



## **Contribution from proton and oxygen ions to plasma pressure in the Earth's inner magnetosphere: Arase (ERG) observations**

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The ring current is mainly controlled by the ion pressure and its spatial gradient. The ion pressure is dominated by ions with energies of a few to a few 100s keV. Oxygen ions of ionospheric origin can be energized in the plasma sheet and/or the inner magnetosphere up to a few tens to a few hundreds of keV. The ionospheric oxygen ions make a significant contribution to the ion pressure during geomagnetically active periods.

This paper examines spatial variations and energy-spectral evolution of energetic ions during the main and early recovery phases of magnetic storms with the Dst index minimum smaller than -50 nT during the first year of the Arase (ERG) mission. We primarily use ion data from the MEP-i instrument on board the Arase (ERG) satellite [1]. The instrument measures energetic ions with energies of 9-180 keV/q; ion mass-per-charge is derived from energy and velocity measurements by an electrostatic analyzer and the time-of-flight system, respectively. We investigate the energy and mass dependence of the contribution to total pressure to discuss about possible mass-dependent/selective acceleration in the near-Earth plasma sheet. We also investigate unstable ion velocity distributions that potentially characterize the generation of plasma waves such as electron ion cyclotron (EMIC) waves.

1. S. Yokota, S. Kasahara, T. Mitani, K. Asamura, M. Hirahara, T. Takashima, K. Yamamoto, and Y. Shibano, "Medium-energy particle experiments— ion mass analyzer (MEP-i) onboard ERG (Arase)," *Earth, Planets and Space*, **69**, 172, December 2017, doi:10.1186/s40623-017-0754-8