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MODELING OF THE 11-YEAR VARIATIONS OF THE GALACTIC COSMIC RAY INTENSITY BASED ON THE TEMPORAL CHANGES OF THE RIGIDITY SPECTRUM

Abstract content

We propose a new approach to the modeling of the long period (11-year) variations of the Galactic Cosmic Ray (GCR) intensity based on the Parker's transport equation. Besides very known four universal processes: convection, diffusion, drifts due to the gradient and curvature of the regular Interplanetary Magnetic Field (IMF) and on the warped heliospheric neutral sheet and changes of the GCR particles' energy in the diverged solar wind, the changes of the rigidity spectrum of the GCR isotropic intensity variations as a time dependent parameter are taken into account. We show that the long term variation of the GCR intensity (for the rigidity of 5–50 GV, to which neutron monitor and ground meson telescopes respond) can be interpreted based on the relatively simple classical Parker's diffusion–convection model with inclusion of a new time dependent parameter, particularly, the exponent of the power rigidity spectrum of the GCR isotropic intensity variations. This parameter, as we established before, adequately describes the changes of the character of diffusion of the GCR particles for different epoch of solar activity.

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Summary

Reference

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