

R010-23

A 会場 : 9/25 AM2 (10:45-12:30)

11:55~12:10

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The Impact of the Geomagnetic Storm Event of February 2022 on the Inner Radiation Belt by Test Particle Simulations

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We investigate the impact of the geomagnetic storm event of 3-5 February 2022, known as the “SpaceX” storm, on the inner radiation belt response. Observations showed that an M1.1 solar flare erupted on January 29 and ended up as a shock-driving magnetic cloud (MC), which was the reason for the occurrence of this geomagnetic storm.

A three-dimensional relativistic test particle simulation code was developed to compute the particle trajectories in the inner magnetosphere region. The guiding center Tao-Chan-Brizard model was selected to study the particle dynamics of the radiation belt. The implemented background magnetic field was a time-varying field reproduced by the IGRF-13 and Tsyganenko Model TS05, with the associated inductive electric field computed by the Biot-Savart Law.

The numerical simulations reveal the inner proton belt dynamics during the three geomagnetic storm phases, including the variations of the proton flux in the South Atlantic Anomaly (SAA).

In order to estimate the resulting radiation impacts on the Low-Earth Orbit (LEO) satellites, adequate modelling of the inner proton belt during a magnetic storm is relevant.