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DEVELOPMENT OF A HYDRODYNAMIC MODEL FOR THE NEGOMBO LAGOON

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The Negombo lagoon is one of the most productive shallow coastal water bodies in the west coast of Sri Lanka which is interconnected with the marsh of Muthurajawela. Due to its vast commercial and recreational opportunities the lagoon is currently being heavily utilized but without a proper plan. This ad hoc interference can affect the hydrodynamic behavior of the lagoon and damage the ecological balance. In order to implement conservation measures to avoid damage there should be a mechanism to analyze the hydrodynamic behaviour of the lagoon. The objective of this paper is to present the setting up of a numerical model for the Negombo lagoon using *Delft3D* coastal surface water modeling suite to analyze the hydrodynamic behaviour of the Negombo lagoon.

A boundary fitted orthogonal curvilinear grid was prepared for computational domain with an area of 70 km² to cover the entire lagoon and offshore. The hydrodynamic model for the lagoon was forced by tide, river discharge and wind as boundary conditions. The tide was specified by a set of tidal harmonics at offshore. Fresh water inflow to the lagoon via Dandugam Oya, Ja-Ela and Hamilton canal was input as a single source taking the cumulative discharge. Wind field was assumed to be uniform in the modelling area. The calculation time step of the model was determined considering the Courant–Friedrichs–Lewy condition for finite difference calculations. The model was calibrated using amplitudes and phases of tidal constituents at the offshore boundary.

The model was applied during the period from 2nd to 3rd October, 2002. The preliminary results derived from the model are compared with the measurements. Predicted water levels correlate satisfactorily with the measurements at the lagoon entrance. Velocities predicted at the entrance channel and immediately inside the lagoon also closely correlate with the measurements. Flow pattern predicted by the model is well correlated with the tidal pattern in the area.

The overall result indicates that the calibrated and further refined model would be a useful tool to evaluate the hydrodynamics in the Negombo lagoon.