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**Primary Facies and Diagenetic Controls on the Evolution of Petrophysical Attributes and Rock Type Distribution:
Example of West Mabruk Oil Field (Libya)**

The west Mabruk oil field (Sirt Basin, Libya) was separated into 3 depositional areas 1) a northern area where reef deposits prevail. 2) a central area dominated by lagoon deposits; and 3) a southern area characterized by protected inner platform deposits. The later presents numerous heterogeneities and it has been affected by secondary dolomitisation that can affect all Primary Facies deposits.

The objective of this study is to evaluate the overall lateral change in reservoir quality of the field. In order to integrate sedimentological, diagenetical and petrophysical data, a Primary Facies and Rock Typing classification was performed on several cores taken from the field.

The lateral variations of the facies is important in accounting for the geographic zonation of the petrophysical properties. In particular, the dolomite specifically occurs in the south, the biostromal limestone predominately in the north, and the algal-foraminiferal limestone's in the central area. The lateral change in primary facies has an impact on the porosity and permeability characteristics.

The Primary Facies defined mainly from depositional criteria such as fossil content and texture have a strong sedimentological significance in terms of depositional environment (reef, lagoon and shallow marine), and they display significant overlap in of their petrophysical signature.

The Rock Types are well identified petrophysically and display quite a good distinction in terms of porosity and permeability and an excellent superimposition of the Mercury injection curves. Petrophysical properties are more influenced by diagenetic processes than primary facies.

The results from the Primary Facies and the Rock Type study provide a better knowledge of the 3D distribution of petrophysical properties in the Mabruk. geological model.