

Boom and Bust: The Deepwater Cretaceous Plays of the Mid-Atlantic Margins

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ABSTRACT

Exploration for Upper Cretaceous stratigraphic traps along the Mid-Atlantic margin has proven a roller-coaster ride, no less brutal than the product price cycle. The occasional much-publicized success has led to a frenzy of activity, only too often to lead to significant disappointment. Key highlights include the Jubilee Field in the Tano Basin in Ghana and the Liza Field in the Guyana Basin. But for every success there are multiple sub-commercial discoveries (Liberian margin), and often significant disappointment following appraisal of an initially promising discovery (Zaedyus). This paper will review the relatively brief history of exploration for deep water (>1000 m) stratigraphic traps along these margins, commencing with exploration in the Gulf of Guinea in the 1990s, to the most recent successes in 2017. It will compare the success rate (both geologic and commercial) between this play and more conventional plays along the margins. We propose that the key issue is not to discover hydrocarbons, but to identify accumulations or clusters of sufficient size to allow for commercial development in a deepwater setting. In terms of hydrocarbon presence (as opposed to quantity) this play is in fact rather successful, as key play elements are often well established: - availability of adequate migrated hydrocarbons is frequently demonstrated by discoveries in the onshore or shelfal areas; - modern 3D seismic has allowed identification and imaging of fan and channel systems, pre-drill, minimizing reservoir presence risk; - in the deepwater setting, top seal is unlikely to be a major risk, so long as prospects are distal from the sand input point where stacked canyon systems are common. Trap risk of course remains appreciable, but modern seismic allows identification of lower risk traps (e.g. by identifying minor faults in the up-dip/neck region). As noted above, the key to effective commercialization is hydrocarbon volume, although factors such as operating cost, commodity price, market forces, etc., are also impactful. Variables which may control volume include the nature of the margin (strike-slip versus passive); storage on the slope; distance of the accumulation from the sand input point; the degree of reservoir ponding; the extent of detachment between slope and basin-floor; and structural dip of the accumulation. Understanding the impact of these variables can enhance exploration success in new frontiers along the margin (e.g. Suriname, Equatorial Brazil).