

## ***Interactive comment on “Hosed vs. unhosed: global response to interruptions of the Atlantic Meridional Overturning, with and without freshwater forcing” by N. Brown and E. D. Galbraith***

**N. Brown and E. D. Galbraith**

nic.brown0@gmail.com

Received and published: 29 December 2015

**Thank you for taking the time to review our paper and provide us with useful comments. We address each of your comments below in a point-by-point format.**

“Major comments: (1) This manuscript emphasizes the effect of ocean-ice-atmosphere dynamics on AMOC variations, but no figures have shown the spatial patterns of sea ice cover and the geographic maps of NADW formation in their modelling runs. These issues are missing but important for the authors’ arguments.”

C2784

**Given that our intention was to focus on the hosed vs. unhosed comparison, we did not want to burden the reader with too many figures. But we agree that spatial patterns of sea-ice cover and NADW formation are important for our arguments. We suggest adding 1 figure to show this.**

“(2) In the paragraph Line 18, Page 4676 to Line 5, Page 4677, the authors try to explain the dynamical process in their unhosed experiment. However, the only citation of Glessmer et al. 2014 is far less sufficient to support the complexity of their argument, and in particular no figures of their-own modelling results are shown to corroborate the statement. Therefore, additional figures are requested support this part of the manuscript, at least in the supplementary.”

**As discussed in the responses to Reviewer 1 and Dr. Arzel, we can rewrite the paragraph detailing the dynamical mechanism of millennial variability with more citations and add 1-2 figures to accompany it.**

“(3) In the right column of Fig. 1, it is hard to read the starting time of the ‘hosing-unhosed’ experiment. Consider a change in the line colours.”

**This can be changed to a darker line in the revision.**

“(4) In the paragraph Line 10-19, Page 4681, the authors made comparisons of the AMOC-associated global climate changes between the freshwater-forced simulation and the ‘hosing-unhosed’ experiment. In their argument, the relatively smaller climate anomalies in the ‘hosing-unhosed’ experiment are attributed to a slightly weaker AMOC and larger extension of the North Atlantic sea-ice coverage in the prehosing state of the ‘unhosed’ experiment. In fact, the freshwater-forced simulations applied a hosing flux of ‘a preindustrial annual mean plus an additional 0.2 Sv’, but the ‘hosing-unhosed’ experiment applied a freshwater addition of 0.05 Sv. Therefore, the relatively smaller

C2785

climate anomalies in the 'hosing-unhosed' experiment maybe a result of such reduced freshwater forcing."

**We recognized that using 2 different freshwater fluxes was a weaker part of our paper; therefore a new 'hosed-unhosed' simulation has been run with 0.2 Sv. With this new simulation, a direct comparison will now be possible. We will use this new simulation in the revision.**

"(5) All the supplementary figures have no captions."

**We will add captions for the revision.**

---

Interactive comment on Clim. Past Discuss., 11, 4669, 2015.