

Igneous Intrusions and the Generation of Hydrocarbons

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ABSTRACT

While the tectonic histories of rifted margin basins, emplacement mechanics of intrusions and possible effects on hydrocarbon kinetics and migration have been closely scrutinized (Dalziel, 1991; Galushkin, 1997; Muirhead et al, 2012; Rateau et al, 2013) there is currently very little work on the impact (either beneficial or detrimental) of igneous intrusions on the potential volume of recoverable or migrated hydrocarbons. A significant factor on such understanding is the pre-intrusion maturity of the host rocks and the extent of organic matter alteration. Here we present a model to predict potential source rock maturation volumes within intrusive igneous systems in rifted margin basins as a factor of pre-intrusion maturity. Initial work on extractable organic matter from sediments adjacent to five intrusions suggest that in fact, three of these regimes have the potential to generate significant volumes of hydrocarbons, with one extending the range of the gas window. Applying these regimes to frontier basins west of the UK suggests the emplacement of large sills in rifted basins could be of benefit to otherwise immature source rocks.