

**Notes on Energetic Particle Plots for the LWS CDAW Workshop (plotted by I. G. Richardson ([richardson@lheavx.gsfc.nasa.gov](mailto:richardson@lheavx.gsfc.nasa.gov))).**

The plots show intensity-time profiles for a representative selection of energies and particle types from several (typically ~5) days before the peak of the geomagnetic storm and ~2 days following. The data shown are from:

- **The Goddard Medium Energy Experiment on IMP 8 (30-minute averages):**

Protons at energies of  
0.88-1.15 MeV;  
4.2-5.96 MeV;  
8.65 – 11.1 MeV;  
24.25 – 28.74 MeV;  
42.93 – 63.2 MeV;  
121 – 229.5 MeV.

Data are available until October, 2001.

- **The EPACT instrument on WIND (15-minute averages from CDAWWeb):**

Protons at 19 – 28 MeV.

- **The EPAM experiment on ACE (Level 2, 1-hour averages from the ACE Science Center):**

0.389 – 1.28 MeV He;  
0.465 – 1.71 MeV/n O;  
0.239 – 0.84 MeV/n Fe;  
38 – 53 keV electrons;  
53 – 103 keV electrons;  
103 – 175 keV electrons;  
175 – 315 keV electrons.

The proton/ion data are approximately arranged by ascending energy going from the top to the third panel. The fourth panel shows the electron data.

The bottom panel indicates the estimated location of ICMEs based on the survey of Cane and Richardson (JGR, 2003) updated and with minor revisions. Vertical green lines are times of geomagnetic storm sudden commencements (SSC) which are typically associated with the passage of shocks at the Earth. Additional shocks may be present but not indicated since they are not associated with an SSC.

Note that for more “energetic” events, the particle intensity-time profile can help to indicate the time of the related solar event, and hence the most probable source of the shock/ICME producing the geomagnetic storm.