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**Petrophysical challenges in salt characterization and their
implications on hydrogen storage: A case study from the
Castile-Salado bedded salt interval in the Permian Basin,
United States**

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PETROPHYSICAL CHALLENGES IN SALT CHARACTERIZATION AND THEIR IMPLICATIONS ON HYDROGEN STORAGE: A CASE STUDY FROM THE CASTILE-SALADO BEDDED SALT INTERVAL IN THE PERMIAN BASIN, UNITED STATES

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Abstract

Understanding the petrophysical characteristics and heterogeneity of bedded salt formations is critical to estimate hydrogen storage capacity and design salt caverns. The study presents preliminary results of a petrophysical characterization study conducted in the Castile and Salado formations from the Permian Basin in the United States. We developed and tested well-log-based advanced petrophysical joint inversion modeling workflow to demonstrate the highly heterogeneous nature of these salt formations. Mineral composition is widely mixed with varying proportions of halite, polyhalite, anhydrite, carbonate, and siliciclastics. Our current petrophysical model generally matches with the overall core description; however, there are intervals where well-logs alone cannot distinguish fine-scale heterogeneities of bedded salt; therefore, advanced high-resolution core scanning can be used to improve petrophysical models.

Key words: Bedded Salt, Hydrogen Storage, Petrophysical Modeling, Heterogeneity