Results of the IMO Video Meteor Network – March 2014

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March 2014 was another record-breaking month. The lucky streak of the observers in northern Europe, which enjoyed unusually good weather in the previous months, continued. At the same time, also the observers in southern and eastern Europe finally experienced better observing conditions after a long lean period. In total, 58 out of 80 cameras, i.e. more than 70%, managed to observe in twenty or more nights. In three nights (March 12/13, 13/14 and 28/29) an amazing 72 cameras were active at the same time, which is another splendid result.
In the history of the IMO network there were just two months (October 2011 and August 2012) where we collected more than 10,000 hours of effective observing time. Thanks to the combination of perfect weather and still relatively long nights in March, we collected almost 12,000 hours this time, which set new standards. On the other hand, the typical "spring minimum" of meteor activity was particularly strong this year – 1.7 meteors per hour was the lowest average yield since 2005. Hence, when it comes to the sheer meteor number the month could obviously not compete with August or October, but never before were recorded more than 20,000 meteors in March.

After the two image-intensified cameras AKM I and II of the "Arbeitskreis Meteore" broke down recently, the German meteor observer society purchased another camera. This time we decided for a Mintron 12V6-EX without image intensifier, and a Panasonic 6 mm f/0.75 c-mount lens. This camera is operated by 18-years old Kevin Förster of Thuringia, who became the youngest video observer in Germany and maybe even of the whole IMO network. We wish him that his interest in astronomy will last for a long time.

Since March lacks interesting meteor showers, too, we will have a closer look at the video equipment this time. About a month ago, Sirko Molau met "veteran" lunar occultation observer Eberhard Bredner at a meeting of the German "Vereinigung der Sternfreunde" society, and by chance we came to a discussion about video cameras. The requirement of occultation watchers are partly comparable to ours, because occultation events are often faint and of short duration just like meteors. I was surprised to learn, that the occultists neither prefer the Mintron 12V6-EX nor the Watec 902H2 Ultimate, but rather another camera that I did not even heard of before: the Watec 910HX-RC

This camera is almost twice as expensive and offers also frame integration, which the Watec 902 does not have – but that's something you hardly gain from in meteor observation with the fast moving targets. Still my curiosity was created.
Thanks to the mediation of Bernd Gährken, Nimax GmbH (astroshop.de) was so kind and provided me with two cameras for testing, so that I could compare the Mintron and the Watec side-by-side under real observing conditions. I used a 6 mm f/0.75 Panasonic lens which is frequently used among meteor observers. Both cameras were set to 2x sense up (integration time 1/25s) which is the default setting for MetRec. The gain was turned to maximum (Watec: AGC high; Mintron: maximum manual gain) and the gamma value was set to 0.45 to enhance dark objects.

Skies in June are not perfectly dark, but visually I obtained a limiting magnitude of almost 6 mag in zenith. Already the first look at the monitor revealed significant differences. The video image of the Watec was much more noisy – in particular the vertical structures are disturbing – but many more stars could be spotted. In comparion, the Mintron has almost a noise-free image even at the highest gain level, but only fewer stars were visible (Figure 1). The night sky was recorded with both cameras about 15 minutes for later analysis. The two meteor cameras AVIS2 and MINCAM1 which were active in parallel detected only a minor change in limiting magnitude of about 0.1 mag, so that the observing conditions must have been almost constant.

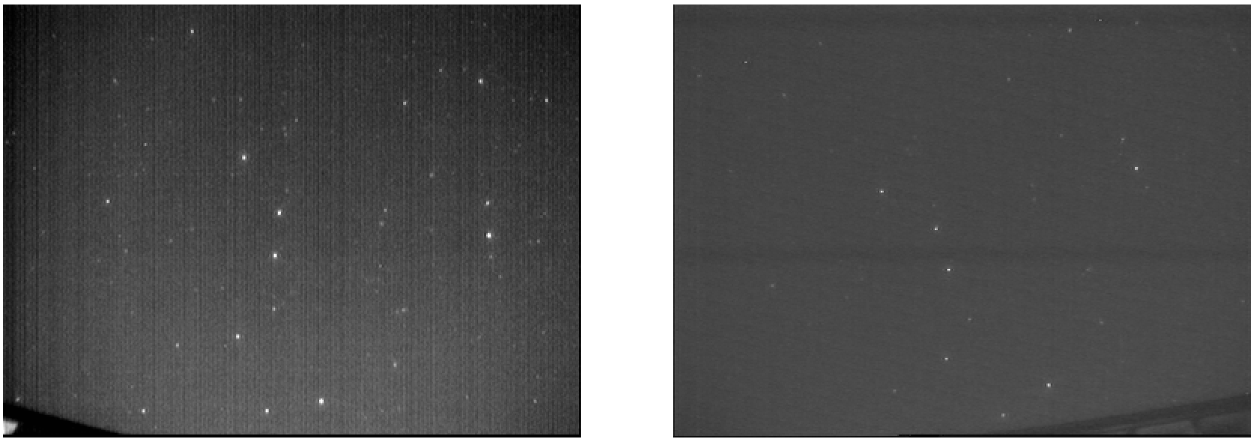

Figure 1: *Reference image of the Watec 910HX-RC (left) and the Mintron 12V6-EX cameras (right), averaged over 64 video frames.*

During the measurement of the reference image, 76 stars of the Watec image could be used, but only 46 stars of the Mintron. Now the question was: Would the noise of the Watec camera increase in the same manner as the object brightness and thereby kill the gain in limiting magnitude?

The faintest visible star in the field of view is no good indicator for the limiting magnitude, since it heavily depends on individual factors like the spectral class of a star. For this reason, MetRec uses similar to visual meteor observers a more robust procedure to determine the limiting magnitude. At first, all stars in the (slightly averaged) video image are segmented and identified. Based on a star catalog it is then determined, how many stars up to a given magnitude are located inside the field of view. A comparison with the measured star count yields the limiting magnitude. This way, individual stars with exotic spectral classes, double or variable stars have almost no impact anymore.

The operation area of both cameras differs significantly (the noise level of the Watec camera was about 24 brightness levels compared to only 6 for the Mintron), but the software will automatically adapt to that. For the Watec camera about 100 stars could be identified, which yielded a limiting magnitude of 5.5 mag. At the same time, only about 70 stars were found in the Mintron recording, which yielded 5.1 mag. So if you push the Watec 910HX-RC to the limits, it is indeed almost half a magnitude more sensitive than the Mintron 12V6-EX.

By chance, the Watec recorded also a faint meteor in the short interval, and that made me a little thoughtful since it was not well-defined but appeared a little fuzzy and unfocussed. So is the Watec camera in fact cheating by integrating over more than two frames in a sliding fashion? To be sure I conducted a few experiments with an "artificial meteor" (laser pointer) which did not harden my suspicion. It seems that only by chance I recorded one of those rare meteors which slowly desintegrate in full view of the observer.

What other differences are there between the Mintron and Watec camera?

- The housing of the Mintron is compact, but the Watec is really tiny. You can hardly build the camera any smaller.
- Both cameras offer frame integration, which is only of limited help for meteor observers but interesting for other astronomical purposes.
- Both cameras are configured via OSD (on-screen display) with five push-buttons. The buttons of the Mintron are directly integrated in the back of the housing, whereas the rc edition of the Watec comes with a small remote control connected via cable. That's very comfortable for the initial configuration of the camera, but a meteor observer will do the settings only once and never touch them again, which relativizes this advantage.
- Whereas the Mintron has only two setting for gamma correction (0.45 and 1.0), you can set the gamma of the Watec in steps of 0.05 and select also smaller values than 0.45. Additionally you can adjust the contrast linearly by setting the minimum and maximum

brightness value. Whether that can be used to further push the sensitivity could not be tested on short notice.

- Both cameras showed a few hot pixels, which you are not happy about when buying a new camera. These pixels were more obvious in case of the Mintron because of the lower noise level.
- If you switch off the AGC (automatic gain control), you can adjust the gain of the Mintron manually. The Watec, on the other hand, offers three AGC levels (low, medium and high) but you cannot set the gain level manually if you switch off AGC.

There are further differences between both cameras, but they are not really relevant to amateur astronomers.

Overall we can conclude that the Mintron costs significantly less than the Watec and yields more “aesthetic” pictures, but that comes at the cost of almost half a magnitude. It should also be noted that I was told that the latest edition of the Watec with serial numbers beyond 1000 is even more sensitive. Both cameras are well suited for meteor observation and in the end the observer has to decide which camera he prefers.

1. Observers

Code	Name	Place	Camera	FOV [°²]	St.LM [mag]	Eff.CA [km²]	Nights	Time [h]	Meteors
ARLRA	Arlt	Ludwigsfelde/DE	LUDWIG2 (0.8/8)	1534	5.8	2467	26	185.7	318
BERER	Berkó	Ludanyhalaszi/HU	HULUD1 (0.8/3.8)	5542	4.8	3847	12	100.5	285
			HULUD3 (0.95/4)	4357	3.8	876	4	31.4	23
BOMMA	Bombardini	Faenza/IT	MARIO (1.2/4.0)	5794	3.3	739	23	119.0	303
BREMA	Breukers	Hengelo/NL	MBB3 (0.75/6)	2399	4.2	699	24	200.1	173
			MBB4 (0.8/8)	1470	5.1	1208	22	158.5	131
BRIBE	Klemt	Herne/DE	HERMINE (0.8/6)	2374	4.2	678	28	181.7	254
		Berg. Gladbach/DE	KLEMOI (0.8/6)	2286	4.6	1080	25	196.2	242
CASFL	Castellani	Monte Baldo/IT	BMH1 (0.8/6)	2350	5.0	1611	24	217.7	419
			BMH2 (1.5/4.5)*	4243	3.0	371	25	210.3	294
CRIST	Crivello	Valbrevenna/IT	BILBO (0.8/3.8)	5458	4.2	1772	27	147.9	316
			C3P8 (0.8/3.8)	5455	4.2	1586	24	164.7	171
			STG38 (0.8/3.8)	5614	4.4	2007	24	182.5	372
DONJE	Donati	Faenza/IT	JENNI (1.2/4)	5886	3.9	1222	25	180.3	418
ELTMA	Eltri	Venezia/IT	MET38 (0.8/3.8)	5631	4.3	2151	22	118.4	187
FORKE	Förster	Carlsfeld/DE	AKM3 (0.75/6)	2375	5.1	2154	3	22.4	35
GANKA	Gansel	Dingden/DE	DARO01 (1.4/3.6)	7141	3.1	652	20	129.4	174
GONRU	Goncalves	Tomar/PT	TEMPLAR1 (0.8/6)	2179	5.3	1842	23	192.8	346
			TEMPLAR2 (0.8/6)	2080	5.0	1508	23	198.1	321
			TEMPLAR3 (0.8/8)	1438	4.3	571	26	196.4	168
			TEMPLAR4 (0.8/3.8)	4475	3.0	442	21	177.4	237
			TEMPLAR5 (0.75/6)	2312	5.0	2259	26	185.9	243
GOVMI	Govedic	Sredisce ob Dr./SI	ORION2 (0.8/8)	1447	5.5	1841	25	182.1	267
			ORION3 (0.95/5)	2665	4.9	2069	12	74.0	90
			ORION4 (0.95/5)	2662	4.3	1043	23	53.8	143
HERCA	Hergenrother	Tucson/US	SALSA3 (1.2/4)*	2198	4.6	894	29	287.1	346
IGAAN	Igaz	Baja/HU	HUBAJ (0.8/3.8)	5552	2.8	403	13	90.0	88
		Debrecen/HU	HUDEB (0.8/3.8)	5522	3.2	620	26	207.9	206
		Hodmezovasar./HU	HUHOD (0.8/3.8)	5502	3.4	764	26	168.1	163
		Budapest/HU	HUPOL (1.2/4)	3790	3.3	475	21	58.7	55
JONKA	Jonas	Budapest/HU	HUSOR (0.95/4)	2286	3.9	445	25	149.1	164
KACJA	Kac	Kamnik/SI	CVETKA (0.8/3.8)	4914	4.3	1842	21	147.6	420
		Kostanjevec/SI	METKA (0.8/12)*	715	6.4	640	8	70.8	157
		Ljubljana/SI	ORION1 (0.8/8)	1402	3.8	331	15	69.0	47
		Kamnik/SI	REZIKA (0.8/6)	2270	4.4	840	18	131.3	419
			STEFKA (0.8/3.8)	5471	2.8	379	20	156.0	279
KISSZ	Kiss	Sulysap/HU	HUSUL (0.95/5)*	4295	3.0	355	22	134.1	62
KOSDE	Koschny	Izana Obs./ES	ICC7 (0.85/25)*	714	5.9	1464	20	143.7	820
		La Palma / ES	ICC9 (0.85/25)*	683	6.7	2951	25	165.5	954
		Noordwijkerhout/NL	LIC4 (1.4/50)*	2027	6.0	4509	16	118.1	195
LOJTO	Łojek	Grabniak/PL	PAV57 (1.0/5)	1631	3.5	269	18	132.2	100
MACMA	Maciejewski	Chelm/PL	PAV35 (0.8/3.8)	5495	4.0	1584	19	135.6	268
			PAV36 (0.8/3.8)*	5668	4.0	1573	20	158.1	300
			PAV43 (0.75/4.5)*	3132	3.1	319	19	115.3	74
			PAV60 (0.75/4.5)	2250	3.1	281	20	125.0	202
MASMI	Maslov	Novosimbirsk/RU	NOWATEC (0.8/3.8)	5574	3.6	773	16	90.4	221
MOLSI	Molau	Seysdorf/DE	AVIS2 (1.4/50)*	1230	6.9	6152	20	163.3	777
			MINCAM1 (0.8/8)	1477	4.9	1084	27	222.3	344
		Ketzür/DE	REMO1 (0.8/8)	1467	6.5	5491	27	186.8	586
			REMO2 (0.8/8)	1478	6.4	4778	25	198.6	471
			REMO3 (0.8/8)	1420	5.6	1967	12	85.2	46
			REMO4 (0.8/8)	1478	6.5	5358	27	200.0	515
MORJO	Morvai	Fülöpszallas/HU	HUFUL (1.4/5)	2522	3.5	532	26	221.4	157
MOSFA	Moschini	Rovereto/IT	ROVER (1.4/4.5)	3896	4.2	1292	26	164.7	257
OCHPA	Ochner	Albiano/IT	ALBIANO (1.2/4.5)	2944	3.5	358	19	93.8	141
OTTMI	Otte	Pearl City/US	ORIE1 (1.4/5.7)	3837	3.8	460	19	113.3	187
PERZS	Perkó	Becsehely/HU	HUBEC (0.8/3.8)*	5498	2.9	460	26	183.8	278
PUCRC	Pucer	Nova vas nad Dra./SI	MOBCAM1 (0.75/6)	2398	5.3	2976	21	152.0	201
ROTEC	Rothenberg	Berlin/DE	ARMEFA (0.8/6)	2366	4.5	911	17	139.6	140
SARAN	Saraiva	Carnaxide/PT	RO1 (0.75/6)	2362	3.7	381	24	181.3	192
			RO2 (0.75/6)	2381	3.8	459	24	184.3	198
			RO3 (0.8/12)	710	5.2	619	23	184.4	249
			SOFIA (0.8/12)	738	5.3	907	24	194.4	154
SCALE	Scarpa	Alberoni/IT	LEO (1.2/4.5)*	4152	4.5	2052	4	25.3	24
SCHHA	Schremmer	Niederkrüchten/DE	DORAEMON (0.8/3.8)	4900	3.0	409	27	186.5	328
SLAST	Slavec	Ljubljana/SI	KAYAK1 (1.8/28)	563	6.2	1294	13	75.0	44
STOEN	Stomeo	Scorze/IT	MIN38 (0.8/3.8)	5566	4.8	3270	25	132.1	394
			NOA38 (0.8/3.8)	5609	4.2	1911	27	159.7	353
			SCO38 (0.8/3.8)	5598	4.8	3306	28	176.4	486
STRJO	Strunk	Herford/DE	MINCAM2 (0.8/6)	2354	5.4	2751	25	196.6	344
			MINCAM3 (0.8/6)	2338	5.5	3590	23	192.2	270
			MINCAM4 (1.0/2.6)	9791	2.7	552	20	137.5	168
			MINCAM5 (0.8/6)	2349	5.0	1896	24	185.7	266
			MINCAM6 (0.8/6)	2395	5.1	2178	27	190.6	256
TEPIS	Tepliczky	Agostyan/HU	HUAGO (0.75/4.5)	2427	4.4	1036	26	205.2	194
		Budapest/HU	HUMOB (0.8/6)	2388	4.8	1607	24	169.6	290
TRIMI	Triglav	Velenje/SI	SRAKA (0.8/6)*	2222	4.0	546	17	52.8	148
YRJIL	Yrjölä	Kuusankoski/FI	FINEXCAM (0.8/6)	2337	5.5	3574	23	140.8	196
ZELZO	Zelko	Budapest/HU	HUVCSE03 (1.0/4.5)	2224	4.4	933	13	31.6	65
			HUVCSE04 (1.0/4.5)	1484	4.4	573	10	29.0	58
Sum							31	11816.6	20247

* active field of view smaller than video frame

2. Observing Times (h)

March	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
ARLRA	10.4	10.9	8.6	-	-	7.8	5.8	10.6	10.5	10.4	10.3	10.2	9.4	3.3	-
BERER	-	-	-	-	-	-	-	-	-	-	-	10.3	10.3	10.4	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BOMMA	0.2	1.8	0.5	-	0.8	3.9	-	10.7	3.0	2.8	10.3	10.0	10.2	8.8	0.2
BREMA	3.3	11.2	11.2	6.1	11.0	11.0	6.3	10.9	10.7	3.0	10.6	10.6	8.8	1.1	-
	3.0	2.2	10.0	4.9	10.8	10.2	6.2	10.6	10.6	-	10.4	10.4	7.3	-	-
BRIBE	4.0	9.8	11.1	6.0	11.0	10.9	3.8	10.0	10.8	8.1	10.5	10.5	10.5	2.4	-
	4.7	9.3	10.7	4.7	10.5	10.9	2.6	10.8	10.8	10.6	10.4	10.3	9.1	3.4	-
CASFL	-	0.9	4.0	4.3	11.2	10.1	9.8	11.0	10.9	10.0	10.2	9.0	10.7	10.6	10.0
	-	0.5	3.6	3.6	11.0	9.9	9.8	10.8	10.8	8.1	10.7	9.1	10.5	10.5	9.5
CRIST	-	6.2	-	4.1	3.0	10.8	10.8	9.4	5.4	0.6	9.1	8.4	4.5	5.3	4.0
	2.3	7.6	-	2.9	3.8	10.8	10.8	10.7	6.4	3.5	10.6	10.5	10.4	10.3	6.4
	-	5.9	-	3.0	-	10.8	10.7	10.7	9.5	2.4	9.7	10.5	10.5	10.4	7.8
DINJE	0.3	2.2	1.4	-	1.9	3.7	7.4	10.9	8.9	7.6	10.8	9.7	9.9	10.4	-
ELTMA	-	-	1.5	-	5.4	10.8	3.6	10.9	6.0	1.7	10.7	9.7	1.2	6.4	-
FORKE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GANKA	2.1	9.9	8.4	9.5	7.0	9.9	5.3	10.4	9.8	4.2	7.4	7.7	4.9	-	-
GONRU	-	-	4.6	-	1.5	10.8	10.9	9.0	10.1	10.7	8.5	10.1	8.3	8.0	10.5
	-	-	7.0	-	3.8	11.0	11.0	8.9	10.2	10.8	10.8	9.9	7.7	8.0	10.6
	-	0.6	4.6	-	3.8	10.6	10.8	10.0	4.6	10.7	10.6	10.6	9.1	7.5	9.6
	-	-	5.4	-	-	10.9	11.0	8.9	10.3	10.7	10.8	10.8	6.4	3.6	10.2
	-	0.4	4.2	-	3.8	9.8	11.0	9.5	9.4	10.9	10.8	9.5	7.2	5.5	9.1
GOVMI	4.0	1.5	-	-	-	-	-	10.8	6.7	9.5	10.6	10.5	10.4	10.4	-
	1.0	-	-	-	-	-	-	6.9	-	1.8	10.6	10.0	9.2	8.7	-
	0.5	0.2	-	-	-	0.2	-	1.3	-	0.8	1.2	0.9	1.4	2.1	-
HERCA	-	-	5.0	8.6	11.2	8.8	10.3	11.1	11.1	11.1	8.9	7.8	9.2	10.1	10.2
IGAAN	10.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	11.3	-	2.8	-	-	-	6.3	10.8	10.5	7.0	10.6	10.4	10.3	10.4	4.8
	7.3	-	-	-	-	4.2	3.4	8.2	8.1	8.1	8.0	8.0	8.0	7.9	4.0
	10.3	-	-	3.8	-	-	1.8	10.9	10.8	1.7	1.2	1.0	0.3	1.0	2.3
JONKA	8.2	-	-	-	-	0.3	-	6.3	5.5	5.7	6.0	5.5	4.4	6.5	1.5
KACJA	-	4.2	-	-	-	3.4	2.8	10.7	6.5	3.0	8.9	10.4	10.4	10.3	1.0
	-	-	-	-	-	-	-	10.2	-	8.7	10.2	8.3	8.0	-	-
	-	-	-	-	-	2.9	0.7	10.2	-	1.4	-	6.4	3.8	8.2	1.6
	-	6.2	-	-	-	3.2	2.9	10.8	7.3	-	-	9.1	10.3	10.2	1.9
	-	5.8	-	-	-	3.5	2.7	11.0	9.3	3.7	9.0	10.7	10.6	10.6	3.1
KISSZ	11.3	-	-	0.5	-	-	-	-	8.4	0.4	10.1	0.3	0.7	10.2	4.8
KOSDE	-	-	-	10.0	3.7	0.3	6.8	2.5	-	-	6.8	7.2	6.1	3.7	10.2
	10.1	10.1	10.1	10.0	10.0	10.0	9.7	3.7	-	2.7	7.5	6.5	5.7	5.3	4.4
	-	-	7.4	6.5	5.8	8.1	-	-	7.6	-	9.1	9.0	-	-	-
LOJTO	6.9	3.7	9.6	-	-	-	-	8.8	10.4	11.0	10.7	10.7	9.8	8.3	-
MACMA	-	-	7.6	-	-	-	-	-	9.1	8.7	8.0	10.1	9.6	7.7	-
	-	-	8.7	-	-	-	-	7.1	10.9	10.8	10.7	10.7	10.6	10.6	1.8
	-	-	7.6	-	-	-	-	0.5	9.6	0.3	10.5	6.1	10.2	10.5	2.6
	-	-	7.7	-	-	-	-	8.2	2.8	10.5	10.3	10.4	10.0	1.0	3.0
MASMI	8.4	-	-	2.3	8.3	2.4	7.3	-	6.1	-	-	1.2	4.6	-	-
MOLSI	10.6	8.1	8.5	-	9.7	10.3	6.9	10.3	10.2	-	-	-	-	7.7	-
	-	8.4	6.6	-	9.5	11.0	7.1	10.9	10.8	10.7	10.7	10.6	10.5	8.3	-
	6.6	8.7	5.2	-	1.9	4.9	4.1	10.7	10.7	9.2	10.6	10.4	10.4	4.3	-
	11.2	10.3	9.2	-	-	4.9	4.7	10.8	10.7	8.9	10.5	10.5	9.9	-	-
	9.8	9.6	6.9	-	0.7	-	-	-	9.1	-	10.6	6.3	5.3	-	-
	11.1	10.0	8.8	1.2	1.5	4.9	4.3	10.5	10.8	9.3	10.6	10.5	10.5	3.7	-
MORJO	11.3	-	3.5	-	-	3.3	-	10.9	10.8	9.4	10.7	10.5	10.5	10.6	6.8
MOSFA	-	1.8	2.9	2.8	11.2	11.2	9.3	9.1	8.4	1.5	7.5	8.2	8.0	6.8	2.3
OCHPA	-	-	-	-	1.8	1.7	2.4	1.3	1.7	0.7	3.4	-	1.7	2.3	-
OTTMI	-	8.2	-	-	10.3	9.4	-	8.2	1.5	4.2	-	8.3	8.3	9.7	2.7
PERZS	8.4	1.8	-	-	-	4.3	0.7	10.6	7.7	8.7	9.0	9.5	9.4	8.7	-
PUCRC	-	-	-	-	-	1.5	1.7	10.6	8.5	-	10.5	10.5	10.7	10.5	6.2
ROTEC	9.1	11.0	6.3	-	-	8.0	3.3	10.6	10.6	7.9	10.4	10.3	7.0	-	-
SARAN	-	2.2	2.9	-	10.9	10.8	10.1	6.2	8.6	10.7	10.6	9.9	3.8	5.9	7.9
	-	1.0	2.7	-	10.9	10.9	10.3	5.2	7.1	6.4	10.3	10.6	8.2	10.5	10.5
	-	-	2.8	-	10.9	10.8	10.2	6.1	8.1	10.5	10.6	1.2	9.4	10.4	10.3
	-	2.7	3.0	-	10.9	10.8	10.0	5.9	8.0	10.7	10.6	10.6	8.6	9.0	10.5
SCALE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SCHHA	3.7	3.5	10.9	7.3	10.9	10.8	3.5	10.9	10.8	7.7	10.7	10.5	10.5	2.1	-
SLAST	-	-	-	-	-	-	-	-	-	-	5.8	6.1	2.9	4.1	-
STOEN	-	1.3	2.2	2.7	5.3	9.5	3.3	10.9	7.7	3.4	8.5	5.6	5.2	4.6	1.7
	-	1.9	3.3	3.6	5.4	10.5	3.6	11.1	5.7	3.8	10.5	10.8	10.4	9.6	0.9
	-	1.1	4.3	3.6	5.7	9.9	4.8	10.9	8.0	5.7	10.8	10.7	9.4	10.6	2.5
STRJO	5.1	10.8	7.8	6.7	10.3	10.5	3.9	9.9	10.3	10.2	10.2	10.1	8.1	1.5	-
	4.4	10.8	7.6	7.2	9.9	10.5	3.7	10.4	10.3	9.3	10.2	10.2	10.0	-	-
	-	10.5	5.8	4.9	0.4	10.4	2.6	9.5	10.2	6.6	9.0	9.9	8.1	2.0	-
	4.9	10.8	8.0	5.7	10.0	10.5	3.4	10.1	10.3	9.6	10.1	10.2	8.2	0.3	-
	4.7	10.8	7.5	5.2	10.0	10.5	3.9	10.0	10.4	9.7	10.2	10.1	10.1	1.8	-
TEPIS	10.2	-	-	3.4	-	9.1	0.4	10.7	10.6	9.1	10.5	10.5	10.4	10.3	6.0
	11.1	-	-	1.8	-	7.1	-	6.2	10.6	3.1	10.5	10.4	10.4	10.2	6.0
TRIMI	0.3	-	-	-	-	0.6	0.4	1.4	0.5	-	2.0	3.4	3.1	3.8	-
YRJIL	-	-	-	-	1.0	-	2.5	9.7	6.8	4.6	9.3	9.4	3.9	3.4	-
ZELZO	-	-	-	-	-	-	-	-	2.2	-	2.5	-	-	5.0	-
	-	-	-	-	-	-	-	-	-	-	4.1	-	-	3.2	-
Sum	242.3	256.4	290.0	146.9	298.4	460.5	323.4	604.3	567.1	425.3	643.6	634.8	573.4	460.5	219.4

March	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
ARLRA	-	2.5	-	2.1	9.6	3.9	3.2	1.2	0.6	6.7	9.4	9.3	4.6	9.1	9.1	6.2
BERER	-	-	-	2.4	10.1	9.5	9.0	-	-	-	9.8	4.0	9.1	6.4	9.2	-
	-	-	-	-	-	-	-	-	-	-	9.3	-	9.1	3.8	9.2	-
BOMMA	9.0	5.0	10.1	9.5	2.1	0.2	-	1.5	8.6	0.2	-	-	9.6	-	-	-
BREMA	-	-	-	9.6	6.7	4.9	9.8	-	9.7	9.5	6.5	8.9	9.4	9.3	-	-
	-	-	-	-	3.6	-	9.1	2.0	9.5	8.5	3.7	5.2	9.1	9.1	-	2.1
BRIBE	1.0	2.4	-	9.5	8.2	1.1	9.6	8.8	5.8	3.1	0.8	1.3	5.0	4.6	-	1.1
	4.4	-	-	8.7	8.1	-	6.8	-	9.7	7.2	1.9	9.4	9.4	9.4	-	2.4
CASFL	10.5	10.5	4.0	10.4	10.3	-	-	-	10.0	-	-	-	9.9	9.8	9.8	9.8
	10.3	10.3	3.5	10.2	9.2	-	-	-	9.6	-	0.2	-	9.7	9.6	9.6	9.7
CRIST	4.4	2.9	0.2	10.1	7.7	0.5	-	1.9	6.8	0.2	-	4.8	9.7	0.9	9.0	7.2
	-	-	-	9.5	7.7	-	-	1.0	6.8	-	3.4	4.8	9.7	4.1	9.6	1.1
	10.3	7.1	-	9.4	10.0	0.3	-	0.7	6.1	-	-	5.3	9.7	5.3	9.5	6.9
DINJE	10.4	5.1	10.3	10.2	7.1	-	-	3.0	9.4	0.5	-	-	10.0	10.0	9.9	9.3
ELTMA	0.4	-	-	-	8.5	5.7	-	1.7	2.5	1.4	-	2.0	8.7	9.8	9.5	0.3
FORKE	-	-	-	-	-	-	-	-	-	-	-	-	-	8.1	6.1	8.2
GANKA	-	-	-	7.9	1.2	-	3.1	5.5	7.4	6.9	-	0.9	-	-	-	-
GONRU	10.5	8.3	8.1	7.8	2.4	-	9.0	10.2	7.0	-	10.0	-	6.6	9.9	-	-
	10.6	7.2	8.2	7.9	3.1	-	8.0	10.1	7.1	-	10.0	-	6.4	9.8	-	-
	10.3	8.4	7.8	8.0	4.4	1.8	7.6	9.0	5.7	6.2	9.1	-	6.5	8.5	-	-
	10.6	7.0	-	7.8	3.1	-	8.3	10.1	6.7	-	9.7	-	5.5	9.6	-	-
	10.0	3.1	6.1	7.6	3.5	1.0	6.7	8.8	5.7	7.6	10.0	-	6.6	8.1	-	-
GOVMI	10.1	10.3	6.1	9.0	10.1	10.1	4.1	1.3	6.8	4.0	1.8	2.9	9.7	9.6	9.5	2.3
	6.7	5.7	1.4	6.3	5.7	-	-	-	-	-	-	-	-	-	-	-
	1.8	1.4	0.5	1.6	1.7	1.4	-	0.3	4.0	1.6	0.9	1.3	9.6	9.6	9.5	-
HERCA	10.9	10.8	10.8	10.8	10.5	9.0	10.7	10.5	9.9	9.3	10.5	9.5	9.9	10.2	10.0	10.4
IGAAN	-	-	-	2.2	10.0	9.9	6.1	2.4	4.6	9.7	-	0.9	9.4	9.6	9.5	5.5
	2.1	10.2	-	6.9	10.2	10.0	6.4	1.7	5.7	5.9	9.8	9.5	9.7	9.6	9.6	5.4
	3.7	5.0	4.9	7.4	7.8	7.6	5.5	-	7.0	7.6	2.6	4.8	7.5	7.5	7.5	6.5
	-	4.0	-	-	0.3	0.3	0.8	1.4	-	0.3	-	2.9	2.1	0.3	1.2	-
JONKA	2.7	5.1	0.6	5.8	6.3	5.6	8.8	-	6.4	9.9	8.4	8.4	8.6	9.7	9.6	3.3
KACJA	10.0	10.2	4.8	10.1	10.1	3.8	-	-	1.3	-	-	-	9.8	-	9.6	6.3
	7.6	-	-	-	-	-	-	-	-	-	-	-	9.0	8.8	-	-
	5.6	-	4.1	-	6.2	6.3	-	-	-	-	-	0.6	6.9	-	4.1	-
	7.8	10.3	3.8	8.6	10.2	3.8	-	-	-	-	-	-	9.4	-	9.8	5.7
	10.4	10.4	5.7	8.7	10.4	3.8	-	-	-	-	-	-	9.6	-	9.8	7.2
KISSZ	4.3	10.4	0.2	1.0	0.6	9.7	8.4	-	7.9	-	8.9	8.0	9.3	9.4	9.3	-
KOSDE	8.9	10.1	10.1	10.1	8.9	-	-	9.9	9.9	8.4	9.9	0.2	-	-	-	-
	1.5	2.0	1.6	4.1	5.7	-	-	7.5	5.7	9.0	7.1	6.5	-	9.0	-	-
	3.5	-	-	8.9	-	8.8	6.4	3.5	8.7	-	7.7	-	8.6	8.5	-	-
LOJTO	2.0	-	-	-	2.9	-	8.0	-	-	-	2.0	-	9.4	6.8	5.1	6.1
MACMA	5.1	4.4	-	2.7	8.9	9.9	7.2	2.0	-	-	-	1.2	9.4	9.4	9.4	5.2
	2.8	6.5	-	2.9	9.9	10.0	7.2	-	-	-	-	3.2	9.5	9.5	9.4	5.3
	2.7	6.1	-	2.8	10.0	4.7	8.1	3.2	-	-	-	-	9.6	9.5	0.7	-
	2.5	6.5	-	2.1	9.7	9.9	7.9	-	-	0.5	-	-	2.8	6.0	7.6	5.6
MASMI	6.9	9.6	-	-	-	9.3	8.2	-	0.1	-	1.4	-	7.8	-	-	6.5
MOLSI	4.2	8.2	2.1	9.6	9.5	6.0	-	-	-	-	-	8.0	9.0	8.9	8.4	7.1
	5.0	7.3	1.4	10.0	10.1	7.3	-	0.4	2.6	9.2	9.7	9.7	9.6	9.6	8.7	6.6
	-	3.5	-	5.5	9.9	5.9	3.8	7.4	5.2	3.2	9.4	9.3	7.6	9.2	6.9	2.3
	-	3.2	-	5.7	9.9	5.4	3.9	7.5	4.8	4.4	9.5	9.4	7.8	9.3	7.9	8.3
	-	-	-	-	-	-	-	6.8	-	-	9.4	7.3	3.4	-	-	-
	-	4.7	-	-	9.9	5.8	3.5	7.6	4.5	4.4	9.6	9.4	7.5	9.3	7.9	8.2
MORJO	3.6	8.0	8.3	10.1	10.2	10.1	7.5	-	7.0	9.9	6.2	6.9	9.6	9.6	9.6	6.5
MOSFA	9.2	5.1	0.2	7.4	4.7	0.8	-	-	9.2	-	-	0.4	10.0	9.8	9.1	7.8
OCHPA	7.9	-	0.9	7.6	7.4	-	-	-	9.6	-	-	9.6	10.0	4.5	9.6	9.7
OTTMI	-	7.2	-	3.4	9.1	-	8.5	6.9	5.0	-	-	-	0.7	-	0.8	0.9
PERZS	-	8.2	1.9	7.5	10.2	9.4	5.9	1.5	9.4	6.0	5.9	5.2	9.5	9.7	9.6	5.1
PUCRC	6.4	10.2	6.8	9.8	9.3	5.4	-	6.2	-	-	-	1.4	9.0	9.0	5.6	2.2
ROTEC	-	-	-	-	9.1	4.5	-	-	4.0	-	9.4	9.1	-	9.0	-	-
SARAN	8.5	6.6	9.0	5.8	6.4	-	6.6	8.6	9.1	-	7.5	-	5.7	7.0	-	-
	10.2	10.4	9.9	6.5	5.7	-	6.1	8.1	8.9	1.4	6.7	-	5.8	-	-	-
	10.1	9.3	9.8	6.4	7.6	-	6.5	8.5	9.3	2.1	6.9	-	6.6	-	-	-
	10.3	8.1	8.7	5.0	6.6	-	6.3	8.8	9.6	-	7.2	-	5.8	6.7	-	-
SCALE	-	-	-	-	-	-	-	-	-	-	-	-	4.7	9.1	5.9	5.6
SCHHA	5.1	0.2	-	7.7	4.5	-	8.1	2.4	9.6	8.8	2.9	2.5	9.2	9.2	-	2.5
SLAST	5.6	5.6	-	9.7	9.7	9.1	-	-	3.6	-	-	-	4.0	5.2	3.6	-
STOEN	0.9	-	-	4.7	9.8	1.3	-	2.9	2.1	-	-	0.7	9.2	9.8	9.7	9.1
	2.6	2.4	-	4.4	9.9	1.3	-	3.3	4.3	0.2	-	1.2	10.0	9.9	9.7	9.4
	4.8	4.1	-	5.2	10.2	1.9	-	4.1	4.7	1.7	0.4	2.4	9.9	9.8	9.8	9.4
STRJO	-	-	-	7.5	9.6	7.1	6.6	3.2	4.2	7.3	9.1	9.1	8.6	8.9	-	-
	-	-	-	7.3	9.4	6.9	6.7	-	3.7	8.0	9.1	9.1	8.6	8.9	-	-
	-	-	-	-	-	-	-	-	3.0	5.7	9.1	9.1	8.5	8.9	-	3.3
	-	-	-	6.2	8.8	6.7	6.0	2.7	-	7.6	9.1	9.1	8.5	8.9	-	-
	-	-	-	7.3	8.9	5.8	5.8	2.6	3.6	7.3	9.1	9.1	8.4	4.1	0.7	3.0
TEPIS	4.1	8.3	-	3.2	10.0	9.7	8.1	-	6.4	9.0	8.9	9.5	9.5	3.1	9.4	4.8
	-	8.1	-	2.5	9.8	6.3	4.1	-	7.5	8.8	8.5	9.0	6.9	5.3	5.2	0.2
TRIMI	4.9	7.0	-	4.7	6.5	5.6	-	1.6	-	-	-	-	1.3	5.7	-	-
YRJIL	9.6	8.1	0.2	6.9	-	7.9	5.2	6.4	8.3	6.2	8.6	8.4	8.3	4.6	1.5	-
ZELZO	1.1	1.7	-	2.2	-	1.3	2.7	-	1.8	-	2.4	5.3	-	3.0	-	0.4
	-	2.1	-	1.0	-	2.3	2.0	-	2.4	-	2.2	6.0	-	3.7	-	-
Sum	346.4	366.4	172.1	441.4	525.4	296.6	307.9	226.7	376.1	235.4	341.6	292.0	575.1	527.9	381.3	258.0

3. Results (Meteors)

March	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
ARLRA	17	26	10	-	-	5	9	26	26	26	28	26	14	1	-
BERER	-	-	-	-	-	-	-	-	-	-	-	36	24	23	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BOMMA	1	6	1	-	4	11	-	22	8	7	28	28	13	27	1
BREMA	2	6	6	4	7	11	6	14	6	2	7	10	10	1	-
	2	4	6	1	11	6	10	4	10	-	13	6	5	-	-
BRIBE	2	7	17	10	20	11	3	14	20	6	12	15	13	1	-
	5	5	22	5	14	13	3	14	15	18	16	16	9	2	-
CASFL	-	1	9	7	20	31	17	19	22	8	28	16	22	28	14
	-	2	13	4	9	10	15	13	13	8	21	25	14	18	9
CRIST	-	5	-	9	1	16	25	29	15	1	25	18	22	26	16
	5	5	-	3	2	7	18	15	7	2	15	8	8	13	5
	-	1	-	1	-	20	28	15	18	5	23	32	27	28	18
DINJE	1	13	1	-	5	15	18	33	13	12	28	3	24	28	-
ELTMA	-	-	2	-	15	12	4	20	4	4	23	11	3	9	-
FORKE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GANKA	5	5	6	3	6	19	8	8	18	4	9	18	9	-	-
GONRU	-	-	4	-	5	26	30	25	31	31	24	23	9	4	13
	-	-	9	-	1	21	29	15	21	20	21	14	9	11	22
	-	1	2	-	1	4	16	6	2	16	10	14	12	4	7
	-	-	8	-	-	15	18	14	25	25	16	17	6	10	16
	-	1	4	-	2	15	19	11	17	9	21	10	8	6	12
GOVMI	5	1	-	-	-	-	-	24	2	7	18	15	14	24	-
	1	-	-	-	-	-	-	9	-	2	9	2	6	9	-
	3	1	-	-	-	1	-	8	-	5	6	6	9	14	-
HERCA	-	-	1	2	14	7	20	11	14	11	12	11	10	18	21
IGAAN	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	17	-	1	-	-	-	6	9	13	8	11	5	10	10	4
	6	-	-	-	-	2	6	8	8	6	13	9	3	4	3
	3	-	-	3	-	-	3	1	3	3	5	3	1	3	2
JONKA	12	-	-	-	-	1	-	3	7	8	16	10	6	5	3
KACJA	-	2	-	-	-	12	8	38	10	8	42	22	33	42	1
	-	-	-	-	-	-	-	22	-	9	38	18	21	-	-
	-	-	-	-	-	1	1	7	-	3	-	4	1	9	3
	-	10	-	-	-	14	6	45	33	-	-	32	51	25	1
	-	5	-	-	-	9	5	20	5	4	23	26	16	18	2
KISSZ	3	-	-	1	-	-	-	-	2	1	7	1	2	3	2
KOSDE	-	-	-	38	18	2	38	11	-	-	36	37	40	8	61
	59	71	82	57	59	66	57	11	-	14	55	62	49	15	42
	-	-	11	10	16	14	-	-	11	-	16	7	-	-	-
LOJTO	2	4	5	-	-	-	-	7	15	7	10	10	7	2	-
MACMA	-	-	8	-	-	-	-	-	23	26	30	23	22	7	-
	-	-	9	-	-	-	-	9	22	28	30	27	6	14	1
	-	-	1	-	-	-	-	1	8	2	8	2	7	6	4
	-	-	6	-	-	-	-	4	1	12	23	20	17	6	2
MASMI	25	-	-	4	8	1	20	-	18	-	-	6	8	-	-
MOLSI	10	53	28	-	51	51	15	74	67	-	-	-	-	8	-
	-	8	3	-	9	13	8	22	21	23	23	22	20	10	-
	20	33	13	-	1	9	9	30	55	32	66	57	46	4	-
	29	29	17	-	-	13	15	24	41	21	40	39	29	-	-
	1	2	2	-	1	-	-	-	8	-	14	2	1	-	-
	23	34	8	2	2	6	10	26	50	20	45	58	22	2	-
MORJO	10	-	2	-	-	1	-	7	11	10	12	10	5	8	4
MOSFA	-	5	8	9	19	20	7	9	17	3	16	25	15	12	2
OCHPA	-	-	-	-	3	2	8	6	4	4	8	-	6	8	-
OTTMI	-	21	-	-	12	13	-	14	2	3	-	15	6	8	19
PERZS	6	1	-	-	-	3	4	17	13	9	26	17	18	16	-
PUCRC	-	-	-	-	-	4	3	18	6	-	19	13	15	12	3
ROTEC	3	11	1	-	-	5	5	10	10	10	18	16	7	-	-
SARAN	-	1	3	-	18	11	8	4	8	20	14	14	3	10	5
	-	1	2	-	12	11	20	6	13	11	17	8	8	13	10
	-	-	3	-	14	16	15	4	7	5	7	8	3	15	16
	-	2	6	-	14	13	10	3	9	12	12	10	3	4	6
SCALE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SCHHA	11	2	18	14	16	17	12	14	29	5	20	25	11	2	-
SLAST	-	-	-	-	-	-	-	-	-	-	7	5	2	2	-
STOEN	-	8	7	8	36	39	12	20	11	9	38	24	16	14	7
	-	10	7	8	20	28	10	16	13	7	38	33	18	17	4
	-	5	13	8	43	37	22	33	15	9	55	44	26	18	4
STRJO	18	16	15	2	11	29	7	26	30	10	18	27	15	1	-
	8	14	7	6	8	13	6	14	34	6	9	31	15	-	-
	-	15	8	4	1	12	8	13	16	3	18	18	8	1	-
	12	18	11	3	9	19	6	11	23	9	15	27	8	1	-
	14	15	11	7	11	14	10	10	23	9	16	22	10	1	-
TEPIS	8	-	-	5	-	4	1	8	8	3	15	6	10	7	10
	13	-	-	3	-	12	-	10	12	4	11	20	12	13	9
TRIMI	2	-	-	-	-	3	2	8	3	-	15	12	6	11	-
YRJIL	-	-	-	-	7	-	2	15	7	7	7	12	4	1	-
ZELZO	-	-	-	-	-	-	-	-	5	-	8	-	-	9	-
	-	-	-	-	-	-	-	-	-	-	8	-	-	8	-
Sum	373	486	437	241	556	816	681	1037	1057	632	1411	1324	968	718	384

March	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
ARLRA	-	1	-	2	20	6	4	1	1	7	17	18	5	8	8	6
BERER	-	-	-	5	40	21	24	-	-	-	32	5	21	29	25	-
	-	-	-	-	-	-	-	-	-	-	8	-	4	5	6	-
BOMMA	22	7	30	17	4	1	-	5	31	1	-	-	28	-	-	-
BREMA	-	-	-	13	1	3	12	-	11	14	8	3	6	10	-	-
	-	-	-	-	3	-	10	1	8	6	2	8	6	6	-	3
BRIBE	2	3	-	12	12	4	12	11	13	7	1	4	12	9	-	1
	8	-	-	15	7	-	7	-	13	6	4	6	5	12	-	2
CASFL	27	30	9	17	12	-	-	-	25	-	-	-	20	14	13	10
	24	15	4	14	11	-	-	-	13	-	1	-	11	8	9	10
CRIST	14	4	1	20	6	2	-	6	9	1	-	9	11	1	15	9
	-	-	-	14	4	-	-	2	9	-	2	5	12	2	6	2
	19	19	-	26	9	2	-	4	5	-	-	17	28	2	12	13
DINJE	30	5	25	19	3	-	-	7	32	2	-	-	30	21	32	18
ELTMA	1	-	-	-	13	8	-	5	5	4	-	6	19	6	12	1
FORKE	-	-	-	-	-	-	-	-	-	-	-	-	-	22	4	9
GANKA	-	-	-	6	6	-	5	10	14	12	-	3	-	-	-	-
GONRU	8	3	6	8	1	-	17	18	11	-	21	-	13	15	-	-
	25	4	8	8	6	-	14	12	10	-	16	-	11	14	-	-
	6	4	3	3	2	3	4	9	3	8	8	-	7	13	-	-
	8	3	-	5	1	-	9	2	7	-	13	-	9	10	-	-
	14	3	3	7	3	4	9	11	8	11	14	-	10	11	-	-
GOVMI	19	15	4	16	19	9	1	2	17	2	1	4	8	18	21	1
	9	16	4	11	12	-	-	-	-	-	-	-	-	-	-	-
	11	9	3	9	11	7	-	2	7	3	2	1	6	8	11	-
HERCA	21	6	8	6	15	7	12	21	5	19	12	6	15	17	9	15
IGAAN	-	-	-	3	8	7	7	2	8	7	-	1	3	14	13	6
	5	11	-	13	13	6	5	5	7	5	9	11	6	6	9	1
	3	3	3	9	8	4	5	-	11	10	6	2	5	12	12	2
	-	5	-	-	1	1	3	1	-	1	-	6	4	1	2	-
JONKA	1	6	1	5	13	6	7	-	10	11	10	4	1	9	8	1
KACJA	32	34	7	39	30	7	-	-	1	-	-	-	19	-	28	5
	13	-	-	-	-	-	-	-	-	-	-	-	22	14	-	-
	4	-	3	-	2	4	-	-	-	-	-	1	3	-	1	-
	25	34	2	40	37	6	-	-	-	-	-	-	24	-	28	6
	33	26	3	22	16	6	-	-	-	-	-	-	20	-	19	1
KISSZ	1	3	1	1	2	3	6	-	4	-	5	4	2	5	3	-
KOSDE	56	73	58	72	55	-	-	58	51	49	56	3	-	-	-	-
	4	5	8	10	12	-	-	28	17	49	36	21	-	65	-	-
	5	-	-	11	-	24	9	7	16	-	11	-	11	16	-	-
LOJTO	3	-	-	-	4	-	7	-	-	-	2	-	3	5	2	5
MACMA	1	12	-	1	11	16	13	4	-	-	-	1	18	16	19	17
	8	19	-	1	22	14	12	-	-	-	-	2	24	23	18	11
	4	4	-	1	2	2	4	1	-	-	-	-	7	8	2	-
	6	5	-	2	17	14	12	-	-	1	-	-	3	11	28	12
MASMI	15	22	-	-	-	31	15	-	23	-	1	-	14	-	-	10
MOLSI	8	34	2	34	45	11	-	-	-	-	-	82	78	73	32	21
	13	8	1	22	26	6	-	1	1	11	24	16	11	12	4	6
	-	1	-	4	48	15	4	13	3	8	29	26	15	23	13	9
	-	1	-	2	29	16	2	11	4	4	26	27	9	20	11	12
	-	-	-	-	-	-	-	7	-	-	2	5	1	-	-	-
	-	3	-	-	35	20	8	23	6	7	29	23	14	16	12	11
MORJO	4	5	4	7	10	6	6	-	6	6	4	1	1	6	9	2
MOSFA	9	6	1	15	3	1	-	-	17	-	-	1	20	4	8	5
OCHPA	25	-	1	18	3	-	-	-	6	-	-	7	11	6	7	8
OTTMI	-	7	-	7	20	-	10	5	9	-	-	-	4	-	6	6
PERZS	-	20	2	15	16	13	4	3	10	2	5	2	12	19	21	4
PUCRC	11	15	6	15	16	3	-	12	-	-	-	3	7	14	3	3
ROTEC	-	-	-	-	18	1	-	-	3	-	8	5	-	9	-	-
SARAN	7	4	13	4	7	-	6	8	13	-	1	-	3	7	-	-
	12	5	14	2	2	-	7	6	4	1	8	-	5	-	-	-
	22	7	14	6	12	-	12	18	19	1	11	-	14	-	-	-
	7	2	9	1	3	-	3	6	10	-	3	-	2	4	-	-
SCALE	-	-	-	-	-	-	-	-	-	-	-	-	10	4	5	5
SCHHA	5	1	-	18	5	-	16	1	14	21	4	7	16	20	-	4
SLAST	2	2	-	4	5	3	-	-	2	-	-	-	2	6	2	-
STOEN	2	-	-	3	17	2	-	18	13	-	-	3	30	23	23	11
	2	2	-	4	13	1	-	18	15	1	-	5	29	15	12	7
	2	3	-	5	16	4	-	21	12	4	1	8	27	25	17	9
STRJO	-	-	-	9	14	4	14	4	9	8	13	19	9	16	-	-
	-	-	-	8	10	6	11	-	7	6	5	14	17	15	-	-
	-	-	-	-	-	-	-	-	1	4	8	12	8	8	-	2
	-	-	-	7	6	6	6	5	-	9	9	16	12	18	-	-
	-	-	-	9	10	2	7	1	2	6	11	12	12	8	1	2
TEPIS	5	4	-	4	12	5	9	-	11	12	9	18	7	5	4	4
	-	11	-	6	22	14	6	-	18	14	11	20	16	12	19	2
TRIMI	12	12	-	14	13	12	-	4	-	-	-	-	6	13	-	-
YRJIL	13	12	3	14	-	6	9	6	8	9	16	16	14	7	1	-
ZELZO	1	4	-	3	-	5	4	-	4	-	5	11	-	4	-	2
	-	4	-	1	-	5	5	-	5	-	4	10	-	8	-	-
Sum	649	582	264	744	910	395	394	426	637	370	544	520	908	886	585	312