AOGS 2005

Continuous measurement of gaseous pollutants at Anantapur a semi-arid zone in India

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Carbon monoxide (CO), nitrogen dioxide (NO_x) and surface ozone (O_3) play a central role in the oxidizing capacity of the atmosphere. Standard meteorological parameters and concentrations of these trace gases at Anantapur (14.62^0N; 77.65^0E; 331 mts a.m.s.l.), the drought prone area situated in the semi-arid zone, were monitored almost continuously from June 2001 to June 2003 by ground based ambient air analysers. Anantapur represents a very dry continental region of Andhra Pradesh, India and the climate is hot and dry in summer (March–May) hot and humid in rainy season (June-November) and dry in winter (December–February). Seasonal, monthly and diurnal variations of 15 minutes average are examined. In the monsoon and winter, dry deposition dominates; ozone values are relatively low with CO and O_3 negatively correlated. In the summer, photochemistry dominates; ozone values are relatively high, and CO and O_3 positively correlated. Ozone shows a yearly mean mixing ratio of 35 ppbv. The rate of increase in O_3 is greatest around 0830 hours local time, whereas the magnitude of the maximum rate of decrease during the evening is considerably smaller. This feature distinguishes the urban and rural sites since the magnitude of the rates during morning and evening are more similar at urban sites. During the course of our observations for this period the daytime concentration of CO varies between 200 to 1200 ppbv and that of NO_x varies between 3 to 20 ppbv. Diurnal variations in CO and NO_x are mainly due to local emissions, boundary layer process and local wind pattern. It is observed that NO_x concentration is maximum during the seasons monsoon and winter, whereas it is minimum in summer. Similarly CO concentration levels are high during the seasons monsoon and summer and low in winter.

Keywords: Carbon monoxide; nitrogen oxides; surface ozone; semi-arid zone.

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