

Fluid flow in fractured reservoirs

Dr Benoît Noetinger, IFP Energies Nouvelles

Fractured reservoirs are important in hydrology, in oil industry applications (about 40%) of known reserves and now in CCS applications. The question of sequestrating CO₂ in fractured formations is now debated, and has not received a definitive answer.

This is due to the underlying complex physics of flow in fractured media, that are intrinsically multiscale objects, from the pore scale to the field scale. The localization phenomena inherent to critical systems can become dominant, resulting in wide uncertainties. Basically, the fluid stored in the matrix flows to the well via a connected path of fractures, of negligible volume.

Any model must account for this basic feature of flow in fractured formations. This implies specific homogenisation and simulation techniques, known under the name of multiporosity models that will be presented. The talk will focus on practically oriented issues, and to simulation techniques at the 3D Discrete Fracture Network (DFN) level. Connections between DFN, PNM (Porous Network Models) will be pointed out, as well as random walk techniques.