

Comments on Manuscript ar-2024-39 Submitted 02 Dec 2024

Title: Impact of Sampling Frequency on Low-Cost PM Sensor Performance

The paper presents a field study in which a Low Cost Sensor measurement station for PM_{2.5} is designed and operated during one month on the roof of a building of Indian Institute of Technology (New Delhi campus). The data are analyzed and compared to reference measurement obtained by BAM Beta attenuation mass monitor through different sampling frequencies by the Low Cost Sensor Station. The general context of the study is interesting, it deals with configuration of sampling frequency of Low Cost Sensors regarding power consumption especially for remote deployments and what is it possible to characterize with in term of short pollution event. The precise objectives of the paper are clearly described. The paper is well written, and results are clearly presented. It is in line with topics of *Aerosol Research*.

Nevertheless, some important points have to be accounted to improve the paper and avoid any misinterpretation.

General comments:

The main comment I have on the paper is to clarify the definition of the sampling frequency/sampling interval and related discussion on the effect of this parameter on the results. It is not clear to what correspond exactly LCS sampling frequencies named 5, 10, 15, 30, 60 min and how they are obtained.

As it is written it let thinking that data corresponding to such frequencies are obtained by doing periodic average on the raw measurements done by LCS working at an effective sampling frequency of 15 seconds. This means that sampling frequency of the LCS is not changed during experiments. This as to be clarified in the paper and the title of the paper should be adapted. In fact, if the frequency studied by the authors is a periodic average obtained by post-treatment it has no relationship with LCS intrinsic performance. The title should avoid such misunderstanding.

The authors should improve the paper by better describing how the LCS data are acquired: if it is always active sampling during one month or if there sleep mode periods between measurements periods?

Specific comments

Page 3, line 80

Precise/confirm that BAM unit is equipped with PM₁₀ Inlet + PM_{2.5} Cyclone (which model VSCC or URG?)

Page 5, lines 106-107

Give additional information to explain the difference between data aggregated on 60 min interval and the hourly average.

Page 11, fig. 7

Improve readability of titles

Page 11, lines 168-171

The conclusion of the paper should be adapted to avoid misunderstanding about energy consumption minimization of LCS according to finding of this study. Energy consumption is

not directly studied here and no evidence are given that operation of LCS with lower energy consumption due to lower effective sampling frequency provide comparable measurements.