

Correlation Between Forbush-Decrease Amplitude Detected by Mountain Chacaltaya Neutron Monitor and Solar Wind Electric Field

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Abstract : This study examines the correlation between the amplitude of Forbush Decreases (FDs) detected by the Mountain Chacaltaya neutron monitor and the solar wind electric field (E). Forbush Decreases, characterized by sudden drops in cosmic ray intensity, are typically associated with interplanetary coronal mass ejections (ICMEs) and high-speed solar wind streams. The Mountain Chacaltaya neutron monitor, located at a high altitude in Bolivia, offers an optimal setting for observing cosmic ray variations. The solar wind electric field, influenced by the solar wind velocity and interplanetary magnetic field, significantly impacts cosmic ray transport in the heliosphere. By analyzing neutron monitor data alongside solar wind parameters, we found a high correlation between E and FD amplitudes with a correlation factor of nearly 87%. The findings enhance our understanding of space weather processes, cosmic ray modulation, and solar-terrestrial interactions, providing valuable insights for predicting space weather events and mitigating their technological impacts. This study contributes to the broader astrophysics field by offering empirical data on cosmic ray modulation mechanisms.

Keywords : cosmic rays, Forbush decrease, solar wind, neutron monitor

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