

Atmos. Meas. Tech. Discuss., referee comment RC1
<https://doi.org/10.5194/amt-2022-269-RC1>, 2022
© Author(s) 2022. This work is distributed under
the Creative Commons Attribution 4.0 License.

Comment on amt-2022-269

Anonymous Referee #2

Referee comment on "Applicability of the low-cost OPC-N3 optical particle counter for microphysical measurements of fog" by Katarzyna Nurowska et al., Atmos. Meas. Tech. Discuss., <https://doi.org/10.5194/amt-2022-269-RC1>, 2022

In the presented manuscript authors show the comparison between low-cost optical counter OPC-N3 of the Alphasense Systems with the reference instrument a shadowgraph type VisSize D30 of the Oxford Lasers. The focus of the research was to identify the usefulness of the OPC in fog detection and research.

The manuscript is important and interesting. There are however several issues that should be improved before the publication. I'll present the list of my list of comments and suggestions below.

Section 2.2

The instrument setup should be much more described. Was any additional housing applied for the OPC to protect it against humidity or rain? Was it lying down on the roof of the building, or on any platform above the roof? If yes how much height above the roof surface? Can you present any photos of the devices set up?

In table 2, in the text it is written that OPC sampling was 10 s, then averaged up to 1 minute, in the table it is 1 minute sampling time, please make it consistent.

Section 2.3.2

Equation 3, please check if all variables are explained, what is pix^2 , is i here another variable or just index?

Section 2.4

Why there was double averaging applied? Why not straight average from 10s to 10 minutes?

In the research authors used standard deviation as the uncertainty of the OPC measurements (based on 1 min resolution). It is a basic statistical error representation, probably good enough for this study. Please elaborate on how it would change if you would calculate it from 10 s, which was as far as I understood, basic sampling time. How uncertainty would change if you also consider Poisson statistics which represents a random error in the measurements?

Section 2.4.1

What was the reason to do the 1 hour averaging? Why not 0.5h or 2 hours? It should be elaborated, how was it representative? Is it 2:00:59 – 3:01:07 really an hour or a little bit more? I understand it is a minor issue, but it just looks strange.

How it differs from other periods? Can authors present the temporal evolution of droplet size distribution for all sampling periods (at least in the appendix)? The authors should explain to the readers why the analyzed period and later case study in section 4.1 was better than the rest of the time series.

Section 4.1

Authors with good results applied the Refractive Index correction. Please elucidate if all data presented are based on RI_{OPC} or RI_{water} because it is not clear to me. Can you present any figure on how the correction influenced the measurements (at least in the appendix)?

Section 5

Is it possible to apply any correction function for all factors influencing the OPC measurements (internal temperature, humidity, refractive index)?

In conclusion, I find this manuscript valuable and interesting. There are still fields to improve significantly, which is why I recommend a major review after which it can be

published.