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UGOE contribution to WP 2

Comparison of CME catalogues

Volker Bothmer & UGOE Team

HELCATS 4th BAM, 7 June 2016, Albenai, Bulgaria

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)

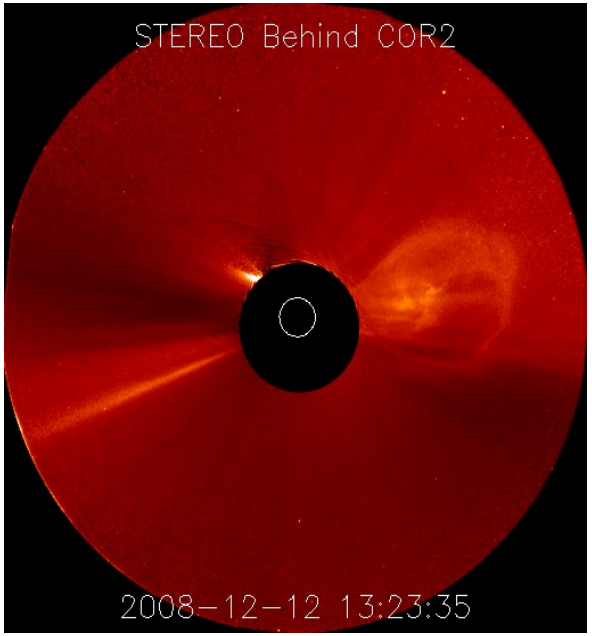
- Comparison of HI – COR2 catalogues

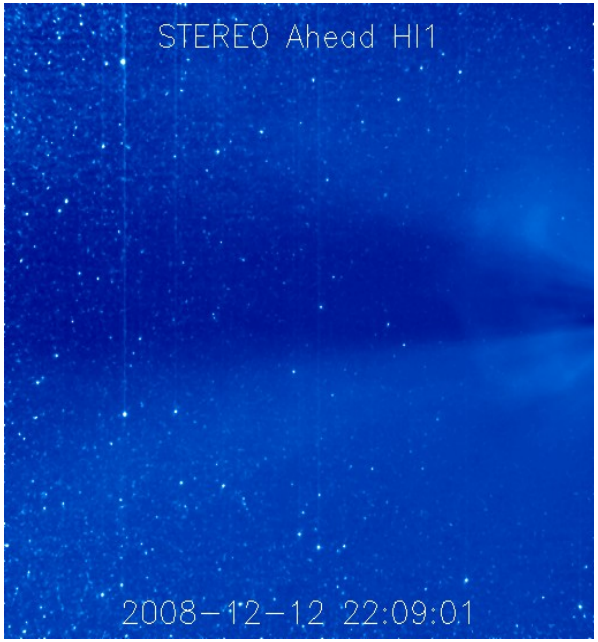
→ WP3

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

HI – COR2 CME comparison





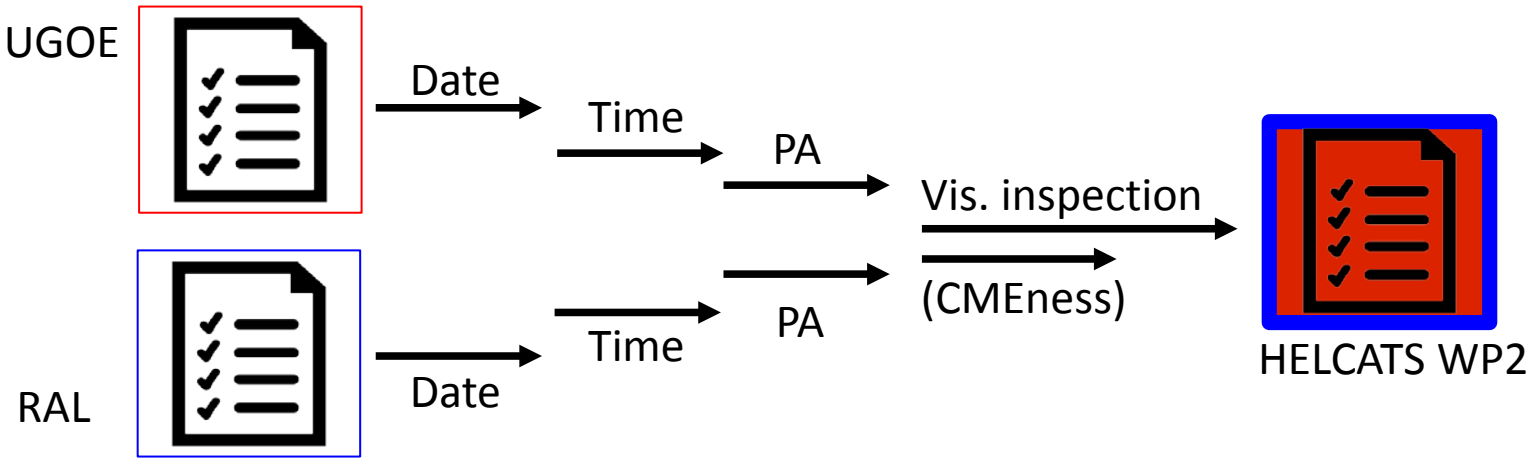
UGOE

RAL

COR2 list 2007-2011
STEREO A&B

HELCATS

HI list 2007-2013
STEREO A&B


UGOE
Date
Time
PA
Vis. inspection
(CMEness)
RAL
Date
Time
PA
HELCATS WP2

```
# 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]
# â€MCMEâ€Nness (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)
#
# Cor: Visibility in Cor 2 A. Crosscheck with CME-List-Bosman. Running internal number.
#
#
# date»  »       time     S/C   PAn   PAs   Halo  CME    PA    Speed   LonFPF  LatFPF SpeedSSEF LonSSEF LatSSEF SpeedHMF LonHMF LatHMF   Cor      date          time
 2007-04-15»    15:30      A    40    90     No     0    65      304     -42      15      312      -36      13      317     -31      10              2007-04-15    07:30
 2007-04-17»    15:30      A    95   130     No     0   100      316     -78     -11      334      -89     -10      351    -101      -8       29     2007-04-17    06:07
 2007-04-19»    10:50      A    50   140     No     2    95      359     -42      -7      370      -36      -7      379     -30      -7       30
 2007-05-01»    15:30      A    65   105     No     1    90      279     -93       0      295     -105       1      315    -118       2       31
 2007-05-09»    10:50      A    50   125     No     1    90      256     -92       0      274     -105       1      297    -120       1       35
 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       38
 2007-05-18»    00:10      A    95   125     No     1   110      562     -75     -20      592      -88     -20      624    -101     -19              2007-05-17    14:22
 2007-05-21»    22:10      A    60   140     No     2   100      329     -74     -10      338      -81     -10      347     -89      -9       40
 2007-05-23»    21:30      A    50   100     No     1    75      233     -53      12      237      -49      12      240     -45      11       43
 2007-05-29»    23:29      A    60   140     No     1   100      373     -68     -10      385      -76     -10      397     -84     -10              2007-05-29    15:37
 2007-06-10»    10:49      A   100   125     No     1   115      391     -79     -24      417      -91     -23      448    -103     -22              2007-06-10    09:07
 2007-06-12»    12:49      A    60   105     No     2    80      305     -55      10      309      -59      10      312     -63      10       52
 2007-06-25»    06:09      A    60   110     No     0    75      260    -117      10      315     -139       5      409    -166      -2       No
 2007-07-08»    22:49      A    50   125     No     2    80      504     -72      11      546      -86       9      593    -102       7       60
 2007-07-11»    02:09      A    60   110     No     2    90      362     -54       2      373      -50       2      385     -46       2       63
 2007-07-13»    02:49      A    50    90     No     1    70      318     -66      21      326      -74      20      333     -82      20              2007-07-12    12:22
```

UGOE

COR2 list 2007-2011
STEREO A&B

HIsCORCAT
(**HI s**yncronized with **COR CAT**)

RAL

HI list 2007-2013
STEREO A&B

HELCATS COR2-HI1 database

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Table-Legends (Click to expand/collapse)

Your search returned 109 results.

HEL no	CME no	Preevent date	Preeevent 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	CME-Mass	SpeedFPF
[-]	[-]	[yyyymmdd]	[hh:mm:ss]	[yyyymmdd]	[hh:mm:ss]	[deg]	[lon,old]	[deg]	[deg]	[-]	[deg]	[yyyymmdd]	[hh:mm:ss]	[km/s]	[g]	[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	9.5E15	256
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	4,00E+15	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	3,75E+15	319
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	1,60E+15	469
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	5,00E+14	504
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	2,85E+15	407
7	78	08.10.2007	14:20:00	09.10.2007	01:24:00	40	52	10	1	0,3	12,58	09.10.2007	00:49	238	2,75E+15	334
8	83	04.11.2007	10:22:20	04.11.2007	22:52:20	310	-43	12	-27	0,3	18,45	04.11.2007	21:29	259	3,10E+15	425
9	86	16.11.2007	09:20:00	16.11.2007	16:23:00	323	125	-15	6	0,32	18,45	16.11.2007	20:09	344	1,55E+15	334
10	92	31.12.2007	00:22:20	31.12.2007	03:52:20	239	-93	-21	-12	0,68	5,59	31.12.2007	02:49	-	-	347
11	93	02.01.2008	09:52:20	02.01.2008	13:22:20	249	-52	-8	13	0,43	9,5	02.01.2008	12:49	773	-	681

Results:

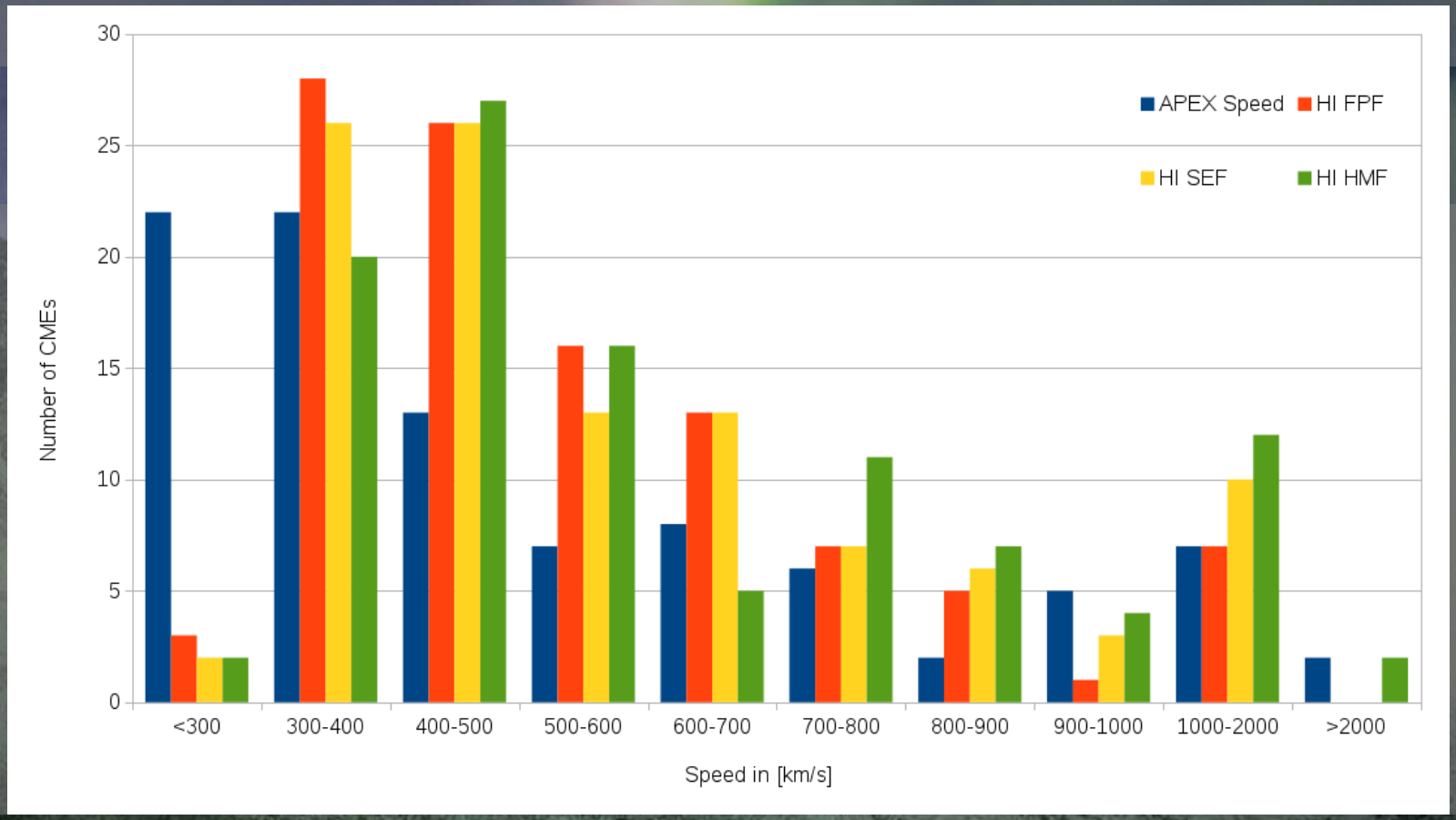
- **STEREO A:** 260 of 496 HI events are included in the COR2 list 2007-2011
  - 1 event not visible in COR2 A but in B
- **STEREO B:** 278 of 399 HI events are included in the COR2 list 2007-2011

Every CME visible in HI was also visible in COR2

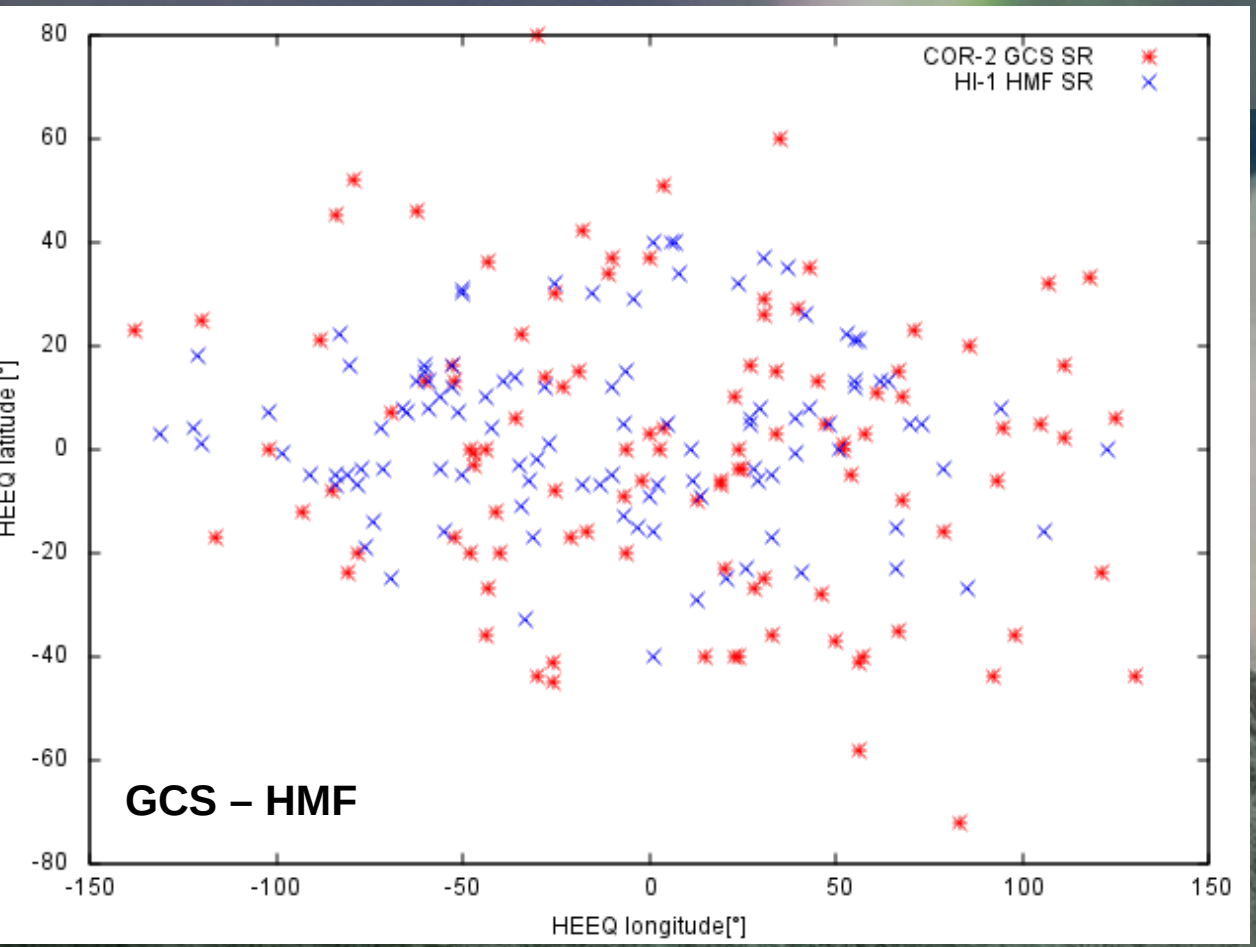
Seems trivial but:

- CME expansion and density decrease are different compared to slow and fast wind streams as indicated by analsis of Helios data.
- Influence of Thomson sphere.
- Near Sun brightness of coronal streamers may obscure faint CMEs.

Overview: determined CME speeds



Comparison of modelled source regions



avg lon. shift: 20°

avg lat. shift: +11°