Japan Geoscience Union Meeting 2013
(May 19-24 2013 at Makuhari, Chiba, Japan)

PEM07-P07 会場:コンベンションホール 時間:5 月 22 日 18:15-19:30

Nonlinear evolution of electrostatic solitary waves in the Earth's boundary layers: two-fluid warm plasma simulations
Nonlinear evolution of electrostatic solitary waves in the Earth's boundary layers: two-fluid warm plasma simulations

Amar Kakad[1*], Yoshiharu Omura[1]
Amar Kakad[1*], Yoshiharu Omura[1]

[1]Research Institute for Sustainable Humanosphere, Kyoto University, Japan
[1]Research Institute for Sustainable Humanosphere, Kyoto University, Japan

A two-fluid warm plasma model of electrostatic solitary waves propagating parallel to the magnetic field in magnetospheric boundary layer plasma is presented. The model uses the approach of stationary-profile traveling coordinate transformation; as a result it provides only time-stationary solutions that represent the electrostatic solitary waves in stationary frame. These solutions do not provide information on the evolutionary characteristics of solitary structures. Such models failed to provide information about the sources responsible for the generation of electrostatic solitary waves. To address these issues, we carry out one-dimensional fluid simulation of electrostatic solitary waves propagating parallel to the magnetic field in electron-ion plasmas. The role of various perturbations in the generation of electrostatic solitary structures is investigated in detail. Enlightened by our simulation results, we speculate that the solitary structures observed in magnetospheric boundary layer plasma may have similar generation mechanism.

キーワード: Electrostatic solitary waves, plasma waves, Fluid simulation
Keywords: Electrostatic solitary waves, plasma waves, Fluid simulation