Simulating the Outer Radiation Belt During the Rising Phase of Solar Cycle 24

MEI-CHING FOK[1], ALEX GLOCER[1], QIUHUA ZHENG[1], SHENG-HSIEN CHEN[1], SHRI KANEKAL[1], TSUGUNOBU NAGAI[2] and JAY ALBERT[3]

[1]*NASA Goddard Space Flight Center, USA*
[2]*Tokyo Institute of Technology, Japan*
[3]*Air Force Research Laboratory, USA*

After prolonged period of solar minimum, there has been an increase in solar activity and its terrestrial consequences. We are in the midst of the rising phase of solar cycle 24, which began in January 2008. During the initial portion of the cycle, moderate geomagnetic storms occurred repeatedly, roughly follow the 27 day solar rotation. Most of the storms were accompanied by increases in energetic electron fluxes in the outer radiation belt. These enhancements were often preceded with rapid dropout at high L shells. We seek to understand the similarities and differences in radiation belt behavior during the active times observed during the beginning of this solar cycle. This study includes extensive data analysis and simulations using our Radiation Belt Environment Model. We identify the processes, i.e., transport and wave-particle interactions, that are responsible for the flux dropout and the subsequent enhancement and recovery.