Heliophysics Integrated Observatory

Project No.: 238969
Call: FP7-INFRA-2008-2

HFC – User Guide

Version 1.3

Title:	**HFC – User Guide**
Document No.:	HELIO_OBSPM_02_005_UM
Date:	22 November 2013
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Distribution:	Project

CAPACITIES

e-infrastructure

Revision History

Version	Date	Released by	Detail
V0.1	02/03/2012	J. Aboudarham	First draft of the document
V1.0	28/06/2012	J. Aboudarham	First version of the document
V1.1	28/06/2012	X. Bonnin	Corrections and updates of the document
V1.2	13/07/2012	J. Aboudarham	Insertion of referees comments, addition of VOTable description and SHEBA connexion
V1.3	22/11/2013	X.Bonnin	Update Section about HQI

Acronyms

CIR	Corotating Interaction Region
CME	Coronal Mass Ejection
CSV	Comma-Separated Values
GUI	Graphical User Interface
HFC	Heliophysics Features Catalogue
HFE	HELIO Front End (Main GUI interface of HELIO)
HQI	Helio Query Interface
IVOA	International Virtual Observatory Alliance
PQL	Parameterized Query Language
REST	REpresentational State Transfer
SQL	Standard Query Language: Language used to query databases
VO	Virtual Observatory

1. Introduction

HFC contains the morphological description of features obtained from codes of automatic features detection. The description of the codes as well as information about the features can be found in the documentation mentioned in Section 5 of this manual. HFC consists of:
- a database that holds all the description of the proposed features, as well as some information about their processing. Several ways of access are provided, as described in Section 2.
- a web interface (graphical user interface, GUI) that allows to query the HFC in several ways, some pre-defined, and others which may be tuned by users.
- SOAP, TAP, and REST web services that allow to query the HFC us ing PQL.
- a few added values that enrich the results of a query, providing some basic context information.

1.1 About the HFC

The HFC is available at http://voparis-helio.obspm.fr/hfc-gui/. Hereafter, all references to the HFC GUI mean this web site.

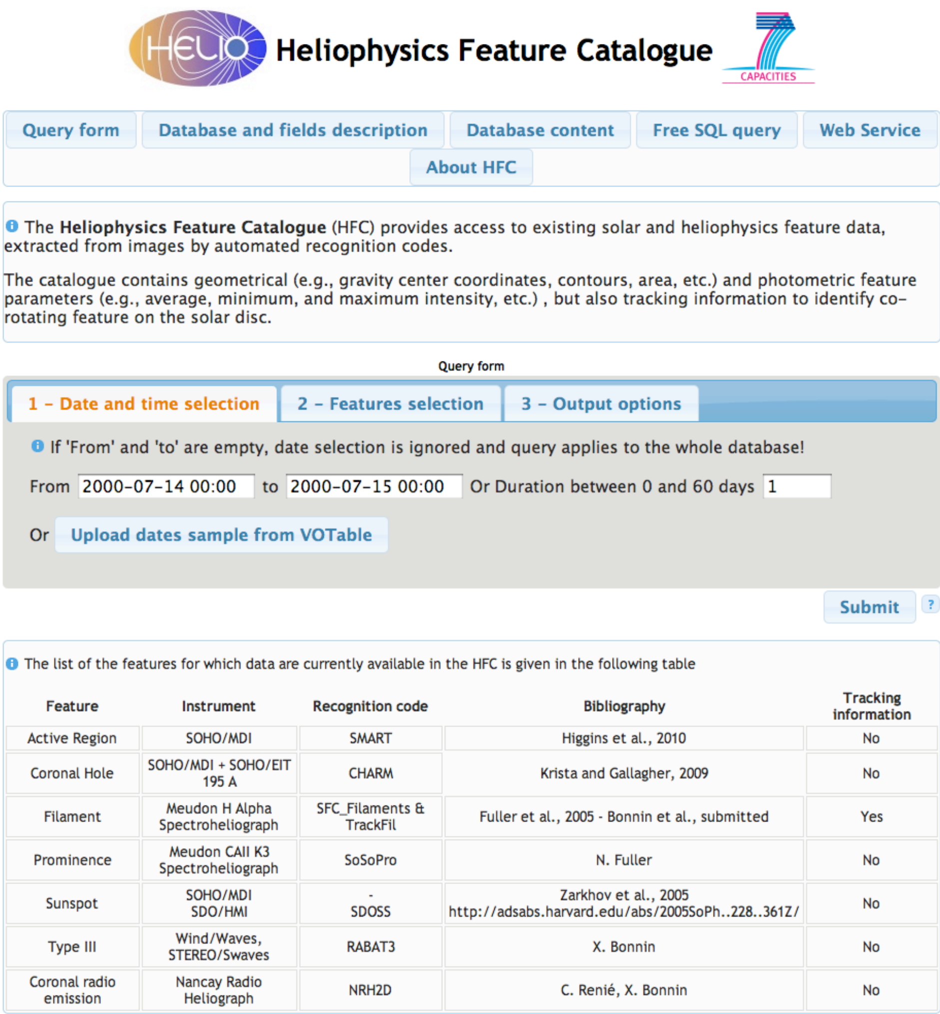


Fig. 1: Main query page of the HFC GUI.

Figure 1 shows the main query page of the HFC. On top is a set of buttons giving access to the full functionality of the HFC. Initially, the Query form is selected. Below is a collection of tabs allowing to specify the parameters of a query by selecting time, the concerned features and the desired output information. At the bottom of the main page information about the features and the detection codes is provided.

2. How to Access the HFC

HFC can be accessed several ways. The easiest for human beings is the GUI. Software programmes can connect through a Web-service.

2.1 The Graphical User Interface

As mentioned above, the main access to the HFC GUI is through http://voparis-helio.obspm.fr/hfc-gui/. It corresponds to the page shown in Figure 1.

2.2 The HQI Interface

The HELIO Query Interface (HQI) provides SOAP, TAP, as well as REST interfaces to access to the HFC database. These interfaces are fully compliant with latest VO standards : queries are submitted using parameters following the syntax of the IVOA Parameterised Query Language (PQL), and the HQI returns VOTable format files which include UCD/Utype IVOA keywords.

The SOAP endpoint of the HFC web services can be found at the following URL:

http://voparis-helio.obspm.fr/hfc-hqi/HelioService

Section 5 describes in detail how to query the HFC using the REST web-service interface through the HTTP (GET/POST) protocol.

More information about the HQI can be found in the dedicated document "Service Interface Specification".

2.3 Other possible ways

A description of the use of IDL to access the services is available at http://www.helio-vo.eu/documents/help/ssw/helio_ssw_intro.html. A branch of the SolarSoft package provides basic codes that help to query the HFC directly from the IDL language. After having installed all of the required packages, to test simple queries on the HFC, compile and run the demo_hfc_overplot program from the IDL interpreter.

IDL> demo_hfc_overplot

Discussions about how to access some characteristic information of the HFC directly through the HELIO Front End (HFE) are in progress. A document describes the needs (HELIO_HFE-HFC_connection_v01.pdf).

3. How to use the HFC Query form

This section focuses on the use of the HFC GUI Query form, which provides a very wide range of possibilities to query the HFC, and which is probably the most usable at first for the users. Once they get familiar with the HFC content, they could shift to access from IDL, if more advanced use is needed.

3.1 Overview

The query interface is based on three tabs. Each tab allows to specify a part of the query as shown in Figure 2. The first tab concerns date and time selection. The second tab covers selection of features to take into account in the query. The third tab allows to specify the desired output results of the query.

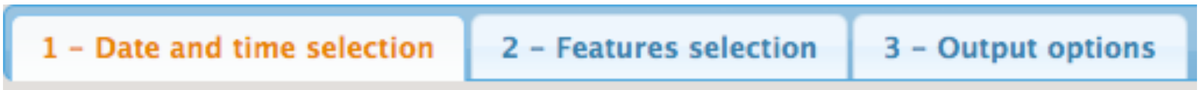


Fig. 2: Copy of the tabs used to specify the query.

Note that at any time, clicking on the 'Query form' tab near the top of the page, will bring back the 'Date and time selection' tab.

3.2 Specify query

3.2.1 Date and time selection

In this first tab, the user selects a time range for the query. When clicking in the small 'From' or 'To' fields, a calendar appears (Figure 3), where the user can select year, month, day, hour and minute. Once the 'From' form is completed, the 'To' form is automatically filled with a 15 days interval. The end time can be changed either by clicking in the 'To' field or by changing the duration in the 'Duration' field.

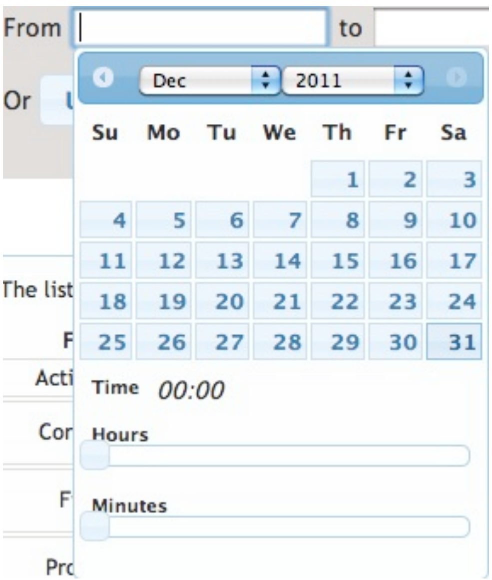


Fig. 3: Calendar for date and time selection

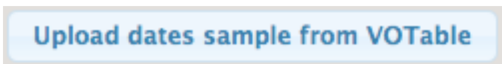


Fig. 4: VOTable upload button

It is also possible to get query values from a file in VOTable format (see section 4.3). After clicking the 'Upload dates sample from VOTable' button (see Figure 4 above), the user is asked for the file to load from the user's computer. Then, the list of dates is extracted from the file, and a dedicated dialogue allows to select one or several dates of interest. Multi-selection is possible by holding the 'Control' or 'Command' key while clicking on the date. Note that in order to avoid huge amount of query results, the time interval is restricted to 60 days. The only way to avoid this limitation is to use the SQL query directly (see Section 4).

3.2.2 Features selection

When clicking on the 'Features selection' tab, a list of features appears. It gives the list of features available at that time, and the instrument which recorded them (see Figure 5).
When you select a feature, a new pull-down menu appears, which proposes criteria that can be used to restrain the selection (see Figure 6). If you choose one of these options, a new panel appears, which gives the possibility to enter values in order to restrict the specific field of the query. The extreme values found in the HFC database are shown, so the user can manually check the plausibility of the input.

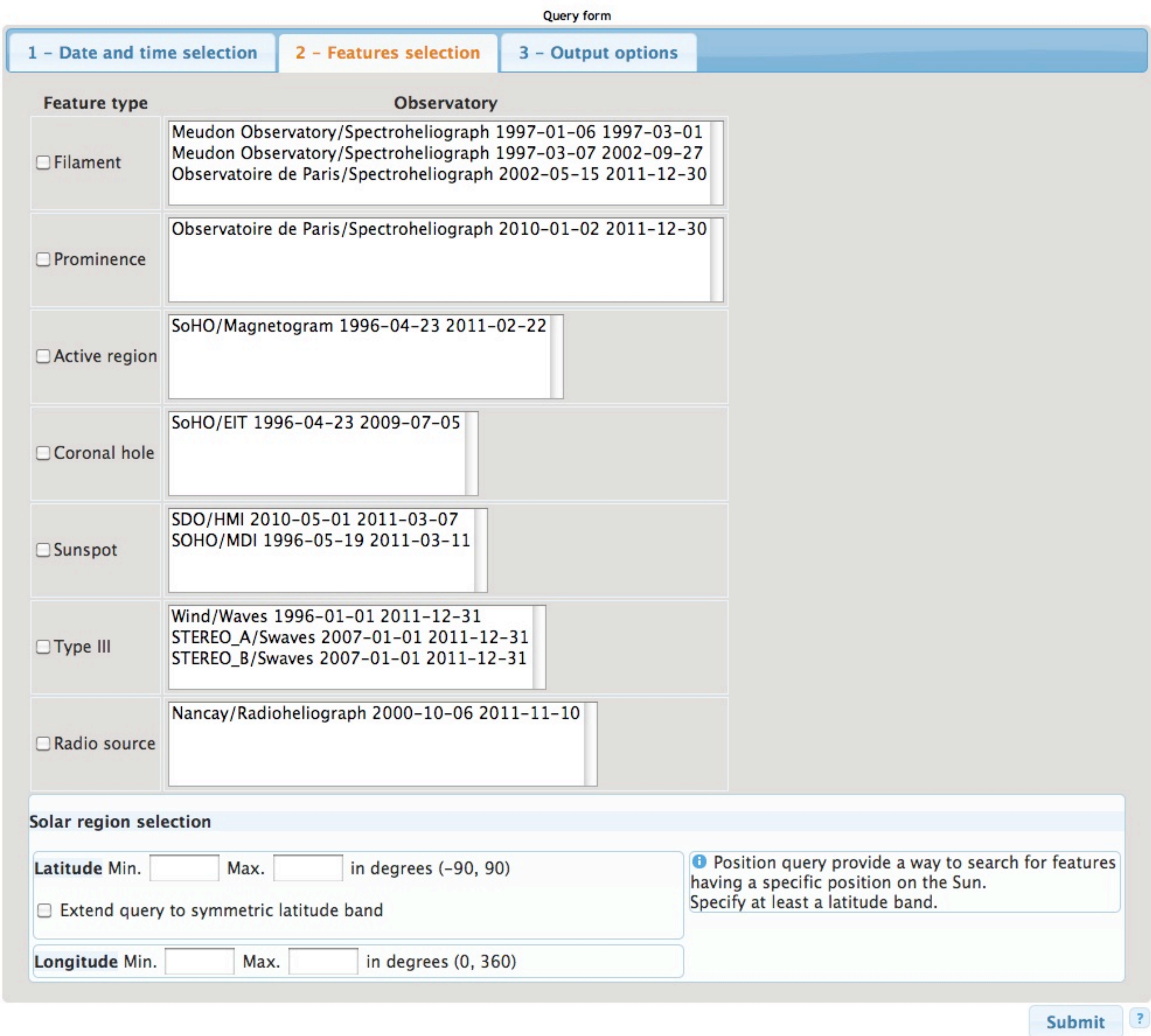


Fig. 5: The features selection window.

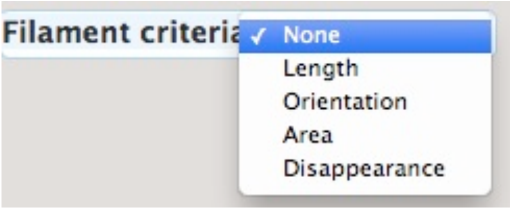


Fig. 6: Optional criteria for filaments

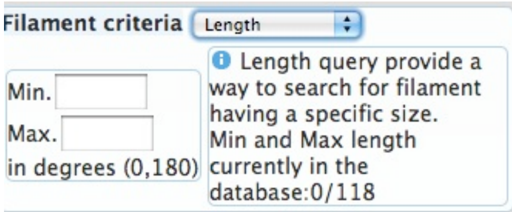


Fig. 7: Entry panel to restrain filaments length

At the bottom of the list of features, a part of the interface allows to query on a solar location, instead of features characteristics. For latitude, a checkbox allows to extend the query to the symmetric latitude band on the opposite solar hemisphere. (See bottom of Figure 5)

3.2.3 Output options

When clicking on the 'Output options' tab, the list of available features appears. When pressing the small triangle in front of the name, a list of fields appears. Some are already ticked, which correspond to the default output fields. (See Figure 8) The user is then free to select/deselect any field in the list. Note that the database and field description (see Section 4) gives the complete list of fields available. So users can use the direct SQL query to return any available field.

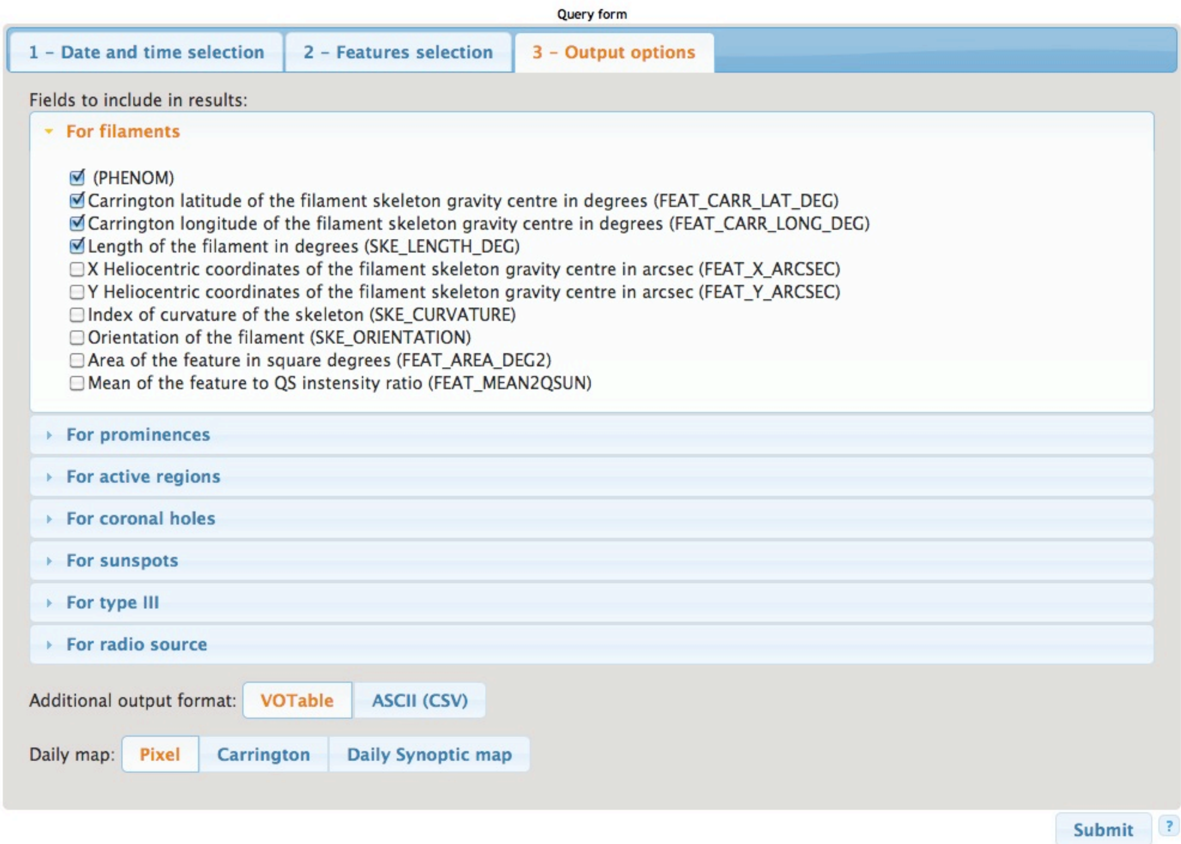


Fig. 8: Output options for filaments. The ticked fields are the default output fields.

The output of the query appears as a HTML table in a web page, but they could be saved (see section 3.3) in VOTable format (xml-based standard for virtual observatories, see section 4.3) or in ASCII – CSV (using comma as a separator such that the file can be read by any spread sheet program). Also, the output page offers drawing on the fly maps of the Sun where selected features are plotted. You can select maps plotted in pixels or in Carrington coordinates. The Daily Synoptic map option allows to plot all of the features at their location on the solar disk. (See Figure 9 for an example of a synoptic map).

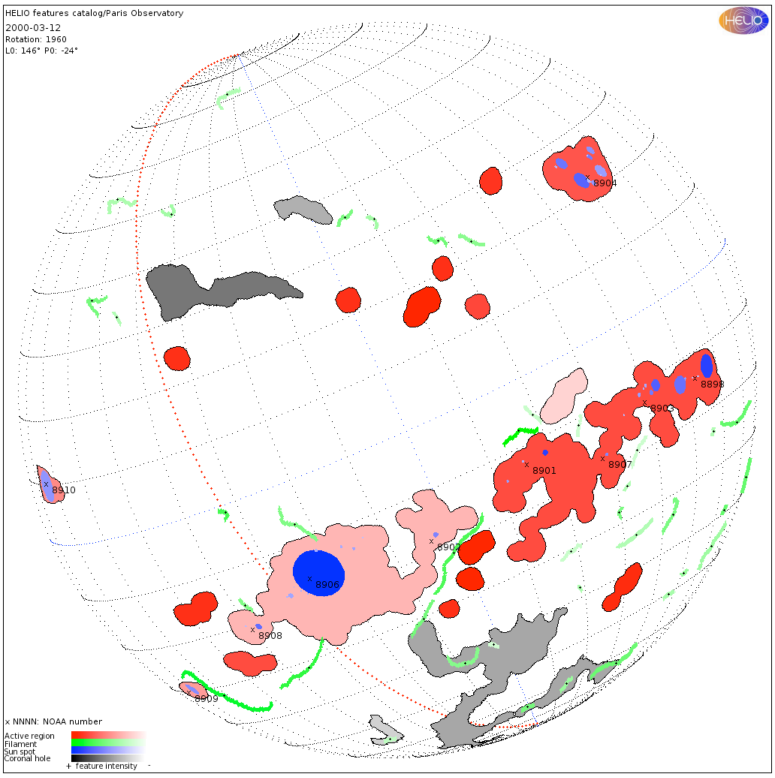


Fig. 9: Daily Synoptic map. Each colour corresponds to a specific feature, and the intensity of the colour to a criterion of 'importance' (intensity, contrast, size, ...) of the feature. The red-dotted line gives the location of the 0-longitude in Carrington coordinates.

3.3 Submit the Search

At the end of each tab window, a 'Submit' button is available. Clicking it will retrieve the result of the query taking all selected options into account

3.3 Get Search Results

After pressing the 'Submit' button, a new page is displayed,. It gives the result for the start day of the query and displays the daily maps if asked for. An example of the upper part of a result page is shown in Figure 10. At the top, the number of obtained features is given next to a link that allows saving the output in VOTable (cf. section 4.3) or CSV format (note that the complete answer, including all dates is saved in a separate file per feature). Below this header appears a page selector and below a list of days in the current page. The Daily Synoptic map is displayed, and then a list of tabs give the various available times for the concerned day. So the results are ordered by date, feature and hour.
Below the maps a section called 'Tab results' is shown. When the user clicks on it, a detailed table with the results will appear. (see Figure 12)

When the tracking of a feature is available (only for filaments, at the time of writing this document), the user can click on the feature's ID (i.e. the first column of the result, on the left), and a new window pops up, showing the behaviour of the feature during all the time it was observed (Figure 13). Arrows at the top of the window allow to scroll between the images within the full observing time.

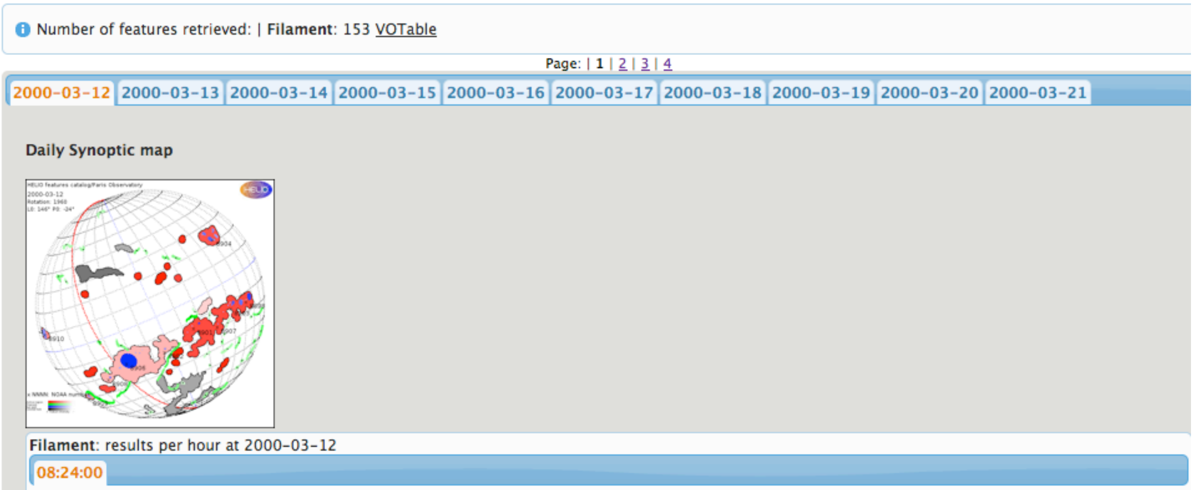


Fig. 10: Top of a result page. Number of results, number of pages to display, and a tab per day are displayed.

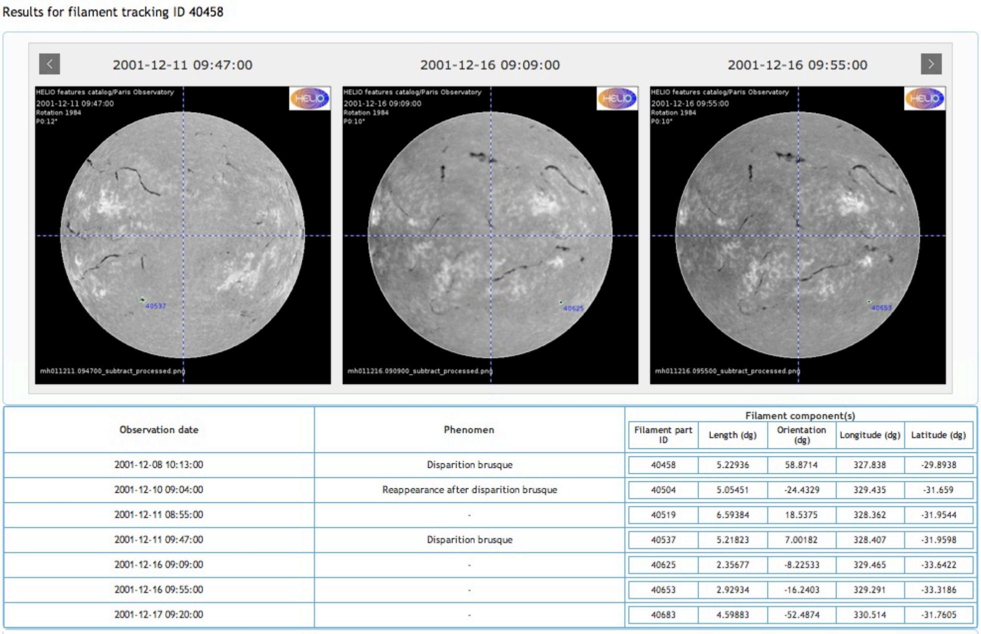
Tab results +

Fig. 11: Section to open to display the results in tabular form.

Tab results –

Index of the feature during a rotation Click for tracking info	Id of filament's component(s)	Name of the observatory/spacecraft	Phenomen ?	Carrington latitude of the filament skeleton gravity centre in degrees	Carrington longitude of the filament skeleton gravity centre in degrees	Length of the filament in degrees
40359	40503	Meudon Observatory/Spectroheliograph/Spectroheliograph	-	-41.3	33.18	25.6
40371	40509 40512	Meudon Observatory/Spectroheliograph/Spectroheliograph Meudon Observatory/Spectroheliograph/Spectroheliograph	Disparition brusque	0.88 5.19	68.36 59.33	12.37 1.99
40380	40517	Meudon Observatory/Spectroheliograph/Spectroheliograph	-	31.53	355.22	4.89
40395	40505	Meudon Observatory/Spectroheliograph/Spectroheliograph	-	-13.36	331.24	14.15
40406	40514 40516	Meudon Observatory/Spectroheliograph/Spectroheliograph Meudon Observatory/Spectroheliograph/Spectroheliograph	-	26.15 27.92	329.31 313.26	35.22 10.26
40422	40507	Meudon Observatory/Spectroheliograph/Spectroheliograph	-	-11.9	60.31	12.14
40458	40504	Meudon Observatory/Spectroheliograph/Spectroheliograph	Reappearance after disparition brusque	-31.66	329.44	5.05
40466	40508	Meudon Observatory/Spectroheliograph/Spectroheliograph	Reappearance after disparition brusque	-2.75	319.22	11.04
40468	40511	Meudon Observatory/Spectroheliograph/Spectroheliograph	-	6.18	32.69	6.47
40488	40506	Meudon Observatory/Spectroheliograph/Spectroheliograph	-	-12.18	310.24	23.68
40495	40513	Meudon Observatory/Spectroheliograph/Spectroheliograph	-	15.44	58.37	4.76
40510	40510	Meudon Observatory/Spectroheliograph/Spectroheliograph	-	-0.28	288.29	8.94
40529	40515	Meudon Observatory/Spectroheliograph/Spectroheliograph	-	24.75	59.66	4.84

Fig. 12: Tabular view of the results

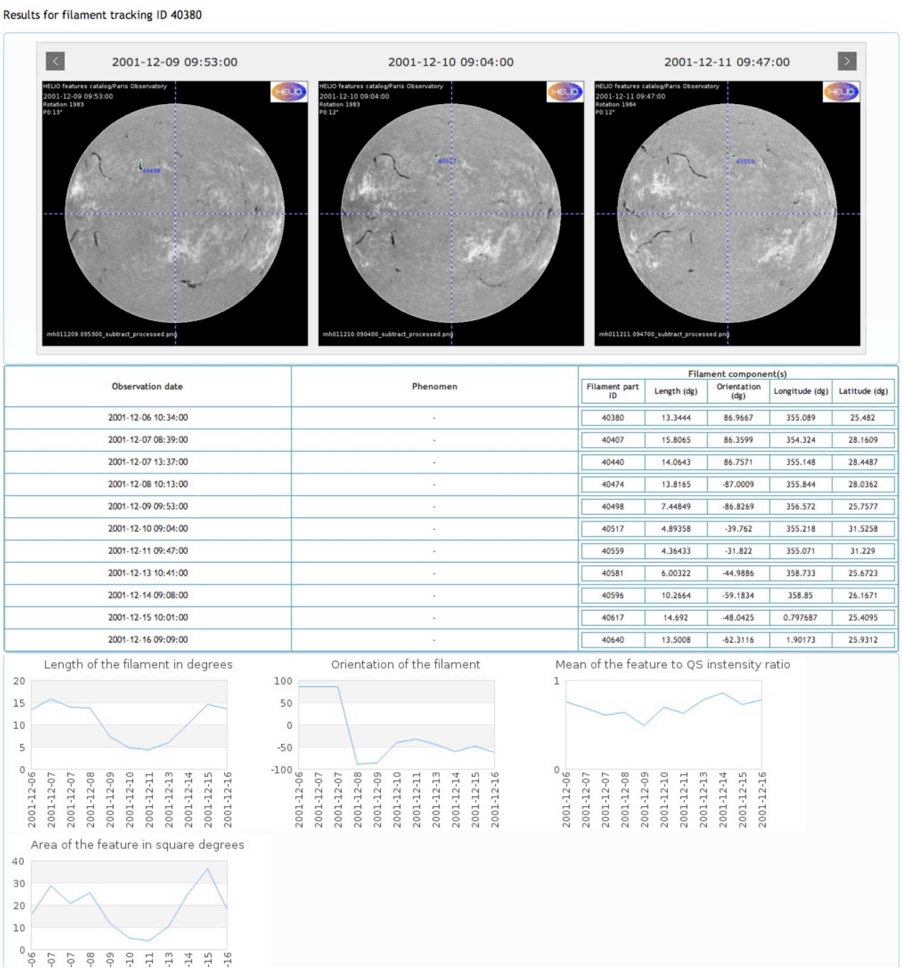


Results for filament tracking ID 40458

Observation date	Phenomen	Filament component(s)				
		Filament part ID	Length (dg)	Orientation (dg)	Longitude (dg)	Latitude (dg)
2001-12-08 10:13:00	Disparition brusque	40458	5.22936	58.8714	327.838	-29.8938
2001-12-10 09:04:00	Reappearance after disparition brusque	40504	5.05451	-24.4329	329.435	-31.659
2001-12-11 08:55:00	-	40519	6.59384	18.5375	328.362	-31.9544
2001-12-11 09:47:00	Disparition brusque	40537	5.21823	7.00182	328.407	-31.9598
2001-12-16 09:09:00	-	40625	2.35677	-8.22533	329.465	-33.6422
2001-12-16 09:55:00	-	40653	2.92934	-16.2403	329.291	-33.3186
2001-12-17 09:20:00	-	40683	4.59883	-52.4874	330.514	-31.7605

Fig. 13: When clicking on a feature's ID, this new window appears, giving information on the feature during all the time it was observed.

As shown in Figure 14, additional plots complete the table. For filaments, it gives the evolution of length, orientation, intensity and area.



Results for filament tracking ID 40380

Observation date	Phenomen	Filament component(s)				
		Filament part ID	Length (dg)	Orientation (dg)	Longitude (dg)	Latitude (dg)
2001-12-06 10:34:00	-	40380	13.3444	86.9667	355.089	25.482
2001-12-07 08:39:00	-	40407	15.8065	86.3599	354.324	28.1609
2001-12-07 13:37:00	-	40440	14.0643	86.7571	355.148	28.4487
2001-12-08 10:13:00	-	40474	13.8165	-87.0009	355.844	28.0362
2001-12-09 09:53:00	-	40498	7.44849	-86.8269	356.572	25.7577
2001-12-10 09:04:00	-	40517	4.89358	-39.762	355.218	31.5258
2001-12-11 09:47:00	-	40559	4.36433	-31.822	355.071	31.229
2001-12-13 10:41:00	-	40581	6.00322	-44.9886	358.733	25.6723
2001-12-14 09:08:00	-	40596	10.2664	-59.1834	358.85	26.1671
2001-12-15 10:01:00	-	40617	14.692	-48.0425	0.797687	25.4095
2001-12-16 09:09:00	-	40640	13.5008	-62.3116	1.90173	25.9312

Fig. 14: Complete tracking information: images, table, and plots.

4. Advanced Features

4.1 General information

In order to allow wider user of HFC, an additional set of information is available. They can be reached through the buttons that appear at the top and bottom of each page of the HFC GUI (Figure 15).

Fig. 15: Button bar giving access to all information concerning HFC.

The first button (Query form) is the way to go back to the standard query interface described extensively in the previous sections.
The second button (Database and fields description) displays a window giving the name of all tables of the HFC database as well as the name of all fields (see Figure 16). This will allow the user to know all the information needed to build SQL queries.

Heliophysics Feature Catalogue

Database tables and fields description

Table OBSERVATIONS:

FIELD	COMMENT
ID_OBSERVATIONS	
OBSERVATORY_ID	Ref. to OBSERVATORY information
DATE_OBS	Start date of the observation
DATE_END	End date of the observation
JDINT	Julian day of the observation, integer part
JDFRAC	Julian day of the observation, fraction part
EXP_TIME	Exposure time (if available), in seconds and fraction of s
C_ROTATION	Carrington rotation
BSCALE	as extracted from the header
BZERO	As extracted from the header
BITPIX	Coding of the original image
NAXIS1	First dimension of the original image (X)
NAXIS2	Second dimension of the original image (Y)
R_SUN	Radius of the Sun in pixels

Fig. 16: Top of the window giving HFC tables and fields, when clicking the 'Database and fields description' button.

The next button (Database content) shows in detail what is available in the HFC. (Figure 17)

HFC content

Date range

Feature	Observatory/Instrument/Telescop	First date	Last date
Filament	Meudon Spectroheliograph	1996-01-05	2011-12-30
Prominence	Meudon Spectroheliograph	2005-01-02	2011-12-30
Active region	SoHO MDI Magnetogram	1996-04-23	2011-02-22
Coronal hole	SoHO EIT EIT	1996-04-23	2009-07-05
Sunspot	SoHO MDI Continuum	1996-05-19	2011-03-11
Sunspot	SDO HMI continuum	2010-04-30	2011-03-27
Type III	Wind Waves Rad2	1996-01-01	2011-12-31
Type III	STEREO_A Swaves HFR	2007-01-01	2011-12-31
Type III	STEREO_B Swaves HFR	2007-01-01	2011-12-31
Radio source	Nancay Radioheliograph	1997-01-02	2007-05-02
Radio source	Nancay Radioheliograph	2000-10-06	2012-03-10

Fig. 17: List of features available in the HFC

The first table shows the availability of data per feature and time range.

Then, a plot visualised this information and lets the user see in which time period data is available but also when it is missing. (Figure 18).

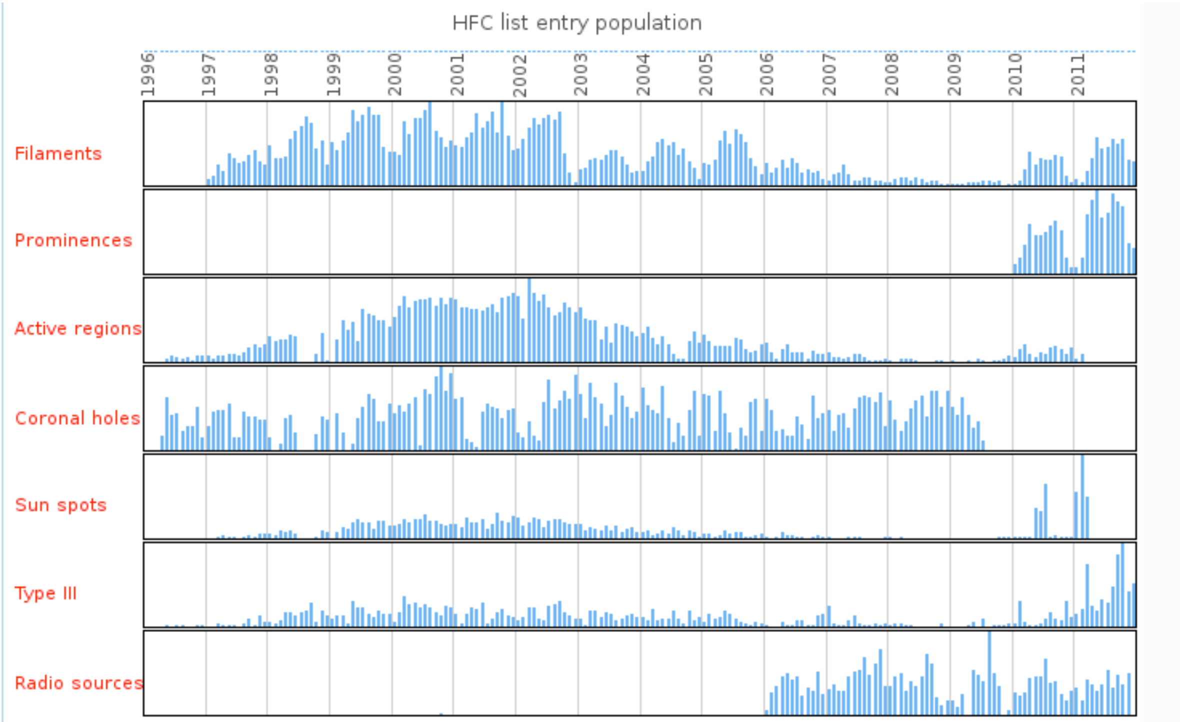


Fig. 18: Availability and abundance of the features at the HFC

Then, for each year, a monthly plot gives the number of features detected, as shown in Figure 19.

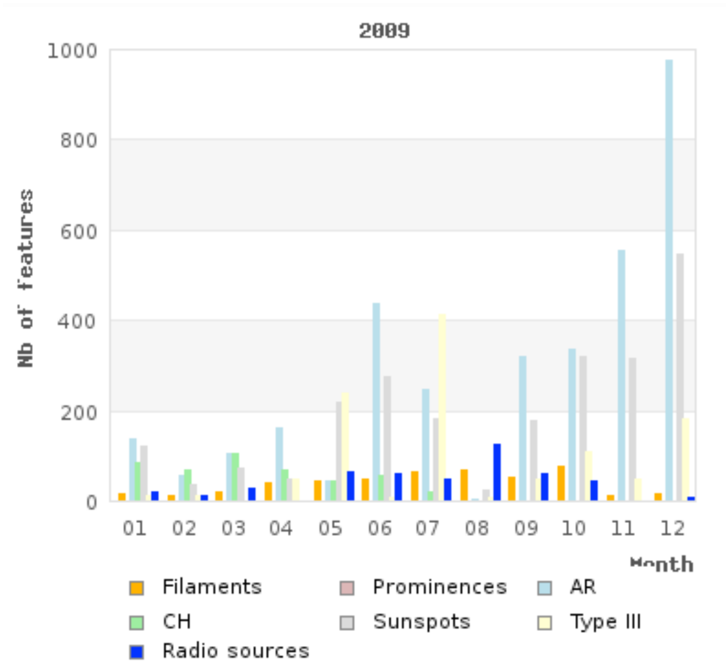


Fig. 19: Number of detected features for a given year, grouped by months.

The use of the 'Free SQL query' button will be explained in the next section.
The 'Web service' button displays a window providing a link towards web service information (Figure 20).

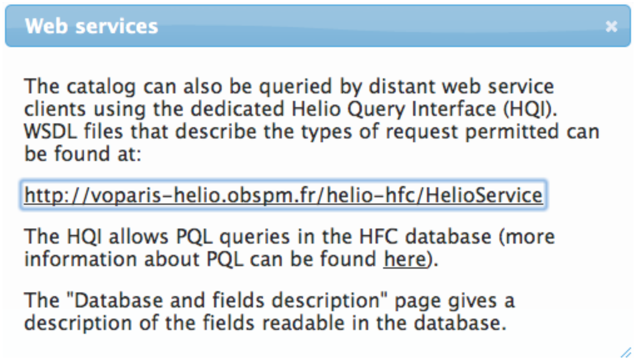


Fig. 20: Web service information

Last, the 'About HFC' button displays general information concerning HELIO project and a link to its web page (Figure 21).

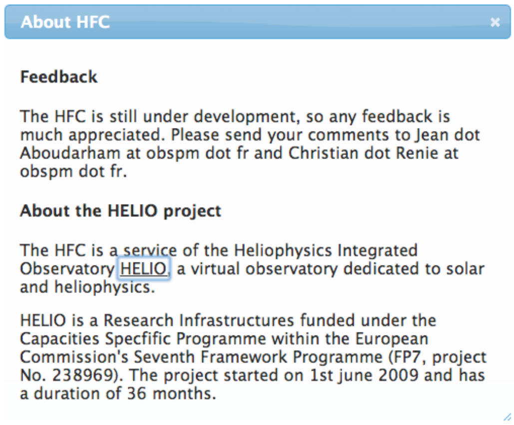


Fig. 21: 'About HFC' button.

4.2 SQL query

A powerful tool of HFC is the possibility to build one's own SQL query. The user does not need to know SQL syntax to use it. (Appendix gives the general aspect of a standard SQL query)
The easiest way to use it consists in building through the HFC GUI a query as close as possible to your needs. After clicking the 'Submit' button, at the bottom of the result page, a line writes 'SQL log'. When clicking the '+' at the end of the line, the full query you asked for appears in SQL (Figure 22). There is one query per feature.

Fig. 22: An example of the display of the SQL query build when using HFC GUI.

It is then possible to copy the query by selecting it and choosing 'Copy' in the 'Edit' menu of your Internet browser. Then, click the 'Free SQL query' button to go to the corresponding page and paste the previous query in the Free SQL search window. (Figure 23). You can edit the content of this window. For example, if you make a very restrictive search and want to extend it to more than the 60 days allowed, you can change the end date in the query. Be careful not to build a query which may send back thousands or tens of thousands results!

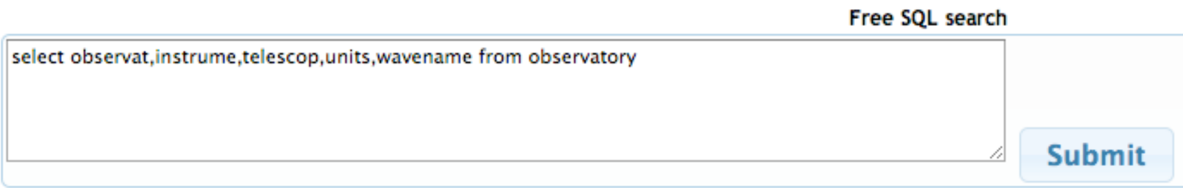


Fig. 23: Free SQL search window. The user can edit it to enter his own SQL query.

4.3 VOTable

In order to upload a VOTable usable in the HFC query interface, it must contain one of the following fields:
'DATE_OBS', 'date_obs', 'AR_DATE', 'OBS_DATE', 'time_start', 'time_end', 'time'
The date format must be as follows: YYYY-MM-DDTHH:MN:SS
There could be several dates in the VOTable.

When exporting the results of a query as a VOTable, the format used takes into account UCD and Utypes of the ANNOTATIONS table. An example of such a VOTable is given in the Appendix.

4.4 Link to SHEBA propagation model

It is possible for the user to apply the TCD's SHEBA propagation model (http://cagnode58.cs.tcd.ie:8080/PropagationModelGUI/) directly to the features obtained from a query. Figures 24 and 25 show respectively the result of a query concerning filaments and coronal holes. As you can see, on the right part of the results list, a link, named 'CME' for filaments and 'CIR-SW' is available. It refers to the various options of the SHEBA propagation model.

Index of the feature during a rotation Click for tracking info	Id of filament's component(s)	Name of the observatory/spacecraft	Phenomen	Length of the filament skeleton in degrees	X Heliocentric coordinates of the filament skeleton gravity centre in arcsec	Y Heliocentric coordinates of the filament skeleton gravity centre in arcsec	Link to the SHEBA forward propagation model
23785	24273	Meudon//	Abnormal behavior	7.53	322.31	-865.86	CME
23939	24298	Meudon//	-	10.68	793.99	362.74	CME
23974	24287 24288 24290 24291 24294	Meudon// Meudon// Meudon// Meudon// Meudon//	-	8.26 1.38 7.18 2.28 6.31	704.14 773.77 789.49 663.71 647.99	93.21 122.41 158.35 178.56 259.42	CME CME CME CME CME
24044	24308	Meudon//	-	25.02	279.64	865.86	CME

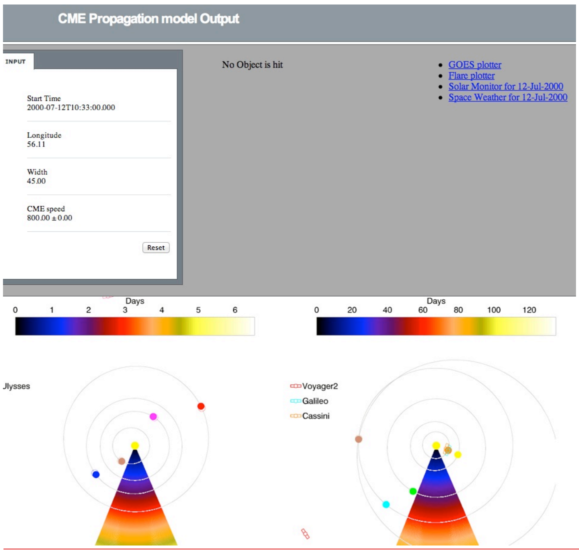
Fig. 24: Result of a query for filaments. On the right side of the screen copy, clicking on the 'CME' link send directly information to the SHEBA propagation model.

ID_CORONALHOLES	Name of the observatory/spacecraft	Area in Mm2 of the CH	Bounding rectangle heliographic coordinate North West most point in degrees	X Heliocentric coordinates of the CH gravity centre in arcsec	Y Heliocentric coordinates of the CH gravity centre in arcsec	Link to the SHEBA forward propagation model
2752	SoHO/EIT/EIT	50851.6	37.69	284.46	-732.3	CIR-SW
2753	SoHO/EIT/EIT	604.66	33.68	411.46	-603.34	CIR-SW
2754	SoHO/EIT/EIT	12145.8	26.6	300.47	-113.32	CIR-SW
2755	SoHO/EIT/EIT	5637.24	41.96	237.32	767.97	CIR-SW

Fig. 25: Result of a query for coronal holes. On the right side of the screen copy, clicking on the 'CIR-SW' link

send directly information to the SHEBA propagation model.

When the user clicks on the corresponding link, it sends the central coordinates of the concerned feature to SHEBA; a new window pops up and the user arrives on the result page of the propagation, as shown on Figure 26 for a CME deduced from a filament, and on Figure 27 for a CIR deduced from a coronal hole.



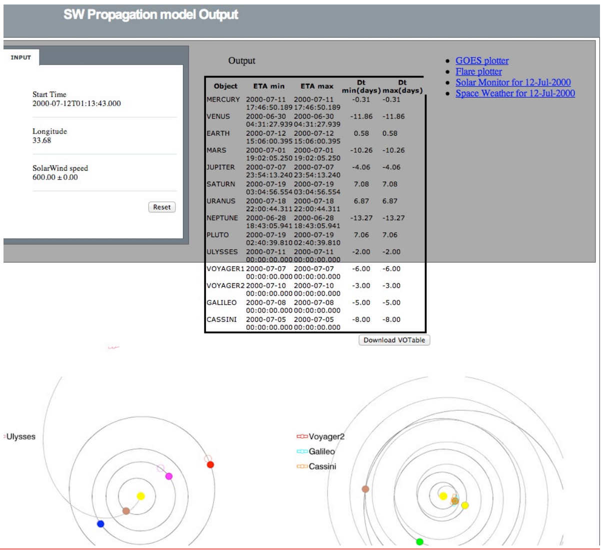


Fig. 26: SHEBA result for CME *Fig. 27: SHEBA result for CIR*

5. Documentation related to HFC

Currently the following documentation, related to the HFC, exists:

- *HELIO_HFC_V2.0.pdf*: General description of the organization of the database of the HFC, with the tables common to all features.
- *HELIO_OBSPM_S2_005_TN_HFC_Developers_Guide_v1.0.pdf*: HFC user manual for developers.
- *HELIO_Feature_Description_CHARM.pdf*: Description of the CHARM code for the detection of coronal holes, with information about the available fields in the HFC.
- *HELIO_Feature_Description_NRH2D.pdf*: Description of the NRH2D code for the detection of radio sources, with information about the available fields in the HFC.
- *HELIO_Feature_Description_SMART_v1.1.pdf*: Description of the SMART code for the detection of active regions, with information about the available fields in the HFC.
- *HELIO_Feature_Description_TypeII.pdf*: Description of the radio type II bursts detection code, with information about the available fields in the HFC.
- *HELIO_Feature_Description_TypeIIIBurstsV01.pdf*: Description of the radio type III bursts detection code, with information about the available fields in the HFC.
- *HELIO_Feature_Description_FilamentV2.pdf*: Description of the filaments detection code, with information about the available fields in the HFC.
- *HELIO_Feature_Description_FilamentTrackingV2.pdf*: Description of the filaments tracking code as well as of the corresponding fields available in the HFC.
- *HELIO_HFC_Level3_Data_V03.pdf*: Information concerning the various levels of data provided in the HFC appears there.

- *HELIO_HFE-HFC_connection_v01.pdf*: Description of how HFC can be used as a service included in HFE.
- *Service Interface Specification.docx*: Gives the specifications of all the interfaces available through HELIO, and how to access them, including HFC.
- *REC-VOTable-1.2.pdf*: Official document describing the structure of the VOTable standard (available through the IVOA web site: http://www.ivoa.net/ in the Documents and standards repository).
- *PQL-0.2-20090520.pdf* : Official document describing the PQL syntax (available through the IVOA web site: http://www.ivoa.net/ in the Documents and standards repository).

Appendix

SQL basics

A standard SQL query looks like:
Select [*field1,field2,* …] from [*table1, table2,…*] where [*condition*] order by [*field*] [*asc|desc*]

Where:
- field1, … correspond to the name of the fields you want as an output
- table1, … correspond to the name of the tables (or views) which the above fields belong to
- condition is a set of constraints where you can define for each field (which should exist in the table mentioned above) the min and max values with the following syntax:

field BETWEEN *val_min* AND *val_max*

Conditions can be concatenated using AND and/or OR boolean operators.
(note that the **where** *conditions* is optional, but if you omit begin and end dates, you may retrieve a huge amount of results!)
- field and *asc* or *desc* options indicate the way to sort the results using the corresponding field.

The '*' symbol is a wildcard which replaces any letter

Example:
SELECT FEAT_AREA_DEG2, FEAT_MEAN2QSUN FROM VIEW_AR_GUI WHERE (DATE(DATE_OBS) BETWEEN DATE('2000-07-10T00:00') AND DATE('2000-07-20T00:00')) AND (FEAT_HG_LAT_DEG BETWEEN 20 AND 30) AND (FEAT_AREA_DEG2 BETWEEN 100 AND 10345) ORDER BY DATE_OBS ASC

In this query:
- FEAT_AREA_DEG2, FEAT_MEAN2QSUN
correspond to the fields we want to retrieve. (to write SELECT * FROM … would provide an answer with all the fields of the corresponding table/view)
- VIEW_AR_GUI
is the view the various fields of the query belong to
- (DATE(DATE_OBS) BETWEEN DATE('2000-07-10T00:00') AND DATE('2000-07-20T00:00'))
is a first condition to satisfy (a date interval)

- (FEAT_HG_LAT_DEG BETWEEN 20 AND 30)

is a second condition to satisfy (due to the AND keyword): location on the disk

- (FEAT_AREA_DEG2 BETWEEN 100 AND 10345)

is a third condition to satisfy (due to the AND keyword): size of the active region in square degrees

- ORDER BY DATE_OBS ASC

indicate we want to order the results by ascending order.

Output VOTable example


```
<?xml version="1.0"?>
<VOTABLE xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns="http://www.ivoa.net/xml/VOTable/v1.1" version="1.1"
xsi:schemaLocation="http://www.ivoa.net/xml/VOTable/v1.1 http://www.ivoa.net/xml/VOTable/v1.1">
<!--
 !  VOTable written by STIL version 3.0 (uk.ac.starlink.votable.VOTableWriter)
 !  at 2012-07-17T10:52:13
 !-->
<RESOURCE>
<DESCRIPTION>HFC GUI</DESCRIPTION>
<INFO name="QUERY_STRING">SELECT ID_FIL,DATE_FORMAT(DATE_OBS,'%Y-%m-%dT%T') as
DATE_OBS,FEAT_CARR_LAT_DEG,FEAT_CARR_LONG_DEG,SKE_LENGTH_DEG,SKE_CURVATU
RE,SKE_ORIENTATION,FEAT_AREA_DEG2, FEAT_MEAN2QSUN FROM VIEW_FIL_GUI WHERE
(DATE(DATE_OBS) BETWEEN DATE('2001-06-01T00:00:00') AND DATE('2001-06-05T00:00:00'))
ORDER BY TRACK_ID ASC</INFO>
<TABLE name="VIEW_FIL_GUI">
<FIELD datatype="int" name="ID_FIL"
ucd="meta.id"><DESCRIPTION>ID_FIL</DESCRIPTION></FIELD>
<FIELD arraysize="*" datatype="char" name="DATE_OBS" ucd="time.start;obs"
utype="image.time_obs"><DESCRIPTION>Start date of the observation</DESCRIPTION></FIELD>
<FIELD datatype="float" name="FEAT_CARR_LAT_DEG" ucd="new UCD needed;pos.bodyrc.lat"
utype="feature.centre.lat_carr"><DESCRIPTION>Carrington latitude of the SS gravity centre in
degrees</DESCRIPTION></FIELD>
<FIELD datatype="float" name="FEAT_CARR_LONG_DEG" ucd="new UCD needed;pos.bodyrc.long"
utype="feature.centre.long_carr"><DESCRIPTION>Carrington longitude of the SS gravity centre in
degrees</DESCRIPTION></FIELD>
<FIELD datatype="float" name="SKE_LENGTH_DEG" ucd="phys.size"
utype="filament.skeleton.chain_code.length"><DESCRIPTION>Length of the filament skeleton in
degrees</DESCRIPTION></FIELD>
<FIELD datatype="float" name="SKE_CURVATURE" ucd="new UCD needed"
utype="filament.skeleton.curvation"><DESCRIPTION>Index of curvature of the
skeleton</DESCRIPTION></FIELD>
<FIELD datatype="float" name="SKE_ORIENTATION" ucd="new UCD needed"
utype="filament.orientation"><DESCRIPTION>Orientation of the filament
skeleton</DESCRIPTION></FIELD>
<FIELD datatype="float" name="FEAT_AREA_DEG2" ucd="phys.area"
utype="feature.area.area_deg_sq"><DESCRIPTION>Area of the SS in square
degrees</DESCRIPTION></FIELD>
<FIELD datatype="double" name="FEAT_MEAN2QSUN" ucd="new UCD needed"
utype="feature.mean_intensity_2quiet_sun"><DESCRIPTION>Mean of the SS to QS instensity
ratio</DESCRIPTION></FIELD>
<DATA>
<TABLEDATA>
  <TR>
    <TD>32676</TD>
    <TD>2001-06-01T07:05:00</TD>
    <TD>42.6098</TD>
```

```
    <TD>83.3316</TD>
    <TD>1.96323</TD>
    <TD>0.0407231</TD>
    <TD>-33.932</TD>
    <TD>5.55664</TD>
    <TD>0.77280318</TD>
  </TR>
...
  <TR>
    <TD>32764</TD>
    <TD>2001-06-05T07:57:00</TD>
    <TD>4.99833</TD>
    <TD>289.457</TD>
    <TD>3.63539</TD>
    <TD>0.0480533</TD>
    <TD>54.9829</TD>
    <TD>1.95997</TD>
    <TD>0.85927447</TD>
  </TR>
&lt;/TABLEDATA&gt;
&lt;/DATA&gt;
</TABLE>
&lt;/RESOURCE&gt;
&lt;/VOTABLE&gt;
```