

The relationship between the space environments of high energy electrons and the satellite anomaly caused by internal charging

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Spacecraft charging is still the main part of the satellite anomaly which is caused by the space environment. Choi et al. (2011) analyzed satellite anomaly events occurred at the geostationary Earth orbit (GEO). They found a strong relationship between the occurrence of satellite anomaly and Kp index. This result suggests that the majority of anomalies are caused by enhancement of middle and high energy electrons due to geomagnetic disturbances. There are two kinds of spacecraft charging. One is surface charging and the other is internal charging. Surface and internal charging are caused by few keV and few MeV electrons respectively. In our presentation, we will report one sample case of satellite anomaly caused by the internal charging, and discuss the correlation with the enhancement of high energy electron observation, and introduce the Monte-Carlo simulation results of internal charging due to the accumulations of high energy electrons on the material of the electrical device within the satellite body.

Keywords: Spacecraft charging, Satellite anomaly, Internal charging