

ERG 理論・モデリング・総合解析班およびERGサイエンスセンター現状報告 ERG Modeling/Theory Team and ERG Science Center: A basis to investigate the dynamics of the inner magnetosphere

関 華奈子^{1*}, 三好 由純¹, 天野 孝伸², 齊藤 慎司³, 宮下 幸長¹, 堀 智昭¹, 大村 善治⁴, 海老原 祐輔⁴, 能勢 正仁⁵, 加藤 雄人⁶, 家田 章正¹, 梅田 隆行¹, 齊藤 (長谷川) 実穂¹, 北村 成寿¹, 中溝 葵¹, 瀬川 朋紀¹, 篠原 育⁷, 松本 洋介⁸, 中野 慎也⁹, 西村 幸敏¹⁰, 中村 雅夫¹¹, 吉川 顕正¹²

Kanako Seki^{1*}, Yoshizumi Miyoshi¹, Takanobu Amano², Shinji Saito³, Yukinaga Miyashita¹, Tomoaki Hori¹, Yoshiharu Omura⁴, Yusuke Ebihara⁴, Masahito Nose⁵, Yuto Katoh⁶, Akimasa Ieda¹, Takayuki Umeda¹, Miho Saito (Hasegawa)¹, Naritoshi Kitamura¹, Aoi Nakamizo¹, Tomonori Segawa¹, Iku Shinohara⁷, Yosuke Matsumoto⁸, Shin'ya Nakano⁹, Yukitoshi Nishimura¹⁰, Masao Nakamura¹¹, Akimasa Yoshikawa¹²

¹ 名古屋大学太陽地球環境研究所, ² 東京大学大学院理学系研究科, ³ 名古屋大学大学院理学研究科, ⁴ 京都大学生存圏研究所, ⁵ 京都大学大学院理学研究科, ⁶ 東北大学大学院理学研究科, ⁷ JAXA 宇宙科学研究所, ⁸ 千葉大学大学院理学研究科, ⁹ 統計数理研究所, ¹⁰ カリフォルニア大学ロサンゼルス校, ¹¹ 大阪府立大学, ¹² 九州大学大学院理学研究院

¹STEL, Nagoya University, ²Graduate School of Science, University of Tokyo, ³Graduate School of Science, Nagoya University, ⁴RISH, Kyoto University, ⁵Graduate School of Science, Kyoto University, ⁶Graduate School of Science, Tohoku University, ⁷ISAS, JAXA, ⁸Graduate School of Science, Chiba University, ⁹ISM, ¹⁰UCLA, USA, ¹¹Osaka Prefecture University, ¹²Graduate School of Science, Kyushu University

Geospace storms are the largest electromagnetic disturbances in the near-Earth space caused by CMEs and CIRs accompanied by the strong southward IMF. During the geospace storms, it is observationally known that the particle acceleration up to the relativistic energies are taking place as a consequence of dynamic interactions of the magnetic and electric field and particles. Aiming at understanding of physical mechanisms of the particle acceleration and regional couplings in solar-terrestrial system during the geospace storms the ERG project is underway in Japan. One of characteristics of the ERG project is close collaboration between three task teams, namely, the satellite, ground-based observation, and modeling/theory teams.

The ERG modeling/theory team has developed several numerical models for geospace studies. For example, we have developed new physics-based models for the global dynamics of the ring current (GEMSIS-RC model) and radiation belt (GEMSIS-RB model) as a part of the GEMSIS phase-2 project at STEL. GEMSIS-RC is a self-consistent and kinetic numerical simulation code solving the five-dimensional collisionless drift-kinetic equation for the ring-current ions in the inner-magnetosphere coupled with Maxwell equations. GEMSIS-RBW model implement the wave-particle interaction process into the three-dimensional relativistic gyrokinetic test particle simulation code. ERG modeling/theory team has also conducted comparative studies of simulation results and ERG-related ground observations.

In order to provide efficient study environment for the trinity collaboration in the ERG project, we have also developed ERG science center function as a part of the GEMSIS phase-2 project at STEL in collaboration with the THEMIS and IUGONET teams. One of important tasks of the ERG science center is to provide integrated data analysis tools and combined database not only for the ERG satellite but also for related ground-based observations and numerical modeling. The CDF (Common Data Format) is adopted as data format for the ERG database, and the CDF database is incorporated into integrated data analysis tools based on TDAS (THEMIS data analysis software suite). We report the current status of the ERG science center and some of modeling/theory team activities in the presentation.

キーワード: ジオスペース, ERG, モデリング, 理論, サイエンスセンター, 総合解析

Keywords: geospace, ERG, modeling, theory, science center, integrated studies