

Human interventions and climate change on the West African sand river



Effects of coastal erosion near the harbour of Lomé

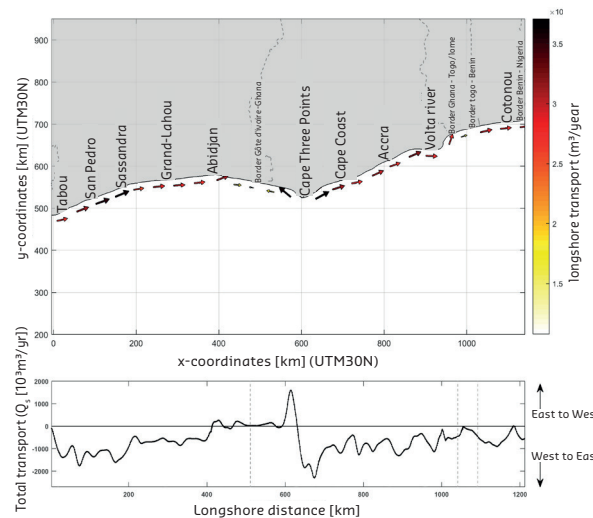


Workshop in Grand Lahou

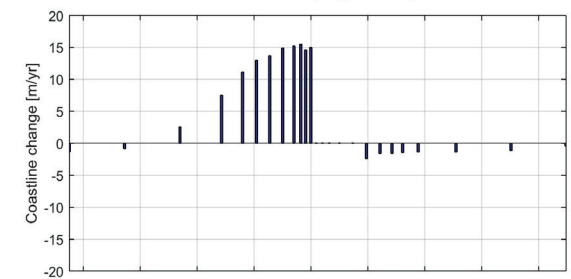
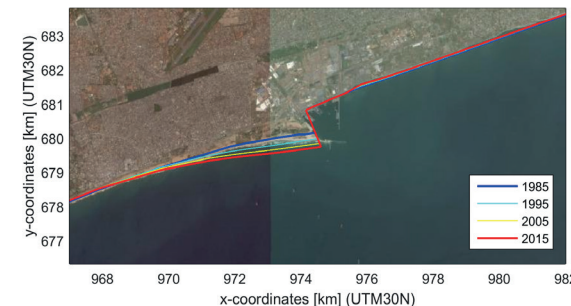
The West African coast consists of a narrow low-lying coastal strip maintained by sediments from rivers that is transported along the coast by waves and currents: a “sand river”. Today, however, much of the fluvial sand is retained behind river dams and the flow is interrupted at several locations by jetties. The sandy coastal barrier is therefore eroding almost everywhere. The situation is already critical and it is likely to worsen in the future due to climate change. The coastal zone is home to about 31% of West Africa’s population. This figure is expected to rise as urban population growth is increasing at an annual rate of 4% according to the World Bank. In addition, the coastal zone is the source of 56% of West Africa’s Gross Domestic Product.

Several studies have been carried out in the past in order to assess the problem of coastal erosion in different countries in West Africa. Although this information is extremely valuable as a first-step assessment of the ongoing erosion problems, those studies are mainly qualitative and they are based on different data sources in the different countries.

This study set up a quantitative and consistent large-scale sediment budget study using a unique numerical modelling framework for the Ivory Coast, Ghana, Togo and Benin. The numerical modelling framework was based on Delft3D and UNIBEST-CL+. The study has provided quantitative information about the sand moving along the coastline in the “sand river”. The study has also investigated and quantified the possible effects of major human interventions and climate change (that is to say, sea-level rise, increasing storm intensity and changes in the wave direction) on sediment transport along the coast and on shoreline changes.



Computed sediment transport rates in the baseline situation



Modelled coastline changes near the harbour of Lomé

The model output indicated, for example, that the effects (such as leeside erosion) of some of the major ports may extend up to nearly 50 kilometres along the coast. Moreover, land loss due to sea-level rise may become the largest source of erosion by the end of the century in the most extreme scenarios for sea-level rise. A key to the success of the project was “sharing information” and “creating awareness”. The main results of the project were discussed and shared in a number of consultation and validation workshops. Furthermore, a public on-line viewer is now available to facilitate communications with local stakeholders.

The project is part of the World Bank’s West Africa Coastal Areas Program (WACA), a convening platform that aims to help countries obtain financing and expertise to sustainably manage their coastal areas. WACA was established in 2015 in response to requests from West African countries to manage coastal erosion and flooding, promote climate-resilient coastal management and improve livelihoods in West Africa’s coastal communities.

Further reading:

<http://v-web004.deltares.nl/africa/africa/>