Results of the IMO Video Meteor Network – October 2012

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October 2012 was an unexceptional month. There were phases like around October 7 and 19, where more than 50 video cameras were in operation, but also times such as end of October, where just 20 cameras could observe. The record-breaking result of 2011, which was obtained under perfect weather conditions, could not be realized again under these circumstances. With well above 8,700 hours, the effective observing time reduced by 15%. The number of recorded meteors dropped by 17,000 to 43,000. Thus, we obtained about the same total as in 2010.

End of October, Sirko Molau started to operate REMO3, a third automated and remotely operated meteor camera west of Berlin. It consists of a used Mintron camera and like the other two REMO systems of an 8 mm f/0.8 Computar lens. After years, were the creaky cameras with their 3.8 mm lens got almost blind, they are now back to the top with the 8 mm lenses. The number of meteors recorded by REMO1 has increased fourfold in 2012 compared to the same time interval in 2011. In fact, even though this camera has clearly less effective observing time, it recorded more meteor so far then the powerful video systems of Enrico Stomeo.

With respect to meteor activity, October is dominated by the Orionids. Figure 1 shows an overview of the full activity interval in 2011 and 2012. It shows the typical plateau between October 19 and 24 with a peak flux density of 13 meteoroids per 1,000 km^2 and hour (using a zenith exponent of 1.0 to be comparable with visual observations). That's only half of the peak flux density in 2011

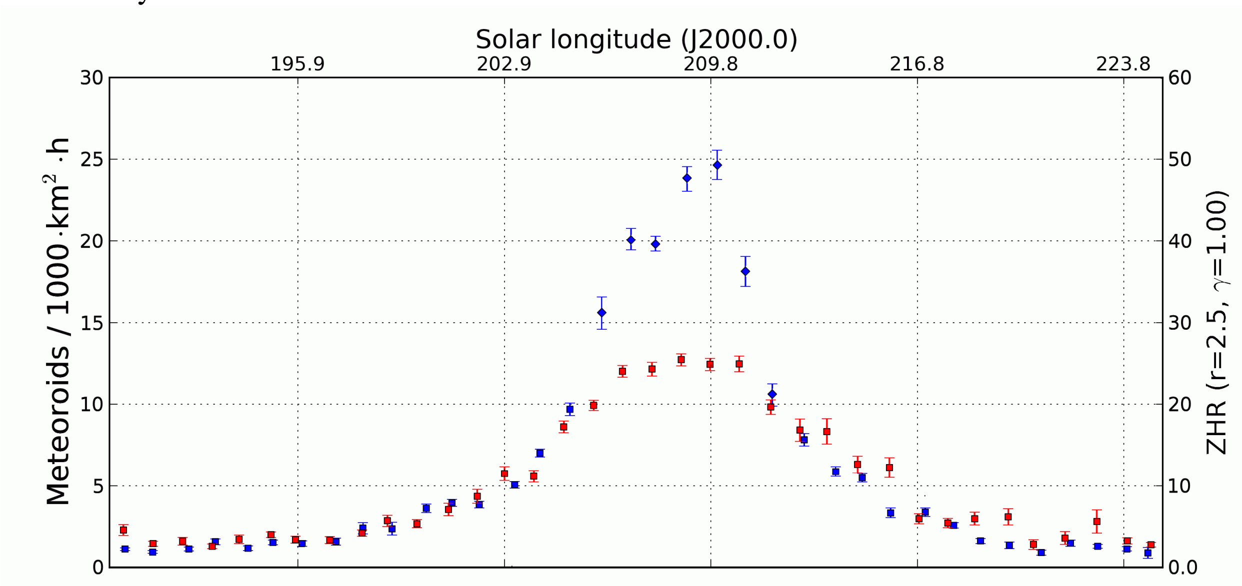

Figure 1: *Flux density profile of the Orionids from data of the IMO network in 2011 (blue diamonds) and 2012 (red squares).*

A systematic observation error seems improbable, as both profiles match well until 205 and after 212° solar longitude. To be on the safe side, we compared the activity profiles of the southern Taurids and sporadic meteors in the same time interval, anyway (figure 2). Also here the rates between October 20 and 25, 2011, were 30 to 40% higher than in 2012. But that's not all: Two weeks before and after the Orionid maximum, the activity in 2011 was lower than in 2012. Could there be a dependency from the lunar phase? Early October and early November 2011 there was only little disturbance from the Moon in the second half of the night, whereas the sky was brightly illuminated by the waning Moon during the Orionid maximum. In 2012, the observing conditions were poor in early October and early November (waning Moon), but the Orionid peak was only little affected by the waxing moon. So it could be that the limiting magnitude is systematically underestimated under moonlit skies (when the Moon is possibly even inside the field of view), leading to increased flux densities.

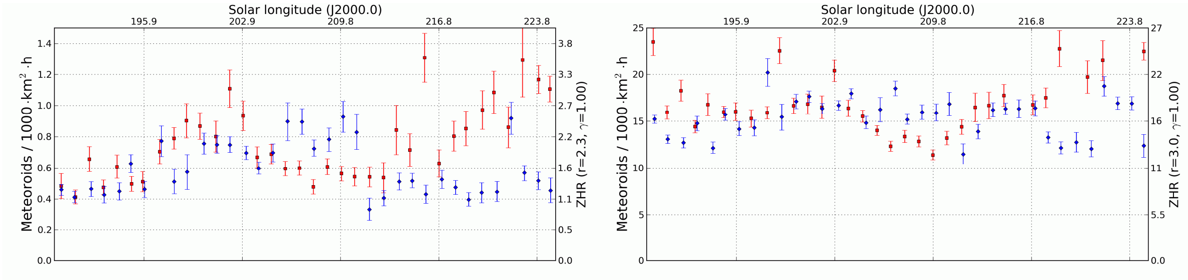

Figure 2: *Flux density profile of the southern Taurids (left) and sporadic meteors (right) in the same solar longitude interval as the Orionids in figure 1. Given are the values for 2011 (blue diamonds) and 2012 (red squares).*

That relativizes the observed difference in flux density between 2011 and 2012, but it does not fully explain the 100% excess in 2011. This year the peak flux density was simply lower than last year as confirmed by visual ZHR profiles of 2011 and 2012.

Let's now have a look at the Orionids (8 ORI) from the viewpoint of our last meteor shower analysis in spring 2012. Almost 55,000 Orionids could be used for the analysis, just 10% less than Perseids. The biggest surprise was the activity interval that was obtained. We had shown before that the Orionid activity surpassed October to a great extent. In our last analysis, however, the shower could be tracked from mid-August till end-November. In other words: The Orionids start right after the Perseid maximum and vanish only after the Leonids!
The fuzziness of activity intervals at the edges, when the shower activity is slowly getting lost in the sporadic background, is well-known. But even when these questionable intervals are removed, the activity interval still lasts from August 25 to November 19. During that time, the rank never exceeds 7, i.e. the radiant can be detected unequivocally. Figure 3 shows the development of the individual shower parameters (right ascension, declination, velocity, activity) over the full activity interval.

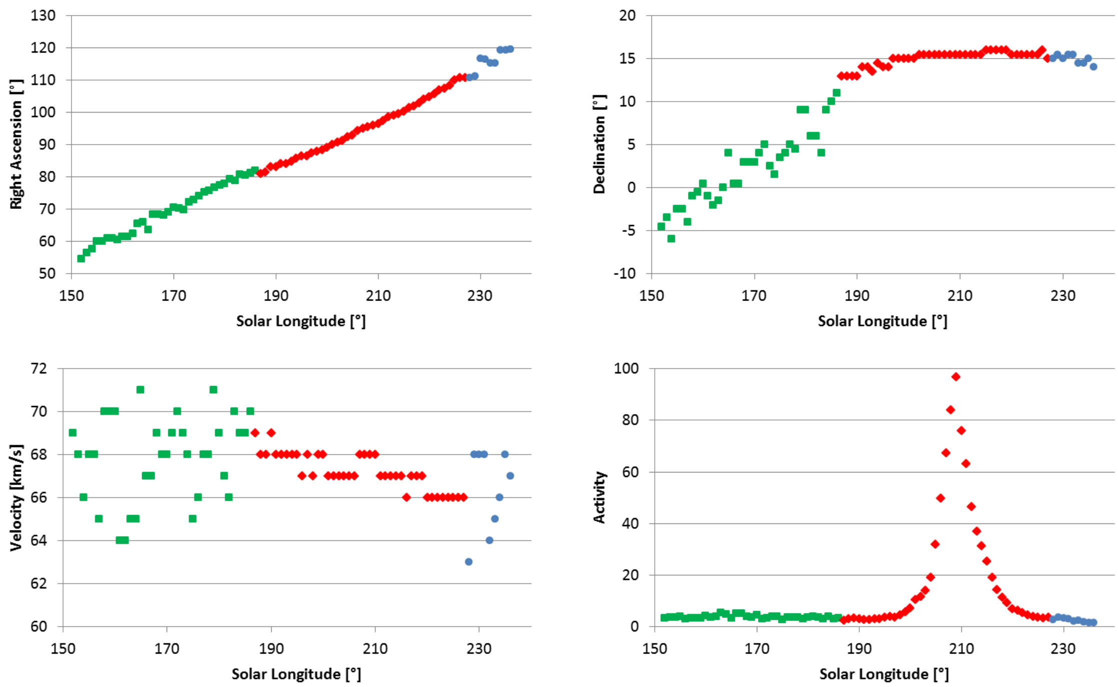

Figure 3: *Shower parameters of the Orionids in the activity interval from 152 to 236° solar longitude: Right ascension (up left), declination (up right), velocity (down left) and activity (down right). The three segments of activity are marked with different colors.*

The drift in right ascension is almost constant in the full activity interval with 0.73° per day (or more precisely: per degree solar longitude). With respect to declination and velocity, the shower can be split into three segments.

In the first segment until about 186° solar longitude, the declination grows constantly about 0.4° per day with significant scatter from one day to the next. In the second segment until 227° solar longitude, the scatter is negligible. The declination grows only by a small amount and remains constant in the end. In the last segment, the declination is slowly decreasing.
The meteor shower velocity is almost constant in the first segment, but there is significant scatter. With the begin of the second interval, the scatter is almost gone and the velocity reduces by 0.06 km/s per day on average. In the last interval, there is once more significant day-to-day variation in the velocity.
Table 1 gives the average shower parameters for the full activity interval, and for each segment individually.

Table 1: *Parameters of the Orionids from the MDC Working List and the analysis of the IMO network in 2012. Given are the mean parameters over the full activity interval, and the values for the three individual segments.*

Source	Solar Longitude		Right Ascension		Deklination		Vinf	
	Mean [°]	Interval [°]	Mean [°]	Drift [°]	Mean [°]	Drift [°]	Mean [km/s]	Drift [km/s]
MDC	209	-	95.4	+0.7	+15.9	+0.1	67.1	-
IMO 2012	209	152-236	97.7	+0.73	+13.5	+0.25	67.1	-0.02
	169	152-186	69.2	+0.78	+2.3	+0.39	67.9	-
	209	**187-227**	**96.6**	**+0.75**	**+15.2**	**+0.06**	**67.1**	**-0.02**
	232	228-236	117.2	+1.0	+14.9	-0.1	66.3	-

There may be different interpretations for the observed variations.
The most simplistic explanation is, that there is stronger scatter at the edges of the activity interval due to lower activity. That is unlikely, though, as the activity remains at a low level until 197 and after 225° solar longitude, i.e. the scatter is reducing dramatically at times when the number of Orionids is still very low.
In principle we could observe here the effects of more than one shower. However, there is no real discontinuity at 186 and 227° solar longitude – only the standard deviation of two parameters changes.
Another option could be, that the Orionid stream consists of an older and a younger component. Over time, the meteoroids of the older background component have dispersed more wiedely in space and time from the mean orbit of parent comet 1/P Halley, whereas the young component is still compact. It is well-known, that the Orionid activity was significantly enhanced between 2006 and 2009, which hints on an additional component crossing the Earth orbit.
Last but not least it is thinkable that Earth crosses first remote areas of the meteoroid stream, where particles had to undergo strong perturbations to move that far from the comets orbit. Thus, the scatter in parameters is stronger here, whereas the near peak the Earth crosses the core of the particle stream with only little perturbations.
The last two explanations may sound plausible, but they are pure speculation at this time until they are confirmed by some computer simulations.

In the end we would like to hints on a little curiosity: In our meteor shower analysis we find two artifacts, which are common for large meteor showers. They have certain similarity to the Orionids and are probably caused by observational errors. A third shower, however, is particularly interesting. It can be tracked between 208 and 213° solar longitude and fits well to the „classical“ Orionids based on the radiant position and activity. With 38 km/s, the velocity is just half of the typical Orionid velocity, though! The origin of the artifact in unclear at this time.

Back to other meteor shower of October 2012. The biggest surprise was not presented by the Orionids, but a few days earlier by the Draconids. An outburst was predicted for last year, and it was well observed both visually and by the video systems of the IMO network. There was no prediction for enhanced activity in 2012. The bigger was the surprise, when Peter Brown reported an outburst in the evening hours of October 8, based on data of the Canadian CMOR radar. That outburst was stronger than any other shower ever observed by CMOR. Soon it was suspected, that the outburst mainly consisted of very faint radar meteors beyond the limits of our video cameras. A first analysis revealed a peak shortly after 17 UT with a FWHM (full width at half maximum) of about 90 minutes – as short as the 2011 outburst. Unfortunately, skies were not yet dark at this time in Europe – even the most eastern stations started observation just at the peak. Furthermore the weather was not favorable at many observing sites. Still, we were able to record 170 shower members from the descending activity branch (figure 4). The peak flux density was measured right after 17 UT with 10 meteoroids per 1.000 km^2 and hour. Already three hours later, the rate had decreased such that it did not stand out from the sporadic background anymore. Hence, the activity was clearly higher than usual, but in the visual range it could not compete with the 2011 outburst, when the flux density was more than ten times as high. In addition, the 2012 outburst was 0.6° solar longitude or nearly 15 hours later than in the previous year.

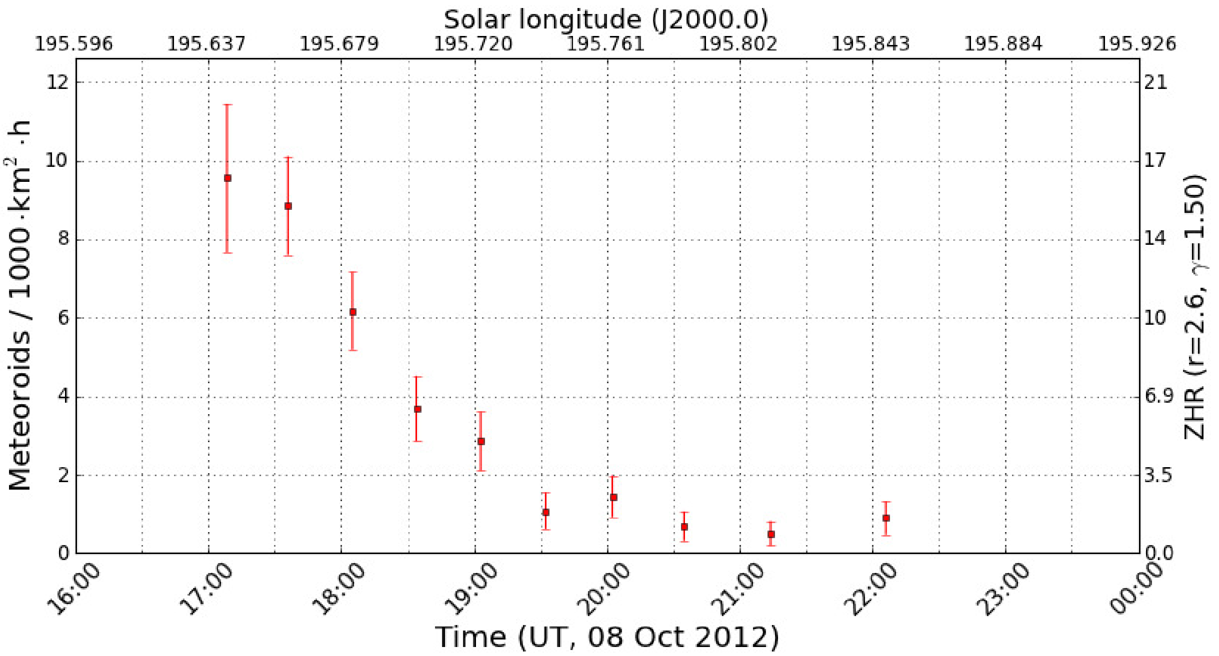

Figure 4: *Flux density profile of the Draconids in the evening hours of October 8, 2012.*

In the lastest meteor shower analysis, the October Draconids (9 DRA) are only detected between 194 and 196° solar longitude. The by far biggest amount of those 2,500 shower meteors were probably recorded in 2011. The parameters of the shower are summarized in table 2.

Table 2: *Parameters of the October Draconids from the MDC Working List and the analysis of the IMO network in 2012.*

Source	**Solar Longitude**		**Right Ascension**		**Deklination**		**Vinf**	
	Mean [°]	**Interval [°]**	**Mean [°]**	**Drift [°]**	**Mean [°]**	**Drift [°]**	**Mean [km/s]**	**Drift [km/s]**
MDC	196	-	264.1	+1.9	+57.6	+0.3	23.3	-
IMO 2012	195	194-196	262.0	-	+56.0	-	21.0	-

The epsilon Geminids (23 EGE) resemble the Orionids both with respect to radiant position and velocity, but they cannot compete with their „big brother“ with respect to flux density. Their 2012 activity profile is little spectacular – the flux density amounted in the full activity interval to about 4 meteoroids per 1,000 km^2 and hour without any significant peak. In our recent analysis, the shower could be traced with more than 7,000 meteors between end of September and early November. The rank remains below 9 in the full activity interval. So it is no surprise that the shower parameters determined by us match perfectly to the values from the MDC list (table 3).

Table 3: Parameters of the epsilon Geminids from the MDC Working List and the analysis of the IMO network in 2012.

Source	Solar Longitude		Right Ascension		Deklination		Vinf	
	Mean [°]	Interval [°]	Mean [°]	Drift [°]	Mean [°]	Drift [°]	Mean [km/s]	Drift [km/s]
MDC	206	-	101.6	-	+26.7	-	69.7	-
IMO 2012	209	186-220	104.7	+0.84	+27.6	-0.11	70.5	0

A little more surprising was the analysis of the October Ursae Majorid (333 OCU) activity. Typically this shower reaches peak flux densities of up to 5 meteoroids per 1,000 km^2 and hour. This year, the value grew beyond ten in the morning hours of October 15 (figure 5). To exclude binning effects, we tested different parameter combinations. Still the higher the temporal resolution we chose, the more prominent was the peak. A detailed analysis revealed that the four Portuguese TEMPLAR cameras of Rui Goncalves had recorded an unusual number of shower meteors on October 15 after 5 UT. Unfortunately there were hardly other cameras active by that time. At least, also the Portuguese cameras of Carlos Saraiva detected a few October Ursae Majorids by that time, whereas ICC7 at the Canary Islands recorded nothing unusual.

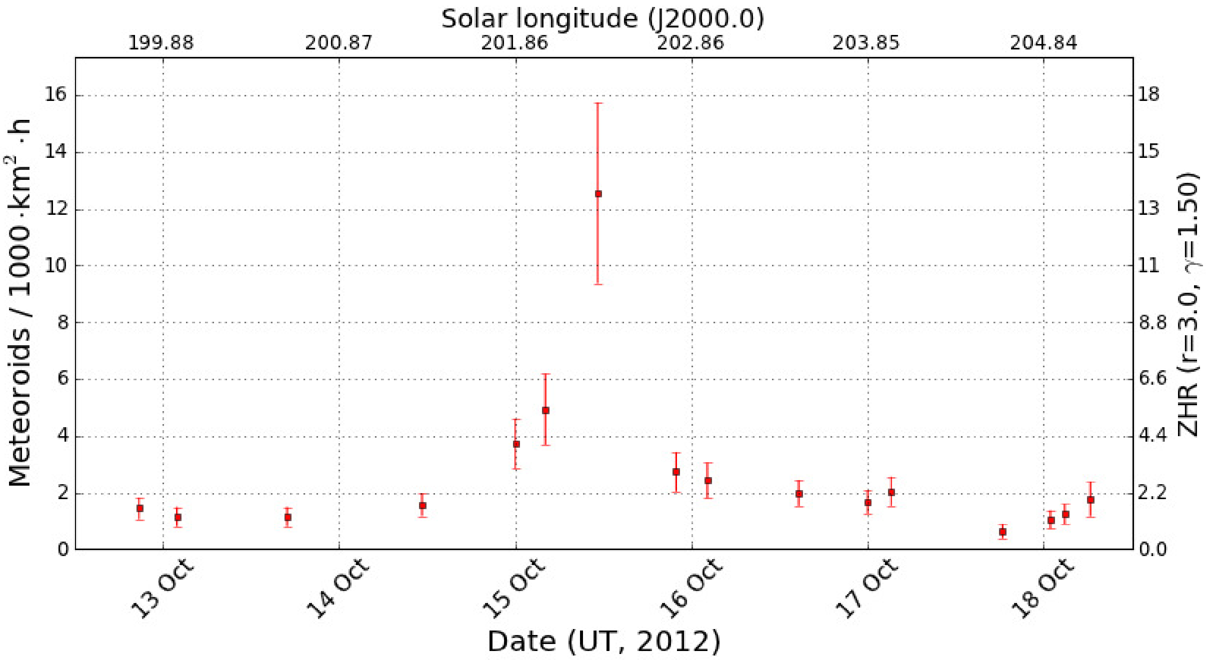

Figure 5: Flux density profile of the October Ursae Majorids from data of the IMO network in 2012, calculated with a zenith exponent of γ=1.5.

Table 4 presents the parameters of this shower, derived from well over 1,200 shower members. The October Ursae Majorids are only active in five nights. Thanks to their large declination, the drift in right ascension is more than 2° per day. In total, the parameters derived recently by us fit well to the values given by MDC.

Table 4: Parameters of the October Ursae Majorids from the MDC Working List and the analysis of the IMO network in 2012.

Source	Solar Longitude		Right Ascension		Deklination		Vinf	
	Mean [°]	Interval [°]	Mean [°]	Drift [°]	Mean [°]	Drift [°]	Mean [km/s]	Drift [km/s]
MDC	202	-	144.8	-	+64.5	-	55.2	-
IMO 2012	202	201-205	144.1	+2.4	+64.3	-0.4	53.6	-

The October Camelopardalids (281 OCT) remained inconspicious this year. No surprise, as we had shown in 2009 that this shower is only active at 192.6° solar longitude for overall less than six hours. That observing window fell into the European afternoon hours this year, which is why there are no observations of this shower.
Our meteor shower analysis of spring 2012 yields two shower candidates in the first decade of October, which fit reasonably to the October Camelopardalids. Unfortunately, both show too much scatter to be regarded as a safe detection of a days-long background component for this shower.

In 2012, the Leonids Minorids (22 LMI) showed a flat activity profile without a clear peak. They were traced between October 18 and 28 in our last meteor shower analysis. The shower parameters show only little scatter and the agreement with the MDC values is once more remarkable (table 5).

Table 5: *Parameters of the Leonis Minorids from the MDC Working List and the analysis of the IMO network in 2012.*

Source	Solar Longitude		Right Ascension		Deklination		Vinf	
	Mean [°]	Interval [°]	Mean [°]	Drift [°]	Mean [°]	Drift [°]	Mean [km/s]	Drift [km/s]
MDC	210	-	161.4	+1.4	+36.2	-0.4	62.9	-
IMO 2012	209	204-214	159.9	+1.0	+36.7	-0.2	60.9	-

Of course, our 2012 meteor shower analysis revealed further meteor showers in October which are less prominent. In the following, they shall be presented in more detail.

The sigma Arietids (237 SSA) were detected with over 4,600 meteors between October 1 and 29. A more detailed analysis revealed that there are in fact at least two very similar meteor showers. The first segment until 207° solar longitude does not fulfill our quality criteria, as it shows too strong scatter in declination and an unusually high reduction of meteor shower velocity. Still it yielded an average rank of 7, which hints on a real source.
The other segment has a clear activity profile. At maximum on October 28, a rank of 4 is reached.
If both segments are compared with the MDC parameters given for the sigma Arietids it becomes clear, that the list values fit to neither of these segments. Thus, the first segment is omitted because of strong scatter in parameters, whereas the second segment is found to be the onset of the northern Taurid activity.

The gamma Piscids (236 GPS) can be tracked between October 15 and 22 in our data set. The shower shows a constant activity without any noticeable peak. The scatter in parameters is acceptable, which is why we regard this shower as real even though it never reaches a rank below 10. The agreement with the MDC list values is mediocre (table 6).

Table 6: *Parameters of the gamma Piscids from the MDC Working List and the analysis of the IMO network in 2012.*

Source	Solar Longitude		Right Ascension		Deklination		Vinf	
	Mean [°]	Interval [°]	Mean [°]	Drift [°]	Mean [°]	Drift [°]	Mean [km/s]	Drift [km/s]
MDC	200	-	17.7	-	+9.3	-	17.5	-
IMO 2012	204	201-208	17.4	+1.1	+16.8	+0.7	23.6	-

Between October 9 and 26, we could identify an unknown shower with more than 3,000 shower members. The activity interval may last even a bit longer, but at the edges the shower parameters deviate significantly. The fast meteor shower presents only little scatter in right ascension and velocity, and some more scatter in declination. The rank is all the time below 10, which is why it

can be regarded as a safe detection. The activity profile shows a slight increase without a clear peak. The meteor shower velocity increases significantly in October.
To be on the safe side, we compared our shower parameters with the latest version of the MDC list, and there was indeed a match! The tau Cancrid meteor shower (480 TCA) was only recently reported by Jenniskens. There is no velocity information given for this shower, but only a radiant position. However, when the difference in solar longitude is taken into account, the two radiant positions from Jenniskens and us deviate less than one degree from one another (table 7).

Table 7: *Parameters of the tau Cancrids from the MDC Working List and the analysis of the IMO network in 2012.*

Source	**Solar Longitude**		**Right Ascension**		**Deklination**		**Vinf**	
	Mean [°]	**Interval** [°]	**Mean** [°]	**Drift** [°]	**Mean** [°]	**Drift** [°]	**Mean [km/s]**	**Drift [km/s]**
MDC	207	-	137.5	-	+30.5	-	-	-
IMO 2012	204	196-212	134.2	+1.0	+29.4	+0.1	68.7	+0.22

At the end of October, another unknown meteor shower could be discovered with about 600 members between 211 and 219° solar longitude. It shows a distinct activity profile with maximum at October 28. The shower closely resembles to the Leonis Minorids, but the radiant is located 15° further north. At peak, a rank of 6 is reached, which is a strong indicator for the reality of the shower. Once more we consulted the latest version of the MDC list, and once more there was a hit. This time our new shower fits perfectly to the lambda Ursae Majorids (524 LUM) reported only recently by Andreic (table 8).

Table 8: *Parameters of the lambda Ursae Majorids from the MDC Working List and the analysis of the IMO network in 2012.*

Source	**Solar Longitude**		**Right Ascension**		**Deklination**		**Vinf**	
	Mean [°]	**Interval** [°]	**Mean** [°]	**Drift** [°]	**Mean** [°]	**Drift** [°]	**Mean [km/s]**	**Drift [km/s]**
MDC	215	-	158	+0.99	+49	-0.52	60.3	-
IMO 2012	214	211-219	156.1	+1.1	+48.9	-1.1	61.5	0

Also at the end of October, we could successfully detect the Andromedids (18 AND). Between October 27 and December 5, more than 2,400 shower meteors were registered. The analysis of this shower revealed some peculiarities: Typically the right ascension is growing monotonously, whereas for some showers the sign of growth in declination may change in the activity interval (like in case of the Orionids). Here we found the opposite: The increase in right ascension turns into a decrease towards the end of the activity interval, whereas declination rises continuously from 20 to 60°.
It turns out that the shower can easily be divided in two segments. The first segments fits perfectly to the MDC values for the Andromedids (table 9). We see a moderate increase in right ascension and declination. The activity profile shows a prominent peak at November 9 with a rank of 5.

Table 9: *Parameters of the Andromedids from the MDC Working List and the analysis of the IMO network in 2012.*

Source	**Solar Longitude**		**Right Ascension**		**Deklination**		**Vinf**	
	Mean [°]	**Interval** [°]	**Mean** [°]	**Drift** [°]	**Mean** [°]	**Drift** [°]	**Mean [km/s]**	**Drift [km/s]**
MDC	232	-	24.2	+0.63	+32.5	+0.33	20.5	-
IMO 2012	226	213-238	22.7	+0.3	+29.4	+0.6	19.4	-0.19

The second segment presents a decrease in right ascension combined with a steep increase in declination. This shower has an almost constant velocity and a flat activity profile with a minimum rank of 7. It fits well to the December phi Cassiopeiids (446 DPC) recently reported to the MDC by Jenniskens (table 10). Indirectly, also the reduction in right ascension and the strong increase in declination is confirmed. If the position measured by us is extrapolated to the solar longitude given by Jenniskens, the deviation in radiant position is less than a degree.

Table 10: *Parameters of the December phi Cassiopeiids from the MDC Working List and the analysis of the IMO network in 2012.*

Source	Solar Longitude		Right Ascension		Deklination		Vinf	
	Mean [°]	Interval [°]	Mean [°]	Drift [°]	Mean [°]	Drift [°]	Mean [km/s]	Drift [km/s]
MDC	252.5	-	19.8	-	+58.0	-	19.8	-
IMO 2012	249	244-253	23.3	-0.5	+52.6	+1.7	17.8	0

Beyond these showers, we found traces of the psi Aurigids (133 PSA), zeta Taurids (226 ZTA), lambda Draconids (135 LDA), eta Taurids (417 ETT) and October Lyncids (228 OLY) in our data. In all cases the scatter in meteor parameters was too high for a reliable confirmation of these showers, though.

1. Observers

Code	Name	Place	Camera	FOV [°²]	St.LM [mag]	Eff.CA [km²]	Nights	Time [h]	Meteors
ARLRA	Arlt	Ludwigsfelde/DE	LUDWIG1 (0.8/8)	1488	4.8	726	11	53.7	90
BERER	Berko	Ludanyhalaszi/HU	HULUD1 (0.95/3)	2256	4.8	1540	18	125.8	1049
			HULUD2 (0.75/6)	4860	3.9	1103	17	116.3	327
			HULUD3 (0.75/6)	4661	3.9	1052	16	109.5	217
BIRSZ	Biro	Agostyan/HU	HUAGO (0.75/4.5)	2427	4.4	1036	19	151.8	548
BOMMA	Bombardini	Faenza/IT	MARIO (1.2/4.0)	5794	3.3	739	14	76.7	298
BREMA	Breukers	Hengelo/NL	MBB3 (0.75/6)	2399	4.2	699	22	135.3	488
			MBB4 (0.8/8)	1470	5.1	1208	19	141.5	437
BRIBE	Brinkmann	Herne/DE	HERMINE (0.8/6)	2374	4.2	678	26	147.4	593
		Berg. Gladbach/DE	KLEMOI (0.8/6)	2286	4.6	1080	28	173.8	880
CASFL	Castellani	Monte Baldo/IT	BMH2 (1.5/4.5)*	4243	3.0	371	21	131.0	667
CRIST	Crivello	Valbrevenna/IT	BILBO (0.8/3.8)	5458	4.2	1772	24	147.0	989
			C3P8 (0.8/3.8)	5455	4.2	1586	24	146.7	714
			STG38 (0.8/3.8)	5614	4.4	2007	22	73.4	547
CSISZ	Csizmadia	Zalaegerszeg/HU	HUVCSE01 (0.95/5)	2423	3.4	361	17	87.4	310
ELTMA	Eltri	Venezia/IT	MET38 (0.8/3.8)	5631	4.3	2151	19	157.4	1026
GONRU	Goncalves	Tomar/PT	TEMPLAR1 (0.8/6)	2179	5.3	1842	21	171.3	793
			TEMPLAR2 (0.8/6)	2080	5.0	1508	22	183.8	755
			TEMPLAR3 (0.8/8)	1438	4.3	571	26	180.6	743
			TEMPLAR4 (0.8/3.8)	4475	3.0	442	22	160.3	629
GOVMI	Govedic	Sredisce ob Dr./SI	ORION2 (0.8/8)	1447	5.5	1841	22	119.4	702
			ORION3 (0.95/5)	2665	4.9	2069	18	96.4	349
			ORION4 (0.95/5)	2662	4.3	1043	18	105.5	392
HINWO	Hinz	Brannenburg/DE	ACR (2.0/35)*	557	7.4	4954	11	55.1	584
IGAAN	Igaz	Baja/HU	HUBAJ (0.8/3.8)	5552	2.8	403	23	144.4	531
		Debrecen/HU	HUDEB (0.8/3.8)	5522	3.2	620	26	170.3	875
		Hodmezovasar./HU	HUHOD (0.8/3.8)	5502	3.4	764	20	158.9	766
		Budapest/HU	HUPOL (1.2/4)	3790	3.3	475	17	58.3	102
JONKA	Jonas	Budapest/HU	HUSOR (0.95/4)	2286	3.9	445	22	159.9	550
KACJA	Kac	Kostanjevec/SI	METKA (0.8/12)*	715	6.4	640	4	28.7	199
		Ljubljana/SI	ORION1 (0.8/8)	1402	3.8	331	12	37.3	52
		Kamnik/SI	REZIKA (0.8/6)	2270	4.4	840	16	110.9	1336
			STEFKA (0.8/3.8)	5471	2.8	379	12	55.1	176
KERST	Kerr	Glenlee/AU	GOCAM1 (0.8/3.8)	5189	4.6	2550	30	210.6	933
KISSZ	Kiss	Sulysap/HU	HUSUL (0.95/5)*	4295	3.0	355	24	168.6	251
KOSDE	Koschny	Izana Obs./ES	ICC7 (0.85/25)*	714	5.9	1464	14	132.5	1136
		Noordwijkerhout/NL	LIC4 (1.4/50)*	2027	6.0	4509	16	57.2	216
MACMA	Maciejewski	Chelm/PL	PAV35 (1.2/4)	4383	2.5	253	20	118.6	279
			PAV36 (1.2/4)*	5732	2.2	227	24	140.9	649
			PAV43 (0.95/3.75)*	2544	2.7	176	22	139.4	313
MARGR	Maravelias	Lofoupoli/GR	LOOMECON (0.8/12)	738	6.3	2698	24	170.1	832
MOLSI	Molau	Seysdorf/DE	AVIS2 (1.4/50)*	1230	6.9	6152	16	108.2	1518
			MINCAM1 (0.8/8)	1477	4.9	1084	20	140.6	480
		Ketzür/DE	REMO1 (0.8/8)	1467	5.9	2837	25	206.6	2206
			REMO2 (0.8/8)	1478	6.3	4467	2	18.8	48
			REMO3 (0.8/8)	1420	5.6	1967	2	16.2	29
MORJO	Morvai	Fülöpszallas/HU	HUFUL (1.4/5)	2522	3.5	532	22	173.5	599
OCAFR	Ocana Gonzales	Madrid/ES	FOGCAM (1.4/7)	1890	3.9	109	8	5.2	16
OCHPA	Ochner	Albiano/IT	ALBIANO (1.2/4.5)	2944	3.5	358	13	39.5	330
OTTMI	Otte	Pearl City/US	ORIE1 (1.4/5.7)	3837	3.8	460	27	177.8	906
PERZS	Perko	Becsehely/HU	HUBEC (0.8/3.8)*	5498	2.9	460	20	143.8	1281
PUCRC	Pucer	Nova vas nad Dra./SI	MOBCAM1 (0.75/6)	2398	5.3	2976	24	160.0	1049
ROTEC	Rothenberg	Berlin/DE	ARMEFA (0.8/6)	2366	4.5	911	22	139.3	322
SARAN	Saraiva	Carnaxide/PT	RO1 (0.75/6)	2362	3.7	381	25	158.5	486
			RO2 (0.75/6)	2381	3.8	459	24	172.3	625
			SOFIA (0.8/12)	738	5.3	907	24	167.5	410
SCALE	Scarpa	Alberoni/IT	LEO (1.2/4.5)*	4152	4.5	2052	22	111.3	537
SCHHA	Schremmer	Niederkrüchten/DE	DORAEMON (0.8/3.8)	4900	3.0	409	27	194.0	889
SLAST	Slavec	Ljubljana/SI	KAYAK1 (1.8/28)	563	6.2	1294	13	58.3	271
STOEN	Stomeo	Scorze/IT	MIN38 (0.8/3.8)	5566	4.8	3270	27	150.8	1547
			NOA38 (0.8/3.8)	5609	4.2	1911	27	150.4	1095
			SCO38 (0.8/3.8)	5598	4.8	3306	28	163.8	1454
STRJO	Strunk	Herford/DE	MINCAM2 (0.8/6)	2362	4.6	1152	24	165.0	396
			MINCAM3 (0.8/12)	728	5.7	975	25	161.8	448
			MINCAM4 (1.0/2.6)	9791	2.7	552	21	118.2	188
			MINCAM5 (0.8/6)	2349	5.0	1896	25	154.9	649
TEPIS	Tepliczky	Budapest/HU	HUMOB (0.8/6)	2388	4.8	1607	22	158.9	918
TRIMI	Triglav	Velenje/SI	SRAKA (0.8/6)*	2222	4.0	546	18	98.7	389
YRJIL	Yrjölä	Kuusankoski/FI	FINEXCAM (0.8/6)	2337	5.5	3574	20	92.5	457
ZELZO	Zelko	Budapest/HU	HUVCSE03 (1.0/4.5)	2224	4.4	933	7	40.0	109
Sum							31	8755.2	42975

* active field of view smaller than video frame

2. Observing Times (h)

October	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
ARLRA	-	-	-	-	-	-	4.3	3.8	7.0	-	-	-	3.7	-	2.4
BERER	2.6	-	6.8	-	8.7	5.9	8.7	10.3	6.7	9.7	5.6	-	-	-	2.5
	1.0	-	-	-	10.0	6.7	8.9	10.2	6.7	8.5	5.7	-	-	-	2.3
	-	-	-	-	9.5	6.7	8.9	10.9	7.4	8.1	5.4	-	-	-	2.0
BIRSZ	7.6	2.4	10.7	4.2	10.5	6.9	8.6	8.5	-	-	-	-	-	10.5	-
BOMMA	2.2	3.6	11.1	8.0	-	5.5	7.9	2.1	-	-	-	-	-	2.0	1.7
BREMA	-	4.1	-	0.8	-	5.4	8.4	9.1	6.7	9.7	5.6	6.5	-	-	-
	-	-	-	1.6	-	9.5	11.0	9.7	7.4	9.5	6.6	7.6	-	-	9.6
BRIBE	0.7	3.8	-	2.6	-	1.3	6.7	-	8.7	7.0	5.1	5.8	0.3	0.8	5.5
	2.6	0.9	-	3.9	0.2	2.0	10.7	0.2	11.2	11.2	3.0	10.0	1.6	-	7.1
CASFL	-	9.2	5.2	4.6	4.2	-	7.6	-	-	6.5	-	2.6	1.8	-	2.7
CRIST	3.2	5.0	2.4	1.4	8.8	-	-	0.7	10.4	11.0	-	10.5	5.6	-	9.3
	6.5	4.1	-	-	9.9	-	7.9	0.7	6.8	7.7	0.3	9.8	5.4	-	8.7
	-	5.0	2.6	0.9	8.1	1.4	-	0.6	5.5	10.6	-	10.5	1.0	-	1.4
CSISZ	1.9	-	9.3	3.6	8.6	1.1	8.0	9.0	1.3	-	1.7	-	-	-	-
ELTMA	-	-	10.2	7.6	8.5	3.2	5.2	-	8.6	-	-	1.1	-	-	-
GONRU	9.5	5.9	10.6	10.8	7.5	10.6	7.7	8.7	-	8.9	-	10.2	7.8	11.1	11.0
	10.7	6.4	10.8	11.0	7.7	10.6	8.5	8.8	-	9.1	-	10.9	7.9	11.2	11.1
	10.6	5.3	10.7	10.7	6.2	10.6	7.1	7.3	2.8	4.4	5.3	9.2	7.0	10.6	10.6
	9.8	5.6	10.8	10.9	6.2	10.7	7.3	8.2	-	7.2	-	8.0	5.2	10.5	10.8
GOVMI	2.7	6.0	-	-	10.8	6.5	9.0	8.0	0.4	1.2	2.0	-	-	2.8	1.2
	3.6	5.4	-	-	10.9	5.4	9.1	6.5	-	0.8	-	-	-	1.4	-
	-	-	10.2	8.1	10.9	8.4	6.9	8.4	-	1.0	-	0.3	-	4.1	1.4
HINWO	-	1.6	1.7	-	3.1	-	-	-	-	-	-	-	6.9	5.2	-
IGAAN	-	0.2	4.0	6.5	8.4	7.4	-	5.9	9.9	0.7	2.3	-	-	-	5.8
	0.2	0.3	6.1	7.6	9.1	7.7	4.7	10.5	3.4	6.4	8.9	1.6	1.4	-	9.8
	-	-	10.2	7.4	10.0	10.3	-	10.2	9.1	0.9	5.8	-	2.4	-	6.0
	-	-	1.0	0.3	-	0.5	-	3.4	2.3	6.2	2.1	-	-	-	-
JONKA	-	-	10.8	5.0	10.8	6.6	8.1	8.8	8.8	4.8	3.4	0.8	-	-	1.4
KACJA	-	-	-	-	10.4	3.9	-	-	-	-	-	-	-	-	-
	-	-	-	0.2	1.6	2.5	0.8	-	-	-	-	-	-	-	-
	1.9	-	3.0	0.9	1.9	6.4	5.6	4.7	-	-	-	-	-	-	-
	2.8	-	5.5	3.2	2.6	5.9	1.7	3.4	-	-	-	-	-	-	-
KERST	-	5.2	8.1	9.6	9.6	9.3	9.5	9.3	7.4	5.2	7.9	9.3	9.2	8.5	8.3
KISSZ	1.0	-	9.7	6.9	10.6	7.3	7.9	9.4	5.3	5.0	5.1	-	1.0	-	2.4
KOSDE	8.0	-	9.4	-	-	9.7	10.7	10.7	10.8	10.8	10.8	-	10.9	10.9	10.8
	0.4	0.3	-	-	-	5.9	4.5	6.0	-	8.6	-	2.2	1.7	1.8	2.0
MACMA	1.2	-	4.0	-	3.1	2.4	2.7	-	8.4	-	10.8	9.8	4.4	4.1	8.7
	2.0	-	3.9	2.2	4.4	2.6	2.8	-	8.0	2.1	10.6	10.6	5.0	4.3	9.3
	3.5	-	3.0	-	2.2	-	2.6	-	8.6	2.1	10.7	10.7	3.7	4.1	8.9
MARGR	4.2	6.8	7.0	8.8	10.2	9.3	8.8	8.6	-	7.3	8.9	7.4	9.7	5.3	6.7
MOLSI	-	8.0	3.7	-	9.9	-	7.8	4.6	7.2	7.5	6.1	7.1	9.5	5.0	-
	5.8	10.7	2.4	9.8	10.9	-	6.5	3.7	5.9	10.9	6.8	8.8	9.0	4.5	-
	7.8	7.3	3.8	9.2	-	10.0	8.2	10.4	10.3	6.9	10.9	5.0	5.5	-	11.0
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MORJO	-	3.1	9.9	4.4	11.0	10.5	8.2	10.9	9.7	4.5	4.5	0.5	-	-	7.2
OCAFR	0.4	1.0	-	0.5	0.2	1.1	0.7	-	1.0	0.3	-	-	-	-	-
OCHPA	-	-	-	-	-	-	1.6	-	0.3	0.6	0.8	-	-	-	-
OTTMI	8.5	9.1	9.5	8.1	8.4	-	8.2	4.7	6.9	11.2	3.8	3.0	-	8.5	8.8
PERZS	0.2	0.8	10.9	4.2	11.0	6.0	9.2	10.6	4.7	2.1	3.1	-	-	-	0.9
PUCRC	0.4	3.4	6.9	6.4	7.4	3.4	8.2	0.5	-	1.2	-	0.9	5.4	3.5	-
ROTEC	3.8	9.1	3.7	6.3	-	6.0	5.1	10.4	-	4.6	10.1	3.5	4.2	-	10.3
SARAN	6.5	9.3	10.0	9.9	-	10.6	8.5	4.4	-	-	5.7	4.1	3.0	10.1	9.9
	9.9	10.7	10.1	10.7	6.6	-	8.1	4.6	-	6.8	4.7	-	3.7	-	9.7
	9.4	10.6	10.1	10.7	5.8	8.3	9.5	3.4	-	-	5.7	4.6	2.9	8.5	10.2
SCALE	0.4	2.1	9.6	2.1	4.3	0.4	5.0	-	1.6	1.6	-	-	-	-	0.2
SCHHA	1.1	4.1	-	3.3	0.5	6.2	10.1	1.6	8.6	11.2	1.6	10.1	7.6	4.2	9.2
SLAST	0.1	-	0.2	-	5.0	4.9	1.5	2.4	-	-	-	-	-	-	-
STOEN	-	3.0	8.4	1.4	4.2	2.1	6.1	0.6	2.2	5.0	1.9	1.8	6.9	3.7	-
	0.9	3.6	8.8	1.9	4.1	3.3	6.7	0.2	2.3	4.9	2.5	2.6	6.9	4.3	-
	0.4	4.9	9.0	5.0	7.1	1.9	5.7	0.3	1.4	4.6	2.5	2.3	7.2	4.6	-
STRJO	5.1	1.8	-	3.7	-	4.3	9.7	8.8	7.5	10.8	9.1	6.5	0.9	-	8.9
	5.1	3.4	-	2.9	-	4.8	10.6	9.1	7.7	10.8	9.4	6.5	1.5	-	3.6
	1.5	-	-	2.5	-	-	7.6	5.0	6.3	3.4	9.2	4.4	0.5	0.2	8.2
	2.8	0.9	-	1.0	-	4.3	10.6	8.6	7.3	10.8	9.3	5.5	1.3	-	8.5
TEPIS	7.2	0.6	10.6	5.5	10.7	7.7	10.2	9.7	5.6	6.7	0.5	-	-	10.3	-
TRIMI	3.0	0.2	6.8	8.2	9.5	6.6	5.0	3.9	-	-	-	-	-	2.0	-
YRJIL	-	1.8	-	-	2.1	9.3	9.8	0.8	1.9	-	2.2	0.7	2.7	5.6	-
ZELZO	-	-	5.9	-	-	-	8.8	5.2	-	5.3	-	-	-	-	-
Sum	180.7	196.6	339.1	267.0	363.9	327.8	436.0	347.0	278.0	323.9	244.0	233.3	182.3	184.2	288.0

October	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
ARLRA	-	-	2.8	8.3	8.6	-	-	-	-	-	-	-	10.5	0.5	-	1.8
BERER	-	3.8	11.5	11.2	8.2	9.3	7.9	1.7	-	-	-	-	-	-	-	4.7
	-	3.8	11.6	11.3	7.0	8.7	6.7	1.7	-	-	-	-	-	-	-	5.5
	-	3.3	11.6	11.2	4.8	7.2	5.4	1.7	-	-	-	-	-	-	-	5.4
BIRSZ	1.6	7.5	11.5	11.5	10.9	11.6	10.9	-	-	-	-	-	-	4.3	6.4	5.7
BOMMA	10.5	5.9	4.8	-	8.0	3.4	-	-	-	-	-	-	-	-	-	-
BREMA	11.1	-	3.8	9.9	3.7	7.9	7.1	2.5	-	4.5	6.9	11.9	3.2	-	1.9	4.6
	11.0	-	2.1	9.0	-	-	-	3.8	-	3.5	7.2	12.3	3.3	-	4.3	12.5
BRIBE	8.7	1.1	7.3	8.5	6.5	11.9	11.9	10.3	-	1.0	5.6	12.1	7.7	-	1.2	5.3
	10.3	2.6	7.9	6.0	8.9	11.9	11.8	11.2	5.6	0.2	2.1	12.0	10.7	-	3.1	4.9
CASFL	7.3	1.9	9.1	8.7	10.0	8.0	10.4	10.0	8.8	4.3	-	1.8	-	6.3	-	-
CRIST	5.2	0.3	8.5	6.3	8.3	3.8	10.6	9.7	11.7	0.3	-	0.4	2.3	11.3	-	-
	4.3	2.4	4.6	5.1	8.2	4.9	11.6	11.7	11.7	0.7	-	-	3.8	9.7	0.2	-
	0.2	-	0.2	0.2	8.0	0.9	2.5	1.9	8.4	1.6	-	-	0.8	1.1	-	-
CSISZ	0.7	9.2	5.5	10.5	-	2.6	2.7	-	-	-	-	-	-	4.5	7.2	-
ELTMA	11.4	11.1	11.7	11.3	9.0	11.8	12.0	11.6	8.4	6.0	-	-	-	8.3	0.4	-
GONRU	4.0	-	-	-	11.2	-	-	0.8	2.4	-	6.4	9.5	10.9	-	5.8	-
	4.4	-	1.7	2.7	11.1	-	-	-	2.3	-	6.7	9.7	11.0	-	9.5	-
	4.2	-	0.5	3.0	11.4	-	6.5	-	2.7	-	3.0	9.1	11.4	-	9.2	1.2
	3.4	-	0.2	2.1	11.0	-	-	-	1.1	-	4.0	8.8	11.0	-	7.5	-
GOVMI	3.4	9.9	9.1	10.5	8.6	3.4	8.3	-	-	1.3	-	-	-	4.5	9.6	0.2
	2.1	10.4	10.2	10.5	8.4	0.5	2.6	-	-	1.0	-	-	-	0.9	6.7	-
	1.6	10.6	9.5	10.3	0.9	-	1.0	-	-	1.1	-	-	-	-	10.8	-
HINWO	4.9	10.8	9.8	4.0	5.5	1.6	-	-	-	-	-	-	-	-	-	-
IGAAN	6.5	11.4	11.5	4.7	11.0	11.3	11.6	5.6	-	6.9	1.6	-	-	1.8	8.0	1.4
	-	11.1	11.0	11.1	11.1	11.1	10.3	9.9	0.9	0.7	3.6	-	-	-	2.7	9.1
	3.2	10.3	10.3	10.3	10.3	10.4	10.3	10.3	-	3.6	7.6	-	-	-	-	-
	4.6	2.6	5.5	5.6	-	4.6	2.9	-	-	2.5	-	-	-	3.8	5.3	5.1
JONKA	-	5.9	11.7	11.7	11.8	11.8	11.9	6.2	-	5.2	-	-	-	3.1	5.0	6.3
KACJA	-	-	-	11.4	-	-	-	3.0	-	-	-	-	-	-	-	-
	0.9	4.7	10.5	6.8	-	-	0.8	-	-	6.0	-	-	-	0.3	2.2	-
	3.5	11.2	11.2	10.0	11.8	11.8	9.7	5.9	-	11.4	-	-	-	-	-	-
	-	-	-	-	7.0	8.8	2.2	0.5	-	11.5	-	-	-	-	-	-
KERST	8.6	8.6	7.1	8.4	8.3	6.9	7.7	6.2	2.9	8.4	8.3	2.8	0.3	0.1	2.0	7.6
KISSZ	2.0	6.6	11.6	11.6	11.8	11.8	11.9	11.9	-	4.8	-	-	-	1.6	4.2	7.2
KOSDE	1.9	6.0	-	-	11.1	-	-	-	-	-	-	-	-	-	-	-
	4.6	-	-	0.8	-	-	-	-	-	-	6.3	8.8	-	0.7	-	2.6
MACMA	-	9.6	9.9	8.9	6.1	9.4	-	-	1.7	0.5	-	-	-	-	2.4	10.5
	-	11.8	8.0	12.0	11.0	10.5	-	-	1.7	0.9	1.8	-	2.7	-	2.5	10.2
	-	11.1	12.1	12.0	11.2	10.6	-	-	2.5	1.0	1.9	-	3.8	-	2.8	10.3
MARGR	10.1	7.9	9.5	6.9	10.1	5.2	2.8	2.2	2.3	-	-	4.1	-	-	-	-
MOLSI	3.3	10.3	10.9	6.2	-	-	-	-	-	1.1	-	-	-	-	-	-
	2.8	11.2	11.5	6.4	-	-	-	-	-	2.5	-	-	-	3.0	7.5	-
	6.7	5.5	11.7	11.8	11.8	4.4	-	-	-	8.4	3.0	9.0	12.1	-	6.6	9.3
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7.4	11.4
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.4	10.8
MORJO	5.4	11.6	11.7	11.6	11.8	11.8	11.3	5.4	-	6.5	-	-	-	2.0	-	-
OCAFR	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
OCHPA	2.1	-	4.5	4.6	4.4	5.0	5.4	4.9	3.9	1.4	-	-	-	-	-	-
OTTMI	10.0	2.0	-	8.3	7.9	6.3	-	2.2	3.6	4.1	6.4	6.0	5.8	4.7	7.2	4.6
PERZS	8.0	11.2	11.4	11.4	11.5	11.5	11.5	-	-	3.6	-	-	-	-	-	-
PUCRC	10.1	9.7	11.3	5.1	11.4	11.4	11.4	11.4	11.4	4.5	-	-	3.3	11.4	-	-
ROTEC	6.7	-	-	11.2	11.8	1.8	-	0.4	-	7.3	-	0.7	12.4	1.8	-	8.1
SARAN	2.2	-	9.4	9.6	6.1	-	-	0.4	0.2	4.8	3.8	7.8	8.4	2.1	5.8	5.9
	2.1	-	9.4	9.6	5.2	-	7.4	1.0	-	6.6	6.4	10.4	11.2	2.3	8.8	6.3
	2.6	-	9.3	10.1	4.4	-	-	0.8	-	5.2	7.3	-	10.8	2.8	7.8	6.7
SCALE	10.5	10.2	7.0	6.4	1.0	6.3	11.2	10.7	11.2	1.4	-	-	0.2	7.9	-	-
SCHHA	10.6	1.4	7.4	10.3	8.4	10.7	12.0	11.9	-	-	6.1	12.2	4.9	-	7.1	11.6
SLAST	-	-	8.9	10.5	8.5	5.5	4.4	4.9	-	1.5	-	-	-	-	-	-
STOEN	11.2	8.3	10.6	10.3	1.5	11.2	12.0	12.0	12.1	2.9	-	0.9	3.1	7.2	0.2	-
	11.0	8.0	11.1	8.0	-	9.9	11.9	11.5	12.0	5.4	-	0.2	2.1	6.1	0.2	-
	11.1	8.1	10.5	8.7	1.7	11.7	12.0	12.0	12.0	8.0	-	0.6	2.6	7.5	0.4	-
STRJO	10.6	3.2	9.0	8.5	8.1	11.4	6.8	-	-	3.0	-	11.7	11.8	-	0.2	3.6
	9.9	3.0	9.2	8.8	8.3	11.5	6.4	-	-	3.3	2.4	6.4	11.6	-	2.1	3.5
	8.7	2.7	7.7	7.3	8.1	11.5	6.4	-	-	1.9	-	-	11.8	-	-	3.3
	10.5	3.7	9.4	9.0	8.0	11.5	6.4	-	-	3.3	2.3	4.8	11.7	-	0.3	3.1
TEPIS	2.1	7.8	11.4	11.5	5.0	11.6	8.3	-	-	-	-	-	-	4.2	6.9	4.8
TRIMI	6.8	5.9	7.4	6.6	7.0	6.4	7.1	5.6	-	-	-	-	-	0.7	-	-
YRJIL	3.8	-	-	1.2	-	-	6.7	0.3	8.9	12.2	10.0	9.4	1.7	-	-	1.4
ZELZO	-	0.6	11.2	-	-	-	-	-	-	3.0	-	-	-	-	-	-
Sum	325.0	337.8	507.3	517.3	462.7	405.0	370.6	235.7	150.4	190.8	120.7	183.4	218.9	126.5	194.8	216.5

3. Results (Meteors)

October	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
ARLRA	-	-	-	-	-	-	7	9	7	-	-	-	3	-	4
BERER	6	-	41	-	46	23	127	95	68	85	37	-	-	-	4
	1	-	-	-	16	8	35	25	24	30	21	-	-	-	2
	-	-	-	-	15	8	27	24	11	20	9	-	-	-	1
BIRSZ	15	4	29	6	26	18	30	24	-	-	-	-	-	28	-
BOMMA	7	11	40	37	-	13	25	5	-	-	-	-	-	4	12
BREMA	-	5	-	2	-	33	34	33	28	33	9	20	-	-	-
	-	-	-	2	-	35	41	37	14	45	12	25	-	-	32
BRIBE	1	6	-	7	-	1	16	-	31	46	4	18	1	2	33
	8	2	-	5	1	3	48	1	51	53	6	47	4	-	63
CASFL	-	28	15	15	15	-	27	-	-	30	-	5	6	-	14
CRIST	21	26	5	2	36	-	-	2	56	40	-	53	8	-	86
	20	15	-	-	38	-	18	2	23	28	1	28	9	-	65
	-	26	13	2	65	1	-	2	14	49	-	52	8	-	9
CSISZ	2	-	32	9	31	2	26	26	2	-	3	-	-	-	-
ELTMA	-	-	52	13	17	4	15	-	5	-	-	2	-	-	-
GONRU	32	11	55	50	8	41	21	32	-	38	-	63	19	58	56
	32	15	50	44	11	39	28	34	-	21	-	48	11	64	63
	29	12	51	46	8	24	32	25	4	10	27	49	14	43	35
	22	9	55	53	14	45	25	20	-	19	-	40	11	52	42
GOVMI	5	17	-	-	57	11	75	31	1	2	2	-	-	7	3
	6	6	-	-	20	6	34	15	-	2	-	-	-	4	-
	-	-	34	16	34	8	17	21	-	4	-	1	-	10	1
HINWO	-	1	2	-	20	-	-	-	-	-	-	-	57	25	-
IGAAN	-	1	2	20	34	24	-	24	23	1	6	-	-	-	18
	1	2	13	24	27	22	30	48	7	22	28	2	1	-	45
	-	-	23	4	41	24	-	39	33	3	5	-	1	-	13
	-	-	6	2	-	3	-	7	7	8	1	-	-	-	-
JONKA	-	-	36	7	18	11	37	29	16	25	2	3	-	-	2
KACJA	-	-	-	-	60	15	-	-	-	-	-	-	-	-	-
	-	-	-	1	2	2	3	-	-	-	-	-	-	-	-
	8	-	11	5	7	13	31	19	-	-	-	-	-	-	-
	7	-	10	12	7	3	5	6	-	-	-	-	-	-	-
KERST	-	21	31	33	41	34	30	32	7	10	25	50	48	25	51
KISSZ	1	-	11	6	10	4	9	8	7	11	2	-	1	-	1
KOSDE	43	-	68	-	-	77	91	82	77	99	105	-	92	94	94
	2	2	-	-	-	22	11	13	-	37	-	13	11	12	6
MACMA	2	-	4	-	2	1	6	-	20	-	26	16	2	6	20
	2	-	5	3	10	4	12	-	27	6	51	44	11	17	43
	6	-	5	-	2	-	4	-	17	3	28	17	1	5	14
MARGR	9	7	36	28	34	29	29	24	-	36	43	26	42	39	32
MOLSI	-	97	9	-	183	-	98	34	40	160	73	171	122	71	-
	25	48	1	26	45	-	32	11	9	40	15	46	17	19	-
	103	59	12	50	-	86	50	124	124	57	137	81	28	-	134
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MORJO	-	9	25	6	27	19	37	41	13	27	6	1	-	-	14
OCAFR	1	1	-	1	1	3	3	-	5	1	-	-	-	-	-
OCHPA	-	-	-	-	-	-	11	-	2	3	5	-	-	-	-
OTTMI	23	32	18	22	25	-	37	6	32	56	24	1	-	42	30
PERZS	1	1	59	8	61	16	64	97	16	22	8	-	-	-	1
PUCRC	1	14	15	12	12	3	33	3	-	7	-	5	70	7	-
ROTEC	7	13	1	6	-	2	6	22	-	5	21	9	4	-	17
SARAN	13	25	26	10	-	24	23	5	-	-	15	18	10	31	33
	21	23	41	35	11	-	27	9	-	12	4	-	17	-	33
	12	22	18	20	7	10	18	2	-	-	11	22	4	22	24
SCALE	2	10	23	7	10	2	9	-	5	9	-	-	-	-	1
SCHHA	4	3	-	5	2	19	34	6	21	40	2	52	28	8	56
SLAST	1	-	1	-	5	3	1	9	-	-	-	-	-	-	-
STOEN	-	11	42	5	11	7	15	4	17	20	15	10	78	27	-
	1	11	31	11	14	6	14	1	7	17	7	7	65	28	-
	4	18	38	19	13	6	16	2	3	20	27	10	87	36	-
STRJO	7	2	-	4	-	1	24	19	9	22	18	21	1	-	27
	8	5	-	5	-	7	25	22	11	24	23	21	2	-	8
	1	-	-	2	-	-	7	4	4	3	5	6	3	1	18
	8	3	-	3	-	5	48	22	19	40	26	27	3	-	45
TEPIS	17	4	66	19	44	18	58	53	42	35	1	-	-	37	-
TRIMI	4	1	14	10	29	5	15	17	-	-	-	-	-	5	-
YRJIL	-	4	-	-	10	43	42	6	4	-	7	3	7	23	-
ZELZO	-	-	21	-	-	-	20	12	-	17	-	-	-	-	-
Sum	552	643	1196	740	1283	896	1773	1325	963	1453	903	1133	907	852	1305

October	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
ARLRA	-	-	6	18	19	-	-	-	-	-	-	-	14	1	-	2
BERER	-	14	151	164	51	64	30	4	-	-	-	-	-	-	-	39
	-	6	45	54	15	23	10	1	-	-	-	-	-	-	-	11
	-	3	48	21	1	6	8	1	-	-	-	-	-	-	-	14
BIRSZ	8	41	43	67	43	71	43	-	-	-	-	-	-	15	28	9
BOMMA	59	22	11	-	44	8	-	-	-	-	-	-	-	-	-	-
BREMA	28	-	32	37	11	42	12	1	-	26	47	41	3	-	6	5
	25	-	8	26	-	-	-	1	-	16	33	48	2	-	8	27
BRIBE	52	8	37	36	22	89	39	32	-	3	36	42	17	-	6	8
	53	12	43	19	37	107	90	64	11	1	26	62	41	-	16	6
CASFL	25	7	60	55	76	29	76	67	68	14	-	13	-	22	-	-
CRIST	10	2	40	41	120	32	87	132	120	2	-	1	22	45	-	-
	9	12	18	36	82	47	49	84	76	1	-	-	21	31	1	-
	1	-	1	1	149	6	4	15	110	7	-	-	5	7	-	-
CSISZ	1	33	21	58	-	1	8	-	-	-	-	-	-	22	33	-
ELTMA	75	106	53	54	15	120	179	155	91	5	-	-	-	63	2	-
GONRU	7	-	-	-	110	-	-	1	6	-	30	62	74	-	19	-
	9	-	1	31	68	-	-	-	1	-	35	47	69	-	34	-
	4	-	1	30	75	-	83	-	1	-	5	45	55	-	31	4
	5	-	1	29	71	-	-	-	2	-	15	33	45	-	21	-
GOVMI	6	71	64	137	58	14	48	-	-	6	-	-	-	29	57	1
	6	55	31	67	38	3	17	-	-	3	-	-	-	5	31	-
	5	60	47	82	5	-	6	-	-	2	-	-	-	-	39	-
HINWO	51	131	156	83	54	4	-	-	-	-	-	-	-	-	-	-
IGAAN	16	40	53	7	68	46	55	7	-	21	8	-	-	15	39	3
	-	51	82	99	111	68	65	63	3	4	22	-	-	-	12	23
	11	46	67	90	87	79	71	74	-	35	20	-	-	-	-	-
	10	2	11	14	-	4	1	-	-	4	-	-	-	7	14	1
JONKA	-	18	42	44	54	65	59	9	-	31	-	-	-	10	25	7
KACJA	-	-	-	119	-	-	-	5	-	-	-	-	-	-	-	-
	1	11	8	17	-	-	1	-	-	3	-	-	-	2	1	-
	28	153	171	221	167	216	96	90	-	100	-	-	-	-	-	-
	-	-	-	-	10	40	14	4	-	58	-	-	-	-	-	-
KERST	46	46	36	67	47	39	33	29	21	41	32	12	2	1	9	34
KISSZ	6	7	19	23	21	23	28	27	-	9	-	-	-	2	11	4
KOSDE	5	26	-	-	183	-	-	-	-	-	-	-	-	-	-	-
	20	-	-	2	-	-	-	-	-	-	32	26	-	3	-	4
MACMA	-	29	41	37	13	28	-	-	4	3	-	-	-	-	1	18
	-	66	63	76	63	80	-	-	11	3	3	-	2	-	1	46
	-	25	36	39	35	32	-	-	5	4	3	-	6	-	2	24
MARGR	65	50	69	75	86	17	16	9	18	-	-	13	-	-	-	-
MOLSI	21	196	176	56	-	-	-	-	-	11	-	-	-	-	-	-
	6	54	42	9	-	-	-	-	-	4	-	-	-	3	28	-
	109	96	172	183	145	21	-	-	-	131	4	89	127	-	51	33
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	22	26
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8	21
MORJO	28	45	46	43	61	64	34	10	-	38	-	-	-	5	-	-
OCAFR	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
OCHPA	9	-	34	40	38	44	55	43	36	10	-	-	-	-	-	-
OTTMI	56	7	-	79	67	41	-	22	25	41	62	34	45	20	40	19
PERZS	59	94	100	141	177	175	147	-	-	34	-	-	-	-	-	-
PUCRC	63	76	92	9	57	110	135	115	123	3	-	-	24	60	-	-
ROTEC	15	-	-	51	55	4	-	1	-	38	-	5	30	2	-	8
SARAN	3	-	46	65	12	-	-	2	2	19	18	26	18	16	10	16
	3	-	55	59	18	-	56	8	-	45	6	41	48	12	14	27
	2	-	45	54	4	-	-	7	-	20	12	-	25	16	5	28
SCALE	41	53	33	14	7	51	86	75	73	3	-	-	1	22	-	-
SCHHA	50	7	45	39	43	75	85	65	-	-	56	59	9	-	20	56
SLAST	-	-	70	91	44	37	5	1	-	3	-	-	-	-	-	-
STOEN	117	131	89	46	5	181	227	210	178	16	-	6	29	49	1	-
	66	76	74	22	-	141	174	160	118	9	-	1	16	17	1	-
	108	106	77	41	4	167	217	188	150	16	-	3	33	42	3	-
STRJO	18	8	32	22	33	48	8	-	-	7	-	35	26	-	1	3
	35	9	26	25	34	48	9	-	-	7	10	55	19	-	5	5
	14	8	29	10	24	30	5	-	-	5	-	-	7	-	-	2
	45	18	48	35	49	91	11	-	-	14	13	46	23	-	2	5
TEPIS	35	63	63	122	10	112	40	-	-	-	-	-	-	29	41	9
TRIMI	32	29	38	33	41	50	19	43	-	-	-	-	-	4	-	-
YRJIL	14	-	-	6	-	-	31	2	42	70	54	72	6	-	-	11
ZELZO	-	1	23	-	-	-	-	-	-	15	-	-	-	-	-	-
Sum	1596	2230	3071	3371	3037	2893	2572	1827	1295	961	582	917	864	577	699	559