Observational study of energy exchange between thermal and suprathermal electrons - S-310-37 sounding rocket experiment -

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In order to investigate the energy budget in the ionosphere it is indispensable to understand the process of energy transfer from photoelectron to thermal electron, which is closely related to plasma heating, atmospheric airglow and other various ionospheric phenomena. However there are few observations of the electron energy distribution function in the energy transition region (2-5 eV) especially in the lower ionosphere, which is mainly attributable to the difficulties in developing the instruments. On that account we have developed the Suprathermal Plasma Analyzer (SPA) to measure the electron energy distribution function for suprathermal electrons. The SPA was installed in the sounding rocket S-310-37 and the electron energy distributions were measured at the height from 100 km to 138 km. Although the data were contaminated by sunlight and extremely large fluctuations in electron density, an enhancement of suprathermal component was identified at the height about 110 km. In this presentation, we discuss the process of energy input into the suprathermal electrons by using the result of Langmuir probe and fixed bias probe measurements.