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Recurrent dipolarization energisation and aurora: corotation or modulation?

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Planetary magnetospheres receive plasma and energy from the Sun or moons of planets, and consequently stretch magnetic field lines. From time to time, energy is rapidly released in the magnetosphere by reconfiguring the magnetic fields (i.e. magnetic dipolarization). The energy subsequently precipitates into the ionosphere and upper atmosphere, causing auroral intensifications. Using measurements from multiple instruments onboard the Cassini spacecraft, we reveal that magnetic dipolarization event at Saturn could reoccur after one planetary rotation, and name them as recurrent magnetic dipolarization. The dipolarization events also exist in the dayside magnetosphere, which has no known precedent with terrestrial magnetospheric observations. The recurrent dipolarization event is believed to energize charged particles and produce enhanced aurora in Saturn's polar region. The concurrent aurora and energetic neutral atom emissions are also found to be nearly corotating with the planet.