Interactive comment on “Gas exchange estimates in the Peruvian upwelling regime biased by multi-day near-surface stratification” by Tim Fischer et al.

Anonymous Referee #1

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1 General Comments

The article by Fischer et al. is concerned with the impact of stratification on the air-sea gas exchange of N$_2$O, which leads to gradients of dissolved nitrous oxide which diminish as the surface is approached.

This type of study has been carried out for CO$_2$, but this is the first time that such a study has been conducted for N$_2$O in an upwelling region, which are recognised as hotspots for N$_2$O emission. It is important to better constrain the air-sea exchange of N$_2$O as it is thought that the ocean is a strong source of N$_2$O.

The authors provide reasonable and justifiable arguments for the effect of stratification on N$_2$O gas exchange, and with some further effort the article could be published.

2 Specific Comments

P3L28: Add references to Sutherland et al. 2014 and Sutherland et al. 2016

For figure 4, can you add a mean diurnal cycle of temperature. I would like to see the extent of the thermal stratification.

section 2.2.5: can you add a histogram of the wind speed data used

section 2.2.7: I did not fully understand your model. Can you please elucidate with a schematic? I also did not understand why the model was constrained by the glider data only.

3 Technical Corrections

P5 L2: define OMZ
P5 L5: and will be called ‘oxygen interface’ in the following – > henceforth referred to as ‘oxygen interface’
P5 L6: express 0.5 nm in meters
P5L7: ship-caused – > ship-induced
P7L27: Fig 4 comes before fig 2
P9L1: It is to be investigated – > Here we investigate
P10L18: you cannot start a sentence with I.e.
4 References

