

## **The Role of Biofacies in the Search for Stratigraphic Traps in Middle Jurassic Carbonates, Saudi Arabia**

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### **ABSTRACT**

A biofacies-based interpretation scheme using the vertical distribution of various biocomponents and their relationship with carbonate petrographic fabrics, reveals clear paleoenvironmental preferences. The Arabian Plate throughout the Middle Jurassic was dominated by shallow marine carbonates that were deposited in the low latitudes of the western Tethys. Periodically, the Arabian Plate was submerged and open-marine/basinal facies containing ammonites and other pelagic fossils were deposited as far as the outcrop belt in Central Saudi Arabia.

These facies interfinger with shallow marine facies, which have relatively high diversity foraminiferal assemblages with characteristic index taxa, enabling dating and regional sequence correlation across the Arabian Plate. During the Middle and Late Jurassic, intrashelf basins developed within this shallow marine platform and distinctive bioassemblages evolved as isolated communities. Although they are often of limited biostratigraphic application owing to ecological bias in distribution, their paleoenvironmental significance is crucial. Such paleoenvironmentally sensitive assemblages have been recorded in all Saudi Arabian Jurassic reservoirs and their significance increases as intrashelf basins form. These intrashelf basins are characterized by a spicule-filament predominant biofacies with basin-rims, predominated by a stromatoporoid biofacies. Mapping these biofacies can help identify potential sites of intrashelf basin margins where potential stratigraphic traps may form. Stromatoporoid and other biofacies also provide critical constraints in the search for potential stratigraphic traps at each stratigraphic level, allowing for delineation of other major regional depositional environments such as lagoons and basins.