

I. PHYSICS

Astrophysics (Atmospheric Ozone)

STUDY OF ATMOSPHERIC OZONE VARIATIONS IN THE STRATOSPHERE AND MESOSPHERE DURING THE SOLAR ECLIPSE

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THE aim of the experiment was to measure the ozone concentration profiles over Thumba in the altitude range, 10km to about 79km under normal conditions and during the eclipsed conditions. In the upper atmosphere, ozone is controlled directly by photochemistry above an altitude of about 40km. The time constants are determined by solar radiation incidence as well as a number of chemical reactions in which several atmospheric species (whose abundance are not accurately known) take part and hence are not known precisely. One of the aims of the experiment was to determine the altitude above which the ozone concentrations change during the eclipse.

Keywords : Atmospheric Ozone; Photochemistry; Solar Blind Photodiode.

EXPERIMENT

Equipment

The instrument consists of a rocket borne solar middle ultraviolet photometer which measures the attenuation profile of the UV radiation from the sun in three wavelength bands; $250 \pm 8\text{nm}$ and $310 \pm 10\text{nm}$, in the upper atmosphere. Since ozone is the main absorbing species in the earth's atmosphere at these wavelengths, the measured attenuation profile can be used to calculate ozone concentrations in the upper atmosphere over an altitude region extending from 10km to about 70km. The actual instrument consists of a collimator, interference filter, and ultraviolet sensitive solar blind photodiode with associated electronics.

RESULTS

Three instruments were flown on Centaur rockets from Thumba (8°N , 76°E), two on February 16, 1980, one at 1454hr when the solar obscuration was 40 per cent, the second at 1522hr when the solar obscuration was 70 per cent. The third instrument was flown as a control experiment on February 17, 1980, at 1522 hr. All the three experiments have yielded good quality data which are still under analysis.