

Faulting and Fault Seal: Progress with Prediction

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The understanding and prediction of fault behaviour is a critical component of exploration and production strategies. Faults may be either, seals, retarders of conduits for fluid flow. An integrated approach to fault evaluation has proved successful in recent years. The integrated approach involves; amalgamation of detailed microstructural and petrophysical property analysis of fault rocks, the characterisation of the population and distribution of sub-seismic faults from well, core and outcrop data, and an evaluation of the seismic scale fault array attributes. This paper will review the progress and achievements of fault seal analysis. Examples where successful application has been possible will be presented and the important uncertainties that limit application of fault seal prediction will be highlighted and used to identify the challenges for future work. We will also demonstrate how integrated fault analysis has benefited exploration, production and extending the life of specific fields. Improving fault seal analysis is difficult but not impossible. Reducing the uncertainty associated with fault zone behaviour prediction is achievable if the following are recognised:

- Seismic resolution places important limitations on the characterisation of the fault zone architectures needed for flow modelling.
- Robust databases on fault zone architectures and fault rock properties quantify the properties for flow behaviour.
- Calibration and validation of fault analysis 'tools' from well-constrained situations allows improved prediction and the development of robust fault seal advisors.
