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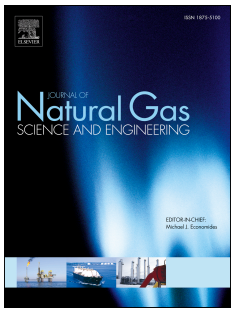

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Resource potential of gas reservoirs in South Pakistan and adjacent Indian subcontinent revealed by post-stack inversion techniques

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ABSTRACT

Seismic post-stack inversion facilitates the interpretation, mapping and quantification of hydrocarbon bearing zones. This study estimates reservoir properties (i.e. acoustic impedance and porosity) by applying post-stack seismic inversion techniques to a gas prone reservoir in the Sawan area, Southern Indus Basin, Pakistan. In this particular study, model-based and sparse-spike inversion algorithms are successfully applied on 3D seismic and wireline log data to predict reservoir character in the Lower Goru Formation (C-sand interval). Our results suggest that model-based post-stack seismic inversions provide more reasonable estimates (i.e. returning detailed spatial variations) for acoustic impedance and porosity when compared to sparse-spike inversion algorithms. The calibration of these estimates with petrophysical analysis of wireline log data indicates an appropriate agreement amongst them. Importantly, the results obtained in our case study can be applied to similar basins in Asia with 'tight' oil and 'tight' gas accumulations composed of sand-shale intercalations with different thickness and areal distributions.

Keywords: Post-stack inversion; Acoustic impedance; Sparse-spike inversion; Model-based inversion.

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