R006-37
Zoom meeting B ：11/2 PM1 (13:45-15:30)
14:30〜14:45

Preferential energization of lower-charge-state heavier ions in the near-Earth magnetotail

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O+ ions make a significant contribution to plasma pressure in the inner magnetosphere during magnetic storms. The storm-time O+ enhancements are primarily caused by enhanced supply from the ionosphere and effective energization in the magnetotail. In order to characterize the magnetotail process that dominates the effective energization, we examine differences in energy spectra of energetic 10-180 keV/q ions between different ion species: H+, He++, He+. O++, and O+. We use observations made by the MEP-i instrument on the Arase (ERG) spacecraft on the nightside in the radial distance of ˜5 Re to ˜7 Re during the main and early recovery phases of the May 2017 and July 2017 storms. The comparisons of energy spectra show that, for the same charge states, heavier ions are more energized than lighter ions. For the same mass, lower-charge-state ions are more energized than higher-charge-state ions. The spectra exhibited a sharp decrease at high energies for all ion species, while the spectra for more energized ions were shifted toward higher energies, compared to those for less energized ions. The results suggest that the preferential energization results from temperature increase rather than generation of energetic ions at the high-energy tail. Considering temporal and spatial scales of heavy ion kinetic motions, we conclude that the preferential energization of lower-charge-state heavier ions occurs during the course of dipolarization, likely due to non-adiabatic heating in the near-Earth plasma sheet, effective trapping during the transport by localized flow channels, and/or non-adiabatic acceleration around the near-Earth flow-braking region.