Cosmic ray modulation and noise level on the extended multidirectional muons detector telescope installed in south of Brazil: preliminary analysis

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Because of the large detector mass required to detect high-energy cosmic rays, ground-based instruments remain the state-of-the-art method for studying these particles. At energies up to ˜100 GeV, primary galactic cosmic rays experience significant variation in response to solar wind disturbances, such as interplanetary coronal mass ejections (ICMEs). In this way, ground-based detectors can provide unique information on conditions in the near-earth interplanetary medium. Since 2001 a prototype multidirectional high energy $>$ 50 GeV cosmic-ray (muons) detector telescope was operating in the Southern Space Observatory (SSO/CRSPE/INPE - MCT), Brazil (geomagnetic coordinates 19ž 13' S and 16ž 30'E). In December 2005, an upgrade increased the collection area in 600 %, becoming two layers of 28 m2 each. The objective of this work is to analyze cosmic ray count rates observed by ground-based detector in order to find both variations not associated with interplanetary structures, possible associated with the noise from the instrument, and decrease rates caused by cosmic ray modulation due to interplanetary structures near Earth. We use 1 minute resolution data from the extended telescope collected since January 2006, which is the first data since the update of the instrument on December 2005. We also use the disturbance storm time Dst index from Kyoto, plasma and interplanetary magnetic field from the ACE satellite. In the future, this study will help to separate cosmic ray modulation caused by interplanetary structures from those variations in short periods (less than 1 month) caused by noise from the instrument. The high energy cosmic ray (muon) telescope at the SSO is a tri-lateral collaboration between Brazil, Japan and the United States.