Results of the IMO Video Meteor Network – November 2016

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Taking into consideration that November weather is typically wet and cold in central Europe, the second-to-last month of 2016 provided relative good observing conditions – better than in many years before. However, it could not cope with record-breaking month of November 2015. An overall of 79 cameras contributed to the IMO network and more than half of these managed to observe in twenty or more observing nights. Among them the new camera RO4 of Carlos Saraiva, a Watec camera with a c-mount zoom lens that started regular observation in November. With over 9,700 hours, the effective observing fell about 20% short of the 2015 result, and the number of meteors even dropped by 25% to 43,000.

With respect to meteor showers, November was not particularly thrilling. Far away from their famous outbursts at the onset of the millennium, the Leonids presented the usual activity profile with a slow increase starting at about 232° solar longitude (November 13), a peak activity of 7 meteoroids per 1,000 km^2 and hour between 236° and 238° solar longitude (November 17-19) and a steeper decrease until 240° solar longitude (November 21). As in case of many major showers in 2016, the moon hampered the Leonid observation significantly. However, in the end our data confirmed the prediction that there was no unusual activity.

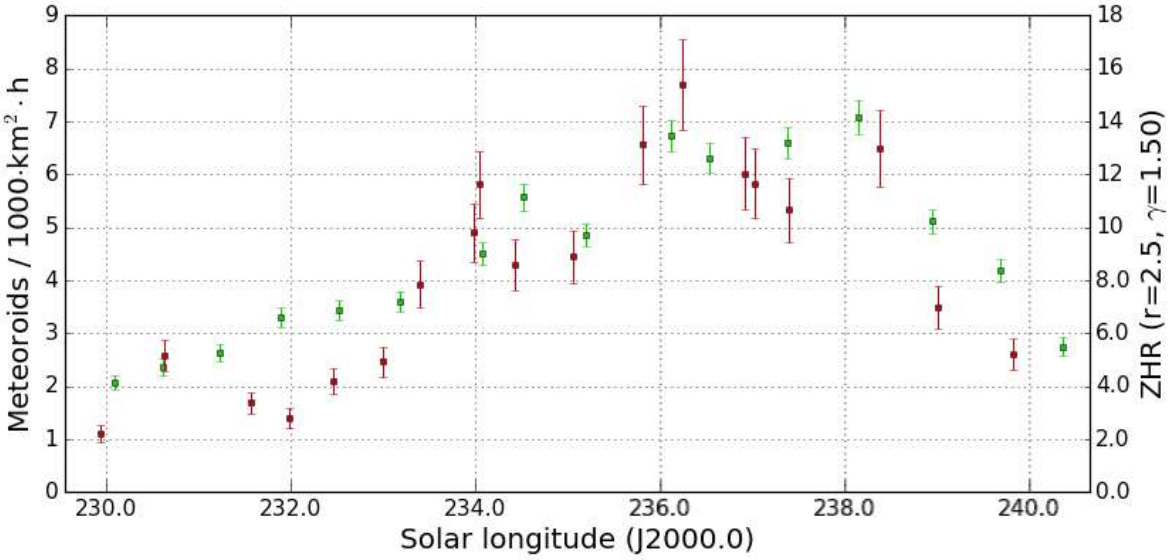

Figure 1: *Comparison of the flux density of the Leonids 2016 (red) with the average of the years 2011-2015 (green), derived from video data of the IMO Video Meteor Network. The 2013 data were omitted from the average profile, since activity was significantly enhanced that year which would distort the profile.*

Figure 2 shows exemplary for the Leonids 2016 the impact of the new method to calculate the limiting magnitude loss from meteor motion. The new algorithm (which is not yet used) creates an activity profile of similar shape, but the absolute ZHR and flux density values reduce about a factor of two compared to the previous method.

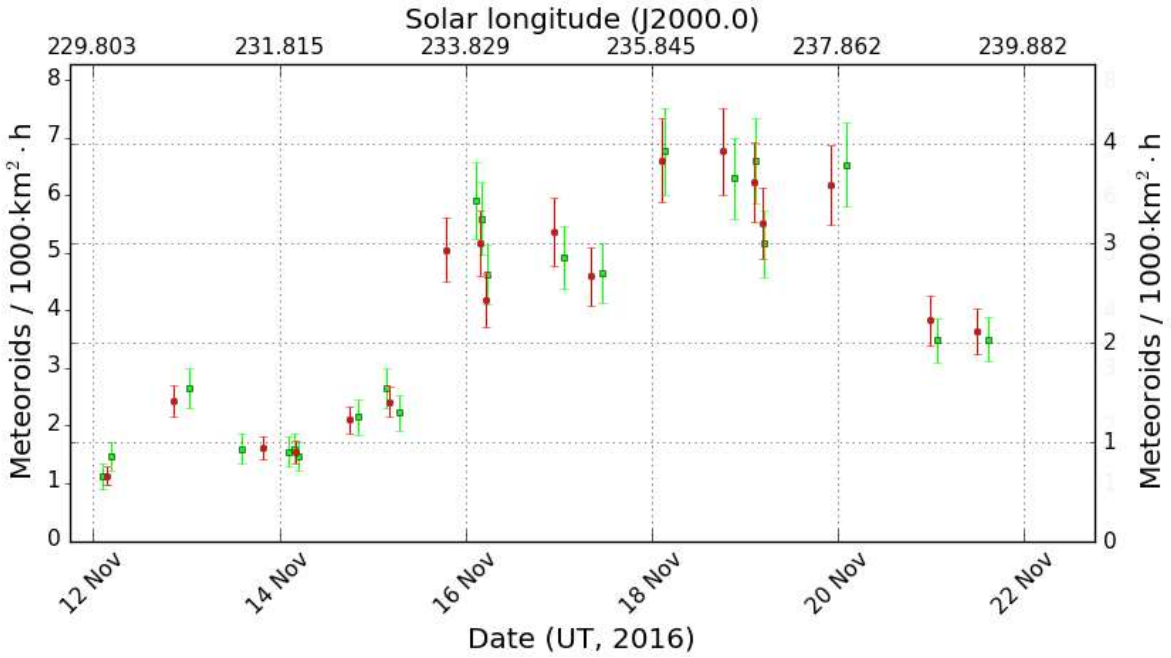

Figure 2: *Comparison of the 2016 Leonid flux density profile obtained with the previous (red, left axis) and new method (green, right axis) to calculate the limiting magnitude loss caused by meteor motion.*

The alpha Monocerotids presented no surprise to the observers as well. As in the previous few years they were effectively absent. Due to the small data set, we present in figure 3 the average activity profile of the years 2011 till 2016.

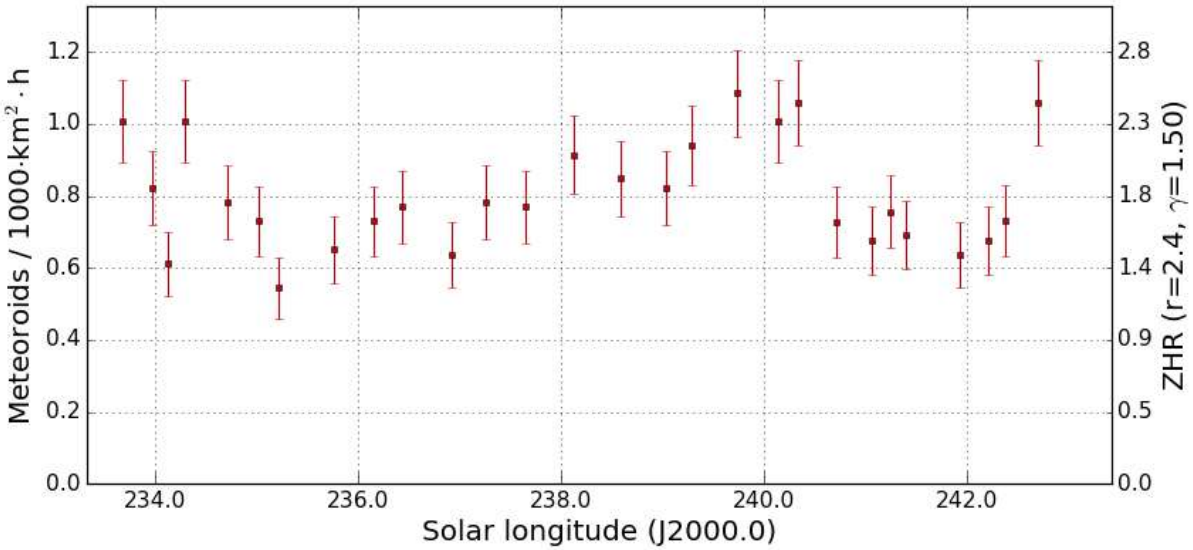

Figure 3: *Average activity profile of the alpha Monocerotids from the years 2011-2016, derived from video data of the IMO Video Meteor Network.*

Figure 4 presents the flux density profile of the Northern and Southern Taurids. It seems remarkable that the Southern Taurids shows maxima at mid of October and November with a dip in-between. Since just with the second peak also the Northern Taurid activity rises we may suspect that once more we see the imprint of the lunar phase.

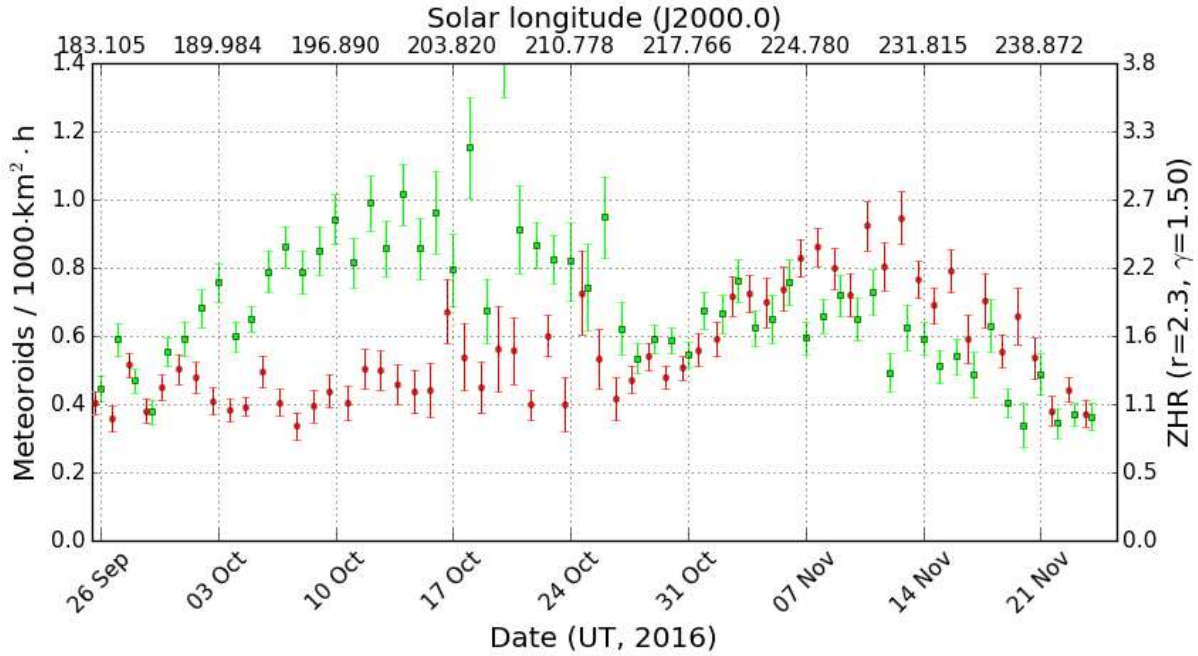

Figure 4: *Flux density of the Northern (red) and Southern Taurids (green) 2016, derived from video data of the IMO Video Meteor Network.*

However, if all data from 2011 till 2016 are averaged (figure 5) and only the 2015 data set is omitted (because of higher rates during the "Taurid swarm" that year), we get the same picture. The southern branch dominates in October and has a weak secondary peak in mid-November. The northern branch, on the other hand, is not very strong in October, but becomes quite prominent in November. The dip at the end of October is a real feature independent of the lunar phase.

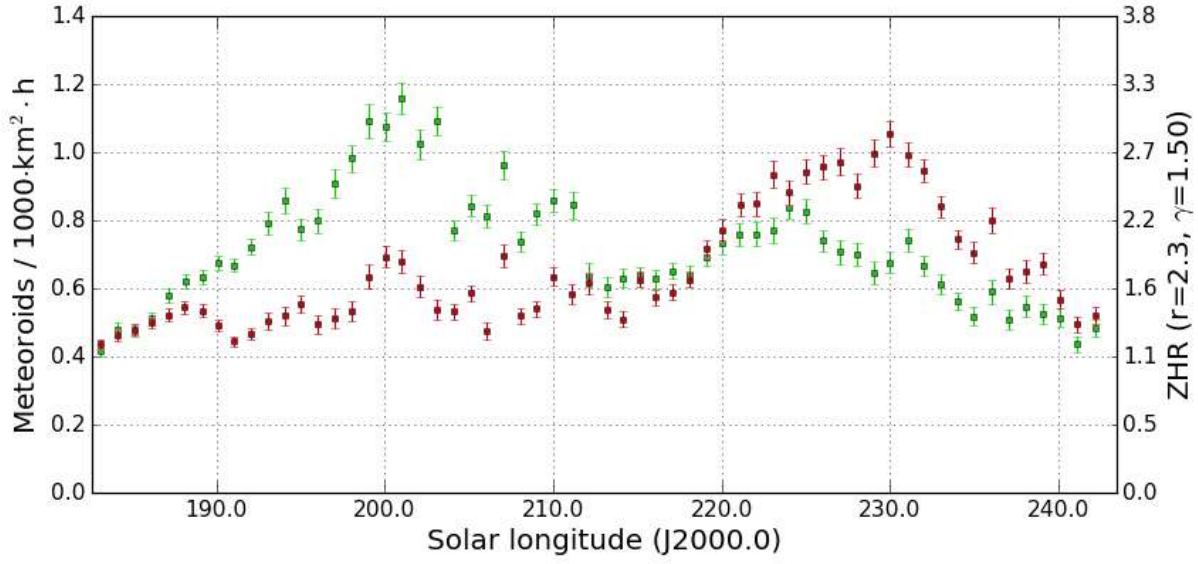

Figure 5: *Comparison of the average flux density profile of the Northern (red) and Southern Taurids (green) in the years 2011-2016. The 2015 data were omitted, since Taurid activity was enhanced that year by the "Taurid swarm".*

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	24	165.4	949
BANPE	Bánfalvi	Zalaegerszeg/HU	HUVCSE01 (0.95/5)	2423	3.4	361	14	55.0	122
BERER	Berkó	Ludanyhalaszi/HU	HULUD1 (0.8/3.8)	5542	4.8	3847	12	115.9	685
BOMMA	Bombardini	Faenza/IT	MARIO (1.2/4.0)	5794	3.3	739	23	137.1	782
BREMA	Breukers	Hengelo/NL	MBB3 (0.75/6)	2399	4.2	699	23	139.0	373
BRIBE	Klemt	Herne/DE	HERMINE (0.8/6)	2374	4.2	678	19	100.3	456
		Berg. Gladbach/DE	KLEMOI (0.8/6)	2286	4.6	1080	19	102.9	423
CARMA	Carli	Monte Baldo/IT	BMH2 (1.5/4.5)*	4243	3.0	371	3	24.4	63
CASFL	Castellani	Monte Baldo/IT	BMH1 (0.8/6)	2350	5.0	1611	22	176.0	698
CRIST	Crivello	Valbrevenna/IT	BILBO (0.8/3.8)	5458	4.2	1772	21	156.2	661
			C3P8 (0.8/3.8)	5455	4.2	1586	19	119.0	493
			STG38 (0.8/3.8)	5614	4.4	2007	22	178.5	1289
DONJE	Donati	Faenza/IT	JENNI (1.2/4)	5886	3.9	1222	23	149.7	831
ELTMA	Eltri	Venezia/IT	MET38 (0.8/3.8)	5631	4.3	2151	14	97.5	451
FORKE	Förster	Carlsfeld/DE	AKM3 (0.75/6)	2375	5.1	2154	14	89.5	367
GONRU	Goncalves	Foz do Arelho/PT	FARELHO1 (1.0/2.6)	6328	2.8	469	2	11.9	16
		Tomar/PT	TEMPLAR1 (0.8/6)	2179	5.3	1842	27	215.9	1043
			TEMPLAR2 (0.8/6)	2080	5.0	1508	26	220.2	838
			TEMPLAR3 (0.8/8)	1438	4.3	571	27	210.8	453
			TEMPLAR4 (0.8/3.8)	4475	3.0	442	27	199.0	801
			TEMPLAR5 (0.75/6)	2312	5.0	2259	27	196.8	980
GOVMI	Govedic	Sredisce ob Dr./SI	ORION2 (0.8/8)	1447	5.5	1841	21	170.5	548
			ORION4 (0.95/5)	2662	4.3	1043	21	169.2	386
HERCA	Hergenrother	Tucson/US	SALSA3 (0.8/3.8)	2336	4.1	544	29	269.8	844
HINWO	Hinz	Schwarzenberg/DE	HINWO1 (0.75/6)	2291	5.1	1819	1	10.3	40
IGAAN	Igaz	Hodmezovasar./HU	HUHOD (0.8/3.8)	5502	3.4	764	21	145.9	393
		Budapest/HU	HUPOL (1.2/4)	3790	3.3	475	2	7.6	11
JONKA	Jonas	Budapest/HU	HUSOR (0.95/4)	2286	3.9	445	20	155.0	325
			HUSOR2 (0.95/3.5)	2465	3.9	715	22	173.8	307
KACJA	Kac	Kamnik/SI	CVETKA (0.8/3.8)	4914	4.3	1842	11	67.6	415
		Kostanjevec/SI	METKA (0.8/12)*	715	6.4	640	3	22.8	65
		Ljubljana/SI	ORION1 (0.8/8)	1399	3.8	268	12	45.3	88
		Kamnik/SI	REZIKA (0.8/6)	2270	4.4	840	11	72.3	769
			STEFKA (0.8/3.8)	5471	2.8	379	11	72.8	310
KOSDE	Koschny	Izana Obs./ES	ICC7 (0.85/25)*	714	5.9	1464	25	176.1	1359
		La Palma / ES	ICC9 (0.85/25)*	683	6.7	2951	25	156.8	1361
		Izana Obs./ES	LIC1(2.8/50)*	2255	6.2	5670	27	216.8	1871
		La Palma / ES	LIC2 (3.2/50)*	2199	6.5	7512	25	201.0	1748
LOPAL	Lopes	Lisboa/PT	NASO1 (0.75/6)	2377	3.8	506	3	3.5	24
MACMA	Maciejewski	Chelm/PL	PAV35 (0.8/3.8)	5495	4.0	1584	12	47.3	118
			PAV36 (0.8/3.8)*	5668	4.0	1573	16	73.5	199
			PAV43 (0.75/4.5)*	3132	3.1	319	10	28.5	98
			PAV60 (0.75/4.5)	2250	3.1	281	16	80.9	281
MARRU	Marques	Lisbon/PT	CAB1 (0.75/6)	2362	4.8	1517	28	223.5	973
			RAN1 (1.4/4.5)	4405	4.0	1241	23	181.2	680
MOLSI	Molau	Seysdorf/DE	AVIS2 (1.4/50)*	1230	6.9	6152	20	144.7	1415
			ESCIMO2 (0.85/25)	155	8.1	3415	19	138.0	466
			MINCAM1 (0.8/8)	1477	4.9	1084	20	132.9	928
		Ketzür/DE	REMO1 (0.8/8)	1467	6.5	5491	26	169.1	1142
			REMO2 (0.8/8)	1478	6.4	4778	26	172.0	1006
			REMO3 (0.8/8)	1420	5.6	1967	26	188.9	760
			REMO4 (0.8/8)	1478	6.5	5358	16	87.7	548
MORJO	Morvai	Fülöpszallas/HU	HUFUL (1.4/5)	2522	3.5	532	18	157.0	345
MOSFA	Moschini	Rovereto/IT	ROVER (1.4/4.5)	3896	4.2	1292	14	16.2	117
OTTMI	Otte	Pearl City/US	ORIE1 (1.4/5.7)	3837	3.8	460	24	205.8	372
PERZS	Perkó	Becsehely/HU	HUBEC (0.8/3.8)*	5498	2.9	460	23	64.1	503
ROTEC	Rothenberg	Berlin/DE	ARMEFA (0.8/6)	2366	4.5	911	19	147.5	283
SARAN	Saraiva	Carnaxide/PT	RO1 (0.75/6)	2362	3.7	381	22	148.1	308
			RO2 (0.75/6)	2381	3.8	459	26	174.8	572
			RO3 (0.8/12)	710	5.2	619	26	182.3	736
			RO4 (1.0/8)	1582	4.2	549	10	52.2	111
			SOFIA (0.8/12)	738	5.3	907	22	116.5	347
SCALE	Scarpa	Alberoni/IT	LEO (1.2/4.5)*	4152	4.5	2052	16	97.2	224
SCHHA	Schremmer	Niederkrüchten/DE	DORAEMON (0.8/3.8)	4900	3.0	409	21	103.6	359
SLAST	Slavec	Ljubljana/SI	KAYAK1 (1.8/28)	563	6.2	1294	12	68.4	284
			KAYAK2 (0.8/12)	741	5.5	920	8	55.9	35
STOEN	Stomeo	Scorze/IT	MIN38 (0.8/3.8)	5566	4.8	3270	20	111.4	773
			NOA38 (0.8/3.8)	5609	4.2	1911	19	112.1	611
			SCO38 (0.8/3.8)	5598	4.8	3306	21	118.4	900
STRJO	Strunk	Herford/DE	MINCAM2 (0.8/6)	2354	5.4	2751	22	146.0	823
			MINCAM3 (0.8/6)	2338	5.5	3590	21	137.0	479
			MINCAM4 (1.0/2.6)	9791	2.7	552	14	71.9	73
			MINCAM5 (0.8/6)	2349	5.0	1896	20	132.3	419
			MINCAM6 (0.8/6)	2395	5.1	2178	21	140.5	466
TEPIS	Tepliczky	Agostyan/HU	HUAGO (0.75/4.5)	2427	4.4	1036	17	141.4	319
			HUMOB (0.8/6)	2388	4.8	1607	23	181.5	571
TRIMI	Triglav	Velenje/SI	SRAKA (0.8/6)*	2222	4.0	546	19	139.7	205
WEGWA	Wegrzyk	Nieznaszyn/PL	PAV78 (0.8/6)	2286	4.0	778	17	76.6	253
YRJIL	Yrjölä	Kuusankoski/FI	FINEXCAM (0.8/6)	2337	5.5	3574	3	10.2	36
Sum							30	9774.9	42776

* active field of view smaller than video frame

2. Observing Times (h)

November	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
ARLRA	5.5	7.8	6.6	5.4	3.8	1.7	1.0	3.5	7.8	0.3	6.8	11.7	11.8	3.5	-
BANPE	3.7	-	3.6	2.8	-	-	-	-	-	-	-	-	1.1	4.7	1.8
BERER	-	4.5	9.9	8.4	-	-	-	-	11.9	-	-	-	2.5	12.0	-
BOMMA	9.1	2.3	1.0	1.6	0.7	9.4	6.0	4.1	1.5	9.3	-	10.6	2.1	1.7	12.8
BREMA	8.8	5.8	3.1	1.9	6.4	0.3	1.3	2.4	-	-	6.8	2.5	13.1	-	-
BRIBE	1.6	4.8	0.5	-	0.2	-	-	7.9	-	-	-	0.4	4.9	-	-
	2.2	-	5.1	-	1.8	-	-	5.2	-	0.9	3.7	1.0	10.7	-	-
CARMA	11.7	10.1	2.6	-	-	-	-	-	-	-	-	-	-	-	-
CASFL	12.3	10.7	5.1	-	0.2	8.6	7.0	12.7	5.7	9.1	6.6	10.1	2.6	9.7	11.7
CRIST	0.6	3.9	2.0	-	-	9.9	9.9	12.3	6.3	10.3	12.5	4.8	-	8.1	11.6
	-	0.4	3.9	-	-	7.8	1.7	12.3	6.4	7.5	12.4	5.3	-	12.5	12.6
	1.5	4.8	2.0	-	-	11.1	11.2	12.3	7.5	9.9	12.4	8.0	-	10.5	11.5
DONJE	11.3	3.7	1.8	2.2	2.4	11.4	6.0	5.3	1.9	8.9	-	11.5	2.9	1.6	12.8
ELTMA	-	-	10.6	-	-	8.2	9.1	6.7	-	0.6	-	10.4	-	11.5	6.7
FORKE	0.2	-	7.7	-	-	5.7	-	3.0	-	-	-	0.4	12.9	4.3	-
GONRU	3.1	8.8	-	-	-	-	-	-	-	-	-	-	-	-	-
	7.9	7.5	4.4	2.7	12.1	12.1	12.1	3.8	5.9	6.6	8.5	3.0	12.2	10.5	10.3
	7.4	7.4	4.4	3.2	12.2	12.2	12.2	4.2	5.4	6.8	8.7	2.4	12.4	12.4	12.5
	4.6	6.2	3.6	1.2	12.1	12.1	12.0	2.7	5.3	6.5	6.3	2.5	12.3	11.6	12.3
	5.3	5.2	3.9	1.2	12.0	11.9	12.0	2.5	4.1	6.6	8.6	2.2	12.4	12.2	11.4
	4.3	5.5	3.5	0.8	11.9	11.9	11.9	2.3	3.8	5.7	7.2	3.4	8.4	10.9	10.1
GOVMI	11.9	-	10.3	12.0	1.5	0.2	-	-	-	10.2	-	3.9	9.6	8.7	2.8
	11.9	-	7.4	11.6	-	0.2	-	-	-	10.2	-	7.8	10.2	10.7	4.4
HERCA	9.7	11.7	6.5	6.7	11.6	11.8	11.7	12.0	11.8	11.4	11.0	11.7	11.6	11.8	11.8
HINWO	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
IGAAN	1.1	-	8.8	8.8	-	-	-	-	8.5	7.7	1.3	-	0.2	2.5	5.4
	-	-	3.8	3.8	-	-	-	-	-	-	-	-	-	-	-
JONKA	10.2	2.5	12.3	10.4	-	-	1.7	-	11.5	3.9	-	0.7	-	6.4	2.7
	10.4	2.5	11.9	10.7	-	-	1.0	-	10.8	4.3	-	2.1	1.7	9.3	6.0
KACJA	4.6	1.6	5.5	1.5	-	-	-	-	-	2.4	-	8.2	-	7.0	2.8
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2.5	0.6	5.0	3.2	-	-	-	-	-	-	-	-	-	1.5	3.5
	4.7	1.7	9.7	1.6	-	-	-	-	-	1.3	-	8.1	-	6.8	2.8
	5.0	1.8	5.6	1.6	-	-	-	-	-	2.5	-	9.3	-	7.2	4.2
KOSDE	10.4	-	4.2	9.8	6.7	11.1	5.8	11.2	11.1	10.5	3.0	3.5	3.1	1.5	6.4
	-	4.4	0.8	0.7	10.2	-	7.3	10.2	8.5	8.2	7.2	5.6	-	1.6	5.5
	10.0	0.2	4.7	9.6	7.5	11.4	6.2	11.3	11.4	11.6	9.9	9.5	3.9	1.5	11.8
	11.0	4.5	1.0	1.0	10.5	11.0	7.0	10.2	9.2	8.2	7.3	6.2	-	-	10.6
LOPAL	-	-	-	-	-	-	-	-	-	-	-	0.2	-	-	-
MACMA	-	5.0	-	8.8	0.5	-	1.4	-	-	-	-	-	-	0.5	0.6
	-	3.7	-	9.0	1.1	-	3.9	-	-	1.7	-	0.2	-	-	1.5
	-	2.1	-	1.8	-	-	-	-	-	-	-	-	-	-	0.2
	-	5.0	-	8.7	0.6	-	4.1	-	-	3.2	-	0.2	-	1.4	2.9
MARRU	6.4	8.7	1.0	5.5	12.1	12.1	12.1	7.4	7.6	10.4	5.6	1.2	12.1	10.9	12.4
	4.6	6.2	3.9	-	10.1	10.9	11.8	5.2	4.2	11.9	1.3	1.7	11.9	11.4	12.1
MOLSI	3.4	9.8	11.8	4.4	-	3.2	5.8	1.7	1.6	-	-	3.4	12.3	3.9	-
	-	9.4	12.3	4.0	-	3.5	7.4	1.4	0.8	-	-	2.2	11.4	2.8	-
	2.4	9.6	12.2	3.0	-	2.8	5.5	1.2	1.2	-	-	2.3	10.7	1.2	-
	7.1	9.0	4.9	6.5	6.1	1.4	2.5	3.1	7.1	2.5	8.7	4.2	11.4	1.3	-
	7.0	8.4	5.5	7.4	6.0	1.5	2.9	3.1	5.9	1.5	8.9	3.7	11.8	2.4	-
	7.2	9.2	5.5	7.2	6.7	2.0	1.7	2.9	6.9	3.7	8.4	1.6	13.1	3.5	-
	7.7	9.6	5.5	7.3	6.7	1.7	2.7	3.4	5.9	2.1	9.3	4.0	13.2	2.9	-
MORJO	11.1	-	8.5	10.0	-	-	1.2	-	-	-	1.5	-	-	4.4	6.2
MOSFA	-	0.9	-	-	-	0.3	0.8	0.8	0.8	-	1.7	1.0	0.7	0.2	2.3
OTTMI	-	0.5	7.2	12.3	12.3	12.4	1.8	12.4	12.5	12.5	12.5	12.5	9.7	9.4	9.2
PERZS	5.2	-	3.3	4.7	0.9	-	0.2	-	0.8	1.5	-	3.5	4.1	1.2	0.8
ROTEC	6.4	9.9	3.6	-	1.8	0.5	-	-	11.7	-	6.2	11.2	12.9	-	-
SARAN	3.7	5.7	5.3	1.2	11.0	10.8	11.5	6.1	5.5	6.1	1.6	1.9	8.2	9.3	9.8
	2.4	6.1	4.5	0.3	10.9	10.5	11.7	5.4	4.9	10.9	1.6	-	12.5	12.1	11.5
	4.3	7.4	5.2	3.2	11.1	10.7	11.6	6.0	6.1	10.7	1.9	-	12.0	12.2	11.1
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9.7
	3.0	5.7	4.2	1.5	4.8	9.1	9.7	4.7	4.3	10.0	1.5	1.8	4.9	3.5	10.3
SCALE	-	5.7	12.0	-	0.8	9.4	7.2	7.8	-	0.6	-	8.6	-	12.8	5.2
SCHHA	3.2	3.6	2.2	-	6.5	-	0.2	6.4	-	0.5	-	-	7.6	-	-
SLAST	3.6	-	6.7	2.3	-	-	-	-	-	1.2	-	9.6	-	4.7	0.2
	3.3	-	6.1	2.7	-	-	-	-	-	-	-	-	-	-	-
STOEN	-	9.4	10.8	-	-	7.4	11.2	9.3	0.5	1.5	-	11.7	-	10.7	7.7
	-	9.2	10.2	0.2	-	7.2	10.8	9.9	-	1.6	-	10.7	-	13.0	9.4
	-	8.9	10.3	0.4	-	7.7	10.9	10.5	0.6	2.7	-	11.9	0.2	9.6	10.7
STRJO	7.3	1.9	2.9	2.8	3.2	-	-	4.8	-	0.9	9.9	0.7	11.5	-	-
	7.0	0.9	-	2.4	2.2	-	-	3.4	-	0.9	10.0	0.9	13.2	-	-
	-	-	3.2	1.7	0.1	-	-	0.3	-	0.5	0.1	-	13.2	-	-
	6.0	0.9	2.2	-	3.0	-	-	3.6	-	0.2	9.8	-	12.4	-	-
	7.3	1.2	2.2	2.2	1.8	-	-	4.0	-	0.9	9.9	-	13.1	-	-
TEPIS	10.0	3.6	10.9	12.3	-	-	3.9	-	9.3	8.9	-	-	-	-	-
	9.2	3.6	11.5	12.3	-	-	3.9	-	10.1	8.3	-	-	5.8	12.4	0.9
TRIMI	11.7	4.3	6.5	11.7	-	-	-	1.3	-	6.3	-	10.8	-	6.4	3.2
WEGWA	-	2.2	7.3	0.2	-	-	1.8	7.0	2.3	-	-	4.3	-	2.4	-
YRJIL	-	1.1	-	-	-	-	-	-	-	5.1	-	-	-	-	-
Sum	355.0	319.3	392.2	282.4	244.1	305.1	314.3	291.2	266.9	310.2	250.6	292.8	412.5	380.7	356.7

November	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
ARLRA	-	-	7.8	7.8	7.7	6.1	10.8	3.9	9.4	-	-	12.2	12.3	10.2	-
BANPE	-	5.5	2.9	-	-	8.8	11.1	0.7	-	-	-	-	3.2	4.0	1.1
BERER	-	-	-	-	-	7.3	12.5	12.8	-	-	-	11.9	12.9	9.3	-
BOMMA	5.6	-	-	0.3	-	5.5	5.4	-	-	-	13.2	4.6	7.0	13.3	10.0
BREMA	0.2	0.1	3.3	5.5	-	4.8	3.5	8.2	13.7	7.7	-	13.8	12.0	13.8	-
BRIBE	-	-	5.6	0.5	1.0	0.3	0.8	4.6	12.6	13.6	4.5	11.9	12.5	12.1	-
	-	0.3	8.0	3.0	-	-	1.4	-	13.3	2.0	4.4	13.2	13.1	13.3	0.3
CARMA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CASFL	5.2	-	-	9.2	-	-	-	1.7	-	-	13.3	9.7	1.7	13.3	9.8
CRIST	3.4	-	-	6.3	-	-	-	1.6	-	5.7	9.1	8.8	12.9	13.0	3.2
	1.7	0.7	-	5.9	-	-	-	0.2	-	5.7	5.6	5.1	11.3	-	-
	3.4	0.2	-	10.9	-	-	-	4.6	-	7.2	10.6	9.9	12.8	13.0	3.2
DONJE	6.3	-	-	-	-	5.0	5.7	0.7	-	-	13.3	5.1	6.7	13.0	10.2
ELTMA	0.2	-	-	0.2	-	-	-	-	-	-	6.5	-	7.3	13.2	6.3
FORKE	-	-	0.2	-	9.9	-	12.7	8.4	-	-	1.9	-	9.3	12.9	-
GONRU	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	12.2	6.8	9.3	-	-	6.4	12.5	12.6	-	5.1	0.7	9.2	6.1	10.2	5.2
	12.5	6.7	9.2	-	-	6.4	12.7	12.7	-	4.8	-	9.6	6.2	10.6	5.0
	12.3	6.6	10.3	-	1.6	7.8	12.5	12.6	-	3.7	-	7.8	11.2	9.0	4.1
	12.3	7.4	8.7	-	-	5.4	12.6	12.4	-	4.3	0.4	6.7	4.8	9.1	3.4
	12.1	5.8	9.4	-	1.4	7.4	12.4	12.2	-	3.4	-	7.6	10.5	8.6	4.4
GOVMI	-	11.5	8.2	-	9.3	12.3	12.3	12.3	2.6	-	-	0.8	12.3	12.3	5.5
	-	6.9	9.0	1.4	10.1	12.3	12.3	9.5	2.3	-	-	0.7	12.3	12.3	5.7
HERCA	7.6	7.6	10.8	11.4	6.8	-	6.4	11.4	11.9	1.3	12.0	2.8	4.3	1.0	11.7
HINWO	-	-	-	-	-	-	-	-	-	-	-	-	-	10.3	-
IGAAN	-	9.1	9.1	5.9	9.2	9.2	9.2	9.2	6.0	9.3	-	9.3	7.3	8.8	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
JONKA	-	-	7.9	-	7.9	10.7	13.2	12.0	4.1	3.5	-	11.5	9.8	12.1	-
	-	-	8.4	-	8.2	10.6	13.2	11.7	3.3	9.7	2.3	12.3	10.4	13.0	-
KACJA	-	-	-	-	-	-	-	-	-	-	-	-	12.6	13.2	8.2
	-	-	-	-	-	-	-	7.4	-	-	-	-	-	11.8	3.6
	1.1	-	-	-	-	-	-	-	0.6	-	-	0.5	9.0	12.6	5.2
	-	-	-	-	-	-	-	-	-	-	-	-	12.6	13.3	9.7
	-	-	-	-	-	-	-	-	-	-	-	-	12.6	13.3	9.7
KOSDE	8.6	5.3	7.9	-	11.1	2.3	-	-	10.9	1.4	9.9	-	7.9	5.1	7.4
	5.2	4.7	5.5	6.8	6.2	6.1	2.2	10.0	10.5	2.2	-	11.5	8.4	-	7.3
	8.9	5.5	8.3	-	11.1	2.4	-	-	11.8	1.7	10.5	11.8	8.3	7.6	8.4
	11.2	6.0	10.9	-	11.0	7.0	1.6	11.5	11.5	2.3	-	11.5	8.3	-	10.5
LOPAL	-	-	-	-	0.5	2.8	-	-	-	-	-	-	-	-	-
MACMA	-	-	-	-	8.0	-	-	-	-	0.2	6.4	0.6	6.3	9.0	-
	-	4.9	11.1	0.2	13.1	-	-	-	-	0.8	6.2	0.5	6.7	8.9	-
	-	2.1	10.7	0.6	4.0	-	-	-	-	-	1.9	-	2.5	2.6	-
	-	6.3	10.6	2.1	12.5	-	-	-	-	-	6.1	1.1	7.3	8.8	-
MARRU	11.7	6.6	8.3	-	0.2	8.3	12.6	11.4	-	4.5	0.6	5.6	11.3	11.8	5.1
	12.1	7.0	5.6	-	-	10.1	12.2	6.4	-	1.7	-	10.6	8.3	-	-
MOLSI	-	12.0	-	4.2	12.5	-	12.6	4.7	-	-	-	10.7	12.7	12.7	1.3
	-	12.5	-	4.0	13.0	0.5	13.1	4.6	-	-	-	10.4	11.4	13.3	-
	-	10.9	-	1.9	12.9	0.4	13.0	4.6	-	-	-	10.8	13.1	13.2	-
	0.9	3.3	9.9	9.1	7.1	5.8	8.6	6.5	6.7	-	-	12.7	12.6	10.1	-
	-	3.5	9.3	9.1	8.0	6.3	9.1	7.4	6.8	-	0.4	13.0	12.8	10.3	-
	2.2	4.0	11.6	10.6	9.8	7.2	10.6	7.7	7.4	-	-	13.7	13.5	11.0	-
	1.9	3.8	-	-	-	-	-	-	-	-	-	-	-	-	-
MORJO	-	10.4	12.4	3.9	10.4	13.1	13.2	13.1	2.0	13.1	-	11.9	-	10.6	-
MOSFA	-	-	-	-	0.2	-	-	-	-	-	-	-	1.9	2.3	2.3
OTTMI	10.3	2.7	0.2	12.5	12.8	7.9	-	-	-	2.9	11.1	-	1.2	7.0	-
PERZS	-	5.0	1.5	-	3.4	4.4	4.7	4.3	1.1	1.0	-	1.5	5.9	4.3	0.8
ROTEC	-	-	6.2	7.2	4.5	4.7	9.1	7.4	7.2	-	-	13.6	13.5	9.9	-
SARAN	10.1	8.0	6.4	-	-	-	-	-	-	3.3	4.3	10.2	8.1	-	-
	4.0	8.7	7.2	-	0.4	7.8	12.0	5.8	-	2.4	4.3	9.3	7.4	0.2	-
	4.0	8.4	6.5	-	1.0	6.2	8.5	7.1	-	4.0	4.8	10.0	8.1	0.2	-
	12.4	8.5	7.3	-	0.2	0.9	1.3	-	-	-	0.2	7.1	4.6	-	-
	9.6	7.7	3.8	-	-	-	-	-	-	2.0	2.2	9.1	3.1	-	-
SCALE	-	-	-	0.2	-	0.3	-	-	-	-	6.8	-	5.5	9.2	5.1
SCHHA	-	-	10.8	1.0	1.4	1.3	1.1	1.3	13.6	4.5	6.8	4.3	13.3	11.9	2.1
SLAST	-	-	-	-	-	-	-	3.5	0.9	-	-	-	12.3	12.4	11.0
	-	-	-	-	-	-	-	3.1	2.4	-	-	-	12.8	12.7	12.8
STOEN	-	0.2	-	1.0	-	-	0.2	1.7	0.9	-	1.0	0.5	4.4	13.2	8.1
	-	-	-	1.0	-	0.2	0.5	0.5	0.4	-	-	0.4	4.4	13.3	9.2
	-	-	-	1.1	-	-	0.1	0.6	0.9	-	0.9	1.0	5.3	13.5	10.6
STRJO	-	1.9	10.4	8.1	2.5	2.3	3.0	9.1	13.4	12.0	-	10.7	13.8	12.9	-
	-	1.2	8.8	6.9	4.8	3.4	2.6	6.6	12.2	11.0	-	13.7	13.6	11.3	-
	-	-	-	-	5.6	-	-	6.4	8.3	5.9	-	5.9	8.7	12.0	-
	-	0.7	8.6	5.4	2.2	0.9	1.6	9.1	13.3	12.8	-	13.6	13.6	12.4	-
	-	1.4	10.0	7.2	4.9	1.6	3.0	8.3	12.1	10.9	-	13.6	13.7	11.2	-
TEPIS	-	-	-	-	4.3	13.0	2.1	8.9	7.9	8.3	7.7	10.4	9.9	10.0	-
	-	8.0	9.0	-	2.7	13.0	13.0	13.0	3.4	0.7	2.4	11.4	13.1	13.2	0.6
TRIMI	-	8.9	0.4	1.1	-	11.2	8.9	8.2	4.7	-	-	-	11.2	12.3	10.6
WEGWA	-	-	1.0	0.6	7.4	12.7	12.6	-	-	2.8	2.7	-	6.2	3.1	-
YRJIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.0
Sum	209.2	255.3	348.3	174.1	282.8	290.4	386.3	376.2	250.1	199.4	195.0	467.7	644.0	679.4	242.7

3. Results (Meteors)

November	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
ARLRA	60	62	17	4	14	8	2	35	18	1	30	60	76	6	-
BANPE	8	-	7	8	-	-	-	-	-	-	-	-	6	15	1
BERER	-	62	61	29	-	-	-	-	44	-	-	-	21	59	-
BOMMA	34	10	7	5	3	45	53	30	7	33	-	49	14	5	87
BREMA	23	15	4	5	25	1	6	12	-	-	10	9	33	-	-
BRIBE	11	8	3	-	1	-	-	19	-	-	-	1	42	-	-
	7	-	9	-	12	-	-	9	-	1	22	3	41	-	-
CARMA	29	31	3	-	-	-	-	-	-	-	-	-	-	-	-
CASFL	30	54	8	-	1	39	25	69	16	38	36	24	14	25	58
CRIST	3	12	1	-	-	72	45	71	36	23	53	10	-	17	49
	-	2	10	-	-	38	12	48	39	29	52	9	-	41	57
	10	17	2	-	-	110	89	129	65	69	123	35	-	62	117
DONJE	42	11	8	5	4	76	42	44	13	24	-	61	23	16	97
ELTMA	-	-	46	-	-	47	66	36	-	5	-	26	-	34	32
FORKE	1	-	27	-	-	16	-	23	-	-	-	2	57	12	-
GONRU	4	12	-	-	-	-	-	-	-	-	-	-	-	-	-
	24	40	10	4	86	97	75	14	31	23	44	22	44	53	36
	17	24	7	3	46	68	71	6	15	10	36	14	56	51	57
	2	7	5	1	34	40	28	2	14	13	7	6	29	28	35
	13	18	4	2	68	70	60	3	15	15	29	14	52	43	58
	7	19	7	1	69	76	98	2	21	12	35	18	57	65	68
GOVMI	44	-	28	34	2	1	-	-	-	20	-	22	41	19	2
	24	-	14	27	-	1	-	-	-	14	-	16	26	19	3
HERCA	18	49	13	27	42	42	47	33	31	33	37	43	37	35	28
HINWO	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
IGAAN	16	-	40	23	-	-	-	-	26	15	1	-	1	8	10
	-	-	8	3	-	-	-	-	-	-	-	-	-	-	-
JONKA	12	10	33	17	-	-	2	-	23	10	-	4	-	33	3
	14	11	30	14	-	-	2	-	22	9	-	9	3	7	6
KACJA	10	4	21	2	-	-	-	-	-	7	-	49	-	77	9
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	6	1	11	1	-	-	-	-	-	-	-	-	-	5	5
	11	7	129	5	-	-	-	-	-	4	-	130	-	102	12
	6	6	17	2	-	-	-	-	-	4	-	38	-	47	10
KOSDE	74	-	42	84	49	89	78	103	126	91	11	19	12	9	35
	-	26	1	2	120	-	107	126	127	110	98	63	-	6	42
	130	2	91	120	74	115	91	130	120	97	73	51	10	4	59
	167	19	7	6	127	69	105	147	126	110	85	66	-	-	37
LOPAL	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-
MACMA	-	6	-	15	4	-	6	-	-	-	-	-	-	3	1
	-	10	-	12	2	-	5	-	-	2	-	1	-	-	1
	-	2	-	7	-	-	-	-	-	-	-	-	-	-	1
	-	12	-	19	2	-	11	-	-	5	-	1	-	2	3
MARRU	12	26	1	13	52	64	81	22	38	45	12	7	60	79	73
	28	7	1	-	25	33	50	6	20	30	3	12	53	62	57
MOLSI	12	84	140	29	-	30	27	10	16	-	-	10	59	8	-
	-	28	40	4	-	7	11	3	5	-	-	2	51	3	-
	6	48	73	10	-	9	16	3	16	-	-	8	69	3	-
	103	76	21	8	60	12	6	29	34	12	42	10	129	3	-
	96	69	9	11	34	13	3	37	9	3	26	8	97	1	-
	59	57	12	8	39	12	8	29	15	9	31	7	75	2	-
	117	91	16	24	55	8	5	43	6	2	46	12	100	10	-
MORJO	15	-	28	25	-	-	1	-	-	-	2	-	-	23	11
MOSFA	-	6	-	-	-	2	5	5	5	-	12	7	6	1	18
OTTMI	-	4	16	22	27	17	9	24	18	22	29	17	12	13	14
PERZS	39	-	31	32	6	-	1	-	5	10	-	30	29	9	5
ROTEC	15	25	7	-	1	1	-	-	8	-	13	7	20	-	-
SARAN	8	6	6	3	17	18	26	6	19	23	1	7	27	14	22
	18	14	5	2	40	36	46	12	20	45	7	-	28	39	44
	14	25	5	13	48	57	62	16	27	53	8	-	41	48	53
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16
	11	4	2	4	25	32	34	8	12	22	3	13	21	21	21
SCALE	-	7	17	-	2	19	18	24	-	1	-	20	-	20	16
SCHHA	8	2	1	-	20	-	1	20	-	3	-	-	33	-	-
SLAST	4	-	24	8	-	-	-	-	-	4	-	21	-	14	2
	3	-	8	3	-	-	-	-	-	-	-	-	-	-	-
STOEN	-	59	86	-	-	69	109	59	1	12	-	35	-	49	33
	-	26	60	2	-	38	81	83	-	6	-	35	-	41	29
	-	48	87	3	-	66	102	101	2	12	-	69	1	69	49
STRJO	71	4	8	2	10	-	-	24	-	1	54	3	54	-	-
	37	3	-	4	5	-	-	12	-	4	28	6	50	-	-
	-	-	2	3	1	-	-	2	-	2	1	-	12	-	-
	31	1	2	-	6	-	-	6	-	1	15	-	18	-	-
	35	4	2	1	3	-	-	10	-	1	41	-	40	-	-
TEPIS	10	15	22	27	-	-	5	-	15	29	-	-	-	-	-
	16	21	42	41	-	-	16	-	26	28	-	-	9	40	2
TRIMI	12	5	9	22	-	-	-	3	-	2	-	20	-	10	4
WEGWA	-	13	16	1	-	-	9	8	2	-	-	27	-	9	-
YRJIL	-	2	-	-	-	-	-	-	-	21	-	-	-	-	-
Sum	1637	1349	1530	812	1261	1663	1858	1696	1254	1230	1156	1269	1789	1499	1488

November	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
ARLRA	-	-	44	49	40	17	40	6	60	-	-	144	112	44	-
BANPE	-	13	7	-	-	13	16	4	-	-	-	-	9	13	2
BERER	-	-	-	-	-	26	59	58	-	-	-	118	106	42	-
BOMMA	24	-	-	1	-	37	19	-	-	-	81	13	63	106	56
BREMA	1	1	7	8	-	7	14	17	52	11	-	44	30	38	-
BRIBE	-	-	45	7	2	2	5	4	50	39	17	66	80	54	-
	-	1	27	3	-	-	10	-	49	3	11	70	79	65	1
CARMA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CASFL	25	-	-	27	-	-	-	3	-	-	59	31	6	72	38
CRIST	6	-	-	23	-	-	-	3	-	19	27	55	68	65	3
	7	2	-	21	-	-	-	1	-	23	24	37	41	-	-
	7	1	-	32	-	-	-	8	-	23	63	103	102	113	9
DONJE	28	-	-	-	-	34	12	1	-	-	100	12	71	62	45
ELTMA	1	-	-	1	-	-	-	-	-	-	8	-	53	75	21
FORKE	-	-	1	-	36	-	70	10	-	-	3	-	66	43	-
GONRU	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	51	27	26	-	-	17	84	73	-	24	1	63	16	46	12
	56	19	34	-	-	10	59	61	-	13	-	51	14	27	13
	32	12	19	-	3	14	22	28	-	5	-	23	17	22	5
	57	27	30	-	-	8	58	52	-	17	2	36	3	38	9
	55	21	42	-	13	17	73	49	-	17	-	50	36	34	18
GOVMI	-	46	19	-	37	39	47	20	3	-	-	5	53	61	5
	-	29	15	3	31	37	36	7	2	-	-	3	32	41	6
HERCA	18	32	34	40	20	-	16	47	31	2	26	16	10	2	35
HINWO	-	-	-	-	-	-	-	-	-	-	-	-	-	40	-
IGAAN	-	30	33	9	18	19	29	18	9	17	-	30	20	21	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
JONKA	-	-	9	-	14	18	37	16	1	16	-	25	13	29	-
	-	-	11	-	17	22	24	6	2	13	1	28	23	33	-
KACJA	-	-	-	-	-	-	-	-	-	-	-	-	105	110	21
	-	-	-	-	-	-	-	10	-	-	-	-	-	46	9
	2	-	-	-	-	-	-	-	2	-	-	1	12	39	3
	-	-	-	-	-	-	-	-	-	-	-	-	170	169	30
	-	-	-	-	-	-	-	-	-	-	-	-	75	88	17
KOSDE	54	23	60	-	61	11	-	-	90	8	79	-	47	59	45
	38	23	23	31	28	35	9	84	88	8	-	108	27	-	31
	60	26	39	-	57	9	-	-	103	11	90	122	64	79	44
	68	26	64	-	59	35	1	116	96	9	-	117	44	-	42
LOPAL	-	-	-	-	3	20	-	-	-	-	-	-	-	-	-
MACMA	-	-	-	-	20	-	-	-	-	1	19	2	21	20	-
	-	19	34	1	29	-	-	-	-	5	16	1	33	28	-
	-	16	31	2	12	-	-	-	-	-	10	-	10	7	-
	-	28	50	6	53	-	-	-	-	-	30	4	36	19	-
MARRU	71	14	35	-	2	28	60	43	-	16	1	26	36	43	13
	55	16	27	-	-	30	50	33	-	5	-	47	30	-	-
MOLSI	-	89	-	22	121	-	139	15	-	-	-	205	209	187	3
	-	50	-	5	21	2	47	3	-	-	-	58	69	57	-
	-	72	-	13	78	2	101	8	-	-	-	117	148	128	-
	1	11	60	53	29	14	46	10	33	-	-	138	144	58	-
	-	10	56	55	38	12	42	19	27	-	1	141	137	52	-
	4	9	51	34	26	19	35	14	17	-	-	79	78	31	-
	1	12	-	-	-	-	-	-	-	-	-	-	-	-	-
MORJO	-	30	35	8	17	28	33	22	1	14	-	26	-	26	-
MOSFA	-	-	-	-	2	-	-	-	-	-	-	-	13	20	15
OTTMI	10	6	1	19	34	7	-	-	-	7	18	-	8	18	-
PERZS	-	46	10	-	23	37	43	30	8	7	-	12	48	37	5
ROTEC	-	-	11	13	14	2	11	1	5	-	-	65	55	9	-
SARAN	16	9	15	-	-	-	-	-	-	4	18	31	12	-	-
	5	16	23	-	3	24	62	20	-	5	14	27	16	1	-
	9	24	37	-	5	26	44	20	-	11	28	41	20	1	-
	29	13	16	-	1	7	9	-	-	-	1	16	3	-	-
	20	10	17	-	-	-	-	-	-	2	14	32	19	-	-
SCALE	-	-	-	1	-	2	-	-	-	-	6	-	28	31	12
SCHHA	-	-	68	3	5	5	6	4	39	10	15	12	60	42	2
SLAST	-	-	-	-	-	-	-	2	2	-	-	-	77	91	35
	-	-	-	-	-	-	-	1	1	-	-	-	7	5	7
STOEN	-	1	-	3	-	-	1	8	2	-	2	1	63	137	43
	-	-	-	1	-	1	1	3	2	-	-	1	60	105	36
	-	-	-	1	-	-	1	3	2	-	3	4	73	132	72
STRJO	-	3	65	23	10	5	19	21	78	60	-	111	120	77	-
	-	2	38	21	11	12	12	9	40	26	-	57	70	32	-
	-	-	-	-	5	-	-	4	5	6	-	10	10	10	-
	-	2	12	8	7	2	7	17	43	37	-	74	82	48	-
	-	4	65	13	7	5	17	11	27	26	-	72	51	31	-
TEPIS	-	-	-	-	5	37	14	21	3	7	3	31	39	36	-
	-	39	32	-	2	41	42	38	3	3	5	36	42	45	2
TRIMI	-	5	1	2	-	21	20	5	10	-	-	-	16	28	10
WEGWA	-	-	1	3	39	51	46	-	-	3	10	-	8	7	-
YRJIL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	13
Sum	811	915	1380	565	1058	867	1648	1087	986	533	806	2848	3618	3375	788