Transport Variability of the Brazil Current from Observations and a Model

Claudia Schmid and Sudip Majumder

General comments

The paper addresses the variability of the western boundary current of the South Atlantic Ocean, the Brazil Current. The basic information used is in situ data from Argo profiles and SSH from satellite, as well as results from the HYCOM NCODA system, with 1/12 of degree and a robust assimilation scheme. Moreover, it is also investigated the relationship with climatic indexes such as SAM, Nino3.4 and AMO.

The article title sounds very strange with this "a Model", not only because HYCOM NCODA is a well-known and recognized numerical system for ocean circulation, but also considering the bunch of models being used nowadays. My suggestion would be something like "... from Observations and an Assimilating System for Ocean Circulation".

Response:
Thank you. We changed the title a bit finding a compromise between the suggestion and the initial title.

Please note: all page and line numbers are based on the revised version in bold font.

In my opinion, lots of commas are missing along the text. Moreover, too short phrases are also common, which could be easily merged with the previous one to make the text more fluent and clear. An example of this can be found in lines 21 and 22 of pg19, among others.

Response:
Thank you. During the revisions we tried to make the text more fluent.

Specific comments

The methodology for transport estimation as well as for uncertainties quantification has adequate criteria based on previous works of the same group. OK.

Lines 5-6, pg14: is there a reason to treat as anomalies the difference between some specific month and the annual value for that year? Is this an anomaly or a seasonal variation? In my opinion, the anomaly should be obtained through the difference between the individual monthly transports and the long term mean for the correspondent month. This aspect needs to be clarified. Maybe an analysis of the anomalies could also bring some interesting aspects of the long term variability, mainly related to the climate indexes and their combination.

Response: Thank you, we expanded the text to clarify what we did. (page 15, l.8-12)

Lines 22-23, pg 14: a bit forced with "the annual cycle from HYCOM and Argo & SSH are very similar from November until April". Can this be related to the quantification of "anomalies" mentioned in Lines 5-6, pg14?

Response: thank you, the text has been revised. (page 16, l.15-20)

Moreover, there is always a jump between December and January in the mean annual cycles of figure 6. How these figures behave with a long term mean climatology for each month to quantify the anomalies?

Response:
All these jumps are quite small. For example, the difference between the December and January value in at 24S is less than 0.5 Sv. This difference is similar to the difference between the transport in April and May for the observations and smaller than the difference between the transport in March and

April for HYCOM, for example. Also, these jumps are smaller than the standard error at all 3 latitudes. For the mean annual cycle, we get a similar result with respect to the timing of the seasonal cycle and a bit larger standard errors because the interannual variability has not been removed.

Line 13, pg15: "In about 2001 to 2010 ..." should be "Around 2009. . ." isn't it?

Response: Thank you, we rephrased this. (page 17, l.5–6)

Figures 7 and 8: the vectors of the cross wavelet diagrams are impossible to distinguish. Another issue is the absence of the information of wavelet coherence to consider only the some parts of the graphic. This information is crucial and there is a need to present it.

Response: Thank you. We improved the discussion of the wavelet analysis. Figures of the coherence were added and the arrow style was changed.

Another key issue: is it possible to associate the description of time lags described with the arrow directions in the cross wavelet phase diagrams? This aspect needs to be strongly clarified.

Response: Thank you. While improving the discussion we also looked into this and added our finding to the text.
(page 20, l.15–17)

Technical corrections

Lines 21–23, pg5: this last phrase should be moved to the end of line 2, pg9, because it is related to methodology. Am I right? Some idea can still remain at the introduction, of course, but not mentioning the appendixes.

Response:
Done. (page 5)

Line 8 and 15, pg8: two open parenthesis with only one to close; it happens many times, maybe due to text editor. In any case, it must be corrected.

Response: Thank you. This problem was introduced during the transition to the way citations are done to the standard used by Copernicus. Unfortunately, we missed some of the problems. We will make sure to fix/avoid such issues in the revised version.