CO_2 STORAGE POTENTIAL IN THE LATE NEOGENE INTERVAL, FEDERAL OFFSHORE, GULF OF MEXICO SHELF, USA

Ismail Halim Faruqi

ABSTRACT

Capturing carbon dioxide at emission sources and storing it in geologic formations, knows as Carbon Capture and Storage (CCS), plays a vital role in reducing CO_2 emissions and addressing global warming. A surge in CCS initiatives in the Gulf Coast of the United States motivates this study to evaluate the potential for geological carbon storage beneath the federal offshore waters, within Late Neogene interval of the Gulf of Mexico shelf. Three pivotal components—capacity, injectivity, and confinement—underscore the feasibility of geological storage in this area. Petroleum production along the region showed a widespread of high-quality reservoir and seals across the continental shelf which are essentials for effective geological carbon storage. This study quantifies a capacity of approximately 32 Gigatons of CO_2 storage, while achieving Million Tons per annum (Mtpa)-scale injectivity is feasible due to prevalent injectable sands. Achieving these rates and volumes necessitates perforating multiple sands identified in project-specific areas. Confinement risks include legacy wells, growth faults along the shelf, and steep dips near salt piercements. This requires a strategic focus on prospect areas towards down-dip fetch areas, away from existing oil and gas fields. Evaluation of two prospect areas assesses the trade-offs between proximity to CO_2 sources, ample storage capacity, and minimized leakage risks. While offshore operations may entail higher costs than onshore equivalents, they offer attractive advantages such as a single landowner, fewer and newer wells, and easily accessible seismic and well data. Overall, the research reveals a significant CO_2 storage resource and promising business opportunities, potentially offsetting decades of CO_2 emissions from Texas and Louisiana sources.

Alexander P. Bump

Susan D. Hovorka

Carlos Uroza