Earth System
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Interactive comment on "North Atlantic subpolar gyre along predetermined ship tracks since 1993: a monthly dataset of surface temperature, salinity, and density" *by* Gilles Reverdin et al.

Anonymous Referee #2

This study presents newly binned datasets along four ship tracks in the subpolar North Atlantic, including monthly sea surface temperature, salinity, and density between 1993 and 2017. Based the data, this study further describes the characteristics of those key variables in the region in terms of their temporal and spatial variability. The subpolar region has been sparsely and irregularly sampled especially prior to the Argo era let alone the continental slope regions that are not available even from the Argo data which all makes this dataset based on observations from routine volunteer ships particularly interesting. However, I found some statements are rather vague and it tends to lack good transitions to connect paragraphs. Please see my main concerns along with some minor comments outlined below.

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General comments

1. Introduction: While the first and second paraphs in Introduction make it clear why the surface observations in the subpolar region are critical, it doesn't seem to have made a good transition to the third paragraph. What is the main purpose of the third paragraph? How does it lead to the fourth paragraph? I would suggest the authors strengthen the importance and uniqueness of their data product (i.e., vs. Argo), and discuss previous studies based on the same ship data with emphasis on how the presented data could make a difference.

2. The name of the subsections is misleading. Section 3.1 actually describes variability along all the transects not just 'AX01 and AX02'. Section 3.3 discusses the interannual variability and is not about an analysis method.

3. I found a couple of places very confusing because of the lack of transparency on the method. The authors need to be specific on what data were used and how a derived quantity was defined and for what purpose. For example, what is 'seasonal cycle of interannual RMS variability'? what data were used for calculating this 'RMS variability'? Why The motivation of those analysis needs to be clarified which will help the reader to understand the present results.

Minor comments

Line 41: de Jong and de Steur 2016

Line 66-77: Please reword. See general comments above.

Line 82: Is this 'interannual standard deviation' the same as 'interannual RMS variability' used in section 3.2? Please be consistent.

Line 89: Are those cargo ships? Do they run on a regular schedule? How long does it take for sampling each transect?

Lines 149-150: It is confusing about what has been done here with the averaged sea-

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sonal cycle. Please rephrase.

Lines 150-151: What about temperature and density?

Lines 158-159: It is not clear why EOF will be performed.

Line 170: Should it be 'top left'?

Line 173: What is the error map like? What is the magnitude of the error?

Line 210: Since N-AX01 is a variation of B-AX01 and has been less frequently sampled, I would suggest sticking with the B-AX01 for discussions. Then Figures 1 and 2 can be merged. Figure 2 right panel on N-AX01 can be moved to Supplementary.

Line 236ff: It is not clear what data were used for calculating those RMS values – still monthly anomalies that have the seasonal cycles removed? Also, what about the comparison between AX01 and GX01?

Line 237: Please define 'RMS'.

Line 275: Fig. 5.

Line 302: 'the seasonal variability'? The seasonal cycles have been removed from the data for analysis. . .

Line 415: 'or the old one?'

Line 419: Typo 'than'.

Line 592: B-AX02 (left) and B-AX01 (right).

Figure 1: B-AX01 (red) and B-AX02 (black). What is G-AX02? It doesn't appear in the text.

Figures 2: The sketch on the top left corner is too hard to read.

Figures 2 and 3: Please put the name of the transect in the figure titles and use 'B-AX01' instead of '59 N' for consistency. Please add the colorbar.

Figure 4: Please add the colorbar.

Figure 5: Also, please replace '59 N' with AX01 for consistency.

Data files:

1. The global attribute 'title' in each file should contain the name of the ship track (e.g., AX01). Then the user can find any relevant studies used the data collected along that transect.

2. Error information seems to be missing for each variable included in the data file.