

UPPER ATMOSPHERE TEMPERATURE MEASUREMENTS USING  
AIRGLOW PHOTOMETER ON BOARD A ROCKET

H. Takahashi, B.R. Clemesha, P.P. Batista and Y. Sahai

ABSTRACT

One of the most useful techniques to observe neutral atmosphere temperature in the mesopause region, between 80 to 100 km, is to measure the molecular rotational temperature of the oxygen emission,  $O_2(0.1)$  atmospheric band at 762.0 nm and the OH vibration-rotation band, for example OH(9,4) band at 775.0 nm (ref.1). Ground based observations in these emissions have been carried out from various stations around the globe and their nocturnal and seasonal variations have been studied (ref. 2,3). The ground-based observations, however, can not provide information regarding the height of the emission layer. Photometers on board a rocket, measuring in situ the emission spectra makes it possible to observe the height profile of the emissions and their rotational temperatures. These measurements have been carried out only in the auroral region (ref. 4). The scientific background for carrying out these measurements from an equatorial and/or mid-latitude region and instrumentation to be used will be discussed.

REFERENCES

1. BATTANER, E. et al. Temperature measurements of the high atmosphere by optical methods. *Annales Geophysicae*, 2, 67-72, 1984.
2. TAKAHASHI, H. et al. Airglow  $O_2(^1\Gamma)$  atmospheric band at 8645Å and the rotational temperature observed at 23°S. *Planet. Space Sci.*, 34, 301-306, 1986.
3. MYRABO, H.K. Temperature variation at mesopause levels during winter solstice at 78°N. *Planet. Space Sci.*, 32, 249-255, 1984.
4. DEANS, A.J. and SHEPHERD, G.C. A rocket measurement of thermospheric temperatures derived from molecular rotational intensity distributions in the Aurora. *Planet. Space Sci.*, 31, 1137-1145, 1983.