The Response of Density Underflows to Rift Basin Floor Topography and Palaeoclimate: Implications for Syn-Rift Reservoir Distribution.

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ABSTRACT

Deepwater, syn-rift deposits present an exciting play type currently being targeted worldwide. Following UK North Sea successes in the 1970s and 1980s with the 'Brae Play' it wasn't until the turn of the century that the potential of the Norwegian Continental shelf for these plays was realised. The discovery of Johan Sverdrup, and others such as Pil, Bue, Gudrun and Alvheim on the Norwegian Continental Shelf has renewed interest in this play-type worldwide (e.g. Lower Cretaceous of the Central Graben and Outer Moray Firth, UK and Offshore Brazil and West Africa sub-salt).

However, these depositional systems evolved in localised, complex, basins which are sensitive to temporal and spatial topographic variation from rift structures. This PhD project focuses on the evolution of these deepwater syn-rift systems, in particular their response to the basin-floor topography typical of rifts. Most studies in this regard to date have focused on salt-influenced topography, passive margins or finer grained systems. The outcrops in the Gulf of Corinth, Greece present a unique opportunity to study these in a coarse-grained, mud-deficient, active rift setting where Plio-Pleistocene deltas and their associated deepwater gravity current deposits form on the edge of a syn-depositional horst block. In a suite of superbly exposed and located outcrops, field data collection, outcrop boreholes and drone photogrammetry can give a new understanding of the evolution of stratigraphic and structural architecture from bed-set scale up to system scale and inform decision making in this exciting play type as an excellent outcrop analogue. Fieldwork to date has shown the stratigraphic architecture to be significantly more complex than first thought with the influence of multiple footwall-derived point sources active during discrete sequences in response to base-level changes adding further influence to axial sediment routing.

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