

## **“Sensitivity Study of the main petrophysical and geomechanical parameters for the CO<sub>2</sub> storage capacity estimation in deep saline aquifers”.**

The storage capacity in aquifers is usually estimated by simple volumetric calculations involving the total volume of the considered formation, the porosity and an average saturation. Although this is a necessary step, it is now being recognized that this approach is much too simple and may overestimate at least by an order of magnitude the real storage capacity of the formation envisaged for CO<sub>2</sub> storage. Indeed, the pressure is a key limiting factor in medium or low permeability formation. First, the water relative permeability and capillary pressure characteristics of the formation play a major role when injecting CO<sub>2</sub>. The kinetics of CO<sub>2</sub> injection in aquifers is dominated by the low mobility of water compared to CO<sub>2</sub>. In general, the shape of the water relative permeability curve in first drainage is usually sharp. Hence, if the formation has a medium permeability (200 mD), it will behave effectively as a low permeability formation at relatively low CO<sub>2</sub> saturation and it will be necessary to develop high injection pressure. Second, the mechanical properties must be considered not only for avoiding or controlling fracturing, but also for precise calculations of storage. For closed aquifers, the compressibility is a key parameter. For semi-closed or open aquifers, the fluid motions at large scale and for long periods of time are also important.

First, a sensitivity study will quantify the importance of the key parameters mentioned above in terms of storage capacity. Second, a case study of a potential storage in Spain is expected to be performed by collecting data and performing laboratory experiments to determine essentially transport and mechanical properties useful in the simulation.