ON THE NET HEATING OF AURORAL JET CURRENTS IN THE POLAR MESOPAUSE REGION (ABSTRACT)

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Assuming that the cooling-to-space of the atmosphere in the mesopause region around 100 km altitude is caused by CO_2 15 μm band radiation, the efficiency is reduced to one twentieth or less that calculated on the condition of local thermodynamic equilibrium (J. T. HOUGHTON: The Physics of Atmospheres, 2nd ed., Cambridge, Cambridge Univ. Press, 57, 1986).

The amount of joule heating in this region of auroral belt during substorm period is calculated from ground based magnetometer observations (Y. KAMIDE and A. D. RICHMOND: Geophys. Monogr., **28**, 67, 1984).

Combining the above mentioned cooling and heating effects one can calculate the amount of net heating.

The result shows that 1.3°K warming, which should require one day before cooling, may be attained by only one hour substorm duration.

This may have significance in considering the dynamical effect of solar activity in the global atmosphere such as discussed by K. LABITZKE and H. VAN LOON (J. Atmos. Terr. Phys., **50**, 197, 1988).

(Received November 27, 1989; Revised manuscript received April 2, 1989)

MID-WINTER WARMINGS IN THE SOUTHERN HEMISPHERE STRATOSPHERE IN 1988 (ABSTRACT)

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An analysis was done of intense midwinter warmings which took place in the southern hemisphere stratosphere during August–September 1988. By using the southern hemispheric data set up to the 1 mb level provided by Japan Meteorological Agency, it is found that the 30 mb temperature increase over eastern Antarctica, about 60 K for 10 days from August 22 to September 1, is associated with the amplification of a quasi-stationary planetary wave of zonal wavenumber 1. The enhancement of wave 1 appears quasi-periodically with a times scale of about 2 weeks during the mid-winter of 1988. Clear evidence is presented to show that the quasi-periodic amplification of wave 1 is due to the wave-wave interaction between the quasi-stationary forced wave of wavenumber 1 and the eastward traveling wave of wavenumber 2. It is emphasized, therefore, that the mechanism of warming in this case is quite different from the transient vertical propagation of a planetary wave forced from below as observed in the northern hemisphere winter.

(Received September 28, 1989)