REPP-CO2 – project overview

V. Hladík, O. Krejčí, J. Franců, V. Kolejka (Czech Geological Survey), R. Berenblyum (IRIS)

REPP-CO2

- Preparation of a **RE**search **P**ilot **P**roject on **CO2** Geological Storage in the Czech Republic
- Příprava výzkumného pilotního projektu geologického ukládání CO2 v České republice

REPP-CO2

- Coordinator: Czech Geological Survey (CGS)
- Partners: IRIS, VŠB – Technical University of Ostrava, ÚJV Řež, a.s., Research Centre Řež, Miligal, s.r.o., Institute of Physics of the Earth, Masaryk University (UFZ)
- Funding: Norway Grants
- Budget: 77 mil. CZK ≅ 2.85 mil. €
- Grant provider: Ministry of Finance
- Programme partner: Ministry of Environment
- Project duration: 23/1/2015 – 30/11/2016

Project objectives

Main objective is to significantly contribute to the development of the CO2 geological storage technology in the Czech Republic:

- advancement of the Technology Readiness Level (TRL) of CO2 geological storage in the Czech conditions from TRL4 (technology validated in laboratory) to TRL5 (technology validated in relevant environment)
- for CO2 storage, TRL5 means its validation by means of a pilot project in geological settings similar to possible future commercial storage sites

Project objectives

(i) **Assess the selected geological structure** (a depleted oilfield) as a possible geological storage site for a research CO2 storage pilot project, utilising the methodology according to the Czech national law No 85/2012 Coll. on the storage of carbon dioxide in natural geological structures;

(ii) Strengthen the **Czech-Norwegian cooperation** in the area of CO2 geological storage and related research and development;

Project objectives

(iii) **Test the methodology**, procedures and criteria for description and assessment of a planned CO2 storage complex as specified by the **law No 85/2012 Coll.** on the storage of carbon dioxide in natural geological structures under real conditions of a concrete storage site preparation;

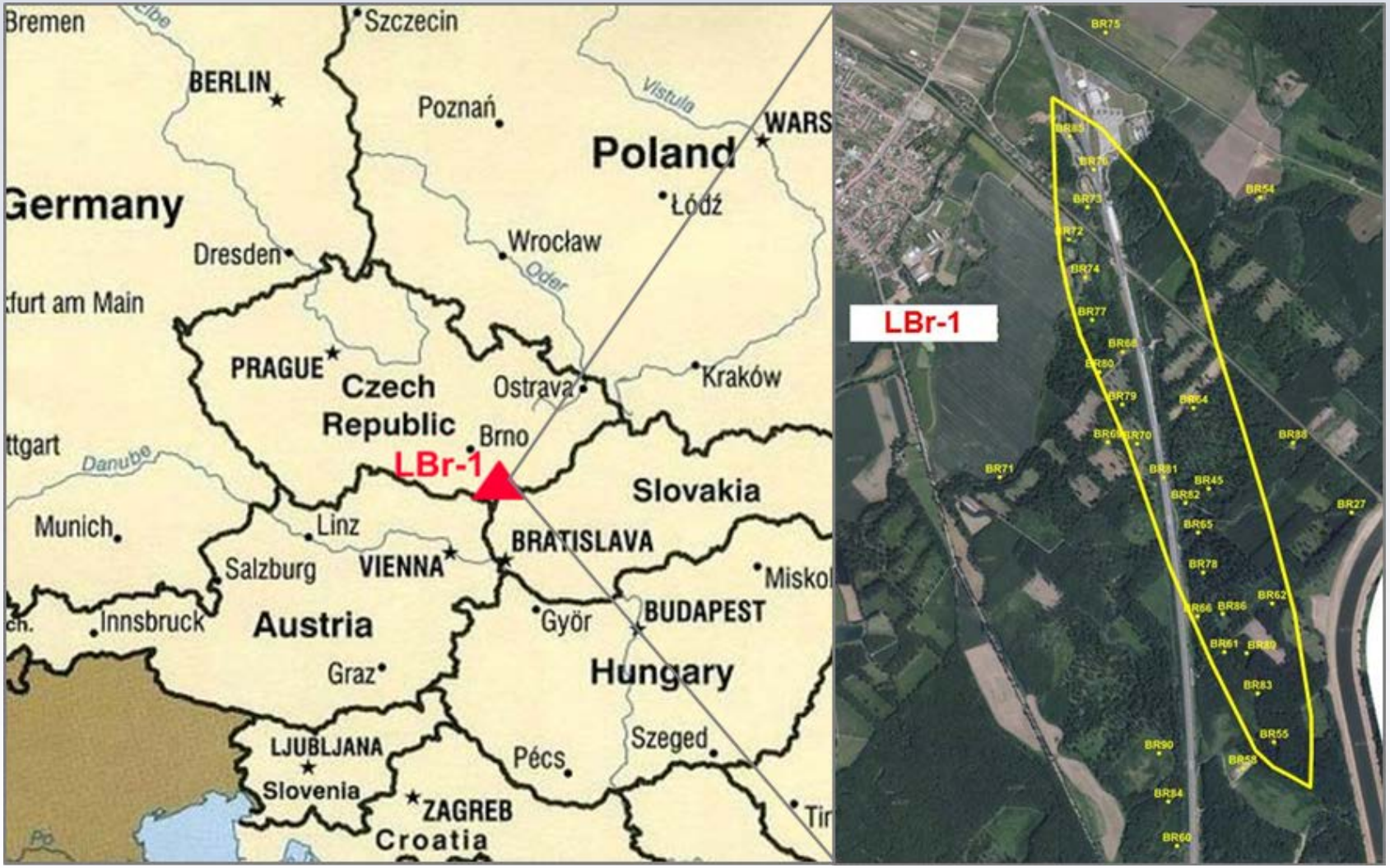
(iv) Perform **geological modelling** of the storage site and subsequent **numerical simulation of CO2 injection**;

Project objectives

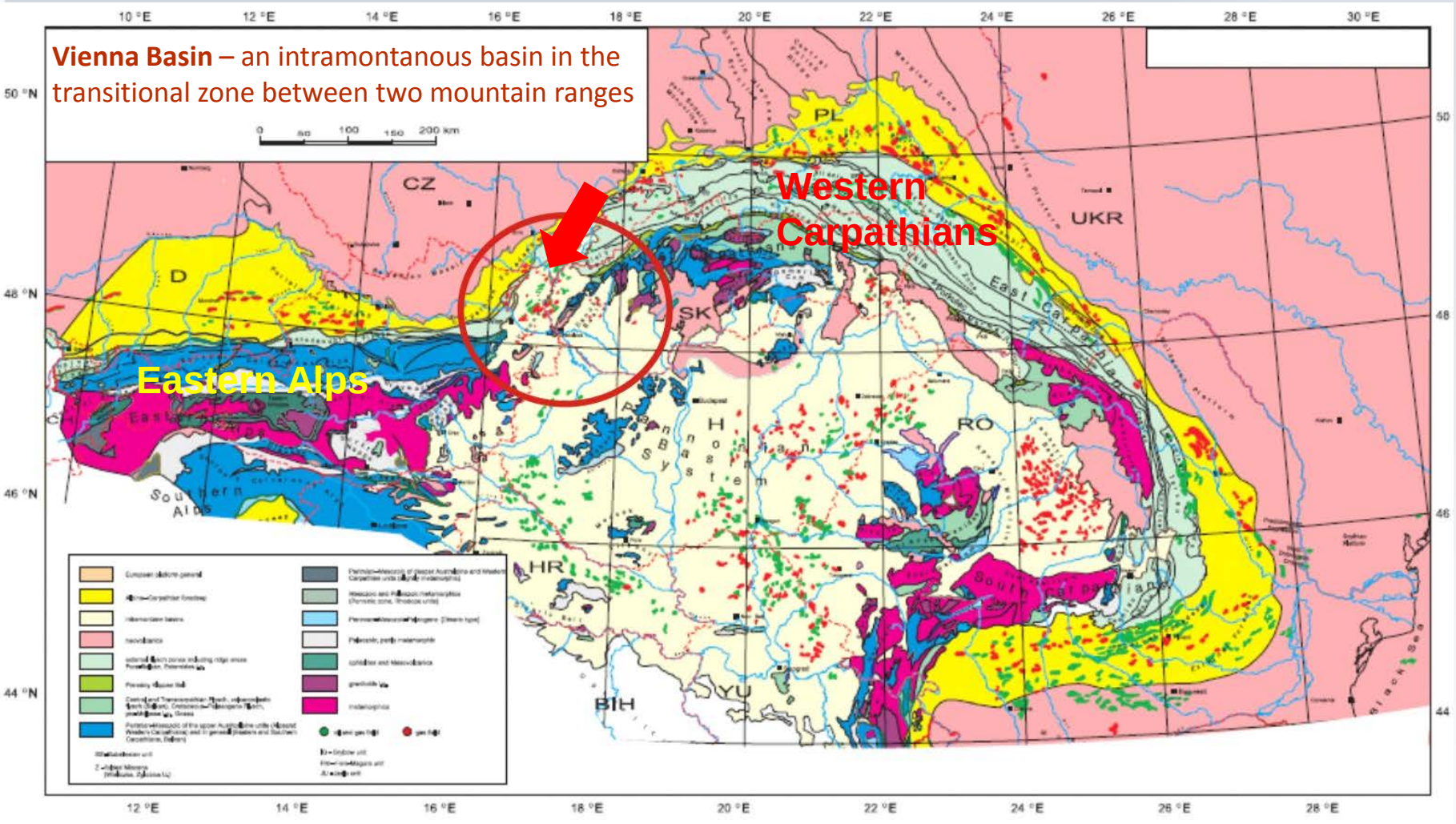
(v) Perform a **risk analysis of the storage site**, including assessment of conflicts of interest, proposal of risk mitigation measures and compilation of **storage site monitoring plan**;

(vi) Newly **assess the potential of the Carpathian** rock formations in the area of the Czech Republic from the CO2 storage point of view.

LBr-1 location



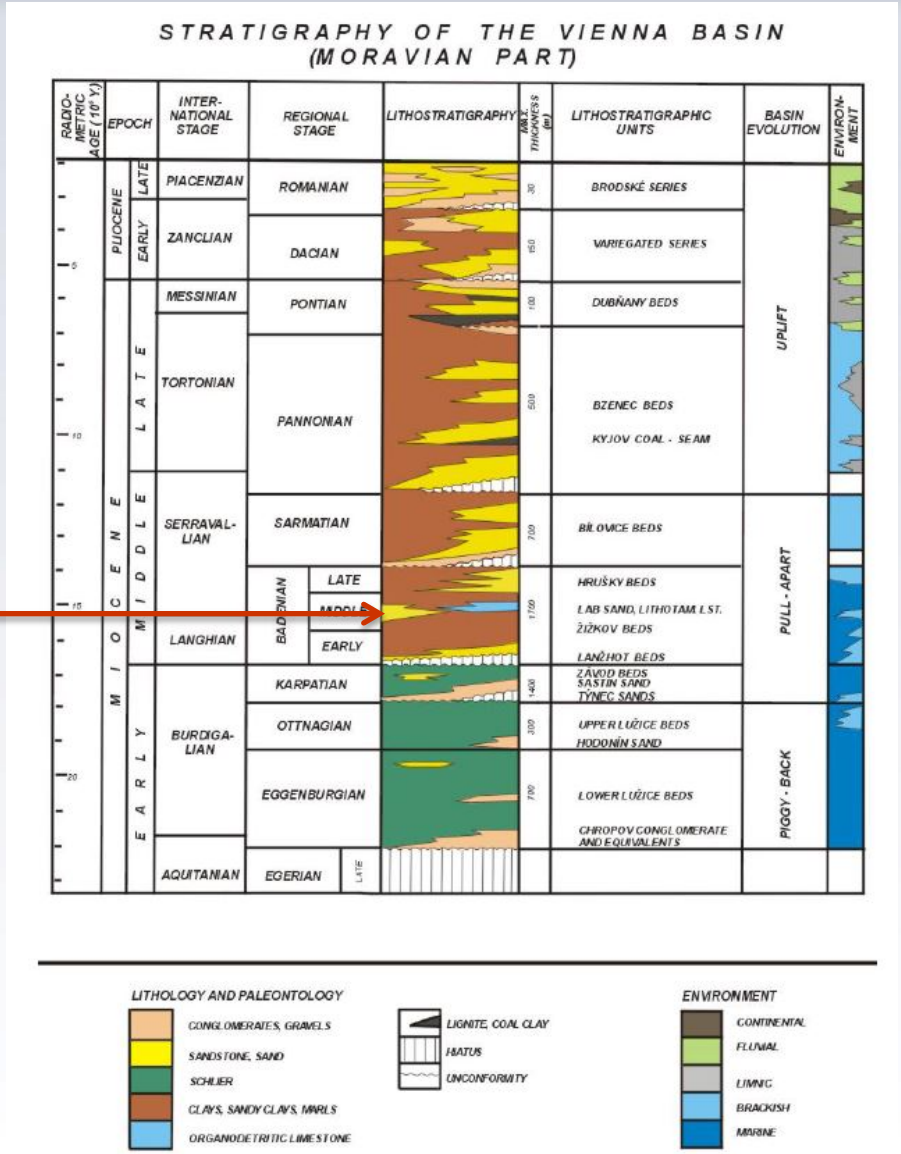
Geological position



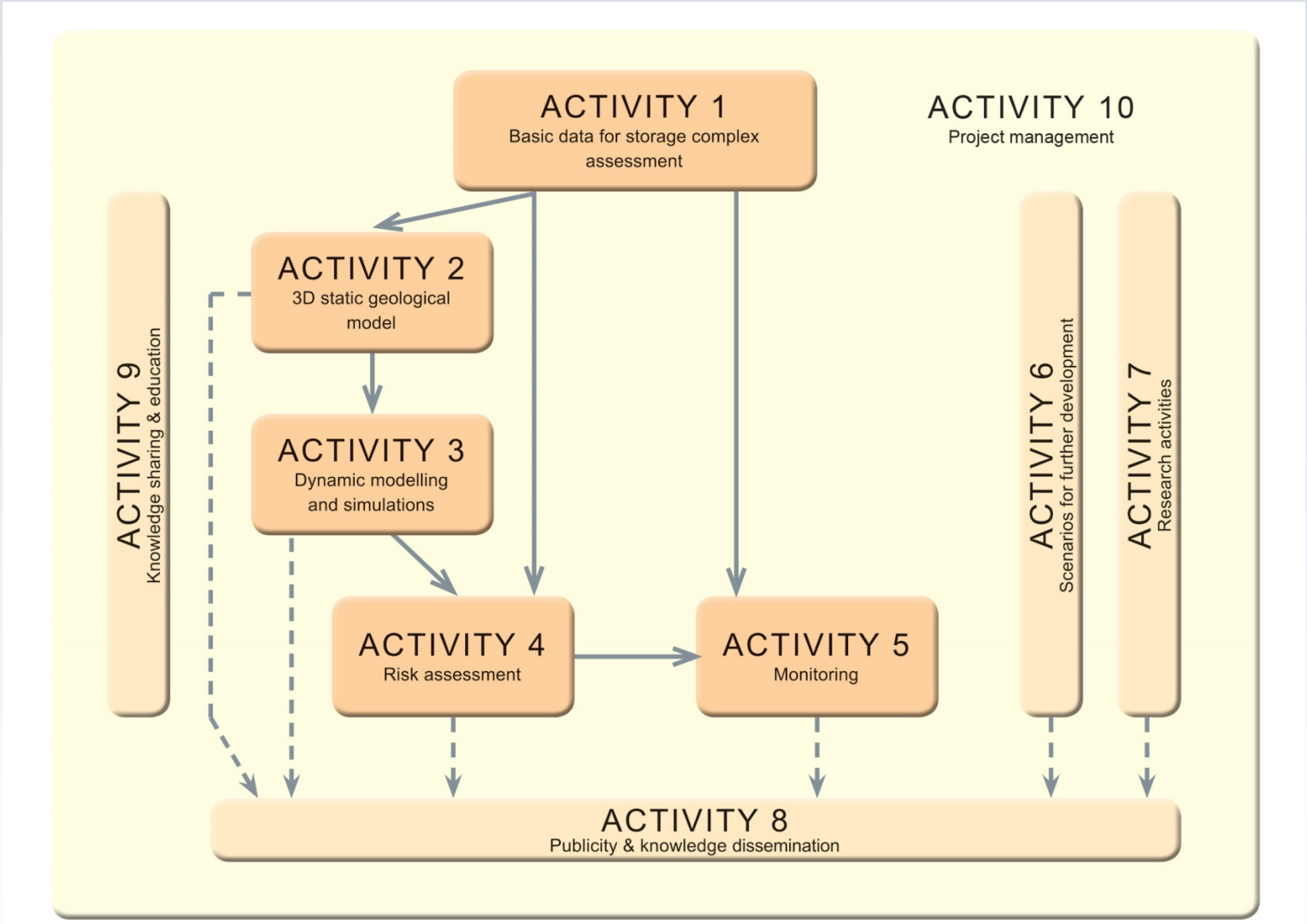
General overview and distribution of oil and gas fields in the Circum Carpathian Region of Central Europe. (Golonka & Picha, 2006)

Stratigraphic position

LBr-1 oil field

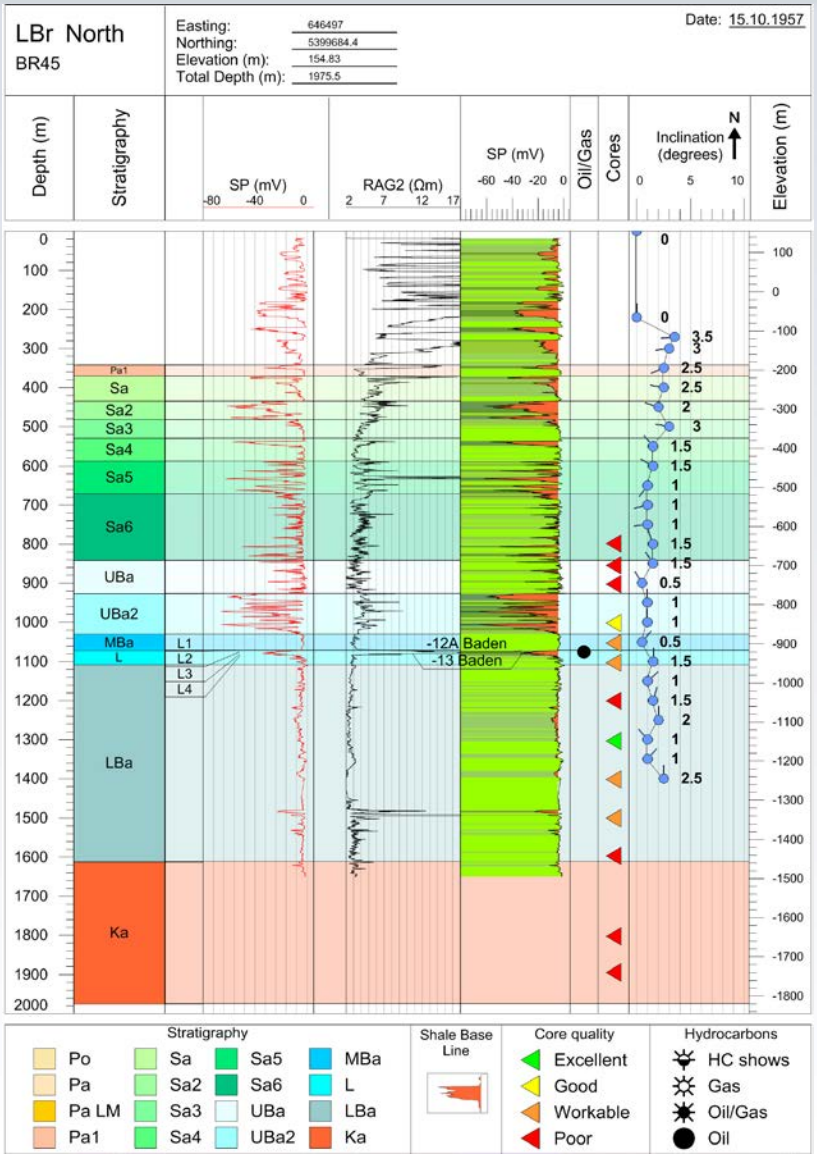


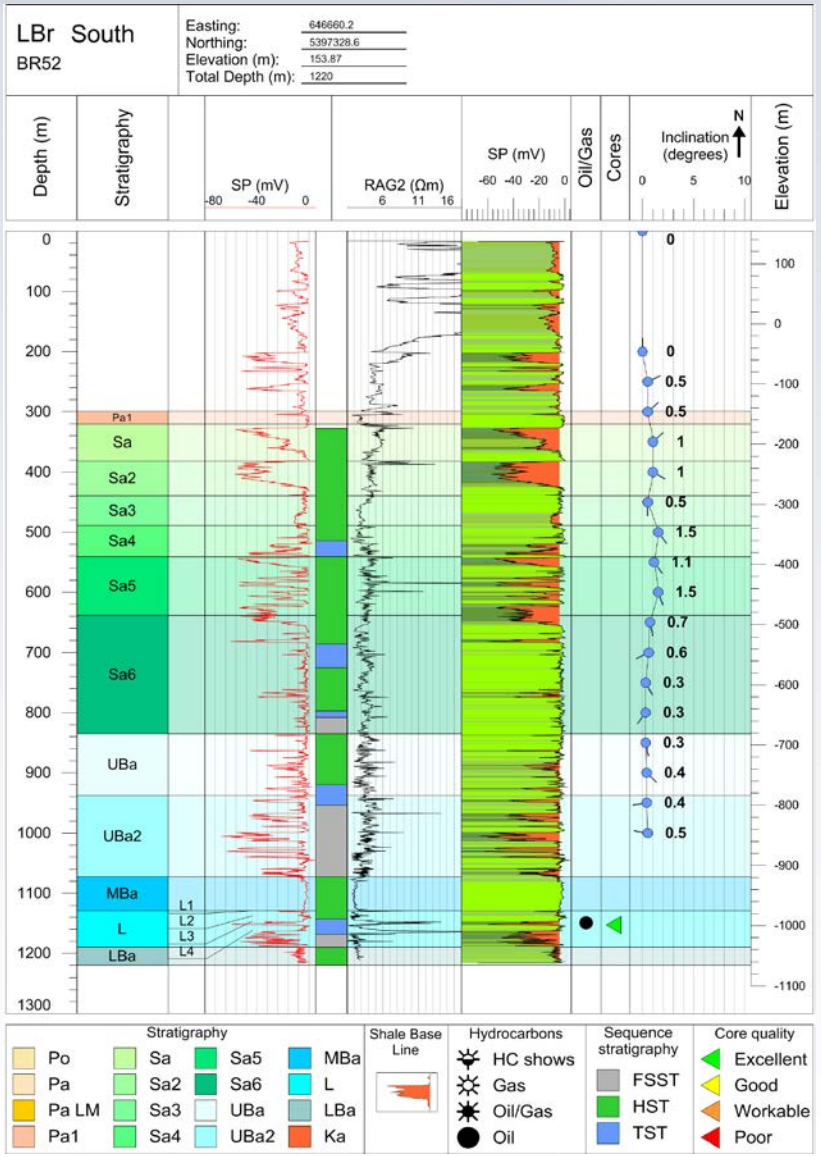
Project structure



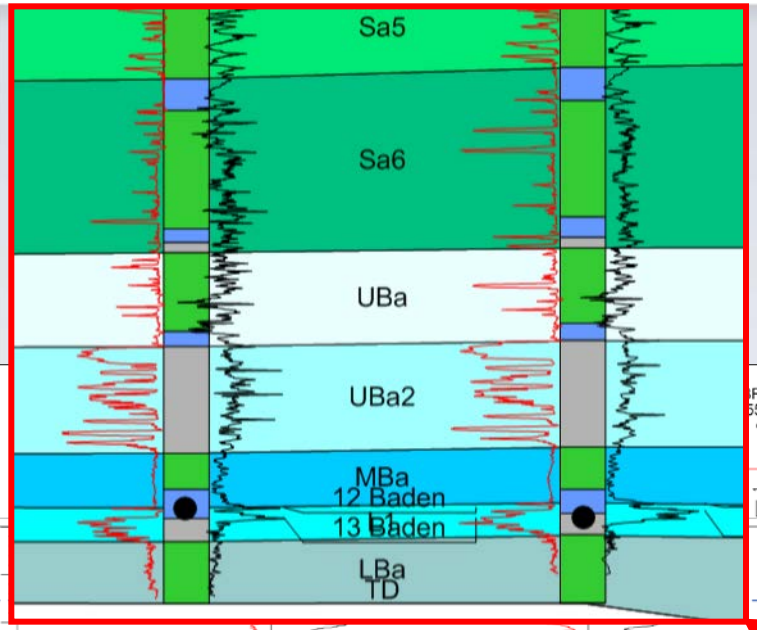
A1 - Archive cores

A1 – Re-assessment of old data





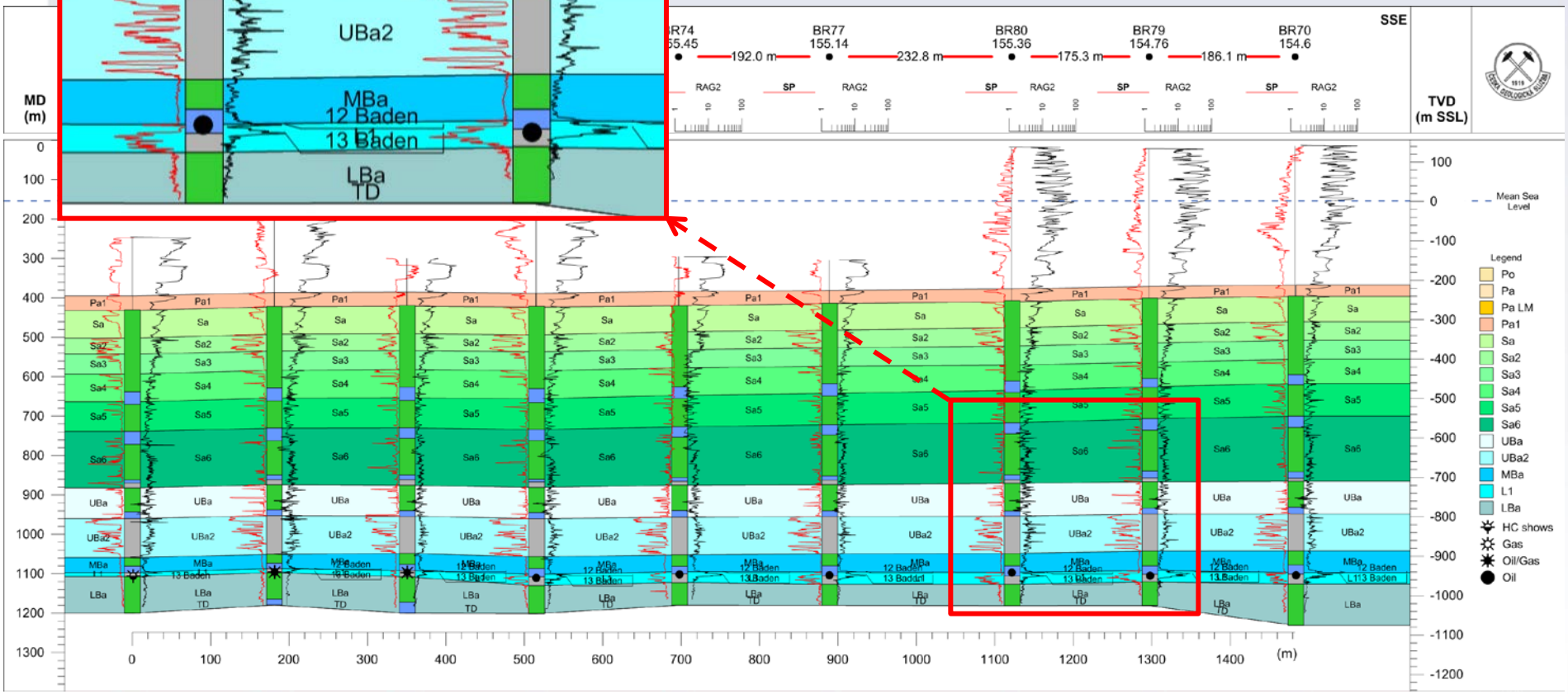
Sequence stratigraphic interpretation of well log data



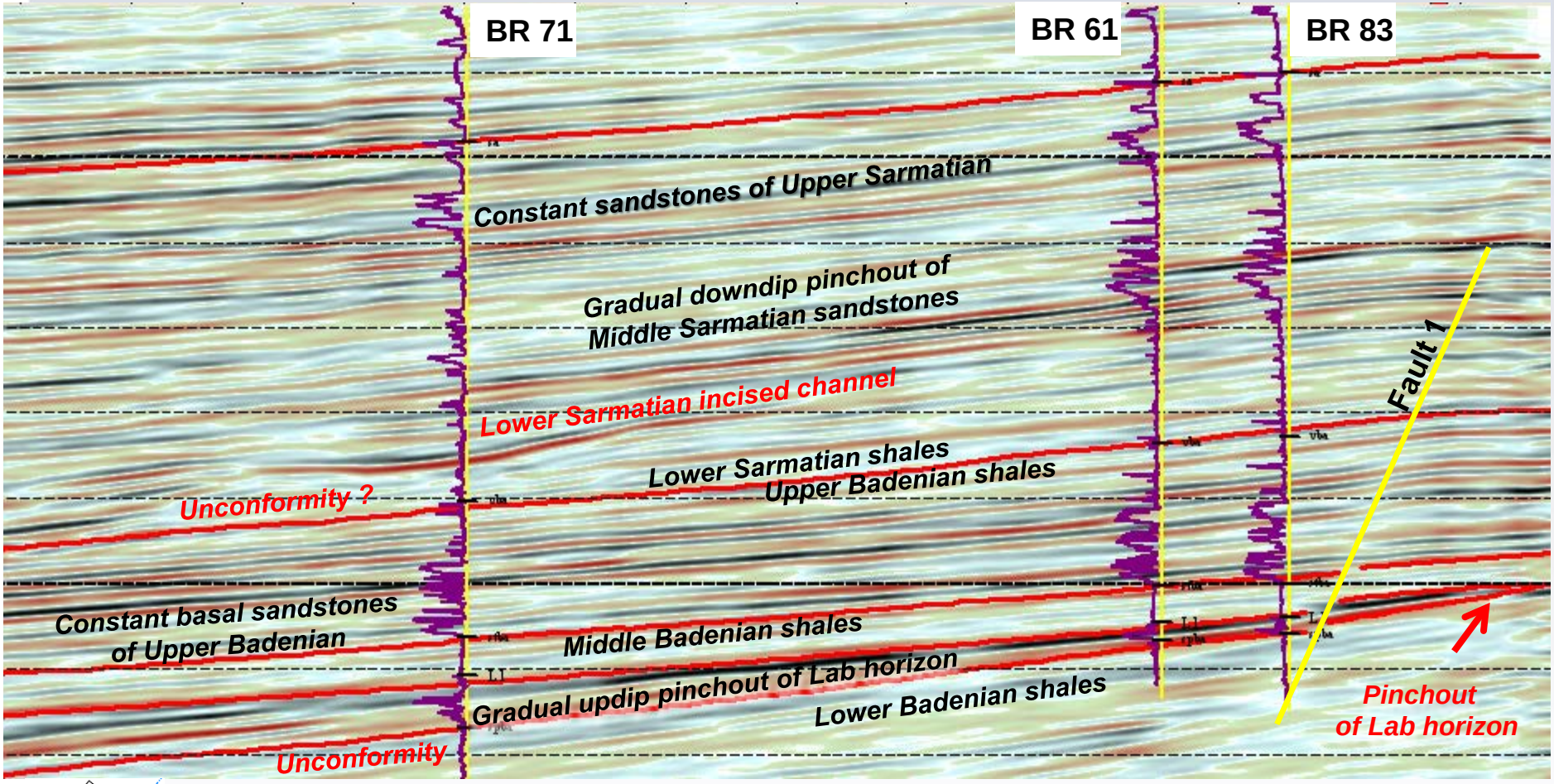
Upward coarsening / fining

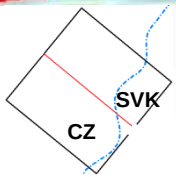
Relative sea level fluctuation

Stratigraphic architecture

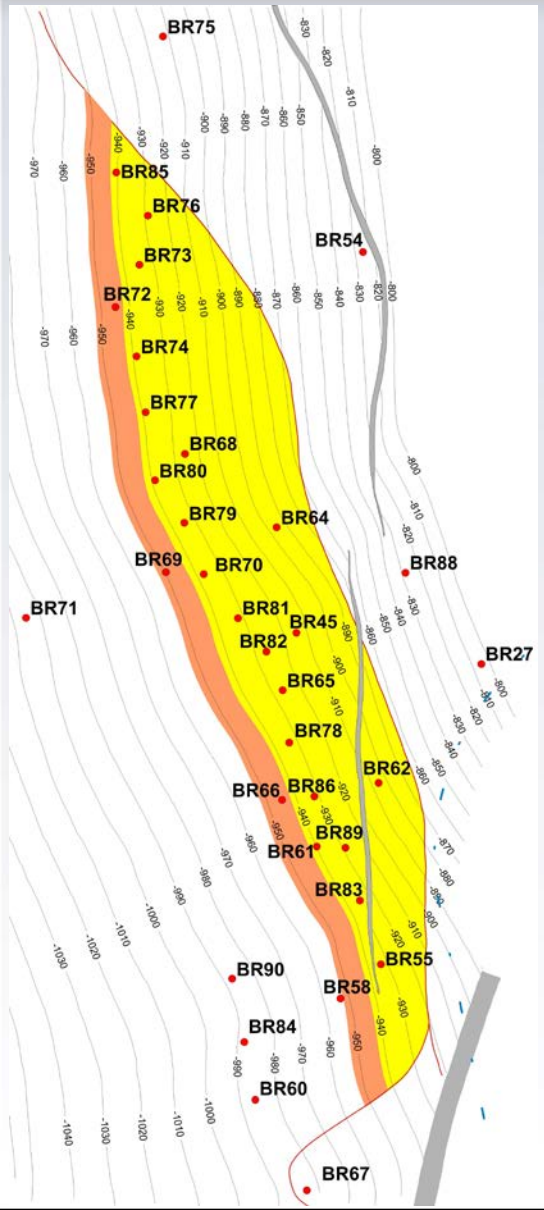


Integration of seismic stratigraphy and well log data



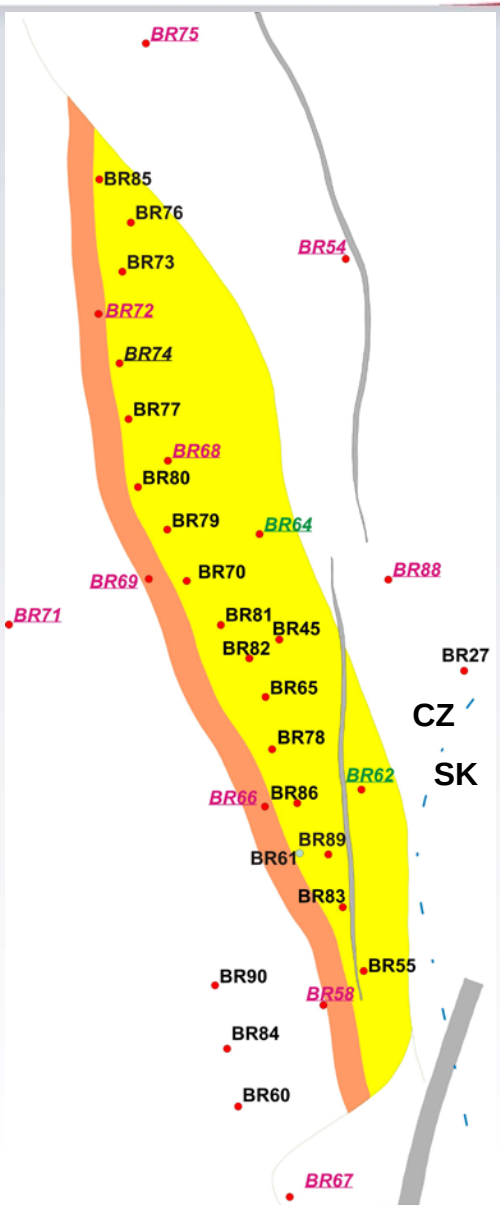


LBr-1 – old abandoned wells



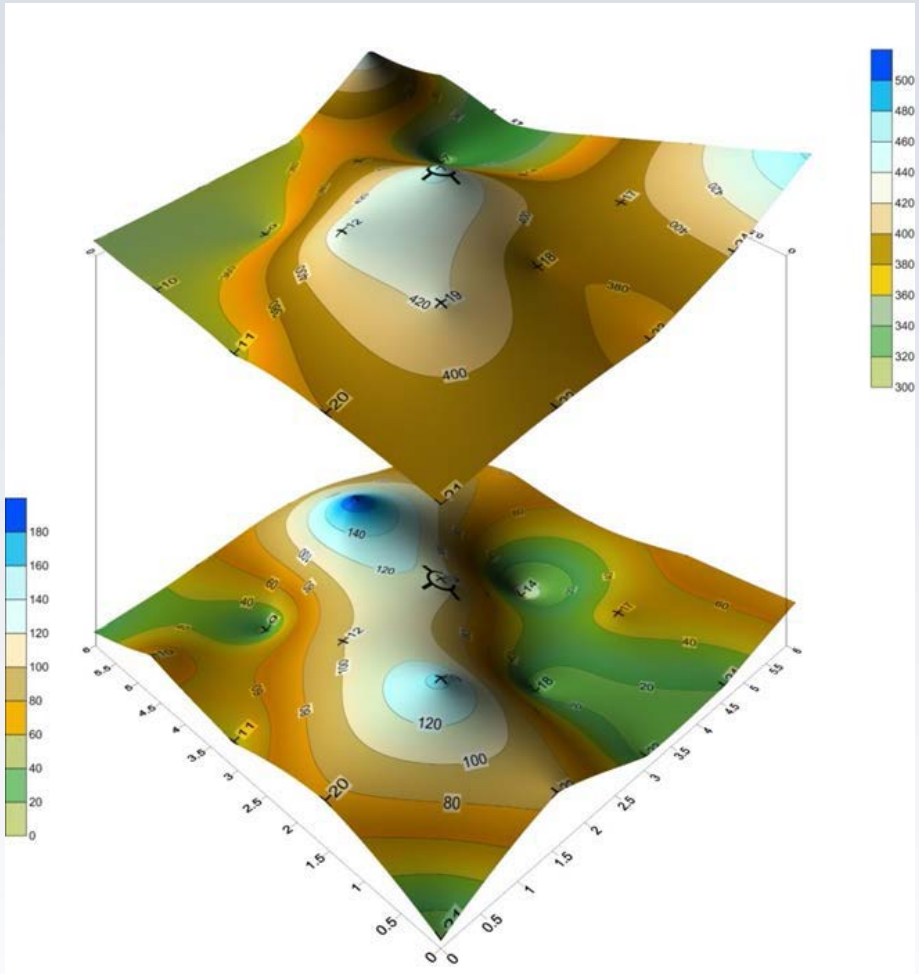
Top of Lab Horizon

- Fault
- Pinch-out boundary
- Gas zone
- Oil zone



- BR90 Abandoned well
- BR75 Re-abandoned well
- BR64 Targeted well

Monitoring



Atmogeochemical monitoring: Concentrations of CO2 and CH4 in soil gas in the vicinity of well Br-22

Project Geodatabase

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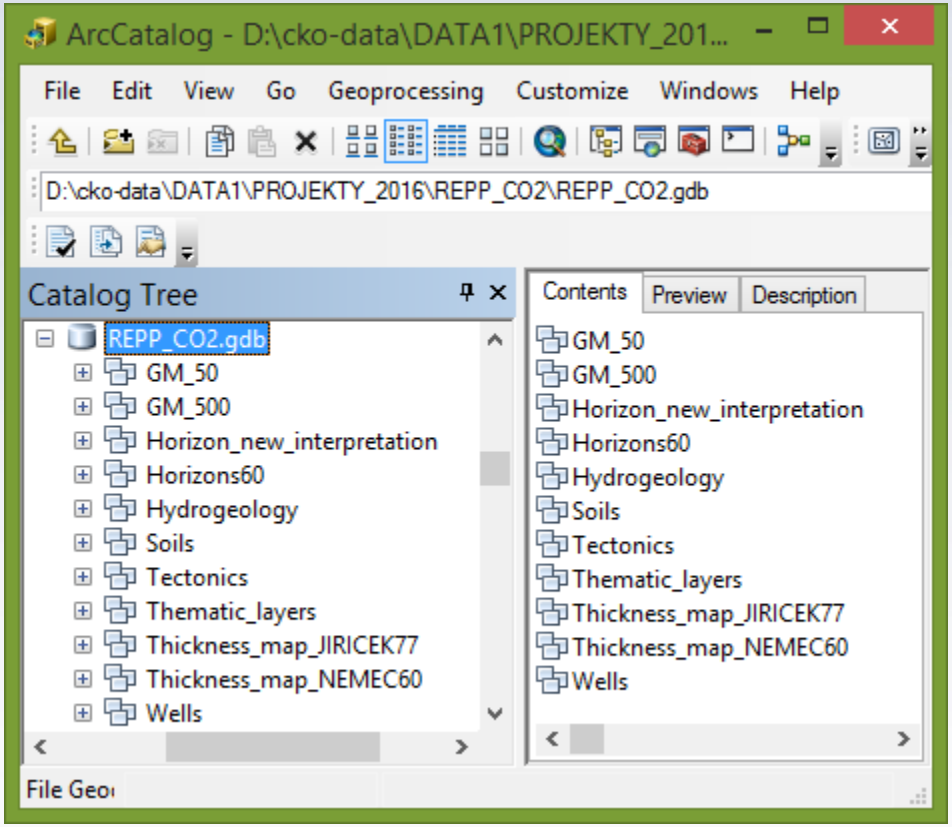

- Geology50
- Geology500
- Horizons_new_interpretation
- Horizons60
- Hydrogeology
- Soils
- Tectonics
- Thematic layers
- Thickness maps_JIRICEK77
- Thickness maps_NEMEC60
- Wells

Related Tables (Petrology, Pressure, Saturation, Seismic profiles description)

Project complexity

Team work, cooperation and keeping deadlines are essential:

- 10 Activities
- 54 Tasks
- 106 deliverables
- >130 researchers and technicians from 7 institutions

Knowledge sharing

Two short courses prepared and led by IRIS:

- Risk analysis (Stavanger)
- Reservoir geomechanics (Ostrava)

Three study visits of Czech research-ers at IRIS

Lessons learned

- „Digging“ for information from old archive data is time consuming and requires specific „local“ knowledge but results can be excellent
- Supplementary site investigation is necessary, especially to get fresh cores for geomechanical and geochemical experiments and allow in-situ borehole tests (stress field, permeability)
- Local conditions need to be taken into account for choice of monitoring methods (high seismic noise level, periodical flooding, etc.)
- A promising CO2 source revealed (95.5 % purity) – 240 th. t/yr released into the atmosphere

Final project steps

- Finalisation of dynamic modelling and simulations of CO2 injection into the reservoir
- Finalisation of risk analysis – quantification of risks, tool for evaluation of abandoned wells
- Drafting of final monitoring plan
- Scenarios for further development of the pilot project
- Lessons learned & plan of „to be done“
- Final project conference and seminar at GHGT-13 in Lausanne

Sustainability

- All project data and results are stored in project geodabase in structured way
- Activity 6 is focused on further development of the LBr-1 site, incl. scenarios and work plans
- Advisory Panel composed of stakeholders (regulators, policy makers and industry) provides feedback to project results
- Continuation of work is secured in the H2020 ENOS project (2016-2020)

To learn more

Discussion seminar – Lausanne

COOPERATION BETWEEN FORERUNNER AND FOLLOWER COUNTRIES IN CCS RESEARCH:

THE EXAMPLE OF NORWAY AND THE CZECH REPUBLIC

14 November 2017

Acknowledgements

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www.geology.cz/repp-co2