Energetic particles in the plasma sheet

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In this study we focus on the relation between thermal particles and non-thermal particles in the plasma sheet.

First, we performed statistical analysis using Geotail/LEP data in order to observe how the high energy particles are distributed in the plasma sheet. We found that the high energy particles have the asymmetry in the direction of Y (dawn-dusk). However the thermal temperature of the plasma sheet doesn't have such an asymmetry clearly. Furthermore Dawn-Dusk asymmetry can be observed at the CPS (central plasma sheet) more clearly.

Second, we discuss the confinement of high energy particles. Because Dawn-Dusk asymmetry can be observed at the CPS more clearly, we considered that the high energy particles are confined in CPS. On the other hand, we found that the high energy particles leak from dawn and dusk edges of the plasma sheet.

Third, to understand the origin of the high energy particles we studied some magnetic reconnection events. Furthermore we studied the events that are a little far from reconnection region. From these studies we could find that thermal heating and non-thermal particles production occur different region in some cases.

From these analyses we discuss the relation between thermal and non-thermal particles taking account the three elements of the convection and confinement and origin of the non-thermal particles.