Effect of Weather Condition on the Muon Flux Distributions

OLESYA SITNIKOVA, Georgia State University — In recent years, many studies have been done regarding to the correlations between the Earth’s climate conditions and the cosmic ray fluxes [1,2]. The Earth atmosphere is constantly bombarded by a rain of charged particles known as the primary cosmic rays. These primary cosmic rays will collide with the atmospheric molecules in the upper atmosphere and create extensive secondary particles which shower downward to the surface of the Earth. Most of the particles, which reach to the surface of the Earth, are muons (>80%) together with a small percentage of electrons, gammas, neutrons, etc. The fluxes of these particles should be influenced by the weather conditions of the Earth’s atmosphere, which can be regarded as particle radiation absorber. At Georgia State University (GSU), multiple cosmic ray particle detectors have been constructed to measure the fluxes and energy distributions of the secondary cosmic ray particles. In this presentation, I will describe the setup of one of the muon detectors at GSU. The detector has been recording data nonstop since July of 2009. The preliminary results of the correlation study of the muon flux with the atmospheric temperature, pressure and solar radiation will also be discussed in this presentation. Reference: 1) L.V. Egorova, V. Ya Vovk, O.A. Troshichev, Journal of Atmospheric and Terrestrial Physics 62, 955-966 (2000). 2) Henrik Svensmark, Phy. Rev. Lett. 81, 5027 (1998).