

夜側オーロラ帯、昼間側カusp・クレフトにおける降込電子構造の間に現れる突発的な降下イオンビーム

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Sporadic downgoing ion beams embedded in the discrete electron precipitations in the auroral and cusp/cleft regions

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One of the most outstanding findings by the Reimei satellite would be downgoing ion beam along the field line. While these signatures are always sporadic, embedded in the discrete electron components in the nightside auroral and cusp/cleft regions. It is general that Reimei repeatedly observes the short-lived ion beams in a crossing of the auroral zone. It is also usual that the field-aligned component of the beam flux is the largest and has the smallest energy. These properties are very similar to the microburst ion precipitations observed in the cusp, as reported by Ebihara (2008). The past polar-orbiting satellites, however, have not observed this type of ion signatures at higher altitudes than Reimei, suggesting that the altitude of Reimei, about 640 km, would be suitable for the observations of beam-like field-aligned ion precipitation signatures. The time resolution of the auroral particle sensors covering an almost full pitch angle range is quite high, matching the measurement of the ion beams with the short duration time, a few hundreds of msec to a few sec. The characteristic energy of the ions distributes from 100 eV up to a few keV. In addition to these short-duration ion beams, Reimei has frequently observed the energy-dispersed ion precipitation components probably with the ionospheric origin at lower latitudes, as reported on the basis of the previous polar satellite observations. In contrast to these well-known precipitating ion signatures, the downgoing ion beams are seen only during the short term at higher latitudes near or adjacent to discrete electron components. The transversely accelerated ions (TAIs) occurring at the ionospheric altitudes are often observed with the downgoing ion beams, which sometimes makes it difficult to distinguish the pitch angle distributions between the ion beams and the TAIs because some of the fluxes perpendicular to the field line overlap. In this presentation, the detailed properties of these sporadic downgoing ion beams would be shown.