Public justification (visible to the public if the article is accepted and published):
The revised manuscript has been seen again by one reviewer, which suggest publication after addressing some further revisions.

Please make sure that all captions are complete and comprehensively document all panels and lines shown in them in detail.

Line 35 Are all models for the experiments used here? It may make sense to only count models that also provide output for the experiments analyzed here.
Thank you for pointing this out. We have included a complementary phase.

Line 44: Missing blank space after question mark.
Thank you for noticing. We have corrected the revised version.

Line 48: I suggest using the term "projections" in "predictions" as in IPCC to refer to scenario-based projections as opposed to "predictions with initialized SST conditions".
We have made corrections in the revised version.

Line 75: Specify whether the radiative forcing and land use changes are also changing or whether they are kept constant.
The corrections have been included in the revised version.

Line 100-101: The sentence reads odd and it is unclear what is normalized. In the current formulation it is unclear whether the error first normalized at the grid scale level or if it is the total RMSE normalized in the end?
After calculating the RMSE for each model, these values were collectively normalized to ensure consistent scaling across all comparisons, we have clarified in the text.

Line 148-152: Please refer to panels a-d in the figure caption and provide a more comprehensive documentation on what is shown in each individual panel.
Thank you for pointing this out. We have corrected in the revised version.

Line 153-156: Likewise, refer
We have corrected in the revised version, too.

Line 162-163: Is there any AMIP run with multiple realizations in which you could test how robust the PLS loadings are when running multiple members of AMIP within the exact same model but with different atmospheric initial conditions.
Thank you for the thoughtful suggestion. Testing the robustness of the PLS loadings across multiple realizations within the same model, with different atmospheric initial conditions, is indeed an interesting approach. However, this falls outside the scope of the current project that was funded between 2022 and 2023. In the conclusion section, we have included a sentence about this limitation and highlighted the opportunity for future studies.

Additionally, we expect that aleatoric variations from different initialisations will not affect the large-scale patterns identified by the PLS methodology. Similarly to Principal Component Analysis, PLS isolates dominant and clear patterns of variability in datasets. While the noise introduced by the different initialisations will impact the weather patterns and subsequently the temporality of climate oceanic patterns, the relationships between these patterns and precipitation in South America is not expected to change, since these are due to the model's ability in representing the atmospheric physics and its relations with the oceans, which should be kept equal in a single-model ensemble.

Line 217-218: Please add a comparison of a measure of ensemble spread to support the reduction in uncertainty between full ensemble and subset

Thanks for your point. We have now computed the standard deviation of the full ensemble set (0.24) and the reduced ensemble set (0.21), meaning a reduction of 12.5%.

Additional private note (visible to authors and reviewers only):

Note that one reviewer was no longer available to review the revised manuscript. Therefore, I added some additional points above. Please carefully address the questions by the reviewer and myself regarding the robustness of the results and the sensitivity to the chose threshold 0.6 and the realization of the climate model.

We have furthered the discussion on the 0.6 threshold in the methodology section.