

Research on the lower thermospheric wind during geomagnetically active periods

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This paper reports effects of the geomagnetical disturbance on the lower thermospheric wind on statistical basis. When searching for electrodynamic effects due to enhanced ion drag or Joule heating on the neutral wind we find that it is an absolute necessity to have established a good knowledge of the background neutral wind pattern in an undisturbed ionosphere. This is why we have been studying the lower thermospheric wind dynamics for geomagnetical quiet time. Based on the data obtained by the European Incoherent Scatter (EISCAT) UHF radar located in the northern Scandinavia, Nozawa and Brekke [1999a, 1999b] have studied neutral wind characteristics in the lower thermosphere between 95 and 119 km under geomagnetically quiet conditions (A_p less than 16) over a solar cycle between November 1986 and October 1996. Data of 56 days were analyzed and grouped in order to investigate variations of the wind in different seasons and solar cycle conditions. Seasonal and solar cycle dependences of mean winds as well as diurnal and semidiurnal amplitudes were found. For example, zonal mean wind blows eastward almost all the times and its amplitude maximizes at 95 km and becomes stronger (about 40 m/s) than that in winter (about 20 m/s).

In this study, we have analyzed EISCAT CP-1 and CP-2 data of about 100 days obtained over 13 years occurring between January 1987 and December 1999. Data are sorted according to season and geomagnetical activity. By comparing wind data for quiet and active times in each season, we will discuss the effects of the geomagnetical disturbance on the lower thermospheric dynamics.

References:

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