Geoscientific
Model Development
Discussions

Open Access

Interactive comment on "Methodological aspects of a pattern-scaling approach to produce global fields of monthly means of daily maximum and minimum temperature" *by* S. Kremser et al.

Anonymous Referee #2

Received and published: 12 November 2013

This is a very helpful and well written paper. Thank you very much for this exploration of the pattern scaling approach! I only have some minor comments:

1. The highlights of the paper (what is new in comparison to earlier approaches) should be clearly stated in the abstract: (i) test of hemispheric ocean land temperatures as additional predictors, (ii) selection of the training data set for a given global mean temperature pathway, (iii) test of time dependence of scaling coefficients). It is somehow hidden in the description of the results

2. p 4840, l 15 and 16: Maybe it is clearer to call it "forced change" instead of "forced variability"

3. Figure 2: Explanation of black and blue dots should be added to the caption. It is only given in the text.

4. p 4842, l 18-19: The CPSM does not emulate the "variability". I would delete the term here. Or do you mean the seasonal cycle?

5. Figure 5: Would be good to add the a column of the differences between column 1 and column 2

6. p 4845, l 12-13: I think it is the difference between the decadal mean (2090-2099) and the average over the reference period (1961-1990)

7. Figure 6: Hatching and thin black line are really hard to see

8. p 4847, l 24: "applying the regression model to T'max" instead of "applying the regression model to changes in T'max"

9. Is the "Assessment of the value of using multiple basis functions" done in cross-validation setting, i.e. the training is based on e.g. RCP8.5 while the test of the performances is based on the other scenarios? It should be done in this way. Otherwise it is not surprising that the performance it better for the model including more predictors.

10. p 4849: I would call the paragraph "Scenario dependence" instead of "Linearity" as this is what you actually check for the scaling coefficients. Figure 8 shows that there is some scenario dependence of the scaling coefficients that is not necessarily monotonous with the forcing. Therefore your test for a linear dependence of the scaling coefficients on the forcing may not find these dependencies. I would recommend showing a map of the ranges of the scaling coefficients at each grid point (devided by their mean values).

11. p 4853: T' global AOGCM has to get an index "i" although there is not much space

12. p 4856: The improvement by allowing for a time dependence of the fit coefficients should also be tested in a cross validation setting (e.g. training on RCP8.5 and appli-

cation to RCP4.5, see point 9)

C1925