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Spatio-temporal characteristics of high-latitude geomagnetic variations

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Information about the spatio-temporal distribution of amplitudes and time derivatives of geomagnetic variations is important to those commercial and non-commercial applications which can experience problems under active geomagnetic conditions. Such applications may suffer damage from intense geomagnetic activity. Or else their performance is impeded because they rely on the existence of a quiet geomagnetic background in order to properly assess the accuracy of their data and correct for excessive geomagnetic variations.

Our presentation focusses on measurements from DMI's magnetometers located in Denmark and Greenland which run autonomously and continuosly at 1-s sampling rate. In order to examine the spatio-temporal characteristics of geomagnetic variations under a variety of activity levels we categorize the geomagnetic variations with respect to the prevailing level of activity. We then investigate the relation between the temporal and spatial frequency content of geomagnetic variations under various levels of geomagnetic activity. The results demonstrate how the observed geomagnetic variations reflect the coupling between the solar wind and the magnetosphere-ionosphere system.