

## S-520-23号機による電離圏中のDC電場観測

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## Electric field measurement in the ionosphere by S-520-23 sounding rocket

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S-520-23 sounding rocket experiment was carried out at Uchinoura Space Center (USC) in Japan at 19:20 JST on 2 September, 2007. The purpose of this experiment is the investigation of the process of momentum transportation between the atmospheres and the plasma in the thermosphere during the summer evening time at mid-latitudes. S-520-23 sounding rocket reached to an altitude of 279 km 268 seconds after a launch. The Electric field and VLF/MF band Receiver (EVMR) is loaded on S-520-23 sounding rocket. The EVMR measured the two components of electric field less than 40Hz in the spin plane of the payload by using a two set of orthogonal double probes. The electrodes of two double probe antennas were used to gather the potentials which were detected with high impedance pre-amplifiers using the floating (unbiased) double probe technique. The potential differences on the two main orthogonal axes were digitized on-board using 16-bit analog-digital converters, sampled at 400 samples/sec with low pass filters at cut-off frequency of 40 Hz.

The largest contribution to the electric field measurements by double probes moving through the ionosphere at mid-latitudes is that due to the  $\mathbf{v} \times \mathbf{B}$  fields created by their motion across the ambient magnetic field, where  $\mathbf{v}$  is the rocket velocity in the Earth-fixed reference frame and  $\mathbf{B}$  is the ambient magnetic field. The sum of the squares of the two components represents the magnitude of the DC electric field in the spin plane of the payload. These data reveal abrupt, large-scale variations which can immediately be attributed to changes in the geophysical electric field since the  $\mathbf{v} \times \mathbf{B}$  fields are slowly varying. The sum of the squares data also reveals contributions at the spin frequency and its harmonics. These contributions result primarily from distortions of the waveforms in the raw data.

In this presentation, we will discuss the results of DC electric field in the ionosphere.