THE MEASUREMENT OF THE ATMOSPHERIC MINOR CONSTITUENTS BY INFRARED SPECTROSCOPY (Abstract)

Hisafumi MURAMATSU*, Yukio MAKINO*, Michio HIROTA*,

*Upper Atmosphere Physics Research Division, Meteorological Research Institute, 1-1, Nagamine, Yatabe-machi, Tsukuba-gun, Ibaraki 305

Tohru SASAKI*, Sadao KAWAGUCHI** and Takashi YAMANOUCHI**

**National Institute of Polar Research, 9-10, Kaga 1-chome, Itabashi-ku, Tokyo 173

The water vapor content in the atmosphere was measured by Fourier transform infrared spectroscopy. The relationship between the transmittance and the column density of the water vapor was calculated theoretically for the selected lines from 5700 to 5900 cm^{-1} using the line parameters. The column densities in the atmosphere were deduced from the peak transmittances in the observed solar spectrum using this relationship. The results were compared with those obtained from radiosondes. The agreement was within 20%.

It has been revealed that the difference of the resolution for the observed spectral line from that assumed in the theoretical calculations of the transmittance has a large effect on the accuracy. The apodization applied to the interferogram to reduce the side lobe of the spectrum has also a large effect on the results.

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BALLOON MEASUREMENTS OF AEROSOLS IN THE ANTARCTIC STRATOSPHERE (Abstract)

Yasuhiro MORITA*, Yasunobu IWASAKA** and Akira ONO**

*Research Institute of Atmospherics, Nagoya University, 3-13, Honohara, Toyokawa 442

**Water Research Institute, Nagoya University, Furo-cho, Chikusa-ku, Nagoya 464

Balloon measurements of aerosols made until now in the Antarctic stratosphere are first reviewed briefly. The second part of this report describes the apparatus used in the balloon and aircraft measurements of aerosols which are carried out in the 24th Japanese Antarctic Research Expedition. The apparatus is a light-scattering aerosol particle counter which is based on a commercial type and improved to be suitable for the balloon measurements in the Antarctic stratosphere. The particle counter is essentially a dark field microscope with a sensitive photomultiplier as a detector. The photomultiplier detects the light scattered by individual aerosol particles in sampled air when they pass through the focal point of optical system. The height of detected pulse is a function of size and refractive index of the particles, and the rate of pulse counting indicates the particle number density. Two pulse height descriminators are used for counting the particles having the diameter $\geqq 0.3$ μm and $\geqq 0.5$ μm, respectively, for the refractive index of 1.40. Thus a rough indication of the size distribution is obtained. The construction and calibration of the light-scattering aerosol particle counter are also described.

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