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Modern Analogs for Carbonate Reservoirs – Great Bahama Bank Revisited

Study of modern depositional environments in the Bahamas formed a cornerstone of carbonate facies analysis in previous decades. Numerous workers provided details on facies types, depositional processes, and early diagenesis that were incorporated into the development of classical carbonate facies models. The Bahamas continue to be an invaluable modern laboratory for a new generation of studies that focus more on the details of reservoir distribution and evolution through time. Modern environments are valuable as analogs for conceptualizing the spatial distribution of reservoir facies within a single time-slice and for obtaining a first-order quantitative approximation of geometrical attributes for potential reservoir facies. Combining remote sensing data such as satellite images and aerial photographs with surface sediment maps provide facies trends and dimensionality data that can be used to show patterns and assist the modeling of a reservoir relative to simulated well spacing. These two-dimensional data are of even more value when combined with either results of coring studies from modern environments, or from detailed outcrop work that provide the third (i.e. vertical) dimension to the reservoir system. Combining this geometrical data with recent advances in our understanding of early diagenesis enhances the predictability of probable reservoir and flow unit distribution in the subsurface. New insights, such as the potential for syndepositional marine cementation at depths up to 100m, the presence of "meteoric" diagenetic fabrics in marine burial environments, and effects of pore architecture on petrophysical characteristics of carbonate rocks have all led to a better understanding of the distribution of potential reservoirs in the subsurface.