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TECHNICAL ASPECTS AND ANALYSIS OF THE COSMIC RAY MODULATION EFFECTS DURING GEOMAGNETIC STORMS

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Disturbances in the interplanetary space near the Earth are closely related to solar variability and its variety of eruptive phenomena, such as CMEs and CIRs. Many authors have shown that they are the interplanetary origin of geomagnetic storms. Such geomagnetic phenomena can cause damage to technological systems, both in space and on the ground. Structures ejected from the Sun can modulate high-energy cosmic rays that reach the Earth's Atmosphere. Ground based high-energy cosmic ray (muons) detectors can detect solar-related anisotropy effects. With suitable analysis, they can be used to observe signatures around 8 hours prior the disturbance arrival in the Earth's magnetosphere. A multidirectional high-energy > 50 GeV muon telescope was installed and is operational at the Southern Space Observatory - OES/CRS/CIE/INPE – MCT or SSO, as part of an international network which aims to study and forecast geomagnetic storms. Cosmic rays are also observed in a different energy range by Spaceship Earth, a neutron monitor network. The objective of this work is to present technical aspects of the SSO's muons telescope observations and to analyze the data related to geomagnetic storms. Comparison with the Spaceship Earth neutron monitor data is also presented. To identify and study interplanetary geoeffective structures we use plasma and magnetic field data from ACE spacecraft. Geomagnetic storms were identified using the Dst index. We show some cosmic ray (muons and neutrons) decreases associated with geomagnetic storms and its interplanetary origin.