89 -- 2017-03-07 20:37:42
Session 8A Paper 5
Khadka, Sovit: Physics Department, Institute for Scientific Research, Boston College, Massachusetts, USA
Valladares, Cesar: William B. Hanson Center for Space Sciences, University of Texas at Dallas, Richardson,TX, USA
Doherty, Patricia: Institute for Scientific Research, Boston College, Massachusetts, USA

The dependence of Nighttime Plasma Irregularities on Daytime Low-Latitude Electrodynamics during Solar Maxima

The unique electrodynamics of the low-latitude ionosphere provides practical benefit for space weather prediction. A forecasting capability of occurrence of plasma irregularities with precise time and location is not straightforward, and varying degrees of scientific effort have been committed to investigate their electrodynamics and seeding conditions till today.

A recent study by Khadka et al. [2016] showed that minor correlation of peak value of equatorial electrojet with net postsunset ionospheric scintillation index (S4) greater than 0.2 exists during solar minimum, and offers a venue to predict post sunset and nighttime ionospheric irregularities based on noontime measurement of the equatorial and low-latitude ionosphere. Most of the post sunset plasma behaviors depend on the zonal electric field and accompanying vertical ionospheric plasma drifts.

In this study, we will present results that will show the mutual relationship between noon (electrojet), afternoon (GPS-TEC) and nighttime ionospheric phenomena (Scintillation, S4 index) during recent high solar activity phase based on Khadka et al. [2016] approach. We will discuss the drivers of ionospheric scintillation and disturbance events through statistical, and case study analyses associated with Jicamarca and LISN database of magnetometers, radars, and GPS observed in the American sector.

Even though the emphasis remains on one solar maximum period, our study provides a possible route to predict and mitigate space weather effects on technological devices of communication and navigation system.

Reference: Khadka et al. [2016], Radio Sci., 51, 742–751, doi: 10.1002/2016RS005966.