

鹿児島ロケット実験による電離圏中の電場・LF/MF帯電波伝搬特性観測計画

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Measurements of DC electric field and propagation characteristics of LF/MF radio waves in ionosphere using the sounding rocket

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Two sounding rocket experiments, which are S-310-37 rocket experiment and S-520-23 rocket experiment, will be carried out at Uchinoura Space Center (USC) in 2007. The purpose of S-310-37 rocket experiment is an integrated observation of the high electron temperature layer in the Sq current focus during the winter daytime over USC. In order to measure the field-aligned electric field due to the Sq current, we develop the three-dimensional electric field detector (EFD). The EFD measures three components of electric field by using 3 pair of probe antenna. In order to obtain the electron density profile in the ionosphere, the MF band radio wave receiver (MFR) measures the intensities and the Doppler shift of radio wave from NHK Kumamoto broadcasting station (873 kHz, 500 kW). We estimate the electron density profile using the observations and the full wave method.

The purpose of S-520-23 rocket 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. The Electric field and VLF/MF band Receiver (EVMR) is loaded on the sounding rocket. The EVMR measures the two components of electric field by using 2 pair of probe antenna in order to obtain a dynamics of plasma particle in the ionosphere directly. One of 2 pair probe antenna is a probe antenna newly developed for a future mission of spacecraft. Therefore in this rocket mission, the engineering experiment using new antenna will be carried out. The EVMR measures the intensities and the Doppler shift of JJY signal from Haganeyama LF radio station (60 kHz, 50 kW) and MF radio wave (873 kHz, 500 kW), too. The electron density profile and the collision frequency in the ionosphere are estimated by the measurement of LF/MF band radio waves and the full wave method.

In presentation, we will show the scientific objective of two sounding rocket experiments and the present status of developments of the instrument onboard the both sounding rockets.