An alternative method to evaluate fracture network efficiency to fluid flow

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Fracture networks exist at a wide range of scale in the earth crust and strongly influence the hydraulic behaviour of rocks, providing either pathways or barriers for fluid flow. Many oil, gas, geothermal and water supply reservoirs form in fractured rocks. The main challenge is the development of numerical models that describe adequately the fracture networks and the constitutive equations governing the physical processes in fractured reservoir. The hydraulic properties of fracture networks, derived from Discrete Fracture Network (DFN), models are commonly used to populate continuum equivalent models at reservoir scale, to reduce the computational cost and the numerical complexity. However, the efficiency of fracture networks to fluid flow is strongly tied to their connectivity and spatial distribution, that continuum models are not able to capture explicitly. In this work we used field data and synthetic models to introduce a new parameter to evaluate the efficiency of fracture networks to fluid flow, reflecting a range of variability in fracture network characteristics (e.g. P32, number of fractures, stress field). This alternative method allows to model fractured systems at reservoir scale, in a variety of geological settings, using exclusively a DFN approach.