THE
IRON MOUNTAINS GEOPARK

Application for Membership in the UNESCO Global Geoparks

HISTORY OF THE EARTH IN TWO DAYS

November 2015

Motto: Come, brother, and learn to know the rocks.
(Antonín Frič, 1869)

Sandstone exploitation at Škrovád, in the Iron Mountains piedmont area, in the late 19th century.

The EGN Charter

1. A European Geopark is a territory which includes a particular geological heritage and a sustainable territorial development strategy supported by a European programme to promote development. It must have clearly defined boundaries and sufficient surface area for true territorial economic development. A European Geopark must comprise a certain number of geological sites of particular importance in terms of their scientific quality, rarity, aesthetic appeal or educational value. The majority of sites present on the territory of a European Geopark must be part of the geological heritage, but their interest may also be archaeological, ecological, historical or cultural.

2. The sites in European Geopark must be linked in a network and benefit from protection and management measures. The European Geopark must be managed by a clearly defined structure able to enforce protection, enhancement and sustainable development policies within its territory. No loss or destruction, directly or via sale, of the geological values of a European Geopark may be tolerated. In this respect European Geoparks are managed within the framework established by the Global Geoparks Network Charter (see below).

3. A European Geopark has an active role in the economic development of its territory through enhancement of a general image linked to the geological heritage and the development of Geotourism. A European Geopark has direct impact on the territory by influencing its inhabitants' living conditions and environment. The objective is to enable the inhabitants to re-appropriate the values of the territory's heritage and actively participate in the territory's cultural revitalization as a whole.

4. A European Geopark develops, experiments and enhances methods for preserving the geological heritage.

5. A European Geopark has also to support education on the environment, training and development of scientific research in the various disciplines of the Earth Sciences, enhancement of the natural environment and sustainable development policies.

6. A European Geopark must work within the European Geopark Network to further the network's construction and cohesion. It must work with local enterprises to promote and support the creation of new by-products linked with the geological heritage in a spirit of complementarity with the other European Geoparks Network members.

…….. 2015
Lesvos, Greece
signed by representatives of the following Geoparks: Haute, Lesvos, Vulkaneifel, Maestrazgo

For proposed Geopark:
23rd of November 2015

Iron Mountains Geopark
RNDr. Daniel Smutek

CONTENT

ANNEXES

Electronic version of the Application for Membership in the European Geoparks Network can be downloaded at www.geoparkzh.cz/cs/ke-stazeni.

INTRODUCTION

The application for becoming a UNESCO Global Geopark is based on a nearly 40 years long work in this region (from that running 5 years as the Iron Mountains Geopark or the Iron Mountains National Geopark).

Very good knowledge of the area and long-term cooperation with locals convinced the representatives of villages, towns and municipality in general about meaningfulness of the National Geopark Project which they go along with and which they help to develop. Schools of different grades, universities, research places and commercial subjects have come to the same conclusion.

Being part of UNESCO Global Geopark is an important impulse for the Geopark's development and is a possibility how to generate a wide spectrum of activies that our region can profit both socially (education) and commercially (development of tourism) from.

Our conviction that we work within the principles and rules convenient with The EGN Charter (see Page 3) come among other things from:

- The long-term process of geoscientific education at primary and secondary schools, education of teachers from the entire region and expert and lay public.
- Establishing and continual developing the Geopark's infrastructure connecting the important geosites proving the unique diversity of geological composition of the area and the history of the Earth's life from the Precambrian to the present.
- The tourist and bicycle paths (routes) network going through variety of pleasant landscapes without any important industrial or agricultural strain.
- The established information centres network that has been enriched by the interpretation centres – „Gates into the Iron Mountains"
- The long-term cooperation with the likes of the Iron Mountains Protected Landscape Area, Czech Geological Survey and the representatives of the municipalities which enables further development and higher quality information for the Geopark's visitors and creation of the requirements for further development of geotourism.
- Themes and topics of educational programmes such as "Earth's history in two days" or "Journey in quest of water".

A IDENTIFICATION OF THE AREA

A.1 Name of the proposed Geopark

The name of the proposed Geopark is the Iron Mountains Geopark.

A.2 Location of the proposed Geopark

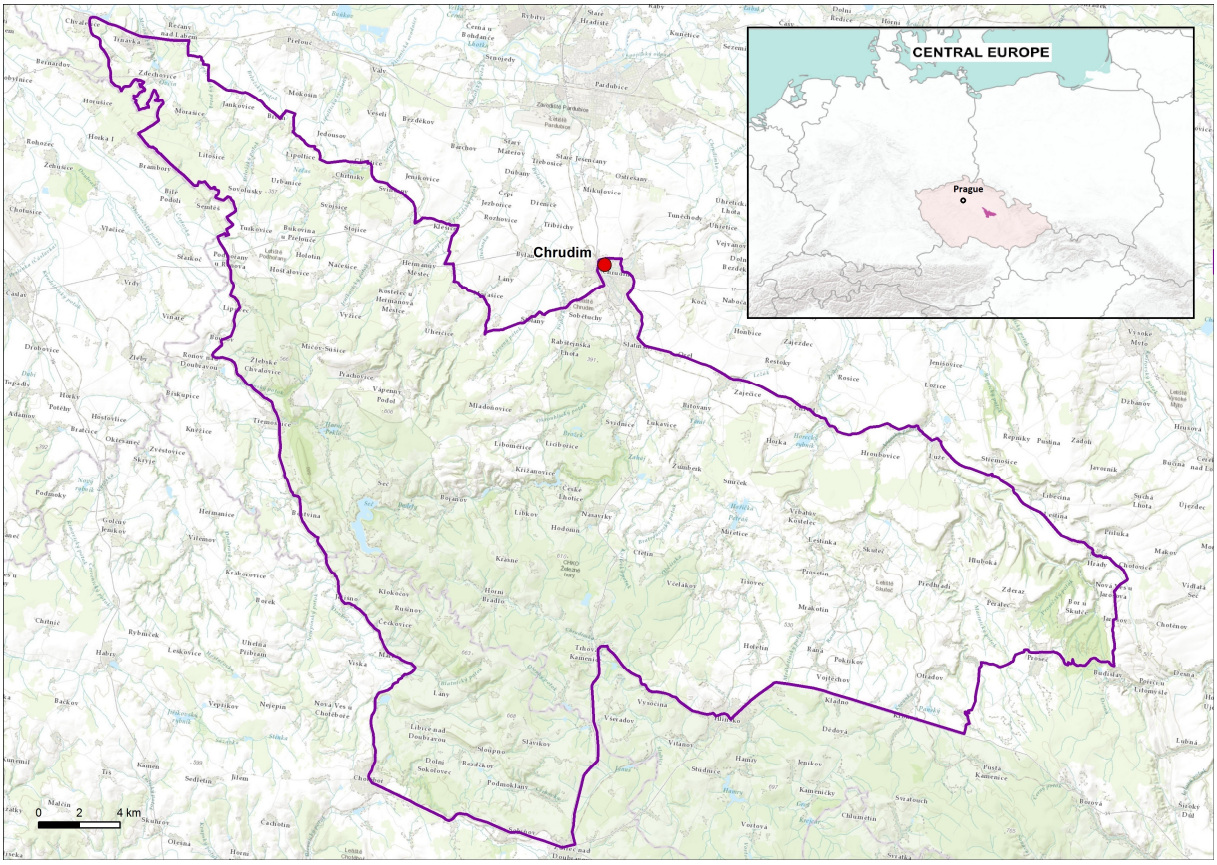


Fig. 1. The Iron Mountains Geopark is located along the southern limit of the Pardubice Region some 100 km east of Prague. Coordinates (Google maps): N 49.949507, E 15.796201

A.3.1 Geology and surface of the territory

The Iron Mountains Geopark is located in the central part of the Czech Republic. It occupies the major part of the Iron Mountains and their surroundings.

The main geological phenomenon is the great variety of geological environments (over 100 rock types) and the presence of almost all stratigraphic units - from the Proterozoic through the Tertiary. This is an area, in which symbolically a book about the history of the Earth is incorporated.

The Iron Mountains Geopark is surrounded from three sides by platform sediments of Mesozoic era - Czech Cretaceous, from which a triangular body of the Iron Mountains emerges. Geopark boundaries are delimited by the area in the shape of an imaginary predator with the area of 777 square km.

The name of Železné hory (in Czech the name means Iron Mountains) is very old, the first mention is from 1278. The name has been derived from deposits of iron ore, which was mined here already by the Celts.

The establishment of the Iron Mountains was initiated by Vodní zdroje Chrudim, spol. s.r.o. already in 2010. The company has operated in the region since 1970, whereas in 1991 it was transformed from a state enterprise into a limited liability company. Some

employees of the company (geologists and hydro-geologists) have had nearly 40 years of experiences in the region. In 2012 based on the decision of the Council of National Geoparks, the company was awarded the Decree of the National Iron Mountains Geopark by the Environment Minister

Geographically, the Iron Mountains Geopark is located in eastern Bohemia, about an hour's drive east of the capital City of Prague. In the area of Geopark there are 231 municipalities that make up the southern part of the Pardubice region and the northern edge of the Vysočina region. As mentioned above, the Geopark covers the area of 777 km^2 and the Geopark border is 190 km long.

The total difference between the highest and lowest point is 468 m. The highest "mountain" is Vestec located 668 m above the sea level and the lowest point is the location Týnec nad Labem 200 m above the sea level in the Labe river valley. The widest part of the Iron Mountains is a complex of gneisses and schists of the Proterozoic age and the hilly nature of the relief is given by the accumulation of the granite pluton with quartzites and limestones of the Paleozoic age. The morphology of the Iron Mountains is identified by more than 50 km long fault, along which the area uplift with the jump height of about 1 km occurred in the tertiary. Due to subsequent erosion the scenery-like rugged topography (on the southwestern edge) or the questo topography (northeastern slope of the Iron Mountains) has been exposed.

The stream network is determined by Chrudimka River, which has in the central part of the territory the canyon-like character. On Chrudimka several dams has been built, with the biggest one being the water reservoir Seč (built in 1924 - 1934, with the area 194 ha), which has both the water management and recreational significance.

From the climatic point of view the area of the Geopark very colorful with three defined separate climate zones. The significant rainfall interface going along the spine of the Iron Mountains is remarkable. The difference of fallen rainfall is the major cause of the creation of groundwater reserves in their neighborhood.

A.3.2 Demography

The beginnings of settlement in the area of Geopark (Chrudim) date back to the late Paleolithic (about 13,000-11,000 years ago). At that time groups of people penetrated into the heart of the Iron Mountains as evidenced by findings of stone and later copper axes and spears. An intensive colonization of the territory only took place during the 12^{th} - 13^{th} centuries. The first mention about the "Mons Ferreus" comes from 1278 (Peter of Zittau, Zbraslav Chronicle). At the turn of the 13^{th} - 14^{th} centuries the first archaeological evidence of mining of iron ore (Trhová Kamenice) and gold panning (Hrochův Týnec, Kraskov) are reported.

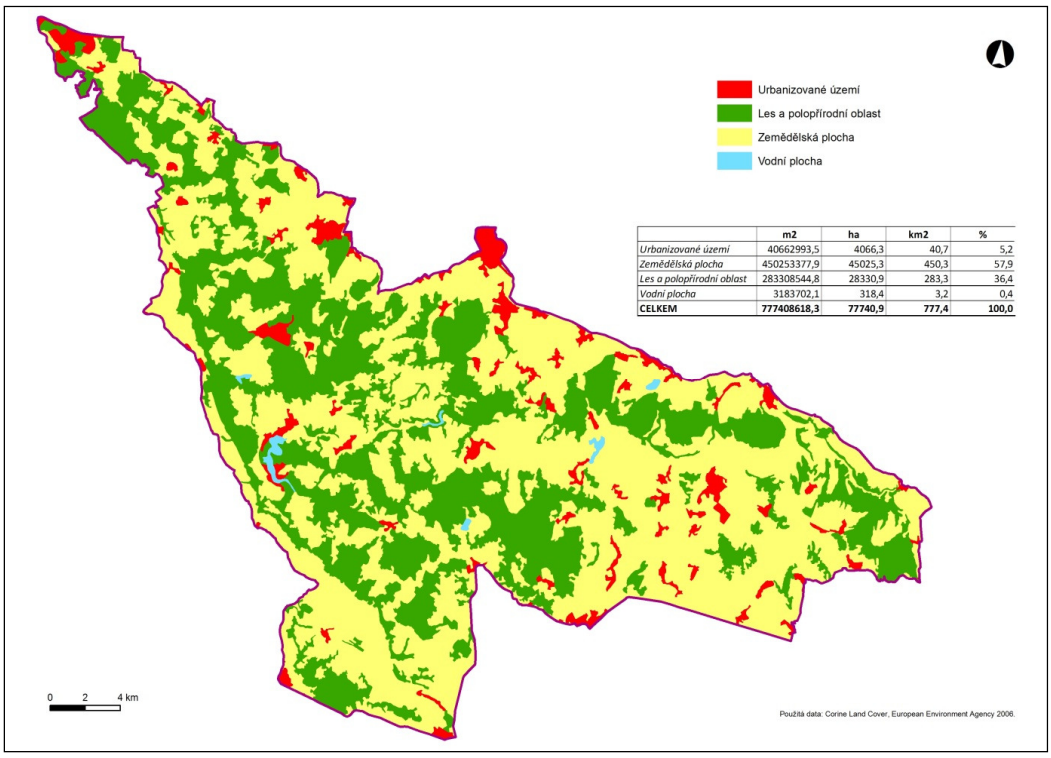
In terms of mining the period 1950 – 1990 is important, when at many places pyrite, polymetallic ores, uranium, fluorite and barite were mined. The intensive extraction of building stone (granite), restoration rocks (limestone) and major raw materials (limestone) has continued till the present.

Currently the population of more than 100,000 inhabitants lives in the territory of the Iron Mountains Geopark in 231 towns and villages. The population density is very uneven; in Geopark it amounts to 129 inhabitants per km^2 (in the area of 777 km^2).

Due to the relief of the landscape mainly agriculture has developed here. The agriculture is focused on crop and

livestock production; at higher altitudes the intense breeding of cattle, sheep and goats on the grassy vegetation prevails. The landscape has not been to any great extent affected by intensive agriculture and the existence of large fields with no hedgerows and line growths. For these reasons, scenic and rugged landscape has been preserved.

The Fig. 2. down below shows the representation of urban, agricultural and forest areas. It is noteworthy that nearly half the area of the Geopark is covered by various forests according to the varied landforms and climatic zonation.



	m2	ha	km2	%
Urbanizované území	40662993,5	4066,3	40,7	5,2
Zemědělská plocha	450253377,9	45025,3	450,3	57,9
Les a polopřírodní oblast	283308544,8	28330,9	283,3	36,4
Vodní plocha	3183702,1	318,4	3,2	0,4
CELKEM	**777408618,3**	**77740,9**	**777,4**	**100,0**

Fig. 2. The representation of urban, agricultural and forest areas in the Iron Mountains Geopark.

The industry is concentrated in small scale in larger towns in the Geopark territory (Chrudim Skuteč, Hlinsko, Ždírec nad Doubravou, Chotěboř and Chvaletice). No heavy industry is present in the area of Geopark.

Only the mining industry is represented in greater extent. There are 16 active quarries in the territory of the Geopark with an uncovered series of geological phenomena suitable for study, education and research, at the same time providing data important for the development of the Geopark. Many owners of the quarries have been acquainted with the Geopark project and agreed to cooperate on the project. Traditionally, there have been many quarries in the Territory. The reviews of the quarries have discovered more than 500 (!) now defunct mining sites (see Fig. 3.).

The ground transport infrastructure is very good, the access road and railway communications allow seamless access to visitors from the Czech Republic whereas the nearby airport terminal (Pardubice) provides access for the visitors from abroad.

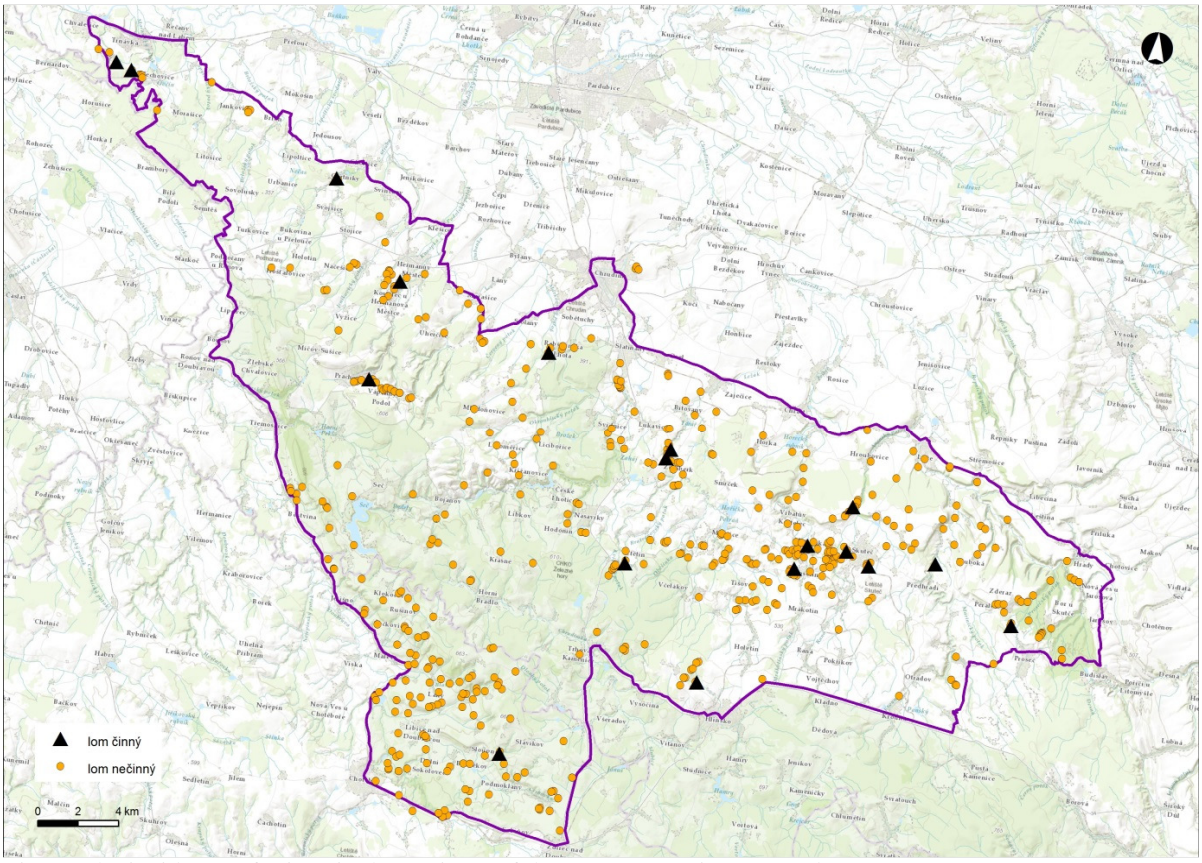


Fig. 3. The incidence of mines in the territory of the Iron Mountains Geopark.

To increase the mobility of visitors (hiking and biking), you can use the network of accommodation and refreshment facilities. Marking hiking trails follows the rules of the Club of Czech Tourists (KCT). In 2012, 22 nature trails were available in the Geopark territory. There are 34 registered bicycle routes in the territory including two of them with a focus on geo-tourism. The bicycle route MAGMA founded in 2000 was among the first in the Czech Republic.

Furthermore, there are horseback trails in the territory (horseback riding), which are followed by equestrian circles. For the congress and incentive tourism, which requires a relatively large accommodation and catering facilities there are 3 available objects, other objects (10) offer outdoor experiences as well as wellness and relaxation. Currently, a number of projects for the construction of interpretive centers have been prepared, some of which are nearing completion.

A.4 Organization in charge and management structure

Vodní zdroje company in Chrudim in the period 1991 - 2010

The specificity of the National Geopark consists in the fact that its governing body is a private company Vodní zdroje Chrudim, spol. s.r.o., which has been since 1991 operating in the field of hydrogeology, whereas more than a third of its employees (geologists, hydrologists, hydrochemists) from a total number of 25 have continuously worked in the state enterprise Vodní zdroje from the 1970´s.

In addition to geology, environmental geology, engineering

geology and remediation geology the company portfolio includes long-term educational activities. The company has offered and organized excursions with Geo-science theme for elementary and high schools as well as universities and colleges. Furthermore, the company offers extensive geological collection (minerals, rocks, fossils with the regional and systematic focus) for study purposes. A specialized library with more than 5,000 volumes has been built. The company also organized national professional conferences (Chalk Conference 2007, a meeting of museum and PLA staff from the Czech Republic and Slovakia 2009); it established a number of natural history exhibits and nature trails with geo-science theme (Heřmanův Městec – town at two seas, Stonework and shoe Museum in Skuteč, Lime Museum in Závratec at Temošnice). The company also hosted several traveling geo-science exhibitions (What's new underground, Stone Chrudim etc.).

Vodní zdroje company in Chrudim in 2010 - 2012

In the years 2005 - 2010 preparatory works were carried out in cooperation with the Český ráj Geopark to complement the portfolio of activities and the expertise which formed the basis for the preparation of nomination dossiers for submission to the title of the Iron Mountains National Geopark. A number of institutions dealing with - among other things - geology in the Iron Mountains region – i.e. the territory of the future Geopark have been acquired for cooperation - we call them "key participants".

The cooperation has been established with:

AOPK - Administration of the PLA the Iron Mountains and the Regional Centre in Pardubice – it deals with the protection of the geological environment in the PLA territory. It provides the management of individual sites, their monitoring and documentation.

ZO ČSOP Nasavrky - Civic Association with the mission of nature protection and care for it.

ZO ČSOP Chotěboř - Civic Association with the mission of nature protection and care for it.

Lime burning museum – Berl lime-kiln in Závratec at Třemošnice - The museum, founded by the town of Třemošnice, was established in 2010 in the building of an old lime kiln. It presents the importance and history of lime burning in the Iron Mountains.

Municipal Museum in Skuteč - Shoe and stone museum - In its depositories the museum houses regional geologic collections. At the same since 2009 it has presented new exhibition of the stonework in Skuteč region with the outside maquette of quarry and its individual workplaces with the well-arranged geology of the area.

Regional Museum Chrudim – it organizes exhibitions, inter alia, with geoscientific theme. In depositories it maintains regional geological collections.

Municipal Museum Chrást u Chrudimi – It houses the permanent exhibition dedicated to the geology, paleontology and evolution of man with a regional dimension.

Society of Friends of the Iron Mountains – The civic association with the focus on research, documentation, promotional and educational activities in the area of nature and landscape protection.

In 2011, the nomination dossier on the application for awarding the title of the National the Iron Mountains Geopark was completed and submitted to the assessment by the Council of National Geoparks of the Czech Republic (CR RNG). The completion of the application was complete with a list of statements - the consent of the affected municipalities, towns and administrative bodies - regions, PLA the Iron Mountains, civic associations with the intent to establish and operate NGŽH. After the visit of representatives - evaluators - from the NGŽH council the application has been approved and recommended to the Minister of the Environment, who awarded the title to Vodní zdroje Chrudim, spol. s r.o. in April 2012.

Fig. 4. Awarding decree in April 2012.

The Company in the period 2012 - 2015

After founding of NGŽH the company's activities in the areas of the science, research and educational grants funded by OPČR have significantly expanded. The collaboration with CGS within the project of Basic geological mapping (ZGM 1: 25 000) in the territory of NGŽH has developed; in the cooperation with AOPK an information system in the plain air of NGŽH was established including print and electronic materials; a number of geoscience nature trails and outdoor exhibitions have been implemented, and the works began on the implementation of interpretive exhibition centers - the gateways to the Iron Mountains.

NGŽH sent their representatives abroad to collect the necessary inspiration. In 2011 we took part in the EGN GEA Norvegica conference; in 2012 we visited the EEG/GGN conference in the Arouca Geopark in Portugal; in 2013 we participated in the EEG Conference in Italy and finally in 2014 we visited the GGN conference in Saint John, New Brunswick, Canada (see Fig. 5.).

We took active participation in all conferences - we presented papers on NGŽH, educational programs and focus of NGŽH. In May 2015 NGŽH hosted the third annual conference of National Geoparks of the Czech Republic with the international participants (Germany,

Slovakia, Poland); in the period from July to October within the grants for the border-crossing aid of the Czech Republic we worked on the feasibility study on the possibility of establishing geoparks in Georgia.

Fig. 5. Portugal, Arouca 2012

Canada, Saint John 2014

Within the grant projects we - in the cooperation with the University of Hradec Kralové – have developed and published a number of methodological textbooks and manuals with geotouristic and geoscience topics. Currently we have been working on converting the site into English version.

A big attention is paid to PR events in collaboration with regional newspapers, radio and television of the Czech Republic; two films were made on NGŽH in collaboration with Česká televize (Czech TV).

Financing activities of the Geopark is an integral part of the activities of the establishing entity. The initial period was partially paid from the overhead costs of the company (years 2010-2011), whereas in the years 2012 - 2015 the overhead costs of employees having the competence over Geopark activities have been fully covered from external resources, including the creation of reserves for the initiation any activities of other, mainly grant projects.

Due to the method of financing activities of the Geopark it is not possible to draw up a detailed budget for the period 2016 - 2020. The reason is the time structure and principles of the announcement of grant projects of the Czech Republic and the inability to forecast demand for existing Geopark products (excursions, workshops, equipment, etc.).

period	costs	Gross revenue *
2012	610 000	2 670 000
2013	750 000	300 000
2014	150 000	5 300 000

Explanation:

* … admission fees, revenue from brochures, payments for the implementation of contracts, including retrospective-cost items); amounts are in CZK (1 € equals to about CZK 27, -) – Source: Annual reports of NGŽH.

For management, management structure and co-operation of individual entities see the Figure. 6.

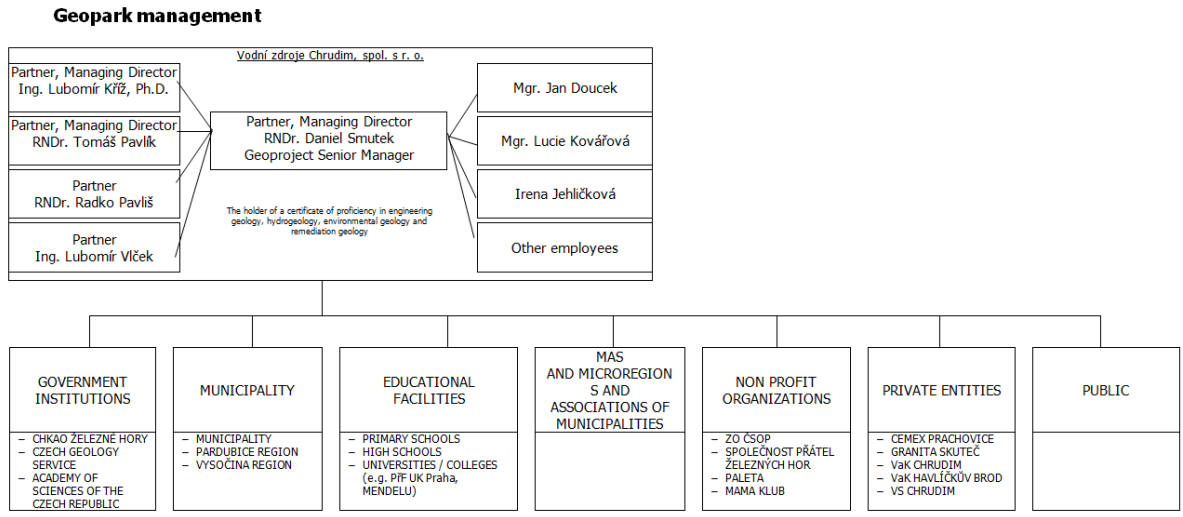


Fig. 6.

Board of Geopark

The Geopark advisory body on the issues of management, promotion and communication, consists of representatives of the applicant and key partners. It will discuss, recommend and communicate various key steps and procedures at the Geopark management.

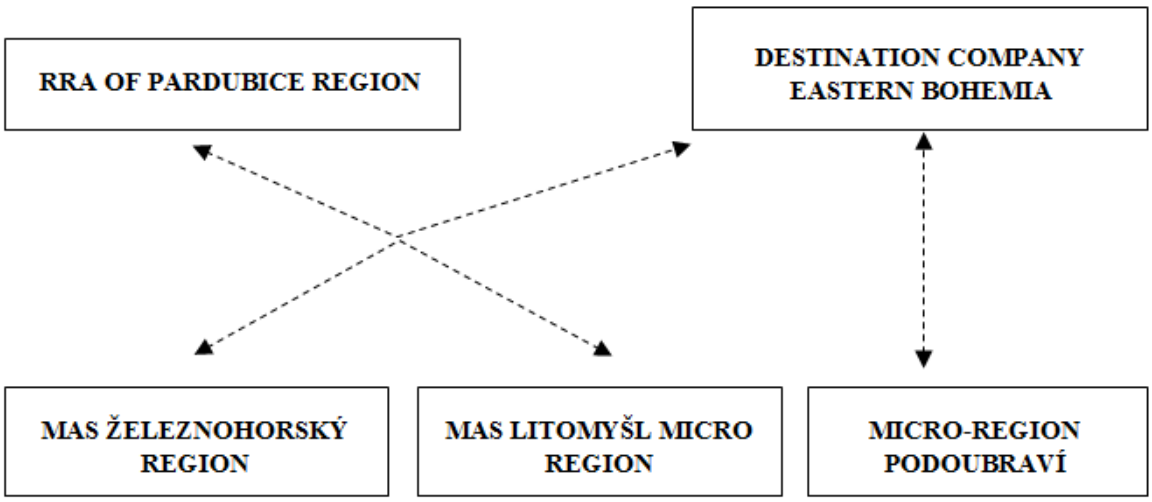
The Scientific Council of Geopark

The planned activities to support the management of the Geopark also include the establishment of an expert commission (Scientific Council of the Geopark), which will oversee the technical content of the activities implemented in the territory of the Geopark. Board of members will include representatives of the ASCR, CGS, UK, ME, Pardubice region or other institutions and entities. Generally, these will be experts in the fields of geology, biology, management, tourism and others. This council would meet at least once a year or - if necessary - several times a year.

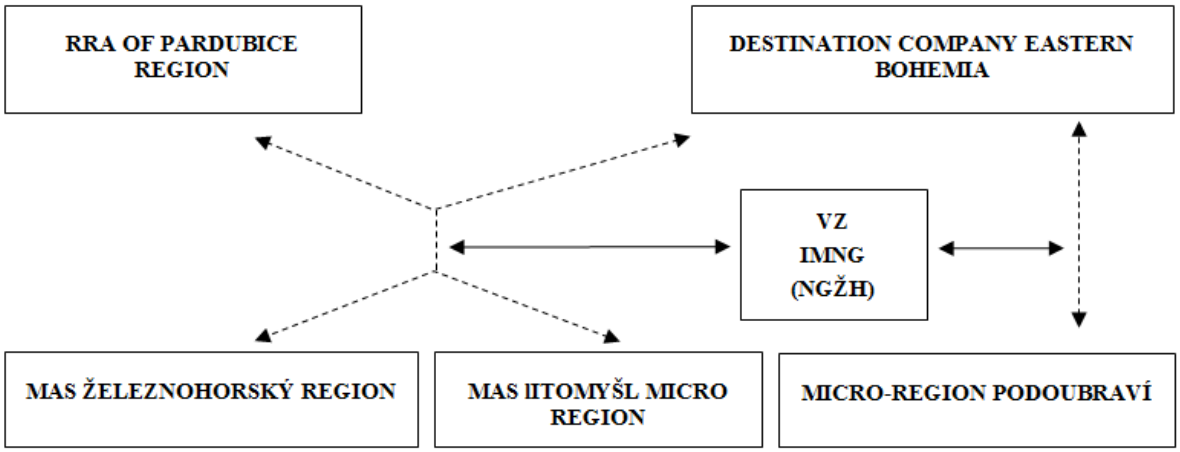
Destination Management

Currently, the destination management is in the territory of the future Geopark promoted mainly by these entities: Regional Development Agency of Pardubice Region (RRA), Destination company of East Bohemia (project of Tourist region Chrudim - Hlinsko), MAS Železnohorský region, micro-region Podoubraví and the Association of Toulovcovy Maštale municipalities in the collaboration with MAS Litomyšl micro-region. MAS Železnohorský region operating in the western part of the Geopark is the most important entity. It is one of the most active MAS in the Czech Republic.

The involvement of the applicant in the structure of the destination management in the territory of the future Geopark is expected in the following form. The applicant himself will not manage and control the destination management in the area; it will cooperate



on its implementation with existing bodies, particularly the MAS Železnohorský region. In collaboration with other entities, the applicant will be mainly responsible for the technical part of the cooperation, i.e. it will be the expert patron of development activities.



The Iron Mountains Geopark (NGŽH) very closely cooperates with the municipalities in the region that participate in its development. They include:

- counties, cities, municipalities
- commercial institutions (museums etc.).
- schools (primary, secondary)
- Universities, research institutes
- CGS
- Associations of multiple municipalities (MAS)
- Individual companies and enterprises

Geopark logo

Sufficient marketing promotion based on concise logo, uniform design manual and a uniform approach to media coverage of the area are the prerequisites for the development and sustainability of the Geopark

Creating a single graphic manual is being finalized. Its implementation is expected during 2016. The project logo as a supporting element takes the following form (see Fig. 7. below). The logo of Geopark is based on the geological characteristics of the whole area. The Iron Mountains National Geopark is located in an area with the contact of several regional geological features. Therefore it is possible to learn much about the regional geology of the whole Bohemian Massif within one or two days.

Five hexagons depicted in the logo of the Geopark represent the five major geological elements represented in the Iron Mountains area. The color of hexagons is based on geological color range of individual rocks.

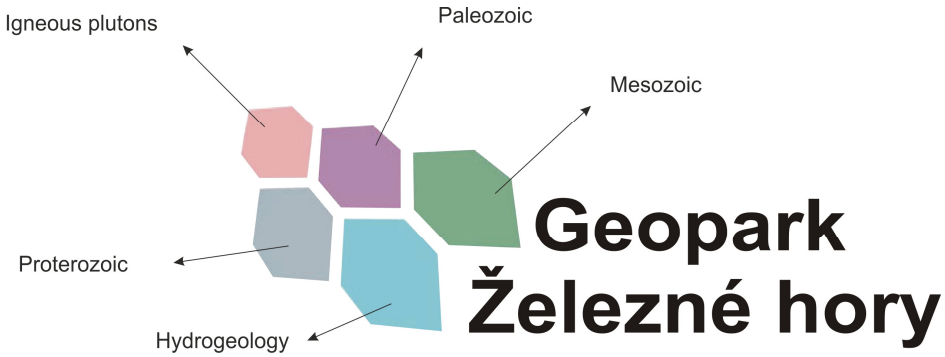


Fig. 7. The Iron Mountains Geopark's Logo

A.5 Applicant contact details

Address: Vodní zdroje Chrudim, spol. s r. o.
U Vodárny 137, 537 01 Chrudim
Czech Republic

Contact persons: RNDr. Daniel Smutek
Managing Director and Director of Vodní zdroje Chrudim and Director of the Iron Mountains National Geopark
e-mail: smutek@vz.cz

Mgr. Jan Doucek
Manager of the Iron Mountains National Geopark
e-mail: doucek@vz.cz

Fig. 8. The company premises of Vodní zdroje Chrudim and the registered office of the Iron Mountains Geopark