

## **Geological Modelling of the Porcupine Median Ridge: Implications for the Hydrocarbon Prospectivity of North Atlantic Hyper-Extensional Basin and Margin Systems**

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The Porcupine Median Ridge (PMR) is located in the frontier deepwater South Porcupine Basin some 200 km off the southwestern coast of Ireland. The PMR is important because it forms the edifice for the Lower Cretaceous Dunquin carbonate platform exploration prospect, which is considered one of the largest un-drilled exploration targets offshore NW Europe. The composition of the PMR remains unknown and previous workers have suggested that it is composed of volcanic, sedimentary or metamorphic (serpentinitic) rock. Here, we analyse recently acquired potential field data and two dimensional long offset seismic reflection data over the PMR to provide new insights into the PMR geology. The results of gravity and magnetic data modelling will be presented and integrated with interpretations of both the new 2D seismic reflection data as well as published regional deep seismic refraction profiles. Published basin modelling studies have demonstrated that the South Porcupine Basin underwent hyper-extension during the Jurassic and Cretaceous periods with beta factor (total strain) estimates of more than 6.0. We describe how basin hyper-extension played a key in PMR genesis as well as on petroleum system elements such as regional thermal regime, timing of trap formation and source maturation and reservoir development. Of wider interest are the implications for the Lower Cretaceous play systems that have recently proved prolific elsewhere in the Atlantic Basins such as offshore Brazil and along the West African Transform Margin. The PMR may provide a Rosetta Stone in our understanding of the petroleum geology of these Atlantic hyper-extensional basinal systems, which are of renewed focus in the context of deepwater NW European oil and gas exploration.