

Operational Regional Wave Forecasting System at NMEFC

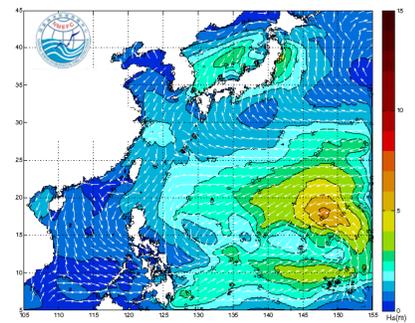


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NMEFC started wave forecast at 1966. With the development of computational ability, the forecasting method has been changed from statistical or semi-statistical methods to numerical forecasting methods. Until now, we can present about 20 kinds of products to the public, including real-time & hind-cast products, which provide forecasting services for sea swimming, fishery, inshore tourism, sea routes, harbors, offshore oil platforms production, et al. And forecasting domains include global, regional, and coastal regions.

Wave forecasting system for North-west Pacific (NWP)

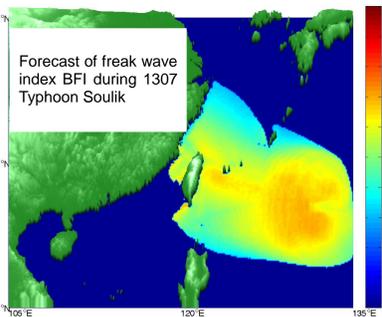
- ✓ SWAN wave model
- ✓ 105-155E, 5-45N
- ✓ Resolution: $0.1^\circ \times 0.1^\circ$
- ✓ 36 directions
- ✓ 36 frequencies with range 0.02~0.5Hz
- ✓ 5 days forecast
- ✓ regional forcing wind based on WRF
- ✓ Forecast of significant wave height, mean wave direction, wave period



Forecast wave height and direction on 07/10/2013 12UTC

Wave forecasting system for China seas

- ✓ Swan wave model and double-grid nest
- ✓ 105-130E, 5-45N
- ✓ Resolution: $1^\circ / 30 \times 1^\circ / 30$
- ✓ 36 directions
- ✓ 36 frequencies with range 0.02~0.5Hz
- ✓ 5 days forecast
- ✓ regional forcing wind based on WRF
- ✓ Forecast of significant wave height, mean wave direction, wave period, BFI, and mean wave steepness

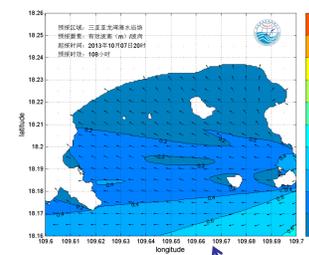
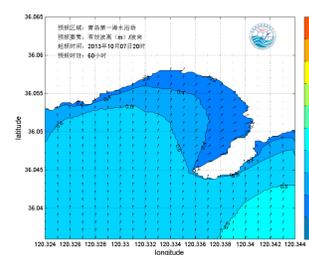


Performance

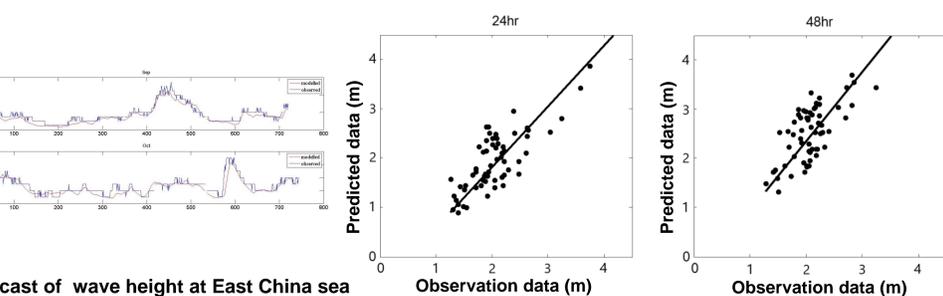
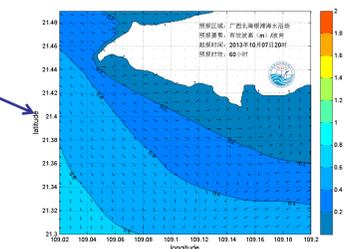
For significant wave height(H_s) >1m, within 72 hours forecast, relative error: <27%, absolute error: $H_s < 0.5m$

Shallow water wave forecasting system of sea beaches

- ✓ SWAN wave model and 3 multi-grids nesting technique
- ✓ Resolution: 20~50m
- ✓ physical process: bottom friction, wave shoaling, depth-induced breaking and wave diffraction
- ✓ tide influence on coastal waves
- ✓ 5 days forecast
- ✓ regional forcing wind based on WRF
- ✓ Forecast of significant wave height, mean wave direction, wave period



Shallow water wave forecast for different sea beaches

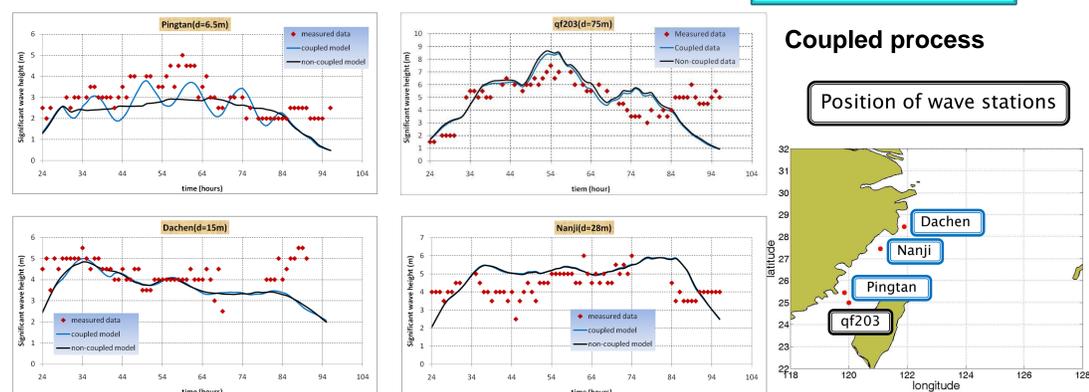
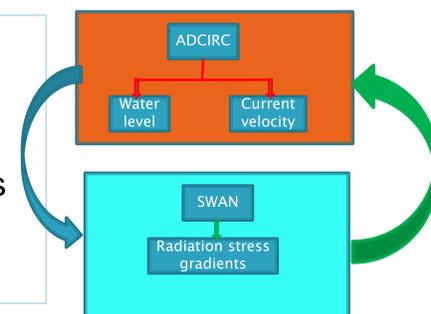


Prospects

- ✓ To set up more shallow water wave forecasting system along China coasts based on the couple model
- ✓ To develop operational wave data assimilation system considering both HY-2 satellite altimeter and buoy data
- ✓ Provide more forecast products, such as forecast with dangerous sea information

Development of coastal waves forecast based on the coupled wave and storm surge model

- Wave model: SWAN
- Storm surge model: Adcirc
- The coupled process
- ✓ Using the same unstructured meshes
- ✓ Without interpolation, so it is very efficient



Forecasting experiment during of 0908 typhoon "Morakot"

It can be concluded that consideration of the interaction of wave and storm surge will improve the coastal wave height forecasting, especially at shallow water.