



HELCATS

UGOE contribution to WP 2

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HELCATS AM, 18-19 May 2015, Göttingen, Germany





Objectives - WP 2, Task 2.3

- To update the STEREO/SECCHI/COR2 CME catalogue, initiated under the SOTERIA FP7 project (& DLR Stereo/Corona, AFFECTS), until the end of 2011 (including the application of forward modelling to the appropriate CMEs)
- Comparison of HI – COR2 catalogues

➔ WP3

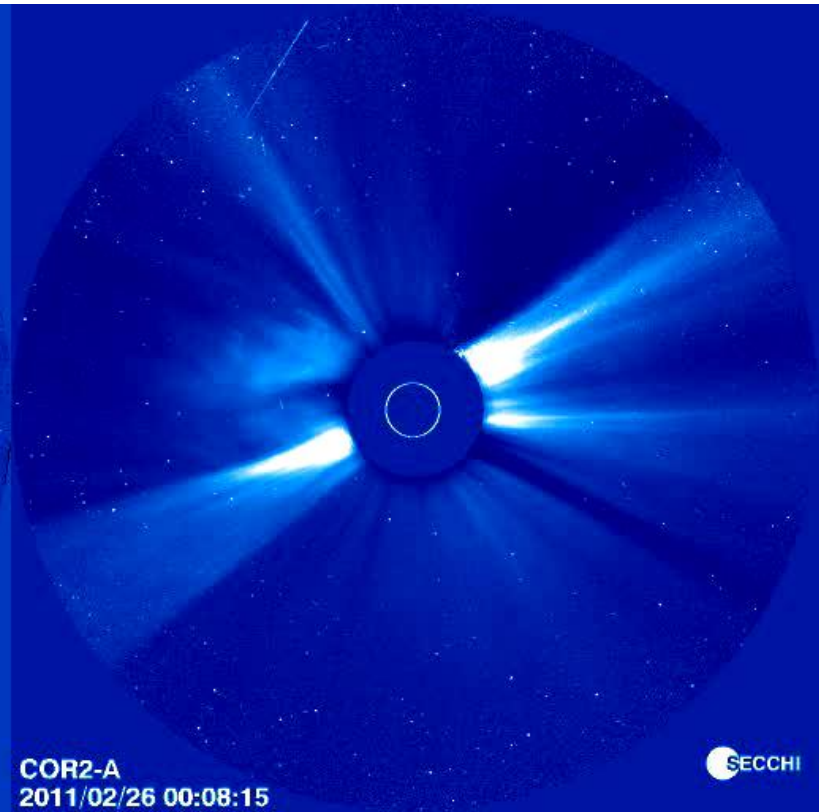
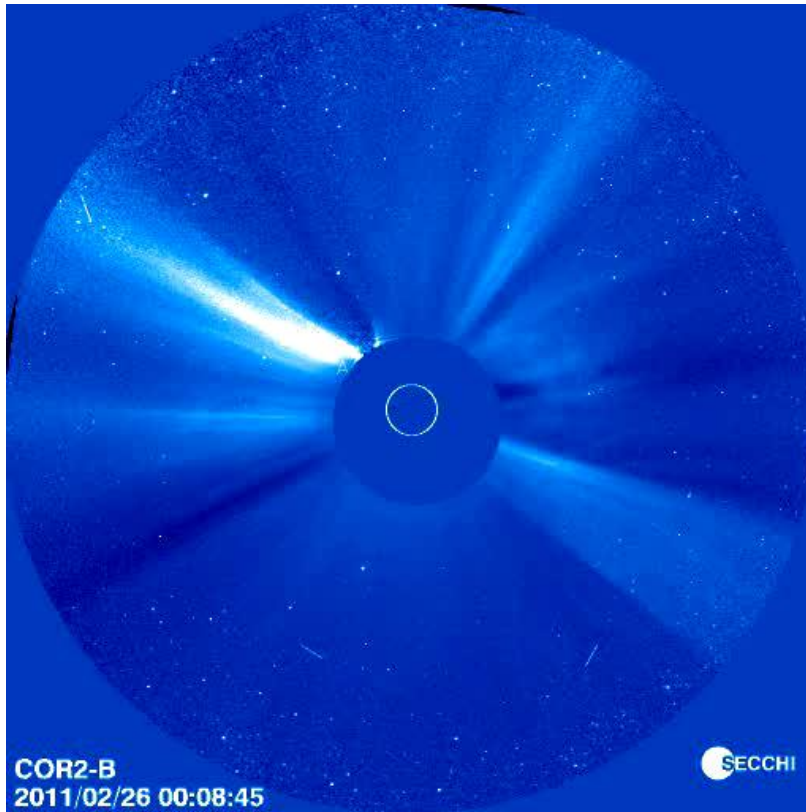
To compare the results from the geometrical and forward modelling of HI CMEs with the modelling results for COR2

To prototype the use of inverse modelling to derive typical HI CME parameters (speed, size, mass), for photospheric and low coronal source regions typically associated with CMEs





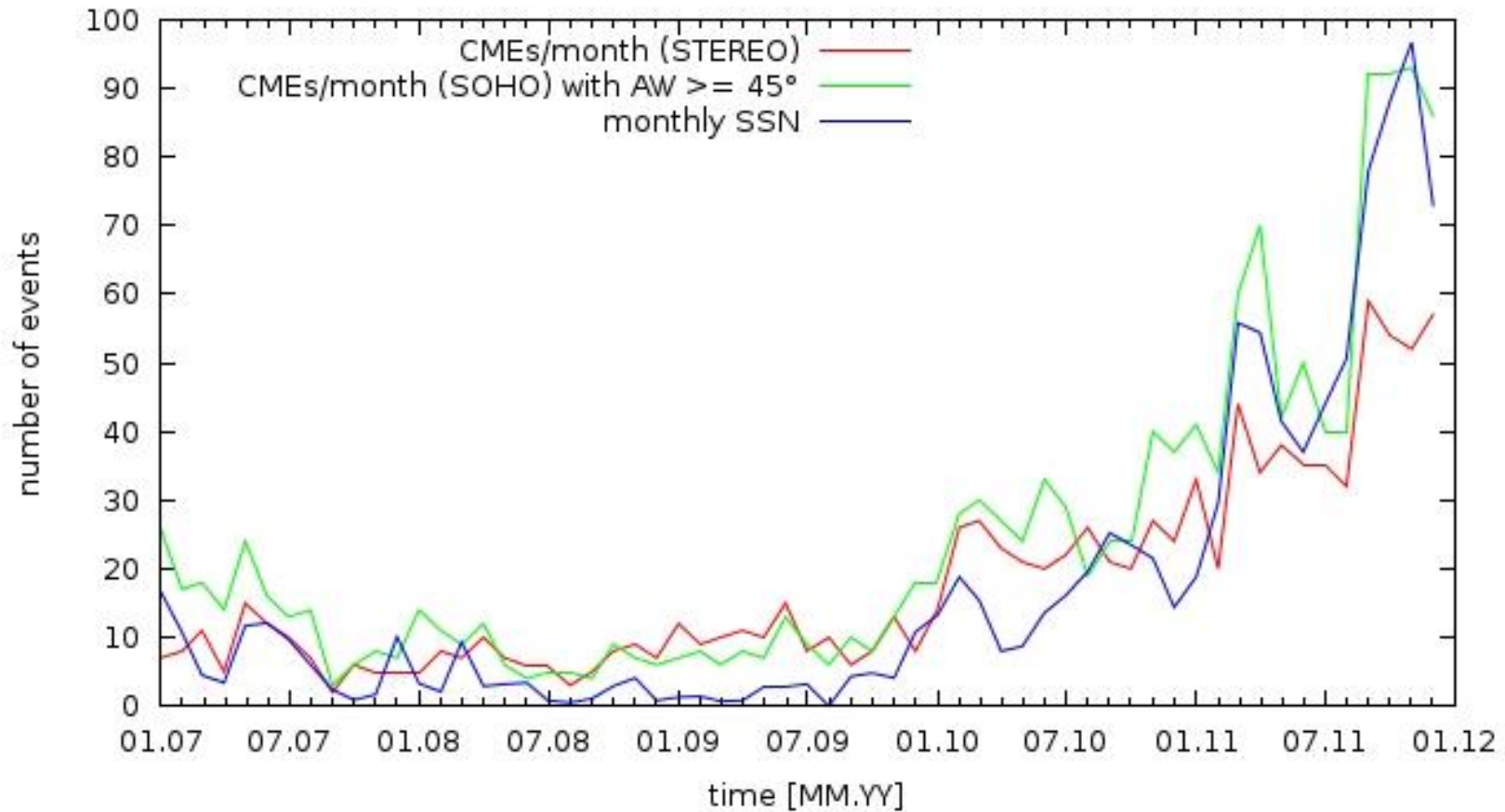
Examples of STEREO/SECCHI/COR2 CME Observations





CME-Häufigkeiten und Sonnenfleckenzyklus

Comparison with SOHO CME-Catalog





Development of COR2 CME list

Selection Criteria

- Based on clarity of CME appearance in STEREO/SECCHI/COR2 FOV ($2.5 - 15 R_s$)

Best-Of CMEs

- List with 1071 events until end of 2011 established

CME-Modeling

- 241 “best-of CMEs” studied by GCS modelling (Thernisien, Howard, Vourlidas, 2006) based on 3-D concept for CMEs (derived by Cremades & Bothmer, 2004)

All results are available online @ www.affects-fp7.eu/cme-database/





COR2 CME list

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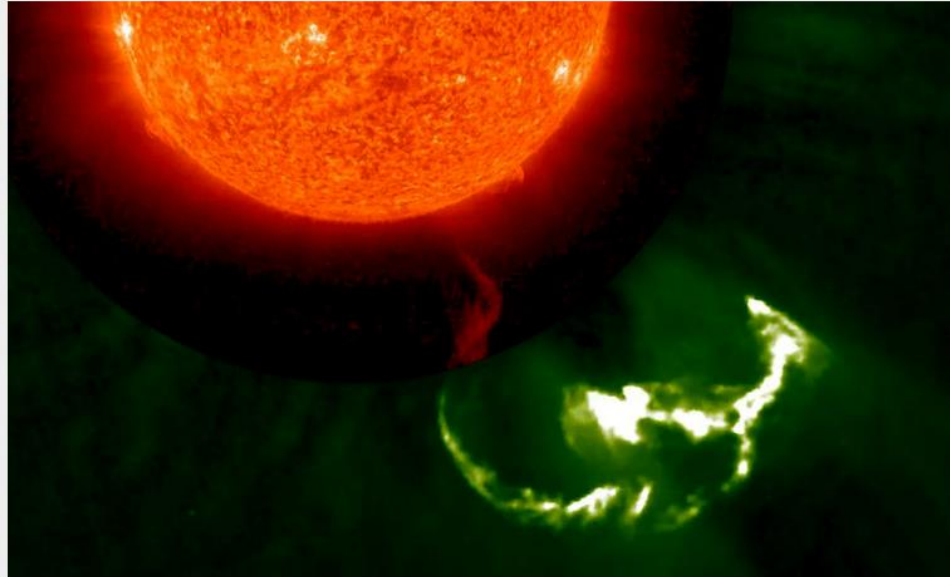
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A solar eruption observed on March 12, 2012 by STEREO-B © NASA STEREO

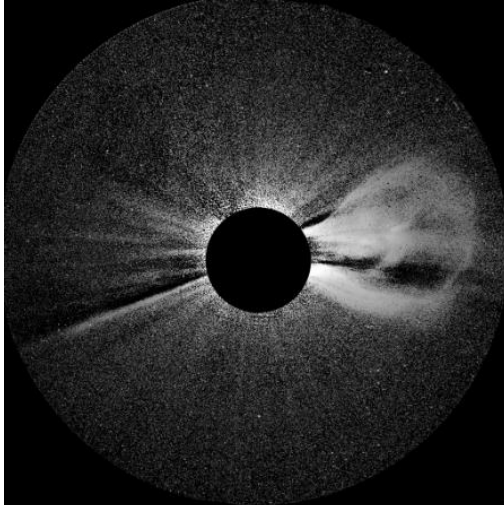
Coronal Mass Ejection Database

Welcome to the STEREO/SECCHI/COR2 CME-Database of the Institute for Astrophysics, University of Goettingen, Germany. This site provides currently information on identified CMEs in the SECCHI/COR2 synoptic movies available at the [NRL SECCHI website](#) in the SECCHI/COR2 field of view at distances between 2 - 15 solar radii. Since launch of the STEREO mission in October 2006, 1071 bright above the coronal background appearing CMEs were identified from January 2007 until end of December 2011. For these events the database contains information about basic CME properties comparable to the [SOHO/LASCO CME catalog](#) and spacecraft positions. Out of a selected set of 264 CMEs, which appeared very clear in brightness and structure, 241 of them were analyzed with the Graduated Cylindrical Shell (GCS) modeling technique developed by [Thernisien, Vourlidas and Howard in 2006](#) based on the 3D CME scheme introduced by [Cremades and Bothmer in 2004](#).

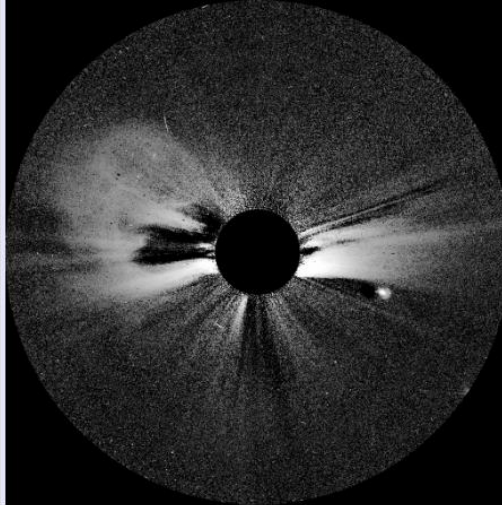




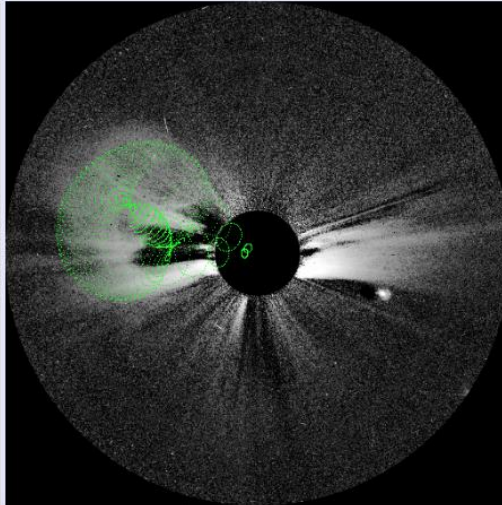
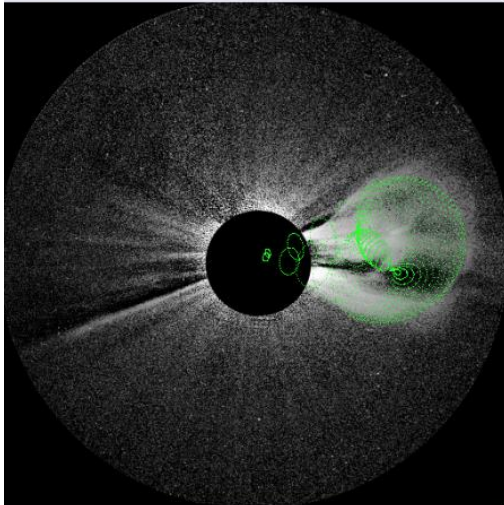
Sample STEREO/SECCHI/COR2 CME GCS Forward Modelling – December 12, 2008, 14:22 UT



COR2B white-light Coronagraph image



COR2A white-light Coronagraph image



The Fitting with the GCS Forward-Modeling Code yields the following results.

GCS Fit-Parameter from Modeling:
Carrington Longitude: 70.434
Carrington Latitude: 5.031
Tilt Angle: 50.870
Height: 16.071
Ratio: 0.268
Half Angle: 10.061

Timestamp of used COR2-Images for Modeling: 20081212 14:22:00
#formatting: yyyyymmdd hhmmss



Courtesy: E. Bosman



HI CME lists with modelling results for STEREO A and B

```
# Header
#
# Time (UT) // that the CME is first observed in the HI-1 FOV // [yyyy-mm-dd hh:mm]
# Spacecraft [A or B]
# Northernmost position angle of CME [degrees]
# Southernmost position angle of CME [degrees]
# Potential Halo [yes or no]
# "CME"ness (0, 1, or 2 where 2 is unambiguously a CME)
# PA // along which time-elongation profile is extracted in degrees
# (-999 in this, and subsequent, records means that no time-elongation profile was extracted,
# and hence no fitting was done)
#
# Speed [km/s], method (FPF)
# HEEQ Longitude in degrees (FPF)
# HEEQ Latitude in degrees (FPF)
#
# Speed [km/s] (SSEF: lambda=30 degrees)
# HEEQ Longitude in degrees (SSEF: lambda=30 degrees)
# HEEQ Latitude in degrees (SSEF: lambda=30 degrees)
#
# Speed in km/s (HMF)
# HEEQ Longitude in degrees (HMF)
# HEEQ Latitude in degrees (HMF)
#
#
```

STEREO/SECCHI/HI-1A

2007-2013: 821 events

2007-2011: 496 events, 197 definite ones

STEREO/SECCHI/HI-1B

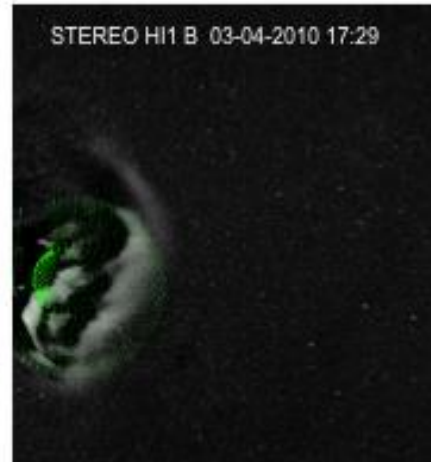
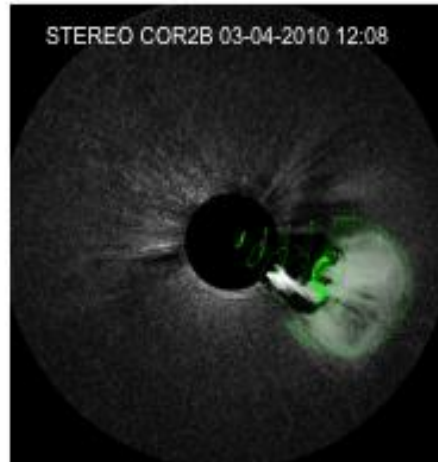
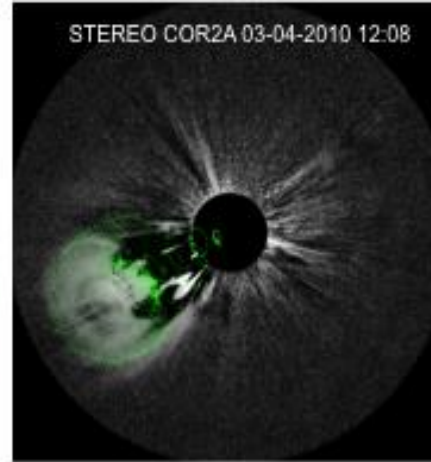
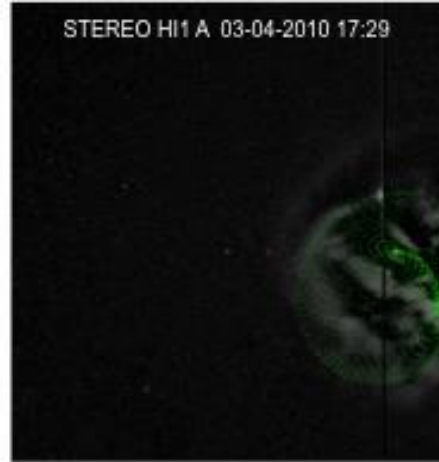
2007-Jun 2013: 698 events, 226 def. ones

2007-2011: 399 events, 136 definite ones

# date	time	S/C	PAn	PAs	Halo	CME	PA	Speed	LonFPF	LatFPF	SpeedSSEF	LonSSEF	LatSSEF	SpeedHMF	LonHMF	LatHMF
2007-04-15	15:30	A	40	90	No	0	65	304	-42	15	312	-36	13	317	-31	10
2007-04-17	15:30	A	95	130	No	0	100	316	-78	-11	334	-89	-10	351	-101	-8
2007-04-19	10:50	A	50	140	No	2	95	359	-42	-7	370	-36	-7	379	-30	-7
2007-05-01	15:30	A	65	105	No	1	90	279	-93	0	295	-105	1	315	-118	2
2007-05-09	10:50	A	50	125	No	1	90	256	-92	0	274	-105	1	297	-120	1
2007-05-15	04:10	A	35	80	No	0	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999
2007-05-16	00:50	A	35	125	No	2	80	352	-47	7	368	-53	8	378	-59	8
2007-05-18	00:10	A	95	125	No	1	110	562	-75	-20	592	-88	-20	624	-101	-19
2007-05-21	22:10	A	60	140	No	2	100	329	-74	-10	338	-81	-10	347	-89	-9
2007-05-23	21:30	A	50	100	No	1	75	233	-53	12	237	-49	12	240	-45	11
2007-05-29	23:29	A	60	140	No	1	100	373	-68	-10	385	-76	-10	397	-84	-10
2007-06-10	10:49	A	100	125	No	1	115	391	-79	-24	417	-91	-23	448	-103	-22
2007-06-12	12:49	A	60	105	No	2	80	305	-55	10	309	-59	10	312	-63	10
2007-06-25	06:09	A	60	110	No	0	75	260	-117	10	315	-139	5	409	-166	-2
2007-07-08	22:49	A	50	125	No	2	80	504	-72	11	546	-86	9	593	-102	7
2007-07-11	02:09	A	60	110	No	2	90	362	-54	2	373	-50	2	385	-46	2
2007-07-13	02:49	A	50	90	No	1	70	318	-66	21	326	-74	20	333	-82	20
2007-07-14	02:09	A	80	135	No	1	80	406	-76	10	450	-93	8	502	-111	6
2007-07-16	11:29	A	95	135	No	1	115	423	-43	-18	435	-48	-20	443	-54	-21
2007-07-29	04:49	A	50	90	No	1	70	372	-80	20	392	-92	18	414	-104	15
2007-08-08	22:49	A	55	110	No	1	-999	-999	-999	-999	-999	-999	-999	-999	-999	-999



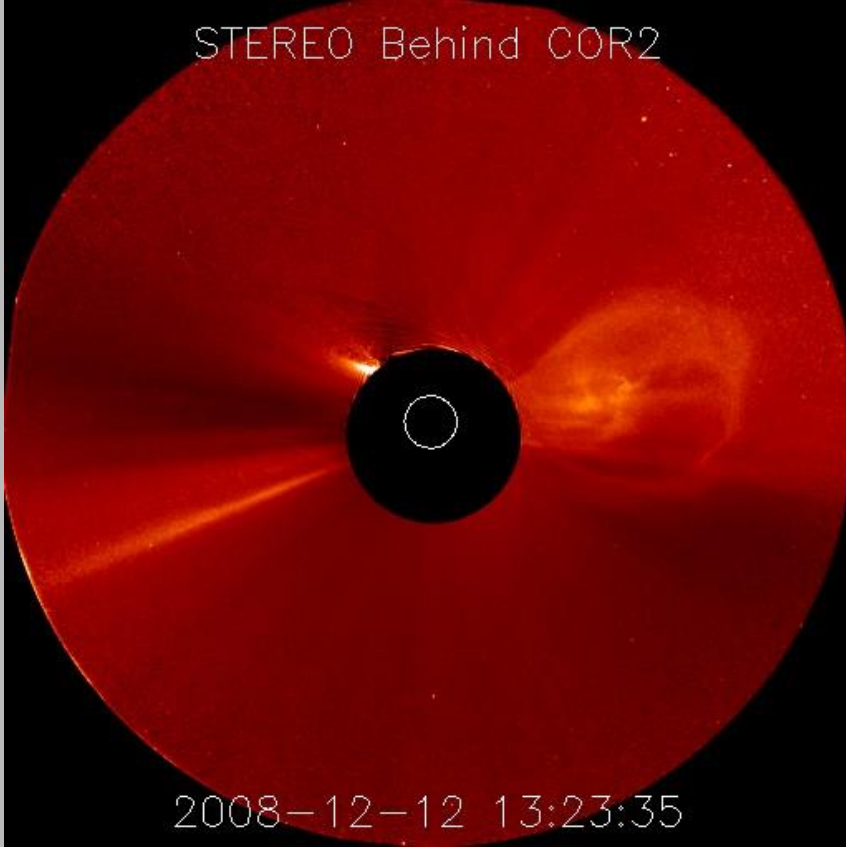
Sample CME observed in the STEREO/SECCHI/COR2 and HI1 A and B fields of view on April 03, 2010 - The green grids are the CME GCS-fits.



Courtesy: L. Volpes & E. Bosman

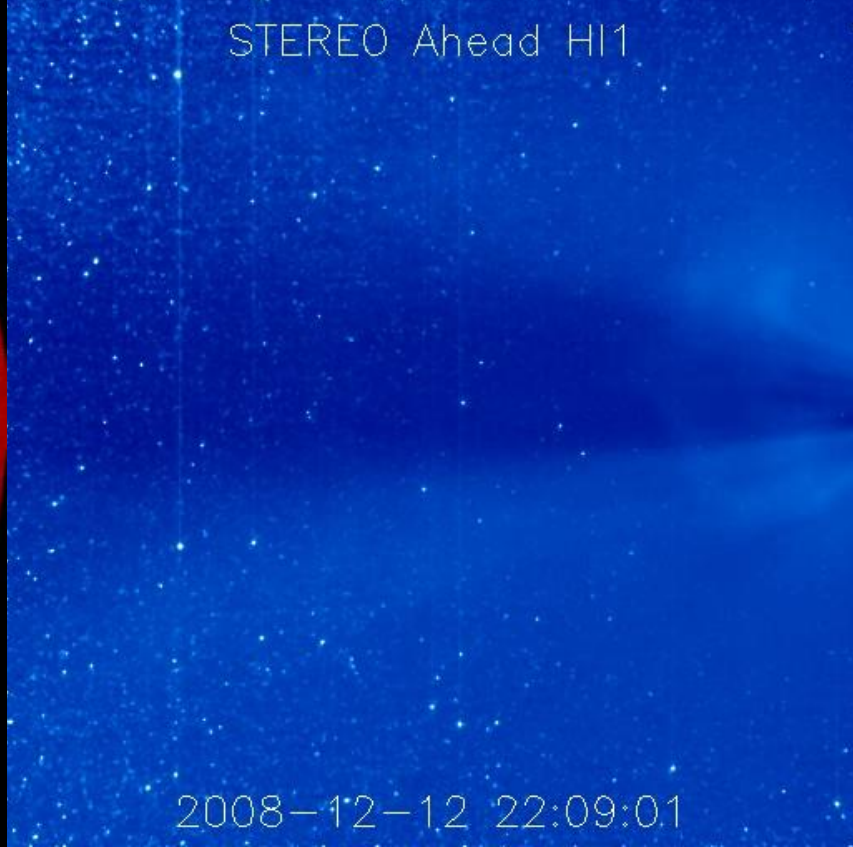


STEREO Behind COR2



2008-12-12 13:23:35

STEREO Ahead HI1



2008-12-12 22:09:01

UGOE



COR2 list 2007-2011
STEREO A&B

106 CMEs (latest update)



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RAL



HI list 2007-2013
STEREO A&B





HI – COR2 CME catalogue, online database to be released

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Your search returned 109 results.

HEL no	CME no	Preevent date	Preevent time	Last Cor2 date	Last Cor2 time	GCS carlon	GCS stoney lon	GCS lat	GCS tilt	GCS Asp. Ratio	GCS h_angle	HI first date	HI first time	APEX SPEED
[-]	[-]	[yyyymmdd]	[hh:mm:ss]	[yyyymmdd]	[hh:mm:ss]	[deg]	[lon,old]	[deg]	[deg]	[-]	[deg]	[yyyymmdd]	[hh:mm:ss]	[km/s]
1	35	09.05.2007	02:22:30	09.05.2007	12:52:30	88	-116	1	-17	0,43	10,06	09.05.2007	10:50	282
2	38	15.05.2007	18:52:30	16.05.2007	01:22:30	39	-79	13	52	0,35	28,23	16.05.2007	00:50	352
3	49	04.06.2007	17:00:00	05.06.2007	09:23:59	320	111	-10	2	0,45	27,95	05.06.2007	09:29	192
4	50	07.06.2007	18:30:00	08.06.2007	03:54:00	240	68	-12	-10	0,26	17,05	08.06.2007	03:29	292
5	60	08.07.2007	16:52:30	09.07.2007	00:52:30	55	-69	-8	7	0,23	24,6	08.07.2007	22:49	337
6	71	21.08.2007	07:00:00	21.08.2007	14:23:00	25	118	-13	33	0,24	13,14	21.08.2007	15:30	409

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Your search returned 109 results.

CS tilt	GCS Asp. Ratio	GCS h_angle	HI first date	HI first time	APEX SPEED	CME-Mass	SpeedFFF	FFF LON	FFF LAT	SpeedSSEF	SSEF LON	SSEF LAT	SpeedHMF	HMF LON	HMF LAT
[deg]	[-]	[deg]	[yyyymmdd]	[hh:mm:ss]	[km/s]	[g]	[km/s]	[deg]	[deg]	[km/s]	[deg]	[deg]	[km/s]	[deg]	[deg]
-17	0.43	10,06	09.05.2007	10:50	282	9.5E15	256	-92	0	274	-105	1	297	-120	1
52	0.35	28,23	16.05.2007	00:50	352	4,00E+15	352	-47	7	368	-53	8	376	-59	8
2	0.45	27,95	05.06.2007	09:29	192	3,75E+15	319	92	0	347	107	0	381	123	0
-10	0.26	17,05	08.06.2007	03:29	292	1,60E+15	469	57	-22	479	61	-23	485	66	-23
7	0.23	24,6	08.07.2007	22:49	337	5,00E+14	504	-72	11	546	-86	9	563	-102	7
33	0.24	13,14	21.08.2007	15:30	409	2,85E+15	407	76	-15	437	90	-16	475	106	-16

