Field evaluation of low-cost Alphasense OPC-N3 during urban regeneration activities: the case of MUSA Open-air laboratory at University of Milano-Bicocca

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Low-cost sensors are becoming ever more prominent in air quality research, but much work needs to be done to improve their accuracy. Laboratory and field tests are necessary to assess the response of these devices compared to reference instrumentation, while site-specific correction factors may be necessary given the strong dependence on environmental factors. This work reports preliminary results from the deployment of low-cost sensors in the context of an urban regeneration project in the city of Milan. Particulate matter (PM) concentrations were monitored by means of four low-cost optical particle counters (OPC-N3, Alphasense), coupled with a research-grade instrument (Dust Monitor Grimm 1.108), during renovation works on the campus of the University of Milano-Bicocca. As results showed a consistent underestimation of PM concentrations by the OPC-N3 in both indoor and outdoor environments, a correction factor was calculated based on the reference data. Corrected data showed better correlation with the reference instrument for the pre-works and construction phase. The applied factor proved to be less effective with the intensification of the works and the cold season forcing, failing in correcting the technical limitation of the instrument during high PM emission events. A more specific algorithm, capable of considering increased emissions from the site and environmental parameters, will be derived as this research progresses.