SIZE DISTRIBUTIONS OF SOLAR PROTON EVENTS IN 1955-1996

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Long-term data (1955-1996) on solar proton events (SPEs) are analyzed, relying upon a new arising paradigm of particle acceleration in different sources at/near the Sun (flares, shock waves, etc. In all 320 events have been separated above 1 pfu (proton $cm^{-2}s^{-1}sr^{-1}$) of the >10 MeV protons, associated with identified source flares (flare-related events). Then, within this sample, a second group (a subgroup) has been formed of the 159 events, additionally having a certain or probable sudden storm commencement (SSC) association (flare-SSC related, or shock-associated events). The basic result is that the power-law slope for *integral energy* intensities is 1.38±0.05, in general agreement with earlier analyses of integral energy distributions, but steeper than that for *differential* energy distributions. A second result is that the SSC associated events have a double power-law spectrum with two different exponents, near 1.04±0.01 and 1.65±0.02 below and above 10^3 pfu, respectively. The longitude distributions of the proper sources for these two groups display different behaviour suggesting different origin of the two particle populations. A certain difference also was found to exist in the slopes of integral size distributions at > 10 MeV (320 flare-associated events and 66 mixed events) and at > 500 MeV (Ground-Level Enhancements). This may point out to a dependence of slope on the proton energy under consideration.