

RESPONSE TO RC1

We thank the reviewer for constructive comments. Our responses to all of your comments are given below.

This paper documents the validation of a relatively new 3D PBL scheme in an offshore application coupled to a wave model making it a state-of-the-science study well worth publishing. All my comments on this are relatively minor and I will list them below.

1. The main thing I would like to have seen is how the coupling is done to the wave model. This is something still not seen very often and it would be helpful to spell it out. I am aware that directional drags could also be implemented in such coupling and whether or not this is done should be mentioned. I assume the wave height and period come into the roughness length somehow. I believe this would add to the completeness of the paper.

We added a sentence to clarify this, see lines 89-92: "Every 30 minutes, the WRF model 10-m zonal and meridional velocities are passed to WW3 and the wave characteristics (significant wave height, wave period, and wavelength) are passed to the WRF model surface-layer parameterization. In the surface-layer parameterization, the time-varying surface roughness length is calculated from the wave parameters, with a specified Charnock parameter relation."

2. Figure 6. Caption does not mention that potential temperature is also shown.

Thank you, we added a sentence indicating that the potential temperature is also shown. See new Fig. 6 caption.

3. Line 209 and Figure 10. "1800 UTC Nov 6". The observed winds don't show a maximum at that time (or any observations).

We made this sentence more specific: "In particular the observed maxima between 0600-1500 UTC Nov. 6 were underpredicted at SNS and MRY". By maxima, we mean to say the approximate time series portion with the largest wind speeds. See L217-219 in the revised manuscript.

4. Line 229 and Figure 12. "0600 UTC Nov 6". This is not a time shown in Figure 12.

Thank you for noticing this error. We corrected the sentence to "At 0000 UTC Nov. 6, higher TKE was confined near the coastline." See L238 in the revised manuscript.

5. Line 261. "full 3D PBL". May be helpful to add a "wherein..." here as I had to search back through the paper to find what the full option was.

We added a sentence to remind the reader what the essential aspects of the full 3D PBL parameterization are here. See L280-281 in the revised manuscript.

6. Overall while the differences were marginal, it was good to see the surface and lidar data validating the coupled model. If any simulations were carried out without coupling the wave model, it would have been interesting to see a note on whether that helped or why a wave model was coupled.

We appreciate this comment. We considered comparing simulations with and without coupling to the wave model. However, we deemed that work not essential to the main purpose of the manuscript, which is demonstrating that the 3D PBL parameterization works properly in coupled atmosphere/wave simulations and comparing it to a traditional 1D PBL parameterization in this framework. With an already long manuscript and this topic not being crucially related to the primary purpose of the manuscript, we defer this to future work.