A38r Long-term Variation of Relativistic Electrons at Geostationary Orbit

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It is well known that highly energetic (∼MeV) electron at geostationary orbit altitude flux increases very much when the solar wind velocity is high. However, by closer inspection, the increase of highly energetic electrons likely to have a dependence on seasons as well as on IMF (interplanetary magnetic field) polarity. We have examined relativistic electron data obtained by JAXA satellites and confirmed a significant dependence on IMF sector polarity; i.e. a large increase of highly energetic electron flux took place during a toward sector in the spring season, while the increase took place during an away sector in the autumn. This dependence is to be explained by so-called Russell-McPherron effect.

We also examined a long-term variation of highly energetic electrons based on the JAXA satellite data for twenty years. Results demonstrate that total intensity of highly energetic electrons depends on solar activity in a long time scale. We have newly identified that the minimum flux of highly energetic electrons in the last solar cycle was seen in December, 2009, which coincides with the time of the geomagnetic aa index minimum. Actually, highly energetic electron flux at geostationary orbit altitude decreased so much by two orders of magnitude around the December, 2009. The sub-storm activities in that month was minimum by looking at AE index. We are considering that completely no acceleration process took place in that month, resulting in an extremely low flux of energetic electron density.