The observational study for high energy particles below L=2.1 using Hisaki

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Hisaki is a low-altitude satellite with an orbital altitude of about 1000 km and an inclination of 30 degrees which is equivalent to 1.2-2.1 in L-value. Hisaki has been designed as an EUV spectroscope for observing Jupiter and other planets, but its photon-detector is also sensitive to radiation such as protons and electrons. In particular, electrons of more than 5 MeV and protons of more than 50 MeV can penetrate the shield of the instrument and reach the detector. Therefore, Hisaki can be used as a radiation monitor in the low altitude area (low L-value).

The Hisaki launched in November 2013 has been observing planets for more than 6 years. We have summarized the count rates caused by radiation and clarified that the trend is dependent on solar activity in orbital regions with L-values greater than 1.8. In addition, it was confirmed that the count increased several times with a timescale of several hours in response to solar activity like SEP. These phenomena were also captured by radiation monitors onboard the ISS in the orbital region of higher L-values (L>3) and were recognized as SEP particle injection. However, no clear observational evidence has been obtained for the behavior near L-value 2.

In this presentation, we will discuss the behavior of high-energy particle at various time constants in the low-altitude region around Earth.

Keywords: High energy particle, Hisaki, Low altitude