Biostratigraphic and Sedimentological Modelling of the Upper Shuaiba Formation in North Oman. The Key to Effective Correlation

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The Aptian Shuaiba Formation is the subject of continued exploration interest in North Oman, with an ongoing PDO drilling campaign in the greater Malaan and adjacent area. Current geological studies are focussing on the integration of seismic mapping, sedimentology, biostratigraphy and isotopic analysis.

Seismic mapping has identified a series of clinoform geometries within the Upper Shuaiba. Well based correlations support this clinoform model, previously this work involved log trace matching with limited lithological input, and the model required calibration with other well generated datasets. Several similar clinoform-like shoal trends can be recognized in the area. Confidence in interpretation levels varies across the area and a well based confirmation of the clinoform model can provide support for the validity of the exploration play concept.

In order to improve the understanding of these structures and the detailed internal reservoir architecture biostratigraphic analysis has been undertaken using core samples primarily, together with ditch cuttings.

Biostratigraphic analysis employs the integration of quantitative micropalaeontological data (thin section and routine) together with nannofossil data. Significant lateral and vertical assemblage changes are evident between and within reservoir units, representing a range of palaeoenvironments from lagoonal to open marine. The frequency of biofacies and depositional cycles is dependant primarily on sampling interval. Small scale changes in biofacies composition should allow for high frequency cycle recognition.

The recognition of discrete biofacies related to specific depositional environments has been used to fingerprint carbonate / mud cycles within the Upper Shuaiba. Integration of these data with sedimentological and seismic information enables enhanced stratigraphic resolution of the reservoir units, improved inter-well correlation, and reservoir modelling.