P R E F A C E

The studies on atmospheric ozone and night airglow incorporated in the thesis are grouped into two sections, one on atmospheric ozone (Chapters 1-8) and the other on night airglow (OI) 5577 Å (Chapters 9-11).

Section I - STUDIES ON ATMOSPHERIC OZONE

The results of ozone measurements, surface and total ozone and the distribution of ozone in the vertical, made at Srinagar/Gulmarg (34°N) during June 1955-December 1960 are given in Chapter 1. The ozone measurements made at Hyderabad (17°N) in March-April 1961 are reported in Chapter 2 (reprint). Chapter 3 consists of two notes (reprints), in which our work on a possible ozone increase at night are reported. Observations were made simultaneously on three pairs of wavelengths and the attenuation due to large particle scattering was considered. Observations made at Ahmedabad during 1962-64 on second and third umkehrs occurring during the twilight period are reported in Chapter 4. The second hump in the curve of $N_\lambda$ against $Z^4$ is accentuated when the twilight glow due to atmospheric aerosols is enhanced.

Chapters 5-8 are devoted to the study of biennial and larger-period variations in atmospheric ozone. The latitudinal extent of the biennial oscillations in ozone data, and regularity in occurrence of phase-shifts are considered in Chapters 5, 6 and 7. Correlation between the biennial variations in ozone and
stratospheric zonal winds, stratospheric warmings are discussed in Chapter 7. Ozone variations in relation to geomagnetic activity are discussed in Chapter 8. 11-year cycles in ozone variations are found to be correlated with solar cycle changes in geomagnetic activity.

Section II - STUDIES ON NIGHT AIRGLOW (OI) 5577 Å

Results of night airglow measurements made at Srinagar during March 1958-November 1960 are presented in Chapter 9 (reprint). Mean nocturnal variations of (OI) 5577 Å intensity (I_{5577}) observed at Srinagar are compared with those observed at other stations situated along 75°E meridian in Chapter 10. The results suggest meridional movements of bright airglow patch between equator and about 30°N latitude in course of a night. This however requires further observations.

Some observational results on time-variation and latitudinal distribution of I_{5577} suggesting influence of magnetic activity are reported in Chapter 11. Significant positive correlation is found to exist between year-to-year variations of I_{5577} and 11-year cycle in magnetic activity. The observational material used in Chapter XI is very inhomogeneous and the results obtained therefore be regarded as exploratory and tentative.

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