

# THURSDAY AM POSTER ABSTRACTS

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## **Depositional Controls and Sequence Stratigraphy of Lacustrine to Marine Transgressive Deposits in an Active Rift Basin, Cretaceous Bluff Mesa, Indio Mountains, West Texas**

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Successful hydrocarbon exploration in former rift basins of the South Atlantic pre-salt has generated interest in understanding depositional, diagenetic, and stratigraphic controls on pre-salt deposits. However, most studies to date have focused on attributes and controls on pre-salt lacustrine carbonate reservoir systems and little work has been done on the overlying marine sealing facies. Currently our standard sequence stratigraphic model of marine transgression of rift systems involves a single pulse of marine flooding of fluvially incised valleys resulting in back-stepping of fluvial and estuarine siliciclastic facies within the erosionally confined zone of an incised valley. However, the pre-salt systems of the South Atlantic involve deep and broad alkaline lakes containing microbial carbonate facies that were deposited on rift structurally generated geomorphic surfaces. Using an outcrop analogue, this study aims to provide a depositional and stratigraphic model for marine transgression of lacustrine rift basin sediments that are similar in age, tectonic regime, and climatic setting to the pre-salt seal facies of the South Atlantic.

The Lower Cretaceous Bluff Mesa Formation was deposited on the eastern margin of the Chihuahuan Trough failed rift and is exposed within multiple Laramide-age thrust panels in the Indio Mountains of West Texas. The mixed carbonate-siliciclastic system thins from 360m to 220m across the study area and contains 9 fourth-order sequences that record

the transition from fluvio-lacustrine to shallow marine deposition. Sequences 1-4 are characterized by lacustrine siltstones or thin marine wackestones during highstands and fluvial sandstones during lowstands. Sequences 5-9 are characterized by thick ooid grainstones and fossiliferous packstones during highstands and shoreface to shelfal sands during lowstands. The presence of thin marine limestones in sequences 1-4 suggest that marine incursion occurred during highstands but the basin was still primarily a rift lake. A significant rise in base level occurred during sequence 5 marking the onset of continuous marine deposition. The observed succession of mixed terrestrial-marine sequences suggests transgression of rift basins involves multiple pulses. The understanding that there is a transitional zone has implications for seal integrity and distribution in South Atlantic plays, as well as reservoir quality in the upper strata of subsalt reservoirs.

