



EGUsphere, author comment AC2
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Reply on RC2

Daan R. Scheepens et al.

Author comment on "Adapting a deep convolutional RNN model with imbalanced regression loss for improved spatio-temporal forecasting of extreme wind speed events in the short to medium range" by Daan R. Scheepens et al., EGU sphere, <https://doi.org/10.5194/egusphere-2022-599-AC2>, 2022

Dear Reviewer,

Thank you for your review and suggestions for improving the clarity of the manuscript. We proceed to answer your questions to the best of our ability. The changes and clarifications will be added to the final manuscript.

Major comments:

- There seems to be a slight misunderstanding here. The integral in eq. 5 goes over thresholds t in $[0,1]$ where $t=0$ takes into account all datapoints. Only then, e.g. at $t = a$ only those points with relevance $\geq a$ are included in the integral. At increasingly higher thresholds, increasingly many points are, indeed, discarded from the computation but they are not absent from the final integral. We will make sure, however, to clarify this subtlety in the methodology. We will also make sure to clarify the differences between the SERA and the re-weighting of the MAE or MSE, but do wish to highlight their common goal, which is to increase the importance of the tails in the loss function. For this reason we do not see that a comparison of the two is in any way unsound or unfair. Indeed, we would argue that the fact that these two methods attempt to achieve the same goal by different means is surely what makes the comparison of interest in the first place.
- We are not sure whether we fully understand this point as the model that we investigate outputs deterministic predictions, not probabilities. We do, however, acknowledge that model errors tend to increase for the distributional tails due to larger absolute values. Having said that, for a prediction to be correct the SEDI requires only that a prediction and observation pair both surpass some thresholds t_p and t_o (respectively), regardless of how largely t_p and t_o were in fact overshoot. In terms of discrete extreme event prediction, the continuous errors are thus irrelevant. We have decided, however, to include in the results a continuous score (such as the RMSE) between the continuous prediction and observation fields, including its variation between the same set of thresholds used for the SEDI, to show how the continuous errors differ between the different models i.e. loss functions.
- Noted. We have decided to include another, linear, weighting method in addition to the inverse weighting, and will provide results of the SERA loss with its lower control-point set to either the 90th, 75th or 50th percentile while keeping its upper control-point fixed at the 99th percentile. We will also go to greater lengths to compare and contrast

the results of the different loss functions in order to provide a more complete picture.

- Noted. The literature review on DL methods will be removed from the introduction, as, indeed, this is not the main focus of the manuscript. Instead, additions will be made to the review of extreme event predictions and another paragraph will be added in which the aim and the motivation of the paper are more clearly stated.
- The ensemble was constructed by averaging the individual predictions, equally weighted. We will make sure to clarify this.
- Noted. We propose changing the title as follows: "Adapting a deep convolutional RNN model with imbalanced regression loss for spatio-temporal forecasting of wind speed extremes in the short-to-medium range".

Minor comments will all be incorporated.