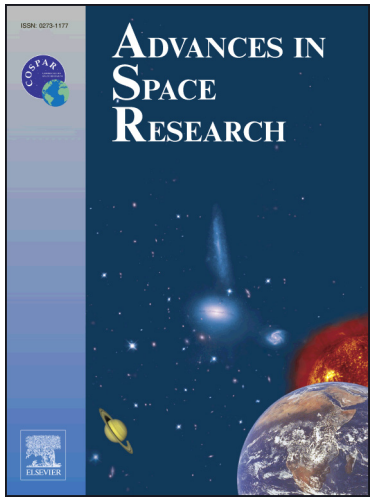

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*Nm*F2 trends at low and mid latitudes for the recent solar minima and comparison with IRI-2012 model

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Abstract

The ionospheric electron density peak (*Nm*F2) is analyzed for the recent minima of solar activity for two mid-latitude stations, Rome (41.8°N, 12.5°E, geomagnetic latitude 41.7°N, Italy) and Gibilmanna (37.9°N, 14.0°E, geomagnetic latitude 37.6°N, Italy), and for the low-latitude station of Tucumán (26.9°S, 294.6°E, geomagnetic latitude 17.2°S, Argentina), located in the south ridge of the equatorial ionization anomaly. An inter-minima comparison reveals that from an ionospheric point of view the last minimum of solar activity (minimum 23/24) was peculiar, with values of *Nm*F2 lower than those recorded during the previous minima for all the stations and all the hours of the day. A more pronounced decrease is observed at Tucumán than at Rome and Gibilmanna. The study of the winter and semi-annual anomaly shows that at mid-latitude stations the winter anomaly is not visible only for the years 2008 and 2009, which represent the deeper part of the prolonged and anomalous last solar minimum. The same is for the semi-annual anomaly. A comparison with the version 2012 of the International Reference Ionosphere model (IRI) is also carried out. The results reveal that for low solar activity the model works better at mid latitudes than at low latitudes, confirming the problems of IRI in correctly representing the low-latitude ionosphere. Nevertheless, using as input updated values of the solar and geomagnetic indices, no loss of accuracy is detected in the IRI performances for the last solar minimum with respect to the previous ones, both at mid and low latitudes.

Keywords: ionosphere, ionospheric electron density peak, IRI model, solar minimum, solar cycle.