**Geoscientific
Model Development
Discussions**

Interactive comment on "The HadGEM2 family of Met Office Unified Model Climate configurations" by The HadGEM2 Development Team: G. M. Martin et al.

Anonymous Referee #1

General Comments:

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This paper describes the ability of the HadGEM2 family to reproduce a few important features of the climate system. Climate models from the HadGEM2 family can include different components of the climate system (ocean, atmosphere including stratosphere or not, with biogeochemical cycle...). The performances of the models are evaluated in different configurations component by component. This gives a very nice multi-disciplinary point of view of the quality of the models. These models are compared with observations using a large number of metrics and show reasonable agreements

with observations for most of the climatic mean and variability.

The paper is well written, and the evaluation is clear and honest. I therefore recommend this paper for publication in GMD with minor revision (see below).

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Specific Comments:

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- p. 767, l. 19: "climate prediction" I think "projection" is a better word than "prediction". Prediction is widely used in meteorology and in order to dissociate climate from meteorology I have the impression that using a different word is better. Moreover the authors may have in mind the potential predictability of the climate system at the decadal time scale. This is actually an area of intense research for the last few years. Nevertheless, no clear conclusions have emerged yet concerning any predictability at this time scale. I think that the authors have to define what they were thinking of by using the term "prediction". The same problem appears elsewhere in the manuscript (p. 768, l. 4; p. 790, l. 2).

- p. 775, l. 15: I have difficulties to find the comparison between GPCP and CMAP in the Taylor diagram. I think I have missed the symbol, which is not easy to find in my view.

- p. 775, l. 20-25: I think it will be valuable to quantify (in the text) the improvements that are found in the Taylor diagram between HadGEM2 family and HadGEM1 for the different variables discussed in the text. For instance the authors can compute the mean distance to the observations in the space of their Taylor diagram and provide this figure in parenthesis for each variables they discuss.

- p. 777, l. 25: "show overall improvement". This is very difficult to draw such a conclusion when looking at Fig. 4. This seems region dependent (worst in South America for instance) and the colour scale is not very helpful. Please try to be more

specific concerning this overall improvement and find a more appropriate colour scale.

- p. 783: Please give a word (and/or reference) concerning the representation of the Atlantic Meridional Overturning Circulation in the model family

- Table 2: It will be more appropriate to use mSv (103 m3/s) in this table since most of the figures are smaller than 0.1 Sv (which is nice).

- Fig. 6: which time period is used for the comparison?

- Fig. 14: Please provide a colour bar scale.

Interactive comment on Geosci. Model Dev. Discuss., 4, 765, 2011.