

## **Is there Hydrocarbon Potential in the Oceanic Crust Basins Offshore Suriname?**

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### **Abstract**

The Earth's crust is divided into many plates. The relative motion of the plates determines whether plate boundaries are convergent, divergent or transform. The focus of this abstract however is 'oceanic crustal basins' formed at divergent plate boundaries.

At divergent plate boundaries, continental rifts occur as the plates move apart from each other. At continental rifts, the crust is extended and faulted and as a result splits apart. At this location, a volcanic ridge is formed as hot mantle material wells up to fill the void left by the separating plates. The mantle material of basaltic composition accretes to the plate edges, cools and forms new oceanic crust. As the plates move apart, the oceanic crust grows, building an ocean that widens between the slowly separating plates.

As the plates spread apart, the newly formed oceanic crust fractures into a 'basin and range' topography, thereby forming many new rift basins between the spreading center and the trailing edge of the drifting continents. With time, these 'pull apart basins' are fill-in and overlain by distal sedimentary deposits derived from the drifting continents and pelagic oozes. The Mid Atlantic Ridge, which encompasses the mid-ocean rift and ridge that separates South America from Africa, is a mature divergent plate boundary. On either side of the ridge, many 'pull apart basins' exist in the oceanic crust between the ridge and the African continent to the east of the ridge and the South American continent to the west. The Guyana – Suriname Basin lies on the northeastern edge of the South American continent and comprises an area of stretched continental crust and, in the deeper part of the basin, an area of rifted oceanic crust.

In the extended oceanic crust offshore Suriname, numerous pull - apart basins and abyssal hills are identified from seismic data. These basins are filled with thick layers of sediment, likely originating from the South American continent and in-situ pelagic deposits. These basins could be self-containing, having all the elements required for the generation and entrapment of hydrocarbons. There have since 2006 been discoveries in the transform margin basins in the stretched continental crust along the South American and western African coasts, but exploration of the deep water 'pull apart basins' in the oceanic crust has not yet occurred.

The deep-water area offshore Suriname, consisting of extended oceanic crust, containing 'pull apart basins', has not been explored, but 2D seismic data was acquired over that area in 2007, allowing preliminary evaluations to be conducted. These early results are encouraging and will lead to further evaluations in the future. At this time however, the question remains, 'Is there hydrocarbon potential in extended oceanic crust basins and if so what are the geological risks and other technical challenges associated with it?' This paper presents the results of preliminary analysis of the oceanic crust basins offshore Suriname that highlights and addresses some of these issues.