

## ***Interactive comment on “The role of the North Atlantic overturning and deep-ocean for multi-decadal global-mean-temperature variability” by C. F. Schleussner et al.***

### **Anonymous Referee #1**

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The paper by Schleussner et al "The role of the North Atlantic overturning and deep-ocean for multi-decadal global-mean-temperature variability" is an interesting statistical study of CMIP5 models variables describing Atlantic meridional overturning circulation. I recommend the paper for final publication after a minor revision.

The authors do not state clearly whether they use annual datasets (I presume they do) – this should be clarified in the abstract and in the description of the data (section 2). The used CMIP5 models are given by acronyms, and I would expect at least a brief description of the models and why these particular ones (among many others) were chosen for analysis.

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In the caption of Figure 2, the authors mention "red noise first order auto-regressive process" but do not give specific details on the scaling exponent of the red noise – this is important to describe. It is not clear whether the AR(1) process is expected to simulate red noise with some high value of the parameter – if this is what the authors mean then it is not exactly power-law red noise.

In page 976, the authors say that time series have been standardised. Do they mean "normalised", i.e. removed mean values and divided by std?

The caption of Table 1 should be re-arranged, because it is not clear which column is "middle" and why first and second columns are described at the end.

It is not clear why in Fig.2 the light lines for significance levels are of different colours (in Fig.3 they are both grey). Also, the legend of Fig.3 shows these lines, whereas the legend of Fig.2 does not.

The meaning of the numbers on the colour links in Fig.6 should be explained in the caption of the figure.

### **MINOR COMMENTS**

In page 971, last paragraph, "does not, however, imply. . ."

In the y-axis label of Figure 4, power of R should be properly typed instead of \*\*

In page 974, "can be specified" – 'f' is missing. In the same page, "a heuristic" should be rather "an heuristic criteria"

In page 975, "In the next step. . ." and "analysis allows one to separate. . ."

In page 976, after Eq.3, the continuing text should not be indented (remove the blank line after the TeX equation).

In page 979, instead of "FULL, green" better to say "solid green line"

The grey lines in Figure 8 do not need to be dashed (it makes them poorly visible in

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some panels, whereas their colour distinguish them from others well enough).

Figures 8-10 have equivalent layouts, but Fig.8 misses the legend in the last panel, and Figure 10 has only six panels (one of the models is not present), with all the models rearranged in the panel in a different way. Also, the legends of Figures 7 & 9 are boxed, whereas in the other figures it is not done. It would be good to use uniform style in the figures for better readability.

In Figure 10, red curves do not need to be dashed. In the caption of this figure, numbering (1)-(3) is not needed because none of the curves are numbered in the plots and all can be distinguished by their colours.

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