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# Preliminary assessment of CO2 storage potential of deep saline aquifers in the Lusitanian Basin, (Portugal): mineralogical and chemical constrains

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The reduction of atmospheric CO2 through its safe geological storage, as CCUS techniques is one of the goals to achieve the 2050 commitment. Within the scope of the PILOTSTRATEGY project, two sedimentary sequences Triassic (on-shore) and Cretaceous (offshore) were object of a detailed study in order to evaluate their potential as CO2 storage complexes in the Lusitanian basin (west Portuguese margin).

A multi-disciplinary, multi-analytical approach was applied to the potential reservoirs and caprock samples to their characterization. The obtained results (XRD, TGA, petrography) reflect the predominance of siliciclastic composition of the reservoirs (mainly quartz and K-feldspar) whereas the caprock exhibit a carbonate (mainly calcite) (Cretaceous) or gypsum (Triassic) composition.

Several batch reaction experiments were carried out at Edinburgh University (UEDIN). Samples from the Cretaceous storage complex reacted with a NaCl brine injected with CO2 at controlled P=100bar, T=40°C conditions for 30days during which the chemical composition of the brine was regularly analysed. The elemental variations of the brine reacting with the reservoir samples reflect the dissolution of the present mineralogical phases, namely the K-feldspar, pyrite and clay minerals, and in some cases the precipitation of new phases, such as opaline silica.

The composition of the brine reacting with the caprock, registered an increase in Ca content at the first 2 days, interpreted as being the result of the limestone dissolution, without further variation throughout the experiment with a constant pH (6.36-6.57).

The identification of newly formed phases and evidence of dissolution as future and ongoing work are fundamental in understanding the entire process and predictability of the reservoir and sealant.

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