

Reply to Reviewer comments on the manuscript “Signal, noise and skill in sub-seasonal forecasts: the role of Teleconnections” by A. Karpechko et al.

We thank the anonymous Reviewer for helpful comments. Below we provide point-to-point responses indicating how the manuscript has been revised. The comments by the Reviewer are repeated in *blue italic*, citations from the revised manuscript are in *black italic*:

Reviewer 2

The main aim of the manuscript is to investigate how the atmospheric teleconnections from the stratosphere and the tropics affect the signal and noise (and their ratio) in subseasonal forecasts. Results show that teleconnections affect the signal-noise ratio if there is a sufficiently large signal-noise ratio. However, in mid- and high-latitudes, the signal-noise ratio becomes too small on seasonal timescales. The authors conclude that extracting the effect of teleconnection requires larger ensemble sizes than are in most datasets available for research and provide an estimation of the required ensemble size for capturing the signal (or response) associated with the stratospheric and tropical teleconnections. The authors have addressed my main concerns in the revised version of the manuscript. I recommend this paper for publication.

Thank you!

(Specific technical points are listed below)

Acronym ACC is not defined in the text.

ACC is defined in the revised manuscript.

Abstract: “Skill improvements are considerably smaller for surface temperature and total precipitation, suggesting a smaller role of the teleconnections in their predictability”- However, is it considerably smaller or comparable? (see Figs 9-10, and even Fig.11). It seems that there is an improved skill for temperature and precipitation as well (although smaller), although scattered.

SLP skill is increased by more than 0.4 over sizeable areas in both experiments, and even by 0.5 in TROP during weeks 5-6. Such large increases are nearly missing in T2M and TP fields, so we still believe that the improvements are smaller for T2M and TP. Given the reviewer’s concern, we remove word “considerably”, so that the revised text reads: “*Skill improvements are smaller for surface temperature and total precipitation...*”

Line 400: Eastern Pacific and northern Europe - include coordinates.

The coordinates have been added.

Line 602: is that for TROP or for both relaxation experiments?

There is little stratospheric influence in subtropics, so it is probably good to specify that we are talking about tropical teleconnections. The revised text reads:

“In subtropical regions with high signal-to-noise ratio, as little as ~10 members (or less) are sufficient for the ensemble mean to represent at least 2/3 of the tropical teleconnection signal in SLP.”

Fig4: Maybe a suggestion in case you reproduce this figure: use transparent shading to improve visibility of the overlapping points.

Thank you for this suggestion. In the revised version we applied a transparent shading and it somewhat improved visibility, although, because of large amount of dots, it is impossible to fully reveal all overlapping dots.

Line 560: missing “and”

This has been added.