



Coastal Vulnerability Due to Sea-level Rise Hazard in the Bangladesh Delta

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Approximately half of the world's population or 3.2 billion people lives within 200 km of coastlines and many of them in the world's deltaic plains. Sea-level rise, widely recognized as one of consequences resulting from anthropogenic climate change, has induced substantial coastal vulnerability globally and in particular, in the deltaic regions, such as coastal Bangladesh, and Yangtze Delta. Bangladesh, a low-lying, one of the most densely populated countries in the world located at the Bay of Bengal, is prone to transboundary monsoonal flooding, potentially aggravated by more frequent and intensified cyclones resulting from anthropogenic climate change. Sea-level rise, along with tectonic, sediment load and groundwater extraction induced land uplift/subsidence, have exacerbated Bangladesh's coastal vulnerability. Here we describe the physical science component of the integrated approach based on both physical and social sciences to address the adaption and potential mitigation of coastal Bangladesh vulnerability. The objective is to quantify the estimates of spatial varying sea-level trend separating the vertical motion of the coastal regions using geodetic and remote-sensing measurements (tide gauges, 1950–current; satellite altimetry, 1992–present, GRACE, 2003–present, Landsat/MODIS), reconstructed sea-level trends (1950–current), and GPS and InSAR observed land subsidence. Our goal is to conduct physically based robust projection of relative sea-level change at the end of the 21st century for the Bangladesh Delta to enable quantitative measures of social science based adaption and possible mitigation.