Results of the IMO Video Meteor Network – July 2015

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Also July captivated with unusually good observing conditions. Best weather conditions occurred in southern Europe, were a few cameras observed without any break. But also at other locations there are hardly any breaks in the observing statistics. An amazing 75 out of 84 cameras managed to observe in twenty or more nights, 13 of these in thirty or more nights. In every second night, at least 70 cameras were active, in two nights even 79 cameras.
The overall effective observing time increased to 9,300 hours, 15% more than in the previous record year 2013. With regards to the number of meteors the increase is smaller, because the hourly average of 3.9 meteors was well below the long-term July average. In the end, the video observers collected almost 37.000 meteor records.

Our Hungarian friends could win a new observer in July. Rafael Schmall observes from Hungarian Kaposfö and provides data to the IMO network. His camera HUVCSE05 consists of a KPC-350B video camera with a 4mm f/1.0 Tamron lens.

With the alpha Capricornids and southern delta Aquariids, July offers two showers with a well-defined activity profile. However, both showers reach their peak at the end of the month, so that we have only half activity profiles from 2015 so far. For this reason we postpone their analysis by one month and think in this analysis about the perception coefficient instead.

It’s a well-known phenomenon in visual observation that two observers with the same limiting magnitude do not necessarily see the same number of meteors. Some observers have difficulties to detect weak static objects (stars), but they perform well in detecting moving objects (meteors). For other observers it is vice versa. Hence, a personal factor was introduced to correct the ZHR of an observer: the perception coefficient P. To determine P, a mean ZHR profile is computed from a large set of visual observations, and then the deviation of the ZHR values from individual observers is calculated. The perception coefficient can be represented as a correction factor for the ZHR, but also as an offset to the limiting magnitude of the observer.

In case of video observations we refrained a long time from such a correction factor. The limiting magnitude is calculated in the same way for all cameras, and meteor detection is also based on the same algorithm. When everything works fine, there is no need for something like a perception coefficients. However, the current algorithm for limiting magnitude calculation is not perfect as we found out in our April analysis. Changing the start value of the NoiseLevel parameter is sufficient to change the resulting limiting magnitude by half a magnitude. For this reason we now checked if there is systematic deviation between the video cameras. As almost all of our cameras are automated and observe in every clear night, we have large data sets for most of them available for the analysis.

In the first step, we calculated the average sporadic flux density from January till July 2015, which yielded a value of about 20. Then this exercise was repeated for every single camera, and we plotted the deviation from the average flux density over the limiting magnitude of the camera (figure 1, left). There is indeed a significant variation between ten and more than fifty, but there is no dependency from the liming magnitude of the camera. If the deviation is plotted as limiting magnitude offset, we obtain corrections between -0.5 and +1.0 mag (figure 1, right). Exemplary we identified a few cameras in the plot.

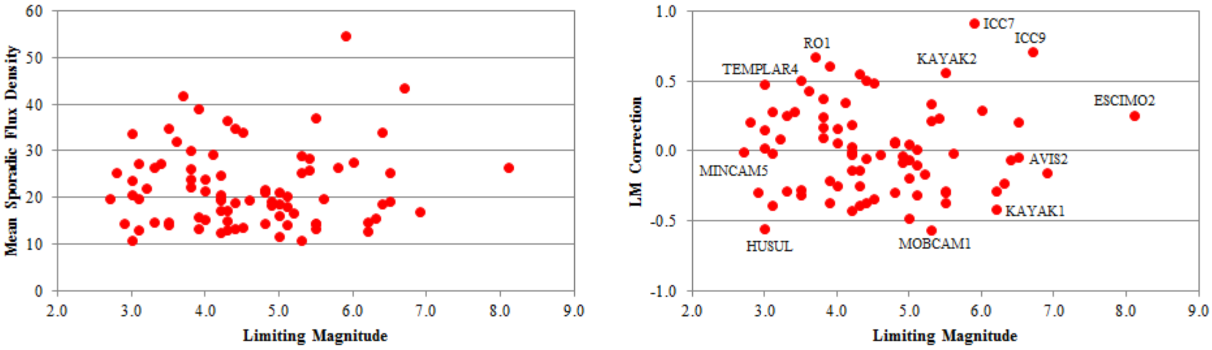

Figure 1: *Mean sporadic flux density from January till July 2015, plotted over the limiting magnitude of the camera (left). The deviation from the mean flux density can be displayed as a correction of the camera's limiting magnitude (right).*

Figure 2 is another representation, in which the corrected is plotted against the original limiting magnitude of the camera.

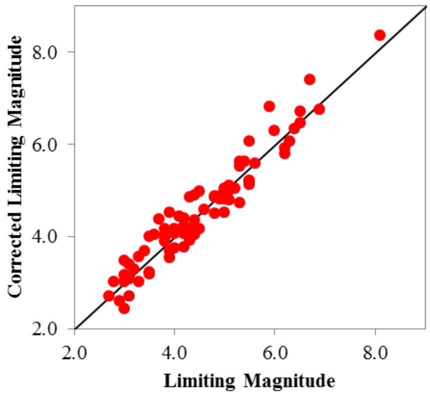

Figure 2: *Corrected vs. original limiting magnitude of IMO network cameras.*

In the next step we determined, which impact this perception coefficient has on the usual meteor shower parameters we obtain. We calculated the sporadic flux density in July 2015 with and without correction of the perception coefficients (figure 3). The scatter becomes smaller, but there is not principal change of the flux density profile.

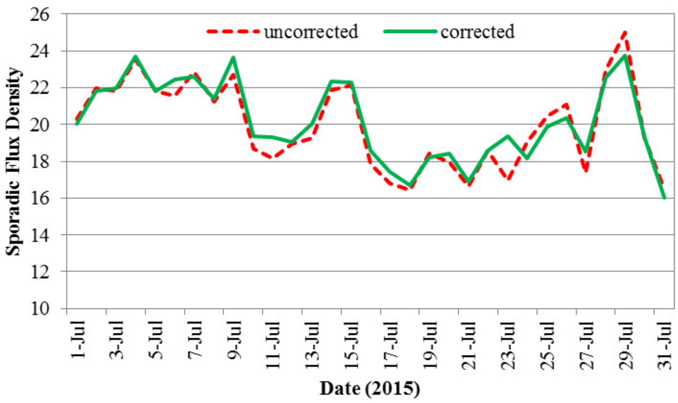

Figure 3: *Sporadic flux density in July 2015 with and without correction of the perception coefficients.*

The same picture is obtained, when we extend the analysis to the full interval from January till July 2015 (figure 4). The variance of the flux density is reduced by 40% on average.

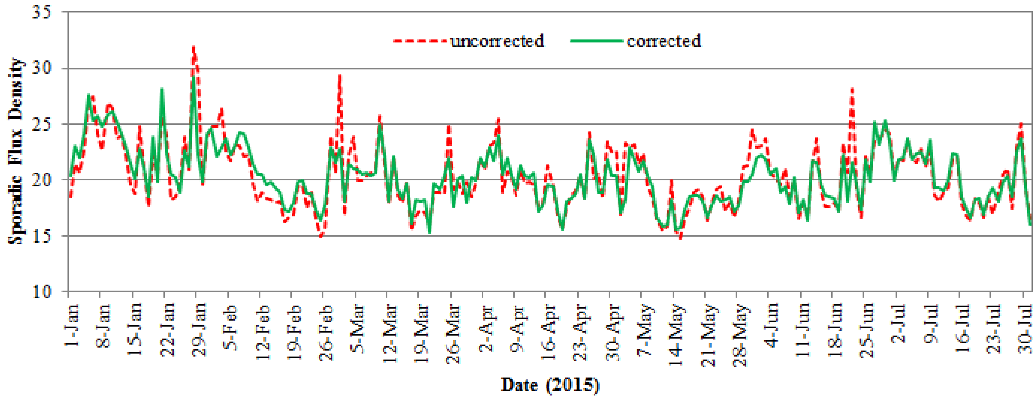

Figure 4: *Sporadic flux density from January till July 2015 with and without correction of the perception coefficients.*

And what about the population index? A comparison of the sporadic r-profile in July 2015 shows a clearly larger impact of the perception coefficients then for the flux density (figure 5). The population index is not only increasing by tendency, also the scatter is reducing significantly.

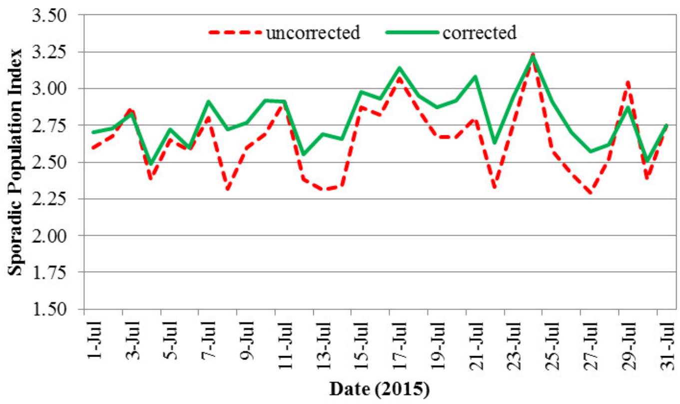

Figure 5: *Sporadic population index in July 2015 with and without correction of the perception coefficients.*

That is confirmed, when the sporadic population index is compared for the full interval from January till July 2015 (figure 6). Outliers in the population index profile, which have been discussed several times before, do not completely disappear, but they are significantly damped. In numbers, the variance of the data is halved!

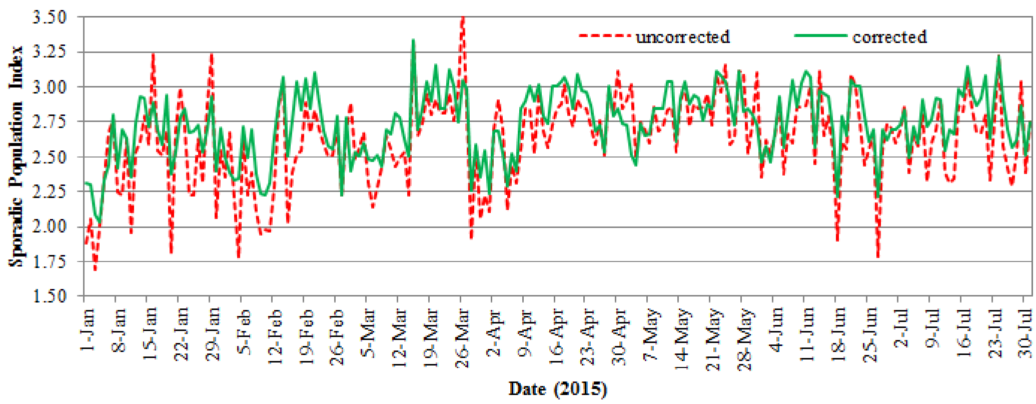

Figure 6: *Sporadic population index from January till July 2015 with and without correction of the perception coefficients.*

When the corrected r-values are plotted as usual with error bars, they also disclose clear periodic variations with a monthly cycle (figure 7).

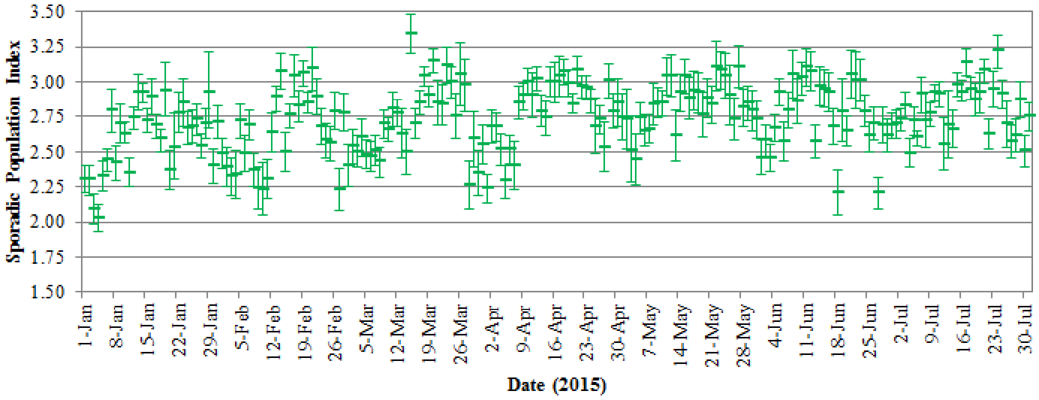

***Figure 7:** Sporadic population index from January till July 2015 with correction of the perception coefficients and with error bars.*

To enhance this effect, we calculated a sliding mean over five days to level out short-term variations. It is confirmed, that the sporadic population index varies by about 0.4 on a monthly basis (figure 8). It gives rise to suspicion that the population index is affected by the lunar phase. For this reason we plotted the lunar phase additionally as pictograms and as a sine wave in the diagram. The agreement is obvious. At new moon when skies are darkest we observe larger r-values than at full moon. The effect becomes smaller in the summer months, when the low altitude full moon has a smaller impact.

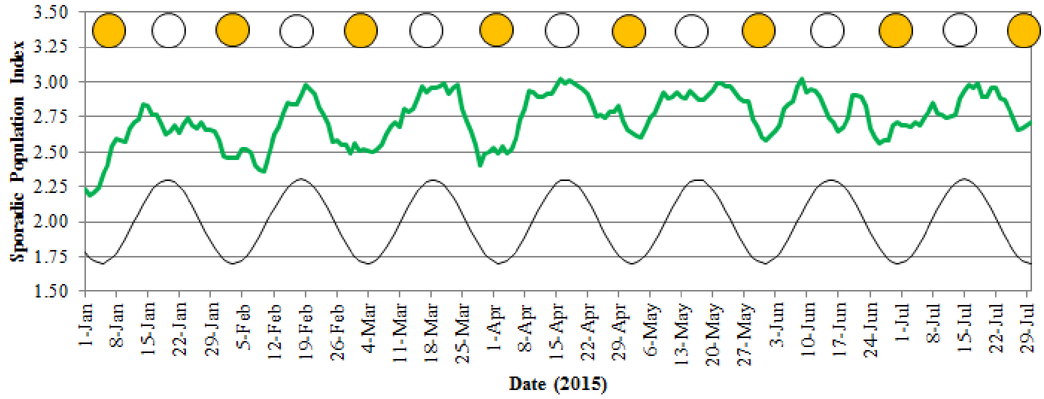

***Figure 8:** Smoothed sporadic population index (sliding 5-days-average) from January till July 2015 with correction of the perception coefficients. The lunar phase is shown in parallel.*

To make the effect even more evident, we plotted the average sporadic population index from January till July over the lunar phase (new moon = 0/1, full moon = 0.5) in figure 9.

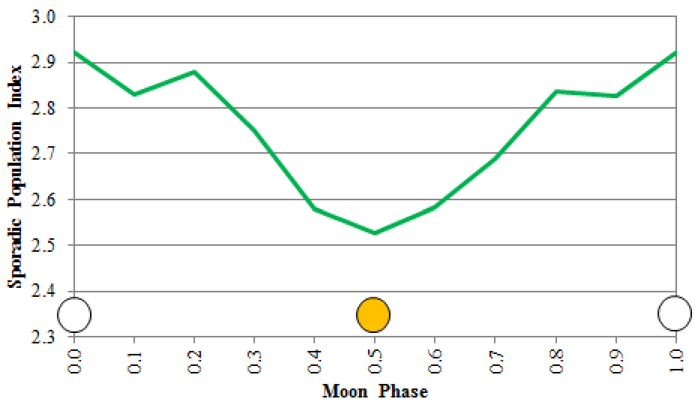

***Figure 9:** Sporadic population index from January till July 2015 (corrected for the perception coefficients) plotted over the lunar phase.*

If the long-term variations from the 5-days sliding mean are removed from the population index profile, we obtain a consistent picture with only few outliers (figure 10).

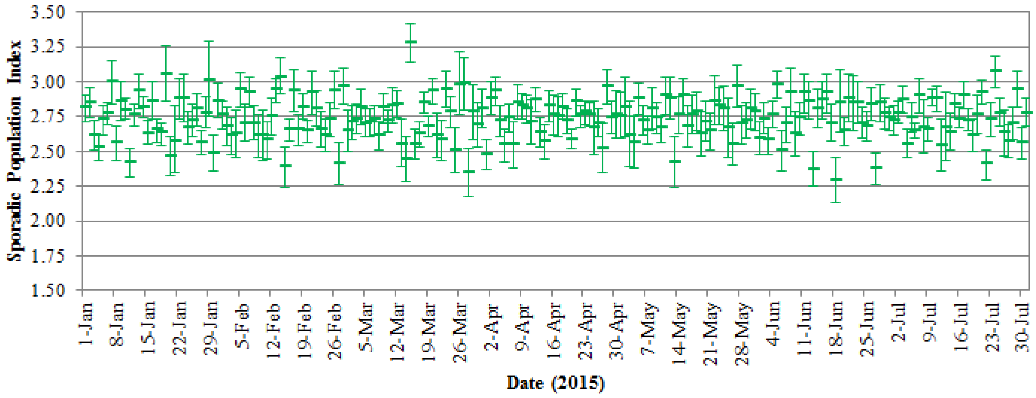

Figure 10: *Sporadic population index from January till July 2015 with correction of the perception coefficients and eliminaiton of long-term variations due to the lunar phase.*

This effect could hardly be explained if it would only affect the population index, but not the flux density. So we calculated also for the flux density a 5-days sliding mean (figure 11). Indeed we find also here a correlation with the lunar phase albeit to a lesser extent. The flux density (calculated with a population index of 3.0) varied depending on the lunar phase by 25%, whereby highest values are measured at full moon.

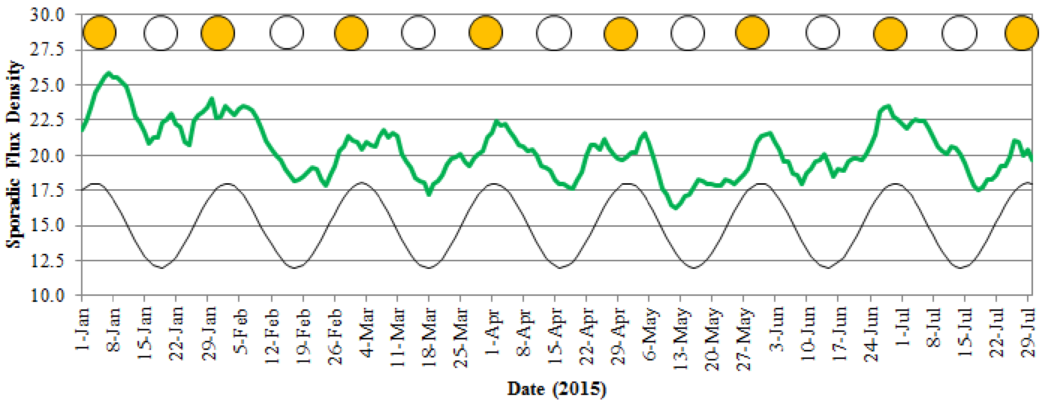

Figure 11: *Smoothed sporadic flux density (sliding 5-days-average) from January till July 2015 with correction of the perception coefficients. The lunar phase is shown in parallel.*

Also the flux density can be averaged over the lunar phase (new moon = 0/1, full moon = 0.5, figure 12). We see that the largest values do not occur directly at full moon, but a few days later.

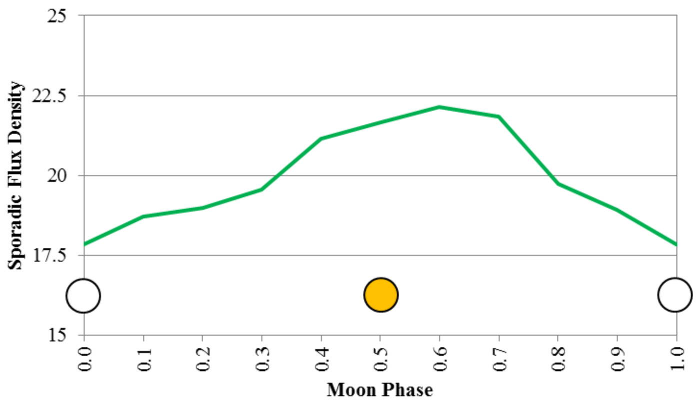

Figure 12: *Sporadic flux density from January till July 2015 (corrected for the perception coefficients) plotted over the lunar phase.*

At the moment we cannot pin down the effect any further. A spot-check analysis only reveals, that the lunar phase effect could be linked to the limiting magnitude of a camera. Cameras like REMO1 to REMO4 in Ketzür/DE with a small field of view (8mm lens and 1,450 square degrees) show only a small dependency from the lunar phase (figure 13, left), whereas the flux density of MIN38, NOA38 and SCO38 in Scorce/IT with large fields of view (3.8mm lens and 5.500 square degrees) depends much stronger on the lunar phase (figure 13, right).

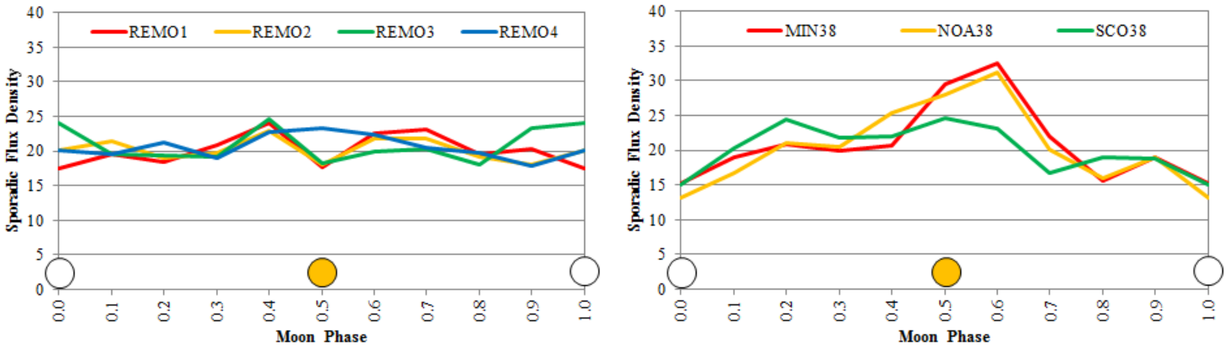

Figure 13: *Sporadic flux density from January till July 2015 (corrected for the perception coefficients) plotted over the lunar phase for selected cameras. Left four cameras with 8mm lens and small field of view, right three cameras with 3.8mm lens and large field of view.*

In summary we got the following insight:

- The perception coefficient is also helpful for video observations as long as there are systematic deviations in the limiting magnitude calculation.
- The correction of the perception coefficients as a fixed limiting magnitude offset for each camera does not change the profile of the flux density, but it reduces the scatter by 40%. The population index increases by 0.1 and the variance is cut into halves. Outliers in the population index profile, which have been regularly observed in the past and could not be explained so far, are significantly damped.
- Both the flux density and the population index show a significant correlation with the lunar phase. Whereas the sporadic flux density at full moon is about 25% higher than at new moon, we see a reduction of the population index by about 0.4. In nights with moonlit skies, the limiting magnitude is significantly underestimated, whereby sensitive cameras with small field of view are affected to a lesser extent than weak or wide-field cameras. That leads in total to the observed variation in the population index. The root cause for this shift still has to be determined in detail, though.

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	24	83.9	599
BANPE	Bánfalvi	Zalaegerszeg/HU	HUVCSE01 (0.95/5)	2423	3.4	361	18	21.0	154
BERER	Berkó	Ludanyhalaszi/HU	HULUD1 (0.8/3.8)	5542	4.8	3847	18	99.1	766
			HULUD3 (0.95/4)	4357	3.8	876	18	96.9	213
BOMMA	Bombardini	Faenza/IT	MARIO (1.2/4.0)	5794	3.3	739	25	144.5	722
BREMA	Breukers	Hengelo/NL	MBB3 (0.75/6)	2399	4.2	699	24	72.8	195
BRIBE	Klemt	Herne/DE	HERMINE (0.8/6)	2374	4.2	678	26	89.1	350
		Berg. Gladbach/DE	KLEMOI (0.8/6)	2286	4.6	1080	23	84.7	301
CASFL	Castellani	Monte Baldo/IT	BMH1 (0.8/6)	2350	5.0	1611	28	144.1	457
			BMH2 (1.5/4.5)*	4243	3.0	371	28	138.0	365
CRIST	Crivello	Valbrevenna/IT	BILBO (0.8/3.8)	5458	4.2	1772	31	161.1	684
			C3P8 (0.8/3.8)	5455	4.2	1586	29	141.1	489
			STG38 (0.8/3.8)	5614	4.4	2007	30	165.5	1263
CSISZ	Csizmadia	Baja/HU	HUVCSE02 (0.95/5)	1606	3.8	390	22	96.8	237
DONJE	Donati	Faenza/IT	JENNI (1.2/4)	5886	3.9	1222	29	191.8	1137
ELTMA	Eltri	Venezia/IT	MET38 (0.8/3.8)	5631	4.3	2151	28	131.0	391
FORKE	Förster	Carlsfeld/DE	AKM3 (0.75/6)	2375	5.1	2154	23	87.3	402
GONRU	Goncalves	Tomar/PT	TEMPLAR1 (0.8/6)	2179	5.3	1842	31	182.2	854
			TEMPLAR2 (0.8/6)	2080	5.0	1508	31	182.5	632
			TEMPLAR3 (0.8/8)	1438	4.3	571	25	143.5	280
			TEMPLAR4 (0.8/3.8)	4475	3.0	442	30	173.0	748
			TEMPLAR5 (0.75/6)	2312	5.0	2259	28	151.0	591
GOVMI	Govedic	Sredisce ob Dr./SI	ORION2 (0.8/8)	1447	5.5	1841	28	118.9	452
			ORION3 (0.95/5)	2665	4.9	2069	21	77.5	180
			ORION4 (0.95/5)	2662	4.3	1043	21	83.7	225
HERCA	Hergenrother	Tucson/US	SALSA3 (0.8/3.8)	2336	4.1	544	25	113.3	316
HINWO	Hinz	Schwarzenberg/DE	HINWO1 (0.75/6)	2291	5.1	1819	21	85.6	418
IGAAN	Igaz	Debrecen/HU	HUDEB (0.8/3.8)	5522	3.2	620	26	123.0	279
		Hodmezovasar./HU	HUHOD (0.8/3.8)	5502	3.4	764	25	107.7	272
		Budapest/HU	HUPOL (1.2/4)	3790	3.3	475	23	119.7	114
JONKA	Jonas	Budapest/HU	HUSOR (0.95/4)	2286	3.9	445	20	90.4	225
			HUSOR2 (0.95/3.5)	2465	3.9	715	26	139.2	278
KACJA	Kac	Kamnik/SI	CVETKA (0.8/3.8)	4914	4.3	1842	20	88.3	467
		Kostanjevec/SI	METKA (0.8/12)*	715	6.4	640	4	13.3	29
		Ljubljana/SI	ORION1 (0.8/8)	1402	3.8	331	24	104.5	212
		Kamnik/SI	REZIKA (0.8/6)	2270	4.4	840	19	88.2	508
			STEFKA (0.8/3.8)	5471	2.8	379	18	82.5	308
KISSZ	Kiss	Sulysap/HU	HUSUL (0.95/5)*	4295	3.0	355	27	130.6	168
KOSDE	Koschny	Izana Obs./ES	ICC7 (0.85/25)*	714	5.9	1464	25	143.1	1040
		La Palma / ES	ICC9 (0.85/25)*	683	6.7	2951	25	144.8	1406
		Noordwijkerhout/NL	LIC4 (1.4/50)*	2027	6.0	4509	20	59.7	162
LOJTO	Łojek	Grabniak/PL	PAV57 (1.0/5)	1631	3.5	269	12	51.5	71
MACMA	Maciejewski	Chelm/PL	PAV35 (0.8/3.8)	5495	4.0	1584	29	108.2	680
			PAV36 (0.8/3.8)*	5668	4.0	1573	28	105.9	658
			PAV43 (0.75/4.5)*	3132	3.1	319	26	103.8	398
			PAV60 (0.75/4.5)	2250	3.1	281	29	106.4	668
MARGR	Maravelias	Lofoupoli/GR	LOOMECON (0.8/12)	738	6.3	2698	28	216.4	620
MARRU	Marques	Lisbon/PT	CAB1 (0.8/3.8)	5291	3.1	467	30	197.5	862
			RAN1 (1.4/4.5)	4405	4.0	1241	28	159.1	431
MASMI	Maslov	Novosimbirsk/RU	NOWATEC (0.8/3.8)	5574	3.6	773	24	50.1	250
MOLSI	Molau	Seysdorf/DE	AVIS2 (1.4/50)*	1230	6.9	6152	26	104.0	1054
			ESCIMO2 (0.85/25)	155	8.1	3415	25	108.1	368
			MINCAM1 (0.8/8)	1477	4.9	1084	20	82.5	469
		Ketzür/DE	REMO1 (0.8/8)	1467	6.5	5491	25	93.9	808
			REMO2 (0.8/8)	1478	6.4	4778	24	93.2	538
			REMO3 (0.8/8)	1420	5.6	1967	22	93.5	373
			REMO4 (0.8/8)	1478	6.5	5358	24	94.0	730
MORJO	Morvai	Fülöpszallas/HU	HUFUL (1.4/5)	2522	3.5	532	26	121.7	237
MOSFA	Moschini	Rovereto/IT	ROVER (1.4/4.5)	3896	4.2	1292	26	31.4	215
OCHPA	Ochner	Albiano/IT	ALBIANO (1.2/4.5)	2944	3.5	358	19	68.4	224
OTTMI	Otte	Pearl City/US	ORIE1 (1.4/5.7)	3837	3.8	460	24	118.9	311
PERZS	Perkó	Becsehely/HU	HUBEC (0.8/3.8)*	5498	2.9	460	21	110.4	393
PUCRC	Pucer	Nova vas nad Dra./SI	MOBCAM1 (0.75/6)	2398	5.3	2976	23	126.8	200
ROTEC	Rothenberg	Berlin/DE	ARMEFA (0.8/6)	2366	4.5	911	20	78.6	226
SARAN	Saraiva	Carnaxide/PT	RO1 (0.75/6)	2362	3.7	381	31	179.0	361
			RO2 (0.75/6)	2381	3.8	459	30	173.6	495
			RO3 (0.8/12)	710	5.2	619	31	183.7	680
			SOFIA (0.8/12)	738	5.3	907	31	155.3	324
SCALE	Scarpa	Alberoni/IT	LEO (1.2/4.5)*	4152	4.5	2052	22	97.4	182
SCHHA	Schremmer	Niederkrüchten/DE	DORAEMON (0.8/3.8)	4900	3.0	409	29	71.0	303
SCHRA	Schmall	Kaposfö/HU	HUVSCE05	2777	3.5	632	11	30.9	75
SLAST	Slavec	Ljubljana/SI	KAYAK1 (1.8/28)	563	6.2	1294	22	111.8	302
			KAYAK2 (0.8/12)	741	5.5	920	24	128.6	156
STOEN	Stomeo	Scorze/IT	MIN38 (0.8/3.8)	5566	4.8	3270	30	145.0	776
			NOA38 (0.8/3.8)	5609	4.2	1911	30	148.9	550
			SCO38 (0.8/3.8)	5598	4.8	3306	30	143.4	783
STRJO	Strunk	Herford/DE	MINCAM2 (0.8/6)	2354	5.4	2751	26	81.0	222
			MINCAM3 (0.8/6)	2338	5.5	3590	23	64.8	239
			MINCAM4 (1.0/2.6)	9791	2.7	552	21	58.6	119
			MINCAM5 (0.8/6)	2349	5.0	1896	25	69.2	196
			MINCAM6 (0.8/6)	2395	5.1	2178	23	71.8	218
TEPIS	Tepliczky	Agostyan/HU	HUAGO (0.75/4.5)	2427	4.4	1036	25	135.4	275
			HUMOB (0.8/6)	2388	4.8	1607	27	118.5	628
TRIMI	Triglav	Velenje/SI	SRAKA (0.8/6)*	2222	4.0	546	20	71.5	168
Sum							31	9358.6	36725

* active field of view smaller than video frame

2. Observing Times (h)

July	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
ARLRA	3.8	3.8	3.8	-	-	4.1	2.9	1.2	2.4	4.2	4.4	-	-	3.0	-
BANPE	0.6	0.1	1.0	1.6	-	0.8	1.4	-	-	-	0.7	-	-	-	1.1
BERER	-	-	5.4	5.0	5.7	5.1	4.4	-	5.0	6.0	-	-	-	-	4.0
	-	-	5.5	5.1	5.8	5.2	4.5	-	5.0	6.0	-	-	-	-	2.8
BOMMA	4.0	1.5	-	-	-	-	6.7	6.0	4.3	5.1	4.4	3.2	4.4	4.7	6.9
BREMA	4.5	-	4.6	1.7	4.5	4.7	3.0	-	4.8	3.7	3.1	-	-	4.1	2.8
BRIBE	4.6	-	4.4	1.8	3.5	4.9	2.1	-	5.1	4.9	4.9	1.2	-	-	1.2
	4.6	2.6	4.7	3.5	1.7	5.0	2.8	-	5.0	-	5.0	-	-	-	-
CASFL	6.3	6.3	3.0	6.5	5.4	5.3	2.6	5.3	6.0	6.6	6.7	3.6	-	-	5.8
	6.1	6.0	2.2	6.0	5.0	3.8	2.4	4.6	5.4	6.4	6.4	3.3	4.7	6.5	4.1
CRIST	6.1	2.3	0.6	6.3	6.3	5.0	3.4	5.6	6.4	6.4	6.5	5.4	4.8	6.6	6.6
	6.3	2.5	0.7	6.3	6.3	4.3	0.9	5.8	6.5	6.4	6.4	3.7	6.6	6.6	6.5
	6.2	3.0	1.5	6.3	6.3	4.8	3.5	5.8	6.4	6.4	6.5	6.0	4.2	6.6	6.6
CSISZ	2.7	-	5.2	3.1	4.8	2.2	6.7	-	-	3.3	1.9	4.7	-	-	3.7
DONJE	4.8	4.6	6.4	5.8	5.4	6.8	6.7	6.2	6.6	6.7	6.8	7.0	6.8	6.9	6.9
ELTMA	2.6	1.1	1.6	2.9	4.4	6.1	5.7	-	2.2	6.5	-	5.5	6.6	6.7	2.8
FORKE	4.9	4.9	4.2	1.1	1.1	5.2	-	0.7	3.9	5.2	5.3	-	-	-	3.5
GONRU	7.0	7.1	7.2	7.1	7.3	7.3	6.2	7.4	7.0	7.3	3.9	4.4	4.7	3.8	4.2
	7.2	7.3	7.3	7.4	7.4	7.4	5.9	7.4	7.1	7.5	3.6	4.7	5.3	3.5	4.3
	5.6	7.1	7.2	6.9	7.3	7.1	4.6	6.9	4.1	7.2	-	-	3.2	-	0.9
	6.9	7.3	7.3	7.2	7.4	7.4	5.7	7.4	7.0	7.5	2.9	4.1	4.4	3.3	-
	4.7	7.3	7.3	6.3	7.3	7.4	4.1	7.0	3.9	7.4	2.1	3.3	3.3	2.2	-
GOVMI	2.9	5.5	5.4	5.4	5.9	5.9	6.0	-	3.0	6.1	2.9	3.8	-	4.4	3.8
	-	-	-	-	-	5.9	6.1	-	2.2	6.0	2.4	-	0.2	5.1	3.3
	-	-	-	-	-	-	5.9	-	3.0	6.0	2.8	-	-	5.3	3.1
HERCA	-	8.4	0.4	3.8	0.2	2.7	6.5	7.9	8.0	-	-	7.5	1.2	1.3	4.8
HINWO	5.0	5.1	5.0	1.0	-	5.2	-	-	3.0	5.0	5.0	-	-	-	3.0
IGAAN	-	5.5	5.3	4.8	5.0	5.5	5.4	-	5.2	5.9	-	5.2	-	5.2	6.1
	4.3	5.9	6.0	6.0	3.0	3.3	5.0	-	4.4	4.7	6.3	4.6	-	0.8	2.5
	5.5	2.3	5.6	5.7	5.8	1.6	5.9	-	5.7	5.9	5.5	-	-	-	5.7
JONKA	5.4	1.7	5.9	5.9	5.9	5.4	5.1	-	4.3	6.1	5.5	2.4	-	0.5	4.5
	5.9	3.3	5.9	5.9	6.0	6.0	6.0	-	4.8	6.1	6.2	-	-	1.8	6.1
KACJA	5.7	1.9	1.6	4.9	5.5	-	6.1	-	5.6	5.9	-	3.6	1.3	6.2	3.8
	-	-	1.0	5.5	-	-	-	-	-	-	-	-	-	-	-
	5.7	2.3	2.8	2.5	6.0	4.6	5.9	-	4.4	6.0	1.7	4.0	3.4	5.0	5.3
	6.0	1.5	-	4.9	5.7	-	6.3	-	5.0	5.9	-	3.8	2.2	6.5	4.1
	6.0	2.1	2.0	5.5	5.7	-	-	-	5.2	5.9	-	3.7	1.5	6.1	4.1
KISSZ	5.7	1.9	6.0	1.7	6.2	6.2	6.2	-	6.5	6.2	5.6	3.3	-	1.0	6.5
KOSDE	4.9	6.9	7.9	7.9	3.5	1.3	3.9	7.2	8.0	7.4	7.6	0.5	3.2	-	1.6
	3.1	4.2	4.2	3.8	3.7	-	-	5.1	6.5	7.5	8.3	7.5	1.9	4.6	-
	3.4	-	3.0	2.8	2.7	3.7	0.7	-	3.7	1.3	0.7	-	-	-	1.3
LOJTO	3.7	4.4	4.1	4.4	4.1	4.5	4.6	-	4.6	-	-	-	-	-	2.8
MACMA	3.2	1.7	5.0	5.0	5.0	5.1	4.9	-	3.9	1.5	1.4	-	3.9	3.4	5.1
	5.0	4.0	5.0	5.2	5.2	4.8	5.2	0.2	3.6	0.3	-	-	4.0	2.1	4.7
	5.1	4.3	4.9	5.2	5.0	4.3	5.2	0.4	3.9	-	-	-	3.4	2.5	4.7
	4.9	4.6	5.0	5.0	5.0	5.0	5.1	0.2	2.8	0.2	0.5	-	3.9	2.3	4.6
MARGR	4.5	6.1	6.9	7.6	7.8	7.9	8.0	8.0	7.9	8.0	8.0	8.1	8.1	-	-
MARRU	6.8	7.1	7.2	7.3	7.2	7.3	7.2	7.2	7.3	7.3	7.0	7.3	6.8	7.4	7.4
	4.8	6.0	7.0	6.2	5.5	6.7	2.7	7.4	6.8	6.8	6.8	6.8	7.1	4.3	2.2
MASMI	1.0	0.9	1.9	-	-	0.7	-	2.5	2.3	0.2	0.9	-	0.4	0.9	2.5
MOLSI	4.6	4.6	4.7	4.6	4.7	4.7	-	0.5	4.9	4.9	4.9	-	-	3.1	5.1
	5.3	5.3	5.4	5.4	5.4	5.4	-	0.9	5.5	5.6	5.6	-	-	3.2	5.8
	4.8	4.8	4.7	4.7	4.8	5.0	-	0.7	5.4	5.3	5.4	-	-	2.6	5.6
	4.0	4.1	4.0	-	-	4.3	3.8	1.3	2.2	4.5	4.6	-	0.3	3.6	1.1
	4.1	4.0	4.1	-	-	4.4	4.0	1.6	2.2	4.6	4.7	-	-	3.8	-
	4.3	4.3	4.4	-	-	1.8	-	0.8	4.7	4.8	4.8	-	-	2.9	-
	4.3	4.1	4.2	-	-	4.6	4.1	1.0	2.3	4.6	4.8	-	-	3.4	0.7
MORJO	4.6	4.2	3.0	6.1	6.1	6.0	6.1	-	5.8	6.1	6.2	5.7	-	-	5.7
MOSFA	0.8	0.5	0.5	1.4	1.3	-	0.3	1.2	1.7	2.3	0.9	0.6	0.7	2.0	1.1
OCHPA	4.1	5.9	2.0	4.6	2.7	4.5	2.8	1.3	5.6	1.4	2.7	-	-	3.9	-
OTTMI	5.1	0.7	5.5	4.8	4.5	-	3.8	-	-	-	-	-	6.0	-	1.1
PERZS	-	4.8	5.8	6.2	6.2	6.2	6.2	-	1.9	6.3	2.9	3.9	-	3.3	5.6
PUCRC	5.8	1.1	3.8	4.7	6.2	6.1	6.2	-	0.9	6.3	6.5	5.2	6.3	6.5	6.2
ROTEC	3.9	4.0	3.6	-	-	4.4	3.0	-	-	4.5	3.1	-	-	2.8	-
SARAN	6.6	7.1	6.3	7.3	6.2	7.5	6.0	7.5	3.8	7.7	7.7	7.7	6.4	4.0	5.5
	7.4	7.3	7.2	7.4	6.6	7.5	6.3	7.8	3.9	7.7	7.8	7.8	6.9	5.2	5.0
	7.5	7.1	7.1	7.2	6.5	7.6	6.3	7.4	3.8	7.6	7.5	7.5	6.8	4.9	4.7
	3.9	5.4	4.4	2.5	6.6	7.0	2.8	4.9	3.6	7.8	7.8	7.9	3.5	2.3	5.8
SCALE	5.4	2.2	0.9	3.4	4.2	5.8	5.2	0.2	-	6.3	6.2	4.3	4.4	-	6.0
SCHHA	4.6	0.5	4.3	2.1	2.8	4.9	2.0	0.2	3.4	3.9	1.5	0.3	-	0.5	2.5
SCHRA	4.1	2.7	3.4	4.4	1.9	2.1	1.3	-	-	-	-	-	-	-	-
SLAST	5.9	3.7	3.0	5.9	5.9	4.7	5.9	-	5.9	3.4	2.6	3.9	4.2	4.8	5.8
	6.1	4.3	3.4	6.1	6.1	5.7	6.1	-	6.1	6.1	3.7	3.9	4.5	5.2	5.5
STOEN	6.2	3.2	1.9	3.5	3.4	6.3	5.1	0.5	2.3	6.7	6.7	4.6	6.5	6.5	6.2
	6.4	4.9	2.7	4.3	3.6	6.2	6.1	0.5	1.6	6.6	6.6	4.7	6.4	6.6	6.4
	6.2	3.9	3.3	3.9	3.6	5.8	4.6	0.4	1.1	6.6	6.5	4.2	6.2	6.6	5.1
STRJO	4.4	2.7	3.6	2.1	1.5	4.7	3.2	0.2	4.9	4.8	3.7	-	-	0.9	0.7
	4.3	3.0	3.9	2.0	0.7	4.6	2.8	-	4.9	4.2	3.0	0.5	-	1.1	0.3
	2.6	2.8	3.6	2.0	-	4.7	1.8	-	4.7	3.9	2.5	-	-	-	-
	4.3	2.9	3.3	1.9	0.9	4.6	3.1	-	4.9	4.5	3.7	-	-	0.9	0.4
	4.4	2.7	4.2	2.0	1.5	4.6	2.4	-	4.9	4.0	2.8	-	-	-	-
TEPIS	3.9	5.5	5.6	5.6	5.6	5.7	5.7	-	0.8	5.8	5.8	2.7	-	4.1	5.7
	0.5	2.2	2.4	3.1	5.6	5.7	4.1	-	3.1	5.8	5.8	2.8	0.2	3.2	3.8
TRIMI	-	1.5	-	6.2	4.1	1.5	3.5	-	1.7	4.3	1.9	3.3	1.1	4.8	3.0
Sum	358.4	300.4	336.3	347.2	337.7	378.1	334.7	162.3	344.2	411.8	317.5	213.7	181.9	243.9	288.7

July	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
ARLRA	4.5	4.0	3.1	4.2	1.8	3.7	-	4.5	4.4	-	2.0	2.8	2.4	2.9	5.2	4.8
BANPE	1.0	0.3	-	0.6	1.6	1.6	1.8	1.3	1.0	-	-	-	0.3	-	-	4.2
BERER	6.2	-	6.2	-	5.9	5.9	6.4	-	4.9	-	6.4	6.2	-	-	3.9	6.5
	6.2	-	5.3	-	5.9	5.9	6.5	-	5.1	-	6.5	5.2	-	-	3.9	6.5
BOMMA	5.2	7.0	7.2	7.1	7.1	7.1	6.9	3.8	7.3	7.4	5.8	7.4	7.5	6.5	-	-
BREMA	2.1	0.6	3.3	4.5	1.0	2.1	3.3	1.5	-	0.7	-	0.9	-	5.7	2.9	2.7
BRIBE	1.2	2.9	2.5	4.9	0.8	3.3	3.0	4.5	0.5	5.4	-	3.0	5.1	6.0	6.2	1.2
	1.8	5.1	1.8	5.7	-	2.9	3.4	3.4	1.4	4.5	-	5.1	5.9	4.8	2.2	1.8
CASFL	6.9	6.9	5.7	7.0	6.8	7.0	7.1	3.1	-	6.4	1.7	4.8	2.2	0.8	1.5	6.8
	6.6	6.6	4.3	6.7	6.5	6.7	6.9	-	-	5.6	0.7	4.4	2.2	-	1.4	6.5
CRIST	6.6	3.7	5.0	6.8	6.8	6.8	6.9	6.9	2.4	6.6	4.6	7.1	5.4	2.2	2.3	2.7
	6.7	3.2	5.0	4.1	6.8	6.8	3.0	6.9	-	4.8	-	6.2	2.8	2.8	2.7	3.5
	6.6	3.6	5.2	6.8	6.8	6.8	6.9	6.9	-	6.8	4.8	7.1	5.8	3.5	3.5	4.3
CSISZ	5.0	6.8	3.6	2.8	-	3.9	5.5	3.2	7.2	4.1	-	1.6	7.3	-	-	7.5
DONJE	6.0	7.0	7.2	7.1	7.2	7.1	7.2	4.8	7.3	7.4	7.2	7.5	7.5	6.9	-	-
ELTMA	5.8	6.6	5.6	6.8	6.7	7.1	6.6	2.8	5.5	4.9	0.3	4.0	5.8	0.5	-	7.3
FORKE	5.6	3.5	3.8	-	2.6	4.2	-	3.0	4.3	0.6	-	5.7	-	5.3	5.2	3.5
GONRU	6.9	4.9	7.1	3.1	7.0	7.7	7.7	6.6	5.4	7.8	3.7	7.9	7.6	3.4	1.1	2.4
	6.4	4.6	7.2	4.0	7.0	7.8	7.8	6.7	5.5	7.9	3.3	8.0	7.0	2.9	0.6	2.5
	5.9	3.5	7.1	4.1	3.4	7.7	7.7	7.0	3.8	7.7	3.2	7.7	6.6	-	-	-
	6.6	4.8	7.0	3.3	6.3	7.8	7.8	6.7	5.0	7.9	3.6	8.0	6.7	2.5	0.8	2.4
	6.2	3.6	6.9	3.7	3.1	7.7	7.8	7.2	3.9	7.9	3.2	7.9	6.7	1.6	-	-
GOVMI	4.8	4.4	6.3	6.3	6.5	3.8	5.9	2.7	2.1	0.8	3.6	0.2	5.6	0.3	-	4.6
	2.7	2.1	6.3	6.3	2.7	6.3	6.4	1.4	0.9	-	0.2	-	4.1	0.5	-	6.4
	4.5	3.2	6.2	6.2	6.1	6.5	6.5	1.9	1.5	0.2	1.6	-	4.7	0.4	1.2	6.9
HERCA	7.1	-	2.2	0.9	8.3	8.6	8.2	-	2.1	1.5	8.5	4.6	5.6	-	2.1	0.9
HINWO	5.7	5.1	-	-	2.3	5.4	-	3.2	4.5	2.2	-	4.1	1.0	5.4	5.3	4.1
IGAAN	6.0	1.3	4.4	6.1	6.4	5.9	6.3	1.5	3.9	3.0	4.8	3.5	-	2.0	1.9	6.9
	3.0	1.2	-	4.6	6.6	4.1	5.2	1.8	2.9	-	5.7	2.4	6.5	-	-	6.9
	5.5	-	6.2	-	6.3	6.4	6.3	3.1	6.0	1.9	6.4	6.5	-	-	2.9	7.0
JONKA	-	4.9	6.0	-	-	-	-	-	-	1.2	5.6	5.5	-	-	1.5	7.1
	5.4	6.4	6.2	5.4	6.5	6.6	6.6	3.8	5.5	2.0	6.4	6.1	-	-	1.2	7.1
KACJA	6.4	-	6.6	4.6	3.4	3.5	6.3	-	1.1	-	-	-	-	-	-	4.3
	-	-	-	6.2	-	-	-	-	-	-	-	-	-	-	-	0.6
	6.3	3.4	6.3	5.0	3.7	5.6	6.3	-	-	1.6	-	-	0.3	-	-	6.4
	6.6	-	6.6	4.9	3.2	3.7	6.3	-	0.6	-	-	-	-	-	-	4.4
	6.5	-	6.4	4.3	2.3	4.4	6.4	-	-	-	-	-	-	-	-	4.4
KISSZ	2.2	6.5	6.4	6.3	6.6	6.6	5.3	6.0	5.9	-	6.6	5.5	0.2	-	2.2	1.3
KOSDE	1.1	-	8.1	8.2	7.7	-	-	1.4	8.2	8.2	8.3	8.3	8.3	3.5	-	-
	-	3.6	8.4	8.5	8.5	7.6	3.3	-	8.6	8.6	8.6	0.8	7.1	6.1	-	4.7
	3.7	-	-	4.2	1.2	4.7	2.5	3.1	-	3.9	-	-	-	4.0	3.7	5.4
LOJTO	2.8	-	-	-	-	-	-	-	-	-	-	-	-	-	5.5	6.0
MACMA	3.7	4.3	2.4	2.3	5.7	5.0	5.8	0.2	5.9	2.0	6.0	1.1	1.5	2.4	4.5	6.3
	2.6	3.6	2.2	2.2	5.9	4.3	5.9	-	6.0	0.5	5.4	0.9	1.4	3.3	6.1	6.3
	2.8	3.5	2.0	1.5	5.6	4.6	5.8	-	5.6	0.9	5.4	-	1.3	3.3	6.3	6.3
	3.1	3.6	2.2	1.9	5.7	4.5	5.8	-	5.8	0.9	5.1	0.9	1.6	3.7	6.2	6.3
MARGR	-	6.8	8.2	8.2	8.1	8.2	8.2	8.1	8.1	8.1	8.2	8.2	8.2	8.2	6.5	8.2
MARRU	6.4	2.6	7.6	1.4	-	7.6	7.7	7.7	7.4	7.7	7.7	7.7	7.7	3.8	2.8	3.9
	5.2	3.8	7.3	0.5	2.7	7.4	7.6	4.5	6.5	7.7	6.8	7.4	4.6	-	-	-
MASMI	2.3	1.7	1.0	3.5	3.2	3.7	-	3.9	3.5	-	4.1	1.8	1.2	1.4	-	4.6
MOLSI	5.2	4.7	5.3	1.3	3.5	5.4	3.9	0.9	1.8	5.7	-	4.0	-	5.9	1.2	3.9
	5.8	5.4	5.9	1.1	4.2	6.1	-	0.5	0.7	6.3	-	1.0	-	6.5	1.4	4.4
	5.6	3.2	5.6	1.2	4.0	5.8	2.7	0.6	-	-	-	-	-	-	-	-
	4.8	4.9	4.9	4.9	-	4.8	-	5.2	4.5	-	2.0	2.6	4.7	1.8	5.7	5.3
	5.0	5.0	5.0	5.1	0.3	5.0	-	5.2	4.4	-	1.8	2.8	4.1	1.4	5.4	5.2
	5.1	5.2	5.2	5.3	-	5.4	-	5.5	4.0	-	1.9	3.1	5.9	2.2	6.0	5.9
	5.1	5.2	5.1	5.2	-	4.9	-	5.3	3.9	-	1.9	2.3	3.9	1.5	5.9	5.7
MORJO	5.9	5.6	5.2	5.9	6.5	1.4	-	1.4	4.8	3.2	1.8	4.3	4.6	-	3.0	2.5
MOSFA	1.8	1.8	1.2	1.9	0.8	1.6	1.7	-	-	1.1	-	1.2	0.8	0.4	-	1.8
OCHPA	5.7	2.4	2.5	6.0	-	6.3	-	-	-	3.0	-	1.0	-	-	-	-
OTTMI	1.7	5.1	3.5	6.4	7.4	7.3	6.7	7.5	5.5	3.1	7.5	6.4	0.3	6.5	5.7	6.8
PERZS	6.4	6.2	6.6	-	6.6	-	6.8	2.5	6.2	-	-	-	4.5	-	-	5.3
PUCRC	6.7	6.3	6.7	6.6	6.6	6.6	6.7	2.3	6.5	-	-	-	-	-	-	-
ROTEC	4.6	4.7	4.3	3.8	-	3.5	-	5.0	5.1	-	2.2	2.7	2.2	-	5.8	5.4
SARAN	3.9	0.7	7.9	1.2	5.2	8.1	8.2	4.5	8.0	8.3	7.5	8.2	6.0	1.8	0.6	1.6
	3.1	0.4	7.9	0.5	-	8.1	8.0	4.3	8.0	8.1	6.7	8.3	5.8	1.3	0.3	1.0
	3.6	1.0	7.7	1.7	6.6	7.9	7.8	4.5	7.9	7.9	7.0	8.1	6.0	3.3	0.6	2.6
	4.4	0.7	7.8	1.3	4.1	8.1	8.1	4.5	8.2	8.2	7.5	7.5	5.5	1.4	0.2	1.6
SCALE	5.5	6.5	5.8	6.3	-	-	6.1	1.1	-	4.2	-	5.1	-	-	-	2.3
SCHHA	0.4	2.2	1.5	5.3	4.3	0.9	3.2	1.0	2.5	3.9	-	0.8	3.2	2.9	5.2	0.2
SCHRA	-	-	-	-	2.6	1.6	2.0	-	-	-	-	-	4.8	-	-	-
SLAST	6.1	4.5	6.0	6.1	6.1	5.2	6.2	-	-	-	-	-	-	-	-	6.0
	6.3	5.5	6.3	6.0	6.6	6.2	6.7	3.4	2.3	-	-	-	-	-	-	6.5
STOEN	6.5	6.6	6.9	7.0	7.0	6.7	6.8	0.3	6.0	4.2	0.8	2.7	6.2	0.4	-	7.3
	6.6	6.5	6.8	6.9	6.8	6.7	6.9	0.3	6.1	4.6	0.2	3.1	6.0	0.2	-	7.6
	6.5	6.3	6.4	6.9	7.0	6.8	6.6	-	6.3	4.2	0.3	4.3	6.1	0.2	0.2	7.3
STRJO	2.9	4.1	4.9	5.4	-	3.9	3.3	1.6	-	0.4	-	1.9	1.6	4.8	6.0	2.8
	2.3	2.5	3.2	5.3	-	3.2	3.2	1.7	-	-	-	-	1.0	3.8	-	3.3
	2.2	1.6	4.2	5.0	-	1.8	3.1	0.7	-	-	-	1.3	0.2	3.6	5.7	0.6
	3.1	3.0	4.3	5.4	-	3.9	3.2	1.2	-	0.4	-	1.5	0.9	2.8	3.1	1.0
	2.4	3.1	4.4	5.3	-	3.1	3.1	1.0	-	0.4	-	1.9	0.6	4.5	6.0	2.5
TEPIS	5.9	6.0	6.1	4.4	6.2	6.2	6.3	6.3	6.4	-	6.2	6.1	-	-	-	6.8
	5.7	6.0	6.1	4.4	6.2	6.3	6.3	5.9	6.1	-	5.0	4.8	-	-	0.6	6.8
TRIMI	1.2	4.0	4.9	5.5	4.7	1.6	6.8	-	-	-	-	-	-	-	-	5.9
Sum	370.4	298.1	411.7	347.4	339.6	423.0	395.2	229.3	292.7	244.5	232.3	291.0	250.6	163.8	171.9	340.3

3. Results (Meteors)

July	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
ARLRA	18	27	19	-	-	34	7	7	8	39	41	-	-	19	-
BANPE	4	1	8	13	-	5	9	-	-	-	6	-	-	-	7
BERER	-	-	28	25	31	33	35	-	34	40	-	-	-	-	16
	-	-	6	9	10	6	11	-	12	15	-	-	-	-	5
BOMMA	16	5	-	-	-	-	13	13	13	36	15	8	12	22	30
BREMA	4	-	9	7	11	12	4	-	17	13	9	-	-	10	5
BRIBE	7	-	7	4	10	11	9	-	22	23	17	6	-	-	2
	6	4	5	7	4	14	9	-	18	-	21	-	-	-	-
CASFL	15	17	4	27	8	10	3	13	17	37	27	5	-	-	13
	16	12	6	11	8	5	1	6	12	28	18	6	8	14	8
CRIST	8	6	1	8	11	19	5	15	31	19	25	16	19	29	31
	11	3	2	10	9	10	3	9	16	24	13	14	17	23	19
	18	12	4	19	19	26	11	26	53	62	22	30	32	47	44
CSISZ	5	-	10	8	7	4	8	-	-	5	4	10	-	-	7
DONJE	14	13	29	20	13	25	35	21	38	60	29	26	30	36	38
ELTMA	11	2	5	15	7	9	8	-	7	26	-	8	14	18	10
FORKE	15	19	6	1	1	27	-	3	10	29	19	-	-	-	13
GONRU	20	27	31	38	41	41	15	31	28	24	9	15	15	13	5
	14	18	19	22	28	26	8	29	21	29	6	8	11	9	3
	11	5	12	11	13	8	5	18	4	12	-	-	2	-	1
	15	22	28	24	28	33	13	30	28	26	6	10	7	4	-
	15	19	27	16	16	29	6	12	11	37	1	4	4	2	-
GOVMI	8	18	15	14	19	14	17	-	18	32	17	11	-	14	8
	-	-	-	-	-	5	8	-	3	18	4	-	1	12	4
	-	-	-	-	-	-	11	-	7	13	8	-	-	20	7
HERCA	-	23	1	11	1	5	19	20	23	-	-	18	2	3	8
HINWO	13	9	11	1	-	24	-	-	8	26	25	-	-	-	13
IGAAN	-	6	9	2	7	5	2	-	12	12	-	5	-	11	13
	6	7	6	3	7	5	9	-	11	19	9	10	-	2	8
	2	2	3	2	6	2	8	-	4	5	4	-	-	-	6
JONKA	8	4	9	6	8	6	10	-	12	14	11	4	-	3	10
	6	5	9	7	6	4	14	-	11	10	15	-	-	4	7
KACJA	25	8	2	19	17	-	19	-	22	38	-	12	3	35	16
	-	-	3	15	-	-	-	-	-	-	-	-	-	-	-
	8	4	2	2	7	6	7	-	12	15	5	4	5	11	10
	24	2	-	11	23	-	29	-	24	43	-	12	9	51	27
	19	7	3	13	12	-	-	-	14	22	-	3	5	19	12
KISSZ	4	3	6	3	6	4	3	-	11	9	5	1	-	1	9
KOSDE	13	41	70	71	9	3	6	53	47	36	40	3	9	-	12
	26	34	51	28	8	-	-	38	49	48	62	53	4	10	-
	8	-	2	3	7	7	2	-	13	1	1	-	-	-	5
LOJTO	8	2	6	4	6	2	5	-	6	-	-	-	-	-	2
MACMA	28	12	24	21	33	26	27	-	19	3	2	-	21	8	34
	25	18	26	21	16	21	28	1	17	2	-	-	14	9	26
	22	15	16	15	19	6	12	1	8	-	-	-	8	5	15
	36	27	28	24	24	21	34	1	10	1	2	-	17	11	20
MARGR	4	7	9	14	28	23	30	26	17	17	7	13	33	-	-
MARRU	11	13	16	31	26	23	16	17	32	19	25	11	22	15	10
	8	13	8	12	13	27	2	16	20	13	14	16	19	9	5
MASMI	4	6	9	-	-	2	-	10	8	2	4	-	4	5	9
MOLSI	16	31	23	19	31	28	-	1	74	83	48	-	-	18	90
	15	14	13	16	7	15	-	1	21	23	15	-	-	1	26
	18	17	9	14	11	23	-	1	48	45	37	-	-	1	57
	19	47	21	-	-	39	32	6	17	37	34	-	1	16	6
	16	17	11	-	-	22	21	2	13	32	39	-	-	13	-
	3	14	10	-	-	3	-	6	8	24	22	-	-	9	-
	34	26	23	-	-	41	31	2	10	40	33	-	-	14	1
MORJO	6	2	4	8	8	11	9	-	10	13	10	8	-	-	9
MOSFA	5	3	3	11	8	-	2	9	10	17	6	4	6	13	7
OCHPA	5	9	6	9	9	6	1	7	19	8	16	-	-	14	-
OTTMI	6	1	4	4	10	-	3	-	-	-	-	-	17	-	6
PERZS	-	6	6	17	9	17	18	-	7	25	16	8	-	11	18
PUCRC	7	3	4	4	3	3	10	-	2	9	12	4	11	18	4
ROTEC	3	8	4	-	-	14	2	-	-	11	12	-	-	7	-
SARAN	10	9	10	12	10	14	8	13	9	18	12	15	9	2	6
	18	14	11	22	24	19	5	18	7	14	23	19	11	7	8
	17	25	24	29	24	30	12	29	12	30	32	33	9	5	13
	2	3	4	5	10	17	2	16	4	23	21	13	3	1	10
SCALE	7	7	2	11	6	12	3	1	-	13	16	1	8	-	4
SCHHA	4	3	10	6	16	21	9	1	9	6	5	2	-	3	12
SCHRA	8	5	6	10	4	4	5	-	-	-	-	-	-	-	-
SLAST	8	5	1	15	9	3	7	-	15	18	9	6	3	19	14
	3	8	1	2	12	6	3	-	3	10	7	3	7	6	3
STOEN	18	21	10	14	10	18	9	2	20	55	32	16	29	32	20
	7	10	11	14	7	20	6	1	7	35	22	12	23	22	15
	22	27	19	20	10	19	12	2	9	41	37	13	35	27	13
STRJO	2	3	1	5	6	11	8	1	21	17	5	-	-	1	1
	8	7	12	3	1	13	8	-	24	19	3	1	-	4	1
	3	3	5	3	-	14	4	-	7	4	3	-	-	-	-
	13	1	4	1	3	15	5	-	20	11	2	-	-	1	1
	5	2	5	1	8	15	5	-	9	9	5	-	-	-	-
TEPIS	5	3	9	9	10	5	11	-	3	9	10	1	-	8	11
	3	20	18	18	16	13	25	-	30	23	25	6	1	11	16
TRIMI	-	2	-	14	8	6	9	-	4	11	5	4	2	15	8
Sum	875	874	914	964	873	1125	821	535	1290	1735	1122	511	522	803	933

July	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
ARLRA	45	22	10	47	13	16	-	33	22	-	5	31	25	19	59	33
BANPE	7	2	-	4	12	10	11	9	6	-	-	-	2	-	-	38
BERER	31	-	39	-	61	47	53	-	39	-	69	73	-	-	37	75
	10	-	5	-	15	13	8	-	12	-	30	14	-	-	6	26
BOMMA	14	36	26	32	37	26	33	18	33	59	34	65	76	50	-	-
BREMA	4	1	6	16	3	11	11	3	-	3	-	2	-	22	6	6
BRIBE	6	14	6	27	3	4	7	19	3	31	-	13	23	40	35	1
	3	22	2	26	-	5	12	6	8	29	-	30	36	24	5	5
CASFL	28	23	15	24	33	18	22	3	-	18	4	20	5	3	12	33
	28	11	16	19	15	23	24	-	-	17	3	12	4	-	8	26
CRIST	33	18	23	34	28	29	41	39	8	31	25	52	44	12	18	6
	29	9	22	12	24	23	10	40	-	22	-	30	28	16	25	16
	53	26	45	48	59	47	65	91	-	62	34	105	110	28	44	21
CSISZ	9	12	4	10	-	6	25	15	14	13	-	2	27	-	-	32
DONJE	18	44	40	44	45	47	44	24	52	78	58	79	83	54	-	-
ELTMA	7	12	13	10	15	22	16	15	23	19	2	22	44	3	-	28
FORKE	25	14	7	-	7	23	-	15	16	3	-	42	-	68	25	14
GONRU	26	21	33	14	14	52	56	34	21	54	32	63	51	18	5	7
	16	19	26	9	15	38	40	41	19	38	14	57	31	9	4	5
	11	5	14	5	4	15	20	18	3	12	16	31	24	-	-	-
	17	15	37	12	16	50	42	31	13	69	23	71	51	17	5	5
	22	22	21	13	3	33	47	38	11	44	22	72	37	7	-	-
GOVMI	10	10	20	27	22	14	33	8	3	3	7	1	38	1	-	50
	9	2	10	6	4	9	28	5	1	-	1	-	19	1	-	30
	5	2	14	13	14	20	24	2	1	1	2	-	18	2	2	39
HERCA	17	-	3	1	29	17	26	-	13	4	23	15	19	-	14	1
HINWO	29	15	-	-	7	35	-	15	24	13	-	21	9	67	34	19
IGAAN	16	6	12	17	15	13	28	3	8	5	11	18	-	6	9	28
	9	2	-	12	12	11	12	6	10	-	25	5	17	-	-	49
	5	-	1	-	8	6	7	1	6	2	7	10	-	-	3	14
JONKA	-	9	14	-	-	-	-	-	-	5	23	19	-	-	12	38
	9	6	6	8	18	10	18	6	13	3	31	20	-	-	2	30
KACJA	25	-	31	21	12	26	56	-	2	-	-	-	-	-	-	78
	-	-	-	7	-	-	-	-	-	-	-	-	-	-	-	4
	8	9	13	11	6	16	21	-	-	1	-	-	1	-	-	28
	38	-	39	35	15	19	52	-	3	-	-	-	-	-	-	52
	21	-	22	15	6	24	36	-	-	-	-	-	-	-	-	55
KISSZ	4	6	6	7	9	9	13	9	7	-	15	9	1	-	7	1
KOSDE	4	-	60	69	44	-	-	17	81	64	91	83	90	24	-	-
	-	17	60	96	96	50	5	-	108	137	138	3	135	82	-	68
	12	-	-	13	1	18	10	8	-	5	-	-	-	15	17	14
LOJTO	5	-	-	-	-	-	-	-	-	-	-	-	-	-	12	13
MACMA	13	20	7	16	48	22	47	1	64	3	60	3	7	8	43	60
	8	11	10	23	34	17	44	-	48	2	51	9	12	22	66	77
	10	6	3	2	20	9	23	-	27	4	43	-	6	10	47	46
	11	18	4	15	24	23	40	-	45	3	51	6	12	20	71	69
MARGR	-	27	32	24	31	28	13	29	30	19	26	27	44	34	20	8
MARRU	17	12	17	5	-	33	45	52	45	58	58	77	86	50	14	6
	8	8	14	1	3	21	30	13	21	32	24	48	13	-	-	-
MASMI	10	11	6	16	6	16	-	21	23	-	30	14	5	11	-	18
MOLSI	78	65	52	6	29	98	13	3	15	107	-	20	-	81	6	19
	25	16	16	3	7	28	-	4	5	38	-	6	-	39	1	13
	46	22	28	4	16	66	3	3	-	-	-	-	-	-	-	-
	45	38	43	44	-	40	-	75	22	-	12	15	43	11	87	58
	40	31	44	36	1	29	-	46	18	-	5	17	29	4	35	17
	6	18	11	24	-	23	-	15	19	-	8	18	23	11	57	41
	51	47	39	47	-	54	-	43	19	-	4	17	19	11	72	52
MORJO	6	9	10	15	15	5	-	3	13	6	8	8	7	-	16	18
MOSFA	12	13	7	15	7	9	11	-	-	6	-	8	5	3	-	15
OCHPA	15	16	17	20	-	14	-	-	-	27	-	6	-	-	-	-
OTTMI	5	8	8	16	17	19	23	27	19	5	23	15	2	29	19	25
PERZS	29	18	17	-	39	-	39	4	16	-	-	-	41	-	-	32
PUCRC	11	5	13	14	11	14	16	4	18	-	-	-	-	-	-	-
ROTEC	22	11	12	11	-	10	-	25	13	-	4	9	1	-	33	14
SARAN	3	1	23	3	1	16	19	6	21	22	25	37	16	5	3	3
	5	1	20	1	-	33	34	7	22	36	35	50	19	4	3	5
	8	1	26	2	12	39	33	10	41	42	33	72	20	6	3	8
	5	2	16	2	2	17	15	10	15	26	24	33	13	5	1	4
SCALE	12	7	9	10	-	-	10	5	-	4	-	19	-	-	-	15
SCHHA	1	5	4	29	19	1	18	3	15	24	-	4	21	18	33	1
SCHRA	-	-	-	-	10	6	9	-	-	-	-	-	8	-	-	-
SLAST	21	25	22	18	18	24	26	-	-	-	-	-	-	-	-	16
	6	9	13	6	5	11	8	3	1	-	-	-	-	-	-	20
STOEN	25	40	29	38	37	54	39	1	40	20	4	21	60	3	-	59
	27	19	21	23	29	28	31	1	29	13	1	21	50	2	-	43
	33	19	33	44	31	37	39	-	44	26	2	30	69	1	1	68
STRJO	3	9	8	27	-	8	8	1	-	1	-	8	12	33	14	8
	3	5	7	29	-	16	14	6	-	-	-	-	4	33	-	18
	1	4	4	3	-	4	2	3	-	-	-	3	1	26	18	4
	5	5	6	13	-	4	10	1	-	1	-	1	7	30	30	6
	7	7	10	16	-	9	9	3	-	1	-	15	1	32	38	6
TEPIS	7	7	9	4	27	13	18	16	13	-	14	15	-	-	-	38
	13	18	22	9	52	28	38	40	20	-	47	54	-	-	4	58
TRIMI	6	9	9	13	13	5	14	-	-	-	-	-	-	-	-	11
Sum	1327	1055	1422	1411	1304	1786	1697	1056	1324	1371	1337	1796	1704	1130	1141	1967