# Statistical study on high-speed neutral winds observed in the lower thermosphere over Longyearbyen (78.2 deg N)

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Of vital importance is to qualify significance of the magnetospheric forcing (such as the Joule heating and the ion drag) to the polar lower thermospheric wind dynamics, in order to obtain better understanding of the Magnetosphere-Ionosphere-Thermosphere (MIT) coupling process.

Several measurements by Incoherent Scatter (IS) radars and Fabry-Perot Interferometers (FPIs) demonstrated neutral winds with speeds exceeding 300 m/s in the polar lower thermosphere during geomagnetically active intervals. The wind speeds are significantly larger than a typical wind speed (less than 200 m/s). This suggests that the magnetospheric forcing generates such high-speed neutral winds. A case study determined contributions of the Joule heating and the ion drag on the generation of a high-speed neutral wind (~500 m/s, at 118 km), and suggested that the Joule heating was a major important factor. However, general characteristics of the high-speed neutral winds are little known.

In this study, we have investigated general characteristics (e.g., occurrence rate) of the high-speed neutral winds based on wind data sets of ~63 days obtained from 1998 to 2005 with the European Incoherent SCATter (EISCAT) Svalbard Radar (ESR) located in Longyearbyen (78.2 deg N, 16.0 deg E in geographic coordinates, 75.2 deg in invariant latitude). Among the wind data of 17302 counts at 117-118 km height, ~71% of the data exhibits speeds of less than 200 m/s. On the other hand, some wind data have speeds of more than 300 m/s, and its occurrence rate is ~12%. In the presentation, we will show these results as well as the local-time distribution of the high-speed neutral winds (with speeds of more than 300 m/s), and discuss the generation of the high-speed neutral winds.