

Irving, A., Reynolds, M. & Delisle, S. 2006.

Fault characterisation: how collaborative research helps fill the gaps.

Structurally Complex Reservoirs Conference, Geological Society, London, 28 February–2nd March.

ABSTRACT

The ability to accurately characterise fault zone properties is of major importance with many of the world's remaining hydrocarbon reserves being found in structurally complex reservoirs. The inclusion of accurate fault properties in both geological and simulation models has become a key part of the reservoir management strategy, but how can this be achieved?

In an attempt to answer this question, the Total Geoscience Research Centre (GRC) devised a research programme. The result of the research programme was a workflow loop consisting of:

- Detailed modelling of fine-scale fault rock properties
- Generation of upscaled properties for reservoir simulation
- History matching of the simulation model and feedback into the fine-scale geomodel

Having developed in-house tools to address parts of the workflow, the GRC chose to sponsor specialised contracted research projects to provide additional solutions. A number of Joint Industry Projects were selected, mostly brokered through the ITF Structurally Complex Reservoirs Programme.

The results produced by the ITF-based projects have provided a valuable addition to our knowledge and filled some of the gaps that existed in our workflow loop. However, a number of points require further investigation, principally relating to the accurate representation of fault zone properties within dynamic simulation grids. We feel that the future of fault characterisation research lies in developing:

- Appropriate techniques to bridge the gap between fine and up-scaled fault properties,
- Pertinent geomechanical tools,
- A new generation of meshes and multi-phase fault-rock flow properties.

A major research effort will also be required to develop characterisation techniques for faulted carbonate sequences.