PETROPHYSICAL COMPLEXITIES OF A PROGRADING REEF MARGIN

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ABSTRACT

Reservoir properties characterization in reef system can be challenging due to their complex petrophysical variability. The petrophysical complexity or variations are often below the resolution of geophysical tools and thus, their prediction from seismic or well data relies on complementary high-resolution laboratory petrophysical study integrated with geological analysis. Nevertheless, few studies provide detailed characterization of lithological, diagenetic, age and petrophysical properties in order to accurately characterize these complexities.
This study provides a robust integrated dataset based on a 7-core transect through an evolving 1.6 Ma Pleistocene margin in the Southern Dominican Republic. These reefal carbonates show various degrees of diagenetic progression including; unexposed deposits to meteorically altered, and dolomitized. Integration of petrophysical laboratory measurements (porosity, permeability, acoustic velocity, and electrical resistivity), with core-based lithologic description, thin-section petrography, diagenetic analysis, and digital image analysis enable a comparison of the geological interpretation (rock textures, pore types, depositional environments, and diagenetic environments) and measured petrophysical properties.

The integrated dataset will provide new insight into interconnected relationships within carbonate fringing margins that can further be incorporated into geotechnical and mechanical models. In addition, we will develop a gridded model from core measurements and stratigraphic data that can be used to assess optimal seismic acquisition parameters and limits of imaging resolution within the reefal margin.

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