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Assessing the impact of cyclones in the coastal zone of Bangladesh

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We review the state of knowledge regarding tropical cyclones and their impacts on coastal ecosystems, as well as the livelihood and health of the coastal communities, under the present and future climate, with application to the coastal zone of Bangladesh. This region is particularly vulnerable to tropical cyclones as it is very low-lying and densely populated. Cyclones cause damage due to the high wind speed and also the ensuing storm surge, which causes inundation and salinity intrusion into agricultural land and contaminates fresh water. The world's largest mangrove forest, the Sundarbans, protects the coast of the Brahmaputra-Ganges-Meghna (BGM) delta from these cyclonic storms but mangroves are themselves vulnerable to cyclone damage, as in 2007 when $\sim$36% of the mangrove area was severely damaged leading to further losses of livelihood.

We apply an idealised cyclone model and use the winds and pressures from this model to drive a storm surge model in the Bay of Bengal, in order to examine the impact of the intensity, track speed and landfall of the cyclones in terms of surge and inundation. The model is tested by reproducing the track and intensity of Cyclone Sidr of 2007. We also examine the projected future climate from the South Asia Regional Climate Model to understand how tropical cyclones may change under global warming and assess how this may impact the BGM Delta over the 21st century.