

Meteor stream activity. II. Meteor outbursts.

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Abstract (from CDS): In the past two centuries, alert amateur and professional meteor astronomers have documented 35 outbursts of 17 individual meteor streams well enough to allow the construction of a homogeneous set of activity curves. These curves add to similar profiles of the annual streams in a previous paper (Paper I). This paper attempts to define the type and range of phenomena that classify as meteor outbursts from which the following is concluded: Outbursts are associated with the return of the comet to perihelion (near-comet type outburst), but occur also when the parent comet is far from perihelion and far from the Earth (far-comet type). All outbursts of a given stream are of one type only, depending on encounter geometry. The activity curves, expressed in terms of Zenith Hourly Rates (ZHR), have a shape that is usually well described by: $ZHR = ZHR(\max) 10^{-(B|\lambda_{\text{sun}} - \lambda_{\text{sun}}(\max)|)^{\alpha}}$. The steepness of the slopes varies from an exponent of $B=7$ to $B=220$ per degree of solar longitude, with a typical value of $B=30$. In addition, most near-comet type outbursts have a broader component underlying the main peak with $B \sim 1-7$. The duration ($\Delta t \sim 1/B$) of the main peak is almost independent of location near the comet, while the background component varies considerably in duration and relative intensity from one return to another. The two components in the activity curve are due to two distinct structures in the dust distribution near the parent comet, where the main component can be due to a sheet of dust that emanates from the IRAS dust trail. This brings the total number of distinct structures in meteor streams to four, including the two structures found from the annual stream activity curves in Paper I.

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