



EGUsphere, author comment AC2
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Reply on RC2

Riccardo Silini et al.

Author comment on "Improving the prediction of the Madden–Julian Oscillation of the ECMWF model by post-processing" by Riccardo Silini et al., EGU sphere,
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We thank the reviewer for his / hers comments which allow us to improve our work, in particular, the discussion. The corresponding author (RS) has recently defended his doctoral thesis, and the reviewer's pertinent and relevant comments overlap in part with those of the expert PhD committee.

1. The reviewer wonders "would a stratification of the training data with respect to the initial conditions and their respective sectors be a good idea?" Intuitively this is a great idea, but technically it is not possible because of the lack of data to train the networks. We work with the ECMWF predictions, which are available every two weeks, for 20 years. If we split the dataset into 8 (phases), we wouldn't have enough data to perform a reliable training of the network. In fact, we can see already from our training that we found the minimum number of samples needed for the training to be 1700 out of the 2200 available. We will include a comment about this point in the revised manuscript.

2. The forecast on the Wheeler-Hendon phase diagram using machine learning techniques as standalone are not as good as those obtained with state-of-the-art dynamical models. The reviewer wonders "What is missing to get a better prediction? "

We believe that it might be possible to obtain better results with more EOFs, it probably depends on the importance of the associated variance. Since we were proposing a different approach to predict the MJO, we had to be able to fairly compare our results with other models, and the best models use RMM1 and RMM2 only. For what concerns including other variables as input data, it is a very promising idea, in fact RS and CM developed in 2021 (Silini, & Masoller, *Sci. Rep.* 11, 8423) a fast and effective metric to compute information transfer among variables, which would allow to identify variables that can be used as informative inputs. This is the object of future work and in the revised manuscript we will include a comment about this point.

3. We agree with the reviewer's suggestion, and we will modify the revised manuscript accordingly.