Results of the IMO Video Meteor Network – December 2017

Sirko Molau, Abenstalstr. 13b, 84072 Seysdorf *2018/10/21*

With over 46,000 meteors from 9,800 hours effective observing time, the output of December 2017 was below the results of the two preceding years. In particular in northern Europe we had several intervals with poor weather, where we could not observe for a few days in a row. Exactly half of the 80 active video cameras managed to observe in twenty or more nights, but even the observers in southern Europe with their often-favorable conditions rarely passed 25 nights.

So it was of no importance, that the waning moon hardly interfered with the Geminid peak, because you need both good lunar *and* weather conditions. Figure 1 presents the flux density profile of the last major shower in 2017 in comparison with the three preceding years. Whereas the activity profile of 2016 was of poor quality and the flux density was strongly overestimated (in fact, after another analysis we deleted some data sets from December 2016 with zero effective collection area, but still many Geminids in cloud gaps), we see in 2017 activity values below the average. Once more there is quite some scatter in the data, because right in the maximum night the weather conditions were fairly poor.

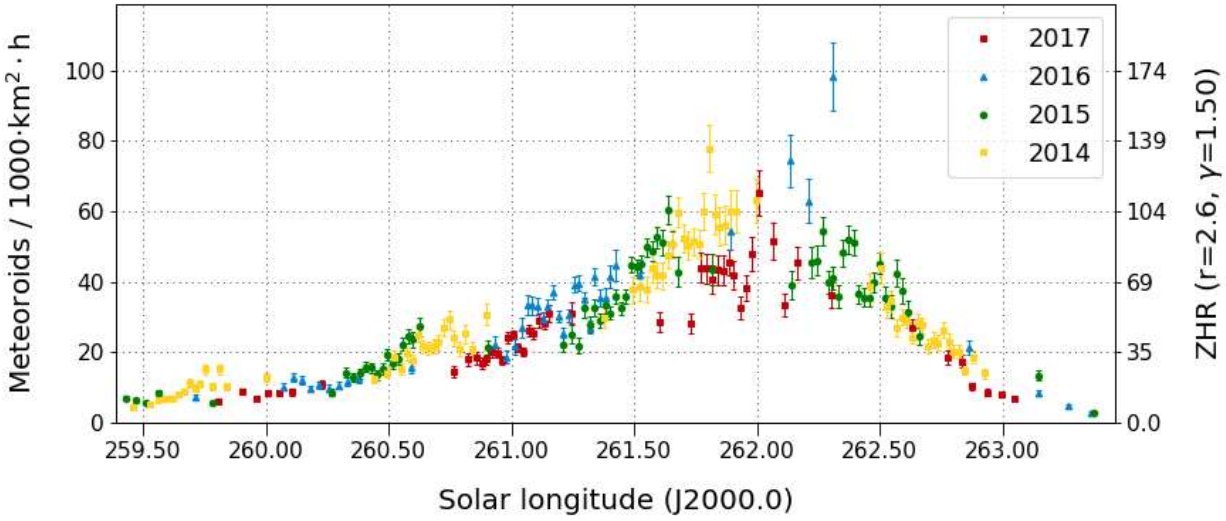

Figure 1: *Comparison of the flux density profile of the Geminids in 2014-2017, derived from video data of the IMO Network.*

With r=2.1, the population index of the Geminids (figure 2) was only marginally smaller than the sporadic population index (r=2.3). The profile is rather flat – fluctuations are probably caused by the insufficient data set.

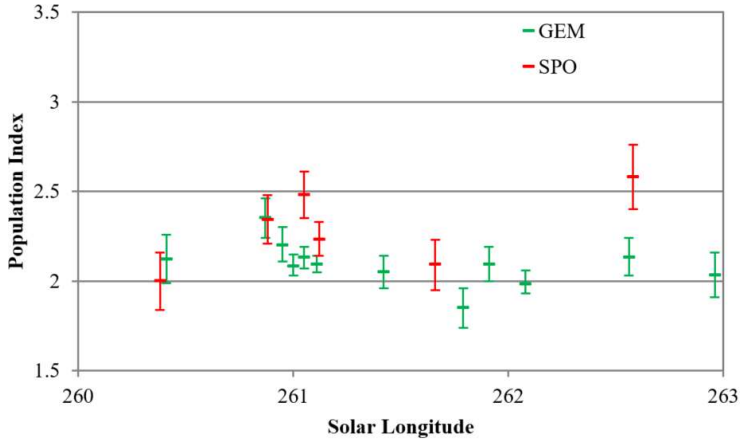

Figure 2: *Population index of the Geminids (green) and sporadic meteors (red) in December 2017.*

The observing conditions were somewhat better during the Ursids, but in northern Europe also this shower disappeared behind clouds. Whereas we recorded occasional outbursts earlier this decade, the Ursids remained inconspicuous in 2017 just as in the two years before. The activity of 2015 to 2017 (figure 3) shows a similar profile with significant activity between 270° and 271.5° solar longitude, and a peak flux density of about 10 meteoroids per 1,000 km^2 and hour between 270.5° and 271° solar longitude (December 22). The time of peak activity varies a bit, but the shape of the profile remains the same.

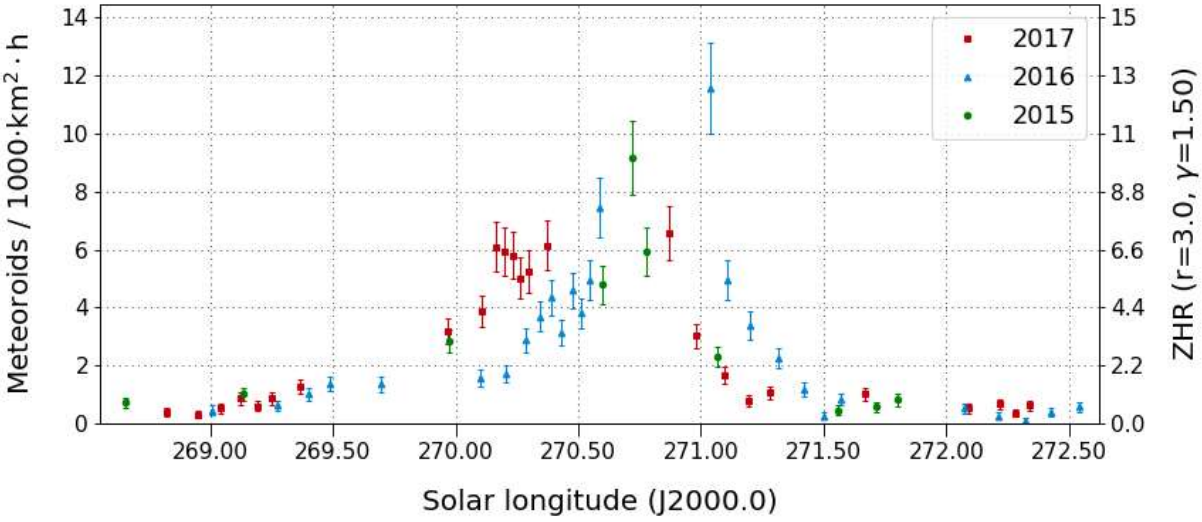

Figure 3: *Comparison of the flux density profile of the Ursids in 2015-2017, derived from video data of the IMO Network.*

With r=2.2, the population index of the Ursids is similar "unspectacular" as of the Geminids.

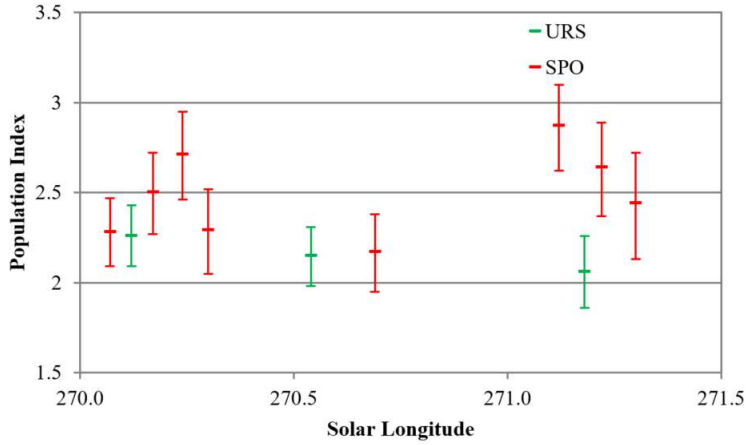

Figure 4: *Population index of the Ursids (green) and sporadic meteors (red) in December 2017.*

At this point we would like to remark on a new meteor database. In spring 2018, Jure Zakrajšek started to import the meta data of his observations into an Access database. After some discussion with Sirko Molau the idea was born, to store the meta data of the whole IMO Network, which are currently maintained manually in a big Excel spreadsheet, in that database. Not only is a database less error-prone, but it is also more flexible and allows for additional analyses with only little effort, for example.

In the following months, Jure and Sirko invested some time to import the meta data of all MetRec logfiles since 1993 into the database. We stumbled across a number of minor inconsistencies, which were localized and fixed to maintain the high quality of the IMO Video Meteor Database. In the end there was zero deviation between the Excel spreadsheet and the database. In fact, the new database is even more comprehensive than previous sources, because missing information were extracted and manually added from other sources like the monthly reports.

The following annual report contains already a few figures created from the new database. Before we will publish it in the Internet, we first have to run some final consistency checks, migrate the database to PostgreSQL and relocate the user interface to the IMO network webserver. Once that is completed, we will publish the URL.

To the end-of-year review: In 2017 we see another small decrease in the number of active video cameras. In the 19th year of the IMO network, 41 observers (2016: 44) from 11 countries (2016: 12) participated with overall 82 meteor cameras (2016: 85) in the IMO network. Top scorer with respect to the number of cameras was Germany (19), followed by Italy and Portugal (13 each). Ten cameras were operated in Slovenia and Hungary, six in Poland, four in Spain, two in the US and one in the Netherlands, Finland and Russia.

Figure 5 shows that the decrease in meteor cameras had no impact on the effective observing time, which was just in-between the results of 2015 and 2016. However, the number of recorded meteors reduced by 10%, which mainly reflects the long breakdown of the CILBO cameras on the Canary Islands.
In 365 observing nights (2016: 366) and 116,595 observing hours (2016: 113,937) we recorded a total of 425,337 meteors (2016: 474,658). The average count went down to 3.6 meteors per hour and reached the lowest value in the last 15 years.

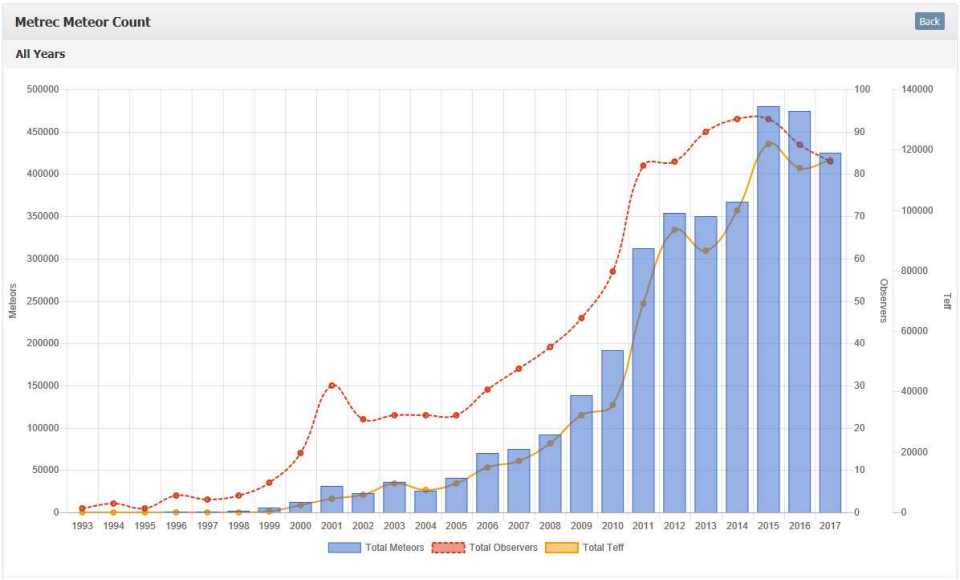

Figure 5: *Comparison of the number of observers, meteors, and the effective collection area in the IMO Video Meteor Database between 1993 and 2017.*

Figure 6 depicts how many meteors were recorded in which country in 2017. It is obvious, that most observations still origin from southern and central Europe. A closer look reveals that Italy is plotted marginally darker than Germany. In fact, even though there were less cameras operated in 2017, the effective observing time of Italian cameras was 8% larger than the German, and the meteor count even 25%. The competitive edge of the German observers with respect to the meteor count has shrinked to 2% in the overall statistics, and we expect that the Italian observers with take over the lead in 2018.

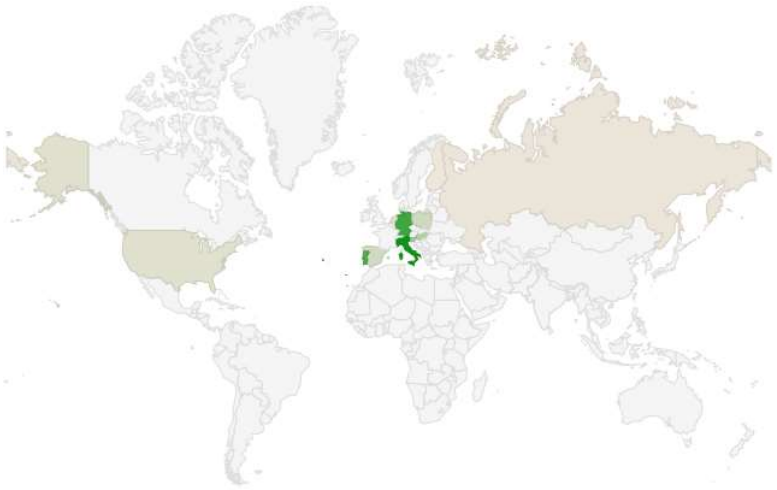

Figure 6: *Country distribution of meteors recorded in 2017.*

Table 1 shows the monthly distribution of video meteor observations. The average output was slightly below 10,000 meteors, but October and August 2017 ranked 3rd and 4th in the long-term statistics of the IMO network. In January and October 2017, we recorded more meteors than ever before in these months.

Table 1: *Monthly distribution of video observations in the IMO Network 2017.*

Month	# Observing Nights	Eff. Observing Time [h]	# Meteors	Meteors / Hour
January	31	11,947.3	33,601	2.8
February	28	7,119.5	14,593	2.0
March	31	10,534.8	19,938	1.9
April	30	8,267.7	16,252	2.0
May	31	7,319.1	16,187	2.2
June	30	7,252.9	18,741	2.6
July	31	8,457.3	35,690	4.2
August	31	12,751.6	78,489	6.2
September	30	9,926.4	35,898	3.6
October	31	13,123.2	67,253	5.1
November	30	10,107.8	42,628	4.2
December	31	9,787.1	46,067	4.7
Total	***365***	***116,594.7***	***425,337***	***3.6***

Nine observers (one more than in 2016) managed to collected more than 300 observing nights. On top we find the "usual suspects", whereby in 2017 the Portuguese observers Rui Goncalves (348 nights) and Rui Marques (341 nights) outpaced Sirko Molau (339 nights). Further observers from Italy, Portugal and the US follow in short distance.
With respect to the effective observing time, we had two observers in 2017 (Rui Goncalves and Carlos Saraiva) which collected more than 10,000 hours. With respect to the meteor count, however, Sirko Molau was again the top scorer. Overall 12 observers (one more than in 2016) provided over 10,000 meteors to the video database.
Table 2 presents the details for all active observers in the IMO network in 2017. The number of cameras and stations refers to the major part of the year.

Table 2: *Distribution of video observation over the observers in 2017.*

Observer	Country	# Observing Nights	Eff, Observing Time [h]	# Meteors	Meteors / Hour	Cameras (Stations)
Rui Goncalves	Portugal	348	13,073.2	40,966	3.1	6 (1)
Rui Marques	Portugal	341	4,725.3	16,111	3.4	2 (1)
Sirko Molau	Germany	339	9,851.3	49,563	5.0	7 (2)
Stefano Crivello	Italy	338	6,916.9	34,880	5.0	4 (1)
Carlos Saraiva	Portugal	336	10,643.7	26,049	2.4	5 (1)

Enrico Stomeo	Italy	334	5,488.4	32,248	5.9	3 (1)
Carl Hergenrother	USA	326	2,707.6	6,593	2.4	1 (1)
Mario Bombardini	Italy	319	2,131.3	10,833	5.1	1 (1)
Francesca Cineglosso	Italy	307	1,777.4	7,851	4.4	1 (1)
István Tepliczky	Hungary	294	3,031.7	7,924	2.6	2 (2)
Mitja Govedic	Slovenia	292	2,793.8	7,243	2.6	1 (1)
Javor Kac	Slovenia	286	6,132.2	28,049	4.6	5 (3)
Jörg Strunk	Germany	281	5,081.9	16,542	3.3	5 (1)
Zsolt Perkó	Hungary	280	1,682.7	6,929	4.1	1 (1)
Antal Igaz	Hungary	279	2,258.0	3,198	1.4	2 (2)
Rainer Arlt	Germany	276	1,224.9	6,658	5.4	1 (1)
Bernd Klemt	Germany	272	2,443.8	7,149	2.9	2 (2)
Károly Jónás	Hungary	271	2,953.2	5,844	2.0	1 (1)
Flavio Castellani	Italy	265	2,075.0	6,602	3.2	1 (1)
József Morvai	Hungary	265	1,511.4	2,985	2.0	1 (1)
Maurizio Carli	Italy	263	1,831.3	12,274	6.7	1 (1)
Hans Schremmer	Germany	261	1,349.7	3,738	2.8	1 (1)
Mike Otte	USA	251	1,327.3	2,579	1.9	1 (1)
Maciej Maciejewski	Poland	250	4,115.4	14,280	3.5	4 (1)
Maurizio Eltri	Italy	240	1,492.0	5,851	3.9	1 (1)
Martin Breukers	Netherlands	234	1,119.2	2,744	2.5	1 (1)
Wala Wegrzyk	Poland	231	973.2	2,622	2.7	1 (1)
Leo Scarpa	Italy	230	1,329.3	2,212	1.7	1 (1)
Stane Slavec	Slovenia	228	2,142.9	4,938	2.3	2 (1)
Wolfgang Hinz	Germany	227	1,202.4	4,075	3.4	1 (1)
Fabio Moschini	Italy	202	1,073.2	3,572	3.3	1 (1)
Eckehard Rothenberg	Germany	194	1,001.2	2,411	2.4	1 (1)
Kevin Förster	Germany	182	990.8	4,090	4.1	1 (1)
Alvaro Lopes	Portugal	172	1,155.8	1,804	1.6	1 (1)
Detlef Koschny	Netherlands	158	2,732.5	17,962	6.6	4 (2)
Mikhail Maslov	Russia	152	630.1	2,841	4.5	1 (1)
Paolo Ochner	Italy	151	976.4	2,842	2.9	1 (1)
Erno Berkó	Hungary	130	918.8	5,428	5.9	1 (1)
Ilkka Yrjölä	Finland	120	618.5	1,525	2.5	1 (1)
Jure Zakrajšek	Slovenia	96	589.2	1,457	2.5	1 (1)
Tomasz Łojek	Poland	90	506.5	1,841	3.6	1 (1)
Péter Bánfalvi	Hungary	8	15.3	34	2.2	1 (1)

In the list of the Top-10 video camera (table 3), the ante was up again significantly. Whereas barely 300 observing nights were sufficient in 2016, it had to be 315 nights in 2017. Indeed, there were five cameras with over 300 observing nights that did not made it into the Top-10. The following cameras, which recorded more than 10,000 meteors, are also missing in the list: STG38 (13,640), BMH2 (12,274), AVIS2 (11,347) and MIN38 (11,178).

Table 3: *The ten most successful video systems in 2017.*

Camera	Location	Observer	# Observing Nights	Eff. Observing Time [h]	# Meteors	Meteors / Hour
SALSA3	Tucson (US)	Carl Hergenrother	326	2,707.6	6,593	2.4
CAB1	Lisbon (PT)	Rui Marques	326	2,612.8	9,234	3.5
TEMPLAR1	Tomar (PT)	Rui Goncalves	325	2,544.3	10,463	4.1
TEMPLAR2	Tomar (PT)	Rui Goncalves	320	2,525.6	8,541	3.3
TEMPLAR4	Tomar (PT)	Rui Goncalves	319	2,409.5	8,843	3.7
MARIO	Faenza (IT)	Mario Bombardini	319	2,131.3	10,883	5.1
SCO38	Scorce (IT)	Enrico Stomeo	318	1,867.5	11,193	6.0
TEMPLAR5	Tomar (PT)	Rui Goncalves	317	2,213.1	7,896	3.6
BILBO	Valbrevenna (IT)	Stefano Crivello	316	2,087.0	10,180	4.9
NOA38	Scorce (IT)	Enrico Stomeo	315	1,848.5	9,877	5.3

The complete dataset from 1993 to 2017 will be available shortly at the IMO network homepage http://www.imonet.org for download. Including 2017, the database has grown to 3,514,296 meteors from 864,879 hours effective observing time in 6,469 nights.

As always, we would like to thank to the committed video observers who contributed to the IMO network. Particular thanks to Stefano Crivello, Enrico Stomeo, Rui Goncalves, Carlos Saraiva, Maciej Maciejewski and Jörg Strunk, who check every month together with Sirko Molau the consistency of the data set and ensure the high quality of the database.

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	23	89.9	530
BERER	Berkó	Ludanyhalaszi/HU	HULUD1 (0.8/3.8)	5542	4.8	3847	4	22.8	308
BOMMA	Bombardini	Faenza/IT	MARIO (1.2/4.0)	5794	3.3	739	25	201.6	1311
BREMA	Breukers	Hengelo/NL	MBB3 (0.75/6)	2399	4.2	699	10	35.0	167
BRIBE	Klemt	Herne/DE	HERMINE (0.8/6)	2374	4.2	678	14	41.4	249
		Berg. Gladbach/DE	KLEMOI (0.8/6)	2286	4.6	1080	13	44.6	306
CARMA	Carli	Monte Baldo/IT	BMH2 (1.5/4.5)*	4243	3.0	371	19	195.1	1385
CASFL	Castellani	Monte Baldo/IT	BMH1 (0.8/6)	2350	5.0	1611	18	190.5	587
CINFR	Cineglosso	Faenza/IT	JENNI (1.2/4)	5886	3.9	1222	24	85.2	816
CRIST	Crivello	Valbrevenna/IT	ARCI (0.8/3.8)	5566	4.6	2575	25	165.6	684
			BILBO (0.8/3.8)	5458	4.2	1772	25	188.6	1137
			C3P8 (0.8/3.8)	5455	4.2	1586	20	156.7	710
			STG38 (0.8/3.8)	5614	4.4	2007	23	148.3	1029
ELTMA	Eltri	Venezia/IT	MET38 (0.8/3.8)	5631	4.3	2151	15	119.8	640
FORKE	Förster	Carlsfeld/DE	AKM3 (0.75/6)	2375	5.1	2154	9	37.5	167
GONRU	Goncalves	Foz do Arelho/PT	FARELHO1 (0.75/4.5)	2286	3.0	208	11	86.5	106
		Tomar/PT	TEMPLAR1 (0.8/6)	2179	5.3	1842	22	218.6	1163
			TEMPLAR2 (0.8/6)	2080	5.0	1508	21	229.7	1092
			TEMPLAR3 (0.8/8)	1438	4.3	571	22	221.3	524
			TEMPLAR4 (0.8/3.8)	4475	3.0	442	21	223.9	1064
			TEMPLAR5 (0.75/6)	2312	5.0	2259	25	204.7	967
GOVMI	Govedic	Sredisce ob Dr./SI	ORION2 (0.8/8)	1447	5.5	1841	22	162.3	605
			ORION4 (0.95/5)	2662	4.3	1043	26	164.4	443
HERCA	Hergenrother	Tucson/US	SALSA3 (0.8/3.8)	2336	4.1	544	26	233.8	967
HINWO	Hinz	Schwarzenberg/DE	HINWO1 (0.75/6)	2291	5.1	1819	18	71.1	401
IGAAN	Igaz	Hodmezovasar./HU	HUHOD (0.8/3.8)	5502	3.4	764	22	84.5	239
		Budapest/HU	HUPOL (1.2/4)	3790	3.3	475	13	78.4	113
JONKA	Jonas	Budapest/HU	HUSOR (0.95/4)	2286	3.9	445	21	135.6	304
			HUSOR2 (0.95/3.5)	2465	3.9	715	19	134.4	285
KACJA	Kac	Kamnik/SI	CVETKA (0.8/3.8)	4914	4.3	1842	6	27.0	69
		Kostanjevec/SI	METKA (0.8/12)*	715	6.4	640	11	79.5	295
		Kamnik/SI	REZIKA (0.8/6)	2270	4.4	840	9	57.8	440
			STEFKA (0.8/3.8)	5471	2.8	379	8	24.2	44
KOSDE	Koschny	Izana Obs./ES	ICC7 (0.85/25)*	714	5.9	1464	25	198.6	1062
		La Palma / ES	ICC9 (0.85/25)*	683	6.7	2951	13	76.4	951
		Izana Obs./ES	LIC1(2.8/50)*	2255	6.2	5670	24	245.3	1390
		La Palma / ES	LIC2 (3.2/50)*	2199	6.5	7512	15	125.4	1501
LOJTO	Łojek	Grabniak/PL	PAV57 (1.0/5)	1631	3.5	269	8	41.3	223
MACMA	Maciejewski	Chelm/PL	PAV35 (0.8/3.8)	5495	4.0	1584	14	39.8	207
			PAV36 (0.8/3.8)*	5668	4.0	1573	14	76.7	366
			PAV43 (0.75/4.5)*	3132	3.1	319	13	34.3	151
			PAV60 (0.75/4.5)	2250	3.1	281	15	81.7	316
MARRU	Marques	Lisbon/PT	CAB1 (0.75/6)	2362	4.8	1517	25	222.5	1373
			RAN1 (1.4/4.5)	4405	4.0	1241	26	219.8	1224
MASMI	Maslov	Novosimbirsk/RU	NOWATEC (0.8/3.8)	5574	3.6	773	11	42.7	346
MOLSI	Molau	Seysdorf/DE	AVIS2 (1.4/50)*	1230	6.9	6152	19	90.4	769
			ESCIMO2 (0.85/25)	155	8.1	3415	15	85.7	169
			MINCAM1 (0.8/8)	1477	4.9	1084	17	79.3	537
		Ketzür/DE	REMO1 (0.8/8)	1467	6.5	5491	23	90.1	460
			REMO2 (0.8/8)	1478	6.4	4778	22	101.5	711
			REMO3 (0.8/8)	1420	5.6	1967	24	123.6	516
			REMO4 (0.8/8)	1478	6.5	5358	22	113.3	670
MORJO	Morvai	Fülöpszallas/HU	HUFUL (1.4/5)	2522	3.5	532	19	104.0	234
MOSFA	Moschini	Rovereto/IT	ROVER (1.4/4.5)	3896	4.2	1292	26	249.8	729
OCHPA	Ochner	Albiano/IT	ALBIANO (1.2/4.5)	2944	3.5	358	20	178.2	556
OTTMI	Otte	Pearl City/US	ORIE1 (1.4/5.7)	3837	3.8	460	22	157.1	353
PERZS	Perkó	Becsehely/HU	HUBEC (0.8/3.8)*	5498	2.9	460	19	144.7	742
ROTEC	Rothenberg	Berlin/DE	ARMEFA (0.8/6)	2366	4.5	911	12	49.3	155
SARAN	Saraiva	Carnaxide/PT	RO1 (0.75/6)	2362	3.7	381	22	207.3	590
			RO2 (0.75/6)	2381	3.8	459	23	224.5	916
			RO3 (0.8/12)	710	5.2	619	25	185.8	890
			RO4 (1.0/8)	1582	4.2	549	26	224.8	383
			SOFIA (0.8/12)	738	5.3	907	24	196.8	702
SCALE	Scarpa	Alberoni/IT	LEO (1.2/4.5)*	4152	4.5	2052	25	182.8	342
SCHHA	Schremmer	Niederkrüchten/DE	DORAEMON (0.8/3.8)	4900	3.0	409	17	64.2	364
SLAST	Slavec	Ljubljana/SI	KAYAK1 (1.8/28)	563	6.2	1294	11	49.6	125
			KAYAK2 (0.8/12)	741	5.5	920	11	60.8	89
STOEN	Stomeo	Scorze/IT	MIN38 (0.8/3.8)	5566	4.8	3270	26	197.4	1534
			NOA38 (0.8/3.8)	5609	4.2	1911	27	208.3	1376
			SCO38 (0.8/3.8)	5598	4.8	3306	28	206.0	1395
STRJO	Strunk	Herford/DE	MINCAM2 (0.8/6)	2354	5.4	2751	14	34.6	377
			MINCAM3 (0.8/6)	2338	5.5	3590	14	29.9	194
			MINCAM4 (0.8/6)	2306	5.0	1412	9	21.7	77
			MINCAM5 (0.8/6)	2349	5.0	1896	11	27.4	119
			MINCAM6 (0.8/6)	2395	5.1	2178	13	29.3	217
TEPIS	Tepliczky	Agostyan/HU	HUAGO (0.75/4.5)	2427	4.4	1036	22	153.6	579
			HUMOB (0.8/6)	2388	4.8	1607	20	122.1	367
WEGWA	Wegrzyk	Nieznaszyn/PL	PAV78 (0.8/6)	2286	4.0	778	21	97.1	337
YRJIL	Yrjölä	Kuusankoski/FI	FINEXCAM (0.8/6)	2337	5.5	3574	3	1.5	5
ZAKJU	Zakrajšek	Petkovec/SI	TACKA (0.8/12)	714	5.3	783	19	129.8	231
Sum							31	9787.1	46067

* active field of view smaller than video frame

2. Observing Times (h)

December	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
ARLRA	-	1.6	-	4.6	-	-	2.4	5.8	1.2	2.1	0.2	8.2	2.4	5.2	0.8
BERER	-	2.1	-	-	-	-	6.7	-	-	-	-	-	8.1	-	-
BOMMA	-	4.8	6.7	10.4	13.4	13.4	-	1.0	13.2	-	1.6	3.8	3.5	12.2	-
BREMA	-	-	-	-	-	-	2.8	0.2	-	-	-	5.7	1.5	0.5	2.9
BRIBE	-	-	-	-	-	-	2.6	3.3	1.9	1.1	-	7.2	0.5	0.8	0.6
	7.5	-	-	-	-	0.6	1.3	5.4	1.4	-	-	5.8	1.6	-	2.4
CARMA	-	10.0	13.2	10.5	-	-	-	-	-	-	-	-	-	2.7	13.6
CASFL	-	10.1	13.0	10.3	-	-	-	-	-	-	-	-	-	2.8	13.6
CRIST	-	3.9	5.6	4.2	5.1	5.3	1.0	0.3	6.8	-	-	2.8	1.2	6.7	-
	-	2.7	2.5	4.6	7.3	1.5	4.7	12.2	8.6	-	-	1.1	2.3	4.4	6.3
	-	3.5	7.8	12.2	6.5	1.3	0.5	12.2	7.9	-	-	9.8	4.4	6.1	8.7
	-	3.7	8.1	12.1	2.0	-	-	11.9	7.1	-	-	6.8	3.7	4.3	6.6
DONJE	0.3	4.2	8.0	11.2	6.7	1.0	1.9	12.1	8.5	-	-	6.3	2.3	4.7	6.2
ELTMA	-	-	-	-	-	-	-	-	12.1	-	-	3.2	2.0	7.6	-
FORKE	-	10.5	-	-	-	-	5.0	1.0	-	-	-	4.0	0.4	0.2	-
GONRU	11.0	11.6	11.7	11.7	11.6	5.5	1.7	-	3.0	-	-	-	-	-	-
	12.5	9.3	9.9	11.4	12.6	7.5	6.5	-	-	-	12.9	12.2	0.2	-	12.8
	12.5	12.8	12.9	12.9	12.9	8.1	6.5	-	-	-	13.0	11.8	-	-	13.0
	12.6	11.7	12.6	12.7	12.8	5.6	4.0	-	1.4	2.4	12.8	11.1	-	-	13.0
	11.3	12.7	11.5	12.0	12.3	7.1	5.8	-	-	-	13.0	12.0	-	-	13.0
	11.8	10.6	8.6	9.7	12.2	4.4	4.0	-	1.3	1.5	12.4	11.1	-	0.2	12.4
GOVMI	7.5	1.2	9.7	3.3	4.5	12.6	9.7	-	9.9	-	6.8	-	6.1	-	-
	7.2	2.8	5.8	3.6	6.0	12.4	7.8	-	7.1	-	6.3	-	5.4	3.9	-
HERCA	-	-	6.6	7.7	0.2	0.8	10.5	11.4	11.3	11.5	4.7	6.0	10.9	10.7	11.4
HINWO	1.5	7.4	-	-	-	3.6	5.6	3.5	2.9	2.6	2.2	8.2	3.9	2.1	-
IGAAN	4.3	0.2	-	4.6	1.3	9.2	10.9	-	5.2	-	0.3	-	4.1	-	-
	5.7	2.9	-	4.5	-	1.7	-	-	8.0	-	-	-	6.0	-	-
JONKA	-	0.5	-	4.7	-	3.2	12.2	-	6.1	-	0.2	-	5.7	-	-
	-	2.7	-	4.0	-	3.5	11.3	-	7.4	-	0.5	-	6.7	-	-
KACJA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	0.2	3.3	10.1	8.3	8.0	13.1	13.3	-	13.1	-	2.3	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
KOSDE	3.0	-	2.2	2.7	5.9	8.3	11.5	-	9.2	11.4	-	-	11.5	11.5	8.8
	6.5	4.9	6.1	6.1	5.6	5.7	5.7	6.5	6.7	8.5	-	1.6	11.0	-	-
	8.6	4.4	5.5	7.9	9.4	10.5	11.8	-	10.8	11.7	-	-	10.4	11.9	11.7
	6.5	3.6	4.8	7.5	10.0	11.5	11.5	-	10.3	11.5	-	1.9	10.1	11.5	-
LOTJO	-	-	-	-	-	-	-	-	2.6	-	-	-	11.5	5.1	-
MACMA	0.2	-	-	-	-	-	9.5	-	0.5	-	3.0	0.3	-	9.9	-
	0.2	-	-	-	-	-	13.6	-	1.0	4.2	6.2	-	-	11.2	-
	0.2	-	0.2	-	-	-	7.0	-	-	2.7	1.0	-	-	6.9	0.6
	-	-	-	-	-	-	13.6	-	-	4.1	6.1	0.2	-	11.5	3.3
MARRU	11.6	9.7	9.6	11.5	11.6	9.5	9.2	-	6.5	0.5	12.8	12.5	1.1	1.3	12.9
	11.5	8.7	9.7	12.3	12.2	4.6	2.0	2.2	1.2	-	12.0	11.4	-	0.7	12.2
MASMI	-	-	-	-	-	-	-	-	5.6	2.6	5.4	4.0	5.5	3.0	-
MOLSI	7.2	-	-	-	-	-	6.5	5.5	7.5	0.6	2.1	9.1	2.1	-	8.1
	8.1	-	-	-	-	-	6.9	6.8	7.8	-	0.3	9.4	2.1	-	8.6
	5.4	-	-	-	-	-	6.8	4.9	7.3	-	2.1	7.8	1.8	-	7.2
	0.1	8.7	-	3.0	-	-	1.2	4.9	2.0	0.8	-	4.9	1.7	5.9	0.9
	-	8.9	-	4.6	-	-	1.1	5.4	1.6	-	-	6.4	2.5	6.7	1.1
	-	11.4	-	5.4	-	-	2.0	5.7	3.4	1.2	-	6.5	2.6	8.7	1.2
	-	11.0	-	6.2	-	-	1.3	5.5	2.6	1.2	-	6.1	2.5	7.8	1.0
MORJO	1.0	-	0.2	-	-	-	-	-	-	-	-	-	2.7	1.5	-
MOSFA	0.9	10.9	11.0	11.5	13.4	12.9	4.4	3.2	12.7	-	-	9.4	11.3	7.7	12.8
OCHPA	2.1	10.0	9.9	13.1	13.2	12.9	1.6	-	11.0	-	-	4.2	-	-	7.6
OTTMI	7.1	12.4	-	-	7.6	1.9	13.2	1.3	8.8	3.7	7.4	2.7	5.0	1.7	3.7
PERZS	5.4	-	6.4	2.0	1.7	13.4	13.4	-	8.0	-	-	-	-	-	-
ROTEC	-	-	-	-	-	-	-	4.3	-	-	-	3.7	0.3	2.6	-
SARAN	8.3	10.1	5.8	10.8	12.0	6.5	1.9	-	-	-	12.7	12.4	0.8	-	12.6
	12.4	12.8	8.6	13.0	-	6.4	2.2	-	4.0	-	12.5	11.9	1.4	-	12.8
	10.8	9.7	9.0	10.8	-	5.9	2.5	2.1	6.2	-	10.0	11.0	1.0	0.6	10.4
	11.8	12.5	9.5	12.8	-	7.6	3.2	0.8	6.2	-	11.4	11.7	1.3	0.2	12.7
	12.5	7.8	8.8	8.1	6.2	6.2	3.1	-	2.3	-	12.6	12.1	0.6	-	12.9
SCALE	2.4	9.7	12.0	8.8	12.3	12.7	-	1.0	9.6	-	-	2.3	2.1	8.5	-
SCHHA	3.4	-	-	2.7	-	-	4.5	5.0	2.3	2.2	0.5	9.8	2.4	1.6	1.9
SLAST	-	-	7.5	-	1.4	7.6	-	-	1.7	-	0.9	-	-	-	-
	-	-	11.8	-	9.4	10.8	0.9	-	-	-	0.7	-	-	-	-
STOEN	3.2	9.6	11.0	8.7	13.4	13.1	2.6	1.6	12.8	-	-	5.7	0.7	7.0	-
	2.6	12.3	12.2	10.2	13.5	12.7	2.9	0.9	12.8	-	-	6.1	1.3	6.2	-
	3.2	12.2	13.3	10.8	13.5	13.3	3.0	1.7	10.0	-	-	5.9	2.0	6.6	0.5
STRJO	-	-	-	-	-	-	0.9	3.4	0.4	-	-	5.8	2.5	0.4	0.9
	-	-	-	-	-	-	1.0	2.6	0.3	-	-	5.7	1.7	1.2	0.8
	-	-	-	-	-	-	-	-	-	-	-	1.8	1.8	0.7	0.3
	-	-	-	-	-	-	0.2	2.5	-	-	-	4.5	1.8	-	0.6
	-	-	-	-	-	-	1.8	3.0	0.4	-	-	4.7	2.2	1.1	0.7
TEPIS	8.7	2.7	-	3.0	-	4.3	13.4	-	3.5	-	-	0.6	6.3	5.4	-
	2.0	-	-	3.0	-	4.9	12.6	-	4.1	-	0.3	-	3.5	5.2	-
WEGWA	11.4	-	5.6	0.4	-	0.2	12.5	0.2	0.2	0.2	0.5	1.5	7.0	5.5	2.7
YRJIL	-	-	-	-	-	-	-	-	-	1.1	-	-	-	-	-
ZAKJU	-	1.4	9.8	8.6	11.2	11.7	-	-	12.0	-	1.3	-	0.1	0.3	-
Sum	284.2	352.2	354.8	396.7	318.9	336.5	361.7	161.3	361.3	89.4	211.0	352.7	219.1	252.7	308.8

December	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
ARLRA	0.8	1.7	6.3	-	-	0.8	1.9	-	-	6.9	11.3	4.4	9.1	9.0	2.5	0.7
BERER	-	-	-	-	-	-	-	-	-	5.9	-	-	-	-	-	-
BOMMA	8.3	13.6	12.8	4.0	12.7	10.7	13.0	13.2	13.5	1.8	0.6	2.8	-	4.7	5.9	-
BREMA	8.4	-	-	-	-	-	-	-	-	-	-	5.5	6.9	0.6	-	-
BRIBE	-	-	-	-	-	-	-	-	-	5.6	4.6	4.1	6.3	1.7	-	1.1
	-	-	-	-	-	-	-	-	-	4.9	3.6	-	5.9	3.2	-	1.0
CARMA	13.6	13.4	13.5	6.4	13.5	11.5	12.7	5.8	13.7	9.6	-	0.4	9.0	8.3	13.7	-
CASFL	13.6	13.0	13.4	6.1	13.4	10.4	13.0	6.0	13.6	7.5	-	-	8.4	8.8	13.5	-
CRIST	3.8	4.5	5.7	0.8	4.9	7.1	2.8	7.4	3.0	-	0.3	0.6	-	1.1	0.3	-
	12.0	13.2	10.6	4.2	13.2	10.4	10.8	13.1	-	0.4	-	0.5	13.2	2.3	3.5	-
	13.1	13.2	10.5	4.9	13.2	10.2	10.7	13.2	-	0.3	-	0.4	12.8	3.0	2.2	-
	13.2	13.2	10.0	4.8	12.6	6.0	10.7	4.3	-	-	-	-	13.2	2.4	-	-
DONJE	-	6.6	9.5	5.8	13.2	11.1	11.0	13.2	-	0.4	-	-	0.3	3.8	-	-
ELTMA	10.2	13.3	4.3	1.3	13.1	7.2	10.4	6.3	11.7	-	-	-	-	5.8	11.3	-
FORKE	-	-	-	-	-	-	-	-	-	12.4	3.6	-	-	0.4	-	-
GONRU	-	-	-	-	-	-	-	11.0	4.1	3.6	-	-	-	-	-	-
	12.9	12.9	12.9	12.9	12.9	12.9	8.9	12.3	1.2	8.6	-	-	-	-	-	2.4
	13.0	12.9	13.0	13.0	13.0	13.0	8.7	12.3	-	8.1	-	-	-	-	0.2	6.1
	12.9	12.8	12.9	12.9	12.8	12.8	9.2	11.4	-	4.3	-	-	-	-	-	6.6
	13.0	13.0	13.0	13.0	13.0	13.0	8.3	12.5	0.6	7.7	-	-	-	-	-	6.1
	12.6	12.5	12.5	12.4	12.4	12.3	8.9	11.8	0.4	3.1	-	-	0.8	-	-	4.8
GOVMI	0.3	6.3	12.4	3.3	0.4	-	10.9	8.8	12.8	12.8	9.0	-	-	6.7	-	7.3
	0.4	4.0	12.6	1.7	1.0	4.9	10.6	9.9	12.7	12.7	9.6	-	0.2	5.4	3.5	6.9
HERCA	11.5	-	-	4.2	8.7	-	10.9	11.3	11.2	9.7	11.6	5.9	11.6	11.8	11.3	10.4
HINWO	-	-	-	-	-	0.2	-	-	-	13.0	7.3	-	1.7	1.6	0.2	3.6
IGAAN	7.7	8.2	3.9	2.2	0.6	-	3.9	1.0	4.6	2.5	3.6	-	1.6	-	0.6	4.0
	11.8	7.8	-	5.2	-	4.2	-	-	8.0	2.1	-	-	-	10.5	-	-
JONKA	13.7	13.7	7.8	8.7	9.9	3.4	2.7	-	11.0	10.7	1.9	1.7	1.7	10.6	-	5.5
	13.4	13.7	7.7	8.6	9.2	3.6	3.0	-	9.6	10.3	2.0	-	-	11.9	-	5.3
KACJA	1.9	-	-	-	7.5	-	1.2	6.1	6.0	4.3	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.3	3.5
	10.8	-	-	-	8.6	0.6	6.3	8.4	12.2	4.7	-	-	-	2.6	3.6	-
	2.2	-	-	-	4.4	-	1.1	3.9	5.4	4.5	-	-	-	1.2	1.5	-
KOSDE	-	8.5	7.3	8.7	11.5	11.5	9.0	6.6	9.8	7.8	7.8	10.4	8.9	0.7	-	4.1
	1.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	11.9	11.8	9.8	11.9	11.7	11.8	12.0	11.9	-	12.0	10.7	9.4	-	-	5.8
	1.7	11.5	11.5	-	-	-	-	-	-	-	-	-	-	-	-	-
LOTJO	-	2.0	-	-	-	-	-	-	-	-	13.4	-	-	4.0	1.9	0.8
MACMA	0.2	0.8	-	-	-	-	-	-	0.2	4.7	0.6	8.0	-	-	1.4	0.5
	0.6	1.3	-	-	-	-	-	-	-	6.8	8.9	13.0	-	0.8	6.5	2.4
	-	0.2	-	-	-	-	-	-	-	1.7	1.3	3.6	-	-	6.8	2.1
	1.7	1.6	-	-	-	-	0.6	-	-	6.7	9.2	12.1	-	0.8	7.2	3.0
MARRU	12.9	12.8	12.8	12.8	12.8	12.8	8.1	11.7	2.3	1.7	1.5	-	-	-	-	-
	11.9	11.9	12.4	12.5	12.5	8.5	12.4	11.7	4.4	8.8	-	-	-	2.2	3.6	6.3
MASMI	-	6.8	1.8	4.8	-	3.0	-	-	0.2	-	-	-	-	-	-	-
MOLSI	2.7	2.9	1.2	-	-	-	2.9	-	-	4.6	11.7	-	4.3	2.6	1.6	7.2
	2.8	3.5	-	-	-	-	-	-	-	-	12.5	-	4.4	2.0	2.4	8.1
	1.7	3.7	-	-	-	-	1.9	-	-	4.0	11.0	-	3.5	1.6	1.8	6.8
	2.0	1.6	4.1	1.4	-	-	1.4	0.2	-	6.9	11.6	8.1	6.1	8.5	4.1	-
	2.5	2.1	5.4	2.1	-	-	2.3	0.2	-	8.1	13.0	8.2	6.6	8.8	3.3	0.6
	3.0	2.4	5.4	1.4	-	0.2	2.1	0.5	-	8.7	14.2	10.5	8.8	10.7	5.7	1.9
	3.0	2.0	5.3	2.1	-	-	2.1	-	-	8.8	14.1	9.7	5.1	10.1	4.6	1.2
MORJO	2.3	11.2	3.4	10.6	1.6	2.6	4.4	3.7	13.6	13.6	5.7	1.1	5.3	12.1	-	7.4
MOSFA	12.9	12.3	13.3	2.6	12.8	12.1	11.0	4.8	13.5	4.9	-	-	6.1	8.6	12.8	-
OCHPA	12.4	13.4	-	-	9.0	12.2	13.8	5.2	11.3	4.7	-	-	-	4.3	6.3	-
OTTMI	7.4	-	13.1	7.1	-	-	4.8	-	-	12.4	13.1	7.1	-	-	2.5	13.1
PERZS	-	9.3	13.5	2.8	-	5.9	8.6	7.9	13.2	13.5	9.8	-	-	5.1	2.8	2.0
ROTEC	1.2	1.4	-	0.7	-	-	-	-	-	6.1	13.1	3.8	-	9.1	3.0	-
SARAN	12.3	12.5	13.0	13.0	12.4	-	12.8	12.4	5.0	9.1	-	-	-	2.3	-	8.6
	12.5	11.9	13.0	12.8	12.8	12.9	12.9	11.9	3.2	8.1	-	-	-	4.1	-	10.4
	11.2	11.6	11.5	-	9.8	9.6	9.4	8.7	4.0	8.2	0.3	-	-	3.5	-	8.0
	12.6	11.3	12.8	12.8	12.8	12.9	11.2	10.7	3.6	7.8	0.3	-	-	5.1	-	9.2
	12.7	2.4	12.9	12.1	12.8	-	12.8	11.8	4.6	8.9	-	-	0.2	2.9	-	9.5
SCALE	12.4	12.7	11.8	0.4	13.4	6.0	8.2	5.1	12.5	0.3	1.5	-	0.8	5.6	10.7	-
SCHHA	4.8	-	-	-	-	-	-	-	-	4.6	2.5	2.4	9.0	4.6	-	-
SLAST	-	-	-	-	6.6	3.6	-	1.0	6.8	5.7	-	-	-	-	6.8	-
	-	-	-	-	7.0	4.6	-	1.4	8.2	4.8	-	-	-	-	1.2	-
STOEN	13.5	11.5	10.0	2.3	13.5	7.5	11.1	5.5	13.5	1.6	-	0.7	0.6	6.7	10.0	-
	13.4	12.8	11.1	2.5	13.6	8.2	11.0	5.2	13.5	1.7	0.2	1.3	0.5	7.0	12.6	-
	7.9	12.7	10.5	3.0	13.6	7.3	11.4	4.7	13.5	2.2	0.6	0.6	0.6	8.1	13.3	-
STRJO	-	-	-	-	-	-	-	-	-	5.5	7.7	3.3	2.2	0.7	0.3	0.6
	-	-	-	-	-	0.9	0.2	-	-	5.1	7.5	-	1.9	0.7	0.3	-
	-	-	-	-	-	0.2	-	-	-	4.7	7.9	0.2	4.1	-	-	-
	0.4	-	-	-	-	0.9	-	-	-	5.3	7.4	2.0	1.8	-	-	-
	0.4	-	-	-	-	-	-	-	-	5.3	7.2	-	2.1	-	0.2	0.2
TEPIS	10.6	11.4	5.1	10.9	4.2	-	3.0	-	12.7	13.5	6.1	2.1	-	12.6	2.9	10.6
	9.8	10.8	6.2	5.4	4.7	-	2.7	-	12.8	10.0	1.8	1.0	-	12.1	-	9.2
WEGWA	-	-	5.2	-	1.0	-	-	3.0	-	13.3	11.3	2.9	-	9.6	-	2.9
YRJIL	-	-	-	-	-	-	0.2	0.2	-	-	-	-	-	-	-	-
ZAKJU	-	4.4	-	0.9	10.9	7.2	10.9	12.0	12.9	0.6	-	-	-	3.0	10.6	-
Sum	454.0	484.6	450.7	291.9	445.4	328.6	406.6	361.3	362.5	439.2	315.8	149.1	195.0	298.0	225.3	217.8

3. Results (Meteors)

December	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
ARLRA	-	4	-	7	-	-	4	43	7	16	1	184	39	28	1
BERER	-	1	-	-	-	-	13	-	-	-	-	-	284	-	-
BOMMA	-	38	32	64	83	84	-	6	92	-	10	94	52	137	-
BREMA	-	-	-	-	-	-	8	1	-	-	-	47	16	3	8
BRIBE	-	-	-	-	-	-	12	7	4	5	-	126	10	1	2
	34	-	-	-	-	2	5	20	3	-	-	127	33	-	5
CARMA	-	108	113	80	-	-	-	-	-	-	-	-	-	14	100
CASFL	-	47	46	20	-	-	-	-	-	-	-	-	-	9	47
CRIST	-	56	56	34	42	41	6	2	69	-	-	41	13	66	-
	-	23	18	33	21	4	17	71	23	-	-	6	17	26	9
	-	46	43	63	17	6	4	71	30	-	-	185	48	68	30
	-	35	41	53	5	-	-	62	16	-	-	126	32	41	18
DONJE	2	66	59	95	21	1	6	104	31	-	-	37	17	16	6
ELTMA	-	-	-	-	-	-	-	-	61	-	-	67	27	70	-
FORKE	-	54	-	-	-	-	10	1	-	-	-	55	1	1	-
GONRU	17	13	19	13	16	9	3	-	1	-	-	-	-	-	-
	33	34	45	58	45	19	24	-	-	-	138	185	1	-	62
	36	65	54	69	55	28	17	-	-	-	118	180	-	-	63
	24	26	35	25	21	19	3	-	2	11	64	71	-	-	33
	31	34	45	53	53	33	24	-	-	-	142	171	-	-	59
	46	54	50	46	56	22	7	-	7	6	114	170	-	1	63
GOVMI	19	4	29	9	5	32	54	-	38	-	25	-	171	-	-
	16	2	24	8	6	11	29	-	17	-	15	-	142	29	-
HERCA	-	-	33	25	1	5	28	39	45	22	8	27	153	176	43
HINWO	4	25	-	-	-	22	21	15	20	15	3	142	60	7	-
IGAAN	5	1	-	13	2	12	21	-	21	-	1	-	61	-	-
	5	2	-	4	-	2	-	-	9	-	-	-	61	-	-
JONKA	-	3	-	26	-	14	26	-	27	-	1	-	42	-	-
	-	1	-	10	-	7	22	-	26	-	3	-	60	-	-
KACJA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1	5	46	23	29	50	50	-	79	-	7	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
KOSDE	8	-	4	31	19	52	51	-	73	83	-	-	166	64	45
	82	53	47	54	49	46	43	58	63	131	-	20	294	-	-
	25	13	10	14	22	30	52	-	66	74	-	-	274	92	62
	65	31	38	51	78	62	79	-	103	153	-	29	411	169	-
LOTJO	-	-	-	-	-	-	-	-	3	-	-	-	160	21	-
MACMA	1	-	-	-	-	-	40	-	3	-	23	1	-	84	-
	1	-	-	-	-	-	81	-	3	6	30	-	-	149	-
	1	-	1	-	-	-	41	-	-	4	7	-	-	58	1
	-	-	-	-	-	-	91	-	-	8	29	1	-	89	3
MARRU	67	58	73	60	84	45	25	-	13	4	158	266	4	7	67
	39	51	60	57	56	8	9	6	12	-	110	220	-	3	74
MASMI	-	-	-	-	-	-	-	-	12	23	58	19	70	30	-
MOLSI	12	-	-	-	-	-	31	31	62	3	6	311	10	-	76
	5	-	-	-	-	-	6	7	7	-	1	78	4	-	15
	11	-	-	-	-	-	21	12	43	-	1	267	10	-	46
	1	71	-	5	-	-	5	29	5	4	-	90	35	45	2
	-	54	-	10	-	-	3	48	5	-	-	160	58	67	4
	-	64	-	12	-	-	9	34	12	5	-	103	45	41	3
	-	44	-	10	-	-	7	51	9	13	-	151	59	64	1
MORJO	6	-	1	-	-	-	-	-	-	-	-	-	27	16	-
MOSFA	3	30	37	39	40	33	6	18	37	-	-	96	15	46	45
OCHPA	5	52	39	48	39	52	1	-	26	-	-	34	-	-	10
OTTMI	11	30	-	-	17	3	26	6	19	9	37	21	59	1	12
PERZS	40	-	52	16	8	58	80	-	48	-	-	-	-	-	-
ROTEC	-	-	-	-	-	-	-	16	-	-	-	61	1	8	-
SARAN	25	29	26	24	25	15	11	-	-	-	56	127	7	-	32
	32	44	39	53	-	18	13	-	4	-	98	173	13	-	53
	51	50	40	42	-	16	13	8	22	-	71	144	7	3	54
	20	17	19	16	-	6	9	1	7	-	40	61	11	1	17
	47	39	39	46	30	7	5	-	3	-	56	138	4	-	28
SCALE	8	27	22	24	17	5	-	3	21	-	-	21	11	40	-
SCHHA	1	-	-	3	-	-	32	23	7	11	1	143	53	11	8
SLAST	-	-	27	-	6	14	-	-	2	-	9	-	-	-	-
	-	-	18	-	13	17	1	-	-	-	2	-	-	-	-
STOEN	24	97	81	63	74	52	2	17	112	-	-	177	8	61	-
	20	66	51	63	77	40	5	13	103	-	-	184	12	38	-
	20	92	73	68	88	56	3	16	88	-	-	151	18	51	1
STRJO	-	-	-	-	-	-	6	9	3	-	-	180	70	1	6
	-	-	-	-	-	-	3	5	3	-	-	82	36	5	1
	-	-	-	-	-	-	-	-	-	-	-	18	17	2	2
	-	-	-	-	-	-	1	1	-	-	-	60	20	-	1
	-	-	-	-	-	-	9	7	2	-	-	97	50	4	3
TEPIS	21	4	-	17	-	13	65	-	26	-	-	3	85	46	-
	4	-	-	12	-	20	41	-	20	-	2	-	21	38	-
WEGWA	26	-	10	2	-	2	40	1	1	1	3	7	73	34	11
YRJIL	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-
ZAKJU	-	1	29	14	25	14	-	-	30	-	5	-	1	1	-
Sum	955	1764	1624	1685	1245	1107	1380	862	1706	610	1453	5735	3559	2083	1232

December	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
ARLRA	4	4	15	-	-	2	5	-	-	33	65	8	23	24	12	1
BERER	-	-	-	-	-	-	-	-	-	10	-	-	-	-	-	-
BOMMA	68	90	62	9	67	67	66	67	61	5	4	22	-	20	11	-
BREMA	46	-	-	-	-	-	-	-	-	-	-	17	20	1	-	-
BRIBE	-	-	-	-	-	-	-	-	-	36	5	6	29	5	-	1
	-	-	-	-	-	-	-	-	-	26	7	-	33	8	-	3
CARMA	119	94	92	26	111	99	73	63	91	33	-	2	43	39	85	-
CASFL	48	35	43	19	38	52	24	43	40	7	-	-	9	22	38	-
CRIST	31	36	43	5	40	100	21	80	19	-	2	4	-	7	2	-
	22	51	29	3	69	40	70	73	-	1	-	2	46	4	6	-
	58	59	68	4	68	32	73	73	-	1	-	1	80	6	3	-
	40	33	49	5	39	22	46	7	-	-	-	-	37	3	-	-
DONJE	-	79	92	11	93	69	108	105	-	1	-	-	2	8	-	-
ELTMA	71	60	7	3	58	51	38	39	23	-	-	-	-	26	39	-
FORKE	-	-	-	-	-	-	-	-	-	38	6	-	-	1	-	-
GONRU	-	-	-	-	-	-	-	9	1	5	-	-	-	-	-	-
	82	48	64	57	72	75	28	57	6	22	-	-	-	-	-	8
	52	49	52	58	54	53	28	32	-	21	-	-	-	-	1	7
	29	24	25	21	24	30	17	13	-	5	-	-	-	-	-	2
	54	54	47	60	49	67	26	45	3	12	-	-	-	-	-	2
	49	39	38	40	50	43	24	27	1	8	-	-	1	-	-	5
GOVMI	2	10	33	2	1	-	29	18	35	41	31	-	-	8	-	9
	2	3	22	1	1	19	12	17	20	27	10	-	1	3	2	4
HERCA	23	-	-	1	18	-	55	29	27	36	38	6	37	42	25	25
HINWO	-	-	-	-	-	1	-	-	-	40	13	-	3	2	1	7
IGAAN	9	9	8	6	1	-	9	2	17	8	12	-	7	-	2	12
	6	3	-	4	-	9	-	-	2	1	-	-	-	5	-	-
JONKA	24	24	22	18	5	16	4	-	16	5	5	1	3	13	-	9
	20	26	16	21	10	14	2	-	16	6	5	-	-	13	-	7
KACJA	3	-	-	-	21	-	6	17	12	10	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	2
	67	-	-	-	94	1	21	80	145	9	-	-	-	5	18	-
	2	-	-	-	10	-	1	13	9	3	-	-	-	1	5	-
KOSDE	-	33	46	46	31	39	41	35	44	34	32	33	31	1	-	20
	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	62	65	88	56	67	45	55	56	-	51	56	42	-	-	13
	8	107	117	-	-	-	-	-	-	-	-	-	-	-	-	-
LOTJO	-	1	-	-	-	-	-	-	-	-	22	-	-	12	2	2
MACMA	1	1	-	-	-	-	-	-	1	21	2	27	-	-	1	1
	1	2	-	-	-	-	-	-	-	29	11	37	-	5	7	4
	-	1	-	-	-	-	-	-	-	12	4	18	-	-	1	2
	2	3	-	-	-	-	2	-	-	20	12	40	-	2	10	4
MARRU	53	57	61	48	74	78	15	35	10	5	6	-	-	-	-	-
	64	52	61	58	61	68	61	24	9	27	-	-	-	6	16	12
MASMI	-	64	11	40	-	18	-	-	1	-	-	-	-	-	-	-
MOLSI	6	11	2	-	-	-	10	-	-	33	88	-	19	27	16	15
	4	6	-	-	-	-	-	-	-	-	14	-	3	2	2	15
	2	17	-	-	-	-	2	-	-	7	57	-	7	4	8	22
	4	7	10	7	-	-	1	1	-	25	53	11	11	24	14	-
	4	19	16	9	-	-	10	1	-	41	91	19	34	32	24	2
	4	7	13	2	-	1	5	2	-	17	62	12	16	29	13	5
	3	12	19	8	-	-	7	-	-	44	89	16	21	26	13	3
MORJO	16	21	7	20	1	13	3	7	22	20	11	1	5	16	-	21
MOSFA	30	27	30	2	33	35	20	17	30	4	-	-	15	20	21	-
OCHPA	24	39	-	-	22	47	40	20	33	4	-	-	-	7	14	-
OTTMI	4	-	19	12	-	-	10	-	-	12	26	3	-	-	2	14
PERZS	-	38	64	5	-	62	57	22	70	59	51	-	-	4	3	5
ROTEC	1	5	-	2	-	-	-	-	-	17	31	3	-	8	2	-
SARAN	26	18	32	26	31	-	28	12	9	21	-	-	-	1	-	9
	53	28	50	37	42	41	41	23	9	20	-	-	-	7	-	25
	42	34	46	-	44	57	43	21	17	37	2	-	-	8	-	18
	13	10	20	22	16	25	22	7	1	8	2	-	-	4	-	8
	32	14	39	30	36	-	40	26	6	18	-	-	1	3	-	15
SCALE	20	25	18	1	11	15	6	7	9	2	1	-	3	13	12	-
SCHHA	18	-	-	-	-	-	-	-	-	20	1	4	19	9	-	-
SLAST	-	-	-	-	15	15	-	5	12	9	-	-	-	-	11	-
	-	-	-	-	11	10	-	1	7	2	-	-	-	-	7	-
STOEN	115	71	77	9	110	97	53	61	52	3	-	4	4	53	57	-
	99	95	73	8	89	78	49	49	54	6	1	8	3	51	41	-
	73	71	64	12	77	70	54	57	53	4	2	1	5	58	69	-
STRJO	-	-	-	-	-	-	-	-	-	69	16	3	8	3	1	2
	-	-	-	-	-	1	1	-	-	37	12	-	5	2	1	-
	-	-	-	-	-	1	-	-	-	23	8	1	5	-	-	-
	1	-	-	-	-	1	-	-	-	18	10	2	4	-	-	-
	1	-	-	-	-	-	-	-	-	34	6	-	2	-	1	1
TEPIS	34	23	13	29	12	-	7	-	37	47	19	2	-	36	3	37
	28	21	11	7	5	-	7	-	30	48	8	2	-	22	-	20
WEGWA	-	-	4	-	1	-	-	12	-	37	21	2	-	37	-	12
YRJIL	-	-	-	-	-	-	1	1	-	-	-	-	-	-	-	-
ZAKJU	-	8	-	1	20	16	13	17	20	1	-	-	-	2	13	-
Sum	1728	1840	1815	903	1791	1717	1480	1427	1136	1345	1025	374	637	800	638	411