

EUROPEAN GEOPARKS

14TH/CONFERENCE

7TH - 9TH SEPTEMBER 2017

PONTA DELGADA, AZORES, PT

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Abstracts Book



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**"GEOPARKS: PATHWAYS OF SUSTAINABLE
TOURISM FOR DEVELOPMENT"**

Abstracts Book

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This book brings together the abstracts of the oral and poster presentations at the 14th European Geoparks Conference under the theme “Geoparks as a sustainable tourism strategy for development”. The conference was held on 7th to 9th September, 2017 in Ponta Delgada, São Miguel island in the Azores UNESCO Global Geopark.

It integrates 164 abstracts, mostly oral presentations (125) and also 39 posters, on the following themes: Geoparks and Sustainable Tourism; Conservation, Science and Research; Education, Public Awareness and Communication; Good Practices in Geoparks; Engaging Communities and Networking; Aspiring Geoparks.

Authors of oral communications and posters presented on the 14th European Geoparks Conference are welcomed and encouraged to submit a paper to a Special Issue of “Geosciences”, an international peer-reviewed open access quarterly journal published by MDPI fully dedicated to the EGNAZORES2017 Conference.

“Geosciences” was recently selected for inclusion in ESCI (Web of Science), starting from articles published in 2017.

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EUROPEAN GEO PARKS

14TH/CONFERENCE

7TH - 9TH SEPTEMBER 2017
PONTA DELGADA, AZORES, PT

"GEO PARKS: PATHWAYS OF SUSTAINABLE
TOURISM FOR DEVELOPMENT"

WORKSHOP "GEO PARKS & GEOTOURISM IN VOLCANIC AREAS"



A DISASTER-PREVENTION BOOM IN JAPAN AND THE IMPORTANCE OF SCIENTIFICALLY CORRECT KNOWLEDGE

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Keywords: natural disaster, earthquake, volcanic eruption, disaster prevention

Japan is now within a "boom of disaster prevention" after we experienced recent large natural disasters: that is, earthquake disasters at Tohoku in 2011 (subduction-zone earthquake and tsunami which brought a serious accident in nuclear power plants) and Kumamoto in 2016 (inland earthquake), plus a volcanic disaster in Mt. Ontake in 2014 with the highest number of casualties among the Japanese volcanic disasters after the World War II. A key promoter of this boom is principally the mass media, which is providing the information of disaster damages and the recovery processes in various points repeatedly. As a result, this boom triggered several businesses of infrastructure construction, communication and countermeasures for disaster prevention information, and so on, and promoted national research programs of monitoring/observation of natural hazards and understanding the mechanisms. However, it will end as far as it is a "boom," such as previous booms we experienced. For instance, Tohoku had already experienced a large earthquake and tsunami in 1933. Reflecting these disaster, many monuments of the earthquake-tsunami disaster were built in devastated areas by the mass media and local people in order that the memory would not fade out. Hazard map and protective walls for tsunamis had been prepared for most areas. In 2011, however, many casualties were reported from the area near the monuments, within the dangerous zones in hazard maps, and outside protective walls.

It is said that natural disaster comes when people forgot it. The reason why the boom will end is said to be what people cannot catch the disaster as their own issue. For not avoiding termination of the present activity and motivation, it is important to let people catch the future disaster as their own issue. How shall we do for this? How can we catch the disasters as our own issue? At first, it is important for people to understand natural hazards with scientifically correct knowledge. We should understand that a hazard map only illustrates an example among previous events, and that protective walls do not function against a tsunami which engineers could not design; misled guidance and designing would introduce human disasters. People including engineers and city planners have to understand natural hazard-related geology of the area where they are living. One-side education by selling pieces of knowledge is mostly disliked by people. In this point, geoparks are an outdoor class to be able to effectively learn about natural hazards. This is because Geoparks can talk directly to people and visitors about not only blessings from nature but also nature hazards. For utilizing Geoparks effectively for dissemination of disaster prevention, sustainable geological research in those areas becomes important.

*EXTINCT VOLCANOES, ACTIVE GEOTOURISM IN BAKONY–BALATON GEOPARK,
HUNGARY: VISITOR CENTRES, INTERPRETIVE SITES, GEOLOGICAL TRAILS AND GUIDED
GEOTOURS IN VOLCANIC AREAS*

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Keywords: geotourism, geointerpretation, guided geotours, volcanic heritage

Bakony–Balaton UNESCO Global Geopark was accepted into the European Geoparks Networks in 2012. The 3,244 km² Geopark is located in western Hungary, near Lake Balaton, the largest lake in Central Europe, on the boundary of four major geographic regions (on the North the Transdanubian Range, with Bakony Mts is a part of it, on the South the Transdanubian Hills, on the East the Great Hungarian Plain, whereas on the West the Little Hungarian Plain extends into its area). It is characterized by a variety of geological, topographic, climatic and hydrological features as well as by its extensive biodiversity. Numerous geosites are located within protected natural areas (Balaton Uplands National Park, Protected Landscape Areas, Nature Conservation Areas) and/or many of the geosites are protected by law. There are 172 rock formations in the territory but the most iconic landscapes of the Geopark were undoubtedly formed by volcanism.

During the last phase of the Alpine orogeny basaltic magma rose up to the surface and one of the densest volcanic fields was formed in Europe: approximately 50 volcanoes erupted in the Bakony–Balaton Uplands Volcanic Field. The initial phase of the intense basaltic volcanism provided a small amount of pyroclastics and lava during the late Miocene: phreatomagmatic explosions started approximately 8 million years ago in the area of the Tihany Peninsula. Subsequently, the predominant part of the volcanoes in the area were characterised by a calmer activity producing lava fountains and cinder cones, nevertheless, the activity that produced lava flows was the most common one. Phreatomagmatic explosive volcanic activity started later again in the Tapolca Basin and Káli Basin over the Pliocene erosional surface but in other places extensive lava fields were developed. Due to frost disintegration during the Pleistocene, mainly slope debris were accumulated on retrograding hillsides in the dry and cold periods (periglacial). During interglacial periods watercourses, fed by the abundant rainfall, carried a significant amount of loose sediments away. This erosional process led to the formation of the basalt-capped volcanic remnant hills, landmarks of the Geopark.

The volcanic landscapes are popular destinations for the visitors of the area, and also strong pillars of the geotourism. Balaton Uplands National Park Directorate, as the management organisation of the Geopark, operates 14 visitor centres and interpretive sites: 7 of which are connected to the rich geological-volcanic heritage. The Lavender House Visitor Centre in Tihany is also the Eastern Gate of the Geopark: there are many interactive installations and a full HD movie related to the volcanism (and a huge world map with a selection of volcanic geoparks). The abandoned basalt quarry of Hegyestű is one of the most important geological interpretive sites of the Geopark where a new volcanological exhibition will be open in the near future, thanks to the Interreg Danube GeoTour project. Lake Cave of Tapolca Visitor Centre, the Western Gate of the Geopark is the most visited geosite (150,000 visitors/year): here the exhibition here also presents the development of the surrounding volcanic landscape. There are numerous volcanological-geological trails in the area, e.g. the very first one in Hungary (Lajos Lóczy Nature Trail, Tihany Peninsula). These facilities are excellent bases for geotourism, involving even local communities: geotours in volcanic areas, guided by the management organisation and by the trained Geopark Partners, are the most popular outdoor activities in the Geopark.

TOURISM AND ACTIVE VOLCANISM

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Keywords: eruptions, Jökulhlaup, contingency plans, Iceland

On a geological timescale Iceland is a very young country, and volcanism is very much a part of life in Iceland. Individual volcanic events occur on average at a 3 – 4 year interval. Despite the dominance of basalts, explosive eruptions are more common than effusive, since frequent eruptions through glaciers give rise to phreatomagmatic activity. The largest explosive eruptions (Volcanic Explosivity Index – VEI 6) occur once or twice per millenium, while VEI 3 eruptions have recurrence of 10 – 20 years. Jökulhlaups caused by volcanic or geothermal acitvitiy under glaciers are the most frequent volcanically related hazard, while fallout of tephra and fluorine poisoning of crops, leading to decimation of livestock and famine, killed several thousands people prior to 1800 AD. The most severe volcanic events to be expected in Iceland are: (1) major flood basalt eruptions similar to the Laki eruption in 1783 (located within Katla UNESCO Global Geopark), (2) VEI 6 plinian eruptions in large central volcanoes close to inhabited areas, similar to the Öräfajökull eruption in 1362, which wiped out a district with some 30 farms (adjacent to Katla UNESCO Global Geopark), and (3) large eruptions at Katla leading to catastrophic jökulhlaups towards the west, inundating several hundred square kilometres of inhabited agricultural land in south Iceland. Economic impact of volcanic events can be considerable and some towns in Iceland are vulnerable to lava flows. For instance a large part of the town of Vestmannaeyjar, off the coast of Katla UNESCO Global Geopark, was buried by lava and tephra in a moderate-sized eruption in 1973. The prospect of fatalities in moderate explosive eruptions is increasing as frequently active volcanoes, especially Hekla, adjacent to Katla Global Geopark, have become a popular destination for hikers. Automated warning systems, mainly based on seismometers, have proved effective in warning of imminent eruptions and hold great potential for averting danger in future eruptions.

Following a small jökulhlaup in Jökulsá á Sólheimasandi, a glacial river from the outlet glacier Sólheimajökull, scientists and public authorities put more emphasis on preventive measures and educating the public about ways to minimize the danger of fatalities in such natural hazards. Increased seismic activity in Eyjafjallajökull prior to the eruption in 2010 was also taken seriously as evacuation plans in the region had been practiced only weeks before the eruption. Since then increased seismic activitiy within the Katla caldera accompanied by massive increase in tourism in the area has also been taken seriously by the local and national authoriities.

In this paper the eruption emergency guidelines for Katla and Eyjafjallajökull will be explained and the measures taken for working with the tourism industry in the area. The present Contingency Action Plan for the area was published on 30.1.2017. Sustainable tourism in Katla UNESCO Global Geopark is very much dependant on keeping the local tourism operators and visiting tourists up to date regarding this aspect of living and visiting this beautiful and dynamic destination.

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"GEO PARKS: PATHWAYS OF SUSTAINABLE
TOURISM FOR DEVELOPMENT"

WORKSHOP "GEOHAZARDS IN GEO PARKS"



BUILDING RESILIENT GEOPARKS IN EUROPE

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Keywords: resilient geoparks, geoconservation, geotourism

The main objective of the SENDAI Framework is to reduce the disaster risk in losses, primarily in lives, livelihoods and health and additionally in economic, physical, social, cultural and environment of modern societies, which is further analyzed into the main target to reduce direct economic loss in relation to global GDP by 2030. In addition, one of the goals of EU for the 2030 Sustainable Development Agenda combined with the EU policy for tourism is to ensure healthy and safety, promoting well-being of people at their home and visiting areas. More and more international and European organizations put nowadays at high priority the need to strengthen tourism sector and mitigate the risk of potential disasters, which in most cases cause devastating impacts in infrastructures and services. New tourism trends are focused on the "adventure and participatory tourism", which encompasses several kind of threats at disaster prone areas. Indeed, several recent cases offer many examples to testify what the loss in economy through the tourism revenue, can be.

The UNESCO GGs can ideally be considered as "adventure and participatory destinations" because are exceptional nature territories where visitors can enjoy natural, cultural and human wealth, participate in various adventure and educational activities, learn and integrate with local communities and benefit from the various geotouristic products. The perception of geoparks is based on the conservation and promotion of the natural and human capital through geoconservation and geotouristic activities which will create the necessary income to support local communities and re-fund additional geoparks activities in the coming future. Consequently, the main tool for geoparks to achieve sustainable development at their territories is the growth of geotourism. Managers and decision makers of geoparks are in a better position, than the normal tourism sector, to understand and appreciate the risks that nature induced or climate change disasters impose on their infrastructure and services. The geoparks are obliged thus to consider all these threats and take actions in minimizing risks, mitigating their impact and built resilient geoparks.

Raising awareness and increasing prevention and preparedness are unique actions and one way to face these challenges. In past, several geoparks were engaged in the implementation of civil protection projects which resulted in certain tools for raising awareness and improve knowledge in prevention, preparedness and increasing resilience of structures and services. Under RACCE project posters, printed material as well as two educational museum kits were produce to train children and parents on the earthquake and volcanic risk, and to support them in case of an emergency. The E-pres project was recently finalized producing an innovative application to test and evaluate evacuation drills in schools, museum and other visiting places. Under EVANDE a web platform for distant learning of adults, has been developed that provides courses for earthquakes, floods and wild fires, as well as many printed and web educational objects.

All these outcomes could be further exploited by geoparks' managing organizations under certain initiatives that can be organized either through the Geohazards working groups or under small thematic groups.

DISASTER RISK REDUCTION AT EUROPEAN GLOBAL GEOPARKS, WAYS FORWARD

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Keywords: natural hazards, disaster risk reduction

Disaster risk reduction (DRR) is a challenge that concerns and mobilizes UNESCO Global Geoparks (UGGps) in their overall context of promoting sustainable development and their specific aim of serving the needs of future generations for a safer and prosperous planet.

UGGps are located in geographical settings which may be partly or entirely exposed to natural hazards. In 2015, a thematic DRR survey was addressed to UGGps site managers. Launched by UNESCO, it aimed to provide an overview of natural hazard distribution at UGGps. According to the responses, 82% of UGGps potentially exposed to at least one type of natural hazard that may turn into a disaster and threaten a site's integrity.

In recent years, natural hazards have already caused extensive damage to UGGps. Katla UGGp in Iceland has experienced significant volcanic eruptions, damaging infrastructure and natural environment. Different types of landslides frequently occur on the slopes surrounding such as the Haute Provence Geopark, damaging access roads and tourist paths. Many sites face a high flooding risk, as revealed by heavy floods in the past decade in Italy (Apuan Alps) and Slovenia (Idrija) and many other regions.

Potential damage to UGGps can also put the livelihoods of communities living in their proximity at risk, as they are often an important source of employment, income and environmental goods and services. Furthermore, their loss or deterioration could negatively impact local, national and international communities because of their historical and symbolic importance.

At the same time, these iconic sites have tremendous potential to serve as useful platforms to share knowledge on DRR. They play an active role in telling the story of past and present natural processes and the way they affect people. Many UGGps have community and school programmes to raise awareness about the source of natural hazards, associated risks and ways to reduce their impact.

In light of the above, during the 39 European Geoparks Meeting held in Burren and Cliffs of Mother Geopark in March 2017, European UGGps have formed a working group on Geo-hazards. The group aims to raise awareness of geoparks' inhabitants and citizens on natural hazards and potential risks, to protect European UGGps infrastructures and their communities and to contribute to safeguarding the global environment and human societies from the threats posed by natural hazards and climate change.

The working group will assist European UGGps in strengthening livelihood capacities in DRR, in developing synergies and common activities and to exploit existing knowhow and best practices. Its core members will encourage the identification of risks, protection from different hazards, transfer knowledge and capacities, training staff and visitors, as well as fostering climate change resilience, and the preservation of UGGps and their communities. The WG group is going to act under the World Geoparks Network WG on Geohazards mitigation, implementing its working plan in Europe but also will undertake further activities and initiatives in which all European UGGps will be asked and will be welcome to participate and develop together.

*THE CHANGING LANDSCAPE OF GEOHAZARD COMMUNICATIONS
AND PUBLIC PARTICIPATION*

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Keywords: Geohazard, public participation

This is the age of the audience. As society and culture embrace ever more free flowing dialogue, supported by new technologies and platforms, we have entered a new era of co-created, democratised communication. Top-down approaches are suffering mass decline as communicators evolve to flow through the fluid cultural context of the audience.

Dialogue builds knowledge which in turn empowers people to take positive actions. When people expand their understanding, they are empowered to make balanced, well informed decisions that can transform their own lives that their communities.

Internet and other online communication technologies are creating new potential for rapid and massive public involvement by both active and passive means. The power of social media, the ability to engage people around the world at relatively low cost, the importance of developing sustainable education programmes and the high value of investing in educating women and children must be recognised. Social media and citizens interactions play an important role on the perceptions and effects of geohazards on a regional or even larger scale.

Citizen science also described as "public participation in scientific research" is a strong tool to engage, inform and educate the public. By recognizing citizens as participants and not just as a research subject, dialogue will be reinforced and the public will actively expand their understanding of Earth systems and geohazards. If we are to see an increase in 'global geoscience literacy' – the ability of the general public to understand and use geoscience information – we need equip ourselves with the communication and engagement tools of the moment to educate effectively. But some rules in communication never change: the importance of (i) knowing your audience, not just in a superficial way, and (ii) recognising that it can take time to establish and build strong communication relationships, came across clearly.

Knowledge is power. Engaged citizens are informed citizens and consequently prepared citizens.

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THEME "GEO PARKS AND SUSTAINABLE TOURISM"

ORAL



A NEW TOURISM PRODUCT FOR CRETE BASED ON UNESCO SITES' SYNERGIES; CRETE, GREECE

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Keywords: UNESCO sites, tourism product, synergies

Crete is one of the most touristic places in Greece holding for decades one of the top positions in tourist demand annually. It is an island that combines long lasting history, a magnificent natural environment, a marvelous climate all over the year and a famous culture and tradition. Every season population increases by 8 times due to the concentration of tourism around the summer months. The industry was built upon the model of "pleasure peripheries" combining sun, sea and sand. The tourism activity was thus concentrated along the coastal areas, and the tourist resources were mainly from the northern European countries and the USA. Following the trends of modern tourism industry, it has been turned over to a massive and all-inclusive destination, which minimizes the income and the benefits for the local communities. Moreover, this tourism expansion in the coastal area unbalanced the development opportunities of the whole island leading gradually to the economical abandonment of the inland rural areas, urbanization of coastal zone and internal migration. The advantage though of this situation is the excellent preservation of natural and cultural environment of the inland, which now can be regarded as a precious gem. A treasure that sustainable development can be based on and act as the driving force for the rehabilitation of rural areas and balanced economic development for the whole island.

Despite its unique and diachronous archaeological and historical heritage, Crete lacks in UNESCO designations. For many years, only the Samaria MAB in western Crete was included in a UNESCO program. Since the initiation of IGGP in 2015, Crete hosts two more UNESCO sites, those of Psiloritis and Sitia UGGs. The three UNESCO sites are allocated in mountainous rural areas and are distributed all over its extent, from the western and central to the eastern part. The Region of Crete, in collaboration with the managing structures of the three sites and the Natural History Museum of Crete, is developing a new tourism product, titled the "UNESCO sites of Crete", which is going to be supported through an Intergraded Spatial Investment plan. The aim of this initiative is to establish a new touristic product that will be based on the marvelous Cretan nature and culture, will be spread all over the year and support local sustainable development activities. The project will focus in raising awareness on the UNESCO sites' value, presenting the opportunities and increasing ownership of local population; in developing and branding of a new touristic product; in marketing and promoting the product; in supporting new entrepreneurship in the topic, and in creating a coordinating structure. The Region of Crete and the three UNESCO sites foresee a great opportunity to develop synergies and common activities that will strengthen the three sites, increase their visibility and promotion, support eco-, geo- and green tourism and enhance sustainable development all over the island.

*PAIVA WALKWAYS: AN EXAMPLE OF SUSTAINABLE MANAGEMENT IN AROUCA
UNESCO GLOBAL GEOPARK (PORTUGAL)*

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Keywords: Paiva walkways, Arouca geopark, sustainable management

The Paiva Walkways are an important educational and tourism attraction located in the northeastern area of the Arouca UNESCO Global Geopark, which opened to public since June 2015. It is a key-infrastructure with real socio-economic impact from local to international level, consisting of an impressive wooden pathway, carved on the rocks, along 8 km on the left bank of Paiva River, allowing the contact and the knowledge of a previously inaccessible area. The biggest focus of visitors' attention in the walkways is its spectacular engineering and architecture building. Additionally the major attraction is the contact with the Paiva River, a national and international reference for the white water sports, such as rafting, kayaking and canoeing. A journey through the Paiva Walkways allows the observation of several white water rapids which have interpretative panels about their geological explanations/origin. The harder water rapid is recognized as geosite of Arouca UNESCO Global Geopark and belongs to the "Route of the Geosites". At the same time, visitors can contact with several important wildlife species of fauna and flora, some of them presented over nine interpretative panels along the walkways – the "biospots". The Municipality of Arouca is the responsible authority for the sustainable management of Paiva walkways attraction in the context of the Arouca Geopark. The success of the management of this attraction is based on effective partnership between the Municipality of Arouca and many public and private organizations, providing quality on the visitors' experience. Carrying these players into a team requires a strong leadership and a skilled workforce in the "frontline" and in the "back-stage".

"Passadicosdopaiva.pt" is an online platform system with a strong marketing image, which provides information on the walkways and also works as a booking system for entrance tickets and also for requesting educational/guided visits. This online management platform allows to control the number of visitors and to manage the carrying capacity of this infrastructure with consequent effect on the sustainability of natural resources. On the field, the Municipality of Arouca provides rangers at the main entrances of the Paiva Walkways who welcome visitors, check tickets entrance and take care of the pathways. A private taxi service is also available for transportation of visitors between both entrances. Training courses providing special skills were implemented by the Arouca Geopark staff, addressed to rangers and taxi drivers. These courses allowed the establishment of a higher standard of qualification, which is crucial to ensure consistency in services quality. Related to the walkways, the Municipality of Arouca and Arouca Geopark Association established several partnerships to promote also some events to diversify the offer (e.g. trail running, birdwatching or the "Route of the Geosites"). The Paiva Walkways won the World Travel Awards 2016 in the "Europe's leading tourism development project" category. This year the Paiva Walkways won the "Geoconservation Award 2017" and are nominated again for the World Travel Awards in the "Europe's leading tourism development project" and "Europe's Tourism Attraction" categories.

*ARARIPE UNESCO GLOBAL GEOPARK: MATRIX OF PRIORITIES OF THE VISITATION
IMPACT MANAGEMENT PLAN WITH A FOCUS ON GEOTOURISM AND THE
GEOCONSERVATION OF LAND RESOURCES.*

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Keywords: visitation impact management plan, geotourism, geoconservation, sustainable development

The Araripe UNESCO Global Geopark has the challenge of becoming the most important tourist equipment in the region of Cariri Cearense, essentially for its territorial transversality and its mission to foster sustainable regional development. With this purpose, this study, based on an integrative review of methodologies for the management of green areas, aims to adapt and apply the itinerary proposed by the Chico Mendes Institute of Bioconservation, thus configuring a Visitation Impact Management Plan with a focus on Geotourism and GeoPark Araripe Territorial Resource Geoconservation.

The implementation of the proposed plan was operationalized in five phases divided into two distinct stages: the first one to define the Matrix of Indicators and Management Priorities; And the second one of management, to define the Matrix of Monitoring and Evaluation of Results. In this study, we present the results of the diagnostic phase, which, according to the Priorities Matrix, demonstrate the need for a more active management process regarding the quality of the visitation experience, given the low demand of visitors in four geosites: Parque dos Pterossauros, Cachoeira de Missão Velha, Pedra Cariri and Floresta Petrificada; regarding the environmental impacts evidenced, it is recommended to prioritize in the management plan to the Riacho do Meio and Ponte de Pedra geosites; finally, the Colina do Horto, Pontal de Santa Cruz and Batateiras geosites present the best results in relation to quality of visitation and demand for impacts evidenced by the access conditions and good infrastructure presented, but they require attention regarding the management of the limited options of visiting activities. We conclude that the proposed instrument is adequate for the decision making of the management team and stakeholders, optimizing the decision-making process based on the indicators as guides for the management of geosites based on the quality of the visitor's experience and the protection of the natural and cultural resources available in the territory.

*ANALYSIS OF GEOSITES WITH TOURISTIC USE OF THE AZORES UNESCO GLOBAL
GEOPARK: A CONTRIBUTION TO ENHANCE SUSTAINABLE TOURISM POLICIES*

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Keywords: geosites analysis, Azores UNESCO Global Geopark, sustainable tourism policies

The tourism and environmental policies of the Azores Autonomous Region and the Azores UNESCO Global Geopark are based on the promotion of nature tourism and its environmental sustainability, where the valuation of volcanic landscapes, geodiversity and geotourism play a major role.

The touristic experiences in direct contact with nature are at the top of the Azorean tourism attractions, whose pressure on the spaces of visitation has deserved highlights and a more significant attention from users, decision makers and the general public.

In Azores archipelago 121 geosites are currently identified, 93 of them with touristic use. An analysis of the state of the art of these sites of geological interest with geotouristic use was done, including its inventory and characterization, the monitoring carried out and an evaluation of the existing infrastructures, visitation conditions, tools and devices of interpretation, existing support material and activities developed at the different geosites. The importance of this analysis is justified by the commitment to a nature tourism of excellence, genuine and based on experiences, and also the concerns with growing touristic demand that has taken place. In fact, there has been in several periods a high concentration of tourists in the most emblematic geosites, with some impacts of this touristic pressure beginning to occur.

The analysis done shows that most of the sites are well equipped with visitor support infrastructures - namely belvederes (66%), interpretation centers (16%), parking areas (95%) and sanitary infrastructures (39%) – several geosites offer outdoor activities (84%), many have on-site tools for interpretation of their geological characteristics (49%), and geological information is provided for almost all geosites (85%), namely as interpretative leaflets.

This analysis is the first step of the TURGEO project - "Definition of carrying capacity for touristic use of geosites: a tool for the sustainability and tourism valuing of the natural resources of the Azores", which aims to establish a methodology to define the carrying capacity for geosites of the Azores and their application to sites with high touristic pressure. Based on scientific criteria and attentive to the specifics of the different sites and the accomplishment of an empirical analysis with the local stakeholders, the project also aims to improve the process of decision making in the management of geosites.

*"THE FIFTH LAKE": AWARDED SUSTAINABLE PRACTICES IN THE ASPIRING GEOPARK
CONCA DE TREMP – MONTSEC (LLEIDA, SPAIN)*

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Keywords: tourism, sustainable, geopark, heritage

The Fifth Lake is a sustainable touristic product that consists of a five-day circular hike through a truly singular part of the aspiring Geopark Conca de Tremp – Montsec, from Eocene to Ordovician. It is a self-guided route that demands no great technical skills. It allows you to immerse in outstanding landscapes which are the result of millions of years of formation and to meet people through who transfer the essence and authenticity of a cultural territory.

The project was born in 2012 joining the efforts of the local people who wanted to offer a quality, specialized and non-seasonal touristic product which reflects the human side of tourism. The Association "Marques de Pastor" (Shepherd Marks), stakeholder of the aspiring Geopark, is in charge of the management of the Fifth Lake, formed by rural tourism accommodations of the area and a travel agency (Pirineu Emocio) which sells the product.

The circuit integrates natural and cultural heritages. It takes you to numerous viewpoints, full of geological history and singular geodiversity, where the Fifth Lake, Montcortés, is highlighted as a unique karstic lake at 1065 m. People can do birdwatching, discover both abandoned villages and villages that still full of life, and enjoy the stories and legends that talk about geomorphology and how people survive in the heart of these mountains.

To meet the goals of a responsible and sustainable tourism, the Fifth Lake follows three main criteria. First, the environmental criteria contribute to the conservation of trails and landscapes, which includes the commitment of local, national and abroad volunteers to restore the dry-stone walls. It also avoids tourists damaging or taking plants, animals or geological items and waste during the trail. Moreover, it promotes the usage of public transport, The Train of the Lakes, contributing to offset the carbon footprint of visitors. Second, it meets economic criteria reinvesting part of the price of the touristic product in the area and fostering local products. Finally, social criteria because it is a bottom-up project that uses and put in value the popular knowledge and facilitates cultural interchanges between visitors and locals. 2015 was the year of the consolidation of the Fifth Lake reaching over 150 bookings, it meant 1000 overnight stays out of season and a turnover of € 100,000. Thanks to these results, this touristic product has become a marketable, viable and sustainable. Moreover, due to its internationalization, this experience is a non-seasonal tourism, boosting local economies such as food processing and handicraft sectors. Consequently, it improves the self-esteem by local territory.

The Fifth Lake has been awarded as recognition of its innovative management and the sustainable practices: Fitur 2017 the "Best Active Tourism" for "National Nature in Spain"; in 2015, the "Singular initiatives for Protecting and Improving the Environment" by the Catalan Government and in 2013 the first Sustainable Tourism Prize in Catalonia.

Consequently, this project has played a key role in our territory as an example of good practices and it could be exported and reproduced to other Geopark's areas.

SUSTAINABLE TOURISM BEST BE DEVELOPED IN QESHM ISLAND GEOPARK

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Keywords: geopark, sustainable tourism, qeshm island, sustainable development

Qeshm island is famous for its wide range of ecotourist attractions such as Hara Biosphere Reserve, the largest stretch of mangrove forest along the Persian Gulf shoreline, which lies between island and the mainland. According to environmentalists, about 1.5% of the world birds and 25% of Iran's native birds annually migrate to this hub of biodiversity and the first Geopark in Iran.

Travel and tourism industry creates jobs much easier and faster than any other sector, which is crucial for developing of the island with high unemployment.

Nowadays tourism is going to be the largest industry in Qeshm. The growth of tourism in the island structuring developments and economic progress which somehow it can be in a complex interaction with the environment. How to make tourism in Qeshm island more sustainable and put it at the service of sustainable development, is the research question and under discussion.

Sustainable tourism can eventually lead to sustainable development throughout the territory, while carrying out conservation, protection of culture, social and economic development.

In order to have much less damage to the environment, all educational programs and information on environmental protection, based on natural ecological and geological attractiveness of the island and sustainability for the natural and cultural protection was held in priority for the development.

The aim was to promote any form of tourism, which may contribute to the preservation of positive synergies between tourism, biodiversity and local people.

To achieve this, we followed below mentioned steps in Qeshm island UNESCO Global Geopark, with the considering that, tourism will never be completely sustainable as every industry has impacts, but it can work towards becoming more sustainable.

1. Know positive and negative impacts of tourism;
2. Manage tourism throughout monitoring and planning;
3. Communicate between the public sector, the private sector and the local community;
4. Implementation of training programs;
5. Considering the carrying capacity.

From our experiences and activities mentioned in the essay we conclude that sustainable development is the best strategy for tourism in Qeshm island and it can be done through education of the local community to encourage their attitudes towards sustainable tourism development.

*AN EXAMPLE FOR GEOSITES TO BE BENEFITTED FOR GEOTOURISM: VARTO (MUŞ), TURKEY*Iskender Dolek¹, Fuat Saroglu²¹Mus Alparslan University, Rektörlük, Diyarbakır Yolu 7. km 49250- MUŞ, 49250, Turkey.

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Muş is one of the least developed cities of Turkey in terms of socio-economic conditions. Although agriculture and stockbreeding come to forefront as economic activities, tourism incomes are below Turkey average in this city. Tourism comes into prominence as much as industry for the development of countries in the 21st century. For this reason, countries seek alternative tourism activities apart from classic tourism perception including sun, sea and sand mottos. There are a number of geosites having scientific and educational value in Turkey. Among these geosites, there are also ones which need to be protected against destruction and passed down to next generations.

Varto district located in the northwest of Muş province has geologic and geomorphologic characteristics that can be used for the purpose of geotourism which is an alternative tourism type to classic tourism perception including sea, sand and snow.

There are significant geosites that should be passed down to future generations by means of protecting scientific and educational aspects of them in Varto district and its neighborhood. In addition to scientific and educational natural beauty, some of these geosites have important folk tales.

This study introduces North Anatolian Fault (NAF) which is one of the structures to control Karlıova triple junction, which is rarely found in the world, and secondary structures affiliated with NAF. Morphologic figures developed by fault control have characteristics unique to the region. Geologic heritage units of this basin which is internationally introduced as Karlıova basin (Trideljansın) are worth to be advertised. This presentation introduces Caldera of Bingöl Volcano, Kunav Cave, Hamurpet Lakes and layers encompassing high density of fossils as geosites. One of the peak points of Bingöl volcano, Kohkale Hill is one of the rare places to observe interesting light plays occurring during the sunset particularly in July and August. It is believed that protecting these zones through modern methods and offering these places to tourism will bring activity to the district. When Bingöl Mountain and its neighborhood are turned into geopark, this place is going to be protected better and internationally known for tourism.

GEOSITES LOCATED IN GEOPARKS: METHODOLOGIES TO AVOID PUBLIC USE IMPACTS

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Keywords: public use, tourism, impacts

High quality resource management requires use of a systematic and comprehensive system of measurements that will gather information on visitors' opinions about existing recreation services and an understanding of the effects of use levels and patterns on the quality of the recreation experience. In addition, an analysis system is needed that will help to resolve high intensity recreation use issues on geosites that receive public use. Of particular concern to managers is the need to obtain the best possible data to make decisions. Numerous frameworks have been created to assist public use experts manage use, most falling under the umbrella of social carrying capacity. These include Limits of Acceptable Changes (LAC), Visitor Experience and Resource Protection (VERP), Visitor Impact Management (VIM), and others. In 2016, several US federal land agencies (including NPS, USFS, USFWS) developed a new interagency framework, called Visitor Use Management (VUM) framework.

Although many resource managers use the above referenced frameworks, it is our suggestion that the newest proven method of visitor use framework should be tested and considered for resolving conflicts among visitors engaged in recreation during peak use periods at high use geosites. As a result of high use in many Geoparks, recreationists will need accurate information about the geosites they can visit, and the activities they can participate in that will help them achieve their experience goals and reduce conflicts with other visitors. In addition, geopark managers need better data to help resolve site selection and other issues for infrastructure (e.g., developed day use areas, dispersed recreation areas) and to establish a solid basis for policy and regulatory decisions about visitor use on the geopark settings.

Accordingly, the purpose of this abstract is to discuss the need to conduct research on the recreational carrying capacity across geosites at Geoparks. The study will provide management guidance for issues related to allowable recreational uses, numbers and types of facilities that may be considered in the future, and level of development/service to be provided at existing and future facilities. Particular emphasis will be placed on issues and techniques appropriate to unit-based recreation use and management. This social science effort provides the scientific underpinnings upon which future decisions can be made, and will be invaluable in demonstrating to Geopark managers residents why specific decisions are made. By engaging the public in the gateway communities in and around geoparks, we can improve the level of satisfaction, and also the conservation of the geosites.

GEOTOURISM - REFLECTING TOOLS FOR A SUSTAINABLE DEVELOPMENT

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Keywords: geotourism, science popularisation, SDGs and heritage education, World heritage education

When a "Concept for Geotourism" was first introduced in 1997 in a poster session hosted by the German Geological Society in Berlin, nobody could have foreseen that this field of activity would still exist 20 years later. No one could have predicted that today geotourism is an important element in the socio-economic development of global geoparks all over the world. Even now, only a few scientists have focussed their attention on the topic of geotourism. Why? This is a complex topic and field of work, linking "geo" and "tourism" and as such, embraces many different elements and/or disciplines. One of the main difficulties arises from the fact that geotourism is based on the geological heritage of an area or a site, such as Messel Pit and that the sum of all associated scientific documents and procedures are valorised by tourism in the broadest sense.

This contribution provides an overview of the disciplines and tools associated with geotourism and the effects of a successful implementation of geotourism. An extended definition of geotourism was published in 2002 by FREY, SCHAEFER & BUECHEL. The four fundamental areas in geotourism are the associated geosciences and other sciences, economy, knowledge by interests of the general public or guests, and the media as well as education.

Over 25 years have passed since the first geotouristic activities were introduced in the Geopark Gerolstein/Vulkaneifel, which still exist today. The extended above mentioned definition of geotourism is now 15 years old. The present author and the aforementioned authors see geotourism as a branch of applied geo-science which contributes towards: i) a general understanding of geo-scientific topics by education; ii) promoting a sustained and future-oriented development of the geo-image; iii) developing and utilizing modern and useful media as well as communication tools; iv) communication network with a functioning further training and knowledge distribution structure for succeeding generations; v) the protection of scientifically important geological heritage sites.

The decision made by UNESCO on November 17, 2015 to introduce the certification "UNESCO Global Geoparks", also confirms the significance of the aforementioned branch. The growing numbers of members of the Global Geopark Network has spurred numerous activities and a huge cooperation within this segment. All work carried out by the members is rooted in the fundamental principles of their own geological heritage site or territory, which so becomes the foundation for sustainable development. The members actively promote this in projects and measures.

The development and implementation of the aforementioned areas of geotourism is illustrated for a selection of different Global Geoparks and one world heritage site: Vulkaneifel UGG (Germany), Naturtejo UGG (Portugal), Bergstrasse-Odenwald UGG (Germany) and the UNESCO World Heritage Site Messel Pit (Germany). Available data will be used to identify examples of target groups that have been successfully attracted. Marketing measures and regional activities will be explained. Some of the specifically developed further training courses and tourist products are also part of it. In addition to this, the author addresses the exchange between tourist destinations, the type of guided tours, the interaction with scientific disciplines and institutes as well as additional measures designed to revitalize the geo-identity of an area. The aim is to stimulate and develop the importance attached to these sites in internal communication, for political decision makers and the pride within the population for an "area" or "site" or the geopark territory, as a base for a future-oriented sustainable development.

It is important to consider the long-term development of the different fields and topics, especially those that seem difficult to develop and deal with. The aim is to identify new measures and possibilities, which lead to an improved geotouristic development. This must also involve attracting scientists who are willing to take the somewhat different approach of geotourism seriously and embrace it as a scientific discipline.

In this context, the Global Geoparks Network (GGN) takes on a pivotal role and has an important task. The function of the regional networks is demonstrated by the activities of the European Geopark Network and the Asian-Pacific Global Geopark Network, the two current active networks within the GGN.

HOW TO MANAGE RECREATION ACTIVITIES AND PRESERVE GEOHERITAGE IN GEOPARKS - EXAMPLE OF DANUBE GEOTOUR PROJECT

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Keywords: geoheritage, recreation activities in geoparks, tourism pressure, recommendations

Geoparks nowadays face an increasingly important challenge: they have to emphasize their visibility and at the same time they have to preserve their geoheritage for the next generations. This is especially demanding due to pressure of tourism, especially outdoor recreation activities. In the last decade the number of people who use natural area for recreation is increasing along with the multiplies of the variety of outdoor recreation activities. The Institute of the Republic of Slovenia for Nature Conservation is a project partner of a project Danube GeoTour (Danube Transnational Programme). Our task in this project is to prepare an overview of recreation, sport and educational activities in eight project geoparks, to determine their impacts on geoheritage and the intensity of these impacts.

In the first part of our study we analyzed the frequency and impact strength of 42 different recreation and education activities in eight project geoparks. Impacts were evaluated based on experiences of geopark managers. Firstly we determined which of the frequently occurring recreation activities have an important impact on geological heritage. We paid special attention to activities, for which an important increase in related impacts on geoheritage in the next decade is expected. In the second step we identified activities, which are not frequent, but they already have an important impact on geoheritage. These activities demand special attention. Lastly we identified the most preferable activities: they are frequent, but they have low impact on geoheritage.

We also wanted to separate activities in relation to their potential for education and geointerpretation. This potential is important because it affects the efficiency of individual approaches toward geoheritage preservation: both frequent and rarely occurring recreation activities with huge potential for geointerpretation require different approach than those with low potential for geointerpretation.

For all selected activities we studied outdoor recreation activities -related legislation. We have focused on laws addressing recreation activities and their impacts on geoheritage. We performed detailed overview of International conventions and Slovenian national and regional legislation. This database was used as a basis for collecting information on recreation-related legislation in other partner countries. For each of these countries we identified both deficiencies and excessive restrictions of existing legislation. These findings will be included in final recommendations.

In the next phase of the project we will identify important challenges for recreation-related sustainability in geoparks. We will study experience of managers in different geoparks and best available practices from the literature to identify possible solutions. For each geopark we will prepare guidelines for long-term conservation of geoheritage and for consent among residents, tourists and naturalists. These guidelines will include recommendations for visitors, for geopark managers and for local enterprises.

*NETWORKING ACTIONS TO DEVELOP AND TO SUPPORT SUSTAINABLE TOURISM IN
THE BEIGUA UNESCO GLOBAL GEOPARK (LIGURIA REGION - NORTH WEST ITALY)*

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Keywords: sustainable tourism, networking, geotourism, geoparks

The Beigua UNESCO Global Geopark's territory offers diverse opportunities for tourism which are available all the year long and in different areas, both along the coast and in the hinterland. This wide supply has been built during the last ten years developing and connecting all the environmental and cultural values together with the geographical features and strong partnerships with local stakeholders. This was a stable relationship and networking action based on:

- the network of geological and biological sites;
- the network of historical and cultural heritage sites;
- the network of paths and trails (thematic paths, nature trails and cultural trails);
- the network of outdoor activities and recreational facilities;
- the network of Visitor Centres and Info Points;
- the network of local associations for environmental protection, agricultural development and forestry management;
- the network of regional and local public authorities in charge for tourism;
- the network of tourism operators (tourism facilities owners);
- the network of local producers.

The networking policies in Beigua UNESCO Global Geoparks received a crucial impulse in occasion of the International Year of Sustainable Tourism for Development 2017 as a stronger and stronger partnership has been achieved involving the whole territory.

Several events have been put in a unique calendar and a lot of activities have been scheduled under the umbrella of the IY2017: special offers for outdoor activities (trekking, trail running, canyoning, bouldering, mountain biking, snowshoeing) but also several educational activities for kids, dedicated geo-excursions for family, local products tastings in farms and farms tourism, local museum guided visits and extra exhibits in the Geopark Visitor Centres and Info Points.

The IY2017 in Beigua Geopark has been supported by a coordinated communications management plan using several information tools (social networks, web site, app, electronic newsletters, paper magazine) and organizing some press conferences and bulletins at a regional and national level.

Networking and working groups activities to share common projects and goals is for sure successful practices in Beigua territory; a great opportunity to connect people and all the local stakeholders but also a new challenge to promote the Beigua UNESCO Global Geopark as a tourism destination of excellence with high quality tourism offers and services based on nature, culture and local food.

SUSTAINABLE GEOTOURISM IN AUSTRALIA, THE LUCKY COUNTRY

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Keywords: outback geotourism, supervolcano, Astrobleme, interpretation

Australia is indeed a lucky country. It has a diverse and ancient landscape and wonderful rocks. Its National Anthem acknowledges that it is "girt by sea" and the rest is a large interior continental "Outback" with ragged mountain ranges and far horizons. Whilst there is a sporadically populated coastal fringe, the ancient and arid outback also sustains extensive mining and patchy pastoral industry. Tourism, mostly nature-based, also provides economic benefits and employment for its sparsely populated rural areas. Sustainability in South Australia has been assisted by a diversification of visitor experiences, and new geotourism opportunities can contribute to tourism growth.

Camping has always been an adventurous pursuit in the outback and glamping has more recently attracted visitors to destinations like South Australian Rawnsley Park, where ecolodges are open to both the landscape and the stars. The Outback is favoured as both a natural and cultural destination for its remoteness and for its spectacular geology and landscapes, with renowned sites in the Flinders Ranges where Ediacaran fossils represent part of the very beginnings of life on earth. Aboriginal cultural heritage, art and stories, includes the oldest known evidence of Aboriginals recently found in a Flinders Ranges rock shelter. Pioneering history and legends of exploration also are part of sustainable tourism.

The vast, remote, and isolated outback on the other hand often lacks modern infrastructure, is poorly covered by mobile networks and GPS, has mostly 4WD-only access, is semi-desert with sparse water resources, and isolated mining communities and pastoral properties. Geosites that appeal to tourists are rare, often undocumented, certainly unconnected and largely unknown.

Sustainable geotourism is exemplified by newly discovered geosites and a network of georoute tracks and trails which are being developed in pristine outback country by Nature Foundation SA on two large Nature Reserves. The Witchelina Nature Reserve in the Willouran Ranges of northern SA has an inventory of geosites, embedded in a rugged terrain crossed by former pastoral station tracks, now being re-purposed to attract visitors. Sensational aerial images provide an insight into spectacularly folded early Adelaidean stratigraphy, with complex thrusts and possible salt-diapirs.

The Hiltaba Nature Reserve on northern Eyre Peninsula demonstrates 10 million years of ancient volcanic activity, where Australia's largest super-volcano erupted spectacularly 1590 million years ago in the Gawler Ranges. Hiltaba is also adjacent to the site of Australia's biggest astrobleme at Lake Acraman which impacted a billion years later. Visitor segmentation studies evaluate visitor experiences, at both natural and cultural sites to determine the most meaningful and successful. There are four categories of 'desired' visitor experiences: Social Visitors, Learn Together Families; Intellectual Visitors and Sensualists. Geotourism interpretation at Witchelina and Hiltaba Reserves has focussed on meeting the 'desired' experiences of all four types of visitors. Planning for sustainable Geotourism in SA includes comprehensive field notes, brochures, annotated maps, guides and on-ground signage for geosites and georoutes, which are visitor focused. Implementation of these initiatives includes monitoring the effectiveness of the interpretation and the engagement of visitors in geotourism in Australia, the lucky country!

AN EMERGING PARADIGM FOR THE UNESCO GLOBAL GEOPARKS: THE ECOSYSTEM'S HEALTH PROVISION

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Keywords: geoparks, healthy lifestyles, health services, ecosystem services

The concept of the ecosystem's health provision and the need to take it into account multiple initiatives at the national and global level for the development and implementation of international nature conservation policies, enhances and reaffirms the importance of the UNESCO Global Geoparks as one of a kind, unified geographical areas with a "bottom-up" development strategy within a holistic approach, protecting and promoting all of its natural and cultural heritage, and used for education and science and as sustainable economic asset associated with the implementation of responsible tourism. Therefore, it is crucial to develop a conceptual framework that supports a model that accesses the spectrum of the Ecosystem's Health Provision as part of an effort to set up tools and methods, for the spatial evaluation of the ecosystem's health services at an UNESCO Global Geoparks scale.

To develop an Ecosystem's health provision spectrum (EHPS) at an ecological scale for the UNESCO Global Geoparks it is crucial to have a systematic approach for identifying and evaluating environmental settings that serve as health resources, the Health Potential Indicator (HPI), as well as the opportunity made available to take advantage of them through the different channels of human experience, the Ecosystem's Health Opportunity (EHO).

The aim of this paper is to suggest an interdisciplinary approach to be applied to UNESCO Global Geoparks, where not only relevant information is included but also proposes for a standardized survey and grading methodology that can be used to assess the ability of providing and promoting healthy lifestyles, hence the Ecosystem's health provision spectrum at an ecological scale.

Because the diversity of stimulus from the ecosystem settings depends on the structural and functional complexity of the abiotic and biotic components of the ecosystems, a prospective HPI should be developed and supported through components based on the findings from surveys and from literature that connect ecosystem settings diversity that have a specific link with human senses. We suggest that the EHO, should be developed and supported through components that go beyond the current classification of the nature trails. Those components should provide information also about the total of biomechanical and physiological load applied on the participant during the completion of course. The EHPS proposed, is in line with UNESCO's priorities, in particular with the Earth Sciences Programmes and its motto "Geosciences in the Service of Society". Moreover, the holistic approach, whose current implementation is a requirement of the management entities of the territories classified as UNESCO Global Geoparks, implies that approaches be able to address the social, environmental and economic dimensions of sustainable development, thus reaffirming the founding principles of UNESCO. Therefore, the ecosystem's health provision at an ecological scale will be for the UNESCO Global Geoparks, another important tool for an efficient management, to promote economic development, well-being and health.

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STONES AT THE TABLE

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Keywords: sustainable tourism, local community, students, geo-products

Sustainable tourism, as the name implies, is based on the continuous development of society. This development requires consideration of the present but also with the quality of life in the future, protecting vital resources, developing social cohesion and equity factors, guaranteeing sustainable economic growth.

The project "Stones at the table" is a project of the Terras de Cavaleiros Association Geopark (TCAG) - managing entity of the Terras de Cavaleiros UNESCO Global Geopark (TCUGG), in partnership with the students of the restaurant and hotel courses of the Schools of Macedo de Cavaleiros.

"Stones at the table" is a project that aims to encourage restaurants and bars, from the Terras de Cavaleiros UNESCO Global Geopark area, to (re) create dishes and drinks inspired by the rich and diversified Geological Heritage of the area.

This project follows the gastronomic festival held in the year 2015 in the European Geopark week, which encouraged the restaurants in the TCUGG area to have on their menu dishes aligned to the geology of this geopark.

One of the objectives of this project is the elaboration and adoption of strategies that will allow the involvement of the population in the conservation of the geological and cultural heritage in the TCUGG area.

The "Stones at the table" project, will be developed in 4 phases:

Phase 1 – Project presentation for all TCUGG restaurants and bars in June 2017 by TCAG and Schools of Macedo de Cavaleiros where there will be a tasting table with the already created geo-products (Sobreda garnets, mica-schist of hunting sausages, "Umbiguitos" and serpentinites liqueur). During this phase the project will be publicized through posters, flyers and invitations.

Phase 2 - Registration of restaurants and bars that want to join this project: beginning of June to end of September 2017 - During this phase a TCAG technician will go to all restaurants and bars (as it was done in Gastronomic festival in 2015) to carry out the registration and find out which dish(s) the restaurant intends to present.

Phase 3 - from September 2017 to January 2018 - students of the restaurant and hotel course will work in their school on dishes and drinks chosen by the restaurants and bars.

Phase 4 - from February 2018 to June 2018 - students will work in the restaurants and bars to present and present the dish / drink that the restaurant / bar has chosen.

We want, at the end of this project, a greater involvement with local community – restaurants and bars so that they will transmit to the visitors of the TCUGG area the geodiversity and authenticity at the table.

*SUSTAINABLE TOURISM ON THE SKI SLOPES IN THE
CHABLAIS UNESCO GLOBAL GEOPARK, FRANCE*

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Keywords: sustainable tourism, geotourism, sport, science communication

The Chablais is a wealthy, comparatively densely populated Geopark situated in Eastern France. The local economy is driven by tourism; in summer visitors flock to resorts such as Evian on the shores of Lake Geneva, and in winter, tourists come to mountain resorts such as Chatel and Morzine to ski and snowboard. Studies have shown that tourist frequentation is reasonably well balanced with 6.9 million nights recorded in winter and 4.4 million nights documented in summer.

The Chablais UNESCO Global Geopark works within this context to offer an inviting program of sustainable tourism products across the territory. The objective of the Geopark is to raise public awareness (both our local population and visitors to the territory) as to the variety and the value of local heritage.

A strategic review in 2016 identified that the majority of Geopark events are scheduled for the summer tourist season. In response the Chablais UGG sought to develop a memorable winter event in collaboration with one of our partners, the Portes du Soleil. This Franco-Swiss association, the Portes du Soleil brings together 12 villages in two countries and offers holiday makers more than 650km of ski slopes to explore. With contrasting views south towards Mont Blanc, and to the north across Lake Geneva, this world class winter sport domain registered 3.9 million ski-days on the French slopes alone in 2015/6.

Working in partnership, the objectives of the event were identified: to raise awareness of the new UNESCO Global Geopark label, as well as the treasures of the Chablais. The chosen event needed to encourage participants to open their eyes and appreciate the landscape and its resources in another way. However, the event faced one significant constraint. The public was a sports audience, they come to experience speed and sensation, and were not seeking a cultural product that required time and investment.

To best address these objectives, an orienteering treasure hunt was developed, encouraging participants to cross the landscape on skis and to "collect" curiosities and anecdotes along their route. A total of twelve beacons were developed each with a game card to stamp and a "True or False", or a "Did you know?" panel. The final beacon featured tasting of traditional cheese and a heritage quiz, the successful participants were awarded Geopark Chablais goodies and Portes du Soleil ski passes.

The event took place over two days in January 2017 and created strong press interest. It was deemed a huge success by the Portes du Soleil and the Geopark and another edition will be prepared for 2017/18. The detail of the event, its organization, examples of the supports used, as well as the overall of the results will be presented during our paper.

SUSTAINABLE TOURISM AS STRATEGY OF RIBEIRA GRANDE IN THE MUNICIPAL MANAGEMENT OF A GEOSITE: CALDEIRA VELHA, AZORES UNESCO GLOBAL GEOPARK

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Keywords: geoconservation, municipal management, geotourism, environmental education and awareness

Caldeira Velha is identified as a priority geosite of the Azores UNESCO Global Geopark and a protected area classified as Natural Monument. Located on the north flank of Fogo Volcano, this area of secondary volcanism became the most visited geosite of Ribeira Grande municipality and one of the most touristic places on São Miguel island. These distinctions reveal the importance of preserving the natural heritage of Caldeira Velha with scientific, educational, scenic and touristic relevance.

This place was traditionally used for thermal baths and the fumarole was used for the traditional cooking of wickers, to facilitate the extraction of the bark, later used in the confection of basketry.

Since 2013, Caldeira Velha is under the management of Ribeira Grande City Council through collaborations with the Azores UNESCO Global Geopark and the São Miguel Natural Park.

Several valuing strategies have been made by the present management in Caldeira Velha, such as the creation of the Environmental Interpretation Centre; the improvement of a path way and the construction of facilities; the management of the touristic visitation; the establishment and dynamization of an educational and environmental awareness program; the establishment of the "Hot Spring Walking Trail" with guided tours; the control actions of exotic and invasive flora that are gradually replaced by native species to support the slopes; and the maintenance and cleaning of Caldeira Velha.

Currently, a team of 17 professionals (trained in natural heritage, tourism, and communication) ensures the maintenance of the space and the public visitation of the geosite, being the Environmental Interpretation Centre one of the most visited in the Azores.

To date, more than 70 activities were developed with schools, associations, the local population and tourists in the field of preservation of natural heritage, tourism and environmental sustainability and culture. The Environmental Interpretation Centre of Caldeira Velha has become a reference in environmental education for all those who participate in the initiatives promoted by Ribeira Grande City Council. Occasionally cultural activities are held at Caldeira Velha (*i.e.* craft expositions, music and relaxation sessions).

Support is also given to environmental and volcanic monitoring carried out by various official entities.

Recently, the increase of tourism has brought some concerns in the management of this important geosite, namely the management of the different areas and activities. To contribute to the management of Caldeira Velha it has been calculated the public carrying capacity and defined a system to organize the tourism agencies schedules.

Ribeira Grande City Council recognizes the importance of the geological heritage for science, education, geotourism and local development. The management of special geological occurrences is the example to ensure not only Caldeira Velha but also the nine identified geosites of Azores UNESCO Global Geopark in the municipality, as well the places of municipal interest identified (for instance the "Pico Queimado", the eruptive centre of the 1563 eruption) to protect and promote our geoheritage.

USING FFOREST FAWR UNESCO GLOBAL GEOPARK'S GEOLOGICAL, INDUSTRIAL AND CULTURAL HERITAGE AS RESOURCES FOR GEOTOURISM

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Keywords: geotourism, industrial heritage, mineral exploitation, geotrails

Fforest Fawr UNESCO Global Geopark, the first geopark in Wales, became a member of the European and Global Geoparks Networks in 2005 and a UNESCO Global Geopark in 2015. It is located in the western area of the Brecon Beacons National Park, and fulfils one of the aims of the geopark concept by developing geotourism as a driver for sustainable economic development. The geopark's approximately 480 million years of geological history forms the basis for the area's industrial, as well as its cultural and social heritage, and together they provide a rich resource for geotourism and educational activities. The Industrial Revolution started in Britain sometime between 1780 and 1800. Although iron smelting in South Wales started as early as the beginning of the 17th century, metal production increased from 1750 with the development of the lower Swansea Valley as a global centre for copper production and the establishment of iron works along what is now the southern boundary of the geopark. With the growth of the Industrial Revolution the geological resources of the Fforest Fawr Geopark area were systematically exploited for over 200 years. Mining, quarrying and brick making contributed to wealth creation and South Wales became a major player in the new industrial age which changed the world. The area's economy was enhanced by mineral exploitation and the growth of agriculture to feed the rising population in the coalfield and industrial centres of South Wales. Mines and quarries along the southern margin of the geopark exploited mineral resources required by the expanding metal industries. Coal, the mainstay of metal production, was mined in the southern area of the geopark. Limestone quarrying and lime burning provided lime for use in agriculture and as a flux in the metal industry. Silica sand used in the manufacture of refractory bricks, which were exported worldwide, was derived from sand deposits and crushed sandstone rich in quartz. Rottenstone, a fine siliceous powder, derived from the weathering of the topmost unit of limestone of Carboniferous age was used for polishing copper and tinfoil. Transporting the raw materials to the furnaces in the industrial centres resulted in the development one of the earliest examples of an integrated transport system. Innovative developments in an iron works on the southern margin of the geopark contributed to establishing the American anthracite and steel industries. The red "flag", the iconic symbol of the workers, was first raised by rioting ironworkers and coal miners in 1831 in Merthyr, a gateway town on the geopark's south eastern margin. Owing to several decades of economic decline the quarries, mines brickworks and elements of the transport system were abandoned. However, disused tramroads now provide access to the weathered and overgrown relicts of this former hive of industrial activities within steeply wooded valleys and upland areas. Geotrails developed by the Fforest Fawr UNESCO Global Geopark, which are significant components of its geotourism provision, provide information and guide visitors to these sites within the Geopark's beautiful and diverse dramatic landscapes.

ROKUA GEOPARK DEVELOPING THE ECONOMY OF ITS REGION

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Keywords: tourism, Finland, geofood

Rokua Geopark has been given an active role in developing the local economy of its region. After its founding in 2010 the Geopark has gathered a group of approximately fifty local companies to promote and develop the services and products of the area under the Geopark visibility. The companies ranging from tourism activity companies and hotels to local hardware stores and newspapers have applied to join the group and by doing so they have agreed to follow and respect the Rokua Geopark rules of cooperation.

The joint activities are diverse ranging from meetings and product development to joint marketing. In the monthly open meetings chaired by the Geopark Management Team, the companies gather to learn from each other and to hear the latest developments in the region. In 2015 Rokua Geopark joined the VisitOulu marketing company with a full membership granting the Geopark and its businesses visibility in the marketing cooperation of Oulu region.

The marketing of Oulu region is directed to tourism companies and tourists coming from abroad and also to Finnish tourists from south of Finland. Oulu region extends across Finland from the Gulf of Bothnia coast to the Russian border. The region has an area of 44,000 km² and is the second biggest region in Finland with a population of approximately 400,000 inhabitants.

Rokua Geopark has three action groups: Education and Culture, Environmental and Tourism. These groups are composed of local officials, teachers and business owners. Each of the three groups has its own areas of responsibility. The companies form an action group guiding the business development activities and tourism promotion activities of the Geopark. Thus the companies are able to have input into how the Geopark is developed and what kind of activities it needs to do. At present Rokua Geopark is the lead partner in a European Union project; Attractive Oulu Region 2018 ERDF in which under the guidance of the Geopark the companies develop and market their tourism products in cooperation with tourism market professionals from Central Europe, China and Japan.

Interesting new product developments at present are the Camp School products for Asian school children and new activity products like the under ice diving experience in which divers are taken to dive into the ice age shaped kettle hole lakes in freezing winter conditions. Other new developments are the food products the companies are developing under the Geofood brand. In Geofood products the geological story behind the locally grown and produced food is given a strong emphasis.

As a result of the developing work the Geopark is seeing a growth in the amount of tourists coming to the area. Especially the amount of international tourists has been growing during the past years. Furthermore the public awareness in the Oulu region of the Geopark and its activities has grown significantly.

LESVOS ISLAND UNESCO GLOBAL GEOPARK: RAISING VISIBILITY AND PROMOTION

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Keywords: visibility, promotion, signage, Lesvos

The Natural History Museum of the Lesvos Petrified Forest, which is the managing body of the Lesvos Island UNESCO Global Geopark has undertaken several initiatives for its promotion and visibility as part of its holistic strategic plan for the sensitization and awareness raising of local people and visitors on the importance of the geosites and the Geopark. The purpose of this project was the creation of scientifically sound digital content related to the Geopark of Lesvos and the geosites, as well as the creation of appropriate promotional infrastructure and material offering also equal opportunities for access to local people and tourists via the digital content that was created. The promotion and visibility of Lesvos UNESCO Global Geopark and its geosites and other sites of interest is particularly important as it attracts a new group of tourists, protect the geological heritage and at the same time promotes the activities related with geotourism in the countryside of Lesvos, by developing new and upgrading the existing tourist product.

The activities included:

- Signage of Lesvos UNESCO Global Geopark through information and interpretation panels
- Digital Promotion of sites in Lesvos Geopark – Documentation and Digitization
- Website with interactive applications
- Publication of Geopark books, Geopark field guides, Geopark maps and Geopark leaflets and brochures
- Geopark promotional events and presentations
- Promotional activities through national and local media

The placement of information and interpretation panels which cover the entire area of the Lesvos UNESCO Global Geopark aim through their informative and educational character to acquaint the local population and the visitors with the particular geological phenomena that have taken place in the past in Lesvos and also to offer the knowledge to the general public to understand the importance of conserving and preserving the geological heritage for future generations. Furthermore they are informing about the common identity of the entire island and its recognition as UNESCO Global Geopark.

Lesvos UNESCO Global Geopark logos and maps placed on the entrance gates of the Lesvos Geopark (airport, port) but also in the main town squares and roads the visitors are being informed of the designation and the uniqueness of the territory.

The development of a new website containing a series of web based applications which, apart from their main role which is the preservation, documentation, digitization and web based promotion of the Geopark and the geological monuments of Lesvos, allow the user to discover the geological heritage sites, areas of ecological value and cultural sites to contribute with his/her own experience and knowledge and to generally interact with the applications and with other users. Local people and visitors of Lesvos island, as well as any interested person, have at their disposal a wealth of information on Lesvos UNESCO Global Geopark and the set of geosites and other sites of interest that constitute it.

EUROPEAN GEOPARKS

14TH/CONFERENCE

7TH - 9TH SEPTEMBER 2017
PONTA DELGADA, AZORES, PT

"GEOPARKS: PATHWAYS OF SUSTAINABLE
TOURISM FOR DEVELOPMENT"

THEME "GEOPARKS AND SUSTAINABLE TOURISM"

POSTER



*THE UNESCO GLOBAL GEOPARK LABEL: A WORLDWIDE LABEL FOR A DIFFERENTIATED
VALORIZATION OF LOCAL RESOURCES?*

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Keywords: development, local resources, label, UNESCO

This proposition of communication, born from a research-action work started in 2014 and of an active and followed demarche-project since 2012, proposes a point of view on territorial dimensions through patrimonial differentiation, within the frame of an application to the "UNESCO Global Geoparks" label.

Beyond the sole territory of the Pays Beaujolais, central terrain of the study, the Geopark label questions the territorial reach-out of patrimonial labels in the revelation of territorialized resource. Our research is complementary with the works of the UMR PACTE and its department, departing from a peculiar place, that of territorial projects, for which the question is to know how they build themselves and, as they go, mobilise, reveal and highlight new resources. Within the process of resources building, we must also look at the role, strategies and logics of the involved actors.

SCIENTIFIC TOURISM AS A SUSTAINABLE DEVELOPMENT TOOL

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Keywords: scientific, geotourism, sustainable development, science

The number of visitors who visit the Cabo de Gata-Níjar UNESCO Global Geopark with a geologic and scientific purposes, are increasing every year and some points the Geopark as a international top destination for scientific and educational geotourism. Both national and international visitor chooses the Geopark to admire it's amazing and unique geology and are becoming a real alternative in winter season in the area, which benefits from the presence of teachers, students , geologists and nature lovers from all over the world. Most of them came to the geopark for fieldwork, to map, indentify and study the different types of rocks that can be observed inside the protected area. Another segment of the scientific visitors came to take samples or to study a precise part of the geopark. The mix between volcanic and sedimentary rocks and the fact that most of the best exposed outcrops of submarine volcanism of the whole western mediterranean are exposed along the coastline is a decisive factor when scientist choose Cabo de Gata-Níjar Geopark as a destination.

Also, it is indeed an amazing opportunity to get in touch with researchers from all over the world, which enrich the exchange of knowledge between the staff of the geopark and the visitors. Also, as result of some of these fieldworks trips (some of them with educational purposes and other with a strictly scientific approach) the Geopark has started a collaboration with the University of Barcelona and developed a joint project related with Seismic Hazards connected with the Carboneras Fault. The geopark is going to collaborate also in an educational campaign at schools within the area of influence of the Carboneras fault. Also bird watching is gaining importance and many scientific and bird lovers come to the geopark to watch steppe and wetlands birds.

The Geopark management itself is supporting this type of Geotourism as one of the best alternative out of the summer season to break with the seasonality that sometimes is linked with mediterranean coastal areas.

THERMAL RESOURCES AS A MAIN DRIVER FOR LOCAL BUSINESS DEVELOPMENT

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Keywords: thermal resources, sustainability, tourism, Azores

Business strategy has to be different at small scale economies like the Azorean economy. Especially when the company's core business is related to a pure service business as it is within the tourism industry. In a pure service business the service is the primary entity that is sold, thus the strategy has to be different than the one used in manufacturing businesses.

The Azorean Government developmental strategy has, for the most, given priority to an economic sustainable development based on environmental friendly practices. It was established, starting in 2014 until 2020, three priority areas for regional development: - agriculture, livestock and agribusiness; fisheries and sea; and tourism; in order to comply with the European Strategy for Research and Innovation for Smart Specialization. In the last years the archipelago has become a main touristic destination, especially in what regards Nature tourism as well as Geotourism. The tourism industry has grown and is becoming an important cornerstone of the region's economy. Thermal resources are of major importance at the regions where they occur and, in some cases are cornerstones to their economic development, the Azores are no exception. In the Azores the diverse nature of thermal resources promotes a multitude of uses within the small geographical area, with special interest for tourism development. The use of the Azores' natural thermal resources can enhance the region's competitiveness among all three selected strategic dimensions. During the last decade the regional government has invested highly in the promotion of the Azores as a Health & Wellness touristic destination. Unfortunately the integration of several other valuing aspects of the use of the Azorean natural resources did not follow up. The challenge for policy makers is in determining what combination of uses will yield higher net benefits, while avoiding irreversible effects that can impact negatively, at short and at long-term the Azorean community well-being as well its welfare. For investors within the sector the challenge would be on the business strategy definition given the current market demand, policy constraints, as well as current available resources.

Azores Essentials Lda. is a recently created, privately owned Azorean company that offers a suite of services based on the use of endogenous Azorean resources, namely several geothermal resources. Its main activity is related to the management of a tea house located on the main geothermal field at Furnas, in an old private thermal bath house dated from the nineteenth century. As secondary activities, the company is also involved on the development of touristic packages offered within thematic routes and offers also a wide array of consulting services to other local small businesses. Our services depend on the use of material as well as immaterial resources, many of them linked to the Azorean thermal heritage. The nature of our activity, allied to our home base location, led to a natural and interesting partnership with the Azores UNESCO Global Geopark. A mission statement and the business presentation as well as a balance of the first year of activities will be presented and discussed.

EUROPEAN GEO PARKS

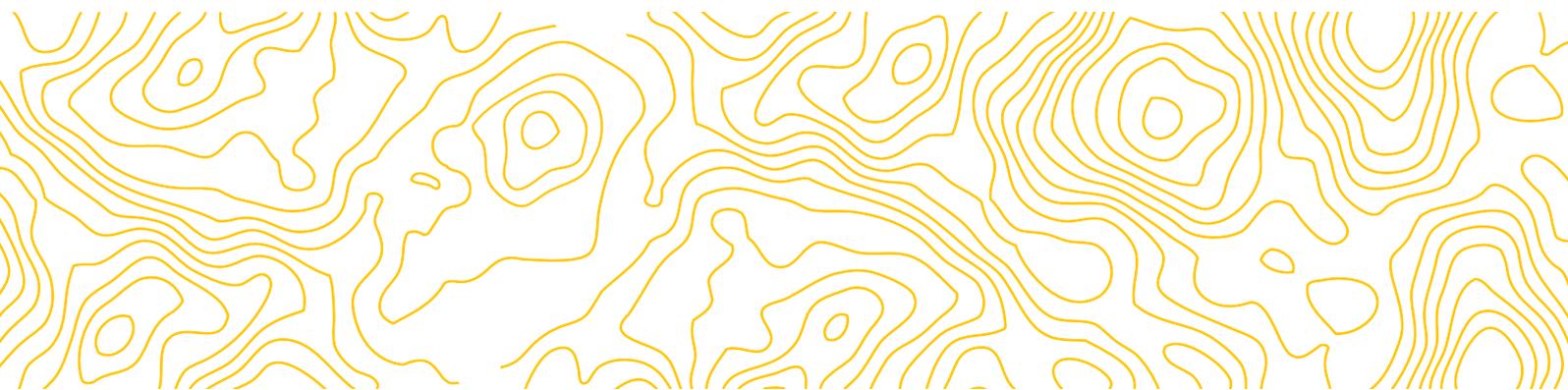
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"GEO PARKS: PATHWAYS OF SUSTAINABLE
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THEME "CONSERVATION, SCIENCE AND RESEARCH"

ORAL



WHY AND HOW VISITING CASTAÑAR CAVE WITHOUT ENTERING IN IT. VILLUERCAS-IBORES-JARA GEOPARK, CÁCERES, SPAIN

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Keywords: caves, minerals, conservation, visitor center

Castañar Cave is a unique natural laboratory, because of the mineralogy and morphology of its speleothems. The cave form within dolostones, magnesites and siliciclastic rocks of Edicaran age, in the Iberian Massif, in Cáceres, Spain. The most characteristic speleothems are branching and fibrous aragonite speleothems, which are sketched as the Villuercas-Ibores-Jara Geopark logo. These speleothems formed by capillary seepage or drip water and in many cases nucleate on soft red clays that coats the walls, roof and floor or the cavity. In addition to aragonite and calcite, Mg-rich minerals as dolomite (rarely described in caves) and huntite are common. Many of these minerals are unstable both chemically (aragonite or huntite) and mechanically (fragility of the aragonite and softness of the red clays). The cave has a very stable microclimate with very low interchange with the outside atmosphere. Any small perturbation, caused for example by visitors may have dramatic effect on the speleothems allowing it faster dissolution or transformation to more stable minerals. In order to avoid these anthropic damages, the visit regime has to be very limited. At present only 440 persons, organized in groups of 5, enter in the cave every year. The visits are between May and September. So it was necessary to improve the visitor centre in order to show the cave values to any people interested in the cave (including all age persons). For these reasons, in 2010 the Junta de Extremadura totally renewed the visitor centre. The new visitor centre includes a variety of contents: Geology and Geography; Prehistory, History, Etnology and Biodiversity; a small replica of part the cave; all the information on the origin, minerals and environment of the cave; and a 3D video. The visitors really like the centre, they really enjoy the replica of part of the cave, as they can take plenty of photographs, feel safe and enjoy the darkness. However, visitors really feel the cave when they see the 3D video. It is also important to explain them why the number of visitors is so reduced, and they really understand that the preservation of this jewel is priority to visits. In short, the experience in the Castañar Cave indicates that the design of well-equipped visitor centres can supply additional values to the Natural Monuments of the Geoparks making them more accessible to a wider variety of public. In addition, the public is concerned about the importance of preservation.

*THE ANDALUSIAN STRATEGY OF INTEGRATED MANAGEMENT OF GEODIVERSITY:
ANALYSIS AND PROGRESS*

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Keywords: conservation, geodiversity, strategy, Andalusia

The three orogenies that affected the Andalusian region (Cadomian, Hercinic and Alpine), have given place to a relative small territory which outstands for its complexity and diversity in many different aspects: orography, climate, geological heritage, ecosystems and culture.

In the national and European framework Andalusia is considered as a reference territory regarding the policies to manage its Geological Heritage and Geodiversity. In this sense, in 2010, after decades of work, the Andalusian Strategy of Integrated Management of Geodiversity was approved. It is a holistic approach to coordinate initiatives amongst different entities, (universities, ministries, councils, companies, individuals, etc.). It has a validity of eight years, and establishes a total of 93 actions to guarantee the conservation of its geosites; to promote their sustainable use; to create an integrated management model; to promote the institutional participation of Andalusia in international programs such as 'Global Geosites Programme' or 'International Geosciences and Geoparks Programme of UNESCO; as well as to develop programmes of environmental education and disseminating the values of the Andalusian Geodiversity.

The Strategy includes the Inventory of Andalusian Geo-resources, which represents a valuable tool to manage the sites of geological importance of Andalusia. This inventory was published in 2004 and includes 662 sites after the inclusion of 74 new elements in 2011. The inventory is the result of an extensive collection, research and diagnosis of the Andalusian Geological Heritage, which includes the assessment of the scientific, didactic and tourist interest of the selected sites, as well as detailed and precise diagnoses on the quality, potential for sustainable use and state of conservation of the most significant landmarks of the geology of Andalusia.

Since its launch, more than 82 % of the objectives have been fulfilled or are in the process. After the natural parks Cabo de Gata- Níjar and Sierras Subbéticas in 2006, the natural park Sierra Norte de Sevilla was declared European and Global Geopark in 2011. More than 500 activities have been carried out in the whole territory of Andalusia, regarding Geological Heritage and Geodiversity. The three UNESCO Global Geoparks of Andalusia develop initiatives that are exported to others territories of the region.

FIVE CLEAR BENEFITS THAT SCIENCE PROVIDES TO THE SUSTAINABLE TOURISM IN A UNESCO GLOBAL GEOPARK

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Keywords: science, sustainable, tourism, benefits

The concept of sustainable tourism is included in the definition and guidelines of the EGN and GGN geoparks since the beginning back in the year 2000, and it has been clearly reinforced with the UNESCO brand. Geoparks work with the classical idea of local development through education and geotourism in order to get economic, social and environmental benefits.

Economic benefits come mainly through the number of visitor and the implication of local stakeholders and local business related mainly with the tourism sector, but also with the revalorization of local products and handcrafts. Social benefits can be considered with new job opportunities and public investment on better infrastructures, but social benefits are mainly related with the empowerment of local people through education, a basic tool to increase the identification and pride towards their territory. Finally, environmental benefits are directly related to the conservation of the natural and cultural heritage that must be guaranteed into the geopark, especially regarding geological heritage.

Promoting scientific activity in a UNESCO Geopark is a key action that feeds directly the sustainable tourism offer creating direct benefits like:

- 1) Working together with the scientific community attracts rapidly the attention of local politicians and institutions that might want to be part of the project;
- 2) Additionally, the scientific results reinforce the idea of an interesting and credible destination;
- 3) Creating new knowledge will improve constantly the discourse of the geotourism offer. Visitors will be more satisfied and will have a good reason to come back to the geopark;
- 4) Creating new knowledge improves also the educational material for scholastics and local people emphasizing the idea of living in a rich territory and contributing to the social benefits related to the identification and pride towards the territory;
- 5) Scientific activity is closely related to geoconservation.

The experience of Basque Coast Unesco Global Geopark promoting scientific activity has been really positive to feed our sustainable tourism project from the economic, social and environmental point of view. As a result of these cooperation our discourse has been improved every year, new geoconservation projects have been started up and educational talks and materials have been created for local people, therefore, feeding the economic, social and environmental benefits of the geopark.

INVENTORY AND QUANTITATIVE ASSESSMENT OF GEOMORPHOSITES: AN APPLICATION AND METHODOLOGICAL COMPARISON IN ARMAÇÃO DOS BÚZIOS, SE BRAZIL

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Keywords: geomorphosite, quantitative assessment, methodological comparison, Armação dos Búzios

The inventory and quantitative assessment of the valuable occurrences of geodiversity is of paramount importance to establish efficient geoconservation strategies. This process will provide necessary subsidies for the management of sites, taking into account its importance for the economic development of the communities involved. However, this subject is still passing through a moment of methodological improvements. This work aimed to apply two methodologies for the inventory and quantitative assessment of sites of geomorphological relevance (geomorphosites) in Armação dos Búzios municipality, Rio de Janeiro State, Brazil. This municipality is located in the Costões e Lagunas (Cliffs and Lagoons) aspiring Geopark and this work is inserted in the context of geodiversity inventory of the area to support geopark's strategies. Since it is focused in geomorphosites only, two methodologies were selected: one focused in geodiversity assessment as a whole (GEOSSIT - the official methodology of the Geological Survey of Brazil) and another focused only on geomorphosite assessment (developed in the University of Lausanne - Switzerland). The municipality of Armação dos Búzios is small (70,278 km²) and, in order to perform this methodological comparison, eight sites were selected for evaluation. The selection of the sites is the first step in creating an inventory and several authors proposed different criteria for this step, but there is always a degree of subjectivity. In this case the selection was mainly based on the authors experience in the area, taking into account the most interesting geomorphological features in terms of scientific, educative and touristic values. By applying the two methods, it was possible to identify the similarities and differences of the parameters used and results. The Brazilian method (GEOSSIT) is more complex, which was expected since the Swiss method intended to be simple and easily applied. Although there are similar parameters, the methods are very different in its applications, which created differences in the final result. Since the GEOSSIT method is not only focused on geomorphology, some sites with other interests received higher scores, which is not always interesting if the work focuses only in geomorphology. It highlights the importance of clearly defining the aim of the inventory before choosing a method. But, more important than that, is the possibility of integration between the methods, instead of simply choosing one. The values in the Swiss method are given by the researcher while, on the GEOSSIT, the value is given by answering objective questions, being a more transparent method. However, sometimes the options for these questions are not enough and it could be improved by issues highlighted in the Swiss method. So, this work aimed to display the main differences between the two methods in order to improve evaluation methods in the Brazilian reality. It is expected that these preliminary results helps in this development, subsidizing territorial management in these important areas, taking into account the conservation of geodiversity and the sustainable development of the communities living near these features.

*MINING ACTIVITIES DURING THE 20TH CENTURY IN THE CHELMOS – VOURAIKOS
GLOBAL GEOPARK: CONNECTING GEOLOGY WITH THE LOCAL PEOPLE*

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Keywords: coal mining, conservation, public awareness, coal seams

During the 20th century mining and quarrying activities took place in the area that today represents the Chelmos – Vouraikos Global Geopark. At least three limestone quarries were used during the second half of the century to extract aggregates for building materials. Nevertheless, the coal mining activities in the area of the Kalavryta basin are certainly considered more important. The presence of low rank coal seams (lignite) in the area of Kalavryta has been known for a long time, however, the first coal mining started at the beginning of the 20th century with the exploitation of outcrops to cover local needs for domestic heating. In 1923 with the first open coal pits at Xidias and Drosato started the more intensive extraction of lignite and ten years later a third open pit at Palaeochori was established. Soon, and before WWII coal mining at Palaeochori proceeded with underground excavations and lignite production increased. Even during the war the Italian occupation forces continued the exploitation and in fact increased the quantities of mined coal. The three main coal mines continued to operate until the early 1980's. Despite the relatively long mining history of the Kalavryta coal seams, they were only studied more extensively in 1992 and basically after the coal mines were abandoned, with the intention to develop and expand coal mining in the area, something that in the end never happened. Today, what has been left to remind the former coal mining activity within the Geopark area are only a few remains from the mining installations at Xidias and the mining wastes found close to the localities of the coal mines. The entrances of the underground mines for safety reasons were either blasted or filled and covered with soil and wastes. Most local people have no knowledge about the coal mining that used to be an important economic activity in the area of Kalavryta for most of the 20th century, and only a small number of the elders have memories of the mines, as some of them actually worked as miners. For a whole century, and not too long ago, the local communities were depending on the coal mining. As in every mining community, mining and by extension geology was part of their lives. It is up to us in the Chelmos – Vouraikos Global Geopark to bring back the memories to the elders and teach the young and the geotourists the mining stories of the Kalavryta coal mines and reconnect them with their past and with geology.

NATURTEJO UNESCO GLOBAL GEOPARK GEOLOGICAL HERITAGE IN LOCAL MANAGEMENT PLANS

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Keywords: geoconservation, geosites, territory management

In the early 2000s efforts began to protect the Geological Heritage in the Naturtejo UNESCO Global Geopark region. To protect various threatened sites the first geopark in Portugal was created in 2006. Geoparks are not protected areas and since 2008 they are recognized under the Portuguese Law with an international status, even with a vague framework. However 55.8% of Naturtejo Geopark's geosites are legally protected, supported by different protection frameworks.

Since the establishment of Naturtejo Geopark new protected areas were created, at national and regional levels, focused on geological heritage, beside other values, protecting legally all the geosites in their perimeter, and indirectly influencing territorial management (Portas de Ródão Natural Monument and Serra da Gardunha Protected Landscape).

The vulnerability of a geosite depends on its size, its nature, the potential threats to which it is exposed but also to its protection measures. Widening of roads, construction of wind farms, river bed constructions, agriculture and other projects in the territory can threaten rare fossils and fragile minerals. Hence, specific local protection is of importance to guarantee safeguarding of these and other geosites. Geoconservation intends to make a sustainable use of the Geological Heritage that reflects the geopark's wide geodiversity, establishing management measures that articulate concerns of all the stakeholders of the territory which is achieved through local policies, such as Municipal Management Plans, articulated with regional and national strategies. For the local sustainable development is it also very important to articulate geosite protection with tourism promotion, that will stimulate local economy not endangering heritage.

Currently 59 geosites in Naturtejo Geopark are already included in the Municipal Management Plans, whilst only 1/3 of the territory updated the plans in accordance with the current directives. Also Protected Areas Management Plans and Environmental Impact Studies comprise the importance of Geodiversity/Geological Heritage for Ecosystems and Environment.

GEOHERITAGE INVENTORY OF CHAPADA DOS VEADEIROS NATIONAL PARK AND SURROUNDINGS – GOIÁS - BRAZIL

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Keywords: geoheritage, inventory, Chapada dos Veadeiros

Characterizing and defining geosites that need to be conserved, whether for scientific purposes or for education is a task for the geoscientific community. The fact that Brazil is a very extensive territory, with 8,547,403 km², difficult the geological mapping and geological interest sites knowledge.

The main objective of this work is to perform a geological heritage inventory that is a scientific value quantitative assessment method of the Chapada dos Veadeiros National Park (PNCV) and its surroundings. The geoheritage inventory will be a further attribute to tourism and education as well as dissemination of geosciences to the population.

The PNCV was created in 1961 and protects an area of 65,514 ha of the Brazilian Cerrado of altitude. There are several plants species; hundreds of springs and water courses; rocks over one billion years old, and landscapes of rare beauty.

The region is geologically inserted into a contact zone between the Araí, Paranoá and Bambuí Groups. The Araí Group is a low-grade metamorphic volcano-sedimentary sequence. The Paranoá Group is represented by a metasedimentary sequence of passive margin composed especially of psammite, mudstone and limestone in which the basal units are composed of tidal and supra-tidal sediments covered by units of marine environment dominated by tidal current. The Bambuí Group is characterized by a mudstone-limestone sequence that shows relatively shallow marine sedimentation.

The inventory follows the methodology of Brilha (2016) which consists of general characterization, identification, geographical location, accessibility and vulnerability. Followed by geological characterization, potential of educational and tourist use, risks of degradation and subsequent conservation.

For the quantification of the geosites some criteria were adapted to the study area, such as accessibility, which was modified to: handicap accessible; site located less than 500 meters from an unpaved road; trail above 5 kilometers and overnight trekking. Nine sites of geological interest were inventoried in the PNCV and ten around the São Jorge village and Alto Paraíso de Goiás city.

The result of the quantification was a high scientific value for the Vale da Lua, because it is a unique geomorphological, stratigraphic and petrological geosite. However, the geosite has no risk of degradation and has conservation management places. Within the PNCV, the Cânion I geosite presents a slightly higher value due to the fracture system representativeness, followed by the Salto de 120 due to the tectonic representation (uplift, folds and faults). In the PNCV, the quantification use and the risk of degradation aspects are homogeneous, the differences are in accessibility. In PNCV vicinity, it is observed that the greater use is the touristic not associated with the scientific value. According to the quantitative evaluation results, conservation and management actions will be proposed for geosites with higher value.

VOLUNTARY MINING AND GEO-ARCHAEOLOGY: RESEARCH AND CONSERVATION IN CULTURAL LANDSCAPES

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Keywords: geo-archaeology, cultural landscapes, volunteer work, mining archaeology

Supporting voluntary research provides opportunities for long-term sustainable research and conservation projects in the cultural landscape of a geopark. Within the Bergstrasse and Odenwald region (Germany), the Geopark network enables voluntary groups yielding contact with the departments of monument and nature protection as well as mining authorities. A broad variety of different aspects reflects the vivid and very active work of the "Old Mining Working Group": In the last twenty years the voluntary members gained a lot of experience in practical field work and working techniques through their own initiative as well as networking with other geopark partners. Especially the group's long term research, their cooperation with universities and other experts contributes enormously to the work of the federal agency for monument conservation. The inventory of mining relics as archaeological objects is professionally done by archaeological prospection and mapping. One important task of the working group is the restoration of old mines within the Odenwald region. The working group takes over important tasks as official body, representing the mining authorities and securing the public safety-in-mines (risk management in abandoned mines). Another interesting aspect builds the topic "mine as biotope" and the cooperation with nature conservation authorities (e. g. bats or amphibians). All these different issues are integrated into the geopark's daily work. Reactivated mines and research results are introduced into touristic infrastructure, e. g. interpretation panels (so called "Geopoints") or the restoration of an old silver and copper ore mine from the 15th century, open to visitors with guided tours by the volunteers. Special events for the public, advanced training courses for Geopark-on-site-guides and projects with schools are other additional elements of the working groups activities and the intense cooperation with the UNESCO Global Geopark Bergstraße-Odenwald. The resulting professional teamwork offers new possibilities in geopark areas and the interpretation and protection of cultural landscapes.

THE DECLARING AND GEOCONSERVATION OF FUENTELSAZ GSSP STRATOTYPE

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Keywords: stratotype, declaration, geoconservation, enhancement

The Fuentelsaz Stratotype is a series of sedimentary rocks that constitute the best sedimentary record for the transit between the Lower and the Middle Jurassic in the world, recognized by the International Union of Geological Sciences, who has taken it as a reference section between the Aalenian and Toarcian stages for the official chronostratigraphic scale.

The International Subcommittee on Jurassic Stratigraphy (a subsidiary of the International Commission on Stratigraphy) appointed a working team consisting of this period specialist with the task of choose the best reference section for the limit between Lower and Middle Jurassic, in addition to Fuentelsaz, this team consider outcrops in Scotland, Germany and Morocco.

In the year 2000, at the 31st International Geological Congress held in Brazil, the Fuentelsaz Section was formally established as the GSSP Stratotype, being the first recognized Global Stratotype in Spain

The section consists of a sequence of layers of limestones and marls deposited in a shallow marine platform environment in semi-arid climatic conditions. It contains a large variety of marine organisms fossils including bivalves, brachiopods, cephalopods as well as microfossils such as foraminifera, ostracods and pollen. The boundary determined by this stratotype has been defined by the first presence of ammonites *Leioceras opalinum*.

In addition to fossil organisms, this section collects other aspects recorded in sediments such as stratigraphy, sedimentary environments, magnetostratigraphy, isotopic studies that allows to know the temperature of these seas, their mineralogy and geochemistry in order to determinate their chemical composition. All these studies have allowed us to know the environmental changes that occurred at that time and how the organisms react to them.

On the first meeting of the Scientific Committee of Molina and Alto Geopark, held in 2013, is taken the decision to request the Regional Government to provide of legal protection for this item, which would ensure its permanence as international reference. In 2016, the Regional Autonomous Government of Castilla-La Mancha, announce the starting of procedures to declare this outcrop as Natural Monument, providing the status of protected space and ensuring its conservation. In this year, IGME, Fuentelsaz's Municipality and Geopark team, collaborate, achieving the ceremony of official declaration of the Fuentelsaz Stratotype and the installation of the golden spike.

In 2017, the Fuentelsaz's Municipality, along with the Geopark, promotes a program of initiatives aimed to enhancement of this site, making it accessible to society, and using it as a tourist resource. This program of activities consists of different initiatives among which we highlight the following: Guided visits and informative talks, edition of brochures and other tourist and outreach materials, installation of information panels and signalling elements in the site, recovery of the old waste dump for interpretive area and panoramic viewpoint of the Stratotype, and the creation of a paleontology and archeology visitor's centre, with special attention to the diffusion of the Stratotype.

COLLECTING FOSSILS FOR RESEARCH AND EDUCATION IN UNESCO GLOBAL GEOPARKS AND OTHER PROTECTED AREAS

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Keywords: fossils, geoparks, UNESCO, conservation

Collecting fossils is essential not only for science, but also education. Crucially, any palaeontological locality where no sampling is permitted could be considered to have lost its scientific value – in an analogous way to having been physically lost, for instance beneath construction works. Within the context of legally protected sites, this issue of what constitutes ‘appropriate’ sampling, and by whom, can become a major challenge for site managers and authorities – especially in the context of designations such as UNESCO Global Geoparks, where educational is a key aim of site management (and effective education, especially at University level, may require the collection of fossils). Even within the global principles promoted by UNESCO for its listed sites, solutions vary vastly, the most extreme being the recreational and commercial exploitation of palaeontological heritage promoted in the Dorset and East Devon ‘Jurassic Coast’ World Heritage site in England (UK), whereas elsewhere, collecting might only be permitted for pure scientific research, and not for school-level education. Within the aims and statutes of UNESCO Global Geoparks, however, commercial exploitation of palaeontological heritage is firmly established as unacceptable - but what sorts of sampling or collecting activities should actually be considered acceptable, and how can they be effectively managed?? This can be a major challenge for UNESCO Global Geoparks, where promoting scientific and educational activities, as well as the conservation of the paleontological heritage, has to rely on national, regional or even municipal regulations, which may sometimes have conflicting objectives, including by controlling whom can collect specimens and where they should be deposited and displayed (e.g.. not necessarily within the Geopark). The aim of this review, therefore, is to provide examples from across a range of Global Geoparks and other protected areas, to demonstrate that collecting fossils, if appropriately managed, can not only promote scientific discoveries, but also educational benefits and community involvement.

*UNESCO GLOBAL GEOPARKS AND THE INTERNATIONAL COMMISSION ON
GEOHERITAGE (ICG) – A POTENTIAL NEW PARTNERSHIP FOR ADVANCING THE
SCIENCE AND PRACTICE OF GEODIVERSITY CONSERVATION*

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Keywords: geoheritage, geodiversity, geoparks, IUGS

The International Commission on Geoheritage is a new Scientific Commission within the International Union of Geological Sciences and was established at the 35th International Geological Congress, held in Cape Town, South Africa, from the 27th August to 4th September 2016. The International Commission on Geoheritage incorporates a Heritage Sites and Collections Subcommission (HSCS) (<http://geoheritage-iugs.mnhn.fr>) and a Heritage Stones Subcommission (HSS) (<http://globalheritagestone.com/>). The Heritage Sites and Collections Subcommission, in particular, focuses on those aspects of Geodiversity and Geoheritage associated with natural geological materials and processes, both in-situ (e.g. within 'geosites') and ex-situ in institutional collections - and hence, primarily facets of a natural rather than a cultural heritage. Originally, a Geological Task Group within International Union of Geological Sciences the Heritage Sites and Collections Subcommission continues to develop a comprehensive website providing on-line global resources for geoheritage and its conservation, with reviews of national conservation legislation, links to national geosite inventories (with interactive maps) and the beginnings of an inventory of globally important Geosites, continuing work initiated in the 1990s. Although the Heritage Stones Subcommission primarily focusses on geological heritage in a cultural context, there are key themes which can also be relevant to education and cultural activities in the context of a UNESCO Global Geoparks. The objectives of the Heritage Stones Subcommission include: Facilitating the formal designation of dimension stones that have achieved widespread recognition in human culture; creating a Global Heritage Stone Resource (GHSR) and a Global Heritage Stone Province (GHSP) as internationally recognized geological standards; and to promote the adoption and use of this heritage stone designations by international and national authorities. The aims of the International Commission on Geoheritage and both its component Subcommission include providing an umbrella under which diverse national and international organisations and programmes can now meet and build partnerships in areas of common interest – at a global level. In this context, the potential for close collaboration between the Heritage Sites and Collections Subcommission, in particular, and the European Geoparks Network and the Global Geoparks Network is obvious. The challenge is to ensure that we can influence policy and practice in relation to geological heritage and its relevance to society at a global scale, and not just within UNESCO designated areas.

THE INTERNATIONAL UNION OF GEOSCIENCE IUGS

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Keywords: union structure, standards, scientific programs, geoparks

The International Union of Geological Science (IUGS) is the world largest geoscientific union representing over 1 million geoscientists through its Adhering Members and Affiliated Organisations. The Union is an international non-governmental organization devoted to international cooperation in the field of geology. It aims to promote development of the Earth Sciences through the support of broad-based scientific studies relevant to the entire Earth system; to apply the results of these and other studies to preserving Earth's natural environment, using all natural resources wisely and improving the prosperity of nations and the quality of human life; and to strengthen public awareness of geology and advance geological education in the widest sense.

IUGS fosters dialogue and communication among the various specialists in Earth Sciences around the world. It achieves this by organizing international projects and meetings, sponsoring symposia and scientific field trips, and producing publications. Topics addressed span the gamut from fundamental research to its economic and industrial applications, from scientific, environmental and social issues to educational and developmental problems. For example, IUGS is currently involved in:

- identifying and defining the problems critical to an improved understanding of terrestrial and planetary geological processes;
- encouraging formulation and testing of new geological concepts, models, and methodologies;
- focusing effort internationally on the study of critical economic or environmental problems whose resolution may depend on an understanding of geology;
- fostering international agreement on nomenclature and classification in geoscientific disciplines such as stratigraphy, petrology and tectonics, geochemistry and geo-informatics;
- providing support in geologic expertise for the evaluation of Geoparks and World heritage sites;
- strengthening mechanisms for facilitating international cooperation in geological research and exchange;
- improving publication, dissemination, and use of geological information internationally;
- encouraging new relationships between and among disciplines of science that relate to geology worldwide;
- attracting competent students and research workers who will devote their attention to geology, and to stimulate excellent education for students interested in geology;
- fostering an increased awareness among individual scientists world-wide of what programs are being carried out in geology in each country;
- promoting public understanding and appreciation of the planet earth, its environment in space, and their study; and
- furthering the public welfare by assuring that geology makes appropriate contribution to public policy decisions of an international nature.

IUGS works through its Commissions, Task Groups and Initiatives, plus joint programs with other Geoscience unions, such as the International Union of Geodesy and Geophysics (IUGG). One of the prime tasks of IUGS in the new IGGP structure of UNESCO is providing experts in geoscience for the Global Geopark Network.

PROTECTING GEOSITES IN IRISH UNESCO GLOBAL GEOPARKS

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Keywords: geosite, Irish UNESCO Global geoparks, County Geological Sites, planning

Within the three Irish UNESCO Global Geoparks (Copper Coast, Marble Arch Caves and Burren and Cliffs of Moher), individual Geosites are mostly protected as County Geological Sites (CGS). This designation was recognised in the National Heritage Plan 2002, which allows integration into statutory County Development Plans (CDP) and consideration in the planning process.

The Irish Geoheritage Programme was set up in 1998 between the Geological Survey and National Parks & Wildlife Service (NPWS) to promote awareness and protection of significant geological sites. The original premise was to designate important sites as statutory geological Natural Heritage Areas (NHAs), but lack of resources and a change of priority to EU habitat designations (Special Areas of Conservation - SAC), resulted in the omission of specific geological protection at European and national level. However, the Geoheritage Programme has identified and documented important County Geological Sites (under 16 Themes) through its ongoing rollout of County Audits (from 2005), which allows inclusion of the CGS in County Development Plans and consultation with the Geological Survey on any proposed development that might impact on a site. This protection at county level is arguably proving more effective than imposed EU or national legislation, as it provides for consultation and compromise (for example, in legal quarrying the preservation of a representative geological section, with access and promotion can be agreed) and landowners are not aggravated by officious 'notifiable actions' as associated with EU designations. The most significant CGS are also recommended as geological NHAs.

Looking at the eighteen Geosites in the Burren and Cliffs of Moher Geopark, eleven are protected under CGS status; two will become CGS in the next CDP revision; one is a Viewing Point, a category not currently included in the Geoheritage Programme's 16 Themes, but may be in the future; and the remaining four come under the umbrella of SAC, NHA and pNHA designations.

The CGS designation has helped underpin previous applications to UNESCO Global Geopark membership, as in the case of the Burren and Cliffs of Moher, and continues to support the development of Ireland's aspiring Geopark projects.

*THE GEOLOGICAL AND GEOHERITAGE MAP OF THE SERRAS DE AIRE AND
CANDEEIROS NATURAL PARK: PRODUCT OF A CONTINUOUS COLLABORATION
BETWEEN INSTITUTES OF THE PORTUGUESE CENTRAL ADMINISTRATION*

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Keywords: geological and geoheritage map, sustainability, karstic values, inventory

The publication of the simplified geological map of the Sintra Natural Park, in 1998, with the identification of the geological heritage sites, marked the beginning of a long and lasting collaboration between the Portuguese Geological Survey (LNEG, IP) and the National Nature Conservation Institute (ICNF, IP). Since then, three more geological and geoheritage maps of Natural Protected Areas were published and numerous other projects were carried out under this collaboration.

In 2016 one more product of this collaboration was published: the Simplified Geological and Geoheritage Map of the Serras de Aire e Candeeiros Natural Park (SACNP). It is a deliverable of a three year project financed by European Structural Funds and coordinated by ASSIMAGRA (a Portuguese association of mining industry). This project aimed to sustainably integrate the quarrying activities that take place in this natural park, in the land use and territorial planning management. As a result of this collaboration with mining industry, the extractive activities are becoming more compatible with nature conservation, contributing for the sustainable development of the region.

The simplified geological map with geological heritage sites and its associated field guide aims to be a scientific based comprehensive tool for general public, but also for specialized end-users such as nature sportsmen, researchers, administrative managers of the natural park and local authorities.

Located in the Centre of Portugal, the SACNP embraces a tectonically uplifted jurassic limestone massive that stands out from the surrounding regions. Resulting from the combination between lithology and uplift, it shows a peculiar karstic landscape with several relevant surface and underground morphological structures, as well as a large number of associated habitats with endemic flora and fauna.

The present map is an adaptation and simplification of the 1:50 000 official geological map sheets edited by the LNEG that cover the area of the SACNP. Besides the identification of the geosites, it contains one geological cross section, the main trails of the park, and the location of picnic areas, view points and visitors centers.

The geosites' inventory is composed by 75 geosites and results from bibliographic research complemented by intense fieldwork. Three major types of geosites are referred in the SACNP:

- Karstic heritage, where the caves are the majority of the selected geosites, but with the superficial karst well represented by several dolines, karstic depressions, lapiaz fields and caves.
- Paleontological heritage, where the jurassic age dinosaur footprints of "Monumento Natural das pegadas de dinossáurios da Serra de Aire" and of the "Vale de Meios" sites are the best known geosites, but other are valuable too, such as the recently known Echinoderms from Cabeço da Ladeira site.
- Sedimentological and structural heritage, which preserve the carbonate depositional and tectonic history of this limestone massif.

Each geosite has its proper description on the field guide that complements the map, which also gives notice of the geological history of the limestone massif.

AN "INTRA-KARST" OBSERVATORY: TOWARD A BETTER UNDERSTANDING AND A BETTER PROTECTION OF UNDERGROUND WATER

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Keywords: karst, water resource, observatory, Quercy

Over half of the drinking water production for Lot County (France) comes from Causses du Quercy territory. Significant from a quantitative point of view, this water resource is still very sensitive to pollution because of the fast water flow into the karst system and the very limited natural capacity of those heavily impermeable soils to purge pollutants.

In order to preserve this water resource, the aspiring Geopark and its partners (Occitanie Region, dour-Garonne Water Agency, Gramat Study Center, Lot speleology Committee) have developed an "Intra-karst" observatory. The Ouyse karst system is one of the biggest and more developed in France. It was chosen as a natural laboratory to experiment this "Intra-karst" observatory. A whole array of measuring devices was installed at various key points of the Causse: underground with the help of local speleologists as well above ground, on the main resurgences and sinkholes. Those devices were scheduled to initiate the data collection at the same time (2 may 2016, at 11h p.m.). For nearly two months, the various sensors collected data each hour on all the main physical and chemical parameters of the water, meanwhile samplers took daily sample of water for geochemistry analysis. This way, the geochemical evolution of the water resource has been monitored during several flood episodes.

The great weather conditions of June 2016 allowed providing interesting informations about water-flow under the Causse. The first results showed the contribution of each part of the territory to the main resurgence of Cabouy and its evolution during flow episodes.

The improvement of knowledge of the karst system functioning with the intra-kart observatory will help to insure the protection of this strategic water resource. Following this first experimentation, all partners, with the agreement of local stakeholders and water resource managers, had decided to continue and reinforce the study. This work will be conducted as part of a PhD thesis which will be driven by the aspiring Geopark in partnership with Toulouse and Rouen universities and Gramat Study Center. This research project should start in June 2017.

GEOHAZARDS AND UNESCO GLOBAL GEOPARKS IN THE NORTH ATLANTIC GEOSCIENCE (NAG) REGION

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Keywords: geohazards, North Atlantic, geological surveys

NAG, or North Atlantic Geosciences (NAG) is a cooperative framework agreement between the National Geological Surveys of the UK, Ireland, the Netherlands, Norway, Germany, Iceland and Denmark and Greenland. Representatives from the NAG surveys meet twice a year and for the past 18 months have been discussing ways to become more involved in UNESCO Global Geoparks, both on a national level and collectively through the entire NAG area.

In 2016, the Geological Survey of Northern Ireland and the British Geological Survey took the lead to establish the geoscience research that has been carried out in UNESCO Global Geoparks, Aspiring Geoparks and World Heritage Sites within the NAG area. A total of nine themes were identified: palaeontology, coastal/marine geology, geomorphology, caves and karst (including groundwater), petrology/ mineralogy, stratigraphy/ sedimentology, volcanology, glaciology and geo-hazard studies.

It was identified that the most common research theme was geomorphology with the majority of sites having carried out research in this field. The least common research theme was geo-hazard studies, despite all of the areas studied having experienced or being at risk from some form of geological hazard.

Geo-hazards in some of the sites in question pose a real threat to both human and animal health, as well as to local infrastructure, and there is a need to increase awareness and understanding of these risks. UNESCO has identified geo-hazards as being one of the key focus areas for UNESCO Global Geoparks, and addressing the risks associated with these will also help to achieve at least some of the UNESCO Sustainable Development Goals.

Through the NAG group of National Geological Surveys it has been agreed to establish a working group to carry out a more detailed audit of the potential geo-hazards in UNESCO Global Geoparks, Aspiring Geoparks and World Heritage Sites within the entire NAG area. The ultimate goal being to establish a working group that will initiate geo-hazard research where needed to try and improve the understanding and reduce the risks that geo-hazards pose.

EUROPEAN GEO PARKS

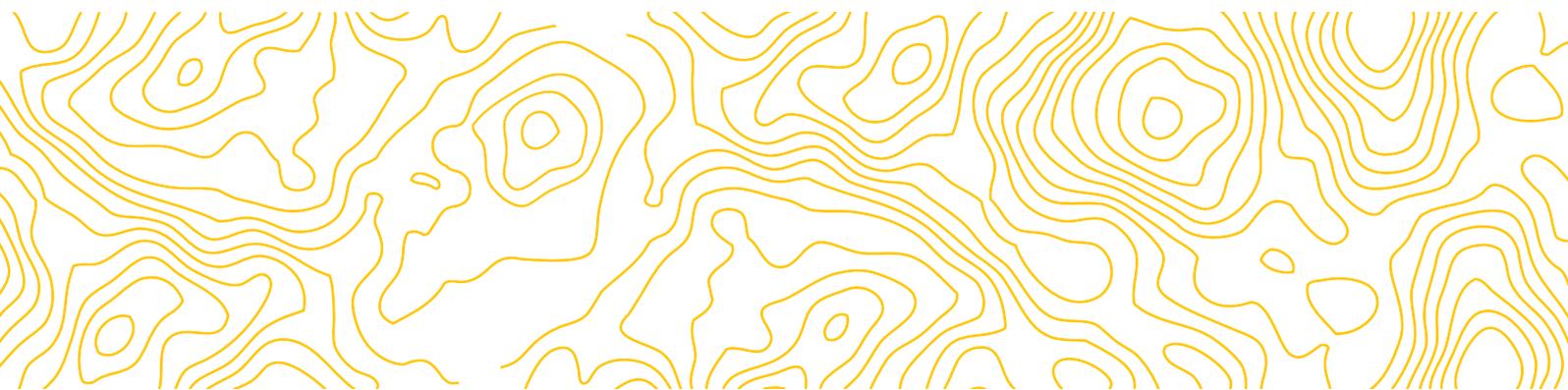
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"GEO PARKS: PATHWAYS OF SUSTAINABLE
TOURISM FOR DEVELOPMENT"

THEME "CONSERVATION, SCIENCE AND RESEARCH"

POSTER



*IS THE GEOPARK CONCEPT A GOOD STRATEGY FOR THE MUNICIPALITY OF
FLORIANÓPOLIS (SANTA CATARINA, BRAZIL)?*

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Keywords: geoheritage, tourism, geopark, Florianópolis

Florianópolis is the capital of the state of Santa Catarina in southern Brazil. The corresponding municipality has its major territory in the island of Santa Catarina (424km²) and a small part in mainland (11,9km²). The island has a unique scenic landscape with dozens of beaches, lagoons, dunes, restinga vegetation, rocky shores and mangroves. For this reason, it is a well-known "sun & beach" tourist destination, mainly during the 3-months summer period (January to March) when the population doubles, reaching one million people. Due to this high touristic pressure, more urban-tourist infrastructures are built which do not take into account the diversity of ecosystems of the insular environment, causing threats to natural heritage, including the loss of geodiversity and geological heritage, still poorly known by the public administration and local population.

The geological setting of the municipality is constituted by precambrian granitic rocks, cretaceous dikes and continental and transitional quaternary deposits. The inventory of geological heritage, based on the review of geological literature and suggestions of experts who have researched the area, has identified twenty geosites representative of the geological and geomorphological evolution of the municipality of Florianópolis. These sites have regional scientific relevance but most of them have high potential for educational and tourist uses. Some of these sites are already used in educational activities and research in higher education but not yet by primary and secondary school teachers. Outreach activities with geological interpretation are still non-existent. Clearly the island faces big problems concerning mass summer tourism causing many troubles to visitors and local population and affecting negatively the environment as a whole. Would a geopark be a good solution for Florianópolis?

In spite of the geological heritage of the island does not have international relevance (a requisite to become a UNESCO Global Geopark) this territory could benefit with the implementation of some strategies that are usual in geoparks. For instance, alternative geotouristic activities could be a way to promote the visit of tourists all-year round and not just during summer. This could be a new possibility of income for the communities of Florianópolis. In addition, an educative programme addressed to students and local population focused on the need to preserve the geodiversity and biodiversity of the island could contribute to raise awareness for the need to change the development policy of the island. This change would need the political support of the local and state administrations that need to be convinced that the present development model is completely unsustainable for the fragile nature of the island and for the permanent population.

NATURAL AND HUMAN THREATS TO GEOHERITAGE: ISSUES FROM THE INVENTORY OF THE TAUBATÉ BASIN, CONTINENTAL RIFT OF SOUTHEASTERN BRAZIL

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Keywords: vulnerable geosites, Taubaté basin, scientific inventory, continental rift of Southeastern Brazil

The knowledge of the geological heritage of a region is essential for the sustainable management of its resources, since it allows to diagnose the threats to which this heritage is subjected and provides indications about the limitations for the use and occupation of the areas involved. Regions constituted by sedimentary rocks subjected to the action of chemical weathering are naturally fragile. When exposed to urban interventions they become even more vulnerable. The region of the Taubaté Basin is part of this context, since its rich geodiversity is threatened both by weathering and by anthropic activities.

Located in the eastern portion of the state of São Paulo, the basin occupies an approximate area of 2400 km², within eleven municipalities. It is considered by many researchers an "open air school", because of high scientific, didactic outcrops, used for teaching and research. Installed during the Eocene / Oligocene, it is part of a set of basins belonging to the Continental Rift of Southeastern Brazil, associated to the late phase of the tectonic activation event of the South American Platform.

The region is a key location for the understanding of post-Gondwana geological history, being one of the most important areas for paleontological studies of Southeastern Brazil, with outcrops containing lithotypes, structures, and fossils of inestimable value. However, these values have been gradually lost due to the extreme fragility of the outcrops, threatened both by infrastructure works and mining activities, as by weathering, which visibly degrades the rocks in a short period of time, permanently affecting features which register the sedimentary and tectonic evolution of the basin.

In order to diagnose the threats and develop mechanisms geoconservation of this patrimony, the scientific inventory of the region was carried out. The methodology adopted began with the definition of frameworks, which guided the selection of geosites according to pre-established subjects. Based on the geological history of the basin, five frameworks were defined: 1) Opening of the basin; 2) Neogenic deposition and deformation; 3) Quaternary deposition and deformation; 4) Sites with geomorphological interest; and 5) Paleontological heritage. Of the 33 points considered initially as potential geosites, only 20 compose the inventory, because some outcrops were either destroyed by anthropic activities or very weathered, affecting the visibility of the records used to characterize it as a relevant site.

The high risk of degradation to which the rocky exposures of the basin are subjected brings up a challenge to the management of the inventoried heritage. Thus, this inventory corresponds to the first step in a project aimed at identifying and evaluating the threats that affect the local geological heritage, in order to contribute to increasing the interest of the public power in geoconservation issues. It is intended that this evaluation will lead to the creation of measures necessary to mitigate these threats, influencing on territorial planning and improving the management of resources and natural landscapes. It will make possible the preservation of geosites, which record an important part of the geological history of Southeastern Brazil.

*UPDATING THE GEOSITES INVENTORY OF THE APUAN ALPS UNESCO GLOBAL
GEOPARK (ITALY): THREE NEW STRUCTURAL GEOSITES IN METAMORPHIC ROCKS*

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Keywords: geosite, inventory, structural features, Apuan Alps

National geosites inventories, such as those at regional level, are commonly characterized by the prevalence of geomorphosites, i.e. geological sites related to geomorphological processes and landforms that come out from the landscape. On the contrary, the geosites dealing with the structural geology are surveyed with lower frequency as they require a more complex analysis and interpretation. This discrepancy is even more evident in an area such as the Apuan Alps that displays many, if not all, of the geological structures related to rock deformation typical of mid-crustal levels. Indeed, the Apuan Alps have accounted for a "gym" of the structural geology for Italian and foreign geologists, as witnessed by hundreds of scientific papers about this topic. The Apuan Alps UNESCO Global Geopark has started to fill this gap in 2015, establishing a set of new structural geosites that have gone to merge into its geosites inventory which is constantly being updated. In particular, three new geosites related respectively to foliation, folds and polyphase folding occurring in the metamorphic rocks, that stand out due to their scientific value, their exemplarity and representativeness, and their aesthetic quality, have been uploaded. A novelty item of these geosites lies in their description that was made according to the new guidelines of ISPRA (Italian Institute for Environmental Protection and Research), that intend to overcome the problem of texts written in specialized technical terms, difficult to understand for the most. The extended descriptions of the structural geosites are informative texts and drawings trying to introduce the geological structures with simple, non-technical, but scientifically correct, terms. This new approach fits well with the mission of the Geoparks for which protection and conservation of the geological heritage should be considered as a dynamic process helping the access to knowledge and awareness to the widest possible audience.

This contribution provides the results of this new approach for three structural geosites in the territory of the Apuan Alps UNESCO Global Geopark. Their digital sheets have been included in the database of the Italian "National Inventory of Geosites" managed by ISPRA.

GEOLOGICAL MAIN THEMES AND INTERNATIONALLY REMARKABLE GEOSITES IN FINLAND

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Keywords: geoparks, geosites, classification, Finland

The Geological Survey of Finland (GTK) has worked with the clear aim of spreading knowledge about geological heritage to the public, to the tourism sector, and to places of education.

With the aims of marketing geological heritage and of increasing geological knowledge, the GTK makes an evaluation of regional nature values, mapping and popularisation of nature targets, the design of trails and visitor centres, the production of educational materials. GTK also provides professional help to the authorities and the local projects in their work to create new Geoparks in Finland. Good example of this work and co-operation is Rokua UNESCO Global Geopark.

GTK's opinion is that on national level we should avoid granting Geopark status to multiple areas with exactly same themes. In order to coordinate projects, five national main themes have been chosen from Finland's geological history to direct the planning of new Geopark candidates; bedrock, quaternary formations, peatlands, lake-/seascape and areas with special geological interest.

Finland's bedrock is the oldest in Europe (age range 3.5–1.55 Ga). Rock types and their structures tell us about the development stages of our planet. Famous internationally well known rock types are Rapakivi granite, Orbicular granite and granites in common. The most famous Finnish gemstone is Spectrolite. The bedrock of Koli fell in East Finland represents an ancient eroded mountain range and preserves a record of many significant events in Earth history.

Finland's soil has been formed 14,000–10,000 years ago from loose soil types stratified by the melting water from the Fennoscandian glacier. Some of the geomorphological formations created by the glacier have international significance like the Salpausselkä I-III ice-marginal formations, esker ridges and huge drumlin fields. Rokua UNESCO Global Geopark tells about the birth of the esker.

The labyrinth created by approximately 56,000 lakes is a geological nature type unique to Finland. The lake network has been created as a result of post-glacial rebound and tilting of land related to it. The lake nature is complemented by the Baltic Sea's land uplift coasts. Internationally significant places are e.g. Kvarken Archipelago/ High Coast UNESCO World heritage site and Finland's largest inland lake network Saimaa Lake area.

Mires accounted for a third of Finland's land area. Peatlands have been created during the last 10,000 years. Together with northern Sweden's, Kola Peninsula's and the Republic of Karelia's mires them form a unique northern European string bog zone. Internationally well known bog types are raised bogs, aapa bogs and palsa bogs. Representative raised bogs include Kauhaneva-Pohjankanga, Valkmusa and Kurjenrahka in Southwest Finland.

Areas with special geological interest are e.g. Lappajärvi and Söderfjärden meteorite craters. Lappajärvi is a lake is formed from a 23 km wide meteorite impact crater, which is estimated to be 76 million years old. It is Europe's largest crater lake. The Söderfjärden is the result of a meteorite impact about 520 million years ago. "The most beautiful meteorite crater in Finland" has a diameter of about 4 miles and is more than 300 meters deep.

GEOLOGICAL HERITAGE INVENTORY OF PARAÚNA REGION - GOIÁS - BRAZIL

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Keywords: geological heritage, Paraúna Goiás Brazil, inventory

All heritage, cultural, natural, esthetic, scientific or economic value, must be preserved so that future generations can have the opportunity to unveil and understand the history and evolution of the Earth. Preservation is very well accepted by the society that has the conscience to take care of the environment in which it lives. The great barrier in the heritage conservation is to understand the intrinsic values, that cannot be quantified. Geological heritage has more degradation risk around cities because of unplanned development. The geo-heritage could be lost in exploration activities.

The *Paraúna* geosites are constantly used by the local population. The natural monuments of *Paraúna* have degradation risk due to the lack of education, protection and conservation strategies. Five geomorphological geosites were characterized with scientific value in *Paraúna*. The geosites inventory and quantification were carried out to understand the current state of conservation. The *Serra das Galés* is a complex geosite icon and is protected as a permanent preservation area of a farm. This geosite contains the highest risk of degradation, since its geoforms are carved by wind and rain. The conservation of *Serra das Galés* is difficult because of the natural erosional process.

The *Ponte de Pedra* I and II are a set of caves and waterfalls formed by karstic environment with high educational value. The *Serra da Portaria* is an erosional hill and can be considered the best geosite to understand the region stratigraphy and landscape formation process, with high scientific value. The *Morro do Cristo* has a city panoramic view and is visited by tourists. The *Muralha* geosite, in comparison with the other geosites, has no expressive quantification value but contains a mystery created around it by the habitants of the region.

Despite all the problems *Paraúna* is a touristic region with easy geological and geomorphological understanding for all type of public. The *Paraúna* region has a high scientific value which justifies further conservation strategies work and a proper management.

GEODIVERSITY RESEARCH METHODS IN GEOTOURISM

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Keywords: geotourism development, qualitative & quantitative geodiversity, geodiversity classification, assessing methods

It is important that in the first stage of geotourism development is to focus on the basic research of geodiversity analysis. Methods of measurement, classification and evaluation can distinguish the areas with high geodiversity, which is useful for geotourism development. Geodiversity studies should be included in Earth science research priorities, which are very important from the practical points of view. Before attempting to the analyze of geodiversity, it is necessary to correctly explain the geodiversity definition and context. There are many vague definitions that cause inaccuracies in the interpretation of the methodology.

Methods mainly are focused on scientific quality of the objects. It is necessary to include other values in the evaluation process of assessment. This paper include review of methods for assessing a geodiversity and proposal of conduct in methodology. According to that, the most important is the proceedings stencil in quantitative as well as a qualitative geodiversity. Complete geodiversity is assessed by qualitative and quantitative value supplementing the information about the state of the natural environment. Important is to recognize which kind of geodiversity is an output of the other one. This may result in the emergence of the correct order of assessment. The most popular method of presenting geodiversity are the maps. Is available as a GIS spatial analyses. The geodata mainly is basing on the diversity of abiotic components of the natural environment which is create by geodiversity indexes. They are investigated in the context of richness of natural environmental components, efficient management and geoconservation. Innovation of this material is represented by using qualitative and quantitative components in the same assesing. The topic of these both geodiversities is still an open issue however, they can bring more solid and detailed results. Geodiversity can become as important an indicator as biodiversity, even if it is an initial stage of methodology conception.

The evaluation of research can impact fields in geological and geographical science and management of geospace.

*PROMOTING AND CONSERVING THE PALEONTOLOGICAL HERITAGE IN
BEIGUA UNESCO GLOBAL GEOPARK (LIGURIA REGION - NORTH WEST ITALY)*

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Keywords: fossil corals, Oligocene, paleontological geosite, geoparks

Inside the territory of the Beigua UNESCO Global Geopark is located one geosite of particular interest from the point of view of fossil remains: Sassello-Maddalena. The well preserved fossil content of these site highlights the geological history of the territory, referring in particular to the transgressive depositional phases of the Tertiary Piedmont Basin (TPB) on the inner margin of the Ligurian Alps chain before the opening of the modern Ligurian Sea.

The Maddalena succession starts with marine sediments, laying on the metaphiolites of the Voltri Unit, which testifies the early stage of the Oligocene (28 My) transgression of the TPB. This event is here characterized by the development of a small reef of corals and red algae (Corallinales). The reefal buildup is suffocated by coarse to medium grained silicoclastic sediments which exhibit a rich larger foraminifera assemblage (Nummulites and Lepidocyclinids). A new coral and red algae reefal settlement overlays these deposits that are, finally, overlain by mollusk-rich sandstones and pelites, linked to a deepening phase of the basin. The abundant, well preserved, in living position, large coral colonies are the most valuable element of this site. During Miocene the area underwent shallow and deep sea phases until the Messinian (7.2-5.3 My), when the deposition of evaporites closed the history of the TPB. Meanwhile, at the beginning of the Miocene the modern Ligurian Sea was opening southward, changing therefore the paleogeography of the entire area.

The site, equipped with interpretative panels, is characterized by an easy accessibility, an excellent conservation status and exposure of fossil remains (coral colonies still in situ) and an easy reading of stratigraphic succession.

These characteristic make it a perfect didactic geosite, but at the same time, very exposed to natural deterioration and thoughtless drawing of samples.

A new project has been planned to guarantee the best condition of conservation and educational use. The project aims: 1) to identify bigger and better preserved coral colonies; 2) to remove debris material 3) to protect it with a transparent structure. This structure will be accompanied by essential data explanations. The Sassello-Maddalena geosite is already explained in the Geopark's Visitor Centre of Palazzo Gervino, a historical building in Sassello town centre, through a dedicated exposition of some corals and multimedia material which allow visitors to retrace the geological evolution of the area.

ONE SHORE, MULTIPLE SCENERIES: CHALLENGES FOR ASSESSMENT AND USE OF COASTAL GEOHERITAGE IN THE STATE OF SÃO PAULO, BRAZIL

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Keywords: geoconservation, geodiversity, coastal heritage, Brazil

The coastal region of São Paulo State, Southeastern Brazil, has been the focus of geoheritage inventories since 2012. By means of local, town-based inventory work, about a hundred sites have been already selected and intend to compound a list to be the basis of a future geodiversity ecosystem services plan. The current physical configuration of the region is a result of geological, geomorphological and climate processes acting since Archaean and Proterozoic, going through the opening of South Atlantic Ocean – along with an NE-SW line controlled by ancient structures - and variations of sea level. All these processes acting heterogeneously caused strong differences in the morphodynamic nature along the whole coastal zone, strongly controlling the assessment and management of geoheritage.

According to its physical characteristics the region may be divided into distinct segments. The Northern section is characterised by a highly indented coastline, with restricted drainage basins and small bays and beaches separated by rocky promontories, as well as numerous islands. The Serra do Mar slopes are close to the coastline. Most of the geosites are representative of Precambrian events related to the amalgamation of Gondwana Supercontinent, as well as to its breakup, at Cretaceous. At the Central portion (the so-called Baixada Santista) a tectonic-related estuary complex, with tidal channels and mangroves greatly controlled human occupation and land use occur. Local history is strongly related to the colonisation of the country in the XVI century and there stands Brazilian's first village, São Vicente. Being the closest to the capital city, most of the natural heritage has been destroyed, part of which can be seen in several historical monuments and buildings. On the Southern coast, mainly dissipative, long beaches predominate, and the coastal plains are large as a result of tens of kilometers from the Serra do Mar to the coastline. A large estuarine-lagoon system associated with the largest watershed on the coast, the Ribeira do Iguape River, are main local features. Active erosion processes are frequently enhanced by human activities, what makes the sites extremely vulnerable, and fragile. Many of the selected geosites are representative of coastal active dynamics.

Besides geodiversity values, the coast of São Paulo comprises a number of conservation units, including two UNESCO's Biosphere Reserves related to the Atlantic Forest. It is also home to important traditional communities, such as fishermen (the Caiçaras), remnants of African slaves settlements (the Quilombolas), and indigenous people (mainly Guarani and Mbya-Guarani ethnic groups), which hold outstanding intangible cultural heritages. Strong relationships between built heritage and geodiversity are extensively found in stone materials used in constructions and monuments, since these materials comes mostly from local lithotypes.

As the most populated and industrialised state of Brazil, São Paulo's coast is the focus of extreme property speculation and a tourism industry that lacks environmental concerns. Adequate evaluation of geoheritage leading to future inclusion in territorial management programs may be the key to sustainable use of its abiotic natural heritage.

*GEOHERITAGE AND ADVANCED TRAINING FOR THE OIL INDUSTRY:
THE LUSITANIAN BASIN CASE-STUDY (PORTUGAL)*

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Keywords: technical applications of geoconservation, Lusitanian Basin, petroleum systems, advanced training

The Lusitanian Basin (Central Portugal) is a recurring subject of study within different disciplines of Earth Sciences, mainly because of the expressiveness and representativeness of its stratigraphical and paleontological record, as well as the world class quality of outcropping elements of petroleum systems and salt tectonics geometries. In fact, in the Lusitanian Basin three global stratigraphic references were defined for the Jurassic System – the Toarcian GSSP, the Bajocian GSSP and the Bathonian ASSP –, but the sedimentary record of the Lusitanian Basin includes a set of outcrops that provide favorable conditions for educational activities, in the frame of the Portuguese Educational System, which are increasingly being sought for the development of advanced training activities in the context of the hydrocarbon exploration models.

The Geosciences Centre of the University of Coimbra (Portugal) has more than one decade of knowledge transfer to the oil industry through training and field courses developed in the Lusitanian Basin, as well as organizing unit of international scientific meetings on petroleum geology. Training activities are mainly focused on the use of outcrop analogs of elements and processes of petroleum systems that occur along the western costal area of the basin as a resource for the study of other extensive margins in the Atlantic Province.

This paper presents the main reasons that attract this particular public, which includes geo-specialists and geo-experts, to the Lusitanian Basin outcrops, as well as the geosites that are currently visited for advanced training purposes by different oil companies – Cape Mondego, Praia do Pedrógão, S. Pedro de Muel, Paredes de Vitória, S. Martinho do Porto, Peniche and Praia de Santa Cruz. As so, the geological heritage of the Lusitanian Basin represents a paradigmatic example of the relevance of enlarging the traditional vision that Technical Applications of Geoconservation are limited to scientific research, education and geotourism, the last one considered in the sense of an activity intended exclusively for geo-amateurs and/or to people who are either unaware or interested in learning about geological issues.

MAVECURE: THE IMPORTANCE OF GEOCONSERVATION FOR A STRATEGIC SITE IN THE GEOLOGICAL AND ECOLOGICAL EVOLUTION OF COLOMBIA.

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Keywords: Mavecure , granitic rocks , Orinoco , Amazon forest

The geographic location and geological conditions of Colombia provide a perfect setting for complex relief and high geodiversity. Based on these general features, there are two main regions. The Andean region in Colombia comprises unique hydric, orogenic, glacier and volcanic systems in a highly tectonic setting. The region to the East is characterized by low altitudes with sabana, plateaus and inselbergs in the big Amazon forest which works as an atmospheric regulator to Earth.

These research is mainly focused in Mavecure, the isolated mounts in Eastern Colombia. It is a precambrian rock complex that was exposed by intense periods of erosion, and represents one of the oldest exhumed surfaces in South America. It also serves as habitat for a complex ecosystem in the Amazon and Orinoco regions. Therefore, it becomes a key setting for biological exchange, favoring the colonization of endemic species in a highly geodynamic setting.

In addition, it has been an important constraint in the evolution of indigenous tribes that are not involved with modern society. Their myths and stories reflect the importance of the geomorphology and natural resources in the area for their community development and survival. Some heritage features include granitic caverns, joints or giant blocks. This oral tradition entangles their roots and social sense as members of a larger system. Then, Mavecure becomes both a natural and cultural patrimony site for Colombia.

Mavecure constitutes one of the most important RAMSAR sites in Colombia visited by Alexander von Humboldt. It is the landmark where Orinoco, Negro and Guaviare rivers converge, forming a fluvial star in the precambrian basement. However, protection authorities in Colombia do not account for geological or geomorphological processes when declaring national heritage or natural sites, leading to the absence of any geopark in the country. Therefore, there is no tourism regulation in important places such as Mavecure.

This project will aim to the development of a database with the characteristics and methodologies for geoconservation. It will help develop and promote strategies to create awareness and declare Mavecure as a strategic geological and biological site. The final objective will be the establishment of the first granitic geopark in South America.

*COMBINING GEOLOGY, PALAEOLOGY AND ARCHAEOLOGY INTO A MULTI-
ATTRACTION TOURIST DESTINATION - CASE STUDY OF VIMINACIUM
(DANUBE REGION, SERBIA)*

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Keywords: geotourism, mammoths, Viminacium, Serbia

The Danube region in Serbia is home to numerous geological and geomorphological features as well as paleontological remains of mammoths and other animals that testify to the long and vivid history of this area. Besides these attractions, this region contains valuable cultural heritage dating back to prehistoric times as well as the remains from the Roman and Medieval period. One of the places where all of these attractions come together is the ancient Roman site of Viminacium. This site provides all of the necessary attractions for creating a unique multi-attraction destination. Viminacium was the capital of the Upper Moesia Roman Province and a military camp from the 1st until the 4th century AD. In 1979 the site was classified as a cultural heritage site of great importance and in 2006 it was opened for visitors. So far, only less than 3% of the city has been excavated and presented to the public. These excavations are the main tourist attractions of the site and they include the Emperor Hostilian's mausoleum, amphitheatre, necropolis, baths and the remains of a highly developed infrastructure.

In addition to Roman heritage, this site is also home to a complete steppe mammoth skeleton from Middle Pleistocene fluvial deposits discovered in 2009 just 300 meters from the archaeological park. The skeleton is remarkable for its completeness and excellent state of preservation, and one of very few known skeletons of its kind. Furthermore, in 2012 over 300 bones of mammoths and other late Middle Pleistocene mammals were discovered nearby. All of these attractions were discovered at the Drmno mine open area, the second largest mine open area in Serbia. These fossil discoveries resulted in the creation of the first ever Paleontological Park in Serbia in 2014, right next to the archaeological park. The park exhibits all representative skeletons to the public in a specific artificial cave-like construction. Besides these archaeological and fossil remains this area also hides valuable geological heritage. All of the remains were discovered in aeolian loess sediments which present a significant archive of Middle and Late Pleistocene palaeoclimatic and palaeoecologic changes. The tourist offer of Viminacium could further be extended with the interpretation and presentation of these sections as well as the industrial heritage of the Drmno coal mine. The combination of a unique landscape and rich geological and archaeological heritage of considerable scientific and educational value packed together in one product is particularly interesting from the tourism perspective. Not only would this destination be a good choice for those who already possess some degree of scientific knowledge and interest in geology and archaeology, but it might also capture the interest of those who have little or no knowledge of the Earth Sciences.

Although not formally designated a geopark the park shares many of their characteristics. Both the park's host community and its visitors are seemingly interested in this type of multi-interest attraction; the former typically endorse the park's development because they benefit from the income, attention and educational opportunities it generates.

*STEPS IN THE DEVELOPMENT OF A GEOCONSERVATION STRATEGY FOR ALTO RIBEIRA
TOURIST STATE PARK (SÃO PAULO, BRAZIL)*

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Keywords: geoheritage, carrying capacity, geotourism, Alto Ribeira Tourist State Park

The Alto Ribeira Tourist State Park (PETAR) is located in the Ribeira River valley, state of São Paulo, Brazil. The park covers an area of 36,000 hectares and includes the Environmental Protection Area (APA) of Serra do Mar and the Mata Atlântica Biosphere Reserve. The area of PETAR integrates the Mantiqueira orogenic system of Neoproterozoic age (800-500 Ma). The main lithological types are Cenozoic sedimentary deposits, Jurassic-Cretaceous basic dykes, granitic bodies, and metamorphic rocks of the Açungui Supergroup. Carbonate rocks are responsible for the regional karst systems, known as Açungui Speleological Province. The main objective of the undergoing project is to define a geoconservation strategy for PETAR in order to promote a sustainable touristic use of the geological heritage. PETAR has been chosen due to its geological and speleological heritage importance, which includes approximately 450 caves. The project started with a literature review, followed by a preliminary inventory of geological sites, based on a previous inventory made for other purposes. The inventory phase was concluded with field work to identify and evaluate the geological sites and also to characterize the visitors' profile of PETAR and the existent regional touristic offer. At the current stage of the research, methods to assess the carrying capacity of sites are being developed. These methods are based on previous proposals and aim at providing management tool for the geological sites with most touristic potential. Future tasks will include the geological interpretation of sites, adapted to the public that was characterized, aiming the promotion of a high-quality geotourism based on a good interpretation and on sites with low degradation risk. At the end of the project, it is expected that PETAR managers may apply its main outputs in the management plans of this protected area, which is one of the main natural attractions of the State of São Paulo

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SOBRARBE-PIRINEOS: AN OUTDOORS CLASSROOM TO LEARN ABOUT THE MAKING OF MOUNTAINS

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Keywords: geoeducation, geoparks, mountain geology, Sobrarbe-Pirineos

Geoeducation is one of the main tasks of an UNESCO Global Geopark. To facilitate the transfer of knowledge from the geologist to the non-university students is not easy but it is necessary. Sobrarbe-Pirineos Geopark is located in the center of the Pyrenees, a mountain chain of Alpine origin but also with a Variscan nucleus. Sobrarbe geodiversity comprises rocks from the Cambrian to the Holocene, all kind of tectonic structures often showing clearly relations between tectonic and sedimentation and outstanding examples of all kinds of high mountain morphologies (glacial, periglacial, karst, fluvial, slopes...). These characteristics constitute a great frame to teach the geology of mountains not only to university students but also to those of Secondary and also Primary school.

To achieve such a goal, Sobrarbe-Pirineos Geopark offers to teachers and pupils a wide variety of activities and facilities. There are three specific educative itineraries addressed to Secondary School pupils. Besides that, many routes of the geo-trail network have already been tested with pupils checking the usefulness of the route and the interpretation materials in the frame of the formal education. The visitor center also constitutes a good starting point to get immersed in the geology of the Pyrenees. Within the Geopark, there is a student's residence of the Aragón Regional Government that makes the stay of the school visitors easier and cheaper. Several groups visit every year the Geopark making use of all these facilities and materials. Most of them take itineraries located in the center of the Geopark that deal with (1) the characteristics of the rocks, (2) the generation of the structures and the raising of the mountains and (3) the shape of the landscape and its evolution through time. In addition, some groups include or are entirely composed by pupils with special education needs and then materials are adapted in order to facilitate their work while in Sobrarbe.

*PROJECT "RAINS & RUINS", AN EDUCATIONAL TOOL BY THE APUAN ALPS UNESCO
GLOBAL GEOPARK (ITALY) FOR DISASTER RISK REDUCTION*

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Keywords: flood, geological hazards, educational tool, disaster risk reduction

In accordance with the IGGP-International Geosciences and Geoparks Programme, the UNESCO Global Geoparks (UGG) are invited to organize a variety of activities to communicate geoscientific knowledge aiming at raising the awareness of the local inhabitants in understanding of natural processes and hazards.

The Apuan Alps UGG is working on building more resilient communities that have the knowledge and skills to effectively respond to potential geological hazards.

One of the main achievements is the "Rains & Ruins" educational exhibition dedicated to the 20th anniversary of the devastating flood that occurred on 19th June 1996 in the Apuan Alps, between Versilia and Garfagnana. The history of the Apuan Alps is a history of rains and ruins. Here, the floods return sooner or later with such a unique and sudden violence; disasters are not the rule, but the recurring exception. Landslides and floods belong to everyone's experience, yet people forget quickly after each reconstruction.

Using the memory of past disasters is the best way to warn about the geological risks and hazards and to develop educational activities for all ages but above all for school-aged kids.

The "Rains & Ruins" exhibition includes images, informative panels, multimedia and educational tools about the 1996 flood, the heaviest storm we had ever seen in the Apuan Alps. On that day, Nature combined an explosive mix of particularly hazardous "ingredients". Uncommon meteorological and geographical factors caused a monstrous rainstorm. Destructive and impetuous flood waves came down from the central-southern Apuan Alps. It was not just a water wall but actually a fluid saturated with rock and plant debris. It was this impressive solid transport of the rivers that determined devastating consequences with more than 600 landslides, mostly debris flows.

The experience of the 1996 flood has significantly guided the Park Master Plan with management guidelines and written rules to prevent and mitigate the damage caused by landslides and floods.

In addition, local communities and Geopark visitors should receive accurate information about the causes and ways to reduce the impact of this particular geological hazards. A special catalogue of the exhibition has been printed as educational tool to spread knowledge and awareness for the local people, the Park visitors and the school-aged kids.

The project "Rains & Ruins" presents an example on how UNESCO Global Geoparks through sharing of experiences and knowledge with their partners can support local communities, learning from the past in order to build a safer future.

*EDUCATION IN REYKJANES UNESCO GLOBAL GEOPARK IN ICELAND:
USING GOOGLE MAPS AND VIRTUAL REALITY IN NATURAL SCIENCE EDUCATION*

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Keywords: education, natural science, google, virtual reality

The presentation will focus on an ongoing project involving Google Maps Education, Reykjanes UNESCO Global Geopark, Visit Reykjanes and GeoCamp Iceland. The aims of the project will be to photo map hiking paths and geosites in Reykjanes Geopark in cooperation with Google Maps with emphasis on creating educational tools and assignments for student groups and exploring geological sites in the area in VR.

Teachers and students within the field of earth and natural sciences have always emphasized the benefits of outdoor active education, but recently the access to a bigger variety of sites and geological places of wonder has become within the reach of a bigger group. Today it is not uncommon that student and teacher groups at undergraduate level or even secondary schools travel to other countries for project work and on-site training as part of practical science education.

Increasingly international student and teacher groups have turned to Iceland natural science education and site visits to geological, geographical and cultural places of significance. They have realised the potential of outdoor active education, especially when focusing on geology and renewable energy.

Reykjanes UNESCO Global Geopark has become a popular destination for these groups because of easy and short access to places of geological interest, earth formation, visible tectonic plate boundaries and utilisation of renewable energy sources. For them the active involvement and close proximity to the sources of geophysical activities and harnessing of renewable energy sources, is equal to few other places on earth. This closeness to raw and unspoiled environment along with easy, inexpensive and frequent access is the ultimate natural science classroom and provides an ideal learning environment for study groups.

In cooperation with Google Maps Education, Reykjanes Geopark, Visit Reykjanes and GeoCamp Iceland, have begun an extensive image mapping of the geopark with emphasis on key areas of geological and cultural significance. The resulting images will be displayed in Google Maps and offer study groups – both international and local – with the possibility to prepare their visits to the park prior to their arrival. The images will also offer additional information and access to Virtual Reality experience as they are connected to practical project and educational assignments developed by local educational institutions.

By mapping the Geopark visitors will be able to augment and receive additional information on numerous sites within the park and students will be able to explore and learn about the park in Virtual Reality, as well as deliver their assignments electronically within Google Maps.

The focus of the presentation is to show how we are able enhance understanding of Reykjanes UNESCO Global Geopark by offering natural science education and connecting international teacher and student groups with the local population through on-site practical training and applied educational activities in Virtual Reality. Conference guests will be invited to take a look at the project results at EGN2017 in virtual reality display.

MUSIC & STONES, THE CANTATA "QUERALT, THE DREAMER", AN EXTRAORDINARY WAY TO EDUCATE ON THE VALUES OF THE CENTRAL CATALONIA GEOPARK

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Keywords: cantata, music, stones, education

The Geopark of Central Catalonia held on 2016 a cantata that brought together almost 900 children from 21 different music schools of the Geopark region. With the title "Queralt Somiatruïtes" (Queralt the Dreamer, in Catalan), the cantata wanted to show the singularity of our territory through a pedagogical activity to spread the preservation task that is being carried out by the geopark of Central Catalonia.

The participating children, ranging from 3 to 8 years old, interpreted the music and texts created for the event. The Cantata was an extraordinary way to promote awareness of the outstanding values of our geological heritage. The names of the characters, the music, the scenarios, the illustrations and the texts have been consciously chosen to add value. Indeed, one of the protagonists of the Cantata was the Mole the Geologist, the mascot of our geopark.

The story revolves around the Queralt Somiatruïtes, a very imaginative girl whose feet rose from the ground when she started to daydream. Her grandmother Barbara proposes that they get stones with memories so that they can be put in their pockets so they can have their feet on the ground. This way, the storyline introduces some of the stones that better reflect the geological and non-geological values of our geopark: a fossil representing science, a plaster representing imagination and dreams, a round stone symbolising patience and effort, and a heart-shaped stone representing love and passion for life. An adventurous journey starts where each of her grandfathers and grandmothers gives her a stone with a special memory.

Merchandising material was published and distributed for the very day of the cantata representation: a brochure, the booklet with the music, texts and illustrations, a CD containing the original music among others. One of the many epic moments was when the attendees to the Cantata sung the adventures of Queralt Somiatruïtes on their journey through the Geopark. The people who attended to the cantata were given promotional material from the geopark with the objective of promoting the geological importance of the territory and enhancing geotourism.

A VISITORS CENTRE WITH AN INTERACTIVE APPROACH

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Keywords: interactivity, communication, education, geological heritage

Gea Norvegica UNESCO Global Geopark lies in southern Norway, and covers an area of 3000 km². In a geologic perspective, the area consists of four distinctively different domains in terms of origin and age, spanning from Precambrian bedrocks (1500 Ma) to the magmatic rocks of the Permian Oslo rift (280 Ma). Flavoured with a carbonatite volcanic region (580 Ma), pristine cambrosilurian successions (542 – 417 Ma), orogenic events and countless glaciations, the diversity of rocks and landforms in the area is significant, creating the foundation for multiple industries, agriculture and scientific discoveries, in the past, present and future.

As an UNESCO Global Geopark, our main obligation is to convey the links between this rich geological heritage and all other aspects of the area's natural, cultural and intangible heritages, and with that lift the general knowledge and awareness in our community. To fulfil this, Gea Norvegica Geopark has created a visitors centre with a focus on learning through interactivity, using both traditional and state of the art technology.

In many visitors' centre, the rock collection is central, traditionally containing showcased first-class samples which in many cases are not very accessible for the visitor and maybe a bit static. To reinvent our display of rocks from the area, and to make it more dynamic, we have taken in use radio frequency identification tags (RFID). The RFID-tag is attached to a rock, and a specific information page containing pictures, facts and illustrations about the rock is unlocked for the visitor if the rock is placed on a reading plate. In fact, the RFID-tag can be attached to any given object of interest, i.e. an end product from one of the many industries founded on the geological materials of the area.

If a visitor found a rock of special interest, and wants to explore it up close, the centre also features optical microscopes for thin-section or water sample studies. The microscopes are fitted with live video transfer making group teaching possible. Further, a large interactive map of the geopark is available at a touchscreen making it possible for the visitor to see exactly where the studied rock or object of interest comes from. The map also features information and links to the whole Global Geopark network, so the visitors can explore any of our colleagues geoparks.

To sum it up, the centre creates unlimited possibilities to present our unique geological heritage, and we are proud to present it to our fellow colleagues and the general public.

*ENVIRONMENTAL EDUCATION ON THE AZORES GEOPARK:
ONE FOR ALL AND ALL FOR ONE*

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Keywords: environmental education, geoeducation, partnerships, educational resources

Ever since its beginning, the Azores Geopark has always betted strongly on public awareness and environmental education activities. Being an archipelagic geopark, it is due to the partnerships with the science centers and the environmental interpretation centers, scattered all over the Azorean territory, that every year an assortment of activities is offered to the Azorean population, covering every island of the archipelago.

The main partners of the Azores Geopark on these activities are the Island Natural Parks, public companies, non-profit associations and municipalities. The type of activities varies widely, depending on many factors, such as the partners, target audiences, themes of the year, teachers requests, among others.

The main campaigns that are promoted annually are: the World Earth Day and National Geological Heritage Day, the Geopark school program (which is disclosed together with the School Program of the Island Natural Parks) and the European Geoparks Week. The Geopark School Program includes environmental education activities for all different Education levels. This involves the schools and students from the archipelago, but also from the mainland and other countries, during all the school year.

The Geopark continuously produces educational resources, such as PowerPoint presentations with guidelines for teachers, differentiated by grade level (available free online on the web page www.azoresgeopark.com); children books "The volcanos of Azores – children guide" and "The rocks of Azores – children guide", children activities and games; programs for field trips to the "Geosites of My Island" and proposals for teacher activities; brochures and Geosite maps.

Another important activity for the Azores Geopark is conducting training activities for the technicians of the Island Natural Parks, tourist guides, teachers and other professionals who work in geoeducation, geotourism and geoconservation. Targeting specially the teachers and educators, the Geopark offered workshops in the Environmental Education Regional Meetings, which happen every two years.

The Azores Geopark also strongly supports the Portuguese Olympiads of Geology, created by the National Geological Society, ever since its first edition in 2015, by organizing the regional round in this Autonomous Region and supporting the Azorean students that pass to the national and final round, in mainland Portugal. The students that win this national competition go to participate in the International Earth Science Olympiads, where in 2015 and 2016 Portuguese students won several medals.

INNOVATING IN GEOSCIENCES' EDUCATION: A COMIC BOOK EXPERIENCE

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Keywords: education, aspiring geopark, innovation, art

Earth Sciences, and Geology in particular, seem hard to understand for people. The Beaujolais Aspiring Geopark has a key role in choosing the right speech and in finding and developing the right tools for scientific mediation in geology. Besides people on the field, whom remain the essential part of an educational policy on geosciences, we sometimes have to create educational material so people can understand the great geological history of the Beaujolais by themselves, on sites or in schools.

In 2017, the Beaujolais Aspiring Geopark decided to launch a Mobile App built with the educational authorities. First innovative project for the Aspiring Geopark, this Mobile App gave us ideas on how to make people and science communicate.

Comics, the 9th Art, is a distinct and particular art form. It has not been long since comic books have gained recognition as an art form. We believe they can be used as an educational and informational asset too.

A modern way to communicate:

In France, comics with a didactic purpose are scarce.

Mostly we find didactic isolated drawings, but most of the academics and "traditional" educators do not use comics much.

But we have to insist and question the links between amusement, pleasure, and knowledge, and that is the main reason why we decided to push for this project.

Drawing is not intended to replace the didactic text; it has its own characteristics. If the text is a way to knowledge, the comic (drawn history) is a gate to a personal learning path: comics can be a privileged invitation into the educational policies, a way for one to discover and create his or her own path to understanding.

A modular tool for a wider audience:

The use of comics as a didactic tool enables us to reach a wider audience, it being school public or general audiences.

In this comic, we chose to focus on the geological history of the Beaujolais, which can be separated into eight parts. Therefore, eight pages of comics will be created, which can be used together or separately.

An artistic work: give a place for artists into the Geopark project.

Besides being an educational project on geosciences, this project is also a way to introduce ideas about art and creativity to the public. We have, as a Geopark, to preserve the truth on scientific information. But this comic, besides being an institutional demand, is also a demand to a local artist whose creative liberty must be valorised and respected. This way, the resulting work can be more than just an entertaining way of assimilating institutional information. Our aim is with this project to be a wholesome work of art, a collaboration between the institutional, the scientific, and the creative, and a successful step in the journey to building new approaches to learning and spreading information.

EARTHWORKS - DEVELOPING GEOLOGICAL INTERPRETATION AND EDUCATION IN THE NORTH PENNINES, UK

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Keywords: interpretation, education, community, tourism

Those who work in Global Geoparks are always trying to find new ways to bring their geological heritage to life and to engage new audiences. This is often against the backdrop of diminishing budgets and a constant search for new resources. In this context the Geopark team in the North Pennines is pleased to have been able to secure funding from the UK's Heritage Lottery Fund to further its work in helping people to enjoy, explore and understand geoheritage in this beautiful part of northern England.

The new work includes IT based interpretation of geology and landscape, temporary art installations, film-making, writing and photography projects, alongside a range of work with local schools. Training elements of the programme include guide training and three year-long apprenticeships. In a new area of work for the Geopark team, the project will enable a long term engagement with people with visual impairment, who will be able to experience the tactile nature of our rocks.

Children are being invited to make films about their geo-heritage, and to create new ICVT-based interpretation. Each school child in the Geopark is also being invited to take part in what may be the country's largest public art project, by placing a rock of their choice in a large stone artwork on the North Pennine moors. Geosites will be made more accessible as part of this work and new geotrails will be created from villages within the Geopark where the team has not created such trails in the past. New partnerships are also being created to help devise and deliver this programme, including with the Natural History Museum (London) and an organisation dedicated to working with visually impaired people. New partnerships with businesses will be created through the project, which will also seek to have a deeper engagement with the area's three destination management organisations.

The project is being developed by the North Pennine Area of Outstanding Natural Beauty (AONB) Partnership, the managers of the North Pennines UGG. Depending on the outcome of an INTERREG bid with partner UGG, Earthworks will also have a transnational collaborative element alongside its UK Heritage Lottery funded programme.

The presentation will cover all aspects of the project and be illustrated from work in development and using examples of past successes in this field. It will invite sharing of ideas and new collaborations across the Global Geoparks Network and with those developing new UGG applications.

CHARACTERIZATION OF SOILS AND "TERROIRS" OF THE BEAUJOLAIS' VINEYARD

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Keywords: vineyard, Beaujolais, soils, terroir

The name "Beaujolais" is known worldwide mainly for its wines and vineyard. About 50 kilometers long and 15 kilometers wide, it extends along the Saône River between the south of Burgundy and the north of Lyon city. Twelve denominations make up the Beaujolais vineyard, including 10 Crus and the Beaujolais and Beaujolais-Villages names. The geological diversity of the region plays a major part in the landscapes' morphologies and in the creation of specific "terroirs". In order to learn more about the natural characteristics of the vineyard, it has been decided to launch a study to characterize wine-growing soils and "terroirs".

Since 2009, the study of characterization of soils and "terroirs" of the Beaujolais' vineyard is carried out by SIGALES; a consulting firm specialized in mapping, soils and "terroirs" studies. An extensive field work was made on all 18,000 hectares of the vineyard, with more than 1,000 excavated wells and nearly 20,000 auger holes made. In parallel, the organization of workshops with local winegrowers has helped to refine the mapping work. The end of this study and the delivery of its final results is scheduled for summer 2017:

i) A better geological, pedological and spatial knowledge of the vineyard: Based on scientific research and methods, this characterization study makes it possible to obtain new knowledge on the composition of the soils and the superficial geological formations of the Beaujolais' vineyard. The near-field mapping work is so precise that it has been possible to refine the boundaries of geological terrain in some areas. Also, particular geomorphological formations could be identified;

ii) Awareness-raising and pedagogy with the different actors of the wine industry and the public: On the basis of the obtained results, it will be possible to recommend an adaptation of cultural practices to the environment in collaboration with local partners (winegrowers and technicians). Advices maps could be produced to help winegrowers production control costs and respect the environment. Soils maps can also be wonderful educational tools for different audiences;

iii) The valorization of the soils and "terroirs" to improve the image of Beaujolais wines: Soils maps are not perceived as an outcome but as a working tool available to all professionals in the field. The notion of "terroir" will take full meaning in the communication that will be made around the wine as an economic product, thus participating in restoring a quality image to the Beaujolais' wines. This can be associated with the territory and its landscapes as part of a promotion of destination oriented towards sustainable and experiential tourism.

The Aspiring Geopark Beaujolais has already been able to understand the importance of such a study in its project of knowledge and enhancement of the geo-heritages of its territory. Some valorization projects were created thanks to collaboration with SIGALES, the viticulture and tourism community: creation of an exhibition module on the links between soils and parental geological materials, giant maps for sensitization of the public, training courses for students in viticulture, and more to come.

RAISING AWARENESS OF GEODIVERSITY SERVICES IN TERRAS DE CAVALEIROS UNESCO GLOBAL GEOPARK

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Keywords: geodiversity, services, geosite, sustainability

Nature provides all the goods, conditions and services for the maintenance of life, societies and human well-being. Most of the approaches (e.g. United Nations Millennium Ecosystem Assessment) advertise these benefits as ecosystem services, mostly associated to the renewable resources on a biological basis. More recently, non-renewable and renewable geodiversity services are being framed into the MA ecosystem services categories: regulating, supporting, provisioning, and cultural services (Gray et al., 2013). In order to promote the geodiversity values, the Terras de Cavaleiros UNESCO Global Geopark (TCUGG) is now introducing the geodiversity services concept in the educational and touristic programmes.

All geosites can be presented within the scope of the geodiversity cultural services taking into account that they provide data to develop our scientific knowledge. In the most important TCUGG geosites, the educational approach stress the contribution of these sites to the knowledge of the Earth history. Geodiversity cultural services also include aspects like recreation or spiritual experiences, with numerous examples in TCUGG, as well as in all other geoparks.

The TCUGG promotes the understating of the sustainable use of geodiversity provisioning services and offers teachers training and educational programmes focused on geological resources. These programmes include the visit to active quarries exploiting construction materials, and mines exploiting industrial minerals like talc (active) and tungsten (inactive). Other provisioning services like freshwater and mineral water are mentioned in the geosites related with thermal springs in the geopark. This topic is also addressed in the geopark interpretative centre dedicated to the characteristics, origins and uses of ore minerals.

The geodiversity supporting services refers to the geology as an essential foundation for biodiversity (services to the ecosystems) and human activities (direct supporting services). Locally, the Earth dynamics is expressed by a diversified landscape with mountains, plateaus and valleys sculpted on a variety of rocks, which results on a remarkable biodiversity. One of the TCUGG educational programmes is focused on the relief as the structuring element of the landscape and on the relationship between geodiversity and biodiversity. Soil processes, especially weathering and soil profile development, are well observed in many outcrops and geosites. The understanding of the slow soil formation, on the scale of the geological time, raises awareness for the importance of its conservation. The habitat provision is also clearly comprehensive in the Morais massif, the core of the geopark, were the endemic vegetation is clearly related to the occurrence of exotic ultramafic rocks.

Direct geodiversity supporting services to human well-being are represented by the hydroelectric dam in Tuela river gorge and by the wind power on the top of Bornes Mountain.

Finally, examples of geodiversity regulation services are scattered throughout the TCUGG. These services can be illustrated with the importance of rocks as essential natural filters for water quality regulation in the context of the hydrological cycle, and the importance of the rock cycle as a nature regulation service, attending to its importance for carbon sequestration, storage and climate regulation.

*WHAT'S A LOGO WORTH? - INCREASING THE BRAND AWARENESS IN
REYKJANES UNESCO GLOBAL GEOPARK, ICELAND*

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Keywords: branding, logo, awareness, enterprises

Reykjanes UNESCO Global Geopark has for the last years promoted the use of its logo for the purpose of increasing the brand awareness.

Reykjanes UNESCO Global Geopark joined the European Geoparks Network in 2015. Its one of the youngest geopark in the network. Its also a young section of Iceland. It is a land-born, highly volcanic counterpart of the Mid-Atlantic Ridge where two tectonic plates diverge at an average rate of 2.5 centimeters per year. Reykjanes is a popular destination in Iceland with almost 300 local enterprises in tourism.

Visibility is essential for UNESCO Global Geoparks. Its important to stimulate ecotourism in the area and promote sustainable local economic development. In 2016, Reykjanes Geopark (RGP) begun to work on contracts between the Geopark and local enterprises about the usage of the logo. RGP soon came to realize the only way to make the logo worth something, is if the enterprises make the logo valuable.

The RGP logo is not for everyone to use. It is a symbol of something special. The logo is supposed to be desirable. Even though RGP makes demands, the user guidelines are simple, built on guidelines from other geoparks and the European Geoparks Network.

Enterprises using the logo will have prior access to material published by the Geopark, e.g. educational and information material. The enterprises will also have access to short educational videos about the Geopark, its geology and culture. They also should accept the logo guidelines and use the logo as RGP request.

The focus of the presentation is to show what a good design can do for Geoparks, how the local enterprises make the RGP logo valuable for others to seek after and how to combine the UNESCO temple logo with RGP logo with examples of the use of the logo in Reykjanes UNESCO Global Geopark.

GEOETHICS AS INDISPENSABLE TOOL FOR GGN IN THE CONTEXT OF THE AGENDA 2030 FOR SUSTAINABLE DEVELOPMENT

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Keywords: Geoethics, UNESCO Global Geoparks, Agenda 2030, Sustainable Development

With the new designation UNESCO Global Geoparks (UGG) it was understood that networking activities and balanced geographical representation across all Member States are fundamental principles. Bearing in mind that UGG are also encouraged to develop themes that are promoted or supported by UNESCO, UGG can be considered key actors in the promotion of the 17 Sustainable Development Goals (SDGs) of the Agenda 2030. In this sense, in a recent questionnaire applied to 22 UGG, in the framework of an ongoing research study, only 33% of the answers considered very important the SDG N.16 "Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels" and its targets. However, this goal is very relevant for UGG according to the guidelines that the management structures should consider in their strategic plans to promote peace and human rights and guarantee access to information. On the top of this it is also pertinent to reflect about the role of geoscientists in the territorial management of the UGG, who should seek to contribute to an effective regional sustainable development. It is also crucial to think about the role of the ones chosen to become evaluators regarding evaluation missions on UGG. It is in this reality that more than ever it is important to take into account the importance of Geoethics when speaking about the UGG strategies and adopted policies. Considering that Geoethics consists on the research and reflections about values that underpin appropriate behaviours and practices, wherever human activities interact with the Earth system and facing the new statutes of International Geoscience and Geoparks Programme (IGGP), Geoethics should also be at the core of the UGG concept. But how can this be implemented in a network that counts already with 127 territories spread among 35 countries with such a rich cultural diversity and with so many different socio-political realities and that it will be increasing every year? Furthermore, can in fact Geoethics be considered a useful tool inside the GGN activities and strategies? Can capacity-building on this issue be spread out worldwide through these global and its regional networks? Bearing these questions in mind, following Geoethics principles is a very useful tool for all UGG, aiming this way to find constructive and positive relationships and partnerships, allowing to find ways and solutions for an effective contribution of these territories to the Agenda 2030 for Sustainable Development and some of their specific SDG's.

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Keywords: sustainable tourism, environmental education, UNESCO MAB area

Rich in natural monuments Saarte Geopark area covers over 700 islands and islets in western Estonia. The biggest island Saaremaa is well known amongst tourists because of its location and isolation.

Geologically, the area is famous by the internationally recognized Kaali meteorite crater. However, the main pillar of Saarte Geopark is based on the presentation of the Silurian era. The outcrops of the Silurian are located all over the islands and present $\frac{3}{4}$ of the Silurian era. Most of them are exposed along on the seashore and form high or low cliffs.

Saarte Geopark has an overlapping area with the West Estonian Archipelago Biosphere Reserve (established 1990). It is a UNESCO Biosphere Reserve in Estonia, located in the West Estonian archipelago in the eastern Baltic Sea. In addition to the overlapping area we carry the same values, and develop our cooperation in designing environmental friendly lifestyle.

Saarte Geopark is cooperating with UNESCO MAB (Man and Biosphere) area to raise awareness in locals of sustainable management and lifestyle. Best way in adult training (local people and also tourism entrepreneurs) is the involvement of children as information multipliers. To ensure the broad impact of the geopark to the economic and social development, NGO Saarte Geopark has started The Geopark Ambassador Project.

To support sustainable tourism in our area, the most important and efficient way is to train local pupils to be a Geopark ambassador, at first to understand connections between local nature and cultural heritage and for the second to spread the knowledge.

Schooling is done by project days, excursions and summer camps where groups can research their favourite subject related to geological, natural and heritage sites in Saarte Geopark. The aim is to introduce the topic by make a presentation, worksheet, short movie, or why not music video or comic. The outcome is distributed at Estonian schools, local newspapers and social media channels.

Geopark ambassadors are also involved in further projects as Geopark and MAB area experts with their youthful view of life.

VOLCANO DAY IN THE NOVOHRAD-NOGRAD GEOPARK

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Keywords: geological heritage, interactive volcano show, role play, Ipolytarnoc Fossils

The main gateway to the Novohrad-Nógrád Geopark is the Ipolytarnóc Fossils site, where a rhyolitic volcanic catastrophe destroyed and conserved a 18-Million-year-old habitat.

Interactive volcano show commemorates this event in the Ancient Pine Visitor Centre of the site each year, during the EGN week. Slovak and Hungarian schools attend it, which is one of the most successful programs of the hectare-large Nature Conservation Area.

The leading volcanologist, prof. Szabolcs Harangi (the head of the Hungarian Academy of Sciences-ELTE Volcanology Research Group) always provides an entertaining environment, where the pupils can become members of a Volcano Observatory. For the students it is a role-playing game with spectacular experiments.

The themes speak by themselves:

A volcanic eruption is imminent! How could this happen? What does volcano monitoring mean and how could a volcano eruption be forecasted? How can the magma move through the crust, what is the driving mechanism and how this helps in the monitoring work?

Triggering eruption: explosion or effusion? Predictions and minimising volcanic hazards by evaluating safety actions after a spectacular volcanic eruption on the spot.

Questioning the likelihood of further volcanic eruptions in the Carpathian-Pannonian region can give a perspective of the active volcanism on our dynamic Earth effecting climate changes.

Beside the main volcano shows (twice a day) posters and movies about volcanic eruptions can be seen inside the Visitor Centre. The 4DX movie, an animated time travel to the Miocene volcano is purely fun, but the guided tours on the geological trail, where ignimbrites with charred plant remains are exposed are serious professional programs.

The host is the Bükk National Park Directorate, which provides blind, touching rock tests from the geopark's volcanic rocks (basalt, andesite, dacite and rhyolite types). More than 600 people take part in each volcano day, which the children consider a great fun. Interpretation of geological processes in a playful way can be rewarding even for the teachers.

From the geopark's perspective the volcano day is an important tool for educating the public about the diverse volcanic heritage of the region, which may contribute to the public support of the preservation of the unique geological resources.

ALL IN ALL IT'S NOT JUST ANOTHER PAINTING IN THE WALL: A TIMELINE OF EARTH HISTORY

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Keywords: timeline, earth, geocentros, education project

The geological history of Earth and the origin and evolution of Life on it is an amazing adventure, the adventure of the co-evolution of the geosphere and biosphere, our adventure.

A new educative experience has been carried in the Fausto Maldonado Geocentro (Childhood and Primary Education School) of Cañamero village with the collaboration of the educative community and the Geopark Scientific and Educative Committee (GSEC): the realization of a timeline of Earth History. A timeline is a very visual and useful tool to teach and learn about Earth History.

Talks and workshops were imparted to children and teachers about the major events in Earth's past based on the geologic time scale, with the objective to realized one-week workshop in which all the educative community draw the timeline in a 20 meters long wall of the geocentro. After that, teachers and pupils worked on the geologic time scale designing new exercises, experiences and educative tools during some weeks. The timeline was designed by the GSEC together with a collective of urban artists, in order to make it scientifically exact, but also attractive for the main public, especially for children, but based on the previous work realized in the geocentro by teachers and pupils.

The painting was done during the EGN Week of Villuercas-Ibores-Jara UNESCO Global Geopark (May 19-28). All the educative community collaborate on it, with different activities adapted to each school level. Other segments of the population have also participated, increasing the educational value of this work. This experience contributes with the EGN and GGN, and geosciences in a broader sense, aim of spread the Earth's history, our history, in the most important Population segment for the future of mankind and Earth: the more the children (and the people) know about their territory and planet, the more they take care of them!

THE POWER OF PHOTOGRAPHY

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Keywords: Novohrad-Nógrád UGG, photography, sustainable tourism, Medves Pohto Marathon

Nowadays, in time of social media, photographs play significant role. In Novohrad-Nógrád UGG we are trying to systematically work with amateur photographers in order to achieve widespread sharing of beauties of our Geopark, improving the awareness of photographers on Geopark values and increasing the public interest. During a year we prepare several activities that connect exploration of Geopark values and photographing. The most popular and the most important activity is so called Medves Photo Marathon, held on biannual basis. The Medves Photo Marathon is a 48-hour program marathon for several hundreds of photographers and fans of Novohrad-Nógrád Geopark coming from the whole Hungary and Slovakia. It is held on Medves Plateau, the largest basalt lava plateau in Central Europe which extends from the Hungarian side to the Slovak territory of the trans-border Geopark.

The main idea is that photographers who attend the Photo Marathon make a lot of pictures and by presenting them via social media they present our Geopark widespread. Photo Marathon means to prepare many activities on many places, like:

- exhibitions of amateur photographers;
- workshops on various photo-topics (e.g. presentation of photo-technique, photographing of portraits, people in folk costumes, models on medieval castles etc.);
- guided hiking trips to selected geo-sites;
- shooting of sunsets, sunrises or night sky from special places known only by natives;
- several of our medieval castles standing on volcanic peaks are specially illuminated;
- on medieval castles, historic groups (armigers, knights, riders, landlords, ladies, craftsmen, etc.) pose the photographers;
- bird watch and shooting from special cabins;
- presentation of old shooting techniques, etc.

During a photo marathon a photo-competition is declared: each participant of the Medves Photo Marathon can send his pictures made during the event. There are three categories (Landscape, People, Living Nature), besides the prizes in main categories, prizes as the best young photographer, the best geo-site picture or Facebook voting winner are also awarded.

Since 2013, the Photo Marathon has been held three times, altogether more than 540 photographer and 2000 other participants took part in it. In competition more than 700 photographs made by 232 photographers competed. Each event was organised with the help of approx. 100 volunteers per event. How many people could see the beauties and values of the Novohrad-Nógrád UNESCO Global Geopark through the pictures on social media can be hardly estimated, but we have registered an increased public interest, more visitors coming from outside. We find the Medves Photo Marathon is our very attractive and efficient promotional a presentation tool.

*VISIBILITY, COMMUNICATION AND DISSEMINATION OF INFORMATION IN THE AZORES
UNESCO GLOBAL GEOPARK: A POWERFUL TRILOGY AIMED FOR PUBLIC AWARENESS*

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Keywords: visibility, communication, public awareness, geotourism

In accordance with the IGGP-International Geosciences and Geoparks Programme approved in November 2015 by the General Assembly of UNESCO, the UNESCO Global Geoparks (UGG) are "single, unified geographical areas where sites and landscapes of international geological significance are managed with a holistic concept of protection, education and sustainable development". Moreover a UGG uses its geological heritage, in connection with all other aspects of the area's natural and cultural heritage, to enhance awareness and understanding of key issues facing society, and by raising awareness of the importance of the geopark area's geological heritage in history and society today, a UNESCO Global Geoparks promotes in the local population a sense of pride and strengthens their identification with the territory.

A key tool to achieve such a desideratum is the implementation of a strong and continuous strategy of visibility and promotion of the geopark territory, activities, players and stakeholders, especially those in relation with the promotion of sustainable local economic development mainly through geotourism. Thus, visitors as well as local people need to be able to find relevant information on the UNESCO Global Geopark namely through a visibility (e.g. pannels), communication (website) and dissemination of information (e.g. leaflets) strategy.

This work presents the Azores UNESCO Global Geopark major achievements under the scope of its visibility, communication and dissemination of information strategy, that includes:- Visibility: new panoramic panels in iconic touristic viewpoints; info wood poles in sites and areas of special geological significance; geological trail; "Island Delegation" street signalling and outdoor; panels in strategic places (e.g. geosites of international relevance),- Communication: regular presence in media (e.g. a weekly program in Antena 1 – Açores radio station and a two-weeks full page in the regional newspaper "Açoriano Oriental") and social networks (e.g. Facebook, Twitter, Instagram); participation in public sessions, workshops and conferences, - Dissemination of information: production of a promotional video on the Azores UGG and a set of 5 documentaries about the Azores geodiversity, geosites, and geotourism; on-line leaflets on the island geodiversity and geosites; special publications for kids and for education awareness.

The implementation of such a strategy in the period 2012-2016 (e.g. after the integration of the Azores Geopark in the European Geoparks Network) implied the allocation of the adequate human and financial resources that, in face of the financial crisis affecting Portugal in the past recent years, delayed the full implementation of some of the programmed activities. Nevertheless, the accomplished achievements can be considered significant, improved deeply the public awareness on the Azores UNESCO Global Geopark and are a valid contribution for the geotourism in the Azores archipelago.

COMPLICATED GEOLOGY - WRAPPED FOR THE PUBLIC - GOOD FOR AWARENESS AND LOCAL IDENTITY

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Keywords: communication, geological stories, cultural heritage, history

Gea Norvegica Geopark, covering 3000 km² in Norway, has a very long and diverse geological history to tell. The geopark project started early years of 2000, when the geopark network was very young. In the beginning the idea of the geopark was almost only about the geological heritage. A heritage including quite complicated geology, as type localities of carbonatite volcanism, several unique mineral occurrences including the first finding of the element Thorium and the mineral thorite, the permian blue larvikite rock. Also important heritages are rocks of two Precambrian orogenies, Cambrian-Ordovician- Silurian fossil rich limestones and Quarternary glacial remnants. The landscape is also diverse, from coastal to mountainous areas - cities, villages, industrialized areas, agricultural land, rivers, valleys and forests. The area also have a rich mining history. As the first global geopark in the Nordic countries, a huge efforts has been done and is still an important task, to introduce the geopark concept to local people and visitors. The area is in need of local pride and knowledge of their heritage. Starting as a quite geological park, Gea Norvegica has transformed into a global geopark communicating the different geological stories in a holistic perspective. The knowledge of geosciences and geology in particular, in the Norwegian society is very low, even though the country has been and still is so dependent of geological resources. Gea Norvegica Geopark is combining the geological knowledge with the history of the area, the industrial development, the agriculture, the botany and the local culture. Agriculture - food - soil- geoscience is obvious for geologists but not necessarily for the inhabitants. Many artists have been in the area through history - why has the landscape meant so much to artist and has landscape anything to with geology? Our Viking forefathers used rocks to bury their dead and left us important heritage, stone age people used local rocks for tools, and medieval people used rocks for constructions still in use. The presentation will show examples of how a geopark can transform complicated geology to understandable and exciting new knowledge to everybody - with great success.

THE ESTEAM PROJECT EBOOK "RESEARCH OF NATIONAL CURRICULA OF NATURAL SCIENCES IN PORTUGAL, NORWAY AND SLOVENIA"

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Keywords: ESTEAM Project, natural Sciences Teaching, ICT Technologies, outdoor learning

The ESTEAM project - Enhancement of School TEaching Methods by linking schools, experts and Geoparks combined with outdoor activities and ICT technologies - is co-financed by the ERASMUS+ Programme of the European Union. It started on September 2016 and will run in 36 months. The coordination of the project is carried out by the Idrija Heritage Centre, the coordinator of the Idrija Geopark activities. There are seven associated partners - three UNESCO Global Geoparks (Idrija Geopark, Magma Geopark and Naturtejo Geopark), two schools within the Geoparks areas, the University of Ljubljana-Faculty of Natural Sciences and Engineering-Department for Geology and an ICT company called Locatify. The target groups of the Project are Natural Sciences teachers, future Natural Sciences teachers, Professors of didactics at Faculties, pupils aged 12-15, Geoparks staff and employees in educational institutions.

The eBook "Research of National curricula of Natural Sciences in Portugal, Norway and Slovenia: analysis and guidelines" is the first output of the ESTEAM project (O1). The eBook consists of six chapters: 1 – Introduction; 2 – Description of the UNESCO Global Geoparks; 3 – Current methodology in teaching Natural Sciences in elementary schools; 4 – Research of National curricula and needs; 5 – New trends and good practices in Natural Sciences teaching in elementary schools; 6 – Conclusion.

When comparing the organisation of the three countries school systems involved in the research, one can perceive differences but the teachers use several didactic methodologies (including ICT technologies). The research of the national curricula on Natural Sciences Teaching in the three countries shows the subjects where natural sciences are taught: Natural Sciences, Biology, Geology, Physics, Chemistry and Geography. The number of subjects and how Natural Sciences are combined with them depends on each country. Online questionnaires were elaborated to understand the improvement needs of the Natural Sciences learning/teaching process and they were addressed to pupils, teachers, future natural sciences teachers and four personal interviews for teachers from each Geopark were also carried out. 792 participants solved the questionnaires. Based on the data analysis, the majority do not know about UNESCO Global Geoparks. The ones who do are seeking help in the preparation of materials, fieldtrips, experts' help and organisation of activities. Pupils prefer using modern technology in the outdoor activities, especially games. Teachers are not so keen on this, though. The ESTEAM Project aims at developing the number of activities in partnership with local schools, the use of apps and the number of outdoor classes in the three Geoparks' territory. The common topics selected from the national curricula of Natural Sciences in the three countries in order to create the mobile application on Output 2 are: 1 – Man's Impact on Earth; 2 - Ecosystems; 3 – Geology. This eBook is the base, theoretical support and justification for the next Output of the ESTEAM Project – Development of teaching methodology: mobile teaching/users experience platform.

INTERACTIVE EXHIBITION EXPLAINING THE LOCAL GEOHERITAGE – A CASE STUDY FROM "GEOLAND OF HOLY CROSS MOUNTAINS" GEOPARK (POLAND)

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Keywords: geological education, geoheritage, geopark, Holy Cross Mountains

Explanation geology to non-geologists in the attractive and scientific correctly way is the biggest challenge for any interpretative centre functioning on geopark's area. It seems that the fundamental problem is an effectiveness communication, which depends on communicating skills and scientific knowledge of geopark's staff (guides, educators) but it's also strongly connected with the form of presentation of geological issues. Modern, interactive techniques and tools, are interesting way to improvement communication with visitors in the exhibition's space. The Centre of Geoeducation in Kielce - the main interpretative centre of, „Geoland of the Holy Cross Mountains”, a new, aspiring geopark from Poland, providing a good examples reflecting the problems described above. The permanent exhibition at the Centre showing the main elements of geological heritage of the geopark's area, which are the Devonian sequence and different geological phenomena connected with the Devonian sedimentary rocks. That's the cause "The Devonian Story" and, „The Geological Process" becomes two main part of scientific scenario of exhibition. The permanent exhibition of the Centre of Geoeducation combines traditional geological exhibition resources (specimens of local Devonian rocks and fossils) with some interactive elements, like a touch-screen, animations, 5D-symulators etc. Opened in 2012, that is 5 years ago, the exhibition requires successive implementation of never and more efficient technological-visual solutions to ensure the more effectiveness and attractiveness experiences for visitors. It is worthy to said that after the 5-years experiences of using exhibition for geological education of schoolchildren and youth, there are few problems clearly visible:

- a language using at the information panels is too difficult for non-geologist, especially children;
- scientific information presented at the exhibition should be more simplified and more clearly for visitors;
- a scenography and visual narration using at the current exhibition don't have a strong influence on visitor's emotions;
- a level of interactivity of the currently exhibition is too low, to get involved all of the visitors;
- new scientific research and discoveries on the Devonian sequence of the Holy Cross Mountains cause that many of educational panels and dioramas at the exhibition requires revision.

The answer for problems described above is the project starting on „The Geoland of the Holy Cross Mountains" geopark's area at the present year. The project entitled: „The modernization of permanent exhibition and building the Geological Garden of Experiences in the Centre of Geoeducation" comprises the creation of completely new scenography of exhibition, with more interactive elements, simplified visual narration and updating scientific content of dioramas or panels. The physical scope of the project will increase the facility's attractiveness for different groups of visitors (especially children and youth), just as it will make it possible to develop a more varied and attractive educational offer.

*INTEGRATION OF GEOPARK THEMES INTO LOCAL CURRICULA - A NEW STEP IN
EDUCATIONAL COOPERATION IN ROKUA GEOPARK*

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Keywords: education, curriculum, sustainability, geoheritage

Rokua Geopark explores the heritage of the last Ice Age. The characteristic features of the area are the glacial ridges, pine and lichen-clad heaths and kettle holes with crystal clear water ponds. Deep stream valleys and sun heated sandy slopes serve unique habitats for many rare plant and insect species to live. Rokua Geopark also includes fascinating cultural sites which have a history dating back to even 8500 years.

Rokua Geopark has cooperated closely with local schools and other educational institutions for several years. The cooperation has included i.e. workshops, material development and field trips to Geopark's attractions together with Geopark staff, teachers and students. As a result the teachers have realized the importance for pupils to have a better understanding and appreciation of their home region and on the other hand, experienced the opportunities of Rokua Geopark's sites and values for teaching.

In 2015 Rokua Geopark announced the concept of Geopark schools. At the moment there are six acknowledged Geopark schools in the region. The Geopark schools have actively integrated the Geopark themes in their education as required in the criteria. Rokua Geopark and its partners like Parks & Wildlife Finland (Metsähallitus), Oulu University and Geological Survey of Finland have strongly supported the schools by developing materials and methods and by educating the teachers for the specialized themes.

The Geopark themes have been integrated in the curricula both in practical contents of courses as well as in theoretical framework of education. The practical contents include i.e. field trips to nature and culture sites, international cooperation with other schools and lessons given by professionals. The theoretical framework consists of values like natural and cultural heritage and diversity, responsibility, ecologicality, locality, internationality and networking.

So far the experiences have been encouraging and both the professionals and teachers have been very satisfied and excited with the new contents and methods. In general the Geopark themes seem to offer valuable tools to encounter modern social and environmental challenges and thus it is important for Geoparks to actively offer and develop their services for local school teaching. It is also important to take the personnel of the schools along the development work.

IN GEOPARK KARAVANKE THERE IS FUN, EDUCATIONAL AND NO CHORE

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Keywords: Geopark Karavanke, education, geology, interpretation

Karavanke/Karawanken UNESCO Global Geopark, cross-border Geopark between Slovenia and Austria, comprises 14 municipalities, 9 on the Austrian and 5 on the Slovenian side.

The most important objectives of the Geopark Karavanke are integration of educational institutions in the structure and functioning of the Geopark Karavanke, popularisation of the geology and geological features among children, their teachers, educators and parents. To excite curiosity, enthusiasm, experience, to understand and feel respect towards nature were our starting points that our work is based on.

Every year, we publish an invitation to the selected theme. The purpose of the activities is to implement professional training workshops for teachers and educators with intention to encourage them to implement new teaching contents in geology in accordance with their experiences. In the autumn, we conduct the workshop with a presentation of the themes and experimental workshops. Later, educators and teachers deal with the themes through the school year. In the spring, they submit reports that come out in geo web newsletter. We reward them with symbolic prizes and diplomas, and organize professional off-road excursion in Geopark Karavanke.

For educators and teachers, we have prepared a teaching tool and material on the chosen topic (Volcanoes - the Earth erupts, on the surface something is brewing, Water and stone – inseparable parts of nature, Fossils – stories from the past, Dinosaurs – the extinct life on Earth, "We are UNESCO!"). In accordance with the curriculum, we have prepared worksheets for the realisation of the programs in nature, in information centres or in the classrooms. We equipped classrooms in nature, interpretational points, geo playgrounds and learning paths, which carry out programs under the slogan "It's fun, it's educational and no chore ". Our guides are Franz and Marica, who come each from their part of the Geopark Karavanke and help us to explore the undiscovered treasures.

For the youngest, we have produced a number of games – colouring books, stone memory, Franz and Marica picture puzzle, dominoes and book of riddles "Riddles, knotting, anagrams". For the elderlies we have prepared a didactic play "Do you know me?" and a manual "Geological treasures of the Geopark Karavanke", which can be used as a guide to the field, as a learning manual or as a booklet for tasks solving. In the info centre "World of geology" there is "GeoPulse" interactive table, available to discover the secrets of the Geopark Karavanke, "Geopark-Jump and Run" computer game and "Geopark quiz". Another highlight is so-called "Geoclock" which displays the entire creation and evolution of the Earth through animation.

The geology is present everywhere, and is closely related to all other natural and social sciences. It is closely connected with people that teach about nature, as well as those that are learning about it. The geology in the Geopark Karavanke is more than flourish; creative work, based on the experiencing of nature and geology with all our senses on "It's fun, it's educational and no chore" way will be our main goal in the future.

GEO-EDUCATION IN IDRİJA UNESCO GLOBAL GEOPARK

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Keywords: geo-education, pedagogical programmes, curriculum, school network

The Idrija Mercury Mine undoubtedly takes credit for implementation of educational activities. In 1990s, it organized educational programmes for teachers and opened Anthony's Main Road for visitors displaying a part of mercury ore deposit. Since then, the Anthony's Main Road has been the attraction for students and visitors. The second magnet is the Municipal Museum with its regular and temporary collections. Schools often combine their visit to the Museum with a stop at the Franja Partisan Hospital, which, however, is not within the Idrija UNESCO Global Geopark.

During and after the process of establishing the Idrija Geopark different school programmes have been organized with help of the Mine. Local schools most frequently used these programmes as part of their days of culture and science which are a part of their curriculum.

After the official inauguration and acquiring the status of UNESCO Global Geopark, the Idrija Geopark has developed a range of educational activities with its partners in the last years. They have been well accepted (especially locally) and are slowly becoming a tradition.

Programmes that are carried out:

- »Počitnikarija« summer workshops with Friends of Youth Association, which has been running since 2012 and offers 5 - 6 workshops to children free of charge.
- Network of Schools in the Idrija Geopark is a network of four local primary schools. The successful cooperation with schools started in 2013 and has been preserved. The idea behind the network is that each year one school organizes a theme day for seventh grade pupils together with help and cooperation of the Idrija Geopark and external persons.
- Pedagogical programmes for elementary schools go hand in hand with school curriculum for primary school triads in the Republic of Slovenia. The programmes, which also include the Geopark's partners, are annually promoted in the leaflet »Geo-experience for Small and Big Explorers« that is distributed to all Slovenian primary schools.

On special occasions, e. g. EGN Week, DECH (Days of European Cultural Heritage) or Children's Week, a selection of programmes is offered to local schools and carried out free of charge.

There has also been cooperation with the Jurij Vega Grammar School. Each year, the Geopark presents and organises field trips or workshops on the topics of 500 years of mercury mining, origin of an ore deposit, natural and cultural heritage, and identification of rocks in the Idrija area on the Social Studies Day.

Finally, let us mention the ESTEAM project, (Enhancement of School TEaching Methods by linking schools, experts and geoparks) the purpose of which is to improve the quality of science teaching in schools by means of innovative methods and outdoor activities. The project includes: the Idrija, Naturtejo and Magma UNESCO Global Geoparks, two primary schools, the University of Ljubljana and the ICT Company.

NEW GURSLI MINE EDUCATIONAL PATH IN MAGMA GEOPARK

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Keywords: education, mines, geopark

Magma Geopark has been working with education and communication since 2010. The educational offer is various and it includes now the history of the mining industry. In 2016 Magma Geopark cleaned and secured the "room 3" of the Gursli mines and open it to the public offering guided tours with specialized Geopark guides. In 2017 Magma has improved the information panels in Gursli, working with local communities, in the frame of the Drifting Apart EU project. The project supports Magma to create new info panels with original historical pictures, geological explanation and information for tourist in connection with the plate tectonics Earth's evolution. Most of the gneisses that contain the molybdenite at Gursli were originally granites. Some of the gneisses, however, contain the mineral garnet. This forms when clay is heated to temperatures above ~500°C and indicates that some of the rocks here were originally sediments that formed in an ancient sea. All of the rocks have been deformed and metamorphosed at high temperatures more than once. The streaky structure in the gneisses at Gursli trends roughly north-south and dips to the west. Most of the molybdenite occurrences are associated with coarse grained veins of quartz or quartz plus feldspar. The veins are up to 1 meter thick and generally trend north-south, parallel with the structure of the gneisses. The molybdenite is concentrated along the boundary between the vein and the gneiss, occurring both in the gneiss and in the vein. These veins were formed in the rock at a depth of many kilometers below the surface about 920 million years ago. This happened under the formation off the Sveconorwegian mountain chain in the beginning of the formation of Rodinia supercontinent. The new panels aims to promote the itinerary in the mines, promoting the awareness of the mining history between young generations and inform tourist on the most important economical activities in the area at the beginning of the 20 Century. The population grew due to the mines activities and today is still possible to see the buildings constructed at lake Gullvannet during the active period at an outdoor museum of mining culture. These included a residence for the mining manager and his staff, three barracks with room for 60 men, a toilet, two smithies, an enrichment plant with a crusher, mills and a flotation unit, several outhouses, a tool shed and a store for explosives. The mine at Gursli was active to supply molybdenum for steel production during World War I: Molybdenum is a metallic element whose most important use is to strengthen and harden steel. In 1917 there were about 100 employees at Gursli; at peak times there were up to 160 men processing the ore. After the war the price of molybdenum crashed and the mine closed in 1919. From 2016, when the mines was open, about 4000 visitors explore the sites and app. 400 have been guided them from Magma Geopark.

*CHIP & CRYSTAL EXPERIENCE ENERGY: A CHILDREN'S BOOK THAT EXPLORES ENERGY
RESOURCES IN STONEHAMMER UNESCO GLOBAL GEOPARK*

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Keywords: energy, education

Among its geological assets Stonehammer UNESCO Global Geopark has always included the industrial energy infrastructure based around Saint John, New Brunswick. Unlike some of the geoparks in the global family ours has an industrial centre in the largest community in the geopark. The energy industry dates back almost 400 years when coal mined north of the geopark was first shipped from the Saint John harbour in 1639. Almost 200 years later Dr. Abraham Gesner, known as a founder of the modern petroleum industry, lived in Saint John from 1838 to 1842 where he worked as the first Provincial Geologist. The first gas works were in place by 1844 and streetlights erected in 1845. By 1884 the city had commercially available electric power, just two years after New York City. Although New Brunswick has only few petroleum resources exploited so far, Saint John on Canada's east coast has the country's largest oil refinery. It is home to the first deep-water crude oil terminal in the western hemisphere able to receive supertankers, and the first liquefied natural gas terminal in Canada. Just west of Saint John at Point Lepreau the geopark has one of Canada's only nuclear power generating stations. Geoparks are about more than just rocks and our long history of energy production provides opportunities to make the connection between energy and geology. Many of the people who live in the geopark work in these industries.

'Chip & Crystal Experience Energy' is a new book for children produced by Stonehammer UNESCO Global Geopark that explores New Brunswick's energy resources, where they come from, and how they relate to our geology. In the book two children named Chip and Crystal travel through time to find out where energy comes from. New Brunswick is a small province (72,908 km²) with a population of about 750,000. Although Stonehammer UNESCO Global Geopark (2,500 km²) represents only 3% of the land area it has a responsibility to serve all of New Brunswick. Chip and Crystal travel across New Brunswick to explore energy resources. The book was locally written and illustrated and developed in partnership with the Canadian Geological Foundation, the New Brunswick Energy Institute, the Province of New Brunswick and the New Brunswick Museum. The book has been distributed to all Grade 4 students in New Brunswick to compliment the education curriculum. It is also available to download free from the geopark web site (www.stonehammergeopark.com). The Stonehammer UNESCO Global Geopark Kids' Advisory Committee assisted with the development of the book.

MAGMA GEOPARK INFO CENTRE AND EXHIBITION

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Keywords: exhibition, education, geological heritage, virtual reality

Magma Geopark is planning to open the new info centre and the geological exhibition in Egersund town centre (Magma Geopark GEOMuseum) and the end of September 2017. The exhibition will be based on geological story line that display the most significant geological phenomena that influence the Magma Geopark landscape formation. The centre will be constituted by two main room: one room that include the geoVR virtual exhibition stations and traditional information along the walls with the geological storyline, while in the second room visitors could buy local GEOfood products, and learn more about the European and Global Geoparks within the publications corner. The first room will be provided by the innovative immersive reality geoVR educational tool. The exhibition, that already include many territories in the World will offer to the user an amazing tour within Magma Geopark and the rest of the World. The exhibition creates educational possibilities combined with the most attractive technologies that aim to attract young people to the Geoparks World. The virtual World in fact it display 360 degrees landscape provided with educational hot spots that approach the user with information, videos, augmented reality or pictures. At the same, the geoVR is disable friendly to guarantee access to the remote localities to people affected to motor disability. The info centre is financed with three International projects and the Rogaland Regional Fund: this will give the possibility to create geoVR stations in other localities in the World (Drifting Apart, EU North Periphery Program and geoVR NORA projects) in the frame of the GEOMuseum module easy replicable and that is currently involving the Kangia Fjord UNESCO World Heritage Site in Greenland, the Faroe Island Geopark project and the Katla UNESCO Global Geopark in Iceland. Magma Geopark is also cooperating with the new Jossingfjord Centre that is plan to be finish by 2018 and it includes an other Magma Geopark info centre.

For more info www.geovr.no and the Magma Geopark you tube channel to experience geoVR.

*VISUAL MEDIA FOR SHARING GEOHERITAGE WITH BOTH PARTNERS AND VISITORS:
THE EXAMPLE OF THE MASSIF DES BAUGES UGG*

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Keywords: media, illustrations, geoheritage, awareness

Annuals conferences cycle during EGN Week and formation days all year along, are occasions for us to develop and improve a true language to share geoheritage with all our partners. This process allow us to built ready to use resources, like illustration or movie clips, to feed our website and our partners with quality productions. An iterative approach that allow us to build a body of knowledge to establish a progress dynamic in the time. A work realized internally to keep track of the entire process and its evaluation.

Providing adapted geological information for a diverse public audience is a key challenge for geoparks. The information must interest the public in people's relationship with the Earth history in a very attractive way, avoiding the trap of being too complex or academic. Pictures and cartoons are key tools for increasing the public's understanding and awareness of geoheritage, natural resources, and sustainable development. These graphics can provide attractive and educational ways to present information in an accessible way and they use an integrated approach to address the specific needs of the public. Creating these images is not within the scope of an ordinary graphic designer or infographist. It requires a combination of skills: (1) a good understanding of geological concepts; (2) design skills and a good management of animation software programs; and (3) an understanding of pedagogy and science-popularization approaches to ensure the geological concepts are presented appropriately for the intended audience.

We present the experience of the Massif des Bauges Geopark to show how we integrate this communication program at various levels. The aim is to explain the landscape and geoheritage in the form of a story. We present small stories about each of our sites, but also put them in the perspective of the larger stories of geological and human history. We use different approaches to illustrate this dynamic, taking into account the specific details of the sites and our partners there, and integrating this into a global coherence. The pictures, cartoons, videos, applications and panels illustrate the decision-making process involved during the production process and the application of the three skills described above. The gap between the available resources and issues involved in this work indicates that there is a wide range of possibilities and a place for new skills in the crucial domain of geoheritage popularization, providing layman-friendly geoscience information and ensuring sustainable development.

EUROPEAN GEO PARKS

14TH/CONFERENCE

7TH - 9TH SEPTEMBER 2017
PONTA DELGADA, AZORES, PT

"GEO PARKS: PATHWAYS OF SUSTAINABLE
TOURISM FOR DEVELOPMENT"

THEME "EDUCATION, PUBLIC AWARENESS AND COMMUNICATION"

POSTER



*THE IMPORTANCE OF TOURISM FAIRS FOR THE DISSEMINATION OF GEOPARQUES: A
STUDY OF GEOPARKS IN BRAZIL AND PORTUGAL*

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Keywords: tourism, tourist fairs, geoparks

The World Tourism Organization (2001) defines tourism as a "set of activities that people carry out during their travels in places other than their natural surroundings for a period of less than a year, for the purpose of leisure, business And other reasons not related to the exercise of a remunerated activity in the locality visited ". With the rapid growth of tourism, the diversification of these activities in Brazil and in the world is evident, with the strengthening of activities geared towards nature such as: ecotourism, adventure tourism, geotourism, among others."A geopark is a geographically defined territory with a strategy of sustainable development based on the conservation of geological heritage, in association with the other elements of natural heritage, and geoparks. Cultural, with a view to improving the living conditions of the populations that inhabit the interior." (BRAZIL 2009).

The promotion and dissemination of geoparks is accomplished through various forms and tourism fairs is one of them. According to Dias and Cassar (2005) "Participation in tourism fairs that are held periodically around the world is of fundamental importance for the promotion of a tourist destination." The fairs generate opportunities for direct and indirect business, visibility in the sector, influence on the marketing time of the tour operator and travel agents in relation to the final public. Tourism fairs are still today one of the best showcases for this marketing at different regional, national or international levels.

Thus, the present study is characterized as a bibliographical, exploratory and descriptive, as well as a qualitative approach. The research was applied in Coordinators of the geoparks: Araripe (Brazil), Seridó (Brazil) and Naturtejo (Portugal). The results obtained point to the success of tourism fairs as a form of promotion, the benefits they bring to the geoparks, as well as the importance of the public and private sector as partners of the studied geoparks.

GEO-ROUTES AND INTERPRETATIVE PANELS IN LANZAROTE AND CHINIJO ISLANDS GEOPARK: GEOLOGY FOR ALL

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Keywords: interpretative, geopark, geo-routes, panels

Lanzarote has a diverse geology as it is a volcanic island active for more than 15 million years. Volcanism, always present, has interacted with erosive and sedimentary processes to give rise to a great variety of unique and spectacular landscapes in an island environment, which originate Geosites of international relevance. Lanzarote and Chinijo Islands UNESCO Global Geopark, established in 2015, has designed a strategy for the improvement of its outreach information offer while upgrades the tourist infrastructure. In this way, two actions were carried out in 2016: the design of 17 interpretative panels in three languages (Spanish, English and German) and 5 thematic geological route guides, to be done by car. The panels and geo-routes are designed to improve the varied tourist infrastructures that already exist in the island, although they also include Geosites hitherto unknown to the general public and, therefore, are outside of the usual tourist circuits, thus contributing to diversification of the island tourism.

The format of all interpretive panels is homogeneous, since it must conform to the current legislation for the Natural Protected Areas of the Canary Islands. They include: (1) an evocative and stimulating title to draw attention to a particular geological process or element; (2) brief, concise and rigorous texts in geological terms, without technical language and; (3) images that may include maps, illustrations and photos. They are situated on public spaces close to the Geosites that are referred.

The geo-routes stops cover a wide variety of geological topics that are representative of the geological evolution of Lanzarote island. A series of brochures have been also designed for each route, to guide visitors through the geology of the island. Some aspects of historical, cultural and natural interest are also described. The selected themes cover from the formation of old volcanic massifs to quaternary eruptions and erosional and sedimentary processes.

Until now, there was no information on some of the most visited geological sites, such as Los Hervideros, Salinas del Janubio or El Golfo. In fact, these places are visited for their spectacular scenery and, together with Timanfaya National Park, are a must visit for any tourist in Lanzarote. It is intended that, although the almost 3 million tourists who visit the island do it for its climate, safety, culture and gastronomy, once here, they discover the geological values of Lanzarote and Chinijo Islands and enjoy its spectacular geoheritage. Panels and self-guided geo-routes are shown as a means of effective outreach of the insular geological heritage and its interaction with other natural and cultural values that make this tourist destination a unique place for the visitor. The infrastructure generated opens a wide range of possibilities and can be used by tourism guides, with the possibility that tourism agencies incorporate new itineraries created, thus expanding the offer of geotourism on the island and contributing to sustainable development through its geoheritage.

*EARTH SCIENCES EDUCATION APPLIED TO CHAPADA DOS VEADEIROS GEOLOGICAL
FORMATION - GOIÁS - BRAZIL*

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Keywords: geoeducation, geoconservation, geoheritage, Chapada dos Veadeiros

The main geoconservation activities comprise geoheritage inventory and community education. Another ongoing project named "Geoheritage Inventory of *Chapada dos Veadeiros* National Park region – Goiás – Brazil", has as main purpose the geoheritage research to map the main geosites. The Brazilian population does not have access to this knowledge that is very specific. With that in mind, we present this university extension project that focuses in community geological education and interpretation training. This work aims to establish and consolidate the geoconservation in the *Chapada dos Veadeiros* region, with education activities which involves the local community. The main project objectives are: training tourist guides, Brazilian biodiversity institute technical team (*Instituto Chico Mendes de Biodiversidade, ICMBio*) and elementary school teachers in basic geology, mineralogy, rock types and geotectonic. Perform field trips with natural elements observation (minerals, rocks, structures, landscape, among others) in tourist routes with high geology relevance. The education method consists in classes about Earth Sciences and geology principles applied to *Chapada dos Veadeiros* region. The methods are based in theoretical classes about basic learning and field trips to teach local geological formations. Furthermore, teach the students to share this knowledge with visitors and community; and the elaboration of research and applied products, such as booklets, guides and explanatory panels.

For each area of *Chapada dos Veadeiros* region we consider the potential and particularity of each community and environment. Specific education program is carried out for each local audience to achieve results more applied to that area. The general program content comprises: Introduction, Earth origin and evolution, Geological time scale, Minerals and rocks, Earth internal and external dynamics, Tectonic plates, Geographical location, Field relations, and *Chapada dos Veadeiros* regional and local Geology. In the first project stage, we performed a course from February 14 to 21 of 2017 in *Alto Paraíso de Goiás* city. We teach 36 tourist guides and Brazilian biodiversity institute technical employees. The course comprised 40 hours with 16 hours' field trip in tourist routes with high geoheritage importance. The main education goal was achieved with the participants' comprehension of the local geological formation, so they can work as knowledge multipliers to visitors and community.

*GEOCONSERVATION IN PROTECTED AREAS: A TOOL TO END THE ARMED CONFLICT IN COLOMBIA*Miguel Tavera¹¹Eafit University, Calle 47 # 77aa 28, Medellin, Colombia. E-mail: mtavera@eafit.edu.co**Keywords:** geoconservation, protected areas, armed conflict, Colombia

Antioquia is one of the largest geographic departments in Colombia. It is located along the Andes. Its physical geography comprises a wide variety of features: Caribbean coast, three of the main Colombian rivers (Magdalena, Cauca and Atrato), two mountain axes: Central and Western Cordillera, periglacial lagoons, karstic geoforms, diverse relief, paramos with glacial record, and active fault systems. The latter marks the accretion of terranes through the geologic time. Another important feature is the different climate settings as a function of altitude, ranging from paramos (4080 m) to hyperhumid jungles. There are in between some other typical settings such as mountain woods and dry depressions. These settings with their diverse geological and biological characteristics encompass geomorphological units that show evidence of Precambrian complexes to recent glacial deposits.

Antioquia has 54 Protected Areas. These conservation sites have been chosen to regulate natural resources, mostly based on their biological characteristics. The geological component, denominated "gea", has not been considered, so far, in any of the inventory records. However, this is not the result of an absence of geological features to be accounted for. As previously described there is a wide variety of rock record and geoforms that could be used to declare Geoparks or Geological Parks. There is still work to be done to achieve this goal. Many studies could be developed for the understanding of geological sites without having an industrial purpose such as ore minerals or hydrocarbon exploration and exploitation.

This research will be focused in the recollection of data of the geological resources available in each Protected Area of Antioquia. These database will be analyzed to determine the possible geological sites, evaluate their importance and declare the best places for Geoparks location. In addition to this objective, it is proposed for these Geoparks to serve as spaces for the resocialization and integration of former guerrilla members which have ceased fire as the result of the Peace Treaty.

These former militants have lived most of their lifetime in areas of natural and geological significance. It is common for them to be familiar with places that have not even been visited by scientists or government agents because of the social constraint created by the warfare. It will be of great importance for this work to account for the main objectives in the research and selection of Geoparks (UNESCO): contribution to the socioeconomic development of local communities using geodiversity as a driving motivation. In this case, the geoparks will not only promote the geological and geomorphological features in the area. These parks will serve as well as settings to provide job opportunities and social participation to the former guerrilla members. Pedagogic tools and strategies will be used to promote the appropriation and sustainable development during this new Peace period in Colombia.

*THE FINDING PLACE OF THE SUN CHARIOT AS A FLAGSHIP SITE IN GEOPARK
ODSHERRED, DENMARK*

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Keywords: flagship site, Geopark Odsherred

The Sun Chariot is an artefact significance for the Pan-European Bronze Age culture about 3,400 y BP and has since its appearance in 1902 in Trundholm Bog, Odsherred had significant symbolic value for the region and Denmark as nation. It is known far beyond the borders of Denmark and is unique in its kind throughout the world.

The bog developed approximately from 4-5,000 y BP as a consequence of the land uplift after the ice from the Weichselian had withdrawn. As the land uplift exceeded the sea-level rise, beach-ridge systems grew west of Trundholm Bog, and "Trundholm Bay" was cut off from the open sea into a brackish lake and then developed into a raised peat bog.

When the Sun Chariot was found more than 100 years ago, the finding place was marked. As the bog and the surrounding landscape developed, the finding place gradually became inaccessible and was somehow forgotten. As a part of the four-year strategy of the Geopark Odsherred Foundation the board of directors in a major new project with landowners and local stakeholders wish to make the finding place of the Sun Chariot accessible again and an attractive site for residents, tourists and guests of Odsherred. The first version of the project was presented for the Geopark Board in December 2015. The Board and the Municipal council are the decisive bodies which have the power to approve the basic design. After the board meeting the designers were asked to develop an elaborated project suitable for presentation in the public. In September 2016 the design was presented for Her Majesty the Queen of Denmark at Her official summer cruise at an event in Trundholm Bog at the exact location of the find.

Since the beginning of the project the local landowners have been involved in the process developing the project on their land. In 2017 the project is now going into the establishment phase where the ownership of the areas around the finding place have to change hands to place the participating land plots more appropriate. This process is called land consolidation where a number of land plots within a demarcated geographical area are exchanged simultaneously. The reorganizations are implemented as combinations of purchases and sales. In Denmark land consolidation has been used since the last agricultural reforms in the late 1700 and is considered a tradition and is fundamental to our common landscape and cultural heritage. Along with the land consolidation process another process of funding the project is taken place. Both national and local funding is needed realize and restore the finding place of the Sun Chariot.

UNESCO GLOBAL GEOPARKS: TOWARDS THE INCLUSION OF PEOPLE WITH DISABILITIES

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Keywords: 2030 Agenda, sustainable development, UNESCO Global Geoparks

According to UNESCO, more than one billion people around the world live with some form of disability, of whom nearly 93 million are children. These people experience inequalities in their daily lives, and have fewer opportunities to access a quality education. The UN Sustainable Development Goals (SDG) challenge all countries to implement effective strategies and actions until 2030, covering the three environmental, economic and social dimensions of sustainable development. The importance of quality education is one of the SDG that should be addressed by all UNESCO Global Geoparks (UGG).

This work attempts to bring the attention of geoparks towards the need to implement inclusive educational strategies in their territories. These strategies should include not only educational resources addressed to visitors with disabilities, but also to guarantee accessibility conditions, at least to some of their geosites. The use of resources, either indoor or outdoor, based on Information and Communication Technologies (ICT) adapted to people with disabilities can be a way to develop innovative solutions in partnership with geoparks, universities and ICT companies.

Some examples of the current existence of inclusive programmes in UGG are: (1) the Molina & Alto Tajo UGG (Spain), with sites accessible to people in wheelchairs, and with interpretive panels in Braille; (2) the Burren & Cliffs of Moher UGG (Ireland), which created a programme to test the accessibility of 7 sites in order to allow visits of adults with intellectual and physical disabilities; (3) the Cabo de Gata-Níjar UGG (Spain), with tactile models, and lava tunnels accessible in wheelchair; (4) the Naturtejo UGG (Portugal), with educational books for children written in Braille; and (5) the Araripe UGG (Brazil), which promoted outdoor educational activities specific for blind students. The social responsibility of UGG, founded on the principles of geoethics and of the UN 2030 Agenda, may well be an opportunity to reinforce the work near and for the communities, creating a multidisciplinary network of partnerships.

*"TROUS DE MÉMOIRE": TO TRACE THE DAILY LIVES OF NINETEENTH CENTURY
PEASANTS-MINERS IN QUERCY*

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Keywords: Quercy, phosphorite cave, mining, local culture

In Causses du Quercy (S.W France), the phosphate exploitation was at its height just over a century ago. But does anyone still remember the living and working conditions of those who were in charge of the extraction of the valuable ore? Unlike remains of the Cenozoic species, the tale of Quercy miner never fossilized.

During the course of 2012, two local associations decided together to lift the veil on this part of the local history. Many months were necessary to find and gather archives documents, period photographs and any testimony buried in the local memory.

Using the stereoscope technique – a contemporary technique from the Quercy mining exploitation period – some photographs in re-enactment of this time have been realised in 3-D view. For historic accuracy, the collections of Cuzal Ecomuseum, which gather a wide variety of items linked to Quercy rural life over time, have been used for costumes and tools. Also, many volunteers have helped to those attempts of re-enactment. Simultaneously, a local performance company – "Les Trucs en Scope" – wrote and created a one-hour show called "Trous de mémoire" (i.e. literally "Holes of memory", but also a pun in French language since it means "Memory lapse"). The plot of the show is built around the character of Augustin, a miserable peddler, who stops by a country inn for the night and tells us his own story, and through this he also passes on the local story full of promises and disappointment of phosphate mining in Causses du Quercy.

During 2013 and 2014 tourist seasons, those 3-D re-enactments were showed at "Cloup d'Aural" phosphorite cave Geosite and were seen by 25,000 to 30,000 visitors. In the same time, "Trous de mémoire" show was scheduled many times on the Geopark territory. The first representation was a truly emotional moment; performed at Bach, on the "Cloup d'Aural" phosphorite cave Geosite, this representation gathered almost all the inhabitants of the village. For many spectators, it was an emotional way to rediscover long-time forgotten family roots. Indeed, the phosphate mining exploitation has been very intensive but on a short period of time only (less than thirty years). This "phosphate rush" so to speak was very traumatic for the territory and its inhabitants, revolutionising the local way of life just to stop as suddenly as it had started. For a long time, local families had stop to mention this subject and the phosphorite caves have often been perceived negatively.

This action was a very important step to help the territory to reappropriate this heritage and reconcile itself with its own history.

*INFLUENCE OF INTERPRETATION ON THE CONSERVATION INTENTIONS OF TOURIST'S
AT PROTECTED AREAS: THE CASE OF "ALGAR DO CARVÃO" GEOSITE,
AZORES ISLANDS, PORTUGAL*

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Keywords: conservation intentions, environmental interpretation, nature tourism,
ecotourism, protected areas

Most tourists visiting the Azores are people with an interest in nature and high economic power. However, no study has characterized the effect that environmental interpretation can play in their satisfaction and predisposition to contribute to the nature conservation. Environmental interpretation involves on-site education, while people (*e.g.* tourists) engage in activities developed in a natural environment. The main objective of this study was to examine the conservation intentions of nature tourists that visit the Azores and the influence of the environmental interpretation in their conservation intentions.

The case study focused on the nature tourists who visited the "Algar do Carvão" volcanic pit (Terceira Island), one of the most emblematic Azorean geosites. Tourists were divided into three groups according to the situation of environmental interpretation to which they were exposed: without oral interpretation by nature guides (control group; nA=39), and two with interpretation briefs stated by nature guides (regular brief, nB=54; pro-conservation brief, nC=30). The effect of environmental interpretation on several conservation indicators was measured by a survey administered to tourists immediately before and after the visit.

The results indicate that not only the environmental interpretation provided by the guides significantly increased the satisfaction of the tourists, compared with those who did not receive any explanation, but had also a positive effect on the tourists conservation intentions (*e.g.* intention to donate money for a conservation cause). No statistic differences were found between the effects to the two briefs.

This suggests that environmental interpretation may be a crucial point to implement in the Visitors' centers in the Azorean Natural Parks and Geosites. Many of these do not provide guided tours, but the information, satisfaction and conservation attitudes that visitors take out of the experience could be much improved if they had them. Also, nature tourism activities, which currently have few or none environmental interpretation could benefit from this type of measure.

It was shown that environmental interpretation is effective to increase the satisfaction of the activity, as to promote conservation intentions among nature tourists. These results could be a good incentive for the implementation of a visitor payback project in Azores, encouraging tourists to give money voluntarily to conserve the places they visit, mainly on the more sensitive protected areas.

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ORAL



*TRANSYLVANIA DINOSAUR MUSEUM – SCIENCE, PALEOART AND LOCAL
DEVELOPMENT IN THE HAȚEG COUNTRY DINOSAUR GEOPARK*

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Keywords: dinosaur sculptures, geoheritage interpretation, geoscience education, community involvement

A groundbreaking scientist in the beginning of the 20th century, Ferencz Nopcsa, founder of palaeobiology and island dwarfism theory, discovered 5 genera of dinosaurs and 25 genera of reptiles on his estate from the Hațeg basin in Transylvania. His drawing of *Struthiosaurus transsylvanicus* was the first realistic reconstruction of a dwarf dinosaur. As an increasing number of dinosaurs, pterosaurs and various vertebrates, invertebrates and plants from the area of the Hațeg Country Dinosaur Geopark were published lately, the dwarf dinosaurs continued to stimulate the imagination of a growing number of paleoartists all over the world. A private initiative of NGOs and paleoartists, supported by research institutes, universities and local community, the Transylvania Dinosaur Museum project aims at reconstructing the Late Cretaceous dwarf dinosaurs that lived on the Hațeg Island. The project started in 2014, when three life size, museum quality dwarf dinosaurs were reconstructed by world famous Canadian dinosaur sculptor Brian Cooley: sauropod *Magyarosaurus dacus*, ornithopod *Zalmoxes robustus* and raptor *Balaur bondoc*. After visiting the Canadian Rockies, the largest of the dwarfs, *Magyarosaurus*, took a transatlantic trip to the Netherlands and reached Romania on a trailer after a European journey which included stops at two EGN Geoparks. Meant to promote both dwarf dinosaurs and geoparks, the journey of *Magyarosaurus* was filmed by a Canadian team and turned into the documentary "A Sauropod Abroad", launched in 2016 and already awarded three prizes at international film festivals. The *Magyarosaurus* replica is now exposed in the yard of the Science and Arts Center, while *Balaur* has a dedicated exhibition at the Visiting Center of the Geopark. *Zalmoxes* is now an ambassador that frequently travels with the Geopark team to various events in Romania and participates in various educational activities. Apart from 3D dinosaur reconstructions, black and white drawings of all the animals and plants discovered so far in the Hațeg area have been for the Museum made by Polish geologist and paleoartist Jakub Kowalski. As project partner, the Town Hall of locality General Berthelot offered a 19th century manor house to host the Museum exhibits. The building will be renovated by the local GAL within the National Rural Development Program. Four rooms of the museum will be dedicated to permanent exhibitions, while the fifth room will host temporary exhibitions and various events. The permanent exhibition will display two ecosystems: the nesting site from Tuștea, with *Paluditans*, ridden by pterosaurs and raptors and a dry alluvial plain environment with *Struthiosaurus*, *Telmatosaurus* and *Theriosuchus*. The temporary exhibition room will display the giant pterosaur *Hatzegopteryx thambema*, along with the world of dwarf dinosaurs reconstructed by means of augmented and virtual reality equipment. The project partners are working together to fulfill the main goals of the Transylvania Dinosaur Museum project: study and interpretation of dwarf dinosaur faunas and their ecosystems, support local innovation, create new jobs, promote the geopark concept and support the Hațeg Geopark in projects of natural and cultural heritage conservation, education, as well as in social, economic and cultural development of the Hațeg Country.

GEOSITES ROUTE OF AROUCA GEOPARK: A GEOLOGICAL-BASED TOURISTIC PRODUCT IN A GEOTOURISM DESTINATION

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Keywords: Geological-based touristic product, Geotourism Destination, Geosites Route, UNESCO Global Geoparks

Since 2015, Arouca UNESCO Global Geopark, located in northern of Portugal, offer a new geological-based touristic product nominated Geosites Route of Arouca Geopark. This Route is composed by 3 itineraries marked with road signs where is possible to discover 31 geosites:

Itinerary A: Freita the enchanted mountain approximately - 20 Km;

Itinerary B: Through the unknown mines and meanders of Paiva River- 62 km;

Itinerary C: Paiva: the amazing valley - 18 km.

Along this route we can understand some important chapters of earth's history through a significant investments and facilities like 6 news observatory platforms, guidebook, interpretative panels, 2 thematic Interpretative centers and the Paiva Wood Walkways.

This Geological-based touristic product is part of geotourism offer where is possible to discover magical sites due the authenticity of the places promoted by local geodiversity, biodiversity, landscape and culture. The "Giant Trilobites, Birthing Stones, Cruziana Ichnofossil of Paiva Valley, Regoufe and Rio de Frades complexes Mines were some highlight geosites of this route.

The Geosite route is managed and monitoring by AGA – Arouca Geopark Association, an entity certified by ISO 9001, responsible to ensure the protection and conservation of the geological heritage and simultaneous to promote activities of geoeducation and geotourism, in this UNESCO destination.

Currently, this Route is used professionally, not only by staff of Arouca Geopark, but also by local operator tours and local interpretative-guides trained by Arouca Geopark Staff who offering new geotouristic experiences to visitors.

This Geotouristic Route allows linked the in a kind of network the geosites and reinforce the touristic attraction of Arouca Geopark promoting its restaurants, accommodations, local products and museums creating benefits to the local communities.

This year the "Geosite Route & Paiva Walkways of Arouca Geopark" won the "Geoconservation Award 2017" promoted by PROGEO European Association for the conservation of Geological heritage – Portuguese Commission.

*MANAGERS OF UNESCO HERITAGE OF MERCURY AS PARTNERS OF
IDRIJA UNESCO GLOBAL GEOPARK*

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Keywords: UNESCO World Heritage List, UNESCO Global Geopark, management, Local Geopark Partners

Exceptional geological conditions and the development of the territory of Idrija throughout its earthly history have led to exceptional Idrija mercury ore deposits and more than 500 years of constant mining in the area. During this time, an exceptional technical heritage was created which preserved a high level of mining throughout the Mine's operation. However, Idrija's past was also greatly influenced by natural scientists, especially geologists and botanists. An important piece of Idrija's history puzzle is also immaterial heritage of exquisitely fine lace and typical miners' cuisine that evolved in this intimate, remote region. In 2012, this rich and remarkable heritage was included in UNESCO's Cultural Heritage List. Today, it is managed by three main institutions: the Municipality of Idrija, the Idrija Mercury Heritage Management Centre (CUDHg), and the Idrija Municipal Museum.

While preparing for the UNESCO Cultural Heritage List nomination all three institutions decided to establish a Geopark Idrija based on the exceptional geology and rich heritage of the area. The Geopark would provide new employment opportunities, primarily in the fields of sustainable rural development and geotourism. In 2013, after six years of preparations and active involvement, Idrija was included in the European and global network of Geoparks. In 2015, the UNESCO Global Geopark was born.

The success was mainly the result of co-operation between all local partners included in the Geopark but mostly by that of key managers of UNESCO's cultural heritage in Idrija who are also actively involved in Idrija's UNESCO Global Geopark. The Municipality, the Municipal Museum and CUDHg are key players in the sustainable development strategy for Idrija's Geopark. They present a model of successful integration of heritage in tourist offer. Additionally, they manage cultural, natural and geological heritage and wisely include it in their marketing with great care.

The employees of these institutions are experts in their individual fields of UNESCO heritage management and are actively involved in field work. They offer help and consult other Geopark partners. Sharing knowledge about protection and preservation of natural and cultural heritage and its interpretation is priceless. This enables all Geopark partners to be actively involved in their fields and contribute to well-being of Geopark guests.

Exemplary care for heritage and correct management make Geopark partners a good example for inhabitants and guests who are being informed that sites of outstanding universal values (OUV), which are inscribed in UNESCO Cultural Heritage List, are an important part of Idrija's UNESCO Global Geopark. They need to be preserved for future generations and cherished in their beauty.

NEW APPLICATIONS FOR THE PROMOTION OF THE GLOBAL GEOPARKS AND THE GEOSITES IN THE TROODOS UNESCO GLOBAL GEOPARK

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Keywords: web-application, Global Geoparks, geosite, Cyprus

The Troodos UNESCO Global Geopark (TUGG), which is located in the heart of the island of Cyprus, has been a member of the European and Global Geoparks Networks since 2015. Amongst the recommendations of the Networks that should be carried out by the TUGG, until its next revalidation mission, were the establishment of the "Geoparks Corner" in the Visitor's Center and the improvement of guiding visitors in geosites and geotrails.

The challenge was the creation of an interactive and dynamic exhibit, which will provoke the interest of visitors. Therefore, we proceeded with creating one Google and two ESRI ArcGIS Web Map applications for the UNESCO Global Geoparks (UGG) and the TUGG geosites respectively. For the needs of these applications two geodatabases were created with spatial references, informational texts and images regarding the UGG and the TUGG geosites. These geodatabases were transformed in a —kml format, which allows to be connected with the developed maps in a way that all necessary information can appear on the maps.

These applications were uploaded on the website of the TUGG, as well as at the Visitor's Center, through an interactive touch screen. The WebGIS application for the "Geoparks Corner", is programmed to run without internet connection and it is based on an open source geospatial software, which features three different basemaps, constructed from data derived from Natural Earth & NASA. The existing 119 members of the UGG in 2015 are depicted on the WebGIS Map as points. Through the interactive touch screen the visitors can choose one of the three basemaps for their touring, increase or decrease the scale, change location and with a simple touch in any of the 119 points they may read related information in a pop-up window. This information includes the name of the Geopark and the Network, the location, the year of the integration and the number of each geopark in the Network. Furthermore, the application includes tools to restore the settings, scale adjustments and language selector.

The applications of the geosites and the tours around the TUGG were programmed to run through ESRI ArcGIS Web relief map of Cyprus, on which the boundaries of the TUGG are visible. On the map for the geosites application the visitor may view 50 numbered points corresponding to the 50 of the 62 geosites of the TUGG. The visitor with a simple click on each point can seek a photo and details of each geosite in a pop-up window. The application for the tours includes 14 proposals, where the visitor with a simple click on each proposal on the left side of the screen, can see details of the selected tour and simultaneously the route with the stops on the map in the right side of the screen. These tours have been drawn carefully to connect geosites and geotrails with museums, environmental centers and local businesses.

The above applications are powerful geotouristic tools giving the opportunity to the visitors to discover the geoparks around the world as well as the geosites of the TUGG geopark.

THE KARAVANKE/KARAWANKEN UNESCO GLOBAL GEOPARK - GOOD PRACTICE OF CROSS-BORDER COOPERATION

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Keywords: Karavanke/Karawanken Geopark, cross-border cooperation, INTERREG Slovenia-Austria, EUfutuR

The Karavanke/Karawanken UNESCO Global Geopark is cross-border geopark between Slovenia and Austria. It was established in 2010, and since March 2013 it is a member of European and Global Geopark Network. Its area extends to 1067 km², with a population of approximately 53.000 inhabitants. The Karavanke/Karawanke Geopark is marked by rich geological variety between the Alps and the Dinarides, extraordinary cultural and natural heritage. The great geodiversity of the Karavanke/Karawanken Geopark area (the oldest Palaeozoic stones, important mineral and fossil deposits, deposits of metallic minerals that were exploited in the past, karst caves and other karst forms, evidence of former volcanic activity, ...), its natural and cultural particularities are present in many different ways, including two key geo-centres (one in Mežica - Slovenia, second in Bad Eisenkappel - Austria), numerous information points and educational trails. The management structure of the Karavanke/Karawanken Geopark is formed as the cross-border Working group (ARGE), established by all (14) municipalities from the Geopark area, together with other key partners, like Podzemlje Pece, d.o.o. - Tourist mine and museum in Mežica (SLO), and Obir Tropfsteinhöhle - Obir Dripstone Caves in Bad Eisenkappel (AT). The cross-border Working group (ARGE) has following goals: (a) The conservation of geological and natural resources; (b) The fostering of awareness, information and education about and in the Karavanke/Karawanken Geopark, the European and Global Geoparks Network and its positioning as a Geopark; (c) The economic valorisation of the Geopark, especially through sustainable tourism; (d) General cross-border cooperation and regional development in terms of sustainable development policies. The cross-border entrepreneurial cooperation, joint planning and marketing of tourism will be additionally extended and strengthened through activities linked to the Karavanke/Karawanken Geopark in the future. As a shorttime goal concerning the management structure of the Karavanke/Karawanken Geopark is to establish a permanent equal cross-border participation in the form of the European Grouping of Territorial Cooperation (EGTC), to create a legal entity with highest bilateral certainty. This operational challenge is primary addressed by the EUfutuR project, new project of cross-border cooperation, which is implementing within the Cooperation Programme Interreg V-A Slovenia-Austria 2014-2020 and is co-financed by the European Union, through the European Regional Development Fund and Land Kärnten. Beside the establishment of an EGTC, the main objectives of the EUfutuR project are strengthening the bilateral identity and the international importance of the Karavanke/Karawanken Geopark. It will enhance the cooperation among local communities, schools and kindergardens, local inhabitants and institutions, involved in regional development activities. The EUfutuR project is based on joint management bodies development, educational strategies and awareness activities to strengthen common linguistic, cultural and natural identity of the area. The EUfutuR project will provide conscious, living bilateral identity, and will contribute crucially to the recognition of the Karavanke/Karawanken Geopark at the international level.

NEW STRATEGY FOR UGG DEVELOPMENT AND VISIBILITY IN TERRITORIES OF POVERTY

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Keywords: panels, equipment, poverty, sustainable development

UNESCO Global Geoparks (UGGp) in the world have to follow strictly the same guidelines, strategies and criteria. Therefore the expected next integration of new UGGp located in poverty areas (Africa, South Asia, Latino-America) request adapted tools and strategy in term of site equipment and Geopark visibility.

These territories of poverty have mainly the same characteristics: difficult climatological context, lack of individual tourism substituted by guided small group tourism, strong financial and human management difficulties, non written local languages, wild landscapes, etc...

In these conditions, the use of site pedagogical/information panels representing important financial investment and strong maintenance cost is absolutely not adapted and should be substituted by a more economical and integrated system able to provide the same result in term of UGGp visibility and pedagogy as well as providing new incomes and not supplementary expenses.

This new strategy for UGGp visibility in territories of poverty was experimented for the first time, in 2016-2017, inside the Aspiring Geopark Ngorongoro-Lengai (Tanzania, Sub-Saharan Africa, UGGp candidate 2017) through a cooperation with UGGp Haute Provence (France) inside an European program (10th European development Found) created for providing development aid to African, Caribbean and Pacific (ACP) countries and to overseas countries and territories (OCTs).

In this probably future Sub-Saharan UGGp, this new strategy is part of the global concept used for the creation of this Geopark and was developed coherently inside all its territory- more than 10.000 km²- trough 3 discovery routes presenting about fifty Geopark sites. In this territory full of amazing landscapes, was just used strategically "Geopark referenced landmarks" connected with printed documents used by the guides, allowing the total disparition of anykind of intrusive pedagogic panel.

The first realization of this strategy realized at the scale of an entire Geopark, should be analysed as an existing model able to be transferred to others UGGp projects located in similar poverty areas around the world.

*TWO UNESCO DESIGNATIONS IN ONE AREA, SYNERGY OR CHALLENGE?
A CASE STUDY IN QESHM ISLAND UNESCO GLOBAL GEOPARK (IRAN)*

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Keywords: UNESCO Programmes, Hara Biosphere Reserve, Qeshm Island

Qeshm Island is fringed with biologically diverse mangrove forests, which lies along the Persian Gulf in the middle and northern areas of Qeshm between the island and the mainland. This forest is a hub of biodiversity in south of Iran and is one of the most important habitats that play valuable role in the formation of the biodiversity of the Persian Gulf. Since the area is located at contact zone of Palearctic Oriental and Aftropical world biogeographic regions, its biodiversity is unique. Protection of coral reef by filtration sea water and nursery ground for many aquatic organisms are some of these roles. Hara mangrove forest was designated by UNESCO as biosphere reserves in 1967. Furthermore almost all this protected area is located inside Qeshm Island Geopark territory. Several villages are adjacent to the forest and local's lives somehow depend to Hara and they took advantages of neighboring to this unique nature from long ago. With regard to this issue, community base plan is one of the best ways to managing this natural reserve. In coordination with Iranian UNESCO national committee and Iranian Department of Environment as responsible for protecting of the Hara Biosphere Reserve, Qeshm Island UNESCO Global Geopark programmes were begun in this area. The capacity which was created by linking with local people through the Geopark programmes have been used to empowering Hara (Mangrove) Biosphere reserve management. At first step, educational programmes for the local communities with aim at how to celebrate and conserve their natural heritage are ongoing in collaboration with M&B programme. Right now Hara Biosphere Reserve is among the most important Geopark sites and was promoted as a Bio-Geo site. Our experience in the island as a result of our activity during the last 3 years shows that the public awareness about importance of this biosphere reserves were increased and both UNESCO brands cooperate in synergies together without any overlapping or challenging. This essay will discuss, how two UNESCO site designations (Biosphere MAB & with Geopark programme) could work and cooperate in synergy with each other and how this status could add value by being both independently branded.

SOCIAL MEDIA CONNECT US!

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Keywords: social media, share experiences, communicate, visibility

We want to analyze how social media are a fantastic method (cheap, easy, accessibility, immediate...) to communicate our activities, our geology and our geodiversity.

They are also a simple method to share good practices and to keep in touch with different UNESCO Global Geoparks around the world and with aspiring geoparks which are looking for good ideas to do in their territories.

In Villuercas-Ibores-Jara UGG we are working with social media since 2009, when we made a Facebook page "Social Support to the candidature of Villuercas Ibores Jara aspiring geopark". Everybody can share activities follow us, and the most important thing, to feel the geopark: ask questions, learn about what a geopark is, etc. A very easy way to get more followers and supporters to our geopark.

After this great experience, we made an official fan page in Facebook in 2012, @GeoparqueVilluercas, with 4.500 followers (it's very active all days, all weeks, all months, and all year). We want to analyze who are and where are our followers, who share our activities and what kind of them are more popular. Also, in Twitter we have an amazing experience. @VilluercasGPark is one of the most popular in the geoparks world. We have more than 5.000 followers and 16.600 tweets during the last four years. We want to share our experience to communicate education and scientific activities, touristic and cultural ones. Also it's very usefull to share and communicate activities from our partners.

Finally, we analyze our experience on Instagram, our latest and greatest experience. During the last year, each day we have shared one picture and a short text about geology and geodiversity, and now we have more than 1000 followers from different countries. We have more than 200 "likes" every day. We want also to compare the social media between Spanish geoparks, only in Twitter, Facebook and Instagram, and how important is to share our common activities and to keep in touch between us.

SUSTAINABLE MOBILITY

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Keywords: sustainable mobility, sustainable development, education, vehicular mobility

The vehicular mobility, both of goods and of tourists, represents a problematic environmental issue for the Alpine territories, such as the one where the Adamello Brenta UNESCO Global Geopark is located. These territories are particularly sensitive and the infrastructures for the vehicular mobility present some risks. First, they can modify the natural landscape and interfere with the cultural tissue; second, they can bring to a loss of attractiveness and competitiveness on the touristic market; third, they can negatively contribute to the increase of pollution and climate change. The problem of vehicular mobility in the Geoparks is linked to tourism, and vice versa, the problem of tourism in protected areas often becomes a problem linked to vehicular mobility. Paradoxically, the risk is that one of transferring the chaotic traffic from cities to holiday places, where one is looking for a direct contact with nature.

In front of this scenario, Geoparks and protected areas have to carry out and promote different models of vehicular mobility, that are sustainable, accepting the challenge of developing a touristic offer that can reduce its impact on our Planet. Geopark's can be promoter of a new cultural approach: "the new mobility starts in our minds".

In this sense the Adamello Brenta UNESCO Global Geopark developed several projects during the last years, inside a broader strategy of sustainable development. Indeed, the sustainable mobility starts from the activation of more operational actions that have to work in a network through the proposal of a complete and wide offer. This offer then is accompanied by adequate marketing strategies and by widespread information. The organization of the sustainable mobility offer includes the pedestrians' and cycle's mobility, efficient public transport and traffic regulation.

The general strategy lies in creating a new way of thinking, making mobility and travelling a part of the holiday experience, raising the awareness of Geopark's visitors and their impact on these beautiful, remote and delicate areas. In this way it is possible to activate a chain educative effect on future visitors. Choosing to use a Geopark's shuttle or train is also an awareness gesture that could be potentially adopted at home, coming back from holiday, and bringing the Geopark into the cities.

Today it's therefore possible overtake the "old" mobility model, starting from the Geoparks and the protected areas, as the Adamello Brenta UNESCO Global Geopark and other Alpine Parks already experienced with success.

THE EXTENSION WORK OF ZIGONG UNESCO GLOBAL GEOPARK

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Keywords: geopark extension, boundary adjustment

Zigong UNESCO Global Geopark is situated in Zigong City, southwest of Sichuan Province, People's Republic of China, Asia and the Pacific Region. The extremely abundant dinosaur fossils and other vertebrate fossils, the typical Jurassic section and complete well-salt production relics are rich in Zigong Geopark; most of these are of international and national significance in scientific research. The Geopark was issued as a national geopark of China in 2001, as member of the Global Network of National Geoparks in February 2008, and reconfirmed four years membership in the Global Network of Geoparks in December 2012.

The geoheritage sites of the Geopark are widely and dispersedly distributed. When Zigong Geopark applied for the membership of the Global Network of National Geoparks in 2007, it classified all large-scale, the most typical and representative geoheritage sites into three scenic areas which are Dashanpu Dinosaur Fossil Site Scenic Area (8.7 km²), Zigong Well-Salt Industry Technology Scenic Area (1.92 km²), Dinosaur Fossil Locality Scenic Area in Rongxian County (46 km², including Qinglongshan Dinosaur Fauna, Rongxian Dinosaur Fauna and Jinhua Fern Flora) with a total area of 56.62 km². The three scenic areas are separated from each other without a continuous boundary.

According to the suggestion about adjustment of the boundary of Zigong Geopark given by the Executive Board of Global Geoparks Network (GGN) of UNESCO in 2012, and also to keep up with IGGP Statutes and Geoparks Guidelines, Zigong Geopark carried out investigation within the park area and adjusted the park as a whole area with a unified and definite boundary. After extension, the park is ranged from Qinglong Mountain at Fuxing Township, Rongxian County in the north, to Suoluo Valley of Jinhua Township, Rongxian County in the south, to the city boundary between Zigong and Leshan in the west, to Sanduozhai Town of Da'an District in the east, with an area of 1,630.46 km², 2720% larger than the old one. Within the Geopark boundary, there are 4 counties, 42 towns, 450 administrative villages and about 2000,000 residents.

After a series of investigations, more geoheritages have been included in the park, including anticline structure in western Weiyuan as well as stratigraphic sections of rarely-exposed Upper Triassic Series Lacustrine sedimentary strata and Lower Cretaceous Series Aeolian deposit section, which can promote scientific research and popularization as well as tourism development in the geopark.

There are abundant rare fossil resources in Rongxian County, which are centrally and closely distributed with large exposed area in Qinglongshan, Fuxin Village, Rongxian County. To protect the potential fossils, the Geopark expand the boundary of the original Qinglongshan Scenic Area, to make it as the important preserved area for further scientific research and a supplement to the research of Dashanpu Dinosaur Fossil Site.

The revised boundary also includes a series of natural and cultural spots, such as historical village, scenic spots, and wetlands, which can profitably enhance the geotourism connotation of geoparks, enrich knowledge of local people about geoparks, improve their living quality and promote the local economic development.

UNESCO GLOBAL GEOPARKS – MODEL REGIONS FOR THE SUSTAINABLE DEVELOPMENT GOALS

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Keywords: 2030 Agenda, sustainable development goals

In January 2016, the 17 Sustainable Development Goals (SDGs) of the 2030 Agenda for Sustainable Development — adopted by world leaders in September 2015 — officially came into force. The SDGs create an integrative policy framework which promises to lead to just social development and economic growth that will go hand-in-hand with ending poverty and a respect for nature and planetary boundaries. All stakeholders such as governments, civil society and the private sector are expected to collaborate to making the implementation of the new agenda a success. Globally, most countries have committed to Agenda 2030 as a top priority. In Germany a new national Sustainability Strategy is in force since January 2017, which is entirely based on Agenda 2030.

The Agenda 2030 does not only require top-down government regulation, it needs concrete places on the planet, where measures to meet individual SDGs – and the Agenda 2030 as a whole – are communicated, negotiated, implemented and evaluated. UNESCO Global Geoparks are such places. They do not only contribute to the visibility of geology and promote tourism; they rather are predestined to raise awareness of key issues facing society, such as using our earth's resources sustainably, mitigating the effects of climate change and reducing risks related to natural disasters.

Therefore, UNESCO Global Geoparks can and should position themselves as model regions for sustainable development in their respective regional and national context. Different than other regions, their integration into the GGN allows sharing solutions to sustainability, which have been identified locally, at the European and global level.

In addition, UNESCO Global Geoparks have a unique opportunity to claim a promising "niche" in worldwide sustainability policy-making. While in different fields, for example in biodiversity conservation, many institutions are competing for being prime coordinators, the geo-related themes of Agenda 2030 are not yet well "claimed". As a matter of fact, Agenda 2030 is full of geo-related issues, such as geothermal energy, the mining of raw materials, CCS, groundwater, soils or underground waste disposal. Therefore, Agenda 2030 provides an ideal option for underlining the societal and political relevance of UNESCO Global Geoparks.

At a workshop in November 2016, organized by the Foreign Office and the German Commission for UNESCO, representatives of all German UNESCO Global Geoparks discussed opportunities related to these special geo-related sustainability issues. What became apparent is that UNESCO Global Geoparks are indeed able to accentuate and expand their role in implementing the SDGs: For example, moderating discussions with regional stakeholders about the expansion of renewable energies, exploring synergies between climate change mitigation and nature conservation, finding local solutions for handling common goods like groundwater or designing "living labs" for transformation processes of mining areas. Integrated in a regional network, cooperating with scientific research and legitimated by their bottom-up approach as well as through their international cooperation, UNESCO Global Geoparks are in a position to mediate between different interest groups, inform the wider public and involve local decision-makers – in short: assuming the role of an active coordinator in moving towards sustainability.

JICA ACTIVITIES TO SUPPORT QFZO FOR RE-DESIGNATION OF THE QESHM GEOPARK AT UNESCO PROGRAM

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Keywords: re-designation, Qeshm Geopark, participatory approach

Referring the discussions between the government of Islamic Republic of Iran and Japan, it had approved to support Qeshm Island which is under development by Qeshm Free Zone Organization, to provide a Sustainable Master Plan. The project that is a three years package of several activities, started on November 2015 including to support Qeshm Island to be designated again as a UNESCO Global Geoparks' Program. Under a concept of participatory approach, which the Project dedicated to promote in Qeshm, a series of the activities have been planned and implemented in collaboration with QFZO, in order to achieve sustainable development goals.

We can mention to the below activates so far: to hire a Geopark Planning expert, to arrange meetings in Japan between JICA and UNESCO representatives, to review the geopark dossier before sending to UNESCO, to attend two team members of a domestic seminar in Makuhari city in Japan, to accompany UGN top managers to visit the island, to accompany the evaluators of UGN during their visit in Qeshm, to lubricate the relation between QFZO and Dep. of Environment of Iran in Tehran to manage Hara Mangrove Protected Area, to allocate a part of the Interim and Final Report to the geopark issues and emphasizing on the vitality of grabbing and promoting the geopark as an international reputed brand, to support to dispatch three experts to attend the 7th global conference in UK, to arrange visits and meetings for the top managers of QFZO from Unzen Geopark in Japan, to suggest to apply the Satoyama Initiative for integrated development of the island as an eco-island and geopark, to invite lecturers from Japan to discuss with Qeshm geopark officers and managers in order for sharing knowledge referring the Japan's excellent experience of networking, to promote Qeshm to Japanese tour operators, to develop Qeshm brochure in Japanese, to establish tourism website in three languages, to implement several pilot projects related to Qeshm geopark, to support villagers to improve their livelihood via involving them in sustainable tourism and agriculture in the framework of pilot projects (ongoing), to persuade QFZO to create an "Ecotourism Steering Committee" to converge the several parts of the organization, to dispatch one expert of Qeshm geopark office to attend a one month training course about ecotourism in Japan. Finally Qeshm geopark re-designated on May 5t, 2017 thanks to hardworking of a big group of people from Locals, village councils, Geology Survey of Iran, National Commission of UNESCO, private consultants and contractors, QFZO and JICA.

*KENTS CAVERN PREHISTORIC CAVES: CASE STUDY FOR PRIVATE SECTOR ENGAGEMENT
IN THE MANAGEMENT AND ACTIVITIES OF A UNESCO GLOBAL GEOPARKS*

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Keywords: management structure, private sector, community engagement, tourism

The English Riviera became the first urban Global Geopark in 2007 and remains one of the most densely populated UNESCO Global Geoparks in the Global Geoparks Network. The territory extends over 100km² across three towns, Torquay, Paignton and Brixham, with a population of 137,000.

The English Riviera Geopark has a rich and well-exposed geological heritage, from Devonian reefs to Pleistocene bone-caves, including Kents Cavern, Prehistoric caves, the UK's most important prehistoric cave site, with evidence of human activity from over 500,000 years ago. The geological heritage of the territory played an important part in the development of earth science in Britain and includes sites crucial to the initial characterisation of the Devonian Period.

Kents Cavern Prehistoric Caves were opened to the public in 1880 and today, Nick Powe is the 5th generation custodian of this award-winning show cave attraction in the Geopark. The cave is ranked as the most important Stone Age cave in Britain.

The oldest human fossil in Britain was discovered at Kents Cavern Prehistoric caves, a 41,000 year old early modern human (*Homo sapiens*) jawbone. Neanderthals used the cave during the Ice Age and Heidelbergensis (*Homo erectus*) flint handaxes found here are dated at over 500,000 years old.

Today the cave is open every day for guided tours and has become the underground visitor centre for the English Riviera UNESCO Global Geopark. Throughout the year the geosite stages underground entertainment putting on Shakespeare plays and other theatrical performances. These are promenade shows around the caves where professional actors guide the audiences around the caves performing abridged versions of classic English theatre.

The Geopark is an essential element to the attraction's visitor offer. During the Geopark Festival week, usually held in the last week in May, the cave hosts an International Communication weekend which connects Geoparks around the World through Amateur Radio.

This oral presentation showcases the role this privately operated geosite plays in the management and activities of a successful UNESCO Global Geopark. It will explain how the management structure operates, the importance of local community engagement and the role the Geopark has as guardians for the Global Geopark brand across its partner organisations.

ALTERNATIVE TOURISM ACTIVITIES IN LESVOS ISLAND UNESCO GLOBAL GEOPARK

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Keywords: alternative tourism, Lesvos, sustainable development, geotourism

Lesvos Island UNESCO Global Geopark, with an area of 1636 km² and 382 km of coastline, is located in the NE Aegean Sea. It is the third largest island in Greece and the seventh largest in the Mediterranean.

The island's terrain is scattered with a variety of geological monuments and formations, such as the Lesvos Petrified Forest, volcanoes, hot springs, important fossil sites, major geological faults, waterfalls and coastal landforms which are all important evidence of the Aegean's geological history.

Lesvos also displays a rich biodiversity. Due to the favorable soil and climatic conditions, the island possesses an abundant flora. More than 1400 taxa (species and subspecies) of plants make up the island's vegetation, and without exaggeration Lesvos could be described as a "Botanical Paradise", replete with exquisite and rare plants, trees and shrubs. The distinctive ecological value of the island was further emphasized by the integration of three areas labeled as Special Areas of Conservation and six areas categorized as Special Protection Areas for Avifauna into the European Ecological Natura 2000 Network. Lesvos is also recognized as an ideal place for birdwatching in the Mediterranean.

Lesvos offers its visitors a chance to get to know and visit a network of geosites, important habitats, accessible archaeological sites and monuments, all of which highlight the longstanding presence of humans on the island and their close relationship with the natural environment and its resources.

This paper analyses the work carried out by the Lesvos island UNESCO Global Geopark to encourage and support the development of alternative tourism activities, various forms of agrotourism, celebrations and cultural festivals, together with gastronomic tourism. At the same time, it promotes the rich cultural tradition, contemporary artists, and local products.

Lesvos Island UNESCO Global Geopark encourages and supports the development of activities like birdwatching, cycling, climbing, hiking, trekking, sailing, diving, riding, fishing, educational programs, sea- and agrotourism activities, cultural festivals and a variety of nature tours and activities which offer visitors unique experiences and are connected with important geosites.

Lesvos Geopark works to enhance the island's geological, natural and cultural heritage through a series of actions and initiatives aiming to the interpretation and promotion of geological monuments for residents and visitors, by supporting a group of experts who are organising and promoting all the above described activities.

REGIONAL COLLABORATION TO STRENGTHEN THE CONCEPT OF UNESCO GLOBAL GEOPARKS IN SOUTH EAST EUROPE

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Keywords: regional collaboration, UNESCO Global Geoparks, good practices, sharing experience

Southeast Europe primarily consists of the Balkan Peninsula. The states included in the region are (in alphabetical order), Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Greece, Kosovo, Macedonia, Moldova, Montenegro, Romania, Serbia, Slovenia and Turkey.

It is in this part of Europe, besides Scandinavia, that the fewest geoparks are included in the European and Global Network of UNESCO Geoparks even though there are particular closed areas of exceptional geological features that would make a basis for a geopark. In certain countries, there are also institutions (UNESCO commissions, ministries, geological surveys and societies, etc.) and individuals who are in favour of the idea of a geopark and are looking for possibilities to launch it. In addition to presenting an opportunity for sustainable tourism development, especially in the countryside, geoparks offer new employment possibilities, which are of utmost importance in certain South European countries. Geoparks are the most innovative sustainable product where visitors are not just tourists.

Various international workshops, meetings and conferences present opportunities to connect and share experience and good practices of mature geoparks already included in both the European and Global Network of UNESCO Geoparks. This provides aspiring geoparks with opportunities to learn about these good practices and implement them.

The Idrija UNESCO Global Geopark has accepted the initiative by the UNESCO office in Venice (Sector of Natural Sciences) to organize a workshop for South European geoparks in order to promote the idea and essence of geoparks, support aspiring geoparks and expand the EGN/GGN network.

The aim of the three-day event: The representatives from mature geoparks share their experience as members of EGN, GGN and UGG network with workshop participants – the overlapping of UNESCO destinations with UNESCO Global Geoparks, tourism development in geoparks, activities that help preserve geological heritage, benefits for local economy, development of synergies with other UNESCO sites in the country, successful geo-interpretation, positive effects of co-operation between geoparks and national institutions etc.

The opportunity: Aspiring geoparks get a chance to present their situation, expectations and challenges they face during the process of establishing a geopark.

The aim of the workshop: to establish new geoparks in Slovenia, Croatia and Romania and especially in those countries where there are no geoparks included in the EGN/GGN network: Albania, Bosnia and Herzegovina, Bulgaria, Kosovo, Macedonia, Monte Negro, and Serbia.

All regional workshop participants get familiar with most prominent sights of the Idrija UNESCO Global Geopark. A one-day field trip takes the participants to Idrija's countryside where they meet Geopark's partners, visit geo-interpretation sites and experience how cultural and intangible heritage is included in the Geopark's offer. Every day is rounded off by fantastic local cuisine with traditional dishes from local ingredients.

GEO-PRODUCTS IN GEOPARK - GEOLAND OF THE HOLY CROSS MOUNTAINS – POLAND

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Keywords: geo-products, Holy Cross Mountains, Geopark, handicraft

The area of aspiring Geopark – Geoland of the Holy Cross Mountains, is situated in the central part of Poland. The geopark has very strong geological and geomorphological basis. On the relatively small area – 526 km², occurring various sedimentary rocks represent almost all the geological periods from Cambrian to Quaternary. The substantial geological values of Geopark's area are:

- outcrops of different sedimentary rocks – the most important are the middle and upper Devonian sedimentary rocks with abundant fossils;
- over 70 geosites in the majority protected by law;
- structural morphology with interesting elements of relief.

Based on the strong geology and geomorphology of the geopark, various geo-products were created. The flagship product is the Centre of Geoeducation. It is also a headquarter of the geopark. In the Centre there is an exhibition about geological history of the region. At the exhibition you can find numerous models of fossil animals. Numerous multimedia presentations also help to understand difficult geological issues. The most interesting of them is the 5D cinema, where a simulation of the journey to the center of the Earth is presented. The Center also conducts numerous educational activities. The most important are the annual geological picnics which attract a few thousand people every year. Therefore, there was organized events called: "The Trilobite's Day" or "The Tetrapod's Day".

Another interesting part of the geological event is the lead smelting in the Museum of the Village of Kielce. This event brings the old mining traditions to the region. Geopark organize numerous field games – questing's. The Geopark also organizes hiking and cycling rides. Craftsmanship is important geo-product that ensure geopark promotion. We are currently evaluating the certification of such products as clay pottery, wood sculpture, or traditional polished limestone handicraft from Holly Cross Mountains Area. Geopark has established relationships with organizations that promote and sell handicrafts as souvenirs.

Geopark also wants to promote geo-food. There are many regional dishes in Holly Cross Mountains Area, such as the famous soup called zalewajka.

A touring publication of the order to the next geo-product, which coordinates Geopark. So far, numerous publications have been published by Geopark Kielce, which has now become part of the Geoland of The Holly Cross Mountains.

To support the emergence of new geo-products and streamline existing ones, Geopark is cooperating with such organizations as Polish Tourist and Sightseeing Society, Regional Tourist Organization or Local Action Groups.

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"GEOPARKS: PATHWAYS OF SUSTAINABLE
TOURISM FOR DEVELOPMENT"

THEME "GOOD PRACTICES IN GEOPARKS"

POSTER



BUILDING AND BRANDING A GLOBAL GEOPARK IN ROMANIA

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Keywords: Global Geopark, building, branding

Building a Global Geopark means to follow the official recommendations and existing models but also to adapt them to local socio-economic context. Each geopark is unique and has to bring inside the Global Network not only a specific geology, natural and cultural heritage but the experience, work and results of the geopark team. A geopark project has specific steps to be taken so far aiming to build the three main pillars: optimum territory, partnerships and a sustainable management plan to be implemented by the geopark team. The three pillars are building a bridge between the beginning of the geopark project and the real management of the geopark territory. An optimum territory is a territory which is well defined from the geological, historical, cultural and administrative point of view. It could be defined after multidisciplinary research studies, meetings with local stakeholders, associations, local administrations and local communities. The territory has to be imagined not just as an interesting area but a manageable one, where identified objectives of the management plan have to be implemented in a coherent context. Partnerships are crucial and have to comprise strategic partners for management, communication, research and cultural activities. The management plan is based on territorial resources, type of partners and geopark team creativity in identifying development objectives and related activities.

In our approach the three pillars described above were considered key elements for social entrepreneurship and brand development. The two are interrelated and have proved that the geopark has to become a key partner for social, economic and cultural development.

The entrepreneurial approach is using techniques to develop, fund and implement solutions to social, cultural, or environmental issues. Branding is a way of defining our geopark to ourselves, to our team and to external communities. It could be called the geopark's identity. The brand is aiming to create a market value for the geopark and to allow development of a tourism / geo-tourism destination, to create opportunities for geopark team, local entrepreneurs and local stakeholders. And in reverse all of them to be more attached and involved in geopark development.

The paper presents two case studies from Romania: Hateg Global Geopark and Buzau Land Aspiring Geopark. In both cases University of Bucharest is playing a key role and has developed experience and expertise to support the new UNESCO Geoparks Program in Romania.

GEO –WATER COLOUR: A DIFFERENT APPROACH TO GEOPARKS

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Keywords: geo-watercolour, arts, geological heritage, geoparks

Geological heritage, both in its landscape aspect and in smaller scale elements (rocky outcrops, sedimentary structures, minerals, fossils, etc.) offers an infinite range of colors, textures and shapes, which can serve as inspiration for artistic painting, both figurative and abstract.

The workshop of Geo-Watercolor emerges as an initiative to promote Geological Heritage, through a fun and carefree activity such as "creative watercolor". This workshop was developed in the framework of the 11th European Geoparks Week in Sierras Subbéticas (Cordova, Spain). It includes a talk about Sierras Subbéticas UNESCO Global Geopark, an introduction to the watercolor technique, landscape and rock practices, and finally a collective practice of creative watercolor in large formats, in which all participants collaborate, letting the imagination and spontaneity flow, having as a background the natural heritage of the Sierras Subbéticas. The approach of the course, in which the freedom prioritises over the technique, allows the activity to be open to a wide range of participants (from the age of two years). In the collective practice of creative watercolor, all the participants collaborate in the creation of a common, large format work, in which the result is not important at all, but spontaneity and liberation, so that people of all ages can participate.

In the workshop Geo-Watercolour, the geosites have represented a guiding thread to show, through artistic expression, the emotions and sensations produced by the contemplation of the landscape of the Subbetic Sierras, the light, the atmosphere, the karstic formations, vegetation, fauna, fungi, rocks and fossils.

Art represents a powerful tool for the dissemination and education of science and in the case of Geology and Geological Heritage, a world of possibilities opens up.

The Sierras Subbéticas is a mountainous territory where karstic modeling and Jurassic and Cretaceous series with a great abundance of ammonites stand out. It was declared a Geopark in 2006.

THE CONCEPT OF THE GEOPRODUCT: SUCCESSFUL EXAMPLES FROM NATURTEJO UNESCO GLOBAL GEOPARK

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Keywords: geoproduct, Naturtejo Geopark, local sustainable development, innovation

When UNESCO Naturtejo Global Geopark integrated into the GGN (2006), its geological heritage increased the attractiveness of the territory. Furthermore, local companies have been showing interest in joining their products and services to the ideals of the Geopark and to the Geopark brand. Geoproducts are innovative, new or reinvented traditional products related with the geodiversity of this 5060 km² territory. The products are strategies to promote local identity that can be a way of "bringing the Geopark Home".

Local products reflect the biophysical conditions and traditional techniques of preparation, such as GeoWine (Súbito) or GeoLiquor (Acha Doce). The liquors, prepared with genuine techniques from autochthonous raw material, remit to the mining ore and the granites of the region (Ore, Gold, Earth Depths). The olive oil from Tagus River schist terraces (Rodoliv) is branded with Portas de Ródão Natural Monument, the iconic epigenic gorge.

The territory has been affirmed in the sector of green economy and organic production. Aromas do Valado has stood out as a distillery of aromatic and medicinal plants, that cultivates and processes autochthonous plants of Naturtejo Geopark, producing essential oils, personal care products and cosmetics. Also aged beef (Geo do Prado) and wine (Herdade do Escrivão) are Geopark ambassadors, in this case, produced with sustainable practices in the ecosystems.

Some Geoproducts are very didactical, like Geocakes, a cake design company, whose cake of a trilobite producing Cruziana, besides being tasty, can teach trilobite feeding behaviors or paleogeography. Love – Local Product is a gourmet basket which combines local products from different producers within the entire territory (olives, jam, olive oil) with a Geoproduct exclusive packaging, providing also, also providing visits to farms.

Artisans are reinventing products with ancient artistic know-how approached with new visions, ideas and special interpretations of Naturtejo Geopark. For example goldsmith Paulo Dias who has created a handmade line of jewellery "Trilobite... Precious – for million years" or Vónô an artisan who is reinventing "burel", a Portuguese handmade fabric, made of wool, adapting it to the Geopark's stories, textures and colours.

The tourism services can also raise awareness for Geodiversity, such as the GeoRestaurant "Petiscos e Granitos", the GeoResort "Casa do Forno" and the "Monsanto GeoHotel School", framing their spaces and services in this unique territory. GeoLife or ActiGeo are companies that promote geotourist activities, tours in geomonuments and that include the interpretation of landscape and geodiversity.

Geoproducts have been present in a wide range of Naturtejo Geopark activities, including visits to production units, tastings and workshops as well as presentations, fairs, festivals, specialized markets, trade shows for professionals in Portugal and abroad.

Naturtejo Geopark Geoproducts are true ambassadors of the Geopark brand, they are more than products; they promote local identity.

INCLUSIVE MULTISENSORIAL ACTIVITIES FOR PEOPLE WITH DISABILITIES. A CASE STUDY DEVELOPED IN THE BASQUE COAST GEOPARK IN ZUMAYA (NORTH SPAIN)

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Keywords: multisensorial activities, disabilities, inclusive

People with different kinds of disabilities are part of our societies. In the last decades and mainly in the first world, efforts to include these people in different levels of formal educational programs have been made. However, scientific activities are much more infrequent, even non-formal ones.

In 2012, a group of professors, students and administrative workers from the Faculty of Geological Sciences of the University Complutense of Madrid (Spain) begun the innovation project Geodivulgar, to develop non-formal geological educative actions for all the society. Due to the success of the designed activities, the association Ciencia sin Barreras (Science without Barriers) emerged two years later to develop inclusive activities for people with disabilities. Nowadays, more than 50 members from different faculties, universities, museums, etc. integrate these two complementary group.

Along the weekend 19-21 June, 2015 an innovative and inclusive action was conducted by Ciencias sin Barreras: a geological fieldtrip in the Basque Coast Geopark in Zumaya (North Spain) for deafblindness people without geological educational background. The Geological Society of London (Jeremy Wilson Charitable Trust & Thomas Jefferson Field Research Fund), Geodivulgar (University Complutense of Madrid) and individual donations granted this activity. The excellent exposure conditions in Zumaya, as well as the existence there of two Global Stratotype Section and Point (GSSP), were the main reasons to choose this location for this activity. It was focused on understanding concepts such as the sedimentation process, biological evolution and extinction, the geological time or the significance of geological time boundaries. To develop the activity, each participant needed a mentoring geologist for explanations as well as an interpreter-signing for translation of the information and tactile methods applied directly on the outcrop (Gómez-Heras & García-Frank, 2016).

This event had an impact on the media. It was broadcast in the national TV program "En lengua de signos" (La2 de TVE, 27/06/2015, <https://www.youtube.com/watch?v=AV2lrcydc4g>). A documentary film was made and showed in the Zero Project Conference and in the Cineforum of the General Assembly of the European Geosciences Union, (Viena, February and April, 2016, respectively) (<https://www.youtube.com/watch?v=i2uWUBsY3Ow>, in Spanish; <https://www.youtube.com/watch?v=UofKRblfptY>, in English).

This case study must be considered as a good example of the great possibilities of the Geoparks as places where accessible and inclusive activities for people with disabilities are possible, according to the seventeen UN Sustainable Goals 2016-2030.

INFLUENCE OF THE AALENIAN GLOBAL STRATOTYPE SECTION AND POINT IN THE SOCIAL DEVELOPMENT OF THE MOLINA REGION-ALTO TAJO GEOPARK (SPAIN)

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Keywords: geoconservation, social development , rural geotourism

The Molina Region-Alto Tajo Geopark, established in 2014, is located in the NE of the Guadalajara province (Central Spain). It extends by an area up to 4.000 km², but it is notably deserted (only 2.4 inhabitants per km²). Molina de Aragón is the main village of the Geopark, where almost 1/3 of the total population is concentrated (Carcavilla et al., 2016). The main feature of this region is his important geodiversity, showing a low degree of anthropic damage allowing, therefore, a good preservation of the natural and cultural heritage.

The high geological value of this Geopark is reflected in the existence of several singular sites, being one of them the Fuentelsaz stratotype, the first Global Stratotype Section and Point (GSSP) established in Spain. This stratotype of the Toarcian-Aalenian boundary (Lower -Middle Jurassic) (Cresta et al., 2001) constitutes a Spanish geosite of international relevance, so that the Comunidad Autónoma of Castilla-La Mancha will briefly avow it as Natural Monument. The stratotype is located in a small village (Fuentelsaz) with less than 100 inhabitants, being their economic resources based mainly in subsistence agriculture and farming.

Following Carcavilla et al. (2016), a geopark must be governed by three basic principles: 1) the existence of an important geoheritage, being the conductive thread of development actions; 2) to promote geoconservation and divulgation actions; and 3) promote the local socioeconomic and cultural development. In this sense, the establishment of the Fuentelsaz stratotype matches with such premises. The process begins promoted by the scientific community, mainly in the fields of the geology and the paleontology. However, it was also important to boost the local community in the sustainable development scenario.

Nowadays, the Fuentelsaz stratotype is playing an important role dealing with these three principles:

- 1) research scientific activities in progress around the stratotype contribute to increase their importance as a worldwide reference geosite;
- 2) design of new actions of geoconservation and divulgation are carried out, as is the case of a new interpretation center (open since 2016), explanatory panels around the village, as well as an oriel located in front of the stratotype with more explanatory panels about this geosite;
- 3) finally, it is expected that all these actions contribute to the development of a respectful rural geotourism and to the socioeconomic conditions of this region.

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THEME "ENGAGING COMMUNITIES AND NETWORKING"

ORAL



GEOPARK VOLUNTEERS AND AMBASSADORS PROGRAM

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Keywords: Global Geopark, volunteers, ambassadors, young people

Hateg Global Geopark, in Romania, is the result of a grass root effort which started in 2000 and was initiated and coordinated by University of Bucharest now in charge with geopark management and working on a long term project. For more than 20 years the Geopark developed the area through research, education, and tourism infrastructure and heritage interpretation. But all this is not enough for a Global Geopark; it also needs a deep connection with the community in order to develop a sincere sense of place.

During the last few years new educational tools and structures were developed: educational packages, EDU-Geopark Network, Explorers Clubs in 12 local schools. In 2013 the Geopark team started a volunteer programme called Volunteers for Geopark. The result is the most successful Volunteer Group in Romania, with hundreds of activities and projects, national and international recognition and a model for other volunteering initiatives. The program is aiming to involve young people as geopark partners and also to fulfill their needs for social recognition of their skills and creativity and to support their personal development in life and profession. More than 200 local students were enrolled and they signed a contract, passed training stages and were involved in more than 30 projects, some of these projects being initiated by volunteers themselves. Based on an evaluation process volunteers are receiving an international Voluntpass issued by University of Bucharest and a Diploma supplement with specific skills developed during their voluntary work.

In 2016 a new program started aiming to train the best volunteers to be able to represent their communities in national and international projects and to contribute to increase the level of understanding, appreciation, conservation and promotion of Hateg Global Geopark. After training sessions on subjects ranging from leadership, public speaking, heritage interpretation to geoparks history, and several field application, 18 young volunteers passed the evaluation and validation process and have become Geopark Ambassadors. The process is continuing every year since.

Geoparks Ambassadors is a unique and innovative project aiming to train and involve young volunteers to become partners of the geopark administration and official representatives of their territory in national and international missions. They are now one of the Hateg Global Geopark voice and image within local communities and abroad. Further mission are to come and meanwhile they started to contact young people from other Global Geoparks to share their experience and enthusiasm for youth exchanges and cooperation projects.

*DRIFTING APART: SUPPORTING THE DEVELOPMENT OF NEW AND ASPIRING UNESCO
GLOBAL GEOPARKS IN CANADA, NW EUROPE AND RUSSIA*

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Keywords: innovation, periphery, best practice, partnership

The establishment of a UNESCO Global Geopark is a significant undertaking; however once operational, the economic, environmental and educational opportunities are many and varied. Causeway Coast and Glens Heritage Trust (CCGHT), based in Northern Ireland, is leading a three year INTERREG VB Northern Peripheries and Arctic Region project which supports the development of new and aspiring Geoparks in Canada, NW Europe and Russia. These peripheral northern areas share common social, environmental and economic challenges which a well-functioning Geopark can help address. By investing over €1.3 million across seven existing UNESCO Global Geoparks and six aspiring Geoparks, Drifting Apart aims to secure enhanced economic, environmental and educational prospects for those living and working in the northern periphery region. Drifting Apart draws upon the strengths and expertise of all partners to deliver four key 'work packages' or project outputs.

Marble Arch Caves UNESCO Global Geopark has developed the 'Drifting Apart Storyline' which connects and promotes the common geological history and heritage of all partner areas. Linked to the storyline are a set of best practice interpretation guidelines for existing and aspiring geoparks across the region. Shetland UNESCO Global Geopark is leading the development of geology based education resources for schools, community groups and local businesses. These resources will help partners enhance community understanding of the fascinating and shared geological heritage of the region and build capacity in local communities to develop geological and cultural heritage based products and services. Magma UNESCO Global Geopark is developing 3D virtual learning and remote access platforms which afford anyone, anywhere, an opportunity to experience and learn about key geological sites throughout the northern periphery region. Stonehammer UNESCO Global Geopark is conducting research into the effectiveness of current management practices at geological heritage sites throughout the partnership area. The outputs of all work packages will result in the development of resources and best practice management guidelines for new and aspiring Geoparks in peripheral areas. Aspiring Geopark partners will use these resources to prepare applications for UNESCO Geopark Status in the period 2017 – 2020.

With just over 12 months remaining, the Drifting Apart project has already delivered a series of best practice resources which existing and aspiring geoparks are using to help secure, enhance and promote the ethos and objectives of the UNESCO Global Geopark family. Drifting Apart partners expect that upon completion of the project in March 2018, new aspiring and existing geoparks will join the partnership to develop and deliver a 'phase two' project, focusing on best practice monitoring and management of geohazards in the northern periphery area. The key aim of a potential phase two project will be to build capacity within local communities and regional authorities to reduce vulnerability and risks associated with a wide range of well-recognised and in other cases more obscure geohazards.

*SUSTAINABLE TOURISM EXAMPLE OF CILENTO, VALLO DI DIANO AND ALBURNI
NATIONAL PARK MULTIDESIGNATION UNESCO LABELS
(WHS, MAB, GEOPARK, MEDITERRANEAN DIET)*

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Keywords: sustainable tourism, multidesignation UNESCO labels

The Cilento, Vallo di Diano and Alburni National Park has all recognition of Unesco (MAB, WHS, GG and Mediterranean diet).

The limits of the Biosphere Reserve, World Heritage site, Global Geopark, and Emblematic Community of the Mediterranean diet practically coincide with the boundaries of the National Park and all these different designations are managed by the same Park Authority. With exception of the archeological and historical sites of the World Heritage property which are managed by the Italian Ministry of Culture and Tourism.

The range of different recognitions received by the National Park has helped raise awareness of its importance as a research unit which allows, in a holistic manner, for the study of the complex interactions between natural (biotic and abiotic), cultural, and social elements. Such an area allows for the study of the services rendered by each of these components, making a contribution to understanding the linkages between ecosystem services, sustainable development, and society's well-being.

International designations have helped in securing important funding for the park's management, for example through the European Commission's LIFE Programme. Some designations also generated the creation of interesting projects. Being the Emblematic Community for the Mediterranean diet led to the establishment of a network of Farmer Custodians of the park's agricultural heritage. The farmers collect seeds of traditional crops (e.g. cereals, vegetables, fruits) and work on the recovery and cultivation of these crops. On the other hand, being part of a very active and experienced network of European and Global Geoparks helped the park greatly in the development of sustainable tourism and marketing strategies.

The lack of a specific legal framework on internationally designated areas that integrates the different levels of regional, national and international legislation in this case, is offset by the park master (plan land-use restrictions, conservation protection of geological, biological and cultural heritage).

But, perhaps, its biggest challenge lies in affirming its importance as an internationally designated area within the local community.

To enhance and maintain reliable and up-to-date information on the natural and cultural values of the territory it is important to promote the implementation of different integrated projects, for example the creation of models for the measurement and evaluation of ecosystem services.

We develop awareness and communicate campaigns about the National Park and its international designations targeted at local communities and decision-makers to turn these audiences into supporters. Then the park can become a model of local management and even export its good practices into other contexts.

At the end we are realizing a project in which the geodiversity is the support for biodiversity and cultural heritage (es. custodians farmer, three rivers and three caves, integrated system of Paleolithic cave in camerota etc).

The results of these projects and campaigns are disseminated through the use of public databases and by participating in international networks in order to share knowledge and link these activities to experiences conducted internationally. All local stakeholders are included in the processes of knowledge sharing and dissemination of results.

RECOVERING THE ETHNOLOGICAL AND CULTURAL HERITAGE (SIERRA NORTE DE SEVILLA UNESCO GLOBAL GEOPARK, SPAIN)

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Keywords: ethnological heritage, cultural heritage, environmental volunteers

From 17 to 31 July 2016 was held in Almadén de la Plata the Environmental Volunteer Work Camp: "Springs, Life sources", that had the main goal of strengthen the traditional relationship of Sierra Norte de Sevilla inhabitants with the water through the traditional springs and fountains.

The activities of the Environmental Volunteers are an important tool of Sierra Norte de Sevilla in order to strengthen the links with the inhabitants of the Geopark's territory.

This Volunteer activity was organized by the City Council of Almadén de la Plata through the Andalusian Youth Institute with the collaboration of Sierra Norte de Sevilla UNESCO Global Geopark, and executed by the enterprises Natures, S.C.A. and Sierratur.

The main goal was implemented through several activities: springs inventory, improving information and restoration of a part of them. A fundamental part of the work was agreeing the intergenerational relations; open the social participation in the project; and the collaboration with public entities and social groups.

The partial objectives were:

- 1 Recover information from the fountains and springs present in the municipality of Almadén de la plata.
- 2 Delve into the biodiversity linked to springs.
- 3 Improve the knowledge about the species (animals and plants) that depend on these environments.
- 4 Involve the inhabitants in the conservation of springs, and increase awareness of the ecological and economic benefits of springs and fountains.
- 5 Recover some springs and fountains, ensuring the accessibility to them.
- 6 Promote active tourism around the local springs.

This work camp gather 30 young people from all over Spain who makes an inventory of springs and sources, restore some of them, developed a tourist route and produce an environmental guide.

INTERREG "ATLANTIC GEOPARKS": A TRANSNATIONAL PROJECT FOR THE PROMOTION AND COOPERATION OF UNESCO GLOBAL GEOPARKS IN THE EUROPEAN ATLANTIC AREA

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Keywords: INTERREG Atlantic Geoparks, cooperation and networking between UGG, promotion of UGG, UNESCO Global Geoparks

INTERREG Atlantic Area is a European funding programme that promotes transnational cooperation among 37 Atlantic regions of five European countries (France, Portugal, Republic of Ireland, Spain and United Kingdom). In this context, during the last call for INTERREG Atlantic Projects, a partnership of 10 European UNESCO Global Geoparks (Arouca, Azores, Basque Coast, Burren & Cliffs of Moher, Copper Coast, Fforest Fawr, Geo Mon, Lanzarote, Marble Arch Caves and North Pennines AONB), two aspiring geoparks (Community of Cantabria and RNP Armorique), one university (University of Trás-os-Montes e Alto Douro) and one supporter partner (GGN Association) developed and applied for financial support for the "Atlantic Geoparks" Project. This was submitted to the programme under specific objective 4.2 (Enhancing natural and cultural assets to stimulate economic development), under the interventions i) development and promotion of the tourism potential of natural areas, and ii) protection, development and promotion of public cultural and heritage assets. This project, approved in May, aims to promote and disseminate the geological and cultural heritage of the Atlantic Geoparks involved, in order to attract visitors and generate new economic activities. "Atlantic Geoparks" will produce cutting-edge tools to promote Geotourism and undertake programmes of educational activities and environmental awareness about geological heritage. It is anticipated that the development and implementation of the seven working packages of this project will have a significant impact on the visibility of the Geopark designation locally and a noteworthy increase in the number of visitors to the Geoparks. In this context, the project will actively involve local communities and businesses as key stakeholders, since their engagement is vital for the development of the Geotourism. This will contribute to boosting economic activities by supporting business development and therefore helping to increase or safeguard jobs. Thus, this project will contribute to a smart, inclusive and sustainable growth, sharing the main aims of the Europe 2020 strategy, including innovation and knowledge, a more sustainable economy, high employment and social inclusion. It is also expected that this project will influence regional policies by increasing awareness amongst public authorities of the need to manage the geological areas under economic and environmental sustainable criteria, supported by European policies and UNESCO recommendations. Finally, the sustainability and transferability of the outputs and results obtained through this project will be assured by sharing the learning across the Global Geoparks Network.

*CONTRIBUTION FOR THE DISCUSSION AND NEW APPROACHES ABOUT THE
DEVELOPMENT OF UNESCO GLOBAL GEOPARKS IN LATIN AMERICA AND THE CARIBBEAN*

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Keywords: UNESCO Chair on Geoparks, Latin America Geoparks, development strategies for UGG, new approaches for UGG

Latin America and Caribbean (LAC) is an emerging region regarding UNESCO Global Geoparks (UGG) topics. Despite the efforts done on initiatives since 2001 on establishing UGG in Argentina, Brasil, Chile, Colombia, Ecuador, México, Nicaragua, Peru and Venezuela, until now only four territories became members of the Global Geoparks Network (Araripe UGG – Brazil 2006; Grutas del Palacio UGG – Uruguay 2013; Comarca Minera UGG – México 2017 and Mixteca Alta UGG – México 2017).

In this context, it should be emphasized that Geoparks concept emerged in a European context that differs significantly from the LAC reality. In this sense, one of the main issues to create Geoparks in this region of the world has been based in the the "European Geopark Model", settled on the same territorial evaluation approach. However, due to the specific social, political and cultural realities, this model is inappropriate taking into account the existing evaluation criteria of the UGG Evaluation Form.

Moreover, the systemic lack of understanding in LAC countries about the fundamental principles of the UGG, despite their widespread outreach, has resulted in not so goodpractices and also in a wrong use of the Geopark concept as designated by UNESCO, creating in many cases a negative social interpretation about the UGG territories. This reality in the LAC countries, contributes to an abusive process of new consultants in this field so-called experts in the guidelines of the International Geoscience and Geoparks Programme, who only seek for a quick and easy profite and jeopardizing the proper development of new UNESCO Global Geoparks, as territorial development strategy made with people and for the people included in these territories.

The LAC framework demands the development of new ways of thinking and approaches as well as new tools and strategies for the establishment and evaluation of territories that can became an UGG. In this sense, the UNESCO Chair on Geoparks, Sustainable Regional Development and Healthy Lifestyles is a worthwhile platform on capacity-building for increasing society awareness on the value and principles of UGG in LAC region through an innovative network of research, teaching and transfer of knowledge under the partnership of 10 Universities in nine different countries, five of them located in LAC region. This UNESCO Chair aims to stimulate learning and promotion of competencies, collaborative decision-making, and taking responsibility for present and future generations, particularly regarding the advanced capacity-building necessary for territorial management and to create or improve the technical skills of teams involved in the process for establishing new UGG in LAC countries. urthermore, this UNESCO Chair creates a great opportunity for international cooperation and networking between universities and UGG, setting basis for a more coordinated and inclusive work for the promotion and progress of the territories taking into account the 17 SDG's of the Agenda 2030 for Sustainable Development.

ASPIRING GEOPARK BEAUJOLAIS' GEO-INITIATIVE CONTEST

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Keywords: geopark, Beaujolais, initiative, development

The Beaujolais' Geopark project has always had a bottom-up approach, working, for example, with local and regional stakeholders on a participatory census of geosites.

Furthermore, it was important to us to create opportunities to develop economical activities, to reveal geology, to promote the territory and to involve local communities. That is the spirit of Geoparks and sustainable development!

In 2016, the concept of geo-initiative was born of the idea that the Geopark has to highlight those who act on the ground. The Geopark management team and the steering committee have sought to define and develop this idea.

A geo-initiative is a project (completed or forthcoming) which fits in the Geopark Beaujolais' philosophy (local and sustainable development, natural resources enhancement...). We did not specify the definition further, in order to favor innovation, but we illustrated it with examples to feed the imagination! A geo-initiative could be events, visits or tours, equipments or facilities, goods or artisanal products, tourist services, economical activities and many more!

At the beginning of the year 2017, the Aspiring Geopark Beaujolais opened the geo-initiative contest. It is a call for projects which aims at helping new or previously existing geo-initiatives to emerge. Our main goals were to:

- Make emerge and valorize actions landed around the Geopark project
- Maintain the mobilization of local stakeholders on the Aspiring Geopark Beaujolais
- Develop local and sustainable economy linked to the philosophy of the project
- Improve visibility and knowledge about the Aspiring Geopark Beaujolais to the public

This first edition of the contest was a true success: about 60 applications were submitted within a month! A broad diversity of project holders have submitted geo-initiatives: associations, companies, schools, public organizations... for a great diversity of projects, such as events, derivatives, geosite designs... After a selection committee, 39 geo-initiatives were awarded. 4 of them were given special mention of the jury, and 9 of them will receive a helping hand from the aspiring Geopark's team.

Some examples of geo-initiatives' awards 2017:

- The event "Strates" (Strata in English) organized by an association of local artists to show geology through photography, design, handmade jewelry, local products...
- A project of landscaping roundabout made by college students to show geo-heritage;
- The International day of fossils animation proposed by an association of specialists in geology and paleontology; and many more!

This contest was a great way to make people proud of the Geopark and a great illustration of local communities' involvement. This success was illustrated through numerous press and social networks releases. Whole visits and new programs had to be added, and local actors are proud and satisfied.

This contest gave body and sense to many actions or projects, positioning the Geopark as a pillar of Beaujolais' local development. Obviously, we have no choice but to renew the geo-initiatives contest next year!

WORKING WITH SCHOOLS AND BUSINESSES

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Keywords: geoschools, geopark enterprises, cooperation

Geoparks not only focus on the geological heritage in their areas, they also strive to develop partnerships with existing businesses and schools in the geoparks. Sometimes this is not easy as schools and businesses are often very busy places. Teachers work according to local, regional or national curricula and in line with their labour contracts while tourist businesses in areas with rapid increases in tourist numbers have a hard time keeping up with daily pressures. In this paper, the experiences of Katla UNESCO Global Geopark regarding those issues will be shared.

Regarding working with schools, lessons were learnt from Rokua UNESCO Global Geopark and Arouca Global Geopark, both through an Erasmus+ projects and visits during the European Geoparks Network Conference in Rokua in 2015. A grant was secured from the Icelandic UNESCO Commission to develop the Geo-School concept in Katla Global Geopark resulting in a formal agreement signed by the Geopark manager and the School principal. The details of the contract will be explained in the paper.

The development of the contracts made between Katla UNESCO Global Geopark and businesses in the area were based on the models provided through EGN Coordination Committee meetings in 2013-2014. What came apparent, however, once the model texts had been translated into Icelandic, that it was felt that they were too long and detailed and were therefore adapted to local demands, without losing sight on the main philosophy of EGN regarding sustainability and responsible development of the local economy. Another issue was the distinction between a certified Geopark enterprise and a certified Geopark product. This is still under consideration, one possibility being to have a single contract with each Geopark enterprise including provisions for the development of certified Geopark products.

Finally, the issue of fees for Geopark enterprises will be discussed. In one of the three municipalities of Katla UNESCO Global Geopark there is a long standing tradition that most of the tourist businesses pay an annual fee to the tourism cluster in the area (www.visitklaustur.is) in order to be able to hire a full time staff member for marketing and product development. Now this cluster is considering the possibility to transfer these duties (and fees) to Katla UNESCO Global Geopark. In the next municipality opinions are divided in this respect and in the third municipality of the Geopark there is no existing tourism cluster. A continuous discussion and conversation is needed to develop and maintain these important links with the local communities in our geoparks as schools and businesses can be seen as the cornerstones of each community.

A MASTERPLAN FOR THE HONDSRUG UNESCO GEOPARK

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Keywords: masterplan, development, focus, identity

The Hondsrug region is a unique geological area where the cultural heritage is closely linked to the land. Milestones such as creating expositions, acquiring UNESCO status and expanding the geographical area show that much work has already been done: and there are many other opportunities which can be exploited over the coming years. That calls for continued efforts, focusing on essentials and continually striving after co-operation between all partners in the Hondsrug region. In 2017 the Geopark status of the Hondsrug will be re-evaluated for the coming four years, making it a good time to launch our Master plan for 2017-2027. This plan sets out our ambitions for the next ten years. The Master plan is the result of collaboration between government bodies, land managers, marketing organizations, educational institutions and other partners. On 15 November 2016 all partners committed themselves to working together to implement the Master plan and make it a reality. That in itself may also be seen as an important milestone.

A plan for ten years

The aim is to strengthen the economic development of the Hondsrug region, based on the strong regional identity and international appeal which the newly-acquired status brings with it. Alongside preservation and education, further development is one of the most important criteria which UNESCO attaches to the Geopark status. This must be agreed with local residents, commercial organizations and governments.

The Master plan in brief

The central focus for the Hondsrug Geopark and its partners is the identity of the Hondsrug region. The remarkable geology, nature and cultural history make the Hondsrug UNESCO Global Geopark a distinctive region with an international appeal. The power of the Hondsrug region rests on three unique elements: (1) the ridges and valleys formed by the ice, (2) a wealth of archaeological treasures and (3) the cultural landscape formed over thousands of years by human activity. Devoting more attention to these three core values will make the Hondsrug region even more attractive, both for local residents and tourists. Geopark de Hondsrug aims to stimulate sustainable economic development in the region based on these core values. In that way we will maintain the robustness and energy of the region by protecting and investing in the regional qualities. Innovation and participation of local businesses and residents are an essential part of that. Focused education and marketing will increase the reputation of the Hondsrug UNESCO Global Geopark.

This master plan details how we, working together with all our partners, will strengthen the regional identity over the coming ten years!

This presentation will give you a more detailed description of how we made the plan together with all the partners. In a short movie we show the content of the master plan.

*SMALL IS BEAUTIFUL - THE CONCEPT OF THE GEOVILLAGE AS A COMMUNITY-LED ASSET*David Cropp¹

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Keywords: community, geotourism, education, conservation

The community of Martley in Worcestershire UK, through the creation of The Teme Valley Geological Society, has taken its own responsibility for the significant geological assets it has within its own defined local area. The Society now has a thriving membership, and an annual programme of events, free publications of geological trails and sites for visitors, as well as a significant online contact and database. Its website can be viewed at www.geovillage.eu, and shows the growth of the organisation to the point this year when first discussions have been initiated to build an iconic geogateway centre at the heart of the village. Supported initially by the EU LEADER programme, the success of the project over the past six years has taken us to a proposal for the design protocols for other communities to engage with and aspire to as GeoVillages. Contact has also been made with other community partners in France, Germany and Turkey, also identified in Greece and Poland, and at the UNESCO Congress expressions of interest were also recognised and identified with other European partners.

These design protocols have been drawn up but now need the rigour of a wider examination and critique from those engaged with GeoDevelopment. This presentation offers those participating the opportunity to shape the next stage of the GeoVillage concept with us, as it is important that the model proposed is acceptable and enshrined across Europe, not just at a local level. We believe that a GeoVillage has the potential to act as the local driver of geotourism, as well as education, local farming and food sourcing - and above all offers an economic model which can be sustainable at a time when there appears to be austerity within funding across many European countries, including our own. The GeoVillage also offers itself as a complimentary asset alongside GeoParks - diversifying and developing the awareness of the importance of our geological assets. Now we would welcome your input!

THE CONTRIBUTION OF THE EUROPEAN UNESCO GLOBAL GEOPARKS FOR THE AGENDA 2030 FOR SUSTAINABLE DEVELOPMENT: A PRELIMINARY APPROACH

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Keywords: Agenda 2030, Sustainable Development, UNESCO Global Geoparks, Questionnaire

The UNESCO Global Geoparks (UGG) due to their definition, commitments and activities are key actors in the development of strategies and policies towards a sustainable regional development. In this context, the plan of activities developed in each UGG should always be guided towards the sustainable development of the people who live in these territories. For this reason, Sustainable Development is one of the “Top 10 topics” within UGG and it is even highlighted in the application process for new candidatures. Furthermore, with the establishment of the International Geoscience and Geoparks Program (November 2015), it was considered that the UGG could strongly contribute for a real sustainable development linked to issues on geodiversity, the environment, geohazards, climate change and the sustainable use of natural resources. Taking also into account the approval of the Agenda 2030 for Sustainable Development and its five pillars (People, Planet, Prosperity, Peace and Partnership) together with its 17 Sustainable Development Goals (SDG’s), a research study is on progress with the intention to answer to two main questions: i) Do the European UGG members effectively contribute to the achievement of these three key components (Top 10 topics, five pillars and 17 SDG’s) concerning a sustainable future? ii) Can these contributions be quantified and used as good practices examples, in order to demonstrate the real impact of the European UGG actions towards ending poverty, protecting the planet and ensuring prosperity for all? To start to collect data on this subject a first exploratory questionnaire was answered by 22 European UGG. The results obtained showed that 41% were aware of all SDG’s, 100% replied that several of the activities developed (since 2012) could already be accounted as a contribution for the 17 SDG’s and the three SDG’s chosen as “very important” more voted were: No. 15 “Life on land”; No. 4 “Quality Education” and No. 17 “Partnership for the Goals”. With this exploratory questionnaire it was possible to make a first evaluation about the level of awareness inside the European UGG towards the relevance and contribution of their past and present activities for the achievement of the SDGs. In this framework, this research study intends to establish a new knowledge about the importance and impact of the initiatives developed by the European UGG in the field of Sustainable Development. It is also expected that this research can bring a new direction to the compromises of the UGG towards the UNESCO priorities and strategies, assuming their role as a UNESCO designation.

“ALL DIFFERENT, ALL EQUAL”: WHY IT IS SO DIFFICULT TO DEVELOP NEW UNESCO GLOBAL GEOPARKS IN LATIN AMERICA AND CARIBBEAN COUNTRIES? THE EXAMPLE OF THE MIXTECA ALTA UNESCO GLOBAL GEOPARK

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Keywords: Latin America Geoparks, Mixteca Alta UGG, development strategies for UGG, new approaches for UGG

The first initiatives for the establishment of Geoparks in Latin America and Caribbean (LAC) appeared in 2001, just one year after the creation of the European Geoparks Network (EGN). In the following 12 years more than 40 territories in LAC region have manifested strong intentions to become members of the Global Geoparks Network (GGN). Despite this reality, just four territories in this continental area are today recognized as UNESCO Global Geoparks (UGG). Yet, if we take into account that in the first 12 years of the EGN more than 50 territories became part of this regional network, it is clear that some different challenges and difficulties exist in the LAC territories to establish new UGG, despite the strong efforts done by many entities.

Several meetings have taken place to discuss this issue and to try to understand why it is not easy to create new applications to UGG. One of the conclusions could be the different socio-political and cultural reality of LAC, which could be an obstacle due the model on which the original “European Geopark” concept does not fit into the necessary adaptation of the cultural and socio-political diversity. Despite this conclusion, the debate around this is constant and it seems that it remains as a continuously unsolved matter. In this sense, it is important to focus on detail on the idiosyncrasies of the LAC territories and associated issues and, moreover, on the potential strategies to overcome the difficulties for the establishment new UGG in this region of the world.

With this work we want to identify, discuss and systematize some key distinctive features of the LAC territories based on the evaluation procedures and criteria established by the International Geoscience and Geoparks Program of UNESCO. It will be taken into consideration the example of the Mixteca Alta UGG, where some of this issues are related with the following features: i) the presence of indigenous groups and their complex cultural structures; ii) the local economy based on the primary sector; iii) the lack of educational opportunities; iv) the high illiteracy and poverty; v) the lack of territorial management structures and strategies; vi) the absence of tourism capabilities and facilities; vii) the misunderstanding and unawareness about the UGG concept or even the UNESCO role s.l.; and viii) the frequent existence of a corruption culture.

In this framework, it will be developed a study under the auspices of the UNESCO Chair on “Geoparks, Sustainable Regional Development and Healthy Lifestyles”, held by the University of Trás-os-Montes e Alto Douro (Portugal), aiming to contribute for a better understanding of the socio-political and economic and cultural reality of the LAC territories. With the identification and understanding of the distinction set of features of these territories and taking into account the 17 SDG’s of the Agenda 2030 for Sustainable Development, it is intended to generate new capacity-building tools adapted to different realities, valuing them more appropriately and contributing to overcome the issues related with the development of new UGG in LAC countries.

PUBLIC LIBRARIES AS NEW GREAT PARTNERS FOR GEOPARKS

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Keywords: public library, touristic Information point, disclosure activities, geopark partner

Central Catalonia UGG has been collaborating with the library of the University Campus of Manresa (the main city of the territory) since the beginning, when it was established as the documentation and research centre of the Geopark. Recently, moreover, many more public libraries have joined the Geopark, becoming very active partners.

At the documentation and research centre, the staff is responsible of the archive and registering on a specific electronic data base all the references and literature related to Geoparks, regional geology, geological and mining heritage, natural resources, environment, maps, etc. for a later easy consultation. But this centre is much more than just a research place. It holds many formative events and temporary exhibitions related to the Geoparks, geology and mining, and other interactive activities like, for example, a sandbox.

As part of its infrastructure, a cartography room has been prepared. Inside, researchers and students can look at all the published regional geological maps and reports provided by the geological survey of Catalonia, as well as other maps and atlas referring to natural resources. Full equipped computers with specific software have also been installed in the room.

Another interesting and very successful program that has been implemented in the Geopark is the one called "Points of Touristic Information", for companies and services within the territory, that was created by the government of the province of Barcelona to complement the network of regular information offices, and that the Geopark has adapted as a way to formally involve new partners. Besides restaurants, hotels, guiding companies and others, many libraries have joined the program, contributing with a very strong set of activities. Such activities like those carried out during the so called "Time of..." sessions -focused in minerals and rocks-, the "Tale Hour" tour with the book for children edited by the Geopark, or informative talks about Geoparks and field excursions organized together with them to local geological sites, are some examples of how libraries can help with the educational and disclosure tasks that Geopark carries on. Public libraries have turned out to be great and close partners for the Geopark at the time of disclosing its values, organizing events and becoming information points spread all over the territory.

*PLANNING SUSTAINABLE LEISURE LANDSCAPES IN KATLA UNESCO GLOBAL GEOPARK,
ICELAND - A MULTI-LEVEL APPROACH*

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Keywords: management, tourism, sustainable leisure landscape

In Iceland, tourism has grown rapidly over the past decades, with 4,000 foreign visitors in 1950 increasing towards 1,8 million in 2016, with an annual increase in 2015-2016 of 39% (ITB, 2016). While, in comparison with other countries, 1,8 million visitors may not seem excessive, this number is almost 5,5 times higher than the Icelandic population (being rural, over 500 annual visitors per local inhabitant in Katla UNESCO Global Geopark recently). The excessive growth is believed to continue in coming years. While a flourishing tourism industry can provide positive effects to a society, benefiting the economy of local communities it has also been shown that tourism has significant negative impacts on the vulnerable Icelandic ecosystems where overload and trampling cause large-scale deterioration and erosion. This negative impact has often been met by quick-fix measures and hasty infrastructure construction. Such interventions can impact the aspect of natural landscapes resulting negatively on tourism experience and consequently the Icelandic economy. This emphasizes the importance of well-defined spatial management of tourism in vulnerable arctic/volcanic environments in the attempt to balance conservation, economy and experience. In 2017 a holistic Management Plan (DMP) was developed for Katla UNESCO Global Geopark, in cooperation with a broad spectrum of local stakeholders. The overall aim was to achieve a sustainable leisure landscape in which natural quality, economic prosperity and local culture are preserved and stimulated - taking into account both the perspective of locals and visitors. Katla Geopark offers a stunning geological showcase of international significance formed by the interaction of Iceland mantle plume and continental rift, including "volcanic glaciers", their rivers and outwash plains, moss-covered lava fields, highland ecosystems, vast areas of pseudo-craters, black beaches and waterfalls. These form the main drawcard of the area for tourism. However, there was a lack of balance between current recreational use and tourist dispersal and the sensitivity of the arctic/volcanic nature. Decisions on where to locate tourism infrastructure, facilities and destinations had mainly been based on short-term pragmatic considerations rather than with an overview of the landscape qualities. Based on field research, different landscape entities and their carrying capacity were determined. Also different experiences and types of land-use were identified considering various target groups of tourists and their demands, underpinning the importance of preserving different experiences for different target groups in the Geopark within a spectrum of Urbanists vs. Purists. This approach indicates the intensity level of infrastructure and development that should be considered within the different landscape entities and target groups. Thus aiming to plan and design or preserve different areas with specific target groups in mind. This theoretical base was transformed into an on-site zoning plan for the whole Katla UNESCO Global Geopark with various focal points aiming to streamline the heaviest flow of tourists through the area. Examples of site-specific architectural designs were made for some of the focal points.

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Keywords: empowerment, bottom-up, network, participatory

Las Loras is a Spanish region located to the north of Castilla and León Autonomous Community, occupying a part of the northwest of Burgos' region and a part of the northeast of Palencia's region. Las Loras Geopark Project began in 2004. It emerged as an initiative of the civil society of the territory that sought to promote a model of sustainable development using the natural and cultural rich heritage that exists in that area, with the objective of mitigate the intense process of depopulation that has affected this territory for decades. During these years, not only it has been possible to involve the great majority of the social and institutional fabric of the territory, but it has also been achieved that both, provincial and regional administrations, support this project through economic and collaboration agreements, being a clear example of bottom-up initiative. Throughout this time, a multitude of actions have been carried out aimed at the protection, dissemination and custody of natural and cultural heritage, environmental education and training and sustainable geo-tourism. In all of them, one of the fundamental objectives has been the empowerment of the local population as an indispensable step towards the success of this Project. Informational talks, field trips with the local population designed as an exchange of knowledge about the natural and cultural heritage, sectorial meetings to make decisions and develop participatory action plans, environmental volunteer programs and custody of the territory, work in Network with local associations, signage of different geo-routes, guided tours, etc. Currently, together with Campos de Amaya Secondary School of Villadiego we have started a network with other European Geoparks in which there will be exchanges of teachers and students of secondary schools located in these Geoparks. Three participatory working groups are at this time operating, consisting of the working group of mayors of the municipalities of the territory, the working group of associations and foundations, and the scientific committee that consists of more than 20 scientists from different disciplines and places in Spain. As the governing body of the Project, an executive committee has been created where the provincial and regional administrations are represented, as well as the different participation work groups, through a representative of each one of them.

At this time, Las Loras Geopark Project is in the published list of new UNESCO Global Geoparks 2017, awaiting endorsement by the Executive Board.

*BOTTOM-UP APPROACH, SUSTAINABLE DEVELOPMENT AND SUSTAINABILITY IN
VILLUERCAS-IBORES-JARA UNESCO GLOBAL GEOPARK.*

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Keywords: bottom-up approach, management structure, sustainability, Villuercas-Ibores-Jara

The management structure of Villuercas-Ibores-Jara UNESCO Global Geopark introduces different bodies that reflect the bottom-up approach as the sustainable development methodologies suggest. Although the Council of the Province of Cáceres (Spain) is responsible for the management, no action is started without the approval of the Geopark Council in which the territory (companies, social bodies and municipalities –the bottom-) and the Public Administrations (Regional and provincial governments – the up-) are represented. With that design, the Geopark Council is, actually, an evolution of the bottom-up approach: It erases the concept of "bottom" bodies that try to take strategies, proposals and projects to the "up" bodies. It also erases the potential distance from the "bottom" to the "up" administrations. Simply, the Council meets the bottoms and the ups all around the table in which the decisions are taken.

The most important tasks of the Geopark Council are the approval of the multiannual Master Plan and the annual Action Plan that is financed by all the partners. The Geopark Steering Committee meets at least every two month for conducting and following the execution of the actions. This Committee reproduces again the bottom-up approach.

The Action Plan is composed of different programs that integrate sustainable development objectives as conservation, research, education, economic development promotion, geotourism and networking. Its methodology suggest that public invests must build a "development ecosystem" in which the private economical activities are possible. Among these public invests and initiatives we can find public rules, training, tourist information devices and facilities, technical and financial support for companies creation, etc. Although these initiatives will be implemented by the public administrations, they will be decided jointly in the council of the geopark with the participation of all the entities, the bottom and the up entities. This kind of methodology produces a large quantity of new companies and employment in a region that is characterized for suffering from the lowest rates of development in Europe. It reveals that sustainability in this region means to work more in the sustainability of the companies and the created employment rather than in the geopark sustainability itself.

The communication explains how these management structures were created and how they actually work and, finally, what it can see in Villuercas-Ibores-Jara as a result in terms of sustainable development.

*A TRANSNATIONAL EDUCATION PROJECT ON COASTAL GEOLOGY: FLYSCH & GO,
STROLLING THROUGH THE HISTORY OF THE EARTH*

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Keywords: networking, transnational, education, participation

Geology knows no administrative borders. That's what makes it a great starting point for transnational projects in territories which share geology. We share much more than that in our case: a country, culture, language and customs.

The Euskadi-Aquitania Euroregion was set up under the European Grouping of Territorial Cooperation (EGTC) instrument to take part in a fundamental mission to invigorate cooperative politics between countries in the European Union. The Euroregion promotes cooperation between different public and private agents from both sides of the border between Spain and France and has access to subsidies applicable to culture, multilingualism, youth, citizenship, the knowledge economy, innovation, research and more.

“Flysch & go: Strolling through the history of the Earth” has been funded by the Euskadi-Aquitania programme and run throughout the 2016-2017 school year. The CPIE (Permanent Centre for Environmental Initiatives) of the Basque-French coast and the UNESCO Basque Coast Global Geopark, both members of the project, have exchanged knowledge and experiences to disseminate geology to school children and local people from both sides of the border.

The project has led to the creation of the geological map of the Basque Coast, with 18 places of geological interest from a tourism and dissemination standpoint, as well as graphic support materials for educators/guides and jotters for school children taking part in the outings. Six educators/guides from the two organisations have received training through theory sessions and practicals and will guide the field trips.

A pilot session was held with mixed groups of pupils from two schools, including the two field trips to the Geopark and the French Basque coast. Amongst the different criteria used in selecting the schools were membership of UNESCO's Associated Schools Network and a requirement that teaching be delivered in Basque to facilitate monolingual visits and materials.

Euskera is the language of the Basque people. Whilst nowadays it is a minority language, it is our cultural treasure and a symbol of our identity, and one of the axes along which the Geopark should take forward its interpretative discourse and its development strategy.

The educational materials created — support for the educators on the visits and jotters for school pupils — will remain in the educational programmes of both promoting entities so that they can be offered to all schools in the French and Spanish Basque Country which teach their syllabus in Basque.

The geological map of the Basque coast will also be available in tourist information offices on the Basque coast that so wish, establishing geotourism as an option and making the Basque Coast Geopark a cornerstone of geology for the entire Basque coast.

AZORES UNESCO GLOBAL GEOPARK: CONTRIBUTION TO SUSTAINABLE DEVELOPMENT GOALS

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Keywords: Sustainable Development Goals, Azores UNESCO Global Geopark

According to the United Nations Development Programme, the Sustainable Development Goals (SDGs), "are a universal call to action to end poverty, protect the planet and ensure that all people enjoy peace and prosperity". This 17 SDGs, were built on the successes of the Millennium Development Goals, while including new areas such as climate change, economic inequality, innovation, sustainable consumption, peace and justice, among other priorities.

The Azores UNESCO Global Geopark, in his action plan, has defined and developed different actions and activities to contribute to the SDGs:

Goal 4: Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all: Implementation of the Geopark School Program, a specific program integrated in the regional offer and available at all schools in the 9 islands, with several environmental education activities, for all different levels of education and development of several activities for the general population, with a wide diversity of environmental awareness activities with the goal to provide Knowledge of their territory, their geological heritage and potential;

Goal 8: Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all: The promotion of sustainable local economic development through geotourism with opportunities for the local communities; the Azores Tourism Board (ATA), established the Azores Geopark as the key player for the implementation of the Azores geotouristic promotion and qualifying policies, which includes the development of new services and products; Support at the development of new "geoproducts" and "geoservices", as it is the case of the "Biscoito Bomba" (biscuit), "Queijo do Morro" and "Queijo do Vale" (cheeses) and the "Pico-nic", a meal and info service provided by a local company that provide an experience in harmony with nature and value local products and sustainable living;

Goal 11: Make cities and human settlements inclusive, safe, resilient and sustainable: With the aim of making the geopark accessible to all, the Azores Geopark organized several inclusive activities, in cooperation with Associations of the archipelago, namely for blind, handicap, disabilities and drugs-rehabilitation persons; and also promotes and keeps alive the cultural and religious traditions of the region giving the local people a sense of pride of their region.

Goal 12: Ensure sustainable consumption and production patterns: The consumption and valorisation of endogenous products, and the promotion of living in harmony with the Azorean volcanic nature through environmental awareness, promotion and valorisation of the natural heritage of the geopark;

Goal 13: Take urgent action to combat climate change and its impacts: Participation in the regional policies and several workshops of the Regional Program for Climate Change as well as in the meetings of the technical team;

Goal 17: Strengthen the means of implementation and revitalize the global partnership for sustainable development: Reinforcement and establishment of partnerships, supported on the EGN Charter and the UGG Guidelines, with 44 local, regional and national institutions, entities and companies and with the Global and European Geoparks network, to share expertise, knowledge and best practices, and increase mutual understanding.

LOCAL AND INDIGENOUS KNOWLEDGE REGARDING THE USE OF GEO-CULTURAL LANDSCAPE IN THE ASPIRING RIO COCO GEOPARK

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Keywords: traditional environmental knowledge, geotourism, geoparks, land use

The description and analysis of the current or potential usage of the local and indigenous traditional environmental knowledge in the region of Northern Nicaragua is rather neglected research topic. To fill this gap, author supported by local team conducted the geo-anthropological research in summer 2017 in this rather neglected Central American region, concretely in the northern area of the aspiring Rio Coco Geopark. The purpose of this research was to identify the local and indigenous knowledge regarding the present and traditional use of natural resources including land use and to analyse the contribution and potential of usage of this knowledge for the local development sustainability. Especially, the assessment to what extent this knowledge could serve for enhancement of the local geotourism sustainability was of high importance.

The research process itself was of the same importance as its results, especially the involvement of the local and indigenous people. In this participative research, the young local and indigenous persons obtained training and served as co-investigators who then interviewed representatives of local households. The other field methods included life history of Elders, discussions in the focal groups involving common people from local communities as well as the mapping and photo-documentation of the identified local and indigenous traditional environmental knowledge. As the positive side effect, this research process supported the revival of the community memory and revitalization of its cultural and natural identity.

The research findings point out that the more distant and more dispersed are the local settlements the better conserved local and indigenous knowledge regarding the traditional land use and other use of natural resources. Among the best-conserved local and indigenous traditional environmental knowledge in the northern area of the aspiring Rio Coco Geopark was the usage of earth material and plants. The local indigenous people are not expressing and transmitting the spiritual dimension of their traditional environmental knowledge (sacred times or sites, rites, rituals or taboos regarding the traditional land use and other use of natural resources) anymore because they had been experiencing the continuous repression realized by the dominant (colonial) society in the past.

The majority of identified traditional land use and use of the other natural resources as well as related traditional environmental knowledge in the researched northern region of the aspiring Rio Coco Geopark seems to be more sustainable than the present land use practices and the use of natural resources generally for agriculture, medicine, constructions etc. The local communities should dedicate much more attention and efforts to conserve, transmit and use this local and indigenous traditional environmental knowledge and thus (among others) to improve the sustainability management of this emerging geotourism destination.

*FROM THE ORCHARD TO THE FILLED BOTTLE - USING NATURAL RESOURCES FROM
THE GEOPARK AND A PARTNER NETWORK TO GAIN AWARENESS AND VISIBILITY*

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Keywords: geopark, orchard, natural resources, partner network

A Geopark is not only Geology - It also includes other natural resources and the people which are living within the Geopark. For sure the Geology is the basis of the local conditions and history as well as the flora and fauna. The Nature and Geopark Styrian Eisenwurzen tries on different levels to involve local people to protect on the one hand the geology and natural resources and on the other hand to gain awareness and visibility. With this presentation we would like to introduce how are we working together with farmers and local people on the topic "From the orchard to the filled bottle." In our Geopark we have a partner network with local farmers which are producing different things from regional resources such as beef or cheese. Furthermore we also have farmers which are producing cider, jam, apple juice, pear juice and so on. This topic shows how we strengthen the orchard farmers on different levels as we see the orchard as the main part of our cultivated landscape. The variety of apples and pears is very rich in our Geopark with rare and even lost varieties. The "Veitlbauer" - Cider cellar and experience farm is one best practice example as they have been one of the first ones using apple and pears products for professional sale. And this means visibility for our Nature and Geopark. They are using our logos, presenting us and the region on different levels (eg. fairs) and gain awareness about the resources in our Geopark. It is a challenging field they and we are working on. The competition and market is very hard in the Austrian food industry, harvest as well as fruit tree pruning can be expensive and many more issues to figure out. But with this network we can not only preserve the geodiversity, we also can work together for the nature and cultivated landscape. Finally, the inhabitants of our Geopark and especially the farmers have different goals together and gain awareness as well.

THE GEOPARK CONCEPT SWABIAN ALB – REFLECTIONS ON THE OLD CONCEPT AND A NEW MASTER PLAN

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Keywords: geopark concept, master plan, Swabian Alb, natural and cultural heritage

In 2005 the Geopark Swabian Alb got its first concept. The first Geopark Management with the support of the University of Applied Sciences (UAS), Nürtingen, did the elaboration. It followed primarily the application document, which was submitted for the approval of the (National) Geopark in 2002.

The concept concentrated first on a description of the area, on the specific regional development of the Swabian Alb, followed by guidelines (so-called "Leitbilder"), concepts and a list of current as well as intended projects according to the general goals of Geoparks. Also a financial plan for the next three years was included – and actually, all suggested measures in the concept should be implemented within this period.

In the following years, the organizational structure changed from a kind of adopted partner of the Tourist Organisation Swabian Alb to an own independent association (Geopark Schwäbische Alb e.V.), mainly based on the membership of 10 districts. In the last two years, also a sponsorship by regional unions and enterprises could be achieved. The development was accompanied by two national and international evaluations, were the last one in 2014 was also asking for an update of our Geopark concept document.

Since 2013, the UAS performed several study projects with its students in Landscape Planning, in order to provide all relevant material for the elaboration of a new concept, the so-called Master Plan. In the first half of 2015, we have also 20 international students working on this issue. Currently we evaluate those materials from the last projects. Together with outcomes of workshops on geotourism, geotope management, geoeducation as well as on sustainable regional development, and a SWOT analysis on the basis of an inquiry of 70 stakeholders in the Geopark, a new Master Plan will be elaborated and discussed in various meetings of our Geopark association before final implementation. The perspective of this plan should last until 2020.

In this presentation we reflect and report about the meaning of a concept, the development process of a Master Plan, and the Master Plan itself for a responsible use of the natural and cultural heritage in the Geopark Swabian Alb.

REYKJANES UNESCO GLOBAL GEOPARK: BUILDING PUBLIC AWARENESS AND ENGAGING COMMUNITIES BY STORYTELLING

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Keywords: public awareness, local community, best practices, storytelling

In 2016 the municipalities within the Reykjanes Unesco Global Geopark as well as local companies in the region joined up to inform the Icelandic public about the Reykjanes peninsula and inspire the inhabitants, with the aim to strengthen the image of the region, attract new people into the area, increase the number of employees and build up the local spirit of the community.

The employment rate has improved rapidly within the last few years in the Reykjanes Unesco Global Geopark - from 14% in 2008 to 1,5% in 2016 - causing new and unexpected challenges for industries and municipalities the region alike.

Study on public awareness towards the Reykjanes peninsula was published in 2015 which indicated that the region was considered the least attractive in Iceland to work and live in.

The reasons mainly centered around the general image of the area, with people pointing to prior negative impression such as it being the home of the US NATO base, high unemployment rate, low educational level, negative PR, as well as unattractive environment and nature.

The first major task of Reykjanes Unesco Global Geopark after becoming a member of the GGN was to challenge this negative impression of the region and change the ideas Icelanders had about the area. A major step towards this goal was a project done in cooperation with Visit Reykjanes, local municipalities and companies in the region, named "REYKJANES – WE HAVE GOOD STORIES TO TELL", launched in 2016. The project focuses on telling good stories from the local community in Icelandic media and create positive awareness on positive initiatives in the area.

At the end of the year 2016 a new study indicated that the project had a positive impact on the general public and people were more positive towards the area.

With the presentation I want to showcase how the Reykjanes region has been working on changing the image and building up the self esteem of the community with concrete examples and best practices.

LOCAL SHOPS: GEOPARK'S FRIENDS

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Keywords: local shops, involvement, geoproducts, geopark's corner

The Adamello Brenta Nature Geopark weaved a thick web of local contacts aimed at involving the residents in its activities, both for the implementation and creation of specific projects and to raise awareness about the environmental issue. Among the various local organizations that collaborate with the Geopark, the trade sector had very few joint activities. Believing that these businesses represent a direct line with the final user, the Geopark created a new joint project to involve them inside new cooperative typologies. The project consists of creating and promoting a network of local shops so called "Geopark's friends" where to have a dedicated corner, the "Geopark's corner". In this corner are showcased the Geopark's products and gadgets.

The aim of this project is the one of enhancing the Geopark's visibility, but also to involve different categories of residents, such as the trades' men and women, raising their awareness on the potential of the territory where they live in. Indeed they can be active subject of the protected area, spreading out the Geopark's image in a univocal and systematic way. In fact, despite the strong effort of the Geopark since several years in the communication sector, from a recent analysis of customer satisfaction came out that the Geopark should enhance its visibility and involve more and more tourists and residents in the activities of active conservation of the territory. Hence, another ambitious aim of this project is the one of letting as many visitors as possible know the existence of the Geopark and the importance of it, raising their awareness.

During the winter 2016/17 the Geopark carried out four public evenings addressed to trade sector with the aim of presenting the project and collecting proposals and ideas on how to put it into effect. The Geopark involved all the organizations interested, public and private: the Geopark's municipalities and communities, the "Quality Park" Association, regional business association (Associazione Confesercenti del Trentino), local association of trade (UCAS), Trade and Tourism Union of Trento.

Last but not least, the exhibitors of the Geopark's corner are made by a local Social Cooperative with recycled cardboard, so there is also a subtle educative message.

Since the beginning has joined the project the local shop of the main Geopark's village, putting the "Geopark's corner" in the 4 local shops in the core of the Geopark. Several other private and public shops have shown already their interest and during next summer they will join the projects, showing the success of this project.

EUROPEAN GEO PARKS

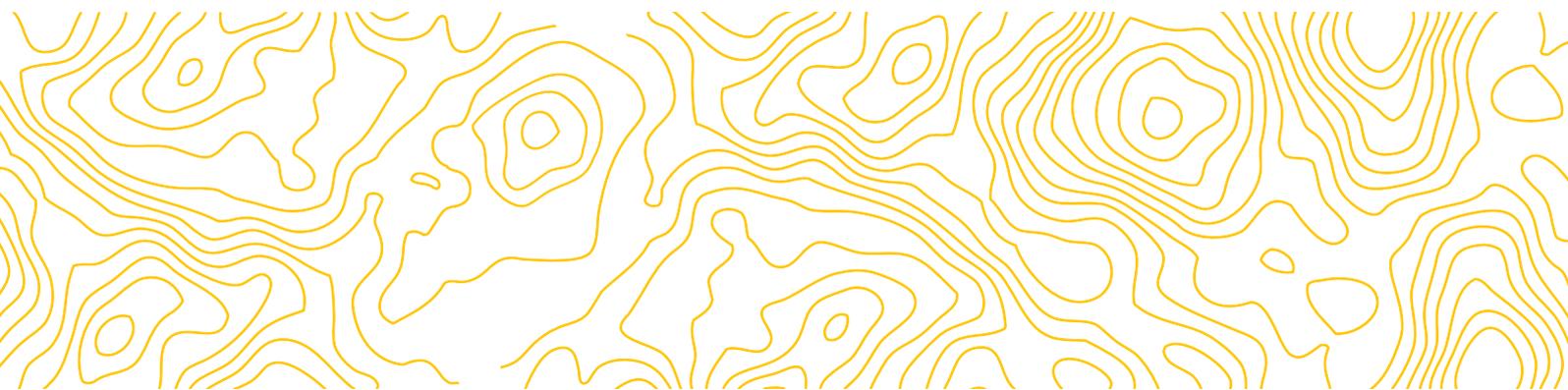
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PONTA DELGADA, AZORES, PT

"GEO PARKS: PATHWAYS OF SUSTAINABLE
TOURISM FOR DEVELOPMENT"

THEME "ENGAGING COMMUNITIES AND NETWORKING"

POSTER



*UNESCO GLOBAL GEOPARKS AS ACTIVE PARTNERS TO ACHIEVE GLOBAL
UNDERSTANDING GOALS*

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Keywords: International Year of Global Understanding, UNESCO Global Geoparks, global sustainability, local actions

Proclaimed in 2016, the International Year of Global Understanding (IYGU) emphasizes the role of global understanding to face current social, cultural, and economic changes, and focuses on the global sustainability of local actions. To implement targeted local projects with a global reach is a challenging task, but the mechanisms and actors usually involved in the creation of a geopark can be of great usefulness to conceive other action plans fostering global understanding as a tool to achieve sustainable development goals.

Several key factors can be identified to explain the success of geoparks, historically linked to an ad hoc initiative and now formally framed under the umbrella of UNESCO:

- The application to become a UNESCO Global Geopark (UGG) is expertise-conducted but emerges from local motivation, i.e., it is a bottom-up initiative;
- The management of a UGG requires community involvement and the need to work in a transdisciplinary basis besides geosciences;
- The evaluation, nomination, and revalidation of a UGG are a self-regulated process conducted by members appointed by the Director-General of UNESCO on recommendation of Global Geoparks Network and of Member States, on the basis of the strict guidelines.

Throughout all the steps towards the final nomination (or revalidation) of UGGs, research, information, and education at all levels, from university researchers to local community groups, are core features of the UGG concept. All these aspects converge to the need of developing strategies for targeted local projects with a global reach as a basis to implement the IYGU aims and goals. As so, geoparks, by fostering economic sustainable development of local communities through the promotion of geotourism and education, can be seen as an effective strategy to achieve global sustainability; the understanding of their current dynamics can inspire other strategies to promote local projects with global impact thus meeting global challenges, such as the seventeen UN Sustainable Goals 2016-2030.

"PEIRA LEVADA": AN EXPERIMENTAL ARCHAEOLOGICAL WORKSHOP

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Keywords: volunteerism, megaliths, experimentation, Quercy

Causses du Quercy (France) are dotted by many megaliths: there are more than 360 dolmens known throughout the aspiring Geopark. But, those monuments have been erected 5,000 years ago, and, for many of them only remained nowadays fading tumulus – levelled by erosion and recovery of material for more recent constructions – crowned by their 3 characteristic enormous rocks: one of them positioned horizontally above the 2 others placed vertically.

Those Giant's tables have long fed local legends and faiths: they were seen by some as altars for sacrifices or, by others, as terminals for a cosmo-telluric networks. But the shared question always was: what techniques have been used to move and to lift such heavy masses? For example, the stone table of "Pierre-Martine" weighs about 22 tonnes!

The project "Peira levada" ("standing stone" in Occitan language) was designed on this basis: to try to build a new dolmen using only human-powered techniques.

The construction has been ongoing for few years. Part of the work has been completed by a handful of people (i.e. digging for foundations; stone and deer antlers tooling tryout; tree-cutting; tumulus building...). But every year, a festive day had been held, gathering together many others volunteers; here is a short account of this adventure:

In 2003, one of the future dolmen's side jamb (a 4-tonnes stone!) was moved for 200 meters. In 2004, a first attempt to erect this stone into vertical position failed because of ill-conceived foundations. In 2005, a more suitable technique allowed to achieve this first stone set up and, in 2006, to move and erect the second side jamb. During the winter 2006/2007, the tumulus was built while respecting datas from archaeological surveys: a rectangular shape; vertical front face and sides; a gentle slope on the back side. On 13 may 2007, an 8-tonnes stone table was delicately installed above the two jambs, using this ramp and the spontaneous assistance provided by 200 participants from across the generations. The children alone ended up the work by pulling up by themselves a second stone of just 3 tonnes in weigh! And finally, the following winter, the tumulus was completed after numerous exchanges with archaeologists. The "experimental dolmen" – like its honourable predecessors – shall now withstand the test of time; what will our descendants think about it? The project was successful, but for all the participants of this adventure it was above all a human and educative achievement. An educative achievement: because the project demonstrated that dolmens building did not require superhuman strength or thousands of people, but common sense and know-how. Also because the experimental dolmen with its unaltered tumulus shows us how original dolmens may have been: the tumulus presence often surprises the public.

A human achievement: because mostly the spectators– sometime sceptical ones – came only by curiosity but, very spontaneously, became actors of the construction; both young and elderly people pulled together the ropes to deliver "their" stone and to contribute to a collective and gratuitous piece of work.

EUROPEAN GEO PARKS

14TH/CONFERENCE

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"GEO PARKS: PATHWAYS OF SUSTAINABLE
TOURISM FOR DEVELOPMENT"

THEME "ASPIRING GEO PARKS"

ORAL



UNIFICATION OF DIFFERENT PARTIES IN ARAS ASPIRING GEOPARK, NORTHWEST IRAN

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Keywords: Iran, Aras, geopark, management

"Aras Aspiring Geopark" is the new applicant from Iran to join UGG. This area has a high potential in geology, nature, and culture and related heritage to develop geotourism and geopark concept. The geology of area includes one of the best and most important Permian-Triassic Boundary (PTB) in the world, numerous geological features, and attractions, biodiversity and landscapes. There are also a collection of several old churches, more than any places in Iran including Saint Stephanus Monastery (UNESCO WHS).

While Iran has only one UGG and its management system is under the Qeshm Free Area organization Management structure, there is no problem or conflict there, but it is expected that the geopark management system in other areas will be complicated. The nominated area is inside the Territories of Aras Free Zone Organization and 3 counties, although the AFZO has the key role in geopark management and related activities, but it is necessary to involve other local governments into this program. It is needed to use the authority of 3 counties in their area for geopark programs.

The policy which was taken by AFZO to unify all the parties in this program was very intelligent and smart. AFZO never invite or push the neighboring counties to cooperate with them in geopark program. It was just to avoid some misunderstandings and resistance against the program because the philosophy and concept were not clear for the counties officials. AFZO has started to develop tourism facilities and develop geosites in its own territory, the number of visitors increased in the result. AFZO also started working with locals to involve them in geopark programs and building new job opportunities and help them to improve their economy and livelihood situation. The policy worked out, and when the habitants of neighboring counties observed the big changes in AFZ local's life, they started to deal with governors and councils to be a part of the geopark program. It turned to an official demand from governors to AFZO and the outcome was an agreement between all parties to be a part of geopark program and have a sharing management body.

The reasons caused Aras Aspiring Geopark developing its territory beyond the free zone borders are:

- To include more geosites in geopark sites
- To cover more cities and villages with the geopark's benefits umbrella
- To help conserving all kind of the heritages in the region

It seems geopark idea in this area is very effective and useful, there were many forgotten traditions and cultural values now revived by geopark activities and people are happy with this.

*COOPERATION BETWEEN ASPIRING TROLLFJELL GEOPARK AND TROLLFJELL
OUTDOOR RECREATION COUNCIL- A WAY TO BUILD LONG-TERM STABILITY AND
STRENGTHEN OUTDOOR LIFE FOR THE LOCAL POPULATION*

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Keywords: local cooperation, aspiring geopark, Outdoor Recreation Council, outdoor experiences

The aspiring Trollfjell Geopark lies on the Helgeland coast, Central Norway. The geopark was established in 2013 and applied to become a UNESCO Global Geopark in 2015. The geopark has a varied and unique geological heritage. Within Trollfjell lies the Leka island which has a complete ophiolite complex. This gives visitors an outstanding experience through the bright red and yellow colours of the bedrock. Torghatten Granite Mountain has a hole that goes right through – a natural wonder seen no other place in the world. The hole was originally a marine abrasion cave that broke through the mountain to create a tunnel. The strandflat, a unique landform best described as a shallow platform between land and sea, gives endless opportunities for kayaking in an archipelago with thousands of islands.

In 2016, Trollfjell Outdoor Recreation Council was founded in the same area as the aspiring geopark. The geopark and the outdoor council has many overlapping functions: to create increased values to the region by promoting the natural and cultural heritage, to facilitate outdoor and recreational life for the local population and for tourists, and to establishing outdoor learning arenas for schools and children. The region has a long tradition of outdoor life and many of the geosites in the geopark can be experienced along the well-extended net of hiking trails in the mountains. Biking and island hopping are popular, and you can take your bike with you on the express boats that service the island routes.

In this presentation, we describe how the geopark and the outdoor recreation council aim to work together to build a stronger platform to deliver outdoor experiences and learning opportunities for locals and tourists. They are both inter-municipal organisations struggling with the same type of challenges as they operate in a large coastal area with a small population. We believe that cooperation and mutual agreements between these two existing organisations is a way to create unity and to give long-term financial and organisational stability, which could be a way to promote tourism and population growth and to develop the local economy.

THE GEOTOURISTIC POTENTIAL OF THE OESTE REGION OF PORTUGAL

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Keywords: Oeste Region of Portugal, geotourism, geological heritage, aspiring geopark

Presently, it is under discussion the relevance of the defining a new geopark in the West region of continental Portugal, on the usually called "Região Oeste" (West Region), situated in the central west coast of continental Portugal, and comprises twelve municipalities, Alcobaça, Alenquer, Arruda dos Vinhos, Bombarral, Cadaval, Caldas da Rainha, Lourinhã, Nazaré, Óbidos, Peniche, Sobral de Monte Agraço and Torres Vedras. This is primarily a rural area, but where tourism has been growing. The touristic potential of this region is enhanced with white sandy beaches and surf, attracting thousands of visitors and a growing History and Nature tourism. The area possesses two international relevant geologic features. In the Peniche Peninsula, the Pliensbachian-Toarcian stratotype (international geologic reference that better represents a particular time period of the Earth's History). This site attracts mainly national and international scientist, but there is a growing awareness of its importance by schools and the general public. The visitors search this site not only for its geological significance, but also to observe marine fossil and for its landscape beauty, within the Unesco Berlengas Biosphere Reserve. Other UNESCO site is Óbidos as Creative City in Literature.

Fossils, in particular the dinosaur findings in that area are also international relevant. From the Late Jurassic (~150 Ma), many fossilized dinosaur remains have been found in this area, not only for the quantity of bones found, but also for the significant number of species. Several unique species have been identified from those remains, like *Lourinhanosaurus antunesi*, due to the work many national and international researchers. These fossils area a great local attraction, as part of the collection of the "Museu da Lourinhã", that attracts about 24000 visitors/year, and an under construction thematic park about dinosaurs, "Parque dos Dinossauros da Lourinhã". More than 200 fossil species are unique to the Oeste and have been named after localities within. The "Região Oeste" has also other sites of geologic sites of regional and local importance, some already in the Portuguese national inventory of geosites: The "Afloramento da Brecha Vulcânica de Papôa" is a site near the village of Peniche where it is possible to observe a volcanic breccia surrounded by Lower Jurassic limestones. This breccia is a result of a collapsed volcanic conduit. Another area of interest is the "Corte Geológico da Península de Baleal", North of Peniche, where it is possible to observe a beautiful tilted limestone sequence. The section denominated as "Arribas da Praia do Salgado" is a good area for the public to observe several marine animal fossils, fossilized beaches and a XV century landslide.

We recognize that many more sites have great potential to be included in the geosites list and need to be characterized.

NEW GEOPARKS – A COMMON CONCERN IN PROGEO WG1- BALCAN COUNTRIES

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Keywords: ProGEO, South-Eastern Europe, geoconservation, geoparks

ProGEO is the first international association of geoconservation in Europe, whose main aim is to promote scientific, educational and cultural values of Geology in order to enhance the protection and conservation of the geological heritage, in both legislative and practical aspects. ProGEO is affiliated to the IUGS (International Union of Geological Sciences), is member of the IUCN (International Union for Conservation of Nature), organizes International ProGEO Symposia on Conservation of Geoheritage and, since 2008 holds sessions at International Geological Congresses (IGC). Through the "Declaration of the Rights of the Memory of the Earth", adopted at the end of the First International Symposium on the Conservation and Geological Heritage, at Digne-les-Bains (France) in 1991, which recalls the intimate link between Men and Earth, ProGEO contributed to the "movement for geoparks", a corollary of the geoconservation, started in the late 90s. ProGEO activities are developed at national and international levels, within regional working groups. The ProGEO WG1 – South East Europe was established in 1995 in Sofia, including Albania, Bulgaria, Greece, FY R Macedonia, Romania, Serbia and Slovenia. Subsequently the group was joined by Croatia (1996), Turkey (1998), Bosnia and Herzegovina (2001), Hungary (2005) and Kosovo (2013). On national level, all the country working groups established inventories of the geological sites based on a commonly agreed specific categories and works for the protection and capitalization of their scientific, cultural, aesthetic values, through education and tourism. The country groups contributed to the geosites project which established frameworks for selection of geoconservation sites of international importance, published in 2012 (Wimbledon W.A.P. & Smith-Meyer. S (eds.), 2012, Geoheritage in Europe and its conservation, ProGEO, 405 pp.). Efforts for the establishment of geoparks, based on the UNESCO criteria are undertaken in most of the Balkan countries. Some countries already succeeded to create geoparks, members of the Global Geoparks Network; in order of the accomplishment: Lesvos (Greece), Hațeg (Romania), Papuk (Croatia), Chelmos-Vouraikos (Greece), Novohrad-Nógrád (transborder Hungary-Slovakia), Vikos –Aaos (Greece), Bakony-Balaton (Hungary), Karawanken (transborder Austria-Slovenia), Idrija (Slovenia), Kula (Turkey). New geoparks are under preparation, in a more or less advanced stage, in Albania (Kurveleshi), Una National Park (Bosnia and Herzegovina), Bulgaria (Belogradchik), Croatia (Rab), Romania (Buzau), Serbia (Djerdap), Turkey (Kizilcahamam – Çamlidere). Dissemination of good practices and experiences in creating and managing geoparks, from the established geoparks to the aspiring ones prove to represent an useful tool of cooperation, as it was shown during the ProGEO WG1 meeting and the two special sessions dedicated to "Geoparks and Geotourism" and "Geological Heritage in the Middle East and South East European countries", organized in the 70th Geological Congress of Turkey (Ankara, 10-15 April 2017). The presentations and debates highlighted the progress in geoconservation in the Balkan countries and occasioned proposals for strengthening the regional cooperation: involvement of more students in ProGEO activities, organization of summer schools training on geoconservation, establishment of a digital interactive map with geosites of WG1 member countries.

*THE ROLE OF THE PORTUGUESE FORUM OF UNESCO GLOBAL GEOPARKS REGARDING
NEW CANDIDATURES: THE CASE OF THE ASPIRING GEOPARK ESTRELA*

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Keywords: Aspiring Geopark, National Forum, cooperation, partnerships

The Portuguese Forum of UNESCO Global Geoparks was created in 2011 by the Portuguese National Commission for UNESCO (NatCom – Portugal) in an initiative in line with other UNESCO networks. It is a platform for deepening the knowledge among its members, encouraging a greater exchange of experiences and good practices and defining joint working strategies for the future, being open to other Geoparks that are inscribed in the Global Geoparks Network (GGN). In this sense, the main objectives of the Forum are to coordinate joint initiatives between the Portuguese UNESCO Global Geoparks (UGG), to promote the development of new applications for UGG, providing technical and scientific support, to promote and support projects that can contribute to the valorization of the geological heritage, at a national level, to disseminate the activities of the GGN and other regional networks, to streamline activities in close cooperation with other Fora /National Committees of UGG and to encourage and effectively contribute for cooperation initiatives with the Community of Portuguese Speaking Countries and with Latin American countries.

In this framework, bearing in mind the statutes and guidelines regarding the role of the Fora/National Committees for UGG and taking into account the recommendation that these structures should promote the development of new UGG, assessing and endorsing new applications, the Portuguese Forum of UGG along with the support of the National Committee for the International Geosciences Programme of UNESCO (IGCP) and the Portuguese NatCom, have been supporting since 2015, several activities related with the new Aspiring Geopark Estrela. In this sense, it has been provided technical and scientific support based in several meetings with the participation of the Executive and Scientific Coordinators of each Portuguese UGG (Naturtejo da Meseta Meridional, Arouca, Açores and Terras de Cavaleiros), the Coordinator of the Portuguese Forum of UGG and the President of the National Committee for IGCP. Beside these intensive collaboration and even the visiting by the members of this new Aspiring Geopark to the Portuguese UGG, the Portuguese Forum along with the National Committee for IGCP have been also participating in events organized by this Aspiring Geopark.

In order to assist the Aspiring Geopark Estrela the Portuguese Forum of UGG, was also been encouraging their members to participate in EGN/GGN Conferences and, which brought a strong visibility to this new application.

ASPIRING GEOPARK ESTRELA: A STRATEGY FOR SUSTAINABLE DEVELOPMENT

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Keywords: Aspiring Geopark Estrela, sustainable development, tourism, science and education

The Aspiring Geopark Estrela, with an area of approximately 2,700 km², is a territory where sustainable development must be worked in an integrated way. Set in its geological heritage and millenarian human presence, the Serra da Estrela has been and is still a geography of opportunities.

With the applicati

on to UNESCO's Global Geoparks Program, sustainability gains an added significance within a true territorial-based development strategy. In this framework, the 17 objectives of the United Nations Agenda 2030 are worked on a cross-cutting and everyday basis, since development is by nature inclusive. Among the different objectives, we highlight the fostering of partnerships that synergistically, allows to achieve objectives and strengthen the sense of belonging of the territory.

The development of partnerships in the Aspiring Geopark Estrela has made the networking possible and has contributed to establish common strategies, with a view to the development of the territory, based on its endogenous resources and its communities. As territories of Science, Education and Culture, which intend to place their relevant geological heritage at the service of communities, geoparks implement bottom-up development strategies based on communities, the development of partnerships and their endogenous resources, that is, in its natural and cultural heritage. In this way, through sustainable development, they contribute to the construction of new infrastructures, promote the conservation of geological heritage, education and tourism, while stimulating the development of new economic strategies, reinforcing the productive fabric, thus contributing to local economic growth and the creation of new job opportunities.

Considering the three pillars of a Geopark : i. Tourism, ii. Education and iii. Community development, the Estrela Geopark Association has implemented a set of activities involving the local communities as the core of the Aspiring Geopark, aiming at the education and dissemination of the UNESCO Global Geopark rationale.

This presentation will show examples of: i. the networks of interpretative routes within the activities "Tourism for All" and "Heritage and Landscape", ii. technical and educational training, iii. conferences and open fora, iv. publications and v. incentives for research.

The UNESCO seal, which this territory aspires to, cannot be reduced to a mere patrimonial and/or territorial classification. We are therefore faced with a strategy which, leveraged by the brand and above all by the UNESCO principles, should contribute to the implementation of a new, more integrated, endogenous and sustainable development paradigm. In each of the areas of intervention, existing resources are a means to achieve common goals, grounded in new approaches, synergies and international cooperation. Integrating the UNESCO Global Geoparks Network is not an end in itself for the Estrela, it is the principle for a new way of working, reinterpreting and refunctionalizing what this territory has of most value, its identity.

This application was born from the evidence of its geological heritage, a result of the will of a territory and the need of its people. This is the opportunity to build new paths of development, traversed in millions of years of Geological History.

*THE ESTRELA ASPIRING GEOPARK: FROM GEOHERITAGE TO AN INTERDISCIPLINARY
SOCIETY-FOCUSED SCIENCE DEVELOPMENT PLAN*

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Keywords: aspiring geopark, Serra da Estrela, geoheritage, development

The Serra da Estrela is the highest mountain range in mainland Portugal and is part of the Iberian Central Cordillera, dividing the Atlantic façade of the country to the NW, from a Mediterranean domain to the SE. Bounded by two main fault scarps, a plateau (1,500 - 2,000 m asl) of Hercynian granite, occupies the central area of the Aspiring Geopark. Elsewhere, where Paleozoic metasediments outcrop, the relief is deeply incised by fluvial erosion and dominated by long and sharp ridges. The Estrela is bounded by planation surfaces that cut the Hercynian basement and that formed before the Alpine uplift. The altitude, steep fault scarps, plateaus and geographical setting, make the Estrela the first barrier to the eastbound Atlantic air masses, and gave result to the development of glaciers during the Pleistocene. A plateau ice-field and five radiating valley glaciers occupied the highest parts of the mountain with an estimated equilibrium line altitude at 1,650 m asl. The plateau style of the glaciation and the ELA just below the plateau edge made the Estrela very sensitive to climate fluctuations, having resulted in various terminal moraine complexes. The central plateau area shows widespread glacial erosion features and an almost complete stripping of the weathering mantle, while the non-glaciated plateaus show a rich landscape dominated by granite weathering landforms. The remarkable glacial landscape of the serra da Estrela, when considering its setting in SW Europe, together with other significant geoheritage, such as periglacial, weathering and mass wasting phenomena, tectonic, petrological and hydrogeological features, together with the links from the lowlands to the highlands, are at the core of Estrela's application to a UNESCO Global Geopark.

The Estrela has been one of the traditional regions for mountain research in Portugal, both in the geological and biological sciences, with the first interdisciplinary study taking place with the Geographical Society of Lisbon Expedition in 1881. Since then, several scientists have studied the Estrela, with the main studies on the glaciation being the ones from Lautensach (1929, 1932), Daveau (1971) and more recently, Vieira (2005, 2008). However, in the last decade, research has decreased. The recent implementation of the Association Geopark Estrela has been quintessential into bringing together the national and international science community interested in the serra da Estrela. The first step took place in May 2017, at the International Conference Managing Mediterranean Mountain Geoheritage taking place in Manteigas, being the starting point of a new approach for an integrated research program for the Estrela Geopark. The science development plan will be implemented in early 2018, based on a white paper on the current status of research in the Estrela and on the definition of the key science topics for the next decade. The topics will include both basic and applied science questions, aiming at supporting regional development in the Geopark region. The plan, driven by the importance of geodiversity and its significance for sustainable development aims at fostering interdisciplinary research, while promoting the creation of a new generation of scientists.

*ASPIRING GEOPARK ESTRELA: DIAMONDS ARE FOREVER?*Jan Jansen¹

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Keywords: ecosystem, phenomenological approach, multidisciplinary research, genius loci

In this presentation Aspiring Geopark Estrela is viewed as a rough diamond which can be cut into many facets. It is argued why Earth Sciences are not enough to understand the complex ecosystem of Serra da Estrela. In order to grasp all facets of this shiny diamond we also need Human Sciences to manage the area in a sustainable way and to let this unique mountain massif shine at his best.

Without knowledge and willingness it will not be possible to combine both the need for a socio-economic viable community in the Serra da Estrela and the sustainable management of its goods and services with the demand in urban areas for energy, drinking water, leisure, nature, culture and high quality food products. Aspiring Geopark Estrela creates a new momentum both for multidisciplinary research and cooperation of all 9 municipalities in managing the region.

On a historical basis major examples are shown of how facets of the rough Estrela diamond were cut by both its non-living and its living nature, the interaction of both and thus in short by its ecology. Additionally, the role of man in using the genius loci is highlighted and how his technology brought about socio-economic developments in the region, which may explain the present state of the art.

The importance of the phenomenological approach is underlined: understanding the different ways in which people look at nature. The goal is to get anyone around the table who is interested in the area so that good communication is initiated creating opportunities to achieve synergistic collaboration. In other words that all the different viewpoints from artist to scientist, from farmer to townsman, from child to adult, from resident to tourist, civil servant to entrepreneur and so on will fall in the right place. In addition we all have also a view where we personally stand for, being a more emotional, spiritual view. This view may be called our interior side of sustainability. It all starts with our experience of beauty which connects us with the cosmos including Aspiring Geopark Estrela as a unique part of the world.

The integration of various disciplinary approaches in the field of Earth Sciences and Human Sciences was already targeted in the 19th century by the Sociedade de Geografia de Lisboa, who organised the scientific expedition to Serra da Estrela in 1881 including numerous academic disciplines.

To remain in the sphere of geosciences and using a metaphor as expression of the phenomenological approach as to optimise the communication between all players in the region, the ultimate goal of this contribution is polishing the existing qualities and supplying suggestions of cutting new facets of Estrela diamond.

GEODIVERSITY OF SOUTHEASTERN BRAZILIAN CONSERVATION UNITS

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Keywords: trilha transcarioca, Estrada Real, Geoparque Costões e lagunas, trail mapping and signaling

The Southeastern Region of Brazil comprises four of the most populated states of the country (São Paulo, Rio de Janeiro, Minas Gerais and Espírito Santo), and hosts a series of conservation units that are either urban or readily accessible from the major cities. These will be fundamental to spreading the concepts of Geodiversity and Geoheritage to the majority of the country's population. We are currently assessing these values in 3 important mosaics of conservation units: 1) Trilha Transcarioca, an urban network of trails spanning over 180 km, cutting through 5 different units; 2) Estrada Real, the original road the Portuguese built for moving the colonial gold production from Minas Gerais' Iron Quadrangle to the port cities of Rio de Janeiro and Paraty and beyond; and 3) an established Geopark, Costões e Lagunas, encompassing the beautiful coastline along the state of Rio de Janeiro. Initial efforts were dedicated to signaling the trails when necessary, followed up by an inventory of would-be geosites and points of geological interest. Next, detailed descriptions are being adapted for use as geological billboards and cellphone apps that will describe the main features of chosen sites. Each mosaic has its own priorities which relate to the main diversity of features. Trilha Transcarioca has some of the best and most iconic views of the city of Rio de Janeiro, and the original magmatic and metamorphic rocks that constitute the Sugar Loaf, Pedra da Gávea, or the mountain that hosts Cristo Redentor, for example, could not be left out. The geomorphology and the process of erosion and abrasion are also highlighted. For the chosen segment of Estrada Real, emphasis is similar, but with the added interest of how the geology plays an essential part of the hisyorical gold and diamond mining cycles of the 18th century. Costões e Lagoas, as the name implies, dels with the geological history, with an emphasis on geomorphology and sea level fluctuations that have shaped the area.

*ASPIRING GEOPARK VIS ARCHIPELAGO (CENTRAL ADRIATIC, CROATIA)*Joško Božanić¹, Dr. Tvrtko Korbar², Prof. Josip Belamarić³¹Centre Studia Mediterranea, University of Split, Faculty of Philosophy, Radovanova 13, Split, Croatia.

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Vis archipelago is a peculiar area in the central part of the Adriatic Sea which has undergone specific geological transformations related to salt tectonics, resulting with fabulous geological structures and geomorphological features. The islands are characterized by both, the oldest and the youngest rocks on the eastern Adriatic coast, and are still growing. A variety of unusual 220 million years old rocks are incorporated within diapirs – masses of primordial salt from Earth's deep layers that penetrated the Earth's surface while pushing upwards younger carbonate rocks deposited on top of an ancient tropical carbonate platform. The most spectacular tectonic intrusion from the Earth's deep was formed in the very spacious Komiža Bay, where peaks of this salt and magmatic burst from the crust five kilometers in depth, rise above the sea.

The World Wildlife Fund has proclaimed the Vis Archipelago one of ten last „Paradise oases of the Mediterranean“, while taking into consideration its natural distinctiveness, cultural heritage, historical references to the island as the crossroads of maritime routes, which has been in the centre of great historical events since Antiquity. Based on undertaken scientific research which has revealed exceptional biodiversity of land and underwater flora and fauna of Vis, the WWF has included the Vis Archipelago in the Blue Corridor (2003). This open sea island is an area with the largest concentration of monuments of nature in Croatia. The archipelago includes the most distant Croatian islands (Palagruža, Jabuka, Sveti Andrija, Brusnik and Biševo). Each of these islands is unique in its geological and its fishing history with the oldest preserved type of fishing boat in the Mediterranean - falkuša. The island of Vis is the birthplace of urban civilization on the eastern coast of the Adriatic. In 397 BC, Dionysus the elder, tyrant of Syracuse, founded on the island of Vis the first Greek colony on the eastern coast of the Adriatic. Greek historian Theopompus writes that the Ionian Sea (i.e. the Adriatic) got its name from Ionios. Vis is located along the oldest trans-Adriatic route – Diomedes' route. Due to its strategic importance the British called Vis the „Gibraltar of the Adriatic.“ In WWII Vis was the only unoccupied territory in Europe. After the WWII Vis archipelago became a military zone and remained to until 1989.

Forceful isolation of this open sea insular space also had one positive consequence: it conserved the island at the time of sudden expansion of mass tourism on the Adriatic and preserved it for better times in which the world recognized the value of its natural and cultural heritage. Our initiative for the establishment of the Geopark Vis Archipelago is a priority task for this area, with the aim to include it in the European Geopark Network and the UNESCO list of world heritage.

UNFOLDING THE GEOLOGICAL STORY OF THE LAUHANVUORI REGION ASPIRING GEOPARK

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Keywords: Finland, mire, geology

The Aspiring Geopark of Lauhanvuori Region is located in Western Finland. The Geopark covers an area of 4000 square kilometers and has 45 000 inhabitants in 9 municipalities including three provincial towns. Large parts of the area is covered by wetlands, which gives the Geopark its main theme, the mire.

The Geopark area is predominantly flat, with a few scattered low hills. An esker formation runs through the geopark forming a backbone connecting different parts of the area. The Lauhanvuori hill is known as the highest point in Western Finland, 231 m a.s.l. The area is the southwestern part of the water divide running through the country, dividing the lakeland in the east and coastal river plains in the west.

The bedrock of the area consists predominantly of Proterozoic granitic rocks. The bedrock surface shows traces of extensive tropical weathering in the past, including tor formations. An Ediacaran or Cambrian sandstone formation covers the central part of the area.

The area has been located near the centre of active continental ice sheets during the ice age, but it has repeatedly been covered by passive glaciers. This has led to very little glacial erosion. Because of this, thick deposits of many glacial cycles occur, including interglacial deposits such as podzols and remnants of mires from the past. The last glaciation produced a thin but impermeable fine-grained till sheet covering parts of the area. This has acted as a base layer for formation of mires even above permeable sediments.

Postglacial processes include land uplift and locally washing of the till deposits by the sea. Paleobeaches cover large areas up to 200 m. a.s.l. The land uplift continues at a rate of 1 cm per year. It has also incorporated tectonic events: a six-kilometre long scar of an earthquake has recently been found from the Lauhanvuori National park, suggesting a notable tremor roughly 9000 years ago in an area that is presently known for its tectonic serenity.

The mire formation initiated soon after deglaciation. Primary mires formed at the seaside and formed basis for growth of peat beds up to 5 meters thick. A development from Carex dominated peat types to Sphagnum dominated peat types can be widely seen, reflecting a typical paludification cycle from nutrient rich fens to nutrient poor raised bogs. The geography and climate in the area favours mire formation.

The end product of these processes has led to a flat and gently undulating landscape where small river valleys cut the otherwise more or less mire dominated back lands. The mires in the area have formed during the last 9000 years and preserve the climate history in their peat deposits. Large mire areas have survived to this day and are now part of National parks and mire conservation areas that form the backbone of geological sites within the Aspiring Geopark area.

BEYOND TIME AND SPACE- THE ASPIRING JURASSIC GEOPARK OF FIGUEIRA DA FOZPaulo Trincão^{1,2}, Estefânia Lopes³, Jorge Carvalho¹, Sebastião Ataíde¹, Margarida Perrollas¹¹ Municipality of Figueira da Foz, Av. Saraiva de Carvalho s/n, 3084-501 Figueira da Foz, Portugal.

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Due to its unique geological and geomorphological features Figueira da Foz municipality has plenty of geoheritage significance. It is worldwide-known site due to its international stratigraphic relevance given by the establishment of two stratotypes (the Global Boundary Stratotype Section and Point for the base of the Bajocian Stage and the Auxiliary Stratotype Section and Point for the base of the Bathonian Stage), that gave us a Golden Spike in 2016, which corresponds to a worldwide recognition of the area; There is an abundant palaeontological heritage of the region (dinosaurs, gastropods, fossil reefs and plants exposed and identified in an old coal exploration...). Beyond the Jurassic, there are important quaternary outcrops (lakes, dunes...). The remarkable geodiversity of these outcrops justifies the implementation of strategies in order to conserve and promote the geosite, classified as Natural Monument in 2007. Though our aspiring geopark approach aims to go beyond the geological resources mentioned. The archaeological patrimony, the cultural heritage and the biodiversity complete the region with high quality, and provide a global classroom by which to study the region. It is a catalogue of scientific, touristic and educational values that is already being used for a long period of time.

The aspiring Jurassic Geopark of Figueira da Foz is being built around the interaction between nature and culture and it is envisaged as the place where one could explore the connection between the natural and the anthropic worlds. It is highly interdisciplinary and it has the support from the community and from Earth, Life, and Social Sciences specialists (architects, fine-art artists, anthropologists, archaeologists, historians, museologist, teachers, economists) that emphasize this broader approach.

We aim to strengthen and promote the importance of this region and we do pretend to present the concept and principles of the aspiring Jurassic Geopark of Figueira da Foz, the strategy for community participation and development, as well as the geological attractions in the area and the geotourism.

The creation of the geopark will organize and structure a reality already seen in Figueira da Foz, and the awareness created will enable us to maximize a feasible planning and ensure a sustainable future of the site.

From all that was listed, Figueira da Foz Municipality has all the condition to create the first geopark in the Lusitanian Basin, under the name "Geoparque Jurássico da Figueira da Foz" and will be a model of development based on the conservation and valorisation of its geological heritage, with the community's imprint and involvement.

*ASPIRING VIANA DO CASTELO LITTORAL GEOPARK: FIRST STEPS TOWARDS A
UNESCO GLOBAL GEOPARK DESIGNATION*

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Keywords: education, geopark, geoconservation, sustainable development

The Viana do Castelo Littoral Geopark (VCLG) corresponds to the territorial area of the county of Viana do Castelo (NO of Portugal), an area of 320 km² with about 90 thousand inhabitants. The first phase of the inventory of geosites and geodiversity sites was carried out between 2005 and 2012, within the scope of a doctoral thesis developed at the Earth Sciences Centre of the University of Minho, and identified four themes on geoscience communication, namely Rheic-An Ancient Paleozoic Ocean; The Installation and Evolution of the Coastal Mountains; The Environments and The Climate of the Pleistocene and the Human Being in the Geological Space. The inventoried ge-odiversity preserves elements of high interest in several geological topics, namely residual, granitic, tectonic, fluvial, aeolian and geocultural geoforms, from Lower Cambrian to Holocene. The municipal geoconservation strategy, which was included in the geopark's constitution project, received the 2016 Geoconservation Prize, awarded by ProGEO. As a result of the 2nd geodiversity inventory phase (2014-2016), the VCLG currently has 2900 ha of classified geological heritage areas as 13 Natural Monuments, under Decree-Law 142/2008 of 24 July, and 16 sites of geodiversity, essentially with touristic and educational potential use. The interpretation of Natural Monuments and the geopark's identity is leveraged by the regional operational programme NORTE2020, assuming the installation of hosting and interpretive panels, outcrop QR codes, interactive tables, website and mobile application, both accessing the geopark virtual tour. The necessary approximation between Schools and Science (the scientific equipment, the scientists and their problems, and methodologies in Science) has been achieved by the creation of the Science School and Scientific Research Support Network, under the scope of the Viana do Castelo School Participatory Budgeting, a group of 6 Geosciences Laboratory Units and a Memory Center (Municipal Rock Library) installed on each public host school node. This network aims supporting the development and implementation of the work project methodology as the background option, and the central focus of curricular development. For the school year 2017-2018 the VCLG revised and approved 19 global curricular projects presented by host schools, corresponding up to 45% of flexibilization of the curricular management, from the 1st to High School education grade. Besides these curricular projects, the geopark also provides an Educational Project with 13 activities on geology and history-archaeological sciences, and 4 continuous training courses for teachers.

The VCLG is managed by Viana do Castelo Littoral Geopark Association, a civil, non-profit and noncommercial association, regulated by private law, with 17 entities represented in the association's governing bodies. The general assembly is made up of 36 founding institutions, all the county parish councils and schools. The scientific council is filled by 13 researchers from the institutions that support the development of the geopark, namely the University of Minho, the University of Coimbra, the Marine and Environmental Sciences Centre-MARE and the Polytechnic Institute of Viana do Castelo. There is an advisory council which includes 57 personalities recognized as the ambassadors of memory and roots of Viana do Castelo.

*THE APPALACHIAN GEOPARK ASPIRING PROJECT, WEST VIRGINIA, USA:
RIVERS, RAIL, CAVES, COAL AND PEOPLE*

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Keywords: West Virginia, rivers, caves, coal

Currently there are no Geoparks in the United States, the pre-aspiring Appalachian Geopark is proposed to fill this gap in the Global Geopark Network (GGN). The Appalachian Geopark (AG) will be formed from three southern West Virginia counties: Fayette, Greenbrier and Raleigh. These three counties are the heart of the Geopark region within West Virginia, and include the critical components of rivers, caves and coal; as well as transportation modes, including river, rail, and meandering country roads.

A preliminary geosite inventory exposes nearly 100 geosites focusing on these and other themes. The heritage of the people living in the Appalachians is well-known, both domestically and internationally, through its unique Bluegrass music and the three national parks units of southern WV (New River Gorge, Gauley River, and Bluestone National Parks). In addition, the Greenbrier Resort is a well-known large-scale lodge offering hot springs, first class lodging and restaurant opportunities, and an underground labyrinth designed to shelter the US President and the US Congress in times of national crisis (now inactive). Now a tourism focal point, and a historical geosite, the Greenbrier is an anchor within Greenbrier County. Additional, internationally acclaimed geosites include numerous other hot springs, karst, caves, rail and coal heritage, water and geological formations of international significance.

The newly build Bechtel Summit Reserve is a leadership, adventure and Scout camp that provides lodging for nearly 50,000 youth adventurers. This world-class leisure infrastructure is one of the critical hubs within the AG, and is located just minutes from the New River Gorge National River. Also, West Virginia State Parks, high adventure activities, such as geo-rafting tours, climbing opportunities and more are scattered throughout the three counties. West Virginia University is currently the responsible agency—the organization that is “priming the pump” and will hand over the leadership to local grass roots entities. WVU holds steadfast to its mission of delivering high-quality education, excelling in discovery and innovation, modeling a culture of diversity and inclusion, promoting health and vitality, and building pathways for the exchange of knowledge and opportunity between the state, the nation and the world. The scope of the Appalachian Geopark advances the University’s land-grant mission, as well as service, collaboration and economic enrichment of the state. In summary, West Virginia University is committed to leading the way and stimulating great things in the state – and we firmly believe this is a great concept that will strengthen West Virginia state in a multitude of ways.

The Appalachian Geopark will be an economic stimulus that will allow tourism to take a front seat in the state’s economy.

SALPAUSSELKÄ GEOPARK-PROJECT

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Keywords: ice-marginal formation, Salpausselkä, groundwater, aspiring geopark

The Geological Survey of Finland started a preliminary study of the values of Salpausselkä formations as a potential applicant for a Geopark in 2015. Based on the preliminary study, Lahti University of Applied Sciences launched the Salpausselkä Geopark project in 2017. The aspiring Salpausselkä Geopark is situated in Lahti region, in the Southern Finland about 100 km northeast of Helsinki, the capital of Finland. The area covers some 2 700 km².

Salpausselkä formations represent the best-known geological features in Finland. At the end of the last ice age, during the deglaciation stage of the continental ice sheet, the climate got suddenly colder about 12 800 years ago, and the retreat of the ice sheet margin stopped. The cold period, known as the Younger Dryas period, lasted for approximately 1 200 years. During this period, gravel and sand deposited at the margin of the continental ice sheet, forming the First Salpausselkä about 12 100 – 12 300 years ago and the Second Salpausselkä about 11 600 – 11 800 years ago. The formations are at their most representative in Lahti region. The rapid and dramatic climate cooling was possibly caused by the release of cold freshwater from either the North American or North European ice lakes. This disturbed the ocean stream circulation in the Northern Hemisphere and weakened the warming effect of the Gulf Stream. The Salpausselkä ridges represent strong evidence of this prehistoric climate change.

Although in Scandinavia, Russia and North America there are many formations dating back to the same period as Salpausselkä, the classical formations of Salpausselkä are still widely referred to in geological research. There are many features with international geological value in the area. For example, around the Lahti Sports Centre on the First Salpausselkä, there is an impressive kettlehole landscape and an adjacent delta formation with meltwater channels. There are several large springs along the fringes of Salpausselkä, including Kiikunlähde, the largest natural spring of Finland. Aurinkovuori hill on the Second Salpausselkä is an impressive ridge formed of gravel and sand with deposits over 110 m thick. Päijänne National Park forms a part of the aspiring Geopark. It lies in the southern part of the lake Päijänne, the second largest lake of Finland, and covers an area of 14 km². The heart of the National Park is Kelvenne, one of the most beautiful esker islands in Finland. The Pulkkilanharju esker is another example of both scenic and scientific value.

Salpausselkä formations with thick sand and gravel layers provide the Lahti region with good quality groundwater. Groundwater bodies under Salpausselkä formations are large. Groundwater is an important natural resource in the Lahti region for e.g. region's strong brewery and food industry. All tap water in the region comes from groundwater. Water consumption in the region is on a sustainable level - only one third of the groundwater is used. Protection of groundwater is very important to Lahti region, especially in the City of Lahti, where almost 70 % of the population live on top of groundwater bodies.

*GEOPARK AS A BRANDING TOOL FOR AN AREA WITH
DIFFERENT CULTURAL FEATURES - MIRE CONNECTS US!*

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Keywords: aspiring geopark, Mire, branding, geology

The aspiring Geopark Lauhanvuori Region is located in Western Finland: Satakunta, South Ostrobothnia and Pirkanmaa counties' marchland. The counties represent different cultural backgrounds, and the regions have traditionally little in common. The administrative structures encourage the local organizations to co-operate with regions in the opposite directions, and the tourism marketing practices have been quite diverged as well: Satakunta has rather worked together with Southwest Finland and South Ostrobothnia has been looking northward to Ostrobothnia.

Despite the strong cultural and administrative borderline, the area comprises a unique and contiguous geological and natural district. The basis for the geological gestalt formed during and after the last ice age and it is visible in the scenery, habitats and species even nowadays. As a result, the area of nine municipalities and three subregions intend to submit application to UNESCO Global Geoparks in 2018. Since the area is profiled as a mire Geopark we can state "Mire connects us" beside the generally known Geopark motto "Rock connects us".

UNESCO Global Geopark doesn't exist without local people and their willingness to develop it. Every Geopark has its own brand which raises from local stories. Geology enables biology, and they guide the behavior of humans. For example, the last ice age formed eskers that are easy to pass, and it is not a coincidence that the medieval route Kyrönkankaantie is situated where it is. We have to learn the local geological history to be able to understand our own history and to appreciate the geological, natural and cultural heritage we have. Finally, it makes us want to protect our environment in spite of administrative borders.

In addition to the shared geological values, there is geotourism with new technological solutions that helps to unite the firms and people who haven't cooperated before. Tourism businesses are offered the possibility to present and sell their services under the same Geopark website. They can trust each other's quality in Geopark context even though they haven't got acquainted with each other in advance. Touristic services and products are marketed under the Geopark brand that has specified quality standards. Joining the mutual webshop is made as easy as possible even for the small tourism service providers. And little by little, firms learn to work together when they serve the same clients.

The aspiring Geopark Lauhanvuori Region is still little known as a tourism destination even in Finland, not to mention internationally. UNESCO Geopark brand gives not only an international conspicuousness but also an image of a destination that is worth visiting. It is an opportunity on the one hand, obligation on the other. The brand is a promise for the visitor, and the area has to fulfill that promise. We have a common goal that we are striving for, and everybody in the area is responsible for it. UNESCO Global Geoparks' operational guidelines give us direction and we are going there together.

EUROPEAN GEO PARKS

14TH/CONFERENCE

7TH - 9TH SEPTEMBER 2017
PONTA DELGADA, AZORES, PT

"GEO PARKS: PATHWAYS OF SUSTAINABLE
TOURISM FOR DEVELOPMENT"

THEME "ASPIRING GEO PARKS"

POSTER



*"QUATERNARY GEOPARK - NORTH GRANADA VALLEYS", A PROPOSAL*Alfonso Arribas Herrera¹, Francisco Juan García Tortosa², Juan José Manrique López³, Myriam Prieto Labra⁴¹Instituto Geológico y Minero de España, Calle Ríos Rosas 23, C.P. 28003, Madrid, Spain. E-mail: a.arribas@igme.es²Universidad de Jaén. Departamento de Geología, Campus Las Lagunillas, C.P. 23071, Jaén, Spain.

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Keywords: Quaternary, North Granada Valleys, badlands, paleontological records

The proposed "Quaternary Geopark - North Granada Valleys" covers 1,410 km² in south-east Spain (Eastern Andalusia). The geology of the region has influenced the culture of inhabitants from prehistory to the present. The geology, geomorphology, archaeology and culture blend to create an inseparable whole, in an area that has some of the most ancestral traditions and human traces of Continental Europe.

The proposed geopark covers the main fluvial valleys in quaternary sediments in this North Granada intermountain depression. The arid nature of the region's weather, with scarce vegetation on the valley slopes, favours observation of one of Continental Europe's best quaternary records.

These lands, included in the limits of this Geopark proposal, show, through a direct and visual reading supported by their landscape, the quaternary geological history of a vast territory without an exit to the sea during millions of years, which trapped and generated an extraordinary record of continental quaternary sediments. The highlight of its geological history is a palaeoriver and paleolake that were active approximately between 5 million year ago and 0,5 million years ago, during the endorheic period in which quaternary sediment were accumulated. Since then, a new exorheic period lasting until the present has configured its current geomorphology, characterised by an impressive eroded landscape.

These valleys with spectacular badlands expose the most wide-ranging and longest-lasting group of paleontological deposits of Continental European quaternary vertebrates. In particular, large vertebrates deposits have been discovered in Early Pleistocene sediments, with more than 150 sites identified.

The proposed geopark is a perfect addition to the current group of Iberian geoparks. The park enables conservation and exploration of an exceptional quaternary record, in a territory with some of the minimum anthropic alteration in Continental Europe. The people of the Province of Granada, throughout the 34 municipalities in question, have safeguarded and protected the area for centuries. Now, the area will be available for educational purposes and for society as a whole.

THE BEAUJOLAIS' ASPIRING UNESCO GLOBAL GEOPARK, A TASTE OF GEO-DIVERSITY

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Keywords: geopark, beaujolais, geology, landscapes

Famous throughout the world for its wines and vineyards, the Beaujolais is also a region shaped by man, who has reaped the benefits of the soil's diversity. This remarkable geology has given rise to great diversity, not only in the landscapes and heritage, but also in terms of human activity, in the culture and traditions.

Located in France, on the edge of the Massif Central, North-West of Lyon within direct view of the Alpine domain, the Beaujolais region has a complex and varied geological heritage. The diversity of its soil and its landscapes springs from the convergence of a great number of phenomena and geological structures. This geology has greatly influenced the inhabitants' way of life, that's why Beaujolais aspires to become an official UNESCO Global Geopark.

Also characterized by geology, the diversity of landscapes in the Beaujolais province, from forested mountains to the plain, through vineyard hillsides, is a defining element of its identity. Dating back millions of years, this story is being conjugated in the present tense, through human activities, History, heritage, culture and life of the region. A large part of its identity, its past and its future comes from the great diversity of stones remarkably emphasized in the local architecture, which is a "permanent exhibition" of the geological terroirs of Beaujolais. Since its launch in 2012, the Geopark project has involved many local stakeholders and has created a real territorial dynamic. Beyond the international recognition, the Geopark label is a pro-active tool for sustainable development of the territory. The project is though participative, built on actions and dynamics already existing; sustainable and committed to long-term development, for passing an attractive and living heritage, vehicle of knowledge and promotion for the territory. Today, as an Aspiring Geopark, the Beaujolais reveals its secrets. Visiting the Geopark, you'll discover the history of the earth, through varied and unexpected forms! Not forgetting that throughout Beaujolais, man drew from the soil to shape his living environment, continuing the work of modeling landscapes. Geosites take us on a trip through time!

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Keywords: Majella, carbonate platform, Apennines, Italy

Majella National Park is located in the Central Apennines (Italy), in a vast mountainous area of about 740 km². It comprises the Maiella Massif, represented by about ten north-south-aligned peaks exceeding 2,500 m (including Mt. Amaro, 2,793 m, the second highest peak of the Apennine chain), the reliefs of Morrone, Porrara, Pizzalto, Rotella and Pizzi-Secine Mts., all more than 1,880 m high. Thanks to its peculiar setting (high altitude only 30 km far from the Adriatic sea), unique in the European framework, and to the unusual geomorphological heterogeneity of the territory resulting from a combination of karst, glacial and fluvial processes, the Park is characterized by a great variety of microclimates and habitats, which has allowed to develop and preserve a precious and rare heritage of biodiversity.

Owing to the complex geologic history of the Maiella Massif and surrounding areas, the Park features many different landforms. Woodlands rich in water characterize the wide tectonic depression of the Caramanico Valley (carved by Orta River) which separates the rounded gentle profile of the Maiella Massif to the east from the impervious steep slope of the Morrone to the west. Bare pitted highlands, like lunar landforms, characterize the top of the Maiella (es. Vallone di Femmina Morta) shaped by flowing ice that long ago covered the higher parts of the massif. Impressive narrow canyons (e.g. Vallone dell'Inferno), sided by vertical cliffs, cut across the Maiella exposing thick successions of white carbonates. Wide sunny karstic plateaux, which tens of thousands years ago were lacustrine environments (e.g. Quarto di Santa Chiara at 1,250 m a.s.l.), are interposed between the NW-SE elongate reliefs of Rotella, Pizzalto and Porrara.

Looking at the geological aspect, several different sedimentary rocks and sequences outcrop in the area, deposited in various sedimentary environments. Thick piles of carbonate rocks are exceptionally well-exposed along the canyons and in the open spaces on top of the highest mountains. Sedimentary structures and fossil content recovered in these carbonates attest to a long period of sedimentation in warm, shallow-marine environments, revealing that the Maiella and surrounding carbonate mountains looked, approximately from 140 to 7 Ma, as the present-day Bahamas and Persian Gulf. Limestones indicative of deeper water marine environments, more recent shallow-water evaporites and terrigenous deposits, accumulated in deep-marine basins, mainly occur in correspondence of the gently dipping in the Caramanico depression and in the Secine-Pizzi Mountains. Lithic industries of Early and Middle Paleolithic age have been recovered in lacustrine deposits outcropping at Valle Giumentina, testifying to one of the oldest human settlement of Europe.

The Park hosts at least 90 geosites, some of which are well-known in the international geologic and paleontologic literature because of their scientific relevance. Its natural heritage is deeply fused together with cultural aspects: many caves are of an archeological interest and the steep calcareous slopes of Park's mountains housed hermits. Therefore, Park's Administration, supported by the regional Association of Geologists, decided to candidate its territory to become part of the UNESCO Global Geopark Network.

TOWARDS AN INTERNATIONAL GEOPARK 'SCHELDT DELTA' ON THE BORDER OF THE NETHERLANDS AND BELGIUM

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Keywords: Aspring GeoParks, human Geology, Scheldt Delta, climate change

The Scheldt Delta area, which we would like to introduce as a cross-bordering Geopark in the Netherlands and Belgium, is a complex region by its position at the highly dynamic land to sea transition for millions of years. Moreover, it is densely populated and in the past was highly dynamic due to the formation of the Scheldt estuary. As people nowadays are little aware of the importance of the subsoil for their daily life, it is essential to enhance this knowledge, certainly in view of climate change.

The unique aspect of our aspiring GeoPark is the interaction between natural geological processes and the human interference for centuries, which we would like to highlight. On the one hand by emphasizing the geological features, still visible today (e.g. in quarries, geological sections, and in today's tidal landscape). On the other hand by using examples of human interference related to these geological phenomena (e.g. quarries, brick production, tidal mills, defense systems related to inundation, peat excavation, prehistoric occupation sites, settlement pattern, 'drowned villages', dikes and lately the famous 'Delta works').

The Scheldt Delta area is usually observed by people as a flat and dull type of terrain, although sometimes unexpected elevation differences and sharp contrasts in landscape occur. 'Geosites' testify from a dynamic landscape showing a range from very old to very young geological processes. Local exposures in several quarries in the Belgian part of the Geopark show outcrops of the so-called 'Boom clay', dated to 34 M years ago, and intensively exploited for the production of bricks, tiles and pottery from the Roman period onwards, and perhaps even earlier (prehistory). At Nieuw-Namen on the Dutch side of the border, Pliocene sediments are exposed, witnessing coastal beach conditions, while at the nearby exposure of the Brabantse Wal tidal sediments from the Early Pleistocene (1.5-2.0 M) are visible.

Another important geological feature of the Pleistocene is the 'Flemish Valley', a ca. 20 m deep and ca. 50 km wide palaeovalley which includes fluviaeolian and marine sediments from at least 300.000 years ago, as well as remains from the earliest human occupation of the area by Neanderthal populations. This valley was blocked by a large coversand dune 'Maldegem-Stekene', leading to an extensive freshwater lake, the 'Moervaart depression', which were created during the final Pleniglacial and Lateglacial, both attracting prehistoric hunter-gatherers to settle down. At the same time the Scheldt changed from a braided river to a meandering river, reorienting its course in eastern direction towards Antwerp and the Brabantse Wal. During this process large oxbows flanked by river dunes were created which are still visible in the present landscape.

Due to rising sea level starting from the early Holocene, the Lower-Scheldt gradually got affected by the sea resulting in several reorientations and a drowning of the landscape and human settlements. The geological monument of Saeftinghe, with its tidal flats on the flanks of the Westerscheldt, is an excellent example of both human interference and how the current landscape would be without embankments.

*GEOLODAY: THE DISSEMINATION OF GEOLOGICAL ASPECTS TO
FERNANDO DE NORONHA COMMUNITY, BRAZIL*

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Keywords: Fernando de Noronha, education, interpretation

The Fernando de Noronha Archipelago is an Aspiring Geopark Project in Brazil, and is considered by many visitors as one of the most beautiful places in the country due to its landscape, geodiversity and biodiversity. In order to continue developing actions for the application of the archipelago and aiming to disseminate the geological aspects to the local community, the "Geoloday" event was held in 2016. This was an initiative of the Working Group that has been preparing the proposal for the application. The event was supported by the students of Igneous Petrology from the Federal University of Minas Gerais (UFMG), the Natural Areas Tourism Laboratory of the Ponta Grossa State University (UEPG), Econoronha (the concessionaire of the National Park), ICMBio (Responsible for the protected areas of the Archipelago), the Golfinho Rotador Project (which is sponsored by Petrobrás), and the Tamar Project.

The activities lasted for one day, and were part of the Environmental Week of the School and High School Fernando de Noronha Archipelago (EREM AFN), which is the only one on the island and has approximately 450 students. Geology students from UFMG, who normally do field work in the Archipelago, were responsible for scientific monitoring and interpretation of the environment, since there are no geologists on the island. For different classes, visits were made to different geosites. These geosites were proposed by the Geological Service of Brazil, such as Rata Island (which has access forbidden for public use), Atalaia Beach, Southeast Bay, Morro São Jose, Praia do Leão, Enseada das Caieras and Enseada do Abreu, located in the Marine National Park area. With excellent results, the activities allowed the students to visit places already known, but now with the geological focus, previously unknown. This geological "look" was also aroused among the school's teachers. For the students of the University, interpreting the landscape for a different audience, composed of children and adolescents, was a new challenge.

THE COTENTIN PROJECT, A PRE-ASPIRING GEOPARK IN NORMANDY (FRANCE)

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Keywords: geoheritage, Cotentin, Normandie, aspiring geopark

The pre-aspiring geopark is located in the western part of the Cotentin Peninsula, corresponding to the north of the Manche department in Normandy. In this small corner of France, the coastline shows various geomorphologic forms, rocky coasts, dunes, estuaries, sand and pebble beaches, contrasting with moorlands, peaceful valleys, small woods, streams hedgerows and stone walls in the countryside.

This land of contrasts exposes a rich natural and cultural heritage. The coastal landscapes show a remarkable geological diversity representing more than two billion years of Earth's history, from Paleoproterozoic rocks to recent Quaternary deposits. Numerous geosites were identified in this area along the coast and in the inside. Some of them are very famous spots of the french geology, such as the Flamanville granite surrounded by its metamorphic aureole.

Very diverse stone resources have been exploited for a long time. Many of them served as building stones for many megaliths, castles, manors and farms that form an exceptional cultural heritage. Other useful substances such as kaolin were exploited, as well as iron ore within an original undersea mine.

Numerous sites are home to remarkable biodiversity, particularly botany in moors and dunes or colonies of marine birds on rocky coasts. Many of these sites are protected by the French conservatoire du littoral and nature reserve status.

Man has lived in North Cotentin since very ancient times. In addition to the exceptional remains of Neanderthal habitat, traces of civilization from Prehistory and Celtic origins are everywhere. Their location made the early peoples prey to many invaders, Saxons, Romans and Danes, perhaps explaining the smuggling activity observed more later between the Channel Islands and the continent. This rich history is at the origin of the great diversity of the cultural heritage: monuments, traditions, language, gastronomy, etc., which tourism offices propose to discover through thematic routes, guided tours and different activity centers, supported by an offer of accommodation in development.

However, the local authorities are aware that the Cotentin still suffers from a lack of image and frequentation, despite the dynamism and variety of the local tourist offer. Consequently, considering the attraction of this area depending on its exceptional geology and its authentic natural and cultural heritage, the local authorities have developed a territory project contributing to the economic, tourism and social progress of the Cotentin Peninsula. On the initiative of local people, relayed by public and private partnerships, new actions are gradually emerging. Taking into account these dispersed actions in a general project must allow this territory to apply for the geopark Unesco label in three or four years.

ASPIRING SAIMAA GEOPARK PROJECT: LAKE SAIMAA LAUNCHED THE FIRST FINNISH DESIGNATION OF ORIGIN (D.O. SAIMAA) LABEL

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Keywords: Lake Saimaa, Aspiring Saimaa Geopark Project, designation of origin

Designation of Origin (D.O) is an internationally renowned brand. The regional council of South Savo was the first in Finland who began to grant D.O labels. The label is called Designation of Origin Saimaa.

Lake Saimaa belongs to Finland's internationally best-known and the most respected brands. Designation of Origin Saimaa is Finland's first proprietary label. The slogan of the label is: Designation of Origin Saimaa – 100% good from Lake Saimaa area. The word `good` means taste and high quality. It has also a positive impact for the environment, for the food culture and the vitality of the region and society.

The Regional council of South Savo is also a member of Saimaa Geopark association, which target is to apply UNESCO Global Geopark Status to Lake Saimaa area. Aspiring Saimaa Geopark project and the D.O. Saimaa brand owners are in important role to grow and develop the nature tourism concept in Lake Saimaa region. Food producers, retailers and restaurants will have the opportunity to take advantage of marketing Finland's first regional designation of origin label.

Product-specific the D.O. Saimaa label has been given to 12 producers. Labelled products are for example spices, wines, berries, different kind of meat and fish- products, sweets, carrots, sausages and cereal products. In Lake Saimaa region there are a large number of small producers and food processing companies. They have developed for years high-quality products. The D.O.Saimaa label adds value for the products and distinguishes them from competitors. D.O. Saimaa sign-labeled products are both gastronomically and ethically a very good choice. Restaurants may use the D.O. Saimaa label in individual doses or create menus around the D.O. Saimaa –menus theme. It is also to apply the D.O.Saimaa label for design and art crafts products.

The interest of food products and the manufacturing of food is growing constantly. Reliable information of the origin of food and the methods of manufacturing is increasingly important factor when making purchasing decision. D.O. Saimaa label tells to the consumer that the product is produced environmentally friendly in Lake Saimaa – the future Saimaa Geopark - area! The mark also tells us that the entire production chain is short and traceable.

GEODIVERSITY AND GEO-EDUCATION IN THE CONSTRUCTION OF TOURIST AND LEISURE TERRITORIES: THE CASE OF THE ESTRELA ASPIRING GEOPARK

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Keywords: heritage, geology, geotourism, education, Serra da Estrela

Geodiversity has an intrinsic enormous scientific value in allowing us to understand the evolution of our Planet. In this sense, it is necessary to implement strategies to preserve geodiversity, through geoconservation. In order to disseminate and promote geological heritage, some territories seek to develop educational programs that promote direct contact with geoheritage, contributing to the recognition of its importance and consequently of the need for its conservation. In implementing educational promotion strategies, with the use of properly prepared guides and appropriate educational materials, teachers are encouraged to promote field lessons at different levels of education, contributing to increasing the interest in geosciences, as well as for a better understanding of other phenomena occurring on Earth.

With the objective of promoting the development of value-added activities, based on geodiversity, we have seen a tourist appropriation of these resources, giving rise to geotourism strategies. We are thus faced with a potential form of sustainable tourism that can contribute to the economic development of many regions, while respecting sustainability criteria.

The conservation of geological heritage takes place through the implementation of key methods, such as inventories, with evaluation of its scientific, educational, cultural and tourist value; the implementation of signage, publications (articles, leaflets, guides and maps), audiovisual media (promotional videos), exhibitions, and interpretative panels accessible to all (in several languages, including Braille) and the establishment of interpretative routes. In this context, this presentation aims to identify different strategies of valorization, promotion and appropriation of courses, placing them at the service of the community and tourist development. Examples of the Aspiring Geopark Estrela, a privileged space for geotourism and geo-education will be used.

The territory of Aspiring Geopark Estrela, comprising 9 municipalities, (Guarda, Seia, Gouveia, Celorico da Beira, Fornos de Algodres, Manteigas, Belmonte, Covilhã and Oliveira do Hospital), has its agglutinating element in Serra da Estrela, with geological heritage of national and international scientific relevance. The Estrela is part of the Iberian Central Cordillera and the first barrier to the moist air masses from the Atlantic that enter southwest Europe. The mountain with a summit plateau between 1,400 and 2,000 m ASL was extremely sensitive to the cold periods of the Pleistocene, having developed extensive glacial and periglacial features. These, interplay with the Cenozoic geomorphological heritage marked by large and medium scale morphotectonic elements affecting the dominant granite terrains, as well as the metasediments, as well as with the remnants of planation surfaces and deep weathering. The landscape is a complex and rich geological and geomorphological mosaic with major controls on climate, hydrology, ecosystems, culture and economy that extend far beyond the Aspiring Estrela Geopark region.

We will show examples of the different educational programs that are being currently promoted and directed to the disciplinary areas of the Natural Sciences, Biology/Geology and Geography, of the basic and secondary education. Our approach allows for an interdisciplinarity with other areas of knowledge, such as, for example, History and Archeology.

*DIFFERENT ACTIONS IN FAVOR OF THE SERIDÓ GEOPARK PROPOSAL, NORTHEAST BRAZIL*Nayara C. S. da Silva¹, Cristiane S. C. D. Gomes², Marcos A. L. do Nascimento²¹EMPROTUR - Potiguar Tourism Promotion Company, Natal, Brazil. E-mail: nayaracsturismo@gmail.com²Federal University of Rio Grande do Norte, Natal, Brazil.

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Keywords: Seridó Geopark, Rio Grande do Norte, Northeastern, Brazil

The activities of the Seridó Geopark proposal were started in April, 19th, 2010 under the context of the Project "Geoparks in Brazil", established in 2006 by the Brazilian Geological Survey–CPRM. During the last years, the partnership between CPRM and UFRN has allowed the development of different actions: (a) Inventory of 16 geosities in the municipalities of Cerro Corá, Lagoa Nova, Currais Novos, Acari, Carnaúba dos Dantas and Parelhas, covering an area of 2,800 Km². (b) Projects developed at UFRN: (i) Technical Study and Diagnose for the Establishing of the Seridó Geopark (2010); (ii) Geological Heritage of the Seridó Region: Inventory and Integration of Geosites to Support Geopark Proposal (2012); (iii) Heritage Education in Natural Environment at the Seridó Geopark municipalities (2013); (iv) Routes of the Seridó: Analysis of the touristic potential of the Potiguar Seridó (2013); (v) Formulation of the Tourism Development Master Plan of Currais Novos (2013) and (c) Master's Thesis: (i) The Seridó Geopark, RN: Touristic values and management and Geosites Tourism Practice: an environmental assessment in the Seridó Geopark Project (defended in 2013 and 2015, respectively, both in PPGTUR/UFRN).

Moreover, under the progress of these activities new partnerships were established, joining forces to achieve the assembling of the Seridó Geopark, especially those with SEBRAE/RN and IPHAN/RN. Besides a number of projects focused on the regional tourism development, the SEBRAE/RN published the Guide Book for the Seridó Region, which presents informations about many geosites. The IPHAN/RN has ensured the preservation of the archeological heritage in geosites, either by acting in compliance with the law, either by running social programs and accessibility constructions in order to allow restricted visitation to the Xiquexique and Mirador geosites. The government of the State of RN, starting from the report of the I Workshop Geopark Project Seridó in 2015, began the discussions on three possibilities of management models: Social Organization, Foundation and Public Consortium. In this way, the decree was created with the purpose of forming a working group to propose the legal regime of the Geopark. In conjunction with this initiative, there is promotion and dissemination of some geosites in international fairs. New actions are currently being proposed for biennium 2016-2017, including: (a) promotion of environmental education and training courses for tourist guides, conductors and managers; (b) proposal of an academical extension project on defining geoturistic trails; and (c) preparation of promotional materials (folders and videos).

*VOLCANIC ISLANDS AND ENVIRONMENTAL INTERPRETATION: AN ANALYSIS
BETWEEN FERNANDO DE NORONHA GEOPARK PROJECT (BRAZIL) AND AZORES
GEOPARK (PORTUGAL)*

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Keywords: Fernando de Noronha, Azores Geopark, environmental interpretation

Fernando de Noronha is a volcanic archipelago, located in the northeastern region of Brazil, in the Atlantic Ocean, 345 km from the coast. Since 2007, studies and actions have been carried out aiming at the candidacy of Fernando de Noronha to the Global Geoparks Network (GGN).

The Azores Geopark is a volcanic archipelago composed of 9 islands, also located in the Atlantic Ocean 1,815 km from the European coast. It has been part of GGN since 2013 and has decentralized management as one of his main characteristics.

A geopark should promote geoscientific knowledge in an accessible way, and for that reason some actions have been and are being carried out aiming to improve the environmental interpretation in Fernando de Noronha regarding aspects of its geodiversity. To identify these actions and propose best practices, a comparative study was carried out with the Azores Geopark. Thus, fieldwork was carried out in Fernando de Noronha and Azores Geopark from January to June 2016.

In both archipelagos some initiatives already developed aiming the environmental interpretation were the production of printed materials such as guides and brochures, interpretative panels and guided and self-guided interpretive trails.

In Fernando de Noronha, these actions are more focused on aspects of local biodiversity. Some actions carried out related with the geosciences were the Geological Guide of Noronha, a brochure presenting the Geopark Project, divulgation in newspapers and governmental sites, and interviews at the local radio. In order to promote geoscientific knowledge, the geological theme is being integrated in tourism guide training courses and studies are being developed for the implementation of a geo-trail.

Based on these findings, it is possible to conclude that Fernando de Noronha needs new interpretive means aiming the interpretation of its geological heritage and its landscape. Based on the actions carried out by the Azores Geopark, it is suggested the creation of games, children's activities and guides (i.e the Children's Guide to Azores Rocks and Volcanoes), as well as the implementation of geological routes, integrating the main geosites.

Other actions using new technologies can also be implemented at geosites of both archipelagos, such as QR Codes, smartphone applications, interactive interpretive panels and augmented reality.

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