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MAPPING SEA LEVEL RISE BEHAVIOUR IN AN ESTUARINE DELTA SYSTEM: A CASE STUDY ALONG THE SHANGHAI COAST

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Sea level rise (SLR) is a major projected threat of climate change that is expected to affect developing coastal cities located in estuarine delta regions. Shanghai is one such city, being located in the Yangtze River Delta (YRD). It is difficult, however, for decision-makers to implement adaptation due to the uncertain causes, magnitudes, and timings of SLR behaviours. This paper attempts to map the causes and magnitudes of SLR behaviours on a decadal scale. We analyse the tidal level records from 11 tidal gauge stations and the corresponding bathymetry measurements around these stations since 1921. We identify three new SLR behaviours along the Shanghai coast due to anthropogenic geomorphologic changes (AGCs), besides the well-known eustatic sea level rise (ESLR), tectonic subsidence (TS), and urban land subsidence (ULS). The first new behaviour is regional sea level rise (RSLR), which occurs as a result of land reclamation and deep waterway regulation. The second is regional sea level fall (RSLF), which occurs because the channel bed is eroded due to sediment supply decline in the river catchment. The last SLR behaviour is local tidal datum rise (LTDR). Thus, we project that the magnitude of SLR for SC ranges from 10 cm to 16 cm from 2011 to 2030. They drive the upstream migration of tidal limit. Clarifying SLR behaviours is important for local decision-makers to plan structural and non-structural measures to combat escalating flood damage costs in an estuarine delta system. It is full of future challenges.

Biography

Cheng Heqin completed her PhD from Tongji University and Post-doctoral studies from East China Normal University State Key Laboratory of Estuarine and Coastal Research. She is the member of Chinese Committee of Marine Surveying and Mapping, the Executive Director of Chinese Ocean marine Geological Society and Shanghai Geophysical Society. She has published more than 130 papers in reputed journals, three books, two patents and three software copyrights. She has her expertise in estuarine and coastal sediment dynamics and morphodynamics, integrated coastal zone management. Her long time measurement data sets of tidal level, bathymetry, channel morphology and fishery models and semi-analytical model analysis of sediment entrapment in estuaries, impact of sea level rise create new pathways for adaptation estuarine and coastal cities to sea level rise. She has built this challenging strategy after years of experience in research, evaluation, teaching and administration in institutions.

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