2015年1月7日および3月18日の磁気嵐におけるリングカレントイオンの特徴

桂華 邦裕 [1]; 関 華奈子 [2]; 能勢 正仁 [3]; 町田 忍 [1]; 三好 由純 [2]; Lanzerotti Louis J.[4]; Mitchell Donald[5]; Gkioulidou Matina[5]; Gerrard Andrew[6]; Manweiler Jerry W.[7]
[1] 名大・STE 研; [2] 名大 STE 研; [3] 京大・理 地磁気センター; [4] ニュージャージー工科大学; [5] JHU/APL; [6] NJIT; [7] Fundamental Technologies, LLC

Characteristics of ring current protons and oxygen ions during the 7 January 2015 and 17 March 2015 storms

Kunihiro Keika[1]; Kanako Seki[2]; Masahito Nose[3]; Shinobu Machida[1]; Yoshizumi Miyoshi[2]; Louis J. Lanzerotti[4]; Donald Mitchell[5]; Matina Gkioulidou[5]; Andrew Gerrard[6]; Jerry W. Manweiler[7]
[1] STEL, Nagoya Univ.; [2] STEL, Nagoya Univ.; [3] DACGSM, Kyoto Univ.; [4] NJIT; [5] JHU/APL; [6] NJIT; [7] Fundamental Technologies, LLC

http://st4a.stelab.nagoya-u.ac.jp/jp/

We investigate enhancements and losses of energetic (˜50-˜500 keV) protons and oxygen ions during two intense storms on January 7 and March 17 in 2015. We use proton and oxygen ion data from RBSPICE onboard Van Allen Probes.

During the January 7 storm (Dst_{min} = -99 nT), Van Allen Probes explored the inner magnetosphere on the night side, with both spacecraft located around midnight at apogee. Their orbits were in opposite phase. RBSPICE data are available from both spacecraft during the rapid recovery of the storm. We analyze energy spectra of both species to identify whether the ring current is symmetric or not, and determine the dominant loss process.

During the March 17 storm (Dst_{min} = -223 nT), Van Allen Probes traveled in the pre-midnight sector during the outbound paths and around midnight during the inbound path. The orbits of the two spacecraft were in opposite phase. The Dst index during the storm showed a two-step decrease with the first minimum at 9 UT and the second at 22 UT. Enhancements of ring current ions began at RBSPICE-B at ˜7 UT, and RBSPICE-A entered the ring current region at ˜9 UT. The RBSPICE data show penetration of energetic protons (mu˜0.1 keV/nT) down to L˜4 during the first storm development. Protons penetrated more deeply (as low as L˜3) during the second enhancement. The protons, which we confirmed made a dominant contribution to energy density at L = 3-4, are more enhanced in flux around the storm maximum. The flux of 200-400 keV oxygen ions was enhanced and localized around midnight near the end of the first storm development. Oxygen ion enhancements during the second development were seen in a wide range of MLT (pre-midnight to midnight). We examine the evolution of ion energy spectra to identify whether each phase of the multi-step storm development was due to deep penetration of transport/injections, density enhancements, or/and non-adiabatic acceleration of protons and oxygen ions.