Geosci. Model Dev. Discuss., 5, C742–C744, 2012
www.geosci-model-dev-discuss.net/5/C742/2012/

Geoscientific
Model Development
Discussions

Interactive comment on "The Norwegian Earth System Model, NorESM1-M – Part 2: Climate response and scenario projections" *by* T. Iversen et al.

Anonymous Referee #1

Received and published: 2 October 2012

This paper presents the response of the new NorESM1-M Earth System model to idealized forcings and RCP scenarios from the CMIP5 protocol. Various general aspects of the climate are assessed, like changes in surface temperature, precipitation, and oceanic and atmospheric circulation (among others). A thorough assessment of the climate sensitivity has been done. Appart from some minor revisions, the scientific quality of the paper is good and it is well written. I also ask for some minor revisions on the structure of the paper. For this, I recommend this paper for publication.

Minor comments and suggestions

Page 2, first paragraph of the introduction: the second sentence of this paragraph

("Explicit description [. . .] (Tjiputra et al., 2012)") sounds negative to me. I suggest to remove it here, and replace it with the following sentence at the end of the same paragraph: "Another version of NorESM1 called NorESM1-ME includes an interactive carbon cycle, and will be described in a coming paper (Tjiputra et al., 2012)".

On the introduction: from page 3 - line 6 to page 6 - line 2, the text is resembles more a model description or experimental setup than an introduction to what will be done in the paper. For clarity, only keep in your introduction its two first paragraphs, and the last one. The rest of the introduction (from page 3 - line 6 to page 6 - line 2) will consist in a "model and simulation description" section, following the introduction.

Page 6, line 25: add "(following Andrews et al., 2012)" after "gross feedback factors", and remove the last sentence of this paragraph.

Replace "TRC" with "TCR" on: - page 8, line 27, 28 and 29 - page 9, line 27 - page 10, line 1

Page 10, line 24: add the reference to the volcanic sulfates dataset used here (or point to another companion paper or section).

Page 12, line 29: give a reference for the non-linearity test, or give more details.

Figure 4: adding the maps for the natural forcing only experiment would provide some very interesting comparison with the two other simulations. Also precise what are the white areas on the maps (name of the test and significance level).

Legend of Figure 5, line 9: replace "insignificant" with "not significant"; precise the name of the statistical test.

Maps of Figure 5, linked with last paragraph of page 12: your point for this diagnostic is to show that a large part of the forced variability in the historical run can be explained by the sum of the responses to GHG and aerosols forcings. Then it has to be the first thing that we want to see on those maps. Hatch the areas where the differences between the GHG only + aerosols only and the all forcings experiment are identified

GMDD

5, C742–C744, 2012

as “considerable” (following the last paragraph of page 12). Otherwise looking at those maps consists in a tiresome game of “find the differences”. Say how you define the considerable differences (in a statistical sense).

Page 15, line 26: replace “to” with “too”.

Page 24, 1st paragraph: the EOF analysis reveals that the NAO in NorESM1-M tend to be projected on the 4th EOF, which explains around 7% of the variance. In NCEP, the EOF 2, exhibiting the NAO pattern, explains around 15% of the variance. This should imply that the NAO explains less variance in NorESM1-M than in NCEP (there should also be a link with the storminess, as mentioned in this paragraph). As well, the fact that the NAO seems to be projected on two EOFs is likely to arise some questions on the NAO in the NorESM1-M. In the contrary, the PNA in NorESM1-M is close to the PNA pattern in NCEP, so this result is already satisfying. This would thus be interesting to have a more precise comment on the NAO here. An additional figure with the two first EOF of the North Atlantic domain (NAO and East Atlantic Pattern, -80/40°E;20/80°N) with the amount of variance explained, on the same data (NorESM1-M and NCEP, as pre-processed for this section), will give a clearer view on the NAO in the model.

Page 24, line 7: replace “NorEMS1-M” with “NorESM1-M”.

Interactive comment on Geosci. Model Dev. Discuss., 5, 2933, 2012.