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Abstract

Aiming at understanding the flow velocity, temperature and salinity fields, a 3D time-dependent hydrodynamic model was applied to Hirota bay using the few monitoring data. The model was run to reproduce the time variation in water temperature, salinity and flow velocity during two periods, flood season from September to October 1991 and normal season from July to September 1992. The hourly-change regimes of the observed tidal elevation at the open boundary, river discharges, winds and meteorological parameters were incorporated into the forcing variables of the model. The model results agreed fairly well with the observed data except some minor discrepancies. It was found from the results that the flow field in the surface layer varied considerably year-to-year depending on the river discharge. The flow field in the autumn of 1991 was characterized by an offshore current system affected by flood river plume, and in the summer of 1992, it was very stagnant under dry and calm conditions. On the other hand, simulated vertical flow fields at the longitudinal cross section were consistent with two periods, despite the differences of current velocity. It was characterized by outflow in the surface layer, inflow in the middle layer and outflow in the bottom layer.