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Heliospheric Transient Structures Associated with Short-Period Variations in the GCR Flux

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Abstract content

Short-period variations in the integral GCR fluence (> 100 MeV) often observed in neutron monitor data have also been seen by the High Sensitivity Telescope (HIST) aboard the Polar spacecraft. Although HIST was designed to measure radiation-belt electrons, it makes clean measurements of the integral GCR fluence when Polar is outside the radiation belts. These measurements show GCR variability on a variety of timescales including 0.1 mHz - 1 mHz. On August 20, 2006 a Forbush decrease observed at Polar was also seen at the INTEGRAL spacecraft. Data from Polar HIST and from INTEGRAL's Ge detector saturation rate (GEDSAT), which also measures the GCR background with a threshold of ~ 200 MeV, show similar, coherent, short-period GCR variations at two very different locations within the Earth's magnetosphere. Comparing these variations from Polar and INTEGRAL to solar wind magnetic field and plasma conditions at the L1 Libration point sunward of the Earth reveal this coherency occurs when Earth is in close proximity to and inside a flux rope interplanetary CME (ICME). Inversion of the ICME magnetic field results in a flux rope axial orientation nearly parallel to the radial direction. This orientation is consistent with a grazing passage of the ICME with the Earth. New measurements from STEREO will enable detailed 3-D analyses of such solar wind disturbances along spatial scales on the same order of typical SEP and GCR proton gyroradii, which are needed to help determine the mechanism behind this short-period variability.

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'Olivo, 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 359-360

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