journal of the international meteor organization

WGN

35:5
october 2007

Aurigids
Draconids
Conferences
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ISSN 1016-3115

WGN Vol. 35, No. 5, October 2007, pp. 95 – 116

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Front cover photo

The IMC 2007 group photo on the terrace of Pic du Midi Observatory.

Writing for WGN

This Journal welcomes papers submitted for publication. All papers are reviewed for scientific content, and edited for English and style. Instructions for authors can be found in WGN **31:4**, 124–128, and at `http://www.imo.net/articles/writingforwgn.pdf` .

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Editorial — Them and us; short reports

Chris Trayner

Humans are a communicative species — that is one of the characteristics of *Homo sapiens*, and probably part of what gave us our control over the environment and our civilisation. The IMO Council has been talking a lot recently about whether we are running the organisation in the right way. In particular, we have been wondering whether we fail to communicate with the members enough.

If we are failing like this, then we risk becoming too remote from the people we are trying to serve. We risk having what is called a 'them and us' culture — one where members feel there are them over there, and us over here, and the one ignores the other.

If the Council is too remote, then one thing that is needed is for us to communicate to you. You may have noticed that there have been more official Council announcements and items recently in the Administrative section at the start of WGN. This is a result of Council trying to say more about what we are doing and what we decide.

For communication to be most useful it has to be two-way, though. The other side of the coin is for members to talk to Council. Many do so at IMCs, but only a small fraction of members go there and it is only once a year. Council cannot do what members want unless members tell it what they want.

I would therefore encourage members to tell Council what they want out of the IMO. They could write directly, or they could write it as a letter to WGN. As Editor, of course, I would prefer letters in WGN — it gives me a more lively letters section, and contributes to the Journal. But the important thing is that people write.

Humans are a communicative species, and it would be strange if members were not already talking to each other about what they want from IMO; they have probably been doing so for years. These are the sorts of thoughts and wishes that would make good letters to WGN. However much your letter criticises IMO, I would not censor it; I would only censor a letter if it were offensive or libelous. (I would shorten it if it were too long. If your English were poor, I would suggest changes to avoid you looking foolish in print.)

A good letter can get a satisfying response, as Alastair McBeath's letter in the previous WGN showed. There was a flurry of emails between Council members about it, and one such email has been submitted to me to publish as a reply. It is perhaps a pity that only this one was submitted, somewhat in the form of a Council 'official line', rather than more Council members writing as individuals.

Alastair's letter was one of the most delicious pieces of 'stirring it' I have read for years, and a piece of wit in the true sense. A letter like this does a real service to an organisation — it gets a debate going. When the replies cover a range of opinions they amount to the organisation thinking out its attitudes as a communicating organism. Controversial letters are to be appreciated, not avoided.

Humans are a communicative species — that is part of the way we control our environment. If you want to control the environment that IMO provides for your meteor work (WGN, conferences, meteor reporting mechanisms, budgets), then it is important to join in the data flow. Writing to WGN is one way of doing this. When emailing to **wgn@imo.net**, remember to put the work Meteor in the subject line to get past our anti-spam filters.

Short reports

In the June Editorial I explained that short reports were as welcome as full papers. I was delighted a few days ago to receive an email from Pavel Habuda offering me not one but two! They appear in this issue, on pages 99 and 101.

This is exactly the sort of thing that the Council want to see in WGN as well as longer papers: short reports on recent results. By the time you read this, Pavel's results will be less than a month old.

In the past WGN used to publish many such short items but they seem to have faded away in recent years, with few being submitted. Perhaps the internet has taken a lot of this traffic, but we feel that there is still a place for these papers in WGN. To emphasise this, we are introducing another section called Short Reports to contain them. We encourage more of you to submit these pieces.

IMO bibcode WGN-355-editorial NASA-ADS bibcode 2007JIMO...35...95T

IMC 2008 in Slovakia

The IMC Local Organizing Committee

We are very pleased to inform you that next IMC will take place near Bansk Bystrica in Slovakia from 18th to 21st September 2008. The conference location, the Šachtička Hotel, is situated just 7 km from the town Banská Bystrica.

The IMC 2008 will be the third International Meteor Conference in Slovakia. The conference centre is located in a magnificent hotel in a green mountain area. The place is close to the geographical center of Europe, which we plan to visit.

There are many travelling possibilities to Banská Bystrica. The closest airport is in Bratislava. The Slovak capital can also easily be reached by train or bus. Road connections are good, too.

The Local Organizing Committee (LOC) is situated in the Public Observatory and Planetarium in Žiar nad Hronom. The LOC can be contact via the members Daniel Očenáš or Stanislav Kaniansky: `sky@planetarium.sk` (main address) or `dano.ocenas@gmail.com`.

We will provide you with more detailed information in the December issue of WGN and hope to see you in Slovakia next September.

Daniel Očenáš and Stanislav Kaniansky

IMO bibcode WGN-355-imc-imcann NASA-ADS bibcode 2007JIMO...35...96I

From the Treasurer — IMO Membership/WGN Subscription Renewal for 2008

Marc Gyssens

We invite all our members/subscribers to renew for 2008. The fees are as tabulated below. The corporate subscription rate applies to institutions, libraries, etc. Individuals pay the IMO membership fee and get WGN as part of their IMO membership.

We apologize to our North-American members for substantial increase of the membership fee in USD, which is almost entirely due to the unfavorable rate of the Dollar against the Euro. We ask for their understanding. We have thorougly investigated the possibility of having WGN printed in the USA for North-American members, but this turned out to be not viable financially, unfortunately.

IMO Membership/WGN Subscription 2008				
surface mail delivery:		€26		US$ 36
airmail (outside Europe only):		€49		US$ 69
Supporting membership:	add	€26	add	US$ 36
Corporate subscription rate 2008				
surface mail delivery:		€50		US$ 70
airmail (outside Europe only):		€73		US$ 103

It is possible to renew for two years by paying double the amount.

General payment instructions can be found on the IMO's website, `http://www.imo.net`. Members and subscribers who have not yet renewed will find enclosed a leaflet with payment instructions that apply to their geographical region. Please follow these instructions! Choosing the most appropriate payment method results in low or even no additional costs for you as well as the IMO. The IMO strives to keeping these costs low in order to control the price of the journal!

We already thank all our members that will renew for their continued trust in our Organization.

One final request: every year, a lot of members renew late. As a consequence, back issues that already appeared have to be sent out to these members. Please support our volunteers in their bimonthly effort to have WGN shipped to you by renewing promptly! Thank you for your understanding and cooperation!

IMO bibcode WGN-355-gyssens-renewals NASA-ADS bibcode 2007JIMO...35...96G

From the Treasurer — Electronic Shop and New Publications

Marc Gyssens

Electronic shop

Since the beginning of October, the IMO's electronic shop became operational, as some of you may already have noticed. To access it, just surf to `http://www.imo.net` and click on 'Publications' under 'Organization'. There, you get an overview of all publications that are available (it has now become impossible to order publications that are sold out). A green marker indicates there is still ample stock. An orange marker, however, indicates that there are only a few copies left and that you should hurry if you want to secure one for yourself. After having placed your order, you will then be directed to another page where you can indicate your shipping information and method of payment. Just follow the instructions; it is very easy!

The available payment options are the same as for membership renewal. However, we explicitly ask members in EU countries to give preference to bank transfers to the account of the International Meteor Organization, Mattheessensstraat 60, B-2540 Hove, Belgium, in Euro, using IBAN and BIC-numbers:

IBAN: BE30 0014 7327 5911 (omit spaces in electronic transfers)

BIC: GEBABEBB

When done correctly, such a transfer should cost you no more than a domestic transfer, and it does not generate costs for us, contrary to, e.g., PayPal. By contributing to lower these costs, you help us (and yourself) in keeping prices for publications in check!

Apart from providing you a uniform and easy tool to order publications, the electronic shop also provides us with an effective tool to follow up outstanding orders more efficiently.

New and newly available publications

We want to point out the attention of our readers to two new or newly available publications:

- DVD archive of WGN and IMC proceedings. Several WGN volumes and IMC proceedings, many of which no longer available in printed form, are now available on DVD. Details can be found in the inside back cover. You can order this DVD for EUR 45 (USD 63).
- Radio Meteor School 2005 Proceedings. These proceedings resulted from bringing together for the very first time professional and amateur radio meteor observers, and is therefore a basic contribution to this field of meteor observing. The first printing was immediately sold out, but a second printing is now available at EUR 15 (USD 21). Do not miss it!

Both publications can be ordered conveniently through our electronic shop!

IMO bibcode WGN-355-gyssens-pubs NASA-ADS bibcode 2007JIMO...35...97G

Letter — Reply to 'Naming Names', by Alastair McBeath

Jürgen Rendtel [1]

With some surprise, I read Alastair McBeath's letter in the August issue of WGN (vol. 35, p. 70). There are several aspects to be considered.

In general, the nomenclature of astronomical objects and formations on the surfaces of objects needs rules and definitions. Otherwise we end up at a mess of various kinds of words, designations, and phrases. The unambiguous astronomical nomenclature is one of the tasks of the International Astronomical Union. This is handled by people with a solid background in their field, not for puristic language reasons. At this point, pronounciation problems of different languages cannot be a criterion for the naming. Very probably it is impossible to find designations which are suitable and easy to pronounce in all languages. Alastair describes in detail how the suffix and other names cause problems — mainly because one letter can be pronounced in quite different ways. I experienced discussions between native English speakers who could hardly agree how to pronounce names of constellations — and these are in use for centuries and are no new invention. Alastair correctly recalls that we had a paragraph on the -iids suffix in the 1995 Visual Handbook of the IMO. There we said that the -iids form would be consequent but we left the -ids as an exception. Now the exception is replaced by the rule — what is the problem? I think the change is less than, for example, the change of the comet designation was some years ago. And this also holds for the general public as it concerns just a few showers, none of them being a major shower.

The IMO will be involved in the process of establishing and confirming new showers/streams. Indeed, the identification, confirmation and definition of a stream is a more difficult topic, but it has nothing to do with the naming. We will certainly see different streams when using different observing techniques. This is natural, as we deal with different mass ranges, and streams differ significantly in this respect.

The working list which is provided by the IMO (and published e.g. as our Shower Calendar) should be considered as an excerpt from the general list. For our list we choose showers which can be recognized and analysed from visual data. We know that there are many more, which are difficult or impossible to observe visually, such as the α-Boötids or the numerous radiants which now are summarized as antihelion source. So the IMO working list cannot be the 'master list'. Establishing a master list includes another aim: the collection of data of all streams which encountered the Earth also in the past. This is necessary if one wishes to deal with historical observations as well as with predicted events in the future. Like our working list, the master list will be incomplete. No compilation of data is complete as long as research is done. So I do not see a problem with this list here either.

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IMO bibcode WGN-355-rendtel-letter NASA-ADS bibcode 2007JIMO...35...98R

Short reports

θ Aurigids and α Aurigids — confused radiants in the 2007 September 1 outburst

Pavol Habuda [1]

The difference between the radiants of the α and θ Aurigids during the 2007 September 1 outburst, and its impact on results, are discussed.

Received 2007 October 30

1 Introduction

An outburst of θ Aurigids on 2007 September 1 was forecast years before, for example in (Jenniskens, 1997). As time passed, publicity for this outburst rose between meteor observers and other astronomers. Many astronomers prepared to observe this outstanding theatre — but with one prevailing mistake:

Most sources did not distinguish between the annual α Aurigids (with ZHR up to 10) and occasional outbursts of the θ Aurigid meteor shower. There was just an outburst of Aurigids. Who cares whether α or θ? And this 'small' mistake is in fact a serious problem in evaluating the observations of the Aurigids.

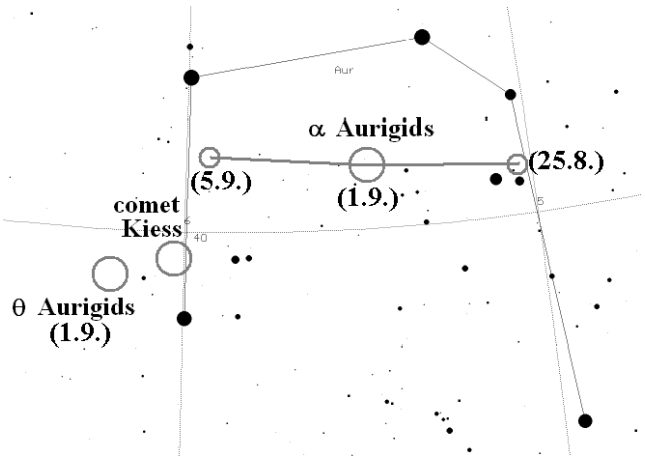

Figure 1 – The Aurigid radiants. This is only a sketch, not plotted with full precision. The θ Aurigid radiant has coordinates RA = 92.°5, DEC = 38.°5, based on TV observations in 2007 by Chris Peterson.

The Figure shows the difference between the radiants of the α and θ Aurigids. The radiant of the α Aurigids has coordinates RA = 84°, DEC = 42° on September 1 from `http://www.imo.net`. Jenniskens & Lyytinen (2003) gave the radiant of the θ Aurigids as RA = 90°, DEC = 39°. We can compute that these two radiants are 7° away one from another. If we take the coordinates of Peterson (`http://www.cloudbait.com/science/aurigid2007.html`), the difference between the radiants is 9°.

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IMO bibcode WGN-355-habuda-aurigids
NASA-ADS bibcode 2007JIMO...35...99H

The radiants are close together, so many meteors can be assigned to both showers. But if a meteor has suitable geometry, a difference of 9° is enough to distinguish between them. And this happened for many observers. They counted radiant of the α Aurigids, and most meteors were classified as AUR. But meteors in the Lynx and Taurus regions were too far (in angle) from the AUR's radiant, so they counted them as sporadics. I show below only one example of such observation, but many other observers fail in the same way:

Observer	Ernie Iverson
Date UT	2007 September 1
Location	Antelope Valley, California 34.°9506 N 118.°3100 W
Video Camera	Stella Cam EX with $f = 3.8$ mm, $f/0.8$ lens, frame integration 2x
Timing	GPS time stamp using a Kiwi OSD video time inserter
Field of view	$89.°2 \times 68.°6$ centered slightly west of Polaris
Detection Method	Visual inspection of tape
T_{eff}	1.50 hours
Moon	80%

The observations (see Table overleaf) confirmed the prediction of an outburst rich in bright meteors. We see that Iverson counted 4 'sopradic' meteors of $m = -3$ and brighter in 1.5 hours. This is much more than we expect — experience shows we can see 1 meteor brighter than −2 magnitude in from 5 to 10 hours of observation. It means, with very high probability, that some so-called sporadics are in fact θ Aurigids. So re-evaluation of video observations would be necessary, if authors examined them for α Aurigids.

If we have visual observation only, the re-evaluation cannot be done. But we can conclude two things for the observations affected. First, the ZHR of the outburst is slightly under-estimated. Second, there are many θ Aurigids among the sporadics, so their mean magnitudes and frequencies are not suitable for evaluating. Analysis of the θ Aurigid's outburst must take this misunderstanding into account to obtain correct results.

Table 1 – Magnitude Distributions of Iverson's observations

m	-5	-4	-3	-2	-1	0	1	2	3	4
AUR	0	2	5	13	8	4	5	5	9	1
SPO	1	1	2	0	1	1	0	1	5	0

References

Jenniskens P. (1997). "Meteor stream activity. IV. Meteor outbursts and the reflex motion of the Sun". *Astronomy and Astrophysics*, **317**, 953–961. (http://adsabs.harvard.edu/abs/1997A&A...317..953J).

Lyytinen E. and Jenniskens P. (2003). "Meteor outbursts from long-period comet dust trails". *Icarus*, **162:2**, 443–452. (http://adsabs.harvard.edu/abs/2003Icar..162..443L).

2007 Draconids – enhanced activity or not?

Pavol Habuda [1]

Information is presented about visual detection of Draconid activity on 2007 October 13. TV data did not confirm higher activity, but not all data have been analysed yet. Francesco Ocaña reported suspicious activity from Cepheus (or surrounding area) the night before — are these two events coincidental or not? Only further analysis could resolve this, so all observers are requested to do so.

Received 2007 October 29

1 Visual observations of KOUJA and DIVIR

Visual observers Jakub Koukal (KOUJA) and Irena Divišová (DIVIR) reported enhanced activity of Draconids (previously called Giacobinids, hence the code GIA) on 2007 October 13 between 18^h25^m and 19^h25^m UT.

KOUJA saw 6 GIAs in the interval, 4 of them in the short time between 18^h32^m to 18^h35^m UT. Essential data about observation follows: Field = 0, +30; $T_{\rm eff}$ = 1.00; F = 1.00; Lm=6.4; 6 GIA, 24 SPO, 1 DAU, 2 ANT. This observer saw 116 SPO and 2 GIA in the rest of the night; $T_{\rm eff}$ = 7.47; mean Lm = 6.3. Mean magnitude of SPO = 4.4; mean magnitude of GIA = 3.1.

DIVIR saw 4 GIA in the interval 18^h25^m to 19^h25^m UT. Both observers saw three meteors. Field = 0, +30; $T_{\rm eff}$ = 1.00; F = 1.00; Lm = 6.3; 4 GIA, 15 SPO, 1 DAU, 1 ANT. This observer saw 80 SPO and 0 GIA in the rest of night; $T_{\rm eff}$ = 7.00; mean Lm = 6.3; Mean magnitude of SPO = 4.00; mean magnitude of GIA = 1.00.

Both observed from the same place, Kroměříž, Czech Republic, 17°23′46″ E, 49°18′14″ N.

2 TV observations

Four observers analysed their video observations from the night 2007 October 13/14 promptly. Their results follow.

Roberto Haver reported very many clouds between 18^h00^m and 18^h45^m UT. A single GIA was observed at $19^h50^m47^s$ UT (m = +3.0).

Sirko Molau had perfectly clear skies all night and both his cameras in Seysdorf were operated. The image-intensified camera **AVIS2** observed from 17^h52^m UT. In 10.5 hours it observed 259 meteors — but just one possible GIA. Between 17^h52^m and 19^h00^m only five meteors were recorded, none GIA. The non-intensified camera **Mincam1** was operated between 17^h18^m and 04^h41^m UT. It recorded 61 meteors in 11.3 hours, but also just one possible GIA. Between 17^h33^m and 19^h00^m it recorded three meteors, none GIA. Occasional clouds around 18^h30^m cannot be ruled out completely, but meteors before and after that time show no traces of cloudiness.

Bernd Brinkmann's analysis showed 3 meteors between 17^h46^m–19^h00^m on 2007 October 13/14. One of them is a possible GIA at 18^h50^m (m = 1.6). The next possible GIA was observed at 21^h04^m (m = 2.1). Another 41 sporadics were detected during the whole night. Lm for stars was about 4.0–4.4, depending on color index.

Javor Kac operated his camera **ORION1** with the following results: on October 12, 1.3 hours centered on 01^h07^m UT — 0 GIA and October 13, 0.7 hours centered on 22^h05^m UT — 0 GIA. His camera suffered from cloudiness.

3 Observation of Francisco Ocaña

Another interesting report about enhanced activity comes from Francisco Ocaña form central Spain. During telescope party on October 12/13, he noticed many slow meteors coming from the Cepheus region. He reported his observation to Meteorobs mailing list. His mail follows:

I was observing at central Spain the 12th October between 21^h *and* 23^h *UT. It was a bit hazy, with poor seeing. Overall LM was better than 6.*

These meteors were slow. Slower than TAUs, KCGs or these showers. So perhaps $v \sim 15$–25 *km/s. They were mainly faint. Just a +2 one. Most were +4. The rate was high for an unknown source (for me) and it attracts my attention.*

The radiant area was around Cepheus, close to the zenith. I was facing to S, so I can say they didn't come from Cygnus or Cassiopeia, but perhaps from Ursa Minor other Lacerta. It is not easy determine because I saw most of them in the same part of the sky.

He did not take any note or count at that moment. The activity was continuous during the 2 hours. The meteors were characterised by their slow speed. The rate was 5–10 meteors per hour. Another (not meteor) observer told him about activity too. His estimation was 1 meteor per 5 minutes. Ocaña estimated Lm about 6.5, maybe close to 7.0 at zenith.

It is possible that this activity could be from the Draconids too. His field was far from the radiant, so it is hard to say anything more about the shower. But the question arises — were there even two outbursts? Ocaña confirmed that his observation really is from October 12/13 after a direct question about the date of observation.

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IMO bibcode WGN-355-habuda-draconids
NASA-ADS bibcode 2007JIMO...35..101H

4 Discussion

KOUJA could be considered as an experienced observer. DIVIR observed with him, they saw 3 meteors together, discussing the shower association of joint meteors. This means that we must take their observations as one-person therefore. Their observations could be considered trustworthy: Draconids are easy to distinguished from sporadic by their slow velocity. Both observed GIA previous nights too and saw a considerable amount of them.

On the other hand, no TV observation confirmed activity of GIA clearly. The most interesting interval is between $18^{\mathrm{h}}30^{\mathrm{m}}$–$18^{\mathrm{h}}35^{\mathrm{m}}$ UT. Not all observers have sent their data yet. It is necessary to analyse log files again and search through them for Draconids, especially on cameras with a higher Lm. Any outburst could be rich on faint meteors, so not reachable by cameras with low gain. And we have the observation of Francisco Ocaña and his friend too. Was it random coincidence of meteors, or did they see a real outburst of some shower?

The only way to answer the question of enhanced GIA activity is to analyse data from TV cameras again from both nights. It is plausible to add GIA into shower list and rerun the shower analysis again. If there are original tapes from observation yet, try to shift the threshold for meteor detection lower — we need all true positives. There will be many false positives, but that is not a problem.

Conferences

The 26th IMC: Barèges, France, 7–10 June 2007: a delight!

Paul Roggemans [1], *Galina Gospodinova* [2], *Katya Koleva* [3] *and Desislava Zhivkova* [4]

The International Meteor Conference of the IMO was organized in Barèges, France, on 2007 June 7–10. The conference included a lecture program, an unforgettable excursion to the famous Pic du Midi Observatory and above all a wonderful atmosphere of friendship and cooperation.

Received 2007 July 15

1 Introduction

Since the very beginning, the International Meteor Conferences got something of magic. Over the years, meeting after meeting more meteor workers got involved. As long as 20 years ago, a saying circulated: 'The IMC, you can't afford to miss it.' Once someone tasted the wonderful atmosphere, people can't resist the IMC spirit and come back year after year. The IMC community has grown into one of the most successful specialized international astronomical meetings within the world of amateur astronomers.

At a given moment it looked as if, for the first time, we would have had over 100 participants. However in the final week some registered participants cancelled for various reasons. With 84 people from 18 countries, it is obvious that the IMC spirit motivates year by year more people to take part. The lecture program was well filled and the presentations of exceptional quality, the atmosphere was always friendly and the organizational work done very professionally for every detail. The meals were in the French way and thus a delight for all of us, with always a salad to start and a tasteful menu with wine as much as anyone wanted, dessert, coffee and cheese with appropriate wine, not seen at an IMC since 1993 also in France. The wonderful Pyrenees with their impressive landscape, the spectacular excursion to the Pic du Midi Observatory via the pass Tourmalet, the legendary Astro Poetry show, the famous Belgian beers in the bar, the specialities that our Japanese, Polish, Bulgarian and other friends offered all of us, the several excellent guitar playing and singing meteor workers, it all helped the indescribable IMC spirit to be felt stronger as ever before.

2 The arrival and opening

The days before the IMC several people were already in Barèges for the Radio School and the Orbit workshop (Wislez, 2007). Instead of late evening workshops during the IMC, specialized participants have sessions in

the days just before the IMC. The possibility to come a day or two before the main IMC is ideal to make the travelling more worthwhile and take a holiday to enjoy the region. Most participants arrived during Thursday 7 June. The accommodation in L'Hospitalet was perfect for an IMC with comfortable rooms and an extremely friendly, helpful staff. A movie theatre down in the village proved to be perfect as lecture room, a short walk several times a day between the IMC host and the lecture room served for some extra time to chat. Thursday at about 18^{h} French time (defined as some instant between 18^{h} and $18^{h}30^{m}$) the opening speech and a welcome reception marked the official start of the 26th IMC. François Colas, coordinator of the local organizing committee, opened the IMC and introduced the mayor of Barèges who welcomed the IMC participants, in English. After the official speeches a welcoming drink was offered to everyone. Most people had arrived in time to enjoy the first evening dinner and learned to clean the tables after dinner. Some went to bed early to recover from the long journey to the IMC, while the others enjoyed the bar till late at night.

Figure 1 – Concentrated looks during the lectures: from left to right Danielle Moser, Tom Roelandts, Benny Gyes, Roland Winkler, Mirko Nitschke, Katya Koleva and Frans Lowiessen. Photo: Jean-Marc Wislez.

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IMO bibcode WGN-355-roggemans-imcrept
NASA-ADS bibcode 2007JIMO...35..103R

Figure 2 – The main building of Pic du Midi observatory and the dark blue sky. Photo: Luc Bastiaens.

3 The Friday program, lecture day

Friday was the main lecture day. The first session 'Method of observation: single and multiple station' was chaired by Jérémie Vaubaillon who introduced Peter Brown, one of the IMO founding members and first Council members. Peter presented an impressive lecture about his ongoing research: 'An Overview of the Meteor Research Program at the University of Western Ontario'. Then Detlef Koschny, one of our IMC veterans, informed us about 'Data analysis of double-station meteors'. Next, Eduard Bettonvil developed his 2005 and 2006 talks about determining positions of meteor trails with another aspect: 'Precision of a meteor's impact position on the Earth'. During the coffee break a local specialty from the Netherlands was offered at the occasion of Jos Nijland's birthday: a large tasteful bread with raisins, a most appreciated extra. After the coffee break Jonathan McAuliffe entertained the audience with a talk about 'Canary Islands Double Station Meteor Project — First Light!' with a flavour of Irish humour. Felix Bettonvil completed the first session with a talk about a very important but in the past often neglected aspect: 'Velocity determination of meteors based on frequency analysis'.

The second session was chaired by David Asher and was dedicated to 'Dynamics of meteoroids (1)'. Maria Grisevich from Moscow, Russia, presented: 'New method for entry dynamics determination upon observations'. The morning sessions were completed by Jérémie Vaubaillon revealing the latest predictions for the possible 2007 Aurigid meteor outburst.

The excellent weather on Friday noon allowed the enjoyment of a tasteful lunch in the open air, offering plenty of time for informal contacts. The General Assembly of the International Meteor Organization opened the afternoon sessions. With Jürgen Rendtel, David Asher and Josep Trigo, being as only council members present, the IMO General Assembly was rather short, not even a financial report was presented to be approved.

After the coffee break the session about Dynamics of meteoroids continued, chaired by Peter Brown. David Asher explained 'the basic idea of Meteor stream resonances' and Galina Ryabova introduced 'the weighting method in modelling of meteoroid stream formation'. The time schedule of the lectures was remarkably well respected. Jürgen Rendtel chaired session 3 about Video observations. First Shinsuke Abe informed us about the 'Japanese TV meteor observation network and the future plans from space'. Then Juraj Toth from Slovakia described the 'all-sky TV meteor observations from Modra'. Josep Trigo and Jose Maria Maliedo introduced 'the Spanish Fireball Network for continuous all-sky CCD and video monitoring'. After this lecture it was time for the poster session with plenty of time for informal contacts and also to make renewals for IMO membership fees. Fewer posters were displayed than at previous IMCs, but the quality of the presentations was excellent.

The Friday evening dinner was preceded by another reception with local fine white wine and cake offered by the host of l'Hospitalet and much appreciated by everyone. After dinner, and when the tables were cleaned, the Polish team displayed a film about the past IMC 2006 in Roden and Jérémie got the audience in the mood with the 2004 IMC song. When the evening program was finished, nobody moved as if we all expected more, until Jérémie spoke the magic words: 'the bar is open' and in no time everybody rushed up to l'Hospitalet!

Figure 3 – Kazuya Noguchi and Masa-yuki Yamamoto reading Haikus in Japanese and then in English. Photo: Jean-Marc Wislez.

More people discovered the wealth of Belgian beers in the bar where the excellent guitar players like Valentin Velkov, Jérémie Vaubaillon, Jonathan McAuliffe, etc. inspired everyone to sing all together playing music in various ways. The Bulgarian K-K-song couldn't fail, 'Let it be' was performed as 'I-eM-Cee', and the meteor blues were invented till early in the morning.

4 Saturday, the excursion day

After breakfast, and having cleaned the tables, we left by bus at 8^h French time to visit the Pic du Midi observatory. The ride with the two busses through the Pyrenees offered breathtaking views with a short stop at the well known Tourmalet. The final track was even more spectacular as we went up to the 2900 meter high observatory by cable cars. Visiting the observatory under the excellent weather conditions was a real delight, excellent to take the traditional group picture. Thereafter we were guided to see the 2 meter telescope, a 60 cm telescope and the famous Bernard Lyot Coronograph.

Due to some delay to get the entire group down by cable car, we got caught in a thunderstorm with heavy rainfall. The planned picnic at Tourmalet was replaced by plan B. While it rained cats and dogs, the entire IMC group found shelter under a kind of public roof where the picnic packages were distributed to eat. The law of Murphy did it again as it stopped raining once we were all in the bus to return to Barèges where we arrived a bit delayed for the final 10 lectures of this IMC.

Session 4 started with about an hour delay and covered Meteor Shower analysis chaired by Masa-yuki YamaMoto. First Pavel Koten from the Czech Republic informed us about 'the video observations of the 2006 Leonids at the Ondřejov Observatory'. Then Geert Barentsen revealed some new features of the VDMB data input and showed with some animated graphs how

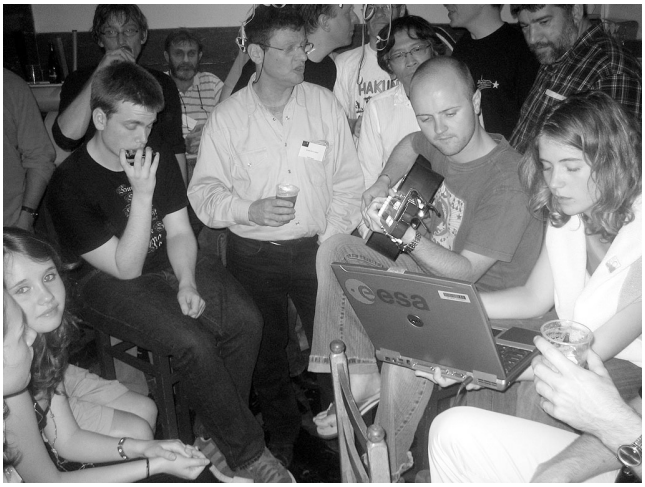

Figure 4 – The last IMC evening many spent the night singing together. On the foreground we recognize from left to right: Galina Gospodinova, Desislava Zhivkova, Geert Barentsen (harmonica), Detlef Koschny, Masa-yuki Yamamoto, Jonathan McAuliffe (guitar), Frans Lowiessen and Lucie Maquet (laptop). Photo: Katya Koleva.

Figure 5 – Jérémie Vaubaillon explains the history of the coronograph. Photo: Detlef Koschny.

the on the fly ZHR gets its shape as observations are being added. Next, Przemyslaw Żołądek and Mariusz Wiśniewski gave an impressive overview of 'the results of the Polish Fireball Network double station results and 2004 Perseid meteor shower'. The session was completed with the lecture of Jürgen Rendtel about 'the details of the strong 2006 Orionids outburst' and comparison with past Orionid activity.

After a short coffee break, Session 5 about Radio observations was chaired by Galina Ryabova. Kazuya Noguchi presented 'Development of an automatic echo-counting program for HROFFT spectrograms' and Valentin Grigore described 'the visual and photographic 2006 Geminid results in Romania'. The final session 6 about special observations was chaired by François Colas. Masa-yuki Yamamoto introduced 'the WIND project: A Lithium release experiment by a Japanese sounding rocket'. As the lectures were shorter than planned, the program got almost on schedule (French time). Jiří Borovička gave a detailed overview of 'the spectroscopic results for Geminid meteors' which are very distinct from other meteor showers being more compact due to their perihelion passage close to the sun. Then Jérémie Vaubaillon talked about 'the hard task of observing meteoroids' and stressed the importance of amateur-professional cooperation. Professional astronomers cannot do the amount of observations needed and amateurs need the professionals for information and motivation. The final speaker was Valentin Grigore who proposed: 'the European Near Earth Asteroid Research Project'.

Then at the end of Saturday afternoon, sooner than on any previous IMC, IMO President Jürgen Rendtel thanked the IMC organizers François Colas and Jérémie Vaubaillon as well as their assistants who did the work 'behind the curtains' for this splendid IMC we all enjoyed so much. Any words fail to express the degree of our gratitude to the organizers.

After dinner the cinema alias lecture room was filled with more participants than during any of the lecture sessions. An IMC without the legendary International Meteor Poetry Show directed by Andrei Dorian Gheorge would not be a real IMC anymore. Andrei managed to get many participants on stage for poems, haikus and performances accompanied by the guitarists Jérémie Vaubaillon, Valentin Velkov, Jonathan McAuliffe and Stanislav Kaniansky. Songs like the 2006 IMC song of Jonathan and the 2005 IMC song by Jérémie got the audience singing together, an unforgettable atmosphere.

At the end of this memorable evening Jérémie Vaubaillon spoke words of thanks to François Colas who had done most of the impressive organizational work. After some final instructions for the departure Sunday Morning, we were reminded to clean the tables.

The law of Murphy hit again as all the IMC participants were showered by the intense rainfall on the way up to l'Hospitalet, a few hundreds of meters at the other side of the village. Afterwards the bar was filled with people, playing guitar, singing all together, for many hours as nobody wanted to quit this magic emotional atmosphere of friendship and brotherhood. For many of us no more than a couple of hour of sleep were left before the departure of the bus to Lourdes and Barcelona for the participants who went on to attend the professional meeting 'Meteoroids'. The exceptional timing of this IMC was planned to connect the two meetings so that one journey made it possible to attend the two conferences and 19 persons took advantage of this formula. More about 'Meteoroids' can be read in a report by Jürgen Rendtel and David Asher (2007).

Figure 6 – The cable car arriving at the Pic du Midi Observatory. Photo: Adriana Nicolae.

5 The impressions of some of the youngest IMC participants

The roots of the IMC tradition go back to 1979 and the formula still appeals to young observers and newcomers. We hope that our testimonies may convenience you to join us at our next conference!

Galina Gospodinova: Although I observe meteors since 2003, it was my first participation in a meteor conference and my first visit to France. When we entered the small beautiful mountain village of Barèges, my first impression was that it looks like a site taken from a fairy tale. It was surrounded by mountains from everywhere and a small river flowed through its centre. I have so many memories of the conference itself but I will share the most exciting of them. Most impressive was the friendliness of all participants. All of them were friendly, joyful and amusing and predisposed me in favour of being myself. The lectures were very interesting and made me even more enthusiastic than before to observe meteors whenever I have a chance to do it. The hostel where we stayed was unusual with its ancient appearance. The meetings we had in it in the evenings were new for me. I liked them very much because I saw people of different ages and different countries being together and having a good time in one and the same way. These are my brightest impressions of the IMC and I am glad to share them with you!

Katya Koleva: First I want to say that this conference was one of the best for me. It was full of emotions. Everyone predisposed me to communicate and this made me very close with them. The astronomers are very friendly persons. No matter what age they are! The place of Barèges was amazing. We saw the most beautiful observatory. For its location... — I have no words! Íèêîãà íå áÿõ âèæäàëè íåùî ïîäîáíî. Jérémie and François had organized everything perfectly. Everyone looked happy and satisfied. I want to thank them again!

This year we saw the results, which these meetings generate: double-station meteor observations between neighbour countries. It is so exciting to see that the IMC unites the participants and that they start to work together like a close team. I noticed that many of the conference participants were involved as professionals in physics and astronomy. This is wonderful. Each IMC always supplies me with new interesting and useful acquaintances.

Desislava Zhivkova: My impressions of the IMC this year are wonderful. From the lectures of the other participants I learnt many new things about meteor observations. I realized how and what our data are used for, and I am glad to know that our work during the year gives results. As young observers we are happy to help the study of these interesting phenomena. I was fascinated by the friendly atmosphere of the IMC. The people there are very friendly and although we are quite younger than most of the participants, they accepted us very well. I give my special congratulations to the organizers who were taking care for us during all our stay. The village where the conference took place was very beautiful indeed. Our visit to the Observatory Pic du

Figure 7 – The Astro Poetry show director, Andrei Dorian Gheorge, Valentin Grigore and their shadows in action Photo: Luc Bastiaens.

Midi was very interesting. Thank you for this unforgettable experience. For sure my participation at the IMC made me enjoy astronomy stronger and especially meteor observations. I will have very pleasant memories of it!

6 Conclusions

Although the 2007 IMC took place in June instead of September, this did not have a negative effect on the number of participants. Those who had the privilege of taking part will keep most pleasant memories of this as a highlight in lifetime. Our friends François Colas, Jérémie Vaubaillon and the assistants, Julien Lecubin, Alain Montintin, Christian Ruatti, of the local organizing team together with the staff of L'Hospitalet offered us a fantastic IMC. Thank you all for the work and effort you did to make this possible, all the extras you gave us, your friendship and your human qualities!

References

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IMC photographs

Photo galleries on the IMO website: the IMC history since the first meeting in 1979 is documented with commented photographs. Anyone who has photographs of past IMCs and who wants to share these with all of us, please contact Paul Roggemans. The IMC galleries are available at: `http://www.imo.net/imo/imc/history` and include a detailed overview of the 2007 IMC.

The IMC group photo is on the front cover of this issue.

Aurigids

Visual observations of the Aurigid peak on 2007 September 1

Jürgen Rendtel [1]

We analyse data of 368 α-Aurigids observed visually in 53.16 hours effective observing time around the predicted peak of the shower on 2007 September 1. We find a peak time of $11^{\rm h}20^{\rm m}$ UT ± 3 minutes ($\lambda_\odot = 158\overset{\circ}{.}556 \pm 0\overset{\circ}{.}003$), a peak ZHR of 132 ± 26 (based on counts in five-minute intervals) and a duration (FWHM) of 45 minutes with a slightly asymmetric profile (ascent 27, descent 18 minutes). The population index in the peak period was low ($r = 1.74 \pm 0.08$).

Received 2007 October 30

1 Introduction

Predictions of an outburst of the α-Aurigids have been published by Lyytinen and Jenniskens (2003) and updated by Jenniskens and Vaubaillon (2007). This activity caused by the long-period comet C/1911 N1 (Kiess) yielded a unique opportunity to study meteoroids from this comet ejected around 83 BC. The predicted peak time was $11^{\rm h}36^{\rm m}$ UT on 2007 September 1 (Jenniskens & Vaubaillon, 2007).

The annual activity of the α-Aurigids reaches a ZHR of about 10 (Rendtel et al., 1995; Dubietis & Arlt, 2002). Other short lived outbursts have been reported in 1935, 1986, and 1994 (Jenniskens, 2006).

2 Observing conditions

Short-lived outbursts require a careful selection of the observing location: the radiant must be high enough in the sky at the instance of the peak and other disturbances should be minimized. In the case of the 2007 α-Aurigid peak time at $11^{\rm h}33^{\rm m}$ UT (± 20 minutes according to the Aurigid web page `http://aurigids.seti.org`), observers in the western regions of North America were best placed. However, a waning gibbous Moon (80% illuminated) was high in the southwestern sky. This is already problematic under clear conditions, but becomes disastrous when haze occurs. A significant deviation from the reference limiting magnitude of 6.5 was the consequence. The effect was less strong because a large portion of bright meteors was expected.

In fact, most observers reported limiting magnitudes between 4.0 and 5.3 mag, with only a few exceptions towards better conditions. Different attempts were made to block the bright moonlight: shadow of trees or buildings were useful, but a dark umbrella has helped as well.

3 Visual data

Despite the poor circumstances we received numerous reports. Many of these reports were sent through the IMO's live web page. Others have been collected from the Aurigid web page `http://aurigids.seti.org`. Several observers have been contacted for details of their reports. Their useful comments and revised data breakdowns helped to establish a good sample for the analysis. This is important because the short duration of the outburst and the circumstances limited the sample of each individual observer to about 30–50 meteors at best (Table 1). If we try to obtain a temporally resolved rate profile, we need to accumulate all available data.

The total sample for the peak period included in this paper was collected by 26 visual observers from eight countries worldwide. It contains data of 368 α-Aurigids

Table 1 – Observers contributing to the 2007 α-Aurigid analysis (5-letter code of the VMDB, effective observing time, and number of α-Aurigids). This list summarizes observations made between August 31, $21^{\rm h}30^{\rm m}$ UT and September 1, $22^{\rm h}10^{\rm m}$ UT.

Name	VMDB code	Obs. time	No. of AUR
Salvador Aguirre	AGUSJ	$5\overset{\rm h}{.}00$	1
José Alvarellos	ALVJO	$2\overset{\rm h}{.}41$	17
Bernd Brinkmann	BRIBJ	$2\overset{\rm h}{.}57$	37
Dustin Brown	BRODU	$0\overset{\rm h}{.}23$	5
Clark Chapman	CHACJ	$0\overset{\rm h}{.}35$	9
Steve Chapman	CHASJ	$1\overset{\rm h}{.}00$	7
Daniel Fischer	FISDA	$1\overset{\rm h}{.}16$	21
Bill Godley	GODBJ	$1\overset{\rm h}{.}75$	9
Mitja Govedic	GOVMI	$2\overset{\rm h}{.}03$	14
Robin Gray	GRARO	$3\overset{\rm h}{.}10$	21
Wayne T. Hally	HALWA	$4\overset{\rm h}{.}00$	4
Kim Hay	HAYKI	$1\overset{\rm h}{.}35$	5
Robin Hegenbarth	HEGRJ	$0\overset{\rm h}{.}96$	22
Carl Hergenrother	HERCJ	$1\overset{\rm h}{.}81$	21
Jakub Koukal	KOUJA	$1\overset{\rm h}{.}42$	3
Peter Kozich	KOZPJ	$1\overset{\rm h}{.}16$	52
Robert Lunsford	LUNRO	$5\overset{\rm h}{.}00$	28
Paul Martsching	MARPA	$4\overset{\rm h}{.}25$	9
Bruce McCurdy	MCCBR	$1\overset{\rm h}{.}25$	9
Eran Ofek	OFEER	$0\overset{\rm h}{.}23$	6
Krzystof Polakowski	POLKJ	$2\overset{\rm h}{.}00$	3
David Stine	STIDA	$2\overset{\rm h}{.}33$	9
Wesley Stone	STOWE	$2\overset{\rm h}{.}77$	33
William Watson	WATWI	$2\overset{\rm h}{.}95$	1
Alan Whitman	WHIAL	$1\overset{\rm h}{.}08$	21
Ilkka Yrjölä	YRJIL	$1\overset{\rm h}{.}00$	1

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IMO bibcode WGN-355-rendtel-aurigids
NASA-ADS bibcode 2007JIMO...35..108R

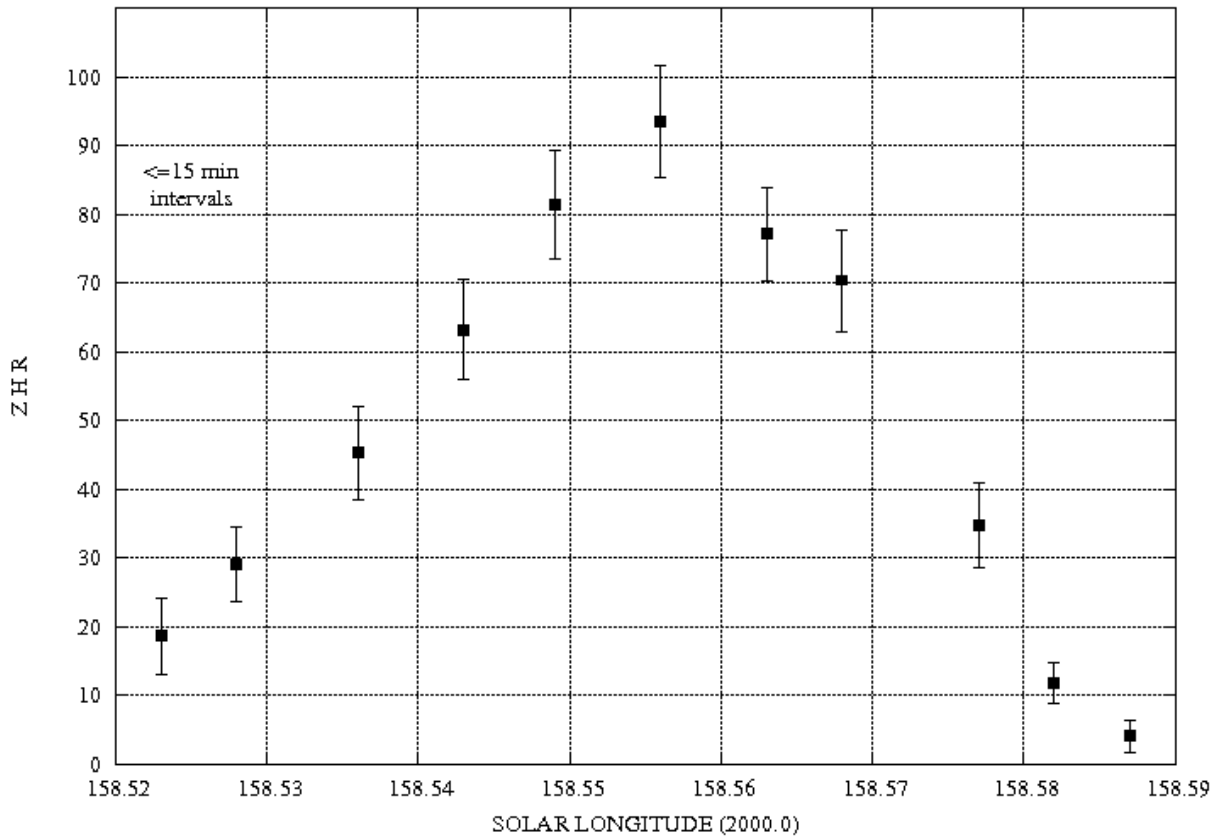

Figure 1 – ZHR-profile of the α-Aurigids based on 144 count intervals of 15 minute maximum duration using a constant population index of $r = 1.74$. The longer intervals yield a smooth profile.

observed in 53.16 hours effective observing time. Additional observations in the nights before and after the peak confirmed the typical annual rates and are not analysed here.

4 Population index profile 2007

The short duration of the outburst limits the possibilities of deriving a profile of the population index r. We can just calculate one (average) value for the entire outburst period, and still the size of the sample is lower than for usual studies of this type.

In order to find out what influence the moonlit sky may have had, we calculated the population index r first from the entire sample, and then from all α-Aurigids observed under LM ≥ 4.0 and finally for data obtained with LM ≥ 5.0. Of course, the samples become smaller when we limit the conditions (see Table 2). For comparison: the annual α-Aurigids yield a value of $r = 2.3 \pm 0.1$ (Rendtel et al., 1995).

The difference between the three values shown in Table 2 is surprisingly small and indicates that the calculation procedure is robust against observing conditions, and that the population index obviously was almost constant over the magnitude interval between $m = -4$ and about $m = +3$. The low r-value underlines the predicted and reported large portion of bright shower meteors. However, it was not that low to neglect the effect of the limiting magnitude on the ZHR calculation as expected by a few observers. Because of the size of the sample, we favour the population index obtained from the observations made under skies with LM ≥ 4.0 as the representative figure and use this for the next steps. The size of the sample and the short duration of the outburst did not allow us to look into details of the population index in the central and outer parts of the meteoroid stream. Hence, we use a constant value of the population index for the further analysis.

Table 2 – Population index r of the α-Aurigid peak period $\lambda_\odot = 158\overset{\circ}{.}50 - 158\overset{\circ}{.}60$ (2007 September 1, 10^h00^m UT – 12^h30^m UT). For three data sets defined by the observing conditions the limit of LM, the calculated population index r, the size of the sample and the average LM of the data set are listed.

Data set	r	Sample	LM(avg.)
All data	1.76 ± 0.07	206	4.85
≥ 4.0	1.74 ± 0.08	186	5.04
≥ 5.0	1.63 ± 0.08	107	5.48

5 ZHR profile

For the ZHR calculation we use $r = 1.74 \pm 0.08$ as shown and explained above. Before we calculate the ZHRs right away, we had to deal with some details of the reports. Because the activity varied strongly over a short period, we need to have information for short intervals. For example, we cannot derive the peak moment with

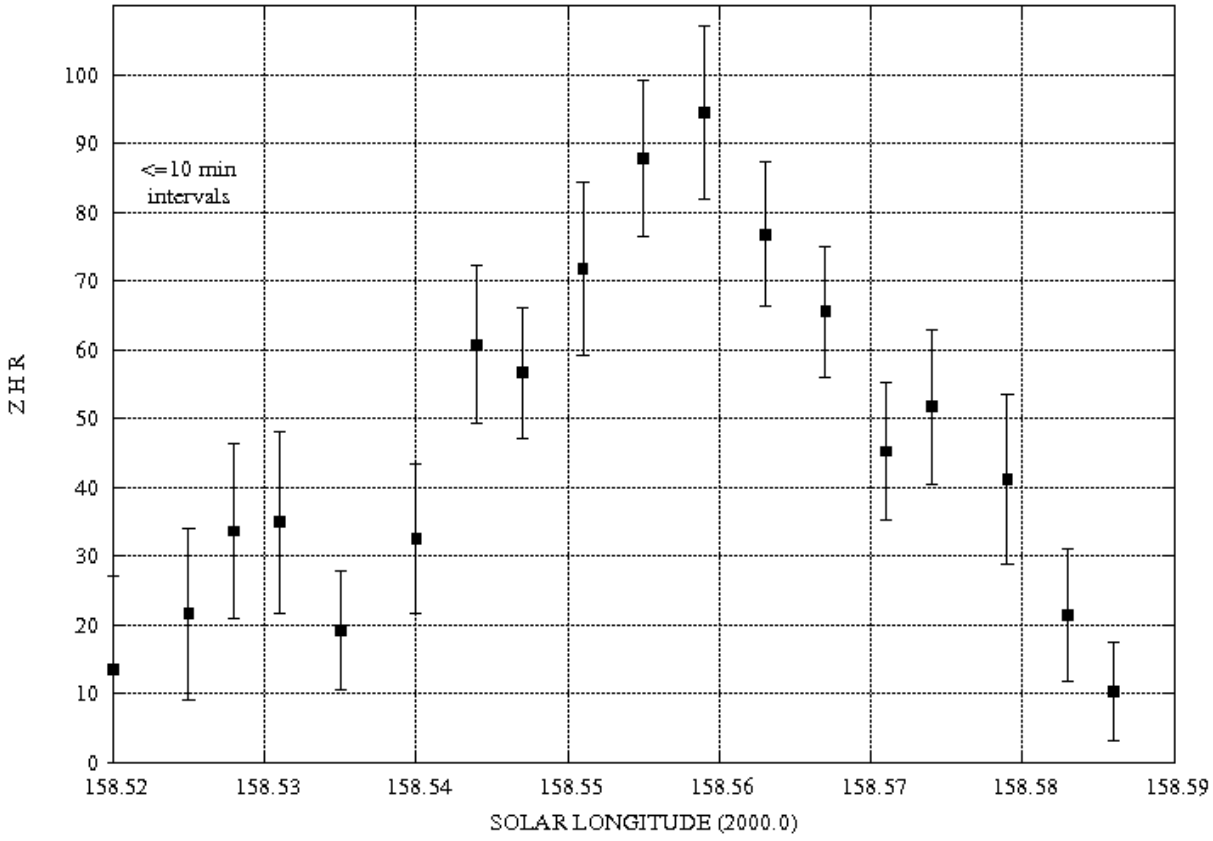

Figure 2 – ZHR-profile of the α-Aurigids based on 97 count intervals of 10 minute maximum duration. The lower ZHR values at $\lambda_\odot = 158\overset{\circ}{.}550$ and $\lambda_\odot = 158\overset{\circ}{.}560$ are poorly defined. Structures are difficult to confirm.

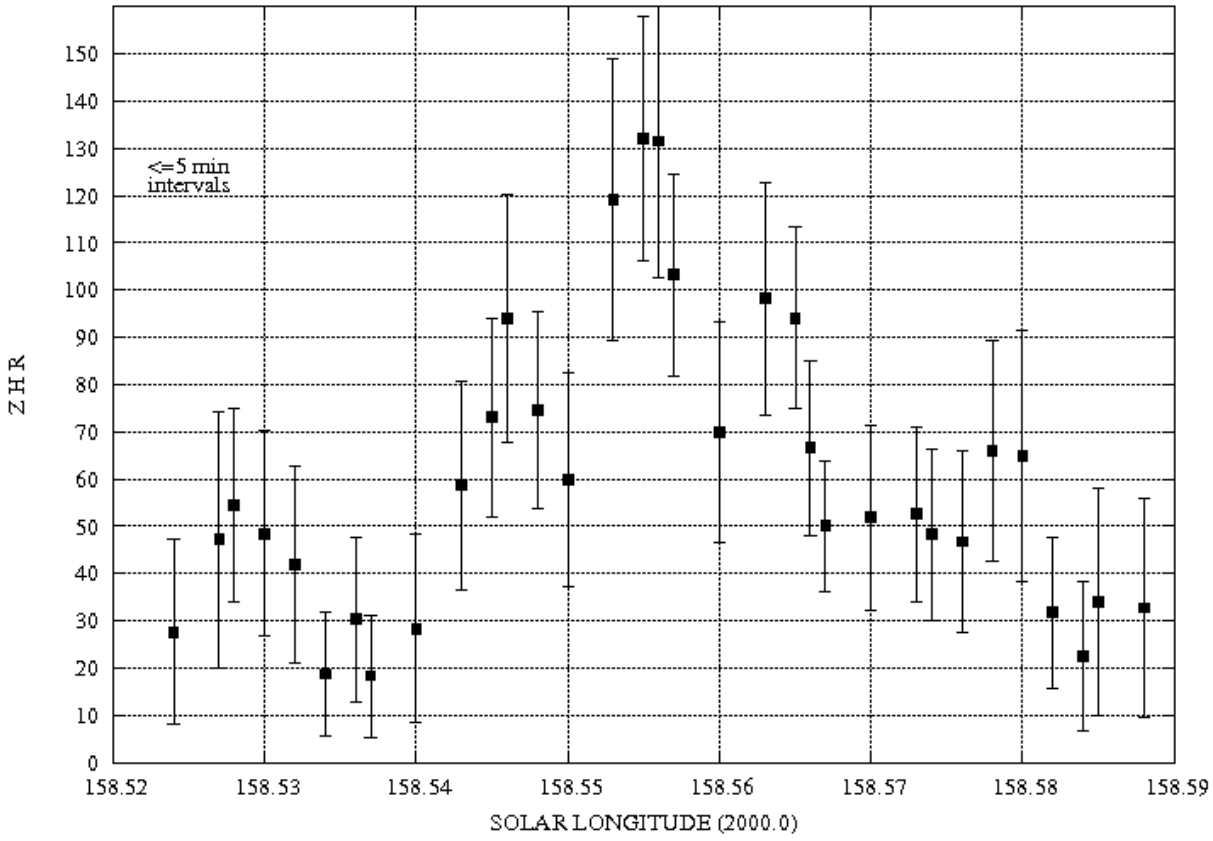

Figure 3 – ZHR-profile of the α-Aurigids based on 61 count intervals of 5 minute maximum duration. Like in Figure 2, lower ZHRs at $\lambda_\odot = 158\overset{\circ}{.}550$ and $\lambda_\odot = 158\overset{\circ}{.}560$ are based on very small samples as compared to their neighbours. Scatter becomes large because of the few meteors per bin.

an accuracy of 5 minutes if we use count intervals of 15 or 20-minutes length. Consequently, we cannot include reports which summarized large portions of the outburst or even the entire peak period in just one interval. Of course, the small samples for each individual observer may involve the case that *no shower meteor* was observed in a bin even close to the peak. Only a combination of data obtained by many independent observers (many measurements of the flux or rate in one and the same bin) may yield a reliable ZHR for each interval. The entire sample collected in the period between $\lambda_\odot = 158\overset{\circ}{.}02$ and $158\overset{\circ}{.}97$ (i.e. from August 31, $21^{\rm m}30^{\rm m}$ UT until September 1, $22^{\rm h}10^{\rm m}$ UT) contains data of 368 α-Aurigids (Table 1).

Here we present three graphs of the calculated ZHR. As in the case of other shower activity analyses, we set the maximum correction factor to 5 and include only data from periods with a radiant elevation of at least 20°. Since most observers of the immediate peak were located in western North America, this was not a critical parameter.

5.1 Maximum interval length 15 minutes

In the first case, we use all intervals (144 intervals, maximum bin length 15 minutes). From this sample we determine a peak time of $\lambda_\odot = 158\overset{\circ}{.}556 \pm 0\overset{\circ}{.}003$, corresponding to $11^{\rm h}20^{\rm m}$ UT (±3 minutes). This smooth profile consists of one ZHR average in about 10 minute steps (Figure 1), and the peak ZHR reaches 93 ± 8. Further details of the immediate peak period are listed in Table 3, top section.

5.2 Maximum interval length 10 minutes

We also run the ZHR calculation including only bins up to 10 minutes duration (97 intervals; Figure 2). Here we get one ZHR average every 6 minutes, with the peak ZHR of 95 ± 13 at $\lambda_\odot = 158\overset{\circ}{.}559 \pm 0\overset{\circ}{.}003$, i.e. $11^{\rm h}24^{\rm m}$ UT. This result is not deviating from the result obtained from the first data set. As a consequence of the smaller sample per bin the scatter increases, and there seem to occur small structures in the profile, of which a shoulder at $\lambda_\odot = 158\overset{\circ}{.}530$ seems significant. However, if we look into Table 3, middle section, we see that the two higher ZHRs are based on just 6 meteors and the peak therefore is highly questionable if not confirmed by other techniques.

The duration of the outburst, defined by the FWHM (full width at half maximum) is about 45 minutes. In both cases, the ascending branch is slightly longer (25–27 minutes from half maximum to peak) than the descending branch (15–18 minutes from the peak to half maximum) of the profile.

Table 3 – right – ZHR of the 2007 α-Aurigids for the immediate peak period. Obs. gives the number of observers contributing to the average; AUR is the number of α-Aurigids recorded in the interval. A difference of $0\overset{\circ}{.}0067$ in solar longitude corresponds to 10 minutes.

$\lambda_\odot$(2000.0)	Obs	AUR	ZHR	Error
158.523	8	10	18.6	5.6
158.528	14	27	29.1	5.5
158.536	17	43	45.3	6.8
158.543	27	73	63.2	7.3
158.549	31	104	81.4	7.9
158.556	32	130	93.6	8.2
158.563	35	128	77.2	6.8
158.568	29	90	70.4	7.4
158.577	20	30	34.7	6.2
158.582	17	14	11.8	3.0
158.525	4	2	21.6	12.5
158.528	6	6	33.6	12.7
158.531	6	6	34.9	13.2
158.535	7	4	19.2	8.6
158.540	8	8	32.5	10.8
158.544	14	27	60.7	11.5
158.547	19	35	56.6	9.4
158.551	13	31	71.8	12.7
158.555	19	58	87.8	11.4
158.559	17	56	94.5	12.5
158.563	20	53	76.8	10.5
158.567	21	47	65.5	9.5
158.571	13	19	45.2	10.1
158.574	12	20	51.7	11.3
158.579	8	10	41.1	12.4
158.583	7	4	21.4	9.6
158.524	2	1	27.6	19.5
158.527	2	2	47.2	27.2
158.528	4	6	54.5	20.6
158.530	3	4	48.4	21.7
158.532	3	3	41.9	20.9
158.534	3	1	18.7	13.2
158.536	3	2	30.3	17.5
158.537	3	1	18.3	12.9
158.540	2	1	28.3	20.0
158.543	4	6	58.6	22.1
158.545	6	11	73.0	21.1
158.546	5	12	94.0	26.1
158.548	6	12	74.6	20.7
158.550	4	6	59.9	22.6
158.553	4	15	119.2	29.8
158.555	6	25	132.2	25.9
158.556	5	20	131.5	28.7
158.557	7	22	103.2	21.5
158.560	4	8	69.8	23.3
158.563	5	15	98.2	24.6
158.565	8	23	94.1	19.2
158.566	6	12	66.6	18.5
158.567	8	12	50.0	13.9
158.570	4	6	51.9	19.6
158.573	5	7	52.5	18.6
158.574	5	6	48.2	18.2
158.576	4	5	46.7	19.1
158.578	4	7	65.9	23.3
158.580	3	5	64.9	26.5
158.582	4	3	31.7	15.9
158.584	3	1	22.5	15.9
158.585	2	1	33.9	24.0
158.588	2	1	32.7	23.1

Table 4 – Peak time of the α-Aurigids 2007 – predictions and results. Sato published his prediction on August 26.

Peak (UT)	Source
11:33 ±20 min	Jenniskens at Aurigid web page `http://aurigids.seti.org`
11:22	Sato at `http://fas.kaicho.net/tenshow/meteor/aur2007/Aur2007.html`
11:20 ±3 min	This analysis

5.3 Maximum interval length 5 minutes

In a third attempt to get more precise peak and structure information, we allowed only 5-minute bins, thus reducing both the sample size per bin and the number of bins (61). Hence we obtain a larger scatter of the ZHR values shown in Figure 3. The peak ZHR increases to 132 ± 26, but as listed in Table 3, bottom section, the individual ZHRs are only based on some 20 meteors, instead of more than 100 and more than 50, respectively, in the first two profiles. Although we see higher ZHR values here, we cannot define the peak time with better accuracy than in the first two data sets. Here we get $\lambda_\odot = 158\overset{\circ}{.}555 \pm 0\overset{\circ}{.}002$ as the peak time ($11^{\rm h}19^{\rm m}$ UT). Further, we see dips and apparent sub-peaks, which cannot be regarded as significant until we have confirmation by other observing techniques. Both the rates at $\lambda_\odot = 158\overset{\circ}{.}550$ and $\lambda_\odot = 158\overset{\circ}{.}560$ are defined by fewer meteors than their neighbours (see Table 3, bottom section).

6 Discussion

The peak of the α-Aurigid outburst occurred close to the expected position. Like in the case of the Leonid peaks in the years 1999 to 2006, the prediction of the peak time deviated only little from the observations, while the activity level obviously remains difficult to predict.

We find a population index of $r = 1.74 \pm 0.08$ from the meteors observed under a sky with a limiting magnitude of at least $m = +4$. The effect of the bright skies due to the moonlight interference is relatively small, indicating that the meteoroid size distribution does not vary over the magnitude interval between $m = -4$ and about $m = +3$ within the error margins.

The observations during the immediate peak period were performed by observers in a very limited geographical region (California, Oregon, British Columbia, Arizona). When we combined Leonid observations from locations between Central Asia and Australia, we had to consider a correction to geocentric positions (McNaught & Asher, 1999; Molau et al., 2002). Such a correction is not necessary in the case of the α-Aurigids 2007.

The calculated peak ZHR depends on the maximum length of the included bins. Probably the best estimate for the peak time is obtained when the maximum bin length was set to 10 minutes. The peak occurred at $\lambda_\odot = 158\overset{\circ}{.}556 \pm 0\overset{\circ}{.}003$, that is $11^{\rm h}20^{\rm m}$ UT. In the ZHR profile we have to consider possible (true) density fluctuations which superpose with statistical effects. The best estimate of the peak rate seems to be the value ZHR $= 132 \pm 26$ derived from 6 minute intervals. Indications of substructures are very weak because of the error limits.

7 Conclusions

The short duration of the entire α-Aurigid outburst limits the accuracy in the determination of the peak ZHR and peak time. The best values derived from the available visual data are ZHR $= 132 \pm 26$ at $\lambda_\odot = 158\overset{\circ}{.}556 \pm 0\overset{\circ}{.}003$, corresponding to 2007 September 1, $11^{\rm h}20^{\rm m}$ UT. The width of the slightly asymmetric profile is 45 minutes (FWHM). The ascent from half peak to the peak lasted 27 minutes, the descent to half peak only 18 minutes. Substructures in the ascending branch are based on very small samples and need to be confirmed by data obtained with other techniques. During the peak period we find a low population index of $r = 1.74 \pm 0.08$ for the meteor magnitude interval between $m - 3$ and $m + 4$.

Acknowledgements

We thank all observers sending their data to the IMO's on-line Aurigid website. Further data was collected via `http://aurigids.seti.org`, NASA's Aurigid web page. Some observers sent details of their data sets on request which greatly improved the available sample.

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History

Meteor Beliefs Project: East European meteor folk-beliefs

Tsimafei Avilin[1]

Some folk-beliefs about meteors and meteorites from various East European countries are discussed, illustrating the range of such matters, further to what has been presented in the Meteor Beliefs Project earlier.

Received 2007 August 15

1 Introduction

Additional comparative material to the Belarussian meteor and meteorite folklore presented earlier (Avilin, 2006) from various East European countries is given here, to illustrate the similarities and differences among places which seem to share a common ancestry for such beliefs. Additional relevant information can be found in (Bojurova & McBeath, 2003; McBeath, 2003; Slavković & McBeath, 2003; and Warner, 2003). The fresh items in this article are not intended to be an exhaustive survey for the places involved, merely to illustrate some of what is available. Where possible, the information has been presented in alphabetical order by region or country. To avoid needless repetition, it should be understood that the creatures called *zmey*, *zmok*, or something similar, are fiery, often serpentine, draconic creatures in folk-belief, which are frequently associated with meteors. Usually, the creature itself is said to be the meteor, and typically a bright, fireball-class meteor at that.

2 Balkan states

In Serbian, Bulgarian and Macedonian folk beliefs the zmey is often called *hala* or *ala* (= 'snake' in Turkish). The hala may come to the ground as a thick gloom or fog that prevents the corn from ripening. It possesses great power, is insatiable, and is the leader of black clouds and hail, bringing storms, strong winds, and even hurricanes. In some local beliefs they are thought to defend their land from other halas, just as zmeys are said to do elsewhere. They inhabit lonely caves and gorges and avoid bodies of water. Their dwellings are said to be bright with gold, silver and precious stones. When they grow old, some of them become so enormously huge and powerful that even the Earth cannot hold them. Such halas leave the Earth for the heavens and fly between the stars as falling stars or comets.

There may be a link here with the ancient Slavic belief that grass snakes were considered to be streams of rain that poured from the sky to the ground, but then stayed there rather than running away (Nenadavets et al., 2003, p. 240). The 'fiery *vuzh*' (vuzh = 'grass snake'), or zmey, from the Belarussian beliefs discussed earlier could thus have become an indicator of impending rain.

A falling star was said to denote the escape of a man from prison or other captivity. In Montenegro, Macedonia and Serbia one should not be surprised by it, but should keep silent or say: "Behind the thorns, behind a bush hide!", so the 'owner' of the falling star would not be caught (Plotnikova, 2006).

The Southern Slavs, like the Eastern ones, believed that a falling star showed the death of its earthly double. A star was said to fall on the grave of a deceased man in the Rhodope Mountains of Bulgaria. On seeing a falling star in Serbian Kosovo, it was said that, "a candle goes to somebody's grave". The Bulgarians tell of star torrents which fell to the ground before the Bulgarian-Serbian war of 1885 (ibid.)[1].

3 Czech Republic

In Czech mythology, the fiery meteoric *zmok* or *zmek* is a devil willing to serve people. If he flies high, it is said to augur well, but if low, then badly, and his appearance is especially thought to portend danger connected with fire.

4 Estonia

A falling star was thought to relate to a man's death: "An infant is born and a new star appears in the sky. If somebody dies, his star becomes dim and falls down". Estonians, as others, used the formula "the star falls - make your wish". However, one should not point at a falling star, as the finger will begin to decay (Pruller, 1966, p. 155).

Meteors and meteorites were also believed to be bad omens. In the Hallist region it was said that stars fell when an old demon threw hot stones in the sky. A fallen meteorite was called a stone arrow. In the Saarema and Muhu islands it was believed that meteorites were either evil or good spirits, including the Kratt (a property-guarding spirit), the Vedaya (a property-bringing spirit), and the Pisuhand (a house-spirit) (ibid.).

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IMO bibcode WGN-355-mcbeath-mbp28
NASA-ADS bibcode 2007JIMO...35..113A

[1]These 'star torrents' would presumably have been the strong Andromedid activity that peaked on 1885 November 27, though the war in Bulgaria actually started with the Russian-supported Serbian army invading Bulgaria on November 17 — *Project Coordinators.*

5 Lithuania

Among the Lithuanians, (as with the Belarussians, and also the Ukrainians and Russians), there is a widespread belief of probably Christian origin, that the stars are candles set up by the Lord, one per man. When that man dies, the angels extinguish his candle-star, and it falls from the sky. When a sinner dies, his candle-star immediately falls to the ground (i.e. straight down in the sky); a righteous man's candle-star falls sideways or upwards (Anonymous, 2004, p. 195).

As the Lithuanians might say, "If a star falls, then a man has left this world: if rich - with a tail, if poor - a simple star " (Vaiškűnas, 1993, pp. 335–336); or, "If a big star falls down, then a grown-up has died, if a small star, then a child" (ibid.). Sometimes it is said that the star does not fall to the ground, but goes from one place to another, and that it flies in the direction where the man died (Vaiškűnas, 2002, p. 384).

In Lithuania too, "if you see a falling star, your wish will be fulfilled" (ibid.).

In Lithuanian mythology, the *aitvaras* has similar features and functions to the Belarussian *khut*, as a kind of meteor-dragon which brings wealth and good fortune to its chosen household. In both cases, these creatures appear to have combined the elements of belief from one of a number of kinds of house-spirit with the fiery zmej. The famous researcher of Lithuanian mythology Julius Greimas, suggested that such originally distinct and different creatures had their various aspects mixed with one another over time. Christianity too influenced how they were perceived, and so the aitvaras gained some features of the Christian Devil (Greimas, 2003, p. 66).

The aitvaras that brings money is allocated a separate type, the 'money aitvaras', or in some regions, the *pukys*. Such can be easily recognized in flight by their shape, which is like either a scorching poker or a falling star. When a star falls from the sky, one can say, "Here is the aitvaras flying with money" (op. cit., p. 70). The aitvaras may appear in two other alternative forms: a bird, such as a black cock, crow or heron, or as an air vuzh. In the second case it is described as a worm that looks like a grass-snake in the shape of a poker, or a rouble, and richly coloured. It sprawls over the sky in an autumn evening, or in summer before the Sun has set, at tree-top height. Its front part, corresponding to its head, is often said to be flame-coloured and thicker than the back, and it moves without bending, but somewhat upwards from the ground (op. cit., p. 73).

Among meteorite beliefs, the concept of 'thunder-stones' particularly linked to fossils such as belemnites, is a recurrent theme. The Lithuanian name for such fossils is *Laumes papas* (literally the nipples of the goddess Lauma; Karski, 2001, p. 153). Their origin is explained by a myth according to which the goddess Lauma strayed with a mortal man, and the angry thunder-god Perun punished her for it by cutting off her nipples, chopping them up into small pieces, and scattering them over the Earth (Kirkor, 1882/1994, p. 36).

6 Russia

Russian belemnite-meteorites are called 'thunder arrows' or 'Devil's fingers'. The peasants even distinguish two kinds of arrows: fiery ones, from which unexpected fires happen, and stone (or cast-iron) ones that kill people and split trees (Maksimov, 1903/2002, p. 295). The second kind has much in common with lightning strikes, and also to severe, genuine small meteorite strikes. It must be noted though that the actual object identified as the 'thunder arrow' may be just a prehistoric stone weapon. In respect of the lightning aspect, the fused soil lightning strikes can create, in the form of dendritic, knotty, 'icicles' of earth called fulgurites, are also named 'thunder arrows' by the peasants. These arrows (of whatever type) might be thrown into water, which water was then used to treat people ill with colic (Dal', 1880/2002, p. 97). They might be kept in lofts as well, to protect against thunder and lightning (Maksimov, 1903/2002, p. 294).

Similar to the concept of a meteor as a wandering soul after death found in Belarussian belief previously, a meteor in some Russian provinces might be called *man'yak* (literally 'maniac', a mad or cursed person, though it has been suggested its derivation is really from 'manit', to beckon). The peasants considered that such cursed people roamed abroad in this way, waiting for forgiveness. There are beliefs too that the man'yak always fell from the sky to a farmstead when a woman lost her virginity; or that evil spirits flew to visit lonely women thus in the form of meteors, when their husbands went in search of a job to far-off lands. Thus women said at the sight of a man'yak-meteor: "Amen! Fall to pieces!" (Sakharov, 1849/1990, p. 115).

According to other Russian ideas, the meteor-zmey flies to women who pine for their absent or dead husbands too heavily or for too long a time. The zmey takes on the form of the husband, and may even have sex with the woman, but no one else can see him. His voice may be heard in the house talking, or he may even answer questions, and his mistress will grow rich. Such a zmey is usually described as having a head in the form of a ball, a back like a washtub, and an extremely long tail, up to 5 *sazhens* (a sazhen is an old Russian unit of length, roughly 7 feet or 2.15m, so 5 sazhens is about 10.7m). When he comes to his chosen place, he explodes into small sparks, and when he flies, he can do so low to the ground, maybe no higher than a sazhen above it (Maksimov, 1903/2002, pp. 304–305).

The Russians believe that sorcerers and witches can fly, taking the appearance of a fiery zmej or a meteoric fireball to do so. For example, from Chmelinki village, Tula district, comes the tale of a sorcerer who was the lover of a married woman. The woman became pregnant, and as her husband was abroad, she hung herself in shame and fear. The sorcerer flew up to her body in the form of a fiery zmej every night, and every time he came he broke himself up into sparkling fragments, so that the sheep thrashed about in the yard, and the cows lowed. He wailed for a while, then flew away (Kolchin, 1899/2002, pp. 436–437). In the village of

Verkhnie Koki (formerly called Sosnovka village), in the Ul'yanovsk region of Russia, when something fiery flew through the sky, people said that was *Baba* Khryst'ya flying over, a witch who lived in this village (information from a female resident of Slonim district, Belarus, but who had moved there from Russia. 'Baba' is a term for an old woman, commonly used also to mean 'witch' in Slavonic folktales).

Russians from Tula province also consider that a falling star is an omen of a man's death or birth. When a baby boy is born, it is said that this 'new man's' star moves to another place very quickly, so fast it cannot be seen, thus those viewing it think that the star falls. The belief is that very many stars fall in July and August because many people die and many children are born in these two months. Some peasants instead consider that stars fall from the sky because of hot air accumulating, or severe frost. One legend about the origin of the Milky Way is also concerned with a star's fall. A peasant saw a falling star and made a wish for the Devil to appear. Then the peasant asked the Devil to build a crystal bridge (Milky Way) to Chervonoe Kingdom (Kolchin, 1899, pp. 9).

7 Ukraine

The Ukrainians of Litinsky district believe that the falling star is the sinful soul of the deceased. It is thought that it asks whoever has seen it to pray for the remission of its sins, and by crossing oneself on seeing a falling star, it is cleansed of its sins (Chubinskij, 1872, p. 17). In Charkov district, falling stars are thought to be dying people. Witches steal them for their witchcraft: death comes to a homestead where a star fell, and a child dies (ibid.).

In Lutsk district, there is a belief that the meteor-star of a dying man flies towards his outgoing soul to take it. An observer watching the falling star should cross himself, and thrice say 'amen'. Alternatively, falling stars are seen as angels who dispel evil spirits from the sky (Lutsk district), or that they are devils who want to become kindly angels (Podolsk district). Another belief holds that devils turn into stars and climb up the sky, then the angels make a common effort to throw them down again. They fall to the ground where they land as puddles of resin. If a man treads in such a puddle, he will fall ill with tuberculosis, without hope for recovery. To turn away this evil, the one who sees the falling star should say the word 'amen' twelve times, or go on saying it until the star goes out. As many times as 'amen' is said is how many sazhens deep the devil will go into the ground, and the place where he fell will be completely harmless. Sometimes though the place of such a devil's fall is said to be a bad site for building a house, because the devil is living there already (op. cit., pp. 16–17).

In the Ukrainian Kholmskaja Rus a falling star is considered to be a firebrand, which was stolen from the sky by the Devil. The Devil uses these firebrands to reinforce the suffering of people in Hell, or otherwise in his power (op. cit., p. 16). Elsewhere, a falling star is perceived as the Devil's candle, which the Lord or an angel has thrown down. Sometimes the Devil secretly sets his candle on behalf of his lesser devils or his followers, but the Lord or an angel watching the candles recognizes this, and knocks it off with a stick. While looking at the falling star, one should say 'amen' three times, so when it lands on the ground it will turn into a melted tarry resin, gradually solidifying to become rosin (clearly a popular tradition in Ukraine). Without saying the 'amens', it will instead transform into a devil, and cause plenty of harm to people living nearby (op. cit., pp. 16–17).

People in Usha district believe not only that small stones may fall from the sky, but even large rocks and boulders, which are said to be nothing less than actual stars which have fallen to the Earth. These seem to be mythological explanations for the unusual appearance of some rocks or mountain outcrops (op. cit., p. 17).

8 Conclusion

While not encompassing all the meteor beliefs from the places discussed here, the breadth of the similar beliefs across such a large area perhaps says as much for the origins of the peoples and their fascination for continuing such tales, as about what might really be thought 'true' of meteors and meteorites. One last note for now. There is a prohibition to count, or to point to the stars, common to the Slavonic peoples generally, that relates to the belief that in so counting, a man may point to his own star, at which the star will fall and the man will die (Plotnikova, 2006).

Project organisers' endnote

When his first Meteor Beliefs Project article was published on Belarussian meteor folklore in August 2006, a follow-up piece on other East European meteor beliefs was already planned by guest author Tsima Avilin, and it is with great pleasure we present his second contribution later in this issue.

As ever, the Meteor Beliefs Project's coordinators welcome input from anyone with fresh information to share. You can find out the kind of material we are interested in, and what to send us, by re-reading the initial article in *WGN* **31:2** for April 2003, or visiting the webpage at `www.imo.net/projects/beliefs`. We look forward to hearing from you!

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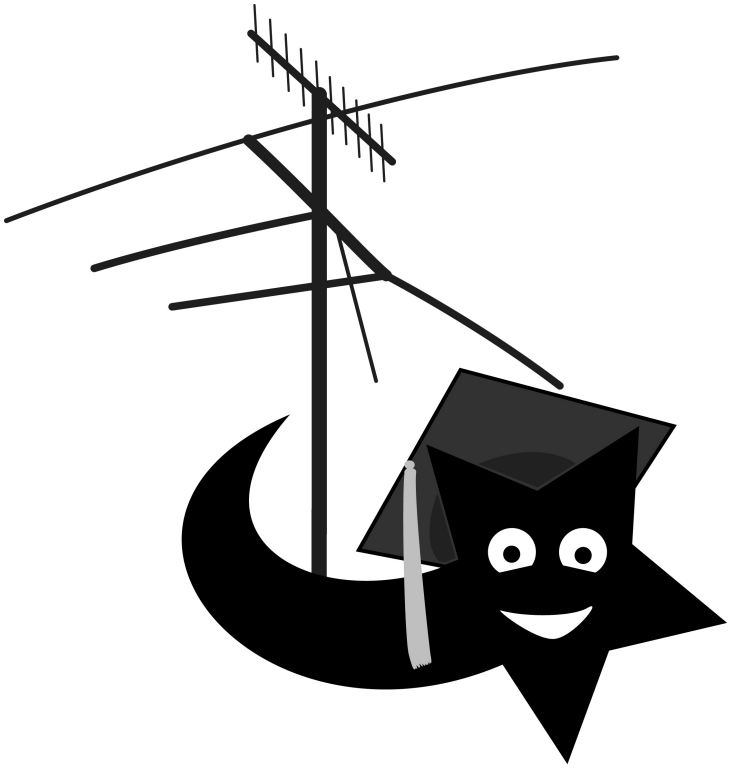

Published by the International Meteor Organization 2006

Edited by Cis Verbeeck and Jean-Marc Wislez