

Numerical modeling of hydrodynamics in the Agua Brava lagoon, located in Nayarit, Mexico

Barrios Piña, Héctor Alfonso; Ramírez León, Hermilo; Cuevas Otero, Abraham; Torres Bejarano, Franklin Manuel; Ponce Palafox, Jesús Trinidad

Abstract

In this paper a study of the hydrodynamics of the Agua Brava lagoon system is performed by numerical modeling. The importance of studying this lagoon system lies with aquaculture activities carried out by shrimp farms. The π -HYDRO model is used for the numerical simulations of hydrodynamics and temperature and salinity dispersion. The boundary conditions regarding ocean properties were generated with the HYCOM ocean model, whereas tides were calculated from the tidal predictions of the MAR V1.0. A hydrological study was also performed to calculate the freshwater contributions and take them into account in the numerical simulations. The scenarios analyzed are the dry and wet seasons particularly for 2013. For the case of the dry season, a slight influence of hydrological contributions to the dynamics of the lagoon is observed, where the effects of the tidal flow are predominant. For the wet scenario, the effects of both tidal and hydrological flow drive the motion within the lagoon, especially being predominant the hydrological flow due to the river discharges in the near region to the shrimp farms.

keywords

Fluid dynamics, Hydrodynamics, Lakes, Shellfish