

Result of the IMO Video Meteor Network – August 2018

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In August, the number of IMO network video cameras grew to 85 again. Jure Zakrajšek started to operate his second camera PETKA, which is just like the first one a Mintron with a 8mm f/0.8 Computar lens. During the Perseids, Peter Slansky experimented with a Sony α7S to determine the population index of the shower – also his HD video data were analyzed in a complex multi-pass process with MetRec and inserted into the video database.

The weather in August was nearly perfect. Looking at the statistics we see only a few individual cameras which were for technical reasons not constantly in operation, and a short phase of instable weather around August 25. Other than this, all cameras were in operation without any longer break. In all days but five, almost 70 IMO network cameras scanned the night sky. Highlight was August 22/23, when 81 of 85 cameras managed to capture meteors, but even at the worst day of month more than half of all cameras were in operation.

65 cameras managed to observe in twenty or more observing nights, 23 of these even in 30 or more nights. So, it is no surprise that the effective observing time summed to overall more than 13,100 hours, which is our best August outcome ever. We recorded 88,000 meteors, which is slightly less than in 2015 and 2016. This implies, that the average rate of 6.7 meteors per hour was below the average of previous years. This in turn is surprising since the Perseid peak coincided roughly with new moon. Our experience from previous years is, that the flux density is by tendency higher in years with new moon and dark skies, and it is lower in years with full moon illuminated skies (because of systematic effects in the limiting magnitude determination algorithm).

Figure 1 shows the activity profile of the Perseids close to the maximum, compared to the average Perseid rate 2011-2017 (without 2016). The flux density of August 11/12 is indeed a little, of August 12/13 significantly below the long-term average.

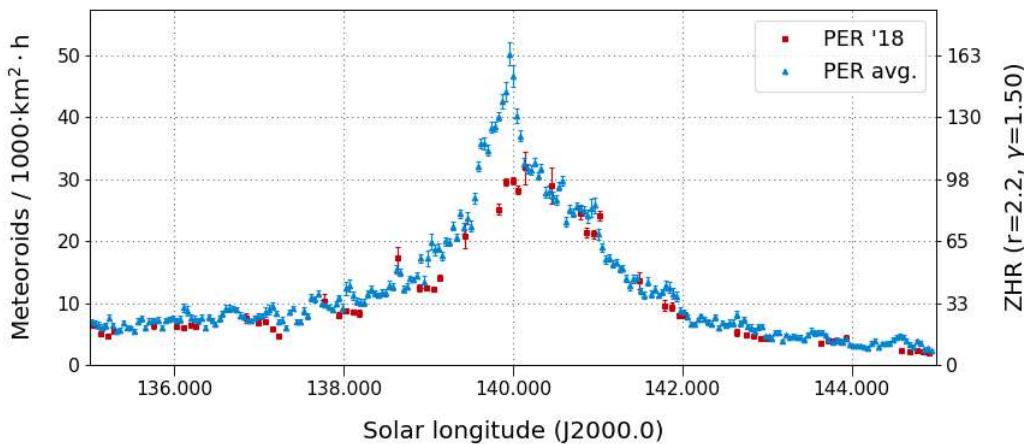


Figure 1: Flux density profile of the Perseids 2018 (red) and in the average of 2011-2017 (without 2016, blue), derived from video data of the IMO Network.

Even if we consider only the years 2012 and 2015 with similar good lunar conditions, and if we restrict the analysis to cameras, which were active in all three years, the picture does not change: The activity level in 2018 remains clearly below average (figure 2).

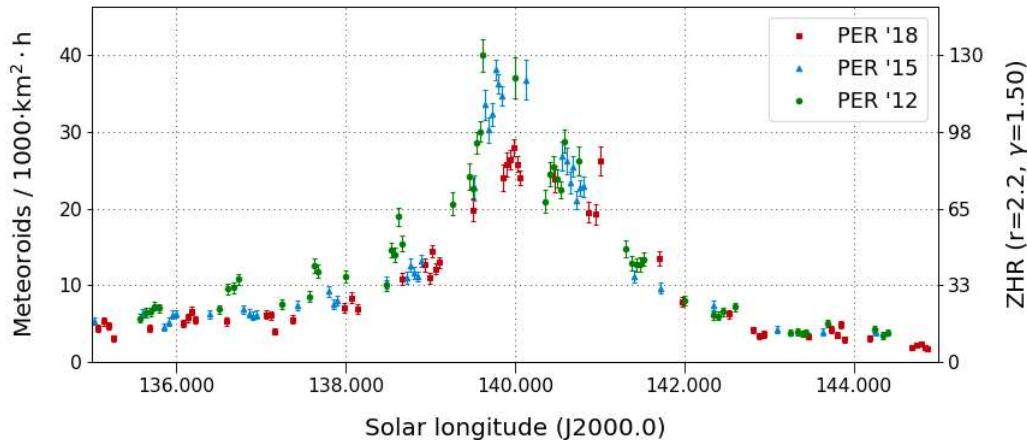


Figure 2: Comparison of the Perseid flux density in moon-free years (2012, 2015, 2018) from a subset of cameras that was active in all three years.

Let's finally compare our data set with visual Perseid observations of 2018. Figure 3 contrasts the video profile form the IMO network with observation from the IMO Visual Meteor Database, which were collected via the online report form. Both profiles look similar, and also visual observations revealed a mediocre maximum with zenithal hourly rates below 100.

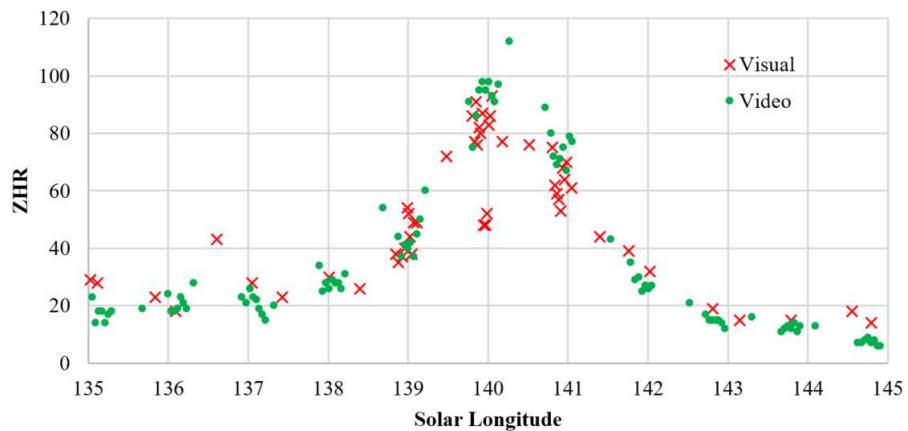


Figure 3: Comparison of the zenithal hourly rate of the Perseids 2018 based on visual observations of IMO (red crosses) and video data of the IMO Network (green dots).

The population index of the Perseids (figure 4) remained unremarkable. Before the peak, it scattered around values of $r=2.05$, during the maximum and thereafter it fell to values near $r=1.85$. At the same time interval, the average sporadic population index was $r=2.85$. The values are comparable with 2015 and higher than in 2017, which matches to our previous experiences.

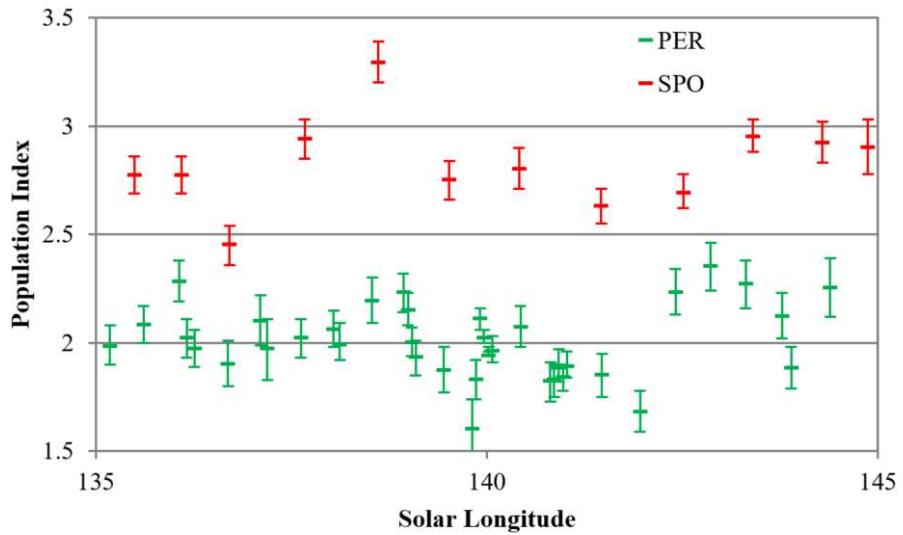


Figure 4: Population index of the Perseids (green) and sporadic meteors (red) in 2018.

Note that most Perseid 2018 data were contributed by Stefano Crivello. With his four cameras he collected less effective observing time than Sirko Molau and Rui Goncalves, but the effective collection area of his cameras for Perseids was larger, which is why he recorded also more Perseids (table 1).

Table 1: Contribution of individual observers with an effective collection area for Perseids of over 250,000 km² and hour.

Observer	# Cameras	Eff. Obs. Time [h]	Eff. Coll. Area [10 ³ km ² h]	# Perseids
Stefano Crivello	4	944.2	772.1	3524
Sirko Molau	7	1011.9	562.1	2916
Rui Goncalves	6	1252.9	520.3	1959
Enrico Stomeo	3	528.2	497.9	2173
Maciej Maciejewski	4	565.3	404.2	2438
Karoly Jonas	3	565.5	397.1	1739
Javor Kac	5	699.2	354.1	2847
Jörg Strunk	5	886.4	347.8	2120
Rui Marques	2	443.7	314.3	1134
Maurizio Eltri	1	218.4	282.9	679
Mario Bombardini	1	280.4	276.7	1063

In figure 5, we compare the 2018 activity profile of the kappa Cygnids with the average of 2011-2017 (without 2014). Also, in this case, the rate was by tendency lower than in the long-term average. Otherwise the profile shows no surprises.

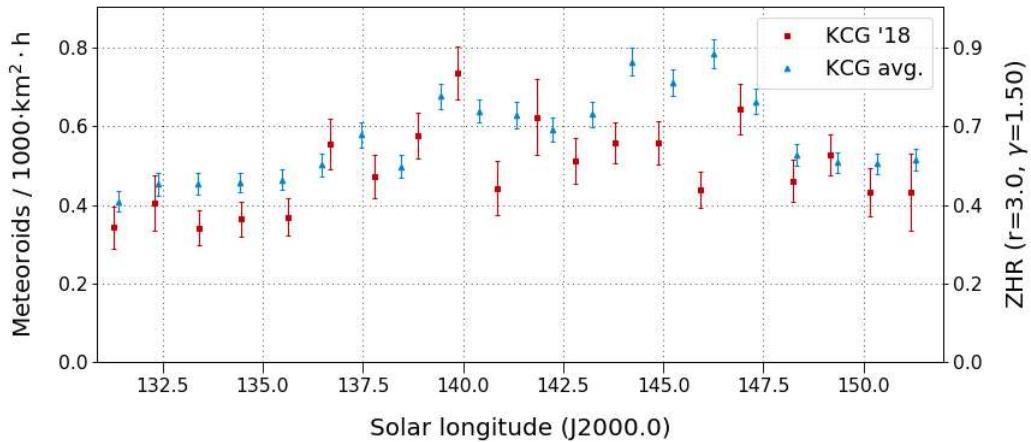


Figure 5: Flux density profile of the kappa Cygnids 2018 (red) and in the average of 2011-2017 (without 2014, blue), derived from video data of the IMO Network.

The population index of the kappa Cygnids had an average value of $r=2.85$, which is slightly larger than the sporadic average population index of $r=2.75$ in the same solar longitude interval. There are only few meteor showers with this property.

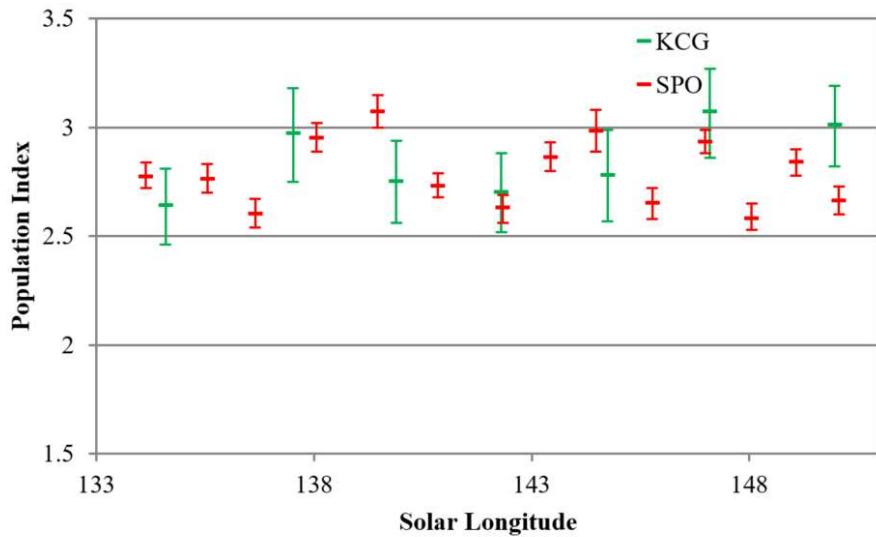


Figure 6: Population index of the kappa Cygnids (green) and sporadic meteors (red) in 2018.

1. Observers

Code	Name	Place	Camera	FOV [° ²]	St.LM [mag]	Eff.CA [km ²]	Nights	Time [h]	Meteors
ARLRA	Arlt	Ludwigsfelde/DE	LUDWIG2 (0.8/8)	1475	6.2	3779	29	141.1	1226
BERER	Berkó	Ludanyhalaszsi/HU	HULUD1 (0.8/3.8)	5542	4.8	3847	23	149.7	1557
BIATO	Bianchi	Mt. San Lorenzo/IT	OMSL1 (1.2/4)	6435	4.0	1705	31	179.1	1277
BOMMA	Bombardini	Faenza/IT	MARIO (1.2/4.0)	5794	3.3	739	31	226.9	2079
BREMA	Breukers	Hengelo/NL	MBB3 (0.75/6)	2399	4.2	699	25	128.7	456
BRIBE	Klemt	Herne/DE	HERMINE (0.8/6)	2374	4.2	678	16	81.1	370
CARMA	Carli	Berg. Gladbach/DE	KLEMOI (0.8/6)	2286	4.6	1080	27	146.8	1076
CASFL	Castellani	Monte Baldo/IT	BMH2 (1.5/4.5)*	4243	3.0	371	28	133.2	1642
CINFR	Cinglosso	Faenza/IT	BMH1 (0.8/6)	2350	5.0	1611	27	158.7	819
CRIST	Crivello	Valbrevenna/IT	JENNI (1.2/4)	5886	3.9	1222	31	233.7	1720
ELTMA	Eltri	Venezia/IT	ARCI (0.8/3.8)	5566	4.6	2575	31	203.5	1529
FORKE	Förster	Carlsfeld/DE	BILBO (0.8/3.8)	5458	4.2	1772	31	200.0	1853
GONRU	Goncalves	Foz do Arelho/PT	C3P8 (0.8/3.8)	5455	4.2	1586	30	182.8	1291
		Tomar/PT	STG38 (0.8/3.8)	5614	4.4	2007	31	179.2	2218
			MET38 (0.8/3.8)	5631	4.3	2151	28	167.3	1249
			AKM3 (0.75/6)	2375	5.1	2154	26	136.6	1171
			FARELHO1 (0.75/4.5)	2286	3.0	208	15	70.2	59
			TEMPLAR1 (0.8/6)	2179	5.3	1842	31	238.7	1248
			TEMPLAR2 (0.8/6)	2080	5.0	1508	31	239.4	1056
			TEMPLAR3 (0.8/8)	1438	4.3	571	30	209.7	436
			TEMPLAR4 (0.8/3.8)	4475	3.0	442	30	235.9	1280
			TEMPLAR5 (0.75/6)	2312	5.0	2259	31	197.0	947
GOVMI	Govedic	Sredisce ob Dr./SI	ORION2 (0.8/8)	1447	5.5	1841	29	158.4	882
			ORION3 (0.95/5)	2665	4.9	2069	28	176.7	665
			ORION4 (0.95/5)	2662	4.3	1043	27	164.9	618
HERCA	Hergenrother	Tucson/US	SALSA3 (0.8/3.8)	2336	4.1	544	16	113.0	421
HINWO	Hinz	Schwarzenberg/DE	HINWO1 (0.75/6)	2291	5.1	1819	30	156.9	1352
IGAAN	Igaz	Budapest/HU	HUPOL (1.2/4)	3790	3.3	475	26	128.9	327
JONKA	Jonas	Budapest/HU	HUSOR (0.95/4)	2286	3.9	445	29	182.3	752
KACJA	Kac	Kamnik/SI	HUSOR2 (0.95/3.5)	2465	3.9	715	29	177.7	895
		Kostanjevec/SI	CVETKA (0.8/3.8)	4914	4.3	1842	24	148.0	1654
		Kamnik/SI	METKA (0.8/12)*	715	6.4	640	27	149.9	523
		Ljubljana/SI	REZIKA (0.8/6)	2270	4.4	840	24	153.2	1572
		Kamnik/SI	SRAKA (0.8/6)*	2222	4.0	546	27	150.3	1144
KOSDE	Koschny	La Palma / ES	STEFKA (0.8/3.8)	5471	2.8	379	24	151.2	1161
LOJTO	Łojek	Grabniak/PL	ICC9 (0.85/25)*	683	6.7	2951	30	187.7	2347
MACMA	Maciejewski	Chelm/PL	LIC2 (3.2/50)*	2199	6.5	7512	30	171.1	2071
			PAV57 (1.0/5)	1631	3.5	269	16	99.8	705
			PAV35 (0.8/3.8)	5495	4.0	1584	30	137.1	1238
			PAV36 (0.8/3.8)*	5668	4.0	1573	28	171.3	1617
			PAV43 (0.75/4.5)*	3132	3.1	319	29	151.6	1110
			PAV40 (0.75/4.5)	2250	3.1	281	30	187.9	1594
MARRU	Marques	Lisbon/PT	CAB1 (0.75/6)	2362	4.8	1517	24	171.1	1217
MASMI	Maslov	Novosibirsk/RU	RAN1 (1.4/4.5)	4405	4.0	1241	25	150.8	800
MOLSI	Molau	Seysdorf/DE	NOWATEC (0.8/3.8)	5574	3.6	773	11	44.6	496
		Ketzür/DE	AVIS2 (1.4/50)*	1230	6.9	6152	29	155.8	2246
			ESCIMO2 (0.85/25)	155	8.1	3415	28	172.4	574
			MINCAM1 (0.8/8)	1477	4.9	1084	29	133.0	1005
			REMO1 (0.8/8)	1467	6.5	5491	30	147.6	1696
			REMO2 (0.8/8)	1478	6.4	4778	29	152.1	1425
			REMO3 (0.8/8)	1420	6.4	1967	30	173.9	1435
			REMO4 (0.8/8)	1478	6.5	5358	30	172.6	2080
MORJO	Morvai	Fülpöszallas/HU	HUFUL (1.4/5)	2522	3.5	532	23	166.0	406
MOSFA	Moschini	Rovereto/IT	ROVER (1.4/4.5)	3896	4.2	1292	27	138.7	527
NAGHE	Nagy	Budapest/HU	HUKON (0.8/3.8)	5500	4.0	1575	30	137.9	1528
		Piszkestető/HU	HUPIS (0.8/3.8)	5615	4.0	1524	30	154.3	1413
		Zamardi/HU	HUZAM (0.8/6)	2358	4.7	1266	23	145.2	525
OCHPA	Ochner	Albiano/IT	ALBIANO (1.2/4.5)	2944	3.5	358	11	59.7	253
OTTMI	Otte	Pearl City/US	ORIE1 (1.4/5.7)	3837	3.8	460	22	113.7	324
PERZS	Perkó	Becsehely/HU	HUBEC (0.8/3.8)*	5498	2.9	460	26	158.6	721
ROTEC	Rothenberg	Berlin/DE	ARMEFA (0.8/6)	2366	4.5	911	15	84.3	266
SARAN	Saraiva	Carnaxide/PT	RO1 (0.75/6)	2362	3.7	381	30	189.1	483
			RO2 (0.75/6)	2381	3.8	459	28	208.3	709
			RO3 (0.8/12)	710	5.2	619	28	214.8	660
			RO4 (1.0/8)	1582	4.2	549	28	202.9	318
			SOFIA (0.8/12)	738	5.3	907	30	154.8	468
SCALE	Scarpa	Alberoni/IT	LEO (1.2/4.5)*	4152	4.5	2052	27	165.7	476
SCHIHA	Schremmer	Niederkrüchten/DE	DORAEMON (0.8/3.8)	4900	3.0	409	27	147.2	1010
SLAPE	Slanksy	Munich/DE	SONYA7S (1.4/50)	1919	8.7	6674	2	6.7	727
SLAST	Slavec	Ljubljana/SI	KAYAK1 (1.8/28)	563	6.2	1294	27	139.9	855
STOEN	Stomeo	Scorzè/IT	KAYAK2 (0.8/12)	741	5.5	920	26	146.8	335
			MIN38 (0.8/3.8)	5566	4.8	3270	29	173.8	1921
			NOA38 (0.8/3.8)	5609	4.2	1911	29	176.5	1590
			SCO38 (0.8/3.8)	5598	4.8	3306	27	155.7	1813
STRJO	Strunk	Herford/DE	MINCAM2 (0.8/6)	2354	5.4	2751	29	144.0	1282
			MINCAM3 (0.8/6)	2338	5.5	3590	28	133.9	584
			MINCAM4 (0.8/6)	2306	5.0	1412	28	136.8	479
			MINCAM5 (0.8/6)	2349	5.0	1896	28	141.6	804
			MINCAM6 (0.8/6)	2395	5.1	2178	28	135.7	963
TEPIS	Tepliczky	Agostyan/HU	HUAGO (0.75/4.5)	2427	4.4	1036	28	183.0	1214
			HUMOB (0.8/6)	2388	4.8	1607	28	152.2	978
WEGWA	Wegrzyk	Nieznaszyn/PL	PAV78 (0.8/6)	2286	4.0	778	28	129.4	777
YRJIL	Yrjölä	Kuusankoski/FI	FINEXCAM (0.8/6)	2337	5.5	3574	25	69.6	362
ZAKJU	Zakrajsek	Petkovec/SI	PETKA (0.8/8)	1431	5.6	1955	10	66.9	438
			TACKA (0.8/12)	714	5.3	783	28	175.7	690
Sum							31	13140.5	88080

* active field of view smaller than video frame

2. Observing Times (h)

August	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
ARLRA	3.3	4.9	5.4	3.5	5.3	5.6	5.6	5.6	3.7	4.4	5.7	5.8	5.9	3.0	6.0
BERER	5.3	6.3	6.5	6.8	7.0	7.1	7.1	7.2	7.3	7.2	5.6	7.5	4.1	-	7.7
BIATO	7.3	5.6	2.5	7.6	8.0	4.1	5.1	7.8	3.6	8.1	4.3	8.2	7.0	4.1	8.3
BOMMA	7.0	7.7	7.6	7.8	7.9	7.7	4.6	7.8	8.0	7.9	8.1	8.2	7.1	0.9	8.5
BREMA	6.8	6.8	-	4.3	7.0	6.8	3.6	6.0	-	-	6.9	0.5	3.0	1.4	6.3
BRIBE	-	-	-	-	-	-	-	-	-	-	-	-	4.5	2.5	5.8
	4.7	6.3	3.7	5.8	6.5	6.7	4.3	5.6	3.1	5.5	7.2	7.2	2.7	1.0	6.0
CARMA	2.0	-	2.8	2.8	3.6	7.7	7.9	7.9	4.1	8.1	8.1	7.8	3.4	4.3	1.6
CASFL	1.6	-	2.8	1.9	4.0	7.4	7.9	8.0	2.9	8.1	8.1	8.1	3.2	4.2	1.4
CINFR	7.0	7.7	7.7	7.9	7.9	5.5	8.0	8.1	8.1	8.3	8.2	6.8	1.6	8.4	
CRIST	7.3	7.2	4.7	3.2	7.5	7.5	7.6	7.7	4.6	7.8	7.2	7.7	2.8	7.8	6.4
	7.3	7.1	4.5	1.9	7.4	7.4	7.6	7.7	4.8	7.8	7.4	7.8	2.8	7.7	6.3
	6.5	6.9	4.0	3.0	7.6	7.6	4.1	7.4	1.5	4.7	6.7	6.8	2.7	7.7	6.9
	7.3	7.3	4.7	3.0	7.5	7.6	7.4	7.5	5.3	7.8	7.2	7.1	3.2	7.7	6.7
ELTMA	1.9	4.0	5.8	7.2	6.9	7.3	6.9	6.3	4.3	6.6	7.4	8.0	1.2	-	7.3
FORKE	6.3	-	6.6	4.7	6.6	4.3	6.1	4.8	4.1	5.2	7.3	7.3	2.3	1.3	7.4
GONRU	3.2	1.2	1.0	-	-	0.5	1.9	1.6	7.8	7.5	-	-	1.9	1.7	-
	7.7	7.4	8.0	7.8	8.2	6.9	6.9	6.8	8.4	8.5	8.3	2.2	6.9	8.6	8.6
	7.3	7.6	8.2	7.9	8.3	7.0	7.1	6.8	8.5	8.5	8.6	2.2	7.3	8.7	8.7
	7.8	7.0	5.5	4.8	7.5	6.6	2.9	4.5	8.5	7.1	7.9	0.6	3.3	8.5	7.8
	8.1	6.9	7.3	7.4	8.1	6.6	7.5	6.2	8.5	8.5	8.5	1.6	6.9	8.7	8.7
	7.1	5.2	5.1	6.2	7.1	6.9	3.4	5.2	8.4	7.2	7.8	1.2	3.5	8.4	7.2
GOVMI	2.2	5.0	1.5	7.2	6.0	7.3	3.4	2.1	7.5	-	2.2	7.7	6.8	1.0	7.8
	2.5	6.0	7.4	7.5	5.2	7.6	7.3	7.7	7.7	-	4.0	7.9	7.9	-	8.1
	1.9	4.4	6.9	7.0	4.8	7.1	4.8	6.5	7.3	-	2.7	7.4	7.4	-	5.8
HERCA	8.9	-	-	8.7	9.1	8.3	-	-	-	3.0	1.5	0.5	7.8	9.3	-
HINWO	6.4	6.2	6.0	5.6	6.8	6.9	6.2	5.2	4.9	5.5	7.2	7.3	2.2	1.7	6.9
IGAAN	1.6	4.4	6.7	3.6	6.4	6.4	4.9	-	-	1.9	6.5	7.1	6.6	2.8	5.0
JONKA	1.0	5.2	7.2	7.0	6.5	7.4	5.8	7.4	7.6	2.7	7.5	7.6	7.7	1.7	5.8
KACJA	1.8	-	6.6	3.1	4.0	7.1	7.4	7.6	7.7	1.6	3.3	7.8	4.7	-	5.0
	-	6.3	7.2	7.5	5.0	7.6	5.1	6.9	7.9	1.7	3.6	8.1	6.7	5.3	8.3
	1.8	-	6.6	6.8	3.7	7.4	7.6	7.7	7.8	2.0	3.0	8.0	3.9	-	5.2
	2.4	1.8	7.0	5.9	0.2	3.6	7.3	6.7	7.6	4.9	1.6	7.8	2.4	1.0	7.1
	1.9	-	6.8	7.0	4.3	7.3	7.5	7.6	7.6	1.5	2.4	8.0	2.8	-	4.6
KOSDE	4.0	4.5	5.1	4.1	7.0	7.5	8.5	-	8.6	8.7	8.7	1.7	0.4	7.2	8.8
	7.2	6.4	6.9	2.9	6.0	6.8	6.7	-	7.3	7.2	7.4	1.4	0.3	5.4	6.7
LOTJO	6.3	-	5.5	5.3	6.0	5.8	-	7.1	7.0	-	-	-	7.5	4.4	-
MACMA	5.2	6.0	5.0	6.3	6.4	6.5	6.9	4.7	5.8	0.5	1.1	7.1	7.1	1.7	6.6
	6.4	6.8	6.7	6.7	6.8	6.9	6.9	6.4	7.1	1.4	1.6	7.5	-	3.5	7.5
	2.2	2.4	2.1	2.4	4.6	5.4	5.9	5.5	5.8	0.6	-	7.3	7.4	1.8	4.5
	6.4	6.3	6.6	6.3	6.7	6.8	6.9	6.7	0.8	2.7	7.2	7.3	3.4	7.4	
MARRU	5.6	2.7	6.9	7.6	8.0	8.1	8.1	6.4	8.2	8.2	8.2	4.4	8.3	8.3	6.1
	2.7	0.2	0.8	-	-	-	-	0.3	5.9	8.2	8.2	3.1	4.0	8.3	8.6
MASMI	-	4.2	5.0	-	1.4	-	5.4	5.5	5.6	5.2	-	-	-	-	-
MOLSI	2.5	5.6	5.6	6.3	6.4	5.4	5.9	6.6	0.2	5.3	6.8	6.8	3.5	4.0	7.0
	3.7	6.6	5.7	6.9	6.9	5.1	6.8	7.0	-	6.4	7.3	7.4	3.1	4.2	7.5
	0.9	4.5	5.1	5.6	6.7	4.6	6.8	7.1	0.2	5.1	7.2	7.0	3.2	4.1	7.2
	1.4	4.9	5.4	3.1	5.7	5.7	5.7	5.9	3.7	5.6	5.8	6.1	6.2	3.0	6.4
	1.7	5.1	5.6	3.7	5.9	5.9	5.4	6.0	4.8	5.7	6.2	6.4	6.2	3.3	6.6
	1.9	5.7	6.3	4.5	6.5	6.6	6.6	6.7	4.5	6.3	6.5	7.0	7.1	3.6	7.2
	-	5.8	6.3	5.0	6.5	6.6	6.2	6.7	5.1	6.1	6.6	7.0	6.8	3.9	7.2
MORJO	-	4.7	7.2	7.2	6.3	7.2	6.9	-	-	-	-	-	7.9	4.6	7.6
MOSFA	-	-	3.6	1.9	2.4	6.2	7.9	7.9	2.8	8.0	6.7	7.9	1.6	4.1	1.4
NAGHE	1.4	4.8	7.2	6.1	5.3	5.4	3.9	5.8	5.6	1.5	7.6	7.6	7.5	3.9	4.0
	3.5	6.3	5.7	6.3	6.1	4.7	6.1	5.6	6.1	6.0	5.8	7.2	7.5	2.5	6.4
	1.2	5.8	7.4	7.5	6.4	6.6	3.9	-	-	-	-	-	6.1	1.4	-
OCHPA	-	-	-	3.7	-	7.8	5.2	-	-	5.5	7.3	-	-	-	0.5
OTTMI	7.9	5.6	3.4	-	-	2.2	8.1	4.6	8.1	8.3	8.0	8.4	1.7	2.2	1.1
PERZS	-	4.8	6.4	7.2	7.2	7.3	4.9	7.1	5.8	-	3.0	7.7	7.7	1.7	7.9
ROTEC	-	-	-	-	-	-	-	-	-	-	-	-	5.8	-	7.2
SARAN	1.2	2.1	2.8	1.3	1.8	2.6	7.4	1.8	8.7	8.7	8.7	6.0	5.3	7.5	9.0
	5.4	6.9	7.5	7.3	8.0	4.8	7.7	2.8	8.8	8.6	-	5.6	6.4	8.6	8.5
	6.7	7.7	8.1	6.1	7.9	5.9	8.1	5.2	8.5	8.2	-	6.4	5.8	8.2	8.3
	5.2	7.5	6.5	4.7	7.3	3.1	5.0	1.9	8.8	8.6	-	4.6	6.1	8.6	8.7
	0.8	0.9	1.1	1.3	1.1	1.7	4.1	0.7	4.2	8.7	8.5	5.4	3.8	7.4	8.6
SCALE	1.9	4.0	5.5	7.0	3.1	7.4	7.2	6.0	3.6	6.5	7.7	8.0	1.0	-	6.2
SCHHA	6.7	6.7	4.7	5.0	6.9	6.1	1.5	6.9	3.0	4.1	7.3	3.0	4.7	3.4	7.6
SLAPE	-	-	-	-	-	-	-	-	-	-	3.3	3.4	-	-	-
SLAST	1.0	4.7	6.2	6.3	1.5	6.3	6.3	6.3	3.6	3.6	2.7	6.3	2.5	0.6	6.2
	1.5	4.5	6.8	6.8	1.8	6.8	6.8	6.8	4.2	3.2	6.8	2.7	0.2	6.8	
STOEN	1.7	5.2	6.5	7.3	1.7	7.5	7.3	6.7	3.8	5.7	7.5	7.6	1.7	-	5.7
	0.9	5.4	1.2	0.4	1.9	7.4	7.5	7.6	3.9	5.9	8.1	8.2	1.9	-	5.2
	1.0	5.8	6.0	6.5	2.6	6.5	7.5	6.5	3.2	5.0	7.2	8.2	1.6	-	5.8
STRJO	2.7	6.2	6.3	4.0	6.6	6.6	6.6	5.7	3.2	5.5	7.0	6.6	3.5	2.1	1.1
	1.7	6.2	6.3	4.0	6.4	6.3	6.2	4.8	2.9	5.3	6.7	5.9	2.2	0.9	-
	2.8	6.3	6.4	3.9	6.6	6.6	6.4	5.4	3.0	5.5	6.7	6.9	2.6	1.3	1.4
	1.9	6.1	6.3	4.3	6.6	6.3	6.4	5.4	3.2	5.5	7.0	6.0	3.2	2.1	1.3
	2.1	6.2	6.3	3.9	6.4	6.2	6.4	5.8	2.8	5.6	7.0	6.5	2.8	2.0	-
TEPIS	2.5	5.5	7.0	7.0	7.1	7.1	2.4	7.3	7.3	0.7	7.4	7.5	7.6	0.3	7.7
	1.8	2.4	6.7	6.9	3.4	6.9	2.9	6.9	7.0	0.4	7.0	7.5	7.4	0.3	7.5
WEGWA	5.8	2.8	4.8	0.8	2.6	6.6	5.2	4.2	6.9	-	5.1	7.0	6.4	3.4	4.4
YRJIL	2.4	1.9	1.9	-	-	2.1	3.5	3.7	3.4	3.8	1.3	1.9	1.5	1.3	1.0
ZAKJU	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	4.3	5.7	7.0	7.4	2.4	7.5	6.8	6.7	7.7	5.3	3.6	7.8	1.7	0.4	8.0
Sum	290.9	377.5	434.9	408.4	433.5	490.1	472.2	449.3	428.6	391.7	443.6	483.5	373.8	272.6	478.4

August	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
ARLRA	6.2	2.1	6.3	6.4	1.9	6.1	6.4	3.4	-	5.9	2.8	-	6.4	6.3	3.5	3.7
BERER	7.6	5.1	3.7	5.7	-	6.6	6.5	-	-	-	5.6	8.3	-	7.9	-	-
BIATO	8.6	2.0	5.3	8.5	8.7	8.4	7.2	8.7	6.4	0.6	0.9	2.4	8.0	7.7	3.6	0.5
BOMMA	8.5	8.5	7.8	8.5	8.7	8.7	8.6	8.6	7.0	0.1	8.3	9.0	9.0	8.8	9.2	0.8
BREMA	3.5	7.9	3.4	-	6.7	8.0	8.1	2.9	1.3	1.8	-	-	8.7	0.3	8.8	7.9
BRIBE	5.5	7.2	7.6	1.3	4.2	4.1	6.5	3.8	-	8.1	-	0.4	8.2	-	4.4	7.0
	7.1	7.5	7.6	3.5	-	4.0	7.1	4.5	-	7.5	-	2.4	8.0	-	2.9	8.4
CARMA	6.1	4.4	5.9	4.1	1.0	5.7	4.1	2.8	-	0.8	5.4	7.1	6.6	4.8	2.3	-
CASFL	8.4	7.4	8.0	8.0	3.3	8.6	6.9	3.9	-	-	6.7	9.0	9.0	5.8	4.1	-
CINFR	8.5	8.5	8.4	8.6	8.7	8.7	8.7	8.7	7.9	2.3	8.8	9.0	9.0	8.8	9.2	0.8
CRIST	8.1	5.5	8.2	4.7	8.3	8.4	8.4	8.5	5.4	2.3	8.6	8.7	8.8	8.3	3.7	0.6
	8.1	6.0	8.2	5.0	8.3	8.4	8.4	8.5	2.0	1.4	8.7	8.7	8.8	8.5	3.8	0.3
	8.1	5.3	8.2	5.5	8.2	8.4	8.4	8.5	2.0	1.4	8.7	8.7	8.8	6.1	-	2.4
	8.1	5.7	8.2	5.0	8.3	8.4	8.4	3.8	1.2	0.3	1.4	1.5	8.8	8.8	3.8	0.2
ELTMA	8.3	8.4	7.7	6.5	5.5	6.0	7.7	4.2	0.5	-	4.8	7.4	7.5	8.3	3.4	-
FORKE	7.5	-	7.4	7.8	-	7.1	7.4	1.3	-	0.9	6.2	4.4	8.1	3.3	0.9	-
GONRU	-	7.6	8.5	8.4	8.5	-	-	-	-	-	-	-	-	-	-	8.9
	8.0	8.7	8.8	8.8	8.8	8.8	8.9	5.3	8.9	8.9	9.0	5.9	1.3	9.1	9.2	9.1
	7.8	8.8	8.9	8.9	8.9	8.4	9.0	5.4	9.1	9.1	9.2	4.8	0.3	9.3	9.4	9.4
	5.3	8.7	8.8	8.8	8.7	8.5	8.8	4.1	8.8	8.8	8.9	4.0	-	8.8	9.2	9.2
	7.4	8.8	8.9	8.9	8.9	8.5	9.0	5.3	9.1	9.0	9.2	5.4	-	9.3	9.3	9.4
GOVMI	4.8	8.4	8.6	8.6	8.8	7.9	8.7	3.1	8.6	7.0	8.8	2.0	0.4	4.2	8.5	8.7
	7.9	7.9	6.4	8.0	5.6	8.2	8.2	7.0	0.7	-	2.2	8.2	8.5	8.6	3.1	0.2
	8.1	8.2	8.2	8.3	3.2	8.4	8.5	8.1	1.9	-	2.5	8.0	2.2	8.7	3.3	2.3
	7.7	7.7	7.8	7.8	7.9	7.9	8.0	5.9	-	-	3.2	7.8	8.4	7.9	2.0	0.9
HERCA	-	-	-	-	9.5	-	-	-	-	-	9.4	6.0	9.3	9.8	2.1	9.8
HINWO	7.3	0.5	7.5	7.8	5.7	5.3	7.7	0.5	-	2.5	7.7	4.0	8.3	5.1	1.4	0.6
IGAAN	6.8	1.7	7.3	7.3	4.4	7.7	6.8	0.6	-	1.4	-	7.4	7.1	1.0	-	5.5
JONKA	8.0	8.0	7.1	7.2	5.3	8.1	8.3	0.2	0.8	-	-	8.6	8.7	8.7	7.4	7.8
KACJA	8.0	8.1	8.3	6.6	3.8	6.2	6.1	7.9	-	-	-	8.3	8.7	8.3	-	-
	8.3	6.4	-	6.2	7.5	6.1	8.6	5.8	0.3	-	1.1	3.7	2.8	5.4	0.5	-
	8.2	8.3	8.1	6.7	4.1	6.3	6.6	8.0	-	-	-	8.6	8.5	8.3	-	-
	7.0	6.5	8.2	8.2	5.2	8.2	6.9	7.7	-	-	0.8	8.1	8.4	7.8	-	-
KOSDE	8.1	8.2	8.3	6.7	3.9	6.4	6.6	7.9	-	-	-	8.7	8.7	8.4	-	-
	8.8	8.9	8.9	9.0	8.5	7.5	6.5	5.6	5.1	4.6	4.3	3.7	4.3	3.8	4.5	-
LOTJO	7.2	7.5	6.8	7.3	6.8	6.2	5.7	4.0	4.1	4.5	4.6	5.0	6.1	5.6	5.8	5.3
MACMA	6.5	3.2	3.5	6.4	4.0	6.3	6.3	7.6	1.6	0.4	-	6.5	1.5	1.9	2.4	2.1
	7.7	-	7.0	7.8	3.9	7.9	8.1	8.1	3.3	0.7	-	8.4	3.6	8.5	8.4	5.7
	6.8	7.2	7.4	7.4	4.1	7.6	7.7	7.7	2.9	1.2	-	8.0	3.8	8.2	8.1	5.6
MARRU	7.5	7.6	7.6	7.7	4.3	7.9	7.9	8.0	4.0	1.2	-	8.3	4.5	8.4	8.5	6.1
	4.7	8.3	8.4	8.4	4.0	8.4	6.9	8.5	-	-	-	-	-	-	-	-
MASMI	-	8.3	8.7	8.7	8.5	7.7	7.8	7.5	8.2	4.2	7.8	2.3	-	5.0	8.4	7.4
MOLSI	-	-	2.8	6.5	0.7	-	2.3	-	-	-	-	-	-	-	-	-
	7.1	7.1	6.8	7.2	7.4	6.0	6.2	5.1	2.7	-	7.5	0.6	7.9	0.8	5.5	-
	7.6	7.7	7.7	7.8	7.9	7.9	6.7	6.2	1.8	-	8.2	2.1	8.4	2.0	5.8	-
	7.2	7.5	5.0	6.1	7.8	4.8	2.0	3.5	0.4	-	4.7	0.2	5.8	1.3	1.4	-
	6.3	4.7	6.6	6.5	0.3	6.8	6.8	2.9	1.4	6.9	3.3	-	6.9	4.7	3.4	5.5
	6.6	5.4	6.7	6.8	-	6.9	6.9	3.1	1.4	6.8	2.2	-	7.1	4.5	3.8	5.4
	7.3	6.1	7.4	7.5	0.6	7.7	7.7	3.9	1.4	8.0	4.6	-	8.2	5.4	4.2	6.9
MORJO	7.3	5.8	7.4	7.5	0.9	7.7	7.7	3.4	1.4	8.0	3.6	0.8	8.1	5.1	4.7	7.4
MOSFA	7.9	8.0	8.1	8.1	8.2	8.1	8.2	5.1	4.3	-	-	8.5	8.5	8.7	6.5	8.2
NAGHE	6.6	5.6	4.3	4.3	0.4	7.9	3.4	3.1	-	0.7	7.3	9.1	9.1	7.7	6.8	-
	5.8	5.1	4.4	3.5	2.1	2.6	3.2	0.8	1.1	0.6	-	8.6	5.5	8.7	4.1	4.2
	7.0	5.2	6.1	4.4	2.3	2.9	4.0	0.5	1.9	0.5	-	8.6	5.3	4.1	7.0	8.7
	8.2	7.6	8.3	8.3	7.4	7.8	5.9	4.6	2.1	-	4.1	8.7	8.1	8.8	9.0	-
OCHPA	-	-	-	-	4.7	-	-	-	-	-	6.4	7.2	6.4	5.0	-	-
OTTMI	3.6	8.1	1.0	-	3.8	8.8	2.3	-	4.2	-	6.1	-	6.2	-	-	-
PERZS	8.0	8.0	8.0	8.1	7.9	8.1	8.4	5.5	1.0	-	1.2	8.3	-	-	3.6	3.8
ROTEC	7.2	0.7	7.4	7.3	1.2	7.5	7.6	3.5	-	6.7	3.3	-	7.1	7.8	-	4.0
SARAN	7.1	8.7	7.6	8.7	8.7	8.8	8.7	8.4	9.1	6.3	6.4	3.3	-	6.8	7.1	8.5
	6.5	-	8.4	8.6	8.5	8.4	7.4	8.5	8.6	9.0	9.0	-	1.4	8.9	9.3	8.9
	7.3	8.3	-	8.3	8.3	8.4	8.4	8.4	8.5	8.9	9.0	-	2.9	9.0	9.0	9.0
	2.5	8.6	8.5	8.4	8.7	8.7	8.5	8.3	8.8	9.0	9.3	-	-	8.4	9.2	9.4
SCALE	8.2	8.3	8.3	8.1	6.2	6.3	8.5	5.9	-	-	8.6	-	8.8	8.3	4.2	0.9
SCHHA	3.9	7.0	7.5	2.3	-	5.8	7.7	2.6	-	8.0	-	5.3	8.1	-	4.1	7.3
SLAPE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SLAST	7.3	7.7	7.8	7.0	3.9	7.2	5.7	4.4	-	-	0.4	7.0	7.0	7.7	-	-
	7.9	8.2	8.2	7.2	6.0	-	5.9	8.1	-	-	0.3	7.2	7.2	8.1	-	-
STOEN	7.6	8.0	8.0	8.1	6.6	6.6	7.9	5.8	1.0	-	7.7	8.9	9.0	8.4	4.1	0.2
	8.2	8.4	8.5	8.5	8.3	8.2	8.4	7.7	2.2	-	8.8	9.0	9.1	8.9	6.0	0.8
STRJO	4.1	7.2	8.3	8.2	6.8	8.2	7.8	5.8	1.2	-	-	-	8.8	8.5	6.5	0.9
	6.9	7.4	7.5	3.0	0.6	4.8	6.9	4.1	1.4	7.5	-	0.3	8.1	-	6.4	5.4
	6.4	7.3	7.4	2.3	0.5	5.3	5.2	4.1	1.7	7.9	-	0.4	8.1	-	5.9	5.6
	6.1	7.4	7.5	2.8	0.8	4.6	5.8	4.5	2.5	7.8	-	-	8.2	-	1.6	5.4
	6.3	7.4	7.5	3.0	0.7	4.8	7.6	4.3	2.3	6.9	-	-	7.8	-	6.1	5.3
TEPIS	6.3	7.4	7.3	2.4	0.9	4.0	6.4	3.7	0.9	7.7	0.2	-	8.0	-	6.0	4.5
	7.5	7.8	7.9	7.7	7.2	8.0	8.1	5.3	-	-	-	8.4	8.5	8.5	6.0	7.7
	7.7	7.7	7.8	3.4	3.2	2.4	6.5	1.4	-	-	-	8.3	8.5	8.5	4.3	7.5
WEGWA	5.1	7.2	6.5	6.2	7.3	5.5	2.5	3.2	0.4	-	7.1	2.7	1.9	7.6	0.2	-
YRJIL	4.9	4.1	4.5	4.7	-	5.6	0.6	1.4	0.7	-	-	4.1	4.6	2.4	-	2.3
ZAKJU	-	-	-	7.6	8.2	8.3	8.4	8.1	-	-	0.2	7.6	7.7	7.7	3.1	-
	8.1	8.0	7.9	7.8	7.3	8.3	8.3	8.0	-	-	1.7	8.8	8.7	8.7	1.8	-
Sum	546.8	533.5	562.9	534.3	428.5	550.7	567.4	409.1	203.6	218.9	298					

3. Results (Meteors)

August	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
ARLRA	12	50	51	24	53	79	55	66	40	53	80	156	53	13	62
BERER	30	47	43	60	69	79	64	75	74	45	178	401	53	-	57
BIATO	40	5	27	22	41	36	45	71	48	75	77	238	98	19	54
BOMMA	47	78	77	68	66	92	32	85	84	140	85	271	172	8	90
BREMA	24	20	-	21	32	30	8	33	-	-	45	2	12	6	29
BRIBE	-	-	-	-	-	-	-	-	-	-	-	41	19	54	
	37	44	17	31	48	70	28	37	11	53	108	234	27	3	61
CARMA	7	-	28	13	28	36	88	85	39	131	121	267	37	74	14
CASFL	5	-	28	3	12	37	53	61	15	67	46	113	26	34	1
CINFR	30	69	57	71	45	58	14	60	70	116	152	289	160	10	77
CRIST	62	54	13	10	63	72	62	90	48	90	133	222	37	77	47
	59	47	13	9	75	77	81	72	55	114	186	315	86	136	40
	46	44	18	22	53	65	22	68	8	41	114	180	37	101	53
	85	78	27	13	57	85	122	100	73	128	176	281	96	153	84
ELTMA	2	24	72	48	21	51	56	66	51	55	88	241	14	-	62
FORKE	41	-	39	21	60	60	72	59	34	72	118	227	41	7	69
GONRU	3	7	2	-	-	2	10	3	10	10	-	-	1	2	-
	38	13	19	25	35	36	45	41	64	71	106	9	43	87	52
	31	20	22	15	17	27	36	51	48	75	91	8	46	73	47
	17	8	6	6	10	11	6	8	25	18	54	1	12	33	14
	34	23	21	15	28	44	52	40	84	78	144	21	69	90	56
	15	6	4	13	12	39	14	45	98	56	127	18	28	101	33
GOVMI	1	10	9	28	28	36	30	17	37	-	32	180	125	8	45
	2	15	25	22	12	41	25	24	37	-	22	147	101	-	32
	1	5	21	23	16	32	23	17	34	-	30	140	123	-	17
HERCA	31	-	-	41	34	37	-	-	-	5	4	2	67	55	-
HINWO	46	36	35	35	71	74	57	59	48	78	122	223	53	11	74
IGAAN	4	13	8	11	19	11	15	-	-	6	34	68	40	4	16
JONKA	2	20	12	20	19	31	26	29	54	11	67	135	104	9	26
	4	20	40	28	37	33	24	35	47	9	86	192	133	5	33
KACJA	2	-	52	47	37	75	58	65	121	4	47	409	79	-	72
	-	15	13	24	11	26	23	37	22	7	17	64	37	15	29
	2	-	48	75	36	79	79	84	101	7	23	300	69	-	71
	13	7	48	54	1	35	44	53	85	24	6	287	16	6	71
KOSDE	38	67	57	22	96	76	79	-	145	161	121	10	3	100	148
	77	79	88	21	80	83	96	-	111	127	103	12	5	78	96
LOTJO	38	-	38	39	55	47	-	61	55	-	-	-	125	23	-
MACMA	39	30	27	35	32	79	69	49	97	3	7	237	150	11	72
	53	53	57	53	51	79	73	102	102	11	12	365	-	27	85
	16	13	16	13	26	45	44	59	65	3	-	271	166	12	29
	45	55	43	44	47	58	67	86	74	2	8	237	155	28	74
MARRU	21	6	13	14	23	42	71	61	102	94	120	60	153	96	33
	8	1	3	-	-	-	-	2	57	75	133	42	29	87	54
MASMI	-	54	58	-	18	-	81	82	69	56	-	-	-	-	-
MOLSI	26	64	73	84	84	109	136	1	72	190	298	92	100	87	
	6	8	17	20	13	12	23	41	-	21	49	89	9	15	22
	5	17	25	29	34	16	36	71	1	37	113	231	44	46	30
	3	62	62	23	82	81	44	66	42	69	142	166	158	30	69
	2	55	62	20	80	75	37	60	46	68	109	164	124	26	68
	7	42	65	31	66	70	28	43	39	67	76	128	116	39	54
	-	58	99	40	109	123	30	85	65	80	159	187	186	36	90
MORJO	-	22	11	28	20	24	23	-	-	-	-	-	83	25	13
MOSFA	-	-	17	4	3	23	40	31	8	38	38	100	9	36	1
NAGHE	9	38	49	52	66	52	43	62	78	12	127	290	223	36	42
	20	48	30	48	53	33	59	57	64	66	82	235	182	22	62
	9	16	37	33	31	20	21	-	-	-	-	137	3	-	
OCHPA	-	-	-	9	-	26	28	-	-	27	87	-	-	2	
OTTMI	21	7	12	-	-	5	11	18	27	29	47	52	3	10	7
PERZS	-	24	24	45	57	51	32	20	28	-	13	103	97	2	41
ROTEC	-	-	-	-	-	-	-	-	-	-	-	41	-	37	
SARAN	9	14	19	8	9	14	34	4	24	25	47	50	14	37	17
	9	12	12	11	9	12	50	9	55	63	-	85	47	51	41
	10	8	8	7	10	9	50	13	40	67	-	73	22	50	34
	7	4	2	2	6	12	9	4	30	33	-	27	31	30	24
	5	5	7	6	7	12	36	4	29	35	53	53	15	33	20
SCALE	1	10	13	10	12	19	13	15	18	22	48	107	8	-	24
SCHHA	44	34	38	14	70	39	6	76	32	43	124	56	73	36	88
SLAPE	-	-	-	-	-	-	-	-	-	-	276	451	-	-	-
SLAST	1	22	32	45	6	49	45	25	43	24	20	157	24	2	41
	1	10	17	13	8	20	18	15	16	14	6	44	7	1	18
STOEN	5	62	79	51	11	79	77	93	84	57	146	331	21	-	84
	2	61	3	3	11	75	66	83	72	48	141	282	33	-	61
	2	79	61	53	23	65	76	88	65	49	148	363	22	-	99
STRJO	15	74	55	30	75	80	47	42	17	81	130	216	39	14	4
	7	25	34	18	35	43	17	20	11	32	54	101	12	6	-
	10	22	29	7	16	31	23	15	17	25	36	81	10	7	3
	9	40	38	21	56	50	27	31	21	38	63	139	22	7	2
	9	31	41	33	63	51	26	42	19	68	87	209	28	9	-
TEPIS	9	30	43	43	58	55	14	62	52	4	117	223	127	2	52
	14	16	24	35	10	39	14	37	51	2	87	202	100	1	46
WEGWA	21	12	19	7	15	47	36	27	50	-	83	119	114	31	25
YRJIL	17	8	4	-	-	17	28	29	11	21	5	22	19	4	3
ZAKJU	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	16	25	30	31	13	29	30	11	45	23	15	108	8	1	44
Sum	1442	2201	2528	2118	2829	3631	3306	3661	3711	3509	6101	12820	5254	2369	3535

August	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
ARLRA	56	8	42	61	5	43	52	13	-	19	10	-	20	25	15	10
BERER	83	29	9	31	-	20	35	-	-	-	-	19	30	-	26	-
BIATO	64	21	20	33	35	31	25	35	25	4	6	16	27	19	19	1
BOMMA	87	65	49	34	51	56	25	40	37	1	55	56	42	54	30	2
BREMA	5	37	4	-	13	26	15	13	2	6	-	-	29	1	20	23
BRIBE	22	33	26	2	26	15	9	13	-	46	-	1	22	-	12	29
	37	32	35	7	-	27	14	11	-	37	-	9	26	-	5	27
CARMA	70	57	65	43	8	72	39	29	-	7	68	73	73	49	21	-
CASFL	33	28	28	28	7	28	19	18	-	-	25	45	33	21	5	-
CINFR	58	34	32	32	30	30	29	24	28	2	32	29	29	34	18	1
CRIST	56	42	39	15	49	34	35	30	10	6	28	31	44	22	5	3
	69	56	48	17	52	40	34	43	6	5	31	23	29	25	8	2
	56	35	39	21	42	26	20	21	6	4	33	35	53	20	-	8
	87	81	73	35	84	64	57	29	9	2	9	10	62	45	12	1
ELTMA	65	41	38	29	35	37	29	18	3	-	24	27	27	19	6	-
FORKE	59	-	18	59	-	20	29	4	-	3	15	6	35	2	1	-
GONRU	-	2	2	2	1	-	-	-	-	-	-	-	-	-	-	2
	30	56	56	32	41	48	38	10	54	36	39	13	4	36	34	37
	37	46	54	39	34	26	25	7	32	25	32	6	1	16	35	34
	6	22	12	22	10	10	22	1	19	23	7	6	-	12	17	18
	32	27	66	43	31	38	27	9	48	34	27	17	-	15	38	29
	19	40	33	23	37	35	20	4	22	22	35	1	1	2	22	22
GOVMI	44	37	18	32	22	23	30	12	4	-	11	27	18	15	2	1
	26	16	19	18	5	9	15	12	2	-	3	12	6	13	3	1
	15	14	19	14	8	9	13	7	-	-	7	6	9	9	1	5
HERCA	-	-	-	-	20	-	-	-	-	-	27	25	18	27	1	27
HINWO	56	4	34	70	22	13	46	3	-	4	22	10	32	8	3	3
IGAAN	18	3	8	13	5	4	2	1	-	1	-	9	6	2	-	6
JONKA	36	13	17	17	11	16	6	1	2	-	-	14	22	13	8	11
	30	22	14	24	4	16	18	2	1	-	-	7	6	10	8	7
KACJA	91	63	74	76	21	48	59	37	-	-	-	41	34	42	-	-
	35	23	-	21	19	15	18	16	1	-	7	11	5	10	2	-
	126	81	63	75	24	46	48	37	-	-	-	41	27	30	-	-
	46	35	52	36	17	48	33	30	-	-	3	36	35	23	-	-
	83	44	47	32	5	37	37	30	-	-	-	24	20	25	-	-
KOSDE	125	144	107	116	112	103	99	74	75	50	29	52	36	41	23	38
	97	100	87	92	83	69	58	44	47	36	42	48	64	52	48	48
LOTJO	48	55	-	-	-	-	34	27	-	-	-	11	-	-	3	46
MACMA	62	32	31	30	10	17	33	14	4	4	-	16	11	12	14	11
	78	-	54	53	20	43	50	50	20	6	-	30	19	25	29	17
	28	28	37	25	14	29	31	31	12	4	-	28	10	25	22	8
	64	60	43	44	17	50	70	35	17	6	-	44	14	40	36	31
MARRU	33	50	46	33	43	10	40	19	34	-	-	-	-	-	-	-
	-	36	36	32	28	23	22	16	23	22	22	4	-	11	24	10
MASMI	-	-	24	43	1	-	10	-	-	-	-	-	-	-	-	-
MOLSI	115	92	84	98	84	93	30	49	15	-	57	4	29	5	33	-
	30	24	25	15	31	27	12	21	5	-	18	3	10	4	4	-
	54	31	28	17	35	22	5	12	2	-	37	1	15	6	5	-
	75	21	71	76	1	66	61	12	2	50	31	-	43	28	23	37
	64	22	46	66	-	71	52	10	6	21	6	-	14	9	6	36
	85	28	61	61	2	57	47	16	2	51	19	-	43	28	25	39
	101	43	93	99	5	79	63	16	4	53	11	1	54	21	34	56
MORJO	22	12	10	17	14	12	8	4	3	-	-	14	13	15	4	9
MOSFA	21	18	8	8	1	16	5	7	-	2	22	26	19	15	11	-
NAGHE	55	28	34	29	16	17	31	6	7	3	-	35	18	23	22	25
	69	26	34	31	19	17	25	3	5	3	-	46	18	13	12	31
	27	20	15	15	15	18	12	12	2	-	6	28	12	16	20	-
OCHPA	-	-	-	-	9	-	-	-	-	-	20	14	18	13	-	-
OTTMI	6	20	3	-	9	12	1	-	6	-	11	-	7	-	-	-
PERZS	37	20	17	12	20	16	10	18	7	-	8	9	-	5	5	-
ROTEC	33	1	23	44	2	23	27	4	-	15	2	-	7	6	-	1
SARAN	7	15	13	18	11	12	15	9	17	8	6	1	-	4	14	8
	15	-	31	19	16	10	17	18	21	24	17	-	3	14	20	18
	24	19	-	16	19	18	18	15	26	22	22	-	2	10	25	23
	5	7	4	4	5	11	7	5	10	7	6	-	-	4	13	9
	10	13	15	12	10	13	10	8	8	5	10	-	2	1	20	11
SCALE	15	21	13	12	13	11	11	7	-	-	13	-	16	15	8	1
SCHHA	10	38	39	8	-	10	26	10	-	31	-	20	24	-	3	18
SLAPE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SLAST	63	41	39	38	15	35	29	12	-	-	2	14	16	15	-	-
	25	17	12	14	7	-	9	9	-	-	2	9	9	14	-	-
STOEN	99	93	74	56	62	64	36	28	6	-	53	57	45	47	20	1
	70	75	61	58	63	36	41	28	4	-	51	56	38	43	22	3
	73	69	83	58	53	65	38	27	4	-	-	-	57	66	22	5
STRJO	44	70	45	10	5	32	13	10	12	45	-	1	23	-	30	23
	24	27	22	3	2	8	10	11	3	15	-	2	12	-	17	13
	15	26	18	4	2	10	6	9	3	25	-	-	16	-	4	9
	26	59	28	10	4	11	11	8	6	31	-	-	13	-	21	12
	45	42	34	6	4	9	9	10	2	31	1	-	21	-	18	15
TEPIS	43	28	33	27	24	23	22	9	-	-	-	41	13	22	20	18
	38	21	29	29	21	18	26	12	-	-	-	28	22	25	13	18
WEGWA	22	29	17	19	18	15	8	5	1	-	15	1	9	11	1	-
YRJIL	23	17	36	9	-	32	1	12	3	-	-	9	19	11	-	2
ZAKJU	-	-	-	67	71	70	70	44	-	-	2	49	29	29	7	-
	33	22	34	24	21	26	28	10	-	-	6	23	13	18	3	-
Sum	3695	2807	2850	2613	1802	2448	2220	1376	735	857	1103	1411	1701	1401	1081	965