

Interactive comment on “Atmospheric measurements of ratios between CO₂ and co-emitted species from traffic: a tunnel study in the Paris megacity” by L. Ammoura et al.

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Review of Ammoura et al. Atmospheric measurements of ratios between CO₂ and co-emitted species from traffic: a tunnel study in the Paris megacity

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This paper describes a tunnel study measuring a suite of anthropogenic trace gases. They use the ratio of each gas to CO₂ to evaluate the emission rates of these gases and compare with bottom-up inventory data. The authors compare their results with other studies in other urban areas, and provide some explanations for the similarities

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and differences. Of particular interest is the detailed analysis of the CO/CO₂ ratios, which highlights the variability in this ratio, and as the authors point out, makes using CO measurements as a proxy for fossil fuel CO₂ a real challenge.

This paper was really a pleasure to read. The topic is clear, the experiment well designed, the analysis is well explained, and the discussion nicely covered all my initial questions. The subject material is entirely appropriate for ACP. I have a few very minor comments on points of clarity, but the paper could be published as is without problems.

Pg 20199 Line 20. What is meant by “tertiary sector”?

Pg 20211. Lines 1-4. Are the emission ratios also temperature dependent (more VOC and CO emissions when air temperature and/or engine temperature is lower)? If so, do September and October approximate the annual average temperature for Paris, or might we expect that the observations could be biased relative to the annual average Airparif inventory?

Pg 20211 line 28. Table 3, not table 6.

Pg 20213 line 25-27. This last sentence of the paragraph is unclear.

Pg 20214 lines 7-16. The most likely explanation is the first one given – at higher speeds, the CO:CO₂ ratio is lower. The further explanation regarding tunnel ventilation seems less likely, but the phrasing of the paragraph seems to overly emphasize this second possibility. I would rephrase the second explanation to something like “we cannot rule out the possibility that. . .”

Figure 1. It would be nice to see a larger version of this key figure, as it is difficult to examine hour-by-hour at this resolution. Although not the main intent of the paper, the observed diurnal cycles in the mixing ratios will likely be of interest to many readers.

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