

Review of manuscript submitted by Meinen et al. to OS  
titled:

Characteristics and causes of Deep Western Boundary  
Current transport variability at  $34.5^{\circ}\text{S}$  during 2009–2014

## Summary and Recommendation

This study uses 6 years of PIES/CPIES data at  $34.5^{\circ}$  to describe the variability of the Deep Western Boundary Current (DWBC) transport. The main results are similar to other latitudes, in that the DWBC variability is much larger than the mean. I found at times that there is too much emphasis on the absolute transport when the title of the paper refers to transport variability. Only one model, OFES, is used to estimate absolute transport. Have other models been considered for comparison? I worry that the results of absolute transport are too sensitive to this choice of reference velocity from the model. However, I think that this manuscript is nice contribution to the community and should be published after my concerns below have been addressed.

## Major Comments

- Line 26–29: This needs to specify that the estimate of absolute transport is from a combination of observations and model output.
- Line 235: Reference to a  $0.2^{\circ}$  horizontal grid is not exactly correct. These models have a grid with a resolution of  $0.1^{\circ} \times \cos(lat)$ . So, less than  $0.1$  at these latitudes. Give a precise value of the horizontal spacing in km and how this relates to the PIES spacing.
- Lines 372–393: There is too much emphasis on absolute transport. Stick with the focus of the manuscript and consider removing this section since it is too dependent on model output.
- Line 411: Is there any evidence observationally or from the model in this region that the deep reference currents are really constant with depth, especially on the slope where the currents may be bottom intensified, “bottom trapped?”

## Minor Comments

- Line 112: I don't like the acronym "SAM" used for the Southwest Atlantic MOC. SAM is commonly referred to as the Southern Annular Mode. Consider defining another acronym to avoid confusion for the reader.
- Line 227: It unnecessary to use "high quality." This is too subjective. How do you quantify "high quality?" Remove this.

## Figures

- Fig. 2: I don't like the colorbar limits. Consider making it  $\pm 24$  like in Fig. 9 with no contours and draw contours emphasizing maximum values.
- Fig. 2: It is misleading to us SS topo for model output since the representation of the bathymetry may be significantly different due to smoothing. You should use model topo for model output figures.