

Long-term and transient time evolution of cosmic ray fluxes detected in Argentina in association with rain precipitation and atmospheric electricity time variations

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We present preliminary results obtained at El Leoncito (CASLEO, San Juan, Argentina; magnetic rigidity of 12 GV) with the CARPET detector which has been installed in April of 2006. CARPET is a charged particles detector composed of two layers of receivers separated by an aluminum plate. Each layer is sensitive to electrons above 0.2 MeV, protons above 5 MeV and γ -rays with energy above 20 keV, while the signal received in coincidence by the two layers inform on > 5 MeV electrons and 30 MeV protons.

In this paper we present results on the long-term modulation of cosmic rays including the low energy muon component obtained at CASLEO. We also found transient temporal variations (few minutes to few hours) of the signal received by the CARPET in association with rain precipitation events. A statistical study based on ~ 100 events shows 2 different correlations between the relative variations of the cosmic ray signal and the amount of precipitated rain water. On the other hand about 20 % of the events detected by the CARPET do not show any associated positive rain records. To better understand these two correlations and the absence of precipitated rain water for some events, we investigate the role of atmospheric electricity temporal variations and the presence of thunderclouds associated with cosmic ray events detected by the CARPET.