Van Allen Probes によってリングカレント領域で観測された周期的なイオンフラックスの変動

Periodic Ion Flux Modulation observed by Van Allen Probes in Ring Current Region

*山本 和弘1, 能勢 正仁2, Kletzing Craig3, Smith Charles4, MacDowall Robert5, Spence Harlan4, Reeves Geoff6,7, Larsen Brian6,7

*Kazuhiro Yamamoto1, Masahito Nose2, Craig Kletzing3, Charles Smith4, Robert MacDowall5, Harlan Spence4, Geoff Reeves6,7, Brian Larsen6,7

1. Graduate School of Science, Kyoto University, 2. Data Analysis Center for Geomagnetism and Space Magnetism, Graduate School of Science, Kyoto University, 3. Department of Physics and Astronomy, University of Iowa, 4. Institute for the Study of Earth, Oceans and Space, University of New Hampshire, 5. Solar System Exploration Division, Goddard Space Flight Center, 6. Space Sciences and Applications Group, Los Alamos National Laboratory, 7. Space Sciences Division, The New Mexico Consortium

In the drift-bounce resonance that was theoretically introduced by Southwood et al. [1969], the interaction is expected between ULF waves and electrons or ions. Through the interaction, charged particles in the ring current can be accelerated or deaccelerated and the population of ring current particles can be changed. There are many observations of drift-bounce resonance for protons [e.g., Kokubun et al., 1977; Takahashi et al., 1990; Dai et al., 2013], whereas only a few observations of drift-bounce resonance are reported for O⁺ ions [Yang et al., 2010, 2011].

In this study, we report several events of periodic flux modulation of protons and O⁺ ions observed by Van Allen Probes in 2012-2016. We find periodic flux modulation of O⁺ ions and Pc5 waves on November 4, 2015 (event A) and November 30, 2015 (event B). In event A, the flux modulation is recognized at 1-50 keV and dispersed in energy. In event B, however, the flux modulation is limited at ~10 keV. We will examine dependence of the flux variations on pitch angles and energies, and discuss if the variations are due to drift-bounce resonance.

Keywords: wave-particle interaction, drift-bounce resonance, geomagnetic pulsations, oxygen ions, ring current, Van Allen Probes

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