

## Measurement of thermal and suprathermal electron energy distribution in the Sq current focus by the sounding rocket S-310-37

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A sounding rocket experiment was carried out on January 16, 2007 in order to elucidate the mechanism of electron temperature enhancement in the Sq current focus. The rocket S-310-37 was launched at 11:20 LT from the Uchinoura Space Center (41.1N, 100.3E) in Japan and traversed near the center of Sq current focus at the height of about 100 km during its upleg.

Eight instruments were installed to measure plasma parameters, electric field and magnetic field and to determine the rocket's attitude. The Suprathermal Plasma Analyzer (SPA) is one of those instruments, which mainly aims to observe the thermalization processes of non-thermal electrons from a viewpoint of electron energy distribution. It is a newly developed instrument based on the single Langmuir probe method to measure an energy distribution from thermal to suprathermal electrons (up to several eV). The combination of a second harmonic method and a channel electron multiplier (CEM) makes it possible to measure an electron energy distribution of both thermal and suprathermal electrons. For a safe operation of CEM in the lower ionosphere, a differential pumping system using a non-evaporable getter material was equipped. The principal advantages of the SPA are the ability to 1) measure an electron energy distribution from thermal to suprathermal electrons continuously with high energy resolution and 2) determine the space potential precisely.

In the rocket flight, the SPA started measurement at the height of 90 km after opening the sealing cap of electron entrance and applying a high voltage to CEM. Then the current-voltage characteristics of plasma were repeatedly observed, and the electron energy distribution can be estimated at the altitude between 90 km and 138 km. In this paper, we present the principle of the SPA briefly and the preliminary results of electron temperature and electron energy distribution derived from the SPA data.