Climate extremes in the 20th and 21st centuries: implications for critical coastal ecosystem in the Gulf of Guinea

FRANCK EITEL KEMGANG GHOMSI[1], ROSHIN P. RAJ[2], ANTONIO BONADUCE[2], GRAHAM D. QUARTLY[3]

[1] *Department of Oceanography, University of Cape Town, South Africa*
[2] *Nansen Environmental and Remote Sensing Center, Bergen, Norway*
[3] *Plymouth Marine Laboratory, Plymouth, United Kingdom*

The coastal regions around the Gulf of Guinea, located within the Gulf of Guinea Large Marine Ecosystem (LME), one of the most productive coastal and offshore waters in the world, provide ideal conditions for four unique ecosystems - mangroves, seagrasses, salt marshes and coral reefs - each occupying an ecological niche. However, an increasingly warm environment due to climate change threatens to disrupt these fragile ecosystems, both through sea level rise and more frequent marine heat waves (MHWs). A significant MHW has been observed in the Gulf of Guinea from October 2019 to April 2020, one of the longest in the satellite era, and appears to be caused by both anomalous heat fluxes and eddy advection in the region, which occur in two successive phases. In addition, sea levels in the region are rising faster than the global average, possibly related to increased outflow from the Niger and Sanaga rivers, with potentially dangerous consequences for coastal communities. Taken together, the impacts of MHWs, sea level rise and the influence of the West African monsoon are putting increasing strain on local ecosystems and communities in the Gulf of Guinea, particularly in a region where two-thirds of the population depend on fishing for their livelihoods.