



Investigation of gravity wave propagation by Continuous Doppler sounding

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Multi-point continuous Doppler sounding is a useful tool to investigate internal gravity waves (GWs) propagating at ionospheric heights due to collisions between neutral particles and ionospheric plasma. We present several applications of Doppler sounding: a) analysis of GW propagation in 3D, which is based on multi-point continuous Doppler sounding at three different frequencies; sounding radio waves of various frequencies reflect at different altitudes. An advantage of this analysis is complete information about the GW propagation in 3D and about the attenuation of wave power with height. The disadvantage is a relatively small number of events that can be analyzed; critical frequency of the ionosphere foF2 has to be larger than the highest sounding frequency and also significant cross-correlation between signals reflecting at different altitudes is necessary. b) statistical analysis of observed horizontal propagation velocities of GWs in 2D. This is based on multi-point continuous Doppler sounding at single frequency. It is shown that horizontal directions of GWs exhibit a seasonal dependence associated with changes of neutral winds.