Results of the IMO Video Meteor Network – August 2016

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The favorable observing conditions of the preceding months continued into August. In particular in the last decade we experienced perfect observing conditions at almost every site. Between August 24/25 and 30/31, more than 70 out of 77 cameras were in operation with just two exceptions. Eight cameras managed to observe in August without any break (once more all of them in Italy and Portugal), and 69 cameras managed to observe in twenty or more observing nights.
With over 12,000 hours, the total effective observing was the third best outcome ever, but still it fell 3% short of August 2015. On the other hand, we increased the maximum number of meteors ever recorded in a single month to over 96,000 (+5%).

Highlight of the month was the Perseid meteor shower, which was particularly looked forward in this year. The lunar phase was not optimal, since the waxing moon interfered increasingly night by night, but at least the morning hours remained moon-free. The traditional maximum, which was expected to occur in the afternoon hours UT of August 12, was predicted by M. Maslov and E. Lyytinen to be stronger than usual. The reason was Jupiter, who should have shifted that part of the Perseid trail, which the Earth crossed in 2016, closer to the Earth orbit. In addition, Earth was expected to pass certain dust trails. On August 11 at 22:34 UT Earth would encounter the 1-rev dust trail, leading to slightly higher zenithal hourly rates (+10). At 23:23 UT, an increase of bright meteors was predicted, caused by the 4-rev dust trail. Finally, according to a calculation of J. Vaubaillon, Earth was to pass the densest part of the Perseid stream already in the morning hours of August 12, caused by the 2-rev dust trail.

The above-mentioned dust trails presented indeed a spectacular show to visual observers on August 11/12 with highest Perseid rates since the 1993 outburst. Also, the increase in bright meteors while passing the 4-rev dust trail was clearly noticeable. But how would these dust trails reflect in the IMO network video data?

Figure 1 compares the overall 2016 Perseid maximum from August 7 to 17 (red) with the average of the years 2011 till 2015 (green). On the ascending activity branch, rates were marginally lower than on average, which may be attributed to the missing moon. Between solar longitude 139 and 140°, however, when the Earth passed the dust trails, the rates where clearly higher than average.

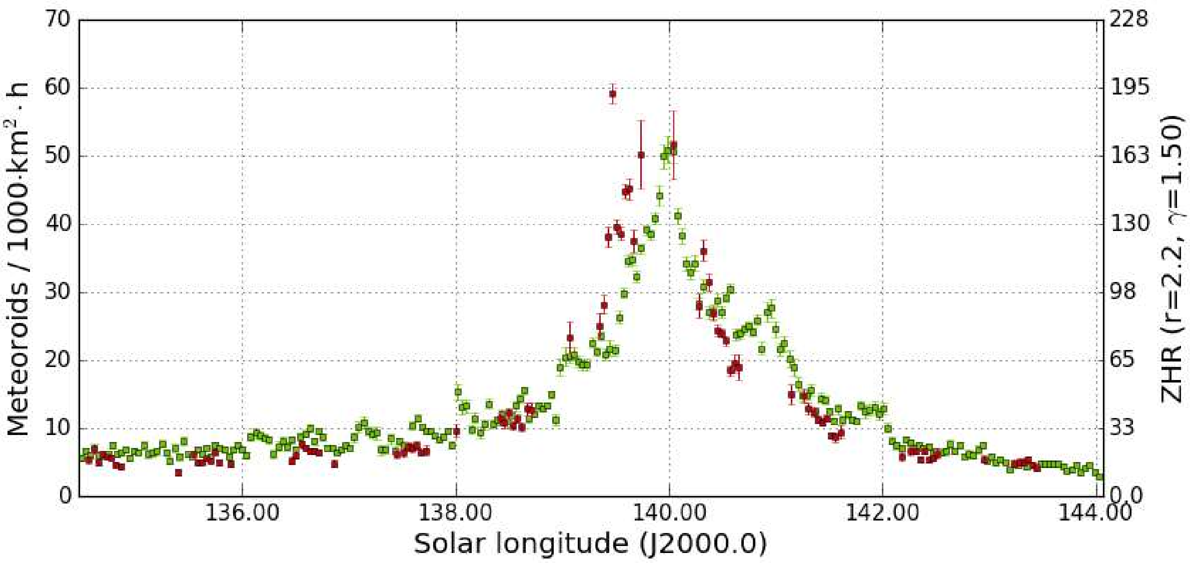

Figure 1: *Comparison of the activity profiles of the Perseids in 2016 (red) with the average of 2011-2015 (green), derived from video observations of the IMO Network.*

In figure 2 we show only the two maximum nights. Also here we see clearly, that the rates on August 11/12 were beyond the average, and we notice certain fine structures in the profile. The following night shows the typical rate decrease.

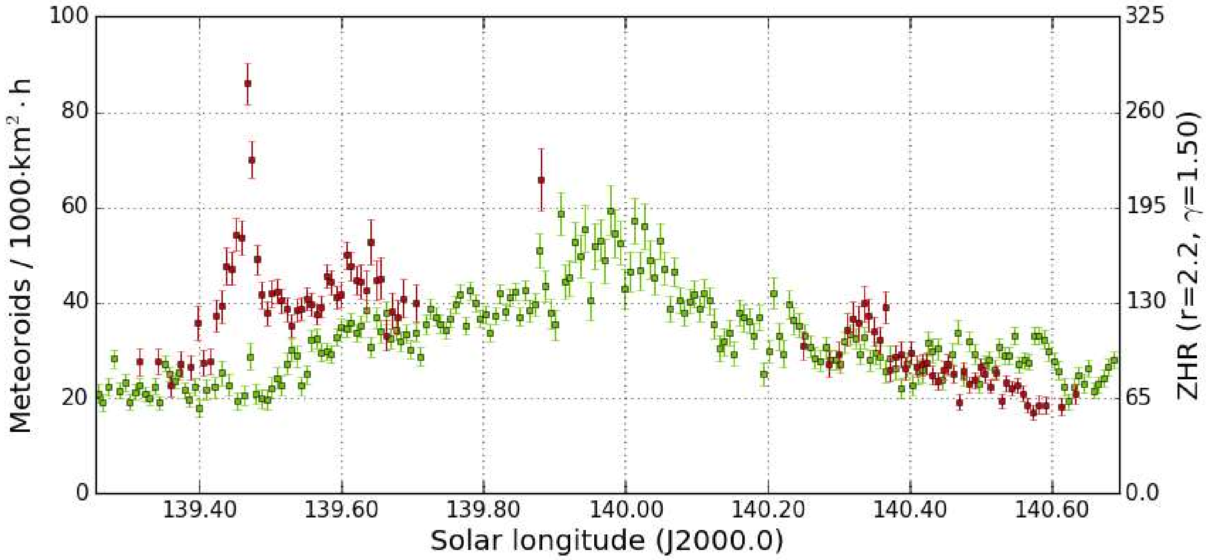

Figure 2: *Comparison of the activity profiles of the Perseid peak in 2016 (red) with the average of 2011-2015 (green), derived from video observations of the IMO Network.*

Figure 3 presents the same solar longitude interval than figure 2, but this time in comparison with visual observation from August 2016, obtained from the live graph at the IMO homepage and scaled accordingly. Both graphs align quite well, but we shall note that the visual observations were processed with a population index of r=2.0 and the video data with r=2.2.

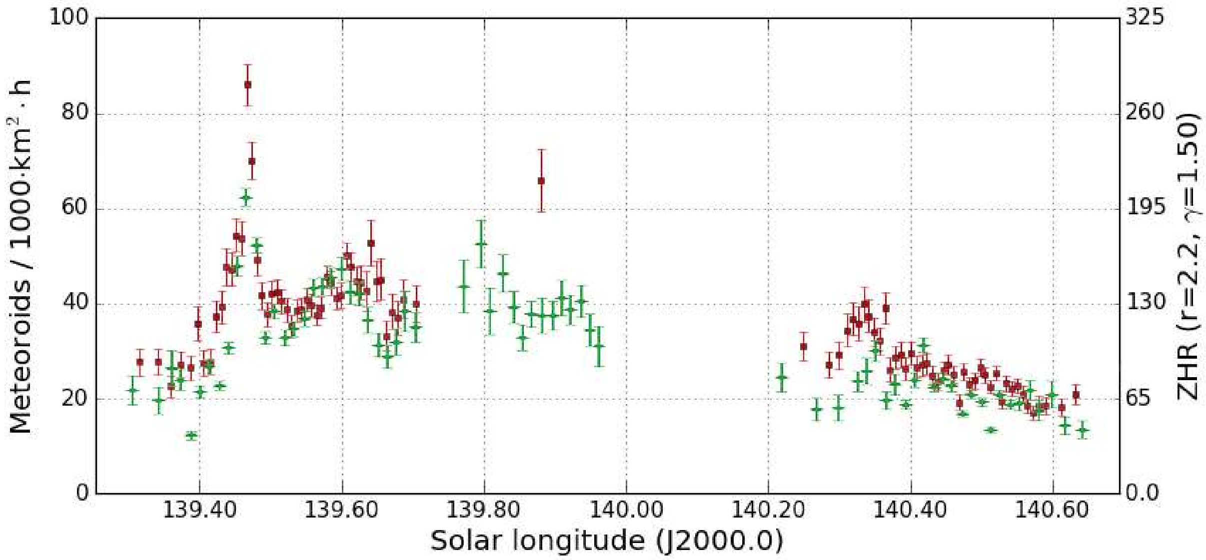

Figure 3: *Comparison of the activity profiles of the Perseid peak in 2016 obtained by video (red) and visual observation of IMO (green).*

The high-resolution display (5 minutes per interval) of August 11/12 (figure 3) shows that rates were generally enhanced between 22:15 and 23:45 UT with an additional peak close near 23:20 UT.

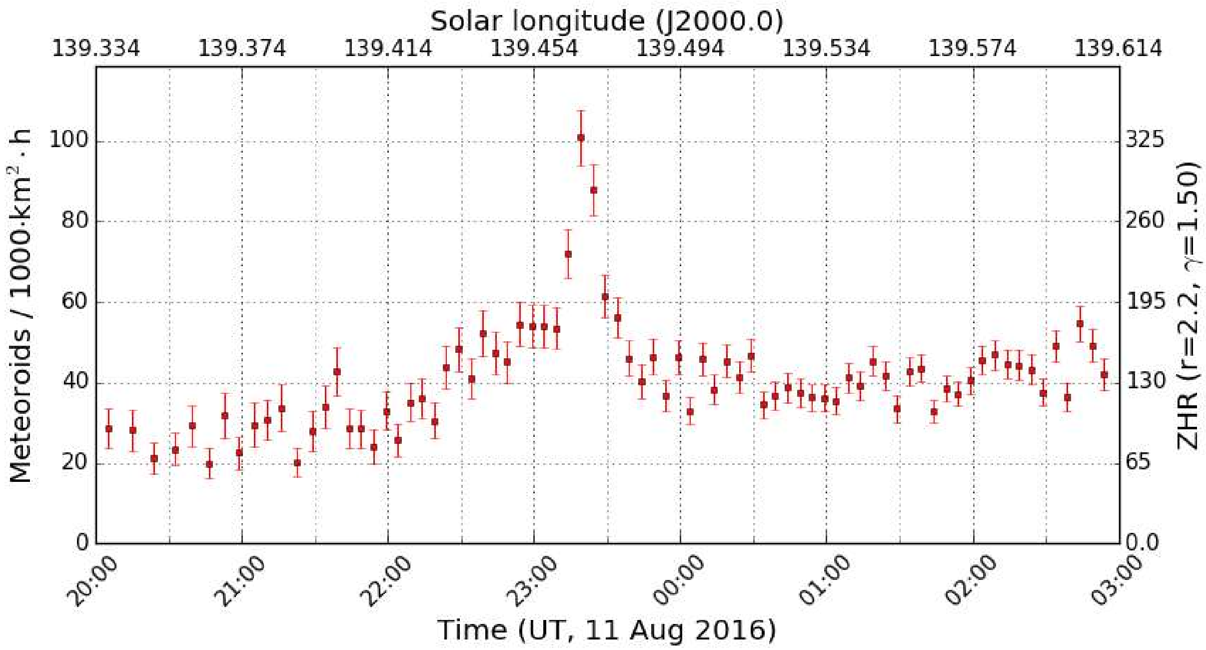

Figure 4: *High resolution activity profiles of the Perseids on August 11/12, 2016.*

We tried to model the flux density profile of figure 4 empirically with three components (figure 5). The background component is approximately linear in this interval with an absolute value of 32 meteoroids per 1,000 km^2 and hour at 23:00 UT and a slope of 80 per degree solar longitude. We add a Gaussian with peak at 149.453° solar longitude (22:58 UT), a peak flux density of 22 meteoroids per 1,000 km^2 and hour and a full width at half maximum (FWHM) of 70 minutes. As third component, we add another Gaussian at 149.467° solar longitude (23:19 UT) with peak flux density of 50 meteoroids per 1,000 km^2 and hour and a FWHM of 10 minutes.

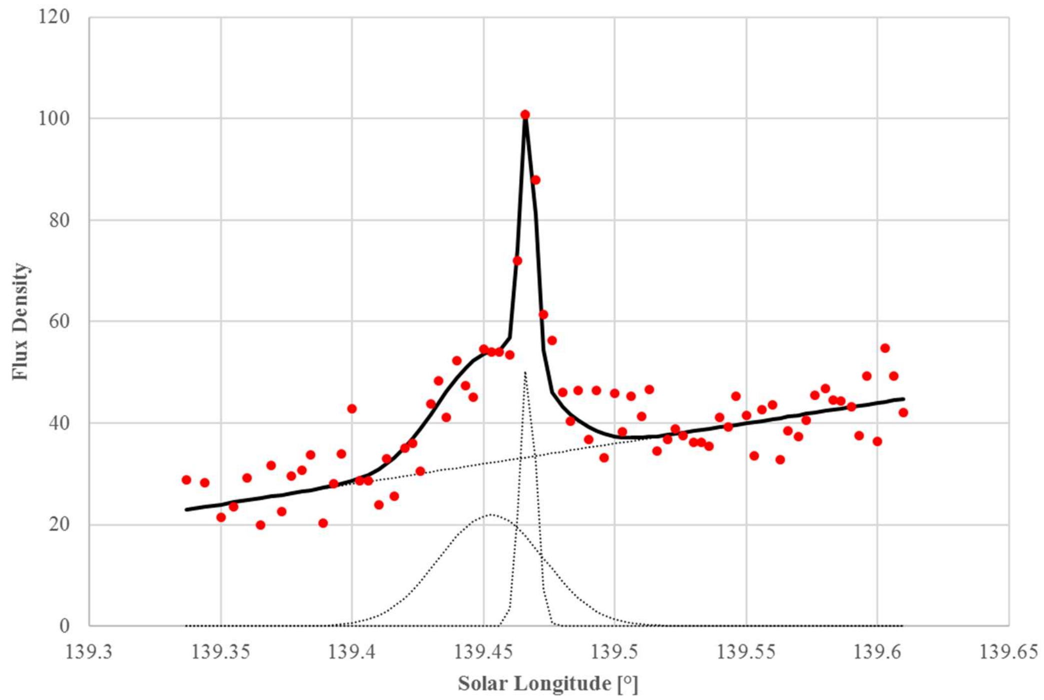

Figure 5: *Modelling of the activity profiles of the Perseids on August 11/12, 2016, (red dots) with a linear component and two Gaussians (dotted black lines). The thick black line represents the profile resulting from all three components.*

The first Gaussian should represent the 1-rev dust trail, which occurred about half an hour later and which was stronger than predicted. It reached 2/3 of the nominal flux density at that time. The second Gaussian can be attributed to the 4-rev dust trail. The peak time matches perfectly to the prediction given the temporal resolution of the analysis (5 minutes). The activity of this dust trail was 50% higher than the activity of the background component.

A closer look a figure 3 hints also at the 2-rev dust trail. After the above-mentioned dust trails, the activity peaks between 139.60 and 139.65° solar longitude (02:40-03:50 UT) and declines slightly thereafter. That alone could also be caused by the fact, that certain cameras had already to pause by then because of dawn. However, also the visual observations peak at 139.60° solar longitude and show a significant drop thereafter. Thus, we may have passed the center of the 2-rev dust trail at about 3:00 UT.

For the sake of completeness, we like to mention than at maximum resolution of 2 minutes per interval, the narrow peak of the 4-rev dust trail shows clear oscillations (figure 6) – an effect that has been observed repeatedly in the past.

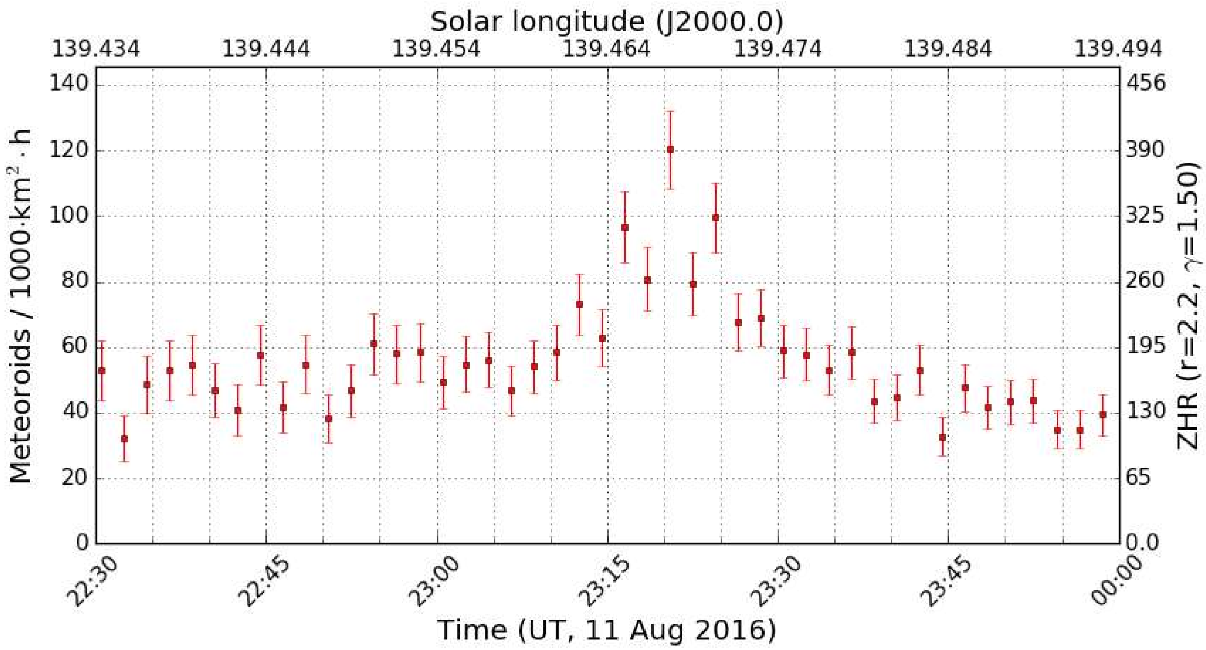

Figure 6: *Activity profiles of the Perseids on August 11/12, 2016, with maximum temporal resolution (two minutes per interval).*

In the end, we want to inspect the population index. Figure 7 shows the r-profile of the Perseids and sporadic meteors between August 7 and 17 (same interval as figure 1). Both curves are nearly parallel with an offset of 0.6, i.e. the population index of the Perseids was an average of 0.6 smaller than the sporadic population index. Since the same fluctuations show up in both profiles, they should primarily be caused by changing observing conditions or cameras. However, we also see that the r-value close to the Perseid peak shows virtually no variation.

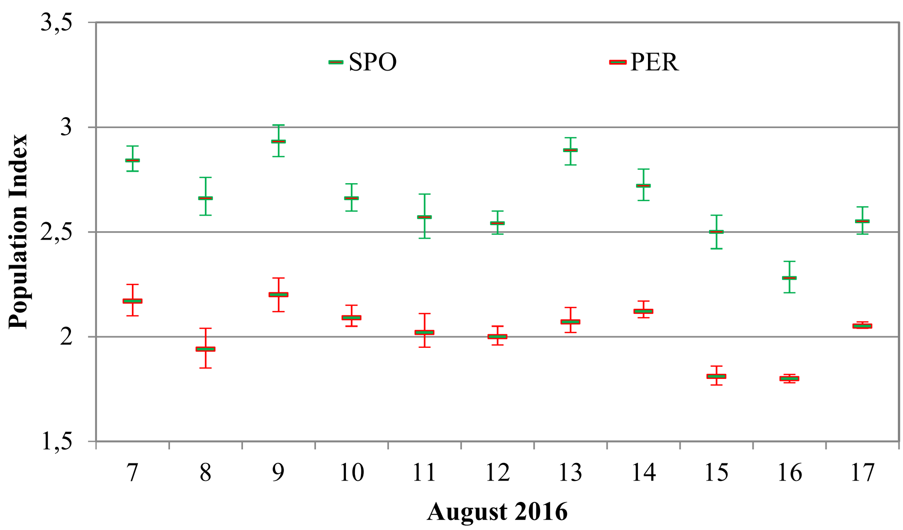

Figure 7: *Population index profile of the Perseids and sporadic meteors in August 2016, derived from video observations of the IMO Network.*

Let's inspect the Perseid population index of August 11/12 in more detail. Figure 8 shows the hourly values between 21:00 and 03:00 UT. The r-value deviates on marginally from 2.0 in that night – only in the interval 23:00-00:00 it is smaller with r=1.8. Thus, our video data confirm both the prediction and the visual impression that the 4-rev dust trail caused brighter meteors.

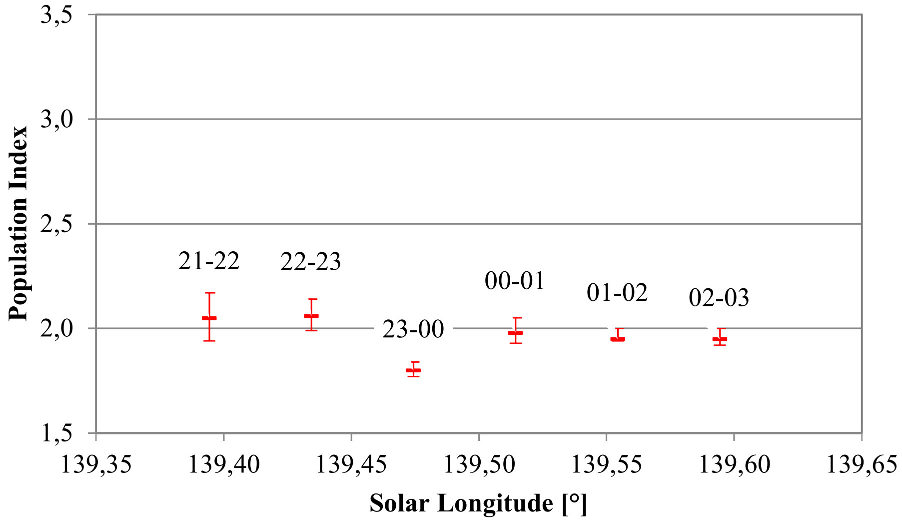

Figure 8: *Population index profile of the Perseids on August 11/12, 2016.*

1. Observers

Code	Name	Place	Camera	FOV [°²]	St.LM [mag]	Eff.CA [km²]	Nights	Time [h]	Meteors
ARLRA	Arlt	Ludwigsfelde/DE	LUDWIG2 (0.8/8)	1475	6.2	3779	27	125.6	1250
BERER	Berkó	Ludanyhalaszi/HU	HULUD1 (0.8/3.8)	5542	4.8	3847	25	149.5	1977
BOMMA	Bombardini	Faenza/IT	MARIO (1.2/4.0)	5794	3.3	739	30	201.8	2408
BREMA	Breukers	Hengelo/NL	MBB3 (0.75/6)	2399	4.2	699	25	141.7	709
BRIBE	Klemt	Herne/DE	HERMINE (0.8/6)	2374	4.2	678	26	147.0	941
		Berg. Gladbach/DE	KLEMOI (0.8/6)	2286	4.6	1080	24	139.8	874
CARMA	Carli	Monte Baldo/IT	BMH2 (1.5/4.5)*	4243	3.0	371	29	169.9	976
CASFL	Castellani	Monte Baldo/IT	BMH1 (0.8/6)	2350	5.0	1611	27	180.9	1236
CRIST	Crivello	Valbrevenna/IT	BILBO (0.8/3.8)	5458	4.2	1772	31	200.1	2415
			C3P8 (0.8/3.8)	5455	4.2	1586	28	173.0	1692
			STG38 (0.8/3.8)	5614	4.4	2007	31	207.8	3175
DONJE	Donati	Faenza/IT	JENNI (1.2/4)	5886	3.9	1222	30	213.0	2868
ELTMA	Eltri	Venezia/IT	MET38 (0.8/3.8)	5631	4.3	2151	29	192.7	1800
FORKE	Förster	Carlsfeld/DE	AKM3 (0.75/6)	2375	5.1	2154	20	121.5	991
GONRU	Goncalves	Foz do Arelho/PT	FARELHO1 (1.0/2.6)	6328	2.8	469	20	117.9	504
		Tomar/PT	TEMPLAR1 (0.8/6)	2179	5.3	1842	31	239.0	1589
			TEMPLAR2 (0.8/6)	2080	5.0	1508	31	241.6	1437
			TEMPLAR3 (0.8/8)	1438	4.3	571	31	216.8	578
			TEMPLAR4 (0.8/3.8)	4475	3.0	442	31	239.8	1834
			TEMPLAR5 (0.75/6)	2312	5.0	2259	31	216.1	1513
GOVMI	Govedic	Sredisce ob Dr./SI	ORION2 (0.8/8)	1447	5.5	1841	27	129.5	841
			ORION3 (0.95/5)	2665	4.9	2069	1	0.2	2
			ORION4 (0.95/5)	2662	4.3	1043	21	81.0	342
HERCA	Hergenrother	Tucson/US	SALSA3 (0.8/3.8)	2336	4.1	544	23	175.4	821
HINWO	Hinz	Schwarzenberg/DE	HINWO1 (0.75/6)	2291	5.1	1819	18	112.5	743
IGAAN	Igaz	Budapest/HU	HUPOL (1.2/4)	3790	3.3	475	27	150.2	341
JONKA	Jonas	Budapest/HU	HUSOR (0.95/4)	2286	3.9	445	26	173.0	830
			HUSOR2 (0.95/3.5)	2465	3.9	715	27	180.0	1000
KACJA	Kac	Kamnik/SI	CVETKA (0.8/3.8)	4914	4.3	1842	17	117.0	1613
		Kostanjevec/SI	METKA (0.8/12)*	715	6.4	640	15	93.2	453
		Ljubljana/SI	ORION1 (0.8/8)	1399	3.8	268	22	138.5	1300
		Kamnik/SI	REZIKA (0.8/6)	2270	4.4	840	17	114.3	1729
			STEFKA (0.8/3.8)	5471	2.8	379	13	82.2	1044
KOSDE	Koschny	Izana Obs./ES	ICC7 (0.85/25)*	714	5.9	1464	30	208.3	1970
		La Palma / ES	ICC9 (0.85/25)*	683	6.7	2951	30	209.1	2756
		Izana Obs./ES	LIC1(2.8/50)*	2255	6.2	5670	28	212.5	2980
		La Palma / ES	LIC2 (3.2/50)*	2199	6.5	7512	30	251.7	3742
LOPAL	Lopes	Lisboa/PT	NASO1 (0.75/6)	2377	3.8	506	29	200.0	523
MACMA	Maciejewski	Chelm/PL	PAV35 (0.8/3.8)	5495	4.0	1584	28	162.2	1725
			PAV36 (0.8/3.8)*	5668	4.0	1573	27	155.8	1819
			PAV43 (0.75/4.5)*	3132	3.1	319	26	132.3	1021
			PAV60 (0.75/4.5)	2250	3.1	281	27	164.5	1501
MARRU	Marques	Lisbon/PT	CAB1 (0.8/3.8)	5291	3.1	467	31	251.1	1972
			RAN1 (1.4/4.5)	4405	4.0	1241	29	225.9	1451
MASMI	Maslov	Novosimbirsk/RU	NOWATEC (0.8/3.8)	5574	3.6	773	27	132.0	1447
MOLSI	Molau	Seysdorf/DE	AVIS2 (1.4/50)*	1230	6.9	6152	26	56.3	548
			ESCIMO2 (0.85/25)	155	8.1	3415	27	157.9	423
			MINCAM1 (0.8/8)	1477	4.9	1084	26	109.5	704
		Ketzür/DE	REMO1 (0.8/8)	1467	6.5	5491	29	144.4	1933
			REMO2 (0.8/8)	1478	6.4	4778	29	144.8	1502
			REMO3 (0.8/8)	1420	5.6	1967	22	119.5	805
			REMO4 (0.8/8)	1478	6.5	5358	30	150.5	1601
MORJO	Morvai	Fülöpszallas/HU	HUFUL (1.4/5)	2522	3.5	532	28	189.1	741
MOSFA	Moschini	Rovereto/IT	ROVER (1.4/4.5)	3896	4.2	1292	20	34.9	250
OTTMI	Otte	Pearl City/US	ORIE1 (1.4/5.7)	3837	3.8	460	23	111.7	303
PERZS	Perkó	Becsehely/HU	HUBEC (0.8/3.8)*	5498	2.9	460	26	145.3	1951
ROTEC	Rothenberg	Berlin/DE	ARMEFA (0.8/6)	2366	4.5	911	22	76.4	348
SARAN	Saraiva	Carnaxide/PT	RO1 (0.75/6)	2362	3.7	381	30	219.2	768
			RO2 (0.75/6)	2381	3.8	459	26	188.7	952
			RO3 (0.8/12)	710	5.2	619	26	193.2	958
			SOFIA (0.8/12)	738	5.3	907	29	181.5	710
SCALE	Scarpa	Alberoni/IT	LEO (1.2/4.5)*	4152	4.5	2052	29	182.1	873
SCHHA	Schremmer	Niederkrüchten/DE	DORAEMON (0.8/3.8)	4900	3.0	409	27	150.8	1131
SLAST	Slavec	Ljubljana/SI	KAYAK1 (1.8/28)	563	6.2	1294	18	88.1	433
			KAYAK2 (0.8/12)	741	5.5	920	24	122.1	268
STOEN	Stomeo	Scorze/IT	MIN38 (0.8/3.8)	5566	4.8	3270	30	191.3	2664
			NOA38 (0.8/3.8)	5609	4.2	1911	30	187.3	2377
			SCO38 (0.8/3.8)	5598	4.8	3306	30	191.3	2763
STRJO	Strunk	Herford/DE	MINCAM2 (0.8/6)	2354	5.4	2751	28	135.3	1183
			MINCAM3 (0.8/6)	2338	5.5	3590	28	122.8	772
			MINCAM4 (1.0/2.6)	9791	2.7	552	27	131.6	255
			MINCAM5 (0.8/6)	2349	5.0	1896	28	123.2	546
			MINCAM6 (0.8/6)	2395	5.1	2178	27	125.6	810
TEPIS	Tepliczky	Agostyan/HU	HUAGO (0.75/4.5)	2427	4.4	1036	27	171.5	832
			HUMOB (0.8/6)	2388	4.8	1607	29	173.4	1275
TRIMI	Triglav	Velenje/SI	SRAKA (0.8/6)*	2222	4.0	546	24	148.1	457
YRJIL	Yrjölä	Kuusankoski/FI	FINEXCAM (0.8/6)	2337	5.5	3574	21	58.8	428
Sum							31	12013.6	96296

* active field of view smaller than video frame

2. Observing Times (h)

August	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
ARLRA	4.5	1.6	0.8	-	3.0	5.5	5.8	-	0.4	5.9	-	1.8	4.4	2.9	5.8
BERER	-	4.3	4.6	7.0	6.5	2.9	7.2	7.2	7.1	1.1	2.6	7.5	6.0	5.0	6.7
BOMMA	5.9	7.1	7.8	7.8	1.5	7.2	7.9	7.9	7.8	3.6	8.1	8.1	8.2	8.3	8.4
BREMA	0.3	-	-	6.4	5.1	6.6	4.1	1.6	-	6.8	-	7.0	1.4	4.5	7.3
BRIBE	-	-	1.9	3.8	3.7	6.8	1.1	2.4	-	7.0	-	6.9	2.0	4.7	7.4
	-	-	-	2.8	6.2	6.5	0.4	0.9	1.7	6.4	-	5.9	5.9	7.0	7.3
CARMA	0.7	7.1	7.5	0.5	6.8	7.6	7.6	6.2	0.2	0.9	8.0	7.9	6.6	7.7	6.2
CASFL	1.9	7.2	7.7	1.6	7.3	7.8	7.9	6.4	-	1.4	8.1	8.3	8.1	8.0	7.1
CRIST	7.4	7.4	7.5	0.9	7.5	7.4	7.6	7.6	5.0	7.7	7.9	7.9	8.0	8.0	7.5
	6.0	7.4	7.4	-	7.5	7.0	7.7	7.7	-	5.9	7.9	7.9	8.0	8.0	6.7
	7.4	7.4	7.5	1.6	7.6	7.6	7.7	7.7	4.7	7.7	7.9	7.9	8.0	8.0	7.5
DONJE	6.9	7.8	7.8	7.8	1.9	7.8	7.8	8.0	7.9	4.1	8.1	8.2	8.3	8.4	8.5
ELTMA	7.5	7.6	7.7	7.3	1.7	7.4	7.8	7.9	4.2	5.5	8.1	8.1	8.2	8.3	5.2
FORKE	4.9	-	-	-	0.7	-	5.3	4.5	-	6.1	-	-	6.7	7.4	3.3
GONRU	6.1	4.0	-	2.1	8.3	8.4	8.4	6.1	7.4	8.5	8.6	8.6	4.3	2.8	4.5
	8.0	8.1	4.0	2.5	8.2	8.2	8.3	8.3	8.4	8.5	8.4	8.4	8.5	7.1	8.3
	8.2	8.2	3.5	2.6	8.3	8.4	8.4	8.1	8.3	8.6	8.6	8.6	8.5	7.2	8.8
	7.6	8.0	2.9	0.9	8.2	8.2	8.3	3.1	8.0	8.3	8.3	8.4	8.4	4.6	8.4
	8.2	8.2	2.8	1.4	8.3	8.4	8.4	8.1	8.2	8.6	8.4	8.6	8.6	7.3	8.6
	7.5	7.9	2.6	1.1	8.1	8.3	8.3	7.5	8.0	8.4	8.4	8.3	8.4	4.3	7.7
GOVMI	2.7	4.1	7.2	7.2	-	3.7	7.4	6.4	-	1.4	5.3	0.8	4.0	7.1	0.5
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2.3	4.1	7.2	7.2	-	3.4	5.6	7.2	3.2	1.8	-	-	-	-	-
HERCA	-	-	-	-	-	5.9	4.3	8.1	7.2	8.0	2.8	9.3	9.1	7.2	9.5
HINWO	-	-	-	-	-	-	-	-	-	6.0	-	-	6.4	7.5	5.1
IGAAN	-	4.7	4.5	6.0	-	5.6	7.2	7.3	5.2	1.3	6.4	2.0	7.6	6.7	4.4
JONKA	-	5.4	6.9	7.3	2.2	6.8	7.0	7.6	7.3	-	7.6	3.9	7.9	7.0	3.6
	-	6.2	6.9	7.3	2.8	7.1	7.5	7.5	7.3	-	7.7	3.7	7.8	7.7	1.4
KACJA	2.7	6.8	7.3	7.5	-	7.5	7.4	7.6	-	-	7.7	4.7	7.8	1.8	-
	-	0.7	6.3	6.4	-	6.5	7.5	7.5	-	-	7.7	2.0	7.2	-	-
	-	6.8	7.6	6.2	-	7.6	7.8	6.0	-	-	8.0	5.6	8.1	3.0	2.2
	2.7	7.2	7.5	7.4	-	7.7	7.7	7.7	-	-	7.8	3.9	7.8	0.7	-
	1.9	6.5	7.4	7.6	-	7.5	7.6	7.7	-	-	7.7	4.0	8.0	1.6	-
KOSDE	8.1	8.5	8.5	8.1	5.9	6.6	8.6	1.9	8.5	8.2	8.7	8.8	8.8	8.5	8.9
	8.4	8.5	8.5	8.5	8.5	7.4	8.6	8.6	8.6	8.7	8.7	8.7	7.6	7.3	6.3
	-	8.6	8.7	9.0	6.3	6.7	8.8	2.2	8.9	7.2	8.7	8.5	8.9	8.1	9.0
	8.5	8.5	8.5	8.5	8.6	7.4	8.6	8.7	8.7	8.8	8.8	8.8	8.3	7.3	6.3
LOPAL	8.2	8.1	4.6	6.3	8.5	7.6	7.9	5.1	4.4	6.4	8.7	7.5	5.5	8.5	8.7
MACMA	4.6	3.1	5.7	6.1	6.6	-	6.9	6.8	0.5	-	5.6	7.2	5.6	5.0	2.5
	4.6	1.2	5.7	6.1	-	-	7.0	6.8	0.2	-	6.1	7.6	5.5	4.2	3.3
	-	1.8	3.3	4.9	6.0	-	6.8	5.7	-	-	5.5	7.3	3.8	1.9	1.4
	3.8	1.9	5.1	5.9	6.8	-	6.9	6.8	-	-	6.1	7.2	5.4	4.4	3.8
MARRU	8.1	8.2	8.2	8.3	8.2	8.3	8.4	8.3	7.1	8.5	8.5	8.5	8.6	8.6	8.7
	8.2	8.2	-	7.1	8.3	8.4	8.1	8.0	3.6	8.3	8.3	8.3	6.8	7.6	7.6
MASMI	4.4	4.9	5.0	5.1	5.2	5.1	-	1.5	5.6	2.4	5.0	5.9	6.0	4.4	5.0
MOLSI	0.9	2.2	3.0	0.5	2.5	3.1	1.1	3.4	-	1.9	0.7	0.4	1.1	0.3	2.9
	6.4	-	6.8	-	4.1	6.4	7.1	3.0	2.4	2.8	0.8	-	7.5	7.2	7.6
	5.3	0.6	6.4	-	-	6.0	6.6	3.3	1.3	2.3	0.9	-	6.7	5.0	6.5
	4.9	1.3	1.1	-	2.9	6.1	3.4	4.3	5.7	6.6	-	3.4	2.9	3.7	5.2
	5.1	1.6	-	0.2	3.3	6.5	3.4	4.4	5.8	6.7	-	3.6	2.6	3.8	5.7
	-	-	-	-	-	-	-	-	4.6	6.8	-	3.4	3.3	4.1	5.9
	5.1	1.4	0.7	0.3	3.4	6.6	3.4	4.1	5.8	6.9	-	3.6	2.9	4.3	6.1
MORJO	-	7.1	7.3	7.3	5.2	3.1	7.5	7.4	5.6	1.7	7.6	5.7	7.9	7.8	4.2
MOSFA	0.5	2.0	2.7	0.2	3.0	3.5	-	3.5	-	1.1	-	-	-	-	-
OTTMI	6.0	7.9	-	8.0	8.1	3.0	4.9	8.2	8.2	-	0.6	-	-	0.6	2.8
PERZS	2.8	3.9	7.4	-	-	5.1	7.5	7.6	4.8	0.7	7.7	0.5	7.7	7.6	-
ROTEC	2.3	0.7	-	-	-	5.3	3.2	0.6	0.9	5.5	-	0.9	0.2	0.8	6.0
SARAN	8.3	8.5	5.2	8.5	8.6	6.5	8.4	7.5	6.3	8.4	8.9	7.7	7.5	8.0	8.3
	8.3	8.4	4.6	8.4	8.4	8.5	5.2	8.5	6.6	8.6	8.8	8.8	-	8.9	4.6
	8.1	8.2	7.0	8.4	8.3	8.4	5.1	8.2	6.2	8.4	8.6	8.7	-	8.4	4.5
	8.2	8.4	5.0	8.4	8.5	2.6	5.0	4.0	4.6	5.3	7.9	5.4	4.9	3.0	3.1
SCALE	6.6	7.1	7.6	7.1	1.1	6.9	7.7	7.8	2.0	3.2	6.5	8.0	8.0	8.1	2.9
SCHHA	-	-	3.4	6.3	6.0	6.9	3.0	1.8	1.4	3.2	-	7.4	6.1	3.9	7.6
SLAST	0.3	4.7	4.8	-	-	-	-	-	-	-	-	-	5.0	1.9	1.6
	0.8	6.4	5.1	7.4	-	2.6	7.5	-	-	-	6.9	2.5	7.4	3.1	1.9
STOEN	6.8	7.5	7.6	6.7	2.3	5.8	7.9	7.9	1.6	1.9	5.9	8.2	8.1	8.2	5.0
	6.6	6.4	7.6	6.6	2.2	5.4	7.8	7.9	0.5	0.8	5.9	8.2	8.3	8.3	4.9
	6.1	6.5	7.6	6.5	2.7	5.9	8.0	8.0	0.7	1.2	5.7	8.2	8.3	8.1	4.8
STRJO	2.3	-	2.0	4.5	3.5	6.2	1.5	3.6	0.4	1.0	-	5.5	2.3	0.5	6.9
	1.6	-	1.5	3.2	2.5	1.2	0.9	0.9	0.5	1.6	-	5.8	1.1	1.3	3.9
	1.6	-	1.7	3.2	3.5	6.3	1.1	2.2	0.4	3.2	-	5.8	0.5	1.5	6.9
	1.9	-	1.6	2.1	3.3	4.5	1.1	3.1	0.2	6.7	-	5.6	1.3	1.8	6.2
	0.7	-	1.8	3.3	3.4	6.1	1.4	2.9	-	6.7	-	2.8	1.1	1.7	5.0
TEPIS	2.6	4.2	7.0	7.0	0.7	7.2	7.2	7.3	5.6	4.4	7.5	-	7.6	7.2	6.7
	3.0	3.9	7.0	7.0	0.4	7.2	7.2	7.3	6.3	5.3	7.4	0.3	7.6	7.0	6.6
TRIMI	1.8	4.7	7.4	7.5	-	7.6	7.6	7.7	-	1.6	7.8	2.4	8.0	1.0	2.7
YRJIL	-	0.9	3.0	2.2	-	-	2.7	2.2	1.8	-	4.1	2.7	-	1.0	-
Sum	293.1	347.8	358.5	342.9	298.2	425.3	444.0	416.8	263.8	312.5	385.0	404.0	434.9	393.7	386.4

August	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
ARLRA	6.2	6.2	4.6	2.1	-	6.0	1.0	5.5	7.0	7.2	7.2	7.4	1.6	6.5	7.3	7.4
BERER	-	-	1.1	7.7	6.7	-	-	7.8	6.5	5.8	7.4	8.3	8.3	-	5.6	8.6
BOMMA	3.3	3.2	1.8	4.8	2.8	-	8.7	8.8	8.8	9.0	8.9	9.1	9.0	7.0	1.9	9.1
BREMA	7.4	7.4	7.5	-	3.0	2.8	3.3	7.9	7.9	8.0	6.9	-	5.8	8.3	8.4	6.0
BRIBE	7.5	7.5	6.4	-	3.4	1.5	7.9	8.0	8.1	8.1	8.1	1.7	6.9	7.3	8.5	8.4
	7.4	7.4	-	-	4.2	0.9	7.8	7.9	8.0	8.0	8.1	6.2	6.9	7.6	8.4	-
CARMA	5.3	2.5	-	-	0.2	8.5	8.5	8.6	8.6	8.6	8.7	8.7	8.9	1.5	2.0	7.8
CASFL	4.9	3.0	-	1.0	-	8.4	8.7	8.8	8.8	8.8	8.9	9.0	9.2	-	3.5	9.1
CRIST	2.3	3.5	0.2	4.5	2.8	7.6	8.5	8.5	8.6	8.6	8.7	8.7	8.8	2.8	1.8	8.9
	0.2	1.4	0.2	3.8	1.9	8.3	8.4	8.5	8.5	8.6	-	8.7	7.6	2.2	0.6	9.0
	4.4	4.5	0.7	5.7	3.2	7.6	8.3	8.5	8.6	8.6	8.7	8.7	8.8	3.3	3.1	8.9
DONJE	3.9	3.4	2.9	6.7	4.1	-	8.7	8.8	8.8	8.9	8.9	9.1	9.0	8.6	2.6	9.3
ELTMA	4.0	1.4	0.8	2.9	-	-	8.7	8.2	8.1	8.4	7.8	8.8	8.5	5.1	8.2	9.3
FORKE	6.4	7.6	7.8	2.2	-	-	-	7.5	7.9	7.9	7.9	7.9	-	3.2	8.0	8.3
GONRU	1.0	6.2	4.4	1.2	9.0	8.0	-	-	-	-	-	-	-	-	-	-
	4.8	8.4	7.8	5.7	8.7	8.7	8.6	3.9	8.9	6.0	8.5	9.2	9.1	9.2	9.0	9.3
	5.1	8.6	8.1	4.7	8.9	9.0	9.1	4.3	9.1	6.2	8.7	9.3	9.3	9.4	9.2	8.3
	5.1	8.4	7.7	5.1	8.8	8.7	8.8	3.6	8.9	3.8	8.3	9.1	9.1	6.0	6.0	7.8
	5.3	8.6	7.8	6.1	8.7	8.9	9.0	3.6	9.1	5.6	8.6	9.3	9.3	9.4	9.1	9.3
	3.6	7.8	7.0	3.9	8.6	8.7	8.7	3.4	8.4	3.7	8.2	9.0	9.1	6.7	7.0	7.5
GOVMI	1.4	2.2	0.7	5.7	1.1	-	0.9	6.2	7.4	7.7	8.4	4.8	8.5	-	8.4	8.3
	-	-	-	-	-	-	-	-	-	-	-	0.2	-	-	-	-
	-	-	0.5	0.6	0.2	-	0.2	1.9	6.9	8.2	8.3	0.9	6.7	-	1.6	3.0
HERCA	8.7	-	-	7.7	6.8	6.7	8.5	-	9.7	7.9	3.0	7.7	8.3	9.3	9.7	10.0
HINWO	6.0	6.9	7.6	3.5	-	3.6	2.3	8.0	8.2	8.2	8.3	8.4	-	1.9	8.6	6.0
IGAAN	-	5.5	3.3	7.3	7.5	-	1.2	8.1	5.2	8.2	8.3	8.3	0.8	4.9	4.1	8.6
JONKA	2.4	7.6	-	6.4	8.2	-	-	8.4	5.0	8.6	8.6	8.7	8.7	7.0	4.0	8.9
	2.9	8.0	2.3	6.2	8.1	-	-	8.4	6.5	8.5	8.6	8.7	8.7	7.6	5.7	8.9
KACJA	-	-	-	-	-	-	-	-	-	7.8	8.6	8.5	7.5	-	7.9	7.9
	-	-	-	-	-	-	-	-	5.9	7.7	6.6	7.9	6.5	-	-	6.8
	1.9	-	-	2.0	-	-	6.1	5.9	8.7	8.7	8.8	8.8	7.1	-	3.4	8.2
	-	-	-	-	-	-	-	-	-	7.8	8.7	8.5	7.6	-	6.0	7.6
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.7	8.0
KOSDE	5.1	0.6	5.2	7.0	7.0	4.7	9.1	9.1	8.4	7.9	6.3	1.8	3.5	-	7.5	8.5
	4.6	2.7	2.8	3.7	4.1	3.6	4.0	5.3	6.0	7.0	8.0	7.7	8.9	-	9.3	8.5
	9.2	-	7.4	7.0	8.0	5.7	9.3	9.5	8.9	9.0	6.0	2.4	4.0	-	7.3	9.2
	5.4	4.4	9.0	9.0	9.0	8.6	9.1	9.1	9.2	9.2	9.2	8.6	8.9	-	9.3	9.4
LOPAL	-	7.5	5.9	4.9	9.0	8.9	8.9	1.0	7.2	7.3	4.4	9.2	-	9.1	3.3	7.4
MACMA	3.3	6.1	4.6	7.7	7.8	3.2	-	3.2	8.1	8.2	8.2	8.3	8.4	1.8	8.5	8.6
	2.6	6.1	5.0	7.8	7.9	4.5	-	2.8	8.2	8.2	8.3	8.4	8.5	1.9	8.6	8.7
	1.0	6.0	4.1	7.6	5.1	1.3	-	2.1	8.0	8.2	8.1	7.6	7.8	0.6	7.9	8.5
	3.4	6.3	5.6	7.7	7.8	6.2	-	3.3	8.1	8.2	8.2	8.3	8.4	1.8	8.5	8.6
MARRU	8.4	8.7	8.6	5.2	8.7	8.2	8.8	5.7	8.8	5.8	8.8	8.9	8.9	6.2	8.0	8.9
	5.7	8.5	5.3	7.1	8.7	8.9	9.1	2.3	9.0	8.5	9.0	9.2	9.2	9.3	-	9.3
MASMI	5.5	5.9	-	3.8	6.1	0.6	2.8	-	7.0	7.1	5.6	3.4	-	7.1	4.7	6.9
MOLSI	4.1	2.3	0.5	-	-	1.0	-	-	0.9	0.6	2.4	0.4	1.7	2.5	7.8	8.1
	4.4	7.7	0.9	1.8	-	6.7	7.6	8.1	8.2	8.2	8.3	8.4	6.3	2.1	8.5	8.6
	1.9	5.9	-	1.2	-	5.3	5.8	0.5	0.7	3.1	7.5	7.4	4.3	1.5	6.0	7.5
	6.7	7.0	4.1	2.6	1.3	5.5	1.1	7.3	7.5	7.7	7.1	7.8	3.0	8.0	8.1	8.1
	6.6	7.1	3.6	2.0	0.7	5.4	0.9	7.4	7.7	7.8	7.3	8.0	2.9	8.2	8.2	8.3
	7.1	5.4	4.5	3.1	1.7	6.1	1.0	7.8	7.1	8.0	7.4	7.3	2.6	8.0	6.5	7.8
	7.1	7.4	3.7	2.2	1.6	5.8	1.2	7.7	7.9	8.0	7.4	8.1	2.8	8.2	8.4	8.4
MORJO	4.9	6.2	5.3	3.8	8.1	-	-	8.4	8.4	8.5	8.6	8.6	8.7	7.6	7.8	8.8
MOSFA	1.6	0.5	-	0.3	-	1.9	2.6	2.2	2.0	1.4	2.8	1.4	1.4	-	-	0.3
OTTMI	3.5	0.3	0.3	8.4	-	7.6	-	-	4.4	0.3	6.0	3.3	-	3.0	8.9	7.4
PERZS	-	0.9	0.8	7.2	2.6	-	0.4	8.3	8.4	8.5	8.5	8.6	8.7	1.3	8.8	9.0
ROTEC	6.1	6.2	-	-	-	2.9	-	1.5	6.7	4.7	2.8	1.8	-	5.1	5.0	7.2
SARAN	1.7	6.0	3.5	-	6.7	7.6	6.5	2.6	9.1	9.1	9.2	9.0	8.9	9.0	4.4	9.3
	2.2	8.5	5.1	-	9.1	6.7	-	-	-	8.4	9.2	9.1	8.6	7.9	3.1	4.2
	2.8	8.3	5.1	-	8.9	6.5	-	-	-	9.1	9.0	8.8	8.5	9.0	5.6	5.1
	1.8	1.3	-	-	8.9	8.9	8.8	2.0	9.2	9.4	9.3	9.0	8.8	7.3	3.6	8.9
SCALE	4.1	1.7	-	3.1	-	3.6	8.6	8.1	7.9	8.7	8.3	8.8	8.2	3.3	8.1	9.0
SCHHA	7.8	7.4	7.0	-	2.1	3.1	8.1	2.0	6.6	8.1	7.9	5.4	7.2	4.9	8.5	7.7
SLAST	0.3	-	-	0.4	-	-	7.3	6.6	8.1	8.2	8.2	8.2	8.2	1.8	4.8	7.7
	2.5	0.7	1.0	2.8	-	-	7.6	8.1	8.0	8.2	8.2	8.3	1.5	-	5.6	8.0
STOEN	5.2	2.0	0.9	4.9	-	4.9	8.7	8.7	7.6	8.7	8.9	8.9	9.0	4.1	8.3	9.1
	6.1	1.7	0.3	4.2	-	5.6	8.6	8.8	7.7	8.9	8.9	8.9	9.0	2.9	9.0	9.3
	6.2	3.0	1.3	4.9	-	5.9	8.8	8.8	7.8	8.9	9.0	9.0	9.0	2.2	8.4	9.3
STRJO	7.4	7.5	7.4	-	4.7	1.1	1.5	7.8	8.0	6.5	5.7	5.2	7.4	8.0	8.4	8.5
	7.4	7.5	7.4	-	5.6	0.9	3.3	7.9	7.9	7.8	7.5	5.2	4.1	7.6	8.4	8.3
	7.4	7.4	7.5	-	5.5	0.9	3.6	7.9	8.0	8.1	8.1	5.1	7.8	8.0	8.4	-
	7.4	7.3	7.3	-	4.6	0.8	3.2	7.8	7.8	2.8	7.5	5.2	2.4	7.8	8.3	3.6
	7.4	7.5	7.5	-	5.1	1.1	3.4	7.8	7.9	8.1	4.8	3.3	6.1	7.8	2.5	8.4
TEPIS	-	7.8	1.0	7.4	6.7	-	1.9	8.2	6.4	8.3	8.4	8.4	-	7.5	8.6	8.7
	-	7.7	1.2	7.0	6.4	0.2	4.2	-	4.9	7.9	8.4	8.4	8.5	7.8	8.6	8.7
TRIMI	-	-	-	4.2	-	-	8.4	8.0	5.1	8.3	8.7	8.8	8.8	4.6	6.4	9.0
YRJIL	-	3.1	-	2.7	5.5	1.2	-	5.1	5.6	0.4	2.7	2.7	0.4	-	5.3	3.5
Sum	297.3	353.3	241.9	260.2	301.9	285.5	336.1	407.8	522.5	544.4	558.8	530.2	466.9	339.6	477.5	582.8

3. Results (Meteors)

August	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
ARLRA	48	14	2	-	12	56	75	-	2	117	-	16	25	16	54
BERER	-	25	52	117	48	73	111	136	108	4	40	463	87	39	100
BOMMA	60	72	81	96	11	99	95	105	84	42	403	316	192	104	104
BREMA	1	-	-	25	17	48	12	3	-	65	-	123	9	33	35
BRIBE	-	-	11	30	17	61	6	14	-	71	-	155	24	27	52
	-	-	-	18	29	57	2	3	5	65	-	146	51	52	49
CARMA	3	23	39	3	42	59	47	46	1	7	212	128	67	36	20
CASFL	5	35	39	4	46	65	78	42	-	12	186	145	96	51	41
CRIST	73	59	76	3	86	82	121	119	45	143	498	311	146	103	55
	51	38	63	-	62	70	75	76	-	57	338	254	123	85	41
	101	111	102	8	139	133	151	134	44	182	483	354	169	145	80
DONJE	82	69	105	99	5	113	108	121	107	62	451	352	195	152	120
ELTMA	51	48	53	61	8	79	93	93	37	56	301	301	135	92	42
FORKE	55	-	-	-	2	-	82	33	-	79	-	-	79	92	15
GONRU	20	13	-	5	27	30	38	16	25	56	136	63	10	7	10
	76	63	14	10	75	79	67	38	55	77	200	107	64	35	39
	61	60	17	12	69	67	77	19	56	67	248	102	51	19	49
	25	20	6	1	25	33	37	8	28	29	111	40	32	2	18
	68	68	16	6	70	84	99	35	55	124	383	141	81	33	59
	55	55	18	4	85	96	95	10	65	126	280	98	91	7	38
GOVMI	16	13	65	57	-	13	53	59	-	9	127	14	77	50	3
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	9	12	41	41	-	11	42	44	13	12	-	-	-	-	-
HERCA	-	-	-	-	-	33	24	30	19	40	6	177	80	48	41
HINWO	-	-	-	-	-	-	-	-	-	55	-	-	70	74	36
IGAAN	-	7	11	17	-	13	17	21	23	5	63	11	34	18	9
JONKA	-	20	26	26	6	33	45	57	31	-	231	37	56	36	16
	-	26	31	47	7	42	50	63	60	-	261	36	90	51	9
KACJA	12	72	104	97	-	122	133	124	-	-	356	79	195	10	-
	-	2	34	32	-	12	43	26	-	-	113	16	48	-	-
	-	39	78	61	-	76	70	68	-	-	267	83	133	29	36
	33	71	119	110	-	136	131	131	-	-	361	57	134	6	-
	10	48	83	65	-	81	83	90	-	-	308	49	148	7	-
KOSDE	79	98	71	60	21	20	84	8	55	79	173	137	118	106	115
	134	146	108	103	80	89	149	108	85	111	186	176	146	110	101
	-	177	156	124	48	65	165	15	98	125	349	236	181	154	110
	180	148	152	113	110	127	166	167	80	141	310	233	180	115	106
LOPAL	23	18	9	19	21	20	21	12	11	29	98	44	35	23	22
MACMA	34	11	49	67	70	-	121	77	2	-	211	257	71	18	9
	40	4	44	67	-	-	111	85	1	-	355	353	74	27	23
	-	10	16	29	31	-	64	34	-	-	232	235	38	14	10
	8	9	23	51	57	-	87	57	-	-	222	227	64	26	20
MARRU	97	51	101	75	91	97	85	36	62	118	271	150	100	71	54
	66	66	-	32	63	69	52	34	36	77	234	116	76	53	61
MASMI	44	68	45	52	63	57	-	13	82	16	132	265	122	42	45
MOLSI	10	7	32	2	7	34	14	30	-	10	2	1	17	2	21
	13	-	44	-	9	24	23	7	3	4	1	-	30	12	25
	39	3	69	-	-	55	66	17	6	14	3	-	95	23	44
	81	5	4	-	51	112	41	85	106	164	-	85	27	37	45
	73	4	-	1	47	80	34	59	102	150	-	60	15	27	50
	-	-	-	-	-	-	-	-	50	97	-	54	20	26	32
	76	3	2	3	43	75	45	86	96	140	-	58	13	31	38
MORJO	-	21	35	40	11	6	47	49	13	7	164	45	43	46	14
MOSFA	4	13	17	1	26	29	-	27	-	15	-	-	-	-	-
OTTMI	13	19	-	23	27	16	13	18	43	-	4	-	-	4	12
PERZS	31	25	112	-	-	38	117	153	44	6	549	4	193	110	-
ROTEC	11	4	-	-	-	29	16	2	1	55	-	1	1	19	26
SARAN	40	24	21	31	35	36	28	11	23	47	136	42	44	15	35
	39	44	28	50	37	55	21	28	34	60	161	97	-	36	14
	47	54	50	58	33	34	12	19	33	53	113	67	-	26	14
	31	39	28	37	32	23	29	7	22	22	115	42	36	9	26
SCALE	21	19	27	32	5	45	45	42	10	15	144	140	69	48	18
SCHHA	-	-	19	50	41	79	33	10	3	44	-	272	62	28	67
SLAST	3	40	37	-	-	-	-	-	-	-	-	-	91	16	11
	1	6	12	20	-	5	19	-	-	-	67	17	30	2	3
STOEN	66	78	92	70	14	128	131	134	14	17	319	349	207	148	56
	73	50	64	79	11	106	132	138	5	10	299	351	209	124	47
	63	63	83	83	25	118	140	144	5	8	292	406	227	148	55
STRJO	7	-	27	32	18	98	10	21	2	14	-	172	23	2	63
	7	-	15	29	18	7	4	2	2	10	-	145	6	5	21
	5	-	6	6	7	21	5	7	1	10	-	33	3	3	19
	4	-	9	9	9	32	10	8	2	63	-	104	11	4	24
	3	-	11	13	16	77	9	23	-	103	-	89	8	9	38
TEPIS	14	16	42	41	1	49	43	41	23	23	228	-	35	30	26
	19	25	67	63	1	66	54	73	39	47	257	4	76	61	49
TRIMI	8	6	17	14	-	25	27	26	-	2	110	14	44	3	5
YRJIL	-	7	28	6	-	-	13	9	14	-	146	56	-	4	-
Sum	2422	2464	3058	2640	2067	4002	4446	3686	2071	3468	12246	9311	5632	3276	2745

August	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
ARLRA	73	56	16	3	-	54	1	38	90	79	81	87	3	68	84	80
BERER	-	-	4	45	35	-	-	79	39	75	56	66	71	-	31	73
BOMMA	15	25	15	17	9	-	49	52	73	50	59	52	49	30	8	41
BREMA	41	37	32	-	19	4	3	33	36	37	9	-	27	30	21	9
BRIBE	45	45	23	-	21	8	41	44	56	45	15	3	32	31	35	29
	50	38	-	-	18	2	39	44	47	49	27	9	20	29	25	-
CARMA	33	4	-	-	1	26	32	21	16	22	30	23	15	1	5	14
CASFL	33	16	-	3	-	39	36	41	38	28	38	45	35	-	14	25
CRIST	10	9	2	13	13	41	41	57	44	54	53	51	52	2	8	45
	2	7	1	19	5	42	59	38	52	43	-	35	22	3	2	29
	36	18	4	44	13	63	75	83	81	102	82	74	76	4	15	69
DONJE	14	20	13	47	8	-	60	86	82	67	68	65	77	43	9	68
ELTMA	18	12	7	8	-	-	29	36	47	32	26	31	25	8	36	35
FORKE	52	60	63	10	-	-	-	47	54	55	46	55	-	10	52	50
GONRU	5	14	5	5	13	6	-	-	-	-	-	-	-	-	-	-
	28	39	31	28	42	47	42	8	22	26	44	45	67	56	20	45
	24	26	32	21	34	39	26	8	34	24	24	49	40	34	22	26
	2	15	13	10	14	11	18	4	11	7	10	14	19	5	5	5
	29	31	26	20	39	53	36	9	35	13	32	42	51	43	21	32
	17	23	27	28	35	42	26	9	14	10	27	47	31	14	18	22
GOVMI	2	15	5	5	7	-	9	26	29	23	37	20	36	-	35	36
	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-
	-	-	3	4	1	-	1	13	9	19	10	6	18	-	11	22
HERCA	32	-	-	28	25	18	35	-	17	21	4	16	25	27	39	36
HINWO	31	53	41	8	-	12	8	50	64	49	51	55	-	4	49	33
IGAAN	-	5	6	12	6	-	3	9	7	10	6	7	2	2	3	14
JONKA	7	16	-	11	16	-	-	18	19	22	22	19	20	11	7	22
	6	19	5	13	12	-	-	21	21	20	21	15	21	14	14	25
KACJA	-	-	-	-	-	-	-	-	-	53	53	37	57	-	44	65
	-	-	-	-	-	-	-	-	17	19	27	16	27	-	-	21
	7	-	-	6	-	-	28	36	60	49	41	35	30	-	22	46
	-	-	-	-	-	-	-	-	-	82	98	65	74	-	28	93
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	35	37
KOSDE	32	7	23	63	53	41	76	94	85	71	26	9	22	-	57	87
	88	33	52	46	36	20	26	57	62	53	93	61	90	-	97	110
	69	-	51	41	59	35	67	102	112	129	44	19	38	-	80	131
	71	59	73	89	81	64	63	92	118	116	117	93	127	-	120	131
LOPAL	-	22	2	9	11	11	14	5	7	4	11	8	-	6	4	4
MACMA	13	63	27	35	36	17	-	10	76	76	77	68	66	15	78	71
	9	56	30	49	37	10	-	9	77	62	48	46	69	8	68	57
	6	30	18	26	12	9	-	4	32	24	32	28	26	4	30	27
	14	54	37	64	43	24	-	14	55	56	58	57	56	8	56	54
MARRU	45	39	44	22	53	26	33	16	16	12	26	33	52	22	26	48
	10	41	7	17	40	29	30	8	31	18	33	43	44	27	-	38
MASMI	31	25	-	21	17	3	14	-	70	38	35	23	-	53	19	52
MOLSI	15	8	2	-	-	3	-	-	7	4	26	5	7	27	136	119
	5	15	1	2	-	16	21	9	22	23	28	27	12	5	23	19
	4	16	-	3	-	13	30	3	3	17	44	40	11	5	53	28
	75	92	32	14	6	55	6	57	98	113	99	109	16	115	120	83
	62	47	9	3	2	38	1	39	93	78	84	79	13	74	91	87
	56	28	16	9	4	31	1	45	42	67	58	36	6	43	28	56
	55	79	17	7	4	31	6	55	92	95	83	102	7	100	77	82
MORJO	10	10	7	4	26	-	-	13	13	29	14	16	17	12	10	19
MOSFA	14	3	-	2	-	13	15	14	13	8	18	8	8	-	-	2
OTTMI	7	2	2	14	-	8	-	-	12	1	7	16	-	11	14	17
PERZS	-	8	5	37	15	-	4	62	49	67	61	64	57	6	63	71
ROTEC	19	14	-	-	-	11	-	3	34	22	5	8	-	22	16	29
SARAN	1	18	3	-	8	9	9	9	13	13	18	27	33	15	7	17
	3	38	11	-	25	18	-	-	-	22	21	30	35	19	12	14
	6	43	8	-	40	25	-	-	-	27	30	59	48	40	12	7
	3	9	-	-	21	16	12	6	18	17	9	34	29	15	8	15
SCALE	23	12	-	4	-	14	19	16	18	11	19	18	11	4	14	10
SCHHA	59	46	24	-	11	12	53	6	36	41	20	23	15	13	47	17
SLAST	2	-	-	1	-	-	15	30	19	33	36	16	24	5	13	41
	1	2	1	1	-	-	12	14	11	10	6	10	3	-	4	11
STOEN	46	16	11	17	-	68	66	75	71	76	83	75	57	23	64	93
	53	12	2	7	-	68	71	88	54	54	73	51	37	7	48	54
	66	28	12	26	-	73	100	107	69	80	83	75	51	8	53	72
STRJO	74	53	48	-	30	3	6	68	77	78	25	17	57	55	64	39
	70	45	28	-	22	3	8	45	45	60	25	19	26	35	46	24
	17	22	16	-	12	1	4	7	5	22	6	3	4	4	6	-
	29	27	29	-	6	2	3	26	25	9	18	4	5	32	35	7
	55	39	27	-	25	3	12	44	42	52	17	5	28	36	8	18
TEPIS	-	15	6	16	11	-	6	22	15	31	17	19	-	14	29	19
	-	35	6	30	24	1	16	-	23	50	28	25	29	27	42	37
TRIMI	-	-	-	3	-	-	18	19	8	15	19	15	22	3	14	20
YRJIL	-	15	-	7	34	2	-	16	20	1	7	10	1	-	24	8
Sum	1830	1829	1061	1097	1190	1333	1534	2219	2902	3070	2784	2619	2281	1387	2534	3092