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Earth System Dynamics Discussions

Interactive comment on "Scenario and modelling uncertainty in global mean temperature change derived from emission driven Global Climate Models" *by* B. B. B. Booth et al.

Anonymous Referee #1

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This study is an up-to-date description of numerical experiments that aim to estimate the impact of scenario and model diversity uncertainty in global mean temperature. The novelty here is the emphasis on emission driven simulations. I found the manuscript interesting, important for its new contributions to the field and well written, although several sections lack clarity (these are pointed below). I recommend the article to be accepted with minor revisions.

page 1057 line 11: typo "development"

page 1058 : please clarify second sentence.

page 1060 line 3: typo "aggressive"

page 1060: For an even superficial understanding of this section more information should be given to the reader. The last paragraph of section 2.1.1 is difficult to follow.

page 1061: typos line 15 "straightforward" and line 26 "we've"

page 1062 line 16: units for the radiative forcing.

page 1062 line 20: "the the"

page 1063: last paragraph of section 2.2 unclear.

page 1064 line 14: missing word.

page 1065 paragraph starting in line 14: unclear.

page 1065 line 25: typo "become"

page 1065 line 26: "The inclusion of carbon..." I would remove this second announcement of information to come. It does not add much here.

page 1066 line 1: unclear against what it is being compared.

page 1066 last paragraph of section 3.1: I am unconvinced that the information about uncertainty increasing with RCP is of any real value. I may be wrong in my understanding but at least this should be clarified. Since each simulation is depicted as a difference with respect to a baseline, it seems obvious that for a very low RCP –let us say RCP0.0– the spread should be roughly that of the natural variability. This would be a minimum, and all models should agree in the reaction: a stationary evolution by definition. The farther you deviate from RCP0.0 the farther discrepancies between models should have an effect. How can be expected, as implied from the last sentence in the text, that reducing emissions to zero may not reduce uncertainty?

page 1067 line 13: grammatical issue makes sentence unclear.

page 1068 line 8: eliminate "which"

page 1068 line 27: typo "section sections"

ESDD

3, C474–C476, 2012

Interactive Comment

page 1070 line 1-8: The reasons for differences include the amount of simulations. A larger amount of simulations will tend to span further (the variance will be barely effected but the range quite a bit). This concentration on extremes generate situations like the one described in line 15.

page 1070 line 11: typo "use" to "us"

page 1071 line 22: Clarify what is meant not to "explore the corners". The covariates?

page 1073 line 11: typo "previously thought"

page 1073 line 12: see Skinner L (2012) A Long View on Climate Sensitivity. Science 337:917–919.

page 1073 line 14: typo

page 1073 line 14: please point out where this is coming from.

page 1074 line 23: Going from global to regional not only may increase the impact of scenarios driven by regional characteristics, but also increase the interannual variability noise, and perhaps model error too.

page 1076 line 11, 28; page 1077 line 31: strange reference numbers.

page 1081: Fig 1a is not very friendly, and less so is Fig 2. At least this last should be shown much larger. Caption of Fig 1 describes the figure on the right twice.

page 1082 caption: typo "also included is"

Interactive comment on Earth Syst. Dynam. Discuss., 3, 1055, 2012.