

Are Stratigraphic Traps More Risky?

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ABSTRACT

Historically, stratigraphic traps have been perceived to be more risky than structural traps. This study analyses 230 exploration wells worldwide that targeted stratigraphic traps in clastic reservoirs since 2008, to investigate if this perception is justified. Over the study period, only 14% of exploration wells globally have targeted stratigraphic traps. They had an average Technical Success Rate (TSR) of 48%, comparable to other trap types, and an average Commercial Success Rate (CSR) of 26%, which was 10 percentage points lower than other trap types on average. Most stratigraphic traps tested during 2008-2016 were located in passive margins targeting Cretaceous and Tertiary turbidite complexes, with half of them located in deepwater (>500m) areas. Performance in stratigraphic traps needs to be reviewed on a basin and analogue basis to remove other play risks that have a greater impact on performance than the trap type itself. The Cretaceous turbidite play along the eastern Atlantic Margin has been one focus area, covering basins from Morocco to Namibia. Whilst stratigraphic traps along the margin have had a TSR of 60%, only the eastern Tano Basin has delivered commercial volumes so far. Well failure and success analysis show that the non-commercial volumes associated with discoveries outside of the eastern Tano derive largely from the basin configurations, influencing turbidite deposition and resulting in a lack of charge focus. In many cases, stratigraphic traps have taken the blame, but the causes for low CSRs are more profound and significant for the exploration potential of the whole margin. In areas where turbidite systems can be connected and hydrocarbon migration focal points exist, there is a greater chance of commercial success. Unfortunately, seismic attributes, even when effective, do not appear to de-risk reservoir connectivity. The dataset reveals that stratigraphic traps delivered larger average discovery sizes for oil than other trap types – driven by the eastern Tano discoveries and Liza discovery in Guyana. Stratigraphic traps had low finding costs overall at c.\$1/boe. Success rates and finding costs can match or better structural traps in some areas, especially for gas plays. Stratigraphic traps do not appear to be inherently riskier, although success in these plays relies on using the right geoscience tools and ensuring integration of the trap element into the entire petroleum systems analysis.