

# Response letter:

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Xu YUAN, Xiaolong YU and Zhongbo SU

Dear Dr. A.J. George Nurser ,

We want to thank you for organizing quality review of our article and we sincerely appreciate the valuable comments. In our response, reviewers' comments are listed in gray shaded and our responses are provided in blue color.

General comments:

I believe it is now almost publishable. I would just like you to make the changes suggested by the reviewer and also the changes to the English indicated in the attached pdf.

We have carefully checked the manuscript and made changes to the English accordingly as indicated in the commented PDF. We also have been made to address the comments of the reviewer.

Dear Referee #1,

We sincerely appreciate your careful reading of our revision. We have made corrections to our previous draft, listing the reviewer's comments in gray shaded and our responses in blue color.

General comments:

In this round, I do see great improvements in the manuscript. Still, much patience should be paid in the text-editing and discussion. The followings are some comments.

Many thanks for your valuable suggestions and comments. In our revised manuscript, the typos are carefully addressed. Detailed descriptions are now included for some of the physical mechanisms.

Minor comments:

Line45, 'Comparedto' --> 'Compared to'

Corrected.

Line65, delete 'and SST variation'

Deleted.

Line81, 'ta' --> 'the'; delete 'as the depth'

Corrected.

Line130-133, the time span '2005-2010' is mentioned in the text, but it is different with that shown in Figure3. Which time series is used to calculate the correlation coefficients (0.75 and 0.9) in the text?'

We used the time span from 2005 to 2015 to calculate the correlation coefficient. We have corrected the time span in the revised manuscript.

Line184-186 and Figure8, Ekman pumping is propotional to the Curl of wind stress (not the zonal wind stress), and pumping would result in a shallow thermocline depth.

We have changed the sentence in Lines 184-187 in the revised manuscript.

"In the meantime, a negative wind stress curl mainly dominated by the zonal wind stress, leads to a weakening Ekman pumping in the western TIO. This weakened Ekman pumping inhibits the upwelling from December to April, resulting in the thicker thermocline depth (green line), which in turn, also makes the BL thicker."

Line187, 'THE' --> 'the'.

Corrected.

Line216-217, In positive IOD events, more precipitation occurred in the WIO should also contribute to the surface freshwater.

We have added this in the revised manuscript in Lines 217-220.

“In the western TIO (Figures 9b, 9d, and 9f), the thicker BL prominently occurs only during the mature phase of positive IOD events that are associated with deeper thermocline and fresher surface water. The deeper thermocline is due to wind-induced downwelling and the fresher surface water is attributed to the westward freshwater advection and more precipitation induced by positive IOD events in the western TIO.”

Line407, 'Argo (a) and SODA(b)' --> 'Argo (a-d) and SODA(e-h)'

Corrected.