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Dynamic Validation of the TAGI Fluvial Reservoir Model in the Giant Ourhoud Field (Berkine Basin, Algeria)

Ourhoud is one of the world's major ongoing on-shore field developments. An interdisciplinary approach identified the main drives in reservoir heterogeneity. These are the facies architecture, a marked diagenetic overprint and reservoir compartmentalization.

Facies were modeled within a geostatistical framework using a sequential index simulation to reproduce the Triassic floodplain architecture. Sandbody distribution and connectivity was characterized with an object-based simulation of channel-belts downcutting into the floodplain.

The dominant diagenetic feature is a clear increase in quartz cement content with depth. It is independent from changes in stratigraphy or facies. This trend is strongly correlated with a decrease in porosity and permeability. Therefore, petrophysical properties were restored to a datum before populating the model constrained to facies. Multiple well interference testing identified flow barriers that were allocated in the seismic interpretation to define reservoir compartments.

With this workflow, a fine 3D reservoir model was constructed and its dynamic behavior was tested with streamline-based simulation. A consistent response was observed when comparing, simulated versus actual, pressure responses from the interference test. The same technique was applied to choose the best-adapted upscaling scheme.

Confidence in the reservoir description was confirmed when the upscaled 3D model was simulated using finite differences method. The dynamically validated static reservoir model will be a reliable tool to assess hydrocarbons in place, production profiles and recovery in the Ourhoud Field.