Temporal changes of the rigidity spectrum of the Forbush effects of galactic cosmic ray intensity based on the experimental data

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We use data of neutron monitors and ground meson telescopes to study the daily temporal changes of the rigidity spectrum of the Forbush effects of the galactic cosmic ray (GCR) intensity. We show that the change of the exponent γ of the rigidity spectrum $\frac{\delta D(R)}{D(R)} \propto R^{-\gamma}$ of the GCR intensity is generally related with the alternation of the level of the interplanetary magnetic field (IMF) turbulence during the Forbush effects. We show that the rigidity spectra of the Forbush effects of the GCR intensity gradually are hardening during the decreasing phases of the intensities and then steadily are softening during the recovery phases. A relationship between the rigidity spectrum exponent γ of the Forbush effects of the GCR intensity and the exponent ν of the power spectral density ($PSD \propto f^{-\nu}$), of the components of the IMF turbulence (range of frequency $\sim 10^{-6} \div 10^{-5} Hz$) is established. We show that temporal changes of the rigidity spectrum exponent γ of the Forbush effect of GCR intensity can be successfully used to estimate the temporal evolution of the power spectral density exponent ν of the IMF turbulence for the arbitrary short time interval determined only by the accuracy of the GCR data; it is not achievable by in situ measurements of the IMF, as far to calculate the power spectral density exponent ν of the IMF turbulence for the given time interval there is needed large series (a few times exceeded the given time interval) of the experimental data.