Electron flux enhancement in the inner radiation belt during magnetic storms

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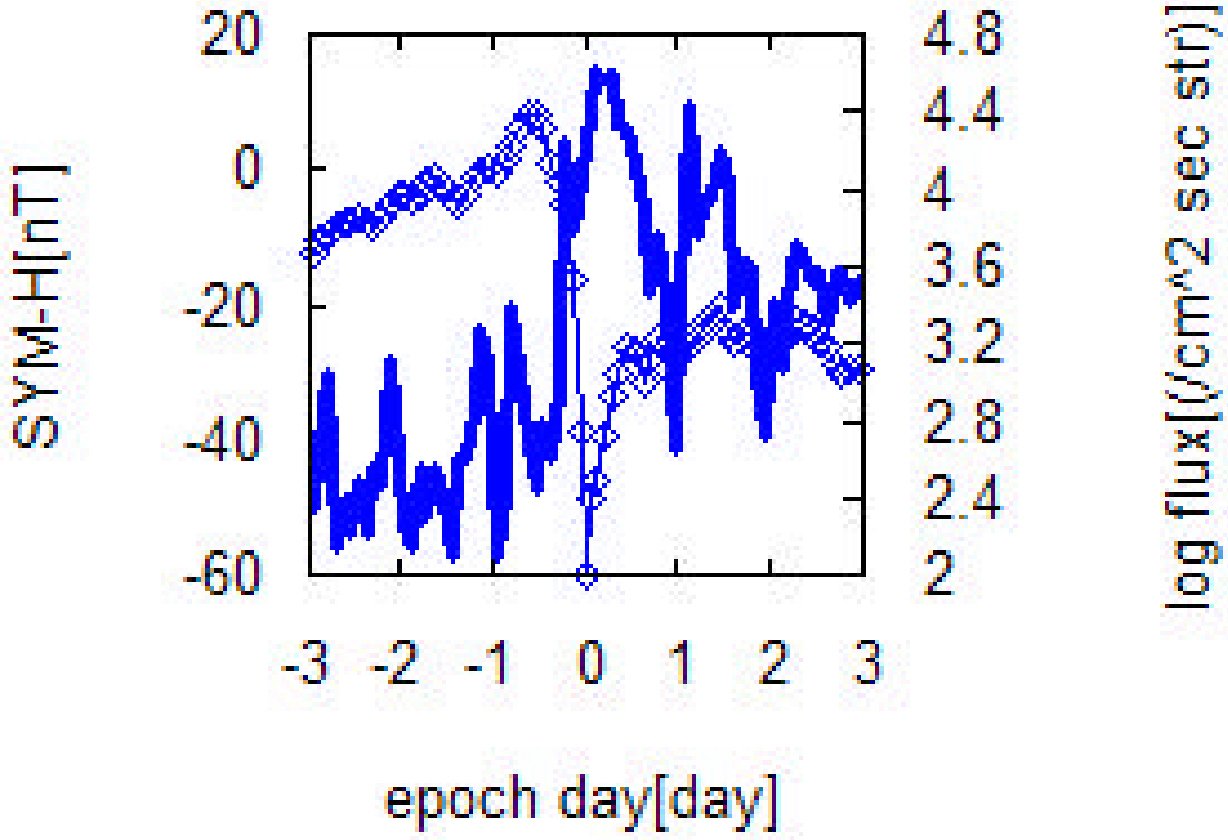
The inner radiation belt has been believed to be a region where energetic particles are stably trapped in the terrestrial magnetic field. However, little is known about source and loss mechanisms of the energetic particles during magnetically disturbed periods. Therefore, it is important to investigate the response of energetic particles during magnetic storms.

In this study, we used the data sets from NOAA12 satellite (Altitude 815km) to investigate the dynamics of energetic particles (300~1100keV) in the inner belt during magnetic storms in 1992.

Though electron flux in the slot region do not show an increase during initial and main phase of storms, significant enhancement of electron flux in the inner belt was detected during main phase of storms. The statistical study (the superposed epoch analysis) also confirmed that the electron flux in the inner belt (L=2) increases during main phase, while the outer belt flux decreases.


SYM-H[nT]
20
0
-20
-40
-60
4.8
4.4
4
3.6
3.2
2.8
2.4
2
log flux[(/cm^2 sec str)]
-3
-2
-1
0
1
2
3
epoch day[day]