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Night time annual variation of longitudinal structure in the topside ionosphere observed by the DEMETER satellite

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Nigh time longitudinal structure of electron density (Ne) and temperature (Te) in the topside ionosphere are examined using data observed by the DEMTER satellite from 2006-2007 under geomagnetically quiet condition (Kp<3). Distribution of Ne show complex structure due to longitudinal structure excited by latent heat release in troposphere as well as middle latitude enhancement and the Weddel sea anomaly. On the other hand, Te does not show clear longitudinal structure. A spectrum analyses are performed with the DEMETER data around magnetic equator. Wavenumber 1 of Ne dominates other wavenumbers during May-July and December-January. Wavenumber 4 of Ne becomes dominant in March and August-October. Meanwhile, wavenumber 1 of Te is pronounced in all months except December. Wavenumber 4 of Te only becomes dominant in October. These features of Ne and Te are significantly different from those in the daytime. In this paper, mechanism of longitudinal structures of Ne and Te are discussed comparing daytime distributions.

Keywords: ionosphere, longitudinal structure, electron density, electron temperature, DEMETER, wave-4