

The Effect of ALfvenic Turbulence on the Auroral Ionosphere

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We demonstrate from observations that ALfven waves above the auroral oval exist in a turbulent state. It is shown that the cascade from large MHD scales to kinetic or dissipative scales in these waves leads to electron acceleration large parallel electric fields and plasma outflow from the auroral oval. Furthermore we demonstrate how inhomogeneity of ionospheric density profiles may accelerate the rate at which energy is transported across scales leading to wave focussing and in some cases extreme depletion of ionospheric plasmas. These depeleted regions can extend over latitudinal widths of 100s of kilometers.