

Comment on **essd-2022-31**

Anonymous Referee #2

Referee comment on "European primary emissions of criteria pollutants and greenhouse gases in 2020 modulated by the COVID-19 pandemic disruptions" by Marc Guevara et al., Earth Syst. Sci. Data Discuss., <https://doi.org/10.5194/essd-2022-31-RC2>, 2022

The manuscript developed a comprehensive European dataset of emission adjustment factors due to COVID-19 at daily basis for each country in 2020. A total of nine sectors is included in the dataset. Combining the emission adjustment factors, as well as the basic pre-COVID emission inventory, the dataset can serve the atmospheric modeling community on the analyses regarding the emission contributions by countries, sectors, pollutants and days during the pandemic. The manuscript is generally clearly organized, thorough discussions are provided, and dataset is publically available. I just have several technical comments on the data sources in deriving the emission changes. Below are my detailed comments.

Line 17: You didn't mention the methodology and dataset used in this work. Can you summarize the key method and dataset in deriving the emission adjustment factors for key sectors in one sentence or two in the abstract?

Line 33: -51%

Line 35-36: I don't think a reference or doi here is appropriate in the abstract. The same for the BAU gridded inventory.

Line 39: There are 17 figures in the paper... too many for the readers to follow the key analyses. Can you simplify them or moving some of them to supporting information?

Line 192: For the power industry, do you have statistics of the power generation? I understand the power generation can be related to the outdoor temperature (for AC), but there are lots of other electricity needs which are not directly related to temperature (like

cooking). It's more straightforward and reliable to use the power production or fuel consumption statistics to derive the emissions.

Line 337: I'm confused for the usage of Google Mobility Reports in estimating the emissions of "other stationary combustion activities". Only mobility trends can be reflected, so even they appear in places like restaurants, they can not represent the emissions emitted by the restaurants.

Line 499, Line 550: How about the gasoline-fueled vehicles?

Line 957: Where are the machine learning techniques used? Anything I missed?