Fracture Modeling Methodology Based on Continuity Cube Data

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The target of this methodology is the building of a DFN model and the relevant fracture petrophysical parameters evaluation. With the seismic data we can subdivide the brittle events in two different sets based on their scale: seismic faults (kilometric) and continuity cube scale events (hectometric). If well data are available we can insert in the models a third set of fractures: the so called “log scale” fractures (decametric).

The seismic scale faults can be introduced in a deterministic way directly from the static model. The interpreted continuity cube events are filtered and then utilized to obtain a fracture intensity grid considered as the conceptual model to distribute the fracture at this scale. The information coming from continuity cube, 3D-seismic and FMI interpretation are utilized in order to get an expanded grid property distribution that represents the geological driver to distribute the fractures at the log scale. Obviously, the final model has to honour the FMI interpretation, in terms of orientation and number of fracture intersected by each well.

The dynamic validation of the DFN models has to be made using dynamic data such as well test, interference test, etc., but if they are not sufficient or not available at all, the Reiss approach (1980) or analogues data are alternative ways to get the petrophysical evaluation of the fracture network from the DFN model.

Moreover, a 3D grid indicating the enhancement of porosity and permeability can be extracted directly by the fracture intensity grid without any fracture network petrophysical evaluation.