Monitoring Geological CO₂ storage

Main goal
Improved quantitative prediction of the spatial distributions of CO₂ in subsurface storage.

Project time scale: 2011 – 2014

Contribution to CO₂-handling
- A rock physics library provides the basis for a systematic approach to CO₂ monitoring
- Joint inversion of multiple data sources constrained by rock physics models assures consistent use of data
- Quantitative interpretation of inversion provides the spatial distribution of CO₂ in subsurface storage
- Reliable prediction of CO₂ ensures public safety and support for continued CO₂ storage
- Quantitative assessment of CO₂ saturation provides the limits for storage rates and capacity essential for the economy of a storage site in emission trading

Approach verified in synthetic case
Generating synthetic data
Repeated measurements of multiple types
Repeted measurements of multiple types
Repeted measurements of multiple types

Data baseline
Data monitor 1
Data monitor 2

Inversion
Inversion
Inversion

Stochastic rock physics
Dynamic seismic parameters
Static seismic parameters

Fluid properties
Matrix properties

Equation for rock physics inversion

In synthetic example:
Data displayed is a sub-selection of those used in the joint inversion. Joint posterior distribution of three seismic parameters (PI, Vp/Vs, density) are computed in a 3D grid. A slice of PI is displayed.