

ARCHITECTURAL ANALYSIS OF TECTONICALLY INFLUENCED SHALLOW WATER MOUTH BAR COMPLEXES, LOWER CRETACEOUS MAESTRAT BASIN, SPAIN: IMPLICATIONS FOR RESERVOIR CHARACTERISATION AND MODELLING

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ABSTRACT

Deltaic sandstones commonly form oil and gas reservoirs which are characterised by complex stratigraphy leading to difficulties in the accurate prediction of spatial and vertical facies variations (reservoir modelling). This is especially so where synsedimentary tectonics leads to rapid spatial changes in accommodation space and sediment transport trajectories. To help overcome this, well-exposed field analogues can be used as a guide for building and populating a reservoir model. In recent years, significant progress has been made, using field analogues, in the description and prediction of fluvial and deep marine facies architecture for reservoir modelling purposes. However, delta front architecture is considerably less well understood and this project aims to investigate the nature and controls of deltaic sand body architecture within the Galve sub-basin in eastern Spain.

The Galve sub-basin has a superbly exposed succession (at oil field scales) of shallow water deltaic facies and genetically related carbonates (Lower Cretaceous Xert Formation), providing the perfect opportunity for an outcrop analogue study. The studied succession was deposited during a rifting cycle that affected Iberia from the Oxfordian through to Albian and represents a high ranked regional transgression, showing a change from terrestrial fluvial facies (Barremian) to open marine shelf carbonates (Aptian). However, the shallow-water deltaic succession (Barremian – Early Aptian), represents a series of lower ranked regressions that overall, exhibit a retrogradational parasequence set stacking pattern. The multiple sediment input points and syn-tectonic nature of the basin have led to a significant variation in facies, architecture and sand body stacking patterns. A combination of a drone, high resolution (1:25), closely spaced (10s m) sedimentary logs, architectural element analysis, and sequence stratigraphy will be used to capture these variations. The results will demonstrate how shallow water deltaic sandbody architecture can be described and evaluated along with how these techniques can be applied in reservoir characterisation and modelling studies.