

Rio Bonito Formation suitability for permanent CO₂ storage

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Keywords: Geological carbon storage, CO₂ storage site characterisation, Rio Bonito Formation

Impact: By analysing reservoir and sealing quality, leak risks, data coverage, available infrastructure in the region proximity, and the social context, this work indicates that Rio Bonito Formation presents a promising opportunity for permanent CO₂ storage in Brazil, mostly in term of its strategic location and adequate petrophysical characteristics for storage capacity and containment.

Highlights: The reservoir quality of the sandstones indicates sufficient storage capacity and petrophysical reservoir properties, especially due to average depth and thickness. The presence of mudstone layers suggests a promising sealing quality, with low seismicity activity. Regional proximity analysis showed good accessibility to potential sites for CO₂ injection, considering its onshore location and the great concentration of stationary CO₂ emitting sources.

Abstract:

Carbon Capture and Storage technologies (CCS) are one of the key tools for the required reduction of greenhouse gases in order to meet sustainable development scenarios to limit the climate change harmful effects. Geological carbon storage plays an essential role in the deployment CCS technologies worldwide at scale. Finding the suitable geological units for CO₂ storage requires interdisciplinary studies that must be addressed to each potential injection site. Considering a field-based approach, an initial site screening for CO₂ storage in the Rio Bonito Formation in the Paraná Sedimentary Basin was performed in this work, in order to identify its suitability for permanent CO₂ storage. Main parameters and properties related to reservoir quality, sealing quality and other leak risks, data coverage, regional proximity analysis, and social context analysis were compared to desirable characteristics for site selection. The analysis suggests a good potential of petrophysical available data for storage capacity and indications of effective containment of the injected CO₂ due to the presence of mudstone layers. However, it is required further characterization of the geological system and trapping mechanisms and assessments of public perception on CCS in the region.