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High flow variability and storm events shape the ecology of the Mbashe Estuary, South Africa

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Abstract

The possible impacts of extreme events on the ecology of selected aquatic biota within the Mbashe Estuary were investigated during a four year (2010–2013) spring sampling programme. During periods of low to average flow conditions the estuary is shallow, turbid and characterised by the presence of fluid mud and the build-up of mud and clay deposits. During these conditions, extremely high biomasses of intertidal microalgae and zooplankton are present. Fish and macroinvertebrate abundance and diversity are also highest during low-flow conditions. Flood events can reset, or partially disrupt, the sediment erosion/depositional cycle and decrease the biomass and diversity of plankton, fish and macroinvertebrate species. The Mbashe Estuary's unique fluid mud habitat is therefore subjected to regular resetting, which potentially contributes to the fluid nature of the muds. A storm surge in 2011 resulted in the temporary dieback of an area of mangroves, as a result of the deposition of marine sediment. Although extreme events seem to play an important role in the deposition and erosion cycle of the estuary, an increased frequency of both types of extreme events may ultimately result in estuarine habitat loss, which will adversely affect the biota of the estuary.