

Interactive comment on “Varying soil moisture-atmosphere feedbacks explain divergent temperature extremes and precipitation projections in Central Europe” by Martha M. Vogel et al.

S. Ghosh (Referee)

subimal@civil.iitb.ac.in

Received and published: 17 July 2018

The authors have performed an excellent analysis on understanding the uncertainty in precipitation projections with soil moisture-atmosphere feedbacks. I thoroughly enjoyed reading the manuscript and I recommend acceptance of the manuscript with very minor revision.

1. The authors have used kernel density estimation to get the trimodal pdf of changes in the projected summer precipitation. I have a small query, what is the impact of selection

C1

of bin size on the shape of the derived distribution. This is clearly a tri-modal case, no doubt, but in my humble opinion, if a K-S test can be performed to just show that the distribution across models differ statistically significantly from uniform distribution and unimodal distributions such as normal and gamma, it may strengthen the claims made by the authors.

2. A minor check, in Table 1, the del LH for wet model, does it have negative sign? I guess it is positive, as I can see from the plots. Kindly recheck.

3. Another minor comment, just to strengthen the conclusions, made by the reviewer, is it possible to statistically show that the classes of very dry, dry and wet models are independent (with the help of multi-variate statistics) when we consider multiple variables, presented in Table 1. This is just a suggestion.

4. Constraining the model with correlations from observation gets rid of extreme models and hence the multi-model projections of summer precipitation shows almost no change. The other way round, probably the models which are not performing well showing extreme and abrupt changes. May be some discussion on this would be a good addition. A small point with this, are we assuming that the correlation will remain unchanged in future? I may be missing something here, but if we are making such assumption, do we have a justification for the same.

5. Fig 9 is an excellent figure summarizing the theory. Just wondering, due to evaporative land surface cooling, is there a possibility of reduction in advective moisture from a distant source?

Finally, this is a fantastic analysis and I am sure this will be a great addition to the literature on understanding the projected climate from models.

Interactive comment on Earth Syst. Dynam. Discuss., <https://doi.org/10.5194/esd-2018-24>, 2018.

C2