



# HELIO : Une nouvelle vision de l'Héliosphère

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et les tout plein de participants à HELIO

(Obs Paris, IRAP, IAS)

(BASS2000, CDPP, MEDOC)

<http://www.helio-vo.eu/>



HELIO a eu plein de sous de la Communauté Européenne sous contrat n° 238969

# Mais qu'est HELIO ?

(à prononcer la bouche en cul de poule)

- Projet FP7 CE avec 13 participant (10 européens dont ESA, 3 US dont NASA)
- Outil basé sur des services, en partie «VO-Compliant» (VOTables, UCDD/Utypes, TAP EuroPlaNet). Registries au MSSL et Obs Paris
- Requêtes par types de données, position instrument, cible, instrument, date, ...
- Utilisable par un GUI, par des Workflows, sous IDL

# Accès aux données

(éviter l'accès hâtif, ça fait aller à la selle)

- Accès unique pour 58 catalogues d'événements (1942 à maintenant)
- Accès unique pour les données de 211 sources de données provenant de 157 instruments issus de 49 observatoires (sol et espace)
- Utilise largement BASS2000, MEDOC, CDPP

● Sun

○ Start Time

● End Time

● Mercury

● Venus

● Earth

● Mars

# Valeurs ajoutées

- Relier les données avec un modèle de propagation balistique (CME, CIR, SEP ; avant et arrière)
- Combiner des listes d'événements (2)
- Montrer les informations de contexte
- Catalogue de structures héliosphériques (filaments, protubérances, régions actives, trous coronaux, taches solaires, radio type III, sources radio coronales ; bientôt type II)

# Services

(Compris ?)

## Event catalogue

2012 ▾ September ▾ 31 ▾ To 2012 ▾ October ▾ 31 ▾

*Event type:*  CME  Flare  Solar Wind  Particle 

*Location:*  Solar  IPS  Geo  Planet

*Obs. type:*  In situ  Remote  All

Show all catalogues *Catalogue title search:*

# Services

(Compris ?)

Event catalogue

Feature catalogue

Data evaluation ser

Context

Instrument capabilities

Instrument location

Data access



A screenshot of a search interface for event catalogues. The interface is light yellow and contains several sections:

- Date Range:** Two date pickers. The first is set to "2012" (year), "September" (month), and "31" (day). The second is set to "2012" (year), "October" (month), and "31" (day). They are separated by the word "To".
- Event type:** A label followed by four radio buttons: "CME", "Flare", "Solar Wind", and "Particle". A small calendar icon is to the right.
- Location:** A label followed by four radio buttons: "Solar", "IPS", "Geo", and "Planet".
- Obs. type:** A label followed by three radio buttons: "In situ", "Remote", and "All". The "All" option is selected.
- Buttons and Search:** A yellow "Reset" button is on the left. To the right is a checkbox labeled "Show all catalogues" and a text input field labeled "Catalogue title search:".

A)

# Services

(Compris ?)

Event catalogue

Feature catalogue

Data evaluation

Context

Instrument

Instrument

Data access

Query form Database and fields description Database content Free SQL query Helio Front End

Query form

1 - Date and time selection 2 - Features selection 3 - Output options

If 'From' and 'to' are empty, date selection is ignored and query applies to the whole database!

From 2011-09-24T00:00 to 2011-09-25T00:00 Or Duration between 0 and 60 days 1

Or Upload dates sample from VOTable

Submit ?

The list of the features for which data are currently available in the HFC is given in the following table

Feature	Instrument	Recognition code	Bibliography	Tracking information
Active Region	SOHO/MDI SOHO/EIT	SMART SPOCA-AR	Higgins et al., 2010 Barra et al., 2009	No
Coronal Hole	SOHO/MDI + SOHO/EIT 195 A SOHO/EIT	CHARM SPOCA-CH	Krista and Gallagher, 2009 Barra et al., 2009	No
Filament	Meudon H Alpha Spectroheliograph	SoSoft & TrackFil	Fuller et al., 2005 - Bonnin et al., submitted	Yes
Prominence	Meudon CAII K3 Spectroheliograph	SoSoPro	N. Fuller	No
Sunspot	SOHO/MDI SDO/HMI	MDISS SDOSS	Zharkov et al., 2005 <a href="http://adsabs.harvard.edu/abs/2005SoPh..228..361Z/">http://adsabs.harvard.edu/abs/2005SoPh..228..361Z/</a>	No
Type III	Wind/Waves, STEREO/Swaves	RABAT3	X. Bonnin	No
Coronal radio emission	Nancay Radio Heliograph	NRH2D	C. Renié, X. Bonnin	Yes

(DA)

# Services

(Compris ?)

Event catalogue

Feature catalogue

Data evaluation service (interop access to AMDA)

Co

Inst

Inst

Da

**DES(Data Evaluation Service)**

**SEARCH INTERFACE**

StartTime  EndTime  \*Date format: YYYY-MM-DDTHH:MM

Mission  Parameter

Function

Average/Sampling time resolution to be used(sec)

Your condition

**DES CONTEX SERVICE(PLOTS)**

StartTime  EndTime  \*Date format: YYYY-MM-DDTHH:MM

Mission  ACE  WIND  Ulysses  STEREO-A  STEREO-B





## Context Service (CXS) & Quicklook pages

Select the required Context Service routine, set the parameters and make the request

GOES Lightcurve

Flare Location

Parker Spiral

CDAW Movies

Plot GOES light-curve for selected time interval

Starting date:

2003

October

30

20

00

00

Ending date:

2003

November

02

03

59

59

Plot type:

X-ray

Proton

Event ca

Feature

Data eva

Context

Instrument capabilities

Instrument location

Data access

A)

Service

Event catalogue

Feature catalogue

Data evaluation service

Context

Instrument capabilities

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**HELIO** Instrument Capabilities Service (ICS) Test GUI

**Preset Search**

Select a List: Instrument

Starting date: 2003 October 28

Ending date: 2003 November 03

**Qualifying Parameters: (for Instrument)**

**Observing Domain 1:**

- Sun  Mercury  Venus  Earth  Mars  Jupiter  Saturn
- Heliosphere  Planetary  Comet  Helopause  Galactic

**Observing Domain 2:**

**Solar:**  Interior  Disk/inr. cor.  Outer corona  Disk/helios.  Solar-wind

**Planetary:**  Environment  Magnetosphere  Ionosphere  Aurora

**Other:**  Interstellar  Energy release  Structure

**Instrument Type:**  Remote  In-situ

**Observable Entity:**

- Photons  GMR  HXR  SXR  EUV  UV  visible   $\mu$ -wave  radio
- H-alpha  He 10830
- Particles  Charged  Energetic  Neutral  Dust  Cosmic-ray
- Fields  Electric  Magnetic  Gravity

**Keywords:**

- Imager  Spectrometer  Polarimeter  Coronagraph  Magnetograph  Magnetometer
- Oscillations  Composition  Irradiance  Photometer  Radiometer  Plasma

Search [Reset] Show Recs.: all HTML Auto

*Note: Options set within a section are OR'ed together while the sections are AND'ed together*

**Free SQL Query**

```
SELECT name,loc_gen,loc_p1,loc_p2,sat_id FROM observatory WHERE loc_gen='ERO' OR loc_gen='LPO' LIMIT 100
```

S

Event catalogue  
Feature catalogue  
Data evaluation service  
Context  
Instrument capabilities  
Instrument location  
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**HELIO** Instrument Location Service (ILS)  
Test GUI

**Preset Search**

Select a List: Trajectories with coverage

Starting date: 2003 : October : 28 : 00 : 00 : 00 :  
Ending date: 2003 : November : 03 : 23 : 59 : 59 :

**Planet:**  Mercury  Venus  Earth  Mars  Jupiter  Saturn  Uranus  Neptune

**Spacecraft:**  Ulysses  STEREO-A  STEREO-B  Messenger  Voyager 1  Voyager 2  
 Galileo  Cassini  New Horizons  Rosetta  Dawn

Search Reset Show Recs.: all HTML Auto

**Free SQL Query**

```
SELECT * FROM trajectories WHERE time BETWEEN '2000-01-01' AND '2000-01-03' LIMIT 10
```

Search Reset Text Auto



# Data Provider Access Service (DPAS) Test GUI



Starting date: 2003 October 30 20 00 00

Ending date: 2003 October 31 03 59 59

Search

Reset

HTML

Auto

## Instruments:

ACE\_CRIS  
ACE\_EPAM  
ACE\_MAG  
ACE\_SEPICA  
ACE\_SIS  
ACE\_SWEPAM  
ACE\_SWICS  
ACE\_ULEIS  
BBSO\_GONG  
BLEN\_PHOENIX\_2  
CASSINI\_MAG  
CLUSTER\_CIS  
CLUSTER\_DWP  
CLUSTER EDI  
CLUSTER\_EFW  
CLUSTER\_FGM  
CLUSTER\_PEACE  
CLUSTER\_RAPID

## Observatories:

ACE, BBSO, BLEN, CASSINI, CLUSTER, CTIO, GEOTAIL, GOES-12, GOES, HINODE, IMAGE, KANZ, KPNO, KSAC, KSFO, LEAR, MESSENGER, MEUD, MEX, MGS, MLSO, MWSO, NANC, NEAR, NOBE, OACT, OAUC, OVRO, PDMO, POLAR, PROBA2, RHESSI, SDO, SOHO, STEREO-A, STEREO-B, TEID, TIMED, TRACE, UDPR, ULYSSES, VEX, VOYAGER, WIND, YNAO, YOHKOH, GONG-HALPH, HalphaKanz, HalphaHASTA

*(49 unique values found)*

## Instructions:

*Select a time range and one or more instruments then hit search.  
Select VOTable to save to an XML file*

No. of Instruments = 157

to AMDA)

# Data access

# Services

(Compris ?)

Event catalogue

Feature catalogue

Data evaluation service (interop access to AMDA)

Context

Instrument capabilities

Instrument location

Data access

# Mais que fait donc HELIO ?

(I)

(Ah ben on se demande !)

The screenshot shows the HELIO Front End web interface. The main heading is "HELIOPHYSICS INTEGRATED OBSERVATORY". A "Select Event List" dialog box is open, allowing users to filter events by type, location, and observation type. The "Geo" location is selected. Below the dialog, a table lists various event lists with columns for Description, From, To, Type, Status, and Info. The "NMDB Ground Level Enhancement List" is highlighted in orange. To the right of the table, there are checkboxes for "AAD Ground Level Enhancement List" and "NMDB Ground Level Enhancement List", both of which are checked.

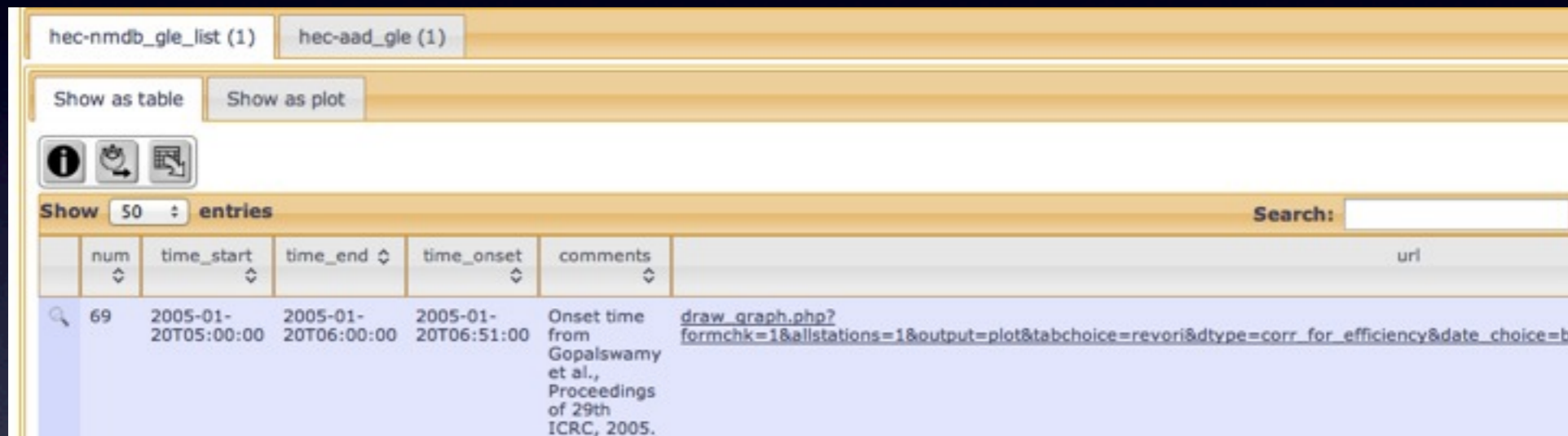
Description	From	To	Type	Status	Info
Storm List [Gopalswamy et al., 2009]					
Mars Earth Interplanetary CME (ICME) List [Falkenberg et al., 2011]	2001-04-04	2003-11-21	event	closed	i
Stream Interaction Regions (SIR) from Wind and ACE data [Jian et al., 2011]	1995-01-01	2009-12-25	event	closed	i
GOES strong flare and SEP list [Klein et al., 2011]	1996-07-09	2006-12-14	event	closed	i
NMDB Ground Level Enhancement List	1942-02-28	2006-12-13	event	static	i
Study of SEP Events of 1997-2006 [Cane et al., 2010]	1997-04-01	2006-12-14	event	closed	i

Choix de listes  
d'événements thématiques

# Mais que fait donc HELIO ?

(I)

(Ah ben on se demande !)



hec-nmdb\_gle\_list (1) hec-aad\_gle (1)

Show as table Show as plot

Show 50 entries Search:

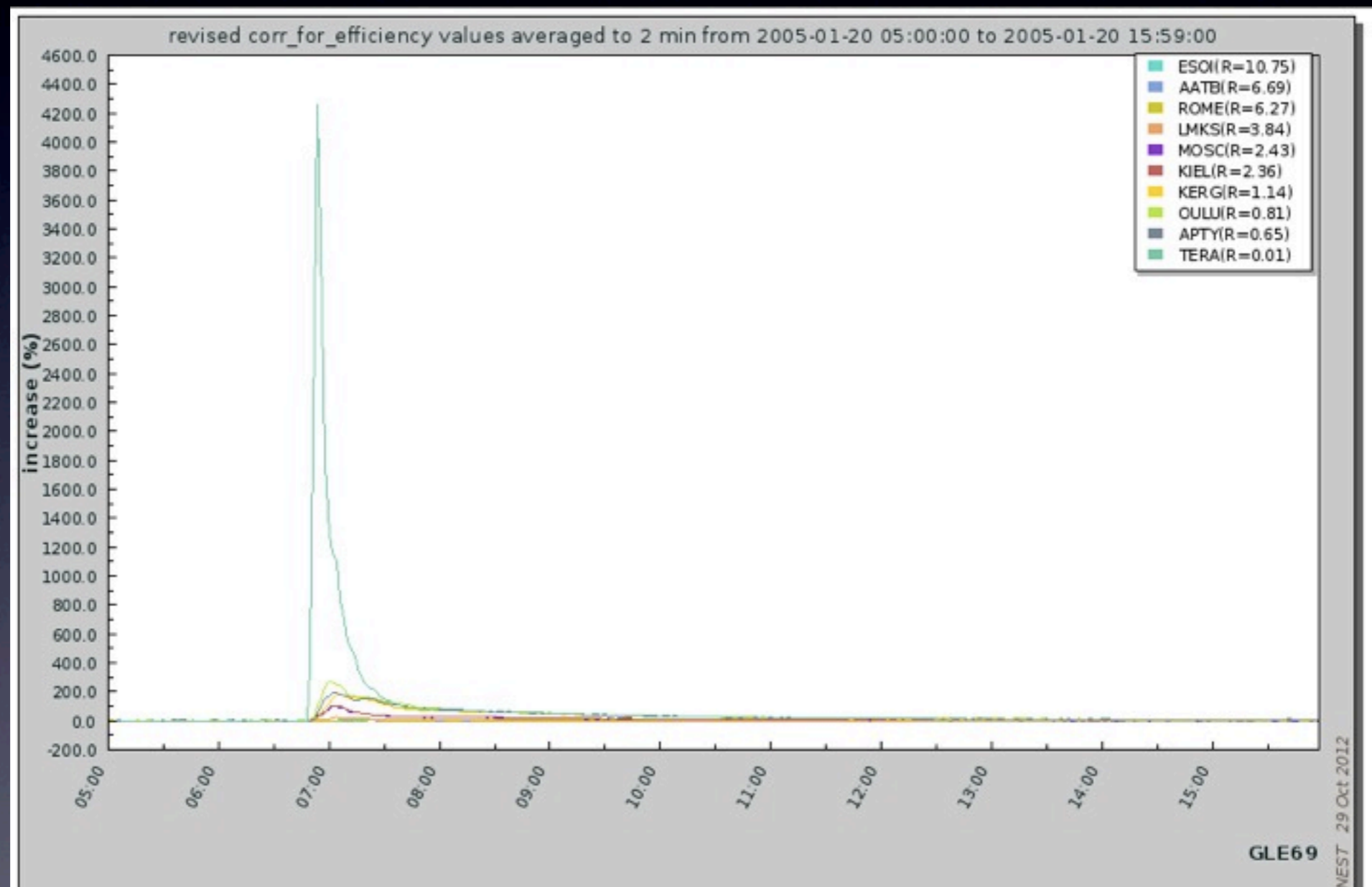
num	time_start	time_end	time_onset	comments	url
69	2005-01-20T05:00:00	2005-01-20T06:00:00	2005-01-20T06:51:00	Onset time from Gopalswamy et al., Proceedings of 29th ICRC, 2005.	<a href="#">draw_graph.php?formchk=1&amp;allstations=1&amp;output=plot&amp;tabchoice=revori&amp;dtype=corr_for_efficiency&amp;date_choice=b</a>

Obtention des listes à une période donnée

# Mais que fait donc HELIO ?

(I)

(Ah ben on se demande !)

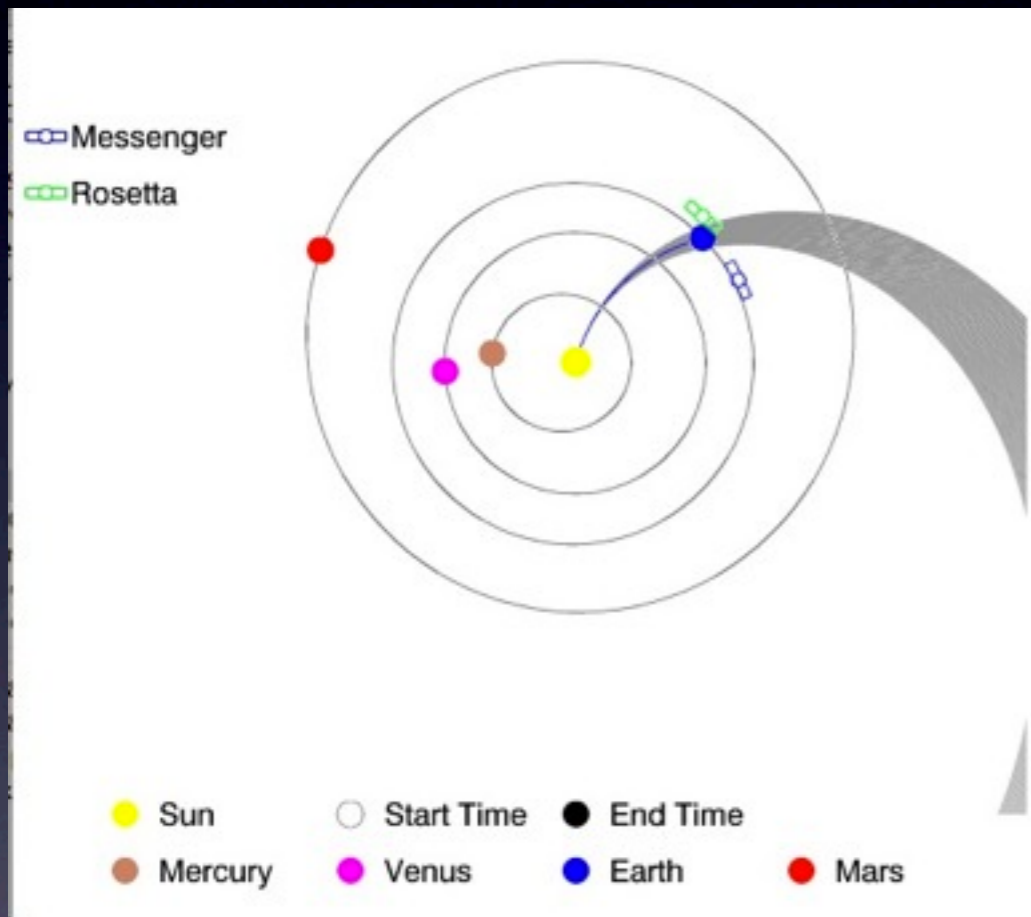


Visualisation des événements



# Mais que fait donc HELIO ?

(2) (Toujours pas trouvé ?)



Modèle de  
propagation CME,  
CIR, SEP

# Mais que fait donc HELIO ?

## (2)

(Toujours pas trouvé ?)

Select Parameter

Parameter	Value
Object	Earth
Speed	800
SpeedError ±	100
Width	60

Planet or Satellite hit by the CME  
CME speed in km/s  
Error in the speed in km/s  
Longitudinal width of the CME in degrees

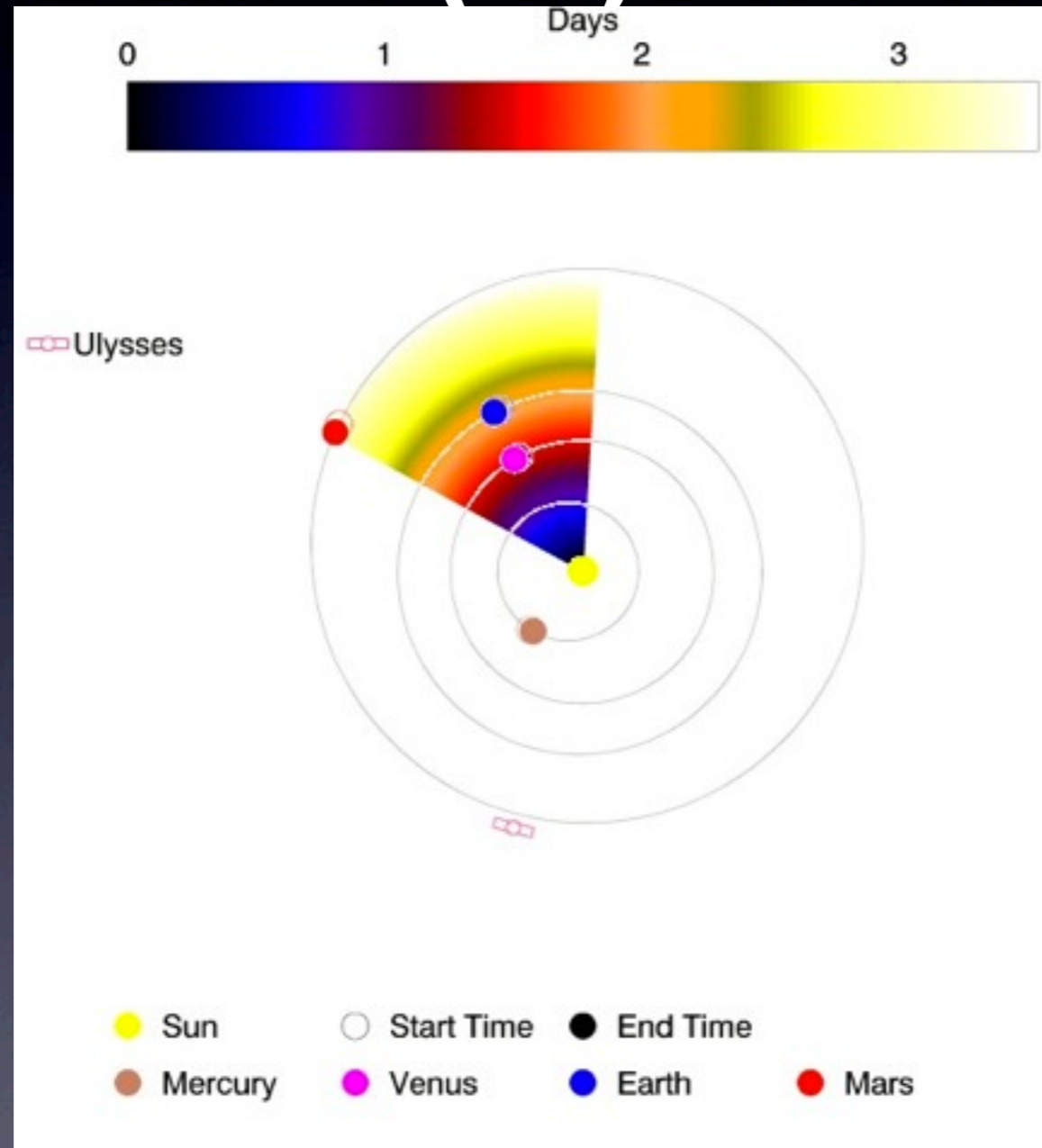
The diagram consists of two parts. The top part shows a yellow circle representing the Sun on the left. An orange cone representing a Coronal Mass Ejection (CME) originates from the Sun and extends to the right. Labels include 'Sun', 'CME', 'velocity' (indicated by an arrow), 'width' (indicated by a double-headed arrow across the cone's base), and 'longitude' (indicated by an arc). The bottom part shows a similar setup but with a blue circle representing Earth. The CME cone is shown hitting Earth. Labels include 'Sun', 'CME', 'PA<sub>sun</sub>' (indicated by an angle), 'width' (indicated by a double-headed arrow), and 'flare longitude' (indicated by an arc).

En avant et en arrière...

# Mais que fait donc HELIO ?

(2)

(Toujours pas trouvé ?)



Exemple de CME

# Mais que fait donc HELIO ?

(2) (Toujours pas trouvé ?)

SHEBA CME propagation model (14)

Show as table Show as plot

Hide missed objects

Show 50 entries Search:

time_start ▲	long_hg ⚡	long_hci ⚡	long_width ⚡	v ⚡	v_err ⚡	target_obj ⚡	r_hci ⚡	HitOrMiss ⚡	ETA ⚡	ETA_min ⚡	ETA_max ⚡	Dt ⚡
2001-04-02T10:39:06.516	2.14	119.11	65	800	100	MERCURY	0.433	0	-	-	-	
2001-04-02T10:39:06.516	2.14	119.11	65	800	100	VENUS	0.721	1	2001-04-04T00:12:35.030	2001-04-03T20:02:11.862	2001-04-04T05:34:30.532	1.56
2001-04-02T10:39:06.516	2.14	119.11	65	800	100	EARTH	1	1	2001-04-04T14:45:00.832	2001-04-04T08:57:41.464	2001-04-04T22:11:34.306	2.17
2001-04-02T10:39:06.516	2.14	119.11	65	800	100	MARS	1.564	1	2001-04-05T23:29:21.646	2001-04-05T14:03:46.632	2001-04-06T11:36:32.379	3.53
2001-04-02T10:39:06.516	2.14	119.11	65	800	100	JUPITER	5.078	0	-	-	-	

Planètes concernées par l'événement

# Mais que fait donc HELIO ?

## (3)

(Va-t-on enfin savoir ? Quel suspense...)

Show as table Show as plot

Check options to filter the results below.

Observing Domain 1 Observing Domain 2 Instrument Type Observable Entity Keywords

Solar:  Interior  Disk/inr. cor.  Outer corona  Disk/helios.  Solar-wind  
Planetary:  Environment  Magnetosphere  Ionosphere  Aurora  
 Interstellar  Energy release  Structure

Only show lists containing: Sun, Disk/Inr. Cor., Geo, obsType

Show accessible instruments only ('Note: Instruments in red cannot be accessed through HELIO')

Show 50 entries

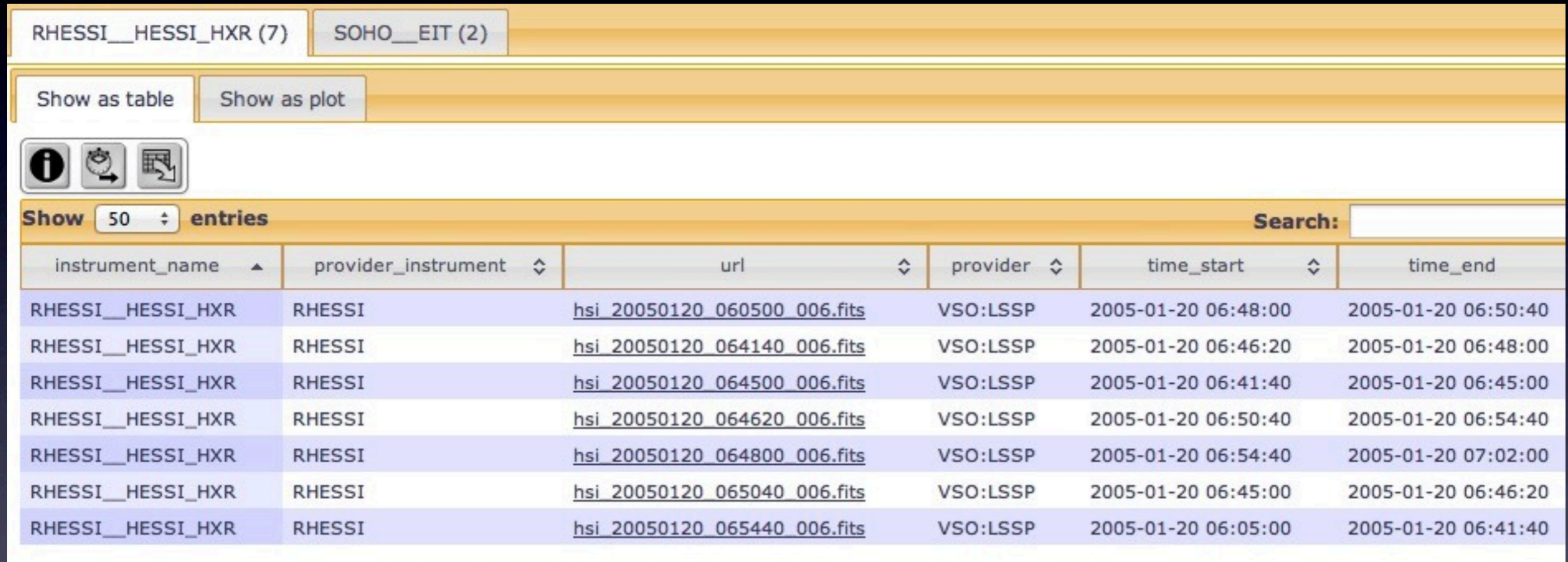
name ▲	observatory_name	obsinst_key	experiment_id	time_start	time_end	lon
CDS	SOHO	SOHO__CDS	<a href="#">1995-065A-02</a>	1996-03-31T00:00:00	2020-01-01T00:00:00	Coron Diagn Spect
CFDT1	KSFO	KSFO__CFDT1	-	1985-05-01T00:00:00	2020-01-01T00:00:00	Carte Disk 7 No. 1
CFDT2	KSFO	KSFO__CFDT2	-	1992-01-01T00:00:00	2020-01-01T00:00:00	Carte Disk 7 No. 2
CHIP	MLSO	MLSO__CHIP	-	1996-03-31T00:00:00	2020-01-01T00:00:00	Chrom Helium Photo
EIT	SOHO	SOHO__EIT	<a href="#">1995-065A-03</a>	1996-03-31T00:00:00	2020-01-01T00:00:00	Extre ultrav Imag Teles

Choix des instruments

# Mais que fait donc HELIO ?

(3)

(Va-t-on enfin savoir ? Quel suspense...)



RHESSI\_\_HESSI\_HXR (7) SOHO\_\_EIT (2)

Show as table Show as plot

Show 50 entries Search:

instrument_name ▲	provider_instrument ◆	url ◆	provider ◆	time_start ◆	time_end
RHESSI__HESSI_HXR	RHESSI	<a href="#">hsi_20050120_060500_006.fits</a>	VSO:LSSP	2005-01-20 06:48:00	2005-01-20 06:50:40
RHESSI__HESSI_HXR	RHESSI	<a href="#">hsi_20050120_064140_006.fits</a>	VSO:LSSP	2005-01-20 06:46:20	2005-01-20 06:48:00
RHESSI__HESSI_HXR	RHESSI	<a href="#">hsi_20050120_064500_006.fits</a>	VSO:LSSP	2005-01-20 06:41:40	2005-01-20 06:45:00
RHESSI__HESSI_HXR	RHESSI	<a href="#">hsi_20050120_064620_006.fits</a>	VSO:LSSP	2005-01-20 06:50:40	2005-01-20 06:54:40
RHESSI__HESSI_HXR	RHESSI	<a href="#">hsi_20050120_064800_006.fits</a>	VSO:LSSP	2005-01-20 06:54:40	2005-01-20 07:02:00
RHESSI__HESSI_HXR	RHESSI	<a href="#">hsi_20050120_065040_006.fits</a>	VSO:LSSP	2005-01-20 06:45:00	2005-01-20 06:46:20
RHESSI__HESSI_HXR	RHESSI	<a href="#">hsi_20050120_065440_006.fits</a>	VSO:LSSP	2005-01-20 06:05:00	2005-01-20 06:41:40

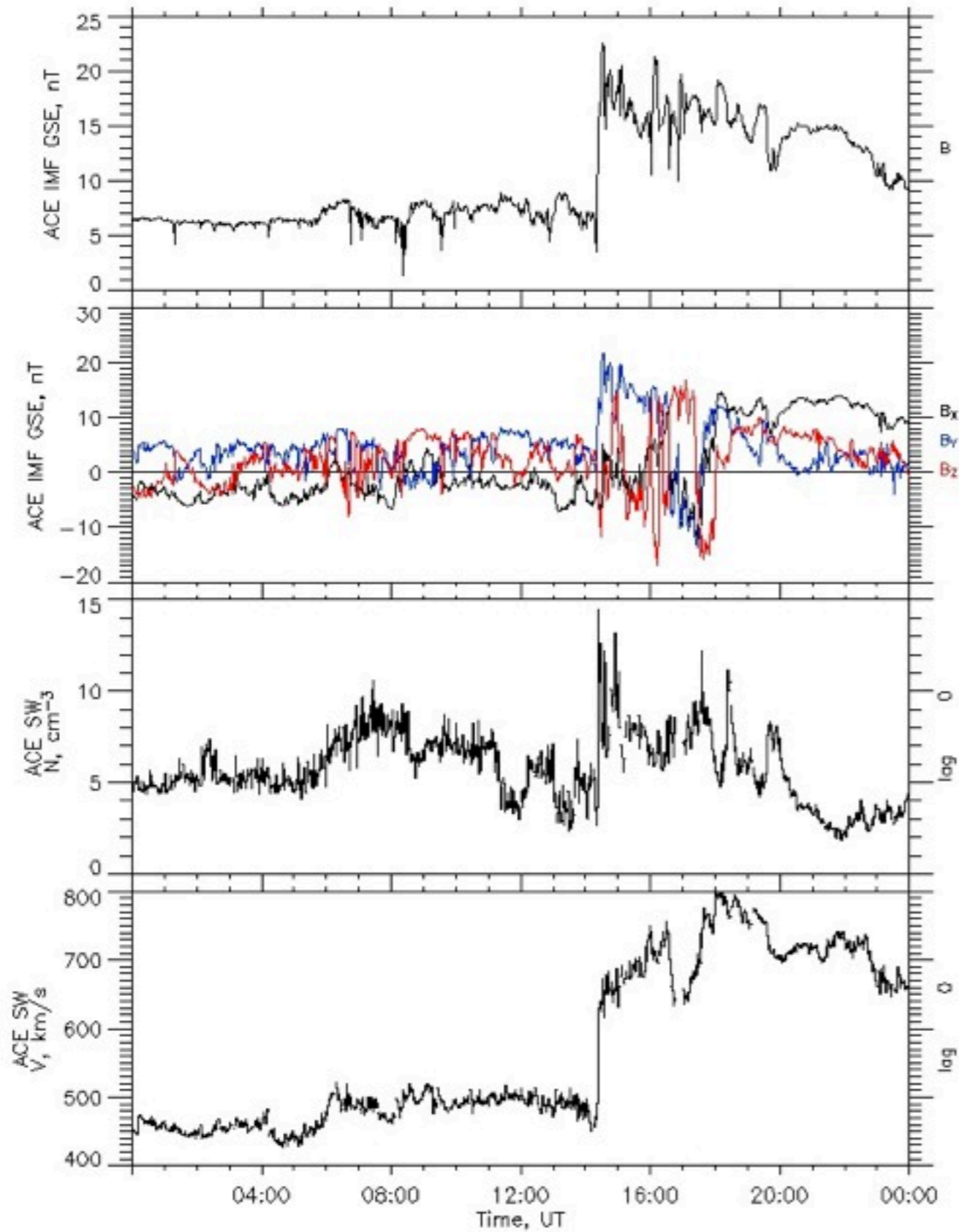
Liste et récupération des données

# Mais que fait donc HELIO ?

(3) (Aaaaah ! Enfin !)

Tracé de  
données  
à la  
volée

# Enfin HELIO ?



Enfin !)

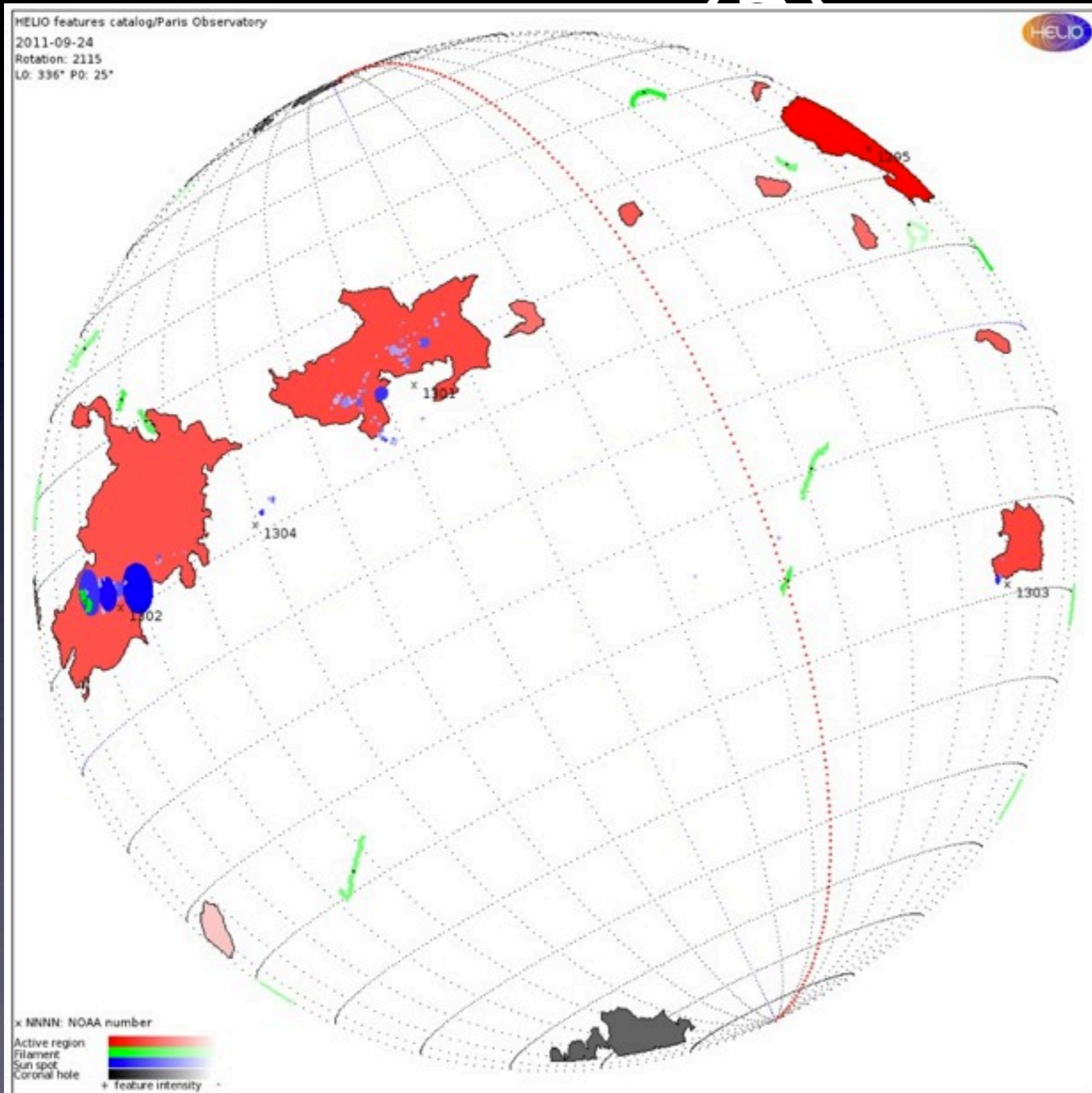
Tracé de données vent solaire à la volée par AMDA

Apr 4 2001

Created by AMDA(C) V2.0 Wed Oct 31 11:11:56 2012



# Mais que fait donc HELIO ?



Tracé des  
données  
synoptiques  
par le HFC

# HELIO, une interface unique pour :

(ben oui, pour quoi, au fait ?)

- Accéder à un grand nombre de données
- Accéder à des plus-values importantes (event catalogue, features catalogue, ...)
- Relier les événements dans tout le Système Solaire
- Fournir de nouveaux types de requêtes
- De plus:
  - Workflows pour automatiser les tâches
  - Accès direct aux catalogues et données par IDL

# D'autres informations

(Oh oui ! Encore !)

<http://www.helio-vo.eu/>

**Une instance HELIO est en cours  
d'installation en France**

**Maintenance sur du long terme  
assurée par les partenaires français**