Dear Dr. Liu,

First and foremost, thank you for handling our manuscript revision so swiftly, and thank you to the two reviewers for the fast turn-around, especially during these times. It is greatly appreciated.

We are happy that the reviewers find our responses satisfactory. We are also happy to try and address the last two points raised by Reviewer 1. We have attempted to do so navigating the line between adding value to the discussion of our analysis, as the reviewer has helped with, and avoiding speculating on the sources of the behaviors under consideration, given the limits set for our overview study, which the reviewer acknowledges and agrees with.

We have modified the two parts of the text where the two issues are treated in the following manner (the new wording is highlighted in the text pasted below), using the reviewer suggestions, also including the Yip et al., 2011 reference in our list. We also included a new sentence in the Discussion section with regard to the results in precipitation variability, and two additional references, Pendergrass et al., 2017 and Yun et al., 2020. We hope this satisfies these last concerns.

Please note a correction we performed of an oversight (due to my submitting the paper at a time when the second author, responsible for the data processing was already on vacation). The time series of global quantities shown in Figures 1, 4, 6 and 7, and A2, were smoothed by an 11-yr running mean, not a 21-yr running mean. Of course, that is not changing any results.

Thank you once again for your attention and commitment to this process.
All the best – and happy new year,

Claudia Tebaldi

About pattern differences:
We deem a rigorous quantification of the differences between patterns beyond the scope of this paper, and focus on a qualitative assessment of the similarities that surface by showing on the bottom row of Figure 3 the difference between CMIP6 and CMIP5 normalized patterns, confirming the small magnitude of the discrepancies in TAS over all regions, except for the Arctic, known to be affected by large variations among model, scenarios (with a possible role of the lowest scenario in CMIP6, SSP1-1.9, whose land-sea ratio has likely no equivalent among the CMIP5 scenarios, but further, more rigorous investigation is needed to confirm this) and internal noise (likely playing a minor role given the number of model and scenarios contributing to these averages). Similarly for percent precipitation the regions that stand out where the largest differences are found are the tropics, known to be affected by large variability and uncertainties. In this case the possible role of aerosol forcing (Yip et al., 2011) warrants further investigation, especially as we consider that SSP3-7.0 forcing composition and trajectory are quite different from previous scenarios'. As mentioned, the use of these experiments in conjunction with their variants by LUMIP and AerChemMIP could further attribute some of these scenario-dependent features to differences in regional forcing like land-use or aerosols. Also, a subset of CMIP6 models are running the CMIP5 RCPs, and results from those experiments will allow a clean analysis of variance, partitioning sources between model and scenario generations.

About changes in ensemble spread over time:
A deeper investigation of the sources of changes in variability for both variables (which could also tackle how much of the changes in precipitation variability is directly connected to that of GSAT, and what other sources may be at play) is beyond our scope but will be facilitated by the availability of these CMIP6 IC ensembles in addition to the already well studied CMIP5-era large IC ensembles (Deser et al., 2020).

More related to that in the Discussion section:

The decadal scale results appear at odds with recent studies that detected increased variability of precipitation with warming (Pendergrass et al., 2017; Yun et al., 2020), and call for in-depth studies of the sources and robustness of the behavior here described.

New References:

Pendergrass, A.G., Knutti, R., Lehner, F., Deser, C., and Sanderson, B.M.: Precipitation variability increases in a warmer climate. Scientific Reports, 7, 17966, https://doi.org/10.1038/s41598-017-17966-y, 2017.

Yip, S., Ferro, C.A.T., Stephenson, D.B., and Hawkins, E.: A simple, coherent framework for partitioning uncertainty in climate predictions. Journal of Climate, 24, 17, 4634-4643, https://doi.org/10.1175/2011JCLI4085.1, 2011.

Yun, K.-S., Lee, J.-Y., Timmermann, A., Stein, K., Stuecker, M.F., Fyfe, J.C., and Chung, E.S.: Increasing ENSO-rainfall variability due to changes in future tropical temperature-rainfall relationship. Nature Communications Earth and Environment, in press.