

High-latitude atmospheric turbulence examined through TMA trails

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Sounding rocket measurements have provided some of the most detailed observations of the small-scale response of the neutral lower thermosphere to magnetospheric energy input in the auroral zone. In January and February 2007, a series of such launches were carried out at Poker Flat, Alaska, during substorm conditions. The rocket measurements provided wind profiles and the north-south gradients in the winds, as well as detailed in situ measurements of the electric fields, electron densities, particle energies, and neutral densities, and temperatures. In addition, we were able to detect the development of atmospheric turbulence at 80 km through analysis of the TMA reinjection bag. The atmospheric turbulence develops soon after the cloud forms, and proceeds from Navier-Stokes through Kraichnan turbulence in the most diffuse observations towards the end of the observations.

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