

Faults and Their Significance for Large-Scale CO₂ Storage Workshop Hosted by the University of Calgary, Calgary, Canada

Friday 23rd August 2019

Success of CO₂ Capture and Storage (CCS) technology depends on the safe, secure and long-term storage of CO₂ at large-scale (mega tonnes per site). Upward migration and leakage of injected CO₂ along faults is a key risk. The aim of the workshop is to gain understanding on how faults could influence long-term storage of CO₂. The workshop will build from oil and gas industry experiences, as well as the research community, to gain a clear perspective on fault properties that are important to CO₂ storage. The 1-day event will provide an opportunity to review laboratory experiments, field studies and modelling results to gain insights on the importance of faults for CO₂ storage. Current practices to evaluate fault seal as well as critical technical gaps will be discussed.

The workshop will provide an opportunity to review current research on CO₂ controlled release experiments and what can be learnt from them plus the contribution from simulations. The 1-day event will document critical issues for CO₂ storage related to faults, the experience of current experimental work and identify remaining gaps in knowledge.

Agenda

Introduction to the Workshop (James Craig, IEAGHG & Don Lawton, University of Calgary)

Session 1: Overview of Faults and a Perspective on their Importance for CO₂ Storage (Chair – Ganesh Dasari)

- - Why are faults important for CO₂ storage – Business Perspective
- - What critical factors do we need to know
- - What questions should be asked in relation to CCS projects (Owain Tucker, Shell)
- Fault architecture & terminology (Malcolm Lamb, University of Calgary)
- A perspective from the oil & gas industry (Rod Myer, ExxonMobile (TBC) / Christopher Wibberley, Total (TBC))
- DISCUSSION

Session 2: Lessons Learned from Field & Experimental Work (Chair – Andrew Feitz)

- 'CSIRO In-Situ Laboratory project – A controlled CO₂ release experiment in a shallow fault zone', SW Hub (Western Australia) (Alison Hortle, CSIRO)
- Review of current research on natural CO₂ seeps – ENOS / South Africa / Green River, Utah (Gareth Johnson, Strathclyde University)
- Updates on 3 field experiments i.e. CO₂ fault release experiments
 - Otway (Andrew Feitz, CSIRO)
 - Sulcis Fault Laboratory (Alberto Pettinau, Sotacarbo)
 - Mont Terri (Yves Guglielmi, LBNL)
- DISCUSSION: Comparison of field experiments – commonality of objectives, approach, measurements

Session 3: Geomechanics, Modelling and Comparison Research (Chair – Yves Guglielmi)

- Modelling CO₂ / fluid flow across & up faults – rates, detection, mitigation & corroboration with field data (Jonny Rutqvist, LBNL)
- Relevant experience from mining, high level radioactive repository sites on geomechanics, sub-surface fluid movement and containment. (TBC)
- Predicting what pressure-induced conditions enable fluid flow through faults. (Speaker TBC)
- DISCUSSION

Session 4: Summary & Wrap-up – Workshop Outputs (Panel Session with all Session Chairs)

- Establish critical issues related to faults for large-scale CO₂ storage sites.
- Compile experience on setting up different CO₂ fault release experiments to establish the degree of commonality.
- Draw on understanding from other sectors to build on experience.
- What can be learnt from field experiments and simulations.
- Identify gaps in Knowledge.