

## Ionospheric heating in the dayside polar region during solar minimum and geomagnetically quiet equinox periods.

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The localized and rapid changes in the polar cap ionosphere seem to be one of the important issues for the future space weather predictions. From the observations with the European Incoherent Scatter (EISCAT) radar system, some interesting features of the dayside polar cap ionosphere have been revealed even during geomagnetically quiet (small Kp) periods. In order to understand dayside polar ionosphere/thermosphere, we have performed simultaneous observations with the EISCAT UHF radar (at Tromsø) and EISCAT Svalbard radar (ESR) (at Longyearbyen). In this study, we report on two examples of significant ionospheric disturbances observed in the dayside polar region at around or higher than 80 deg latitude with the ESR 32 m antenna (elevation angle of 30 deg) on March 20 and 21, 2018. The quiet ionosphere was observed in the same periods with ESR 42 m antenna (field-aligned direction) and the EISCAT UHF radar (at Tromsø). The solar and geomagnetic activities were quite low, F10.7=69 and Kp=0-1-, during the observational periods (07:00-13:00 UT) on both days.

In the first case (March 20), the IMF Bz component fluctuated around 0 nT before 10:00 UT while the IMF Bz showed negative values after about 10:00 UT. Strong ion flows were widely seen higher than 80 deg latitude during 09:00-12:00 UT. Before 09:00 UT, quasi periodic variations of the localized ion flows were seen at around 80 deg latitude. The ion temperature was about 1000 K at around 80 deg latitude with some rapid enhancements during the observational period. The electron density showed quasi periodic variations (about 10 minutes) in association with strong ion flows. In the second case (March 21), strong ion flows and increases in the ion temperature were observed during the periods of positive Bz. Strong shears of the ion flows and reversals of the flow direction were remarkable at around 08:30 and 09:00 UT. The rapid increase in the ion temperature was seen after 09:00 UT when strong ion flows were observed. The ion temperature was changed from about 900 K to 2000 K within 10 minutes at around 09:04-09:14 UT. These data sets will be examples which would show features of the dayside polar cap ionosphere during the solar minimum condition. We will compare the present data with the IPY 2007-2008 data which were obtained from continuous observations with the ESR during the last solar minimum periods.