

Geosci. Model Dev. Discuss., referee comment RC2  
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## Comment on gmd-2022-122

Anonymous Referee #2

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Referee comment on "Representing chemical history in ozone time-series predictions – a model experiment study building on the MLAir (v1.5) deep learning framework" by Felix Kleinert et al., Geosci. Model Dev. Discuss., <https://doi.org/10.5194/gmd-2022-122-RC2>, 2022

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This paper presents an interesting work on the use of machine learning to forecast tropospheric ozone. The current version answers most of the previous review remarks. However, for the sake of completeness, I would raise two questions that could be addressed in the text as "discussion" even though some of them could lead to more experiments in future works.

Indeed, the first remark is related to the forecast model chosen by the authors, that creates time-series forecasts for each individual air-quality station. As discussed in the text, the experiments show that better results are obtained when using data from surrounding stations rather than a single one, which seems logical as this "neighborhood" strategy helps capturing the advection ozone. For this reason, it would be interesting to develop a bit more the comparison with models that use spatial data, as for example <https://doi.org/10.1007/s10994-020-05944-x> that uses 2D matrices of the entire area in the form of images and video frame prediction algorithm. I believe that WRF-Chem outputs can easily be represented as 2D matrices.

The second question concerning the datasets. In my opinion, only a single year seems too limited to catch the dynamic of the atmosphere. As training, validation and test subsets cover different months of the year, seasonal variations are certainly present and cannot be correctly expressed. A more clever strategy would be to use datasets from several years (even if only in a reduced number of months per year), and validate with the same period in another year.

As stated before, answering these remarks is not mandatory but would greatly contribute to the paper completeness, even if just in the form of a discussion.