

Detection of the ionospheric day/night terminator effect by SuperDARN radars

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It is well known that the non-uniform ionospheric conductivity has an effect to deform the ionospheric convection pattern. For example, it is deduced that the dawn-dusk asymmetry of the ionospheric convection pattern in the polar region is caused by the electric charges and the secondary electric field arisen from the non-uniform ionospheric conductivity around the day/night terminator.

We have tried to detect the sharp deformation of the ionospheric convection around the day/night terminator by using data from the SENSU Syowa East SuperDARN radar. We found a remarkable convection pattern during the intervals from February to March and from September to October when the day/night terminator crossed the field of view (FOV) of the radar. However, the direction of the convection was opposite to that expected from the day/night terminator effect and is rather explained by the line of sight (LOS) velocity expected when the ionospheric plasma flows anti-sunward across the FOV of the radar. In addition, it was difficult to interpret the obtained results, because the place where the day/night terminator crosses the FOV of the radar corresponds to the auroral zone around the midnight. In this study, therefore, we attempt to detect the day/night terminator effect by using data from the SuperDARN radars that observe the polar cap ionosphere.

Keywords: SuperDARN radars, ionosphere, conductivity, day/night terminator, convection