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Stratigraphy and Diagenesis of Pleistocene Eolian Deposits from the Northern Coast of Puerto Rico

The morphology and geochemistry of cements in Pleistocene eolian deposits from Cueva del Indio, Punta Morrillos, and Breñas on the north coast of Puerto Rico suggest that timing of deposition and cementation varied. When diagenesis of the Cueva del Indio eolianite was compared to that of the Punta Morrillos and Breñas eolianites, a shorter period of diagenesis and relatively younger age was established for these former sediments. This interpretation is based on the presence of greater amounts of remnant aragonitic bioclasts and its closer proximity to the coast. In contrast paleosols located 5 meters above sea level at Punta Morrillos, suggest a reactivation surface caused by a relative drop in sea level and a pause in formation of the eolian dunes. This was followed by a relative rise in sea level that renewed eolian accumulation. During the initial fall in sea level, younger seaward dunes were formed. These were then inundated in the relative rise in sea level that followed and was recorded by the prismatic morphology of the cements and elevated traces of strontium and sodium. It was concluded that: (1) since vadose meniscus and pendant cements were altered early in the diagenetic sequence, these fabrics cannot be used to characterize ancient eolianites; and (2) cement morphology and trace elemental composition suggest that the later rise of 5 meters in relative Holocene sea level recorded at Cueva del Indio, Punta Morrillos, and Breñas eolianite produced second stage cements that were precipitated in marine phreatic and/or intertidal settings.