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# Recent coastal evolution in a carbonate sandy environments and relation to beach ridge formation: the case of Anegada, British Virgin Islands

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In a changing climate context coastal areas will be affected by more frequent extreme events. Understanding the relationship between extreme events and coastal geomorphic response is critical to future adaptation plans.

Beach ridge landforms commonly identified as hurricane deposits along tropical coasts in Australia and in the Caribbean Sea. However their formative processes in such environments are still not well understood. In particular, the role of different extreme wave events (storm waves, tsunami waves and extreme swell), in generating beach ridges is critical to their use as palaeotempestology archives.

Anegada Island is a carbonate platform situated in the British Virgin Island between the Atlantic Ocean and the Caribbean Sea. Pleistocene in age, Anegada is surrounded by the Horseshoe fringing coral reef. Two Holocene sandy beach ridge plains are present on the western part of the island. The north beach ridge plain is Atlantic facing and has at least 30 ridges; the south beach ridge plain is Caribbean Sea facing and contains 10 ridges.

Historical aerial photos enabled the shoreline evolution from 1953 to 2012 to be studied. Three different coastal domains are associate with the beach ridge plains: strong east-west longshore transport affects the north coastline, the south-west coastline from West End to Pomato Point represents an export corridor for these sediments and finally, along the southern coastline, from Pomato Point to Settling Point the area presents a depositional zone with little to no change in the last 70 years.

The link between the extreme wave events that have affected Anegada Island in the last 70 years and beach ridge creation is discussed. Hurricane Donna crossed over Anegada Island in 1960: its geomorphological signature is tracked in the shoreline change analysis and its implication in beach ridge formation is discussed. Anegada Island has also been impacted by tsunami waves (Atwater et al., 2012) and a comparative discussion of the effects of hurricane and tsunami on the island will be presented.

Atwater, B. et al., 2012. Geomorphic and stratigraphic evidence for an unusual tsunami or storm a few centuries ago at Anegada, British Virgin Islands. Natural Hazards, 63, pp. 51-84.