

Wasia Formation Shelf to Platform-Margin Transition Determined From Cores Tied to Seismic Data: Southern Rub' Al-Khali, Saudi Arabia

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ABSTRACT

Observations made on Lower Cretaceous Wasia Formation cored intervals helped evaluate seismically-based, interpreted environments of deposition (EODs). Two independent studies were performed to determine possible EODs: one based on cores and the other based on seismic facies.

From the core based study, two wells penetrating likely platform and upper-slope deposits were selected for additional petrophysical analysis. The first was interpreted to have penetrated a shallow lagoon EOD. Observed lithologies include grain-dominated packstones and grainstones alternating with mud-dominated packstone. Core, NMR, and wireline logs indicate porous and permeable strata (~ 10 to 100mD) consistent with shallow-marine deposition. The second was interpreted to have penetrated platform margin to slope EODs. Observed lithologies include peloidal- packstones and grainstones alternating with mud-dominated packstones. Core, NMR, and wireline logs indicate porous strata with lower permeabilities (~ 1 to 10mD) consistent with relatively deeper marine deposition.

In an independent analysis based on seismic facies, a shelf-/platform-margin model was selected to link seismic observations to interpreted EODs on the basis of integrating geologic observations and ranking of key points from the literature. The EODs interpreted from seismic data used a legacy method and workflow specific to the Wasia made on 3D data over +9000 sq. km area.

The lithofacies interpreted from the cored intervals were noted with respect to their likely shelf-/platform-margin positions and likely EODs as determined from the cores. The EODs determined from the cores alone were compared with the EODs determined from analysis of seismic facies. When EODs interpreted from the cores were tied back to EODs interpreted from seismic data, the independently derived EODs are remarkable in their agreement, pointing to the robustness of this legacy seismic facies method and suggesting that it has much to offer in cases where cored intervals are typically lacking.