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STEREO observations of solar energetic particles: a case study

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The STEREO mission gives an opportunity to combine stereoscopic observations of the Sun, providing the CME characteristics for example speed and propagation direction from the close vicinity of the Sun, when particles are accelerated, with *in-situ* particle data measurements. This information is important for timing analysis of the solar energetic particle (SEP) events. As expected for the declining phase of the solar cycle, during the year 2007, the energetic particle increases were dominated by CIR events. One opportunity to study the solar energetic particles occurred between 18 May and 27 May 2007, a period with a quite complex temporal profile of particle enhancement in intensity. During this period the twin STEREO spacecrafts, A and B, were at heliocentric distances of 0.96 and 1.06 AU, respectively, with a separation angle of about 9 degrees. The time-of-flight mass spectrometer SIT measured the initial CIR increases in energetic ions (up to 1 MeV/nucleon) on 18 May and 24 May 2007, first on the B and then on the A spacecraft. The SEPT instrument observed a rapid rise of $\sim$ 100 keV electrons on 19, 20, and 23 May 2007, most likely indicating small SEP events. Associated flares were B9.5, B6.7 and B5.3 classes, as recorded by the GOES X-ray data. The source regions of the two CMEs were well seen by a 3-D reconstruction of SECCHI observations, one on 20 May 2007 in an active region around the disk centre and the second on 23 May 2007 on the west limb of the Sun. We survey the abundances of H, He and heavier elements, such C to Fe, to separate

the CIR and SEP ions. A preliminary analysis shows that the He/H ratio (measured at a fixed MeV/nucleon) on 20 May and 23 May 2007 is consistent with average values measured in the CME-related SEP events. The radio data from ground-based stations clearly indicates type II radio emissions, which are well correlated with 19 May and 23 May 2007 events, suggesting the presence of the shock propagating in the corona and thus supporting the idea of the shock-associated (gradual) nature for these events.