

R005-12

B会場：11/4 PM2 (15:45-18:15)

17:00~17:15

Equatorial plasma bubbles observed over longitude 100°E sector after Hunga Tonga-Hunga Ha'apai eruption on January 15, 2022

#Hozumi Kornyanat¹, Supnithi Pornchai², Tongkasem Napat², Seechai Khanitin², Sophan Somkit², Jamjareegulgarn Punyawit², 大塚 雄一³, 斎藤 享⁴, 西岡 未知¹, 津川 卓也¹, 山本 衛⁵

(¹ 情報通信研究機構, (² KMITL, Thailand, (³ 名大・宇地研, (⁴ 電子航法研, (⁵ 京大・生存圏研

Equatorial plasma bubbles observed over longitude 100°E sector after Hunga Tonga-Hunga Ha'apai eruption on January 15, 2022

#Kornyanat Hozumi¹, Pornchai Supnithi², Napat Tongkasem², Khanitin Seechai², Somkit Sophan², Punyawit Jamjareegulgarn², Yuichi Otsuka³, Susumu Saito⁴, Michi Nishioka¹, Takuya Tsugawa¹, Mamoru Yamamoto⁵

(¹ NICT, Japan, (² KMITL, Thailand, (³ ISEE, Nagoya Univ., Japan, (⁴ ENRI, MPAT, Japan, (⁵ RISH, Kyoto University, Japan

There have been some reports on the plasma bubble detection at mid and low latitudes after the huge eruption of the Hunga Tonga-Hunga Ha'apai submarine volcano in the South Pacific on January 15, 2022, at 04:14 UT. The eruption released enormous energy into the atmosphere, and the pressure wave went around globally. The coupling from the upper atmosphere could trigger the electron density fluctuation in the ionosphere. Pre-reversal enhancement (PRE) causes uplift of the bottom side ionosphere and is considered one of the conditions for EPB seeding. The moderate magnetic storm commenced on 14 January 2022 followed by its recovery phase on January 15, 2022. An enhanced electric field due to the magnetic storm could also enhance the ExB drift and amplify the PRE around the sunset terminator causing a favorable condition for the EPB seeding.

Chumphon is considered a magnetic equator station as it locates at geographic 10.72 degrees N, 99.37 degrees E, where is at geomagnetic 1.33 degrees N, 172.19 degrees E based on IGRF-13. The new VHF radar is operated at the frequency of 30.65 MHz. This study reports strong Equatorial Plasma Bubbles (EPBs) observed by the new VHF radar over Chumphon, Thailand on January 15, 2022. The overhead radar beam detected the EPB as high as 750 km altitude. TEC enhancement in the Equatorial Ionization Anomaly (EIA) region is also detected by the GNSS network in Thailand on January 15, 2022. GNU Radio Beacon Receiver (GRBR) in Bangkok, Thailand also detects the enhanced S4 index. We will also report positioning error information regarding the event. Though the cause of the detected plasma bubble is still unclear, we report the preliminary results and seek a fruitful discussion.

There have been some reports on the plasma bubble detection at mid and low latitudes after the huge eruption of the Hunga Tonga-Hunga Ha'apai submarine volcano in the South Pacific on January 15, 2022, at 04:14 UT. The eruption released enormous energy into the atmosphere, and the pressure wave went around globally. The coupling from the upper atmosphere could trigger the electron density fluctuation in the ionosphere. Pre-reversal enhancement (PRE) causes uplift of the bottom side ionosphere and is considered one of the conditions for EPB seeding. The moderate magnetic storm commenced on 14 January 2022 followed by its recovery phase on January 15, 2022. An enhanced electric field due to the magnetic storm could also enhance the ExB drift and amplify the PRE around the sunset terminator causing a favorable condition for the EPB seeding.

Chumphon is considered a magnetic equator station as it locates at geographic 10.72 degrees N, 99.37 degrees E, where is at geomagnetic 1.33 degrees N, 172.19 degrees E based on IGRF-13. The new VHF radar is operated at the frequency of 30.65 MHz. This study reports strong Equatorial Plasma Bubbles (EPBs) observed by the new VHF radar over Chumphon, Thailand on January 15, 2022. The overhead radar beam detected the EPB as high as 750 km altitude. TEC enhancement in the Equatorial Ionization Anomaly (EIA) region is also detected by the GNSS network in Thailand on January 15, 2022. GNU Radio Beacon Receiver (GRBR) in Bangkok, Thailand also detects the enhanced S4 index. We will also report positioning error information regarding the event. Though the cause of the detected plasma bubble is still unclear, we report the preliminary results and seek a fruitful discussion.