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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Direct measurements of black carbon fluxes in central Beijing using the eddy-covariance method" *by* Rutambhara Joshi et al.

Anonymous Referee #2

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Joshi et al. present a truly excellent example of how atmospheric chemical measurements can be used to directly improve models and provide new insight into underlying processes. The paper is well written, the data are robust, and the analysis is strong. This paper adds substantively to the literature. The flux uncertainty estimates, footprint analysis and tables of statistics are useful and well done. I recommend publication following minor revisions. Comments are below.

Comments:

1. In the Methods, please be clear on the actual length of the inlet line: it's on a 102 m tower, but presumably longer? Figure 1 would be much improved with line lengths and

flow rates, making the field setup more reproducible. Please provide estimates on particle losses from the inlet lines in the general size range. While those losses might not influence the calculated fluxes, size-dependent losses can cause bias in total particle mass or number fluxes – and some underestimates of emissions (or deposition).

2. A technical point, but Figure 2 woud be easier to interpret if the x-axis ran from 0-24 hours (rather than ending at 18).

3. Figure 3 makes me worry about signal loss due to attenuation. While the authors write that "Given the majority of the flux is driven by much lower frequencies, a correction for high frequency loss is not applied." However, this fact is not clear from Figure 3. Please specify what percentage of the flux is driven by lower frequencies (and how that is defined), and what the influence of a correction would be. That is, would correcting the flux in Figure 3 for attenuation cause a 5% change (in which case, definitely minor), or a 30% change (in which case the corrections should be applied)?

4. The significant figures in Figure 4(b) and 10 are excessive. Please correct to something more reasonable. Also, it is not clear if 'a' is the slope or intercept in Figure 4b? Please specify on the figure what 'a' and 'b' refer to.

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