

## ***Interactive comment on “Technical note: Emission mapping of key sectors in Ho Chi Minh city, Vietnam using satellite derived urban land-use data” by Trang Thi Quynh Nguyen et al.***

### **Anonymous Referee #2**

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#### General comments

The paper presents a novel method to generate an updated spatial emission inventory (EI) at city scale using remote sensing data. A high quality EI, of course, is crucial for air quality modeling and designing mitigating strategies. However, the authors do not show clearly how their new method was developed to generate better results. In general, the emphasis of this paper was given mostly to the show the EI results of Ho Chi Minh City, rather than the major differences and advantages of their new methodology compared with other existing methods. As a technical note, the descriptions of the novel method were not complete and precise enough to allow their reproduction by fellow scientist.

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The lack of an uncertainty analysis that quantify the errors of the emission inventory is also a major concern. I would expect to see such simulations performed as part of this study, especially for their novel allocation method.

#### Specific comments

Abstract: The authors should talk more about the novel methodology they use, rather than the EI results of the city. Introduction Line 44: Please remove Taiwan from the list. It is NOT a country. The authors compare the difference among previous EIs, which is quite helpful. But they should also talk more about the major improvements of their novel methodology in comparison with other studies that use different allocation methodologies. Higher detail level of activity data, local emission factors and a novel approach for grid allocation are used in this study. It is obvious the last one is their major originality. They should focus most on this point and provide more information. For example, what are the advantages of using satellite derived urban land-use morphological maps? Table 1: The table should also include a comparison of the time resolutions of these EIs. As mentioned in Introduction, the time resolution of previous EIs can be one year or one month. Why annual emissions (a coarse resolution) are estimated in this study if emissions exhibit strong seasonality? Methodology There is no need to talk about Hanoi. Local emissions are important in all big cities even they are greatly influenced by adjacent sources. Figure 1: The boundary of Ho Chi Minh City is not very clear in the right figure. As mentioned in Introduction, a study by B.Q.Ho et al., 2019 (Line 69-72) calculate emissions of many pollutants in Ho Chi Minh City in 2017 and also allocate emissions from area sources to grid cells. Why the authors choose 2009 to 2016 as their target year? What is the difference between these two studies? Figure 2 is not clear enough to show how spatial allocation is achieved. A detailed figure that illustrate the complete spatial allocation process is needed in this part. Line 123: Daily VKT can be influenced by many factors. Please justify the assumption that VKT is constant over years. The spatial allocation results should be validated by field measurement data. Results Discussions Line 394: A Study of N.T.K.Oanh et al,

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2015 applied the same method with this study. Does it mean the methodology used in this study is not a novel one? Line 440-441: why not use the same year to compare the results between two versions? I think it is more useful to show the improvements of the novel method. As many assumptions and average values are used in this study (for example Line 125-130, Line 157-160 and elsewhere), the authors should try their best to justify these assumptions and discuss the uncertainties associated with these assumptions and average values. I recommend a Monte Carlo simulation or other methods to be used in this study to quantify the uncertainty of each estimation process and the overall uncertainty.

#### Technical corrections

Please check the use of subscripts throughout the manuscript. For example, CO<sub>2</sub> should be CO<sub>2</sub>. Also use the right significant figures and proper units in all the Tables. The numbers present in the tables contain too many digits and hard to read. Punctuations are missing in some sentences. For example in Line 394.

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