

Japan Geoscience Union Meeting 2011

(May 22-27 2011 at Makuhari, Chiba, Japan)

©2011. Japan Geoscience Union. All Rights Reserved.



PEM032-P20

会場:コンベンションホール

時間:5月27日 10:30-13:00

東南アジア域 GPS 受信機網を用いた移動性電離圏擾乱の観測 Observations of traveling ionospheric disturbances using GPS networks in the Southeast Asia

津川 卓也^{1*}, コンニヤナット ワッサナンミーチャイ², 石橋 弘光¹, 加藤 久雄¹, 西岡 未知³, 大塚 雄一³, 齊藤 昭則⁴, 長妻 努¹, 村田 健史¹

Takuya Tsugawa^{1*}, Kornyanat Watthanasangmechai², Hiromitsu Ishibashi¹, Kato Hisao¹, Michi Nishioka³, Yuichi Otsuka³, Akinori Saito⁴, Tsutomu Nagatsuma¹, Ken T. Murata¹

¹ 情報通信研究機構, ² モンクット王ラカバン工科大学, ³ 名古屋大学太陽地球環境研究所, ⁴ 京都大学理学研究科地球物理学教室

¹NICT, ²KMITL, ³STEL, Nagoya University, ⁴SPEL, Kyoto University

Two-dimensional total electron content (TEC) maps have been derived from ground-based GPS receiver networks and applied to studies of various ionospheric disturbances since mid-1990s. For the purpose of monitoring and researching ionospheric disturbances which can degrade GNSS navigations and cause loss-of-lock on GNSS signals, we have developed TEC maps over Japan using the dense GPS network, GEONET. Using the GPS-TEC maps, we have revealed some severe ionospheric events such as high latitude storm-time plasma bubbles and storm enhanced density events observed over Japan. These events cause loss-of-lock of GPS signals and large GPS positioning errors. The dense GPS receiver networks would be a powerful tool for the nowcast/forecast of ionospheric disturbances.

As a part of Southeast Asia low-latitude ionospheric network (SEALION), four GPS receivers have been operated in Thailand since 2005, collaborated with KMITL, Thailand. We have found that periodic TEC fluctuations (PTF) with the periods of 15-30 minutes are often observed at these GPS stations in the spring (Apr-May) late afternoon. Based on the analysis using multiple GPS receivers in Southeast Asia, we suspect that the PTFs is a manifestation of traveling ionospheric disturbances (TIDs) which propagate at 150-200 m/s away from the equator. However, it has been difficult to reveal the spatial structures and temporal evolutions of such TIDs due to the sparse GPS receiver networks in the Southeast Asia.

We are now developing regional high-resolution TEC maps in the Southeast Asia using GPS receiver networks by installing GPS receivers and/or collecting GPS receiver data, collaborated with KMITL (Thailand), LAPAN (Indonesia), UKM (Malaysia), and HIG (Vietnam). In this presentation, we will show the preliminary results of the two-dimensional TEC observations of TIDs in the Southeast Asia. We also report the current status of future direction of ionospheric monitoring system using GPS receiver networks in the Southeast Asia.

キーワード: 電離圏, 東南アジア, GPS, 全電子数, 電離圏擾乱

Keywords: ionosphere, southeast asia, GPS, total electron content, ionospheric disturbances