

## **DEPENDENCE ON SOLAR ACTIVITY LEVEL OF THEORETICAL F2 LAYER TRENDS DUE TO EARTH'S MAGNETIC FIELD VARIATIONS**

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There are several mechanisms that may induce long-term trends in the ionosphere, mainly the upper atmosphere cooling due to an increase in greenhouse gases, long-term changes in geomagnetic activity, and the Earth's magnetic field, generated in the Earth's core, which presents long term variations in the field's strength and orientation. This last possible source of ionosphere trends, which is analyzed in the present work, affects the thermospheric neutral winds that move the conducting plasma of the ionosphere, inducing long term changes at ionospheric levels. Noon foF2 and hmF2 changes are assessed through a theoretical approximation considering the Earth's magnetic field secular variations obtained from the International Geomagnetic Reference Field (IGRF), horizontal winds from Hedin HWM93 empirical model, and neutral temperature and composition from Hedin MSISE-90. Ionospheric trend patterns in terms of location (latitude and longitude) and season are obtained for different solar activity levels. A region of strong variations, between approximately 10°N and 30°S in latitude and between 20°E and 80°W in longitude, is detected. The relative importance of the Earth's magnetic field in ionospheric long-term trends, and the solar activity filtering effects over its detection, are analyzed through the variation of foF2 and hmF2 trend patterns in terms of solar activity.

long-term changes, ionosphere, Earth's magnetic field

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