

## COMMISSION F1

## METEORS, METEORITES, AND INTERPLANETARY DUST

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## COMMISSION F1 WORKING GROUPS

**Div. F / Commission F1 WG**      **Meteor Shower Nomenclature**

## TRIENNIAL REPORT 2018-2021

### 1. Background

Commission F1 is a renewed Commission 22, which was originally established in 1922 and had the same name before its discontinuation in 2015, i.e. Meteors, Meteorites, and Interplanetary Dust. The commission is formed by scientists who study the smallest objects in the Solar System, through observations, modeling theory and laboratory studies, representing a different community from those studying comets and asteroids. The field is, nevertheless, an important part of the planetary sciences community at large, the study of small Near Earth Objects and their impact hazard, and relevant to satellite operators as well as various fields in atmospheric sciences. Currently the commission has 158 members with an Organizing Committee composed of 7 elected members.

### 2. Developments within the past triennium

#### 2.1. *Conferences*

Held every three years, the ‘Meteoroids’ conference is the main conference representing the Commission F1. The Meteoroids 2019 conference took place in Bratislava, Slovakia, from June 17 – 21, 2019. Meteoroids 2019 was the tenth international conference in a series of meetings on meteors, meteoroids, meteorites, interplanetary dust, and related topics, which have been held since 1992. The previous meeting, Meteoroids 2016 was held in ESTEC, Noordwijk, the Netherlands. Meteoroids 2019 was dedicated to the pioneering Interplanetary Matter Bratislava group of the Astronomical Institute of the Slovak Academy of Sciences (SAS), in particular to one of its original members, Prof. Vladimir Porubcan, who is also one of the founders of the Meteoroids conference series. The conference was organized by Comenius University in Bratislava and its department of Astronomy and Astrophysics with the participation of colleagues from the Astronomical Institute of the SAS.

The 2019 conference brought together 129 meteor astronomers, both professional and

amateurs, who gave a total of 83 oral presentations and 53 posters showing results relevant to all areas of meteor physics and astronomy. Sessions focusing on physical processes reported results regarding sources of meteoroids; physics and chemistry of meteors; composition and physical properties of meteoroids; and their dynamical evolution. Other sessions focused on more technical aspects of the field such as current and future observing methods and techniques, in-situ experiments, spacecraft anomalies, and meteorite recovery efforts. This year included a session reporting results relevant to planetary defense, a growing critical research area. The conference reflected the significant progress achieved in meteor science over the last years and illustrated the growing interest in the field shown by the large number of early and mid-career scientists. The proceedings of the conference were published on a special issue of the journal *Planetary and Space Science*. The guest editors were D. Janches, A. Moorhead, J. Toth, M. Hajdukova, R. Jedicke and Q. Ye.

After evaluating four proposals during the 2019 conference, the OC decided that the Meteoroids 2022 conference will be held at Huntsville, Alabama, USA organized by the Meteoroid Environment Office at NASA Marshall Space Flight Center.

### 2.2. *Meteor Data Center*

The Commission maintains the official IAU Meteor Data Center (MDC), currently headed by T. Jopek of the Astronomical Observatory at A.M. University in Poznan, Poland. The data can be accessed at <http://www.ta3.sk/IAUC22DB/MDC2007/>. The MDC maintains the Working List of Meteor Showers and supports the public accessibility of meteoroid orbit data. In 2020, Jopek announced his retirement. A proposal is on the table headed by Maria Hajdukova of Bratislava Observatory and Regina Rudawska of A. M. University to continue the work of the MDC.

The nomenclature of meteor showers and the need to formulate a descriptive list of newly established meteor showers that can receive official names during the next General Assembly are the task of a functional Working Group in C.F1. This Working Group on Meteor Shower Nomenclature has 11 members, including one IAU associate (an active amateur astronomer). The chair is P. Jenniskens. The WG collaborates closely with the MDC and provides arbitration in proposed meteor shower names. In the past triennium, the WG established new guidelines for moving showers from the Working List of Meteor Showers to the List of Removed Showers. The WG also supported the implementation of lookup tables to define the dispersion in radiant position and solar longitude (time of occurrence), to better identify duplicate entries. The Working List now contains 836 showers, 112 of which are established. Recently, over 50 more entries were added from ongoing video orbit surveys.

### 2.3. *Meteoroids Book*

A project that was carried out from last triennium and completed during the 2018-2021 triennium is the much needed book focusing on the Commission's scientific interests. In 2019, *Meteoroids: Sources of Meteors on Earth and Beyond* was published by Cambridge University Press. Edited by G. Ryabova, D. Asher and M. Campbell-Brown, the 12-chapter book is aimed as a guide to provide students and researchers with an overview of all of the main topics concerning meteor science ranging from the physical composition of meteoroids to the most recent optical and radar observations and ongoing theoretical developments. Critical application of the field to the risk posed by meteoroids - to spacecraft, and on the ground - and future avenues of research are also discussed. Chapters also include description of the the latest dynamical models, insights and the evolution

of meteoroid streams and complexes. In-depth laboratory analysis of recovered material are also part of the topics presented in the book.

### 3. Conclusion and future plans

Most of the tasks of the Commission are long-term and as such, they will continue progressing during the 2021–2024 triennium. Commission F1 will continue coordinating the organization of the Meteoroids conference every 3 years, next one taking place in 2022 in Huntsville Alabama, USA. Furthermore, through the activities of its Working Group, the Commission will continue maintaining the IAU Meteor Data Center and leading the effort to define the nomenclature of meteor showers, ensuring the official list of showers have no duplicate names for the same shower and/or other conflicts as well as to decide which of the proposed showers can be declared as established. For the assistance with this work Commission F1 established a Working Group on Meteor Shower Nomenclature. The Working Group is also proposed to be continued and will oversee the ongoing restructuring of the MDC.

The commission will continue to actively encourage the collaboration between professional and amateur astronomers in the field of meteors and meteorite research. Nowadays, amateurs are equipped with video and photographic cameras which provide high quality data to contribute to meteor science. In addition, assisting local researchers in the study of important meteor events and small asteroid impacts is also the Commission's interest. Very bright meteor events (superbolides) are relatively rare phenomena, but if they occur in populated areas, they cause wide attention, media coverage, and sometimes even panic. Finally, the Commission's members are always actively co-organizing meteor related sessions in larger and more general conferences like International Radio Science Union (URSI), American Geophysical Union (AGU), European Planetary Science Conference (EPSC) or European Geophysical Union (EGU) among others. Meteors research is critical to other areas outside astronomy, e.g. parts of geophysics (atmospheric sciences, impact processes), geochemistry (supply of meteoritic material), radio communications, etc. Commission F1 must play a role engaging other science community in the study of meteors.

Diego Janches  
*President of the Commission*