



Morphosedimentary evolution of carbonate sandy beaches at decadal scale : case study in Reunion Island , Indian Ocean

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Global change introduce a lot of uncertainties concerning future trajectory of beaches by directly or indirectly modifying major driving factors. An improved understanding of the past shoreline evolution may help for anticipate future coastline response. However, in tropical environment, studies concerning carbonate beaches dynamics are scarce compared to open sandy beaches. Consequently, coral reef protected beaches morphological adjustment is still poorly understood and long-term evolution rate are poorly quantified in these specific environment.

In this context, La Reunion Island, insular department of France located in Indian Ocean, constitute a favoured laboratory. This high volcanic island possesses 25 km of carbonate beaches which experience hydrodynamic forcing specific from tropical environment: cyclonic swell during summer and long period swell during winter. Because of degraded coral reef health and high anthropogenic pressure, 50% of the beaches are in erosion since 1970s. Beach survey has been conducted since 1990s by scientist and are now encompassed as pilot site within a French observatory network which guarantee long-term survey with high resolution observational techniques. Thus, La Reunion Island is one of the rare carbonate beach to be surveyed since 20 years.

This study aims to examined and quantify beach response at decadal scale on carbonate sandy beaches of Reunion Island. The study focus on 12 km of beaches from Cap Champagne to the Passe de Trois-Bassins. The analyze of 15 beach profile data originated from historical and DGPS beach topographic data confirm long term trend to erosion. Sediment lost varies between 0.5 and 2 m³.yr⁻¹ since 1998. However longshore current have led to accretion of some part of beach compartment with rate of 0.7 to 1.6 m³.yr⁻¹. Wave climate was examined from in-situ measurement over 15 years and show that extreme waves associated with tropical cyclones and long period swell play a major role in beach dynamics. Swell frequency and intensity are both determinant for beach evolution.