SEDIMENT SUSPENSION ON A TIDAL FLAT NEAR AN ERODING BEACH

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Abstract
Kunduchi Beach is located approximately 10 kilometres north of Dar es Salaam City on the coast of Mainland Tanzania. The whole area north of the Dar Es Salaam City is endowed with beautiful, but eroding sandy beaches. The severe coastal erosion that is taking place threatens the buildings and the land as a whole. The aim of this study is to collect information on erosive forces and the littoral processes in the area so that options for the control of the erosion are based on good quality scientific data.Currents and sediment concentrations were measured using a multi-sensor self-recording current meter. Waves were measured using pressure gauges. Some physical features were measured visually.The general orientation of the shoreline is 330 degrees and the tidal flat is characterised by ripples. At about 150 m from the shoreline, ripples are 7-9 cm high and their wavelength is about 40 cm. Closer to the beach, ripple orientation is 350 degrees; ripple height is 5 cm and ripple wave length is 5 cm. Results show that during flood tide the current direction is southerly (an average of 210 degrees) and at high tide the average direction is 150 degrees. The direction of the ebb tidal current is northerly (an average of 360 degrees). On the average, the current speed was 0.1 m/s. Significant waves heights increased with increasing water level, from 0.1 metres in water depth of 0.5 metres to about 0.4 metres when the water depth reached 2.4 metres. The wave period did not show significant variation with increasing water depth. The average wave period was 8 seconds.Suspended sediment concentration varies in phase tide level. Sediment concentration is related with water level by an exponential function C / C max = 0.107 exp(0.6597 D) , where D is water depth.There is a remarkable variation of sediment concentration between the two main seasons. Sediment concentrations are much higher during the southerly winds than during the northerly winds.Longshore sediment transport rates are found to be in the order of 3x10-8 m3/s/m.

Keywords:
Sediment concentrations,
Eroding beach,
Nearshore currents.