

Table 7 Working list of cometary meteor showers

Recently active meteor showers and their parent comets. Radiant and orbital elements in equinox J2000. Dates given are for AD 2000. Shower activity is expressed with peak solar longitude λ_{\odot}^{\max} , full-width-half-maximum (W , in degrees, λ_{\odot}) and peak rate ZHR^{\max} (per hour), whereby: $ZHR = ZHR^{\max} (W/2)^2 / ((\lambda_{\odot} - \lambda_{\odot}^{\max})^2 + (W/2)^2)$. The magnitude distribution index is $\chi = N(m + 1)/N(m)$. Sequence of mean orbit for each stream has most reliable values on top. In some cases, the original orbit (given from a mean of individual orbital elements) was made to intersect Earth's orbit. Parent body orbits are for the best corresponding theoretical orbit of a meteoroid intersecting the orbit of Earth, not to be confused with the orbit of the parent itself. Sources are given at end of Table.

Table legend:

IAU#	Code	Name	a (AU)	q (AU)	i (°)	ω (°)	Node (°)	Peak λ_{\odot}^{\max} (°)	R.A. (°)	Decl. (°)	χ	W (°)	ZHR^{\max}	src
Outburst	Notes	Dates (2000)	Dates (2000)	Peak	Peak	Peak	Peak	λ_{\odot}^{\max}	R.A.	Decl.	χ	W	V_g (km/s)	src
(Epoch)	a (AU)	q (AU)	i (°)	ω (°)	Node (°)	R.A. (°)	Decl. (°)	λ_{\odot}^{\max}	R.A.	Decl.	χ	W	ZHR^{\max}	src
Parent	Name	(Epoch)	λ_{\odot}^{\max}	<i>Tisserand parameter T_J, absolute magnitude H_0 (n) or H_N if asteroidal in appearance</i>										
(Epoch)	a (AU)	q (AU)	i	ω (°) <td>Node (°) <td>R.A. (°) <td>Decl. (°) <td>$\Delta R.A./\Delta \lambda_{\odot}$</td> <td>$\Delta \text{Decl.}/\Delta \lambda_{\odot}$</td> <td>$\Delta \text{Decl.}/\Delta \lambda_{\odot}$</td> <td>$V_g$ (km/s)</td> <td>$\Delta C-E$ (AU)</td> <td colspan="2"></td> </td></td></td>	Node (°) <td>R.A. (°) <td>Decl. (°) <td>$\Delta R.A./\Delta \lambda_{\odot}$</td> <td>$\Delta \text{Decl.}/\Delta \lambda_{\odot}$</td> <td>$\Delta \text{Decl.}/\Delta \lambda_{\odot}$</td> <td>$V_g$ (km/s)</td> <td>$\Delta C-E$ (AU)</td> <td colspan="2"></td> </td></td>	R.A. (°) <td>Decl. (°) <td>$\Delta R.A./\Delta \lambda_{\odot}$</td> <td>$\Delta \text{Decl.}/\Delta \lambda_{\odot}$</td> <td>$\Delta \text{Decl.}/\Delta \lambda_{\odot}$</td> <td>$V_g$ (km/s)</td> <td>$\Delta C-E$ (AU)</td> <td colspan="2"></td> </td>	Decl. (°) <td>$\Delta R.A./\Delta \lambda_{\odot}$</td> <td>$\Delta \text{Decl.}/\Delta \lambda_{\odot}$</td> <td>$\Delta \text{Decl.}/\Delta \lambda_{\odot}$</td> <td>$V_g$ (km/s)</td> <td>$\Delta C-E$ (AU)</td> <td colspan="2"></td>	$\Delta R.A./\Delta \lambda_{\odot}$	$\Delta \text{Decl.}/\Delta \lambda_{\odot}$	$\Delta \text{Decl.}/\Delta \lambda_{\odot}$	V_g (km/s)	$\Delta C-E$ (AU)		

Code	Name	a	q	i	ω	Node	Peak	λ_{\odot}^{\max}	Decl.	χ	W	ZHR^{\max}	Notes
					Dates (2000)		R.A.			$\Delta R.A./\Delta \lambda$	$\Delta \text{Decl.}/\Delta \lambda$	V_g	$\Delta C-E$
<i>January:</i>													
#89	PVI	January π -Virginids			01/10-01/21		Jan. 16	295		~2	(4)	--	Apex
	$N=7$	12.6	0.396	160.6	283.0	295.2	179	+09	+0.1	+0.9		64.4	SASY
	$N=22$	--	--	--	--	--	167	+10	--	--	--	--	RRR
#90	JCO	Jan. Comae Berenicids			01/19-01/23		Jan. 22	301		--	(1.6)	2	This work
	$N=3$	Inf.	0.512	137.3	267.8	300.5	188.9	+16.8	-0.3	+1.3		63.9	MP
	$N=6$	Inf.	0.548	136.8	263.1	297.4	175	+25	--	--	--	65	
Parent?	C/Lowe (1913 I) - assumed to be Halley type.							$\lambda_{\odot} = 304.4$	$T_J = -0.23$	$H_{10} = --$			V_{13}
(1913)	(30)	0.405	120.5	280.7		304.4	187.9	+21.9	--	--	--	59.4	0.0045

Table 7 (*cont.*)

February

Code	Name	q	i	ω	Dates (2000)	Node	Peak R.A.	λ_{\odot}^{\max} Decl.	χ $\Delta R.A./\Delta \lambda$	W $\Delta \text{Decl.}/\Delta \lambda$	ZHR^{\max} V_g	Notes
<i>Parent</i> (2005)	2003 EH ₁ 3.126	0.979	70.782	171.369	(Epoch 2005-01-30)	282.952	231.0	$\lambda_{\odot} = 282.9$ $+50.0$	$T_J = +2.06$ $+0.5$	$H_N = +16.67$ -0.3	40.77	0.2145
#100	XSA Daytime ξ -Sagittarids			01/17-02/01			Jan. 23	304.9	--	(6)	--	
$N = 15$	1.080	0.285	1.1	46.9		304.9	283.2	-21.9	--	--	24.4	ZS
$N = 14$	1.744	0.383	4.3	66.6		296.0	284.8	-18.6	--	--	26.3	ZS
<i>February:</i>												
#101	PIH π -Hydrids			02/01-02/13			Feb. 06	317.1	--	(5)	--	Apex
$N = 8$	32.8	0.892	162.2	36.2		137.1	210.3	-23.0	+1.3	-0.4	70.7	This work
$N = 2$	2.3	0.96	178.8	159		145.7	236.7	-20.2	--	--	67	GE (2.54)
#102	ACE α -Centaurids			02/02-02/19			Feb. 08	319.4	2.0	3.4 ± 0.6	7.3 ± 1.5	PJ
Outburst in 1980 and possibly 1974												
(1980)							1980, Feb. 08	319.2	2.2	$0.011 \pm$ 0.004	>230	PJ
Visual	(14)	0.977	107.0	348.9		$\lambda_{\odot} = 319.2$	210.9	-58.2	--	--	--	JW
$N = --$	Inf.	0.986	108.3	357.3		138.9	212.1	-59.4	+1.9	-0.5	58.2	PJ
$N = --$		0.973	105.0	344		140.2	209.8	-58.4	+1.9	-0.5	59.3	K88
#103	TCE Centaurids II			01/23-03/12		(146.7)	223.6	-61.3	--	--	54.2	GE
$= \theta$ -Centaurids = μ -Velids = β -Hydrids												
visual	(7.2)	0.922	131.8	31.3		$\lambda_{\odot} = 321.0$	203.8	-39.6	+0.81	+0.01	60.2 ± 2.3	Mean
$N = 2$	5.0	0.87	114.7	43		150.7	217.8	-43.7	+1.1	-0.4	64.6	PJ
$N = 2$	1.7	0.92	145.4	39		146.7	202.8	-48.3	--	--	59	GE (2.45)
visual				02/10-02/13		144.7	218.8	-35.2	--	--	63	GE (2.49)
						207.5		-43.5	--	--		M (#112)

PIH – “this:” Diffuse radiant. q versus Π dependence.

Table 7 (cont.)

February

Code	Name	a	q	i	ω	Dates (2000)	Node	Peak R.A.	λ_{\odot}^{\max} Decl.	χ $\Delta R.A./\Delta \lambda$	W $\Delta \text{Decl.}/\Delta \lambda$	ZHR ^{max} V_g	Notes Δ_{C-E}
#110	AAN α -Antilids = α -Hydrids				01/15-02/10			Feb. 02	313.1	3.4	1.6	<2	GB
	$N = 327$	1.788	0.142	64.3	141.9		$\lambda_{\odot} = 304.7$	140.0	-10.0	-	-	-	IMO
	σ	-	± 0.032	± 7.8	± 5.3		133.1	161.9	-13.5	+0.68	-0.16	42.6	GB
	$N = 6$	-					± 2.4	± 2.3	± 3.1	± 0.03	± 0.01	± 2.6	
	Visual							135.9	-10.0	+0.98	-0.57	42.6	GK
								178.3	-17.6				M (#85)
#111	FCM Feb. Canis Majorids				02/17-02/20			Feb. 19	330.6	-	(1.6)	-	
	Outburst (1985)						1985, Feb. 19	330.60	330.60	(1.8)	-	>70	
							$\lambda_{\odot} = 330.60$	104.3	-25.6	-	-	Fast	Ch. 13
#29	(DLE) δ -Leonids = <i>ecliptic antihelion source</i>				01/21-03/12		150.6	101.9	-28.1	-	-	19.5	This work
	Inf.	0.949		21.3	23.2			Feb. 23	334.7	3.0	14 \pm 6	1.1 \pm 0.3	PJ
#112	NDL N . δ -Leonids = <i>ecliptic antihelion source</i>				01/21-03/12			Feb. 23	334.7	3.0	14 \pm 6	0.6 \pm 0.3	PJ
	$N = 8$	1.954	0.612	4.8	266.4		$\lambda_{\odot} = 336$	168.0	+16.0	+0.80	-0.30	-	IMO
	$N = 24$	2.618	0.643	6.2	259.0		331.4	155.1	+17.9	-	-	20.6	ZS73
	Fireballs	AD 1043-1073:			02/19-02/23		338.8	159.7	+18.8	-	-	20.1	L72B
		1999 RD ₃₂			(Epoch 2005-01-30)			115	+23	-	-	-	AT (4)
	(2005)	2.640	0.605	5.927	264.128		345.995	168.2	+13.8	+0.53	-0.14	22.77	+0.0679
#113	SDL S . δ -Leonids = <i>ecliptic antihelion source</i>				01/21-03/12			Feb. 23	334.7	3.0	14 \pm 6	0.5 \pm 0.3	PJ
	$N = -$	1.950	0.804	9.8	237.2		334.7	148.6	+18.6	-	-	17.3	This work
	$N = -$	2.182	0.729	4.3	69.0		146.4	137.7	+17.8	-	-	17.4	T89 (6c)
	$N = 37$	2.473	0.702	6.4	91.3		134.5	136.1	+07.2	-	-	20.9	ZS
#114	DXC Daytime γ -Capricornids				01/17-02/12			Feb. 01	311.3	-	(10)	-	
	$N = 5$	3.103	0.760	10.5	118.2		311.3	321.4	+06.0	-	-	18.5	ZS73
	$N = 16$	2.473	0.702	1.5	108.0		314.2	324.7	-11.2	-	-	18.5	ZS

AAN – Stream detected in AMOR radar survey with limiting magnitude +14.

#115	DCS	Daytime Capricornids–Sagittariids		01/13–02/28		Feb. 02	312.5	–	(18)	–	~7	ZS73
	<i>N</i> = 15	1.684	0.355	6.8	242.5	145.1	–23.3	–	–	–	26.8	GE (2.01)
	<i>N</i> = 3	2.08	0.36	4.5	246	144.7	–20.8	–	–	–	28.9	HV18043
	<i>N</i> = 1	1.5	0.28	2	234	143.7	–20.8	–	–	–	25.1	ZS
	<i>N</i> = 29	1.712	0.415	6.2	69.8	309.1	–14.2	–	–	–	29.4	ZS73
	<i>N</i> = 26	1.991	0.314	6.8	60.0	314.0	–15.3	–	–	–	–	–
	Parent? (2005)	2001 ME ₁	0.356	3.558	247.831	138.795	–21.2	–	–	–	29.59	0.0782
	DEQ	Daytime ε-Aquariids			01/15–02/13	Feb. 04	315.8	–	–	–	–	–
	<i>N</i> = 17	2.004	0.529	8.8	84.8	315.1	–6.8	–	–	–	23.1	ZS
	DCQ	Daytime <i>c</i> -Aquariids			01/29–02/28	Feb. 13	325	–	–	–	–	–
	<i>N</i> = 11	2.3	0.82	2.1	299	144.7	–23.7	–	–	–	14.1	GE (2.18)
	Parent? (2006)	2004 NL ₈	0.736	4.412	293.079	135.129	–20.4	–	–	–	17.75	+0.0379

March:

#118	GNO	γ-Normids		02/25–03/22 <th>Mar. 13 <th>353 <th>2.4 <th>3.3 ± 0.5 <th>5.8 ± 1.0 <th>Apex</th> </th></th></th></th></th>		Mar. 13 <th>353 <th>2.4 <th>3.3 ± 0.5 <th>5.8 ± 1.0 <th>Apex</th> </th></th></th></th>	353 <th>2.4 <th>3.3 ± 0.5 <th>5.8 ± 1.0 <th>Apex</th> </th></th></th>	2.4 <th>3.3 ± 0.5 <th>5.8 ± 1.0 <th>Apex</th> </th></th>	3.3 ± 0.5 <th>5.8 ± 1.0 <th>Apex</th> </th>	5.8 ± 1.0 <th>Apex</th>	Apex
	Visual	(Inf.)	0.976	130.9	15.5	173.1	–51.3	–	–	(65.7)	PJ
	<i>N</i> = 6	4.6	0.98	121.6	13	178.7	–56.0	–	–	58.9	GE (3.14)
	<i>N</i> = 3	1.18	0.66	137.4	95.9	(179.7)	–42.7	–	–	56.8	GE (3.15)
	<i>N</i> = 2	3.12	0.85	145.4	49	(179.7)	–41.2	–	–	64.0	GE
	radar					176	–50.1	–	–	–	WE55
	visual				03/06–03/11	242.0	–53.1	–	–	–	M (#149)
	LCE	λ-Centaurids			03/17–03/21	Mar. 19	359	–	–	(1.6)	–
	<i>N</i> = 3	7.74	0.774	59.3	58.0	173.7	–59.5	–	–	38.4	GE (3.09)
	?Visual				03/05–03/17	177.2	–56.6	–	–	–	M (84)

GNO – Also called Coronae Australiids after a transcription error in the 1935 shower list by R. MacIntosh.

Table 7 (cont.)

March

Code	Name	q	i	ω	Dates (2000)	Node	Peak R.A.	λ_{\odot}^{\max} Decl.	χ $\Delta R.A./\Delta \lambda$	W $\Delta \text{Decl.}/\Delta \lambda$	ZHR ^{max} V_g	Notes Δ_{C-E}
#43	ZSE	ζ -Serpentids		03/20-04/01			Mar. 25	365	-.-	(4.4)	-.-	
		Possibly related to δ -Aquilids										
	$N=1$	4.771	0.985	150.0	193.1	360.1	266.3	-06.3	-.-	-.-	67.42	HV5688
	$N=1$	6.358	0.946	150.3	207.9	11.5	273.7	-06.6	-.-	-.-	67.58	HV3024
#120	DPA	δ -Pavonids		03/11-04/16			Mar. 31	11.1	2.6	8.4 ± 1.6	5 ± 1	PJ
		= β -Pavonids = ϕ -Pavonids										
	Visual (164)	0.959	108		337	191.1	309.1	-62.8	1.4	+0.2	58	PJ
	Visual				04/13-04/15		305.2	-66.3	-.-	-.-	-.-	M (#244)
	Parent (1907)	$C/1907 G_1$ (Grigg-Mellish) (Epoch 1907-03-28)						$\lambda_{\odot} = 10.42$	$T_J = -0.23$	$H_{10} = +9.7$ ($n=8.4$)		
		(29.96)	0.928	110.057	328.756	190.417	309.0	-60.4	-.-	-.-	58.72	0.0039
	Parent? (1742)	$C/1742 C_1$						$\lambda_{\odot} = 7.71$	$T_J = -0.25$	$H_{10} = -.-$		
		(29.96)	0.907	112.596	324.587	187.710	305.8	-58.9	-.-	-.-	59.50	0.1636
#121	NHY	ν -Hydrids		03/01-03/06			Mar. 02	343.1	-.-	(2.0)	-.-	Antihelion
	$N=2$	1.622	0.626	12.5	88.4	163.1	159.1	-12.2	-.-	-.-	19.7	This work
	$N=-.-$	2.521	0.718	9.6	70.8	184.6	158.6	-11.3	-.-	-.-	19.3	T89 (18)
	$N=29$	2.138	0.618	0.5	84.7	163.0	162.0	+06.8	-.-	-.-	20.9	ZS
	$N=3$	12.5	0.75	7.3	62	178.7	159.6	-05.3	-.-	-.-	20.1	GE (3.02)
	Parent? (2005)	1999 RM ₄₅						$\lambda_{\odot} = 340.88$	$T_J = +3.95$	$H_N = +19.33$		
		1.681	0.598	10.881	90.716	160.888	158.4	-08.1	-.-	-.-	20.57	0.0071
#122	APX	α -Pyxidids		03/06-03/06			Mar. 05	345.9	-.-	-.-	-.-	
	Outburst (1979)	Tim Cooper						<345.91	2.2	<0.015	>50	PJ
	? ^{Visual}	(Inf.)	0.852	30.1	44.1	166.1	135.5	-35.2	-.-	-.-	25.9	Ch. 13
					03/07-03/14		175.2	-42.6	-.-	-.-	-.-	M (#82)
#50	(VIR)	March Virginids		02/18-04/25			Mar. 14	354	3.0	~ 22	4.5 ± 0.7	IMO/PJ

NHY – “this:” two video meteors from DMS database (+3.5 and +5.0^m). Intrinsically faint comet. Association uncertain.
 VIR – This includes the March η -Virginids.

#123	NVI	N. March Virginids	02/18-04/25	Mar. 14	354	3.0	~22	2.2 ± 0.7	IMO/PJ	
	<i>N</i> = --	= <i>antihelion</i> source								
			3.7	174.3	+08.7	+0.9	+0.4	(23.0)	GK	
	<i>N</i> = 18		0.728	353.5					ZS73	
			0.496	358.0	+02.3	--	--	23.0		
	Parent?	1998 SJ-70	(Epoch 2005-01-30)	$\lambda_{\odot} = 368.09$	$T_J = +3.25$, $H_N = +18.33$					
	(2005)	2.234	0.657	7.157	260.045	8.232	188.0	+08.6	20.51	0.0341
#124	SVI	S. March Virginids	02/18-04/25	Mar. 14	354	3.0	~22	2.3 ± 0.7	IMO/PJ	
		= <i>antihelion</i> source = <i>southern Virginids</i>								
	<i>N</i> = --		3.8	158.3	+05.0	--	--	(22.9)	GK	
	<i>N</i> = 13		0.606	160.4					ZS73	
			0.565	182.0	-08.5	--	--	22.9		
	<i>N</i> = 5		0.64	175.7	+02.7	--	--	20	KL (1)	
#11	EVI	η -Virginids	03/03-03/23	Mar. 14	354	3.0	(8)	<1.5	PJ	
		= Southern Virginids								
	Outburst?			1953 Mar. 12-13		$\lambda_{\odot} = 352.4$			MP	
	(1953)	2.19	0.387	2.0	172.4	181.6	+1.00	-0.37	Ch. 28	
	<i>N</i> = 7		0.382	0.8	113.8	182.1	+1.00	-0.37	This work	
			0.424	3.5	349.1	180.7	--	--	PG	
	<i>N</i> = 3		0.394	4.0	282.4	168.7	--	--	T89 (14N)	
	<i>N</i> = --		0.234	5.6	289.6	174.3	+0.90	+0.31	L71B	
	<i>N</i> = 4		0.431	3.5	308.0	185.6	--	--	L71B	
			0.36	0.3	287	188.8	--	--	KL (2)	
	<i>N</i> = 9		0.26	5.7	296.9	188.8	--	--	NL (61.3.3)	
	<i>N</i> = 3		0.42	2.9	304.3	181.6	--	--	MP	
	<i>N</i> = --		0.288	1.0	291.0	196.6	--	--	ZS	
	<i>N</i> = 63		0.325	6.4	310.6	183.3	+06.8		ZS73	
			0.222	9.8	299.7	202.6	-03.8		ZS73	
	<i>N</i> = 24		0.312	8	315.7	198.1	-07.7		ZS73	
	<i>N</i> = 23		0.403	0.0	121.8	183.6	+03.7		W57	
	<i>N</i> = 3		0.42	5.2	285.8	182.6	+03.7		W54	
	<i>N</i> = --		0.384	6	284	170.6	+03.7		T89 (14Q)	
	<i>N</i> = --		0.498	0.3	109.4	162.3	-02.3		T89 (14S)	
	<i>N</i> = --		0.359	9.1	93.4	188.3	-05.3		T89 (19Q)	
	<i>N</i> = --		0.397	3.4	114.4	179.3	-11.3		T89 (19S)	
	<i>N</i> = --		12.3	4.126	105.4	175.2				

Table 7 (cont.)

March

Code	Name	a	q	i	ω	Dates (2000)	Node	Peak	λ_{\odot}^{\max}	χ	W	ZHR ^{max}	Notes
								R.A.	Decl.	$\Delta R.A./\Delta\lambda$	$\Delta\text{Decl.}/\Delta\lambda$	V_g	Δ_{C-E}
N=2	2.93	0.41	1	105	177.7	183.6	-03.3					27.8	GE (3,17)
N=-	2.70	0.45	2	102	170.7	176.6	-00.3					29	JW
Parent?	<i>(Epoch 2005-07-14)</i>												
(1766)	2.665	0.406	2.419	106.503	148.300	157.4	+7.1					28.61	0.1290
(2004)	2.658	0.362	0.187	111.648	153.774	165.3	+6.1					30.01	0.0192
(2047)	2.618	0.327	0.076	115.777	150.814	164.1	+6.1					31.07	0.0051
#38	CUR	ξ -Ursae Majorids			03/18-04/03	Mar. 19	358.0				(6)	-	-
N=3	2.899	0.803	12.6	238.5	358.0	175.4	+30.1					18.9	This work
N=1	3.780	0.810	12.6	234.8	358.0	172.4	+30.3					18.88	HV6915
N=1	2.908	0.783	11.5	240.4	358.4	175.4	+26.1					18.59	HV6971
N=1	2.553	0.804	19.3	238.4	360.2	187.4	+36.9					19.42	HV7040
#290	(ALL)	α -Leonids											
#39	NAL	N. α -Leonids			02/25-03/25	Mar. 07	349				(11)	-	-
N=3	2.016	0.907	6.9	43.3	173.9	158.7	+31.0			+0.4		11.1	This work
N=23	1.978	0.878	5.8	226.0	343.9	146.6	+31.3					12.3	ZS
N=10	1.691	0.814	8.5	241.8	350.2	167.2	+28.0					13.9	ZS
N=-	2.721	0.793	9.4	240.0	2.7	176.3	+22.7					-	GK
N=1	2.638	0.912	7.0	218.2	2.5	160.2	+30.2					13.00	HV3076
N=1	2.835	0.971	5.7	201.9	12.1	151.7	+33.6					10.68	HV10394
N=19	1.119	0.853	2.4	256.4	2.6	181.3	+10.4					7.3	ZS
Fireballs	AD 1071-1188:			03/22-03/30		111	+27					-	AT (9)
#125	SAL	S. α -Leonids			02/25-04/24	Mar. 19	359				(11)	-	-
N=5	2.016	0.907	6.9	221.8	358.8	141.8	-07.0			+1.1	+0.0	11.9	This work
N=-	2.313	0.904	10.5	40.3	168.0	131.6	-12.2					13.2	T89 (16)
Visual				03/13-03/23		148.2	-05.4					-	M (#71)
#126	SGE	March δ -Geminids			03/22-04/15	Mar. 21	361				(10)	-	-
N=2	1.66	0.94	2.1	32.8	152.9	114.5	+12.2					8.0	This work
N=1	2.054	0.996	0.7	182.9	1.4	104.4	+28.1					4.9	IAU#332F1
Fireballs	AD 1062-1188:					112.7	+20.9					-	AT (1)

Table 7 (cont.)

April

Code	Name	a	q	i	ω	Dates (2000)	Node	Peak R.A.	λ_{\odot}^{\max} Decl.	χ $\Delta R.A./\Delta\lambda$	W $\Delta\lambda/\Delta\lambda$	ZHR^{\max} V_g	Notes
(1803)												~ 860	
$N = -$	45.7	0.921	79.6	214.3	31.8	272.0	31.950	$-$	$-$	$-$	$-$	46.6	DMS
$N = -$	31.61	0.918	79.61	214.53	32.439	271.6	+33.3	$-$	$-$	$-$	$-$	46.5	AW
dispersion (σ)	$-$	± 0.013	± 1.1	± 2.6	± 1.0	$-$	$-$	$-$	$-$	$-$	$-$	$-$	$-$
$N = 4$	Inf.	0.928	80.3	212.0	32.6	272.7	+33.7	$-$	$-$	$-$	$-$	47.6	PG
$N = 7$	56.0	0.918	79.5	214.5	32.2	271.9	+33.3	$-$	$-$	+1.23	+0.17	47.07	KP
$N = 5$	28	0.919	79.0	214.3	32.5	271.9	+33.6	$-$	$-$	+1.1	+0.0	47.6	AC
$N = 5$	25.812	0.879	78.6	217.2	32.3	271.5	+34.0	$-$	$-$	$-$	$-$	45.6	JW
Parent	$C/1861 G_1$ (Thatcher)						$\lambda_{\odot} = 31.48$	$T_J = +0.30$	$H_{10} = +5.5$ ($n=4.0$), $P=415.5$ yr				
(1861)	55.682	0.9225	79.776	213.484	31.860	271.9	+33.5	$-$	$-$	$-$	$-$	47.08	0.002
#132	BPA	β -Pavonids			03/11-04/16	Apr. 07	17.2	$-$	$-$	$-$	(14)	$-$	IMO
Visual	Inf.	0.992	108.8	349.2	$\lambda_{\odot} = 17.2$ 197.7	308.0	-63.0	+1.40	+0.20	$-$	$-$	59	This work
#46	BCR	β -Craterids			04/01-04/06	Apr. 03	13.5	$-$	$-$	$-$	(2)	$-$	Antihelion
$N = 1$	2.716	0.678	17.6	75.6	191.7	176.8	-26.9	$-$	$-$	$-$	$-$	22.6	HV10365
$N = 1$	2.804	0.734	16.5	68.1	196.6	176.5	-28.3	$-$	$-$	$-$	$-$	21.0	HV10478
#27	KSE	κ -Serpentids			04/01-04/07	Apr. 05	15.7	$-$	$-$	$-$	(3)	< 4	AC
$N = -$	Inf.	0.45	65	275	15.7	230.6	+17.8	$-$	$-$	$-$	$-$	45	AC
$N = 1$	41.7	0.417	63.0	279.9	16.5	232.6	+15.4	$-$	$-$	$-$	$-$	45.01	HV10098
#49	LVI	λ -Virginitids			03/03-04/24	Apr. 10	20	$-$	$-$	$-$	(21)	$-$	$-$
		= extension of η -Virginitids?											
$N = -$	2.188	0.257	8.8	306.1	24.5	218.7	-16.2	$-$	$-$	$-$	$-$	32.2	T89 (23)
$N = -$	2.630	0.343	2.0	295.0	20.2	210.7	-10.2	$-$	$-$	$-$	$-$	26.8	L71B
$N = -$	2.374	0.426	4.6	106.0	201.7	205.7	-16.3	$-$	$-$	$-$	$-$	27.0	T89 (24)
$N = 12$	1.731	0.344	14.1	298.7	17.7	214.0	-01.3	$-$	$-$	$-$	$-$	28.6	Z73

Table 7 (cont.)

April

Code	Name	a	q	i	ω	Dates (2000)	Node	Peak R.A.	λ_{\odot}^{\max} Decl.	χ $\Delta R.A./\Delta \lambda$	W $\Delta \text{Decl.}/\Delta \lambda$	ZHR^{\max} V_g	Notes Δ_{C-E}
#21	AVB α -Virgins <i>= ecliptic antihelion source meteors</i>					03/22-04/26		Apr. 18	28	\sim	\sim 8.6	\sim 5	RK
	$N =$	2.58	0.688	4.2	240.4	21.7	185.4	+09.6				16.8	SH
	$N =$	19	2.349	0.753	247.5	28.9	195.6	-05.3				16.6	L71B
	$N =$	21	2.56	0.812	239.7	31.8	195.6	+00.7					L71A
	Parent?	1998 SH ₂			(Epoch 1998-09-21)				$\lambda_{\odot} = 28.95$	$T_J = +2.93$	$H_N = +20.81$		PW'04
	(1998)	2.703	0.760	2.401	245.257	28.946	195.9	-01.9				18.05	0.0110
#137	PPU π -Puppids					04/15-04/28		Apr. 22	33.6	2.0	(5)	<1	PJ
	Outbursts (see Tab. 6e)												
	Visual	2.97	1.00	21	359	33.640	110.4	-45.1		+0.40	-0.10	15	PJ
	Parent	26P/Grigg-Skjellerup			(Epoch 1977-04-07)				$\lambda_{\odot} = 33.354$	$T_J = +2.81$	$H_{10} = +11.7$		
	(1977)	2.999	1.006	21.098	359.311	213.354	109.8	-45.0		+0.46	+0.12	15.10	+0.0122
	(2002)	2.736	1.005	22.347	1.624	211.740	110.8	-48.5				15.46	+0.1127
	(2044)	2.779	1.005	22.397	2.243	211.470	111.5	-48.5				15.54	+0.0881
#138	ABO α -Bootids					04/14-05/12		Apr. 28	36.7				
	Outburst	Telescopic						1984 Apr. 28	38.168	\geq 4	0.016	High rate	
	(1984)	(155)	0.775	20.2	237.4	38.168	214.4	+19.3				(24.65)	Ch. 13
	$N =$	5	2.680	0.839	232.5	22.1	193.1	+22.9				16.7	PG
	$N =$	8	2.647	0.753	246.9	36.9	218.6	+18.8		+0.7	+0.2	20	L72B
	$N =$	2	2.02	0.73	252.7	23.3	210.7	+21.0				22.9	SH
	?Fireballs	AD 1023-1099:			04/10-04/16		234	+30					AT (13)
#47	DLI μ -Virgins					04/01-05/12		Apr. 28	39 \pm 2	3.0	14 \pm 3	1.1 \pm 0.5	PJ
	$N =$	3	2.531	0.418	286.5	38.3	226.8	-08.7				28.3	PG
	$N =$	7	3.116	0.477	280.0	35.7	221.7	-05.2		+0.50	-0.19	26.8	L71B
#139	GLI γ -Librids					03/24-05/07		Apr. 28	39 \pm 2	3.0	14 \pm 3	1.1 \pm 0.5	PJ
	$N =$	38	0.926	0.191	326.7	15.9	223.9	-12.8				26.0	ZS
	$N =$	17	1.570	0.410	113.7	225.5	234.1	-19.7				24.7	ZS73

Table 7 (cont.)

May

Code	Name	a	q	i	ω	Dates (2000)	Node	Peak R.A.	λ_{\odot}^{\max} Decl.	χ $\Delta R.A./\Delta \lambda$	W $\Delta \text{Decl.}/\Delta \lambda$	ZHR ^{max} V_g	Notes Δ_{C-E}
$N=11$	29.8	0.612	165.5	101.5	45.79	338.02	-01.75	+0.888	+0.456	-	-	L	
$N=9$	5.536	0.587	164.6	96.7	47.8	339.0	-00.9	-	-	-	-	65.0	ZS73
$N=51$	3.34	0.54	161	90	47.7	338.6	+00.8	-	-	-	-	63	KL (17)
$N=1$	13.0	0.560	163.5	95.2	43.1	336.8	-01.3	-	-	-	-	65.5	JW
$N=-$	6.140	0.541	165.4	91.4	45.5	339.1	-01.5	-	-	-	-	64.8	G
<i>Parent IP/Halley (Epoch 1986-02-19)</i>													
(1986)	17.940	0.587	162.687	98.605	46.211	338.2	-0.3	-	-	-	-	65.93	0.0658
#145	η-Lyrids				05/07-05/12	May 10	49.1	-	(2)	-	-	3 ± 1	
$N=12$	6.03	0.995	79.4	190.0	45.7	292.5	+39.7	-	-	-	-	3 ± 1	
$N=5$	Inf.	0.998	75.3	193.0	50.3	290.8	+42.7	-	-	-	-	45.3	KO
σ	± 0.042	± 0.002	± 1.4	± 1.0	± 1.0	± 1.0	± 0.8	-	-	-	-	± 0.8	
?Fireballs AD 1049-1070:													
<i>Parent C/1983 H₁ (IRAS-Araki-Alcock) (Epoch 1983-05-12)</i>													
(1983)	98.098	0.997	73.252	192.852	49.102	288.0	+44.0	-	-	-	-	43.77	0.0058
#146	CAU β-Coronae Australids				04/23-05/30	May 15	54.7	-	(11)	-	-	<3	PJ
Visual	(12.1)	0.221	121.7	125.3	234.7	285.1	-39.9	+1.10	+0.00	-	-	56.4	IMO
Visual				04/28-05/05		285.7	-36.9						M (#208)
#147	PAQ ϕ-Aquirids				05/19-05/23	May 21	60	-	(2)	-	-	-	
$N=-$	2.78	0.56	174.1	270.4	239.7	350.9	-3.5	-	-	-	-	64	NL (5.12)
#148	MLV May (λ-)Virgnids				05/05-05/06	May 06	45	-	(2)	-	-	-	Antihelion
$N=-$	3.232	0.547	13.3	90.5	223.4	217.7	-31.2	-	-	-	-	25.6	T89 (28S)
$N=-$	6.705	0.686	3.5	72.0	225.2	210.7	-18.2	-	-	-	-	25	L71B
$N=-$	2.157	0.482	1.3	101.4	224.3	227.7	-19.2	-	-	-	-	24.6	T89 (28Q)
#55	ASC α-Scorpiids				04/21-05/26	May 16	55.2 \pm 0.9	2.5	4.9 \pm 1.1	-	-	3.2 \pm 0.4	PJ
$N=3$	2.640	0.330	9.8	116.5	236.8	247.0	-28.8	+0.73	-0.07	-	-	31.0	PG
$N=-$	2.469	0.324	8.9	117.7	233.1	243.8	-28.1	-	-	-	-	30.6	T89 (31)

N = 2	2.235	0.212	3.5	132.0	230.2	247.8	-24.1	-	-	33	L71B
N = 22	1.502	0.264	3.5	130.0	237.8	255.1	-25.2	-	-	29.0	ZS
N = 29	1.458	0.243	0.6	132.9	232.5	251.1	-22.7	-	-	29.4	ZS73
N = 3	2.097	0.189	2.3	136.7	217.0	238.7	-21.1	-	-	32.1	L71B
N = 5	2.15	0.21	3	134	222.7	240.7	-22.1	+0.50	-0.19	35	AC
N = 30	1.464	0.283	13.5	308.3	58.4	257.1	-13.2	-	-	28.7	ZS
N = 27	1.707	0.282	7.4	306.2	56.9	253.2	-17.3	-	-	29.7	ZS73
N = 4	2.33	0.26	6.0	305.9	61.4	255.9	-19.2	-	-	32.5	NL (61.5.10)
N = 3	2.170	0.133	10.0	322.0	44.7	247.7	-18.1	-	-	36.3	L71B
Fireballs	AD 988-1068:			05/25-06/01		240.7	-20.1	-	-	-	AT (18)
Parent?	2004 BZ ₇₄	(Epoch 2006-03-06)					$\lambda_{\odot} = 59.36$	$T_J = +2.37$	$H_N = +18.39$		
(2006)	3.048	0.330	16.506	115.415	239.509	249.3	-34.0	-	-	32.19	0.0289
#292	(OPH)	May Ophiuchids									
#149	NOP	N. May Ophiuchids		04/25-05/31	May 13	49.7			(14)	-	-
		= ecliptic antihelion source									
#150	SOP	S. May Ophiuchids		04/25-05/31	May 20	56.7	-14.0	+0.90	-0.10	27.8	IMO
		= ecliptic antihelion source							(14)	-	-
#151	EAU	ε -Aquilids		05/09-05/22	May 20	59	-24.0	+1.00	+0.00	27.8	IMO
N = 17	0.873	0.354	59.6	318.3	59.5	284.9	+15.6	-	(5)	-	-
N = 30	0.89	0.65	67	309	48.7	291.5	+29.1	-	-	30.8	ZS
N = 16	0.78	0.41	68	327	55.7	293.5	+22.1	-	-	32.1	KL (9)
										31	KL (15)
											Helion
#293	(DCE)	Daytime ω -Cetids									
#152	NOC	N. Daytime ω -Cetids		04/24-05/27	May 07	46.7			(12)	<2	
		= ε -Arietids									
N = 86	1.27	0.10	27	28	32.7	356	+08.3	-	-	35.3	KL (3)
N = 16	0.967	0.108	42.0	25.6	47.8	2.3	+17.8	-	-	33.0	ZS
N = 18	1.412	0.147	29.1	35.9	48.0	12.8	+19.3	-	-	34.1	ZS
N = 17	1.64	0.11	30	32	52.7	17.7	+19.3	-	-	37.4	KL (13)
N = 3	1.01	0.08	15.5	22.8	62.1	24.4	+11.8	-	-	32.8	NL (61.5.13)
N = 10	2.44	0.17	10.2	42.6	64.4	37.7	+20.0	1.7	-	35.8	NL (61.5.3)

Table 7 (cont.)

May

Code	Name	q	i	ω	Dates (2000)	Node	Peak R.A.	λ_{\odot}^{\max} Decl.	χ $\Delta R.A./\Delta \lambda$	W $\Delta \text{Decl.}/\Delta \lambda$	ZHR^{\max} V_g	Notes
Parent? (2003)	$C/2003 Q_1$ (SOHO) (1.64)	0.032	29.33	52.38	(Epoch 2003-08-21)	43.43	17.5	$\lambda_{\odot} = 43.4$ +20.5	$T_J = (+3.37)$	$H_{10} = -$	42.31	0.165
#153	OCE S. Daytime ω -Cetids			05/05-06/09			May 07	46.7	$-$	12 ± 2	~ 8	Ch. 23
$N = 970$	1.583	0.133	37.1	214.9		225.0	19.0	-7.0	+0.80	+0.38	36.5	GB
σ	$-$	± 0.035	± 7.5	± 6.0		± 7.9	± 3.3	± 2.1	± 0.02	± 0.01	± 2.6	
$N = 11$	1.623	0.122	32.6	213.9		228.6	22.5	-03.6	$-$	$-$	36.6	ZS
$N = 11$	1.055	0.066	36.3	200.2		246.8	29.7	+01.5	$-$	$-$	34.6	ZS73
$N = 3$	1.41	0.13	33.8	212.5		245.6	36.1	+01.2	$-$	$-$	35.7	NL (61.5.8)
radar	1.3	0.11	34	211		238.7	29.6	-03.5	$-$	$-$	36.7	L54
#154	DEA Daytime ε -Arietids			05/04-06/06			May 16	55	$-$	(13)	<4	
	$=$ ecliptic helion source											
$N = 25$	2.026	0.592	2.8	90.0		48.1	44.7	+21.2	$-$	$-$	20.6	ZS
$N = 6$	2.08	0.60	2.7	89.5		63.0	59.5	+23.8	+1.2	$-$	21.0	NL (61.5.5)
Parent? (2005)	2002 SY ₅₀ 1.706	0.530	8.291	80.484	(Epoch 2005-08-18)	53.030	42.1	$\lambda_{\odot} = 53.05$ +27.5	$T_J = +3.87$	$H_N = +17.57$	21.48	0.0481
#294	(DMA) Daytime May Arietids			05/04-06/06			May 16	55	$-$	(13)	<4	
#155	NMA N. Daytime May Arietids			05/04-06/06								
	$=$ Daytime May Piscids, part of Taurid complex, twin of SOA											
$N = 56$	1.532	0.33	3.4	60.8		55.0	37.2	+18.1	$-$	$-$	25.2	ZS
$N = 11$	1.56	0.39	2.9	64.8		62.8	47.2	+19.3	+1.0	$-$	24.4	NL (61.5.2)
$N = 16$	1.94	0.44	6	74		54.7	41.7	+23.2	$-$	$-$	24.6	KL (10)
Parent?? (2003)	2003 QC ₁₀ 1.376	0.369	2.469	59.722	(Epoch 2003-08-27)	60.960	43.4	$\lambda_{\odot} = 60.96$ +19.1	$T_J = +4.48$	$H_N = +17.83$	23.98	0.0773
#156	SMA S. Daytime May Arietids			05/04-05/27			May 16	55	$-$	$-$	<2	
	$=$ part of Taurids complex, twin of NOA											
$N = 43$	1.68	0.27	5	233		232.7	33.7	+09.2	$-$	$-$	28.9	KL (11)
$N = 6$	3.23	0.35	12.5	243.7		242.6	48.5	+08.3	+1.9	-1.2	31.8	NL (61.5.9)
$N = 9$	1.39	0.22	16.7	224.1		244.7	41.3	+05.8	+1.4	$-$	30.1	NL (61.5.6)

#157	ICA	<i>i</i> -Cassiopeids	05/09–06/01	May 23	62	–	(9)	–	–	
	<i>N</i> = –	2.265	128.1	43.1	+69.2	–	–	–	–	T89
	<i>N</i> = 30	1.099	90.5	33.4	+66.7	–	–	–	–	ZS
#52	OUM	<i>ω</i> -Ursae Majorids	05/07–06/05	May 23	62	–	(12)	–	–	SH
	<i>N</i> = 5	2.93	170.5	174.7	+66.7	–	–	–	(27.1)	BL71A
	<i>N</i> = 11	1.971	170.8	172.4	+66.7	–	–	–	27.1	ZS73
<i>June:</i>										
#65	GDE	<i>γ</i> -Delphinids	06/01–06/20	June 11	80.4	–	(8)	–	–	Apex
	Outburst	51 meteors		1930 June 11	80.42	–	0.010	–	>200	PJ
	(1930)			λ_{\odot} = 80.42	312.6	–	–	–	~60	PJ
	<i>N</i> = 6	1.041	280.1	87.0	+12.2	–	–	–	55.7	ZS
	<i>N</i> = 2	3.4	286	81.7	+06.2	–	–	–	55.9	GE (6.36)
	<i>N</i> = 2	2.9	261	82.7	+12.2	–	–	–	57.9	GE (6.37)
	<i>N</i> = 1	10.666	271.7	75.0	+03.9	–	–	–	60.48	HV7758
	<i>N</i> = 1	9.277	249.9	82.7	+11.2	–	–	–	61.8	HV7873
#158	CET	<i>π</i> -Cetids	06/18–07/04	June 28	95.0	(6)	5.6	–	4	PJ
	Outburst	J. C. Bennett, 20 meteors		1977	96.63	–	–	–	–	Ch. 13
	(1977)			λ_{\odot} = 96.63	30.6	–	–	–	~3.4	–
	Visual	(55.5)	322.6	275.7	–11.7	–	–	–	66.8	PJ
	<i>N</i> = 2	3.2	297	262.7	–06.7	–	–	–	65	GE (6.41)
	Parent?	<i>C/1874 G₁ (Winnecke)</i>	(Epoch 1874-05-14)		λ_{\odot} = 95.85	T_J = –0.94, H_{10} = +5.0 (<i>n</i> = 4.0), <i>P</i> = unknown	–	–	67.93	0.0671
	(1874)	(103)	148.41	331.717	–10.9	–	–	–	–	–
#159	TAQ	<i>τ</i> -Aquiriids	06/27–07/06	June 29	97.3 ± 0.5	2.5	2.6 ± 0.6	7.1 ± 1.6	–	PJ
	Visual	(Inf.)	101.6	277.3	–11.5	1.0	+0.4	(64.3)	–	PJ
	Visual		07/1–07/12	340.3	–11.5	–	–	–	–	M (#276)
#160	(OSC)	<i>ω</i> -Scorpiids	05/23–06/15	June 03	71.9 ± 0.4	3.0	4.3 ± 1.2	5.2 ± 1.4	–	Antihelion
		= ecliptic antihelion source meteors = <i>χ</i> -Scorpiids								PJ
#66	NSC	<i>N. ω</i> -Scorpiids	05/23–06/15	June 01	70	–	(9)	–	~5	GK
	<i>N</i> = 32	2.116	261.4	73.6	–15.3	–	–	–	19.6	ZS
	<i>N</i> = 17	1.943	265.4	65.9	–10.8	–	–	–	19.9	ZS73

Table 7 (cont.)

June

Code	Name	a	q	i	ω	Dates (2000)	Node	Peak R.A.	λ_{\odot}^{\max} Decl.	χ $\Delta R.A./\Delta\lambda$	W $\Delta\lambda/\Delta\lambda$	ZHR^{\max} V_g	Notes Δ_{C-E}
$N=11$	3.11	0.68	6	257	74.7	247.7	+0.9	21	AC				
$N=11$	3.112	0.679	6.0	256.7	74.6	246.7	-	20.1	L71B				
$N=4$	2.63	0.755	3.3	249.1	70.5	238.7	-	21	L71A				
Fireballs	AD 1037-1102:			06/07-06/19		260.7	-11.0		AT (21)				
Parent?	1996 JG	(Epoch 2005-01-30)											
(2005)	1.802	0.611	5.200	269.733	63.370	242.5	-13.2	20.0	0.0164				
#161	SSC	S. ω-Scorpiids		05/23-06/15	June 01		70	~5	GK				
		= θ -Librids		06/01-06/10	251.5	-22.2			M (163)				
$N=-$	2.852	0.693	1.7	74.7	250.0	243.7	+0.90	23.0	GK				
Fireballs	AD 995-1076:			06/14-06/19		246.8	-26.1		AT (18)				
#61	TAH	τ-Herculids		05/19-06/14	June 03		72	<2					
Outbursts	(see Tab. 6g)												
$N=14$	2.695	0.970	18.6	204.2	72.6	228.5	+39.8	15	L71B				
$N=8$	2.90	0.986	20.7	203.6	80.8	236.4	+40.8		L71A				
Parent	73P/Schwassmann-Wachmann 3			(Epoch 1930-07-03)									
1930 VI	3.081	1.006	17.384	192.021	78.024	219.7	+44.6	13.79	0.0056				
(2022)	3.092	0.983	11.296	202.176	67.023	210.0	+27.4	12.36	0.0139				
(2027)	3.060	0.921	6.276	218.183	48.681	200.4	+10.2	13.50	0.0068				
(2049)	3.039	0.899	6.329	222.453	44.645	200.0	+09.3	14.25	0.0134				
#162	ACI	α-Circinids		06/04-06/04	June 04		73.9	-					
Outburst	Belinda Bridge												
(1977)	(100)	0.855	33.4	46.8	253.92	1977 June 04	74.02	>100	PJ				
#163	(SAG)	μ-Sagittariids		04/21-07/12	June 28		97	(27.1)	PJ				
		= Ophiuchids, ecliptic antihelion source						(2.3)					
#67	NSA	N. μ-Sagittariids		05/26-07/10	June 09		78.0	1.5	RK				
		= θ -Ophiuchids, ecliptic antihelion source											
$N=-$	2.390	0.566	4.5	271.2	91.7	271.9	-17.3	22.9	PG				

$N=28$	2.224	0.503	0.3	279.3	86.2	270.3	-23.1	-	-	24.3	ZS
$N=-$	2.415	0.544	3.2	274.8	87.5	270.7	-20.0	-	-	23.4	T89 (33)
$N=30$	1.858	0.665	1.5	263.3	99.4	275.5	-20.9	-	-	18.3	ZS
Parent?? (1770)	<i>(Epoch 1770-08-14)</i>										
	3.15	0.674	1.325	256.400	103.095	275.6	$\lambda_{\odot}=101.1$ -21.3	$T_J=+2.61$	$H_0=-$	20.94	0.0143
#69	SSG	S. μ-Sagittariids									
		= θ -Ophiuchids, ecliptic antihelion source									
$N=-$	2.142	0.650	2.6	84.3	279.4	276.4	-27.5	+0.73	+0.07	19.6	PG
$N=4$	2.33	0.52	1.0	97	260.7	262.8	-25.0	-	-	23.5	GE (6.01)
$N=4$	2.90	0.460	4.2	101.4	263.0	267.8	-28.0	-	-	26.7	CL
$N=31$	1.908	0.384	2.5	113.8	271.1	283.3	-25.1	-	-	26.8	ZS
$N=11$	1.981	0.430	3.9	108.4	280.2	290.8	-26.0	-	-	25.6	ZS
$N=6$	2.797	0.405	4.7	108.0	258.7	266.8	-28.0	-	-	28	L71B
$N=3$	2.08	0.52	5.0	97.0	266.0	268.0	-27.7	-	-	23.3	NL (61.6.9)
Fireballs	AD 1080-1098:										
Visual	06/22-07/17										
Visual	06/28-07/05										
Visual	06/08-06/15										
#295	(JAQ)	June Aquilids									
#164	NZC	N. June Aquilids									
$N=19$	1.364	0.150	45.0	325.0	81.7	292.7	-04.9	-	(9)	3	JVF
$N=35$	1.348	0.114	39.3	329.5	86.5	298.3	-07.1	-	-	37.0	ZS
$N=11$	1.143	0.152	43.1	326.7	99.7	311.1	+0.7	-	-	36.3	ZS
$N=13$	1.5	0.15	39.5	324.0	80.7	290.4	-05.8	-	-	33.8	ZS
$N=2$	1.8	0.18	37.9	318	78.7	285.7	-05.9	-	-	36.3	GE (6.09)
$N=4$	1.61	0.11	40.1	328.9	85.0	294.6	-08.3	-	-	36.3	GE (6.33)
Visual	06/10-06/19										
#165	SZC	S. June Aquilids									
		= alpha Microscopiids									
$N=4$	1.15	0.11	33.5	152	259.7	297.8	-33.9	-	-	38.5	NL (61.6.4)
#166	JLY	June Lyrids									
		= ξ -Draconids									
Outburst (1966)				06/11-06/21	85.167	280.3	+30.0	2.7	23	17	M96
(1996)	(100)	0.994	52.2	196.9	85.167	280.3	+55.0	-	-	-	Ch. 13
										(33.4)	Ch. 13

Table 7 (cont.)

June

Code	Name	a	q	i	ω	Dates (2000)	Node	Peak R.A.	λ_{\odot}^{\max} Decl.	χ $\Delta R.A./\Delta\lambda$	W $\Delta\lambda/\Delta\lambda$	ZHR^{\max} V_g	Notes
(1966)		(10)	0.84	50	231		84.5	278.4	+35.0	--	--	(31)	AC
$N=11$		2.054	0.912	45.3	224.1		86.2	281.9	+43.8	--	--	27.1	ZS
$N=-:-$		3.58	0.98	50	201		64	276.3	+52.0	--	--	32.4	T68
$N=-:-$		Inf.	0.98	56	202		76	275.3	+50.0	--	--	39.3	T68
#296	<i>(SIS)</i>												
#167	σ -Sagittariids												
	N. σ -Sagittariids					06/01-07/28		June 24	92.3	--	(23)	--	
	= ρ -Sagittariids												
$N=45$		1.133	0.332	8.2	309.4		92.3	293.1	-14.0	--	--	23.2	ZS
$N=4$		1.72	0.38	4.5	296.6		86.6	278.4	-20.0	1.3	--	26.5	NL (61.6.6)
$N=18$		1.970	0.386	3.9	293.3		73.1	263.5	-19.8	--	--	27.1	ZS73
$N=4$		2.811	0.430	13.0	284.2		86.5	275.4	-11.0	--	--	28	L71B
<i>Parent?</i>	$2001 ME_1$					(Epoch 2005-01-30)			$\lambda_{\odot}=93.13$	$T_J=+2.67$	$H_N=+16.81$		
(2005)	2.651		0.356	5.748	293.601		93.132	284.6	-18.1	--	--	29.70	+0.011
#168	SSS					06/01-07/28		June 18	87	--	(23)	--	
	S . σ -Sagittariids												
	= γ -Sagittariids												
$N=29$		2.594	0.361	2.8	113.6		267.4	278.6	-25.3	--	--	29.3	ZS73
$N=2$		2.2	0.26	5.8	127		260.7	278.8	-27.0	--	--	31	GE (6.22)
$N=3$		3.33	0.33	4.1	113.7		265.7	276.0	-24.5	--	--	31.1	NL (61.6.10)
Fireballs	AD 1038-1078:				05/25-05/31			273.7	-28.0	--	--	--	AT (17)
#169	SCU					06/07-07/22		June 27	94.9	--	(18)	--	
	Scutids												
$N=32$		1.361	0.599	13.7	278.8		95.6	281.7	+00.9	--	--	18.9	ZS
$N=9$		1.367	0.615	10.3	276.8		93.4	277.4	-06.4	--	--	17.5	ZS73
$N=2$		2.126	0.606	15.5	268.5		97.7	279.3	-02.0	--	--	18.9	L71B
#63	COR					06/04-06/30		June 26	94.9	--	--	--	
Outburst	seen by C. Hoffmeister						1937, June		$\lambda_{\odot}=94.9$	1.9	(10)	13	H48
(1937)	(3.0)		1.013	3.1	7.7		274.9	192.6	-19.4	--	--	--	H48
$N=-:-$		3.00	1.014	2.9	7.1		275.0	191.4	-18.2	--	--	9.10	KP

visual	2.5-10	1.012	3.5	7.7	274.9	192.6	-19.4	-	-	10 ± 2	AC
(1953)	2.90	0.99	0.0	201	82.7	206	-09	-	-	10.0	HV7862
?Fireballs	AD 1079-1111:			06/20-06/21		214	-14	-	-		AT (22)
Parent?	2004 HW			(Epoch 2006-03-06)			$\lambda_{\odot} = 77.41$	$T_J = +3.04$	$H_N = +17.13$		
(2006)	2.689	0.977	0.666	25.406	257.290	205.0	-13.0	-	-	10.23	0.0088
#170	JBO	June Bootids		06/26-06/30		June 28	96.3	-	(1.6)	<1	
		Outbursts (see Tab. 6b)									
(1998)	3.3	1.016	18.4	183.65	96.046	222.88	+47.90	-	-	14.1	EN270698
Error	±0.3	±0.000	±0.4	±0.07	±0.000	±0.16	±0.06	-	-	±0.4	
(1998)	-	-	-	-	96.30	219.0	+49.0	+0.60	-0.40	13.9	TOM
(1995)	3.157	1.016	26.7	182.1	92.633	237.6	+59.5	-	-	17.8	JN950624
N = -	2.140	1.004	18.4	194.2	75.8	229.4	+49.8	-	-	12.8	T89 (34)
N = 54	2.479	1.000	21.7	168.0	91.2	208.9	+65.7	-	-	15.1	ZS
(1952)	2.89	1.01	21	189	83.7	227.4	+50.8	-	-	14.8	HV4106
Parent	7P/Pons-Winnecke			(Epoch 1915-09-20)			$\lambda_{\odot} = 100.52$	$T_J = +2.67$	$H_{10} = +7.2$ (var.)		
(1915)	3.261	1.013	18.305	172.414	100.518	208.9	+53.0	-	-	14.24	-0.0419
(1995)	3.435	1.013	22.301	172.648	93.098	214.0	+61.1	-	-	16.05	0.2422
(2039)	3.359	1.016	17.194	177.484	89.230	207.6	+51.8	-	-	13.62	0.0339
#171	ARI	Daytime Arietids		05/22-07/02		June 07	76.7	2.7	6.6 ± 2.0	54 ± 12	Helton
N = 1	2.581	0.064	36.963	25.376	(80.411)	44.9	+25.7	-	-	42.1	PJ
N = 48	1.376	0.085	25.0	25.9	77.6	40.2	+23.8	-	-	35.7	U
N = 55	1.750	0.094	27.9	29.5	78.7	43.7	+25.9	-	-	37.6	ZS
N = 32	2.0	0.08	17.4	28	81.7	49.7	+23.2	-	-	39.4	ZS73
N = 380	1.67	0.10	18.7	29.9	77.3	44.0	+23.1	-	-	36.9	GE (6.05)
N = 7	2.27	0.05	38.9	20.3	85.3	47.3	+25.2	+1.5	-	42.8	KL (14)
N = 8	1.49	0.06	33.4	23.0	85.5	46.8	+26.3	-	-	38.8	NL (61.6.1)
(1951)	1.61	0.090	21	29	77.5	44.1	+24.1	+0.70	+0.60	37	NL (61.6.2)
(1950)	1.49	0.10	18	29	77.7	44.5	+22.1	-	-	36	L54
Parent	Marsden-group of Sun skirrers			(Epoch 2004)			$\lambda_{\odot} = 81.5$	$T_J \sim +1.8$	$H_{10} > +1.8$		
(2004)	Inf.	0.0480	26.800	23.240	81.460	49.3	+23.2	-	-	45.68	0.006
(2004)	3.33	0.0483	26.800	23.240	81.460	47.8	+23.5	-	-	43.03	0.000

Table 7 (cont.)

June

Code	Name	a	q	i	ω	Dates (2000)	Node	Peak	λ_{\odot}^{\max}	χ	W	ZHR ^{max}	Notes
								R.A.	Decl.	$\Delta R.A./\Delta\lambda$	$\Delta\text{Decl.}/\Delta\lambda$	V_g	Δ_{C-E}
#172	ZPE				05/20–07/05			June 09	78.6	2.7	(18)	~20	
		<i>= part of Taurid complex, twin of STA</i>											
$N=1$	1.283	0.2860	5.506	50.012	(80.414)	58.3	+24.7	–	–	–	–	26.2	U
$N=56$	1.492	0.365	6.5	60.5	81.5	64.5	+27.5	–	–	–	–	25.1	ZS
$N=73$	1.918	0.319	5.3	59.2	78.3	61.1	+24.9	–	–	–	–	29.3	ZS73
$N=6$	1.72	0.30	7.1	69	81.7	65.8	+27.1	–	–	–	–	27.8	GE (D.01)
$N=27$	1.72	0.31	4.8	56	71.7	51.7	+22.2	–	–	–	–	27.8	NL
$N=57$	1.74	0.33	3.2	59	73.7	55.7	+21.2	–	–	–	–	26.8	BF66
$N=60$	1.55	0.31	5.7	57.0	71.3	52.2	+23.1	–	–	–	–	27.6	KL (12)
$N=9$	1.67	0.30	5.7	55.4	84.5	65.0	+25.5	–	–	–	–	28.4	NL (61.6.3)
$N=--$	2.33	0.35	8.0	61	77.0	63.8	+27.1	+1.1	+0.4	+0.4	+0.4	28.8	L54
Parent?	2P/Encke	<i>(Epoch 1974-04-23)</i>											
(1974)	2.217	0.338	5.793	62.907	98.539	85.6	+28.0	–	–	–	–	29.18	0.1778
#173	BTA				06/05–07/17			June 28	96.7	–	(17)	~10	
		<i>= part of Taurid complex, twin of NTA</i>											
$N=41$	1.653	0.274	0.3	52.3	102.7	84.9	+23.5	–	–	–	–	29.0	ZS
$N=57$	1.853	0.325	2.2	239.2	275.2	80.2	+21.4	–	–	–	–	28.2	ZS73
$N=--$	2.2	0.34	6	246	276.4	86.7	+19.0	+0.8	+0.4	+0.4	+0.4	30	AC
$N=2$	1.7	0.31	4.8	237	261.7	65.7	+18.1	–	–	–	–	27.8	GE (6.21)
$N=7$	2.17	0.46	3.7	255.1	264.9	76.2	+20.4	+1.0	–	–	–	25.5	NL (61.6.5)
$N=--$	2.2	0.34	6	224	278.1	87.3	+19.3	+0.8	+0.4	+0.4	+0.4	31.4	L54
Parent	2004 TG ₁₀	<i>(Epoch 2006-03-06)</i>											
(2006)	2.242	0.315	1.291	240.428	281.864	88.4	+22.5	–	–	–	–	29.90	0.0614
#174	TAS				06/09–07/25			June 27	96.0	–	(18)	–	
		<i>= ecliptic helion source</i>											
$N=--$	1.317	0.631	4.4	83.6	96.0	93.3	+31.3	–	–	–	–	15.8	ZS

July:

#175	JPE	July Pegasus	07/07-07/13	July 09	107.5	3.0	3.5	2.7	Apex
	Visual	0.536	267.2	340.0	+15.0	+0.6	+0.2	61.3	IMO
	N = 1	Inf.	243	339	+17	-	-	75.3	PJ
	Parent??	C/1979 Y ₁ (Bradfield)	(Epoch 1980-01-24)		$\lambda_{\odot} = +108.61$	$T_J = \sim 0.66$	$H_0 = +11.8$	$(n = 4.9)$	P = 291 yr
	(1980)	45.017	263.932	346.5	+11.2	-	-	63.99	0.0673
#176	PHE	July (γ -)Phoenicids	06/24-07/18	July 12	110.3	3.0	2.5 ± 0.5	4.0 ± 1.9	PJ
	N = --	2.5-Inf.	31-24	31.6	-47.7	+1.04	+0.53	47 ± 3	WE60
#177	BCA	β -Cassiopeids	07/03-08/19	July 30	126.6	3.43	5.0	10	D00
	N = 6	18.194	192.1	14	+63	-	-	60	PG
	N = 12	0.995	89.1	353.5	+59.1	+1.04	+0.20	50.4	T65
				125.2	+53.3	-	-	-	Antihelion
#178	JCE	July Centaurids	07/01-07/07	July 05	103.3	-	(2.4)	-	-
	Outburst	07:45-09:00 UT Sydney, 50 short swift, none next hr			$\lambda_{\odot} = 103.282$	-	<0.030	>40	-
	(1896)	(Inf.)	25.4	~225	-35	-	-	15.3	PJ
	N = --	4.170	32.8	233.7	-10.2	-	-	12.8	T89 (35)
	Parent??	1997 OK ₁ (Epoch 2005-01-30)			$\lambda_{\odot} = 116.44$	$T_J = +2.98$	$H_N = +20.10$	-	-
	(2005)	2.797	13.255	221.9	-28.5	-	-	9.11	0.0079
#179	SCA	σ -Capricornids	06/18-07/30	July 12	110	-	(17)	-	-
	N = --	1.726	284.5	302.7	-15.9	-	-	22.5	T89
	N = 40	1.310	311.2	311.1	-14.5	-	-	26.9	ZS
	N = 35	1.782	290.3	298.7	-18.7	-	-	24.6	ZS73
	N = 5	2.86	289.8	307.6	-15.2	1.0	-	28.9	NL (61.7.8)
	N = 3	1.56	312.5	326.9	-12.1	-	-	30.0	NL (61.7.11)
#180	MSE	μ -Serpentids	07/03-07/31	July 16	114	-	(11)	-	-
	N = --	1.879	197.3	240.0	+11.0	-	-	7.7	J92
	N = --	2.447	07/17-07/17	232.7	-4.2	-	-	8.6	T89 (37)
#181	KPA	κ -Pavonids	07/17-07/17	July 17	114.8	-	-	-	-
	Outburst			1986:	114.827	2.2	0.027	~60	PJ
	(1986)	(34.2)	45.7	282.1	-68.0	-	-	23.5	PJ
	(1986)	(3.2)	48.1	282.3	-66.9	-	-	18.9	PJ

Table 7 (cont.)

July

Code	Name	q	i	Dates (2000)	Peak	λ_{\odot}^{\max}	χ	W	ZHR ^{max}	Notes
	a			ω	R.A.	Decl.	$\Delta R.A./\Delta \lambda$	$\Delta \text{Decl.}/\Delta \lambda$	V_g	Δ_{C-E}
#88	ODR	<i>o</i> -Draconids		07/06-07/24	July 17	115.5	-	(7)	-	
	$N=3$	3.52	1.01	190	279.7	+61.8	-	-	28.6	CL
	$N=14$	4.329	1.006	192.2	285.0	+61.3	-	-	28.5	ZS
#182	OCY	<i>o</i> -Cygnids		07/17-07/22	July 19	117.2 ± 0.5	2.7	4.9 ± 1.2	2.5 ± 0.8	PJ
	Visual	= ψ -Cygnids ≠ α -Cygnids			$\lambda_{\odot} = 117.2$	304	-	-	-	PJ
	Photo				304.5	+49.7	-	-	39.4	BK65
	$N=1$	4.57	0.97	206	306	+55	-	-	35.5	HV8018
#1	CAP	α -Capricornids		07/19-08/18	July 30	127 ± 1	2.2 ± 0.3	15.1 ± 2.6	2.0	PJ
	$N=36$	2.618	0.602	266.67	306.6	-08.2	+0.54	+0.25	22.2	IMO
	σ	±0.44	±0.037	±4.4	±2.6	±1.5	±0.02	±0.02	±1.5	This work
	$N=269$	2.155	0.550	273.3	306.7	-09.3	+0.91	+0.25	23.4	GB
	σ	±0.40	±0.036	±5.3	±2.7	±1.3	±0.02	±0.01	±1.7	
	$N=-$	2.540	0.594	267.6	303.4	-10.6	+0.75	+0.28	22.2	H02
	$N=15$	2.283	0.626	266.2	315.9	-08.7	-	-	20.6	PG
	$N=-$	2.038	0.544	275.9	306.4	-09.9	-	-	22.5	G
	$N=-$	2.636	0.580	268.0	314.7	-08.8	-	-	23.0	JVF
	$N=44$	1.920	0.620	267.9	315.9	-07.1	-	-	19.7	ZS
	$N=28$	1.850	0.630	267.2	327.1	-11.7	-	-	18.8	ZS73
	$N=18$	2.524	0.592	267.9	305.4	-09.6	-	-	25.0	L71B
	$N=21$	2.565	0.590	269.0	308.4	-09.6	+0.9	+0.3	22.8	AC
	Parent	169 P/NEAT (= 2002 EX ₁₂)		(Epoch 2005-09-18)		$\lambda_{\odot} = 128.78$	$T_J = +2.89$	$H_N = +26.49$		
	(2005)	2.603	0.605	265.952	306.6	-08.4	-	-	22.21	0.1434
#183	PAU	Piscis Austrinids		07/09-08/17	July 27	123.7 ± 0.7	3.2	2.4 ± 0.5	2.9 ± 0.8	PJ
	$N=32$	4.31	0.17	114	340.7	-25.7	+0.90	+0.40	40.5	KL (32)
	radar				331.7	-17.8	+1.5	-0.3	-	WE60
	radar				328.7	-26.8	-	-	-	ER55
	Visual				338.4	-32.5	-	-	-	M (#290)
	Visual				331.9	-29.5	-	-	-	M (#274)

Table 7 (cont.)

August

Code	Name	a	q	i	Dates (2000)	Peak	λ_{\odot}^{\max}	χ	W	ZHR ^{max}	Notes	
					ω	R.A.	Decl.	$\Delta R.A./\Delta \lambda$	$\Delta \text{Decl.}/\Delta \lambda$	V_g	Δ_{C-E}	
#185	DBA	D. (β-)Andromedids										
$N=13$	0.599	0.139	59.4	07/01–07/03	100.5	July 02	100.5	–	(2)	–		
Parent?	<i>96P/Machholz (Epoch 2002-07-25)</i>											
(2002)	0.731	0.057	60.181	14.584	94.609	37.7	+30.3	–	–	33.25	0.3434	
#186	EUM	ϵ-Ursae Majorids										
$N=--$	2.994	0.980	20.0	07/1–07/15	105.8	July 08	106	–	(6)	–		
				156.3		192.5	+61.7	–	–	15.2	T89 (36)	
#187	PCA	ψ-Cassiopeids										
$N=25$	2.418	0.821	72.1	07/15–07/19	114.4	July 17	114.8	–	(2)	–		
$N=23$	3.65	0.87	71	121.2	116.7	389.4	+71.5	–	–	40.3	ZS	
$N=41$	1.72	0.87	77	133	115.7	381.0	+75.3	–	–	40.5	KL (25)	
$N=23$	1.09	0.90	83	126	115.7	373.8	+66.3	–	–	40.5	KL (23)	
Parent	<i>1973 NA</i>											
(2006)	2.434	0.825	67.674	(Epoch 2006-03-06)	100.275	12.2	+69.0	–	–	38.40	0.0854	
#188	XRI	Daytime ξ-Orionids										
$N=3$	8.33	0.08	32.8	07/04–07/29	301.9	July 20	117.7	–	–	44.0	NL (61.7.5)	
$N=23$	5.18	0.18	16	211.6	297.7	94.4	+15.0	–	–	38.4	KL (22)	
#189	DMC	Daytime μ-Cancerids										
	<i>= helion source</i>											
$N=43$	1.720	0.443	2.1	07/03–08/11	128.0	July 30	126.0	–	–	–		
$N=5$	2.50	0.25	5.1	71.0	124.1	122.7	+22.4	–	–	24.3	ZS	
				53.2		108.4	+24.8	+1.0	–	31.1	NL (61.7.6)	
<i>August:</i>												
#190	BPE	β-Perseids										
Outburst	High rate of faint meteors											
(1935)	(35.6)	0.863	142.7	08/07–08/08	135.4	Aug. 08	135.4	–	–	–	Apex	
$N=1$	4.96	1.002	168.86	1935 Aug. 08	135.558	1935 Aug. 08	135.558	>4	0.011	High	PJ	
				134.3	135.4	52.8	+40.2	–	± 0.004	(66.2)	Ch. 13	
				143.23	134.47	46.5	+44.8	–	–	63.8	DMS	

#191	ERI	η-Eridanids	08/03-08/14	Aug. 10	137.5	(4)	<6
<i>N</i> = --	20.26	0.961	130.4	26.6	317.490	45.0	-12.9
<i>Parent?</i> (1852)	<i>C/1852 K₁ (Chacornac)</i> (Epoch 1852-04-20)	0.910	131.097	37.367	319.380	42.9	-12.6
#192	TRI	Aug. Triangulids	08/05-08/14	Aug. 12	139.8	(4)	--
<i>N</i> = 7	1.062	0.886	150.0	264.7	139.8	37.5	+30.7
<i>N</i> = 18	1.45	0.67	152	92	132.7	53.8	+33.2
<i>N</i> = 15	1.52	0.98	141	173	137.7	38.8	+37.2
Possibly related to #190 (BPE)							
#7	PER	Perseids	07/17-08/24	Aug. 13	140.19	2.5	3.01 ± 0.16
Outbursts (see Tab. 5c)							
<i>N</i> = 87	71.4	0.953	113.22	151.3	140.19	48.33	+57.96
σ (intrinsic) > 50		±0.009	±1.5	±2.3	±3.3	--	--
<i>N</i> = --	24.0	0.949	113.0	150.4	139.7	46.8	+57.7
<i>N</i> = 193	62.50	0.948	113.1	151.3	138.0	45.3	+57.7
<i>N</i> = --	25.366	0.963	112.8	154.5	135.6	38.9	+56.2
<i>N</i> = 8	8.04	0.960	110.2	152.5	140.5	46.2	+59.4
<i>N</i> = 10	11.0	0.95	113.1	150.9	137.2	41.9	+56.8
<i>N</i> = 20	22.527	0.934	113.2	147.9	139.5	46.9	+57.2
<i>N</i> = --	22.53	0.934	113.2	147.9	139.4	47.0	+58.2
<i>Parent</i> (1995)	<i>109P/Swift-Tuttle</i> (Epoch 1995-10-10)	0.959	113.454	152.989	139.384	45.8	+57.7
#193	ZAR	ζ-Arietids	08/13-08/25	Aug. 19	146	--	--
<i>N</i> = 2	17.903	0.973	172.6	19.5	326.7	49.7	+14.2
Visual					λ_{\odot} = 146.9	04.6	+09.3
Fireballs	AD 1063-1077:		08/07-08/15		45	+15	
<i>Parent?</i> (1862)	<i>C/1862 N₁ (Schmidt-Tempel)</i> (Epoch 1862-07-04)	0.956	172.109	27.166	328.437	49.5	+13.6
#194	UCE	ν-Cetids	08/15-08/22	Aug. 19	146	--	--
<i>N</i> = --	2.560	0.640	144.0	82.0	325.7	38.6	-2.8
							61.0

Table 7 (cont.)

August

Code	Name	a	q	i	ω	Dates (2000)	Node	Peak R.A.	λ_{\odot}^{\max}	χ	W	$\Delta R.A./\Delta \lambda$	$\Delta \text{Decl.}/\Delta \lambda$	V_g	ZHR ^{max}	Notes
#195	β-Indids					08/20-09/22?		Aug. 31	157.3	-	-	-	-	-	-	
$N = --$	2.205	0.907	14.9	43.1	345.7			342.8	-51.7	-	-	-	-	14.1		T89 (44S)
Parent (1993)	C/1991 L ₃ (Levy)					(Epoch 1993-02-22)			$\lambda_{\odot} = 157.69$	$T_J = +1.52$	$H_{10} = +8.0$	$(n=4)$	$P = 51.3$ yr			$+0.0789$
	13.853	0.932	18.161	32.743	337.692			320.2	-60.6	-	-	-	-	18.30		
#196	NPH					07/16-08/14		Aug. 03	129.7	-	(12)	-	-	-	-	Antihelion
$N = --$	(3.23)	0.674	74.0	76.1	311.8			20.0	-43.0	-	-	-	-	44.0		IMO
Parent? (1951)	1951 C ₁ (Padijusakova)					(Epoch 1951-01-30)			$\lambda_{\odot} = 131.22$	$T_J < +0.25$	$H_{10} = --$	-	-			This work
	Inf.	0.693	87.897	68.602	311.220			21.9	-38.5	-	-	-	-	50.19		0.0321
#298	(IAQ) t-Aquiriids					08/11-08/25		Aug. 20	147.70	3.2	33	+0.90	-	~2.1		IMO
#33	NIA								-04.7	-	-	-	-	27.6		DMS
$N = --$	2.419	0.358	7.4	297.4	145.1			328.0	-09.3	-	-	-	-	34.4		PG
$N = 3$	3.580	0.238	5.7	306.7	129.5			326.9	-03.4	-	-	-	-	24.5		ZS
$N = 65$	1.045	0.249	4.4	319.1	138.0			343.1	+00.5	-	-	-	-	26.1		ZS
$N = 54$	1.356	0.302	5.2	307.4	153.1			350.2	+1.1	-	-	-	-	25.1		(NL61.8,2)
$N = 5$	1.20	0.30	7.9	310.4	146.7			344.1	-05.6	+1.03	+1.13	-	-	31.2		AC
$N = --$	1.625	0.260	5.0	308.0	147.7			328.4	+01.6	-	-	-	-	28.9		L71B
$N = 3$	1.918	0.326	4.0	299.7	162.1			355.2	-00.7	-	-	-	-	33.1		ZS73
$N = 29$	1.366	0.242	3.2	313.5	152.2			352.7	-08.0	-	-	-	-	32.9		KL (28)
$N = 13$	1.92	0.20	12.0	313.4	120.3			321.4	+06	-	-	-	-	1.5 ± 0.3		AT (39)
Fireball	AD 1062-1164:					08/28-09/02		338						2.9		PJ
#3	SIA					07/15-08/25		Aug. 04	131.7 ± 1.0	3.3	9 ± 2	1.7 ± 0.2	26	2.9		IMO
$N = --$	2.676	0.190	8.6	137.5	306.9			339.0	-15.6	-	-	-	-	34.8		DMS
$N = 4$	3.547	0.266	0.0	121.5	304.7			321.4	-14.6	-	-	-	-	35.0		L71B
$N = 13$	2.12	0.26	7.6	125.9	307.3			328.5	-17.6	-	-	-	-	31.5		KL (27)
$N = --$	2.364	0.208	6.9	131.8	311.7			334.7	-14.2	+1.07	+0.18	-	-	33.8		AC

Table 7 (cont.)

August

Code	Name	q	i	Dates (2000)	Peak	λ_{\odot}^{\max}	χ	W	ZHR ^{max}	Notes				
	a			ω	R.A.	Decl.	$\Delta R.A./\Delta \lambda$	$\Delta \text{Decl.}/\Delta \lambda$	V_g	Δ_{C-E}				
#12	KCG	κ-Cygnids												
				08/03-08/31	Aug. 20	145.2 ± 0.8	2.2	8.8 ± 0.7	2.3 ± 0.4	PJ				
				$\lambda_{\odot} = 145.0$	286	+59	+0.30	+0.10	24.8	IMO				
	1993:	5.12	35.9	201.4	284.0	+52.7	-	-	24.0	DMS				
	$N=4$	±1.22	±0.005	±1.5	±0.8	±1.7	-	-	±1.1					
	1993:	4.10	34.7	206.2	287.1	+49.5	-	-	23.4	DMS				
	$N=5$	±0.57	±0.003	±0.9	±0.5	±0.8	-	-	±0.9					
	$N=32$	3.19	32.6	197.4	276.9	+53.6	-	-	21.4	DMS				
	σ	±0.91	±0.016	±7.6	±6.9	±6.8	-	-	±2.0					
	$N=13$	3.513	33.0	197.7	278.4	+52.3	-	-	21.7	PG				
	$N=8$	2.583	42.9	203.1	299.1	+63.2	-	-	25.9	ZS73				
	$N=3$	3.437	29.7	207.7	282.4	+42.1	-	-	20.1	L71B				
	$N=8$	3.09	38	194	286.2	+59.1	+0.0	+0.0	24.8	AC				
	Fireballs	AD 1059-1098:												
#200	ESE	η-Serpentids												
				07/25-09/13	306.5	+40.2	-	-	-	AT (26+38)				
				07/06-10/19	Aug. 24	151	-	(39)	-					
					<i>= λ-Aquilids</i>									
	$N=22$	1.795	4.5	213.2	287.7	-03.7	-	-	8.6	PG				
	$N=-$	1.792	5.2	209.5	277.7	-04.0	-	-	9.8	T89 (38)				
	$N=-$	2.294	0.898	39.7	322.4	-12.6	-	-	11.8	T89 (44Q)				
	Parent?	<i>2000 QS₇ (Epoch 2005-01-30)</i>												
	(2005)	2.682	0.905	222.591	297.8	-11.7	-	-	12.60	0.00437				
#201	GDO	γ-Doradids												
	Visual	(28.8)	0.970	08/27-09/03	Aug. 29	155.7 ± 0.5	2.8	3.7 ± 1.3	4.8 ± 1.6	PJ				
				23.0	61.2	-50.2	+0.5	+0.2	(40.1)	PJ				
#202	ZCA	Daytime ζ-Cancerids												
	$N=3$	5.00	0.05	08/07-08/22	Aug. 20	147	-	-	-					
				206.5	119.7	+19.0	-	-	43.8 (NL61.8.5)					
#203	GLE	Daytime γ-Leonids												
				08/18-08/24	Aug. 22	148.7	-	(3)	-					
					<i>= ecliptic helion source</i>									
	$N=40$	1.527	0.569	262.0	139.9	+12.4	-	-	19.6	ZS				

$N=46$	0.968	0.860	6.4	59.0	149.2	156.6	+19.7	-	-	22.0	ZS
$N=4$	2.38	0.60	7.5	90.6	148.7	153.4	+20.8	2.1	-	22.9	(NL61.8.4)
Parent?? (2005)	1999 RD ₃₂ 2.640	0.605	6.147	274.453	335.309	156.1	$\lambda_{\odot} = 155.3$ +01.1	$T_J = +2.87$, $H_N = +16.32$	-	22.77	-0.0501
#204 DXL	Daytime γ -Leonids										
$N=25$	1.598	0.330	2.5	238.4	334.9	142.1	+12.8	-	-	27.4	ZS
Parent? (2005)	2001 YB ₅ 2.349	0.323	3.381	62.113	161.330	151.7	$\lambda_{\odot} = 161.33$ +14.3	$T_J = +2.89$, $H_N = +20.62$	-	30.46	0.0759
September:											
#205 XAU	ζ -Aurigids										
$N=1$	28.24	0.971	106.4	128.0	157.5	93.5	+62.6	-	-	-	-
$N=1$	11.49	0.793	117.5	123.8	159.4	92.6	+56.4	-	-	56.9	PK#620125
$N=1$	2.50	0.785	111.5	117.1	160.4	92.3	+58.5	-	-	59.7	PK#621134
#206 AUR	(α) -Aurigids										
= θ -Aurigids											
Outburst				1994		158.700	1.7	0.019	~400		PJ
Outburst				1986		± 0.020		± 0.002			
Outburst				1935		158.518	1.3	0.018	250 \pm 30		PJ
$N=3$	Inf.	0.683	148.5	110.2	158.7	86.3	≥ 158.664	2.2	0.021	≥ 100	Ch. 13
$N=-$	Inf.	0.802	146.4	121.5	158.6	85.5	+41.0	+1.35	± 0.009	65.7	This work
Parent (1911)	C/1911 N ₁ (Kiess) 184.6	0.684	148.421	110.378	158.978	91.6	+42.0	-	-	66.3	AC
#207 SCS	Sep. (β -)Cassiopeids										
$N=8$	15.8	0.968	162.4	176.1	172.8	33.0	+68.9	-	-	69.1	This work
#208 SPE	Sep. (ϵ -)Perseids										
$N=8$	31.1	0.742	138.9	241.9	171.3	50.2	+39.4	-	-	64.5	This work
Parent (1911)	C/1911 N ₁ (Kiess) 184.6	0.684	148.421	110.378	158.978	91.6	$\lambda_{\odot} = 158.98$ +39.3	$T_J = -0.84$, $H_{10} = +7.9$	-	66.17	0.0027

Table 7 (cont.)

September

Code	Name	q	i	ω	Dates (2000)	Node	Peak R.A.	λ_{\odot}^{\max} Decl.	χ $\Delta R.A./\Delta \lambda$ $\Delta \text{Decl.}/\Delta \lambda$	W	ZHR ^{max} V_g	Notes
$N=10$	15.0	0.750	142.8	241.3	168.0	51.5	+39.5	-	-	-	65.6	R92
σ	-	± 0.033	± 3.9	± 3.6							± 1.7	
$N=3$	Inf.	0.733	140.5	242.6	166.9	47.2	+38.9	-	-	-	65.4	PG
$N=-$	34.087	0.764	149.5	238.0	170.1	54.8	+36.2	-	-	-	67.1	T89 (46)
Fireballs		AD 1046-1069:		09/03-09/09		33.8	+38.2	-	-	-		AT (40)
#209	ϵ-Eridanids			08/20-09/16		Sep. 12	170	2.8	~ 12	~ 1.5	1.5	PJ
EER	= π-Eridanids			$\lambda_{\odot} = 170.0$		56.6	-13.8	+0.70	+0.20	59.0	59.0	IMO
$N=1$	11.08	0.576	83.5	81.5	359.3	59.3	-17.4	-	-	-	52.6	HV83606
Outburst				1981 Sep. 10.6			>168.12	-	0.06	-	>170	PJ
Visual	(11.)	0.61	164	80	168.1	56.6	-13.8	-	-	-	~ 57	PJ
<i>Parent?</i>	<i>C/1854 L₁ (Klimkerfues = 1854 III)</i>			<i>(Epoch 1854-06-23)</i>			$\lambda_{\odot} = 167.49$	$T_J = -0.11$, $H_{10} = +6.4$	$(n=4.0)$		56.52	0.0076
(1854)	(25.27)	0.6481	108.110	73.871	347.487	53.5	-16.2	-	-	-		
#210	β-Aurigids			09/19-09/25		Sep. 21	179.3	-	-	-	-	
Outburst	19 meteors					1968 Sep. 21	179.258	2.3	-	-	-	
(1968)							+43	-	-	-	Medium	Ch. 3
$N=1$	4.57	0.98	148	159	179.256	86	+42	-	-	-	66.5	HV4453
$N=1$	23.08	1.00	145	170	176.7	93	+45	-	-	-	67.9	HV4454
$N=1$	Inf.	1.03	146	168	176.7	91	+44	-	-	-	68.8	HV4460
$N=1$	8.04	0.97	147	157	182.7	102	+42	-	-	-	67.3	HV4554
<i>Parent?</i>	<i>1790 A₁ (Herschel)</i>			<i>(Epoch 1790-01-16)</i>			$\lambda_{\odot} = 179.13$	$T_J < -0.70$, $H_{10} = -$	-	-		
(1790)	Inf.	0.722	148.068	115.931	179.125	114.5	+38.2	-	-	-	66.76	0.0333
#81	SLY	Sep. Lynxids		09/26-09/29		Sep. 28	185.0	-	-	(2)	-	
$N=1$	9.05	0.880	138.0	221.9	187.0	81.2	+46.6	-	-	-	65.2	PK#572513
$N=2$	76.970	0.770	136.5	152.5	185.9	110.9	+47.9	-	-	-	65.0	L71B
#211	AOR	Sep. α-Orionids		09/21-09/28		Sep. 26	183	-	-	(3)	-	
$N=16$	1.52	0.91	152	47	2.7	86.7	+09.0	-	-	-	62	KL (37)
$N=1$	1.2	0.68	157	91	3.7	80.7	+12.0	-	-	-	60.8	HV4597
$N=1$	1.63	0.80	157	66	3.7	82.7	+11.0	-	-	-	63.4	HV4609

#212	KLE	<i>k</i> -Leonids		09/21-09/29	Sep. 24	181	-	(3)	-
		= twin shower of Dec. Monocerotids							
	<i>N</i> = 21	48.0	0.11	26	39	180.7	162.7	+15.7	-
	<i>N</i> = 9	17	0.17	24.8	31.9	184.2	162.2	+14.0	-0.2
	<i>N</i> = 3	1.6	0.13	7.0	35.6	184.1	187.0	+5.8	-
	Parent (1917)	<i>C</i> /1917 <i>F</i> ₁ (Mellish)	(Epoch 1917-04-15)			$\lambda_{\odot} = 168.9$	$T_J = +0.64$	$H_0 = +7.4$ (<i>n</i> = 3.9)	
		27.65	0.190	36.339	51.122	169.558	155.9	+26.0	-
									42.10
									0.4955
#213	BRC	β -Gruids		08/23-09/15	Sep. 03	160.3	-	(9)	-
	Visual	(3.16)	0.852	16.9	337	340.3	-47	-	21.0
#214	BCP	β -Capricornids		09/05-09/15	Sep. 10	167.7	-	(4)	-
	<i>N</i> = -	2.429	0.170	13.0	305.7	327.7	-12.8	-	37.0
	Fireballs	AD 1045-1068:		09/24-09/30	304.7	-13.8	AT (52)	-	
#30	(PSC)	Piscids							
		= antihelion source meteors							
#215	NPI	Northern (δ -)Piscids		09/12-09/31	Sep. 27	184	3.0	<23	0.5
		= extension of Taurid complex?							
	<i>N</i> = 7	4.83	0.256	5.2	306.6	174.4	9.2	+07.7	+1.07
	<i>N</i> = 3	1.977	0.272	5.2	305.2	173.3	7.0	+07.0	-
	<i>N</i> = 93	1.346	0.311	3.5	306.3	173.5	9.1	+07.2	-
	<i>N</i> = 42	1.868	0.344	3.8	298.5	168.3	0.8	+03.9	-
	<i>N</i> = 9	2.062	0.399	3.4	290.8	199.8	26.7	+14.3	-
#216	SPI	Southern (δ -)Piscids		09/12-09/23	Sep. 17	174	3.0	<23	~1.5
		= extension of Taurid complex?							
	<i>N</i> = 5	1.546	0.247	6.3	130.6	364.0	23.6	+05.1	-
	<i>N</i> = 8	1.55	0.284	5.3	126.6	359.7	18.0	+03.1	-
	σ	-	± 0.021	± 0.9	± 3.0	± 0.1	± 1.82	± 0.62	± 1.3
	<i>N</i> = 19	1.64	0.28	5.4	125.7	363.0	18.7	+05.2	+0.7
	<i>N</i> = 4	2.5	0.28	8.4	123.9	362.9	20.3	+02.7	-
	<i>N</i> = 16	1.792	0.493	14.6	102.4	362.9	17.0	-11.0	-
	Parent?? (2003)	2003 QC ₁₀	(Epoch 2003-08-27)			$\lambda_{\odot} = 181.02$	$T_J = +4.48$	$H_N = +17.83$	
		1.376	0.369	5.035	119.760	361.015	16.3	+01.6	-
									24.06
									0.00010

Table 7 (cont.)

September

Code	Name	q	i	ω	Dates (2000)	Node	Peak R.A.	λ_{\odot}^{\max} Decl.	χ $\Delta R.A./\Delta\lambda$	W $\Delta\lambda$	ZHR^{\max} V_g	Notes	
#217	OPC	ω-Piscids											
	<i>= ecliptic antihelion source</i>												
$N=33$	2.864	0.525	1.5	273.6	09/12–09/23	190.8	Sep. 17	174	--	(4)	--	--	
$N=6$	3.165	0.642	5.7	79.4		3.0	10.6	+06.3	--	--	24.6	L71B	
$N=7$	2.987	0.529	3.9	92.4		14.6	0.5	-08.8	--	--	21.4	This work	
$N=3$	3.00	0.65	5.6	79.3		3.0	16.0	+01.7	--	--	24.5	PG	
<i>Parent?</i> (2005)	2.687	0.552	17.079	90.915		359.002	10.7	-17.7	--	--	24.89	0.0033	
#218	GSA	Sep. (γ-)Sagittariids											
$N=-:-$	2.008	1.003	1.0	8.0	09/11–09/15	350.8	Sep. 13	170.1	--	(32)	--	--	
Fireballs	AD 1071–1163:			09/23–10/12			270.8	-31.0	--	--	6.2	T89 (48)	
<i>Parent?</i> (1936)	2.643	0.996	0.856	13.940		347.153	279.1	-26.9	$T_J = +5.66$	$H_N = +15.99$	8.61	0.0467	
(2001)	2.643	1.001	0.377	8.948		353.036	276.1	-25.0	--	--	8.31	0.0481	
(2048)	2.645	0.999	0.043	10.475		352.143	277.9	-23.4	--	--	8.38	0.0487	
#76	KAQ	κ-Aquariids											
$N=3$	2.564	0.884	1.0	45.2	09/08–10/12	359.8	Sep. 22	179	--	(14)	--	--	
$N=35$	2.606	0.741	7.6	247.8		179.5	334.0	-13.8	--	--	12.8	PG	
$N=6$	2.572	0.725	4.4	250.6		168.5	343.0	+08.3	--	--	18.0	ZS	
$N=9$	2.366	0.705	3.9	253.7		181.3	336.2	-01.2	--	--	18.1	ZS73	
$N=5$	3.180	0.814	1.8	235.6		178.7	350.2	+03.2	--	--	18.2	ZS73	
$N=4$	2.940	0.867	2.1	229.2		186.6	339.2	-04.4	--	--	16.5	L71B	
$N=3$	3.115	0.810	2.0	236.0		178.7	342.3	-02.5	+0.80	+0.40	15.3	L71A	
Visual				09/14–09/23			339.2	-04.4	--	--	16.0	AC	
Fireballs	AD 1053–1163:		09/19–09/27		$i_{\odot} \sim 166$		346.3	+00.5	--	--	--	M (#299)	
<i>Parent?</i> (2006)	2.458	0.878	4.743	46.724		6.389	333.6	+00.2	$T_J = +3.17$	$H_N = +20.39$	12.90	AT (45)	
							345.4	-20.6	--	--	--	0.0095	

Table 7 (cont.)

October

Code	Name	a	q	i	ω	Dates (2000)	Node	Peak R.A.	λ_{\odot}^{\max} Decl.	χ $\Delta R.A./\Delta i$	W $\Delta \text{Decl.}/\Delta i$	ZHR ^{max} V_g	Notes Δ_{C-E}
<i>October:</i>													
#224	DAU					09/29–10/18		Oct. 08	191.0	2	(8)	3.0	Apex
		24.1	0.845	130.2	226.7	191.0	83.5	+50.4	+1.10	+0.10		64.9	R92
	σ	--	± 0.085	± 4.5	± 12.2				--	--		± 1.9	
#225	SOR					09/26–10/26		Oct. 05	191.7	3.0	(12)	--	
		14.56	0.92	138	34	$\lambda_{\odot} = 191.7$	86.0	-03.0	+0.80	+0.00		65.00	IMO
		57.18	0.66	145	71	10	89	+00	--	--		65.9	HV8870
#281	OCT					10/03–10/07		Oct. 06	193.0	--	--	65.8	HV4974
	(radiant unknown)					$\lambda_{\odot} = 192.006$						--	This work
	(1902)					$\lambda_{\odot} = 192.8$	Cassiopeia						
	(1942)					$\lambda_{\odot} = 193.34$							
	(1976)					192.57	166.0	+79.1	--	--		46.6	This work
#226	ZTA					10/07–10/24		Oct. 09	196	--	(7)	--	This work
		368	0.993	78.6	170.6	16.5	86.1	+14.7	--	--		67.2	This work
	ζ -Taurids	21.3	0.715	162.4	70.9	193.5	71.5	+28.2	--	--		56.5	ZS
		1.632	0.231	163.1	311.8	23.7	88.7	+12.0	--	--		57	KL (43)
		1.48	0.38	152	119				--	--		3.0	IMO
#23	EGE					10/14–10/27		Oct. 19	206.0	1.6	15	68.8	This work
		10.0	0.731	172.9	241.7	209.0	101.6	+26.7	--	--		69	JW
		14.90	0.770	173.0	236.7	208.5	102.0	+27.0	--	--		69.4	AC
		26.77	0.77	173	237	209.7	104.8	+26.9	+0.7	+0.0		68	KL (41)
		3.58	0.88	175	223	203.7	104.8	+24.9	--	--		69.1	L71B
		14.895	0.770	173.0	236.7	208.2	102.8	+26.9	--	--		--	
#227	OMO					10/18–10/22		Oct. 19	206	--	(2)	--	This work
		5.2	0.865	135.0	46.4	25.7	101.9	-01.4	--	--		63.5	GE (10.16)
		5.4	0.97	136	341	25.7	117.6	-05.1	--	--		65.0	GE (10.16)

Parent?	$C/1723 T_1$ (Keggler– Crosst–Saunderson)	(Epoch 1723–09–28)	$\lambda_{\odot} = 198.92$	$T_J \sim -0.01$	$H_{10} = +5.5$ ($n = 4$), P unknown
(1723)	Inf.	130.192	332.715	18.919	115.5
#228	OLY	Oct. Lyncids	10/10–10/23	206	(5)
	$N = 6$	0.926	211.7	205.8	111.3
#229	NAU	v-Aurigids	10/20–10/22	207.3	(2)
	$N = 7$	0.267	311.0	208.0	87.9
#8	ORI	Orionids	10/02–11/07	208.6	2.9
	Outburst (1993)		1993 Oct. 7.8	204.5	2.0
	(1993)	0.613	76.5	24.069	92.0
	$N = -$	0.571	82.8	208.6	95.4
	$N = 30$	0.578	81.5	28.7	94.7
	$N = 12$	0.581	80.3	27.2	93.6
	$N = -$	0.570	83.0	29.7	96.7
	$N = 23$	0.570	83.4	29.9	96.4
	$N = 17$	0.562	87.0	27.8	95.6
	$N = 61$	0.57	86.1	26.1	93.8
Parent	1P/Halley	(Epoch 1986–02–19)	$\lambda_{\odot} = 208.67$	$T_J = -0.59$	$H_{10} = +2.1$ ($n = 7.5$)
(1986)	17.940	164.715	80.446	28.671	95.8
#22	LMI	Leonis Minorids	10/21–10/25	209.0 ± 0.7	1.9 ± 0.7
	$N = 10$	0.616	125.32	208.36	159.5
	$N = 4$	0.641	124.5	209.9	160.7
	$N = -$	0.65	124	211.7	162.7
Parent	C/1739 K ₁ (Zanotti)	(Epoch 1739–06–18)	$\lambda_{\odot} = 211.04$	$T_J \sim -0.01$	$H_{10} = +3.3$ ($n = 4$), $P =$ unknown
(1739)	Inf.	124.260	110.665	211.044	161.0
#230	ICS	October ι -Cassiopeids	10/15–10/28	209	(5)
	$N = 6$	0.644	128.5	208.7	36.7
	Fireballs	AD 1032–1357:	10/22–11/06	+66.0	-
#231	ACM	Daytime α -Canis Majorids	10/12–10/22	+60.3	-
	Visual		10/12–10/22	204	(4)
	Inf.	0.812	110.5	24.8	92.1
			50.9	-14.0	-
			92.1	-14.0	-
				58.8	This work

Table 7 (cont.)

October

Code	Name	a	q	i	ω	Dates (2000)	Node	Peak R.A.	λ_{\odot}^{\max} Decl.	χ $\Delta R.A./\Delta\lambda$	W $\Delta\lambda/\Delta\lambda$	ZHR ^{max} V_g	Notes Δ_{C-E}
#232	BCN	Daytime β-Cancerids											
$N=2$	2.8	0.93	152	325	10/18–10/30	24.7	Oct. 26	213	–	–	(5)	–	–
$N=2$	2.6	1.00	153	359		25.7	121.7	+04.9	–	–	–	66.1	GE (10.17)
$N=3$	4.3	0.95	156	334		32.7	114.7	+05.9	–	–	–	66.1	GE (10.18)
$N=3$	6.1	0.98	148	10		35.7	127.7	+05.8	–	–	–	66.1	N62 (26.1)
							120.6	+00.9	–	–	–	66.1	N62 (26.3)
#233	OCC	Oct. Capricornids											
Outburst					09/20–10/24		Oct. 03	189.7	–	–	–	2.3 ± 1.5	PJ
$N=--$	4.264	0.987	0.8	190.8	1978	189.7	Oct. 03	189.70	–	–	>0.15	–	–
$N=--$	(3.65)	0.99	2.8	193.2		203.8	303.0	–10.0	+0.90	–	+0.20	10.0	IMO
						189.3	315	–14	–	–	–	10.4	T89 (53)
							301.5	–08.7	–	–	–	15 ± 3	W88
Parent (1979)	$D/1978 R_1$ (Haneda-Campos)												
	2.070	0.997	3.407	190.543	(Epoch 1979-01-07)	183.491	287.6	$\lambda_{\odot} = 183.49$	$T_J = +0.93$	$H_{10} = +12.5$ (var.)	–	7.34	0.1381
#234	EPC	Oct. (ϵ)-Piscids											
$N=5$	2.919	0.616	2.8	262.5	10/02–10/12	195.0	Oct. 08	195	–	–	(4)	–	–
$N=--$	1.780	0.479	1.6	283.8		197.3	8.7	+8.1	–	–	–	21.8	J92
$N=45$	1.843	0.566	0.7	93.6		11.6	20.7	+11.3	–	–	–	23.2	T89 (52N)
$N=6$	2.19	0.550	0.7	274.0		195.5	12.8	+4.4	–	–	–	20.5	ZS
							15.6	+7.3	–	–	–	23.5	LB71A
#235	LCY	λ-Cygnids											
$N=3$	2.768	0.972	13.9	199.4	10/20–11/07	213.2	Oct. 12	199	–	–	(7)	–	–
$N=--$	2.585	0.828	17.8	234.4		189.6	319.1	+34.9	–	–	–	12.3	PG
$N=--$	2.352	0.950	22.0	204.6		233.5	338.6	+31.3	–	–	–	18.0	T89 (49a)
Parent? (2006)	2005 CA				(Epoch 2006-03-06)		334.5	+57.3	–	–	–	15.8	T89 (49c)
	2.359	0.967	17.006	203.186		202.759	313.3	$\lambda_{\odot} = 202.8$	$T_J = +3.03$	$H_N = +15.34$	–	13.20	+0.131
#236	GPS	γ-Piscids											
$N=--$	2.478	0.945	2.7	200.0	10/10–11/25	225.6	Oct. 13	200	–	–	(18)	–	–
							347.6	+0.3	–	–	–	10.4	T89 (54)

$N = -$	2.866	0.871	1.4	224.9	229.8	377.7	+9.3	-	-	13.4	T89 (60)
Outburst?	Radiant "SE Peg/NE Psc"										
Parent?	(Epoch 1960-09-26)										
(1960)	6344 P-L	0.931	4.058	213.516	203.905	339.0	+06.0	-	-	11.06	0.0280
#237	SSA	σ -Arietids		10/10-10/22		Oct. 15	202	-	-	(5)	-
		= part of Phaethon complex									
$N = 28$	4.46	0.11	7	145	22.7	44.7	+14.2	-	-		KL (46)
$N = 24$	1.74	0.05	17	158	21.7	52.7	+15.2	-	-		KL (47)
#86	OGC	Oct. γ-Cetids		10/19-10/24		Oct. 20	206.4	-	-	(2)	Ch. 13
Outburst	Coast of Maine, USA; 25/hr 01 UT, 100/hr 03 UT										
(1935)				1935 Oct. 20	$\lambda_{\odot} = 206.36$	40.6	-04.8	-	-	~ 0.09	RM
$N = 2$	0.950	0.832	2.7	119.3	26.7	50.4	-06.9	-	-		RM
$N = -$	2.442	0.791	11.6	58.4	28.1	18.6	-18.7	-	-		This work
$N = 2$	1.760	0.783	8.5	67.0	27.7	22.6	-10.7	-	-		T89 (50)
Visual				10/15-10/23		48.8	-02.6	-	-		L71B
Fireballs?	AD 1052-1093:										
#83	OCG	Oct. Cygnids		10/30-10/03		50	-10	-	-	(14)	M (#35)
$N = -$	3.428	0.904	25.0	218.1	190.7	322.5	+44	-	-		AT (63)
$N = 7$	2.764	0.976	25.0	198.6	195.9	317.8	+52.6	-	-		T89 (49b)
$N = 2$	4.66	0.960	26.4	203.8	193.6	307.4	+48.2	-	-		ZS73
#299	(OAR)	October Arietids						-	-		W57
#25	NOA	Northern Oct. (δ-)Arietids		10/01-10/24		(Nov. 03)		-	-	> 9	< 3
		= extension of NTA									
$N = -$	2.168	0.334	5.2	117.1	42.4	52.7	+18.2	-	-		T89 (59)
$N = 15$	4.05	0.22	12	307	201.7	34.7	+20.2	-	-		KL (45)
Parent?	2005 UR										
(2005)	2.259	0.266	6.675	124.247	36.156	51.3	+14.1	-	-	$\lambda_{\odot} = 216.2$	0.0335
#28	SOA	Southern Oct. (δ-)Arietids		10/01-10/24		(Nov. 03)		-	-	$T_J = +2.92$	$H_N = +21.6$
		= extension of STA						-	-	> 9	< 3
$N = -$	2.883	0.381	6.6	108.8	33.0	41.7	+10.2	-	-		T89 (57)
$N = -$	2.540	0.482	11.2	98.7	26.4	33.6	+01.2	-	-		T89 (52S)

Table 7 (*cont.*)

October

Code	Name	q	i	ω	Dates (2000)	Node	Peak R.A.	λ_{\odot}^{\max} Decl.	χ $\Delta R.A./\Delta\lambda$	W $\Delta\text{Decl.}/\Delta\lambda$	ZHR^{\max} V_g	Notes
$N=83$	1.435	0.333	2.9	122.5	18.5	33.1	+10.6	-	-	-	25.6	ZS
$N=58$	1.723	0.273	1.4	126.9	08.5	24.6	+09.1	-	-	-	24.2	ZS73
$N=18$	1.74	0.24	1.2	130.7	23.2	40.3	+14.9	-	-	-	30.7	KL (44)
$N=13$	1.75	0.30	5.8	122.5	24.9	39.5	+10.7	-	-	-	27.8	MP
<i>Parent?</i> 2P/Encke												
(2003)	2.217	0.339	3.943	115.819	44.884	56.0	$\lambda_{\odot}=224.88$ +16.5	$T_J=+3.03$, $H_{10}=+11.5$ (var.)	-	-	29.06	0.1915
#238	DOR	α -Doradids		10/08-10/31		Oct. 21	208	-	(9)	-	<2	WE60
	Radar					$\lambda_{\odot}=207.7$	-55.9	-	-	-	-	Helion
#9	DRA	Oct. Draconids		10/02-10/16		Oct. 08	195.1	2.6	-	-	<1	
	Outbursts (see Tab. 6d)											
(1998)	3.572	0.9966	31.8	173.6	195.0188	263.40	+55.76	-	-	-	21.0	T
(1998)	3.512	0.9964	31.8	173.4	195.081	263.16	+55.75	-	-	-	20.9	T
(1998)	3.33	0.996	31.09	173.36	195.08	263.20	+55.42	-	-	-	20.5	SAYS
$\sigma N=20$	± 0.32	± 0.001	± 0.70	± 0.83	-	± 1.39	± 0.70	-	-	-	0.6	
$N=5$	3.02	0.996	31.4	172.9	196.4	264.1	+57.6	+1.9	+0.3	-	20.4	This work
$N=7$	2.392	0.995	25.5	178.2	203.9	274.7	+52.4	-	-	-	16.7	PG
$N=-$	2.120	0.992	27.6	171.4	204.6	267.2	+55.0	-	-	-	17.4	T89 (51b)
$N=-$	2.855	0.994	29.8	183.8	202.6	283.2	+57.1	-	-	-	22.4	T89 (56a)
$N=2$	3.51	0.996	30.7	171.8	197.0	262.4	+54.1	-	-	-	20.43	AC
$N=2$	3.330	0.999	25.0	177.0	196.7	276.3	+49.0	-	-	-	17.8	L71B
<i>Parent</i> 21P/Giacobini-Zinner												
(1926)	3.513	0.994	30.73	171.748	196.946	261.9	$\lambda_{\odot}=196.95$ +54.0	$T_J=+0.73$, $H_{10}=+8.9$	-	-	20.45	0.0005
(1998)	3.391	0.996	31.859	172.543	195.398	261.9	+55.9	-	-	-	20.92	+0.0381
(2045)	3.235	0.995	31.790	171.351	194.088	259.9	+55.9	-	-	-	20.80	+0.1040
#239	GPU	γ -Puppids		09/28-10/30		Oct. 16	202.7	3.0	(1.3)	-	-	
	$N=4$	17.8	0.980	71.6	16.1	109.0	-44.0	+0.60	-0.20	-	43.0	IMO
						$\lambda_{\odot}=202.7$	-44.0	+1.74	+0.03	-	39.2	This work

#240	DFV	Daytime ψ -Virginids = <i>ecliptic helion source</i>	09/28–10/24	Oct. 15	202	–	(10)	–
	$N=22$	1.513 0.525 2.6	258.1	193.7	–09.6	–	–	–
#241	OUI	Oct. Ursae Minorids	10/10–10/27	Oct. 21	208	–	(7)	–
	$N=4$	3.98 0.995 51.5	179.1	246.6	+74.3	+1.4	–	30.9
	$N=--$	4.0 0.994 50.0	179.8	245.5	+73.8	–	–	29.6
	$N=43$	2.294 0.992 40.0	183.0	267.0	+69.2	–	–	24.1
	$N=--$	2.851 0.984 48.7	191.1	276.5	+76.0	–	–	29.1
#242	XDR	ζ -Draconids	10/05–11/05	Oct. 24	210.8	–	(12)	–
	$N=--$	2.886 0.984 70.6	183.0	192.4	+74.7	–	–	40.1
	$N=38$	1.279 0.988 69.0	175.3	170.3	+73.3	–	–	35.8
	$N=8$	2.052 0.927 71.0	143.1	176.6	+70.9	–	–	39.3
	$N=22$	2.543 0.992 67.1	169.7	190.1	+78.9	–	–	380

November:

#243	ZCN	ζ -Cancerids	11/06–11/20	Nov. 07	225	–	(6)	–	Apex
	$N=7$	2.98 0.443 166.1	100.7	120.5	+14.3	–	–	63.4	This work
	Fireballs	AD 1026–1098:	11/02–11/18	101.7	+19.9	–	–	–	AT (68)
#244	PAR	ψ -Aurigids	10/20–11/16	Nov. 09	226.98	–	(11)	–	BMS#759
	Outburst	15–20.5 UT, 43 meteors 19?		Nov. 09	226.98	–	–	~60	RM
	Outburst	23:15–00:15 UT (Jan Janssens, Belgium)		1989 Nov. 04	222.687	–	–	>50	A90
	$N=--$	6.634 0.439 113.0	277.8	94.0	+50.0	–	–	–	A90
	Fireballs	AD 1024–1096:	10/30–11/03	80.9	+38.0	–	–	–	T89 (62)
#245	NHD	Nov. Hydrids	11/16–11/23	Nov. 17	235	–	–	–	AT (64)
	$N=2$	6.0 0.91 137.6	34.4	130.3	–06.3	0.92	–	65.5	This work
	$N=2$	5.4 0.97 136	34.1	117.6	–05.1	–	–	65.0	GE (10.16)
	Parent?	$C/1943 W_1$ (van Gent–Peltier–Dainaca) (Epoch 1994-01-12)			$\lambda_{\odot} = 239.50$	$T_J \sim -0.03$, $H_0 = +10.2$ ($n=3.5$),		66.69	P unknown
	(1994)	(200)	0.902 136.007 34.249	132.9	–08.3	–	–	0.0336	
#13	LEO	Leonids	10/31–11/23	Nov. 17	235.1	2.5	3.0 ± 0.6	13 ± 3	PJ
	Outbursts (see Tab. 4a)				+21.60	+0.659	–0.325	70.66	HB
	(2001)	10.1	0.9853 162.36 173.50	154.24					

Table 7 (cont.)

November

Code	Name	q	i	ω	Dates (2000)	Node	Peak R.A.	λ_{\odot}^{\max} Decl.	χ $\Delta R.A./\Delta\lambda$	W $\Delta\text{Decl.}/\Delta\lambda$	ZHR ^{max} V_g	Notes
(2000)	9.4	0.9853	162.42	173.47	236.10	154.16	+21.76	--	--	--	70.54	HB
(1999)	9.9	0.9839	162.44	172.51	235.31	153.66	+21.76	--	--	--	70.57	HB
(1998)	9.8	0.9839	162.05	171.89	234.68	153.29	+22.12	--	--	--	70.54	HB
(1997)	8.5	0.9844	162.23	172.37	235.20	153.58	+21.90	--	--	--	70.38	HB
(1995)	14.8	0.9827	161.55	171.85	235.24	154.08	+22.18	--	--	--	70.83	HB
$N=5$	13.972	0.985	162.4	173.1	235.6	153.2	+22.0	--	--	--	70.9	PG
$N=-$	11.5	0.985	162.6	172.5	235.2	153.0	+22.0	+0.70	-0.42	-0.42	70.7	AC
$N=9$	10.3	0.984	162.1	172.4	235.0	153.6	+22.1	+0.60	-0.45	-0.45	70.26	KP
$N=29$	15.2	0.984	162.53	172.36	235.7	153.9	+21.6	+0.944	-0.603	-0.603	70.92	BPS
σ	--	± 0.003	± 1.26	± 3.06	± 1.10	± 1.0	± 0.8	--	--	--	± 0.92	
Parent (1998)	55P/Tempel-Tuttle 10.338	0.984	(Epoch 1998-08-15) 162.482	172.229	235.021	153.4	$\lambda_{\odot} = 235.02$ $+21.8$	$T_J = -0.29$	$H_0 = +8.5$	$(n = 10.7)$	70.63	0.0081
#246 (1995)	AMO α -Monocerotids Outburst			11/15-11/25		Nov. 21	239.3	2.7	3.8	3.5	3.5	IMO
$N=10$	(500)	0.488	134.13	90.66	59.322	117.10	239.322	1.80	0.008	500	63.0	PJ
σ	($a > 28$)	± 0.005	± 0.34	± 0.78	± 0.4	± 0.13	+00.83	--	--	63.0	± 0.2	DMS
(1985)				R.A. = 109.6°, Decl. = -7.1°			± 0.16	--	--	--	~ 600	Ch. 13
(1935)				R.A. = 110.8°, Decl. = -5.1°			239.316	(2.7)	0.003	~ 600	~ 1200	Ch. 13
(1925)							239.344	(~3)	~ 0.009	~ 2300	~ 2300	Ch. 13
							239.384	--	~ 0.005			Antihelion
#247 (TAU)	Taurids			09/16-12/29		Nov. 05	224 \pm 1	2.3	22 \pm 3	7.3		PJ
#17 NTA	Northern Taurids			09/16-12/29		Nov. 05	224 \pm 1	2.3	22 \pm 3	4.0		PJ
$N=80$	2.12	0.350	3.1	294.9	226.2	58.6	228 \pm 3	2.3	46	3.5 \pm 0.5		IMO
σ	± 0.25	± 0.053	± 1.1	± 6.5	± 10.2	--	+21.6	+0.80	+0.16	28.3	± 1.9	PK
				$\lambda_{\odot} = 234.673$		62.0	--	--	--	27.1		U

$N = 12$	2.178	0.383	4.7	291.0	223.0	51.1	+22.8	--	--	28.2	PG
$N = 25$	2.20	0.284	2.9	302.3	212.7	44.0	+18.9	+0.82	+0.22	30.69	KP
$N = --$	2.443	0.418	2.9	286.0	242.5	67.7	+22.1	--	--	27.3	T89 (69)
$N = --$	2.454	0.557	3.8	91.3	60.6	58.7	+20.1	--	--	22.5	T89 (65)
$N = 13$	2.19	0.36	5.5	294.6	206.1	34.2	+18.4	--	--	28.4	KL (50)
$N = 45$	2.59	0.359	2.4	292.3	230.7	59.0	+22.4	+0.76	+0.10	29.2	AC
Fireballs	AD 1062–1095:			11/21–11/25		55	+25	--	--	--	AT (74)
Parent	2004 TG ₁₀			(Epoch 2006–03–06)			$\lambda_{\odot} = 223.83$	$T_J = +2.99$, $H_N = +19.46$			
(2006)	2.242	0.315	3.622	298.443	223.865	54.7	+22.3	--	--	29.89	+0.0128
#2 STA	Southern Taurids			09/25–12/19		Nov. 05	224 ± 1	2.3	22 ± 3	3.3	PJ
$N = 144$	2.07	0.352	5.4	115.4	37.3	49.4	+13.0	+0.73	+0.18	28.0	PK
σ	±0.32	±0.058	±1.1	±7.2	±11.1	--	--	--	--	±2.1	
$N = 19$	2.096	0.357	5.6	114.4	38.7	49.8	+12.8	--	--	28.3	PG
$N = 49$	1.67	0.30	7.1	129	24.7	44.7	+11.2	--	--	29	GE (D.01)
$N = 46$	2.00	0.340	6.3	116.8	32.7	44.7	+11.5	+0.82	+0.22	28.35	KP
$N = 46$	1.93	0.375	5.2	113.2	40.7	51.2	+13.8	+0.79	+0.15	27.0	AC
$N = 73$	2.08	0.33	2.2	118.2	15.5	27.9	+08.8	--	--	28.8	KL (37)
$N = 17$	2.08	0.50	4.2	99.0	56.8	59.7	+16.7	1.0	--	23.8	NL (61.11.1)
$N = 8$	2.4	0.38	5.5	112	43.7	53.7	+14.2	--	--	27.8	W54
Fireballs	AD 1052–1170:			11/19–12/07		43.7	+04.2	--	--	--	AT (73)
Parent	2P/Eneke			(Epoch 2003–12–27)			$\lambda_{\odot} = 224.88$	$T_J = +3.03$, $H_{10} = +11.5$ (var.)			
(2003)	2.217	0.339	3.943	115.819	44.884	56.0	+16.5	--	--	29.06	0.1915
#24 PEG	μ-Pegasids			09/29–11/18		Nov. 12	230.4	--	(5)	<2	
Outburst?				1952, Nov. 12			$\lambda_{\odot} = 230.41$	--	--	>50	Ch. 21
HV3570	3.856	0.9735	8.10	195.80	230.412	335.53	+21.78	--	--	11.21	This work
(error)	±0.16	±0.0003	±0.09	±0.10	--	±0.15	±0.12	--	--	±0.14	
HV3570	3.860	0.974	8.1	195.66	230.412	335.42	+21.68	--	--	11.20	JW
$N = 2$	3.099	0.948	7.18	206.34	(235.04)	355.4	+26.1	--	--	11.1	U
$N = 6$	3.86	0.97	8	196	230.7	335.6	+21.3	--	--	11.2	AC

PEG – “U:” From two video meteors during the 1998 and 1999 Leonid campaigns.

Table 7 (*cont.*)

November

Code	Name	q	i	ω	Dates (2000)	Node	Peak R.A.	λ_{\odot}^{\max} Decl.	χ $\Delta R.A./\Delta\lambda$	W $\Delta\lambda/\Delta\lambda$	ZHR^{\max} V_g	Notes
#18	AND				10/08–11/22		Nov. 14	232	--	(18)	--	
	Outbursts (see Tab. 6a)											
$N=18$	2.76	0.789	10.0	238.9	231.0	24.2	+32.5	+0.63			17.2	This work
$N=5$	1.749	0.691	12.0	--	221	27.2	+34.9	--			17.6	J92
$N=3$	2.375	0.760	14.3	245.2	207.2	3.3	+31.8	--			18.1	PG
$N=-$	2.441	0.738	12.4	248.6	201.9	2.6	+26.3	--			18.7	T89 (55)
$N=-$	1.824	0.854	13.8	232.4	234.8	17.7	+46.3	--			14.1	T89 (63)
$N=23$	2.90	0.777	7.5	242.7	225.5	23.7	+09.3	--			18.9	SH59
$N=-$	2.7	0.74	6.8	247	226	27.7	+25.2	--			18.0	J
<i>Parent</i>	<i>3D/Biela</i>				(<i>Epoch 1852-09-29</i>)							
(1852)	3.524	0.864	12.654	224.712	246.556	5.8	+43.4	$T_J = +0.78$			16.15	-0.0066
(2004)	3.491	0.798	7.501	236.175	213.790	24.6	+27.2	--			17.21	0.0410
(2050)	3.510	0.806	5.950	234.913	231.498	24.2	+23.9	--			16.76	0.0891
#248	IAR				11/01–11/23		Nov. 16	233.637	1.88 ± 0.12	(9)	8.2 ± 2.8	HM
$N=25$	1.076	0.085	1998 Nov. 18		$\lambda_{\odot} = 235.0$	77.0	+35.0	--			--	KZ99
$N=32$	1.467	0.132	30.5	336.3	222.3	76.3	+33.3	--			34.0	ZS
Fireballs	AD 1032–1083:		19.6	326.1	222.1	68.1	+30.2	--			34.2	ZS
			10/30–11/03			80.9	+38.0	--			--	AT (64)
#249	NAR				11/17–11/29		Nov. 23	241	--	(5)	--	NMS
$N=3$	1.54	0.790	2.8	246.4	236.18	39.0	+23.2	--			12.3	T89 (67a)
$N=-$	2.608	0.794	5.3	238.2	241.3	38.7	+21.2	--			16.3	L71B
$N=4$	3.257	0.784	9.7	238.0	228.2	22.7	+30.3	--			17.8	
#250	NOO				11/16–11/29		Nov. 27	245	--	(5)	--	(Outburst)
Outburst					1964	Nov. 25/26	244.12	1.8	0.020		140	Ch. 13
(1964)	Inf.	0.23	43	123	244.12	85.7	+04.0	--			~45	This work
$N=16$	12.7	0.088	26.9	145.8	(60.0)	85.2	+15.6	+0.71	-0.03		43.3	

N=8	7.32	0.089	29.1	146.6	57.5	83.8	+15.3	--	--	43.5	MB ₇
N=7	12.26	0.045	41.5	161.4	41.9	79.4	+14.6	--	--	38.8	ZS
Fireballs? AD 1053-1082:											
				11/08-11/13		83.6	+00.0				AT (69)
#251	IVI	Daytime t-Virginids		11/05-11/07	Nov. 05	223	223	(2)	--	--	Helion
N=8	1.217	0.985	10.1	60.7	224.3	210.4	-03.8	--	--	29.0	ZS

December:

#19	MON	(Dec.) Monocerotids		11/27-11/17	Dec. 13	260.9 ± 0.6	3.0	4 ± 3	2.0 ± 0.4	Apex
N=11	50.7	0.193	35.2	128.1	101.8	+08.1	+0.83	-0.05	42.0	PJ
N=15	19.9	0.188	34.9	128.9	102.0	+08.3	+0.95	-0.03	41.6	This work
σ	--	±0.012	±3.1	±2.1	±1.1	±1.2			±1.8	O89
N=12	27.6	0.187	34.9	128.9	102.2	+08.3	--	--	41.8	LO90
N=30	6.199	0.153	22.3	135.8	95.1	+14.5	--	--	40.0	ZS
N=52	7.114	0.119	24.7	141.2	92.1	+15.0	--	--	41.6	ZS73
N=--	52.24	0.175	31.5	131.0	100.7	+08.0	+0.80	+0.00	42	LB
N=3	7.69	0.19	39.9	130	106.7	+05.9	--	--	40.5	GE (12.09)
N=6	5.56	0.11	39.0	138.9	102.3	+09.5	--	-0.5	42.2	NL (61.12.7)
N=4	11	0.11	22.6	135.3	95.5	+14.5	+1.0	--	41.3	NL (61.12.2)
N=--	3.464	0.121	22.3	141.9	89.0	+13.9	--	--	41.6	T89 (75S)
N=4	20.00	0.20	18.7	131.5	77.3	+15.1	--	--	40.6	NL (60.12.9)
N=3	42	0.14	24.8	135.8	77.6	+14.0	--	--	42.4	J
N=2	Inf.	0.186	35.2	128.2	103.7	+07.9	--	--	42.4	W57

Parent C/1917 F₁ (Mellish) (Epoch 1917-04-15)

(1917)	27.65	0.190	35.981	128.263	80.267	102.0	+07.8	--	--	41.94	0.0615
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#32	DLM	Dec. Leonis Minorids		12/12-12/17	Dec. 14	262.4	(2)	--	--	--	
N=6	11.9	0.554	133.8	265.6	156.1	+32.7	--	--	62.3	This work	
N=3	4.70	0.549	133.97	265.98	156.5	+32.0	--	--	62.1	DMS	
N=--	inf.	0.612	132.3	255.8	156.1	+34.6	--	--	63.7	CL	
N=9	3.76	0.81	138	249	163.7	+39.7	--	--	64	KL (193tr)	
N=3	57.4	0.712	135.7	264.5	151.7	+32.8	--	--	63.4	W57	
?Outburst 44 meteors											
(1921)					1921 Dec. 05	254.26	9.1?	--	--	>80	Ch. 13
					λ_{\odot} = 254.26	160	--	--	--	--	

Table 7 (cont.)

December

Code	Name	q	i	ω	Dates (2000)	Node	Peak R.A.	λ_{\odot}^{\max} Decl.	χ $\Delta R.A./\Delta i$ $\Delta \text{Decl.}/\Delta i$ V_g	W	ZHR ^{max}	Notes
Parent? (1799)	C/1798 X ₁ (Bouvard)	0.775	(Epoch 1799-01-01) 139.354	234.967	266.648	169.0	$\lambda_{\odot} = 266.65$ +28.3	$> T_J = 0.01$, $H_{10} = +11.0$ ($n=4$), P unknown	-	-	66.62	0.1165
#16	HYD σ-Hydrids			12/03-12/18								
$N=18$	12.3	0.224	124.9	124.0	84.8	Dec. 17	265.5 ± 0.8	3.0	6.6 ± 2.0	2.5 ± 0.5	PJ	This work
$N=4$	37.046	0.294	132.5	114.4	73.2	131.9	+00.2	+0.72	-0.21	58.0	PJ	PG
$N=-$	113.8	0.253	127.9	119.3	72.5	124.2	+03.1	-	-	60.2	ZS	T89 (71)
$N=2$	11.525	0.230	125.0	124.0	82.7	121.7	+03.9	-	-	58.5	PJ	L71B
$N=-$	11.53	0.230	125.0	124.0	82.7	129.6	+00.8	-	-	57.9	JW	JW
$N=8$	30.0	0.244	125.5	120.7	79.7	127.6	+01.8	+0.80	-0.20	58	J	J
#252	ALY α-Lyncids			12/10-01/03								
Outburst (1971)	(25.4)	0.281	84.4	295.9	268.8	Dec. 21	268.9	-	-	-	>350	Table III
? $N=5$	1.193	0.206	153.8	318.4	264.6	1971 Dec. 20	< 268.78	-	60	50.4	PJ	PJ
#15	URS Ursae Minorids (= Ursids)			12/17-12/26								
Outbursts (see Tab. 5b)												
$N=64$	4.62	0.944	51.5	204.9	270.74	219.35	271.0 ± 0.3	3.4	(0.7)	12 ± 3	PJ	IMO
σ	±1.3	±0.007	±1.0	±1.9	±0.07	±4.0	270.6 ± 0.1	3.0	1.6	33.0	IMO	This work
$N=-$	2.62	0.89	52	224	270.7	190.5	+74.7	-	-	±0.9	32	KL (195)
Parent (2008)	8P/Tuttle	0.934	(Epoch 2008-01-15) 54.983	207.506	270.341	270.34	$T_J = +0.31$, $H_0 = +8.0$ ($n=6.0$)	-	-	34.27	0.0952	
(2049)	5.106	0.934	54.611	207.438	270.018	213.9	+74.4	-	-	34.08	0.1030	
#20	COM Dec. Comae Berenicians			12/12-01/15								
$N=-$	14.6	0.560	136.0	262.2	283.1	Dec. 26	274	3.0	26	3.2 ± 0.7	IMO	
$N=-$	11.1	0.86	149.4	137	260.7	175.7	+24.7	-	-	64	L87	
$N=4$	14.4	0.541	139.4	265.0	283.3	190.6	+13.7	-	-	64	GE (12.22)	
						175.2	+22.2	-	-	63.7	This work	

HYD – “this.” Strong variation of q versus i . Values are for a cluster of orbits near the center of the range.

URS – The proper name is “Ursae Minorids.” The activity curve consists of two components with $B=0.9 \pm 0.4$ (ZHR = 10) and $B+=0.08 \pm 0.03/B- = 0.5 \pm 0.4$ (ZHR = 2.0), where B is the \log_{10} exponent of ZHR versus solar longitude.

N = 11	Inf.	0.580	134.0	259.6	282.0	175.8	+25.4	+0.88	-0.45	64.0	AC
N = 1	18.92	0.556	136.4	263.2	284.3	176.4	+23.5	-	-	63.75	JW
#253	CMI	Dec. Canis Minorids	12/02-12/05	Dec. 03	Dec. 03	Dec. 03	252.4	-	-	-	Antihelion
	Outburst										
(1988)	93 meteors plotted										
N = 1	1.38	0.08	39	154	77	111	+11	-	-	~54	Ch. 13
N = 1	3.79	0.08	36	149	80	109	+13	-	-	Swift	Ch. 13
#254	PHO	Phoenicids	12/04-12/06	Dec. 05	Dec. 05	253	2.8 ± 1.5	<3			
	Outbursts (see Tab. 6k)										
Visual	2.96	0.99	13	359	74	15.6	-44.7	-	-	11.7	AC
<i>Parent</i>	<i>D/1819 W₁ (Blanpain)</i>		<i>(Epoch 1819-11-22)</i>				$\lambda_{\odot} = 249.80$	$T_J = +0.51$	$H_{10} = +8.5$		
(1819)	2.957	0.986	8,970	360,164	69,795	357.4	-42.0	-	-	10.06	0.0971
<i>Parent</i>	<i>2003 WY₂₅</i>		<i>(Epoch 2005-01-30)</i>				$\lambda_{\odot} = 252.25$	$T_J = +0.54$	$H_N = +20.88$		
(2005)	2.847	0.983	5,911	6,250	72,244	3.8	-26.6	-	-	9.15	0.0163
(1819)	2.993	0.889	9,23	349,65	80,020	347.9	-44.0	-	-	10.85	0.089
#255	PUV	Puppids-Velids I	11/02-01/22	Dec. 06	Dec. 06	254.0	2.9	18 ± 3	4.5 ± 0.7		PJ
		= core of Puppids-Velid Complex									
Visual											
N = 6	1.3	0.98	70	360	82.7	141.5	-45.0	+0.50	-0.20	36.8 ± 2.2	Mean
N = 3	1.1	0.98	75	361	82.7	145.5	-45.2	-	-	35.3	GE (12.07)
Visual				12/03-12/12		113.4	-45.2	-	-	37.4	GE (12.08)
Visual				12/03-12/04		118.4	-40.8	-	-	-	M (61)
#14	(XOR)	χ-Orionids	12/01-01/5	Dec. 11	Dec. 11	≤259	≤259	(22)	(22)	(0.6)	M (65)
#256	ORN	Northern χ-Orionids	12/01-01/5	Dec. 11	Dec. 11	≤259	≤259	(22)	(22)	(0.6)	
		= Extension of NTA into Dec.									
N = 12	2.22	0.449	2.5	283.9	257.3	83.9	+25.5	+0.54	+0.00	24.9	This work
N = 7	2.271	0.417	3.3	286.6	254.2	82.1	+26.4	-	-	26.4	PG
N = -	2.185	0.523	4.0	275.0	261.7	82.8	+23.0	-	-	23.6	T89 (72)
N = 15	1.729	0.376	0.1	294.4	251.6	83.4	+23.4	-	-	26.2	ZS
N = 49	1.475	0.265	0.0	309.2	256.9	97.0	+23.3	-	-	28.7	ZS73
N = 4	2.216	0.472	2.5	281.0	259.0	83.8	+26.0	-	-	25.7	L71B
N = 4	2.22	0.47	2	281	258	84.8	+26.0	-	-	25.2	AC

PUV – Puppids-Velids – Name consists of two constellation names, both “-id”.

Table 7 (*cont.*)

December

Code	Name	q	i	ω	Dates (2000)	Node	Peak R.A.	λ_{\odot}^{\max} Decl.	χ $\Delta R.A./\Delta\lambda$	W $\Delta\text{Decl.}/\Delta\lambda$	ZHR ^{max} V_g	Notes Δ_{C-E}
Parent? (2002)	2002 XM ₃₅				(Epoch 2002-12-02)							
	2.331	0.376	2.854	290.836	251.773	81.3	$\lambda_{\odot} = 251.77$ $+25.7$	$T_J = +2.96$	$H_N = +22.96$	28.31	0.0196	
#257 ORS	Southern χ-Orionids			12/01-01/16		Dec. 12	260		(2.2)	(0.6)		
	= Extension of STA into Dec.											
$N = 12$	2.23	0.594	5.2	86.4	80.1	78.7	+15.7	+0.88	-0.03	21.5	This work	
$N = 6$	2.193	0.528	4.4	94.3	78.5	81.1	+17.6	-	-	23.3	PG	
$N = 8$	2.224	0.471	6.9	100.6	79.8	85.7	+16.0	-	-	23.1	L71B	
$N = 4$	1.85	0.56	4.6	93.7	79.3	80.7	+16.8	+1.3	-	21.5	NL (60.12.2)	
$N = 32$	1.790	0.420	2.6	109.0	78.2	87.8	+20.6	-	-	25.2	ZS73	
$N = 8$	2.1	0.47	7	101	79	85.7	+16.0	-	-	25.5	AC	
$N = 4$	1.64	0.38	15.7	114.3	78.3	91.6	+08.9	-	-	26.9	NL (60.12.3)	
#4 GEM	Geminds			11/27-12/18		Dec. 14	262.08		(2.0)	0.90 ± 0.10	120 ± 10	Ch. 22
	<i>Main peak:</i>											
$N = 221$	1.372	0.1410	24.02	324.42	261.49	113.2	+32.5	+1.02	-0.15	34.58	DMS	
σ	± 0.033	-	± 1.29	± 0.91	± 0.30	± 0.69	± 0.24	-	-	± 0.61		
Mean	1.357	0.1400	24.27	324.63	261.433	At peak in year 2000						
Δ/Δ_{\odot}	-1.9e-3	+1.0e-3	-0.13	-0.41	+1.00							
Δ/yr	-7.0e-4	+2.1e-6	+9.7e-3	+7.8e-3	+6.8e-4							
$N = 19$	1.386	0.137	24.4	324.7	260.2	112.0	+32.6	-	-	35.0	PG	
	<i>Background component (radar):</i>											
$N = 48$	1.376	0.141	23.9	324.9	259.2	110.5	+32.9	+0.92	+0.07	34.63	This work	
σ	± 0.12	± 0.009	± 2.1	± 1.2	± 1.7	± 0.76	± 0.36	-	-	± 0.80		
$N = 118$	1.306	0.139	23.2	325.2	262.1	114.2	+32.1	-	-	34.0	ZS	
$N = 20$	1.30	0.13	18.2	327	261.7	112.8	+29.9	-	-	34.2	GE	
$N = 11$	1.19	0.14	16.4	325.7	260.1	110.2	+29.9	+1.1	-	32.5	NL (60.12.1)	
$N = 401$	1.31	0.14	24	326	260.7	111.8	+32.9	-	-	34.2	KL (51)	

Parent (2005)	3200 Phaethon 1.271	(Epoch 2005-08-18) 24.186	0.140	325.246	262.495	115.0	$\lambda_{\odot} = 262.50$ +32.4	$T_J = +4.51$	$H_N = +14.6$	33.92	0.0208
#258	DAR	Dec. α-Aurigids		12/14-12/31	Dec. 14	Dec. 14	262.2	1.8	(7)	~1/10	
	Outburst? (1996)			1996 Dec. 13			262.218				
	N = 5	2.279	0.668	257.7	79.7	262.218	+43.1				T89
	N = --	2.365	0.694	253.6	84.9	270.0	+35.5				PG
	N = --	2.096	0.760	245.4	85.9	274.7	+42.0				T89 (77)
	N = 22	1.851	0.901	221.0	91.2	276.5	+62.0				T89 (78)
	N = 6	2.053	0.816	235.9	85.0	293.9	+58.3				ZS
#259	CAR	Carinids		12/04-02/04	Dec. 16	Dec. 16	264	3.0	(25)	14.2	ZS73
	Visual				$\lambda_{\odot} = 263.7$	129.0	-58.0			38.9 \pm 2.5	Mean
	N = 4	2.94	0.91	323.7	76.9	155.3	-60.9			38.9	NL (60.12.7)
	N = 16	1.940	0.970	347.0	79.7	142.4	-54.2			39.0	JVF
	N = 3	1.89	0.98	340.5	77.2	143.6	-54.3			38.5	NL (61.12.6)
	N = 5	2.08	0.98	353.4	79.0	138.8	-53.1			39.1	NL (60.12.8)
	N = 7	2.205	0.970	344	82.7	135.6	-63.4			33.2	GE (12.06)
#260	GTI	γ-Triangulids		12/15-01/13	Dec. 24	Dec. 24	272		(12)		
		= Dec. β -Perseids									
	N = 3	2.545	0.926	212.0	273.0	43.3	+41.6			11.3	PG
	N = --	2.292	0.932	209.3	272.3	40.8	+32.2			10.5	T89 (76)
	N = 14	2.420	0.857	228.0	262.6	54.7	+25.2			12.8	L71B
#261	DDC	Daytime δ-Scorpiids		12/05-12/07	Dec. 06	Dec. 06	254			(2)	
		= ecliptic helion source									
	N = 4	2.38	0.50	262.6	74.4	246.6	-26.3			25.3	NL (61.12.3)
	N = 3	2.27	0.43	255.4	79.5	248.8	-24.3			26.9	NL (60.12.5)
Parent? (2006)	2004 YD ₅ 2.274	(Epoch 2006-03-06) 3.610	0.494	262.331	88.195	263.1	$\lambda_{\odot} = 268.24$ -27.4	$T_J = +0.39$	$H_N = +29.26$	24.89	0.0002
#262	KLI	Daytime (κ-)Librids		12/08-12/12	Dec. 11	Dec. 11	259			(2)	
	N = 3	1.35	0.19	221.1	78.8	231.3	-20.8			31.9	NL (60.12.6)
	radar			235.7	235.7	19.2					ER55

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