A Global Survey of COSMIC Ionospheric Peak Electron Density and Its height: A Comparison with Ground-based Ionosonde Measurements

Yen-Hsyang Chu, Chin-Lung Su and Hsiao-Tsung Ko
Institute of Space Science, National Central University, TW

In this article, the ionospheric peak electron density and its height measured by FORMOSAT-3/COSMIC satellites in terms of GPS radio occultation technique and a network of ground-based ionosondes distributed around the world are compared and extensively examined. It is found that, in spite of the latitude, the mean values of the peak electron density measured by COSMIC satellites are systematically smaller than those observed by ground-based ionosondes. The discrepancy between them is dependent on the latitude. Moreover, statistical analysis shows that the slopes of the regression line that is best fitted to the scatter diagram of occultation-retrieved peak electron density (ordinate axis) versus ionosonde-observed peak density (abscissa axis) are universally less than one. About peak height (hmF2), the former is systematically higher than the latter as large as 20% or more in equatorial and low latitude regions.