

Seismostructural and Sedimentologic Evolution of the Callovian-Oxfordian Reservoir of the Toukimt Field (Essaouira Basin, Morocco)

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In the Essaouira basin, the Callovo-Oxfordian platform constitutes a model of carbonate reservoir that produces gas and condensate. The geodynamic data, following the study of seismic sections covering the Toukimt field, and the data of the TKM 201 well, allow identification of three stages of evolution: A Pre-rifting stage (seismic sequence A); A Rifting stage (seismic sequence B); and a Post-rifting stage (seismic sequence C). Salt tectonic constitutes the major structural event having conditioned the physiomy of the current structure of Toukimt.

The isochron map of a horizon near top Argovian reservoir shows that this one is organized in a roll-over anticline type, and related to a network of complex faults with multiple reactivations.

The sedimentological data, resulting from the microfaciologic analysis of the Callovo-Oxfordian interval of the TKM 201 well, show the existence of several systems of biotrititic shoals dominated by granular sediments, where the zoogenic debris can reach up to 80 %. These prograding shoals are developed in a shallow carbonated platform, regularly swept by storm currents.

The electro-sequential analysis of the Callovo-Oxfordian of the TKM 201 well shows that the hydrodynamic parameters reflect two types of electro-sequences with positive and negative trends. These sequential data show that the Callovo-Oxfordian carbonated shoals are arranged into four depositional sequences: SD1, SD2, SD3, SD4, with asymmetrical and regressive evolution, marking the progressive filling of the basin.

The diagenetic data according to the chronodiagenetic analysis of the post-sedimentary transformations, consider that except for the mechanical and chemical compaction which are the principal inhibiting factors, early cementation and the late fracturation as well as dolomitization, contributed in a positive way to the improvement of the petrophysical properties, in particular the permeability supported by fracture porosity in crystalline dolomites of Argovian age.

Keywords: Callovian-Oxfordian, reservoir, sedimentology, diagenesis, petrophysical properties