磁気圏の磁気双極子化に伴い発生する磁場擾乱：あらせ観測結果

松岡 彩子 [1]; 能勢 正仁 [2]; 三好 由純 [3]; 寺本 万里子 [4]; 野村 麗子 [5]; 藤本 晶子 [6]; 田中 良昌 [7]; 篠原 学 [8]; 篠原 育 [9]; 笠原 禎也 [10]; 笠羽 康正 [11]; 石坂 圭吾 [12]; 松田 昇也 [13]; 小路 真史 [3]; 中川 朋子 [14]
[1] JAXA 宇宙研; [2] 名大・宇地研; [3] 名大 ISEE; [4] 名大・宇地研; [5] JAXA; [6] 九工大; [7] 国立極地研究所/総研大; [8] 鹿児島高専; [9] 宇宙研／宇宙機構; [10] 金沢大; [11] 東北大・理; [12] 富山県大・工; [13] ISAS/JAXA; [14] 東北工大・工・情報通信

Magnetic field disturbances associated with the magnetic dipolarization observed by Arase (ERG) in the inner magnetosphere

Ayako Matsuoka[1]; Masahito Nose[2]; Yoshizumi Miyoshi[3]; Mariko Teramoto[4]; Reiko Nomura[5]; Akiko Fujimoto[6]; Yoshimasa Tanaka[7]; Manabu Shinohara[8]; Iku Shinohara[9]; Yoshiya Kasahara[10]; Yasumasa Kasaba[11]; Keigo Ishisaka[12]; Shoya Matsuda[13]; Masafumi Shoji[3]; Tomoko Nakagawa[14]
[1] ISAS/JAXA; [2] ISEE, Nagoya Univ.; [3] ISEE, Nagoya Univ.; [4] ISEE, Nagoya University; [5] JAXA; [6] Kyutech; [7] NIPR/SOKENDAI; [8] Kagoshima National College of Technology; [9] ISAS/JAXA; [10] Kanazawa Univ.; [11] Tohoku Univ.; [12] Toyama Pref. Univ.; [13] ISAS/JAXA; [14] Tohoku Inst. Tech.

Magnetic field disturbances often appear in the night-side magnetosphere associated with the magnetic dipolarization. The disturbances carry significant energy which is considered to be released by the global configuration change of the magnetosphere, The energy normally directs to the earth in the inner magnetosphere in the several Re distance from the earth. It suggests that the disturbances are generated in the near-earth magnetosphere, about 10 Re distance from the earth. However, it is not clear how much of the disturbance energy would dissipate on the way to low altitudes and how much would arrive to the ionosphere.

The Arase (ERG) satellite was launched on December 20, 2016, to investigate the physics in the inner magnetosphere. The energy exchange between particles and fields is one of the major subjects of the Arase project. We are studying the magnetic dipolarization and associated disturbances observed by Arase.

In the ARASE orbit magnetic (and electric) disturbances are very often observed when magnetic depolarization occurs. It is consistent with the Van Allen Probes results.

The dipolarization direction of the magnetic disturbances at the plasma sheet boundary layer (PSBL) was aligned with GSM Y direction. In the previous works, magnetic disturbances found at tail PSBL were often linearly polarized and considered to have large perpendicular-k (oblique propagation). Energy is suggested to dissipate by the Landau damping process of kinetic Alfven waves.

Meanwhile, for the magnetic disturbances in the inner magnetosphere associated with the depolarization, the direction of the polarization rotates around the background field. It suggests that the disturbances are torsional mode Alfven wave, in which the polarization direction depends on the location. The torsional mode Alfven waves are considered to propagate in the solar atmosphere and heat the coronal plasma. By studying the Alfven waves in the earth magnetosphere, we anticipate understanding the heating process by Alfven waves in the universe.