



A STATISTICAL WALK THROUGH THE IAU MDC DATABASE

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Overview of the IAU MDC database

Meteor Data Center

IAU-HDC home IAU Commission 22 IAU Commission 15 IAU Division F IAU main page

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List of all meteor showers Sorting by: [IAU No](#) [Sol. Lon.](#) [R.A.](#) [D.E.](#) [VG](#) [DOWNLOAD](#) list of all showers!

No	Code	Name	No	Code	Name	No	Code	Name
00001	CAP	alpha Capricornids	00229	NAU	nu Aurigids	00427	FED	February eta Draconids
00002	STA	Southern Taurids	00230	ICS	October iota Cassiopeids	00428	DSV	December sigma Virginids
00003	SIA	Southern iota Aquariids	00231	ACM	Daytime alpha Canis Majorids	00429	ACB	alpha Coronae Borealis
00004	GEM	Geminids	00232	BCN	Daytime beta Cancrids	00430	POR	September pi Orionids
00005	SDA	Southern delta Aquariids	00233	OCC	October Capricornids	00431	JIP	June iota Pegasus
00006	LYR	April Lyrids	00234	EPC	October epsilon Piscids	00432	NBO	nu Bootids
00007	PER	Perseids	00235	LCY	lambda Cygnids	00433	ETP	eta Pegasus
00008	ORI	Orionids	00236	GPS	gamma Piscids	00434	BAR	beta Arietids
00009	DRA	October Draconids	00237	SSA	sigma Arietids	00435	MPR	mu Perseids
00010	QUA	Quadrantids	00238	DOR	alpha Doradids	00436	GCP	gamma Cepheids
00011	EVI	eta Virginids	00239	GPU	October gamma Puppids	00437	NLY	November Lyncids
00012	KCG	kappa Cygnids	00240	DFV	Daytime psi Virginids	00438	MLE	mu Leonids
00013	LEO	Leonids	00241	OUI	October Ursae Minorids	00439	ASX	alpha Sextantids
00014	XOR	chi Orionid Complex	00242	XDR	xi Draconids	00440	NLM	November Leonis Minorids
00015	URS	Ursids	00243	ZCN	zeta Cancrids	00441	NLD	November lambda Draconids
00016	HYD	sigma Hydrids	00244	PAR	psi 1 Aurigids	00442	RLE	rho Leonids
00017	NTA	Northern Taurids	00245	NHD	November Hydrids	00443	DCL	December Leonids
00018	AND	Andromedids	00246	AMO	alpha Monocerotids	00444	ZCS	zeta Cassiopeids
00019	MON	December Monocerotids	00247	TAU	Taurid Complex	00445	KUM	kappa Ursae Majorids
00020	COM	Comae Berenicids	00249	NAR	November nu Arietids	00446	DPC	December phi Cassiopeids
00021	AVB	alpha Virginids	00250	NOO	November Orionids	00448	AAL	April alpha Librids
00022	LMI	Leonis Minorids	00251	IVI	Daytime iota Virginids	00449	ABS	April beta Sextantids
00023	EGE	epsilon Geminids	00252	ALY	alpha Lyncids	00450	AED	April epsilon Delphinids
00025	NOA	Northern October delta Arietids	00253	CMI	December Canis Minorids	00451	CAM	Camelopardalids
00026	NDA	Northern delta Aquariids	00254	PHO	Phoenicids	00452	TVI	theta Virginids
00027	KSE	kappa Serpentids	00255	PUV	Puppil-Velorids I Complex	00453	MML	May mu Leonids
00028	SOA	Southern October delta Arietids	00256	ORN	Northern chi Orionids	00454	MPV	May phi Virginids
00029	DLE	delta Leonid Complex	00257	ORS	Southern chi Orionids	00455	MAC	May alpha Comae Berenicids

CATALOGUES
[List of all showers](#)
[List of established showers](#)
[Working list of showers](#)
[List of shower groups](#)
[List of removed showers](#)
[Database of photographic meteor orbits](#)

DOCUMENTS
[New meteor shower reports](#)
[Shower nomenclature rules](#)
[Shower nom. working group](#)

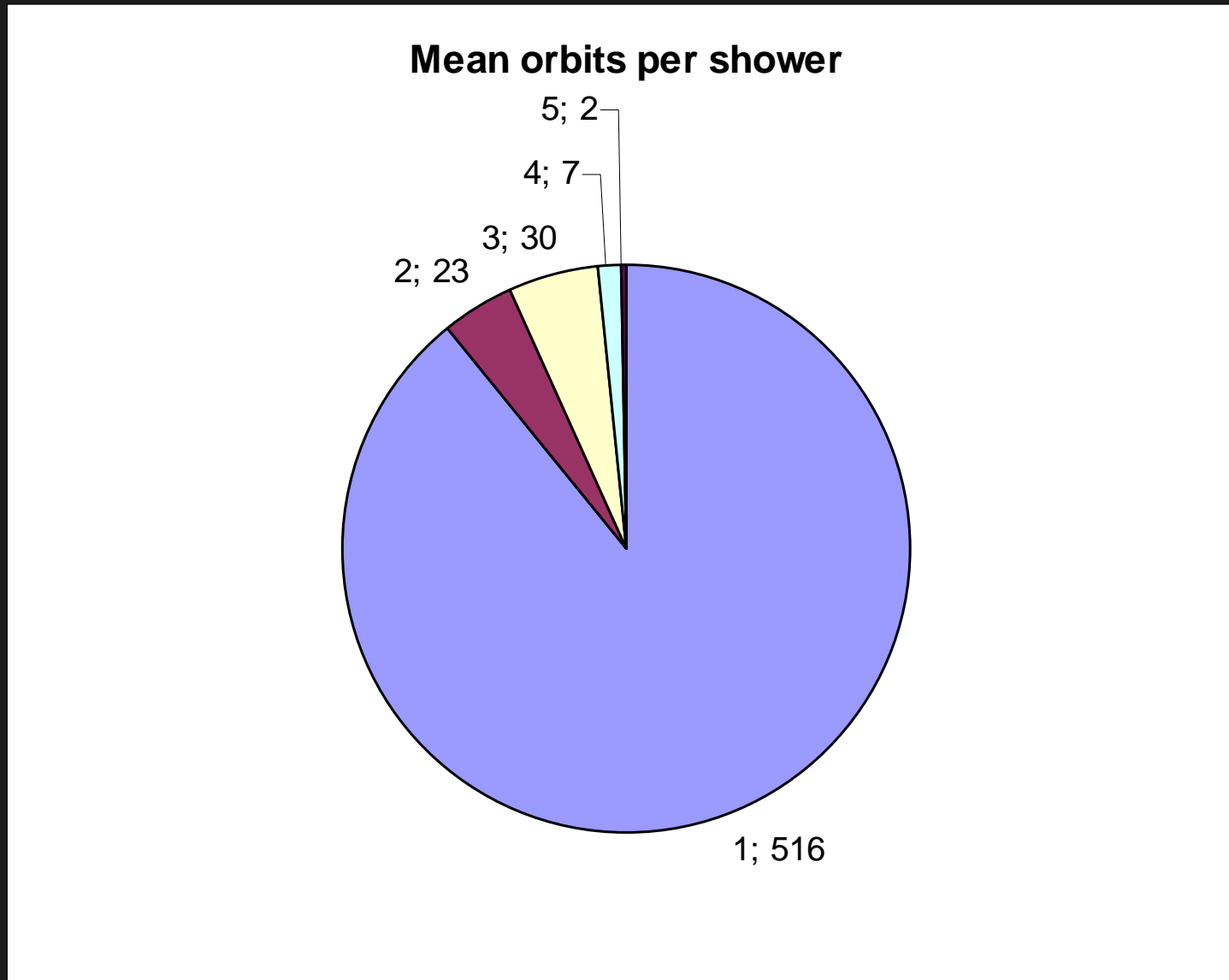
OTHER SITES
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[ASTDYS main page](#)
[IMO main page](#)

- base downloaded on June 1st, 2014 (Last update: 2013.12.13)

Overview of the IAU MDC database

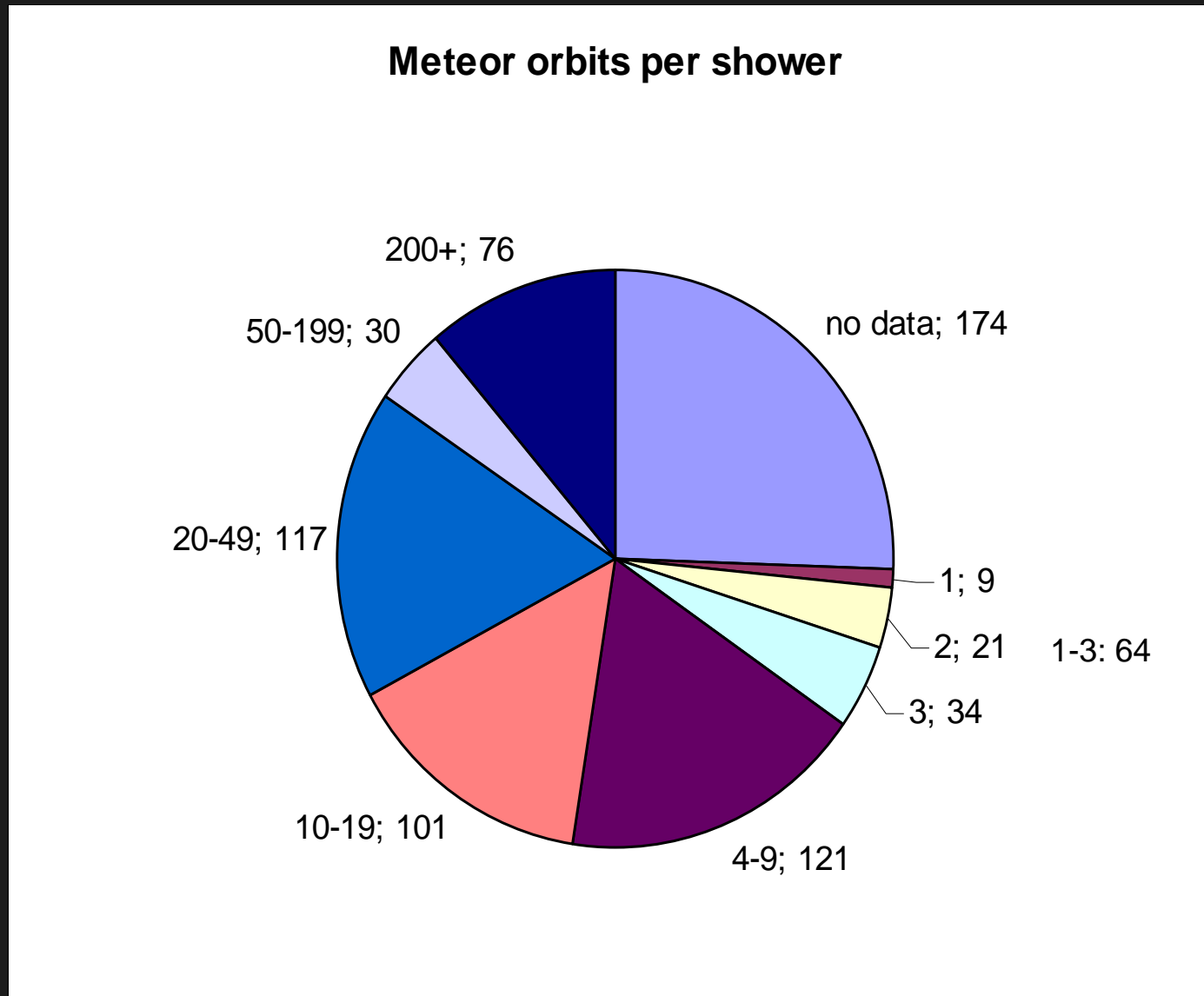
- on-line version is a standard .csv file, separator is "|".
- 45 comment lines at the beginning.
- 683 data lines.
- data about 578 showers (some showers have several entries).
- 24 shower complexes are included in the database.
- 427 lines include bibliographic data.

Overview: number of mean orbits for one shower



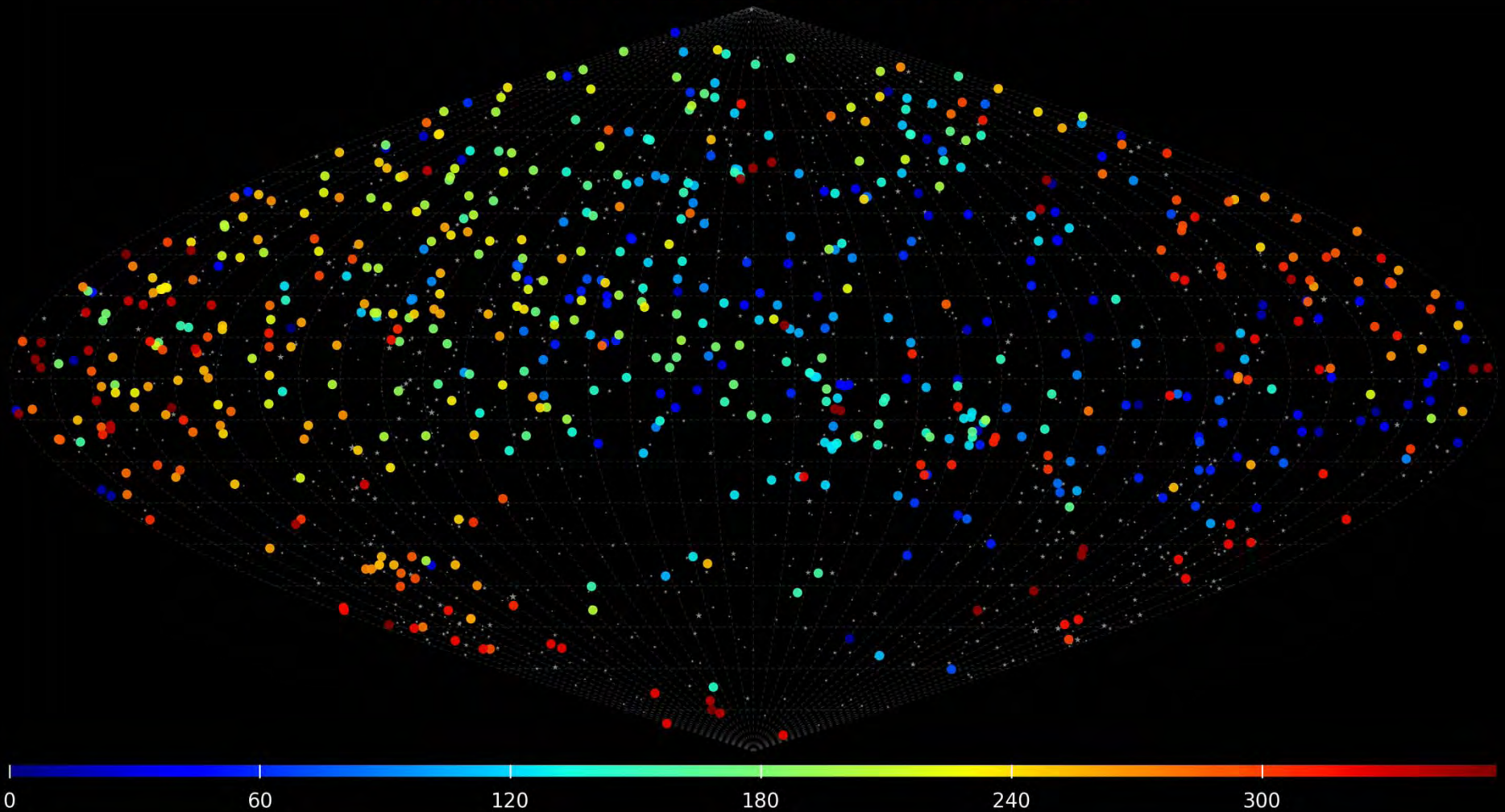
1-3: 64

Overview: number of meteors in a shower



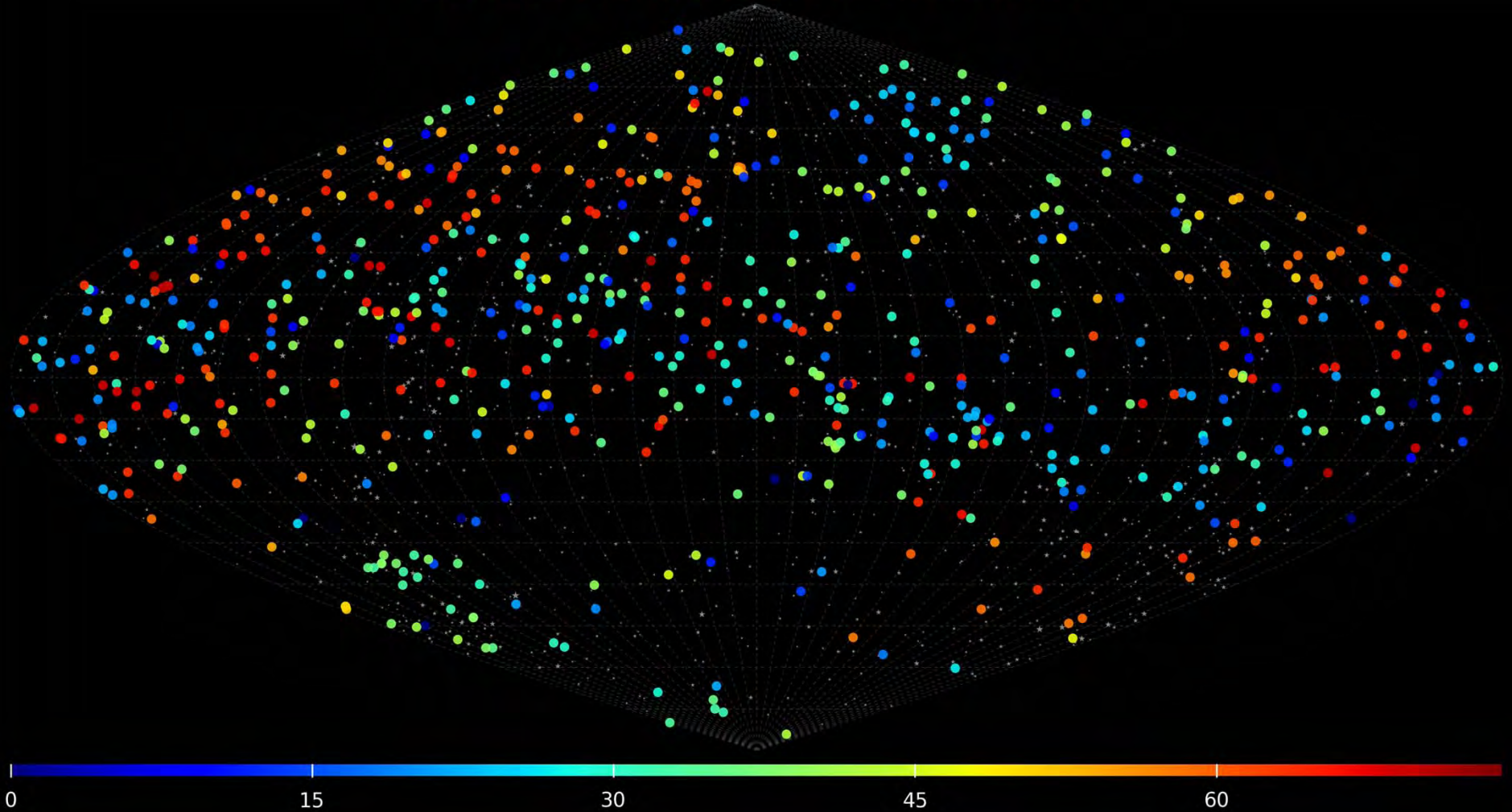
Overview: all radiants with sol color coded

IAU MDC database showers



Overview: all radiants with v_g color coded

IAU MDC database showers



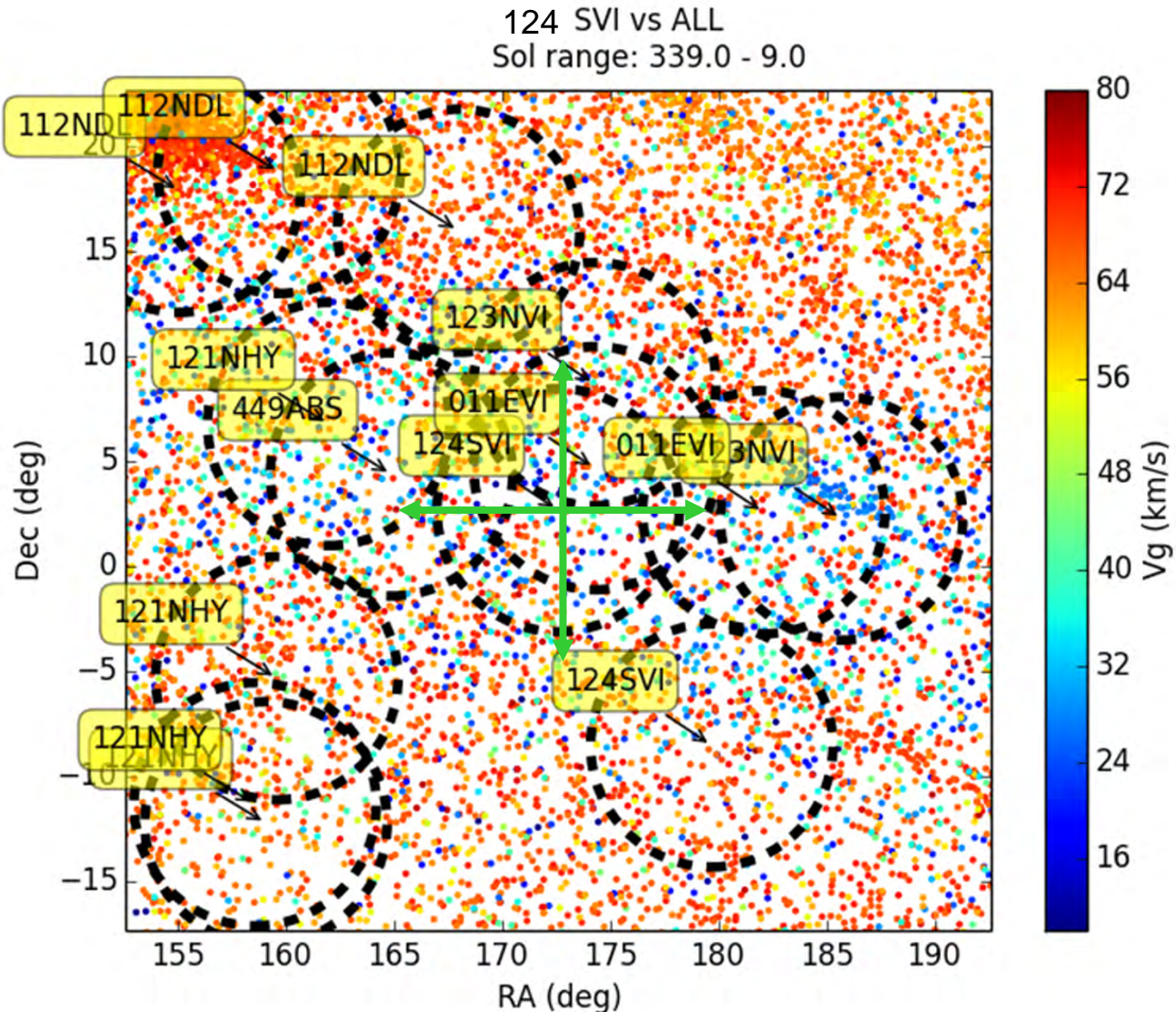
Minor inconsistencies in the IAU MDC

- in 55 cases Flamsteed star numbers part of the shower name (not consistent with the current naming rules).
- 95 showers have status 10, not explained in the comments.
- "-.-" or "-" indicating missing data in some places.
- numerical values sometimes given as range (i.e. 2-5, etc.) or as inf., or similar. Example: $a = (2.5)$ converts to -2.5 in Excell
- a few typos were found.

Shower similarities from orbital similarity

- each line of data treated as a single shower (647 showers in the database, not actual 578).
- all showers were mutually compared using Southworth-Hawkins orbital similarity criterion.
- tolerance set to $D_{SH} \leq 0.15$.
- 120 showers have no, or incomplete, orbital data.
- 61 similar pairs (42 different showers) found.

Shower similarities from radiant search



$$\Delta \text{sol} \leq 7^\circ$$

$$\Delta \text{RA} \leq 7^\circ$$

$$\Delta \text{DE} \leq 7^\circ$$

manually:

$$\Delta v_g \leq 3 \text{ km/s}$$

- 30 similar pairs found (2 labeled in the database as identical).

Combined results of both searches

- only 4 pairs appear on both lists!
- these 4 cases are discussed in details in the article.
- radiant search very unreliable, analysis of orbital similarity search results show that tolerances have to be more relaxed:

$$\Delta\text{sol} \leq 20^\circ$$

$$\Delta\text{RA} \leq 14^\circ$$

$$\Delta\text{DE} \leq 7^\circ$$

$$\Delta v_g \leq 3 \text{ km/s (confirmed)}$$

Conclusions

- A reliable database of showers and shower candidates is a must in the modern research.
- IAU MDC database satisfies basic requirements but needs to be improved:
 - orbital elements are a must today.
 - data have to be checked against typos, etc. periodically.
 - database has to be updated more rapidly.
 - activity period needs to be specified.
 - naming rules not adequate for such number of showers.
 - what is the minimum number of orbits for a new shower?
 - can IMO help?



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Thank you for your attention. Questions?