



Storm surge predictions for the seas around Taiwan using an operational model

C.S. YU (1), H.C. YU (1), C.J. Chiang (1), and C.T. Terng (2)

(1) Dept. of Marine Environment and Engineering, NSYSU, Kaohsiung, Taiwan (jasonyu.nsysu@gmail.com/+32 7 525 5173),

(2) Marine Meteorology Center, Central Weather Bureau, Taipei, Taiwan(gfs3@mmcm.cwb.gov.tw/+32 2 23491199)

High levels due to severe storms can coincide with high tides, which often cause coastal flooding problems. Loss of life and properties during flooding can be minimized if enough warning of the impending flood is given. Taiwan situated in the southwest Pacific where typhoon (tropical storm) is often threatening Taiwan during summer and autumn. A numerical model for predicting both tides and surges has been developed for operational purpose at the Central Weather Bureau (CWB), Taiwan. The model has been constructed based on the scheme developed by Yu (1993) and Yu et al. (1994) and implemented for daily prediction of tide and surge around Taiwan. Depth averaged shallow water equations were used to describe the hydrodynamic motions by the model. Simulations were verified first with observed tides by comparing their harmonic constituents. Surge deviations were then further analyzed for estimating the influences on water levels due to typhoon. Wind field were obtained from routine weather forecast by CWB and computed using idealized typhoon model during typhoon periods in order to give early warning to the defense authorities when track differ from the prediction. The tracks of five typical typhoons threatened Taiwan were simulated. Surges can be observed from the model results along the track of typhoon. Comparing the model results with the observations around Taiwan shows accuracy of the model. Model results show, generally, good agreements with the observations, particularly on the eastern part of Taiwan. Somewhat bigger discrepancies during typhoon can be observed for the stations along the Strait (west coast), which are mainly due to lack of geometric affected typhoon details when typhoon passing through the high mountains in the central area of Taiwan.