

On the generation of short range pressure pulses within the auroral ionosphere

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Atmospheric Gravity Waves (AGWs) at the auroral region is a very hot problem of upper atmospheric dynamics. The work here ensures the connection between AGWs producing Traveling Ionospheric Disturbances (TIDs) within the auroral region giving the signature of heat balance through Joule heating and heating due to Lorentz forcing. We developed an analytical model using magneto-hydrodynamic formulation to investigate this connectivity. In the formulation, low frequency components of a local time-dependent disturbance have been considered due to auroral current traversing from the source region as short-range gravity wave-train. In the altitude-time domain, it appears as pressure pulses. It is found that, for a definite altitude range above the effective height, pulses generated due to Lorentz force are of shorter duration relative to Joule heating. Results are presented graphically and discussed in terms of causality background.