Distribution of brightenings of periodic comets during the 9-22 cycles of solar activity
9–22

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The paper provides another look at some questions of a long-term unresolved problem of cometary physics: the dependence of cometary brightness on the solar activity. Contrary to the previous approach, the work does not compare the photometric curves of comets and solar activity indices. The base material are data excerpted for the study of the secular decrease in the brightness of short-period comets (Svoreň, 1991). For the 15 short-period comets with the largest number of returns, the positive deviations of brightness in individual returns from the long-term trend were analysed. The covered time period of 1850–1987 corresponds to the cycles of solar activity from 9 to 22. In total, 59 brightenings in the range from 0.5 mag to 3.0 mag compared to the long-term course was identified. It was found that the distribution of brightenings has a faint maximum at the beginning of the declining phase of the cycle, and certainly does not correlate with the maximum of the solar cycle activity. Multiple brightenings (different comets in the same period) do not occur randomly, but are significantly clustered. During these periods, the interplanetary environment was in the state that caused or significantly supported the increased activity of comets in different directions from the Sun. These active periods do not prefer any phase of the solar cycle.

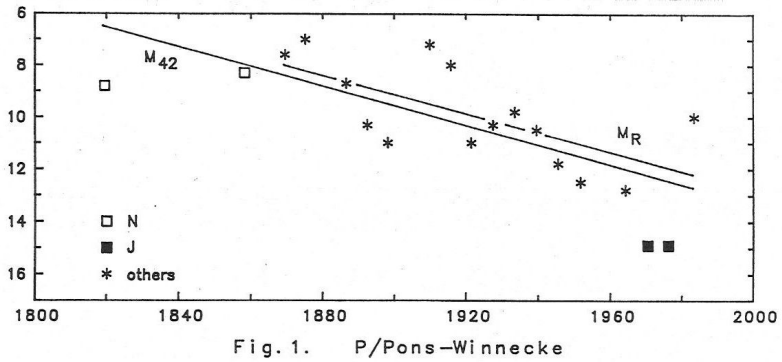

Fig. 1. P/Pons–Winnecke

Figure: Secular changes of the comet 7P/Pons-Winnecke during the 19th and 20th centuries.

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