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Statistical analysis between Travelling Ionospheric Disturbances (TIDs) and SuperDARN Near Range Echoes (NREs)

The Super Dual Auroral Radar Network (SuperDARN) forms a global network of coherent high frequency (HF) radars located at mid- to high latitudes. Atmospheric gravity waves (AGWs) are ubiquitous throughout the atmosphere and can transport enormous energy and momentum from above or below into the mesosphere. AGWs are readily detected by HF radars as Travelling Ionospheric Disturbances (TIDs) (Oinats et al., 2015). Different mechanisms cause SuperDARN Near Range echoes (NREs) around 100 km altitude. By using cross-correlation and statistical significance analysis, a moderate correlation between the two phenomena was found (Rauf et al., 2019). TIDs amplitudes, wavelengths and velocities are estimated to be 5-15 km, 15-75 km, and 30-70 m/s, respectively (He et al., 2004). The cross-correlation between the TID-perturbed electric field and SuperDARN backscatter power shows a good correlation.

References

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Apply to be considered for a student ; award (Yes / No)?

Yes

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PhD

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