DEVELOPING PREDICTIVE SEQUENCE STRATIGRAPHIC & SEDIMENTOLOGIC MODELS FOR EXPLORATION AND RESERVOIR CHARACTERIZATION OF MIOCENE MIXED HETEROZOAN-PHOTOZOAN RAMP SYSTEMS IN TROPICAL SETTINGS

Elson Core
University of Kansas, Department of Geology, Lawrence, KS, USA
core@ku.edu

ABSTRACT

Tropical carbonate ramp systems composed of heterozoans plus those photozoans that tolerate adverse conditions are important in the rock record and form petroleum reservoirs (e.g. Perla Field offshore Venezuela). Compared to normal tropical systems (e.g. Bahamas-rimmed-platform), there is a lack in understanding of controls on facies types and distribution, stratigraphic architecture, and reservoir character. This is especially true for ancient tropical settings affected by adverse conditions. The Caribbean region during the Miocene was affected by upwelling, which had a major effect on development of shallow-water carbonate systems in this tropical setting. Adverse photic zone conditions prevented the development of typical photozoan rimmed-platform systems, and instead, shallow-water ramp systems with complex mixtures of heterozoans and certain photozoans developed. My research is focused on exceptional exposures of Miocene in the Dominican Republic and Jamaica. These areas are ideal for evaluation of various controls on the systems, including relative sea-level history, paleotopography, paleogeography, paleoceanography, and influx of land-sourced siliciclastics. Methods of study in each area include measuring stratigraphic sections, physically tracing strata and surfaces and marking on photomosaics, documenting facies, sedimentary structures, structural data, features indicative of sea-level position, and "way-up" indicators for paleotopographic reconstruction. 300-500 samples will be collected from each area for petrographic study to collect quantitative facies data, and obtain petrophysical (porosity and permeability) data. Bivalves samples will be collected for strontium isotope data to aid in development of chronostratigraphic frameworks. Models for systems with heterozoans (+/– some photozoans) must include additional controls on carbonate production (e.g. currents and nutrients source) and physical processes that cause reworking and transport; sea-level changes, water energy, and substrate slope angles are important. Results from this study will further our understanding of controls on sequence stratigraphy, facies distribution, and reservoir character that can be used to understand similar systems, including those forming reservoirs in the subsurface.

AAPG Search and Discovery Article #90298 © 2017 AAPG Foundation 2016 Grants-in-Aid Projects