2011年東北地方太平洋沖地震後に観測された全電子数変動特性
Characteristics of Total electron content variation after the M9.0 2011 off the Pacific coast of Tohoku earthquake

柿並 義宏1*, 渡部 重十2, 鴨川 仁3, 茂木 透3, 劉 正彦4, 孫楊軒4
KAKINAMI, Yoshihiro1*, WATANABE, Shigeto2, KAMOGAWA, Masashi3, MOGI, Toru1, LIU, Jann-Yenq4, Yang-Yi Sun4

1北海道大学地震火山研究観測センター, 2北海道大学大学院理学研究院宇宙理学専攻, 3東京学芸大学教育学部物理学科, 4台湾国立中央大学太空研究所

Institute of Seismology and Volcanology, Hokkaido University, 2Department of Cosmoscience, Hokkaido University, 3Department of Physics, Tokyo Gakugei University, 4Institute of Space Science, National Central University

Sudden strong vertical displacement of Japan Trench by the M9.0 2011 off the Pacific coast of Tohoku earthquake (the Tohoku EQ) that occurred on 11 March 2011 triggered huge tsunami and the tsunami inflicted intolerable damage on Tohoku district, Japan. Acoustic and gravity waves excited by the tsunami propagated to thermosphere and disturbed ionosphere about 10 minutes after the mainshock, which are often observed after the large earthquakes. After the atmospheric waves arrive at the ionosphere and initial enhancement and depletion of plasma appeared, huge plasma depletion in the hundred kilometer scale occurred over the tsunami source area and lasted for a tens minutes. Simultaneously, various ionospheric disturbances were observed. In this paper, we investigate characteristics of ionospheric disturbances using Total Electron Content (TEC) calculated from the data of GPS network, GEONET (GPS Earth observation network system) which has more than 1000 GPS receivers. In order to investigate frequency of disturbances, we analyze TEC variation with Hilbert-Huang Transform (HHT) which can analyze data of non-stationary time series. Moreover, initial variations of TEC after arrival of the atmospheric waves at ionosphere are examined. Finally, interaction between atmosphere and ionosphere is discussed.

キーワード：東北太平洋沖地震，電離層擾乱，津波，音波，重力波，全電子数
Keywords: the off the Pacific coast of Tohoku earthquake, ionospheric disturbance, tsunami, acoustic wave, gravity wave, total electron content