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Lagoonal islets as indicator of recent environmental changes – The caledonian example

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Sandy islets ("Caye") of New Caledonia have a major role in the lagoonal ecosystems and a high importance in the Caledonian culture and way of life.

One of the recurrent issues for people and governmental agencies concerns the islets's future in the perspective of Climate Change and Sea Level Rise.

In this context, the Coastal Observatory of New Caledonia (OBLIC) has initiated research about the recent and present evolution of islets in order to predict their "behavior" and their future. The past evolution trends at pluri-decadal scale as well as present behaviors are highly variable from one islet to another from slight accretion to huge erosion and land loss (fig. 1) which endanger the islets.



Figure 1: Coastal erosion (Petit Ténia islet)

Analysis and observations show that six main stages constitute the life-cycle of Caledonian islets, namely: nucleation, growing, maturity, decay, relic and endangered. Changes of environmental parameters act as forcing factors which can drive the islets evolution from one stage to another. The becoming of each islet is linked to its geomorphology, its location within the lagoon, its past evolution, its present state and future evolution of environmental parameters. Parameters are linked to the climate variability like ENSO or IPO which control

the intensity and direction of trade winds and the average sea level in the SW Pacific. Forcing factors include also extreme events like cyclones, storms and austral swells which can trigger at very short term powerful erosion or accretion with high impact on the islets shape and morphology. Sea level rise induced by the anthropogenic climate change has also to be taken into account. Based on these criteria, our work presents an assessment of the future of the Caledonian islets in the perspective of climate change and sea level rise.