

Mid Latitude Sporadic E-layer Variability during Ascending Phase of Solar Cycle 24

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Abstract

The paper presents a comparative study of the ionospheric sporadic E layer parameters (fbEs, foEs, and h'Es) retrieved from ground based ionosonde at mid latitude station Yamagawa, Japan (31.20 N, 130.370 E) during the ascending phase of 24th solar cycle i.e. during January 2012 to December 2014. The comparison between the E-region parameters has been carried out on a diurnal, seasonal, annual and day night basis. The diurnal maxima of foEs, fbEs, and h'Es are generally higher during high solar activity. From the present study it is found that the highest values of fbEs are observed during the summer while the lowest values are observed during autumn at mid latitude. Similarly, the highest values of foEs are observed during the summer season while the lowest values are recorded in autumn season. However, the highest values of h'Es are recorded during the spring and the lowest values are recorded in autumn. The variability of Es during the day and night time is also studied. The sporadic E can form and disappear in a short time during either the day or night. We have also studied the percentage occurrence of sporadic E. The occurrence of Es changes from year to year.

Keywords: Sporadic E; Blanketing frequency; Critical frequency; Wind shear.

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1. Introduction

The E-region of the ionosphere is located about 80 to 160 km in altitude. The height can vary a little, and, along with electron density, depends on solar zenith angle and solar activity. During day hours, electron density can reach 10^5 e/cm^3 . At night, when the supply of radiations from the sun is cut off, ionization levels drop to 10^3 e/cm^3 . Basically, these ionization densities are expected under normal conditions. Sporadic E

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