

M.S.114. SUNEELA, S.S.—On the Climatological aspects of Air pollution potential over Trivandrum—1989—Dr. D.V. Viswanadam and Dr. H.S. Ram Mohan.

The study of air pollution potential is essential for any urban area in order to initiate remedial measures for the mitigation of air pollution. The main objective of the study is to provide the climatology of air pollution potential and to give the spatial distribution of sulphurdioxide concentration for Trivandrum. Sulphur dioxide is the single most important contaminant and is very effective even at low concentration.

A detailed study of atmospheric conditions for any urban area is essential since the dispersion and dilution of pollutants emitted into the atmosphere is solely governed by it. The extensive literature survey carried out as a part of the study emphasises the necessity of studying the climatological occurrence of inversions, isothermals, lapse conditions, mixing heights, ventilation coefficients, winds and stability. Since Gaussian model is the most widely used one, It was used for Trivandrum City and the spatial distribution of sulphur dioxide concentrations was studied.

To study the atmospheric pollution potential over Trivandrum, meteorological data for a five year period 1977 to 1981 was made use of. Data of emission inventory for all the factories in Trivandrum was also collected. The mixing height has also been determined for every hour on all days of the five year period according to the method developed by Holzworth (1964). Ventilation coefficients have been computed by multiplying mixing height with wind speed. Upper air temperature structure has been analysed and frequency table of inversions, isothermals and lapse conditions in every 50mb layer of the atmosphere from surface to 500mb level has been prepared. Pasquill stability categories have been determined for every hour for the entire period of study. The diurnal and the monthly variation of these parameters have been also been studied. Wind roses have been drawn on a monthly basis taking the surface wind for a five year period together by classfying them into sixteen direction classes and five speed classes. The climatology of air pollution potential has been studied in detail giving equal importance to each of the parameters involved. Using all the possible parameters such as mixing height, wind speed and atmospheric stability a new pollution potential index is developed and applied for Trivandrum City. By applying Gaussian plume model, the spatial distribution of sulphur dioxide concentrations over the city has been determined and represented diagrammatically for each month.

The occurrence of inversions and isothermals over Trivandrum is not in considerable frequency as to cause any adverse effect of pollution. Studies of

mixing heights and ventilation coefficients show that these values are negligibly small during night-time compared to daytime. Wind is maximum during southwest monsoon season and is mainly from the northwestern sector. During night-time except in the monsoon season calm conditions comes to about 75%. Studies on atmospheric stability show that stable conditions which have an adverse effect on the dispersal of pollutants are observed only during night-time and unstable conditions during daytime. It is seen that wind direction fluctuation range can be taken as a measure of surface turbulence. Studies on pollution potential index suggest February as the most favourable month for the dispersion of pollutants. The isopleth analysis for studying the spatial distribution of sulphur dioxide concentrations over Trivandrum suggests the northeastern part of the city as the optimum location for further industries.