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Variations in tweek reflection height observed at Kagoshima during magnetic storms

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Variations of the D- and lower E-region ionosphere at middle and low latitudes associated with magnetic storms have been investigated using satellites and ground VLF signals. Kikuchi and Evans (1989) reported unusual enhancements of energetic electron fluxes over Japan at L = 1.3 during a large magnetic storm based on NOAA-6 satellite data. Araki (1974) reported that the phase of trans-equatorial VLF signals from a transmitter changed anomalously at night during the main phase of two large magnetic storms. Peter and Inan (2004) reported that the occurrence rates of lightning-induced electron precipitation (LEP) events depend on geomagnetic activities. Ohya et al. (2006) reported the response of the nighttime D-region ionosphere to the great magnetic storm of 2?12 October 2000. The tweek reflection height significantly decreased by approximately 10 km at 15:50?16:50 UT on 2 October and at 12:50 UT on 3 October in the beginning of the storm. However, the response of the D-region during magnetic storms has not sufficiently known yet. In this study, we investigate variations in tweek reflection height during several storms observed at Kagoshima over 35 years from 1976 to 2011. The descent (rise) of the reflection height corresponds to increase (decrease) in electron density in the ionospheric D- and lower E-regions. The variations in the tweek reflection height observed at Kagoshima during magnetic storms correspond to the variations in electron density at low and middle latitudes in the lower ionosphere. For example, during a magnetic storm of 26 August- 6 September, 1978 (the peak of Dst index: -226 nT), the hourly tweek reflection height suddenly fell by about 5 km several times during the storm recovery phase. In the presentation, we show variations of in the tweek reflection height during several magnetic storms.