

2010年4月の放射線帯高エネルギー電子の増加について

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Unusual flux enhancement of relativistic electrons at geosynchronous orbit in early April, 2010

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We report an unusually large flux enhancement of MeV electrons at geosynchronous orbit (GEO) during a magnetic storm occurred on April 6, 2010. An interplanetary coronal mass ejections (ICME) faster than 800 km/s caused the main phase of this storm, and then a high-speed coronal hole stream (CHS) arrived at the earth. The minimum Dst index during the April storm was -73 nT. The large flux enhancement of MeV electrons at GEO started from the end of the main phase. The maximum flux of $1.8 \times 10^5/\text{cm}^2 \text{ sec str}$ was recorded on April 7, which was larger than the highest flux enhancement event at GEO during solar cycle 23 [Kataoka and Miyoshi, 2008, GRL]. The peak amplitude of the magnetic field H component at GEO became smaller than usual, indicating the inflation of the dayside magnetosphere and the expansion of the trapping region of the outer belt. In fact, the solar wind density and dynamic pressure were extremely small around the end of the main phase and the early recovery phase. As shown by our previous studies, combined solar wind structure of ICME and subsequent CHS is capable of creating the rarefied solar wind that causes the inflation of the dayside magnetopause. We discuss the importance of the double rarefaction mechanism to understand the April 2010 event