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Discussions

Interactive comment on "Long-term evaluation of air sensor technology under ambient conditions in Denver, Colorado" *by* Stephen Feinberg et al.

Anonymous Referee #1

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"Long-term evaluation of air sensor technology under ambient conditions in Denver, Colorado"

General Comments The manuscript presents the long-term (7 months) field evaluation of commercial low-cost air quality devices in Denver, Colorado. Most of the devices measure particulates with a few monitoring ozone and nitrogen dioxide. Criteria used in the investigation of performance include data capture, correlation with reference instruments and trend analysis with respect to time and wind information. While it was shown that the devices have good data capture, the study showed there was a wide range of agreement with the PM reference methods. It was suggested that the varying performance in this work compared to past studies may be linked to differences in study locations, as such the need to factor this in future performance evaluation. Relative

humidity was identified as one of the main artefact affecting the measurements of PM a common limitation of light scattering based PM sensors. This study shows an objective evaluation of the immediate usability of commercial low-cost air pollution sensors which are known to require additional data processing approaches to give more precise and accurate readings.

Specific comments The authors have compared mass concentrations with number concentration for some of the devices, I suggest removing the information on slope and intercept from the Table 3 as this is not informative but can mislead the reader with regards to the performance of these units. It will help if the authors give more information on how the PM2.5 are calculated by the various manufacturers for the devices reporting this unit of measurement, including the size range each measured. I am not sure the section describing the comparison of the high-time resolution of the device with respect to the reference unit is well described. Will having a time series plot of the 1-minute data from all devices (PM/ref PM and O3/ref O3) albeit for 24-hour period complement the conclusion drawn by this analysis? With regards to the difference in trend patterns (time/wind), have the authors considered the impact of the RH diurnal cycle on the PM sensors. Typically, high RH are observed at night-times, this may be masked in the wind trend analysis (high RH randomly spread across the wind directions). It is worth checking the time trend analysis using periods of low RH (say < 50%).

Technical corrections P.2, line 19, add "was" after the phrase "the sensors . . .. " P. 5, line 118: what do the authors mean by ". . .challenge concentrations. . ." P. 6, line 149-150 rephrase ". . . the clause removing wind-blown snow . . .."

Interactive comment on Atmos. Meas. Tech. Discuss., doi:10.5194/amt-2018-12, 2018.