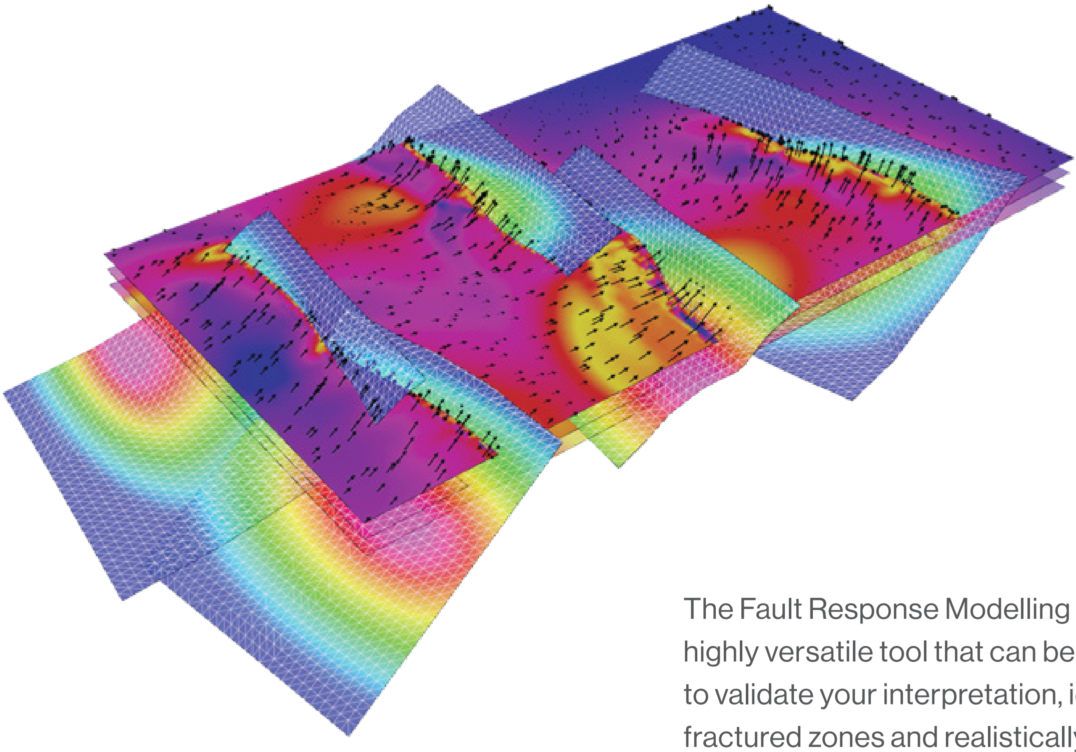
Fault Response Modelling

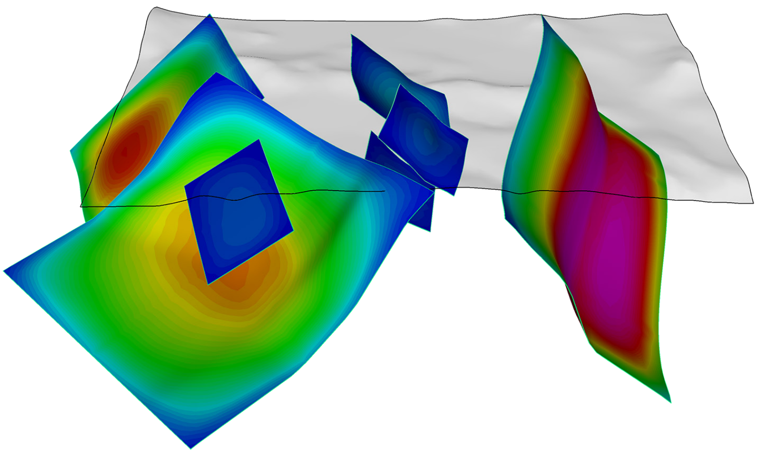
Boundary element modelling to simulate displacement on faults, and geomechanical analysis of surrounding fracture systems



The Fault Response Modelling module is a highly versatile tool that can be used to validate your interpretation, identify highly fractured zones and realistically model stress perturbations around faults and other discontinuities.

The module considers mechanical properties to reproduce fault-related deformation and provides a quantitative assessment of the surrounding fracture system. Faulting is simulated using a boundary element method with triangular elastic dislocations. This approach allows complex faulting scenarios to be quickly tested and evaluated.

Strain and stress fields calculated using the boundary element approach, or derived from the Strain Capture tool in Move, can be used to predict fracture orientations. Resolving the shear and normal stress components allows failure potential of individual fractures and nearby faults to be assessed.



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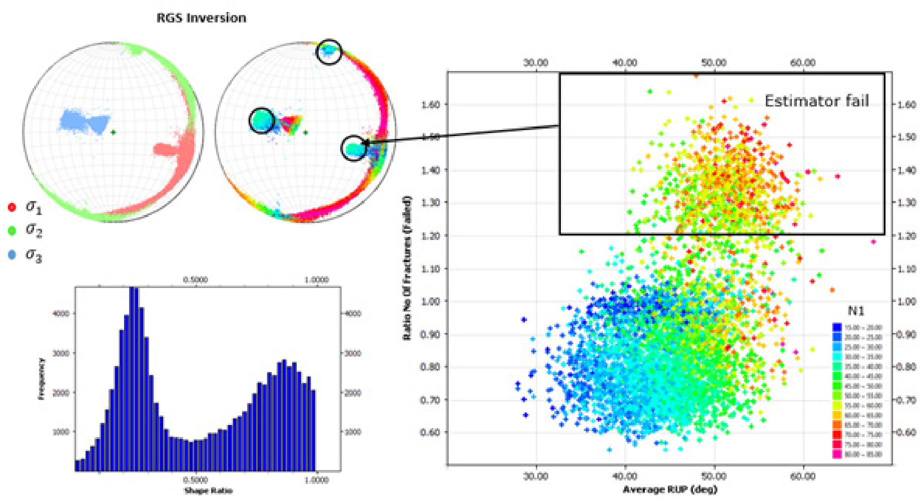
Features

- Fracture sets can be used as Master Faults. Hence, the strain transfer and interaction between fracture planes in DFNs (Discrete Fracture Networks) can easily be performed (NEW in Move2016.2).
- Slip Zone Modelling after Jeyakumaran (1992) is now available for Master Faults. The slip on faults is derived from a regional stress, a driving stress, or a user defined traction which is applied onto the fault surface(s) (NEW in Move2016.2).
- A new sheet called 'Fracture Analysis: Angular Misfit' has been added to the tool. This allows the user to calculate the angular misfit between observation fractures and strain based fractures, which resulted from Fault Response simulation runs, geomechanical or 3D kinematic strain capture workflows (NEW in Move2016.2).
- Displacement on faults is simulated using an analytical solution for triangular dislocations in an elastic half-space, which allows the depth of faults to be considered in the model.
- Use of triangular dislocation elements allows complex geometries of faults and other discontinuities to be modelled, including enclosed bodies like salt diapirs and igneous intrusions.
- Displacement on faults can be defined for individual triangular elements of meshes or calculated from a regional stress field.
- Pressure perturbations around reservoirs can be simulated by calculating the displacement induced by pressure acting on a triangulated surface.
- Displacement, strain and stress are calculated at observation points in surrounding rock volume with defined elastic and mechanical properties.
- Different fracture sets can be generated and compared to the orientations of real fractures.
- Shear and normal stress components can be calculated for fault and fracture systems.
- Optimal fracture orientations can be derived by using the shear and normal stress components to identify the fracture with highest Coulomb Stress.
- Relationships between shear and normal stress can provide information about fracture intensity, mode of failure and reactivation potential.
- Fracture sets can be filtered based on fracture stability and Coulomb Stress failure, allowing the fractures exceeding the failure criteria to be easily visualized.

New for 2018

- Monte Carlo Stress Inversion



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