YEAR-TO-YEAR CHANGES OF THE TROPOPAUSE HEIGHT AT SYOWA, ANTARCTICA—A POSSIBLE RELATION TO THE OZONE HOLE—(ABSTRACT)

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The tropopause height is sensitive to the temperature change in the troposphere, which is controlled by moist convection and heat flux by baroclinic waves, and also to the temperature changes in the lower stratosphere which are controlled by radiative and chemical heating and heat flux by planetary waves. Since the ozone hole has occurred in the Antarctic lower stratosphere, the changes of tropopause height at Syowa possibly provide evidence of circulation changes relating to ozone depletion.

Long-term mean seasonal changes of tropopause height at Syowa, which were observed during 21 years from 1966 to 1987, are that the maximum height appeared in winter and spring, and the minimum, in summer; the height is negatively correlated with temperature in the lower stratosphere. Furthermore, year-to-year changes of the October total ozone correlate well negatively with the rise of the tropopause height. These results are considered to show that the tropopause height can be an index of changes related to ozone depletion.

From comparison of the year-to-year variation of the tropopause height, it is found that the height of 1987 is higher than that of 1975 during all seasons; the most remarkable changes are seen in spring. These remarkable changes are mainly due to temperature decline in the lower stratosphere above 300 mb relating to the ozone depletion, and slightly due to temperature rise in the troposphere: these characteristics are obtained from comparison of the vertical profiles of temperature. The results suggest that temperature changes in the troposphere and lower stratosphere in all seasons could contribute to the ozone depletion condition.

More detailed analysis of the tropopause height could elucidate the circulation changes relating to the ozone hole.

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MEASUREMENTS OF THE NUMBER CONCENTRATION OF AEROSOL PARTICLES IN NORTHERN NORWAY (ABSTRACT)

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The number concentrations of aerosol particles in five size ranges were measured continuously using a particle counter (Rion, KC-01B) in Arctic Norway for one month in midwinter in 1987/1988. Samples of aerosol particles were collected on filter paper, and the chemical composition