

ABSTRACT

The relationship between coastal processes and the evolution, sedimentology, morphology and stability of the Palisadoes tombolo was studied.

The wave climate comprises perennial, trade wind generated swell and diurnal, sea breeze generated waves. After control and modification of wave generation and approach directions, both wave forms approach the Palisadoes predominantly from the south east, and initiate almost constant east to west littoral drift. Wind waves initiate foreshore erosion during daytime, while the swell returns sediment onshore after cessation of the sea breeze. Storm and earthquake events have historically interrupted normal coastal processes, considerably modifying coastal morphology at those times.

Subaerial beach morphology is shaped by several interacting variables including wave energy, beach sediment size and man's interference. Long-shore bars and transverse bars were observed in the gently sloping region offshore from the eastern end of the Palisadoes: both appear to be permanent features of the littoral zone.

Historical trends of Palisadoes shoreline movement include southerly migration of the root section; recession between Plumb Point and Little Plumb Point, and accretion at Port Royal. However, short-term beach surveying generally failed to indicate trends of shoreline accretion or erosion.

Beach sediments mainly comprise terrigenous clastic material. Fining in mean grain size of foreshore sediment up to Rocky Point was attributed to sediment abrasion, with coarsening beyond accounted for by relative enrichment of coarse sediment after removal of fines to deep water. Carbonate mud infiltration represents the first stage of beachrock formation. Beachrock cement mineralogy is Mg-calcite; cement morphology is semi-opaque microcrystalline micrite.

Coastal zone management can be improved by creation of foredunes on the root section of the tombolo; re-assessment of construction methods and effectiveness of groins and revetments, and study of the influence of gravel mining in source rivers on sediment supply to the coastal zone.