

FIELD MEASUREMENT OF WAVE BLOCKAGE IN THE NEARSHORE REGION

Hwa CHIEN, Pei Hung CHEN, Chia Chuen KAO

Coastal Ocean Monitoring Center, NCKU, Tainan

ABSTRACT

Applications of wave and current data both coastal and offshore include the ocean resource exploitation, ship routing, coastal protection, waste disposal, ecological distribution, sedimentological studies and flood warning. Eventually, data collected operationally in real time in Taiwan are now available for monitoring, determination of long-term statistics and assimilation into nowcast/forecast numerical models. In 2004, several datasets of wave height and period variation were collected by a disc data buoy deployed in the shelf zone of a separately island Siao-Liou-Chu (SLC) near the southwestern coast of Taiwan. Under the typical clam weather climate of SLC at the season, the wave heights oscillated from 0.5m to 2m and the periods oscillated from 6s to 13s. Both the wave heights and periods variation featured semi-diurnally periodic. However, these phenomena did not occur everyday. Moreover, similar phenomena were not identified in another nearby Ta-Peng (TP) data buoy station, which is only 14 km away from the SLC station.

It should be noted that during the occurrence of the oscillation, there were no effecting weather systems. The directional spectral analyses showed that the wave propagated mainly from the south and reflected when approaching to the coastline. On the other hand, it could be found that the higher wave heights occur, the higher wave groupiness factors are.

The SLC island area is currently designed to be the training and competition site of wind surfing and sailing. Due to the fact that the wave heights change rapidly in the clam weather condition without any foregoing hints, it might cause unpredictable lost accordingly. The occurrence of this spatially inhomogeneous wave phenomenon should be warned in advance.

In order figure out the mechanisms inducing the mentioned inhomogeneous wave field, numerical simulation of current has been carried out. Nested mesh systems are established in 3 different scales. Prince Ocean Model (POM) is

implemented to calculate the tidal current around the SLC Island in the fine mesh with grid size of 100m. The bathymetric changes indeed effect the direction and speed of tidal current. The tidal ellipse demonstrates the north-south current in the spot where the buoy deployed. These current fields are then linearly superposed with average flow induced by Kuroshio and used as the inputs of SWAN wave model. Currently, the numerical experiments are not yet enough to yield explanation to the wave heights and periods oscillation.