

Nonlin. Processes Geophys. Discuss., referee comment RC2
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Comment on npg-2022-9

Anonymous Referee #2

Referee comment on "Fortnight conditioning of historical data to improve short-term precipitation predictions" by Yoshito Hirata and Yoshinori Yamada, Nonlin. Processes Geophys. Discuss., <https://doi.org/10.5194/npg-2022-9-RC2>, 2022

This paper illustrates how conditioning a nowcast precipitation prediction on the calendar day improves a precipitation score.

The poor English syntax and grammar make the manuscript very difficult to follow. The lack of clear and detailed explanations of what is done make the manuscript impossible to assess. For example, the annex is not called in the main text and it does not clarify anything on the procedure that is used by the authors.

From what I see, I do not see how the paper is relevant in NPG, as I do not see a real conceptual innovation (the only innovation appeared in a paper already published by the authors).

Therefore, my appraisal of the paper is based on a guess of what was done to obtain the results.

Major points

The authors use time series with a time increment of one minute. Therefore, not only there is a seasonal cycle, but the time series also contain a diurnal cycle. If there is any cycle in the data, a Fourier transform should be able to detect it. The results reported in Figure 1 do not suggest any type of periodicity.

The methods section does not state how precipitation is predicted (e.g. what model?). Even the AR prediction is not clear. How are the authors certain that they do not over fit

the data?

When they use the term "improve" (e.g. in the title), they should state with respect to what? The improvement over operational nowcasting from meteorological institutions should be demonstrated.

I feel that the reported result (better 2h forecast when taking D=14 day prior information) is only valid for the statistical scheme alluded to by the authors. Nothing proves or even suggests that this would hold in a "regular" nowcasting meteorological forecast.

The main result of the paper is based on Figure 1. But this figure does not prove anything, in particular for D=14. The authors have not tried other values of D, in particular larger values. The seasonal dependence is not discussed or even assessed. Why is there a "bump" for D=1? Precipitation differences of 0.006 mm (maximum value of the vertical axis in Figure 1) are not measurable by meteorological instruments. Therefore, the apparent minimum for D=14 cannot be measured in practice. This minimum of mean absolute error might not even be statistically significant (and it is obviously not physically relevant).

The right way to assess forecast schemes is to use cross validation procedures, i.e. at least by considering a training period and a separate validation period. Therefore, it is not even clear that the reported result is actually true.

Specific comments

Abstract: is precipitation dependence a weather variable? (or what is weather variable, and how do the authors define "precipitation dependence"?).

I. 15: Why and how the uni-modal relation (whatever that means) of aerosols and convective energy (why convective energy) is connected to the scattering and absorption of solar radiation?

I think that the authors miss the main point of predicting precipitation, as they treat zero values in the same way as non zero values.

The methods section is inappropriately unclear, especially for a journal like NPG. The first paragraph of section 3 should be in the methods section. The AR model is not defined properly. An order of 120 sounds like overfitting. Precipitation is not Gaussian, especially

at minute time scales. An AR model is an obvious bad choice.

Why don't the authors consider the hour of the day when they condition the forecast? They might avoid an aliasing phenomenon that could explain a fortnight conditioning.

The first paragraph of section 4 is incomprehensible, and is not related to analyses of the paper.

The Appendix section is not really informative on what is done in the forecast.

Conclusion

I cannot recommend the publication of this manuscript in NPG.