



## Comment on **essd-2021-153**

Anonymous Referee #2

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Referee comment on "Daily CO<sub>2</sub> emission for China's provinces in 2019 and 2020" by Duo Cui et al., Earth Syst. Sci. Data Discuss., <https://doi.org/10.5194/essd-2021-153-RC2>, 2021

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The ESSD manuscript "Daily CO<sub>2</sub> emissions for China's provinces in 2019 and 2020" by Cui et al. describes a new emission dataset for China at the provincial level. It is the first inventory at the provincial level for all 31 provinces and at a resolution of daily, accounting for weekends and holidays. The authors state that the application of their new dataset will facilitate a more local and adaptive management of China's CO<sub>2</sub> emissions during the COVID-19 pandemic recovery and the ongoing energy transition. I believe the dataset will have some use for this application, but it will also have some serious limitations. A major limitation is the use of the poor indicator of cement production for industrial CO<sub>2</sub> emissions. Cement production is a very specific contribution to industrial emissions. Not enough was said (line 167-173) about this choice. If cement is the largest contributor to industrial emissions, what fraction/percent of industrial emissions is it per province annually? With China being a major manufacturing and exporting country for goods across the world, I would not expect cement to be such a large fraction everywhere. This factor needs to be addressed and the authors need to acknowledge that while they have developed a new method and dataset, there is still much room for improvement with these three sectors, and not just those that they consider future work.

### Specific points

Line 49: Need to expand and provide citations for EDGAR, CDIAC and CEAD here in the introduction.

Line 53: What is China's mitigation target, by what date and according to what baseline year?

Line 76: Do the authors mean “by acknowledging the uncertainties more than just the total emissions”?

Line 152: by “totally” do the authors mean “combined”? If so changing to combined would be clearer.

Line 170: remove “were”

Line 217: Should refer to Figure 1 regarding the “valley shape” which needs a few months to illustrate the shape. Table 1 lists the minimum and maximum only.

Section 3, General: For most readers who will have a limited knowledge of Chinese provinces, the lists of province abbreviations is tedious to read and not useful, even with the Table 1 legend. I acknowledge that perhaps this comment is unwarranted and just my own bias, since I would not feel the same if it were my own country’s sub-national regions or those of the US, which are more commonly known. My suggestion is to just state the number of provinces in the text, rather than provide long lists, since the tables and figures give that detail anyway. A compromise to improve readability may be to just state the number and list them in parentheses. I will leave this to the authors and editor to decide on what is best.

Section 3, General: the identification of U, W for the power sector and inverted U and Line shapes for industry is a useful grouping with a reasonable explanation provided.

Section 3, General: It should be stated that “1 ton = 1000 kg”. In some usage, like in the US, “ton” is 2000 pounds, while “tonne” or “metric ton” is 1000 kg.

Line 386: “which fell during the COVID-19 pandemic” should be replaced with “ which fell during a period of national restrictions due to the COVID-19 pandemic”, since the pandemic is still going on.

Figure 1-6. Clearer and larger x-axis labels would be an improvement.

Figures 1-11. Listing the provincial abbreviations in the figure captions is not helpful and they should be removed.

Figure 5 says southern China, but it is actually all 31 provinces.

Table 3 and 4. It might be helpful to note that the sum of each column or month is 100%.