

## ***Interactive comment on “Field Calibration of Low-Cost Air Pollution Sensors” by Andres Gonzalez et al.***

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1) The most significant flaw in the analysis presented is that it seems that the data used to train the calibration models are the same used to evaluate the same models? If so this is not a valid test, and the training and test data need to be independent data sets. The purpose of these tests is to determine how well field calibrations of the sensors works. It is being done in the presence of many unknown and uncontrolled ambient variables. This is different from a lab calibration where, for example you might compare instrument response to a pure span gas setting, with few uncontrolled variables. In these experiments we compare the response of the sensors to reference field sensors and determine how well a multiple linear regression model can relate the sensor response to the variable in question. 2) Overall the calibration approach is not clear,

with no indication of the improvement achieved with the increasing complexity of the calibration equation used. It would be helpful to the reader if the authors could provide a baseline performance of the sensors using a simple linear fit to the raw sensor signals, before including other variables such as temperature. This would enable the impact of sensor interferences, e.g. from temperature, to be understood in both the laboratory and field calibrations. We do add this information and analysis. Specifically showing the raw sensor signal compared to data from air monitoring station. 3) As this is a description of a new instrument the authors should provide an assessment of the measurement uncertainty. We do add the uncertainty of each sensor calibration not only from our calibration but also from literature review. 4) The poor performance seen for the OPC-N2 sensor when compared to reference measurements is not adequately discussed. Early studies using these sensors identified a significant humidity dependence impacting the data under high humidity conditions. A study by Antonio et al. (2018) developed a correction for this instrumental effect on the OPC-N2, resulting in an apparent improvement in data quality. The authors should at the very least acknowledge this earlier work and discuss the implications for the work presented here. We do add the implications of the others in term of OPC-N2 calibration assessing the impact in our results. 1) Table 1 has no units on values other than the average mixing ratio. We do add the unit of each value in Table 1. 2) The statement on line 321 that calibrations will last \_ 3 months has no supporting evidence and should either be removed or justified. References: Di Antonio A, Popoola OA, Ouyang B, Saffell J, Jones RL. Developing a relative humidity correction for low-cost sensors measuring ambient particulate matter. *Sensors (Switzerland)* 2018;18:2790. doi: 10.3390/s18092790. We do add the reference(s) for the statement on line 321.

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Discussion paper

