Heliophysics Integrated Observatory

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HFC Web Services
1.0

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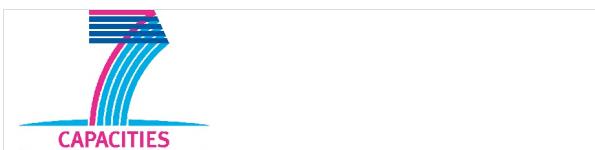
Revision History

Version	Date	Released by	Detail
0.1	24 Mars 2011	Xavier Bonnin	First Draft
1.0	25 Nov. 2013	Xavier Bonnin	First Release

Note: Any notes here.

HFC Web Services
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Acronyms

API – Application Programming interface
FP7 – Seventh Framework Programme
GUI – Graphical User Interface
HELIO – HELiophysics Integrated Observatory
HFC – Heliospheric Feature Catalogue
HQI – Helio Query Interface
IAS – Institut d'Astrophysique Spatiale
IVOA – International Virtual Observatory Alliance
LESIA – Laboratoire d'Etudes Spatiales et d'Instrumentation en Astrophysique
MEDOC – Multi Experiment Data and Operation Centre
MSSL – Mullard Space Science Laboratory
NOAA - National Oceanic and Atmospheric Administration
NRH – Nançay RadioHeliograph
PI – Principal Investigator
PQL – Parameterized Query Language
SQL – Structured Query Language
TAP – Table Access Protocol
TBC – To Be Confirmed
TBD – To Be Defined
VO – Virtual Observatory
VOSI – Virtual Observatory Support Interface
WSDL - Web Services Description Language

Introduction

The scope of this document is to describe the web services provided by the Heliophysics Feature Catalogue (HFC) to query its database. HFC stores useful information about numerous solar and heliosphere features, extracted from observations by feature recognition codes. Furthermore it is a service of the HELiosphysics Integrated Observatory (HELIO), a virtual observatory (VO) dedicated to solar and heliosphere physics. HELIO relies on a network of services that propose dedicated user interfaces to search, mine, handle, and access data. For more information about the HFC and HELIO, please visit the dedicated web pages [RD2] and [RD1].

Relevant Documents

[RD1]   http://www.helio-vo.eu/   (HELIO project web page)
[RD2]   http://voparis-helio.obspm.fr/ (HFC web page at Observatoire de Paris)
[RD3]   http://helio-hfc.ias.u-psud.fr/ (HFC mirror site at IAS)
[RD4]   http://wiki.ivoa.net/internal/IVOA/TableAccess/PQL-0.2-20090520.pdf
[RD5]   http://www.ivoa.net/documents/REC/ADQL/ADQL-20081030.pdf
[RD6]   http://www.ivoa.net/documents/TAP/20100327/REC-TAP-1.0.pdf
[RD7]   http://www.ivoa.net/documents/VOTable/20091130/REC-VOTable-1.2.pdf
[RD8]   http://voparis-helio.obspm.fr/hfc-gui/doc/Service Interface Specification.pdf

General Information

HFC is composed of the following elements:

- A MySQL database containing all of the features parameters extracted by the recognition codes.
- A web page (or GUI) providing a user friendly interface to query the database from a web browser
- Web services allowing PQL-like [RD4] and ADQL [RD5] requests on the database, through dedicated SOAP, TAP, or HTTP-REST interfaces.

HFC main site is hosted and maintained by the Observatoire de Paris, the mirror site is hosted by the MEDOC at IAS [RD3].

HFC Web Services

HFC provides web services that allow distant clients (e.g., web pages, API, browser, etc.) to query the database using VO-compliant exchanging protocols and formats. These web services - also called HELIO Query Interface (HQI) - is common to all of the HELIO database-oriented services, and so offers the possibility to access to their content in a standard way. HQI also permits SQL based searching when connected to JDBC compliant databases.

The HFC web services:
- Support 3 types of access protocol: SOAP, HTTP, and TAP.
- Support 2 query languages: PQL and ADQL (only for the TAP interface).
- Return VOTable 1.2 format files [RD7].

The three next sections briefly explain how to query the HFC using the 3 access protocols. A list of the HFC tables available from the web service is given in Appendix A. Appendix B presents a summary of the PQL-like input parameters allowed by the SOAP and HTTP interface.

More information about the HQI can be found in reference [8] document.

How to query the HFC using the HTTP interface

The HTTP interface is reachable calling java servlets. A typical request looks like:

http://voparis-helio.obspm.fr/helio-hfc/HelioQueryService?FROM=*table_name*

, where *table_name* is a string giving the name of the HFC table to query (FROM input parameter is mandatory).

Examples of queries using the HTTP interface can be found in Appendix C.

How to query the HFC using the SOAP interface

The SOAP interface is described using a WSDL standard access. The list of WSDL files providing the available methods for the HFC can be found here:

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

How to query the HFC using the TAP interface

HFC provides a basic TAP interface to query database with ADQL. A typical request looks like:

http://voparis-helio.obspm.fr/hfc-hqi/sync?LANG=ADQL&QUERY=adql_query

, where LANG= keyword specifies the query language, and QUERY= keyword provides the ADQL query to perform.

Appendix

A. List of the HFC Tables accessible from the web services

The following table provides a list of the HFC tables (or views) that can be queried through the web services.

TABLE NAME	DESCRIPTION	COMMENT
OBSERVATIONS	Information about observations used by the feature recognition codes.	
OBSERVATORY	Information about observatory/instrument that provide observations.	
NOAA	Information about NOAA regions.	
PP_OUTPUT	Information about pre-processed observations.	
FRC_INFO	Information about the feature recognition codes	
PP_INFO	Information about pre-processing codes.	
ANNOTATIONS	Information about HFC standards and data model	
VIEW_OBS_HQI	Merged information about Observatory/Observations	SQL join over OBSERVATIONS and OBSERVATORY tables
VIEW_PP_HQI	Merged information about Observatory/Observations/Pre-processed observations	SQL join over OBSERVATIONS, PP_OUTPUT, and OBSERVATORY tables
VIEW_AR_HQI	Information about detected active regions (including tracking data)	SQL join over OBSERVATORY, OBSERVATIONS, NOAA, FRC_INFO, ACTIVEREGIONS, and ACTIVEREGIONS_TRACKING tables
VIEW_CH_HQI	Information about detected coronal holes (including tracking data)	SQL join over OBSERVATORY, OBSERVATIONS, CHGROUPS, FRC_INFO, CORONALHOLES, and CORONALHOLES_TRACKING tables
VIEW_SP_HQI	Information about detected sunspots (including tracking data)	SQL join over OBSERVATORY, OBSERVATIONS, NOAA, FRC_INFO, SUNSPOTS, and SUNSPOTS_TRACKING tables
VIEW_FIL_HQI	Information about detected	SQL join over OBSERVATORY,

	filaments (including tracking data)	OBSERVATIONS, FRC_INFO, PP_INFO, PP_OUTPUT, FILAMENTS, and FILAMENTS_TRACKING tables
VIEW_PRO_HQI	Information about detected prominences (including tracking data)	SQL join over OBSERVATORY, OBSERVATIONS, PP_INFO, PP_OUTPUTS FRC_INFO, PROMINENCES, and PROMINENCES_TRACKING tables
VIEW_RS_HQI	Information about detected NRH radio sources (including tracking data)	SQL join over OBSERVATORY, OBSERVATIONS, FRC_INFO, RADIOSOURCES, and RS_TRACKING tables
VIEW_T3_HQI	Information about detected type III solar radio bursts	SQL join over OBSERVATORY, OBSERVATIONS, FRC_INFO, TYPE_III tables

For more information about the content of these tables, please visit: http://voparis-helio.obspm.fr/hfc-gui/help.php.

B. PQL-like input parameters

The following table provides a summary list of the PQL-like input parameters allowed by the interface. For a detailed description of PQL parameters used by the HQI, please read reference [8].

PARAMETER	VALUE	COMMENT
FROM	Name of the table of the database	Mandatory
WHERE	Where clause condition on table's columns using PQL syntax	Optional
STARTTIME	Start date and time of the time range (ISO8601 format: YYYY-MM-DDTHH:MM:SS)	Optional
ENDTIME	End date and time of the time range (ISO8601 format: YYYY-MM-DDTHH:MM:SS)	Optional
SELECT	It can be used to reduce the columns returned in the query result object. Column names must be separated with commas.	Optional
MAXRECORDS	Maximum number of	Optional

	records returned	
STARTINDEX	Index number of the first row in the dataset. This should be used by the client when the maximum number of rows returned by the server is reached.	Optional
LIMIT	Same than MAXRECORDS	Optional
SQLWHERE	Where clause condition on table's columns using SQL syntax. (STARTTIME and ENDTIME parameters cannot be used with SQLWHERE.)	Optional
TIME		Not used by the Helio interface..
POS		Not used by the Helio interface.
REGION		Not used by the Helio interface.
SIZE		Not used by the Helio interface.

C. Examples of queries using the HTTP interface

The examples of queries using the HFC HTTP interface can be easily tested on a web browser by clicking on the URL (or by copying-pasting the URLs in the address bar). In all of the cases, the HFC web services should return a VOTable format file.

- Get information about feature recognition codes used in the HFC:

http://voparis-helio.obspm.fr/helio-hfc/HelioQueryService?FROM=FRC_INFO

- Get information about the observatory and observations in the HFC, limiting the number of returned rows to 10:

http://voparis-helio.obspm.fr/helio-hfc/HelioQueryService?FROM=VIEW_OBS_HQI&MAXRECORDS=10

- Get information about detected/tracked active regions observed by SDO/AIA instrument between 2011-01-01T00:00:00 and 2011-01-02T00:00:00:

http://voparis-helio.obspm.fr/helio-hfc/HelioQueryService?FROM=VIEW_AR_HQI&STARTTIME=2011-01-01T00:00:00&ENDTIME=2011-01-02T00:00:00&WHERE=OBSERVAT,SDO;INSTRUME,AIA

Note: the comma "," and semi-comma ";" characters in the WHERE clause parameter must be understood respectively as "=" and "AND" expressions in term of SQL syntax.