Results of the IMO Video Meteor Network – August 2014

Sirko Molau, Abenstalstr. 13b, 84072 Seysdorf *2014/12/18*

With 83 active cameras, the participation in the IMO network reached another high in August 2014. One camera appeared for the first time in the statistics - after a longer break we could welcome a new observer again. Rui Marques of Portugal is operating the Watec camera RAN1 with a 4.5 mm f/1.4 lens at a suburb of Lisbon.

Between August 11 and 18 (with one exception), 70 or more of the mentioned 83 cameras were in operation. More than three quarters of all cameras managed to obtain twenty and more observing nights, and five cameras (all in Italy) could even observe without any break. That's an impressive proof that the weather was also in the summer months sympathetic to the observers. Still, with 9,700 hours the effective observing time it fell short by 100 hours compared to 2013, and the gap to the record breaking August 2012 was almost 1,000 hours. Since the Perseids occurred at the time of full moon, also the total meteor count was smaller than in the two years before. Thanks to the average rate of 7.3 meteors per hour, we gathered almost 71,000 meteors which was just 5% below the outcome of 2012 and 2013. So once more August marked the highlight of the year.

Years where the Perseids conjunct with full moon, are no so attractive for visual observers. In addition, the peak ZHR is such years is typically smaller than in years with dark skies. That effect was observed in 2014 again - the IMO quick look analysis yielded a peak ZHR below 80. It can be assumed, that the ZHR is in reality not smaller, but that the correction of the lower limiting magnitude introduces larger systematic errors. Before we focus on that, we first want to check the strength of the 2014 Perseid peak in our video data. Figure 1 compares the flux densities of the last four years. In fact, the video data show the opposite result: With flux densities of up to 50 meteoroids per 1,000 km^2 and hour (calculated with a zenith exponent of γ=1.5), the days near the 2014 Perseid peak perform better than in the three years before.

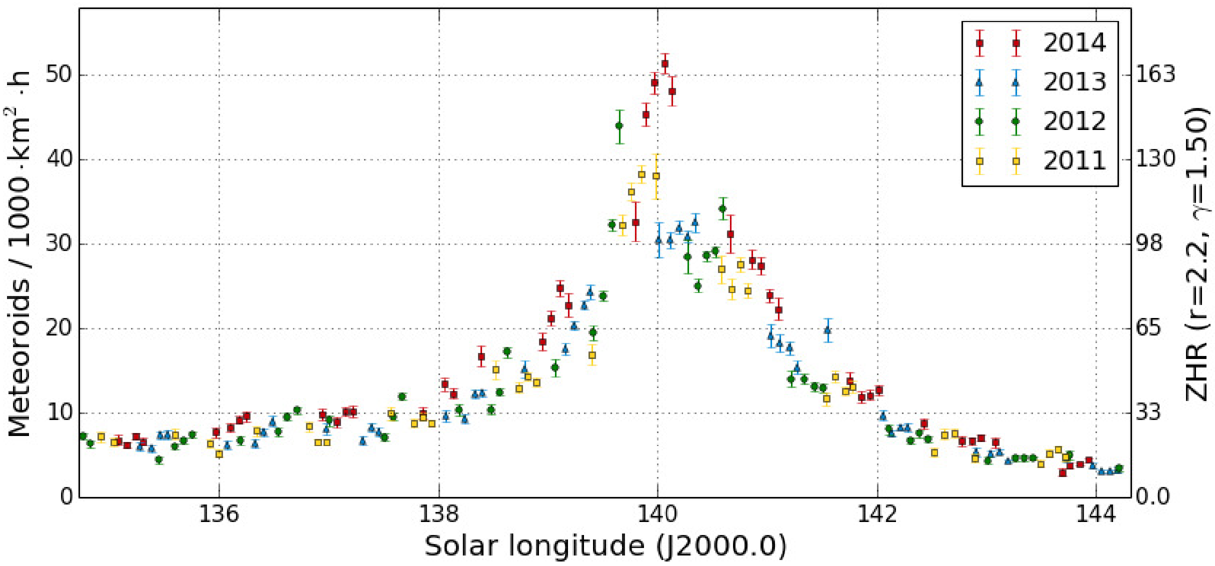

Figure 1: *Flux density profile of the Perseids in the years 2011 till 2014, obtained from observations of the IMO Video Meteor Network.*

For the sake of completeness, figure 2 presents the full Perseid profile, averaged over the last four years.

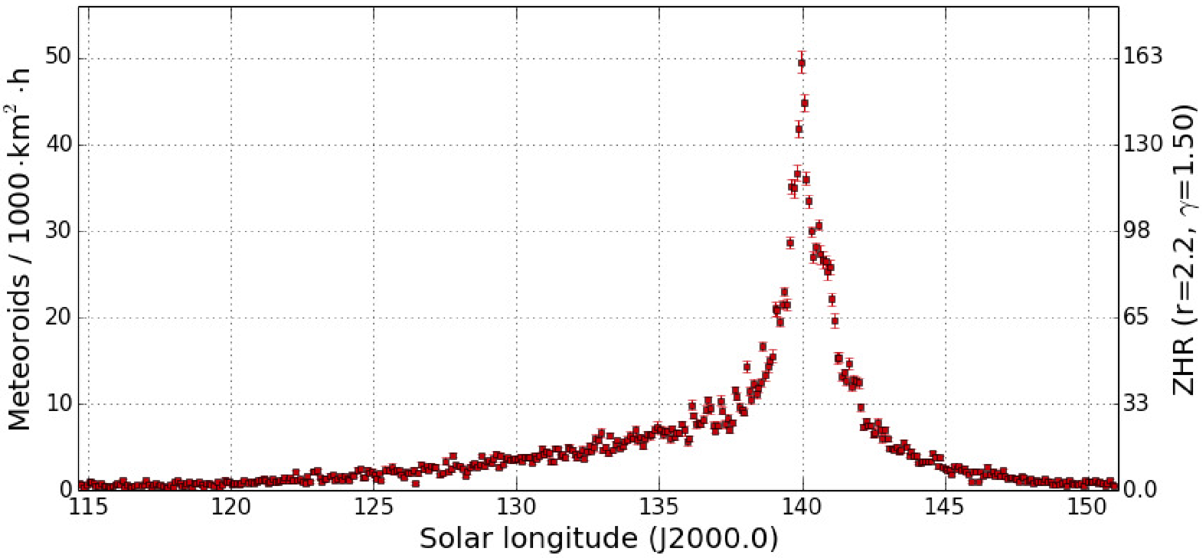

Figure 2: *Averaged flux density profile of the Perseids in the years 2011 till 2014.*

It remains to clarify, why the visual ZHR in full moon years is smaller than in others. A possible explanation is that concentrated observers manage to detect also faint stars in the star fields, but that the detection of faint meteors suffers stronger from the bright, low-contrast background. In particular faint meteors may be overlooked easier. If that's the case, also the population index obtained from visual observations should slightly decrease. So it would be worthwhile to compare the population index beside the flux density in years with full moon.

Of course, we also checked which population index we obtain from our video data. The analysis was carried out for the interval of August 3/4 till August 18/19, when the Perseids clearly stand out from the sporadic background. Figure 3 shows the population index profile for the years 2011 till 2014.

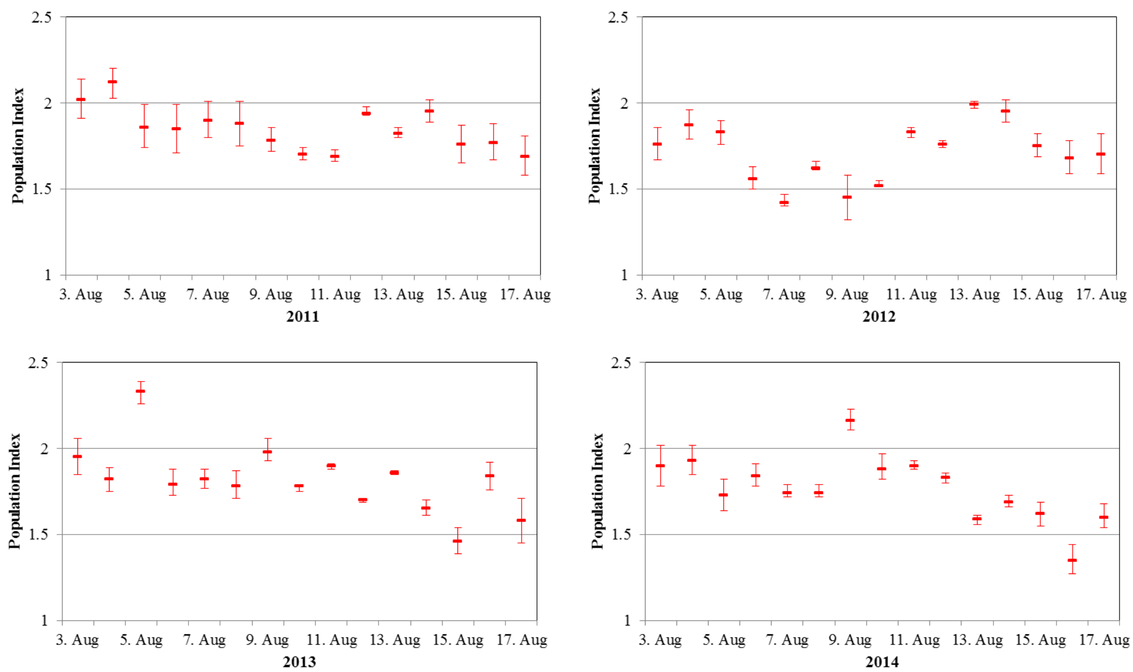

Figure 3: *Population index profile of the Perseids in the year 2011 (up left) till 2014 (down right).*

First we notice that the r-value is overall very small. It often shows values between 1.7 and 1.8 and jumps only occasionally above two. Whereas the population index of 2011 and 2012 shows a clear minimum at the peak and in the days before, it is relatively constant at that time in 2013 and 2014.

In all years, the r-value is decreasing at the end of the activity interval. It often reaches even smaller values than at the Perseid peak (including 2014). That is particularly remarkable, since at the end of the activity interval the „sporadic contamination" is increasing, which should rather push the r-value upward

In most cases, the r-profile is smooth and continuous – subsequent nights have often similar values. However, there are also clear outliers. The population index of August 9/10, 2014, for example, is 0.3 to 0.4 higher than in the nights before and thereafter. That is unrelated to the quality or size of the data set: In all three nights we could use almost a thousand Perseids, and the curves for different limiting magnitude classes intersect perfectly (figure 4).

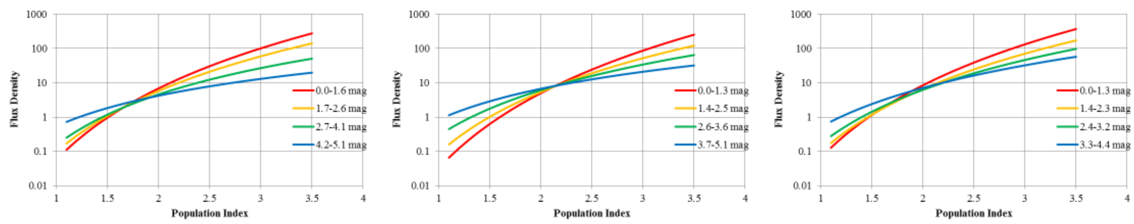

Figure 4: *Dependency of the flux density from the population index for different meteor limiting magnitudes on August 8/9 (left), 9/10 (center), and 10/11 (right).*

Indeed it is questionable, if the r-value of that particular night really deviated by such a large amount. So we were looking for alternative explanations for the outlier.

To eliminate the impact of individual cameras we reduced the data set for testing to those cameras that were active in all three nights. The result was virtually the same.

Since the limiting magnitude classes are adapted to the available data set, the intervals are cut slightly different in each night. The interval for the most sensitive cameras stars at 4.2 mag on August 8/9, for example, at 3.7 mag thereafter and at 3.3 mag on August 10/11. But when the intervals are fixed over all nights, the picture does still not change.

Next we analysed whether the number of limiting magnitude classes has an impact on the outcome. For that we splitted the observing intervals into two, three and four limiting magnitude classes. In case of two, the r-values deviate slightly stronger from night to night, but the result for three and four classes was virtually identical (figure 6). The reason is probably, that cameras with average limiting magnitude, which provide almost no information about the population index in this kind of analysis, have only little impact when three or four classes are used. Only the particular weak and strong meteor cameras count (figure 5). Still, the outlier on August 9/10 remains visible in all three cases.

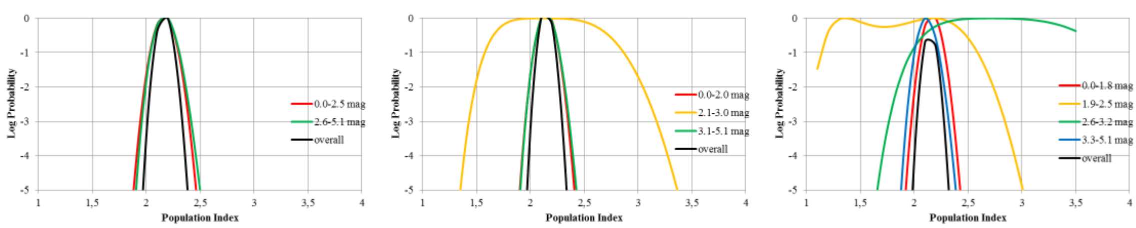

Figure 5: *Probability of individual limiting magnitude classes on August 9/10 for two (left), three (center) and four (right) classes. In case of two classes, all intervalls contribute, whereas in case of three or four classes the intervals with average limiting magnitude (yellow resp. yellow and green line) have only a small impact on the determination of the r-value.*

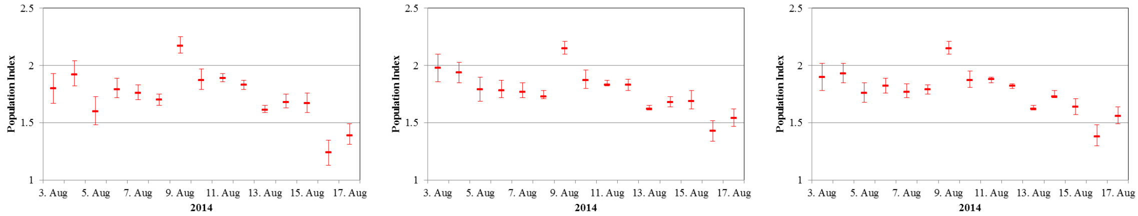

Figure 6: *Population index profile of the Perseids in 2014, calculated with two (left), three (center) and four (right) limiting magnitude classes.*

Finally we calculated the population index profile of sporadic meteors for comparison. Note that for Sporadics no real flux density can be calculated, since there is no defined radiant and, thus, no correction for the impact of the radiant altitude. The workaround of MetRec is to model sporadic meteors as an empirically weighted mix of sporadic sources with known position (N/S Apex, Helion and Antihelion, N/S Toroidal).

It is surprising that the sporadic population index in August (figure 7) is relatively small – instead of the expected typical r-values near three it scatters around 2.5. On August 9/10 there is no particularly large population index, but in the night thereafter it breaks down significantly. Later both the Perseid and the sporadic population index profile show similar deviations, e.g. particularly small values on August 13/14 and 16/17.

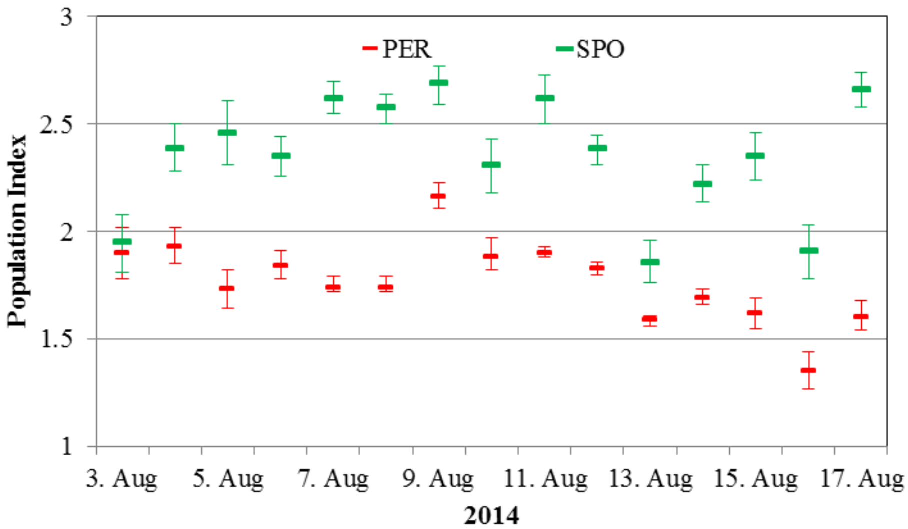

Figure 7: *Population index profile of the Perseids and Sporadics in August 2014.*

So there is no satisfying explanation for the outlier in the population profile on August 9/10, 2014. Our analysis has shown, however, that the algorithm applied by us is relatively robust. Even if different parameters are changed, the obtained r-values change only a little.

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	133.2	1394
BANPE	Bánfalvi	Zalaegerszeg/HU	HUVCSE01 (0.95/5)	2423	3.4	361	23	53.2	449
BERER	Berkó	Ludanyhalaszi/HU	HULUD1 (0.8/3.8)	5542	4.8	3847	21	124.8	1165
			HULUD3 (0.95/4)	4357	3.8	876	21	121.4	383
BOMMA	Bombardini	Faenza/IT	MARIO (1.2/4.0)	5794	3.3	739	31	218.2	2513
BREMA	Breukers	Hengelo/NL	MBB3 (0.75/6)	2399	4.2	699	25	125.7	621
			MBB4 (0.8/8)	1470	5.1	1208	25	130.6	714
BRIBE	Klemt	Herne/DE	HERMINE (0.8/6)	2374	4.2	678	21	87.0	521
		Berg. Gladbach/DE	KLEMOI (0.8/6)	2286	4.6	1080	23	83.3	549
CASFL	Castellani	Monte Baldo/IT	BMH1 (0.8/6)	2350	5.0	1611	31	136.4	858
			BMH2 (1.5/4.5)*	4243	3.0	371	30	122.1	733
CRIST	Crivello	Valbrevenna/IT	BILBO (0.8/3.8)	5458	4.2	1772	31	165.3	1357
			C3P8 (0.8/3.8)	5455	4.2	1586	29	121.1	788
			STG38 (0.8/3.8)	5614	4.4	2007	31	180.0	1517
CSISZ	Csizmadia	Baja/HU	HUVCSE02 (0.95/5)	1606	3.8	390	24	61.8	522
DONJE	Donati	Faenza/IT	JENNI (1.2/4)	5886	3.9	1222	31	228.0	2733
ELTMA	Eltri	Venezia/IT	MET38 (0.8/3.8)	5631	4.3	2151	26	155.1	1320
FORKE	Förster	Carlsfeld/DE	AKM3 (0.75/6)	2375	5.1	2154	18	44.9	452
GONRU	Goncalves	Tomar/PT	TEMPLAR1 (0.8/6)	2179	5.3	1842	30	201.5	1175
			TEMPLAR2 (0.8/6)	2080	5.0	1508	27	177.2	1134
			TEMPLAR3 (0.8/8)	1438	4.3	571	30	183.2	694
			TEMPLAR4 (0.8/3.8)	4475	3.0	442	30	202.0	1610
			TEMPLAR5 (0.75/6)	2312	5.0	2259	30	185.3	1390
GOVMI	Govedic	Sredisce ob Dr./SI	ORION2 (0.8/8)	1447	5.5	1841	25	133.9	996
			ORION3 (0.95/5)	2665	4.9	2069	24	115.2	491
			ORION4 (0.95/5)	2662	4.3	1043	26	114.4	516
HERCA	Hergenrother	Tucson/US	SALSA3 (1.2/4)*	2198	4.6	894	28	160.3	583
HINWO	Hinz	Schwarzenberg/DE	HINWO1 (0.75/6)	2291	5.1	1819	26	103.6	771
IGAAN	Igaz	Baja/HU	HUBAJ (0.8/3.8)	5552	2.8	403	11	56.5	381
		Hodmezovasar./HU	HUHOD (0.8/3.8)	5502	3.4	764	13	72.4	567
		Budapest/HU	HUPOL (1.2/4)	3790	3.3	475	25	116.4	212
JONKA	Jonas	Budapest/HU	HUSOR (0.95/4)	2286	3.9	445	24	139.5	632
KACJA	Kac	Kamnik/SI	CVETKA (0.8/3.8)	4914	4.3	1842	16	65.1	640
		Kostanjevec/SI	METKA (0.8/12)*	715	6.4	640	3	20.1	120
		Ljubljana/SI	ORION1 (0.8/8)	1402	3.8	331	19	69.5	209
		Kamnik/SI	REZIKA (0.8/6)	2270	4.4	840	15	66.5	607
			STEFKA (0.8/3.8)	5471	2.8	379	10	40.9	245
KISSZ	Kiss	Sulysap/HU	HUSUL (0.95/5)*	4295	3.0	355	27	147.9	338
KOSDE	Koschny	Izana Obs./ES	ICC7 (0.85/25)*	714	5.9	1464	30	223.9	2336
		La Palma / ES	ICC9 (0.85/25)*	683	6.7	2951	28	170.3	1982
		Noordwijkerhout/NL	LIC4 (1.4/50)*	2027	6.0	4509	23	91.3	506
LOJTO	Łojek	Grabniak/PL	PAV57 (1.0/5)	1631	3.5	269	15	51.8	209
MACMA	Maciejewski	Chelm/PL	PAV35 (0.8/3.8)	5495	4.0	1584	25	98.3	611
			PAV36 (0.8/3.8)*	5668	4.0	1573	30	118.0	1205
			PAV60 (0.75/4.5)	2250	3.1	281	26	96.0	620
MARGR	Maravelias	Lofoupoli/GR	LOOMECON (0.8/12)	738	6.3	2698	29	233.7	620
MARRU	Marques	Lisbon/PT	RAN1 (1.4/4.5)	4405	4.0	1241	19	125.6	766
MASMI	Maslov	Novosimbirsk/RU	NOWATEC (0.8/3.8)	5574	3.6	773	22	93.5	1063
MOLSI	Molau	Seysdorf/DE	AVIS2 (1.4/50)*	1230	6.9	6152	25	116.5	1364
			MINCAM1 (0.8/8)	1477	4.9	1084	25	104.2	881
		Ketzür/DE	REMO1 (0.8/8)	1467	6.5	5491	29	144.2	1772
			REMO2 (0.8/8)	1478	6.4	4778	27	139.5	1102
			REMO3 (0.8/8)	1420	5.6	1967	17	97.0	707
			REMO4 (0.8/8)	1478	6.5	5358	29	146.5	1429
MOSFA	Moschini	Rovereto/IT	ROVER (1.4/4.5)	3896	4.2	1292	25	65.3	574
OCHPA	Ochner	Albiano/IT	ALBIANO (1.2/4.5)	2944	3.5	358	22	87.6	305
OTTMI	Otte	Pearl City/US	ORIE1 (1.4/5.7)	3837	3.8	460	26	106.1	310
PERZS	Perkó	Becsehely/HU	HUBEC (0.8/3.8)*	5498	2.9	460	19	115.6	1105
PUCRC	Pucer	Nova vas nad Dra./SI	MOBCAM1 (0.75/6)	2398	5.3	2976	21	98.4	788
ROTEC	Rothenberg	Berlin/DE	ARMEFA (0.8/6)	2366	4.5	911	22	127.9	548
SARAN	Saraiva	Carnaxide/PT	RO1 (0.75/6)	2362	3.7	381	26	167.6	554
			RO2 (0.75/6)	2381	3.8	459	29	197.9	1054
			RO3 (0.8/12)	710	5.2	619	29	210.9	1223
			SOFIA (0.8/12)	738	5.3	907	27	182.5	658
SCALE	Scarpa	Alberoni/IT	LEO (1.2/4.5)*	4152	4.5	2052	16	81.9	637
SCHHA	Schremmer	Niederkrüchten/DE	DORAEMON (0.8/3.8)	4900	3.0	409	26	112.2	1075
SLAST	Slavec	Ljubljana/SI	KAYAK1 (1.8/28)	563	6.2	1294	14	50.4	253
STOEN	Stomeo	Scorze/IT	MIN38 (0.8/3.8)	5566	4.8	3270	30	167.3	2171
			NOA38 (0.8/3.8)	5609	4.2	1911	30	166.2	1813
			SCO38 (0.8/3.8)	5598	4.8	3306	29	170.9	2376
STORO	Štork	Kunzak/CZ	KUN1 (1.4/50)*	1913	5.4	2778	1	4.9	71
		Ondrejov/CZ	OND1 (1.4/50)*	2195	5.8	4595	1	9.0	132
STRJO	Strunk	Herford/DE	MINCAM2 (0.8/6)	2354	5.4	2751	29	126.4	733
			MINCAM3 (0.8/6)	2338	5.5	3590	29	109.7	938
			MINCAM4 (1.0/2.6)	9791	2.7	552	29	106.5	770
			MINCAM5 (0.8/6)	2349	5.0	1896	29	115.3	693
			MINCAM6 (0.8/6)	2395	5.1	2178	29	118.5	847
TEPIS	Tepliczky	Agostyan/HU	HUAGO (0.75/4.5)	2427	4.4	1036	28	80.7	457
		Budapest/HU	HUMOB (0.8/6)	2388	4.8	1607	28	94.9	781
TRIMI	Triglav	Velenje/SI	SRAKA (0.8/6)*	2222	4.0	546	20	96.2	406
YRJIL	Yrjölä	Kuusankoski/FI	FINEXCAM (0.8/6)	2337	5.5	3574	11	34.8	294
ZELZO	Zelko	Budapest/HU	HUVCSE03 (1.0/4.5)	2224	4.4	933	7	23.3	104
			HUVCSE04 (1.0/4.5)	1484	4.4	573	6	20.2	78
Sum							31	9762.9	70821

* 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	0.2	4.6	3.6	3.5	3.7	6.4	6.5	6.6	6.5	-	5.5	6.7	0.4	1.5	3.7
BANPE	1.9	2.4	2.6	3.1	-	-	2.6	4.1	1.3	4.5	-	0.3	-	2.0	0.9
BERER	7.0	6.9	0.6	-	-	-	-	4.1	6.5	7.5	2.7	-	2.1	4.6	-
	7.0	6.6	0.5	-	-	-	-	3.9	4.9	6.8	2.8	-	1.5	3.7	-
BOMMA	7.0	5.7	7.5	7.5	7.9	6.8	8.0	7.8	8.0	8.1	8.0	8.2	2.5	8.3	8.0
BREMA	4.5	5.9	1.3	3.5	6.5	-	6.4	-	4.4	6.5	7.0	7.0	5.3	-	-
	3.2	3.8	-	2.7	6.5	-	6.4	0.3	2.7	6.2	6.9	7.0	5.9	-	5.4
BRIBE	0.6	4.0	-	-	-	-	-	-	-	-	-	3.9	7.1	3.2	1.7
	4.1	4.5	0.5	-	6.7	-	6.0	0.7	0.6	5.4	1.1	4.2	3.9	2.1	-
CASFL	1.8	4.2	7.7	0.9	4.9	2.2	1.1	3.5	4.6	3.4	2.1	4.2	5.1	4.5	6.2
	1.1	3.4	7.4	0.9	5.9	2.1	0.9	3.5	4.6	3.8	2.0	4.5	3.8	4.8	6.3
CRIST	5.0	4.9	4.4	5.3	3.3	7.1	5.6	4.7	4.4	4.7	1.9	7.9	7.6	7.6	2.4
	1.2	6.1	5.4	4.9	7.5	7.0	6.4	1.7	4.5	5.2	1.0	1.8	7.0	6.9	2.3
	4.2	7.0	6.5	6.9	4.8	7.2	6.3	5.4	7.1	6.3	4.3	7.9	5.1	7.6	3.6
CSISZ	-	3.0	-	-	-	1.1	2.5	5.0	1.2	4.4	4.3	3.8	6.0	0.6	1.1
DINJE	7.1	5.8	7.6	7.6	8.0	6.6	8.1	8.2	8.0	8.0	8.2	8.2	2.2	8.4	8.3
ELTMA	7.2	4.4	6.5	5.0	6.7	5.5	6.4	5.7	5.0	4.5	5.3	7.5	7.0	5.4	8.4
FORKE	5.3	-	-	-	0.2	2.5	2.1	5.3	4.9	-	0.8	-	-	4.8	-
GONRU	2.1	-	8.2	7.6	5.0	4.4	2.5	3.4	6.3	3.1	8.3	4.3	8.4	8.5	8.5
	2.6	-	8.2	7.7	5.1	3.5	2.2	3.0	6.5	3.3	8.5	4.5	8.6	8.7	8.7
	2.6	-	8.2	8.3	3.2	4.4	2.9	1.7	5.5	2.2	8.5	4.1	8.6	8.5	8.6
	2.3	-	8.2	7.6	4.3	4.2	2.7	3.1	6.3	3.7	8.5	5.0	8.6	8.7	8.7
	2.6	-	8.2	8.1	3.6	4.5	2.9	2.2	5.3	0.9	8.5	4.2	8.6	8.6	8.7
GOVMI	5.5	7.2	7.1	5.2	-	-	6.9	7.5	4.4	7.6	1.6	3.0	0.9	3.5	3.0
	5.1	6.6	6.6	1.9	-	-	6.3	7.6	2.5	6.8	1.5	2.7	0.4	1.1	3.4
	4.6	6.5	6.3	2.5	-	0.2	6.2	7.4	3.8	7.5	1.1	2.4	0.3	1.8	2.4
HERCA	-	-	-	6.1	6.5	6.3	9.1	8.9	3.3	4.9	2.2	2.3	3.2	7.5	1.2
HINWO	5.7	-	1.2	4.5	0.4	6.3	4.9	6.8	6.2	0.4	1.1	6.7	1.2	6.5	0.4
IGAAN	7.1	7.1	-	7.2	-	1.6	2.4	7.6	3.1	6.7	6.2	4.4	3.1	-	-
	7.2	6.7	2.1	4.4	-	4.0	3.7	7.5	7.6	6.5	5.4	7.1	7.7	2.5	-
	5.9	6.2	3.0	6.7	1.1	-	-	7.5	7.6	6.6	1.9	2.7	2.8	2.5	1.5
JONKA	7.1	7.2	4.3	6.0	1.1	-	2.7	7.5	7.6	7.6	2.7	3.5	5.7	7.3	1.1
KACJA	-	-	-	0.4	-	-	-	7.5	-	6.8	0.4	-	-	2.5	0.8
	-	-	-	-	-	-	-	-	-	3.2	-	-	-	-	-
	2.7	6.7	1.4	-	-	6.7	4.6	7.6	-	7.0	0.3	-	1.1	0.4	-
	-	-	-	-	-	-	-	7.7	-	5.6	0.7	-	-	0.9	0.8
	-	-	-	-	-	-	-	-	-	-	-	-	-	2.4	1.1
KISSZ	6.5	6.9	4.6	7.3	0.4	-	1.8	3.2	7.3	6.7	0.6	5.1	7.8	5.8	1.6
KOSDE	6.6	8.6	7.0	8.6	4.5	8.2	8.7	4.6	-	6.3	8.7	8.8	8.9	8.9	8.9
	8.8	-	-	8.8	6.4	6.1	7.4	6.4	5.4	4.5	4.5	4.1	4.1	3.7	4.5
	5.2	-	-	-	4.6	0.9	5.4	-	3.4	4.7	2.7	2.2	4.4	2.7	-
LOJTO	5.2	6.2	4.4	2.3	3.5	0.2	-	-	-	-	-	4.6	-	-	3.3
MACMA	4.3	3.6	5.6	4.9	0.9	1.5	0.6	-	4.0	7.3	0.2	4.9	1.9	0.5	3.1
	6.8	4.9	6.2	4.0	1.6	2.7	1.6	0.9	4.6	7.2	0.7	5.0	3.1	0.4	3.2
	4.4	0.9	1.6	-	-	1.3	0.7	0.3	6.2	7.0	-	5.2	3.3	0.4	2.8
MARGR	8.0	7.6	1.4	6.9	8.7	8.6	8.7	7.4	6.5	4.0	5.6	-	8.1	8.9	9.0
MARRU	-	-	-	-	-	-	-	-	4.2	3.4	8.4	3.2	7.7	8.3	8.1
MASMI	3.0	4.9	5.0	5.1	5.2	5.0	-	5.5	3.7	-	5.7	1.2	3.2	3.5	5.1
MOLSI	6.1	4.4	1.6	-	6.0	3.4	6.5	6.2	6.3	-	1.7	2.1	1.8	3.6	4.7
	6.7	0.9	1.1	-	6.2	3.9	7.0	6.4	5.7	0.4	1.1	0.8	1.5	2.2	2.7
	2.7	5.2	3.5	4.5	6.1	6.4	6.6	6.2	6.5	1.6	5.6	6.3	1.4	0.4	3.1
	2.5	4.5	2.8	3.8	5.4	6.5	6.6	5.8	6.6	0.8	5.6	5.9	1.1	-	3.1
	-	-	-	-	-	-	-	-	-	-	4.4	6.6	1.4	-	3.7
	2.5	4.7	4.1	4.1	5.4	6.5	6.6	6.6	6.7	0.9	5.8	6.4	1.5	0.6	3.4
MOSFA	2.1	1.5	-	1.3	4.6	0.5	-	1.7	1.0	1.9	3.1	2.8	4.4	3.2	4.2
OCHPA	2.3	5.7	1.0	2.4	7.8	1.4	-	0.8	5.6	2.9	-	1.3	5.1	0.3	3.9
OTTMI	4.6	3.9	-	0.6	-	4.1	6.2	3.5	5.1	0.5	1.7	7.7	5.5	6.0	4.2
PERZS	5.2	6.9	7.2	6.3	-	-	7.0	6.9	-	4.7	-	-	-	2.5	2.3
PUCRC	1.3	-	-	-	-	-	7.5	6.0	-	-	4.7	5.7	1.7	1.8	6.9
ROTEC	-	4.1	3.8	-	4.6	5.8	5.8	6.4	6.5	-	5.3	6.6	-	-	3.6
SARAN	-	-	7.7	3.1	-	-	0.8	1.3	4.7	0.5	4.6	2.0	7.6	8.5	8.6
	-	-	8.1	6.5	4.7	2.5	2.6	2.4	7.5	3.9	8.5	2.7	8.5	8.6	8.6
	-	-	8.1	7.2	7.0	4.0	4.0	2.9	7.8	4.4	8.0	2.8	8.5	8.5	8.6
	-	-	8.1	4.8	-	1.1	-	1.3	4.5	2.0	7.8	2.9	8.5	8.6	8.6
SCALE	6.7	-	-	-	-	-	-	-	5.0	-	-	7.3	6.2	3.7	7.2
SCHHA	4.5	5.3	-	1.2	6.1	-	2.5	-	1.0	-	6.4	6.7	6.5	3.2	3.2
SLAST	-	-	-	-	-	-	-	-	0.5	1.4	0.5	-	-	-	2.4
STOEN	4.3	5.3	7.7	4.8	7.1	5.1	7.6	5.4	6.1	4.7	5.7	7.3	6.8	6.0	7.7
	4.7	5.8	6.7	3.7	6.5	4.6	7.8	6.1	7.0	4.8	5.7	7.3	6.8	5.5	7.8
	4.5	5.9	7.7	4.5	7.6	5.6	7.8	7.4	7.3	5.1	6.1	7.1	6.7	6.6	7.4
STORO	-	-	-	-	-	-	-	-	-	-	-	-	-	4.9	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	9.0	-
STRJO	5.9	5.9	1.1	1.9	6.2	-	6.1	1.8	2.4	0.5	5.9	5.1	6.8	3.9	5.1
	5.9	2.7	0.1	0.7	6.1	-	6.0	2.8	2.6	0.9	5.8	5.3	4.7	2.5	4.3
	5.9	5.7	0.8	2.4	6.4	-	5.6	2.3	2.7	1.1	6.0	5.6	6.9	0.5	2.2
	5.6	2.6	1.7	2.2	6.3	-	6.3	1.9	2.4	0.3	5.7	3.8	6.7	2.8	4.7
	6.1	2.3	0.3	1.1	6.1	-	6.1	2.1	2.7	1.3	5.9	5.8	6.9	3.8	5.0
TEPIS	4.5	5.6	3.0	7.0	3.1	-	0.9	7.3	5.0	6.6	2.0	0.5	1.0	1.7	0.9
	2.0	4.0	2.7	4.1	1.3	-	2.5	5.3	3.8	5.8	2.5	0.3	0.6	3.2	1.4
TRIMI	5.1	7.3	5.7	-	-	2.2	7.6	7.7	1.3	-	0.6	-	2.1	5.4	5.7
YRJIL	-	-	-	-	-	-	-	-	-	-	-	3.9	3.1	-	3.7
ZELZO	-	-	-	-	-	-	-	-	-	5.7	-	3.2	3.5	-	-
	-	-	-	-	-	-	-	-	-	7.1	-	3.1	4.2	-	-
Sum	292.0	281.2	265.5	262.1	259.3	198.7	304.2	317.8	324.8	296.6	295.1	319.2	332.2	318.5	315.7

August	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
ARLRA	-	0.7	7.3	4.7	4.5	4.9	6.0	4.2	6.6	-	7.9	8.0	7.9	5.9	-	5.2
BANPE	2.7	5.2	3.8	0.2	-	1.7	1.0	-	0.7	1.8	0.5	3.1	3.1	3.7	-	-
BERER	6.9	7.9	7.2	3.1	3.1	7.8	8.2	-	8.0	6.9	-	7.2	8.5	8.0	-	-
	7.0	8.0	7.3	3.3	3.0	7.7	8.3	-	8.1	6.9	-	7.3	8.7	8.1	-	-
BOMMA	8.1	8.3	8.2	6.0	5.9	8.3	1.0	7.4	5.2	8.8	6.7	8.0	7.7	8.4	8.2	2.7
BREMA	-	0.3	4.8	0.1	5.8	2.9	7.4	7.6	7.1	-	8.1	8.1	0.9	2.1	3.8	8.4
	-	2.1	4.6	6.8	5.7	4.0	7.6	7.4	7.0	-	7.9	8.0	-	0.3	3.8	8.4
BRIBE	3.8	0.4	4.6	6.5	6.3	4.2	3.4	4.9	7.4	-	5.8	7.7	1.3	2.1	1.3	6.8
	5.7	-	4.9	7.0	4.0	2.3	2.4	4.3	5.2	-	1.6	-	-	2.8	-	3.3
CASFL	8.3	8.3	6.8	2.9	4.7	4.4	4.7	7.4	0.9	1.5	1.3	7.7	9.0	7.9	0.3	3.9
	8.1	7.9	5.3	1.2	3.9	1.7	3.5	7.1	0.7	0.6	0.2	6.8	8.9	7.2	-	4.0
CRIST	8.1	6.9	0.5	5.5	7.8	8.2	0.7	4.9	5.9	2.0	0.7	8.5	8.8	7.9	7.7	4.4
	8.1	4.9	-	0.3	2.4	5.7	0.2	1.0	0.5	0.4	-	2.5	8.8	7.4	6.7	3.3
	8.1	6.8	0.5	4.7	7.7	7.8	1.4	5.4	6.8	3.0	0.2	8.2	8.8	8.3	7.7	4.4
CSISZ	2.0	5.0	3.1	1.2	-	2.2	1.8	-	0.2	2.5	-	2.5	3.4	3.1	0.9	0.9
DINJE	8.5	8.5	8.2	6.9	6.5	8.5	2.1	7.8	5.9	8.9	7.2	8.0	9.1	9.1	8.4	4.1
ELTMA	8.4	7.6	8.4	-	3.6	6.3	3.0	7.7	5.9	0.6	-	4.2	-	8.9	-	-
FORKE	-	-	2.5	1.1	1.2	3.4	-	0.4	3.8	-	-	4.5	0.2	1.4	0.5	-
GONRU	8.6	8.5	5.2	5.5	8.8	5.3	8.5	8.9	9.0	3.6	9.1	5.0	8.0	8.9	8.9	9.1
	8.8	8.8	5.1	5.1	9.0	6.3	8.6	9.1	9.1	3.9	9.2	5.2	7.9	-	-	-
	8.7	8.3	1.1	5.6	7.3	3.8	8.2	5.8	8.9	2.9	8.2	4.5	7.8	8.4	7.3	9.1
	8.8	8.7	4.6	4.9	9.0	4.4	8.7	8.7	9.1	3.1	9.2	5.1	8.2	9.2	9.0	9.4
	8.7	8.5	1.1	4.4	7.1	5.5	8.2	6.1	9.1	3.5	8.2	4.6	7.5	8.9	7.6	9.4
GOVMI	3.4	7.8	7.8	-	-	4.4	7.9	-	0.7	6.6	1.5	7.8	8.0	7.8	6.8	-
	3.6	7.3	7.8	-	-	3.7	5.8	-	0.7	6.3	-	7.9	7.2	7.5	4.9	-
	3.2	7.8	6.8	-	-	3.0	7.0	-	0.9	6.2	0.2	7.6	7.2	7.6	3.9	-
HERCA	4.7	2.4	3.4	0.6	7.1	3.7	3.2	8.1	9.4	8.0	0.9	8.6	9.6	9.3	9.9	9.9
HINWO	1.2	2.2	7.5	1.0	3.0	6.8	3.7	-	7.4	-	-	8.1	6.8	3.5	0.1	-
IGAAN	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	5.7	6.9	4.8	-	2.3	8.0	4.0	-	7.9	7.6	-	8.4	0.3	3.8	0.7	-
JONKA	6.8	8.0	5.0	-	2.2	7.8	-	-	6.8	7.3	-	8.7	8.7	6.8	-	-
KACJA	5.1	7.7	4.9	0.8	-	4.4	1.4	-	-	4.5	-	-	7.3	8.8	1.8	-
	-	8.2	-	-	-	-	-	-	-	-	-	-	8.7	-	-	-
	3.8	7.9	3.3	1.9	-	1.4	1.9	0.9	-	4.7	-	-	5.2	-	-	-
	6.6	7.9	4.6	0.6	-	4.3	1.5	-	-	4.9	-	-	8.8	8.9	2.7	-
	6.6	8.1	4.7	0.4	-	4.1	1.5	-	-	4.4	-	-	7.6	-	-	-
KISSZ	7.4	8.0	6.7	0.4	3.8	8.3	5.6	-	7.4	7.7	2.0	7.5	8.7	8.8	-	-
KOSDE	9.0	9.0	9.0	0.8	7.3	8.6	4.8	9.2	9.2	8.9	6.7	1.8	9.3	9.3	9.3	4.4
	-	6.0	7.0	6.4	2.1	7.8	9.4	9.4	1.4	9.4	2.2	9.4	3.2	2.7	9.6	9.6
	-	5.5	2.2	4.7	3.4	-	4.0	4.1	1.4	-	7.5	6.4	6.3	0.9	3.2	5.5
LOJTO	1.6	1.7	-	6.5	-	3.5	3.8	-	1.8	-	-	-	3.2	-	-	-
MACMA	5.3	6.3	5.4	1.7	3.0	8.1	6.2	-	-	6.8	-	-	-	3.6	7.9	0.7
	4.7	6.2	4.5	2.3	2.6	8.0	6.7	0.5	0.4	6.6	0.2	-	7.5	6.6	7.5	0.8
	4.3	5.8	4.2	2.1	2.6	7.1	6.6	0.5	0.3	6.6	-	-	7.4	6.4	7.5	0.5
MARGR	9.1	7.7	8.9	9.2	8.7	-	9.3	9.4	9.2	5.9	9.2	9.5	9.5	9.5	9.6	9.6
MARRU	7.6	7.7	8.3	6.9	-	4.5	6.5	7.2	7.4	0.2	-	-	-	7.8	9.1	9.1
MASMI	2.2	5.6	2.6	0.9	6.6	-	6.7	4.9	3.0	-	-	-	-	-	-	4.9
MOLSI	5.7	7.2	2.3	1.6	0.9	7.5	6.8	-	7.0	-	1.0	7.9	7.9	-	6.3	-
	4.9	7.2	1.8	0.6	1.1	7.7	6.4	-	6.0	-	-	7.6	8.3	-	6.0	-
	-	0.2	6.9	6.0	7.2	4.6	2.5	6.4	7.0	-	7.9	7.9	7.3	7.9	0.2	6.1
	-	0.4	6.9	5.8	7.1	4.4	3.0	6.6	7.3	-	7.9	8.0	7.2	7.4	-	6.5
	-	-	7.0	5.8	7.3	4.9	2.0	6.7	7.3	0.2	8.0	8.1	7.4	7.8	-	8.4
	0.5	-	7.1	5.8	7.3	5.0	2.4	7.0	7.1	0.2	8.0	8.1	7.5	7.6	-	7.1
MOSFA	4.9	4.0	2.8	1.1	2.4	-	2.2	-	2.2	0.5	-	2.4	4.6	3.3	-	2.6
OCHPA	8.4	5.5	-	-	-	5.6	5.0	3.7	-	1.6	-	5.9	6.4	5.0	-	-
OTTMI	4.8	5.2	3.0	5.1	0.7	-	-	6.1	4.2	4.4	1.4	6.1	1.6	-	8.6	1.3
PERZS	2.2	8.1	8.2	-	-	4.8	-	-	-	8.3	1.7	8.7	8.7	8.8	7.1	-
PUCRC	8.1	7.9	4.9	1.0	-	3.6	5.0	3.3	4.9	2.2	-	3.3	3.4	8.6	6.6	-
ROTEC	-	-	6.3	4.8	6.9	5.5	4.2	6.7	7.4	-	7.9	8.1	7.1	7.2	-	3.3
SARAN	8.7	8.7	7.1	7.7	8.6	6.2	8.7	9.0	9.0	4.8	9.1	4.6	8.3	-	8.9	8.8
	8.7	8.7	7.3	7.9	8.4	5.6	8.7	9.0	9.0	3.5	9.1	4.8	7.4	7.1	8.8	8.8
	8.6	8.7	8.1	8.2	8.4	6.6	8.7	8.9	9.0	5.2	9.0	4.8	8.0	9.2	8.9	8.8
	8.7	8.7	5.8	7.0	8.6	6.2	8.7	9.0	9.0	4.2	9.1	4.6	8.1	9.0	8.8	8.8
SCALE	-	6.3	-	3.2	3.0	3.7	1.9	5.3	5.6	-	-	3.0	8.0	5.8	-	-
SCHHA	7.2	1.3	2.1	6.8	5.2	4.1	2.8	5.5	3.4	-	5.4	5.9	2.4	2.1	4.2	7.2
SLAST	-	7.5	5.3	3.4	-	1.1	2.3	0.6	-	4.3	-	-	7.7	8.5	4.9	-
STOEN	8.3	7.3	7.2	4.1	3.6	4.2	4.3	5.7	6.5	0.5	-	2.9	9.0	9.0	2.8	0.3
	8.4	7.5	6.9	4.2	3.0	3.8	4.8	5.9	6.6	0.7	-	3.1	9.1	9.1	1.9	0.4
	8.4	7.7	7.3	4.1	3.5	4.7	4.6	5.4	5.4	1.0	-	1.2	9.1	8.9	2.3	-
STORO	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
STRJO	2.2	1.2	2.1	7.0	3.4	4.4	1.7	6.2	6.6	-	7.4	8.0	2.9	4.2	4.2	6.3
	1.6	0.6	1.0	5.0	3.1	4.2	1.0	6.3	6.3	-	7.1	8.0	2.5	3.0	3.2	6.4
	1.7	0.2	1.3	7.0	2.8	4.5	0.8	2.5	7.4	-	6.3	8.0	2.4	3.5	2.0	2.0
	1.8	0.5	0.7	6.9	3.5	3.9	1.4	6.2	7.0	-	7.8	8.0	2.5	3.1	3.0	6.0
	1.8	1.1	1.3	6.9	3.3	4.1	1.5	6.3	6.4	-	7.6	8.0	2.4	2.7	2.9	6.7
TEPIS	3.6	3.6	1.6	1.7	0.6	4.7	1.6	-	3.9	1.1	0.5	4.3	2.9	1.0	0.5	-
	5.2	5.8	3.8	1.1	0.8	3.4	2.4	-	3.3	1.8	2.0	8.1	8.1	6.9	2.7	-
TRIMI	5.3	6.5	8.2	-	-	2.7	0.6	-	-	5.1	-	-	7.8	8.9	0.4	-
YRJIL	-	4.4	-	-	-	3.5	3.2	1.4	4.4	-	1.5	-	2.3	-	3.4	-
ZELZO	4.5	-	1.7	-	-	-	-	-	-	4.3	-	0.4	-	-	-	-
	-	-	1.9	-	-	-	-	-	-	3.0	-	0.9	-	-	-	-
Sum	373.5	425.3	362.4	264.0	282.7	360.0	321.6	310.0	375.6	230.4	248.1	397.1	463.3	423.2	285.2	257.6

3. Results (Meteors)

August	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
ARLRA	1	27	24	34	37	70	65	90	78	-	89	177	2	17	17
BANPE	12	22	23	30	-	-	24	46	10	57	-	3	-	20	7
BERER	116	93	3	-	-	-	-	38	59	104	23	-	18	52	-
	34	26	1	-	-	-	-	7	17	22	7	-	7	17	-
BOMMA	74	62	95	71	107	111	124	111	108	113	126	303	25	135	83
BREMA	14	12	6	13	28	-	48	-	14	24	86	106	57	-	-
	13	13	-	14	36	-	36	1	12	44	64	124	67	-	36
BRIBE	1	24	-	-	-	-	-	-	-	-	-	65	106	10	9
	32	20	1	-	38	-	37	2	1	60	11	85	55	9	-
CASFL	8	18	63	6	53	10	5	16	19	21	22	62	46	32	49
	4	14	61	4	42	7	5	16	22	28	18	85	49	30	46
CRIST	36	32	48	50	40	66	53	32	29	44	13	152	134	90	23
	6	33	25	38	50	63	44	12	38	36	7	1	106	60	13
	27	57	29	49	52	81	53	38	77	71	48	152	67	86	23
CSISZ	-	21	-	-	-	6	21	43	9	37	35	36	72	6	8
DINJE	108	54	98	72	108	123	127	134	116	125	136	333	20	137	93
ELTMA	48	25	66	17	61	57	70	70	37	37	40	173	91	75	77
FORKE	67	-	-	-	1	22	16	66	58	-	6	-	-	53	-
GONRU	6	-	38	59	15	16	12	7	41	5	91	94	98	77	75
	12	-	56	63	22	18	10	8	36	17	108	97	117	82	71
	7	-	30	34	3	11	9	9	16	4	73	80	88	51	51
	12	-	85	49	27	12	19	17	41	23	164	168	206	113	92
	12	-	75	83	11	30	20	22	22	4	150	158	136	84	54
GOVMI	37	48	68	22	-	-	31	69	38	72	17	28	2	26	43
	16	23	28	5	-	-	36	49	19	37	11	23	3	8	27
	21	25	35	9	-	1	25	50	25	50	12	23	1	11	16
HERCA	-	-	-	21	20	20	45	47	13	23	16	22	40	42	4
HINWO	41	-	8	32	2	32	28	63	55	2	6	165	10	58	2
IGAAN	37	32	-	36	-	9	13	50	13	41	65	62	23	-	-
	36	23	6	27	-	12	17	38	52	44	66	113	110	23	-
	14	7	5	19	4	-	-	16	20	20	9	12	10	5	5
JONKA	40	27	4	34	2	-	14	35	46	32	25	26	49	62	15
KACJA	-	-	-	2	-	-	-	113	-	91	2	-	-	30	6
	-	-	-	-	-	-	-	-	-	16	-	-	-	-	-
	6	23	3	-	-	18	16	22	-	20	2	-	5	3	-
	-	-	-	-	-	-	-	93	-	58	3	-	-	11	4
	-	-	-	-	-	-	-	-	-	-	-	-	-	26	9
KISSZ	22	11	5	15	1	-	4	12	13	26	4	35	47	19	7
KOSDE	116	110	76	111	23	65	85	58	-	62	112	171	140	119	107
	157	-	-	151	45	68	121	133	111	77	83	80	36	26	41
	32	-	-	-	24	4	40	-	13	22	18	24	72	18	-
LOJTO	14	14	8	2	5	1	-	-	-	-	-	90	-	-	15
MACMA	43	30	16	39	5	4	3	-	21	49	2	129	16	3	10
	53	63	30	39	8	20	8	6	51	123	5	285	48	2	19
	37	8	10	-	-	9	4	3	44	63	-	141	27	1	11
MARGR	25	28	3	30	34	27	24	30	14	6	7	-	38	36	37
MARRU	-	-	-	-	-	-	-	-	31	26	118	113	105	74	38
MASMI	36	46	23	53	50	62	-	76	46	-	108	18	92	43	84
MOLSI	129	59	6	-	94	20	114	60	64	-	3	15	7	44	52
	107	13	5	-	56	17	93	71	68	3	3	10	20	22	17
	19	33	20	68	65	93	93	95	111	25	156	261	19	2	10
	9	30	13	38	46	65	72	57	48	4	54	120	6	-	11
	-	-	-	-	-	-	-	-	-	-	84	179	18	-	15
	11	23	12	55	23	60	72	68	66	4	137	211	17	2	13
MOSFA	13	13	-	7	49	3	-	13	6	23	27	41	47	29	36
OCHPA	5	17	4	5	40	2	-	3	15	10	-	24	40	2	20
OTTMI	12	15	-	2	-	9	10	12	18	3	8	61	25	22	17
PERZS	53	65	75	34	-	-	101	117	-	47	-	-	-	23	17
PUCRC	15	-	-	-	-	-	73	41	-	-	46	113	10	11	76
ROTEC	-	12	10	-	23	26	30	35	25	-	51	104	-	-	7
SARAN	-	-	33	22	-	-	3	6	22	2	26	16	41	43	36
	-	-	52	32	16	4	7	19	42	36	100	67	110	84	59
	-	-	49	54	38	8	9	18	56	23	95	55	102	80	61
	-	-	22	13	-	7	-	9	18	10	47	42	99	58	36
SCALE	33	-	-	-	-	-	-	-	35	-	-	191	86	35	50
SCHHA	33	31	-	11	60	-	15	-	11	-	121	185	168	51	27
SLAST	-	-	-	-	-	-	-	-	4	9	4	-	-	-	22
STOEN	47	53	108	28	107	75	109	98	73	61	39	197	180	88	112
	41	48	52	22	106	67	79	57	44	35	46	203	213	63	97
	36	48	111	30	147	75	132	88	101	83	85	248	224	101	128
STORO	-	-	-	-	-	-	-	-	-	-	-	-	-	71	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	132	-
STRJO	40	21	3	4	48	-	37	5	7	3	57	72	112	20	33
	52	9	1	4	69	-	56	15	11	8	120	165	62	12	41
	45	17	5	5	56	-	40	10	15	11	89	132	151	3	17
	42	9	4	5	33	-	45	7	6	1	47	103	114	15	29
	41	3	2	3	52	-	41	8	12	11	91	162	130	25	39
TEPIS	10	20	10	32	8	-	6	49	31	44	26	3	5	7	5
	18	43	22	51	8	-	26	65	40	71	35	2	5	31	21
TRIMI	22	27	16	-	-	10	28	37	4	-	4	-	17	38	42
YRJIL	-	-	-	-	-	-	-	-	-	-	-	123	46	-	26
ZELZO	-	-	-	-	-	-	-	-	-	23	-	34	19	-	-
	-	-	-	-	-	-	-	-	-	18	-	26	23	-	-
Summe	2266	1680	1790	1858	2098	1596	2603	2811	2438	2404	3609	7179	4557	2996	2499

August	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
ARLRA	-	4	105	69	31	44	45	27	72	-	78	87	50	34	-	20
BANPE	17	40	29	1	-	11	8	-	5	12	2	22	23	25	-	-
BERER	96	102	83	21	7	62	62	-	46	24	-	71	53	32	-	-
	34	37	22	15	5	23	21	-	20	17	-	14	21	16	-	-
BOMMA	122	101	65	37	53	76	3	39	46	49	40	55	69	61	42	7
BREMA	-	1	12	1	17	7	15	25	30	-	35	25	1	6	3	35
	-	7	22	18	22	9	19	30	22	-	36	23	-	2	11	33
BRIBE	27	1	22	46	29	17	17	28	28	-	22	32	2	6	3	26
	33	-	26	62	21	10	9	14	6	-	5	-	-	5	-	7
CASFL	74	54	34	5	37	19	13	43	3	4	8	24	45	30	2	33
	62	50	22	4	27	7	5	29	6	2	1	15	27	25	-	20
CRIST	82	55	1	18	45	43	3	15	33	5	3	54	47	46	31	34
	92	22	-	2	6	20	1	6	4	3	-	15	35	21	12	17
	82	56	2	23	56	59	4	14	44	10	1	61	66	49	41	39
CSISZ	16	45	22	8	-	16	13	-	3	21	-	20	25	24	6	9
DINJE	131	120	66	40	62	75	8	14	42	60	47	68	79	78	45	14
ELTMA	93	49	47	-	34	28	6	37	17	1	-	14	-	50	-	-
FORKE	-	-	22	6	9	28	-	4	30	-	-	51	1	9	3	-
GONRU	61	45	19	21	44	9	35	23	57	10	29	10	54	50	33	41
	70	45	12	21	43	14	38	27	40	12	43	13	39	-	-	-
	34	18	1	12	8	3	27	13	24	1	17	3	19	16	10	22
	69	63	11	20	50	8	57	39	37	9	31	15	50	34	48	41
	64	56	2	32	27	13	45	20	45	10	35	13	46	43	30	48
GOVMI	33	73	64	-	-	25	42	-	3	48	3	48	61	56	39	-
	17	32	32	-	-	15	10	-	2	17	-	18	23	26	14	-
	20	41	26	-	-	14	19	-	4	18	1	19	20	22	8	-
HERCA	16	7	4	2	25	3	3	25	29	19	1	18	27	32	32	27
HINWO	4	14	60	5	15	32	13	-	48	-	-	52	12	11	1	-
IGAAN	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	7	14	2	-	2	9	4	-	11	3	-	8	1	4	1	-
JONKA	26	51	18	-	8	23	-	-	21	16	-	21	20	17	-	-
KACJA	43	101	35	6	-	31	7	-	-	24	-	-	71	71	7	-
	-	52	-	-	-	-	-	-	-	-	-	-	52	-	-	-
	11	33	5	5	-	4	8	5	-	4	-	-	16	-	-	-
	89	102	29	1	-	26	8	-	-	17	-	-	90	70	6	-
	38	72	23	2	-	16	3	-	-	14	-	-	42	-	-	-
KISSZ	10	21	11	1	2	10	7	-	11	10	2	10	7	15	-	-
KOSDE	89	82	79	7	48	80	30	82	96	65	51	6	69	85	56	56
	-	54	61	34	12	81	92	107	8	96	16	63	23	10	96	100
	-	29	11	16	17	-	15	15	3	-	56	33	16	2	12	14
LOJTO	5	3	-	19	-	10	8	-	4	-	-	-	11	-	-	-
MACMA	30	32	30	7	13	45	30	-	-	18	-	-	-	4	30	2
	33	55	37	26	12	50	52	2	1	28	1	-	70	22	50	6
	17	26	17	10	4	33	31	3	2	20	-	-	48	15	34	2
MARGR	30	23	20	19	17	-	22	22	25	6	12	28	16	13	12	16
MARRU	32	20	30	19	-	18	22	23	29	1	-	-	-	26	20	21
MASMI	17	53	14	6	75	-	78	33	18	-	-	-	-	-	-	32
MOLSI	57	137	9	8	15	122	71	-	61	-	3	78	114	-	22	-
	40	80	8	3	5	63	40	-	27	-	-	29	65	-	16	-
	-	1	114	91	65	55	13	55	74	-	61	79	36	34	1	23
	-	1	76	68	57	29	4	32	61	-	64	64	28	31	-	14
	-	-	49	59	36	16	2	25	54	1	48	59	24	19	-	19
	1	-	79	96	70	27	12	57	74	1	62	96	34	28	-	18
MOSFA	48	29	24	7	20	-	15	-	15	3	-	17	38	25	-	26
OCHPA	38	25	-	-	-	9	10	7	-	1	-	10	10	8	-	-
OTTMI	18	13	4	12	2	-	-	8	8	5	3	9	5	-	8	1
PERZS	23	119	90	-	-	15	-	-	-	47	7	69	83	62	58	-
PUCRC	76	56	35	8	-	14	17	29	21	8	-	13	35	49	42	-
ROTEC	-	-	30	10	11	24	4	21	26	-	30	32	19	16	-	2
SARAN	18	20	16	19	30	17	22	34	21	11	27	8	22	-	14	25
	29	37	26	32	29	8	33	33	39	12	25	12	30	18	31	32
	54	40	40	32	45	23	58	40	42	22	35	15	39	39	25	26
	30	19	15	11	20	10	22	26	35	7	17	9	20	18	13	25
SCALE	-	42	-	21	22	14	2	18	19	-	-	10	30	29	-	-
SCHHA	62	8	11	47	35	18	16	24	5	-	42	26	14	9	18	27
SLAST	-	62	30	13	-	1	2	1	-	14	-	-	41	37	13	-
STOEN	156	105	67	44	40	37	23	41	45	4	-	12	102	90	28	2
	135	89	63	40	28	27	11	27	37	4	-	14	78	70	15	2
	144	100	65	52	39	40	21	33	37	6	-	7	82	94	19	-
STORO	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
STRJO	9	4	5	41	12	9	8	39	40	-	28	39	7	7	7	16
	5	6	2	33	6	23	4	44	41	-	39	60	19	6	4	21
	4	3	4	46	9	8	1	6	24	-	22	34	4	6	2	1
	5	1	1	34	16	7	7	43	28	-	32	32	9	3	5	10
	8	8	4	26	9	9	3	26	25	-	32	45	4	10	2	16
TEPIS	31	19	8	12	2	25	8	-	25	7	3	28	21	7	5	-
	55	59	32	7	5	26	23	-	26	8	6	39	33	20	4	-
TRIMI	27	31	32	-	-	9	2	-	-	10	-	-	24	24	2	-
YRJIL	-	28	-	-	-	9	16	4	16	-	2	-	8	-	16	-
ZELZO	14	-	4	-	-	-	-	-	-	8	-	2	-	-	-	-
	-	-	4	-	-	-	-	-	-	6	-	1	-	-	-	-
Summe	2913	3103	2202	1539	1511	1820	1428	1437	1901	859	1164	1977	2525	1922	1108	1028