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Ocean Science
Discussions

Interactive comment on "Correlation between subsurface salinity anomalies in the Bay of Bengal and the Indian Ocean Dipole and governing mechanisms" *by* Zheen Zhang et al.

Anonymous Referee #1

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The authors suggested that the subsurface salinity of the Bay of Bengal (BoB) was correlated with the IOD with a lag of several months. They further concluded that the coastal Kelvin waves carry signals of salinity anomalies from the eastern equatorial Indian Ocean and propagate along the coasts. Subsequently, westward Rossby waves propagated these signals to the center basin. I think this study is interesting. However, there are several concerns regarding model validation and result interpretation.

1. Previous studies suggested that remote forcing from the equator significantly modulated the intraseasonal current and eddy kinetic energy (EKE) in the BoB by the coastal Kelvin waves and reflected/free Rossby waves. Strong Intraseasonal Variability of Cur-

rents and large EKE can be found near 5N in the eastern Indian Ocean (e.g., Chen et al. 2017 JPO, 2018 JGR). Obvious salinity anomalies can also be observed here in your Fig. 10.

In Fig.10, you chose several sub-regions. How to choose these sub-regions? To clearly demonstrate your points of remote forcing modulating the salinity by waves, I suggest to choose a sub-region near 5N in the eastern Indian Ocean. Furthermore, it would be helpful to compare the differences of these sub-regions, not just in correlation coefficient (Fig. 11).

2. I am surprised that the amplitude of correlation coefficient for the BoB (Fig. 9) is comparable with that for the sub-regions (Fig. 11). Which region was chosen when calculating the correlation coefficient for the BoB.

3. Could you clearly demonstrate the lagged period for each sub-region? It's not easy to identify this information in Fig. 11.

4. Lines 164-173. Evidences are needed here.

5. Model validation

(1) "The distribution of composited SSTA presents a dipole mode in the tropical Indian Ocean, which indicates the MPI-ESM-MR can reproduce IOD events." It would be better to show more evidences here.

(2) The salinity of HAMSOM is obviously lower than that of the other datasets (Fig. 2). Dose this affect the results in this study?

(3) The salinity in the subsurface layer is less correlated with each other (Fig. 3b). Are we confident enough in the results?

(4) Why is the RC-CLIM not used in Fig. 2? Why choose EN4 as the "standard" in Fig. 6? How to obtain the conclusion "Overall, the standard deviations of HAMSOM and other data sets are in close agreement" according to Fig. 6?

(5) Could you give more explanation of the grey lines in Fig. 6?

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