

Comparison of Modeled Fracture Sets from Structure Analysis with Field Data from Oman

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Combination of structural analysis and Discrete Fracture Network has become a standard workflow used both in exploration and production of fractured reservoirs. Two reservoirs analogues located in Oman (Natih Formation) have been heavily studied at outcrops scale. Those analogues consist in two classical trap structures: a salt dome and a Fault-Propagation-Fold. Fracture sets are studied from aerial to outcrop scale. Fracture maps (10 x 10 m.) are collected on structurally relevant locations on each structure. Spatial, statistical and connectivity analyses are performed on those fracture maps. Comparison of fracture maps at the different scales provides a framework of up-scaling properties for those two particular structures.

3-D digital models, with similar geometric characteristics than the reservoir analogues, are schematically created from those three structures. Static analyses, like simple and gaussian curvature or dip analysis, are performed on the two digital models. Then each modelled structure is restored according to its own tectonic setting and forward modelled to capture the strain induced by the deformation. Discrete Fracture Networks are generating for each model using finite strain attributes to constrain fracture density. Orientation, spatial and connectivity analyses (connectivity degree and relative connectivity) are performed on the Discrete Fracture Networks. Fracture sets digitally modelled are compared to the real data set.