Atmos. Chem. Phys. Discuss.,
https://doi.org/10.5194/acp-2020-446-RC2, 2020

Atmospheric Chemistry and Physics Discussions

Interactive comment on "Meteorology-normalized impact of COVID-19 lockdown upon NO_2 pollution in Spain" *by* Hervé Petetin et al.

Anonymous Referee #1

Received and published: 7 July 2020

The article under review here aims to quantify the impact of the Covid-19 lockdown measures in Spain on air quality. The topic is interesting from the point of view of air quality practitioners and the general public, but it also raises substantial scientific challenges. Even if economic activities were substantially reduced during the lock down period, the impact of meteorological factors on air quality precludes a simple comparison with previous years. Instead, the authors mobilize innovative machine learning approaches to tackle the issue.

The quality of the presentation, scientific quality, and societal relevance are excellent, and publication in ACP is therefore recommended.

I am nevertheless proposing the following minor suggestions that could help further strengthen the paper.

General comment:

The authors should be encouraged to extent the coverage of their study. Applying the method over the whole of Europe is certainly the scope for another paper. But an extension of the temporal coverage up to the end of the lockdown in Spain would be interesting.

Specific comments:

L24, L403: the coronavirus is SARS-COV-2 not COVID-19

L36: without supporting reference, it is wiser to state that "the impact on industry is *presumably* more contrasted"

L50: in the motivation of the work, the authors could add that this type of analysis will serve to validate the model-based assessment using emission scenarios derived from activity data during the lockdown

L69: where is the GHOST data available ? If GHOST database is not publicly open, the reference of the availability of the data should remain EEA's AQ e-reporting database.

L75: the formal deadline for 2019 AQ e-reporting data to be delivered as E1a is September 2020, what is the fraction of 2019 data already E1a at the date of submission?

L125: please clarify what you mean by "unique values", is the date index the julian day, and if so why would it be unique?

L145: hyperparameters should be defined and discussed either in the main text or in the annex. Further details would be appreciated in the annex on how the choice of those hyperparameters are related with the problem at hand (density and spread of observations, number and diversity of predictors etc. . .).

L245: include the value of the uncertainty interval, it is difficult to compare percentages in 3.2 and ppbv intervals in 2.3.3

L255: the impact of the LEZ could actually be an increase of NO2 at stations in the outskirts of that zone

Figure 2: N seems to be missing from the plot

L266: clarify if the confidence interval is taken from the distribution of daily differences

L325 and L344: could there be a role of background ozone in the relation between NOx emission changes and NO2 concentrations that would appear through this latitudinal gradient?

L365: clarify which reduction is for urban and traffic stations

L412: also mention day of the week in the preductors, which is presumably very important for NO2

Interactive comment on Atmos. Chem. Phys. Discuss., https://doi.org/10.5194/acp-2020-446, 2020.