Atmospheric
Measurement
Techniques

Discussions

Interactive comment on "Effect of Polyoxymethylene (POM-H Delrin) offgassing within Pandora head sensor on direct sun and multi-axis formaldehyde column measurements in 2016–2019" *by* Elena Spinei et al.

Anonymous Referee #2

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The manuscript "Effect of Polyoxymethylene (POM-H Delrin) offgassing within Pandora head sensor on direct sun and multi-axis formaldehyde column measurements in 2016 – 2019" by E. Spinei et al., describes an issues of overestimation of HCHO columns measured by certain Pandora instruments due to thermally-induced HCHO emissions from the material of instruments' sensor heads (manufactured from plastic polyoxymethulene homopolier, POM-H). The paper describes laboratory investigations performed to evaluate the magnitude of the offgassing effect, field co-location case studies, as well as the laboratory and field evolution of the instrument with a new, POM-

free, sensor heads. The manuscript is of interest for atmospheric sciences community, provides a clear definition, and a thorough assessment of the issue. The topic is appropriate for AMT, and I recommend publishing the manuscript after authors address a minor comments outlined below.

General comments:

The manuscript provides a detailed timelines and descriptions for multiple events such as Pandora sensor head design changes; laboratory testing for POM and non-POM units; and case-studies for real-life deployments/colocations. I found myself flipping back and fourth through the manuscript, I therefore think that the manuscript will be improved by inclusion of a master table summarizing the types of tests, dates, intercomparison campaigns, identification numbers of units, modifications to the units, etc. This table can be placed at the end of Section 1. Can authors develop a correction factor that can be applied for direct sun HCHO data collected during 2016-2019 to correct for HCHO production, so the dataset can be utilized by the scientific community? For example, recommending temperature ranges during which data would be usable, and showing examples of intercomparison with in-situ techniques (if available) or with satellite data showing a reasonable agreement.

Specific comments:

Lines 10-14: define cold and warm temperature ranges. Remove quotation marks from "cold"

Figure 1: define light blue, gray and green lines

Lines 91-98: add explanation for which spectra are used for direct sun and multi-axis DOAS retrievals.

Figure 2: add ambient temperature to the figure

Line 160: add a coma before 118

Line 161: add a coma before and 148

Line 171: remove quotation marks from, "mimicking"

Line 314: remove bold face from contribution

Lines 404-405: The statement "Pandora HCHO measurements derived from direct sun observations between 2016 and 2019 cannot be used in the current form. Results presented here most likely are representative of other instruments build between 2016 and 2019" is very drastic. Authors should consider adding recommendations on possible corrective approaches, so the data could be utilized by scientific community.