

# The Working Group on Meteor Showers Nomenclature: a History, Current Status and a Call for Contributions

T. J. Jopek • P. M. Jenniskens

**Abstract** During the IAU General Assembly in Rio de Janeiro in 2009, the members of Commission 22 established the Working Group on Meteor Shower Nomenclature, from what was formerly the Task Group on Meteor Shower Nomenclature. The Task Group had completed its mission to propose a first list of established meteor showers that could receive official names. At the business meeting of Commission 22 the list of 64 established showers was approved and consequently officially accepted by the IAU.

A two-step process is adopted for showers to receive an official name from the IAU: i) before publication, all new showers discussed in the literature are first added to the Working List of Meteor Showers, thereby receiving a unique name, IAU number and three-letter code; ii) all showers which come up to the verification criterion are selected for inclusion in the List of Established Meteor Showers, before being officially named at the next IAU General Assembly. Both lists are accessible on the Web at [www.astro.amu.edu.pl/~jopek/MDC2007](http://www.astro.amu.edu.pl/~jopek/MDC2007).

**Keywords** meteor shower • meteoroid stream • methods: nomenclature

## 1 Introduction

The naming conventions for celestial objects, and the method of announcement of their discovery, has been the prerogative of the International Astronomical Union (IAU) since years. At its inaugural meeting in Rome in 1922, the IAU standardized the constellation names and abbreviations. More recently the IAU Committee on Small Body Nomenclature has certified the names of asteroids and comets, e.g. see Kilmartin (2003), Ticha et al. (2010) or enter the website [www.ss.astro.umd.edu/IAU/csbn/](http://www.ss.astro.umd.edu/IAU/csbn/).

Until 2009, however, the IAU has never named a meteor shower. The need to settle on official nomenclature rules was widely discussed, but the problem was not settled by the community of meteor astronomers. As a result, there was much confusion in the meteor shower literature. Some well defined showers had multiple names (Draconids, Giacobinids, ...), while many showers were given a different name in each new detection.

This situation changed during the IAU General Assembly in Prague in 2006, when Commission 22 established a *Task Group on Meteor Shower Nomenclature*. The task of this group was to formulate a descriptive list of established meteor showers that could receive official names during the next IAU General Assembly in Rio (Jenniskens 2007; Spurný et al. 2007, 2008). Task Groups are established for

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periods of three years, and serve until the next General Assembly. The members of the first Task Group on Meteor Shower Nomenclature were: Peter Jenniskens (chair), Vladimír Porubčan, Pavel Spurný, William J. Baggaley, Juergen Rendtl, Shinsuke Abe, Robert Hawkes and Tadeusz J. Jopek.

## 2 Nomenclature Rules and the Working List of Meteor Showers

To make this task possible, the traditional meteor shower nomenclature practices were formalized, and a set of nomenclature rules was adopted:

- a meteor shower should be named after the constellation of stars that contains the radiant, using the possessive Latin form of the constellation and replacing the Latin declension for "id" or "ids",
- if in doubt, the radiant position at the time of the peak of the shower (at the year of discovery) should be chosen,
- to distinguish among showers from the same constellation:
  - the shower may be named after the nearest (brightest) star with a Greek or Roman letter assigned ("η Lyrids", "c Andromedids"),
  - the name of the month (months) may be added (May Lyncids, September-October Lyncids),
- for the shower with a radiant elongated less than 32 degrees from the Sun, one should add "Daytime" before the shower name ("Daytime Arietids", "Daytime April Piscids"),
- by adding "South" and "North" one refers to the branches of a single meteoroid stream, both branches are active over about the same period of time. The radiants of these branches are located south and north of the ecliptic plane,
- showers that move through two constellations can be named by giving the two constellations in successive order using a "-" symbol, e.g., Librids-Luppids,
- a composed name of a shower is allowed (Northern Daytime ω Cetids),

In case of confusion, *The Task Group on Meteor Shower Nomenclature* will select among the proposed names a unique name for each shower. For further details related to all above rules see (Jenniskens 2006a, 2008).

The second part of the task – to create a descriptive list of established meteor showers – is a much more complicated issue. As a starting point a Working List of ~ 230 showers was compiled using data collected and published in the book by Jenniskens (2006b). Each shower was given a name, a unique number and a three-letter code to be used in future publications (η Aquariids, 31, ETA). The Working List, and the list of nomenclature rules, was posted on a newly established IAU Meteor Data Center website (Jopek 2007).

During the Meteoroids 2007 meeting in Barcelona, the Task Group worked out the logistics of adding new streams to the Working List, and of adding new information on streams already in the Working List:

- the institute responsible for maintaining the Working List is the IAU Meteor Data Center, managed currently by Vladimír Porubčan of SAS, Slovakia,
- already known and newly discovered streams should be reported in the literature only with a designated IAU name, number and code,

- Tadeusz J. Jopek of the UAM Astronomical Observatory, Poland, is the person currently responsible for:
  - maintaining the shower part of the IAU MDC website,
  - reporting new streams and new data on existing streams,
  - giving out new IAU numbers and codes. To obtain new numbers and codes the author should contact T.J. Jopek directly<sup>3</sup>,
- the International Meteor Organization takes a role in coordinating the reporting of newly discovered showers. It facilitates the inclusion of showers that are recognized by amateur astronomers, for example from visual observations.

To inform the scientific community of newly discovered showers, the IAU's Central Bureau for Astronomical Telegrams (CBAT) issues an electronic telegram (CBET) with a brief summary of each new find. Those telegrams are prepared by the Task Group, as a part of the process of reporting new streams, when new showers are added to the working list. Following this CBET, all publications discussing that new shower should use the newly established name, number, and shower code.

During the 2006-2009 triennium, the Working List was updated several times (Kashcheev et al. 1967; Uehara et al. 2006; Brown et al. 2008; Molau and Kac 2009; Molau and Rendtel 2009; SonotaCo 2009; Brown et al. 2010; Jopek et al. 2010). In July of 2009, the Working List of all Meteor Showers consisted of 365 meteor showers.

### 3 The List of Established Meteor Shower

The Task Group met again at the May 2009 Bolides Meeting in Prague, where the Task Group settled on the list of established meteor showers. Established showers are those meteor showers that have certainly manifested. 64 meteor showers from the Working List were moved to the *List of Established Showers*. As the main grounds for this action, two factors were considered — definite shower activity (for example because of a strong meteor outburst) or confirmation from the detection of a shower in at least two recent meteor orbit surveys. The decision to move a shower into the list of established showers was to some extent subjective and border cases were decided by the democratic process of voting in the Task Group. Goal was to leave out any showers that were not certain to exist. The list was subsequently posted on the Meteor Data Center website for review.

In August of 2009, during the Commission 22 business meeting held in Rio de Janeiro, the content of the List of Established Showers was approved without changes (Watanabe et al. 2010), and this decision was confirmed by the subsequent Division III business meeting, see *Bowell et al. (2010)*. As a result, for the first time in the history of meteor astronomy, meteor showers were officially named by the IAU. All these showers are listed in Table 1.

### 4 The Working Group for Meteor Shower Nomenclature

To facilitate the future update of the Working List and the List of Established Showers, Commission 22 (C22) has accepted a two step process:

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**Table 1.** Geocentric data of 64 showers officially named during XXVII IAU General Assembly held in Rio de Janeiro in 2009. For each shower, the solar ecliptic longitude  $\lambda_s$ , the radiant right ascension and declination  $\alpha_g$ ,  $\delta_g$  are given for J2000.0.

No	IAU No & code	Stream name	$\lambda_s$ (deg)	$\alpha_g$ (deg)	$\delta_g$ (deg)	$V_g$ (km/s)
1	1 CAP	$\alpha$ Capricornids	127	306.6	-8.2	22.2
2	2 STA	Southern Taurids	224	49.4	13	28
3	3 SIA	Southern $\iota$ Aquariids	131.7	339	-15.6	34.8
4	4 GEM	Geminids	262.1	113.2	32.5	34.6
5	5 SDA	Southern $\delta$ Aquariids	125.6	342.1	-15.4	40.5
6	6 LYR	April Lyrids	32.4	272	33.3	46.6
7	7 PER	Perseids	140.2	48.3	58	59.4
8	8 ORI	Orionids	208.6	95.4	15.9	66.2
9	9 DRA	October Draconids	195.1	264.1	57.6	20.4
10	10 QUA	Quadrantids	283.3	230	49.5	41.4
11	12 KCG	$\kappa$ Cygnids	145.2	284	52.7	24
12	13 LEO	Leonids	235.1	154.2	21.6	70.7
13	15 URS	Ursids	271	219.4	75.3	33
14	16 HYD	$\sigma$ Hydrids	265.5	131.9	0.2	58
15	17 NTA	North. Taurids	224	58.6	21.6	28.3
16	18 AND	Andromedids	232	24.2	32.5	17.2
17	19 MON	December Monocerotids	260.9	101.8	8.1	42
18	20 COM	December Comae Berenicids	274	175.2	22.2	63.7
19	22 LMI	Leonis Minorids	209	159.5	36.7	61.9
20	27 KSE	$\kappa$ Serpentids	15.7	230.6	17.8	45
21	31 ETA	$\eta$ Aquariids	46.9	336.9	-1.5	65.9
22	33 NIA	North. $\iota$ Aquariids	147.7	328	-4.7	27.6
23	61 TAH	$\tau$ Herculids	72	228.5	39.8	15
24	63 COR	Corvids	94.9	192.6	-19.4	9.1
25	102 ACE	$\alpha$ Centaurids	319.4	210.9	-58.2	59.3
26	110 AAN	$\alpha$ Antliids	313.1	140	-10	42.6
27	137 PPU	$\pi$ Puppids	33.6	110.4	-45.1	15
28	144 APS	Daytime April Piscids	30.3	7.6	3.3	28.9
29	145 ELY	$\eta$ Lyrids	49.1	292.5	39.7	45.3
30	152 NOC	North. Daytime $\omega$ Cetids	46.7	2.3	17.8	33
31	153 OCE	South. Daytime $\omega$ Cetids	46.7	22.5	-3.6	36.6
32	156 SMA	South. Daytime May Arietids	55	33.7	9.2	28.9
33	164 NZC	North. June Aquilids	86	298.3	-7.1	36.3
34	165 SZC	South. June Aquilids	80	297.8	-33.9	33.2
35	170 JBO	June Bootids	96.3	222.9	47.9	14.1
36	171 ARI	Daytime Arietids	76.7	40.2	23.8	35.7
37	172 ZPE	Daytime $\zeta$ Perseids	78.6	64.5	27.5	25.1
38	173 BTA	Daytime $\beta$ Taurids	96.7	84.9	23.5	29
39	183 PAU	Piscis Austrinids	123.7	347.9	-23.7	44.1
40	187 PCA	$\psi$ Cassiopeiids	106	389.4	71.5	40.3
41	188 XRI	Daytime $\xi$ Orionids	117.7	94.5	15	44
42	191 ERI	$\eta$ Eridanids	137.5	45	-12.9	64
43	198 BHY	$\beta$ Hydruisids	143.8	36.3	-74.5	22.8
44	206 AUR	Aurigids	158.7	89.8	38.7	65.7
45	208 SPE	September $\epsilon$ Perseids	170	50.2	39.4	64.5

**Table 1 (continued).** Geocentric data of 64 showers officially named during XXVII IAU General Assembly held in Rio de Janeiro in 2009. For each shower, the solar ecliptic longitude  $\lambda_s$ , the radiant right ascension and declination  $\alpha_g, \delta_g$  are given for J2000.0.

No	IAU No & code	Stream name	$\lambda_s$ (deg)	$\alpha_g$ (deg)	$\delta_g$ (deg)	$V_g$ (km/s)
46	212 KLE	Daytime $\kappa$ Leonids	181	162.7	15.7	43.6
47	221 DSX	Daytime Sextantids	188.4	154.5	-1.5	31.2
48	233 OCC	October Capricornids	189.7	303	-10	10
49	246 AMO	$\alpha$ Monocerotids	239.3	117.1	0.8	63
50	250 NOO	November Orionids	245	90.6	15.7	43.7
51	254 PHO	Phoenicids	253	15.6	-44.7	11.7
52	281 OCT	October Camelopardalids	193	166	79.1	46.6
53	319 JLE	January Leonids	282.5	148.3	23.9	52.7
54	320 OSE	$\omega$ Serpentids	275.5	242.7	0.5	38.9
55	321 TCB	$\theta$ Coronae Borealids	296.5	232.3	35.8	38.66
56	322 LBO	$\lambda$ Bootids	295.5	219.6	43.2	41.75
57	323 XCB	$\xi$ Coronae Borealids	294.5	244.8	31.1	44.25
58	324 EPR	$\varepsilon$ Perseids	95.5	58.2	37.9	44.8
59	325 DLT	Daytime $\lambda$ Taurids	85.5	56.7	11.5	36.4
60	326 EPG	$\varepsilon$ Pegasids	105.5	326.3	14.7	29.9
61	327 BEQ	$\beta$ Equuleids	106.5	321.5	8.7	31.6
62	328 ALA	$\alpha$ Lacertids	105.5	343	49.6	38.9
63	330 SSE	$\sigma$ Serpentids	275.5	242.8	-0.1	42.67
64	331 AHY	$\alpha$ Hydrids	285.5	127.6	-7.9	43.6

- before being published, each new shower will obtain a unique name, the IAU number and three letter code. After publication, the shower will be added to the Working List of Meteor Showers and the discovery announced,
- all showers which come up to the verification criterion will be included in the List of Established Showers, and after their approving by the C22 business meeting during the next General Assembly, all new established showers will from thereon be known by their official name.

This makes the naming of meteor showers an ongoing effort. During the business meeting in Rio, the present members of Commission 22 agreed that the *Task Group on Meteor Shower Nomenclature* should be transformed into the *Working group on Meteor Shower Nomenclature*. The current members of the Working Group in the 2009-2012 triennium are: Peter Jenniskens (chair), Tadeusz J. Jopek (vice-chair), Vladimír Porubčan, William J. Baggaley, Juergen Rendtl, Shinsuke Abe, Peter Brown and Pavel Koten. The main goal of the Working Group is similar to that in the previous triennium: maintaining and improving the Working List of meteor showers on the IAU Meteor Data Center website; assigning new names, numbers and three letter codes for the showers discovered in new surveys; and decide which new showers can be moved to the List of Established Showers, and thus obtain official names during the next IAU General Assembly in Beijing in 2012.

## 5 Conclusions and Call for Contributions

In 2009 for the first time in history of the Meteor Astronomy, 64 showers were officially named by the IAU. Their names are given in Table 1, and are posted on the IAU MDC website, see Jopek (2007). The current Working List of Meteor Showers has already 301 candidate showers that could receive official names if their existence can be confirmed.

Meteor astronomers can contribute to minimizing the confusion in the literature by checking the correct name of a shower when minor showers are discussed and by adhering to the newly adopted names (e.g., "δ Aquariids", not "δ Aquarids"). Showers that are not yet in the Working List should be reported before they are mentioned in new (amateur or professional) literature.

Nomenclature is important in astronomy because it regulates the language used by astronomers. In our meteor community we started with this task quite recently. Our first experiences taught us that there is a real need to assign a particular name to a particular shower, but that this task alone is not simple. We needed to check, and check again, that those names were unique and did not lead to confusion. The task to establish if a new shower is a real entity or only ill defined, is even more difficult. To establish a shower is the end of a long process that can take many years. At the beginning of the process, no one can predict all problems that wait for a solution in a given case.

In the near future, the Working Group on Meteor Shower Nomenclature has several tasks to solve. At this moment, we are expanding the information on meteor showers included in the Working List to make the list more descriptive. As a very important next step, we consider developing more objective criteria to be used for verification whether a given shower can be considered an established one. More precise and regular meteor observation can be of invaluable help in this task. In addition, our community needs new theoretical concepts and studies that can make us more confident in recognizing meteor showers among a sporadic meteor background.

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