

# Estimation of an electron number density in the lower ionosphere at nighttime from LF/MF radio waves observed by S-310-33 rocket

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S-310-33 rocket was launched at Uchinoura Space Center (USC) at 0:30 a.m. (LT) on January 18, 2004. We observed two radio waves transmitted from Kanoya air base (238kHz) and NHK Kumamoto 2nd ch. (873kHz) by using the Medium Frequency Receiver (MFR) onboarded the rocket. Thus, we obtained the propagation characteristics of radio wave, and both the wave intensity was absorbed suddenly at 89km altitude.

The propagation characteristics in the ionosphere is calculated by using Full wave method. It need the electron number density profile previously to calculate the propagation characteristics by Full wave method. Radio wave absorption method is to estimate the electron number density by comparing the observed wave intensity with that calculated with Full wave method. We can obtain the propagation characteristics by using this method.

The electron density at the altitude from 68km to 110km is estimated by using Radio wave absorption method. The electron density is estimated to increase suddenly at the altitude from 88.5km to 89.5km. This region has the electron number density three times or more at least as lower as the altitude at 88km. Next, the electron number density estimated by MFR is compared with that measured by FLP. The electron number density estimated by MFR is three times as low as that measured by FLP. At the other region, the electron number density estimated by MFR is ten times or more as low as that measured by FLP. The error margin included in the electron number density estimated by MFR is examined. However, The electron number density estimated by MFR cannot correspond to that measured by FLP.