

ENERGY SPECTRA OF ACCELERATED SOLAR PROTONS FROM DIFFERENT SOURCES:

II. SOURCE SPECTRA AND ACCELERATION MODELS

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It is widely believed now that a significant fraction of the solar energetic particles (SEPs) following major solar flares are actually accelerated at a CME-driven shock. Thus, the SEPs observed at 1 AU and those that interact at the Sun may represent quite different populations. In addition, in the emerging new paradigm for SEP acceleration in different sources at or near the Sun, the existence of two classes of flares - impulsive and gradual - is recognized. They differ, in particular, by the SEP composition and electron spectra. The more broad picture of the SEP events should include characteristics of the particles that interact at the Sun to produce gamma-ray emission and neutrons. In this context, we analyze available data on source proton spectra (SPS) reconstructed earlier for 80 solar proton events (SPEs) of 1949-1992. It is suggested that the SPS may be separated depending on the source type, its location and interplanetary conditions of SEP propagation. A great importance of SPS data for the development of a comprehensive quantitative theory of particle acceleration at/near the Sun is demonstrated. The SPS data for certain large events are treated in terms of the concept of multiple acceleration processes.