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プラズマバブルと電離圏全電子数空間勾配の関係について
Relationship between plasma bubbles and spatial gradient in ionospheric TEC

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The ionosphere is one of the serious error source in global navigation satellite systems (GNSS). Spatial gradients in ionospheric total electron contents (TEC) makes it difficult to correct ionosphere induced error by differential GNSS techniques.

Plasma bubbles are known to accompany sharp TEC gradient. Its frequent occurrence is a serious issue in advanced applications of GNSS. Plasma bubbles includes plasma irregularities with various scale sizes and the correspondence between the large scale plasma depletion and the sharp TEC gradient is not clear.

In this study, spatial gradients in TEC are observed by five GNSS receivers distributed with distances 0.4-1.6 km at Ishigaki (about 20 deg. magnetic latitude), Japan. Large scale plasma depletions are observed by an all-sky airglow imager located at Yonaguni (about 100 km west of Ishigaki). Detailed comparison between the TEC gradients and airglow intensity maps are conducted to reveal where the sharp TEC gradients exist in plasma bubbles.

Keywords: Plasma bubble, Ionospheric TEC, Spatial gradient in TEC, Lows latitude ionosphere, GNSS