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NEW INDEX FOR THE EXPLANATION OF THE 11-YEAR VARIATIONS OF THE GALACTIC COSMIC RAY INTENSITY

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Abstract content

We calculate the temporal changes of the exponent g of the power law rigidity R spectrum of the GCR isotropic intensity variations using neutron monitors experimental data for four 11-year cycles of solar activity (1960–2002). The temporal changes of the power law rigidity spectrum exponent g of the GCR isotropic intensity variations are inversely correlated with the changes of the GCR intensity. We assume that ~70–80% of the 11-year variations of the GCR intensity is stipulated by the changes of the IMF turbulence versus solar activity. We propose that the temporal changes of the exponent g of the power law rigidity R spectrum can be considered as the vital (new) index to explain the 11-year variations of GCR in the energy range of 5–50 GeV, to which neutron monitors and ground meson telescopes respond. The frequency range of the IMF turbulence is responsible for the effective scattering of the GCR particles of the energy range of 5–50 GeV in the case of the average interplanetary magnetic field strength and the average solar wind velocity $\sim U = 400$ km/s. Also, the proposed index can be successfully used to estimate the temporal changes of the exponent n of the power spectral density for the frequency range of the IMF turbulence.

If this papers is presented for a collaboration, please specify the collaboration

Summary

Reference

Proceedings of the 30th International Cosmic Ray Conference; Rogelio Caballero, Juan Carlos D'Olive, Gustavo Medina-Tanco, Lukas Nellen, Federico A. Sánchez, José F. Valdés-Galicia (eds.); Universidad Nacional Autónoma de México, Mexico City, Mexico, 2008; Vol. 1 (SH), pages 497–500

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