Accepted Manuscript

Effect of projected sea level rise on the hydrodynamic and suspended sediment concentration profile of tropical estuary

Shahirah Hayati Mohd Salleh, Anizawati Ahmad, Wan Hanna Melini Wan Mohtar, Chai Heng Lim, Khairul Nizam Abdul Maulud

PII: S2352-4855(18)30046-X
DOI: https://doi.org/10.1016/j.rsma.2018.08.004
Reference: RSMA 408

To appear in: *Regional Studies in Marine Science*

Received date : 3 January 2018
Revised date : 28 May 2018
Accepted date : 22 August 2018

Please cite this article as: Salleh S.H.M., Ahmad A., Mohtar W.H.M.W., Lim C.H., Maulud K.N.A., Effect of projected sea level rise on the hydrodynamic and suspended sediment concentration profile of tropical estuary. *Regional Studies in Marine Science* (2018), https://doi.org/10.1016/j.rsma.2018.08.004

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.

ACCEPTED MANUSCRIPT

Effect of Projected Sea Level Rise on the Hydrodynamic and Suspended Sediment Concentration Profile of Tropical Estuary

Shahirah Hayati Mohd Salleh[1], Anizawati Ahmad[1, 2], Wan Hanna Melini Wan Mohtar[1*], Chai Heng Lim[3], Khairul Nizam Abdul Maulud[1]

[1]Department of Civil and Structural Engineering, Universiti Kebangsaan Malaysia (UKM), 43600 Bangi, Selangor, Malaysia
[2]Coastal Management and Oceanography Research Centre, National Hydraulic Research Institute of Malaysia (NAHRIM), 43300 Seri Kembangan, Selangor, Malaysia
[3]Institute of Ocean and Earth Sciences (IOES), Universiti Malaya (UM), 50603 Kuala Lumpur, Malaysia

**Corresponding Author*
E-mail address: hanna@ukm.edu.my

Abstract. Kuala Pahang, an estuary located in the East Coast of Malaysia is projected to experience a 0.03, 0.14 and 0.31 m increase in sea level in the years 2020, 2060 and 2100, respectively. To predict how tide and current speed affect suspended sediment concentration, the MIKE 21 HD and ST models were used to simulate the hydrodynamics and sediment transport at Kuala Pahang. The study is limited to the Southwest Monsoon period and the model was conducted as a localised analysis at the Kuala Pahang estuary. The results of hydrodynamic modelling of 2014 baseline showed the difference in water level between spring and neap tide had influenced the current speed as the maximum flow velocity varies between 0.20and1.95 m/s. The Southwest Monsoon affect current flow in two ways, namely through the sea dominated flood tide and through river discharge during ebb tide. Meanwhile rising in sea level had increased 10% of the current speed in year 2060 based on the 2014 model. Sediment transport modelling showed that the averaged suspended sediment concentration (SSC) fluctuated between 55-1532 mg/l in year 2014 and could reached a maximum value up to 5091 mg/l in year 2100, even with an increment of only 0.10 m/s maximum current speed. The profound impact of SLR on hydrodynamics and SSC is significant at the Kuala Pahang estuary and has a direct impact on the socio-economics and livelihood of local communities. This projection model can provide an effective management for the sustainability of estuary ecosystem and is relevant for understanding future hydrodynamic and suspended sediment patterns.

Keywords: Sea Level Rise; Hydrodynamics; Southwest Monsoon; Suspended Sediment Concentration; Modelling; Kuala Pahang.

1 Introduction

The issue of climate change which lead to sea level rise (SLR) has a significant impact not only engineering design and community lively hood but also the morphology of coastal area and the ecosystem of water column (Zhou et al., 2013). Globally, the average SLR is estimated to be 0.17m in the 21st century with an increment of 1.80 mm/year, although a sudden increase of 3.10 mm/year was observed between 1993-2003 (IPCC, 2007). The Peninsular Malaysia however, is projected to have a higher SLR in the 21st century, an

Download English Version:

https://daneshyari.com/en/article/10115914

Download Persian Version:

https://daneshyari.com/article/10115914

Daneshyari.com