

Japan Geoscience Union Meeting 2011

(May 22-27 2011 at Makuhari, Chiba, Japan)

©2011. Japan Geoscience Union. All Rights Reserved.



PEM029-16

Room:203

Time:May 24 18:15-18:30

Paradigm on solar energetic particle events

Shinichi Watari^{1*}, Satoshi Inoue¹, Ken T. Murata¹

¹NICT

High-energy particles accelerated by solar activity are called solar energetic particles (SEPs). It found that there are two distinct types of SEP events by satellite observations of SEP composition and charge states. One is electron-rich SEP event called impulsive SEP event. Another is proton-rich SEP event called gradual SEP event.

Electron-rich SEP events are observed associated with impulsive flares, which occur in solar longitude around 55 degrees in the west and contains more heavy ions. On the other hand, proton-rich SEP events are observed associated with long duration events (LDEs): long-duration flares. Source regions of the events widely distribute in solar longitude. These observations suggest that SEPs of impulsive events are accelerated near flare regions and SEPs of gradual events are accelerated by shock waves of coronal mass ejections (CMEs).

It is found that some gradual SPE events have characteristics of impulsive SEP events according to long-term observation of SEP composition and charge states by the ACE spacecraft. As a result of this observation, acceleration of flare seed particles by quasi-perpendicular shocks is proposed on acceleration of high-energy SEPs.

Keywords: solar energetic particle, solar flare, coronal mass ejection, shock wave