

Investigating Deformation Styles of
Salt Detachments Using Seismic
Attribute Analysis: An Example from
the Gulf of Mexico

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INVESTIGATING DEFORMATION STYLES OF SALT DETACHMENTS USING SEISMIC ATTRIBUTE ANALYSIS: AN EXAMPLE FROM THE GULF OF MEXICO

DEFORMATION OF THE SALT DETACHMENT IN THE GULF OF MEXICO

ABSTRACT

The current deformation style of active salt detachments beneath delta and deep-water fold-thrust belts in the Gulf of Mexico is poorly constrained. The combination of seismic interpretation and seismic attribute analysis provides greater resolution for identifying fault patterns that are otherwise unresolved in conventional seismic amplitude displays. These techniques are applied to the Ship Shoal and North-West Gulf Coast 3D seismic volumes, and used to investigate the geometry of low signal amplitudes within six interpreted salt diapirs. The ridge enhancement filter and similarity attributes display a strong correlation with faults and fractures observed over a range of magnitudes, and identify structural relationships between salt diapirs and the surrounding sedimentary overburden. Conventional seismic amplitude displays show salt diapirs as ductile and homogenous structures. However, this study concludes that diapirs are likely to contain interbedded resistive sequences facilitating brittle shear. Deformation styles exhibited by active salt diapirs are broadly comparable to those observed in outcrops within exhumed detachment systems. Future application of seismic attribute analysis is needed to improve the understanding of deformation styles exhibited by similar submarine structures.

KEYWORDS

Salt tectonics, Gulf of Mexico, salt detachment, seismic attributes analysis, salt diapirs

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