Results of the IMO Video Meteor Network – September 2015

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2015 confirmed its reputation as an unusually wealthy year for meteor observers. Even though a first glimpse shows larger gaps in the observing statistics, the weather was quite cooperative, in particular in Germany. Three out of four cameras obtained twenty or more observing nights. In the greater Berlin area, three REMO cameras of Sirko Molau and LUDWIG2 of Rainer Arlt could even operate without any break. For this reason, the output of these cameras was particularly high with over a thousand meteors each. Only two Italian wide-angle cameras and the image-intensified systems in Bavaria and on the Canary Islands were similar successful. In fact, Sirko could record for the first time over 10,000 meteors in a single month with all his cameras. That has not even achieved in August so far!

September 1/2 and 9/10 were the best nights with 75 active cameras each, Already for the fifth time in 2015, the overall effective observing time in a single month was a 5-digit figure. With over 11,000 hours, September ranks fourth in the IMO network long-term statistics. Also the output of over 53,000 meteors is unique; more meteors were only recorded in October 2011 (with particularly strong Orionids) an in August 2011-2015. Compared to the previously best September result, we achieved an increase of 40% in meteor detections.

Already in August Detlef Koschny activated a second image-intensified camera LIC1 on Tenerife. The camera is identical to LIC1, which Detlef operates at his Dutch home in Noordwijk. Data from this camera are reported here for the first time, the August data will be submitted later.

September is renowned for a number of minor showers or "streamlets" which often show irregular activity. In some years a few radiants are active, in other years different radiants. Maybe that's not even a special characteristic of September, but at least there is growing suspicion here, because meteor shower analyses often reveal different results. Three minor meteor shower candidates shall be analysed in more detail now.

The first shower is the kappa Cepheids (751 KCE). This shower was recently detected by Croatian meteor observers and has "pro tempore" status in the MDC list. Showers are first marked like this, before they are taken over into the ordinary working list after an independent check. In this case, there was even a possible parent body identified: 2009SG18.
At the 2015 IMC, Damir Segon pointed to possible enhanced activity in the morning hours (UT) of September 21, 2015. Indeed, Jürgen Rendtel visually spotted a handful of shower meteors in the relevant interval, but significance was low because of the small sample size.

After we re-calculated the shower assignment of all meteors, we could not confirm this observation. The shower does not stand out of the sporadic background at any time (figure 1). Depending on the parameter choice, different peaks can be seen at different times, but they are of no significance. In addition we checked which radiants could be detected in the video data of September 20/21 (177°-178° solar longitude). None of the intersection areas matched even remotely to the given position.
The analysis of a million video meteors in 2012 showed some individual radiants between 174° and 180° solar longitude. All of them are farther north with a declination beyond 80°, their rank is partly beyond 20 and the shower parameters (α, δ, v_{geo}, rank) vary strongly from one night to the next. Hence, also in this data set we cannot identify the kappa Cepheids.

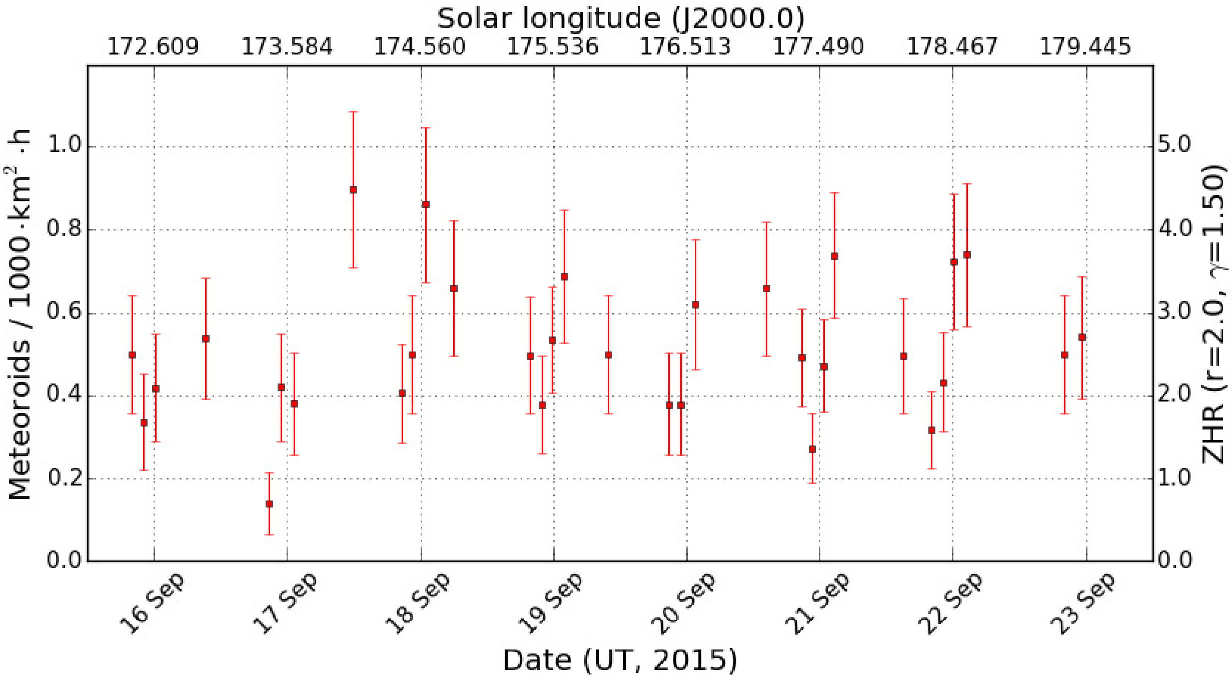

Figure 1: *Flux density profile of the kappa Cepheids 2015, derived from observations of the IMO video network. The shower does not stand out from the sporadic background.*

Beyond that, Jürgen reported "suspicious activity" from a radiant near α=95°, δ=67° on the morning of September 17 (174° solar longitude). Once more we re-calculated the radiants in that particular night, but there was no hit. Only in the following night we found one reasonable candidate with α=97°, δ=63° and v_{geo}=59 km/s. However, that one was at the bottom of the list and, thus, rather a chance alignment.
Also the 2012 analysis yielded a radiant in close temporal (173° solar longitude) and spatial (α=100°, δ=66°, v_{geo}=58 km/s) vicinity. However, also that one had a rank of 44 and must be rather rated as statistical fluctuation.

The third meteor shower candidate are the chi Cygnids (757 CCY) which were announced in an IAU telegram. There Peter Jenniskens reported an "outburst" of a new cometary meteor shower. In the night of September 14/15, five (!) similar orbits were obtained by the CAMS Benelux network. In the same night, CAMS California could provide an additional four orbits. At 172° solar longitude, the radiant was located at α=301.0° and δ=32.6° with v_{geo}=15.1 km/s. Also Yasuo Shiba from the SonotaCo Network pointed by email to an unknown meteor shower, that was observed between September 20 and 22. At 177° solar longitude, the average radiant position was about α=298°, δ=36° with v_{geo}=15.5 km/s. According to Shiba, the shower had not been detected in Japan between 2007 and 2014.

But was it indeed a new meteor shower?

Once more, we first turned to the analysis of 2012. To relieve the search for unknown meteor showers, I prepared an EXCEL files with macros two years ago (http://www.imonet.org/imc13/search_shower.xlsm). There you only have to enter the observed radiant position, and EXCEL will calculate if there are similar radiants in our list. In addition you can check if there is a hit in the MDC list or the CMOR data. Indeed, we found immediately a number of matches in close spatial and temporal vicinity (table 1, left column).

Table 1: *Individual radiants from the chi Cygnids, derived from observations of 1999-2011 as well as 2012 to 2015. Rk is the rank of the radiant.*

	1999-2011 (76,000 Met)			2012 (25,500 Met)			2013 (25,000 Met)			2014 (22,500 Met)			2015 (39,000 Met)		
SL	α / δ	v_{geo}	Rk	α / δ	v_{geo}	Rk	α / δ	v_{geo}	Rk	α / δ	v_{geo}	Rk	α / δ	v_{geo}	Rk
162													303 / 21	13	10

163				310 / 33	15	48							303 / 25	14	4
164													305 / 22	10	6
165	295 / 33	19	25				308 / 25	14	31				303 / 25	15	6
166	297 / 34	19	20							298 / 35	13	26	303 / 26	13	5
167													304 / 27	14	3
168	303 / 29	18	11				294 / 33	13	26				303 / 27	14	2
169	302 / 31	17	8	298 / 39	19	29							304 / 30	14	2
170	302 / 31	17	7				302 / 29	10	46				302 / 29	14	2
171	302 / 32	18	6	307 / 38	15	43	300 / 36	18	24	302 / 29	15	13	301 / 31	13	2
172	302 / 32	19	6				302 / 30	14	42				302 / 35	13	3
173	303 / 34	17	11	309 / 37	19	18				299 / 30	14	27	302 / 33	13	1
174													300 / 34	13	1
175	299 / 38	18	9										300 / 36	14	1
176	300 / 39	18	9				303 / 25	15	46	305 / 34	14	22	300 / 37	14	1
177	296 / 40	19	20	310 / 39	17	27	305 / 29	17	41	309 / 34	15	12	298 / 37	13	1
178	298 / 38	18	10				299 / 25	13	36				296 / 39	13	4
179	300 / 39	19	25										298 / 39	13	2
180													296 / 42	13	4
181													296 / 41	13	4

The radiant becomes visible at about 165° to 166° solar longitude, peaks around 171° to 172° and disappears at 173° solar longitude. Between 175° and 179° solar longitude it re-occurs, but with a position 5° more north. It remains an open question whether it is in fact one or two meteor showers.

Did we miss this meteor shower in our 2012 analysis? Not at all! The unknown shower was automatically recognized by our search routine, and we reported about this candidate in the September 2012 report. At the IMC 2013, when the full list of IMO network meteor showers was presented, we listed this shower candidate with number C8. The position given there matched perfectly to the data given in the telegram (table 2).

Thus, we could identify this shower in our 1999-2011 data set. But was there indeed an "outburst" on September 14/15, 2015? We took the meteor shower parameters of 2012 (see table 2), re-calculated the meteor shower assignment for 2012 till 2015 and determined the flux density profile (figure 2). In 2015, the flux density was poor with a rate of about 0.5 meteoroids per 1,000 km^2 and hour. Still this activity level was higher than in the three years before, which probably just reflect the sporadic background. There was no particular peak on September 14/15.

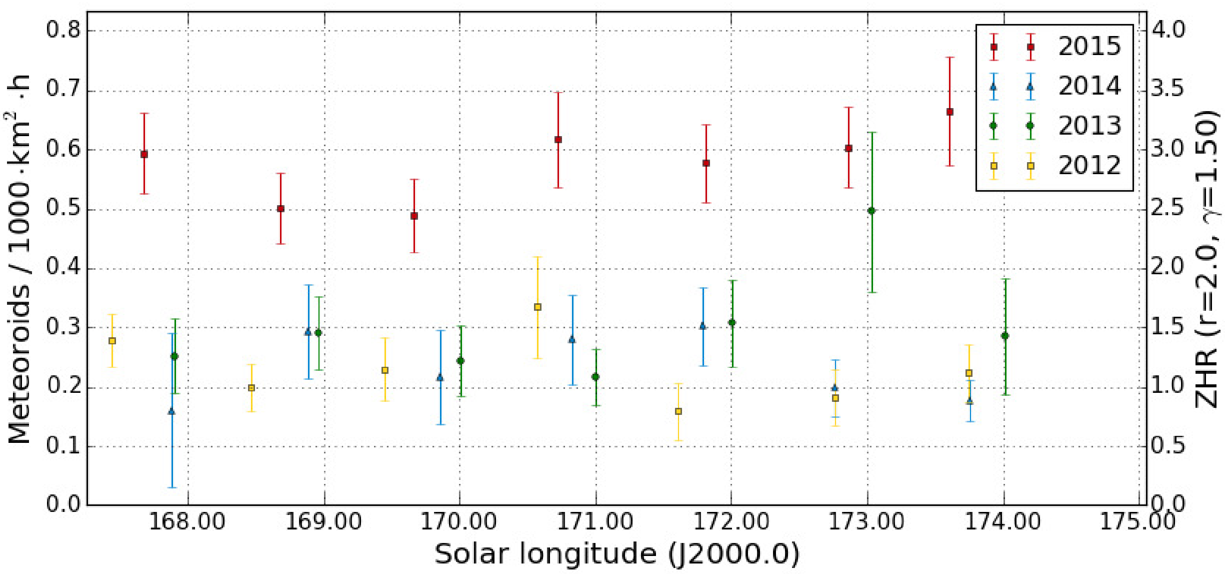

Figure 2: *Flux density profile of the chi Cygnids 2012-2015, derived from observations of the IMO video network with the shower parameters of 2012.*

Next we re-calculated the radiants per night for 2012 till 2015. The data sets are only one third to one half of the 1999-2011 data set. The shower can hardly be detected in the years 2012-2014, only sometimes we find radiants with similar parameters, but also a large rank. In 2015, however, the chi Cygnids are the strongest meteor source in the sky between solar longitude 173° and 177°! The analysis had to be extended several times, because the activity interval was much larger than expected. In the end, we confirmed activity of the shower between 162° and 181° solar longitude without any doubt. The meteor shower was more and longer active than in the years before. That was probably the reason, why it was detected both in the CAMS and SonotaCo network data of 2015.

The 2015 data set confirms that we are dealing here with a single shower, not two. Also the radiant drift can be determined precisely now thanks to the long activity interval. The drift in right ascension has a different sign than given by MDC. The difference in the radiant position of Jenniskens and Shiba confirm our value, though.

Table 2: *Parameters of the chi Cygnids from the MDC Working List and the analyses of the IMO Network in 2012 and 2015.*

Source	**Solar Longitude**		**Right Ascension**		**Declination**		**Vinf**	
	Mean [°]	**Interval [°]**	**Mean [°]**	**Drift [°]**	**Mean [°]**	**Drift [°]**	**Mean [km/s]**	**Drift [km/s]**
MDC	170.5	-	300.5	+0.68	+31.1	+0.2	14.65	-
IMO 2012	171	168-173	302	-0.0	+32.0	+0.9	14	-
IMO 2015	173	162-181	300.3	-0.4	+33.4	+1.1	13.3	-

Last but not least we re-calculated the flux density of 2015 once more with the new parameters of table 2. The result is given in figure 3. The activity shows significant fluctuations and the peak occurred between September 14 and 17.

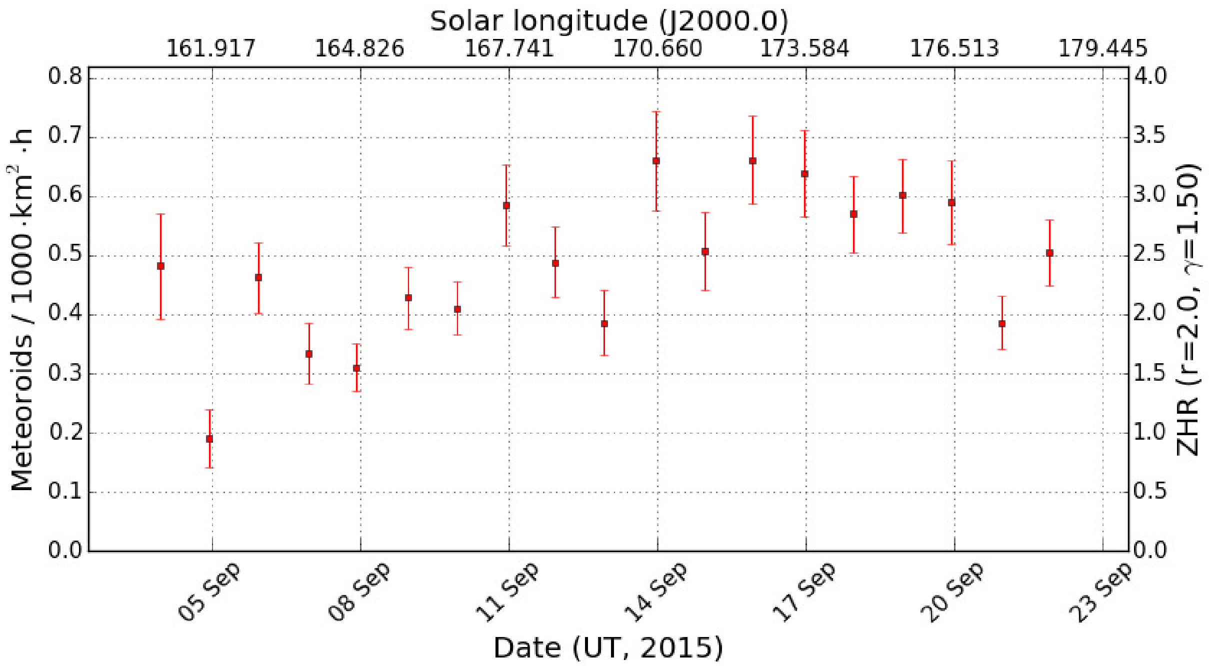

Figure 3: *Flux density profile of the chi Cygnids 2015, derived from observations of the IMO video network with the new shower parameters of 2015.*

1. Observers

Code	Name	Place	Camera	FOV [^{o2}]	St.LM [mag]	Eff.CA [km^2]	Nights	Time [h]	Meteors
ARLRA	Arlt	Ludwigsfelde/DE	LUDWIG2 (0.8/8)	1475	6.2	3779	30	189.5	1561
BANPE	Bánfalvi	Zalaegerszeg/HU	HUVCSE01 (0.95/5)	2423	3.4	361	12	27.2	202
BERER	Berkó	Ludanyhalaszi/HU	HULUD1 (0.8/3.8)	5542	4.8	3847	11	92.1	535
			HULUD3 (0.95/4)	4357	3.8	876	1	8.8	18
BOMMA	Bombardini	Faenza/IT	MARIO (1.2/4.0)	5794	3.3	739	29	173.8	898
BREMA	Breukers	Hengelo/NL	MBB3 (0.75/6)	2399	4.2	699	22	133.0	444
BRIBE	Klemt	Herne/DE	HERMINE (0.8/6)	2374	4.2	678	26	144.6	594
		Berg. Gladbach/DE	KLEMOI (0.8/6)	2286	4.6	1080	23	117.2	431
CASFL	Castellani	Monte Baldo/IT	BMH1 (0.8/6)	2350	5.0	1611	25	140.1	522
			BMH2 (1.5/4.5)*	4243	3.0	371	23	123.1	438
CRIST	Crivello	Valbrevenna/IT	BILBO (0.8/3.8)	5458	4.2	1772	28	180.4	813
			C3P8 (0.8/3.8)	5455	4.2	1586	26	135.6	497
			STG38 (0.8/3.8)	5614	4.4	2007	29	199.4	1418
CSISZ	Csizmadia	Baja/HU	HUVCSE02 (0.95/5)	1606	3.8	390	16	112.1	225
DONJE	Donati	Faenza/IT	JENNI (1.2/4)	5886	3.9	1222	26	168.7	1001
ELTMA	Eltri	Venezia/IT	MET38 (0.8/3.8)	5631	4.3	2151	24	147.7	587
FORKE	Förster	Carlsfeld/DE	AKM3 (0.75/6)	2375	5.1	2154	24	133.5	726
GONRU	Goncalves	Tomar/PT	TEMPLAR1 (0.8/6)	2179	5.3	1842	28	209.6	915
			TEMPLAR2 (0.8/6)	2080	5.0	1508	28	204.5	696
			TEMPLAR3 (0.8/8)	1438	4.3	571	28	190.7	352
			TEMPLAR4 (0.8/3.8)	4475	3.0	442	27	205.3	734
			TEMPLAR5 (0.75/6)	2312	5.0	2259	26	171.2	746
GOVMI	Govedic	Sredisce ob Dr./SI	ORION2 (0.8/8)	1447	5.5	1841	19	125.4	567
			ORION3 (0.95/5)	2665	4.9	2069	18	95.7	248
			ORION4 (0.95/5)	2662	4.3	1043	13	74.3	187
HERCA	Hergenrother	Tucson/US	SALSA3 (0.8/3.8)	2336	4.1	544	26	192.1	526
HINWO	Hinz	Schwarzenberg/DE	HINWO1 (0.75/6)	2291	5.1	1819	26	152.3	826
IGAAN	Igaz	Debrecen/HU	HUDEB (0.8/3.8)	5522	3.2	620	20	134.3	263
		Hodmezovasar./HU	HUHOD (0.8/3.8)	5502	3.4	764	21	113.2	269
		Budapest/HU	HUPOL (1.2/4)	3790	3.3	475	4	32.0	25
JONKA	Jonas	Budapest/HU	HUSOR (0.95/4)	2286	3.9	445	20	132.6	238
			HUSOR2 (0.95/3.5)	2465	3.9	715	20	140.1	255
KACJA	Kac	Kamnik/SI	CVETKA (0.8/3.8)	4914	4.3	1842	16	84.4	596
		Ljubljana/SI	ORION1 (0.8/8)	1402	3.8	331	22	100.3	250
		Kamnik/SI	REZIKA (0.8/6)	2270	4.4	840	15	85.5	878
			STEFKA (0.8/3.8)	5471	2.8	379	10	60.1	327
KOSDE	Koschny	Izana Obs./ES	ICC7 (0.85/25)*	714	5.9	1464	27	222.9	2141
			LIC1(2.8/50)*	2255	6.2	5670	26	182.8	1564
		La Palma / ES	ICC9 (0.85/25)*	683	6.7	2951	29	174.9	2891
		Noordwijkerhout/NL	LIC4 (1.4/50)*	2027	6.0	4509	20	106.9	194
LOJTO	Łojek	Grabniak/PL	PAV57 (1.0/5)	1631	3.5	269	5	26.6	34
LOPAL	Lopes	Lisboa/PT	NASO1 (0.75/6)	2377	3.8	506	28	87.5	346
MACMA	Maciejewski	Chelm/PL	PAV35 (0.8/3.8)	5495	4.0	1584	24	135.6	731
			PAV36 (0.8/3.8)*	5668	4.0	1573	22	123.7	647
			PAV43 (0.75/4.5)*	3132	3.1	319	21	134.5	488
			PAV60 (0.75/4.5)	2250	3.1	281	23	139.3	781
MARGR	Maravelias	Lofoupoli/GR	LOOMECON (0.8/12)	738	6.3	2698	11	102.4	243
MARRU	Marques	Lisbon/PT	CAB1 (0.8/3.8)	5291	3.1	467	28	200.1	734
			RAN1 (1.4/4.5)	4405	4.0	1241	28	207.4	601
MASMI	Maslov	Novosimbirsk/RU	NOWATEC (0.8/3.8)	5574	3.6	773	14	69.7	344
MOLSI	Molau	Seysdorf/DE	AVIS2 (1.4/50)*	1230	6.9	6152	24	161.2	1921
			ESCIMO2 (0.85/25)	155	8.1	3415	22	146.7	310
			MINCAM1 (0.8/8)	1477	4.9	1084	22	139.1	980
		Ketzür/DE	REMO1 (0.8/8)	1467	6.5	5491	30	207.4	2106
			REMO2 (0.8/8)	1478	6.4	4778	30	214.3	1765
			REMO3 (0.8/8)	1420	5.6	1967	26	174.9	1084
			REMO4 (0.8/8)	1478	6.5	5358	30	218.4	1889
MORJO	Morvai	Fülöpszallas/HU	HUFUL (1.4/5)	2522	3.5	532	18	134.8	255
MOSFA	Moschini	Rovereto/IT	ROVER (1.4/4.5)	3896	4.2	1292	22	23.3	150
OCHPA	Ochner	Albiano/IT	ALBIANO (1.2/4.5)	2944	3.5	358	8	16.9	128
OTTMI	Otte	Pearl City/US	ORIE1 (1.4/5.7)	3837	3.8	460	26	145.2	313
PERZS	Perkó	Becsehely/HU	HUBEC (0.8/3.8)*	5498	2.9	460	20	135.0	785
ROTEC	Rothenberg	Berlin/DE	ARMEFA (0.8/6)	2366	4.5	911	27	192.0	436
SARAN	Saraiva	Carnaxide/PT	RO1 (0.75/6)	2362	3.7	381	28	201.3	411
			RO2 (0.75/6)	2381	3.8	459	27	209.4	614
			RO3 (0.8/12)	710	5.2	619	26	208.8	628
			SOFIA (0.8/12)	738	5.3	907	28	216.2	462
SCALE	Scarpa	Alberoni/IT	LEO (1.2/4.5)*	4152	4.5	2052	24	129.4	280
SCHHA	Schremmer	Niederkrüchten/DE	DORAEMON (0.8/3.8)	4900	3.0	409	22	114.8	555
SLAST	Slavec	Ljubljana/SI	KAYAK1 (1.8/28)	563	6.2	1294	20	96.0	369
			KAYAK2 (0.8/12)	741	5.5	920	18	94.6	115
STOEN	Stomeo	Scorze/IT	MIN38 (0.8/3.8)	5566	4.8	3270	25	129.6	843
			NOA38 (0.8/3.8)	5609	4.2	1911	26	128.5	663
			SCO38 (0.8/3.8)	5598	4.8	3306	25	126.5	847
STRJO	Strunk	Herford/DE	MINCAM2 (0.8/6)	2354	5.4	2751	27	148.0	810
			MINCAM3 (0.8/6)	2338	5.5	3590	27	121.2	662
			MINCAM4 (1.0/2.6)	9791	2.7	552	24	78.0	135
			MINCAM5 (0.8/6)	2349	5.0	1896	29	142.8	532
			MINCAM6 (0.8/6)	2395	5.1	2178	25	127.5	491
TEPIS	Tepliczky	Agostyan/HU	HUAGO (0.75/4.5)	2427	4.4	1036	23	138.5	371
			HUMOB (0.8/6)	2388	4.8	1607	22	138.9	646
TRIMI	Triglav	Velenje/SI	SRAKA (0.8/6)*	2222	4.0	546	14	52.0	148
YRJIL	Yrjölä	Kuusankoski/FI	FINEXCAM (0.8/6)	2337	5.5	3574	19	94.6	318
Sum							30	11250.5	53569

* active field of view smaller than video frame

2. Observing Times (h)

September	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
ARLRA	2.5	6.5	4.4	4.8	5.9	4.1	7.7	7.3	7.3	2.6	4.7	2.5	6.4	8.4	7.7
BANPE	2.9	1.1	1.5	-	-	2.7	0.5	2.5	2.8	-	2.8	3.5	2.0	-	-
BERER	8.7	-	-	-	-	-	9.0	8.9	8.9	-	-	9.0	7.9	-	-
	8.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BOMMA	4.0	8.8	4.2	0.2	8.8	9.0	9.6	9.7	9.6	9.5	9.7	9.8	2.0	3.3	7.4
BREMA	8.5	3.7	5.4	-	5.1	-	-	9.0	9.1	9.1	8.7	-	2.2	3.1	3.1
BRIBE	8.2	-	0.6	-	4.9	-	1.7	7.3	9.1	9.2	7.4	0.6	2.2	7.8	3.6
	6.8	1.1	2.0	-	2.1	-	2.1	-	8.9	8.9	5.3	-	-	5.4	3.0
CASFL	9.1	1.8	5.1	2.2	9.4	8.6	5.7	7.3	2.1	0.9	5.6	0.6	-	5.8	2.6
	8.9	1.6	3.9	-	9.2	8.3	4.7	6.3	1.3	-	6.8	-	-	3.7	1.3
CRIST	4.3	5.9	8.5	-	9.2	9.2	9.3	9.3	8.1	2.5	3.6	6.2	-	7.0	0.3
	0.1	1.6	1.1	-	9.1	9.2	9.3	9.2	7.1	1.4	3.2	2.2	-	0.2	-
	5.0	8.2	8.8	0.2	9.2	9.2	9.3	9.3	8.6	3.0	4.1	6.3	-	7.2	1.0
CSISZ	8.1	7.4	6.2	-	-	8.3	6.7	9.1	-	-	2.1	-	9.3	4.1	8.1
DONJE	3.0	8.9	5.4	0.5	8.7	9.4	9.6	9.6	9.7	9.8	-	9.6	3.2	3.9	8.2
ELTMA	7.7	2.9	5.3	0.3	7.1	9.0	9.4	8.6	8.2	8.8	9.2	9.7	-	6.0	5.3
FORKE	-	-	1.1	8.8	-	-	8.4	0.2	8.9	7.2	5.9	2.9	6.7	3.3	6.2
GONRU	6.8	1.9	3.9	4.6	9.5	9.6	9.4	8.4	3.3	9.8	-	4.7	6.3	7.4	-
	6.8	2.3	4.1	4.7	9.6	9.7	-	8.7	3.0	9.9	0.6	4.3	6.8	7.3	-
	3.7	0.4	3.5	3.4	9.2	8.6	9.4	7.2	4.3	9.7	0.5	0.7	5.9	6.6	-
	7.5	1.5	4.4	4.5	9.6	9.7	9.2	8.2	2.1	9.9	-	3.4	5.0	6.7	-
	2.9	0.5	3.4	3.6	8.3	9.4	9.1	7.3	4.1	9.7	-	1.3	5.2	7.3	-
GOVMI	8.8	8.2	0.9	-	-	3.7	2.7	7.7	6.4	-	9.2	9.5	7.8	5.0	4.3
	8.2	7.3	0.6	-	-	0.2	2.8	7.5	5.6	-	8.1	9.5	7.3	2.9	0.2
	8.8	7.9	-	-	-	0.1	2.6	7.2	6.4	-	9.1	9.5	7.1	2.7	-
HERCA	0.3	2.4	4.6	7.0	-	8.8	8.7	4.2	4.0	-	3.8	9.2	5.1	3.8	8.8
HINWO	-	2.8	3.6	8.9	2.6	0.4	8.9	1.3	9.2	6.3	8.9	3.6	5.7	2.9	6.3
IGAAN	6.2	7.2	1.3	2.3	-	9.2	5.7	4.9	5.4	-	-	9.3	8.1	2.9	5.2
	6.8	4.5	0.8	-	0.7	6.9	7.5	6.9	4.3	-	2.7	7.1	7.3	2.9	7.5
	-	-	-	-	-	-	-	8.7	8.9	-	-	5.3	9.1	-	-
JONKA	8.9	5.9	2.5	-	-	9.2	8.2	9.4	7.4	-	-	9.6	9.6	-	1.6
	8.9	4.4	3.1	-	-	9.2	8.1	9.2	8.4	-	-	9.6	9.6	-	2.2
KACJA	9.2	0.2	2.4	-	-	9.2	9.2	-	8.8	0.3	9.0	-	-	-	1.4
	8.7	3.6	3.3	-	-	4.5	9.3	4.0	9.4	-	4.8	8.2	2.8	1.6	3.8
	8.2	0.6	2.9	-	-	8.7	9.4	-	9.3	-	9.1	-	-	-	1.6
	8.5	0.7	3.1	-	-	9.2	9.3	-	9.3	-	8.1	-	-	-	-
KOSDE	9.3	9.4	9.4	9.4	8.3	9.5	9.5	9.5	9.6	5.9	9.6	9.7	9.7	9.7	9.8
	3.7	4.2	-	6.0	6.3	7.5	8.5	9.6	9.9	6.2	9.9	7.8	9.9	7.5	10.0
	7.0	7.2	7.6	7.2	6.4	7.2	7.4	7.1	6.8	4.1	7.3	7.7	7.4	6.4	6.6
	5.6	6.2	-	-	-	-	-	-	-	-	-	1.8	-	8.8	2.4
LOJTO	4.4	-	1.7	-	-	-	-	-	-	6.3	-	-	5.5	-	-
LOPAL	8.2	5.5	1.6	4.5	6.9	8.1	5.9	4.5	1.3	2.2	-	0.6	1.2	1.8	-
MACMA	7.1	-	5.7	8.1	0.8	1.1	-	1.7	7.5	9.2	-	-	4.1	2.1	7.6
	7.6	-	6.5	7.6	-	0.8	-	0.8	-	9.1	-	-	4.1	1.9	6.0
	8.0	-	6.2	7.5	1.1	-	-	1.4	6.9	8.3	-	-	4.1	1.6	6.7
	8.3	-	7.2	8.1	-	1.5	-	1.1	6.8	8.8	-	-	4.2	2.0	7.8
MARGR	-	-	9.7	9.7	9.7	-	9.7	9.8	-	-	-	7.6	9.0	9.7	9.9
MARRU	9.0	3.0	5.5	7.7	7.8	8.7	9.0	7.7	2.6	9.0	1.0	2.3	4.6	9.1	-
	8.8	2.7	2.0	7.1	7.5	8.5	8.9	9.0	6.6	8.7	-	2.8	6.3	4.9	-
MASMI	7.6	5.1	-	5.2	2.5	-	5.3	4.9	2.9	7.9	-	-	-	3.8	1.8
MOLSI	-	3.3	0.8	2.3	-	7.7	1.2	2.5	8.6	8.8	8.4	8.9	7.0	-	6.1
	-	0.4	-	0.4	-	2.1	-	2.9	9.1	9.2	8.8	9.3	7.0	-	5.8
	-	1.8	-	2.1	-	4.9	-	2.0	8.8	8.9	8.1	9.0	6.0	-	4.9
	5.4	7.5	5.2	5.9	6.0	3.7	8.7	8.5	8.8	3.0	5.7	2.8	4.7	8.1	8.4
	5.1	7.2	5.2	6.6	6.5	4.1	8.8	8.8	8.9	3.7	6.0	3.4	5.3	9.0	8.7
	6.0	7.8	6.7	6.7	6.4	1.1	8.7	8.8	9.0	3.5	6.4	2.7	5.2	6.8	8.6
	6.4	7.6	6.4	6.6	6.9	4.4	8.9	8.9	9.0	3.5	5.5	3.4	5.1	8.6	8.6
MORJO	8.9	6.6	5.4	-	-	9.2	9.1	9.4	5.2	-	-	-	9.0	2.9	6.6
MOSFA	1.7	0.3	0.5	-	2.0	1.8	1.4	1.1	0.2	-	1.6	-	-	0.9	0.2
OCHPA	3.5	-	-	0.7	0.8	3.3	4.4	2.3	0.2	-	1.7	-	-	-	-
OTTMI	4.2	3.5	7.2	4.2	6.9	-	1.9	0.3	2.4	-	4.8	9.2	9.8	8.1	3.5
PERZS	8.2	8.1	3.5	-	-	8.9	-	8.1	9.0	-	9.4	9.6	8.7	3.9	4.8
ROTEC	-	8.2	4.1	3.7	4.7	4.1	8.6	8.3	7.4	-	6.9	4.0	7.8	8.1	7.6
SARAN	8.5	4.5	3.9	7.0	8.4	9.4	9.7	7.6	5.2	9.5	-	2.1	5.2	5.4	-
	9.5	3.7	1.1	5.8	7.8	9.4	9.7	6.9	4.5	8.9	-	2.0	5.6	5.2	-
	9.3	4.6	-	7.0	7.9	9.2	9.4	7.5	4.9	8.8	-	3.3	6.3	5.4	-
	9.6	4.8	5.2	6.9	7.9	9.5	9.4	7.7	5.2	9.1	-	1.7	6.4	5.5	-
SCALE	6.1	1.9	5.5	0.4	5.9	8.5	8.5	7.4	6.3	9.1	8.6	9.2	0.2	6.0	2.5
SCHHA	7.9	1.8	1.5	-	5.0	-	3.5	3.0	8.9	5.7	5.2	-	-	7.9	-
SLAST	8.1	2.2	4.0	-	-	3.6	7.1	-	-	-	8.1	8.9	2.6	3.3	5.1
	8.2	2.8	4.4	-	-	-	-	-	-	-	5.9	9.0	2.8	5.2	6.2
STOEN	8.5	1.0	4.2	2.0	6.1	6.6	7.3	4.8	4.4	6.6	9.6	7.7	-	4.3	3.4
	8.3	1.2	5.2	1.7	6.3	7.5	7.7	4.4	3.2	5.9	9.6	7.9	0.3	3.8	3.6
	8.2	0.9	4.8	1.5	5.9	5.6	7.5	4.4	3.2	6.2	9.7	7.5	0.4	4.6	3.0
STRJO	7.8	-	2.4	1.3	4.8	-	7.4	6.0	9.0	7.2	9.1	0.6	3.5	7.9	4.3
	7.0	0.8	1.6	1.1	2.8	-	6.8	6.0	8.9	6.5	9.2	0.5	3.4	7.1	4.0
	1.6	0.2	0.3	-	3.0	-	6.2	4.8	9.1	5.7	9.1	-	1.6	7.1	4.2
	8.1	2.1	0.8	0.4	4.0	-	7.1	6.1	9.0	7.5	9.2	0.3	3.6	7.1	4.3
	8.1	0.5	-	1.1	4.1	-	7.2	5.3	9.1	6.4	9.2	-	2.9	7.3	3.7
TEPIS	8.7	6.7	4.8	-	-	6.6	4.1	8.9	6.4	0.1	-	9.4	7.9	2.8	1.7
	8.7	6.7	-	-	-	7.8	4.7	8.9	5.8	-	2.1	9.4	7.5	3.1	3.2
TRIMI	2.8	-	2.1	-	-	8.1	6.4	8.4	6.0	-	3.6	2.9	3.9	1.5	-
YRJIL	6.8	-	-	3.9	5.3	5.0	0.3	6.6	3.9	7.0	-	-	2.9	7.1	-
Sum	511.6	273.8	271.8	223.4	320.9	418.3	488.4	478.1	489.8	365.0	362.3	352.7	363.3	362.5	292.3

September	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
ARLRA	3.2	6.4	8.7	2.8	8.7	5.9	4.6	8.6	8.9	4.6	8.6	9.4	9.0	8.3	9.0
BANPE	-	-	-	-	1.6	3.3	-	-	-	-	-	-	-	-	-
BERER	8.3	9.4	5.2	-	-	9.6	-	-	-	-	-	-	-	7.2	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BOMMA	5.9	8.6	5.9	9.8	6.4	10.4	5.1	1.3	0.8	5.9	5.2	1.6	-	1.1	0.2
BREMA	0.4	3.5	-	5.2	-	-	-	3.2	1.0	8.2	9.3	4.1	10.1	10.5	10.5
BRIBE	3.3	7.7	3.9	1.3	3.2	-	0.5	4.5	2.2	4.0	10.3	10.4	10.4	9.7	10.6
	1.1	5.4	-	2.8	4.3	-	1.9	3.1	0.7	4.8	7.9	10.0	9.9	9.6	10.1
CASFL	9.8	3.9	10.2	9.9	8.2	1.6	-	6.4	7.2	9.4	-	-	-	3.5	3.2
	9.0	1.6	9.9	9.2	7.7	1.2	0.2	5.1	7.2	9.0	-	-	-	3.7	3.3
CRIST	9.8	5.6	9.9	2.6	10.0	8.9	1.6	4.1	8.0	4.7	4.0	4.7	4.9	10.4	7.8
	0.4	1.5	9.5	2.1	9.8	6.7	-	3.3	7.6	10.2	3.6	3.0	6.3	10.4	7.5
	9.7	4.9	9.9	3.3	10.0	9.3	2.6	5.2	8.4	9.9	5.5	5.5	6.8	10.5	8.5
CSISZ	-	-	8.5	1.7	6.3	10.5	-	6.4	-	-	-	-	-	-	9.3
DONJE	6.8	9.0	7.6	10.2	7.1	10.4	6.5	1.4	1.3	6.5	-	1.6	-	0.8	-
ELTMA	7.0	6.3	8.1	10.2	1.1	9.3	-	-	-	0.2	-	1.5	0.3	6.2	-
FORKE	7.6	1.6	5.6	1.9	-	9.0	-	7.7	10.1	0.2	1.4	1.4	7.8	10.5	9.1
GONRU	8.4	10.1	10.1	10.2	10.1	6.4	10.1	8.1	9.2	6.8	1.9	10.2	2.4	9.6	10.4
	8.8	10.2	10.2	10.3	10.2	6.5	10.2	8.2	9.3	6.9	2.2	10.6	2.3	10.1	10.7
	8.3	10.0	10.1	10.1	10.1	5.3	7.3	6.9	8.6	4.0	-	9.7	5.8	10.7	10.7
	8.5	10.2	10.2	10.3	10.3	6.1	9.2	8.1	9.3	7.0	-	10.6	3.1	10.0	10.7
	8.3	10.0	10.0	10.1	10.1	4.0	7.3	6.9	8.5	-	-	7.7	1.5	5.6	9.1
GOVMI	7.2	7.5	5.6	-	9.9	10.0	8.9	-	2.1	-	-	-	-	-	-
	2.8	3.4	4.1	-	9.6	10.0	5.6	-	-	-	-	-	-	-	-
	4.8	4.0	4.1	-	-	-	-	-	-	-	-	-	-	-	-
HERCA	4.5	10.5	9.5	6.8	8.9	-	-	7.6	10.5	10.6	10.8	10.1	10.7	10.5	10.4
HINWO	7.0	4.5	7.2	2.9	-	9.3	-	7.5	10.1	-	0.7	2.4	9.5	10.4	9.4
IGAAN	7.9	9.6	9.4	4.5	-	10.1	4.9	9.8	-	-	-	-	-	-	10.4
	5.5	6.6	5.8	1.1	-	7.5	7.3	6.6	-	-	-	-	-	-	6.9
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
JONKA	8.1	9.5	5.7	4.2	8.6	5.0	6.6	8.4	-	-	-	-	-	3.5	0.7
	8.9	9.4	6.5	3.9	8.0	9.5	8.0	8.7	-	-	-	-	-	3.5	1.0
KACJA	-	-	-	1.0	9.9	8.6	3.7	-	-	-	0.7	5.7	5.1	-	-
	-	3.7	3.1	0.5	7.2	8.0	2.4	-	-	-	0.5	4.9	5.4	0.6	-
	-	-	-	0.8	10.0	8.7	4.6	-	-	-	0.3	6.0	5.3	-	-
	-	-	-	-	-	-	-	-	-	-	1.1	5.7	5.1	-	-
KOSDE	9.8	3.9	1.4	9.8	9.9	6.7	10.0	-	-	-	2.0	6.8	6.8	9.9	7.6
	10.0	2.5	7.4	8.5	10.1	9.8	-	-	3.9	3.8	5.6	-	4.6	4.8	4.8
	6.9	2.9	1.4	7.4	7.1	2.7	8.3	2.9	-	5.4	1.8	5.2	5.7	7.5	6.3
	2.6	7.6	2.4	4.4	2.0	0.5	3.2	1.0	3.0	5.7	9.8	9.9	9.9	10.0	10.1
LOJTO	-	8.7	-	-	-	-	-	-	-	-	-	-	-	-	-
LOPAL	2.9	3.7	3.8	3.5	2.2	1.6	1.0	2.7	2.6	1.1	1.7	2.2	0.7	2.8	2.7
MACMA	4.2	9.4	3.7	0.6	5.4	9.5	7.5	9.2	4.7	-	-	9.9	6.0	0.2	10.3
	4.8	9.7	2.7	0.5	4.1	9.7	6.6	10.0	4.5	-	-	10.4	5.8	0.2	10.3
	4.1	9.6	2.8	-	5.0	10.0	7.5	10.0	5.2	-	-	10.4	7.5	-	10.6
	4.8	9.7	2.6	0.3	5.5	10.0	7.1	10.0	5.5	-	-	10.4	6.9	0.3	10.4
MARGR	9.9	7.7	-	-	-	-	-	-	-	-	-	-	-	-	-
MARRU	9.4	9.3	9.5	9.4	9.5	9.4	9.4	9.5	9.5	7.4	5.7	4.9	-	4.2	6.0
	9.4	10.0	9.7	10.0	10.0	6.3	9.0	10.2	7.0	8.3	7.5	7.8	6.4	9.5	2.5
MASMI	-	7.9	8.8	-	-	-	-	-	-	-	1.3	4.7	-	-	-
MOLSI	9.1	6.3	6.0	7.0	9.1	9.3	-	3.3	9.6	-	-	6.3	9.7	9.9	10.0
	8.8	5.2	5.7	6.4	9.1	9.8	-	10.0	10.1	-	-	5.1	8.3	9.0	4.2
	8.0	4.5	5.3	5.7	7.8	9.0	-	2.2	9.3	-	-	4.7	7.5	9.2	9.4
	1.7	5.8	9.4	5.9	9.4	5.9	7.0	8.9	8.7	5.2	9.5	9.8	9.4	9.8	8.6
	1.7	6.4	9.6	6.7	9.4	6.4	7.1	8.7	8.9	4.7	9.4	9.6	9.5	10.1	8.8
	1.3	-	3.8	-	9.6	6.3	-	9.2	9.5	6.0	10.1	10.3	10.1	-	4.3
	1.2	6.4	9.7	6.0	9.8	6.5	7.1	8.9	9.2	4.8	9.3	10.3	9.9	10.3	9.2
MORJO	7.5	9.2	3.7	-	5.6	10.2	10.1	10.3	-	-	-	-	-	-	5.9
MOSFA	0.6	0.2	2.0	1.4	2.9	0.2	-	0.7	0.4	2.5	-	-	-	0.2	0.5
OCHPA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
OTTMI	9.1	-	-	3.5	6.4	6.4	6.1	6.2	4.2	7.8	7.5	2.8	0.8	7.8	10.6
PERZS	9.6	7.7	4.5	-	10.1	10.1	8.4	-	0.2	-	-	-	-	1.9	0.3
ROTEC	-	5.9	8.9	4.7	9.4	5.8	3.8	8.9	9.2	4.9	9.3	9.7	10.0	10.1	7.9
SARAN	9.3	8.9	8.4	9.8	8.7	5.7	9.6	9.7	9.1	6.1	6.0	7.6	4.2	7.1	4.7
	9.4	9.0	8.5	9.7	8.6	7.6	9.5	9.8	8.8	10.3	10.7	9.4	-	9.7	8.3
	9.3	-	8.3	9.4	8.5	8.1	9.4	9.5	8.6	10.0	10.5	9.3	7.5	9.3	7.5
	9.3	9.1	8.4	9.7	8.7	3.7	9.5	8.7	8.3	8.0	9.4	9.4	8.1	10.1	6.9
SCALE	8.1	5.1	7.4	7.0	1.6	10.0	0.4	-	-	-	-	1.3	-	2.4	-
SCHHA	4.6	2.4	4.0	0.9	7.5	0.4	-	4.9	4.7	-	-	5.3	10.0	9.2	10.5
SLAST	1.9	5.2	4.7	-	8.1	9.6	3.5	-	-	-	1.0	4.4	4.3	0.3	-
	3.8	5.7	6.1	-	8.3	9.6	4.7	-	-	-	1.3	4.4	5.5	0.7	-
STOEN	6.5	8.0	8.9	9.8	2.4	7.8	0.4	-	-	0.1	-	2.1	0.6	6.5	-
	6.4	8.2	7.7	9.9	1.2	8.3	0.5	-	-	-	-	2.0	0.6	6.9	0.2
	6.7	8.2	9.0	10.1	1.8	7.2	0.4	-	-	-	-	1.9	0.6	7.2	-
STRJO	2.6	4.7	7.7	1.6	1.0	-	3.6	5.2	2.1	1.0	9.4	7.9	10.1	9.5	10.3
	1.7	3.1	7.9	1.5	0.5	-	0.6	4.6	1.9	1.3	3.1	-	9.3	9.7	10.3
	0.9	0.4	6.7	-	-	-	1.5	3.4	0.3	0.2	3.2	0.5	6.1	1.0	0.9
	1.2	4.0	7.3	1.1	1.0	0.2	3.5	4.7	1.7	0.5	9.1	9.0	9.7	9.8	10.4
	2.6	3.7	6.4	1.1	0.7	-	2.9	4.1	1.9	1.2	9.1	-	8.9	9.5	10.5
TEPIS	3.4	7.6	5.8	0.8	9.9	9.9	9.0	9.8	-	-	-	-	5.2	6.6	2.4
	7.8	8.2	5.7	0.5	9.9	9.9	8.8	9.8	-	-	-	-	4.7	5.0	0.7
TRIMI	-	3.2	-	-	-	-	1.2	-	-	-	-	1.5	0.4	-	-
YRJIL	-	-	-	7.7	3.3	-	1.8	5.0	4.0	2.5	8.7	-	-	5.4	7.4
Sum	414.2	459.5	468.2	342.0	468.4	471.2	319.1	379.1	307.6	221.7	246.0	364.0	353.0	430.5	431.8

3. Results (Meteors)

September	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
ARLRA	5	64	27	48	48	29	82	93	67	11	21	12	43	69	92
BANPE	19	8	10	-	-	22	3	18	23	-	24	25	15	-	-
BERER	72	-	-	-	-	-	54	67	80	-	-	44	37	-	-
	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BOMMA	24	41	14	1	46	62	67	60	69	41	61	45	11	13	27
BREMA	18	14	11	-	15	-	-	34	46	31	16	-	5	9	4
BRIBE	31	-	2	-	17	-	9	35	52	49	23	2	1	43	8
	14	3	4	-	4	-	1	-	59	41	15	-	-	35	6
CASFL	36	5	10	3	45	44	26	32	5	4	17	1	-	23	4
	40	3	12	-	37	29	21	33	2	-	31	-	-	20	1
CRIST	6	16	27	-	59	52	50	72	39	8	3	21	-	29	1
	1	3	3	-	43	43	41	39	22	9	13	8	-	1	-
	25	30	49	1	75	76	106	105	74	12	13	31	-	36	4
CSISZ	8	16	7	-	-	18	16	18	-	-	6	-	12	19	9
DONJE	17	50	17	3	55	64	77	83	81	52	-	62	13	32	33
ELTMA	24	14	25	2	40	34	61	40	43	40	34	28	-	16	23
FORKE	-	-	5	68	-	-	49	1	62	49	9	13	55	11	38
GONRU	27	3	9	14	38	37	42	38	16	57	-	12	22	29	-
	22	5	9	5	38	30	-	29	12	66	1	4	21	17	-
	1	1	3	2	13	14	23	10	15	35	3	3	12	10	-
	26	5	6	5	42	38	35	31	10	54	-	12	22	21	-
	4	2	5	6	28	33	51	27	23	49	-	5	23	23	-
GOVMI	37	30	3	-	-	9	5	62	34	-	53	61	36	16	4
	22	12	3	-	-	1	4	24	12	-	22	22	20	4	1
	16	15	-	-	-	1	3	20	23	-	25	24	30	6	-
HERCA	1	3	7	13	-	23	19	6	16	-	9	17	27	21	16
HINWO	-	8	19	71	5	1	48	6	67	23	34	20	40	10	46
IGAAN	9	4	4	4	-	41	12	13	11	-	-	21	15	4	6
	16	10	2	-	1	23	29	16	4	-	6	18	15	7	17
	-	-	-	-	-	-	-	10	6	-	-	2	7	-	-
JONKA	12	11	11	-	-	30	23	23	5	-	-	26	8	-	3
	25	12	10	-	-	20	15	18	15	-	-	19	15	-	2
KACJA	34	1	12	-	-	62	68	-	70	1	47	-	-	-	6
	14	3	4	-	-	16	29	16	31	-	6	12	6	5	5
	40	2	9	-	-	89	123	-	114	-	118	-	-	-	12
	30	1	5	-	-	50	52	-	53	-	24	-	-	-	-
KOSDE	92	96	91	95	96	89	89	105	127	42	95	94	95	129	107
	32	28	-	36	46	56	74	88	90	53	102	83	78	57	94
	72	117	140	149	110	136	131	209	156	45	152	129	149	128	123
	11	18	-	-	-	-	-	-	-	-	-	6	-	23	2
LOJTO	5	-	1	-	-	-	-	-	-	10	-	-	9	-	-
LOPAL	16	8	4	5	15	19	17	18	10	13	-	3	10	4	-
MACMA	32	-	11	36	2	3	-	5	42	67	-	-	27	7	33
	44	-	20	35	-	3	-	3	-	49	-	-	18	2	18
	26	-	11	19	3	-	-	6	26	31	-	-	16	2	11
	51	-	25	41	-	5	-	3	41	47	-	-	24	1	29
MARGR	-	-	23	27	34	-	21	28	-	-	-	15	17	16	31
MARRU	22	4	11	25	18	24	31	30	7	44	6	9	17	33	-
	19	2	4	17	22	27	28	31	33	40	-	9	20	11	-
MASMI	23	15	-	14	11	-	20	46	12	41	-	-	-	14	9
MOLSI	-	10	4	12	-	61	1	30	184	160	128	158	73	-	83
	-	2	-	3	-	12	-	1	28	22	17	22	8	-	11
	-	6	-	8	-	30	-	9	97	84	69	76	38	-	34
	47	81	54	43	60	47	105	113	111	21	50	19	40	103	93
	13	53	43	48	53	33	89	114	86	23	26	18	43	88	86
	24	63	50	44	41	4	54	82	87	14	26	17	28	54	67
	45	72	52	54	44	38	70	103	102	18	36	22	37	92	86
MORJO	21	15	12	-	-	25	22	19	7	-	-	-	10	3	6
MOSFA	12	2	4	-	13	11	9	4	1	-	10	-	-	4	1
OCHPA	23	-	-	3	5	31	31	22	1	-	12	-	-	-	-
OTTMI	6	9	16	9	19	-	1	2	4	-	10	26	13	16	14
PERZS	20	24	5	-	-	75	-	71	66	-	63	60	59	11	35
ROTEC	-	17	13	8	8	4	33	23	29	-	10	6	8	19	31
SARAN	12	3	2	11	18	18	19	27	13	14	-	5	12	4	-
	37	6	3	12	23	21	32	18	26	29	-	9	20	12	-
	36	6	-	15	30	19	25	14	18	37	-	6	21	8	-
	12	7	3	11	18	31	21	26	21	20	-	4	21	4	-
SCALE	17	2	13	2	15	23	22	17	21	14	18	18	1	11	5
SCHHA	34	10	6	-	20	-	10	29	43	17	15	-	-	50	-
SLAST	12	1	3	-	-	21	47	-	-	-	36	26	22	8	21
	14	1	1	-	-	-	-	-	-	-	11	12	6	6	8
STOEN	29	6	43	8	59	36	82	34	26	54	67	27	-	29	20
	51	6	34	4	37	34	59	39	15	31	47	24	2	18	14
	62	11	41	6	69	32	76	46	13	48	42	28	2	29	17
STRJO	51	-	3	4	18	-	35	36	86	38	49	2	4	77	14
	59	3	1	6	8	-	21	25	82	35	44	2	4	49	13
	3	1	2	-	3	-	6	9	28	6	4	-	1	13	3
	27	3	1	2	10	-	17	26	63	31	36	1	7	49	8
	27	2	-	6	14	-	23	18	51	25	22	-	5	39	8
TEPIS	27	23	7	-	-	19	5	36	21	1	-	27	21	3	3
	44	40	-	-	-	45	12	43	26	-	16	44	32	9	12
TRIMI	6	-	3	-	-	23	17	34	18	-	10	5	9	3	-
YRJIL	19	-	-	11	16	13	1	24	5	33	-	-	11	34	-
Sum	1929	1168	1104	1075	1607	2059	2600	2745	3184	1889	1863	1582	1549	1801	1518

September	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
ARLRA	11	78	91	17	108	23	40	108	60	21	59	72	63	42	57
BANPE	-	-	-	-	11	24	-	-	-	-	-	-	-	-	-
BERER	35	32	15	-	-	64	-	-	-	-	-	-	-	35	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BOMMA	18	24	31	56	30	69	19	2	2	44	17	1	-	2	1
BREMA	2	6	-	24	-	-	-	7	2	36	42	11	35	42	34
BRIBE	15	36	14	3	9	-	4	14	8	17	49	43	38	33	39
	5	17	-	7	11	-	4	17	4	7	38	37	28	35	39
CASFL	25	6	48	37	27	3	-	19	18	40	-	-	-	27	17
	22	4	47	23	19	4	1	10	19	31	-	-	-	15	14
CRIST	28	33	49	9	61	36	4	16	45	41	6	15	10	40	37
	1	1	29	7	42	21	-	16	33	46	8	5	15	26	21
	65	38	73	12	106	64	7	32	72	92	18	38	31	78	55
CSISZ	-	-	16	2	16	26	-	10	-	-	-	-	-	-	26
DONJE	15	23	49	68	37	90	24	4	7	41	-	3	-	1	-
ELTMA	14	11	26	31	3	38	-	-	-	1	-	11	3	25	-
FORKE	36	6	46	3	-	20	-	39	51	1	4	3	52	47	58
GONRU	50	58	59	59	52	18	40	37	44	18	5	43	5	27	56
	28	57	47	54	39	14	26	24	30	10	1	35	5	32	35
	18	22	23	23	21	5	14	7	9	4	-	19	11	12	19
	38	52	45	41	44	12	21	22	33	13	-	34	8	21	43
	39	62	62	58	40	8	22	36	38	-	-	36	6	23	37
GOVMI	22	14	11	-	66	68	29	-	7	-	-	-	-	-	-
	6	9	9	-	25	30	22	-	-	-	-	-	-	-	-
	11	6	7	-	-	-	-	-	-	-	-	-	-	-	-
HERCA	9	43	37	17	28	-	-	25	29	30	24	25	22	21	38
HINWO	31	21	48	3	-	24	-	53	60	-	4	6	63	61	54
IGAAN	13	10	20	7	-	24	14	17	-	-	-	-	-	-	14
	10	10	14	2	-	24	17	8	-	-	-	-	-	-	20
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
JONKA	7	15	6	1	20	7	11	11	-	-	-	-	-	5	3
	7	15	7	2	19	21	15	13	-	-	-	-	-	1	4
KACJA	-	-	-	3	68	76	8	-	-	-	6	66	68	-	-
	-	5	6	2	26	17	5	-	-	-	2	17	21	2	-
	-	-	-	2	103	127	12	-	-	-	2	68	57	-	-
	-	-	-	-	-	-	-	-	-	-	4	58	50	-	-
KOSDE	110	28	30	122	99	26	106	-	-	-	5	15	28	64	66
	82	13	65	63	98	78	-	-	33	10	64	-	59	46	36
	209	36	39	123	105	10	138	16	-	44	19	43	43	66	54
	3	4	6	12	4	2	9	2	6	10	15	13	14	20	14
LOJTO	-	9	-	-	-	-	-	-	-	-	-	-	-	-	-
LOPAL	22	20	25	20	12	11	4	22	16	8	10	12	4	10	8
MACMA	16	69	2	1	24	85	40	50	13	-	-	55	36	1	74
	13	47	11	4	21	75	30	60	11	-	-	48	46	1	88
	12	29	5	-	20	52	12	33	5	-	-	59	41	-	69
	20	44	8	2	32	84	33	55	15	-	-	64	60	2	95
MARGR	25	6	-	-	-	-	-	-	-	-	-	-	-	-	-
MARRU	58	40	50	35	38	33	28	41	40	15	7	28	-	18	22
	33	35	30	28	30	18	17	33	24	23	20	13	5	21	8
MASMI	-	41	61	-	-	-	-	-	-	-	6	31	-	-	-
MOLSI	168	47	77	101	132	96	-	30	99	-	-	30	64	77	96
	23	11	9	12	23	10	-	2	22	-	-	9	21	29	13
	68	15	50	40	76	33	-	16	52	-	-	26	46	55	52
	1	54	94	40	116	14	89	131	54	40	108	96	107	85	90
	6	59	100	38	114	15	70	115	43	41	72	79	77	65	55
	1	-	20	-	69	11	-	60	32	21	58	65	70	-	22
	7	55	113	44	119	10	59	99	46	41	80	112	73	78	82
MORJO	7	11	15	-	17	26	13	8	-	-	-	-	-	-	18
MOSFA	4	1	12	9	21	1	-	4	4	18	-	-	-	2	3
OCHPA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
OTTMI	16	-	-	11	20	22	15	8	7	13	15	8	1	12	20
PERZS	48	11	21	-	62	80	49	-	1	-	-	-	-	20	4
ROTEC	-	22	24	4	26	5	17	31	12	9	21	25	6	14	11
SARAN	21	12	26	23	26	15	22	17	17	9	9	18	12	15	11
	33	39	34	38	33	13	25	38	15	19	26	17	-	17	19
	39	-	35	33	24	16	41	38	28	11	26	45	20	23	14
	19	35	27	19	17	10	22	18	15	9	18	22	11	11	10
SCALE	7	5	16	16	4	20	1	-	-	-	-	6	-	6	-
SCHHA	36	6	17	3	40	4	-	14	21	-	-	20	43	61	56
SLAST	4	9	9	-	43	61	7	-	-	-	2	20	15	2	-
	1	4	3	-	1	15	1	-	-	-	2	12	14	3	-
STOEN	21	36	73	54	21	59	2	-	-	1	-	2	5	49	-
	21	34	40	49	7	47	4	-	-	-	-	6	5	34	1
	13	26	63	59	12	52	4	-	-	-	-	5	3	88	-
STRJO	17	32	52	4	2	-	11	29	22	5	63	38	39	38	41
	13	13	38	5	1	-	1	16	13	6	13	-	74	61	56
	4	3	15	-	-	-	1	2	2	1	2	3	10	7	6
	9	16	30	2	1	1	5	14	4	2	34	38	39	24	32
	13	8	32	2	1	-	8	5	11	8	31	-	48	41	43
TEPIS	2	8	11	1	34	31	28	27	-	-	-	-	19	15	2
	16	16	16	3	60	55	44	50	-	-	-	-	36	24	3
TRIMI	-	6	-	-	-	-	5	-	-	-	-	7	2	-	-
YRJIL	-	-	-	32	4	-	1	24	9	4	31	-	-	26	20
Sum	1822	1729	2339	1625	2640	2153	1321	1655	1263	861	1046	1736	1787	1884	2035