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SPACE RADIATION ENVIRONMENT IN LOW EARTH ORBIT MEASURED FROM 2006 THROUGH 2011

Abstract

The Technical Data Acquisition Equipment, which consists of the Light Particle Telescope for measurements of high energy electrons, protons and alpha-particles, as well as the Heavy Ion Telescope for measurements of high energy heavy ions, had been operated on board the ALOS satellite (Advanced Land Observing Satellite) in polar earth orbit at 700 km altitude for 5 years from 2006 through 2011. In this orbit, the proton radiation environment is composed of the South Atlantic Anomaly region that is settled by the combination of the rotation axis of the earth and trapped protons in the inner radiation belt, and of the proton component in galactic cosmic rays that distributes along with the geomagnetic cut-off rigidity distribution. The electron radiation environment has also the horn region that corresponds to the foot point of the outer radiation belt in addition to those two components. The operation period of the ALOS satellite was through the solar-activity minimum period so that the space radiation environment around the ALOS satellite had been almost stable. However, large solar flares followed by CMEs occurred in December 2006, and disturbed the space radiation environment around the ALOS satellite. The enhancements in proton and electron flux due to the solar event were measured in this period both in the polar and the horn regions. In addition, high speed solar wind often flowed during the operation period of the ALOS satellite. The modulation of electron flux due to the solar wind variation was measured in the horn region all through the operation period. On the other hand, slow variation along with solar cycle variation was seen both in proton and electron flux in the South Atlantic Anomaly region. In this paper, the space radiation environment in low earth orbit measured by the ALOS satellite during solar-activity minimum period from 2006 through 2011 in comparison with the calculation result obtained from the usual space radiation models is reported.