

## Correlation of ROTI and loss of lock between Taiwan and Okinawa associated with equatorial plasma bubbles

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Since equatorial plasma bubbles (EPBs) affect wide-band radio waves, the effect of EPBs on GPS navigation system is considerable. For example, losses of Lock (LOL) can be observed in GPS receivers when EPBs sweep over. This is because hundreds-meter scale irregularities inside EPBs cause Fresnel diffraction to L-band radio waves. Rate of TEC change index (ROTI) can be also enhanced due to kilometer-scale fluctuations associated with EPBs. Namely, ROTI and LOL are good proxies for these irregularities. It is conceivable that the temporal variations of ROTI and LOL depend on stage of development of EPBs. In the present study, the differences of ROTI and LOL associated with EPBs are examined using GPS data observed at Taiwan and Okinawa. In most of EPBs determined by all-sky imagers at Sata and Darwin, the enhancements of ROTI and LOL were detected. In order to select EPBs which are observed at both Taiwan and Okinawa, the followings are assumed;

- 1) ROTI observed at Okinawa is enhanced one hour after the enhancement of ROTI at Taiwan.
- 2) ROTI at Okinawa determined by a GPS satellite within one hour of the enhancement of ROTI at Taiwan is not available even though it is observed one hour after.
- 3) Data outage due to LOL is regarded as the enhancement of ROTI.

It is found that about half of EPBs are observed at both GPS receivers. The enhancement of ROTI at Taiwan tends to be larger than at Okinawa. In this presentation, we will discuss the rate of LOL at both GPS receivers.

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