

R006-33

A 会場 : 11/7 AM2 (10:45-12:30)

12:15~12:30

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ULF-modulated energetic electron precipitation in magnetically quiet time using OCTAVE VLF/LF observations

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Energetic electron precipitation (EEPs, >100 keV) from radiation belts to the D-region ionosphere during substorms has been studied since the 1960's using very-low frequency (VLF, 3-30 kHz)/low frequency (LF, 30-300 kHz) transmitter signals and riometers (Thorne and Larsen, 1976). Modulation of D-region due to EEP by ultra-low frequency (ULF) waves during a substorm was reported (Miyashita et al., 2020). However, there was only one report for the EEP associated with ULF modulation using VLF/LF transmitter signals. In this study, we investigate the EEP event associated with the ULF modulation that occurred on 11:15-11:40 UT on October 9, 2017 (magnetically quiet time), using VLF/LF transmitter signals of "Observation of CondiTion of ionized Atmosphere by VLF Experiment (OCTAVE)" network. The VLF/LF transmitter signals from four transmitters (NLK, NDK, WWVB and NAA, USA) were received at Athabasca (ATH), Canada. We found oscillations in intensities on the NDK-ATH and NLK-ATH paths with a period of 200-300 s during magnetically quiet time in 11:00-12:00 UT on 9 October, 2017. However, the VLF/LF oscillations were not seen on the WWVB-ATH path. The calculation results based on wave-hop method showed that even if the height decreases due to the EEPs, the electric field strength of WWVB-ATH path would oscillate. Because of the characteristics of the WWVB-ATH path, we considered that there were no variations in the WWVB-ATH amplitude during the EEPs. H-component of magnetic field variations (ΔB_H) at ATH and the low latitudes in the wide longitudes also oscillated with the same periods of 200-300 s. The VLF waves and magnetic data were almost in-phase. It is reported that when the solar wind speed is less than 300 km/s, Pi2 pulsations with a long period (>200 s) is generated by the cavity mode of the magnetosphere (Kwon et al., 2013). We concluded that the VLF oscillations showed EEPs modulated by Pi2 ULF magnetic pulsation. In this presentation, we will discuss the cause of the VLF/LF oscillations in detail.