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On the relationship between polar cap patches and regions of HF cusp backscatter

E. Osmundsen (1), J. Moen (1), K. Oksavik (2), H. C. Carlson (3)

(1) Department of Physics, University of Oslo, Oslo, Norway, (2) Applied Physics laboratory, Johns Hopkins University , Laurel, Maryland, USA, (3) Air Force Research Laboratory, AFOSR/CA, Arlington, Virginia, USA

On December 15, 2001 the EISCAT Svalbard Radar (ESR) was operated in a meridian scan mode of high resolution plasma measurements around magnetic noon. These high resolution ESR measurements were complemented by the CUTLASS Finland radar and all-sky observations of cusp auroral activity above Svalbard. This is a unique data set to investigate the relationship between variability in HF backscatter and meso-scale plasma dynamics in the cusp inflow region. The equatorward edge of regions of significantly enhanced backscatter power is observed in near collocation with steep latitudinal gradients of plasma entering the polar cap. This observation is in support of gradient drift instability as the driver of F-region backscatter irregularities.