

Comparisons and validation of the TIDs occurrence in the ionospheric tilt measurements with the GNSS observations (CVTIDs)

M. Sivakandan

Medium-scale traveling ionospheric disturbances (MSTIDs) are wave-like disruptions in the ionospheric plasma density, with horizontal scales ranging from 100 to 500 kilometers. These disturbances are caused by various sources, including gravity waves, solar terminators, and electrodynamic instability processes. MSTIDs can be observed both during the day and at night; however, the mechanisms behind daytime and nighttime MSTIDs differ. Research indicates that daytime MSTIDs are primarily generated by primary and secondary gravity waves that originate in the lower and middle atmosphere, respectively. In contrast, nighttime MSTIDs are attributed to electrodynamic processes, specifically Perkins instability, which is associated with coupling between the E- and F-regions of the ionosphere. Despite their significance, the climatology of MSTIDs over the European sector has not been thoroughly explored. Various methods and datasets have been employed to study the occurrence of MSTIDs. In this study, we compare the occurrence of traveling ionospheric disturbances estimated from ionosonde tilt measurements with those derived from differential total electron content (dTEC) and ionogram feature-based methods. We found a generally good correlation among these three approaches, with some exceptions. The detailed results will be discussed in this presentation.