

Structural Geology

Geoscience Wales Ltd (GWL) offers a structural service analysing the distribution and nature of fracture systems in reservoir formations in order to develop 3D models of fractures and faults in the reservoir.

Fractured Carbonates

Fractures are often an important component in carbonate reservoir systems and can both aid and hinder fluid flow within a reservoir. Our experience of fractures in carbonate reservoir systems can help you understand the relationship between fracture systems and the host sediments and how the fractures are likely to affect reservoir performance.

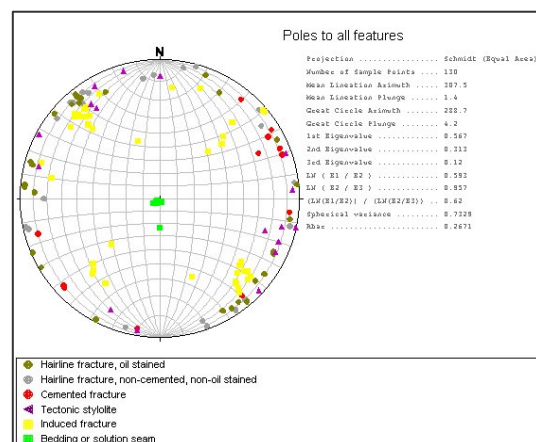
Fractures can significantly affect the behaviour of a reservoir system since they can:

- act as fluid conduits enhancing production
- act as baffles compartmentalising the reservoir
- lead to water breakthrough

In fractured reservoirs, an understanding of the relationship between the fractures and the host sediment is essential to predict the performance of the reservoir. For optimum integration with sedimentological data, we have a close working relationship with GWL sedimentologists. This enables us to offer integrated reservoir solutions to establish the relationship between fractures, reservoir quality and reservoir performance.

Fracture Studies

GWL can carry out fracture studies from core, borehole image logs and thin sections or from a combination of these data. Additional information from analysis of seismic data, wireline logs and regional geological data also improve the detail of fracture models. GWL obtains the best results from the integration of several datasets on a variety of scales.



Interpretation and Integration

- fracture characterisation
- timing of fracturing in relation to diagenesis and tectonism
- fracture intensity, connectivity, distribution and controls due to lithofacies and structural position
- fracture orientation
- interpretation of borehole image data and correlation with core data
- integration with sequence stratigraphy to understand controls between relative sea level and diagenesis and, in turn, fracturing
- integration of logged data, petrographic, core analysis, wireline log and PLT data to identify zones of flow
- consideration of palaeo-stress for predictive structural modelling
- preparation of a 3D model of fault and fracture distribution and reservoir compartmentalisation
- *in situ* stress analysis
- logged data displayed in depth on output by WellCAD software

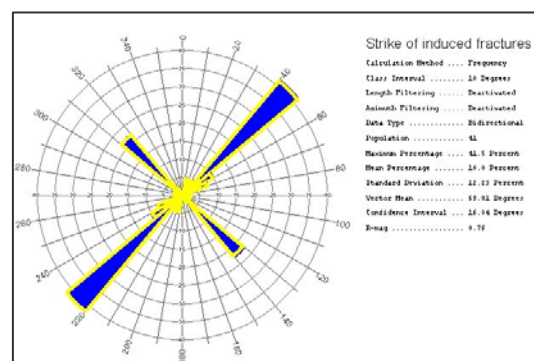
Features Described

- fracture dimensions including aperture
- fracture type – open, closed, cemented, shear, vuggy, etc.
- fracture boundaries – diffuse or sharp
- fracture fill – cements and porosity
- fracture morphology, geometry and displacement
- fracture orientation and density
- fracture relationship to host sediments
- fracture zones, sets, corridors and faults
- stylolites and solution seams
- fracture cements and chronology
- artefact fractures
- borehole breakout and mud pressure induced hydraulic fracture

Experience

GWL has experience principally with the following formations:

- Shuaiba
- Thamama
- Mauddud
- Arab
- Habshan
- Ratawi
- Marrat
- Ahmadi



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