

# **A Comparison between Shale Gouge Ratio (SGR) and Stochastic-Juxtaposition Techniques for Fault Seal**

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Traditionally the analysis of fault seal has been purely deterministic or a combination of deterministic and stochastic methods. In a deterministic model, prediction of the locations of reservoir overlaps is made from the static model of the reservoir horizon and fault geometry. The principal aim is to map faulted reservoir overlaps and determine their sealing character. This is usually performed using a predictive algorithm such as the shale gouge ratio (SGR) that predicts the sealing capacity of the fault rock from the shale content of the formations that have moved past that point on the fault.

Stochastic models offer the possibility to test multiple realisations of the juxtapositions at the fault. Stochastic models capture the uncertainty in the position of the reservoir at the fault by allowing multiple realisations of stacking geometries, where the principal assumption is that these stacked reservoir zones are laterally continuous covering the entire likely fill area. It is further assumed that all sand-sand connections are likely to be leaky, i.e. that fault-rock does not contribute to fault seal.

Do these conceptually different approaches lead to different predictions of trap fill? Comparison of the predictions between the two methods shows a surprising degree of conformity. The sand-shale proportions in the stochastic model mimic the role of  $V_{\text{shale}}$  input in the deterministic SGR method. This presentation covers published case studies, and examines benefits and pitfalls of both methods.