Responses to Comments of Reviewer #1

We appreciate very much the comments of Reviewer #1 and have revised the manuscript accordingly. In the following, we explain our response to the comments. The relevant revisions are highlighted with red color in the marked manuscript.

Comments:

A good and timely study about properties of inertial waves. What I miss is a more detailed description of the used boundary layer model (line 106) and how the definitions of its variables relate to the analysis. Related to that is the rather poor Figure 5. Getting observed and modelled NIWs right requires good forcing and a good ML model. So please highlight and enlarge important panels of Fig 5, come up with a metric (e.g., difference in NI EKE), and discuss differences - if any.

Response:

First of all, we would like to express our sincere thanks to the reviewer for his/her constructive comments on our study. We are very pleased to learn that the reviewer considers our study being “a good and timely” one about properties of inertial waves.

In this study, we used the regional oceanic modeling system (ROMS) (Shchepetkin and McWilliams, 2005) to compute the near inertial currents. We discretized the whole depth into 35 layers in the vertical direction and refined the near-surface layers. The sea surface boundary condition is required to satisfy:

$$\nu \frac{\partial \mathbf{u}}{\partial z} = \boldsymbol{\tau}_{\mathbf{s}} \tag{1}$$

where, ν is the viscosity of seawater, which was determined by the conventional k-ε turbulence model (Rodi, 1987; Umlauf and Burchard, 2003); τ_s is the wind drag given by (Fairall et al., 1996):

$$\tau_s = \rho_a C_d u_{10}^2 \tag{2}$$

where, ρ_a is the density of the air; C_d is the wind drag coefficient; u_{10} is the horizontal wind speed at the 10-m level. To determine C_d, we preferred a formula that fits the numerical results obtained under extreme wind conditions with an improved wave boundary layer model

(Chen and Yu, 2016; Chen et al., 2018; Xu and Yu, 2021). So, the wave boundary model was not directly applied. The computed surface currents $\mathbf{u}$ is actually the averaged horizontal flow velocity within the top layer. The relevant modification is added in the revised manuscript [P8, L191-213].

We have improved the resolution of Figures 5 and 6, and enlarge the important panels [P16, Figure 5; P18, Figure 6]. We also introduced a metric, i.e., the classic Pearson product-moment correlation coefficient (Derrick et al., 1994), to verify the model:

$$r = \frac{\sum_{i=1}^{n}(X_i - \bar{X})(Y_i - \bar{Y})}{\sqrt{\sum_{i=1}^{n}(X_i - \bar{X})^2}\sqrt{\sum_{i=1}^{n}(Y_i - \bar{Y})^2}} \tag{3}$$

where r is the correlation coefficient, X and Y are the computed and observed results. The correlation coefficient reaches 0.7 in this study. It is thus concluded that the numerical results are in reasonably good agreement with the HF Radar data. The relevant modifications have been added in the revised manuscript [P17, L375-377].

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