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# Forbush decreases for 2001-2004 observed with low latitude muon telescopes of Brazilian SSO observatory

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Forbush decrease is a depression of cosmic ray intensity observed by ground based neutron monitors (NM) and muon telescopes when the IMF disturbance associated with the FD passes the Earth or exists in the space between the Sun and Earth. The cosmic ray flux diminishes in the regions closed with enhanced IMF magnitude which forbids particles to enter in the region. In principle, the similar physical mechanism is governing the cosmic ray modulation and cosmic ray decreases: heliospheric magnetic field turbulences, fluctuations on which CR particles are scattering, changing their pitch angles and escape from initial velocity direction. As the CR flux observed on the ground based installations is sensitive to the frequency and amplitude of the IMF inhomogenities the CR flux variations are useful tools for remote sensing and even for tomography (in the case of flux measurements by network) of the large scale structures of solar wind disturbances existing in proximities of the Earth and in the heliosphere on the whole. As for the energy of muons registered by low latitude detectors corresponds to several tens GeV energy of primary CR incident on the Earth atmosphere, those have great Larmour gyration radius in the IMF near the Earth, of about 0.1-0.2 AU that makes them sensitive to the spatial IMF inhomogenities of the similar scale. The CME hitting the Earth magnetosphere have this kind scale comparable with 1 AU and from the muon detector observations there could be derived the features of the disturbances. The latter could be utilized as a precursor of CME

collision with the Earth magnetosphere which causes the geomagnetic storms.

Before to utilize the muon count rate for geomagnetic storm prediction we would like to study the count rate fluctuations in the whole and Forbush decreases first of all. For the time of CR observations by muon telescopes of Southern Space Observatory (29˚26'24"S; 53˚48'38"W) from 2001 to 2004 there happened 36 great geomagnetic storms with the Dst index lower than -100 nT. In all cases when storms happened, the muon monitors registered FD too. In the half of the cases muon FD generally coincide in time with the storm, beginning several hours before its, in another cases muon FD were observed long before the storms possibly being associated with a preceding turbulence in IMF. Always the muon FD are greater than the FD of South Pole NM, the latter are less or about of 10%. When muon telescope looks at the sun side, it mostly feels a decrease of its count rate of about 10-15% during 12 hours, showing that the space between Sun and Earth is fulfilled with IMF turbulences, however we considered mostly disturbed periods. The statistical study of muon telescope response to disturbed IMF continues and we will report main features of the study in the presentation.