

SODIUM LIDAR MEASUREMENTS OF ZONAL MOMENTUM FLUX IN THE POLAR WINTER MESOPAUSE REGION

BIFFORD P. WILLIAMS 1, David C. Fritts 1, Bernd Kaifler 2, Ulf-Peter Hoppe 2

1 NorthWest Research Associates, Colorado Research Associates Division, Boulder, Colorado, USA, e-mail: biff@cora.nwra.com

2 Norwegian Defence Research Establishment, Kjeller, Norway, e-mail: Ulf-Peter.Hoppe@ffi.no

The zonal momentum flux in the mesosphere and lower thermosphere region is believed to be an important driver of the polar temperature structure, but measuring the flux requires higher temporal resolution than most radars and lidars can obtain. The Weber sodium lidar has been making wind and temperature measurements at ALOMAR, Norway (69N, 16E) since August 2000, including zonal momentum flux measurements during the winters from 2004 to 2009 with typical resolution up to 1-3 min and 1 km with 1 m/s random radial wind error from 85 to 95 km altitude. This resolves the short period waves believed to carry most of the flux. The dynamics at this location feature a large and variable semidiurnal tide in the upper-mesosphere with amplitudes of up to 120 m/s that may influence gravity wave momentum deposition. Variability in the filtering of the gravity waves at lower altitudes is likely, especially with the large changes associated with episodic stratospheric warmings during the winter measurement periods. In this presentation, we will present the mean of wintertime momentum flux from all the measurements. We will also investigate the day-to-day and year-to-year variability in the context of the tides and lower atmosphere conditions.

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Bifford P. Williams, NorthWest Research Associates, Colorado Research Associates Division, 3380 Mitchell Lane, Boulder, Colorado, 80301 USA, tel: 001-303-415-9701x243, fax: 001-303-414-9702, e-mail: biff@cora.nwra.com