

Challenge

Modelling of thermo-hydro-mechanical processes in geological environment

Multiphysics

Geotechnical solution of environmental problems (nuclear waste deposition, CO2 sequestration, geothermal energy) as well as for extraction of raw materials (oil, coal, metals etc.)

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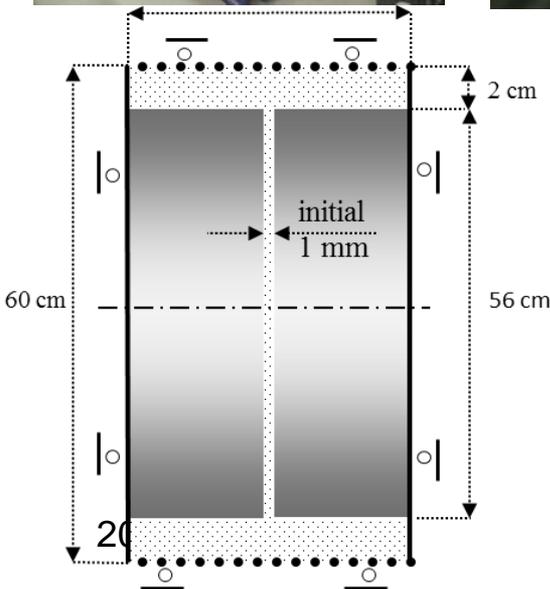
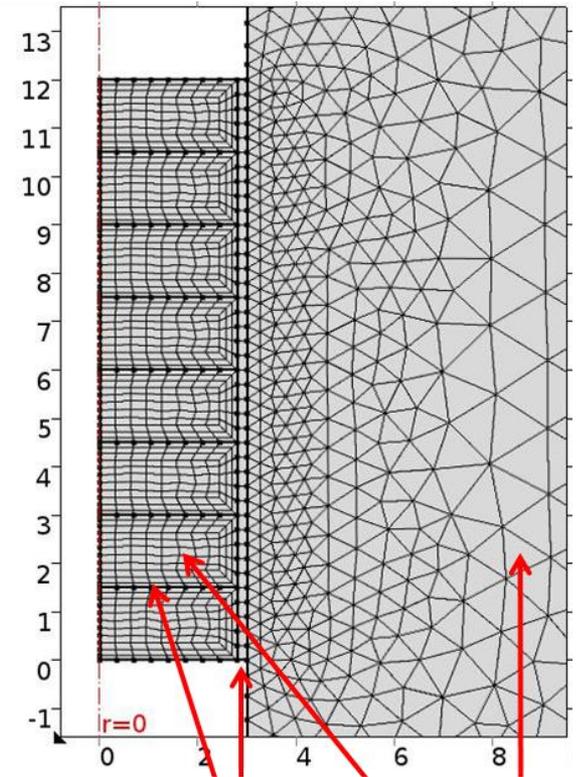


SEALEX experiments IRSN France,
 Decovalex 2015 math. model. project

Benefits

Joint benefits from going beyond current technological barriers by overcoming mathematical complexity due to nonlinearity in variably saturated flow and nonlinear mechanical response.

Project D2015+ / Multiphysics

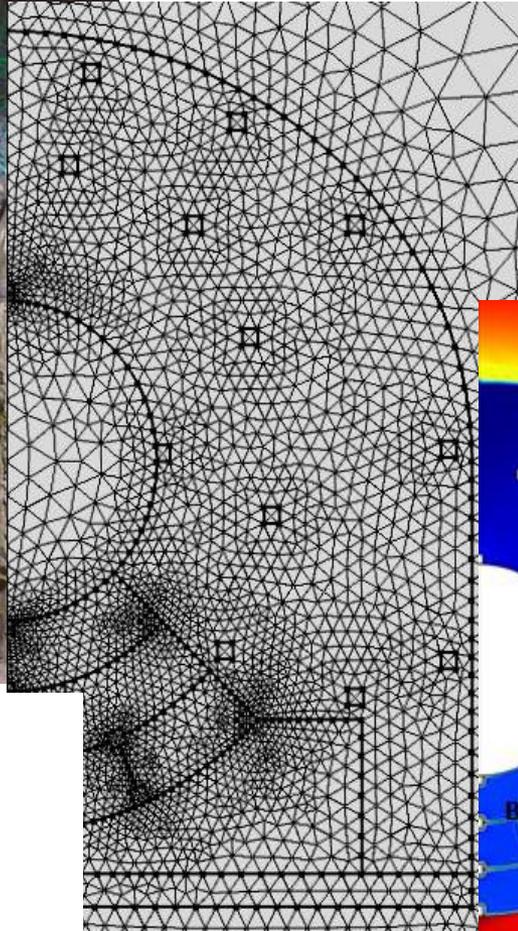
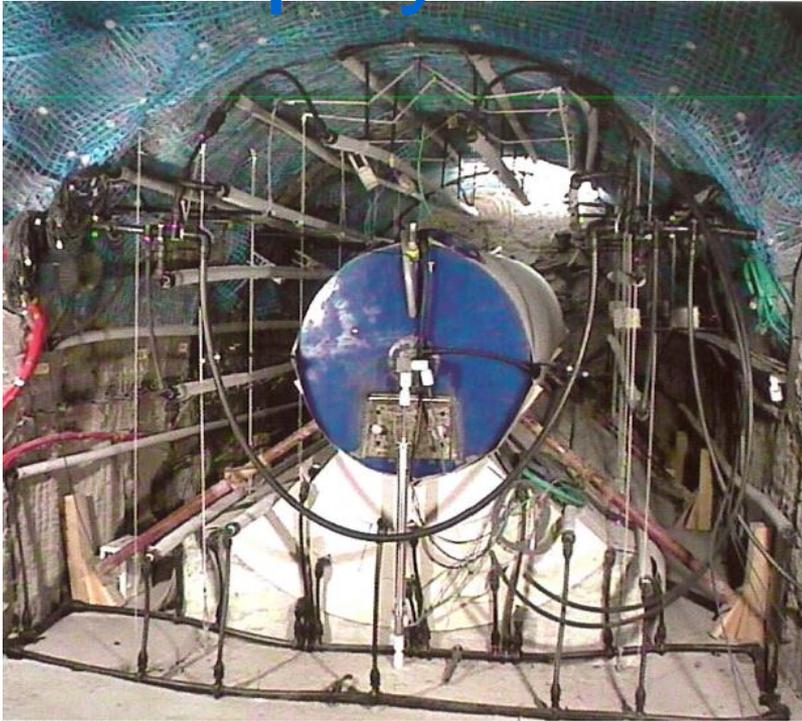


SEALEX (Tournemire)

- Flow in variably saturated rock and bentonite
- Large deformation due to swelling
- Mechanically induced changes in porosity, permeability, retention curves
- Closing technological gaps

Project D2019 / Multiphysics

Coordinated by
Berkeley Nat. Lab.

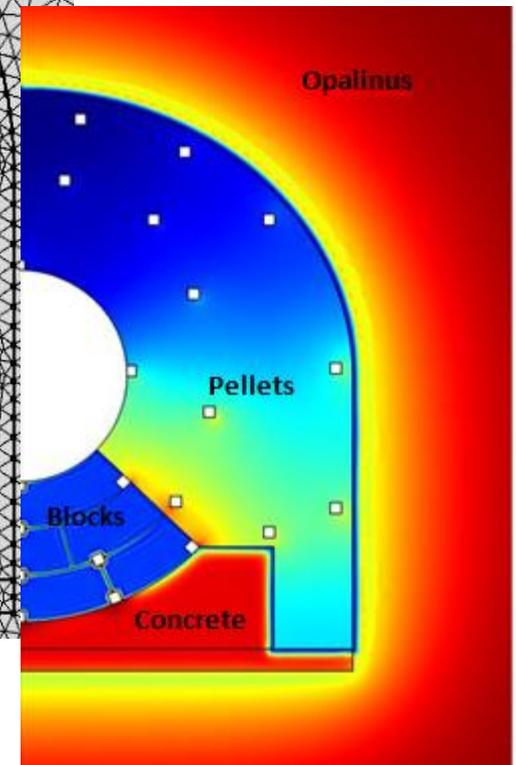


Saturation
in early phase

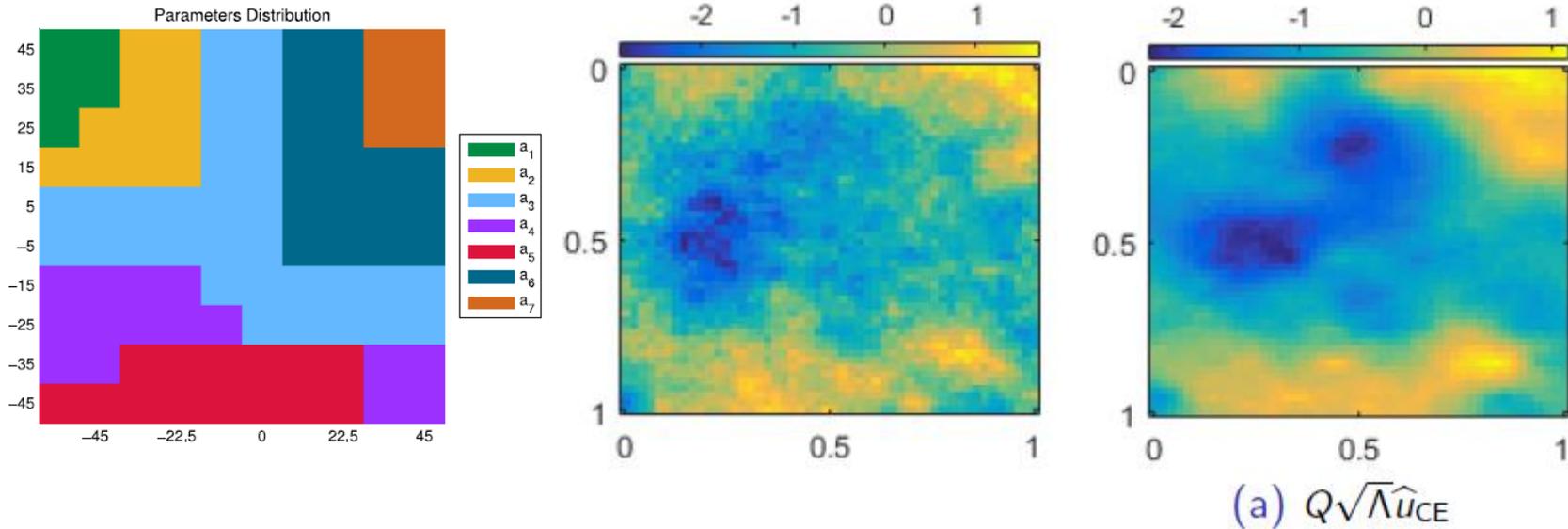
EB experiment (Mt Terri)

- Sealing with bentonite pellets and blocks
- 10.5 years, questions on plug homogeneity?

AMI



Selected problems: Inverse problems and uncertainties



Inverse problems for identification of material parameters (permeability)

- apriori given material interface: analysis of existence of the solution, effect of discretization, gradient based optimization
- Bayesian approach with lognormal distribution