R006-21
Zoom meeting B ：11/1 PM2 （15:45-17:30）
16:45-17:00

Field-aligned low-energy O+ ion flux variations in the inner magnetosphere observed by Arase

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Recent studies employing the Van Allen Probes [Chaston et al., 2015; Kistler et al., 2016; Nose et al., 2016; Gkioulidou et al., 2019] have shown that unidirectional/bidirectional energy-dispersed O+ flux appears a few minutes after substorms in the inner magnetosphere and lasts for ~10 min with a decrease in its energy from ~5 keV to 10?100 eV. Nose et al. [2016] found that the unidirectional energy-dispersed O+ flux is observed in 80% of the total events and that its direction is parallel (antiparallel) to the magnetic field when the Van Allen Probes are located below (above) the geomagnetic equator. This strongly implies that these O+ ions are extracted from the ionosphere at the onset of substorms and flow along the magnetic field toward the geomagnetic equator. Low-energy O+ ions may be scattered near the geomagnetic equator and remain there, although the scattering mechanism is yet unknown. They will contribute to the O+ content of the inner magnetospheric plasma, and the resultant increase in the O+ density may provide a precondition for the O+-rich ring current.
In the present study, we examine the low-energy O+ ion flux variations observed by the Arase satellite in the inner magnetosphere. Magnetic field dipolarization is selected from the magnetic field data obtained by the fluxgate magnetometer (MGF) [Matsuoka et al., 2018] in the period of April 1?October 31, 2017 and July 1, 2018?January 31, 2019, and we find 192 events. Data from the low-energy particle experiments?ion mass analyzer (LEPi) [Asamura et al., 2018] are examined to check if the selected dipolarization events are accompanied by low-energy O+ ion flux variations in the direction along the local magnetic field. There are some events of the low-energy O+ ion flux enhancement, which (1) starts a few minutes after the dipolarization onset, (2) has energy-dispersed signatures with decreasing energy down to ~10 eV, (3) can be observed in both storm and non-storm periods, (4) has a field-aligned distribution (pitch angle is ~ 0 degree below the equator and ~ 180 degrees above the equator), and (5) causes increases of the O+ density and the O+/H+ density ratio by ~8 times and ~3 times, respectively. In the presentation, we will show the analysis results in more detail and discuss their contribution to the O+ content of the inner magnetospheric plasma, such as the warm plasma cloak and the oxygen torus.