

Hydromechanical behaviour of complex porous reservoir and cap-rocks subjected to cyclic deformation and gas-water mixtures (including hydrogen) injection.

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The scope of the current PhD project is to explore the mechanical and poroperm response of unconsolidated sample at reservoir and caprock pressure equivalent (10-20 Mpascal) at dry , partially saturated, during rapid cyclic stress of deformation and then including pure hydrogen injection . The project will require working on the set up and testing of the new triaxial deformation rig planned within the PNRR- NEST project and having stage with foreign institutions as the University of Grenoble and Edinburgh University.

Program:

First year : test of the machine with unconsolidated samples during stress cycle of deformations

Second year: Diffusivity of hydrogen across deformed samples. X ray tomography at synchrotron lab to explore the poroperm behaviour during stress cycles

Third year: discussion of data and writing stage.

The project will liaise with and benefit from the existing groups based in Naples of Geotechnical Engineering working on rock deformation (Prof Russo), hydrogen storage (SHINE, Iacopini) and Microbiology during Hydrogen injection (references to Prof Giovannelli and Prof Di Benedetto)

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