

Operational Wave Forecasting System in KMA and its Applications

Pil-Hun Chang, Sang Myeong Oh, In Yong Jeong, Sukzun Youn, and Hyun-Suk Kang
Forecast Research Department, National Institute of Meteorological Sciences, Seogwipo,
Republic of Korea

(e-mail: phchang@korea.kr)

In the present study, we introduce the KMA (Korea Administration Meteorology) operational wave forecasting system and its applications. The operational wave forecasting system adopts the third-generation spectral wave model WaveWatch-III version 6.07, and the system includes Global, Regional, and Coastal models with the spatial resolution of about 25 km, 4 km, and 1 km, respectively. All wave models run two times a day (00, 12 UTC) to provide 12 day forecasts for global area, and 5 day forecasts for regional and coastal areas. In addition, the regional wave ensemble model consisting of 25 members and the rapid refresh wave forecast model are run, operationally. In order to improve the forecast skill, we implement the data assimilation system for each wave model and the one-way modeling system forced by tidal current and sea wind. Currently, the global wave model only incorporates the data assimilation procedure, in which the satellite-observed significant wave heights (SWH) are assimilated using the optimal interpolation methods. It improves SWH forecast skill about 4.0 % for 24-hour lead time. Similar method assimilating moored-buoy data around sea of Korea peninsula is applied to the rapid refresh wave model, and its test-operation is in progress. Since the Yellow Sea is strong tidal region in which the tidal range along the coasts reaches 4 to 8 meters, the wave-tide interaction based on the coastal wave model is examined for the operational usage. The preliminary results show that the tide induced about 10% changes of SWH where the tidal current is strong, and the large change in SWH appears when the severe weather condition occurs. The operational model forecasts are used for marine weather services in KMA, and also they are used as the input of various warning systems in KMA. For instance, coastal wave model results are used as the input of Rip current forecast system, total water level forecasting system, and swell warning system. In the presentation, we will introduce on-going developments and some applications of wave forecasts, including national services of data and graphical products.