIKOS - A00S GEOPARK, GREECE



BEIGUA GEOPARK, ITALY



FFOREST FAWR GEOPARK, WALES, UK



ODSHERRED GEOPARK, DENMARK

"Clara and the Stairs of Time", a musical geological story, and in a unique outdoor concert, Odsherred Geopark, Denmark, amplified the sound generated by rocks moving in the sea. Local artists painted on-site at visitor centres in the Burren and Cliffs of Moher Geopark, Ireland. In the English Riviera Geopark, UK, children showcased their talents as pavement artists by using

chalk to draw fossils. Outdoor sports are becoming increasingly popular. Sports events include racing around Mount Hjórléifshöfði in Katla Geopark, Iceland, climbing workshops in Luberon Geopark, France, and the football tournament in Karavanke/Karawanken Geopark (Austria/Slovenia) which finished with the award of the cross-border Petzen/Peca Football Cup.



SIERRAS SUBBÉTICAS GEOPARK, SPAIN



ORE OF THE ALPS GEOPARK, AUSTRIA



SIERRA NORTE DE SEVILLA GEOPARK, SPAIN



PSILORITIS GEOPARK, GREECE



POLLINO GEOPARK, ITALY



MASSIF DES BAUGES GEOPARK, FRANCE

The European Geoparks Week 2018



ROKUA GEOPARK, FINLAND



REYKJANES GEOPARK, ICELAND



MUSKAU ARCH GEOPARK, GERMANY AND POLAND



PAPUK GEOPARK, CROATIA



VILLUERCAS IBORES JARA GEOPARK, SPAIN



MOLINO-ALTO TAJO GEOPARK, SPAIN



GEOLOGICAL MINING PARK OF SARDINIA GEOPARK, ITALY



ROCCA DI CERERE GEOPARK, ITALY



ENGLISH RIVIERA GEOPARK, UK

However, European Geoparks, also have real menus with a choice of delicious food. The “Geo-Menu” of Azores Geopark, Portugal contains dishes cooked in a geothermally heated natural oven. The introduction of the newly developed Codfish Festival in Naturtejo Geopark, Portugal proved to be a successful event.

Attaining and maintaining visibility is one

of the significant goals for all UNESCO Global Geoparks. Publicising European Geoparks Week 2018 involved 640 press releases and the publication of over 8,100 articles in newspapers and magazines. The 1,200 events and activities attracting almost 175,000 participants contributed to the success of EGN Week 2018

Barnabás Korbély: korbely@geopark.hu

Chablais, France, Rokua, Finland and Sesia Val Grande, Italy UNESCO Global Geoparks

Climate Change from the Professional Perspective: An ERASMUS+ Project



Sixth Form Students from VaalaLukio and Lycée la Versoie visiting the Chablais. Learning about naturally changing climate and sustainable communities at the glacial erratic boulder, “the Pierre à Passat”, Le Lyaud, France.
© SIAC.

A newly approved ERASMUS+ project for high school students began with an exchange visit to the Chablais UGGp, France this October. Twenty Finnish students joined their French counterparts to explore the theme of the week: Climate change and professional development in the context of the UN’s Sustainable Development Goal 11, “Sustainable Communities”. Students from Cobiacchi Technical School, Italy participated remotely in the exchange. They joined the French and Finnish students via Skype and used their study time to work on local subjects directly linked to SDG 11.

The project was carefully designed to respect the national curricula of the three exchange countries and placed emphasis on the innovative “learning by doing” Finnish approach to education. A shared online workspace houses the supporting material for the project: explanatory documents, worksheets, exchange photographs and material produced by the students. This will be developed over the next three years during visits to Finland and Italy.

The Finnish team comprised the students and 4 teachers from Vaala Lukkio School and the Rokua UGGp Education Manager. The Italian team brought together students and teachers from Cobiacchi Technical School as well as the Education Manager from The Sesia Super Volcano Association, the President of

the Sesia Val Grande UGGp and a professor from Turin University. The French were represented by the students of La Versoie, the Coordinator of the Chablais UGGp and teachers from the La Versoie School.

During the exchange students worked through a varied programme by visiting localities in the Chablais UGGp. Daily each site involved different challenges: drinking water resources, natural hazards, human activity and traditional sustainable communities linked to natural resources threatened by changes in the climate. The rich programme provided a voyage of discovery for students and teachers, visitors and locals alike.

The Italian students, communicating by Skype, worked on complementary themes, notably the “Walsler Community”, a traditional society that developed in harmony with the climate and their local resources. Enabled by Skype, all the ERASMUS+ students had the opportunity to meet descendants of this community who spoke in dialect about their traditional way of life and their customs.

The exchange drew to a successful close with students from all countries giving English oral presentations of the different topics they had studied during the week.

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Day four of the exchange: At the top of Niffon Mountain learning about ancient sustainable communities.

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Final experiments before the concluding presentations by the students of their work
© SIAC.



Arouca Geopark (Portugal), Haute Provence Geopark (France) Las Loras Geopark (Spain) and Lesvos Island Geopark (Greece)

Outcomes of ERASMUS+ GEOPARKS (2016-2018)



1. Students engaged in the Geopark project investigate fossils in Haute Provence UNESCO Global Geopark, France.

3. Spectacular cliffs and karst features in Las Loras UNESCO Global Geopark Spain, provide participants in the Geopark Erasmus project with a memorable experience.

2. Students get hands-on experience of petrified trees in the Lesvos UNESCO Global Geopark, Greece.

4. A visit to Canelas Quarry and museum in the Arouca UNESCO Global Geopark provides participants with the opportunity to see the remarkable giant trilobites.

Erasmus+ Geoparks is a project co-funded by the European Union, within the programme Erasmus+ Action 2 Strategic Partnerships. Our partnership consists of four schools, all of them located in geoparks. The schools include the Experimental High School of Mytilene of the University of the Aegean, in the Lesvos Island Geopark, Greece; Lycée Alexandra David Neel in Haute Provence Geopark, France; Agrupamento de Escolas de Arouca in Arouca Geopark, Portugal; I.E.S. Campos de Amaya in Villadiego (Burgos), Las Loras Geopark, Spain. In delivering this project we relied on the invaluable help and assistance of all the organizations of the above mentioned Geoparks: Natural History Museum of the Lesvos Petrified Forest (Greece), Haute Provence Geopark (France), Arouca Geopark (Portugal) and Las Loras Geopark (Spain).



Co-funded by the Erasmus+ Programme of the European Union

Geology is a little known part of our culture and for that reason we have made the school communities and the public aware of the geopark concept, about the geopark in their territory and the need to preserve its heritage. In addition participants were provided with the opportunity to get to know other European Geoparks. Under this pretext, our centres have opened their doors to other European schools as well as local and international institutions to expand our students' horizons and improve their competence in foreign languages. Consequently, we are using innovative tools and methodologies, working on real issues with real institutions and organizations, promoting the use of and up-dating skills in new technologies and foreign languages, as well as developing the personal initiative and entrepreneurial skills of our students.

In delivering presentations about their geoparks, students from every school focused on the geology, flora and fauna and cultural heritage. They gave pre-

sentations in meetings in the different geoparks involved in the partnership. During these meetings students and teachers visited the geoparks, participated in workshops, experienced different cultures and created links. During the last year of the project we created materials to promote our geoparks, such as designing a guided route (Spain); engaging in Land Art (France); creating a geo-tale about the petrified forest of Lesbos (Greece), and designing an information leaflet for children (Portugal). We also promoted entrepreneurial attitudes in our students with activities such as: developing geotourism businesses that provide outdoor sport and leisure activities (Spain and France); creating recipes based on geological phenomena for restaurants (Portugal); devising digital education activities (Greece). This is also a way to motivate students to continue to study and work in their home territories and reduce the failure level in schools.

We are disseminating the results of the project to promote tourism as a tool for enhancing sustainable development in geoparks and making the local population aware of the value of their geopark. All the activities and final products can be seen on the project webpage <http://lyk-peir-mytil.les.sch.gr/fourgeoparks/>. Dissemination is also taking place in teachers training colleges and in Erasmus+ events.

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Idrija UNESCO Global Geopark, Slovenia

Developing Innovative Geoproducts in Idrija Geopark



Individual counselling for local providers concerning the shared development of the innovative geoproducts.



An example of a new geoproduct.



Danube Transnational Programme

Danube GeoTour

The Idrija UNESCO Global Geopark is an area in the western part of Slovenia with exceptional geological features, unspoilt nature, a unique wealth of technical and cultural UNESCO heritage associated with mining mercury, the tradition for making Idrija lace and an interesting cuisine. These attributes provide numerous possibilities for further development and economic opportunities for local providers. One of the main roles of Idrija UNESCO Global Geopark is to establish and interpret the connection between the geological and cultural heritage, local identity, social and economic development.

Within the Interreg Danube GeoTour Project, Idrija UNESCO Global Geopark collaborates with seven other geoparks in the Danube region, developing innovative geoproducts. In this way geoparks contribute to developing a green economy, help in building a local identity that is visible in a transnational context, and contribute in strengthening social and economic aspects. Understanding and communicating geoproducts is a key element and a challenge for all involved geoparks.

The "Guideline for the development of innovative GeoProducts" was established within the Danube Geotour Project to provide a baseline framework for defining geoproducts. The creation of a geo-

product has to follow three basic requirements:

a geologic connection, economic viability and also involve geopark partnerships. During the development stage and use, it must also respect the natural and cultural environment as well as addressing issues involving social inclusion and vulnerable groups. The development of a range of different geoproducts facilitates cooperation with the local population, the improvement of local supply chains and the valorisation of human resources within the local area. It also benefits from one of the most important and innovative geopark assets – networking and partnerships.

The main purpose for developing geoproducts in the Idrija UNESCO Global Geopark is to raise their visibility, to connect local providers with different services in a common network, to generate products with added value and to increase the quality of products and services for the customers.

According to the guidelines three main steps for pilot actions have been prepared by the Idrija UNESCO Global Geopark. The first step is the establishment of a system for the development of geoproducts, involving an assessment system, a quality assurance system and a marketing system. The second step is cooperation with local providers and the shared development of geoproducts. The final step is to conduct testing of the developed geoproducts. In cooperation between local providers and the Idrija UNESCO Global Geopark, two pilot geoproducts are now in the development phase. The first product, the GeoArt & Craft Trail, consisting of art and craft products, services and events. The second geoproduct involves GeoFood Trails, which consist of culinary products, services and events. The Danube GeoTour project is co-financed by the European Union funds (ERDF, IPA).



Testing and evaluating the potential geoproducts.

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Karavanke/Karawanken UNESCO Global Geopark, Austria & Slovenia

Celebrating European Cooperation Day in the Cross-Border Geopark



Participants in the European Cooperation Day in UNESCO Global Geopark Karavanke/Karawanken.

Photo by Urosh Grabner.

European Cooperation Day is celebrated all over Europe and in neighbouring countries on the 21st of September. Most cross-border, transnational and interregional cooperation programmes organize this event for people who are not involved in EU-related activities to showcase project results and highlight the importance of territorial cooperation. This year the European Cooperation Day occurred for the seventh time. In 2011, several INTERREG programmes recognized the need to develop a joint communication activity to promote the outcomes of INTERREG to a wider audience. The slogan of this year's events was "Painting our future together". Numerous festivals, including cross-border hikes, photo competitions, exhibitions and others were organized.

In the framework of the Cooperation Programme INTERREG V-A Slovenia-Austria, this year's European Cooperation Day was organized by the Government Office of the Republic of Slovenia for Development and European Cohesion Policy (the Managing Authority) in cooperation with the Austrian programme partner Amt der Kärntner Landesregierung and the Geopark Karavanke/Karawanken. During the event entitled "Experience the crossborder Geopark", participants visited the former lead and zinc mine in Mežica (Slovenia) and took the cable car up to the top of the Peca/Petzen Mountain (Austria). Especially for this event, all three Geopark educational centres (Mežica, Črna na Koroškem and Lavamünd) prepared an exhibition of paintings with the theme, "Geopark Karavanke/Karawanken in the European future". The Geopark-educational centres Mežica and Lavamünd also organized a short music programme, which included the unofficial Geopark anthem "We are at home in the Geopark", sung in

The exhibition of paintings with the theme "Geopark Karavanke/Karawanken in the European future" organized by the Geopark-educational-centres (Mežica, Črna na Koroškem and Lavamünd).

Photo by Urosh Grabner.



the Slovenian and German languages.

During the event, participants were acquainted with three projects that are being implemented, namely EUfutuR, NaKult and NatureGame.

EUfutuR, a three yearlong project, started in 2016. The main objectives involve strengthening the bilateral cooperation between inhabitants and their active involvement in the Karavanke/Karawanken Geopark activities (IDENTITY) and improving the visibility and international significance of the Karavanke/Karawanken Geopark through European and Global Geopark Network activities (INTERNATIONALIZATION). It also involves modifying the management structure of the Karavanke/Karawanken Geopark to achieve more effective cross-border regional development using the format of the European Grouping of Territorial Cooperation (INSTITUTIONALIZATION).

NaKult and **Nature Game** are new projects, started this year, both co-financed by the European Union, through the European Regional Development Fund, and Land Kärnten (Austrian State Carinthia).

The **NaKult project - Geological hiking experiences in Geopark Karavanke** involves developing and equipping a long-distance geotrail which aims to valorize and enhance awareness of the Geopark's rich geodiversity.

The **Nature Game project - The natural-geological playground Petzen/Peca mountain**, aims to strengthen the awareness of nature (regionally and globally) through a combination of attractive outdoor activities and nature- and geo-experiences. The provision of adventurous activities to encourage the experience of geodiversity and the environment in a playful way will emphasize the importance of the cross border Geopark Karavanke/Karawanken.

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Participants experience the, "Secrets written in Stone" event.

Photo by Urosh Grabner.

Muskauer Faltenbogen / Łuk Mużakowa UNESCO Global Geopark, Germany & Poland



Common Heritage – Common Future:

International Geopark Camp III, Eco meets Geology in the Muskau Arch Geopark

Participants in the Muskau Arch UNESCO Global Geopark's 3rd International Geopark Camp (IGC).



Muskau Arch UNESCO Global Geopark experienced another international summer in 2018. During the 3rd International Geopark Camp, 34 youths from six countries met to discover, investigate and experience the changing landscape in the Lusatia region. Consequently, 15 and 16 years old girls and boys from Lesvos Island (Greece), Hațeg (Romania), Bakony-Balaton (Hungary), Pollino (Italy) UNESCO Global Geoparks and from the transnational Muskau Arch UGp (Germany – Poland) spent one week in the town of Weißwasser/O.L.

The participants considered the issue concerning the current and future possibilities for energy production in the transnational region. There is a long tradition of lignite mining in Lusatia. The first mine was opened in 1843 in the territory of the Muskau Arch UGp. Briquette factories, rail lines, power plants generating electricity, settlements and huge open-cast mines followed with enormous environmental and social impacts in the region. Today, at the beginning of the 21st century, the United Nations Agenda 2030 seeks alternative solutions on a global scale, and addresses the problems for reconciling these solutions with the needs of the population.

In order to achieve a closer understanding of these issues, the camp's participants visited former mining sites and re-cultivated areas, facilities for traditional and modern energy production and water supply. These destinations revealed the existing and possible



Participants in the IGC visit water cleaning facilities in the Geopark.

areas of tension that exist between protecting economic development and the resulting effects on the natural environment and the consumption of finite resources.

The young people shared and processed their experiences and results based on their exposure to economic and environmental issues during the so-called Eco Day - the highlight of the Camp. During Eco Day, they had time to engage in an intensive discussion about personal and real-world needs, based on the United Nations Sustainable Development Goals (SDGs). So far, only a few of the girls and boys had considered such issues. Most of the youths had never taken a close look at all the aspects of Agenda 2030. It was even more surprising that many of them expressed their personal views and the most intensive discussion arose from a position of feeling personally affected. For the creative part of the day, the young people divided into transnational groups, using diverse possibilities to create an exemplary better world with earth models, common videos or paintings and a story.

Beside all these challenges, the participants had a lot of fun during joint cultural evenings and regional dinners, common sports activities and team work. Finally the most important experience for all participants was to consider how to create a more peaceful world through international understanding and respect.

The young people process and share their views on how to change the world.



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Unesco Global Geoparks Greece-Cyprus

Memories of Gaia

A partnership travelling exhibition focusing on Geotourism Development in Insular Geoparks



Presentation of the Global Geoparks Network



Hellenic Geoparks Presentation

The travelling exhibition “Gaia Memories - UNESCO Global Geoparks Greece-Cyprus” presents the impressive geological monuments from the insular UNESCO Global Geoparks of Greece and Cyprus (Lesvos, Psiloritis, Sitia and Troodos) in a comprehensive and attractive way for the general public. Visitors will experience the beauty of the landscapes and the processes that transformed the landscapes over time providing the background for the development of a variety of modern ecosystems. They will also discover the opportunities available to the public to engage in touristic and educational activities.

The exhibition started its journey on October 2018 from Athens and the Eygenides Foundation where it will be hosted until May 2019. From there it will travel via Cyprus to the other Greek island Geoparks.

The exhibition is complemented by educational and informative activities and aims to educate and familiarize visitors of all ages with the world of nature, culture and science.

The exhibition is divided into fourteen units and three main sections containing impressive topics and interactive presentations. The first section presents the UNESCO Global Geoparks and the wealth of their geological treasures. It also highlights the Global Geoparks Network and the net-



working activities which promote the Asia-Pacific Geoparks Network (APGN), the European Geoparks Network (EGN) and the Latin American and Caribbean Geoparks Network on a regional basis.

The second section presents the UNESCO Global Geoparks of Greece and Cyprus. Lesvos, Psiloritis, Sitia, Vikos-Aoos and Chelmos-Vouraikos Geoparks in Greece and Troodos in Cyprus unravel the history of their fascinating monuments, rock formations and fossils. The captivating story continues with audiovisual productions featuring the geosites, natural and cultural monuments that contribute to the beauty of the Geoparks in Greece and Cyprus. These Geoparks are also home to the remains of past life that spurred the human mind to seek answers concerning the origins of life and the world.

In the third section visitors are invited to discover the geotouristic activities and educational programmes organized by the UNESCO Global Geoparks of Greece and Cyprus. Each Geopark functions as an active workshop helping the local population and visitors of all ages, especially children and young people, to discover their relationship with our planet and nature, to become aware of climate change, the wise use of natural resources, to prepare for dealing with natural hazards and to understand and train for a sustainable way of living.

Highlights of the exhibition include unique fossils and an impressive petrified tree trunk from the 20 million years old petrified forest of Lesvos. Floor graphics, fossilized plants and organisms, photographic and audiovisual displays present the evolution of the Geoparks of Greece and Cyprus and the history of the processes that created their spectacular landscapes and geosites.

The exhibition has been organized through the cooperation project “Geotourism Development in Insular Geoparks” / GEO-IN which is financed by E.U. INTERREG Greece-Cyprus and national funds from Greece and Cyprus.

General view of the main exhibition hall



Bergstrasse-Odenwald UNESCO Global Geopark, Germany

The Sustainable Development Goals 2030

as an integral part of communication, education and regional networking



Celebrating
the “Fruit tree
of the year” in
Bergstrasse-
Odenwald
Geopark.



In September 2015 the United Nations agreed on 17 Sustainable Development Goals (SDGs) aimed at ending poverty and hunger, protecting the planet and opening the way for environmentally-friendly development. The big challenge now is to communicate the message from the international and federal level down to the smallest community through events, actions and activities. By building successful regional networks which focus on environmental education, protecting geodiversity and biodiversity, cultural and intangible heritage, UNESCO Global Geoparks are ideally suited for this purpose.

In this context, Bergstrasse – Odenwald UNESCO Global Geopark provides SDG vocational training and lectures for Geopark Rangers as well as for the public, participating in SDG activity days, and regularly organizes events which support specific SDGs. These include, for example, the annual programme in which “Fruit Tree of the Year” fosters SDG No. 15 (*protect and promote sustainable use of terrestrial ecosystems and halt biodiversity loss*) while the geo-educational activities (e.g. geo-work-

shops, nature-researchers and Geopark Ranger programmes), strongly underline the relevance of SDG No. 4 (valuable education for all). Furthermore, SDG 17, international partnerships, is addressed by the Geopark’s affiliations with UNESCO Global Geoparks Mt. Lushan, Hongkong, China, and Naturtejo, Portugal. Cooperation with the World Heritage Sites Messel Pit and Lorsch Abbey contribute to SDGs 11 and 16 by promoting and strengthening the impact of these institutions on communities. The development of Geopark projects and programmes naturally take into account relevant SDGs and contribute towards creating a regional identity. In addition, the Geopark has developed a comprehensive SDG web platform, which communicates the SDGs in combination with information, relevant links and ongoing projects and contributes substantially to the SDG working groups at the European and Global level. Currently, an interactive map of the territory, which highlights special SDG supporting activities of the member communities and counties, is being developed.

From a general perspective, all these aspects help to discover the multifaceted diversity of our planet, the individual landscapes, their evolution and their significance for us humans, leading to a greater appreciation of nature and the environment and an awareness of the need for their protection.

The most important aspect in this context is the ability of the UNESCO Global Geoparks to transform the rather abstract SDGs into hands-on activities and projects, which help raise the awareness about these goals in a clear and understandable manner. Thus they act as transformation platforms between international declarations of intent and on-site implementation. Therefore, the UNESCO Global Geoparks are considered worldwide as model regions for the Sustainable Development Goals 2030.

And the obvious basic message is, that it should be our own interest to work towards ensuring the long-term stability of conditions, which enable life – including us humans – to survive on Earth.

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Geoworkshop
at UNESCO
WHS Messel Pit:
Creating your
own fossils.



International
exchange visit
from Japanese
UNESCO Global
Geoparks
and LIONS
members, led
by Hongkong
UNESCO Global
Geopark.

Vulkaneifel Geopark wins the “Successfully connected in Europe” competition

Heinz-Peter Thiel and Julia Franzen from Vulkaneifel UNESCO Global Geopark receiving the award from the German Association of Towns and Municipalities and Federal Ministry of the Interior, Building and Community.



The German Federal Ministry of the Interior, Building and Community acknowledges cities and regions, which jointly realise projects with European partners thus actively shaping their local development. A jury has now selected the four winners of the competition “Successfully connected in Europe” and announced that the Vulkaneifel UNESCO Global Geopark, as a founding member of the European Geoparks Network shows in an exemplary way how the natural features of a region can be used positively for its economic and touristic development in a European context.

Marco Wanderwitz, Parliamentary State Secretary at the Federal Ministry of the Interior, Building and Community stated that “The winners of our competition show an outstanding example, how cooperation across borders may enhance the development of cities and regions and at the same time strengthen the public spirit and the identification with Europe”.

From 45 to 35 million years ago the first volcanoes formed in what is today the UNESCO Global Geopark Vulkaneifel. The president of the German Commission for UNESCO, Prof. Dr. Maria Böhmer explained: “Today this outstanding geological heritage shows us how the Planet has changed over millions of years. It also shows us how sustainable development can work in the future. With gentle tourism and successful education the UNESCO Global Geopark Vulkaneifel makes that tangible



GEWINNER DES JAHRES
2018

**ERFOLGREICH
VERNETZT
IN EUROPA**

**GEMEINSAM
STÄDTE UND REGIONEN
GESTALTEN**

The logo of the “Successfully connected in Europe” award presented to Vulkaneifel UNESCO Global Geopark in 2018.

for young and old.” The involvement of all local stakeholders – from policy makers to businesses, environmental organizations and the local population – is a factor for the success in the Vulkaneifel. Prof. Böhmer concluded her address with the statements: “The Europe-wide cooperation of the UNESCO Global Geopark Vulkaneifel is exemplary! Those who are responsible for this project demonstrate that networking across borders opens new perspectives and strengthens the view of our common heritage. The acknowledgment of the UNESCO Global Geopark Vulkaneifel with the award “Successfully connected in Europe” is therefore richly deserved”.

The competition is part of a wider Project of the German Federal Institute for Research on Building, Urban Affairs and Spatial Development focusing on European cooperation in relation to topics relevant to spatial development. While the competition identified how towns, cities and regions with strong European connections used these to their advantage, preliminary and accompanying studies analysed the potential advantages, constraints and factors for success resulting from more European cooperation. The results will lead to practical guidelines which provide motivating examples and methods as well as generating policy recommendations to promote connections and cooperation between European towns, cities and regions.

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Copper Coast UNESCO Global Geopark, Ireland

Keeping local crafts alive by starting an annual craft fair in the Copper Coast Geopark



The Copper Coast UGGp Embroidery Workshop.

As a community based Geopark run by volunteers, the Copper Coast UNESCO Global Geopark is dedicated to the promotion, preservation and conservation of local crafts and crafts people.

Traditional methods of manufacturing local products are an important part of the intangible heritage of the Copper Coast Geopark. Previously the Copper Coast Geopark has focused on promoting this aspect of our intangible heritage by selling local products in its visitor centre and promoting these products through Geopark events and marketing. This year the volunteer management committee decided to develop a promotional event that would showcase local artisans and techniques with a day of workshops for the general public during the autumn season.

Funding to facilitate this event was successfully

sourced from Creative Ireland (a national initiative to promote creative activities across Ireland). The idea to include the programme for a Copper Coast Skills taster day was developed by Geopark Management Team member Orlaith Hamersley. The event featured local artisans showcasing a range of crafts and skills from sailor's knots to Bayeux tapestry style embroidery and resulted in a great afternoon with people from across the country coming to our visitor centre in the village of Bunmahon within the Copper Coast Geopark. The event will hopefully be the first of many such promotional activities to showcase and keep alive the many local crafts that make up the intangible heritage of the Copper Coast UNESCO Global Geopark.

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Participants in the workshop learning how to make traditional sailors knots.



Participants engage in traditional knitting techniques.





HATEG Country UNESCO Global Geopark, Romania

Development of Geoproducts in Hateg Country Geopark

The House of Stone, Ohaba Sibisel Village. Photo by Constantin Cretescu.



Geoproducts are locally manufactured products linked with geopark activities and are symbols of local geological and cultural heritage. As marketable goods they introduce the local products and local handicrafts as cultural objects to tourists and also contribute to increasing the public's knowledge about geology. The concept of geoproducts is a key element of the Geopark's organization, often associated with the Geopark's mission for socioeconomic development. The presentation of Hateg geoproducts during the 2nd Creative Traditions Forum held during October in Hateg and Bucherest allowed the general public to evaluate the products and contribute ideas for further development.

In Hateg Country Global Geopark stories about the dwarf dinosaurs of Transylvania, as well as the tales of the earth, nature and people, have been developed as geoproducts made available in a network of visitor centres and sites designated as "Houses of the Geopark" and "Dino Stops". We are using an innovative approach to develop an infrastructure for geotourism and education based on iconic geological assets and the intangible heritage that has been unfolding over generations. Based on scientific research, the subjects selected with the intention to connect science and art include: dinosaurs, volcanoes, intangible heritage, rocks, local architecture, people and the rural landscape. For each subject, the following small, unique visitor centres called "houses" were created: *House of the Geopark*; *House of Science and Art*; *House of Dwarf Dinosaurs*; *House of Volcanoes*; *House of Traditions and House of Stones*. Furthermore, we are planning to build more houses to tell new stories about plants, butterflies, time, water, pottery and local caves. These houses and other historical, natural and cultural assets are linked by thematic trails allowing visitors to discover the area.

In partnership with local communities and investors, distinct *Dino Stops* are being developed. A *Dino Stop* is a site that combines the artistic reconstruction of a unique dinosaur species with the provision of a choice of souvenirs, coffee, local

meals and information. Developed in partnership with local associations or producers, *Dino Stops* are small commercial sites and tourist attractions. They provide visitors with an overview of the local identity and geodiversity combined with heritage management and marketing development.

In our case a geoproduct is not only another local product, it comes with a deep connection to the Earth with a strong sense of identity at a local level. Each geoproduct is unique in its construction and involves a story about people and the place they inhabit. As a result, we find that the philosophy of a geoproduct takes into account three factors: identity, production and marketing. In the framework of the Interreg Danube GeoTour Project co-financed by the European Regional Development Fund (ERDF) and Instrument for Pre-Accession Assistance (IPA) funds, we developed practical guidelines with the purpose of defining the geoproduct concept, explaining its philosophy, showing how a geoproduct can be constructed and characterized by adopting the best practices from the project partners and from other EGN members.

Located in the Southwest of Transylvania, Hateg Country UNESCO Global Geopark was developed and is managed by the University of Bucharest.

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The House of Volcanoes, Densus Village. Photo by Remus Suci.



Cabo de Gata-Níjar UNESCO Global Geopark, Spain

Winter Geopark: A brand new programme in the Cabo de Gata-Níjar Geopark



A participant is fascinated by the mega cross-bedding on the El Argamasón georoute.



Participants enjoy the final georoute of the programme at La Cueva del Pájaro.



Participants experience the dramatic views of the cliff along La Molata georoute.



During the very active season last winter, Cabo de Gata-Níjar UNESCO Global Geopark launched a new geoeucational programme in collaboration with locally based geotourism enterprises, the Carboneras Municipality and the Geopark's staff. The programme was conceived as a tool to encourage people to visit the Geopark during the winter months, in an area that is internationally known for its beaches and maritime landscapes.

With the help and collaboration of geotourism enterprises in the Geopark and the Carboneras Municipality, we managed to establish a new georoute every weekend during the period from February to the last weekend of April 2018, including holy week, which is the beginning of the tourism season in Cabo de Gata.

How did it come together? Following the basic idea, we started to work with enterprises to carefully select the georoutes. We wanted to

offer an activity for every body, in other words, short, long, easy, difficult, by the sea, inland, and in unknown places. So finally we created eleven georoutes, always on Saturdays, and every single event involved the Geopark's commitment.

From the bluest sea and the isolated light-houses, crossing volcanic calderas and fossil reefs, visiting castles, and the highest points of the Geopark, to well known touristic beaches, we discovered for the people every weekend a little of the magic of this small corner of Spain. We also succeeded to explain to the participants the volcanic origin and evolution of the Cabo de Gata Volcanic Complex, one the most important submarine volcanic outcrops of the western Mediterranean.

The first Saturday of the programme was promoted during prime time on the Andalusia Regional TV, News with an interview with Lucia Tejero, the Geopark's manager. Every single week, a press note was published to let people know which route was programmed for every weekend. Starting the programme was challenging but every weekend more and more people started to join and by March it was clearly a success for everyone involved.

Here we want to say thank you to every enterprise which collaborated with us. They joined the programme knowing that the economic benefit was next to nothing. However, even this did not deter them from participating because they believe in the concept. What can we say? See you next winter with more Winter Geopark!!! THANK YOU!!!

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Bakony–Balaton UNESCO Global Geopark, Hungary

Routes of fire: wandering on new volcanic trails



The 'Basalt Organs' of Szent György Hill.
Photo by Zoltán Szenthe.

Bakony–Balaton UNESCO Global Geopark has an outstanding geodiversity (172 rock formations) but its most iconic landscapes were undoubtedly, formed by volcanism. Approximately 50 volcanoes erupted in this area 8–2.3 million years ago: the emblematic basalt-capped volcanic remnant hills, landmarks of the Geopark, were shaped by erosion processes.

The volcanic landscapes are popular destinations for our visitors, and also pillars of geotourism. Balaton Uplands National Park Directorate, as the management organization of the Geopark, operates 14 visitor centres and interpretive sites. Seven of these are connected to the rich geological-volcanic heritage.

The disused basalt quarry of Hegyestű is one of the most important geological interpretive sites in the Geopark where, thanks to the Interreg Danube

Geo Tour Project, a new volcanological exhibition to attract visitors with a set of science-based interactive attractions and visual take-home experiences will open in the near future. Visitors will find a unique exhibition at this matchless site (did we just forget to mention that you are actually standing inside the crater of a former volcano?), with a fantastic panorama, but do not focus only on the characteristic basalt columns, as these are just an appetizer for further exploration.

At the gate of the picturesque Káli Basin, we still have a long way to go and wondrous lessons to learn in addition to the Geopark's volcanic, natural and intangible heritage. The 27-km-long route of our brand new 'Fire Nature Trail' reveals various events in the history of the area, and an accompanying booklet also provides a glimpse into the volcanic heritage of the Danube region.

Our journey ends at yet another spectacular 360°panoramic site. The surrounding hills, the remains of former volcanoes, line up at your feet like desserts on a menu card. The "Geopark's chef" presents you with the just redesigned and much shorter 'Ring of Fire' and 'Basalt Organs' nature trails in the remarkable Badacsony and Szent György hills. If you are really hungry why not try out some of our recently developed geoproducts? Congratulations, you just discovered a part of the Danube GeoTour.

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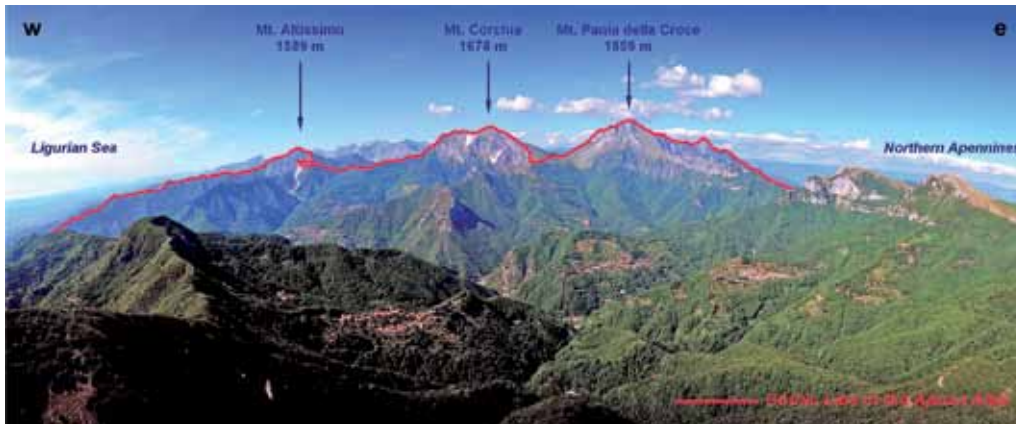
Visitors at Hegyestű Geological Interpretive Site.
Photo by Barnabás Korbély.



One of the 31 new interpretive panels presenting the volcanic heritage of the Geopark and the iconic landscape of the Tapolca Basin.
Photo by Barnabás Korbély.

Apuan Alps UNESCO Global Geopark, Italy

Way-marked trails along the Gothic Line in the Apuan Alps Geopark



The western most sector of the battlefield during the Italian Campaign during the Second World War.

During the last year of the Second World War (August 1944 – April 1945), the Gothic Line, a 320 km-long belt of German fortifications against the Allies (Anglo-American armies) and the Italian partisan forces, was established in Italy, from the Ligurian to the Adriatic Sea, through the Apuan Alps and the Northern Apennines.

The Gothic Line consisted of a series of strong-points which exploited the topography involving the highest peaks, steep ridges and rock faces, and other natural obstacles such as rivers and wetlands. The natural defensive system was supplemented by military fortifications built by the Todt Organization, employing mainly Italian workers under the command of German engineers.

The rocky bastions of the Apuan Alps formed the westernmost sector of the Gothic Line with hidden observation posts, trenches, dugouts and bunkers. These natural and military fortifications were manned and defended at the highest points of the mountain range by the 4th Alpine Division “Monterosa” from the Italian Social Republic and soldiers from the German 10th and 14th armies. The Italian and German armies held the battlefield for seven long months, in part due to the fortified positions located in the difficult terrain in the Apuan Alps sector. Their most successful action in the whole of the Italian Campaign.

Here, the Second World War left a legacy of a long trail of blood, including the Nazi-fascist massacre of 560 local villagers and refugees in Sant’Anna di Stazzema, on 12th August 1944.

Nowadays, the Gothic Line fortifications are sufficiently well preserved in the Apuan Alps,



“Sitting Bull” observation post and dugout in Mosceta-Passo dell’Alpino.



A guided visit inside the “Sitting Bull” dugout.

even without specific activities of conservation and reconstruction. However, the Apuan Alps UGGp and local communities agreed to carry out the progressive restoration and promotion of the most significant trenches and dugouts in the Mt. Corchia-Mt. Pania group.

Here the dugouts were excavated, mainly in the phyllites and calcareous schists of the Palaeozoic basement, on the east-dipping limb of the Mt. Corchia syncline, taking advantage of the relatively low rock resistance and the structural setting. Due to the low permeability of the rocks, the dugouts host a unique wildlife with two endemic species of Cave salamander, *Speleomantes italicus* and *Speleomantes ambrosii*, classified as “near threatened” according to the International Union for the Conservation of Nature.

The first goal of this project is to preserve the historical memory of tragic war events for future generations, while the second is to promote the existing trails in the Apuan sector along the entire length of the Gothic Line.

Consequently, the gradual recovery and enhancement of these fortifications has started, increasing the tourist appeal along marked trails in places full of historical and natural interest. The information panels are not limited to the cultural perspective of the military fortifications, they also deal with the geological and biological components of the landscape around these buildings.

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Odsherred UNESCO Global Geopark, Denmark

The Geopark introduces two new Information Points, and initiates two future Information Hubs



Artist's impression of the outreach unit for disseminating information about the coastal development of the eastern part of Odsherred.

One of the most important recommendations concerning the Geopark's operation and management included in the evaluation report approving Geopark Odsherred's membership of the European Geoparks Network in 2014, was to establish, or at least develop, plans for a new Geopark visitor centre, to act as a major visitor distribution hub for the wider Geopark.



In 2017 the Geopark's Board and Secretariat initiated the project, which, rather than establishing one big centre, will eventually develop four information points over the next two to three years. Locations for the info points and the information provided had to be decided and designers had to be appointed. In this context, the Geopark's Secretariat wished to locate the info points to benefit areas with confirmed Geopark partners.

The first two info points will focus on the geology of the northern part of the Geopark area and on the general concept of a Geopark. They will be located

in a restaurant/café (Klint), and in the same building as the tourist and Geopark Office (Nykøbing Sjælland). The last two locations are intended to focus on art history at the Arts Museum (Asnæs), and local produce at Dragsholm Castle. Both sites are located in the southernmost part of the Geopark.

In spring 2018 the production of the exhibition content for the first two localities was developed, and on June 29th, the first two info points opened to the public. At present, the Geopark Secretariat is working on acquiring financial support for the next two hubs, which are expected to open sometime around spring 2019.

The info points include inspiration maps, enlarged reality view stations, information dissemination panels, and listening stations for children. Their designs are adapted for the local area providing each site with a unique atmosphere. Furthermore, at the info points staff are available during normal opening hours. This means that we can reduce expenses to a minimum, and focus on the visitor's experience.

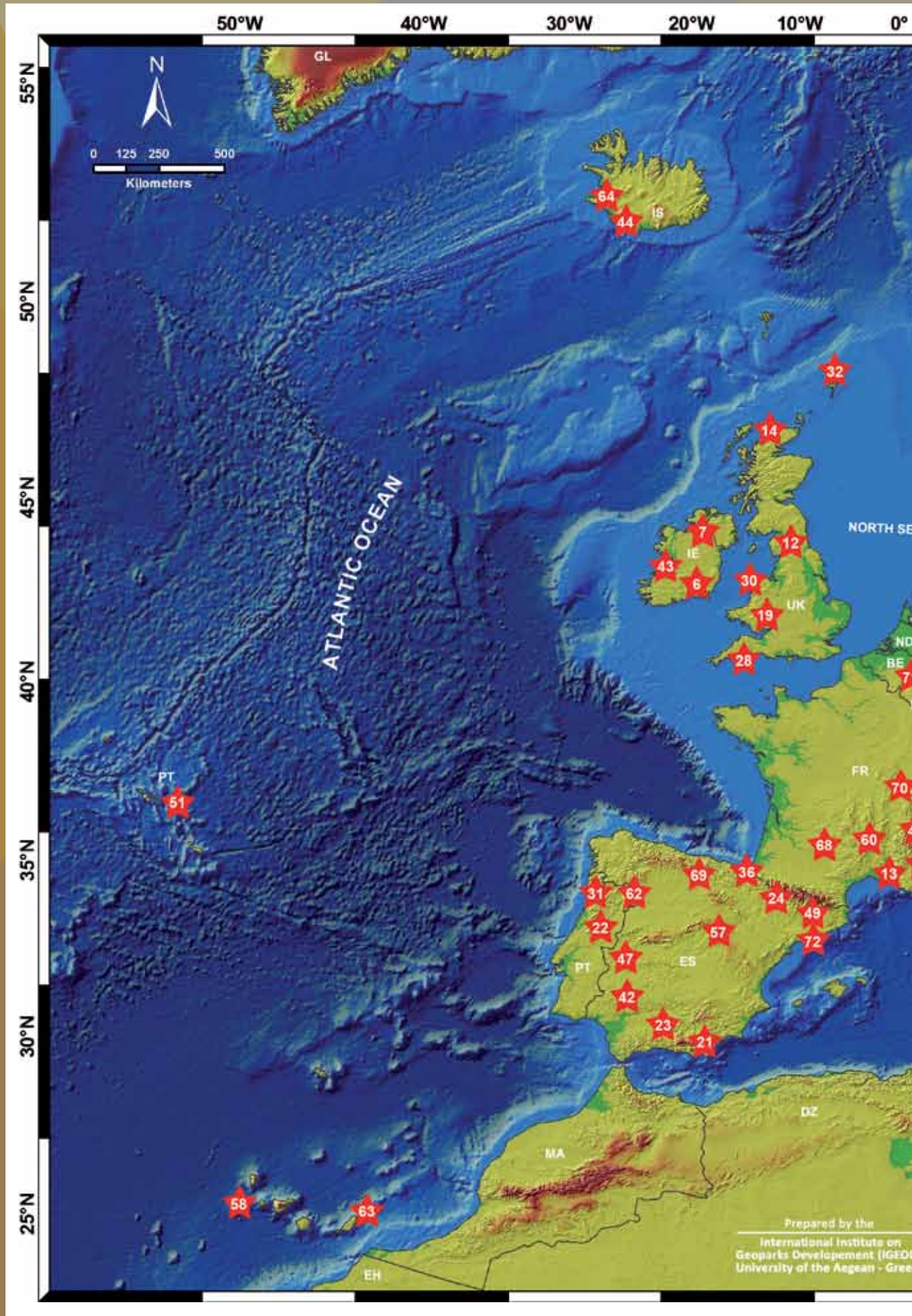
Hans-Jørgen Olsen, director of Geopark Odsherred stated that: *"The geopark area is quite limited (only 355 km²) and therefore, we have a fair chance of enticing people to make full use of the open landscapes. But we also want to provide the visitor with an (indoor) opportunity to understand the full Geopark concept. In that sense, the decentralized visitor hubs provide the public with a thorough insight into the daily work of the Geopark, and we are pleased to see how well, the public have taken to this welcomed addition to the geopark"*

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Artist's impression of the outreach unit, focusing on different seasonal activities in the Geopark.



The European Geoparks



The Network consists of 72 Geoparks in www.european-geoparks.com

arks Network today



24 European countries (February 2019)
geoparks.org



1	Haute-Provence Geopark	FRANCE	36	Basque Coast Geopark	SPAIN
2	Vulkaneifel Geopark	GERMANY	37	Cilento, Vallo di Diano e Alburni Geopark	ITALY
3	Lesvos Island Geopark	GREECE	38	Rokua Geopark	FINLAND
4	Psiloritis Geopark	GREECE	39	Tuscan Mining Park Geopark	ITALY
5	TERRA.vita Geopark	GERMANY	40	Vikos – Aaos Geopark	GREECE
6	Copper Coast Geopark	IRELAND	41	Muskauer Faltenbogen / Łuk Mużakowa	GERMANY & POLAND
7	Marble Arch Caves Geopark	IRELAND & UK	42	Sierra Norte de Sevilla Geopark	SPAIN
8	Madonie Geopark	ITALY	43	Burren and Cliffs of Moher Geopark	IRELAND
9	Rocca di Cerere Geopark	ITALY	44	Katla Geopark	ICELAND
10	Styrian Eisenwurzen Geopark	AUSTRIA	45	Massif des Bauges Geopark	FRANCE
11	Bergstraße-Odenwald Geopark	GERMANY	46	Alpi Apuani Geopark	ITALY
12	North Pennines AONB Geopark	UK	47	Villuercas-Ibores-Jara Geopark	SPAIN
13	Luberon Geopark	FRANCE	48	Chablais Geopark	FRANCE
14	North West Highlands Geopark	SCOTLAND, UK	49	Central Catalonia Geopark	SPAIN
15	Swabian Albs Geopark	GERMANY	50	Bakony-Balaton Geopark	HUNGARY
16	Harz – Braunschweiger Land Geopark	GERMANY	51	Azores Geopark	PORTUGAL
17	Hațeg Country Dinosaurs Geopark	ROMANIA	52	Karavanke/Karawanken Geopark	SLOVENIA & AUSTRIA
18	Beigua Geopark	ITALY	53	Idrija Geopark	SLOVENIA
19	Fforest Fawr Geopark	UK	54	De Hondsrug Geopark	NETHERLANDS
20	Bohemian Paradise Geopark	CZECHIA	55	Sesia Val Grande Geopark	ITALY
21	Cabo de Gata – Nijar Geopark	ANDALUCIA, SPAIN	56	Kula Geopark	TURKEY
22	Naturtejo da Meseta Meridional Geopark	PORTUGAL	57	Molina and Alto Tajo Geopark	SPAIN
23	Sierras Subbéticas Geopark	ANDALUCIA, SPAIN	58	El Hierro Geopark	SPAIN
24	Sobrarbe - Pirineos Geopark	ARAGON, SPAIN	59	Ore of the Alps Geopark	AUSTRIA
25	Gea Norvegica Geopark	NORWAY	60	Monts d' Ardèche Geopark	FRANCE
26	Parco Geominerario della Sardegna Geopark	ITALY	61	Odsherred Geopark	DENMARK
27	Papuk Geopark	CROATIA	62	Terras de Cavaleiros Geopark	PORTUGAL
28	English Riviera Geopark	UK	63	Lanzarote and Chinijo Islands Geopark	SPAIN
29	Adamello - Brenta Geopark	ITALY	64	Reykjanes Geopark	ICELAND
30	GeoMôn Geopark	WALES, UK	65	Pollino Geopark	ITALY
31	Arouca Geopark	PORTUGAL	66	Sitia Geopark	GREECE
32	Shetland Geopark	SCOTLAND, UK	67	Troodos Geopark	CYPRUS
33	Chelmos – Vouraikos Geopark	GREECE	68	Causses du Quercy Geopark	FRANCE
34	Novohrad – Nograd Geopark	HUNGARY & SLOVAKIA	69	Las Loras Geopark	SPAIN
35	Magma Geopark	NORWAY	70	Beaujolais Geopark	FRANCE
			71	Famenne-Ardenne Geopark	BELGIUM
			72	Conca de Tremp-Montsec Geopark	SPAIN

Chelmos-Vouraikos UNESCO Global Geopark, Greece

Activities and events in the Chelmos-Vouraikos Geopark



Participants celebrating the World Environment Day enjoy the forest during a guided tour of the educational trail "Agios Ioannis-Keramidaki".

The Chelmos - Vouraikos Management Group participated in a number of activities and events within the framework of the European Geoparks Week, between 2-6 May 2018, to promote the National Park and the UNESCO Global Geopark, as well as the European (EGN) and Global Geoparks Network (GGN). Schools from all over the country participated during this period in activities aimed at bringing children close to nature and learning about the richness and value of flora and fauna in our country and especially, the plants and animals of Chelmos Vouraikos National Park.

Within the framework of the events "EN SYRMO 2018 - Odontotos Festivities" from 27 April to 31 May, organized by the Municipality for Public Benefit of Aegialia, the Chelmos-Vouraikos Management Group had the opportunity to deliver the interactive Chelmos-Vouraikos National Park and UNESCO Global Geopark presentation at the Geopark's Information Centre to the students of various schools from the regions of Chios, Cyclades, Attica and Achaia. On 8 May,

the Environmental Team of the Anthoussa Secondary School visited Chelmos-Vouraikos National Park and UNESCO Global Geopark within the framework of a school programme entitled "Biodiversity and Threats to Biodiversity". This involved guided tours within the Geopark's geotopes. On the 13th of May, the 38th Annual Crossing of Vouraikos Gorge was organized by the Association of Mountaineering - Skiing - Climbing and Environmental Protection of Kalavrita. On 20 May, a children's workshop "The Gorge of Inspiration" organized by the Environmental Education Centre of Klitoria-Akrata took place with events for children aged 6-12. This involved toys, paintings and activities of environmental interest at the Zachlorou - Train Bridge, in the Vouraikos River Gorge which inspired the great painter Yannis Spyropoulos.

During two days, 4-5 June, Chelmos-Vouraikos Management Group played an active role in the educational activities provided by the Primary School of Kalavryta. This involved the provision of supporting material together with the participation of the Forest Protection Specialists. On Monday, 4 June, guided by their teachers, the area around the Primary School of Kalavryta, with the help of the Kalavrita Police Department, was appropriately organized as a traffic education park, with the aim of learning about the importance of road safety and road behaviour. The Chelmos-Vouraikos Management Group participated in this event by supplying seven mountain bikes and helmets. Also, on Tuesday 5 June, during the World Environment Day, the Forest Protection Specialists of the Chelmos-Vouraikos Management Group, organized a guided tour on the educational trail "Agios Ioannis-Keramidaki" for the 4th and 5th grade students of Kalavrita primary school to inform them about the area's natural environment.

1. Poster for the "EN SYRMO 2018 - Odontotos Festivities" from 27 April to 31 May.

2. Participants in one of the educational programmes.



1

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Styrian Eisenwurzen UNESCO Global Geopark, Austria

GeoRafting – Experiencing geology

Development of a new innovative GeoProduct within
the funded project Interreg Danube GeoTour



Danube Transnational Programme
Danube GeoTour

GeoRafting? - Experience earth's history in a rafting boat aka "Travel through time, engage in sports and explore the Salza Valley". Take a tour to learn all about the Gesaeuse region, about the Nature and Geopark Styrian Eisenwurzen and the formation of the Salza Valley. Discover 200-million-year-old rocks, conglomerates and deposits from the Ice Age, beautiful gorges, as well as steep slopes with a unique biodiversity.

The characteristic elements within the UNESCO Global Geopark Styrian Eisenwurzen, Austria are formed by water: rivers, springs, gorges and caves. The area and the River "Salza" are very famous for white water sports such as rafting or kajaking. These provide the basis for the development of GeoRafting. Everything started some years ago with a proposed project by our geologist Heinz Kollmann. He saw the potential for developing a new tool to attract another target group.

The idea of GeoRafting is to provide interested visitors with more information about the Nature and Geopark Styrian Eisenwurzen, including its biodiversity, geological and cultural heritage during a rafting tour. Along the route participants will see and enjoy a very unique landscape shaped by water. At the various stops and geological highlights, the rafting guides provide the participants with interesting facts.

During the funded project Interreg Danube Geo Tour, the Geopark Management Team together with its partner Rafting Camp Palfau now has the possibility to develop GeoRafting including:

- Implementing the concept.
- Providing workshops and training materials for GeoRafting guides in German and English



- Marketing activities with flyers and videos in different languages, engagement with social media, a web page and other activities..

The main result of this Interreg transnational project will be a joint Danube GeoTour designed to strengthen cooperation between the regions of the eight participating Geoparks and act as an innovative tourism product to accelerate visibility and promote tourist visits in these Geoparks. Sharing experiences, testing pilot geotourism products and new interpretative approaches should increase the local inhabitants' participation, Geopark management capacities and ensure equal quality provision between the Geoparks in the Danube region and other European Geoparks. The project is co-funded by the European Regional Development Fund (ERDF) and the Instrument for Pre-Accession Assistance (IPA) which replaces a number of European programmes.

More information about the project and GeoRafting are available within the following links: www.interreg-danube.eu/danube-geotour
www.eisenwurzen.com
www.raftingcamp.at

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GeoRafting on the River Salza in the Nature and Geopark Styrian Eisenwurzen.
Copyright Stefan Leitner – NP Gesaeuse.



GeoRafting Workshop with interested rafting guides in April 2018. Copyright Nature and Geopark Styrian Eisenwurzen.



Filming at at the River Salza, May 2018. Copyright Robert Gamperl.

Thematic Routes in the Vikos-Aoos Geopark: a continual experience

Installing an information panel on the route - "The "miraculous" flora of the Vikos Gorge".



Rare species of plants that grow in the meadows along the trail.

The Vikos Aoos Geopark is located along the northwestern borders of Greece. During the last years Epirus SA, the Region of Epirus and the Geopark's Municipalities, as members of the Geopark's Coordination Committee, initiated the project "NET ROUTES" in cooperation with the administrative authorities of Gjirokastra, Albania. The primary goal of this project was to highlight the common border area of the two countries through a network of Thematic Routes, in order to serve as a common destination for alternative tourism, where visitors will be made aware of its rich natural and cultural heritage. One of these Thematic Routes is presented here.

"The "miraculous" flora of the Vikos Gorge"

Vikos Aoos Geopark, and especially Mt Timfi, is among the most interesting botanical regions of Greece with about 1,700 species of plants. In the Vikos Gorge, in the heart of the Geopark, one can find many of the rare plants in the area. Horse chestnut trees (*Aesculus hippocastanum*) grow on the steep slopes of the gorge. This tree is native to the countries of the Balkan Peninsula and is included in the United Nations global list of species in need of protection. In spring, color is added to the rocks by snowdrops (*Galanthus reginae - olgae* subsp. *vernalis*), Centaury (*Centaurea pawlowskii*) and Madonna lilies (*Lilium candidum*). These have a restricted distribution in Greece and are protected by legislation including the Berne Convention, the CITES Treaty and the Presidential Decree 67/1981 of the Greek State. Serbian phoenix (*Ramonda serbica*), among the rarest plants in the gorge and a remnant of an earlier geological period when Europe had a tropical climate, is of special interest.

The significant botanical value of the area is en-



An information panel focusing on medicinal plants and famous local healers, the co-called "Vikos' doctors".

hanced by the existence of many medicinal herbs, which are used by the residents of Zagori for therapeutic purposes. In fact, the area was the birthplace of the famous "Viko-giatroi" ("Doctors" from Vikos), practical healers who cured the sick using various herbs sourced from the large natural pharmacy of the Vikos Gorge. These included the European centaury (*Centaureum erythraea*), Felty germander (*Teucrium polium*) a drought loving plant, common sage (*Salvia officinalis*), Mountain tea (*Sideritis raeseri*), Hellebore (*Helleborus cyclophyllus* subsp. *odorus*), St. John's Wort (*Hypericum perforatum*) and many others..

The old paved steps of Vradeto ("Skala" Vradetou) that ascend the Mezaria Gorge (an offshoot of the Vikos Gorge) connect the villages Kapesovo and Vradeto, and the old path leading from Vradeto to the view point of

Beloi (the balcony of Vikos Gorge). Along the botanically rich path of just 5 km, 350 plant species and subspecies are recorded. One in three plants is recognized as being of particular interest. It is either native to Greece or the Balkans, or rare and protected by law, or is used pharmaceutically.

Other thematic routes, which are being developed as part of the same project, are as follows: "Hunters of the last Ice Age in the Voidomatis Valley" (see EGN Magazine, Issue 11), "The Mysterious Rocks in Papigo", "The Hidden Thesaurus: Architecture in Konitsa", and "The Geopark's Geo-biodiversity". Additional routes are currently being implemented by a new Greece - Albania Interreg project.

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Basque Coast UNESCO Global Geopark, Spain

The Geopark Unveils an Exact Replica of a Spectacular Ichnofossil

A view of the flysch cliffs which characterize the Basque Coast.



Around ten ichnofossils of huge scientific interest have been identified in the cliffs of the flysch formation within the Basque Coast UNESCO Global Geopark. The specimens are continuously monitored so that any problem linked to natural erosion can be quickly identified.

A few months ago, the team of scientists in the Geopark discovered that one of these fossils was about to be detached and damaged. In response, the team launched an innovative project to obtain an exact replica of this ichnofossil assigned to the ichnogenera *Scolicia* which are attributed to burrowing echinoids (sea urchins).

The Geological Survey of Spain (Spanish acronym IGME) has been entrusted with replicating the fossil under the leadership of Eleuterio Baeza, curator of the IGME's Geomining Museum. It has been a painstaking process, but the result is an exact replica of the ichnofossil with maximum replication in terms of its size, shape and texture.



Making a mold of the ichnofossil in the field.

The decision was taken to replicate the fossil owing to its sensitivity to environmental factors and the difficulties inherent in extracting it from the rock undamaged. The genuine fossil can therefore be preserved in its original location without altering its physical environment.

The reproduction contains the greatest concentration of well-preserved trace-fossils, more than 50, recorded to date along the entire Basque Coast.

The fossil in this case contains a collection of burrows measuring six metres long and roughly one metre wide produced by members of the sea urchin family.

The specimen is special not only for its size but for its excellent state of preservation. It is around 53 million years old and formed at approximately 1000 metres in the depths of the ocean.

In the words of Asier Hilario, Scientific Director of the Geopark, "it has a strikingly unusual accumulation of fossil traces in just one layer; the environment may have been rich in nutrients and the high concentration of traces may be due to an abundance of food, though this is just one interpretation. We have no evidence confirming this".

In addition to its scientific value, the fossil is of huge educational interest. This is the reason why the replica will be permanently exhibited in the Algorri Interpretation Centre in Zumaia. The Basque Coast Geopark now has one more resource at its disposal for promoting its rich heritage.

Presenting the replicated ichnofossil to the general public.



Video: https://youtu.be/s3_SlYVvyqg?t=38s
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Harz - Braunschweiger Land UNESCO Global Geopark, Germany

Landmarks in the Geopark Harz - Braunschweiger Land - Ostfalen, Germany.

Geopark Ambassadors for the ECHY 2018

Reconstruction of the Western Gate to the former Imperial Palace of Werla a significant landmark in the Geopark with a view of the Brocken Mountain.



The Geopark Harz - Braunschweiger Land - Ostfalen is a very large Geopark with an area of approximately 9,600 square kilometres. Therefore, a landmark project that subdivides the Geopark into 34 areas, is used as a 'first step-programme' to visit the Geopark and learn the essentials about the history of the region.

Some landmarks, like the "Brunswick Lion", reveal the history of the main city of the Geopark area and, together with the "Imperial Palace of Werla", are sites of historical significance. Consequently the Geopark has developed a strong co-operation with archaeologists and historians. The project is a good example of this co-operation and is approved as an official project for the European Year of Cultural Heritage (ECHY) 2018.

The landmark "Imperial Palace of Werla" presents a place, that in the Middle Ages, was one of the

most important sites in the the history of northern Germany. Between 919 and 1013, all German kings visited Werla, and the succession to the throne was decided here on two occasions.

A long period of archaeological investigations, together with a careful analysis of the medieval texts, provide detailed information about the history of Werla, its architecture and its infrastructure. Of particular interest is the interaction between the natural environment and the use of resources by humans. These studies, which can be described as landscape archaeology, relate, for example, to the origin of the building materials, the demand for timber or for supplying the 22-hectare site from the surrounding area. Using Werla as an example, the "ecological footprint" of a medieval royal manor is discussed.

The presentation of the archaeological structures involves a system of environmental and landscape protection. This system was implemented for the first time in northern Germany in Werla. Since 2012 Werla has become a case model for the archaeological preservation of monuments and one of the most important places to visit inside the UNESCO Global Geopark.

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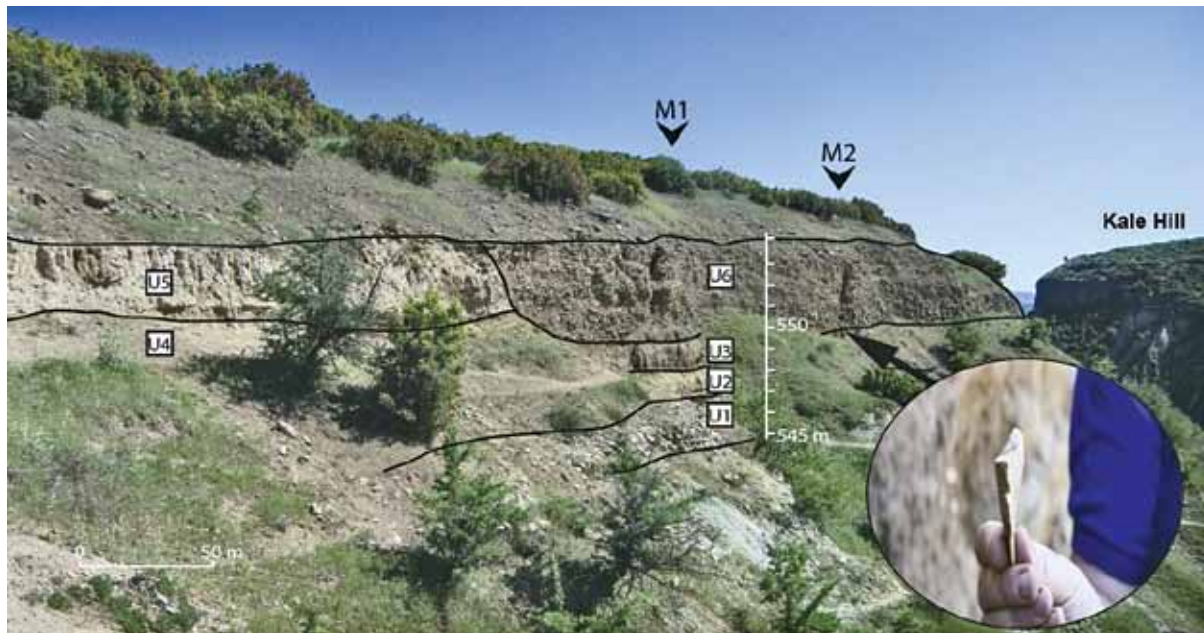
Tue - Sat: 11:00 am - 5:00 pm
Sun: 2:00 pm - 5:00 pm

Kula UNESCO Global Geopark, Turkey

The earliest hominin Palaeolithic artefact from Western Turkey

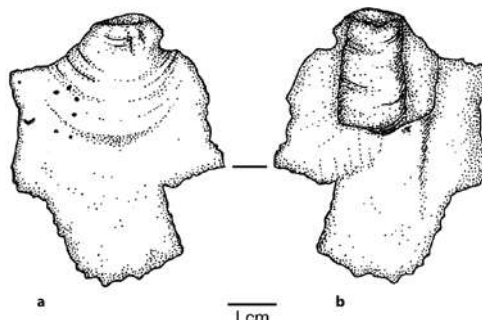


Location of the hard-hammered flake found in the palaeo meander of the Gediz River, Kula UNESCO Global Geopark, Western Anatolia.



Anatolia, which lies at the gateway between Asia and Europe, was frequently favoured as a route for Early Pleistocene hominin dispersal. Although early hominins are known to have occupied Turkey, with numerous finds of Lower Palaeolithic artefacts documented, there is little reliable evidence, either stratigraphical or geochronological, for the the chronology of dispersal events. Within Turkey, the oldest known hominin locality is that of Kocabas, in the Büyük Menderes Valley in Western Anatolia, where fragments of a cranium, tentatively attributed to *Homo erectus*, were found in travertine deposits by Kappelman and his colleagues in 2008. Although an age of 490-510 thousand years was reported based upon thermoluminescence results, a revised age estimate of between 1.3 and 1.1 million years (Ma), based upon cosmogenic isotope analysis, has recently been suggested for this cranium. Elsewhere, evidence for human occupation is limited to isolated finds of Lower Palaeolithic stone tools, hence the chronology of hominin dispersal across Anatolia has, to date, had little reliable stratigraphical or geochronological constraint.

In 2005 a Palaeolithic quartzitic artefact (hard-hammer flake) was discovered in fluvial/alluvial sediments in a palaeomeander section of an Early Pleistocene Gediz River terrace deposit, within the territory of the Kula UNESCO Global Geopark in Western Turkey. The dimensions of the flake were 56 mm from the platform to the distal end and 44 mm across the maximum width. The time period during which the palaeomeander loop was occupied



Ventral (a) and dorsal (b) sketch of the hard-hammered flake recovered from a palaeo meander section of the Early Pleistocene Gediz River.

at the Gediz River was established by dating associated basaltic lava flows, and from these the likely period of hominin occupation in the area can be determined. Thus new $^{40}\text{Ar}/^{39}\text{Ar}$ age estimates, together with palaeomagnetic measurements, enabled a narrowly defined chronology to be established for the artefact-bearing sediments. These results

suggest that hominin occupation in the area occurred within a time period spanning ~1.24 Ma to ~1.17 Ma, making this the earliest, securely-dated, record of hominin occupation in Anatolia. The time period suggested for this artefact is time-equivalent to Marine Oxygen Isotope Stages (MIS) 38-35.

In the wider region, the oldest archaeological site in south-western Asia is Dmanisi in Georgia, dating to ~1.8 Ma, where the remains of *Homo*, recently attributed to *Homo erectus ergaster georgicus* were found in association with a 'Mode 1' flake and core industry and a mammalian assemblage that is characteristic of Mediterranean temperate woodland. Pollen from the Dmanisi area records the spread of temperate steppe-forest after the Olduvai normal excursion, with vegetation dominated by herb taxa with steppic and xeric elements, indicating an increasing trend towards aridity due to the amplification of climatic oscillations at this time. Our early hominins in the Kula Geopark may have experienced similar environments.

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From the bottom of the sea to the roof of the house: exhibiting a new trace fossil in the House of Nature



A professionally prepared star-like trace fossil, approximately 50 cm in diameter from the Tlukačka Quarry.

The Bohemian Paradise Geopark, usually noted for its attractive “rock cities”, has recently acquired a new unique specimen. Thanks to the co-operation between the Geopark’s management, the multidisciplinary Scientific Committee and amateur geologists, visitors can now see the new fossil discovery exhibited in the House of Nature. This is situated in the settlement of Dolánky in the town of Turnov and managed by an environmental NGO (Non Governmental Organization), a strategic partner of the Geopark Bohemian Paradise. The wall of the main exhibition room in the House of Nature is devoted to introducing the Geopark and the remaining exhibition space is used to present and interpret the Geopark’s geological and natural heritage.

The newly discovered large, up to 1m wide, star-like or fascicular trace fossils were found in the abandoned Tlukačka Quarry where phyllites, foliated, low grade metamorphic rocks, were quarried and used for roofing slates. This site played the main role in the search for evidence of the age of the Železný Brod Phyllites assigned by most geologists to the Proterozoic Eon, the period which preceded the proliferation of complex life on Earth. The breakthrough occurred unexpectedly in the

Installing the trace fossil in the House of Nature: Radek Mikuláš (upper left), Martin Souček (middle) and Martina Pásková (right).



The trace fossil donated by Martin Souček to the UNESCO Global Geopark Bohemian Paradise before preparation. Scale = 5 cm.

early 1980s, during a geological excursion, which ironically aimed to demonstrate the Proterozoic hypothesis. One of the participants found a huge fossil in the shape of a star indicating clearly that the phyllites must be younger than Proterozoic. Professor Ivo Chlupáč, a well-known geologist, appealed to the quarry workers by promising a bottle of rum for the discovery of another specimen. The occurrence of these fossils in the phyllites proved to be not too rare and cost the professor many bottles of rum. Step by step, Professor Chlupáč acquired a relatively rich assemblage of trace fossils and in 1997, he published a paper on this subject.

Subsequently an amateur geologist Martin Souček found surprisingly well preserved gastropods, similar to the genus *Bellerophon*, in Tlukačka Quarry. This discovery provided unequivocal evidence for the Ordovician age of the phyllites. He also collected a dozen giant fascicular or star-shaped trace fossils and donated one of them to the Geopark. This “star” shows several features that reveal the worm-like nature of the burrowing organism (e.g. a polychaete) responsible for producing the star-like trace fossils. The organism is assumed to have occupied a main tube-like a vertical shaft which is not preserved. The rays of the star probably represent individual burrows which radiated from the main vertical tube in attempts to gain nutrients from the thin mud layer on the sea floor.

Thus, the Bohemian Paradise Geopark has added to the ichnofossil heritage in the UNESCO Global Geoparks Network and will interpret this for its visitors.

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Is the Villuercas-Ibores-Jara Geopark still a land to explore?

Although the mountain massif of Villuercas is a classical area in Spanish geology, mainly because of its geomorphology which is of international relevance, research carried out in the area during recent years has produced such important discoveries that make sense of the question raised in the title.

During the last decades the discovery of the exceptional cave of Castañar de Ibor and the description and understanding of the area's fossil record have enhanced the geological value of the territory. The cave is a small cavity, but due to the surprising diversity of speleothems and their state of preservation it is recognized as a Natural Monument, which is studied and permanently monitored. The occurrence of *Cloudina* sp. and other representatives of the Late Ediacaran fauna, including the first animals with an external skeleton from 550-541 million years ago, have added new information about the evolution of life on planet Earth.

It is worth noting that the 2,544 km² Extremadura mountain massif is difficult to access owing to its sheer slopes and dense vegetation. In addition, for several centuries, there were vast hunting estates where access was not permitted. However, in recent times the Geopark's scientific team has, with the invaluable assistance of some of the current landowners, obtained permission to access to these unexplored sites.

Recent fieldwork has resulted in the discovery of two new sites with fossils of *Cloudina* sp. One of these sites will be developed as a geosite for visitors wishing to observe a crucial step in the evolution of life. Field work also involved recording and interpreting the occurrence and origin of fractured quartz-arenites of the Armorican Quartzite Formation. Fieldwork has also led to a better understanding of the palaeogeographical context and the geodynamic evolution of the area. Investigating way-up using the occurrence of the trace



A view of the Sierra of Castillejo area. A beautiful landscape with newly discovered geological and archaeological assets.

fossil *Cruziana*, revealed the inverted flank of a new synclinal structure within the general anticlinal structure of the area.

New sites with significant occurrences of the trace fossil *Cruziana* are being described. The trace fossil *Skolithos* has been recorded in an area popularly named the "Sierra of the nails". This is an accurate description for rocks containing a high density of this trace fossil, and is a perfect example of a link between local knowledge and science. Finally, new Chalcolithic rock paintings created during the transitional period from the Neolithic to the Bronze Age are found in the numerous fractures in the quartzarenites used as shelters by our ancient ancestors.

We are proud that this research increases the value of our heritage. Now it is time to communicate this new knowledge to the general public. Provision is scheduled for new training, the creation of new geosites and dissemination of information.

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Skolithos trace fossils in an outcrop of quartzarenite creates the appearance of a rock full of nails.

Two Legends from the western area of the Geopark

A view of Llyn y Fan Fach, a glacial lake situated in a cirque on the northern flank of the Black Mountain.

Photo by Matt Botwood.



A lake and a steep sided valley in the western area of Fforest Fawr Geopark provide the setting for two stories, *The Bride of Llyn y Fan Fach* and the *Twrch Trwyth* or *Cwlwch ac Olwen*. These traditional stories are associated with named places and involve supernatural beings and/or encounters between persons and supernatural beings. They were written in Welsh in the 14th century *Red Book of Hergest*.

The lake Llyn y Fan Fach sits in an amphitheater-shaped basin created by glacial erosion. *The Bride of Llyn y Fan Fach* tells how a young farmer won the love of a beautiful lake maiden with a gift of wheat bread. Her father, the noble spirit of the lake, consents to their marriage providing a dowry of as many sheep, cattle, goats and horses that she could count without drawing breath. However, father and daughter warn the farmer that she will only remain true to him if he does not strike her three times with iron. Inevitably he hits her accidentally three times. She summons the livestock returning by owl-light to the Otherworld beneath the lake

Being struck by iron may allude to Bronze Age people feeling threatened by the increased production of iron weapons at the beginning of the Iron Age. The reference to wheat bread suggests that the lake was a site used to celebrate Llamas, the annual wheat harvest held on August 1.

The River Twrch is associated with the story of

the *The Twrch Trwyth* (noble boar), the first recorded Arthurian Romance. The story of *The Twrch Trwyth* or *Culwch ac Olwen* tells how Culwch's stepmother declares that he will never have a wife unless he gains Olwen, the daughter of the giant Yspaddaden Pencawr. Olwen's name translates as 'she of the white track' because she leaves a trail of white clover where she walks. In love with a beautiful maiden he has never seen, Cwlhwch, on his father's advice, seeks help from his cousin King Arthur. Yspaddaden, in order to hinder the marriage which will lead to his death, sets Culwch an apparently impossible task. He has to obtain the comb, scissors and razor from between the ears of the powerful Twrch Trwyth which are needed to prepare the giant for the wedding. In the wild hunt through south Wales, Arthur and his knights cross the River Twrch and eventually corner the boar on the banks of the River Severn. They snatch the desired implements from between its ears and thus ensure the marriage of Culhwch and Olwen.

In this story Ysbaddaden represents winter, the Twrch symbolises winter storms. The supernatural Arthur and his knights ensure the union of Culhwch, a sun god, and Olwen, symbolising spring, thus safeguarding the return of life to the land.

The local communities take pride in these stories which are a source of inspiration and enjoyment.

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The valley of the River Twrch.

Photo by Tony Ramsay.



A sketch depicting the hunting of the Twrch Trywth by Mike Freeman, a Swansea artist, for a mural in Aberystwyth University.

Ore of the Alps UNESCO Global Geopark, Austria

The Nebra Sky Disc - a Bronze Age calendar?

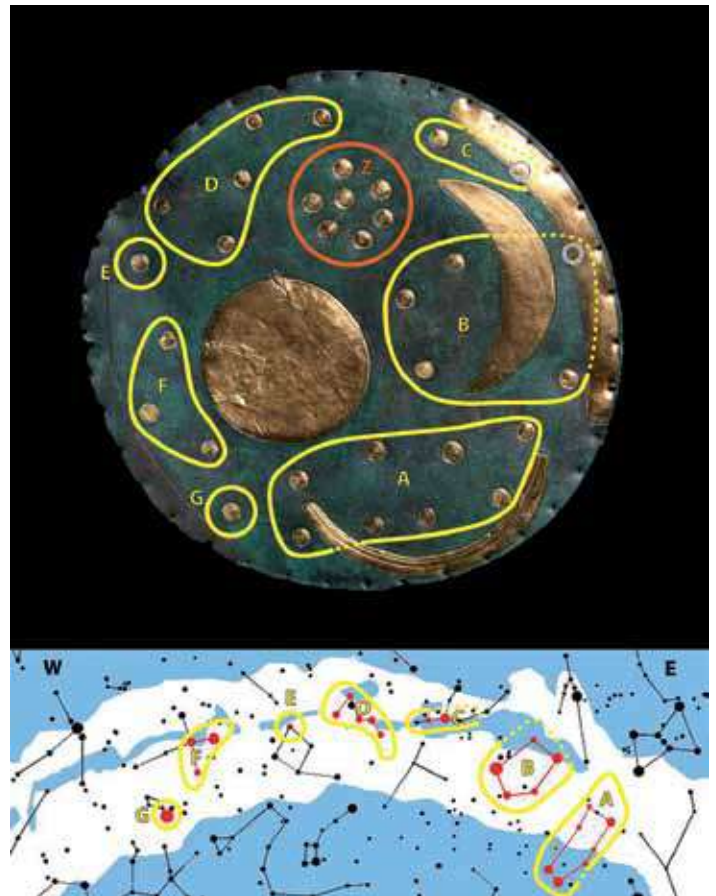
The Nebra Sky Disc, a forged bronze disc with gold plating has a diameter of 320 mm. In the summer of 1999, hobby archaeologists discovered and excavated this find from the Bronze Age near Nebra (Saxonia, Germany).

Chemical analyses by several experts have shown that the copper of the bronze disc (an alloy of copper and tin) originates from the prehistoric mines of today's Ore of the Alps UNESCO Global Geopark (Pernicka, E., Lutz, J., Stöllner, T. (2016): Bronze Age Copper produced at Mitterberg, Austria, and its Distribution. *Archaeologica Austriaca*, 100, 19-55, Vienna).

The first interpretation of the symbols on the disc was presented in 2003 in Halle an der Saale (Saxonia, Germany). This explained the disc as a kind of rural astronomical calendar. To-date experts, such as the Ore of the Alps amateur astronomer Erich Kutil, have constantly provided new interpretations. Kutil's astronomical interpretation is based on the assumption that the star formations incorporated on the disc are consistent with the constellations of the real starry sky.

The illustration shows Kutil's interpretation of the sky disk of Nebra in which the stars (small golden dots on the disk) are assigned to their corresponding constellations in the modern night sky. Are there similarities here - despite a slight change in the constellations over several thousand years?

The map of stars in the night sky shows the current arrangement, from east to west, of constellations in the Milky Way: Gemini (A), Auriga (B), Perseus (C), Cassiopeia (D), Cepheus (E), Cygnus (F) and Lyra (G). If you take a closer look at these constellations, you can also find them on the Nebra Sky Disc. The constellations are positioned along the Milky Way and the number of



stars is correct. Two stars (white circles on the Nebra Disc) are considered to be represented by small protruberences on the gold plate in the constellations Auriga (B) and Perseus (C). The pattern and proportions of the inferred constellations on the disc correspond with the relative positions and proportions of these constellations in the map of the night sky. The angular position of the constellations and the order of the images corresponds almost exactly with the modern star map. The "star rosette" shown on the disc (Z) is interpreted as a symbol for the sky zenith, a point in the sky or on the imaginary celestial sphere directly above an observer.

The source of these conclusions can be found in Erich Kutil (2008) "Faszination Himmelscheibe - Astronomische Deutung der Himmelscheibe von Nebra" (Fascination Sky Disk - Astronomical Interpretation of the Sky Disk of Nebra). The visitor centre of the Ore of the Alps UNESCO Global Geopark was opened in 2015 with a special exhibition about the Nebra Sky Disc (Fig. 2). This astronomical interpretation is still a component of the permanent exhibition designed by Erich Kutil.

The grouping of stars on the Nebra Sky Disc with the star formations show a compelling similarity with the star constellations within the Milky Way. The inferred constellations in the Bronze Age sky and constellations within the Milky Way are indicated by letters. Graphics GeoGlobe

Guests visit the exhibition "Nebra Sky Disc" at the visitor centre of the Ore of the Alps UNESCO Global Geopark, 2015; Photo by Horst Ibetsberger



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The enigmatic Stoplesteinane stone circle in the Magma UNESCO Global Geopark.

The Magma Geopark area is characterized by a rich cultural and archaeological heritage from the pre-Viking and Viking periods.

During the last two years the Magma Geopark staff engaged in several activities with local and national institutions to strengthen and promote the cultural heritage. In particular, Magma developed a very good cooperation with the Eigersund Municipality, Rogaland County, the Archaeological Museum in Stavanger, local land owners and communities. The most interesting challenge for the future is the development of the Stoplesteinane site.

Stoplesteinane (the Stople rocks) involve 16 rocks erected in a circular pattern. The circle has a diameter of 21 metres and consists of rocks measuring up to 1,2 metres in height. The stone circle is located at the top of Skårabrekkå – part of the grounds belonging to the old Årstadfarm. Årstad was the largest and one of the oldest farms in the district and it is believed that the old Egersund had its origin on the land of this farm. Årstad farm is thought to have existed since the Viking times.

The reason for constructing the stone circle is unknown. According to myths the Stoplesteinane is a monument associated with a Thing dating back to the Viking Age (800 – 1000 BC). The Thing was a meeting place in which Viking law was determined. Each community had its own independent Thing usually situated at visible locations preferably on a hill – much like the location of Stoplesteinane. Things were also often situ-

ated in proximity to graveyards.

Similar but rare, stone circles exist elsewhere in Norway and Northern Europe. Some, which have been excavated, proved to be graves, ranging in age from the end of the Bronze Age (1800 – 500 BC) to the end of the Iron Age (500 BC – 600 AD). The significance of the Stoplesteinane is uncertain. Ashes found in the centre of the ring in 1930 suggest that this was an ancient burial site. However, it has been suggested that burial monuments from the Iron Age (500 BC – 1000 AD) could also have been used as the site for a Thing during the Viking Age.

With the agreement of the local landowners, strengthening the cultural heritage involving the Stoplesteinane has been an on-going issue for twenty years. Now Magma UNESCO Global Geopark, with a project to develop a satellite company for the valorisation of the site, is the leader in this endeavour. The landowners accept the Geopark as a catalyst responsible for organizing regular meetings and also recognize the importance of Magma Geopark's role as a local development company.

Within the new Company, Magma will act as a catalyst for the creation of new jobs, supporting local inhabitants and at the same time promoting local businesses based on the Geopark's values.

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Reykjanes UNESCO Global Geopark, Iceland

The World of the Guardian Spirits on the Reykjanes Peninsula



During 2017 and 2018, Reykjanes Geopark nominated spokespersons for children. These spokespersons are inspired by old Norse folk stories about guardian spirits who protect and promote the success of the places where they live.

We welcome you to the hidden world of the Reykjanes Peninsula, where the guardian spirits reign. Reykjanes is an area that is alive and dynamic. Its delicate natural environs demand special treatment and respect. Its guardian spirits guide us around the wonderland that is Reykjanes and tell children of all ages about the geology, the land, the ecosystem and the sea.

Bergisinn

Bergisinn góði is sometimes called Beggi. As the old book *Heimskringla* tells us, he is almost as old as the land and has protected it for centuries. Even though he is huge, he knows how to hide and can disappear into the landscape. He is fast on his feet and travels with ease over the rocky lava. Bergisinn has a habit of sleeping for long periods, even for centuries, but has recently woken up and is eager to tell us all he knows about the Reykjanes Peninsula.

Berglind

Berglind is the guardian spirit that is most interested in the living aspects of Reykjanes – its plant life and animals. She feels for every

living thing and knows that in nature, we must take care of the small things to make sure that it prospers as a whole.. She knows that water is absolutely necessary and a very important part of the cycle of life. Berglind loves the water and being in the rain as well as dwelling in grassy dells. All the animals in Reykjanes are her friends.

Brimir

Brimir is the guardian spirit that dwells in the sea. He guards the sea, the beaches and all that lives in the sea. Although Brimir lives in the sea and stays there most of the time, he sometimes comes up onto the land to meet his friends Bergisinn and Berglind. He is also fond of talking with the birds and the fish and playing with the whales that swim in the ocean near Reykjanes.

Reykjanes-Skotta

Reykjanes-Skotta is the unruly resident of the Geopark. She dreams of becoming a guardian spirit and protecting the land as the others do, but finds it difficult to control her temper and often falls foul of her impulsiveness. Reykjanes-Skotta appeared one day thousands of years ago after an earthquake on the Reykjanes Peninsula. It is believed that she used to live underground, but when a fissure appeared in the land, she jumped out of it and has been here ever since.

The Guardian Spirits – from the left Reykjanes-Skotta, Brimir, Bergisinn and Berglind.

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Geological roots in Sardinia's intangible heritage:

the exchange between landscape, mining, history and
cultural traditions

Every year on August 15 the festival of Santa Maria di Mezz'Agosto, which is probably of Byzantine origin, is held in the town of Iglesias, the administrative centre of the Sardinia UNESCO Global Geopark. It coincides with the Catholic feast celebrating the Assumption of Mary and involves a procession in which men carry large supplicatory structures called candlesticks on their shoulders. The candlesticks represent the different quarters, or "Gremi", of the town. These are the guilds and corporations that corresponded to the Associations of Arts or Trades in Italy during the Middle Ages. The festival in the Sardinian city of Sassari was included in UNESCO's List of Intangible Cultural Heritage in 2013.

Organizing this ancient feast in Iglesias is documented in the first of the four books of the "Breve di Villa di Chiesa", an ancient code of laws dating back to 1200 that regulated the life of the city. Book IV regulates the mining and metallurgy industry. It is a rarity at the European level and is one of the few testimonies that provides such a detailed insight into the functioning of an industry during medieval times. The ancient code defines the order in which the candlestick bearers leave the church, thus indicating their status in the procession. The University Candlestick is followed by the Mountain Guild Candlestick underlining the strong link between the community, geology and mining. The colours of the Mountain Guild Candlestick, silver and black, obviously refer to the main mineral deposits in the area.

The eight candlesticks of Iglesias are more than 4 metres tall; range in weight from 350 to 450 kg and are carried on the shoulders of 16 to 20 men. They consist of three parts: the base with four staves arranged in a cross that rest on the arms of the bearers, a column about three metres in height ending in a capital with many multicoloured silk ribbons. The Mountain Guild



The Mountain Guild Candlestick is carried from the Chiesa della Vergina Purissima at the beginning of the festival of Santa Maria di Mezz'Agosto

candlestick has wooden side panels depicting Saint Barbara, protector of mine workers, an image of Mary's Assumption and scenes of mining life in medieval times. The University Guild Candlestick portrays the main activities of Iglesias including mining, sheep farming, agriculture and crafts.

The candlestick bearers include young and old believers, frequently chosen by vote. Some participants alternate on an annual basis to sponsor and provide decorations for a candlestick. The Royal Archives of Barcelona, Catalonia, Spain indicate that the Guild of Gold and Silversmiths funded a candlestick for the festival in Iglesias. At the end of the procession the guilds meet to share a convivial celebration.

The festival of Santa Maria di Mezz'Agosto has reawakened the interest and dedication of the entire population and year on year increasingly attracts the attention of tourists and people from the region. The processions of the Candlesticks through the streets of historic centres in Sardinia enriches the provision of sustainable cultural tourism in the Sardinia UNESCO Global Geopark.

1. The bearers carry a candlestick through the streets of Iglesias.

2. Image of a side panel on the Mountain Guild candlestick.



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Shetland UNESCO Global Geopark, Scotland UK

The Exploitation of Riebeckite Felsite by Shetland's Neolithic People

Shetland knives
of polished
riebeckite
felsite.
© Shetland
Amenity Trust



People have quarried and utilized stone in Shetland over millennia, none more so than the Neolithic population, who exploited this important resource for house building and for stone tools. These early farmers, who worked the land as far back as 3,800 BC, also had an eye for art. In particular, the manufacture of polished axeheads and knives from riebeckite felsite, an intrusive igneous rock similar in composition to granite.

Amongst Shetland Museum's large stone tool collection is an assemblage of highly polished riebeckite felsite axeheads and a group of very thin oval-shaped 'knives', a type unique to the islands. These tools are crafted from various rocks, with more than half being made from the highly patterned spherulitic felsite. The resulting implements are exquisite and could be viewed as pieces of fine art, such is their beauty. But they were also functional; the knives are polished with a very fine edge, which could have

served various functions including skinning animals. Many show surface wear, with evidence of use and re-sharpening, but there are others in the collection that are pristine, and their provenance within the landscape suggests a special ceremonial function.

Various hoards have been discovered in the islands, including a magnificent group of 19 flawless felsite knives discovered on top of Stourborough Hill, a location surrounded by evidence for Neolithic settlement. These knives were buried in the moor, side-by-side, and propped up by slabs of local sandstone placed at either end. Other knives and axeheads, buried in wet moorlands have also been found in similar arrangements, suggestive of votive offerings. We may never fully understand the belief systems of early Shetlanders, but their religious practices have ensured that we can appreciate the beauty of their extraordinary tools and the skills of those who created them.

Evidence of these early stone tools is recorded throughout the islands, but the quarry sites are located in the north-west of Shetland's mainland, suggesting possible trade with the outlying regions. The quarry pits have remained virtually untouched since they were operational, with evidence of stone tool production including anvil and hammer stones and the resulting debris scattered on the surface. The felsite dykes, consisting of large greyish-blue veins traverse the hillside protruding through the red granite bedrock. Large blocks of spherulitic felsite stand proud against the russet-toned landscape, just as they did 6,000 years ago, when the site must have been a hive of activity.

Shetland's riebeckite felsite quarries are the subject of an ongoing study 'Making an Island World: Neolithic Shetland' by a group of geologists and archaeologists, led by University College Dublin. We very much look forward to their work being published so that we can better understand the exploitation of this geological resource and its importance for an ancient community.

A block of
spherulitic
riebeckite
felsite within
the landscape.
©Author.



Excavation of a
quarried dyke.
©Gabriel Cooney.

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Sobrarbe- Pirineos and Ordesa-Monte-Perdido: Geology From the Top

A view of the Cilindro de Marboré peak and its impressive anticline from Monte Perdido.

Photo by Ánchel Belmonte.



A high geodiversity is one of the main characteristics of Sobrarbe-Pirineos UNESCO Global Geopark. The geology involving 550 million years is contained in the landscape from the southern mountains, with a mild Mediterranean climate, to the severe alpine condition in the high mountains in the North. Two orogenies (Variscan and Pyrenean), some of the key geological structures that enable an understanding of the formation of the Pyrenees, the southernmost glaciers in Europe and many geomorphological features typical of the mountain landscapes, are the basis of a rich geological heritage.

In Ordesa and Monte Perdido National Park, one of the most important areas in the territory, the Geopark has created 11 geotrails together with one educational programme. The territory's impressive geology is part of the reason for its designation as a National Park which is currently celebrating its centennial.

Sobrarbe-Pirineos UGGp is contributing to the celebration through different activities. One event involved a geological trek across the National Park. On 1 and 2 September, 2018, a group of 15 participants with three mountain guides, two geological guides and members of staff from the National Park participated in a beautiful tour starting from the Ordesa valley.

Soon, the entire group was immersed in a world of limestone cliffs that reveal the story of the ancient Pyrenean Sea from Upper Cretaceous to Eocene times. The Cretaceous-Palaeogene boundary and the location of the Palaeocene-Eocene Thermal Maximum were observed en-route. The participants gained an understanding of the impact of these two significant events in the history of the Earth.

After spending a night in the famous Góriz hut, where Charles Lyell, a famous British geologist worked in the 19th century, the participants ascended the 3,355 metres high Monte Perdido, the second highest peak in the Geopark and the third highest in



The participants reached the Monte Perdido Glacier.

Photo by Ánchel Belmonte

the Pyrenees. The view from the summit was awesome. Surrounded by folds, tarns and canyons, participants learned about the origin, not only of the Ordesa and Monte Perdido National Park, but also of the whole Pyrenean Mountains.

For some of the participants, this was their first time to ascend and experience such a symbolic summit. Sharing our common love for geology and mountains brought the group together in friendship.

The route continued, and involved climbing down the north face of Monte Perdido, to observe an outstanding geosite, one of the last Spanish glaciers. Despite their reduced size, the glaciers are of considerable environmental significance. Detailed studies are being developed to monitor the retreat and the impact of global climate change on the volume and extent of the ice. The disappearance of the ice is associated with the development of new features including plateau limestone karst with karren fields.

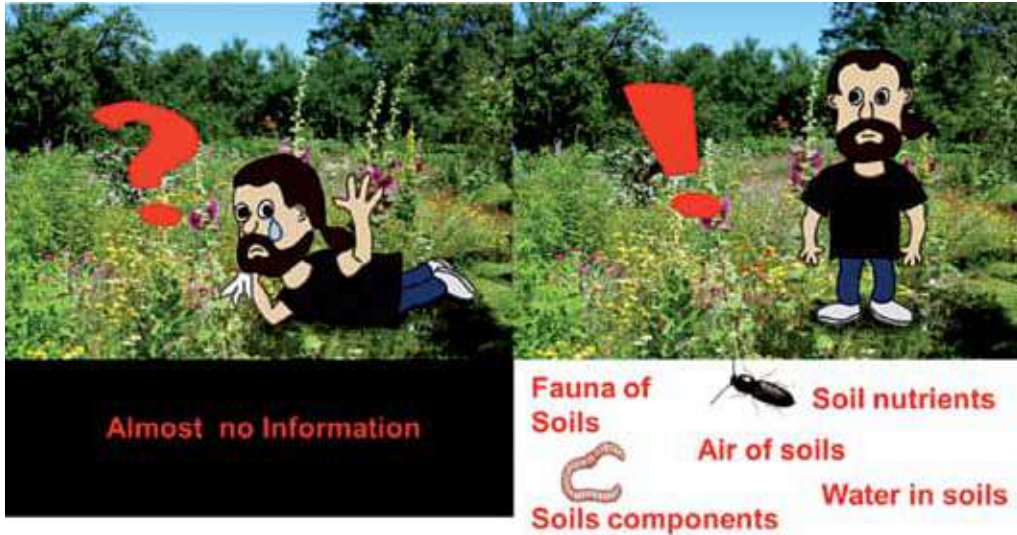
Finally, after a long descent, the group reached the floor of the Pineta Valley. In 2019 the Geopark will develop a new route for trekking through our mountains will take place. Stay tuned!

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TERRA.vita UNESCO Global Geopark, Germany

An atlas of the Geopark's soils

The soil atlas:
100 pages
packed with
information
on soils.



Our soils are a little appreciated treasure although 95% of our food cannot be produced without soils. What kind of soils do we find, are they endangered or degraded? Many of these questions find answers in the new soil atlas of TERRA.vita Geopark.

Soils have a very significant role and form a very and vulnerable interface between the lithosphere, atmosphere and biosphere. Soil degradation is very evident in many parts of the world, but soils are still not recognized and regarded with the same esteem as water or air.

TERRA.vita UNESCO Global Geopark is located in northwestern Germany in the transitional zone between the northern flatlands and the northwestern hill country. The Geopark contains a variety of rocks which, as a result of erosion, give rise to many different soil types. Agriculture plays a very important economic role and places a high, sometimes even too high, demand, and pressure on our soils.

The new atlas of soils in the Geopark provides first-hand information and is written in a popular but scientifically based language. The first pages provide a short introduction to soil science and continue with the presentation of the 17 most significant soil types in TERRA.vita Geopark. Each soil type is presented on four pages with the same standardized format. The atlas contains information about the soil profile, soil building processes, the chemical, physical and general characteristics of soils and the risks involved in the increasing demands on TERRA.vita's soils. The atlas is illustrated with numerous pictures, graphics and anecdotes.

Secondary schools provide the core target group for the atlas. However, all schools in TERRA.vita are included and free copies are provided to those who express a real interest. The atlas is added to our 10 TERRA.bboxes and two soil boxes which are loaned to educational institutions and schools.

The atlas also addresses the communities, their politicians and planning departments. Here decisions are taken concerning construction projects, including housing developments which by sealing the surface affect drainage patterns leading to the destruction of the soil structure. In Germany 90 hectares of soils are sealed daily.



The dilemma: Almost no information on soils is available.

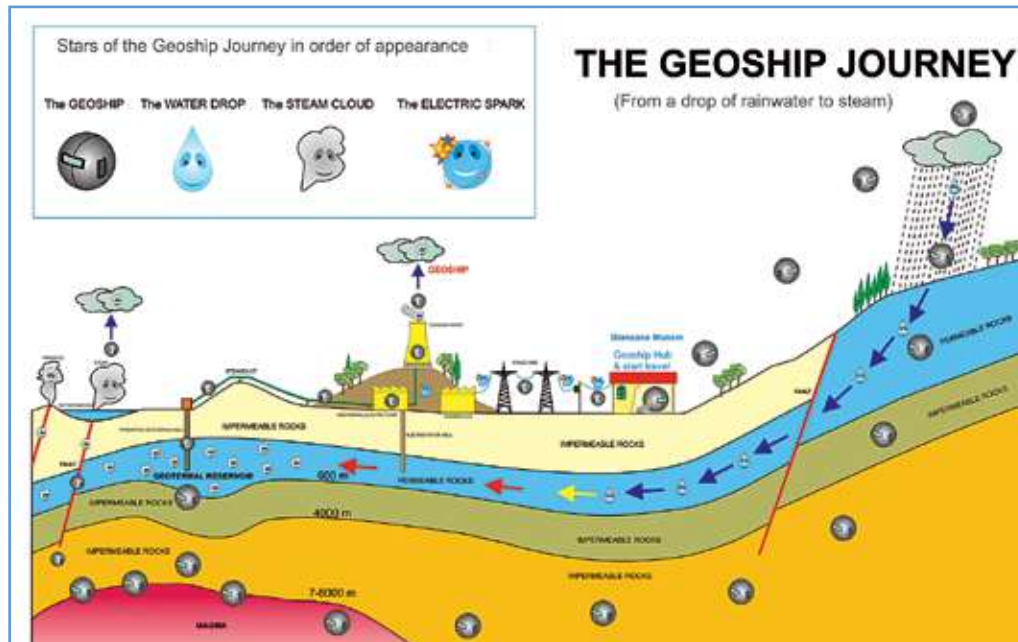
Why has this unique atlas been produced for the TERRA.vita area? It all started in the year 2000, when the project "Fascination Soil" was acknowledged as an external project of the Expo 2000 in the city of Hannover. One lasting result is the TERRA.park, a two hectare landscape park, which provides information about TERRA.vita's soils.

From TERRA.vita's perspective, soils are a suitable issue to be addressed by Geoparks. Geoparks can provide basic information about the evolution of soils, they can deliver insights into the fascinating world below our feet. Soils are crucial for the existence of mankind and are not „dirt“. The atlas is available at bookstores for 12.90 € or www.geopark-terra.vita.de. ISBN 978-388926-152-6

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THE Geoship Journey:

From rainwater drops to steam



The Geoship's journey and the characters, the stars of the journey.

The Biancane near the village of Monterotondo Marittimo, is a significant geosite where visitors to the Tuscan Mining Geopark can follow a trail and experience the effects of geological processes involving intense geothermal activity.

The geological features include:

- steam emissions, locally called *fumacchi*, that emit water vapour and numerous other gases;
- the *lagoni*, gurgling hot water pools with temperatures above 150°C;
- the formation of sulphur crystals by sublimation together with the formation of other minerals caused by reactions between chemically aggressive gases and geothermal fluids on surface rocks;
- the deposits of boron, calcium, sodium, magnesium and potassium salts caused by water evaporation in the *lagoni*.

Monterotondo is also well known as the site for the first geothermal power plant built in 1958. The power plant's renovated building will serve as a new Museum for the area. The museum, which illustrates the unusual geology of the Biancane, combines multimedia presentations with informative explanations of phenomena with many interactive experiences. Visitors will experience a fascinating and exciting journey, a virtual "full immersion" into the depths of the Earth to discover the origin of geothermal energy.

Visitors will voyage on board a GEOSHIP: a craft able to penetrate rocks and withstand the very high underground pressures and temperatures. Visiting GEONAUTS will be guided on this fascinating journey by the voice of the Geoship Commander. The craft will start from the clouds, full of water vapour, which in falling as rain seeps through the porous rocks as part of the groundwater system until it encounters a heat

source generated by sub-surface volcanic activity creating a geothermal reservoir. Here, thanks to the heat generated by a magmatic mass more than 7 – 8 km beneath the surface, it converts into highly pressurized steam which rises to the surface.

Some of the steam will naturally migrate upwards via faults and fractures in the rocks. This gives rise to geological phenomena such as leaching, the deposition of useful and precious metal ores, the alteration of rocks and, finally, to geothermal features on the Earth's surface, such as *lagoni*, fumaroles, geysers, steam jets and hot, bubbling mud. However, a part of the steam can be redirected from wells through pipes to the geothermal power plants to produce electricity.

During the journey, the GEOSHIP will change in size to allow the GEONAUTS to follow a drop of water along its journey from the clouds to the geothermal reservoir far beneath the Earth's surface and to observe its transformation into steam.

Continuously following the steam in its ascent to the surface, the GEONAUTS will have a unique view of the geological history of the area. They will observe rocks far underground that formed from the magmatic intrusion 7 – 8 km beneath the surface.

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Museum Project Group

Coordination Alessandra Casini – Tuscan Mining Geopark

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Exhibit Design 490 Studio – Space- Quadricomia

Customer Orano Pippucci, Antonio Guerrini - Municipality of Monterotondo Marittimo

The Biancane Geosite and cooling tower of the geothermal power plant.



The renovated power plant building showing the proposed design for the museum with the geoship.

Burren and Cliffs of Moher UNESCO Global Geopark, Ireland

The Society for the Protection of Ancient Buildings (SPAB)

An example of community-based conservation in the Burren and Cliffs of Moher Geopark



Exterior walls of An Cabhail Mhór, Kilinaboy.

Known locally as 'An Cabhail Mhór', this late 16th Century-early 17th Century structure comprising the remains of a walled and fortified house has stood on the banks of the Fergus River, Kilinaboy in the Burren for over 400 years. It is known to have been the home of the Blood family, who came to Ireland during this time. It is the only known surviving building of its type in the west of Ireland. Subsequent Irish rebellions and reprisals resulted in the total destruction of most of these colonial structures.

The building remained hidden under ivy and was largely forgotten until the local community group, the Kilinaboy Historical and Heritage Group, realised that its condition had deteriorated noticeably from the time when they played there as children. The group decided to do what they could to preserve their heritage for future generations.

The preservation of the building was funded through the Geopark LIFE project (an EU-funded tourism for conservation programme established by the Burren and Cliffs of Moher Geopark), in close cooperation with the Kilinaboy Heritage Group, Clare County Council Conservation Officer and the Na-

tional Monuments Service. As a result an ecological report, a 3-D laser scan of the building and conservation training events were provided for the Group with a view to enabling the local community to participate actively in the conservation project.

With the completion of the Geopark LIFE project in December 2017 the Society for Protection of Ancient Buildings (Ireland) were contacted to see if they would be able to continue the work and provide specialist conservation services. They agreed, and with financial support from the Heritage Council of Ireland organized a 'Working Weekend' to train and begin actual conservation work on the structure of the building.

The 'Working Weekend' was held on the 18th/19th August 2018 and under the supervision of Eoin Madigan, a lime mortar and stone conservation specialist the next phase in conserving the building commenced. The event was a practical hands-on training course in building conservation and brought new life to the building for the first time in over 400 years.

Through their engagement with the local community, combined expertise, funding support from the Heritage Council, and importantly their insurance coverage which indemnifies the landowner, SPAB offer real tangible hope to the local community that training and conservation works will continue over the coming years to stabilise the building, make it safe for visitors and that An Cabhail Mhór can be added to the list of local attractions in the area.

This project complements the national Adopt a Monument scheme for local communities that is also funded by the Heritage Council.

For further information about SPAB contact spabireland@gmail.com and the Adopt a Monument scheme; www.abarthaheritage.ie



Conservation lime mortar work on the interior walls of An Cabhail Mhór.

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Arouca UNESCO Global Geopark, Portugal

The Illustrate your School Project



An illustration of the Marialva River in Rossas primary school.

Groups of Kindergartens and primary schools in the Arouca UNESCO Global Geopark, AGA were re-classified in 2006, according to the Educational Charter of the Arouca Municipality with the approval of the Ministry of Education. In this process the Arouca UNESCO Global Geopark, AGA (Associação Geoparque Arouca) and the Arouca City Council suggested that the rooms in each school should be named to reflect the natural/cultural heritage of the Arouca Geopark in the vicinity of the school.

Firstly, AGA launched an educational project named “Illustrate your School” in order to gather names for all rooms within the individual schools.

The main goal of this project is to introduce the younger generations to their natural and cultural heritage and the importance of protecting these. In this way the school communities will develop a sense of place and belonging.

This project involves school competitions in which pupils are challenged, using information acquired during field trips, to illustrate the specific “heritage” for their respective school, and to contribute to decorating the schools’ interior spaces.

The “Illustrate your School” educational project was initiated during the school year 2016/2017, as a competition entitled the “Route of the Ge-

osites of the Arouca Geopark Illustrated” for a group of schools in the parish of Burgo. In the following school year, two school groups benefited from this project. Rossas primary school children participated in an assignment entitled the “The School in Nature” and decorated the school rooms focusing on rivers and biodiversity. Pupils in Escarizp used the theme “Heritage at your door” and decorated their school with illustrations based on archaeological sites.

In the current school year, a group of schools centred on Chave will host the “Discovering the Forest” competition, generating illustrations related to people who live in and depend on the local forest. Boavista school will, in the competition based on “Memories of Eulália”, create images and discover archaeological sites, stories, myths and natural sites in the Santa Eulália parish.

In the next school years, the “Illustrate your School” project will be through drawing competitions, in the primary schools of Canelas, Serra de Vila, Arouca, Fermedo, Moldes, Ponte de Telhe and Alvarenga as in Arouca college.

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Luberon UNESCO Global Geopark, France

Children engage in the protection and enhancement of a fossiliferous Aptian Stage deposit in Luberon Geopark



Pupils discovering the Aptian marls of “La Tuilière” guided by a geologist and partner in the Geopark.



On-site information panels introducing the Aptian outcrop to the general public.

Located at the north of the Luberon UNESCO Global Geopark, the Saint-Saturnin-lès-Apt municipality has special rocks: fossiliferous marls which led to the creation of the Aptian Stage involving a period between approximately 125 and 113 million years ago. In 1840, the famous French palaeontologist, Alcide d’Orbigny, studied outcrops near the town of Apt and in documenting their fossil content, rich in many different species of ammonites, proposed the creation of the Aptian Stage as a new stratigraphic stage in the Cretaceous Period.

Today, many of the outcrops involved in the original description are covered by houses, a lake and other developments. The “Tuilière” outcrop, located in Saint-Saturnin-lès-Apt, is one of the best sites to study and discover the nature of the Aptian Stage. Twenty eight ammonite species have been described from this site, belemnite rostrums are abundant together with fossils of gastropods, bivalves, corals, sea urchins, brachiopods and shark teeth. The fourteen described shark species include two new species. Microfossils (foraminifera, ostracoda) which are abundant are used to define biozones within the rock sequence.

Scientists, local authorities (Saint-Saturnin-lès-Apt Municipality and Vaucluse Administrative Department), the local people and the Geopark’s staff, joined together to protect this area as a Sensitive Natural Space in order to manage and conserve the natural heritage (geology, fauna and flora), pursue research and disseminate information.



During the year 2017-2018, 5th year pupils of the Empereur Primary School, in Saint-Saturnin-lès-Apt, were involved in an educational project proposed by the Geopark to discover this special geosite and to enhance the dissemination of information about the Aptian Marls for the general public. By participating in field trips, guided by local associations for education, they experienced the abundance of fossils including ammonites, belemnites, gastropods and bivalves in the marls. They also learned about plants and animals and human activities at this important site. Based on their experiences, the children wrote texts, drew pictures and had to think how to disseminate their knowledge and understanding of the site to other people.



Detail of a panel designed with the pupils’ pictures and texts.

The Luberon Geopark developed the work produced during the school year by installing new on-site interpretation boards dealing with the special geomorphology of marls shaped like “elephant backs”, fossils that can be discovered at the outcrop, its palaeoecology, palaeogeography and of course the necessity to protect this historically and scientifically unique geosite.

The Aptian marls of “la Tuilière” together with their fossil content can rely on the local inhabitants, especially on the children, to be discovered by visitors, protected and respected as a part of the Earth’s heritage.

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Papuk UNESCO Global Geopark, Croatia

Camping site Duboka a new addition to tourism in Papuk Geopark



A view of the Duboka campsite.

Papuk UNESCO Global Geopark, which is located in the southern region of the Pannonian Basin, rises like an island above a flat, predominately agricultural landscape with a few neighbouring mountains. Its exceptional geological diversity contributed to a biologically diverse habitat that has been protected as a Nature Park (since 1999) and UNESCO Global Geopark (since 2007). Observed from the air, the landscape is characterized by many ridges which are crossed by numerous creeks and small rivers. Most of the surface is covered with dense forest, but there are a few rocky outcrops that provide hikers with amazing views.

It is estimated that 150,000 to 200,000 people visit Papuk every year. However, owing to the lack of accommodation most people only stay for one day. In May 2017 a new campsite was developed near Velika to address this issue. Now with the prospect for residential visits, tourists have the opportunity to stay and explore more of the Geopark. The development involved an investment of 370,000 Euro financed by the Protected Area System - PARCS Project administered and funded by the Croatian Government Ministry for Nature Conservation and Spatial De-

The space provided for tents in the campsite.



A geological workshop concerned with looking for fossils.

velopment. The Duboka campsite with a surface area of 8,000 m² accommodates approximately 96 guests. Space is provided for camping vehicles, as well as for tents.

Special attention was paid to protecting the environment, the use of energy and preventing pollution. Solar panels were installed to supply electricity for hot water and the campsite has a biological waste water purifying plant and an area for recycling and collecting waste. Aggregates and binders based on natural resins were used instead of asphalt to surface the site.

The main aim of the campsite Duboka in Velika is to organize a nature school where students can discover interesting facts about Papuk Geopark. The project involved equipping the nature school with tents, sleeping bags and groundsheets for 30 students. During their stay students learn the basic skills for surviving in nature – how to pitch a tent, making a campfire, navigation and exploration. Five educational panels describe the educational modules. In addition, the students are given working maps with leaflets which address various subjects including biology (forests, streams, meadows, etc.), geology (the fossils of the Pannonian Sea), archaeology and the cultural heritage of the Papuk Geopark. The whole programme is approved by the Ministry of Education for Primary Schools with a planned curriculum for the each class.

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Beaujolais UNESCO Global Geopark, France

Revealing the Geopark's hidden treasures, with a taste of geodiversity!



Beaujolais UNESCO Global Geopark is located in southeastern France within the Auvergne-Rhône-Alpes region. The territory of the Beaujolais UGGp with an area of 1,550 km² involves 130 municipalities and a population of more than 227,000 inhabitants.

Beaujolais, known worldwide for its wines, benefits from an exceptional geological diversity that has been shaped over nearly 450 million years.

Bordered by the vast Hercynian (or Variscan) French Massif Central domain to the west and the external peripheral zone of the Alpine domain, the Beaujolais has inherited a rich and complex geology, with an especially large variety of rock types, geological processes and ages. The extensive north-western area of the territory is composed of a vast assemblage of primary terrains (metamorphic and magmatic formations), while the southeast is characterized by limestone and shale formations from the Mesozoic Era.

The region is characterized by three types of relief: the Saône River Plain on the eastern border, the wine growing area made up of gentle slopes interrupted by wood-covered valleys and the mountains of Beaujolais extending throughout the west and reaching heights of over 1,000 metres at the region's borders.

Strong links exist between the local geology, landscapes and the establishment of specific natural environments (moors on acidic soils, bogs developed on watersheds and on the humid environments of the Saône Plain and areas of calcareous grassland).

Beaujolais' exhibits a rich cultural heritage, manifested in the numerous historical buildings such as castles, churches and distinctive villages which stand out due to their remarkable architecture. The variety of rock types used in their construction reflects the geological diversity of the region.

The western part of the Geopark has a rich industrial heritage based on a textile industry related to water quality, thanks to the local geology.

Since 2012, the Geopark is managed by a group of four communities with a steering committee and several working groups. The Geopark team is composed of four members and a part time geologist. These work with a large network



of organizations (public bodies, local stakeholders, associations and businesses) to operate and develop the Geopark's management plan.

Beaujolais' economic development has always been based on geologically related local resources. The vineyard soils derived from granites, schists and clayey limestone, the volcanic rocks beneath the pastures and forests and arable farming on the fertile, alluvial plains. The Beaujolais and its daily life are rooted in the heart of the earth.

Beaujolais' wines really express the large variation in geology and soil types. This is why many studies involving scientific research were conducted on the geology and soils in the territory.

In addition to its geology, Beaujolais is a land of eco-tourism that holds treasures for those who appreciate the landscapes, its bountiful nature and local products. That is why local enterprises have created a new concept named "Become Geo-curious in Beaujolais", packages including visits to geosites, tourism services and a meal (restaurant or picnic made with local products). Some new partnership agreements are in progress with visitor centres developed to create geo-products and promote the Geopark.

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Normal fault on the Pierres Folles geological trail.

© Beaujolais UNESCO Global Geopark.

Schoolchildren engaged in educational activities in the Geopark.

© Beaujolais UNESCO Global Geopark.



Cyclists enjoy the vineyard landscapes in the Geopark.

© Beaujolais UNESCO Global Geopark.



Famenne-Ardenne UNESCO Global Geopark, Belgium

An essential destination involved in sustainable tourism



The spectacular Durbuy Anticline, situated in the village of Durbuy, consists of Late Devonian (Frasnian) grey and black limestone.

The Geopark is located in the southern part of Belgium. It has a surface area of 911km², a population of 67,000 and hosts the councils of Beauraing, Durbuy, Hotton, Marche-en-Famenne, Nassogne, Rochefort, Tellin and Wellin. The area's numerous treasures range widely from the significant geology, cultural heritage, a varied economy including tourism. The area has a long-standing tradition as a popular holiday destination, attracting visitors from all over the world.

The Geopark is located mainly in the "Calectienne", a typical strip of limestone, which together with three distinct river basins, the Lesse, the Lomme and the Our the, forms the unifying back-bone of our Geopark. The area has a potential for geological investigation and contains the largest number of karst phenomena, not only in Belgium but also in Europe. The territory features caves and exceptional karst sites that are unique in Europe. These sites are of great scientific interest and have been studied intensively for many years. Landscapes, the result of geomorphological processes, also reflect the nature of the soil and the high level of biodiversity. The many different rock types found in the area are evident in the rich architectural heritage

The Famenne-Ardenne Geopark is one of Wallonia's essential destinations, featuring the exceptional caves of Han, Rochefort and Hotton, Durbuy (the smallest town in the world) and picturesque villages and castles. For over a century, the Cave of Han (300.000 visitors per year) has been a driving force in the expansion of tourism. It is the only natu-



The Han-sur-Lesse show cave is one of the most beautiful caves in Europe and has been awarded three stars in the famous Michelin Guide.

ral attraction in Belgium to have been awarded three stars in the famous Michelin Guide. The recent installation of LED lighting in the caves is a marvellous contribution to valorise and protect this heritage.

Tourists who wish to enjoy the great outdoors will be delighted by our hiking and cycling trails. "Famenne à Velo" is a 350km cycling network with a wide distribution of focal points extending over parts of the provinces of Namur and Luxemburg. Cycling along the networks is definitely a delightful and different way of exploring the Geopark's natural, cultural and architectural heritage! For sure the best way to valorise sustainable tourism.

Concerning tourism, internal partnerships are really important. Becoming a partner of the Famenne-Ardenne Geopark provides a unique opportunity to participate in the development, enhancement and prestige of our beautiful region. By signing a convention with the Geopark, tourism operators will receive the benefits of promotion at local, regional, national, international and even global levels. They are also engaged in an eco-responsible approach promoting, among others, awareness of energy consumption and collaboration with local producers. By signing, the partners participate in the development and territorial identity of the Famenne-Ardenne UNESCO Global Geopark. They are part of a quality approach necessary for the sustainable and economic development of the territory and are invited to engage, if necessary, in other recognized approaches in achieving quality.

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Members of the Famenne-Ardenne UNESCO Global Geopark partnership promote one of the cottages in the territory.



Conca de Tremp - Montsec UNESCO Global Geopark, Spain



Where rocks tell the story about our origins



Conca de Tremp – Montsec UNESCO Global Geopark, in the north-west part of Catalonia (Spain), with an area of 2,040 km², includes 19 municipalities, and about 16,000 inhabitants. The Geopark is managed by an Association established by the public institutions of the area. It has three management levels. These involve the presidency and the decision-making and consulting level in which a scientific and a local development committee ensures the participation of the local community.

An outstanding kaleidoscope of geodiversity

The Geopark is located in the South-Central Pyrenees, along the ECORS-Pyrenees transect. This 250 km long deep seismic survey across the Pyrenees from the Aquitaine basin to the Ebro basin, the first complete seismic image of an entire orogenic system on a crustal scale, represents a landmark in the understanding of mountain belts.

It is a place where the rocks “speak” about geodiversity and the Earth’s history during the last 550 millions years, from the Palaeozoic to the present day. The interaction between tectonic and surface processes during mountain building shaped this dramatic landscape.

A broad range of sedimentary facies models, representing ancient depositional environments, can be identified such as synorogenic deltaic sequences or the uniquely preserved Middle Eocene-Oligocene conglomerates. Other treasures include the lime rich waters of Basturs Lake and a tufa mound complex unique in Europe. The highest resolution record of climate history in the Iberian Peninsula over the last 500 years has been recovered from Montcortés Lake, a karst mountain lake. Visitors can see the Puigcercós landslide, which in 1881 forced the relocation of the population. Finally, there is a great variety of soils used both for research and educational purposes.

A journey through the evolution of life

We can also travel in time by observing the fossil-

ized remains of ancient organisms, and discovering a record of successive, and different, mass extinction events. In the north, rock outcrops ranging from Cambrian to Permian in age, include the remains of organisms like graptolites, trilobites or tetrapods. Continuing this journey, we arrive in the Mesozoic, finding very well preserved early Cretaceous fossil lagerstätte, the most complete sequence of rudists in the Pyrenees and Upper Cretaceous rocks, in which the remains of bones, tracks and eggs of the last dinosaurs in Europe are preserved. The marine invertebrates which define the Ilerdian Stratotype and early Eocene primates also feature as important fossils in the Geopark’s story of life. Later, human activity from Neanderthals to the Roman legacy and medieval castles left their mark on the landscape. The later proliferation of different mining activities, the booming cement industry and the construction of different hydroelectric power stations had a great socioeconomic impact on the area. Today, by observing the dark sky, which in many areas has the certification from the Starlight Foundation, we can reconnect with our origins.

Disseminating information, a tool for empowerment

The Geopark has a very well distributed network of museums and facilities that helps unfold its heritage to people with different levels of expertise. Guided and self-guided tours along different geotrails are available with interpretation panels that connect geology with biodiversity and culture.

By explaining our heritage, people can, with a better understanding of the heritage, strengthen their roots with the territory and become its custodians to preserve it for future generations.

In this way, many local initiatives have already been implemented such as local wines named and labelled after fossils.

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A panoramic view of Montsec,
©Jordi Peró.

A guided educational fieldtrip to Puigcercós landslide.



©Geoparc Conca de Tremp-Montsec.



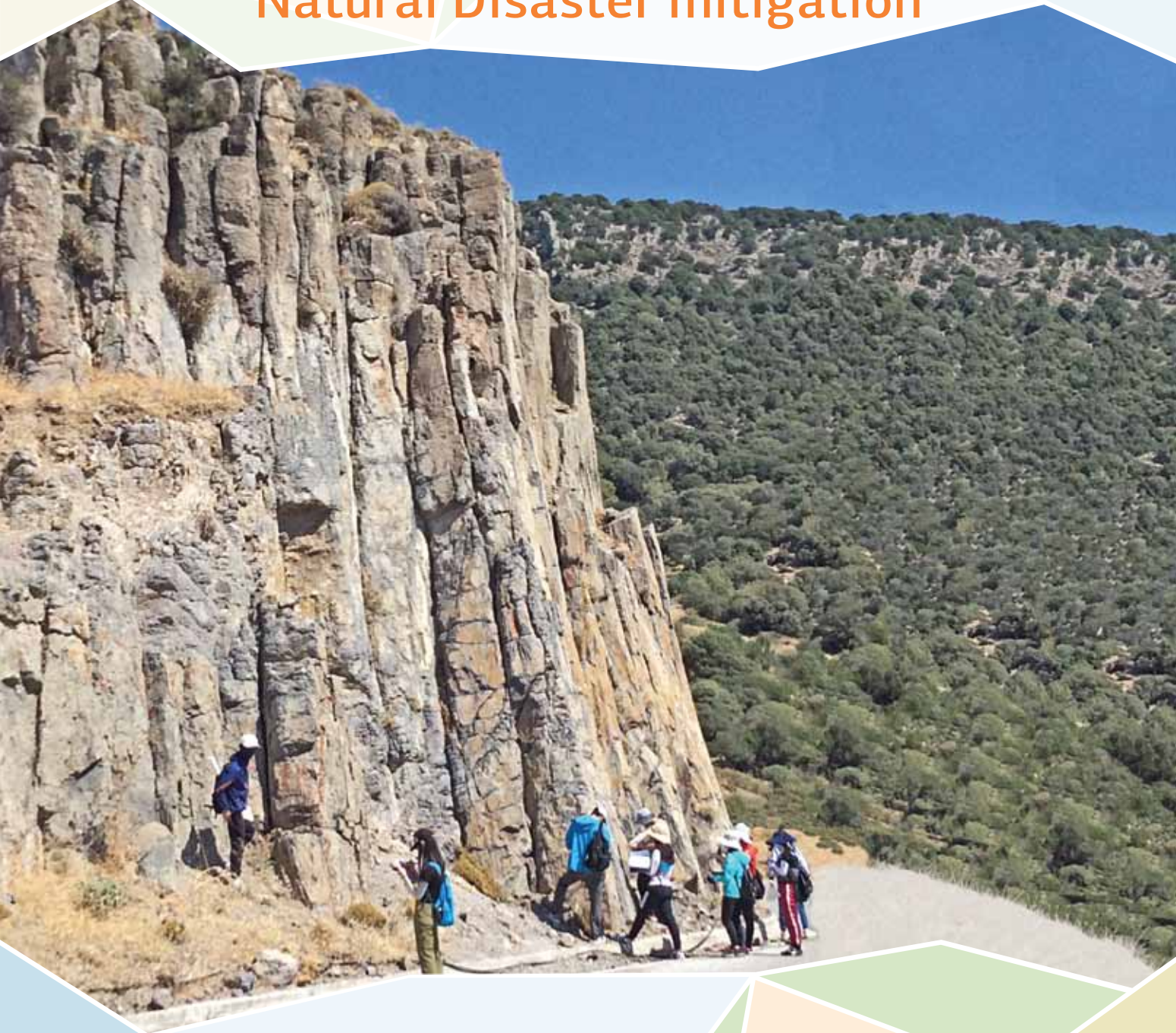
A guided visit to a site with a trail of Titanosaur footprints.

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International Intensive Course on Geoparks 2019

UNESCO Global Geoparks

Climate Change adaptation and Natural Disaster mitigation



May 31 - June 10 2019

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Welcome to the 15th European Geoparks Conference!

The Natural Park Sierra Norte de Sevilla - UNESCO Global Geopark will host the 15th European Geoparks Conference in September 2019.

The headquarters of the 15th Conference is located in the city of Seville, one of the largest tourist destinations in Europe and the World. The theme of the Conference “**Memory of the Earth, a Future for People**”, focusses on Sustainable Development for the Geoparks’ inhabitants.

The meetings of the Advisory Committee and the Coordination Committee of the European Geoparks Network preceding the conference will be held in the village of Cazalla de la Sierra, in the Geopark Sierra Norte de Sevilla.

Located north of the province of Seville, the Natural Park Sierra Norte de Sevilla is one of the largest protected natural areas in Andalusia. It is a member of the EU wide Natura 2000 Network (ZEC and ZEPA), a part of the Dehesas de Sierra Morena Biosphere Reserve (M & B) and is also designated as a Starlight Reserve.

Dates EGN AC Meeting: 23rd September, 2019
 EGN CC Meeting: 24th September, 2019
 Conference: 25th – 27th September, 2019

For more information: <http://egnsierranorte2019.com/>
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