Development Plan for Geotourism in Pyhä-Luosto National Park, Finland and in Khibiny Tundra, Russia

ABCGheritage – Arctic Biological, Cultural and Geological heritage - project (KO368)

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1. Introduction

Aim of the ABCGheritage -project was to provide new information about geological heritage of the most northern part of Green Belt of Fennoscandia and develop sustainable geotourism in the area. Project included different kind of activities for reaching that goal: geological surveys together with other fields of science (e.g. archaeology, botany, limnology) were made both in East-Lapland, Finland and in Khibiny Tundra, Russia. Scientific conferences and meetings were held in Pyhä-Luosto visitor centre Naava, Finland and in Apatity, Russia. Lessons about geology were given to the public, employees of national park and tourism entrepreneurs in Finland. Three products for geotourists were produced. Barents Tour for Geotourists –booklet describes geologically interesting sights in Eastern-Lapland, Kola Peninsula and in Norway. Geological recreational map and booklet for Khibiny Tundra provide first safe hiking routes in Khibiny Tundra and description of the routes with geological sights on the way. Mobile guiding service called MobiRanger is a three-years-long pilot service, which can be downloaded to mobile devices having gps-function. The application presents the geological sights of Pyhä-Luosto National Park, keeps the hiker on the trails and shows places for rest – like huts and campfire sites.

The aim of this development plan for geotourism is to describe the state of geotourism in Pyhä-Luosto national park and in Khibiny Tundra, analyze the potential of geotourism and geopark status, and valuate the next steps with which to develop sustainable geotourism in these areas.

2. Geological importance and current status of geotourism

2.1 Identification of the areas

2.1.1 Pyhä-Luosto

Pyhä-Luosto area consists of National Park, which is 14,300 hectares in size, and the surrounding area for tourism. Skiing-resorts of Pyhä and Luosto are popular tourism destinations. Pyhä-Luosto area is situated in the municipalities of Pelkosenniemi, Sodankylä and Kemijärvi.

The national park was founded in 1938, and one of the important reasons was the valuable geological history and geodiversity of the area. The backbone of the national park is a 35-km-long range of 12 hills and fells stretching from the Soutaja Fell to the Yli-Luosto Fell. Metsähallitus – Parks and Wildlife Finland – is the manager of national park. There were 101 600 visits to the national park and 69 900 visits to the national park’s visitor centre Naava in year 2014.

Management plan for national park was prepared in 2007 and will be updated in 2016. Pyhä-Luosto visitor centre Naava is the window to the national park providing information about hiking possibilities as well as natural and cultural values of the national park. The permanent exhibition in visitor centre Naava highlights the nature and cultural history of Pyhä-Luosto region.
Geology of Pyhä-Luosto area and its connection to the history of the Earth is presented in the exhibition too.

Pyhä-Luosto National Park has very variable status in geological heritage. The heritage consists of geological sights and examples of different geological subjects. The local bedrock is an example of typical ancient Finnish bedrock, which belongs to the Precambrian era. It is roughly 2,000 million years old and consists of plutonic rock types, such as granite and gabbro, crystallized kilometres deep inside the earth’s crust as well as volcanic and metamorphic rock types. The quartzite and conglomerate form the Pyhä-Luosto fell range itself. They belong to the last-mentioned type of rock. Originally quartzite and conglomerate were deposits of sand and gravel which the wind and water piled up and sorted into sediments. As a result of orogeny, they metamorphosed, changing their appearance and mineral composition. The surficial deposits and landforms represent also typical Finnish landforms. They were formed during the Quaternary Period over the last two million years. At that time Finland was covered by a continental ice sheet more than two kilometres thick. During the last deglaciation phase the ice sheet receded from the area. It occurred roughly 10,400 years ago. The soil and its surficial deposits, such as till, gravel and sand, were generated by the continental ice sheet and its melt waters. The ground also includes soil types formed of organic matter after the Ice Age, such as the peat and gyttja appearing in bogs and mires.

The following sights are highlighted as most important ones from Pyhä-Luosto National Park.

1. Isokuru Gorge. The deepest gorge in Finland with walls that soar 220 metres into the air from the bottom of the gorge. The creation of Isokuru was the end result of several geological processes like fracturing of bedrock, glacial and glaciofluvial erosions and weathering. The Isokuru Gorge is accessed by a stairway that descends to the southern end of the gorge. A duckboard trail along the gorge bottom leads to the Pyhänkasteenlampi pond and waterfall. Isokuru is a sight along most frequently visited day-tip-trail in the national park. Along the trail there are more than ten information panels of different geological phenomena. Information panels are available in Finnish, Swedish, English and German. Isokuru is one out of 20 geological sights in the national park, which are guided through mobile guiding service made in the ABCGheritage – project 2012-2015.

2. Pyhänkasteenlampi Pond. The most popular tourist attraction in the national park. A kettle-like depression on the bottom of which lies a clear pond and a 17-metre gushing waterfall, Pyhänkasteenputous. This sight is connected with the trail going through Isokuru Gorge.
3. Ukonhattu Fell block field. The shattered rocks have covered the top and slopes of Ukonhattu Fell, forming a continuous block field. It is formed as a result of frost weathering.

4. Aittakuru Canyon and auditorium. Aittakuru is a V-shaped gorge eroded by marginal melt water streams into an ancient fracture in the bedrock. An auditorium for performances has been built around the small pond at the bottom of the gorge. Aittakuru lies outside the national park, but it is an integral part of the geological sights in Pyhä-Luosto area.

5. Amethyst. The Lampivaara amethyst deposit located near the Luosto tourism resort is one of the most significant semiprecious stone findings in Finland and noteworthy even on a European scale. Amethyst is a purple, translucent quartz that crystallized ages ago from the hot solutions of the earth’s crust into beautiful, hexagonal crystals onto the walls of the cavities in the bedrock. Arctic Amethyst Mine (Kaivosyhtiö Arctic Ametisti Oy) is inside the national park and operates with special permission written in the act. Arctic Amethyst Mine organizes excursions and transportations to the mine. It gives more information about amethyst and gemstones, and it has a souvenir shop and a café.

6. Ripple marks. Ripple marks on boulders in Isokuru Gorge and on the slopes of Noitatunturi Fell are patterns made in the sand bed by moving water. They are quite common in the rocks of the fell range, and beautiful, well-preserved ripple are a very characteristic feature for these quartzites. Now they serve as a reminder of geological events that occurred so far back in time that it is almost unfathomable from the perspective of a human lifespan.

7. Tunturiaapa Mire. It is a mire-complex which consists of varying peatland and peat types. The eastern part of the mire is a barren sphagnum bog with raised-bog-like features such as the large peatland ponds and high peat banks. There is a nature trail with duckboards and a bird-watching tower in Tunturiaapa mire.

2.1.2 Khibiny Tundra

Khibiny Tundra is an outstanding area with marvelous landscapes and mineralogical diversity. There is discussion and planning going on for establishing a national park in the area in the future. The process takes time, as the borders for the future nature protection area have been drawn many times during the last years, because of rich deposits of apatity and other ores and active mines. Khibiny is situated north from town of Kirovsk in the Murmansk oblast in the central part of Kola Peninsula. The city of Kirovks is situated in a beautiful valley in the middle of Khibiny Tundra. It has a long tradition as a ski resort and capacity to serve summer tourism, too.

Geologically Khibiny Mountains are an approximately 350 Ma-old multiphase intrusice massif with the total square of 1327 km². It is formed of compositionally and structurally different nepheline syenites crystallized from magmas, which intruded along conic faults. Rock complexes nested as
east-exposed arcs determine the style of the geological map. The magmatism ended with dykes of phonolites and tinguiates having intruded along faults. Many of the minerals are decorative. However, it is the huge variety of minerals that made the Khibiny world-famous. Of about 4000 minerals known in the world, more than 1000 were found there, 115 of them for the first time. It is a world record for a geological object. The Khibiny Mountains area also special in that rare minerals occur as big crystals and aggregates: eudialytes, astrophyllites, lamprophyllite, aegirine, titanites, with all these having different tints and morphologic types. There are several museums specialized in geology, mineralogy and mining in Kirovsk, Apatity and Monchegorskr.

Geological Institute of Kola Science Centre has made geological recreation map of Khibiny Tundra with the assistance of their Finnish colleagues from Geological Survey of Finland. There are 15 safe hiking routes for day-trips described in the guide book and on the map. Considering climatic conditions, geological tourism in the Khibiny is only possible in the non-snow period, in summer and early autumn from June to September. At the same time weather conditions change: frost and snow fall are occur occasionally in June. In early summer, as firn basins rapidly melt, mudflows go down the mountains, blocking sandy roads. All this should be considered while travelling in the mountains. The Khibiny are relatively low, in average 1060 meters above sea level, but annually take human lives. The main reason for tragic events is the violation of safety measures. Tourists must register their route in the Administration of Kirovsk and Kuelporr Rescue Station if the route is close. As a result from the geological surveys made in the area, there are many roads and paths that have been constructed to facilitate access even in remote areas. Major part of the Khibiny, especially gorges and low areas, is not covered by mobile operators. Following the safety measures, visitors can enjoy splendid views and mineralogical finds.

2.2 Geotourism as a part of economic activities

Geotourism is growing part of the nature-based tourism, yet the number of tourists considering themselves as geotourists is small. This kind of tourists who choose their travel destination based on special activities or interests can be described “specialists”. According to visitor surveys made by Metsähallitus, average visitors of National Parks and their visitor centres are interested in geology. This group can be called “generalists” in their attitude to geology as one attraction in their travel destination choice. In areas where the geological heritage is obvious and highlighted in the information and services provided, the “generalists” can also be considered as geotourists.

The skiing tourism industries are under the tutelage of the state in Khibiny, and geotourism based on geological and mineralogical heritage of the area is in its infancy. City of Kirovsk has hotels and restaurants and other infrastructure of tourism. Traditions of winter tourism, good connections by airlines, St Petersburg-Murmansk railroad and highway create potential for nature tourism with geology as an important attraction on global scale, too.
Similarly to Khibiny, Pyhä-Luosto tourism resort is well-known winter sports centre. There are hotels, rentable cabins, several restaurants, active tourism association and many tourism entrepreneurs – so the infrastructure for tourism is really good. Approximately 10 tourism companies are having cooperation agreement with Metsähallitus and provide services, which follow guidelines for sustainable nature-based tourism. Domestic and foreign tourists visiting the National Park create a potential demand for geotourism in the area.

There is un-used potential in the contents of geological heritage, which both the areas and operators there can easily highlight even without extra funding. There is need for dissemination of information and marketing with leading edge on geological heritage. These activities are discussed in chapter 3. Strategies and actions.
3. Development of geotourism

3.1 Strategies and actions

Strategies for developing sustainable geotourism and concrete actions are gathered in the table below. Timeframe, indicators for accomplishing the action, responsibilities and final deliverables are included.

<table>
<thead>
<tr>
<th>Timeframe</th>
<th>Funding</th>
<th>Action</th>
<th>Indicators / comments</th>
<th>Responsible partner(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Long-term</td>
<td>No external funding needed</td>
<td>Marketing Pyhä-Luosto and Khibiny tundra as geotourism destinations. Making cross-border dissemination about the geological sights and geotourism possibilities in these areas.</td>
<td>Providing information about the geological heritage to local tourism entrepreneurs and tourism associations. Scientific-popular lectures delivered in the universities of Rovaniemi and Apatity, in museums and in visitor centres.</td>
<td>Geological Survey of Finland, Geological Institute and Metsähallitus</td>
</tr>
<tr>
<td>Mid-term</td>
<td>No external funding needed</td>
<td>Printed postcards and other non-expensive but high-quality souvenirs of the most famous geological localities of the area</td>
<td>Number of new products in sale</td>
<td>Metsähallitus</td>
</tr>
<tr>
<td>Long-term</td>
<td>External funding needed</td>
<td>High-quality sales-products promoting the areas. Like book about natural and cultural heritage of Pyhä-Luosto National Park.</td>
<td>Number of new products in sale</td>
<td>Metsähallitus</td>
</tr>
<tr>
<td>Long-term</td>
<td>No external funding needed</td>
<td>Articles of different geological localities of Pyhä-Luosto area and Khibiny Tundra to be published in the newspapers</td>
<td>Contacts to journalists; local newspapers and seasonal papers of tourism resort</td>
<td>Geological Survey of Finland, Geological Institute, Metsähallitus</td>
</tr>
<tr>
<td>Long-term</td>
<td>External funding needed</td>
<td>Geological and archaeological studies and surveys. Results presented in scientific conferences and in new</td>
<td>Potential sites in Pyhä-Luosto: Karhunjuomalampi Pond</td>
<td>Geological Survey of Finland, Metsähallitus</td>
</tr>
<tr>
<td>Time Frame</td>
<td>Funding Need</td>
<td>Activity Description</td>
<td>Description of Benefits</td>
<td>Responsible Party</td>
</tr>
<tr>
<td>------------</td>
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</tr>
<tr>
<td><strong>2. New services and infrastructure are created for supporting the sustainable geotourism</strong>&lt;br&gt;Mid-term</td>
<td>External funding needed</td>
<td>New information boards about geological heritage along existing trails in Pyhä-Luosto. Threat of vandalism along the trails in Khibiny is real – therefore new information boards to museums/tourist information points in Russia.</td>
<td>Potential sites in Pyhä-Luosto: Kuorinkikuru Gorge and Anninkinlampi Pond, Top of Uhriharju Rock, Aittakuru auditorium, Ukko-Luosto Spring subject being groundwater</td>
<td>Metsähallitus</td>
</tr>
<tr>
<td>Mid-term</td>
<td>External funding needed</td>
<td>Suggestion for new hiking trail from Tunturiaapa Mire to Peuraharju Esker and Peurakuru Gorge in Pyhä-Luosto</td>
<td>Consideration about the need for new trail according to management plan</td>
<td>Metsähallitus</td>
</tr>
<tr>
<td>Long-term</td>
<td>External funding needed</td>
<td>Mobile guiding service for geological sites in Pyhä-Luosto national park and Khibiny Tundra to be used by visitors and tourism entrepreneurs. The future outdoor maps and maps to be updated made both in printed and electric formats.</td>
<td>Permanent mobile guiding services available in both areas; electronic maps</td>
<td>Metsähallitus, manager of future nature protection area of Khibiny; assistance from Geological Survey of Finland and Geological Institute</td>
</tr>
<tr>
<td>Short-term</td>
<td>No external funding needed</td>
<td>Geological education including field excursions to the most important localities in Pyhä-Luosto national park for the staff and tourism entrepreneurs operating in the area</td>
<td>Educated staff and tourism entrepreneurs</td>
<td>Geological Survey of Finland, Metsähallitus, tourism entrepreneurs</td>
</tr>
<tr>
<td><strong>3. Networking locally and internationally for promotion of geological heritage</strong>&lt;br&gt;Long-term</td>
<td>No external funding needed</td>
<td>Twinning activities between Pyhä-Luosto national park and the future nature protection area of Khibiny Tundra</td>
<td>Discussion, getting to know each-other’s areas, sharing best practices</td>
<td>Metsähallitus, manager of future nature protection area of Khibiny</td>
</tr>
<tr>
<td>Long-term</td>
<td>External funding needed</td>
<td>Running a preparatory project aiming at establishment of geopark to Pyhä-Luosto area.</td>
<td></td>
<td>Municipalities, Metsähallitus</td>
</tr>
</tbody>
</table>
3.2 Possibilities – Geopark status

Geoparks are combination of conservation, sustainable development and community involvement. A geopark must demonstrate geological heritage of international significance. The purpose of a geopark is to explore, develop and celebrate the links between that geological heritage and all other aspects of the area’s natural, cultural and intangible heritages. Geoparks stand for education, science and its popularization. A sound communication and PR strategy are required from each geopark. Geopark is based on common agreement of managers of the area and other partners to accept regulations of European/Global Geopark Network; no official decisions or decrees are necessary.

The establishment of a Geopark should be based on strong community support and local involvement, developed though a “bottom-up” process. It should demonstrate strong support from local political and community leaders, including in relation to the provision of necessary financial resources. The Geopark should have effective and professional management structure, and deliver policy and action for sustainable regional socio-economic and cultural development across the territory where it is located. The initiative to create a Geopark must therefore come from local communities and/or authorities with a strong commitment to developing and implementing a management plan that meets the community and economic needs of the local population whilst protecting the landscape in which they live. A Geopark shall involve public authorities, local communities, private interests, and both research and educational bodies, in the design and running of the Geopark and its regional economic and cultural development plan and activities.

Global Geoparks Network website provides information about application procedure – as well application itself with annexes required are listed in detail. There are criteria which a potential geopark has to meet. The criteria cover topics such as 1. size and setting, 2. management and local involvement, 3. economic development, 4. education, 5. protection and conservation, and 6. the global network. The status of each Geopark, of its management and performance, shall be subject to a periodical review within four years. This review is based on a progress report prepared by the designated management body of the Geopark in cooperation with respective authorities that signed the original proposal, and forwarded to the Geoparks Secretariat at UNESCO. An expert mission is sent to review the status of the Geopark.

At present, the European Geoparks Network comprises 65 Geoparks from 22 European Countries. There is only one Geopark in Finland, Rokua, established in 2014, and one candidate, Golden Geopark of Lapland. At the moment there are no Geoparks in Russia. Both countries have several ideas under planning process. The main aim of the European Geoparks Network is to support its members to bring sustainable territorial development to the geopark by using that territory’s geological heritage, primarily through the development of geotourism. The Network is responsible for the assessment of its members operation and services in order to promote the “European Geoparks” label as a high quality brand in Geotourism. The Network owns the “European Geopark” trademark registered within all countries in the European Community. The members of the European Geoparks Network are members of the Global Geoparks Network assisted by UNESCO (GGN).

The assessment for possibility to attain geopark status needs a whole preparatory project. The objectives of the project would be 1.) building up the administration of the geopark with the future partners, like representatives from municipalities, business sector, 2.) compilation of the planned geopark 3.) inviting
assessor/verifiers representing the geopark-network for analyzing the proposed site 4. submission of an application and required annexes to Coordination Unit of the European Geoparks Network

In Pyhä-Luosto area, a membership in the European Geopark Network has been under consideration for years. Cooperation between the national park, local tourism entrepreneurs and municipalities is stated as good and active. There are regular meetings and the new visitor centre of Pyhä-Luosto national park with its exhibition and services was built in projects, where municipalities and tourism association were partners. National park status is in itself a well-known, remarkable brand in Finland. Tourism entrepreneurs having cooperation contract with Metsähallitus or guides who are certified as national park guides can use the national park logo in their business. At the moment the surplus, which geopark status would give to Pyhä-Luosto area, is not valued high. In the chapter 3. Strategies and actions activities for developing geotourism are listed. Most of the activities concern highlighting the geological heritage, disseminating information, providing new services and infrastructure and like this developing the geotourism. The step towards geopark is listed as a preparatory project in chapter 3. Strategies and actions.

Membership in the geoparks network is not yet actual for Khibiny Tundra. The area needs to have the status as nature protection area first, so that the physical borders and administration are defined. The mining company operating in the area is a potential partner for geopark cooperation.

Both Pyhä-Luosto and especially Khibiny Tundra have enough geological tourism potential to became Geopark in the future. If such target is assessed, a common preparatory or planning project could be a useful tool.