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Reservoir Rock-types Determination Based on Wire-line Logs and 3D Petrophysical Modeling in Ahnet Basin Field

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SUMMARY

The vertical and lateral reservoir properties distribution over field scale is a critical factor that requires investigation for the appraisal wells drilling success.

This paper provides an approach based on a technical classification of rock-group, the so-called rock-typing technique. Each rock-type has specific sedimentological characteristic and homogeneous petrophysical properties. These rock-types are used in a 3D Static geocellular modeling.

This technique is used advantageously in Ahnet field uncored wells, where the interval studied is a layer-cake reservoir type and in which the lower part is generally producing gas.

An electrofacies characterization is performed for all wells with complete logs suites. The cores porosity (PHIE) and permeability (KH) are generally used in addition to the logs, to give a petrophysical sense.

Because of the low permeability values, these properties are not used and the core porosities are replaced by estimated porosities (PIGE).

Six (6) electrofacies are defined, simultaneously calibrated with estimated porosities PIGE and ranked progressively from clean sandstone (Rock-Type 1) with the best porosities to shale rock type (Rock-Type 6).
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Six (6) electrofacies are defined, simultaneously calibrated with estimated porosities PIGE and ranked progressively from clean sandstone (Rock-Type 1) with the best porosities to shale rock type (Rock-Type 6). The frequency histogram rock types illustrate the similarities between wells. However the best rock types 1 and 2 slightly predominate in the southern part of the field. The North-South well section globally shows the following succession: The lower interval contains essentially the rock type 2 and 3 succession overlaid by rock types 5 and 6 in the northern zone. The rock type 1 predominates in the southern field zone. The middle part of studied interval contains essentially the rock type 1 in the north, however with a predominance of rock types 5 and 6. The upper reservoir is made mainly by the succession of rock types 3, 4, 5 and 6. The rock types 1 and 2 are developed only in the southern field.

**Key words:** Distribution, Petrophysical properties, Electrofacies, Estimated porosities, Calibrated, Rock-Types.