



# Hot Mock-Ups at Josef URL

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26.10.2016



## CTU & Josef URL

Czech Technical University (CTU) was established in 1707

- 8 faculties and 5 institutes, approx. 23000 students

Faculty of Civil Engineering

- 37 departments and research centres, over 5000 students

Centre of Experimental Geotechnics (CEG)

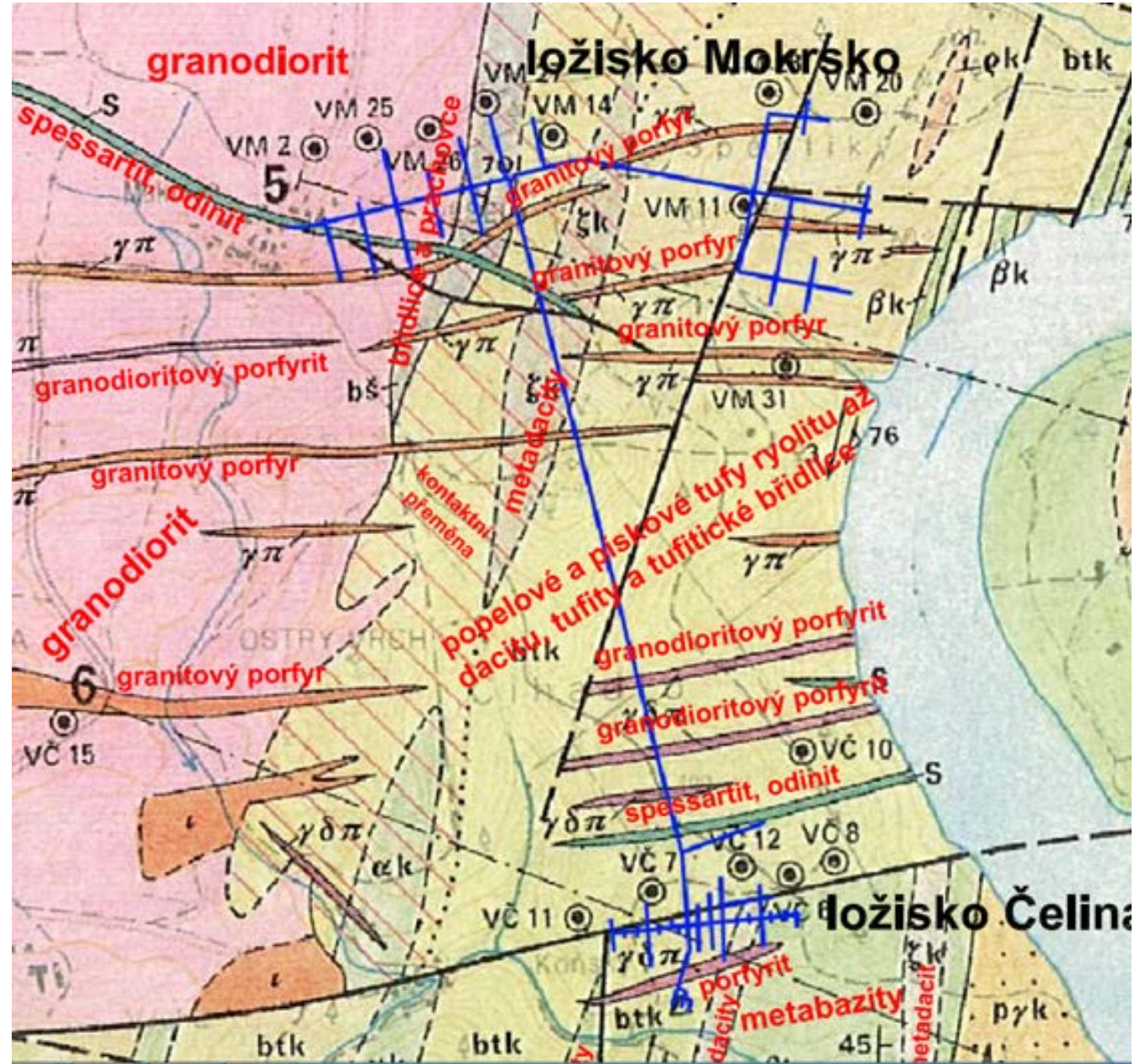
- Josef Underground Laboratory (URL)



**CTU**  
CZECH TECHNICAL  
UNIVERSITY  
IN PRAGUE

Josef URL

Opened in 2007



## Past (Mock-Up) Experiments

### 2002-2007 Mock-Up-CZ

- Laboratory experiment
- Mixture of bentonite (RMN) + sand + graphite
- Highly compacted blocks
- Temperatures below 100°C



## “Past” (Mock-Up) Experiments

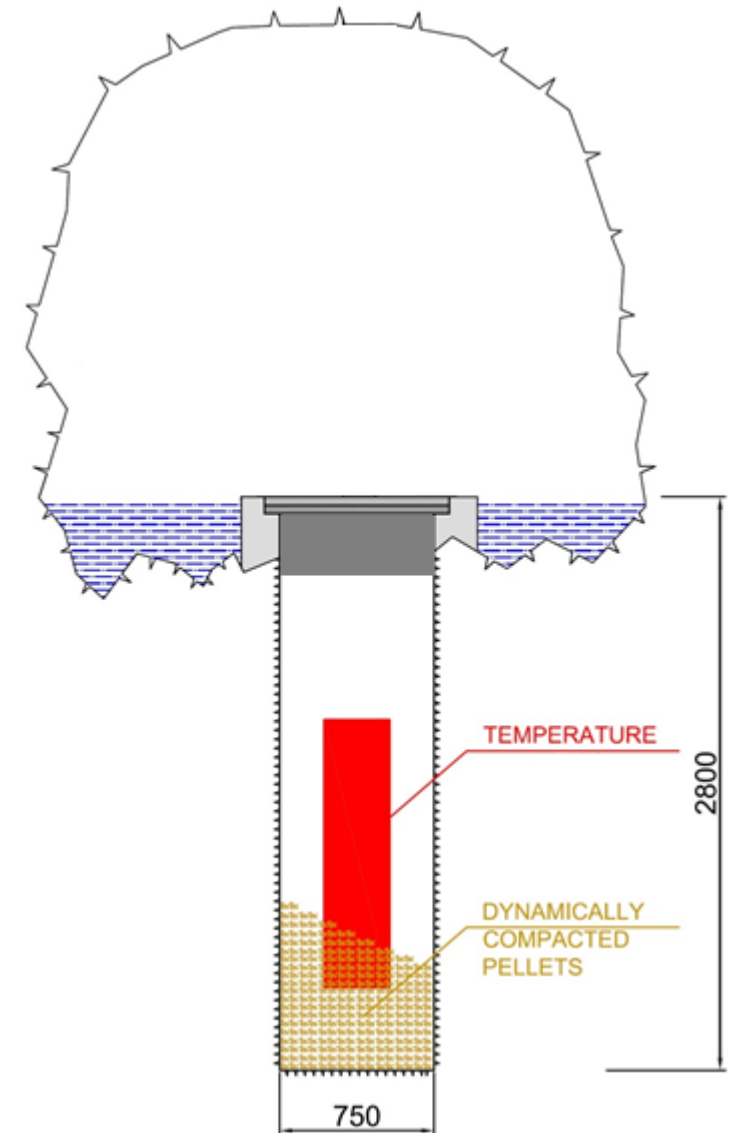
2011-now Mock-Up-Josef

- In situ experiment
- Bentonite B75
- Highly compacted blocks
- Temperatures below 100°C
- Super container style



## Hot Mock-Ups at Josef URL

- Two Mock-ups → Mock-Up-V2&V3  
Experiments in final stage of preparation  
Commissioning – beginning of 2017
- Vertical deposition wells
- Same size as previous mock-ups



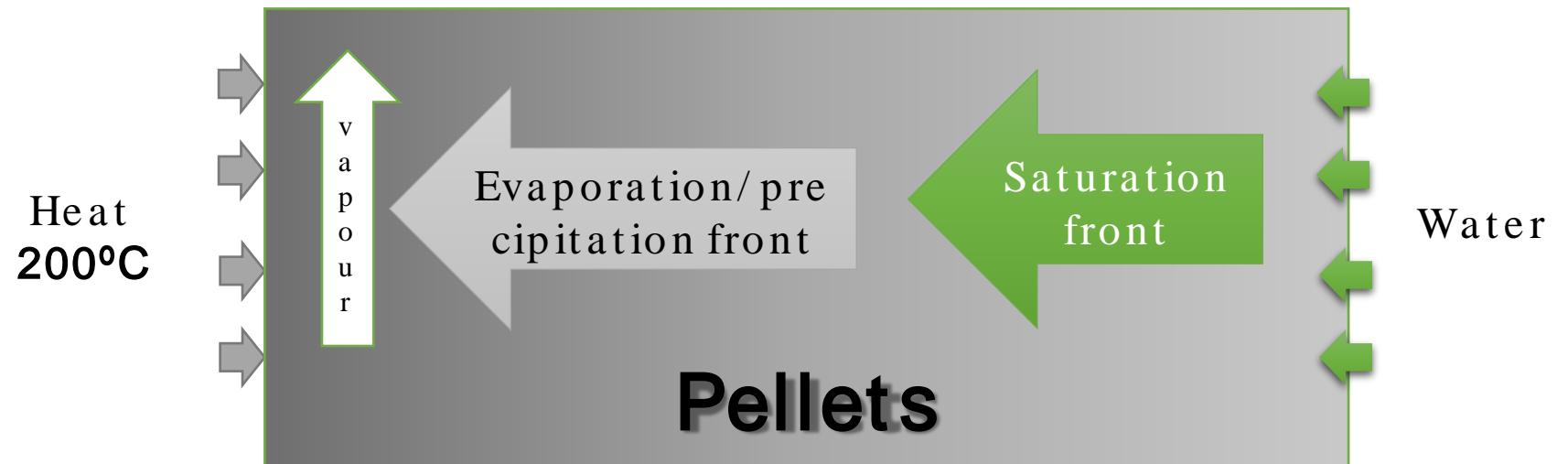


## Hot Mock-Ups at Josef URL

- Temperature
  - 200°C with gradual decrease\*
- Two types of bentonite
  - B75 – Czech Ca/ Mg bentonite
  - MX80 type – Na type bentonite
- Dynamically compacted pellets

## Hot Mock-Ups at Josef URL

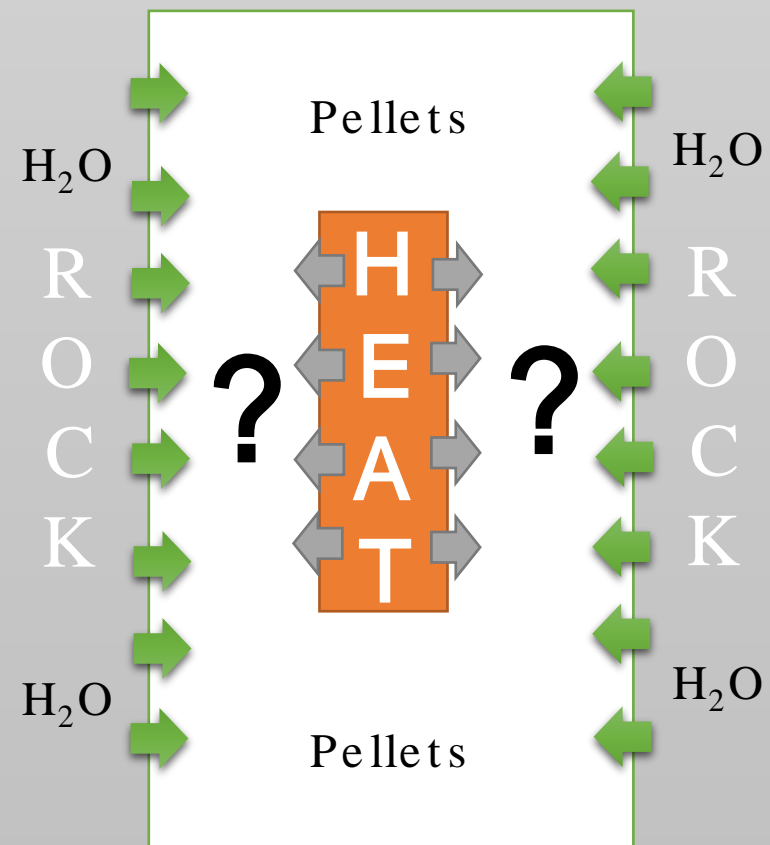
- Semi open system
- Artificial saturation





## Hot Mock-Ups at Josef URL

- Water transport
- Vapour transport
- Salt precipitation
- Bentonite alteration
- Pellets homogenisation
- Dry x wet x mixed scenario



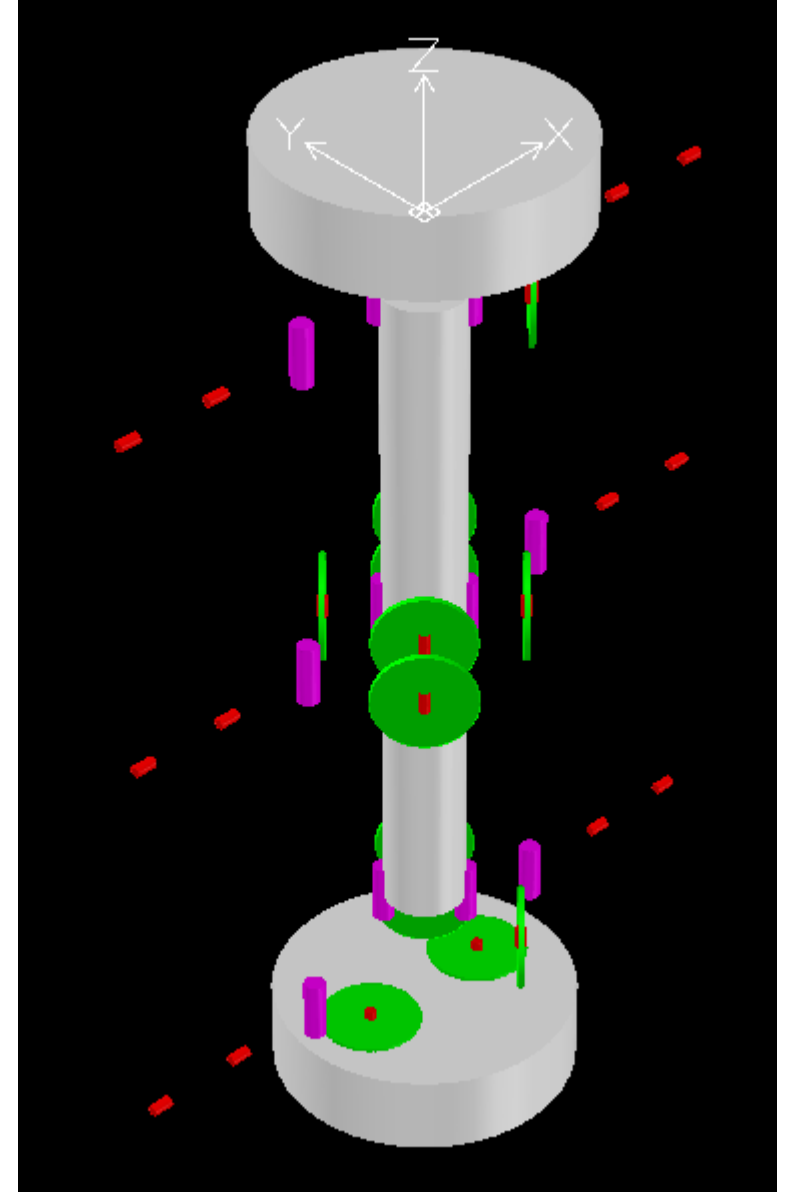
## Hot Mock-Ups at Josef URL

Instrumentation (inside)

- Temperature
- Swelling (total) pressure
- Pore pressure

Three profiles in the experiment itself

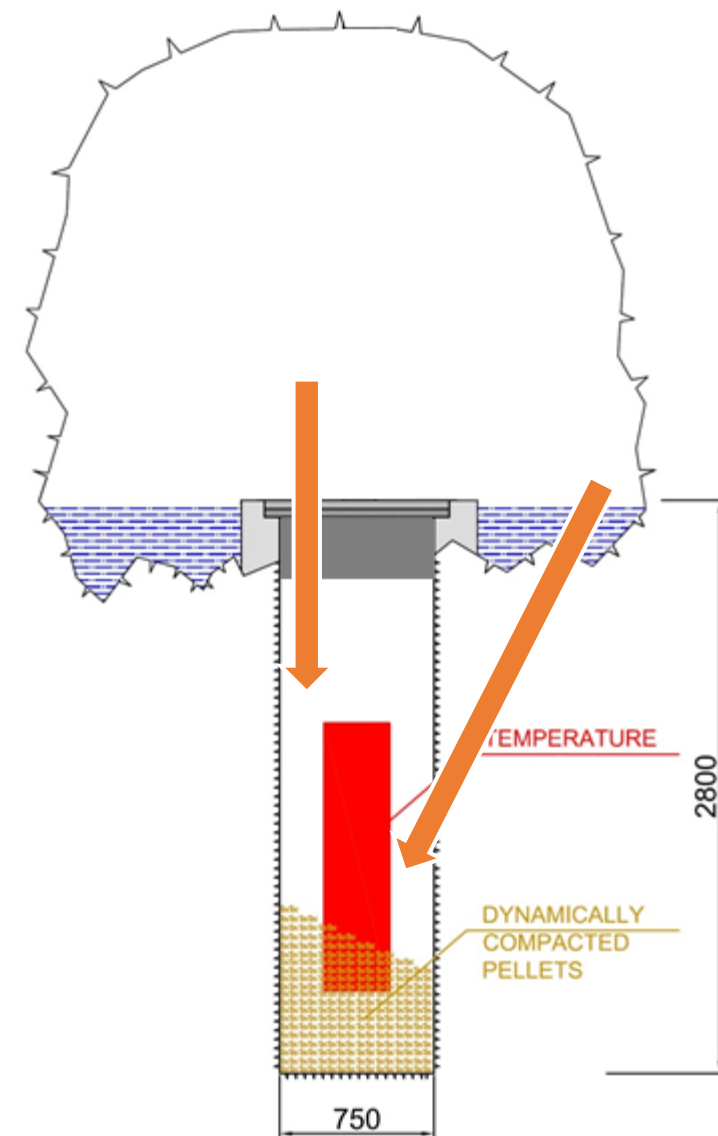
Monitoring boreholes in surrounding rock



## Hot Mock-Ups at Josef URL

### Sampling

- From top
- From inclined boreholes
- Regular intervals
- Possibility of migration experiments\*





## Hot Mock-Ups at Josef URL

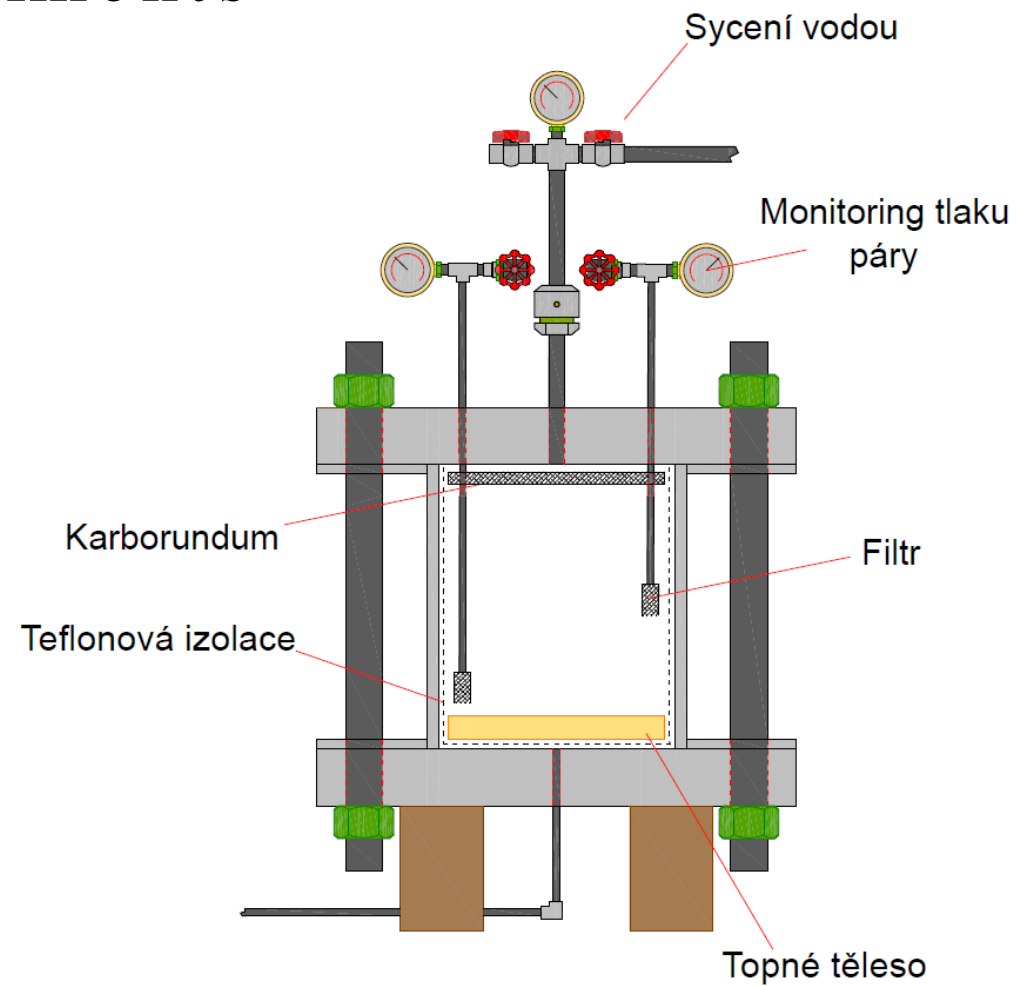
Research planned

- Geotechnics
- Geochemistry\*
- Radiochemistry\*
- Microbiology\*
- ...
  
- Numerical modelling

## Complimentary laboratory experiments

### Medium size hot experiment

- Fully closed\* system
- Saturation pressure up to 10 MPa
- Temperature up to 200°C



# Complimentary laboratory experiments

## Autoclave

- Fully closed system
- Temperature up to 200°C

