

# Dependence of solar energetic particle intensities on the density of suprathermal seed particles

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We have investigated the relation between the fluence of a Solar Energetic Particle (SEP) event and the density of the suprathermal seed particle population in the inner heliosphere prior to the event. Using data from the past solar maximum (2000-2003), the size of events was determined using the fluence of Fe with  $>10$  MeV/nucleon as measured by the SIS instrument on ACE. As a proxy for the seed particle density, we use the daily-average number density of Fe with 0.04 to 0.64 MeV/nucleon on the day before large SEP events occur, as measured by the ULEIS instrument on ACE. The measured number density was then extrapolated to 10 keV/nucleon to estimate the available seed population. We find that the maximum intensity of SEP events appears to be limited by the suprathermal ion density - large events occurred only when there was a significant density of suprathermal ions in the inner heliosphere prior to the event. When the suprathermal density was low, only small events occurred. This result suggests that by monitoring the suprathermal ion density in the inner heliosphere it should be possible to forecast the maximum size of SEP events and also forecast all-clear periods.