INFLUENCE OF TRAFFIC VOLUME REDUCTIONS ON AMBIENT AIR QUALITY IN DHAKA, BANGLADESH

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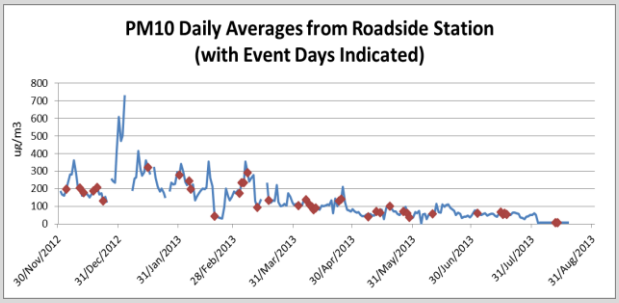
Introduction

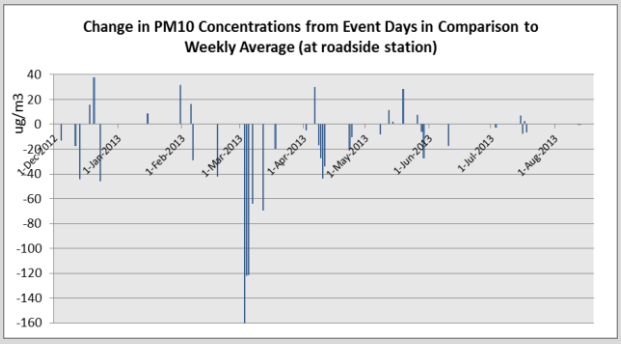
Occasionally there are events in Bangladesh which drastically reduce urban traffic volume for an entire weekday. During the period December 2012 – August 2013, there were 41 such events in Dhaka. This study was undertaken to understand the influence of traffic volume reductions on the ambient air quality (PM_{10}, $PM_{2.5}$, and NO_x) in Dhaka. This work is part of the BAPMAN (Bangladesh Air Pollution Management) project in collaboration between NILU and CASE.

Methods

The study period was 01 December 2012 – 20 August 2013, of which 41 traffic volume reductions were recorded from newspaper articles. Traffic surveys indicated that approximately 90% of motorize traffic volume was reduced during these events. During the study period, daily average concentrations were collected at two urban monitoring stations (one roadside, and one background) for PM_{10}, $PM_{2.5}$, and NO_x Dhaka. These daily averages were compared for days with traffic volume reduction events, and weekdays without. Here only roadside monitoring data is presented.

Results: PM_{10}

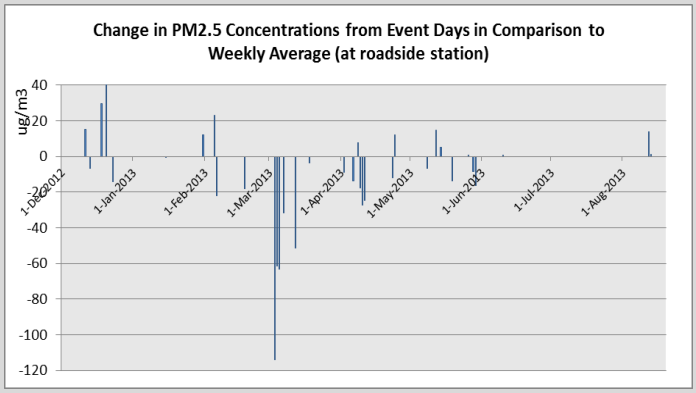




73% of traffic reduction days had PM_{10} concentrations **lower** than weekly average.

Traffic reduction days had PM_{10} concentrations 17% **lower** than weekly average.

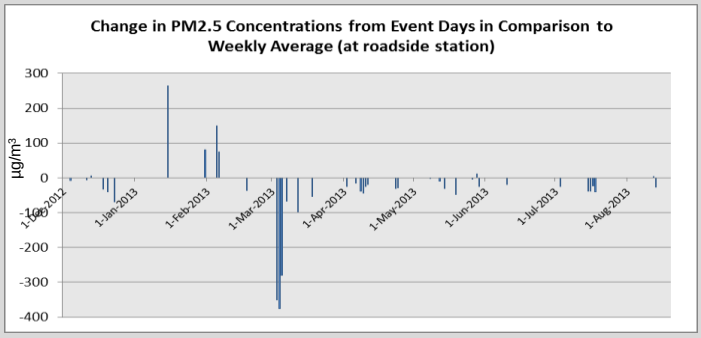
Results: $PM_{2.5}$



70% of traffic reduction days had $PM_{2.5}$ concentrations **lower** than weekly average.

Traffic reduction days had $PM_{2.5}$ concentrations 15% **lower** than weekly average.

Results: NOx



80% of traffic reduction days had NOx concentrations **lower** than weekly average.

Traffic reduction days had NOx concentrations 37% **lower** than weekly average.

Conclusions

Results indicate that traffic volume reductions in Dhaka have a significant improvement on ambient air quality at a roadside location. Much of the PM_{10} ambient concentration reductions (17%) occurred during the dry winter months, thus an indicator of reduced road dust re-suspension. $PM_{2.5}$ and NOx ambient concentration reductions (15% and 37% respectively) were most likely due to reduced vehicle emissions. This analysis could give valuable advice to future traffic mitigation options for Dhaka in regards to the degree traffic reduction mitigation measures can reduce certain pollutants, and improve air quality in general.

BAPMAN Project Website:
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