

Observation plan of electron density structure on lower ionosphere by S-310-40 sounding rocket

FUKAZAWA, Tatsuya^{1*}, ISHISAKA, Keigo¹, ASHIHARA, Yuki², ABE, Takumi³

¹Toyama Pref. Univ., ²Elec.Eng.Nara NCT., ³ISAS/JAXA

In general, ionosphere has D layer (60~90km), E layer (90~140km), F1, F2 layer (140km~) at daytime. Each layer absorbs and reflects different wavelength wave. However D layer is disappearance at night. So, MF band wave which have been absorbed by D layer is reflected by E layer, and propagate in the distance. Therefore, at night we did a reception experiment by NHK Kumamoto 2nd broadcasting (873 kHz) which can be received at daytime at Uchinoura Space Center. As a result, in the winter night, we confirmed that the reception strength decreased during from 90 to 150 minutes after sunset. We observed the sporadic E layer in the ionosphere by Yamakawa MF radar (NICT) in Kagoshima. We did not found sporadic E layer. Therefore we guessed that there were occurred a high electron density on lower ionosphere. Thus, we did the S-310-40 sounding rocket plan for investigate on lower ionosphere When decrease the reception strength. After we checked phenomenon which could not be received the AM broadcasting, we launched S-310-40 sounding rocket at Uchinoura Space Center on 19 December 23:48(JST). We received radio waves are, 60 kHz (standard radio wave station), 405 kHz (Minami Daitou radio navigation beacons), 666 kHz (NHK Osaka 1st Broadcasting), and 873 kHz (NHK Kumamoto 2nd Broadcasting) by LF and MF radio band receiver. Moreover, at the same time we observed the electron density profile by the impedance probe and langmuir probe. We calculate density of magnetic field strength from result of S-310-40 sounding rocket plan, and use the Full wave method. So, we get electron density profile when abnormal propagation. We can separate right and left circularly polarization from each frequency's signal by frequency analyze. So, we can analyze the propagation characteristic. Therefore, we can guess the propagation characteristic and electron density on the lower ionosphere.

Keywords: sounding rocket, electron density