



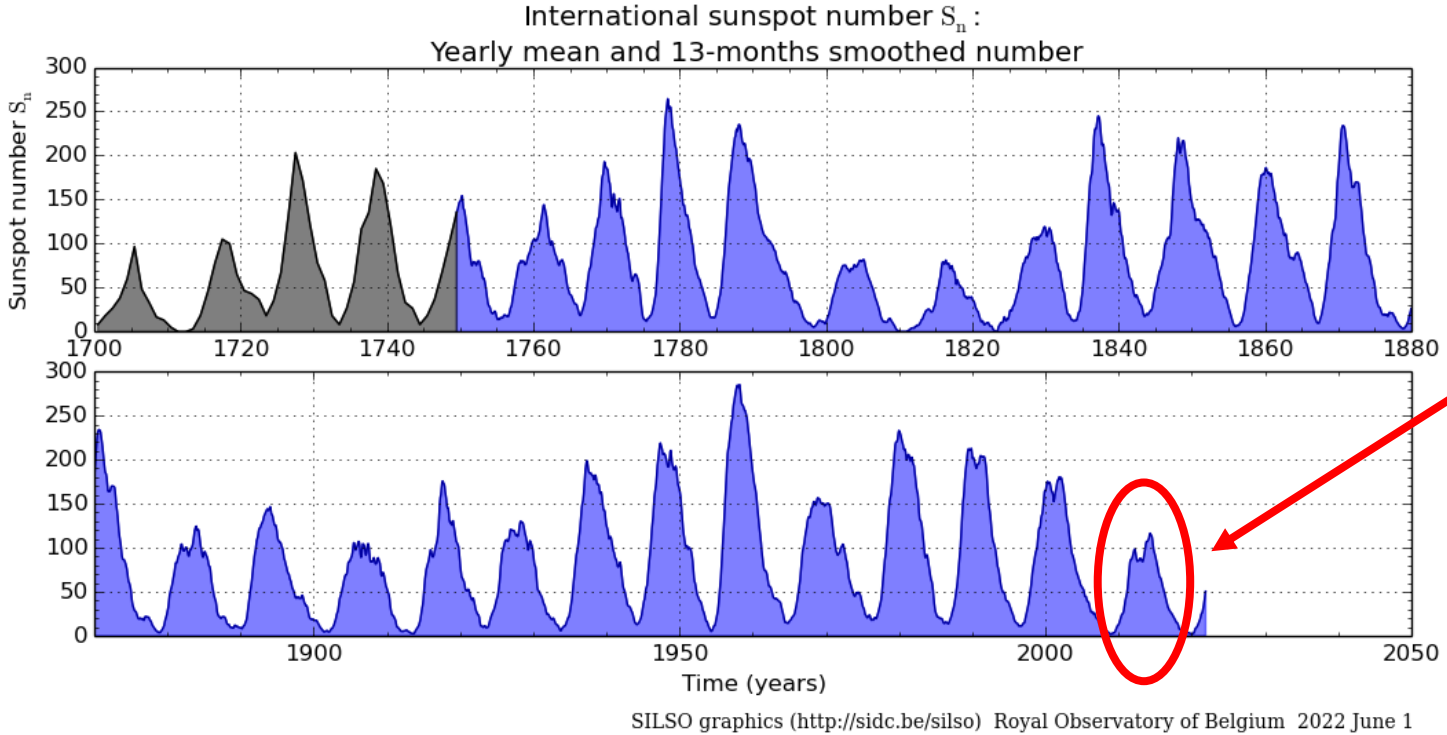
Online Catalog of Solar Activity Events of Solar Cycle 24

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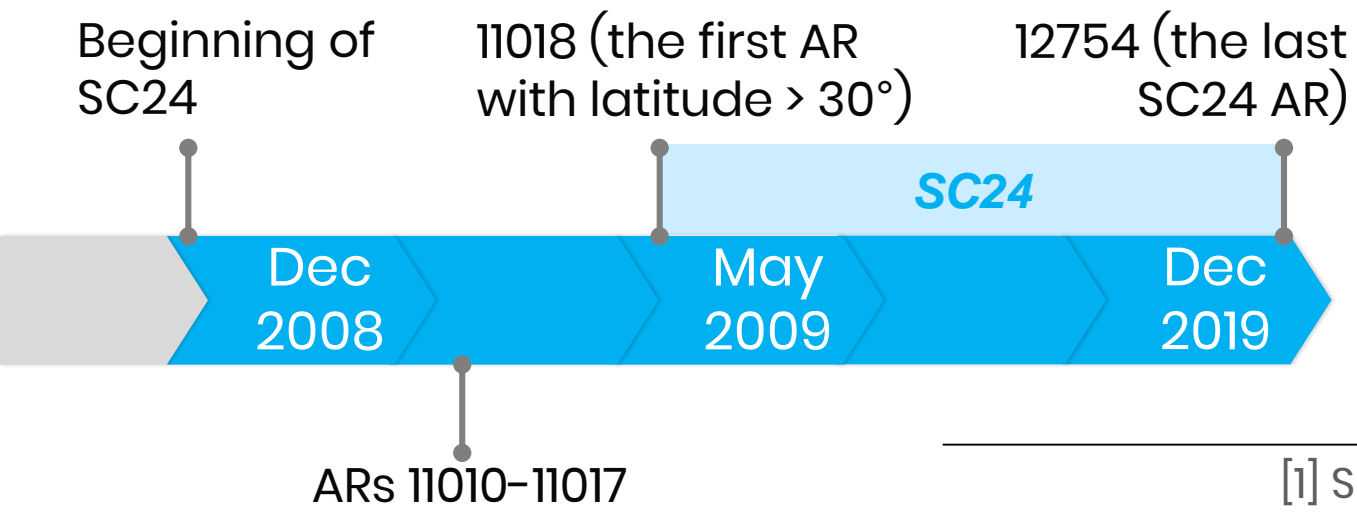




SILSO graphics (<http://sidc.be/silso>) Royal Observatory of Belgium 2022 June 1

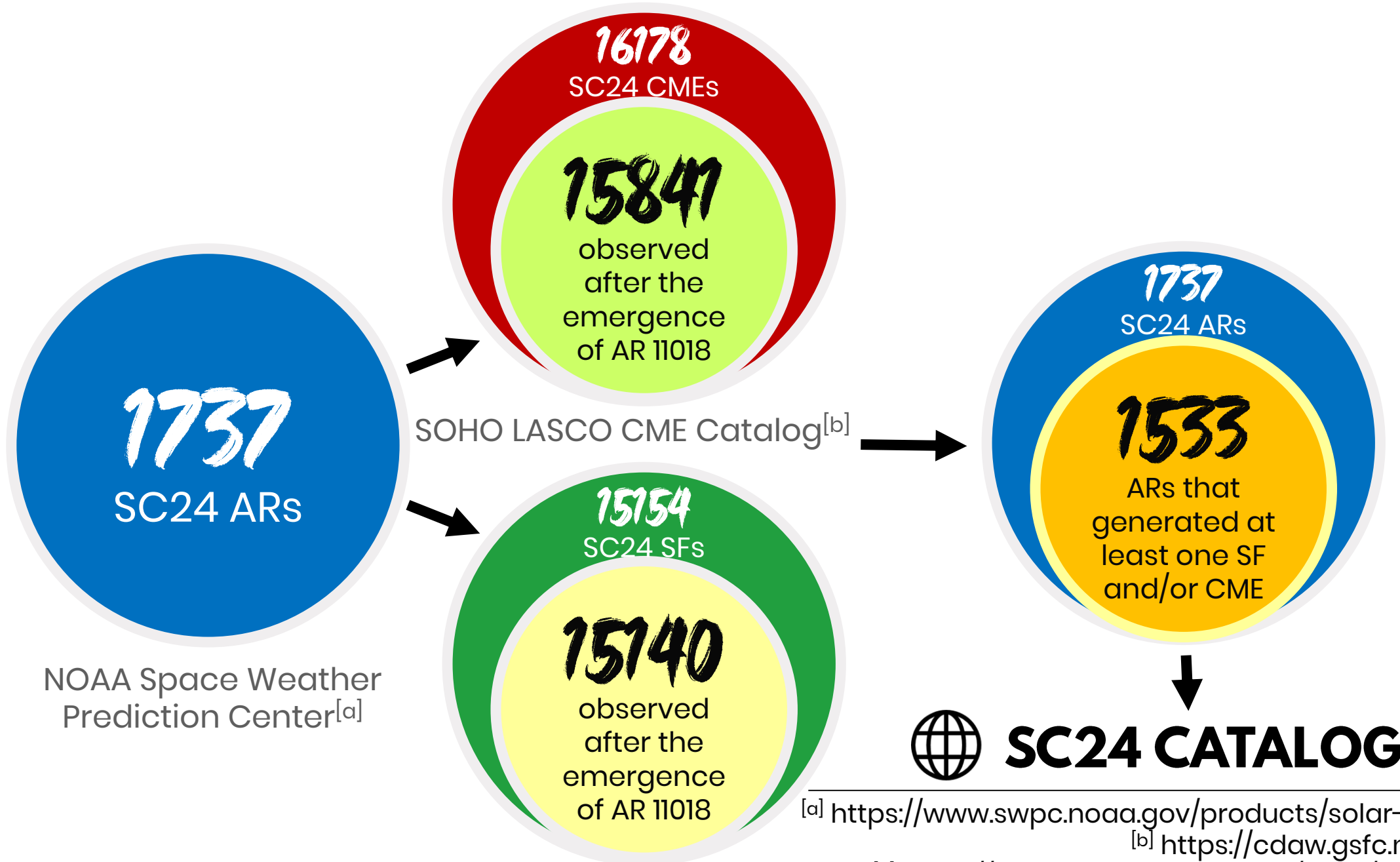
Solar cycle 24 (SC24):

- the weakest since SC14 (1902–1913)
- 4-th weakest ever



Period	Dec 2008 – Dec 2019 ^[1]
Duration	11.0 years
First SC24 AR	NOAA 11018 (23 May 2009)
Last AR	NOAA 12754 (25 Dec 2019)
Maximum	April 2014

[1] SILSO Database of Royal Observatory of Belgium, Brussels

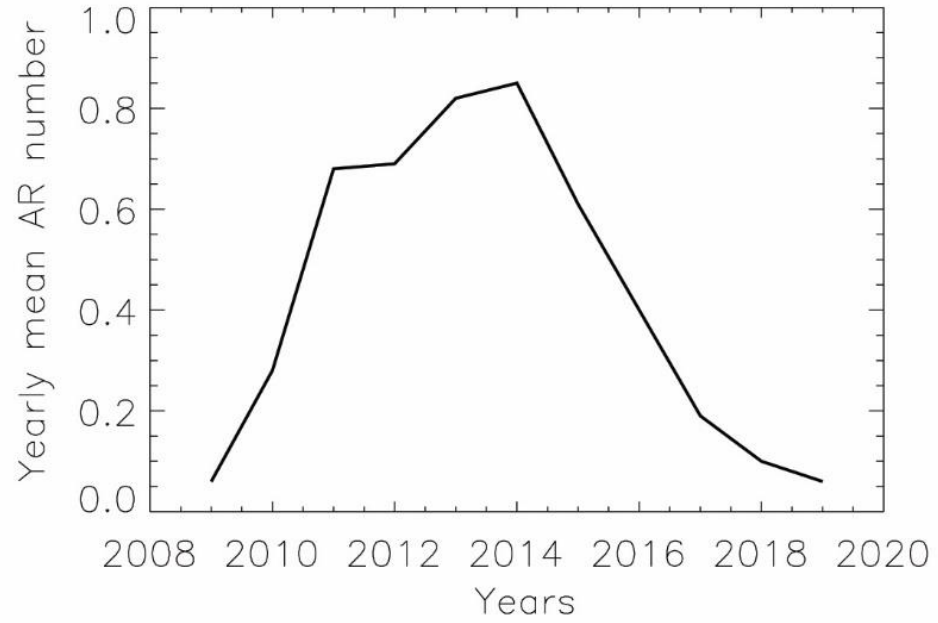
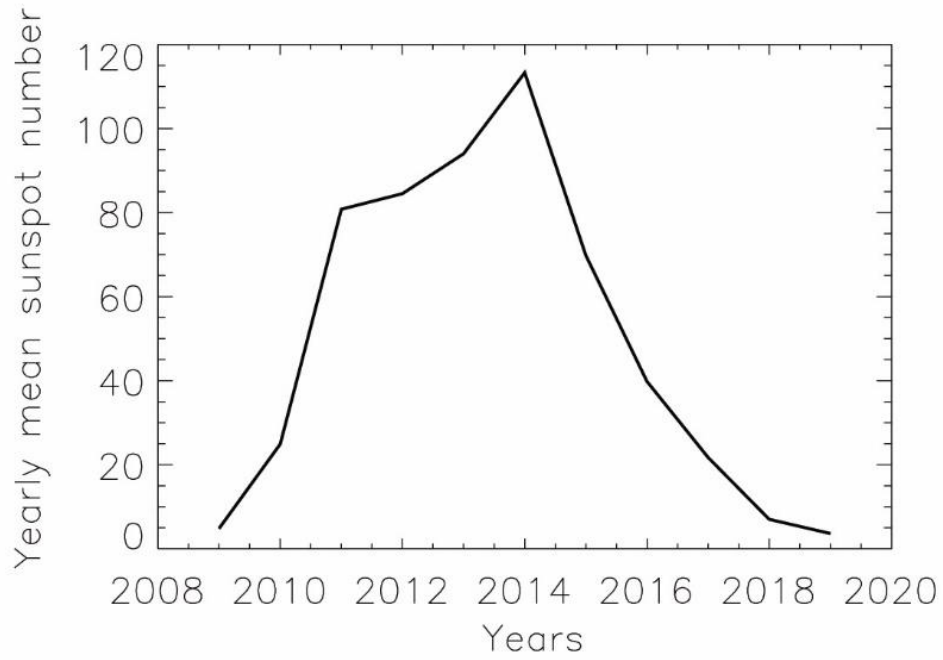


^[a] <https://www.swpc.noaa.gov/products/solar-region-summary/>

^[b] https://cdaw.gsfc.nasa.gov/CME_list/

^[c] https://hesperia.gsfc.nasa.gov/goes/goes_event_listings

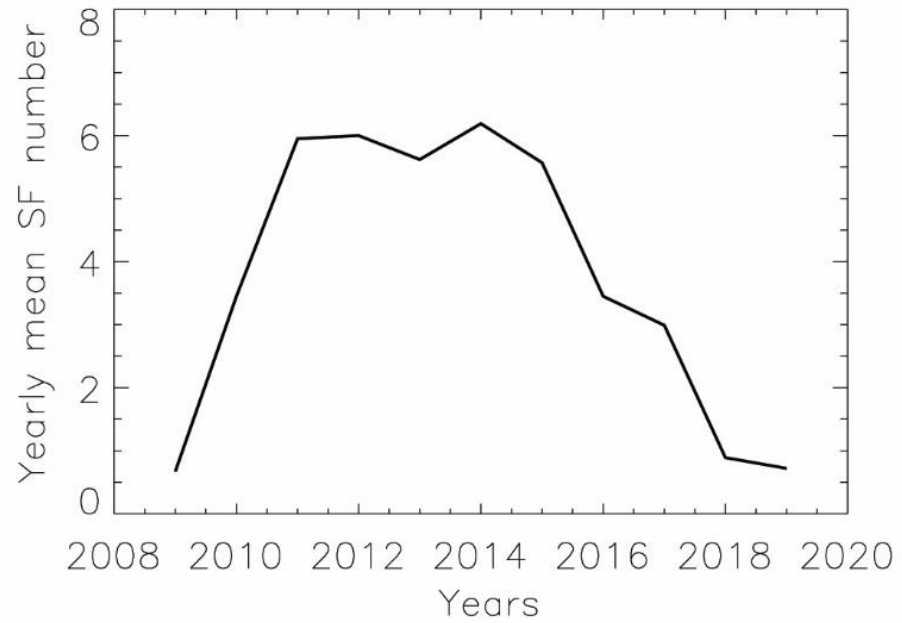
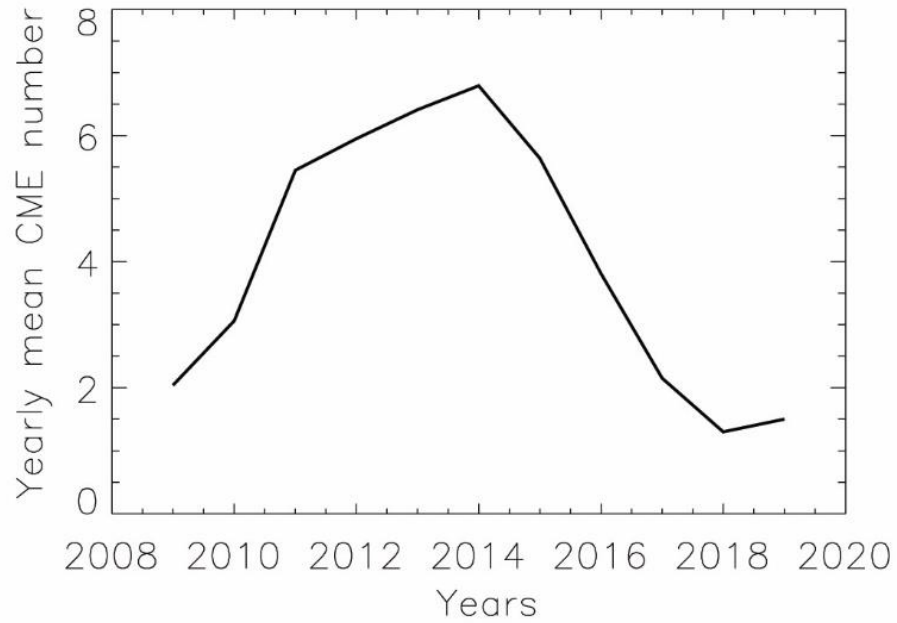
		AR			CME				SF							
NOAA No.	Date	Lat	Long	Type	Onset	CPA	AW	V	Start	Peak	End	Class				
11018	23/05/2009	-33	-38	β	02:30:03	116	8	260								
					05:54:03	108	13	273								
11021	17/06/2009	-16	71	α	22:30:03	242	12	516								
11024	03/07/2009	-25	-16	β					23:05	23:08	23:10	B1.3				
									23:49	23:54	23:58	B3.2				
	04/07/2009	-27	-2	β					01:02	01:19	01:26	B3.6				
									02:08	02:13	02:20	B4.7				
									04:29	04:37	04:42	B8.3				
									06:00	06:06	06:13	B2.1				
									07:48	07:52	07:56	B2.8				
									12:31	12:34	12:38	B2.0				
									13:40	13:55	13:57	B5.3				
									15:03	15:08	15:12	B4.8				
									16:11	16:14	16:16	B1.5				
									22:01	22:09	22:15	B5.9				
					05/07/2009	-27	13	β					07:07	07:13	07:18	C2.7
					06/07/2009	-27	26	β					16:59	17:05	17:11	C1.0
11025	08/09/2009	17	74	-					17:01	17:05	17:10	B2.2				
11026	21/09/2009	-29	-63	α					12:51	12:56	13:02	B1.1				
	22/09/2009	-30	-54	β	09:08:02	128	9	382	10:54	10:57	11:01	B3.6				
...																
18055 rows																

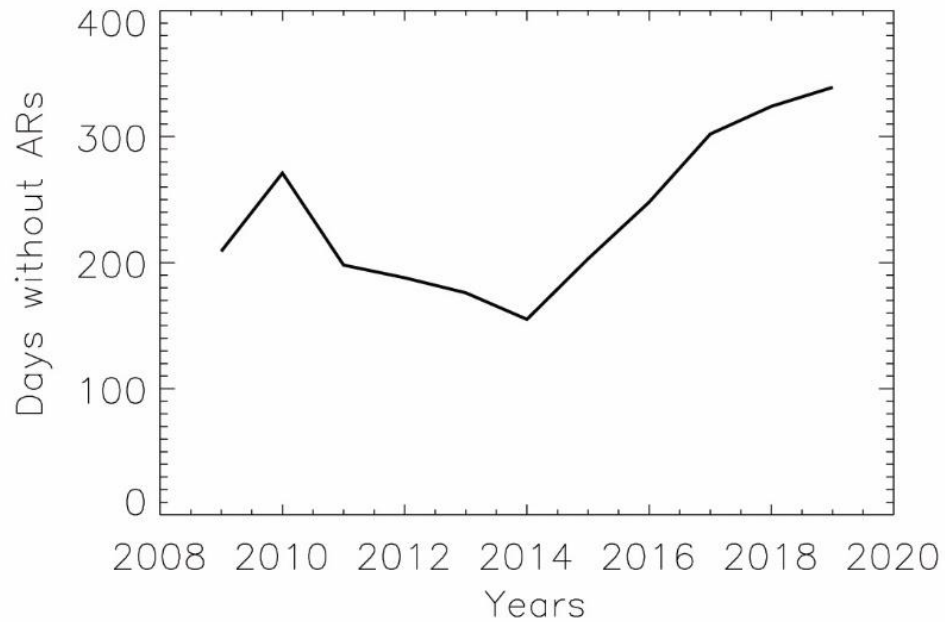
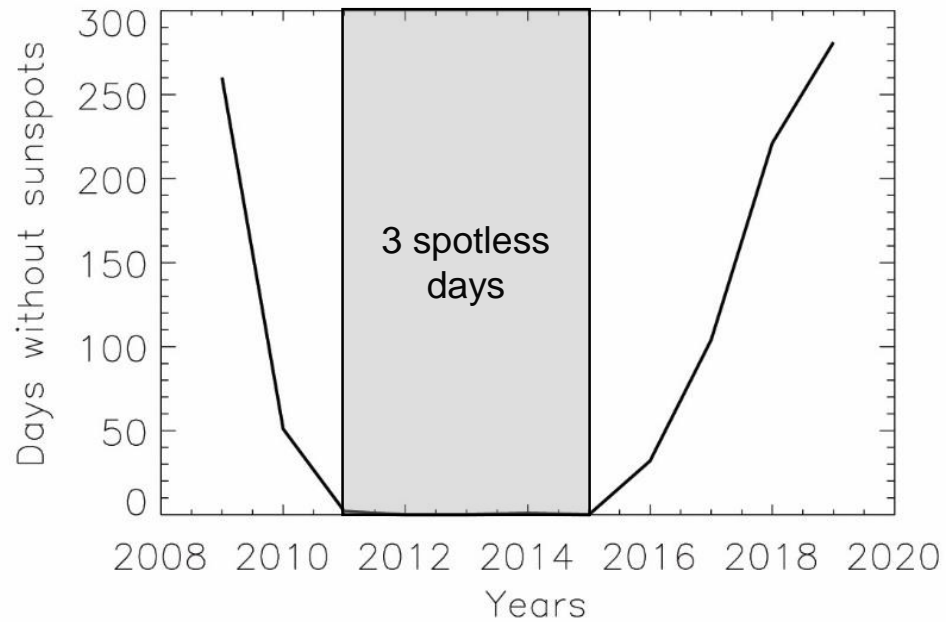


Peak (**2014**):

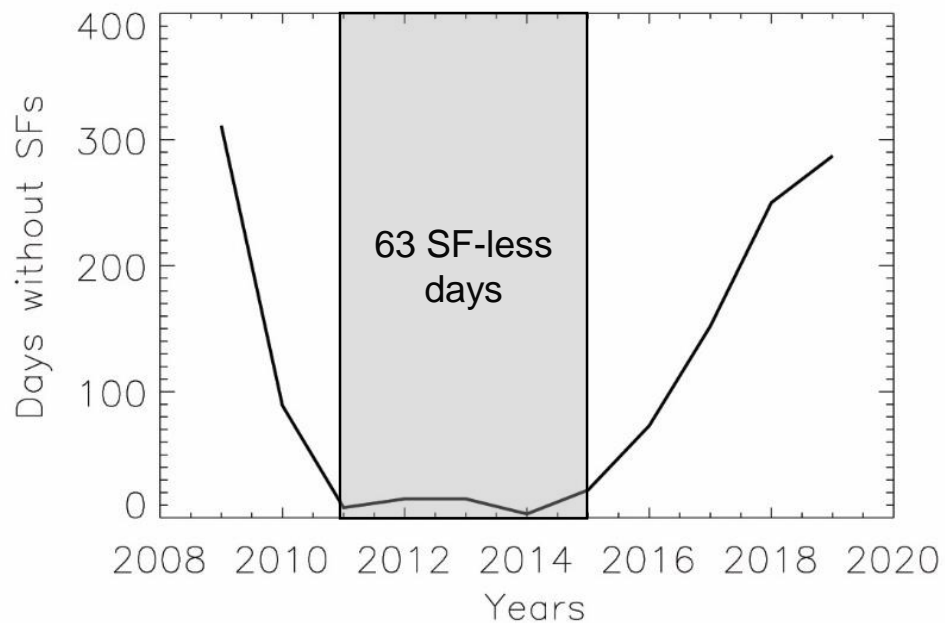
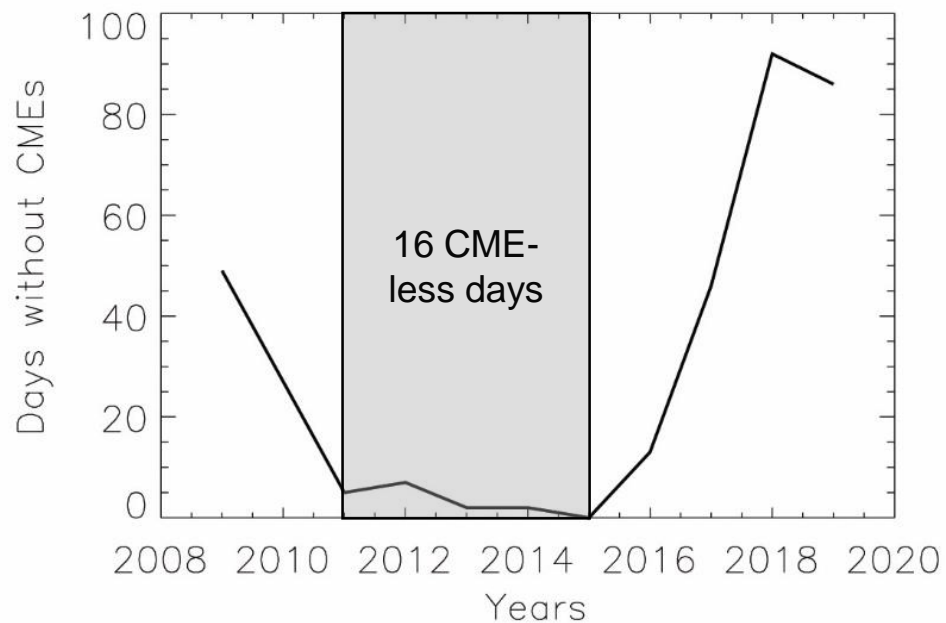
- 113.3 sunspots
- 0.85 ARs
- 6.79 CMEs
- 6.19 SFs

per day on average





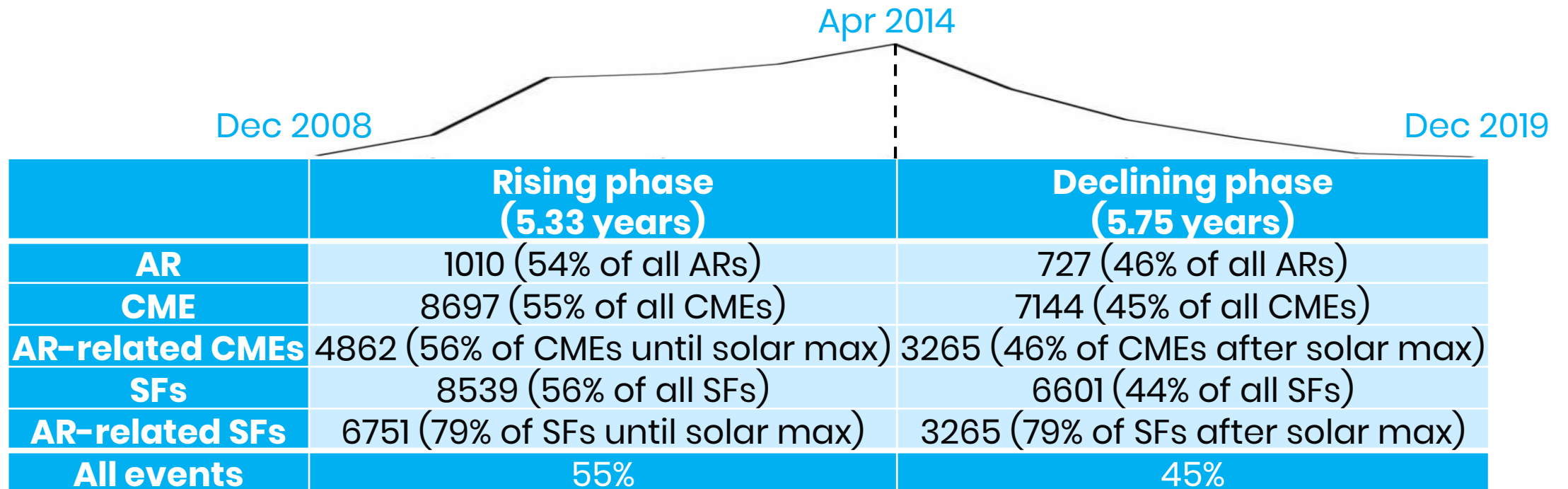
Quiet period
2011-2015:
 5 years
 1826 days



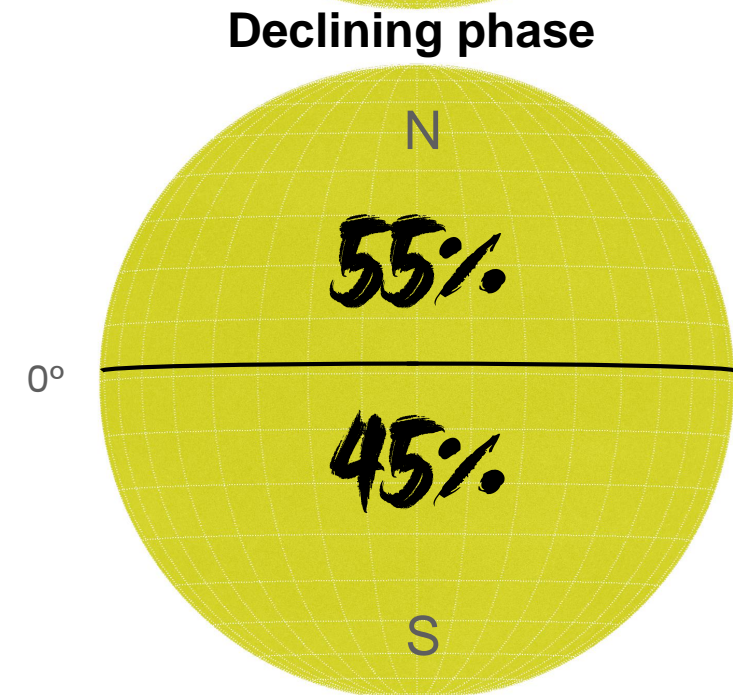
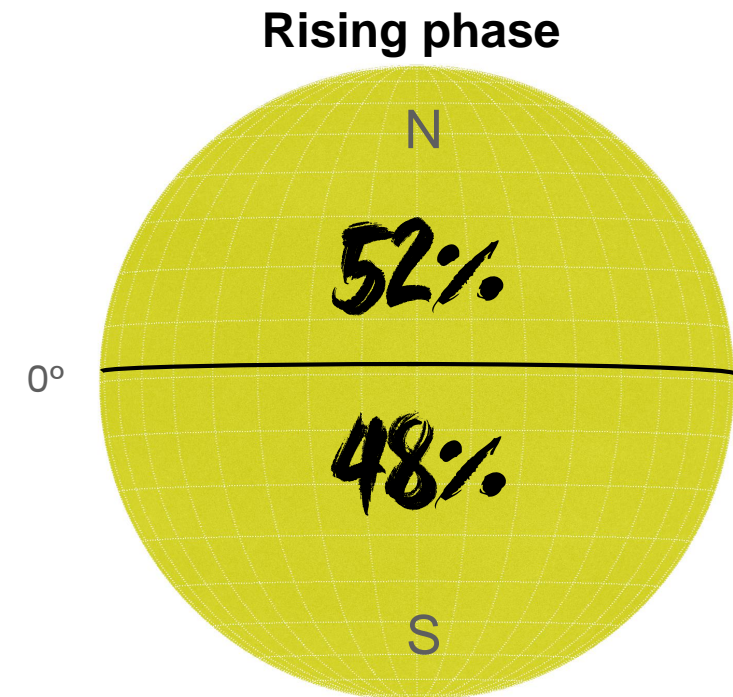
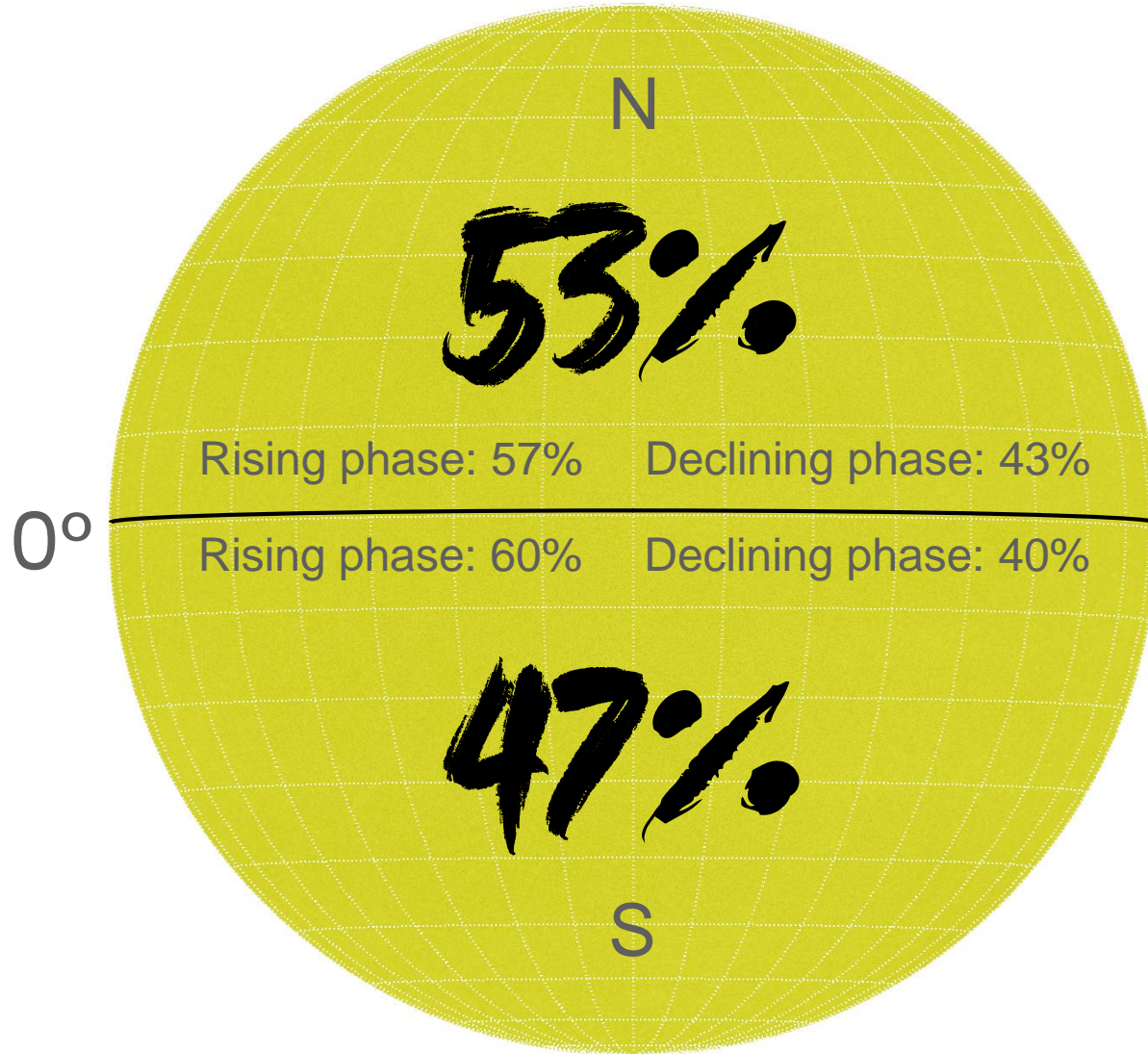
Solar Activity Events of Solar Cycle 24									
		CMEs				Flares			
		Number		%		Number		%	
AR-related		8126		51.3		12512		82.6	
Non-AR-rel		7715		48.7		2628		17.4	
Total		15841				15140			
		-less	-productive	-rich (≥ 3)	Total	-less	-productive	-rich (≥ 3)	Total
ARs	Number	327	1410	1033	1737	628	1109	768	1737
	%	18.8	81.2	59.5		36.2	63.8	44.2	
				73.3				69.3	

- AR-related CMEs: >50%
- CME-productive ARs: >80% (73% CME-rich)
- SFs formed in AR: >80%
- SF-productive ARs: ~64% (69% SF-rich)

- 55% of all solar activity events were observed in the rising phase of the SC - 54% of ARs, 55% of CMEs and 56% of SFs.
- CMEs: before solar maximum - mostly AR-related (56%); after it - mostly originated outside AR (54%).
- SFs: most events were associated with ARs both before (79%) and after (84%) the peak of the SC.

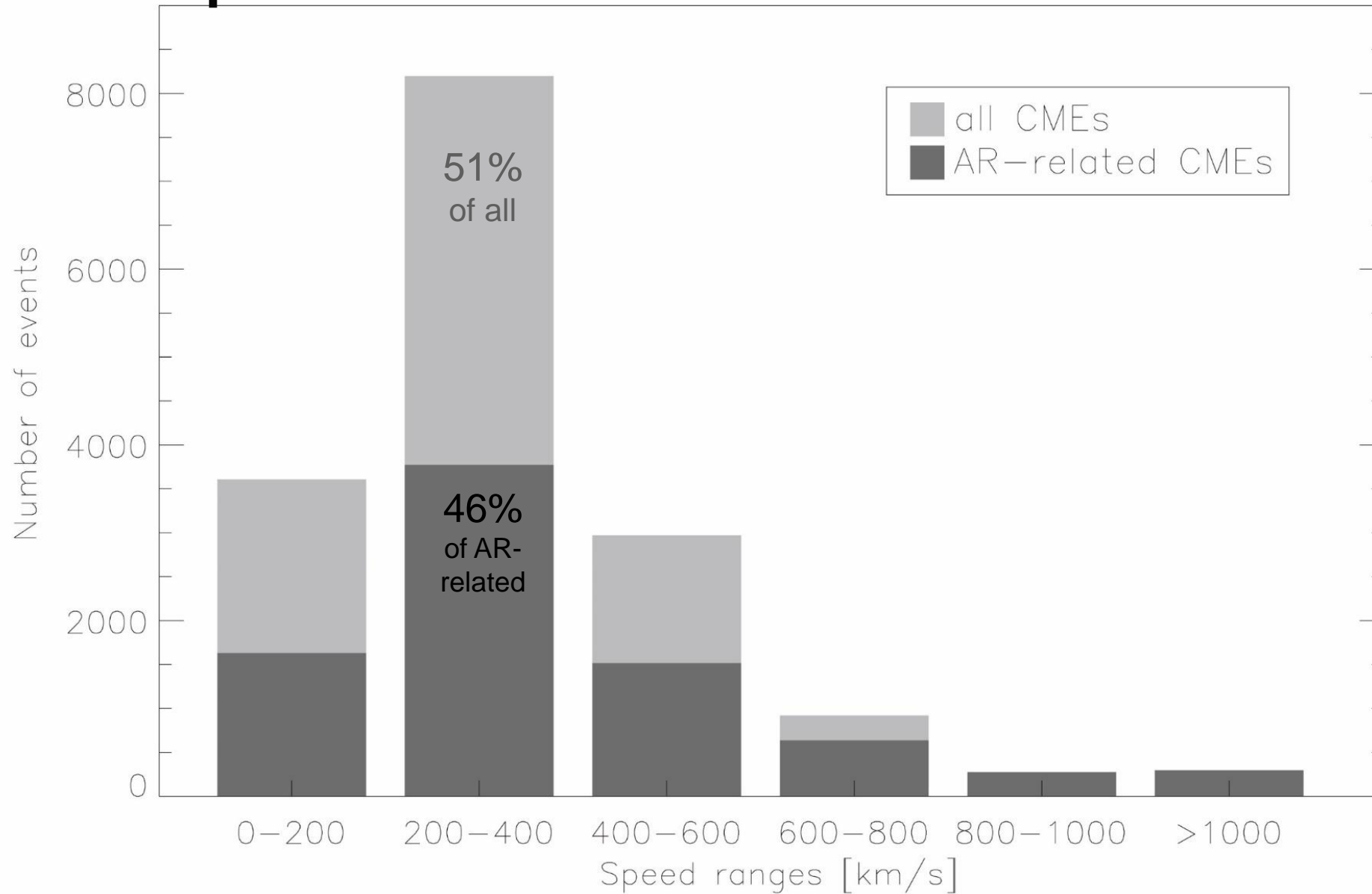


ARs N-S asymmetry



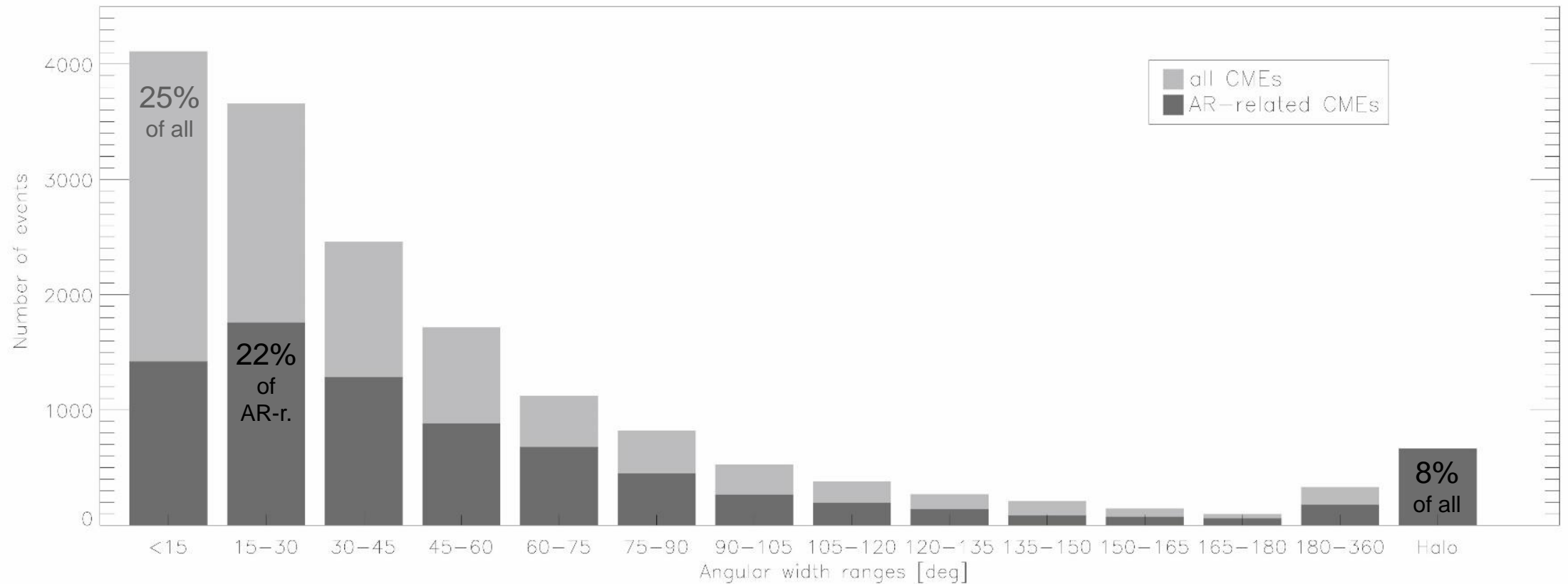
CME speed distribution

Median:
AR-related CMEs – 319 km s⁻¹
CMEs Outside AR – 294 km s⁻¹

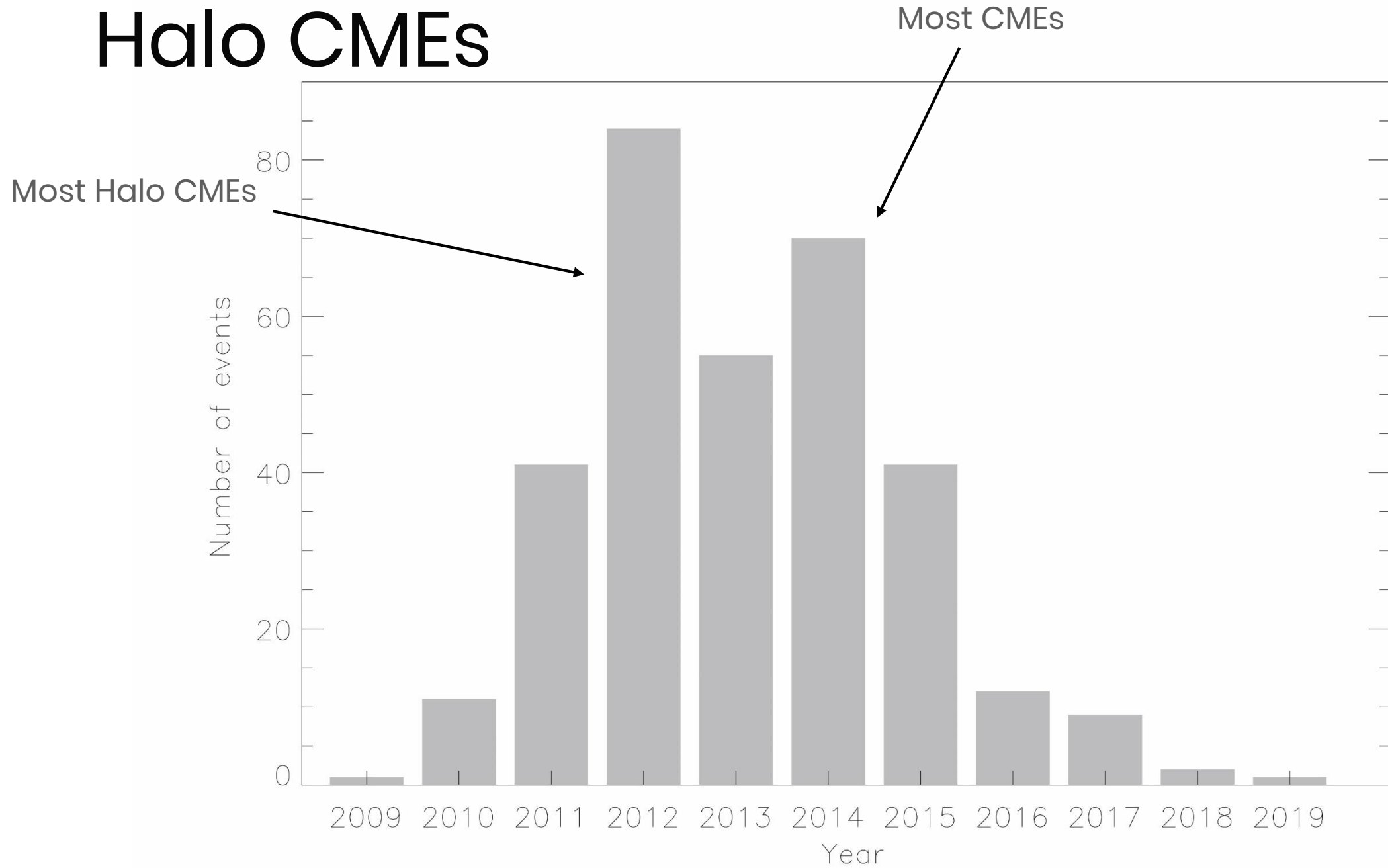


CME angular width distribution

Median:
AR-related CMEs – 40°
CMEs Outside AR – 32°

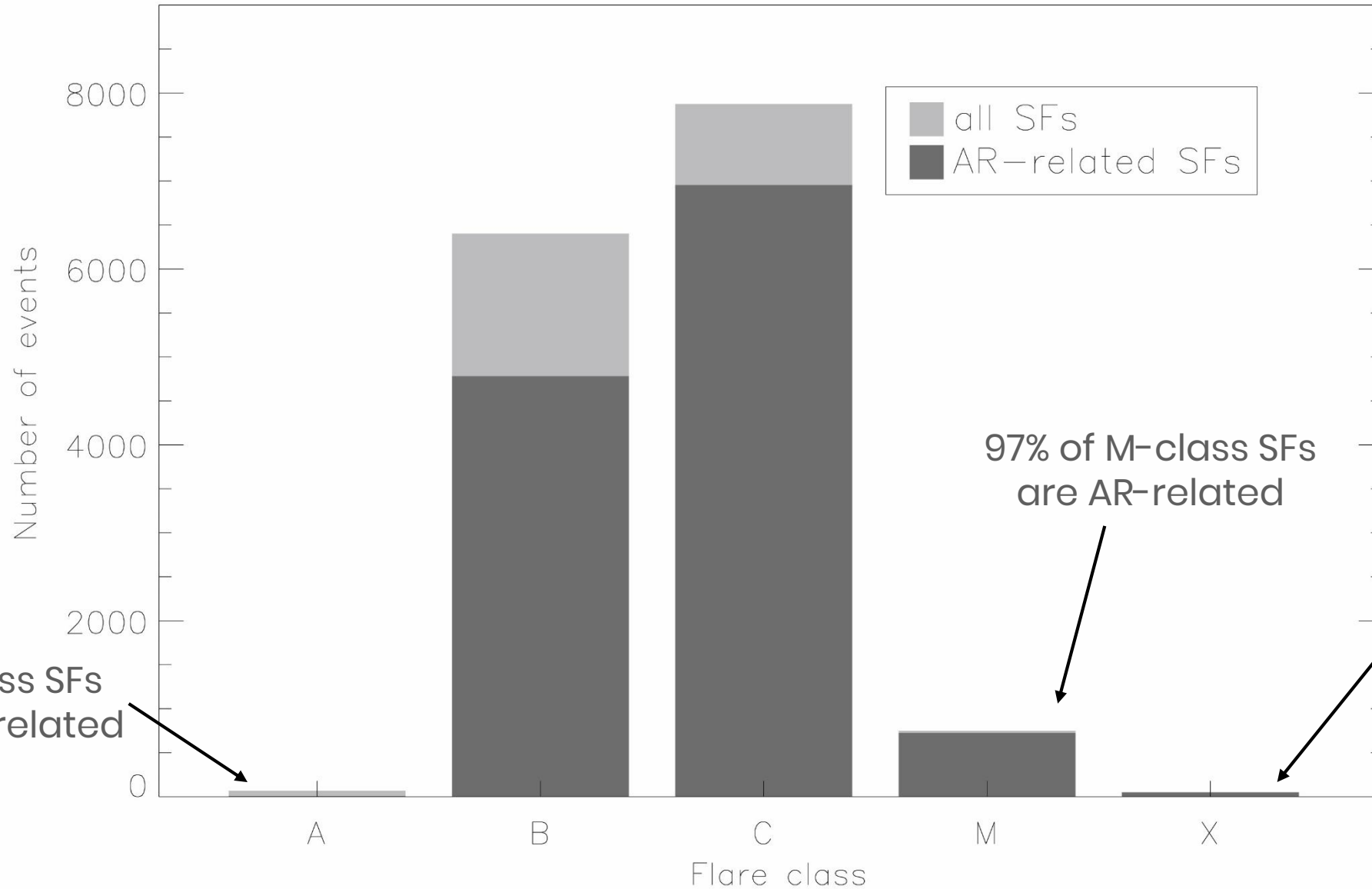


Halo CMEs



SFs class distribution

Mean:
AR-related SFs – C4.0
SFs Outside AR – C3.5

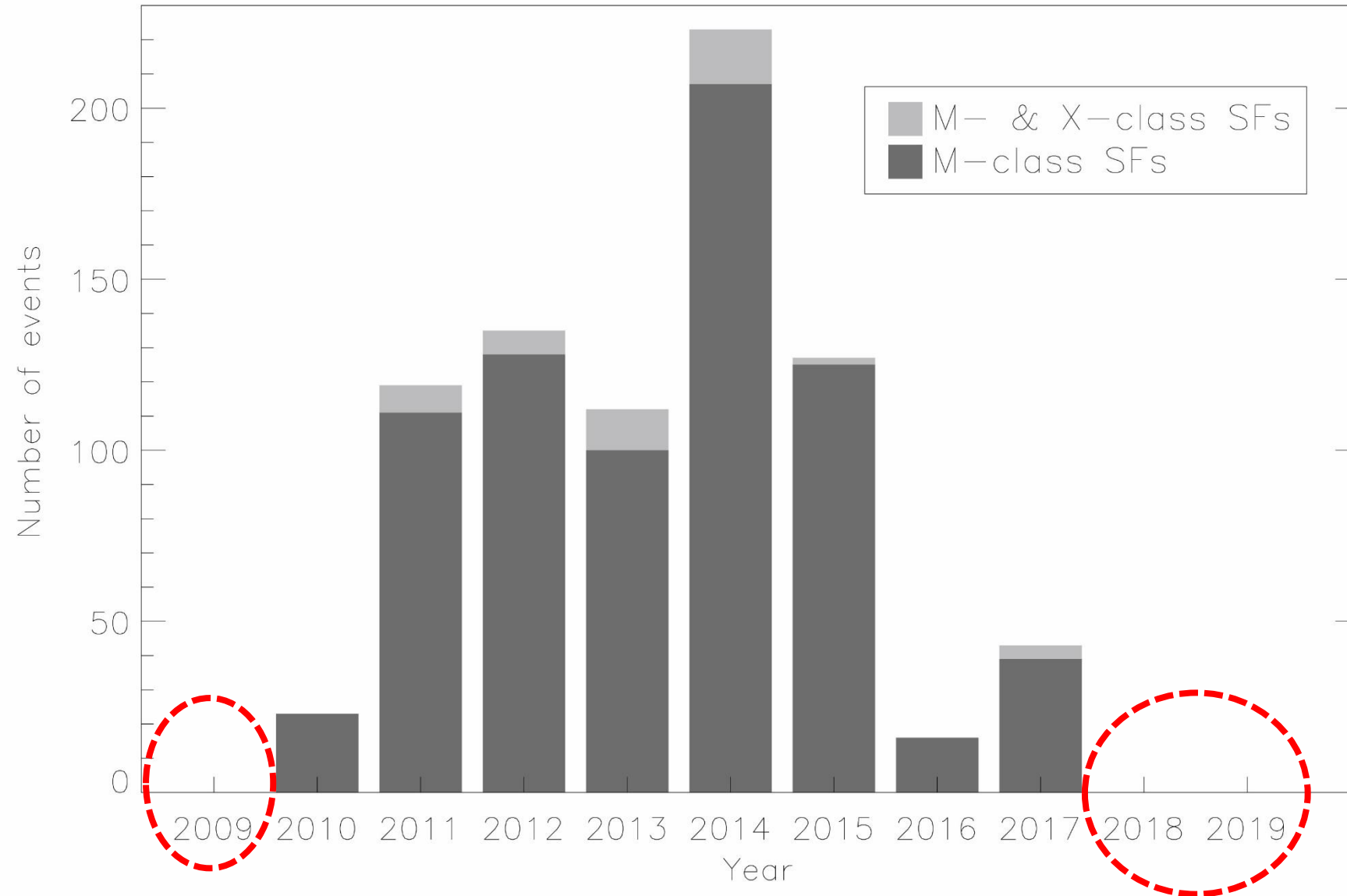


91% of A-class SFs are not AR-related

97% of M-class SFs are AR-related

100% of X-class SFs are AR-related

M- & X-class SFs



Thank you

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