

A spectacular year 2018 started with a meager January. With Thomas Bianchi of Italy and Henrietta Nagy of Hungary, we could win two new observers for our video network, but still the output was well below the previous years. Thomas operates the Mintron camera OMSL1 with a 4mm Tamron lens in Mt. San Lorenzo. In the previous few months, Henrietta has taken over the support for a number of meteor cameras in Hungary. Here she is listed with the new camera HUPIS, a Mintron camera with 3,8mm Computar lens installed in Piszkestető.

Overall 41 observers contributed with 80 meteor cameras to the IMO network in January 2018. The first half of the month saw longer observing gaps at all observing sites due to poor weather, in the second half at least the observers in southern Europe could observe unhamperedly. Thus, only about ever third camera managed to observe in twenty or more observing nights in January. The effective observing time sums up to 8,000 hours, whereas in the previous three years we collected between 9,000 and 12,000 observing hours. With over 20,000 meteors, also the meteor yield was up to 40% smaller than in the years before.

Full moon right before the peak in combination with poor weather did not promise fine observing conditions for the first major shower of the year. In the night of January 3/4, 2018, we could record just about a thousand meteors. Figure 1 shows the activity profile of the Quadrantids. Due to their short peak, the profile is not really meaningful. It only tells us that in the aforementioned night we recorded more Quadrantids than in the nights before and thereafter. Whether we really hit the peak (which is quite unlikely given the low flux density of 10 meteoroids per 1,000 km² and hour) we only know when comparing the data with the years before.

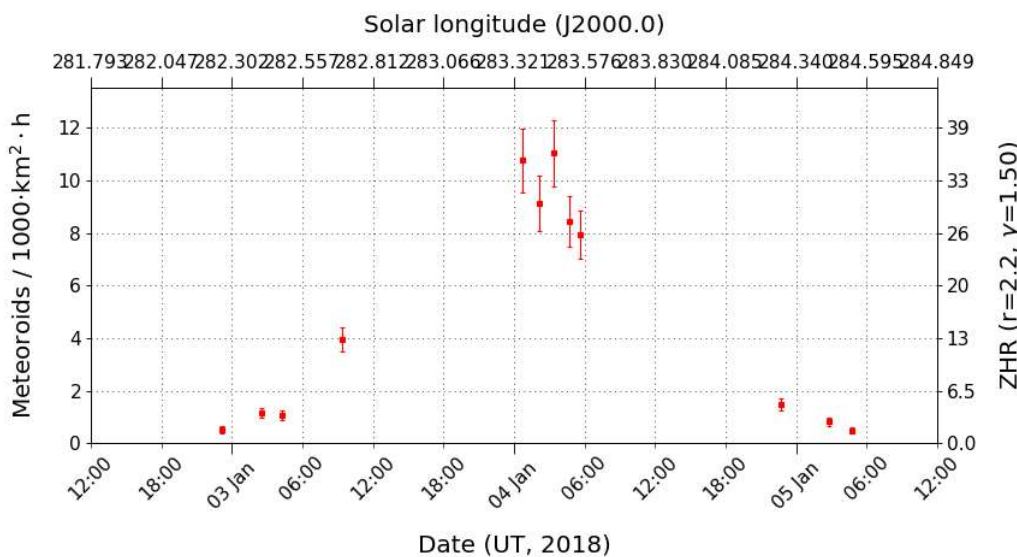


Figure 1: Flux density profile of the Quadrantids in January 2018, derived from video data of the IMO Network.

Figure 2 presents the flux density profile of the years 2015 till 2018. It shows that we indeed missed the peak in 2018. That far away from the maximum the rate was still considerable, but we should not forget that we measure higher flux density at full moon by tendency.

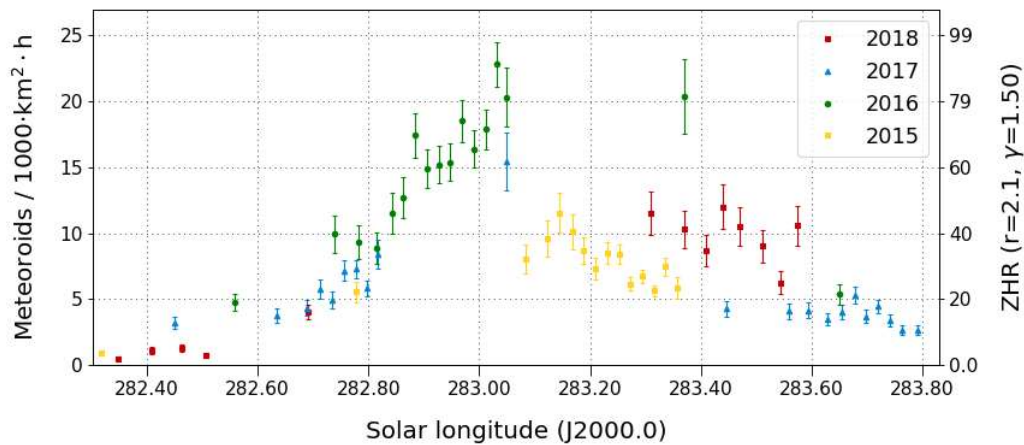


Figure 2: Comparison of the flux density profile of the Quadrantids in 2014-2017, derived from video data of the IMO Network.

The population index in 2018 was derived from about 400 Quadrantids to $r=1.7$, compared with $r=2.3$ for 200 sporadic meteors in the same time interval. That sounds plausible and matches to the values we obtained for 2013, 2014 and 2017. However, in other years, the population index differs substantially, as can be seen in figure 3. Particularly conspicuous are 2012 and 2016, when the Quadrantid peak occurred right before new moon and we measured population indices of $r=2.5$. Furthermore, the sporadic population index was particularly small in 2012 and 2015.

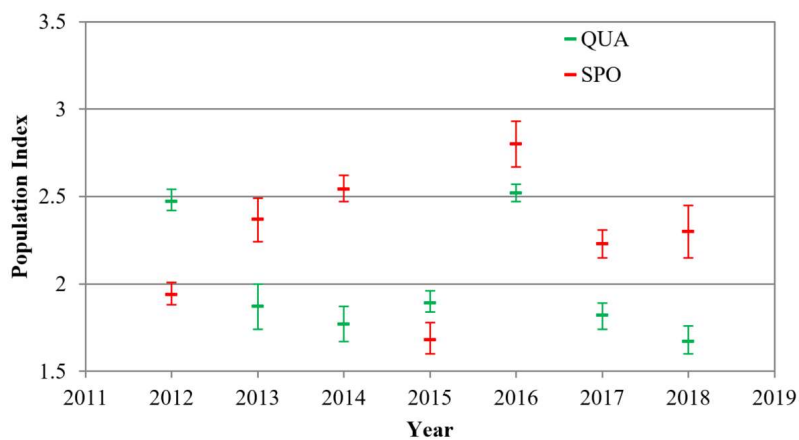


Figure 3: Population index of the Quadrantids (green) and sporadic meteors (red) in 2012-2018.

If we compute a higher resolution population index profile from all years (figure 4), this paradox is at least partially resolved. With $r=2.3$ to $r=2.0$, the population index at the begin and end of the activity period is higher than at about 283.3° solar longitude when the value decreases to $r=1.6$. Since we observe every year only a fraction of the full activity profile in central Europe, we sometimes catch regions with a higher and in other years regions with a smaller population index. For this reason, the r -values are nearly identical every four years. The remaining variations can be attributed to different observing conditions (weather, lunar phase).

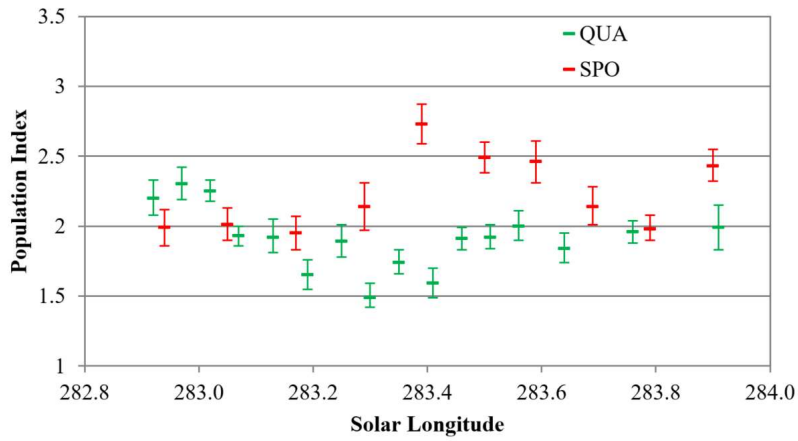


Figure 4: Higher resolution average population index profile of the Quadrantids (green) and sporadic meteors (red) in 2012-2018.

On January 9/10, 2015, we could observe an extremely short outburst of the kappa Cancrids with a FWHM of just 40 minutes. In the previous years the shower remained invisible, but the peak time was also outside the European observing window. In 2018, we reached the corresponding solar longitude of 289.315° on January 9 at 21:10 UT. That was still quite early in the night, but on most observing sites the radiant was already above 20° altitude, so that we should have an outburst of similar strength. A re-calculation of the shower assignment of all meteors yielded hardly any matches, though, which is why we can quite safely exclude another outburst in 2018.

Finally, we checked if the minor shower of the gamma Ursae Minorids was observed in 2018. The activity profile (figure 5) shows slightly enhanced rates between January 18 and 20, but the flux density remained below one meteoroid per $1,000 \text{ km}^2$ and hour. The population index was clearly smaller than the sporadic r-value, but more detailed values could not be derived due to the small data set (150 shower meteors).

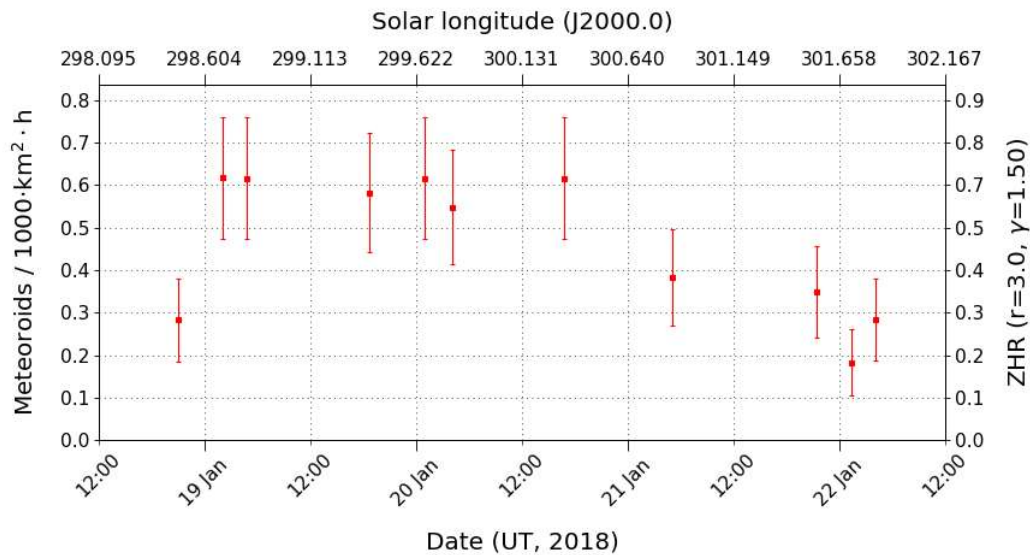


Figure 5: Flux density profile of the gamma Ursae Minorids in January 2018, derived from video data of the IMO Network.

1. Observers

Code	Name	Place	Camera	FOV [°]	St.LM [mag]	Eff.CA [km ²]	Nights	Time [h]	Meteors
ARLRA	Arlt	Ludwigsfelde/DE	LUDWIG2 (0.8/8)	1475	6.2	3779	19	78.4	285
BERER	Berkó	Ludanyhalaszi/HU	HULUD1 (0.8/3.8)	5542	4.8	3847	2	16.0	132
BIATO	Bianchi	Mt. San Lorenzo/IT	OMSL1 (1.2/4)	6435	4.0	1705	13	22.9	165
BOMMA	Bombardini	Faenza/IT	MARIO (1.2/4.0)	5794	3.3	739	22	125.5	446
BREMA	Breukers	Hengelo/NL	MBB3 (0.75/6)	2399	4.2	699	12	61.6	108
BRIBE	Klemt	Herne/DE	HERMINE (0.8/6)	2374	4.2	678	19	65.7	132
		Berg. Gladbach/DE	KLEMOI (0.8/6)	2286	4.6	1080	15	47.1	81
CARMA	Carli	Monte Baldo/IT	BMH2 (1.5/4.5)*	4243	3.0	371	23	240.6	1048
CASFL	Castellani	Monte Baldo/IT	BMH1 (0.8/6)	2350	5.0	1611	21	220.8	431
CINFR	Cineglosso	Faenza/IT	JENNI (1.2/4)	5886	3.9	1222	19	30.9	213
CRIST	Crivello	Valbrenna/IT	ARCI (0.8/3.8)	5566	4.6	2575	21	173.5	512
			BILBO (0.8/3.8)	5458	4.2	1772	21	177.9	641
			C3P8 (0.8/3.8)	5455	4.2	1586	17	156.4	384
			STG38 (0.8/3.8)	5614	4.4	2007	21	167.9	871
ELTMA	Eltri	Venezia/IT	MET38 (0.8/3.8)	5631	4.3	2151	14	104.2	331
FORKE	Förster	Carlsfeld/DE	AKM3 (0.75/6)	2375	5.1	2154	6	11.1	42
GONRU	Goncalves	Foz do Arelho/PT	FARELHO1 (0.75/4.5)	2286	3.0	208	17	126.6	76
		Tomar/PT	TEMPLAR1 (0.8/6)	2179	5.3	1842	23	198.4	538
			TEMPLAR2 (0.8/6)	2080	5.0	1508	24	208.3	457
			TEMPLAR3 (0.8/8)	1438	4.3	571	23	209.7	217
			TEMPLAR4 (0.8/3.8)	4475	3.0	442	23	199.9	415
			TEMPLAR5 (0.75/6)	2312	5.0	2259	25	204.2	427
GOVMI	Govedic	Sredisce ob Dr./SI	ORION2 (0.8/8)	1447	5.5	1841	18	148.6	281
			ORION4 (0.95/5)	2662	4.3	1043	2	17.7	54
HERCA	Hergenrother	Tucson/US	SALSA3 (0.8/3.8)	2336	4.1	544	28	248.5	472
HINWO	Hinz	Schwarzenberg/DE	HINWO1 (0.75/6)	2291	5.1	1819	13	55.4	97
IGAAN	Igaz	Budapest/HU	HUPOL (1.2/4)	3790	3.3	475	12	74.8	47
JONKA	Jonas	Budapest/HU	HUSOR (0.95/4)	2286	3.9	445	17	93.0	124
			HUSOR2 (0.95/3.5)	2465	3.9	715	2	12.5	18
KACJA	Kac	Kamnik/SI	CVETKA (0.8/3.8)	4914	4.3	1842	11	74.0	209
		Kostanjevec/SI	METKA (0.8/12)*	715	6.4	640	10	90.7	158
		Kamnik/SI	REZIKA (0.8/6)	2270	4.4	840	11	79.9	434
			STEFKA (0.8/3.8)	5471	2.8	379	11	70.1	180
KOSDE	Koschny	Izana Obs./ES	ICC7 (0.85/25)*	714	5.9	1464	25	175.7	601
		La Palma / ES	ICC9 (0.85/25)*	683	6.7	2951	2	22.8	201
		Izana Obs./ES	LIC1 (2.8/50)*	2255	6.2	5670	25	221.2	834
		La Palma / ES	LIC2 (3.2/50)*	2199	6.5	7512	3	33.3	252
LOJTO	Łojek	Grabniak/PL	PAV57 (1.0/5)	1631	3.5	269	5	33.1	71
MACMA	Maciejewski	Chelm/PL	PAV35 (0.8/3.8)	5495	4.0	1584	13	42.3	97
			PAV36 (0.8/3.8)*	5668	4.0	1573	13	79.2	197
			PAV43 (0.75/4.5)*	3132	3.1	319	11	57.7	59
			PAV60 (0.75/4.5)	2250	3.1	281	14	84.0	194
MARRU	Marques	Lisbon/PT	CAB1 (0.75/6)	2362	4.8	1517	26	190.9	469
			RAN1 (1.4/4.5)	4405	4.0	1241	26	198.9	539
MOLSI	Molau	Seysdorf/DE	AVIS2 (1.4/50)*	1230	6.9	6152	11	29.5	138
			ESCIMO2 (0.85/25)	155	8.1	3415	10	34.9	32
			MINCAM1 (0.8/8)	1477	4.9	1084	12	25.3	100
		Ketzür/DE	REMO1 (0.8/8)	1467	6.5	5491	19	75.7	237
			REMO2 (0.8/8)	1478	6.4	4778	21	89.4	283
			REMO3 (0.8/8)	1420	5.6	1967	20	102.9	272
			REMO4 (0.8/8)	1478	6.5	5358	23	99.0	373
MORJO	Morvai	Fülöpszallas/HU	HUFUL (1.4/5)	2522	3.5	532	21	118.3	132
MOSFA	Moschini	Rovereto/IT	ROVER (1.4/4.5)	3896	4.2	1292	21	149.7	196
NAGHE	Nagy	Piszkestető/HU	HUPIS (0.8/3.8)	5615	4.0	1524	16	28.0	109
OCHPA	Ochner	Albiano/IT	ALBIANO (1.2/4.5)	2944	3.5	358	14	20.9	50
OTTMI	Otte	Pearl City/US	ORIE1 (1.4/5.7)	3837	3.8	460	22	160.2	281
PERZS	Perkó	Becsehely/HU	HUBEC (0.8/3.8)*	5498	2.9	460	17	93.7	204
ROTEC	Rothenberg	Berlin/DE	ARMEFA (0.8/6)	2366	4.5	911	7	37.7	64
SARAN	Saraiva	Camaxide/PT	RO1 (0.75/6)	2362	3.7	381	18	134.3	228
			RO2 (0.75/6)	2381	3.8	459	24	186.7	376
			RO3 (0.8/12)	710	5.2	619	23	175.5	429
			RO4 (1.0/8)	1582	4.2	549	24	165.6	145
			SOFIA (0.8/12)	738	5.3	907	20	142.6	263
SCALE	Scarpa	Alberoni/IT	LEO (1.2/4.5)*	4152	4.5	2052	17	112.1	144
SCHHA	Schremmer	Niederkrüchten/DE	DORAEMON (0.8/3.8)	4900	3.0	409	19	75.4	124
SLAST	Slavec	Ljubljana/SI	KAYAK1 (1.8/28)	563	6.2	1294	8	50.9	153
			KAYAK2 (0.8/12)	741	5.5	920	13	75.0	56
STOEN	Stomeo	Scorze/IT	MIN38 (0.8/3.8)	5566	4.8	3270	20	142.1	659
			NOA38 (0.8/3.8)	5609	4.2	1911	5	24.8	102
			SCO38 (0.8/3.8)	5598	4.8	3306	21	161.9	610
STRJO	Strunk	Herford/DE	MINCAM2 (0.8/6)	2354	5.4	2751	17	68.2	263
			MINCAM3 (0.8/6)	2338	5.5	3590	16	66.1	115
			MINCAM4 (0.8/6)	2306	5.0	1412	15	64.7	79
			MINCAM5 (0.8/6)	2349	5.0	1896	14	60.8	131
			MINCAM6 (0.8/6)	2395	5.1	2178	18	57.7	111
TEPIS	Tepliczky	Agostyan/HU	HUAGO (0.75/4.5)	2427	4.4	1036	15	82.6	208
			HUMOB (0.8/6)	2388	4.8	1607	14	97.4	147
WEGWA	Wegrzyk	Nieznaszyn/PL	PAV78 (0.8/6)	2286	4.0	778	17	72.3	159
YRJIL	Yrjölä	Kuusankoski/FI	FINEXCAM (0.8/6)	2337	5.5	3574	6	29.0	39
ZAKJU	Zakrajšek	Petkovec/SI	TACKA (0.8/12)	714	5.3	783	15	109.4	120
Sum							31	8172.2	20672

* 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	3.0	2.8	-	1.9	5.9	2.0	12.0	12.0	2.2	-	-	-	4.3	4.4	-
BERER	-	9.3	6.7	-	-	-	-	-	-	-	-	-	-	-	-
BIATO	-	-	-	-	-	-	-	-	1.2	-	-	0.4	-	-	-
BOMMA	5.8	11.6	2.4	2.3	3.2	-	-	0.3	4.4	2.0	0.3	5.3	3.8	1.0	-
BREMA	0.3	-	-	-	8.3	2.0	8.9	13.3	-	-	3.4	-	-	12.0	-
BRIBE	-	0.2	0.5	0.3	9.9	-	1.1	10.9	3.2	1.3	2.6	-	-	9.1	-
	-	-	1.0	0.4	9.8	-	-	5.0	3.8	-	1.3	-	-	7.9	-
CARMA	9.8	12.4	4.9	13.6	-	-	9.0	-	4.8	4.4	-	12.4	11.0	-	-
CASFL	7.6	12.0	5.0	13.6	-	-	7.1	-	4.4	4.9	-	12.1	10.6	-	-
CINFR	-	2.7	1.2	0.2	-	-	-	-	2.0	0.7	-	1.9	1.4	0.8	0.2
CRIST	2.9	8.2	10.0	5.0	-	-	3.8	0.5	1.0	-	-	13.0	11.8	2.3	0.8
	3.5	8.3	10.1	6.9	-	-	2.8	0.2	0.4	-	-	13.0	12.6	2.6	0.3
	4.0	10.6	11.9	2.2	-	-	-	-	-	-	-	13.0	12.6	0.7	-
	0.3	4.0	8.6	8.5	-	-	4.6	-	1.5	-	-	13.0	12.7	3.5	0.7
ELTMA	-	-	1.2	9.6	0.9	-	-	-	-	-	7.7	2.0	7.8	-	-
FORKE	0.8	-	-	-	-	-	-	-	-	4.5	-	-	1.3	-	-
GONRU	-	-	-	-	0.9	-	-	-	-	-	-	-	-	4.9	8.8
	2.4	-	1.1	-	-	12.6	10.2	8.2	-	-	-	-	5.4	12.6	8.5
	2.9	-	-	-	-	12.9	9.8	7.4	-	-	9.6	-	4.8	12.7	8.1
	-	-	-	-	4.5	12.9	9.5	6.8	-	9.8	12.6	-	3.9	12.4	7.2
	1.4	-	-	-	-	12.9	10.0	7.3	-	-	9.0	-	3.6	12.7	7.3
	1.3	-	-	-	3.3	12.4	9.4	6.9	-	9.4	12.0	-	3.7	12.2	6.9
GOVMI	-	8.7	7.7	1.5	7.4	9.3	-	-	-	-	-	-	-	-	-
	-	6.4	11.3	-	-	-	-	-	-	-	-	-	-	-	-
HERCA	7.2	3.1	8.5	-	11.6	10.9	5.9	3.1	-	1.6	4.6	8.5	10.3	11.2	10.9
HINWO	1.6	-	-	5.3	1.8	-	-	-	8.2	13.4	-	-	2.6	2.1	-
IGAAN	-	10.5	3.2	-	3.5	5.5	-	3.3	-	-	-	-	-	-	-
JONKA	-	8.4	1.1	-	3.5	2.1	3.9	7.3	2.3	-	-	-	-	-	-
	-	10.4	2.1	-	-	-	-	-	-	-	-	-	-	-	-
KACJA	-	-	3.7	-	-	-	-	-	-	-	6.1	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	6.7	-	-	-	-	-	-	-	6.0	-	-	-	-
	-	-	3.2	-	-	-	-	-	-	-	2.9	-	-	-	-
KOSDE	4.3	7.3	4.2	7.0	5.7	-	-	6.4	8.1	10.8	9.2	6.0	3.6	8.3	7.0
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	6.4	2.8	8.6	8.5	9.3	-	-	4.3	11.6	12.0	11.8	9.5	5.3	10.3	7.5
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LOTJO	-	-	-	-	-	-	-	14.0	-	-	-	1.7	-	-	12.6
MACMA	-	-	1.0	3.6	-	0.5	2.5	13.3	1.3	-	-	-	-	-	12.9
	-	-	1.7	8.0	-	2.7	6.8	14.0	4.0	-	-	-	-	-	13.6
	-	-	0.8	7.0	-	-	6.7	13.8	-	-	-	-	0.2	-	13.6
	-	-	1.7	9.0	-	2.6	6.2	13.8	4.0	-	-	-	0.7	-	13.6
MARRU	7.2	-	-	-	2.5	8.1	4.6	2.9	-	7.7	7.7	-	6.7	12.5	5.7
	5.7	-	-	-	-	6.8	6.8	5.5	3.0	12.2	5.8	-	6.5	12.5	5.3
MOLSI	-	2.3	3.8	1.0	-	-	-	1.3	11.0	-	-	-	-	3.2	1.9
	2.5	2.1	4.0	3.6	-	-	-	1.6	10.9	-	-	-	-	3.4	2.4
	1.9	-	2.2	1.5	-	-	-	1.0	9.4	-	-	-	-	3.1	1.4
	-	2.5	-	2.0	7.2	2.0	11.4	11.1	2.6	-	-	-	2.6	3.6	-
	2.4	2.0	0.1	1.3	8.5	1.7	13.0	12.7	3.5	-	-	-	3.1	4.3	1.0
	3.5	3.6	-	2.3	10.7	3.5	14.0	13.8	3.2	-	-	-	3.2	4.6	-
	3.1	3.2	-	1.0	10.5	2.9	14.0	13.8	3.5	2.0	-	-	3.0	4.7	1.1
MORJO	-	10.4	1.9	-	2.9	1.7	4.5	4.7	5.0	-	-	-	-	-	-
MOSFA	1.4	9.2	4.4	6.2	-	1.6	1.4	-	0.2	3.1	0.2	12.7	10.6	-	-
NAGHE	-	-	2.8	1.0	0.2	1.0	0.2	3.4	1.1	0.2	-	-	-	5.2	-
OCHPA	0.5	1.6	-	0.5	-	-	-	-	-	0.7	-	-	-	-	-
OTTMI	12.6	-	13.0	13.0	7.3	3.4	-	3.1	-	1.0	0.3	7.2	9.1	-	0.5
PERZS	-	6.7	5.4	-	6.0	9.7	-	3.1	-	-	-	-	-	-	-
ROTEC	3.3	-	-	-	-	1.3	-	13.4	-	-	-	-	5.9	4.0	-
SARAN	3.6	-	-	-	-	6.4	8.2	1.6	5.9	11.6	4.9	-	5.9	7.8	2.5
	6.3	-	0.2	-	-	6.6	6.8	5.5	3.8	9.3	2.5	-	7.3	12.6	4.5
	6.1	-	-	-	-	4.0	5.7	3.5	5.6	9.7	3.2	-	-	10.0	3.0
	5.6	-	-	-	-	7.1	7.2	-	4.1	7.3	2.6	-	2.5	11.4	5.0
	3.3	-	-	-	-	8.0	4.4	1.2	5.3	10.6	4.0	-	4.6	7.8	4.0
SCALE	3.3	1.5	2.4	10.3	1.0	-	-	-	-	-	4.8	-	11.8	-	-
SCHHA	-	-	1.6	1.1	10.5	-	-	8.2	3.9	-	1.5	0.2	2.2	8.0	0.7
SLAST	-	-	0.7	0.5	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	0.8	-	-	-	-	-	-	-	-	-	-	-
STOEN	0.3	6.7	7.7	9.6	0.4	-	-	-	1.1	-	8.0	3.5	11.4	-	-
	2.9	4.9	6.8	9.7	0.5	-	-	-	-	-	-	-	-	-	-
	3.3	7.6	7.7	10.5	0.5	-	-	-	1.0	-	9.4	3.8	13.2	-	-
STRJO	-	-	-	0.2	3.9	-	11.5	10.3	4.0	4.6	3.4	-	-	11.6	-
	-	-	-	0.4	3.8	-	12.4	11.1	3.9	3.5	1.6	-	-	9.1	0.3
	-	-	-	0.3	5.8	1.2	12.7	11.1	4.1	2.9	2.5	-	-	12.4	-
	-	-	-	-	1.5	-	11.5	10.5	2.8	4.2	2.9	-	-	11.7	0.2
	-	-	-	0.2	5.7	0.5	11.7	9.5	3.6	2.9	2.1	-	-	3.3	-
TEPIS	-	7.7	1.2	0.3	8.2	11.7	3.8	10.8	-	-	1.1	-	-	3.4	-
	-	7.9	-	0.5	6.9	11.0	-	9.1	-	-	-	-	-	-	-
WEGWA	9.7	4.3	0.9	3.5	-	-	-	13.2	-	-	-	-	9.5	7.4	-
YRJIL	-	-	-	-	-	-	-	7.6	2.5	-	-	-	-	-	-
ZAKJU	-	-	7.5	-	-	-	-	-	-	6.0	2.8	-	-	-	-
Sum	154.0	223.9	204.4	195.7	194.0	209.0	300.8	381.9	179.6	182.6	176.5	139.2	258.0	325.2	171.2

January	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
ARLRA	7.0	1.6	0.1	4.3	8.3	0.7	-	-	1.5	-	-	-	-	1.4	3.0	-
BERER	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BIATO	0.9	2.8	3.4	1.4	0.2	2.5	1.2	2.9	-	-	-	-	3.5	2.0	0.5	-
BOMMA	-	13.1	12.8	6.0	1.0	5.2	10.3	5.2	11.1	5.8	-	-	12.6	-	-	-
BREMA	0.5	-	2.0	3.3	-	-	-	-	-	1.9	-	-	-	-	-	5.7
BRIBE	3.0	2.5	2.7	1.5	1.4	1.2	-	-	-	-	2.2	-	-	5.7	-	6.4
	1.7	-	2.5	3.3	-	1.2	-	-	-	-	1.8	0.7	-	2.5	-	4.2
CARMA	10.8	12.6	13.3	12.3	6.3	13.2	12.0	13.1	13.0	-	6.0	13.0	12.9	12.9	6.9	-
CASFL	10.6	12.6	13.2	12.4	-	13.1	12.0	13.0	12.8	-	5.7	12.8	12.8	12.5	-	-
CINFR	-	4.1	2.6	3.3	0.3	1.5	3.1	0.7	1.7	-	-	-	2.3	-	-	0.2
CRIST	12.9	12.8	12.1	12.8	12.3	12.7	12.7	12.3	-	-	-	5.1	8.5	-	-	-
	12.9	12.8	12.2	12.8	12.7	12.7	12.7	12.7	-	-	-	4.5	11.2	-	-	-
	10.6	12.8	1.0	12.7	5.2	12.7	12.7	12.6	-	-	-	12.5	8.6	-	-	-
	12.9	12.8	12.2	12.8	12.7	12.7	12.7	12.7	-	-	-	5.4	3.4	0.2	-	-
ELTMA	-	10.0	9.6	9.1	3.1	12.0	8.0	12.4	10.8	-	-	-	-	-	-	-
FORKE	-	-	-	-	-	-	-	0.2	-	-	-	0.8	-	-	3.5	-
GONRU	-	11.3	-	5.4	-	-	-	-	-	5.9	7.7	10.3	11.1	10.6	11.6	-
	5.5	12.4	12.5	8.2	5.5	8.1	4.2	10.1	-	10.8	12.3	12.1	12.1	11.9	7.1	4.6
	5.0	12.6	12.6	8.3	5.2	7.8	3.6	9.8	0.7	10.0	12.4	11.8	12.4	12.3	9.8	5.8
	3.7	12.5	12.5	7.4	4.7	7.6	-	10.7	-	10.2	12.2	11.5	12.2	12.1	9.7	3.1
	4.7	12.7	12.5	8.3	4.8	7.5	3.4	9.8	-	10.0	12.4	12.4	11.7	11.9	8.5	5.1
	3.5	12.0	10.5	6.9	4.6	7.7	3.7	10.3	-	10.0	11.6	11.2	11.9	11.7	8.7	2.4
GOVMI	2.8	11.6	8.5	6.4	1.6	10.2	-	7.8	12.6	12.5	5.3	-	-	9.9	12.4	12.4
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HERCA	-	9.5	10.6	11.1	11.2	7.6	10.8	11.0	10.7	10.4	10.2	10.0	11.3	11.4	8.6	6.7
HINWO	4.6	-	0.7	-	-	3.5	-	1.3	-	-	-	5.6	-	-	4.7	-
IGAAN	-	5.1	-	8.6	-	9.5	-	-	7.2	-	6.2	4.4	-	7.8	-	-
JONKA	-	4.5	-	9.3	3.9	8.4	-	-	10.1	-	6.1	6.5	1.3	8.9	5.4	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
KACJA	-	7.2	-	-	-	4.6	5.6	12.5	12.7	-	6.0	6.3	-	5.0	4.3	-
	-	-	-	-	-	10.8	3.7	12.4	12.7	10.1	7.1	-	10.0	10.0	6.4	7.5
	-	7.5	-	-	-	4.8	6.9	12.5	12.9	-	6.0	7.8	-	5.8	3.0	-
	-	7.5	-	-	-	5.1	6.4	11.1	12.9	-	4.8	4.7	-	5.2	6.3	-
KOSDE	9.0	8.5	6.0	8.3	7.6	7.7	7.6	8.8	7.4	5.8	7.4	3.7	-	-	-	-
	-	-	11.4	11.4	-	-	-	-	-	-	-	-	-	-	-	-
	9.3	9.1	11.6	10.9	11.7	11.7	11.3	11.5	8.7	8.5	5.1	3.9	-	-	-	-
	-	-	11.1	11.1	11.1	-	-	-	-	-	-	-	-	-	-	-
LOTJO	-	1.4	-	-	-	-	-	-	-	-	3.4	-	-	-	-	-
MACMA	-	1.0	-	-	0.6	-	-	-	0.8	0.3	4.2	-	-	-	-	0.3
	-	5.0	-	-	0.6	-	-	-	0.8	9.1	6.4	-	-	-	-	6.5
	-	4.0	-	-	0.4	-	-	-	-	0.2	6.8	-	-	-	-	4.2
	-	4.9	-	-	0.8	-	-	-	1.8	10.1	6.6	-	-	-	-	8.2
MARRU	6.3	12.0	11.9	8.0	8.9	8.6	5.5	2.9	0.2	11.2	12.2	12.0	6.0	10.7	4.5	4.4
	0.8	12.3	11.5	11.1	2.4	0.2	12.3	12.2	0.2	8.6	11.8	10.4	12.1	8.8	4.1	10.0
MOLSI	0.6	-	-	-	-	-	-	1.8	-	-	-	-	1.8	-	0.8	-
	-	-	-	-	-	-	-	1.7	-	-	-	-	2.7	-	-	-
	0.5	-	-	-	-	-	-	1.2	-	-	-	-	2.2	0.2	0.7	-
	5.8	1.8	1.4	2.9	7.3	-	-	1.3	2.7	-	-	-	-	3.7	3.1	0.7
	8.6	2.6	1.2	4.1	9.9	-	-	-	2.4	-	-	-	-	2.6	3.7	0.7
	7.6	2.8	1.8	4.4	10.2	-	-	-	3.5	-	1.0	-	-	3.5	5.1	0.6
	7.7	2.9	1.5	4.9	9.8	-	-	1.4	3.7	-	0.7	-	-	1.5	1.6	0.5
MORJO	2.9	8.4	1.5	7.0	5.6	7.6	0.4	-	11.2	-	7.5	5.5	0.8	12.3	8.1	8.4
MOSFA	5.6	10.6	12.3	8.8	-	12.7	11.1	12.3	10.7	-	3.3	-	11.3	-	-	-
NAGHE	-	1.9	0.2	4.6	-	3.6	0.2	-	-	-	0.8	1.6	-	-	-	-
OCHPA	0.2	-	1.4	-	-	7.9	1.6	1.6	0.4	-	0.9	0.2	1.0	2.4	-	-
OTTMI	12.8	12.8	12.8	8.1	-	-	-	-	1.4	12.6	1.4	11.4	-	12.5	1.3	2.6
PERZS	6.4	8.0	5.0	5.4	-	7.7	1.0	4.2	4.4	11.6	2.0	-	-	2.4	-	4.7
ROTEC	4.5	-	-	-	5.3	-	-	-	-	-	-	-	-	-	-	-
SARAN	-	-	-	12.3	-	-	12.2	12.4	-	8.2	8.4	8.9	9.7	-	3.8	-
	1.4	12.5	10.3	12.5	-	1.2	12.5	12.4	-	9.3	12.3	11.9	12.2	-	5.4	7.4
	1.5	11.2	11.1	11.1	-	3.0	11.7	11.7	-	8.1	10.6	10.3	11.1	9.7	5.8	7.8
	1.0	12.6	10.0	11.8	-	2.1	11.9	12.5	0.3	6.1	12.3	4.1	11.5	7.8	5.9	2.9
	-	-	-	12.3	-	1.2	12.2	12.3	-	9.8	10.4	10.4	12.3	-	1.0	7.5
SCALE	-	12.7	11.0	9.4	3.5	8.2	7.9	10.9	7.6	0.2	5.6	-	-	-	-	-
SCHHA	6.2	1.7	1.6	9.3	2.7	-	-	-	-	-	2.4	-	-	3.7	1.9	8.0
SLAST	-	-	-	-	-	10.7	-	10.7	12.5	-	6.6	6.7	-	2.5	-	-
	-	7.5	1.6	2.5	0.5	11.3	5.5	6.4	12.8	-	6.5	7.5	-	5.3	6.8	-
STOEN	-	12.3	11.6	5.9	2.2	13.1	7.9	13.0	10.4	-	7.8	6.7	2.5	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	0.4	13.2	12.0	5.5	2.0	13.1	7.6	12.8	10.8	-	10.6	9.6	7.3	-	-	-
STRJO	3.2	1.7	4.9	1.7	-	0.3	-	-	-	-	1.0	-	-	1.7	1.9	2.3
	2.8	-	4.5	1.5	-	-	-	-	-	-	2.2	-	-	2.6	1.7	4.7
	-	1.5	0.2	-	-	-	-	-	-	-	1.4	-	-	0.8	2.5	5.3
	3.1	1.8	4.8	-	-	-	-	-	-	-	1.2	-	-	1.8	-	2.8
	3.1	1.7	4.6	1.5	-	0.2	-	-	-	-	1.1	-	-	1.0	2.0	3.0
TEPIS	2.9	3.7	-	6.0	2.1	11.3	-	-	-	-	-	-	-	-	-	8.4
	2.3	3.1	-	5.9	-	11.8	-	-	8.8	5.1	9.1	-	-	8.3	7.6	-
WEGWA	1.8	0.8	3.2	-	3.5	-	-	0.3	4.6	6.0	-	0.6	-	1.6	1.4	-
YRJIL	6.9	-	-	-	-	-	2.5	-	-	-	-	-	-	-	4.3	5.2
ZAKJU	-	12.1	1.0	0.9	-	12.5	6.4	8.9	12.7	-	6.4	7.2	11.6	7.7	5.7	-
Sum	238.8	457.0	375.1	409.0	213.7	372.3	295.0	402.3	284.2	228.4	333.4	302.0	285.9	286.8	211.1	181.2

3. Results (Meteors)

January	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
ARLRA	8	6	-	11	5	1	67	62	9	-	-	-	39	7	-
BERER	-	48	84	-	-	-	-	-	-	-	-	-	-	-	-
BIATO	-	-	-	-	-	-	-	-	9	-	-	2	-	-	-
BOMMA	4	40	8	3	4	-	-	2	30	5	2	23	18	6	-
BREMA	1	-	-	-	12	4	24	28	-	-	3	-	-	19	-
BRIBE	-	1	1	1	24	-	2	22	6	2	6	-	-	19	-
	-	-	5	1	14	-	-	9	2	-	4	-	-	14	-
CARMA	42	47	23	84	-	-	18	-	34	4	-	49	38	-	-
CASFL	17	25	12	29	-	-	9	-	12	3	-	23	15	-	-
CINFR	-	18	7	1	-	-	-	-	16	4	-	13	13	6	1
CRIST	12	11	38	7	-	-	4	2	4	-	-	37	35	3	1
	34	19	52	9	-	-	2	1	2	-	-	54	44	7	2
	19	22	58	5	-	-	-	-	-	-	-	23	38	4	-
	3	44	75	22	-	-	7	-	4	-	-	72	62	6	1
ELTMA	-	-	10	28	5	-	-	-	-	-	27	2	34	-	-
FORKE	1	-	-	-	-	-	-	-	-	30	-	-	3	-	-
GONRU	-	-	-	-	1	3	4	1	5	5	3	-	1	4	-
	3	-	1	-	-	53	45	6	-	-	-	-	12	41	14
	7	-	-	-	-	39	32	5	-	-	12	-	7	46	12
	-	-	-	-	8	20	24	2	-	10	15	-	2	15	8
	3	-	-	-	-	33	33	6	-	-	7	-	12	27	8
	1	-	-	-	9	32	31	3	-	17	21	-	3	48	5
GOVMI	-	13	70	2	6	25	-	-	-	-	-	-	-	-	-
	-	7	47	-	-	-	-	-	-	-	-	-	-	-	-
HERCA	20	1	19	-	24	22	4	11	-	2	8	14	19	22	20
HINWO	1	-	-	20	1	-	-	-	20	28	-	-	4	4	-
IGAAN	-	7	1	-	3	2	-	2	-	-	-	-	-	-	-
JONKA	-	16	9	-	10	6	5	4	3	-	-	-	-	-	-
	-	13	5	-	-	-	-	-	-	-	-	-	-	-	-
KACJA	-	-	17	-	-	-	-	-	-	-	22	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	80	-	-	-	-	-	-	-	48	-	-	-	-
	-	-	11	-	-	-	-	-	-	-	11	-	-	-	-
KOSDE	14	17	18	31	25	-	-	16	38	29	34	23	8	30	5
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	18	5	16	18	18	-	-	6	51	46	53	45	10	43	17
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LOTJO	-	-	-	-	-	-	-	30	-	-	-	3	-	-	28
MACMA	-	-	3	20	-	3	15	23	1	-	-	-	-	-	10
	-	-	9	31	-	2	37	39	1	-	-	-	-	-	26
	-	-	4	12	-	-	8	13	-	-	-	-	1	-	11
	-	-	12	34	-	3	8	41	6	-	-	-	3	-	30
MARRU	11	-	-	-	9	30	26	6	-	29	33	-	14	35	5
	13	-	-	-	-	21	29	5	8	20	16	-	23	50	7
MOLSI	-	2	11	5	-	-	-	7	58	-	-	-	-	40	3
	1	1	3	2	-	-	-	2	14	-	-	-	-	5	2
	3	-	23	9	-	-	-	1	27	-	-	-	-	19	5
	-	6	-	10	18	2	72	47	5	-	-	-	9	4	-
	4	4	1	4	12	3	61	66	10	-	-	-	17	16	3
	6	11	-	8	25	1	64	50	4	-	-	-	13	11	-
	3	8	-	1	25	7	98	75	16	2	-	-	17	19	5
MORJO	-	21	1	-	7	4	2	2	2	-	-	-	-	-	-
MOSFA	4	15	4	1	-	1	3	-	1	2	1	14	12	-	-
NAGHE	-	-	21	2	1	6	1	9	4	1	-	-	-	17	-
OCHPA	3	7	-	4	-	-	-	-	-	3	-	-	-	-	-
OTTMI	18	-	19	17	24	5	-	7	-	2	2	24	14	-	3
PERZS	-	19	39	-	6	20	-	2	-	-	-	-	-	-	-
ROTEC	2	-	-	-	-	1	-	28	-	-	-	-	20	3	-
SARAN	14	-	-	-	-	14	21	5	5	16	9	-	7	14	4
	17	-	1	-	-	24	19	1	10	9	4	-	13	30	3
	11	-	-	-	-	13	23	5	10	12	3	-	-	34	8
	6	-	-	-	-	4	4	-	4	1	1	-	8	11	3
	10	-	-	-	-	12	25	3	7	14	10	-	10	26	1
SCALE	2	3	10	11	4	-	-	-	-	-	12	-	13	-	-
SCHHA	-	-	7	2	26	-	-	11	1	-	3	1	4	5	2
SLAST	-	-	3	2	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-
STOEN	2	37	50	47	3	-	-	-	8	-	41	4	63	-	-
	10	18	34	38	2	-	-	-	-	-	-	-	-	-	-
	17	33	42	56	5	-	-	-	7	-	41	3	57	-	-
STRJO	-	-	-	1	9	-	59	38	13	19	6	-	-	57	-
	-	-	-	2	6	-	25	11	10	3	1	-	-	29	1
	-	-	-	1	6	1	14	17	4	2	1	-	-	18	-
	-	-	-	-	3	-	26	16	11	6	1	-	-	31	1
	-	-	-	2	11	2	33	13	10	3	3	-	-	3	-
TEPIS	-	29	7	2	34	25	8	18	-	-	2	-	-	1	-
	-	19	-	2	28	27	-	6	-	-	-	-	-	-	-
WEGWA	27	18	6	8	-	-	-	20	-	-	-	-	22	10	-
YRJIL	-	-	-	-	-	-	-	8	6	-	-	-	-	-	-
ZAKJU	-	-	25	-	-	-	-	-	-	4	4	-	-	-	-
Sum	392	611	1002	607	433	471	992	813	508	333	470	429	757	859	255

January	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
ARLRA	35	4	1	6	11	1	-	-	1	-	-	-	-	7	4	-
BERER	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BIATO	7	22	22	11	1	18	8	20	-	-	-	-	28	13	4	-
BOMMA	-	48	42	54	7	47	24	12	24	6	-	-	37	-	-	-
BREMA	3	-	4	4	-	-	-	-	-	1	-	-	-	-	-	5
BRIBE	5	1	6	1	2	2	-	-	-	-	2	-	-	13	-	16
	1	-	6	4	-	1	-	-	-	-	3	1	-	4	-	12
CARMA	37	64	93	59	14	69	65	73	60	-	13	51	68	35	8	-
CASFL	17	28	33	22	-	25	29	21	37	-	9	18	28	19	-	-
CINFR	-	27	21	22	2	11	21	4	11	-	-	-	14	-	-	1
CRIST	49	43	28	56	46	36	35	20	-	-	-	26	19	-	-	-
	55	49	31	62	55	31	50	42	-	-	-	12	28	-	-	-
	13	36	5	42	19	24	22	24	-	-	-	24	6	-	-	-
	73	79	38	83	72	57	87	69	-	-	-	10	6	1	-	-
ELTMA	-	43	28	21	3	35	33	51	11	-	-	-	-	-	-	-
FORKE	-	-	-	-	-	-	-	1	-	-	-	1	-	-	6	-
GONRU	-	4	-	2	-	-	-	-	-	1	9	12	7	10	4	-
	10	42	41	25	8	28	6	31	-	23	46	26	38	25	9	5
	12	31	29	12	8	9	8	20	1	21	28	27	38	29	14	10
	4	12	10	5	1	6	-	8	-	13	8	11	9	15	6	5
	8	41	35	7	9	11	3	14	-	21	24	33	31	34	10	5
	5	35	32	3	4	17	3	15	-	24	30	18	21	28	16	6
GOVMI	2	24	10	28	1	17	-	19	14	15	2	-	-	8	11	14
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HERCA	-	14	24	9	24	17	27	24	21	24	9	17	23	20	16	17
HINWO	5	-	1	-	-	6	-	1	-	-	-	3	-	-	3	-
IGAAN	-	7	-	8	-	7	-	-	1	-	5	2	-	2	-	-
JONKA	-	4	-	10	2	13	-	-	5	-	11	7	2	11	6	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
KACJA	-	40	-	-	-	18	24	28	29	-	14	7	-	5	5	-
	-	-	-	-	-	29	7	36	19	8	10	-	24	14	6	5
	-	74	-	-	-	24	36	64	61	-	15	16	-	9	7	-
	-	36	-	-	-	21	30	22	24	-	10	3	-	7	5	-
KOSDE	32	17	26	31	31	30	33	29	31	28	12	13	-	-	-	-
	-	-	108	93	-	-	-	-	-	-	-	-	-	-	-	-
	55	49	44	42	41	49	47	45	45	31	25	15	-	-	-	-
	-	-	82	79	91	-	-	-	-	-	-	-	-	-	-	-
LOTJO	-	1	-	-	-	-	-	-	-	-	9	-	-	-	-	-
MACMA	-	2	-	-	2	-	-	-	5	3	8	-	-	-	-	2
	-	9	-	-	6	-	-	-	1	13	17	-	-	-	-	6
	-	1	-	-	1	-	-	-	-	1	6	-	-	-	-	1
	-	10	-	-	3	-	-	-	5	9	16	-	-	-	-	14
MARRU	33	28	27	6	7	12	4	1	1	36	38	20	21	21	10	6
	2	38	37	27	1	1	50	33	1	13	38	33	32	21	14	6
MOLSI	1	-	-	-	-	-	-	6	-	-	-	-	4	-	1	-
	1	-	-	-	-	-	-	1	-	-	-	-	1	-	-	-
	27	3	4	9	2	-	-	1	1	-	-	-	-	11	5	1
	37	9	2	7	13	-	-	-	3	-	-	-	-	8	2	1
	20	7	10	9	12	-	-	-	2	-	1	-	-	11	4	3
	27	9	6	18	14	-	-	5	5	-	1	-	-	9	2	1
MORJO	3	10	1	9	2	8	1	-	10	-	5	5	2	13	7	17
MOSFA	6	21	19	10	-	14	23	14	13	-	4	-	14	-	-	-
NAGHE	-	6	1	15	-	9	1	-	-	-	5	10	-	-	-	-
OCHPA	1	-	5	-	-	7	3	2	2	-	4	1	2	6	-	-
OTTMI	26	19	17	13	-	-	-	-	9	10	7	13	-	18	5	9
PERZS	4	15	11	16	-	15	2	11	13	16	3	-	-	2	-	10
ROTEC	7	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-
SARAN	-	-	-	16	-	-	19	12	-	14	22	13	18	-	5	-
	1	39	24	28	-	1	29	25	-	13	22	21	25	-	9	8
	5	37	25	27	-	3	48	37	-	15	32	31	19	21	4	6
	3	12	6	7	-	2	8	10	1	4	12	12	8	7	3	8
	-	-	-	23	-	1	22	16	-	18	17	22	18	-	4	4
SCALE	-	18	15	11	2	14	10	8	8	1	2	-	-	-	-	-
SCHHA	7	1	2	17	7	-	-	-	-	-	4	-	-	5	1	18
SLAST	-	-	-	-	-	60	-	25	36	-	22	2	-	3	-	-
	-	10	1	2	1	10	6	5	11	-	1	6	-	1	1	-
STOEN	-	74	60	19	4	73	59	69	11	-	14	14	7	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2	59	58	16	3	65	37	44	23	-	21	12	9	-	-	-
STRJO	6	2	29	1	-	2	-	-	-	-	3	-	-	8	2	8
	2	-	9	2	-	-	-	-	-	-	1	-	-	4	2	7
	-	1	1	-	-	-	-	-	-	-	1	-	-	5	1	6
	4	2	16	-	-	-	-	-	-	-	1	-	-	8	-	5
	3	3	11	1	-	1	-	-	-	-	3	-	-	3	1	5
TEPIS	6	2	-	17	3	31	-	-	-	-	-	-	-	-	-	23
	1	4	-	6	-	16	-	-	11	3	8	-	-	13	3	-
WEGWA	10	1	9	-	4	-	-	1	5	3	-	1	-	8	6	-
YRJIL	9	-	-	-	-	-	6	-	-	-	-	-	-	-	5	5
ZAKJU	-	18	1	2	-	14	11	8	11	-	5	3	10	3	1	-
Sum	682	1345	1207	1135	542	1018	937	1028	583	388	638	572	625	519	240	281