

# **Analysis of the three intense geomagnetic storm observed on July 20-31, 2004: solar, interplanetary and cosmic ray effects near the Earth.**

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Geomagnetic storms are geomagnetic field disturbances caused by gusts in the solar wind, injecting a substantial quantity of energy into the magnetosphere, intensifying the ring current, becoming strong enough to exceed some key threshold of the quantifying storm time Dst index. In this work we analyze three intense geomagnetic storms ( $Dst < -100\text{nT}$ ) occurred in period of July 22nd, 24th and 27th, 2004. We use images of solar corona made by Large Angle and Spectroscopic Coronagraph (LASCO) and the solar disk made by the Extreme Ultraviolet Imaging Telescope (EIT) aboard the Solar and Heliospheric Observatory (SOHO). Observations of plasma and interplanetary magnetic field obtained by the Advanced Composition Explorer (ACE) were also used. We analyze high energy cosmic ray observations obtained using the Muon Telescope of the Brazilian Southern Space Observatory-SSO of the INPE's Southern Regional Space Research Center at ( $29^{\circ}26'24''\text{S}$ ;  $53^{\circ}48'38''\text{W}$ ) for identify Forbush decreases in the cosmic ray intensity. The main objective of this work is study three intense geomagnetic storms ( $Dst < -100\text{ nT}$ ), that occurred in a relatively small time interval, in order to identify their solar origin, interplanetary counterparts and cosmic ray modulation near the Earth. This study is important for the study of energetic cosmic rays modulation due to a subsequent chain of interplanetary disturbances, and in the near future it will help the understanding of space weather cosmic ray variability.