[EE] Eveningポスター発表 | セッション記号 P (宇宙惑星科学) | P-EM 太陽地球系科学・宇宙電磁気学・宇宙環境

[P-EM15]Dynamics in magnetosphere and ionosphere

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This session provides an opportunity to present recent results from satellite and ground-based observations and theoretical and simulation studies on the magnetosphere, ionosphere, and their coupling system. We invite contributions dealing with various phenomena related to the magnetosphere-ionosphere system: solar wind-magnetosphere interaction, magnetosphere-ionosphere convection, field-aligned current, magnetic storms/substorms, neutral-plasma interaction, ionospheric ion inflow and outflow, aurora phenomena, and so forth. Discussions on planetary and satellite ionosphere and magnetospheres, future missions and instrument developments are also welcome.

[PEM15-P25]Effects of Ionospheric Hall Polarization on Magnetospheric Configurations and Dynamics in Global MHD Simulation

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キーワード：磁気圏電離圏結合、電離圏分極、磁気圏シミュレーション

We investigate how the M-I coupling and boundary conditions affects the results of global simulations of the magnetosphere. More specifically, we examine the effects of ionospheric Hall polarization on magnetospheric convection and dynamics by using an MHD code developed by *Tanaka et al*. [2010]. This study is motivated by the recently proposed idea that the ionospheric convection is modified by the ionospheric polarization [*Yoshikawa et al*., 2013].

We perform simulations for the following pairs of Hall conductance and IMF-By; Hall conductance set by α$_{H}$ = 2, 3.5, 5, and uniform distribution (1.0 [S] everywhere), where RH is the ratio of Hall to Pedersen conductance, and IMF-By of positive, negative, and zero. The results are summarized as follows.

(a) Large-scale structure: In the cases of uniform Hall conductance, the magnetosphere is completely symmetric under the zero IMF-By. In the cases of non-uniform Hall conductance, the magnetosphere shows asymmetries globally even under the zero IMF-By. Asymmetries become severe for larger RH. The results indicate that ionospheric Hall polarization is one of the important factors to determine the global structure.

(b) Formation of NENL: The location becomes closer to the earth and timing becomes earlier for larger α$_{H}$. The difference is considered to be related to the combined effects of field lines twisting due to ionospheric Hall polarization and M-I energy/current closures.

(c) Near-earth convection: In the cases of non-uniform Hall conductance, an inflection structure is formed around premidnight sector on equatorial plane inside 10 R_E. Considering that the region 2 FAC is not sufficiently generated in MHD models, the structure corresponds to a convection reversal often shown in the RCM. Previous studies regard the structure as the Harang Reversal in the magnetosphere. In the cases of uniform Hall conductance, by contrast, such structure is not formed, indicating that the Harang Reversal may not be formed without the effect of ionospheric Hall polarization.

The above initial research strongly suggests that the ionospheric Hall polarization plays a significant role in the M-I system.