Natural Hazards
and Earth System
Sciences

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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 paper includes an excellent overview of a methodology to assimilate information by spectral instrumental in numerical model to predict wave characteristics associated with typhoon events in Taiwan.

The technical content is appropriate and excellently presented with an interesting mathematic methodology for wave spectra assimilation and adequate numerical vs. instrumental validations.

I think this is an excellent methodology that allows us to improve our own operational

systems to assess wave fields generated by hurricane/ typhoon episodes.

However the text does not explicitly describe some issues related to the implementation of the numerical model SWAN, wind forcing characteristics etc. My recommendation is to improve this description are as follows:

1. Describe in more detail the forcing wind fields used (of the CWB forecast). Detail whether the resolution of $0.5°$ is sufficient to adequately define the main characteristics of typhoons (eye, maximum wind radius, etc.). Comment temporal frequency of occurrence and describe deeply about the spatial and temporal interpolation job.

2. Discuss in detail the physical coefficients you used in the SWAN (dissipation, drag coefficient, whitecapping , quadruplets , etc.), if you leave the default values or if you performed additional sensitivity analysis. Also justify the selection of the time step for nonstationary executions.

3. Justify in detail by you set frequency components 41 and 32 directional components. It appears that the more components are taken to define the spectrum, best results are obtained, do they? Do you have performed an analysis of the results improved with increasing spectral resolution?.

4. You propose a radius search for your virtual buoy 1000 km. Does it applies only to the area of analysis (Taiwan)?, or could be applied to other areas of hurricanes / typhoons ?. It (seems) that it depends on the relative position of the typhoon track and the position of your buoy in deep water?. Which the maximum number of virtual buoys that must be taken into account?. Do the presence of islands, low or sheltered coastal areas could be a source of error for the selection of these virtual buoys? Please comment in the text.

5. Description of Figure 2 should be more descriptive, about the selection of virtual buoys .