Wedge-like ion dispersion: Viking observations and simulations

Yusuke Ebihara[1], Masatoshi Yamauchi[2], Hans Nilsson[2], Masaki Ejiri[1]

[1] NIPR, [2] IRF

Particle drift simulation of low-energy ions with a simple geomagnetic field and the Volland-Stern type convection electric field is found to be capable of investigating dispersed sub-keV ion events deep inside the dayside ring current region observed by Viking.

From the shape of the dispersion in the energy-latitude diagrams, they are called wedge-like dispersions; Type 1 (characteristic energy monotonically increasing with latitude), Type 2 (energy increasing with latitude and subsequently decreasing with latitude), and Type 3 (energy monotonically decreasing with latitude).

All these cases are understood as results of energy-dependent drift motion of ions coming from the nightside near-earth tail if the distribution function in the source region varies in time and space.

Particle drift simulation of low-energy ions (less than few keV) with a simple geomagnetic field (dipole) and the Volland-Stern type convection electric field is found to be capabl

e of investigating dispersed sub-keV ion events deep inside the dayside ring current region observed by Viking.

We will show three types of such events and simulation results.

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All these cases are understood as results of energy-dependent drift motion of ions coming from the nightside near-earth tail if the distribution function in the source region varies in time and space. The results indicate that the wedge-like ion dispersions even may be associated with a substorm injection and/or a localized plasma flow channel in the near-earth tail.