

Winter Mesopause Region Scale Height derived from VHF Meteor Radar Temperatures and LF absolute Reflection Heights measured at Collm

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The change of ionospheric absolute reflection heights h of low-frequency (LF) radio waves at oblique incidence in the course of the day is measured at Collm Observatory (51.3°N, 13.0°E) using 1.8 kHz sideband phase comparisons on sporadic oscillation bursts between the sky wave and the ground wave of a commercial 177 kHz transmitter (Zehlendorf, reflection point 52.1°N, 13.2°E). Plasma scale height H estimates are calculated from the decrease/increase of h in the morning/evening during winter months. The day-to-day variations of H are compared with those of daily mean temperatures at 90 km, measured with a VHF meteor radar (36.2 MHz) at Collm utilising the amplitude decay of meteor reflections. A good qualitative correspondence is found between the two data sets. Since mesospheric long-period temperature variations are generally accepted to be the signature of atmospheric planetary waves, this shows that LF reflection height measurements can be used for monitoring the dynamics of the upper middle atmosphere.