

Comment on acp-2020-1061

Anonymous Referee #1

Referee comment on "Convergent evidence for the pervasive but limited contribution of biomass burning to atmospheric ammonia in peninsular Southeast Asia" by Yunhua Chang et al., Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2020-1061-RC2>, 2021

NH₃ is one of the key agents during the formation of secondary inorganic aerosols, which can make up over half of the ambient fine particles. Whilst an overwhelming contribution of agricultural activities to global and regional NH₃ budgets, biomass burning is believed to represent the most important source of NH₃ to the atmosphere in fire-prone regions. In this study, multiple-techniques were used by Chang et al. to challenge this long-standing point of view. Their results were cross-validated and jointly suggested that during the dry wildfire season, biomass burning emissions represented a ubiquitous but comparatively small NH₃ source. Besides these specific results, this manuscript establishes a framework or methodology that could be extended to other fire-prone regions, based on the synergic use of concentration measurement, satellite retrieval, and isotopic analysis to constrain our understanding of NH₃ sources in various atmospheres. The manuscript ends with an open question, but this may be the trigger to foster new research. Therefore I recommend publication after addressing the following issues.

Figure 1. The citation is incomplete.

Line 115-116. Specify the number of samples used to achieve the analytical precision you claimed.

Figure 3c. This figure is some sort of arbitrary. I suggest the author to replot it. The gridded population density can be extracted from WORDPOP. URL:
<https://www.worldpop.org/geodata/listing?id=77>

Figure 7a. Numerous studies have confirmed that particulate potassium can hardly be the exclusive tracer of biomass burning, thus if possible, I suggest the authors to use levoglucosan to particulate potassium in Figure 7a.

Line 303-307 and Figure 7b. I appreciate the use of nitrogen isotopic source signatures of NH₃ emitted from biomass burning based on the authors' actual measurements. Since the insensitivity of the isotopic endmember of biomass burning-emitted NH₃, it is not a big problem to include the result of Kawashima and Kurahashi (2011) to perform source apportionment study here. However, the isotopic endmember determined in Kawashima and Kurahashi (2011) is $\delta^{15}\text{N-NH}_4^+$ instead of $\delta^{15}\text{N-NH}_3$. I strongly suggest the authors to clarify this in their revised MS.