

Variations of the NmF2 during the storm observed by GPS over South Korea

S. Jin (1, 2), J. Park (1), B. Choi (1) and P. Park (1)

(1) Korea Astronomy and Space Science Institute, 61-1, Whaam-dong, Yusong-gu, Daejeon 305-348, South Korea, (2) Shanghai Astronomical Observatory, Chinese Academy of Sciences, Shanghai 200030, China (sgjin@shao.ac.cn / Fax: 82-42-861-5610)

The electron density F2 peak value (denoted as NmF2) is of great influence on the shape of ionospheric electron density profile Ne (h), and is also an important parameter of Ne-profile that may be related to the various physical processes, such as geomagnetic storms and solar flares. However, NmF2 is often obtained using the semi-empirical International Reference Ionosphere (IRI) models or more-cost scatter radar techniques, etc. Now dual-frequency GPS observations have become a powerful tool for mapping high-resolution ionospheric structures. In this paper, Ionospheric electron density profiles are obtained from the permanent Korean GPS Network (KGN) data with GPS tomography reconstruction technique, and the reliability is further verified with independent ionosonde techniques. And then the ionospheric NmF2 response to geomagnetic storms in 2003 has been investigated over South Korea. It has shown that NmF2 has anomalous variations (decrease) during the storms. This evidence also confirms the theory that the "decrease in NmF2" is mainly caused by the changes in neutral composition (molecular nitrogen concentration [N₂] and oxygen concentration [O₂]), where during a geomagnetic storm, the magnetospheric sources drive upwelling of molecular rich gas from lower altitudes to F region altitudes.

Key words: GPS, NmF2, Tomography reconstruction.