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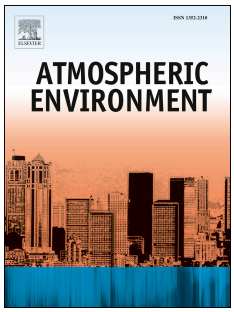

Air pollution trends over Indian megacities and their local-to-global implications

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Air pollution trends over Indian megacities and their local-to-global implications

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ABSTRACT

More than half of the world's population lives in urban areas. It is estimated that by 2030 there will be 41 megacities and most of them will be located in developing countries. The megacities in India (Delhi, Mumbai, and Kolkata) collectively have>46 million inhabitants. Increasing population and prosperity results in rapid growth of the already large consumption of energy and other resources, which contributes to air pollution, among other problems. Megacity pollution outflow plumes contain high levels of criteria pollutants (e.g. Particulate matter, SO_2, NO_x), greenhouse gases, ozone precursors and aerosols; which can affect the atmosphere not only on a local scale but also on regional and global scales. In the current study, emissions and concentration trends of criteria and other air pollutants (polycyclic aromatic hydrocarbons, carbon monoxide and greenhouse gases) were examined in the three Indian. Further, various policies and control strategies adopted by government are also discussed to improve air quality. Decreasing trends of SO_2 have been observed for all three megacities due to decrease in the sulphur content in coal and diesel. Whereas, increasing trend for NO_x has been found in the three megacities due to increase in number of vehicles registered and high flash point of CNG engines which leads to high NO_x emission. In terms of SPM and PM_{10}, highest emissions have been found at Kolkata whereas highest ambient concentrations at Delhi. For Mumbai and Kolkata fluctuating trends of SPM concentrations were observed between 1991 to 1998 and stable afterwards till 2005, whereas for Delhi, fluctuating trend was observed for the entire study period. However, several steps have been taken to control air pollution in India but there is a need to focus on control of non-exhaust emissions including municipal solid waste and biomass burning in the megacities and surrounding areas.

Keywords: Methane, carbon dioxide, PAHs, odd-even scheme, air quality management

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