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Comprehensive analysis of the ionospheric response to the 2015 geomagnetic storms over different station

Abstract:

A crucial and fundamental problem in ionospheric physics is the ionosphere's dependency on solar activity. This dependence provides information that is necessary to comprehend the ionosphere's changes and its processes. Here in this work, ionospheric electron densities and fof2 is utilized to characterize large-scale ionosphere responses during 2015 geomagnetic storm. With the data gathered from International Reference Ionosphere (IRI-2016 model), which is an empirical standard model of the Ionosphere, this work try to construct a correspondence between the solar activity and the change in Ionosphere's characteristics across three different stations, on different altitudes. It has been observed that the electron density decreases on the day of the solar event as compared to the normal quiet days. Similar decrease in fof2 can also be seen for the three different stations on the geomagnetic storm day. Geomagnetic storms are linked to both the suppression and amplification of abnormalities. At low and middle latitudes, extreme events may result in over-shielding, PPEF, and fluctuating electric fields, especially if magnetospheric ring current plasma is augmented in a way that encourages such effects.

Keywords: Geomagnetic storm, TEC, foF2, International Reference Ionosphere (IRI)

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