STATE OF A BARRIER OF BENTONITE BLOCKS AFTER 18 YEARS OF OPERATION

M.V. Villar
FEBEX

- Full-scale in situ test: bentonite blocks barrier, natural hydration, two heaters
- In operation since 1997
- Partial dismantling in 2002
- Final complete dismantling in 2015

The project was supported by:
- different scale laboratory tests, including mock-up
- modelling and model development
**COMPARISON PARTIAL DISMANTLING**

**Humedad y densidad**

- **S9**: 22.9%
- **S15**: 22.8%
- **S58**: 27.1%

- **S9**: 1.58 g/cm³
- **S15**: 1.58 g/cm³
- **S58**: 1.55 g/cm³

- **S9**: 85%
- **S15**: 86%
- **S58**: 98%

**COLD SECTIONS**

- **S9**, 5 years
- **S15**, 5 years
- **S58**, 18 years

**Water content (%):**

- **Distance to gallery axis (cm)**

**Dry density (g/cm³):**

- **Distance to gallery axis (cm)**
SUMMARY OF OBSERVATIONS

✓ Sealing capacity develops quickly if water availability is enough
✓ The thermal gradient delays homogenisation, because it hinders(?) saturation
✓ The dry density changes take place not only radially but also longitudinally along the barrier (effect of the back of the gallery)
✓ The state in the external part of the barrier has barely changed with respect to the first dismantling: irreversibility of initial deformation
✓ Low density favours homogenisation (initial strains are not too large)

UNCERTAINTIES AND FUTURE WORK

✓ Homogeneous water content is not imperative for homogeneous $S_r$: implications on dry density homogenization
✓ Role of thermal gradient on homogenisation
✓ Scale effect: homogenisation under thermal gradient was observed in small cells. Is the geometry (radial vs. axial) also a discriminating factor?
✓ Data base generated in FEBEX-DP very valuable for modellers