

Lithification of 65-Year-Old Carbonate Spoils Piles

Nathan M. Snyder

Department of Geology and Geological Engineering, University of Mississippi, University, MS 38677-1848, nmsnyder@olemiss.edu

The harbor of Stocking Island, 2 kilometers east of Great Exuma Island, Bahamas was dredged in 1942. The spoils were deposited on the west shore of the island as four separate piles collectively measuring approximately 350 x 50 meters in plan view and approximately 2 meters high near the centers. Spoils piles are on the leeward side of Stocking Island and are exposed to minimal wave energy. The spoils are composed of small to medium sand-sized aragonite grains, mostly spherical to oval in shape, that are almost completely micritized. Those grains that can be identified are mostly coral and mollusk fragments.

The grains are cemented by up to 30 bulk % meniscus cements that are dominantly calcite, indicating that cementation occurred after dredging. The remaining porosity is up to 26 %. Although there are no quantitative measures of permeability in these rocks, observations during a violent thunderstorm indicate that these spoils piles are highly permeable and well flushed with meteoric water. Inasmuch as there is not an updip source of carbonate to form these cements, the carbonate source is assumed to be internal to the spoils piles. There is, however, no evidence of dissolution in any of the samples collected. These cemented modern sediments are lithified, and unconfined compression strength is estimated to be between 45 and 50 Mega Pascals. Thus, as a partly lithified carbonate grainstone, these spoils piles serve as an analog for early porosity evolution in hydrocarbon reservoirs.