We would like to sincerely thank the referee for the time and effort he or she put into this review and the helpful suggestions improving our manuscript. We address the issues raised by the referee below.

I wonder if it is necessary to use the PDO index, as suggested by the authors, there are little differences in the result when just using the ENSO index. Maybe just use two frequency bands of the ENSO index.

We agree that using two frequency bands of the ENSO index would be equally justified. We added another remark to the methodology that clarifies right from the beginning of the regression analysis that the PDO index, as it is used here, can be understood as the low-frequency component of the ENSO index.

As I understand both the ENSO and PDO indices are derived from the model results. Maybe it is necessary to show how the modeled indices compare with observations. It is not explained how the PDO index is derived.

Agreed. We included indices based on observational data in Fig. A01 and also included a description of how both indices are derived.

Do different flavors of ENSO have an influence? Such as the so-called central Pacific ENSO.

We did not test this but used the Nino34 index to capture both flavours of ENSO. Judging from SST regressions, the difference between Central Pacific and Eastern Pacific El Nino is most pronounced in the central to eastern Pacific (e.g. Ashok et al. 2007). Available observational data suggests that the impact in the region of interest is rather small. For example, Liu et al. 2015 showed that the ITF transport anomalies during both ENSO types are rather similar. We therefore suggest to not address this aspect in the manuscript.

Does the Indian Ocean have a decadal mode that could influence the region through oceanic Kelvin wave propagation or some teleconnection?

Yes, there is evidence for Kelvin wave propagation from the Indian Ocean across the AMS into the Pacific (e.g. Yuan et al. 2013) and we considered to include an Indian Ocean mode in our analysis. The first choice would be the Indian Ocean Dipole Index (IOD), however the IOD does not show variability on the timescales considered here. The Indian Ocean is of course subject to decadal variability, but it appears mostly related to the Pacific or is even forced by Pacific climate modes. In particular in the southeastern tropical IO (see Han et al. 2014 for a review). We therefore consider it justified to not include an Indian Ocean mode in our analysis. We added a respective note to the manuscript.

In Results, the first paragraph refers to Fig. 3, which in fact should be Fig. 1.

Corrected

Line 198: "off the northwest coast of Australia" - it is not clear what the authors refer to in the figure.

It should read “off the northeast coast of Australia”.

Line 236: fix the sentence.

Fixed

Fig.7: the legend doesn't match the caption.

We are not sure what you mean here. However, we changed the legend of Fig. 7 to show all lines. Please feel free to clarify this point.

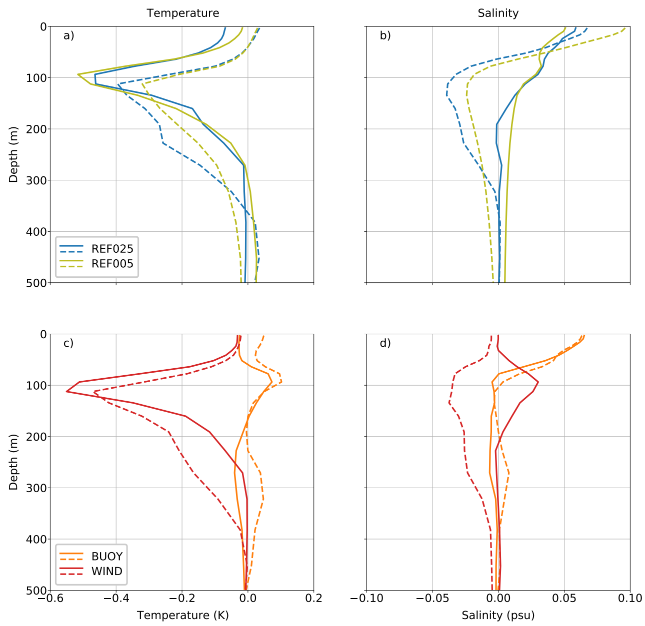

Figure 1: Linear regression of temperature and salinity to Niño3.4 (solid) and PDO index (dashed) from (a, b) reference experiments and (c,d) sensitivity experiments. All data has been filtered with an 8-year low-pass filter

Line 251: explain the meaning of the "advective nature".

We rephrased the sentence it now reads: *The momentum flux experiments (WIND) reproduces the subsurface signals, highlighting the fact that they are due to wind-stress-driven advection, but shows no surface anomalies associated with ENSO and PDO cycles.*

References

Ashok, K., Behera, S. K., Rao, S. A., Weng, H., and Yamagata, T. (2007), El Niño Modoki and its possible teleconnection, *J. Geophys. Res.*, 112, C11007, doi:10.1029/2006JC003798.

Han, W., Vialard, J., McPhaden, M. J., Lee, T., Masumoto, Y., Feng, M., & de Ruijter, W. P. (2014). Indian Ocean Decadal Variability: A Review, *Bulletin of the American Meteorological Society*, *95*(11), 1679-1703.

Liu, Q.-Y., Feng, M., Wang, D., and Wijffels, S. (2015), Interannual variability of the Indonesian Throughflow transport: A revisit based on 30 year expendable bathythermograph data, *J. Geophys. Res. Oceans*, 120, 8270– 8282, doi:10.1002/2015JC011351.

Yuan, D., Zhou, H., & Zhao, X. (2013). Interannual Climate Variability over the Tropical Pacific Ocean Induced by the Indian Ocean Dipole through the Indonesian Throughflow, *Journal of Climate*, *26*(9), 2845-2861. Retrieved Aug 18, 2021