

Statistical study of maximum ionospheric electron density deduced from lightning whistlers obtained by DEMETER

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Electromagnetic waves radiated by lightning discharges in the VLF frequency range penetrate through the ionosphere and are observed as plasma waves so-called whistlers. In this paper, we used the fractional hop whistlers recorded by the ICE experiment onboard the DEMETER satellite to estimate the maximum electron density of the ionosphere F2 layer from the dispersion of whistlers. We have developed an automatic long-term whistler detection technique which enables us to carry out the statistical study of many whistlers from the satellite data. As a result, the maximum electron densities estimated by whistlers has a good agreement with those from ground-based measurements by ionosonde. Moreover, statistical properties of latitudinal dependencies of electron-density in different local times and seasons were obtained.

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