

Facies Analysis, High-resolution Sequence Stratigraphy in the Epeiric Carbonate Platform, Kharaib Fm., Western Margin of Abu Dhabi, UAE

Kevin Michael Torres, Beltrán Alberto Balza

Main Objectives:

This work presents the results of semi-regional stratigraphic-sedimentological analysis, interpretation of epeiric carbonate platform sub-environments concatenated in system tracks of the complete third-order Barremian sequence and the subsequent integration with well logs data as well as extrapolation of main stratigraphic surfaces in western margin of Abu Dhabi onshore oil fields.

Total of 16 cores were used to describe 21 sedimentary facies, which were later grouped genetically into 6 facies associations that reflect deposition in distinct sub-environments within the epeiric carbonate platform.

Well logs data were used for petrophysical characterization of sedimentary facies response in order to allow the stratigraphic correlation of main surfaces along studied area.

Finally, stratigraphic correlations, facies variation maps per system tracks and chronostratigraphic charts have been constructed using the key wells, and conditioned using additional log data.

The sequence at the base is marked by subaerial exposure manifested by the presence of mature paleokarts features. The interval is composed by coated grain-rich and algal-bearing facies interbedded with skeletal packstones forming fining-upward cycles. The top of algal rich sediments, are limited by a regional surface that divide the algae dominant environment from deeper environments. The micritic nature of the fine grained sediments, associated with an increase in clay content, reflects deposition within a lower ramp environment and is related to the maximum flooding interval.

Immediately above the maximum regional flooding interval start implanting a progradational stacking pattern, composed by a facies succession that forms in general a single large-scale cleaning-upwards cycle from argillaceous wispy laminated wackestones and packstones, through algal-bearing thick interval, to coated grain and rudist-bearing facies at the top.

Proportion of facies association were estimated in cores and the lateral variation were mapped per system tracks, expressed in sedimentary maps, which allowed identifying the lateral variation of sub-environments and presumably estimate the paleo-topography in which the sediments were deposit.

New aspects:

This stratigraphic analysis led in establishing a semi-regional sedimentological and stratigraphic framework, which predict the occurrence of sub-environments which are all over the Barremian sequence, allows extending the stratigraphic surfaces in wells without core information as wells as the sedimentary maps may be used to understand the lateral variation of main facies during exploration activities.