those measured previously by several investigators in the antarctic region. The aerosol optical thickness at $\lambda=500$ nm was about 0.08 as an average of the observed values for the period from January to April 1984, while it decreased to about 0.04 for the period from September 1984 to January 1985.

Angular distributions of the scattered radiation in the solar aureole region were measured by an aureolemeter, *i.e.* a wide-dynamic-range scanning radiometer with filters of the same wavelengths as the sunphotometer. The instrument is designed to be able to measure direct-solar and scattered sky radiances simultaneously in all directions. We found that the diffuse-to-direct radiation ratio in the solar almucantar divided by the optical airmass, which is approximately proportional to the optical thickness determined by the sunphotometry, also decreased in the summer of 1985 to about one half of the value in the summer of 1984.

Volume spectra of columnar aerosols were obtained by inverting the spectral extinction data and the solar aureole data simultaneously. It was found that the mono-modal volume spectrum with mode radius of about 0.4 μm was dominant throughout the year and that the loading of giant particles ($r>1$ μm) was enhanced relatively in autumn and spring.

Measurements of the sky brightness distribution were carried out for the period from August 1984 to January 1985. Comparisons between observed and calculated distributions of the brightness and the degree of polarization in the solar principal plane showed that the representative value of the surface albedo around Syowa Station was about 0.8 in early summer, and about 0.7 in midsummer.

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BALLOON MEASUREMENT OF AEROSOLS IN THE ANTARCTIC STRATOSPHERE (II) (ABSTRACT)

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A balloon measurement of aerosols has been made in the summer of 1984 to investigate the behavior of the polar stratospheric aerosols. Number concentration and the size distribution of Mie particle (aerosol particles with diameter greater than 0.3 μm) were measured by using a light scattering aerosol particle counter. The counter has two pulse height discriminators to differentiate the size of the particles having the diameter greater than 0.3 and 0.5 μm, respectively, for the refractive index of 1.40. A rough indication of the size distribution is obtained from the size ratio.

The vertical distribution of the number concentration and the size distribution were obtained up to about 13 km on December 18, 1984. Compared with the result of the measurements on June 3 and October 16, 1983, the present result indicates the low concentration at stratospheric heights. This shows that the seasonal variation of aerosol concentration exists clearly in the antarctic stratosphere. The concentration was found to be slightly higher than that usually appeared during the low volcanic period in the summer season. This indicates that the aftereffect of El Chichón eruption still remains in the antarctic stratosphere. The aerosol count ratio of two size ranges shows small values in the stratosphere.

The low values suggest that the size distribution with large particles dominates in the stratosphere.

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MICROPHYSICS ON WINTER ENHANCEMENT OF ANTARCTIC STRATOSPHERIC AEROSOL: HYDRATION OF SULFURIC ACID DROPLETS (ABSTRACT)

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Backscattering coefficient and depolarization ratio of the Antarctic stratospheric aerosols were observed by a lidar at Syowa Station (69°00′S, 39°35′E) in 1983. Their values increased extremely as the winter progressed, which suggests that most of the stratospheric particles had nonspherical shapes (possibly ice crystal particles) in winter.

The freeze-out of ice from diluted sulfuric acid droplets is possibly an important process controlling the winter enhancement of Antarctic stratospheric aerosols.

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OBSERVATIONS OF WAVE, MEAN-FLOW INTERACTIONS IN THE SOUTHERN HEMISPHERE TROPOSPHERE AND STRATOSPHERE: A COMPARISON WITH THE NORTHERN HEMISPHERE (ABSTRACT)

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Characteristic features of the flow and wave, mean-flow interactions in the Southern Hemisphere troposphere and stratosphere are studied. An emphasis is placed upon the comparison of the stratospheric final warmings occurring in the two hemispheres. The dataset for this study consists of the NMC 1200 GMT analysis between 0.4 and 1000 mb during 1982. The transformed Eulerian mean diagnosis is used for examining the wave, mean-flow interaction.

The final warming occurred around March 31 in the Northern Hemisphere and around October 20 in the Southern Hemisphere. The final warming in the Southern Hemisphere is more rapid and intense, which is consistent with the fact that the planetary scale wave activity in the Southern Hemisphere is more intense than that in the Northern Hemisphere during the spring season.

In the Southern Hemisphere the polar easterly did not descend below 10 mb after the final warming, while the polar easterly kept descending to 50 mb in the Northern Hemisphere. The equatorial easterly in the lower stratosphere had extended and been connected to the polar easterly in the upper stratosphere of the Southern Hemisphere, while the connection was not observed in the Northern Hemisphere. It is found that both warmings were associated with the enhanced