



A measurement of the TPMU - PROBA II Microsatellite Instrument and its comparison with the SWARM Langmuir Probes results

Katerina Podolska, Frantisek Hruska, and Vladimir Truhlik

Institute of Atmospheric Physics, Academy of Sciences of the Czech Republic, Prague, Czech Republic (kapo@ufa.cas.cz)

This contribution deals with the long-term measurement of the floating potential (FP) and the electron temperature (Te) provided by the Thermal Plasma Measurement Unit (TPMU) scientific instrument on-board the PROBA II microsatellite. The device is working with limitations of scientific measurements caused very probably by installed on-board software. This brings lower data volume as it was planned. Affected are the ion measurement and partially the electron temperature measurement.

We present comparisons of the TPMU long-term measurement of the FP and the Te with the Te and the FP SWARM Langmuir Probes measured data. We implement the method of stochastic comparison of the probability distribution between measurements of FP and Te of both instruments to recognize seasonal and solar activity similarities. The analysis is performed for all seasons of the period from the years 2013 – 2015 for the Equatorial region, North and South hemisphere. The data are divided into the three groups by the geographical latitude to the Northern hemisphere ($\text{lat} > 15^\circ$), the Southern hemisphere ($\text{lat} < -5^\circ$) and Equatorial zone ($\text{lat } 15^\circ - -15^\circ$) and to four groups by season. This comparison confirms that the TPMU PROBAIL Te and FP measurement statistically corresponds to the SWARM Te and FP measurement.

The annual seasonal changes in the floating potential are observed in this analysis. Changes in the beginning, the end and duration of seasons over a period of years reflect also changes of the Kp index. Changes over the solar cycle are also visible. The main TPMU goal is the validation and testing of new design of the instrument which is necessary for possible applications of TPMU design for future scientific missions.