Know your Sands, but Know your Mass Transport Deposits Even More: High Resolution Borehole Images Illuminate the Reality of Sands in the Deepwater Gulf of Mexico

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ABSTRACT

Geoscientists working in the deepwater Gulf of Mexico (GOM) know that mass transport deposits (MTDs) exist in the sedimentary column, and to study their impacts, when subsalt plays do not have good seismic resolution to capture detailed geology, geological evaluations rely on borehole images. It was only a few years ago that new borehole imaging technology was developed to make possible detailed evaluations. These new images have unraveled a whole new picture of the geological landscape in the deepwater GOM—a landscape that is heavily sculpted and dominated by mass transport deposits.

Borehole images have revealed that MTDs, due to their immense energy and expanse, change the entire depositional framework in the region they impact. MTDs are often responsible for how much of a deposited sand body survives, and where sand accumulates. Whereas, many sands are observed to be normally deposited, with a normal waning energy sequence observed in the upper end of the sand, borehole images also reveal, in other cases, an end of the sand that is marred by an MTD having scoured away what might have been several tens of feet of the sand. Conversely, many sands find their deposition enabled by the new topographic cradle, a possible minibasin or even microbasin, formed by the MTD.

This paper illustrates the impact of MTDs on sand deposition and sand body survival. Sand depositional interpretations, as afforded by today's borehole images for the GOM, are presented, showcasing the direct sand deposition control by MTDs. From a field development perspective, the abrupt termination of a reservoir caused by MTDs creates a complexity not considered before. At the same time, the field development teams now have very apt technology, the borehole image now possible in the OBM drilled wells of the deepwater GOM, to help unravel the MTD sand complex.

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