# Akebono/SMS observations of ion outflow in the polar ionosphere

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We estimated the field-aligned velocities of H+, He+, and O+ ions from distribution functions obtained by the suprathermal ion mass spectrometer (SMS) on Akebono satellite in the periods of 1989-1998.

Statistical analysis for altitude, invariant latitude, and magnetic local time shows that the field-aligned velocities are upward in polar region (ILAT > 60 deg) and the large velocities occur near auroral region above 6000km altitude.

In the polar ionosphere above 1000 km altitude, some ions can escape to magnetosphere. It has been clarified by satellite observations that the ion outflow is associated with transverse ion heating and conics as well as polar wind.

Akebono satellite launched on February, 1989, has obtained enormous data about ion outflow, heating, and conics over 10 years. We investigated a long-term variation of ion outflow observed by the suprathermal ion mass spectrometer (SMS) on Akebono.

We made database which includes field-aligned velocities of H+, He+, and O+ ions obtained by SMS in the period of 1989-1998, satellite position, Kp index, and sunspot number. The statistical analysis for altitude, invariant latitude, and magnetic local time shows that

(1) the feild-aligned velocities are upward in polar region (ILAT > 60 deg),
(2) the large velocities occur near auroral region above 6000 km altitude,
(3) location of the high-speed region depends on geomagnetic disturbance,
(4) amplitude of ion velocities may not depend on geomagnetic disturbace.

The high-speed region corresponds to the region in which ion heating and conics occur, and the ion heating and conics may be generated near polar cap boundary.