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Deepwater Reservoir Learnings from the Zafiro Field, Equatorial Guinea and Implications for Ultra Deepwater Production

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Deepwater reservoirs continue to provide new technical challenges for hydrocarbon development and production. These reservoirs have complex environments of deposition and architectures that must be well understood to ensure optimal resource development and hydrocarbon recovery. Technology advances including higher resolution 4D seismic data coupled with the application of sequence stratigraphic concepts in deepwater reservoir settings has resulted in breakthrough improvement in the understanding of deepwater reservoirs. In the Zafiro Field, technology-driven insights have provided a greatly improved understanding of deepwater slope channel systems that can be applied to the ultra deep. The Zafiro Field, Equatorial Guinea was discovered in 1995 and is composed of stacked Pliocene deepwater slope channel deposits that record large scale clastic input into the Gulf of Guinea following partial collapse of the paleo-Niger delta. High-resolution 3D and 4D seismic datasets are calibrated by over 65 well penetrations, with >3500ft of conventional core and 7 years of production data. In this paper we explore the linkage between physical stratigraphy, environments of deposition, reservoir architecture and resulting production performance found in the deepwater slope channel systems of the Zafiro Field. The Pliocene canyon fill is organized into three compensationally stacked composite sequences. Each displays an overall fining-upward trend from traction-dominated to suspension-dominated deposits associated with a temporal evolution in plan-form geometry. A comprehensive knowledge of the architecture, continuity and connectivity of slope channel reservoirs has been gleaned from the Zafiro Field. These insights will be critical to the successful pursuit of future ultra-deep water opportunities.