CONCLUSION AND RECOMMENDATION

Conclusion

The study of diffusion coefficient was undertaken in the Upper Gulf of Thailand by using a statistical method. Based on the similarity of the auto-correlations of the micro-scale Eulerian and Lagrangian velocities, the coefficient was expressed as the product of the Eulerian time scale and the mean of the Eulerian velocity fluctuations squared. The diffusion coefficient in the north-south direction was found to be higher in magnitude than in the east-west direction which was a result of stronger current prevailing in the Gulf in the north-south direction.

The seawater level was calculated by 25 constituents of tide as: S_a, S_{sa}, M_m, M_{sf}, M_f, Q_1, O_1, M_1, P_1, S_1, K_1, OO_1, $2N_2$, μ_2, N_2, ν_2, M_2, λ_2, L_2, T_2, S_2, K_2, M_3, M_4 and M_6. The predicted seawater level gave the results were closely the seawater level especially during spring tide. In whole Upper Gulf of Thailand, each constituent had magnitude of phase lag and amplitude nearly the same. Pattern of flow during flood tide was northward flow and during ebb tide was southward flow.

The developed POM which concerned only tide gave the satisfied output. The predicted velocity was reliable about 70% which compared with recorded data. The model had been applied to compute flow velocity and water level fluctuation. The results were found very close to the analytical solution. The calibration of the hydrodynamic model showed a good comparison of the observed current system in the Gulf. The predicted circulation patterns in the Upper Gulf of Thailand agreed well with the observed condition in the area.

TSS dispersion model was used to study the TSS concentration fields in the immediate vicinity of the rivers mouth and in the Upper Gulf of Thailand. The verification had done by comparing the predicted diffusion patterns with the satellite image showed similar trend in the diffusion pattern between observed and simulated results.

Recommendation

In the hydrodynamic model development, a new approach to the stability problem should be set up so that a large time step can be used in the computation. Additionally, the criteria for model development in tide and tidal current should assign the amplitudes and phase differences of tide levels along the coastline boundary in order to get more accurate solutions.

Thailand is under the influences of the prevailing Northeast and Southwest monsoons. The Northeast monsoon flows from land to sea in winter from November to February, while the Southwest monsoon blows from sea to land from May to September. The wind generates a wind driven current at thin layer of water at the surface and its magnitude is about 3 percent of the wind velocity. The wind stress should be integrated for more accuracy of the model.

The boundary value problems should be studied in more detail especially the effects of open boundary and shoreline boundary which contributed to the computed values within the boundaries. The functional relationship between the stability, the effective eddy-viscosity parameter and the weighting factor for the spatial velocity averaging process should be established.

One of the most important needs in sediment transport modeling is the betterment of understanding of sediment transport theory, especially the mechanism quantifying the dynamics of interactions between flowing water, sediment particles, and bed materials. The advances in each area shall reduce the empiricism needed in the computational model, and thus enhance the model completeness, effectiveness and efficiency.

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