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HOW AIR POLLUTANTS BEHAVED ON THE DAY OF THE SOLAR ECLIPSE ON 16 FEBRUARY 1980

An arrangement was made to monitor air at Pune to measure the concentration variation of air pollutants such as sulphur-dioxide, nitrogen-dioxide, ozone and Ammonia on 16 February 1980, the day of eclipse. Air sampling was arranged on the terrace of Ramdurg House Annexe during the period from 14 to 18 February 1980. The air was aspirated, at chosen intervals, through suitable absorbers during the above period. The apparatus used during air sampling and analysis were, glass midget impingers, air pump, air flowmeter, thermometer, spectrophotometer etc. Analytical methods used are given below :

- (1) Sulphur-dioxide (SO_2) : West and Gaeke method.
- (2) Nitrogen-dioxide (NO_2) : Saltzman method
- (3) Ozone (O_3) : Neutral buffered potassium iodide Method.
- (4) Ammonia (NH_3) : Phenol hypochlorite method.

2. The air pollutants behaved in a normal way during the period of eclipse. Sulphur-dioxide concentration varied between trace & 0.006 ppm. The concentrations of nitrogen-dioxide, ammonia and ozone were between 0.082 and 0.499 ppb, 0.361 and 1.536 ppb and 08.16 and 48.47 ppb respectively during air monitoring period. It is interesting to note that concentration of SO_2 , NO_2 , NH_3 and O_3 were below the background level (Table 1). However, the concentrations of suspended particulates were between 20.8 and 301.4 $\mu\text{g}/\text{m}^3$ (Table 2). These concentrations are above the usual range (10 to 20 $\mu\text{g}/\text{m}^3$) of suspended matter in clean mountain air. It can be seen from Fig. 1 that the diurnal variation of surface ozone closely follows the diurnal variation of surface temperature. A close correlation is also observed between wind and ozone concentrations. With the advance of the day and rise in air temperature, turbulence and mixing in the lower layers increase, with a resultant increase in the rate of replenishment of ozone from the above and hence increase in concentration in near ground. During night, replenishment of ozone is weak or very small, and it was maximum during 1200 - 1800 IST.

3. The concentrations of sulphur-dioxide, nitrogen-dioxide, ammonia, ozone and suspended particulates did not show any change on the day of eclipse. The concentrations of all the pollutants except suspended matter were below the background levels. It can also be seen that the pollutants released by the various industries did not affect the air-quality of the place of air monitoring programme.

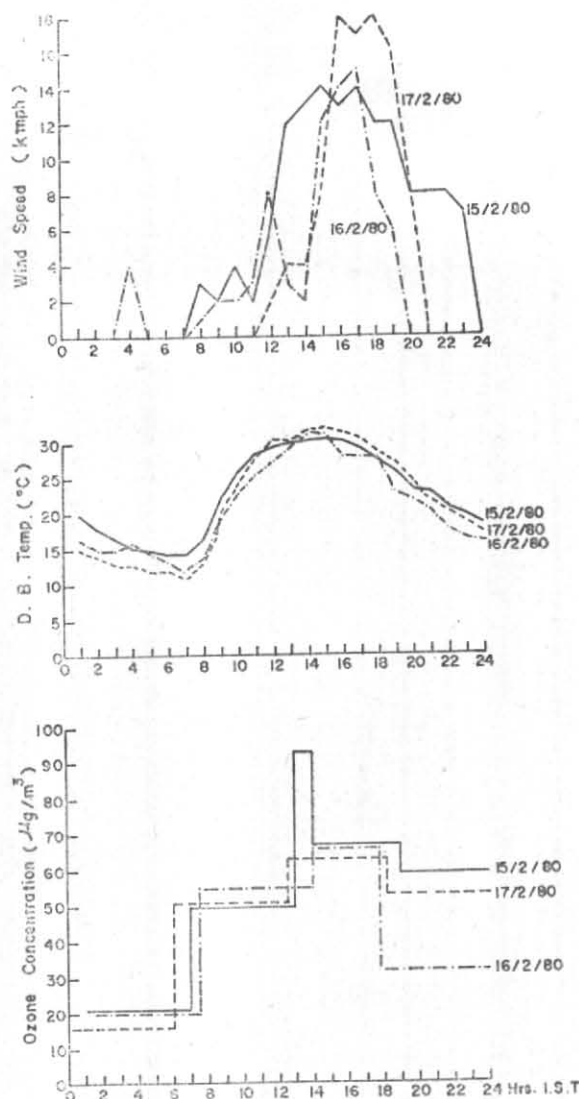


Fig. 1

TABLE 1
Background levels

Particulates	Concentration
Ozone (O_3)	00 to 0.07 ppm (ground level)
Sulphur-dioxide (SO_2)	0.002 to 0.01 ppm
Nitrogen-dioxide (NO_2)	0.5 to 4.0 ppb
Ammonia (NH_3)	6 to 20 ppb
Suspended Particulate	10 to 20 $\mu\text{g}/\text{m}^3$

4. The authors are grateful to Dr. R. P. Sarker, Deputy Director General of Meteorology (Climatology & Geophysics), Pune for his keen interest in

TABLE 2
Suspended particulates

Date (Feb 1980)	Time	Du- ra- tion (hr)	Net wt.	Mean flow rate	$\mu\text{g}/\text{m}^3$
15	1530-1715	2	0.0223	33	202.3
	1720-0120	8	0.0363	25	108.7
16	*0125-0735	6	0.0142	30	47.2
	0740-1040	3	0.0151	10	301.4
	1045-1310	2.25	0.0021	25	20.8
	1315-1730	4.15	0.0230	40	81.0
17	0030-0630	6	0.0225	—	—
	0640-0940	3	0.0188	19.0	197.5
	1000-1300	3	0.0174	24.2	143.5
	1300-1600	3	0.0081	43.5	37.1
	1615-2015	4	0.0187	23.5	119.1
	2030-2330	3	0.0146	—	—
18	0005-0600	6	0.0184	23.5	78.1
	0610-0910	3	0.0228	23.3	195.3
	0930-1230	3	0.0262	22.0	237.7

*Period of eclipse from 2.20 P.M. to 4.52 P.M. on 16 February 1980.

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