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Analysis of the 20 January 2005 Ground Level Enhancement

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Abstract content

Observations of the Ground Level Enhancement (GLE) of 20 January 2005 are used to investigate a commonly observed, but poorly understood feature of this class of event. The Sanae neutron monitor observed three distinct peaks during this event. The observations were augmented by a neutron moderated detector, from which we could determine that the first, ephemeral peak had a harder spectrum than the remainder of the event, while the Hermanus monitor indicates that particles with energies up to 5 GeV were present in the first peak.

The axis of symmetry of the event is determined from the observations of a series of other neutron monitors, and this axis coincides with the (time-varying) direction of the HMF as measured by the ACE spacecraft. Based on a simple model of quasi-linear scattering theory, it is shown that the second and third peaks need not be due to back-scatter effects as has been proposed previously, but that the rich amount of detail in this GLE allows one to deduce that there were two acceleration regions: first at the flare site in the lower corona, and later the shock formed by the eventual CME. This hypothesis is explored in the next paper.

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 265-268

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