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Shallow hazards and well placement

The Browse Basin is located offshore Western Australia, covering an area of over 140,000 square km containing over 30 tcf of gas sourced from the fluvio-deltaic sediments of the Jurassic Plover Formation. Carbonate build-ups and polygonal faulting are associated drilling hazards that can have a significant impact on rig stability, well planning and anchoring. Accurate identification and localisation of shallow hazards is essential prior to drilling to select the most appropriate location for field infrastructure development.

Condition | Reveal | Interpret | Classify | Validate | AI

Location:
Browse Basin, Australia

Age of faulting:
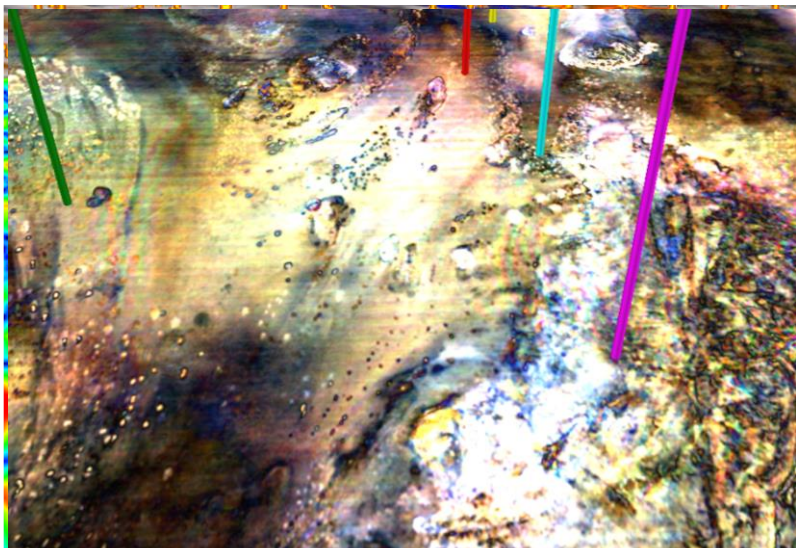Mesozoic

Survey area:
2,828 km²

Volume Size:
100 GB

Rock Type:
Clastics, Carbonates and Volcanics

Structural regime:
Extensional

Onshore/Offshore:
Offshore

Hydrocarbon type:
Gas

images: Geoteric Frequency Decomposition colour blends

Image. Frequency Decomposition RGB Colour Blend mapped over a horizon surface highlighting carbonate pinnacle reefs and karstification from the Poseidon 3D Dataset in the Browse Basin, offshore Western Australia.

Solution

Geoteric's multi-attribute workflow was used to develop an effective shallow hazard assessment. Data conditioning involved noise attenuation to improve the signal to noise ratio and spectral enhancement to improve the lateral continuity of reflectors and overall vertical resolution of events whilst preserving both stratigraphic and structural detail.

Using High Definition Frequency Decomposition RGB Colour Blending of discrete magnitude frequencies, we were able to identify and reveal shallow hazard geomorphologies such as carbonate pinnacle reefs and karstification with high confidence due the algorithm's ability to preserve vertical resolution. RGB Colour Blending of angle stack data also helped to unmask geological features in the basin by highlighting subtle features masked by full-stack data.

Geoteric's Fault Expression workflow was used to delineate shallow faults networks and karst edges with greater confidence by using CMY Colour Blending of several different edge attributes that represent different seismic character. The structural setting was developed further using Geoteric's AI Fault Interpretation Service which identified more events, delineating a polygonal fault system over a large area rapidly.

Result

This multi-attribute approach aided by Geoteric's new AI Fault Interpretation allows for a rapid and detailed understanding of shallow hazards being achieved in a significantly shorter timeframe compared to conventional methods of interpretation.

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Public data courtesy of Geoscience Australia

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