Comment on essd-2021-218

Anonymous Referee #1

Referee comment on "High-definition spatial distribution maps of on-road transport exhaust emissions in Chile, 1990–2020" by Mauricio Osses et al., Earth Syst. Sci. Data Discuss., https://doi.org/10.5194/essd-2021-218-RC1, 2021

High definition spatial distribution maps of on road transport exhaust emissions in Chile 1990-2020; Osses et al.; essd-2021-218.

This manuscript describes the methodological aspects in preparing a high resolution (0.01º×0.01º) inventory of road transport emission for Chile for years 1990-2020. It includes GHG gases (CO_2 CH4) and air quality pollutants (CO, VOC, NOx, PM, and BC). Special emphasis is given to latter one. It considers the impact of changing emissions standards in emissions trends. The analysis includes a comparison with international EDGAR data set, showing good agreement in CO2 but important differences in SLCP.

General comments

The comparison with EDGAR is a very important and useful analysis that benefit the international inventory community to achieve better and reliable global emissions models. A good/plausible explanation is given for the encountered differences with EDGAR.

In this line it is recommendable that the authors also include a comparison with the **Community Emissions Data System (**CEDS). Moreover, to better emphasizes the uncertainties level of the proposed inventory, it should show, if possible, in a summary table, other emissions calculated for Chile, either national/regional or by cities, for GHG and/or SCLP if available.

The manuscript is well written, is suitable for the inventory special issue and is acceptable for publication after some minor revisions and additional comments.

Other comments:

Line 60 page 8

Determining the active fleet is always a complicated matter, especially when a long time series is calculated. The calculation of active fleet should include deregistration and scrapped rate for each vehicle cohort. This produces that a new registered vehicle in year n will be out of the roads in year n + m (number of active years). Since you are using (new?) registered vehicles, have you estimated how many years each (type of) vehicles with technology j are active? Also fuel consumption an emission factors degrade with

aging vehicles. Have you considered any emission factor and fuel consumption function correction for each cohort? Also, VKT may be affected by aging vehicles. Although you calibrate the number of vehicles by fuel sales, some comments should be said with respect to the above point. How are the numbers of vehicles estimated in Figures 2?

Some additional considerations should be added with respect to changes in mobility indicators since these are mentioned in the results. Number of vehicles per household, number of vehicles per inhabitants, number of vehicles/GDP per capita and so on. This extra information, although not strictly necessary will enrich your paper and analysis.

Line 110 page 9:

The English should be rephrased, probably the word "between" is not correct and may be replaced by "among". You are distributing the region's emissions proportionally to the population density of that region. What is the finest population density scale available in your calculation? Are the roads weighting factors constant to all regions in Chile?

Although the spatial disaggregation's methodology is in general understandable, some extra details should be added. It needs some extra clarifications, with regards to the spatial scales. Emissions are calculated in "Regions", then is downscaled to what? … Districts? -> Municipalities? … How do you derive urban from non-urban areas? Are the roads weights similar in urban / rural areas? Readers may profit from the methodology used in your calculations.

Line 145 page 12

Check typo error "if" : The vehicles in category if heavy diesel…"

Figure 6: Caption should declare the emissions color scale (e.g. "same as Figure 5") o added to the figure.

Figure 10, page 22. The Figure shows CO/NOX ratios for other countries. Please define the references for these data.