



Seasonal Variability of the Mid-Latitude Traveling Ionospheric Disturbances from Wallops Island, VA Dynasonde Data: Evidence of a Semi-Annual Variation

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We investigate the ionospheric variability due to travelling ionospheric disturbances (TIDs) over Wallops Island, VA, using Dynasonde derived measurements of ionospheric tilts and vertical Doppler speed between May 2013 and August 2016, covering the bottom-side ionospheric F-Layer. The mean power spectral density (PSD) is determined separately for each month for both ionospheric tilts and for the Doppler speed, with a 2 km resolution in a broad altitude range. This is accomplished using a spectral analysis technique based on the Lomb-Scargle and Welch methods, with an added filtering criterion. We then investigate the seasonal variability of the PSD integral and highlight a semi-annual variation in the overall level of TID activity, with increased activity during summer and winter seasons in the Northern hemisphere. This result provides a more complete picture than other recent publications that only highlighted a winter peak in the same geographical sector. Finally, the relative amplitude of the two peaks in TID activity is shown to vary significantly during the three years investigated and also as a function of the altitude.