REPP-CO2 - Preparation of a research pilot project on CO2 geological storage in the Czech Republic

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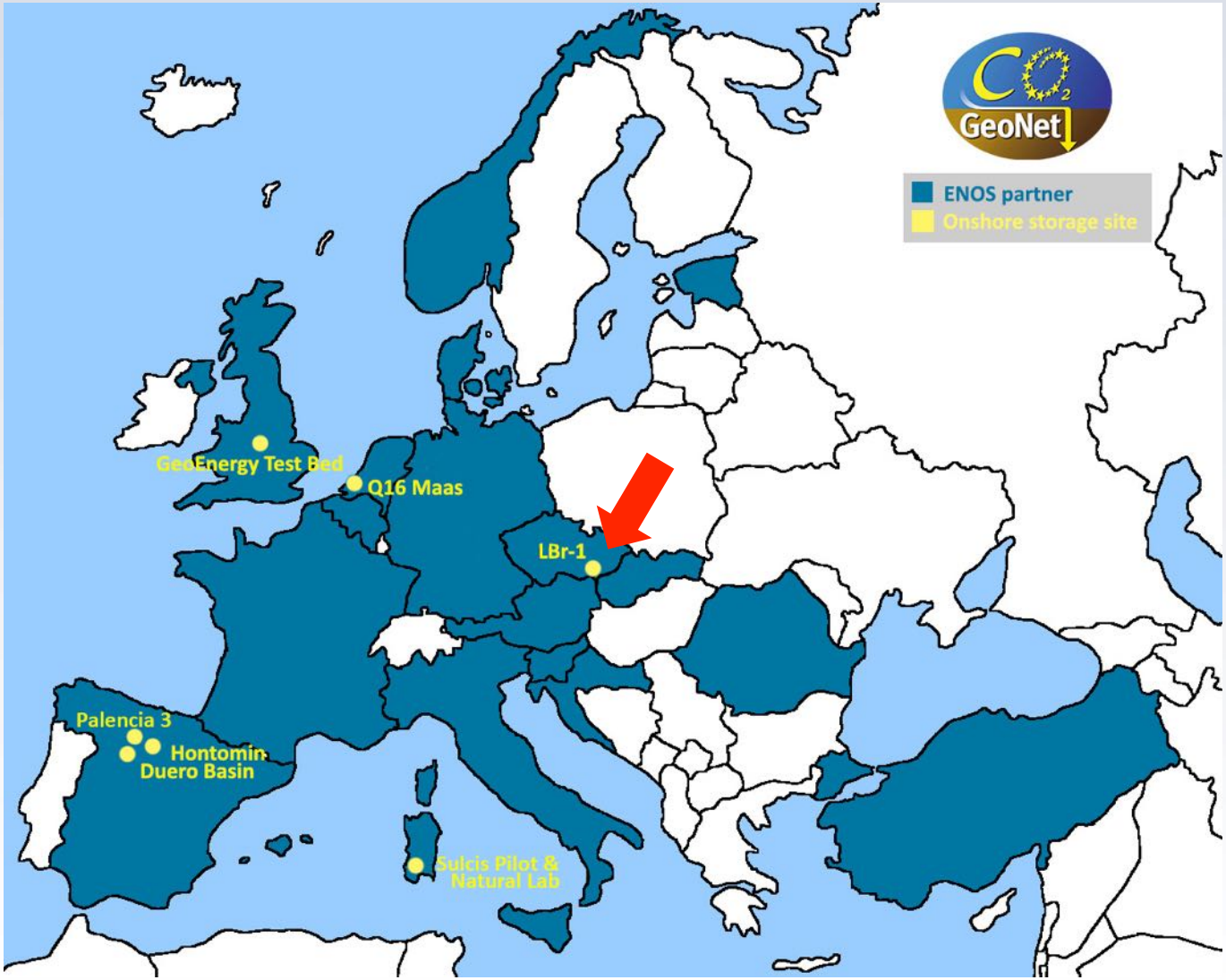
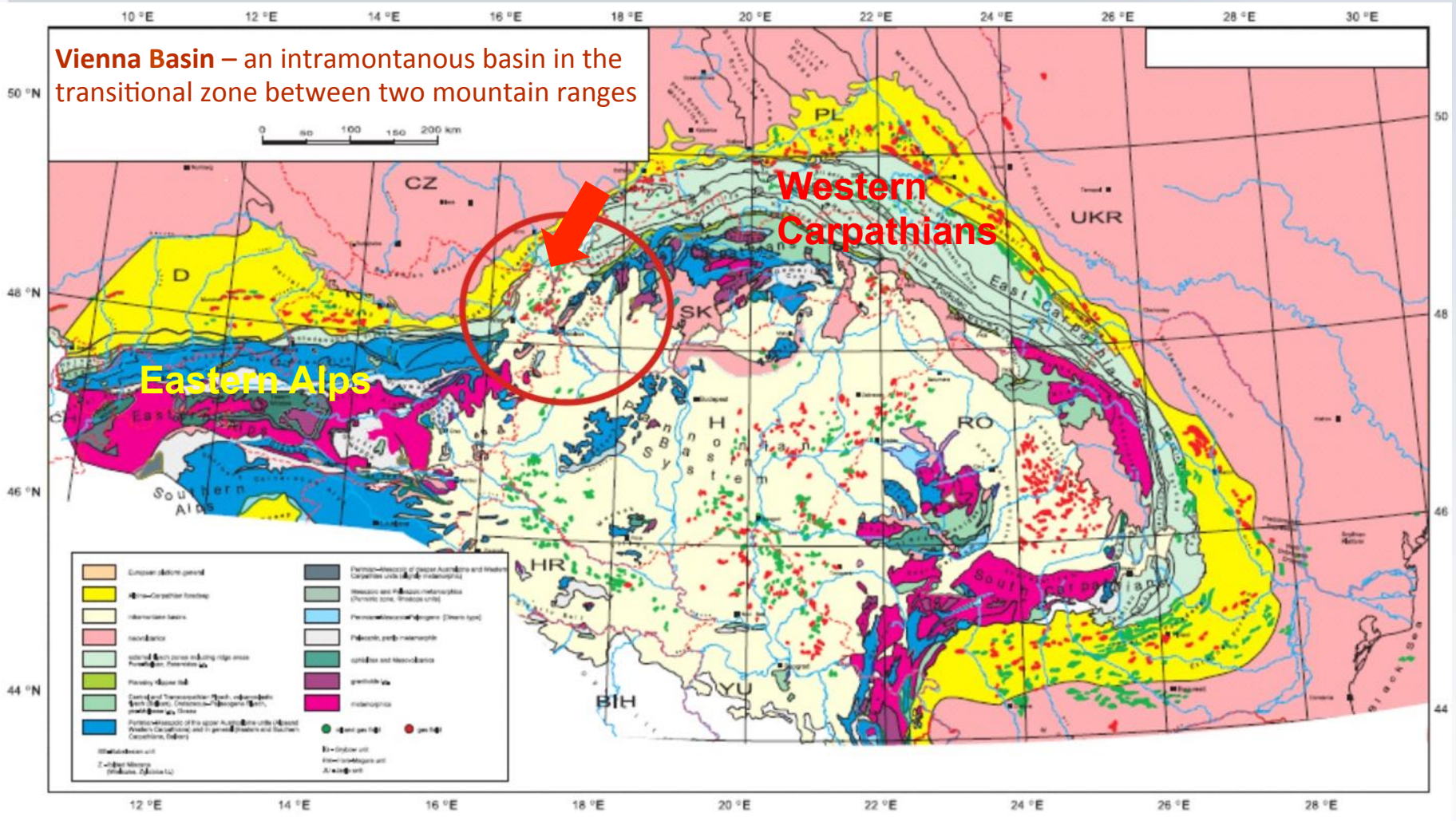
REPP-CO2

- 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
- Grant provider: Ministry of Finance
- Project partner: Ministry of Environment
- Project duration: 23/1/2015 – 30/11/2016

LBr-1 location



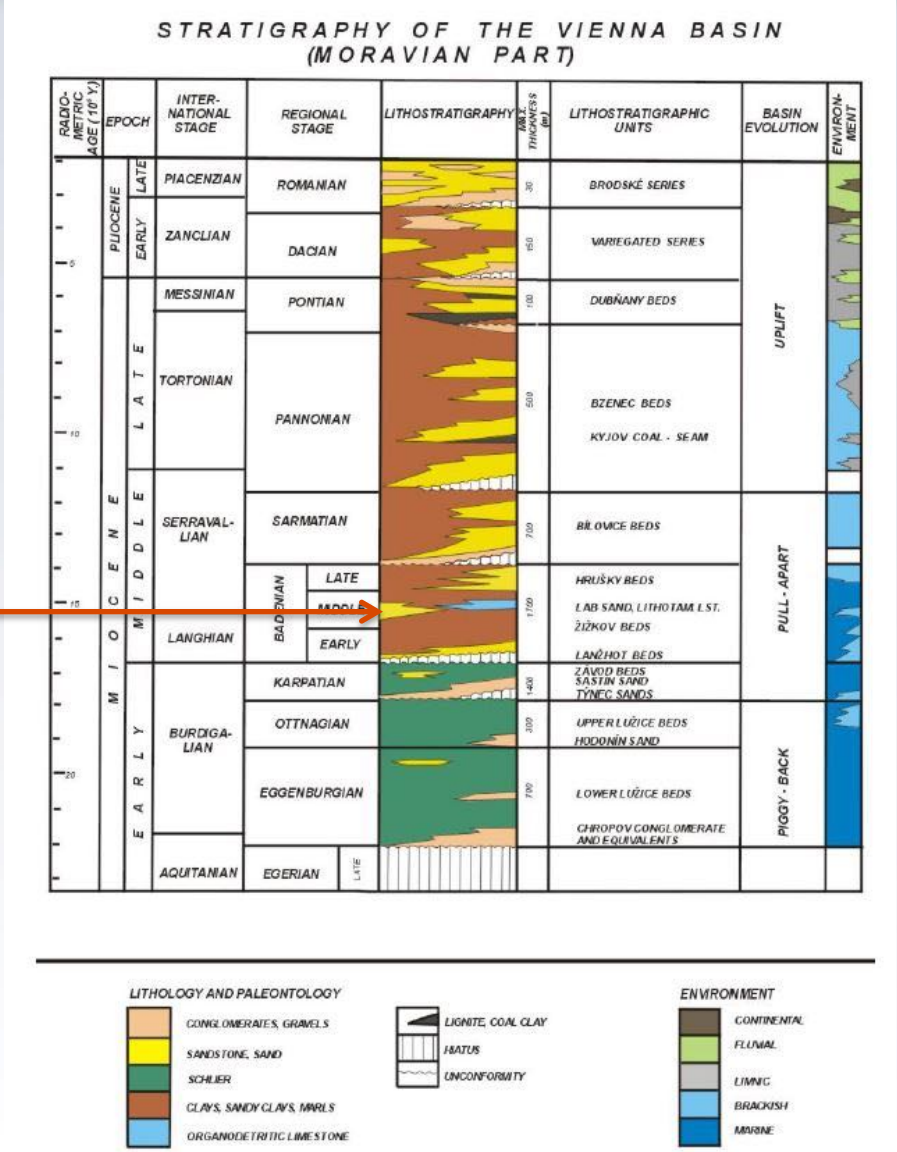
Geological position



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

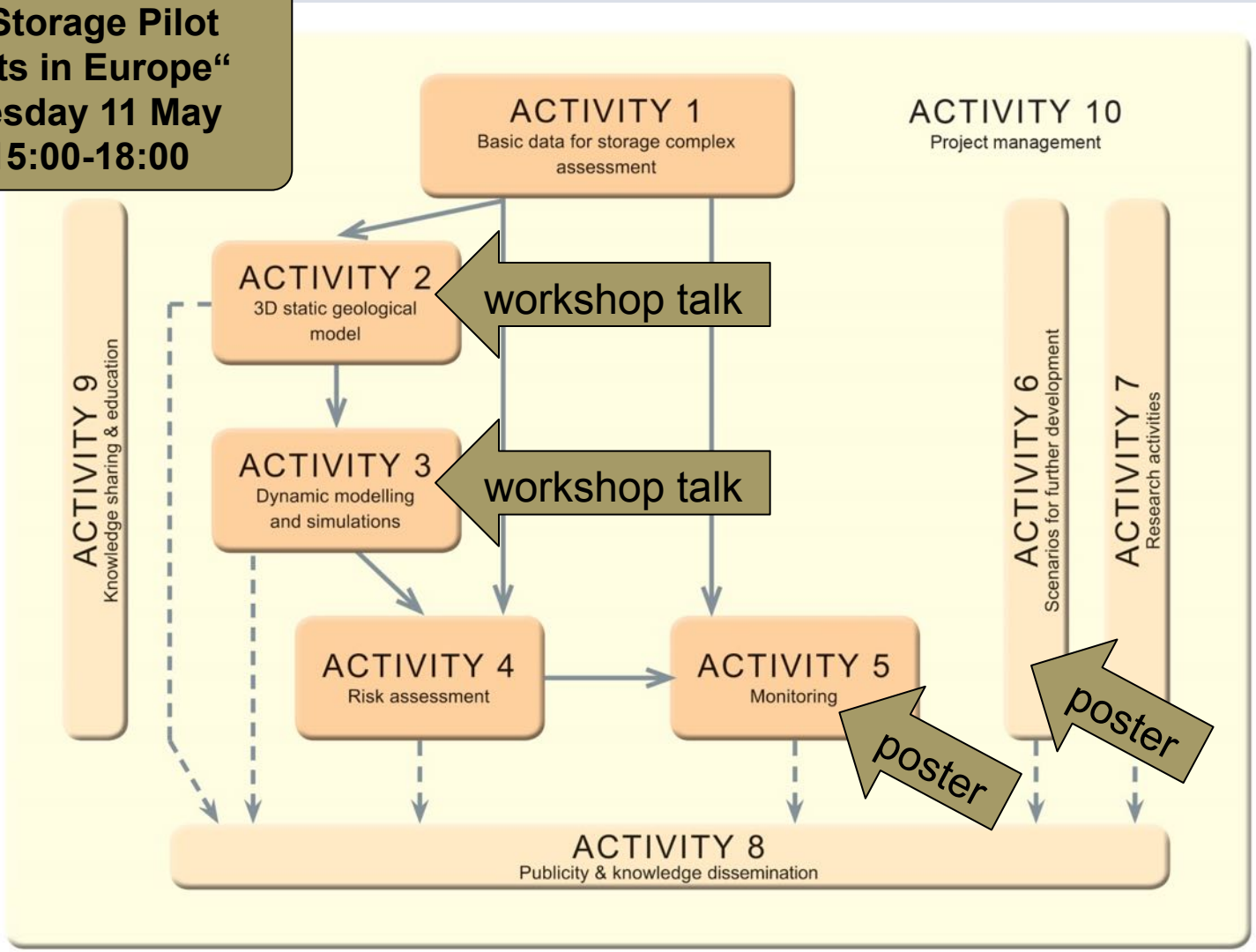
Stratigraphic position

LBr-1 oil field



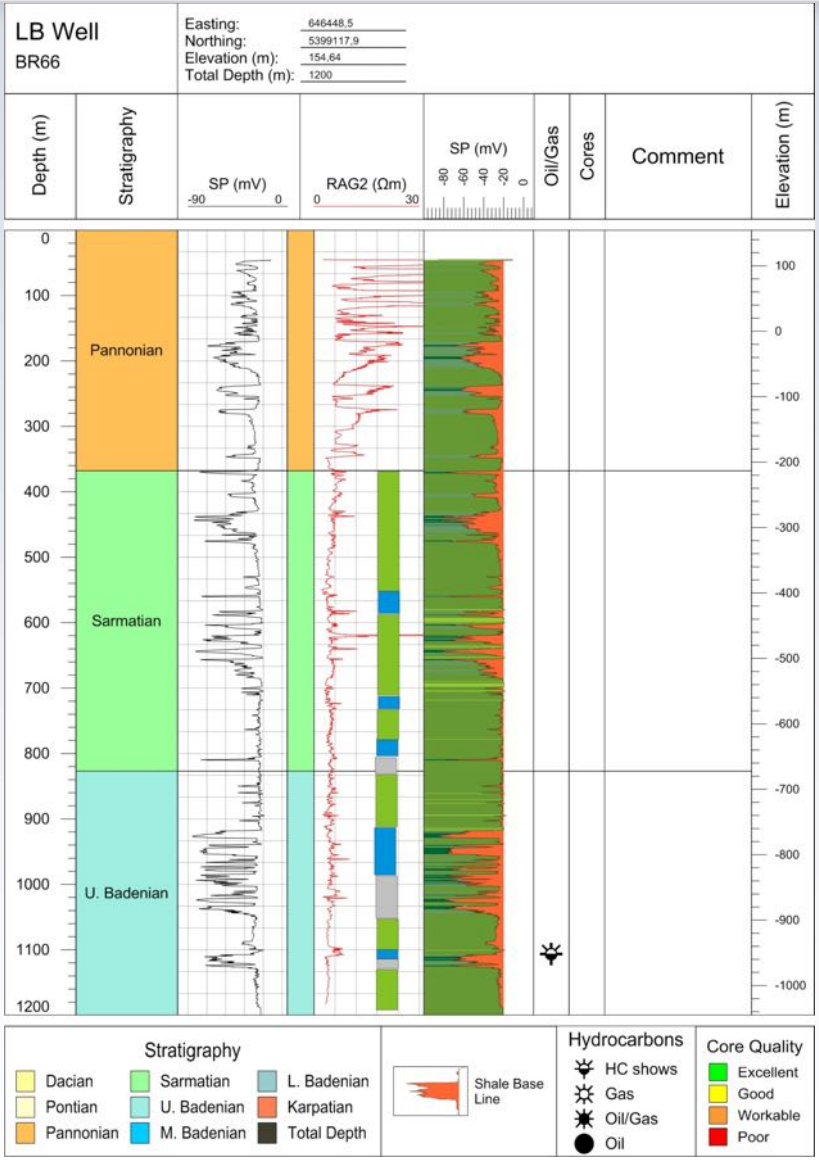
Project structure

Workshop „CO2 Storage Pilot Projects in Europe“ Wednesday 11 May 2016, 15:00-18:00



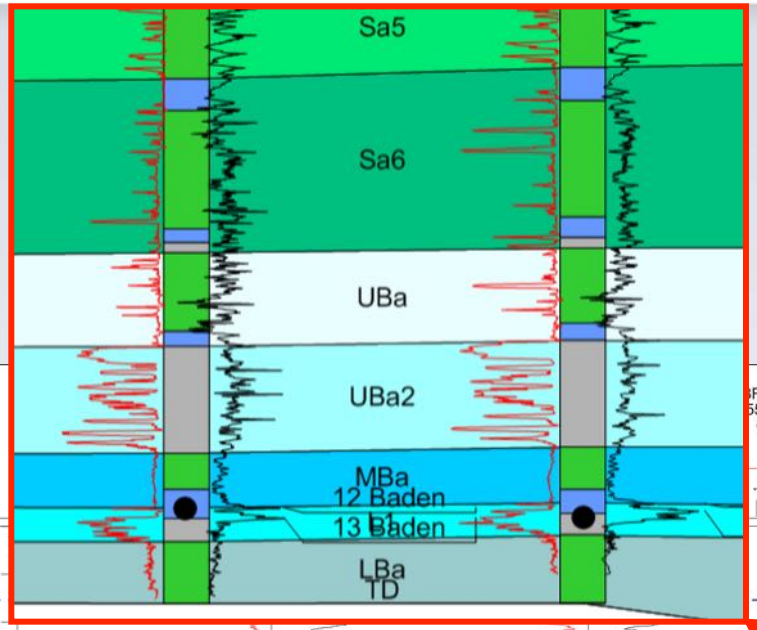
A1 - Archive cores

A1 – Re-assessment of old data



Example of the complex inteptretation of the well Br-66 (from profile IV, authors J. Franců, L. Jurenka, S. Nehyba and O. Prokop).
Product of Activity 2

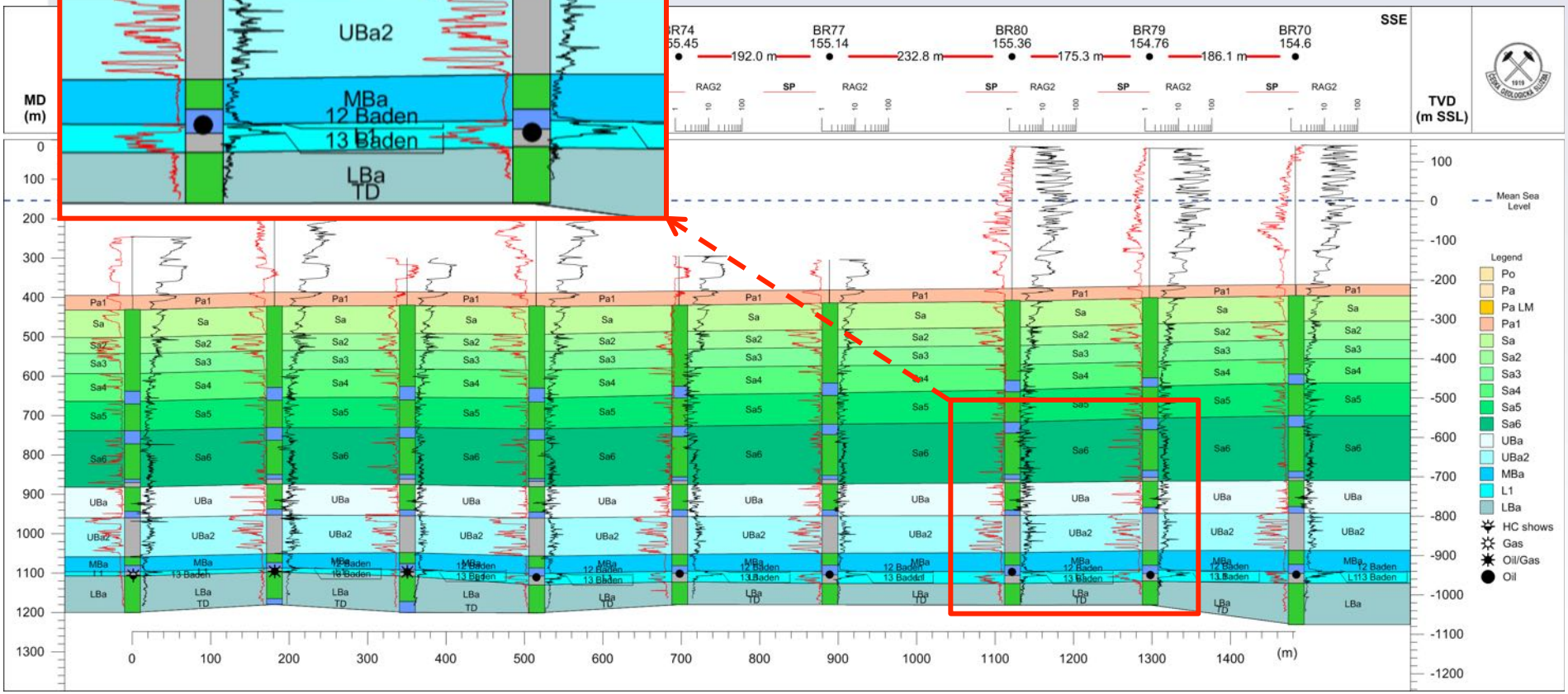
Sequence stratigraphic interpretation of well log data



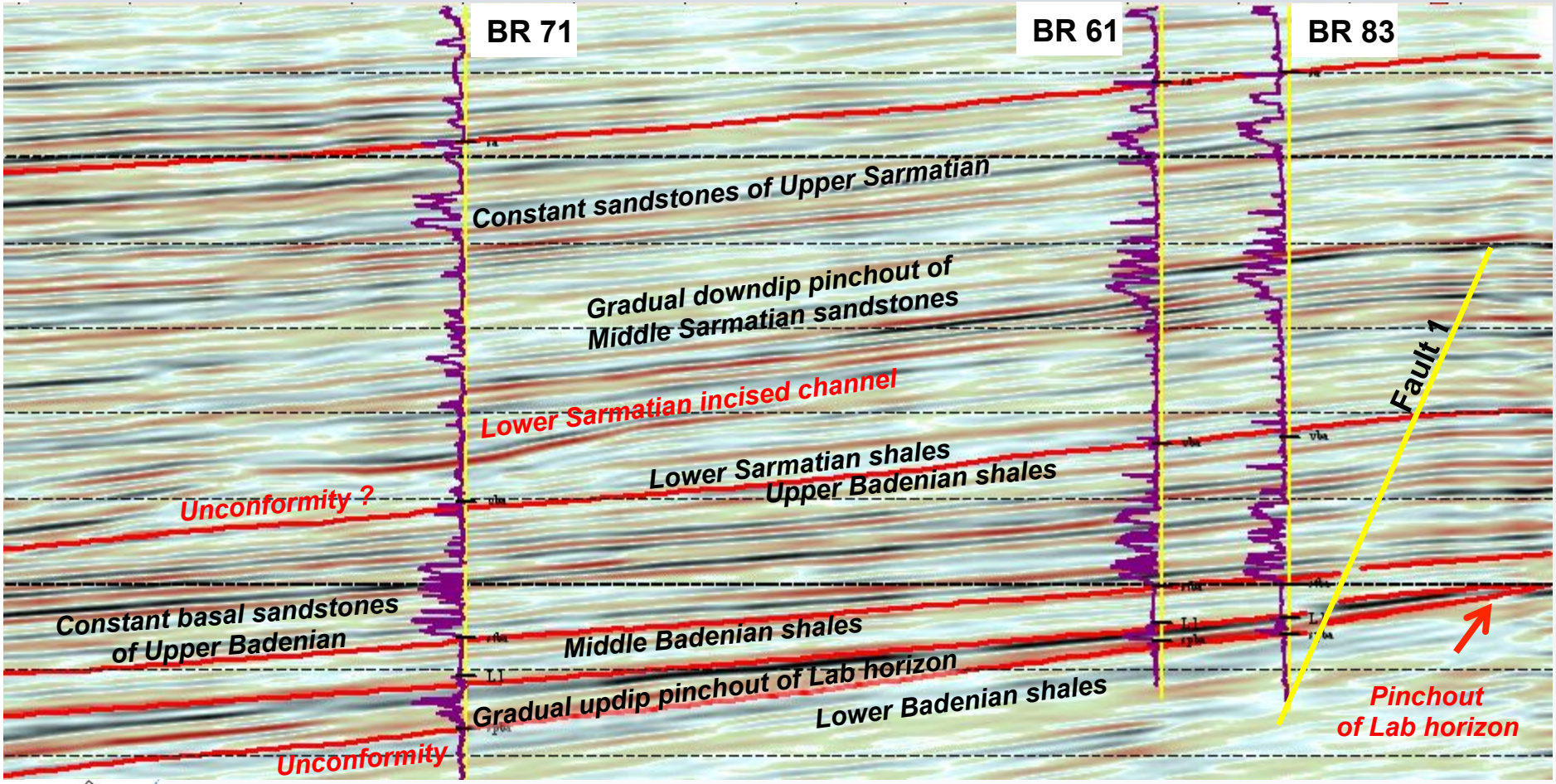
Upward coarsening / fining

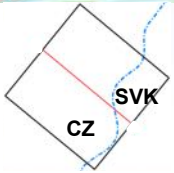
Relative sea level fluctuation

Stratigraphic architecture

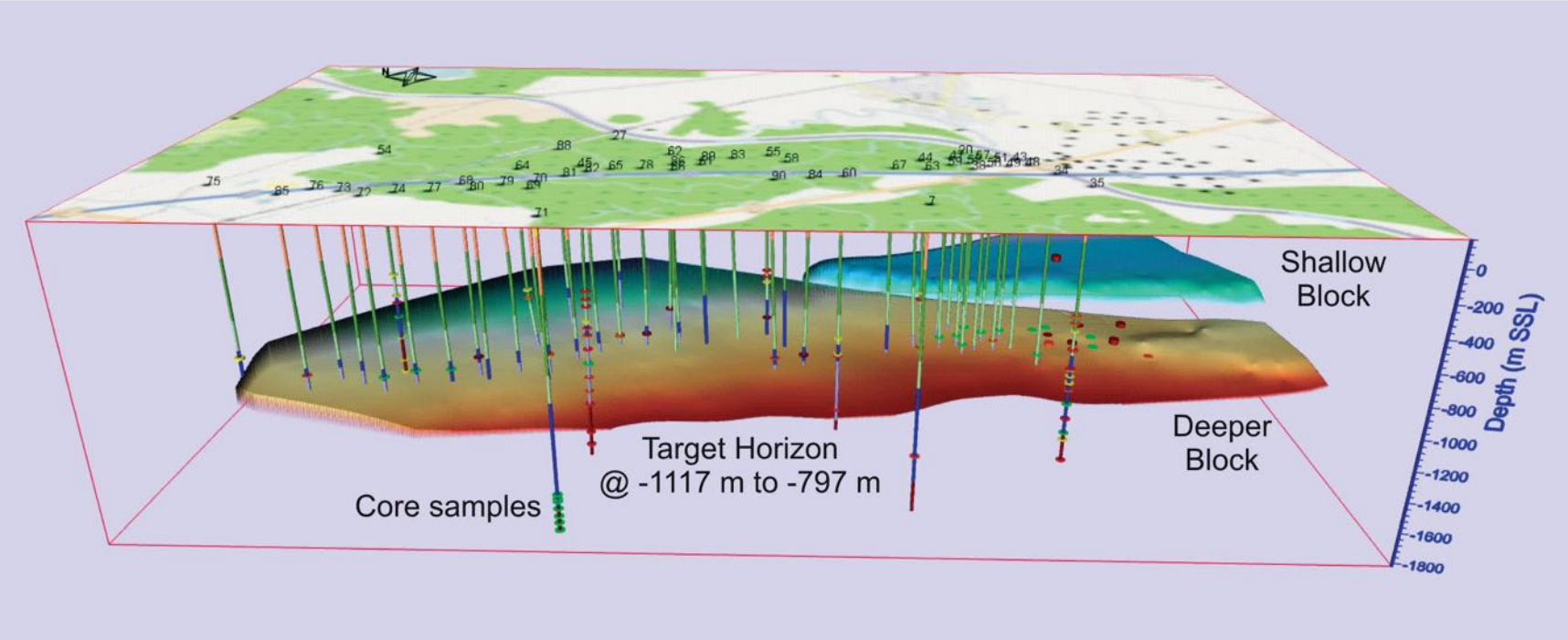


Integration of seismic stratigraphy and well log data



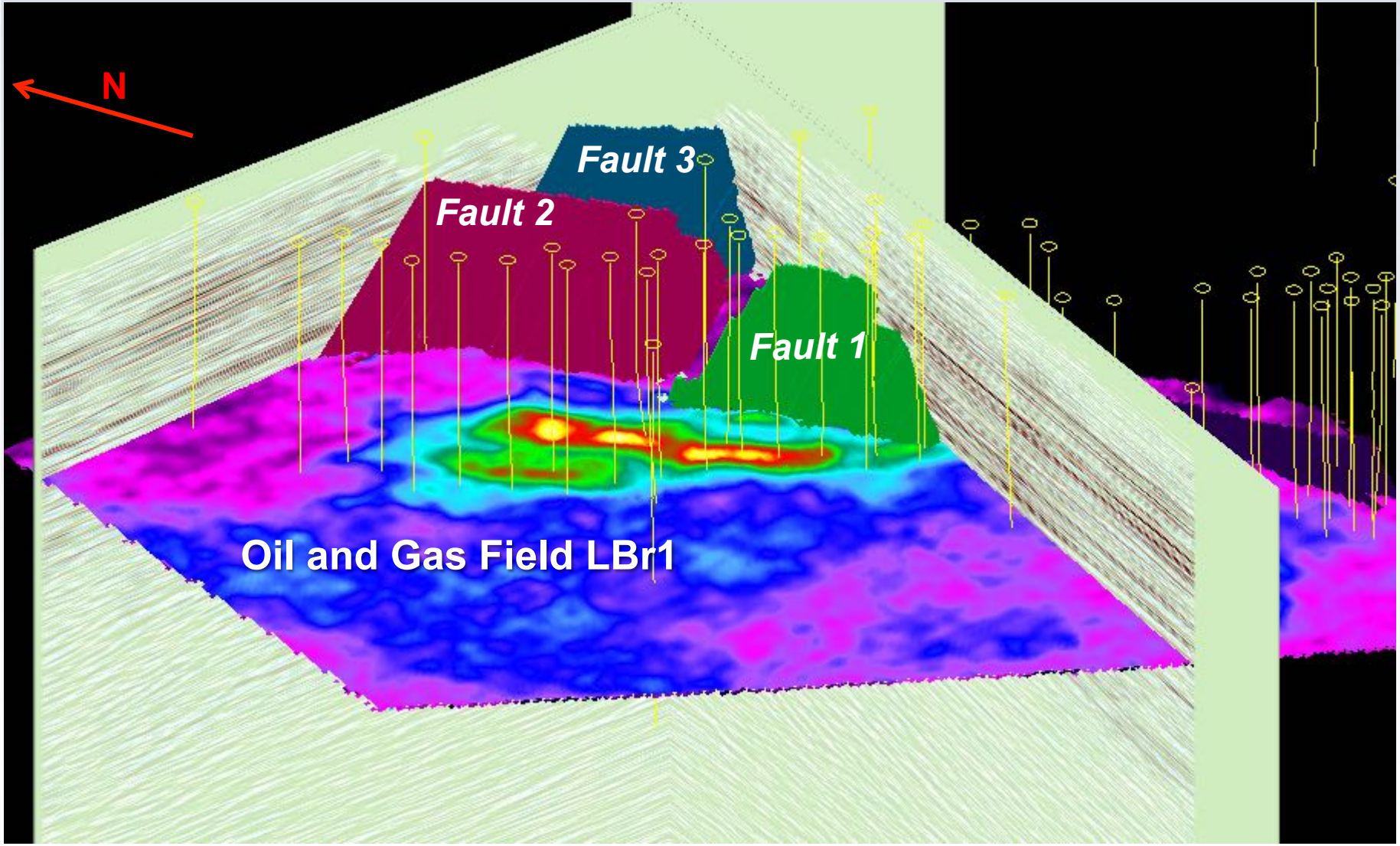


A2 – 3D model

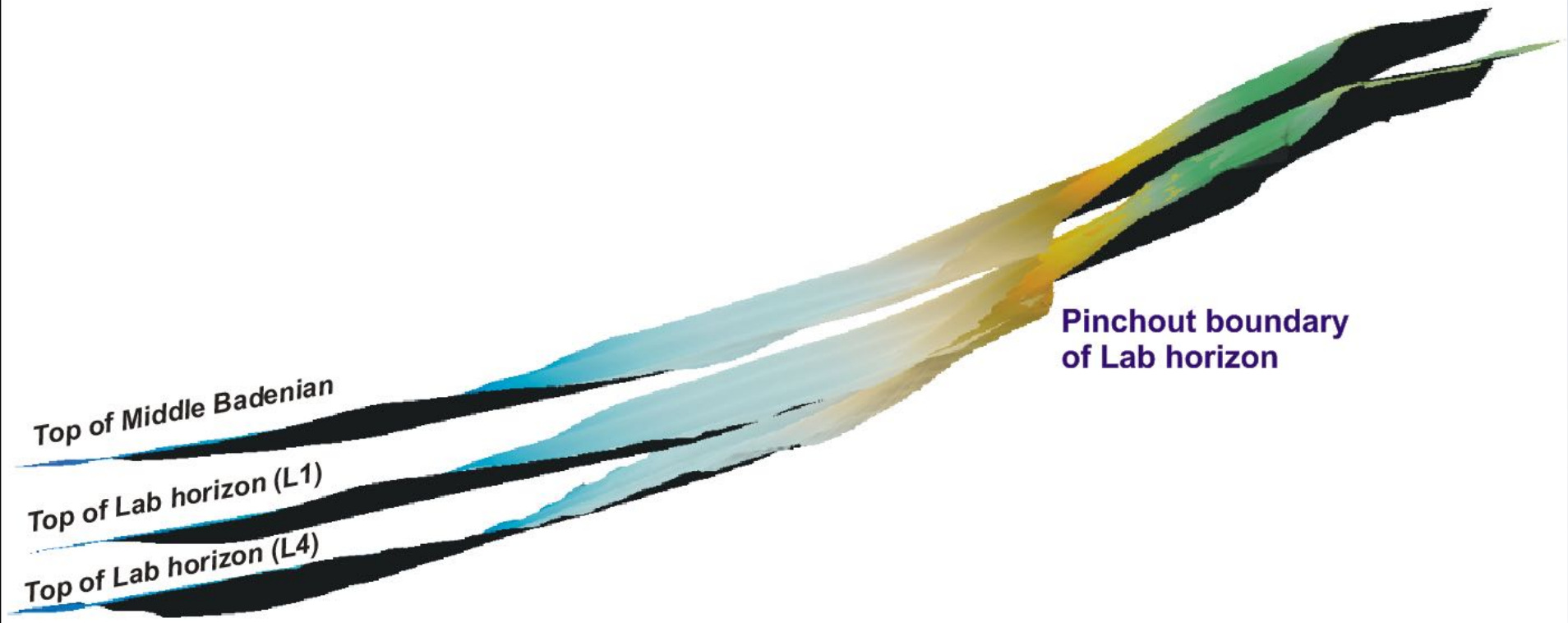

Shallow Block
Deeper Block
Target Horizon
@ -1117 m to -797 m
Core samples
Depth (m SSL)
0
-200
-400
-600
-800
-1000
-1200
-1400
-1600
-1800

Testing of seismic attributes at the level of the Lab horizon

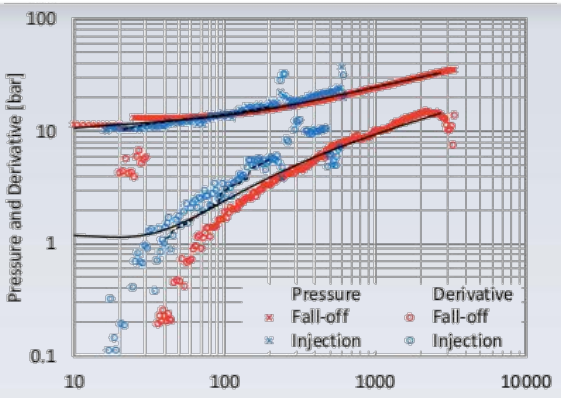
3D View - Attribute - Average Absolute Amplitude

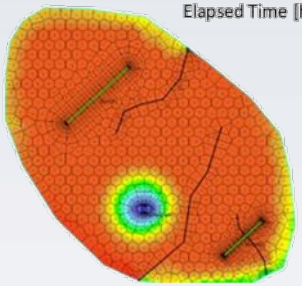


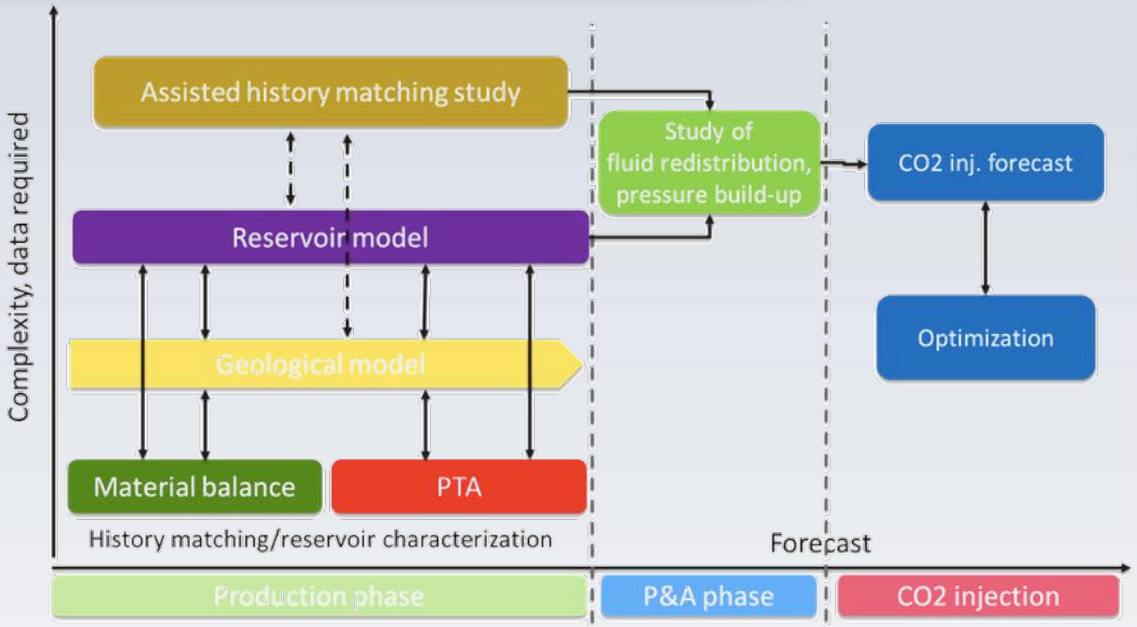
Construction of the first version of the 3D geometric model

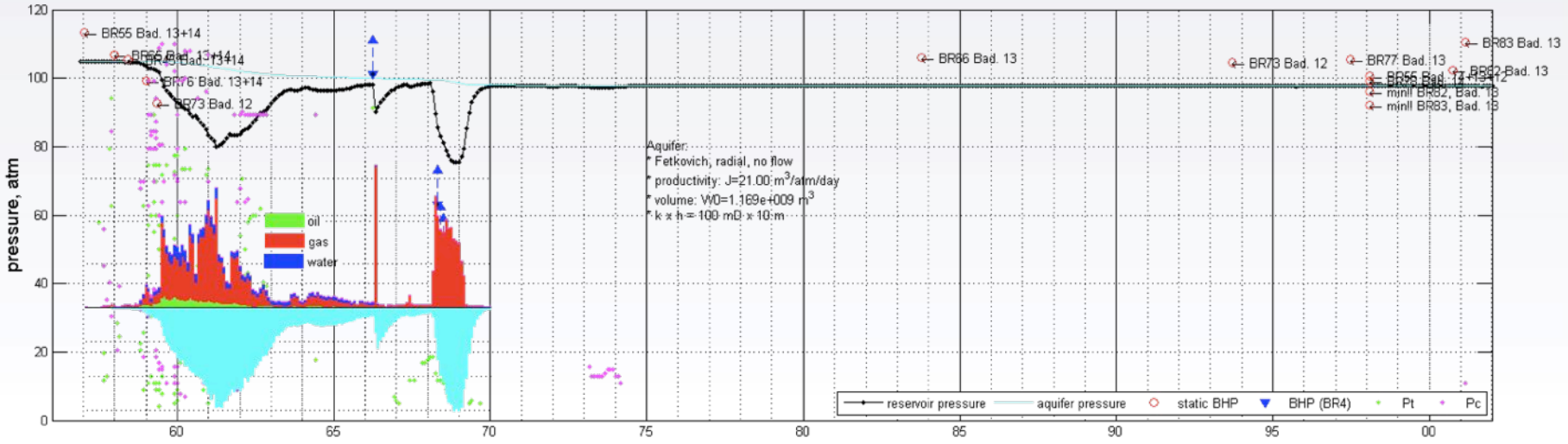


Concepts: simulation



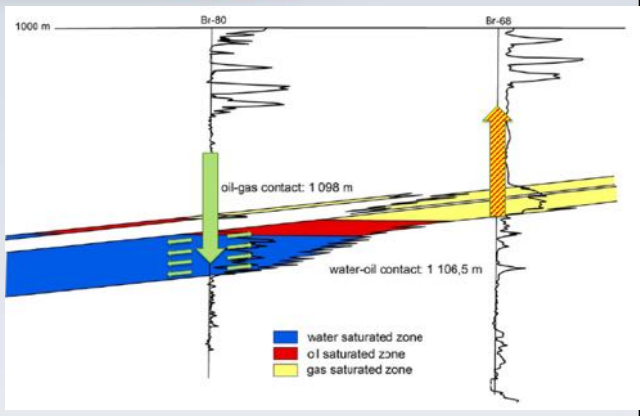


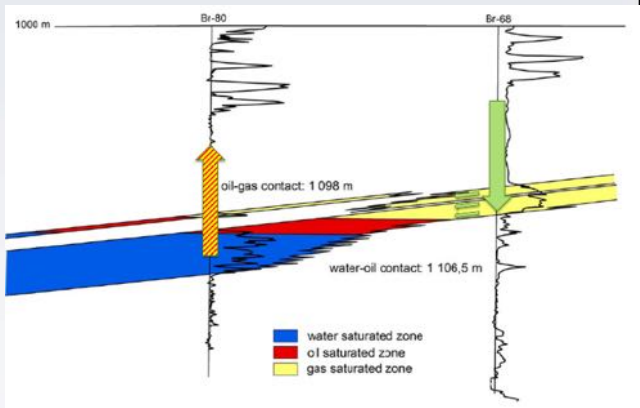




Scenarios

- Storage
- Pressure relief
- EOR

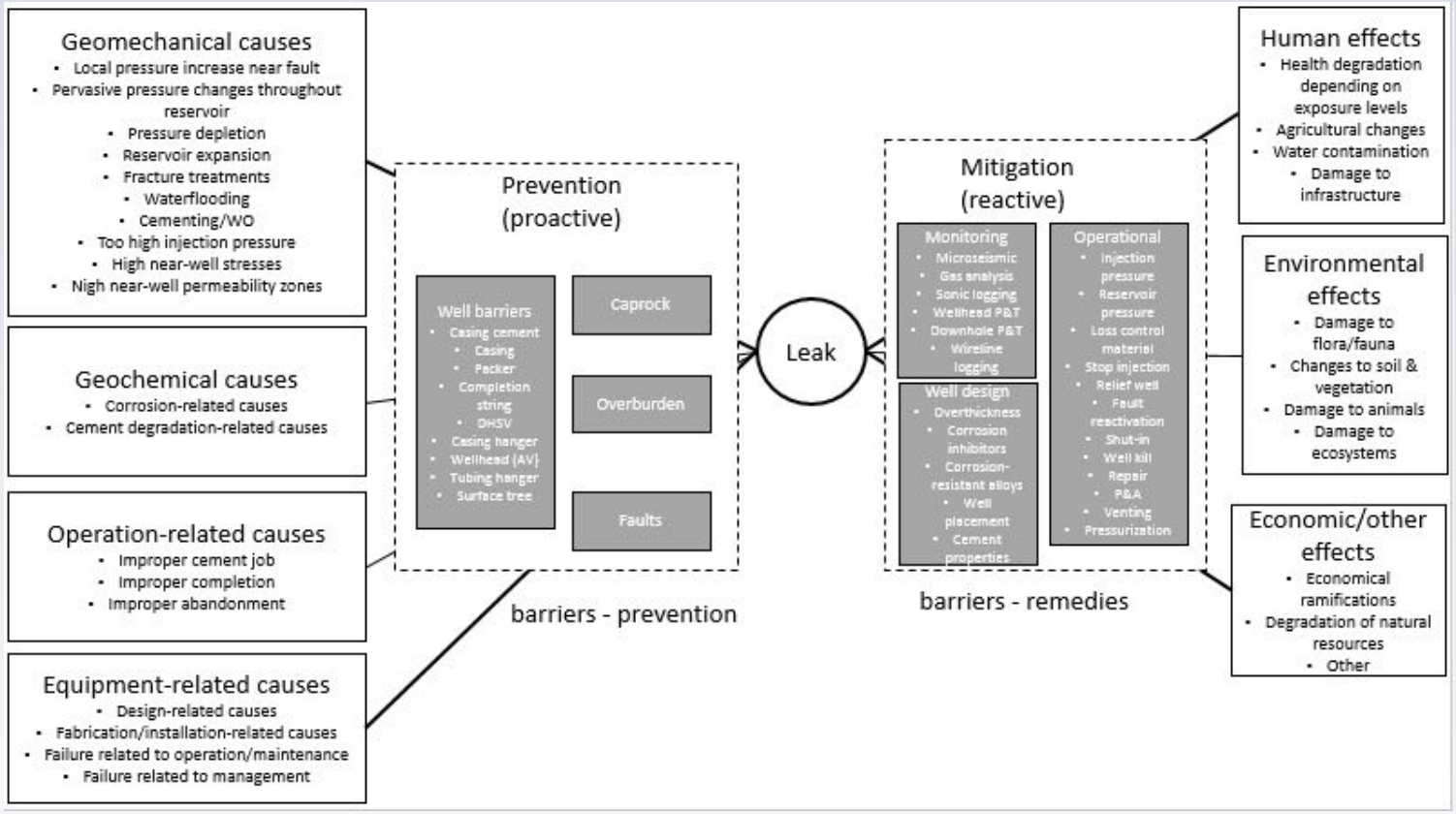




Scenario	Weights
Pure storage	$w_{CO2} > 0;\ \ w_{oil} = 0;\ \ w_{gas} = 0;\ \ w_{water} = 0$
Storage in aquifer with pressure relief	$w_{CO2} > 0;\ \ w_{oil} = 0;\ \ w_{gas} = 0;\ \ w_{water} > 0$
Storage in abandoned field without EOR but with pressure relief	$w_{CO2} > 0;\ \ w_{oil} < 0;\ \ w_{gas} < 0;\ \ w_{water} > 0$
Storage and EOR	$w_{CO2} > 0;\ \ w_{oil} > 0;\ \ w_{gas} > 0;\ \ w_{water} > 0$

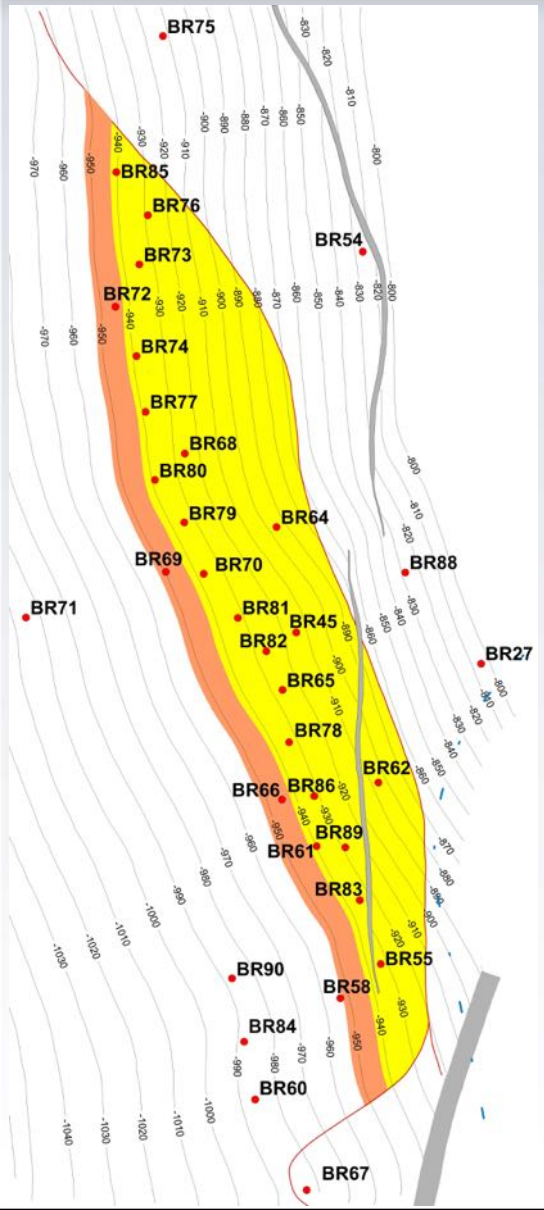
$$F = \sum_{t=0}^{T} \frac{w_{CO2}(t)Q_{CO2}(t) + w_{oil}(t)Q_{oil}(t) + w_{gas}(t)Q_{gas}(t) - w_{water}(t)Q_{water}(t)}{N_w(t)} \rightarrow max$$

Risk identification - Summary



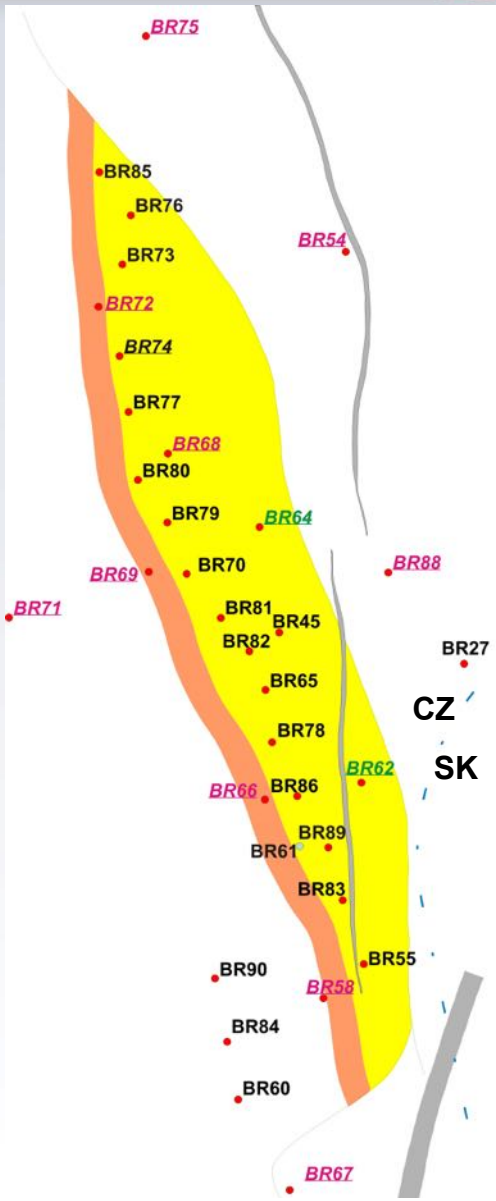
Main approach: Bow-tie analysis to map causes, preventive and mitigating barriers, and undesirable effects (to humans, operations and environment

LBr-1 – status of wells



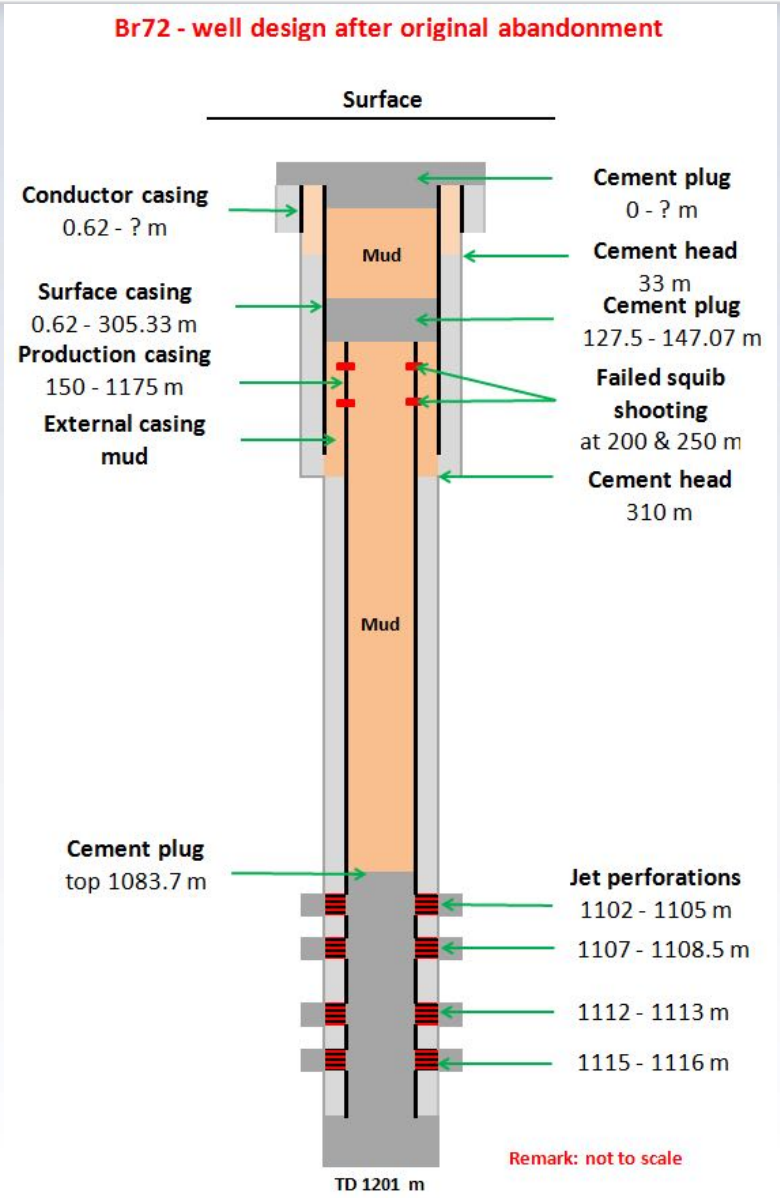
Top of Lab Horizon

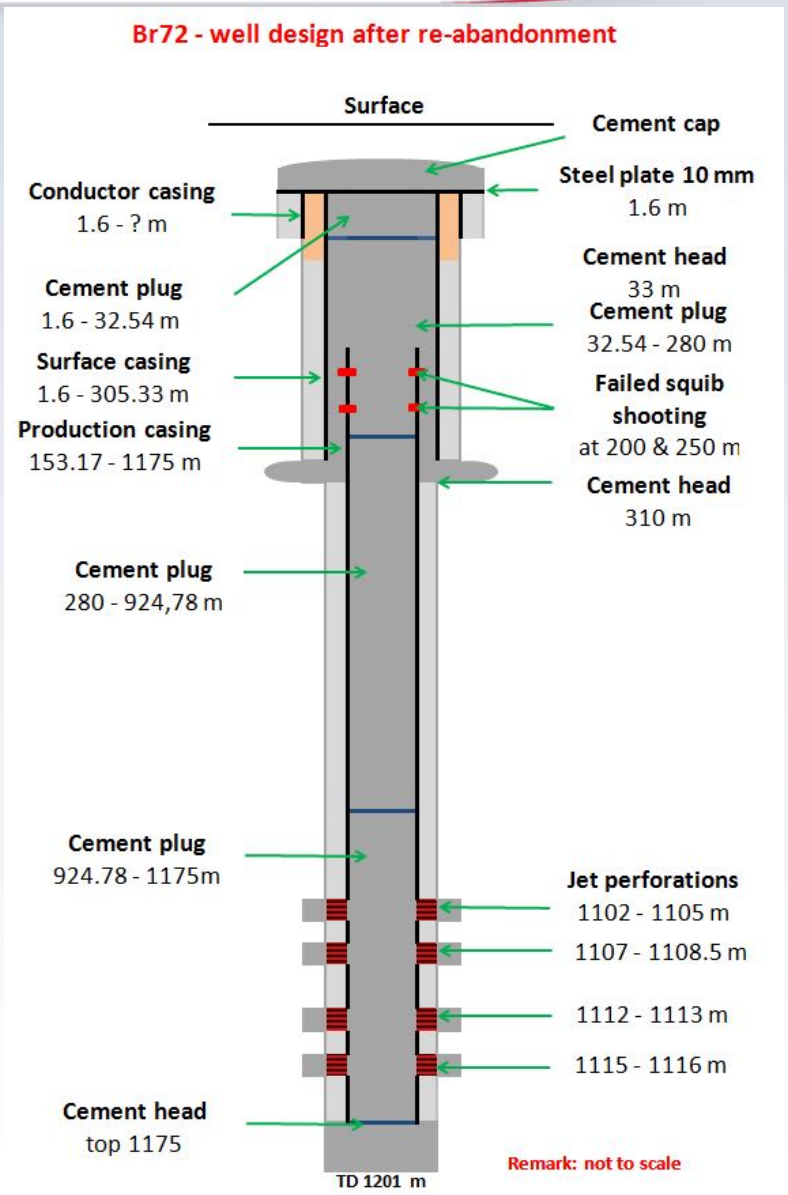
- Fault
- Pinch-out boundary
- Gas zone
- Oil zone



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

Well design after original abandonment and re-abandonment





Future 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 & workshop in Norway
- Continuation of work – ENOS project

www.geology.cz/repp-co2