

## れいめい衛星観測によるカusp領域・オーロラ帯での電子分布と電離圏イオン加速の比較

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### Observational comparison between the cusp/auroral electrons and the accelerated ionospheric ions using the Reimei results

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The observations by the polar-orbiting satellite, Reimei, at the top-side ionospheric altitude of the noon-midnight sector have brought fine-scale properties of the auroral electrons and the accelerated ionospheric ions to us. It has been frequently observed that the ionospheric ions, dominated probably by O<sup>+</sup> ions, are accelerated in the direction almost perpendicular to the local magnetic field in low-altitude the cusp and the nightside auroral oval, as already reported using the recent Reimei results. These accelerated ion components are called transversely accelerated ions (TAIs) and could be transported into the magnetosphere or the outer space. With special interests in these observational signatures and many related scientific aspects, a number of reports have been published on the basis of the past rocket/satellite measurements and the theoretical/numerical approach. The phenomena would be important also from a viewpoint of the escape of the terrestrial/planetary atmospheric particles. It should also be noted that some of them seem to be associated with the field-aligned downstreaming ions in the nightside meridian, which could be precipitated into the ionosphere by sporadic and small-size downward electric field.

Because the Reimei plasma measurements at the low altitude of about 640 km cover the energy range only from 10 eV up to 12 keV with a common time resolution of 40 msec, the main component detected by the Reimei ion sensor (ISA) should be the rammed O<sup>+</sup> TAIs. The H<sup>+</sup> components at such a low altitude, for instance, would have still lower energies than the lowermost energy threshold of ISA even if the plasma waves like EMIC or the other mechanisms energize the ionospheric H<sup>+</sup>.

The acceleration mechanisms are considered to be excited by the energy inflow from the magnetosphere to the ionosphere, carried by the auroral electrons, the electric field, or plasma waves. The Reimei electron measurements at the 640-km altitude enable us to investigate the correlation of the TAI occurrence with the auroral electron precipitation and the upward or secondary electron component almost inside the acceleration region of the ionospheric ions. The correlation of TAIs with the low-energy (several hundreds of eV) electrons is evident in the cusp observations while the TAI appearance in the nightside auroral oval indicates more complicated relations with the auroral electrons in a wide energy range of a few tens of eV up to more than 10 keV with a variety of pitch angle distribution. The results on these comparisons will be presented in this paper.