

Accepted Manuscript

Adapting cities to sea level rise: a perspective from Chinese deltas

He-Qin Cheng, Ji-Yu Chen

PII: S1674-9278(16)30067-3

DOI: [10.1016/j.accre.2017.05.006](https://doi.org/10.1016/j.accre.2017.05.006)

Reference: ACCRE 96

To appear in: *Advances in Climate Change Research*

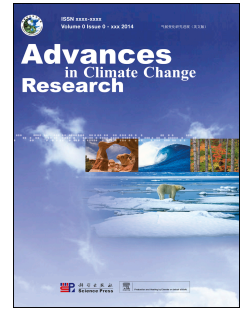
Received Date: 28 August 2016

Revised Date: 5 May 2017

Accepted Date: 19 May 2017

Please cite this article as: Cheng, H.-Q., Chen, J.-Y., Adapting cities to sea level rise: a perspective from Chinese deltas, *Advances in Climate Change Research* (2017), doi: 10.1016/j.accre.2017.05.006.

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



Adapting cities to sea level rise: a perspective from Chinese deltas

CHENG He-Qin*, CHEN Ji-Yu

State Key Laboratory of Estuarine and Coastal Research, East China Normal University, Shanghai 200062, China

* Corresponding author. hqch@sklec.ecnu.edu.cn(CHENG H.-Q.)

Abstract

In recent years, intensifying waterlogging, salt water intrusion, wetland loss, and ecosystem degradation in Chinese delta cities and adjacent regions have generated the pressing need to create an urban form that is suited to both current and future climates incorporating sea level rise. However, adaptation planning uptake is slow. This is particularly unfortunate because patterns of urban form interact with mean sea level rise (MSLR) in ways that reduce or intensify its impact. There are currently two main barriers that are significant in arresting the implementation of adaptation planning with reference to the MSLR projections composed of geomorphologic MSLR projections and eustatic MSLR projections from global climate warming, and making a comprehensive risk assessment of MSLR projections. The present review shows recent progresses in mapping MSLR projections and their risk assessment approaches on Chinese delta cities, and then a perspective of adapting these cities to MSLR projections as following six aspects. 1) The geomorphologic MSLR projections are contributed by the natural tectonic subsidence projections and the MSLR projections by anthropogenic geomorphologic change. The former needs to be updated in a global framework. The latter is accumulated by land subsidence from underground water depletion, water level fall caused by the erosion of riverbeds from a sediment supply decline attributed to the construction of watershed dams, artificial sand excavation, water level raise by engineering projects including land reclamation, deep waterway regulation, and fresh water reservoirs. 2) Controlling MSLR projections by anthropogenic geomorphologic changes. 3) The IPCC AR5 RCPs MSLRs scenarios are expected to be projected to the local eustatic MSLR projections on the Chinese deltas. 4) The MSLR projections need to be matched to a local elevation datum. 5) Modeling approaches of regional river-sea numerical with semi-analytical hydrodynamics, estuarine channel network, system dynamics and adaptation points are perspective. 6) Adaptation planning to MSLR projections requires a comprehensive risk assessment of the risk of flood, fresh water supply shortage, coastal erosion, wetland loss, siltation of ports and waterway in Chinese delta cities and adjacent regions.

Keywords: Mean sea level rise projections; Natural tectonic subsidence; Climate warming; Local elevation datum; Anthropogenic geomorphologic change; Adaptation tipping point.

1 Introduction

Since the beginning of the 21st century, it has been well acknowledged that observed and anticipated climate warming and associated future mean sea level rise (MSLR) are likely to have far reaching impacts on coastal zones (Nicholls and Cazenave, 2010; IPCC, 2013; Ding and Wang, 2016), and that delta regions suffer the strongest threat to MSLR (Syvitski et al., 2009; Clifton, 2011; Qin and Zhu, 2015; Ding et al., 2016). Determining adaptation strategies and actions to cope with MSLR are thus of vital importance for the scientific communities and global governments (Kabat et al., 2009; Rosenzweig and Solecki, 2010; Katsman et al., 2011; Klijn et al., 2015).

Download English Version:

<https://daneshyari.com/en/article/5779003>

Download Persian Version:

<https://daneshyari.com/article/5779003>

[Daneshyari.com](https://daneshyari.com)