

Spatio-temporal structure of gravity waves in the upper atmosphere revealed in meteor radar observations at King Sejong station, Antarctica

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Meteor radar at King Sejong station, Antarctica (62.2°S, 58.8°W), can provide information on horizontal wind in the altitude range of 80-100 km for the horizontal area of about 250 km in radius. Horizontal velocities are obtained from radar echoes back-scattered from meteor trails irregularly generated in the upper atmosphere, and hence the retrieved wind information is not contiguous in terms of the spatio-temporal distribution. The irregularly distributed wind components are regularly-gridded in space-time domain and fit in time to a smooth curve represented by a linear combination of cubic splines. Band-pass time filtering of the regularly gridded wind is used to obtain information on the spatio-temporal structure of the gravity waves (GWs) in the upper atmosphere. GWs revealed through the band-pass filtering are found to mostly exhibit the downward propagation of wave phases (i.e., upward energy propagation). The vertical wavelength of the observed GWs are roughly more than 10 km. Band-pass filtering of the regularly gridded wind data may also provide information on the horizontal propagation properties of GWs (e.g., phase speed, propagation direction and horizontal wavelengths). Further results will be presented at conference.