TEMPORAL DEVELOPMENT OF THE MAGNETIC ZENITH EFFECT

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The temporal dynamics of the magnetic zenith (MZ) effect associated with the growth of the electron temperature is investigated experimentally. When the heater beam and the UHF radar are directed both into the magnetic zenith the increase of the electron temperature is observed to be at least twice that observed when the heater beam and the radar are directed vertically. It is shown for the first time that this effect manifest itself quickly reaching the stationary state within 10 s from the beginning of heating. Such times (5-10 s) are typical for the development of striations with the transverse sizes of the order of several meters. Also the behavior of the ion line spectra in time is analyzed for field aligned and vertical directions of the UHF radar. Theoretical explanation of the fast manifestation of the MZ effect is suggested. Simultaneously it is shown that the maximum of the electron heating is achieved at some intermediate inclination angles of the heater beam between the MZ and the Spitze angle. The estimate of the angle within which such maximum heating effect exists is also discussed.