CZECH GEOLOGICAL SURVEY

Annual Report **2025**



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Director's Foreword

How was the year 2025 for the Czech Geological Survey? One exceptional achievement published this year that stands out is the geological and hydrogeological map of Ethiopia with an area of 1,104,300 km^2 accompanied by comprehensive explanatory notes describing the geological evolution of the area. The map was originally prepared at a scale of 1:1,000,000, but due to the unavailability of a printing press capable of handling such a large sheet, it was eventually printed at a scale of 1:1,200,000. Additionally, the map is available to everyone as an interactive web map application.

This extensive work was accomplished over five years through an ambitious project led by Kryštof Verner, involving a team of geologists from the Czech Geological Survey (CGS), the Faculty of Science of Charles University, and Ethiopian universities, and was funded by the Czech Development Agency. Subsequently, the map won the Czech Cartographic Society's Map of the Year 2025 award, and the Esri company – whose software was used to process the map – honoured the work with the Special Achievement in GIS 2026 Award. This highly prestigious achievement represents a milestone in the history of geological knowledge of the territory and serves as a foundation for Ethiopia's future economic development.

The CGS has other interests also focused on the African continent. In February 2025, I participated in an official visit by Minister of the Environment Petr Hladík to Algeria. During a meeting with Minister of Energy and Mining Mohamed Arkab, his Secretary of State Karima Tafer, and Chairman of the Board of the Algerian Geological Survey (ASGA) Abderezak Khama, we discussed a collaborative project between our two geological surveys. This project will aim at the professional development of our Algerian colleagues while simultaneously conducting more detailed research into the potential of critical raw materials in Algeria.

Critical Raw Materials (CRMs) have become a topic that receives increasing attention year by year, as the profound dependence of both Czech and European industry – and by extension, our entire civilization – on these resources is now widely recognized. 2025 marked the first year of implementation of the CRM National Exploration Programme approved by the Government of the Czech Republic. The CGS and the DIAMO state enterprise are the lead organizations for this project, spearheaded by our distinguished mineral deposit expert Petr Bohdálek. We can only hope that this project will receive guaranteed annual funding without which the geophysical, drilling, and laboratory work necessary to achieve the set goals would be impossible.

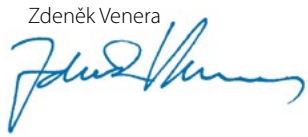
Our broader activities in Africa are similarly tied to critical raw materials. The highly successful PanAfGeo+ project, funded by the European Commission through DG INTPA, contains a part dedicated to geological mapping training that has been excellently led by Veronika Štědrá on behalf of the CGS for the past decade. The project was expanded to include a new Country Window component starting in 2025. This component focuses on field research into the potential of critical raw materials in selected areas of several African countries. The CGS is represented in two consortia: one in Uganda, led by the Geological Survey of Slovenia (GeoZS) and the Czech team led by Zuzana Tasáryová, and the other in Zambia, led by the Geological Survey of Finland and the Czech team led by Kryštof Verner. The projects are just getting started and we eagerly await the results they will yield in the coming years.

The year 2025 is notable for us due to yet another extraordinary event with a long history behind it. In 1972, at the International Geological Congress in Montreal, the Klonk outcrop near Suchomasty was selected as the global stratotype for the Silurian–Devonian boundary (419 million years ago). In 1977, a monument commemorating this event was erected in this village, featuring a viewing aperture directed toward the famous outcrop. Following the political changes in 1989, this monument found itself on private land, eventually behind a fence, and ultimately, in 2024, the landowner even began to demolish it. Fortunately, intervention by the Czech Police and the Beroun District Court prevented its destruction. The CGS took the initiative in cooperation with the municipality of Suchomasty, specifically Mayor Iva Kinclová, and arranged for the monument to be relocated and reinstalled at a new site on municipal land where the memorial continues to serve its purpose. Much of the credit for this cultural and scientific achievement goes to our paleontologist Petr Budil, a student of Ivo Chlupáč, who originally championed the creation of this monument of global significance.

Last year, we celebrated a century of service provided by our geological library. This year, by contrast, I would like to draw your attention to a relatively new endeavour of ours. Since 2022, *World of Geology – Newsletter of the Czech Geological Survey* (Svět geologie – Zpravodaj České geologické služby) has been published quarterly, featuring the latest news on CGS activities and projects, interviews with our staff members, and geological highlights from our country and abroad. This magazine is primarily the work of Editor-in-Chief Klára Froňková, Editor Lea Smrčková, and Graphic Designer Eva Šedinová. Thanks to their outstanding efforts, it has garnered great interest and popularity among geology enthusiasts in just a few short years. This attractive and professionally designed annual report that you are currently reading is also the result of our graphic designer's work.

As is our tradition, I would like to take this opportunity to sincerely thank all my colleagues who bring to their work at the Czech Geological Survey not only their knowledge and expertise, but also tremendous dedication and deep passion for their profession.

Zdeněk Venera



Organizational Structure of the Czech Geological Survey

Situation as of 31 December, 2025

Advisory bodies

Anna Vymazalová
Deputy Director for Research
anna.vymazalova@geology.cz

Editorial Boards
of the Bulletin of Geosciences
and Geoscience Research Reports

Directorate

Zdeněk Venera
Director
zdenek.venera@geology.cz

Management
Project Management
Management and Administration
of the Brno Branch

Human Resources Section
Internal Audit

Advisory bodies

Review Board
CGS Map Approbation Committee

Geochemical Division and Central Laboratories

Anna Vymazalová
Head of Division
& Deputy Director for Research
anna.vymazalova@geology.cz

Environmental Geochemistry and Biogeochemistry

Martin Novák
Head of Department
martin.novak@geology.cz

Rock Geochemistry

František Laufek
Head of Department
frantisek.laufek@geology.cz

Mineral Resources Research and Policy

Michal Poňavič
Head of Department
michal.ponavic@geology.cz

Central Laboratory

Tereza Grabmüllerová
Head of Department
tereza.grabmullerova@geology.cz

Economic Division

Zdeněk Cilc
Head of Division
& Deputy Director for Economics
zdenek.cilc@geology.cz

General Economics

Jana Kuklová
Head of Department
jana.kuklova@geology.cz

Economics and Administration

Blanka Štolbová
Head of Department
blanka.stolbova@geology.cz

Department of Assets and Public Procurement

Radek Mixa
Head of Department
radek.mixa@geology.cz

Geological Division

Petr Mixa
Head of Division
& Deputy Director for Geology,
Deputy Director of the CGS
petr.mixa@geology.cz

Regional Geology of Crystalline Complexes

Jan Jelínek
Head of Department
jan.jelinek@geology.cz

Regional Geology of Sedimentary Formations

Zuzana Tasáryová
Head of Department
zuzana.tasaryova@geology.cz

Applied Geology

Petr Kycl
Head of Department
petr.kycl@geology.cz

Regional Geology of Moravia

Jan Vít
Head of Department
jan.vit@geology.cz

Centre for Lithospheric Research

Karel Schulmann
Head of Department
karel.schulmann@geology.cz

Division of Information Systems

Vít Štrupl
Head of Division
& Deputy Director for Informatics
vit.strupl@geology.cz

Informatics

Richard Binko
Head of Department
richard.binko@geology.cz

Geofond

Milada Hrdlovicsová
Head of Department
milada.hrdlovicsova@geology.cz

Mineral Raw Materials

Jaromír Starý
Head of Department
jaromir.stary@geology.cz

Mining Impacts

Jolana Skřivánková
Head of Department
jolana.skrivankova@geology.cz

Geological Exploration

Zdeňka Petáková
Head of Department
zdenka.petakova@geology.cz

Information Services

Hana Breiterová
Head of Department
hana.breiterova@geology.cz

CGS Publishing House

Patrik Fiferna
Head of Department
patrik.fiferna@geology.cz

Management



From the left: **Vít Štrupl** – Deputy Director for the Division of Informatics, **Petr Mixa** – Deputy Director of the Czech Geological Survey and Deputy Director for Geology, **Zdeněk Venera** –Director of the Czech Geological Survey, **Anna Vymazalová** – Deputy Director for Research, **Zdeněk Cilc** – Deputy Director for Economics, **Jan Vít** – Director of the Brno Branch.

Czech Geological Survey

The Czech Geological Survey is a respected, state-funded organization and a departmental research institute of the Ministry of the Environment. It is responsible for compiling, storing, interpreting, and providing objective geological information to government agencies, the private sector, and the public. In its capacity as the official state geological survey, it is the only institution tasked with the systematic investigation of the geological structure of the entire Czech Republic.

The Survey's well-established reputation is built on an effective balance of public service and top-tier research in geological science, natural resources, geohazards, and environmental protection. As an internationally respected scientific institution, it supports society's goals for sustainable development and plays a vital role in education and in promoting public understanding of geology.

Main fields of activity

- Geological research and mapping
- Rock environment and its protection
- Mineral resources and environmental impacts of mining
- Geohazards: Prevention and mitigation of their impacts
- Geoinformation management and delivery

Mission

- Performance of the state geological survey in accordance with Act No. 62/1988 Coll. (on Geological Works).
- Regional research, geological mapping, and the creation of geological 3D models of the territory of the Czech Republic.
- Basic and applied research in the fields of geohazards, mineral resources, groundwater resources, protection of the rock environment, and environmental protection.
- Acquisition, collection, and evaluation of information on the geological composition of the territory, mineral resources, and geohazards within the Czech Republic.
- Provision of geoscience information and expert support for decision-making in matters of state and public interest.
- International cooperation and foreign development aid.
- Education in geosciences and in the field of environmental protection.

Vision

Through innovative research and use of the most up-to-date technology, the Czech Geological Survey will continue to provide the Czech State with the geoscientific information needed to make crucial policy decisions about energy, water and other critical resources, natural hazards and sustainable development, while working to maintain its position as a leading research institution in the field of Earth sciences.

Long-Term Conceptual Development of Research Organization (LCDRO)

The **CGS** is the leading research organization in the Czech Republic in the field of Earth sciences. Since 2023, it has been implementing a new **Long-Term Conceptual Development of Research Organization (LCDRO/DKRVO)**, which includes the **Strategic Research Plan for 2023–2027**.

This document was prepared in accordance with the Updated Research, Development and Innovation Concept of the Ministry of Environment (MoE) for the years 2016 to 2035 with a view to 2050. Through the peer review assessment of the MoE Expert Advisory Body, this concept received an excellent, top rating. It also serves as the basis for the MoE's decision to provide institutional support. Following the approved document, the research activities of the CGS are focused on the following research tasks:

1. Structure and dynamics of the Earth
(D. Buriánek, P. Hasalová, V. Janoušek)

2. Research of global changes, the biosphere, and the sedimentary record
(J. Frýda, S. Vodrážková)

3. Minerals for sustainable economic development
(M. Poňavič, B. Kříbek)

4. Groundwater research and assessment
(L. Rukavičková, J. Řihošek)

5. Geoenergy research
(J. Holeček, D. Štěpánský)

6. Engineering geology and geohazards
(M. Aue, O. Krejčí)

7. Landscape biogeochemistry in the era of climate change
(M. Novák, J. Hruška)

8. Professional support and organizational development
(M. Vajskebrová, J. Procházková)



Photo by O. Man.

Anna Vymazalová
Deputy Director for Research

All activities within the priority areas, including basic and applied research, are in accordance with the CGS foundation charter and enable the performance of the state geological survey at a high professional level. CGS research is also carried out in close connection with the priority needs of the MoE with the aim of continuing to produce the highest quality geoscientific results both at national and international level. An important part of this new strategic document is the popularization and development of digital technologies in geology as well as research and development of modern analytical and imaging methods, which is very important for the successful implementation of all areas of research.

2025

The year 2025 marked the third year of implementing the new **LCDRO**. During this period, Czech Geological Survey (CGS) staff produced a total of **218 RIV (Register of Information on Results) category outputs**.

Of this total, outputs included: 101 articles in peer-reviewed journals, 3 monographs, 3 chapters in monographs, 57 specialized maps with professional content, including 3D models, 1 output in the audiovisual production category, 1 prototype, 24 organized events such as conferences, workshops, or exhibitions.

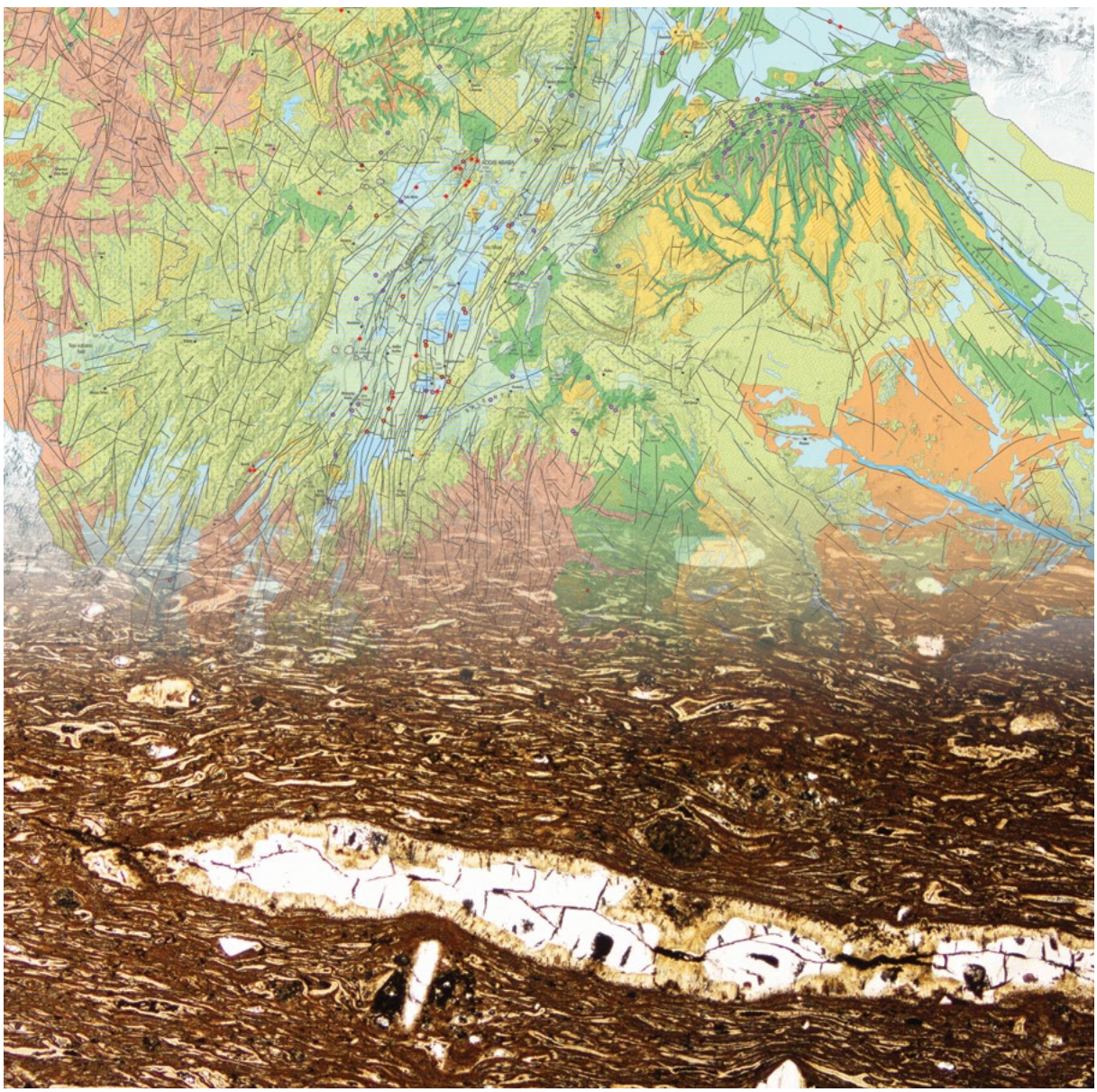
Within the category of articles in professional periodicals, it is important to highlight that **72 articles were published in international impacted journals** ranked in the 1st (38 articles) and 2nd (36 articles) quartiles of their respective fields (Q1, Q2).

A peer review assessment of selected excellent scientific and research results of the Czech Geological Survey, along with a bibliometric analysis for the collection period of 2019–2023, published by the **Research, Development and Innovation Council (RVVI)**, demonstrates that in addition to significant publication activity in the dominant field of Earth sciences and related environmental sciences (with results significantly above both the national and global median, as shown at https://hodnoceni.rvvi.cz/hodnoceni2024/biblio-vo), **the CGS is also a significant producer of applied research results**.

In terms of the share of research organizations assessed with grades 1, 2, and 3 for results over a five-year period (Assessment 20–Assessment 24) in the field of Earth sciences and related environmental sciences, **the CGS remains the most significant producer of the highest quality selected results among all research organizations in the Czech Republic**. These results are assessed in terms of their societal relevance and contribution to knowledge (https://hodnoceni.rvvi.cz/hodnoceni2024/nebiblio).

As the sole institution under the purview of the Ministry of the Environment, the Czech Geological Survey ranks among the foremost research organizations in the Czech Republic in terms of overall research output. It achieves the highest number of publications in top-decile and top-quartile journals. Its publication metrics within the field significantly exceed both national and international medians, reflecting extensive international collaboration.

Exploring Earth:
For understanding and benefit



» Photomicrograph of an ignimbrite from southern Ethiopia (PPL). / Hydrogeological map of Ethiopia at a scale of 1:1,000,000. Photo by D. Buriánek.

2023
LCDRO
2027

Structure and dynamics of the Earth



David Buriánek
Coordinator
for *Earth Structure and Dynamics*

Our primary objective is to deepen our understanding of geodynamic processes within the Earth's interior, spanning a wide range of scales – from detailed investigations of the geological structure of the Czech Republic to studies on the evolution of orogenic belts in Europe, Africa, and Asia.

Building on over a century of tradition in systematic mapping, we combine modern geochemical and geophysical methods to create a comprehensive knowledge base essential for contemporary society.

Our studies and map outputs serve as essential tools for environmental protection and strategic decision-making, including critical raw materials exploration, the safety of deep geological repositories for radioactive waste, and geohazard prevention. We thus bridge cutting-edge basic research with practical applications in spatial planning and energy, contributing to the safe and sustainable development of our environment.



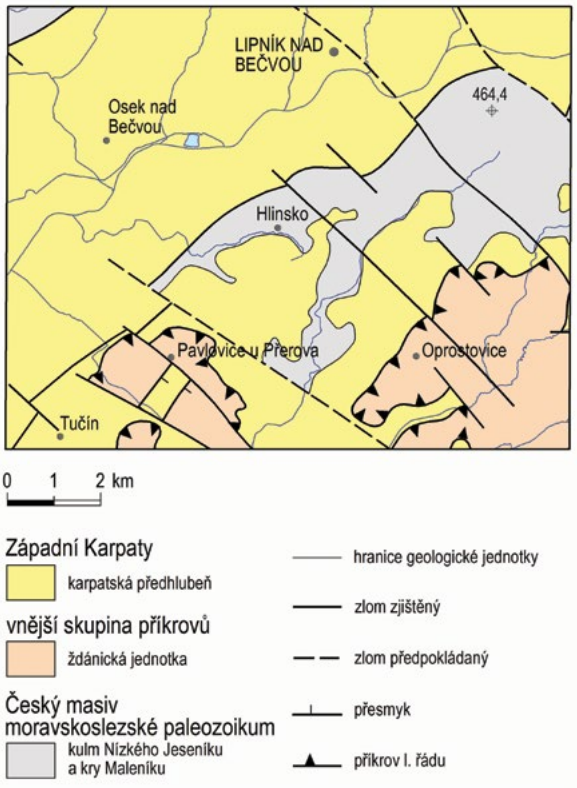
Water resource utilization in southern Ethiopia. Photo by D. Buriánek.

Geological mapping and regional geological research

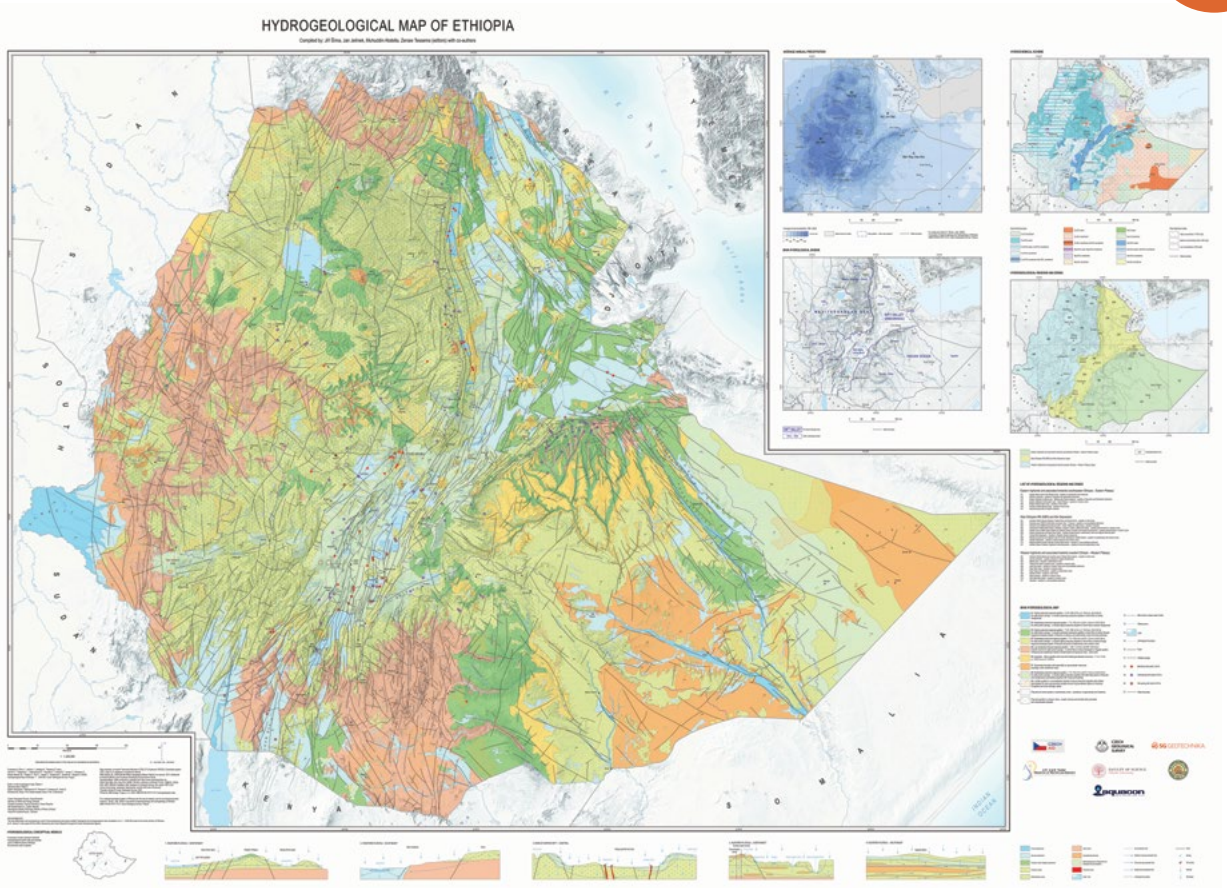
Geological mapping lies at the core of our activities, encompassing the production of geological and thematic maps at various scales, the systematic collection, processing, and archiving of field data, as well as the provision of accompanying datasets and physical documentation. An integral component is also the management of an extensive database infrastructure that enables uniform storage and the long-term utilization of the acquired information. Field data are continuously uploaded to a centralized database, where they are categorized into geological, hydrogeological, and pedological datasets.

In 2025, we completed the development of internal database tools designed for digital field documentation. The new system streamlines data collection, management, and sharing, significantly simplifying subsequent processing during map production. This tool was actively utilized throughout the year to prepare new geological maps.

Mapping activities in 2025 focused primarily on finalizing map sheets under the Geological Mapping of the Czech Republic at a Scale of 1:25,000 project, particularly in the Šumava (Bohemian Forest) and Železné hory (Iron Mountains) regions. A major achievement was the successful publication



Geological map sketch for sheet 25-132 Lipník nad Bečvou.



Hydrogeological map of Ethiopia.

of the geological map along with its explanatory notes for sheet 25-132 Lipník nad Bečvou.

Another important output is the thematic map *Building and Decorative Stones of the Karlovy Vary Region*, scheduled for publication in early 2026. This work summarizes information on the occurrence, properties, and historical and current use of natural stones in the region, providing vital reference material for the professional community, spatial planners, and geoheritage conservation.

On the international front, a major milestone was reached with the completion of the modern geological and hydrogeological mapping of Ethiopia at a scale of 1:1,000,000. These maps are available online via the CGS portal (https://mapy.geology.cz/ethiopia1mil) and a free mobile application. Funded by the Czech Development Agency as part of foreign development cooperation, this mapping initiative provides a vital tool for natural resource management, spatial planning, and water resource management in this rapidly developing country.

Domestically, both the professional community and the general public benefited from new publications and map products dedicated to the geology of the Křivoklát region. In addition, regional mining history was thoroughly documented in the monograph *Neznámé Jemnicko* (*The Unknown Jemnice Region*).

Educational and science outreach initiatives also played a key role. The Czech Geological Survey co-organized a field mapping course for students from the Faculty of Science at Masaryk University, held near Horšovský Týn. Participants gained hands-on experience in geological mapping, the documentation of geological phenomena, and the interpretation of field data.

Mapping and research activities were complemented by the following publishing highlights:

- A peer-reviewed article investigated the provenance of Eocene amber-bearing sediments from the Beloveža Formation near the village of Študlov in Moravia, expanding our understanding of sedimentary source areas and the region's paleogeographic evolution.
- Another publication addresses the stratigraphy of formations within the Silesian and Subsilesian units, refining their lithostratigraphic and regional-geological classification.



Documentation of Cenozoic sediments during the field mapping course for students of the Faculty of Science, Masaryk University, in Horšovský Týn. Photo by D. Buriánek.

- Research also focused on the genesis of doubly terminated quartz crystals in Spanish limestones, with the study discussing their crystallization conditions within the context of diagenetic and hydrothermal processes.

Understanding endogenous processes in the past and present

In 2025, research advanced through numerous national and international projects, notably those funded by the Czech Science Foundation (GA CR) and conducted in cooperation with the National Research Foundation of South Africa and the University of Johannesburg. Research activities were thematically structured around three main pillars:

- the geodynamic evolution of orogenic belts in Europe and Asia,
- the amalgamation and subsequent breakup of the Gondwana supercontinent, exemplified by selected regions in Africa,
- the origin and evolution of the oldest continental crust within the European Variscan orogen.

A major publishing highlight of the year was the release of a special issue in the prestigious journal Geological Society, London, Special Publications. This collection of studies provides new insights into the evolution of large-scale collisional systems and the processes that shaped the continental crust across Eurasia. Research on the European Variscides has primarily focused on the geotectonic evolution of these structures and on the application of numerical models simulating orogenic belt formation and development. Furthermore, detrital zircon analyses helped refine models of the evolution and breakup of the Rodinia and Pangea supercontinents, providing critical data on long-term crustal history and sedimentary provenance.

Beyond Europe, fieldwork spanned several key African regions (Namibia, Algeria, Madagascar, and Ethiopia). These areas serve as vital natural laboratories for studying the processes governing the formation and breakup of Gondwana, as well as the evolution of the deep continental crust. Among the most significant scientific outputs were papers on the development of migmatite domes in Namibia,

which provide new constraints on crustal partial melting and deformation during orogenic stages.

Another significant outcome is an extensive geochronological synthesis of the Kaoko–Dom Feliciano system, which significantly refines the evolutionary framework of this key belt formed during the ocean closure between the South American and African segments of Gondwana. Further research investigated the geochemical signatures and petrogenesis of granitoids in the accretionary Central Asian Orogenic Belt (CAOB) in Mongolia.

In 2025, we successfully concluded a project investigating crust–mantle interactions within the European Variscan convergent orogen. As part of this initiative, the team published a comprehensive study on mantle melting and metasomatism processes, constraining their timing through Sm–Nd, Re–Os, and Lu–Hf isotopic systems. These results significantly enhance our understanding of deep lithospheric evolution and the dynamics of the Variscan orogeny.

Parallel research targeted apatite chemistry in mafic and ultramafic rocks of the Bohemian Massif. During the year, we expanded the analytical dataset with new data, enabling a more precise interpretation of the petrogenesis and geochemical evolution of these rocks.

We also released a new version (6.3) of the GCDkit software package, a widely used tool for processing, visualizing, and interpreting geochemical data.

The TIMS Isotope Geochemistry Laboratory continued its successful collaboration on a number of internal and external projects, primarily by providing high-precision Sr and Nd isotope analyses. The laboratory contributed, for example, to the study of volcanic rocks from Paleozoic rift systems.

Lithosphere research for radioactive waste disposal

In 2025, we completed a project focused on the geological and geotechnical characterization of the host rock at the Bukov URL (Underground Research Laboratory) II. Its objective was to detail the geological, structural, and hydrogeological conditions of the newly excavated underground spaces of the former Rožná mine site. The project results provide essential data for further research and for assessing the suitability of the Bohemian Massif's crystalline rocks for the future deep geological disposal of radioactive waste.

During the year, we hosted a specialized workshop for key stakeholder institutions, including the Ministry of Industry and Trade (MIT), the Radioactive Waste Repository Authority (SÚRAO), the State Office for Nuclear Safety (SÚJB), and the Ministry of the Environment (MoE). This event marked the completion of the project Alternative Technical Solutions for Deep Geological Disposal of Radioactive Waste. The project aimed to analyze potential technical design options for a deep geological repository, assess approaches used across the European Union and globally, and evaluate their applicability to Czech conditions in line with the current national strategy for radioactive waste and spent nuclear fuel management. Concurrently, we continued to develop, verify, and validate modelling approaches and safety analyses, making significant progress in discrete fracture network (DFN) modelling.

Research activities also included geological and hydrogeological mapping of selected candidate sites for the deep geological repository. This fieldwork involved detailed structural documentation, the analysis of outcrops suitable for DFN modelling, and data collection on the fracture systems within the rock mass. Concurrently, remote sensing data were collected and analyzed to conduct morphostructural and geomorphological assessments of the areas, including the identification of potentially water-bearing zones using Earth observation methods.

Geological site investigation plans were finalized for all four candidate sites. Simultaneously, we continued preparing the documentation for planned technical field operations and initiated the supervision of hydrogeological monitoring.

A crucial component of our ongoing research is the long-term hydrochemical and hydrogeological monitoring of an in-situ experiment at the Bukov URL. This experiment focuses on tracking changes in groundwater circulation and chemical composition within the rock mass surrounding experimental boreholes. The acquired data provide valuable insights into the long-term behaviour of the host rock and its response to engineering interventions.

From the past, we draw knowledge for the future



» Red Ordovician carbonates of the Zitai and Kuniutan formations, Red Stone Forest, Xiangxi UNESCO Global Geopark (Hunan, China). The geopark includes two Cambrian GSSPs and represents a significant paleontological area in southern China. Photo by Petra Tonarová.

2023
LCDRO
2027

Research on global changes, the biosphere and the sedimentary record

Jiří Frýda
Stanislava Vodrážková
Coordinators
for *the Global Change Research Area*

Research in this area focuses on global environmental changes across a broad stratigraphic range, from the Paleozoic to the Quaternary. We integrate paleobiological, paleoecological, sedimentological, geochemical, and stratigraphic approaches to analyze the evolution of both marine and terrestrial ecosystems.

Furthermore, we investigate the interactions between volcanism, sedimentary environments, and the biosphere, and reconstruct landscape evolution and exogenous processes during the Quaternary.



Views of the rock walls and valley floor of the Furkotská Valley in the High Tatras. Research here focused on determining the chronology of deglaciation and slope dynamics using a combination of ^{10}Be exposure dating and relative dating (Schmidt hammer test). Photos by Tereza Uxová.



A rock shelter inhabited during the Upper Paleolithic, overlooking the surrounding landscape in the Loita Hills, southeastern Kenya. This locality is the site of geoarchaeological research organized by the University of Illinois in collaboration with the Institute of Archaeology of the CAS and the Czech Geological Survey. Photo by Jan Hošek.

Research on global changes and the evolution of marine ecosystems

Research focused on the evolution of marine ecosystems from the Cambrian to the Cenozoic using integrated paleontological, sedimentological, geochemical, and geophysical methods, resulting in 17 publications in impact factor journals. A major international milestone was the declaration of a new Global Boundary Stratotype Section and Point (GSSP) for the base of the Telychian Stage, with the involvement of Czech Geological Survey researchers.

Paleozoic research yielded new insights into the dynamics of marine ecosystems during major environmental events and refined stratigraphic schemes based on biochemostratigraphy. Attention was also given to microbial sediments and the microbially mediated authigenesis of clay minerals, which may be crucial for recognizing microbial surfaces in the sedimentary record.

Mesozoic research focused on integrated stratigraphy and detailed biostratigraphy of foraminifera and ostracods, including a proposal for a new ostracod biozonation and the comparison of benthic foraminiferal zonation across Europe. A significant outcome was the multidisciplinary study of the Cretaceous–Paleogene boundary in a unique section of flysch facies deposited below the CCD (Carbonate Compensation Depth), where the boundary position was determined with centimetre-scale accuracy.

Cenozoic research concentrated on the relationships among climate, diagenesis, and oceanic circulation. Additionally, international collaborations were initiated to unify micropaleontological methods and data sharing, which contributes to higher comparability of stratigraphic interpretations on a global scale.

Research on global changes and the evolution of terrestrial ecosystems

Research focused on global changes in Upper Carboniferous and Lower Permian terrestrial ecosystems, resulting in 6 publications in impact factor journals. The study of the sedimentary and biotic records provided new findings on the evolution of paleoenvironments around the Carboniferous–Permian boundary and the links between sedimentation and tectonic processes during the development of the Bohemian Massif basins. These results were supplemented by comparisons with significant international sections, allowing the Czech records to be better placed within a broader paleogeographical context.

Attention was also paid to paleoecological changes during the global crises of Late Paleozoic terrestrial ecosystems, including the study of new coal seam outcrops and selected drill cores. Paleobotanical and palynological research contributed to refining the composition of Permo-Carboniferous flora and the stratigraphic assignment of some previously problematic sequences.

Furthermore, the research encompassed processes at the sediment–water interface in a chemically stratified lake. This study demonstrated that short-term fluctuations in redox





» Foliage of the horsetail *Annularia sphenophylloides* from the Kounov coal seam, exposed at the D6 motorway roadcut near Hokov–Děkov. Photo by Zbyněk Šimůnek.

« Domed stromatolite associated with oolitic beds, Heeseberg (Lower Saxony, Germany; Lower Triassic). Beyond its scientific value, this locality holds historical significance: German geologist and mineralogist Ernst Kalkowsky first coined the term "stromatolite" here while studying these structures in 1908. Photo by Stanislava Vodrážková.

potential significantly mobilize rare earth elements and affect the redistribution of other redox-sensitive elements during early diagenesis.

Interaction of volcanism with the sedimentary environment and biosphere

Research in 2025 contributed to a deeper understanding of volcanism's role in the evolution of sedimentary basins and its impacts on the biosphere. This work relied on close collaboration among experts in volcanology, sedimentology, mineralogy, paleontology, and geochemistry, integrating field, laboratory, and modelling research, and resulted in three publications in impact factor journals.

Attention was directed toward identifying heavily eroded diatremes in northern Moravia; their newly documented occurrence suggests that the extent of volcanic activity in this area may have been underestimated. Detailed research on selected diatremes revealed a complex eruptive history involving repeated magma intrusions and effusions, which led to the remodelling of older volcanic structures.

Another study focused on the influence of Neogene intrusions in western Bohemia on heat flow and CO_2 degassing. A new model, based on a series of smaller intrusions, better explains the observed geophysical and geochemical phenomena in the western part of the Eger Rift. In addition to scientific research, the team prepared educational animations illustrating the evolution of diatremes and their role in the geological history of the Bohemian Massif.

Evolution of the Quaternary environment and study of exogenous geological processes

Research in 2025 focused on the development of the Quaternary environment and exogenous processes both in the Czech Republic and internationally, resulting in four publications in impact factor journals.

These studies address the Late Holocene history of Lake Morské oko, the occurrence of broomcorn millet during the Bronze Age in Central Europe and its possible ritual significance, the survival of forest snails in the Carpathians during the last glacial period, and the geomorphology of a deglaciated area on Nelson Island, Antarctica.

Ongoing projects investigated erosion-sedimentation dynamics in the Bohemian Paradise (Český ráj) region and the dating of Vltava and Berounka river accumulations using cosmogenic radionuclides.

Internationally, geomorphological fieldwork was conducted in Antarctica, alongside studies of rock glaciers in the High Tatras, and geoarchaeological expeditions in Kenya, Mauritania, and North Macedonia.

No development without resources: We discover, protect, plan



» Drill core sampling at Křemže. Photo by M. Kubeš.

2023
LCDRO
2027

Minerals for sustainable economic development



Michal Poňavič
Coordinator
for *Minerals for Sustainable Economic Development*

Over the past year, the department's staff participated in significant domestic and international projects focused on the research of critical raw materials (CRMs), as well as construction and energy resources.

The work also included legislative support for state authorities, not only in adapting the Raw Materials Policy of the Czech Republic to regional conditions but also in addressing the protection and extraction of mineral resources within spatial planning.

Attention was paid to studying the environmental and health impacts of the mining and processing of raw materials. Additionally, the department developed new methods for mineral deposit research and mining history (montanistic) studies.



» The Solwezi Cu-(Ni) ore deposit in northern Zambia. This is the largest copper deposit in Africa; annual production in 2025 was 300,000 tonnes of refined copper. Photo by B. Kříbek.

Under the Czech Geological Survey (CGS) Strategic Research Plan for 2023–2027, research projects were carried out in connection with national and EU strategic documents. The research was fully funded by external sources. Among the most significant CGS projects are the RENS project (Rock Environment and Mineral Resources, supported by the Technology Agency of the Czech Republic – TA CR), a contract for the state enterprise DIAMO regarding Strategic Raw Materials in the context of Government Resolution 866/2021, and international projects like SuMREE (TA CR) and DeepBEAT (Horizon Europe).

Domestic research and strategic projects

In 2025, during the implementation of the deposit-focused part of the RENS project, the study of CRM occurrences progressed in the areas of Nové Město pod Smrkem, the Šluknov region, the Havlíčkův Brod region, and historic gold (Au) districts in the Moldanubian Zone. Work also advanced on a catalogue of geochemical characteristics for selected index heavy minerals in their primary parageneses. In addition to scheelite, research focused on creating a catalogue of geochemical characteristics for cassiterite. Technological tests aimed at the processing of graphite raw materials and obtaining concentrates of other CRM resources continued successfully.

As part of the task Strategic Raw Materials in the context of Government Resolution 866/2021, last year's efforts included both deposit and technological research of leucocratic weakly mineralized granites in the Central Moldanubian Plutonic Complex. The study of erlan and skarn mineralization in the Ore Mountains (Krušné hory) continued. In the area of the Čistá–Jesenice Massif, research focused on the distribution of rare earth elements (REE) in individual petrological types of the studied rocks.

International and European projects

As part of the international research project SuMREE (Sustainable Mining of REE in Europe, TH88020001), detailed systematic sampling of the Křemže laterite deposit was completed. This fieldwork served as the basis for compiling regional geochemical maps showing the spatial distribution of selected CRMs (REE, Ni, Co, Sc) in lateritic weathering profiles. Two core boreholes were drilled by a subcontractor, penetrating the lateritic horizons and reaching the underlying ultrabasic rocks. The boreholes provided extremely valuable cores; in 2026, based on detailed mineralogical and geochemical analyses, the distribution of these CRMs in the weathering horizons of the deposit will be precisely determined.

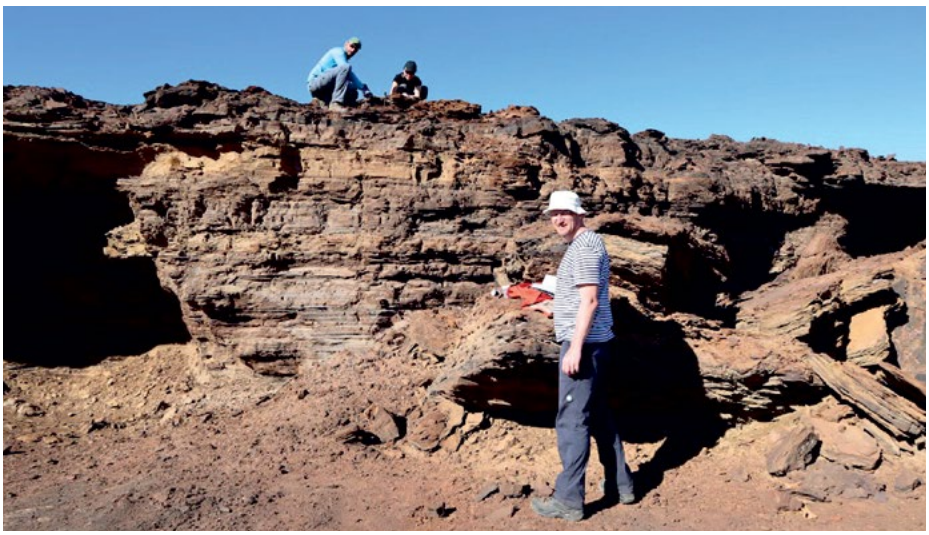
In 2025, work continued on the Horizon Europe project DeepBEAT (Deep exploration BoostEd by Advanced exploration Technologies, 101177617), which tests and develops sustainable geochemical methods for exploring concealed CRM deposits. The CGS participates as a project partner and leader of a work package concerning research at the reference site of REE-Zr-(Mo) mineralization in Hůrky (Čistá–Jesenice Massif). In 2025, activities included the detailed planning of the sampling campaign, initial field reconnaissance, and the collection of biological samples. The CGS also organized a consortium meeting where interim project results from all three reference sites (the Ore Mountains / Erzgebirge, the Čistá–Jesenice Massif, and Säramäki in Finland) were presented. As part of the work package concerning the Ore Mountains, intensive stream sediment sampling was carried out in the summer, covering the entire crystalline area of the Ore Mountains from Aš to Ústí nad Labem. The results of this sampling will be interpreted in the next phase of the project.

As part of the cross-border Czech-Saxon project Recomine SN-CZ Plus, funded by Interreg, three public workshops and excursions were held.

Legislative support and conceptual documents

Over the past year, the following conceptual documents were developed for the Ministry of the Environment and the Ministry of Industry and Trade in connection with Act No. 465/2023 Coll., the Linear Infrastructure Act, as amended:

- *Study on the Availability of Aggregates for Planned Railway Infrastructure and the Construction of Motorways and Class I Roads – Supplement No. 2*. This included an update to



« Detail of reworked old dumps at the Namib Lead and Zinc deposit in Namibia. The granulometric stratification of the dumps forms as pipelines transferring flotation slurry are moved along the perimeter of the tailings pond. Photo by B. Kříbek.

the analysis of available sources of natural and crushed aggregates, considering the percentage breakdown of individual fractions across the regions of the Czech Republic.

- *Study on the Selection of Construction Mineral Deposits of Strategic Importance, Including a Detailed Justification*. The proposed selection concerns reserved deposits of unreserved minerals (building stone and sand-gravel), covering both unmined and actively mined deposits.
- *Study on the Selection of Reserved Limestone Deposits Suitable for Chemical-Technological Processing to Be Designated as Deposits of Strategic Importance.*

In 2025, updates to the regional raw materials concepts for the Hradec Králové Region and the Vysočina Region were initiated. Concurrently, expert cooperation was provided to the Zlín Regional Authority in conducting a Strategic Environmental Assessment (SEA) for the Updated Regional Raw Materials Policy of the Zlín Region, in accordance with Act No. 100/2001 Coll. (Environmental Impact Assessment Act).

Global environmental and health impact studies

- **Botswana:** In the area of the Mupane Gold deposit, flotation tailings and water samples were collected, focusing on evaluating the environmental and health impacts of mine waste. The results revealed high concentrations of arsenic (As) in the flotation tailings, reaching up to 8,000 mg/kg. Seepage from the tailings storage facility threatens watercourses over an area of 60 km^2.
- **Namibia:** For several deposits (Kombat, Oamites, Namib Lead & Zinc), a study was conducted on the bioaccessibility of potentially toxic elements (Cu, Co, Pb, and As) under varying climatic conditions. The work showed that the bioaccessibility of toxic elements is very high in areas with higher rainfall (Kombat area). This can be explained by the formation of carbonate phases (malachite and azurite), which are readily soluble. Conversely, in arid regions (Namib Lead deposit area), potentially hazardous elements are strongly bound to iron and manganese oxyhydroxides, and their bioaccessibility is very low.

State Geological Survey expert opinions

A significant activity involved the work of regional mineral deposit specialists appointed to carry out the statutory tasks of the State Geological Survey. As in previous years, they provided expert opinions, consultations, and advisory services to central state administration bodies, as well as regional and local governments regarding mineral resources. The most significant expert opinions included:

- Evaluation of the applicability of the TA CR project No. TITSMP0909: "Methodology and Creation of Standards for the Development and Periodic Updating of Regional Raw Materials Concepts, Model Solution for Two Selected Regions".
- Expert opinion on the project proposal: "Ore Processing Plant for the Cínovec Deposit, Including the Transport System".
- Preliminary risk assessment in the area of the ČSA open--pit mine.

We investigate groundwater: for life today and tomorrow



Discharge measurement using a chemical tracer method with the Sommer TQ system at the St. Vojtěch spring near Kutná Hora The device enables real-time display and evaluation of the measured data. Photo by I. Kůrková.

2023
LCDRO
2027

Groundwater research and assessment



Lenka Rukavičková
Coordinator
for *Groundwater Research and Assessment*

In 2025, groundwater research at the Czech Geological Survey focused on analyzing the impacts of climate change and mining on natural groundwater resources.

The work also evaluated the sustainability of groundwater use and proposed conservation measures. Specific attention was given to water protection in karst areas, mineral water localities, and crystalline rock regions.

Furthermore, the team explored suitable sites for underground repositories and storage facilities.



« A pumping test at the Litovany borehole, conducted as part of the "Groundwater in Crystalline Rocks" project. Photo by R. Hadacz.

Impact of climate change and other anthropogenic interventions on natural groundwater resources

As part of the PERUN project (Technology Agency of the Czech Republic), the team completed a certified methodology for evaluating groundwater levels to determine natural groundwater resources in Quaternary hydrogeological zones. These new procedures will enable more efficient use and protection of groundwater in Quaternary sediments.

A second methodology that provides guidelines for evaluating Zone II water source protection areas was developed in 2025. It defines the appropriate scope of monitoring to verify their functionality and recommends optimal land-use practices within these zones. This framework is intended for water authorities, which are responsible for establishing protection zones under the Water Act.

Research within the RENS project (Rock Environment and Mineral Resources) in 2025 focused on assessing the extent of contamination in karst systems. The investigation involved water sampling, discharge measurements in cave systems, mathematical modelling, and water management risk assessment of geological structures near karst areas.



» Thermometry at the Číhanské slatě peat bogs. Freezing periods are ideal for detecting mineral water discharges, as surface water freezes while deeper inflows maintain a constant temperature of around 8 °C. Photo by I. Kůrková.



» Fieldwork at the Bohdalov hydrogeological borehole, conducted as part of the "Groundwater in Crystalline Rocks" project. Photo by R. Hadacz.

The team also developed an approach for evaluating the geological conditions of spa source protection zones to determine the effectiveness of existing safeguards for natural curative mineral waters in the Czech Republic. Following a 2024 study focused on the Luhačovice area, research on mineral waters in the Slavkovský les Protected Landscape Area (PLA) is now gathering baseline data to establish or revise protection zones for mineral waters and peloids. These data will be used in preparing the new management plan for the Slavkovský les PLA.

Studies also continued on the impacts of mining activities at the Turów mine in Poland on groundwater and surface water in the Czech border region. In 2025, a dedicated groundwater monitoring network was completed. The goal is to verify whether the underground sealing wall is a sufficient measure to limit groundwater level decline in Czech territory.

Processes of groundwater recharge in various hydrogeological structures

The "Groundwater in Crystalline Rocks" project investigates groundwater dynamics in selected hydrogeological zones within crystalline massifs. In 2025, the first phase of exploratory drilling was carried out, while ongoing geophysical surveys helped identify hydrogeological structures suitable for siting additional wells.

The "System for Continuous Vadose Water Monitoring in Deep Aquifers" project leverages existing measurement infrastructure at the Uhelná site, supplemented by new boreholes, to develop a predictive tool for groundwater levels. Numerical modeling of the unsaturated zone forms a core component of this initiative.

Hydrogeological maps were compiled and revised for selected map sheets in the Czech Republic, with maps for the Novohradské hory and Pošumaví regions completed in 2025. Internationally, the *Hydrogeological Map of Ethiopia at a 1:1,000,000 Scale* was finalized, and the associated research findings were summarized in a scientific monograph.

Hydrogeological aspects of deep geological repository construction and geothermal energy use

Specialists in hydrogeology and hydrochemistry engaged in several applied projects focused on the deep geological disposal of high-level radioactive waste. Ongoing research at the Bukov I and Bukov II underground research facilities in the Rožná mine, as well as at the Josef Underground Laboratory in Mokrsko, involves studying the interaction between groundwater and a simulated disposal unit, alongside hydrogeological documentation of inflows into the mine drifts. Additionally, hydrogeological mapping continued for the third consecutive year around four prospective sites for a deep geological repository in the Czech Republic.

Hydrogeological investigations are also integral to applied research on geoenergy utilization. As part of the SYNERGYS and PUSH-IT projects, a 200-meter-deep hydrogeological monitoring borehole was drilled. Borehole logging, water sampling, and hydrodynamic testing were conducted at the Litoměřice site. These data will serve as input for designing the layout of production wells within the area of the future thermal energy storage facility.



Documentation of a spring in the Pramenský potok valley near Bečov nad Teplou. Photo by J. Holeček.



Discharge measurement using a chemical tracer method with the Sommer TQ system. The software calculates the discharge in real-time based on the tracer quantity and conductivity measurements. Photo by I. Kůrková.

Paving the way for sustainable energy



Drilling a 500-meter-deep core well at the Litoměřice site to characterize the geology of the future BTES field. Photo by J. Holeček.

2023
LCDRO
2027

Geoenergy research



Jan Holeček
Geoenergy Research
Coordinator

In 2025, geoenergy research encompassed seven national and international projects, linking geological sciences with innovative energy storage technologies to reduce greenhouse gas emissions.

These activities primarily focused on the geological storage of CO_2, advancing deep and shallow geothermal energy, and the seasonal storage of thermal energy within the rock mass.

Firmly anchored in the long-term research strategy of the Czech Geological Survey (CGS), this research aims to bolster national energy security and translate scientific findings into industrial-scale applications.



Collecting dissolved gas into a sampling cylinder at the LTV-1 well, Litoměřice. Photo by A. Tym.



The lithological transition to the "Red Permian" is marked by a distinct color change from light sandstones and arkoses to the reddish-brown hues of Permian claystones, caused by iron oxidation in a dry continental climate. Photo by J. Holeček.



Detail of a worn-through drill pipe. Even the relatively thick wall of the high-strength steel pipe could not withstand the friction against the borehole wall caused by excessive bending. Photo by J. Holeček.

Geoenergy research activities seamlessly build upon the results of previous years, aligning with the Long-Term Development Strategy of the Czech Geological Survey for the Period 2023–2027. The work was conducted in accordance with the updated policy guidelines of the Ministry of the Environment, emphasizing climate change mitigation and adaptation through the sustainable use of the subsurface.

These research projects integrate fundamental research with experimental development and practical applications in energy systems. Furthermore, a strong emphasis is placed on knowledge transfer to professionals, government agencies, and industrial partners. This commitment was exemplified by hosting an international expert workshop for the GSEU project at the RINGEN research centre in Litoměřice.

Geological CO_2 storage and CCS

Research on geological CO_2 storage and CCS targets the long-term decarbonization of the Czech industrial sector. In 2025, efforts centred on the practical implementation of results from the earlier CO2-SPICER project and the expansion of activities within the European COREu and GSEU projects. Within the COREu project, where the CGS collaborates alongside more than 40 consortium partners, the development of regional concepts for CO_2 transport and storage in Central and Eastern Europe continued.

In partnership with Unigeo and MND, researchers modelled subsurface reactions and calculated the volumetric capacities of deep aquifers in north-eastern Moravia. The work also involved mapping potential end-users and evaluating the public acceptance of CCS technology in the Czech Republic. This included designing a CO_2 monitoring scheme to establish baseline concentrations at prospective sites.



Baroch Spring in the village of Prameny, Slavkov Forest. Photo by I. Kůrková.

Geothermal energy research

The flagship initiative in geothermal energy research remains the extensive strategic SYNERGYS project (2024–2030), funded by the Just Transition Operational Programme with a budget exceeding CZK 1 billion. In 2025, the team prepared and executed tenders for drilling deep geothermal HDR wells and constructing the BTES1 thermal energy storage facility in Litoměřice. Water samples were collected from the existing PGV LT-1 deep well – from depths of up to 1,400 meters – for detailed chemical and isotopic analyses of dissolved gases. Coupled with green hydrogen production and photovoltaic integration, this integrated system represents a vital innovation for the transformation of the national energy sector.

Meanwhile, the FindHeat project entered its second year, with the CGS leading a survey on testing case studies; the findings were presented at the prestigious EAGE conference in Toulouse. Significant progress was also made in the GSEU project, where the CGS, acting as the task lead, contributed to



Collecting a water and gas sample from a depth of 1,400 meters in the LTV-1 well. Photo by A. Tym.

a centralized platform for accessing national data on sustainable geoenergy capacities. Ultimately, these efforts will culminate in a new pan-European atlas of geothermal potential.

Geological energy storage

Energy storage in the subsurface represents the third main branch of geoenergy research at the CGS. This area encompasses research activities within the European PUSH-IT project. A pilot core well was drilled to a depth of 500 meters at the Litoměřice site, yielding valuable material for lithological and petrological analyses. Furthermore, a 200-meter-deep hydrogeological well was drilled to monitor the future repository, providing essential hydraulic data on the reservoir rocks. The PUSH-IT project aims to achieve Technology Readiness Level (TRL) 5 – validating the technology in a relevant environment.

Parallel to thermal energy storage studies, the team investigated the potential for geological hydrogen storage. In collaboration with Gas Storage CZ, a preliminary study established criteria for selecting suitable natural gas reservoirs for future storage, followed by a multi-criteria analysis of their capacities.

The Managed Deep Biogas project represents another innovative direction in geoenergy research. In 2025, researchers injected the first supporting media into wells to stimulate methanogenesis in closed, depleted coal mines. This work included chemical and isotopic analyses of the generated gases, as well as genetic microbiological examinations of the biota in coal and groundwater samples.

International cooperation and expert support

Beyond internal research, international collaboration with both the academic and private sectors is an integral part of CGS activities. The CGS maintains its strong international standing in geoenergy research through active membership in organizations such as ENeRG, CO2GeoNet, and EuroGeoSurveys. CGS experts also participated in the international Geoenergy Expert Group (GEEG) network, which facilitates the harmonization of geological data at the European level. Alongside scientific outputs, the CGS managed national information portals for CCS technologies and the geothermal potential of the Czech Republic, thereby providing essential expert support to government agencies and industry. Looking ahead to 2026, all ongoing projects will continue to advance, with a particular emphasis on intensifying drilling operations within the SYNERGYS project.

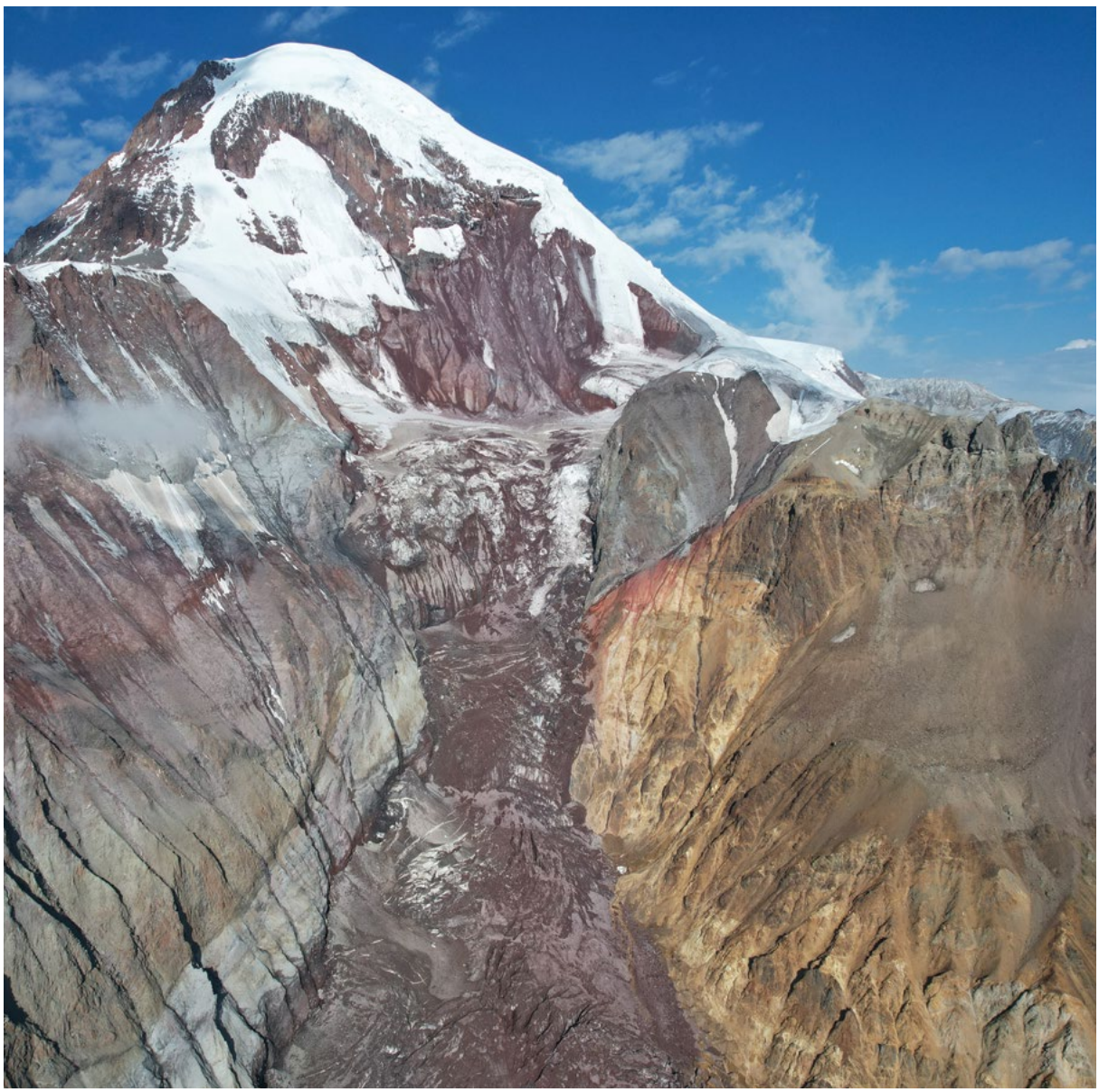


Spectroscopic measurement of a drill core at the RINGEN Core Repository, Litoměřice. Photo by A. Tym.



Scanning and digitization of a drill core at the RINGEN Laboratory in Litoměřice. Photo by A. Tym.

We understand the risks: we protect the landscape and people



» The extinct Kazbek volcano in Georgia, an example of a region prone to frequent catastrophic slope movements.

2023
LCDRO
2027

Engineering geology and geohazards



Milan Aue
Coordinator
for *Engineering Geology and Geohazards*

Aligning with the state's priority needs in geohazard research, the Czech Geological Survey (CGS) in 2025 focused primarily on providing expert data derived from applied research. This data supports the protection and utilization of the rock environment, soil, groundwater, and mineral resources, while mitigating the environmental burden caused by anthropogenic factors.

Furthermore, the CGS contributed to developing tools and technologies essential for the identification, monitoring, prediction, prevention, and risk reduction of natural crises. These include naturally occuring conditions or geological processes that pose a significant threat to humans and their activities – primarily slope movements (landslides), radon risk, and unstable subsoil.



» A landslide on Na Královce Street in Prague-Vršovice that completely demolished a building and overturned a parked van.

As part of this research task, CGS activities primarily focused on the following key topics:

- **Mapping, documenting, and researching geohazards**, including their categorization on a regional and local scale, and addressing negative anthropogenic impacts on environmental quality (e.g., legacy mining burdens, rock environment contamination, and potential health risks).
- **Developing of the geological survey portal** and providing geohazard data to both experts and the general public.
- **Creating of specialized landslide susceptibility maps** for individual geomorphological-geological units and selected urban agglomerations. This work is conducted annually in coordination with the application of the INSPIRE Directive at the CGS.
- **Raising public awareness about radon risks.** Radon from the geological bedrock is a major geohazard directly affecting public radiation exposure. Addressing bedrock radon is crucial, partly due to its interdisciplinary links with monitoring radon concentrations in drinking water and building materials. The project's results contribute to a detailed assessment of natural radioactivity as a key risk geofactor.
- **Identifying key geological factors** that could negatively impact the construction of strategic infrastructure, aiming to better understand how the rock environment interacts with structures and their surroundings. This is closely linked to delineating engineering-geological zones based on homogeneous properties crucial for engineering geology, geotechnics, and foundation design.

In recent years, there has been a growing demand for data on landslides threatening specific structures or building complexes. To meet this need, it is necessary to continuously compile thematic catalogues of slope deformations, delineating the most vulnerable localities or sections of linear infrastructure. In 2025, this work was conducted on road and highway projects of the Road and Motorway Directorate (ŘSD), and primarily along existing roads managed by the Regional Road Administration of the Central Bohemian Region (KSUS). Additionally, through a collaboration established with ČEPS, a.s. (the national electricity transmission system operator), the entire network of extra-high voltage transmission towers in the Czech Republic is continuously analyzed and monitored for risks associated with slope deformations.

Engineering geology research focusing on slope deformations is a core discipline in geohazard studies, as it identifies and addresses the interaction between the rock environment, geohazards (landslides), and built structures. This involves delineating specific areas (known as engineering-geological zones) based on homogeneous properties crucial for engineering geology, construction geology, and geotechnics. Consequently, the CGS continued developing specialized landslide susceptibility maps for specific geomorphological-geological units, selected urban agglomerations, and critical linear infrastructure. Concurrently, mapping at a 1:10,000 scale was conducted as part of the RENS project.



« Rockfall on Road II/201 between the Nezabudice Mill and the Višňová campsite.

As part of the 2025 research agenda, efforts continued to compile an inventory of accurately dated landslides from various sources. The aim is to identify the triggering mechanisms of slope deformation clusters occurring within specific timeframes – often correlated with factors such as heavy precipitation.

Internationally, ongoing slope deformation research includes a development project in Georgia. This initiative focuses on mitigating the risks associated with highly frequent, catastrophic slope movements, technically known as debris flows. These events cause severe socio-economic damage, including loss of life, particularly in Georgia's mountainous regions.

Radon risk originating from geological bedrock is a significant geohazard with a direct impact on public health. The radioactive decay of radon produces metallic daughter isotopes, which deposit on the lung lining and, through internal irradiation, can cause an increased incidence of lung cancer. The CGS is tasked with identifying rock types with elevated radon concentrations, as the gas can seep into buildings constructed upon them, negatively affecting inhabitants' health during long-term exposure.

Research in 2025 focused on monitoring radon concentrations and dose rates in specific local lithologies where elevated values are expected. The occurrence of these rocks can be influenced by structural features, as well as by contacts between rock units with significantly different radon risk categories. The research results inform map updates; if an elevated radon risk is confirmed, the data is published in the Comprehensive Radon Information application on the CGS map server. Evaluating natural radioactivity as a geological risk factor thus enhances public awareness and helps prevent negative impacts on public health.

CGS research activities supporting the construction of strategic linear infrastructure have been ongoing for many years. Examples include the ongoing preparation of the Prague–Dresden High-Speed Railway (HSR), the Beroun tunnel as part of the upgraded rail link towards Plzeň, and the tunnel between the Prague-Dejvice and Prague-Veleslavín railway stations as part of the rail link via Václav Havel Airport towards Kladno.

Over the past year, a detailed engineering-geological survey was initiated for the latter project, during which the CGS is documenting rock formations along the future tunnel alignment. The acquired data will be used to update the 3D geological models developed by the CGS in 2020 and 2024, facilitating their conversion into a BIM (Building Information Modelling) environment.

Additional CGS research in linear infrastructure involved the geological assessment of rock cuts along roads managed by the Regional Road Administration of the Central Bohemian Region (KSUS). Equally important is the ongoing research along planned corridors for new railway connections. This includes the Prague–Dresden HSR and the Beroun tunnel on the upgraded rail link towards Plzeň, where the CGS is currently conducting geological surveys.

A changing Earth: Studying transformations for sustainability



A dried-up stream bed at Lysina in the Slavkov Forest during a drought. Photo by P. Krám.

2023
LCDRO
2027

Landscape biogeochemistry in the era of climate change





Martin Novák Jakub Hruška
Coordinators for *Landscape Biogeochemistry in the Era of Climate Change*

In 2025, we integrated dendro-isotopic analyses of tree rings from Czech old-growth forests with long-term hydrochemical mass balances from the GEOMON network of small catchments.

These studies inspired crucial discussions on critical loads, forest management, and the impacts of drought and bark beetle outbreaks on hydrological and hydrochemical budgets.

We also used various isotopic techniques for tracing the origin of fog, identifying ammonium and nitrate sources in atmospheric deposition in the Ore and Orlické Mountains, and assessing methane emissions from open-pit coal mines using carbon isotopes.



Bohemian Switzerland in the aftermath of the 2022 wildfire. Photo by J. Hruška.

Carbon and selected element cycling in ecosystems under environmental change

Our research focused on understanding shifts in the functioning of forest and aquatic ecosystems driven by a changing climate, atmospheric chemistry, and soil conditions. Isotope analyses of tree rings ($\delta^{13}C$, $\delta^{18}O$, $\delta^{15}N$) enabled us to trace the physiological changes in trees over the past five centuries. Findings from Czech old-growth forests reveal varying responses to acidification, drought, and climate warming that resulted in a species shift that favoured beech over fir and spruce. Furthermore, by comparing stem diameters between 1990 and 2015, we demonstrated that most temperate forest species increased their stem growth despite drought limitations – a trend particularly pronounced among late-successional species on nutrient-rich sites.

We also investigated the response of originally spruce--dominated catchments within the GEOMON network to bark beetle outbreaks and progressive deforestation. These areas are currently experiencing increased nitrate leaching into surface waters and elevated water runoff. Additionally, our evaluation of the mercury cycle within the GEOMON network revealed that the highest mercury inputs originate from leaf and needle litter. Notably, the studied ecosystem components exhibited an exceptionally high retention capacity of this toxic trace element, reaching as much as 97% of the inputs.

In collaboration with the Technical University of Dresden, we examined how dissolved organic carbon (DOC) properties depend on soil types and the depth of runoff sources in the Ore Mountains. An experiment in the Swedish Gårdsjön catchment demonstrated that excess nitrogen inputs drive progressive ecosystem saturation, ultimately leading to nitrogen loss via runoff. Finally, in Bohemian Switzerland, we assessed the ecological impacts of the 2022 wildfire. While we initially detected high nitrate concentrations originating from the burned organic matter, we observed a notable decline in these levels just three years post-fire, driven dominantly by ongoing vegetation recovery.

Modelling biogeochemical processes in the landscape

From 1994 to 2023, we evaluated material fluxes of nutrient base cations (Ca, Mg, and K) in the GEOMON network. In collaboration with the Swiss institute IAP, we used the VSD+ model to simulate the impact of various harvesting practices. Under the "whole-tree harvesting" scenario (extracting more than just stems), catchments become significantly nutrient-depleted.

We also evaluated how atmospheric nitrogen deposition (1990–2013) impacted vascular plant species richness in Czech and US ecosystems. This response varies by geological



Sphagnum moss sampling on the Svalbard archipelago. Photo by F. Veselovský.

substrate. On nutrient-rich bedrock, a significant decline occurs at deposition rates exceeding 8 kg N/ha/year. Conversely, on moderately rich and nutrient-poor rocks, this decline only occurs at above 15 kg N/ha/year.

Isotopes as a diagnostic tool in biogeochemistry

Using stable isotope concentrations and abundance ratios at two mountain sites (Tetřevec in the Orlické Mountains and Pramenáč in the Ore Mountains), we monitored inputs from NO_x and NH_3 emissions into vertical and horizontal deposition (rainfall and fog). We also studied the origin and evolution of fog and precipitation using oxygen (^{18}O) and hydrogen (^{2}H) isotopes.

At the Pod Jelení horou bog on the Czech–German border, we collected peat cores in two seasons and conducted an incubation experiment using an isotopically labelled gas (98% ^{15}N) to determine the rate of biological nitrogen fixation at four depths. Additionally, we completed *Sphagnum* moss sampling at five sites on the Svalbard archipelago above the Arctic Circle, and are currently evaluating biological nitrogen fixation rates in the region's organic soils.

We quantified methane emission sources in open-pit coal mines in the Czech Republic. In addition to measuring emission factors across various sites and coal types, we



Detail of a passive horizontal precipitation sampler in the Orlické Mts. Photo by J. Čuřík.

focused on methane escaping during coal processing and emissions from abandoned mines. Finally, we investigated how chemical digestion methods affect the isotopic composition of Cd, Zn, and Pb in anthropogenic samples. We found that both the digestion method and thermal pretreatment significantly impact concentration and isotopic measurements.

Advancing science, connecting experts



During Geology Day at the CGS, experts annually prepare a program for school groups. Photo by O. Man.

2023
LCDRO
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Professional support and organizational development

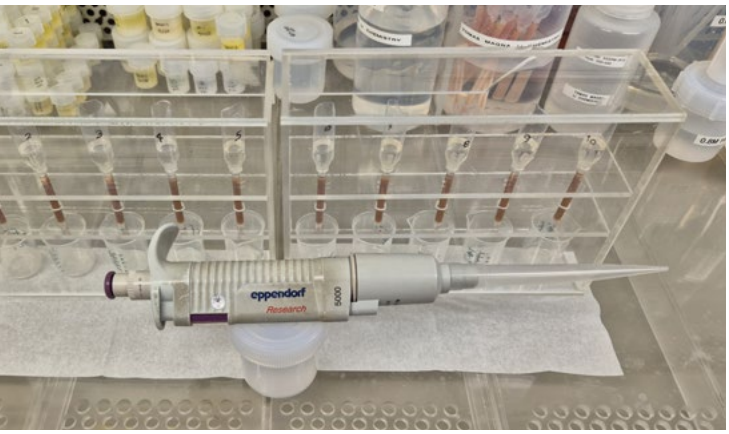


Markéta Vajskebrová
Coordinator
for *Professional Support and Organization Development*

The activities of the Czech Geological Survey (CGS) are consistently driven both by global developments and national priorities. Our vision in this area focuses on supporting expert and applied services, driving the systematic development of our institutional capabilities, and fostering seamless integration across the organization.

Adopting modern analytical and imaging laboratory methods, alongside advanced digital technologies for geological exploration and modelling, plays a vital role in our ongoing development.

Furthermore, presenting and interpreting our findings, expanding our public outreach in the geological sciences, and continuously enhancing our professional expertise remain integral to our mission.



Chromatographic columns used to separate target elements from the rock matrix. Photo by T. Magna.

Research and development of analytical and imaging laboratory methods

Throughout 2025, the Czech Geological Survey continued to dynamically advance its laboratory and instrumental methods. As a result, it strengthened its professional self-sufficiency and built a top-tier analytical infrastructure that fully supports projects and contracts where the CGS acts as a principal investigator or an active co-investigator.

During the year, the CGS published the results of a detailed mineralogical-geochemical study on the impact of short-term and long-term thermal loading on BCV bentonite at 200 °C under dry conditions. In cooperation with the Centre of Experimental Geotechnics of the Czech Technical University (CTU), researchers also analysed samples of identical bentonite from an experiment in the Josef Underground Laboratory, where the material was exposed to heating for five years in a rock environment simulating the conditions of a planned deep geological repository for spent nuclear fuel.

Laboratory activities included routine and specialized geochemical analyses of rock and environmental matrices, with a focus on trace elements and various isotope systematics. At the same time, the laboratory developed new analytical procedures, including the separation of strontium from biological matrices in cooperation with the Institute of Archaeology of the Czech Academy of Sciences (CAS), and the separation of neodymium from soil waters and biological samples.

In the laser ablation laboratory, analytical conditions for determining trace elements in various mineral phases using the LA-ICP-MS method were optimized, including the selection of suitable reference materials. The team prepared a methodological manual and tested the methodology for the *in situ* analysis of trace elements in garnets. Further activities focused on optimizing sampling for microgeochemical and isotope analyses using the Micromill device.



UAV field campaign for the Multiminer project at the Chalkidiki site in Greece. Photo by J. Jelének.

Development of digital technologies in geology

In 2025, the Czech Geological Survey systematically focused on developing digital technologies, particularly database systems, remote sensing, 3D geological modelling, and the numerical modelling of geological processes. The Remote Sensing Department continued to develop methods for environmental monitoring using UAV and satellite data, as well as for studying geohazards both in the Czech Republic and globally. These analyses utilize multispectral, hyperspectral, and radar data.

In cooperation with governmental, academic, and industrial partners, the CGS further developed methodological and software tools for creating, validating, and managing 3D geological models. This effort focused on uncertainty assessment, interoperability with the BIM environment, and applying these models to site selection for a deep geological

repository for radioactive waste. These activities also included systematically storing and archiving 3D data and finalizing an internal CGS directive governing the process of creating and managing geological models.

The institution continued to develop GIS tools for the preparation and the optimization of input data for 3D models, along with creating specialized applications in the ArcGIS Pro environment. In the field of computer and analogue modelling, research focused on melting processes, magma migration, rock deformation, and the dynamics of lithospheric plates. This included the evaluation of the applicability of model results in relation to available geological and geophysical data.

Popularization

In 2025, the Czech Geological Survey continued its active engagement with both the professional and general public through a series of activities designed to make geosciences more accessible to various audiences. The year's most significant popularization event was the traditional two-day Geology Day with the CGS at Klárov, which offered a wide range of interactive programmes and attracted nearly a thousand visitors, including school groups.

Students from the Prague Geographical Grammar School visited the CGS headquarters at Klárov for a dedicated educational excursion to learn about the wide spectrum of CGS activities, its history, and its significance in geoscientific research both domestically and abroad. Furthermore, the CGS actively participated in organizing the regional and national rounds of the Geology Olympiad, whose growing prestige is confirmed by the successes of the Czech team at the International Earth Science Olympiad.



Geology Day booths set up inside the Chapel of St. Raphael, located at the CGS headquarters at Klárov in Prague. Photo by I. Rozkošný.

The CGS Geological Bookshop hosted three thematic photographic exhibitions: *Asian Mountains* by Pavel Čáp, *Among the Volcanoes: Photographs from the Island of Lanzarote* by Ivana Frolíková, and *Křivoklátsko – A Journey into Prehistory* by Vladimír Žáček. Additionally, the institution continued its traditional participation in the Open House Prague festival, opening the premises of the former Klar Institute for the Blind, including the Chapel of St. Raphael, to the public.



Visitors to Geology Day can try out the state-of-the-art equipment currently used by CGS experts in their work. Photo by A. Vilímková.



Looking through a microscope always attracts visitors of all ages. Photo by A. Vilímková.

Other public outreach activities included CGS participation in the Open Day of the Faculty of Science, Charles University, where our experts introduced geological disciplines and their practical applications to students and the general public. At the Ministry of the Environment, the CGS joined the Children's Day programme organized for the children of ministry employees and affiliated organizations, bringing the fascinating world of Earth sciences closer to them. Furthermore, the Brno branch of the CGS Library showcased its collections and promoted its services to prospective readers at the Brno Libraries Day.

During the National Development Days hosted by the Ministry of Foreign Affairs of the Czech Republic, CGS representatives presented key initiatives within international development cooperation. This participation highlighted the importance of the institution's expertise in international partnerships, development, and science diplomacy.

To mark the 30th anniversary of the radioactive waste repository in Dukovany, the CGS hosted a public exhibition booth in Rouchovany. Additionally, CGS experts contributed to restoring the monument to the first international stratotype at Klonk near Suchomasty and helped organize its ceremonial unveiling.

The CGS also participated in a public event organized by the state enterprise DIAMO to present the preliminary results of updated reserve estimates at the Zlaté Hory deposit, fostering better mutual understanding among all stakeholders.

As an investigator for the Recomine SN-CZ-Plus project, the CGS participated in the workshop Critical Mineral Resources and Material Recycling. The event focused on the mineral wealth and historical mining in the western Ore Mountains and their environmental impact. Subsequent project workshops explored the practical applications of plants in biogeochemical prospecting, as well as decorative stones and critical raw materials in the Liberec Region.

The CGS also actively participated in several key professional events. At the GIS Esri CR 2025 conference, representatives showcased the practical use of geodata in public administration. During Raw Materials Week 2025 in Brussels, the institution contributed to discussions on raw material security and geoscientific data. Finally, at the Conference on Shallow Geothermal Energy, CGS experts highlighted how to translate research into practical applications for the public and local governments.

The CGS continued to collaborate with nature conservation authorities, including the Nature Conservation Agency of the Czech Republic (NCA CR), and national geoparks. Outreach activities featured professional lectures and seminars, such as the Barrande Seminars and regular internal staff seminars at Klárov.

During the year, the institution published four issues of the *World of Geology* bulletin in a redesigned format targeting the general public, as well as the first issue of the newsletter for the "Innovation of Geological Information Systems in Bosnia and Herzegovina" project. The CGS also supported the



» The Czech Geological Survey hosted engaging activities at its booth during the Ministry of the Environment's Children's Day. Photo by P. Fiferna.



Participants of the excursion following the Recomine SN-CZ-Plus project workshop on Critical Raw Materials and Stone Quarrying in the Šluknov and Sohland regions. Photo by Š. Mrázová.

publication of the professional journals *Geoscience Research Reports* and *Geological Research in Moravia and Silesia*.

The team continued developing popular-science maps highlighting decorative and building stones, completing the foundational data for the Plzeň Region map and preparing the Karlovy Vary Region map for publication. Additionally, the CGS released a new educational memory game, *Decorative Stones of the Czech Republic*, and the English translation of the book *Women in Geology – How to Become a Geologist?*.

To improve accessibility and user experience, the CGS optimized the content and technical performance of its websites, notably modernizing the search application in the Map Archive. The ongoing management and development of public outreach databases and web applications included updates to the Geologist's Calendar and the Ask a Geologist application.

The CGS launched a new 3D visualization tool for fossils and localities, making collection exhibits accessible online in an interactive format. This tool enhances the appeal of geoscientific information and allows the general public to remotely explore unique collections and educational content.

Furthermore, a newly launched search application for the Geofond material documentation provides digital access to drill cores and other samples physically stored in CGS warehouses. The CGS also released a new dataset of Important Geological Localities of the Czech Republic on the national Open Data Portal. Finally, the institution regularly shared news and educational content via its social media channels.

Human resources support

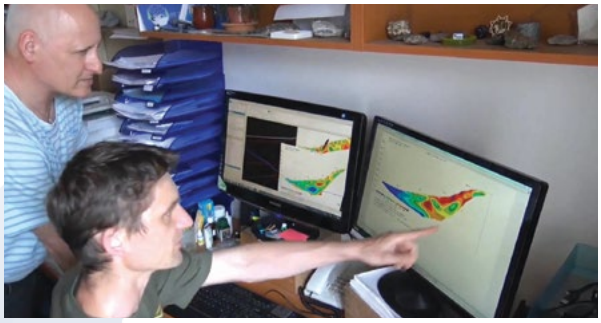
Human resources initiatives included providing employees with various personal development and professional training courses. Furthermore, the CGS actively supports all employees in pursuing further education aligned with their professional preferences. The institution organizes regular English and Spanish language courses at all branches; at the Klárov headquarters in Prague, staff can also study French.

In November 2025, the CGS organized educational tours of its various facilities – Klárov, Kostelní, Lužná, Brno, and Barrandov. Designed primarily for new employees who had joined the CGS since 2023, these visits allowed them to explore the different workplaces and meet their colleagues in person. The CGS also maintains ongoing support for employees pursuing academic degrees; several staff members have successfully completed their programmes, while others are in various stages of their studies and ongoing review.

CGS and the State Geological Survey

The Czech Geological Survey (CGS) is a state-funded organization established by the Ministry of the Environment (MoE) to provide state geological survey in the Czech Republic.

According to § 17 of Act No. 62/1988 Coll., on Geological Works, as amended (the Geological Act), the activities of the state geological survey include the collection, processing, storage, and provision of data on the geological composition of the territory, the protection and utilization of natural mineral resources, groundwater resources, and geological risks.



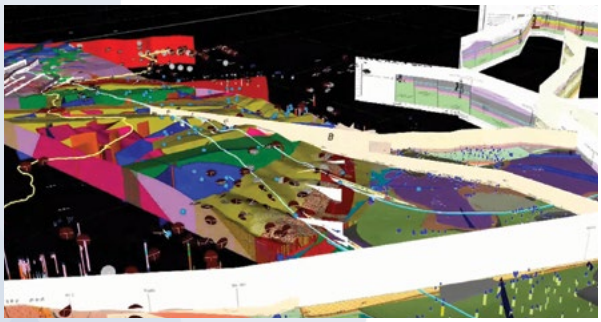






Photo by O. Man.

Vít Štrupl
Head of Information Systems Division,
Deputy Director

Overview of main activities

The state geological survey is carried out through a number of specialized agendas, whose purpose and focus are regulated by more detailed legislative provisions. These include:

- Maintaining inventory of geological projects performed in the Czech Republic.
- Collecting, processing (recording, scanning), archiving, and providing access to geological documentation both in the form of written, unpublished reports and of material documentation (mostly drill cores and samples).
- Managing geological exploration databases (drilling, hydrogeological, geophysical, geochemical, and radiometric).
- Registering and maintaining the slope deformations (landslides, rockfalls, etc.).
- Registering and maintaining the mineral deposits and prognostic mineral resources.
- Registering of underground mines, abandoned mine lands, impacts of mine workings and mining maps.
- Maintaining the sites with mining waste.
- Preparing expert opinions, professional statements, and providing data for spatial urban planning.
- Geological mapping and creation of geological models.

A complete list of all CGS activities is provided in the organization's foundation charter.

Digitalization and professional development

The Czech Geological Survey continuously focuses on the use of modern technologies for data collection, processing, and provision. Individual agendas are digitized to varying degrees, allowing for more efficient data management and easier accessibility for users. This approach is also linked to increasing demands on technological security and data infrastructure management, as well as on the professional qualifications of employees and the need for their continuous professional education.

Making results accessible and communicating with the public

The results of the state geological survey activities and other professional results are primarily made accessible through:

- Web services and specialized applications.
- Expert consultations and opinions.
- Data sets in open data format.
- Specialized publications and electronic outputs.

Records of geological works and geological documentation

CGS and the State Geological Survey



Zdeňka Petáková
Head of Geological Exploration Department



Milada Hrdlovicsová
Head of Geofond Department



Alan Donát
Head of Document Intake and Processing Section



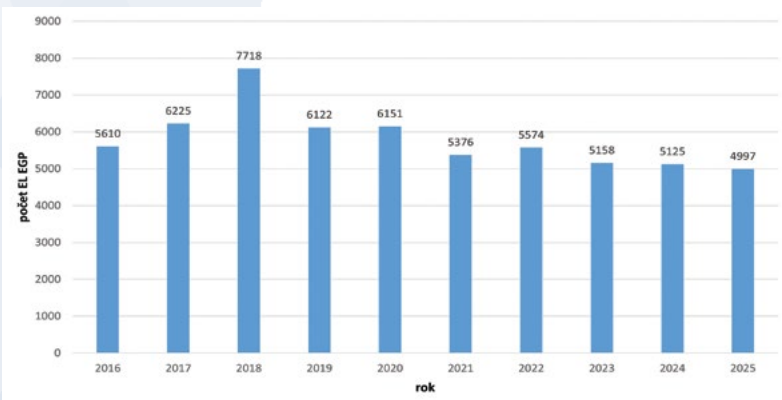
Jolana Skřivánková
Head of Mining Impacts Department

As part of its state geological survey duties, the Czech Geological Survey maintains records of geological works and the organizations that carry them out. It also ensures the collection, permanent storage, professional processing, evaluation, and accessibility of geological documentation and the results of geological works performed by both individuals and legal entities within the Czech Republic. The goal is to enable the use of geological documentation to professionally support public authorities, specialized activities of organizations and companies, and for scientific purposes.

Records of geological works

Organizations performing geological work in the Czech Republic submit documentation for these projects to the Czech Geological Survey, which registers them in accordance with § 7 of the Geological Works Act and the relevant decree. The Ministry of the Environment has entrusted the Czech Geological Survey with maintaining these records. In 2025, **273 economic entities** registered geological works, which is 6 more than in 2024. The number of registering economic entities shows a consistent, constant trend.

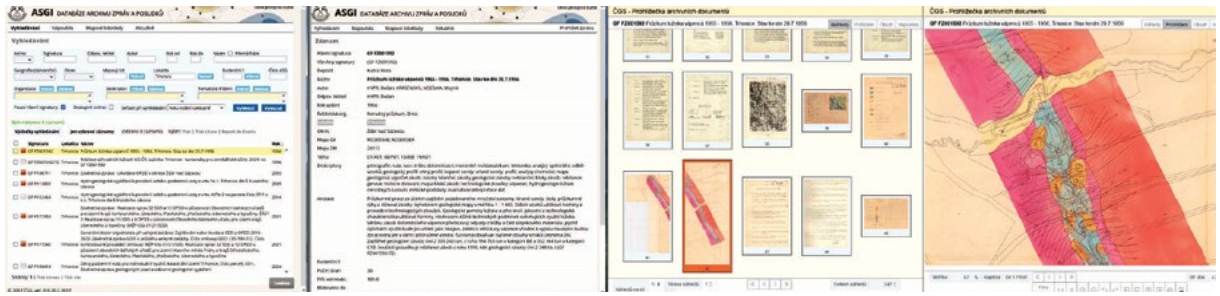
A total of **4,997 registration forms** for geological works were recorded, a slight decrease from the previous year when 5,125 forms were registered. The number of registration forms shows



» Records of geological works – number of registration forms in 2016–2025.



On-site loans and study of geological documentation in the archive's research room. Photo by M. Hlubučková.



The ASGI archive application with access to the online viewer.

a consistent, constant trend, as seen in the figure "Records of geological works – number of registration forms in 2016–2025".

The majority of registered works continue to be in **hydrogeology and engineering geology**, while the number of records concerning mineral resources, the use of geothermal energy, basic geological research, and the identification and assessment of geological factors affecting the environment is increasing.

The database also includes information on **cancelled geological works**, with a total of 9 reported in 2025.

Written and digital geological documentation

Receipt of geological documentation and geological project results

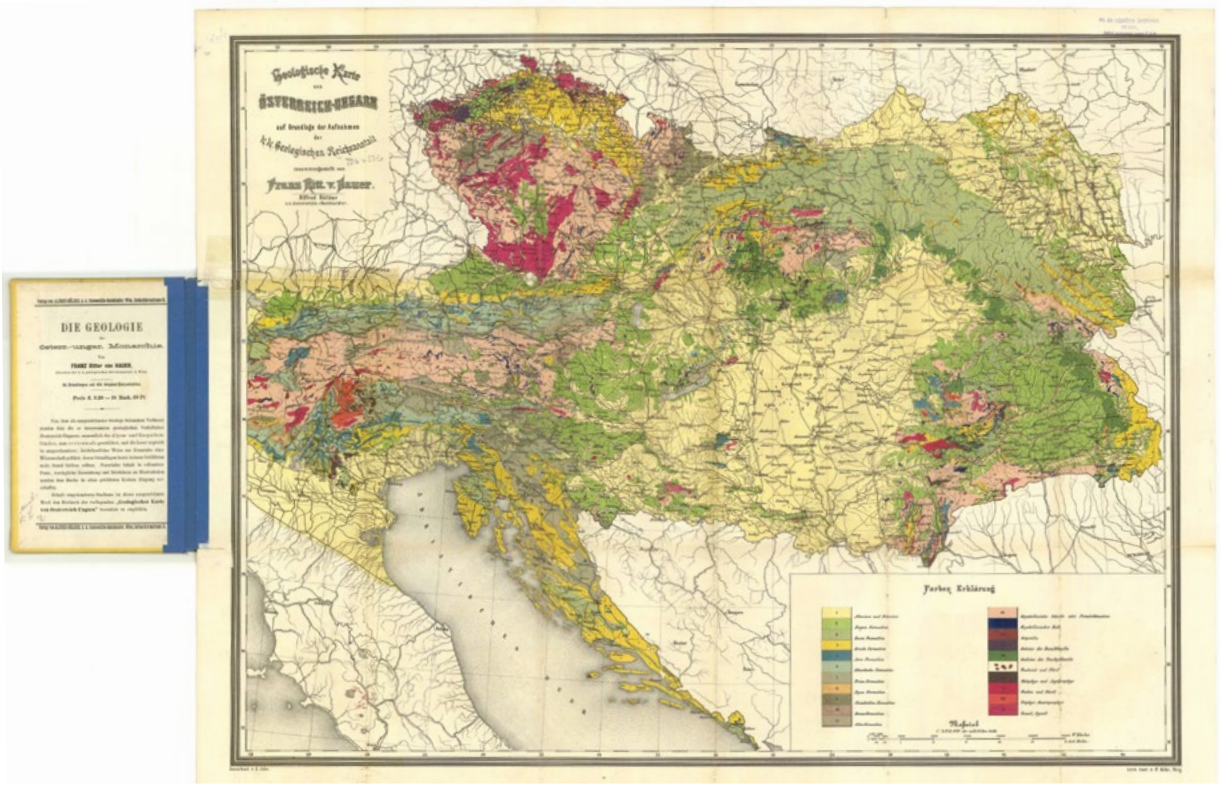
In 2025, a total of **4,940 reports and assessments** with the results of geological works were submitted to the Geofond archive. In addition to acquisitions from new surveys, transferred archives were also incorporated into the collection. All documents were processed as annotated records and are available for parametric searching in the ASGI archive application: https://app.geology.cz/asgi/.

Archival holdings and services

The Geofond archive permanently stores and makes accessible over **297,000 reports and assessments** in its holdings. In 2025, over 2,500 on-site loans were recorded. A service is also provided to trace and electronically deliver selected documentation scans; **578 orders** were processed this way. Larger orders are handled centrally within data services.

Digitalization of the archival fund and remote access

The systematic digitalization of the archival fund is continuously underway at our offices in Prague and Brno. Nearly **59,000 documents** are already available to researchers in the online viewer, including those that were submitted to the archive in electronic form. In 2025, paid access to the viewer was utilized by **313 subscribers.**



Historical map from the map archive collection.
Geologische Karte von Österreich-Ungarn (Geological Map of Austria-Hungary).
Author: Franz Ritter von Hauer, 1875.

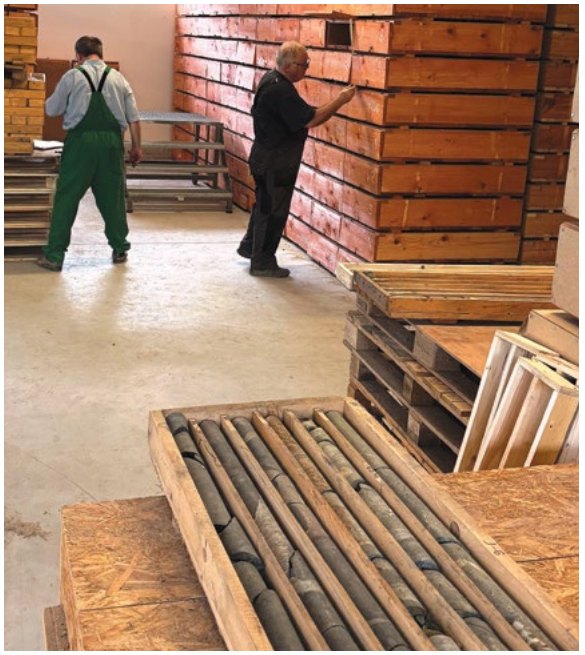
Map archive

The map archive primarily collects cartographic works created as part of CGS research tasks, but it also contains other geoscientific map documents from both the Czech Republic and abroad, including historical maps. In 2025, **over 800 maps** were added to the fund, often including accompanying texts and explanations. The vast majority are available digitally in the new application https://app.geology.cz/mapovy_archiv/en.

Material documentation

The Material Documentation staff continuously update, manage, and, upon request, provide access to a collection of more than 40,500 meters of continuous drill cores and rock samples from structural and other significant boreholes across the Czech Republic.

In the Material Documentation repositories in Lužná, Kamenná, and Stratov, over 16,600 core boxes containing 3,300 objects (predominantly boreholes) are stored within a specialized storage system.



Preparation of a core box storage wall at the Lužná storage facility. Photo by Z. Veselý.



« Registration and storage of drill core samples – Kamenná repository. Photo by Z. Veselý.

Over the course of 2025, drill cores from the Turów Mine monitoring boreholes, a drill core from the Klonk site, and a core from borehole 2140_04T1 in České Velenice were placed in permanent storage. Samples of continuous cores from the engineering-geological survey for the planned Prague–Beroun railway tunnel were accepted for permanent safekeeping, and drill core samples from the MVDD series of boreholes, drilled in the Kladno Basin between 2015 and 2016, were also stored.

Mining History Facility in Kutná Hora

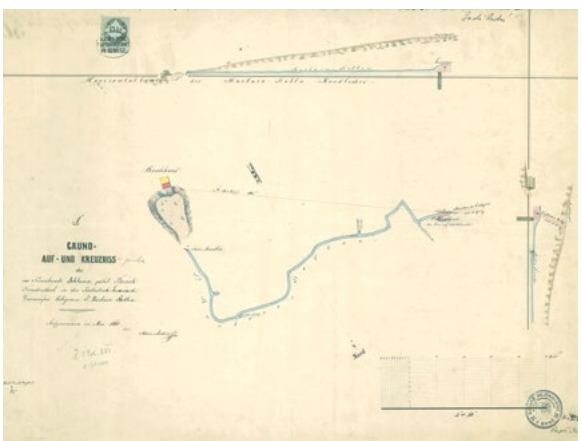
The Mining History Facility in Kutná Hora partly serves as a repository and is also responsible for maintaining the database of undermined areas and the Mining Maps application.

A portion of the Mineral Reserves Fund reports is stored in the facility's recently reconstructed repository. They represent unique, unpublished documents from geological mineral exploration surveys conducted throughout the Czech Republic in the second half of the 20th century. These reports have been gradually digitized over the past few years, and their digital versions are accessible via the CGS web portal. Currently, almost 400 linear meters of these reports are stored here, with more being added every year.

Furthermore, the facility houses a specialized library of geological literature and a collection of mining maps. The specialized library, which includes otherwise unavailable series of periodicals on mining-related topics published before and shortly after the turn of the 20th century, is fully catalogued in the Clavius library system and forms part of the central CGS specialized library. Basic information about the mining maps held in this collection, as well as in the collections of other memory institutions – including previews – is publicly accessible through the Mining Maps application managed by this facility.

Basic information on undermined areas, of which more than 5,600 are currently registered by this facility, is available to the public through the Mining Impacts application.

In addition, the Kutná Hora facility participates in CGS projects and contracts on an annual basis.



» A sample from the mining map collection: A map bearing the reference number MA-A/3259 by A. Ascher from 1861 depicts the Barbora adit near Suchá Rudná, which was driven starting in 1765. The adit portal, located approximately 670 m northwest of the Holy Trinity Chapel in Suchá Rudná, is no longer visible in the terrain today; currently, only the remains of a massive spoil tip can be seen on the hillside.

Drilling and geophysical exploration

CGS and the State Geological Survey



Roman Kujal
Information Systems Management Department



Václav Zikán
Head of Drilling and Hydrogeological Exploration Section

The Czech Geological Survey manages and maintains a number of specialized databases focused on "exploration data". These include a database of geologically documented objects, which features sections describing geological profiles, hydrogeological data, well-logging data, and links to information on the existence of physical documentation, such as drill cores stored in CGS geological documentation archives. Another group comprises geophysical databases, which include well-logging data, radiometry, magnetometry, gravimetry, seismic data, and other information. In addition, CGS also maintains a digitized paper archive. An overview and localization of geophysical data within the Czech Republic are accessible through the Geophysical Measurements map application.

Geophysical data

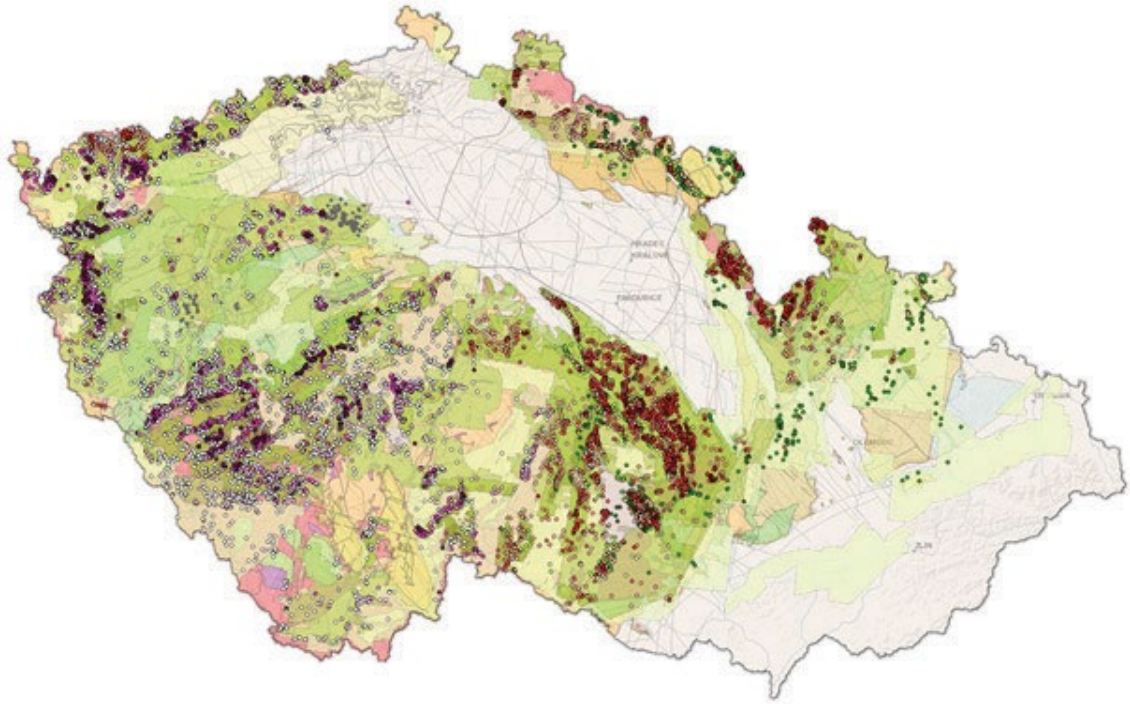
Geophysical data at the CGS fall into two main categories: well-logging data (geophysical measurements in boreholes) and data from the former Geofyzika Brno company. These are distinct datasets managed under their own systems.

Well-logging data are stored in the KAR database sub-register in the form of numerically expressed well-logging curves from individual measurements. An overview of boreholes with well-logging data is available through the Drilling Exploration map application, where the existence of this data is indicated in the attributes.

Data from the former Geofyzika include radiometry, magnetometry (both airborne geophysics), gravimetry, seismic data, physical rock properties, and more. Depending on their nature, they are stored either in a database or a file



» Vibroseis – seismic wave source, with a cable and geophone in the foreground.



Map application "Radiometric Anomalies and Exploration Status Based on Data from the Former ČSUP" (Czechoslovak Uranium Industry).

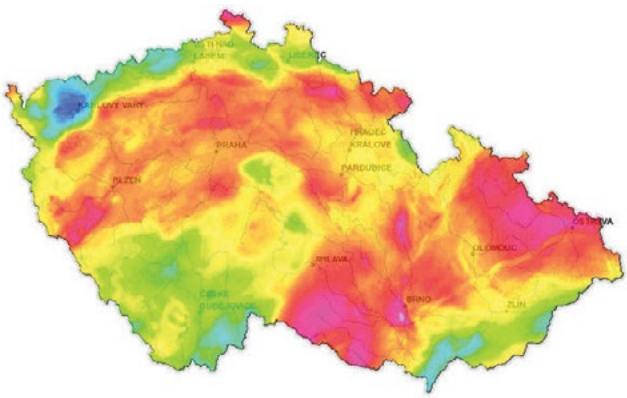
system. In addition to its own data, CGS also archives the **digitized paper archive of Geofyzika Brno**. The Geophysical Measurements map application displays the location of both geophysical data and archival materials.

Drilling and hydrogeological exploration

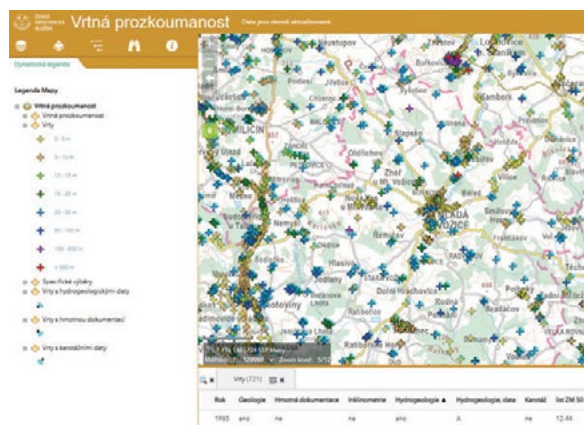
The CGS maintains the **database of geologically documented objects (GDO)** within the Czech Republic. As of December 31, 2025, the GDO database contained **738,492 objects** (an annual increase of 9,400). Since 2024, only basic geological data have been stored for most of the objects included in assessments and final reports. In 2025, 9,100 objects were stored in this manner. The total number of complete geological profiles is 625,882, and these are now stored only within the framework of specific projects. Hydrogeological (HG) data continue to be stored in detail. The total number of objects containing HG data, regardless of the level of detail, was 119,389; in 2025, HG data were added to **2,833 objects**.

The CGS also manages the regional **HG exploration database**, which contains data on regional HG exploration polygons and information on polygons with groundwater reserve calculations. As of December 31, 2025, the database contained **990 polygons**.

In 2025, the symbols in the Drilling Exploration map application were graphically updated, and the links for searched objects were expanded to include a link to information on physical documentation, provided it is stored in the CGS archives.



Map application Geophysical Measurements – map of complete Bouguer anomalies.



Screenshot from the Drilling Exploration map application.

Mineral resources

CGS and the State Geological Survey



Jaromír Starý
Head of the Mineral Information System Department

The Czech Geological Survey (CGS), as part of its state geological survey, manages several responsibilities related to mineral resources. Some activities are performed directly under the authority of the Ministry of the Environment (MŽP/MoE), while others stem from an agreement between the CGS, MoE, and the Ministry of Industry and Trade (MPO/MIT), or from other legislative provisions.

SurIS – Mineral Information System

The fundamental and key element is the Mineral Information System (SurIS), which is part of the Geological Information System (GeoIS). This system continuously and comprehensively collects all available data on the mineral resource potential in the Czech Republic. The data and information from SurIS serve state administration and local government bodies for informed decision-making that supports the development of the state and its administrative units.

Its foundation is a database of mineral deposits and resources in the Czech Republic, which is linked to several sub-databases: companies (organizations), mining lease areas (DP), protected deposit areas (CHLÚ), preliminary consents for establishing DP (PSDP), exploration areas (PÚ), decisions on reserve approval, and graphic objects.

SurIS is continuously updated based on mandatory geological documentation submissions, results of geological work, and departmental forms Geo (MŽP/MoE) V 3-01 and Hor – MPO/MIT. The basic data in SurIS is accessible via a map application (https://mapy.geology.cz/suris/).

The new Information System for Protected Deposit Areas and Special Interventions in the Earth's Crust (ISCHLÚ) also draws from SurIS data. Since 2019, ISCHLÚ has been registered as a Public Administration Information System (ISVS) with the Ministry of the Interior of the Czech Republic.

Departmental data collection

As part of the comprehensive inventory of reserves in exclusive deposits, the CGS, on behalf of the MoE, processes data and outputs from the Annual Reports on the Movement and Status of Reserves in Exclusive Mineral Deposits (Geo (MŽP/MoE) V3-01). These reports are part of departmental data collection as per § 29 of Act No. 44/1988 Coll., on the Protection and Use of Mineral Resources (Mining Act), as amended.

Furthermore, within the framework of mining and technical records, the CGS processes data and outputs from the Form for Providing Data to Mining and Technical Records (Hor – MPO/MIT), which are also part of departmental data collection as per § 29a of Act No. 44/1988 Coll., on the Protection and Use of Mineral Resources (Mining Act), as amended.

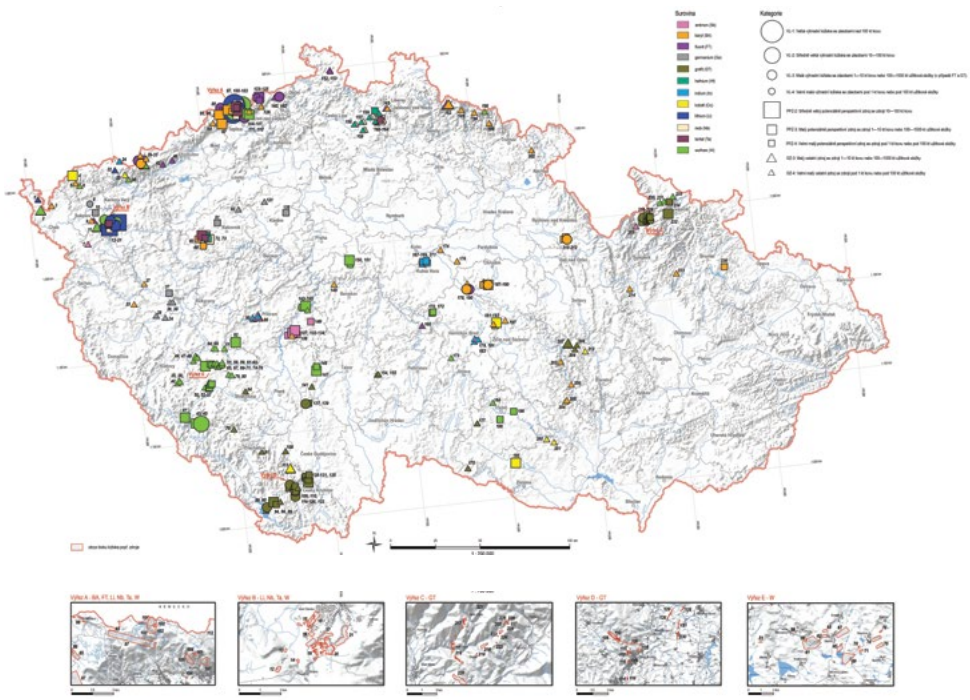
Professional outputs and publications

From the SurIS data, several monographs have been prepared: *Balance of Exclusive Mineral Reserves of the Czech Republic*



» Lánov Quarry – the largest dolomite deposit in the Czech Republic. Photo by J. Starý, 2025.

as of January 1, 2026; *Inventory of Mineral Deposits in the Czech Republic as of January 1, 2026*; a study on *Mineral Reserve Movement in Exclusive Mineral Deposits in the Years 2016–2025*; *Overview of Mineral Reserves in Mining Lease Areas and Other Mined Deposits of Non-Exclusive Minerals as of January 1, 2025*; and the yearbook *Mineral Commodity Summaries of the Czech Republic 2026 (statistical data to 2025)*. This publication has been issued since 1992 with the aim of providing information on mineral resources in the Czech Republic and abroad. The preparation of the publication utilized a range of domestic and international source materials from journals, professional literature, and the latest available editions of various international statistical overviews.



« Map of the Czech Republic showing the distribution of deposits, potentially prospective and other resources of EU Critical Raw Materials (CRM) as of January 1, 2022. Edited by J. Starý.

Mine workings, undermined areas, and mining waste

CGS and the State Geological Survey



Jolana Skřivánková
Head of the Mining Impacts Department



Pavel Šír
Mine Workings Registration Section

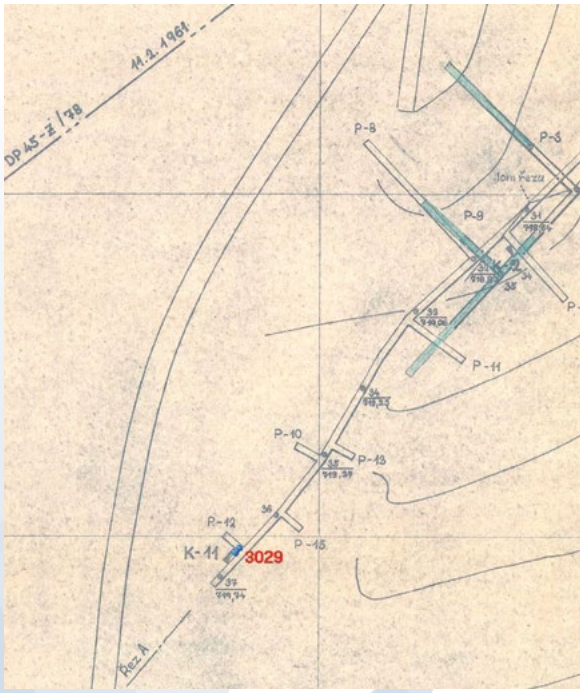
The tasks of the state geological survey performed by the Czech Geological Survey include the maintenance of the Mine Working Impacts Inventory, initial on-site investigations of reported localities and regular inspections of taken safeguarding measures, as well as maintenance of Inventory of Hazardous Waste Facilities.

Mine Working Impacts Inventory

The Czech Geological Survey records reports of hazardous mine workings. The Mining Impact Report web application (https://app.geology.cz/dud_ozn/), accessible through the CGS website, is available online for reporting and recording all newly detected cases of mining impacts. The application allows anyone to report such phenomena, including attachment of photo documentation. Expert staff of CGS subsequently conduct initial on-site investigations and documentation. In case of mine workings, whose original operator or a legal successor does not exist or is unknown and abandoned exploratory mine workings, whose legal successor is the Czech state, regular inspections of safeguarding measures are conducted, funded by the MoE. The field investigations are based on a long-established method.

In 2025, CGS employees inspected almost 1,200 mine working sites and documented their impacts.

The Mining Impacts Inventory comprises files containing relevant documents for each reported case. Data are stored in the mining impacts database of the CGS Information System. Information on the status and location of reported



Section of a mining map from 1985 showing the location of the K-11 chimney, which collapsed in 2025. Addressed within the Mine Working Impacts Inventory.



» Collapse of the Chvalovice mine shaft following graphite mining in Chvalovice u Netolic, Prachatice District. Addressed within the Mine Working Impacts Inventory.

mining impacts are also displayed by the Mining Impacts (https://mapy.geology.cz/dulni_dila_poddolovani/) and Reported Mining Impacts (https://mapy.geology.cz/oznamena_dulni_dila/) map applications, which are permanently accessible to the public on the CGS website.

Undermined areas

The Czech Geological Survey maintains a database of undermined areas in the Czech Republic. In this context, undermined areas are defined as polygons encompassing the known or presumed occurrence of deep underground mine workings, created for the purpose of mineral extraction or exploration. This definition therefore excludes structures like tunnels, cellars, sewers, underground storage facilities, shelters, etc. Data on undermining are continuously updated and refined, serving as a basis for spatial planning. Currently, over **5,600 undermined areas** are registered. Information regarding the individual mine workings and undermined areas is presented in a map application (https://mapy.geology.cz/dulni_dila_poddolovani/) on the CGS website.

The primary sources of information for creating the database of undermined areas are written materials stored in the geological documentation archives of Geofond in Prague, Kutná Hora, and Jílové u Prahy. The facility in Kutná Hora also houses an extensive specialized library of geological and mining literature, as well as collections of mining maps, comprising nearly 14,000 items. Documents from state archives and archives of specialized organizations are also utilized.

For each undermined area, basic data are recorded, such as the mined raw material, period of mining, surface manifestations, data accuracy, level of documentation, and so forth. An important component includes references to relevant reports pertaining to the specific undermined area.

Inventory of Mining Waste Facilities

The Mining Waste Management Act that came into force in 2009 included a comprehensive inventory of mining waste disposal sites in the Czech Republic. The Czech Geological Survey created the Inventory of Mining Waste Facilities, which was included in the CGS Information System. It currently contains more than 7,000 objects and is continuously updated. Detailed data on individual disposal sites, sampling points created during their sampling, and the results of analyses are accessible via the public Inventory of Mining Waste Facilities map application on the CGS website.

The Inventory of Mining Waste Facilities also includes sites that have been classified as hazardous waste facilities. Above-threshold values for pollutants were detected at these sites and, in combination with other factors, they exceed hazard index (HI) 1. Each year, the Ministry of the Environment inspects and investigates six of the potentially most problematic sites. The Inventory of Hazardous Waste Facilities was launched in 2012 as a separate web application in Czech and English versions. So far, 24 facilities have been included in it.

Slope deformations

CGS and the State Geological Survey



Oldřich Krejčí
Engineering
Geology Section

Among the activities of the Czech Geological Survey in performing its state geological survey related to landslides and slope deformations are fieldwork and engineering-geological mapping, the record of specialized technical reports and assessments, and their processing into graphic and text databases within the CGS Information System. This also includes publicly accessible map applications that present areas affected by slope deformations.

The operation of the Inventory of Slope Deformations was fully transferred to the CGS on January 1, 2011. In its current data set, the CGS has been continuously building a detailed Inventory of Slope Deformations in the Czech Republic with a precision of 1:10,000. This inventory contains data and information from the activities of various organizations from 1962 to the present. As of December 31, 2025, 26,892 records of landslide objects were registered.

Active slope deformations are considered more significant sources of risk. Activity is always recorded at the time of mapping the slope deformation. To ensure effective use, the Inventory is continuously supplemented, updated, and verified through field revisions (mapping, assessment activities).

In 2025, a total of 1,447 landslide objects were newly mapped or revised, including 174 active ones.

As part of Regional Geological Administration assessment activities, 97 slope deformations were evaluated. A total of 54 print files of the *1:10,000 Slope Deformation Documentation Maps* were processed.

Information on slope deformations is available online on the internet portal at https://mapy.geology.cz/svahove_deformace/. Data on this portal are continuously updated and supplemented. In 2025, the map application was updated 12 times.

From a methodological perspective, modern remote sensing (RS) methods are extensively used for mapping slope deformations, such as the analysis of the 5th generation digital relief model (DMR 5G) and imaging with CGS's own unmanned aerial vehicles.

Key projects ensuring funding for slope deformation research in 2025 were:

- TA CR Environment for Life – Natural and Anthropogenic Georisks
- Risk Geofactors (MEYS)

Contractual cooperation in 2025 was based on collaboration with the following organizations:

- Road and Motorway Directorate of the Czech Republic, s. p.
- Česká přenosová soustava ČEPS, a. s. (Czech Transmission System)
- Správa železnic, státní organizace (Railway Administration, state organization)

Research results were utilized by cities, municipalities, and the State Environmental Fund for evaluating applications for grants from European funds under the Operational Program



» The head scarp of the Ledové sluje slope deformation in Podyjí National Park. Photo by J. Nečas.

Environment 2021–2027, in accordance with valid program documents. Research work also included innovations in methods for monitoring sloped terrains, innovations in methodologies for determining warning states, and the development of warning systems based on pilot localities.

Continuous data transfer on slope instabilities was carried out for requests for current data on landslide areas in accordance with § 28 of Act No. 183/2006 Coll., on Spatial Planning and Building Code – Update of Spatial Analytical Documents. Currently, this activity takes place within the Spatial Information Output Module of Planning Analytical Materials.

From April 23 to 25, 2025, the 13th annual Slope Deformations and Pseudokarst Conference was held at the Lions Hotel training center in the village of Nesuchyně. The event drew 105 experts from the Czech Republic, Slovakia, and Austria. The program featured 31 presentations divided into thematic sessions: Slope Deformation Research, Geophysical Methods and Remote Sensing of Landslides, Slope Deformation Stabilization and Monitoring, and Slope Deformation Mapping. The conference also included field excursions to notable landslide sites in Dolní Ročov, Březno, and Žíželice, as well as the landslides near the Nechranice Reservoir.



« Attendees of the 13th Slope Deformations and Pseudokarst Conference during the field excursion to the Dolní Ročov landslide. Photo by M. Bednarik.

Expert assessments and spatial planning

CGS and the State Geological Survey



Jan Čurda
Head of the Regional Geologists Administration



Zdeňka Petáková
Head of the Department of Geological Exploration

The Czech Geological Survey, as part of its state geological survey, prepares expert assessments and expertise. This activity is coordinated by the internal body, the Regional Geologists Administration (RGA), and is carried out by regional geologists, hydrogeologists, deposit geologists, and engineering geologists. Furthermore, upon request from public authorities and other authorized entities, the CGS provides expert statements on investment construction plans.
The CGS also provides public authorities with data sets for the purpose of preparing spatial analytical documents (so-called territorial data according to § 64 of the Building Act).

Administration of Regional Geologists of the CGS

The expert and assessment activities of the CGS, carried out pursuant to Section 17 of Act No. 62/1988 Coll., on Geological Works, as amended, focus on the continuous execution of the state geological survey in everyday practice. The core of this work lies in providing expert responses to requests submitted to the CGS – in accordance with relevant legislation – primarily by public authorities.
The expert work of regional geologists, as well as regional specialists in economic geology, hydrogeology, and engineering geology, combined with assessment activities, covers the entire territory of the Czech Republic on a territorial basis, as mandated by the aforementioned Geological Works Act.

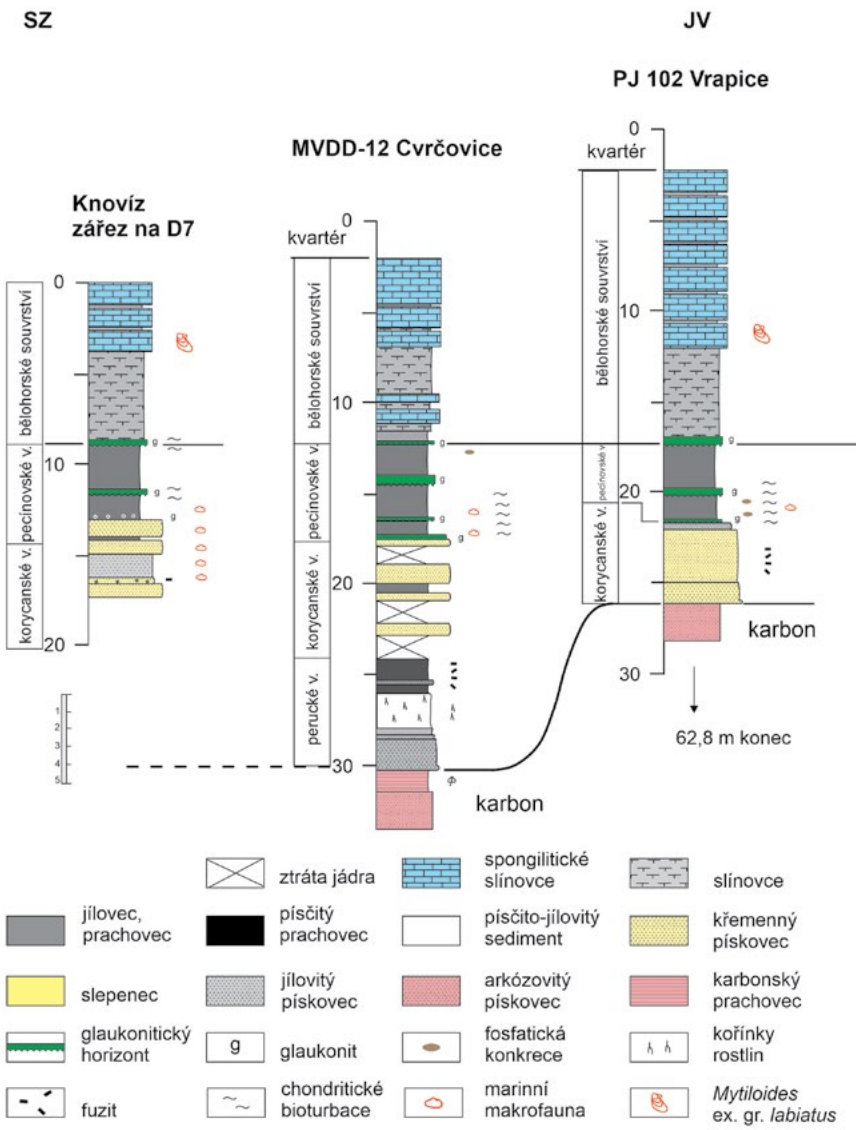
In 2025, which marked the twenty-eighth year of continuous operation of the CGS Regional Geologists Administration, these activities were managed exclusively in digital form via the RGA Protocol application on the CGS web portal. The agenda management system was further improved this year, allowing for the localization of registered events down to specific land parcel numbers when necessary. This proved to be particularly effective when addressing the issue of slope deformations, which dominated the activity portfolio of the CGS Regional Geologists Administration in 2025 with a total of 200 cases.

In the initial months of 2025, the aftermath of the low-pressure system Boris was still subsiding. In September of the previous year, it brought extreme rainfall totals to certain regions of the Czech Republic, which, among other things, triggered an increased number of slope deformations. These primarily had to be surveyed and their risks classified so that they could subsequently be recorded in the CGS Register of Slope Deformations.

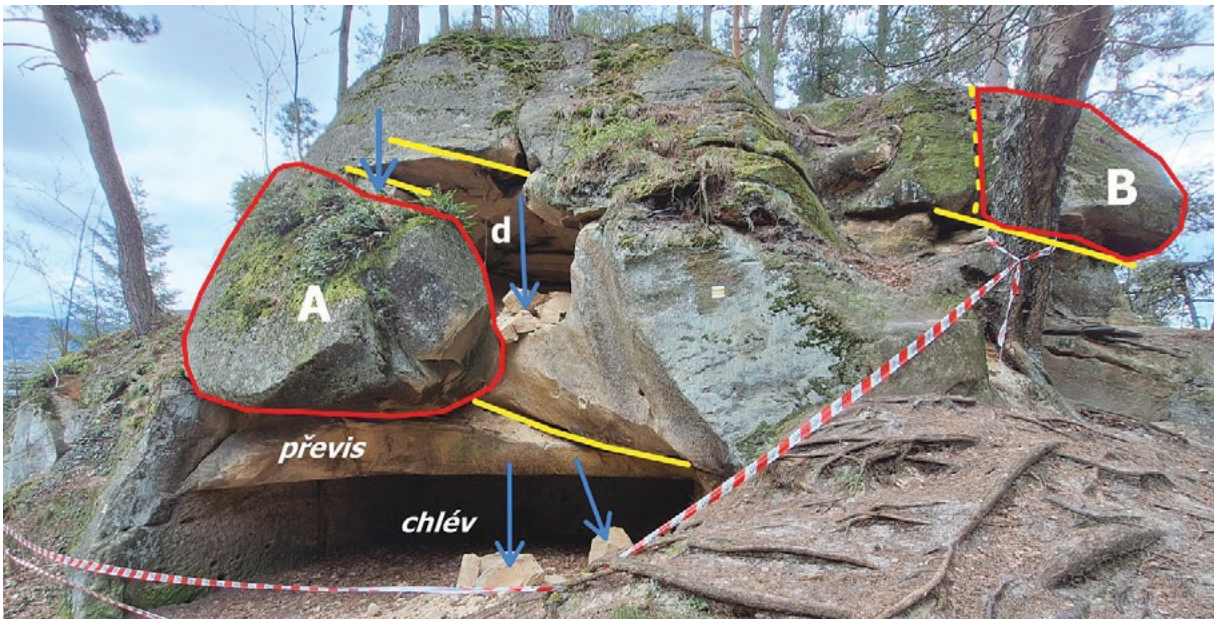
The experience gained during this hectic period led to the preparation of CGS Director's Directive No. 3/2025 on ensuring crisis campaigns and the operation of the CGS



» Unstable rock slope below Road II/2421 in Roztoky near Prague. Photo by J. Novotný.



« Lithological and paleogeographical relationships between the MVDD-12 Cvrčovice borehole and its surroundings, documented in profiles at Knovíz on the D7 highway and in the PJ-102 Vrapice borehole (the base of the Bílá Hora Formation serves as the reference level). Figure by S. Čech (2025).



Overall view and situational diagram of the surveyed rock face in Klokočí near Turnov. Red polygons: rock blocks A and B at risk of collapse; d: cavity; převis: overhang; chlév: rock shelter (animal pen); solid yellow lines: bedding or stratification planes; dashed yellow line: fracture (joint); blue arrows: fallen rock blocks. Photo by P. Čáp.

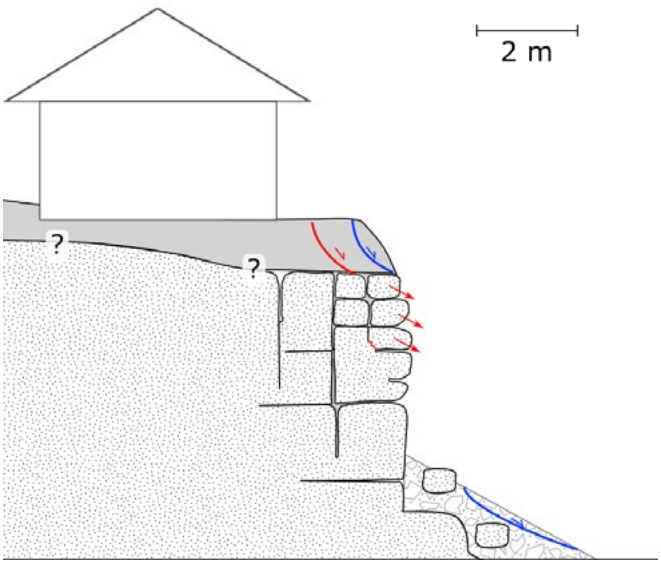
emergency hotline. Upon its entry into force on April 10, 2025, internal mechanisms for managing similarly demanding tasks were codified within the CGS.

In the second half of 2025, the activities of the CGS Regional Geologists Administration in the field of slope deformations were dominated by processes triggered by the announcement of the 89th Call of the Operational Programme Environment: *Restoration of slope stability, stabilization, and remediation of extreme slope instabilities caused by natural phenomena.*

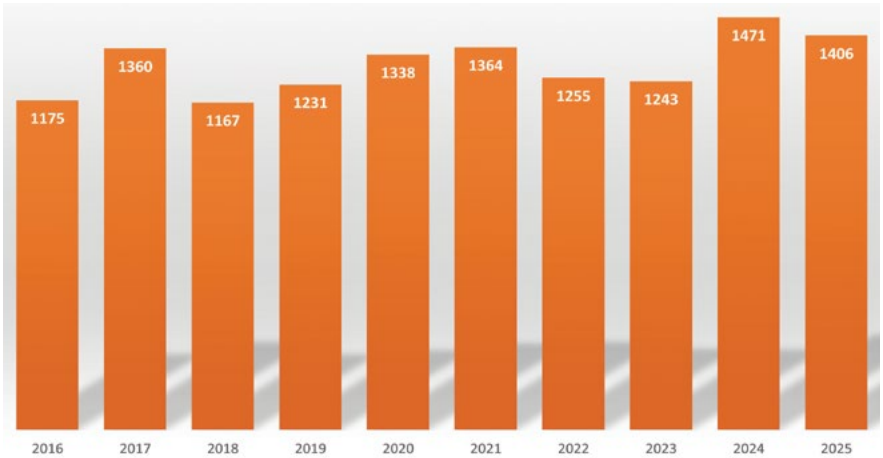
Based on the relevant provisions of the Operational Programme Environment (OPE) 2021–2027 Programming Document, current version number 11, the CGS became obligated – within the framework of bilateral cooperation with the State Environmental Fund – to issue "positive expert opinions" for grant applications submitted by various entities for the remediation of slope deformations that met the specified criteria.

However, the CGS's experience with activities related to grant support for landslide remediation within the Operational Programme Environment, in light of Call No. 89, revealed that the procedural documentation is not formulated clearly enough for most grant applicants. It fails to sufficiently distinguish between the two core phases of the landslide support process within the OPE:

The initial phase consists of the essential primary field reconnaissance of the geological risk factor by CGS specialists, assessing its risk level, and the subsequent recording of these facts in the CGS Register of Slope Deformations. Within the



Schematic cross-section of the unstable slope in Ždírec v Podbezdězí, indicating the two main mechanisms of slope failure: shallow sliding in the near-surface layer and colluvial loams (in blue), and rockfall with the associated collapse of the overlying soil (in red). Figure by L. Janků.



« Number of statements processed between 2016 and 2025.

secondary phase, only landslide remediation projects that are applying for a grant and meet clearly predefined criteria are submitted for evaluation.

A brief analysis of the cases addressing hydrogeological issues in 2025 demonstrates how complicated administrative proceedings have become today, particularly those conducted regarding the granting of consent under the provisions of Section 14, letter c), and individual provisions of Section 17 [paragraph 1, letters g) and i)] of Act No. 254/2001 Coll., on Waters and on Amendments to Certain Acts (the Water Act), as amended.

Usually, after a certain time delay, these are followed by proceedings for the siting of water management structures, groundwater management permits – specifically for its abstraction – and proceedings for issuing of building permits for the construction of water management structures. In such situations, many administrative authorities declare that they lack the necessary expert knowledge to issue a decision. As a result, they turn to the CGS with requests to prepare expert opinions of an arbitral or explanatory nature, pursuant to Section 56 of Act No. 500/2004 Coll., the Administrative Procedure Code, as amended.

Unfortunately, it must be repeatedly stated that many such proceedings are unnecessarily complicated by the obstructive behaviour of some of the participating parties.

A parallel to this destructive approach can also be seen in the actions of various entities – whether legal entities, natural persons, or municipalities – in connection with the entry into force of Government Regulation No. 434/2025 Coll., on the designation of certain exclusive sand and gravel deposits as deposits of strategic importance. The NIMBY (Not In My Back Yard) effect is highly evident in these cases, where citizens reject the construction of publicly beneficial structures and facilities in their vicinity.

In 2025, the relevant CGS regional specialists in economic geology had to expend considerable effort to counter this negative perception of the state's raw materials policy through fact-based arguments. They particularly sought to clarify the site-specific nature, uniqueness, significance, and non-renewability of mineral resources as natural resources essential for the economic development of the Czech Republic.

Rescue field surveys of temporary geological exposures focused mainly on specific sections of the construction of the D6, D7, D11, D35, and D55 highways.

Expert statements

The Information Systems Unit handles the issuance of statements regarding capital construction projects and spatial planning documentation concerning areas with special geological conditions, pursuant to Section 13 of the Geological Act and Sections 18 and 19 of the Mining Act.

In 2025, 1,406 requests for statements concerning the protection of mineral deposits and the existence of undermined areas were processed. A total of 845 statements were issued to spatial planning authorities and citizens pursuant to Section 15, Paragraph 1 of the Mining Act.

The five-year average number of statements fluctuates by a few percent, as is evident from the figure "Number of statements processed between 2016 and 2025". In a year-on-year comparison with 2024, the number of processed statements decreased by 65 items, representing a 5% drop. The processing of these statements was carried out in close cooperation with the assessment activities of the Administration of Regional Geologists of the CGS.

Geological Information System

CGS and the State Geological Survey



Richard Binko
Head of the Informatics Department

The Geological Information System (GeoIS) serves as the key information infrastructure of the CGS, ensuring the standardized collection, secure storage, and efficient distribution of data on the Czech Republic's geological environment. Our long-term goal is to develop this modern digital environment to fully serve the needs of the state administration and the scientific community, while remaining as open to the public as possible. In 2025, we focused on modernizing our software infrastructure and applications, and on deploying innovative tools to facilitate data management and processing. We actively shared our geoinformatics expertise by delivering international workshops in Bosnia and Herzegovina and participating in public outreach and educational events.

Esri and the new GIS software licensing

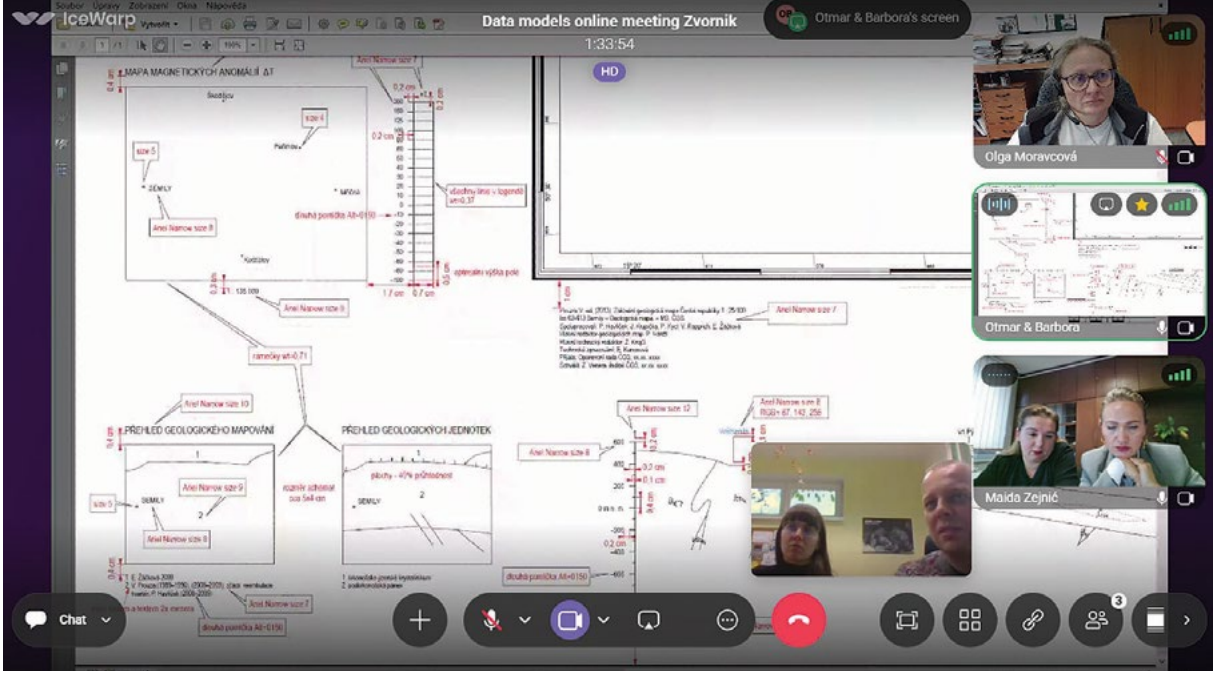
Over the past year, we have successfully signed a three-year Enterprise Agreement for Esri products. The main benefit of this agreement is the ability to simultaneously use both the legacy and new licensing models, which will enable our gradual transition to a licensing system based on the Named User model. In practice, this means easier access to ArcGIS Pro and its extensions, a personalized environment, and the opportunity to utilize the full potential of GIS tools not only in the office but also during fieldwork via mobile applications.

Validation tool for documentation point and analysis databases

The documentation point database, the lithogeochemical database, and the registry of analyses are continuously updated with new findings throughout the entire mapping process. During the data acceptance and review phases, their current status is verified, particularly focusing on the completeness and internal consistency of the records. For this purpose, a validation tool was developed in-house, enabling both the verification of data accuracy and its statistical evaluation, while providing a clear report on the data completion rate.

Expansion of open data to include Important Geological Localities dataset

Following our long-term strategy of digitalization and openness, the Important Geological Localities dataset has been recently added to the National Open Data Catalogue (NKOD). By publishing it in the NKOD, we provide the public with a selection of the most interesting sites from the corresponding database, which contains over 3,500 records of sites that are specially protected, scientifically significant, or otherwise notable. This marks the 18th dataset released by the CGS, fulfilling our obligations under Act No. 261/2021 Coll.



A snapshot from an online workshop on map composition, held as part of the international Bosnia and Herzegovina project.

Workshops in Bosnia and Herzegovina

As part of the "Innovation of Geological Information Systems in Bosnia and Herzegovina" development project, several online workshops were conducted, focusing on the implementation of data models, map composition, and cartographic symbology. These workshops support the development of geoinformatics and cartography skills among our Bosnian partners by providing essential training to staff building their expertise in these areas. This initiative has received a very positive response from our partners and will continue in 2026.

Promotion of activities and development of digital skills

Over the past year, we actively focused on promoting our work and its results to the public. A significant part of these efforts involved collaborating with schools, particularly by organizing specialized excursions for high school students. The students learned about the process of creating geological maps and gained hands-on experience with CGS map applications during practical workshops. We also shared our expertise in professional publications such as an *ArcRevue* magazine article detailing the deployment of the Field Maps application for efficient field data collection.

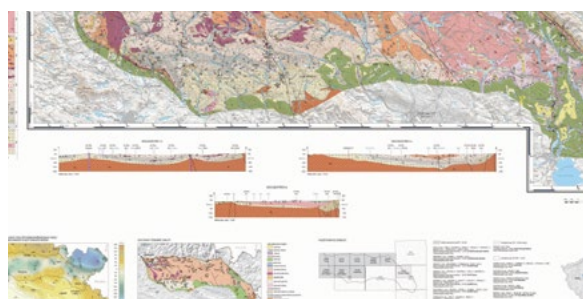
Internally, we organized a professional seminar focused on newly developed GIS tools for geological modelling, and prepared a series of tours and lectures to thoroughly familiarize new employees with our information infrastructure. Continuing our tradition of public outreach, we participated in events such as the Ministry of the Environment's Children's Day and the annual Geology Day, where we sought to introduce the world of digital geology to the general public in an engaging and accessible way.

Map printing

During the prepress phase, three map outputs were finalized. These outputs underwent expert processing, validation, and final proofreading to ensure compliance with strict cartographic standards for accuracy, legibility, and print quality. Specifically, these were the *Geological Map of the Krkonoše Piedmont Basin 1:75,000*, the *Basic Geological Map 1:25,000* (sheet 03-432 Nová Paka), and the *Building and Decorative Stones of the Karlovy Vary Region* map.



The CGS at the Ministry of the Environment Children's Day.



A section of the *Geological Map of the Krkonoše Piedmont Basin 1:75,000*, processed entirely within a geographic information system (GIS).

International Activities and Cooperation in 2025

International activities are an important part of the professional work of the specialists at the Czech Geological Survey. The institution's management systematically works to secure international cooperation of research projects, as well as development or commercial contracts.





Photo by O. Man.

Petr Mixa
Head of the Department of Geology,
Deputy Director

The main benefits of these activities are considered to be the professional and personal development of CGS employees, the study of new geological fields and phenomena, and the development of language, cultural, and personal skills. An important benefit is the enhancement of the Czech Geological Survey's credit among European and global geological institutions. The financial volume of foreign projects represents approximately 5–7% of the CGS annual budget.

International activities are focused both on the European Union region and on other continents – especially Africa, as well as Asia and America. Scientific and development projects cover a whole range of geoscientific disciplines, representing the broad professional competence of the Czech Geological Survey.

Membership in selected international organizations

- AGU Advancing Earth and Space Science
- CETEG Central European Tectonic Groups
- EGS EuroGeoSurveys
- EGU European Geosciences Union
- IAEA International Atomic Energy Agency
- IAEG International Association for Engineering Geology and the Environment
- International Association of Sedimentologists
- SEG Society of Economic Geologists
- SGA Society for Geology Applied to Mineral Deposits

Partner countries in 2025:

- Germany (cross-border geological maps)
- Austria (critical mineral resources)
- Slovakia (Quaternary geology, geochronology)
- Spain (isotope geochemistry, volcanology)
- Norway (environmental geochemistry)
- Finland (critical mineral resources)
- Italy (geology, mineralogy)
- Greece (remote sensing, critical mineral resources)
- Bosnia and Herzegovina (geological information systems)
- Georgia (geohazards)
- USA (structural geology, geological mapping)
- Costa Rica (geological mapping, Quaternary geology, geohazards)
- Peru (geohazards)
- Ethiopia (geological mapping, hydrogeology, volcanology, geochronology)
- Algeria
- Namibia
- Mongolia
- China (geology, tectonics, geochronology, geochemistry)
- Uganda and Zambia (critical mineral resources)
- Madagascar (geology, mineralogy)
- Kazakhstan (geological mapping, critical mineral resources)
- Uzbekistan (geological mapping, critical mineral resources)



Banana trees and coffee plants are the main agricultural crops of central Ethiopia. Photo by P. Mixa.

Activities within EuroGeoSurveys

The Geological Surveys of Europe

Within the European Union, the CGS is an active member of the association of European geological surveys, EuroGeoSurveys (EGS), through which CGS experts participate in a number of research projects and expert group activities via joint research. The most significant of these is the Geological Service for Europe project, in which the CGS is involved in topics such as Critical raw materials, Geothermal energy & underground storage inventory, Improved appraisal, protection & sustainable use of European groundwater resources, Geological framework for the European geological data & information system, and European geological data infrastructure – EGDI. European atlases of geothermal potential, groundwater, and CO_2 storage sites are also being created. On the EGS platform, a discussion has also been initiated among member states about establishing a European Geological Survey, the aim of which would be, among other things, to acquire strategic projects from the European Commission, focused especially on critical mineral resources.

PanAfGeo and PanAfGeo+ Country Windows, Africa

In 2025, the second three-year program of the international PanAfGeo project concluded, in which the Czech Geological Survey trained colleagues from African countries in the skills of geological mapping and Earth remote sensing. This program ended in 2025 with courses in Uganda. The PanAfGeo program is succeeded by a third phase, PanAfGeo+, in which the CGS will again guarantee training in geological mapping and remote sensing under the leadership of Dr. Veronika Štědrá. The aim of the parallel project, PanAfGeo+ Country Windows, is to contribute to the sustainable management of Africa's raw material resources, to address adaptation to and mitigation of climate change, and to support the partnership between the EU and Africa in the field of geosciences, particularly critical raw materials. In 2025, the Czech Geological Survey began participation in mineral deposit projects in Zambia and Uganda; negotiations are underway for CGS participation in projects in Namibia, South Africa, and Rwanda.



Typical semi-mountainous desert landscape in southern Algeria. Photo by I. Soejono.

Algeria and Namibia

The aim of the project "Geodynamic Evolution of Western Gondwana from the Perspective of the Central Hoggar (Algeria) and the Kaoko Belt (Namibia)" is to clarify the relationships between geological units and the geological evolution of the marginal parts of the mountain belt that dominated the geological structure of the western part of the Gondwanan supercontinent during the Late Precambrian. The work in both Namibia and Algeria focuses on studying the metamorphic and structural evolution of the central parts of the orogen and inferring their geological evolution in relation to adjacent units. The results of the project will contribute to the reconstruction of continental block movements and the formation of mountain belts during the Late Precambrian.



Fieldwork in the Central Hoggar region of southern Algeria. Photo by P. Štípská.



Lunch preparation by local guides – Central Sahara, southwest of Tamanrasset, southern Algeria. Photo by P. Štípská.



A field camp in the Central Sahara region of southern Algeria. Photo by J. Konopásek.



Participants of the project presentation event in Banja Luka, September 10, 2025. Photo by P. Fiferna.

Bosnia and Herzegovina

The project "Innovation of Geological Information Systems in Bosnia and Herzegovina", financed by the Czech Development Agency from 2023 to 2027, focuses on developing the long-term sustainable management of geological data and improving access to it. The project includes the provision of technology and capacity building for both geological surveys in the country: the Geological Survey of the Federation of Bosnia and Herzegovina and the Geological Survey of Republic of Srpska.



Training for employees of the geological surveys of Bosnia and Herzegovina at the CGS, April 2–4, 2025. Photo by B. Kořínková.



Project presentation at the event in Banja Luka, September 10, 2025. Photo by P. Fiferna.



Interview for Bosnian television and media in Banja Luka, September 10, 2025. Photo by P. Fiferna.



Participants of the Recomine SN-CZ-Plus project excursion, held during the workshop in Kovářská in the Ore Mountains. Dr. Breiter explains the tin mineralization at the old Vlčí jámy mine workings on Blatenský vrch. Photo by M. Hess, 2025.

Czech–German cooperation

The Recomine SN-CZ-Plus project, funded by the European Regional Development Fund through the Interreg Czech–Saxony 2021–2027 Cross-Border Cooperation Programme, focuses on the topic of mineral resources, specifically decorative stones and critical raw materials, in the Czech–Saxon border region. Through joint Czech–German workshops and excursions, the project addresses the potential future utilization of both historical and contemporary mineral resources, as well as the identification of factors concerning the impact of their extraction on the land surface, water bodies, and landscape ecology.

During the second year of the project, the Czech side hosted, for example, a workshop focused on the decorative stones and critical raw materials of the Liberec Region, as well as a workshop on the historical mining of critical raw materials in the Ore Mountains (Krušné hory), primarily tin ore. Meanwhile, the Saxon side hosted a workshop covering the principles of utilizing plants in biogeochemical prospecting, which represents a promising and environmentally friendly prospecting method. A visit to the fluorite mine in Niederschlag was also part of the program.



Participants of the Recomine SN-CZ-Plus project workshop and excursion in Kovářská in the Ore Mountains. Photo by Š. Mrázová, 2025.



Excursion to the fluorite mine in Niederschlag on the Saxon side as part of the Recomine SN-CZ-Plus project. Photo by U. Bobe, 2025.



» Documentation of the Nicoya Complex basalts at outcrops south of Jacó. In the background are the steep slopes of the Montes del Aguacate mountain range. Photo by V. Žáček.

Research on the vulnerability of the Central Pacific coast in Costa Rica

A project aimed at developing a methodology for assessing coastal vulnerability was carried out in 2025 in Costa Rica. The project was funded by the European Union's ADELANTE 2 programme – a triangular cooperation initiative between the European Union and Latin American countries – and was co-financed by the CGS. An approximately 100-km-long section of the Central Pacific coast was selected as the model area. One of the key outputs of the project was the production of a 1:25,000-scale geological map of the coastal area.



« The methodological manual published by the Costa Rican partners, alongside a digital application, represents the main output of the project. Photo by V. Žáček.



» Rockfall in a Pleistocene lahar during low tide. Photo by V. Žáček.



» The extensive floodplain and wetlands of the Río Grande de Tárcoles are home to American crocodiles. Photo by V. Žáček.



A team of engineering geologists and remote sensing specialists from the Czech Geological Survey, alongside experts from Georgia's National Environmental Agency (NEA), following a joint knowledge-transfer workshop. Photo by M. Dostalík.

Georgia

In 2025, a development cooperation project focused on mapping geological hazards in the mountainous region of Pirikita Khevsureti in Georgia was completed. As part of this initiative, geological threats along 110 km of road infrastructure were assessed, and a hazard evaluation methodology was implemented into the activities of our partner organization, the National Environmental Agency (NEA). The primary output is a series of engineering-geological maps, which serve as a crucial basis for land-use planning, infrastructure maintenance, and the sustainable development of the region. The project also supports the long-term mitigation of geohazards and adaptation to environmental changes that increase the vulnerability of the area. An additional outcome is the Landslider24 tool, designed for the automated detection of landscape changes caused by landslides, erosion, and other geomorphological processes.



Documenting glacial crevasses on the Gergeti Glacier in the Kazbegi region, an area known for frequent catastrophic glacier collapses. Photo by M. Dostalík.



The iconic "Blue Rocks" formation just outside the town of Shatili in the Khevsureti region, shaped by erosion in blue-grey sediments. Photo by M. Dostalík.

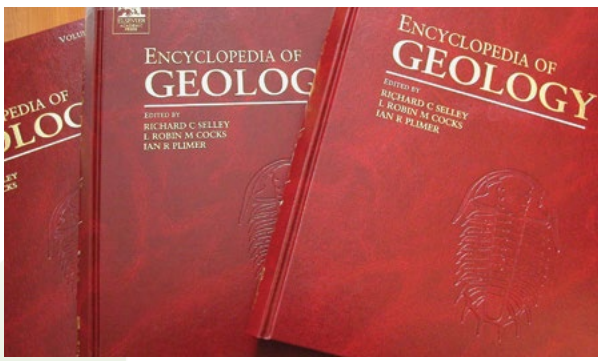


Field expedition participants documenting geohazards and glacial lakes above the village of Roshka in Khevsureti. Photo by M. Dostalík.

2025 Activities and Institutional Performance

In 2025, the professional and institutional activities of the Czech Geological Survey encompassed both scientific, research, and publishing efforts, as well as the operational and organizational management of the entire institution.

The following section of this Annual Report provides a comprehensive overview of the organization's main activities, which contribute to its long-term professional and societal mission.









Areas of activity

The following chapters clearly summarize the key areas that characterize the year-round activities of the CGS:

- **Laboratories:**
  Technical facilities and activities of specialized analytical laboratories.
- **Library and collections:**
  Management of specialized library holdings and collections.
- **Publishing House:**
  Publishing activities, professional publications, periodicals, and online outputs.
- **Selected scientific articles:**
  An overview of significant published results.
- **Financial review:**
  Basic information on funding and economic management.
- **Human resources:**
  Staff composition, employee development, and team welfare.
- **Projects:**
  Research projects managed in 2025.





Photo: CGS Photo Archive.

Central and specialized laboratories

2025 Activities and Institutional Performance



Ondřej Šebek
Head of the Multicollector Mass Spectrometry Unit



František Laufek
Head of the X-ray Diffraction Laboratory



Tereza Grabmüllerová
Head of the Central Laboratories



Daniela Ocásková
Head of the Gas Chromatography Section

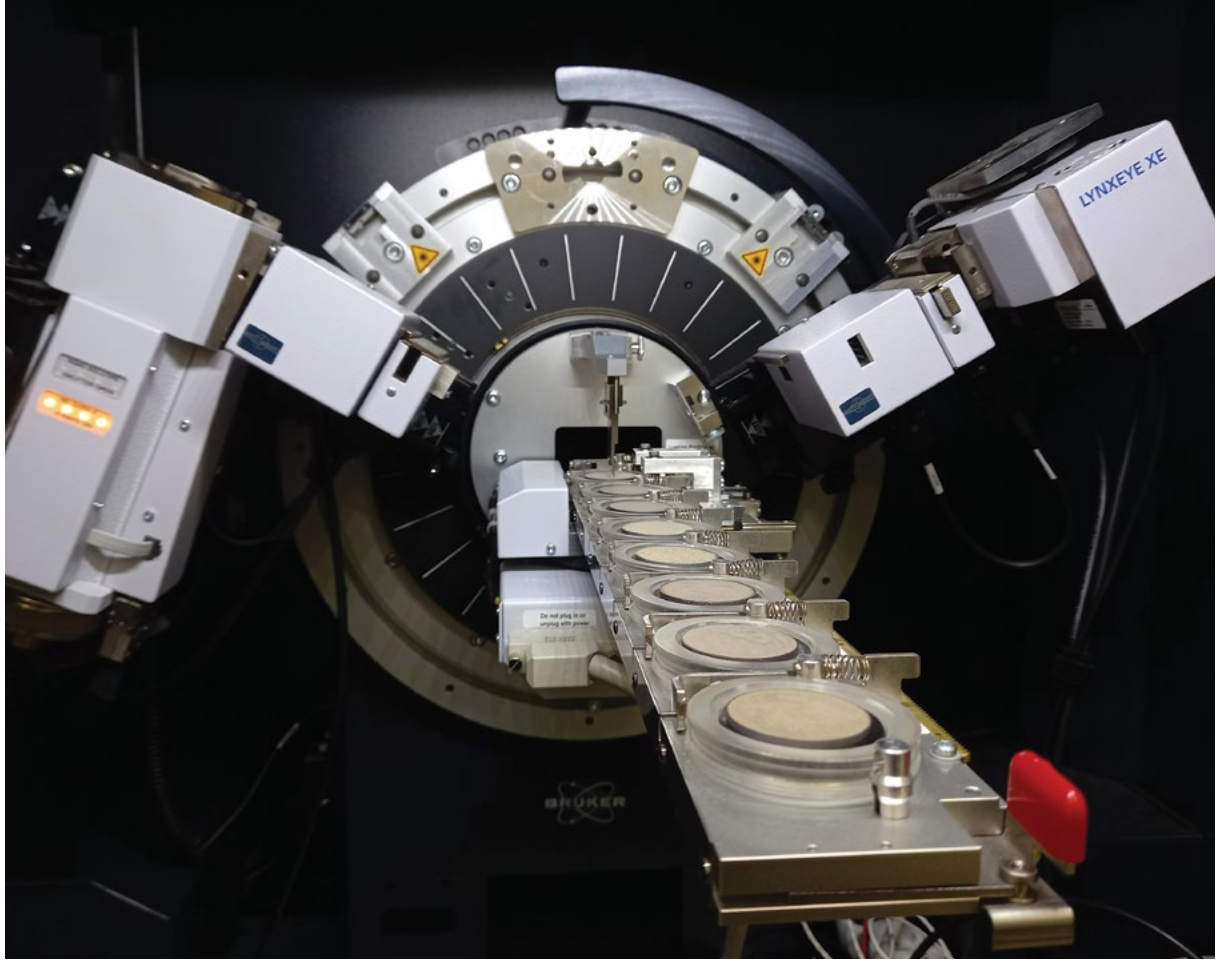
Central and specialized laboratories play an indispensable role in fulfilling the objectives of basic and applied research, as well as in geoscience practice at both national and international levels. The rapid development of exact approaches for describing natural systems and recent and historical processes, along with the precise quantification of material flows, places a strong emphasis on the advancement of instrumental equipment. The application of standardized (accredited) methods and procedures to geomaterial samples is of great importance. Parallel to this, the expert interpretation of results, the active exploration of new analytical possibilities, and especially the implementation of new analytical procedures are also of fundamental significance.

Central Laboratory

The Central Laboratory (CL) – with facilities in Prague and Brno – is a key pillar of the Czech Geological Survey's basic and applied research, supporting the fulfilment of its long-term conceptual development plan (LCDRO) and the execution of its duties as the state geological survey. The CL has been accredited by the Czech Accreditation Institute (CAI) since 1993. The CL's Brno facility specializes in the analysis of hydrocarbons, gases, and semi-volatile and volatile organic compounds. The results from accredited procedures are valid in all European Union countries. Compliance with the quality system is regularly audited by CAI staff.

Main activities: Homogenization of solid samples, separation (wet, magnetic, heavy liquid), pebble analysis, granulometry (particle size analysis), elutriation, sieving, preparation of thin sections, polished thin sections, and polished sections, chemical analysis of water samples, chemical analysis of solid samples, and organic analysis of rocks, water, bitumen, and gases.

Instrumentation: pH meters, conductometers, and an ion meter, an HPLC Azura (Knauer), a deionized water preparation system, automatic titrators, a TOC analyzer with a module for measuring TN TOC-L (Shimadzu), spectrometers – Hg AMA 254, a photometer 200 (Perkin-Elmer), a FAAS AAnalyst 200 (Perkin-Elmer) and PinAAcle 500 (Perkin-Elmer), an ETA-AAS AAnalyst 700 (Perkin Elmer), an ICP-QMS 7900 (Agilent Technologies), a WD-XRF Primus IV (Rigaku), CS 500 and CS 580 analyzers (Eltra), a GC/MSD system AT 6890/5973N (Agilent Technologies), gas chromatographs AT 6890 (Agilent Technologies), 7890A (Agilent Technologies), HP 5890 (Agilent Technologies), and ThermoEuroglas 1200 (Thermo Euroglas), a Leitz MPV-2 microscope photometer, an AT 1100 liquid chromatograph (Agilent Technologies) with FLD and DAD detection (used for the analysis of selected compounds in



Goniometer of the Bruker D8 Advance X-ray diffractometer with an automatic sample changer. Photo by F. Laufek.

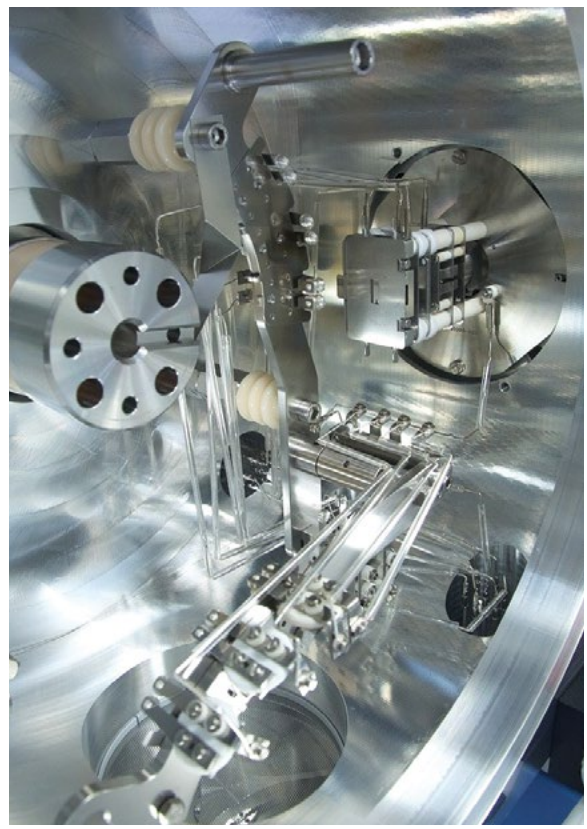
the extractable fraction), a 1000CS elemental analyzer (Eltra), a jaw crusher (Retsch), a ball mill (Retsch), milling equipment (IKA), and a TurboVap analytical fraction concentrator (Zymark). A new ICP optical emission spectrometer (Agilent Technologies) was acquired in 2025.

Specialized laboratories

Specialized laboratories provide expert services, generate primary data, and participate in their interpretation. They actively collaborate on national, international, and multidisciplinary projects. The results of their work are published in renowned journals and presented in international forums.

Isotope Geochemistry and Geochronology Laboratories

Main activities: Analysis of traditional radiogenic isotope systems (Sr, Nd, Os); analysis of non-traditional stable isotope systems (Li, Mg, Fe, Cr, Cu, Zn, Cd, Mo, Pb, etc.); micromilling; sample preparation in a specialized ultraclean laboratory (USL) with controlled air purity; in-situ chemical and isotopic analysis using laser ablation (LA); geochronology using U-Th-Pb isotopes in zircons; in-situ determination of Hf isotope ratio in zircons using LA coupled with MC-ICP-MS; data production for elemental contamination studies (determining sources, transport, and quantification of contaminants); data



Chamber of the thermal ionization mass spectrometer (TIMS) with samples prepared for measurement. Photo by F. Laufek.



» Thermal ionization mass spectrometer (TIMS). Photo by F. Laufek.



» From the left: multicollector inductively coupled plasma mass spectrometer (MC-ICP-MS), laser ablation (LA), and quadrupole inductively coupled plasma mass spectrometer (ICP-QMS). Photo by O. Šebek.

production for archaeology (e.g., determining material provenance); data for economic geology (studying sedimentary, hydrothermal, or metamorphic processes).
Instrumentation: a Triton Plus mass spectrometer with solid-phase thermal ionization (TIMS) and a Neptune multicollector inductively coupled plasma mass spectrometer (MC-ICP-MS) (Thermo Fisher Scientific); a Micromill (ESI) with a microbalance (Mettler-Toledo); an Analyte Excite 193 nm laser ablation system (Photon Machines) with a HelEx two-volume ablation cell; an ICP QMS Agilent 7900x ICP-MS (Agilent); and an ICP OES 5110 SVDV (Agilent).

Laboratory of Stable Isotopes (H, C, N, O, S)

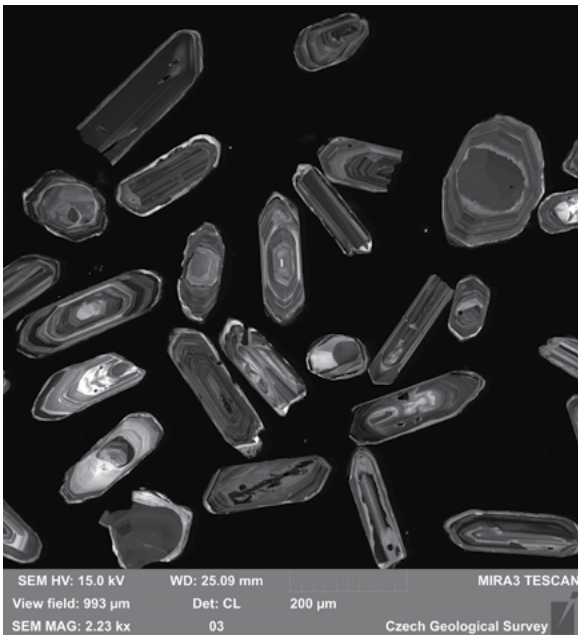
Main activities: Determination of stable isotopes H, C, N, O, and S in natural materials.

Instrumentation: Delta V Advantage, Finnigan Mat 251, and Geo 20-20 mass spectrometers; a Fisons 1108; an EA Flash CNS. The laboratory operates a range of preparation lines to convert samples into gases suitable for isotopic measurements in classic dual-inlet mode. It is also equipped with a Liquid Water Isotope Analyzer 3000 (LGR Inc.).

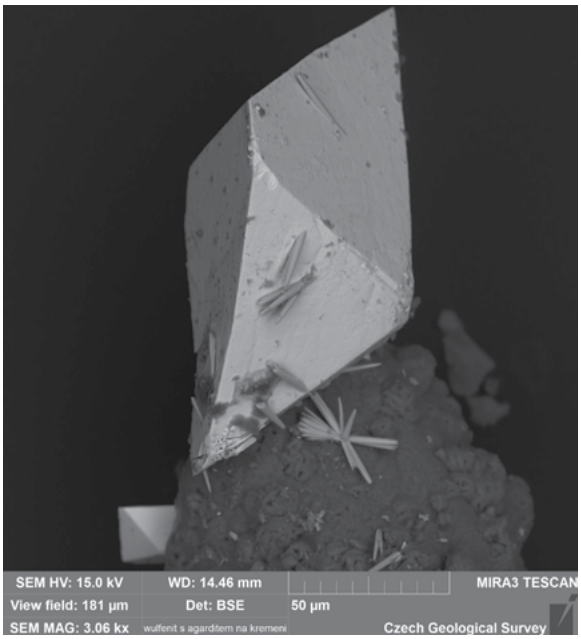
X-ray Diffraction Laboratory

Main activities: Mineralogical analysis of a wide spectrum of geological materials; solving and refining the crystal structures of minerals and synthetic substances; mineralogical-geochemical study of clay minerals and their interactions in the natural environment.

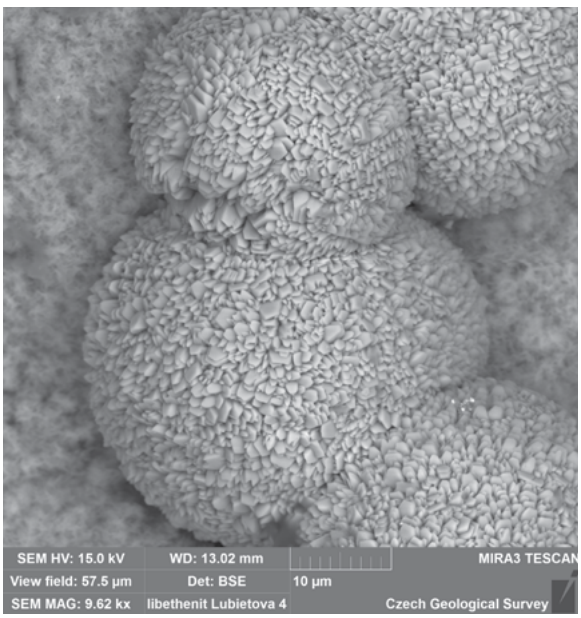
Instrumentation: D8 Advance powder X-ray diffractometer (Bruker).



Zircon grains in cathodoluminescence.



Photograph of wulfenite with agardite on quartz in backscattered electrons, field of view 181 µm.



Photograph of libethenite from Ľubietová in backscattered electrons, field of view 152 µm.

Electron Microscopy and Microanalysis Laboratory

Equipped with a high-resolution electron microscope and associated analyzers, the laboratory allows for the characterization of materials based on morphology and chemical composition, as well as the imaging of 3D objects.

Instrumentation: Tescan Mira 3GMU FEG-SEM (Field Emission Gun – Scanning Electron Microscope); analytical systems including EDS, WDS, and EBSD (Oxford Instruments); and AzTec 6.1 acquisition software, which facilitates the characterization of materials in terms of chemical composition and crystallographic orientation at the microscale.

Fluid Inclusion Laboratory

The laboratory facilitates the study of inclusion homogenization temperatures (from –180 °C to +600 °C) and the composition of aqueous and gaseous fluids in inclusions (up to 5 mm in size) from diverse geological environments.

Instrumentation: Olympus BX53M polarizing microscope with a fluorescence illumination source and a LINKAM THMSG heating-freezing stage.

Experimental Mineralogy Laboratory

The research focuses primarily on the synthesis of chalcogenides, platinum-group metal (PGM) phases, and the study of phase relations.

Micropaleontology, Ecostratigraphy, and Chemostratigraphy Laboratory

The laboratory investigates the influence of global paleoenvironmental changes on marine and terrestrial communities. The research also includes taxonomy, paleoecology, and paleobiogeography.

Library and collections

2025 Activities and Institutional Performance



Hana Breiterová
Head of the Information Services and Geological Library Department



Petr Budil
Head of the Collections Department

Since the institution's founding, our first director, Cyril Purkyně, emphasized the importance of a specialized library for the proper functioning of the state geological survey. The extensive resources of our library and collections are accessed not only by experts from the Czech Geological Survey and other scientific organizations, but also by students, private researchers, and interested members of the public. Dedicated study rooms at our Prague-Klárov headquarters and the Brno branch are open to all visitors, providing access to library collections and archival materials. Additionally, our Kutná Hora office offers access to specialized mining literature.

The Library in 2025

The CGS Library, boasting the most comprehensive collection of geoscientific literature in the Czech Republic, an extensive environmental literature archive – totalling 213,000 volumes – and the largest portfolio of electronic information resources among Ministry of the Environment institutions, serves as a vital information base. It supports not only CGS staff but also the broader scientific community. In addition to standard library services, it provides specialized assistance, such as compiling bibliographies for notable figures and formatting bibliographic citations.

The CzechElib 2023+ project at the CGS Library

Electronic Information Resources (EIR) for the CGS during the 2023–2025 period were successfully secured through the CzechElib consortium. In response to the growing emphasis

The annual statistics regarding access to individual information resources by CGS staff are detailed in the table below.

Source	2023	2024	2025
ScienceDirect	81,887	99,344	76,528
SpringerLink	26,321	32,922	19,198
Wiley Online Library	25,083	25,216	7,775
GeoScienceWorld	1,698	14,570	3,329
Scopus	2,749	2,857	2,225
Web of Science	12,148	10,956	10,702



» A view of the new exhibition in the lobby of the CGS at Klárov, dedicated to fossil discoveries from Antarctica. Photo by O. Man.

on Open Access (OA) publishing, transformative agreements (Read & Publish) were negotiated and signed. Alongside providing access to full-text databases (such as the Springer and Wiley platforms), these agreements included tokens for OA publishing in hybrid journals. The administration of this agenda is managed by the CGS Library.

Collections

The Department of Collections and Material Documentation preserves and provides access to fossils, mineral and rock samples, thin sections, and other physical geological specimens acquired by geological survey staff, as well as finds from other organizations and private collectors. The most scientifically valuable samples are housed in the geological-mineralogical and paleontological collections. This museum-quality material is preserved, made accessible, and registered by the department in the national Central Register of Collections (CES) database in accordance with Act No. 122/2000 Coll., as amended, and the revised Decree No. 92/2023 Coll. The management of these samples is subject to strict regulatory protocols stipulated by these and subsequent legal regulations. Furthermore, physical documentation materials – such as geological and paleontological samples for geological mapping, along with thin sections – are preserved by the CGS in compliance with Act No. 62/1988 Coll., as amended by Act No. 66/2001 Coll.



« The new exhibition – a showcase dedicated to mineralogy. Photo by H. Breiterová.



» Ceremonial unveiling of the newly reconstructed memorial at Klonk. Photo by M. Frouz.

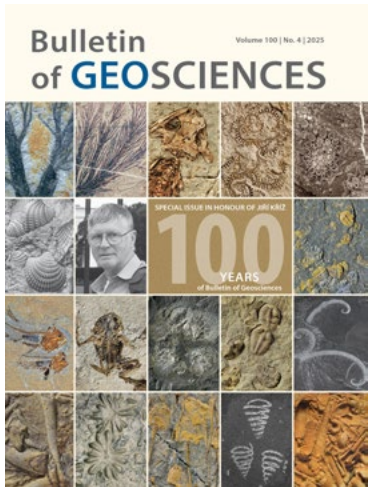
Collections in 2025

The most significant additions to the collections in 2025 included the acquisition of the collection from the estate of the prominent collector and researcher Jan Peršín, complementing the previously acquired first half of the collection, which features unique specimens from Ordovician localities in Prague. Other notable additions included epibionts on the shells of Ordovician organisms (published by Marek and Šarič), type and figured specimens of Permian stromatolites, and type and figured specimens of Silurian and Devonian trilobites provided by V. Vokáč and F. Hartl. Additions to the geological-mineralogical subcollection were rather modest in 2025.

The Department of Collections and Material Documentation continued the ongoing processing of the extensive collection of Assoc. Prof. Josef Sekyra, gathered during his research in Libya, Algeria, and Iraq. A ten-year inventory cycle of the paleontological subcollection was successfully concluded. In 2025, a total of 8,488 paleontological items were inventoried (bringing the cycle total to 87,028), along with 425 items from the geological-mineralogical subcollection.

In addition to managing the CGS collections and material documentation (which comprise approximately 300,000 collection items and 17,000 boxes of documentation material), the department's staff achieved an exceptionally high publication output in 2025, authoring 21 scientific publications. They also continued their expert work as regional geologists. Furthermore, the collection staff contributed to external contracts, internal projects, and continued to participate in teaching programs at the Faculty of Science, Charles University.

M. Polechová served as the guest editor for the extensive issue 4/2025 of the *Bulletin of Geosciences* (an impact-factor journal). This issue was dedicated to the late Jiří Kříž, who passed away in



« Cover of issue 4/2025 of the *Bulletin of Geosciences*, dedicated to Jiří Kříž.

2024, one of the most prominent figures in global paleontology and stratigraphy. She also delivered an invited keynote lecture at the IGCP 735 project conference in Crozon, France.

In 2025, a modern exhibition dedicated to fossils discovered in Antarctica in 2004 was opened in the lobby of the main building of the CGS at Klárov, Prague.

In October 2025, the relocated and restored monument of the first international stratotype at Klonk near Suchomasty was ceremonially unveiled. The CGS collaborated with the municipality of Suchomasty and the Čertovy schody Lime Works on the preservation of this monument, which holds great significance for the global geological community. The Collections Department staff took charge of the expert aspects of the entire project: retrieving archival documents and records, consulting on the monument's reconstruction methods, highlighting the stratotype on the outcrop, carrying out the ongoing clearing of the stratigraphic sequence, and ensuring the correct orientation of the monument relative to the section it indicates. Together with colleagues from the Department of Sedimentary Formations, they also prepared the scientific content for the explanatory information boards.

The year 2025 was filled with numerous public events attended by the Library and Collections staff:

- Geology Day – A two-day event for the general public; approximately 190 people visited the library premises. The theme was "Prague: Living and Non-living". We presented the public with a wide range of publications about Prague, from geology to the environment, including detours into geography and decorative stones. We highlighted Prague's unique location and the sheer number of natural attractions it boasts compared to other major cities. As is tradition, the greatest interest was in children's books. The station focusing on life in the Cambrian was surrounded by visitors throughout both days; the opportunity to examine Cambrian-aged fossils from the CGS collections and to extract them from transported Cambrian rocks proved to be a major attraction.
- Geology Olympiad – This popular competition, featuring dozens of young enthusiasts, attracted the attention of students from all types of schools. A new exhibition was created on the ground floor to serve as a teaching aid for mineralogy, petrology, and paleontology. It is primarily aimed at the 12–18 age group.
- Book Quiz Brno (Knihkvíz Brno) – On May 27, 2025, the third annual Brno Libraries Day took place. This time, we showcased a collection of books about Brno and its surroundings. The greatest interest was shown in geology-themed books intended for children and adolescents.
- Earth Health Day – The project "Paleontology, Sedimentology, and Geology, or a Healthy Earth Since Birth" captured the attention of many attendees. The public was most eager to learn why fossils are preserved in some rocks but not in others.
- The CGS Collections and Library also co-organized an excursion for employees of the Ministry of the Environment. During their visit, the guests admired the research rooms of both departments, the instrumental equipment, and selected samples of fossils, minerals, and rocks.
- An invited lecture was also presented for the Society of Friends of the National Museum.



« General view of the new exhibition. Photo by P. Budil.

Publishing House

2025 Activities and Institutional Performance

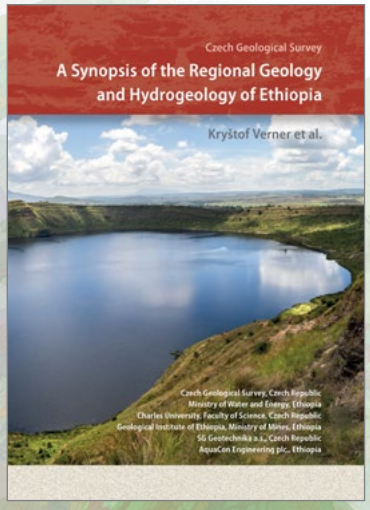


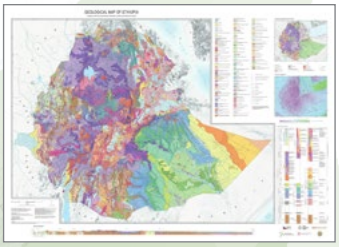
Patrik Fiferna
Head
of Publishing House

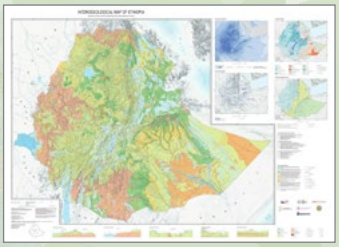
The CGS Publishing House is the largest publisher of geological literature in the Czech Republic. We also produce multimedia content that promotes the institution's activities and the broader field of geology. Our portfolio includes specialized Earth science publications, geological and thematic maps of various scales, and popular science titles.

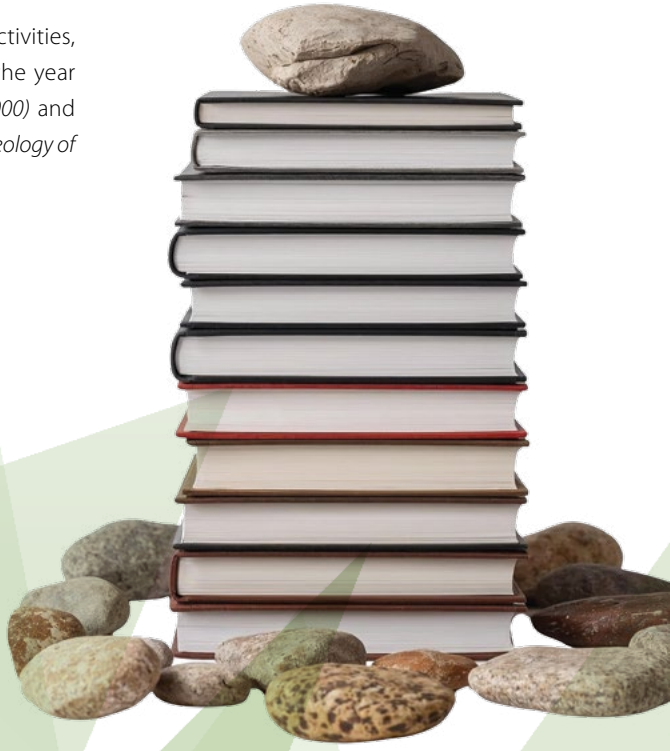
33 books and maps

In 2025, we published a total of 33 titles as part of our core publishing activities, project-related work, and commissioned projects. A major highlight of the year was the map set *Geological and Hydrogeological Map of Ethiopia (1:1,200,000)* and the accompanying publication *A Synopsis of the Regional Geology and Hydrogeology of Ethiopia* by Kryštof Verner et al., which garnered worldwide attention.











Geology Day is the largest public outreach event organized by the Czech Geological Survey. It traditionally enjoys high attendance and strong public interest. Photo by P. Fiferna.

3 photographic exhibition openings

The Geological Bookshop hosted three geoscience-themed photographic exhibitions:

Pavel Čáp: *Asian Mountain Ranges*

Ivana Frolíková: *Among the Volcanoes*

Vladimír Žáček: *Křivoklátsko – A Journey into Prehistory*





Pavel Čáp guided visitors through the photographic exhibition *Asian Mountain Ranges*, dedicated to the geology and landscapes of the Asian high mountains. Photo by P. Fiferna.





Ivana Frolíková presented her vision of a landscape shaped by geological processes to the visitors. Photo by P. Fiferna.





Vladimír Žáček introduced visitors to the exhibition *Křivoklátsko – A Journey into Prehistory*, dedicated to the geology and landscape of the Křivoklátsko region. Photo by P. Fiferna.

4 issues of the *Svět geologie* newsletter

The Publishing House produces the quarterly CGS newsletter *Svět geologie* (World of Geology). It highlights the most significant events and information regarding the institution's activities, along with fascinating insights from the Earth sciences. The newsletter is available for free download on the CGS website.



120 Facebook posts

The Publishing House manages the *Svět geologie* Facebook page (https://www.facebook.com/svetgeologie) and the official CGS YouTube channel (https://www.youtube.com/user/Geologycz). These promotional platforms are highly popular among geology and natural science enthusiasts.

Project work

Throughout 2025, the Publishing House contributed to the projects "RENS – Rock Environment and Mineral Resources" and "Innovation of Geological Information Systems in Bosnia and Herzegovina". The primary role of the Publishing House staff within these projects is to manage publicity and promotion.



A presentation event for the project "Innovation of Geological Information Systems in Bosnia and Herzegovina", held in Banja Luka from September 9 to 11, 2025.

Public events

Geology Day 2025

On June 13 and 14, 2025, Prague's Klárov came alive with the traditional Geology Day. This is the largest public outreach event organized by the CGS, involving more than 60 of the institution's staff members. Friday morning was dedicated to schools, while in the afternoon and throughout Saturday, the campus opened to the general public. Visitors of all ages had the opportunity to experience the work of geologists firsthand – examining rare minerals and fossils, creating a geological map, panning for gold, or working with microscopes. Demonstrations of drone technology, a drilling rig, and the use of virtual reality and 3D modelling also attracted significant interest.



Geology Day is the largest public outreach event organized by the Czech Geological Survey. It traditionally enjoys high attendance and strong public interest.

Open House 2025

The CGS once again participated in the 11th edition of the Open House Prague festival, which took place from May 12 to 18, 2025. The event featured guided tours of the Chapel of St. Raphael and the adjacent courtyard featuring the statue of St. Wenceslas.



Every year, several hundred visitors take the opportunity to explore the usually inaccessible spaces of the former Klárov Institute now the CGS headquarters – during the Open House festival.



The Czech team won a total of eight medals at the 2025 International Earth Science Olympiad (IESO) in Jining, China.

Children's Day at the Ministry of the Environment

The CGS participated in the Children's Day program at the Ministry of the Environment, held on August 27, 2025. The ministry hosted a diverse selection of entertaining and educational stations for both young and adult visitors, introducing the work of various institutions. The CGS presented an interactive booth where children could try out geoscience activities through hands-on play and discover the fascinating world of Earth sciences.



The Czech Geological Survey prepared a variety of geology-themed activities for the Ministry's Children's Day.

Geology Olympiad

The nationwide Geology Olympiad is organized by Masaryk University in cooperation with the Czech Geological Survey and the Czech Association of Museums and Galleries. On March 31, 2025, the regional round for Prague was held at the CGS premises. The competition culminated in the national finals, which took place from May 13 to 16, 2025, in Hlinsko. During the event, participants tested their knowledge across various geological disciplines and applied it in practical field surveys.

The top competitors from Category B went on to represent the Czech Republic at the International Earth Science Olympiad (IESO), held from August 7 to 17, 2025, in Jining, China. The Czech team won a total of eight medals – one gold, six silver, and one bronze.

In recognition of this extraordinary achievement, the students were formally honoured at the Czech Senate in December 2025. Senate President Miloš Vystrčil presented the awards, while Senator Jiří Dušek emphasized the importance of long-term support for academic competitions.

Periodicals

2025 Activities and Institutional Performance

Bulletin of Geosciences

The *Bulletin of Geosciences* is the most important scientific journal published by the Czech Geological Survey. Its predecessor *Věstník Státního geologického ústavu Československé republiky* was founded at the request of the scientists of the State Geological Institute of the Czechoslovak Republic and the first volume was issued in 1925. Since then, thousands of scientific papers have been published and it now constitutes an archive of the most important scientific research on the geology of the Bohemian Massif. In 2006, a new



editorial board set the focus of the journal on paleoenvironmental research and on the evolution of life on Earth. In 2007, the *Bulletin of Geosciences* was included with other international scientific journals in the most prestigious scientific databases. In 2010, based on its high-quality scientific content, the journal received an impact factor from the prestigious American company Thomson Reuters. Thanks to the long-term efforts of the current editorial board, the *Bulletin of Geosciences* is one of the top 10 most important scientific journals published in the Czech Republic.

Journal of Geosciences

The Czech Geological Survey is a co-publisher of the *Journal of Geosciences* (http://www.jgeosci.org), released by the Czech Geological Society with the grant support of the Council of Scientific Societies of the Czech Republic and the Czech Literary Fund Foundation. Being a periodical with a long tradition (65th volume), it follows its predecessors *Časopis pro mineralogii a geologii* ("Journal of Mineralogy and Geology") and *Journal of the Czech Geological Society*. Since 2006, it has been focusing on process-oriented



studies dealing mainly with mineralogy, structural geology, petrology, and with the geochemistry of igneous and metamorphic rocks. In addition to regular volumes, special monothematic issues are also published.

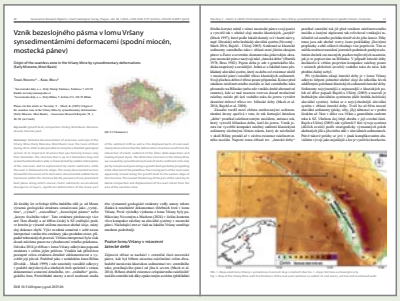
The *Journal of Geosciences* maintains a high standard and is indexed in a number of database services, including the prestigious Web of Science, Scopus and GeoRef. Thanks to this fact, the journal received an impact factor from the Thomson Reuters company in 2011.

The Geoscience Research Reports

The *Geoscience Research Reports*, a compilation of reports, has been published as a periodical in printed form by the Czech Geological Survey since 1952. In recent years, free access has been provided to the full texts of published papers in electronic form as well. The reports have been available since 1991. The *Geoscience Research Reports* acquaint the general public with current knowledge from a wide range of geological fields. Readers are provided with the research findings of academia, state institutions and private companies, involving regional geology, stratigraphy,



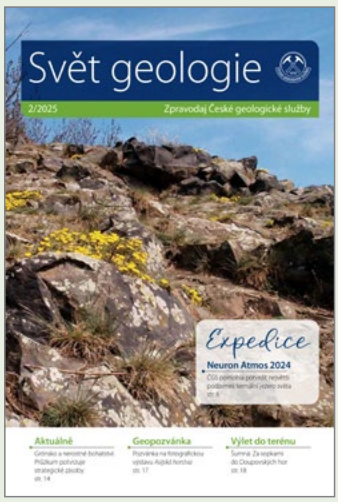
Quaternary research, engineering geology, paleontology, mineralogy, petrology, geochemistry, hydrogeology, minerals, geophysics, geoinformatics and research abroad. The published papers have a high professional standard and are peer-reviewed. The multicolour publication with English summaries is included in the List of Reviewed Non-Impact Periodicals approved by the Czech government's Research, Development and Innovation Council. The CSAB (Content Selection and Advisory Board) has recommended the inclusion of this title in Scopus, for whose content Elsevier B.V. is responsible.



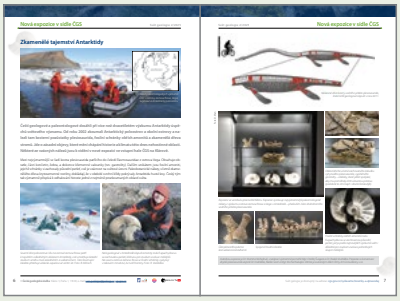
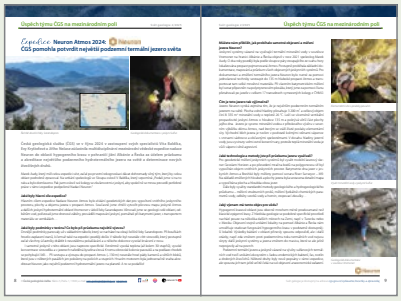


Svět geologie ("The World of Geology"), CGS Newsletter

The Czech Geological Survey produces, stores and provides impartial expert geological information to the state administration, private sector and public. It regularly informs of news involving the organization's activities on its website and the CGS Annual Report. The *Svět geologie*



quarterly also brings the most significant events and information involving the institute's activities as well as interesting geoscience facts. The magazine is free to download from the CGS website and is intended primarily for electronic distribution.

Selected scientific papers

2025 Activities and Institutional Performance

This is a selection of articles published in 2025 in journals ranked in the first quartile (JIF Quartile) according to Web of Science metrics and rankings.

- ACKERMAN, L. – BÁBEK, O. – MAGNA, T. – POITRASSON, F. – NOVÁK, P. – ŠIMÍČEK, D. – WEINEROVÁ, H. (2025): Iron isotopic systematics and ferric iron carriers of Phanerozoic continental red beds and implications for atmospheric oxygenation. – *Chemical Geology* **695**, article 123028.

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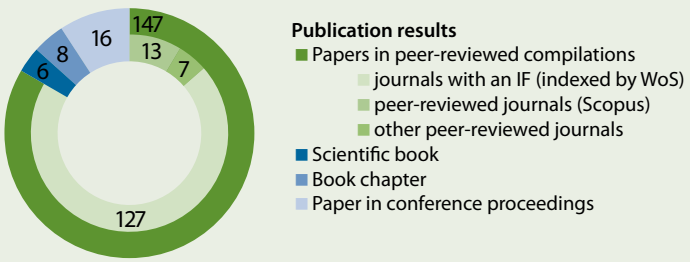
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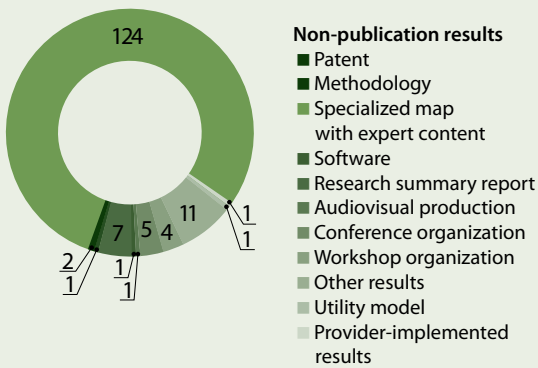
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Statistics on the results of CGS activities according to the current RVVI methodology





Financial review

2025 Activities and Institutional Performance



Zdeněk Cilc
Deputy Director for Economics
and Head of the Economic Division

In 2025, the Czech Geological Survey operated with total costs of CZK 546,203 thousand and total income of CZK 557,773 thousand. A positive financial result (profit) of CZK 11,570 thousand was achieved.

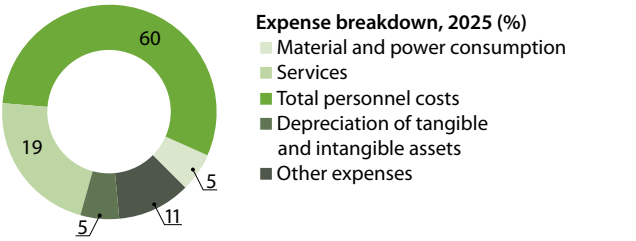
This profit was primarily achieved through revenues from the sale of services and other activities, totalling CZK 110,596 thousand. The largest items within this figure were revenues from services (mainly commercial activities) at CZK 54,196 thousand, and other operating income (mainly overheads from projects and contracts) at CZK 52,403 thousand.

The organization's revenues from grants for projects, institutional funding for its long-term development concept, the contribution from the founding ministry, and investment transfers totalled CZK 443,952 thousand, accounting for 80% of total revenues.

The overall financial result ensured sufficient revenue to cover the costs of the Czech Geological Survey and to support its further development. In investments, a total of CZK 30,817 thousand was spent in 2025 on necessary equipment for the renewal and development of the Czech Geological Survey. The most significant investments in 2025 included the renewal of the vehicle fleet and the procurement of specialized equipment for executing projects and contracts (RENS, SÚRAO).

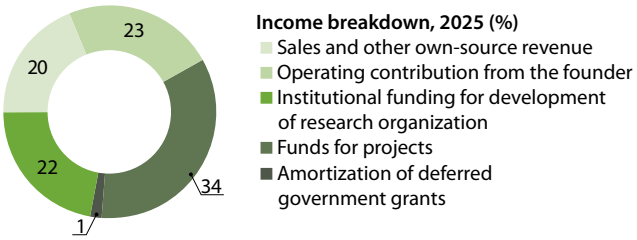
Total expenses of the organization

Total expenses (CZK) 2025	546,203,406
Material and power consumption	26,962,718
Services	103,201,511
Total personnel costs	329,473,973
Depreciation of tangible and intangible assets	24,365,497
Other expenses	62,199,706



Total income of the organization

Total income (CZK) in 2025	557,772,769
Sales and other own-source revenue	113,712,719
Operating contribution from the founder	125,991,693
Institutional funding for development of research organization	121,417,147
Funds for projects	188,237,584
Amortization of deferred government grants	8,413,626



With its science and research results in 2025, the Czech Geological Survey maintained its leading position within the Czech Republic's research evaluation system and secured funding for its development as a research organization, totalling CZK 121,417 thousand. As in previous years, the CGS successfully participated in 2025 in executing domestic (GA CR, TA CR) and international projects (e.g., Horizon Europe, Norway Grants, European Commission projects, etc.), as well as foreign development cooperation projects.

The financial results from 2025 and previous years provide a solid foundation for the organization's continued existence and development. They also ensure the fulfilment of its duties, both as the state geological survey and in the fields of science and research, as well as in providing services to other state and local government bodies and to the public. At the same time, the organization's results help motivate employees to utilize their highly specialized knowledge and expertise to secure additional external funding from new projects and contracts.

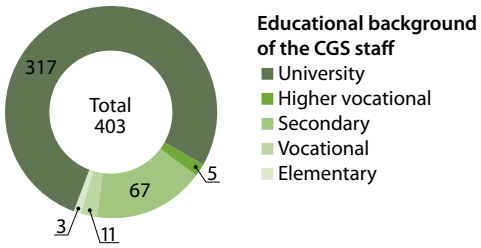
Human resources

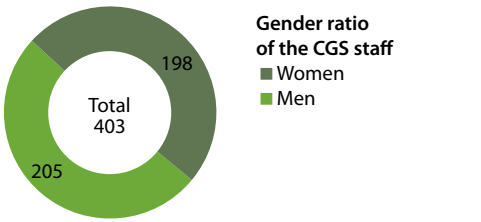
2025 Activities and Institutional Performance



Helena Žemličková
Head of the Human Resources Department

In 2025, the Czech Geological Survey employed 403 staff members, including those on maternity and parental leave. The full-time equivalent (FTE) number of employees was 351.32. The workforce consisted of 198 women and 205 men.





These indicators underline not only a high level of competitiveness in the labour market but also highlight the organization's economic growth and prestige among research institutions in the Czech Republic.

The Czech Geological Survey actively supports the professional development of its employees and is committed to enhancing their qualifications. It provides training through a wide range of courses and seminars, such as language, legal, and economic courses, professional training sessions, specialized seminars, and more.

The organization ensures adherence to the principles of equality for employees of all age groups, women and men alike, across all aspects of working conditions. This commitment is demonstrated by the fact that part-time employment is offered to employees returning from maternity and parental leave, as well as to working retirees and university or doctoral students.

Equality and equal opportunities are core values that we share across the Czech Geological Survey. This principle is actively supported by management and is integrated into all operations and activities performed by the CGS.

In 2025, the CGS fulfilled the commitments it made upon signing the Charter Against Domestic Violence in 2024. Employees received detailed information on this issue, which is also available on the intranet in the section Internal Materials – Training Materials – Charter Against Domestic Violence.

In cooperation with the ROSA Foundation and the Office of the Government of the Czech Republic, the CGS trained three domestic violence ambassadors (Brno office – Kateřina Zelinová; Prague 7, Kostelní office – Michaela Hlubučková; Klárov office – Helena Žemličková). In addition to raising awareness, the ambassadors are tasked with identifying situations where an employee may be experiencing domestic violence, responding with sensitivity, and directing them to support centres.

The ambassadors actively collaborated on a material donation drive for ROSA – a non-profit organization that provides comprehensive assistance to victims of domestic violence and operates the toll-free helpline 116 016. The collection took place in late November and early December 2025.

The CGS actively collaborates with the Institute of Sociology of the Czech Academy of Sciences – specifically its National Contact Centre for Gender and Science – and participates in regular informative workshops. As part of these events in 2025, the CGS delivered an invited presentation on the implementation of the Gender Equality Plan at the Czech Geological Survey, the gender analysis of human resources, and a summary of CGS activities in this area.

In 2025, the CGS Publishing House released the English version of a motivational book for youth by CGS employee Z. Petáková titled *Women in Geology – How to Become a Geologist?*

Projects implemented in 2025

2025 Activities and Institutional Performance

Czech Science Foundation	Project leader (at CGS)
• Pervasive melt migration in continental crust: a micro-scale process with large-scale implications	Hasalová Pavlína
• Origin of the relaminant in the Bohemian Massif during the Variscan orogeny	Štípská Pavla
• Pre-Variscan oceanic basins of the Bohemian Massif – Integrating petrology, geochronology and non-traditional stable isotope systems	Magna Tomáš
• Does tree transpiration drive forest calcium biogeochemistry? Or the other way round?	Oulehle Filip
• Ancient jawed polychaetes: evolution and palaeogeography in the Lower Palaeozoic	Tonarová Petra
• Campaign-style geochronology of pre- to syn-collisional Devonian basins of the Variscan Orogenic Belt	Collett Stephen
• Tracing the environmental impact of electronic waste recycling using Cd, Pb, and Cu isotopes	Martinková Eva
• Nitrogen fixation in polluted Czech peat bogs: Reconciling high N accumulation rates based on ^{210}Pb dating with low $^{15}N_2$ uptake and low P availability	Novák Martin
• Geodynamic evolution of western Gondwana from the perspective of central Hoggar (Algeria) and the Kaoko belt (Namibia)	Konopásek Jiří
• Origin and evolution of the oldest crust of the European Variscides – are detrital age populations of "northern Gondwana" applicable as a tool for provenance analysis?	Soejono Igor
• Generation, extent, and longevity of magma mush columns	Hasalová Pavlína
• Metals and their isotopes in active and abandoned mining areas of sub-Saharan Africa – towards understanding of their geochemistry and impacts	Kříbek Bohdan
• A global model of treethrow forms and the role of tree mortality in carbon storage	Oulehle Filip
• Tropical climate and vegetation response during the Late Paleozoic Ice Age; an integrated study of spatial and temporal variability	Šimůnek Zbyněk
• Duality of extreme metamorphism – assembly history of the eastern part of the supercontinent Pangea	Schulmann Karel

Technology Agency of the Czech Republic	Project leader (at CGS)
• Engineered barrier 200C	Laufek František
• Rock environment and natural resources	Poňavič Michal
• Center for landscape and biodiversity	Oulehle Filip
• Integrated system for air quality research, assessment and monitoring	Novák Martin
• Prediction, evaluation and research for understanding national sensitivity and impacts of drought and climate change in Czechia	Nol Ondřej
• Study of variant technical solutions for deep disposal of radioactive waste	Nahodilová Radmila

• System for continuous vadose zone monitoring and prediction of water level in deep aquifers	Nol Ondřej
• Determination of protective zones of hydrogeological phenomena in the PLA Slavkovský les	Holeček Jan
• Defining and evaluating the areas decisive for subsidizing strategic groundwater resources with regard to their protection and stabilization	Novotná Jitka
• Natural and anthropogenic georisks	Kycl Petr
• The effects of forest fire on soil, hydrology, and the balance of ecologically significant elements in the context of the vegetation	Hruška Jakub
• Potential replacement vegetation modelling for nature conservation (NaPoVeg)	Chuman Tomáš
• The potential for hydrogen storage in geological structures within the Czech Republic	Štěpánský Dan
• Controlled deep biogas	Franců Juraj
• Sustainable mining of REE in Europe	Kubeš Martin
• Ecological methods for the pre-concentration of critical elements in natural rocks or waste from their processing and their connection to separation methods for the electrolytic extraction of these elements in a pure state	Pticen František
• SERVICO2 – Impact of climate, nitrogen and phosphorus deposition, and land use on water as drivers of the greenhouse gas regulation ecosystem service in headwater catchments	Krám Pavel
• Analysis and development of a methodology for evaluating the siting of small and medium-sized reactors in the Czech Republic	Hroch Tomáš

Internal projects funded by the MoE (Ministry of the Environment) under the Long-Term Conceptual Development of Research Organizations	Project leader (at CGS)
• Geology of the Křivoklátsko Protected Landscape Area – compilation of a monography based on research carried out in 2002–2018	Vorel Tomáš
• Continuous inventory of CGS samples in Brno	Bubík Miroslav
• Geology of the Šumava National Park and Protected Landscape Area	Žáček Vladimír
• Public Geology Day	Bukovská Zita
• Pre-Variscan evolution of the central parts of the Bohemian Massif: a key to understanding the current geological structure of the candidate deep repository sites – horizontal cooperation	Soejono Igor
• Regional geological mapping of the Czech Republic at 1:25,000 scale, sheets 25-123 Hranice and 25-143 Bystřice pod Hostýnem	Tomanová Petrová Pavla
• Isotopic composition of Moldanubian granitoids: a new perspective on Variscan orogenic crustal variability and its implications for planned deep repository sites – horizontal cooperation	Janoušek Vojtěch
• Melt migration in the continental crust and its role for granite formation – key to understanding the origin of granitoid bodies potentially hosting radioactive waste depositories – horizontal cooperation	Hasalová Pavlína
• Application of morphostratigraphic, thermochronometric and geochronological methods for reconstruction and prediction of relief evolution in the wider surroundings of candidate sites – horizontal cooperation	Uxová Tereza
• Volcanic systems VIII	Rapprich Vladislav
• Organization of the Central European Tectonic Studies Groups (CETEG) 2025 International Conference	Hasalová Pavlína
• Mobility and speciation of chromium and nickel in surface waters of ultramafic rocks	Krám Pavel

Shilin Nuruu – Geological map and the sedimentological and paleontological characterization of the western part of the Mesozoic Gobi-Altai Rift	Hanžl Pavel
Magmatic and metamorphic evolution of the western margin of the Teplá-Barrandian Unit	Holá Petra
Provenance analysis of metasedimentary rocks of the Balsfjord Complex in the North Norwegian Caledonides – age determination and Hf isotope ratios in detrital zircons	Konopásek Jiří
Melt-mediated coupled dissolution-precipitation in zircon (Kutná Hora Crystalline Complex)	Nahodilová Radmila
Paleotethys intracontinental rift: a precursor of the collisional zone of the Pangea as recorded in Algeria	Štípská Pavla
Intrusions of granitic rocks in durbachites of the Třebíč Pluton – distribution, classification, and genesis	Zachař Adam
Petrographic and geochemical characterization of lithologies at the contact between felsic granulites and garnet clinopyroxenites	Nemeškalová Tereza
The impact of global changes on Phanerozoic communities: Evolution of Cambrian to Devonian invertebrates and research on selected Cenozoic fauna – paleontological evaluation of the CGS collections II	Budil Petr
Revision of the Vintoky facies of the Vilémovice Limestones (Macocha Formation), Moravian Karst	Cígler Vojtěch
Implementation of DKRVO – PART 2.1: Research on global changes and evolution of marine ecosystems – Chemostratigraphy, ecostratigraphy, and micropaleontology – PARTS A, B and C	Frýda Jiří
Research on a newly discovered locality of the Paseky Shales on the Bohutín map sheet (Cambrian, Příbram-Jince Basin)	Kovář Vojtěch
Decoding dolomite: microbial mastery and abiotic alchemy across time	Petráš Daniel
Determination of the ^{10}Be age of the rock glacier on the southern slope of Gerlachovský štít to reconstruct the lower permafrost boundary	Uxová Tereza
Geology, flora, mesofossils, and palynomorphs of the Permo-Carboniferous of the Bohemian Massif	Šimůnek Zbyněk
Evaluation and publication of the results of mapping the European mineral resource potential of selected critical and strategic EU raw materials	Wertichová Blažena
Lithium in groundwater, mineral, and thermal waters of the Czech Republic as a potential raw material resource	Pačes Tomáš
Biomarkers for paleoenvironmental studies	Ocásková Daniela
Development of procedures to purify and study non-traditional stable isotopes in extra small amounts of asteroidal material	Andronikov Alexandre
Selected taphocenoses of the Phanerozoic II: palaeoecology, palaeobiogeography, stratigraphy and sedimentology	Bubík Miroslav
Study of the internal fabric of granitic dykes in the Třebíč Pluton using AMS and microstructural analysis	Uhrová Lucie
Regional geological mapping of the Czech Republic at 1:25,000 scale	Buriánek David
Regional geological mapping of the Czech Republic at 1:25,000 scale, Železné hory Mts	Čech Stanislav
Regional geological mapping of the Czech Republic at 1:25,000 scale, Novohradské hory Mts	Dudíková Schulmannová Barbora
Regional geological mapping of the Czech Republic at 1:25,000 scale, Pošumaví region	Žáček Vladimír
Regional geological mapping of the Czech Republic at 1:25,000 scale, Bohemian Paradise II	Tasáryová Zuzana
Regional geological mapping of the Czech Republic at 1:25,000 scale, Brdy Mts	Vorel Tomáš

• Regional geological mapping of the Czech Republic at 1:25,000 scale, Central Moravia	Tomanová Petrová Pavla
• Development of 3D geological models and related CGS databases	Franěk Jan
• Expert support for the National Geoparks Network of the Czech Republic II	Štědrá Veronika
• Geology of the Bohemian Cretaceous Basin	Čech Stanislav
• Decorative and building stones of the Czech Republic	Dudíková Schulmannová Barbora
• Editing of the Geoscience Research Reports journal	Sidorinová Tamara
• Printing of geological and applied maps	Žáček Vladimír
• Editing of the journal Geological Research in Moravia and Silesia	Buriánek David
• Editorial activities of scientific publications (capacity reporting), ongoing	Janoušek Vojtěch
• Editing and preparation of the electronic version of the Bulletin of Geosciences	Frýda Jiří
• Editing and printing of the Bulletin of Geosciences	Frýda Jiří
• Metamorphic evolution of the (U?)HP units of the Massif Central (France)	Dehoym Luc
• Potential field analyses and modelling of metamorphic terrains near radioactive waste repository site investigation – implications for deep crustal structures	Guy Alexandra
• When and at which conditions crystallized Plešovice zircon	Kotková Jana
• Mineralization of biogenic material in a volcanic environment – III	Mysliveček Jakub
• Changes in the depositional environment, biological origin of sedimentary organic matter, and climate in the profile of the Menilite Formation at the Honětice locality (Ždánice Unit)	Jirman Petr
• Topaz from the greisens of the Jizera Mountains and Cínovec as a potential abrasive for cutting and surface treatment of materials using AWJ (Abrasive Water Jet) technology	Veselovský František
• Laser ablation methodology to study the platinum-group elements (PGE) in sulfides using a new set of the PGE reference materials	Andronikova Irina
• Tectonic evolution and thermochronology of the Moldanubian Unit in the Late Variscan and post-Variscan period	Verner Kryštof
• Development of the "Electronic Mountain Form" application and management of acquired data	Janoušek Michal
• Harmonization of detailed geological maps of the ČGS and BGR, Phase II	Štědrá Veronika
• Important geological localities of the CR	Vajskebrová Markéta
• Administration, maintenance and development of the PMČR50 geo-database related to the compilation of new soil maps and their safekeeping, printing and presentation, CGS, ongoing	Sedláček Jan

Projects funded by the MoE for tasks of the state geological survey	Project leader (at CGS)
• Assessment of methane emissions in the Czech Republic in the context of EU Regulation 2024/1787	Franců Juraj
• Transfer and processing of documentation related to mineral resources from the Department of Geology of the Ministry of the Environment – 2025 phase	Skřivánková Jolana
• Revision of mapped undermined areas and mine workings based on new acquisitions of digital map documents as a basis for investigating mining impacts and for consolidating data on abandoned exploratory mine workings	Horáková Anna
• Processing and evaluating final reports from the Resource Reports Collection at the Kutná Hora office as a basis for investigating mining impacts, 2025 phase	Skřivánková Jolana

• Review of mitigated mining impacts and secured abandoned exploratory mine workings according to Czech Mining Authority Regulation No. 52/1997 Coll., on requirements for ensuring safety and occupational health and operational safety during the decommissioning of major mine workings	Šír Pavel
• Initial investigation of reported mitigated mining impacts in 2025	Štrupl Vít
• REKONSIT: Publication of Mineral Resources of the Czech Republic – Mineral Raw Materials 2025 + Changes in reserves at exclusive mineral deposits 2015–2024 + Draft of a new concept and mock-up for the Mineral Resources of the Czech Republic 2026 publication + coverage and development of the mineral economics domain	Kavina Pavel
• RANAP, 2020, Contact of the Cretaceous and Permo-Carboniferous, web map update	Pacherová Petra
• Update of the soil map series at a scale of 1:50,000	Janderková Jana
• Advisory and expert services provided for the Geology Department of the MoE (including landslides for the Operational Programme Environment, updates of maps, assessments and opinions), NP321 (gas leakage measurement), etc.	Čurda Jan
• Operative geological documentation of linear infrastructure projects	Hošek Jan
• Restoration of selected parts of the geological documentation collection maintained by the CGS Geofond archives, 2025 phase	Hrdlovicsová Milada
• CGS repositories – retransfer of documented samples from old boreholes to the standard storage system of the CGS Geofond Division, storage of more recent physical borehole documentation, 2025 phase	Donát Alan
• Monitoring of hydrogeological boreholes in 2021–2024 (Rebilance sustainability)	Vránek Tomáš
• Transfer of borehole logs from the archived reports of the FZ and P collections into the GDO and GEO systems, bentonite, 2025 phase	Petáková Zdeňka
• Wells with potential gas leakage in the Czech Republic, 2022	Franců Juraj
• Revision of prognosticated resources of industrial minerals and ores, category Q, in Central Bohemia	Mrázová Štěpánka
• Geological conditions in Spa Source Protection Zones – pre-project phase	Kryštofová Eva
• Post-fire activities of CGS geologists in the Bohemian Switzerland National Park	Malík Jan
• Study on the selection of construction mineral deposits of strategic importance with detailed justification in accordance with the Linear Infrastructure Act No. 416/2009 Coll., as amended	Godány Josef

Projects for the MoE and other ministries	Project leader (at CGS)
• Turów 7/2016–2044	Kadlecová Renata
• Institutional support for the long-term conceptual development of the research organization based on an evaluation of its achieved results	Pašava Jan
• Management of a network monitoring the status of ecosystems with regard to air pollution	Hruška Jakub
• Groundwater in crystalline rocks	Novotná Jitka
• Czech-Austrian cooperation in the research of critical and strategic mineral resources in the southern part of the Bohemian Massif	Rambousek Petr
• Goldschmidt Conference 2025	Magna Tomáš
• Innovation of Geological Information Systems in Bosnia and Herzegovina	Čápová Dana
• Improving quality of life by ensuring availability and sustainable management of water resources in Sidama Region and Gamo and Gofa zones, Ethiopia	Verner Kryštof

Horizon Europe and Horizon 2020	Project leader (at CGS)
Prospecting and exploration of hidden deposits using modern technologies	Wertich Vojtěch
FindHeat	Janků Lucie
SEMACRET – Sustainable exploration for orthomagmatic (critical) raw materials in the EU: Charting the road to the green energy transition	Wertich Vojtěch
GSEU – A Geological Service for Europe	Čápová Dana
A Geological Service for Europe – Critical Raw Materials, the International Centre of Excellence and United Nations Framework Classification	Gabriel Zbyněk
A Geological Service for Europe – Geothermal energy & underground storage inventory	Janků Lukáš
A Geological Service for Europe – Appraisal, protection & sustainable use of Europe's groundwater resources	Nol Ondřej
A Geological Service for Europe – Geological framework for the European geological data & information system	Čápová Dana
A Geological Service for Europe – European Geological Data Infrastructure, EGDI	Čápová Dana
A Geological Service for Europe – Communication, Dissemination & Exploitation	Čápová Dana
A Geological Service for Europe – Geological Surveys network and sustainable services for Europe	Čápová Dana
Multi-Miner: Multi-source and multi-scale earth observation and novel machine learning methods for mineral exploration and mine site monitoring	Strnadová Veronika
PUSH IT – Piloting Underground Storage of Heat In geoThermal reservoirs	Tym Antonín
COREu (A European CO_2 Transport and Storage Solution)	Štěpánský Dan
MINEYE – Earth observation techniques for mine cycle monitoring using ML-based data fusion approach	Strnadová Veronika

Other projects co-funded by foreign entities	Project leader (at CGS)
Recomine SN-CZ-Plus 100704154	Mrázová Štěpánka
SYNERGYS	Tym Antonín
Methodology for generating coastal vulnerability maps in Costa Rica, considering sea-level rise as a result of climate change	Žáček Vladimír
Czech participation in envision mission – derisking of VenSpec-H development	Strnadová Veronika
PanAfGeo-2: Africa-EU Partnership – Support to geological sciences and technology	Štědrá Veronika
Support to geological sciences and technology (PanAfGeo+)	Štědrá Veronika
Support to geological sciences and technology (PanAfGeo+) – Uganda	Tasáryová Zuzana
Support to geological sciences and technology (PanAfGeo+) – Zambia	Verner Kryštof

Significant events in 2025

2025 Activities and Institutional Performance

The articles on this page have been adapted and shortened from the news section of the CGS website (cgs.gov.cz).

CGS helped discover the world's largest underground lake



Specialists from the Czech Geological Survey participated in a multidisciplinary international scientific expedition organized by the Neuron Foundation to the hypogene karst region on the border between southern Albania and Greece. The purpose of the expedition was to explore and officially document a massive underground lake and to identify new animal species. Following data evaluation, the lake – named Neuron – was officially recognized as the world's largest underground thermal lake.

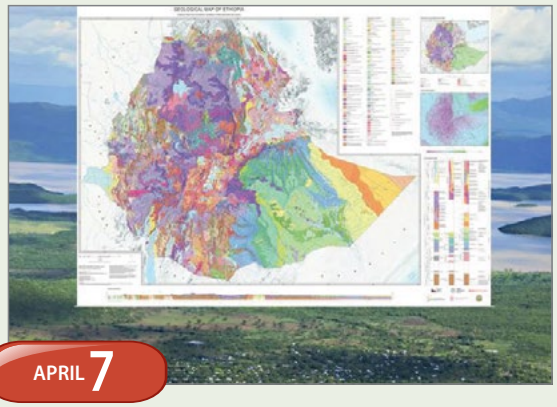
Eva Kryštofová

FEBRUARY 10



Helping in Ethiopia: Results and maps on a new website

APRIL 7



Since 2015, the CGS has been operating in Ethiopia as the lead institution within an international team under the direction of Kryštof Verner. An overview of the outcomes of development cooperation projects in Ethiopia is now available on the newly launched project website: Czech Development Cooperation on Geoscience in Ethiopia. Visitors can access interactive online mapping applications, including a national geological and hydrogeological map of the entire territory of Ethiopia at a scale of 1:1,000,000, as well as a wide range of maps and professional publications.

Project website: https://cgs.gov.cz/en/projects/682x00-ethiopia

Kryštof Verner

CGS Director's Award: Best publications by young authors

JUNE 12

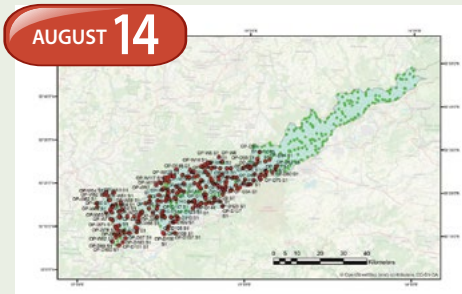


In June, the CGS Director's Awards were presented at a ceremony in the St. Raphael Chapel at Klárov. These awards are presented annually for the best scientific publications written by young researchers under the age of 35. Seven publications by young scientists were submitted to the competition. The results were decided by an expert panel consisting of twelve CGS specialists. Martin Kubeš took both first and second place, while Tereza Nemeškalová Zelinková finished in third place.

Anna Vymazalová

Stream sediment sampling in the Ore Mountains

AUGUST 14



In July, the CGS, together with the German company Beak Consultants, launched extensive stream sediment sampling across the crystalline complex of the Ore Mountains (Krušné hory) – stretching from Aš to Ústí nad Labem – as part of the DeepBEAT project. Based on the sampling and subsequent geochemical analyses of the collected material, elemental maps of the entire region will be compiled. These will then be integrated with data from the German side of the mountain range. This cross-border approach will enable the creation of a 3D prospective geological model and the identification of promising new areas containing critical and strategic raw materials.

Vojtěch Wertich

Innovation of Geological Information Systems in Bosnia and Herzegovina

The annual presentation meeting for the project "Innovation of Geological Information Systems in Bosnia and Herzegovina" was held in the northern Bosnian city of Banja Luka. The event, which drew significant interest from the media and the expert community, was organized by the Geological Survey of the Republika Srpska in cooperation with the Czech Geological Survey and the Geological Survey of the Federation of Bosnia and Herzegovina. The project, implemented by the Czech Geological Survey, is scheduled for the 2023–2027 period and focuses on the long-term, sustainable, and efficient use of geological data and knowledge in Bosnia and Herzegovina.

Patrik Fiferna

SEPTEMBER 17



Award for water management

The project "Targeted Replenishment of Groundwater as a Tool to Reduce Drought Impact in the Czech Republic" received an award from the Technology Agency of the Czech Republic in the Governance category. The project focuses on improving water management, particularly of groundwater, by retaining water in the landscape via managed aquifer recharge. The Czech Geological Survey, together with the T.G. Masaryk Water Research Institute, collaborated on the development of this project from 2020 to 2023. Its proposed solutions help mitigate the impacts of drought.

Renata Kadlecová

NOVEMBER 10



Research boreholes near Křemže

DECEMBER 1



At the beginning of November, two research boreholes were drilled into a lateritic (weathered) deposit near Křemže in South Bohemia as part of the international SuMREE project. The objective was to determine how critical metals are distributed within this type of rock. Both boreholes reached depths of up to 50 meters, making it possible to precisely determine the intensity of the past weathering process and identify which rock sections contain the highest concentrations of the monitored metals. The next phase of research will investigate the physical and chemical processes governing the release and accumulation of critical metals during lateritic weathering.

Martin Kubeš

Project with Costa Rica and Cuba completed



In October, a formal seminar attended by the expert community and members of the diplomatic corps was held in San José, Costa Rica, to present the results of a one-year trilateral cooperation project between the Czech Republic (CGS), Costa Rica, and Cuba. Its goal was to develop a methodology for assessing coastal vulnerability in relation to rising sea levels. CGS specialists participated alongside Costa Rican geologists in geological field mapping in March 2025. One of the key outputs of the project was a geological map at a scale of 1:25,000, while the primary outcome was a methodological manual published by the Costa Rican partners in December, which will be distributed to local governments in vulnerable coastal areas.

Vladimír Žáček



DECEMBER 9



CGS website: What do you need?

2025 Activities and Institutional Performance





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  https://mapy.geology.cz/dulni_dila_poddolovani/
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- Borehole coverage
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Report

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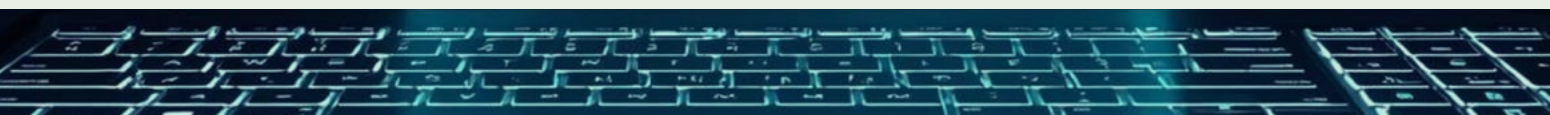
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Principal Offices of the Czech Geological Survey



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Klárov 131/3,
118 00 Praha 1, Phone: 257 089 411

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Barrandov Laboratories

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152 00 Praha 5, Phone: 251 085 111

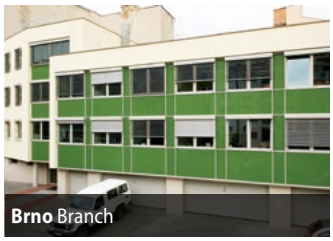
Central Laboratory (inorganic geochemistry) | Rock and Environmental Geochemistry | Special Laboratories



Kostelní Office

Kostelní 364/26, Holešovice,
170 00 Praha 7, Phone: 234 742 111

Geofond Archive | Study Room | Scanner | Specialized offices for the performance of the state geological survey



Brno Branch

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602 00 Brno, Phone: 543 429 200

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Kutná Hora Office

Dačického náměstí 11/7,
Kutná Hora – Vnitřní Město,
284 01 Kutná Hora, Phone: 327 512 220

Mining History Department | Archive of Mining Maps | Archive of Resource Reports Collection | Specialized Library



Jeseník Office

Erbenova 348/1, Bukovice,
790 01 Jeseník, Phone: 584 412 081

Regional Office | Archive of Geological Samples | Bookshop



Electron Microprobe and Microanalysis Laboratory, Faculty of Science, MU **Brno**

Kotlářská 267/2 , Veveří,
602 00 Brno, Phone: 541 129 496

Electron Microprobe and Microanalysis Laboratory



Jílové Regional Museum and Centre for Documentation of Gold Deposits

Masarykovo nám. 16,
254 01 Jílové u Prahy, Phone: 234 742 205

Archive of Written Documentation and Geological Samples of Au Deposits in CR



Lužná Archive of Material Documentation

Čsl. armády 432, 270 51 Lužná u Rakovníka

Archive of Geological Samples | Collections | Publications and Maps



Stratov Archive of Material Documentation

289 22 Stratov 20 and 21

Archive of Written Documentation and Geological Samples



Kamenná Archive of Material Documentation

Kamenná 42, 262 31 Milín

Archive of Geological Samples



Kovanice Archive of Material Documentation

288 02 Kovanice 184

Archive of Written Documentation

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