Home
Online Library ACP
- Recent Final Revised Papers
- Volumes and Issues
- Special Issues
- Library Search
- Title and Author Search

Online Library ACPD
Alerts & RSS Feeds
General Information
Submission
Review
Production
Subscription
Comment on a Paper

Volumes and Issues | Contents of Issue 3

Atmos. Chem. Phys., 8, 749-755, 2008
www.atmos-chem-phys.net/8/749/2008/

The wintertime two-day wave in the polar stratosphere, mesosphere and lower thermosphere

D. J. Sandford[1], M. J. Schwartz[2], and N. J. Mitchell[1]
[1]Centre for Space, Atmospheric & Oceanic Science, Department of Electronic and Electrical Engineering, University of Bath, Bath, BA2 7AY, UK
[2]Microwave Atmospheric Science Group, Jet Propulsion Laboratory, 4800 Oak Grove Dr, Pasadena, CA 91109-8099, USA

Abstract. Recent observations of the polar mesosphere have revealed that waves with periods near two days reach significant amplitudes in both summer and winter. This is in striking contrast to mid-latitude observations where two-day waves maximise in summer only. Here, we use data from a meteor radar at Esrange (68° N, 21° E) in the Arctic and data from the MLS instrument aboard the EOS Aura satellite to investigate the wintertime polar two-day wave in the stratosphere, mesosphere and lower thermosphere. The radar data reveal that mesospheric two-day wave activity measured by horizontal-wind variance has a semi-annual cycle with maxima in winter and summer and equinoctial minima. The MLS data reveal that the summertime wave in the mesosphere is dominated by a westward-travelling zonal wavenumber three wave with significant westward wavenumber four present. It reaches largest amplitudes at mid-latitudes in the southern hemisphere. In the winter polar mesosphere, however, the wave appears to be an eastward-travelling zonal wavenumber two, which is not seen during the summer. At the latitude of Esrange, the eastward-two wave reaches maximum amplitudes near the stratopause and appears related to similar waves previously observed in the polar stratosphere. We conclude that the wintertime polar two-day wave is the mesospheric manifestation of an eastward-propagating, zonal-wavenumber-two wave originating in the stratosphere, maximising at the stratopause and likely to be generated by instabilities in the polar night jet.

Final Revised Paper (PDF, 1516 KB) Discussion Paper (ACPD)

Citation: Sandford, D. J., Schwartz, M. J., and Mitchell, N. J.: The wintertime two-day wave in the polar stratosphere, mesosphere and lower thermosphere, Atmos. Chem. Phys., 8, 749-755, 2008. Bibtex EndNote Reference Manager

Search ACP
Library Search
Author Search

News
- Sister Journals AMT & GMD
- Financial Support for Authors
- Journal Impact Factor
- Public Relations & Background Information

Recent Papers
01 | ACPD, 03 Nov 2008: Anthropogenic influence on SOA and the resulting radiative forcing

02 | ACPD, 03 Nov 2008: Evidence of mineral dust altering cloud microphysics and precipitation

03 | ACPD, 03 Nov 2008: Technical Note: A new method for the Lagrangian tracking of pollution plumes from source to receptor using gridded model output

04 | ACPD, 03 Nov 2008: