Results of the IMO Video Meteor Network – June 2014

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June is presenting shortest nights to the observers of the northern hemisphere, but therefor the average hourly meteor rate is slowly increasing again (from 2.6 in May to 2.9 in June). For this reason our video meteor database contains virtually the same number of meteor in May and June. That picture was confirmed also in this year. The weather was still quite sympathetic to the observers, so that 56 out of the 78 cameras in operation managed to obtain twenty and more observing nights. With 18,500 meteors from 6,500 hours of effective observing time, we recorded a few hundred meteors more than in May, and almost 15% more than in June 2013. Remarkable is the low fluctuation: In the best nights „only“ 68 cameras were active, but even with the very short nights there were never fewer than 34 cameras in operation. TEMPLAR5 of Rui Goncalves was successful in every night of June.

Unfortunately, the rise of the average meteor count is no hint for increasing meteor shower activity. The June Bootids, the only June representative in the IMO working list of meteor showers, have not been active in the last four years. Even though we could assign almost 400 meteors to this radiant, it yields a flux density below 0.1 meteoroids per 1,000 km^2 and hour (figure 1). Chances are high that these are just sporadic meteors which accidentally aligned to the JBO radiant.

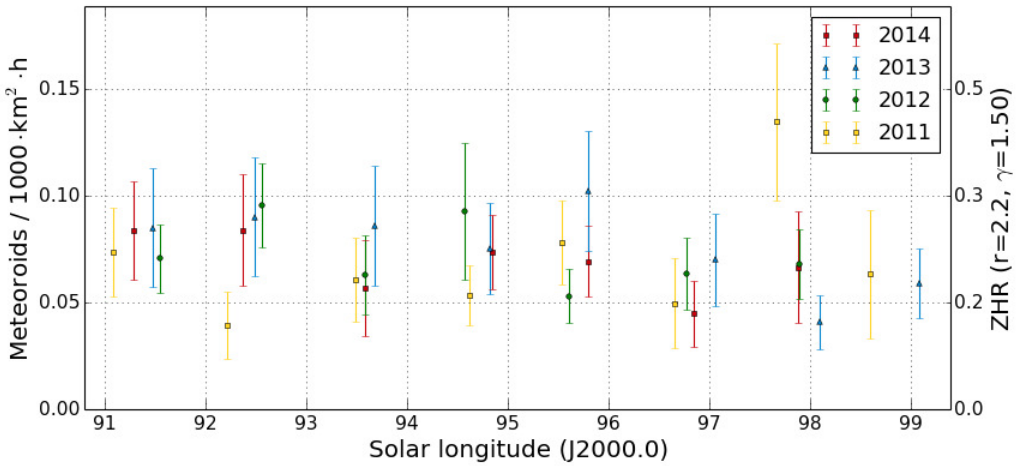

Figure 1: *Flux density profile of the June Bootids from observations of the IMO network 2011 till 2014. The shower does not stand out from the sporadic background in any of these years.*

The Antihelion source shows clear variations from one year to the next. If we average the data over the last four years, there is a slightly falling tendency starting at more than 4 down to about 3 meteoroids per 1,000 km^2 and hour (figure 2).

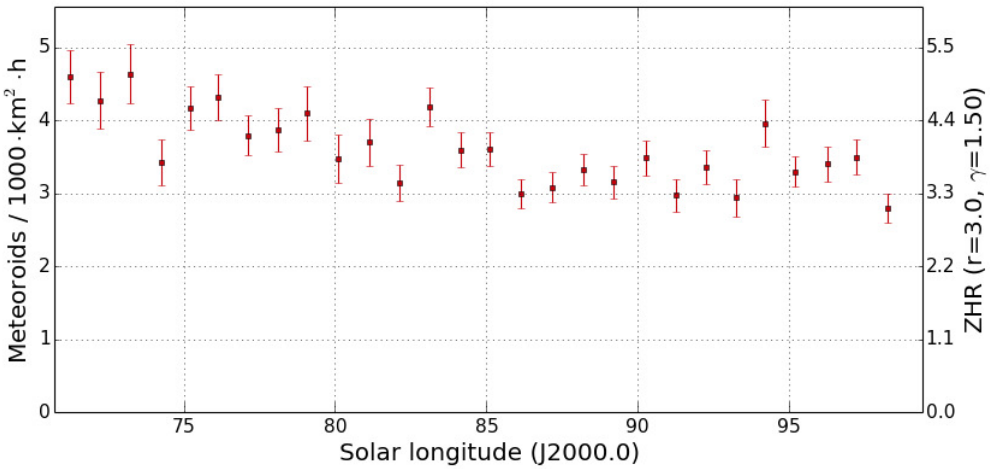

Figure 2: *Mean flux density profile of the Antihelion source in June from observations of the IMO network 2011 till 2014.*

A particular challenge for visual and video observers was invented by Jürgen Rendtel. At the 2014 IMC, he presented a lecture about „Daytime Meteor Showers“ and called for optical observations of the Daytime Arietids in June and the Daytime Sextantids in September/October. Thanks to their radiant position, these are the daytime showers with best chances for observation, but still they are almost exclusively covered by radar observations so far. At least we detected the Arietids in our 2013 meteor shower search based on 70 meteors between 74 and 79° solar longitude (peak at 77°). According to a radar study by Cambell-Brown, the Arietids with their population index of 2.75 should reach a visual peak ZHR of almost 200, i.e. be more active than the biggest nighttime showers. That's a good reason to have a closer look at.

Starting from 2011, we measured the stellar limiting magnitude with MetRec, so from this time on we can (re-)calculate the flux density of meteor showers. As expected, the data set is very small with just a hundred Daytime Arietids recorded since 2011 (40 of which in 2014). When plotting the flux density profile with flux viewer, you will first get an empty plot – no wonder since the minimum radiant altitude is set by default to 20°. Under such "perfect" conditions you will never record a Daytime Arietid, since the radiant is located only 35° west of the Sun. Most Arietids were recorded at about 10° radiant altitude, but none at 15° or higher (figure 3).

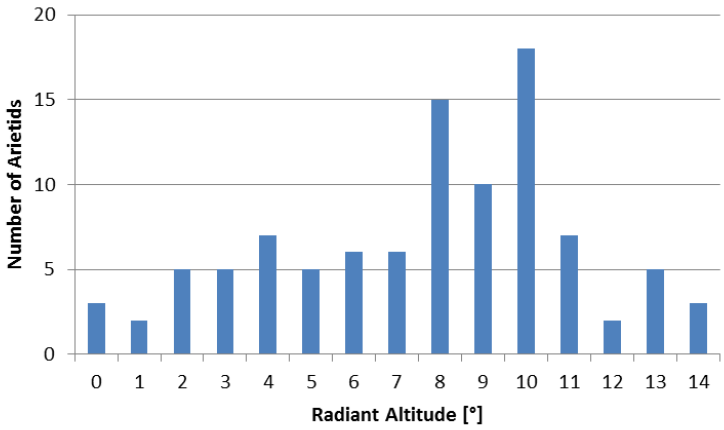

Figure 3: *Distribution of the Daytime-Arietids recorded in 2011-2014 over the radiant altitude.*

If the minimum radiant altitude is set to zero, the sobering activity profile presented in figure 4 is obtained. Instead of an activity peak we find a minimum at the expected time of maximum. Apparently the data set is still too small to obtain a reliable activity profile. Furthermore small systematic errors in the model will have a large impact under such extreme observing conditions (radiant at the horizon, observation at dawn).
The absolute value of the flux density depends significantly on the selected population index when the radiant is so low in the sky. At a moderate value of γ=1.5 we yield flux densities beyond 10 meteoroids per 1,000 km^2 and hour, and the ZHR is one order of magnitude smaller than the values extrapolated from radar data. At γ=2.0 all values increase by a factor of three.

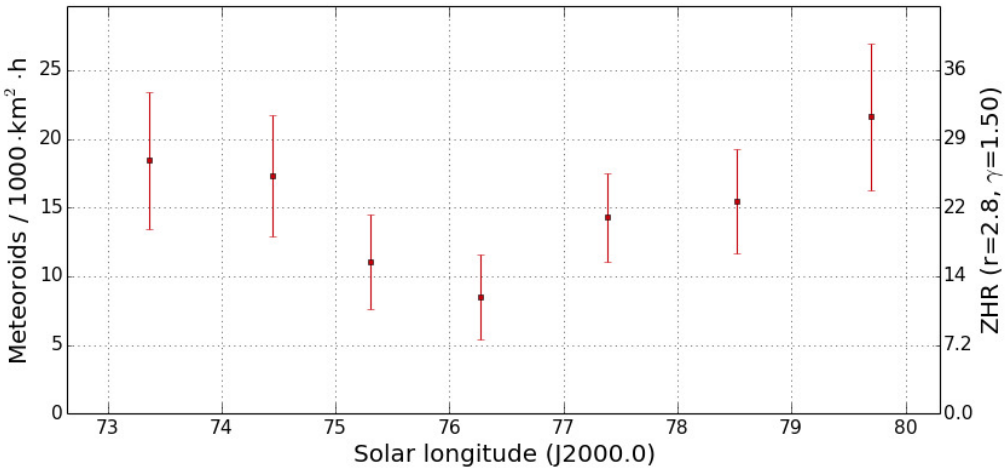

Figure 4: *Mean flux density profile of the Daytime Arietids from observations of the IMO network 2011 till 2014.*

In the end a last comparison: The total normalized collection area of the Daytime Arietids is only about 1/1,000th of the June Bootid collection area, which is why 400 JBO disappear in the sporadic background, whereas 100 ARI represent significant meteor shower activity.

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)	1475	6.2	3779	25	79.9	455
BANPE	Bánfalvi	Zalaegerszeg/HU	HUVCSE01 (0.95/5)	2423	3.4	361	16	15.0	96
BERER	Berkó	Ludanyhalaszi/HU	HULUD1 (0.8/3.8)	5542	4.8	3847	13	59.2	213
			HULUD3 (0.95/4)	4357	3.8	876	14	62.9	78
BOMMA	Bombardini	Faenza/IT	MARIO (1.2/4.0)	5794	3.3	739	26	131.0	363
BREMA	Breukers	Hengelo/NL	MBB3 (0.75/6)	2399	4.2	699	21	70.2	116
			MBB4 (0.8/8)	1470	5.1	1208	20	62.8	88
BRIBE	Klemt	Herne/DE	HERMINE (0.8/6)	2374	4.2	678	24	82.9	170
		Berg. Gladbach/DE	KLEMOI (0.8/6)	2286	4.6	1080	27	88.2	197
CASFL	Castellani	Monte Baldo/IT	BMH1 (0.8/6)	2350	5.0	1611	23	73.7	164
			BMH2 (1.5/4.5)*	4243	3.0	371	20	72.2	140
CRIST	Crivello	Valbrevenna/IT	BILBO (0.8/3.8)	5458	4.2	1772	27	129.8	322
			C3P8 (0.8/3.8)	5455	4.2	1586	28	115.8	239
			STG38 (0.8/3.8)	5614	4.4	2007	29	142.5	455
DONJE	Donati	Faenza/IT	JENNI (1.2/4)	5886	3.9	1222	26	141.7	524
ELTMA	Eltri	Venezia/IT	MET38 (0.8/3.8)	5631	4.3	2151	20	104.6	224
FORKE	Förster	Carlsfeld/DE	AKM3 (0.75/6)	2375	5.1	2154	17	59.3	135
GONRU	Goncalves	Tomar/PT	TEMPLAR1 (0.8/6)	2179	5.3	1842	28	163.2	524
			TEMPLAR2 (0.8/6)	2080	5.0	1508	28	164.9	409
			TEMPLAR3 (0.8/8)	1438	4.3	571	27	148.8	193
			TEMPLAR4 (0.8/3.8)	4475	3.0	442	29	155.9	378
			TEMPLAR5 (0.75/6)	2312	5.0	2259	30	161.5	367
GOVMI	Govedic	Sredisce ob Dr./SI	ORION2 (0.8/8)	1447	5.5	1841	24	81.5	286
			ORION3 (0.95/5)	2665	4.9	2069	19	66.0	104
			ORION4 (0.95/5)	2662	4.3	1043	23	83.9	123
HERCA	Hergenrother	Tucson/US	SALSA3 (1.2/4)*	2198	4.6	894	21	172.5	292
HINWO	Hinz	Schwarzenberg/DE	HINWO1 (0.75/6)	2291	5.1	1819	19	58.9	150
IGAAN	Igaz	Baja/HU	HUBAJ (0.8/3.8)	5552	2.8	403	25	117.3	167
		Debrecen/HU	HUDEB (0.8/3.8)	5522	3.2	620	22	107.6	159
		Hodmezovasar./HU	HUHOD (0.8/3.8)	5502	3.4	764	27	120.7	140
		Budapest/HU	HUPOL (1.2/4)	3790	3.3	475	23	102.5	65
JONKA	Jonas	Budapest/HU	HUSOR (0.95/4)	2286	3.9	445	25	118.9	166
KACJA	Kac	Kamnik/SI	CVETKA (0.8/3.8)	4914	4.3	1842	20	81.3	292
		Kostanjevec/SI	METKA (0.8/12)*	715	6.4	640	2	11.9	34
		Ljubljana/SI	ORION1 (0.8/8)	1402	3.8	331	21	88.1	86
		Kamnik/SI	REZIKA (0.8/6)	2270	4.4	840	21	92.8	430
			STEFKA (0.8/3.8)	5471	2.8	379	21	81.3	230
KISSZ	Kiss	Sulysap/HU	HUSUL (0.95/5)*	4295	3.0	355	24	66.3	67
KOSDE	Koschny	Izana Obs./ES	ICC7 (0.85/25)*	714	5.9	1464	27	155.1	1283
		La Palma / ES	ICC9 (0.85/25)*	683	6.7	2951	28	175.6	1550
		Noordwijkerhout/NL	LIC4 (1.4/50)*	2027	6.0	4509	16	45.4	112
LOJTO	Łojek	Grabniak/PL	PAV57 (1.0/5)	1631	3.5	269	3	7.2	9
MACMA	Maciejewski	Chelm/PL	PAV35 (0.8/3.8)	5495	4.0	1584	10	23.2	165
			PAV36 (0.8/3.8)*	5668	4.0	1573	12	24.8	155
			PAV43 (0.75/4.5)*	3132	3.1	319	8	34.2	32
			PAV60 (0.75/4.5)	2250	3.1	281	10	16.2	96
MASMI	Maslov	Novosimbirsk/RU	NOWATEC (0.8/3.8)	5574	3.6	773	23	29.0	130
MOLSI	Molau	Seysdorf/DE	AVIS2 (1.4/50)*	1230	6.9	6152	22	75.2	456
			MINCAM1 (0.8/8)	1477	4.9	1084	27	114.7	257
		Ketzür/DE	REMO1 (0.8/8)	1467	6.5	5491	25	85.4	434
			REMO2 (0.8/8)	1478	6.4	4778	24	85.0	341
			REMO3 (0.8/8)	1420	5.6	1967	12	38.8	38
			REMO4 (0.8/8)	1478	6.5	5358	24	83.3	396
MOSFA	Moschini	Rovereto/IT	ROVER (1.4/4.5)	3896	4.2	1292	23	31.0	128
OCHPA	Ochner	Albiano/IT	ALBIANO (1.2/4.5)	2944	3.5	358	15	63.0	74
OTTMI	Otte	Pearl City/US	ORIE1 (1.4/5.7)	3837	3.8	460	15	52.8	183
PERZS	Perkó	Becsehely/HU	HUBEC (0.8/3.8)*	5498	2.9	460	20	89.3	312
PUCRC	Pucer	Nova vas nad Dra./SI	MOBCAM1 (0.75/6)	2398	5.3	2976	20	80.2	184
ROTEC	Rothenberg	Berlin/DE	ARMEFA (0.8/6)	2366	4.5	911	18	61.3	97
SARAN	Saraiva	Carnaxide/PT	RO1 (0.75/6)	2362	3.7	381	22	114.3	160
			RO2 (0.75/6)	2381	3.8	459	24	118.6	206
			RO3 (0.8/12)	710	5.2	619	23	125.8	334
			SOFIA (0.8/12)	738	5.3	907	21	102.9	103
SCALE	Scarpa	Alberoni/IT	LEO (1.2/4.5)*	4152	4.5	2052	16	67.5	127
SCHHA	Schremmer	Niederkrüchten/DE	DORAEMON (0.8/3.8)	4900	3.0	409	25	88.4	172
STOEN	Stomeo	Scorze/IT	MIN38 (0.8/3.8)	5566	4.8	3270	26	93.0	375
			NOA38 (0.8/3.8)	5609	4.2	1911	25	91.8	305
			SCO38 (0.8/3.8)	5598	4.8	3306	25	90.8	399
STRJO	Strunk	Herford/DE	MINCAM2 (0.8/6)	2354	5.4	2751	25	62.7	144
			MINCAM3 (0.8/6)	2338	5.5	3590	23	53.2	136
			MINCAM4 (1.0/2.6)	9791	2.7	552	21	48.4	93
			MINCAM5 (0.8/6)	2349	5.0	1896	24	57.8	130
			MINCAM6 (0.8/6)	2395	5.1	2178	20	33.3	87
TEPIS	Tepliczky	Agostyan/HU	HUAGO (0.75/4.5)	2427	4.4	1036	24	104.8	146
		Budapest/HU	HUMOB (0.8/6)	2388	4.8	1607	24	57.5	280
TRIMI	Triglav	Velenje/SI	SRAKA (0.8/6)*	2222	4.0	546	18	50.1	150
ZELZO	Zelko	Budapest/HU	HUVCSE03 (1.0/4.5)	2224	4.4	933	7	14.4	36
			HUVCSE04 (1.0/4.5)	1484	4.4	573	7	15.2	37
Sum							30	6498.7	18493

* active field of view smaller than video frame

2. Observing Times (h)

June	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
ARLRA	4.8	1.7	-	2.7	4.6	4.5	4.0	3.5	4.1	1.5	0.8	3.8	-	4.3	4.3
BANPE	-	0.5	1.0	1.3	-	-	1.2	0.8	1.5	-	0.7	-	-	1.0	0.9
BERER	-	-	-	2.6	-	5.7	5.3	5.5	5.3	-	4.2	5.0	-	3.7	-
	-	-	-	5.9	-	5.8	5.4	5.8	5.4	-	4.2	5.7	-	3.7	-
BOMMA	6.9	0.4	4.6	3.7	6.8	6.6	6.3	6.6	6.6	6.6	6.4	2.6	2.7	-	-
BREMA	-	4.8	-	-	4.6	4.7	4.2	1.4	-	-	4.5	-	1.5	3.4	3.8
	4.8	4.8	-	-	4.2	4.6	2.5	1.4	-	1.0	4.5	4.5	0.9	3.2	3.7
BRIBE	-	5.1	2.5	-	4.9	4.9	3.7	2.2	2.7	-	4.6	4.6	3.7	4.2	2.6
	5.1	5.0	4.5	0.8	4.9	4.9	4.9	2.2	4.0	-	4.6	4.5	3.1	0.4	4.6
CASFL	-	3.2	5.5	1.6	4.9	5.7	6.5	6.3	3.6	6.4	0.7	0.2	0.4	-	-
	-	1.9	4.1	-	3.4	5.3	6.3	6.2	6.2	6.2	3.5	0.8	-	-	-
CRIST	5.7	6.4	5.2	2.0	6.3	5.9	6.3	6.3	6.0	5.3	2.9	-	1.6	-	-
	5.6	6.4	4.4	-	6.1	6.1	6.3	6.2	6.3	6.3	6.2	3.0	2.2	-	0.2
	6.2	6.4	5.5	2.9	6.3	6.0	6.3	6.3	6.3	6.2	6.1	2.7	2.7	-	0.2
DINJE	6.8	0.7	6.4	4.4	6.8	6.8	6.8	6.8	6.7	6.7	6.6	3.1	2.8	-	-
ELTMA	6.5	3.0	6.5	-	6.2	5.6	6.3	6.2	6.6	6.2	4.5	-	-	-	-
FORKE	4.3	4.3	2.3	-	2.6	4.1	3.6	4.0	4.0	-	-	3.9	0.4	-	4.6
GONRU	7.1	2.3	0.7	7.3	4.2	-	6.9	6.5	6.8	7.2	7.1	6.7	6.9	7.0	7.0
	7.1	-	3.0	7.4	1.6	2.0	7.3	6.3	3.6	7.3	7.3	7.3	7.3	7.3	7.3
	-	2.4	-	7.2	4.0	0.6	7.0	5.3	6.1	7.3	7.0	6.8	6.9	7.0	7.0
	7.1	1.2	3.1	7.4	1.0	0.4	6.4	6.2	2.5	7.3	7.3	7.3	7.3	7.3	7.3
	6.2	2.4	2.8	7.4	4.1	1.1	7.0	5.4	3.2	7.3	6.6	4.2	6.2	7.2	7.2
GOVMI	1.1	-	6.0	5.4	4.5	5.9	5.7	4.4	3.9	5.0	2.3	1.4	0.3	1.2	2.3
	1.0	-	5.6	4.2	-	-	3.2	4.1	1.4	2.8	0.4	-	0.3	-	3.0
	0.8	-	2.1	4.4	4.4	5.6	2.8	4.4	5.9	5.9	5.7	2.0	0.5	1.1	2.7
HERCA	8.2	8.3	8.5	8.5	7.9	8.5	-	-	-	-	-	-	-	-	-
HINWO	5.0	5.0	1.1	-	2.6	4.9	2.6	4.8	4.7	3.7	-	1.9	-	1.9	4.6
IGAAN	-	5.5	5.7	6.2	4.6	6.1	6.2	6.1	6.1	1.2	3.0	3.8	-	5.9	3.7
	-	6.0	5.8	5.9	6.0	5.7	5.6	5.6	5.8	-	5.6	-	4.8	4.9	5.6
	1.5	3.9	5.0	6.2	6.1	6.2	6.0	6.0	6.1	1.0	2.2	1.6	4.7	5.8	4.1
	0.3	-	-	6.0	2.2	5.8	5.9	5.9	5.8	4.5	5.9	3.6	4.2	5.8	5.8
JONKA	-	-	4.9	6.1	2.2	6.0	6.0	6.0	5.9	4.5	5.9	4.9	5.0	5.8	4.0
KACJA	2.9	4.7	5.6	2.0	3.6	5.8	6.2	6.0	5.8	3.9	3.5	-	-	1.1	2.0
	-	-	-	-	-	6.5	5.4	-	-	-	-	-	-	-	-
	3.5	3.9	3.4	-	4.8	5.9	5.9	6.0	5.9	5.8	5.7	-	0.6	-	1.8
	3.3	4.2	6.1	2.5	3.3	6.2	6.4	6.1	6.1	4.3	4.0	-	-	1.5	2.5
	2.4	4.3	5.3	0.8	2.2	6.0	6.2	5.9	6.1	4.3	2.8	-	-	1.2	1.5
KISSZ	-	-	0.3	0.3	-	5.8	1.1	5.5	5.5	1.5	-	1.1	0.5	5.4	5.0
KOSDE	8.1	7.5	4.7	5.6	8.0	7.9	5.0	6.0	8.0	8.0	-	4.0	8.0	8.0	-
	8.3	8.3	5.3	8.3	8.3	8.2	8.2	7.7	6.7	6.2	5.2	4.5	3.8	4.2	3.0
	3.9	3.9	-	-	3.7	3.7	-	-	0.7	-	3.5	3.4	-	-	-
LOJTO	-	-	-	-	-	-	5.0	-	-	-	-	-	-	-	-
MACMA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	5.0	4.8	3.6	4.7	4.6	1.9	4.7	4.9	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MASMI	0.7	2.6	-	-	2.3	-	1.5	2.1	2.0	-	1.3	-	0.8	1.0	0.5
MOLSI	4.9	3.3	4.8	0.4	4.8	4.7	4.7	4.7	4.6	4.6	3.9	2.6	2.8	3.1	4.1
	5.9	4.4	5.8	-	5.7	5.7	5.7	5.7	5.6	5.5	4.5	3.4	4.3	3.5	4.6
	4.7	4.5	-	4.5	4.6	4.4	4.0	2.3	3.7	1.1	3.0	4.0	2.4	4.1	4.1
	4.8	4.5	-	4.7	4.6	4.6	4.3	2.7	3.5	-	1.8	3.7	2.1	4.2	4.1
	-	-	-	-	-	-	4.2	-	3.1	-	2.3	4.4	2.4	4.4	-
	4.8	4.2	-	4.7	4.6	4.6	4.0	1.7	3.4	-	2.5	3.6	2.3	4.0	4.3
MOSFA	-	0.4	0.2	0.7	0.8	0.6	1.6	0.7	0.8	1.6	0.9	0.3	0.2	-	-
OCHPA	-	0.5	-	-	6.6	5.2	6.5	6.5	4.9	6.5	3.6	0.4	3.8	-	-
OTTMI	1.1	4.9	-	5.2	2.6	3.1	-	-	-	-	2.6	3.7	1.3	2.2	2.9
PERZS	4.0	2.7	6.3	6.1	-	6.2	6.2	6.2	-	-	-	0.8	-	5.2	1.2
PUCRC	5.9	-	-	-	6.2	5.8	6.2	6.2	6.2	6.0	2.5	2.2	-	0.8	-
ROTEC	4.6	-	-	2.5	4.5	3.9	3.6	3.2	-	2.2	-	-	-	4.0	4.0
SARAN	7.3	4.3	0.9	7.1	-	-	-	2.8	0.8	7.2	7.2	4.9	6.4	7.1	6.8
	7.4	4.3	0.7	7.1	-	-	2.1	3.4	3.2	7.2	7.2	6.8	6.9	7.1	7.2
	7.4	3.6	0.8	7.1	-	-	2.2	4.7	3.4	7.2	7.2	6.7	6.9	7.1	7.1
	7.2	3.8	0.9	7.1	-	-	-	-	-	6.5	5.9	4.1	4.1	5.6	6.6
SCALE	5.5	-	-	-	-	2.6	4.9	0.4	6.1	6.0	6.1	-	-	-	-
SCHHA	4.9	4.9	2.9	1.8	5.1	4.8	2.5	-	2.3	-	5.0	4.9	1.9	4.6	4.9
STOEN	4.2	2.5	5.2	0.3	6.4	5.3	6.1	5.9	6.4	5.6	3.2	-	-	0.2	0.2
	3.9	3.0	3.5	0.6	6.5	5.2	6.1	6.5	6.6	6.5	2.9	-	-	-	0.2
	4.2	2.7	5.0	0.6	6.1	6.4	6.4	6.2	6.3	6.4	2.4	-	-	-	0.3
STRJO	2.7	4.0	2.1	-	3.9	3.9	3.7	3.7	0.5	2.0	3.0	3.6	2.1	2.4	3.4
	1.5	4.0	1.8	-	3.8	3.9	3.2	3.7	-	2.2	3.1	3.6	1.7	2.4	3.6
	-	3.9	0.2	-	1.8	4.3	3.1	4.0	-	2.0	2.8	3.7	1.2	-	4.0
	2.6	4.0	1.5	-	3.9	3.9	2.2	3.7	-	1.7	2.7	3.6	1.8	2.4	3.3
	-	3.7	-	-	3.9	3.9	3.1	3.7	-	-	3.0	3.6	1.3	0.9	0.9
TEPIS	-	-	-	4.6	4.2	5.6	5.3	5.0	4.9	4.3	5.5	3.3	2.3	5.5	5.5
	-	-	-	5.7	4.2	5.6	5.6	5.6	3.2	2.2	1.4	1.1	-	2.3	2.3
TRIMI	2.0	-	4.3	-	2.8	1.6	2.7	3.9	2.7	3.8	1.4	-	-	-	0.6
ZELZO	-	-	-	0.8	-	-	-	-	1.3	-	-	-	-	-	3.5
	-	-	-	0.3	-	-	-	-	3.3	-	-	-	-	-	3.5
Sum	236.7	209.1	184.4	213.9	266.6	311.4	330.3	307.7	278.6	254.4	259.8	187.9	148.3	197.6	206.0

June	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
ARLRA	0.3	4.3	3.4	-	2.5	1.8	4.3	4.3	-	4.1	3.3	2.1	-	1.4	3.5
BANPE	-	-	0.5	-	1.1	-	0.3	-	-	-	1.1	-	1.3	0.2	1.6
BERER	-	-	1.8	-	-	4.0	-	-	5.2	-	-	5.5	5.4	-	-
	-	-	1.9	-	-	4.1	-	0.7	3.1	-	-	5.6	5.6	-	-
BOMMA	-	5.1	6.6	6.1	4.0	5.3	4.9	1.5	6.6	3.9	4.4	6.7	6.7	-	2.4
BREMA	-	4.4	1.6	-	3.9	2.4	3.7	2.3	4.1	3.7	4.4	1.5	-	0.9	4.4
	0.3	4.4	-	-	3.8	2.0	3.5	2.0	3.7	-	3.0	-	-	-	-
BRIBE	2.1	4.1	2.8	-	2.1	1.8	4.5	4.6	0.7	3.8	3.3	-	-	3.0	4.4
	2.1	0.5	4.2	-	0.7	4.0	4.6	4.6	1.0	3.6	2.7	1.0	-	1.2	4.5
CASFL	0.9	-	1.9	3.8	-	0.4	2.6	1.0	-	4.7	5.5	-	0.8	1.8	5.3
	1.0	-	2.3	3.3	5.3	-	2.0	-	-	4.2	4.5	-	0.3	1.6	3.8
CRIST	3.0	5.7	6.0	6.2	6.2	4.7	6.1	5.3	4.0	2.2	5.6	2.4	4.7	1.9	5.9
	1.8	3.5	6.2	6.2	3.7	4.1	4.1	3.6	1.1	0.2	3.9	0.2	4.3	2.0	5.6
	3.0	6.2	6.1	6.2	6.1	4.5	6.1	5.6	4.6	1.7	6.0	2.4	5.4	2.3	6.2
DINJE	-	4.9	6.6	6.1	4.7	6.3	5.4	2.9	6.6	4.4	5.3	6.6	6.7	-	3.8
ELTMA	-	5.9	4.0	3.5	2.7	5.0	-	-	-	3.6	5.8	6.6	6.0	-	3.9
FORKE	-	4.6	2.5	-	-	-	4.2	4.6	-	-	2.6	2.7	-	-	-
GONRU	7.0	6.7	5.0	3.8	4.1	6.8	5.5	3.0	5.9	-	7.1	7.1	6.8	7.1	3.6
	7.3	6.8	5.2	5.7	3.2	7.0	5.9	3.0	6.0	-	7.3	7.3	7.0	7.3	3.8
	7.0	6.9	6.1	4.6	1.4	5.6	4.3	-	4.0	3.0	7.2	7.2	7.1	7.2	2.6
	7.3	6.8	5.2	3.6	3.3	6.6	4.0	2.9	5.4	-	7.3	7.3	6.8	7.3	3.0
	7.2	6.0	6.7	3.8	3.8	6.1	4.3	2.9	4.8	5.5	7.3	7.3	6.7	7.3	3.5
GOVMI	-	-	1.1	1.2	3.6	2.4	3.5	-	-	1.0	3.7	5.5	5.1	-	5.0
	-	-	3.6	1.6	3.6	3.3	5.9	-	-	-	4.4	5.9	6.1	-	5.6
	-	-	3.9	-	1.4	3.6	5.1	-	-	0.5	3.7	5.8	5.9	-	5.7
HERCA	8.3	7.2	8.4	8.4	8.3	8.3	8.1	8.2	8.4	8.4	8.4	7.3	8.3	8.4	8.2
HINWO	-	3.3	1.8	-	-	-	2.1	4.5	-	-	2.3	1.8	-	-	0.3
IGAAN	-	4.8	5.9	4.7	4.6	-	1.8	1.8	-	1.4	5.9	5.9	6.0	4.8	5.6
	3.3	4.6	5.6	0.7	-	5.5	-	-	3.6	-	0.6	5.7	5.3	5.4	-
	-	5.0	6.0	5.2	2.3	1.8	4.9	-	0.9	-	6.0	6.0	6.0	5.6	4.6
	-	-	5.6	0.6	4.0	1.6	-	-	3.7	2.3	5.8	5.6	5.8	-	5.8
JONKA	-	4.3	5.8	-	4.4	3.1	2.9	1.4	4.3	2.0	5.8	5.9	5.9	-	5.9
KACJA	-	-	5.7	2.7	-	4.1	5.3	-	-	1.7	-	-	2.9	-	5.8
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	5.8	2.8	3.2	-	2.9	-	-	3.3	3.0	5.6	2.9	-	5.4
	-	-	6.0	3.1	4.3	5.8	5.5	-	-	2.0	-	-	3.7	-	5.9
	-	-	5.6	2.8	2.3	5.8	5.4	-	-	1.7	-	-	3.0	-	5.7
KISSZ	0.3	4.9	4.9	-	1.5	1.3	1.9	1.6	0.6	-	4.4	5.4	5.3	1.1	1.1
KOSDE	1.2	1.0	7.9	1.4	-	4.2	2.5	5.8	7.9	7.9	7.9	8.0	8.0	1.8	0.8
	2.4	4.5	5.0	5.3	6.5	6.8	-	-	8.2	8.2	8.2	8.2	8.2	3.3	4.6
	-	3.0	-	-	3.0	3.3	3.1	-	2.5	-	-	1.9	2.3	1.7	1.8
LOJTO	-	-	1.2	1.0	-	-	-	-	-	-	-	-	-	-	-
MACMA	1.8	2.1	2.5	0.3	1.8	-	-	2.6	4.4	1.3	-	4.9	1.5	-	-
	0.8	1.5	2.5	0.5	2.9	1.3	0.4	2.5	4.2	1.7	-	5.2	1.3	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1.2	2.0	2.2	-	-	0.4	0.8	2.9	3.8	1.9	0.2	-	0.8	-	-
MASMI	0.5	1.5	0.7	1.1	0.8	-	0.6	0.5	-	0.8	1.7	1.7	0.9	1.5	1.9
MOLSI	0.7	-	-	-	-	-	-	-	1.6	3.8	4.1	3.5	0.7	-	2.8
	1.4	3.0	5.5	2.8	4.5	4.0	5.1	0.5	1.7	5.5	5.5	3.7	-	-	1.2
	-	4.3	3.5	0.2	2.9	2.1	4.1	3.5	-	4.2	4.2	1.2	-	-	3.8
	-	4.3	3.6	-	2.8	2.5	4.2	4.1	-	4.2	4.3	1.5	-	0.2	3.7
	-	4.3	3.3	-	2.1	-	-	-	-	4.2	-	0.8	-	-	3.3
	-	4.3	3.5	-	2.6	2.7	4.2	3.7	-	4.2	4.3	1.2	-	0.2	3.7
MOSFA	-	-	1.8	3.7	5.7	0.2	1.9	0.7	-	2.8	2.1	-	0.2	1.2	1.9
OCHPA	1.0	-	-	3.4	6.2	1.6	-	-	-	6.3	-	-	-	-	-
OTTMI	-	-	-	-	4.5	6.2	-	-	5.4	-	-	5.8	-	-	1.3
PERZS	-	-	2.5	1.8	3.1	4.5	5.7	-	-	-	5.1	6.1	5.5	4.2	5.9
PUCRC	-	4.7	1.1	0.8	-	4.9	0.3	1.6	-	-	5.2	6.0	4.9	-	2.7
ROTEC	3.1	4.2	2.7	-	1.5	2.1	-	4.1	-	4.1	4.1	-	-	-	2.9
SARAN	-	-	7.0	6.1	-	2.4	-	3.3	-	1.7	7.0	7.2	7.0	7.0	2.8
	0.6	-	6.9	6.0	-	1.4	-	2.3	-	1.7	6.6	7.2	6.1	7.1	2.1
	-	-	7.0	7.1	-	3.0	-	3.6	-	2.7	6.9	7.2	7.1	7.1	2.7
	-	-	7.0	5.9	-	2.8	-	3.9	0.6	1.5	7.0	7.2	4.8	7.0	3.4
SCALE	-	3.9	-	4.9	1.9	4.7	-	-	-	1.7	5.7	5.0	5.1	-	3.0
SCHHA	1.9	1.1	4.8	1.9	2.5	3.5	4.9	4.9	-	2.9	2.0	-	-	2.8	4.7
STOEN	0.6	5.9	2.7	4.3	1.8	1.9	1.8	2.3	-	4.7	5.3	4.4	3.3	-	2.5
	0.2	6.0	1.9	4.8	2.2	1.6	1.6	2.1	-	4.5	5.1	4.1	3.4	-	2.8
	0.3	5.9	1.4	5.0	1.7	1.8	0.8	2.0	-	4.6	5.9	3.9	2.5	-	2.0
STRJO	1.8	3.5	1.4	-	1.6	1.0	1.3	2.4	-	3.5	3.6	-	-	0.7	0.9
	1.6	3.3	1.2	-	-	0.9	1.1	2.0	-	3.0	0.4	-	-	0.7	0.5
	-	2.0	0.7	-	1.4	0.7	2.0	2.3	-	2.8	4.2	-	-	0.5	0.8
	1.7	2.9	1.4	-	1.5	0.9	1.3	2.3	-	3.5	3.6	-	-	0.7	0.7
	0.2	0.8	0.2	-	0.3	0.4	-	0.7	-	0.9	1.2	-	-	0.3	0.3
TEPIS	2.2	4.7	4.9	3.5	5.4	-	4.6	-	3.6	1.2	5.5	5.5	5.2	-	2.5
	-	1.1	2.1	1.0	1.4	-	1.5	0.3	1.7	0.9	2.7	1.5	1.6	0.6	1.9
TRIMI	-	-	1.9	-	1.3	4.1	2.2	-	-	3.1	-	1.7	4.9	-	5.1
ZELZO	-	1.4	-	-	-	-	-	-	-	-	3.1	2.4	-	-	1.9
	-	1.7	-	-	-	-	-	-	-	-	2.2	1.0	-	-	3.2
Sum	87.4	209.8	264.3	169.5	180.0	207.0	191.6	139.2	133.9	178.9	286.5	263.9	239.1	126.4	228.5

3. Results (Meteors)

June	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
ARLRA	32	1	-	3	34	23	14	16	11	6	1	13	-	24	40
BANPE	-	2	7	8	-	-	8	6	9	-	5	-	-	10	5
BERER	-	-	-	11	-	17	20	14	19	-	12	25	-	16	-
	-	-	-	5	-	6	4	7	5	-	3	2	-	6	-
BOMMA	22	2	13	6	25	9	16	18	15	13	20	10	6	-	-
BREMA	-	6	-	-	15	6	4	1	-	-	4	-	1	6	4
	3	6	-	-	8	4	1	1	-	1	10	6	2	7	4
BRIBE	-	6	2	-	11	8	6	4	3	-	9	15	5	13	8
	14	11	6	1	9	13	9	3	6	-	9	14	11	2	16
CASFL	-	6	9	2	11	9	15	13	6	10	2	1	3	-	-
	-	2	14	-	4	8	13	8	6	6	4	1	-	-	-
CRIST	11	17	12	1	17	12	16	14	15	10	10	-	6	-	-
	12	12	12	-	13	10	13	16	14	9	10	2	3	-	1
	16	16	5	5	20	23	20	23	23	16	15	5	8	-	2
DINJE	26	1	11	15	29	18	22	39	25	24	25	7	5	-	-
ELTMA	10	6	10	-	11	3	18	13	12	7	15	-	-	-	-
FORKE	4	4	4	-	5	13	11	16	8	-	-	6	1	-	13
GONRU	25	2	4	20	12	-	30	17	7	32	23	16	25	21	37
	12	-	10	22	1	2	17	13	3	22	14	16	13	19	25
	-	1	-	10	2	1	13	4	3	14	7	7	9	9	11
	14	1	3	20	3	1	12	12	2	17	12	10	19	19	33
	18	1	6	25	7	2	16	8	6	20	12	6	9	16	24
GOVMI	3	-	11	22	3	23	14	14	11	16	8	4	2	4	6
	4	-	8	3	-	-	7	8	2	7	1	-	1	-	5
	7	-	4	7	6	7	8	10	6	9	6	3	1	1	3
HERCA	11	11	17	13	12	15	-	-	-	-	-	-	-	-	-
HINWO	10	6	3	-	9	19	9	13	13	6	-	6	-	6	11
IGAAN	-	3	4	5	5	8	9	12	14	2	6	3	-	15	5
	-	12	10	5	14	6	5	7	3	-	8	-	7	3	4
	1	3	5	3	3	6	7	8	7	1	7	2	7	8	5
	1	-	-	4	2	3	5	2	5	1	2	3	2	2	5
JONKA	-	-	5	4	3	5	3	5	8	1	5	4	1	6	12
KACJA	8	9	14	2	7	22	22	23	26	15	14	-	-	5	2
	-	-	-	-	-	20	14	-	-	-	-	-	-	-	-
	2	3	2	-	4	1	4	5	6	6	4	-	2	-	2
	15	9	30	1	10	26	36	25	24	24	8	-	-	6	3
	2	5	9	1	3	15	23	19	13	11	8	-	-	6	6
KISSZ	-	-	1	1	-	3	1	5	4	5	-	6	2	2	6
KOSDE	70	51	28	46	83	56	21	66	74	61	-	14	77	71	-
	56	77	17	99	83	76	68	86	83	69	68	21	38	22	25
	10	13	-	-	16	5	-	-	1	-	5	7	-	-	-
LOJTO	-	-	-	-	-	-	6	-	-	-	-	-	-	-	-
MACMA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	7	3	1	3	3	3	7	5	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MASMI	4	15	-	-	9	-	5	1	2	-	7	-	5	5	3
MOLSI	36	26	23	2	36	33	24	38	18	9	7	9	11	16	24
	8	9	20	-	15	17	19	10	12	7	4	4	6	12	11
	22	8	-	16	30	33	20	2	5	1	10	21	12	22	30
	20	3	-	11	25	23	15	8	5	-	7	8	3	12	22
	-	-	-	-	-	-	7	-	1	-	2	2	2	7	-
	28	8	-	12	26	24	14	1	7	-	7	19	6	26	18
MOSFA	-	3	2	4	5	4	11	4	5	11	5	2	1	-	-
OCHPA	-	1	-	-	7	2	9	6	3	6	5	2	5	-	-
OTTMI	4	12	-	15	17	18	-	-	-	-	8	16	5	11	16
PERZS	2	2	18	31	-	22	23	28	-	-	-	2	-	6	2
PUCRC	15	-	-	-	8	6	14	10	14	14	2	6	-	3	-
ROTEC	6	-	-	1	5	7	2	2	-	1	-	-	-	5	6
SARAN	7	3	1	18	-	-	-	3	1	11	6	6	7	3	7
	14	6	1	6	-	-	1	2	3	16	4	13	3	13	15
	23	12	1	16	-	-	1	9	2	22	17	14	11	12	22
	9	1	1	7	-	-	-	-	-	10	4	2	2	6	8
SCALE	8	-	-	-	-	6	10	1	7	3	6	-	-	-	-
SCHHA	2	6	3	3	16	11	4	-	5	-	12	9	1	14	14
STOEN	7	14	17	4	15	6	30	20	20	17	18	-	-	1	1
	10	15	9	3	13	6	20	11	13	13	11	-	-	-	1
	12	9	19	4	18	14	29	25	26	27	12	-	-	-	2
STRJO	6	8	1	-	21	8	4	7	2	2	4	11	3	8	9
	3	11	3	-	11	11	5	8	-	3	12	14	3	7	6
	-	4	1	-	7	9	5	5	-	1	5	7	5	-	7
	3	7	2	-	13	10	7	5	-	3	7	7	3	6	11
	-	6	-	-	5	6	4	3	-	-	4	5	5	6	5
TEPIS	-	-	-	2	3	2	3	11	3	3	8	6	2	9	12
	-	-	-	14	6	13	13	14	21	14	9	6	-	16	16
TRIMI	7	-	12	-	6	4	10	9	8	7	3	-	-	-	2
ZELZO	-	-	-	3	-	-	-	-	4	-	-	-	-	-	3
	-	-	-	1	-	-	-	-	8	-	-	-	-	-	5
Sum	675	494	430	550	820	800	872	820	696	649	583	426	367	551	601

June	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
ARLRA	1	23	9	-	18	7	43	24	-	39	30	4	-	5	34
BANPE	-	-	3	-	8	-	1	-	-	-	6	-	8	1	9
BERER	-	-	3	-	-	11	-	-	18	-	-	25	22	-	-
	-	-	2	-	-	7	-	1	3	-	-	15	12	-	-
BOMMA	-	19	17	11	18	13	15	3	15	10	10	18	29	-	10
BREMA	-	6	4	-	4	4	10	3	12	3	8	3	-	2	10
	1	6	-	-	3	5	5	3	4	-	8	-	-	-	-
BRIBE	2	6	6	-	4	4	10	8	4	7	4	-	-	10	15
	6	1	10	-	2	11	5	9	4	5	2	1	-	3	14
CASFL	1	-	6	11	-	3	13	3	-	9	12	-	4	8	7
	4	-	6	10	7	-	4	-	-	17	11	-	2	5	8
CRIST	3	15	17	29	20	10	8	13	2	6	14	7	18	2	17
	5	11	16	17	6	9	3	5	1	1	10	1	11	3	13
	4	21	23	31	16	18	11	23	7	11	29	12	24	3	25
DINJE	-	19	24	21	13	21	21	10	24	12	17	37	36	-	22
ELTMA	-	15	12	5	4	6	-	-	-	13	19	16	19	-	10
FORKE	-	16	3	-	-	-	13	8	-	-	8	2	-	-	-
GONRU	25	17	25	13	7	21	9	5	9	-	26	32	20	32	12
	26	4	12	13	12	27	7	7	13	-	29	24	13	25	8
	13	3	4	6	2	7	8	-	2	8	15	12	10	11	1
	17	9	20	9	8	16	8	4	9	-	20	26	14	32	8
	15	6	9	3	9	14	11	2	3	16	28	29	21	22	3
GOVMI	-	-	5	3	20	17	10	-	-	5	7	23	25	-	30
	-	-	6	2	3	5	7	-	-	-	6	7	12	-	10
	-	-	5	-	2	5	5	-	-	3	3	6	4	-	12
HERCA	12	10	11	17	11	12	19	11	15	15	17	15	11	23	14
HINWO	-	7	6	-	-	-	8	7	-	-	5	5	-	-	1
IGAAN	-	5	8	8	10	-	2	1	-	1	11	6	8	2	14
	6	3	11	1	-	13	-	-	6	-	3	10	7	15	-
	-	5	9	5	5	2	4	-	1	-	12	2	8	6	8
	-	-	2	1	6	3	-	-	2	3	3	2	4	-	2
JONKA	-	5	11	-	11	6	5	2	4	6	18	9	14	-	13
KACJA	-	-	25	10	-	17	14	-	-	5	-	-	18	-	34
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	7	3	9	-	1	-	-	3	2	4	2	-	14
	-	-	29	17	37	45	21	-	-	12	-	-	23	-	29
	-	-	18	8	7	21	14	-	-	3	-	-	11	-	27
KISSZ	2	4	2	-	3	2	1	1	1	-	4	3	5	1	2
KOSDE	13	7	68	8	-	39	13	48	76	78	70	72	67	3	3
	19	29	40	37	59	53	-	-	80	79	80	77	88	9	12
	-	12	-	-	7	5	7	-	4	-	-	4	4	9	3
LOJTO	-	-	1	2	-	-	-	-	-	-	-	-	-	-	-
MACMA	12	23	22	2	18	-	-	24	29	2	-	32	1	-	-
	8	13	26	3	26	9	4	22	17	3	-	23	1	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	8	16	16	-	-	4	7	25	12	3	1	-	4	-	-
MASMI	3	8	6	9	5	-	4	4	-	3	7	5	4	13	3
MOLSI	2	-	-	-	-	-	-	-	15	55	50	10	2	-	10
	2	4	14	4	9	5	17	1	6	19	12	5	-	-	5
	-	45	20	1	13	4	32	19	-	25	28	1	-	-	14
	-	18	17	-	14	5	27	24	-	23	31	2	-	1	17
	-	4	4	-	2	-	-	-	-	4	-	1	-	-	2
	-	27	20	-	9	15	26	27	-	21	34	2	-	1	18
MOSFA	-	-	3	10	17	1	4	4	-	10	5	-	1	5	11
OCHPA	3	-	-	2	10	2	-	-	-	11	-	-	-	-	-
OTTMI	-	-	-	-	15	14	-	-	15	-	-	11	-	-	6
PERZS	-	-	8	3	13	16	18	-	-	-	29	21	17	12	39
PUCRC	-	11	5	2	-	17	2	2	-	-	20	13	13	-	7
ROTEC	4	9	6	-	3	1	-	6	-	10	13	-	-	-	10
SARAN	-	-	9	13	-	2	-	1	-	2	12	14	16	16	2
	1	-	18	7	-	2	-	5	-	6	13	24	15	15	3
	-	-	19	21	-	3	-	6	-	12	32	26	22	24	7
	-	-	5	1	-	1	-	1	1	2	8	11	16	6	1
SCALE	-	10	-	10	2	6	-	-	-	8	19	14	11	-	6
SCHHA	4	2	8	1	3	6	12	15	-	5	1	-	-	6	9
STOEN	3	27	18	16	8	8	11	5	-	26	38	16	19	-	10
	1	30	9	17	11	4	6	4	-	27	25	15	17	-	14
	2	30	8	17	7	9	3	3	-	41	40	14	14	-	14
STRJO	4	4	1	-	5	1	2	8	-	11	9	-	-	3	2
	3	8	2	-	-	2	2	10	-	8	1	-	-	2	1
	-	3	1	-	2	2	3	6	-	6	11	-	-	1	2
	3	6	1	-	1	1	3	11	-	9	5	-	-	4	2
	1	5	1	-	2	3	-	6	-	5	11	-	-	2	2
TEPIS	1	4	5	6	14	-	8	-	7	1	12	9	10	-	5
	-	8	20	8	13	-	10	2	9	7	22	12	11	3	13
TRIMI	-	-	5	-	4	14	8	-	-	10	-	10	14	-	17
ZELZO	-	4	-	-	-	-	-	-	-	-	10	6	-	-	6
	-	2	-	-	-	-	-	-	-	-	9	3	-	-	9
Sum	240	605	792	454	577	616	545	442	430	745	1055	809	782	346	721