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## Comparing small and large SEP events and the role of flares and shocks

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### Abstract content

We survey the properties (including the abundance variations) of the  $>20$  MeV proton events ( $\sim 300$ ) that occurred in the years 1997-2005 inclusive. About 20% of the events have the properties of so-called "impulsive events" that are considered to arise from acceleration in flares. We compare the properties and associated flare phenomena of these events with those of the larger events that are usually considered to have their origins in shock acceleration. Since the presence of type II radio bursts is often used as support for shock acceleration, we compare small events with and without associated type II bursts. We also compare the properties of the associated coronal mass ejections (CMEs) noting that only two events out of the whole sample appear not to have an associated CME. The most obvious conclusion from all these comparisons is that the associated flares and CMEs are simply much less energetic for the smaller SEP events. Thus a direct flare contribution in major SEP events seems reasonable.

**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 67-70

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