

We thank Referee #1 and #2 for their encouraging statement and the constructive comments of the second review round. We hope we now answered everything to your satisfaction and made the points raised by reviewer #2 clear.

In the following the review is copied in black with our comments and answers in blue just below each remark.

Reviewer #2

One last thing that is still lacking is on the discussions between the Lagrangian diapycnal flux reported in this study and the classical diapycnal mass flux from literature. In this study, it was concluded that “The second largest contribution originates from the mixed layer with 7.2 Sv (24%), where the Labrador Sea contribution (5.9 Sv) dominates over the Irminger Sea contribution (1.0 Sv).” However, as I mentioned in my previous comment, Petit et al (2020) reported 7 Sv of light-to-dense transformation due to air-sea flux in the Irminger and Iceland basins, in contrast with the current study. The different time period (2010-2019 for current study and 2014-2016 for Petit), as the authors pointed out in their response, might play a role. What other factors might contribute to the difference? Is it possible that the transformed waters from the Irminger Sea re-entrained into the mixed layer in the Labrador Sea? I am not asking the authors to conduct further analysis, but I do think this is an important issue that should at least be discussed.

To clarify this we added to 4.4 : “Concurring with Petit et al. (2020) most of the overturning occurs in the eastern SPNA in the analyzed model. Though, contrary to their analysis we focus on the overall AMOC density at OSNAP (27.62 kg m^{-3}) and not at OSNAP EAST (27.54 kg m^{-3}). Water lighter than 27.62 kg m^{-3} could be transported from the Irminger to the Labrador Sea and then be transformed to $\sigma \geq 27.62 \text{ kg m}^{-3}$. This difference in the density boundary could be an additional reason for the differences in transformation volumes between our results and their work.”

Minor:

Lines 138-139: Please delete comma after “Even though”. Also, I think you only defined two (LSW and INADW) NADW densities, instead of three.

Added at L 142 : “ It is also a reason why we did not define the density boundary between NEADW and DSOW [Handmann et al. 2018] here, which is additionally difficult due to changes in water mass properties along the spreading pathways of NEADW”