Deepwater exploration along the West Africa Transform Margin: a retrospective and an outlook

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Since the year 2000, the equatorial West Africa Transform Margin (WATM) has received considerable investment in deepwater exploration activity through multi-client seismic campaigns, geological and geophysical studies, and the drilling of 74 exploration wells. This investment resulted in more resounding failures than commercial successes. Only within a small segment of the Tano Basin of West Ghana and nearby off-shelf drilling in the Cote D'Ivoire has exploration delivered multiple oil and gas discoveries that have gone on to become development projects and potential commercial successes (e.g., Baobab, TEN Fields, and Jubilee). Within the other basin segments that make up this region of oblique Cretaceous rifting, moveable hydrocarbons were found, but low discovered volumes, effective reservoir problems, as well as a low-oil price environment, have deterred recent investment.

Before attempting to predict the future trend of exploration along this margin, a brief retrospective on deepwater exploration drilling is provided. We focus on three prominent basin segments: Benin, Cote D'Ivoire, and Sierra Leone, looking at exploration results, including those of Shell's Houmelan-1 well in Benin, and summarizing what these tell us about the Atlantic margin petroleum systems and the deepwater plays they targeted.

To justify future exploration investment in a complex tectonostratigraphic setting that has historically delivered mostly limited technical success, explorers, engineers and economists need to provide concrete answers to three fundamental questions: (1) What do we need to find down-hole to have the best chance of delivering a healthy full lifecycle, free cash-flow positive development project in a variable oil price environment? (2) Which under-explored parts of the Equatorial African-margin have the right geology for this? (3) On what plays should the industry focus near-term activity to have the highest chance of success?

This paper concludes by looking to the future. In doing so, it concentrates on potential remaining rewards rather than dwelling on the risk that future exploration investment along this margin destroys corporate value. Against the latter challenge our industry needs to maintain its optimism, retain its credibility, and continue to strive to deliver the hydrocarbon molecules needed to help the economies of West Africa prosper.

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