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## Analysis of multi-eruption solar energetic particle event on March 17-18, 2003

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On March 17-18, 2003 the Energetic and Relativistic Nuclei and Electrons (ERNE) instrument on board the Solar and Heliospheric Observatory (SOHO) spacecraft observed three solar energetic particle (SEP) events in rapid succession (within  $\boxtimes 26$  hours) from the same active region of the Sun. The first event was weak and proton intensity enhancement was observed only below  $\boxtimes 25$  MeV. No coincident coronal mass ejection (CME) was found, but the event was associated with an impulsive H $\alpha$  flare starting at 10:09 UT on March 17 at location S16W33 and with a type III radio burst. The second particle event was associated with an X1.5-class X-ray flare starting on March 17 at 18:50 UT and a fast and wide (1020 km/s, 96°) CME. The CME has been reported to be radio quiet (Gopalswamy et al., 2008). Enhanced proton intensities reached up to 60 MeV. The third SEP event occurred about 18 hours later on the tail of the second one, reached proton energies up to  $\boxtimes 60$  MeV, and lasted for roughly 2 days at energies >10 MeV. The event was associated with another X1.5-class flare, fast and wide (1601 km/s, 206°) CME, and decametric-hectometric type II radio burst. This last event was associated with a shock observed at the ACE spacecraft on March 19. We analyse these particle events based on the velocity dispersion of protons, helium-to-proton ratio, and the observed anisotropy of the particle intensities.

Gopalswamy et al. (2008), Coronal mass ejections, type II radio bursts, and solar energetic particle events in the SOHO era, Ann. Geophys. 26, 3033-3047.

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