

Magnetic field dipolarization and its associated ion flux variations in the deep inner magnetosphere: Arase and Michibiki-1 satellite observations

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The Arase satellite observed clear dipolarization signatures at $L \sim 4.6-4.8$ and magnetic local time (MLT) $\sim 5.5-5.7$ h around 15:00 UT on 27 March 2017 when $Dst \sim -70$ nT. Strong magnetic field fluctuations were embedded in the dipolarization and their characteristic frequency was close to the local gyrofrequency of O^+ ions. After the dipolarization, O^+ flux was enhanced at 5–20 keV, while H^+ flux showed no clear variations. These observations provide evidence for the selective acceleration of O^+ ions by the magnetic fluctuations. At the same time, the Michibiki-1 satellite was located at $L=6.6-7.1$ and $MLT=22.2-23.9$ h. In four events out of six, magnetic field dipolarization was not identified at premidnight by Michibiki-1 but near dawn by Arase. This surprising MLT distribution of dipolarization in the inner magnetosphere may be attributed to an eastward skewing of partial ring current that is created during the storm main phase.