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Investigation of traveling ionospheric disturbances (TIDs) using SANAE SuperDARN radar

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Travelling Ionospheric Disturbances (TIDs) are an ionospheric manifestation of Atmospheric Gravity Waves (AGWs) that occurs in the neutral atmosphere. They are generated by different sources, such as solar terminators (sunrise and sunset), magnetic storms and substorms, tropospheric weather and mountain turbulence. TIDs appear in power spectra of SuperDARN radars as spatially localized enhancements and as quasi-periodic fluctuations in Doppler velocities and reflection heights. SuperDARN is a network of HF radars designed to study plasma convection and plasma density irregularities in the E and F-regions of the ionosphere at high and mid-latitudes. The continuous, large scale nature of SuperDARN observations make them an ideal tool for TID study. Understanding the characteristics and source of mechanisms of TIDs has been of interest since 1960's. AGWs significantly affect global circulation through their ability to transport energy and momentum vertically through different layers of the atmosphere and horizontally across the globe. Although they have been different studies done on TIDs using ground and space based instruments, very few have used observations in the southern polar hemisphere, in particular, SANAE HF radar. This project aims to investigate TIDs events observed by SANAE SuperDARN radar in more details. This preliminary investigation includes determining possible source of mechanisms of the events. We have performed a survey of TIDs in the SANAE HF radar data. When many events are identified, we also survey other radar data which have common or conjugate field of view.

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