



## **A model that describes the spatial variation of ionospheric vorticity fluctuations in the polar ionosphere**

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Spatiotemporal variations of ionospheric vorticity are a measure of the dynamical coupling of the magnetosphere to the ionosphere via field-aligned currents (FACs). We have determined probability distributions of vorticity using 6 years (2000-2005) of measurements from 2 SuperDARN radars in the northern hemisphere with overlapping fields of view, and subdivided these distributions by AACGM latitude and magnetic local time. Using maximum likelihood estimation we have determined that the distributions of the vorticity fluctuations can be well modelled by either q-exponential or stretched exponential probability distributions, depending on location. Such distributions are often associated with multiplicative processes. We illustrate how the parameters of these distributions vary with AACGM latitude and magnetic local time and show that all the observed vorticity distributions can be modelled by a combination of only three states, each representing a different field-aligned current region.