

Diurnal variations of electron density at mid-to high-latitudes

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We investigate the climatological characteristics of diurnal variations of electron density in middle and high latitude ionospheres during solar maximum (2000-2002) and minimum (2008-2009) periods. For this study, we use the electron density profiles obtained from incoherent scatter radars at Millstone Hill, European Incoherent Scatter UHF radar (EISCAT) in Tromsø, and EISCAT Svalbard radar (ESR). In middle latitude at Millstone Hill, mid-latitude summer evening anomaly (MSEA) appears for both solar activities. Annual anomaly is much stronger during solar maximum. In the auroral region at Tromsø, two density peaks appears for June solstice and strong annual anomaly also occurs during solar maximum. In the polar cap region at Svalbard, nighttime peak appears in addition to the daytime peak only during solar maximum. Electron density for June solstice is greater than the other seasons during solar minimum. There are differences of electron densities between auroral and polar cap regions. Daytime peak in the auroral region occurs at local noon time, but in the polar cap region, it occurs at magnetic local noon time. During solar maximum, the nighttime peaks at magnetic local midnight are much stronger in the polar cap region.