

Short Communication

## Report of 4GEON: A Project of Four Continents Connected Through Playful Geoeducation

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### Abstract

IGCP project No. 751 focuses on educational and ‘fun’ aspects of geoconservation, and its first year experienced the exchange of information between the geoparks of Central and Eastern Europe, Asia, South America and Africa. The following are particularly worthy of further elaboration and future efforts: 1) the offer by the geoparks to award local institutions and businesses the “GEO” certificate if they contribute to fun geological education; 2) special excursions through historic towns to look at the origin of the building stones and changes in use over time; 3) targeted cooperation on a personal and project level with the most famous museums in each country; 4) permission for visitors to collect rock samples that would otherwise be lost to natural processes.

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## Introduction

The IGCP-751 project ‘4GEON: Four continents connected through playful geoeducation’ was approved by UNESCO’s International Geoscience Programme (IGP) in 2022 and is expected to continue for five consecutive years. The long-term hope is that immersive and playful engagement with geology will gradually be adopted by both national and global geoparks to the benefit of their communities and nature. The proposed friendly competition will become a “World GeoContest,” promoting the values of geoheritage and principles of humanity, sustainable development, and civic participation among young and older people. Since the younger generation is the future of society, their education and activation can change attitudes in all of society. The general objective of the project is to enhance societal acceptance of the sustainable development of Earth’s geological resources via the involvement and activation of young people through novel, immersive and playful geoeducation.

Local and indigenous communities of these geoparks are facing growing pressure on the exploitation of their land (Espeso-Molinero & Pastor-Alfonso 2020; Pásková 2022; Pásková & Zelenka 2018; Varriale et al. 2022) including local geoheritage. The public is being involved through a user-friendly geoportal that explains how geology relates to the life of local people – accurately, enjoyably, and in their native language. Youth, the future of society, are given special consideration, especially in fragile indigenous communities. Young people can connect with their traditions and heritage, understand and value the stones, rocks, and wildlife around them, identify risks and challenges facing their environment, and come up with meaningful solutions through playful courses (Costes et al. 2021) that combine digital and outdoor activities (such as geobus excursions and trails with QR codes). Each year, geoambassadors

will be chosen from among the course participants, and they will attend a global geo-meeting with geopark representatives and experts. There they will discuss their findings, views, and plans with colleagues from around the world. Scientific evaluation and case studies published in scientific journals will raise awareness of the proposed concepts also within the professional community. The activities of the project leaders and participants are disseminated via the project website (<https://4geon.o-it.info/>) where information about the participating geoparks, other IGCP 751 activities/achievements as well as other relevant information on conferences, gatherings, and publications are updated.

The targeted areas include the Barrandien National Geopark (Czechia, Central Europe), Colca y Volcanes de Andagua UGGp (UNESCO Global Geopark; hereinafter the abbreviation UGGp; Peru, South America), Rio Coco UGGp (Nicaragua, Central America), Ngorongoro Lengai UGGp (Tanzania, East Africa), and Bohol Island Geopark (Philippines, Southeast Asia).

## Project Activities and Achievements

*Meetings:* The first group meeting of the whole project team was called on 18 April 2022 via Microsoft Teams. Previous digital meetings happened separately for the Czech part of the team, the Latin-American part and the rest of the team. Fourteen members of the team attended and the meeting covered introductions of the meeting participants, setting the agenda and note-taker, and information on the project. The first versions of the project documents were shared: press release, website proposal, PR document of the 4GEON project, the skeleton of the geoportal, and project documents sharing, through MS Teams. Activities till the end of the year, division of work, and workshop/conference in Barrandian NG, Czechia were also discussed. At the end of the meeting, it was

agreed that individual geoparks should include information about their geoparks on the website, with data coordinated by Luboš Gardon Jr, and the website by David Zejda. Further, the framework and material for Geoportal and Geocourse development will be expedited by Radek Mikuláš, Josef Zelenka, and David Zejda, while Josef Zelenka handles the logo and simple visual style. Martina Pásková, Radek Mikuláš, and Taiwo Temitope Lasisi were assigned to work on communication with the IGCP Secretariat on progress, annual report, and publication.

The second meeting of the whole project team was called on 21 July 2022, and attended by 17. The meeting summarized progress so far and discussed the next meeting in Czechia to be facilitated by Luboš Gardon Jr. The project website has been updated with the program of scheduled project meetings and workshops, future tasks and goals, plans for educational activities, and the new project logo and style documents. In developing documentation on the participating geoparks, the first version of the geoportal will be provided by the Barrandian NG and will be developed in three phases. Luboš Gardon Snr is creating a memorandum of understanding with the Czech Geological Survey, as already done with the Geological Institute of the Academy of Sciences of the Czech Republic, on data sharing for geoportal and geocourse.

*Conference/workshop:* The first “Annual Meeting IGCP 751- 4GEON: Four Continents Connected through Playful Geoeducation” took place in Příbram, Czechia, between August 29 and September 7, 2022, and brought together experts from Nicaragua (representatives of the Rio Coco UGGp from Peru (The Colca and Volcanoes of Andagua UGGp), from Tanzania (Ngorongoro Lengai UGGp) and the Philippines (Bohol Island Geopark, the first aspiring UGGp from the

Philippines). On September 4, they were joined by representatives of geoparks or educationally perspective sites from Eastern and Southeastern European countries, namely Ukraine, Moldova, Armenia, Georgia, and Slovakia. These participants highlighted the potential of the territories of Ukraine, Moldova, Armenia, and other countries on the edge of the former Soviet Union for their remarkable geological and/or geological cultural attractions.

For the next few days, the 45 participants first dealt with news from regions whose geological attractions are still little known to the wider public. The conference then continued in the form of excursions, with examples of the work already done in school interpretation of geological heritage, organizing geological excursions for the public, and the idea of awarding the “GEO” symbol to institutions and companies that meet the condition of fun promotion of geological heritage.

The extended organizing committee (Martina Pásková, Josef Zelenka, David Zejda, Luboš Gardon Sen., Luboš Gardon Jr., Radek Mikuláš, Lasisi Taiwo Temitope) and foreign participants (Joshua Mwankunda, Ramadhani Khatibu, Lightness S. Kyambile, Marcio Ariel Rivas Núñez, Thelma Elizabeth Sandoval, Vallecillo Monica Bueno, Abraham Caeseres Cabana, Jovencia Ganub and Karl Michael Din) began with an internal discussion on the fulfillment of the objectives of the IGCP No 751 project. Video presentations at the conference can be found at <https://geoparkbarrandien.cz/konference-geoparku-geoeducation-a-geoturism>. Some of the activities/discussions at the conference are discussed in the subsections below.

There was a trip to the Geological Institute of the Academy of Sciences of the Czech Republic. Radek Mikuláš presented this institution as a

potential background for research into phenomena discovered and documented in geoparks. A number of employees of the Institute of Geology work with foreign/international material; detailed research is, however, outlined by the currently running research grants, which normally last three years.

A tour of the historic center of Prague is a must for any visit to the Czech Republic, and fortunately the Barrandian geopark partially overlaps the territory of Prague. In the medieval buildings of Prague, we find a typical sequence of rocks used for construction and sculptural work (Fig. 1). An equally important element of geo-education is the collection of paleontological exhibits and minerals in the National Museum in Prague. This largest Czech museum exhibition has been modernized in recent years and presents artistic reconstructions of ancient life and natural conditions in the Czech Republic. Interactivity or exposure based on tactile sensation is important.

The Karel Capek elementary school in Příbram boasts the title “GEO” awarded by Geopark Barrandian. An example of the work has been the visit of the professional paleontologist Štěpán Rak, who brought dinosaur models and some other paleontological curiosities to children aged 9-10. He explained what the most common mistakes associated with these taxa are, and at the end, he announced a competition in which the children had to classify different animals as either carnivores or herbivores. The whole interactive lesson showed that with the help of appropriate procedures and visual aids, children can be given illustrative, factually correct, and durable information about the Earth’s geological past.

During the next day, an excursion went to the only Czech geopark of the UNESCO network, i.e., Bohemian Paradise UGGp. R. Mikuláš and the other guides presented one of the oldest geotourism areas in Europe, the attractiveness of the microrelief of coarse-grained sandstones, as well



Figure 1. Excursionists at Expedition in the historical center of Prague. Radek Mikuláš (center) explains the local origin of the vast majority of historical building materials in medieval Prague. The pinkish limestone from which the pavement is made comes from the oldest continuously operating quarry in Europe, the Radotín - Cikánka site (Lower Devonian, Pragian stage).

as the consequences of overloading and damage to some attractive geosites. During the field trips, each visitor was able to collect rock samples that would otherwise have been lost to weathering, but of course would not be for sale. This applies, for example, to the Luh at the Skryje location. Here

there are screens with numerous fragments of large trilobites of Cambrian age (Fig. 2). Through solifluction and weathering, they gradually disappear, and new material is released. With proper care and supervision, such locations can provide a few visitors with a profound experience of contact



Figure 2. Trilobites of the genus *Hydrocephalus* described by J. Barrande (middle Cambrian) found at the publicly accessible Skryje-Luh site.

with the ancient geological past. The Bohemian Paradise perfectly presents the connection of geology with history, with spectacular landscapes (Fig. 3), architectural monuments such as castles, and the present, an element of which can be, for example, an organic farm.

### Conclusion

Regional economic development is greatly influenced by tourism, and the fast-expanding geotourism industry offers a substantial opportunity for increased growth. Geoparks, a relatively new concept for the preservation of the earth's geological and natural history, are crucial to the growth of geotourism (Farsani et al. 2011). The establishment of geoparks can lead to new economic activities, new job opportunities, and alternative sources of income while promoting geotourism. The IGCP-751 project will advance the rare, educational, scenic, aesthetic, and scientific importance and value of the targeted geoparks.

Through the network from the project, there will be an exchange of experiences, knowledge, and geotouristic values among the individual geoparks, which will be beneficial to the development and improvement of geotourism (Wójtowicz et al. 2011). The geological landscape and reserves will give chances for the transfer of intercontinental values of geological heritage. The project has brought together female researchers, young researchers, as well as researchers from low-income countries. Three months after project approval, there have been two productive meetings that led to the successful planning and implementation of the conference/workshop, which will help in facilitating knowledge sharing of the targeted areas' geopark.

So far, IGCP-751 has been a very fruitful initiative and is expected to continue until its end in 2026 and the schedule encompasses an annual workshop, geoportal, geocourse, geocontest, and geobus to achieve the aim of connecting four con-



Figure 3. Beautiful Landscape Sample characterizing the Bohemian Paradise UGGp. Upper Cretaceous sandstones. Excursion site of the 4GEON Meeting.

tinents through playful geoeducation.

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**Appendix A**

Details of IGCP 751 Project Leaders and Members

	Total number of scientists	Number of male scientists	Number of female scientists
Number of participating scientists	24	7	5
Number of young scientists/students (<35 years old)	5	2	3
Number of scientists from developing countries	6	3	3

	Name	Country and organization	Contribution area
1	Marcio Ariel Rivas Núñez	Nicaragua, UGPP Río Coco	Geopark Coordinator and management of Cultural Heritage Interpretation
2	Deymins Emmanuel Larios Díaz	Nicaragua, UGPP Río Coco	Historical and archeological studies and education, guiding
3	Franklin Javier Padilla Guillen	Nicaragua, UGPP Río Coco	Sustainable agriculture using the traditional knowledge of local people, the relationship between agriculture and geological conditions
4	Eduard Josué Catín Muñoz	Nicaragua, UGPP Río Coco	Use of ICT, online meetings, transfer of local knowledge records
5	María José Lira Cruz	Nicaragua, UGPP Río Coco	Use of knowledge gained in the project in the strategic development of local geotourism
6	Thelma Elizabeth Sandoval Vallecillo	Nicaragua, UGPP Río Coco	Coordination of cooperation of persons involved in the project
7	Lukáš Laibl	Czech Republic, Barrandian National Geopark	Use of knowledge from paleontology in geotourism, follow-up education
8	Pavla Staňková	Czech Republic, Barrandian National Geopark	Protection of natural resources and development of geotourism in accordance with the principles of sustainable tourism development
9	Luboš Gardoň	Czech Republic, Barrandian National Geopark	Project management, marketing, education, and development of geotourism in accordance with the principles of sustainable tourism development
10	Luboš Gardoň	Czech Republic, Barrandian National Geopark	Coordinator of education activities for Children and Youth
11	Radek Mikuláš	Czech Republic, Institute of Geology of the Czech Academy of Sciences	Secretary of the project use of knowledge from paleontology in Earth heritage interpretation and geoscience popularization

	Name	Country and organization	Contribution area
12	Martina Pásková	Czech Republic, UHK	Leader, coordination of project activities, including projects outputs and their evaluation
13	Josef Zelenka	Czech Republic, UHK	development of geotourism in accordance with the principles of sustainable tourism development
14	David Zejda	Czech Republic, UHK	Development of project information system
15	Taiwo Temitope Lasisi	Czech Republic, UHK (Nigerian state citizenship)	Development of geotourism in accordance with the principles of sustainable tourism development, bibliometric review
16	Abraham Caceres Cabana (Quechua)	Peru, Colca y Volcanes de Andagua UGGp	Development of geotourism in accordance with the principles of sustainable tourism development, historiographic studies
17	Karin Rosario Taco Huamani (Quechua)	Peru, Colca y Volcanes de Andagua UGGp	Concept ABC - sociology of geotourism
18	Esther Basilia Huamani (Quechua)	Peru, Colca y Volcanes de Andagua UGGp	Project marketing
19	Ramadhani Khatibu	Ngorongoro Lengai UGGp	Co-ordination of activities of the geopark
20	Joshua Mwankunda	Ngorongoro Lengai UGGp	Connection with state authorities and international organizations; director
21	Jovencia Ganub	Philippines, Bohol Island Geopark	Supervising environmental management specialist and designated Head of Bohol Environment Management Office; Focal person, Bohol Island Aspiring UNESCO Global Geopark
22	Nancy Rhoena Aguda	Philippines, University of the Philippines – School of Regional and Urban Planning	Volunteer geologist for Bohol Island Geopark; geosciences education; geological heritage conservation; disaster management
23	Marianito Jose Luspó	Philippines -Holy Name University, Bohol	Director of Cultural Affairs & Development Center at HNU; teaches heritage tourism; founded Holy Name University's Photographic Museum and Archive of Boholano Life and Culture
24	Karl Michael Din	Philippines, Bohol Island Geopark	Geopark geologist; educates locals about the geology of Bohol