Ocean Science
Discussions

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Interactive
comment

Interactive comment on "Estimation of oceanic sub-surface mixing under a severe cyclonic storm using a coupled atmosphere-ocean-wave model" *by* Kumar Ravi Prakash et al.

Kumar Ravi Prakash et al.

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Interactive reply to Anonymous Referee #1 of manuscript OS-2017-83 "Estimation of oceanic sub-surface mixing under a severe cyclonic storm using a coupled atmosphere-ocean-wave model" by Kumar Ravi Prakash et al.

General comments

(1) The authors investigate the effects of sub-surface mixing in the ocean under severe storm conditions. The introduction and the reference give the impression that the authors know very well the relevant publication and the overview they give is very nice. To

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Discussion paper

my understanding the novel approach of the article is the use of a coupled atmosphere-ocean-wave model to investigate to simulate the atmospheric and oceanic properties on a very fine scale. The focus is on the generation, propagation and dissipation of kinetic energy in the ocean. I would definitely recommend the publication of the article, although the English is not very well. Almost each sentence is missing an article or the third person "s" is neglected and Ocean is often spelled with capital O. This is not acceptable.

Response: We sincerely thank the Referee for finding it publishable and providing constructive comments that helped to improve the manuscript. We thoroughly checked the manuscript for any missing articles, grammatical mistakes and made necessary corrections. 'Ocean' is now corrected as 'ocean'.

(2) In detail: The abstract is much longer than the conclusions which should be the other way around. And there is not substantial note to the model system used in the article although this is a very important point. Without the model, the investigation could not have happened. So the abstract should focus more on the novel approach and the details of the findings should be discussed in the conclusions.

Response: As suggested by the Referee, we made substantial changes in the Abstract and Conclusions. The abstract is shortened and detailed findings are now discussed in the Conclusions. The model details and model configurations are provided with more details in Section 2 of the revised version. We added a block diagram (Figure 1 in the revised manuscript) to clearly show the exchange of variables between component models WRF, ROMS, and SWAN in the COAWST modeling system. Discussion on variables exchanged added in the manuscript.

(3) Page 3, line 65: NIO is one of the important factors, what are the others?

Response: This sentence is now modified to clear any confusion. The NIO and surface wind stress can generate near-inertial scale mixing at the base of the mixed layer. Other processes such as the nonlinear interaction of NIO and internal tides, and back-

ground flows in the ocean can influence the NIO propagation and kinetic energy and affect the mixing process. Effects of other processes are mentioned at appropriate places (sections 3.3.2 and 3.3.3) in the revised manuscript.

(4) Page 8, line 211: where are the 15m to be seen? The link between the description and the figures is not really strong.

Response: We regret this mistake. The mixed layer depth (MLD) was calculated using the density criteria. We have now marked the position of MLD with a thick black line in Figure 4a (Figure 5a in the revised version). Description of figures elaborated to make the link between figures and text, and the flow between sections strong. (5) Page 9, line240ff: Unclear that the tidal and near/inertial oscillations are the two dominant frequencies.

Response: Two sets of vertical lines are added in Figure 5 (Figure 6 in the revised version) to clearly show near-inertial (f) and tidal (M2) frequencies. The text in the manuscript is also modified accordingly.

(6) Line 250/251: sentence not understandable. What are the other processes?

Response: Other processes include the background flows, the presence of eddies, variations in sea surface height, non-linear wave-wave and wave-current interactions. This is now mentioned in the manuscript with proper references.

Note: We have improved quality of some figures (Figures 3 and 8 of the original version) without making any changes in the data, scale, and symbols. This is just to improve figures to make them publication quality.

Please also note the supplement to this comment:
https://www.ocean-sci-discuss.net/os-2017-83/os-2017-83-AC1-supplement.pdf

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Fig. 1.