

Response to Reviewer #2

We would like to thank the reviewer #2 for thoughtful comments and suggestions. The manuscript is now revised following the reviewer's suggestions. Here, we briefly explain how we address each of the comment. The reviewer's comments are in italic font, and our replies are in normal font.

Reviewer #2 (Remarks to the Author):

"Pacific origin of the abrupt increase in Indian Ocean heat content during the recent global surface warming hiatus", by Sang-Ki Lee et al. uses an ensemble of climate models to examine how heat is redistributed in the ocean during the recent warming hiatus in the surface of the global oceans. They validate the models for this phenomenon by comparing global ocean warming patterns in the models with the warming shown in NODC 0 to 700 meter OHC estimates. They find that during the hiatus heat is exported from the Pacific to the Indian through the Indonesian throughflow. The Authors speculate that this is due to recent periods of persistent La Nina conditions. The paper is well written and appropriate for publication in Nature Geoscience. Considering how novel the results are, I would suggest that the editors consider this paper for publication in Nature. I have a couple of comments and questions listed below. I recommend that the paper be published once these minor points are addressed.

Lns 57-60: The observations of OHC700 curve shown in Fig. 1c come from the NODC estimate. This estimate fills in missing anomalies with zero. Hence, when data density increased in 2003, due to Argo array of profiling floats, the NODC estimate also change the slope of the OHC700 curve (Lyman and Johnson 2014). Because this analysis examines model output this is not a problem for the authors results, however it should be mentioned when discussing the NODC observations.

Lyman and Johnson, Estimating global ocean heat content changes in the upper 1800 m since 1950 and the influence of climatology choice, 2014, Journal of Climate, doi:10.1175/JCLI-D-12-00752.1.

Reply: We have added a section in Supplementary Information (S.I.1) to point out that the OHC_{700} derived from WOA13 increased sharply during 2001-2003 in all ocean basins. Previous studies have suggested that the changes in the historical observation network from a ship-based system to Argo floats introduced an artificial jump in OHC_{700} during the initiation of the global Argo array (2001–2003). Therefore, we pointed out that the OHC_{700} changes derived from WOA13 during 2001-2003 were not used in this study. We cite Lyman and Johnson (2014) in the Supplementary Information.

Lns 140-143: is the link between ENSO and the ITF heat transport known? If it is then reference the appropriate source.

Reply: The connection between the ITF volume transport and ENSO has been suggested by Meyer et al. (1996) and England et al. (2005). Both of these references are already cited (ref 18 and 19).

Ln 196: is the superscript 30 correct?

Reply: The superscript 30 is now changed to (ref 30).