**R006-P15**
**ポスター 1 ：11/24　PM1/PM2 （13:15-18:15）**

#山川 智嗣 [1)], 関 華奈子 [2)], 三好 由純 [3)], 中溝 葵 [4)], 山本 和弘 [5)]
([1] 名古屋大学 ISEE, [2] 東大理・地球惑星科学専攻, [3] 名大 ISEE, [4]NICT, [5] 名大 ISEE

# Variation of ring current ions during magnetic storms on 22 July 2009 based on the GEMSIS magnetosphere-ionosphere coupled model

#Tomotsugu Yamakawa[1)], Kanako Seki[2)], Yoshizumi Miyoshi[3)], Aoi Nakamizo[4)], Kazuhiro Yamamoto[5)]
([1]Institute for Space-Earth Environmental Research, Nagoya University, [2]Department of Earth and Planetary Science, Graduate School of Science, University of Tokyo, [3]Institute for Space-Earth Environement Research, Nagoya University, [4]National Institute of Information and Communications Technology, [5]Institute for Space-Earth Environmental Research ([ISEE), Nagoya University

During magnetic storms, energetic particles are injected on the nightside and westward ring current is formed in the inner magnetosphere. Understanding the dynamics of ring current particles is essential for both the inner magnetosphere and ionosphere, since the ring current causes the variation of the magnetic field and transports the energy from the magnetosphere to the ionosphere through the field aligned current (FAC). The distribution of the ring current during magnetic storms depends on its transport, acceleration, and loss [e.g., Fok et al., 2001]. Recently, Yamakawa et al. [2023] reproduced the formation of ring current and plasmasphere during substorms based on the GEMSIS magnetosphere-ionosphere coupled model. However, this simulation was performed under simplified and static conditions for Region-1 FAC and ion injection on the nightside, which are not true for the inner magnetosphere. The purpose of this study is to investigate the variation of ring current particles during magnetic storms with the input of time-varying Region-1 FAC and ion injection, which are based on the observed solar wind parameters.

In this study, we focused on a magnetic storm on 22 July 2009 and compared simulation results with previous ring current model (CRCM) [Fok et al., 2001] and spacecraft observations. On 22 July 2009, the Dst dropped nearly -80 nT at 07:00 and 10:00 UT [Fok et al., 2010]. We investigated the variation of the inner magnetosphere based on the magnetosphere-ionosphere coupled model between GEMSIS-RC [Amano et al., 2011] and GEMSIS-POT [Nakamizo et al., 2012]. GEMSIS-RC model solves 5-D drift-kinetic equation for ion PSD and Maxwell equations self-consistently. GEMSIS-POT is a 2-D potential solver in the ionosphere. We included the loss term of ring current ions due to charge exchange. The coupled model enabled us to simulate the transport, acceleration, and loss of ring current ions and formation of the plasmasphere. The density and temperature of energetic ions at outer boundary on the nightside are based on the empirical model [Tsyganenko and Mukai, 2003] and the distribution of Region-1 FAC is given by the Weimer model [Weimer, 2001] as well as previous ring current model [Fok et al., 2010]. In this study, the latitudinal distribution of the FAC between lat = 65° and 80° was fitted with a Gaussian function at each MLT grid. By fitting the FAC, we obtained the smoothed distribution of Region-1 FAC, which was used for potential calculation in GEMSIS-POT. Simulation results suggest that intensity of FAC strongly depends on IMF Bz. The GEMSIS coupled model reproduced the shrink of the plasmapause on the nightside and formation of the plasmaspheric drainage plume on the dayside associated with the development of the ring current in the inner magnetosphere. In this event, THEMIS-D observed the inner magnetosphere and Pc5 ULF waves (3 mHz) were observed on the duskside from 09:00 UT to 10:00 UT. In this presentation, we will discuss the variation of ring current and the excitation of ULF waves by ring current ions by comparing with the results of CRCM model and THEMIS observations.