



Electron Temperature and Floating Potential Measurement by TPMU - PROBA II Microsatellite Instrument as Dynamically Evolving System

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Thermal Plasma Measurement Unit (TPMU) scientific instrument was developed for PROBA II microsatellite and launched in November 2009. The device is working with limitations of scientific measurements caused very probably by installed onboard software. This brings lower data volume as it was planned. Affected are ion measurement and partially electron temperature measurement. This limited function of the instrument is stable and lasting since the beginning of the mission. The data are completed with orbital parameters.

We use cluster analysis using time to study seasonal and geographical variations of the floating potential and the electron temperature. Analysis is performed separately for all seasons and Equatorial region, North and South hemisphere. The annual seasonal changes in the floating potential and electron temperature are reflected in the clusters identified in this analysis. Changes in the beginning, the end and duration of seasons over a period of years reflect also changes of Kp index. Using this stochastic cluster analysis method were able to utilize a higher volume of usable measured data and continue with the study of the scientific interesting effects and process the data statistically. Summer seasonal cooling or heating on the South or North hemisphere on the Floating potential is in evidence.