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Dependence of 100 MeV solar proton events on the solar activities: flares and coronal mass ejections

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To investigate the possible acceleration mechanism for high energy ($E > 100$ MeV) protons, the correlation coefficients (CCs) are calculated between the prompt component intensity (PCI) of $E > 100$ MeV solar proton events (SPEs) and the speed of coronal mass ejections (CMEs), and the soft X-ray (SXR) emission of solar flares. Data analysis shows that the CCs between the PCI of $E > 100$ MeV SPEs and the concurrent SXR emission are much higher than those between the PCI of $E > 100$ MeV SPEs and the speed of the concurrent CMEs. The results suggest that both the solar flares and the CMEs are important to the high energy SPEs, however, the concurrent solar flares appears to make more contribution to the high energy SPEs at the early phases of the SEP events.

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