

R005-08

B会場：11/4 PM2 (15:45-18:15)

16:00~16:15

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VHF to UHF scintillation by using satellite and rocket beacon signals

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The ionosphere plays an important role as a communication path between a ground-ground and satellite-ground. The irregularity of the plasma density in the ionosphere is often generated from a few tens of kilometers to a few meters. Notably, irregularities on the scale sizes of hundreds of meters to a few kilometers cause fluctuation in the radio wave transmitted from the Global Navigation Satellite System (GNSS) satellites. Previous studies presented small-scale ionospheric irregularities were generated by cascading of the large-scale irregularities. Therefore, it is essential to observe large (a few km) scale irregularities simultaneously with small (several 100s m) scale irregularities.

The beacon satellites is transmitting the VHF (150 MHz) and UHF (400 MHz) signals and National Oceanic and Atmospheric Administration (NOAA) satellites is transmitting the 137 MHz signal. The km scale irregularities cause the scintillation of those signals and thus we observe the variation of beacon signal amplitude to evaluate the km scale irregularity generation and growth simultaneous with the GNSS signal observation. In addition, the sounding rocket S-520-32 will be launched from Uchinoura, Kagoshima, which aims to observe irregularities associated with the Es layer and medium-scale traveling ionospheric disturbances (MSTIDs) and it will transmit dual-band beacon signals (150 and 400 MHz) in August or September 2022. We will try to observe the beacon signals from the sounding rocket.

The beacon receiver was developed at Chofu, Tokyo, as a test observation. After that, we relocated the beacon receiver to the National Institute of Technology, Kagoshima College, Kirishima (31.73 N, 130.73 E) in July 2022. The scintillation caused by the equatorial anomaly expanding northward is likely to be observed in there. In addition, the beacon signals transmitting from S520-32 can be observed.

In this presentation, we will describe our system and present observation results conducted at Chofu, Kirishima. The results of the rocket campaign will also be presented. The results are compared with the ROTI (rate of TEC index) map, which represents the existence of ionospheric irregularities. Future plans to extend our observation to equatorial regions will also be presented.