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Reservoir Heterogeneity.

The Stybarrow field is located in the Exmouth sub-basin, NW shelf of Australia. The producing reservoir is the Macedon Member, which is a thin sandstone surrounded by shales. The reservoir is compartmentalised with a complex fault and fracture network. Understanding the presence of sand or shale and the precise location of the faults and fractures is critical to maximise the production and develop the field safely.

Condition   Reveal   Interpret   Classify   Validate   AI

Location:
Exmouth sub-basin, NW Australia

Age of faulting:
Triassic to Early Cretaceous

Survey area:
200 km²

Volume Size:
1 GB

Rock Type:
Sandstone

Structural regime:
Extensional

Onshore/Offshore:
Offshore

Hydrocarbon type:
Oil

Classification key: Sand   Shale

Top image: IFC results showing the Stybarrow field classified in two different facies: yellow for the areas likely to contain sand and brown for the areas interpreted as shale.

Bottom image: HD Frequency Decomposition colour blend. The blue feature in the blend has been interpreted as a shale-filled channel. Faulting is clearly imaged as black lineations.
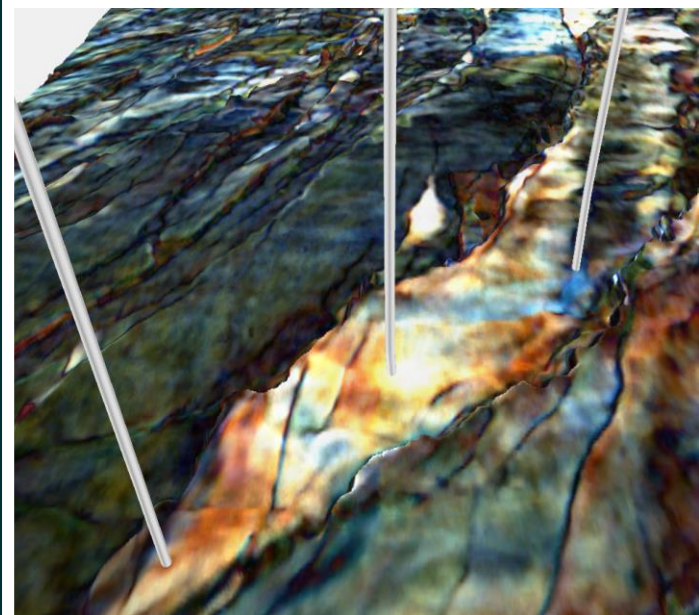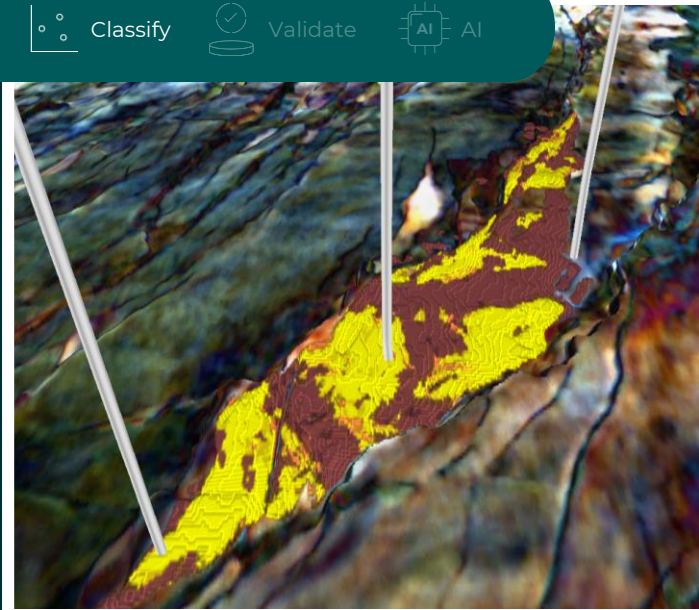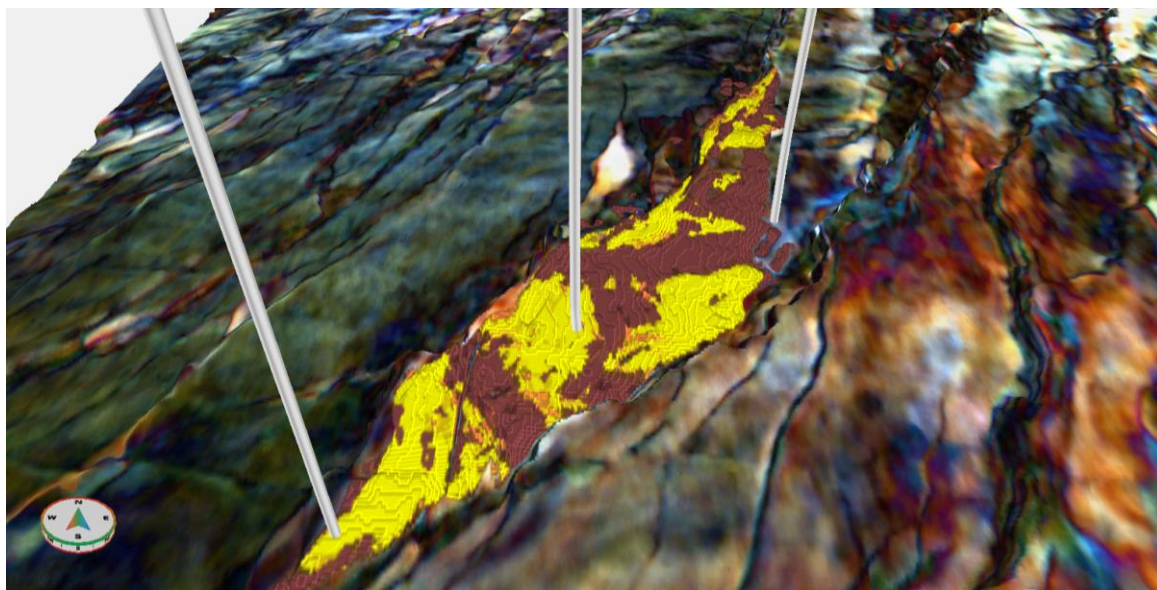
Image. IFC results showing the Stybarrow field classified in two different facies: yellow for the areas likely to contain sand and brown for the areas interpreted as shale.

Solution

A reservoir heterogeneity study was conducted over the field using Geoteric's standard modules. Geoteric's condition module was used to improve the signal to noise ratio and improve the frequency content, producing a conditioned volume that was used as an input for the rest of the workflow.

Using Frequency Decomposition, we were able to identify and unmask features in the reservoir, highlighting areas with better reservoir proprieties. Fault Expression was applied to identify and delineate faults and fractures that could be causing compartmentalisation. The reservoir was extracted as a 3D geobody using Geoteric's Adaptive Geobodies™ technology and an Interactive Facies Classification (IFC+) was performed to classify the sand (denoted yellow) and shale (brown) within the reservoir.

Workflows can be tailored to the specific challenges that you are facing. Geoteric's technology has been successfully applied in many different geological environments, ranging from clastic to carbonate reservoirs, not forgetting unconventional, and even basement.

Result

Richer identification of faults and presence of reservoir facies has produced a greater understanding of the reservoir heterogeneity - essential to developing the resource safely. The clear illustration of depositional system and contact level has delivered an improved understanding of the field's reservoir compartmentalisation and can be used to identify hazards and aid well placement, avoiding costly surprises in the development stage.

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Public data courtesy of Geoscience Australia

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