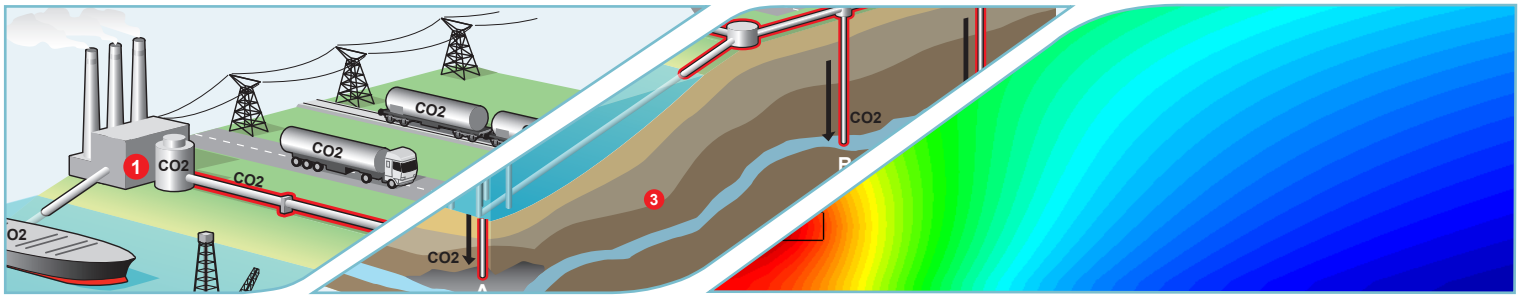

CHAIR "GAZ NATUREL" - PETROSVIBRI

Ph.D thesis public presentation on Monday 2nd May 2016 at 16:00, room GC A3 30 EPFL

Geomechanical modelling of CO_2 injection in deep aquifers

Summary

CO_2 sequestration in deep geological formations is considered as a promising technology to reduce the impact of CO_2 on the greenhouse effect. Practically, large-volume of CO_2 could be injected into a system that consists of a highly porous host reservoir covered by a low permeable sealing caprock. High rate injection could result in an abrupt fluid pressures build-up, deforming the aquifer and compromising the integrity of the caprock. The interaction between the high-pressure injected CO_2 and the host reservoir as well as the cap rock gives rise to a complex engineering system. A good understanding of this coupled interaction is a crucial issue to secure the underground CO_2 injection. This thesis is primarily motivated by such need, and the objectives of the present manuscript are to understand and predict the multiphase flow and thermo-hydro-mechanical processes arising from CO_2 injection into deep aquifers and to develop and evaluate both analytical and numerical modelling concepts as reliable prediction and risk assessment tools. The proposed tool offers a practical solution for determination of caprock and surface deformation, candidate site evaluation and sensitivity analysis of essential parameters. The development can be considered as one of most efficient and accurate design tools for estimating the influence of high injection rates of CO_2 on surface uplift and caprock deformation, which accounts for the hydraulic and mechanical properties of the reservoir and real CO_2 properties.

Speaker

Chao Li is currently finishing his Ph.D at the the Laboratory of Soil Mechanics & Chair "Gaz Naturel" - Petrosvibri at EPFL. He previously obtained the master degree (diplôme d'Ingénieur) in Civil Engineering at the Institut National des Sciences Appliquées (INSA) de Rouen (France) in 2011.

Publications

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http://plan.epfl.ch/?room=GC%20A3%2030

The seminar will be followed by refreshments. Thank you for registering on the following doodle before 27th of April:
https://epfl.doodle.com/poll/zcun9v2u4rg4fafd