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Sequence stratigraphy of Mesdar field (Cambro-Ordovician, Algerian Sahara). Influence of diagenesis and fracturing on the petrophysic properties of reservoirs.

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The field of Mesdar (East-Algerian Sahara) is located on the extension toward the North of Amguid El biod high, and at the limit of the werstern edge of Berkin Basin.
The classical subdivision of lithostratigraphy is R3, R2, Ra and Ri reservoirs.
In this study the sequence stratigraphy concepts enable us to divide it into 12 parasequences correlatable with the parasequences defined by AIT SALEM and al (1993-1995) in the field of Hassi-Messaoud (A, A1, B1, B2, C1, C2, C3, C4, E, F, G1, G2).
The correlation of closely spaced wells at Mesdar shows that the variation of thickness is linked to the horst and graben structure.
The core analysis, petrographic description and fracture measurements, give an overall idea about mechanisms that produced the petrophysic properties of the reservoirs:
The sedimentary bodies constitute a transgressive complex. They comprise several distinct facies associations and sequence stratigraphic tracts.
1) Fluvial and coastal plain (L.S.T) with coarse to medium sandstone, planar and through cross stratification, and a top marked by ichnofacies.
2) Tidal inlet (T.S.T) medium to fine sandstone with bidirectional cross strata and parallel stratified beach deposits.
3) Proximal to distal shore face (H.S.T): medium sandstone with on the top fine material; parallel laminations highly bioturbed.
An attempt to interpret this series indicate that it was deposited in relation to a sea level rise phasis (cycle of 3rd order of Exxon) which allows the staking of 12 parasequences.
A petrographic study shows a decrease of grain size from the lower parasequences (A, B1, B2) fluvial and coastal plain) to the higher (G-F proximal and distal shoreface), with a net increase of fine cement.
The qualities of reservoirs are mainly controlled by sedimentological factors (morphology and sorting of grains) diagenetic factors (silicification, quartz corrosion, stylolithization, quartz dissolution, illitisation of kaolinite); besides that, the tectonics are the major factor that improved porosity and permeability by fissuring (fracturing) the different sedimentary bodies.
In fact the poor producing parasequences (B1, B2) have subangular and angular morphoscopy and a low internity of fracturing; while the parasequences G1 and G2 present a rounded morphoscopy and good porosity (14%) linked to the dissolution and intensive fracturation, are the best productive.
As a conclusion a reservoir model for the transgressive complex and fracturation is proposed.