

Danube Geo Tour

Valorisation of geo-heritage for sustainable and innovative tourism development of Danube Geoparks

Guideline for development of innovative GeoProducts

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IPA PP1 Public Enterprise National Park Djerdap
ASP1 Humanpolis Ltd / Rokua Geopark
ASP2 Naturtejo – Tourism Company

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List of Abbreviations

| | |
|-----|--------------------------------|
| DTP | Danube Transnational Programme |
| ASP | Associated Strategic Partner |
| JS | Joint Secretariat |
| LP | Lead Partner |
| PP | Project Partner |
| WP | Work Package |
| EGN | European Geoparks Network |
| GGN | Global Geoparks Network |
| UGG | UNESCO Global Geopark |
| TIC | Tourism Information Centre |



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1. Introduction

1.1. Background information

The main project objective of Danube GeoTour is to “improve management capacities and strategies and to develop practical solutions for the activation of geodiversity/geoheritage and to seize positive market trends for sustainable tourism development in 8 Geoparks of the Danube region”¹. In order to achieve this, one of the challenges is to “seize the potential of Geopark values and brand for socio-economic development while inspiring local residents and small businesses to develop new, sustainable and innovative geoproducts along the defined Danube GeoTour”²

Understanding and communicating geoproducts is a key element in the project. The objective of WP4 is “to increase the capacities of participating Geoparks in creating unique sustainable tourism products and services based on a Geopark’s specific heritage, the involvement of local SMEs, new gamification tools and visitor engagement with a focus that is in line with the strategy on management tourism pressures and the carrying capacity of each individual territory.”³

The guidelines for innovative geoproduct development are developed in WP4 in direct connexion with the other WPs. The guidelines take into consideration all the information and conclusions developed in WP3 about the pressure on the environment and heritage as well as the legislative context for each partner geopark. It uses the work from WP5, especially in defining “innovative” as mainly a question of interpretation and also in describing the methods of emphasizing the products connexion to Earth. The promotion component of a geoproduct will be developed in correlation with WP6 recommendations. In its turn, these guidelines will be used in implementing the project further by almost all the WPs.

1.2. Methodology

This material was developed using data provided by the partners in the project and by other geoparks in the European Geoparks Network. Its purpose is to define “geoproduct” and to show how it can be created and developed using a series of best practice examples.

The best practice examples and most of the data was collected using three questionnaires and an unstructured interview (Annexes 2, 3 and 4). These questionnaires were answered by the 8 geoparks present in the project. The unstructured interviews were conducted during the 2nd Partners Meeting in Austria, 20-23 September 2017 with the representatives from the 8 geoparks.

Other data derives from experiences and lessons learned from ASP and other members of EGN and GGN, the skills and expertise of the geopark managers present in the project as well as all the partners direct contact with local entrepreneurs in tourism, food art and crafts.

¹ Danube GeoTour Application Form

² Danube GeoTour Application Form

³ Danube GeoTour Application Form



1.3. Summary

These guidelines have the purpose of defining the geoproduct concept, explaining its philosophy, showing how a geoproduct can be constructed and exemplifying with some best practice geoproducts from the project partners and from other EGN member Geoparks.

The concept of geoproduct is a key element in the geopark's system, often associated with the Geopark's mission of socioeconomic development. The literature shows many examples and approaches of geoproducts, sometimes defined only as geological objectives. The need for setting some guidelines for defining a geoproduct is extended from this project to the GGN itself.

To better understand the definition, it is required to set the philosophical framework. The place of the Geoproduct is at the intersection between the identity and the management axis, where local identity, local geodiversity, heritage management and marketing development meet.

The examples chosen to illustrate geoproducts in several stages of development, where suggested by the project partners. They range from interpretation centres and trails to food products and tourism activities.

2. Geoproduct definition and philosophy

Geoproduct is a new term appeared along with the geopark philosophy. It is usually used in the context of a geopark's socioeconomic involvement along with geotourism and geodiversity. Its understanding varies from a broad perspective to one of the most concrete result of the geopark concept implementation.

In the most extensive definition, the geoproduct is considered a potential geotourism focus point⁴, usually a geological attraction. The more focused definitions mention a geopark connexion and include local, manmade products as well as the dialogue between tourists and local heritage. For example, Farsani et al. (2012) define geoproduct as:

Local products related to geopark activities and symbols of geological and geomorphological heritage of the geopark. Geoproducts which are made based on geological elements of geoparks not only introduce the local products and the local handcrafts as cultural components to tourists, but also increase the public knowledge of tourists about geology.⁵

If we discuss the main attributes of a product⁶, then we have to consider three aspects which the geoproduct must comprise in order to be a product:

- It has to respond to a need,
- It has to be created, constructed through a production process,

⁴ **Complova, M.**, 2010, *The identification of geoproducts in the village of Jakubany as a basis for geotourism development*, Acta Geoturistica, volume 1, number 1, 51 – 56

⁵ **Farsani, T., Coelho, C., Costa, C., Carvalho, C.**, 2012, *Geoparks and Geotourism. New approaches to sustainability for the 21st century*, BrownWalker Press, Boca Raton

⁶ <https://www.merriam-webster.com/dictionary/product>



- It has to be marketable and sold.

These characteristics bring the term geoproduct closely to a practical and economical approach, it defines it more clearly and focuses on its necessity as a tool for socioeconomic development through geoparks. This perspective underlines the role of geoparks in achieving social, economic and cultural sustainability and in coping with pressure from the sociocultural impact of tourism.

On the other hand, a geoproduct is not simply another product sold in a geopark. A geoproduct comes with a deep connexion to Earth on a local level and with a strong sense of identity. Each geoproduct is unique in its construction with a story about people and the place they inhabit.

As a result, we find that the philosophy of a geoproduct takes into account two vectors: Identity and management. If we see it as a graphic model, then the geoproduct finds itself at the intersection of these two axes (Fig. 1).

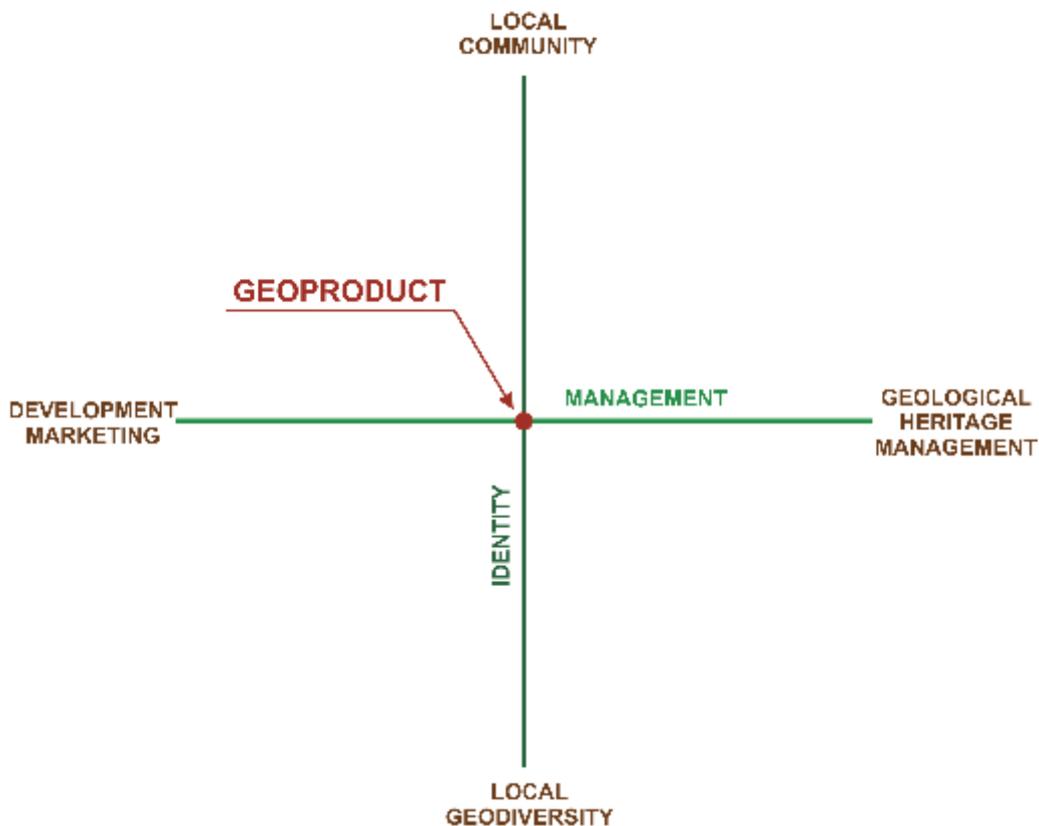


Figure 2. The philosophy of the geoproduct



2.1. Identity axis

A geopark territory is a complex structure made of ecological, socio-economic and cultural realities, shaped by its geodiversity, biodiversity and historic evolution. The sum of them is generating the local identity made of tangible and intangible heritage. The tangible heritage is mainly related to local geodiversity like raw materials, relief, mineral resources, soils. Intangible Cultural Heritage, as defined by UNESCO, 2003⁷ means:

...the practices, representations, expressions, knowledge, skills – as well as the instruments, objects, artefacts and cultural spaces associated therewith – that communities, groups and, in some cases, individuals recognize as part of their cultural heritage. This intangible cultural heritage, transmitted from generation to generation, is constantly recreated by communities and groups in response to their environment, their interaction with nature and their history, and provides them with a sense of identity and continuity, thus promoting respect for cultural diversity and human creativity.

One of the key requirement² for a UNESCO Global Geoparks is to have sites and landscapes of international geological significance managed with a holistic concept of protection, education and sustainable development. A UNESCO Global Geopark 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, such as using our Earth's resources sustainably, mitigating the effects of climate change and reducing the impact of natural disasters. By raising awareness of the importance of the area's geological heritage in history and society today, UNESCO Global Geoparks give local people a sense of pride in their region and strengthen their identification with the area. The creation of innovative local enterprises, new jobs and high quality training courses is stimulated as new sources of revenue are generated through geotourism, while the geological resources of the area are protected.

The Identity axis expresses local cultural and historical identity generated during centuries or millennia by the continuous interaction between local community and natural environment. On the other hand, this axis is revealing one of the main goal of a geopark to cooperate with communities and to identify innovative approaches in order to re-appropriate tangible and intangible heritage values and to revive and strengthen the local cultural identity, in respect to sustainable development principles.

The identity axis is the axis of product development. Is the way a producer is using directly or indirectly local geodiversity components, local knowledge and market needs in the geopark context. This process is part of the cooperation between geopark team and local entities which could be associations, companies, private persons, artists, freelancers, museums, schools, etc.



⁷ UNESCO, 2003. *Intangible Cultural Heritage*

2.2. Management Axis

The management axis is the way to transform a geoproduct in a market good, a product to be sold directly or indirectly and to generate benefits. The benefits are both direct incomes and indirect and induced ones that contribute to geopark promotion, strengthen of local identity and socio-economic development.

Each Global Geopark is using the UNESCO Global Geoparks logo which is one of the most powerful brand in the world in order to develop a local brand of quality for its territory. The management axis is reflecting the way a geoproduct is using the geopark brand to increase its value and also the role each new geoproduct is playing in strengthening the geopark brand. The management axis is expressing the cooperation between the geopark team and the producer of a new geoproduct. In some cases the producer is the geopark team. The management axis is reflecting the main philosophy of Global Geoparks: *Celebrating Earth Heritage, Sustaining local Communities*. Each geoproduct is embedding a part of local geodiversity or geoheritage and in the same time is contributing to local socio-economic development.

As we can see in figure 1 a geoproduct is at the intersection of the two axis. The identity axis is expressing the innovative way in sustainable use of local resources and the management axis reflecting the capacity of a geopark team to support geoproducts development and sale in the benefit of producer and local communities.

3. Creating a geoproduct

In the creation and development of geoproducts, geopark managers and local entrepreneurs must start from the philosophy described in the previous chapter. Then they must follow the most important three requirements of a geoproduct (Fig. 2):

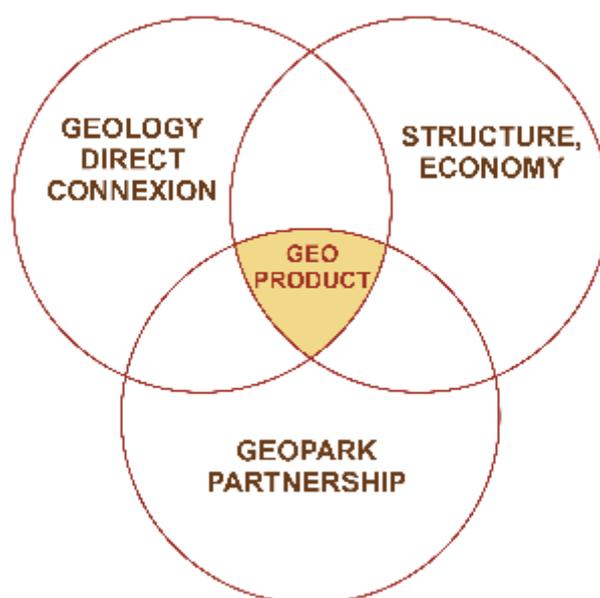


Figure 2. The requirements of the geoproduct



In addition to the main three requirements, the newly developed geoproducts have to respect sustainable standards and communicate these values to their users, visitors and thus help raise awareness on the importance of protecting and valorising the area's geodiversity, natural and cultural heritage in a sustainable way.

Geoproducts creation and development will also consider and respect specific needs of people with disabilities or elderly people and thus increase potential for these groups to have access to geoheritage. The design of these products and their management have to reflect equal chances and inclusion of all categories.

In order to develop or assess a geoproduct we developed a Logical matrix. This logical matrix has a key role in identifying basic elements of the relationship between local communities, geological heritage, local geodiversity and geoproduct development and marketing. Between every two pairs of the mentioned element could be socio-economic and management elements. The logical matrix is presented in Table 1.



Table 1. Logical matrix in development and assessment of a geoproduct

| | | | | | |
|--|--|---|--|---|---|
| LOCAL COMMUNITY | Contribute to social entrepreneurship approach of the geopark | Generates incomes for local community | Tells a story about local community | Integrate elements of intangible cultural heritage | GEOPRODUCT DEVELOPMENT AND MARKETING |
| Contributes to strengthen local identity | | | | Common advantages based on a partnership agreement | New local products strongly related to geopark territory |
| Raise public awareness about local values | | | Added value generated by geological heritage | | Promotes local geodiversity and geoheritage |
| Promote sustainable use of local resources | | Proves the market value of geodiversity | | | Tells a story about Earth history / Celebrate Earth Heritage |
| Identify links between geodiversity, natural and cultural heritage | Framework for geoproducts development | | | | Integrate elements of local geodiversity in new product concept |
| GEOLOGICAL HERITAGE MANAGEMENT | Contribute to Geodiversity Action Plan Development | Identify potential values of geoheritage | Define local geoheritage | Assessment of local geodiversity | LOCAL GEODIVERSITY |



3.1. Geology direct connexion

Geology direct connexion requirement assures that the product is not only a geographical designation – “produced in the geopark” – but it has a deep meaning and an interpretation. The geoproduct must be a sentence in the dialogue between Man and Earth. Sometimes this connexion is only a matter of interpretation. Many products developed today in geoparks can be transformed into geoproducts with ease, if the proper interpretation of their connexion with geology is added.

A good example for this requirement is the GeoFood label⁸. This designation, managed by Magma UGG, is more than just another ecolabel.

GEOfood products must have strong connection with the local Geological Heritage, specific brief information concerning this connection must be provided in the food products and in the GEOfood restaurant menus through written information (ex: potatoes or vegetables that grown in fertile sandstones which were formed by glacier movement during the last Ice Age; olive oil produced from olives grown in Jurassic marls that were deposited in the ancient Sea of Tethys, salt from the ancient Sea, bread from grain growing in the Geopark soil due to special geological phenomena, etc.).

3.2. Structure and economic viability

Structure and economic viability means that the geoproduct has to live up to its “product” part of the term. It has to be constructed (“produced”) as a marketable product meant to be sold. Of course that in some cases the geoproducts are not sold per say, instead they belong to the geopark administration’s educational offer, or they are provided along with other services. In order to be a geoproduct, the object or service doesn’t have to be actually sold, but to have the construction and economic viability which allow it the possibility to be sold. For example, an educational program from the educational offer of a geopark can be considered as fulfilling this requirement by asking the question: would this program be viable if it were to be sold by someone to tourists?

The viability is the health assurance of the geoproduct – it can only exist if it is bought. This means it has to be adapted to market demands, it has to continuously address the needs of the buyers and it has to have the adaptability to focus on new trends and requirements.

3.3. Geopark partnership

The geological connexion and the economic viability would describe only a good business idea without the active role of the geopark. This is the reason why the third important requirement for geoproducts is to have the geopark partnership. Of course, this applies when the geopark is not itself the provider of the geoproduct.

⁸ <https://www.geofood.no/>



The geopark's role as a partner of the geoproduct provider is to assure the quality of the geoproduct and the conditions in which the selling process takes place. This will eliminate opportunistic initiatives of low quality products made to look like geoproducts. It will also make sure that the production process is made with care for the heritage and environment and that it respects the culture and needs of all people, especially vulnerable groups.

4. Best practice examples

Most of the partner geoparks in this project already have an expertise in developing products in collaboration with local partners. Here is a selection of the best practice examples of geoproducts developed in the Danube Geoparks or other EGN/GGN geoparks.

4.1. Rupko's Geological School

This geoproduct is an extended educational program, produced and sold by Papuk Geopark. It can also be a part of the packages sold by tourism agencies.

The program is designed for school children (lower grades, elementary schools) where children have the opportunity to learn the basic things related to the rocks, the mountains, minerals and fossils. Throughout the story, the kids follow the mascot of the Papuk Geopark - Rupko, our little curious explorer. For this purpose, educational boards adapted for children are set up throw-out the Papuk Geopark. Simple worksheets and workshops (puzzle from continents, fossil production) are prepared for children. In the end, everyone gets a small diploma and together with Rupko become young geologist.



Figure 3. Rupko's Geological School

4.2. The Rezi Cake

The Rezi cake was created as a joint project between the Pri Škafarju Inn, Idrija Lace Festival and Marija Nardin, a graduate of Tante Marie Culinary Academy, which is the first school in the UK to offer a Cordon Bleu Diploma. Pri Škafarju inn is one of the Idrija Geopark partners. Together they established a good collaboration and also some good events and activities have been organised. Provider is actively involved in several geopark projects.

The cake is named after the daughter of the legendary wooden pail maker, who was the first person to find mercury in Idrija. The cake's lace pattern was designed by Maja Svetlik from Idrija Lace School. She was inspired by a drop of mercury falling into a pail and then rippling to form a mining town. Legend says that a barrel maker was soaking his bucket in the stream when he saw something shiny, and immediately went to show it at the market. It was mercury that had leaked to the surface – the only liquid metal once believed by alchemists to be the source of all other metals. Over a couple of centuries Idrija miners dug out over 700 kilometers of tunnels and shafts reaching 380 meters in depth at 15 different levels, and produced almost 150 thousand tons of mercury, which was used all over Europe and worldwide in science, agriculture, and the extraction of precious metals, among other things.

The cake is possible to order and buy in Pri Škafarju Inn. The local product is also the basic part of every big event in Idrija. The degustation of Rezi cake is very often included in tourism programs and guided tours of Idrija Geopark.



Figure 4. The Rezi Cake

4.3. Summer camp for kids interested in geological sciences

Annually, the Bohemian Paradise Geopark and a local non-profit institution arrange a summer camp for school children interested in geology, mineralogy and collecting of gem stones. Participants stay close to Nova Paka city, well known for agates, jaspers, garnets and other gem stones. During a whole week of daily walks and evening lectures, children gain knowledge about nature, geology, geological history and origin of local gem stones. They have a lot of opportunities to find and collect gem stones, mostly in the field or in abandoned quarries. Finally, all participants try to work their samples on historical saw and polish machine, and they can take it home as an original souvenir. The camp is traditionally very fruitful and popular among children.

4.4. Geruš Miner's Drink

Geruš is an old miners' drink. Because wine was too expensive to afford on a miner's salary and the desire for alcohol was great, the resourcefulness of the miners helped in its creation. The spirit was in abundance, so was the absinthe plant and water. The absinthe accelerates the secretion of stomach enzymes which is why it can be offered before a meal, as an aperitif.



In 2014 the “geruš” was revitalized and upgraded by local provider and partner of Idrija Geopark, House of Herbs.

The geoproduct was created in 2014 by local provider “House of Herbs” in cooperation with Idrija Geopark and Touristic mine Anthony's Main Shaft. House of Herbs is in charge for selling the product while Idrija UGG and Anthony's Main Shaft support the local provider with promotion. The degustation of geruš is very often included in tourism programs of Idrija Geopark and guided tours in Anthony's Main Shaft.

The Geruš is available for purchase in TIC Idrija and Anthony's Main Shaft, on-line⁹, and also in some restaurants in Idrija.



Figure 5. Geruš Miner's Drink

4.5. Volcanic bomb

It is a dark brown/black colored, preserved green walnuts in a glass fruit jar (compote). The Balaton-felvidéki National Park Directorate launched a geopark product label application process and informed SMEs about this possibility, the background of geoparks and the main features of the local geological heritage. The product is made by Zsusska (www.zsusska.hu), a local producer who applied for a geopark product label. The product can be produced on a small scale.

Volcanic basalt bombs can be found in some areas of the geopark, their dark grey color and spherical shape gave the inspiration to name this delicacy “Volcanic bomb”. Volcanic bombs are easily observable and their origin is easily understandable, an interesting story, connected to volcanoes. Volcanic remnant hills are well visible in the geopark, they are picturesque elements of the landscape. The product resembles to some extent in shape and color to volcanic bombs and its name also makes a connection.

Zsusska is an already functioning entrepreneurship, with existing selling locations, a legal background to produce and sell, and a quality design of the package. The package is durable, transportable, the product is not quickly perishable.

⁹ <http://www.hisa-zelisc.si/spletna-trgovina>, <http://www.gerus.si/>

4.6. Volcano medallion and earrings

The product – jewellery with the shape of a volcano (necklace and earrings), made of felt – is made by a local producer who applied for a geopark label with this product, Lili Mónika Szilvási, a self-employed entrepreneur.

The one time active volcanoes are typical parts of the geological story of the geopark area. Volcanic remnant hills are well visible in the geopark, they are picturesque elements of the landscape. The product resembles in shape and colour to volcanoes. A short text that makes the connection with the geological heritage is placed on the package, below the name of the product: “In remembrance of the volcanoes that were active at Balaton-felvidék 8-2,5 million years ago“.

The producer started producing wool objects and jewellery two years ago. She has a legal framework (being self-employed) of selling the products. A few selling points already exist for her other pieces of jewellery with other shapes. The product can be produced on a small scale. The aesthetic value of the jewellery is high, each piece is handmade and unique. A nicely designed package is missing, the product is durable, transportable, easy to store.

The product meets the requirements of a geopark product, set by the geopark organisation. It is made locally, from mostly local materials (wool) produced in the Bakony Hills in an ecological farm. It meets the sustainability requirements described in the application and a traditional manufacture method is used.

4.7. The Juantaler Valley Buckwheat

The buckwheat is a traditional food of former miners which dug up lead and zinc ore for more than 350 years in the region of Geopark Karavanke. The geoproduct (different culinary products made out of the Juantaler valley buckwheat) was created by the Genusregion Jauntaler Had'n Association (Geopark regional partner) and it is also managed by them.

The Genusregion Jauntaler Had'n Association has made the somewhat forgotten Had'n (buckwheat) become an indispensable part of cooking, and that is how the municipality of Neuhaus (partner of Geopark Karavanke) became famous as the Had'n (buckwheat) community. The high-quality, gluten-free grain that is also considered as a medicinal plant contains a high level of nutrients and has a highly energetic, holistic, and balancing effect on the human organism. The association organizes lectures, relaxing walks and tastings of various specialties made out of buckwheat.



Figure 6. **The Juantaler Valley Buckwheat**

4.8. Visitor Centre “World of Geology”

The visitor centre is an added value of Geopark Karavanke. The Geopark offers guided tours and also programs for schools and children. With this modern geopuls table the visitors are informed about local products.

The two main geoproducts in the visitor centre “World of geology” in Bad Eisenkappel (Austria) are Geopuls system (Geopuls table) and Geoclock. The **Geoclock** shows the entire evolution of Earth through animation. In addition to mysterious fossils from the area, the Geopark Karavanke Information Centre “World of geology” also shows the lithological diversity of the Karavanke mountain range. This is not only interesting for geologists but also for tourists and locals alike because it shows astonishing natural phenomena. The **Geopuls table** represents the lithological map of the area. Guests can use a pen and a book to navigate interactively through all the characteristics of the region. These range from geological treasures to culinary products so every guest can plan their own stay in our region.

The geoproduct was created by company ARS Electronic in cooperation with Working group (ARGE) Geopark Karavanke in the year 2014. It is also managed by ARGE Geopark Karavanke.



Figure 7. Visitor Centre “World of Geology”

4.9. Underground Kayaking and Cycling

One of the most important geoproducts in Karavanke Geopark are the underground activities in the former lead and zinc mine in Mežica (Slovenia) - kayaking and cycling.

Mountain bikes are usually used for exploring the mountains, but here you can ride your bike through the mountain in a mine. Podzemlje Pece, d.o.o. discovered a path through the abandoned and mysterious mining tunnels under Mount Peca. Led by a guide and equipped with helmets and flashlights you can safely ride from one valley to another. The cycling adventure begins as you are greeted by your guide at the Karavanke Geopark Info Centre in Glančnik in Mežica. Together you will head for the entrance in Igrčevo in Črna na Koroškem where you will enter the mine. After cycling the underground trail you will exit the mine in Breg in Mežica, from where you will descend on the asphalt road (about 1.5 km) to the starting point in Glančnik. The mine has a constant temperature of 10 °C.

The underground adventure “Mine tour by kayak” starts in front of the mining museum in Glančnik in Mežica. Visitors board a genuine mining train which takes them from the

museum through the 3.5 km long Gačnik tunnel and up to Unionski vpadnik slope mine. From here you descend for 95 m and go down the stairs to reach the water level. At this point, all visitors receive the necessary protective equipment (neoprene boots, life jackets and mining helmets with a flashlight). Then the tourists enter a flooded shaft where special kayaks for three persons are already waiting. The guide leads them along a small underground river until they reach the underground lakes almost 700 m below the surface. Visitors can now enjoy the peaceful water and explore the underground labyrinth, submerged tunnels and excavation sites. The geoproduct was created by the Geopark's associated partner - Touristic museum and mine – Company Podzemlje Pece, d. o. o., and is managed by the same organisation.



Figure 8. **Underground Kayaking and Cycling**

4.10. Geosites route of Arouca Geopark

The Geosite Route of Arouca Geopark (Duarte & Rocha, 2017) is composed by three different itineraries, 31 geosites, interpretative centres, 6 news observatory platforms, guidebook, interpretative panels, 2 thematic interpretative centers and the Paiva Wood Walkways. Some highlights are the The Giant Trilobites, Birthing Stones, Cruziana Ichnofossil of Paiva Valley, Regoufe and Rio de Frades complexes Mines were some highlight geosites of this route.

This geoproduct reinforce the touristic attraction of Arouca Geopark promoting its restaurants, accommodations, local products and museums creating benefits to the local communities. The georoute is managed by AGA – Arouca Geopark Association, an entity certified by ISO 9001, and also by local operator tours and local interpretative-guides trained by Arouca Geopark Staff who are offering new geotouristic experiences to visitors.

In 2017 Geosite Route & Paiva Walkways of Arouca Geopark won the “Geoconservation Award 2017 promoted by PROGEO European Association for the conservation of Geological heritage – Portuguese

4.11. Kents Cavern Prehistoric Caves

Kents Cavern Prehistoric Caves were opened to the public in 1880 and has been exploited by five generations since then (Powe, 2017). The cave is ranked as the most important Stone Age cave in Britain. Here were discovered the oldest human fossil in Britain, a 41,000 year old early modern human (*Homo sapiens*) jawbone. Also Neanderthals used the cave and Heidelbergensis (*Homo erectus*) flint handaxes found here prove the cave was



used for more than 500,000 years. Guided tours, theatrical performances, promenade shows around the caves where professional actors guide the audiences, specific events are the main activities developed. The cave is opened every day and is managed by a private company, playing an important role in community engagement and branding Global Geopark across its partner organisations. The Cave has become the underground visitor centre for the English Riviera UNESCO Global Geopark.

4.12. Naturtejo geoproducts

Cooperation and promotion activities developed by Naturtejo Global Geopark made local companies interested to join their products and services to the Geopark objectives and brand. Geoproducts are innovative, new or reinvented traditional products related with the geodiversity (Rodrigues et al., 2017).

In this case geoproducts are branded as originated from the geopark territory. Their production and promotion are related to local geodiversity and traditional techniques of preparation are integrated into the geoproducts story, 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.

Other products are using the significance of fossils or rocks like Geocakes, a cake design company whose cake resemble of trilobite producing Cruziana tracefossils, or Paulo Dias who has created a handmade line of jewellery “Trilobite... Precious – for million years”. VÓNÔ is an artisan who is reinventing “burel”, a Portuguese handmade fabric, made of wool, adapting it to the Geopark’s stories, textures and colours.



Figure 9. Cruziana Geocake (Naturtejo Geopark)

4.13. Haute Provence - art and geology

As a founder member of the Geopark concept, Haute Provence Geopark used art as an important tool for promotion, education and public awareness. Local and international artists have organised permanent or temporary art exhibitions or developed artistic products related to local geodiversity, traditions and culture. Some of these approaches evolved into geoproducts or are used as geoproducts by other partners.

One of the approach was to create GEOCOM, a small enterprises aiming to produce and sell fossil replicas in order to separate the management and commercial activities. Using original of different fossils found in the geopark territory perfect replicas, especially of local ammonites, were produced and sold in geopark visiting centers or to local communities. One

step forward was to develop the GEORIUM and educational tool aiming to be used by schools in training kids about scientific research of fossil remains. This geoproducts has an economic, scientific and protection value. The perfect preservation of fossils used to produce high quality of replicas contributes to decrease the interest of fossil hunters and a better promotion of local geoheritage values.

A second type of geoproducts are related to the use of geologic symbols in developing pottery (Benoit de Sousa), sweets (Les ammonites en chocolat), or jewellery (Les Etoiles de Saint Vincent).

Another geoproducts is related to exploitation of the land art works of Andy Goldsworthy (Randonnée pédestre Refuge d'Art Andy Goldsworthy en Haute-Provence). Refuge d'Art is a single, integral work of art, to be visited over a ten-day hike (<http://www.refugedart.fr/>).



Figure 10. **Andy Goldsworthy, Cairn. Haute Provence Geopark**
[\(http://www.refugedart.fr/\)](http://www.refugedart.fr/)

4.14. Hațeg Geopark Network of interpretation houses and trails

The approach is innovative and aims to develop a visiting infrastructure for geotourism and education based on iconic geological assets and the intangible heritage generated by them during generations. The selection of specific assets was based on geologic, anthropologic and ethnographic studies of an interdisciplinary team and the selected subjects are: dinosaurs, volcanoes, intangible heritage, rocks, dinosaurs' mythology, and strong connection between science and art. For each subject special spaces were created as eco-constructions or in renovated old buildings. All of them are called "houses", "case" in Romanian for a better connection to local culture and each is presenting a specific subject in a complementary approach. Until now, six houses are developed: *House of Dwarf Dinosaurs*, *House of Volcanoes*, *House of Traditions*, *House of Rocks*, *House of Science and Art* and *House of the Geopark*. Four thematic trails integrate the houses and other historical, natural and cultural assets and allow a touristic exploitation. For the House of Volcanoes, specific activities and educational programs were developed by a geopark partner in order to generate income and assure the sustainable use of the developed facilities. Based on this model, similar approaches will be developed for some of the other "houses".



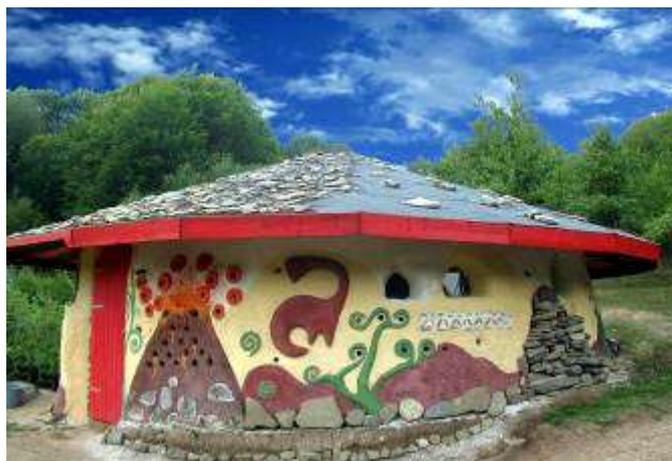


Figure 11. The House of Volcanoes (<https://dragdehateg.org>)

5. Conclusions and recommendations

5.1. Conclusions

Geoproducts are one of the most practical results of a Geopark, they connect geoheritage, cultural heritage, identity, socioeconomic development and interpretation. By creating geoproducts, the project contributes to green economy development and helps build local identity and its visibility in transnational context, which strengthens the social and economic dimensions.

The geoproduct is at the intersection of the two axis – management and identity – bringing together geoheritage and its management as well as the community and its development.

The creation of a geoproduct has to follow three basic requirements: geology connexion, economic viability and geopark partnership. During the production and use, it must also respect the natural and cultural environment as well as social inclusion and vulnerable groups.

The development of a range of different geoproducts facilitates cooperation with local population, advancement of local supply chains and valorisation of human resources within the local area. It also benefits from one of the most important and innovative geopark assets – networking and partnerships.

5.2. Recommendations

In the creation of geoproducts, geopark managers should follow the criteria set up in these guidelines. They should provide assistance and information to their local partners in order for them to understand what a geoproduct is and to be encouraged to create and develop geoproducts.

They should maintain the balance between the intangible value of a geoproduct – its story, its connexion to local identity and symbolic value – and its practical aspects – economic viability, marketability, demand and price.

The geoproduct has to be adapted to market demands, it has to continuously address the needs of the buyers and it has to have the adaptability to focus on new trends and requirements.

This project will provide further assistance by creating an on-line tool to support all phases of innovative product creation and usage. During the implementation of the project actual geoproducts will be created. These can be added to the practical examples featured in these guidelines.

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7. Annexes

7.1. Output Factsheet (separate file)

7.2. Questionnaire for Geoproducts identification and good practice transfer

WP 4 & WP 3

Dear colleagues, I've developed a simple questionnaire connecting main geologic assets and GeoProducts developed in partner geoparks and EGN geoparks.

The questionnaire aims to create a database with existing situation and to support further development and approaches of new GeoProducts and good practice identification / know how transfer. Also to support interpretation of geodiversity in partner geoparks and development of training materials.

Bellow there are short explanations for each geologic item selected:

Geologic Time - Deep Time, Geologic scale explained or interpreted (e.g. Time Alley, leaflets or books to describe Earth evolution in different eras);

Earth structure – how Earth is inside, how it works, plate tectonics, mountain building, and continents position in different eras;

Rocks and minerals – earth materials, how they are made, how they look;

Fossils – different type of fossils presented and explained (e.g. ammonites, dinosaurs)

Volcanism – present and past volcanoes, structure and materials

Karst – endo and exokarst, cave interpretation

Geohazards – explanations of sources, impact, risk prevention (earthquakes, volcanism, tsunami, landslides, flooding, etc.)

Landscape interpretation, including Past, Present and Future evolution and scenarios;

Mining activities, interpretation, impact, etc.

Ice Age relicts, landforms, evolution

Intangible heritage – legends, local interpretation, symbols, including collections and symbolic objects.

Places with significant local value – special places related to local memory or myths, sacred places, areas developing a sense of place.

Other items, if present, could be added.

For each of the 12 mentioned geologic items, each geopark needs to answer with YES or NO to each of the 10 questions indicated in columns (Publication & films, Museums, etc.).



Other approach could be added if necessary. Further details will be required for specific situations.



Annex 7.2

Questionnaire for GeoProducts identification and good practice transfer

| Geologic assets approaches in geoparks | <i>Publications & Films</i> | <i>Museums</i> | <i>Education & training</i> | <i>Exhibitions</i> | <i>Geo-trails</i> | <i>Local products</i> | <i>Events & Fairs</i> | <i>Guided tours</i> | <i>Augmented reality</i> | <i>Art inspiration</i> | <i>Other</i> |
|---|---------------------------------|----------------|---------------------------------|--------------------|-------------------|-----------------------|---------------------------|---------------------|--------------------------|------------------------|--------------|
| <i>Geologic Time</i> | | | | | | | | | | | |
| <i>Earth structure</i> | | | | | | | | | | | |
| <i>Rocks & minerals</i> | | | | | | | | | | | |
| <i>Fossils</i> | | | | | | | | | | | |
| <i>Volcanism</i> | | | | | | | | | | | |
| <i>Karst</i> | | | | | | | | | | | |
| <i>Geohazards</i> | | | | | | | | | | | |
| <i>Landscape</i> | | | | | | | | | | | |
| <i>Mining</i> | | | | | | | | | | | |
| <i>Ice Age</i> | | | | | | | | | | | |
| <i>Intangible heritage</i> | | | | | | | | | | | |
| <i>Significant places</i> | | | | | | | | | | | |
| <i>Other (to be mentioned)</i> | | | | | | | | | | | |



7.3. Geoproduct example template

TEMPLATE

WP4. Best practice examples of existing geoproducts in partner Geoparks

- Output 4.1. -

This template is to be understood in the context of:

1. The WP4 questionnaire about the geological assets you already filled in,
2. The unstructured interview and discussions we had during the last SCOM meeting
3. The presentation and the discussions on the definition of the geoproduct that took place also during the last SCOM meeting

GEOPRODUCT EXAMPLE

NAME

SHORT DESCRIPTION

CREATOR/DEVELOPER ORGANISATION

Who created it and who manages/sells it?

REQUIREMENT 1

How does it relate to Earth (geo)?

REQUIREMENT 2

How is it structured as an economical viable product?

REQUIREMENT 3

How does it involve the Geopark's partnership and story?

PRESENT STATUS

Established and functioning?

Yes? For how long?

No? When is it expected to function?

Other information (if needed)



7.4. Planned geoproduct template

TEMPLATE

WP4. Description of planned geoproducts

- Output 4.1. -

This template is to be understood in the context of:

1. The WP4 questionnaire about the geological assets you already filled in,
2. The unstructured interview and discussions we had during the last SCOM meeting
3. The presentation and the discussions on the definition of the geoproduct that took place also during the last SCOM meeting

PLANNED GEOPRODUCT

NAME

SHORT DESCRIPTION

CREATOR/DEVELOPER ORGANISATION

Who will manage/sell it?

REQUIREMENT 1

How does/will it relate to Earth (geo)?

REQUIREMENT 2

How is it/will be structured as an economical viable product?

REQUIREMENT 3

How does/will it involve the Geopark's partnership and story?

Other information (if needed)

