

Author´s response

Dear Prof. Dr. Brunner

Please find attached with this document the new version of our manuscript, which incorporates the changes suggested during the review process. Attached to this document, you will find the revised manuscript along with a tracked changes version. Below, we provide a summary of the major changes made.

1. The content of the previous **Figure 3** has been incorporated into the former **Figures 1** and **4**. As a result, the original **Figure 3** has been removed, and the remaining figures have been renumbered.
2. To ensure a clearer separation between methods and results, we introduced a new section, **2.3 Performance Metrics**, which contains information previously included in the results section.
3. We added a new section, **3.4 Spatial Analysis of Model Performance**, expanding our analysis to include the comparison of model performance across space. This section includes new figure.
4. In **3.5 Saturation Analysis** and **3.6 Limitations and Uncertainties**, we expanded our discussions.
5. We added additional information to **Figure 5**.
6. Section **4. Summary and Conclusions** has been expanded.
7. Appendices:
 - **Appendix A** now includes a new figure explaining the structure of the hybrid model.
 - **Appendix B** now includes results from additional runs of the hybrid model, allowing for a more robust evaluation of model differences.
 - **Appendix C** includes supplementary figures related to the spatial analysis of model performance.
 - **Appendix D** discusses the temporal variation of the hybrid model's dynamic parameters in detail.

Even with these changes, the main points of the paper did not change. We believe the modifications made extensively cover the changes proposed by both referees. We would like to thank both referees, as their input in the review process allowed us to produce a better manuscript.

Kind regards,
Eduardo Acuña on behalf of the co-authors.