

## LF帯標準電波観測とGPS-TECによるTID同時観測

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## Simultaneous observation of traveling ionospheric disturbances using LF radio wave observation and GPS-TEC

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We had observed the LF Standard Time and Frequency Transmission to determine the height variation of the lower Ionosphere. The Standard Time and Frequency Transmission at the frequency of 60 kHz, which is transmitted from Mt. Hagane station, were observed by crossed loop antenna at Sugadaira, Nagano Prefecture. Separating the sky wave and the ground wave from the received wave, the variation of the ionospheric height was estimated from the phase variation of the sky wave.

In this study, we analyzed the height variation of the ionosphere whose frequency is about 0.3 mHz. This frequency corresponds to that of Traveling Ionospheric disturbances (TID). Using the wavehop method, the LF wave is considered to propagate from Mt. Hagane to Sugadaira with a single reflection at the ionosphere. We examined the TEC variations in the mid-point between Mt. Hagane and Sugadaira in association with the height variation in the lower ionosphere and found that the amplitudes of these variations have a linear relationship each other. Therefore, there is a relationship of ionospheric fluctuations between the lower and upper ionospheres.