

## **Suitability Assessment of CO<sub>2</sub> Storage in Deep Saline Reservoirs with Different Conditions**

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**Abstract** Overuse of fossil fuels in industrial production and human life has increased greenhouse gas emission, which makes a serious threat to human survival environment. CO<sub>2</sub> geological storage in deep saline aquifer can effectively control the extensive emission of CO<sub>2</sub>. The study area of deep saline aquifers for CO<sub>2</sub> geological storage site was set in Dongying Sag, a structural unit of the Bohai Bay Basin. In this paper, we first analyzed the properties of saline aquifers and cap rocks. The analysis results showed that among Shahejie Formation layers, Es2, upper and middle Es3 layers with burial depth between 1464 and 3102 m, four sets of reservoir and cap layers were suited for CO<sub>2</sub> storage in deep saline aquifers. In order to assess the suitability of CO<sub>2</sub> storage in these four saline reservoirs, simulation software TOUGHREACT was selected to simulate of CO<sub>2</sub> fluid migration process in a specific CO<sub>2</sub> geological storage layer. Comparative CO<sub>2</sub> injection simulation and analysis were conducted in the four sets layers of Shahejie Formation with different conditions, including reservoir depth, thickness, pressure, temperature, permeability and porosity. The simulation results showed that reservoir thickness, porosity and permeability has significant effect on migration movement and the pressure field variation characteristics. Comparative simulation results showed that shallower and thicker reservoir is more suitable for CO<sub>2</sub> geological storage in deep saline aquifer.

**Keywords** CO<sub>2</sub>, saline aquifer, geological storage, suitability assessment