The Research of Ionospheric E-region Electron Density using FORMOSAT-3/COSMIC

Kuo-Feng Yang
Institute of Space Science, National Central University

Yen-Hsyang Chu
Institute of Space Science/Center for Space and Remote Sensing Research, National Central University

Abstract:

There are three payloads mounted on each FORMOSAT-3/COSMIC satellite, namely, GPS receiver, tiny ionospheric photometer (TIP), and tri-band beacon transmitter. With the GPS receiver, the atmospheric refractive index can be retrieved from received GPS signals using limb sounding technique, in which the profiles of temperature and ionospheric electron density can be deduced. The ionospheric scintillation and total electron density content from the satellite to ground receiver can be measured by using tri-band beacon transmitter. By using these instruments in combination with ground-based facilities, it is an attempt to investigate the ionospheric global structures. In this report, we use the COSMIC electron density data to discuss the variation of peak electron density and its height, global distribution of mean fluctuation in E-region. Considering the linear transmission path assumption of limb sounding technique, we also compare the COSMIC results with the model results from IRI and other ground-based observation to check the data quality of the COSMIC ionospheric E-region data.