# Forbush Decrease Observed with GRAPES 3

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We have studied coronal mass ejection (CME)-associated Forbush decrease (FD) events observed with GRAPES-3 cosmic ray muon telescope in Ooty, India. Our aims are twofold: a) investigate the temporal relationship between the interplanetary magnetic field peaks and FD decreases, and b) investigate the rigidity dependence of the FDs.

We have used cosmic ray data from the GRAPES-3 instrument for the FD events, while the magnetic field data is from the ACE and WIND spacecraft. We generally find that the time profiles of the FD data correlate unexpectedly well with those of the interplanetary magnetic field, with correlation coefficients ranging from 0.7 to 0.97. We have also investigated the relation between the FDs and associated near-earth magnetic clouds. We find that the trough of the FD is generally well within the magnetic cloud boundaries. These investigations help us in determining the predominant structure (the magnetic cloud, or the associated shock) responsible for the FD.

The GRAPES-3 telescope also has the unique ability to perform multirigidity measurements using a single instrument. This allows us to investigate the rigidity dependence of Fds in a manner that has not been done before. Using a specific model for the progenitor of the FD (shock/magnetic cloud) this investigation lets us constrain the rigidity dependence of the perpendicular diffusion coefficient for high energy cosmic rays in the presence of MHD turbulence.

Keywords: Coronal mass ejection (CME), Cosmic rays, Forbush decrease, Interplanetary magnetic field.

**References**

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