

## ***Interactive comment on “High Resolution Model Intercomparison Project (HighResMIP)” by R. J. Haarsma et al.***

### **Anonymous Referee #3**

Received and published: 6 June 2016

The manuscript is a rather matter of fact description of the CMIP6 endorsed high-resolution MIP. As such it will form an important reference for those undertaking CMIP6 studies. With this in mind I feel positively inclined toward recommending acceptance.

My only concern is the lack of a coupled experiment that is likely to have a large signal to noise ratio. An example might be a quadrupling of CO<sub>2</sub> at some point during the 1950s control. A similar experiment is proposed in CMIP6 (albeit from pre-industrial conditions). The role of high ocean resolution in heat uptake could provide some results that may be difficult to tease out of the tier 2 simulations. The computation costs could be relatively modest. For instance, Kuhlbrodt et al. (2015) showed useful results from a 20-year experiment.

Minor comments

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Abstract: define the acronym MIP

Introduction: A few more acronyms to define, e.g. ITCZ, MJO, QBO.

Section 2.1: Give a proper reference to the CMIP6 publication in this same special issue.

Figure 1: Provide a more detailed caption.

Section 3.1.1: As noted we do not have high resolution data for the entire historical period. Are there any issues with blending the pre and post satellite era data? Whatever methods are used to produce 1/4 degree SSTs, the raw observations simply are not there. For instance the process outlined for producing future (2015-2050) SSTs relies upon the variability being unchanged in a changing climate. Please comment.

Section 4.2, page 10, line 34: insert a space somewhere in andreanalysis.

Section 6, page 12, last line: No need to define ToE as acronym not used.

Section 6, Ocean model biases: insert the word “coastal” before upwelling as the equatorial upwelling zone bias is often different to this.

Section 7.1, page 14, 2nd to last sentence: Is there any evidence that sea ice simulations might improve with increasing resolution. If so give a reference. The project will be moving towards the limit of where the continuum hypothesis is reasonable, which may be an issue.

Section 7.1, page 14, last sentence: This doesn't sound quite right. Maybe Differences would be better than Difference.

Section 7.1, last sentence: replace “such as” with “outlined by” or something similar.

Section 7.4, page 16, paragraph 2: Too many acronyms reduce the readability of manuscripts. AR seems a bit unnecessary as it replaces just two words and only used twice. TC (a bit later on) also seems a bit unnecessary, but as it is used a few

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more times I could live with it.

End of Review

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Interactive comment on Geosci. Model Dev. Discuss., doi:10.5194/gmd-2016-66, 2016.

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