Results of the IMO Video Meteor Network – May 2012

Sirko Molau, Abenstalstr. 13b, 84072 Seysdorf *2012/07/02*

The weather in May was not as perfect as in the year before, but it was still a fruitful month for the video observers which were more numerous than ever before. Overall 40 observers contributed with 73 video systems to the IMO Video Network. Half of the systems recorded meteors in twenty or more nights, so that the effective observing time grew to almost 6,000 hours. The average meteor activity, however, was slightly below the value of the previous year (2.5 instead of 3.1 meteors per hour) which is why the total number of 15,000 meteors almost matched the result of May 2011.

Also in May the camera network could be extended. With Hungarian Zsofia Biro the second female observer joined our forces. Zsofias camera HUAGO started to operate in late November 2011, but first some configuration issues had to be fixed. Now all observations are included in the IMO database.

With respect to meteor showers, May was dominated once more by the eta Aquariids. Among other, also this shower yielded our Australian observer Steve Kerr a respectable total of almost 2,000 meteors. But also the northern hemisphere observers catched one or the other shower member in early May.
In Australia, the radiant lies 60° below the horizon in the evening hours, but rises to more than 50° above the horizon at dawn. In the shorter European nights, the radiant is first 40° below the horizon, and even at more southern observing sites it hardly reaches 20° altitude in the morning hours. Almost no other shower exhibits such tremendous altitude variations as the eta Aquariids, which is why the zenith exponent (or comparable effects) have a strong impact. So the original flux density profile based on more than 1,000 eta Aquariids (with 11,800 sporadic meteors at the same time) shows the typical variations, which reduce significantly when a zenith exponent of 1.6 is applied (Figure 1). However, with the zenith exponent also the peak density raises from 30 (zenith exponent 1.0) to over 60 (zenith exponent 1.6) meteoroids per 1,000 km^2 and hour.

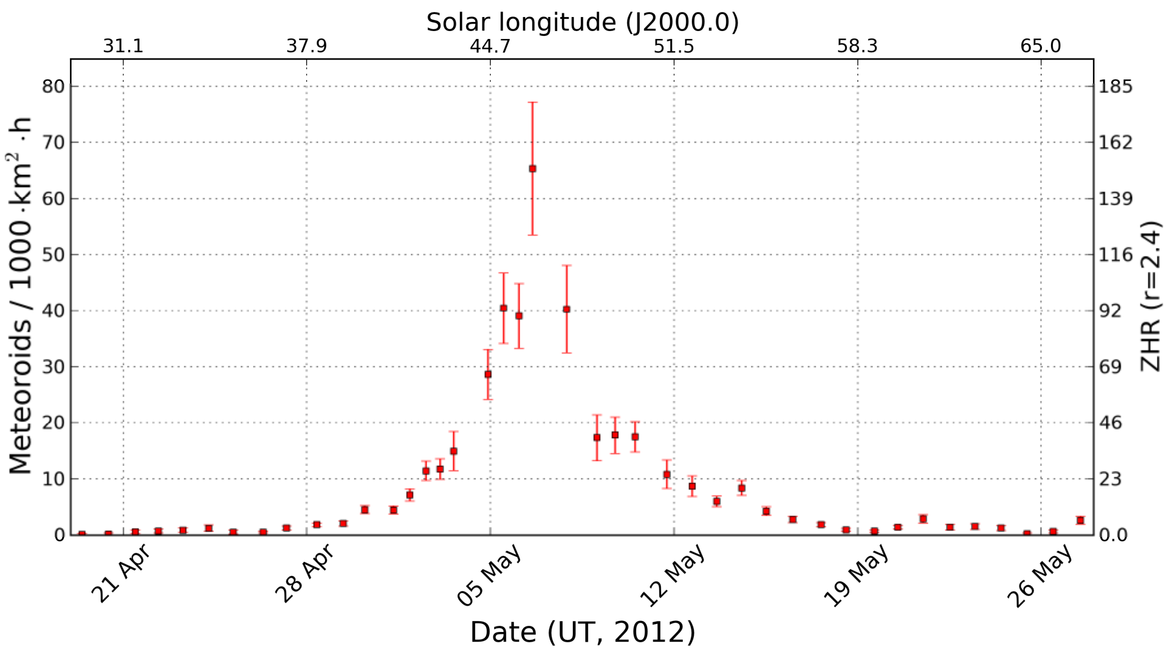

Figure 1: *Flux density profile of the eta-Aquariids in May 2012, obtained with a zenith exponent of 1.6.*

The second shower of the IMO Working List are the eta-Lyrids. They are active around May 10 and could be well covered by our video cameras. Figure 2 shows the flux density profile of this shower, determined from more than 400 shower members (with 2,600 Sporadics in parallel). The flux density hardly reaches a value of two meteoroids per 1,000 km^2 and hour, which gives a peak ZHR of the same value. So this shower won't thrill any visual observer. ☺

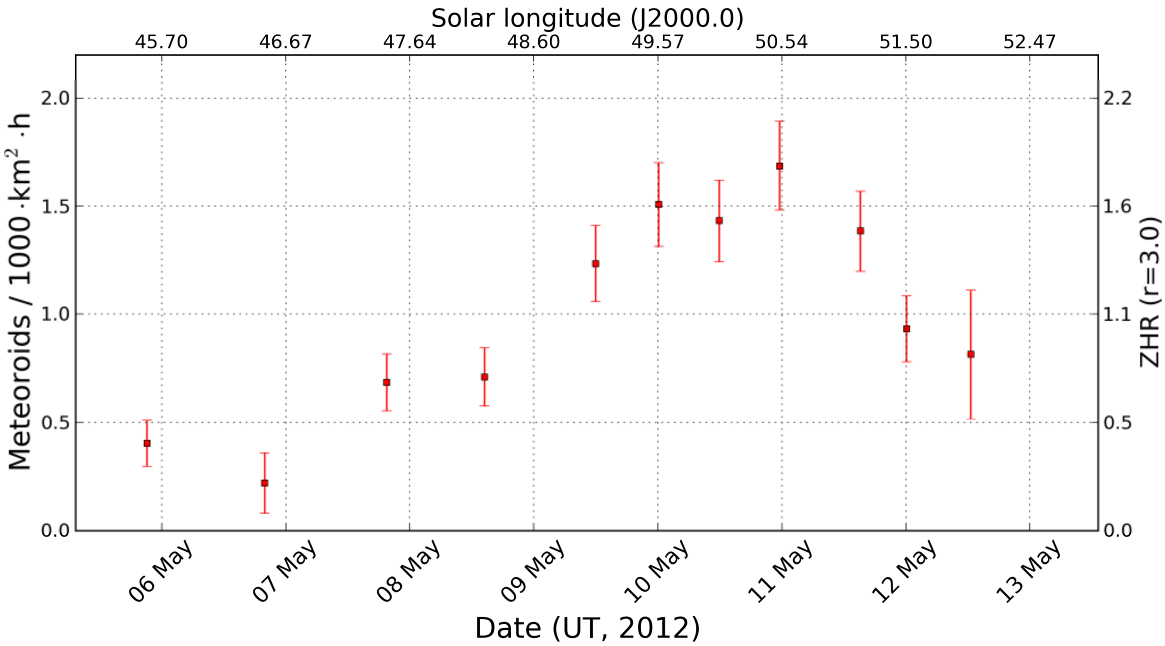

Figure 2: *Flux density profile of the eta Lyrids in May 2012.*

Also in this case, we find a good agreement in the flux density profiles of 2011 and 2012 between 45 and 53° solar longitude (figure 3).

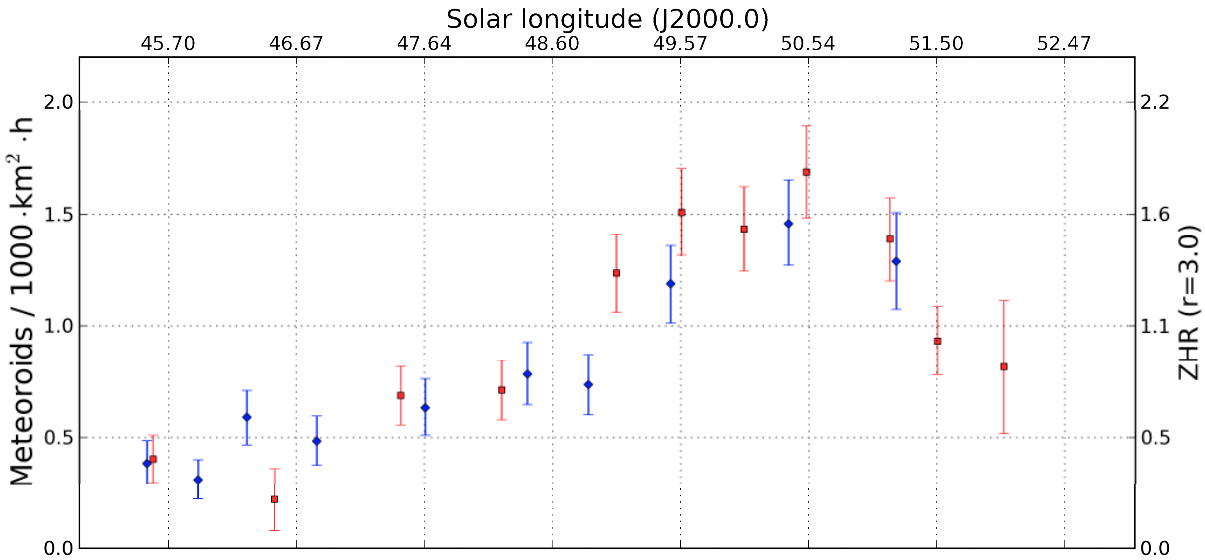

Figure 3: *Comparison of the eta Lyrid flux density profiles of 2011 (blue diamonds) and 2012 (red squares).*

As reported last month, we generated a new list of radiants per solar longitude interval and published it in the internet. Thus, everybody can verify his own meteor shower hypothesis with our data. In the last few days, the StrmFind tool, which is used to automatically extract meteor showers from the radiant list, was reworked. There were basically four changes.

The first modification was about the tracking of radiants. So far, meteor showers were determined „left to right". That is, new radiants we linked to existing radiant chains synchronously with increasing solar longitude. In particular at the beginning of showers, their activity is weak and the radiant position poorly determined, which is why there is the risk that wrong radiants are linked and that the raising edge of showers is less accurate.
The new procedure searches „forward backward". At first, the strongest not yet assigned radiant is determined over all solar longitudes. For this radiant, the extension is searched for forward and

backward in solar longitude. If no further extension is possible, the next strongest unassigned radiant is determined and the procedure is repeated iteratively.
A comparison shows, that both methods yield identical results at higher meteor shower activity, but the results differ at lower activity. The old procedure has sometimes problems with the onset of a meteor shower as described. In case of nearby showers as the Taurids, however, the new procedure may lead to „cannibalization“ among the showers.

The second change was the newly introduces rank of a shower. The rank of a radiants describes, at which position it is located in the sorted radiant list of that solar longitude interval. The rank of a meteor shower is the median rank of the individual radiant belonging to it. That value is useful to distinguish between real showers and chance alignments of radiants. In case of a shower with rank five, for example, the radiant was most of the time among the most active sources in the sky and the shower is with high confidence real. Also if the rank is ten, chances are good that it is a real showers, whereas a rank above fifteen may well be a chance alignment of weak radiants.

The third change relates to the MDC meteor shower list, which was updated in the software. Last but not least, an optional parameter was introduced that outputs the result not only in text, but also in HTML format ready for internet publishing.

The result of the new software was made available online at http://www.imonet.org/showers. There you will see, which meteor shower candidates were extracted from the radiant list, and how well they possibly fit to an MDC meteor shower. Note that there was no manual clean up or verification of the resulting list!

Beside the eta-Aquariids, eta-Lyrids and the minor showers presented in the last reports, the chi Capricornids (76 CCA) were identified, for example. With a rank of 13, this shower falls into the borderline category. However, checking the individual radiants there is almost no fluctuation in position and velocity between 56 and 61° solar longitude. Hence, even if the activity is very low, this shower seems to be real (table 1). For more details, please refer to the online shower list mentioned above.

Table 1: *Parameters of the chi Capricornids from the MDC Working List and the analysis of the IMO Network in 2012.*

Source	**Solar Longitude**		**Right Ascension**		**Deklination**		**Vinf**	
	Mean [°]	**Interval [°]**	**Mean [°]**	**Drift [°]**	**Mean [°]**	**Drift [°]**	**Mean [km/s]**	**Drift [km/s]**
MDC	58	-	314.3	-	-23.2	-	66.3	-
IMO 2012	58.5	56-61	304.4	+0.7	-15.3	+0.3	68	-

1. Observers

Code	Name	Place	Camera	FOV [^{o2}]	St.LM [mag]	Eff.CA [km^2]	Nights	Time [h]	Meteors
ARLRA	Arlt	Ludwigsfelde/DE	LUDWIG1 (0.8/8)	1488	4.8	726	8	36.6	31
BASLU	Bastiaens	Hove/BE	URANIA1 (0.8/3.8)*	4545	2.5	237	3	5.8	4
BERER	Berko	Ludanyhalaszi/HU	HULUD1 (0.95/3)	2256	4.8	1540	14	65.8	206
			HULUD2 (0.75/6)	4860	3.9	1103	14	53.2	135
			HULUD3 (0.75/6)	4661	3.9	1052	13	43.1	94
BIRSZ	Biro	Agostyan/HU	HUAGO (0.75/4.5)	2427	4.4	1036	26	126.3	200
BOMMA	Bombardini	Faenza/IT	MARIO (1.2/4.0)	5794	3.3	739	24	112.9	299
BREMA	Breukers	Hengelo/NL	MBB3 (0.75/6)	2399	4.2	699	16	60.6	75
			MBB4 (0.8/8)	1470	5.1	1208	16	53.3	53
BRIBE	Brinkmann	Herne/DE	HERMINE (0.8/6)	2374	4.2	678	22	94.2	178
		Berg. Gladbach/DE	KLEMOI (0.8/6)	2286	4.6	1080	25	100.1	151
CASFL	Castellani	Monte Baldo/IT	BMH1 (0.8/6)	2350	5.0	1611	18	54.3	165
			BMH2 (1.5/4.5)*	4243	3.0	371	20	56.0	160
CRIST	Crivello	Valbrevenna/IT	BILBO (0.8/3.8)	5458	4.2	1772	24	116.0	298
			C3P8 (0.8/3.8)	5455	4.2	1586	21	85.8	179
			STG38 (0.8/3.8)	5614	4.4	2007	24	102.5	339
CSISZ	Csizmadia	Zalaegerszeg/HU	HUVCSE01 (0.95/5)	2423	3.4	361	19	43.1	95
ELTMA	Eltri	Venezia/IT	MET38 (0.8/3.8)	5631	4.3	2151	20	92.4	203
GONRU	Goncalves	Tomar/PT	TEMPLAR1 (0.8/6)	2179	5.3	1842	18	103.5	280
			TEMPLAR2 (0.8/6)	2080	5.0	1508	17	113.8	243
			TEMPLAR3 (0.8/8)	1438	4.3	571	26	144.0	184
GOVMI	Govedic	Sredisce ob Dr./SI	ORION2 (0.8/8)	1447	5.5	1841	19	101.3	243
			ORION3 (0.95/5)	2665	4.9	2069	16	40.4	70
			ORION4 (0.95/5)	2662	4.3	1043	17	77.1	128
HINWO	Hinz	Brannenburg/DE	ACR (2.0/35)*	557	7.4	4954	14	49.2	277
IGAAN	Igaz	Baja/HU	HUBAJ (0.8/3.8)	5552	2.8	403	19	74.2	143
		Debrecen/HU	HUDEB (0.8/3.8)	5522	3.2	620	23	123.0	180
		Hodmezovasar./HU	HUHOD (0.8/3.8)	5502	3.4	764	22	118.9	164
		Budapest/HU	HUPOL (1.2/4)	3790	3.3	475	17	67.9	55
		Sopron/HU	HUSOP (0.8/6)	2031	3.8	460	27	112.0	350
JONKA	Jonas	Budapest/HU	HUSOR (0.95/4)	2286	3.9	445	23	103.2	143
KACJA	Kac	Kamnik/SI	CVETKA (0.8/3.8)	4914	4.3	1842	13	64.2	191
		Kostanjevec/SI	METKA (0.8/8)*	1372	4.0	361	8	42.7	53
		Ljubljana/SI	ORION1 (0.8/8)	1402	3.8	331	21	100.8	155
		Kamnik/SI	REZIKA (0.8/6)	2270	4.4	840	16	78.4	356
			STEFKA (0.8/3.8)	5471	2.8	379	9	44.0	64
KERST	Kerr	Glenlee/AU	GOCAM1 (0.8/3.8)	5189	4.6	2550	29	248.0	1904
KOSDE	Koschny	Izana Obs./ES	ICC7 (0.85/25)*	714	5.9	1464	25	173.5	1106
		Noordwijkerhout/NL	LIC4 (1.4/50)*	2027	6.0	4509	13	44.5	108
LERAR	Leroy	Gretz/FR	SAPHIRA (1.2/6)	3260	3.4	301	9	45.7	23
MACMA	Maciejewski	Chelm/PL	PAV35 (1.2/4)	4383	2.5	253	21	77.9	55
			PAV36 (1.2/4)*	5732	2.2	227	13	42.5	54
			PAV43 (0.95/3.75)*	2544	2.7	176	20	61.0	84
MARGR	Maravelias	Lofoupoli/GR	LOOMECON (0.8/12)	738	6.3	2698	29	155.3	298
MOLSI	Molau	Seysdorf/DE	AVIS2 (1.4/50)*	1776	6.1	3817	20	90.3	613
			MINCAM1 (0.8/8)	1477	4.9	1084	27	132.3	252
		Ketzür/DE	REMO1 (0.8/8)	1467	6.0	3139	24	106.9	450
			REMO2 (0.8/8)	1475	5.6	1965	23	104.4	201
MORJO	Morvai	Fülöpszallas/HU	HUFUL (1.4/5)	2522	3.5	532	23	104.0	128
OCAFR	Ocana Gonzales	Madrid/ES	FOGCAM (1.4/7)	1890	3.9	109	16	42.0	88
OCHPA	Ochner	Albiano/IT	ALBIANO (1.2/4.5)	2944	3.5	358	18	57.2	113
OTTMI	Otte	Pearl City/US	ORIE1 (1.4/5.7)	3837	3.8	460	24	105.9	235
PERZS	Perko	Becsehely/HU	HUBEC (0.8/3.8)*	5498	2.9	460	25	127.2	365
PUCRC	Pucer	Nova vas nad Dra./SI	MOBCAM1 (0.75/6)	2398	5.3	2976	16	65.8	166
ROTEC	Rothenberg	Berlin/DE	ARMEFA (0.8/6)	2366	4.5	911	3	11.1	18
SARAN	Saraiva	Carnaxide/PT	RO1 (0.75/6)	2362	3.7	381	21	120.1	144
			RO2 (0.75/6)	2381	3.8	459	21	119.3	136
			SOFIA (0.8/12)	738	5.3	907	18	87.9	68
SCALE	Scarpa	Alberoni/IT	LEO (1.2/4.5)*	4152	4.5	2052	18	81.5	176
SCHHA	Schremmer	Niederkrüchten/DE	DORAEMON (0.8/3.8)	4900	3.0	409	21	90.8	100
SLAST	Slavec	Ljubljana/SI	KAYAK1 (1.8/28)	588	-	-	17	28.8	55
STOEN	Stomeo	Scorze/IT	MIN38 (0.8/3.8)	5566	4.8	3270	20	100.4	375
			NOA38 (0.8/3.8)	5609	4.2	1911	21	99.2	318
			SCO38 (0.8/3.8)	5598	4.8	3306	20	103.6	411
STORO	Stork	Kunzak/CZ	KUN1 (1.4/50)*	1913	5.4	2778	3	4.5	27
		Ondrejov/CZ	OND1 (1.4/50)*	2195	5.8	4595	4	7.2	66
STRJO	Strunk	Herford/DE	MINCAM2 (0.8/6)	2362	4.6	1152	18	66.3	69
			MINCAM3 (0.8/12)	728	5.7	975	21	55.9	67
			MINCAM4 (1.0/2.6)	9791	2.7	552	15	60.7	35
			MINCAM5 (0.8/6)	2349	5.0	1896	23	79.2	118
TEPIS	Tepliczky	Budapest/HU	HUMOB (0.8/6)	2388	4.8	1607	25	116.7	298
TRIMI	Triglav	Velenje/SI	SRAKA (0.8/6)*	2222	4.0	546	19	45.5	138
YRJIL	Yrjölä	Kuusankoski/FI	FINEXCAM (0.8/6)	2337	5.5	3574	10	13.0	32
Sum							30	5936.7	15038

* active field of view smaller than video frame

2. Observing Times (h)

May	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
ARLRA	-	-	-	0.6	-	-	-	-	-	-	-	5.5	5.2	5.9	-
BASLU	-	-	-	-	-	-	-	-	-	-	-	1.3	2.6	-	-
BERER	5.6	4.2	-	-	4.1	-	-	-	6.9	5.6	3.3	-	-	-	-
	2.4	2.9	-	-	3.9	-	-	-	5.9	6.5	2.4	-	-	-	-
	2.5	2.2	-	-	3.8	-	-	-	3.0	5.3	1.6	-	-	-	-
BIRSZ	7.4	-	0.2	7.2	6.5	4.1	6.9	6.9	6.9	6.8	6.8	-	-	-	2.8
BOMMA	-	-	1.8	-	0.3	-	2.2	2.5	7.6	5.4	6.0	5.5	3.6	5.8	5.2
BREMA	5.6	-	-	-	-	-	5.9	1.9	0.3	-	2.5	-	5.6	4.3	2.8
	4.2	-	-	-	-	-	2.1	1.2	-	-	1.9	6.1	-	4.1	2.6
BRIBE	-	-	-	-	-	-	6.6	1.7	5.7	4.9	3.0	6.2	6.2	2.3	-
	1.8	4.1	1.0	-	-	-	6.0	1.7	4.6	4.3	2.8	6.2	6.2	3.4	-
CASFL	2.1	6.1	6.0	1.3	-	5.2	0.8	2.7	4.5	3.6	2.0	0.3	2.6	0.2	-
	0.7	4.8	4.9	-	-	2.4	-	1.7	4.6	6.6	3.9	-	2.8	3.0	-
CRIST	-	-	0.2	0.2	-	1.9	5.9	5.4	6.7	6.9	7.3	6.0	6.6	6.5	7.1
	-	0.4	0.2	-	-	5.5	-	2.7	6.0	7.3	7.4	3.1	6.3	5.0	7.1
	-	-	2.1	0.2	-	0.9	0.4	4.4	1.9	6.3	7.3	6.8	6.2	6.0	6.8
CSISZ	2.3	3.4	-	3.7	7.1	-	3.0	3.8	2.0	5.1	1.1	-	-	-	0.2
ELTMA	1.3	7.8	6.3	3.7	2.8	-	7.2	0.2	7.4	7.4	7.1	-	6.6	-	-
GONRU	2.9	-	-	-	6.5	1.3	-	4.9	8.0	-	-	-	-	7.7	6.5
	5.0	-	-	-	6.2	-	-	4.7	8.0	-	-	-	-	7.8	7.8
	4.3	2.9	3.6	5.3	6.8	-	-	5.6	8.0	4.7	1.8	7.5	6.5	2.8	7.7
GOVMI	7.1	5.3	-	4.8	7.3	-	7.1	7.0	6.5	6.5	6.8	-	-	-	-
	-	-	-	4.5	3.3	-	2.3	2.4	4.7	7.0	3.5	-	-	-	-
	-	4.2	-	5.5	6.9	-	6.1	5.8	6.3	6.2	7.0	-	-	-	-
HINWO	-	-	-	-	-	-	1.0	3.3	1.8	5.4	5.2	-	4.7	5.1	-
IGAAN	7.6	-	2.2	3.7	5.7	-	2.0	7.2	7.1	3.1	-	-	-	-	-
	7.5	5.8	-	5.1	6.3	3.4	-	4.7	7.2	7.1	7.0	-	-	-	1.1
	7.7	7.6	1.1	7.5	6.9	1.0	-	6.0	7.3	7.2	7.2	-	-	-	-
	0.3	3.6	-	7.4	7.1	1.6	-	4.7	1.1	7.1	6.8	-	-	-	-
	7.2	6.4	-	7.1	4.1	0.2	5.1	6.5	3.6	6.4	4.4	-	0.3	-	2.0
JONKA	3.8	7.1	-	4.3	7.1	-	-	7.2	6.8	7.1	6.8	-	1.0	-	-
KACJA	-	-	-	2.8	-	-	2.7	3.2	7.3	7.1	6.9	-	2.8	-	4.5
	2.4	4.6	-	-	4.6	-	-	4.2	-	7.2	-	-	-	-	-
	4.1	7.7	3.0	6.7	3.8	-	5.6	3.5	7.4	7.3	7.3	-	-	1.5	5.0
	-	-	-	3.6	-	-	3.3	4.3	7.4	7.4	7.2	-	3.2	0.2	4.6
	-	-	-	-	-	-	-	-	-	-	-	-	3.3	0.8	4.4
KERST	8.5	10.4	10.6	10.3	10.5	10.5	10.6	10.6	10.6	10.7	10.7	10.3	10.8	10.8	10.8
KOSDE	9.2	1.1	8.3	6.2	5.3	-	-	9.0	7.8	-	5.7	8.7	-	7.0	8.9
	2.9	-	-	-	-	-	-	-	-	-	2.0	3.2	5.8	-	-
LERAR	7.5	-	2.1	-	-	-	-	-	-	-	-	-	-	-	6.6
MACMA	0.9	1.7	-	1.6	-	2.3	-	-	4.7	6.8	4.9	-	6.6	-	-
	4.3	-	0.2	-	5.6	5.5	-	-	4.5	4.0	1.2	-	5.9	-	1.8
	1.3	-	-	1.1	1.0	2.6	-	0.2	2.7	3.1	1.3	-	2.6	0.2	-
MARGR	8.1	5.5	-	2.3	5.1	7.7	5.7	2.1	6.4	6.5	3.6	6.2	7.5	6.0	2.9
MOLSI	-	-	-	6.1	-	-	5.1	-	3.3	2.5	5.6	2.2	5.9	5.9	-
	3.5	-	4.1	7.3	4.5	2.6	6.0	0.6	6.5	6.9	6.1	2.7	6.7	6.7	-
	6.5	1.2	-	2.9	-	-	-	6.2	5.4	0.4	0.8	6.0	5.9	5.9	2.7
	6.1	1.3	-	2.6	-	-	0.5	6.1	5.5	-	-	6.0	5.9	5.8	2.1
MORJO	7.6	7.4	0.5	7.5	6.6	-	-	7.2	7.3	7.1	7.2	-	0.3	-	-
OCAFR	5.8	4.7	-	-	-	5.3	-	8.1	2.2	1.4	1.8	0.3	-	2.4	2.4
OCHPA	2.4	-	-	-	-	-	2.6	2.5	4.8	4.3	1.7	-	5.7	2.0	0.3
OTTMI	0.7	-	-	-	1.1	-	4.0	7.4	7.7	6.7	0.6	0.7	6.8	7.4	7.2
PERZS	5.9	2.2	2.1	4.3	6.5	0.6	5.7	6.6	7.3	7.3	7.1	-	-	-	6.0
PUCRC	2.5	4.7	6.2	4.4	1.1	-	2.1	-	3.3	6.3	5.0	-	-	-	-
ROTEC	5.4	-	-	-	-	-	0.5	-	-	-	-	-	-	-	-
SARAN	-	-	-	0.7	6.5	-	-	-	7.3	1.6	-	6.7	-	7.3	7.5
	-	-	-	1.1	6.2	-	-	-	7.4	1.6	-	6.1	-	7.1	7.6
	-	-	-	0.5	5.3	-	-	-	7.3	2.3	-	-	-	7.3	2.3
SCALE	-	-	3.7	2.4	1.1	-	7.3	-	6.2	7.0	6.1	-	2.8	4.4	-
SCHHA	0.5	1.5	-	-	-	-	6.8	3.2	4.6	4.0	5.1	6.4	6.4	-	-
SLAST	0.2	2.2	0.9	0.3	-	-	0.4	-	3.9	2.5	1.0	-	0.5	-	1.8
STOEN	-	7.9	4.4	4.3	2.1	-	7.8	-	6.9	7.3	7.6	-	2.2	5.0	-
	-	7.8	5.4	5.3	2.3	0.2	7.6	-	6.5	7.3	7.4	-	1.7	4.6	-
	-	8.0	6.1	5.4	2.7	-	7.8	-	6.8	7.4	7.6	-	2.0	5.0	-
STORO	-	-	-	1.8	1.7	-	1.0	-	-	-	-	-	-	-	-
	-	-	-	2.1	1.9	-	1.4	1.8	-	-	-	-	-	-	-
STRJO	0.3	-	-	-	-	-	1.8	-	3.5	-	-	5.4	5.3	4.7	-
	1.0	-	0.1	0.8	-	-	5.8	2.0	2.8	-	2.3	1.2	5.4	0.5	-
	2.0	-	-	-	-	-	5.4	-	2.8	-	-	5.4	5.4	4.5	-
	6.3	-	1.9	-	-	-	5.8	1.8	2.8	2.2	2.2	3.3	5.4	4.9	-
TEPIS	7.3	1.3	-	7.2	6.0	4.6	6.8	6.9	6.9	6.8	6.8	-	0.7	-	3.7
TRIMI	0.9	3.3	-	1.5	2.7	-	1.3	-	5.9	4.0	5.4	-	-	-	-
YRJIL	1.4	1.7	2.1	-	1.2	-	0.7	1.5	0.8	-	-	0.6	1.3	1.7	-
Sum	204.8	165.0	91.3	175.2	198.1	69.4	192.7	205.8	344.9	306.8	261.1	135.9	197.8	189.5	152.8

May	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
ARLRA	5.7	5.3	3.2	5.2	-	-	-	-	-	-	-	-	-	-	-	-
BASLU	1.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BERER	-	-	4.3	6.4	5.0	-	-	-	-	4.9	2.7	5.9	2.1	-	4.8	-
	-	-	3.7	4.2	6.4	-	-	-	-	4.3	2.7	4.3	0.7	-	2.9	-
	-	-	1.4	3.9	3.2	-	-	-	-	4.5	4.4	6.1	-	-	1.2	-
BIRSZ	3.4	6.4	6.4	6.3	6.3	1.4	3.2	2.6	1.2	4.0	2.6	4.8	3.6	5.8	5.8	-
BOMMA	7.4	5.2	7.0	7.4	-	-	-	2.0	1.1	5.0	6.6	2.0	6.9	5.1	4.3	7.0
BREMA	5.8	-	-	-	-	-	4.9	2.6	-	5.2	-	4.5	1.1	4.6	3.0	-
	1.4	-	-	2.0	-	-	4.7	-	5.3	5.2	3.7	3.9	0.9	4.0	-	-
BRIBE	6.0	-	1.4	4.1	5.1	5.4	2.9	5.5	5.5	5.4	5.4	-	4.7	2.5	2.9	0.8
	6.0	-	3.3	2.6	3.7	1.9	3.9	5.4	5.1	5.4	5.2	4.2	5.1	1.4	4.8	-
CASFL	5.2	-	-	-	-	-	-	-	-	-	-	0.2	5.1	2.8	3.6	-
	2.8	3.3	-	3.3	-	1.2	0.5	3.1	3.1	-	0.3	-	1.7	-	1.3	-
CRIST	7.0	4.7	6.9	4.2	-	4.8	-	4.0	2.4	-	3.8	0.4	6.6	5.9	4.6	-
	6.9	3.7	6.6	1.8	-	1.1	-	4.4	1.8	-	2.4	-	4.9	-	1.2	-
	6.7	4.6	6.8	4.2	-	-	-	4.4	3.1	-	5.1	0.4	6.4	4.7	4.7	2.1
CSISZ	-	1.2	4.7	0.3	1.2	-	-	-	-	0.2	0.2	2.2	-	1.1	0.3	-
ELTMA	-	-	7.1	7.0	-	-	-	2.5	3.7	-	0.9	-	4.9	3.4	3.8	1.3
GONRU	-	5.8	-	-	7.5	-	7.5	7.3	3.3	2.9	7.4	7.3	7.3	2.1	7.3	-
	-	5.6	-	-	7.4	-	7.5	7.4	3.3	7.0	7.5	7.4	7.3	6.6	7.3	-
	-	4.9	-	2.1	7.5	4.0	7.5	7.5	-	5.4	7.4	7.4	7.4	4.5	7.3	3.6
GOVMI	-	6.7	6.7	4.9	2.5	-	0.6	2.5	-	4.8	3.5	6.3	-	4.4	-	-
	-	4.9	1.0	1.0	-	-	-	-	-	0.7	0.6	1.8	1.2	0.3	1.2	-
	-	1.9	2.8	6.6	3.1	-	-	1.3	-	2.7	3.3	2.1	-	5.3	-	-
HINWO	-	-	-	-	-	2.2	-	1.1	4.9	5.4	3.7	-	-	4.3	1.1	-
IGAAN	-	5.6	6.8	1.7	1.4	-	-	5.1	-	4.6	1.9	5.6	-	0.3	1.0	1.6
	-	5.9	6.4	6.6	6.5	5.2	2.4	6.1	3.6	-	6.1	6.2	-	4.4	2.4	6.0
	-	2.1	6.4	6.8	6.8	-	-	6.3	2.6	4.3	-	6.2	2.9	6.2	6.3	2.5
	-	0.7	-	6.6	0.3	-	-	4.7	-	3.8	-	5.2	-	0.7	6.2	-
	3.2	6.5	5.8	6.2	3.7	2.9	4.2	1.4	2.7	2.9	5.5	4.8	2.4	3.4	3.1	-
JONKA	-	4.2	6.7	6.7	6.6	-	2.5	4.1	1.7	4.9	1.0	4.9	2.5	3.7	1.1	1.4
KACJA	-	3.5	6.3	6.2	-	-	-	-	5.9	-	-	-	-	5.0	-	-
	-	-	7.1	7.1	-	-	-	-	-	-	5.5	-	-	-	-	-
	1.9	4.8	7.0	7.0	-	-	-	1.6	4.0	2.7	3.8	-	-	5.1	-	-
	-	4.9	7.0	6.8	-	-	-	-	6.3	0.4	5.9	-	-	5.9	-	-
	-	5.3	7.2	6.8	-	-	-	-	5.6	-	5.3	-	-	5.3	-	-
KERST	10.8	10.0	8.2	3.1	9.9	9.2	4.8	0.3	0.4	-	5.9	10.8	9.7	5.3	2.9	-
KOSDE	6.3	-	-	2.5	3.4	8.7	8.7	6.5	8.6	7.0	7.1	7.1	4.7	8.6	8.6	8.5
	4.9	-	-	-	2.0	-	2.9	3.0	4.8	4.4	3.2	1.5	-	3.9	-	-
LERAR	6.6	5.1	2.9	2.6	-	-	-	-	6.2	6.1	-	-	-	-	-	-
MACMA	-	1.5	6.1	6.0	2.3	5.8	0.3	2.0	3.5	5.2	5.0	5.3	4.6	0.8	-	-
	-	1.3	5.7	0.7	-	-	-	-	-	-	-	-	-	-	-	1.8
	-	0.9	4.4	5.9	2.2	6.1	5.3	-	5.2	5.5	4.9	4.5	-	-	-	-
MARGR	4.5	5.8	-	4.9	4.3	4.3	6.0	4.7	6.4	6.0	2.3	3.7	5.8	7.0	6.3	7.7
MOLSI	5.5	5.3	-	5.5	1.7	5.4	-	4.2	5.2	5.2	5.2	1.2	4.3	5.0	-	-
	6.6	6.5	2.1	6.4	1.9	6.3	-	5.3	6.2	6.1	6.1	1.2	4.4	5.7	3.3	-
	5.7	5.5	2.2	5.5	5.1	4.6	4.9	5.2	5.1	5.1	-	4.5	4.7	4.9	-	-
	5.7	5.5	1.9	5.5	4.9	4.6	5.1	5.2	5.2	5.1	-	4.4	4.6	4.8	-	-
MORJO	-	5.0	2.3	6.8	6.6	-	1.8	3.8	-	5.0	1.8	5.0	1.0	1.4	0.3	4.5
OCAFR	-	-	-	-	-	2.6	1.4	1.4	0.7	-	-	-	0.6	0.9	-	-
OCHPA	6.6	2.0	3.7	3.5	-	-	-	1.9	2.1	-	-	-	3.7	5.5	1.9	-
OTTMI	7.5	7.6	6.3	4.5	1.4	5.9	4.6	4.2	2.1	-	3.7	3.9	-	3.1	-	0.8
PERZS	2.0	6.9	6.9	6.8	6.8	2.0	-	3.1	-	5.4	5.6	6.4	-	6.3	4.8	2.6
PUCRC	-	-	-	4.8	-	4.9	-	1.7	6.6	5.5	6.0	-	0.7	-	-	-
ROTEC	-	-	-	-	-	-	-	-	5.2	-	-	-	-	-	-	-
SARAN	0.2	7.8	-	-	4.9	7.0	7.6	7.6	7.6	7.6	7.5	7.0	7.5	1.2	7.4	1.6
	0.8	7.8	-	3.0	3.6	6.5	7.6	7.6	7.5	7.4	7.4	6.1	7.5	-	7.4	2.0
	-	6.5	0.2	-	3.9	5.7	7.3	7.4	6.5	7.0	6.3	-	6.8	-	5.1	0.2
SCALE	6.3	6.9	6.8	4.1	-	4.9	-	0.7	-	-	-	-	5.6	2.7	2.5	-
SCHHA	6.2	-	-	1.9	4.8	1.7	5.8	2.8	5.6	5.6	5.5	4.1	5.4	-	2.9	-
SLAST	1.8	2.6	4.1	2.9	-	-	-	-	-	-	2.3	-	-	1.2	0.2	-
STOEN	7.4	4.9	6.9	7.1	-	3.2	-	2.1	-	0.5	-	-	6.7	3.1	3.0	-
	7.1	5.0	6.9	7.0	-	3.3	-	1.3	-	0.2	-	-	6.5	3.8	2.0	-
	7.4	5.0	7.0	7.0	-	3.1	-	1.6	-	-	-	-	6.6	3.2	3.3	0.6
STORO	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
STRJO	4.8	1.6	-	-	4.9	4.5	4.6	3.0	4.6	1.3	4.4	4.2	4.3	3.1	-	-
	5.1	1.2	-	-	4.7	2.6	1.8	1.0	-	4.5	3.5	2.0	4.3	3.3	-	-
	4.9	0.9	-	2.6	4.6	4.4	4.7	-	-	4.4	-	4.3	4.4	-	-	-
	5.1	1.8	-	2.9	4.8	4.5	4.7	1.7	-	2.3	4.4	4.4	2.5	3.0	0.5	-
TEPIS	2.5	6.4	6.4	6.3	6.3	0.4	-	-	1.0	1.7	2.3	3.4	3.2	5.9	5.9	-
TRIMI	-	1.6	6.1	2.2	0.9	-	-	0.3	4.8	0.3	0.7	0.7	0.4	2.5	-	-
YRJIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sum	203.6	236.6	237.1	268.0	180.1	152.3	142.2	182.5	187.3	211.0	215.5	199.8	206.2	205.0	161.8	56.6

3. Results (Meteors)

May	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
ARLRA	-	-	-	1	-	-	-	-	-	-	-	5	3	8	-
BASLU	-	-	-	-	-	-	-	-	-	-	-	2	1	-	-
BERER	21	10	-	-	16	-	-	-	28	21	10	-	-	-	-
	9	5	-	-	16	-	-	-	17	19	9	-	-	-	-
	6	7	-	-	11	-	-	-	7	14	6	-	-	-	-
BIRSZ	9	-	1	11	18	1	11	19	18	13	7	-	-	-	3
BOMMA	-	-	13	-	2	-	16	6	37	22	20	13	5	10	6
BREMA	2	-	-	-	-	-	4	4	1	-	2	-	17	2	3
	3	-	-	-	-	-	1	2	-	-	1	6	-	4	1
BRIBE	-	-	-	-	-	-	8	4	9	14	4	14	16	4	-
	1	7	1	-	-	-	4	2	10	10	3	7	12	2	-
CASFL	9	20	13	4	-	18	2	10	15	13	8	1	10	1	-
	3	12	13	-	-	12	-	4	14	19	7	-	9	7	-
CRIST	-	-	1	1	-	18	19	20	15	16	31	13	12	14	16
	-	1	1	-	-	19	-	14	10	11	22	6	11	9	12
	-	-	4	2	-	4	3	9	8	12	33	27	19	24	30
CSISZ	5	3	-	7	19	-	7	4	5	13	4	-	-	-	1
ELTMA	9	19	12	7	6	-	23	1	10	10	18	-	21	-	-
GONRU	8	-	-	-	19	1	-	5	25	-	-	-	-	21	12
	9	-	-	-	22	-	-	7	18	-	-	-	-	12	16
	2	1	2	6	9	-	-	8	15	5	1	15	11	3	8
GOVMI	9	3	-	16	21	-	22	11	17	23	21	-	-	-	-
	-	-	-	11	10	-	4	3	6	6	5	-	-	-	-
	-	6	-	12	12	-	6	7	5	14	12	-	-	-	-
HINWO	-	-	-	-	-	-	3	13	9	17	30	-	31	34	-
IGAAN	9	-	10	9	22	-	10	12	7	8	-	-	-	-	-
	12	8	-	6	8	3	-	12	18	14	16	-	-	-	2
	10	4	2	13	23	1	-	3	5	18	12	-	-	-	-
	1	2	-	4	9	1	-	1	3	7	4	-	-	-	-
	23	14	-	30	24	1	13	23	14	32	12	-	3	-	4
JONKA	8	10	-	10	17	-	-	10	11	9	5	-	1	-	-
KACJA	-	-	-	12	-	-	8	6	32	36	34	-	3	-	5
	4	9	-	-	13	-	-	5	-	6	-	-	-	-	-
	3	7	3	14	7	-	10	3	14	22	14	-	-	1	6
	-	-	-	14	-	-	18	3	44	32	39	-	9	1	18
	-	-	-	-	-	-	-	-	-	-	-	-	5	2	3
KERST	68	46	129	98	126	116	110	88	91	93	69	71	88	91	81
KOSDE	68	15	47	59	28	-	-	70	66	-	30	21	-	33	33
	4	-	-	-	-	-	-	-	-	-	6	6	20	-	-
LERAR	2	-	6	-	-	-	-	-	-	-	-	-	-	-	2
MACMA	1	3	-	3	-	1	-	-	7	4	3	-	7	-	-
	2	-	1	-	8	2	-	-	8	10	4	-	6	-	1
	4	-	-	4	4	5	-	1	4	8	5	-	7	1	-
MARGR	10	20	-	7	2	16	14	6	11	14	5	8	17	8	10
MOLSI	-	-	-	19	-	-	33	-	34	13	34	18	60	52	-
	7	-	12	19	3	6	14	1	14	9	17	3	17	9	-
	20	1	-	5	-	-	-	22	26	2	4	29	25	23	3
	13	2	-	4	-	-	2	16	17	-	-	15	19	6	6
MORJO	11	11	1	6	20	-	-	5	11	8	9	-	1	-	-
OCAFR	6	5	-	-	-	12	-	4	6	4	5	2	-	5	9
OCHPA	5	-	-	-	-	-	6	7	8	16	8	-	7	7	1
OTTMI	2	-	-	-	3	-	2	20	18	12	3	6	16	10	17
PERZS	9	4	1	31	25	2	16	19	23	25	24	-	-	-	17
PUCRC	4	20	18	12	2	-	1	-	15	21	13	-	-	-	-
ROTEC	7	-	-	-	-	-	1	-	-	-	-	-	-	-	-
SARAN	-	-	-	1	9	-	-	-	10	1	-	6	-	12	1
	-	-	-	4	16	-	-	-	14	1	-	5	-	13	3
	-	-	-	3	8	-	-	-	7	2	-	-	-	4	1
SCALE	-	-	6	6	4	-	21	-	13	17	7	-	7	11	-
SCHHA	1	2	-	-	-	-	11	5	5	6	6	6	12	-	-
SLAST	1	5	2	1	-	-	1	-	5	5	3	-	2	-	2
STOEN	-	30	12	18	7	-	35	-	20	23	19	-	15	16	-
	-	22	15	21	2	1	40	-	30	21	12	-	9	17	-
	-	31	17	21	11	-	41	-	21	29	20	-	8	29	-
STORO	-	-	-	13	7	-	7	-	-	-	-	-	-	-	-
	-	-	-	23	17	-	10	16	-	-	-	-	-	-	-
STRJO	1	-	-	-	-	-	3	-	1	-	-	6	6	3	-
	2	-	1	1	-	-	4	5	2	-	5	5	7	2	-
	1	-	-	-	-	-	1	-	3	-	-	8	4	2	-
	4	-	1	-	-	-	9	1	2	4	2	11	10	5	-
TEPIS	15	6	-	32	26	5	23	20	17	25	12	-	3	-	4
TRIMI	4	11	-	3	11	-	3	-	14	11	18	-	-	-	-
YRJIL	4	3	6	-	3	-	2	2	3	-	-	6	1	2	-
Sum	451	385	351	604	646	245	602	539	973	840	733	341	573	520	337

May	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
ARLRA	5	3	1	5	-	-	-	-	-	-	-	-	-	-	-	-
BASLU	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BERER	-	-	12	17	12	-	-	-	-	15	11	18	5	-	10	-
	-	-	7	10	14	-	-	-	-	11	4	7	2	-	5	-
	-	-	5	6	6	-	-	-	-	7	5	12	-	-	2	-
BIRSZ	4	16	4	13	7	1	4	1	3	11	2	8	4	6	5	-
BOMMA	26	15	19	24	-	-	-	1	1	6	16	2	11	8	8	12
BREMA	9	-	-	-	-	-	4	1	-	5	-	11	1	6	3	-
	3	-	-	3	-	-	2	-	9	5	1	3	1	8	-	-
BRIBE	17	-	2	8	7	11	1	6	10	13	3	-	16	5	3	3
	14	-	5	7	3	5	2	6	4	12	8	5	16	1	4	-
CASFL	15	-	-	-	-	-	-	-	-	-	-	1	12	6	7	-
	8	11	-	10	-	3	3	9	6	-	1	-	6	-	3	-
CRIST	27	4	11	7	-	14	-	7	5	-	6	2	16	13	10	-
	15	4	10	1	-	2	-	7	2	-	10	-	9	-	3	-
	34	4	27	9	-	-	-	18	11	-	15	3	17	3	20	3
CSISZ	-	2	6	1	2	-	-	-	-	1	1	8	-	5	1	-
ELTMA	-	-	16	9	-	-	-	3	14	-	1	-	10	7	6	1
GONRU	-	11	-	-	31	-	29	20	3	6	25	22	27	5	10	-
	-	10	-	-	16	-	19	16	8	10	16	19	20	9	16	-
	-	3	-	2	11	6	8	10	-	6	9	12	12	6	11	2
GOVMI	-	19	16	18	2	-	1	2	-	8	6	21	-	7	-	-
	-	9	3	2	-	-	-	-	-	2	1	4	2	1	1	-
	-	11	6	11	1	-	-	1	-	4	2	7	-	11	-	-
HINWO	-	-	-	-	-	28	-	2	29	36	22	-	-	20	3	-
IGAAN	-	6	6	5	4	-	-	6	-	7	3	12	-	1	1	5
	-	4	11	7	10	7	1	6	7	-	6	6	-	4	2	10
	-	6	7	12	6	-	-	9	2	5	-	8	2	8	5	3
	-	2	-	4	1	-	-	2	-	2	-	7	-	1	4	-
	8	23	11	14	5	4	9	3	7	9	18	19	10	11	6	-
JONKA	-	5	3	6	6	-	2	3	1	5	2	11	6	8	2	2
KACJA	-	12	13	1	-	-	-	-	17	-	-	-	-	12	-	-
	-	-	8	6	-	-	-	-	-	-	2	-	-	-	-	-
	6	8	9	11	-	-	-	2	3	1	4	-	-	7	-	-
	-	35	38	34	-	-	-	-	33	1	14	-	-	23	-	-
	-	11	17	6	-	-	-	-	7	-	5	-	-	8	-	-
KERST	67	78	71	12	48	39	18	1	1	-	38	70	64	29	3	-
KOSDE	16	-	-	19	26	45	59	51	57	56	54	44	48	68	41	52
	14	-	-	-	4	-	5	4	16	11	8	4	-	6	-	-
LERAR	3	2	1	1	-	-	-	-	4	2	-	-	-	-	-	-
MACMA	-	1	6	3	2	1	1	1	1	3	3	1	2	1	-	-
	-	2	8	1	-	-	-	-	-	-	-	-	-	-	-	1
	-	1	3	7	3	7	5	-	3	4	4	4	-	-	-	-
MARGR	11	8	-	12	6	2	13	8	10	17	9	10	9	11	14	10
MOLSI	41	36	-	28	4	43	-	30	40	43	19	4	31	31	-	-
	10	14	6	8	1	12	-	9	12	14	11	2	6	14	2	-
	30	24	8	33	9	17	18	33	34	31	-	24	20	9	-	-
	11	8	3	12	1	9	5	10	6	15	-	7	2	12	-	-
MORJO	-	5	4	8	6	-	1	2	-	6	1	6	2	1	1	2
OCAFR	-	-	-	-	-	8	8	6	2	-	-	-	3	3	-	-
OCHPA	6	7	8	4	-	-	-	4	1	-	-	-	4	5	9	-
OTTMI	14	16	9	3	2	9	14	20	8	-	10	9	-	10	-	2
PERZS	8	20	28	1	12	3	-	6	-	17	8	31	-	18	14	3
PUCRC	-	-	-	6	-	14	-	5	16	11	6	-	2	-	-	-
ROTEC	-	-	-	-	-	-	-	-	10	-	-	-	-	-	-	-
SARAN	1	11	-	-	6	3	11	8	10	13	11	7	9	4	7	3
	1	7	-	2	9	2	7	7	8	9	5	6	9	-	6	2
	-	4	1	-	6	3	3	6	5	5	4	-	3	-	2	1
SCALE	15	14	15	12	-	9	-	1	-	-	-	-	8	7	3	-
SCHHA	10	-	-	1	2	1	2	2	6	6	6	5	3	-	2	-
SLAST	4	8	8	5	-	-	-	-	-	-	1	-	-	1	1	-
STOEN	36	26	24	32	-	14	-	4	-	1	-	-	26	9	8	-
	26	17	23	23	-	6	-	2	-	1	-	-	13	12	5	-
	45	23	36	22	-	9	-	5	-	-	-	-	21	10	9	3
STORO	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
STRJO	10	2	-	-	3	6	2	2	7	4	3	3	4	3	-	-
	8	1	-	-	3	3	1	1	-	5	2	1	6	2	-	-
	3	1	-	1	1	2	1	-	-	3	-	1	3	-	-	-
	12	2	-	2	8	2	8	1	-	6	11	7	5	4	1	-
TEPIS	10	16	12	13	13	1	-	-	1	3	4	9	7	8	13	-
TRIMI	-	4	19	8	2	-	-	1	10	2	4	2	2	9	-	-
YRJIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sum	604	592	566	548	321	351	267	371	450	476	441	485	517	497	292	120