Editor's comments on the revised paper amt-2017-30 (v4)
"Mid-IR spectrometer for mobile real-time urban NO$_2$ measurements" by Hundt et al.

Comments

The paper has greatly improved. I have only a few minor comments which the authors should address before the paper can be published in AMT.

(1) My previous questions about the instrument performance are now answered in the revised paper, but the information is scattered in different chapters. A comprehensive summary should be given in the abstract and conclusion sections. In my understanding, the applied measurement technique has in principle a high potential for accurate, precise, and absolute measurements of NO$_2$. The 1σ precision is 0.13 ppbv at 3 s time resolution. The maximum uncertainty for the determination of NO$_2$ concentrations from Lambert-Beer's law is 5%. This accuracy can be expected under ideal conditions when the ambient temperature is constant and if NO2 wall loss can be excluded in the instrument. In practice, a temperature-dependent drift of optical interference fringes in the measured spectra was found to cause an NO$_2$ offset of up to +/- 5 ppbv, which was corrected based on regular baseline measurements with NO$_2$ free air. Furthermore, an NO$_2$ loss of 10% inside the instrument was quantified in laboratory experiments. For data consistency in the field study, the QCLAS data were adjusted by +20% to match the measurements of a reference instrument which belongs to the Zurich AQM network.

(2) Figure 6: are the fitting errors given as 1σ or 2σ values?

(3) Figure 7: I suggest to show the ozone measurements in the main paper instead of in the supplement. The ozone data are quite instructive as they indicate a nearly complete depletion of ozone when NO$_2$ reaches a maximum due to traffic emission of NO. In Figure 12, the local emission signal of NO$_2$ seems to become saturated at high traffic intensity above 5E+06. Could this be due to depletion of ozone such that emitted NO is not further contributing to NO$_2$? A comment about this behaviour should be given in the paper.

(4) Figure 12: in order to be consistent with Figure 11, the x-axis should be labelled as Traffic Intensity.