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PARAMETER OPTIMIZATION AND DATA ASSIMILATION TO IMPROVE THE TIDAL PREDICTION OF THE SINGAPORE REGIONAL MODEL

by

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National University of Singapore

Abstract

Hydrodynamic modelling is a major tool in the MustHave Box study that focuses on a better understanding of sea level anomalies (SLA) and current anomalies (CA) in the Singapore region. Accurate hydrodynamic modelling is complicated by the tidal flow interactions between the Indian Ocean and the South China Sea, the presence of numerous islands and small channels, seasonal monsoons and short-term weather phenomena. Tidal variation is one of the easier and more important components to assess the accuracy of a hydrodynamic model as it is a deterministic process. The presence of numerous water level observation stations in the region suggests that data assimilation may be a useful tool to improve the tidal prediction of the hydrodynamic model. The steps that have already been taken and that need to be completed for improving the tidal predictions of the model are detailed in this paper. This paper focuses on the initial stages of the data assimilation process particularly the use of single parameter optimization to assess the sensitivity of the tidal constituents at the Java Sea (JS) and South China Sea (SCS) boundaries. This technique is useful and critical in the final data assimilation stage as it provides the modeller a guide to assess results of the data assimilation technique. The results obtained from parameter optimization are discussed. A generic data assimilation and calibration modelling environment called OpenDA which can be used in combination with any model that describes the time evolution of physical processes is described and preliminary verification results are shown.

About the speaker

Alamsyah Kurniawan received his BSc.Eng. degree in Ocean Engineering from Faculty of Civil & Environmental Engineering , Bandung Institute of Technology, Indonesia in 2006. Alam has worked as Hydrodynamic Modeling Specialist in Sea Defence Consultants (SDC) NAD&Nias Indonesia. Much of his previous modeling work has focused on oil spill and Tsunami phenomena. Currently he involves ongoing project in NUS-SDWA and interested in Project MHBox.

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