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Interactive comment on "South Atlantic meridional transports from NEMO-based simulations and reanalyses" *by* Davi Mignac et al.

Anonymous Referee #1

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The manuscript presents an analysis of differences of meridional heat and volume transports among different ocean simulations. Two free running models with with eddy resolving and eddy permitting resolution and four different data assimilation products have been investigated. The main finding it that the assimilation of data increases the transports, thereby bringing them into better agreement to independent estimates. The spread in heat transport is mainly related to volume transport differences which seem to be better constrained by the data in the interior that near the western boundary. The manuscript is rather descriptive and makes its point by many figures that have overlapping information content. The message does not go very deep but is well presented. Among the many different existing assimilation products the presented products are most similar yet differ in several aspects, which makes it difficult to figure out which

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Discussion paper

of the differences (if any) is key for different behavior. One wonders why not other products have been consulted or why no attempt has been made explore reasons for differences. However, there are no serious problems encountered and the manuscript may be publishable after minor revisions. Detailed comments are below.

Details:

L65: How about the contribution from the eastern boundary and the interior circulation, wouldn't these be worth to be shown or at least be mentioned?

L151: I am not clear which studies you refer to. There were already two named, and now two different follow. Maybe this could be slightly rearranged that it reads smoother.

Fig. 4g: Label g missing

L240: Presumably these are the same areas that contribute most to the MHT. The trivial expectation is that the relative spread is similar, such that differences in areas that matter most for the mean MHT also matter most for their spread. Is this so? Could you check this, maybe show the ensemble mean p-OTT.

L255-258: Wouldn't you expect to see an impact of the second peak of southward transports in the ORAs that the FRMs should not show? Also, since Fig.4 shows the mean, I don't see how you can infer conclusions for the time variability from this. You could investigate the contributions to the heat transport variability in more detail instead of speculating.

L272-273: I think showing the ensemble mean p-OTT would also serve here to make this point. Fig.1 shows the volume transport but the depth integrated heat transport could be different.

L278-279: It would be nice to add information on these limits to the figure caption or state them somewhere else.

L294-296: Isn't this basically what we already know from Figure 2?

L313-314: Can this variability be considered realistic? Are the associated features similar to the high resolution model simulation? For instance, the ORAs, except for ORA-IP, have substantially more variability in the interior than the eddy resolving model.

L323-325: It does not become clear why these two time series are shown together. What is their relation or the intention here?

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