磁気圏グローバルモデルを用いた木星オーロラ増光時の磁気圏ダイナミクス

垰 千尋 [1]; 深沢 圭一郎 [2]; 木村 智樹 [3]; 北 元 [4]; 土屋 史紀 [5]; 村上 豪 [6]
[1] 情報通信研究機構; [2] 京大・メディアセンター; [3] RIKEN; [4] 東北大・理・惑星プラズマ大気; [5] 東北大・理・惑星プラズマ大気; [6] ISAS/JAXA

Magnetospheric dynamics during Jupiter auroral enhancements using a global magnetospheric model

Chihiro Tao[1]; Keiichiro Fukazawa[2]; Tomoki Kimura[3]; Hajime Kita[4]; Fuminori Tsuchiya[5]; Go Murakami[6]
[1] NICT; [2] ACCMS, Kyoto Univ.; [3] RIKEN; [4] Tohoku Univ.; [5] Planet. Plasma Atmos. Res. Cent., Tohoku Univ.; [6] ISAS/JAXA

The effect of solar wind variations on the rotation-dominated Jupiter magnetosphere have been investigated using various observations and simulations, while its physical mechanism of the auroral enhancements during solar wind dynamic pressure enhancements is not fully understood. Continuous monitoring of Jupiter auroral spectra using a spectrometer EXCEED (Extreme Ultraviolet Spectroscope for Exospheric Dynamics) on board the planetary space telescope Hisaki reveals the variations of aurora and precipitating auroral electrons during solar wind dynamic pressure enhancements. Application of the electron acceleration theory to the observed parameters suggests enhancements of magnetospheric source currents during the magnetospheric compression. This source current enhancement is proposed to be contributed by the source plasma variation or source position change [Tao et al., 2016JGR].

In order to evaluate the magnetospheric plasma variation during the solar wind compression, we have investigated the magnetospheric dynamics using a magnetohydrodynamic (MHD) simulation model of the Jovian magnetosphere [e.g., Ogino et al., 1998; Fukazawa et al., 2006]. The magnetospheric compression at middle-magnetosphere is traced by a conservation of the magnetic flux of equipotential shell regions. Variations of the magnetospheric plasma density, temperature, and source current density are derived in each shell with various solar wind dynamic pressure values. Dawn-dusk asymmetry of the equipotential shell is seen for the larger pressure case, due to the magnetospheric plasma convection. Variation of the parameters and comparison with the observation will be discussed in the presentation.