

Interactive comment on “Constraining Ammonia Emissions in Vehicle Plumes Utilizing Nitrogen Stable Isotopes” by Wendell W. Walters et al.

Anonymous Referee #2

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This manuscript reports integrated offline measurements of gas phase ammonia and particle phase ammonium concentrations and $\delta^{15}\text{N}$ isotopic signatures, targeting air-masses that are strongly impacted by vehicle emissions. The combination of roadside and on-road data from the Eastern US, and tunnel data from China, provide confidence that the results are representative. The description of the sample collection and analysis procedures is very thorough. Because the gas phase fraction of the majority of the samples is very high, and the enhancements over background concentrations are high, the measured isotopic signatures can be interpreted as reflecting the emissions themselves. This allows the authors to report a narrow range of isotopic signature for a source of ammonia (traffic) that is important, but poorly constrained, in urban areas. One of the most important and unambiguous results from the paper is the identifica-

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tion of an offset in the isotopic signatures from the samples acquired through passive sampling. The authors provide clear theoretical support for the magnitude of this effect based on the relative diffusion rates for the isotopologues in air. Given the importance of this result, it should be mentioned in the abstract.

The topic and results are very appropriate for publication in ACP. Overall, the paper is well-written, though longer than necessary. For example, the section ruling out contributions from background NH_3 (lines 569 – 585) does not need to be so long. I recommend that it be published after some minor revisions.

Specific comments

Line 71 – clarify whether improvements refers to the sources or our understanding of them

Line 76-78 This sentence is worded unclearly

Line 268 -269 Is this sentence saying that the limit of detection for this method was higher than usual due to contamination? It's hard to follow the logic.

Line 319 Define what is meant by fblank

Line 430 Section 3.1.3 appears to have the wrong title

Figure 7 – showing a median and interquartile range for two samples seems a bit excessive. Perhaps just report the two values as individual symbols.

Line 671 – Smirnof is misspelled

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