

## Mean wind and atmospheric tide in the polar mesosphere (1)

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To understand the atmospheric dynamics in the polar mesosphere/lower thermosphere more deeply, we have investigated mean winds as well as atmospheric waves such as planetary, tidal and gravity waves based on wind data obtained with MF radars, meteor radars and EISCAT radars. In this talk, based on MF radar wind data obtained at Tromsø (69.58 deg N, 19.22 deg E) and Poker Flat (65.1 deg N, 147.5 deg W), we report characteristics of mean wind as well diurnal and semidiurnal amplitudes and phases in the polar mesosphere between 70 and 91 km. At now, we have analyzed wind data from November 1998 to January 2003. We averaged wind data according to time and altitude, and made a 1-month averaged wind data as a function of time and altitude. Then, we computed mean wind values and derived diurnal and semidiurnal amplitudes and phases. Results are summarized as follows:

(1) Mean wind. (a) Similar variations in time are found over the 4 years. (b) Between 82 and 91 km, at Tromsø a semiannual variation is found: the meridional mean wind blows southward with an amplitude of 10 m/s in summer and winter, while it blows northward or close to 0 in spring and fall. At Poker Flat in the same altitude region, the meridional mean wind blows southward in summer as well, but it is northward from fall to spring. (c) At and below 85 km, the zonal mean wind exhibits an annual variation: it blows westward with its maximum amplitude 30-40 m/s in summer and eastward with its maximum about 20 m/s in winter. The westward wind amplitude is stronger by about 10 m/s at Poker Flat than at Tromsø.

(2) Diurnal tide. (a) The diurnal amplitude exhibits a similar annual variation over the four years. (b) At Tromsø at and above 79 km, the amplitude is stronger (10-15 m/s) in summer and weaker (about 5 m/s) in winter. (c) At Poker Flat, the amplitude does not exhibit a clear seasonal variation, but it is about 5-10 m/s through a year. (d) The corresponding phase values of the meridional component, where the phase stands for a local time of northward maximum, are about 12 LT through a year, and a year-to-year variation of the phase is not significant. (e) For phase values of the zonal component, where the phase stands for local time of eastward maximum, their variation in time is less significant as well.

(3) Semidiurnal tide. (a) The amplitude tends to increase with altitude increasing, and it is about 5 m/s at 70 km and about 15-20 m/s at 91 km. (b) At Tromsø, the amplitude maximizes in September over the 4 years, and also it becomes stronger in January and February. (c) At Poker Flat, the amplitude does not vary in time significantly except for April when its amplitude is the weakest through a year over the 4 years. (d) At Tromsø, phase values exhibit a similar variation in time over the 4 years and the difference of year-to-year values are less than 3 hours. (e) At Poker Flat, a similar tendency with that of Tromsø is found, but it varies largely in April.

We will report these results and discuss the difference between the two sites.