Results of the IMO Video Meteor Network – April 2017

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In April, the IMO video observers enjoyed very good observing conditions. Two thirds of the cameras collected data in twenty and more observing nights, and three observers managed to record meteors in every night. As usual, the weather was particularly favourable to the southern European observers, whereas it remained mediocre in eastern Europe.
After a longer break we obtained data from the Italian camera ALBIANO in April, but still the number of active cameras decreased to 73. Particularly painful was the failure of all four highly sensitive cameras of Detlef Koschny at the Canary Islands. Starting from April they experienced a maintenance downtime for more than half a year because of problems with the closing mechanism of the camera housings. Despite of this, we still recorded over 16,000 meteors in more than 8,200 hours of effective observing time thanks to the good weather, which is a comparable output to 2014 and 2016.

The Lyrids are the most important meteor shower in April. This year their maximum occurred in the days before new moon, but the time of peak activity (32.3° solar longitude) fell into the European daytime hours. In the past, the maximum time varied by up to a few hours, but figure 1 confirms that the European cameras indeed missed the peak in 2017. Whereas the flux density strongly increased in the morning of April 22, it declined already in the same evening. The peak flux density was only 2.5 meteoroids per 1,000 km^2 and hour.

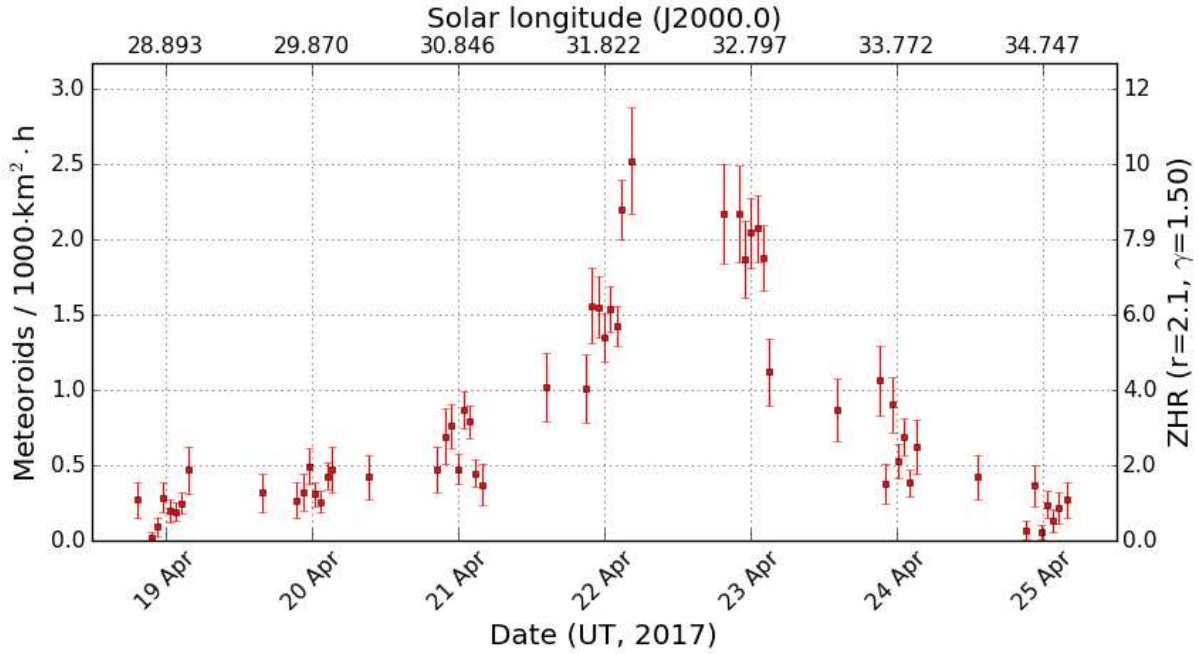

Figure 1: *Flux density profile of the Lyrids in April 2017, derived from video data of the IMO Network.*

Figure 2 compares the activity profile of 2017 (red) with the years 2011 till 2016 (green). Whereas the descending branch matches quite well, we see a significant deviation in the night prior to the peak. It seems that the peak occurred slightly later than usual and maybe it was also a bit weaker.

Visual observations of IMO confirm, that the peak fell into the European daytime hours, but due to data sparsity the exact peak time could not be determined more accurately. According to the IMO Quick Look Analysis, maximum activity was at the lower end of the typical range.

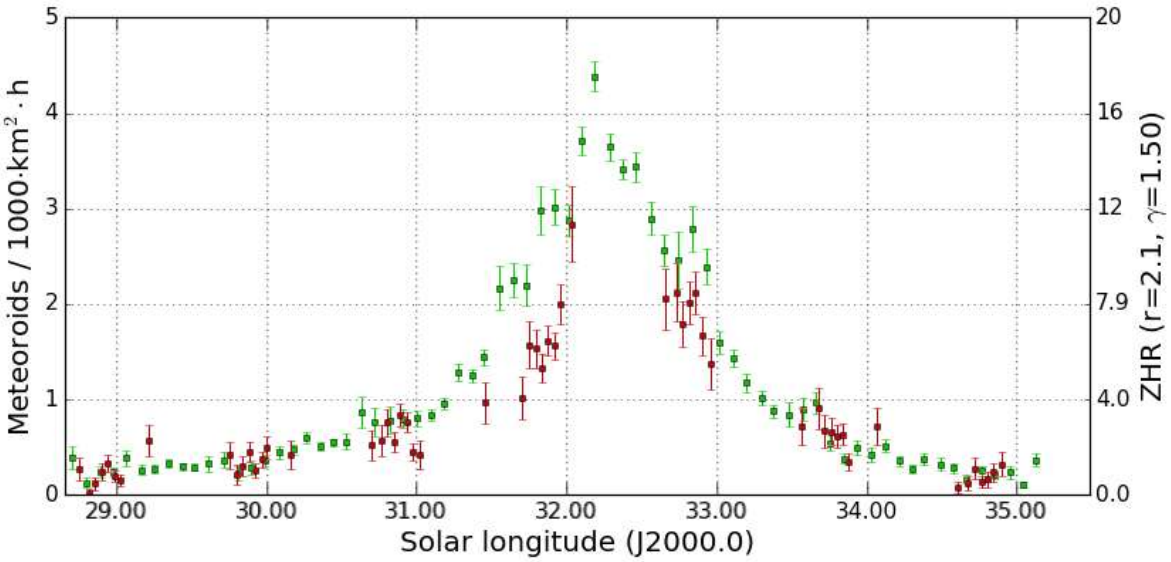

Figure 2: *Comparison of the Lyrid flux density 2017 (red) with the average flux density profile in the years 2011-2016 (green).*

The calculation of the population index is typically only possible for the nights around the Lyrid maximum, because the number of shower meteors is too small before and thereafter. If, however, the data from all years since 2011 are combined, we can compute the population index over the full activity interval (figure 3), because even the intervals at the edges contain sufficient meteors. Our data confirm the population index of 2.1 for the Lyrids, which is given in the IMO Meteor Shower Calendar. Right before the peak, the population index may even be smaller than 2.0. In the same interval, we measure a mean population of 2.7 for the sporadic meteors.

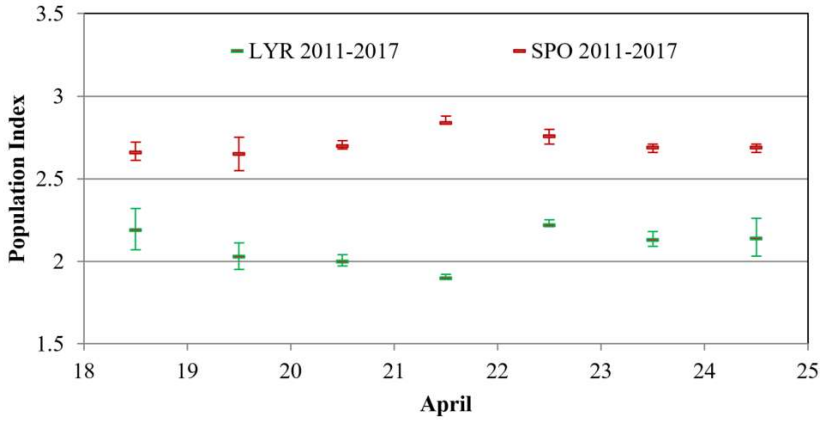

Figure 3: *Mean population index of the Lyrids (green) and sporadic meteors (red) in the years 2011-2017, derived from video data of the IMO Network.*

One weakness of the current procedure is, that the data are averaged over full observing nights. When the analysis covers different years, each interval is made of observations which deviate up to one degree in solar longitude. Furthermore, the interval length is fixed to one day.
For this reason, we reworked the script that calculates the r-profile. Data are now binned by solar longitude and not by date, and the size of each interval is dynamically adapted similar to the flux viewer. Whereas binning of flux data is governed by four parameters (minimum and maximum interval length, minimum meteor number and minimum effective collection area), the effective collection area has no relevance for population index binning: Even if only few meteors are recorded, we can still determine a reliable flux density with sufficient collection area. However,

with the current procedure we typically need a few hundred meteors to determine the population index reliably.

Figure 4 shows the new population index profile of the Lyrids. The minimum number of meteors was set to 500 for the Lyrids and 1,000 for sporadic meteors. Minimum and maximum interval length was 0.1 and 1.0 degree in solar longitude, respectively. We clearly see that the density of the data points near the Lyrid peak is higher, because more meteors were recorded at this time. Unsurprisingly we see more fine structures than in figure 3, but we have to be cautious. In different years we observed the Lyrids at different lunar phases, which causes a systematic shift of the population index. Since we observe different solar longitude segments in each year, the fine structures may represent selection effects of the individual years. On the other hand, we see no erratic jumps in the Lyrids profile as in case of the sporadic meteors, but neighbouring data points have similar values.
In general, we can solve the problem only by removing the systematic deviations by the moon or by averaging over as many years with different lunar phases as possible.

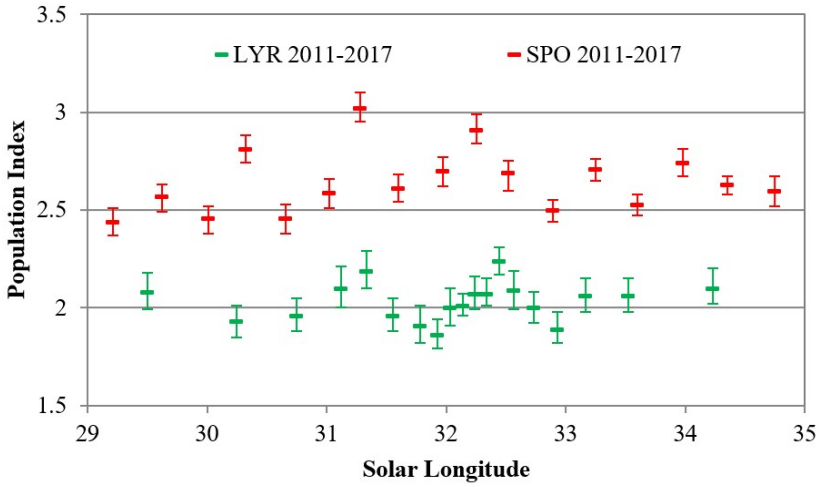

Figure 4: *Detailed r-value profile of the Lyrids (green) and sporadic meteors (red) in the years 2011-2017.*

1. Observers

Code	Name	Place	Camera	FOV [°²]	Slim [mag]	Eff.CA [km²]	Nights	Time [h]	Meteors
ARLRA	Arlt	Ludwigsfelde/DE	LUDWIG2 (0.8/8)	1475	6.2	3779	21	98.4	331
BERER	Berkó	Ludanyhalaszi/HU	HULUD1 (0.8/3.8)	5542	4.8	3847	10	66.5	218
BOMMA	Bombardini	Faenza/IT	MARIO (1.2/4.0)	5794	3.3	739	28	175.5	504
BREMA	Breukers	Hengelo/NL	MBB3 (0.75/6)	2399	4.2	699	25	122.9	150
BRIBE	Klemt	Herne/DE	HERMINE (0.8/6)	2374	4.2	678	25	130.4	237
		Berg. Gladbach/DE	KLEMOI (0.8/6)	2286	4.6	1080	23	128.5	216
CARMA	Carli	Monte Baldo/IT	BMH2 (1.5/4.5)*	4243	3.0	371	22	147.4	550
CASFL	Castellani	Monte Baldo/IT	BMH1 (0.8/6)	2350	5.0	1611	22	156.8	301
CINFR	Cineglosso	Faenza/IT	JENNI (1.2/4)	5886	3.9	1222	25	176.5	276
CRIST	Crivello	Valbrevenna/IT	BILBO (0.8/3.8)	5458	4.2	1772	27	153.8	355
			C3P8 (0.8/3.8)	5455	4.2	1586	21	127.7	234
			STG38 (0.8/3.8)	5614	4.4	2007	28	172.3	572
ELTMA	Eltri	Venezia/IT	MET38 (0.8/3.8)	5631	4.3	2151	21	105.0	234
FORKE	Förster	Carlsfeld/DE	AKM3 (0.75/6)	2375	5.1	2154	9	37.3	101
GONRU	Goncalves	Foz do Arelho/PT	FARELHO1 (1.0/2.6)	6328	2.8	469	27	96.8	131
		Tomar/PT	TEMPLAR1 (0.8/6)	2179	5.3	1842	30	228.2	489
			TEMPLAR2 (0.8/6)	2080	5.0	1508	29	213.9	387
			TEMPLAR3 (0.8/8)	1438	4.3	571	24	177.7	144
			TEMPLAR4 (0.8/3.8)	4475	3.0	442	28	194.1	342
			TEMPLAR5 (0.75/6)	2312	5.0	2259	27	172.7	302
GOVMI	Govedic	Sredisce ob Dr./SI	ORION2 (0.8/8)	1447	5.5	1841	19	80.1	121
			ORION4 (0.95/5)	2662	4.3	1043	11	46.3	39
HERCA	Hergenrother	Tucson/US	SALSA3 (0.8/3.8)	2336	4.1	544	29	263.7	379
HINWO	Hinz	Schwarzenberg/DE	HINWO1 (0.75/6)	2291	5.1	1819	10	50.0	85
IGAAN	Igaz	Hodmezovasar./HU	HUHOD (0.8/3.8)	5502	3.4	764	23	107.6	79
		Budapest/HU	HUPOL (1.2/4)	3790	3.3	475	11	51.6	24
JONKA	Jonas	Budapest/HU	HUSOR (0.95/4)	2286	3.9	445	20	106.6	97
			HUSOR2 (0.95/3.5)	2465	3.9	715	22	113.9	110
KACJA	Kac	Kamnik/SI	CVETKA (0.8/3.8)	4914	4.3	1842	11	46.1	108
		Kostanjevec/SI	METKA (0.8/12)*	715	6.4	640	10	31.2	34
		Ljubljana/SI	ORION1 (0.8/8)	1399	3.8	268	16	81.1	177
		Kamnik/SI	REZIKA (0.8/6)	2270	4.4	840	14	62.9	258
			STEFKA (0.8/3.8)	5471	2.8	379	14	54.2	146
LOJTO	Łojek	Grabniak/PL	PAV57 (1.0/5)	1631	3.5	269	8	44.6	93
LOPAL	Lopes	Lisboa/PT	NASO1 (0.75/6)	2377	3.8	506	24	141.6	107
MACMA	Maciejewski	Chelm/PL	PAV35 (0.8/3.8)	5495	4.0	1584	15	41.2	115
			PAV36 (0.8/3.8)*	5668	4.0	1573	21	89.4	145
			PAV43 (0.75/4.5)*	3132	3.1	319	14	68.8	86
			PAV60 (0.75/4.5)	2250	3.1	281	21	118.1	234
MARRU	Marques	Lisbon/PT	CAB1 (0.75/6)	2362	4.8	1517	28	220.2	264
			RAN1 (1.4/4.5)	4405	4.0	1241	24	165.1	217
MASMI	Maslov	Novosimbirsk/RU	NOWATEC (0.8/3.8)	5574	3.6	773	13	63.8	120
MOLSI	Molau	Seysdorf/DE	AVIS2 (1.4/50)*	1230	6.9	6152	22	110.8	551
			ESCIMO2 (0.85/25)	155	8.1	3415	22	121.2	188
			MINCAM1 (0.8/8)	1477	4.9	1084	17	80.9	161
		Ketzür/DE	REMO1 (0.8/8)	1467	6.5	5491	24	99.2	332
			REMO2 (0.8/8)	1478	6.4	4778	23	102.4	391
			REMO3 (0.8/8)	1420	5.6	1967	25	126.9	369
			REMO4 (0.8/8)	1478	6.5	5358	23	119.5	461
MORJO	Morvai	Fülöpszallas/HU	HUFUL (1.4/5)	2522	3.5	532	18	39.0	85
OCHPA	Ochner	Albiano/IT	ALBIANO (1.2/4.5)	2944	3.5	358	19	125.6	189
OTTMI	Otte	Pearl City/US	ORIE1 (1.4/5.7)	3837	3.8	460	14	14.0	78
PERZS	Perkó	Becsehely/HU	HUBEC (0.8/3.8)*	5498	2.9	460	17	65.0	139
ROTEC	Rothenberg	Berlin/DE	ARMEFA (0.8/6)	2366	4.5	911	16	82.8	112
SARAN	Saraiva	Carnaxide/PT	RO1 (0.75/6)	2362	3.7	381	27	195.5	202
			RO2 (0.75/6)	2381	3.8	459	27	193.5	224
			RO3 (0.8/12)	710	5.2	619	27	186.1	324
			RO4 (1.0/8)	1582	4.2	549	27	93.9	103
			SOFIA (0.8/12)	738	5.3	907	29	182.8	148
SCHHA	Schremmer	Niederkrüchten/DE	DORAEMON (0.8/3.8)	4900	3.0	409	23	140.3	235
SLAST	Slavec	Ljubljana/SI	KAYAK1 (1.8/28)	563	6.2	1294	2	2.1	13
			KAYAK2 (0.8/12)	741	5.5	920	17	97.9	52
STOEN	Stomeo	Scorze/IT	MIN38 (0.8/3.8)	5566	4.8	3270	27	107.6	459
			NOA38 (0.8/3.8)	5609	4.2	1911	26	119.3	367
			SCO38 (0.8/3.8)	5598	4.8	3306	26	129.5	547
STRJO	Strunk	Herford/DE	MINCAM2 (0.8/6)	2354	5.4	2751	23	114.5	348
			MINCAM3 (0.8/6)	2338	5.5	3590	24	112.7	154
			MINCAM5 (0.8/6)	2349	5.0	1896	22	117.4	253
			MINCAM6 (0.8/6)	2395	5.1	2178	23	118.2	191
TEPIS	Tepliczky	Agostyan/HU	HUAGO (0.75/4.5)	2427	4.4	1036	21	104.5	121
			HUMOB (0.8/6)	2388	4.8	1607	22	119.7	158
WEGWA	Wegrzyk	Nieznaszyn/PL	PAV78 (0.8/6)	2286	4.0	778	14	39.3	48
YRJIL	Yrjölä	Kuusankoski/FI	FINEXCAM (0.8/6)	2337	5.5	3574	18	75.1	137
Sum							31	8267.7	16252

* active field of view smaller than video frame

2. Observing Times (h)

April	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
ARLRA	4.3	6.6	2.6	-	2.5	-	-	-	7.1	5.3	-	-	4.7	-	6.5
BERER	8.8	9.1	-	-	-	-	-	-	-	6.1	-	-	-	8.3	-
BOMMA	0.3	2.2	6.3	4.2	8.1	7.7	9.0	9.2	9.1	9.0	5.9	5.6	8.9	7.5	-
BREMA	0.4	1.7	8.9	8.1	4.0	0.5	-	8.6	8.5	1.5	1.1	-	8.1	-	5.2
BRIBE	0.3	6.8	9.0	8.9	6.4	4.2	-	8.5	8.6	1.9	0.9	-	8.2	-	2.9
	-	9.1	9.0	8.8	3.7	2.7	-	8.5	8.5	2.9	2.4	-	7.1	-	4.4
CARMA	6.4	5.8	3.8	-	7.7	9.3	7.7	9.2	9.1	6.2	3.0	8.1	6.2	-	4.3
CASFL	6.5	5.3	3.8	-	8.4	9.3	7.7	9.2	9.2	7.2	3.6	8.2	5.7	3.3	6.2
CRIST	-	3.2	9.0	6.6	8.9	8.9	8.7	9.3	9.2	9.2	7.3	7.3	1.2	7.5	-
	2.2	1.4	6.7	0.9	7.0	6.4	8.8	9.0	7.4	2.2	8.3	6.4	5.8	2.6	4.9
	0.2	1.5	5.4	-	7.7	8.9	8.6	8.9	7.0	-	8.1	4.5	-	2.2	4.7
DONJE	3.3	2.8	8.1	2.6	8.4	9.2	9.1	9.0	8.2	3.2	8.8	7.4	6.1	5.1	4.9
ELTMA	7.1	6.5	1.3	-	2.3	0.3	5.4	7.7	9.0	-	0.8	2.7	-	2.0	-
FORKE	-	-	-	4.7	-	-	-	4.3	8.6	-	-	-	-	-	-
GONRU	5.6	1.8	5.3	0.2	9.2	9.3	9.3	2.0	1.2	9.2	2.3	-	-	0.3	0.2
	9.5	8.1	9.6	9.6	9.5	9.4	9.3	9.3	9.2	9.1	9.1	8.3	1.2	7.2	8.8
	9.9	7.7	9.8	9.7	9.6	9.6	9.6	9.5	7.8	9.4	9.4	7.0	-	5.6	5.6
	9.0	7.0	9.6	9.5	9.5	9.4	9.4	9.3	7.6	9.2	9.2	7.5	-	5.5	-
	9.5	7.8	9.8	9.7	9.6	9.5	9.5	9.4	7.9	9.3	9.1	6.6	-	2.1	4.6
	4.2	6.8	9.6	9.4	9.5	9.3	9.2	8.7	5.6	6.3	7.8	3.5	-	4.3	3.1
GOVMI	9.3	9.2	2.0	-	-	4.2	0.6	5.0	5.6	3.6	0.7	-	0.8	-	0.3
	9.1	9.0	7.5	0.2	-	2.5	-	4.4	5.5	3.0	-	-	-	-	-
HERCA	6.7	10.0	10.3	1.9	-	10.0	10.1	9.9	9.4	8.9	9.8	9.7	9.9	9.9	8.7
HINWO	5.4	-	-	1.9	-	-	-	1.3	8.7	-	-	-	-	-	3.6
IGAAN	7.9	7.9	7.8	-	0.6	5.2	3.7	0.6	7.7	7.1	2.1	2.4	7.5	-	0.6
	6.9	6.6	2.6	-	-	-	-	5.1	0.3	5.2	-	-	-	6.4	-
JONKA	9.4	9.3	7.9	-	-	3.6	5.8	3.9	-	4.9	5.2	-	3.8	5.0	-
	9.4	9.4	6.1	-	-	3.3	5.9	5.8	2.2	4.5	5.0	0.9	5.1	5.0	-
KACJA	9.3	9.4	4.8	-	-	2.5	-	0.5	7.6	4.8	0.8	2.3	-	-	-
	9.2	9.7	1.5	-	0.3	0.2	-	-	1.5	0.3	-	2.5	-	-	-
	9.1	9.6	8.3	-	-	3.5	0.4	4.8	8.7	5.2	-	4.8	-	-	-
	9.6	9.6	4.8	-	-	3.2	-	0.2	6.9	4.6	1.8	3.1	-	-	-
	7.2	9.5	2.4	-	-	1.7	-	0.6	7.5	4.4	0.6	2.4	-	-	-
LOJTO	-	8.2	-	8.9	-	-	-	-	-	4.2	4.9	-	2.2	-	-
LOPAL	7.4	9.3	9.4	8.3	8.8	8.3	9.0	6.1	4.2	6.1	8.3	5.1	2.7	-	3.0
MACMA	9.0	-	0.5	1.0	-	-	0.2	6.5	-	1.0	1.3	-	1.1	0.5	-
	-	1.9	0.9	9.0	-	-	3.9	8.6	1.5	6.9	8.0	-	3.1	4.3	-
	9.3	5.2	6.1	8.9	-	-	3.8	7.4	2.2	5.0	-	-	-	-	-
	9.2	9.0	8.7	9.0	-	-	4.4	7.3	2.4	7.6	8.3	-	3.9	4.2	1.0
MARRU	9.7	9.8	9.7	9.6	9.6	9.5	9.4	9.4	8.5	9.4	9.3	8.4	6.2	7.9	7.4
	9.8	9.8	9.8	1.0	9.7	9.7	9.6	8.5	5.3	6.4	9.4	4.3	-	-	-
MASMI	-	-	-	-	-	-	-	-	-	-	-	-	6.3	-	5.1
MOLSI	7.5	8.6	1.2	2.8	1.3	0.9	-	8.3	8.2	2.2	8.1	-	4.0	2.7	-
	7.2	9.0	2.1	4.1	1.3	2.2	-	8.7	8.7	3.1	8.5	-	4.7	2.9	-
	7.3	8.9	2.2	2.7	1.2	1.0	0.5	8.4	6.7	1.9	7.3	-	3.3	2.0	-
	3.6	7.4	2.8	-	3.8	-	1.2	1.5	7.2	6.3	-	2.1	5.0	0.1	4.8
	4.6	8.3	3.2	1.2	3.3	-	-	0.9	6.4	5.1	-	1.7	5.4	1.0	5.3
	5.4	8.9	3.5	1.3	4.3	-	2.5	1.8	8.5	7.4	-	2.3	6.2	1.3	5.9
	5.2	8.8	3.2	-	2.9	-	-	1.5	8.5	6.4	-	1.2	6.0	1.3	7.6
MORJO	1.0	1.2	0.3	-	-	0.5	1.3	1.3	-	1.3	1.0	-	-	-	-
OCHPA	-	-	-	-	6.5	6.4	5.0	-	7.2	8.6	4.3	4.9	3.9	-	7.1
OTTMI	-	-	-	-	1.3	2.7	-	-	0.2	0.8	-	0.3	-	-	0.9
PERZS	8.9	9.5	9.3	1.3	-	0.9	-	3.7	2.5	2.3	5.1	0.9	0.5	0.2	1.9
ROTEC	4.2	7.4	1.5	-	-	-	-	-	6.9	4.5	-	-	5.3	-	6.7
SARAN	9.0	10.0	9.4	8.8	9.7	7.1	6.5	6.3	5.4	6.6	7.1	6.1	6.9	-	6.4
	8.9	10.0	9.3	9.5	9.4	9.5	9.8	9.7	7.9	-	9.3	7.3	7.0	6.6	5.2
	7.8	9.6	9.0	9.3	9.1	9.2	9.4	8.2	6.9	8.2	9.0	5.9	6.8	6.3	4.1
	2.7	6.2	7.4	4.6	4.8	4.5	6.4	6.4	3.1	2.6	5.3	3.1	3.7	0.9	0.6
	7.5	9.9	9.9	9.9	9.8	9.7	9.7	7.2	3.2	4.9	6.6	4.6	4.6	2.9	2.5
SCHHA	2.1	7.6	9.0	7.9	5.4	4.8	-	8.7	8.6	-	3.9	-	8.4	-	4.4
SLAST	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	8.5	9.4	9.3	-	-	2.9	-	8.7	8.8	6.7	-	5.5	0.8	-	-
STOEN	8.0	6.4	0.8	-	3.3	0.3	5.4	7.3	7.1	0.9	0.7	2.1	0.9	2.3	2.7
	7.2	6.1	1.2	-	3.1	0.8	4.0	9.2	9.2	4.8	-	2.7	0.5	2.0	3.7
	8.5	6.5	1.5	-	5.1	2.0	5.8	9.2	9.1	6.8	1.0	2.6	1.7	2.3	4.0
STRJO	0.9	4.7	8.7	8.9	-	3.1	-	4.9	6.4	1.9	-	0.7	5.2	-	6.2
	0.8	4.7	9.0	8.9	-	0.9	-	8.3	8.5	4.0	-	0.8	5.3	1.7	6.5
	1.5	5.3	8.9	8.8	-	3.7	-	8.2	6.7	4.6	-	-	2.3	1.8	7.1
	-	4.0	8.8	7.6	0.7	2.9	-	8.4	8.5	3.9	-	0.9	6.1	1.6	6.6
TEPIS	9.2	9.2	-	0.2	-	1.9	0.8	8.8	8.7	3.9	6.2	-	3.5	4.6	-
	9.2	9.2	8.0	1.3	-	2.3	1.7	7.8	8.7	4.4	8.2	-	3.3	4.4	-
WEGWA	9.1	6.0	0.2	-	-	-	-	6.0	1.5	1.5	1.0	-	-	-	-
YRJIL	-	-	-	5.7	-	4.7	1.3	2.1	-	-	-	-	6.5	-	4.7
Sum	406.2	466.4	378.4	257.4	247.3	276.2	259.4	417.0	433.8	325.9	265.2	184.7	233.6	155.6	200.9

April	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
ARLRA	3.1	2.9	2.1	6.9	2.0	1.3	4.7	6.6	-	6.2	5.4	5.5	-	6.1	6.0
BERER	7.9	-	-	-	-	5.2	4.8	7.4	3.5	5.4	-	-	-	-	-
BOMMA	0.9	6.9	5.3	7.7	4.8	8.7	8.5	4.3	8.4	3.9	-	0.6	6.1	8.3	8.1
BREMA	1.4	4.6	7.9	7.3	2.3	-	1.8	7.4	-	6.9	5.7	4.9	3.8	7.0	5.3
BRIBE	0.4	3.3	6.2	7.7	4.2	-	3.5	7.6	-	6.7	6.9	4.3	1.1	7.1	4.8
	-	3.6	6.8	6.9	6.4	-	4.5	6.4	-	4.8	6.4	1.1	2.7	7.2	4.6
CARMA	4.1	3.8	8.7	8.6	8.5	8.1	8.4	2.3	-	-	-	-	8.1	-	-
CASFL	7.7	4.8	8.8	8.7	8.7	7.8	8.5	-	-	-	-	-	8.2	-	-
CRIST	-	8.0	6.0	-	6.7	8.7	8.7	5.3	8.6	4.4	-	1.0	6.3	8.3	8.2
	8.6	8.5	7.7	8.4	8.4	8.3	-	3.7	3.2	-	-	0.5	6.8	7.9	1.8
	8.6	8.5	8.2	8.4	-	6.3	-	4.3	-	-	-	-	7.3	7.9	0.5
DONJE	8.6	8.5	7.6	8.4	8.4	8.3	0.2	3.6	2.8	-	-	1.3	7.9	7.9	2.6
ELTMA	-	4.8	5.9	3.6	7.0	8.4	7.5	2.2	-	-	-	-	6.9	6.4	7.2
FORKE	-	-	-	-	5.9	-	-	0.5	2.0	-	3.7	-	0.5	-	7.1
GONRU	2.7	-	2.3	0.3	7.3	0.2	4.8	0.2	0.2	0.6	3.6	6.1	7.1	0.3	5.2
	8.3	5.9	4.5	7.8	8.9	6.3	6.6	8.5	8.5	7.3	6.5	7.9	3.9	1.6	8.5
	8.1	5.0	4.4	8.3	8.5	5.5	4.2	8.1	8.5	7.3	5.2	8.0	2.7	1.7	8.2
	5.8	5.1	4.0	3.9	8.8	5.7	4.7	-	5.9	-	5.7	7.9	-	-	8.5
	8.1	3.7	2.4	3.7	8.9	3.8	5.1	7.7	7.2	7.2	4.6	7.2	1.6	-	8.5
	4.9	4.6	3.6	5.2	8.3	4.5	5.2	6.4	6.3	6.7	4.5	7.3	-	-	7.9
GOVMI	1.5	-	-	-	5.0	8.1	-	3.4	8.0	3.3	-	-	1.8	7.7	-
	1.5	-	-	-	-	-	-	2.0	-	-	-	-	1.6	-	-
HERCA	9.8	9.6	9.7	9.7	9.7	9.7	9.6	9.6	9.4	9.5	9.5	8.6	6.5	8.2	9.4
HINWO	-	-	-	3.8	6.0	-	-	-	7.6	-	4.6	-	-	-	7.1
IGAAN	4.7	6.7	-	-	-	4.5	2.6	5.8	5.6	6.6	2.5	-	-	1.6	5.9
	5.3	-	-	-	3.5	5.4	4.3	-	-	-	-	-	-	-	-
JONKA	6.4	0.9	-	-	3.2	4.9	2.6	6.0	6.6	7.3	2.4	-	-	-	7.5
	6.2	1.4	-	-	3.9	5.3	2.0	7.6	7.2	7.5	2.5	-	-	-	7.7
KACJA	-	2.7	-	-	-	-	-	-	-	-	-	-	1.4	-	-
	2.4	3.6	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	3.7	-	3.9	3.2	8.4	0.2	-	-	-	-	-	0.6	6.7	-
	-	2.9	-	1.0	5.4	8.0	-	-	-	-	-	-	1.8	-	-
	-	2.1	-	0.9	5.5	8.0	-	-	-	-	-	-	1.4	-	-
LOJTO	-	-	-	-	8.0	-	5.6	2.6	-	-	-	-	-	-	-
LOPAL	8.5	-	1.9	0.7	5.4	4.0	-	1.6	-	3.7	-	5.7	8.0	-	6.1
MACMA	1.9	-	-	-	2.3	-	5.6	3.1	4.3	-	-	-	-	-	2.9
	8.2	6.8	-	2.5	7.9	0.2	4.6	3.0	4.4	0.6	-	-	-	0.6	2.5
	-	-	-	1.6	6.0	-	5.7	3.1	2.6	-	-	-	-	-	1.9
	8.1	6.6	-	2.9	7.9	-	6.0	3.0	4.9	1.0	-	-	-	-	2.7
MARRU	9.1	7.9	8.6	6.2	7.8	4.4	4.1	8.7	7.1	6.0	-	4.2	-	4.1	8.2
	9.1	-	4.1	-	4.2	5.3	3.8	6.0	8.5	6.8	1.8	5.4	8.7	-	8.1
MASMI	0.8	-	5.8	1.8	6.7	6.6	-	4.5	5.4	6.3	6.2	4.7	3.6	-	-
MOLSI	-	-	4.0	4.4	7.5	3.1	3.0	7.3	6.5	-	-	-	5.6	6.8	6.8
	-	-	4.3	4.4	7.9	3.6	2.8	7.7	6.9	-	-	-	6.4	7.4	7.3
	-	-	-	-	-	-	-	-	6.7	-	-	-	6.1	7.4	7.3
	3.1	1.2	4.1	6.3	-	2.3	2.5	6.0	-	5.9	4.7	5.9	-	5.8	5.6
	1.7	-	4.5	7.2	-	2.2	3.0	6.5	-	6.2	5.5	6.4	-	6.4	6.4
	4.3	2.6	6.1	7.7	-	2.7	2.7	7.2	-	7.3	6.0	7.1	-	7.0	6.9
	4.7	2.8	5.6	7.7	-	2.4	2.7	7.2	-	7.3	5.6	7.1	-	7.0	6.8
MORJO	0.5	0.2	-	-	-	1.8	0.4	0.9	2.6	7.9	4.1	-	-	4.9	7.8
OCHPA	8.9	5.7	8.8	1.9	8.3	8.6	6.5	-	-	-	-	-	8.2	8.1	6.7
OTTMI	0.7	-	-	0.3	1.9	1.6	1.9	0.5	0.2	-	0.7	-	-	-	-
PERZS	2.0	3.3	-	-	4.4	8.3	-	-	-	-	-	-	-	-	-
ROTEC	-	2.9	4.0	7.5	-	2.0	4.3	6.8	-	6.6	5.4	-	-	6.8	-
SARAN	9.3	-	4.6	2.8	8.7	8.4	3.5	7.4	8.0	9.0	2.8	8.5	9.1	-	8.1
	9.4	-	4.1	2.5	9.0	8.2	2.8	6.0	6.0	8.0	2.7	-	7.6	0.5	7.3
	9.1	-	4.4	2.7	8.6	6.9	-	4.7	5.4	7.8	1.1	-	7.3	1.8	7.5
	6.4	-	0.5	0.2	2.7	1.9	1.3	0.8	0.7	0.9	3.2	-	7.1	-	5.9
	9.1	-	5.0	2.6	8.1	7.3	3.7	6.4	5.3	7.1	2.3	7.2	8.8	0.4	6.6
SCHHA	-	4.1	4.2	5.4	5.6	-	5.4	7.3	-	7.1	7.1	6.2	7.2	7.4	2.5
SLAST	-	-	-	-	-	-	-	-	-	-	-	-	0.5	1.6	-
	-	2.9	1.1	5.5	8.3	8.3	0.4	-	-	-	-	-	3.9	6.9	-
STOEN	4.2	4.3	5.4	3.4	5.2	8.6	6.9	0.3	-	1.3	-	0.3	7.2	5.8	6.5
	4.7	5.9	6.0	2.5	5.3	8.5	7.0	0.3	0.2	1.7	-	-	7.9	7.9	6.9
	4.3	4.2	6.5	2.8	5.1	8.6	7.2	-	-	1.8	-	0.3	7.5	8.0	7.1
STRJO	1.6	3.4	5.5	7.4	1.4	-	2.8	7.5	-	6.6	5.6	7.1	-	7.1	6.9
	-	3.8	2.5	7.3	1.6	-	2.8	6.8	-	7.3	5.8	0.7	0.6	7.1	7.0
	2.0	4.5	5.9	7.6	-	-	3.1	7.5	-	-	5.9	7.2	0.8	7.1	6.9
	1.6	2.0	5.5	6.8	-	-	2.3	7.3	-	7.1	5.5	6.6	-	6.9	6.6
TEPIS	7.7	-	-	-	1.9	7.0	3.1	1.2	7.8	6.2	-	0.2	-	5.0	7.4
	7.6	-	-	-	1.9	6.8	3.6	1.2	7.8	6.9	2.5	-	-	5.5	7.4
WEGWA	0.9	-	-	-	5.3	0.2	0.7	0.4	5.9	-	-	-	-	-	0.6
YRJIL	4.8	2.6	4.5	5.1	-	4.4	5.0	4.2	2.6	-	4.8	4.6	3.3	-	4.2
Sum	281.3	203.8	239.6	258.8	334.3	303.6	239.8	281.9	219.3	246.0	169.0	167.6	221.5	253.2	340.0

3. Results (Meteors)

April	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
ARLRA	9	19	5	-	5	-	-	-	15	3	-	-	14	-	23
BERER	25	21	-	-	-	-	-	-	-	11	-	-	-	32	-
BOMMA	2	3	18	10	8	28	27	12	14	22	9	11	18	18	-
BREMA	1	1	9	7	2	1	-	13	4	2	1	-	19	-	10
BRIBE	2	13	15	9	9	8	-	7	9	3	2	-	17	-	5
	-	14	20	6	3	5	-	9	10	4	1	-	9	-	8
CARMA	14	25	4	-	11	35	34	35	22	14	5	21	10	-	12
CASFL	6	6	3	-	4	17	18	10	11	5	8	10	8	2	13
CRIST	-	3	12	2	8	10	16	16	26	5	8	9	2	7	-
	3	6	11	3	8	19	12	20	13	2	7	5	6	2	10
	1	3	9	-	9	17	8	11	7	-	10	5	-	4	20
DONJE	5	8	16	4	17	28	24	40	29	7	17	16	6	4	15
ELTMA	10	10	2	-	6	2	12	14	8	-	4	1	-	3	-
FORKE	-	-	-	5	-	-	-	13	20	-	-	-	-	-	-
GONRU	5	2	4	1	5	11	10	4	4	10	1	-	-	2	1
	25	14	26	26	22	23	23	23	13	17	24	16	4	15	10
	18	9	28	25	20	24	21	13	13	15	11	5	-	12	4
	8	2	9	7	7	5	6	4	3	6	3	3	-	9	-
	17	10	23	21	15	15	14	12	11	12	3	4	-	10	5
	12	10	13	26	20	20	17	15	13	13	12	4	-	6	1
GOVMI	9	15	3	-	-	3	1	3	5	1	2	-	2	-	1
	6	8	7	1	-	1	-	2	3	3	-	-	-	-	-
HERCA	13	13	18	11	-	12	17	12	11	8	12	9	14	10	10
HINWO	7	-	-	4	-	-	-	3	13	-	-	-	-	-	8
IGAAN	5	3	3	-	1	3	5	2	5	7	1	1	2	-	1
	1	2	2	-	-	-	-	1	1	4	-	-	-	1	-
JONKA	7	8	2	-	-	1	8	1	-	8	5	-	2	1	-
	3	5	4	-	-	2	5	7	2	2	6	1	3	6	-
KACJA	14	33	7	-	-	5	-	5	22	11	3	2	-	-	-
	7	9	4	-	1	1	-	-	4	1	-	1	-	-	-
	8	29	10	-	-	9	1	15	27	14	-	8	-	-	-
	15	43	11	-	-	4	-	2	28	23	3	3	-	-	-
	9	20	4	-	-	2	-	5	12	13	3	3	-	-	-
LOJTO	-	9	-	18	-	-	-	-	-	1	8	-	5	-	-
LOPAL	5	2	7	5	9	4	4	3	1	3	9	1	4	-	1
MACMA	9	-	3	7	-	-	1	11	-	6	9	-	7	3	-
	-	12	5	13	-	-	4	10	2	3	5	-	3	4	-
	3	10	2	6	-	-	3	7	1	5	-	-	-	-	-
	18	15	7	18	-	-	8	24	5	13	22	-	6	6	2
MARRU	15	17	9	16	16	13	9	14	15	19	14	7	2	6	4
	13	9	14	4	12	25	13	9	5	5	3	1	-	-	-
MASMI	-	-	-	-	-	-	-	-	-	-	-	-	11	-	8
MOLSI	28	30	2	5	3	1	-	21	16	7	10	-	7	13	-
	9	11	2	2	1	1	-	15	20	3	10	-	2	1	-
	9	11	1	1	2	1	2	16	24	3	5	-	3	5	-
	9	12	7	-	6	-	1	4	29	23	-	2	24	1	16
	11	26	6	3	5	-	-	1	16	12	-	6	16	2	17
	7	33	8	1	7	-	2	3	32	19	-	6	17	5	27
	17	25	6	-	8	-	-	1	17	14	-	7	31	3	30
MORJO	7	4	1	-	-	3	7	5	-	6	5	-	-	-	-
OCHPA	-	-	-	-	4	15	7	-	5	8	5	4	4	-	5
OTTMI	-	-	-	-	5	6	-	-	1	5	-	2	-	-	6
PERZS	9	20	17	2	-	1	-	3	6	6	11	2	3	1	1
ROTEC	5	10	3	-	-	-	-	-	5	1	-	-	2	-	13
SARAN	10	11	9	5	9	10	14	5	4	6	1	1	8	-	4
	12	10	15	14	12	10	10	16	8	-	7	3	3	5	6
	12	14	32	23	29	18	22	10	11	12	13	3	6	3	3
	5	1	10	5	3	7	4	3	4	3	3	3	1	1	1
	10	10	10	8	6	12	9	1	2	4	3	3	2	2	2
SCHHA	2	10	19	8	6	3	-	12	6	-	4	-	18	-	5
SLAST	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1	5	3	-	-	3	-	7	6	4	-	1	2	-	-
STOEN	27	17	5	-	7	2	21	15	13	2	5	5	2	10	17
	16	15	5	-	5	5	13	5	8	5	-	2	1	8	12
	31	26	8	-	5	4	33	23	21	14	8	7	10	6	15
STRJO	1	5	25	13	-	8	-	9	12	5	-	3	15	-	31
	2	2	12	8	-	6	-	9	7	8	-	2	6	1	11
	2	4	24	11	-	10	-	7	16	6	-	-	1	2	14
	-	2	16	6	1	3	-	6	6	5	-	1	6	1	15
TEPIS	8	4	-	1	-	3	2	9	10	7	8	-	2	3	-
	13	8	9	1	-	2	3	11	9	9	8	-	3	3	-
WEGWA	7	4	1	-	-	-	-	4	5	1	1	-	-	-	-
YRJIL	-	-	-	8	-	3	1	3	-	-	-	-	8	-	8
Sum	600	771	605	380	342	490	472	631	726	499	338	210	377	239	431

April	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
ARLRA	7	6	11	32	11	11	31	28	-	8	17	7	-	32	37
BERER	30	-	-	-	-	22	32	27	5	13	-	-	-	-	-
BOMMA	1	25	16	19	17	49	42	11	37	5	-	5	22	28	27
BREMA	1	4	10	8	3	-	3	12	-	9	5	8	5	10	2
BRIBE	1	5	7	14	4	-	11	22	-	12	19	15	2	22	4
	-	1	13	12	16	-	13	16	-	8	10	3	7	21	7
CARMA	40	19	40	20	53	48	58	1	-	-	-	-	29	-	-
CASFL	23	21	20	14	17	27	37	-	-	-	-	-	21	-	-
CRIST	-	11	10	-	19	28	30	6	10	1	-	2	7	14	14
	22	18	26	27	31	54	-	8	2	-	-	2	14	17	7
	24	15	15	15	-	17	-	14	-	-	-	-	19	9	2
DONJE	42	35	28	41	33	57	1	24	3	-	-	5	30	32	5
ELTMA	-	9	7	6	19	49	28	3	-	-	-	-	11	14	16
FORKE	-	-	-	-	15	-	-	4	16	-	7	-	3	-	18
GONRU	7	-	4	2	4	1	10	1	1	3	10	3	12	2	11
	17	11	10	6	18	16	21	18	17	16	15	13	6	3	21
	14	6	7	9	15	24	7	15	15	14	12	12	1	2	16
	4	3	1	2	11	10	9	-	5	-	6	9	-	-	12
	18	8	8	5	15	21	24	11	10	5	18	8	1	-	18
	3	4	3	3	15	11	9	12	7	13	13	15	-	-	12
GOVMI	3	-	-	-	11	31	-	3	13	3	-	-	3	9	-
	2	-	-	-	-	-	-	3	-	-	-	-	3	-	-
HERCA	17	13	12	11	16	23	25	13	17	7	12	9	6	7	21
HINWO	-	-	-	6	11	-	-	-	14	-	8	-	-	-	11
IGAAN	1	5	-	-	-	7	4	4	9	5	1	-	-	2	2
	1	-	-	-	7	3	1	-	-	-	-	-	-	-	-
JONKA	3	1	-	-	9	7	4	11	8	3	2	-	-	-	6
	4	1	-	-	7	14	5	18	6	2	3	-	-	-	4
KACJA	-	2	-	-	-	-	-	-	-	-	-	-	4	-	-
	5	1	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	3	-	11	5	28	1	-	-	-	-	-	1	7	-
	-	9	-	10	39	57	-	-	-	-	-	-	11	-	-
	-	1	-	2	33	38	-	-	-	-	-	-	1	-	-
LOJTO	-	-	-	-	27	-	20	5	-	-	-	-	-	-	-
LOPAL	3	-	7	3	4	10	-	5	-	2	-	3	5	-	7
MACMA	8	-	-	-	18	-	17	8	6	-	-	-	-	-	2
	12	8	-	1	22	1	22	6	5	3	-	-	-	1	3
	-	-	-	1	19	-	16	6	3	-	-	-	-	-	4
	18	7	-	2	21	-	23	5	5	3	-	-	-	-	6
MARRU	12	9	9	5	7	5	6	8	5	3	-	5	-	3	11
	8	-	5	-	11	22	1	11	12	8	3	7	7	-	9
MASMI	1	-	6	4	22	28	-	5	10	10	8	2	5	-	-
MOLSI	-	-	20	23	71	24	20	81	39	-	-	-	24	62	44
	-	-	6	6	21	5	5	22	7	-	-	-	7	19	13
	-	-	-	-	-	-	-	-	13	-	-	-	10	29	26
	7	3	14	31	-	17	9	25	-	4	19	19	-	33	17
	7	-	24	48	-	27	11	28	-	7	24	25	-	35	34
	10	7	11	23	-	18	5	20	-	12	20	23	-	27	26
	8	5	19	51	-	27	15	47	-	18	35	15	-	34	28
MORJO	3	1	-	-	-	9	1	4	12	4	3	-	-	3	7
OCHPA	22	7	20	3	15	26	14	-	-	-	-	-	7	11	7
OTTMI	5	-	-	2	15	10	13	3	1	-	4	-	-	-	-
PERZS	1	3	-	-	20	33	-	-	-	-	-	-	-	-	-
ROTEC	-	1	9	10	-	10	7	18	-	4	5	-	-	9	-
SARAN	8	-	7	6	9	21	1	14	5	11	1	7	9	-	6
	14	-	6	2	5	16	2	8	8	7	4	-	9	3	9
	11	-	9	2	18	10	-	5	9	17	2	-	13	2	15
	7	-	3	1	4	7	2	4	3	4	2	-	5	-	7
	7	-	4	1	3	12	1	9	3	2	3	5	6	1	7
SCHHA	-	7	6	14	17	-	21	14	-	11	9	13	14	15	1
SLAST	-	-	-	-	-	-	-	-	-	-	-	-	3	10	-
	-	2	1	2	4	4	1	-	-	-	-	-	3	3	-
STOEN	21	20	14	11	45	52	64	2	-	7	-	1	28	29	17
	33	21	8	5	30	52	47	2	1	4	-	-	24	20	20
	23	24	20	8	33	70	66	-	-	4	-	2	32	33	21
STRJO	7	3	27	30	1	-	12	30	-	22	13	21	-	42	13
	-	2	1	20	2	-	5	8	-	7	8	2	1	14	10
	4	7	23	23	-	-	10	22	-	-	12	22	1	21	11
	2	3	22	19	-	-	12	19	-	12	9	11	-	9	5
TEPIS	5	-	-	-	7	17	9	1	7	1	-	1	-	6	10
	11	-	-	-	5	13	8	2	11	8	1	-	-	9	11
WEGWA	2	-	-	-	9	2	1	1	7	-	-	-	-	-	3
YRJIL	11	5	9	15	-	13	23	3	3	-	6	3	6	-	9
Sum	581	382	558	647	939	1214	896	736	370	322	349	303	438	714	692