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Natural Hazards and Earth System Sciences
Discussions

Interactive comment on "Assimilation of decomposed in-situ directional wave spectra into a numerical wave model on typhoon wave" *by* Y. M. Fan et al.

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The authors would like to thank you for very valuable comments and suggestions, which will undoubtedly improve our submitted manuscript and the related figures and thus will be taken into consideration in our revised manuscript.

In the following parts you may find our reply to your comments and the contents will be revised in the manuscript:

1.All SWAN model runs were forced by operational 1 h wind fields, with a 0.5 degree resolution in longitude and latitude, provided by the Central Weather Bureau (CWB).

In order to match up with the model-simulation, the wind fields were linearly interpolated in space and time, which the simulated regions, grid resolution and time step corresponding with the model nesting.

2.The parametric sensitivity analysis (Lee, et al., 2009) was used to search for optimal parameter values in SWAN wave model. These two parameters revealed by sensitivity analysis are: nonlinear saturation-based whitecapping combined with wind input (default value is 0.0015; tuned value is 0.00172) and the coefficient of the JONSWAP results for bottom friction dissipation (default value is 0.038; tuned value is 0.0284).

The grid resolution and time step conformed to the CFL condition.

Reference: Lee, B.C., Fan, Y.M., Chuang, L.Z.H. and Kao, C.C.: Parametric Sensitivity Analysis of the WAVEWATCH III Model, Terrestrial, Atmospheric & Oceanic Sciences, 20, 2, 425-432, 2009.

3.Although we could get higher spectral resolution from the buoy's observation, but due to the limitation of transmission technology, 32 wave directions and 41 wave frequencies are real-time data transmission only. Therefore, the analysis of the results improved with increasing spectral resolution can't be achieved at this stage.

4.The wave heights, which were corrected with altimeter wave height data, were distributed over a finite region of influence with radius of the order of 1000 km (Bauer et al., 1992). However, in order to enable the fictitious buoy data representative virtual stations, and consider the average of storm radius is around 200 km∼300 km, so a radius has been extensively defined for 250 km from the Gagua Ridge buoy. As the average error of significant wave height within 0.1 m for seven virtual stations is acceptable during typhoon period, so our suggestion is to look at the minimum virtual stations for evaluation instead of the maximum.

As bathymetry is one of the input data during model-simulation, the presence of islands, low or sheltered coastal areas could have been overall considered for the aver-

age error.

Reference: Bauer, E., Hasselmann, S. and Hasselmann, K.: Validation and Assimilation of Seaset Altimeter Wave Heights Using the WAM Wave Model, J. Geophys. Res., 97, 12671-12682, 1992.

Interactive comment on Nat. Hazards Earth Syst. Sci. Discuss., 1, 3967, 2013.