

Lower Devonian of Oulad Abbou Area (Coastal Meseta, Morocco): Dynamic of Sedimentation, Diagenesis and Petrophysical Impacts¶

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At Oulad Abbou area, the lower Devonian shows a succession of several carbonated horizons which intersect with pelitic recurrences. It's organized in three lithostratigraphic members. Each one contains a pelitic term, an argilocarbonated term, and a carbonated term at the top. The lower member is distinguished by basaltic intercalations (doleritic), disposed on interstratified basaltic flows, meaning the end of a volcanic episode; the Siluro-Lochkovian passage.

The carbonate sedimentation is developed into a monocline platform carbonate of ramp type, and in an adjacent basin.

The lower Siluro-Devonian of the Oued Cheguigua shows a succession of three sequences of deposit: SD1, SD2, and SD3 which are respectively Siluro-Lochkovian, Praguian, and Emsian ages. Each sequence develops a prograding shelf margin, with calciturbiditic sediments, limited by a transgressive, bioturbate and bioclastic surface. The transgressive system tract is equivalent to the pelitic term. The highstand system tract marks the progressive installation of an encrinitic shoal, characterizing a high energy environment with a local fore-reef fauna.

The diagenetic analysis allows us to define the multiple phases of cementation and recrystallization which affect the granular facies. They led to a total lithification. The early dolomitization is distributed at the top of the SD2 and SD3 sequences. It leads to the formation of a crystalline rock resulting from a process of replacement-recrystallization of a muddy limestone. To these transformations, are added the compaction, the tectonic fissuration, and the associated phases of late dolomitization.

The potentialities of lower Devonian of Oulad Abbou as a reservoir rock, a preliminary study of its petrophysical properties was carried out according to two approaches:

- A qualitative petrographic, by defining porous spaces, and their relationships to the diagenetic transformations,
- A quantitative approach by the measurement of the petrophysical parameters.

Key words: Oulad Abbou, Sequential stratigraphy, Diagenesis, Petrophysical properties.