



Geoparks Going Green





Geoparks Going Green

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<http://www.unesco.org/new/en/natural-sciences/environment/earth-sciences/unesco-global-geoparks>

<http://www.globalgeoparksnetwork.org>
www.visitgeoparks.org

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Geoparks Going Green

International Mother Earth Day

The Global Geoparks Network, in collaboration with the UNESCO Earth Sciences and Geoparks Section, celebrates the International Mother Earth Day every year on the 22nd of April which aims to “promote harmony with nature”.

The International Mother Earth Day is celebrated by all UNESCO Global Geoparks to inform the public about the challenges faced by our planet due to human induced climate change and the disruption of biodiversity. It aims to mobilize people, stakeholders, organizations, and governments around the world to intensify action and address the climate and biodiversity crises by investing in the creation of a sustainable global green economy.

International Mother Earth Day is a day in which we reflect on how we can act individually and collectively to create a ‘green’ future.

Taking into account that the challenges and needs grow every year, UNESCO Global Geoparks from Europe to Africa, from Asia and the Pacific, to South America and Latin America and the Caribbean engage in significant initiatives and actions, for example:

- Converting Geoparks’ museums and other buildings to energy efficient buildings.
- Implementing pioneer activities for energy pro-

duction and managing issues concerned with noise pollution, air quality, water resources, marine litter, and land and landscape planning.

- Developing circular economies.
- Presenting new models for the consumption and reduction of waste by reusing, repairing, and recycling materials.
- Introducing the use of alternative materials for plastic and fossil fuel.
- Organizing educational programmes, lectures, interactive exhibitions, festivals, tours, and activities for raising awareness about climate change and biodiversity to local communities and visitors
- Using indigenous knowledge, also new digital tools to develop new strategies in response to the climate and biodiversity crises.
- Networking and exchanging best practices and examples of projects with successful outcomes.

The new magazine, ‘Geoparks Going Green’, presents some of the best practices in UNESCO Global Geoparks. The Global Geoparks Network, in collaboration with the UNESCO Earth Sciences and Geoparks Section invites you to explore these best practices and, to join with members of the UNESCO Global Geoparks Network, to collaborate in implementing actions that address climate change and biodiversity disruption around the world.

Aso UNESCO Global Geopark, Japan – Asia

The Challenge of Oguni Cedar Wood: an alternative material to plastic and geological materials



Aso Ogunisugi Lab. Produced by Oguni-cho Forest Owners' Association

The Geopark aims to create a sustainable society, however, in achieving this goal, individual residents need to rethink and change their environmentally unsustainable lifestyles. New sustainable alternatives must also be implemented in society. This article describes the innovative efforts by the Oguni-cho Forest Owners' Association in Aso UNESCO Global Geopark.

Oguni Cedar

Oguni Town, located in the Aso UGGp area, Kyushu Island, southwest Japan, is known as the traditional timber "Oguni Cedar" production area. The Oguni forest industry began 250 years ago in the Edo period and the forest of magnificent old trees, planted 250 years ago, is still carefully preserved. The Oguni-cho Forest Owners' Association (OFA) used the SGEC and SGEC-CoC international certification system to further preserve these industries for the future, which guarantees a verifiable environmentally sustainable system.

MOKUITO, fibre made from wood

Many of the clothes we wear in our daily lives are made from chemosynthetic fibre. As an alternative answer to this, the OFA fulfilled



The MOKUITO vest that the woman is wearing is made of wood fibre.

a revolutionary idea, making yarn from wood. In October 2022, the OFA and Aso UGGp collaborated to produce the world's first UGGp staff uniforms made from wood fibre. This uniform will initiate the transition from fast fashion, which is strongly rooted in our lifestyles, to sustainable fashion.

Cedar jewelry accessories

The potential of Oguni Cedar is not limited to producing fibre. In 2019, Aso residents founded the joint venture "Ogunist" and launched "KALCANO", the world's first Oguni Cedar jewelry brand. They believe that Oguni Cedar, with its tradition of sustainability and innovation rooted in the land of Aso, is as valuable as jewelry. Aso UGGp also believes that this epoch-making idea will be a major force in reducing the world's unnecessary consumption of geological materials, and is involved in its marketing and other activities.

The importance of working with local people

As described above, Aso UGGp collaborates with people with innovative ideas in the region as a place to challenge a sustainable society. In the future, we would like to work with these challenges and, in creating a green Geopark, contribute to the development of a sustainable green planet Earth.

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Examples of Kalcano Oguni Cedar jewelry.



Azores UNESCO Global Geopark, Portugal - Europe

The Azores Geopark commitment for developing a greener territory



Participating in an educational activity in the Azores Geopark.



Delivering the LIFE IP project in the Azores Geopark.

The location of the Azores UNESCO Global Geopark, in the North Atlantic Ocean, makes it one of the most geographically isolated archipelagos in the world, with the obvious need for maintaining its environmental sustainability. It should also be noted that the isolation and volcanic origin of the Azorean islands make them especially vulnerable to climate change, the main challenge of the present day. The strong influence of ocean currents and atmospheric conditions contribute to the environmental transformation of the islands, with extreme weather events being the main threat.

Aware of the importance of preserving the archipelago's natural, environmental, and cultural heritage, the Azoreans have been active protagonists in the region's sustainability. Public entities, private entities and non-governmental associations collaborate in creating a more sustainable future. Several pioneering activities have been implemented, namely involving energy production and management, noise, air quality, waste, water, land and landscape planning. These are recognized as examples of good practices in promoting education and environmental awareness, valuing indigenous products, heritage and the Azorean culture.

In the Azores Geopark, we also work to promote sustainable development in all areas of activity. We are committed to raising awareness and educating residents and visitors through our educational programmes such as "Climate Action in my Geopark", "Why the Earth Shakes" and "Volcanoes

of the Azores". Also, through delivering awareness sessions such as coastal cleanups, waste management programmes, commemoration of the International Day for Disaster Risk Reduction, periodic earthquake simulation exercises and much more. There are several actions also carried out within the framework of the Biennium for Climate Action jointly promoted by the Portuguese Network of UNESCO Global Geoparks and Turismo de Portugal, contributing to the search for solutions, both through mitigation and adaptation strategies, to the natural risks caused by climate change.

In addition, and with a view of mitigating and preventing climate change in the territory, various actions are being promoted within the public and private sector, such as projects and initiatives for the decarbonization of the territory, energy transition, adaptation to climate change, developing a circular economy, and the efficient management and protection of natural resources. These are achieved through LIFE projects ongoing in the territory (LIFE IP Açores Natura, LIFE IP Climaz, LIFE Beetles and LIFE Vidalia), with planning at the level of land use (Hydrographic Basin Management Plans, Coastal Plans, Regional Plan for Climate Change, Flood Risk Management Plan, Water Regional Plan, and municipal plans), blue economy projects (BlueAzores) and in terms of tourism the Azores Sustainability Charter, among others.

As a result of these initiatives, the territory of the Azores Geopark was the first archipelago in the world to be certified as a sustainable tourist destination, awarded by Earthcheck, since 2019.

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Tourists enjoy the landscape and tranquility in the Azores Geopark.

Beigua UNESCO Global Geopark, Italy - Europe

Beigua Geopark in action against marine litter



Beigua in Action involves scientific clean-up activities.

Beigua in Action is a new project involving schools, citizens, and local authorities, in which the Geopark's Environmental Education Centre aims to promote waste recovery and steer towards the reduction in the use of plastic materials. The project's main objectives involve controlling marine litter and disseminating the principles of a circular economy.

Marine litter consists of items discarded or transported by rivers or meteorological events into the sea or onto the shores. It consists of plastic, rubber, textiles, metals, wood, and other materials and originates mainly from land-based sources. It is a threat to the environment, but also for tourism, the economy, and health.

Knowledge of the problem and its possible solutions helps us to adopt responsible behaviours in our daily lives. To encourage people's engagement, we proposed a series of webinars dedicated to marine litter and its potential impacts on the Geopark and the Pelagos Sanctuary, the area for protection of marine mammals.

The webinars were followed by four open air days on the beach or along the river banks and inland, to conduct a scientific clean-up. We

called it "scientific" because we did not just pick up abandoned or waterborne litter, but tried to classify it. Each collected piece was identified and we tried to imagine its origin in order to figure out possible actions for prevention or for raising awareness.

We also explored issues concerning a circular economy, a new model of consumption which helps us to reduce waste by reusing, repairing, recycling material and products, and giving them a second life.

Beigua in Action now continues in school, with classroom workshops and field trips and will end in late spring with a photo exhibition. Pictures of our wonderful landscapes and animals will be exhibited next to abandoned garbage, a threat to the environment and a danger to the survival of many species living along the coast or in the waters of the Geopark.

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Beigua in Action, provides participants with sustainable cloth bags to help in their activities.

Beigua in Action, scientific clean-up activities along a river bank.



Bergstrasse-Odenwald UNESCO Global Geopark, Germany - Europe

Working together to preserve our planet



Promoting the 17 sustainability goals of the Global Agenda 2030.

Mother Earth Day is a very special day in the UNESCO Global Geopark Bergstrasse-Odenwald. Every year around April 22, the Geopark organizes many activities throughout the region to draw attention to the importance of treating our environment with care in order to preserve it for future generations.

This year Mother Earth Day was promoted in Germany under the slogan "Live a greener life in harmony with nature". Appropriately, the Geopark, together with the Joachim & Susanne Schulz Foundation and the Neckartal-Odenwald Nature Park, organized a family day in Amorbach on April 23. The young and old were invited to discover the local flora and fauna through games and activities. In parallel with the family day, the German Federal Environmental Foundation's exhibition "Planet Health" will be on display in Amorbach. The interactive exhibition involves visitors with activities in their everyday lives. Various hands-on stations show the influence that everyday actions have on our health and the environment. Those who wished to discover the exhibition were also welcome to join a guided tour during the family day.

Sustainability and climate protection are written in capital letters in the UNESCO Global Geopark. The 17 sustainability goals of the Global Agenda 2030 are decision-making guidelines in all projects and cooperative activities. With its commitment to education for sustainable development (ESD), the Geopark introduces



One of the Geopark rangers engages with schoolchildren.

nature, environmental and climate protection to day-care centres, schools, and the general public. A specially created ESD platform on its website unites all participants who provide educational events for sustainable development in the region.

The Geopark rangers take people in the region on excursions, show them the wonderful landscape and thus sensitize them to a sustainable approach for nature protection. They provide practice-oriented environmental education in the categories of geology and geography, water, forest and nature experience, agriculture, and history. On Mother Earth Day, a Geopark ranger takes children and young people back to the world millions of years ago, when volcanism shaped our region and was also responsible for the formation of the Messel Pit.

In the "Climate Heroes" programme, the Geo-Nature Park implements climate protection campaigns together with its member municipalities and sets different focal points each year. In 2022, the focus was on climate-friendly nutrition; in 2024, the programme will focus on climate-resistant forests. At the same time, the Geo-Nature Park supports its members in increasing biodiversity in the community, for example by designating areas as wild meadows. By protecting species-rich habitats such as the meadow orchard, the Geo-Nature Park is helping to counteract climate-related species extinction.

Further information: www.geo-naturpark.de

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Visitors enjoy one of the panoramic views in the Geopark Bergstrasse Odenwald.



Going Green - Audioguide SmartGuide



ample, to volcanic Káčov Hill and its surroundings along the Jizera River, to Škodějov for copper, for precious stones around Lomnice nad Popelkou and to the Plakánek Valley lined with sandstone rock walls. The Golden Circle of Hruboskalsko Sandstone Rock Town cannot be missed.

The Golden Circle of Hruboskalsko Sandstone Rock Town.

The author of the narration is a legend of Czech geology, a great expert on the Bohemian Paradise Geopark and one of the founders of the Geopark and its long-time chairman of the board of directors, Mr. Doc. RNDr. Václav Ziegler, Csc. For many years he worked at the Museum of the Czech Paradise in Turnov and was the first professional worker of the Czech Paradise Protected Landscape Area. Every month you can read his "Geological Talk" about interesting geological sites in the Bohemian Paradise Geopark on the Geopark's website and Facebook. Although he, at the age of 78 years, does not use a smartphone, he mastered working with the SmartGuide editorial system, digitized his knowledge and know-how and is passing this on to the next generation.

Additional routes and language versions will be gradually added to this audioguide in English, German and Polish.

The SmartGuide is already used in more than 170 destinations in the Czech Republic and 750 destinations worldwide.

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A superb example of Agate found in the Bohemian Paradise



Information panels promote the Audioguide and Smartguide. As part of the promotion of sustainable tourism, the Bohemian Paradise UNESCO Geopark focuses primarily on those areas of the Geopark, that are not overcrowded with tourists.

The Geopark in cooperation with the Czech SmartGuide platform prepared five interesting routes for the digital audio guide. Through the downloaded SmartGuide application, your phone becomes a personal audio guide, both indoors and offline.

The routes lead mostly through lesser-known sites in the Bohemian Paradise UNESCO Geopark, where you will not encounter crowds of tourists and where you will be surprised by the numerous attractions that these sites have to offer. These consist mainly of tours from 11 to 23 km in length with narration not only restricted to the geological attractions on the route.

The audio guide will take visitors, for ex-

Plakánek Valley lined with sandstone rock walls, one of the highlighted tours on the Geopark's Audioguide.



Our relationship with the world, with living beings and with our environment

The issue of climate change is at the heart of the Causses du Quercy Geopark's considerations. Various actions are carried out in order to respond to ecological crises and to question our relationship with the world, with living beings and with our environment.

The Geopark has organized the project "Resonance rupestres" (Rock Resonance). It has hosted artists (drawers, musicians, sound designers) and scientists (anthropologists, prehistorians) in order to investigate painted caves. The objective was to explore the role of art within our sensibilities from prehistory to today, as well as the importance of sound in our artistic perception of the world. Sound creation in the underground environment, acoustic measurements in the caves, and contemporary cave paintings will be presented through different mediation tools, film, immersive video, podcast etc.

The Geopark also works with a wide range of socio-economic stakeholders.

Agriculture : the establishment of Pastoral Land Associations allows an extensive livestock to return to vast natural pastures, to participate in the ecological balance of the karstic plateaus of the Causses, and to reduce their vulnerability to wildfires.

Tourism expertise: the granting of the Park Values Award recognizes the investment by certain professionals committed to human, cultural and environmental values. As true ambassadors of the Causses du Quercy, these professionals are an essential channel for the awareness and preservation of our heritage.

Park Values. Mark – the ambassador of Causses du Quercy Geopark.

©Malika Turin.



Rock resonance «Resonance rupestre» - Contemporary cave paintings.
©Remi Flament.



«Geoparcours» - the educational programme for the children.
© Causses du Quercy UGp.

Tourist accommodation and restaurants: the Geopark supports tourist establishments through the state's "sustainable tourism" fund to carry out work and/or improve their management in order to reduce the impact on the environment. By facilitating the acquisition of this aid, the Geopark is striving to make its territory a true destination for responsible tourism.

Awareness-raising activities for children are also provided. In collaboration with its educational partners, the Geopark offers an educational programme called "Géoparcours". The aim of this project is to enable children to explore and experience the different links between humans and geology, through scientific culture, art, heritage or even local traditions. Handling, touching, climbing, understanding, experimenting etc. The numerous activities on offer include meetings with geologists and palaeontologists, climbing, caving, sorting fossils, reading the landscape, and clay paintings.

The Geopark's inhabitants have not been forgotten in this process. Thus, the Geopark has launched the "Familles à biodiversité positive" challenge (The Positive Biodiversity Challenge for Families). To preserve biodiversity, it is important to understand it, to recognize it and to grasp the complexity of the links that make it so rich. Through awareness-raising workshops, families learn the ins and outs of our actions and engage in daily challenges. After six months, the community that has engaged in the most challenges will receive support in relation to the preservation of biodiversity (restoration of a pond, low walls, creation of an orchard, bird and bats houses, etc.).

The mobilization through these different activities testifies to the educational responsibility assumed by the Geopark of the Causses du Quercy, which positions itself as an actor in the necessary adaptation to climate change.

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Chelmos Vouraikos Geopark's headquarters goes Green!

The office premises of the Chelmos Vouraikos UNESCO Global Geopark.



Buildings are large energy consumers, which at the same time have a high energy saving potential. They are responsible for 40% of the world's energy consumption and their radical energy upgrade is the only way forward. By using appropriate technical and cost-effective technologies, it is possible to achieve a significant improvement in the energy efficiency of buildings, sometimes even zero, with corresponding environmental and social benefits.

The Mediterranean climate is characterized by relatively mild winters and cool summers. These favorable conditions are a key advantage for buildings in Mediterranean areas and especially in Greece. In spring and autumn, the outdoor climate conditions are similar to indoor thermal comfort conditions, eliminating any need for the conditioning of indoor spaces. Despite this favorable climate background, the energy consumption in buildings in the Mediterranean region remains disproportionately high, mainly because of the inadequate insulation of the existing buildings' envelope (Katsaprakis et al. 2020).

The office premises of the Chelmos Vouraikos UNESCO Global Geopark is an old-tech construction, with insufficient insulation, technologically old heating, and cooling facilities and no mechanical ventilation. The Chelmos-Vouraikos UGp, with the aim of contributing to reducing global energy consumption, is about to change its headquarters into a "green building". In order to reduce the annual energy consumption of the building, the following actions will be implemented:

- Appropriate application of thermal insulation,

avoiding the creation of thermal bridges.

- Selection of suitable high-performance electromechanical systems, to meet the needs of heating, cooling, ventilation, lighting and with as little primary energy consumption as possible.
- Use of renewable energy technologies such as photovoltaic systems.
- Implementation of automatic control devices for the operation of electromechanical installations, to limit their unnecessary use.

The energy saving interventions that are going to be implemented, essentially upgrade the existing building. It will become a building with the modern specifications which are imposed on new buildings, with the direct benefit of the building's users, achieving an energy upgrade to energy class A+.

This must be the approach for the buildings of the future. It is a holistic approach for energy management, one that delivers better buildings and creates happy users!

Management Unit of Chelmos – Vouraikos National Park And Protected Areas of The Northern Peloponnese - Natural Environment and Climate Change Agency (NECCA)

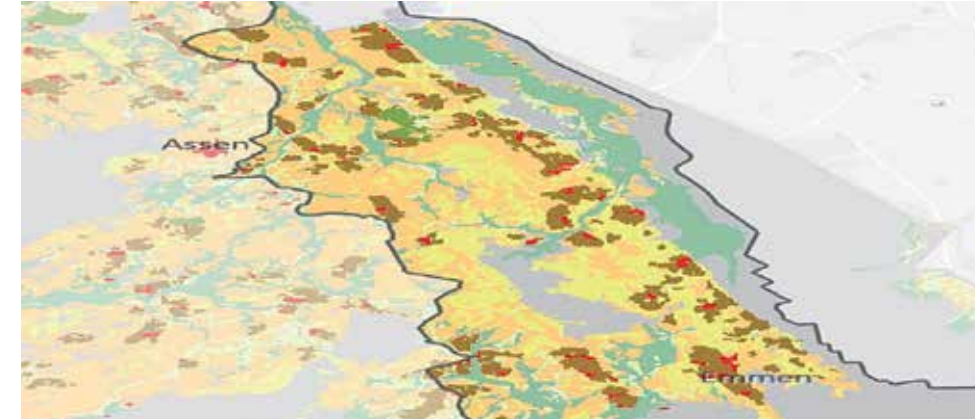
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The Hondsrug Geopark's Engels atlas

The area covered by the Hondsrug Geopark Engels Atlas.



For the Hondsrug area we have developed a new atlas. It is a unique digital atlas in the shape of a story map, connecting the text with maps, figures, and pictures.

In the atlas you can discover how the Hondsrug came into existence and how the landscape has changed in the course of history. Also very importantly, the atlas provides information about the effects of climate change on the Hondsrug and the possibilities to make the area more resistant to climate change.

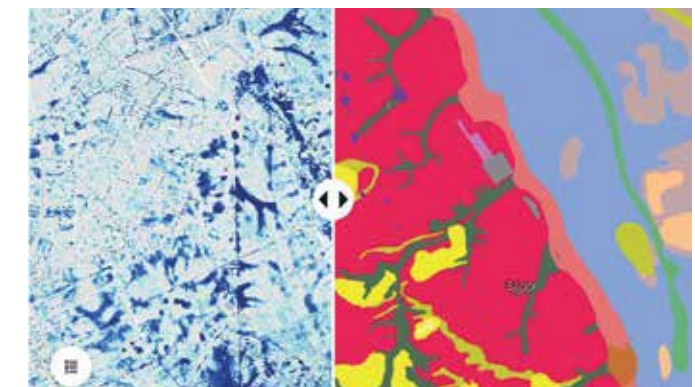
The atlas is a tool for residents and officials. It can be used for education and communication about the effects of climate change and the need for climate adaptation. It is also a source of inspiration for professionals who are involved in climate-adaptive landscape design and area processes for spatial developments. This atlas serves as an important building block for preparing a Hondsrug Landscape Vision.

Are you curious? The atlas can be found here: <https://storymaps.arcgis.com/.../a1157ffc-440343cb8b4537>

The atlas was developed on behalf of the Province of Drenthe and De Hondsrug UNESCO Global Geopark by Climate Adaptation Services and Geo-Inspiratie. It was published on the 22nd of June, 2022.

The atlas consists of a Story Map that guides users through the landscape in 3D and which

View of the Karin-Broekhuijsen sand drift.



The left map shows the water depth for an extreme shower that occurs once every thousand years.

illuminates and connects landscape structures from different storylines with climate challenges and opportunities. In addition, the atlas contains a viewer with 2D maps of the most important landscape features. This atlas is intended for anyone who is curious about the unique landscape of Geopark de Hondsrug.

Structure of the atlas

Chapters 1 – 5 which are subdivided in five periods tell the story of the landscape of the Hondsrug. In the first chapters you can read how the landscape takes shape under the influence of the climate. In subsequent chapters, the first humans arrive in the area. At first the humans adapted to the landscape. Subsequently, people increasingly made their mark on the landscape, and the consequences of climate change have recently become increasingly visible. This is the main subject of the final chapter 'Landscape and climate'. Through this atlas you will discover the possibilities the landscape offers to be more resilient to the consequences of climate change.

In chapter 6 the focus shifts from past to present with lessons we can learn from the landscape to face the climate challenge.

As an appendix there is a map viewer with an overview of all data presented in the different chapters. Here you can make your own choice of combinations of data to be displayed.

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Fforest Fawr UNESCO Global Geopark, Wales UK – Europe

Peat Restoration in Fforest Fawr Geopark and Bannau Brycheiniog National Park



Fforest Fawr UNESCO Global Geopark is situated in the western area of Bannau Brycheiniog National Park. Peatlands form an important part of the Geopark's and National Park's upland landscapes. These unique ecosystems result from partial decomposition of plant remains in the acidic, anaerobic, waterlogged conditions that exist in raised bogs and blanket bogs. Raised bogs, which formed in glacially scoured hollows at the end of the last glacial period, record the transition from minerogenic sediments to peat deposits approximately 11,000 years ago. From this time rising temperatures culminated in the development of a mixed woodland with hazel, oak, pine, and elm. Disturbance of this woodland together with the spread of heathland vegetation was caused by fire management used by Mesolithic hunter gatherers in the area from approximately 8,300 years ago. In cool, wet conditions the increasingly waterlogged heathland was replaced by blanket peat. Deforestation, the spread of heathland, and the expansion of blanket peat intensified with the agricultural practices of the Neolithic and Bronze Age people replacing forest sequestered carbon with peat sequestered carbon.

By storing more carbon than they release, healthy peatlands are significant carbon sinks. Blanket bogs and raised bogs as headwaters of streams and rivers are also important sources for drinking water. Bogs affected by the loss or reduction in plant cover from atmospheric pollution, uncontrolled burning, heavy grazing, and excess footfall, are susceptible to erosion releasing carbon into the atmosphere and peat silt into the water courses. The Bannau Brycheiniog National Park Authority, the Geopark's major partner, aims to increase its peatland restoration work to re-

duce erosion and reestablish waterlogged bog habitats through a combination of revegetation, rewetting, and repairing upland paths.

Revegetating the blanket bog is facilitated by covering flat and gently sloping areas with cut heather "brash." The root networks of new plants germinating from heather seeds, moss fragments and spores contained in the brash stabilise exposed peat surfaces. Heavily eroded and gullied sites sometimes require reprofiling.

Sphagnum mosses, are the essential peat-building plants in peatland ecosystems. By retaining water and secreting acids, these mosses maintain peat growth at the rate of 1 mm per year in resilient peatlands. Sphagnum mosses can be reintroduced as plug plants in areas where they died out.

Rewetting is required when the water table is lowered and the blanket bogs drain through deep erosion gullies. Reducing drainage is achieved by damming erosion gullies to retain or reduce the flow of water and trap sediment. Permeable dams which utilize heather bales, wood or stone, trap sediment which builds up and becomes vegetated. Impermeable dams which use peat or plastic retain water, create pools, raise the water table and improve the bog's resilience against fires.

Eroded upland footpaths contribute to peatland degradation. Path work and repair undertaken by skilled contractors enables footfall management on maintainable paths across areas of peatland.

Restoring healthy peatland will provide a stabilising and positive influence on carbon management, nature recovery, fire management and water quality within the upland landscapes. The restoration work forms part of the Welsh National Peatland Action Programme for storing carbon and reviving vital habitats. The work also contributes to SDG 6, ensuring the availability and management of clean water, combating climate change (SDG 13) and restoring terrestrial ecosystems (SDG 15).

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Controlling water flow in gullies with timber dams in the peat bog at Waen Wen, Bannau Brycheiniog National Park.



Photo by Milestone Environmental



Harz, Braunschweiger Land. Ostfalen UNESCO Global Geopark, Germany - Europe

Sustainable annual themes in the UNESCO Global Geopark



There are many different approaches to how geoparks deal with climate change and sustainability issues that make the world a little "greener".

As a UNESCO Geopark, we are model regions for sustainable development and are obliged to address global societal challenges such as the finite nature of natural resources, climate change, nature-friendly tourism or sustainable water management.

The UNESCO Global Geopark Harz . Braunschweiger Land . Ostfalen chooses an annual theme and organizes, among other things, a Sustainability Day to deal intensively with the 17 Sustainable Development Goals (SDGs) and the 169 sub-goals. Each year we focus on a new SDG.

Various public tours and activities for different target groups take place throughout the year on the respective annual theme. The highlight is the Geopark theme day, a symposium with renowned speakers. Here we always choose highly topical subjects, such as "Future Concept: Sustainable Water Management", "Sustainable Food" or "Biotope and Geotope Protection". For the individual topics, a conference transcript with the various expert contributions is published, which is accessible to everyone free of charge.

The theme day is a platform for networking, where people from a wide variety of disciplines engage in conversation with each other and, at best, develop projects in and for our region that will be implemented in the long term. Some

great projects have already been created.

Together with the local water board, we implement the annual "Our Water" campaign. The project lasts for six weeks and almost 700 pupils take part. We raise the children's awareness of water protection issues and show them how they can take responsibility for their own behavior and contribute to protecting the water and thus the environment.

For the annual theme "Sustainable consumption and production" we have developed a new concept for children of primary school age. It is all about sustainable nutrition. Young people gain access to the production, transport routes and regionality of food in a playful way. They develop an awareness of food and its value.

But since you can only protect what you know, the UNESCO Global Geopark has developed the game "Was für Brocken". So primary school pupils can discover the Harz in a playful way. Perceiving one's own environment and being sensitized to the specific peculiarities forms the basis for the protection of natural and cultural treasures. Classes in the Harz can receive lessons on geology by trained staff and every child get its own copy of the game for free.

The annual themes and the follow-up projects show how diverse we Geoparks are and that we can contribute to sustainability in different ways.

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1. Sustainability dilemmas? Quartz sand mining at the Uhry geosite.

Photo by Marisol Glasserman, © Geopark HBLO.

2. School children playing the Geoparks game.

Geopark game © Regionalverband Harz

3. A discussion involving speakers at one of the Geopark theme days.

Symposium © Geopark HBLO.

Children use landing net during the school project "Our Water".

© Geopark HBLO

Sustainable nutrition should play a role even for the youngest.

Photo by Simone Dargatz, © Geopark HBLO.



Photo by Tony Ramsay.

3. Traeth Mawr, a vegetated raised bog in Fforest Fawr Geopark, developed in a depression within an ice scoured bedrock surface

Photo by Tony Ramsay.

The Huangshan Nature Lecture, addressing climate change through education



Adults and teenagers join in an exciting activity in the Huangshan Sanjiang Wetland Park on World Wetlands Day in 2023.



In 2020, Huangshan UGGp initiated the education project Huangshan Nature Lecture to convey the Geopark's knowledge about nature and science. This project, developed from various educational activities, accomplished by the Huangshan Geopark during the last decade. The project was launched by Huangshan Geopark Administrative Committee and received strong support from multiple organizations such as the Huangshan Municipal Association for Science and Technology, the Huangshan Municipal Library, and the 332 Geological Team of the Provincial Bureau of Geology and Mineral Resources, and some non-governmental organizations.

This project, which attracts young people, is dedicated to natural phenomena which occur in everyday life, and includes lectures on the geology, ecology, biodiversity, and climate in Huangshan. It takes various forms such as holding lectures in designated venues, e. g. the municipal library, and schools in different districts and counties, and observing nature outdoors. Teenagers and parents are encouraged to participate in the project, to understand nature, and to disseminate the concept of "respecting, conforming to, and protecting nature". Relying on the volunteer team of Huangshan Geopark Museum, the Huangshan Nature lecture is free of charge to the public. Up to now, the project has delivered 50 sessions, involving more than 3500 families.

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The lecture in Tangkou Primary School on World Wildlife Day 2023.

Adults and teenagers join in the observing birds event on National Science Popularization Day 2022.



Karawanken-Karavanke UNESCO Global Geopark, Austria and Slovenia – Europe Karawanken-Karavanke Geopark is raising awareness with a new visitor centre Geo.Dom and a special exhibition



The Karawanken-Karavanke UNESCO Global Geopark is a cross border Geopark, located between Austria and Slovenia. It includes 14 municipalities, five Slovenian and nine Austrian, and extends over an area of 1,067 km² with a population of approximately 53,000 residents. In the frame of the INTERREG SI-AT project with the acronym NatureGame the new visitor centre of the Karawanken-Karavanke UNESCO Global Geopark was established at the beginning of 2023. The new visitor centre, the Geo.Dom, is located on the cross border Petzen-Peca Mountain, near the cable car mountain station, at an altitude of 1708 m. This multifunctional building is designed for knowledge transfer, information, entertainment and even gastronomy, as the restaurant named »oben« is located upstairs.

In an attractive way, the diverse geodiversity of the Petzen-Peca and its connections with global issues are emphasized. Special space is dedicated to the naturalist and botanist Mrs. Angela Piskernik, who was born in Bad Eisenkappel-Železna kapla and has, in the past, advocated for the establishment of a cross border nature park in the area, which was later realised with the establishment of the cross border Geopark Karawanken-Karavanke in 2013. The exhibition space is designed to showcase the territory's rich geological heritage with exhibits of fossils and rocks, as well as the natural and cultural heritage, with an emphasis on the rich tradition of mining in this cross border area. The multimedia and interactive exhibition aims to raise awareness about environmental issues and climate change in a playful way. Artificial intelligence technology transforms the visitor's silhouette into a selected plant (tree, flower, etc.), while virtual reality technology teaches many interesting things about the world inside the Petzen-Peca Mountain, a giant karst groundwater reservoir.

The space of the Geo.Dom is also designed to provide space for a wide variety of guest exhibitions. The first of these is the exhibition from Lesvos UNESCO Global Geopark entitled "Understanding Climate Change: Exploring the consequences in the geological record. Cenozoic ecosystems and the current threat." The exhibition was opened and presented by Prof Nikolaos Zouros, director of the Natural History Museum of the Lesvos Petrified Forest, coordinator of the Lesvos



1. The special guest exhibition entitled "Understanding Climate Change: Exploring the consequences in the geological record. Cenozoic ecosystems and the current threat" was opened and presented by Prof Nikolaos Zouros.

Photo by Urosh Grabner.

2. A view of the exhibition space in the Geo.Dom.

Photo by Urosh Grabner.

3. An example of a large fossilized tree trunk from the Lesvos Petrified Forest.

Photo by Urosh Grabner.

4. Part of a petrified Sequoia tree trunk.

Source: <https://www.lesvosmuseum.gr/en/exhibitions/understanding-climate-change-exploring-consequences-geological-record-cenozoic>

Island UNESCO Global Geopark and president of the Global Geopark Network's Executive Board.

The aim of the special 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 through presenting the evidence for past climate changes and their consequences. It explores the question about the impacts that climate change had on ecosystems during Earth history. 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 change. Visitors have the opportunity to understand in depth the history of the Earth and how climate systems have functioned. The information enables them to realize how humans are currently massively intervening in these large-scale and long-term processes, also about the potential impacts of such interventions.

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Kütralkura UNESCO Global Geopark, Chile – L. America

The Ngen, the guardians of our Mother Earth - Ñuke Mapu



The Lengas Forest. There is an urgent social need for restoring ecosystems, at a time when we struggle to counteract climate change, guarantee food security, access to water and the protection of our biodiversity. In this context, geoparks established in indigenous territories must be capable of developing intercultural development strategies.

The current environmental crisis requires us to reconnect with Mother Earth and learn from Küme Mogen (or “Buen Vivir”) Mapuche. Therefore, in order to think about the restoration of ecosystems, the concept of Itrofill Mogen (or “all lives without exception”) is fundamental. This concept is close to the idea of “biodiversity”, but in the Mapuche worldview it integrates the Feyentun or spiritual dimension, where the relationship with nature is what maintains the balance in the being.

From our Mapuche worldview, the world is divided into four dimensions: wenu mapu, ragin wenu mapu, naq mapu and minche mapu. All of them are habituated by beings or spiritual forces and in all of them there is life. All these spaces fulfill a function and contain energies or forces that contribute to the harmonic balance of the universe.

Spaces considered sacred and of sociocul-



View of the Laima volcano, one of Chile's most active volcanoes.

tural importance are also recognized: mawiza (forests with abundant natural vegetation), zeqiñ (volcanoes), lafken (lakes or sea), kura (rocks of different colors and sizes), menoko (swamps), malliñ (wetlands), trayenko (waterfalls or waterfalls), among others.

The spirits of nature are the NGEN which care for and protect life. Each space has a spirit that protects it. The rocks are protected, and cared for by the ngen kura, the forests by the ngen mawiza, the water by ngen ko, the volcanoes by the ngen catch, of the ngen wind kürruf or ngen fire kütral. They contribute to the balance of the environment.

From the perspective of our Ñuke Mapu, there is a call to promote harmony with nature and the Earth to achieve a fair balance between the economic, social, and environmental needs of present and future generations. It is also an invitation to work for sustainable development by incorporating the ancestral wisdom of the native peoples in a reciprocal relationship, exchanging knowledge and also perspectives.

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A view of the 2,865 metres Locquimay volcano.



Lanzarote & Chinijo Islands UNESCO Global Geopark, Spain - Europe

Sonidos Líquidos (Liquid Sounds) – A Greener Festival in Lanzarote & Chinijo Islands Geopark



Celebration of the Sonidos Líquidos Festival and exhibition of environmental awareness projects, 2019.

The fragility of a small territory such as the island of Lanzarote, makes it a unique and special region, hence its protection is one of the main pillars in its sustainable development. The Lanzarote and Chinijo Islands Geopark is aware of the importance of connecting the geological and cultural heritage, therefore it promotes social events that are compatible with the protection of its geological resources.

Sonidos Líquidos Festival assistants toasting with the landscape of La Geria background. 2019.



In this context, in 2011, the Sonidos Líquidos Festival was initiated in Lanzarote, an event that began on a small scale with events held in wineries, which by 2013 became the most important sustainable festival on the island. The festival offers limited capacity concerts held in unique and outstanding sites with a backdrop of wine and food products,

tourism, and culture, including wineries, markets, and wine cellars. The importance of this kind of event concentrates not only on the social event, it also aims to raise awareness among locals, spreading a sense of pride in their landscape, and in doing so encourages the need to preserve it.

In 2019, Sonidos Líquidos was the first festival to be recognised in the Canary Islands as “A Greener Festival”, an award that started in 2007, and is awarded, on the basis of sustainability, only to the best festivals in Europe.

It is a fact that Lanzarote holds an annual event that promotes awareness of the local landscape as well as the Earth's environments. In addition, social responsibility has increased locally. This process occurred from understanding that protecting such a unique region is not only related to intervention, but rather to living hand in hand with it, where the interaction between humans and nature respects all boundaries.

To mark Earth Day, the Lanzarote and Chinijo Islands Geopark feels committed to reminding us, yet again, of how valuable our planet is and how we need to look after it with a kind and responsible approach toward the environment if we and future generations wish to keep enjoying it.

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Trials of potato varieties tailored to organic farming in Las Loras Geopark



An information panel in the trial field provides information about the project.

The "Trial fields of potato varieties tailored to organic farming within Las Loras UNESCO Global Geopark" five-year project was launched two years ago as a part of the activities aiming to highlight local production, with the following objectives in mind:

1. Highlighting and improving the production of seed potatoes.
2. Assessing and informing local farmers about the most suitable varieties for organic farming in the Geopark.
3. Advising farmers about the characteristics and feasibility of agroecological production models, encouraging the transition from intensive to more sustainable cropping patterns.

The Provincial Council of Palencia financed the project through an agreement with the Regional Agricultural Technology Institute, who assumed control of drafting the field protocol and the analyses performed throughout the

In-field training about ecological agriculture.



growing phases, together with the owner of "Las Tuerces Organic Potatoes" farm.

Training sessions were organized simultaneously. Farmers visited organic farms, and were shown the main features of agroecological farming models.

Some results

The results regarding the twelve potato varieties used for the trial need to be assessed at the end of the project. Several parameters are being analysed, such as weight, size, and colour of the collected potatoes, germination, size, ground cover and appearance of the potato plant, cycle and size of the tuber and its uniformity in shape, colour and type of skin, eye depth and conservation. But some other results must be highlighted:

- Farmers and administrations warmly welcomed the field trial project.
- More than 75 participants took part in the four training sessions.
- The project has been disseminated in several national and international events.
- The trial field was visited by more than 200 people, 30 organizations and 60 farmers.
- People from nine countries have visited the trial field.
- High level of media and online visibility.

Significant projects with clear results are powerful tools for promoting the transition to agroecological production and consumption within the Geopark, but there is still a long way to go in changing the currently dominant intensive model.

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Tasting 12 varieties of potatoes with local people.



The Green Geopark's Museum: A Climate Change Adaptation Case Study in Lesvos Island Geopark



View of the building with the walls constructed of grey lava.

The Natural History Museum of the Lesvos Petrified Forest was officially opened in 2001. A key element of its architectural design was the respect for the natural environment and the integration of the building in the natural landscape. It is a single-story building with a total area of 1597 m². The building's exterior walls are constructed from grey lava, the rock created by the successive volcanic eruptions that resulted in the creation of the Lesvos Petrified Forest. The museum hosts and exhibits impressive fossils of the natural history from the Aegean Region, Greece, and from various areas around the world. During the last year the Museum has been transformed into a "green museum", with almost zero energy consumption. This important action aimed to upgrade the energy label of the Natural History Museum of the Lesvos Petrified Forest from D to A+.

The autonomous photovoltaic system creates renewable energy.

The aim of the project was to significantly reduce the primary energy consumption of the building with significant energy savings



and the reduction of greenhouse gas emissions. The interventions included:

- the energy consumption reduction of the external shell of the building, with the installation of new technology window frames,
- the installation of shades to protect the building from the sun,
- the strengthening, and the joining of the skylights of the atriums as well as the two exhibition halls and the improvement of the roof insulation,
- the energy upgrade of the cooling-heating equipment,
- the installation of an autonomous photovoltaic system,
- the upgrade of the lighting of the museum with the replacement of luminaires lamps with new LED technology lamps.

From the above-mentioned improvements, it is estimated that the annual energy savings will be 210 kWh/m² or 79,9% in comparison with the previous consumption. Consequently, the reduction of CO₂ emissions is estimated at 74.90 Kg/m². The payback period has been calculated at 8.05 years. With the completion of the project, a special educational programme has been launched to inform visitors about the challenges associated with climate change and actions to slow it down. In particular, best practices and methodologies are presented for the upgrading of buildings, the reduction of greenhouse gases, and the utilization of renewable energy sources. The project has been financed by ERDF funds of the Operational Programme "North Aegean 2014-2020" of the North Aegean Region.

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A drone provides an aerial photo of Natural History Museum of the Lesvos Petrified Forest.



Lushan Geopark's contribution on climate change and green and low-carbon development



1. Hanpokou U-shaped Valley.

Photo by LI Min.

2. Lushan UGGP, the Five Old Men Peaks in Spring.

Photo by LI Min.

3. Buddha's Light in the Five Old Men Peaks.

Photo by LI Min.

4. The Lushan Cloud Sea.

Photo by LI Min.

Lushan Global Geopark is in the northern region of Jiangxi Province. It is located south of the Yangtze River and to the east of Poyang Lake and covers an area of 548 km². In 2004 Lushan became one of the first global geoparks in the Global Geoparks Network.

The Geopark adopted many measures to adapt to climate change, such as reducing greenhouse gas emissions by using electricity (instead of coal), upgrading tourism buses to be more energy-efficient, and controlling the number of vehicles. Effective dynamic ecological environmental monitoring was implemented using modern facilities, including dynamic bird monitoring, wild animals infrared camera monitoring, atmospheric negative oxygen ion monitoring, disease and pest monitoring, protecting ancient and famous trees, installing a forest fire prevention monitoring system, intelligent checkpoint monitoring cameras, and unmanned aerial vehicles (UAVs) for daily monitoring and patrol.

The Lushan Plant Provincial Key Laboratory was established to conduct a survey, evaluate the vegetation resource, and pursue research on the formation of maintenance mechanism systems for biodiversity, plant endangerment and ecological adaptation, ex situ conservation of species outside their natural habitats, resource discovery and efficient utilization. A 25-hectare research platform for monitoring large-scale subtropical and subalpine forests has been established, focusing on research on carbon and nitrogen cycles, biodiversity, and global climate change.

The Lushan Forest Ecosystem National Orientation Observation and Research Station was established to conduct the dynamic monitoring of bird resources, infrared camera monitoring of wildlife, atmospheric negative oxygen ion monitoring, disease and insect pest monitoring and other natural ecological monitoring work.

Lushan UGGP hosted the Lushan High-Level



Forum on Promoting the Conservation of the Yangtze River and Jiangxi Carbon Neutralization. The focus of the forum was the implementation of the "two mountain theory: protecting clear water and lush mountains are invaluable assets" to promote high-quality

development and to transform ecological advantages into development advantages in the context of the era of "carbon peak, carbon neutral". The forum resulted in the issuance of the Lushan Forestry Declaration (2021), with three proposals for promoting Carbon Neutralization in managing forests in Jiangxi.

Utilizing more science and technology in exhibits innovation and interactive experiences in the Geopark's special museums, such as the Geo-Museum, Stone Inscription Museum, the Religion Museum, Poetry Museum, and Tea Museum provides visitors with a better understanding of the Geopark's geology, natural ecology, history and culture. It also through in-depth tourism generates an interest in thematic research in the geopark and furthers the visitors interest in exploring what the Geopark has to offer.

Since the Geopark became the member of the global geopark family, it adheres to the concepts of "Celebrating Earth Heritage", "Sustaining local Communities," and focusing on the three major goals of protection, education, and sustainable development. With the firmly upheld concepts of "clear waters and lush mountains are invaluable assets" Lushan UGGP enhances conservation, research, and education about geological relics. It also supports and promotes the sustainable development of the local economy in order to realize the harmonious and long-lasting co-existence between humans and nature, and contributes to protecting the global ecological environment by achieving a green and low-carbon development.

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The best tree for your Geopark



The Maestrazgo UGGP has beautiful environments that we must protect to mitigate climate change, man-made changes to nature as well as crimes that disrupt biodiversity.

© David Omedas

How to encourage local people to plant trees to restore and protect forests in the Maestrazgo Cultural Park, UNESCO Global Geopark? During the last year, the Maestrazgo UGGP combated global warming, by restoring the vegetation cover mainly in scheduled activities during the International Day of Forest (21st March), the International Mother Earth Day (22nd April) and the World Environmental Day (5th June).

In order to change mentalities and inform communities about environmental protection, especially young people, the Maestrazgo UGGP invited local communities to plant trees provided by the Geopark allowing everyone to participate in the fight against global warming. During 2022, holm oaks and pine trees were planted in the town of Mezquita de Jarque, as well as elm trees in Mata de los Olmos, Galve, Alcorisa, Mezquita de Jarque, Crivillén and Ejulve to celebrate the International

Day of Forests and the International Mother Earth Day.

During the celebration of the 17th European Geoparks Week in the Maestrazgo UGGP, a sustainable initiative was developed which combines sport and caring for the environment within the framework of the World Environment Day. This busy day, organized in the localities of Mirambel and La Iglesuela del Cid, involved picking litter that spoils our natural spaces and recycling some of the litter to make new products.

Other small actions were the celebration of World Water Day on the 22nd of March with the launch of simple but very important instructions to take care of our Geopark or on the 26th of March when the Geopark became aware of Earth Hour with the aim of raising awareness about turning off the lights when they're not in use and thinking about how much unnecessary electricity you use.

The schedule of the Maestrazgo UGGP for the coming months (2023) includes the continuation of the Elm Project. As part of this project, elm trees are delivered and will be planted in collaboration with the Association of Nature Protection Agents of Aragon in these municipalities: La Zoma, Aliaga, Camarillas, Gargallo, Mas de las Matas, Cañizar del Olivar, La Cuba, Cañada Vellida, Allepuz and Mezquita de Jarque.

All these actions allow the Maestrazgo UGGP to raise awareness, to collaborate on new environmental projects and to increase its impact thanks to the work of the volunteers with new ambitions in order to inform about the biodiversity and Education for Sustainable Development in the territory.

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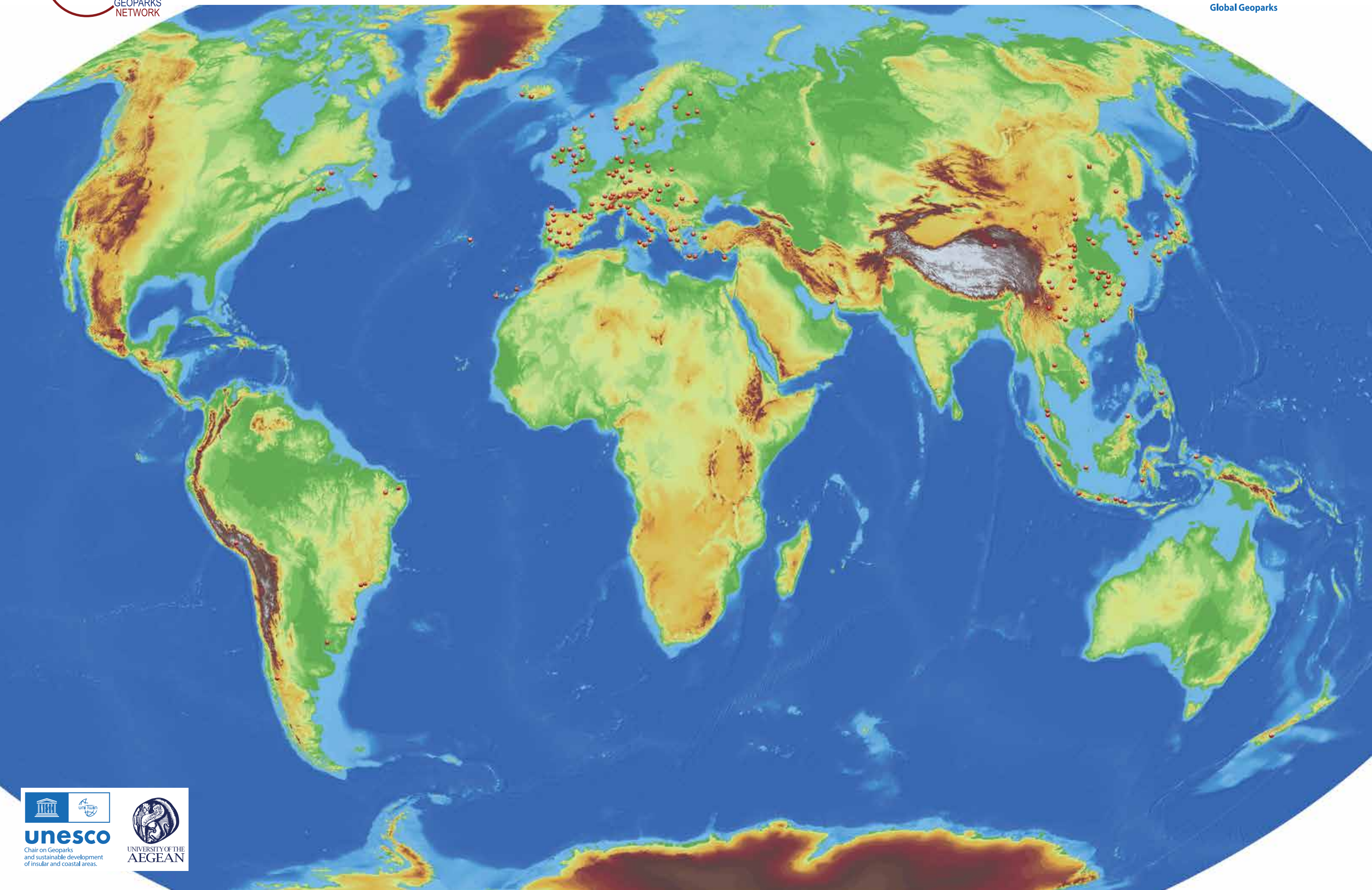
The Maestrazgo Geopark organizes tree planting campaigns with the collaboration of the local communities.

© Ángel Hernández Sesé





UNESCO Global Geoparks



Molina-Alto Tajo UNESCO Global Geopark, Spain - Europe

Creating awareness in the Molina-Alto Tajo Geopark



A fieldtrip with school children. Geoparks have a fundamental role in the fight against climate change. Our objective is not only to protect the environment, but also to know how to engage with society, in order to raise awareness of the challenges we face through climate change.

The Geopark promotes educational awareness-raising and training activities to provide a better understanding about climate change, adapting to climate change and mitigating its consequences. In addition, these actions lead to understanding our geological heritage and its links with the natural and cultural heritage.

Accomplishing activities involving the importance of conserving nature are essential to educate, from an early age, the value of biodiversity and respect for the environment. Education about caring for the planet is necessary for developing ecological awareness so that students and adults can act in their day-to-day lives to reduce pollution or mitigate climate change.

For this, on the occasion of the celebration of International Mother Earth Day, the Molina-Alto Tajo UGp has scheduled two activities in which people are involved.

One of the activities within the framework of the educational programme delivered by the Geopark, is important for creating awareness

about the resources within the territory and provides the necessary knowledge required to mitigate and adapt to the potential effects of climate change. This involves organizing field trips in which schoolchildren get to know their territory and learn to care for it. Working with groups of children from geographically separated schools on these issues enriches their sense of comradeship and is a commitment for the future development of our planet.

Another of these activities involves organizing a training workshop for Environmental Agents, in which participants are informed about the concept of UNESCO Global Geoparks and the heritage of the Molina Alto-Tajo Geopark. It is aimed at a group that supervises the implementation of conservation procedures and at the same time it is in charge of training and advising farmers, ranchers and other professionals on conserving and valuing the geological, cultural and environmental heritage. In this way, these workshops are an effective tool for conservation.

Finally, it is worth noting that we work closely with tourism companies to develop sustainable tourism and adopt a best practices approach to mitigate climate change.

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Awarding certificates for the European Charter for Sustainable Tourism. This aims to engage with the community and businesses, to create networking that builds a sense of ownership and provides opportunities for activities to be promoted in a sustainable way and to make every little action count.



Mt. Apoi UNESCO Global Geopark, Japan – Asia

The Mt. Apoi Dream Project



Preparing and labeling the seed pots for planting.

The Mt. Apoi Fan Club instructing students on planting the alpine plant seeds.

Mt. Apoi Geopark is in the town of Samani, in the southeast corner of Hokkaido, Japan, and is bounded by the Hidaka Mountains and the Pacific Ocean. Here in the Mt. Apoi Geopark, we have implemented the "Apoi Dream Project" as part of the junior high school curriculum for several years. Mt. Apoi is home to certain endemic alpine plants that grow only here due to the influence of rare peridotite rock on the soil chemistry. In recent years, the alpine plant population on Mt. Apoi has been drastically reduced by climate change and by being a popular food source for Ezo deer. This project attempts to regenerate these dwindling alpine plant communities.

This project is conducted at the Samani Junior High School by the Mt. Apoi Fan Club, a

local volunteer group that promotes and supports Geopark activities. The junior high students are first split into groups and begin by planting alpine plant seeds and observing the germination process and plant growth in the classroom. This observational data of the alpine plants' growth is vital for understanding the plants' growing conditions. Once spring arrives in the Geopark, the students conduct tests to see if the plants are strong enough to survive outdoors and continue to study the alpine plants' growing conditions. Through this straightforward activity, we dream that someday the alpine plants found only on Mt. Apoi will be revived for everyone to enjoy.

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These Apoi Azumagiku flowers were successfully transplanted around Cape Enrumu in 2016.



Muskauer Faltenbogen / Łuk Mużakowa
UNESCO Global Geopark, Germany and
Poland - Europe



Cooperation of Lusatian UNESCO sites for a sustainable transformation and structural change (UNESCO5)



Welcoming the partners at the Geopark's Office.

The Lusatian region stretches on both sides of the Neisse River across the federal states of Brandenburg and Saxony (Germany) as well as the Lubusz Voivodeship (Poland). As one of the main traditional energy centres in Germany, the region faces an enormous challenge in structural change due to the phasing out of coal mining by 2038.

Moreover, the area is known worldwide for its unique variety of landscapes with UNESCO status, including a World Heritage Site (Muskau Park), biosphere reserves (Upper Lusatia Heath and Ponds Landscape, Spree Forest), the intangible cultural heritage of the Social Customs and Festivals of the Lusatian Sorbs, represented by the Domowina Association, as well as the Global Geopark Muskauer Faltenbogen / Łuk Mużakowa. These partners have now joined forces in a cooperative, cross-border project to contribute to the successful, economic, ecological, climate-friendly, and social-

The partners plant a tree in the grounds of the old brickworks Klein Köllzig, Muskauer Faltenbogen / Łuk Mużakowa UGGp's Head Office.



ly sustainable transformation of Lusatia. The common goal is to make its cultural and natural heritage more visible and, through better networking, to strengthen the value of tourism provision and support the image of Lusatia nationally and internationally. To this end, a total of eight sub-projects will be implemented in the UNESCO5 project with the participation of regional stakeholders by 2026. These include the development of new themed bike tours, digital information services and videos, as well as a wide range of educational activities for schools and tourists. These activities aim to promote the acceptance and implementation of the Sustainable Development Goals (SDG's) and to further develop the natural and human-shaped landscape of the Lusatian region in a sustainable way and to secure the quality of life and identity especially for the residents of the region.

The festive kick-off event for the project with representatives of the participating project partners took place on March 3 in the old brickworks Klein Köllzig, the representative seat of the UNESCO Global Geopark's Office. The opening was addressed by Mr. Tadeusz Jędrzejczak, Chairman of the EGTC Ltd. Geopark Muskauer Faltenbogen, Ms. Anja Boudon, State Secretary in the Ministry of Agriculture, Environment and Climate Protection of the State of Brandenburg, the Saxon State Minister for Energy, Climate Protection, Environment and Agriculture Mr. Wolfram Günther and the President of the German UNESCO Commission Ms. Prof. Dr. Maria Böhmer.

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Partnership members from the Lusatian UNESCO sites for a sustainable transformation and structural change (UNESCO5).



Papuk UNESCO Global Geopark,
Croatia - Europe

Papuk Geopark participates in the Plastic Free Generation Project



The actors on-stage during a performance of the "Plastic Free Generation".

Under the auspices of the Environmental Protection and Energy Efficiency Fund, Papuk UGGp participated in the project "Plastic Free Generation".

In collaboration with a local primary school from Virovitica one 40-minute performance was created and presented ten times in seven primary schools in the Geopark area.

In a friendly way, using creativity, play, and an interactive approach, the children became aware of the harmful effects of using single-use plastic and other packaging, as well as the production of unnecessary waste in general. The children acquired knowledge about sustainable and responsible behaviour towards the environment, nature and their own health. At the end of the performance, eco-bags with a special logo were distributed to all the students and their teachers with the intention of using them instead of single-use plastic bags.

For the purpose of later dissemination, a video was also produced, which was created as a compilation of recordings from all the performances held in the seven primary schools. The inclusion of subtitles in Croatian and English, make the video accessible to people with hearing impairments and those who do not understand Croatian.

Other neighbouring schools have also shown interest in participating in the project, so it is planned to continue with the implementation of the second phase of the project.

Students watch the performance "Plastic Free Generation"



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Platåbergens UNESCO Global Geopark, Sweden - Europe

Sustainable hydrogen production in Platåbergens Geopark, Sweden's first UNESCO Global Geopark



Attendance at an event at the gas station in the Mariestad municipality Electrivilage.

Platåbergens Geopark is the product of a collaboration between nine Swedish municipalities. The table mountains in the province of Västergötland bear witness to several geological processes that are important if we are to understand the development of our planet. For example, the table mountains contain fossils from now extinct species and some of the discoveries of the world's oldest meteorite. The mountains have created the conditions for a rich cultural heritage, a valuable natural history, and fascinating destinations. One area in Västergötland now has two UNESCO designations, as the Biosphere Reserve Lake Vänern Archipelago and Mount Kinnekulle partly overlaps the Platåbergens Geopark.

In the small municipality of Mariestad, situated in the northern part of the Geopark close to Lake Vänern, the largest lake in Sweden, a project with the aim of producing hydrogen in a sustainable way has been ongoing since 2019. The project consists today of one gas station for refueling fuel cell cars and one preschool where hydrogen gas will provide the energy for heating, cooking etc.

Both the station and the preschool have solar

panels to provide energy for producing hydrogen gas through electrolysis. At the gas station the hydrogen gas is used directly in fuel cell cars and in the preschool there is a fuel cell that is doing the same work to provide electricity. Furthermore, the main component of the exhaust from the cars is water vapor.

Initiating the project was a brave and bold decision by leading politicians and leading representatives from companies in Mariestad. So why did they take this initiative? Mariestad lost many jobs about six years ago and something had to be done to counteract the threatened depression in the labour market. Consequently, the idea to use Mariestad as a test site for the demonstration of green energy production was born. So, both the gas station and the preschool were the first of their kind in the world. Today we see many projects using the same approach to produce green hydrogen, and hopefully they were inspired by the initiative from this small Swedish city close to Lake Vänern.

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Fuel pumps at the gas station in the Mariestad municipality.



View of the gas station in Mariestad municipality.



Qeshm Island UNESCO Geopark, Iran - Asia

Mangrove forest geosite conservation: Combating global warming through Qeshm Island Geopark's programme



Ecotourism and geotourism in the mangrove forest geosite.

Photo by A. Pouzan.

Soheili Village geotourism port.

Photo by A. Besharati.

Qeshm Island UGGp with 35 geosites in the south of Iran has valuable and important ecosystems including desert, mangrove forest, coral reefs, and mud flats. Habitat diversity creates and supports a rich biodiversity throughout the island. Mangrove forests, which are one of the most productive ecosystems on the planet, support human life and CO2 stabilization is one of its functions. This ecosystem absorbs 5 - 10 times more CO2 from the atmosphere than other forests, and plays an important role absorbing the increasing emissions of this greenhouse gas. The largest community of mangrove



Planting mangrove seedlings in Guran Village.

Photo by A. Pouzan.

habitats in the Persian Gulf is distributed between Qeshm Island and the Iranian mainland. In 1976, this area with 86,581 hectares was designated by UNESCO as a biosphere reserve in its Man and Biosphere programme. A part of this area with an area of 21,000 hectares has been designated as a mangrove forest geosite in Qeshm Island Geopark. This valuable coastal geosite has many benefits for the local community, including providing food resources, the use of mangrove wood and the protection of coastal areas against wind and current erosion. Thirteen villages with a population of about 20,000 people are located on Qeshm Island Geopark in the vicinity of the geosite. Population growth and increasing utilization of this forest are a serious threat to the health and functioning of this ecosystem. The release of a large amount of carbon dioxide stored in sediments due to the destruction of mangrove forests contributes to the

intensification of global warming.

To protect the mangrove forest geosite, Qeshm Island UGGp has been considering special programmes to reduce the environmental pressure on the geosite since 2006. The first step to protecting this ecosystem was to engage in mutual communication with the local community to implement community-based conservation programmes. Educational programmes, planting mangrove seedlings, using indigenous knowledge and reducing environmental pressure on the forest have been Qeshm Island UGGp's strategy to conserve and restore this ecosystem.

Mangrove forests have a high capacity and potential for geotourism and ecotourism, therefore promoting these activities instead of direct utilization of the mangrove forest is one of the Geopark's objectives. Nowadays, there are geotourism ports in seven of the thirteen villages adjacent to this geosite, and geotourism activities such as local homestays, local restaurants, local craft shops, local travel agencies etc. are being implemented and supported by Qeshm Island UGGp through the Geopark partners' network in almost all of these villages.

Since 2006, we have learned how the Geopark programme can be effective in addressing environmental challenges such as global warming and drought, so we try to promote these experiences for achieving sustainable development goals.

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Ries UNESCO Global Geopark, Germany - Europe

Ries Geopark opens the Kids' Trail in the Adventure Geotope Daiting: Appealing to the next generation with a message of nature preservation

Opening ceremony of the Kids' Trail in the Adventure Geotope Daiting.

Photo by Constantin Bischoff.



The UNESCO Global Geopark Ries is looking to the future with an important contribution to the present: Opening on Earth Day 2023, the Kids' Trail at the UGGp Ries Adventure Geotopes. Daiting is in a former quarry reclaimed in the programme "From Wound in the Landscape to Nature Paradise" in cooperation with the Heide Allianz.

With the Kids' Trail, the UGGp Ries reaches the next generation to impart the importance of sustainable development and nature preservation through education, engaging, and understandable information.

UGGp Ries mascots Suevie and Riesie lead the way along the nature trail and entertainingly explain the geology, natural and settlement history, plus important safety, and conservation behavior, with games, quiz questions and riddles.

Info-panel topics include: geological history, especially the meteorite impact that formed the Ries landscape (crater and rock debris); fossilization (e.g. *Archaeopteryx*); settlement history (from Celts to the Middle Ages); natural resources (iron ore to iron); protected natural areas (dry grasslands maintained by migratory sheepherding); flora and fauna (oak forest with animals inhabiting every level).

The Adventure Geotope Daiting "Iron Ore and Limestone" was developed as part of the nature conservation project "Quarrying sites in the District of Donau-Ries, from wounds in the landscape to nature paradises" funded by the Bavarian Na-

Aerial view of the The Adventure Geotope Daiting.

Photo by Jürgen Lang.



The Geopark's mascots Suevie and Riesie lead the way on the Kids' Trail. The mascots represent, respectively, the impact rock Suevite and mineral Riesite, for which the Ries Crater is the type locality.

Photo by Constantin Bischoff.

ture Conservation Fund Foundation in response to a joint application by the UGGp Ries and the Heide-Allianz Donau-Ries.

The Heide-Allianz Donau-Ries was founded in 2009 with the goal to preserve and restore the nutrient-poor grasslands characteristic of the region. Heath landscapes provide a habitat for primary colonizers, are home to a wide range of rare animal and plant species and play an important role in the biotope system. Dry grassland and the associated sheepherding are also important for regional identity and tourism.

In the area of the UGGp Ries, where many different rocks were brought to the surface or newly created by the meteorite impact, excavation sites are particularly diverse. The Heide Allianz works to enlarge the dry grassland network, preserve biodiversity, foster cooperation between authorities and shepherds, assist in landscape maintenance measures and serve as a permanent contact point in matters regarding dry grasslands and sheepherding.

The Kids' Trail in the Adventure Geotopes Daiting is focused on the future, introducing the younger generation to the principles of sustainability and nature protection, while its location in a reclaimed quarry is itself a contribution to the region's nature preservation today. The UGGp Ries and Heide Allianz intend to continue their cooperative efforts.

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Seridó UNESCO Global Geopark, Brazil – S. America

The Droughts in the Seridó Geopark and Resilience to Climate Change

The Northeastern people demonstrate the real meaning of resilience, especially when it is associated with a natural phenomenon known as drought. The Northeast of Brazil, where the Seridó UNESCO Global Geopark (Seridó UGGp) is located, is characterized by semi-arid conditions and the occurrence of unique ecosystems associated with an exclusively Brazilian biome, known as "caatinga".

The Seridó UGGp is a territory that we can claim as an authentic example of the northeastern territory. It includes six municipalities, Acari, Carnaúba dos Dantas, Cerro Corá, Currais Novos, Lagoa Nova, and Parelhas, in the south-central portion of the Rio Grande do Norte state.

The territory can be divided into three major geomorphological regions. The northern Serra de Santana Plateau, a high altitudes area with important river springs such as the Potengi River, the most important river in Rio Grande do Norte. The central Highlands with residual isolated inselbergs, and the southern mountain ranges and hills situated in flat terrains of fluvial plains. The central and southern parts of the territory are vulnerable to climate change in response to global warming.

During the 20th century, this territory was affected by droughts that forced their inhabitants to migrate to the coast or to other Brazilian states, such as the southeastern region. This process is known as the Great Brazilian Rural Exit.

The Seridó UGGp territory has experienced the problem for at least two centuries. Nowadays, even with governmental solutions to improve the way of life in the territory, such as the construction of large reservoirs, house cisterns to store water and diverting regional rivers, the Geopark's municipalities still experience dry periods.

The community comprehends the resilience to drought as part of their cultural nature. Sym-

The landscapes of the Seridó UGGp are characterised by drought and the Caatinga biome.

Photo by Silas Costa.



Location map of the Seridó UGGp.

bols such as as dry caatinga trees, the thin and rocky soil, the mountains, the water resources and mining as an alternative activity during dry periods are understood as a part of the Seridó's intangible cultural heritage. These symbols are present in the cordel literature, handicrafts, objects, and the inhabitant's way of life.

The Seridó UGGp explores the community's relationship with nature to promote the knowledge about mitigating and preventing the hazards associated with drought linked to climate change, through educational and conservationist projects, mainly related to geotourism.

The geoproducts, tourists' guidance in the geosites and public actions in the Geopark municipalities have many recommendations for reducing drought impact. Artisans can use recycled materials from mining and sediments accumulated in rivers, visits to geosites can transform the community's vision about abiotic nature and their role in conserving water resources.

The challenge of the Seridó UGGp is to work with different partners in order to reduce the impacts of droughts on water shortage in the territory that are mainly related to fires, poverty and lack of opportunities.

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Shennongjia UNESCO Global Geopark, China - Asia

Conservation & Restoration Making Shennongjia Geopark the Greenest Place in Central China



Planting native trees and stabilizing a slope in Shennongjia UNESCO Global Geopark.

On March 9, Shennongjia UNESCO Global Geopark (UGGp) planted 200 saplings of the Chinese dove tree (*Davidia involucrata*), a national Class I key protected plant species.

In recent years, the Administration of Shennongjia UGGp has planted more than 10,000 trees, most of which come from its rare native plant breeding base. The planting of rare native trees not only adds greening to the Geopark, but also makes a significant contribution to the breeding and communal rejuvenation of rare and endangered native plants.

In the 1960s and 1970s, Shennongjia was heavily logged to support national construction. The logging industry was the backbone of its economy. The felling of numerous large trees created many eco-



Large trees planted along a roadside.

logical problems. Up to 1982, the forest coverage in Shennongjia had fallen to 63%. Since 1982, Shennongjia has established various protected areas and moved from resource consumption to resource protection. Shennongjia laid down the logging tools and started to implement strict protection.

Shennongjia has adopted green development as an important way to adjust its economic structure and transform its mode of development by implementing the integrated protection and restoration of mountains, waters, forests, fields, lakes, and grasses. The Geopark has invested about CNY 80 million on the wetland restoration project, the ecology improvement project, and the eco-restoration project, etc. The eco-restoration project used innovative methods such as using only native plants and mounting soil-conserving wire meshes and racks, to restore the vegetation on exposed slopes and wetland habitats within the Geopark. Up to now, 44 wetland habitats have been restored, with a restoration area of about 2,199 hectares, while vegetation has been restored in 106 exposed sites, with a restoration area of about 26.4 hectares.

Today, the forest coverage in Shennongjia UGGp has exceeded 96%, conserving a source of high-quality water for central China. The integrity of the natural ecosystem has been enhanced, the water quality of watershed sections and water sources has reached 100%, and the air quality has remained No.1 in the province. The improved ecology and environment attracts increasing numbers of tourists. Data shows that the contribution of tourism to Shennongjia's GDP has exceeded 50%. The changing numbers bear witness to the magnificent journey of Shennongjia from cutting into the mountains to strict protection, and then to comprehensive conservation and sustainable development.

Nowadays, in Shennongjia UGGp, the vegetation is lush, the water is clear, the air is clean and fresh, and tourists can often encounter pheasants, serows, monkeys, deer, and other animals. The wetland with long grasses and elegant birds and the mountains with thick primitive forests have become the most valuable resources of Shennongjia.

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View of a site before and after restoration.



Songshan UNESCO Global Geopark, China - Asia

Songshan Geopark's green action against climate change



The Geopark hosts outdoor walking activities.

Over the years, Songshan Global Geopark has always placed equal emphasis on green development and ecological protection, and has carried out research projects on the development of the Geopark and environmental protection, established a science education base, and set up a volunteer service station for "Protecting the Home, Loving Songshan". The Geopark has also joined hands with scientific research institutions, popular science organizations and geopark experts to organize scientific lectures, research classes, community outreach programmes, distribution of popular science books, and hiking and cycling activities to promote the concept of a green and low-carbon footprint, and raise public awareness about environmental protection and climate change.



Xuchang College organizes research activities in the Geopark.

The Songshan Ring Road, which was opened in 2021, not only optimizes the existing public transport network in the Geopark, but also links a few attractions around Songshan, creating a green tourism route that is "full of scenery." It is an important initiative designed to implement ecological protection and high-quality development of the Yellow River Basin, and is another successful contribution for developing a green economy.

In the future, the Songshan Global Geopark will continue to participate in all national and international cooperation activities that are conducive to combating climate change and "going green."

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The tourist road around Mountains.

Stonehammer UNESCO Global Geopark, Canada - North America

Going Green within our communities



The Atlantic
Balloon Festival.

The Stonehammer Geopark is located in the province of New Brunswick, Canada, and encompasses an area of approximately 2,500 square kilometers. It is home to a diverse range of communities, including the cities of Saint John and Quispamsis, as well as several smaller towns and villages. We also are fortunate to share a portion of this territory with the UNESCO Fundy Biosphere and have implemented a Model-independent Data Assimilation (MIDA) approach in our operations. Going green for Stonehammer involves adopting sustainable practices that reduce the impact of tourism and human activities on the environment, while promoting conservation and the preservation of geological and natural resources.

By working closely with local communities in these and other ways, Stonehammer has helped to build a sense of ownership and stewardship among local people, and promotes sustainable practices that benefit both the environment and local economies. This is being achieved through a variety of methods, including:



Stonehammer
Geopark
Container
Village
Interpretation
Centre - 2022.



Sustainable and Responsible Tourism Practices

We continue to encourage sustainable tourism practices such as eco-tourism, responsible tourism, and geotourism. This involves promotional and educational activities that have minimal impact on the environment and local communities, such as the recent Atlantic Balloon Festival. We actively strive to minimize the impact of human activities on the natural environment and encourage the Leave No Trace principals while educating visitors about the importance of conservation and sustainability.

Tucker
Park School
Programme -
2022.

Conservation Education:

Stonehammer conducts programmes to promote on-site conservation education by providing opportunities for visitors and local communities to learn about the importance of connecting with their own backyard biodiversity. Through these engagements, they learn how they can contribute to overall conservation efforts. These include workshops, training programmes, and many public events; such as our recent St. Martins Beach clean-up in addition to multiple student-based activities.

Waste Reduction:

In an effort to showcase our desire to reduce our carbon footprint and waste reduction, our new Interpretation Hub is created from a recycled shipping container and is located within a village of local artisans who also are based in similar containers. We also promote an annual "Take 5 to Pick-Up 5" programme with local students to illustrate that if we only take 5 minutes to pick up 5 pieces of trash, the environmental savings are huge. Based on a Geopark population of 130,000 x 5 pieces it equates to over 650,000 pieces of waste in only 5 minutes.

In conclusion, by implementing these and other biodiversity conservation measures, Stonehammer plays an important role in protecting and conserving local flora and fauna while promoting the sustainable use of natural resources.

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Tianzhushan UNESCO Global Geopark, China - Asia

Tianzhushan Geopark is Making Relentless Efforts to Combat Climate Change

Planting trees
in Tianzhushan
Geopark.



In response to climate change, Tianzhushan UNESCO Global Geopark (hereinafter referred to as Tianzhushan UGGp) has completed a large amount of work in daily forestry management and protection, implementation of forestry projects, utilization of clean energy (construction of photovoltaic power stations), science education and creating a green transportation system, actively preventing forest fires and enhancing the productivity of forest stands, while reducing carbon emissions in terms of energy use. These activities that contribute to the response to climate are described below.

Fire prevention.

To effectively prevent and control the occurrence of forest fires, Tianzhushan UGGp employs more than 100 volunteers and supporters to patrol the Geopark around the clock and invests more than 2 million yuan in additional fire prevention equipment, greatly enhancing the Geopark's fire prevention capability.

Prevention and control of forestry pests

Tianzhushan UGGp has invested more than 1 million yuan in the prevention and control of forest pests, such as *Cenopalpus linepla*, a parasite on pine trees, *Acantholyda posticalis* Matsumura, the pine feeding web spinning sawfly, and *Dendrolimus punctatus* Walker, a species of moths responsible for defoliating pine trees. This investment aims to maintain the ecological balance and effectively protect the forest resources.

Implementation of Forestry Projects

1. Biodiversity project.

The project involves a phase of changing the forest by including the replanting of *Pinus mas-*

Shuttle buses
transport
visitors in the
Tianzhushan
Geopark.



A science
education event
in Tianzhushan
Geopark.

soniana Lamb, the Chinese Red Pine which is used in Chinese traditional medicine, fir trees and *Magnoliae Officinalis* Cortex, used in traditional Chinese medicine, and the construction of fire prevention forest belts.

2. Medium and young forest nurturing inter-logging project

In order to enhance the stability of forest stands and improve their productivity, a total of 3 million yuan has been invested to remediate the consequences of industrial logging in recent years.

3. Degraded Forest Rehabilitation Project

Tianzhushan UGGp has invested a total of 1 million yuan in recent years to rehabilitate degraded forests with low productivity. As a result of this remediation, the productivity of the forest stands has increased significantly.

4. Tree Planting

Every year, Tianzhushan UGGp organizes compulsory tree planting activities to further greening, enhance the beauty of the Geopark and to protect and improve the ecological environment.

Construction of Photovoltaic Power Stations

In order to effectively reduce carbon emissions, actively respond to climate change, and improve air quality, Tianzhushan UGGp has promoted the construction of clean energy photovoltaic power stations in recent years.

Science Education

Tianzhushan UGGp has organized many climate change exhibitions and science lectures, prepared climate change folders and organized Geopark museum visits for students and visitors.

Building a green transportation system

Tianzhushan UGGp is actively promoting the construction of public leisure facilities, including cycling trails in the southern Geopark and shuttle bus lines in the northern Geopark and advocating the use of clean energy vehicles to reduce carbon dioxide emissions.

Through these activities Tianzhushan UGGp aims to ensure the survival of healthy forests, and contribute to reducing the territory's carbon footprint.

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The Volcano Meister Network's Practice in Controlling Invasive Alien Species



The Meisters surveying plant species in the Toya-Uso Geopark.

The Toya-Uso Volcano Meisters Network ("the meisters"), a group of local people who are certified by Toya-Uso UNESCO Global Geopark (UGGp) Council and Hokkaido prefectural government, serves the UGGp in disaster risk reduction education and Geopark guide activities. Under the aegis of the Geopark's Council, the Meisters made a contract with the Japanese Ministry of Environment for eliminating invasive alien species.

Having assigned Dr Shiro Tsuyuzaki, professor in environmental ecology of Hokkaido University, to an advisory post, the Meisters initially surveyed plant species around the 2000 eruption craters and the crater floor of the 1977 eruption. From five surveys, they confirmed the occurrence of 107 species, including 77 that were native to Japan together with 30 alien species. Following the survey's results, the Meisters discussed what they should do and selected the cutleaf coneflower (*Rudbeckia laciniata*) and goldenrod (*Solidago gigantea* var. *leiophylla*) as the plants to eliminate.

From 2019 to 2021, the Meisters removed a total of 640 kg of these plant species. In parallel with these efforts, they shared information



The illustration on the front cover of the manual for controlling invasive alien species.

with related groups and discussed methods for sustainably controlling invasive alien species. Furthermore, the Meisters produced a manual book for those who work on managing invasive alien species. The manual provides basic information on alien species, and also describes how to distinguish and prevent the spread of species that may impact on the natural vegetation of Mt. Usu. They also produced a flyer to motivate the general public to pay more attention to alien species.

Invasive alien species have become a serious concern to the natural environment and biodiversity in the Geopark, such as the vegetation recovery zone along the Nishiyama hiking trail. Here we can observe the recovery of the natural vegetation following the burning of the vegetation during the 2000 eruption. As alien species have been out-competing the native plants in recent years, the Meisters will work closely with the UGGp Council to sustain the nature of the recovery zone by keeping it free from alien species.

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A workshop on controlling the occurrence of invasive alien species.



The LIFE - IP ZENAPA Project



A bumble bee pollinates flowers in a low cost, low maintenance energy crop.

Since 2016 the Naturpark and UNESCO Global Geopark Vulkaneifel together with 15 partners are participating in the LIFE-IP ZENAPA project. Its goal is already contained in its name: "Zero Emission Nature Protection Areas." ZENAPA does not only want to contribute to protecting the climate, nature, and biodiversity, but also wants to show that these goals are not contradictory and can even be achieved through cooperation. Actions for climate protection and biodiversity should and can be carried out together rather than separately.

The target topics in the Nature- and Geopark Vulkaneifel are manifold: green procurement, a renewable heat and power supply, the establishment of alternative energy crops, climate conferences for children and the development of a sustainable infrastructure are just a few of the subjects being considered.

In a total of 10 municipalities, district concepts will promote measures that can increase energy efficiency in the region. The first step is to identify the region's largest energy consumers, where the potential for energy savings and efficiency exists, and what the overall energy balance of the region should look like

E-car sharing in the Vulkaneifel Geopark.



following the renovation. Workshops are held with local residents to develop a concept that will optimize the conditions in the community.

New LED flood lighting in Mehren.

Other examples of measures that will be implemented in the project include:

Conversion to LED lighting

Replacing conventional lighting with LED lighting has economic and ecological benefits. Not only does it reduce energy consumption and maintenance, but also, by reducing light pollution, it protects the fauna and flora. This has been achieved in many sites as part of street lighting upgrades or as part of floodlight retrofits.

Improving the efficiency of biogas plants

A farmer in the region has significantly increased the efficiency of his biogas plant with a cavitation system. This technical device promotes the formation, growth, and decay of gas bubbles in the biogas substrate and increases the surface area for microbial activity. This means that significantly more biogas can be produced more quickly from the same amount of substrate. The additional use of alternative energy crops can also improve crop diversity and provide other benefits such as erosion control.

Operational mobility management

In rural regions, personal motorized transport accounts for a large share of the modal split. To enable the use of sustainable forms of mobility, a pilot and exemplary mobility management system was promoted in the district's administration. The creation of an infrastructure for e-bikes and the installation of various charging points for electric cars makes it easier for employees to switch to other forms of transport. Citizens can also benefit from a public charging station as part of an e-car sharing scheme.

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Wangwushan - Daimeishan UNESCO Global Geopark, China - Asia

Green activities to address climate change in Wangwushan-Daimeishan Geopark



Volunteers ride to South Hill to collect "white waste."

Over several years, the Geopark has been committed to promoting green development, employing environmental education experts and, for more than ten years, joining forces with scientific research institutions, popular science organizations and volunteers to carry out "three actions." These involve engaging with communities, university campuses, and implementing the regular operation of science lectures, study classes and community outreach activities. Also, to organize walking, cycling and "rubbish bank special environmental protection" activities on a regular basis to promote a green and low-carbon lifestyle and to attract public participation in environmental and climate protection work.

The opening of the 2021 Jixin Expressway has become a major north-south corridor through the Geopark, optimizing the transport network, promoting the development of green transport and forming the basis for the Geopark's integration into the tourism route along the Taihang River and the ecological and economic belt along the Yellow River.

In the future, the Geopark will continue to uphold the concept of a green and sustainable development and actively participate in all domestic and international cooperation activities that are conducive to combating climate change and "going green."

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The Earth Day campaign in the community.



Wudalianchi UNESCO Global Geopark, China - Asia

Driving the Development of a Green Economy and Meeting the Challenge of Climate Change



A volcanic barrier lake in Wudalianchi Geopark.

Photo by Bingchengxinzi.

Wudalianchi Geopark has made unremitting efforts to develop a green economy and address the challenge of climate change since joining the Global Geoparks Network in 2004.

A volcanic driblet dish.

Photo by Li Kai.

Wudalianchi delivers annually a science class on Earth science, geological disasters, natural disaster reduction, and climate change etc. in schools and local communities. Science activities

are carried out on World Earth Day, World Environment Day, World Museum Day and the Disaster Prevention and Reduction Day.

An education plan, contest, and outdoor activities on climate change are organized every year. Initiatives for a low-carbon lifestyle are announced every National Low Carbon Day.

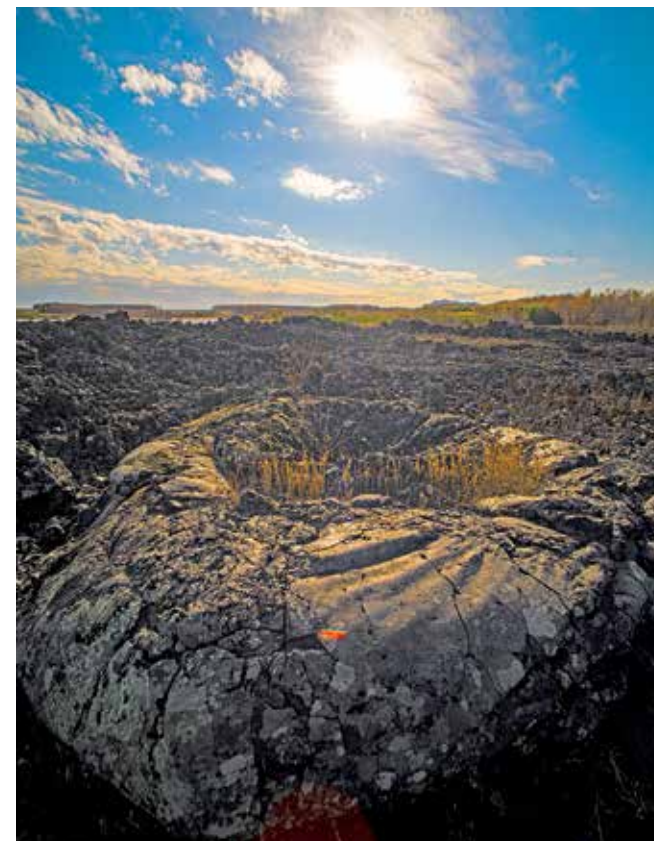
Protection stations are established in important protected areas, and the protection staff are on guard for 24 hours. The Environment Monitoring Station and Negative Oxygen Ion Monitoring Station monitor the water and air quality in real time. Over fifty infrared cameras are installed in forestry, field, and volcanic sites to protect wild animals.

Now the quality of lake water in Wudalianchi has reached status class III, and the negative oxygen ion concentration in the forest in Wudalianchi has reached 5000 - 10000 ions per cubic centimeter.

The south Gelaqiushan Volcano.

Photo by Bingchengxinzi.

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Zhangjiajie UNESCO Global Geopark, China - Asia

On the road to deep integration between ecological preservation and green development in Zhangjiajie Geopark



Overview of Zhangjiajie UNESCO Global Geopark.

Since its designation as a World Natural Heritage Site by UNESCO in 1992 and a Global Geopark in 2004, Zhangjiajie has built an eco-tourism industry based on ethnic customs that attracts numerous visitors. In recent years, with the implementation of the national peak carbon emissions and carbon neutrality goals, the Geopark has creatively integrated geoscience, biological investigation, fossil interactive research and green tourism to create a low-carbon and circular economy based on the natural forest ecosystem in the Geopark.

Adhering to the development concept of “ecology plus sports”, the Geopark promotes the intense integration of sports tourism events and ecological protection. Through cycling, marathons, and other green life initiatives, the Geopark advocates energy saving, emission reduction, and low-carbon, green, and healthy travel. In 2022, based on strictly protecting the natural ecological environment and relying on the south route of the core scenic area, a 15-kilometre “beautiful countryside” bicycle road was built in the park. The road passes through the ecological tea garden, characteristic homestay accommodation, the red culture area (Kangjinyan Village), beautiful countryside (Longweiba Demonstration Village) and other scenic sites.

In order to consolidate the foundation for the conservation of Zhangjiajie’s natural heritage, the first sub-project of biodiversity conservation and ecological restoration in northwest Hunan,



Finding fossils in Zhangjiajie UNESCO Global Geopark.

the Suoxiyu Project of Zhangjiajie, was launched in 2022. It will become a benchmark for regional biodiversity conservation and ecological restoration and promote the green and high-quality development of forest resources in Hunan Province.

Zhangjiajie Global Geopark will continue to devote itself to green eco-tourism and green development in the future.

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The “beautiful countryside” bicycle and marathon road in Zhangjiajie UNESCO Global Geopark.



Longyan Aspiring UNESCO Global Geopark, China - Asia

The construction of a Green and Beautiful Mine



A panoramic view of the Duzikeng spoil tip.

The Zijinshan Gold and Copper Mine in Longyan Aspiring UNESCO Global Geopark has been adhering to the principle of “digging one area, stabilizing this area, controlling this area, and making achievements in this area”. With early ecological restoration planning, large investment and good practices, the ecological vegetation restoration of this mine has been carried out successfully step by step according to local conditions. In the spoil tips such as Duzikeng and Yanzidong, etc., where poor geographical conditions hindered vegetation restoration, rapid vegetation restoration technology combining engineering and biological measures of “layered water control, slope cutting, soil improvement, and plant selection” was adopted to restore the vegetation in the gold mine’s spoil tip wasteland.

The Tingjiang Wharf of the Zijinshan Gold and Copper Mine.

By the end of 2022, a total of 5,559 billion yuan was invested in environmental protection, of which 3,037 billion yuan was invested in engineering measures, 229 million yuan in

vegetation restoration, with a greening area of about 1393 hectares in which 4,18 million flowers and trees were planted.

After more than ten years of environmental governance the industrial tourism resources of geology, mining, and mineral processing, etc. in Zijinshan are now well developed. A tourism trunk line, known as the “Gold Tour”, was constructed, including a main monument park, a subsidiary monument park, an open-pit mining industrial park, a botanical garden, a yacht wharf, a tea garden, a rose garden, a plank trail and an avenue etc. The “Gold Tour” filled the gap in mining tourism in Fujian Province and was rated as a “National Industrial Tourism Demonstration Site”. The beautiful botanical garden, tea garden, flower orchard, ecological farm with lush grass and vibrant vitality have become a good place for its staff to relax and entertain after work.

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Zijinshan main monument park.



