To the problem on the laws of solar energetic particle events occurrence

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The occurrence of solar energetic particle (SEP) events over a long-term time scale is described by the probability theory using some fundamental laws inherent in sets of SEP events. The basic of such laws is the character of relation between the mean rate of SEP events occurrence and the level of solar activity.

The mathematical analysis of a set of most authentic experimental data on SEP events (appeared during the 21th, 22th and 23th cycles of solar activity), separated from the background radiation by physical (rather than technical) selection criteria, has shown that the mean rate of SEP events occurrence is proportional to the solar activity level presented as a smoothed value of Wolf numbers (W). The probability of SEP events occurrence for the given time interval is shown to be dependent only on the sum of monthly average or mid-annual Wolf numbers describing the solar activity for a sought time.

This conclusion is confirmed by the fact, that the SEP events distribution functions, recorded during various solar activity levels (the "active" or "quiet" Sun) or phases (maximum or minimum, ascending or declining), being divided by the sums of Wolf numbers ($\sum$W), are identical within the limits of statistical errors.

This implies that the mean number of events (including extremely large ones), which have occurred during time intervals described by the identical sum of Wolf numbers, is identical too. All this confirms the assumption we have stated earlier, namely, that extremely large SEP events could occur during the quiet Sun years as well. This is also confirmed, in particular, by the data on SEP events occurred within 2005.