R005-20
B 会場 ：11/5　AM1 （9:00-10:30）
10:00〜10:15

#陳　治宇 [1)], 大塚　雄一 [1)], 新堀　淳樹 [1)], 惣宇利　卓弥 [1)], 塩川　和夫 [1)],PERWITASARI　SEPTI[2)], 西岡　未知 [2)], 土屋　史紀 [3)], 熊本　篤志 [4)], 笠原　禎也 [5)], 三好　由純 [1)], 北原　理弘 [4)], 中村　紗都子 [1,6)], 松岡　彩子 [7)], 篠原　育 [8)]
([1] 名古屋大学宇宙地球環境研究所,[2] 情報通信研究機構,[3] 東北大・理・惑星プラズマ大気,[4] 東北大・理・地球物理,[5] 金沢大,[6] 名古屋大学高等研究院,[7] 京都大学,[8] 宇宙研／宇宙機構

A Study of Variations of Plasmaspheric Total Electron Content during Magnetic Storms by Using the GPS Total Electron Content Data

#ZHIYU CHEN[1)], Yuichi Otsuka[1)], Atsuki Shinbori[1)], Takuya Sori[1)], Kazuo Shiokawa[1)], SEPTI PERWITASARI[2)], Michi Nishioka[2)], Fuminori Tsuchiya[3)], Atsushi Kumamoto[4)], Yoshiya Kasahara[5)], Yoshizumi Miyoshi[1)], Masahiro Kitahara[4)], Satoko Nakamura[1,6)], Ayako Matsuoka[7)], Iku Shinohara[8)]
([1]ISEE, Nagoya Univ.,[2]NICT,[3]Planet. Plasma Atmos. Res. Cent., Tohoku Univ.,[4]Dept. Geophys., Grad. Sch. Sci., Tohoku Univ.,[5]Kanazawa Univ.,[6]IAR,[7]Kyoto University,[8]ISAS/JAXA

Total electron content (TEC) is an integration of the electron density along a ray path from satellite to receiver, which can be measured by dual-frequency Global Positioning System (GPS). However, the measured TEC contains inter-frequency biases inherent with satellites and receivers, which cannot be ignored in original TEC. Previous study has developed a method to separate ionospheric TEC from the inter-frequency biases by using the least square fitting procedure.[1] In this method, plasmaspheric TEC (PTEC) is not considered. However, it is known that the PTEC can be 10-50% of the ionospheric TEC. Considering the satellite zenith angle dependence on slant factor which converts the slant TEC to vertical TEC, PTEC could be included in the estimated inter-frequency bias. Therefore, we have analyzed the inter-frequency bias data obtained from approximately 9,000 receivers over the world. Storm events on September 2017 have been investigated to compare with Arase satellite observation data. In the first event, the Dst index reached a minimum of -122 nT at 2 UT on September 8, PTEC decreases by 2.85 TECU on September 8 by using GPS-TEC data and decreases by 1.10 TECU at around 17 UT on September 8 by using Arase satellite data, then recovers. In the second event, the Dst index reached a minimum of -54 nT at 10 UT on September 28, PTEC decreases by 0.59 TECU on September 28 by using GPS-TEC data and decreases by 0.63 TECU at around 21 UT on September 28 by using Arase satellite data, then recovers. The result shows the variation of PTEC deviation obtained from GPS-TEC data and Arase satellite observation data commonly shows that PTEC decreases after the onset of magnetic storm and recovers gradually. PTEC with high spatial and temporal resolutions during geomagnetic storms on March 2013, November 2017 and August 2018 is also investigated. It is shown that the bias at middle and low latitudes decreases during main phase of the three magnetic storms and bias decrease tends to be large at the longitudinal sector which is located in the nightside when the main phase starts. This result indicates occurrence of erosion process in the plasmasphere during the main phase of magnetic storms. Therefore, this study indicates the validity of GPS data on measuring PTEC variations.