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Climate of the Past Discussions

Interactive comment on "Holocene evolution of the North Atlantic subsurface transport" *by* Janne Repschläger et al.

Anonymous Referee #2

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General and specific comments: The paper "Holocene evolution of the North Atlantic subsurface transport" by Repschläger et al presents new Holocene surface temperature and salinity estimations from a sediment core at the Azores Front. The data are used together with existing subsurface and surface data from the same core (Repschläger et al, 2015. Paleoceanography) in order to investigate the subsurface transport between the subtropical and polar North Atlantic and the intergyre transport pathways. This is a very timely and welcome study, and it is very much within the scope of CP. Overall the paper is well structured with clear and good figures. However, it has some issues. The authors suggest a freshwater control of the subsurface transport. The discussion seems to be focused on this hypothesis, and other driving factors appear to be somewhat superficially discussed. Hence, freshwater control does not seem convincing. All driving factors need to be discussed in much more detail including ad-

ditional studies, e.g. Olsen et al. (2012) DOI 10.1038/ngeo1589 in addition to model runs e.g. Blaschek et al. (2015), DOI 10.1007/s00382-014-2279-1. It should also be taken into consideration that the current reconstruction is compared to two other reconstructions. Is it possible to go even further south/north or east/west? The current study also heavily refer to the existing paper by Repschläger et al. (2015) in Paleoceanography throughout the paper. Naturally, some things are not necessary to describe in detail twice, but it should be possible to follow the current study without needing the other paper next to you. Additionally, some references to Repschläger et al. 2015 are in some places misleading, please use original references on e.g. the preferred depth habitats of the planktic foraminifera.

Technical corrections: Abstract, page 1, lines 7-15: The abstract does not mention which type of data that have been used for the reconstructions (Mg/Ca and d18O data).

Regional Setting, page 3, lines 8-12: This part belongs to discussion or introduction.

Methods, page 4, lines 1-5: Explain in more detail

Results, page 5, lines 3-8: Interpretations that belong to discussion

Discussion, page 5, line 26: Consider to add core ID in order to facilitate reading of figure.

Discussion, page 6, line 6: The reference is to Figure 3b, but it is in fact Figure 3c?

Discussion, page 6, lines 20-6: Unclear; explain in more detail.

Discussion, page 7, lines 6-31: Include additional studies and discuss all drivers in more detail

Discussion, page 7, line 15: The acronym ITCZ needs to be defined.

References, page 8, line 27: Make sure that "K0.., N" reads "Koç, N" or "Koc, N" in final version.

Figure 1: Add positions and core ID for the studies from Labrador Sea.

Figure 3: In the figure caption data are described and interpreted; this should be removed.

Figure 4: The acronyms on the figure should be defined in the figure text in order to facilitate reading.

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