



Dynamic characterization of fractured carbonates at the Hontomín CO₂ storage site

yann Le Gallo (1), José Carlos de Dios (2), Ignacio Salvador (2), and Taimara Acosta Carballo (3)

(1) GEOGREEN, Rueil Malmaison, France (ylg@geogreen.fr), (2) Fundación Ciudad de la Energía, Cubillos del Sil, Spain, (3) GEOSTOCK, Rueil Malmaison, France

The geological storage of CO₂ is investigated at the Technology Development Plant (TDP) at Hontomín (Burgos, Spain) into a deep saline aquifer, formed by fractured carbonates with poor matrix porosity.

During the hydraulic characterization tests, 2,300 tons of liquid CO₂ and 14,000 m³ synthetic brine were co-injected on site in various sequences to determine the pressure and temperature responses of the fracture network.

The results of the pressure tests were analyzed using an analytical approach to determine the overall petrophysical characteristics of the storage formation. Later on, these characteristics were implemented in a 3-D numerical model. The model is a compositional dual medium (fracture + matrix) which accounts for temperature effects, as CO₂ is liquid at the well bottom-hole, and multiphase flow hysteresis as alternating water and CO₂ injection tests were performed.

The pressure and temperature responses of the storage formation were history-matched mainly through the petrophysical and geometrical characteristics of the fracture network. This dynamic characterization of the fracture network controls the CO₂ migration while the matrix does not appear to significantly contribute to the storage capacity. Consequently, the hydrodynamic behavior of the aquifer is one of the main challenge of the modeling workflow.