HELCATS
WP 5: Update on the CIR catalogue

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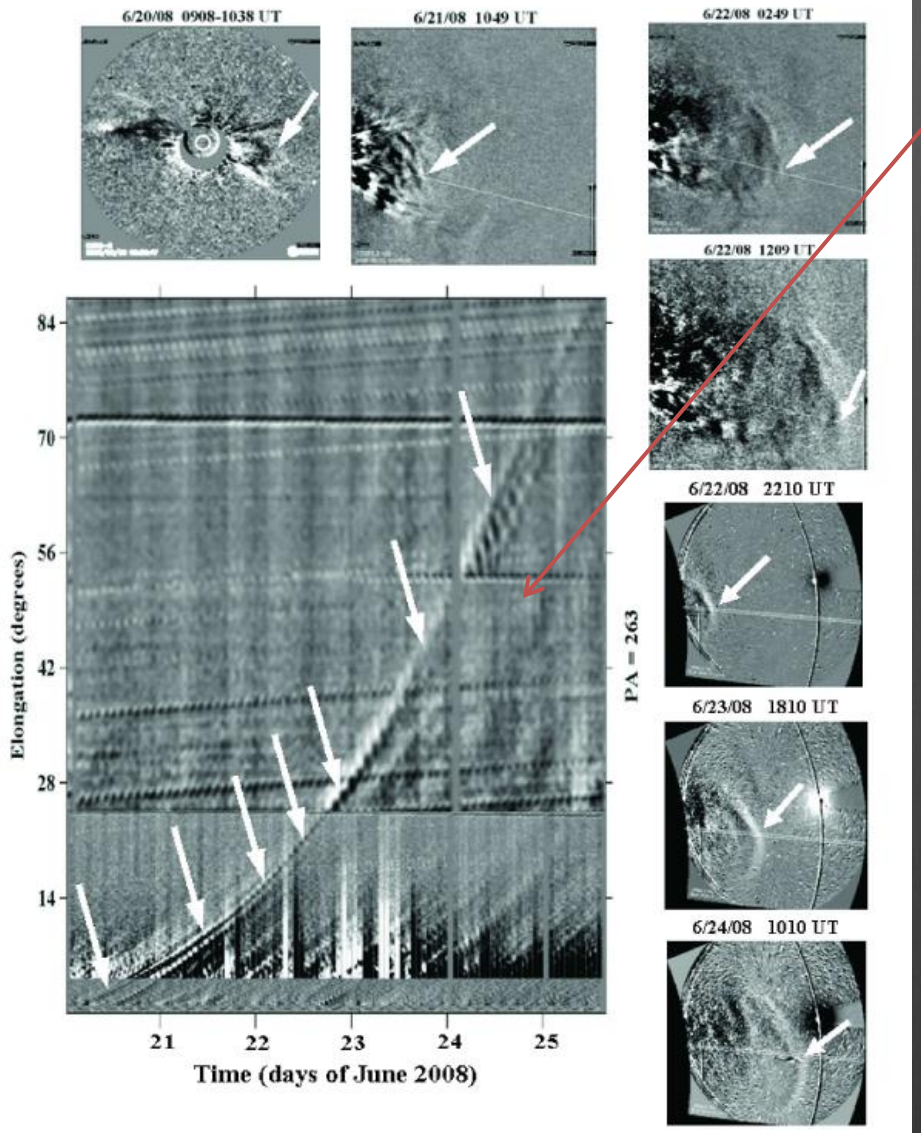
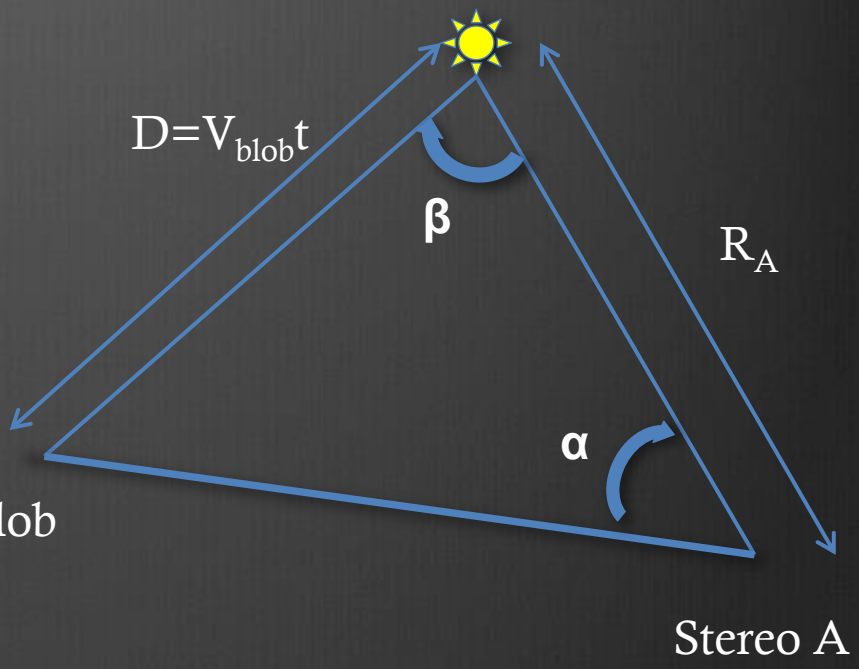
Elongation profile of the blob



In ecliptic pixel band extracted from actual images.



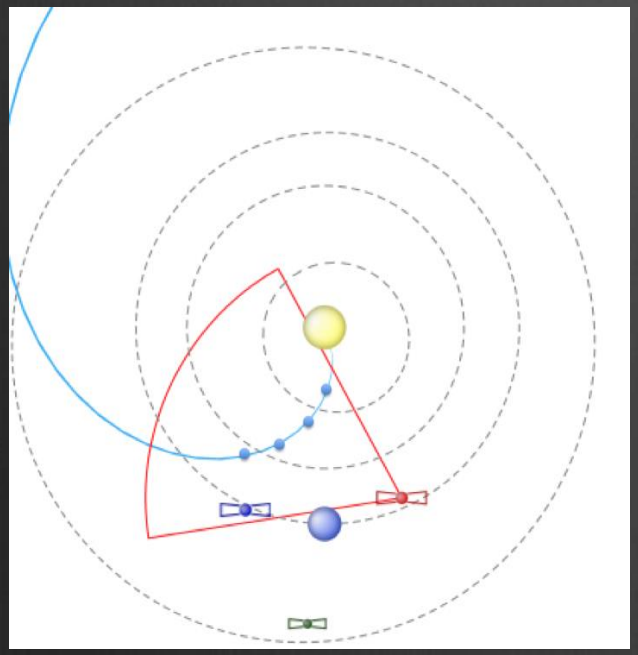
A blob having a constant speed
seen from a satellite (Fixed phi approx.):

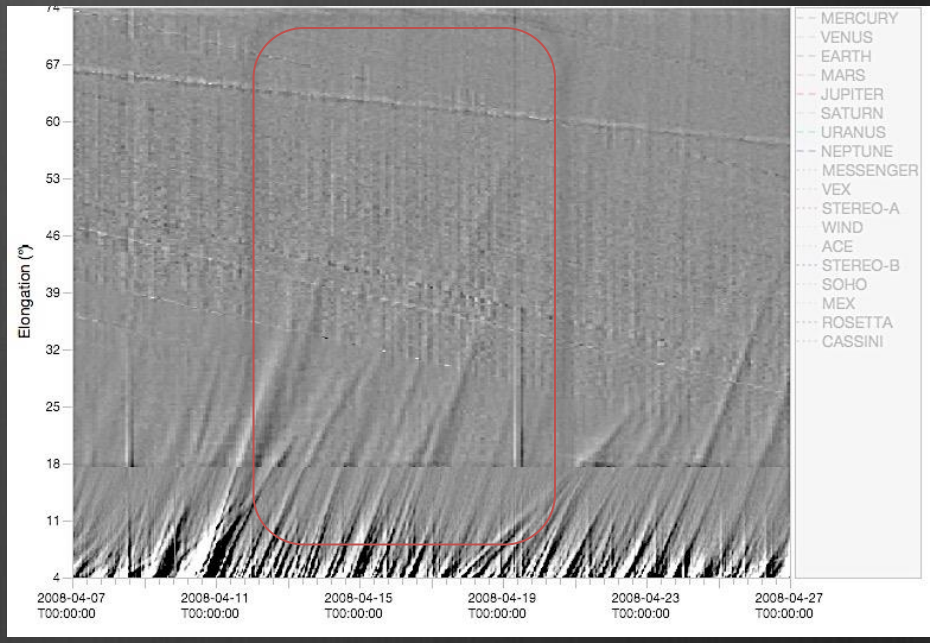
$$a = \arctan\left(\frac{V_{blob}\, t \sin b}{R_A(t) - V_{blob}\, t \cos b}\right)$$

Sheeley and Rouillard (2010)

Series

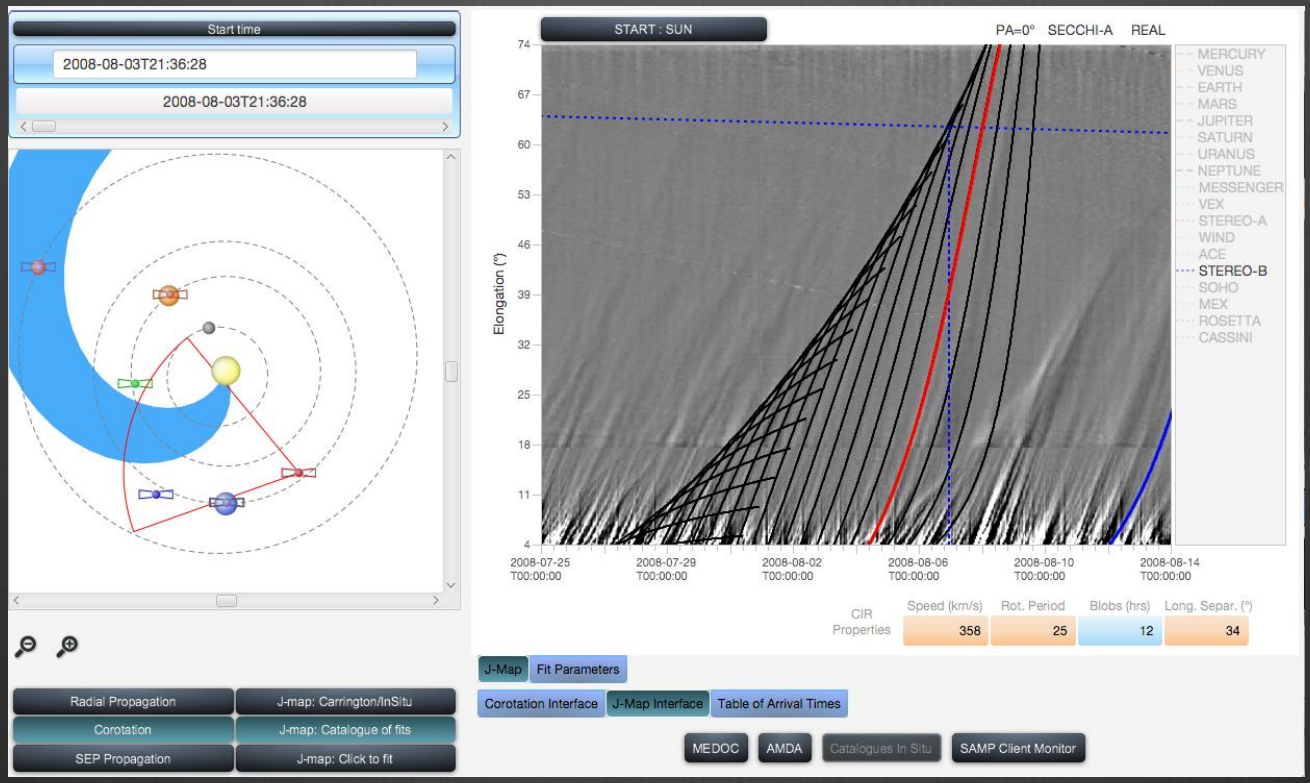
- A series of structures from the same solar region but at different times, moving radially outward with the same speed.





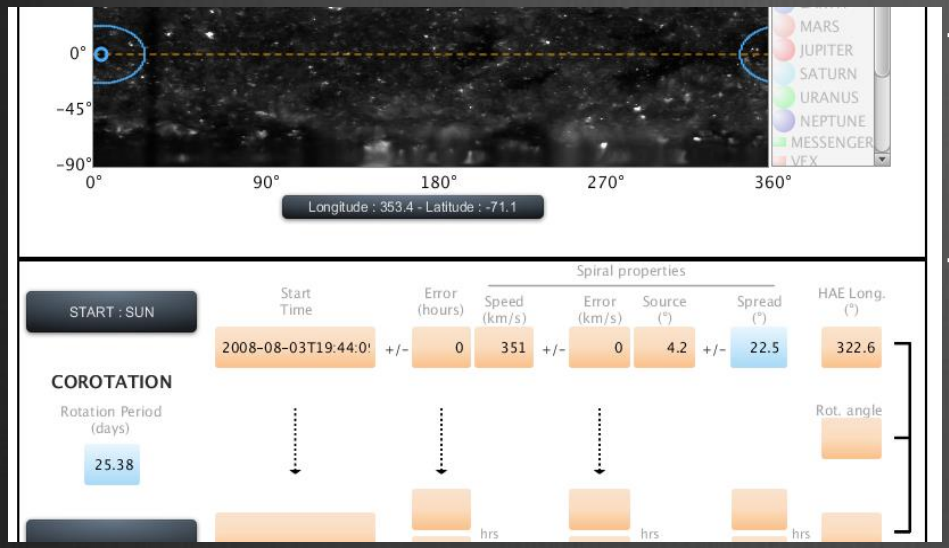
- Visual signature of a SIR
- Reasonable unique speed estimation for all tracks
- Does not give value of the density (running difference images)

Propagation Tool (J-maps)



- User friendly tool developed by Alexis Rouillard and a team of software engineers at IRAP and CNES.
- Takes account of the orbital motion of the satellite.
- Fit one track reproduces the whole SIR signature with periodically emitted structures, tipically every 8 hours.

Fit results and quality



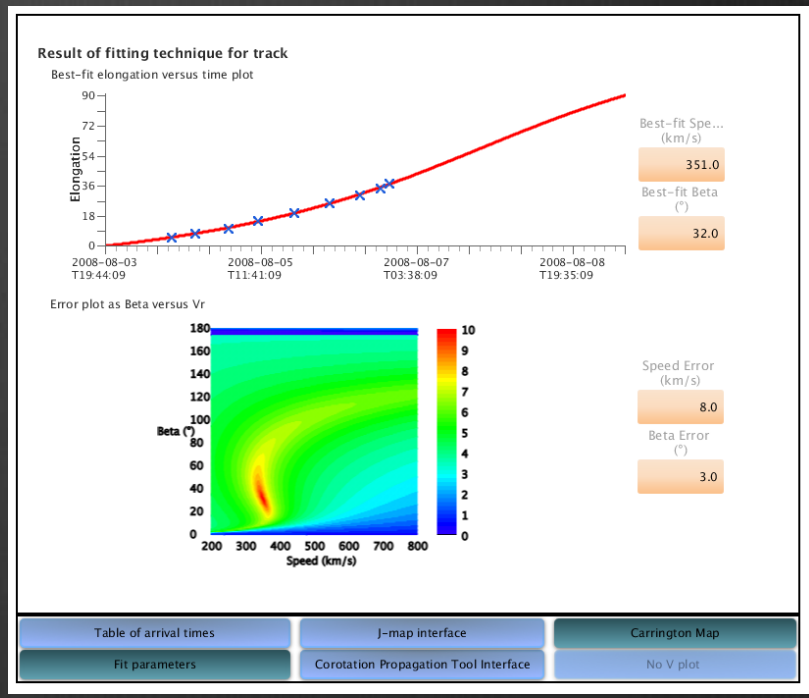
→ Carrington maps with the source point Parker spiral assumed.

→ SECCHI Carrington Maps in EUV provide information about Coronal Holes location. Helioviewer might give better estimate.

One event information:

Blob origin time, V_{blob}, ß,
Carrington longitude, HAE longitude.

→ Recorded in the catalogue.

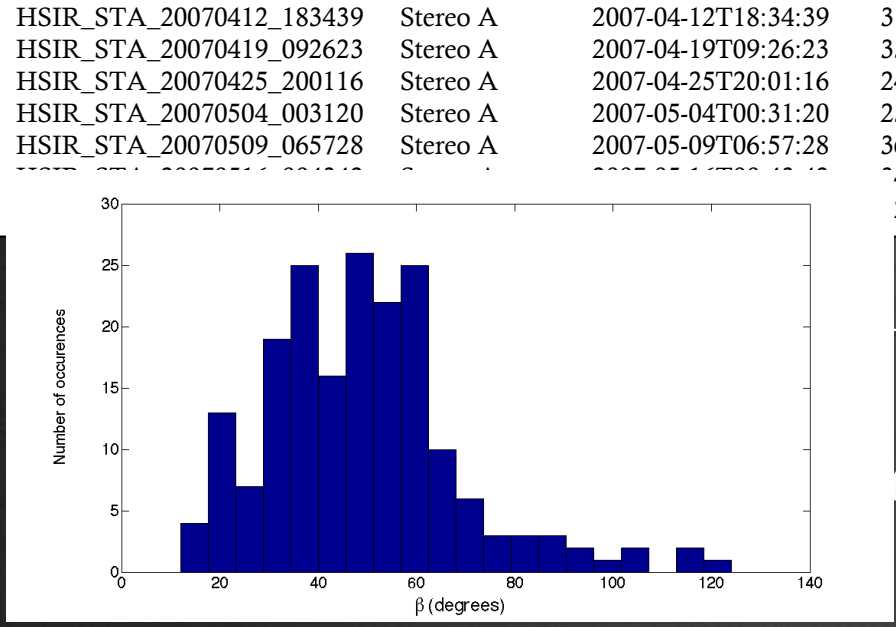


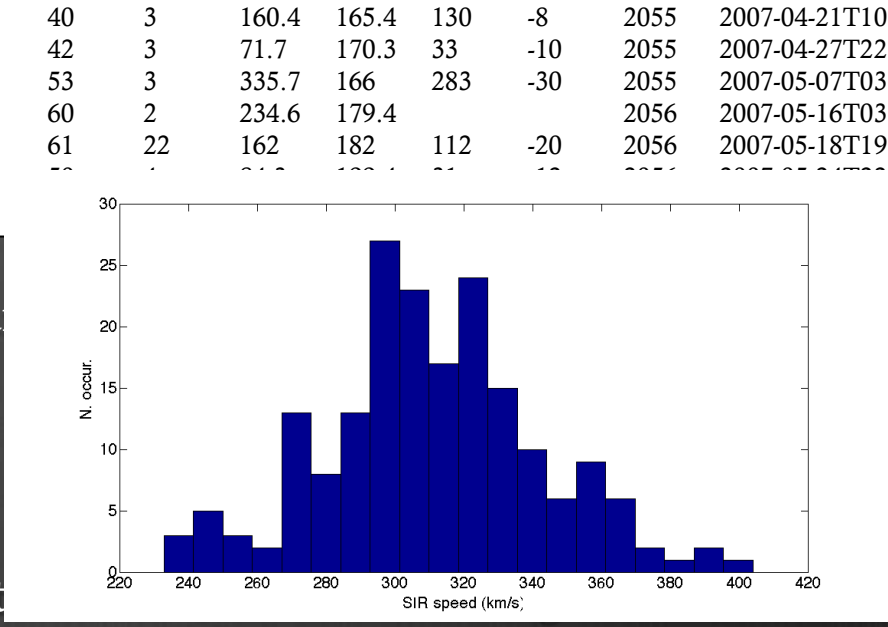
- **To be taken into account:**

- Passage of the Milky Way prevents some events to be identified.
- CME presence: perturbation in J-maps.
- When successive CIRs are in too close proximity it becomes tricky to distinguish.
  Need in the in-situ feedback.
- Corotating sources of small scale transients can be misidentified as CIRs.
- Stereo B J-maps are sometimes of insufficient quality to identify clearly SIRs.

Catalogue update

%ID of the SIR %	Probe	Start Time	CIR params Date	Velocity (km/s)	Err vel (km/sec)	beta (deg)		SECCHI Coronal Hole err beta	Carr source long (deg)			Pred arriv StA HAE source long (deg)	Pred arriv StB C
HSIR_STA_20070412_183439	Stereo A		2007-04-12T18:34:39	317	23	40	3	160.4	165.4	130	-8	2055	2007-04-21T10:
HSIR_STA_20070419_092623	Stereo A		2007-04-19T09:26:23	332	20	42	3	71.7	170.3	33	-10	2055	2007-04-27T22:
HSIR_STA_20070425_200116	Stereo A		2007-04-25T20:01:16	244	25	53	3	335.7	166	283	-30	2055	2007-05-07T03:
HSIR_STA_20070504_003120	Stereo A		2007-05-04T00:31:20	234.6	12	60	2	234.6	179.4			2056	2007-05-16T03:
HSIR_STA_20070509_065728	Stereo A		2007-05-09T06:57:28	361	22	61	22	162	182	112	-20	2056	2007-05-18T19:
				247	14								
				26	6								





- Mean SIR speed: 310.7 ±31 km/s
- Mean beta (one fitted blob /CIR): 49 deg.

Overview on WP 5

Done on the Catalogue of CIRs:

- A list of events and track fits from 2007 up to 2014
- Subset of arrival times at different probes.
- Incorporated into the Propagation Tool (CIR fits database)
- About to be included into AMDA database (arrival times at different probes).

In progress:

- In situ catalogue.
- Feedback from in-situ data: false events rejection, identify undetected ones.
- Identification of Coronal Holes in association with every SIR event.