Nearshore Wave Predictions Around the Northeastern Coast of Taiwan

Outline

- Introduction
- The Model
- Verification
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Introduction

In order to provide the forecast wave information for the safety of near shore recreation activities, the Central Weather Bureau/Marine Meteorology Center (hereafter, CWB/MMC) cooperated with the Tourism Bureau/National Scenic Area Administration/Northeast Coast, to develop a nearshore wave prediction system around the northeastern coast of Taiwan.

The recreation activities in Northeast Coast Area are diversely, such as whale watching, hiking, biking, fishing, swimming, camping, sailing, etc. and many of those are related to the water zone. Because of this, the wave conditions around the area are important for the safety of the tourists, and thus an accurate wave forecasting becomes a necessary operation to that area.
The Model

NWW3-1

NWW3-2

SWAN-4

SWAN-3
Nearshore Wave Prediction model System around Northeastern Coast of Taiwan

45km wind field

15km wind field

5km wind field

NWW3-1
N-S 1~41
W-E 99~155

NWW3-2
N-S 17~32
W-E 113~129

SWAN-3
N-S 21~26.25
W-E 118.75~123

SWAN-4
N-S 24.5~25.5
W-E 121.25~122.25

Topography
ETOPO5

Topography
TaiDBMv6
Forecast domain and topography of SWAN-4
Verification – Typhoon Conson

CONSON, 7-9 JUN., 2004

typhoon (Vmax >= 100 kt)
typhoon (Vmax 64-99 kt)
tropical storm (Vmax 34-63 kt)
tropical depression (Vmax < 34 kt)
secondary center
Comparison

wave heights in Longdong

wave periods in Longdong.
Wave field and Wind field

NWW3-2
Wave field and Wind field

SWAN-3
Wave field and Wind field
Verification – Typhoon Mindulle
Comparison of wind and wave height

Longdong
Comparison of wave period and wind

Wave period at Longdong buoy location

Wind at Longdong buoy location
Comparison of wind and wave height
Comparison of wave period and wind

Wave period at Gueishandao buoy location

Wind at Gueishandao buoy location
Conclusion

- The grid size varying from 0.5°, 0.25°, 0.05° (~5km) to 0.005° (~500m) sequentially, is suitable for the computation.
- The suitable iteration scheme and parallel computing procedure are now testing to achieve the forecast timing.
- Field data blending with wave model through data assimilation might be helpful to reveal the local effect on wave field variation.
- CWB is now establishing a nearshore current model system around Taiwan, and the result might be introduced into the wave model system.