

Outcrop Analogues for Reservoir Characterization - Examples from Lusitanian Basin's Post-Rift Units

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ABSTRACT

Reservoir units are usually identified and characterized based on their seismic imaging, trying to extract geological and petrophysical properties from geophysical large-scale and low-resolution attributes. The access to outcropping real-scale analogues is therefore a crucial tool for such approaches and to improve the accuracy of the interpretations. The Late Jurassic deposits of the Lusitanian Basin (Western Iberian Margin) are excellent examples of outcropping syn- to post-rift siliciclastic sequences with carbonate and mixed intercalations, allowing to know in detail their characteristics as potential reservoir units. Kimmeridgian syn-rift sediments correspond mainly to siliciclastic turbidites (Abadia Fm) filling-up subsiding axial depocenters, laterally fed by alluvial inputs (Alcobaça Fm). The post-rift sequences record strata deposited in shallow-water carbonate platform, with coral barriers and nearshore brackish bays and lagoons (Late Kimmeridgian, Amaral Fm), overlain by fluvial-deltaic with a few marginal marine intercalations until the end of the Tithonian (Lourinhã Fm). North of Lisbon, 20-30 m high coastal cliffs continually expose for around 30 km the Late Kimmeridgian to Tithonian mainly siliciclastic succession, around 1 km thick. From the fort of Consolação to the beach of Areia Branca, a 7 km long continuous outcrop shows the lower half of this succession, around 600 meters thick and gently dipping to the South. Several fourth-order and a few third-order sequences may be defined within this broadly progradational package. Field-based multi-scale analyses may be used to characterize these units, including high-resolution sequence stratigraphic framework, reservoir 3D geometries and connectivity, facies and petrophysical properties, etc. Detailed logging is available and reservoir characterization and modelling has been developed at various scales, namely to serve as analogues for the Lower to Middle Jurassic Statfjord, Dunlin and Brent Groups (North Sea). This contribution presents the overall characteristics of this outcropping succession and its potential for high-resolution sequence stratigraphy application to support production development projects both within the scope of scientific research projects and/or as part of technical field-trip training.