

Nonlin. Processes Geophys. Discuss., referee comment RC1  
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## **Comment on npg-2022-9**

Anonymous Referee #1

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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-RC1>, 2022

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Review of the manuscript 'Fortnight conditioning of historical data to improve short-term precipitation predictions' by Yoshito Hirata and Yoshinori Yamada

The present manuscript tries to attribute short-range precipitation predictability in the large Tokyo megalopolis to the indirect effect of aerosols produced by anthropogenic activities, through their influence on the production of precipitation nuclei and optic effects.

The manuscript is very short not giving enough details for the appropriate reproducibility of the results. Moreover, the methodology, and the arguments in the discussion are very dubious and even not falsifiable, which is fundamental requirement in any scientific theory. Moreover, there are severe methodological shortcomings, described below. Giving those reasons, the manuscript is judged not reaching enough standards to be published in NPG.

The present study should be preceded by experiments with a toy minimal model, reproducing convection and precipitation mechanisms triggered by aerosol nucleation. Then, predictability experiments should be run by imposing some weekly periodicity to

aerosol emissions to simulate the periodic anthropogenic forcing and seek whether any phase synchronizing is observed in precipitation. The predictability study described in the manuscript, obtained with timeseries only is far unsatisfactory due to the existence of a vast number of noncontrolled factors, beyond aerosols. It is thus very difficult to produce a convincing quantifiable attribution of the very-short term precipitation predictability to the aerosol's forcing.

The applied methodology is dubious and impacted by severe pitfalls such as:

- The method of analogues is too little described; for instance, the analogs metric is not clear. Is it based on precipitation only? If yes, the analog's distance is too strict.
- It is not clear if analogs are sought in an independent period of the validation period.
- The details of the AR model are not described. Other benchmark stochastic models should be tested.
- By forecast rank, authors mean error, so authors should precise that.

The unique figure presented is not fully discussed. There are results which are not understandable neither discussed such as: the bump in rank around the forecast delay 60-70 minutes for  $D=1$ ; the reason why the predictability is larger when analogous are sought with  $D=14$  than  $D=7$ . Authors present a very speculative unproven reason for that: 'there is a period doubling bifurcation in the precipitation and that a week periodicity, if it exists, could be unstable'.