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Impact of climate change on longshore sediment transport capacities of sandy beaches in African

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Abstract

Climate is an important issue for coastal managers particularly when long term planning is concern. The impact of climate has been shown by different studies to have significant influence on coastal processes with adverse impact on water levels and shoreline on the global and regional scale particularly in the developed regions for example in Europe. Continental wide analysis of climate change effect on Africa's sandy coastlines is presented here focusing on sediment transport. The Longshore sediment transport (LST) is a key process driving beach erosion/accretion and shoreline change in general. Changes in future transport capacities along the continents coastline were assessed under different climate scenarios (the Shared Socioeconomic pathways (SSP) 126, 245 and 585). Wave parameters were derived from the Coupled Model Intercomparison Project phase 6 (CMIP6) experiments specifically the First Institute of Oceanography-Earth System Model version 2.0 whereas LST were simulated using the famous CERC empirical model. Median (5 -95 percentile) changes in annual mean transports relative to the historical condition were (respectively for SSP125 SSP245 and SSP585) 3.9(0.3-79)%, 4.6(0.3-88)%, and 4.9(0.4-84)% for the whole continent with some locations (~5%) show very high (95-200%) change. The magnitude of changes increases towards the end of the century. The impact of climate changes on LST will be generally minimal at coastal sections in the Gulf of Guinea and the Northern (Mediterranean) whilst relatively higher at sections along the West, and South to East coasts. The implication of this erosion, siltation in harbours and coastal basins trends would be altered which intend would impart for example shoreline management and dredging schemes.

Keywords

Longshore sediment transport, Africa, Climate, CERC