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Comment on acp-2022-3

Anonymous Referee #2

Referee comment on "Simulating the radiative forcing of oceanic dimethylsulfide (DMS) in Asia based on machine learning estimates" by Junri Zhao et al., Atmos. Chem. Phys. Discuss., https://doi.org/10.5194/acp-2022-3-RC2, 2022

This paper presents simulations of radiative forcing (direct and indirect) of oceanic DMS in Asia with the aid of Machine Learning. It is an interesting paper, where the authors attempt to quantify the contribution of DMS to atmospheric SO_4^{2-} and CCN aerosol concentrations, along with their radiative effect over Asia. Machine Learning is utilized in order to fill gaps in the DMS concentrations, where there is lack of observations.

The authors need to explain in more detail why they chose the XGBoost model instead of a different ML model and should give further details on the performance of this approach, both at training and at validation, rather than only Pearson's coefficient and RMSE, especially when the RMSE is of the same order of magnitude as the predicted concentrations. I would have liked to see other performance metrics as well, such as relative errors.

I am also puzzled by the high correlation coefficient and small RMSE in Figure S5, where observations are compared against model predictions for AOD. It is clear that the points are not around the 1:1 line (it looks like that the slope of the fitted straight line is of the order of 0.6). How can R be 0.84 then?? Can the calculations be rechecked please?

As a final comment, the language in the paper needs to be checked, since the paper has a few grammatical errors.