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Mechanical effect of chert nodules in chalk on fracture lengths, apertures, and spacing

Solomon Seyum

Interactions of fractures with chert nodules in chalk are described in core from Ekofisk and Tor Fms., and compared to measurements in chalk at Stevns Klint. In large-scale models of flow through fractures, chert nodules are ignored because their impact on fracture lengths, spacing, and apertures controlling permeability, is not well known despite their notable presence in chalk. Key geometric quantities of fractures from measurements are used to build and constrain numerical, fracture mechanics models to evaluate the effect of mechanical quantities on fracture geometries. Fracture development is affected by chalk-chert elastic stiffness contrasts, fracture positions relative to chert, chert/fracture length ratios, and remote stress magnitudes and orientations.