Indoor Air quality: Presence of students in a classroom changes levels of air-borne particulate matter

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ABSTRACT

Background: The Respira Project is an EU funded Italia-Malta project, whose main aim is to monitor air quality and respiratory Health in schools amongst children aged 11-14 in Malta and Sicilsy.

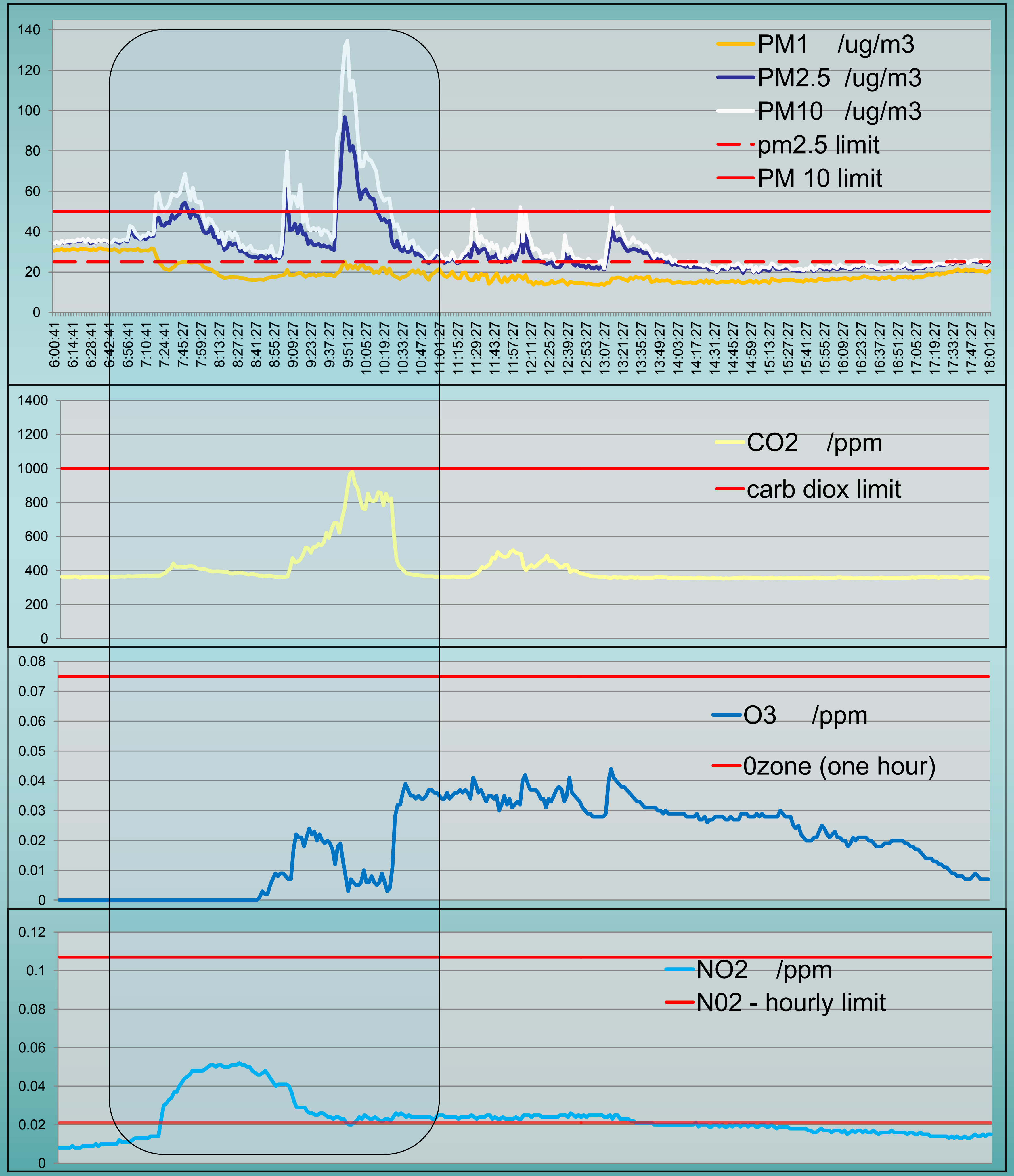
AIM: In this preliminary analysis, airborne or gaseous pollutants in 2 classes in two different schools in MALTA were to be determined for 24 hours during the scholastic year.

Method: An aeroqual IQM60 was used to measure PM 1, PM2.5, PM 10 particulate levels, Ozone, Carbon Dioxide, Carbon monoxide, Nitrogen Dioxide, and Volatile organic compound levels. Levels were monitored every 2 minutes for 24hours

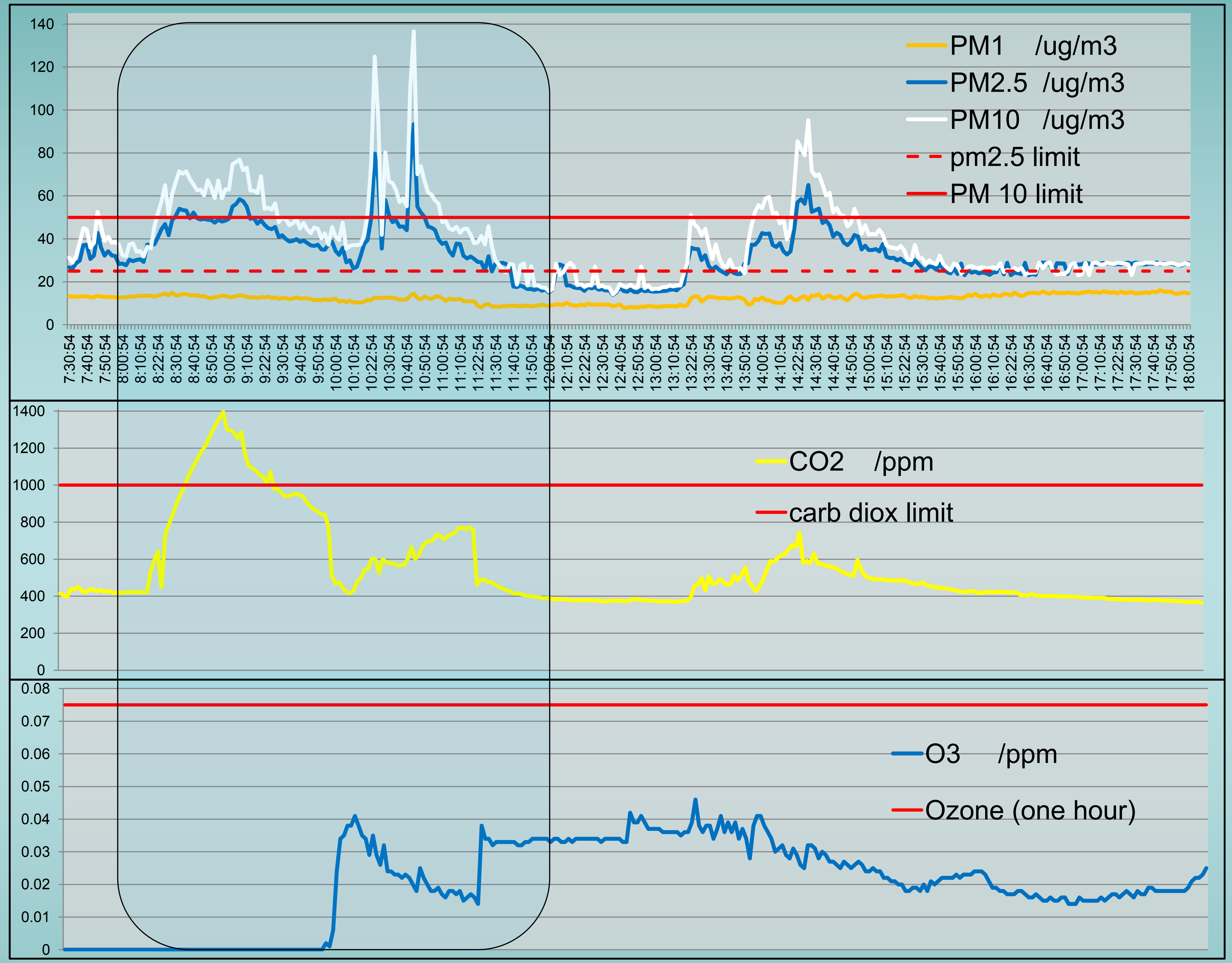
Results: Levels for Ozone, Carbon Monoxide, Volatile organic carbons and nitrogen dioxide, were all well below the maximum recommended levels of indoor air quality in both classes. In school 1, class 1, Carbon dioxide levels rose from baseline 356pp/million, rose to mean of 875pp/million with a peak of 1397 pp/million with students present from 08:00 to 10:00. Similarly PM2.5 and PM10 levels rose from a base lined of 25.1 µg/m^3 and 25.5 µg/m^3 to a mean of 43.4 and 54.0 µg/m^3 with peaks of 58.5 and 76.9 µg/m^3 respectively. However mean PM1 dropped from mean 25.3 µg/m^3 to mean 12.9 with a nadir of 11.37 3 µg/m^3. School 2, Classroom 2 baselines were CO2 356ppm, PM1 30.5, PM2.5 30.7, PM10 30.0 µg/m^3 Classroom values from 9.00 to 11.00 AM CO2 mean 587, peak 981 ppm, Mean PM 2.5 and PM 10 43.8 and 55.9, with peak 96.8 and 134.7 µg/m3 respectively. PM1 from 30.5 µg/m^3 dropped to mean 19.75 with a nadir of 11.37 µg/m3.

Conclusion: These preliminary results indicated that the presence of students in the classroom significantly alters airborne particulate matter concentrations in that particular period.

School 2 – Class 02



School 1 – Class 01



- ❑Presence of students significantly altered levels of particulate matter
- ❑Rise in PM 10 and PM 2.5 levels was noted
- ❑Slight decrease in PM 1.0 levels was noted
- ❑Carbon dioxide rose significantly suggesting inadequate ventilation
- ❑Possible decrease in indoor ozone levels with presence of children
- ❑Nitrogen dioxide levels do not appear to be affected.

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