

this variation occurred are almost the same as those of the Arctic response. The differences of the date and tendency between the Arctic and Antarctic responses cause no problem, because the same disturbance can cause the opposite direction of the heat flux, if the basic state is different. This variation in Antarctica must have the same origin as the Arctic response.

(Received April 8, 1983)

UPPER STRATOSPHERIC CIRCULATIONS: A COMPARISON BETWEEN THE NORTHERN AND SOUTHERN HEMISPHERES (Abstract)

Masato SHIOTANI and Isamu HIROTA

Geophysical Institute, Kyoto University, Sakyo-ku, Kyoto 606

By the use of observations from Nimbus-5 and TIROS-N/NOAA satellites the upper stratospheric circulations are investigated, especially by paying attention to the differences between the Northern Hemisphere (N.H.) and the Southern Hemisphere (S.H.).

One of the most notable features of the thermal structure in the upper stratosphere is the reversal of north-south gradient of the zonal temperature observed in higher latitudes of the S.H. in late winter. This pattern regularly appears every year in the S.H., while it is highly variable in the N.H. because of the occurrence of sudden warmings.

From the statistical analysis, it is found that variability of the zonal mean temperature is much different between the two hemispheres: The increase of the S.H. temperature is highly oscillatory throughout the period from winter to summer, whereas the temperature in the N.H. increases abruptly in midwinter and rather gradually from spring to summer. In association with the temperature variation, the transient planetary waves of wavenumber 2 are predominant in the S.H., in contrast to the dominant steady waves in the N.H.

It is also found that these characteristics of thermal field and wave activity are closely connected with the seasonal variation of zonal mean wind in the stratosphere.

For details, the reader may refer to the full paper of this work (HIROTA *et al.*: Q. J. R. Meteorol. Soc., **109**, 443, 1983).

(Received March 30, 1983)

SEASONAL VARIATION OF THE VERTICAL GRADIENT OF GLOBAL MEAN TEMPERATURE IN THE UPPER STRATOSPHERE (Abstract)

Hiroshi KANZAWA

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

Seasonal variation of the vertical gradient of global mean temperature in the upper stratosphere is investigated with the use of the data from the top channels of Nimbus 5 Selective Chopper Radiometer (SCR) for two years from 1973 to 1974 on daily basis. As the index of the temperature gradient is introduced the