



Emissions Inventory of Anthropogenic PM_{2.5} and PM₁₀ in Mega city, Delhi, India for Air Quality Forecasting during CWG- 2010

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The mega city of Delhi is the second largest urban agglomeration in India with 16.7 mio. inhabitants. Delhi has the highest per capita power consumption of electricity in India and the demand has risen by more than 50% during the last decade. Emissions from commercial, power, domestic and industrial sectors have strongly increased causing more and more environmental problems due to air pollution and its adverse impacts on human health. Particulate matter (PM) of size less than 2.5-micron (PM_{2.5}) and 10 micron (PM₁₀) have emerged as primary pollutants of concern due to their adverse impact on human health. As part of the System of Air quality Forecasting and Research (SAFAR) project developed for air quality forecasting during the Commonwealth Games (CWG) – 2010, a high resolution Emission Inventory (EI) of PM₁₀ and PM_{2.5} has been developed for the metropolitan city Delhi for the year 2010. The comprehensive inventory involves detailed activity data and has been developed for a domain of 70km×65km with a 1.67km×1.67km resolution covering Delhi and its surrounding region (i.e. National Capital Region (NCR)). In creating this inventory, Geographical Information System (GIS) based techniques were used for the first time in India. The major sectors considered are, transport, thermal power plants, industries, residential and commercial cooking along with windblown road dust which is found to play a major role for the megacity environment. Extensive surveys were conducted among the Delhi slum dwellers (Jhuggi) in order to obtain more robust estimates for the activity data related to domestic cooking and heating. Total emissions of PM₁₀ and PM_{2.5} including wind blown dust over the study area are found to be 236 Gg/yr and 94 Gg/yr respectively. About half of the PM₁₀ emissions stem from windblown road dust.

The new emission inventory has been used for regional air quality forecasts in the Delhi region during the Commonwealth games (SAFAR project), and they will soon be tested in simulations of the global atmospheric composition in the framework of the European MACC project which provided the chemical boundary conditions to the regional air quality forecasts in 2010.