Nighttime periodicity for the phase of LF transmitter signals

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At the low- and mid-latitudes, phase of LF transmitter signals largely varies in nighttime rather than that at the high latitudes. The daytime phase is stable due to strong solar ionization at all latitudes. The cause of the nighttime large phase variations has not been revealed. In this study, we focus on the periods of the phase variations of the nighttime LF transmitter signals observed in Japan and South-east Asia. Two propagation paths of Saga-Zao and Fukushima-Kagoshima over Japan are located almost on parallel over Japan. We investigated the periods of LF signals observed in April-June 2007 by using a wavelet analysis. During a Medium-scale travelling ionospheric disturbance (MSTID) was observed in the map of GPS Total Electron Content (TEC) on 6 May, 2007, a period of 30˜40 minutes was seen on the two phase data on both paths. From TEC keogram, the MSTID has the periods of 40 and 60 minutes along the LF paths. In the presentation, we will discuss the cause of the periods of LF phase in detail.