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Climatic and diurnal variability in the occurrence of 10-m scale irregularities in the auroral ionosphere

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SuperDARN HF backscatter radars measure the power and Doppler characteristics of echoes backscattered from 10-m scale irregularities in the high-latitude ionosphere. Occurrence statistics of these echoes were compiled for the TIGER SuperDARN radar for the four-year interval of declining solar activity, 2000 to 2003. The occurrence rates tended to decline with decreasing solar activity, probably due to weaker F-region refraction. They tended to be largest during March equinox and post-midnight, but were otherwise suppressed by increasing solar-elevation angle. This is consistent with the Pedersen conductance assisting formation of irregularities via the interchange instability, yet suppressing them via enhanced cross-field diffusion.