European Geoparks: Progress in a time of crisis
Geoparks: Progress in a time of crisis

The European Geoparks Network (EGN) is one of four regional networks designated as UNESCO Global Geoparks (UGGps). Despite the ongoing pandemic and continued restrictions, European Geoparks demonstrate once again their resiliency and creativity. Through networking and collaboration between geoparks, as well as with their respective communities and stakeholders, the variety of accomplishments and innovations are evidenced that remarkable progress has been achieved in a time of crisis. Papuk UGGp organized the outstanding 5th EGN Digital Forum, and with the designation of seven new Global Geoparks the EGN membership increased to 88 members in 26 countries. In 2021, the exceptional commitment of EGN evaluators enabled UNESCO to undertake 46 missions of which 41 were in Europe.

Geotourism and associated developments in infrastructure are significant components of sustainable economic development. Links between geology, industrial and cultural heritage and climbing are highlighted by Magma, Maestrazgo and Massif des Bauges UGGps. Estrela UGGp celebrates its volcanic heritage in an interactive exhibition. The 560 Suspension Bridge, Odsherred UGGp’s 19 new project initiatives introduced to the relationship between man and nature, the variety of activities and innovations are evidence that remarkable progress has been achieved in a time of crisis. Papuk UGGp organized the outstanding 5th EGN Digital Forum, and with the designation of seven new Global Geoparks the EGN membership increased to 88 members in 26 countries. In 2021, the exceptional commitment of EGN evaluators enabled UNESCO to undertake 46 missions of which 41 were in Europe.

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8 new UNESCO Global Geoparks
in 2022!

UNESCO’s Executive Board has approved the designation of 8 new UNESCO Global Geoparks bringing the number of sites participating in the Global Geoparks Network to 177 in 46 countries.

This year two new countries, Luxembourg and Sweden, this year join the Global Network with the designation of their first geoparks. The UNESCO Global Geopark label recognizes geological heritage of international significance.

The areas included in the Global Geopark Network present an extraordinary geological diversity that underpins different regions’ biological and cultural diversity. The geoparks serve local communities by combining the conservation of their unique geological heritage with public outreach and sustainable development.

With these 8 new designations, the Global Geoparks Network now covers a worldwide surface area of 370,662 km², comparable to the area of Japan. The newly designated UNESCO Global Geoparks are:

- Seridos UNESCO Global Geopark, Brazil
- Southern Canyons Pathways UNESCO Global Geopark, Brazil
- Salpausselkä UNESCO Global Geopark, Finland
- Ries UNESCO Global Geopark, Germany
- Kefalonia-Ithaca UNESCO Global Geopark, Greece
- Mellendal UNESCO Global Geopark, Norway
- Bulzu Land UNESCO Global Geopark, Romania
- Platsåbergs UNESCO Global Geopark, Sweden

Two of the newly designated UNESCO Global Geoparks are situated in Latin America and six in Europe. Owing to COVID-19 restrictions, no new applications from Asia, Africa or the Arab region could be evaluated this year but several projects for the creation of new geoparks in these parts of the world are under way.
The 5th European Geoparks Network Digital Forum – Papuk Special Edition

Greetings to all participants from the studio in Požega.

1. Presentation of the new «Geo Info Centre» mascot.
2. Introduction to the aspiring Geopark Biokovo-Imotski Lakes.
3. The musical interlude provided by the Musical School of Požega.

The 5th EGN Digital Forum – Papuk Special Edition was held from 1 - 2 September 2021. Considering the fact that we live in Covid-19 pandemic times, it was not possible for 150 delegates from European UNESCO Global Geoparks to travel to Croatia and participate live in the 45th EGN Coordination Committee Meeting. So, the meeting was held digitally. The event was designed in such a way that various digital presentations evoked the character of Papuk UGGp.

Before the meeting we sent “Taste of Papuk” packages with local products all over Europe. We also recorded 12 videos showing and presenting what you can do, see and expect when you visit Papuk, including delicious local products and the wonderful people who live and work in the Geopark. The Forum was held at the studio located in the City Library of Požega. However, we completed the Papuk experience with interesting guests in the studio, showing morning exercises in Jankovac, preparing Papuk breakfast, tasting various products from Geopark partners, cooking sarma and plum jam and hosting young musicians from the Požega Music School and the Požega Folklore Ensemble.

In addition to the programme involving the standard agenda, on Day 1 Prof. dr. sci. Marijan Herak presented Earthquake Hazards in the vicinity of Papuk UGGp and Croatian’s aspiring geopark Biokovo-Imotski Lakes was introduced by Ksenija Protrka, Ivana Capin and Hrovje Škrabić on Day 2. Photos, videos and recipes from both days of the meeting can be found on the official website of the event - https://www.5egndigitalforum-papuk.com/agenda-2/.

Mrs. Kristin Ragnes from Norway, Coordinator of the European Geoparks Network (EGN) attended the Digital Forum as a special guest. Following the official part of the meeting, we showed her the attractions of Papuk UGGp, our future “Geo Info Centre”, our Educational Centre “House of Pannonian Sea” and of course the most spectacular geosites “Rupnica” and “Jankovac”.

The final comments from colleagues from UNESCO Global Geoparks across Europe, confirmed their appreciation for a well and successfully organized Digital Forum.

Thank you all.

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The two issues of the special volume Paleontological heritage and geoconservation in UNESCO European Geoparks, edited online by the Geoconservation Research Journal (www.gcr.khuisf.ac.ir) were published recently. It includes 63 articles on fossils and palaeontological geosites in European UGGp’s Precambrian and Palaeozoic presented in stratigraphical order, from Precambrian to Quaternary. The articles provide glimpses of the evolution of the life forms in Europe, depicting biological and geological phenomena and events. The articles show the role that fossils play in educating children and the general public about the history of their importance in dating rocks and in reconstructing ancient environments. Various methods practiced in the geoconservation of palaeontological sites and the ways they are used in geoducation and in organizing touristic routes are described. Some articles demonstrate that well and poorly preserved fossils are equally useful in geoducation and in revealing the processes involved in their preservation. Preparing the article for publication has reinforced collaboration between the geoparks and researchers in institutions and universities not directly associated with individual geoparks. Consequently, many articles are co-authored by scientists and the geoparks’ managers. The special volume resulted from the Fossil Thematic Group’s poster exhibition “Images of the ancient lives in the UNESCO European Geoparks” presented during the the 43rd European Geopark Network CC Meeting, Swabian Alb UGGp, Germany and the 15th European Geoparks Conference Sierra Norte de Sevilla UGGp, Spain. The publication of the Second Volume, Special Issue with 35 articles on Mesozoic and Cenozoic fossils is expected at the end of 2021.

Dan Grigorescu – danalgrigorescu@gmail.com

Exceptionally preserved trilobites showing multifaceted eyes (a, b, c and d) from the Devonian of Vulkaneifel UGGp.
The European Geoparks Week, often called the Geoparks Festival, is held in late May and early June and these dates are a major item in the annual calendar of events for all European Geoparks. This European-wide festival aims to raise public awareness about Geoparks, their role in conserving the geological heritage, educational activities, and how they endeavour to provide economic benefit for the local people by promoting geotourism. It also demonstrates to geopark communities that they are part of a wider European Network.

During EGN Week 2021, despite the need to socially distance because of the pandemic, 79 European Geoparks organized 693 face to face events attracting 78,720 visitors and 223 online activities with 21,645 participants. Nowadays on-line promotion of the Geoparks on the web and social media plays an increasingly important role, and in addition 347 press releases, 82,098 programme flyers and 10,108 printed articles were published.

Events in the 2021 European Geoparks’ programmes involved a variety of activities and, by highlighting the links between the natural heritage and local communities, informed the wider public about the holistic nature of the Geopark concept. Guided tours provide an opportunity to showcase landscapes along established way-marked trails and to introduce new trails. However, guided tours are not just restricted to following trails through the landscape. The Azores UGGp brought geology to the city through its Geo-Urban routes. The Apuan Alps UGGp combined a guided tour with wild food foraging. In Beigua UGGp a guided walk to a geosite was combined with a visit to a cheese producer. Granada UGGp included a visit to an archaeological site and an open-air session of yoga meditation. Haute Provence UGGp integrated geology and contemporary art in a one-day hike. In the Tuscan Mining UGGp, guided excursions to geosites were followed by visits to very beautiful and evocative sites to listen to music and readings from Dante’s Divine Comedy. Combining fieldtrips with an astronomy workshop filled the day in Karawanken-Karavanke UGGp. Bakony–Balaton UGGp celebrated International Volcano Day on 1 June with a guided tour of the volcanic heritage along Hungary’s first nature trail, named after geologist Lajos Lóczy. The exploration of karst landscapes provided a theme for guided walks in the Idrija, Harz.
Braunschweiger Land, Ostfalen, Sitia and Sobořeňské UGGps. Las Loras UGG highlighted research projects funded by the Geopark in this year’s activities. Geology and nature were combined with field trips to orchard reserves in Courel UGGs, and with biodiversity in Estrela UGGs. European Geoparks Week provided Naturtejo UGGp with the opportunity to provide field training for school teachers and Grevena–Kozani UGGp with the chance of introducing the Geopark to the Vice-Minister of the Environment, Giorgos Amira and Vice-Minister of Tourism Sofia Zakaraki.

A beautiful landscape can also be appreciated in other exciting ways. Trollfjell UGGp designed a course in kayaking. The geology and landscapes in the Lauhanvuori and Massif des Bauges UGGps were explored by bike and a cycle race was a highlight in Villuerca–Ibores–Jara UGGp. Katla UGGp’s Hjörleifshöfði Race participants could choose between running 7 or 11 km. Central Catalunya UGGp introduced geocaching as an activity to get to discover the natural and cultural heritage. Guided tours showed participants how Troodos UGGp can provide an alternative tourist destination, through hiking, traditional climbing, cycling and many other adventures.

In some geoparks fossils provide an added attraction during European Geoparks Week. In Yangan Tau UGGp participants in the palaeontological rafting trip collected bones of the woolly rhinoceros, mammoth and horses. Luberon UGGp introduced participants to an important fossil footprint site. Searching for fossils provided an added attraction in Bohemian Paradise and Burren and Cliffs of Moher UGGps. Novohrad–Nógrád UGGp organised special thematic guided tours to fossil sites. North Pennines AONB & UGGp developed a fabulous guided event for families and field trips for young adults with additional needs.

Activities designed for children and students are a regular feature during European Geoparks Week. Celebrating Children’s Day, one of the most important...
activities in Terras de Cavaleiros UGGp, involved preschool and primary school pupils from the Agrupamento de Escolas de Macedo de Cavaleiros. Magma UGGp organized two days in the field with secondary school pupils. Saimaa UGGp spent European Geoparks Week guiding school groups introducing them to common rock types including granite and gneiss. The Children’s Day in the Botanical Garden in Kielce was a significant event in the Holy Cross Mountain UGGp. Children engaged with Molino Alto Tejo UGGp during outings in the surroundings of the Geopark’s schools. TERRA.vita UGGp’s game TERRA.bingo in which children had to find a rock, a tree or an information panel was very well received by visitors and the media. Papuk UGGp created workshops for schoolchildren. European Geoparks Week also provided an opportunity for a variety of group activities and online programmes. Psiloritis UGGp celebrated its 20th anniversary with an exhibition involving local products and artisans. Arouca UGGp celebrated the Opening of the 516 Arouca, the world’s longest pedestrian suspension bridge. Basque Coast UGGp initiated Nautilus, a new classroom for research and teaching, and Cilento Vallo di Diano e Alburni UGGp opened the Museum of Landscape and Nature. European Geoparks Week was initiated with an exhibition and conference in Maestrazgo UGGp. The reopening of the exhibition “The 15th 8000 m high mountain in the world – the biggest rockslide ever in the Himalayas” was the highlight in the Ore of the Alps UGGp. Models of past landscapes, e.g. 2.8 billion years ago, are a feature of three new exhibitions in Reykjanes UGGp's web page and on YouTube are a valuable contribution in promoting the Geopark. Hateg Country UGGp focused mainly on social media posts highlighting current projects in the Geopark. This year De Hondsrug UGGp focused on digital events including educational films and quizzes. The re-published digital guided tours from different locations on GeaNorvegica UGGp’s web page and on YouTube are a valuable contribution in promoting the Geopark. In spite of the problems created by the Covid-19 pandemic, the variety of activities delivered during European Geoparks Week 2021 are a successful outcome in a difficult year. The European Geoparks can look forward to building on this success by offering even more exciting and diverse activities in 2022.

Tony Ramsay
Barnabás Korbély
Bergstrasse-Odenwald UNESCO Global Geopark, Germany

Facing the COVID crisis and supporting the Global Agenda 2030:
Cooperation across the continents, “Climate Heroes” and “Areas of Diversity”

In these times, we all have learned that each crisis provides an opportunity for new developments, creativity and alternative options for cooperation both regionally and internationally. In this context, Bergstrasse-Odenwald UGGp developed combined digital methods with ongoing projects and developments in a series of new activities. Thus, cooperation, without travel and face-to-face meetings was achieved.

International cooperation involved a joint photo exhibition together with our partner UGGp Lushan, China titled “West-East Impressions” consisting of 3D landscape photos from both Geoparks presented in a west – east orientation rainfall hub. Maps accompanied by information about the Geoparks and partnership and a series of 36 photos emphasized the longstanding friendship between the Geoparks. The exhibition was opened virtually in both Geoparks in German/English and Chinese/English with video messages from the Geopark presidents. Due to the pandemic, the first four weeks of the exhibition occurred virtually (video at Geopark YouTube Channel and 3D-tour) and was open to the public for another two months. Both Geoparks considered the exhibition as a perfect tool for cooperation during the restrictions resulting from the pandemic.

Regional networking in combination with the support of the Global Agenda 2030, involved the creation of the project “Climate Heroes”. This citizen science project focuses on involving the outcomes from education about climate change and climate protection measures in our daily activities. It consists of four workshops and a smartphone app, developed with the Survey123 Framework from Esri. The workshop topics include an introduction to the process of climate change (WS 1), forests and climate change (WS 2), an expert round table about flood prevention and climate change (WS 3) and a final summary of the previous events and outcomes (WS 4). Participants can engage in interactive smartphone polls and also use our citizen science app to capture climate relevant information and collect in parallel “hero points”. Every data entry recorded on a virtual dashboard, results in a “hero point” and participants receive prizes and awards from “climate pioneer” up to “climate hero” at the end of the project.

We also focus on the protection of biodiversity. Our programme “Areas of Diversity” targets and involves our members in recognizing areas with potential for ecological improvement, e.g. watercourses, railway embankments, traffic islands, and creating habitats for insects, especially for wild bees. The programme, which is funded by the Geo-Naturepark involves Step 1 GIS documentation of the areas and proposed actions, Step 2 implementation of the actions. The projects presented above show how Bergstrasse-Odenwald UGGp supported its regional network and international partners during the pandemic. As a model territory for the Agenda 2030, we also provide examples of best practice for implementing SDGs like “Climate Change” (Goal No. 13), “Life on Land” (Goal No. 15) or “Strong local communities and international partnerships” (Goals No. 16 and 17).

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Burren and Cliffs of Moher UNESCO Global Geopark, Ireland

Working together while apart in a time of crisis; a new river catchment awareness project from the Burren and Cliffs of Moher UGGp, Ireland.

In September 2020, the Burren and Cliffs of Moher UGGp launched a new citizen science project in collaboration with a group of dedicated local volunteers, the Earth and Ocean Sciences Department of the National University Ireland, Galway and funding from Geological Survey Ireland. In the middle of a global pandemic which introduced unprecedented restrictions it was possible to work together and progress a new project in a time of crisis.

The Aille Engaged project focuses on the catchment of the small, but locally significant Aille River, which flows through the town of Lisdoonvarna and the village of Doolin before entering the sea close to the Cliffs of Moher on the west coast of Ireland.

The river system is complex due to underlying limestone dissolution and the formation of subsurface flow conduits and cave systems. The Aille River flows for much of its course on the contact between Pennsylvanian shales and the underlying Mississippian limestone. It only flows for about 12km from source to sea, however it is fed by a significant, largely underground, tributary which captures flow from a larger catchment area to the north. During high rainfall events this leads to local flooding. Understanding the nature of the contribution from the underground source is vital to modeling the flow characteristics of the entire river system.

The aims of the Aille Engaged project are to promote catchment awareness in line with the EU Water Framework Directive, and to promote Climate Change awareness using locally collected rainfall and river level data. The daily data is entered directly by the volunteers into a database and is displayed ‘live’ on a graph on the Burren Geopark website: www.burrengeopark.ie/learn-engage/rainfall-river-level-data/.

By engaging with both the data collection and the data entry and seeing that data go live to the public this project has empowered the local community to be directly linked to their river catchment as well as to the future climate change models for the river system.

A full year of data has now been collected and over the coming months this data will be processed and linked to various climate change rainfall forecast models for Ireland to forecast how the river system will respond to future climate change, this will provide vital information on possible mitigation or adaptation measures required.

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Dr. Tiernan Henry, National University of Ireland, Galway, processing data from Aille River data loggers.
Chelmos Vouraikos UNESCO Global Geopark, Greece

The Chelmos Vouraikos UGGp Photo Contest as a way to communicate with people during the pandemic crisis!

During the pandemic crisis, the necessity to change the way of communicating with people, since exchanging views and opinions in person was no longer possible. During 2020 Chelmos Vouraikos UGGp’s administrative staff responded creatively to the new challenges and came up with the idea of organizing a digitally held amateur photo competition dedicated to the area of the Geopark and its people. People of all ages and status were invited to participate and send a photo of the aspect that most impressed them while living in, visiting, engaging in sport, admiring geology and nature or just passing through the magnificent landscapes of the Geopark area. The huge success of the first photo contest led to its establishment as an annual event during the EGN Week. Thus, the 2nd Chelmos Vouraikos UGGp photo contest was organized enthusiastically during 2021. We received photos of impressive geological formations, landscapes, animals and plants from the area and photos depicting the everyday activities in the Geopark’s territory. We discovered, with great relief, that the people in our Geopark share the same need to interact with us. In total, 31 incredible photos were evaluated according to their aesthetic criteria and relevance to the Geopark’s interests. Four of them stood out and serve today as representative photos for our diverse territory.

The Discovery Point’s landscape and underlying geology is represented in a bronze relief model.

Three steles highlight the geology and attractions of Fforest Fawr UGGp and show examples of spectacular landscapes in other UNESCO Global Geoparks.

With some areas legally out of bounds to visitors, for periods during Covid lockdown, 2021 was a challenging time for Fforest Fawr UGGp. Some developments which had been planned prior to the pandemic, for example the ‘Touchwall’ at the National Park Visitor Centre were delayed. However, a new hub at Craig-y-nos Country Park was launched as the Geopark Discovery Point during European Geoparks Week in late May 2021. This was closely followed by the creation of a ‘Geopark Learning Lab’ at the Country Park aimed at education groups and the wider public.

The Discovery Point was conceived as an introduction to Fforest UGGp, providing visitors with an overview of the area’s geology, landscape, industrial and social history. The local landscape is represented in a bronze relief model encouraging visitors to explore the area. Further connections can be made through a series of colourful images on tabletops at the “Changing Seasons Café”. The Discovery Point also features three steles which highlight the attractions of Fforest Fawr UGGp and present it as a member of the growing family of UNESCO Global Geoparks. A time trail leads visitors to the Learning Lab which featuring rocks, industrial artefacts and video presentations which provide a deeper insight into the Geopark’s geology, industrial and cultural heritage. Maps, introduce education groups and visitors to the locations of the European and UNESCO Global Geoparks and their Regional Networks.

The new challenge for those managing sites and welcoming visitors is how to adapt to the changing circumstances arising from the pandemic. These include greatly increased visitor numbers and a changed visitor profile placing unanticipated strains on car parking capacity, toilet facilities and information provision. Mitigation measures include increasing the regulation of roadside parking, working with landowners to create overflow parking and enhancing online information about the availability of parking spaces. We are developing pre-book parking and Park & Ride schemes which will help to reduce the capacity issue and reduce the carbon footprint of visiting the Geopark.

The Geopark is also looking at extending its southern boundary to include a number of sites and communities. This would enhance its ability to tell coherent stories and to draw visitors away from sites experiencing ‘overtourism’ to communities where extra footfall will generate sustainable economic benefits. The proposed expansion will introduce visitors to important aspects of Welsh industrial and social history at a time when Wales was a major player on the world stage. In recent years training local businesses as Ambassadors has become an important component in the programmes of Fforest Fawr UGGp and the wider National Park. The programmes will be made more widely available through on-line provision combined with in-person training. Provision of hybrid meetings (mixed in-person and digital) for Ambassador training and meetings of the Geopark’s management team will assist in reducing the Geopark’s carbon footprint.

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One of the colourful table tops at the ‘Changing Seasons Café’ presents visitors with a time line illustrating major events in Earth’s history.

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Presented by the Balloons at the Fforest Fawr UNGeoparks Week opening ceremony. A time line illustrating major events in Earth’s history.
Global Geopark. Salihli UNESCO ceremony of presentation agreement.

SUSTAINABLE DEVELOPMENT

Prof. Demir 20 21

Kula-Salihli UNESCO Global Geopark, Turkey

International collaboration during tough times in Asia

A in most parts of the world, the influence of the Covid-19 pandemic still continues in Turkey. This situation has had a significant negative impact on many sectors, especially on the economy, education, and tourism in our country. Geoparks and their collaborators, like other institutions, have been and continue to be substantially affected by these unforeseeable conditions. However, it is necessary not to despair and to re-establish normality in one’s life or to adjust to the new normality. In 2020, Kula Salihli UNESCO Global Geopark established a partnership in the project entitled IGGP 727 Geological heritage – “sustainable management of geological hazards and water resources in the transboundary region of Kyrgyzstan”, led by the Tian-Shan Geological Society. One of the aims of the project was to conduct geo-heritage research in the Batken region of Kyrgyzstan. On the 18th to the 21st of September, an international seminar was held in Batken, Kyrgyzstan, with the support of UNESCO, as a part of this project. The seminar’s theme was “Geoparks in Central Asia: Supporting Geotourism and Sustainable Geological Heritage, Natural Resources, and Disaster Risk Reduction”. About 70 representatives from Kazakhstan, Kyrgyzstan, Uzbekistan, Russia, Turkey, Switzerland and Germany attended the seminar. At the meeting, representatives from the Kula Salihli UNESCO Global Geopark gave two presentations, entitled “Kula-Salihli UNESCO Global Geopark and Geoparks as a Sustainable Development Tool.” Representatives from the Yangan-Tau UNESCO Global Geopark (Russia) were also present at the meeting. Yangan Tau Geopark representatives also spoke about their experiences in building a geopark and the establishment of the Yangan-Tau Geopark.

At the end of the meeting, an international partnership agreement was signed with the suggestion and guidance of the Kula-Salihli UNESCO Global Geopark representatives. As part of this agreement, Kula-Salihli UGGp, Turkey, Yangan Tau UGGp, Russian Federation, Batken aspiring UGGp, Kyrgyzstan, Cappadocia aspiring UGGp, Turkey, Issyk-Kul aspiring UGGp, Kazakhstan Geoparks National Commission and Uzbekistan Geological Research Institute agreed to cooperate and share experiences on issues such as geo-conservation, the establishment of geoparks, geo-tourism, education and sustainable development.

This seminar, together with the subsequent cooperation agreement, clearly demonstrated the necessity for unity and cooperation in tough times. At the end of the meeting, the Uzbek representatives announced that a seminar would be held on geoparks in Uzbekistan in November. Even in the face of adversity, people continue to work together. We have received all of our vaccinations. We will have PCR tests, and we will continue to share our knowledge and experience in Tashkent on November 2-16, 2021.

Lesvos Island UNESCO Global Geopark, Greece

Exhibition: “Understanding Climate Change”: Exploring the consequences in the geological record. Cenozoic ecosystems and the current threat

Lesvos Island UNESCO Global Geopark makes combating the climate crisis one of its major goals together with activities for supporting the local community in understanding and adapting to climate change through various initiatives. Through exhibitions and public events we utilize the Lesvos Petrified Forest, a unique natural monument, to present past climate changes during the last 20 million years. The results of excavations are exhibited as climate change indicators for the reconstruction of the paleo-environment and paleo-ecosystems and to demonstrate the consequences of the past changes in climate that led to the extinction of many plants and animals. Through educational programmes and activities on climate change we transform the Lesvos Geopark into a learning platform on climate change for the young generation.

In 2021 Lesvos Island UGGp designed and organized an exhibition entitled “Understanding Climate Change: Exploring the consequences in the geological record. Cenozoic ecosystems and the current threat”. The aim of the exhibition is to introduce to the public the unique natural monument of Lesvos, the Lesvos Petrified Forest, and to raise public awareness about climate change by presenting evidence for past changes in climate and their consequences. It explores the question about the impacts that climate change had on ecosystems during Earth’s history. Using the example of the Petrified Forest of Lesvos in Greece, we convey how we can learn from the processes that have repeatedly changed our planet over millions of years to shape our future.

The exhibition includes impressive parts of petrified tree trunks, leaves, branches, roots, fruits and volcanic rocks, as well as detailed information about the Lesvos Petrified Forest. All these exhibits are indicators of past climate changes. The visitors thus have an opportunity to understand in-depth the history of the Earth and how climate systems have worked. The information provided leads them to realize how humans are currently interfering significantly in these large-scale and long-term processes and the potential outcomes of these activities.

The exhibition “Understanding Climate Change: Exploring the consequences in the geological record Cenozoic ecosystems and the current threat” was organized from 10th July to 31st October 2021 by the Messel Pit fossil Site, an UNESCO World Heritage Site the geological record. Cenozoic ecosystems and the current threat was organized from 10th July to 31st October 2021 by the Messel Pit fossil Site, an UNESCO World Heritage Site and the most important fossil site in Germany, in collaboration with the Geo-Naturpark Bergstraße-Odenwald UGGp.

The opening of the exhibition, on 10th July 2021 at the Visitors’ Centre of the UNESCO World Heritage Site Messel Pit.

Ms. Angela Dorn, Minister of Science and Art, Federal State of Hesse, Germany, Prof. Michael Zöller, Director of the Natural History Museum of the Lesvos Petrified Forest and Lesvos Island UGGPs and Ms. Liana Kriibardi, Consul General of the Hellenic Republic of Greece at the opening of the exhibition.

Lesvos Island UGGPs and Ms. Liana Kriibardi, Consul General of the Hellenic Republic of Greece at the opening of the exhibition.

Athanina Pavlidou, Lesvos Island UGGP, Greece - apavlids@gmail.com - lesvospf@otenet.gr

The cooperation agreement and partners.

Overview of the exhibition “Understanding Climate Change: Exploring the consequences in the geological record. Cenozoic ecosystems and the current threat” at the Visitor’s Centre of the UNESCO World Heritage Site Messel Pit.
Travelling through a pandemic: the GEOclimHOME-PRO exchanges delivered during the Covid-19 outbreak

A strong, central point of the project was its perspective was an Erasmus+ project which involved secondary school students from three European UNESCO Global Geoparks: Rokua in Finland, Sesia Val Grande in Italy and Chablais in France.

The aim was to increase the awareness about climate change and to improve students’ understanding of man’s active and passive roles towards the environment. The objectives of the educational activities were also to enhance students’ awareness of social responsibility, in order to stimulate active citizenship and to discover new job opportunities accomplishing the needs of sustainable development, sustainable future and lifestyle.

A strong, central point of the project was its methodology. The students were deeply engaged through transnational exchanges where they were involved in conferences and practical experiences with researchers. They worked mainly in mixed nationality groups to collect data and deliver final papers. They were involved in transnational exchanges where they were involved in conferences and practical experiences with researchers. They worked mainly in mixed nationality groups to collect data and deliver final papers. They were involved in conferences and practical experiences with researchers. They worked mainly in mixed nationality groups to collect data and deliver final papers.

Therefore, GEOclimPRO provides an unexpected way to directly experience the “resilience” we aimed to encourage for the future global changes.

Ilaria Selvaggio - selvaggio.ilaria@gmail.com

The SDG-Geocache project raises awareness of these challenges in a playful way by engaging as many people as possible.

Geocache project raises awareness of these challenges in a playful way by engaging as many people as possible.

<table>
<thead>
<tr>
<th>Time</th>
<th>Meeting</th>
<th>Remote Activities</th>
<th>Adjustments</th>
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<tbody>
<tr>
<td>October 2019</td>
<td>Finland to France</td>
<td>Italy</td>
<td>Done (1)</td>
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<tr>
<td>March 2019</td>
<td>France to Finland</td>
<td>Italy</td>
<td>Done (1)</td>
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<tr>
<td>November 2019</td>
<td>Italy to France</td>
<td>Finland</td>
<td>Done (1)</td>
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<tr>
<td>April 2020</td>
<td>France to Italy</td>
<td>Finland</td>
<td>Canceled</td>
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<tr>
<td>November 2020</td>
<td>Finland to France</td>
<td>France</td>
<td>Rescheduled (Oct 2021) if possible or remote activities (1)(2)(3)</td>
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<tr>
<td>February 2021</td>
<td>Italy to Finland</td>
<td>France</td>
<td>Remote activities (2)</td>
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<tr>
<td>April 2021</td>
<td>Italy and France to Finland – final event</td>
<td>France</td>
<td>Rescheduled (Aug 2021) if possible or remote activities (1)(2)(3)</td>
</tr>
</tbody>
</table>

(1) Activities as usual for transnational meetings in presence: conferences, fieldtrips and labs. (2) Practical activities for each school in its country if possible, mixed with online conferences and virtual meetings to share the experiences with the other partners. (3) Realization of virtual fieldtrips available for everyone and every time in remote working.

The riddle connected with SDG 6. Photo by Elisa Maier.

Swabian Alb UNESCO Global Geopark, Germany
Promoting the Sustainable Development Goals during a time of crisis

The COVID19 pandemic was and still is a time of global crisis. As the pandemic moved across state and territory boundaries, the crisis showed humanity that collaboration is essential for dealing with challenges, consequently people cooperated on diverse levels. Locally, many supported the elderly by doing their shopping or through self-quarantining. Regionally, hospital staff worked long hours to save as many as possible, and globally, scientists shared their research to develop a vaccine in record time.

Similarly, other crises such as climate change, biodiversity loss, hunger and poverty can only be mastered together. This has long been known and led to the 17 Sustainable Development Goals in the UN’s 2030 Agenda. While the different SDGs are meant to provide guidance to people worldwide in their struggle for sustainable development, these goals often seem scientific, theoretical, or even ordinary. Thus, based on the idea from a steering group within the county of Reutlingen, the office of the Swabian Alb Geopark developed an SDG-Geocache project to illustrate the relevance of each of the 17 SDGs to the local population. This project was then implemented by and within the county of Reutlingen. However, the concept was developed in a way that it can be used in other regions.

The SDG-Geocaches differ from regular geocaches, as the individual caches are clearly visible within the landscape. Thus, everyone who passes a cache can stop and access it, solve the riddle and enter their names in the log book. Each of the 17 geocaches covers one of the SDGs and is located in an area relevant to the respective SDG.

The geocache for SDG 6 (Clean Water and Sanitation), for example, is located at a volcanic vent, which contains rainwater, rapidly infiltrating the surrounding limestone. In the past, people settled around these volcanic regions and used the rainwater. However, the water quality was poor leading to high rates of child mortality. This is illustrated via the cache, as one has to take out a tube filled with water, sand, silt and clay which is disturbed on removing the tube. Thus, one needs to wait for the sediment to settle before reading the numbers to open the log book. This shows that it takes time to obtain clean water. It further illustrates that the SDGs are neither theoretical nor ordinary as access to clean water was not available in the Swabian Alb a few generations ago.

Today, it is a human right but on a global scale much has to be done in order to achieve this goal. The SDG-Geocache project raises awareness of these challenges in a playful way by engaging as many people as possible.

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Location of the Geocache concerning SDG 6 at the Hüle in Zainingen.

Photo by Elisa Maier.

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Location of the Geocache concerning SDG 6 at the Hüle in Zainingen.

Photo by Elisa Maier.
Rokua UNESCO Global Geopark, Finland
Geoheritage, culture and sustainable communities in rural areas in Finland, Iceland and Norway
A three-years educational project between three Nordic Geoparks

Nordplus Askola Autumn 2021 “The Finnish and Icelandic students exploring a ca. 8000 years old stone-age dwelling site in Vaala, RUGGp during the exchange in September 2021.”

Nordplus Rokua Autumn 2021 “Students studying a kettle lake in Rokua, RUGGp during the exchange in September 2021.”

Nordplus Saraisniemi Autumn 2021 “Students familiarizing with a local museum in Säräisniemi village, RUGGp during the exchange in September 2021.”

Rokua UNESCO Global Geopark, Finland
Geoheritage, culture and sustainable communities in rural areas in Finland, Iceland and Norway


Autumn 2020, just in the middle of the COVID crisis, a common Nordplus-funded school project was initiated between Rokua UNESCO Global Geopark (RUGGp) in Finland, Trollfjell UNESCO Global Geopark (TUGGp) in Norway together with Katla UNESCO Global Geopark (KUGGp) and Vatnajökull National Park (VNP) in Iceland. The main participants in the project include three upper secondary schools from the Nordic countries.

The idea is to have one-week exchanges between the schools and the territories. The first two exchanges took place remotely, the third exchange in September 2021 took place partially remotely as the Icelandic group travelled to RUGGp and Norwegians participated remotely. The coordinator of the project is Vaala Upper Secondary School located in RUGGp.

The four territories with their unique geoheritage offer comprehensive and concrete learning environments to study the SDGs. Understanding the functioning of Earth’s natural processes is a prerequisite for students to be able to understand the role of human activities in phenomena like climate change and the responsible use of natural resources. Simultaneously, the students improve their knowledge about the uniqueness of their home regions which enhances positive attitudes towards their home and Nordic environments.

The four parks strengthen the project’s expertise and support the schools in learning and in achieving their pedagogical aims. The parks’ experts contribute to field activities by preparing visits, planning methods and learning environments and analysing results together with the teachers and students. Their work with wide networks of institutions and professionals results in fruitful cooperation opportunities for the schools.

The project connects schools which are actively using Geoparks in their teaching and share the same values as the Geoparks. RUGGp and KUGGp have already applied the Geopark School Concept in their territories, for example, the Vaala Upper Secondary School. During this project, an international network of Geopark-oriented schools will be created to support the sharing of common materials, methods and experiences on Geopark-themed teaching. The network, hopefully, will also support international cooperation between schools and geoparks in the future.

Information and project’s outcomes: https://geoheritage.fas.is/

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Gea Norviegica UNESCO Global Geopark, Norway

Gea Norviegica Geopark takes part in the biggest ocean cleanup project in Norwegian history

Plastic litter occurs along rivers, lakes and eventually ends up along the entire Norwegian coast. It can only be described as a major environmental problem for our country.

When the pandemic struck with a new wave in the spring of 2021 and working from home became mandatory in Norway, we at Gea Norviegica used the time to think outside the box. We have previously worked in dealing with marine littering for several years with funding from the Norwegian Environment Agency, cleaning beaches with school students from the Geopark. We wanted to progress this engagement and therefore delivered an invitation to tender to the Norwegian Retailers’ Environmental Fund (NREF). NREF is Norway’s largest private environmental fund, which receives 0.5 Norwegian kroner for every plastic bag sold by its member retailers Norway. NREF provide funds for projects along the entire coast with the goal of cleaning 40% of the surfaces of Norway’s and Svalbard’s coasts by the end of 2023, and it is with great pleasure we can announce that Gea Norviegica UGGp will take part in this work.

Our part in this huge project is to clean 40% of the coastline of three of our municipalities. In total 97 locations of varying size and an expected 30,000 kg of waste materials. In order to carry this out we will employ two new professional coastal cleaners who will work full time, together with two existing employees with broad experience from previous work on the coast. The coastal area in the Geopark consists of steep slopes and numerous islands, so most of the cleaning areas will therefore require the use of a boat to transport the workers and the litter.

The Geopark will involve school children and volunteers in litter picking in safe and suitable locations. This is a great educational opportunity for ‘hands on’ learning about environmental issues, experiencing what it feels like to make a difference and, at the same time incorporating curriculum goals of sustainability. The project also increases our visibility as several media channels want to document our work.

The project in Gea Norviegica UGGp will kick-off in March 2022 and it will be possible to follow every development on our social media channels e.g. Facebook, Instagram (@geaparkenrydder) and www.geoparkenrydder.no.

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Bjørn Magnus Narum - bjørn.narum@geanor.no

The amount of litter picked by a school class in one day.

Typical marine litter along the coast of Oslo Fjord.
Harz Braunschweiger Land Ostfalen UNESCO Global Geopark, Germany
Sustainable Development Goals (SDGs) in Geoparks: SDG 6 Clean Water and Sanitation

The occurrences of water in the Harz Braunschweiger Land Ostfalen UGGp are extremely diverse, including springs, rivers, moors, lakes and dams. Water is undoubtedly one of the most important natural resources in our Geopark. UGGps see themselves as model areas for sustainable development in which the topic of “water” is of central importance. The UN Have defined “Clean Water and Sanitation” as SDG-Goal 6. Specifically, universal and fair access to safe and affordable drinking water is to be achieved for everyone by 2030. There is also a need to improve water quality by reducing pollution, avoiding the introduction of hazardous chemicals and significantly increasing water treatment worldwide. Ecosystems connected to water must be protected or restored, including mountains, forests, wetlands, rivers, aquifers and lakes. In order to achieve these goals, the participation of local communities must be increased.

In Europe, the European Water Framework Directive (EU-WFD) applies, which intends to standardize the legal framework for the water policy of the European Union and to align its corresponding policy increasingly towards sustainable and environmentally friendly water use. All EU member states are obliged to bring their water bodies to good ecological and chemical conditions by 2027 at the latest. Groundwater must be available in sufficient quantity and of good quality. In addition, the WFD prescribes information, consultation and the active participation of the public. So, here is our action plan «Resource Water»:

1.) Networking: Participants as partners and members in the Geopark’s network
   - The water supply companies, in particular, are important partners in our network. For example, the Harz Watersworks currently supplies around two million people and industrial companies in around 70 cities, municipalities and water associations. These then transport the drinking water to the consumer who receives high-quality drinking water. Most of the water comes from the reservoirs of the Harz. Regional suppliers such as the Weddel-Lehe-Water-Association who integrate local sources into the water supply and take care of the treatment of the wastewater.
2.) Participation: Organize meetings and events
   - We aim to inform and involve the population by organizing and participating in events on the topic of water. In May 2019, for example, the Geopark was a partner of the Water Week, in which around 7,300 people took part in 40 events.
3.) Education: Develop and implement educational programmes
   - As part of our sustainable development education programme, we have developed special water events. Here, children of different ages are given lectures about the subject of “water as a resource and habitat” in a playful way. The geoguides team of our Geopark are provided with further specific training activities. For 2021, “Water: A Source of Life” will be the main theme of our event programme.

Henning Zellmer - hzell@web.de

SDG goals 4, 6 and 17 are integrated in Harz Braunschweiger Land Ostfalen UGGp’s action plan Resource Water.

Learning through play: Geopark water action with children near Erkeroede.

Over the years, the ocean waves have brought and scattered an enormous amount of litter onto our shores. This marine debris which includes beverage containers, disposable packaging, fishing gear and other material, is frequently blown further inland by the wind. If nothing is done, the coast and our natural environment will be filled with debris from the sea. Coastlines polluted with marine debris are harmful to all marine life and clearing the coastline is important to ensure the sustainability of the marine environment. Iceland is no exception. The high energy and mainly rocky coastline that surrounds much of Reykjanes Geopark is difficult to navigate and clean, but that does not stop us from cleaning the coastline. This year, a project was launched which sets itself the lofty goal of cleaning up the coastline and getting companies, schools, and institutions to adopt coastal areas for litter picking. Reykjanes Geopark and the Blue Army started a collaboration with the goal of making the Geopark’s coastline the cleanest in Iceland. The Blue Army is a local Non-Governmental Organisation for environmental protection that focuses on the fight against plastic pollution in the sea through litter picking, encouragement and raising awareness of the problem. The clean-up partnership is not only about cleaning beaches but also about documenting cleaning projects and keeping records of the areas and amounts of marine debris collected. In this way, we can monitor the state of the coastline which will help us plan future clean-ups. Additionally, this will also help us build momentum within the local community and the government to take this matter seriously. It has been challenging to mobilize participants for clean-ups due to the Covid-19 pandemic and restrictions on gatherings in Iceland. Nevertheless, we have managed to keep the project going and approximately 15 metric tons of litter was removed from about 22 km of the coastline in 2021. We aim to maintain this good and important co-operation project and make the coastline of Reykjanes Geopark the cleanest in the country. Cleaning up the rubbish from our shores only solves the problem in part because the sea is still full of debris that will be washed ashore in the future with its associated environmental impact. We all need to work together to solve this problem and prevent more rubbish from ending up in the sea.

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TERRA.vita UNESCO Global Geopark, Germany
Putting people representing local intangible cultural heritage in the limelight

According to UNESCO, cultural heritage does not only include monuments and collections of objects, but also traditional handicrafts and intangible traditions such as social practices, rituals, oral traditions, performing arts, festive events, and knowledge and practices concerning nature and the universe.

TERRA.vita has created a database of people in the Geopark area, who practice intangible cultural heritage activities that characterize the region. These people or, in some cases, associations and the cultural heritage they represent are now presented in profiles on TERRA.vita’s website (https://www.geopark-terravita.de/de/immaterielles-kulturerbe). Gradually, the information will be also provided in English. The profiles are accompanied by short videos in which the people practice their craft and demonstrate their understanding of intangible cultural heritage. The locations of the peoples’ workshops or of the festive events are located on an interactive map of the Geopark.

Information boxes provide material on whether and when the cultural heritage was entered on the federal list or on the UNESCO’s list of the Intangible Cultural Heritage of Humanity. Examples for federal UNESCO cultural heritage practices in the TERRA.vita area are the cultivation of orchards of the Kneipp spa culture. Organ craftsmanship and music, indigo dying (“Blauwvlok”) as well as falconry, which are practiced within the borders of the Geopark’s area, are listed on the UNESCO’s Representative List of the Intangible Cultural Heritage of Humanity.

Furthermore, the website presents many local handicrafts with a geological background such as the still successful clogger brick factories and the last remaining pottery workshops (“Postbäcker”), both using clay and clayslones from different geological ages. Also, the plugging agriculture, which resulted in the formation of the plaggen soils in the Middle Ages. The miner’s song “Steigerlief” was recorded by the “Glückau” Anthrazit Ibbenbüren e.V. Music Association and can be listened to on TERRA.vita’s website.

“Plattdüütsch”, known as the Low German, is a West Germanic language variety spoken mainly in Northern Germany and in the northeastern part of the Netherlands. In the TERRA.vita area, there is a large variety of Low German dialects spoken. Therefore, a section of the website deals with the Low German language and also shows a music video in which Bernd Niehenke, also one of the last remaining potters in the region, sings a song in “Plattdüütsch”. To preserve this linguistic cultural heritage, a CD with his songs is currently being recorded.

To further support its intangible cultural heritage, TERRA.vita supported, together with the Osnabrücker-Land-Kultur e.V. association and the Municipality of Bad Essen, the local painter Reinhard Klink. He is known for creating etchings of local landmarks or festivals. For the 100th anniversary of the discovery of the Dinosaur Tracks Bad Essen-Barkhausen, the etching leaves space for one’s own interpretation.

Reinhard Klink created the etching “The dinosaur tracks – lasting tracks in the Nature Park and Geopark TERRA.vita” to celebrate the 100th anniversary of the discovery of the Dinosaur Tracks Bad Essen-Barkhausen. The etching leaves space for one’s own interpretation.

The etching is produced in 25 individual copies.

The Kneipp spa culture is recognized as an intangible cultural heritage on the federal list. It can be experienced on TERRA.vita’s hiking track “TERRA.track Kneipp to go” in Bad Iburg. Photo by Nature and Geopark TERRA.vita.

Aberfeldy Kneipp and Heilbad Kneipp.

The audience attending the presentation of the Acta apuana, volume XVI-XVII, at the Geopark Farm in Bosa di Careggine. Photo by Antonio Bertaletti - bertaletti@parcapuane.it

Audience attending the presentation of the Acta apuana, volume XVI-XVII, at the Geopark Farm in Bosa di Careggine.

The Kneipp spa culture is recognized as an intangible cultural heritage on the federal list. It can be experienced on TERRA.vita’s hiking track “TERRA.track Kneipp to go” in Bad Iburg. Photo by Nature and Geopark TERRA.vita.

Audience attending the presentation of the Acta apuana, volume XVI-XVII, at the Geopark Farm in Bosa di Careggine.

The issue contains several articles. The first two articles provide an analysis of the effects of climate on the maritime slopes of the Apuan Alps, which is useful for hydrological risk prevention, and a hydrogeological and isotopic geochemical overview of the karst aquifers and springs in the Apuan Alps and their vulnerability to both pollution and climate change. Another two contributions deal with issues regarding the ongoing climate change, looking at the reconstruction of the sub PhoneNumber real palaeoenvironment of the Campocatino glacis basin and an analysis of global and local causes of the floral decline in the wetlands of the Apuan Alps.

The botanical articles included in this issue focus on the in-situ conservation project of the very rare orchid Hermannium monorchis population, an analytical key for the identification of the Apuan species of Sphagnum (peat mosses) and the inventory of the samples studied by Maria Ansaldi preserved in the Botanic Museum (Pisa University). In addition, zoological research projects are presented in three articles dealing respectively with the Apuan mountain butterflies Romosia and Enokia collected in the 1800s, the sympatric occurrence of the Alpine chough Pyrrhocorax graculus and Red-billed chough Pyrrhocorax pyrrhocorax and their interaction with the Apuan landscape and the monitoring that documented the return of the wolf in the Geopark area.

The Apuan Alps UGGp is working to make its scientific journal Acta apuana increasingly effective as an essential tool to raise the awareness of the local community about its natural heritage. Acta apuana issues are all available in a printed or digital version (www.actapuana.it).
Katla UNESCO Global Geopark, Iceland

Student research project in Katla Geopark’s Geoschool - Víkurskóli

Katla Geopark and one of the Geopark’s Geoschools, Víkurskóli School in the town of Vík, started a joint research project in January 2021. The research project consists of seasonal monitoring of the coastline in front of Vík, by measuring beach profiles with a GPS, looking at the grain size of the sand and observing the morphology of the beach. The research is carried out by the students at the school, but teachers from the school and a geologist from the Geopark are on hand to guide them through their research. Six beach profiles have been established which will be measured four times per year, in the fall, during winter, in the spring and late summer. Along with the measurements, the students will also learn about coastal areas, what are the causes for accretion or erosion on beaches, the effect of storms and climate change on coastal areas and the history of the coast near Vík. Students from the 3rd grade to the 10th grade participate in the research project, but the students in 3rd and 4th grade conduct their own research on the grain size of the beach sand, why some rocks are different than others, and why and what kind of litter occurs on the beach. The aim of the project is not only to educate the students about research methods and to obtain experience of conducting research on a high level, something that hopefully will serve them well in the future. So far, the students have measured the profiles three times, and hopefully the project will continue for the foreseeable future. With these measurements, the students will be able to tell if the beach is growing or receding, together with obtaining a better idea of the energy state of the beach and of changes in its morphology. That information is very important, as the coastline near Vík has been receding rapidly over the last few decades. In 2011 the first step was made to preserve the coastline by building a “sand collector” on the beach and a second collector was built in 2018. These two sand collectors have stabilized parts of the beach, but monitoring needs to continue to confirm the sustainability of the stabilization process. A report on the student’s measurement will be published annually and the research that the students carry out and their results will hopefully be able to help the municipality and the agencies involved in coastal management in Iceland, in their future efforts to halt the erosion of the coastline in front of Vík.

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Muskau Arch UNESCO Global Geopark, Germany & Poland

The new geosite map and geosite sponsorship programme

The Tertiary and Quaternary deposits in Muskau Arch Geopark preserve evidence of the Earth’s recent history. Characteristic geosites include formations of Pleistocene loose rocks that form only slightly distinctive features in the landscape or were modified and covered by soil and vegetation. With the update of the geosite map, compiled in 1999-2001, the Geopark has for the first time recorded the special characteristics of geosites in areas with unconsolidated rocks and large glacial-tectonic deformation. The result is a three-stage model that summarises and describes the value and maintenance of these sites for the presentation by the Geopark, during revalidations and for its ten-yearly revalidation as a National Geosite®. In addition to 140 official first-category geosites, the map records second-category and other geosites that are of minor importance but outstandingly suitable for certain purposes.

A sponsorship programme was launched in 2019 in order to accomplish the maintenance of the most important geosites. The Geopark approached and succeeded in winning the cooperation of already committed working groups, associations and individuals to take over the required maintenance. In the meantime, six sponsorship contracts have been concluded, which precisely define the scope of necessary measures derived from the information in the geosite map, together with a time frame for achieving and approving the completion of the recommended measures. The maintenance of theignite outcrop in the Felissee municipality is considered a special challenge. It is located along the “Geology Tour”, a cycle route crossing about a dozen giezers. Giezers are morphological features that are particularly characteristic of the Muskau Arch Geopark and almost unique in the world. They are formed by surface oxidation of steeply dipping coal seams forming elongated valleys without drainage. In 2004, an artificial outcrop about 25m wide and 8m deep was created in a typical giezer on the “Geology Tour”.

Unconsolidated rock material is strongly exposed to erosion - rain and frost as well as vegetation cause constant erosion and rearrangement of the rock fragments. As a result, surface exposures that are subject to destruction and landslides are monitored annually. Most recently, in 2015 and 2019, the profile of that geosite, which was exposed to the elements in the intervening years, was restored at great expense. Attempts to protect the outcrop failed due to technical problems. In the end, the sponsorship programme was the deciding factor, not only to secure the maintenance itself, but also to gain professional support to ensure the technically and substantively demanding implementation for conservation. Since 2019, the geosite has been refurbished, twice a year by a single person using only sensitive equipment, while the professional supervisor coordinates larger maintenance measures with the help of the municipality’s building yard. In close coordination of the work, the continuous and needs-based maintenance of the outcrop is thus ensured.

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Information
Panel about the largest erratic boulder (The Devils Boulder) in the Muskau Arch UGGp together with the boulder cleaned of mosses and lichens following the maintenance measures by the municipality of Trzebiež. Photo by the municipality Trzebiež.
Naturtejo UNESCO Global Geopark, Portugal
Project for groundwater resources characterization in the Vila Velha do Rodão syncline

Groundwater is a vital natural resource and of undeniable economic and social value in any region. With the effects of climate change, which in some regions is already causing longer periods of drought and intensifying desertification, it is important to research sustainable and efficient ways to supply communities with good quality water. Foreseeing the need for self-sufficiency in water supply during periods of scarce rainfall, the municipality of Vila Velha de Rodão, located within the area of Naturtejo Geopark, requested a study to characterize the groundwater resources of the region, specifically in the area of the Vila Velha de Rodão syncline. This syncline is formed by rocks, ranging in age from the early Ordovician to the Silurian, which outcrop in the fold limbs as two quartzite NW-SE trending Appalachian-type crests Silurian, which outcrop in the fold limbs as two quartzite NW-SE trending Appalachian-type crests. The Ródão syncline is formed by rocks, a first sampling campaign was carried out in June of 2021 (dry period), in which water samples were collected from springs and boreholes located along the crests. During the sampling, the physical-chemical parameters were measured in situ, and samples were taken for chemical (major elements) and isotopic analyses (δ18O and δ2H). The chemical and isotopic study will allow the identification of the recharge area, the groundwater flow, and the evaluation of the groundwater quality. Climatic analysis (precipitation, temperature, evapotranspiration), together with topographic data, soils, and the degree of fracturing and weathering of the rocks will make it possible to estimate the infiltration and the recharge rates of the aquifers.

In line with the United Nations 2030 Sustainable Development Goals (SDGs), this study has as its main objective to support the management of the sustained exploitation of groundwater resources in the Municipality of Vila Velha de Rodão. The definition of the hydrogeological conceptual model of the quartzite crests will allow the estimation of the available resources and assure the maintenance of the groundwater quality.

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The project team sampling the “O Nascente”, a spring that supplies the village of Foz do Cebreiro.

The Ródão syncline at Portas de Ródão Nature Monument, River Tejo valley.

Trollfjell UNESCO Global Geopark, Norway
Rock hard risk reduction in Torghatten

Mount Torghatten, pierced by a sea cave, is an important monument in Trollfjell UNESCO Global Geopark. The famous “hole in the mountain” has attracted a worldwide audience for centuries. During the past six weeks, workers have been cleaning the hole to make it safe for the increasing number of tourists.

Weathering
The major risk hazard in Torghatten includes rockfalls from the sidewalks and ceiling caused by frost weathering. As freezing water expands, pressure changes lead to widened cracks in the bedrock creating lose rocks in the cave walls and ceiling. Rockfalls are very common especially in springtime, during ice melting. Visiting the hole in Torghatten at this time of the year is not recommended and could be dangerous.

High hanging, high quality work
This is the first time we see risk reduction work of this scale in Torghatten. Local authorities, the consultancy firm Nordconsult and Norwegian Geotechnical Institute have examined the area over years and hired the rock support company Steint Ordens AS to execute the controlled cleaning of the most exposed areas.

We met the three workers from Steint Ordens AS, Tomas Ottemo, Pål Jenssen and Øystein Åsbakk, as they were packing their equipment after six weeks of work.

During this time, they have been dangling 100 metres above ground, removing 50-100 cubic meters of rocks and securing areas with potentially loose rocks.

This heavy work required high quality security equipment, good physical conditions, professional knowledge, and the right tools. The workers’ best friend was the pinch point bar. This tool was used to both loosen and remove rocks. To loosen the biggest boulders, they used air cushions placed in the cracks and inflated to expand, just like the processes of frost weathering.

In some places, instead of removing the rocks, they used 3-metre bolts and glue to attach the rocks to the bedrock. To maintain an untouched look, they camouflaged the bolts with spray paint in the same color as the bedrock.

While standing outside the hole in the rainy weather, we could observe smaller rocks falling from the freshly cleaned sidewalks. Mr. Ottemo was pleased with the rainy weather forecast as this would help to wash down the loose remains from the cleaning.

Further facilitation
To improve the further public safety, Sherpa stairs will be built in order to lead the visitors away from the most unstable areas. An additional plan is to guide the traffic in one direction. In that way it is possible to reduce the total number of people passing through exposed areas. Another important reason for developing the trail, is to control the movement of visitors, protecting and securing the areas where one wishes to avoid wear and tear.

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A worker using a pinch point bar to remove loose rocks from the rock face.

Mount Torghatten pierced by a prominent sea cave.

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Visitor safety will be improved by replacing the existing wooden staircase inside the cave with a less slippery metal stairway.
The European Geoparks Network today

The Network consists of 88 Geoparks in 26 European countries (February 2022)
www.europeangeoparks.org
Moorcroft Wood Local Nature Reserve (LNR) is the site of a 40 geosites within the Black Country UNESCO Global Geopark. It is one of six sites studied in detail for my dissertation (MSC Applied Environmental Geology, Cardiff University). The Black Country is an area of extensive industrial heritage, post-industrial restoration, and urbanisation, all of which are present at Moorcroft Wood. The site today is bounded by canals, housing, and industrial land.

The bedrock below Moorcroft Wood LNR consists of Carboniferous Middle Coal Measures (mudstone, siltstone, sandstone, with coal, ironstone, and fire clay), overlain by Anglian glaciofluvial and glaciolacustrine deposits (clay, silt, and sand) which fill “Moxley Palaeovalley”, a buried channel margin. Superficial deposits, extracted via sand pits, were used in brick-making and iron founding moulding. However, their 10-20m thickness meant that coal and ironstone could only be mined underground via shafts. Both were taken to local ironworks for use in pig iron manufacture.

By 1760s, Molesley had coal mining, primitive blast furnaces, and a canal network. By 1830, Molesley Ironworks and Murby Brickworks were founded and made various products using Moorcroft Wood’s raw materials. By 1890, there were abandoned “old shafts”, “shafts” still in use, numbered pits (for coal mining), and a large “sand pit”. Moorcroft furnace, Murby’s Brickworks, and Moorcroft Ironworks had all been demolished.

By 1904, there was no industrial activity within Moorcroft Wood. Mining had become too expensive, because previous mining and faulting had caused ground instability and risked flooding or fires. The abandoned industrial land was bought and used to build a new isolation hospital. One year later, Moorcroft Wood became a pioneering urban re-planting contract of the Midlands Reafforestation Association. “Made ground” at the surface was mostly slag (an iron-rich waste material, optimal for plant growth) and so covered by 60,000 trees to create a convalescence garden for the hospital. This re-vegetation did not, however, include any re-landscaping.

By 1938, historic mining had caused the sand pit and surrounding coal mining pits to subside. This formed Moorcroft Pool and Long Meadow Pool, around which large pieces of slag were left in-situ as examples of industrial heritage. Other subsidence-induced ponds and waterlogged ground formed by 1965. Moorcroft Wood was only made officially accessible to the general public in 1981, once the hospital no longer used the site. Footpaths and a car park were constructed by 1993, and the site was made a LNR in 1996 due to its exemplary urban forestry. A bedrock of large pieces of slag, the only on-site evidence of Moorcroft Wood’s industrial history is its unusual topography and made ground where “normal” soil would be expected.

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By 1760s, Molesley had coal mining, primitive blast furnaces, and a canal network. By 1806, iron smelting was done on-site in Moorcroft Furnace. In 1830, Molesley Ironworks and Murby Brickworks were founded and made various products using Moorcroft Wood’s raw materials. By 1890, there were abandoned “old shafts”, “shafts” still in use, numbered pits (for coal mining), and a large “sand pit”. Moorcroft furnace, Murby’s Brickworks, and Moorcroft Ironworks had all been demolished.

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The Djerdap UNESCO Global Geopark, situated within the Djerdap National Park, is one of the pilot areas of the project ConnectGREEN within the second phase of the Danube Transnational Programme. The planned developments for the infrastructure of the Danube-Carpathian region threaten to disrupt the geology of large areas and increase the fragmentation of their habitats. Through the ConnectGREEN project, partners from different countries and various fields of activity joined forces to increase the capacity, identification and management of ecological corridors to reduce the conflict between infrastructure development and wildlife conservation. Maintaining or restoring ecological corridors will secure a viable population of large carnivores in the Carpathians and maintain one of the largest biodiversity hotspots and functioning ecosystems on the continent. The main objective of the ConnectGREEN project (2018 - 2021) is to maintain and improve the ecological connectivity between natural habitats, especially between Natura 2000 sites and other protected areas of transnational relevance in the Carpathian ecoregion in the Czech Republic, Hungary, Romania, Slovakia, Serbia and the Ukraine. One of the final activities within the project is the inauguration of an open-air exhibition of photographs in front of the Djerdap UGGp’s Visitor Centre. The educational game «Djerdap Adventure» is one of the products arising from cooperation during the ConnectGREEN project. During Children’s Week, held in Serbia from 4 – 10 October, a series of interesting educational workshops were organized in pre-school and school institutions within the territory of the Djerdap UGGp in which pupils researched and learned about Djerdap through the educational game. In addition, an educational class was held on the topic of birds which pupils had the opportunity to go out into nature and observe birds.

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The Lime Kiln Route promotes the link between Mining Heritage and Natural and Cultural heritage within the Geopark.

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The legacy of the territory’s industrial heritage linked to mining and the geology of the area is disappearing. For this reason, these historical activities should be the subject of attention. Quicklime has been used in construction work from the earliest times. As a raw material, calcite (CaCO3) from limestone and dolostone must be treated for industrial uses by burning it in a lime kiln to obtain quicklime (calcium oxide). The raw material is not scarce because the Maestrazgo UGGp has approximately 1,200 km² covered by carbonate rocks deemed of mineralogical and palaeontological interest. This is a site where various fossils of marine invertebrates have been studied, including different species of ammonites, belemmites, and brachiopods. Through a circular path of 5 km, this route takes the visitor to five lime kilns and facilitates a visit to the restored 8 m in diameter and 9 m in height artificial “Ice House” from the XVI century which is included in the local Route of the “Ice Houses and Cold Vaults”. Additionally, the municipality has another geological information panel about the “Upper Jurassic succession”. This geosite is documented by the Spanish Geological Survey (IB037) and is of important stratigraphical and palaeontological interest. It is a site where various fossils of marine invertebrates have been studied, including different species of ammonites, belemmites, and brachiopods. Through a circular path of 5 km, this route takes the visitor to five lime kilns and facilitates a visit to the restored 8 m in diameter and 9 m in height artificial “Ice House” from the XVI century which is included in the local Route of the “Ice Houses and Cold Vaults”.

Another of the treasures in this superb medieval town is the restored traditional olive oil mill, which now houses a very interesting museum space that includes in the local Route of the “Ice Houses and Cold Vaults”.

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The new Route was the course of a fieldtrip during the Maestrazgo UGGp EGN Week 2021.

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The Lime Kiln Route: Ruta de las calzadas.

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Maestrazgo UNESCO Global Geopark, Spain

Restoring and managing ecological corridors

in mountains as green infrastructure and educational activities with pupils
Troodos UNESCO Global Geopark, Cyprus

The Geoconservation Project along the Maroullena Riverbed: A great example of progress during a time of crisis

The Maroullena River is located at the north central edge of the Troodos Ophiolite Complex (TOC), along which, together with its exquisite natural features, a Venetian Bridge is found as well as one of the most significant geosites (Geosite 3) of the Troodos UGGp. This spectacular exposure of the Lower Pillow Lavas, provides a classic reference locality for the study of these volcanic rocks. A lower unit of hypabyssal intrusions and an upper unit of pillow lavas, are cut by swarms of near vertical dykes, which are the natural recorders of the submarine volcanic activity that occurred on the ocean seafloor approximately 92 million years ago. At this locality, the visitors can experience the excitement of walking on the seafloor of an ancient ocean without the use of submarine vehicles.

In 2015, the Community Council of the Kalo Chorio Oreinis village, in their effort to promote the exceptional natural beauty of the area, created the 4.7 km long “Pikovrisi tis Merikas” nature trail. The trail which starts from the Venetian Bridge, passes through the Maroullena Gorge along wooden steps with railings and wooden towel valley the hikers can walk near small lakes, ends at the picnic site called “Merika”. Along the riverbed valley, the visitors can experience the excitement of walking on the seafloor of an ancient ocean without the use of submarine vehicles.

Since 2020, a huge effort was made by the Local Community Council in collaboration with the Troodos UGGp to restore the trail along the riverbed. The new structures include several tens of metres of elevated wooden sidewalk along the riverbed and a 14-metre-long metal framed bridge with a wooden floor and railings, supported on two concrete bases on either side of the river banks that are cladded with local rocks. Furthermore, in order to enhance the geotouristic offer provided by the nature trail, a new viewpoint with a platform will be constructed on top of the river slope opposite the geosite, that will be reached by visitors from the riverbed via a number of wooden steps with railings.

The geoconservation project was undertaken during a period of crisis due to the minimal number of visitors. It will be completed by the end of the year, thereby strengthening the communities geotouristic product and significantly increasing the number of visitors in the future.

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Arouca UNESCO Global Geopark, Portugal

516 Arouca – Pedestrian Suspension Bridge: a new addition to the Geopark’s infrastructure

On 2 May 2021, the day of the Arouca Municipal Holiday, the 516 Arouca - Pedestrian Suspension Bridge was inaugurated. This prominent suspension structure constructed in the Paiva Valley, provides spectacular views of two geosites in the Arouca UNESCO Global Geopark (UGGp), Portugal – «Paiva Gorge», and «Aguieiras Waterfall», and the famous «Paiva Walkways». This bridge is a significant component of the Geopark’s provision for educational and touristic visits, with a special focus on geology. Views from the bridge contribute to an understanding of the Earth’s dynamics, particularly with respect to the rock cycle and formation of the landscape, and its connection with biodiversity and the history of humans in Arouca UGGp.

Hanging 175 metres above the Paiva River and with a 1.20m wide surface the bridge is named “516 Arouca” for its 516 metres span. It has the capacity to support 1800 people simultaneously and is the largest suspension pedestrian bridge, of this type, in the world. The opening of “516 Arouca” was carefully prepared, taking into account the values of a territory classified as a UGGp and its membership of the Natura 2000 Network. The policies and strategies aimed at promoting responsible and sustainable tourism benefited from the experience acquired in managing the Paiva Walkways in order to avoid the risk of excessive tourist pressure and its impacts. Thus, an online booking system was implemented, with controlled limits and timetables in which visits are always accompanied by guides who, in addition to interpreting the infrastructure and the landscape, play a role in raising awareness of sustainable behaviour and practices. Additionally, to control the flow and quality of visits, “516 Arouca” employs a team of supervisors, responsible for the proper functioning of the infrastructure and to support for visitors and guides. Both teams, guides and supervisors, have previously received training about Arouca UGGp’s values and heritage (from a holistic point of view), as well as first aid and managing panic/stress situations.

At the time of its opening, given the characteristics of this new tourist attraction in Arouca UGGp, the media coverage exceeded all expectations, resulting in “516 Arouca” making the news in several international communication channels. Alongside the media, the demand was immediate. Inaugurated during the pandemic and considering that the tourism sector is one of the most affected by this public emergency, this new infrastructure, with approximately 90,000 visitors in 6 months is proving to be a tourist attraction at the local, regional, national and even international level. This year, the “516 Arouca” was already winner of a “World Travel Awards” as “Europe’s Leading Tourist Attraction Development Project 2021”.

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Bakony–Balaton UNESCO Global Geopark, Hungary

New, interactive exhibition on the diverse volcanic heritage

The iconic columnar basalt rock face of Hegyestű. Photo by Barnabás Korbély.

The Geopark has an internationally significant and unique volcanic heritage. In the Bakony–Balaton Uplands Volcanic Field about 50 volcanoes were active in the period from 8–2.3 million years ago. Thanks to their relatively young age, the recent landforms clearly show that this landscape was «born in fire». As the volcanoes erupted in a wet, marshy environment, phreatomagmatic volcanism was typical. Due to the interaction between magma and water, eruptions were at first usually explosive. Maaras, tuff rings, lava lakes and, in the last phase of volcanic activity, Cinder cones were formed in the mainland. The loose Pannonian sediments around the craters were eroded away by weathering processes, resulting in the formation of the characteristic shaped remnant hills (their contours can be seen in the logo of our Geopark).

Hegyestű Geological Visitor Site near Monoszló village is an important geotourism destination. The spectacular columnar basalt (or more precisely, basanite) rock faces, exposed by quarrying until the 1960s, and the beautiful panorama attract tens of thousands of visitors every year. Significant improvements were made at this site in the frame of the Interreg Danube GeoTour project. In Issue 16 of the European Geoparks Magazine, we provided a brief introduction to the volcanic trails, one of them, the evocatively named “Route of Fire”, starts at this site and lures hikers into the world of the once raging volcanoes. The visitor site’s exhibition has also been thoroughly revamped, with a state-of-the-art multisensory exhibit providing the traditional viticulture of the region, based on volcanic soils, and some of the Geopark products that are sustainably produced by our partners. In the framework of “Hidden Treasures in Balaton Uplands National Park” project, new interpretive panels (in Hungarian, English and German) and a playground for children were installed, and our visitors are now pampered outside with new benches – so this is an ideal place for learning, relaxing and hiking!

The duration of the age of the dinosaurs, or even the time since the last ice age are very abstract measurements on our human timescale. The vast interval of time represented by the geological history of the Earth is as difficult for children to appreciate as it is for adults.

In the Montmelas village school, within the Beaujolais UNESCO Global Geopark, the educational approach was to teach about geological time by creating a nature trail in which time is represented by the distance travelled.

The trail project is based on a network of six trails already created by school children in the same area for themselves as well as for the general public. In all, the six routes provide six different angles of approach to the Montmelas environment (fauna, flora, poetry, landscape, etc.). The geological route is superimposed on the present nature trail.

The objective of the Montmelas Geological Trail is to raise awareness of geological time through walking. The trail is designed as a time scale where one metre travelled corresponds to four million years, over a distance of approximately 1.4 km. Ten information panels mark the key moments in the geological history of the Earth and in the Beaujolais, such as the emergence of life, the appearance of the first animals or the formation of the Alps. Thus, school children and visitors walk relatively longer distances between Precambrian events (formation of the Earth, the Moon, birth of tectonic plates, etc.), hundreds of meters apart, than between panels representing the last 500 million years with panels just a few meters apart. Strolling along the path then allows us to determine our position in the chronological sequence of eras in the history of planet Earth.

In parallel with the panels representing the major stages in the history of the Earth and living things, four panels provide information about the rocks encountered on the route, in this case a sandstone, a dolerite, a microgranite, as well as a micacgast. The goeldiversity presented along the Montmelas Geological Trail provides an example of each of the major rock types (igneous, metamorphic and sedimentary).

The children’s introduction to learning about geological concepts, and geological time in particular, began with the creation of a time line in which a wire stretched in the classroom, symbolizes the history of the Earth. It is enriched during the school year by the addition of geological events, in the form of images, which the pupils have chosen for the geological trail.

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Beigua UNESCO Global Geopark, Italy

First steps on the path of mountain therapy

One of our main missions is to bring people closer to nature, but sometimes it seems like an impossible challenge especially if you lack the grounding and skills to fully enjoy the mountains.

However, we don’t give up on impossible challenges. So, we experimented with a pilot project involving inclusion initiatives which helped us to develop new skills and lay the foundations for a more articulated and complex planning of activities for future use.

We started in January with Federico, a teenager with autism spectrum disorders. In collaboration with his family and in coordination with the teacher who supports him, we brought the Beigua Geopark to Federico’s home through a series of on-line meetings with our Guides. His passion for animals was the starting point to develop a means of reciprocal knowledge, to stimulate involvement and participation and to deal with other themes linked to the Geopark. We worked together on the agro-food chains, a topic Federico is studying at school. Thanks to the Geopark Guides he had the chance to experience, through videos, pictures and tales, the real life of farmers involving breeding and milk processing. We parted with the promise to meet one day in person in the Geopark and share the experiences we have been talking about on a screen over a period of months.

Then we met Leila, a little girl with motor disabilities and chronic illnesses that limit her engagement in community life. Just for her we organized a day in the mountain, in places normally inaccessible to a traditional wheelchair. A dream coming true for the girl and her family.

These were extraordinary experiences, which enriched us as people and as nature professionals, and gave us many ideas to develop proposals for mountain therapy. Beigua Geopark’s future will become more and more inclusive.

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On line activities about Beigua Geopark with Federico.

Styrian Eisenwurzen UNESCO Global Geopark, Austria

Progress in a time of crisis: Revitalizing Nothklamm and the theme trail “GeoPath”

S

pring 2021 was used enthusiastically for important renovation work in the GeoVillage Gams situated in the middle of the Nature and Geopark Styrian Eisenwurzen. Thus, once again parts of the footbridge in the Nothklamm were renovated. An important step to guarantee a breathtaking and safe experience.

At the same time, the content of the “GeoPath” theme trail was updated and brought up to the latest standards. Now 15 stations on an entertaining circuit convey exciting geological highlights from the GeoDorf Gams and the only UNESCO Global Geopark in Styria. In the GeoDorf you can find different fossil and dinosaur tracks, exciting stories about our Earth history and the special Klaus Cave. It is important not to reveal too much at this stage.

The aim of all these involved to raise awareness locally and at the same time protect the geology. The Nature and Geopark Styrian Eisenwurzen and the Natural History Museum Vienna, Oliver Gulas-Wohri (CEO Nature and Geopark), C. NUP Eisenwurzen

On line activities about Beigua Geopark with Federico.
Causses du Quercy UNESCO Global Geopark, France

Contemporary art, know-how and geology in the Causses du Quercy Geopark

Located at Gréalou, Pech Laglaize is a hill with three dolmens built nearly 5,000 years ago, one of which is included in the UNESCO World Heritage List as part of the « Saint James Way in France ». This karstic pastoral area was used since the Neolithic period by sheep breeders who came to graze their flocks of sheep. It is a major natural environment within the Geopark, composed of dry grasslands which provide reservoirs of remarkable biodiversity. The Super-Cayrou refuge artwork has been installed in this environment.

Super-Cayrou is the result of a meeting between the Geopark and the association « Derrière Le Hublot », which develops artistic and cultural projects in the region. This is the first work of art-refuge built as part of the « Fenêtres sur le paysage » (Windows on the Landscape) project. This project aims to develop other works along the GR65 long-distance hiking trail, which is the most frequented section of the St James Way in France.

Composed of two casette tents (dry stone huts typical of the limestone causses) and a large esplanade to contemplate the landscape, Super-Cayrou is constructed entirely of limestone, the local source of dry stone. It is a work of the present, based on ancient know-how linked to dry stone and which the Geopark, with a network of partner craftsmen and associations, is trying to perpetuate. Super-Cayrou invites you to contemplate the landscapes, the cliffs and the stary sky of the Quercy limestone plateaux, to sleep in the middle of nature in a work of art, to take a break during your itinerary on the St James Way.

Super-Cayrou was designed by « Encore Heureux » (Still Happy), a group of architects and artists, together with the inhabitants and the commune of Gréalou and many local participants. Meetings were organized to facilitate the participation of the inhabitants in this project. The work was undertaken locally. Vincent Caussanel, a craftsmen-builder specialising in dry stone and a Geopark partner, coordinated and carried out the work, and the stones came from a small quarry located nearby. The quarry was opened only for this project and closed once the stones had been extracted. This experimental initiative made it possible to supply the site with local stone while limiting the impact on the environment. No concrete, no metal, only natural and local materials were used in a project that respects the environment. The construction work was able to take place in the spring of 2020 despite the restrictions linked to the health crisis.

Guided tours are offered every summer by the Geopark and the Tourist Office and Heritage Service of Grand Figeac.

Another project is underway in the south of the Geopark and should be completed in 2022.

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Courel Mountains UNESCO Global Geopark, Spain

Drystone walling for harmony between brown bears and local honey producers

Honey provides a local sustainable income in many of the world’s rural areas, however the presence of the brown bear constrains the profitability of its production. In the Courel Mountains, UGGp, local people, by using the local geology, found the solution to cohabiting with bears from ancient times. They built more than 240 remarkable structures around beehives to prevent attacks by bears. The structures are circular, up to three metre high, drystone walls. The walls which were constructed from local Palaeozoic slate and quartzite have tops with eaves (overhangs) made of untaxed horizontal stones. If a bear tries to climb the walls, the horizontal stones would fall on the bear, which then escapes. The beehives are traditionally made from natural materials obtained from local cork oaks (Quercus suber). The circular structures were built on south-facing hillsides, in order to benefit from sunlight as much as possible. The large south-facing slopes form part of the structural relief associated with a large recumbent fold that is the flagship of the Geopark. These slopes are covered by heather (Ericaceae) and chestnut trees (Castanea sativa), whose flowers are pollinated by the bees during the creation of the tasty honey.

Courel Mountains UGGp promotes honey as a homegrown product linked to the local geology and the Art of Drystone Walling, Knowledge and Techniques, which is listed in the Intangible Cultural Heritage of Humanity by UNESCO. The circular stonewalls enable the coexistence between the local people and the population of and bears which is increasing in the Courel Mountains thanks to the partnership between the Brown Bear Foundation and the local communities. The partnership has collaborated, with the help of workers and volunteers, in the restoration of the circular drystone walls. These structures were then promoted along hiking routes and other touristic programmes, as well as activities for students. Tourism offices and an ethnographic museum display the honey-related heritage and the production of honey by local beekeepers and young entrepreneurs. Honey pots show the logo of the Geopark. Local producers continue using traditional circular structures for producing honey safely, living in harmony with the brown bear, whose occurrence is a great incentive for visiting the Courel Mountains.

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Honey from the Courel Mountains UGGp.
The Interactive User Guide Applied to Tourism in the Estrela Geopark (GUIA), was publicly launched on the 27th of September, and is an initiative of the Estrela UNESCO Global Geopark, with funding from Tourism of Portugal, and technological implementation from Primelayer.

The GUIA is an interactive tourist information system that intends to be used as an instrument for the management, promotion and enhancement of tourism in Serra da Estrela, improving it as a tourist destination and giving added value to its products. Its use allows visitors to build itineraries according to their interests. This tool aims to centralize and standardize, in a single platform, the information regarding tourism provision in the territory of the Estrela UGGp. It provides visitors with a planning tool for their visit, through a web platform and Mobile Application, promoting tourism communication, accelerating the digital transition of informative support and tourism management in the nine municipalities that are part of this Geopark.

The database that feeds this system (web platform and app) has all the tourism resources, local events of interest, hotel information, as well as weather forecasts and giving added value to its products. Its use allows visitors to build itineraries according to their interests. This tool aims to centralize and standardize, in a single platform, the information regarding tourism provision in the territory of the Estrela UGGp. It provides visitors with a planning tool for their visit, through a web platform and Mobile Application, promoting tourism communication, accelerating the digital transition of informative support and tourism management in the nine municipalities that are part of this Geopark.

There is a long history of mining for ilmenite (titanium iron-oxide) in Rogaland, one of Magma Geopark’s two Counties. The first mines were opened in 1785, near Koldal about 6 kilometres east of Egersund, one of the five municipalities in the Geopark.

Ilmenite contains both iron and titanium, and iron was extracted from 3000 tons of ore removed over a period of 11 years. There were, however, problems with the smelting process and mining ceased in 1796. Mining started again in 1861 and a railway was built to transport the ore 7 km to the coast. Wagons filled with ore extended down to the sea from an elevation of 118 m. The empty wagons were pulled back uphill by horses. Mining ceased at this site in 1881 and was concentrated further east in Rogaland. The ore is developed in a narrow, east-west zone near the boundary between anorthosite and gneisses and occurs in ilmenite-rich lenses.

The county Rogaland was first mapped and described in the County Governor’s “Detailed description” by the County Governor in 1740. This publication also included the mines at Heggdal and was extracted from 3000 tons of ore over a period of 11 years. There were, however, problems with the smelting process and mining ceased in 1796. Mining started again in 1861 and a railway was built to transport the ore 7 km to the coast. Wagons filled with ore extended down to the sea from an elevation of 118 m. The empty wagons were pulled back uphill by horses. Mining ceased at this site in 1881 and was concentrated further east in Rogaland. The ore is developed in a narrow, east-west zone near the boundary between anorthosite and gneisses and occurs in ilmenite-rich lenses.

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The web platform is already online, with the launch of the app expected by the end of 2021. This will be an important gateway to the territory of this UNESCO Global Geopark, allowing a bigger and better communication for tourism, both in Portuguese and in English.

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Magna UNESCO Global Geopark, Norway
Visit the Mines Project in Magma Geopark

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The county Rogaland was first mapped and described in the 1740’s in the publication “Stavanger County detailed description” by the County Governor of Rogaland, Bendix De Fine (1696-1746). This publication also included the mines at Heggdal, also known as Ankerhusgruve, which were in operation from 1785 to 1790. The mining license was held by Moss Ironworks, who exported all the ore to Eastern Norway during this first period of mining. In 1791 Moss Ironworks had eight active mines in the Egersund district, with a value of 4400 Norwegian Krona (about 400 Euro). The ore was transported to the coast on sledges in the wintertime, crossing Lake Kyldsvann and Lake Svennvann, via Grodem, through Lake Suldsvann to Nålaugvika Bay. We assume that most of the workers were local farmers who were trained by experienced miners from the eastern part of Norway.

In Magma Geopark, thanks to the cooperation with the Environmental Department (Miljødirektoratet), we have now valorised all the most important mines located in the Geopark’s five municipalities, securing, and opening them to the public, adding the Geopark’s interpretation panels which connect the cultural and geological heritage.

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Massif des Bauges UNESCO Global Geopark, France

Geology and climbing, dynamic partners during the National Geology Days in France

The National Geology Days, which have existed for three years, provide an opportunity to initiate new partnerships. The Fort de la Batterie, located in the town of Marthods, at the north-eastern tip of the Massif des Bauges UGGG, provides a fantastic view of the Mont Blanc massif and the boundary between the external crystalline massifs and the subalpine chains. The Fort is a small former military base, which has been patiently restored by the members of this dynamic association that manages the site. The Fort’s Association recently worked to install a geological toposcope to present its fantastic geological landscape as part of the enhanced welcome afforded to members of the public. Despite the covid pandemic, the Association also hosted one of the sessions of our partner network working together with the local committee of the Mountain and Climbing French Federation (FFME), another of the Geopark’s partners, in a joint initiative to link geology with climbing. At the foot of the Fort, an enormous isolated block provides a pleasant place in the forest, to help children discover climbing. On the day organized by the Fort Association children and their families were introduced at this previously unrecognized climbing site, to climbing routes and climbing equipment. Various enjoyable workshops involving slack lines, zip lines and climbing routes for different levels were held throughout the day. A welcome was also assured by the members of the Association during visits to the Fort. Pancakes and other dishes were prepared in a convivial setting. The Geopark’s staff were also present and held a geological workshop on the Fort’s esplanade. This involved interpreting landscapes, a 3D geological model of the Bauges Massif and an exhibition of selected rock types. The workshop provided an occasion to present the geology of the area together with the sport and activities of Massif des Bauges UGGG to new members of the public.

The plunging view of the glacier valleys (1000 m vertically above the city of Uging) was an occasion to describe the former extent of glaciers and traces left by their retreat. This special geology day took place during our EGN Week and included other special geological events. On the previous day and over the weekend a one day cycling tour was organized to discover the area’s landscape and heritage, another event involved visiting the waterfall and cave at the in Faverges–Sevrier geosite. A good weekend during which the Geopark’s partners admirably fulfilled their commitments to share their knowledge of the territory. The Fort’s Association is now involved in sharing a place in the mountain which aims to be appreciated by and inspire a wide public. This can be extended, on a neighbouring site, to appreciating the glacial history, the sky at night and orchards designed for conserving old fruit tree varieties.

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North Pennines AONB UNESCO Global Geopark, UK

A landscape for everyone

People are an essential part of any Geopark, as residents, contributors, communities and visitors. But who are those people? In the North Pennines Area of Outstanding Natural Beauty (AONB) and UNESCO Global Geopark, like many other rural landscapes, the people who visit the area and get involved in Geopark activities are usually not fully representative of the wider population. But Geoparks should be for everyone. For a range of reasons, some parts of society are not getting the benefits of these special places.

This is not a new issue. The need and demand for change, so that different groups of people have access, are included and feel ownership of these landscapes, has been known for decades and the actions to make this happen are not innovative or exceptional. But slowly, together, progress is being made.

Examples of this progress in the North Pennines include a range of initiatives involving different groups of people, different organizations and different approaches. Some of the work involves building relationships with individuals who can identify issues and share their own lived experience. Sometimes organizations that are already embedded within communities are the best way to connect. An action research group was formed, made up of representatives with a wider range of experiences from the Geopark and surrounding area who can help on this journey. The Geopark team have worked with a variety of groups, including refugee groups, youth organizations, visually impaired groups, transgender groups and faith communities to offer them opportunities and find out what makes participating more challenging for them and what can be done to support their involvement. Steps for change include working with the North East Autism Society, making staff more aware of issues affecting people with autism and adapting our approaches to be more inclusive, such as providing high-quality information for families to make an informed visit. Disadvantaged young people are engaging with the Geopark through organizations such as The Prince’s Trust and Cumbria Development Education Centre to help build their connection with nature and develop their skills. This includes site visits, practical tasks, creative activities and training.

All this aims to help a wider range of people to feel at home in the North Pennines AONB and UNESCO Global Geopark. This involves changing the way staff work and plan projects to be more inclusive. It involves challenging assumptions and asking difficult questions. These are small steps and it will be a long journey, but this should be a landscape for everyone.

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**Odsherred UNESCO Global Geopark, Denmark**

**Holiday house business leads to Geopark funding of local initiatives**

The corona pandemic hit hard. But having to face international travel bans, citizens all over the world had to exploit the possibilities of domestic travelling, thereby initiating a new wave of staycation trends.

In Geopark Odsherred (Denmark) this meant a profound increase in the renting out of holiday houses. This was more pronounced than in any other region in Denmark because Odsherred is the municipality in Denmark with the most holiday houses, approximately 25,000.

As one of three divisions in the Geopark Foundation, the company Feriepartner rents out approximately 400 houses. Obviously, this results in a large turnover for the Geopark. Resource management of the large 2020 turnover materialized in financial sharing, allowing the Geopark to award DKK 375,000 (c. 50,000 €) to a diverse array of activities and projects.

“This is a typical example of the geopark concept’s ability to create new possibilities and stimulate economic growth. Even during a global crisis, the geopark’s attachment to the local area ensures that the world had to exploit the possibilities of domestic travelling, thereby initiating a new wave of staycation trends.

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**The largest single grant of € 10,000, was given to the Lammefjord Historical Society, which is in the process of raising funds to finance a new museum on one of Europe’s largest land reclamating initiatives, which celebrates its 150th anniversary in 2023.** "It is a great pleasure to be able to co-finance such a project, given the fact that the reclaiming of the Lammefjord, providing waders for seaweed safaris and the establishment of close-to-town shelters for recreational use – to name a few."

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"Our field researchers have collected biological samples on the "Übergossene Alm" (covered mountain glacier) in the Hochkönig mountain range."

**A Field Researcher collecting biological samples on top of the "Übergossene Alm" (covered mountain glacier) in the Hochkönig mountain range.**

On July 2021, Basecamp Research, an environmental research company based in the UK, partnered with the Ore of the Alps UGGp to study the unexplored microbial biodiversity within one of Austria’s vast natural landscapes. Basecamp Research specialises in the discovery of novel environmental microbes from biodiversity hotspots all over the world, with the ultimate aim of improving our understanding of the hidden biodiversity and using this to develop new and sustainable products for the global economy.

To conduct this study, the field researchers first collected small soil samples from many different habitats around the Ore of the Alps UGGp. This included exploring the vast array of beautiful environments within the Geopark, such as the stunning glaciers, magnificent forests and rivers that cover the landscape. The research team conducted all sampling non-invasively and on foot, to ensure that they did not interfere with the magnificent natural ecosystem. After sample collection, the field researchers extracted the DNA from microorganisms in the soil, and then used computational analysis to identify previously unrecorded microbes!

Basecamp Research were assisted in their research by Horst Ibetsberger, the Scientific Director of the Ore of the Alps UGGp. Horst Ibetsberger assisted the field researchers by helping to identify sample sites, involving the research team in the Geopark’s ‘Together for Our Future’ programme and providing the team with a warm Austrian welcome! The ‘Together for Our Future’ programme will show people how we combine investigation with science to understand the true power and complexity of nature so that we may better protect it in the future. As soon as the results of the research work are available, they will be presented virtually in the Geopark schools as well as in the Austrian Geopark Forum and in the presence of representatives of the provincial government of Salzburg by Nadine Greenhalgh’s Basecamp Research team and Horst Ibetsberger. All the stakeholders of the Geopark are really proud to be partnering the research team to learn more about the unexplored biodiversity in the soils beneath our feet!"
Pollino UNESCO Global Geopark, Italy

The discovery of the Bifurto Abyss at the Venice Film Festival

At the 78th Venice International Film Festival - Biennale Cinema 2021, the movie “Il Buco” (The Hole) won the Special Jury Prize. The film, written and directed by Michelangelo Frammartino, was filmed entirely in the area of Pollino UNESCO Global Geopark with the collaboration and support of the Geopark Authority. The film shows the history of the discovery of the “Abisso del Bifurto” (Bifurto Abyss), a vertical cave, that is an important geosite in the Geopark. With a depth of 685 m from ground level, the cave, at the time of its exploration in 1961, was the second-deepest in the world.

The abyss, located in the municipality of Cerchiara di Calabria, is an extraordinary example of karst processes. Now it occupies the fourth place in the ranking of the deepest caves in the world and, according to speleologists, it is one of the most difficult caves in the whole of Southern Italy. In fact, the director’s idea for the film was, thanks to a research project on karst cavities in the Geopark area, organized by the Geopark in collaboration with the University of Calabria and the local speleological association “Gruppo Speleologico Sparviere”.

The film’s narrative recreates the caving expedition in August 1961 when a team of speleologists from Turin plumbed the depths of the cave, juxtaposed with everyday rural life in the Calabrian region. In fact, in one scene, the villagers sit in the town square and watch a communal television outdoor, that depicts the building of the Pirelli Tower in Milan, a national symbol of the country’s postwar economic miracle.

In the same way in the mountains the life of the shepherds seems to flow without ever engaging with the activity of the speleological group. The movie, a coproduction from Italy, France and Germany, was filmed directly in the cave, so it allows us to see closely how the speleologists who first went into the abyss collaborated.

During the filming there was close cooperation between the Geopark team and the film crew, to avoid damage to the natural environment that could have arisen from the crew climbing with their equipment in the park’s highland and descending into the depths of the abyss.

Nevertheless, the film is not only about the depths, but - with an engaging play of contrasts - it shows also the extraordinary landscapes of the park, thanks to the work and expertise of the director of photography, the master Renato Berta.

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The 3D printed model of Noutsos-Kokkoris Bridge for visually impaired people.

Vikos-Aoos UNESCO Global Geopark, Greece

“A Greek Geopark for all”:
Towards an inclusive and accessible interpretation of Vikos-Aoos UNESCO Global Geopark through the project “Listen-Touch-Feel”

The notion of cultural accessibility has a central role in integrated heritage management policies and especially in the management of UNESCO nominated sites. Within this framework the Zagori Ecumuseum implemented the educational pilot project “Listen-Touch-Feel”, aimed at engaging people with special needs, especially the visually impaired, with the natural and cultural heritage in the Vikos-Aoos UNESCO Global Geopark.

Zagori Ecumuseum, one of the major socially driven and local development social enterprises in the Epirus region, operates, in compliance with UNESCO’s cultural policies, by implementing awareness raising and capacity building community-led programmes in the cultural landscape of Zagori including the Vikos-Aoos Geopark.

The main idea was to design an innovative programme for a sensitive and socially marginalized group such as the visually impaired, by combining technological with interactive visual methods such as 3D printing technology and soundscapes-walks. More specifically, traditional historic stone bridges, cultural landmarks in the Geopark were scaled down to 3D printed models along with their surrounding landscapes, such as the Noutsos-Kokkoris Bridge built in 1750, for interpretation by touch and recorded soundscapes.

The programme’s originality lies in the enhanced personal experience of an educational walk in the in-situ monuments of the Geopark, with interactive methods that improve the spatial perception of visually impaired people through touch and hearing.

Methodology

The interpretive walks combine personal experience with a 3D representation of the route’s geomorphology and an audio description with audio stimuli which is designed for small groups.

The project was implemented in three stages.

Stage_1, Capacity Building and Training

Information seminars were held online to inform the wider public regarding the new technological possibilities for visually impaired people to access cultural landscapes and products at all educational levels by using programmes from open-source or commercial technologies and bodies.

Stage_2, On-site implementation

The groups took part in explanatory walks in nature within the cultural landscape of the Geopark, including an interpretive sound recorded tour on a path that is part of the area’s natural and cultural heritage. Apart from the personal landscape experience through the interpretive walks, the 3D depiction of the stone bridges and the route’s geomorphology enabled contact with the monuments and the landscape through touch, as is done with works of art.

Stage_3, In the final part of the project, all the routes were accompanied by an audio description (narration of the visual content) and audio stimuli from the soundscapes collection, to create a virtual enhanced tour.

The soundscapes walk experience

The project utilized the soundscape methodology as a tool to enhance the lack of vision in blind people through acoustics. Even more, the groups were encouraged to experiment in finding solutions to create ecologically balanced soundscapes in which the human community and its sound environment are in harmony, according to the principles of acoustic ecology.

The expected result was the dissemination of technological possibilities for the services of visually impaired people, with as much participation as possible from beneficiaries such as directly concerned blind people, trainers, and educators.

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Villuercas-Ibores-Jara UNESCO Global Geopark, Spain

La Vuelta reaches the Villuercas Peak

In 2021, the organization of La Vuelta, one of the most important multi-stage bicycle races in the world calendar, together with the Giro d’Italia and the Tour de France, decided that one of its stages included reaching the top of Villuercas Peak. Television enables the race to be followed by lovers of cycling and nature tourism. Among its stages, the cyclists arriving at the top of a mountain are the ones that attract the most followers in a television show recording the landscapes, the excitement of the race and the spectators on the road sides. The media expressed admiration for the scenery and the difficulty of the stage. It could not be otherwise since the last fifteen kilometres of ascent, a military track assigned for use in the Geopark, had been adapted as a mountain road and as a component of the Geopark’s geological itinerary during the previous year.

The itinerary used for geotourism interpretation has three branches with interpretation panels. It is also an example of a diversified itinerary with a dozen observation points that combine geological stops together with cultural and natural breaks. The route includes palaeontological sites, protected forests, Appalachian geomorphology, hermitages, snow pits, pilgrimage paths to Guadalupe, faults in Cambrian rocks and other curiosities such as the 13th century hydraulic works, the birthplace of several rivers or a place for touching “the sands of Rhine Ocean beaches”. The views to the north and south reveal the distant valleys of the Tagus and Guadiana rivers.

The Geopark management staff approached the issue of the finishing stage with the view of protecting the route from the impact of large numbers of spectators with the opportunity for an unprecedented level for tourism promotion. Consequently, informative and promotional activities were devised that took into account the Geopark’s conservation principles and objectives. These activities included circulating information and promoting awareness on social networks, campaigns with some local and regional cycling clubs, an award for participants in awareness activities consisting of cycling jerseys with a special Geopark design, providing information about the Geopark for the TV commentators during the broadcast and, finally, the on-site monitoring on the day of the stage. Among the results we can count the following.

Negative impacts on Villuercas Peak and the Geopark’s facilities (panels and signage) were zero. The public withdrew in an orderly fashion taking their own waste so that a subsequent cleaning campaign was unnecessary. The impact on tourism has been considerable, with a large increase of the number of visitors. In conclusion, a good experience in promoting the Villuercas-Ibores-Jara UNESCO Global Geopark.

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Vis Archipelago UNESCO Global Geopark, Croatia

The Baby Boat Programme in the Vis Archipelago Geopark

The Maritime heritage Association Ars HALEuesta (Komiza) and UNESCO Vis Archipelago Geopark plan to collaborate in the education programme for children the “Baby Boat Programme” developed by Ars HALEuesta during last 20 years. On 6 December 2000, St. Nicholas Day, Komiza witnessed the launching of small “gajeta falkula” built according to the design of Dr. Velimir Salamon. This boat was constructed as part of the UNESCO Programme, initiated by Mr. Theodo Fruthof from Amsterdam, the Secretary of the European Maritime Heritage Congress.

The Baby Boat Show Workshop presents experiencing the boat to various audiences, but primarily to children. Within the workshop the ancient man-boat relationship is presented through the shipwright’s, the mariner’s, the painter’s, sculptor’s, poet’s, musician’s views of the boat – in essence the perception of the ship as a living being. According to the “do touch” principle the experience of living with the sea is presented through stimulating all the senses of the children and other participants in the workshop. In the atmosphere of the Adriatic environment, the children are encouraged to build the “gajeta falkula” Baby boat. The boat, reduced to a children’s sized boat, enables the children to row and sail with Baby Boats, to build the boat from paper or wooden kits and boat models. In the Baby Boat Show Workshop children also watch the documentary and other educational films on living with the sea etc., to listen to music and poetry in the local dialect and songs about the sea and the boat.

The workshop starts with the show “Ala falka!” performed by professional actors and musicians. To avoid the necessity of using translation the show is performed in mime. The actors gather the group of children and lead them to the scene where the history of man and his boat will be presented encouraging them to participate actively in the events.

The actor presents the similarity in shape and structure between the boat and the living creatures. The keel corresponds with the backbone, the frames with the ribs, the plating with the skin, the rudder with the will and the sails with wings.

The building of the Baby Boat begins. The Baby Boat is the authentic traditional boat reduced in size to fit the children’s size. The children join in and build the boats under the supervision of mentors.

The children lift the completed structure and carry it to the sea where the Baby Boat is moored. The Baby Boat is assembled with an explanation of the role of the various components of the structure. Here the children are welcomed aboard the boats to experience rowing, paddling and sailing the boats that they have learned to build in the following “Navigation Workshop.”

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Traditional fishing tools - preserving the implements used in the maritime heritage.

Photo by M. Petrić.
Hațeg Country UNESCO Global Geopark, Romania

Education and networking as pillars for progress in Hațeg Country UGGp

In Hațeg Geopark the covid crisis could be described as a succession of restrictions and periods of relaxation. During restrictions, we focused mainly on developing online training courses, conferences and workshops. Relaxation intervals allowed us to organize field research, summer schools and public events. In both cases educational activities and networking played major roles in our strategy. Several key factors supported our approach: the educational network (Edu-Geopark), associated with the University of Bucharest, programmes, partnerships with other UNESCO or aspiring geoparks, involvement of the Geopark’s volunteers and Kulturweit UNESCO volunteers and the financial support of different partners.

The main results could be summarised as follows: new Science School programme and Edu-Geopark workshops, CIVIS Open-Lab project and international course, ReCoN-nect - a H2020 national project, INTER – ASPA Summer School; Erasmus+ project, Youth exchange with Hong Kong and Origens UGGp, The Bee super-ho – a land art and education project. Some of these are presented below.

The Science School is a new programme of the Edu-Geopark Network. The programme which started in spring comprises a series of online presentations and debates focused on the results of research in different geoparks on geology, dinosaurs, butterflies, history, etc. The main target groups are secondary school students and teachers from Hațeg Geopark but other schools have been invited to join.

The CIVIS Open-Lab project and course are the Geopark’s initiatives in the frame of the European Civic University formed by the alliance of higher education institutions across Europe. Science for Resilience: Research for local sustainable development projects is implemented in partnership with professors and students from different disciplines. The project correlates research activities with local communities’ issues and opens a dialogue between academics, students, Geopark volunteers and local people. Implementing the UNESCO Geoparks Programme in Romania is a new international course offered to CIVIS students every semester.

ReCoN-nect - The Green Deal: Research communications to Communities project is developed by a consortium of universities, research institutes, associations and three UNESCO or aspiring geoparks. All partners were involved in public awareness, community talks, and events. On September 24th and 25th the geoparks organized events in rural areas in order to celebrate the European Researchers’ Night.

Geotour is an Erasmus+ project implemented by a partnership of European Geoparks and other associations. Educational support materials and a training platform have been developed in order to validate and recognize new competencies in geological tourism. For more details see: https://geotur.gruposubbetica.com/

The attempt to deal with the pandemic situation confronted us with many challenges. Focusing on education allowed the Geopark to progress in community involvement and to better use the existing resources, to develop new programmes and partnerships, to promote geoparks as territories of resilience and to create a base for the national geoparks network.

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Idrija UNESCO Global Geopark, Slovenia

The School Network of the Idrija UNESCO Global Geopark

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Learning in nature through one’s own experience is the most effective way of learning. This is the principle adopted by the Idrija UNESCO Global Geopark which for many years has been successful in connecting all the surrounding elementary schools by organizing a thematic day of education for the Idrija Geopark School Network.

Each year, together with Idrija Geopark, one school prepares an interesting one-day programme for seventh graders – with various workshops, lectures, and presentations. Local experts are also invited to participate, which ensures a high standard for all educational activities. Students as well as teachers have an opportunity to learn about the diverse natural and cultural heritage within various areas of the Geopark, which can also serve as a good team-building exercise.

The activities of the Idrija Geopark School Network have been taking place since 2013. In 2021 – as in previous years – we prepared a wide range of activities for all seventh-graders from the regions of Idrija and Cerkno. The programme included a workshop titled Geology in Everyday Life, which allowed students to learn about various aspects of geology. The second part of the programme is designed to broaden the knowledge of the natural and cultural heritage of the Idrija region. Students learn about the region’s heritage by using TeachOUT, Idrija Geopark’s educational app, in order to independently explore the town of Idrija. They visited the Idrija Visitor Centre and attended the workshops in the Rocks interactive exhibition to learn about the region’s origins and its rich geological past. They also attended exhibitions on the more than 500-year-long history of Idrija in the Idrija Municipal Museum and ventured into the underworld of the second largest mercury mine in the world.

This year, the thematic day of education was attended by over 180 students from the regions of Idrija and Cerkno. It should be noted that the programme was prepared and delivered by 13 geologist researchers from different institutions – the Department of Geology from the Faculty of Natural Sciences and Engineering of the University of Ljubljana, the Geological Survey of Slovenia, the Slovenian Museum of Natural History, and the Institute of the Republic of Slovenia for Nature Conservation who are part of the Division for the Promotion of Geological Sciences of the Slovene Geological Association, along with teachers from all participating schools and the team of the Idrija UNESCO Global Geopark.

In recent years, the connections between the Idrija Geopark and local educational institutions built a strong foundation that will serve as a basis for future educational activities. Despite the changes brought on by progress in the field of education, our principal goal remains the same – to bring the natural and cultural heritage of the Idrija Geopark closer to people of all generations.

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Learning about geology in the workshop Geology in Everyday Life.

Photo by Mojca Goričaj Kavičil.

Independent exploration of the town of Idrija with the Geopark’s TeachOUT educational app.

Photo by Nina Erjavec.

Learning about geological heritage at the Idrija UNESCO Global Geopark Visitor Centre.

Photo by Bojan Tavež.

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The new educational trail about wild bees in Vulkaneifel UGGp

Bee pollination is important both ecologically and commercially, and the decline in wild bees due to the intensification of agriculture, loss and destruction of habitats, as well as vulnerability to climate change has been increasingly problematic in recent years. The Vulkanhof, a goat farm in Gillenfeld, together with the Nature Conservation Authority, Climate Change Management, and Vulkaneifel Nature and UNESCO Global Geopark installed a new educational trail about wild bees and the benefits of traditional sustainable farming. Four info panels provide details about the life cycle as well as methods of protecting wild bees and show how traditional farming, grazing sheep, and orchards contribute to a diverse, species-rich cultural landscape.

The poor, dry pastures on volcanic soil used for sheep grazing are, through a rich supply of pollen and nectar, an essential part of the habitat that ensures the diversity of wild bee species. Unlike honeybees, wild bees only fly a few hundred metres between their nests and their food source. Pollen- and nectar-donating areas are also important in the development of new habitats. Increasing the connectivity between more of these areas reduces the bee’s problem of distances between food supply and minimises the possibility of a food shortage. Around half of all native wild bee species build their nests, more or less, in the ground. A multitude of areas are inhabited: natural verges, medullary stems, and rotten wood. About a fifth of all native wild bee species build their nests in existing cavities. In nature, such cavities are often created by the feeding tunnels of other insects, e.g. beetle larvae, which bore tunnels into rotten or dead wood. Even though these natural habitats are diminishing, the distribution of wild bee species is often widespread. One possible reason for this is that the required nature of these cavities is not very specific. Artificial nesting aids such as bamboo tubes, reed stalks, or drilled hardwood are gladly accepted by mason, scissor, resin, and mask bees. Some of the corresponding species also use non-natural hollow spaces, such as holes drilled in window frames. In addition to wild bees, sphecoid wasps and other wasp species also use these cavities. All these diverse and structurally-rich habitats can be found in the vicinity of the Vulkanhof and are still cultivated by the farmers. The Vulkanhof Farm is acknowledged as “Lernort Bauernhof” - an extracurricular learning opportunity in farms and vineyards for students of all grades and school levels at general education schools throughout the state of Rhineland-Palatinate. This new trail is a great additional tool to Foster Education for Sustainable Development.

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A home for bees in cavities, medullary stems, and rotten wood.

UNESCO Global Geoparks (UGGs) pursue a modern approach for the protection and sustainable development of a geographical area. According to their regulatory framework UGGs develop and implement educational activities for all ages to spread awareness about our geological, natural, cultural, and intangible heritage. Environmental Education (EE) is a form of education that, instead of focusing on specific issues, aims to create environmentally responsible citizens who are capable and well informed to actively respond to local and global environmental issues.

In 2018, a survey at a postgraduate level in the Hellenic Open University was conducted. It investigated the views and attitudes of teachers serving in Sitia’s primary schools concerning EE and the prospects of using Sitia UGG as a tool for education and implementing EE programmes in the framework of the UN’s seventeen Sustainable Development Goals. All 13 primary schools in the province participated, and 98 (78%) teachers out of 125 answered a questionnaire for this purpose. The main conclusion confirmed that the majority (74%) of teachers in the primary schools are aware of Sitia UGGp. The general attitude of teachers towards EE is positive, as 26% of the participants regarded it as a preferred school programme, 90% of the teachers were interested in implementing EE programmes in Sitia UGGp, and 10% stated that “Geoparks and sustainability should be one of the most important components of EE. However, only 15% of the respondents were aware of the Geopark’s educational programmes, and only 3% had implemented an EE programme related to Sitia UGGp formally through the Head of School Programmes.

Wild bees collecting pollen from flowers.

Wild bees and the western honeybee.

5.

The wild bees educational trail.

Photo by Dr. Hendrik Albrecht.

Sitia UNESCO Global Geopark, Greece

A survey in Sitia’s primary schools of Sitia concerning Environmental Education and the use of the Geopark as an educational tool.

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The degree of interest in implementing EE programmes in Sitia UGGp.
The Lub’ambule: the Luberon UNESCO Global Geopark, gets closer to its inhabitants!

The Luberon Regional Nature Park – UNESCO Global Geopark, preserves and promotes the natural and cultural richness of its territory. In order to introduce its activities to the area’s residents, it recently created a new mobile stand to meet its inhabitants: the Lub’ambule. This project has been supported financially by the Region and by the elected representatives. The Lub’ambule is a tool developed to inform residents and visitors about actions in the park. It aims to raise awareness of the natural, cultural, geological and landscape heritages of the Luberon and of the need to preserve them.

Custom-built by a local company, incorporating local materials (especially Luberon ochers), the Lub’ambule is a refitted trailer that travels all year around to key territories such as climate change, biodiversity, geology, local food, geotourism and culture, enable the park’s inhabitants as key players in the preservation and valorization of their territory.

The Lub’ambule is also a meeting place. Discussions about specific topics concerning the Luberon territory such as climate change, biodiversity, geology, local food, geotourism and culture, enable the population to better understand their land and to be aware about the Luberon’s main challenges. It’s also a place to talk about the renewal of the Luberon Park’s Charter, the territory’s strategic project for the period 2024-2039.

These discussions can lead to individual and collective initiatives about sustainable development. The residents can then participate actively in the current and future development of their territory. The Lub’ambule is a space for dialogue and interaction where everyone is free to share their values, cultures and traditions.

As the Luberon faces climate change it is essential for the park works collectively to maintain the quality of life and the richness of the Luberon’s heritages. The Lub’ambule is a symbolic tool, representing the Luberon Regional Nature Park and the UNESCO Global Geopark Network’s values. Thus, the park aims to be more visible with a presence at the territory’s main events in order to answer questions from citizens.

Grevena-Kozani UNESCO Global Geopark, Greece

A Billion Years of Geoheritage within the Geopark Grevena-Kozani

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Thuringia Inselsberg – Drei Gleichen

UNESCO Global Geopark, Germany
Pangaea – On the trail of the supercontinent in the middle of Thuringia

One of its highlights is the ancient tetrapod fossil site Bromacker from Geotengthal and Tambach-Dietharz. This site, with fossils of early terrestrial vertebrates (tetrapods) from the Lower Permian Epoch about 290 million years ago, is an internationally important geosite. The trace fossils together with the body fossils of these so-called primal saurians are uniquely preserved at this site. On the Saarian Discovery Trail, one of the Geopark’s 17 GeoRoutes, you can get up close to the sauroids.

The Badlands in the Thuringian Castle Country Drei Gleichen can be explored via various GeoRoutes. The three castle hills of Wachsenburg, Burg Gleichen and Mühlburg are built from the colourful approximately 220 million-year-old Upper Triassic rocks. Red and green-grey clay and marl rocks occur on the southern slopes that are almost devoid of vegetation, and define the landscape below the caissons.

In six tourist caves and tourist mines of the Geopark, visitors get an insight into the fascinating 1,000 years mining history of the Thuringian Forest and the management of the fine natural resources of the region. The Geopark has an enormous biodiversity. Almost the entire area of the Geopark is protected as a landscape conservation area and there are also many nature reserves, which provide a home for numerous endangered species.

The cultural heritage is of great importance. It ranges from many archaeological sites, numerous medieval buildings to famous personalities associated with the territory. Johanne Wolfgang von Goethe, who visited numerous surface and underground mines in the Geopark as a Councillor of Mines, and Johann Sebastian Bach are world-famous. The latter worked temporarily in Öhrdorft and the cradle of the musician’s family lies in Weimar.

Keeping to its motto of Pangaea as an all-embracing continent the Geopark would like to contribute with its activities to the strengthening of the global community and to the dismantling of borders between the peoples of the world.

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1. The Bowberg Profile is of high international scientific value showing a series of compressions through an entire series of glacial landscapes from depressions to terminal moraines, outwash plains and island hills. On top of the cliff you find Bowberg Lighthouse - a very popular place to visit for more than 60,000 guests annually. It is being run by only three staff and an impressive 150 volunteers.

2. The Oddehus Tower is a Geopark Visitor Centre with exhibition of the geology, cultural history, biology of the Geosite Oddehus and holds exhibitions of contemporary art. The site also provides visitors with information about UNESCO Global Geoparks and the Vestjylland Geopark. Information is found both in the tower and neighbouring World War II bunkers.

3. The Husby Klipplantage - Premium Hiking Route. A 15 km long hiking route through the spectacular landscape on the West Coast with vegetated dunes and heather has been certified as a Premium Hiking Trail by the German Hiking Institute. It is a spectacular place to visit.

Photo by Stephan Brauner.

Along the Saarian Discovery Trail (GeoRoute 6): life-sized model of the Thuringian dinosaur Lilliensternus liliensternii near the globally unique tetrapod fossil site Bromacker between Geotengthal and Tambach-Dietharz.

Photo by Peter Rohde.

Vestjylland UNESCO Global Geopark, Denmark

An Ice Age Landscape Created by Ice, Water, Wind and Man

Vestjylland Geopark with an area of 4,759 km² and a population in 2021 of 99,077 includes the Lemvig, Struer and Holstebro municipalities, the region of Central Denmark and parts of the North Sea and Limfjord.

The fascinating landscape in Geopark West Jutland shaped by ice, wind, water and man laid the foundation for human existence over the past 9,000 years. Here you can experience a combination of geology, cultural/historical and nature. Whether you are hiking, biking, horseback riding or at sea or you are looking for exciting food experiences with local foods, the Geopark has something to offer.

Geology

Enormous ice sheets have sculpted the impressive ice age landscapes that form the core of Geopark West Jutland. These landscapes mark the final period when the Earth was in a deep freeze and when the Scandinavian Ice Sheet extended from the mountains of Norway reaching its maximum extent 21–23,000 years ago at the Main Stationary Line – the terminal moraine that forms the backbone of the Geopark’s landscape. In the Vestjylland Geopark there is limestone formations that are millions of years old and other landforms formed by rivers, coastal processes and the powerful westerly winds after the end of the ice age.

Cultural history

The development of the landscape has greatly influenced the way people have settled and made a living in the area through time. The many barrows and remnants of the Ancient Road show how conditions here were favourable for growing crops and for trade between the West Coast and the interior parts of the country. Later, meadows along the firths and rivers became important for raising and exporting steers. The West Coast and the Limfjord are rich in stories of shipwrecks along the “Iron Coast”, fishing, ferry services, the growth of market towns and the struggle to protect life and property from coastal erosion and drifting sand.

Natural values

The natural heritage of the Geopark includes beaches, dunes and bays along the North Sea and in the Limfjord. It is here where you also find the largest heathland plantation in Denmark – Klosterheden. This is where beavers were reintroduced to Denmark in 1999. The Geopark also protects several international nature protection areas and 5 nature- and wildlife reserves together with the Nature Park Fisminjom where you can experience huge flocks of migratory birds during spring and autumn. Stoner is among the best fishing waters in the country. A network of parks, trails and special sites provides access to great experiences.

Development activities

Geopark West Jutland is working in close collaboration with local community organizations, municipalities, government institutions and commercial partners to develop new visitor sites and recreational geotrails, attractions and guided tours following the criteria for geotourism. This involves creating digital geopark corridors, information panels, printed maps and folders as well as a comprehensive Geopark app. School materials and educational programmes are also a key focal activities which are being developed in cooperation with local schools and a teacher’s training institution.

Management structure

The Geopark is registered as a self-governing institution with a Board of Trustees, an Advisory Scientific Committee, a partnership and volunteer programme – all supported by a secretariat with two permanent staff members.

Photo by Mikkel Jørgensen, Alpex Media. © Geopark Vestjylland / Alpex Media.

New Members

The Aachenstein at GeoRoute 8: the best view from Bad Tabarz to the Grosser Inselsberg mountain (916.5 m above sea level) - the highest peak in the Geopark. The development of the landscape has greatly

Cormorant

Along the Saarian Discovery Trail (GeoRoute 6): life-sized model of the Thuringian dinosaur Lilliensternus liliensternii near the globally unique tetrapod fossil site Bromacker between Geotengthal and Tambach-Dietharz.

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Photo by Mikkel Jørgensen, Alpex Media. © Geopark Vestjylland / Alpex Media.

New Members
Saimaa UNESCO Global Geopark, Finland

Discover the hidden treasures of Lake Saimaa!

Saimaa UGGp is located in Southeastern Finland. The Geopark has a surface area of 6,063 km² and a population of 180,647 in the towns and municipalities. In 2017, 116,215 people lived permanently inside the Geopark.

Saimaa’s rocks originated in an ancient seabed around 1.9 billion years ago when the marine sediments were folded and metamorphosed creating gneisses during a phase of mountain-building. The youngest part of the bedrock, the rapakivi granite, crystallized around 1.65 billion years ago. The Vääntö Massif, which extends to the southern shores of Saimaa, is considered worldwide as the type area for rapakivi granite.

Nowadays the mountain ranges have been eroded and the base of the mountains can be seen as a mosaic landscape shaped by the continental ice sheet during the Weichselian Ice Age. The First and Second Salpausselkä ice-marginal formations deposed around 12,900–11,600 years ago are some of the glacier’s most visible features. During the period following the last ice age, the development of Lake Saimaa has been affected by southeastern tilting of the land due to asymmetrical uplift. This has shaped Saimaa’s shoreline, outlet channels and direction of water flow, which can be seen, for example, as ancient shorelines at various elevations.

Over the many phases of its history, the Saimaa area has developed a particular natural environment. Saimaa inherited some endangered species that became isolated in the area after the ice age, such as the Saimaa ringed seal. The Saimaa Geopark area has also been used for farming. Many of the area’s churches and graveyards are built on eskers and deltas. Geology provides a strong cultural foundation in the Saimaa Geopark area.

Saimaa UGGp has sites that are part of the Natura 2000 and are included in national conservation programmes. The area also contains some private nature reserves and nature conservation areas established by government decree. Natural monuments and geologically important areas and sites are also protected. Finland has extensive so-called “every man’s right” that allows hiking, berry picking, and other activities in the natural environment.

The Saimaa Geopark Association Board consists of members from municipalities, regional councils, and entrepreneur associations. The Geopark staff coordinate the entire Saimaa Geopark, producing necessary material, applying for project funding, and act as a link between the area and international associations. The association’s budget consists of membership fees paid by the member municipalities. Entrepreneurs can apply to the association for the right to use the Saimaa Geopark Partner logo. Saimaa UGGp already has 97 partner members.

NEW MEMBERS

The Holy Cross Mountains UNESCO Global Geopark, Poland

Geotourism - a journey through the history of the Earth and Man

The Świętokrzyski (Holy Cross Mts.) UGGp, located in the southeast of Poland, in the western part of the Świętokrzyskie (Holy Cross) Mountains, is characterized by exceptional natural and cultural features. The geological history of the area - the lowest and at the same time the most remarkable region in Poland, is responsible for the morphology, climate, biodiversity and the development of settlements and the economy of this region. The area became a member of the UNESCO Global Geoparks on 21 April 2017.

The Geopark, with an area of 526 km² and a population of 252,744 inhabitants contains five communities: Kielce, Checiny, Morawica, Nowiny, and Piekoszow. Its borders coincide with the administrative boundaries of these units of local government.

Geologically, the Holy Cross Mountains, including the Geopark, are situated within the Trans-European Suture Zone (TESZ), the most prominent geological structure in Central Europe. The Świętokrzyskie Mountains are in the only segment within the TESZ where sedimentary rocks from all geological periods from Cambrian to the Quaternary are exposed. Therefore, scientific studies in this region are of fundamental significance for the understanding and reconstruction of the geological history of the European continent. The most important geomorphological characteristics of the Geopark area are a product of the area’s structural geology. The lithological diversity is reflected in the surface topography. It also has a significant influence on the nature of the surface water and groundwater, the soils, the natural vegetation and man’s use of the land.

The documented history of man’s presence in the Geopark area dates back about 60,000 years to an epoch called the Pleistocene. Remains of Neanderthal camps are described from the most beautiful cave in Poland - Paradise Cave, located in the central part of the Geopark. Further events in human activity are recorded in more than 200 archaeological sites dating back to the Stone Age, sacred and secular architecture as well as numerous remains of copper and iron mining dating back to the Middle Ages.

The Holy Cross Mts. UGGp is managed by an association of communities. Local government representatives elect the Geopark management board. The Association of Municipalities Geopark Świętokrzyski cooperates with many bodies and organizations from the scientific community, local government, tourism, education, and business sectors. Local partnership is implemented by fulfilling projects related to the protection and conservation of valuable geological, natural, and cultural sites, as well as geotourism, and education. Examples of activities include cooperation with local tour operators and hotels to promote the Geopark’s provision for tourists. Educational projects, an important component of the Geopark’s activity, are implemented in cooperation with local schools and non-governmental organizations. The Geoeducation Centre in Kielce functions as the main educational and information centre in the Geopark. Here guided tours, geological workshops, and popular science shows for children, adolescents, and adults are organized.

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Kowala geosite - outcrops of Devonian, Carboniferous and Permian deposits in an active quarry.

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16th European Geoparks Conference
46th EGN Coordination Committee Meeting

Nature, Culture and Sustainability in the Climate and Environmental Change

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