

## ***Interactive comment on “The HadGEM2-ES implementation of CMIP5 centennial simulations” by C. D. Jones et al.***

**Anonymous Referee #1**

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[general comments]

This paper addresses how authors have implemented and setup the CMIP5 experimental protocol for the centennial simulations in the Met Office HadGEM2-ES earth system model. It explains what forcings and configurations are used in these experiments corresponding to each sections of CMIP5, and the reasoning behind this.

Some of these centennial experiments with coupled carbon-cycle ESMs are very new type of trial in Coupled Model Intercomparison Project (CMIP), so requires fully detailed description of the setting because of the possible diversion among modeling groups caused from the interactive nature of chemistry, dynamic vegetation, and uncertainty in handling of anthropogenic land use. Specifically, treatment of land use forcing and land use emission is well described in this paper. Difference of setting among Last

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Millennium experiment and 20C3M-RCPs simulations is clearly written.

Also it describes important aspect of selection criteria of the initial condition of ensemble simulations. In the discussion section, there is comprehensive comment about the way to conduct detection and attribution studies in EMS simulation, which should enhance further studies in these area by ESMs community.

The paper is written clearly, and will serve as an important document for the CMIP5 and ESMs community, and will be essential for those who quantify and understand model spread and uncertainties of the future climate projections. I would recommend this paper for publication in GMD after the authors have addressed some questions and minor comments which I have listed in specific comments section below.

[specific comments]

Page 692, line 18: Description about Figure 1 in the paragraph doesn't match the actual figure. It seems the text is for Figure 3 in Taylor (2009), so please rewrite for the actual figure.

Page 698, paragraph from line 5 There is no description about whether fossil fuel and land-use CO<sub>2</sub> emission data used for RCP8.5 emission driven simulation is spatially gridded or not. If gridded emission is used, please provide detailed method and data in addition here, like you've written about the historical forcing.

Page 712, line 10 McGuire et al. 2008 is not listed in references section. And, this may be McGuire et al. 2001 GBC?

Page 712 line 24 and thereafter: There is no notation about Figure 11 and 12 in the paragraph. Please place them in the appropriate sentences.

Page 722 line 6: This should be Fig. 21?

Page 723 line 23: This should be Table 5?

Page 741 Table 4: MOSES2 is not described in the main document. Does MOSES2

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mean TRIFFIED?

Page 759 Fig. 17: It seems the figure is showing smoothly interpolated data. This should be the original data of fractional area changes in the HadGEM2-ES grid as in the Figure 11.

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Interactive comment on Geosci. Model Dev. Discuss., 4, 689, 2011.