Observations of the electron temperature around the Sq focus by FLP (Fast Langmuir Probe) on board the sounding rocket S-310-37

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The electron temperature in the ionosphere is a direct indicator of the energy balance of the ionosphere-thermosphere system and therefore has been frequently observed by the sounding rocket and satellite for many years. The Langmuir probe is most frequently installed to make a direct measurement of the electron temperature and density on the sounding rocket. A statistical study of the electron temperatures observed from the sounding rocket launched from Uchinoura Space Center shows that its altitude profile has the local increase by several hundreds K to one thousand K with respect to the background at the altitude of 105-110km when the rocket trajectory is close to the Sq current focus in winter hemisphere. The ionospheric dynamo is believed to be one of the most important phenomena which control the geomagnetic variation on solar quiet days, Sq. There may exist some interesting phenomena in the center of Sq current focus, including thermal electron heating.

In order to elucidate such mysterious phenomena, the sounding rocket experiment 'S-310-37' was conducted in Uchinoura on January 16, 2007. The rocket was launched at 11:20 LT after confirming that the Sq current focus existed near the planned rocket trajectory. The electron temperature and density, energy distribution of thermal and suprathermal electrons, electric field and magnetic field were successfully measured for both upleg and downleg of the flights.

In this presentation, we mainly discuss the electron temperature variation observed by the FLP (Fast Langmuir Probe) on board this sounding rocket.