

Interactive comment on “Weather and climate forecasting with neural networks: using GCMs with different complexity as study-ground” by Sebastian Scher and Gabriele Messori

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Dear Reviewer,

Thank you for your review and suggestions for improving the clarity of the manuscript. To help other reviewers and readers in the remaining discussion time, I answer your questions already now. Once the discussion is ended, the clarifications will be added to the final manuscript.

“1. Naming models. In the paper the same name is used for the GCM and NN emulation of this GCM (e.g., PLASIMT21). This kind of naming create confusion and makes

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understanding the method and results difficult.”

Thanks for pointing out to us that this naming created confusion. I agree that the naming convention we use is not ideal, and in the revised manuscript, we will use a naming convention that clearly differentiates between the physical models and the neural network emulations trained on the physical models.

“2.What is used as "truth" in Section 2.4 and in Section 3. Are statistics shown in Section3 represent the accuracy of NN emulations of different models (e.g., NN emulating PLASIMT21 vs. PLASIMT21) or the accuracy of NN emulations vs. reanalysis (e.g., NN emulating PLASIMT21 vs. ERA or NCEP/NCAR reanalysis”

Throughout the whole paper, the NN emulations are evaluated against the model they were trained on (e.g., the NN trained on PLASIMT21 is evaluated on PLASIMT21). For the “weather forecasting” problem in section 3.1 and 3.2, the networks are tested on forecasting the model a couple of timesteps ahead. This testing is done on the test-set of the modelruns, so the data not used for the training. For the climate statistics in section 3.3, the statistics of the NN climate emulations are compared to the statistics of the model the network has been trained on (e.g. the statistics of the NN trained on PLASIMT21 are compared to the statistics of PLASIMT21).

In the revised manuscript we will highlight this more to avoid confusion, and make it clearer to the reader that the whole study is confined to the “reality” of the models.

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