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Please fill in your manuscript title.	Hydrocarbon Potential of Hybrid Turbidite-Contourite Systems

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Abstract

Introduction

In deep water settings drift (or coast parallel bottom currents) and turbidite (or gravity) processes are common along continental margins. The interaction of these processes can build large mixed / hybrid (turbiditic-contouritic) depositional systems. These have only been recently recognized and associated with some of the major discoveries at a global scale. This study focuses on recognizing and evaluating mixed systems on seismic data, including undrilled examples from around the globe.

Seismic identification of mixed turbiditic-contouritic depositional systems

Key examples of prolific discoveries associated with hybrid turbidite-contourite systems, include the Rovuma Basin offshore Mozambique (Mamba Complex 85 TCF) (Palermo et al., 2014), the Jubilee Field offshore Ghana (Cronin, B. HGS/PESBG Africa 2019), The Tortue Field offshore Mauritania (D. B. McGuinness et al., 2020) and the deep water confined channel Barra complex (3 BBOIP) in the Sergipe Basin, Brazil. The identification of hybrid systems relies on the recognition of a series of diagnostic criteria derived from the integration of available understanding of these mixed systems (Sansom P., 2018). For hydrocarbon potential evaluation, a full petroleum system elements analysis should be performed in which probable source rocks, reservoir and traps are identified.

Potential source rocks were identified using a systematic frontier basin methodology which includes plate tectonic reconstruction, palaeographic setting, seismic character, any well and outcrop data available, source rock charactetrization and other hydrocarbon indicators such as BSRs (Bottom Simluating Reflectors associated with the presence of methane hydrate). To de-risk reservoir presence and quality, both depositional system features and seismic character were considered. The trapping mechanism was found to be provided by the associated characteristics of the hybrid system. This analysis led to the identification of a series of undrilled hybrid systems across the globe. The huge potential already proven offshore Mozambique, Ghana, Mauritania and Sergipe indicates that this depositional system should be a main target in deep water exploration. Examples from SE Asia and Latin America, indicate that the potential extends into these regions, implying that this system should be considered as a viable highly prospective future target.

Conclusions

Mixed/Hybrid turbiditic-contouritic systems are just beginning to be understood and recognized in major discoveries at a global scale. Modern 2D seismic is proving to be an essential tool in identifying these systems and performing a hydrocarbon potential evaluation.

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