

Interactive comment on “Shipping emissions in the Iberian Peninsula and its impacts on air quality” by Rafael A. O. Nunes et al.

Anonymous Referee #3

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In their manuscript “Shipping emissions in the Iberian Peninsula and its impacts on air Quality”, Rafael Nunes and colleagues report on a study investigating the magnitude and effects of shipping emissions around the Iberian Peninsula. First, they use the STEAM3 model to estimate ship emissions for a number of relevant quantities. Then, they use the EMEP MSC-W model to determine the impact of these emissions on surface concentrations of the trace gases and aerosols they consider. Finally, they determine for all model cells in the domain whether or not the inclusion of the shipping emissions leads to additional exceedances of the WHO and EU air quality guidelines.

The manuscript is clear and well written and fits into the scope of ACP. The setup of the study is logical and straight forward and the results are interesting for anyone modelling air quality for the Iberian Peninsula. Although there is nothing really new about

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the methods and approach used, and there are no surprises in the results, the paper still contributes to our body of knowledge on pollution and air quality. I therefore recommend it for publication in ACP after the points listed below have been satisfactorily addressed.

Major comment

My main criticism of the manuscript is that the results on additional exceedances of air quality standards due to ship emissions (which are potentially of interest to policy makers) depend strongly on the quality of the modelled fields. Only if they give a good representation of the actual air quality and exceedances, then the difference between the results with and without ship emissions can be trusted. I therefore believe that the authors need to include a comparison of the modelled concentrations and exceedances for the scenario including ship emissions to those measured by in-situ air quality networks to demonstrate that they are close enough to reality to make interpretation of delta exceedances worthwhile.

Minor comments

- While the manuscript is overall well written, it would benefit from proof reading by a native speaker
- page 4, line 120: Are Sahara dust emissions and NOx from lightning really taken from the NCAR fire inventory?
- page 7, line 204 and figures: I think it is stated nowhere that when you talk about concentrations, that always means at the surface (I assume)
- page 8, line 251 and following: I'm a bit confused by this discussion of the origins of the seasonality. It sounds as if it is not really clear what the origin is, but don't you have all the information on the magnitude of emissions from STEAM so that you can give clear answers on what drives the seasonality?

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- page 10, line 299: The discussion on uncertainties and limitations is very general indeed and mainly lists the obvious. I think that the comparison to real data will make this section also more relevant.
- Figure 1: I'm not sure that it makes really sense to show all these figures here – they all look the same with the colour scale chosen and I do not see what I can learn from 8 figures which I cannot already see in the first.

Interactive comment on *Atmos. Chem. Phys. Discuss.*, <https://doi.org/10.5194/acp-2019-1186>, 2020.