North West Highlands
GEOPARK
Iar-Thuath na Gàidhealtachd

European Geoparks Network
ABSTRACTS

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Contents

Session 1: New and Aspiring Geoparks I

Rokua:
A Possible Geopark in Northern Finland

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Key words
Northern Finland, Esker and dune formation, Environmental Management System

The Rokua esker and dune area in Northern Finland intends to apply into the European Geoparks Network within the next three years.

The Rokua area, which rises up from a surrounding flat expanse of bogs and fields, is an esker and dune formation shaped during the last ice age; it is approximately 20 km long and 5 km wide. Rokua is a part of 400 km long esker formation starting from South-Eastern part of Finland and ending to the northern part of the Gulf of Bothnia. Rokua Geopark would consist of the Rokua Natura 2000 area and the Utajärvi Stone Park.

Rokua is most famous for its tourism; it is characterized by superb hiking and skiing terrain as well as wellness and rehabilitation activity. Rokua spa and wellness hotel, hotel Rokuanhovi and a substantial amount of privately owned holiday homes have been built in the pine forests and along the lakeshores of the area. The National Park of Rokua is situated in the southern part of the esker.

The possibilities of becoming a member in the European Geoparks Network have been surveyed from year 2005 in close co-operation with the Geological Survey of Finland and the Finnish Forest and Park Services. The preconditions of a Geopark site have been developed by gathering geological information, making an exhibition, a book, georoutes, the administrational model of the site (based on the Rokua Environmental Management System), and also by forming a guiding group for the Geopark application process.

Rokua's strengths are its compact, unique and intact geological formation, the Utajärvi stone park, the Rokua EMS certified according to ISO 14001, strong support from vast group of local authorities and other organizations in the area, shortly upcoming geological exhibition, Rokua book and planned georoutes.

Pieniny:
A proposed new cross-border Polish-Slovakia Geopark

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Key words
Klippen Belt, geotourism, cross-border co-operation, Poland, Slovakia

An initial list of Polish areas meeting the criteria for EGN Geopark membership contains the very interesting cross-border Polish-Slovakia Geopark Pieniny. The major geological theme of this Geopark is the Pieniny Klippen Belt (PKB), a strongly tectonized structure about 600 km long and 1-20 km wide, which stretches from Vienna in the West, to Romania in the East. The area contains several successions of mainly deep and shallow-water limestones, covering a time span from the Early Jurassic to Late Cretaceous. The proposed Geopark includes the central, most interesting part of the PKB and the adjacent areas of the Central Carpathian Paleogene and Western Flysch Carpathians. Its core belongs to the Polish Pieniny National Park (Pieniński Park Narodowy) and its Slovak equivalent the Pieninský Narodný Park. The idea for a National Park was generated by Władysław Szafer in 1921 after Poland gained her independence. The Park was established in 1932 in Poland and in 1967 in Slovakia. The Pieniny National Park area in Poland is 2231 ha and 3750 ha in Slovakia. One quarter of this area is devoted to special nature sanctuaries, the most important ones are: Macelowa Góra, Trzy Korony, Pieniński Potok valley, Pieninki and Bystrzyk. Sixty percent of the park area consists of forests, mainly beech woods, the rest contains meadows, agricultural areas and rocks. The Pieniny National Park fulfills its roles in nature conservation, scientific research, and in promoting educational and tourist activities. The main geotourist attraction is rafting through the Dunajec River Gorge, an excellent scenic and educational trip. Several important geosites are located outside the park, including Rogoźnik Klippe Nature Reserve, placed on the UNESCO List of World Geological Heritage and Czorsztym klippe, an interesting mixture of culture and geology.

A European Geopark on the Isle of Wight

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Keywords
Isle of Wight, Geopark, Coast, Dinosaurs, Landslides

The 110km coastline of the Isle of Wight in southern England displays unique geological and geomorphological features including the richest dinosaur-bearing deposits in Europe, the largest urbanised landslide complex in north-west Europe and stunning coastal cliff scenery providing fresh and continuous geological exposures and excellent access for residents and visitors alike to appreciate the story behind the varied geology and scenery.

The Isle of Wight has long been considered a classic area of British geology, displaying near continuous exposures of Early Cretaceous to Early Oligocene strata, extensive coastal mass-movement phenomena and landforms. Despite a long history of research dating back to the beginnings of the study of the earth sciences, new discoveries continue to be made on the Island, most notably from the richest dinosaur-bearing deposits in Europe which outcrop along the Island's south-west coast. An active programme of interpretation and management of the Isle of Wight's geology and coastline is in place, and much of the coast is designated as Sites of Special Scientific Interest (SSSI), Area of Outstanding Natural Beauty (AONB) and Special Area of Conservation (SAC).

A partnership comprising the Isle of Wight Centre for the Coastal Environment, Dinosaur Isle Museum, the Isle of Wight AONB Partnership and the Isle of Wight Economic Partnership have undertaken a feasibility study in consultation with the local community to assess the value and impact membership of the European Geopark Network could bring to the Island's geological heritage and economy, and what contribution we could bring to the network itself.

The extent and content of the proposed European Geopark is presented along with profiles of the key component partner organisations.

Protecting Geology in Central Europe: Novohrad-Nograd: A Potential Cross-border Candidate

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Keywords
trans-boundary geopark, Neogene, heritage, geotourism, Slovakia, Hungary, protection

The creation of the Novohrad-Nograd Geopark is an ongoing transborder project between Slovakia and Hungary. It has been initiated by local subregions, supported by municipalities, NGOs and territorial agencies alike. This grassroots movement has been building on the rich geological heritage of the area. Diverse marine and terrestrial sediments and varied volcanic rocks and landforms represent the Neogene and Quaternary.

The region is enriched by special living assets as well. Due to unique mosaic-like habitats, several nationally protected sites have been created within its confines on both sides of the border. In the past local people were not really involved in preserving the rich natural heritage of their surroundings.

The Bükk National Park Directorate (Hungary) and the Cerova Vrchovina Protected Landscape Area (Slovakia) as prime regional nature conservation authorities have realized that the best way to move forward in the field of nature protection is to endorse the geopark initiative. When sustainable geotourism can provide tools for the economic development of the region, then the local people have a stake in the protection of their environment.

The would-be geopark has good capabilities for geotourism. Several of its geosites already have self-guided trails, it has an underground mining museum and its most famous geosite, the European Diploma-holding Ipolytarnóc Fossils Nature Conservation Area has been running guided tours on its geological trail since 1986. There is an ongoing development project on the Fossil Area. Its' 800 meter-long trail - with its protective halls - has been made accessible for the disabled this year and the Visitor Centre is still under construction to provide comprehensive facilities for the interpretation of the site's geological past.

Beside the geological heritage, the geopark is also rich in other already recognized natural and cultural assets. For example the Ancient Village of Hollókő (World Heritage Site) is within the confines of the planned geopark. By linking these attractions in an effective network, sustainable tourism can be achieved. The Novohrad – Nograd Geopark initiative wants to build on this recognition, to reunite people and landscape again!

Session 2: Cultural Landscapes: Language, People & Environment

Working Together: Reflections from a Sci-art-history project in the Northwest Highlands Geopark

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Keywords
Geological mapping; art; history of science; landscape; community; Scotland

This year the Northwest Highlands Geopark is three years old, but 2007 marks an important centenary for the Geopark. In 1907 the Geological Survey published their Memoir on The Geological Structure of the North-West Highlands of Scotland. It rapidly became a cornerstone for understanding tectonics and mountain building internationally. Geologists from around the world, together with generations of British students, have been visiting the area ever since. The original work of the geologists is archived in Edinburgh at the British Geological Survey and consists of detailed maps, sketches and observational notes. The North West Highlands designation as a European Geopark in October 2004 is based on this cultural heritage.

We outline the importance of the British Geological Survey resource and chart the evolution from an initial idea to "Mapping Mountains" - a final exhibition of reproductions of the 1880s maps. The exhibition spawned development of associated outreach activities in schools within the Geopark to combine Earth Science and art "Making Mountains". Celebrations of the 1880s work in the scientific community were focused on an international conference in May held in the Geopark and an artist joined the geologists in the field to capture their relationship with the landscape and each other. By sharing venues, activities and experiences, the aim was to integrate historical and cutting-edge science with other expressions of landscape and community.

As funding bids were developed, permissions sought, contacts made and ideas developed the project and its custodians met the challenges that face such integrative projects. Projects that combine cultural heritage with art and science require a clear focus and the determination to deal with challenges such as: targeting and combining funding resources, the bringing together of communities: local and academic, artists and scientists and a lot in between. We do not present a "how-to-do-it guide", but rather reflect on the experience of putting together an integrated project and a celebration of the cultural heritage of the North West Highlands Geopark.

"Stone Voices": Geodiversity, Landscape and People

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Keywords
geodiversity, landscape, cultural heritage

Traditionally, conservation and interpretation of geodiversity have tended to focus on the management of protected sites and explanations of the geological records of the rocks. However, geodiversity is now increasingly recognised to have much wider relevance through its influence on many aspects of the natural heritage, landscape, historical, cultural and built heritage, economic activities and sustainable management of the land, rivers and coast. This presentation explores new avenues for engaging with people through different aspects of their landscape and cultural heritage. It develops the metaphor of "stone voices" (Neal Ascherson, 2002) and examines selected examples of the links between geodiversity, landscapes and people in Scotland. It shows how the 'voices' and 'meanings' of the rocks may be (re-)discovered and experienced in different ways through archaeology, built heritage, literature, poetry and art, revealing the interactions between people and landscapes over time. This heuristic approach to interpretation complements the more traditional didactic approach. It highlights the continuity between the present and the past, and how the 'voices' of the stones can help link people today with their cultural roots and sense of place. Geoparks can provide a real opportunity to engage in this way with a much wider audience and to promote better appreciation of Earth heritage, landscape history, archaeology and local culture in an integrative process that also supports sustainable development.

Relating to Land: The Sound of Ideologies Clashing

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Keywords
Sense of place; consumption; production; ownership; 'rural idyll'; crofting

The Highlands and islands is historically a place that many people feel has been 'made in the minds of outsider'. Under these circumstances it has been easy to both symbolically and actually 'empty' Highland land or landscapes. Classic examples of this symbolic emptying include Lanseer's Monarch of the Glen and Turner's March of the Highlanders. In fact the word 'landscape' has a very particular cultural history which is of interest for those involved in rural development.

During the late 18th and early 19th centuries in the Scottish Highlands and islands the land was commoditised and particular kinds of resources were described and defined as 'natural' and newly legally defined as owned by particular named individuals. The weight of this past remains firmly inscribed on the present in the form of settlement patterns, the legal system, landownership patterns, areas where no human settlement remains, location of deer forests, reduction in native tree cover, economic activities and – equally significantly – in the minds of all those involved in the region today.

This paper explores the influence of this upon current community action and considers issues of personal and regional 'positionality' in relation to the regional and global 'development industry'. These important strands are illustrated by reference to key cultural and symbolic sites within North West Highlands Geopark.

Gaelic Road Signs in Scotland: Putting the Language in the Environment

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Keywords
Scottish Gaelic; Highlands; signs; place-names; local identity

This paper will explore current policies on the use of Gaelic on official signage in Scotland, with special emphasis on the use of Gaelic place-names on road signs in the Highlands. Signs are an important part of the human environment. Their principal function is to direct and inform travellers, however they can also affect interpretations of the local landscape, especially the perceptions of visitors. The use of text in the environment is an obvious indication of human presence, and can connect – or reconnect – people with the landscape. Signs also provide clear evidence of local language use.

Linguistic landscape research suggests that investigations of signage can reveal much about the linguistic situation of a place. The ways in which different languages are used on private and commercial signs can reflect the relative influence of these languages in our lives and in the economy. The presence or absence of different languages on official signage, meanwhile, can give an insight into the objectives of language policies, and whether these are working.

Recent years have seen the introduction of bilingual Gaelic-English signage to areas of the Highlands that previously only had English signs. Is this actually helping to revitalise Gaelic? Some see these signs as costly tokenism, but their symbolic value as attestations of Gaelic place-names could be important, reshaping the linguistic landscape and reinforcing local Gaelic identity. Comparisons will be made to schemes in other countries, such as the introduction of Sámi signs in some northern municipalities of Norway.

Criticism has also been made of the Scottish scheme, and others, for leading to unnecessary confusion and even potentially dangerous situations on the roads. As will be shown, careful consideration of design issues can prevent such problems with bilingual signs, and minimise the impact such signs have on rural surroundings.

Session 3: Making an Impact: Geoparks and Economy

Creating Economic Benefit by Regional and International Networking in the Global and European Geopark Bergstraße-Odenwald, Germany

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Keywords
generation of additional income; benefits for small and medium enterprises; co-operations with regional economy; funding programs

The Geopark Bergstraße-Odenwald covers an area of 3,500 km^2 in the south of Germany between the two European Metropolitan Areas Frankfurt Rhein-Main and Rhein- Neckar. The territory offers a broad variety of locations of geological and cultural importance, highlighted by three UNESCO World Heritage Sites.

Since 2002, the Geopark Bergstraße-Odenwald is a member of the European Geoparks Network, since 2004 a member of the Network of Global Geoparks of UNESCO. More than 100 local authorities and many other stakeholders are actively involved in the regional development process that has been induced under the overall management of the Geopark administration. The wide range of Geopark related projects, programmes and other activities has induced positive economic impacts for different groups of stakeholders.

On an individual level, new sources of income were opened up by the implementation of the Geopark Ranger service. 45 university graduates, trained by the Geopark, are operating region wide for environmental education and tourism programmes. They are linked to the Geopark by free lance contracts.

Economic impacts on the enterprise level are intended by linking Geopark programmes to regional enterprises (restaurants, farms, handcrafts), by the creation of Geopark products (e.g. Geopark wines) and by the provision of targeted training for enterprises.

The continuous co-operation between the Geopark administration, regional tourism organisations and local authorities is functioning as a sound base in order to develop joint projects with regional economy.

The EGN membership is providing significant economic benefits within the frame of joint participation of network partners in European funding programs.

The House of the Volcanoes: Geoturistic and Interpretation Centre of the Andalusian Geodiversity

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Keywords
Andalusia, Geodiversity, Geological History, Mining.

The Environment Department of Andalusia initiated in 1996 a line of work with the aim to integrate the geological heritage in the strategies of sustainable development of the region, especially in the Natural Protected Spaces. Within the " Project of interpretation and enhancement of the natural and cultural resources of the semiarid environment of the province of Almeria ", has been executed the infrastructures necessary for the interpretation of the cultural patrimony of this territory, and result of it is the achievement of the Geoturistic and Interpretation Centre of the Andalusian Geodiversity, placed in Rodalquilar's locality, inside the Geopark Parque Natural Cabo de Gata-Níjar.

This centre focuses the exhibition on the Geodiversity from a double point of view: CONSERVATION - SUSTAINABLE UTILIZATION and, from major to minus scale; WORLD - EUROPE - ANDALUSIA - CAPE OF GATA - RODALQUILAR, across four differentiated rooms.

The access room to the centre is designated to provide the visitor the concepts of geodiversity, geo-resources, geological heritage and geo-conservation and the World and European networks of geoparks. The second room raises a tour for the most typical and with major value geological landscapes of Andalusia.

The third room exposes the geological history of the Geopark Parque Natural Cabo de Gata-Níjar and its environment, the origin and evolution of the Volcanic Complex of Cabo de Gata and the interpretation of the most important elements of the quaternary domain of the coastal plain of Cabo de Gata. And the last room exposes the aspects relative to the historical importance of the mining district of Cabo de Gata.

From Rocks to Bike Racks in the North Pennines, England

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Keywords
Geotourism, Landscape, Cycling, Interpretation, Economy

Geotourism is much more than just printing leaflets and books about rocks. It is about creating interpretive and educational products which are fully linked in with the existing businesses and attractions of an area. By encouraging people to visit the area and to discover and enjoy the geology and landscape, we are using geology to help the local economy and support sustainable development. In places such as the North Pennines AONB and European Geopark, where remote rural communities have limited economic opportunities, this can provide a much-needed boost.

A recent example from the North Pennines is 'Wheels to the Wild', a geological cycle trail around the area's stunning landscapes. The guide contains directions for a three-day main route and three day-rides, and simple, colourful interpretation of the geology, landscape, mining heritage and special natural habitats along the way.

But this is much more than just a guidebook. It includes an accommodation and services guide and a leaflet highlighting other cycling opportunities in the North Pennines. We have improved cycling infrastructure around the route, with new facilities for bike storage and repair in accommodation and attractions, and accessible bikes for hire through a local business. A marketing campaign in the cycling press and two launch rides have led to many enquiries and sales, and a spin-off from producing the trail has been interest from one of the UK's leading cycling holiday companies. Our team has helped promote the Cyclists Welcome accreditation scheme in the area too. All this work has helped to get the Geopark more geared up for cycle tourism.

All of this has been done using funding raised for geological interpretation. We've taken money for rocks and turned it into bike racks and repair kits – creating an integrated geotourism product that local businesses can appreciate and build on.

Session 4: Sustainable Tourism: The Challenges & Experiences

The Ecomuseum of The Bats' Cave in Andalusia

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Keywords
Andalusia, Karstic morphology, Tourism.

The Geopark Parque Natural Sierras Subbéticas is a space with great ecological richness and landscape value. It's characterized by the karst morphology on limestone - a hill country with steep slopes and straits valleys. There exist more than 700 cavities and inventoried caves, which constitute underground passages of extraordinary beauty.

The Bats' Cave stands out among all the caves due its size and archaeological interest. It is located in Zuheros, and is the only cave open to the public. It has 800 m of tour and a maximum height of 76 m. It's adorned with numerous, beautiful speleotems (stalactites, stalagmites, columns, etc.) and small lakes. It has cave paintings and paleontological and archaeological remains of great interest.

The Ecomuseum of the Bats Cave is one of the Geopark's Visitor Centres and serves as interpretation centre for the caves of the whole Geopark, with special dedication to the Bats Cave of Zuheros's.

The interpretive structure designed for the Centre aims to:

- Invite the visitors to think about the rational use of the natural resources, the valuation of the landscapes, the objectives of the protection and the measures implemented.
- Introduce an argument with the different points of view in the approach to the nature.
- Start from a few local aspects of the environment (Bats Cave) to reach to universal conclusions.
- Positively contribute to the visitors' habits and behaviors in relation with the natural spaces and the environment.

Know Your North Pennines

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Keywords
Tourism, Training, Knowledge, Quality, Network

People who work at the front line of tourism provision can make or break the visitor's experience of a place. Tourist Information Staff, Bed and Breakfast operators, pub landlords, staff from visitor attractions and others can and should play a crucial role in increasing the visitor's awareness of an area's special qualities. However, for them to do this in an effective and co-ordinated way, with clear and consistent messages, training needs to be provided.

Know Your North Pennines (KYNP) is a knowledge-based training scheme for people working in the kind of roles described above. It uses the skills, knowledge and enthusiasm of local experts to help tourism providers grow their understanding of the special qualities of the North Pennines Area of Outstanding Natural Beauty and UNESCO European Geopark.

The first programme ran for three years, mainly over the winter months but with summer evening activities too. It provided a structured course with professionally produced support materials. There was an option to take the course as part of a modular degree with a local university. The second programme (this time for two years) is now underway.

KYNP has created a network of tourism providers willing and able to work together and with the Geopark managers to promote the area and take other collective opportunities which arise. It has created a quality standard which the Geopark managers and others trust and is being considered for replication in other protected landscapes.

Though strongly supported (financially and with other resources) by the North Pennines AONB Partnership and Killhope, The North of England Lead Mining Museum, KYNP came up from the community, rather than from agencies and local government; this makes it all the more valuable. This talk will focus on the development of KYNP, the lessons learned and where next for this important project.

Sustainable Tourism and Certification in Geopark Naturtejo: A case study

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Keywords
geopark, sustainable tourism, nature tourism, certification, destination management.

Geopark Naturtejo da Meseta Meridional (GNMM) is a recent member of the European and Global Geoparks Network (EGN and GGN). It's located in the Center of Portugal with an area of 4600 km2 and integrates 16 geosites. The Naturtejo team has been working on a management model for sustainability and tourism certification applied to all types of tourism activities, operations, establishments and projects, including conventional and alternative forms.

GNMM is focusing on a nature tourism approach that enhances the geographical character of this destination, its environment, culture aesthetics, heritage and well-being of its residents, using measurable benchmarks, and aiming to improve tourism's contribution to sustainable development and environmental conservation. Education and training programmes were undertaken in order to improve and manage heritage and natural resources within the municipalities.

Destination management of the GNMM includes land use planning, business permits and zoning controls, environmental and other regulations, business association initiatives, and a host of other techniques to shape the development and daily operation of tourism-related activities, as well as documenting the system's performance for inspection and auditing purposes.

GNMM is undergoing a truly comprehensive effort to allow the various stakeholders to voice their views, disseminate widely the results achieved, and to integrate such results, so as to produce the necessary synergies that will ensure that sustainable development in the Geopark, will indeed generate the economic, social and environmental benefits expected from it.

How the infrastructure of Saaremaa supports the journey through the Silurian in Estonia

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Keywords
Geological heritage, Silurian, geosite, geotope, geotourism

Saaremaa, the biggest island of Estonia has an area of 2922 km^2 (together with nearby islets). On its coasts and islets Silurian rocks out-crop, forming cliffs which together with inland quarries allow making an imaginary journey through the Silurian period.

On the northern coast rocks of the Wenlock series (Lower Silurian) out-crop, reflecting the vivid tropical sea of 429 million years ago. In the western part skeletal wackestones dominate, while eastwards argillaceous limestones with frequent bioherms are spread. Southwards, the extremely fossil-rich rocks of the Ludlow series, are exposed in low cliffs on the western and eastern coast and numerous inland quarries. Kaarma dolomite, Estonia's most famous building material, was formed during this period. Possibly, part of the Kaarma quarry will be opened to visitors. The rocks of the Pridoli series outcropping on Sõrve Peninsula (southern Saaremaa) were formed during the latest Silurian 416 million years ago.

The journey through the Silurian period should include some outcrops of each epoch. It would be an attractive geological tour around and through Saaremaa, to Muhu Island and to nearby islets. Saaremaa has a rather dense road network, making most geosites accessible by car or bicycle. Among the total of 2616 km of roads, bitumen gravel (783 km) and gravel covered (1684 km) roads dominate. Besides, there are many smaller local roads leading directly to geosites. There are hiking trails all over Saaremaa, including a trail across the sea to the islet of Vilsandi, a prominent Silurian outcrop, exposing also karrens (a particular karst phenomenon).

A wide range of accommodation services are offered to tourists with different expectations and financial possibilities. Rural tourism is very popular, but there are also luxurious spa-hotels in Kuressaare town. Camping sites for low-budget travelers all over Saaremaa. The infrastructure of Saaremaa greatly favors geo-tourism and makes a fascinating imaginary journey through the Silurian period, so clearly visible on this Island, possible.

Session 5: Environmental Priorities: Conservation Models for Working Landscapes

The Ichnological Park of Penha Garcia: bringing it back to Nature and sustainable enjoyment (what's next?)

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Keywords
Geomonument, action plan, landscape management, sustainable tourism.

Penha Garcia is a small village with less than 1000 inhabitants. This year Penha Garcia celebrates 750 years of a history made by wars and hardships. This village suffers from a fast decrease of population characterised by an ageing population and lower productivity due to migration of working people to the city. Economic activities are still based on a the primary sector and traditional industry. Since 2003 the process of tourism development was started in this territory. Bypassed by the main country tourist routes, this Portuguese hinterland is wakening up to Nature Tourism, where the visitor meets pristine landscapes, genuine people and hospitality.

The Ichnological Park of Penha is the core and case study of the Geopark Naturtejo Meseta Meridional, the only Portuguese Geopark. Actions already undertaken by Idanha-a-Nova municipality with the help of Penha Garcia community include restoration of the medieval castle (nowadays a wonderful viewpoint) and the watermill complex (site museum with the Fossils House), as well as the ancient paths. The Fossils Trail and the Climbing School were the next steps to create visit corridors to control environmental pressure. The Ichnological Park was defined mainly on the existenting geological heritage and astounding invertebrate trace fossils with 480 M.y. and all the area was protected by the law of the Cultural Heritage. Since 2004 there are regular guided visits. Only three years have shown an increase of 40,5% in the visitors number, almost reaching 9000 in 2006, year of integration of the territory in the European Geoparks Network, with 123,8% more foreigner visitors. The needs of visitor attendance and interpretation of natural and cultural sites lead to creation of a Tourism Office and it is being carried out recuperation of quartzite houses to constitute the Palaeozoic Museum.

A new period is beginning: an action plan is proposed for the next five years in order to mitigate the extent of the landscape change. Five strategies must be followed in order to benefit the geomonument: ranging from restoring riverside flora to minimizing building impact in landscape; cleaning of infrastructure; implementation of geoconservation procedures and research; improvement of the management policies; innovating interpretation with social and environmental-friendly approaches.

Landscapes, not Sites

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Keywords
Landscape, Character, Sites, Development, Conservation

Many branches of conservation, not least Earth Science, seem overly focused on 'sites' and site management. Though this is undoubtedly important, the setting and the context for sites and features is just as important a part of the story.

In Geoparks, where nature & culture based tourism is at the heart of what we do, we ought to be taking an approach which does not divorce geological sites, features and attractions from their wider landscape setting. There are some Geoparks, within and outside protected landscapes, where attractive, scientifically important and interesting geological features have their attraction diminished and their context devalued by intrusive development around them. This intrusion ranges from some of the measures used to actually conserve them, to wind farms, pylons and masts which take away the naturalness, and in some places the wildness, of the setting. For some, tackling this first requires an acceptance that it is a problem, and often requires a change in culture and appreciation of landscape; such changes are often politically sensitive and rarely easy.

This talk will focus on some of the issues surrounding landscape conservation, and the idea that it is not about views as such but about 'character', about the things that make a place special and distinctive, and how the erosion of this character and distinctiveness is a threat to tourism and the economy of Geoparks. Using examples from existing Geoparks and other places, we will explore how sites are only part of the story.

Geosites assessment and management in protected areas of Greece: The case of the Lesvos Petrified Forest Geopark.

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Greece is characterized by a complex geological setting and evolution and was subjected to a variety of geological and geomorphological processes, resulted in a high geodiversity. As a result a large number of spectacular landscapes and geosites are present in the country's protected areas, which include 10 National parks, 51 natural monuments, 11 Ramsar wetlands, 529 Landscapes of natural beauty and 239 Sites of Community Importance – SCI, which belong to the E.U. NATURA 2000 network. In spite of their intrinsic value for the natural environment the presence of geosites is related mainly to the conservation of habitats and ecosystems. Thus geosites failed to gain attention as elements of value for conservation and management.

The aim of this paper is to present a methodology for assessing geosites lying in protected areas. The evaluation process was performed to assign a value to all sites. The evaluation process includes six criteria: 1) scientific and educational value (integrity, rarity, representativeness, and exemplarity); 2) natural beauty and aesthetic value; 3) cultural value; 4) geodiversity; 5) potential threats and protection needs (legal protection, vulnerability); and 6) potential for use (recognizability, geographical distribution, accessibility, and potential for generating economic activities).

The assessment method has been used for the evaluation of geosites and geomorphosites of different scale at two levels: the national parks and monuments (landscape scale) and the Lesvos island Geopark (landform scale).

Representative national parks and natural monuments were classified and assessed using the proposed methodology at a large scale. The same methodology was also used to evaluate distinctive geosites (fossiliferous, volcanic, tectonic and coastal) located at the Lesvos Petrified Forest Geopark, which is located on Lesvos island in the NE of the Aegean Sea. Neogene volcanic rocks are covering the two thirds of the island's total surface, forming characteristic landforms and landscapes. Related to the volcanic activity is the formation of the well-known "Petrified Forest of Lesvos" which covers an area of 15.000 ha at the western part of the island and has been declared as a protected natural monument. Many fossil sites are present along the coast, on the beach and in the sea. In this study the geosites of the Lesvos Petrified Forest Geopark inventory, including sites of different size and categories, were selected, classified and assessed.

Considering the high value of the geosites and the rich geodiversity of the area, several visiting parks and the "lava paths" (itineraries linking all sites of interest) have been designed, to promote landscapes of volcanic origin. In order to protect the identified geosites including the petrified forest fossil sites and ensure their proper management, the Natural History Museum of the Lesvos' Petrified Forest, is managing the "Lesvos Petrified Forest Geopark".

Based on the results of the geosite assessment the Lesvos Geopark explores all positive links between earth heritage protection, nature conservation and sustainable local development. The Lesvos Geopark organizes a network of activities aiming the monitoring and safeguarding of the geosites, the valorisation of local identities linked to the presence of the Geopark, the creation of the necessary touristic infrastructure, and the development of new local products and services, encourage local economic growth and creation of new opportunities for employment.

Session 6: Interpreting Our Environment: Biodiversity and Earth Heritage

Working Together in Lochaber, Scotland

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Keywords
Education, Interpretation, partnership, training, rangers

Lochaber Geopark has set up a Memo of Understanding between a number of organisations including Scottish Natural Heritage, British Geological Survey, The National Trust for Scotland, The John Muir Trust and The Highland Council. These organisations already provide an interpretative and educational service to residents and visitors to Lochaber. Their network of Rangers and educators work closely with schools and support or provide an annual programme of awareness raising events covering natural and cultural history.

The Memo of Understanding sets out an agreement to work toward a common purpose. Lochaber Geopark achieves educational and interpretative aims and objectives by working closely with these organisations; running events together, setting up training or providing resources to enhance the existing educators grasp of Lochaber's geological heritage. This allows them to deliver new geological activities and events or introduce geology into existing programmes. In this way geological interpretation reaches a wider audience. By supporting and nurturing partnerships with these organisations Lochaber Geopark are building the capacity of the existing network of rural nature tourism providers.

Projects have included the development of a geodiversity wall as part of a village redevelopment scheme with the John Muir Trust and a demonstration of building 'drystane dykes' using traditional techniques with Lochaber Colleges Path Skills. In Glencoe The National Trust for Scotland have extended their annual programme of events to include guided geology walks, Landrover tours, children's events and evening talks as part of European Geopark week and the Scottish Geology Festival. The Highland Council Ranger team have all received geology training to enhance their understanding and interpretation of the geological features they encounter on guided walks and The West Highland Museum has included Rock Detectives as a monthly activity in their educational programme.

TERRAGAZE: Explaining your Geopark with virtual reality and computer vision

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Keywords
computer vision, virtual reality, interactive kiosks, geotourism, interactivity

TERRAGAZE is a computer vision system developed for the exhibit "From trilobites to man: 500 million years trough Geopark Naturtejo Meseta Meridional" hosted in Lesvos Petrified Forest Geopark. The goal of the exhibit is to show the active tourism spirit of the Geopark and, at the same time, to explain the geologic heritage of the Geopark. How to give a kayak ride with geologic explanations? How to explain trace fossils? The answer is TERRAGAZE, a system constituted by a video-sensor, a computer vision software running on standard PC, and an output (monitors/projectors). This system makes real a virtual reality application characterized by an innovative and engaging concept: the input device is the body of the visitor. The visitor moves in front of the screen, and his actions have effect on the game. For instance, the visitor can interact in real-time with a trilobite just by moving the hands and trying to touch the extinct arthropod. No external peripherals are required (i.e. headset, glasses, VR gloves). Nevertheless, the system is capable to "see" real-life objects: for instance, TERRAGAZE can perceive the movements of a real paddle, and the visitor can use it for virtual-kayaking in the Geopark.

When the visitor sees himself on-screen, he has a more invested interest on what is going on. This fact achieves a balance between leisure and learning. In fact TERRAGAZE helps to construct a coherent narrative of the exhibit by creating interactive, engaging experiences. This is an effective way to promote the Geopark territory: everyone will remember this intense, immersing virtual experience in the Geopark. By using this technique Geoparks can present a larger variety and more connected material in an appealing manner, even within a limited physical space and with a very low budget.

Raising the profile of soil within geo-conservation: A case study the Anglesey Geopark

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Keywords
Soil conservation; interpretation; Wales

The Anglesey Geopark [GEOMON] commissioned a field guide to soils in the area in an attempt to link geology to biodiversity and landscape. Soils are the weathered surface of geological materials, both weathered rock and superficial deposits, which form the substrate for the habitats of value to biodiversity. Soil scientists have long since identified parent material and vegetation community as two of the key factors of soil formation, landscape being another. As such, soils form the interface that underpins much of the visual impact of landscape.

The GEOMON project led to a publication introducing the general public to the origins and formation of soil and to the enormous diversity of soil types, by providing a series of locations where the public can see soils without the need to dig and prepare soil pits. Such sites include quarries, coastal and river banks, and road cuttings. Where geology, soil and overlying vegetation can be displayed together, a unique opportunity exists to demonstrate the integrated nature of landscape features, and also to convince of the need for integrated conservation measures.

This talk will illustrate some of the sites used to demonstrate the position of soils within the landscape, the importance of their conservation and the contribution they can make to the objectives of a geopark.

Session 7: Discoveries in Earth Sciences: Current & Historical Contributions from the Geoparks

The dwarf dinosaurs: The main geological attraction in the Hateg Country Geopark of Romania.

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Keywords
Haţeg Country Geopark ,Romania, Maastrichtian, dwarf dinosaurs.

The Latest Cretaceous continental fauna of the Haţeg Basin in the Transylvania province of Romania with its emblematic dwarf dinosaurs is internationally recognized as one of the richest and most interesting vertebrate assemblage in the world that depicts episodes of the dinosaurs' world before they perished. The first research on this fauna are done by Franz von Nopcsa (1877-1933) whose researches on his family estate a century ago revealed an assemblage of saurischian and ornithischian dinosaurs, turtles and crocodiles. After a long gap the studies on this fauna were resumed in late 1970s and they continue up until the present day. The diggings, washing and screening methods being completed by sedimentologic, stable isotope and paleomagnetic analysis are all together aiming at an accurate reconstruction of the biodiversity and environments in the Latest Cretaceous of Transylvania. Several new species of dinosaurs, mostly small theropods, were added to the Nopcsa's list of taxa and representatives of all the vertebrate classes from fishes to mammals were discovered, mostly in micropaleontologic samples. Dinosaur eggs associated with skeletal remains of prenatals and hatchlings remains one of the hugest flying reptile that ever lived. These were also discovered during the last two decades.

Through the mediums of scientific films and articles in newspapers and magazines "the dwarf dinosaurs of Transylvania" became an attractive topic for the public, a fact that encouraged us to initiate five years ago the creation of the Haţeg Country Dinosaur Geopark. The region itself is surrounded by marvelous alpine landscapes, and holds vestiges of ancient and mid-age epochs, significant for the history and culture of Romania and Eastern Europe. It is expected that the growth of scientific and cultural tourism in the region, sustained by the creation of adequate facilities and services will contribute to the rise of the socio-economic conditions of the region and its inhabitants.

Megagrooves and ice-streams: The importance of scientific discoveries in the North West Highlands Geopark

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Keywords
Ice Age, ice stream, communicating science

Despite over 200 scientific papers on the geology of the North West Highlands Geopark, new discoveries can still be made. A very active mapping and research project is being run by the British Geological Survey together with several UK universities in and around the Geopark.

One of the most exciting new discoveries is that of the 'Megagrooves'. Megagrooves are large-scale (>10 m wide and 1-2 km long) channel-like grooves, cut straight into bedrock underneath large ice-sheets. They were first discovered in 2005 near Elphin in the NW Highlands Geopark; subsequently a much bigger 'field' of megagrooves has been discovered east of Ullapool, just to the south of the Geopark. Sea-bed imagery has shown that they continue offshore. The megagrooves are parallel to the ice-flow direction of the ice-sheet during the last Pleistocene glaciation and attest to high-velocity ice flow: therefore they can be interpreted as the trace of a palaeo ice-stream. Ice streams are parts of an ice-sheet that have ice flow velocities 10 – 100 times faster than surrounding ice: research in Greenland and Antarctica has shown that they drain a large part of an ice-sheet and greatly affect the its mass balance. The British Ice Sheet was therefore much more dynamic than previously thought.

Why is such research important for a Geopark? Firstly, active research maintains the interest of the (international) academic community, facilitating their support and enticing fieldtrips and conferences to be held: these may form an important contribution to 'shoulder-month' tourism. Secondly, active research – if communicated well – strengthens the perception of the local community and visitors alike that the Geopark is special.

Tertiary Volcanic Activity in Bohemian Paradise Geopark

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Keywords
Volcanic activity; erosion rates; Czech Republic

Volcanic activity in Bohemian Paradise Geopark took place in several periods. The Lower Paleozoic basaltic complex is distributed in the area of Železný Brod. The Variscan Orogeny, was associated with emplacement of subduction- and extension- related magmatic suites between 360 and 260 Ma.

The aim of this study was to extend the knowledge of the character of the youngest volcanism in area of the Bohemian Paradise Geopark. Volcanic activity of the Jikín volcanic field was dominated by scattered Strombolian and phreato-Strombolian eruptions arranged predominantly along E-W trending faults. Facies of 13 volcanic bodies were investigated and their eruptive style was reconstructed. Superficial deposits of cinder-cones and tuff-cones are preserved on several edifices. Studied volcanic apparatuses mostly did not produce lavas. The unique exception is the youngest - Prackov cinder cone, most probably producing so called Kozákov lavas (ca. 4 Ma). Dating of individual apparatuses (mostly yielding 17 Ma) supports interpretation of relief evolution in the studied area during the Miocene. Different erosional levels on individual Strombolian cones offer insight into the internal structure of monogenic Strombolian cones affected by weathering over last 17 Ma. The highest erosion rate of Cretaceous marine sediments took place before volcanic activity, during the Oligocene and Lower Miocene, when regional uplift took place. Since that time only slight erosion affected the north east part of the Bohemian Massif.

Cross Bedding and Calderas: Early Discoveries in the Caledonian Rocks of the Scottish Highlands

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Keywords
Caledonian, cross bedding, way up, cauldron subsidence, caldera

Lochaber Geopark has a great wealth of Earth Heritage. This presentation will highlight two of the key discoveries made in the Lochaber area in the early part of the 20th century.

The first of these was made when the area was mapped for the first time by geologists working for the British Geological Survey (then known as the Geological Survey of Great Britain). Work began in the Ben Nevis and Glen Coe district in 1895. A memoir to the area was eventually published in 1916, and the first detailed geological map followed a few years later in 1921.

The discovery of evidence for large scale collapse structures in the Caledonian igneous rocks had resulted in an important paper by Clough, Maufe & Bailey in 1909, entitled The Cauldron-subsidence of Glen Coe, and the Associated Igneous Phenomena. This was the first place in the world where this type of process was identified in ancient rocks.

The second important discovery had an international flavour, and involved a visiting Norwegian geologist and two students from the University of Wisconsin. Their observations made in 1924 helped resolve the stratigraphic sequence in the Dalradian metamorphic rocks of the Loch Leven area. Rather surprisingly, it was several years before their ideas were adopted.

Cross bedding is well displayed in the local quartzites and this was crucial in unravelling the complex folding in the area. Vogt described how these principles could be applied in 1930 in a paper entitled On the Chronological Order of Deposition of the Highland Schists. However, it would seem that an Irishman should really have been given credit for these ideas more than seventy years earlier.

The Magma Geopark Project, Norway

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Keywords
Layered, intrusion, anorthosite, magma, chamber.

About 925 million years ago, magma formed by melting deep below the surface of the Earth intruded the crust to develop a large magma chamber. Magma (with a temperature of 1100-1200°C) entered the bowl-shaped chamber during six main episodes (called "cycles"), and each time the chamber grew bigger. Some of the magma in the chamber crystallized into rock each time before the next cycle, and the new magma mixed with that remaining in the chamber. After crystallization of the last cycle the solidified magma chamber had a maximum thickness of about 7 km and a maximum breadth of about 40 km; it was located about 20 km below the surface of the Earth.

When magma crystallizes slowly the number of minerals that form increases as the magma cools and gradually changes composition. To start with there was only one mineral (a feldspar called plagioclase which forms a rock called anorthosite); the last rock to form (a member of the granite family called charnockite) contains at least nine minerals. Quartz was one of the last minerals to develop. Most of the crystallisation took place upwards from the floor of the magma chamber that was essentially horizontal. When there were several minerals crystallizing it was common for the light mineral (plagioclase) and the dark minerals (including a black metallic mineral called ilmenite and a dark mineral called orthopyroxene) to form layers between 1 cm and 50 cm thick. There is also a large-scale layering reflecting the six cycles. The intrusion extends from near Bjerkreim in the northwest to Sokndal in the southeast, a distance of about 40 km, and covers an area of ~230 km2, making it the largest layered intrusion in Europe.

This layered intrusion is today exposed in the heart of the Rogaland Anorthosite Province that covers an area of ~1100 km2. The remaining ~870 km2 consists of the rare rock type anorthosite that can otherwise be seen by studying the white spots on the Moon with binoculars. 6 municipalities and 2 counties have part of their area inside the geopark. The area is ideal for the study of many igneous processes. More than 250 scientific geological works have been published from the area, including a geological field guidebook with 42 geosites. There are several international groups that are currently carrying out scientific research in the area.

Session 8: Cultural Landscapes: Linking Culture, Geology and Environment

Tower Hill: A Cultural Landscape Set in Stone

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Keywords
Indigenous tourism; community business; cultural landscapes; Australia

Tower Hill formed around 32,000 years ago when hot rising basaltic magma came into contact with the subterranean water table. This violent explosion created the funnel-shaped crater and islands seen today. Geologically Tower Hill is an international site of significance and principal site for Australia's first (proposed) world geopark, Kanawinka. Artefacts found in ash layers show Aborigines lived in the area at the time of the eruption. Tower Hill was a rich food and medicine source for the Koroitgundidj people whose descendants (through Worn Gundidj) retain special links with this country.

Worn Gundidj at Tower Hill aims to be a must see destination for international and domestic travelers attracting around 160,000 visitors per year. Worn Gundidj is a non-profit Aboriginal owned organisation founded in 1992 to facilitate employment and training for Indigenous people. By balancing modern artwork, nature-based cultural tourism, environmental management and bush-food enterprises with traditional Aboriginal knowledge, we have revitalised culture and strengthened our sustainability objectives. All profits derived from our enterprises are re-invested into community development.

After Ireland`s 1840's Great Potato Famine, Tower Hill's volcanic soil prompted many Irish families to farm the district. Tower Hill was declared Victoria's first National Park in 1892 in an attempt to halt decline. However, grazing, cropping, quarrying and dumping took their toll. By the 1950s Tower Hill was bare and little wildlife remained. In 1961 Tower Hill was declared a State Game Reserve and with the invaluable assistance of numerous volunteer groups more than 300,000 trees have been planted.

Revegetation also re-introduced indigenous understorey plants, ferns and grasses providing habitats for koalas, emus, kangaroos, echidnas, possums and countless bird-life. Tower Hill's cultural story begins at Indigenous pre-European settlement (32000 years+) and lives on today through diverse cultural interaction and broad community engagement. Tower Hill is truly representative of living culture.

Geological mapping and geotourism in the Pyhä-Luosto National Park in Finnish Lapland

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Keywords
Geological outdoor map, geological heritage, Pyhä-Luosto National Park, Lapland, Finland.

The Pyhä–Luosto fell range, in Finnish Lapland, contains geological monuments and sites with special scientific importance in Precambrian sedimentology, Pleistocene glacial geology, geomorphology and aesthetic value. Pyhä was turned into a national park in 1938 and was one of the first in Finland. As Lapland has one of the highest unemployment rates in Finland, the growth of geotourism has had a welcome effect on the development of the area. Including Pyhä – Luosto in the European Geoparks Network would promote the consciousness and awareness of the public towards the protection of geological and geomorphological heritage and improve the quality of services offered to tourists. In 2006 the national park was visited by 105 000 persons. It is administrated by Metsähallitus.

In summer of 2007, the Geological Survey of Finland published a new geological outdoor map of the Pyhä-Luosto area and an accompanying guidebook. Rock types and various glacial and postglacial formations and deposits are indicated on the map with different colours and symbols. In addition, the map contains 43 selected geological excursion sites, such as the mighty quartzite mountain ranges and the deep gorges that have been cut through them by meltwater streams from the glacier, surprisingly well-preserved sedimentary structures, such as ripple marks and dendrites, eskers and vast mires. The deep, crystal-clear canyon lakes, surrounded by steep rock cliffs were sacred and awe-inspiring places for the ancient Sámi (Lappish people). They would build sacrificial sites with stones and sacrifice gifts to the invisible spirits to secure good hunting and fishing luck. Fell huts, marked paths, cycling and canoe routes and campfire sites are also indicated on the map in order to help in planning hiking routes. Equipped with this geological outdoor map and guidebook, the visitor will understand the significant role geology has played in Lapland's landscapes.

Regeneration and Preservation of Cisterns, Water-wheels and Mills in the Geopark Cape de Gata-Nijar, Andalusia, Spain

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Keywords
Andalusia, Cultural Heritage, Water, Wind.

Wind and water have marked throughout time the peculiarities of the Cabo de Gata region, both the natural and the anthropic landscapes. The semi-arid character of the region gives an almost unique character, (this being one of the few subdesertic European protected areas). It is an isolated territory of extreme climate, lashed by powerful winds, and with few constantly flowing watercourses. These features, combined with limited areas of fertile soils, has led to its settlers creating a system of devices and buildings related to wind and water: water-wheels, wells and mills to extract the water and cisterns to preserve it.

In 2001 145 features related to the extraction and conservation of the water and the utilization of the wind were collectively registered in the General Catalogue of Historical Patrimony of Andalusia.

The need for consolidation, restoration, conservation and enhancement of the popular architecture of the Cabo de Gata, is the origin of the collaboration between the Departments of Culture and Environment of the Govern of Andalusia, in order to develop the project "Works of Regeneration and Conservation of Cisterns, Water-Wheels and Mills of the Natural Park Cape of Gata-Níjar". Within this project we will regenerate several elements of the cultural heritage of Natural Park Cape of Gata-Níjar.

Landscape and old mining activities in the Sobrarbe territory, Spain

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Keywords
landscape, mining heritage, geoturism, Geopark

Silver coins minted by the ancient Romans with minerals from these mines are testimony to the antiquity of mining in Sobrarbe. The mining of silver, iron and lead reached its peak splendor in the 16th century. This activity proceeded to go downhill until the 20th century. The last mine was completely abandoned in the 1970s.

This extensive extracting has left a deep footprint on the landscape of the high valleys of the Cinca River. Thousands of tons of land and rock were displaced, entire forests were cut down and the stream network was diverted. For generations, many families' destinies were linked to the ups and downs of mining activities.

The time has come – while the last miners can still tell us their story – to turn an exhausted activity into an educational, cultural and entertaining geoturists attraction, which will help us to understand the folklore and the character of these valleys' inhabitants.

In recent years, various public and private initiatives have emerged to recover and manage this mining heritage. The Sobrarbe Geopark supports these projects and works to unite them together so they can be effectively managed. In order to achieve this goal, there are currently three infrastructures distributed throughout the area: the Geopark Interpretation Centre, the Bielsa Museum and the Geo-mining circuit. The Interpretation Centre (Aínsa Castle) presents the mining heritage, especially the geology related to mineral deposit formation. The community's way of life is highlighted at the Bielsa Museum. Lastly, the Geo-mining circuit summarizes, on five panels, the role of mining technology over the landscape. A brochure has been published so that visitors can discover this heritage at their own pace. The information is available in three languages: Spanish, English and French.

Session 9: New and Aspiring Geoparks II

Urban Geotourism and Geoparks: Combining sustainable urban development with geoheritage

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Keywords
Geotourism, Urbanisation, Geoconservation, Sustainability, Geoheritagge

Geotourism is a growing recreational and educational pursuit and, as specific venues for such activities, Geoparks are expanding, especially in Europe, in China and now more broadly across the globe. Geoparks are generally found in natural settings including national parks, islands, mountain ranges, gorges, valleys and wilderness areas. It is this remoteness and separation from cities, regional centres and even agricultural and rural lands that often provides the attraction for the tourist. However, this may also provide the view that geology is remote from the normal urban habitat and is thus not the major influence on civilisation that geoscientists recognize it clearly is.

The global population needs a significantly greater understanding, awareness and promotion of geoscience. This ranges from its importance in providing energy and raw materials, to the new and critical environmental issues of greenhouse gas pollution and climate change, land degradation and the increasing impact of natural hazards and disasters. Whilst most people would appreciate our need for natural resources – energy, water, soils, metals etc, advocacy of their sustainable use is required.

Increased urbanization is a fact of life. More than 80% of people in the USA, Australia and much of Europe live in cities, with similar trends developing in China and India. The development of urban geoparks would provide opportunities to promote greater knowledge of the geosciences, whilst minimizing our global footprint in terms of distance traveled for host communities.

Currently there are few urban geoparks and geotourism sites eg Fangshan near Beijing in China, Ruhrgebeit near Bochum in Germany and Canadian examples popularised in the Geoscape Maps of Vancouver and other cities. This paper presents a case for geotourism and urban geoparks in Adelaide, Australia and in Hong Kong. Both cities have unique geoheritage sites which are easily accessible to > 1 million urban residents and both promote sustainable use of geoscience resources as well as geoconservation.

Involving local communities: Present activities and future plans in the aspiring Bakony–Balaton Geopark, Hungary

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Keywords
Balaton Uplands National Park, Bakony Hills, basaltic volcanism, geological demonstration sites, local entrepreneurs

There is a geopark initiative in Western Hungary, called Bakony–Balaton Geopark, near Balaton, the largest shallow-water lake of Central Europe. The originator and the administrative body of this aspiring geopark is the Balaton National Park Directorate. Inside the 1.600 km^2 proposed geopark there are large areas protected by national law: parts of the national park, protected landscape areas and nature conservation areas. Many of them were designated for protection exclusively due to their geological significance.

In the southern areas volcanic hills with their characteristic shapes and other volcanological features are the dominant elements of the landscape, formed by the Late Miocene–Pliocene basaltic volcanism. In the north, in Bakony Hills there are outstanding examples of geodiversity, such as a paleokarst area, a unique paleontological site of Late Cretaceous vertebrates, some of the most important former flint quarries of ancient Europe and various active karst features.

The planning area is also extremely rich in cultural heritage: there are several ruins of medieval castles, relics of traditional village and church architecture, vineyards with old press houses, wind- and watermills, etc.

Presenting the beautiful geological heritage to the public is one of the most important tasks of the National Park Directorate, the maintainer of four demonstration sites related to earth sciences. Some geological nature trails were created and also a geological field guide was published. Based on contracts, three of the mentioned geo-related sites are run by local entrepreneurs. A strictly protected cave was opened for spelunkers in Keszthely Hills: this geotouristic programme has its own website and the surprisingly popular cave tours are run by local cavers, under the control of the Directorate.

The visitor centre of the geopark will be at the present Hegyestű Geological Demonstration Site, and other two 'geo-infopoints' will be developed in the highly visited Tihany Peninsula and at the Lake Cave of Tapolca. We intend to involve different local communities to geopark activities at these sites.

Geopark Arouca: Geodiversity and biodiversity during the Palaeozoic

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Keywords
Trilobites; geosites; regional co-operation

In September 2006 the "Geopark Naturtejo da Meseta Meridional" was formally accepted in the European and Global Geopark Networks as the first member in Portugal. The project for a new Portuguese Geopark is under development in Arouca (Aveiro, Central Portugal), which is expected to be submitted to these networks during the first quarter of 2008. The area of around 327 km^2 is dominated by ante-Ordovician rocks of the Douro Group and by Palaeozoic rocks, mainly schists, quartzites, slates, greywackes, and granites that originates a mountainous relief. Two of the key features of the regional geodiversity are the occurrence of magnificent trilobite fossils with international scientific relevance due to their abundance and size (up to 70 cm in length) and a very rare magmatic phenomenon, locally known as "given birth stones", that corresponds to biotitic nodules with a quartz-feldspar-moscovite nucleus, that "jump" from the granitic batholith by thermoclastic action. The geological heritage inventory is now concluded. In the Arouca region, 30 geosites were identified, characterized and sorted in relation to their relevance. Proposals for the conservation of the most sensitive geosites are being presented to the municipality in order to assure the best conditions for a future inclusion in geotourist products.

This natural heritage is complemented with a rich cultural heritage expressed by the traditional architecture, roman mining works, agriculture, a diversified gastronomy based on local products, a local cattle breed, etc. Supported on this extraordinary natural and cultural heritage, the Arouca municipality is leading the creation of a new association in order to manage the future Geopark. This association will join public and private institutions that operate in the region. The preparation of the application for this new Geopark is sponsored by the Portuguese Ministry of the Environment, Territory and Regional Development and supported by a team of geoscience specialists from different Portuguese and Spanish universities.

Session 10:
New and Aspiring Geoparks III

The Sardinian "Parco Geominerario": An array of Palaeoenvironments and Geological features across 530 million years

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Keywords
Geological Heritage, Sardinia, Palaeoenvironments, Education.

Sardinia is a portion of the Variscan orogen which is located in the middle of the Western Mediterranean Sea. Since the18th Century the Island has attracted geologists and palaeontologists. Their research was concerned with clarifying the relationships between geology and mining.

The main geological features consist of well-preserved sequences of Cambrian to Early Carboniferous with a Mid-Ordovician break. These rocks were affected by the Hercynian orogeny resulting in spectacular examples of granites, metamorphic gradient, tectonic nappe, folds, faults, and volcanic activity.

Post-orogenetic continental basins include both Upper Carboniferous and Permian deposits bearing classical European biotas. Triassic, Jurassic and Cretaceous deposits are represented in the whole island; the widespread unconformity between the Mesozoic dolostones and limestones and Palaeozoic rocks is one of the more impressive geological and geomorphologic features.

Tertiary fossiliferous formations are associated with volcanic rocks related to the counter-clockwise rotation of the Sardinian-Corsican microplate during Oligocene-Early Miocene times.

Most of the geological features cited above are represented within the 8 areas included in the Geopark. They testify both to the evolution of ancient life and also to temporal changes in climate, palaeonvironment and palaeogeography. The geomorphology, tectonic and volcanic events are well documented and easily readable on the field.

The geological heritage displayed in the Geopark can play an important role as a tool for public education and sensibilisation to environment preservation. These cultural tourism activities, which can limit the decrease of in population within the mining areas, may represent a solid economic resource if integrated with an appropriate transfer of the knowledge and linked to local economic activities.

From Geotrail to Geopark: The lesson from Austria

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Keywords
Austria, Geotrail, Geopark, Palaezoic.

The Carnic Alps in southern Austria are a key area for the Palaeozoic history of the entire Alps. Since the beginning of the 19th century earth scientists have visited the area to collect, describe and date the abundant fossils contained in rocks of Ordovician to Triassic ages and to disseminate their results within the scientific community. In the late 1980's, however, it became clear that the public at large was not only interested in the daily work of geologists but that there was a need to include the public in scientific activities and their outcome. As a result, in 1987 the Geotrail Program was initiated consisting of five geologically interesting trails over an area of more than 100 km^2 showing fossil and spectacular rock formations, canyons, mountain lakes, caves and panoramic views. At these sites more than 70 plaques were mounted illustrating and describing in plain language the local geology and to raise awareness in the Earth's heritage in general. This activity was complemented by the publication of a booklet of 169 pages, flyers, guided tours, training courses and a lecture program. After almost 20 years since its establishment the Geotrail Program proved to be very successful although the economic and touristic impact is difficult to assess.

In recent years the Geotrail Program has been enlarged through the addition of new sites of interest, replacement of the old plaques and the publication of a new book entitled "The real hero is nature – Geopark Carnic Region". At present the idea of establishing a Geopark is being widely discussed and negotiated with politicians at community and provincial levels. In addition, last year, the Austrian TV showed an impressive and highly appreciated film about the geological phenomena of that region which hopefully will help to raise funds to establish a third internationally recognized Geopark for the Palaeozoic complementing those Geoparks which have already existed for the Cenozoic and Mesozoic eras in Austria.

Idrija Geopark Initiative in Slovenia

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Keywords
geological heritage, mercury mine, mining heritage, interpretation

Idrija mercury mine is known worldwide for its geological origin, outstanding richness, its size and unique mineral assemblage and the complex geological structure of the surrounding area. Mercury mineralization with cinnabar and native mercury was first exploited in 1493. After 500 years of mining the decision to close the mine was made in 1987. The long history of mining has had a significant impact on economical development, social life, science, technology and culture. Because of the variety of its natural and cultural heritage the mine has been proposed to be enlisted within UNESCO's List of the World's Natural and Cultural Heritage. In addition to the mining heritage the rich geological heritage, striking natural features and interaction between geology, landscape, culture and history deserve to be understood and appreciated by the public. The idea for developing a geopark was initiated by the local community. The unique landscape strikingly reflects the underlying geology in terms of rock diversity, unique fossil sites, ore deposits, karst phenomena and complex tectonic history. The main challenge is how to interpret this heritage and get people to identify with it. The local communities will have to decide on the most effective management scheme based on relevant analysis, effective interpretation and marketing strategy and development of a tourist infrastructure to provide the access, facilities and services for different target groups.

Session 11: Sustainable Tourism: Guardianship & Development in the Geoparks

"Meet your Geopark": Bringing young people into contact with the idea of Geoparks

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Keywords
Youth development; competition; education

In advance of the 3rd International UNESCO Geoparks Conference in June 2008 in Osnabrück, a competition open to all Geoparks on the theme of "Meet your Geopark" is going to take place. Both the Conference and the competition are part of the International Year of Planet Earth (IYPE).

The aim of the competition is to make young people familiar with the idea of Geoparks and to encourage them to get involved with the work of their local Geopark managers. So on one hand, they get in contact with their own region, while on the other hand, the geoparks get an impression of the young peoples' view on the region. Furthermore, the cooperation with schools will enhance the pupils' familiarity with the Geoparks.

The competition calls for teams of three or four young people between 15 and 18 years old who would like to get involved with their Geopark. Material to recruit participants will be spread among schools and other institutions of the Geoparks. The teams will create their own project, dealing with the Geopark in which they live. The experiences, gathered on field trips through their own Geoparks will be processed in a creative way, to make them visible for others. Methods can be chosen freely - ranging from artistic ideas to scientific or technical presentations.

Every Geopark management body will choose the best presentation and forward it to the organising committee of the International UNESCO Geoparks Conference. These teams then will take part in a special "Earth Camp" that will take place in advance of the conference. The projects will be presented during the conference.

Breaking Boundaries: Transnational expansion of Marble Arch Caves European Geopark

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Keywords
Marble Arch Caves, expansion, transnational, Fermanagh, Cavan

Marble Arch Caves European Geopark lies in south west County Fermanagh in Northern Ireland and is one the smallest Geoparks within the European Geopark Network. All that is about to change however, as plans are afoot to expand the Geopark not only further in to County Fermanagh, but also across the international border with the Republic of Ireland, into west County Cavan.

Cavan and Fermanagh have shared a long and interesting history, not least because of their shared geological heritage. The two counties in fact 'share' one of the landmark features of the current Geopark, Cuilcagh Mountain, which is cut in two by the international border. By expanding the Geopark not only will complete the geological story of the area be preserved, but the economic and social gain that a Geopark brings will also benefit a much greater region.

Fermanagh District Council is currently working closely with Cavan County Council and other partners to facilitate this expansion, which involves a lot more than just preparing an application dossier. Site selection and development, Geopark awareness and promotion, education and scientific research; all of these activities have been ongoing at the current Geopark for many years and are now also being implemented across the broader proposed Geopark area with great success.

Transnational cooperation is not without its challenges but by working closely with all partners and by having transparent and cohesive relationships, the successful expansion of Marble Arch Caves European Geopark should provide a role model to other expanding Geoparks in the future.

Getourism in Bohemian Paradise Geopark

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Keywords
Bohemian Paradise Geopark, Geotourism, Development

Geotourism seems to be a developing segment of the tourism market that can positively influence professionals, visitors and local people of the region. Bohemian Paradise Geopark is a good focus for regional cooperation among local, national and international organisations and institutions, various subjects and municipalities. The area is among two regions with the oldest history of tourism in the Czech Republic. The beginning of organized tourism here is connected with the foundation of the first local departments of the Czech Tourists' Club in the 1890s which finally created a united district of the Czech Tourist Club in the Bohemian Paradise. This organisation started to publish postcards, posters, maps, guide books etc. Until the beginning of the Second World War the Czech Tourist Club founded and marked hundreds of trails through the whole area. The area has potentially some of the best cycling, walking and horseriding opportunities in the Czech Republic. One of the first steps to support development of geotourism is building new educational trails, preparing a guided tour system and training information centre staff and staff in other public institutions. Some parts of our Geopark are undiscovered and there is a need to improve the infrastructure for these activities, alongside specialist promotion, if their full potential is to be realised. A further goal of tourism promotion, recognised in all regional and local tourism strategies affecting the Bohemian Paradise Geopark, is the extension of the tourist season. The Geopark has been represented at tourism fairs abroad (Berlin, London, Madrid, Munich,Utrecht, Poznan,Warsaw) and at tourism fairs in Czech Republic too (Brno,Hradec Králové,Jablonec nad Nisou, Lomnice nad Popelkou, Ostrava ,Pardubice, Prague).

Water: From Ground to Bottle in the Fforest Fawr Geopark

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Keywords
geology, landscape, groundwater, water cycle, education.

The availability and quality of water for drinking, domestic, agricultural and industrial use is one of the most important issues facing all nations in the 21st Century. Due to its low population density and the absence of intensive farming practices requiring heavy use of pesticides and fertilizers, Fforest Fawr Geopark is an important source of high quality surface and groundwater. This paper demonstrates how geology, landscape and the economic exploitation of groundwater can be linked within an educational programme.

In partnership with Brecon Carreg Spadel UK (a small business within the Geopark) and Cardiff University, the Fforest Fawr Geopark is developing educational programmes aimed primarily at schoolchildren between the ages of 9 – 16 years. The programmes use the geology and well data from an area where groundwater is extracted from a limestone aquifer to explain the relationship between the geology, landscape and groundwater supply, as well as the necessity to protect the catchment area and ensure a supply of high quality drinking water. Through these programmes schoolchildren are introduced to the water cycle, the characteristics and origin of karst features in limestones, the nature of the water table and the transmission of water through fracture zones from areas of recharge to springs, rivers and wells. They are also introduced to extraction methods, the reasons for the variability in water quality between fracture zones, and the processing and bottling of mineral water. The potential effect of climate change on water supply and the need to manage water resources are also emphasised. The programme involves an excursion to the catchment area and a visit to the bottling plant.

Session 12: Traditional Agriculture in Geoparks: Tactics for Survival

North-West Highland Geopark's agriculture: Diversification on crofts and small farms to ensure farm survival

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Keywords
Diversification; crofting; agriculture, Scotland

Small and medium sized farms in Geoparks and all over Europe guarantee their survival by a broad range of strategies and different income sources. Specific "strategies" to ensure the sustainability of the farm as a whole can vary from country to country. This paper reports results of a socio-economic study carried out among Scottish farmers and crofters in and beyond the Geopark area "Northwest Highlands". It focuses specifically on the diversification strategies of farms and crofts related to "Multifunctionality of Agriculture". Forty farm households and 20 rural entrepreneurs (of which the majority run crofts) in Caithness and Sutherland have been interviewed. The paper analyses if farms/crofts in the area have chosen diversification or specialisation strategies, analyses the labour and capital use of farm households in the area and assesses information based on the survey about the future opportunities and threats of farmers and crofters in Caithness and Sutherland.

The paper concludes that although off-farm employment is one of the most accessible strategies to ensure the sustainability of the farm, on-farm activities remains to play a key role for the sustainability of farms. The paper concludes with an assessment of the future of crofts and farms in Caithness and Sutherland.

Crofting into the 21st Century: Challenges and Tactics

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Keywords
Crofting; niche markets; CAP reform

This paper outlines the need for a niche marketing strategy and supports the case for a "Crofting" Brand. It is envisaged that a primary development project designed to aid the marketing process, e.g. the development of Croft branding, will be an output of this research and presented to development organisations for funding. The concept addresses the objective of European rural development funding initiatives such as Leader by "aiming to encourage experimenting with new ways of reinforcing the economic environment in order to contribute to job creation through enhancing the natural and cultural heritage".

About 8,000 crofters are agriculturally active but land use in the crofting areas is constrained by climate, soils and topography - virtually all of the land in the crofting areas is classified as 'Severely Disadvantaged' in terms of the Less Favoured Area Directive.

Crofters have always been innovative and resourceful, deriving income both from the land and from other enterprises or jobs. However, croft livelihoods are being directly affected by the reform to the Common Agricultural Policy. The enlargement of the EU and the encouragement of a global food market means that Scottish food producers' incomes will be more dependant on quality produce and innovative marketing. There is naturally a fear of this change and how it will affect their social and economic welfare and a lack of knowledge about what alternative means of income generation exist.

There is potential for crofters to benefit from income generation based on their natural heritage such as niche marketing, land-management, eco-tourism and heritage tourism. The traditional ways in which crofters have managed their livestock, managed the land, produced food, clothes and a myriad of other items is very attractive to a discerning market today. That which was scorned as "anachronistic" is now prized.

This paper highlights the potential opportunities for marketing croft produce under a "Crofting" brand, describes the need to give practical help in achieving that potential and describes recent action in the crofting areas aimed at meeting these challenges.

'The cows are on the ice': Taking stock in the North West Highlands

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Keywords
Stock reduction; CAP reform; cattle; biodiversity; crofting

For over 200 years cattle numbers in the crofting areas of the Highlands of Scotland have been falling. During the late 18th century and throughout the 19th century cattle were largely replaced by sheep on hill ground. In the early 21st century local crofters in North West Highlands created an organisation aimed at halting and reducing the historic decline in cattle numbers. This group is called North West Cattle Producers Association (NWCPA).

NWCPA has led the way in past years in tackling this difficult issue at a local level with 'home-grown' solutions. The group has succeeded in increasing cattle numbers over the past 5 years. However CAP reform is putting further pressure on cattle numbers and pre-reform projections of changing stocking levels are being fulfilled.

This paper considers the impacts of historic and current decline in cattle numbers in terms of environment, community, culture and economy. From this analyses it seems clear that strategic support for small cattle herds in the most remote regions is a good catalyst for maintaining other important ancillary activity, important cultural landscapes, key skills and biodiversity. The paper describes some of the 'public goods' delivered by current crofting agricultural activity in this context.

Marketing Geopark Agriculture

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Keywords
Geopark, agriculture, marketing

As the main land use in most rural areas, agriculture has a vital role in interesting visitors and others, such as local residents and businesses, in the geological aspects of Geopark areas. In turn, this can generate economic benefits through accommodation, catering and entrance charges, product price premiums, etc. Both food and tourism markets are now highly competitive and worldwide (or at least national), and any particular region such as a Geopark has to establish its own Unique Selling Point (USP) in order to prosper in this difficult marketing environment. In the case of Geopark agriculture, the USP is likely to focus on the ways in which the local terrain influences the structure and processes of farming, and those in which soil nutrients deriving from geological features add special attractions to the consumption of food and drink products supplied by the area. To most potential consumers of services and products, these assets (comparative advantages) have to be actively explained and promoted using high-quality marketing material, involving such features as branding or labelling, textual and pictorial explanatory leaflets, and (for visitors) opportunities to observe ongoing farming procedures and to purchase products for immediate or return-home sale.

These views will be elaborated mainly within the Scottish context, but with material from elsewhere, e.g. the relevance of EU policy instruments and comparisons with some non-Scottish examples.

46

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