General comments

This study is focusing on the understanding of the key process that drive the mean seasonal cycle of heat and salt in the tropical Atlantic. They use data from model (NEMO) and observation (PREFCLIM) and mixed layer budget technique for this purpose. The paper is well written and the flow is to follow.

While the topic is interesting, there are issues the authors must address before publications (detail below). Therefore, I recommend minor revision.

Minor comments

1°) I don't understand what the added value of this paper is. The authors should emphasize this point. To me, most of the results have already been shown previously. The originality of this paper should be clearly addressed.

2°) Why don't you forced the model with the same heat flux as in PFREFCLIM (or vice-versa) since it allows to do that. This will allow, at least, to overcome the problem found in the inconsistency of heat flux in the interpretation of results.

3°) The seasonal variations of the salinity tendency are quite different from Obs and Model. Can you explain this?

5°) Is the use of PREFCLIM suitable for this kind of study since it provides a coarse temporal and spatial resolution?

3°) What is the criterion used to delimitate the boxes? You should clarify this in the text.

Line 37: are you sure that paper of Giordani and Caniaux, 2001 deals about the altantic cold tongue ?

Line 257:  Please can you explain why there a discrepancy between the model and the Obs only at the equator ?