

Coastal management strategy in Kourou, French Guiana

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French Guiana is an overseas department of France, part of the Guianas coast of South America. The Guianas coast is the world's longest muddy coast and one of the most active, due to the important sediment discharge from Amazon, which migrates alongshore as mud banks. Depending on the position of the mud banks, the coastline is more or less vulnerable to erosion and marine submersion. In 2016, the city of Kourou has faced several severe sea-storms and damage mainly on public infrastructures. At that period, the shoreface of Kourou was in an 'inter-bank' phase (position between two mud banks), thus particularly vulnerable to coastal erosion by waves. Consequently, the Kourou city council decided to implement a strategy for the sustainable management of its coastline at short, mid and long-term.

An innovative approach for French Guiana including three phases was conducted. The first step was to evaluate human, economic and environmental issues through field surveys of the population to qualify the typologies of habitats, to identify their perception of coastal risks and to address the different coastal uses. Secondly, we determined the coastal hazards (erosion and marine submersion) in a complex hydrosedimentary system at different timescale. Finally, management scenarios and their economic analyzes were compared and combined to provide decision keys for the town planning strategy.

The results of public surveys showed that the population knows little about the sedimentary functioning of the beach and coastal evolution in general. However, the population would be ready to be relocated, if there are not viable technical solutions, conscious of the natural processes at stake. From several hypotheses and from a statistical analysis, the position of the coastline was projected by 2030 and 2050 and the marine submersion was carried out for a 30-year and 100-year return period. Considering the local dynamics, the modeling was done in the most unfavorable case of 'inter-bank' phase. The different scenarios were phased in the short, medium and long term. In the short term, the goal is to provide protection of the population from erosion, using cost effective and

reversible technical solutions. Then the implementation of medium-term solutions combining beach-nourishment, dune profiling and front-line relocation can be studied more thoroughly. These medium-term actions can enable the municipality to manage the risk of marine submersion with a positive cost-benefit ratio. Finally, the long-term scenarios consider territorial recomposition and adaptation to climate change and coastal risk and flooding exposition.

Keywords

Erosion, submersion, Coastal management, muddy coast, sandy coast