# Impact

SENSE contributes to innovative, continuous and cost-effective monitoring of CO_2 storage sites by facilitating access to automatic satellite data processing, development of fiber optic strain sensing and ocean bottom landers, and providing ground models and workflows.

Achievements

- Advanced geomechanical models and theoretical basis for assessing ground deformation
- Automatic InSAR data processing
- Testing and verification of fiber optics strain sensing
- Machine learning codes for detection of ground motion.
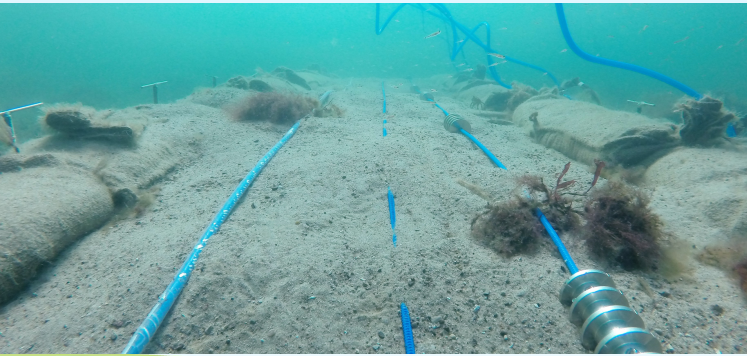
Dissemination

We share our findings with CCS stakeholders and regulators to facilitate use of ground deformation for monitoring reservoir and overburden as an early warning system via:

- Technical papers and workshops
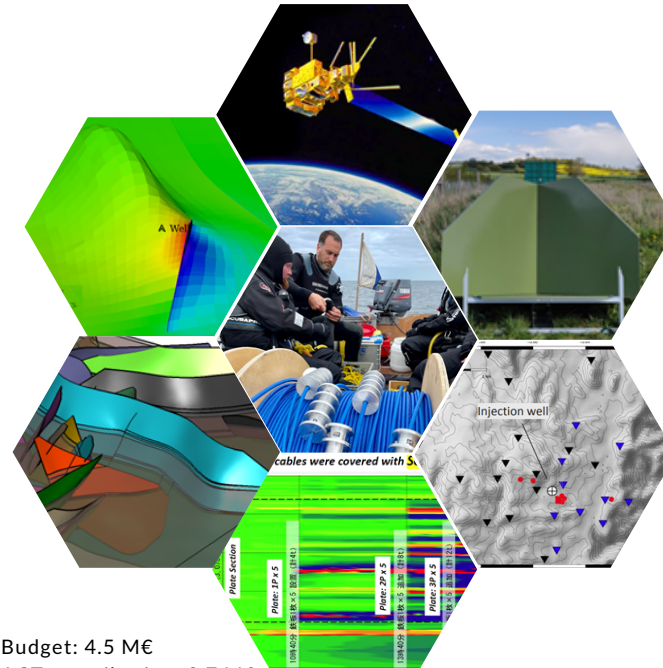- Webinars for industry, professionals, and regulators
- Public science articles.

https://sense-act.eu/   @SenseAct   R^G Sense-ACT

The Consortium

Through collaboration between 14 renowned international partners, SENSE provides world-class expertise and technology development for confident and cost-efficient monitoring of CO_2 storage sites.

equinor   QUAD GEOMETRICS   NGI   GEOMAR

BGS 1835   RITE Research Institute of Innovative Technology for the Earth   ifp Energies nouvelles   IGME

KIGAM   CSIRO   TEXAS Geosciences The University of Texas at Austin Jackson School of Geosciences Museum of Earth History   UiO University of Oslo

Lawrence Livermore National Laboratory   ciudad de la energía

Budget: 4.5 M€
ACT contribution: 2.7 M€
Start date: 1 September 2019
Duration: 36 months
Coordinator: Norwegian Geotechnical Institute (NGI)
Contact person: bahman.bohloli@ngi.no

Accelerating CCS Technologies   SENSE

ASsuring intEgrity of CO₂ storage sites through grouNd SurfacE monitoring (SENSE)
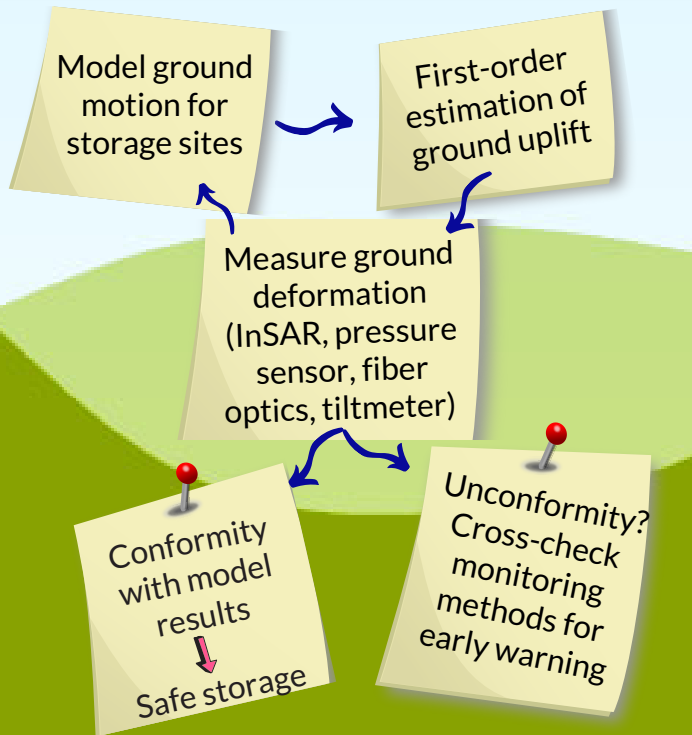
The Challenge

SENSE addresses a key question for CO_2 storage site integrity and safety assessment using ground deformation. Ground surface deformation monitoring is useful onshore but much more challenging offshore. Can we develop cost effective early warning system for possible integrity issues?
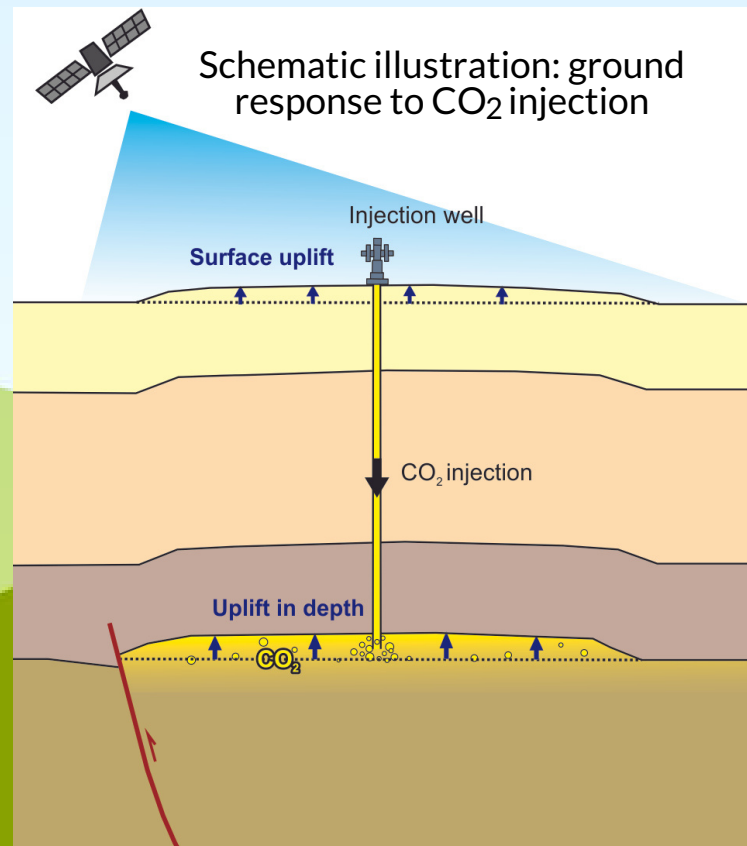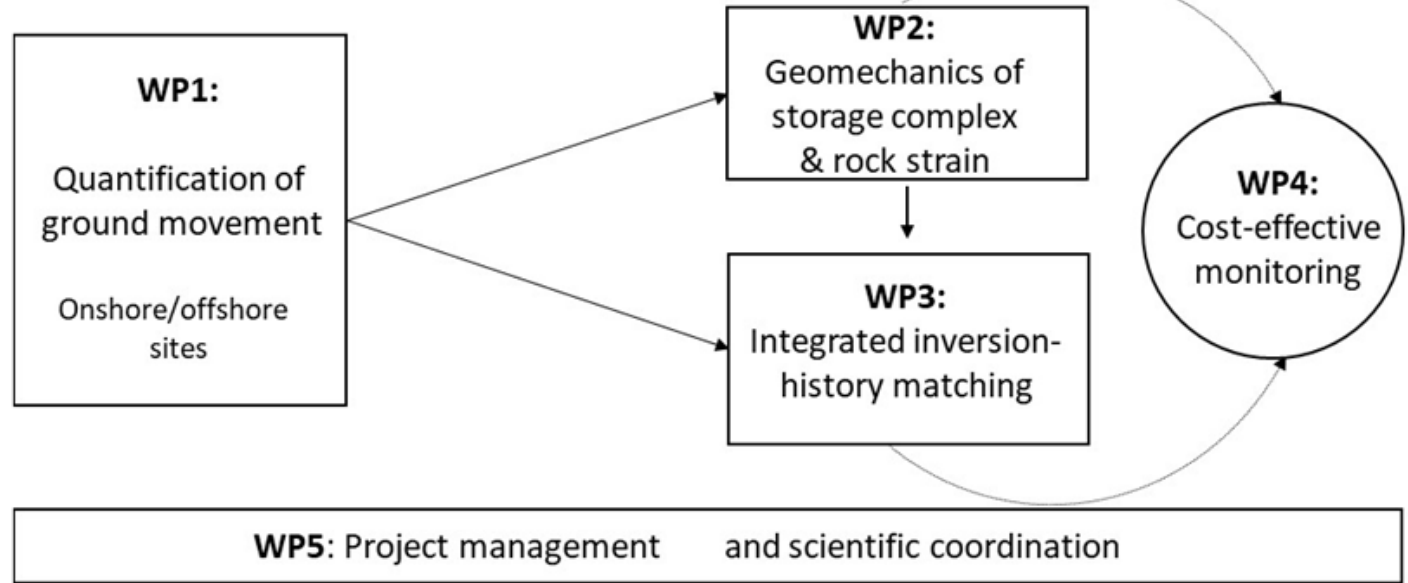
The Solution

SENSE project has developed mathematical solutions and geomechanical models, and examined monitoring options - fiber optics, pressure sensors and tiltmeters. This will help provide cost effective monitoring or early-warning signals based on ground deformation.
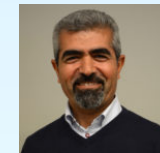
Monitoring Workflow

- Model ground motion for storage sites
- First-order estimation of ground uplift
- Measure ground deformation (InSAR, pressure sensor, fiber optics, tiltmeter)
- Conformity with model results → Safe storage
- Unconformity? Cross-check monitoring methods for early warning

Structure of SENSE project

WP1: Quantification of ground movement — Onshore/offshore sites

WP2: Geomechanics of storage complex & rock strain

WP3: Integrated inversion-history matching

WP4: Cost-effective monitoring

WP5: Project management and scientific coordination

Schematic illustration: ground response to CO_2 injection

Injection well

Surface uplift

CO_2 injection

Uplift in depth

CO_2

SENSE Management Team

Coordinator-Bahman Bohloli
bahman.bohloli@ngi.no

WP1 Leader-Christian Berndt
cberndt@geomar.de

WP2 Leader-Sarah Bouquet
sarah.bouquet@ifpen.fr

WP3 Leader-Joonsang Park
joonsang.park@ngi.no

WP4 Leader-Joshua White
white230@llnl.gov