

Dear editor and the anonymous reviewers,

Thanks a lot for your work and time on our manuscript.

The paper entitled “*High-resolution emission inventory of full-volatility organic compounds from cooking in China during 2015-2021*” (**Manuscript ID: [essd-2023-278](#)**) by Zeqi Li, et al., has been revised carefully according to the correction requests and review reports.

The authors have addressed all the reviews’ comments point-by-point as below. All the corrections and responses have been incorporated into the revised manuscript and supplement (marked with **BLUE COLORED FONTS**).

If further responses and corrections should be made, please don’t hesitate to let us know.

Sincerely,

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Reply on Referee #2:

Dear reviewer,

Thank you very much for your recognition and the valuable suggestions! We have addressed the comments point-by-point as below.

All the corrections have been incorporated into the revised manuscript (manuscript_R1) and the revised supplement (supplement_R1). The point-to-point responses are listed as followed. If further responses and corrections should be made, please don't hesitate to let us know.

Comment 1:

Line 23: Specify the range of xLVOC (13.1 kt/yr)

Response 1:

Thank you for your suggestion. We have updated the information and it now reads: "**13.1 (7.36-21.0) kt/yr.**"

Comment 2:

Introduction: Consider mentioning the popularity of each cuisine that is included in the analysis to help readers understand the results

Response 2:

Thank you for your constructive suggestion. In response, we have included a brief mention of two of the most popular Chinese cuisines in the introduction in **lines 55-57** of the manuscript_R1: "**With the vast regional variation, various popular Chinese cuisines such as Sichuan cuisine and Cantonese cuisine have flourished, each having distinct cooking methods and ingredients.**"

Furthermore, to give readers a comprehensive understanding of the popularity of each cuisine type, we have provided a detailed description in the 'Results and Discussion' section in **lines 390-393** of the manuscript_R1: "**Fig. S2 illustrates the proportion of each cuisine in each province and across China during 2015-2021. It reveals that Chinese fast food and snacks (28.3%), home-style cuisine (20.7%) and Sichuan-Hunan cuisine (11.1%) are the most popular cuisines in China, while non-Chinese cuisine (3.21%) and barbecue (4.67%) are the least common.**"

We believe these additions will help readers grasp the popularity of each cuisine and better understand the results.

Comment 3:

Lines 205-222: Has the uncertainty of this approach been included in section 2.4 analysis?

Response 3:

Thank you for your question. Yes, the uncertainty resulting from the estimation method for EFs has been incorporated in Section 2.4. Although a brief mention was initially made, in response to your feedback and for clarity, we have updated the original statement in **lines 327-332** of the manuscript_R1 as follows: "The EFs are assumed to fit a log-normal distribution, with the CV values based on Chang et al. (2022). Since we made some estimations on the raw data of measured EFs, including using VOC or POA EFs to infer the gaseous and particle-phase full-volatility EFs, and using PM_{2.5} EFs to infer POA emission factors, we also considered the additional uncertainty introduced by these estimates. For the former estimation, we added an additional 30% to the original range of uncertainty of the EFs, for instance, increasing 50% to 80%. For the latter estimation, we added an extra 20% to the original range. " We believe that these clarifications better describe the consideration of uncertainty in our method.

Reference:

Chang, X., Zhao, B., Zheng, H., Wang, S., Cai, S., Guo, F., Gui, P., Huang, G., Wu, D., Han, L., Xing, J., Man, H., Hu, R., Liang, C., Xu, Q., Qiu, X., Ding, D., Liu, K., Han, R., Robinson, A. L., and Donahue, N. M.: Full-volatility emission framework corrects missing and underestimated secondary organic aerosol sources, *One Earth*, 5, 403 – 412, <https://doi.org/10.1016/j.oneear.2022.03.015>, 2022.

Comment 4:

Figure 3: For home-style cuisine subplot, there seems no data for Hunan and some east coastal provinces, what is the reason? How will this contribute to uncertainty?

Response 4:

Thank you for your inquiry regarding Figure 3, which does need some clarification. The absence

of data for certain provinces in the home-style cuisine subplot is a result of one step in our cuisine categorization method, as elaborated in the Text S1 in the supplement: "Moreover, some restaurants in certain regions have distinctive regional characteristics, such as those located in the provinces of China's eight major cuisines (Shandong, Hunan, Sichuan, Guangdong, Fujian, Jiangsu, Zhejiang, Anhui) and Xinjiang. Therefore, we also classified all homestyle restaurants in these areas as local specialty cuisines."

To enhance the explanation of Figure 3 (which has been updated to Figure 4 in the manuscript_R1) in the main text for better reader comprehension, we have slightly updated our previous description in **lines 411-413** of the manuscript_R1: "Restaurants that serve home-style dishes typically offer common, simple, traditional Chinese meals, similar to those prepared in home kitchens, as opposed to the refined and complex dishes found in larger upscale restaurants. They are not distributed in some provinces, **such as Sichuan, Hunan, and Guangdong**, because home-style restaurants in these provinces have been classified into local specialty cuisines due to their distinctive local characteristics (**specific categorization principles are available in Text S1**)."

Besides, in response to your question about the uncertainty, we have added a brief description of this cuisine classification step in **lines 182-192** of the manuscript_R1 and discussed the potential uncertainty it might introduce: "**The remaining restaurants without any specific terms in their names are categorized as home-style cuisine. However, in some provinces, such as Hunan and Guangdong, the home-style restaurants are expected to have distinct regional characteristics and are thus classified as local specialty cuisines. To explore the uncertainty introduced by this categorization method of these restaurants, we also calculated the emissions under the scenario where these restaurants remain classified as home-style cuisine instead of local specialty cuisines. Under this scenario, due to the lowest EF of home-style cuisine, the total cooking organic emissions of the involved 9 provinces (see Text S1) would decrease by 8.61% to 30.4%, and the national total cooking organic emissions would decrease by 12.2%. However, in reality, the EFs of these restaurants are probably closer to those of local specialty cuisines rather than home-style cuisine, so the actual deviation would be much less than these values.**"

Comment 5:

Line 538: provide range for emissions

Response 5:

Thank you for your suggestion. We have updated the information and it now reads: "The emissions of xLVOC, SVOC, IVOC and VOC from cooking in China in 2021 were 13.1 (7.36-21.0) kt/yr, 176 (95.8-290) kt/yr, 241 (135-374) kt/yr, and 561 (317-891) kt/yr, respectively. "