Supported by
eit RawMaterials Connecting matters
Co-funded by the European Union

Lithium research and exploration in the Czech Republic and the role of CGS

Tomas Paces, Peter Rambousek et al.
Czech Geological Survey

Geothermal Lithium Networking Event
27-28 September 2022, Wroclaw

Basic facts on Survey

Geological Survey since 1919

Authorized by Ministry of Environment
and Board of Government for Research, Development & Innovations

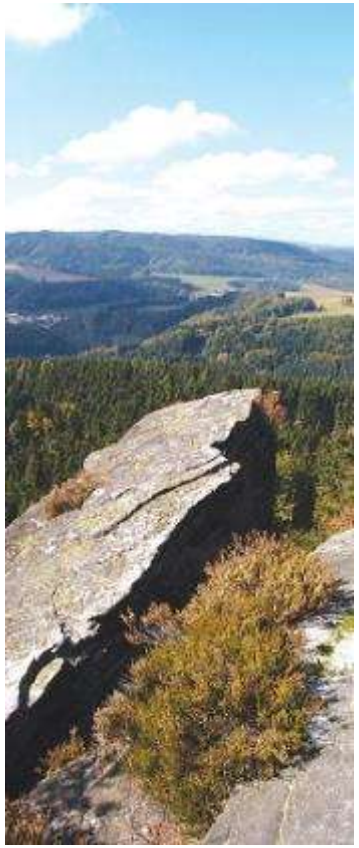
Prague: Headquarters, IT Centre, Central Laboratory, Library, Archive, Bookshop, Collections

Brno: Regional Office and Laboratory of Organic Geochemistry

~ 350 employees

Mission

- Collecting, assessment and dissemination of information on geology, mineral resources, ground water and natural hazards of the Czech Republic .
- Providing geoscientific information and advisory to state and regional authorities for political, economical and environmental decision-making.
- International cooperation and development assistance.
- Geoscience research
- Environmental protection.



Main Fields of Activity

- Geological research and mapping
- Mineral resources and environmental impacts of mining
- Groundwater research and assessment of reserves
- Geohazards, prevention and mitigation of their impact
- Geoenergy sector: Geothermal energy and Carbon storage
- Geoinformation management and delivery

Department of Mineral Resources Research and Mineral Policy

Main activities focussed to new resources of minerals, their future prospects and research into the relations governing their formation

- **critical minerals and strategic**
- **construction materials**
- **regional mineral policy and legislative support**
- **expert assessment**
- **environmental impact of mining**

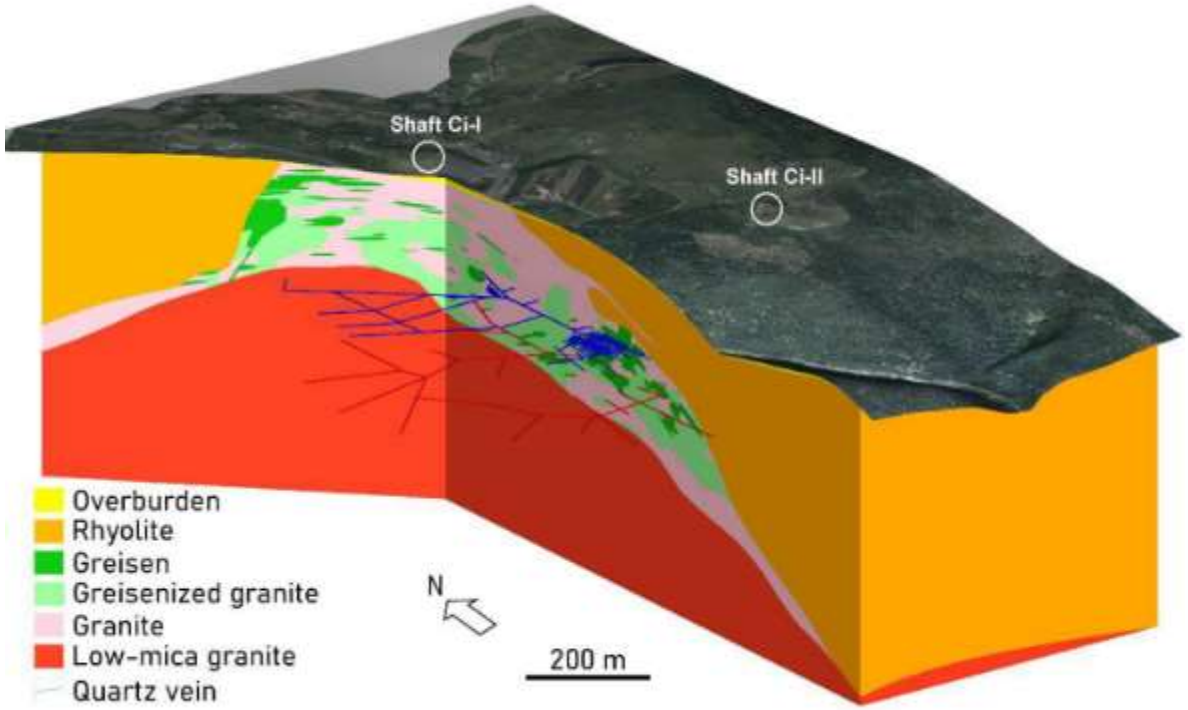
Department of Environmental Geochemistry and Biogeochemistry

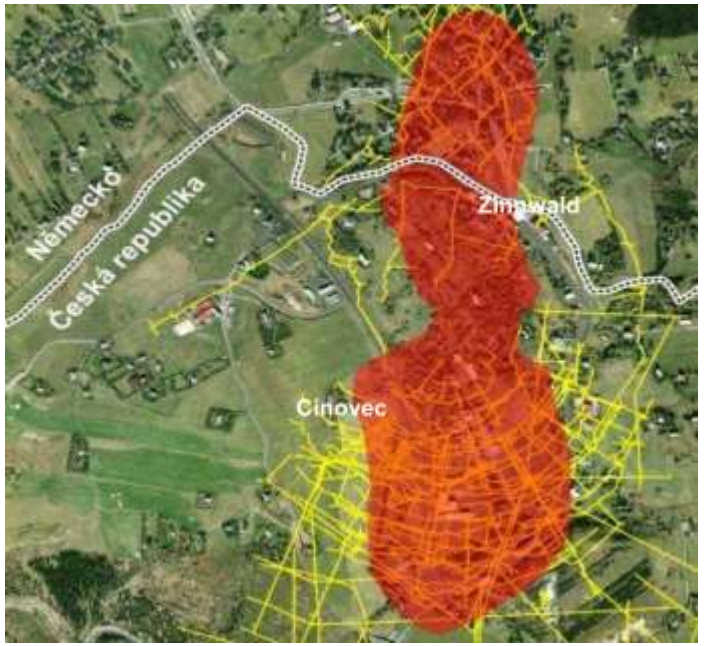
- **Section of stable isotopes**
- **Section of geochemical hazards**
- **Biogeochemistry and climate change section**
- **Section of Multicollector Mass Spectrometry (MC ICP MS)**

Research into Li raw materials in the Czech Republic

- Granite in Bohemian Massif are enriched by Li, mainly in Saxothuringicum
- Industrial greisen Sn-W-Li-deposits in Cínovec and Horni Slavkov
- Li minined since the Second World War – from 1992 closed
- Preparation of LiC for medical purposes and chemical industry in the Sixties and Eighties of the last century
- New research and exploration into possible sources of Lithium started in 2015
- It includes lithium in mining waste and accompanying trace elements in Li-rich materials
- Lithium in natural and artificial solutions
- Technology of separation of Li from solutions

Cínovec is the most important mining project of Li in the Czech Republic , probable also in Europe





- On the border between CR (2/3) and Germany (Saxony)
- Expected start of mining 2026 -2028
- Anual production of 1,7 – 2,2 mil. t of ore = 25 000 t LiC

Zásoby na ložisku Cínovec (09/2021)

	Cut-off %	Tonáž Mt	Li %	Li_2O %	Sn %	W %	LCE Mt
Measured	0.1 % Li (0.2153% Li_2O)	53.3	0.22	0.48	0.08	0.02	0.64
Indicated		360.2	0.2	0.44	0.05	0.02	3.88
Measured+Indocated		413.4	0.21	0.44	0.05	0.02	4.51
Inferred (approx.)		294.7	0.18	0.39	0.05	0.02	2.87
TOTAL		708.2	0.2	0.42	0.05	0.02	7.39

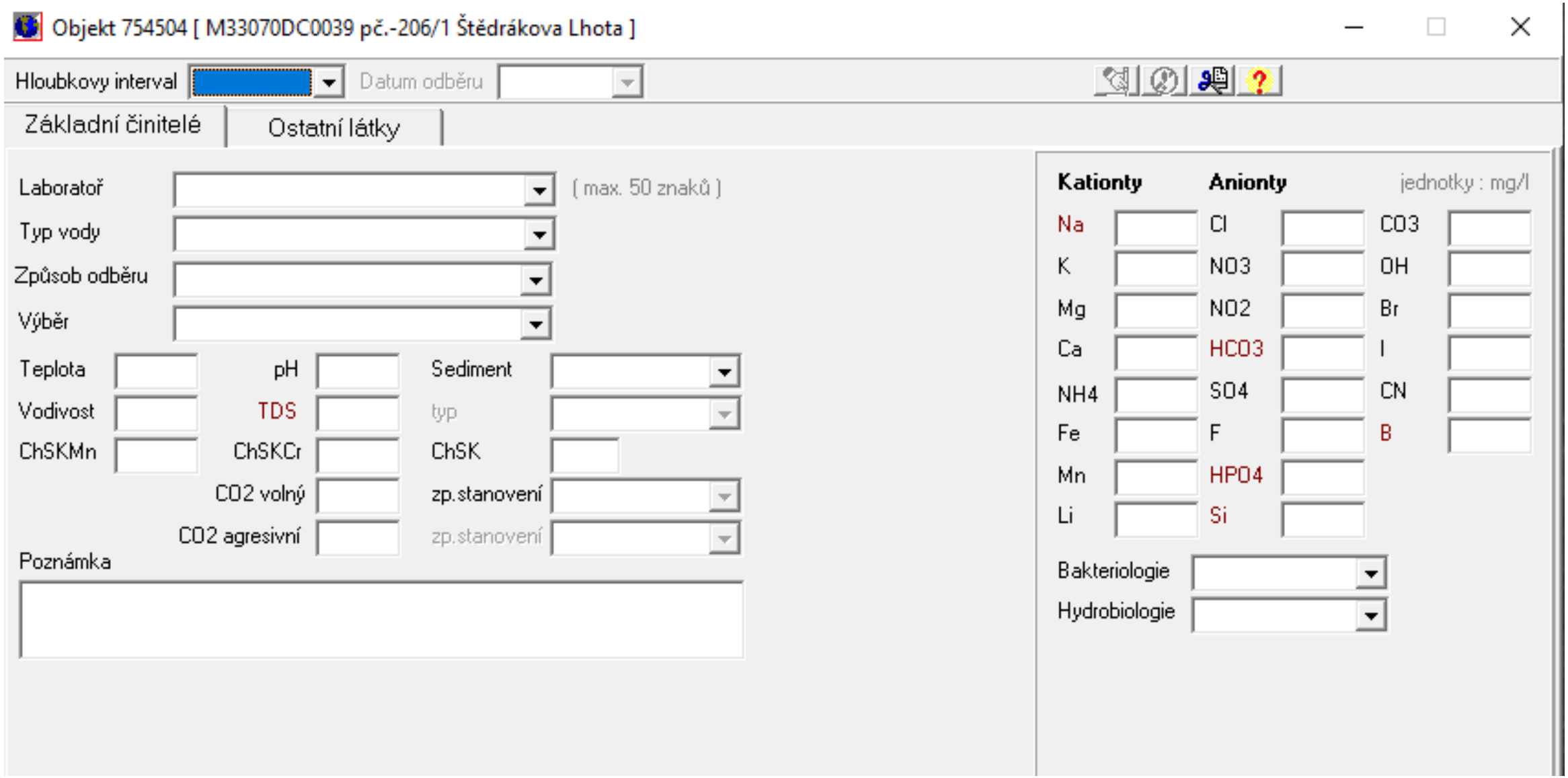
Source : Geomet s.r.o., 2021

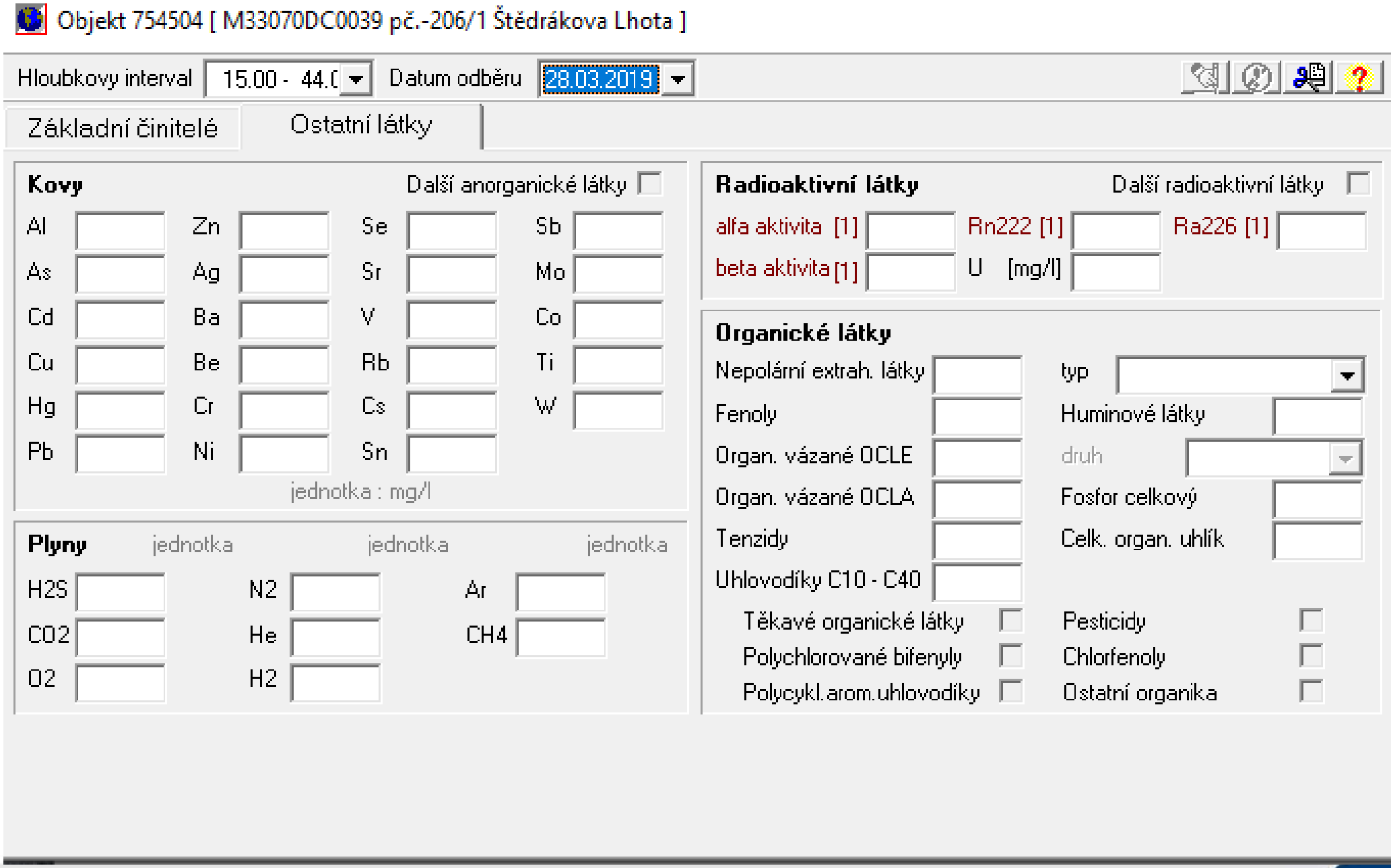
Available Information on ground water – Geofond division

- Database of chemistry of ground waters includes 111387 recorded at all, data from reports and publications

- Li over 0.1 mg/L in 52642 objects
- Li over 1 mg/L in 538 objects
- Li over 1 m/L and temperature over 20°C in 111 objects

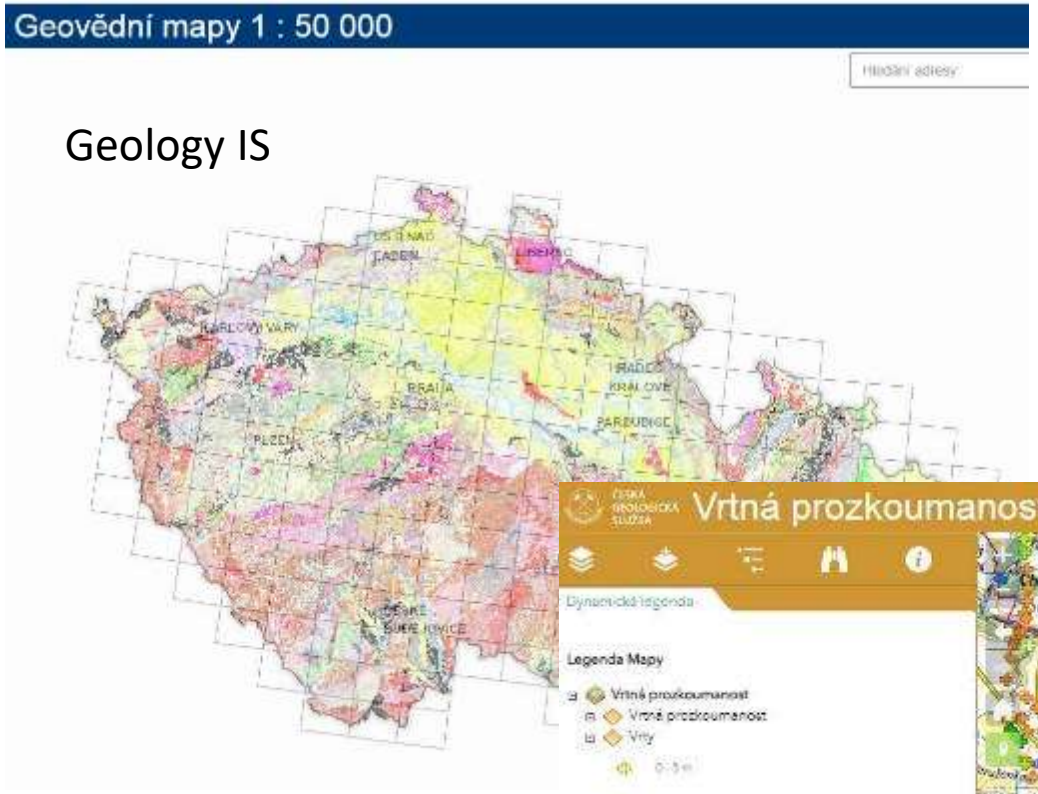
Input screens of the DTB of chemistry of ground waters



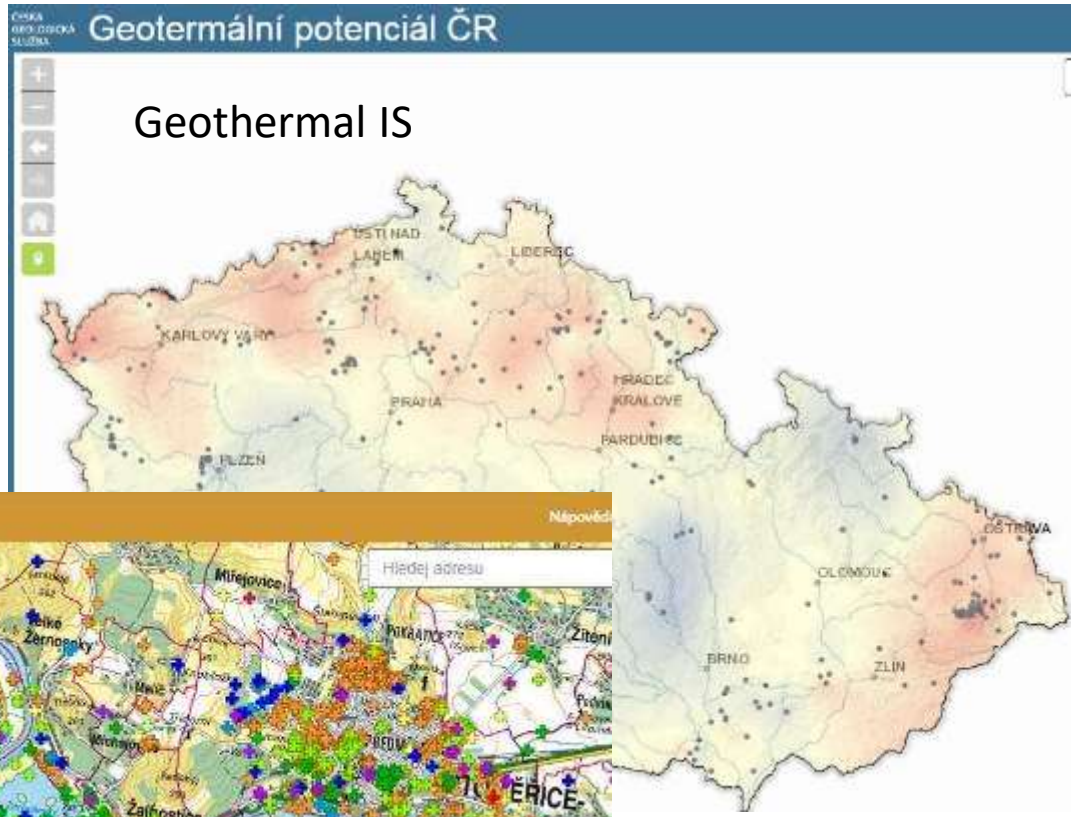

Objekt 754504 [M33070DC0039 pč.-206/1 Štědrákova Lhota]
Hloubkovy interval 15.00 - 44.0
Datum odběru 28.03.2019
Základní činitelé
Ostatní látky
Kovy
Další anorganické látky
Al Zn Se Sb
As Ag Sr Mo
Cd Ba V Co
Cu Be Rb Ti
Hg Cr Cs W
Pb Ni Sn
jednotka : mg/l
Plyny
jednotka
H2S N2 Ar
CO2 He CH4
O2 H2
Radioaktivní látky
Další radioaktivní látky
alfa aktivita [1] Rn222 [1] Ra226 [1]
beta aktivita [1] U [mg/l]
Organické látky
Nepolární extrah. látky
typ
Fenoly
Huminové látky
Organ. vázané OCLE
druh
Organ. vázané OCLA
Fosfor celkový
Tenzidy
Celk. organ. uhlík
Uhlovodíky C10 - C40
Těkavé organické látky
Pesticidy
Polychlorované bifenyly
Chlorfenoly
Polycykl.arom.uhlovodíky
Ostatní organika

Supported by other sources of CGS IS

Geology IS

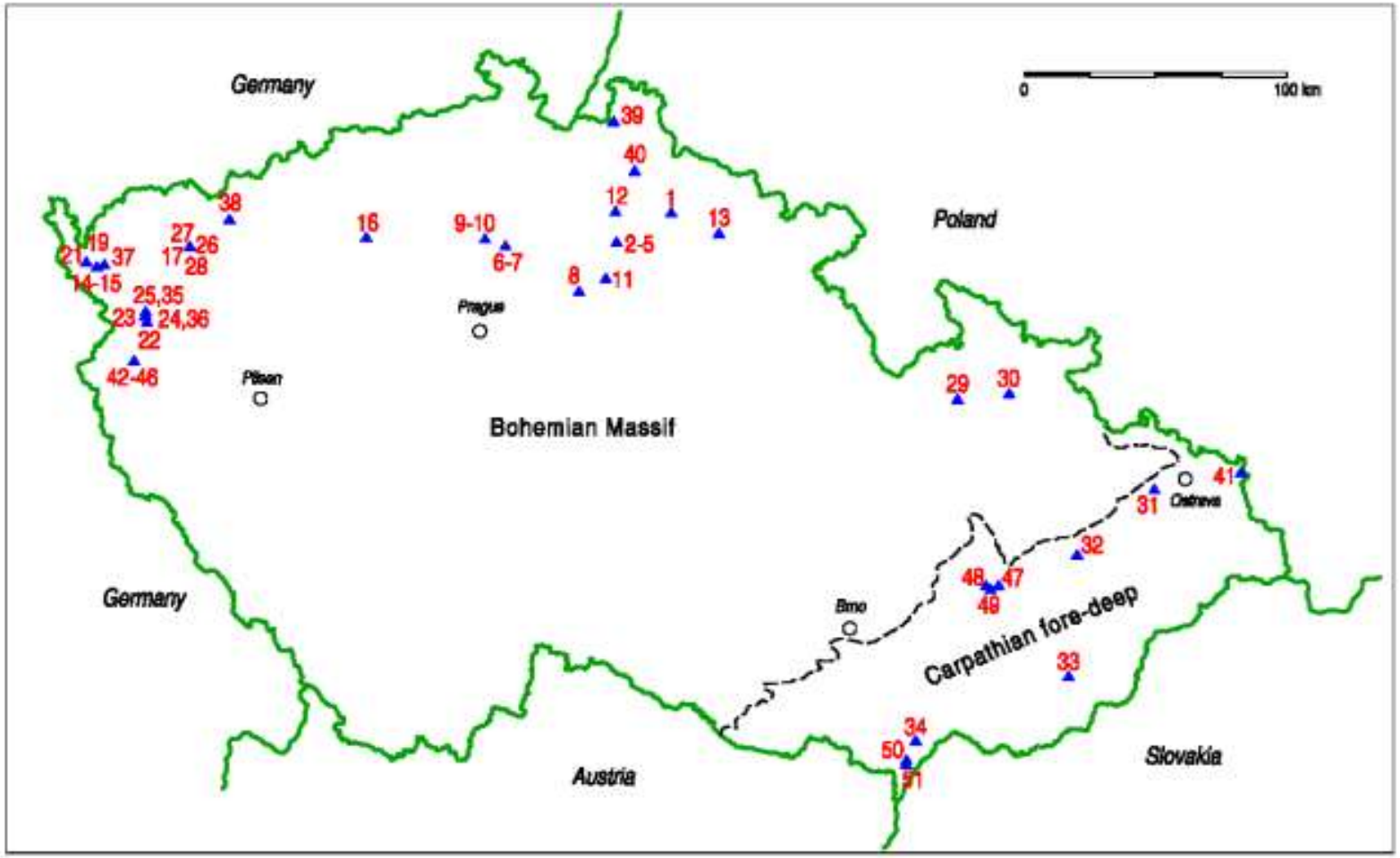


Geothermal IS

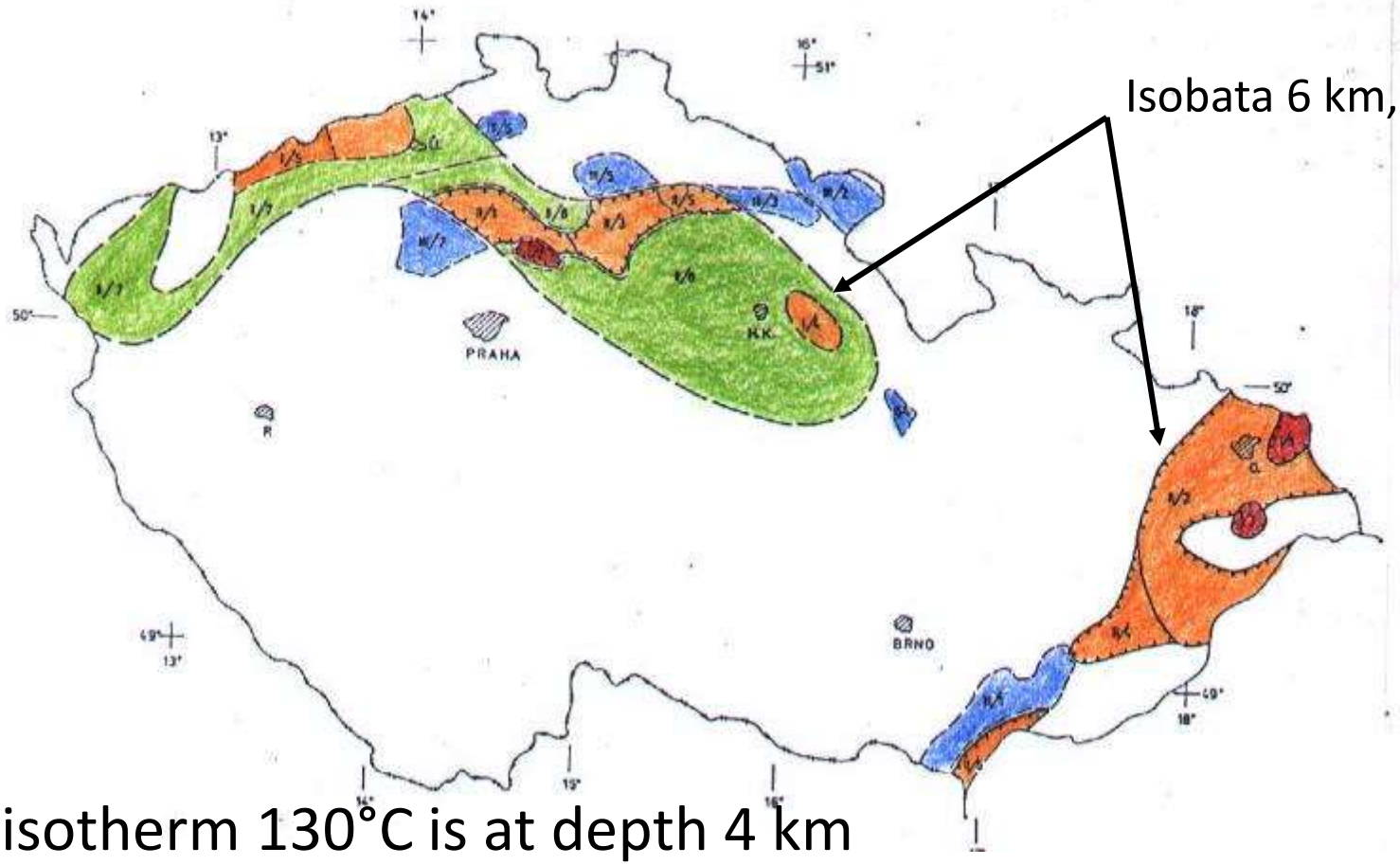


Borehole IS

Mineral waters and brines – new data



Geothermal regions in the Czech Republic



Red – areas where isotherm 130°C is at depth 4 km

Orange – less favorable geological conditions, 130°C at depth 4 to 5 km

Green – Less favorable areas and areas with protected mineral water and springs of thermal water

Blue –Isotherm 130 °C at depth of 5 to 6 km

Technological research

- Natural and artificial brines are subject to technological research within the Czech RENS (Rock Environment Natural Resources) project

- Experiments with concentration of strategic raw materials and isolation of rare and strategic elements

- Focused on separation of trace elements (Li, Au) and electrochemical processes

- Brines with Bromine or Iodine are tested as a leaching medium to extract trace elements, such as Au

Our cooperation within the BrineRIS project

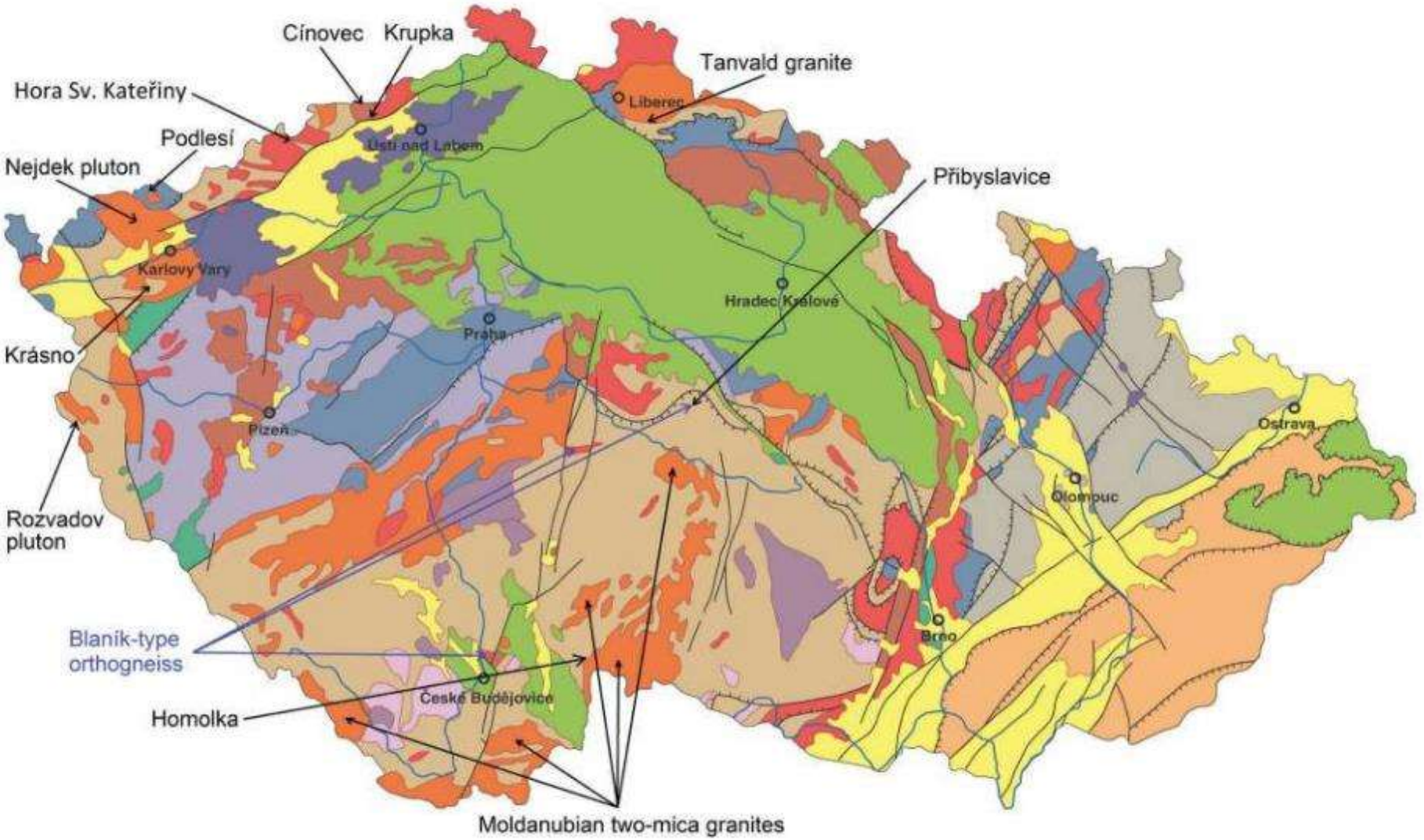
. Cooperation with composition of Brine Li database – delivering of national data set, connecting with supported data sets

- Selection and description of objects with increased concentrations of Lithium
- Additional sampling and analysis of interesting brines within the Czech Republic
- Selection of two localities suitable for sampling of brines for processing technology research
- Assistent service for sampling

Thank you for your attention

tomas.paces@geology.cz

petr.rambousek@geology.cz



Simplified geological map of Czech Republic with localization of Li-enriched granites (according Breiter, 2020)