Modeling of the 11–year and 22–year variations of the galactic cosmic ray intensity

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New two dimensional model for describing of the long period (11-year and 22 – year) variations of the galactic cosmic ray (GCR) intensity has been developed based on the Parker's transport equation. Convection, diffusion, drifts due to the gradient and curvature of the regular interplanetary magnetic field (IMF) and on the warped heliospheric neutral sheet (HNS), and changes of the GCR particles' energy in the diverged solar wind are taken into account in the modeling. Changes of the IMF's turbulence in the range of frequencies $\sim(10^{-6}$ – $10^{-5})$Hz (responsible for the scattering of the GCR particles of the energy 5–50 GeV) and the module of the IMF versus solar activity are considered as the general reasons of the 11–year and 22–year variations of the GCR intensity. The strong relationships between the exponent of the expected rigidity spectrum of the 11–year variations of the GCR intensity and the exponent of the power spectral density of the IMF's turbulence are found for different level of solar activity; there was not recognized any valuable distinction between these relationships for the positive (A$>$0) and for the negative (A$<$0) polarities epoch of solar magnetic cycle.