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Coupled Hydromechanical Modelling of CO2 Sequestration in Deep Saline Aquifers

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Sequestration of carbon dioxide (CO2) in deep saline aquifers has appeared as an important potential option for reducing the emissions of greenhouse gases to the atmosphere. Great amounts of CO2 would be injected in deep saline aquifers as a supercritical fluid, which will dramatically increase the pressure in the injection zone. This overpressure can produce the reactivation of sealed fractures or the creation of new ones in the caprock, through which CO2 could escape easily to the atmosphere. A horizontal caprock – aquifer system has been modelled considering hydromechanical coupling to study the failure mechanism produced when CO2 injection takes place in the system. The understanding of these mechanisms is essential to evaluate CO2 leakage and the injection conditions that can be sustained by the system without causing significant leakage.