Results of the IMO Video Meteor Network – June 2018

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June 2018 presented a substandard yield to the IMO network video observers, which is not obvious from a glimpse at the result tables. We see a continuing tendency which started earlier this year: The typically dominating Portuguese observers had to live with twenty and sometimes clearly fewer observing nights, whereas observers in Germany and Poland collected well above twenty nights. Only our Italian team enjoyed as usual perfectly clear skies. Overall 47 of 76 video cameras recorded meteors in twenty or more observing nights. With 5,700 hours, the effective observing time fell 15% to 25% short of the outcome of the previous four years, and those 14,000 meteors marked a decrease of even 25% to 35%. Indeed, it's the worst June result since 2011 when the IMO network consisted of still less than fifty cameras.

Also, with respect to meteor showers, June has only little to offer. There are the daytime Arietids, which have been targeting by visual and video observers for several years, in order to normalize the hourly rates obtained from radar data with the ZHR and flux density in the optical domain. Due to the exceptionally short observing window, the data is even after 8 years still rudimentary. If we include all observing intervals starting at 0° radiant altitude, all IMO network cameras together have accumulated just 17,500 km^2 and hour of effective collection area in 2,250 hours of effective observing time. That's about as much as two powerful video cameras collect in a single Geminid night. Given this, the reported number of 260 shower meteors is quite substantial. It yields a flux density of about 15 meteoroids per 1,000 km^2 and hour corresponding to a ZHR in the upper two-digit range. Due to the exceptional circumstances the error bars are quite large, though. In particular we would need to find out, how big the sporadic pollution is in this case.

The yield of the June Bootids, the second meteor shower of June, is also negligible, but for a different reason. This shower presents only once in a few years significant outbursts (last time 2004), and otherwise it is below the detection threshold. Both in 2018 and in the long-term average 2011-2017 the flux density was below 0.1 meteoroids per 1,000 km^2 and hour (figure 1), which should reflect the sporadic background. In fact, if we plot the long-term average June Bootid and sporadic profile (the latter one scaled down by a factor of 500), the profiles match almost perfectly (figure 2).

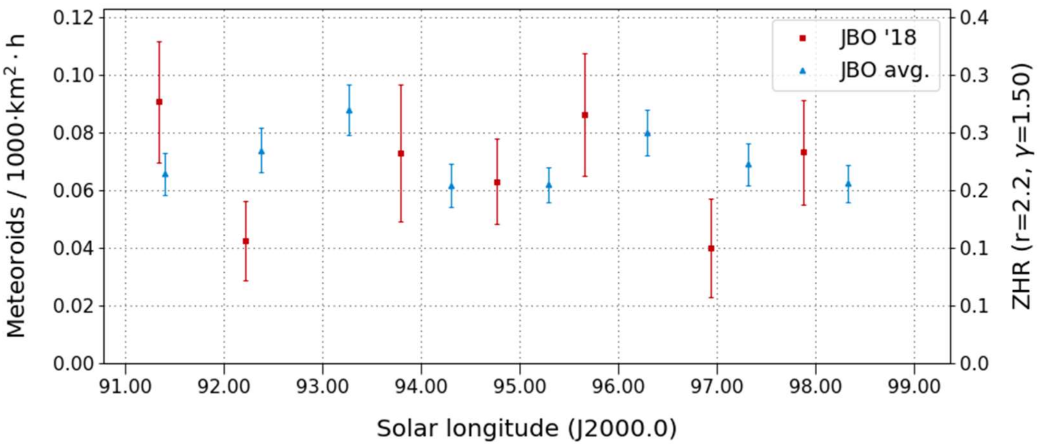

Figure 1: *Flux density profile of the June Bootids in 2018 (red) and in the average of 2011-2017 (blue), derived from video data of the IMO Network.*

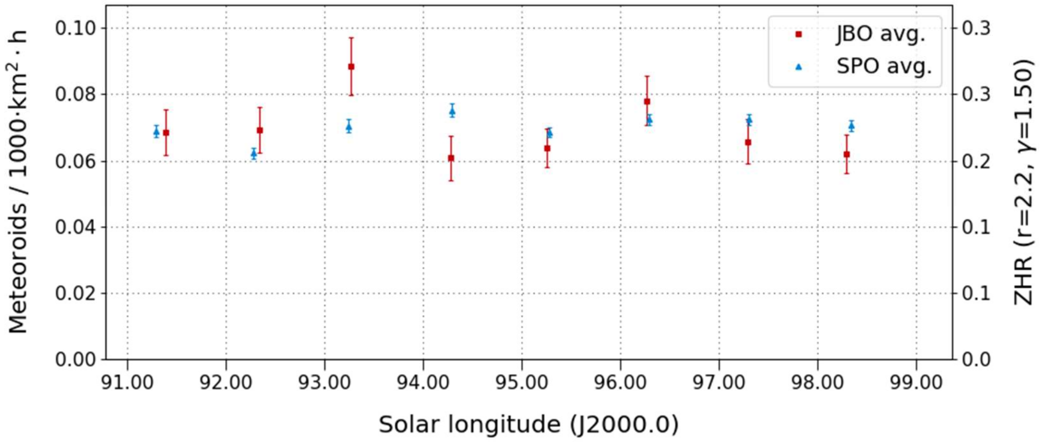

Figure 2: *Comparison of the activity profile of the June Bootids and sporadic meteors (downscaled by a factor of 500) in the average of the years 2011-2018.*

But who has contributed which data set to this graph? The online FluxViewer does now not only provide a data table, but additional statistics on the contributing cameras and observers. Hence, we know that STG38 of Stefano Crivello provided most effective collection area for figure 1. The cameras of Rui Goncalves, Enrico Stomeo and Maurizio Eltri were equally successful data collectors for the June Bootids.

Unfortunately, the backlog of IMO network observing reports has recently significantly increased – now the deficit is almost one year. In order to let interested researcher not to wait too long, we have introduced a second database in FluxViewer. Beside the regular database, which contains complete and double-checked data up to the corresponding monthly report (currently: June 2018) the observers can upload their video data into the temporary database on their own. These data are more up-to-date (sometimes to the day), but incomplete and not double-checked. Via a checkbox in the meteorflux.org web interface the researcher can decide, which of the two data sets he would like to use.

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	66.6	279
BIATO	Bianchi	Mt. San Lorenzo/IT	OMSL1 (1.2/4)	6435	4.0	1705	23	119.7	211
BOMMA	Bombardini	Faenza/IT	MARIO (1.2/4.0)	5794	3.3	739	28	146.0	479
BREMA	Breukers	Hengelo/NL	MBB3 (0.75/6)	2399	4.2	699	17	58.2	100
BRIBE	Klemt	Herne/DE	HERMINE (0.8/6)	2374	4.2	678	20	62.7	158
		Berg. Gladbach/DE	KLEMOI (0.8/6)	2286	4.6	1080	18	69.7	149
CARMA	Carli	Monte Baldo/IT	BMH2 (1.5/4.5)*	4243	3.0	371	24	109.3	439
CASFL	Castellani	Monte Baldo/IT	BMH1 (0.8/6)	2350	5.0	1611	22	109.4	230
CINFR	Cineglosso	Faenza/IT	JENNI (1.2/4)	5886	3.9	1222	28	159.0	630
CRIST	Crivello	Valbrevenna/IT	ARCI (0.8/3.8)	5566	4.6	2575	27	108.3	270
			BILBO (0.8/3.8)	5458	4.2	1772	28	114.3	289
			C3P8 (0.8/3.8)	5455	4.2	1586	25	87.7	231
			STG38 (0.8/3.8)	5614	4.4	2007	26	101.2	431
ELTMA	Eltri	Venezia/IT	MET38 (0.8/3.8)	5631	4.3	2151	25	87.7	199
FORKE	Förster	Carlsfeld/DE	AKM3 (0.75/6)	2375	5.1	2154	15	28.6	137
GONRU	Goncalves	Foz do Arelho/PT	FARELHO1 (0.75/4.5)	2286	3.0	208	3	9.6	5
		Tomar/PT	TEMPLAR1 (0.8/6)	2179	5.3	1842	20	92.4	244
			TEMPLAR2 (0.8/6)	2080	5.0	1508	20	89.2	185
			TEMPLAR3 (0.8/8)	1438	4.3	571	16	66.7	51
			TEMPLAR4 (0.8/3.8)	4475	3.0	442	19	84.6	180
			TEMPLAR5 (0.75/6)	2312	5.0	2259	20	70.3	142
GOVMI	Govedic	Sredisce ob Dr./SI	ORION2 (0.8/8)	1447	5.5	1841	19	60.9	107
			ORION3 (0.95/5)	2665	4.9	2069	6	6.8	10
			ORION4 (0.95/5)	2662	4.3	1043	18	35.0	48
HERCA	Hergenrother	Tucson/US	SALSA3 (0.8/3.8)	2336	4.1	544	23	181.7	357
HINWO	Hinz	Schwarzenberg/DE	HINWO1 (0.75/6)	2291	5.1	1819	20	77.8	142
IGAAN	Igaz	Budapest/HU	HUPOL (1.2/4)	3790	3.3	475	10	35.8	23
JONKA	Jonas	Budapest/HU	HUSOR (0.95/4)	2286	3.9	445	17	51.6	56
			HUSOR2 (0.95/3.5)	2465	3.9	715	20	60.3	69
KACJA	Kac	Kamnik/SI	CVETKA (0.8/3.8)	4914	4.3	1842	13	54.7	139
		Kostanjevec/SI	METKA (0.8/12)*	715	6.4	640	16	66.9	95
		Kamnik/SI	REZIKA (0.8/6)	2270	4.4	840	13	57.3	198
			STEFKA (0.8/3.8)	5471	2.8	379	13	55.7	110
LOJTO	Łojek	Grabniak/PL	PAV57 (1.0/5)	1631	3.5	269	3	9.0	20
MACMA	Maciejewski	Chelm/PL	PAV35 (0.8/3.8)	5495	4.0	1584	22	64.0	135
			PAV36 (0.8/3.8)*	5668	4.0	1573	22	81.0	195
			PAV43 (0.75/4.5)*	3132	3.1	319	22	40.6	61
			PAV60 (0.75/4.5)	2250	3.1	281	22	82.6	232
MARRU	Marques	Lisbon/PT	CAB1 (0.75/6)	2362	4.8	1517	26	141.6	319
			RAN1 (1.4/4.5)	4405	4.0	1241	14	56.2	90
MOLSI	Molau	Seysdorf/DE	AVIS2 (1.4/50)*	1230	6.9	6152	23	85.3	647
			ESCIMO2 (0.85/25)	155	8.1	3415	24	105.5	223
			MINCAM1 (0.8/8)	1477	4.9	1084	9	31.8	78
		Ketzür/DE	REMO1 (0.8/8)	1467	6.5	5491	26	77.5	359
			REMO2 (0.8/8)	1478	6.4	4778	24	77.1	353
			REMO3 (0.8/8)	1420	6.4	1967	25	89.0	322
			REMO4 (0.8/8)	1478	6.5	5358	24	87.1	445
MORJO	Morvai	Fülöpszallas/HU	HUFUL (1.4/5)	2522	3.5	532	20	91.6	74
MOSFA	Moschini	Rovereto/IT	ROVER (1.4/4.5)	3896	4.2	1292	22	95.7	118
NAGHE	Nagy	Budapest/HU	HUKON (0.8/3.8)	5500	4.0	1575	21	56.8	112
		Piszkestetö/HU	HUPIS (0.8/3.8)	5615	4.0	1524	22	32.4	119
OCHPA	Ochner	Albiano/IT	ALBIANO (1.2/4.5)	2944	3.5	358	21	83.5	119
OTTMI	Otte	Pearl City/US	ORIE1 (1.4/5.7)	3837	3.8	460	18	48.6	167
PERZS	Perkó	Becsehely/HU	HUBEC (0.8/3.8)*	5498	2.9	460	18	71.9	83
ROTEC	Rothenberg	Berlin/DE	ARMEFA (0.8/6)	2366	4.5	911	22	72.9	103
SARAN	Saraiva	Carnaxide/PT	RO1 (0.75/6)	2362	3.7	381	17	70.2	91
			RO2 (0.75/6)	2381	3.8	459	15	67.4	106
			RO3 (0.8/12)	710	5.2	619	17	88.0	172
			RO4 (1.0/8)	1582	4.2	549	15	53.6	47
			SOFIA (0.8/12)	738	5.3	907	19	41.2	79
SCALE	Scarpa	Alberoni/IT	LEO (1.2/4.5)*	4152	4.5	2052	25	91.6	89
SCHHA	Schremmer	Niederkrüchten/DE	DORAEMON (0.8/3.8)	4900	3.0	409	22	77.9	190
SLAST	Slavec	Ljubljana/SI	KAYAK1 (1.8/28)	563	6.2	1294	20	78.2	200
			KAYAK2 (0.8/12)	741	5.5	920	21	95.3	85
STOEN	Stomeo	Scorze/IT	MIN38 (0.8/3.8)	5566	4.8	3270	25	78.5	373
			NOA38 (0.8/3.8)	5609	4.2	1911	25	100.6	317
			SCO38 (0.8/3.8)	5598	4.8	3306	29	82.9	366
STRJO	Strunk	Herford/DE	MINCAM2 (0.8/6)	2354	5.4	2751	22	73.0	240
			MINCAM3 (0.8/6)	2338	5.5	3590	19	61.1	124
			MINCAM4 (0.8/6)	2306	5.0	1412	19	64.8	96
			MINCAM5 (0.8/6)	2349	5.0	1896	20	71.0	144
			MINCAM6 (0.8/6)	2395	5.1	2178	20	64.1	126
TEPIS	Tepliczky	Agostyan/HU	HUAGO (0.75/4.5)	2427	4.4	1036	21	80.4	129
			HUMOB (0.8/6)	2388	4.8	1607	19	77.6	122
WEGWA	Wegrzyk	Nieznaszyn/PL	PAV78 (0.8/6)	2286	4.0	778	15	30.8	45
ZAKJU	Zakrajšek	Petkovec/SI	TACKA (0.8/12)	714	5.3	783	21	98.5	124
Sum							30	5714.1	14032

* active field of view smaller than video frame

2. Observing Times (h)

June	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
ARLRA	2.4	-	1.2	4.0	3.9	3.7	3.8	0.3	3.3	3.8	3.4	-	-	1.4	-
BIATO	7.0	6.9	3.7	-	6.7	3.2	0.3	5.2	6.7	6.8	-	3.1	-	5.5	-
BOMMA	6.2	6.7	2.7	2.0	6.9	3.9	-	6.4	6.7	6.6	2.3	5.6	-	5.9	6.6
BREMA	-	2.8	3.5	-	4.9	5.4	-	-	-	5.3	3.6	-	-	-	2.3
BRIBE	-	-	4.9	0.8	4.9	-	-	-	-	0.9	1.8	1.6	4.6	-	0.9
	-	-	4.8	4.7	4.8	3.8	-	3.8	-	-	-	1.0	4.7	-	-
CARMA	6.5	3.9	6.2	6.1	3.8	-	-	5.7	6.6	6.1	1.2	-	0.8	-	5.4
CASFL	6.4	4.3	6.5	6.0	5.1	-	-	5.7	6.5	6.5	1.0	-	-	-	5.6
CINFR	6.8	7.0	4.1	3.0	6.9	4.8	-	6.6	6.8	6.8	4.4	6.2	-	6.6	6.7
CRIST	5.4	-	1.7	0.7	5.2	4.3	-	5.4	2.5	4.7	4.4	1.0	0.2	4.1	5.2
	5.4	4.2	1.4	0.2	4.4	4.3	-	6.2	2.6	6.0	4.4	1.1	0.2	4.8	5.0
	0.5	5.1	0.5	-	1.2	2.4	-	5.9	-	6.3	1.8	-	0.3	2.0	5.0
	5.9	5.6	1.7	0.3	3.0	1.9	-	5.0	-	0.3	0.5	-	-	3.7	5.7
ELTMA	3.6	4.8	4.7	4.4	6.2	-	1.4	4.1	6.3	6.4	4.9	-	-	1.4	5.6
FORKE	-	0.6	2.6	4.3	5.1	0.8	0.8	1.0	1.1	0.2	-	-	-	1.7	-
GONRU	-	-	-	5.0	-	-	-	3.4	1.2	-	-	-	-	-	-
	4.6	2.4	0.5	-	-	-	-	7.1	2.1	-	1.5	1.7	5.3	5.4	-
	4.1	1.9	0.5	-	-	-	-	6.8	2.0	-	1.5	1.4	5.6	5.0	-
	3.1	1.3	-	-	-	-	-	5.1	-	-	-	-	2.7	-	-
	3.7	1.9	-	-	-	-	-	6.4	2.1	-	1.1	1.5	4.8	4.1	-
	2.5	1.0	-	-	-	-	-	5.3	-	0.3	1.0	-	2.5	4.0	-
GOVMI	0.6	3.0	0.8	-	4.1	-	5.1	1.3	1.0	5.7	5.8	-	-	-	1.4
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2.8	1.6	-	-	0.5	0.4	-	0.3	1.0	3.9	1.0	-	-	-	0.3
HERCA	8.6	8.5	8.0	8.1	6.9	8.5	8.2	7.9	7.8	8.1	8.1	7.7	-	-	-
HINWO	5.4	2.0	4.8	5.0	5.1	3.6	4.4	3.7	3.8	2.9	-	-	-	4.7	-
IGAAN	-	-	3.0	-	5.1	-	2.7	-	-	5.3	-	-	-	-	-
JONKA	1.1	1.0	1.5	-	5.0	0.2	-	-	2.3	5.7	4.7	-	-	-	0.5
	2.6	3.2	2.2	1.4	5.3	-	0.3	-	-	5.9	4.8	-	-	-	1.9
KACJA	-	3.7	5.9	5.5	3.4	5.1	5.9	-	-	-	-	-	-	-	2.7
	-	-	3.9	2.8	4.6	3.3	5.9	-	3.6	5.9	2.8	2.7	-	-	1.5
	-	4.2	6.1	5.3	3.2	5.2	6.1	-	-	-	-	-	-	-	2.8
	-	3.8	6.2	5.6	3.4	5.2	6.0	-	-	-	-	-	-	-	3.1
LOTJO	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MACMA	3.9	0.8	3.3	4.8	4.3	4.8	4.7	4.8	2.7	2.0	0.6	3.8	-	1.5	4.5
	5.4	4.3	4.5	4.6	5.0	5.2	5.2	-	0.8	3.3	4.6	5.1	-	2.1	5.0
	4.9	0.3	-	3.2	3.1	4.7	4.0	3.4	0.6	0.9	0.5	3.8	-	0.7	3.4
	-	3.9	4.7	4.5	5.1	5.0	5.0	5.0	4.9	2.7	4.7	4.9	-	1.9	4.8
MARRU	4.9	5.3	1.4	2.8	-	2.5	-	7.0	6.8	-	2.3	5.2	7.2	7.2	6.5
	-	-	-	-	-	-	-	-	-	-	-	1.2	1.3	6.3	-
MOLSI	1.0	4.0	4.8	3.9	4.8	4.5	-	4.5	4.6	4.6	1.5	-	-	3.8	4.5
	3.1	5.4	5.5	5.5	5.4	4.3	2.2	4.9	4.7	5.3	1.6	-	-	4.0	5.2
	2.9	4.6	5.4	4.3	-	-	-	-	-	-	1.5	-	-	-	-
	0.2	-	4.0	3.7	4.0	3.9	3.8	3.7	3.8	3.8	3.5	-	1.2	1.2	-
	-	-	4.2	3.9	4.1	4.1	4.1	4.0	4.1	4.0	3.6	-	1.3	1.0	-
	-	-	4.6	4.3	4.6	4.6	4.5	4.4	4.3	4.3	3.8	-	1.5	0.8	0.2
	-	-	4.6	4.3	4.5	4.5	4.4	4.4	4.4	4.3	3.8	-	1.5	0.4	-
MORJO	5.0	6.2	5.9	-	6.0	-	3.5	-	-	6.0	6.0	-	-	-	2.8
MOSFA	4.5	3.0	5.8	6.4	3.4	-	-	4.6	6.5	5.5	-	-	-	4.5	5.0
NAGHE	0.3	-	3.0	1.0	1.6	0.2	0.9	-	3.7	4.6	4.0	-	-	-	0.8
	0.2	0.5	0.9	1.6	0.4	-	1.5	-	0.8	0.2	2.3	0.2	-	-	2.2
OCHPA	3.2	3.3	-	0.2	-	-	1.2	4.4	5.1	1.3	2.0	-	-	6.4	5.7
OTTMI	0.6	7.1	6.1	-	-	-	-	-	0.3	-	-	-	1.6	0.8	2.3
PERZS	5.9	3.5	3.7	-	5.8	4.0	3.2	1.6	4.9	6.0	6.0	-	-	-	-
ROTEC	1.4	-	3.6	4.2	4.3	4.3	4.3	4.2	3.3	4.1	3.9	-	-	1.5	-
SARAN	-	-	-	0.4	-	-	0.1	3.5	1.9	-	1.6	4.4	7.4	7.6	-
	-	-	-	0.5	-	-	-	2.6	4.3	-	-	2.9	7.1	7.4	-
	-	-	-	0.6	-	-	-	3.7	4.3	-	-	5.6	7.3	7.4	0.8
	-	-	-	-	-	-	-	2.2	-	-	-	1.2	2.3	7.1	-
	0.2	0.6	-	-	-	-	0.3	2.7	2.3	-	0.8	1.4	3.8	-	0.9
SCALE	6.1	4.4	4.6	4.3	4.9	-	-	4.0	5.9	5.2	1.9	1.7	-	1.0	5.3
SCHHA	-	-	1.0	3.8	5.1	0.7	-	0.3	1.5	3.4	0.6	2.5	4.7	-	3.2
SLAST	5.4	4.8	5.3	5.0	-	4.6	4.7	-	3.6	3.4	-	3.6	-	-	4.4
	5.2	6.2	6.4	6.3	-	6.1	5.6	-	4.7	4.4	1.8	3.8	-	-	5.3
STOEN	4.6	5.5	5.6	4.3	4.5	-	0.3	2.9	5.1	4.2	0.9	-	-	0.9	1.5
	5.1	5.7	6.1	4.8	6.1	0.5	-	4.6	6.5	5.9	3.5	1.6	-	1.5	5.1
	4.6	5.1	5.2	5.0	6.0	0.1	0.5	3.0	6.2	4.4	1.1	0.4	0.2	0.8	3.7
STRJO	-	4.0	4.5	-	4.5	4.6	3.9	1.2	1.1	1.9	3.3	-	4.5	-	3.0
	-	3.3	4.3	-	4.6	4.6	3.7	-	0.4	-	2.7	-	4.3	-	3.0
	-	2.8	4.5	-	4.8	4.7	4.5	0.7	-	-	3.1	-	4.5	-	3.1
	-	3.5	4.6	-	4.6	4.6	4.1	-	-	1.9	3.3	-	4.4	-	3.1
	-	3.2	4.4	-	4.6	4.6	3.5	0.2	0.7	1.8	2.7	-	4.2	-	2.1
TEPIS	3.7	1.1	2.3	5.5	5.5	-	1.7	-	4.2	5.4	4.5	-	-	-	-
	4.2	-	0.8	3.3	5.5	-	3.3	-	5.6	5.5	5.4	-	-	-	-
WEGWA	-	0.3	-	4.3	2.6	4.4	4.8	2.7	-	1.5	-	-	-	2.1	0.2
ZAKJU	6.0	6.2	5.6	5.1	3.4	5.8	6.1	-	-	-	-	4.3	-	-	6.0
Sum	187.7	200.3	234.8	191.6	252.7	171.9	150.5	203.8	200.6	222.2	159.4	92.2	102.0	140.2	171.8

June	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
ARLRA	1.2	3.5	1.9	3.6	3.7	3.4	-	-	-	2.0	3.3	2.2	3.6	3.5	3.5
BIATO	6.6	6.7	4.2	2.2	4.0	6.8	3.3	6.7	5.9	4.9	6.6	-	-	-	6.7
BOMMA	6.6	6.6	6.4	6.5	6.4	6.5	2.1	6.6	5.4	5.6	5.0	0.7	1.1	5.3	6.7
BREMA	1.3	1.4	2.2	-	4.5	-	1.3	0.6	-	3.5	5.1	-	5.3	-	5.2
BRIBE	2.5	-	3.4	-	4.2	2.6	0.3	1.5	-	4.7	4.6	4.7	4.6	4.5	4.7
	2.1	-	2.2	-	3.4	3.6	3.8	-	-	4.6	4.6	4.5	4.2	4.5	4.6
CARMA	4.8	1.7	5.8	-	6.0	1.3	4.6	5.8	-	2.4	6.4	6.4	0.7	6.4	4.7
CASFL	4.8	1.5	5.6	2.0	6.3	-	4.9	5.9	-	-	6.3	6.0	0.6	6.4	5.5
CINFR	6.6	6.6	6.4	6.5	6.6	6.6	3.1	6.6	6.2	5.6	5.7	1.5	2.0	5.8	6.5
CRIST	6.2	1.6	5.4	0.7	6.2	4.8	6.1	6.2	2.7	4.7	4.5	-	2.0	6.2	6.2
	6.2	2.0	5.5	1.2	6.2	5.1	6.1	6.1	3.0	3.8	4.5	-	2.0	6.2	6.2
	6.2	1.8	5.7	0.9	6.2	1.7	4.7	6.1	2.7	3.3	6.0	-	1.7	5.9	3.8
	6.2	2.5	5.8	1.5	6.2	5.0	6.1	6.2	2.7	6.1	4.2	0.2	2.5	6.2	6.2
ELTMA	3.1	4.4	-	5.1	6.2	0.2	2.7	2.6	0.3	0.3	3.6	2.8	-	2.1	0.5
FORKE	-	-	-	-	-	4.0	-	-	-	-	0.5	2.2	-	1.5	2.2
GONRU	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	4.1	7.1	7.0	7.1	-	-	6.8	7.1	-	6.1	7.1	1.6	3.4	-	4.4
	3.7	7.3	7.2	7.2	1.0	-	6.6	7.3	-	5.4	7.2	-	3.4	-	4.1
	2.1	7.0	6.9	7.0	1.3	-	6.7	6.9	-	3.6	7.0	-	2.7	0.3	3.0
	3.6	7.2	7.0	7.2	-	-	5.9	7.2	-	5.7	7.2	0.5	3.3	-	4.2
	1.8	7.1	7.0	7.0	1.3	1.1	6.7	6.9	-	3.4	6.8	0.2	1.8	-	2.6
GOVMI	-	2.5	4.3	5.3	5.6	-	5.0	-	-	3.2	0.3	-	-	1.4	4.5
	-	0.2	-	0.3	-	-	-	0.2	-	-	0.2	-	-	1.2	4.7
	-	0.2	3.3	5.2	5.2	-	5.1	-	-	-	0.2	-	0.2	0.8	3.0
HERCA	-	-	6.4	6.7	7.9	8.2	7.9	8.1	7.7	8.3	7.8	8.3	-	8.0	-
HINWO	0.8	4.2	3.8	-	4.5	4.0	-	-	-	-	2.4	3.3	-	4.4	5.0
IGAAN	0.5	-	-	4.2	4.3	-	-	4.8	-	3.5	-	-	-	2.4	-
JONKA	-	3.1	-	5.3	-	1.5	2.6	5.8	-	5.0	5.1	-	-	1.2	-
	0.4	5.3	-	5.8	2.6	0.6	1.9	5.5	0.3	5.0	3.6	-	-	-	1.7
KACJA	0.3	4.4	5.8	5.0	5.7	-	1.3	-	-	-	-	-	-	-	-
	3.2	3.8	5.8	5.8	5.9	-	5.4	-	-	-	-	-	-	-	-
	1.0	4.4	6.0	5.3	5.7	-	2.0	-	-	-	-	-	-	-	-
	0.9	3.9	6.1	4.8	5.7	-	1.0	-	-	-	-	-	-	-	-
LOTJO	-	-	0.7	5.1	-	-	-	-	-	-	-	-	-	3.2	-
MACMA	4.0	-	2.2	3.5	3.9	-	-	-	-	0.5	0.3	-	1.9	1.2	-
	5.0	-	2.5	3.5	4.7	-	-	1.0	-	0.7	0.6	-	5.0	2.9	-
	2.5	-	0.7	0.8	0.9	-	-	0.2	0.4	-	0.2	-	1.0	0.4	-
	4.8	-	2.8	3.4	4.5	-	-	1.2	-	0.5	0.3	-	4.9	3.1	-
MARRU	7.1	6.1	7.1	7.1	-	5.5	7.1	7.1	6.6	7.1	7.2	1.2	7.2	1.7	4.4
	7.2	6.6	2.7	4.9	-	3.2	4.0	7.0	2.7	5.7	3.0	-	0.4	-	-
MOLSI	4.5	-	4.5	1.9	4.5	2.6	4.5	-	-	3.4	3.0	1.6	-	3.7	4.6
	5.2	-	5.2	1.8	5.2	2.8	5.2	-	-	4.8	4.9	2.9	-	5.1	5.3
	-	-	-	-	-	-	-	-	-	-	3.6	1.4	-	2.9	5.2
	3.6	3.8	1.2	2.2	3.6	3.6	-	0.2	1.4	3.1	3.7	3.3	3.6	3.7	3.7
	3.8	3.0	1.0	2.1	3.8	3.9	-	-	1.2	2.4	3.7	2.8	3.7	3.6	3.7
	4.1	4.1	1.3	2.1	4.3	4.3	-	-	1.8	3.4	4.4	4.2	4.4	4.3	4.4
	4.0	3.9	1.2	1.8	4.2	4.2	-	-	1.9	3.7	4.3	3.9	4.3	4.3	4.3
MORJO	1.7	4.7	-	5.9	4.4	3.6	5.8	5.7	4.2	4.3	3.5	-	-	2.9	3.5
MOSFA	4.9	2.5	6.2	-	4.4	-	4.3	3.7	-	1.2	4.4	5.2	0.7	6.4	2.6
NAGHE	0.2	4.1	-	4.7	5.4	-	3.3	5.2	0.3	4.3	4.9	-	-	2.2	2.1
	2.3	1.8	-	0.3	1.9	-	1.3	3.9	2.8	2.5	2.7	-	-	0.6	1.5
OCHPA	4.5	-	6.4	4.5	4.5	-	5.2	5.6	-	4.8	6.0	-	1.1	5.6	2.5
OTTMI	6.5	-	0.4	-	-	-	2.3	2.8	1.5	1.1	2.1	2.5	3.1	1.9	5.6
PERZS	-	2.6	0.3	3.8	5.8	-	5.3	-	-	2.1	2.4	-	-	-	5.0
ROTEC	-	4.2	1.2	3.5	3.8	3.7	-	-	0.7	3.8	3.0	1.9	-	4.0	4.0
SARAN	7.6	-	3.8	3.2	-	-	2.8	6.4	5.3	7.1	2.8	-	4.3	-	-
	7.4	-	-	1.6	-	0.8	2.7	7.3	7.0	7.1	3.4	-	5.3	-	-
	7.3	6.8	4.8	3.6	-	-	3.1	7.2	7.2	7.2	4.9	-	6.2	-	-
	7.4	6.7	2.7	0.4	-	0.4	2.4	6.5	3.5	5.8	-	-	4.8	0.2	-
	6.2	-	1.9	2.6	-	0.8	3.2	4.3	2.0	4.6	-	0.2	2.4	-	-
SCALE	1.7	5.1	2.2	4.9	6.1	0.2	3.1	4.5	-	-	4.8	4.1	1.1	4.2	0.3
SCHHA	3.2	-	4.9	-	4.9	3.6	4.9	-	-	4.9	4.9	4.9	5.1	4.9	4.9
SLAST	0.5	4.6	4.0	4.3	5.2	-	5.1	1.6	-	3.2	-	-	2.2	2.7	-
	-	4.8	4.5	4.9	6.1	-	5.1	2.1	-	3.7	2.3	-	2.6	3.4	-
STOEN	3.3	4.7	0.3	1.3	6.1	-	3.8	4.7	-	0.5	3.5	4.2	0.5	3.9	1.4
	5.2	5.0	1.2	2.0	6.3	-	-	5.0	-	0.8	4.6	5.5	1.4	4.7	1.9
	2.0	4.1	0.5	0.9	5.5	-	1.3	4.6	0.2	0.5	4.2	5.2	1.1	5.0	1.5
STRJO	2.6	-	2.9	-	4.2	1.0	-	3.6	-	0.3	4.4	4.4	4.4	4.3	4.4
	1.9	-	2.7	-	4.1	0.5	0.5	3.0	-	-	4.3	4.4	4.4	4.4	-
	1.3	-	3.0	-	4.4	-	0.7	4.1	-	-	4.0	1.0	4.5	4.5	4.6
	2.6	-	3.4	-	4.3	0.8	0.8	3.9	-	-	4.3	4.2	4.2	4.2	4.2
	1.9	-	2.4	-	3.9	-	-	2.5	-	-	4.3	4.2	4.3	4.2	4.4
TEPIS	0.2	4.9	4.9	2.8	5.2	-	3.2	4.7	1.4	4.4	5.3	-	-	4.0	5.5
	-	5.4	0.5	3.7	5.4	-	3.6	5.1	1.8	4.5	5.5	-	-	3.0	5.5
WEGWA	-	0.8	-	-	4.0	0.5	0.3	-	-	-	-	-	-	1.4	0.9
ZAKJU	5.9	4.9	5.8	5.9	5.9	-	5.1	2.8	0.6	4.2	3.7	-	1.5	3.7	-
Sum	230.9	213.2	241.1	224.4	284.2	113.0	214.0	248.2	91.4	218.9	265.2	118.3	146.7	210.6	212.3

3. Results (Meteors)

June	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
ARLRA	2	-	6	18	24	14	16	3	12	20	5	-	-	6	-
BIATO	3	11	3	-	10	4	1	8	13	7	-	3	-	9	-
BOMMA	21	15	3	6	14	7	-	8	22	24	7	18	-	17	13
BREMA	-	2	1	-	11	6	-	-	-	11	5	-	-	-	2
BRIBE	-	-	10	1	15	-	-	-	-	3	1	5	13	-	2
	-	-	4	10	10	2	-	6	-	-	-	3	11	-	-
CARMA	13	11	18	20	20	-	-	7	27	19	5	-	2	-	27
CASFL	11	13	5	12	10	-	-	3	9	17	2	-	-	-	13
CINFR	21	22	8	7	21	13	-	17	32	23	8	24	-	20	20
CRIST	13	-	2	3	9	5	-	15	10	11	10	4	1	10	13
	13	4	1	1	12	6	-	15	8	13	11	5	2	17	11
	3	6	3	-	4	6	-	18	-	6	8	-	2	6	13
	18	14	2	2	4	3	-	7	-	2	3	-	-	5	33
ELTMA	8	4	3	7	9	-	3	10	9	12	7	-	-	5	11
FORKE	-	4	10	8	20	5	5	7	8	1	-	-	-	13	-
GONRU	-	-	-	3	-	-	-	1	1	-	-	-	-	-	-
	7	2	1	-	-	-	-	18	5	-	2	2	8	16	-
	5	2	1	-	-	-	-	17	2	-	2	4	6	10	-
	2	3	-	-	-	-	-	1	-	-	-	-	1	-	-
	6	1	-	-	-	-	-	9	4	-	1	1	11	8	-
	6	2	-	-	-	-	-	6	-	1	1	-	1	8	-
GOVMI	3	2	3	-	6	-	5	2	4	11	3	-	-	-	2
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1	3	-	-	3	2	-	2	5	5	1	-	-	-	1
HERCA	16	15	17	13	8	11	11	15	13	14	9	13	-	-	-
HINWO	9	2	3	5	11	6	7	3	5	3	-	-	-	7	-
IGAAN	-	-	4	-	1	-	1	-	-	5	-	-	-	-	-
JONKA	2	1	2	-	2	1	-	-	1	5	3	-	-	-	2
	4	3	1	2	1	-	1	-	-	3	4	-	-	-	3
KACJA	-	8	12	19	7	3	7	-	-	-	-	-	-	-	5
	-	-	4	2	4	2	10	-	9	13	4	3	-	-	4
	-	18	15	22	3	17	32	-	-	-	-	-	-	-	9
	-	8	14	12	1	4	15	-	-	-	-	-	-	-	2
LOTJO	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MACMA	5	6	8	8	9	14	8	7	2	4	5	8	-	3	7
	9	5	12	7	18	17	11	-	2	3	7	18	-	7	14
	2	1	-	3	4	3	1	3	3	2	2	8	-	3	5
	-	5	9	8	14	23	17	12	9	5	12	17	-	6	21
MARRU	8	9	1	7	-	3	-	22	17	-	2	8	20	26	15
	-	-	-	-	-	-	-	-	-	-	-	3	4	15	-
MOLSI	8	26	26	28	44	33	-	29	38	26	8	-	-	26	41
	5	5	13	11	4	5	2	5	4	15	4	-	-	9	18
	1	12	17	12	-	-	-	-	-	-	3	-	-	-	-
	1	-	14	17	23	19	13	14	12	19	6	-	10	4	-
	-	-	12	15	30	19	16	10	19	20	13	-	11	4	-
	-	-	12	19	12	10	9	16	11	13	8	-	5	1	1
	-	-	19	18	18	32	31	12	14	23	12	-	6	1	-
MORJO	7	7	1	-	5	-	1	-	-	4	5	-	-	-	1
MOSFA	4	5	2	12	5	-	-	1	9	5	-	-	-	5	2
NAGHE	2	-	3	5	6	1	4	-	3	11	4	-	-	-	1
	1	2	2	4	2	-	4	-	5	2	10	1	-	-	9
OCHPA	1	2	-	1	-	-	1	5	3	2	1	-	-	16	6
OTTMI	4	12	3	-	-	-	-	-	2	-	-	-	7	3	8
PERZS	7	3	3	-	7	1	3	4	5	7	5	-	-	-	-
ROTEC	1	-	3	10	6	10	6	4	3	6	5	-	-	1	-
SARAN	-	-	-	1	-	-	1	1	2	-	3	5	10	8	-
	-	-	-	5	-	-	-	3	4	-	-	2	8	16	-
	-	-	-	4	-	-	-	9	6	-	-	9	28	16	2
	-	-	-	-	-	-	-	1	-	-	-	1	4	7	-
	1	1	-	-	-	-	1	3	5	-	2	3	8	-	2
SCALE	2	2	1	7	5	-	-	3	1	5	1	2	-	1	1
SCHHA	-	-	3	4	9	2	-	1	1	8	1	8	7	-	7
SLAST	2	11	5	12	-	7	6	-	10	9	-	12	-	-	9
	6	10	7	6	-	2	2	-	2	2	1	2	-	-	8
STOEN	14	9	14	14	21	-	2	14	23	19	6	-	-	9	8
	10	10	7	11	23	1	-	7	29	25	8	9	-	9	17
	7	19	10	16	25	1	3	13	22	17	8	2	1	7	20
STRJO	-	10	12	-	25	14	5	3	1	8	10	-	22	-	3
	-	2	6	-	8	8	5	-	1	-	3	-	9	-	4
	-	3	4	-	7	7	3	2	-	-	3	-	3	-	5
	-	3	10	-	5	6	5	-	-	3	3	-	11	-	6
	-	3	4	-	10	6	6	1	2	2	2	-	7	-	3
TEPIS	1	2	4	8	8	-	2	-	2	12	7	-	-	-	-
	4	-	5	8	8	-	2	-	2	10	6	-	-	-	-
WEGWA	-	2	-	2	4	5	4	7	-	5	-	-	-	1	1
ZAKJU	6	6	5	4	6	5	5	-	-	-	-	3	-	-	3
Sum	306	369	413	460	611	371	293	410	473	521	278	206	239	361	434

June	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
ARLRA	2	19	11	15	16	23	-	-	-	7	10	5	13	18	14
BIATO	11	16	11	2	13	8	11	22	8	8	17	-	-	-	12
BOMMA	19	29	20	19	23	23	10	36	18	28	30	4	6	20	19
BREMA	3	2	2	-	8	-	2	1	-	6	5	-	21	-	12
BRIBE	6	-	10	-	15	4	2	2	-	12	5	11	14	11	16
	1	-	4	-	8	3	10	-	-	15	13	16	9	9	15
CARMA	10	4	19	-	19	2	30	23	-	11	36	45	1	41	29
CASFL	9	5	12	2	17	-	10	15	-	-	24	15	3	14	9
CINFR	30	36	17	35	36	33	14	32	18	38	30	7	12	27	29
CRIST	14	3	21	3	15	9	16	13	3	15	11	-	4	23	14
	14	2	19	2	18	10	16	16	6	16	9	-	5	21	16
	13	4	25	3	7	4	10	14	11	7	17	-	10	21	10
	34	5	23	3	26	16	30	28	8	31	22	1	24	45	42
ELTMA	7	10	-	15	17	1	10	10	2	2	14	10	-	10	3
FORKE	-	-	-	-	-	9	-	-	-	-	3	15	-	11	18
GONRU	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	7	28	21	13	-	-	20	18	-	26	33	1	10	-	6
	4	21	19	19	1	-	9	15	-	15	20	-	4	-	9
	1	11	3	3	1	-	4	2	-	5	9	-	1	1	3
	6	22	19	12	-	-	9	15	-	23	19	1	9	-	4
	4	17	14	13	1	1	15	13	-	12	23	1	1	-	2
GOVMI	-	7	5	12	8	-	9	-	-	4	2	-	-	4	15
	-	1	-	2	-	-	-	1	-	-	1	-	-	1	4
	-	1	5	5	4	-	4	-	-	-	1	-	1	2	2
HERCA	-	-	13	13	25	14	20	13	15	22	21	26	-	20	-
HINWO	2	11	11	-	7	10	-	-	-	-	5	9	-	11	15
IGAAN	1	-	-	1	1	-	-	3	-	5	-	-	-	1	-
JONKA	-	5	-	4	-	2	7	5	-	5	7	-	-	2	-
	1	2	-	7	6	1	3	7	2	8	4	-	-	-	6
KACJA	1	12	22	18	20	-	5	-	-	-	-	-	-	-	-
	5	4	11	8	5	-	7	-	-	-	-	-	-	-	-
	1	14	20	18	26	-	3	-	-	-	-	-	-	-	-
	1	4	19	15	10	-	5	-	-	-	-	-	-	-	-
LOTJO	-	-	2	14	-	-	-	-	-	-	-	-	-	4	-
MACMA	3	-	3	4	8	-	-	-	-	3	2	-	11	7	-
	14	-	7	5	8	-	-	1	-	2	4	-	14	10	-
	6	-	1	1	3	-	-	1	2	-	1	-	3	3	-
	16	-	6	8	15	-	-	3	-	1	1	-	15	9	-
MARRU	25	7	15	18	-	6	13	12	2	24	24	7	13	10	5
	6	7	5	9	-	1	9	7	4	15	3	-	2	-	-
MOLSI	35	-	47	14	50	30	42	-	-	26	21	3	-	13	33
	13	-	14	2	14	6	11	-	-	18	5	6	-	16	18
	-	-	-	-	-	-	-	-	-	-	11	3	-	9	10
	11	14	3	4	15	25	-	1	7	11	32	15	16	25	28
	13	13	2	8	16	31	-	-	8	5	19	11	14	22	22
	17	15	3	2	23	29	-	-	4	9	23	14	16	24	26
	12	12	4	7	31	24	-	-	10	10	33	18	19	33	46
MORJO	4	4	-	4	3	1	8	5	1	6	3	-	-	2	2
MOSFA	5	3	5	-	5	-	7	5	-	5	9	6	5	9	4
NAGHE	1	4	-	7	4	-	12	9	1	14	3	-	-	2	15
	7	6	-	2	6	-	3	15	7	11	9	-	-	3	8
OCHPA	2	-	10	5	2	-	7	12	-	5	12	-	4	15	7
OTTMI	5	-	4	-	-	-	11	12	9	7	14	12	10	16	28
PERZS	-	1	1	4	8	-	9	-	-	3	6	-	-	-	6
ROTEC	-	7	1	3	2	8	-	-	2	4	1	1	-	10	9
SARAN	5	-	6	11	-	-	4	7	6	12	5	-	4	-	-
	11	-	-	2	-	3	6	11	5	18	5	-	7	-	-
	21	3	8	5	-	-	4	12	6	21	10	-	8	-	-
	8	2	2	1	-	1	2	3	4	8	-	-	2	1	-
	16	-	3	5	-	2	5	2	2	14	-	1	3	-	-
SCALE	1	10	1	8	5	1	7	6	-	-	4	4	4	5	2
SCHHA	8	-	13	-	12	12	18	-	-	16	8	9	17	16	10
SLAST	4	8	18	22	13	-	29	8	-	8	-	-	2	5	-
	-	3	7	7	5	-	4	2	-	4	2	-	1	2	-
STOEN	24	23	2	9	28	-	25	24	-	3	25	16	3	27	11
	12	12	5	6	31	-	-	16	-	1	23	14	6	20	5
	11	15	5	8	27	-	12	20	1	3	22	30	8	25	8
STRJO	9	-	12	-	13	4	-	7	-	1	7	6	23	17	28
	2	-	8	-	10	1	1	6	-	-	12	12	10	16	-
	2	-	7	-	9	-	1	7	-	-	5	3	7	7	11
	4	-	10	-	7	3	2	9	-	-	9	7	13	15	13
	3	-	6	-	12	-	-	4	-	-	12	7	15	10	11
TEPIS	1	6	5	8	5	-	2	9	5	8	9	-	-	11	14
	-	4	3	4	8	-	1	10	1	10	10	-	-	7	19
WEGWA	-	1	-	-	6	1	1	-	-	-	-	-	-	3	2
ZAKJU	11	6	12	12	8	-	9	4	1	9	4	-	1	4	-
Sum	555	481	642	491	765	362	556	554	179	636	799	372	424	746	725