Results of the IMO Video Meteor Network – February 2012

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In February, the weather differed significantly at the individual observing sites. In the first half of the month, the observers in north-western Europe were preferred, whereas there were only little clear skies in the shouth-east. In the second half, the situation reversed. Now the Hungarian and Slovenian observers were more successful, whereas in Germany the weather was poor. Only the southern European observers enjoyed perfect observing conditions all month long. An overall of 16 cameras recorded meteors in twenty or more nights, which is about one quarter of all active cameras.
With 7,400 hours of effective observing time, the 2011 result was more than doubled. The number of meteors, however, grew only by about 40%. Now you may ask, whether the low average of only 2.1 meteors per hour is real (last year it was 3.4 meteors per hour) or whether there was some other reason. Our analysis shows, that the mean in 2010 and 2011 was well above 3.0, but more like 2.5 before that. In the last two years, we used a different method to determine observing breaks caused by clouds. Apparently this method was too pessimistic, so that in the absence of meteors many clear sky intervals were marked as clouded.

In February we could welcome a new observer in the IMO network. Franzisco Ocana Gonzalez – Paco in short– has been dealing with video meteors already for quite some time. Now he started to operate his own camera FOGCAM in the city of Madrid. We are knocking on wood that the camera name is not a bad omen.

At this point let's have a look at observing results. In the previous months, there were a number of reports in WGN about discoveries of new meteor showers from multi-station video observations. Unfortunately, observation from the IMO Video Meteor Network and our analysis results were either ignored or incorrectly interpreted. That is a pity, because we have proven in the past, that precise meteor shower parameters can also be derived from single-station data. In particular thanks to the long history and the comprehensive size, the IMO Video Meteor Database yields a better coverage than any other meteor database in the optical domain. In 2009, for example, when SonotaCo analyzed the data of the SonotaCo network and published ten new meteor showers in WGN, we could confirm each of these in advance based on our own data.

Before we look at the latest examples, we will first scrutinize the differences between double-station and single-station observations in more detail, and how that affects the calcualtion of meteor shower parameters.

It is not possible to determine the radiant or trajectory of the meteoroid from a single meteor recording. You only see a projection of the meteor against the sky background and you don't know then entry angle at which the meteoroid entered the Earth atmosphere.
In case of double-station observations the same meteor is observed from two different viewing angles. The apparent radiant can be derived from the backward prolongation of the meteor trails. By triangulation, the trajectory of the meteoroid is obtained, which in turn yields the entry velocity. A prerequisite is that the stations are located in a favorable angle with respect to the meteor trail. The connecting line between both stations should at best be perpendicular to the plane of the meteoroid. If the meteoroid moves in parallel to the connecting line, the meteor trail shifts along the direction of meteor motion and an analysis is hardly possible.
In case of single-station analysis, the meteor is not observed from two stations, but the analysis is based on two meteors of the same shower recorded by one station. Also in this case, the geometry must fit. The radiant can be determined by backward prolongation most precisely if both meteor trails are oriented orthogonal to each other. If the meteor trails are nearly parallel, however, the point of intersection cannot be computed properly. The derivation of the meteor velocity is not directly possible from single-station data. The altitude of the atmospheric entry point must be known to determine the entry velocity from the apparent angular velocity and the position of the meteor relative to the radiant.

Thus, there are two principal problems in single-station data analysis. On the one hand you cannot know for sure if two meteors belong to the same shower and have exactly the same radiant, and on the other hand assumptions about the entry point altitude need to be made. Both problems are tackled by statistics. That is feasible because there are typically an order of magnitude more meteors available in single-station analysis than from double-station observations.
In practice, meteors are not evaluated pairwise, but individually. For each meteor, the probability of radiants along the backward prolongation is calculated and accumulated over all meteors. Sporadic meteors yield a smooth background probability if they are numerous enough. If there is an active meteor shower, however, the accumulated probability will be highest at the intersection point of the backward prolongations and the proper shower velocity.

The entry point altitude required for the calculation is derived beforehand as a function of the meteor shower velocity. The real altitude of individual meteors will differ from the mean, but on average they will fit to the value determined beforehand.

What other differences are there between double-station and single-station analyses?

In case of double-station, each meteor yields a single radiant position and entry velocity. The challenge is to find those clusters from the cloud of sporadic radiants that belong to one shower. The orbital elements are typically determined for each meteor individually, and averaged over all meteors. That is somehow dangerous, as only in case of symmetric probability distributions the arithmetic mean yields the expectation value. In case of other distribution types, the expectation value should be derived differently.

In case of single-station, averaging is inherent to the analysis process. The procedure yields exactly one average radiant and velocity for a shower, that fits best to all data. From these values, a set of mean orbital elements can be derived. From the shape and size of the probability distribution, the radiant size and velocity distribution can be deduced, but it is more complicated than in case of double station observations. However, also in case of double-station observations it is not sufficient to treat each radiant as punctiform. The observing error needs to be considered as well. In the end, a probability distribution for radiant position and velocity should be obtained which resembles the distribution derived from single-station data.

In summary: The main disadvantage of single-station observation is the combination of different meteors from the same shower, and the estimate of the meteor altitude. On the other hand, the data set is typically larger and both the search for shower radiants in the sporadic background and averaging meteor shower radiants and the orbital parameters happens automatically.

Before we start to discuss detailed examples, we want to repeat briefly how the single-station analysis in the IMO network is performed. In the first step, the active radiants (i.e. pairs of radiant position and velocity) are calculated for each solar longitude interval. Then a search for radiants with similar parameters in adjacent intervals is performed. The result is a list of meteor showers as published last time in WGN in 2009. Due to the required activity in several solar longitude intervals, the confidence is improved, but short-term meteor showers are missed by this type of analysis. For this reason, we published also the original list of individual radiants per solar longitude interval in the internet at http://www.imonet.org/wgn09/radiants.html. Anyone can easily check there whether a certain radiant stands out from the sporadic background at a given time or not.

Now you may get the impression, that among those up to hundred radiants per solar longitude interval, there will always be chance alignments with real meteor showers, but that is not the case. On the one hand, we focus on the first ten radiants or so on the list. On the other hand, the probability to guess a radiant that deviates no more than 10° and 10 km/s from a given shower can be estimated. The hemisphere contains more than 40,000 square degrees and the relevant velocity interval ranges from 10 to 70 km/s, which gives of the order of 7x400=2,800 possible radiants. So the probability to have a fluke among the ten most active radiants is about 1/280. If you allow only 5° and 5 km/s deviation, it's even about 1/2,240 only.

After these theoretical considerations, we will now address the aforementioned publications. In WGN 39:4, Peter Jenniskens and Peter Gural report on the discovery of the February eta Draconids. On February, 4, 2011 they observed six similar meteoroid orbits from a hitherto unknown meteor shower in a time interval of roughly seven hours. As the shower could not be observed in the night before and thereafter, and also the data of the Japanese SonotaCo network between 2007 to 2009 showed no hint of this shower, the authors assumed a unique outburst originating from the dust trail of a long-periodic comet.

That is a pity, because when the authors would have had a look at the above-mentioned radiant list, they would have recognized immediately, that it was not a unique outburst. The most active radiant at solar longitude 315° found in our 2009 analysis is based on 36 meteors and fits well to the parameters derived by Jenniskens and Gural. The figures are summarized in table 1, whereby the velocities are transformed according to the formula $V_{inf}=\sqrt{(V_{geo}^2+125)}$, and rank is the position of the radiant in the list which is sorted by accumulated probability.
As our analysis was based on data until 2009 it is clear, that the February eta-Draconids must have been active before 2011. We can confirm the short duration of the shower, because already in the adjacent solar longitude intervals the radiant is not detected anymore.
Based on the observation from the IMO Video Meteor Network until the end if 2011, a new analysis was conducted now. The new values derived from 70 shower members deviate only slightly from the previous ones. An additional analysis with higher temporal resolution showed that particularly many meteors were observed between 314.7 and 315.0° solar longitude, but also in a few intervals before and thereafter. Most February eta Draconids were recorded in 2007, 2008 and 2011 so far. The reason is, that in these years we obtained more observations in the corresponding solar longitude interval than in others. Since 2000, an average of 4% of all meteors recorded between 314 and 316° solar longitude belonged to this shower. It indicates that the February eta Draconids are active every year. In 2012, we recorded 20 shower meteors in the nights of February 3/4 and 4/5 (figure 1).

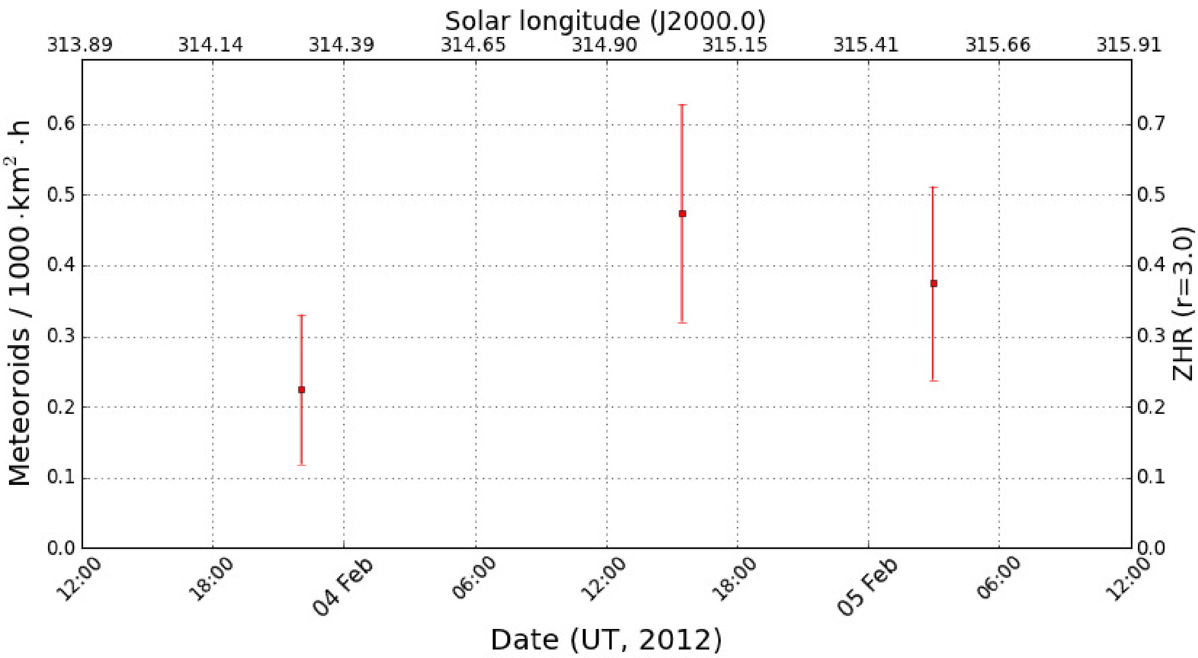

Figure 1: *Flux density of the February eta-Draconids in February 2012.*

Table 1: *Parameters of the February eta Draconids from the analysis of Jenniskens and Gural, and from IMO network analyses in 2009 and 2012.*

Source	Solar Longitude [°]	Rank	Right Ascension [°]	Declination [°]	V_{inf} [km/s]
Jenniskens	315.1	-	239.9	62.5	37.3
IMO 2009	315	1	239.3	61.0	34
IMO 2012	315	2	241.3	61.0	33

In WGN 40:1, John Greaves presented four new meteor showers that he had found in the SonotaCo network data.

The first shower are the December sigma Virginids, derived from 22 meteoroid orbits at a mean solar longitude of 267.4°. This shower was identified by comparing the meteoroid orbits with orbits of known comets. Earlier SonotaCo had assigned all these 22 orbits to the sporadic background. Checking the radiant list given above, no radiant at solar longitude 267 and 268° fits.
However, a new analysis of all data until 2011 draws a different picture. Here we find in all intervals between 263 and 267° solar longitude a radiant that agrees well with the parameters given by Greaves. In fact, the activity interval could still reach beyond these limits. Thus, also this weak shower can be confirmed by us at least when using the more comprehensive data set of 2012.

Table 2: *Parameters of the December sigma Virginids from the analysis of Greaves and from the IMO network analysis in 2012.*

Source	Solar Longitude [°]	Rank	Right Ascension [°]	Declination [°]	V_{inf} [km/s]
Greaves	267.4	-	205.0	5.5	66.9
IMO 2012	263	18	202.4	5.5	69
	264	10	202.8	5.0	68
	265	6	202.9	5.5	71
	266	5	203.4	5.5	71
	267	7	204.6	6.0	71
	268	7	205.3	5.0	69
	269	11	207.0	4.0	70
	270	7	207.4	3.5	68
	271	8	207.9	3.5	68
	272	9	208.4	3.5	70
	273	5	209.5	4.0	69
	274	4	209.9	3.5	69
	275	5	212.0	4.0	69
	276	7	212.4	3.5	69

For the second shower, the alpha Coronae Borealids, Greaves determined a radiant from 15 meteoroids at a mean solar longitude of 309.9°. In our 2009 radiant list, the strongest radiant both at solar longitude 308 and 309° fits well to the values given by Greaves (table 3). The only reason why this shower with 75 members was not identified in the IMO analysis of 2009 was the inactivity in the solar longitude intervals before and thereafter. Hence, the activity was too short for the analysis procedure at that time.
A new analysis based on all data including 2011 is supporting the result, since now the radiant is also on top at solar longitude 307 and 310°, even though with slightliy different declination and velocity.

Table 3: *Parameters of the alpha Coronae Borealids from the analysis of Greaves and from IMO network analyses in 2009 and 2012.*

Source	Solar Longitude [°]	Rank	Right Ascension [°]	Declination [°]	V_{inf} [km/s]
Greaves	309.9	-	233.3	27.0	59.1
IMO 2009	308	1	231.0	28.0	59
	309	1	232.3	27.0	58
IMO 2012	307	1	231.5	29.0	55
	308	1	232.4	26.5	58
	309	1	232.4	26.5	58
	310	1	232.8	23.5	58
	311	4	234.6	22.0	64

Even more interesting is the third candidate from Greaves, the September pi Orionids. Here he obtains a mean radiant from 13 meteoroid orbits at 178.4° solar longitude. Also this shower is clearly confirmed in our 2009 data – the third strongest radiants at 177 and 178° solar longitude fit well to the data of Greaves (table 4). But more that this: In our analysis, these radiant were assigned to a shower as well! In 2009, we could trace the nu Eridanids between solar longitude 158 an 181°. In that time, the radiant drifted in right ascension from 68 to 74° and in declination from -2 to +4°. Between 177 and 181° solar longitude, however, declination jumped to values between +7 and +9°. For this reason, we only had used the interval from 162 bis 165° in our analysis, where the position and velocity showed the smallest scatter.
A new analysis based on all data till 2011 returned a similar picture. Between 175 and 181°, the right ascension is growing by an average of +0.8° per day, and the declination values range from +4 to +6°. Only at solar longitude 179 and 180° it jums again to +9°.
Our assumption is, that the pi Orionids and the nu Eridanids are not two showers nearby in time and space, but that they are in fact the same meteor shower.

Table 4: *Parameters of the September pi Orionids from the analysis of Greaves and from IMO network analyses in 2009 and 2012.*

Source	Solar Longitude [°]	Rank	Right Ascension [°]	Declination [°]	V_{inf} [km/s]
Greaves	178.4	-	74.9	8.4	68.9
IMO 2009	177	3	74.6	7.0	66
	178	3	76.6	7.5	65
IMO 2012	175	1	74.1	3.5	65
	176	2	75.2	4.0	66
	177	1	75.8	5.0	68
	178	3	76.7	4.5	68
	179	4	77.5	9.0	71
	180	4	78.0	9.0	69
	181	2	79.4	6.0	67

Finally we can also confirm the fourth shower discovered by Greaves. For the June iota Pegasids, Greaves had found 9 orbits at a mean solar longitude of 94.5°. In our 2009 analysis, the third strongest radiant at solar longitude 94° is based on 41 meteors and fits well to the parameters given by Greaves. Also in the preceeding interval the radiant is tracable, but not before and thereafter. The latest analysis including all data until 2011 confirms the result. Here, the radiant is on top of the list at solar longitude 93 and 94°, but untracable at 92 and 95°.

Table 5: *Parameters of the June iota Pegasids from the analysis of Greaves and from IMO network analyses in 2009 and 2012.*

Source	Solar Longitude [°]	Rank	Right Ascension [°]	Declination [°]	V_{inf} [km/s]
Greaves	94.5	-	332.6	29.2	60.0

IMO 2009	94	3	331.6	29.0	57
IMO 2012	93	1	331.6	29.0	60
	94	1	331.6	29.0	60

The last example are the July gamma Draconids. This shower was postulated in 1963 based on only three meteor photographs, and it could also be found in the SonotaCo network data. In WGN 40:1, David Holman and Peter Jenniskens report on the confirmation of this shower, after they derived 25 fitting meteoroid orbits with the CAMS network between July 24 and August 1, 2011. Furthermore the two authors report, that this shower was not present in the IMO video analysis of 2009. Unfortunately they made a mistake here, as the July gamma Draconids were clearly identified by us between solar longitude 120 and 127°. Based on 428 shower members, we had derived parameters in 2009 that agree well with the results of SonotaCo and the CAMS network (table 6). In fact, we even presented an activity graph in 2009 which confirms the maximum date of solar longitude 125° given by Holman and Jenniskens.
A new analysis based on all data including 2011 is refining the result. This time, the shower was identified between 122 and 127° solar longitude, with the maximum between 125 and 126° and virtually no radiant drift.

Table 6: *Parameters of the July gamma Draconids from the analyses of Holman and Jenniskens, SonotaCo, and from IMO network analyses in 2009 and 2012.*

Source	**Solar Longitude [°]**	**Rank**	**Right Ascension [°]**	**Declination [°]**	**V_{inf} [km/s]**
Holman	124.7	-	279.6	50.4	29.7
SonotaCo	125	-	280.1	51.1	29.6
IMO 2009	125	-	280.9	50.7	27.3
IMO 2012	122	6	280.6	50.5	27
	123	5	279.7	51.0	26
	124	4	281.4	50.5	26
	125	4	280.6	50.5	27
	126	4	280.5	51.0	27
	127	5	280.5	51.0	26

From these six examples we draw two main conclusions.

Meteor shower and their parameters can be derived reliably from single station data, whereby the radiant position is currently more precisely derived than the velocity. For each hypothesized new meteor shower it is worth to check briefly at http://www.imonet.org/wgn09/radiants.html whether single-station observations of the IMO video network had derived a radiant with similar parameters. If that's the case, you have immediate confirmation for your own hypothesis. If not, you should double-check your results.

In addition, more showers are waiting for their discovery in the above-mentioned radiant list, which slipped our 2009 analysis because of their short duration.

1. Observers

Code	Name	Place	Camera	FOV [$^o{}^2$]	St.LM [mag]	Eff.CA [km^2]	Nights	Time [h]	Meteors
BASLU	Bastiaens	Hove/BE	URANIA1 (0.8/3.8)*	4545	2.5	237	1	4.5	1
BERER	Berko	Ludanyhalaszi/HU	HULUD1 (0.95/3)	2256	4.8	1540	18	92.3	328
			HULUD2 (0.75/6)	4860	3.9	1103	15	57.9	168
			HULUD3 (0.75/6)	4661	3.9	1052	17	51.4	121
BOMMA	Bombardini	Faenza/IT	MARIO (1.2/4.0)	5794	3.3	739	13	108.3	86
BREMA	Breukers	Hengelo/NL	MBB3 (0.75/6)	2399	4.2	699	11	98.9	143
			MBB4 (0.8/8)	1470	5.1	1208	9	69.2	89
BRIBE	Brinkmann	Herne/DE	HERMINE (0.8/6)	2374	4.2	678	16	135.7	186
		Berg. Gladbach/DE	KLEMOI (0.8/6)	2286	4.6	1080	15	130.1	167
CASFL	Castellani	Monte Baldo/IT	BMH1 (0.8/6)	2350	5.0	1611	21	99.2	263
			BMH2 (1.5/4.5)*	4243	3.0	371	21	57.9	299
CRIST	Crivello	Valbrevenna/IT	BILBO (0.8/3.8)	5458	4.2	1772	23	185.8	531
			C3P8 (0.8/3.8)	5455	4.2	1586	22	158.0	305
			STG38 (0.8/3.8)	5614	4.4	2007	24	184.8	692
CSISZ	Csizmadia	Zalaegerszeg/HU	HUVCSE01 (0.95/5)	2423	3.4	361	12	49.3	62
ELTMA	Eltri	Venezia/IT	MET38 (0.8/3.8)	5631	4.3	2151	20	170.3	308
GONRU	Goncalves	Tomar/PT	TEMPLAR1 (0.8/6)	2179	5.3	1842	26	274.0	763
			TEMPLAR2 (0.8/6)	2080	5.0	1508	28	282.2	648
			TEMPLAR3 (0.8/8)	1438	4.3	571	28	271.4	442
GOVMI	Govedic	Sredisce ob Dr./SI	ORION2 (0.8/8)	1447	5.5	1841	17	101.1	211
			ORION3 (0.95/5)	2665	4.9	2069	13	60.9	72
			ORION4 (0.95/5)	2662	4.3	1043	14	100.3	83
HINWO	Hinz	Brannenburg/DE	ACR (2.0/35)*	557	7.4	4954	7	49.7	255
IGAAN	Igaz	Baja/HU	HUBAJ (0.8/3.8)	5552	2.8	403	20	89.5	174
		Debrecen/HU	HUDEB (0.8/3.8)	5522	3.2	620	15	128.9	242
		Hodmezovasar./HU	HUHOD (0.8/3.8)	5502	3.4	764	15	90.6	93
		Budapest/HU	HUPOL (1.2/4)	3790	3.3	475	18	95.5	43
		Sopron/HU	HUSOP (0.8/6)	2031	3.8	460	21	89.6	226
KACJA	Kac	Kamnik/SI	CVETKA (0.8/3.8)	4914	4.3	1842	19	130.7	387
		Kostanjevec/SI	METKA (0.8/8)*	1372	4.0	361	7	57.7	83
		Ljubljana/SI	ORION1 (0.8/8)	1402	3.8	331	20	142.7	166
		Kamnik/SI	REZIKA (0.8/6)	2270	4.4	840	18	121.6	486
			STEFKA (0.8/3.8)	5471	2.8	379	15	117.5	281
KERST	Kerr	Glenlee/AU	GOCAM1 (0.8/3.8)	5189	4.6	2550	12	60.5	474
KOSDE	Koschny	Noordwijkerhout/NL	LIC4 (1.4/50)*	2027	6.0	4509	12	99.5	142
LERAR	Leroy	Gretz/FR	SAPHIRA (1.2/6)	3260	3.4	301	17	127.3	71
MACMA	Maciejewski	Chelm/PL	PAV35 (1.2/4)	4383	2.5	253	14	63.4	63
			PAV36 (1.2/4)*	5732	2.2	227	16	70.0	76
			PAV43 (0.95/3.75)*	2544	2.7	176	13	8.7	37
MARGR	Maravelias	Lofoupoli/GR	LOOMECON (0.8/12)	738	6.3	2698	9	54.7	110
MOLSI	Molau	Seysdorf/DE	AVIS2 (1.4/50)*	1776	6.1	3817	12	75.0	374
			MINCAM1 (0.8/8)	1477	4.9	1084	18	142.7	225
		Ketzür/DE	REMO1 (0.8/8)	1467	6.0	3139	19	135.8	559
			REMO2 (0.8/3.8)	5613	4.0	1186	8	56.2	103
MORJO	Morvai	Fülöpszallas/HU	HUFUL (1.4/5)	2522	3.5	532	18	90.5	99
OCAFR	Ocana Gonzales	Madrid/ES	FOGCAM	1890	3.9	109	4	22.6	23
OTTMI	Otte	Pearl City/US	ORIE1 (1.4/5.7)	3837	3.8	460	16	112.7	232
PERZS	Perko	Becsehely/HU	HUBEC (0.8/3.8)*	5498	2.9	460	18	102.7	430
PUCRC	Pucer	Nova vas nad Dra./SI	MOBCAM1 (0.75/6)	2398	5.3	2976	23	175.4	326
ROTEC	Rothenberg	Berlin/DE	ARMEFA (0.8/6)	2366	4.5	911	7	39.1	58
SARAN	Saraiva	Carnaxide/PT	RO1 (0.75/6)	2362	3.7	381	28	266.6	400
			RO2 (0.75/6)	2381	3.8	459	27	266.4	342
			SOFIA (0.8/12)	738	5.3	907	26	272.0	265
SCALE	Scarpa	Alberoni/IT	LEO (1.2/4.5)*	4152	4.5	2052	19	144.7	206
SCHHA	Schremmer	Niederkrüchten/DE	DORAEMON (0.8/3.8)	4900	3.0	409	15	114.8	104
SLAST	Slavec	Ljubljana/SI	KAYAK1 (1.8/28)	588	-	-	1	3.0	5
STOEN	Stomeo	Scorze/IT	MIN38 (0.8/3.8)	5566	4.8	3270	19	165.9	510
			NOA38 (0.8/3.8)	5609	4.2	1911	20	166.6	376
			SCO38 (0.8/3.8)	5598	4.8	3306	19	172.6	569
STRJO	Strunk	Herford/DE	MINCAM2 (0.8/6)	2362	4.6	1152	6	48.5	26
			MINCAM3 (0.8/12)	728	5.7	975	15	109.2	135
			MINCAM5 (0.8/6)	2349	5.0	1896	14	108.6	161
TEPIS	Tepliczky	Budapest/HU	HUMOB (0.8/6)	2388	4.8	1607	15	116.3	243
TRIMI	Triglav	Velenje/SI	SRAKA (0.8/6)*	2222	4.0	546	16	68.6	208
YRJIL	Yrjölä	Kuusankoski/FI	FINEXCAM (0.8/6)	2337	5.5	3574	14	37.0	103
ZELZO	Zelko	Budapest/HU	HUVCSE02 (0.95/5)	1606	3.8	390	3	21.2	9
			HUVCSE03 (1.0/4.5)	2224	4.4	933	5	25.9	26
Sum							29	7402.2	15494

* active field of view smaller than video frame

2. Observing Times (h)

February	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
BASLU	4.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BERER	7.6	6.1	-	-	6.3	-	7.8	0.4	-	8.4	0.8	0.3	6.6	-	-
	6.9	3.4	-	-	3.1	-	3.2	-	-	4.2	-	1.4	3.2	-	-
	7.5	2.7	-	-	4.3	-	3.0	0.3	-	6.9	0.8	0.3	1.2	-	-
BOMMA	-	-	-	-	-	-	-	11.1	-	-	-	2.0	10.3	10.0	10.8
BREMA	13.0	12.3	10.2	-	5.7	-	-	7.7	10.6	11.5	-	-	-	-	6.5
	12.9	2.0	-	-	5.2	12.7	-	-	10.5	11.2	-	-	-	-	-
BRIBE	12.9	12.9	10.2	12.5	6.5	12.5	0.3	10.3	6.1	12.4	8.4	0.2	-	-	8.1
	12.7	12.7	12.1	12.2	8.7	12.0	0.8	11.5	8.6	12.3	10.2	-	-	-	-
CASFL	-	-	-	-	7.0	0.3	1.7	5.7	-	1.0	-	2.5	5.5	2.8	12.4
	-	-	2.4	0.6	3.9	-	-	3.5	-	-	-	1.5	2.9	3.2	3.8
CRIST	-	12.3	5.8	6.3	11.9	10.3	-	8.3	2.8	-	2.8	10.2	9.6	9.2	11.8
	-	12.3	5.7	5.5	11.3	10.3	1.6	9.5	3.9	-	1.8	7.5	7.4	8.2	11.0
	-	12.3	9.6	7.2	12.2	11.0	0.6	6.0	2.3	-	3.2	10.5	10.1	9.9	11.8
CSISZ	-	-	-	-	-	-	0.6	4.8	-	-	-	-	1.5	-	5.2
ELTMA	-	7.3	-	-	8.2	0.4	0.3	12.3	-	-	-	7.0	9.6	8.9	8.0
GONRU	-	12.0	11.9	9.3	-	-	7.8	11.8	11.8	11.8	11.6	11.7	11.6	11.6	11.6
	-	12.1	12.0	11.5	1.2	6.1	10.0	11.9	11.9	11.9	11.7	11.7	11.6	11.5	11.6
	10.2	12.1	12.1	12.0	2.8	7.6	4.3	11.9	11.9	11.8	11.8	11.8	11.7	11.2	11.7
GOVMI	2.0	-	-	-	0.3	-	2.4	-	-	-	-	-	4.9	5.4	9.0
	3.1	3.7	-	-	-	-	-	7.7	-	-	-	-	-	3.1	4.0
	3.7	-	-	-	-	-	-	-	-	-	-	-	4.0	5.0	4.3
HINWO	-	-	-	-	-	-	-	-	-	-	-	11.1	-	-	-
IGAAN	5.1	-	-	-	-	-	2.7	6.0	4.1	3.0	-	-	0.7	1.5	4.3
	12.6	-	-	-	-	-	8.1	-	4.2	12.3	8.3	-	-	-	-
	11.9	-	-	-	-	-	4.5	-	7.4	-	-	-	-	4.5	-
	-	7.6	-	-	-	-	-	-	2.6	7.6	2.6	0.2	0.3	2.4	0.2
	8.3	7.1	0.4	-	3.1	-	1.9	2.1	-	5.8	3.1	1.9	2.0	-	-
KACJA	-	0.7	-	-	-	-	-	7.6	0.7	1.2	-	-	8.3	8.7	1.8
	-	-	-	-	-	-	-	-	-	-	-	-	6.4	5.2	-
	-	3.1	-	-	1.7	-	4.3	8.8	0.4	-	-	-	5.0	8.6	7.0
	-	0.4	-	-	-	-	-	4.1	2.2	1.5	-	-	9.0	9.5	2.4
	-	0.6	-	-	-	-	-	9.4	-	1.2	-	-	-	-	-
KERST	-	-	-	-	4.4	-	-	-	2.5	3.5	4.2	-	3.7	4.6	6.4
KOSDE	12.1	10.3	7.5	-	-	8.8	-	10.7	11.8	11.8	4.0	-	-	-	-
LERAR	8.8	12.7	1.5	0.3	1.6	12.6	0.9	12.5	8.8	12.4	12.3	-	-	-	-
MACMA	5.4	0.6	-	-	-	-	5.5	-	5.3	11.1	9.1	3.7	-	-	-
	4.8	5.0	3.6	-	-	-	5.8	0.2	9.9	12.2	11.8	4.0	2.0	1.0	-
	-	-	1.4	-	-	-	0.9	-	2.2	0.8	0.3	0.3	-	0.3	-
MARGR	-	-	-	3.7	3.4	-	-	-	-	-	5.5	-	-	-	10.6
MOLSI	-	-	-	3.6	3.3	1.7	-	-	-	0.5	11.2	10.1	-	-	-
	11.5	12.6	12.6	11.1	11.9	2.3	-	6.9	1.6	3.7	12.2	10.6	-	-	3.8
	12.9	7.0	12.6	12.7	7.6	8.0	0.2	1.8	8.4	1.6	9.0	-	-	1.0	7.1
	-	-	-	-	-	-	-	4.8	-	-	-	-	-	-	8.2
MORJO	12.4	-	-	-	-	-	5.7	-	0.8	3.5	-	-	2.1	2.8	0.8
OCAFR	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
OTTMI	-	-	-	8.0	-	-	7.2	9.6	-	7.8	8.2	5.6	-	5.7	1.8
PERZS	3.9	-	-	2.3	-	-	2.7	1.3	-	-	-	-	2.1	4.3	8.3
PUCRC	2.8	-	-	1.4	10.3	-	2.3	11.4	-	-	4.4	7.0	5.5	11.0	9.4
ROTEC	8.9	-	-	0.3	0.3	-	-	-	4.7	-	-	-	-	-	-
SARAN	8.6	10.2	6.5	9.1	5.3	5.3	5.0	8.8	9.6	10.2	10.1	11.7	11.3	-	2.0
	8.4	11.6	6.8	12.0	5.4	5.0	11.1	11.9	11.8	11.8	10.1	11.6	-	-	1.3
	9.4	12.1	6.6	12.0	6.0	9.3	11.9	11.9	11.5	9.9	8.7	11.4	-	-	6.2
SCALE	-	4.4	0.2	0.6	8.5	-	-	10.3	-	-	-	6.1	6.1	8.4	9.6
SCHHA	3.2	12.7	12.9	1.0	3.0	11.6	-	12.6	9.1	12.6	7.2	-	-	-	-
SLAST	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
STOEN	-	-	-	-	8.8	0.5	2.8	10.3	-	-	5.6	4.5	9.8	8.7	12.0
	-	-	-	-	8.4	2.0	0.8	11.5	-	-	6.0	5.5	10.0	8.9	12.0
	-	-	-	-	10.8	1.7	3.4	12.5	-	-	6.1	4.8	10.2	9.5	11.2
STRJO	-	-	-	-	-	-	-	7.7	6.9	8.8	6.8	-	-	-	-
	11.9	5.6	8.9	8.5	9.4	12.3	-	7.9	5.4	8.5	4.8	-	-	-	-
	11.9	8.9	9.0	8.5	8.9	12.2	-	4.8	6.5	4.8	6.3	-	-	-	-
TEPIS	12.5	10.7	-	-	5.4	-	7.2	-	-	11.3	4.5	-	-	-	-
TRIMI	-	2.5	-	-	-	-	-	0.8	-	-	-	-	1.5	1.8	4.9
YRJIL	1.0	2.1	0.3	3.4	0.6	-	-	3.4	5.0	5.7	-	-	-	-	-
ZELZO	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sum	285.3	284.7	182.8	175.6	226.7	176.5	139.3	346.3	223.8	288.5	245.5	188.7	207.7	208.4	272.9

February	16	17	18	19	20	21	22	23	24	25	26	27	28	29
BASLU	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BERER	0.7	-	-	-	6.3	2.7	8.5	-	0.9	8.5	6.6	5.7	-	8.1
	1.8	-	-	-	3.2	2.3	2.9	-	-	5.7	6.5	4.3	-	5.8
	1.5	-	-	-	2.2	3.2	3.3	-	-	1.8	3.5	1.2	-	7.7
BOMMA	9.3	8.7	0.5	-	-	11.7	11.7	2.1	11.5	8.6	-	-	-	-
BREMA	-	-	-	12.0	-	-	-	-	6.1	-	3.3	-	-	-
	-	-	3.8	8.8	2.1	-	-	-	-	-	-	-	-	-
BRIBE	-	-	-	10.5	-	7.7	-	-	4.2	-	-	-	-	-
	-	-	-	-	5.2	8.3	-	-	1.0	-	1.8	-	-	-
CASFL	3.2	4.0	-	-	4.4	7.0	11.8	0.8	7.5	5.7	5.1	2.4	3.3	5.1
	0.6	1.9	0.2	-	2.7	2.9	4.2	1.2	6.9	5.2	3.5	1.2	1.1	4.5
CRIST	9.5	2.0	1.4	-	0.6	11.5	11.4	9.5	10.6	-	11.3	10.4	-	6.3
	7.1	0.6	-	-	-	10.7	11.4	9.4	-	-	11.2	9.2	0.3	2.1
	9.2	2.5	2.2	-	1.3	11.5	11.4	10.1	10.1	-	-	10.8	1.8	7.2
CSISZ	3.5	-	7.4	-	2.8	4.2	9.5	-	-	4.5	2.8	-	-	2.5
ELTMA	11.5	11.1	-	-	3.9	11.7	11.6	6.0	10.5	11.3	9.7	-	10.0	11.0
GONRU	11.6	11.5	11.5	11.4	11.4	10.8	11.2	11.2	11.1	7.6	6.2	5.1	8.2	10.7
	11.6	11.6	11.5	11.5	11.4	9.5	9.7	11.2	11.2	7.6	4.9	5.1	7.6	11.1
	-	11.6	11.4	11.5	11.5	10.3	1.8	11.3	11.3	6.8	6.0	4.6	7.7	10.7
GOVMI	10.9	-	11.3	-	6.4	5.7	11.5	1.2	4.7	8.9	6.9	5.2	-	4.4
	-	-	-	-	5.7	10.8	4.2	1.4	3.3	8.3	4.8	-	-	0.8
	11.0	-	11.3	-	6.1	11.6	11.5	1.8	7.9	8.4	9.3	-	-	4.4
HINWO	-	-	3.5	-	9.8	5.6	9.9	-	-	-	2.9	-	-	6.9
IGAAN	6.8	2.0	3.9	-	4.2	10.3	4.5	2.6	3.2	3.4	1.4	8.6	-	11.2
	7.2	-	1.3	-	6.7	11.6	11.6	-	4.9	11.2	8.9	9.0	-	11.0
	8.6	3.0	3.2	-	2.7	11.4	0.3	5.5	5.5	7.8	5.2	9.1	-	-
	3.9	5.8	-	-	10.1	10.6	8.7	2.8	1.5	7.3	10.7	-	-	10.6
	4.1	2.3	4.0	0.4	9.5	8.2	9.4	0.4	1.6	3.7	10.3	-	-	-
KACJA	11.5	11.8	9.6	-	-	7.4	11.5	4.0	6.2	5.5	8.4	8.8	6.5	10.5
	-	-	10.6	-	-	11.4	11.3	-	5.7	7.1	-	-	-	-
	11.8	11.8	8.0	-	-	9.0	11.5	5.2	8.1	3.5	6.8	8.2	8.8	11.1
	-	11.8	9.6	-	-	9.0	11.6	4.1	7.5	4.9	7.5	9.6	6.4	10.5
	11.6	12.0	9.6	-	-	8.1	11.7	4.1	7.7	5.2	8.6	9.2	7.7	10.8
KERST	7.2	-	4.5	-	9.1	-	-	-	-	-	-	-	4.4	6.0
KOSDE	-	-	4.9	8.5	-	-	-	2.7	6.4	-	-	-	-	-
LERAR	-	-	-	11.9	9.8	11.8	-	-	-	-	7.3	1.8	0.3	-
MACMA	-	-	2.4	0.7	1.8	-	3.8	-	0.7	-	-	4.7	-	8.6
	-	-	-	-	-	-	0.7	1.0	0.7	-	-	4.7	-	2.6
	-	-	0.2	-	0.3	-	0.3	-	0.2	-	-	0.8	-	0.7
MARGR	3.6	2.5	-	11.1	7.0	-	-	-	7.3	-	-	-	-	-
MOLSI	-	-	3.8	8.7	10.2	9.4	9.3	-	-	-	3.2	-	-	-
	2.3	-	-	7.3	11.0	10.0	9.2	-	-	2.1	-	-	-	-
	-	3.4	-	11.9	8.1	-	-	-	8.6	3.1	10.8	-	-	-
	-	2.3	-	11.8	7.5	-	-	-	8.5	2.7	10.4	-	-	-
MORJO	2.3	5.4	1.4	-	7.0	4.5	11.6	-	2.4	1.2	7.1	8.2	-	11.3
OCAFR	-	-	-	-	-	-	-	-	-	-	11.4	7.4	3.3	0.5
OTTMI	9.2	8.1	7.1	7.2	-	4.0	-	-	-	8.3	8.9	6.0	-	-
PERZS	8.6	0.3	8.6	-	7.0	11.7	8.6	-	7.8	6.4	10.3	2.5	-	6.0
PUCRC	11.8	3.7	4.6	-	4.0	11.7	10.4	4.4	11.5	9.1	7.7	11.5	8.2	11.3
ROTEC	-	-	-	9.0	-	-	-	-	4.7	-	11.2	-	-	-
SARAN	11.5	11.3	11.5	11.4	11.3	10.6	11.4	11.3	11.1	11.2	11.2	11.0	11.1	7.0
	11.6	11.3	11.5	11.4	11.4	9.2	11.2	11.3	11.2	11.0	10.1	11.0	11.1	4.3
	11.6	11.4	11.5	11.3	11.2	11.0	11.4	11.2	11.1	11.1	10.3	10.9	11.1	-
SCALE	8.1	7.7	-	-	-	11.5	11.5	2.6	9.2	11.1	9.7	-	8.4	10.7
SCHHA	1.3	-	3.1	7.9	8.3	8.3	-	-	-	-	-	-	-	-
SLAST	-	-	-	-	-	-	-	-	-	-	-	-	-	3.0
STOEN	10.0	10.9	-	-	2.9	11.9	11.8	-	11.5	11.6	11.6	-	9.3	11.4
	9.6	10.6	1.0	-	2.9	11.7	11.6	-	11.6	11.3	11.4	-	8.5	11.3
	10.5	10.7	-	-	2.8	11.9	11.8	-	11.4	10.7	11.6	-	9.5	11.5
STRJO	-	-	-	10.2	-	-	-	-	-	-	8.1	-	-	-
	-	-	-	7.9	3.0	2.7	-	-	3.9	-	8.5	-	-	-
	-	-	-	10.0	5.2	2.6	-	-	-	-	9.0	-	-	-
TEPIS	-	-	-	-	9.6	10.4	11.5	0.3	2.5	5.5	10.3	3.5	-	11.1
TRIMI	8.8	6.0	4.2	-	-	5.5	6.8	4.0	2.0	-	4.0	5.0	3.7	7.1
YRJIL	-	2.7	1.4	-	4.2	6.3	-	-	-	-	0.7	0.2	-	-
ZELZO	-	-	-	-	5.6	9.3	-	-	-	-	6.3	-	-	-
	0.9	-	-	-	5.8	9.4	-	-	-	3.4	6.4	-	-	-
Sum	297.4	234.3	217.5	224.3	297.2	452.1	402.5	154.7	315.0	278.3	391.6	216.9	158.3	309.4

3. Results (Meteors)

February	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
BASLU	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BERER	35	22	-	-	18	-	25	1	-	29	3	1	17	-	-
	24	12	-	-	5	-	11	-	-	17	-	2	7	-	-
	16	10	-	-	8	-	8	1	-	14	3	1	4	-	-
BOMMA	-	-	-	-	-	-	-	13	-	-	-	5	8	8	10
BREMA	26	12	10	-	12	-	-	5	11	22	-	-	-	-	18
	23	5	-	-	5	13	-	-	12	12	-	-	-	-	-
BRIBE	21	22	8	20	14	16	1	8	3	30	8	1	-	-	2
	23	7	16	19	17	15	2	10	6	21	10	-	-	-	-
CASFL	-	-	-	-	28	1	4	20	-	3	-	7	16	9	12
	-	-	10	4	26	-	-	17	-	-	-	7	15	10	26
CRIST	-	42	9	21	45	19	-	18	5	-	8	29	24	14	40
	-	31	11	16	11	14	6	13	8	-	4	21	9	6	24
	-	60	18	35	47	22	4	29	10	-	18	38	34	21	46
CSISZ	-	-	-	-	-	-	2	1	-	-	-	-	3	-	3
ELTMA	-	18	-	-	28	1	2	22	-	-	-	6	13	12	23
GONRU	-	35	35	20	-	-	25	24	32	26	43	44	45	33	38
	-	36	28	27	1	25	26	30	18	18	21	31	28	30	27
	31	29	24	24	1	18	9	29	12	15	18	18	18	16	22
GOVMI	7	-	-	-	2	-	4	-	-	-	-	-	8	13	17
	5	4	-	-	-	-	-	4	-	-	-	-	-	3	2
	2	-	-	-	-	-	-	-	-	-	-	-	5	7	2
HINWO	-	-	-	-	-	-	-	-	-	-	-	37	-	-	-
IGAAN	18	-	-	-	-	-	6	10	7	2	-	-	1	5	6
	27	-	-	-	-	-	26	-	6	26	10	-	-	-	-
	12	-	-	-	-	-	3	-	7	-	-	-	-	3	-
	-	6	-	-	-	-	-	-	2	6	1	1	1	1	1
	7	13	2	-	5	-	5	4	-	10	10	6	6	-	-
KACJA	-	2	-	-	-	-	-	11	4	1	-	-	31	16	1
	-	-	-	-	-	-	-	-	-	-	-	-	13	12	-
	-	1	-	-	3	-	8	9	1	-	-	-	4	7	8
	-	1	-	-	-	-	-	12	6	3	-	-	33	19	3
	-	1	-	-	-	-	-	11	-	1	-	-	-	-	-
KERST	-	-	-	-	50	-	-	-	21	35	38	-	29	44	46
KOSDE	39	17	9	-	-	9	-	8	13	14	2	-	-	-	-
LERAR	5	8	3	1	2	7	1	5	1	8	6	-	-	-	-
MACMA	2	8	-	-	-	-	2	-	4	9	11	2	-	-	-
	3	10	1	-	-	-	3	1	7	18	6	3	3	2	-
	-	-	2	-	-	-	5	-	8	4	1	1	-	2	-
MARGR	-	-	-	14	2	-	-	-	-	-	12	-	-	-	26
MOLSI	-	-	-	39	9	3	-	-	-	3	20	57	-	-	-
	5	30	28	32	16	1	-	2	2	3	27	18	-	-	2
	63	17	63	56	44	33	1	6	45	3	18	-	-	7	41
	-	-	-	-	-	-	-	13	-	-	-	-	-	-	28
MORJO	10	-	-	-	-	-	3	-	2	7	-	-	3	6	1
OCAFR	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
OTTMI	-	-	-	22	-	-	18	16	-	16	25	4	-	10	11
PERZS	16	-	-	7	-	-	10	3	-	-	-	-	8	21	41
PUCRC	2	-	-	3	12	-	3	14	-	-	1	14	20	16	21
ROTEC	17	-	-	2	2	-	-	-	4	-	-	-	-	-	-
SARAN	26	16	15	13	9	15	24	15	13	6	12	15	8	-	5
	15	21	14	17	8	11	15	23	16	9	12	20	-	-	5
	12	10	12	12	10	12	8	19	8	9	12	10	-	-	8
SCALE	-	8	1	3	16	-	-	16	-	-	-	6	7	19	13
SCHHA	10	18	10	1	5	11	-	7	5	16	2	-	-	-	-
SLAST	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
STOEN	-	-	-	-	33	2	8	18	-	-	14	5	15	24	37
	-	-	-	-	24	3	2	24	-	-	11	8	16	21	25
	-	-	-	-	46	2	16	47	-	-	16	9	14	27	29
STRJO	-	-	-	-	-	-	-	3	3	8	8	-	-	-	-
	28	9	13	19	12	8	-	6	6	8	5	-	-	-	-
	21	19	17	19	17	14	-	3	13	7	6	-	-	-	-
TEPIS	26	23	-	-	12	-	13	-	-	8	9	-	-	-	-
TRIMI	-	9	-	-	-	-	-	1	-	-	-	-	4	7	15
YRJIL	6	6	1	10	2	-	-	11	12	11	-	-	-	-	-
ZELZO	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sum	584	598	360	456	607	275	309	563	333	458	431	427	470	451	685

February	16	17	18	19	20	21	22	23	24	25	26	27	28	29
BASLU	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BERER	2	-	-	-	24	11	24	-	1	36	34	19	-	26
	4	-	-	-	9	6	8	-	-	18	18	8	-	19
	2	-	-	-	5	5	13	-	-	6	6	3	-	16
BOMMA	8	3	1	-	-	9	6	3	5	7	-	-	-	-
BREMA	-	-	-	19	-	-	-	-	6	-	2	-	-	-
	-	-	4	14	1	-	-	-	-	-	-	-	-	-
BRIBE	-	-	-	13	-	14	-	-	5	-	-	-	-	-
	-	-	-	-	3	13	-	-	3	-	2	-	-	-
CASFL	10	12	-	-	14	17	25	4	21	17	16	8	5	14
	4	11	1	-	18	25	25	5	22	16	22	8	6	21
CRIST	11	5	1	-	2	41	31	41	28	-	37	33	-	27
	7	4	-	-	-	14	28	26	-	-	27	19	3	3
	35	4	2	-	2	51	50	66	19	-	-	44	2	35
CSISZ	3	-	6	-	7	9	15	-	-	3	7	-	-	3
ELTMA	9	8	-	-	4	29	26	10	8	18	23	-	15	33
GONRU	37	35	34	38	41	17	38	34	34	13	5	3	12	22
	30	36	27	23	33	17	22	31	27	11	7	5	7	26
	-	22	22	18	13	16	6	18	15	8	2	1	7	10
GOVMI	27	-	12	-	11	13	33	3	13	17	21	4	-	6
	-	-	-	-	7	11	8	1	5	9	11	-	-	2
	8	-	3	-	5	12	11	3	5	4	12	-	-	4
HINWO	-	-	14	-	55	46	50	-	-	-	12	-	-	41
IGAAN	17	3	9	-	12	14	12	5	9	4	4	7	-	23
	9	-	1	-	11	12	15	-	3	27	22	27	-	20
	7	5	1	-	7	14	1	4	4	4	2	19	-	-
	1	1	-	-	4	4	2	2	1	3	3	-	-	3
	4	11	9	1	25	30	31	2	2	6	37	-	-	-
KACJA	47	36	11	-	-	8	36	28	6	28	35	30	21	35
	-	-	13	-	-	16	17	-	7	5	-	-	-	-
	17	12	1	-	-	8	12	9	4	4	8	16	11	23
	-	57	17	-	-	48	56	33	28	19	38	41	21	51
	35	38	15	-	-	9	27	18	18	19	23	17	19	30
KERST	52	-	28	-	71	-	-	-	-	-	-	-	20	40
KOSDE	-	-	11	10	-	-	-	4	6	-	-	-	-	-
LERAR	-	-	-	5	4	6	-	-	-	-	5	3	1	-
MACMA	-	-	2	1	1	-	2	-	2	-	-	9	-	8
	-	-	-	-	-	-	1	1	3	-	-	9	-	5
	-	-	1	-	1	-	2	-	1	-	-	5	-	4
MARGR	2	3	-	17	16	-	-	-	18	-	-	-	-	-
MOLSI	-	-	3	25	69	89	47	-	-	-	10	-	-	-
	1	-	-	6	17	17	14	-	-	4	-	-	-	-
	-	9	-	56	9	-	-	-	26	6	56	-	-	-
	-	1	-	22	3	-	-	-	10	3	23	-	-	-
MORJO	4	11	1	-	8	8	5	-	4	1	8	2	-	15
OCAFR	-	-	-	-	-	-	-	-	-	-	7	10	4	2
OTTMI	25	21	23	9	-	7	-	-	-	9	12	4	-	-
PERZS	30	2	29	-	40	58	38	-	32	17	54	6	-	18
PUCRC	18	10	2	-	5	20	20	17	20	14	24	12	14	44
ROTEC	-	-	-	11	-	-	-	-	2	-	20	-	-	-
SARAN	17	17	15	18	23	10	14	17	16	18	15	13	11	4
	15	11	15	10	18	13	11	14	11	13	7	6	6	6
	11	9	9	10	11	12	8	13	14	8	8	4	6	-
SCALE	6	6	-	-	-	29	22	5	6	13	13	-	9	8
SCHHA	1	-	5	1	4	8	-	-	-	-	-	-	-	-
SLAST	-	-	-	-	-	-	-	-	-	-	-	-	-	5
STOEN	26	21	-	-	8	43	65	-	23	35	53	-	21	59
	21	12	1	-	10	44	41	-	21	28	20	-	14	30
	27	20	-	-	11	61	63	-	31	30	47	-	26	47
STRJO	-	-	-	3	-	-	-	-	-	-	1	-	-	-
	-	-	-	3	1	1	-	-	1	-	15	-	-	-
	-	-	-	5	2	1	-	-	-	-	17	-	-	-
TEPIS	-	-	-	-	28	21	26	2	8	9	24	1	-	33
TRIMI	23	21	11	-	-	14	19	18	6	-	13	15	10	22
YRJIL	-	7	5	-	6	21	-	-	-	-	4	1	-	-
ZELZO	-	-	-	-	2	4	-	-	-	-	3	-	-	-
	1	-	-	-	8	8	-	-	-	1	8	-	-	-
Sum	614	484	365	338	689	1034	1026	437	560	511	903	412	271	843