ENOS

Enabling Onshore Storage in Europe

WP3 Workshop:

Storage site solutions: monitoring and verification

08.05.2018

ENOS

WP3 Managing leakage risks for protection of the environment and groundwater

Advance and validate surface and downhole monitoring technologies relevant to onshore storage, including for groundwater protection

Improve understanding on the impacts of leakage and of potential leakage pathways (geological faults and boreholes) to enable a more effective monitoring strategy

Produce best-practice guidelines for a monitoring programme that integrates the newly advanced ENOS technologies and techniques with state-of-the-art commercially available tools

Real-life experience from field laboratories and sites where CO_2 is naturally seeping to the surface used to realise these aims (and data made available for future research)

Sites involved:

Sulcis Fault Lab, Italy

LBr-1, Czech Republic

UK GeoEnergy Test Bed

Groundwater protection – T3.1

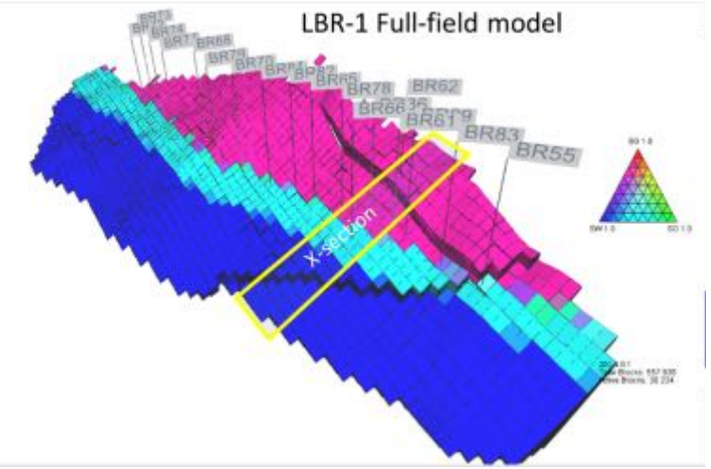
Objectives/Impact: Effective monitoring strategies to locate leakage will be developed, the most sensitive parameters highlighted, sensitivity of tools improved and low cost solutions capable of long term deployment developed

Tasks:

- **Tool box** based on water-gas-rock interaction
- **Advance 5 tools;** sensitivity and cost optimised **for monitoring potable aquifers**

Testing one of the downhole tools

Assessing risk presented by faults & boreholes – T3.2



Objectives/Impact:

- **Improved understanding of the risk posed by faults**
- **Improved monitoring strategies** based on new understanding
- Data to feed technical guidelines on **mitigation of risks through intelligent site design and monitoring strategies** based on risk assessment of boreholes and faults

Tasks:

- Assess **what makes a fault more likely to leak**, model leakage pathways
- **Assess effectiveness of geophysical techniques for monitoring of CO_2 migration** through fault planes (surface and subsurface)
- Examine **expression of leakage** through faults at surface for more efficient monitoring
- Modelling and assessment of **leakage risk presented by old boreholes**; produce technical guidelines/best practice for case study

Development of surface/near surface monitoring tools - T3.3

Objectives/Impact: Advance tools/techniques for CO_2 leakage identification, assessment and quantification (in the unlikely event leakage were to occur). Technologies applicable to onshore storage will be taken to at least TRL6 through field demonstration

Ground CO_2 mapper field test

Tasks:

- **Wide areal detection tools** for effective leakage identification (3 tools)
- **Advanced (soil) gas monitoring tools** to confirm CO_2 concentration and source (2 tools/techniques)
- **Quantification** of leakage (2 tools)

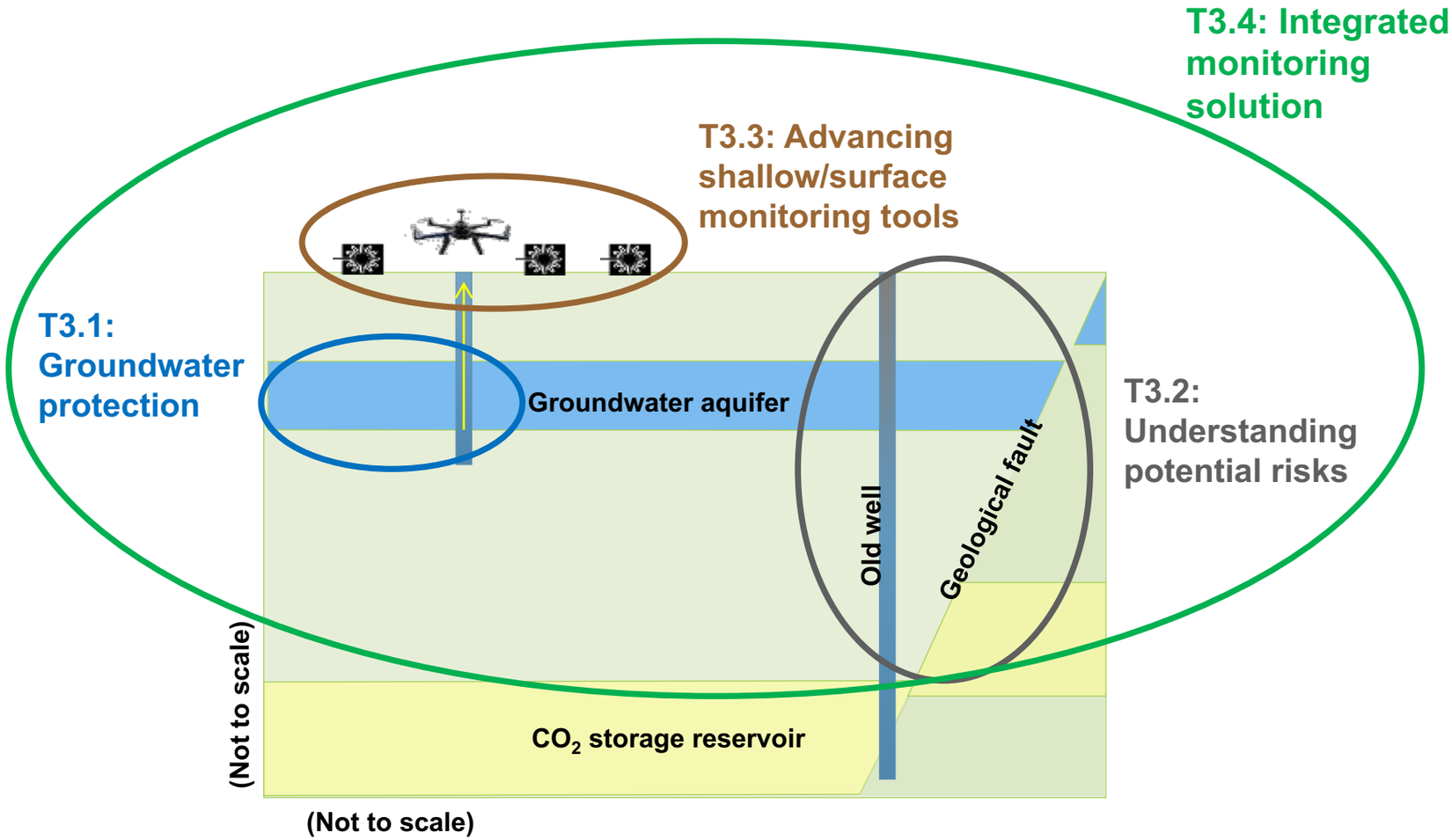
Workpackage organisation

T3.1 Groundwater protection: Demonstrate the efficacy and to advance techniques and technologies suitable for use in drinking water aquifers

T3.2 Understanding risk of CO_2 migration through faults and boreholes for effective monitoring

Task 3.3: Development of surface monitoring tools towards quantification of CO_2 leakage

Task 3.4: Integrated monitoring solution for leakage detection and quantification:



Integrated monitoring solution - T3.4

- Integrate innovative tools advanced through ENOS into a comprehensive monitoring solution alongside current state of the art tools

- Aims of today's workshop from ENOS WP3 perspective:
  - Consider required improvements in the currently available suite of monitoring tools identified by storage site operators/monitoring partners
  - Demonstrate the benefits of the tools & techniques being advanced through ENOS and consider how these can fill the 'gaps' identified by storage operators
  - Obtain input from storage operators on tools & techniques being developed through ENOS

THANK YOU FOR YOUR TIME

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