

Results of the IMO Video Meteor Network – September 2018

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The unusually pleasant weather of the previous month continued in September 2018. At the beginning of the month and on September 22 the conditions were variable, but at all other times almost every camera could obtain long series of observing nights. Highlight was September 16/17, when 80 of 84 cameras were in operation.

71 cameras managed to obtain observation in twenty or more observing nights, and seven cameras (mostly in Portugal and Italy) could observe without any break at all. These are clearly record-breaking results in the twenty-years history of the IMO network.

Since nights are getting longer in September, this results inevitably in an all-time high of 14,400 hours of effective observing time – 150 hours more than in the previously best month September 2016. However, the average rate of 3.8 meteors per hour was lower than in previous years and, consequently, those nearly 55,000 meteors we recorded are only the second-best September output ever.

Unfortunately, we have a significant backlog in analyzing IMO network video data. So far, interested researchers and observers had to wait for a long time until our flux density data were available. That has changed with the new version of MeteorFlux, which went live in September 2019. Since there have been no changes to the software in the past six years, I familiarized myself step-by-step with the source code and implemented long-awaited features myself. Among others, two new data upload channels have been implemented (figure 1).

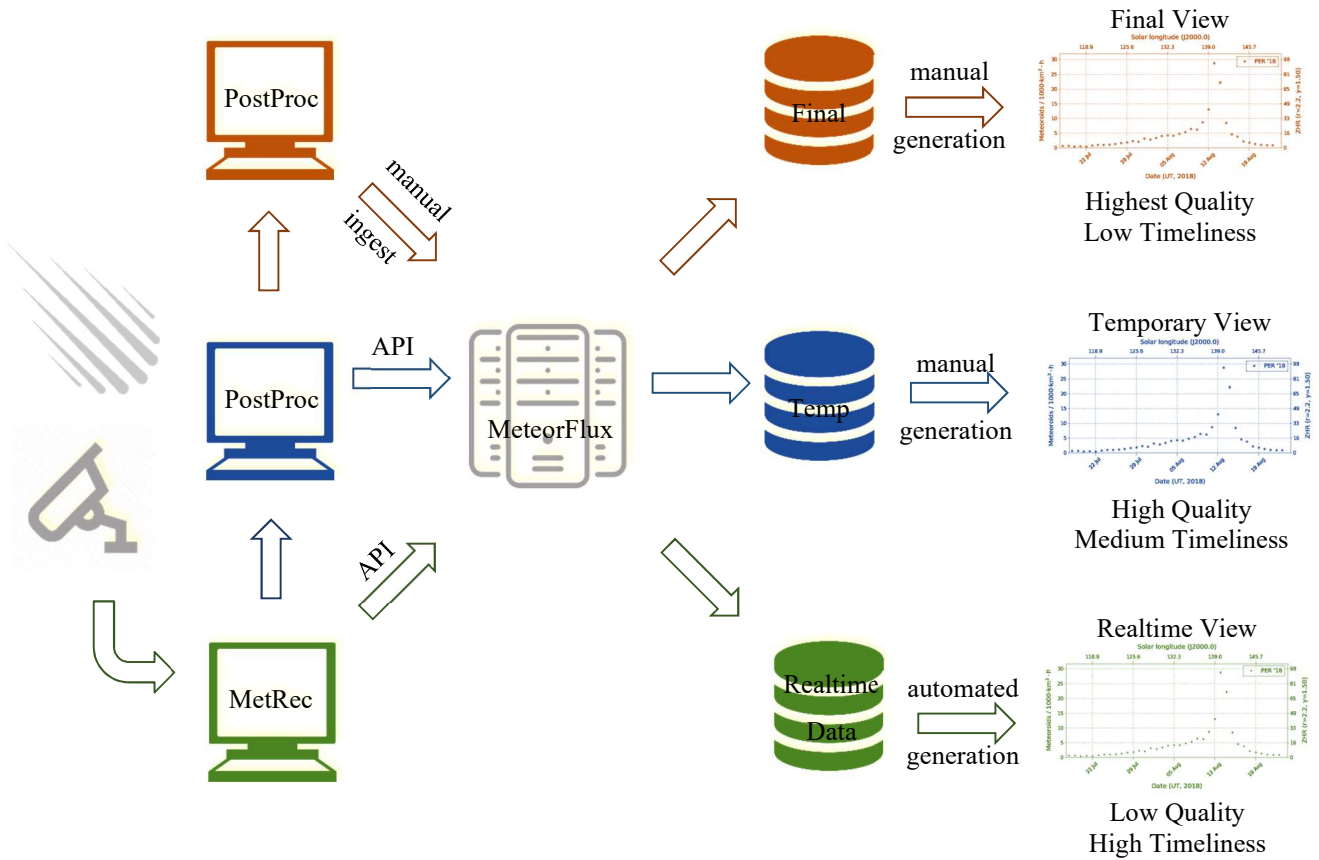


Figure 1: Since September 2019, MeteorFlux is offering three different upload channels for video data.

The previous workflow was as follows: Data of a video camera were recorded and analyzed by MetRec. The camera operator checked and improved the data set with PostProc in the following days or weeks (by deleting false detections, for example), before he uploaded them by ftp to a central fileserver. IMO network administrators would check the data with PostProc once more, before they are manually ingested into the MeteorFlux database. Thanks to the four-eyes-principle, these data have the best possible quality, but also a significant delay of publication of currently more than a year.

Now there is the alternative option that the camera operator is uploading the data after his check directly into a temporary MeteorFlux database. Hence, the timeliness is improving dramatically and the quality is getting just a little worse, because only the double-check by a second person is skipped. Data will be kept in the temporary database until the finally checked data of the corresponding month are uploaded. The graphical user interface at <https://meteorflux.org> remains unchanged – the analyst has only to select if he wants to work on the temporary or final database.

To consequently follow this idea up to the end, and a third upload channel was implemented. Here, MetRec is uploading data directly during the observation to the MeteorFlux server. These data are naturally error-prone, because they still contain all the false detections. This effect is mitigated by the fact, that false detections are typically sporadic and not shower meteors. In addition, there is a specific routine that filters out questionable data automatically. Based on the real-time database, MeteorFlux is automatically generating every five minutes for every active meteor shower an activity profile of the past few days until now. The real-time display at <https://meteorflux.org/rt> is not suitable for further shower analyses, but it presents interested observers the activity level of the currently active showers and if there is any kind of unusual activity ongoing. The interface is designed such that real-time activity profiles can be easily integrated into other websites. Since October 2018, for example, they are displayed at the IMO homepage

The following analyses of two meteor showers rely on the final data set of September 2018. However, at the time of writing of this report, almost half of the September 2019 data are already available at the temporary database.

The alpha Aurigids at the borderline of August to September show in the long-term profile of 2011-2017 an almost constant activity level with just a small increase in rates between 155° and 163° solar longitude. The 2018 activity profile matches roughly to the average profile with the activity between 158° and 161° solar longitude slightly above the background level (figure 2).

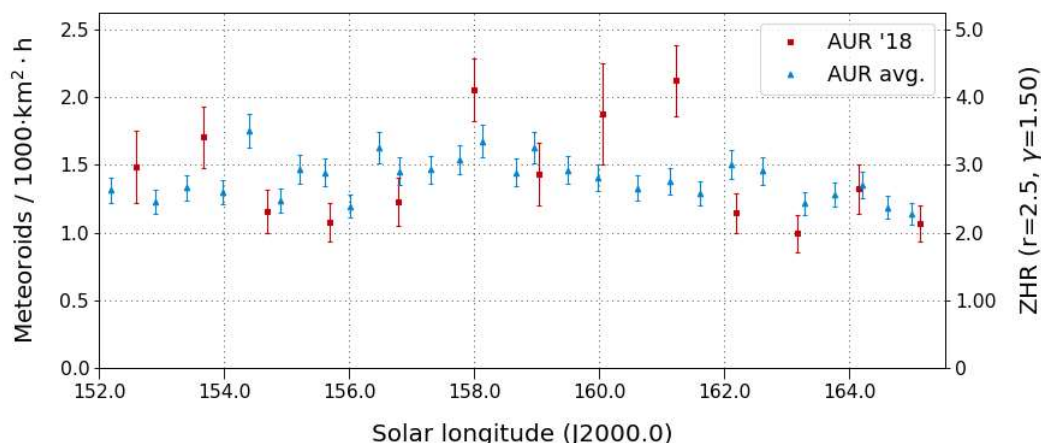


Figure 2: Flux density profile of the alpha Aurigids 2018 (red) and in the average of 2011-2017 (blue), derived from video data of the IMO Network.

The long-term profile of the September epsilon Perseids 2011-2017 (without 2013, when the shower experienced a significant outburst) is more interesting. It shows a continuous increase in rates from 163.0° to 165.5° solar longitude, thereafter declining rates until 166.0° solar longitude, and finally another increase until the real peak at 167.0° solar longitude. Thereafter rates decline and reach the background level at 169.0° solar longitude. 2018 data follow this activity pattern quite well (figure 3).

Of particular interest is a single outlier at 166.2° solar longitude, which is visible in the long-term profile and in the 2018 data, and which is stronger than the main peak. Chance or real structure? Looking at the live graph of the IMO VMDB data from the September epsilon-Perseids 2018 we see also a double peak at 167.2° and 168.2°, but the visual data set and therefore also the temporal resolution is much smaller.

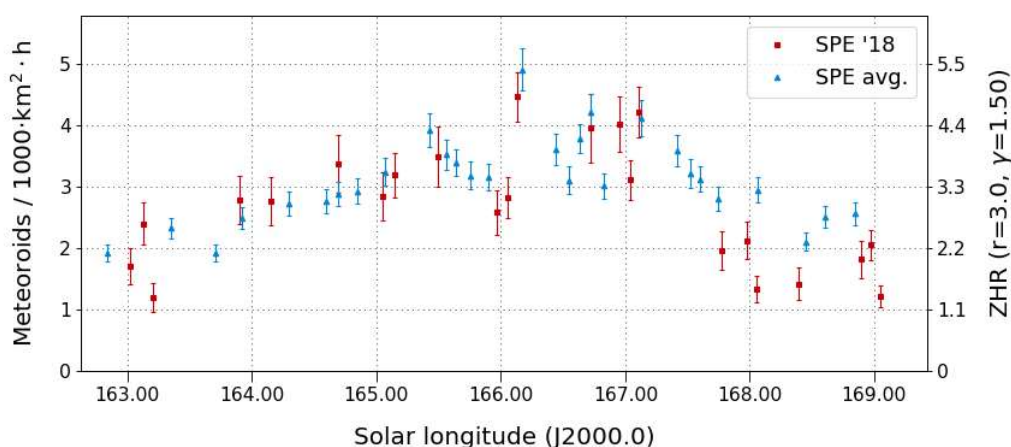


Figure 3: Flux density profile of the September epsilon Perseids 2018 (red) and in the average of 2011-2017 (without 2013, blue), derived from video data of the IMO Network.

The population index of the September epsilon Perseids (figure 4) shows close to the peak significantly smaller values than the sporadic meteors. Towards the begin and end of the activity interval, when the “sporadic pollution” is increasing, the values are approaching one other.

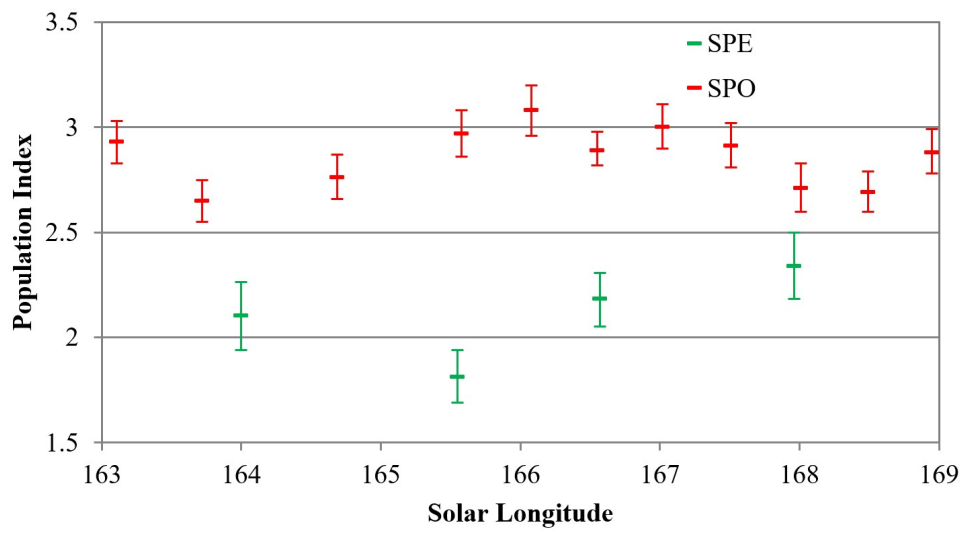


Figure 4: Population index of the September epsilon Perseids and sporadic meteors in September 2018.

1. Observers

Code	Name	Place	Camera	FOV [°]	St.LM [mag]	Eff.CA [km ²]	Nights	Time [h]	Meteors
ARLRA	Arlt	Ludwigsfelde/DE	LUDWIG2 (0.8/8)	1483	6.2	3812	27	167.5	964
BERER	Berkó	Ludanyhalaszi/HU	HULUD1 (0.8/3.8)	5524	4.8	3829	16	133.4	649
BIATO	Bianchi	Mt. San Lorenzo/IT	OMSL1 (1.2/4)	6422	4.0	1699	28	184.2	600
BOMMA	Bombardini	Faenza/IT	MARIO (1.2/4.0)	5779	3.3	644	29	238.2	1162
BREMA	Breukers	Hengelo/NL	MBB3 (0.75/6)	2399	4.2	641	24	174.5	353
BRIBE	Klemt	Herne/DE	HERMINE (0.8/6)	2369	4.2	674	25	167.3	698
		Berg. Gladbach/DE	KLEMOI (0.8/6)	2374	4.6	1123	29	194.6	739
CARMA	Carli	Monte Baldo/IT	BMH2 (1.5/4.5)*	4243	3.0	371	27	121.7	1304
CASFL	Castellani	Monte Baldo/IT	BMH1 (0.8/6)	2402	5.0	1633	26	200.2	598
CINFR	Cineglosso	Faenza/IT	JENNI (1.2/4)	5995	3.9	1240	29	250.3	1084
CRIST	Crivello	Valbrenvena/IT	ARCI (0.8/3.8)	5566	4.6	2571	30	229.6	824
			BILBO (0.8/3.8)	5441	4.2	1764	30	224.9	1103
			C3P8 (0.8/3.8)	5489	4.2	1603	30	206.3	757
			STG38 (0.8/3.8)	5574	4.4	1905	29	137.1	956
ELTMA	Eltri	Venezia/IT	MET38 (0.8/3.8)	5607	4.3	2381	27	186.0	642
FORKE	Förster	Carlsfeld/DE	AKM3 (0.75/6)	2387	5.1	2145	22	152.5	725
GONRU	Goncalves	Foz do Arelho/PT	FARELHO1 (0.75/4.5)	2260	3.0	206	13	80.6	35
		Tomar/PT	TEMPLAR1 (0.8/6)	2212	5.3	1873	30	265.7	1049
			TEMPLAR2 (0.8/6)	2341	5.0	1718	30	267.1	755
			TEMPLAR3 (0.8/8)	1438	4.3	542	29	243.9	373
			TEMPLAR4 (0.8/3.8)	5180	3.0	497	30	264.2	754
			TEMPLAR5 (0.75/6)	2309	5.0	2248	28	224.8	672
GOVMI	Govedic	Sredisce ob Dr./SI	ORION2 (0.8/8)	1471	5.5	2170	26	188.8	622
			ORION3 (0.95/5)	3152	4.9	2130	25	201.0	313
			ORION4 (0.95/5)	3818	4.3	1634	26	189.7	274
HERCA	Hergenrother	Tucson/US	SALSA3 (0.8/3.8)	2336	4.1	538	23	198.8	552
HINWO	Hinz	Schwarzenberg/DE	HINWO1 (0.75/6)	2375	5.1	1889	25	178.6	649
IGAAN	Igaz	Budapest/HU	HUPOL (1.2/4)	2414	3.6	409	14	97.3	106
JONKA	Jonas	Budapest/HU	HUSOR (0.95/4)	3988	3.6	729	25	201.6	298
			HUSOR2 (0.95/3.5)	2468	3.9	716	27	155.7	363
KACJA	Kac	Kamnik/SI	CVETKA (0.8/3.8)	5334	4.3	2028	21	123.4	678
		Kostanjevec/SI	METKA (0.8/12)*	711	6.4	2133	17	84.8	244
		Kamnik/SI	REZIKA (0.8/6)	2269	4.4	863	21	128.3	792
		Ljubljana/SI	SRAKA (0.8/6)*	2348	4.8	1595	26	150.7	607
		Kamnik/SI	STEFKA (0.8/3.8)	5458	3.6	911	19	121.2	418
KOSDE	Koschny	La Palma / ES	ICC9 (0.85/25)*	660	6.7	2835	28	179.5	2133
			LIC2 (3.2/50)*	1933	6.5	6554	26	133.3	1472
LOJTO	Lojek	Grabniak/PL	PAV57 (1.0/5)	728	6.2	2087	13	112.7	507
MACMA	Maciejewski	Chelm/PL	PAV35 (0.8/3.8)	5329	4.0	1530	22	131.3	459
			PAV36 (0.8/3.8)*	5484	4.0	1501	22	171.6	696
			PAV43 (0.75/4.5)*	2251	4.7	1484	23	175.4	640
			PAV60 (0.75/4.5)	2302	5.1	1803	21	164.6	840
MARRU	Marques	Lisbon/PT	RANI (1.4/4.5)	4395	4.0	1330	26	211.8	565
MASMI	Maslov	Novosibirsk/RU	NOWATEC (0.8/3.8)	5559	3.6	827	4	32.8	198
MOLSI	Molau	Seysdorf/DE	AVIS2 (1.4/50)*	1204	6.9	5982	25	169.4	1850
			DIMCAM1 (0.8/8)	1553	6.8	10447	15	86.5	958
			ESCIMO2 (0.85/25)	154	8.1	3828	22	168.5	437
			MINCAM1 (0.8/8)	1476	5.0	1286	10	49.9	237
		Ketzür/DE	REMO1 (0.8/8)	1467	6.5	5459	29	176.5	1359
			REMO2 (0.8/8)	1479	6.4	5037	30	183.7	991
			REMO3 (0.8/8)	1422	6.4	4207	29	203.9	1161
			REMO4 (0.8/8)	1478	6.5	5355	29	205.0	1574
MORJO	Morvai	Fülöpszallas/HU	HUFUL (1.4/5)	3666	3.8	805	26	217.2	306
MOSFA	Moschini	Rovereto/IT	ROVER (1.4/4.5)	3868	4.2	1240	27	204.3	419
NAGHE	Nagy	Budapest/HU	HUKON (0.8/3.8)	5475	4.0	1583	27	209.9	740
		Piszkestető/HU	HUPIS (0.8/3.8)	5622	4.0	1539	5	24.0	58
		Zamardi/HU	HUZAM (0.8/6)	2359	4.7	1340	17	152.9	425
OCHPA	Ochner	Albiano/IT	ALBIANO (1.2/4.5)	3013	4.3	886	25	161.6	307
OTTMI	Otte	Pearl City/US	ORIE1 (1.4/5.7)	2317	3.8	373	21	36.0	164
PERZS	Perkó	Becsehely/HU	HUBEC (0.8/3.8)*	5557	2.9	470	14	121.8	200
ROTEC	Rothenberg	Berlin/DE	ARMEFA (0.8/6)	2359	4.5	907	27	168.4	395
SARAN	Saraiva	Carnaxide/PT	RO1 (0.75/6)	2354	4.0	536	23	172.0	243
			RO2 (0.75/6)	2365	4.1	635	25	237.7	408
			RO3 (0.8/12)	720	5.7	1126	27	251.5	476
			RO4 (1.0/8)	1568	4.2	546	26	229.8	190
			SOFIA (0.8/12)	726	4.8	516	25	223.1	328
SCALE	Scarpa	Alberoni/IT	LEO (1.2/4.5)*	4170	4.5	2044	26	177.0	260
SCHHA	Schremmer	Niederkrüchten/DE	DORAEMON (0.8/3.8)	5522	4.7	3184	25	163.4	550
SLAST	Slavec	Ljubljana/SI	KAYAK1 (1.8/28)	1074	5.7	2642	23	150.7	242
			KAYAK2 (0.8/12)	742	5.7	1052	24	166.4	243
STOEN	Stomeo	Scorze/IT	MIN38 (0.8/3.8)	5587	4.5	2362	28	202.5	1250
			NOA38 (0.8/3.8)	5612	4.2	1889	28	217.5	1011
			SCO38 (0.8/3.8)	5583	4.8	3304	27	199.0	1269
STRJO	Strunk	Herford/DE	MINCAM2 (0.8/6)	2355	5.6	3423	26	162.1	961
			MINCAM3 (0.8/6)	2302	4.5	1150	26	147.1	321
			MINCAM4 (0.8/6)	2274	4.7	1001	26	147.5	335
			MINCAM5 (0.8/6)	1481	6.0	3200	25	162.8	573
			MINCAM6 (0.8/6)	2396	5.3	2748	27	159.5	528
TEPIS	Tepliczky	Agostyan/HU	HUAGO (0.75/4.5)	2428	4.6	1247	23	169.0	561
			HUMOB (0.8/6)	2388	4.6	1225	26	207.7	619
WEGWA	Wegrzyk	Nieznaszyn/PL	PAV78 (0.8/6)	2376	4.4	1264	25	136.0	409
YRJIL	Yrjölä	Kuusankoski/FI	FINEXCAM (0.8/6)	2315	5.5	2769	25	150.0	519
ZAKJU	Zakrajšek	Petkovec/SI	PETKA (0.8/8)	1431	5.6	1956	28	208.6	1333
			TACKA (0.8/12)	715	5.3	784	28	193.9	467
Sum							30	14421.8	54899

* active field of view smaller than video frame

2. Observing Times (h)

September	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
ARLRA	4.1	4.2	7.2	7.2	7.4	5.1	4.0	3.0	6.8	1.5	7.7	-	-	4.8	6.1
BERER	-	-	-	-	-	8.5	8.6	9.3	8.4	9.0	7.3	7.6	9.3	3.2	9.3
BIATO	4.4	0.3	1.2	7.8	9.4	9.0	1.4	9.1	-	9.7	9.8	4.5	1.1	4.3	9.0
BOMMA	-	4.2	3.7	8.9	8.9	6.6	3.7	9.4	9.0	9.8	9.7	3.1	8.1	6.7	9.7
BREMA	8.9	-	0.5	9.2	4.8	-	7.0	6.2	3.9	5.3	1.7	-	9.8	-	8.5
BRIBE	8.6	0.5	3.3	2.5	4.2	3.9	8.2	0.5	6.1	7.5	8.4	-	9.4	5.9	9.1
	8.5	0.4	2.2	2.3	2.9	5.2	8.9	0.7	7.4	8.5	9.3	0.5	8.4	4.3	8.2
CARMA	-	0.7	5.7	7.4	5.9	0.5	2.9	6.6	5.5	6.2	4.4	2.3	4.7	1.4	4.7
CASFL	-	1.7	9.4	9.4	9.4	-	4.1	9.6	9.6	9.6	9.8	5.6	9.1	5.8	7.1
CINFR	-	7.6	4.5	8.9	8.9	7.1	4.1	9.3	9.7	9.8	9.8	3.5	8.1	8.1	9.8
CRIST	3.4	0.9	8.5	9.1	6.8	5.9	8.1	7.0	6.4	9.5	9.5	4.2	4.9	9.7	7.9
	3.5	0.9	7.9	9.1	9.2	5.8	8.2	8.8	6.2	9.5	9.5	3.8	5.6	9.7	7.9
	2.1	1.0	6.5	6.3	9.2	1.8	7.3	9.4	6.3	9.5	9.1	3.9	5.2	3.9	8.5
	0.2	0.3	0.7	0.9	1.1	1.0	2.2	3.6	5.5	7.0	9.5	5.6	5.3	9.4	4.5
ELTMA	-	1.1	8.7	7.0	9.2	2.8	6.0	9.6	9.0	9.2	9.6	2.1	4.2	2.2	9.8
FORKE	-	-	1.9	8.1	7.9	-	-	4.6	8.2	1.4	7.4	5.7	-	2.4	8.1
GONRU	8.8	-	3.1	-	-	-	-	5.1	-	7.8	9.2	-	-	-	-
	9.3	6.2	9.3	5.2	4.2	9.6	7.9	9.7	7.5	9.7	9.8	9.7	9.9	8.7	9.4
	9.4	6.2	9.5	5.3	4.3	9.7	7.9	9.4	7.4	9.8	9.9	9.9	10.0	8.5	9.4
	9.2	6.4	9.3	2.0	0.4	9.5	7.4	8.7	6.2	9.7	9.8	9.8	9.8	8.1	7.5
	9.1	6.2	9.5	2.4	4.0	9.7	7.6	9.3	7.5	9.8	9.9	9.9	10.0	7.9	9.4
	8.9	6.1	9.1	2.2	-	9.4	7.6	8.5	6.3	9.6	9.6	9.7	9.7	7.7	7.7
GOVMI	0.3	-	-	-	7.6	3.0	3.1	9.2	9.2	8.2	2.8	9.5	5.0	1.4	6.7
	-	-	-	-	8.9	4.4	3.0	9.4	9.5	9.2	2.2	9.7	1.3	5.0	7.0
	-	0.7	-	-	3.1	1.8	1.5	9.0	9.1	8.5	7.6	9.3	5.4	4.5	5.7
HERCA	7.0	2.3	-	9.7	8.2	8.0	10.1	10.2	-	10.2	10.2	8.6	9.9	10.1	10.1
HINWO	-	-	4.2	8.7	8.5	2.5	3.6	7.0	9.0	1.2	9.4	3.6	-	2.5	7.3
IGAAN	-	-	-	8.3	4.1	7.8	7.8	8.4	8.2	8.6	-	8.8	2.3	4.4	8.9
JONKA	-	-	-	9.1	6.0	9.1	9.0	9.2	6.9	8.6	8.4	9.5	8.5	3.4	9.7
	-	0.3	0.2	9.1	4.7	9.3	9.0	9.3	8.1	7.9	8.7	7.2	9.6	1.8	5.2
KACJA	0.7	-	0.4	1.8	4.7	-	-	8.6	9.0	9.0	9.2	8.3	7.4	-	-
	-	1.0	-	-	1.7	-	4.0	6.6	5.8	8.5	5.8	7.3	5.6	2.2	1.9
	0.9	-	1.0	3.9	6.0	-	-	8.8	8.8	9.3	9.5	7.8	9.1	-	1.9
	1.9	0.8	0.7	2.4	4.1	7.7	-	7.1	3.2	9.0	9.4	5.2	6.6	-	3.6
	1.0	-	-	2.0	5.4	-	-	8.8	9.0	9.3	9.4	7.9	6.1	-	-
KOSDE	5.1	6.0	7.0	8.0	6.9	-	9.5	9.5	9.6	9.6	9.6	-	6.1	0.3	5.7
	5.7	6.4	6.9	7.3	5.0	-	7.3	7.7	7.1	6.9	7.2	-	3.5	-	4.2
LOTJO	8.6	-	-	-	5.1	-	-	-	-	9.3	-	8.9	-	-	9.1
MACMA	3.4	7.9	3.3	5.7	-	-	-	3.3	0.3	8.5	2.9	9.0	7.7	-	5.9
	8.7	8.8	7.2	6.9	-	-	-	3.6	0.9	9.2	3.5	9.4	8.1	-	8.4
	8.4	8.4	7.1	7.4	-	1.9	-	4.0	0.9	9.0	2.8	9.2	8.9	-	9.3
	8.6	8.7	7.9	7.5	-	3.0	-	4.5	0.9	9.1	3.8	9.4	8.3	-	9.1
MARRU	6.9	-	-	-	-	4.0	5.8	6.8	9.3	9.7	9.2	9.8	9.8	7.2	10.0
MASMI	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MOLSI	-	-	-	5.8	8.4	-	5.7	8.6	8.7	8.5	8.8	8.6	0.2	4.3	9.1
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.7
	-	-	-	5.2	8.9	-	4.1	9.1	9.2	8.9	9.3	8.8	-	3.1	9.5
	-	-	-	1.6	7.4	-	3.0	5.2	3.1	4.6	8.1	8.6	-	5.6	2.7
	4.0	2.7	7.5	6.5	4.9	4.8	5.4	3.2	6.8	0.8	6.9	0.3	-	5.0	6.6
	4.1	3.9	7.9	6.9	6.8	5.2	6.0	3.8	7.7	1.0	7.0	0.4	0.3	5.8	6.6
	4.2	3.5	8.6	7.4	5.3	5.2	6.8	3.3	8.5	-	7.8	0.6	0.2	5.8	7.6
	4.3	4.6	8.6	7.4	6.5	4.5	6.8	3.2	8.4	1.6	7.7	0.6	-	6.0	7.4
MORJO	-	-	-	7.1	9.2	9.2	9.4	9.4	8.3	9.4	7.4	9.5	9.3	2.6	-
MOSFA	-	-	9.4	9.4	8.7	1.9	4.8	8.5	8.8	9.1	9.6	3.3	9.1	2.8	8.5
NAGHE	0.4	-	0.2	9.1	6.6	9.2	9.0	9.3	7.9	9.3	9.2	9.5	7.6	5.0	9.7
	0.4	5.5	-	5.8	3.5	8.8	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	5.6	9.3	7.7	8.1	8.5	-	-	-	-
OCHPA	-	-	0.9	8.2	3.7	-	-	3.3	6.0	8.4	8.4	2.5	8.8	2.2	2.3
OTTMI	-	1.0	2.2	-	0.2	-	1.6	4.0	4.4	7.2	-	1.7	1.7	0.8	1.4
PERZS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9.2
ROTEC	3.4	3.4	8.3	7.6	6.4	7.0	3.5	3.4	7.3	-	7.9	-	-	5.4	6.5
SARAN	8.6	-	-	-	-	0.4	4.3	3.8	5.6	-	9.3	10.0	9.1	-	10.2
	9.1	-	-	-	-	9.3	6.7	5.4	9.8	9.9	9.4	-	9.8	8.0	10.1
	9.0	0.3	-	-	-	9.0	7.0	7.5	9.7	9.7	9.3	9.8	9.8	8.0	9.9
	9.3	-	-	-	-	9.3	6.0	5.2	9.5	9.6	9.4	10.0	10.0	7.5	0.2
	8.9	-	-	-	-	9.0	6.3	4.1	9.8	9.8	8.7	10.0	10.0	8.0	10.0
SCALE	-	0.7	5.6	5.3	9.1	-	5.6	9.5	9.5	8.5	8.9	2.3	3.5	1.4	9.5
SCHHA	8.1	0.8	2.7	2.7	-	-	8.6	-	6.4	7.5	9.3	-	5.6	3.7	8.8
SLAST	-	-	0.3	-	4.3	5.8	-	8.9	7.7	8.4	8.9	5.8	4.9	-	5.2
	-	2.5	-	3.9	0.8	8.1	-	9.1	8.1	8.6	9.1	6.2	6.9	-	5.9
STOEN	-	4.1	7.5	8.1	9.1	1.0	4.5	9.6	9.5	8.9	9.5	3.7	7.1	3.0	9.8
	-	4.4	7.4	8.9	9.4	1.1	5.8	9.6	9.5	9.4	9.6	5.2	8.1	3.8	9.9
	-	3.8	7.2	7.7	8.7	-	5.2	9.6	9.5	8.7	9.5	3.1	6.6	3.2	9.8
STRJO	7.2	2.0	2.6	8.5	8.8	-	7.2	0.2	7.7	2.0	3.1	-	7.2	3.3	8.2
	6.7	1.5	2.4	8.4	8.8	0.2	6.8	0.5	6.6	0.3	3.5	-	5.6	2.9	6.1
	6.8	1.9	0.2	8.7	8.8	-	7.0	0.7	6.8	1.1	3.5	-	0.3	3.3	7.1
	6.6	1.5	2.5	8.4	8.7	-	7.1	0.5	8.2	1.5	3.5	-	8.1	3.7	8.4
	5.9	2.1	2.6	8.5	8.6	0.2	7.2	0.3	6.7	1.3	3.2	-	7.8	3.0	7.1
TEPIS	-	-	0.3	6.7	4.0	8.8	8.9	9.2	8.2	-	-	-	0.2	1.2	9.5
	-	-	1.8	4.2	6.6	9.0	9.0	9.2	8.2	8.7	9.2	9.4	8.5	1.2	9.6
WEGWA	-	1.9	1.6	5.0	8.6	8.7	2.2	5.1	6.3	-	6.3	4.2	1.0	-	7.9
YRJIL	-	7.1	4.9	-	4.1	7.5	1.7	6.9	2.6	1.2	-	5.7	5.5	7.1	1.4
ZAKJU	0.4	1.5	3.9	8.2	3.5	9.0	1.1	9.4	9.4	9.4	9.4	8.3	9.0	-	6.4
	0.7	0.3	2.2	5.4	3.8	8.8	0.7	9.4	9.4	8.7	8.3	6.7	5.8	-	5.7
Sum	273.7	167.2	276.9	415.6	410.3	334.6	387.4	525.7	555.2	568.3	589.8	414.6	459.4	292.2	569.8

September	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
ARLRA	6.8	8.1	8.2	8.3	8.1	5.3	-	1.8	8.4	8.3	1.4	8.3	8.7	8.5	8.2
BERER	8.0	9.5	9.8	9.4	9.9	6.3	-	-	-	-	-	-	-	-	-
BIATO	6.4	4.4	1.4	3.2	9.1	9.5	5.2	5.7	-	9.9	9.6	10.7	10.8	9.9	7.4
BOMMA	6.1	6.1	9.5	10.1	10.3	10.0	9.5	10.4	8.9	6.4	10.1	10.5	10.6	10.7	7.5
BREMA	9.5	10.1	8.7	9.4	7.3	2.8	-	6.7	10.3	9.1	7.6	5.6	10.7	10.9	-
BRIBE	8.4	9.6	8.7	9.4	7.6	3.0	-	-	10.1	-	10.3	-	9.9	10.5	1.7
	8.7	9.5	6.4	9.7	7.7	7.2	-	3.2	9.4	10.1	10.1	10.2	10.2	10.4	4.1
CARMA	2.6	-	-	6.6	7.1	2.0	2.1	3.3	5.1	7.7	5.5	6.9	8.9	1.6	3.4
CASFL	6.5	-	-	10.2	10.3	4.8	3.3	3.3	7.6	10.5	10.4	10.6	10.7	5.6	6.2
CINFR	7.7	6.7	9.6	10.1	10.2	10.3	10.1	10.4	9.2	7.4	9.8	10.5	10.7	10.7	7.7
CRIST	5.6	6.0	9.5	9.9	10.0	7.5	8.9	3.2	9.9	10.3	10.3	10.4	10.4	10.5	5.4
	5.6	6.0	9.8	9.8	9.8	6.0	6.0	2.1	8.9	10.3	9.4	10.4	10.0	10.0	5.2
	3.2	6.7	9.9	9.9	9.9	4.8	7.6	0.2	7.6	10.3	10.3	10.4	10.4	10.5	4.6
	0.2	0.8	1.9	3.5	4.4	3.3	-	1.6	7.9	10.3	10.3	10.4	10.4	10.5	4.8
ELTMA	6.5	6.9	7.1	9.9	9.7	4.0	-	-	3.9	5.3	7.2	10.5	8.7	9.0	6.8
FORKE	9.3	9.4	9.2	9.3	9.4	4.4	-	-	-	4.3	9.5	9.1	7.2	8.9	6.8
GONRU	4.1	-	0.8	3.2	-	-	4.0	-	7.9	9.8	-	8.0	8.8	-	-
	9.8	10.1	9.5	10.1	10.1	5.2	10.2	9.3	10.1	10.1	9.8	10.3	9.3	8.4	7.3
	10.1	10.2	9.6	10.3	10.0	4.9	10.4	9.6	10.5	10.5	9.2	9.6	9.5	8.6	7.5
	9.6	9.9	9.3	9.9	10.2	4.2	10.2	10.2	10.2	9.9	9.0	10.5	9.2	7.8	-
	10.1	10.2	9.6	10.3	9.9	4.9	10.4	9.5	10.4	10.5	9.3	10.6	10.0	8.7	7.6
	9.3	9.7	9.1	9.6	10.0	-	9.1	9.6	9.7	6.0	6.4	7.4	8.1	5.8	2.9
GOVMI	6.0	9.6	9.8	9.9	8.6	8.4	-	2.3	9.9	10.0	10.0	10.1	8.7	10.1	9.4
	9.9	9.9	10.0	10.0	10.0	7.7	-	5.1	10.0	10.1	10.0	10.1	8.9	10.2	9.5
	9.5	9.5	9.6	9.7	9.7	6.8	-	2.2	9.8	9.9	9.2	10.0	8.1	10.0	9.5
HERCA	8.8	10.1	8.7	-	-	9.6	9.9	10.2	3.2	4.6	8.7	10.4	-	-	-
HINWO	9.7	9.8	9.7	9.7	9.9	4.9	-	-	1.5	10.3	9.4	10.3	8.3	10.5	7.1
IGAAN	4.5	7.1	-	-	-	-	-	-	-	-	-	-	-	8.1	-
JONKA	2.5	7.8	9.9	6.5	4.9	8.3	-	-	10.0	10.1	10.4	9.5	10.1	7.6	6.6
	3.7	3.1	2.7	6.9	0.9	8.7	-	-	3.3	2.9	1.9	9.7	8.8	5.9	6.8
KACJA	7.0	4.1	8.0	6.9	3.2	5.8	-	-	6.9	8.3	7.2	6.4	-	-	0.5
	6.4	6.9	7.8	3.2	4.4	5.7	-	-	-	-	-	-	-	-	-
	7.2	5.6	8.2	7.1	3.7	6.4	-	-	6.3	8.5	7.7	-	-	-	0.6
	9.0	3.9	8.6	3.8	5.9	6.0	-	-	5.6	4.6	9.0	9.6	6.4	6.3	10.3
	7.1	5.3	8.2	6.6	3.3	5.8	-	-	3.6	8.5	7.2	6.7	-	-	-
KOSDE	9.8	9.8	1.3	8.9	7.9	6.9	5.9	4.8	5.1	5.1	4.6	2.7	3.6	4.7	5.5
	6.4	6.4	0.5	6.6	5.3	5.1	4.8	3.6	2.9	4.9	4.0	0.6	1.3	5.7	-
LOTJO	9.7	8.0	10.0	10.0	10.1	4.5	-	-	-	8.7	-	-	-	-	10.7
MACMA	8.3	8.4	8.1	8.1	6.9	5.3	1.6	-	0.2	6.9	-	-	-	9.5	10.1
	9.3	9.9	9.8	9.9	10.0	8.1	4.5	-	-	9.6	-	4.5	-	10.5	10.8
	9.1	9.5	9.6	9.6	9.7	8.3	7.4	-	-	9.7	-	4.6	-	10.3	10.3
	9.3	9.7	9.8	9.8	9.9	8.6	6.8	-	-	9.6	-	-	-	10.3	-
MARRU	10.0	8.3	8.7	10.1	6.0	6.8	6.0	6.3	7.1	8.1	6.9	9.5	9.7	10.4	9.4
MASMI	-	-	-	-	-	-	-	-	-	-	-	9.0	7.2	8.4	8.2
MOLSI	6.8	9.2	0.9	9.3	9.4	1.6	-	1.2	8.9	9.7	9.5	9.8	1.6	9.9	4.9
	5.7	9.6	0.2	9.7	9.8	0.4	-	0.5	6.5	7.5	5.3	10.2	2.4	10.3	3.7
	6.6	9.6	-	9.8	9.8	-	-	1.3	9.4	9.6	8.3	9.8	2.5	10.4	5.3
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	8.3	8.6	8.6	8.4	8.5	7.0	1.7	5.8	8.9	8.7	1.4	8.9	9.1	9.2	8.0
	8.6	9.0	8.8	7.9	8.7	6.8	1.2	4.5	8.9	8.9	1.3	8.3	9.4	9.6	8.4
	9.4	9.6	9.7	9.6	9.9	8.3	1.8	6.7	10.1	10.0	2.8	10.3	10.4	10.5	10.0
	9.6	9.6	9.7	9.6	9.9	8.1	1.4	6.6	10.1	9.7	2.7	9.8	10.3	10.4	9.9
MORJO	5.0	9.8	9.8	9.9	9.0	9.7	0.4	4.5	10.3	10.3	10.4	10.4	10.3	9.0	7.6
MOSFA	7.8	6.6	7.2	10.2	10.4	3.4	3.5	2.6	8.8	10.6	10.8	10.6	10.5	-	7.4
NAGHE	3.5	7.0	9.8	7.3	8.1	8.0	-	-	9.9	10.3	10.4	9.2	8.8	8.9	6.7
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
OCHPA	-	-	10.1	10.2	10.2	9.9	-	3.8	10.0	10.4	10.5	10.4	10.5	8.1	9.6
OTTMI	4.5	8.7	7.2	9.8	9.8	3.6	-	4.2	9.2	10.6	9.4	10.4	8.4	3.7	7.4
PERZS	1.1	1.0	0.6	0.2	0.2	2.0	2.3	1.0	0.6	0.8	-	-	-	-	-
ROTEC	9.6	9.8	9.9	9.9	10.0	8.6	-	-	4.3	7.3	6.1	10.3	8.3	8.4	10.1
SARAN	6.9	4.7	9.5	9.4	9.2	6.2	2.2	3.1	3.2	2.5	1.6	9.9	10.3	10.4	9.2
	10.1	9.5	-	10.4	10.6	10.5	6.9	7.8	6.5	7.5	6.5	7.5	9.5	4.6	2.8
	9.8	9.6	9.6	10.1	10.0	10.2	10.1	9.8	9.9	10.2	9.1	10.2	10.4	10.5	10.7
	9.9	9.8	10.2	10.1	10.2	10.2	10.2	10.0	10.2	10.1	9.9	10.3	10.4	10.5	10.5
	9.5	9.7	9.5	10.3	9.6	9.9	10.1	10.5	10.4	10.5	9.8	10.6	2.0	10.7	10.7
	9.9	7.3	7.6	8.5	8.8	8.3	-	8.4	8.3	9.7	9.0	10.7	10.6	10.7	10.7
SCALE	5.3	6.2	8.0	10.1	9.1	-	-	3.4	5.9	5.5	9.0	10.3	10.6	6.1	8.1
SCHHA	9.4	9.3	8.2	9.3	1.5	5.4	-	6.2	7.3	9.0	8.9	9.9	4.4	9.6	0.8
SLAST	5.5	8.3	6.7	5.7	8.1	3.5	-	-	6.8	9.1	7.3	9.1	5.8	4.6	10.0
	5.8	8.7	6.9	6.1	8.2	4.0	-	-	6.9	10.1	10.2	10.1	7.5	2.2	10.5
STOEN	8.9	6.1	8.7	8.4	10.2	4.0	-	2.9	4.6	7.2	8.4	10.0	9.8	8.9	9.0
	9.4	5.9	9.4	9.0	10.2	3.5	-	4.4	7.3	6.7	9.3	10.6	10.6	9.9	9.2
	8.3	5.7	9.3	8.0	10.2	3.5	-	3.7	5.7	7.0	6.8	10.5	10.6	8.8	8.3
STRJO	7.2	9.7	9.6	9.8	7.8	4.6	-	-	6.3	7.5	0.6	7.7	10.3	10.4	2.6
	7.1	9.6	9.3	9.7	5.9	3.3	-	-	5.1	8.1	0.3	7.7	10.3	10.4	-
	7.3	9.7	9.6	9.5	8.9	3.8	-	2.3	2.6	9.3	-	8.0	8.1	9.9	2.3
	7.1	9.6	9.2	9.7	8.4	4.4	-	-	7.2	7.4	-	7.7	10.1	10.4	2.9
	7.4	9.5	9.5	9.8	6.9	3.9	-	-	8.3	7.8	1.0	7.8	10.3	10.4	2.4
TEPIS	7.1	9.5	9.5	9.8	9.9	7.2	-	-	9.5	10.2	10.2	9.5	1.2	8.8	9.6
	6.1	9.7	9.7	9.8	9.9	6.3	-	-	8.6	10.1	9.9	10.1	6.4	6.7	9.8
WEGWA	8.1	6.2	7.2	9.1	9.9	0.4	-	-	3.4	10.1	0.2	7.7	3.5	5.8	5.6
YRJIL	7.8	4.4	1.4	8.4	3.8	7.6	9.0	8.6	9.2	7.3	9.5	-	9.7	-	7.6
ZAKJU	9.8	9.9	9.9	6.0	9.2	6.2	-	1.0	10.3	10.4	8.0	10.4	9.8	8.4	10.4
	9.4	9.8	9.6	6.0	8.7	5.9	-	1.1	10.1	10.3	8.3	10.4	10.5	7.5	10.4
Sum	596.9	619.1	607.2	680.2	650.2	458.3	214.7	260.5	540.9	655.4	524.4	659.7	589.5	620.6	503.5

3. Results (Meteors)

September	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
ARLRA	14	19	48	53	32	21	25	12	35	4	55	-	-	29	19
BERER	-	-	-	-	-	58	50	62	46	45	40	35	49	13	53
BIATO	16	2	10	28	28	22	8	36	-	36	40	7	4	22	17
BOMMA	-	27	23	58	43	32	22	64	32	54	45	8	33	46	51
BREMA	27	-	1	31	8	-	14	15	3	14	5	-	30	-	9
BRIBE	38	1	12	8	18	10	38	1	17	32	45	-	54	32	28
	38	2	6	4	2	10	43	1	19	34	58	1	30	30	32
CARMA	-	5	73	69	84	3	35	74	47	64	52	19	42	11	50
CASFL	-	2	36	39	23	-	16	42	16	29	25	12	25	2	22
CINFR	-	33	13	43	57	34	14	77	38	47	52	6	33	43	43
CRIST	2	2	26	46	30	26	46	9	25	46	46	10	15	34	38
	12	4	36	58	46	28	50	43	34	58	65	13	21	33	54
	7	1	25	24	36	15	40	41	26	40	45	9	9	19	24
	1	1	4	6	8	8	17	22	60	82	90	23	37	69	8
ELTMA	-	4	30	19	38	6	32	55	27	29	34	6	10	5	25
FORKE	-	-	3	25	27	-	-	20	49	5	53	16	-	6	17
GONRU	5	-	2	-	-	-	-	1	-	1	9	-	-	-	-
	45	17	34	9	10	45	23	40	26	52	60	47	48	40	38
	23	13	25	3	8	31	15	16	25	39	45	35	30	16	23
	15	5	17	2	1	19	15	12	2	23	19	21	18	11	4
	27	9	25	4	7	30	16	29	23	40	34	37	45	32	23
	14	8	22	3	-	35	15	19	15	41	33	37	33	28	19
GOVMI	1	-	-	-	25	6	2	46	28	30	22	30	9	9	19
	-	-	-	-	14	2	2	12	19	13	7	17	3	6	11
	-	1	-	-	9	3	1	16	13	13	9	14	4	7	7
HERCA	29	4	-	26	26	26	26	33	-	33	33	27	25	29	25
HINWO	-	-	2	32	23	4	11	25	55	7	45	11	-	6	14
IGAAN	-	-	-	4	5	10	7	10	12	10	-	8	4	5	10
JONKA	-	-	-	8	15	15	14	13	11	16	14	9	7	6	11
	-	1	1	14	9	13	9	14	15	16	29	18	19	5	23
KACJA	3	-	2	8	21	-	-	43	65	44	38	45	47	-	-
	-	3	-	-	3	-	10	25	17	24	14	26	15	5	7
	4	-	3	12	22	-	-	81	70	50	43	35	53	-	27
	9	4	3	8	24	40	-	23	17	30	30	8	27	-	9
	1	-	-	5	22	-	-	32	35	25	22	16	25	-	-
KOSDE	48	63	81	113	84	-	103	131	147	126	142	-	45	3	69
	64	68	86	97	55	-	94	95	68	90	95	-	31	-	55
LOTJO	35	-	-	-	23	-	-	-	-	40	-	48	-	-	46
MACMA	17	15	8	22	-	-	-	8	1	24	6	36	24	-	12
	25	37	10	22	-	-	-	12	7	39	8	34	33	-	29
	29	21	12	24	-	2	-	3	2	35	6	35	26	-	27
	43	50	16	30	-	7	-	10	5	43	9	50	48	-	46
MARRU	12	-	-	-	-	9	6	23	32	27	17	24	25	20	25
MASMI	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MOLSI	-	-	-	21	103	-	39	111	140	61	148	119	1	26	136
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	92
	-	-	-	5	22	-	6	33	35	10	25	21	-	2	25
	-	-	-	5	29	-	8	41	24	15	68	31	-	9	7
	17	12	53	55	27	13	33	7	57	1	70	1	-	25	30
	10	9	44	50	27	12	30	4	48	1	60	2	1	28	21
	13	15	54	50	18	13	31	7	54	-	51	1	1	15	37
	19	29	76	75	41	26	36	7	75	2	63	5	-	20	46
MORJO	-	-	-	2	19	16	12	18	10	18	10	11	8	2	-
MOSFA	-	-	24	26	18	1	15	28	14	10	10	3	9	4	14
NAGHE	3	-	1	30	20	39	40	42	37	31	31	27	32	15	32
	2	8	-	5	8	35	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	25	37	32	14	10	-	-	-	-
OCHPA	-	-	6	8	3	-	-	9	5	8	17	2	14	7	6
OTTMI	-	9	9	-	1	-	11	18	7	10	-	11	12	5	8
PERZS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14
ROTEC	8	5	17	23	12	13	10	1	23	-	25	-	-	7	14
SARAN	5	-	-	-	-	3	5	8	5	-	16	11	9	-	16
	17	-	-	-	-	13	5	12	27	24	21	-	20	14	20
	11	1	-	-	-	9	6	10	29	28	23	27	21	11	23
	8	-	-	-	-	5	3	5	7	9	11	7	13	9	2
	6	-	-	-	-	9	5	10	19	16	15	22	20	6	17
SCALE	-	4	12	4	13	-	18	22	17	9	11	1	1	3	10
SCHHA	31	2	3	8	-	-	40	-	28	17	35	-	18	16	31
SLAST	-	-	2	-	13	5	-	21	17	19	12	21	11	-	9
	-	3	-	3	5	13	-	16	11	14	6	13	9	-	3
STOEN	-	50	49	51	55	3	43	97	45	34	47	8	37	9	57
	-	35	37	34	36	4	42	84	28	35	39	9	20	8	45
	-	34	53	55	52	-	54	79	54	32	44	8	24	8	43
STRJO	39	13	11	65	59	-	57	1	36	7	15	-	34	33	29
	17	5	4	23	19	1	12	2	16	2	4	-	6	12	12
	12	3	1	14	19	-	17	1	17	4	5	-	2	11	12
	15	3	8	37	36	-	23	1	32	6	6	-	26	22	24
	25	9	9	36	38	1	33	1	19	2	7	-	14	22	11
TEPIS	-	-	2	12	4	40	25	45	42	-	-	-	2	4	30
	-	-	2	6	8	34	22	30	27	26	25	28	34	3	32
WEGWA	-	9	5	17	19	19	8	15	28	-	20	12	3	-	19
YRJIL	-	26	22	-	11	21	1	16	4	1	-	24	27	25	2
ZAKJU	6	2	10	42	18	53	2	92	85	69	75	34	48	-	18
	4	1	5	8	4	17	1	21	27	23	14	9	14	-	6
Sum	872	709	1214	1727	1643	988	1537	2298	2365	2108	2578	1301	1527	1003	2022

September	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
ARLRA	47	37	67	54	46	52	-	19	38	34	4	30	62	59	49
BERER	26	56	51	22	29	14	-	-	-	-	-	-	-	-	-
BIATO	14	10	11	17	32	26	19	12	-	33	26	40	29	33	22
BOMMA	22	19	49	47	37	40	48	50	50	27	45	49	59	54	28
BREMA	28	22	29	15	4	3	-	5	33	6	13	7	17	14	-
BRIBE	31	42	28	32	16	12	-	-	46	-	56	-	50	47	4
	40	39	24	30	16	23	-	8	32	18	57	46	48	40	8
CARMA	20	-	-	85	86	18	18	8	69	78	66	83	107	11	27
CASFL	16	-	-	37	40	11	5	9	22	48	33	31	37	13	7
CINFR	24	18	40	44	57	45	44	46	34	27	46	49	33	34	10
CRIST	11	37	21	50	43	10	39	11	28	26	21	37	27	35	27
	14	36	40	63	55	16	39	12	39	47	31	48	38	48	22
	8	31	27	25	40	6	27	1	34	34	47	27	38	31	20
	1	5	7	6	22	9	-	12	75	68	65	72	80	76	22
ELTMA	12	22	27	28	34	9	-	-	27	12	24	41	25	37	24
FORKE	53	42	47	48	44	27	-	-	-	40	43	50	43	44	23
GONRU	6	-	1	2	-	-	1	-	1	1	-	3	2	-	-
	49	66	37	49	49	9	38	40	26	23	27	28	34	27	13
	33	43	30	38	29	10	26	28	38	17	33	22	29	24	8
	15	10	18	17	13	2	18	18	20	12	12	9	17	8	-
	30	36	30	21	39	3	26	26	24	29	29	28	27	17	8
	31	32	33	44	47	-	30	20	20	13	21	17	27	13	2
GOVMI	23	27	32	35	25	14	-	7	30	36	26	39	15	38	48
	15	21	17	9	18	5	-	3	18	19	17	19	13	17	16
	13	19	14	12	15	8	-	3	13	17	16	14	4	11	18
HERCA	16	34	16	-	-	21	36	24	1	13	23	26	-	-	-
HINWO	38	33	39	32	46	29	-	-	5	31	27	45	33	43	13
IGAAN	5	5	-	-	-	-	-	-	-	-	-	-	-	11	-
JONKA	10	12	10	11	7	6	-	-	18	23	12	16	11	15	8
	10	16	18	17	6	10	-	-	19	19	13	13	10	12	14
KACJA	39	24	56	43	9	11	-	-	20	69	44	45	-	-	2
	20	23	20	9	13	10	-	-	-	-	-	-	-	-	-
	56	32	56	54	14	16	-	-	33	66	62	-	-	-	3
	29	12	39	9	11	10	-	-	21	16	43	64	22	44	55
	23	18	40	29	7	13	-	-	11	41	28	25	-	-	-
KOSDE	143	111	9	134	96	104	90	53	33	51	31	13	17	41	52
	66	70	3	74	56	62	50	34	28	40	31	4	9	47	-
LOTJO	40	21	48	48	41	13	-	-	-	30	-	-	-	-	74
MACMA	30	29	45	32	32	19	8	-	1	33	-	-	-	29	28
	31	30	47	41	44	24	16	-	-	48	-	36	-	62	61
	29	26	42	50	46	25	15	-	-	45	-	32	-	51	57
	40	40	65	62	57	29	24	-	-	76	-	-	-	90	-
MARRU	28	20	27	37	13	26	12	17	21	22	19	19	20	26	38
MASMI	-	-	-	-	-	-	-	-	-	-	-	65	34	52	47
MOLSI	95	138	6	123	113	7	-	13	65	75	71	78	4	119	38
	63	146	1	137	125	2	-	3	54	66	60	75	11	110	13
	15	30	-	29	33	-	-	1	25	32	21	25	6	31	5
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	62	46	74	41	74	75	14	56	89	60	3	96	96	95	77
	68	39	57	26	67	54	5	38	35	28	7	38	59	51	72
	53	56	59	39	59	46	7	43	54	53	7	72	95	75	83
	73	76	98	42	79	77	12	41	85	51	10	100	110	104	96
MORJO	5	14	14	17	10	4	1	2	15	19	19	17	14	20	9
MOSFA	11	13	14	23	24	7	3	1	24	31	26	27	30	-	9
NAGHE	15	22	36	16	22	20	-	-	34	44	22	36	20	55	18
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	25	18	20	17	-	4	38	49	23	39	28	25	21
OCHPA	6	15	14	24	19	6	-	10	26	19	18	16	36	3	10
OTTMI	7	6	3	1	1	15	14	6	5	5	-	-	-	-	-
PERZS	10	21	12	17	11	17	-	-	11	29	9	16	7	12	14
ROTEC	20	13	28	20	18	15	8	3	8	7	3	16	21	29	28
SARAN	14	16	-	21	18	9	11	5	11	13	6	9	7	13	12
	13	17	16	15	20	22	9	12	21	9	12	13	19	17	20
	23	24	22	25	28	27	18	16	21	13	8	12	22	12	6
	8	11	5	9	8	7	5	11	5	10	4	9	4	7	8
	21	14	20	20	11	12	-	15	9	5	6	10	13	12	15
SCALE	6	9	4	11	8	-	-	4	17	7	8	14	25	8	14
SCHHA	36	41	38	18	4	18	-	21	14	13	33	36	11	37	1
SLAST	7	13	13	8	5	1	-	-	5	9	12	8	3	14	14
	9	8	14	9	8	2	-	-	4	20	13	20	9	14	17
STOEN	47	46	49	59	56	15	-	10	52	33	49	73	68	57	51
	42	25	38	49	50	9	-	7	36	23	34	64	70	65	43
	54	48	41	60	69	14	-	15	58	47	48	81	76	55	63
STRJO	65	63	65	59	30	36	-	-	22	26	3	38	72	75	8
	24	16	23	11	10	3	-	-	4	14	1	21	29	30	-
	22	22	21	20	14	6	-	7	3	17	-	18	31	33	3
	52	38	30	35	24	11	-	-	20	18	-	18	55	30	3
	38	38	23	30	9	12	-	-	20	8	2	26	34	55	6
TEPIS	16	40	33	29	19	18	-	-	33	50	27	36	3	37	14
	20	38	38	29	16	15	-	-	21	36	28	42	14	26	19
WEGWA	23	7	22	15	29	1	-	-	4	33	1	32	14	28	26
YRJIL	29	17	8	40	19	20	25	37	40	18	30	-	31	-	25
ZAKJU	66	56	79	52	44	21	-	1	62	56	35	81	65	69	92
	15	18	28	12	22	7	-	1	26	34	28	38	23	27	34
Sum	2388	2486	2331	2721	2530	1448	761	849	2004	2368	1778	2542	2252	2704	1845