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3D modelling of potential sites for geosequestration in the Browse Basin, NW Shelf of Australia

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Several Environmentally Sustainable Sites for CO2 Injection (ESSCI) have been identified in the Browse Basin, NW Shelf of Australia. Detailed reservoir characterisation studies are being conducted on these ESSCIs with the purpose of determining their CO2 storage and injectivity capacity. The first ESSCI analysed was the Carbine Ponded Turbidite, a Late Cretaceous (Campanian) confined turbidite deposit of approximately 50 km2 in area and 70-100 m in thickness. A detailed 3D geo-cellular model was built using Petrel, from which preliminary estimates indicate a storage capacity of 0.9-1.8 TCF of CO2. A CO2 reservoir injection simulation using Eclipse is currently underway, in order to simulate injectivity and fluid flow in the system.

A second 3D geo-cellular model was built for the Leveque Shelf Basal Transgressive Sands (BTS), a Late Jurassic (post-Callovian) depositional system comprising fluvial, deltaic and marine facies deposited during the transgression following the continental break-up between Australia and India during the Callovian/Oxfordian. This ESSCI of approximately 8,500 km2 in area and 100-150 m in thickness might represent a migration dissolution or hydrodynamic trap, where CO2 could be injected down-dip and slowly migrate and dissolve up-dip over the course of 100s-1000s of years. After completing the Petrel model, a CO2 reservoir injection simulation will also be conducted.