

S-520-26号機による中緯度電離圏中のDC電場観測

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DC electric field measurement in the mid-latitude ionosphere by S-520-26 sounding rocket

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S-520-26 sounding rocket experiment was carried out at Uchinoura Space Center (USC) in Japan at 5:51 JST on 12 January, 2012. The purpose of this experiment is the investigation of the bonding process between the atmospheres and the plasma in the thermosphere. S-520-26 sounding rocket reached to an altitude of 298 km 278 seconds after a launch. The S-520-26 payload was equipped with Electric Field Detector (EFD) with a two set of orthogonal double probes to measure both DC and AC less than 200 Hz electric fields in the spin plane of the payload by using the double probe method. One of the probes is the inflatable tube structure antenna, called the ITA, with a length of 5 m tip-to-tip. And ITA is very lightweight. The ITA extended and worked without any problems. It was the first successful use of an inflatable structure as a flight antenna. Another one is the ribbon antenna with a length of 2 m tip-to-tip. The electrodes of two double probe antennas were used to gather the potentials which were detected with high impedance pre-amplifiers using the unbiased double probe technique.

We describe about the result of investigation of the relationship between an electric field and the ionospheric plasma in detail. And we investigate that the polarization electric field is observed for the region where the difference of the electron density was large. Then we discuss that the electric field in the ionosphere is concerned with the bonding process between the neutral atmosphere and the plasma in the thermosphere.