Results of the IMO Video Meteor Network – December 2014

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With respect to the weather conditions, December started as bad as November had finished. Fortunately the situation improved towards the middle of the month, so that 65 cameras were in operation during the Geminids maximum on December 13/14. However, the waning moon affected the display significantly. In the following days the weather was mediocre, whereby observers in northern Europe experienced larger observing breaks which are typical for this time of year, whereas observers in southern Europe experienced many clear nights in a row. 27 of the 85 cameras in operation observed in twenty or more observing nights, all five TEMPLAR cameras from Rui Goncalves even in 29 or 30 nights. With over 9,300 hours, the effective observing time fell a few percent short of the result from 2013, as did the overall number of meteors (almost 45,000). The outcome was clearly better than in earlier years, though, which secured another record in the long-term IMO network statistics.

The most important shower of December is also the strongest annual shower – the Geminids. Their maximum does not last as long as the Perseid peak, though, and both showers give a different visual impression, since the Geminids are slower than the Perseids. A bigger particle density is necessary to obtain the same number of visual meteors. Figure 1 compares the Geminids flux density profile of the past three years at a resolution of 30 minutes per bin. It is remarkable that the data sets fit perfectly at the ascending and descending branch, but there are significant fluctuations at the peak between 261.75° and 262.4° solar longitude. If we neglect some outliers, the flux density reaches values of 80 meteoroids per 1,000 km^2 and hour. For comparison: Perseids and Quadrantids yield only fluxes of the order of 50.

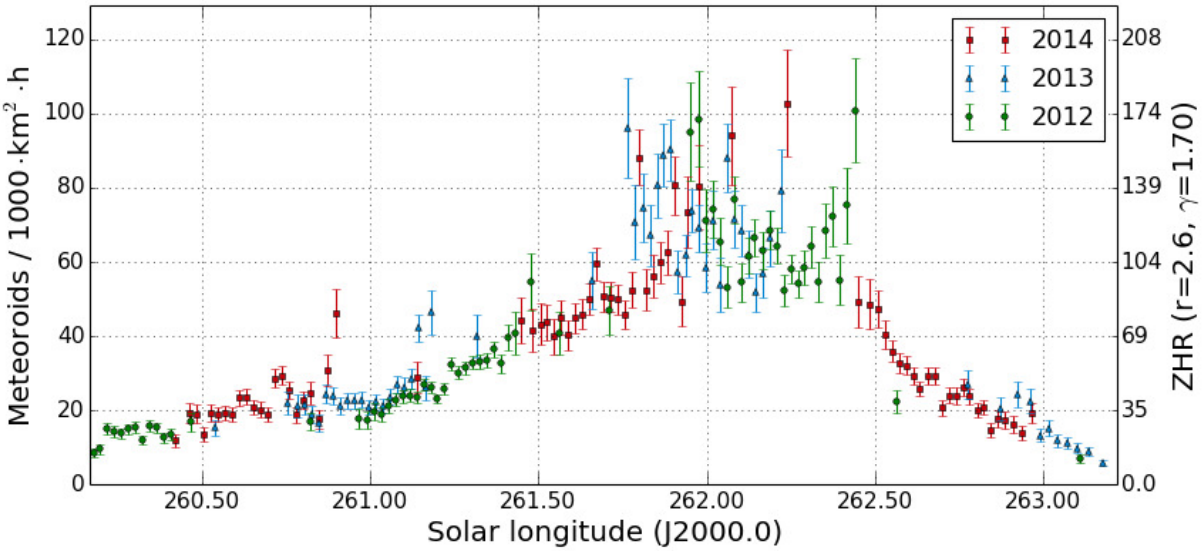

Figure 1: *Activity profile of the Geminids, derived from data of the IMO Video Meteor Network 2012-2014.*

In the nights of highest activity (>1,000 shower meteors for analysis), the population index of the Geminids was typically about 0.5 smaller than the r-value of the sporadic meteors (figure 2).

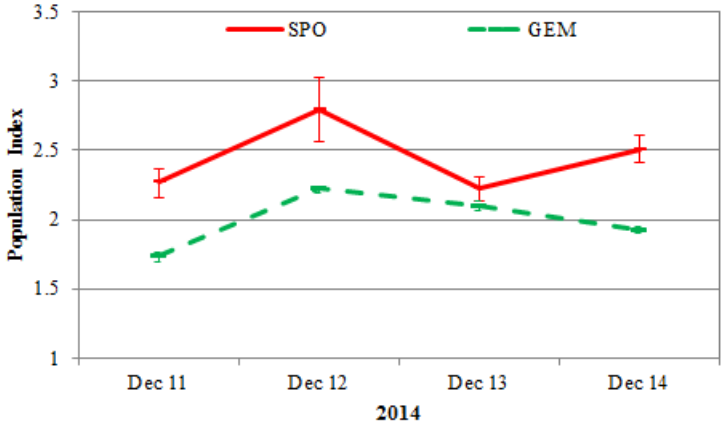

Figure 2: *Population index of the Geminids and sporadic meteors during the Geminid maximum in 2014.*

Just before Christmas, the Ursids have repeatedly surprised the observers with rates well above their long-term average. 2014 was no exception – on the contrary: This year the shower presented a short but particularly strong outburst just at midnight UT of the night of December 22/23 (270.85° solar longitude). Unfortunately the weather was not so good which is why the data set is more sparse than for other showers, but the smaller the selected bin size, the more prominent becomes the peak. In figure 2 there are at least 10 Ursids per bin.

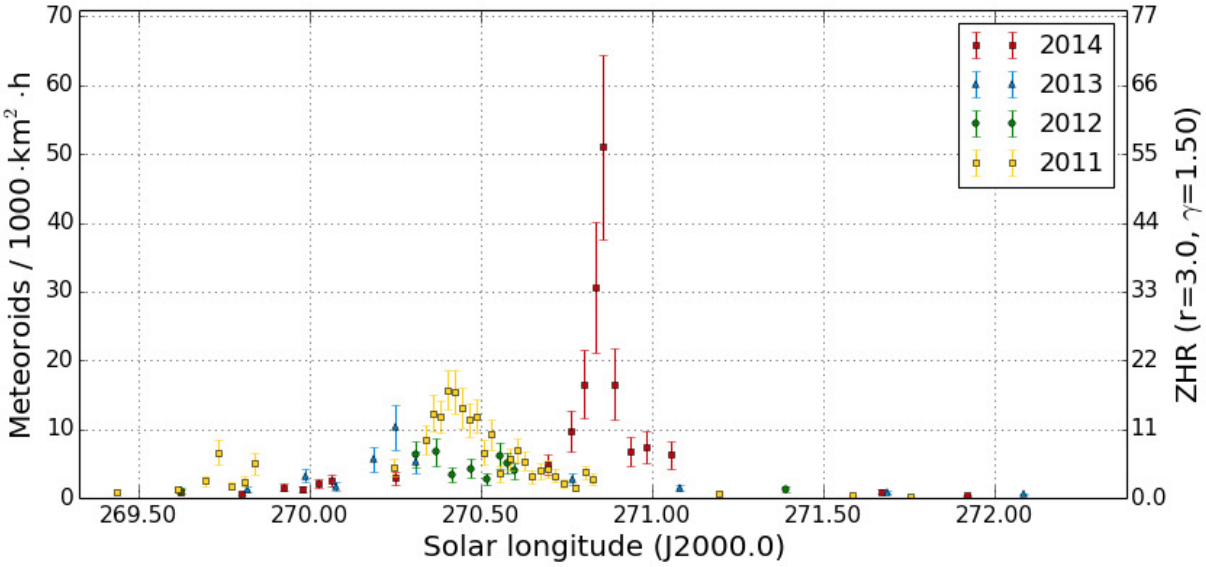

Figure 3: *Activity profile of the Ursids, derived from data of the IMO Video Meteor Network 2011-2014.*

To double-check the result, we created another flux density profile of the peak night 2014 with a fixed resolution of 30 minutes per bin (figure 4). The peak is very prominent here as well. For a few minutes, the flux density was as high as during the Perseid peak! That will delight our meteor shower modelers, which had indeed expected enhanced rates due to the dust trails of comet 8P/Tuttle from 1392 and 1405. Esko Lyytinen predicted a peak for 23:38, Mikhail Maslov for 23:54 and Jeremie Vaubaillon for 00:40 UT. A quick Google search led to a post of Tony Markham, who came to the same preliminary conclusion about the Ursids based on visual observing reports: There was a brief peak with an equivalent ZHR of up to 50.

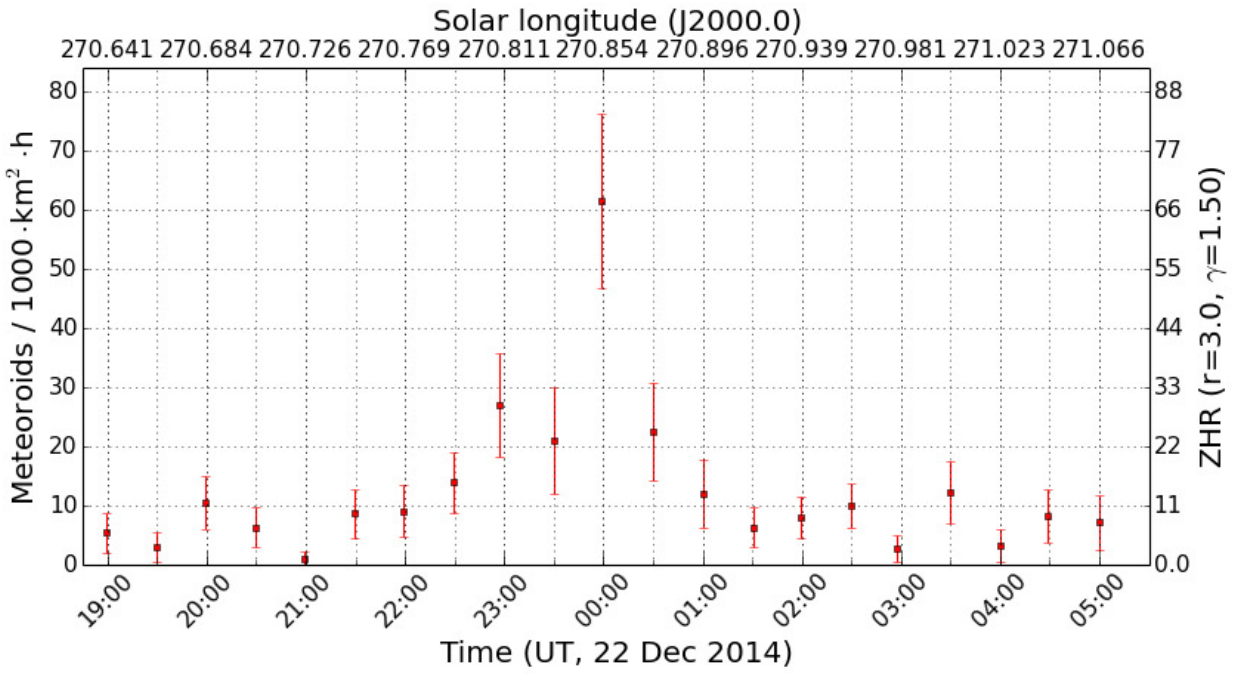

Figure 4: *Detailed profile of the Ursids on December 22/23, 2014, with a fixed bin size of 30 minutes. The outburst occurred almost exactly at midnight UT.*

With 1.7 the population index of the Ursids was clearly smaller than the sporadic values of the same night (2.9), but both values are based on only about a hundred meteors.

Another outburst was predicted for the December Phoenicids. However, that shower is so far south that there are no sensible data from the IMO network available (0 to 4 PHO per night).

The flat activity profile of the sigma Hydrids is somewhat boring, but not so the profile of the Monocerotids. They show all of December a gentle increase of the flux density, but just before the end the activity suddenly doubles. This peak between 261° and 262° solar longitude can be noticed in every of the four years, but it is best visible in the combined profile, of course (figure 5).

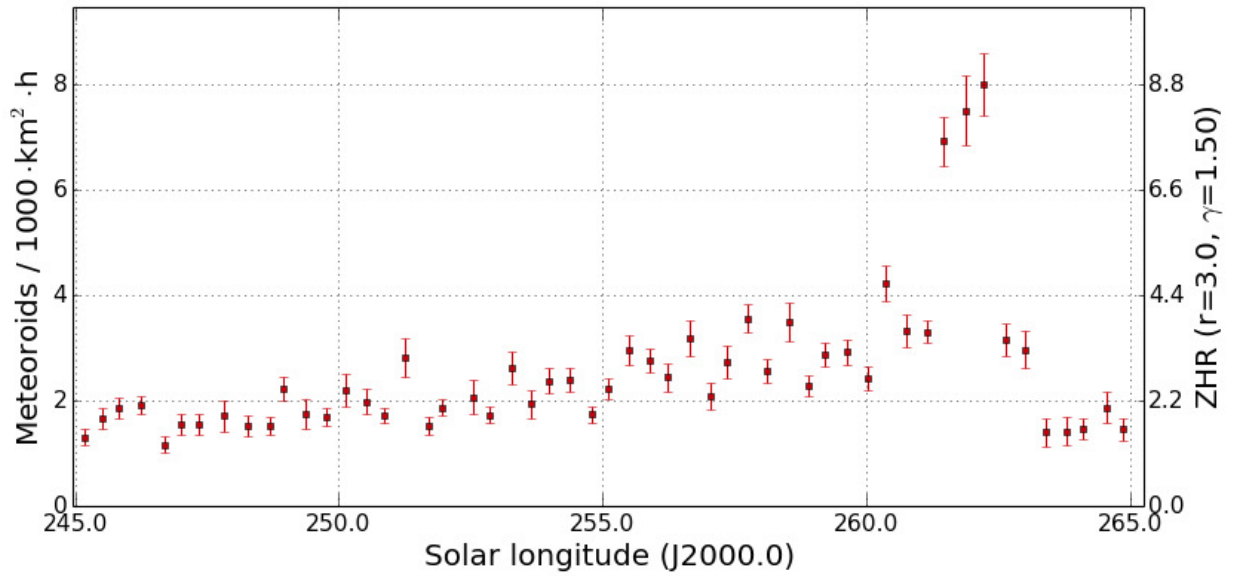

Figure 5: *Activity profile of the Monocerotids, averaged over the data sets 2011-2014.*

Finally, we will present as always a summary of the observing results from the previous year. In the 16th year of the IMO Video Meteor Network, the weather was mainly sympathetic to the observers. It was remarkable that in the first half of the year northern observers often enjoyed better weather conditions than their colleagues in southern Europe. The moon hampered some of the major showers, but the favourable observing conditions continued well into late fall. Only November brought us back to the ground.

The IMO network grew only to a minor extend in 2014. 48 observers (2013: 49) from 15 countries (2013: 16) contributed with 92 meteor cameras (2013:88) to the network. The ranking by country is clearly lead by Germany with 21 cameras, followed by Hungary (16), Italy (13), Slovenia (12) and Portugal (11). Further cameras were operated in Poland (5), the Netherlands (3), Spain, US and the Czech Republic (all 2) as well as Australia, Belgium, Greece, Finland and Russia (all 1).

In 365 observing nights (2013: 365) and 99,880 observing hours (2013: 86,637) we recorded a total of 367,036 meteors (2013: 350,003). Thus, we barely missed the 100,000 observing hours and surpassed the result of the two previous years by over 10,000 meteors. For the first time in the history of the IMO network, were recorded on average more than 1,000 meteors every night! With 3.7 meteors per hour, the average hourly outcome was similar to 2012 (3.8) and slightly below the level of last year (4.0).

Table 1 gives the distribution of observations over the months. In March and October we collected more than 11,000 hours of effective observing time, whereas it was less than 7,000 hours in January, February, June, July and November.

Table 1: *Monthly distribution of video observations in the IMO Network 2014.*

Month	# Observing Nights	Eff. Observing Time [h]	# Meteors	Meteors / Hour
January	31	6,027.2	18,367	3.0
February	28	6,966.3	14,569	2.1
March	31	11,891.1	20,351	1.7
April	30	7,773.9	16,353	2.1
May	31	7,490.0	18,249	2.4
June	30	6,602.3	18,690	2.8
July	31	6,789.2	30,949	4.6
August	31	9,762.9	70,819	7.3
September	30	9,448.3	36,518	3.9
October	31	11,199.1	51,979	4.6
November	30	6,597.8	25,267	3.8
December	31	9,331.7	44,925	4.8
Total	***365***	***99,879.8***	***367,036***	***3.7***

The number of observers that obtained 300 and more observing nights increased from five in the previous year to seven in 2014. Due to technical problems with one camera on the Canaries, Detlef Koschny was barely beaten with his 329 observing nights by two other observers. In the end, Sirko Molau (331) and Carl Hergenrother (330) had a shade more on their accounts. Behind the trio we find Rui Goncalves (324), Antal Igaz (308), Stefano Crivello (303) and Enrico Stomeo (300). Twenty more observers reported 200 and more observing nights, and another fifteen observers more than 100 observing nights.
Nothing has changed in the TOP-3 ranking with respect to the effective observing time. Rui Goncalves could defend his top position by increasing his outcome of 2013 significantly to over 9,500 observing hours. Also second ranked Sirko Molau and third ranked Carlos Saraiva obtained personal records with over 8,100 and 6,800 hours, respectively.
Finally Sirko Molau could prove that six sensitive cameras (mainly Mintrons) are sufficient to beat the output of the two image-intensified cameras on the Canaries. With 43,000 meteors he recorded more meteors than anyone else in a single year before. With over 32,500 meteors, Detlef Koschny ranked "only" second, followed by Rui Goncalves with over 30,000 meteors.

In the long-term statistics, Sirko Molau passed the mark of 4,000 and Jörg Strunk of 3,000 observing nights. Javor Kac, Flavio Castellani and Bernd Klemt all have more than 2,000 nights on their account, and another twenty observers more than 1,000 nights.

Table 2 summarized the details for all active observers of the IMO Video Meteor Network. The number of cameras and stations refers to the majority of 2014.

Table 2: *Distribution of video observation over the observers in 2014.*

Observer	Country	# Observing Nights	Eff. Observing Time [h]	# Meteors	Meteors / Hour	Cameras (Stations)
Sirko Molau	Germany	331	8,169.6	43,032	5.3	6 (2)
Carl Hergenrother	USA	330	2,818.4	6,266	2.2	1 (1)
Detlef Koschny	Netherlands	329	4,488.6	32,567	7.3	3 (3)
Rui Goncalves	Portugal	324	9,556.4	30,344	3.2	5 (1)
Antal Igaz	Hungary	310	4,010.6	7,213	1.8	4 (3)
Stefano Crivello	Italy	303	4,648.5	20,291	4.4	3 (1)
Enrico Stomeo	Italy	300	4,178.7	25,713	6.2	3 (1)
Jörg Strunk	Germany	293	6,215.0	19,048	3.1	5 (1)
Carlos Saraiva	Portugal	288	6,822.5	16,649	2.4	4 (1)
Hans Schremmer	Germany	286	1,411.5	5,264	3.7	1 (1)
Bernd Klemt	Germany	285	2,541.6	6,996	2.8	2 (2)
Istvan Tepliczky	Hungary	281	2,612.4	7,378	2.8	2 (1)
Jenni Donati	Italy	277	1,749.3	9,836	5.6	1 (1)
Rainer Arlt	Germany	272	1,413.9	7,751	5.5	1 (1)
Flavio Castellani	Italy	271	2,837.8	9,427	3.3	2 (1)
Maciej Maciejewski	Poland	270	4,478.3	17,055	3.8	4 (1)
Martin Breukers	Netherlands	261	2,582.9	5,195	2.0	2 (1)
Mitja Govedic	Slovenia	259	2,896.8	9,447	3.3	3 (1)
Mario Bombardini	Italy	253	1,424.2	8,292	5.8	1 (1)
Mike Otte	USA	238	1,296.3	3,122	2.4	1 (1)
Karoly Jonas	Hungary	235	1,327.5	2,583	1.9	1 (1)
Zsolt Perkó	Hungary	231	1,371.8	6,464	4.7	1 (1)
Javor Kac	Slovenia	227	3,295.7	12,038	3.7	5 (3)
Fabio Moschini	Italy	227	651.2	2,771	4.3	1 (1)
Szabolcs Kiss	Hungary	212	969.9	1,045	1.1	1 (1)
Mikhail Maslov	Russia	203	823.1	4,214	5.1	1 (1)
Rok Pucer	Slovenia	200	1,004.0	3,162	3.1	1 (1)
Maurizio Eltri	Italy	199	1,103.4	4,335	3.9	1 (1)
Mihaela Triglav	Slovenia	192	684.3	2,027	3.0	1 (1)
Eckehard Rothenberg	Germany	184	1,053.6	2,172	2.1	1 (1)
Paolo Ochner	Italy	170	863.8	2,060	2.4	1 (1)
Wolfgang Hinz	Germany	164	843.1	4,212	5.0	1 (1)
Erno Berkó	Hungary	160	1,729.5	6,311	3.6	2 (1)
Péter Bánfalvi	Hungary	158	458.5	1,788	3.9	1 (1)
József Morvai	Hungary	153	1,018.0	1,334	1.3	1 (1)
Szilárd Csizmadia	Hungary	150	426.7	1,869	4.4	1 (1)
Grigoris Maravelias	Greece	149	1,001.8	2,357	2.4	1 (1)
Kevin Förster	Germany	141	702.5	2,988	4.3	1 (1)
Tomasz Lojek	Poland	133	738.8	1,221	1.7	1 (1)
Leo Scarpa	Italy	130	547.1	1,701	3.1	1 (1)
Ilkka Yrjölä	Finland	128	730.5	2,025	2.8	1 (1)
Stane Slavec	Slovenia	112	570.2	986	1.7	1 (1)
Rui Marques	Portugal	97	772.2	3,200	4.1	1 (1)
Zoltán Zelko	Hungary	68	456.1	1,215	2.7	2 (1)
Karl-Heinz Gansel	Germany	51	340.7	553	1.6	1 (1)
Steve Kerr	Australien	19	53.1	271	5.1	1 (1)
Rosta Štork	Tschechien	10	102.2	1,200	11.7	2 (2)
Luc Bastiaens	Belgien	3	17.4	11	0.6	1 (1)

The list of the ten most successful video systems reflects the high degree of automation and success of many video systems. For the first time ever there are two cameras with over 300 observing nights. To enter the TOP-10 at all, a camera had to provide at least 280 observing nights, whereas in the year before 260 nights were sufficient. Once more the list does not contain the cameras with highest meteor count: ICC9 (17,129), ICC7 (12,221), AVIS2 (9,948) and JENNI (9,836).

Table 3: *The ten most successful video systems in 2014.*

Camera	Location	Observer	# Observing Nights	Eff. Observing Time [h]	# Meteors	Meteors / Hour
SALSA3	Tucson (US)	Carl Hergenrother	330	2,818.4	6,266	2.2
TEMPLAR5	Tomar (PT)	Rui Goncalves	306	1,915,4	6,777	3.5
SCO38	Scorce (IT)	Enrico Stomeo	292	1,472.4	9,724	6.6
TEMPLAR3	Tomar (PT)	Rui Goncalves	287	1,872,6	3,433	1.8
DORAEMON	Niederkrüchten (DE)	Hans Schremmer	286	1,411.5	5,264	3.7
REMO1	Ketzür (DE)	Sirko Molau	285	1,480.4	9,776	6.6
REMO4	Ketzür (DE)	Sirko Molau	283	1,567.1	8,674	5.5
BILBO	Valbrevenna (IT)	Stefano Crivello	281	1,571.7	7,095	4.5
NOA38	Scorce (IT)	Enrico Stomeo	281	1,405.0	7,511	5.3
MIN38	Scorce (IT)	Enrico Stomeo	280	1,301,3	8,478	6.5

The complete data set of the IMO Video Meteor Network including the 2014 data is available online at the IMO network homepage http://www.imonet.org. Currently the database contains exactly 2,133,934 meteors from 512,494 hours effective observing time in 5,373 nights.

As always, we would like to thank the many observers, whose passion is a guarantor for the success of the IMO Network. Special thanks Stefano Crivello, Enrico Stomeo, Rui Goncalves, Carlos Saraiva, Maciej Maciejewski and Mikhail Maslov, who check together with Sirko Molau every month 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	20	106.0	639
BANPE	Bánfalvi	Zalaegerszeg/HU	HUVCSE01 (0.95/5)	2423	3.4	361	9	39.0	194
BASLU	Bastiaens	Hove/BE	URANIA1 (0.8/3.8)*	4545	2.5	237	3	17.4	11
BERER	Berkó	Ludanyhalaszi/HU	HULUD1 (0.8/3.8)	5542	4.8	3847	12	87.2	613
			HULUD3 (0.95/4)	4357	3.8	876	12	74.8	163
BOMMA	Bombardini	Faenza/IT	MARIO (1.2/4.0)	5794	3.3	739	14	82.4	851
BREMA	Breukers	Hengelo/NL	MBB3 (0.75/6)	2399	4.2	699	17	80.9	174
			MBB4 (0.8/8)	1470	5.1	1208	11	60.0	149
BRIBE	Klemt	Herne/DE	HERMINE (0.8/6)	2374	4.2	678	13	49.4	201
		Berg. Gladbach/DE	KLEMOI (0.8/6)	2286	4.6	1080	10	50.3	256
CASFL	Castellani	Monte Baldo/IT	BMH1 (0.8/6)	2350	5.0	1611	21	184.0	873
			BMH2 (1.5/4.5)*	4243	3.0	371	24	214.0	705
CRIST	Crivello	Valbrevenna/IT	BILBO (0.8/3.8)	5458	4.2	1772	25	158.7	937
			C3P8 (0.8/3.8)	5455	4.2	1586	27	140.2	614
			STG38 (0.8/3.8)	5614	4.4	2007	22	161.1	1475
CSISZ	Csizmadia	Baja/HU	HUVCSE02 (0.95/5)	1606	3.8	390	14	99.1	349
DONJE	Donati	Faenza/IT	JENNI (1.2/4)	5886	3.9	1222	13	91.1	851
ELTMA	Eltri	Venezia/IT	MET38 (0.8/3.8)	5631	4.3	2151	12	80.5	482
FORKE	Förster	Carlsfeld/DE	AKM3 (0.75/6)	2375	5.1	2154	5	31.2	153
GONRU	Goncalves	Tomar/PT	TEMPLAR1 (0.8/6)	2179	5.3	1842	30	299.0	1249
			TEMPLAR2 (0.8/6)	2080	5.0	1508	30	308.9	1287
			TEMPLAR3 (0.8/8)	1438	4.3	571	30	302.2	762
			TEMPLAR4 (0.8/3.8)	4475	3.0	442	30	300.3	1190
			TEMPLAR5 (0.75/6)	2312	5.0	2259	29	298.1	1448
GOVMI	Govedic	Sredisce ob Dr./SI	ORION2 (0.8/8)	1447	5.5	1841	18	154.4	1368
			ORION3 (0.95/5)	2665	4.9	2069	20	150.0	572
			ORION4 (0.95/5)	2662	4.3	1043	20	146.7	745
HERCA	Hergenrother	Tucson/US	SALSA3 (0.8/3.8)	2336	4.1	544	30	259.9	795
HINWO	Hinz	Schwarzenberg/DE	HINWO1 (0.75/6)	2291	5.1	1819	10	57.9	348
IGAAN	Igaz	Baja/HU	HUBAJ (0.8/3.8)	5552	2.8	403	9	69.5	418
		Debrecen/HU	HUDEB (0.8/3.8)	5522	3.2	620	18	121.4	403
		Hodmezovasar./HU	HUHOD (0.8/3.8)	5502	3.4	764	18	70.9	312
		Budapest/HU	HUPOL (1.2/4)	3790	3.3	475	18	122.6	128
JONKA	Jonas	Budapest/HU	HUSOR (0.95/4)	2286	3.9	445	20	141.0	399
KACJA	Kac	Kamnik/SI	CVETKA (0.8/3.8)	4914	4.3	1842	12	71.3	481
		Kostanjevec/SI	METKA (0.8/12)*	715	6.4	640	1	10.1	33
		Ljubljana/SI	ORION1 (0.8/8)	1402	3.8	331	15	75.4	225
		Kamnik/SI	REZIKA (0.8/6)	2270	4.4	840	12	82.2	698
			STEFKA (0.8/3.8)	5471	2.8	379	12	72.9	398
KISSZ	Kiss	Sulysap/HU	HUSUL (0.95/5)*	4295	3.0	355	19	104.3	136
KOSDE	Koschny	Izana Obs./ES	ICC9 (0.85/25)*	683	6.7	2951	21	164.4	1515
		Noordwijkerhout/NL	LIC4 (1.4/50)*	2027	6.0	4509	14	69.0	432
LOJTO	Łojek	Grabniak/PL	PAV57 (1.0/5)	1631	3.5	269	1	2.7	3
MACMA	Maciejewski	Chelm/PL	PAV35 (0.8/3.8)	5495	4.0	1584	12	52.8	171
			PAV36 (0.8/3.8)*	5668	4.0	1573	16	74.1	370
			PAV43 (0.75/4.5)*	3132	3.1	319	10	49.6	140
			PAV60 (0.75/4.5)	2250	3.1	281	12	56.5	274
MARGR	Maravelias	Lofoupoli/GR	LOOMECON (0.8/12)	738	6.3	2698	27	163.7	477
MARRU	Marques	Lisbon/PT	CAB1 (0.8/3.8)	5291	3.1	467	17	88.4	413
			RAN1 (1.4/4.5)	4405	4.0	1241	30	281.9	1124
MASMI	Maslov	Novosimbirsk/RU	NOWATEC (0.8/3.8)	5574	3.6	773	11	45.4	362
MOLSI	Molau	Seysdorf/DE	AVIS2 (1.4/50)*	1230	6.9	6152	13	59.3	580
			ESCIMO (0.6/130)*	21	10.0	3507	2	14.1	15
			MINCAM1 (0.8/8)	1477	4.9	1084	13	49.9	384
		Ketzür/DE	REMO1 (0.8/8)	1467	6.5	5491	19	106.9	838
			REMO2 (0.8/8)	1478	6.4	4778	18	79.4	614
			REMO3 (0.8/8)	1420	5.6	1967	17	98.2	501
			REMO4 (0.8/8)	1478	6.5	5358	18	114.4	811
MORJO	Morvai	Fülöpszallas/HU	HUFUL (1.4/5)	2522	3.5	532	21	130.9	340
MOSFA	Moschini	Rovereto/IT	ROVER (1.4/4.5)	3896	4.2	1292	25	92.6	546
OCHPA	Ochner	Albiano/IT	ALBIANO (1.2/4.5)	2944	3.5	358	3	14.5	46
OTTMI	Otte	Pearl City/US	ORIE1 (1.4/5.7)	3837	3.8	460	12	79.2	188
PERZS	Perkó	Becsehely/HU	HUBEC (0.8/3.8)*	5498	2.9	460	18	158.6	1378
PUCRC	Pucer	Nova vas nad Dra./SI	MOBCAM1 (0.75/6)	2398	5.3	2976	17	95.3	333
ROTEC	Rothenberg	Berlin/DE	ARMEFA (0.8/6)	2366	4.5	911	12	56.2	123
SARAN	Saraiva	Carnaxide/PT	RO2 (0.75/6)	2381	3.8	459	29	273.3	978
			RO3 (0.8/12)	710	5.2	619	28	280.5	1236
			SOFIA (0.8/12)	738	5.3	907	28	246.0	699
SCHHA	Schremmer	Niederkrüchten/DE	DORAEMON (0.8/3.8)	4900	3.0	409	17	90.5	710
SLAST	Slavec	Ljubljana/SI	KAYAK1 (1.8/28)	563	6.2	1294	10	62.3	164
			KAYAK2 (0.8/12)	741	5.5	920	12	85.4	162
STOEN	Stomeo	Scorze/IT	MIN38 (0.8/3.8)	5566	4.8	3270	25	111.3	835
			NOA38 (0.8/3.8)	5609	4.2	1911	24	111.8	837
			SCO38 (0.8/3.8)	5598	4.8	3306	24	118.8	954
STRJO	Strunk	Herford/DE	MINCAM2 (0.8/6)	2354	5.4	2751	14	61.3	212
			MINCAM3 (0.8/6)	2338	5.5	3590	13	59.1	210
			MINCAM4 (1.0/2.6)	9791	2.7	552	15	49.1	253
			MINCAM5 (0.8/6)	2349	5.0	1896	12	53.5	243
			MINCAM6 (0.8/6)	2395	5.1	2178	13	56.0	216
TEPIS	Tepliczky	Agostyan/HU	HUAGO (0.75/4.5)	2427	4.4	1036	20	130.2	757
			HUMOB (0.8/6)	2388	4.8	1607	13	106.4	610
TRIMI	Triglav	Velenje/SI	SRAKA (0.8/6)*	2222	4.0	546	16	76.6	291
YRJIL	Yrjölä	Kuusankoski/FI	FINEXCAM (0.8/6)	2337	5.5	3574	10	46.8	127
ZELZO	Zelko	Budapest/HU	HUVCSE03 (1.0/4.5)	2224	4.4	933	10	45.0	187
			HUVCSE04 (1.0/4.5)	1484	4.4	573	11	43.5	181
Sum							31	9331.7	44925

* 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	-	-	-	1.9	-	0.4	5.2	9.5	8.9	10.6	5.8	1.3	3.8	3.0	2.8
BANPE	-	-	-	-	-	-	-	-	5.0	0.8	3.0	8.7	-	-	-
BASLU	-	-	-	-	-	-	8.6	-	0.3	8.5	-	-	-	-	-
BERER	-	-	-	10.5	-	-	-	-	-	-	4.3	8.8	4.0	-	-
	-	-	-	9.5	-	-	-	-	-	-	3.5	7.8	3.7	0.4	-
BOMMA	-	-	-	-	-	-	0.3	-	7.1	3.2	13.5	11.4	6.5	2.0	-
BREMA	-	-	-	-	-	3.8	5.2	0.4	-	6.5	4.7	4.5	0.4	5.8	-
	-	-	-	-	-	5.7	8.0	-	-	7.3	3.7	4.6	0.7	5.7	-
BRIBE	-	-	-	-	-	-	-	-	1.7	7.4	4.5	-	1.3	9.5	-
	-	-	-	-	-	-	-	-	-	-	1.4	-	2.1	7.2	-
CASFL	2.9	1.8	-	-	0.5	-	6.7	1.9	13.5	10.2	13.5	10.2	3.7	-	-
	1.9	1.1	-	-	-	-	7.1	-	13.4	9.8	13.4	7.0	2.2	-	-
CRIST	1.4	2.4	1.6	1.3	0.3	-	5.3	-	13.2	3.5	12.8	0.5	-	0.4	-
	0.5	0.8	0.7	2.5	1.6	0.5	3.4	0.2	13.1	4.0	10.7	0.4	1.0	-	-
	-	-	-	-	-	-	5.1	0.4	13.2	4.5	12.7	0.9	1.6	0.2	-
CSISZ	-	-	-	6.8	-	-	-	-	-	-	7.0	7.9	11.6	13.8	2.6
DINJE	-	-	-	-	-	-	0.7	-	6.8	8.4	13.5	11.6	6.9	2.9	-
ELTMA	-	-	-	-	-	-	-	1.7	12.4	4.2	13.4	5.7	1.3	5.2	-
FORKE	-	-	-	-	-	-	0.2	10.8	6.8	-	-	-	-	-	-
GONRU	11.9	5.6	9.7	10.5	9.1	9.7	11.4	12.8	12.4	10.5	5.9	-	2.5	11.7	1.1
	12.0	5.4	10.4	11.9	12.9	12.9	12.6	13.0	12.6	10.9	5.3	-	0.7	11.6	0.6
	12.1	3.8	10.9	11.8	11.4	11.9	11.6	12.8	12.5	11.7	4.5	-	5.8	11.4	0.5
	12.0	6.3	10.0	11.5	12.8	12.7	11.8	12.0	12.5	10.7	5.7	-	1.6	11.9	0.6
	11.8	2.9	7.9	12.0	11.5	11.6	11.7	12.8	12.4	10.9	4.4	-	5.4	11.2	-
GOVMI	-	-	-	-	-	-	-	0.2	5.8	5.1	9.5	13.4	13.3	13.4	11.0
	-	-	-	-	-	-	-	-	3.5	5.2	8.8	13.3	12.7	12.7	10.4
	-	-	-	-	-	-	-	-	5.0	2.7	8.9	13.4	12.8	12.8	8.9
HERCA	12.6	6.5	-	0.3	8.7	4.4	12.6	8.5	6.0	11.2	11.8	11.2	4.6	12.7	11.9
HINWO	-	-	-	-	-	-	4.1	12.7	11.9	2.7	3.2	2.3	-	3.8	-
IGAAN	-	-	2.2	-	-	-	-	-	-	-	3.6	-	11.1	13.2	-
	-	1.2	6.8	11.4	-	-	-	-	-	-	2.1	13.4	2.6	5.7	-
	-	-	-	1.4	-	-	-	-	-	-	5.9	7.1	2.4	1.5	2.6
	-	-	-	6.6	-	-	-	-	-	4.4	6.2	-	5.5	1.4	1.7
JONKA	-	-	-	3.9	-	-	-	-	-	-	7.0	10.3	10.7	1.8	0.9
KACJA	-	-	-	-	-	-	-	-	6.1	4.4	12.5	7.3	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	0.8	11.1	4.4	11.1	7.3	0.2	0.3	-
	-	-	-	-	-	-	-	-	10.7	5.2	13.0	7.2	-	-	-
	-	-	-	-	-	-	-	-	9.3	3.7	12.3	7.1	-	-	-
KISSZ	-	-	-	1.0	-	-	-	-	-	-	8.1	11.5	6.0	2.2	0.2
KOSDE	6.9	7.5	6.5	5.4	-	3.4	-	-	-	-	-	-	-	-	8.8
	-	-	-	-	1.4	6.7	4.1	6.3	-	-	-	2.3	12.4	-	2.2
LOJTO	-	-	-	-	-	-	-	-	-	-	-	2.7	-	-	-
MACMA	5.3	13.4	6.9	-	-	-	-	-	3.5	-	3.3	5.0	4.6	0.2	0.3
	6.4	13.8	10.4	-	-	-	-	-	5.3	-	6.5	6.1	6.5	0.7	0.6
	-	10.2	1.6	-	-	-	-	-	5.3	-	4.3	7.0	5.0	-	0.8
	6.2	12.1	10.7	-	-	-	-	-	-	-	2.7	-	6.1	0.2	1.0
MARGR	4.1	0.2	0.5	9.7	-	3.9	3.8	2.9	9.4	8.1	-	1.0	10.2	10.0	4.6
MARRU	-	-	-	-	-	-	-	-	-	-	1.2	-	2.4	6.1	-
	5.9	3.7	2.7	1.6	11.7	11.5	12.4	12.0	12.0	10.9	12.0	0.2	6.9	10.4	-
MASMI	-	6.3	3.2	-	-	-	3.0	-	-	0.7	-	-	6.4	0.3	2.7
MOLSI	-	-	-	-	-	-	1.7	8.1	-	-	6.0	11.6	5.8	-	-
	-	-	-	-	-	-	-	-	-	-	-	10.8	3.3	-	-
	-	-	-	-	-	-	1.6	3.7	-	-	4.0	11.4	4.8	-	-
	-	-	-	-	-	2.2	4.5	8.0	7.0	8.8	4.4	2.9	4.7	7.3	1.8
	-	-	-	0.2	-	-	4.3	5.6	5.5	7.7	3.4	1.8	3.7	6.4	1.1
	-	-	-	-	-	-	5.2	9.1	8.7	9.8	5.1	3.1	6.1	8.5	2.2
	-	-	-	-	-	2.0	3.8	8.8	8.1	9.3	5.4	2.9	5.5	8.5	2.7
MORJO	-	-	1.8	1.3	-	-	-	-	-	-	6.3	8.8	3.4	4.5	2.9
MOSFA	-	-	-	-	0.2	0.2	1.3	0.2	8.0	4.8	8.1	2.8	0.2	-	-
OCHPA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
OTTMI	4.2	7.6	2.4	-	-	4.9	-	-	-	-	4.2	5.0	2.3	-	-
PERZS	-	-	-	-	-	-	-	-	-	8.4	9.4	13.3	12.7	11.8	7.3
PUCRC	-	3.7	-	-	-	-	0.9	8.7	12.8	2.0	12.8	7.1	-	0.3	1.2
ROTEC	-	-	-	-	-	-	2.9	5.6	7.0	7.9	1.9	-	-	2.1	-
SARAN	9.7	5.4	3.9	4.7	12.3	12.7	12.4	12.6	11.5	8.3	7.3	0.4	5.2	7.1	0.2
	10.5	6.3	4.0	6.4	12.5	12.5	12.2	12.4	11.3	8.0	7.1	-	4.1	7.2	-
	10.4	3.8	3.6	4.0	11.1	11.6	12.4	12.3	12.4	6.4	6.2	-	4.5	10.7	-
SCHHA	-	-	-	-	-	0.6	7.6	1.7	-	10.0	2.4	-	7.4	7.8	0.7
SLAST	-	-	-	-	-	-	-	-	2.8	6.2	13.1	10.1	0.2	-	-
	-	-	-	-	-	-	-	-	2.9	5.7	9.5	9.7	0.7	-	-
STOEN	1.0	1.2	-	0.8	0.2	0.5	1.8	1.2	11.7	9.3	13.5	4.2	0.2	1.5	0.5
	0.6	0.8	-	0.3	0.2	0.3	1.7	1.2	12.1	8.4	13.6	4.3	-	1.0	0.4
	1.7	2.3	-	0.2	0.2	0.5	2.9	1.5	12.1	9.7	13.5	5.1	-	0.8	0.9
STRJO	-	-	-	-	-	-	1.8	0.4	1.9	9.0	1.5	-	-	7.8	-
	-	-	-	-	-	-	1.8	-	0.7	9.3	1.5	-	-	8.6	-
	0.3	-	-	-	-	-	1.8	0.4	2.0	8.5	1.3	2.0	1.3	8.6	-
	-	-	-	-	-	-	1.7	-	1.3	7.5	0.7	-	-	8.1	-
	-	-	-	-	-	-	1.8	-	0.6	8.9	2.7	-	-	8.1	-
TEPIS	-	-	-	0.4	-	-	-	-	2.1	5.2	3.1	10.8	10.6	10.2	8.7
	-	-	-	-	-	-	-	-	-	-	3.2	12.4	12.2	-	-
TRIMI	-	-	-	-	-	-	-	-	7.1	-	7.6	8.3	0.9	6.7	3.0
YRJIL	-	-	2.4	8.6	-	2.2	-	-	-	-	-	-	0.4	-	-
ZELZO	-	-	-	-	-	-	-	-	-	2.1	-	4.4	8.3	-	-
	-	-	-	0.3	-	-	-	-	-	2.3	-	4.4	8.6	-	-
Sum	152.3	136.1	120.8	158.7	118.6	149.3	241.0	233.2	432.3	395.8	500.0	398.0	326.3	366.9	110.4

December	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
ARLRA	11.2	0.2	-	4.2	5.0	-	-	-	-	1.1	13.6	12.1	2.2	3.2	-	-
BANPE	-	1.2	-	-	-	5.2	-	8.4	5.5	-	-	-	-	-	-	1.2
BASLU	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BERER	-	3.9	2.2	8.4	6.2	-	-	-	-	9.2	3.1	-	-	13.3	13.3	-
	-	5.6	-	2.7	5.7	-	-	-	-	6.5	2.8	-	-	13.3	13.3	-
BOMMA	-	0.5	-	-	4.6	-	-	-	0.2	-	7.4	-	6.1	9.8	-	9.8
BREMA	3.1	-	-	0.6	6.8	-	-	-	8.1	10.4	-	10.3	2.9	0.3	-	7.1
	3.7	-	-	5.0	7.3	-	-	-	8.3	-	-	-	-	-	-	-
BRIBE	-	-	-	0.7	2.0	-	-	-	-	9.7	4.2	3.3	1.4	0.3	-	3.4
	3.7	-	-	13.7	5.5	-	-	-	-	3.9	-	7.5	3.0	-	-	2.3
CASFL	5.1	8.6	11.4	11.6	13.6	-	-	-	-	12.5	13.0	-	7.0	13.6	9.5	13.2
	4.8	7.2	10.9	11.2	13.5	10.1	7.2	13.0	11.8	12.2	12.9	0.8	6.7	13.5	9.0	13.3
CRIST	4.0	6.7	1.8	5.1	7.4	11.6	-	-	2.6	12.5	10.5	11.1	13.2	13.2	9.4	6.9
	4.0	7.6	0.6	3.0	6.2	10.3	-	-	1.6	10.3	9.3	10.0	9.0	13.2	2.5	13.2
	5.0	6.9	2.4	6.3	8.8	13.1	-	-	2.3	12.8	11.1	13.1	13.2	10.1	10.3	7.1
CSISZ	-	6.5	3.0	10.6	4.8	8.7	4.2	6.7	4.9	-	-	-	-	-	-	-
DINJE	-	2.1	-	-	4.2	-	-	-	-	-	5.4	-	5.3	10.6	-	12.7
ELTMA	-	-	-	-	-	-	-	-	-	6.7	-	-	6.0	12.0	0.4	11.5
FORKE	2.5	-	-	-	-	-	-	-	-	-	10.9	-	-	-	-	-
GONRU	7.5	12.7	9.3	8.4	10.7	12.8	5.3	10.9	12.2	12.8	8.7	12.1	12.8	12.7	12.7	12.6
	8.1	12.8	9.4	8.2	10.7	13.0	5.6	10.6	12.4	13.0	8.1	12.2	13.0	13.0	13.0	13.0
	5.9	11.9	9.0	9.1	12.8	12.8	5.5	10.9	12.2	12.9	6.8	8.3	12.9	12.9	12.8	12.8
	5.1	12.5	9.3	8.2	10.7	13.0	5.0	10.3	10.7	12.9	7.5	11.5	12.9	12.9	12.9	12.8
	6.9	11.4	9.3	9.2	13.0	12.9	5.2	10.8	12.8	13.0	6.8	8.5	13.0	13.0	12.9	12.9
GOVMI	-	5.6	3.1	6.2	7.9	-	-	13.5	12.9	-	11.0	-	5.9	9.0	7.6	-
	-	2.9	2.7	6.2	6.9	12.0	0.6	13.4	11.2	-	10.5	-	0.5	7.2	7.0	2.3
	-	1.2	2.7	4.6	6.6	11.9	0.2	11.7	11.3	-	10.1	-	3.6	8.0	7.6	2.7
HERCA	6.4	2.4	1.9	9.5	12.0	9.5	11.8	12.0	12.5	2.5	1.6	12.7	12.7	10.5	11.5	7.4
HINWO	3.3	-	-	4.4	-	-	-	-	-	-	9.5	-	-	-	-	-
IGAAN	-	5.3	-	10.2	3.3	-	-	-	-	-	13.4	-	-	7.2	-	-
	-	6.1	-	6.1	2.6	3.0	3.4	6.2	13.6	-	9.9	5.4	-	8.4	13.5	-
	-	4.2	2.5	4.4	1.0	6.3	0.6	7.4	6.9	-	2.1	4.0	-	-	7.7	2.9
	-	7.2	-	9.2	6.5	2.6	5.3	11.6	9.4	1.5	10.9	-	5.5	13.7	13.4	-
JONKA	-	7.5	1.4	5.2	5.0	4.5	7.0	11.7	10.7	0.4	13.3	-	5.5	13.4	13.6	7.2
KACJA	-	0.5	3.6	4.8	3.0	12.3	1.3	3.0	-	-	12.5	-	-	-	-	-
	-	-	-	-	10.1	-	-	-	-	-	-	-	-	-	-	-
	-	-	4.4	-	8.8	-	-	-	-	1.1	12.8	-	2.8	7.6	0.2	2.5
	-	0.5	4.0	4.6	7.8	12.8	0.9	3.0	-	-	12.5	-	-	-	-	-
	-	0.4	3.0	5.5	3.3	10.9	1.9	2.9	-	-	12.6	-	-	-	-	-
KISSZ	0.9	8.8	3.5	9.4	5.7	-	7.8	1.5	10.5	-	10.5	0.3	1.6	1.2	13.6	-
KOSDE	10.0	10.6	10.9	10.9	10.8	2.7	9.7	10.9	10.8	10.8	1.8	10.8	6.0	1.7	-	7.5
	2.4	-	-	6.1	5.8	-	-	-	-	6.6	-	5.7	2.7	-	-	4.3
LOJTO	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MACMA	-	6.9	1.1	-	-	-	-	-	-	-	-	-	-	-	2.3	-
	-	9.5	2.0	0.4	1.3	-	-	-	-	0.6	-	-	-	0.2	3.8	-
	-	9.5	-	-	-	-	-	-	-	1.5	-	-	-	-	4.4	-
	-	9.2	1.7	-	1.4	-	-	-	-	1.2	-	-	-	-	4.0	-
MARGR	2.7	5.5	8.3	5.7	-	1.9	12.0	12.4	1.8	12.0	10.2	8.4	5.1	7.4	1.9	-
MARRU	9.2	9.5	4.8	-	0.6	6.8	4.3	0.9	4.8	6.6	5.6	4.0	0.9	8.4	12.3	-
	4.1	11.0	12.0	12.0	11.7	12.0	6.6	11.7	11.2	12.4	9.9	9.2	9.1	11.1	12.0	12.0
MASMI	-	-	-	-	13.8	-	-	-	-	-	-	4.1	4.6	-	-	0.3
MOLSI	0.4	-	2.8	0.7	2.4	-	-	-	-	4.6	5.6	-	8.5	-	-	1.1
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	0.5	-	2.6	0.9	1.7	-	-	-	-	4.5	4.3	-	8.7	-	-	1.2
	11.7	0.3	-	6.8	6.9	-	-	-	-	0.8	13.1	12.5	1.5	-	-	1.7
	10.2	0.2	-	4.1	5.9	-	-	-	-	-	10.2	8.0	0.3	-	-	0.8
	12.2	0.5	-	6.3	7.3	-	-	-	-	1.0	9.4	-	1.9	-	-	1.8
	12.4	0.4	-	6.9	8.4	-	-	-	-	0.9	13.9	12.8	-	-	-	1.7
MORJO	-	5.8	1.7	11.1	4.7	3.8	5.4	13.4	10.3	-	12.9	0.4	1.5	10.2	13.6	7.1
MOSFA	2.4	4.8	3.8	0.4	3.4	2.7	4.2	2.7	2.3	2.7	3.7	2.3	3.1	13.7	3.7	10.9
OCHPA	-	-	-	-	-	4.2	-	4.8	5.5	-	-	-	-	-	-	-
OTTMI	-	-	-	-	-	-	-	-	-	-	-	7.8	5.6	10.9	12.0	12.3
PERZS	-	9.6	4.6	7.3	6.5	6.7	3.5	13.5	13.0	-	11.6	-	-	7.8	8.2	3.4
PUCRC	-	4.3	1.0	0.4	4.1	-	-	-	-	-	4.3	-	6.3	12.2	-	13.2
ROTEC	7.1	-	-	4.0	1.8	-	-	-	-	1.6	13.4	-	0.9	-	-	-
SARAN	-	11.1	12.8	11.5	12.6	12.4	-	10.7	7.0	12.7	10.4	11.9	10.4	10.9	12.5	12.7
	-	11.0	12.6	11.3	12.4	12.2	4.7	11.0	7.5	12.5	11.7	12.3	11.2	11.0	12.2	12.4
	-	7.9	12.7	11.3	12.5	12.5	3.3	9.8	10.4	6.8	7.3	8.8	8.3	9.6	12.5	2.9
SCHHA	4.1	-	-	13.8	7.4	-	-	-	-	7.5	0.3	4.8	2.8	0.5	-	11.1
SLAST	-	-	2.8	-	10.9	-	-	-	-	-	9.9	-	2.5	3.8	-	-
	-	-	-	-	11.1	13.4	2.3	-	-	-	7.6	-	6.1	11.0	-	5.4
STOEN	0.8	1.1	-	0.3	13.0	-	0.6	-	6.4	5.9	-	-	5.2	13.4	7.1	9.9
	0.8	0.9	-	0.2	13.0	-	2.1	-	6.5	6.5	-	-	4.7	13.7	5.7	12.8
	1.2	0.5	-	0.2	13.4	-	1.6	-	6.3	6.1	-	-	4.9	13.6	7.1	12.5
STRJO	4.3	-	-	3.2	9.1	-	-	-	-	0.7	5.2	10.5	-	1.8	-	4.1
	4.5	-	-	2.2	7.1	-	-	-	-	1.5	6.1	9.3	-	2.0	-	4.5
	0.8	-	-	2.7	7.6	-	-	-	-	1.2	0.6	10.0	-	-	-	-
	4.2	-	-	2.1	6.8	-	-	-	-	1.3	5.2	10.5	-	-	-	4.1
	4.3	-	-	3.5	6.6	-	-	-	-	1.1	4.9	9.8	-	1.7	-	2.0
TEPIS	-	2.2	-	4.0	2.5	3.6	7.7	10.3	7.6	3.8	11.2	-	5.8	9.4	11.0	-
	-	-	-	2.8	5.3	4.7	8.2	12.2	10.9	2.9	12.8	-	5.4	-	13.4	-
TRIMI	-	4.5	3.4	7.3	3.4	2.8	-	4.4	3.4	-	6.6	-	3.1	4.1	-	-
YRJIL	1.5	-	-	-	0.3	-	-	-	-	-	11.4	-	13.5	5.2	-	1.3
ZELZO	-	1.4	-	1.4	-	-	5.6	4.7	-	-	6.7	-	-	6.5	3.9	-
	-	0.6	-	2.3	-	-	3.2	4.5	-	-	5.7	-	-	6.1	5.5	-
Sum	203.0	309.7	213.0	380.6	503.5	311.7	163.8	317.4	330.3	316.2	548.8	317.1	329.3	485.0	396.8	365.8

3. Results (Meteors)

December	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
ARLRA	-	-	-	3	-	1	18	52	42	78	19	10	25	24	11
BANPE	-	-	-	-	-	-	-	-	16	4	15	91	-	-	-
BASLU	-	-	-	-	-	-	5	-	1	5	-	-	-	-	-
BERER	-	-	-	60	-	-	-	-	-	-	46	89	54	-	-
	-	-	-	14	-	-	-	-	-	-	18	23	18	2	-
BOMMA	-	-	-	-	-	-	2	-	83	21	190	190	166	18	-
BREMA	-	-	-	-	-	15	14	1	-	13	5	23	3	39	-
	-	-	-	-	-	6	24	-	-	21	6	32	2	33	-
BRIBE	-	-	-	-	-	-	-	-	2	18	8	-	12	72	-
	-	-	-	-	-	-	-	-	-	-	1	-	5	113	-
CASFL	5	8	-	-	2	-	32	3	78	71	125	64	39	-	-
	4	4	-	-	-	-	27	-	53	42	99	42	22	-	-
CRIST	8	17	14	10	2	-	41	-	78	34	119	1	-	2	-
	3	5	4	11	10	3	22	1	87	38	85	4	9	-	-
	-	-	-	-	-	-	80	1	145	55	208	1	10	1	-
CSISZ	-	-	-	7	-	-	-	-	-	-	23	36	117	87	5
DINJE	-	-	-	-	-	-	6	-	64	50	166	196	173	30	-
ELTMA	-	-	-	-	-	-	-	9	88	28	113	45	13	37	-
FORKE	-	-	-	-	-	-	1	91	9	-	-	-	-	-	-
GONRU	69	25	53	30	36	40	44	51	53	36	20	-	33	134	2
	62	22	50	37	50	59	54	60	63	46	10	-	1	172	1
	28	8	30	24	27	46	24	30	29	25	6	-	80	89	2
	56	13	43	32	50	57	37	48	77	32	14	-	10	201	1
	51	18	69	29	51	69	41	44	67	41	6	-	172	191	-
GOVMI	-	-	-	-	-	-	-	1	36	21	80	223	372	220	42
	-	-	-	-	-	-	-	-	15	5	40	95	145	131	19
	-	-	-	-	-	-	-	-	23	2	43	118	234	161	13
HERCA	27	7	-	1	30	6	37	16	10	41	38	36	29	179	51
HINWO	-	-	-	-	-	-	11	99	54	16	31	14	-	40	-
IGAAN	-	-	7	-	-	-	-	-	-	-	19	-	142	183	-
	-	6	24	32	-	-	-	-	-	-	2	97	30	62	-
	-	-	-	2	-	-	-	-	-	-	42	96	32	20	9
	-	-	-	2	-	-	-	-	-	4	13	-	26	3	1
JONKA	-	-	-	7	-	-	-	-	-	-	19	72	114	9	1
KACJA	-	-	-	-	-	-	-	-	39	37	130	93	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	4	48	20	40	29	1	2	-
	-	-	-	-	-	-	-	-	90	47	173	96	-	-	-
	-	-	-	-	-	-	-	-	50	35	97	77	-	-	-
KISSZ	-	-	-	2	-	-	-	-	-	-	15	24	26	11	1
KOSDE	76	97	92	81	-	13	-	-	-	-	-	-	-	-	53
	-	-	-	-	6	21	12	21	-	-	-	13	255	-	11
LOJTO	-	-	-	-	-	-	-	-	-	-	-	3	-	-	-
MACMA	26	42	14	-	-	-	-	-	9	-	2	17	41	2	2
	60	88	39	-	-	-	-	-	30	-	14	25	66	5	2
	-	34	10	-	-	-	-	-	16	-	9	32	17	-	1
	48	94	50	-	-	-	-	-	-	-	12	-	32	1	2
MARGR	6	1	4	23	-	10	8	1	11	23	-	1	142	53	10
MARRU	-	-	-	-	-	-	-	-	-	-	7	-	33	108	-
	45	28	18	8	34	32	62	43	59	40	69	1	114	147	-
MASMI	-	23	6	-	-	-	14	-	-	1	-	-	194	4	16
MOLSI	-	-	-	-	-	-	2	10	-	-	61	272	52	-	-
	-	-	-	-	-	-	-	-	-	-	-	14	1	-	-
	-	-	-	-	-	-	8	10	-	-	29	192	43	-	-
	-	-	-	-	-	15	26	68	19	92	22	50	68	83	10
	-	-	-	1	-	-	20	37	8	36	19	20	45	88	8
	-	-	-	-	-	-	12	45	18	50	20	31	62	75	6
	-	-	-	-	-	6	8	47	30	86	30	53	59	102	11
MORJO	-	-	3	4	-	-	-	-	-	-	15	79	58	57	7
MOSFA	-	-	-	-	1	1	10	1	69	39	89	21	1	-	-
OCHPA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
OTTMI	4	28	1	-	-	14	-	-	-	-	5	34	22	-	-
PERZS	-	-	-	-	-	-	-	-	-	34	93	210	373	250	22
PUCRC	-	5	-	-	-	-	5	32	81	5	61	34	-	2	5
ROTEC	-	-	-	-	-	-	4	17	10	13	2	-	-	16	-
SARAN	31	17	9	26	32	39	56	53	48	46	58	3	55	67	2
	35	22	16	20	53	71	60	57	66	52	64	-	47	38	-
	24	8	10	14	29	35	27	30	40	19	34	-	56	79	-
SCHHA	-	-	-	-	-	5	35	9	-	55	4	-	343	99	2
SLAST	-	-	-	-	-	-	-	-	7	15	31	34	1	-	-
	-	-	-	-	-	-	-	-	5	10	31	36	3	-	-
STOEN	8	7	-	5	1	3	17	5	144	68	148	52	1	10	1
	5	5	-	2	1	2	7	5	117	73	208	44	-	6	2
	10	12	-	1	1	3	25	7	140	77	205	57	-	4	3
STRJO	-	-	-	-	-	-	11	1	2	25	5	-	-	74	-
	-	-	-	-	-	-	8	-	1	41	4	-	-	92	-
	1	-	-	-	-	-	10	1	5	32	5	13	8	129	-
	-	-	-	-	-	-	14	-	1	18	4	-	-	123	-
	-	-	-	-	-	-	11	-	1	27	7	-	-	93	-
TEPIS	-	-	-	3	-	-	-	-	3	12	16	127	204	147	29
	-	-	-	-	-	-	-	-	-	-	11	146	232	-	-
TRIMI	-	-	-	-	-	-	-	-	25	-	29	58	6	37	5
YRJIL	-	-	8	19	-	9	-	-	-	-	-	-	4	-	-
ZELZO	-	-	-	-	-	-	-	-	-	4	-	28	73	-	-
	-	-	-	1	-	-	-	-	-	8	-	24	85	-	-
Sum	692	644	574	511	416	581	992	1011	2365	1887	3507	3641	4911	4257	369

December	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
ARLRA	125	1	-	14	13	-	-	-	-	10	122	65	4	2	-	-
BANPE	-	7	-	-	-	16	-	29	15	-	-	-	-	-	-	1
BASLU	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BERER	-	11	1	25	71	-	-	-	-	62	8	-	-	98	88	-
	-	4	-	4	17	-	-	-	-	10	3	-	-	21	29	-
BOMMA	-	2	-	-	5	-	-	-	2	-	51	-	32	36	-	53
BREMA	4	-	-	1	5	-	-	-	12	6	-	24	3	1	-	5
	6	-	-	3	9	-	-	-	7	-	-	-	-	-	-	-
BRIBE	-	-	-	5	13	-	-	-	-	23	1	23	2	2	-	20
	8	-	-	68	9	-	-	-	-	5	-	44	1	-	-	2
CASFL	27	54	51	39	52	-	-	-	-	34	34	-	33	50	27	45
	16	31	23	37	34	13	41	19	15	33	22	5	32	39	14	38
CRIST	28	55	7	42	46	52	-	-	18	80	24	35	66	71	43	44
	29	43	3	15	42	30	-	-	10	30	15	13	33	46	3	20
	57	84	15	60	76	97	-	-	18	91	55	51	100	132	62	76
CSISZ	-	6	3	13	15	13	8	4	12	-	-	-	-	-	-	-
DINJE	-	9	-	-	1	-	-	-	-	-	35	-	16	35	-	70
ELTMA	-	-	-	-	-	-	-	-	-	13	-	-	26	49	3	58
FORKE	11	-	-	-	-	-	-	-	-	-	41	-	-	-	-	-
GONRU	17	33	27	21	32	63	17	35	51	52	22	36	52	59	56	50
	11	45	27	19	36	62	11	29	49	59	14	25	53	51	54	55
	7	21	13	10	36	18	4	24	22	30	3	5	41	29	27	24
	13	50	29	14	25	49	6	22	46	50	10	19	34	47	49	56
	22	49	18	14	50	47	9	50	55	63	10	11	60	47	47	47
GOVMI	-	20	13	17	65	-	-	71	48	-	49	-	20	34	36	-
	-	4	5	6	17	18	2	9	3	-	14	-	2	15	24	3
	-	9	7	9	23	15	1	14	15	-	17	-	6	13	17	5
HERCA	8	1	1	12	29	27	19	33	35	5	3	25	29	28	27	5
HINWO	22	-	-	22	-	-	-	-	-	-	39	-	-	-	-	-
IGAAN	-	5	-	13	6	-	-	-	-	-	35	-	-	8	-	-
	-	7	-	5	8	1	5	14	35	-	27	8	-	12	28	-
	-	3	8	8	4	11	2	17	31	-	2	1	-	-	23	1
	-	3	-	12	7	1	8	12	4	2	14	-	4	5	7	-
JONKA	-	6	1	10	13	11	18	21	18	3	29	-	8	16	21	2
KACJA	-	3	26	12	12	38	7	3	-	-	81	-	-	-	-	-
	-	-	-	-	33	-	-	-	-	-	-	-	-	-	-	-
	-	-	14	-	28	-	-	-	-	1	22	-	5	4	1	6
	-	3	39	12	59	50	3	6	-	-	120	-	-	-	-	-
	-	2	17	9	8	26	8	2	-	-	67	-	-	-	-	-
KISSZ	1	4	1	4	5	-	9	4	6	-	12	1	1	1	8	-
KOSDE	82	85	91	120	101	4	97	107	97	103	7	95	29	6	-	79
	2	-	-	10	16	-	-	-	-	24	-	21	6	-	-	14
LOJTO	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MACMA	-	7	3	-	-	-	-	-	-	-	-	-	-	-	6	-
	-	17	4	2	7	-	-	-	-	2	-	-	-	1	8	-
	-	9	-	-	-	-	-	-	-	2	-	-	-	-	10	-
	-	17	1	-	5	-	-	-	-	3	-	-	-	-	9	-
MARGR	1	8	20	10	-	2	41	26	6	18	21	18	3	9	1	-
MARRU	27	30	5	-	3	21	15	1	26	35	10	10	4	37	41	-
	3	39	36	34	25	50	17	26	41	34	12	11	21	24	19	32
MASMI	-	-	-	-	66	-	-	-	-	-	-	29	7	-	-	2
MOLSI	3	-	37	10	20	-	-	-	-	60	14	-	32	-	-	7
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	3	-	23	8	3	-	-	-	-	29	10	-	25	-	-	1
	121	3	-	40	34	-	-	-	-	2	91	78	3	-	-	13
	98	2	-	35	33	-	-	-	-	-	91	62	2	-	-	9
	79	1	-	26	22	-	-	-	-	3	43	-	2	-	-	6
	112	1	-	47	26	-	-	-	-	4	96	86	-	-	-	7
MORJO	-	4	2	7	8	6	5	13	21	-	23	2	1	5	17	3
MOSFA	21	34	26	2	23	17	34	17	13	25	25	11	24	22	1	19
OCHPA	-	-	-	-	-	16	-	11	19	-	-	-	-	-	-	-
OTTMI	-	-	-	-	-	-	-	-	-	-	-	12	3	23	21	21
PERZS	-	20	11	8	50	39	15	75	53	-	18	-	-	44	58	5
PUCRC	-	12	5	1	1	-	-	-	-	-	1	-	29	13	-	41
ROTEC	28	-	-	7	1	-	-	-	-	1	23	-	1	-	-	-
SARAN	-	26	48	31	34	48	-	18	27	40	12	23	21	40	33	35
	-	51	51	59	42	66	8	34	34	62	19	30	36	41	50	52
	-	21	30	11	16	29	4	13	22	33	6	12	18	30	24	25
SCHHA	9	-	-	56	29	-	-	-	-	15	1	19	2	2	-	25
SLAST	-	-	4	-	28	-	-	-	-	-	32	-	7	5	-	-
	-	-	-	-	22	19	2	-	-	-	15	-	4	12	-	3
STOEN	6	9	-	2	56	-	1	-	23	36	-	-	54	82	26	70
	5	4	-	1	66	-	8	-	30	37	-	-	49	70	20	70
	5	6	-	1	75	-	7	-	27	39	-	-	47	93	25	84
STRJO	12	-	-	8	22	-	-	-	-	1	8	36	-	2	-	5
	8	-	-	5	11	-	-	-	-	1	10	19	-	3	-	7
	1	-	-	5	10	-	-	-	-	2	1	30	-	-	-	-
	10	-	-	4	12	-	-	-	-	3	6	44	-	-	-	4
	12	-	-	10	14	-	-	-	-	3	4	31	-	2	-	1
TEPIS	-	6	-	8	8	4	32	28	12	13	39	-	15	20	31	-
	-	-	-	4	22	10	25	39	21	11	45	-	21	-	23	-
TRIMI	-	10	10	21	16	8	-	20	7	-	21	-	8	10	-	-
YRJIL	1	-	-	-	5	-	-	-	-	-	36	-	36	6	-	3
ZELZO	-	3	-	4	-	-	13	19	-	-	12	-	-	18	13	-
	-	2	-	4	-	-	6	12	-	-	10	-	-	11	18	-
Sum	1061	1002	756	1156	1836	997	508	877	1006	1303	1763	1070	1173	1582	1148	1329