れいめい衛星で観測したオーロラ微細構造形成の研究

伊藤 祐毅 [1]; 浅村 和史 [2]; 坂野井 健 [3]; 海老原 祐輔 [4]; 山崎 敦 [5]; 小淵 保幸 [6]; 平原 聖文 [7]; 藤本 正樹 [8]
[1] 東大・理・地球惑星科学; [2] 宇宙研; [3] 東北大・理; [4] 名大高等研究院; [5] 宇宙科学研究本部; [6] （株）ジェネシア; [7] 東大・理・地惑; [8] 宇宙機構・科学本部

Study on auroral fine-scale structures observed by REIMEI satellite

Yuki Ito[1]; Kazushi Asamura[2]; Takeshi Sakanoi[3]; Yusuke Ebihara[4]; Atsushi Yamazaki[5]; Yasuyuki Obuchi[6]; Masafumi Hirahara[7]; Masaki Fujimoto[8]
[1] Earth and Planetary Science, The University of Tokyo; [2] ISAS/JAXA; [3] PPARC, Grad. School of Sci., Tohoku Univ.; [4] Nagoua Univ., IAR; [5] ISAS/JAXA; [6] Genesia Corp.; [7] Dept. Earth & Planet. Sci, Univ. Tokyo; [8] ISAS, JAXA

Reimei satellite observes that optical fine-scale structures in auroral arcs often drift toward arc-aligned direction. In northern hemisphere, most of the structures in poleward arc move eastward, and those of equatorward arc move westward. These directions are consistent with directions of ExB drift, when U-shaped potential structure is assumed above the arcs. However, precise mechanisms lead by the ExB drift produces the movement of auroral arcs is still unclear.

On the other hand, electron acceleration in field-aligned direction due to inertial Alfven waves(IAW) is considered to be one of mechanisms to generate fine-scale optical auroral emissions. And numerical simulations show that IAW can make energy-time dispersions of precipitating electrons. We selected events of the electron energy-time dispersions from Reimei data set and examined drift directions of the auroral arcs at geomagnetic footprint.

We will present results of statistical analysis on the plasma structures related with the IAW and corresponding optical auroral emissions. More than 70% of the selected period, which contains electron energy-time dispersions, has auroral arcs with fast flow of fine-scale structures at the footprint. When acceleration altitude is estimated with the energy-time dispersions, source altitudes of electrons are calculated to be 1400-6200km. Furthermore we calculated the velocity vector of optical fine-scale structures in auroral arcs by using cross-correlation method. Calculated velocities are 5-25km/s, which are much faster than typical drift velocity of ionospheric plasmas. Instead, these velocities are approximately agree with the order of ExB drift speed at the source region, indicating that the flows are produced by plasma motions in the source region.