Evidence of Aptian Lithocodium Mounds from Borehole Images and Comparison with Oman Analogues

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Abstract

Objectives:
Lithocodium mounds are early Cretaceous sedimentary structures described in the literature from outcrops, however never described in the subsurface. The objective of the work is to identify and characterize Lithocodium mounds in the subsurface along a 25,000 ft horizontal well.

Procedure:
Drill cuttings sampled at a 100ft interval were observed in thin-section to define and quantify key sedimentary indicators (bioclasts, facies and texture). LWD GR, Density Neutron, resistivity logs were acquired along with Logging while Drilling (LWD) high resolution borehole image log (BHI).

Results:
Bedding dips from BHI data, interpreted along the horizontal well enabled the reconstruction of the reservoir paleo-topography. In particular, the alternation of dip azimuth, combined with the facies interpretation from thin section supported the interpretation of 8 distinct mound structures. An assessment of their overall geometry confirmed the mound shape to be subcircular, consistent with the subcircular geometries observed in Oman at outcrop. The inferred dimensions of the mounds are comparable with the Aptian Lithocodium mounds in Oman (30 to 40 m), and their intermound organization resembles that of Albian mounds in Texas.

Conclusions:
This work demonstrates the value of analyzing cuttings to complement image log interpretation as well as the value of outcrop analogues for interpreting sedimentary structures. For the first time, subsurface identification and characterization of Lithocodium mounds and intermounds was achieved.