38. DISCRIMINATION OF STREAM AND SPORADIC METEORS

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ABSTRACT

Southworth and Hawkins (1963) described a criterion for distinguishing stream meteors from sporadics. A function D of the orbital elements was proposed as a measure of the difference between two orbits. A sporadic meteor was then defined as one whose difference D from all other observed meteors exceeded an empirically determined minimum. Any two meteors that differed by less than the minimum were defined to be members of the same stream.

D may be taken to be a distance in a five-dimensional space, whose coordinates are orbital elements. It is now proposed that a stream would be better defined as a statistically significant concentration of meteors in this orbit-space. The procedure has been programmed for a computer, and applied to the Harvard-Smithsonian radar observations.

References

Southworth, R. B., Hawkins, G. S. (1963)   *Smithson. Contr. Astrophys.*, **7**, 271.

DISCUSSION

Whipple: It is clear that the identification of meteor streams is purely a matter of definition. I suggest that Commission 22 of the IAU take responsibility for setting up objective definitions for meteor showers, associations, streams, etc. Such definitions agreed upon internationally would greatly improve and accelerate the interpretation of meteor data. Personally I believe that no meteor stream should be recognized unless it has been observationally identified within 2, or better, several years.

Southworth: I should like to stress the merits of using orbital elements in objective definitions of showers or streams.

Levin: To obtain some idea of the importance of a meteor stream, a definite lower limit of the masses of particles must be included in the definition proposed by Dr. Whipple.

Millman: I feel that the word stream can be used for particles moving in similar orbits independent of the lower mass limit of the observational data.

Lindblad: One difficulty encountered in computer-selection of meteor streams is the proper choice of the rejection level. If this level is chosen too liberal you may find that 90 % of your sample is included in streams. To avoid this difficulty your computer search should be tested on a previously studied photographic sample of meteor orbits. This you did in your old computer analysis of the Hawkins and Southworth random sample. Have you carried out a similar check on your new computer program?

Southworth: I will try a photographic sample, but have not yet done so. Comparatively small available samples cannot give a very searching test. The new criterion for streams described here is less sensitive to the limiting value of D than the old criterion.