THE INTERNATIONAL METEOR ORGANIZATION

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ABSTRACT. Founded in 1988, the International Meteor Organization (IMO) is an international scientific non-profit association with members all over the world. The IMO was created in response to an ever growing need for international cooperation of amateur work. As such, the main objectives of the IMO are to encourage, support and coordinate meteor observing, to improve the quality of amateur observations, to make global analyses of observations received world-wide, to develop contacts between amateurs and professionals, and to disseminate the observations and results obtained to other amateurs and to the professional community.

1. Organizational Structure

The International Meteor Organization (IMO) is an international, scientific non-profit association. It is composed of individual members, rather than corporate or incorporate societies or groups; the latter apply widely varying standards to their work and are therefore unattractive for implementing international scientific observing programs. At present, the membership of the IMO consists of about 200 meteor workers from 31 countries.

The prime decision-making body within the IMO is the General Assembly which consists of all voting members of the organization. Since amateurs usually do not have funds at their disposal for long-distance traveling to meetings, all decisions are made by written vote. The daily management of the IMO is in the hands of the Council. Council members, including the President of the IMO, are elected by the General Assembly. The present Council consists of 16 amateurs and professionals from all over the world.

2. Objectives

As stipulated in its Constitution, the IMO has set itself the following objectives:

- to affirm the need for studying meteors and related phenomena;
- to promote a global perspective towards the study of meteors and related phenomena, by striving towards common standards and research programs and by developing the international spirit among meteor workers;
- to encourage and develop the study of meteors and related phenomena by amateurs and professionals, both on practical and theoretical levels.
- to encourage and develop international cooperation, among as well as between amateur and professional meteor workers;

A.C. Levasseur-Regourd and H. Hasegawa (eds.), Origin and Evolution of Interplanetary Dust, 335–338.

- to centralize and distribute scientific data on meteors and related phenomena in order to guarantee both their conservation and their accessibility by amateurs and professionals;
- to provide assistance to individual meteor workers as well as groups for the organization of scientific activities.

In order to achieve its goals, the IMO publishes an international scientific journal in English called "WGN", makes available various scientific publications, proposes international standards for observing and reporting data, initiates and/or organizes observing programs, collects and distributes observational data, and organizes, provides assistance in the organization of, or participates in: conferences, lectures, exhibitions, observing camps, etc.

3. The IMO and amateur-professional cooperation

One of the main objectives of the IMO listed above is to provide the framework and facilities for future professional-amateur cooperation.

Most IMO amateur members have a long standing experience as a meteor observer. Moreover, many of them also have an academic degree and thus are amateurs only in the sense that they are not paid for the work they do. In addition the IMO has the support of several professional meteor workers. This rather exceptional composition of its membership allows the organization to assess the reliability of observations by individuals or groups of amateurs and to achieve reliable results. The IMO has thus realized the basic conditions for a durable amateur-professional cooperation.

In order to further advance the quality of amateur meteor work, a set of handbooks is currently being published in which the IMO observing standards are described in great detail, and, at the same time, a lot background information is given. To improve the interpretation of observational results, the IMO takes great efforts in providing easier access for amateurs to the meteor literature. In this respect, a list with over 8000 references covering the period 1794–1987 has already been published by Roggemans (1988). An update of this extensive literature survey is currently under preparation.

For the dissemination of its observations and results, the IMO publishes an international scientific journal called "WGN". WGN consists of two series: an Observational Report Series and a Bimonthly Journal. The Observational Report Series contains the collected observational results obtained worldwide using a standard methodology and should therefore become the key source of amateur observations for the professional community. The Bimonthly Journal serves as the principal interface between amateurs and professional astronomers. In addition, the IMO's annual conferences bring together amateurs and professionals, and thus provide a forum for discussion and the preparation of joint ventures.

4. Scientific structure

In order to coordinate the observations as well as the analyses and the publication of the results, several commissions were established within the IMO. The various commissions specialize in a specific observing technique. In addition, a common annual observing calendar is distributed to publishers of amateur astronomical periodicals with the aim of drawing the attention of as many amateurs as possible worldwide to the international observing efforts and obtaining statistically significant coverage of meteor stream appearances.

Below, we present the commissions that are presently in operation.

4.1. VISUAL COMMISSION

A program for the Visual Commission was discussed and established at the International Meteor Conference in 1989. One major goal is to derive data concerning the structure of meteor streams (particle flux density, spatial number density, mass index) as well as the sporadic background. In order to achieve these goals, appropriate observing techniques are recommended. The program proposes different methods for major and minor streams.

All data of visual observations are stored in the Visual Meteor DataBase (VMDB). This database serves as the central archive and, at the same time, allows a detailed analysis of the data. The VMDB is the only global source of amateur data available for the study of meteor stream structure.

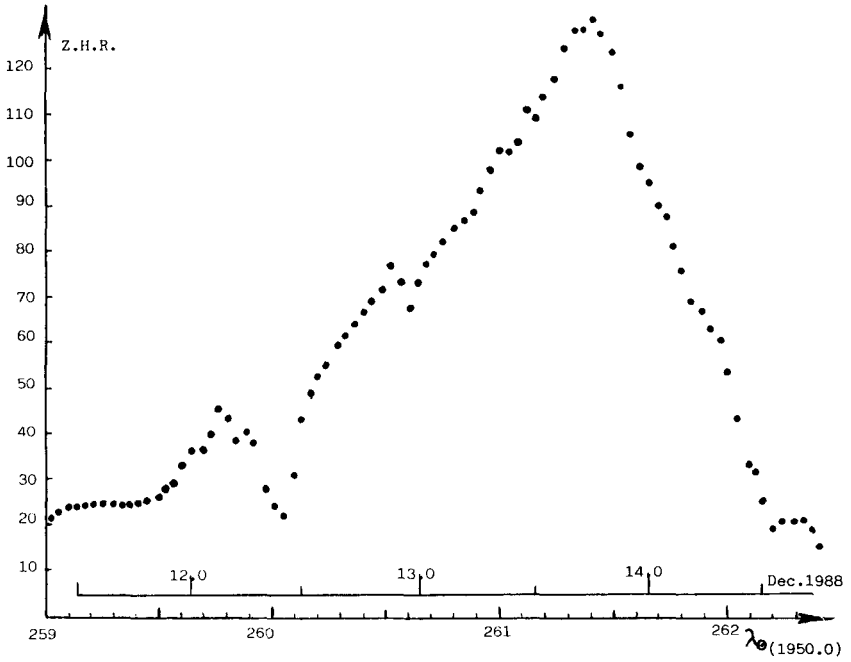

Figure 1. Activity profile of the 1988 Geminids, derived from IMO observations in the VMDB.

In order to demonstrate the effectiveness of the VMDB, we present as an example a summary of the analysis of the 1988 Geminid observations. The global effort to observe this shower yielded 14 193 Geminid meteors. The averaged zenithal hourly rates were plotted in an activity profile, shown in Figure 1 (Roggemans (1989)). The skew activity profile obtained is in very good agreement with results from Šimek and McIntosh (1989). It shows a gradual increase in activity from 20 Geminids per hour on December 12.0 to about 120 Geminids per hour on December 14.0. The peak occurs at solar longitude $\lambda_\odot = 261\overset{\circ}{.}38$ (1950.0) and covers 14 hours. The activity profile is furthermore characterized by a steep decrease immediately following the maximum peak: the Geminid activity dies out in about 24 hours. The asymmetric concentration of particles in the meteor stream can be explained as a consequence of the process of the meteor stream build-up (Fox et al. (1983)). The role of the assumed parent body, asteroid (3200) Phaeton, is not yet fully understood, as shown by Hunt et al. (1985).

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4.2. PHOTOGRAPHIC COMMISSION

The IMO's Photographic Meteor DataBase (PMDB) contains some 1200 processed meteors. The data on these meteors allow radiant position and size determination. For the meteors photographed from at least two stations trajectory and heliocentric orbit could be derived. This long term project has to go on for many more years in order to accumulate sufficient information on the spatial distribution of meteor orbits in the Solar System.

4.3. FIREBALL DATA CENTER

Fireballs are striking and rare phenomena. They occur when meteoroids of reasonable size enter the atmosphere of the Earth. In the case of double or multiple station observations, it is possible to calculate the trajectory and the heliocentric orbit of such objects. This is of great interest, especially if a meteorite fell. Then, its relation to other minor bodies in the Solar System can be derived. Most data necessary for such calculations are provided by camera networks. Visual observations and reports from eye-witnesses may add important information such as the precise time of the event, fragmentation, and in particular accompanying sound phenomena. Eye-witness reports may be especially helpful in case a meteorite has to be searched. Visual and, if possible, photographic observations of persistent trains may also give additional hints on the material entering the atmosphere.

All available data on fireballs are included into a database of the IMO's FIreball DAta Center (FIDAC). The FIDAC database allows analyses of fireball rates and magnitude data (mass index) for rather large particles.

4.4. TELESCOPIC COMMISSION

Telescopic observations allow analyses of positions and structure of radiants. Furthermore, the magnitude range allows one to derive characteristics, such as the mass index, towards smaller particles than observed visually. A detailed program was also established at the International Meteor Conference in 1989.

4.5. RADIO COMMISSION

Radio observations are independent of clouds, daylight and other influences as city lights and so on. The radio program (not using radar but reflections of radio signals from commercial broadcasting stations) encourages people to observe on a more continuous basis. In this way, it is possible to obtain a complete activity profile down to fainter, poorly studied magnitude classes (+10). Studies of the relationship between the visual meteor appearance, their brightness, and the duration of the received echo signal are also needed.

5. References

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