

Statistics of traveling ionospheric disturbances at high latitudes using a rapid-run Ionosonde

The potential of deep learning for the investigation of medium scale traveling ionospheric disturbances (MSTIDs) has been exploited through the Sodankylä rapid-run ionosonde in this statistical study. The complementing observations of the Sodankylä ionosonde with AI implementation and those of the Sodankylä meteor radar reveals the diurnal and seasonal occurrence rate of high-latitude MSTIDs in the recent low solar activity period. In our results, the daytime, nighttime and dusk MSTIDs are predominantly identified during winter, summer, and equinoctial months, respectively. The winter daytime higher (lower) occurrence rate is well correlated with the lower (higher) altitude of the height of the F2-layer peak (hmF2), and the low occurrence rate of the summer daytime is well correlated with the mesosphere-lower-thermosphere wind shear and higher gradient of temperature.

*Samson Moges (1), Ruslan Sherstyukov (1), Alexander Kozlovsky (1), Thomas Ulich (1, 2), and Mark Lester (3)*

- 1. Sodankylä Geophysical Observatory, University of Oulu, Sodankylä, Finland*
- 2. EISCAT Scientific Association, Kiruna, Sweden*
- 3. Department of Physics and Astronomy, University of Leicester, Leicester, UK*