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Atmospheric Measurement Techniques Discussions

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

Anonymous Referee #2

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The paper presents a field evaluation of a number of particle and gas phase 'low-cost' sensor with respect to reference instruments over a seven month period. The comparison of a number sensors over a long time period will be of interest to many within the community as there is increasing interest in using low-cost sensors or air monitoring. The authors have done a good job assessing he accuracy of the sensors relative to reference instrumentation, with some interesting analysis and results. As there was three of each sensor, I would have liked to see some discussion on the precision of the each sensor. It is just as important to understand how well the different sensors were able to produce the same reading and this dataset provides an opportunity to understand the different sensors precision over a long time period. Furthermore, throughout Section 3 I would have liked to have seen more discussion on the results and how they compare

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Discussion paper

to previous studies in the literature. There have been other studies doing field evaluations of some of the sensors included in the current work (many in the introduction) and so it would be see some discussion if similar results were observed and if not what may have been the cause. Overall, the paper is clearly written and well presented.

Specific comments Section 3: Did you see any evidence for baseline drift in any of the sensors over the 7 month period? For example, did the correlation/slope with respect to the reference instrument change in the first month compared to the last? It would be good to include some discussion on the how the different sensors performed in this regard, as in the literature Page 11, line 246: To me, the TSI Air Assure was the best performing sensor in terms of accuracy relative to reference, based on table 3. Therefore, I would be interested to know if there was any humidity effects observed in this instrument like was observed for the OPC-N2 and Airbeam (fig 3). Was it just these two sensors that appeared to be affected by humidity? Page 11, line 267: My take on Fig 4a is that was the sensors that report particle counts that best captured the diel pattern rather than those that report particle mass concentrations, despite the reference instrument also reporting particle mass concentrations. Perhaps the authors could comment on this. Page 12, line 284: I would be good if the authors could briefly indicate what was tried to explain why the PM sensors better captured the win direction trends compared to the diel as knowing what was not the cause will help avoid duplication of effort in future studies. Figure 5: it appears that PM sensors had a wide response range at a north wind direction unlike other direction, that wasn't observed for the ozone sensor. Was there a local soucrce in this direction that may affected the sensor response? This may help understand how aerosol compostion affects the sensor reading. Page 14, line 301: Why were the OPC-N2 and Airbeam the only sensors to the right of reference in Fig 6? Is due to instrument response time or other artefacts? Table 2: Please include the data capture for the OPC-N2 in this table

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