R010-20
C 会場 ：11/5　AM1 （9:00-10:30）
10:15〜10:30

#ぎるぎす　きろろす[1)], 羽田　亨[2)], 吉川　顕正[3)], 松清　修一[4)], ルメール　ジョゼフ[5,6)], ピエラル　ヴィヴィアン[6,7)], スザン　サムウェル[8)]
([1]九州大学 国際宇宙惑星環境研究センター,[2]九大総理工,[3]九大/理学研究院,[4]九大・総理工,[5]Faculty of Science, Catholic University of Louvain (UCL), BELGIUM,[6]Royal Belgian Institute for Space Aeronomy (BIRA-IASB), BELGIUM,[7]Center for Space Radiations, Catholic University of Louvain (UCL), BELGIUM,[8]National Research Institute of Astronomy and Geophysics (NRIAG), EGYPT

How do the geomagnetic storms affect the LEO proton flux distribution during Solar Energetic Particle events?

#Kirolosse Girgis[1)], Tohru Hada[2)], Akimasa Yoshikawa[3)], Shuichi Matsukiyo[4)], Joseph Lemaire[5,6)], Viviane Pierrard[6,7)], Samwel Susan[8)]
([1]i-SPES, Kyushu University,[2]Kyushu University,[3]Kyushu University,[4]Kyushu University,[5]Faculty of Science, Catholic University of Louvain (UCL), BELGIUM,[6]Royal Belgian Institute for Space Aeronomy (BIRA-IASB), BELGIUM,[7]Center for Space Radiations, Catholic University of Louvain (UCL), BELGIUM,[8]National Research Institute of Astronomy and Geophysics (NRIAG), EGYPT

The precipitation of the Solar Energetic Particles (SEP) into the trapping region of the Earth's inner magnetic field was reported by several satellite observations. When the SEP events coincide with geomagnetic storms, the particle precipitation becomes deeper and can access to lower latitude regions. This phenomenon is considered as a dangerous situation for most of the LEO missions, especially the high-inclined orbit missions.

In order to examine how the geomagnetic storms can affect the LEO proton flux distribution during SEP events, we have developed a three-dimensional relativistic test particle simulation code to compute the 70-180 MeV solar proton full trajectories in the inner radiation belt of L-shell range (1 <L <3). We have selected three different Dst index values: -7, -150 and -210 nT, to define quiet time, strong and intense geomagnetic storm conditions and to generate the corresponding geomagnetic field by adopting IGRF model (v12) and Tsyganenko model (T01).

We found that, as long as the magnetic storm was intensified, the proton flux became more prominent at the higher latitude zones and more expanding toward lower latitude range. In addition, the proton flux distribution in the lower latitude zones which includes the South Atlantic Anomaly (SAA), became more flattened as the Dst index was decreased. Finally, the assessment of the corresponding radiation environment showed that a Polar LEO mission could be subjected to 20% excess Single Event Upset (SEU) rates during intense geomagnetic storm.