

The geocoronal responses to the geomagnetic storms

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Abstract

The dominant neutral constituent in the Earth's exosphere, atomic hydrogen, resonantly scatters solar Lyman alpha (121.6 nm) radiation, observed as the geocorona. In September 2013, HISAKI/EXCEED was launched by the Epsilon rocket. It acquires spectral images (52-148 nm) of the atmospheres/magnetospheres of several planets from the Earth's orbit. Due to its low orbital altitude (~1000 km), the images obtained by the EXCEED contain the information of the geocoronal emissions. We report here observations of exospheric responses to geomagnetic storms obtained by the instrument. Several geomagnetic storms observed in February 2014 are accompanied by abrupt temporary increases of the Lyman alpha emissions. We found the responsible mechanism to increase the brightness during the geomagnetic storms and compared it with observations. As a result, we have concluded that the increases of hydrogen atoms can be explained by charge exchange with plasmaspheric ions.