



Bangladesh's coastal vulnerability due to relative sea level rise and storm-surge inundation

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In Bangladesh, the Ganges, Brahmaputra, and Meghna Rivers come together to form the largest delta in the world. This low-lying region is one of the most densely populated area in the world and is prone to monsoonal flooding and frequent inter-monsoon cyclones. Sea-level rise, along with tectonic, sediment load and groundwater extraction induced land subsidence, significantly exacerbate the Bangladesh's coastal vulnerability. A comprehensive understanding of relative sea level variability in this region is therefore crucial and should help to anticipate the impacts of climate change and implement adaptation strategies. For the first time, by combining a unique set of ~ 100 water/sea level measurements, we reconstructed the regional relative water level changes since the 1970s. These information are analyzed against storm surge hazard maps, obtained from a probabilistic study of a large ensemble of statistically and physically consistent synthetic cyclone events representative of the current climate (1980-2015). Thus, a regional vulnerability assessment is conducted, with some specific geographical areas thoughtfully discussed. This work is an essential first step to reduce the consequences of relative sea level rise and storm-surge inundation impacts on the Bangladesh's population.