DYNAMIC MODELLING OF SEMI ENCLOSED SYSTEMS

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ABSTRACT

Dynamic modeling of a semi enclosed system is considered here, which computes of tide levels within the system from open sea tide levels. All models were applied to the Negombo lagoon with the available data. During the modeling process two modeling approaches were investigated. Tidal choking approach is based on the model equation build by Stigebrandat(1980). It considers mainly the channel bottom friction (Cd - drag Coefficient) of the Semi enclosed system. To compute the sea levels within the system Runge-Kutta numerical scheme is applied using ode45 function available in the Matlab. At the value for Cd 0.0063, observed and computed sea level curves within the system were matched. Model was validated using another data set for a different period. Using validated model, prediction was done for volume fluxes during the period and for different river input in the Negombo lagoon. Wave progressive approach is based on the equations of motion and continuity for the shallow seas. To compute the sea level within the system from open sea level, space staggered finite different formulation was used. Fischer's, Leapfrog and Runge-Kutta numerical schemes were applied to the model equations. Efficiency and accuracy for each algorithm were considered to find out more suitable algorithm to model the system using space staggered numerical approximation. The results show Fischer's numerical scheme is the best algorithm that can be applied for hydrodynamic modeling.