Geosci. Model Dev. Discuss.,
https://doi.org/10.5194/gmd-2019-148-AC2, 2019

Geoscientific Model Development Discussions

Interactive comment on "Description of the resolution hierarchy of the global coupled HadGEM3-GC3.1 model as used in CMIP6 HighResMIP experiments" *by* Malcolm J. Roberts et al.

Malcolm J. Roberts et al.

robertsmalcolm@yahoo.com

Received and published: 3 September 2019

Reviewer 1: Stephen Griffies My main concern is with the following statement on page 15, lines 9-10: "Due to intellectual property rights restrictions, we cannot provide either the source code or documentation papers for the UM 10 or JULES." That is a very unsatisfying situation that, in effect, means these simulations are not reproducible by any willing and able person outside of the Hadley Centre. I am disappointed that the Hadley Centre has failed to fully embrace scientific programming of the 21st century where open development / open access greatly supports the climate science endeav-

our by enabling reproducibility.

Response: The initial wording of this model code availability was poorly chosen, and has been clarified in the Data and code availability section. The model codes are available to use as now stated.

I recommend publication with the following minor points.

page 6 lines 14 and 15: please give units

Response: Done

page 6: line 28: please add following citation along with Griffies et al 2015: Preconditioning of the Weddell Sea polynya by the ocean mesoscale and dense water overflows, 2017: C.O. Dufour, A.K. Morrison, S.M. Griffies, I. Frenger, H.M. Zanowski, M. Winton, Journal of Climate, vol. 30, 7719-7737, doi:10.1175/JCLI-D-16-0586.1

Response: Done

page 10, paragraph with line 15: Is worth noting that interior biases can be exacerbated by spurious mixing, especially at the 1/4 ocean resolution. Citations to work from Alex Megan as well as Griffies, Illicak, others can be made.

Response: Done, Page 10, line 17.

Figures 7,8,12 could be more useful with statistical information such as mean bias and rms.

Response: Done for Figures 7,12. Figure 8 is simply the difference between start and end periods, so I don't think this is useful here.

I offer my wish list for additional figures that might serve well to enhance this manuscript. –AMOC circulation streamfunction. Although not directly observable, it is rather commonly shown in papers like this and it greatly adds to modeler-speak communication.

Response: New Figure 16 showing the AMOC in both depth and density space, with text on Page 12, line 23. –Global and indo-pac ocean heat transports. I am particularly interested in Southern Ocean transports given the rather different ACC transports found in the models documented here.

Response: New Figure 17 now shows the northward heat transport for global, Atlantic and Indo- Pacific basins, with some extra breakdown in components. Text included on Page 12, line 29 onwards.

Interactive comment on Geosci. Model Dev. Discuss., https://doi.org/10.5194/gmd-2019-148, 2019.

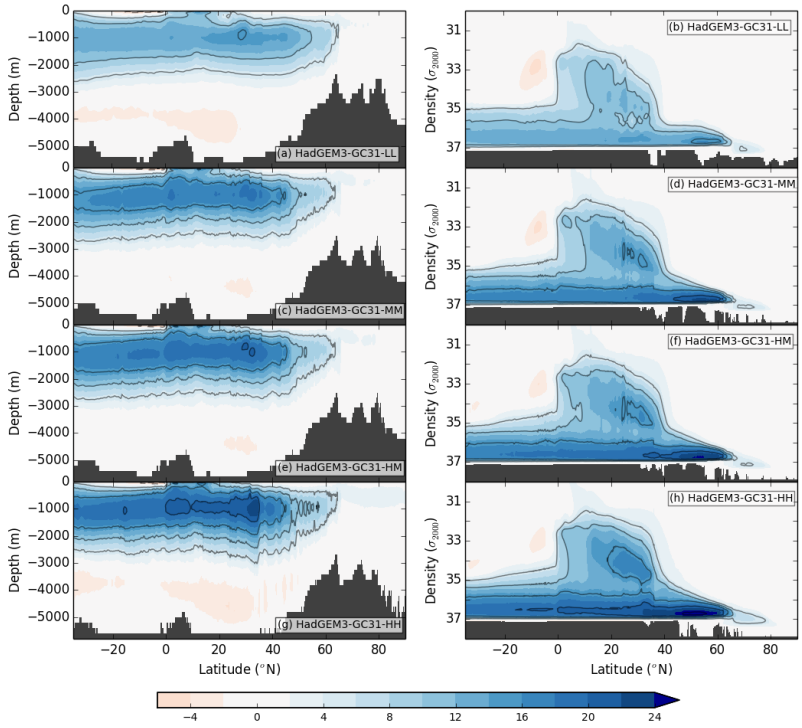

Fig. 1. AMOC in depth and density space

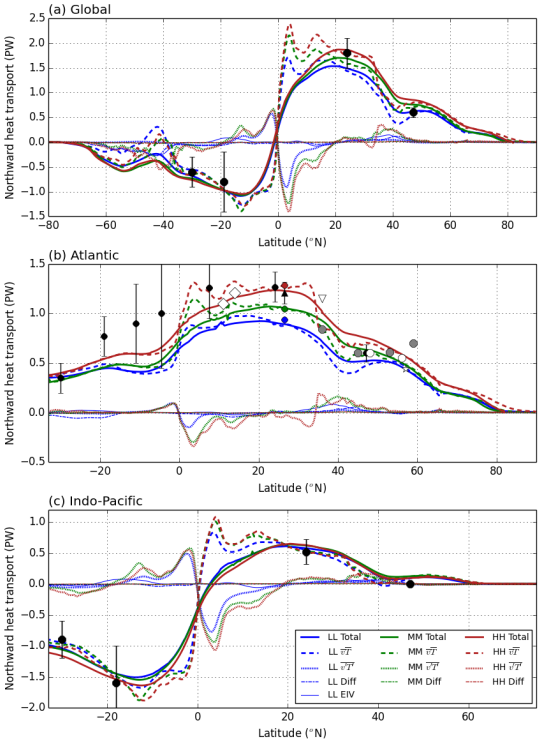

Fig. 2. Northward heat transport for global, Atlantic and Indo-Pacific basins