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Study of TID propagation parameters using Dynasonde measurements from Wallops Island, VA

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Travelling Ionospheric Disturbances (TIDs) are often caused by underlying Acoustic Gravity Waves (AGWs). It is generally assumed that the two phenomena share the same set of propagation parameters (frequency, wavevector components, etc) and as such, that TIDs follow the AGW dispersion relation. This study uses Dynasonde electron density and ionospheric tilt measurements from Wallops Island, VA, to investigate TID parameters in a range of ionospheric altitudes during June and November 2015. Spectral analysis is performed on the data at each individual altitude, and the results are used to determine the TID parameters associated with each time interval, altitude and frequency. The height-stratified statistical distributions of the vertical and horizontal wavelength, propagation direction and phase speed are determined and discussed. For several selected datasets, a procedure is demonstrated to autonomously identify individual wave-packets, based on the variation of the TID parameters over at least one wave period. Finally, for the selected wave packets, the propagation parameters and empirical model results are used to test the agreement with the gravity wave dispersion relation,