Responses to Reviewer's Comments

We appreciate very much the constructive comments and suggestions of the reviewer, and have revised the manuscript accordingly. In the following, we explain our response to each comment of the reviewer. All revisions are highlighted with red color in the marked manuscript.

Comment 1: This study implemented the new source term package of wind input and dissipation into WAVEWATCH III. The basic concept was provided in their previous work and the method was applied to hurricane conditions in this study. The performance of the new package looks good. However, the reason (physical background) of improvement for hurricane condition is unclear. At first, the author tested the new method under moderate wind condition, U10=10m/s, showing that the advantage of new method is the wave development at the young wave age. This finding cannot explain the differences under hurricane condition. The author should explain the mechanism of the differences under hurricane condition. The other specific comments are below.

Response:

First, we would like to express our sincere thanks to the reviewer for his/her positive comment on the performance of the source term package presented in this study. The physical background of the improvement is further emphasized in the revised manuscript *[Page 9, Lines 199-207]*. Please kindly note that one important improvement to the source term in this study is the reasonable inclusion of physics-based breaking wave effect on the wind energy input. Better numerical results on the wave condition at a young wave age can thus be viewed as a good verification to the proposed model. Further explanation of the merit of the model under a hurricane condition is also added in the revised manuscript *[Page 31, Lines 587-598]*.

Comment 2: What's the spatial resolution for the idealized test and the hurricane condition simulations? The spatial resolution cannot affect the results?

Response:

Thanks for the comment. For duration-limited wave cases, the spatial resolution is chosen to be 1/30°. It was verified that a finer resolution leads to no change of the simulation results. For hurricane cases, the spatial resolution is 1/12°, which seems to be a popular choice in hurricane simulations (Fan and Roger, 2016). It is also found that a finer resolution will not change the simulation results. The relevant information is added in the revised manuscript. *[Page 11, Lines 262-266; Page 21, Lines 465-466]*

Comment 3: Why duration-limited simulations were conducted just for the new package? How about other source term package?

Response:

Thanks for the comment. In this section, the main purpose is to verify the applicability of the proposed model for waves in shallow water conditions. Since the other source term packages, in their original forms, were not necessarily valid for shallow water waves, particularly with depth-induced breaking, a direct comparison is not meaningful.

Comment 4: The model performances should be summarized by some statistics such as RMSE.

Response:

The mean absolute error (MAE) and root mean square error (RMSE) of the models are added in the revised manuscript. *[Page 23, Lines 492-495; Page 25, Lines 509-511]*

References:

Fan, Y., and Rogers, W. E. (2016). Drag coefficient comparisons between observed and model simulated directional wave spectra under hurricane conditions. Ocean Modelling, 102, 1-13.