Referee #2

The present manuscript describes spatial pattern and seasonal variability of the diapycnal diffusivities in the Philippine Sea. It was shown that seasonal variability was strong in winter and weak in summer at mid-latitudes, with the seasonal fluctuations more obvious in the upper ocean. The diapycnal diffusivitie that is spatially inhomogeneous were estimated from ARGO float data with the fine scale parameterization. The present manuscript is good scientific quality and well written.

First of all, thank you for your support to our work, we have carefully considered your advises and revised the manuscript.

The obtained results are interesting however revision is needed:

1. More convincing comparison and analysis is needed for diapycnal diffusivities scatters fig 6-7.

Response:

We have added some detailed descriptions and marked 95% confidence interval in these figures (see section 3.3.2). Figs. 6 and 7 are used to support the conclusions from Fig. 4 and Fig. 5. The regression coefficient can represent the response of mixing to wind (eg. Qiu et al., 2012) or other factors(eg. Wu et al., 2011; Jeon et al., 2018). And the same conclusion can be drawn from the two kinds of analysis methods.

2. As far as in Fig.3 (diapycnal diffusivities) and Fig.5 (Vertical structures of geometric averaged diapycnal diffusivities) Philippine Sea was divided for two zones (a) 10°N -25°N and (b) 25°N-35°N, but on figures 6-7 Philippine Sea was divided into three zones 10°N -15°N, 15°N-25°N and 25°N-35°N it is difficult to compare the results for zone (10-25) and make a conclusions about that results on Figs. 6-7 is consistent with the results of Fig.3 and Fig.4.

Response:

Good suggestion. According to your comment, we reprocessed the data and redrew the figures. We divided the region into two parts, low latitude and mid-latitude, which are consistent with the division in Fig. 4 and Fig. 5. We found that the new division does not affect the conclusion but can actually interpret the results better. The new Fig. 6 and Fig.7 have been added in main text and corresponding contexts were revised.

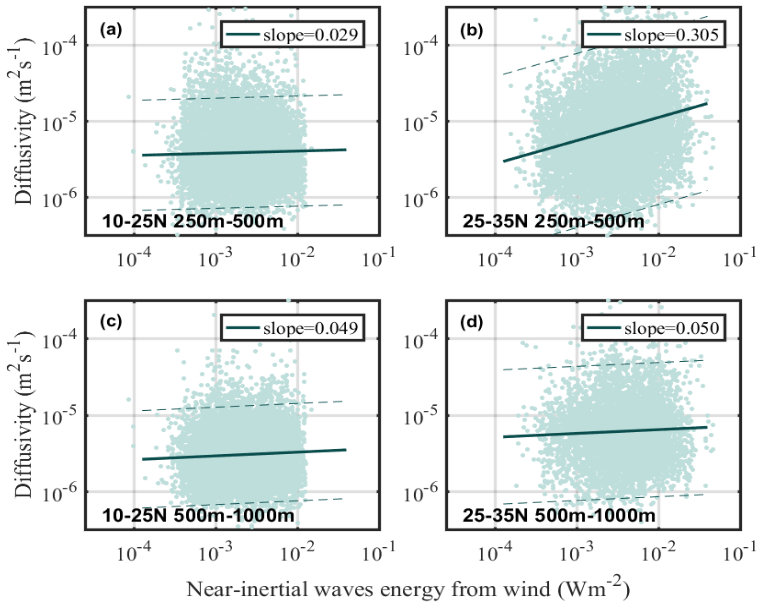

Figure 1 Scatter of log-scale Kz versus log-scale near-inertial energy flux from wind in 250-500 m between (a) 10°N -25°N and (b) 25°N-35°N, and in 500-1000 m between (c) 10°N-25°N and (d) 25°N-35°N The best-fit slopes are denoted by the solid line, the 95% confidence interval is indicated by dash lines.

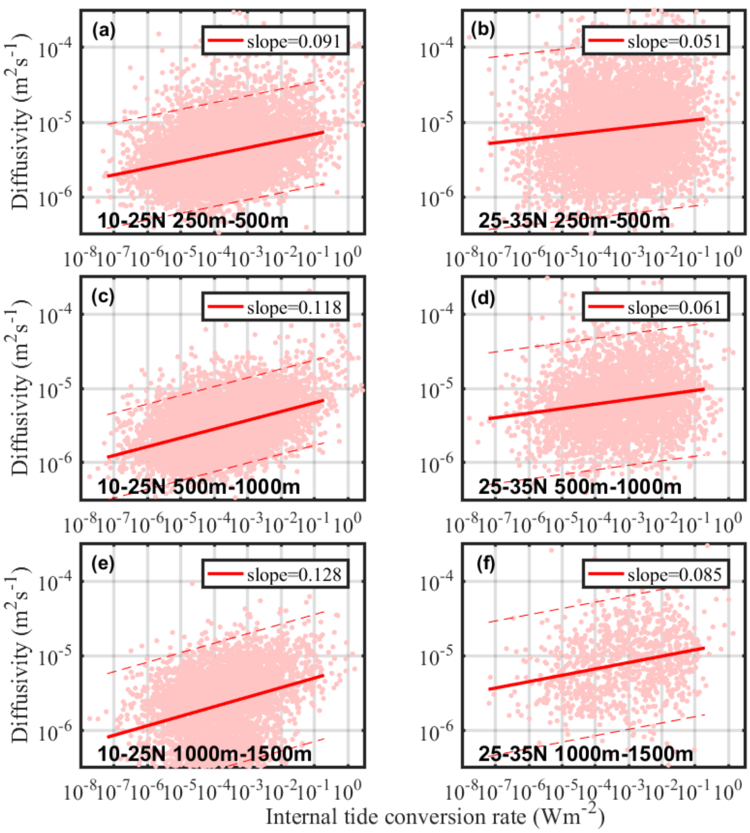

Figure 2 Scatter of log-scale K_z versus log-scale internal tide conversion rate in 250-500 m (row 1), 500-1000

m (row 2), 1000-15000 m (row 3) and the best-fit slopes are denoted by the red line. Columns 1 and are 10°N-25°N and 25°N -35°N latitude bands, the 95% confidence interval is indicated by dash lines.

3. In line 182 H is described as is the mixed-layer depth and was set to a constant 25m, however in Eq (8) H – near-inertial energy flux.

Response:

Thank you for your attention, it has been revised.

4. Typo in Figure 3 Seasonal cycles in diapycnal diffusivities (colorful line) and near-inertial energy flux from wind (green) extents to 250-500 m, 500-1000 m and 1000-1500 m in (a) 10°N -25°N and (b) 10°N-25°N (should be 25°N -35°N).

Response:

It has been corrected.

References:

Wu, L., Jing, Z., Riser, S., & Visbeck, M.: Seasonal and spatial variations of southern ocean diapycnal mixing from argo profiling floats, Nature Geoscience, 2011.

Jeon, C., Park, J.H., & Park, Y.G.: Temporal and spatial variability of near‐inertial waves in the East/Japan Sea from a high‐resolution wind‐forced ocean model, Journal of Geophysical Research: Oceans, 124, 6015–6029, 2018. https://doi.org/10.1029/2018JC014802

Qiu, B., Chen, S., and Carter, G. S.: Time‐varying parametric subharmonic instability from repeat CTD surveys in the northwestern Pacific Ocean, J. Geophys. Res., 117, C09012, 2012.