Results of the IMO Video Meteor Network – January 2015

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January is not really renowned for pleasant weather. Under this premise, the first month of 2015 was quite acceptable, whereby south European observers enjoyed better observing conditions that their more northern companions as most of the time in winter. Whereas the first half of the month was quite balanced – 54 cameras were active during the Quadrantid peak – there were larger observation gaps in the second half. The night of January 29/30 was one of the worst in the last few years with only 12 active cameras that recorded altogether just about 150 meteors in over 50 observing hours.
35 out of 84 cameras active in January obtained twenty or more observing nights. The effective observing time accumulated to over 9,500 hours, which is a few percent less than in the record-breaking year 2012, but much more than in the previous two years. 25,000 meteors are also the by far second-best January result of the IMO network.

During the analysis of the Quadrantid peak 2013 we learnt, that this shower does not fit into the usual scheme. In case of other showers, the activity graphs of individual years fit typically well together and yield a smooth overall profile. Not so for the Quadrantids and you err if you believe the picture would become clearer with the new data set. In fact, the opposite is true. This year, the maximum was expected for 2 o'clock UT of January 4, when the radiant had already a sufficient altitude for European observers. In fact, we measured highest flux densities at about that time, but the level was by a factor two to four lower than in the previous three years (figure 1). So we did not experience an outburst this year, but rather a collapse.

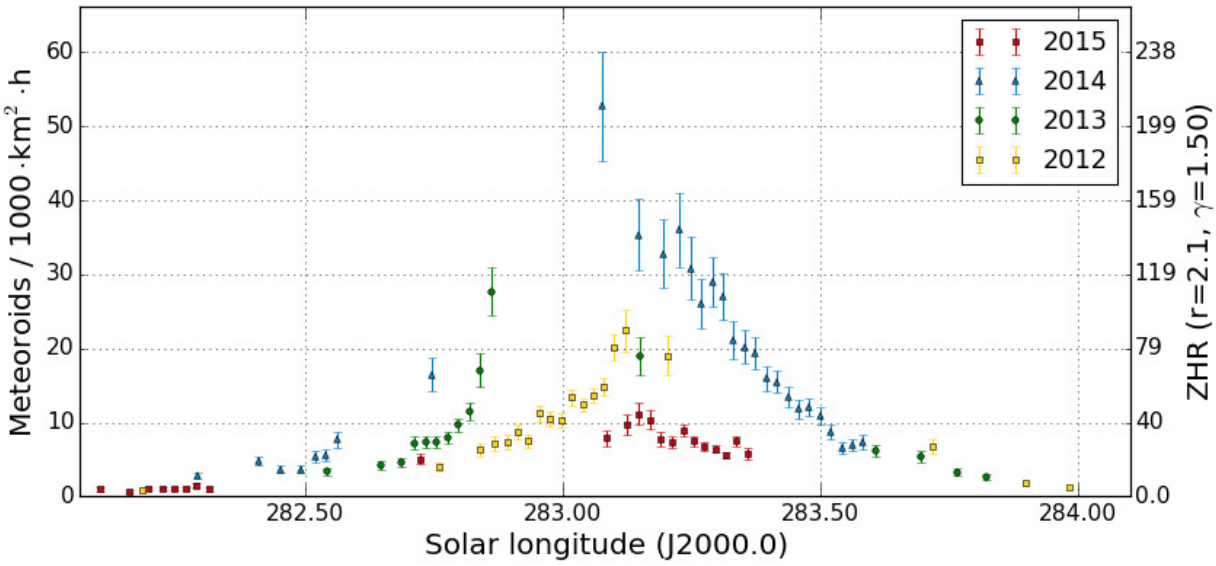

Figure 1: *Activity profile of the Quadrantids, derived from data of the IMO Video Meteor Network 2012-2015.*

So that is obviously a rather bold hypothesis that should be substantiated by other observations. Unfortunately there are no data from IMO quick look analyses available, probably because the data set was too sparse. In the AKM on Jürgen Rendtel managed to catch a few cloud gaps of less than one hour in total in the morning of January 4. In this short interval he obtained a ZHR below 50 and speculated, that this might be the previously discussed "full moon effect" in visual observations. Indeed, the miserable conditions just one day before full moon might also systematically influence the limiting magnitude calculation of video cameras. However, this is rather unlikely since many cameras observed away from the Moon. The only option we currently have is a look at Antihelion and sporadic meteors, which should have been affected in a similar way. Figures 2 and 3 show that this is not the case. As always there are some fluctuations, but in both cases we see the flux density at the same level as in the previous years.

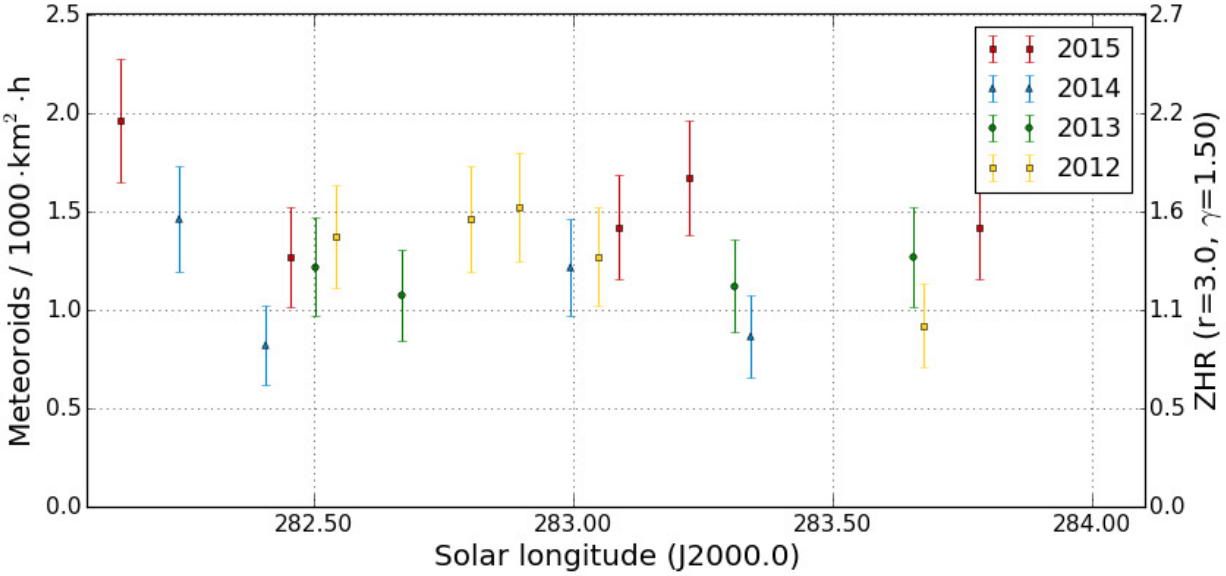

Figure 2: *Activity level of the Antihelion source near the Quadrantid maximum, derived from data of the IMO Video Meteor Network 2012-2015.*

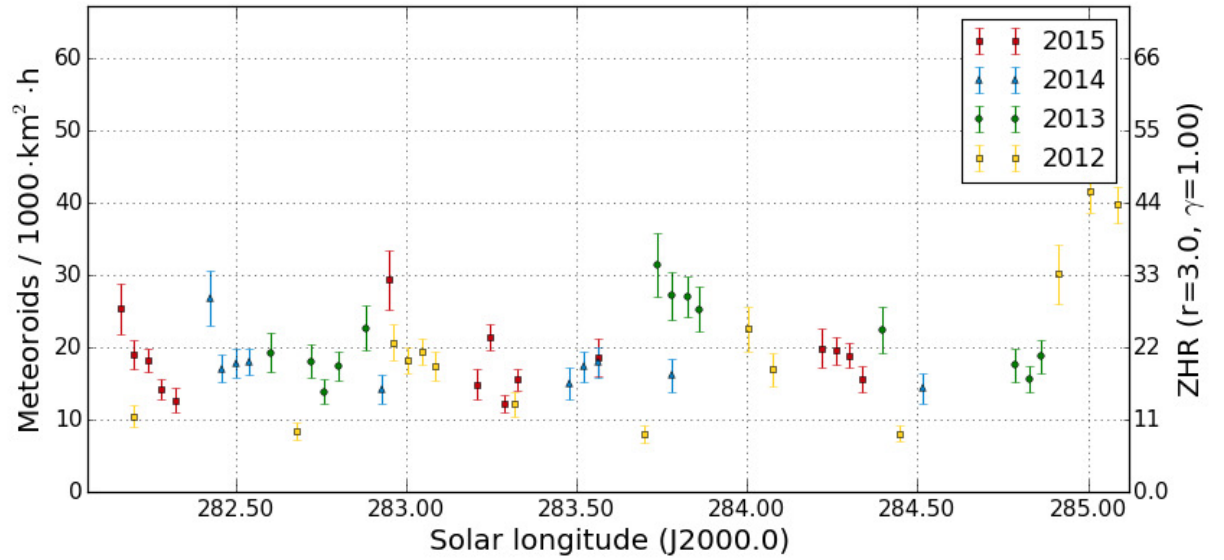

Figure 3: *Activity level of the sporadic meteors near the Quadrantid maximum, derived from data of the IMO Video Meteor Network 2012-2015.*

Finally one could argue, that the profile of the sporadic meteors is only so smooth because figure 3 was obtained with an unusually low zenith exponent of γ=1.0, but that's not an argument either. If the flux density of the Quadrantids is plotted with the same r-value, the profiles of 2012 and 2014 fit better to one another, but the unusually low activity level of 2015 remains (figure 4). The Quadrantids were this year literally rained off!

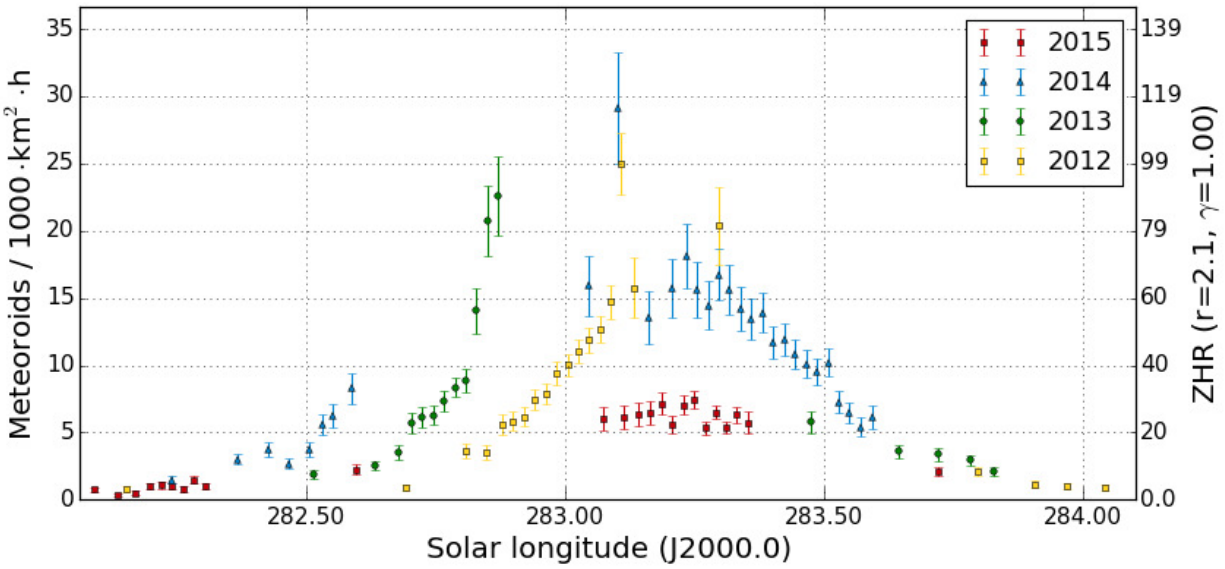

Figure 4: *Activity profile of the Quadrantids, obtained with a zenith exponent of γ=1.0.*

What about the population index? Here we find a value of r=1.8, whereby the individual graphs show a well-defined intersection point despite the large number of >1,000 meteors (figure 5). In the nights before and after the peak, the r-value was clearly above two. In this respect, the Quadrantids are quite reliable, since we obtained exactly the same value of r=1.8 in the peak nights of 2013 and 2014.

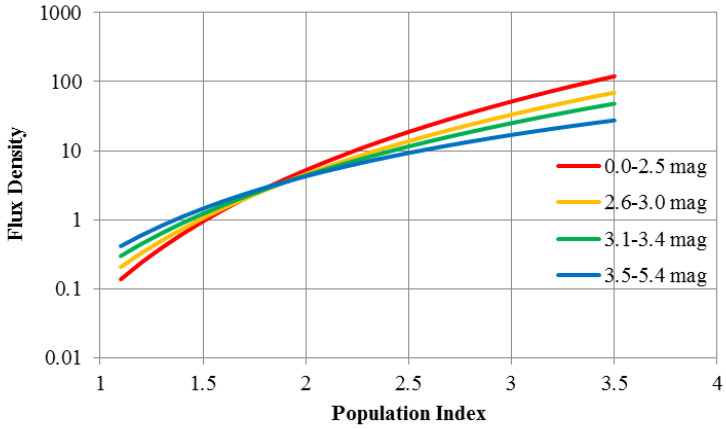

Figure 5: *Dependency of the flux density from the population index, calculated for different meteor limiting magnitudes on January 3/4, 2015.*

1. Observers

Code	Name	Place	Camera	FOV [^{o2}]	St.LM [mag]	Eff.CA [km^2]	Nights	Time [h]	Meteors
ARLRA	Arlt	Ludwigsfelde/DE	LUDWIG2 (0.8/8)	1475	6.2	3779	19	87.2	364
BANPE	Bánfalvi	Zalaegerszeg/HU	HUVCSE01 (0.95/5)	2423	3.4	361	7	21.3	35
BASLU			URANIA1 (0.8/3.8)*	4545	2.5	237	1	3.0	4
BERER	Berkó	Ludanyhalaszi/HU	HULUD1 (0.8/3.8)	5542	4.8	3847	8	62.4	309
			HULUD3 (0.95/4)	4357	3.8	876	8	57.2	87
BOMMA	Bombardini	Faenza/IT	MARIO (1.2/4.0)	5794	3.3	739	25	179.4	585
BREMA	Breukers	Hengelo/NL	MBB3 (0.75/6)	2399	4.2	699	13	77.1	116
BRIBE	Klemt	Herne/DE	HERMINE (0.8/6)	2374	4.2	678	21	96.1	227
		Berg. Gladbach/DE	KLEMOI (0.8/6)	2286	4.6	1080	19	78.2	207
CASFL	Castellani	Monte Baldo/IT	BMH1 (0.8/6)	2350	5.0	1611	24	227.4	613
			BMH2 (1.5/4.5)*	4243	3.0	371	23	198.7	508
CRIST	Crivello	Valbrevenna/IT	BILBO (0.8/3.8)	5458	4.2	1772	27	187.1	691
			C3P8 (0.8/3.8)	5455	4.2	1586	23	141.1	369
			STG38 (0.8/3.8)	5614	4.4	2007	24	188.6	1007
CSISZ	Csizmadia	Baja/HU	HUVCSE02 (0.95/5)	1606	3.8	390	11	24.1	108
DONJE	Donati	Faenza/IT	JENNI (1.2/4)	5886	3.9	1222	25	204.7	883
ELTMA	Eltri	Venezia/IT	MET38 (0.8/3.8)	5631	4.3	2151	17	125.2	433
FORKE	Förster	Carlsfeld/DE	AKM3 (0.75/6)	2375	5.1	2154	8	26.3	56
GONRU	Goncalves	Tomar/PT	TEMPLAR1 (0.8/6)	2179	5.3	1842	25	207.7	534
			TEMPLAR2 (0.8/6)	2080	5.0	1508	24	209.5	463
			TEMPLAR3 (0.8/8)	1438	4.3	571	23	230.4	317
			TEMPLAR4 (0.8/3.8)	4475	3.0	442	26	200.2	411
			TEMPLAR5 (0.75/6)	2312	5.0	2259	27	231.3	596
GOVMI	Govedic	Sredisce ob Dr./SI	ORION2 (0.8/8)	1447	5.5	1841	23	151.5	337
			ORION3 (0.95/5)	2665	4.9	2069	21	87.7	157
			ORION4 (0.95/5)	2662	4.3	1043	23	126.3	159
HERCA	Hergenrother	Tucson/US	SALSA3 (0.8/3.8)	2336	4.1	544	27	234.1	462
HINWO	Hinz	Schwarzenberg/DE	HINWO1 (0.75/6)	2291	5.1	1819	13	58.8	157
IGAAN	Igaz	Debrecen/HU	HUDEB (0.8/3.8)	5522	3.2	620	10	68.9	92
		Hodmezovasar./HU	HUHOD (0.8/3.8)	5502	3.4	764	14	71.6	91
		Budapest/HU	HUPOL (1.2/4)	3790	3.3	475	8	64.4	40
JONKA	Jonas	Budapest/HU	HUSOR (0.95/4)	2286	3.9	445	16	126.2	172
KACJA	Kac	Kamnik/SI	CVETKA (0.8/3.8)	4914	4.3	1842	16	77.8	233
		Kostanjevec/SI	METKA (0.8/12)*	715	6.4	640	2	15.3	20
		Ljubljana/SI	ORION1 (0.8/8)	1402	3.8	331	19	77.2	105
		Kamnik/SI	REZIKA (0.8/6)	2270	4.4	840	19	104.1	437
			STEFKA (0.8/3.8)	5471	2.8	379	15	71.7	194
KISSZ	Kiss	Sulysap/HU	HUSUL (0.95/5)*	4295	3.0	355	15	111.7	77
KOSDE	Koschny	Izana Obs./ES	ICC9 (0.85/25)*	683	6.7	2951	24	180.2	1285
		Noordwijkerhout/NL	LIC4 (1.4/50)*	2027	6.0	4509	19	75.4	197
LOJTO	Łojek	Grabniak/PL	PAV57 (1.0/5)	1631	3.5	269	2	14.9	21
MACMA	Maciejewski	Chelm/PL	PAV35 (0.8/3.8)	5495	4.0	1584	10	50.3	79
			PAV36 (0.8/3.8)*	5668	4.0	1573	16	72.2	226
			PAV43 (0.75/4.5)*	3132	3.1	319	11	71.8	141
			PAV60 (0.75/4.5)	2250	3.1	281	11	68.8	183
MARGR	Maravelias	Lofoupoli/GR	LOOMECON (0.8/12)	738	6.3	2698	17	145.2	181
MARRU	Marques	Lisbon/PT	CAB1 (0.8/3.8)	5291	3.1	467	12	89.9	253
			RAN1 (1.4/4.5)	4405	4.0	1241	25	204.5	501
MASMI	Maslov	Novosimbirsk/RU	NOWATEC (0.8/3.8)	5574	3.6	773	13	74.0	280
MOLSI	Molau	Seysdorf/DE	AVIS2 (1.4/50)*	1230	6.9	6152	17	84.0	390
			ESCIMO (0.6/130)*	21	10.0	3507	4	24.2	35
			MINCAM1 (0.8/8)	1477	4.9	1084	16	76.5	248
		Ketzür/DE	REMO1 (0.8/8)	1467	6.5	5491	22	99.9	508
			REMO2 (0.8/8)	1478	6.4	4778	19	91.3	397
			REMO3 (0.8/8)	1420	5.6	1967	18	108.7	298
			REMO4 (0.8/8)	1478	6.5	5358	22	99.6	401
MORJO	Morvai	Fülöpszallas/HU	HUFUL (1.4/5)	2522	3.5	532	16	126.0	127
MOSFA	Moschini	Rovereto/IT	ROVER (1.4/4.5)	3896	4.2	1292	26	224.0	384
OCHPA	Ochner	Albiano/IT	ALBIANO (1.2/4.5)	2944	3.5	358	23	116.0	369
OTTMI	Otte	Pearl City/US	ORIE1 (1.4/5.7)	3837	3.8	460	19	140.6	209
PERZS	Perkó	Becsehely/HU	HUBEC (0.8/3.8)*	5498	2.9	460	17	98.2	326
PUCRC	Pucer	Nova vas nad Dra./SI	MOBCAM1 (0.75/6)	2398	5.3	2976	19	120.0	256
ROTEC	Rothenberg	Berlin/DE	ARMEFA (0.8/6)	2366	4.5	911	10	57.4	59
SARAN	Saraiva	Carnaxide/PT	RO1 (0.75/6)	2362	3.7	381	22	187.7	375
			RO2 (0.75/6)	2381	3.8	459	25	219.3	516
			RO3 (0.8/12)	710	5.2	619	27	238.7	781
			SOFIA (0.8/12)	738	5.3	907	25	216.7	409
SCHHA	Schremmer	Niederkrüchten/DE	DORAEMON (0.8/3.8)	4900	3.0	409	24	94.2	223
SLAST	Slavec	Ljubljana/SI	KAYAK1 (1.8/28)	563	6.2	1294	19	119.4	111
			KAYAK2 (0.8/12)	741	5.5	920	16	110.6	84
STOEN	Stomeo	Scorze/IT	MIN38 (0.8/3.8)	5566	4.8	3270	28	157.6	703
			NOA38 (0.8/3.8)	5609	4.2	1911	26	168.9	637
			SCO38 (0.8/3.8)	5598	4.8	3306	28	193.1	838
STRJO	Strunk	Herford/DE	MINCAM2 (0.8/6)	2354	5.4	2751	19	93.0	189
			MINCAM3 (0.8/6)	2338	5.5	3590	22	108.0	198
			MINCAM4 (1.0/2.6)	9791	2.7	552	17	73.4	134
			MINCAM5 (0.8/6)	2349	5.0	1896	20	93.1	175
			MINCAM6 (0.8/6)	2395	5.1	2178	20	93.4	161
TEPIS	Tepliczky	Agostyan/HU	HUAGO (0.75/4.5)	2427	4.4	1036	18	111.3	196
			HUMOB (0.8/6)	2388	4.8	1607	17	109.5	225
TRIMI	Triglav	Velenje/SI	SRAKA (0.8/6)*	2222	4.0	546	20	69.6	218
YRJIL	Yrjölä	Kuusankoski/FI	FINEXCAM (0.8/6)	2337	5.5	3574	5	40.3	95
ZELZO	Zelko	Budapest/HU	HUVCSE03 (1.0/4.5)	2224	4.4	933	5	22.2	48
			HUVCSE04 (1.0/4.5)	1484	4.4	573	7	21.4	44
Sum							31	9566.3	25370

* active field of view smaller than video frame

2. Observing Times (h)

January	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
ARLRA	6.3	-	-	5.0	-	1.1	8.1	0.5	-	10.6	1.0	-	1.3	6.4	3.7
BANPE	-	-	-	-	-	3.5	-	-	-	3.2	-	4.8	4.0	-	-
BASLU	-	-	3.0	-	-	-	-	-	-	-	-	-	-	-	-
BERER	-	4.1	-	8.0	4.8	13.1	-	-	-	-	6.9	-	7.8	-	-
	-	3.7	-	8.8	4.6	13.1	-	-	-	-	5.6	-	6.5	-	-
BOMMA	6.4	6.9	6.1	11.5	13.0	10.8	0.5	6.4	8.3	4.4	12.6	10.5	6.6	10.5	8.4
BREMA	-	-	6.5	7.3	-	-	-	-	-	11.1	-	-	-	1.9	9.4
BRIBE	6.0	4.6	6.0	2.6	0.9	-	2.7	0.2	-	4.3	-	-	5.9	5.7	7.1
	1.9	3.0	2.2	0.4	7.0	-	-	-	-	6.3	-	-	4.4	7.0	1.5
CASFL	13.5	8.4	13.5	10.9	13.5	13.4	3.3	-	-	-	-	11.5	9.5	12.8	0.7
	13.3	8.1	13.4	7.6	13.3	13.2	2.8	-	-	-	-	9.2	7.5	12.6	-
CRIST	13.2	5.3	6.8	13.1	6.1	3.4	-	4.4	2.6	4.5	13.0	8.2	2.2	9.6	-
	13.2	-	5.3	12.5	2.7	4.7	-	4.9	0.7	-	12.9	2.3	-	5.3	-
	13.2	7.2	7.4	13.1	7.2	3.6	-	6.2	6.9	3.4	-	-	5.2	10.3	-
CSISZ	-	-	-	-	4.0	2.3	-	0.3	-	1.3	1.7	1.8	5.2	1.1	1.7
DINJE	13.1	6.7	8.0	10.0	12.0	8.9	0.9	9.4	7.1	3.9	12.7	11.8	9.0	13.1	11.6
ELTMA	11.1	4.7	8.3	12.4	10.3	1.9	-	-	-	-	10.6	10.6	8.9	6.1	-
FORKE	4.1	-	-	-	-	1.6	-	-	-	-	-	-	3.7	-	-
GONRU	12.6	9.3	8.0	4.7	5.4	6.0	5.0	12.3	12.6	7.8	12.6	11.0	2.1	4.2	-
	13.0	10.5	10.7	5.0	6.2	6.4	5.1	11.9	12.9	7.1	12.8	10.9	1.8	4.0	-
	12.7	10.7	12.5	11.1	-	6.0	10.2	12.6	12.6	7.1	12.7	10.7	-	2.2	6.4
	12.8	7.2	9.2	5.4	6.3	7.3	5.1	12.2	12.6	5.8	12.7	10.5	1.7	4.0	-
	12.8	10.2	12.3	12.7	3.8	5.5	9.2	11.9	12.8	3.4	12.8	10.1	-	1.9	5.9
GOVMI	1.2	4.7	4.2	5.8	-	11.0	12.0	4.6	2.8	4.9	8.8	8.8	9.9	8.0	13.2
	0.3	0.2	1.2	1.0	-	0.9	1.3	0.9	1.0	5.1	6.7	6.7	8.6	7.9	12.2
	0.7	4.6	3.6	1.9	-	8.0	10.1	3.1	3.4	3.0	6.0	6.9	7.9	7.8	12.7
HERCA	3.6	1.4	11.9	12.2	9.1	12.2	10.6	-	2.0	10.2	6.3	1.4	8.9	3.3	11.4
HINWO	9.7	1.5	-	-	-	0.3	-	-	-	4.0	-	4.7	2.5	9.2	2.6
IGAAN	3.5	-	-	-	4.7	12.3	3.4	-	-	4.6	7.4	7.3	13.2	2.4	-
	-	3.2	-	3.6	5.1	7.7	1.5	-	-	5.8	5.7	7.4	6.7	2.1	6.8
	-	6.3	-	9.0	10.2	-	-	-	-	6.8	5.5	-	11.0	5.2	-
JONKA	-	5.9	0.5	10.5	10.8	13.3	-	1.4	-	6.5	4.7	7.4	12.4	5.2	-
KACJA	-	5.9	-	-	8.9	3.6	5.2	2.1	1.0	6.1	0.7	7.5	-	-	-
	-	-	-	-	-	4.2	-	-	-	11.1	-	-	-	-	-
	0.6	4.2	2.9	5.1	8.9	3.7	5.7	-	4.1	6.1	-	0.2	-	5.5	-
	-	7.4	-	-	9.6	3.5	9.9	1.5	0.8	6.0	1.7	7.9	2.4	4.1	-
	-	-	-	2.9	11.4	6.2	7.4	1.8	1.0	6.1	-	8.2	3.5	1.1	-
KISSZ	-	5.0	-	7.1	10.7	13.3	-	0.6	0.5	9.2	7.7	-	10.8	4.6	-
KOSDE	1.2	-	4.3	-	-	5.2	-	-	-	4.4	2.3	4.2	6.2	8.3	9.3
	0.3	-	8.0	5.5	-	5.1	0.4	5.8	-	5.3	-	-	1.8	-	3.5
LOJTO	-	-	-	-	-	13.7	-	-	-	-	-	-	-	-	-
MACMA	-	-	-	1.2	1.4	10.4	4.6	-	-	-	0.2	-	12.4	-	6.9
	-	0.4	-	2.2	1.1	13.7	6.1	1.1	-	3.1	0.4	-	13.7	-	8.6
	0.4	-	-	2.1	2.0	13.7	6.2	1.4	-	-	-	-	13.4	-	8.0
	-	1.0	-	2.5	0.9	13.8	6.8	-	-	3.7	-	-	13.5	1.6	7.4
MARGR	-	-	-	-	-	-	-	-	7.8	5.4	8.6	-	-	-	8.4
MARRU	-	-	8.8	-	-	-	-	11.5	-	-	11.9	-	-	-	4.6
	12.0	8.7	12.0	12.0	-	10.1	8.8	11.4	11.5	4.2	11.7	5.7	-	2.5	6.7
MASMI	-	-	6.8	1.0	-	0.2	-	1.5	4.1	3.8	11.7	3.9	-	-	-
MOLSI	2.6	2.0	0.2	-	2.3	7.7	6.2	2.1	-	-	2.8	11.7	5.9	10.6	11.7
	-	-	-	-	-	-	-	-	-	-	-	-	1.6	7.3	10.3
	3.8	1.7	0.2	-	2.3	4.7	3.8	3.4	-	-	2.5	10.3	5.9	9.9	10.4
	4.8	5.6	2.5	-	-	1.2	7.9	1.4	0.5	11.3	2.8	-	2.8	8.4	1.8
	-	3.4	1.5	1.8	-	1.0	7.2	-	-	10.7	3.1	-	2.8	8.3	2.1
	8.0	5.9	2.4	-	-	3.0	8.6	1.7	-	11.7	3.0	-	3.6	8.5	2.9
	3.9	3.5	1.8	2.6	-	1.3	8.7	1.1	0.4	11.6	3.4	-	2.9	8.5	2.5
MORJO	-	5.8	0.5	9.4	9.9	12.1	-	2.3	-	5.4	7.5	7.6	13.0	5.1	7.4
MOSFA	13.3	6.2	11.1	11.0	5.2	9.4	-	8.4	9.8	6.2	13.4	9.0	7.1	13.4	-
OCHPA	7.2	6.7	4.3	6.7	6.6	5.7	4.8	6.8	4.8	5.1	5.6	5.0	0.8	7.0	-
OTTMI	10.7	-	-	10.7	-	9.1	7.3	9.8	11.8	8.8	3.9	9.3	7.0	0.8	11.1
PERZS	1.3	6.5	2.0	3.5	1.2	7.5	6.2	3.5	-	8.1	-	9.8	10.6	7.5	13.2
PUCRC	11.1	7.1	2.0	12.9	-	-	-	-	-	-	11.7	8.1	12.9	4.0	2.2
ROTEC	-	2.7	-	5.3	-	-	-	-	-	8.4	-	-	0.9	4.2	3.2
SARAN	-	-	7.3	12.2	4.1	11.9	11.1	6.7	12.6	7.3	12.0	-	-	-	6.1
	11.3	12.6	12.7	12.6	4.0	11.7	12.6	12.6	12.6	5.9	11.9	7.0	0.3	3.3	4.5
	11.0	10.4	12.4	12.2	4.3	12.1	12.3	12.3	12.3	6.4	11.7	6.5	0.5	3.1	8.5
	3.9	-	12.4	12.6	4.1	12.0	12.6	8.6	12.6	5.0	12.0	6.7	0.5	3.4	7.4
SCHHA	0.6	2.6	-	4.4	1.4	0.7	0.3	1.6	-	12.0	-	-	5.9	3.6	8.5
SLAST	6.8	7.2	2.9	9.3	11.5	4.7	0.5	-	-	5.6	2.3	5.8	-	7.0	0.4
	5.6	5.7	2.8	8.6	10.5	-	8.1	-	7.0	7.3	-	-	2.9	8.2	-
STOEN	10.8	6.6	8.7	11.0	10.0	2.9	-	2.2	3.8	5.9	7.8	9.6	6.6	11.7	0.6
	12.8	4.6	11.8	13.5	13.2	2.6	-	1.9	4.6	7.6	10.1	10.4	7.4	12.3	-
	13.3	7.5	13.3	13.5	13.3	3.1	-	3.7	5.1	8.7	10.8	10.3	7.6	12.4	0.6
STRJO	2.7	2.4	1.9	1.8	-	-	2.2	-	-	11.6	-	-	4.7	4.4	7.0
	4.5	4.8	4.5	2.9	-	-	1.5	-	-	11.7	-	-	4.9	5.4	7.2
	3.4	3.6	3.4	0.9	-	1.3	-	-	-	11.4	-	-	4.9	4.1	7.2
	1.5	3.7	3.4	1.8	-	-	-	-	-	10.7	-	-	4.2	4.6	7.2
	3.2	2.5	2.7	3.4	-	1.5	-	-	-	11.3	-	-	4.3	4.3	6.1
TEPIS	1.3	5.3	-	8.0	9.2	8.9	-	1.8	-	2.4	-	10.2	11.4	5.4	7.9
	1.2	2.9	-	9.6	9.3	7.2	-	1.5	-	3.9	2.5	12.1	11.5	5.7	12.9
TRIMI	5.5	6.2	4.8	2.0	-	2.1	1.1	0.6	-	3.7	4.8	2.2	5.4	5.3	4.2
YRJIL	-	-	-	-	14.8	7.8	-	-	-	-	-	2.0	-	-	-
ZELZO	-	-	-	6.7	6.4	4.4	-	-	-	-	-	-	3.6	-	-
	-	-	-	5.8	2.8	4.3	-	-	-	2.5	-	-	2.4	-	-
Sum	378.8	316.7	336.9	464.4	362.3	473.8	275.9	235.9	227.0	437.8	394.2	365.7	418.9	405.2	353.8

January	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
ARLRA	-	12.1	11.6	-	-	4.6	-	0.8	-	-	-	4.4	4.9	3.3	0.2	1.3
BANPE	0.5	-	-	-	-	-	-	-	-	-	3.4	-	-	-	-	1.9
BASLU	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BERER	7.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9.9
	5.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9.2
BOMMA	-	4.7	7.3	-	-	-	-	0.2	0.6	1.8	12.0	11.9	6.6	-	9.9	1.5
BREMA	9.1	4.3	-	-	4.2	10.1	2.2	-	8.2	-	2.6	-	-	-	0.2	-
BRIBE	6.3	6.5	9.6	-	7.0	-	0.9	2.0	6.4	-	2.5	1.6	7.3	-	-	-
	-	11.1	9.5	0.7	6.4	2.7	-	4.8	3.6	-	1.3	-	4.1	-	-	0.3
CASFL	-	4.4	11.5	12.1	6.3	-	5.7	7.0	13.0	9.8	7.9	12.9	9.7	-	11.1	5.0
	-	3.1	10.9	10.4	4.2	-	5.4	5.5	12.9	7.0	5.3	12.8	6.3	-	11.1	2.8
CRIST	-	4.9	8.4	7.3	4.0	-	2.8	12.7	12.6	5.0	4.6	11.6	3.0	1.2	11.2	5.4
	-	0.4	5.5	5.6	2.6	-	1.4	10.2	12.6	2.4	4.3	11.7	2.7	-	11.7	5.5
	-	5.0	9.8	8.7	-	-	2.1	12.7	12.6	8.4	7.1	12.2	4.5	1.7	12.4	7.7
CSISZ	4.1	-	-	-	-	-	-	-	-	-	0.6	-	-	-	-	-
DINJE	-	4.8	13.0	0.7	-	-	-	-	1.2	2.5	12.8	12.0	8.3	-	10.5	0.7
ELTMA	-	5.7	8.2	1.8	-	-	5.4	-	0.9	-	12.0	-	-	-	6.3	-
FORKE	2.4	4.1	8.1	-	-	-	-	-	-	-	-	-	-	-	1.7	0.6
GONRU	4.9	-	-	4.1	11.5	4.2	-	11.9	12.4	12.3	8.9	11.2	1.5	-	-	11.2
	3.6	-	-	3.4	12.2	4.0	-	11.3	12.5	12.5	8.7	11.2	-	-	-	11.8
	12.4	-	9.0	-	11.5	4.0	-	12.2	12.5	12.2	8.5	9.9	-	-	-	10.7
	3.6	-	-	3.1	11.4	2.5	0.2	10.4	12.5	12.5	8.6	10.5	0.9	-	-	11.2
	12.0	-	9.2	2.5	11.7	4.5	-	12.3	12.5	12.5	8.2	8.7	0.9	-	0.6	10.4
GOVMI	5.3	1.8	-	8.1	-	-	-	-	-	5.9	10.9	6.4	4.5	-	3.2	5.5
	5.2	-	-	-	-	-	-	-	0.2	0.5	12.0	7.5	6.6	-	1.7	-
	4.2	1.7	-	5.7	-	-	-	-	-	2.4	10.0	9.0	7.9	-	2.0	3.7
HERCA	11.9	12.2	12.1	11.7	12.0	10.2	10.8	10.6	8.6	7.0	4.6	6.1	11.8	-	-	-
HINWO	-	-	11.8	1.3	-	5.5	-	-	-	-	-	-	-	-	3.1	2.6
IGAAN	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10.1
	7.7	-	-	-	-	-	-	-	-	-	-	3.5	4.8	-	-	-
	10.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
JONKA	11.8	-	1.1	-	-	-	-	-	-	-	12.7	-	10.2	-	-	11.8
KACJA	-	5.1	-	5.5	-	-	0.5	-	-	6.2	6.0	9.2	4.3	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	3.7	-	0.8	0.7	-	-	-	-	6.7	5.9	6.6	4.7	-	1.1	-
	-	5.0	2.6	6.3	-	-	0.4	-	-	11.4	6.9	11.5	5.2	-	-	-
	-	4.0	-	-	-	-	-	-	-	6.2	3.1	7.0	1.8	-	-	-
KISSZ	9.7	-	-	-	-	-	-	-	-	0.2	11.0	-	11.4	-	-	9.9
KOSDE	10.6	-	6.5	10.6	6.2	10.5	10.5	10.5	9.2	10.5	10.5	9.1	8.9	7.9	6.9	6.4
	7.2	-	-	-	0.8	4.3	7.4	-	3.8	-	8.0	0.7	1.6	-	3.2	2.7
LOJTO	1.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MACMA	11.3	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	1.7
	11.6	-	-	-	-	-	-	-	-	-	-	0.4	4.6	0.4	0.6	4.2
	12.9	-	-	-	-	-	-	-	-	-	-	-	5.9	-	-	5.8
	12.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.3
MARGR	7.2	8.7	-	12.4	12.4	12.4	12.2	8.7	11.1	7.8	8.8	1.6	1.2	10.5	-	-
MARRU	3.0	-	6.5	2.2	-	-	4.2	6.7	-	10.9	-	10.0	-	-	-	9.6
	8.9	-	6.7	3.5	9.7	-	2.9	7.1	9.1	11.8	9.4	7.4	2.0	-	-	8.7
MASMI	-	-	-	-	-	-	-	-	10.3	-	3.1	-	-	12.8	7.9	6.9
MOLSI	5.0	1.0	-	8.2	-	-	-	-	2.3	-	-	-	1.7	-	-	-
	-	-	-	5.0	-	-	-	-	-	-	-	-	-	-	-	-
	4.1	-	-	7.4	-	-	-	-	2.0	-	-	-	-	-	-	4.1
	0.2	12.7	13.3	1.3	-	3.1	-	-	3.8	-	-	6.9	3.1	3.8	0.7	-
	-	13.1	13.3	1.6	-	3.3	-	0.4	4.2	-	-	6.6	3.3	3.6	-	-
	-	13.3	13.0	-	-	3.5	-	-	4.8	-	-	7.2	3.5	4.1	-	-
	-	13.3	13.5	2.1	-	3.1	-	-	1.2	-	-	6.5	3.2	3.9	0.6	-
MORJO	7.8	-	-	-	-	-	-	-	-	-	8.2	-	11.3	-	-	12.7
MOSFA	-	1.6	10.6	12.1	7.3	-	4.9	9.5	13.1	7.9	4.4	13.0	5.4	-	8.8	1.9
OCHPA	-	-	2.7	8.3	4.1	-	-	7.0	2.7	6.7	4.0	-	2.9	-	0.5	-
OTTMI	7.9	1.2	12.3	6.7	-	-	-	-	-	7.3	-	0.6	4.3	-	-	-
PERZS	8.6	3.5	0.6	4.6	-	-	-	-	-	-	-	-	-	-	-	-
PUCRC	-	0.7	11.2	3.3	0.4	1.7	7.9	2.7	-	2.3	9.2	8.6	-	-	-	-
ROTEC	-	12.1	11.4	-	-	4.6	-	-	-	-	-	4.6	-	-	-	-
SARAN	7.7	-	7.5	1.1	11.8	-	4.5	6.7	12.2	12.1	12.2	11.4	3.3	-	-	5.9
	9.9	-	-	2.9	10.9	-	3.7	-	12.3	12.2	12.2	10.1	2.1	-	-	7.4
	9.4	-	-	3.1	11.7	4.5	4.6	6.5	12.0	12.0	12.0	11.9	5.9	-	-	9.1
	7.9	-	7.7	-	11.8	-	4.9	6.5	12.2	12.3	12.2	12.1	5.5	-	-	9.8
SCHHA	3.5	2.9	2.7	0.2	2.8	1.1	3.4	-	9.7	-	13.8	1.3	6.3	-	2.4	2.5
SLAST	-	6.1	-	10.2	0.6	-	-	-	-	11.4	7.9	11.1	8.1	-	-	-
	-	3.8	-	-	1.8	-	-	-	-	11.9	7.9	10.8	7.7	-	-	-
STOEN	-	2.1	9.5	5.1	2.0	0.5	5.9	0.6	2.5	1.1	9.8	10.5	2.6	-	6.5	0.5
	-	1.7	10.3	-	2.1	0.5	6.4	1.0	1.1	2.6	9.9	10.5	2.6	-	6.4	1.0
	-	2.1	9.7	6.5	2.7	0.5	5.7	2.1	2.6	2.4	10.0	11.4	4.9	-	7.6	1.7
STRJO	1.8	8.4	11.4	0.9	9.8	3.2	-	-	9.6	-	1.7	-	5.3	-	-	2.2
	2.0	9.1	10.7	0.3	9.3	2.9	-	2.5	10.2	-	0.8	1.5	5.6	-	1.8	3.9
	1.6	9.0	12.5	1.1	1.0	-	-	2.5	-	-	1.0	-	4.5	-	-	-
	1.5	8.8	11.4	-	9.4	2.4	-	2.4	10.0	-	0.8	-	5.6	0.3	1.8	1.6
	2.4	8.8	9.6	0.3	10.0	-	-	2.2	9.0	-	1.3	-	4.4	-	1.8	4.3
TEPIS	8.0	-	-	2.2	-	-	-	-	-	0.9	10.1	2.8	5.8	-	-	9.7
	7.9	1.4	-	-	-	-	-	-	-	-	2.9	-	6.8	-	-	10.2
TRIMI	-	4.3	-	-	-	-	-	-	-	1.7	2.1	3.4	1.5	-	4.9	3.8
YRJIL	-	-	-	-	8.1	7.6	-	-	-	-	-	-	-	-	-	-
ZELZO	-	-	-	-	-	-	-	-	-	-	1.1	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	2.4	-	1.2	-	-	-
Sum	322.0	254.3	383.8	223.0	252.4	122.0	126.9	210.2	336.8	291.2	400.1	401.4	286.5	53.5	160.6	294.3

3. Results (Meteors)

January	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
ARLRA	9	-	-	14	-	7	25	1	-	50	1	-	11	39	7
BANPE	-	-	-	-	-	7	-	-	-	6	-	5	4	-	-
BASLU	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-
BERER	-	30	-	29	5	61	-	-	-	-	45	-	56	-	-
	-	7	-	11	2	27	-	-	-	-	8	-	6	-	-
BOMMA	6	45	52	39	57	21	3	7	10	5	55	32	23	17	32
BREMA	-	-	38	10	-	-	-	-	-	8	-	-	-	2	16
BRIBE	6	9	52	2	2	-	4	1	-	31	-	-	9	5	11
	5	2	30	1	36	-	-	-	-	8	-	-	6	8	4
CASFL	41	44	76	29	48	30	8	-	-	-	-	28	9	38	1
	35	34	98	28	33	25	10	-	-	-	-	22	9	32	-
CRIST	69	28	119	43	31	3	-	18	4	9	55	12	4	11	-
	38	-	78	31	4	5	-	12	1	-	36	5	-	4	-
	105	48	174	75	60	8	-	34	25	9	-	-	10	27	-
CSISZ	-	-	-	-	12	16	-	2	-	8	9	13	18	4	6
DINJE	74	44	107	50	43	46	4	23	16	1	49	56	27	53	39
ELTMA	43	25	83	52	25	6	-	-	-	-	34	22	23	12	-
FORKE	15	-	-	-	-	7	-	-	-	-	-	-	4	-	-
GONRU	48	12	25	8	4	10	6	25	52	14	40	25	8	7	-
	34	13	35	10	7	7	2	31	42	12	36	16	2	8	-
	21	23	34	14	-	3	12	24	19	7	20	8	-	1	8
	41	10	28	9	5	9	1	23	38	10	37	17	3	10	-
	46	34	80	18	1	4	23	28	29	4	28	22	-	1	15
GOVMI	3	12	27	18	-	17	11	7	15	23	14	16	11	32	29
	2	1	10	7	-	5	9	6	8	8	10	5	6	12	12
	1	4	7	1	-	11	10	4	12	8	7	5	4	15	21
HERCA	6	3	37	33	17	28	17	-	7	21	6	3	22	7	17
HINWO	26	1	-	-	-	1	-	-	-	7	-	22	4	42	1
IGAAN	5	-	-	-	9	10	2	-	-	10	16	13	13	2	-
	-	11	-	4	6	19	1	-	-	7	12	7	6	3	2
	-	7	-	5	11	-	-	-	-	5	2	-	2	6	-
JONKA	-	20	3	11	19	22	-	7	-	8	8	6	8	8	-
KACJA	-	46	-	-	59	9	11	4	4	13	1	6	-	-	-
	-	-	-	-	-	5	-	-	-	15	-	-	-	-	-
	1	8	23	4	17	3	4	-	5	5	-	1	-	5	-
	-	66	-	-	58	5	25	3	2	14	4	19	4	15	-
	-	-	-	8	43	8	15	3	5	6	-	19	3	1	-
KISSZ	-	7	-	3	6	7	-	1	1	8	8	-	6	3	-
KOSDE	7	-	47	-	-	51	-	-	-	20	6	7	32	46	63
	1	-	57	11	-	17	1	4	-	7	-	-	2	-	11
LOJTO	-	-	-	-	-	14	-	-	-	-	-	-	-	-	-
MACMA	-	-	-	4	6	20	1	-	-	-	1	-	23	-	7
	-	1	-	2	3	46	12	2	-	12	1	-	49	-	17
	2	-	-	1	5	42	10	1	-	-	-	-	26	-	3
	-	1	-	3	2	43	7	-	-	9	-	-	50	1	13
MARGR	-	-	-	-	-	-	-	-	7	2	7	-	-	-	9
MARRU	-	-	87	-	-	-	-	30	-	-	30	-	-	-	9
	29	40	82	29	-	25	26	32	35	6	27	10	-	1	7
MASMI	-	-	75	8	-	1	-	6	24	12	42	10	-	-	-
MOLSI	28	10	2	-	2	7	9	18	-	-	3	91	19	77	99
	-	-	-	-	-	-	-	-	-	-	-	-	1	18	15
	13	6	1	-	2	6	6	22	-	-	2	61	14	39	55
	4	38	39	-	-	10	12	4	2	61	3	-	22	52	2
	-	44	30	2	-	4	10	-	-	48	2	-	18	40	4
	1	32	15	-	-	12	13	1	-	44	2	-	15	25	7
	4	26	19	1	-	2	11	4	1	58	7	-	12	48	6
MORJO	-	11	1	11	13	18	-	2	-	3	12	7	7	7	3
MOSFA	19	25	66	28	21	8	-	4	6	2	27	10	1	18	-
OCHPA	28	34	42	35	32	19	20	21	10	15	14	7	3	14	-
OTTMI	26	-	-	20	-	24	8	18	17	13	2	12	11	1	15
PERZS	1	53	63	18	5	9	10	7	-	16	-	20	16	42	24
PUCRC	47	29	19	12	-	-	-	-	-	-	29	14	30	4	6
ROTEC	-	1	-	2	-	-	-	-	-	11	-	-	1	9	2
SARAN	-	-	61	16	1	17	14	15	21	12	29	-	-	-	10
	37	32	53	25	3	30	33	43	40	24	31	15	1	3	9
	48	40	71	37	6	44	34	45	56	33	46	9	2	3	25
	22	-	54	26	1	20	27	22	31	19	21	10	2	3	9
SCHHA	5	1	-	11	9	4	1	1	-	34	-	-	10	5	18
SLAST	3	9	1	4	10	2	1	-	-	5	3	2	-	18	1
	2	3	5	5	12	-	4	-	5	1	-	-	1	6	-
STOEN	57	40	126	71	48	6	-	5	3	3	30	22	27	22	3
	49	33	101	62	47	2	-	3	2	9	40	30	25	25	-
	63	59	146	79	57	7	-	11	6	8	36	35	35	22	1
STRJO	4	4	12	8	-	-	1	-	-	27	-	-	3	2	14
	4	13	22	4	-	-	2	-	-	28	-	-	15	8	13
	5	6	31	1	-	3	-	-	-	23	-	-	6	4	12
	3	8	17	4	-	-	-	-	-	16	-	-	6	5	19
	2	7	14	2	-	3	-	-	-	22	-	-	5	5	14
TEPIS	2	11	-	19	23	17	-	7	-	6	-	16	12	11	12
	1	6	-	22	25	18	-	6	-	11	1	23	16	21	15
TRIMI	14	10	56	5	-	4	4	2	-	11	12	4	18	16	6
YRJIL	-	-	-	-	30	19	-	-	-	-	-	3	-	-	-
ZELZO	-	-	-	13	13	15	-	-	-	-	-	-	6	-	-
	-	-	-	12	7	10	-	-	-	5	-	-	4	-	-
Sum	1211	1227	2635	1180	1003	1051	480	600	561	976	1007	823	867	1051	779

January	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
ARLRA	-	62	70	-	-	8	-	1	-	-	-	14	36	4	1	4
BANPE	3	-	-	-	-	-	-	-	-	-	7	-	-	-	-	3
BASLU	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BERER	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	51
	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16
BOMMA	-	39	8	-	-	-	-	1	2	2	48	36	10	-	32	3
BREMA	13	2	-	-	6	8	2	-	9	-	1	-	-	-	1	-
BRIBE	14	11	19	-	17	-	1	3	4	-	4	3	19	-	-	-
	-	14	30	1	18	6	-	18	1	-	1	-	16	-	-	2
CASFL	-	12	28	23	5	-	24	8	40	25	12	33	12	-	31	8
	-	9	19	26	3	-	13	7	21	14	5	25	7	-	31	2
CRIST	-	20	36	10	2	-	10	45	53	6	14	38	1	3	32	15
	-	2	14	6	1	-	5	22	36	2	3	31	3	-	18	12
	-	26	44	8	-	-	11	70	95	10	11	62	10	4	60	21
CSISZ	17	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-
DINJE	-	35	44	2	-	-	-	-	2	5	55	59	10	-	37	2
ELTMA	-	19	33	3	-	-	16	-	1	-	15	-	-	-	21	-
FORKE	3	8	6	-	-	-	-	-	-	-	-	-	-	-	10	3
GONRU	7	-	-	6	28	9	-	25	56	33	22	23	2	-	-	39
	4	-	-	3	31	9	-	23	39	40	18	16	-	-	-	25
	11	-	18	-	15	5	-	15	25	16	7	6	-	-	-	5
	6	-	-	6	27	2	1	9	29	40	7	19	1	-	-	23
	12	-	47	3	30	12	-	33	37	40	20	10	1	-	2	16
GOVMI	11	2	-	10	-	-	-	-	-	6	21	22	10	-	13	7
	9	-	-	-	-	-	-	-	1	3	10	16	6	-	11	-
	4	1	-	1	-	-	-	-	-	4	5	17	9	-	6	2
HERCA	22	23	30	17	29	17	23	20	19	7	4	7	20	-	-	-
HINWO	-	-	34	2	-	7	-	-	-	-	-	-	-	-	3	7
IGAAN	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12
	7	-	-	-	-	-	-	-	-	-	-	2	4	-	-	-
	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
JONKA	8	-	1	-	-	-	-	-	-	-	20	-	13	-	-	10
KACJA	-	26	-	2	-	-	1	-	-	14	7	23	7	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	4	-	1	2	-	-	-	-	11	2	5	3	-	1	-
	-	40	5	7	-	-	2	-	-	60	19	74	15	-	-	-
	-	9	-	-	-	-	-	-	-	20	8	37	9	-	-	-
KISSZ	6	-	-	-	-	-	-	-	-	1	3	-	9	-	-	8
KOSDE	76	-	52	85	37	84	76	70	86	62	62	50	64	67	60	75
	19	-	-	-	5	5	19	-	5	-	20	2	3	-	5	3
LOJTO	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MACMA	13	-	-	-	-	-	-	-	-	-	-	-	-	-	1	3
	27	-	-	-	-	-	-	-	-	-	-	1	33	2	1	17
	17	-	-	-	-	-	-	-	-	-	-	-	23	-	-	11
	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-	19
MARGR	7	17	-	24	12	13	25	7	12	6	9	5	2	17	-	-
MARRU	4	-	25	2	-	-	6	11	-	18	-	14	-	-	-	17
	14	-	20	1	11	-	1	5	25	16	24	13	5	-	-	17
MASMI	-	-	-	-	-	-	-	-	22	-	2	-	-	36	31	11
MOLSI	6	1	-	13	-	-	-	-	3	-	-	-	2	-	-	-
	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-
	3	-	-	3	-	-	-	-	2	-	-	-	-	-	-	13
	1	91	73	2	-	13	-	-	25	-	-	22	16	14	2	-
	-	53	62	8	-	11	-	1	26	-	-	15	14	5	-	-
	-	51	34	-	-	5	-	-	8	-	-	20	8	5	-	-
	-	68	76	6	-	14	-	-	7	-	-	13	10	7	1	-
MORJO	7	-	-	-	-	-	-	-	-	-	6	-	12	-	-	7
MOSFA	-	4	16	17	4	-	11	11	23	13	3	23	6	-	17	1
OCHPA	-	-	4	15	10	-	-	12	6	12	8	-	5	-	3	-
OTTMI	7	2	14	5	-	-	-	-	-	9	-	2	3	-	-	-
PERZS	33	3	1	5	-	-	-	-	-	-	-	-	-	-	-	-
PUCRC	-	3	2	1	1	3	17	4	-	6	3	26	-	-	-	-
ROTEC	-	10	17	-	-	4	-	-	-	-	-	2	-	-	-	-
SARAN	12	-	23	1	18	-	8	4	34	27	13	26	6	-	-	7
	19	-	-	3	13	-	4	-	29	21	24	11	2	-	-	11
	26	-	-	2	33	9	8	9	44	46	46	30	8	-	-	21
	17	-	25	-	11	-	3	2	10	18	15	24	6	-	-	11
SCHHA	7	3	7	1	19	4	8	-	13	-	18	2	21	-	15	6
SLAST	-	7	-	1	1	-	-	-	-	18	4	18	3	-	-	-
	-	5	-	-	2	-	-	-	-	11	9	10	3	-	-	-
STOEN	-	5	44	9	3	3	25	3	6	10	30	59	5	-	35	3
	-	1	44	-	6	3	29	3	4	7	27	48	5	-	29	3
	-	5	41	12	10	2	26	8	9	10	34	55	12	-	45	4
STRJO	7	13	25	7	29	2	-	-	15	-	4	-	10	-	-	2
	4	9	20	1	22	1	-	2	14	-	1	1	8	-	3	3
	2	7	19	1	2	-	-	2	-	-	2	-	8	-	-	-
	3	11	28	-	23	1	-	1	16	-	1	-	9	1	2	1
	5	11	12	2	31	-	-	1	10	-	4	-	5	-	2	4
TEPIS	20	-	-	2	-	-	-	-	-	2	14	3	6	-	-	13
	15	2	-	-	-	-	-	-	-	-	7	-	13	-	-	23
TRIMI	-	4	-	-	-	-	-	-	-	4	7	14	2	-	20	5
YRJIL	-	-	-	-	26	17	-	-	-	-	-	-	-	-	-	-
ZELZO	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	4	-	2	-	-	-
Sum	614	750	1170	367	543	277	375	456	924	675	754	1087	573	165	582	607