Introduction to HIPE and the HSA User Interface

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on behalf of the
Herschel Science Ground Segment Consortium
http://herschel.esac.esa.int/DpHipeContributors.shtml

This presentation is intended as an overview and “quick start”

- It sets the stage for hands-on work
- Some features will not be covered
- Read also the “HIPE Owners Manual”
  - Included with your installation

HIPE is designed to easily handle your Herschel data

- It handles Herschel data types
- It includes routines to go from raw data to publishable results
- It places the official pipeline software on your desktop
- It is modern and actively developed

Introduction to HIPE

- Key Data Concepts
- A Visual Tour of the HIPE Interface
- The HSA User Interface
- Help and Documentation
- Introduction to Scripting

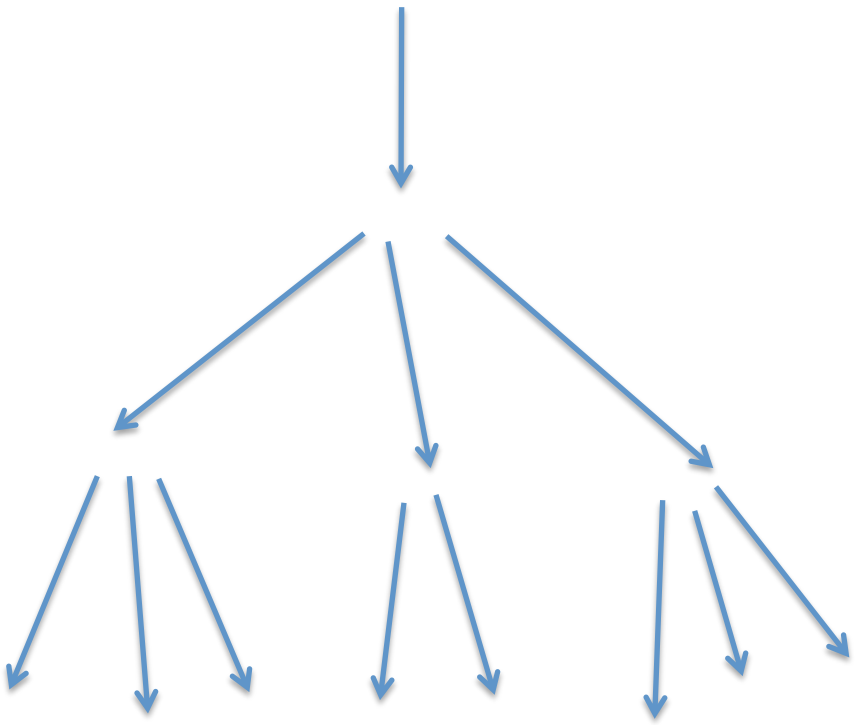
Introduction to HIPE

- Key Data Concepts
  - Objects and Data Products
  - Contexts
  - Data storage
  - Memory management
- A Visual Tour of the HIPE Interface
- The HSA User Interface
- Help and Documentation
- Introduction to Scripting

Wrapping data as objects lets HIPE do more for you

- Sensible defaults for “double-click”
  - Usually a viewer
- A module or function works on any object of a given class
  - Use the same methods or interfaces
- The system can suggest the right task or option
  - Less for you to remember

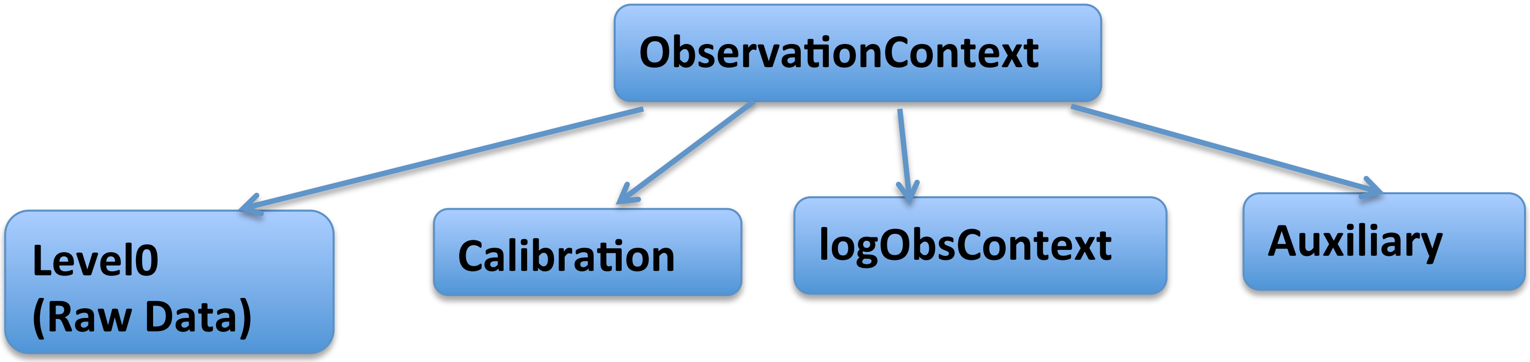
Contexts allow data to be organized in tree structures



- Members can be "named" or simply "numbered"
- Data items are loaded only when they are accessed ("lazy loading")
- Access is the same, wherever the data are

The Observation Context consolidates all the different types of data

- Points to everything that was used for processing
- Easy to choose what to look at or ignore

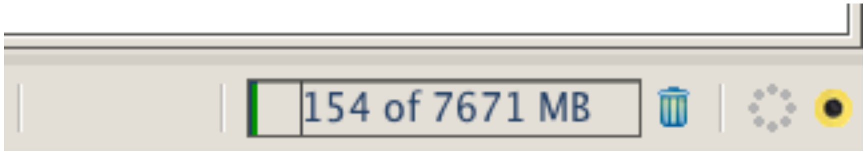


Data products are stored in and retrieved from one of three locations

1. Herschel Science Archive (HSA)
   - Located at ESAC (Madrid)
   - Read-only
2. Local pools
   - On your computer (local store directory)
   - Read and write data
3. MyHSA
   - On your computer (MyHSA directory)
   - Read-only, for data retrieved from HSA
   - Not used in this PACS workshop

Computer memory is automatically managed for you

- The system allocates memory whenever a new object is created
- The system runs "Garbage Collection" as needed
  - Reclaims memory
- Bar in lower right corner shows status



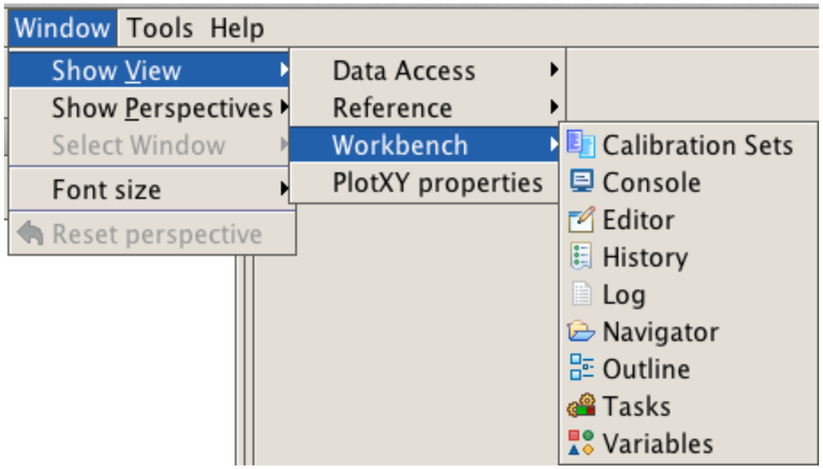
154 of 7671 MB

Introduction to HIPE

- Key Data Concepts
- A Visual Tour of the HIPE Interface
  - Views and Perspectives
  - The Welcome! Perspective
  - The Work Bench Perspective
  - The Product Browser Perspective
  - The Herschel Science Archive Perspective
- The HSA User Interface
- Help and Documentation
- Introduction to Scripting

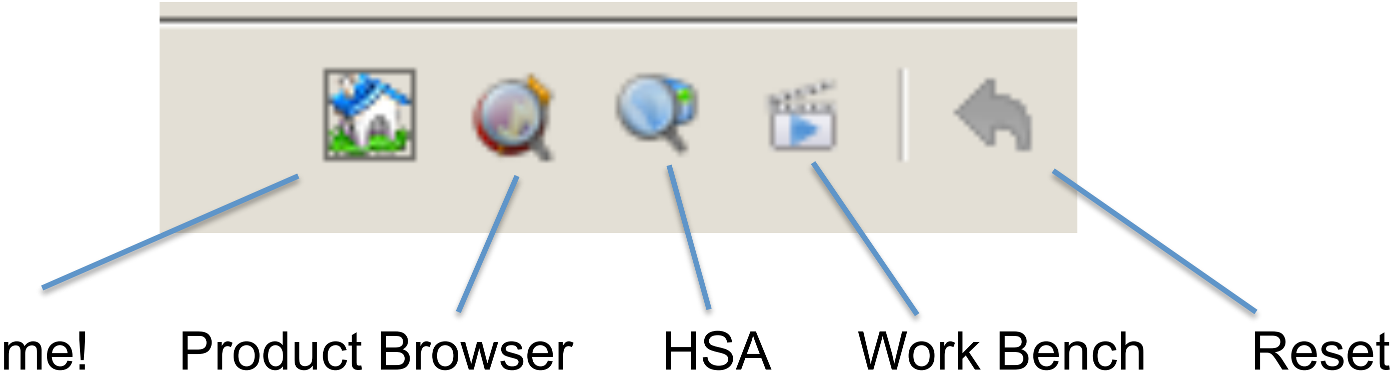
Views are windows or regions with specialized functions

- Views can be resized or minimized
- Views can be endlessly rearranged
- Views don’t shut down when closed
- Views are accessible by menu

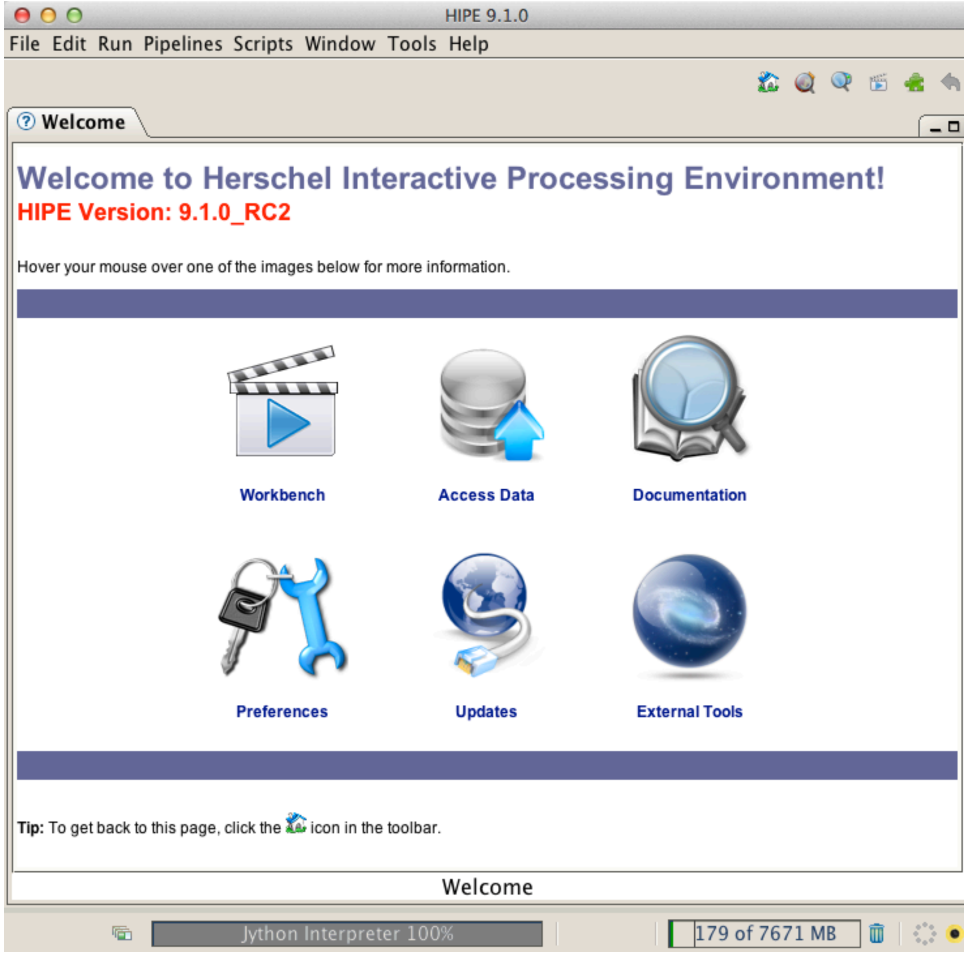


A *Perspective* is a specific collection of view windows

- Perspectives are pre-defined
- Your re-arrangement of views is "sticky"
- You can reset the arrangement to the default



The *Welcome!* perspective is a map to the major parts of HIPE



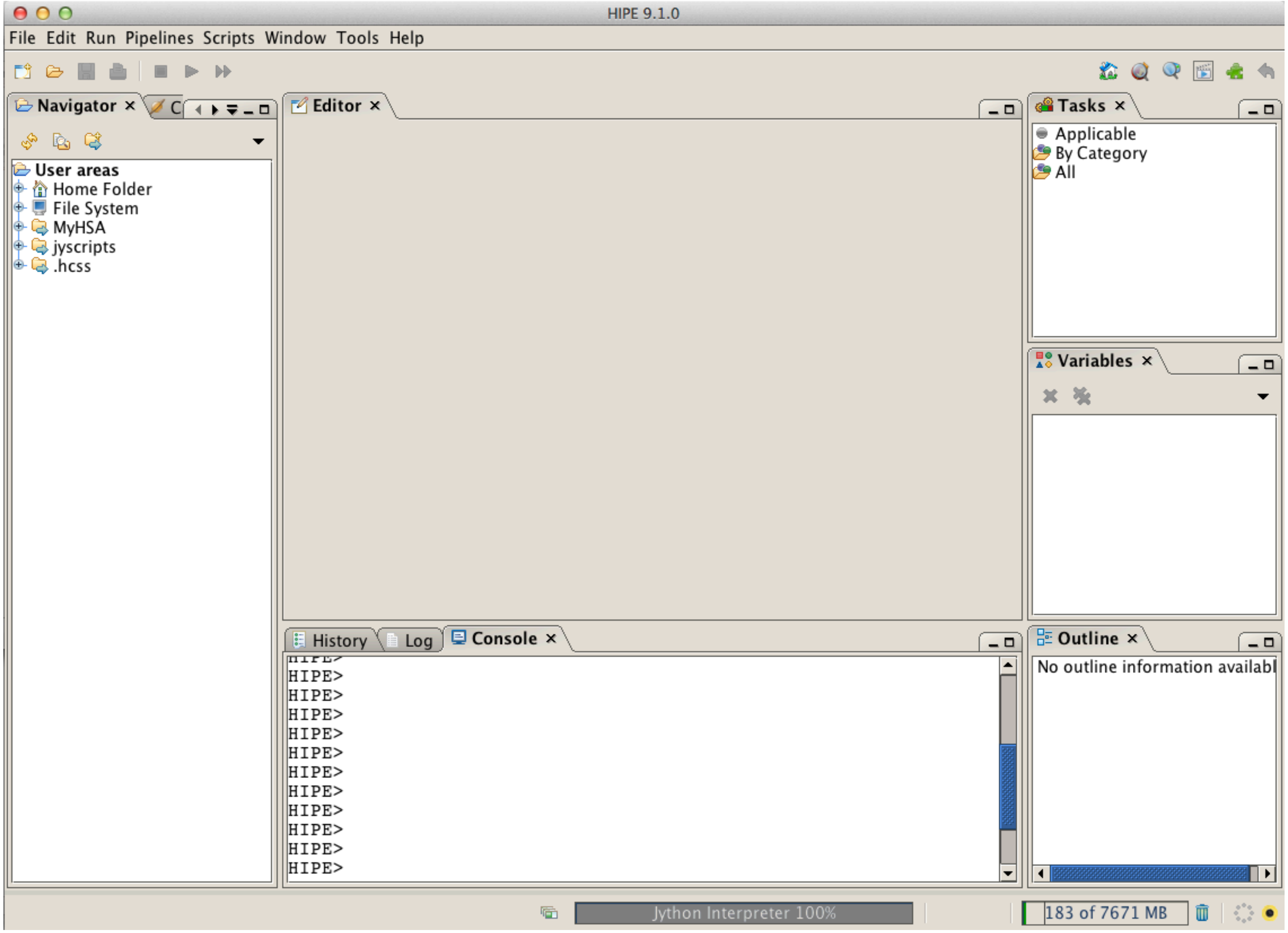
Welcome to Herschel Interactive Processing Environment!

HIPE Version: 9.1.0_RC2

Hover your mouse over one of the images below for more information.

Tip: To get back to this page, click the icon in the toolbar.

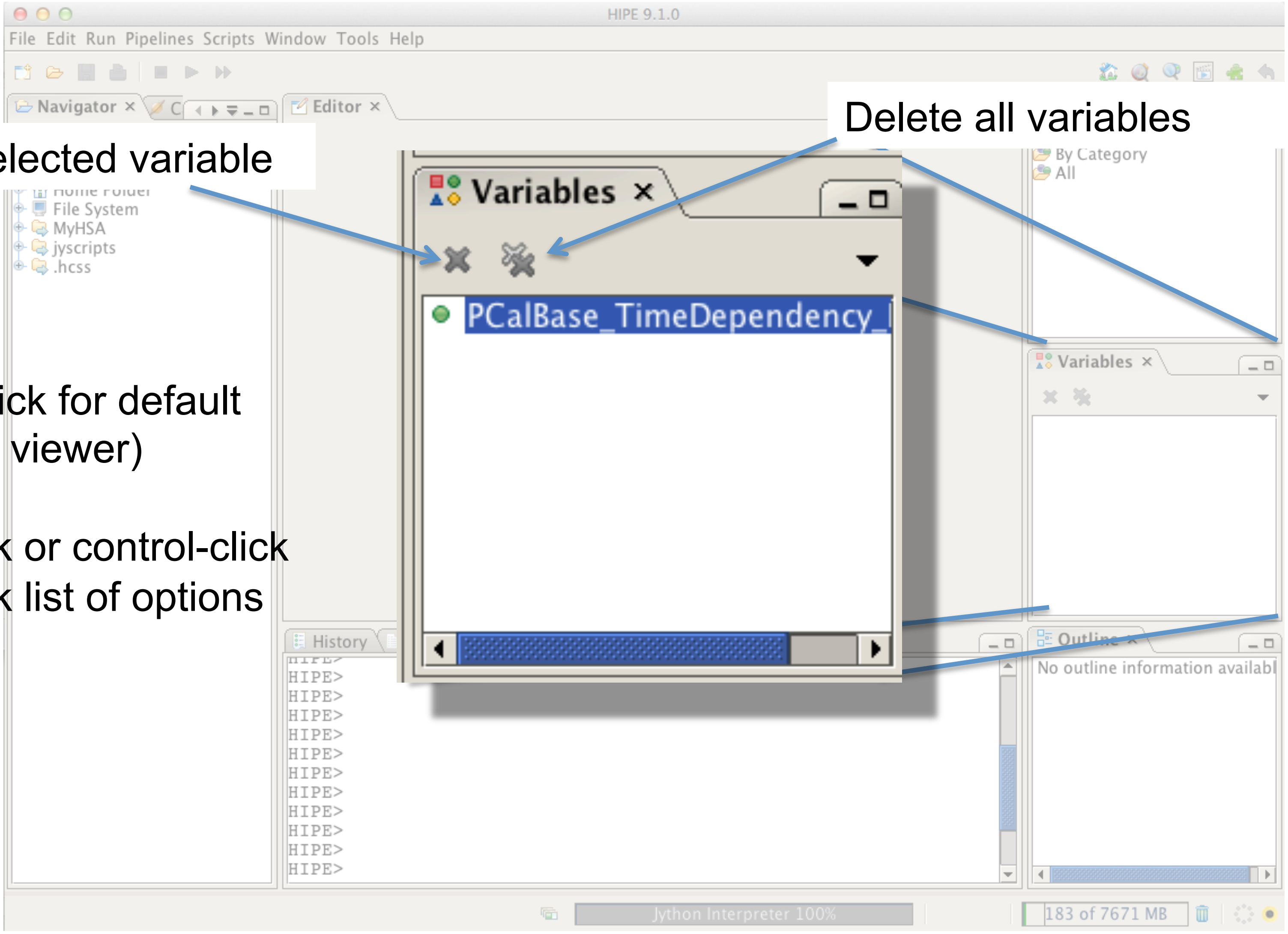
Most of the action takes place in the Work Bench perspective



```
HIPE>
HIPE>
HIPE>
HIPE>
HIPE>
HIPE>
HIPE>
HIPE>
HIPE>
HIPE>
HIPE>
HIPE>
```

No outline information availabl

The Variables view provides easy access to each data item



```
HIPE>
HIPE>
HIPE>
HIPE>
HIPE>
HIPE>
HIPE>
HIPE>
HIPE>
HIPE>
HIPE>
```

Delete selected variable

Delete all variables

Double-click for default (usually a viewer)

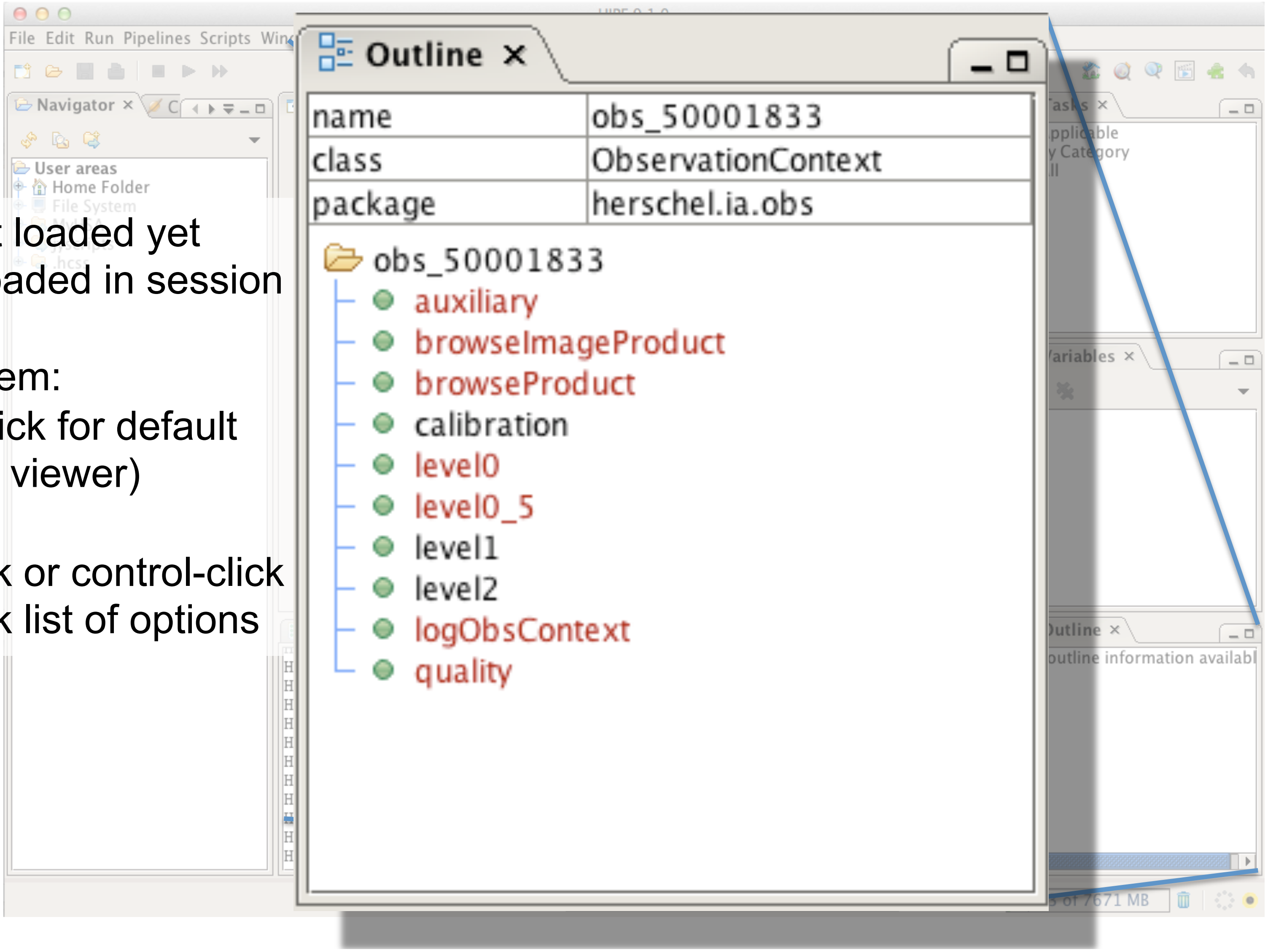
Right-click or control-click for a quick list of options

The Outline view shows details and structure of a data item

Red = not loaded yet
Black = loaded in session

For any item:
Double-click for default (usually a viewer)

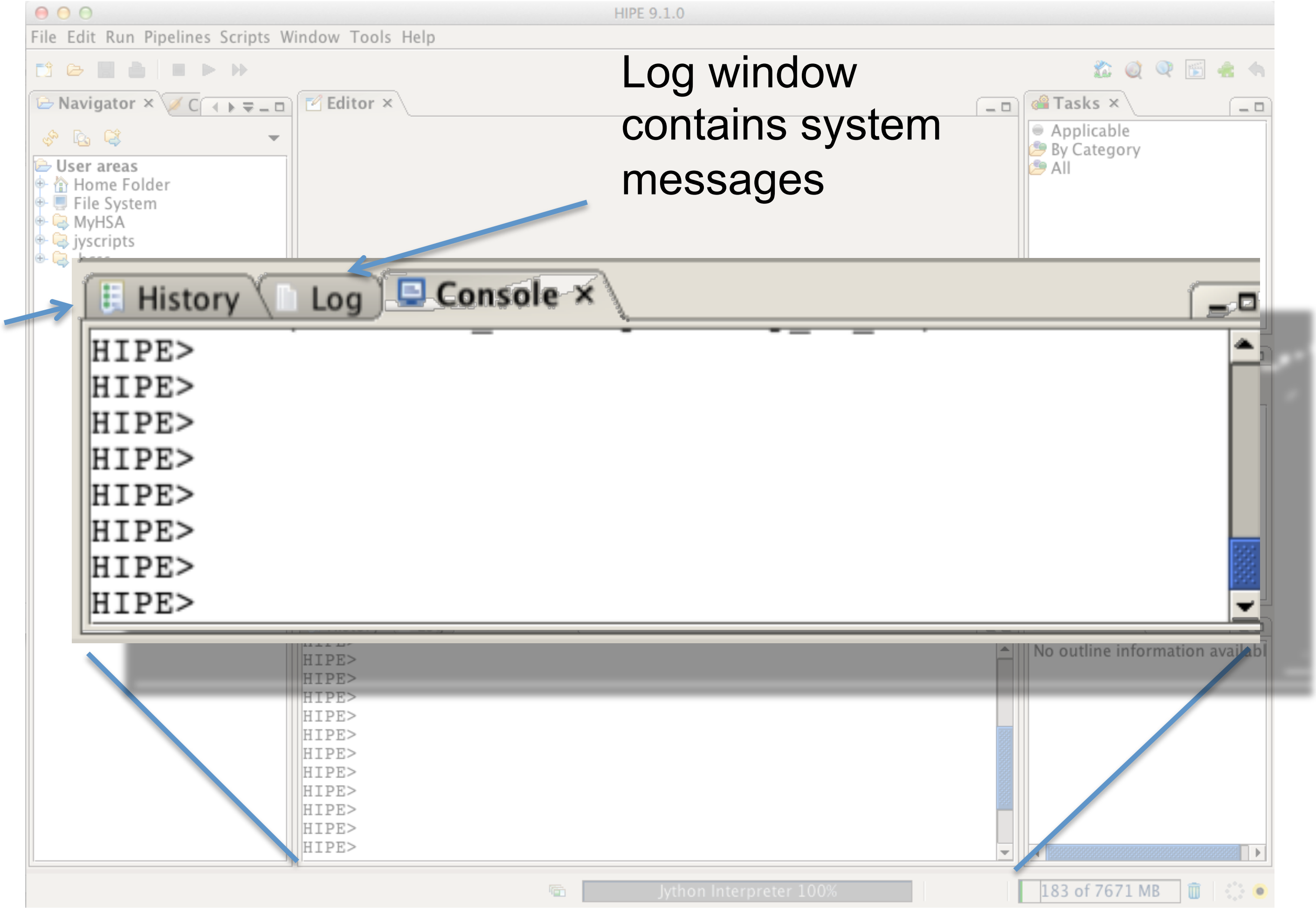
Right-click or control-click for a quick list of options



name	obs_50001833
class	ObservationContext
package	herschel.ia.obs

- obs_50001833
  - auxiliary
  - browseImageProduct
  - browseProduct
  - calibration
  - level0
  - level0_5
  - level1
  - level2
  - logObsContext
  - quality

Jython commands are executed in the Console window

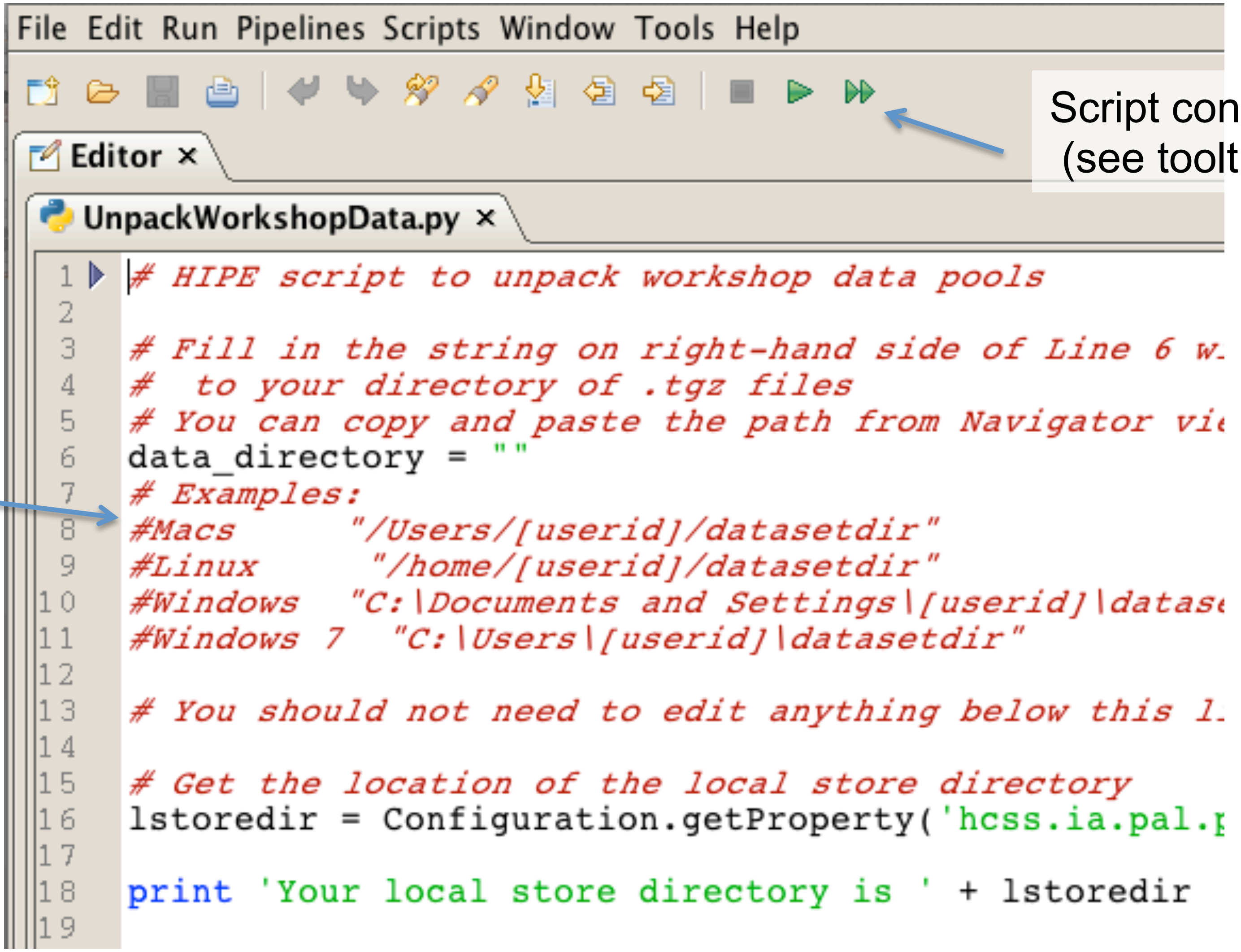


```
HIPE>
HIPE>
HIPE>
HIPE>
HIPE>
HIPE>
HIPE>
HIPE>
```

Log window contains system messages

History tab keeps a record of your commands

The Editor view contains scripts, viewers, and task interfaces

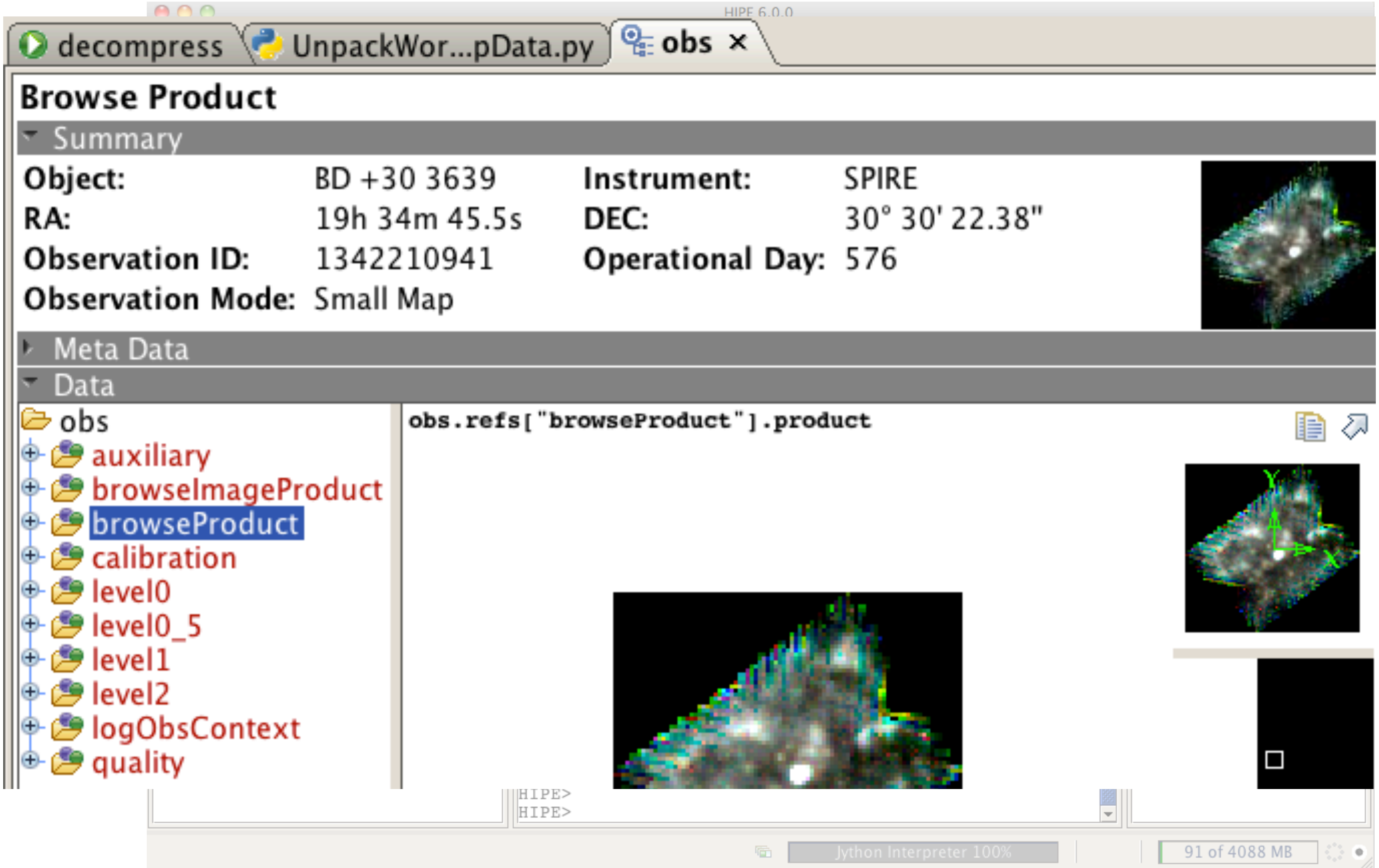


```
1  # HIPE script to unpack workshop data pools
2
3  # Fill in the string on right-hand side of Line 6 w
4  #  to your directory of .tgz files
5  # You can copy and paste the path from Navigator vie
6  data_directory = ""
7  # Examples:
8  #Macs       "/Users/[userid]/datasetdir"
9  #Linux       "/home/[userid]/datasetdir"
10 #Windows    "C:\Documents and Settings\[userid]\datase
11 #Windows 7   "C:\Users\[userid]\datasetdir"
12
13 # You should not need to edit anything below this l
14
15 # Get the location of the local store directory
16 lstoredir = Configuration.getProperty('hcss.ia.pal.p
17
18 print 'Your local store directory is ' + lstoredir
19
```

Script controls
(see tooltips)

Script
window

The Observation Viewer breaks out all the pieces of your observations



Browse Product

Summary

Object:	BD +30 3639	**Instrument:**	SPIRE
RA:	19h 34m 45.5s	**DEC:**	30° 30' 22.38"
Observation ID:	1342210941	**Operational Day:**	576
Observation Mode:	Small Map		

Meta Data

Data

- obs
  - auxiliary
  - browseImageProduct
  - browseProduct
  - calibration
  - level0
  - level0_5
  - level1
  - level2
  - logObsContext
  - quality

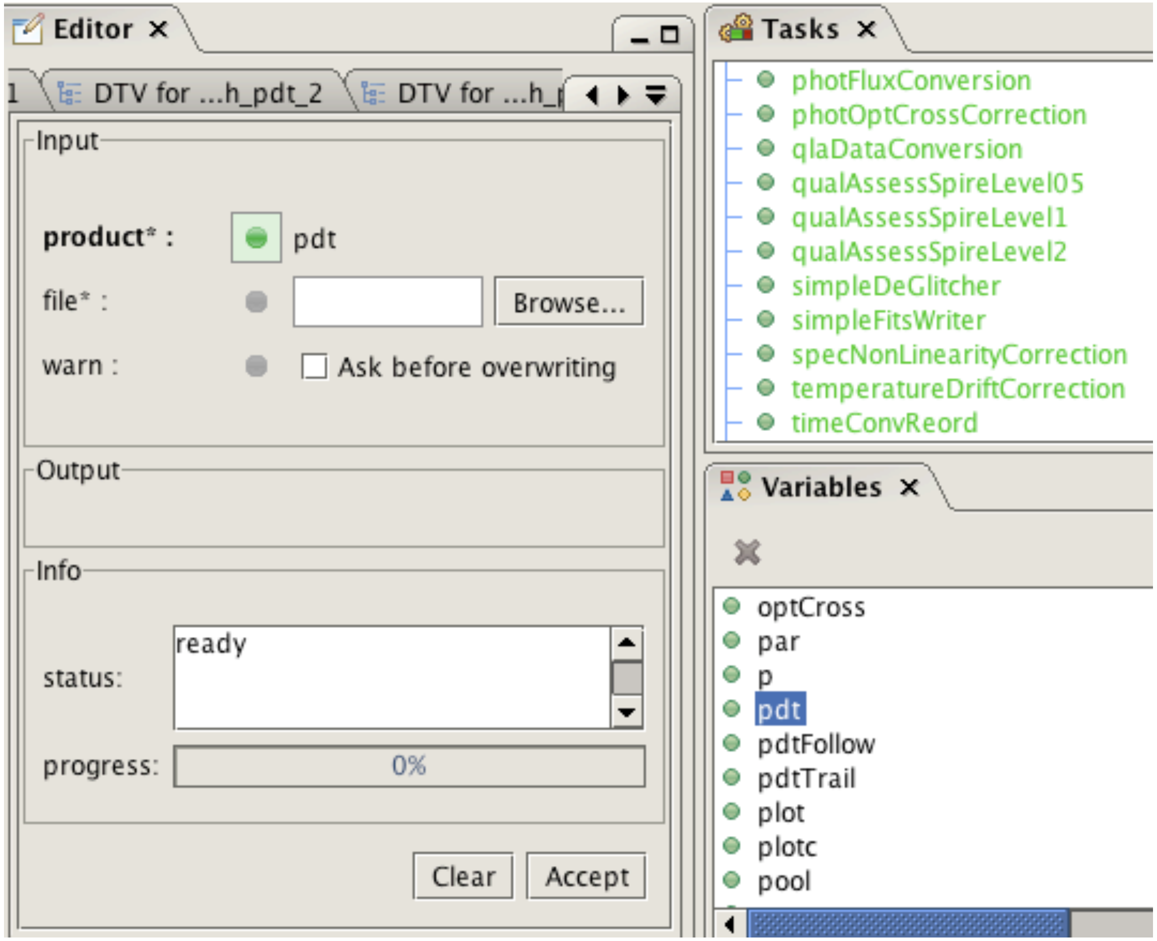
```
obs.refs["browseProduct"].product
```

```
HIPE>
HIPE>
```

The Tasks view enables quick startup of applicable modules

- Double-click to launch
- Drag-and-drop variables into parameter slots
- The “Applicable” tab shows all the available tasks for a selected variable

simpleFitsWriter task



Editor ×

1 DTV for ...h_pdt_2 DTV for ...h_

Input

product* : ● pdt

file* : ● Browse...

warn : ● □ Ask before overwriting

Output

Info

status: ready

progress: 0%

Clear Accept

Tasks ×

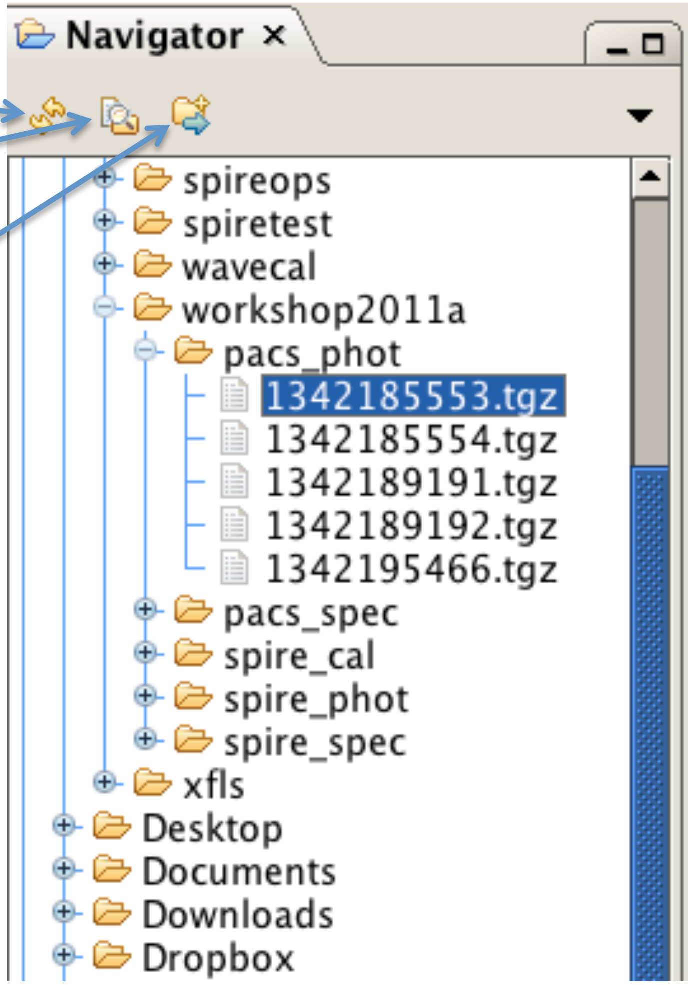
- photFluxConversion
- photOptCrossCorrection
- qlaDataConversion
- qualAssessSpireLevel05
- qualAssessSpireLevel1
- qualAssessSpireLevel2
- simpleDeGlitcher
- simpleFitsWriter
- specNonLinearityCorrection
- temperatureDriftCorrection
- timeConvReord

Variables ×

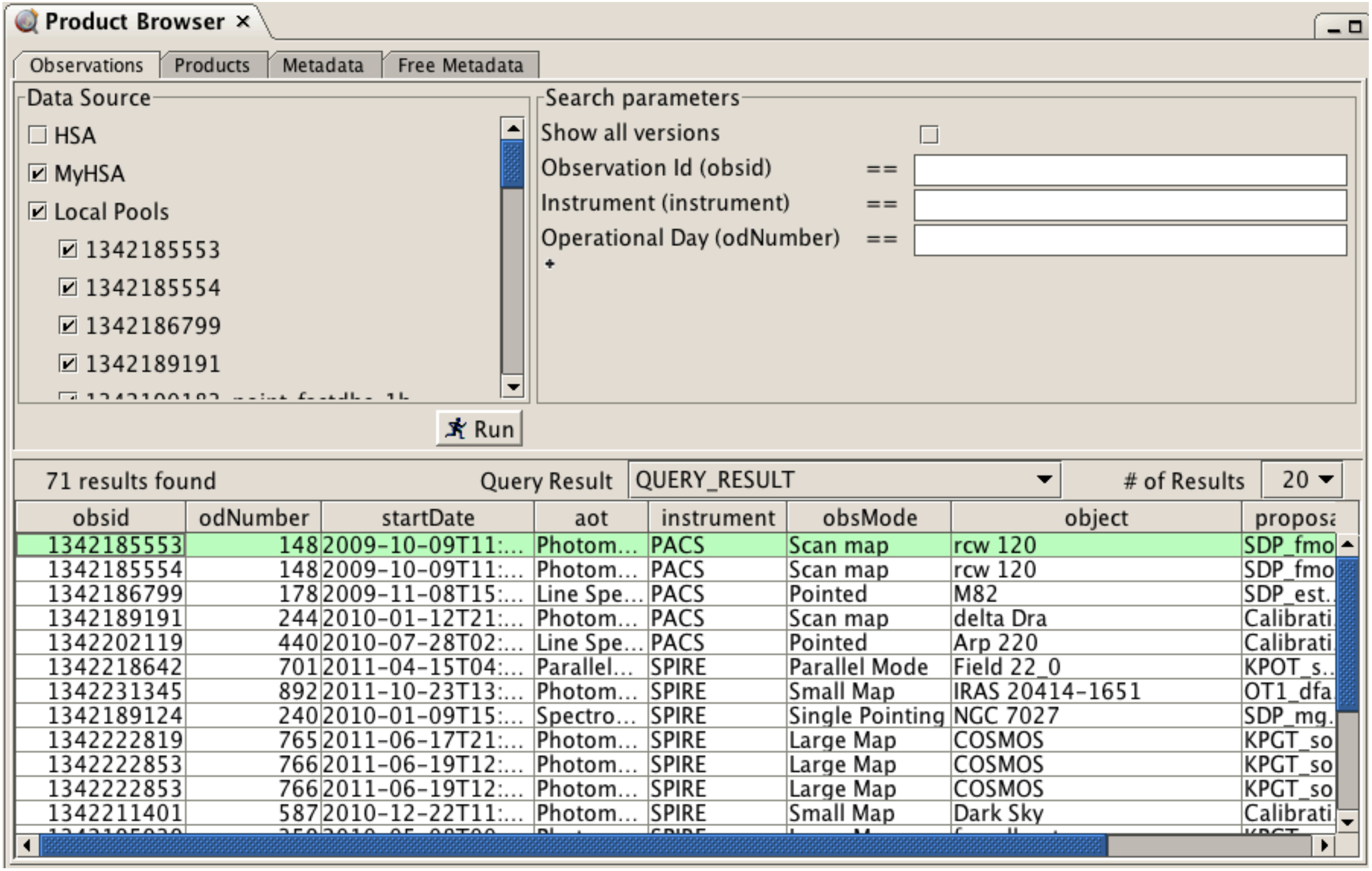
- optCross
- par
- p
- pdt
- pdtFollow
- pdtTrail
- plot
- plotc
- pool

The Navigator view enables browsing of your filesystem

- Refresh
- Show Hidden
- Create "user area"
- Double-click to load a script, a FITS file, or an observation



The Product Browser perspective provides powerful search and retrieval



Data Source

- ☐ HSA
- ☑ MyHSA
- ☑ Local Pools
  - ☑ 1342185553
  - ☑ 1342185554
  - ☑ 1342186799
  - ☑ 1342189191

Search parameters

Show all versions ☐

Observation Id (obsid) ==

Instrument (instrument) ==

Operational Day (odNumber) ==

71 results found

Query Result QUERY_RESULT

# of Results 20

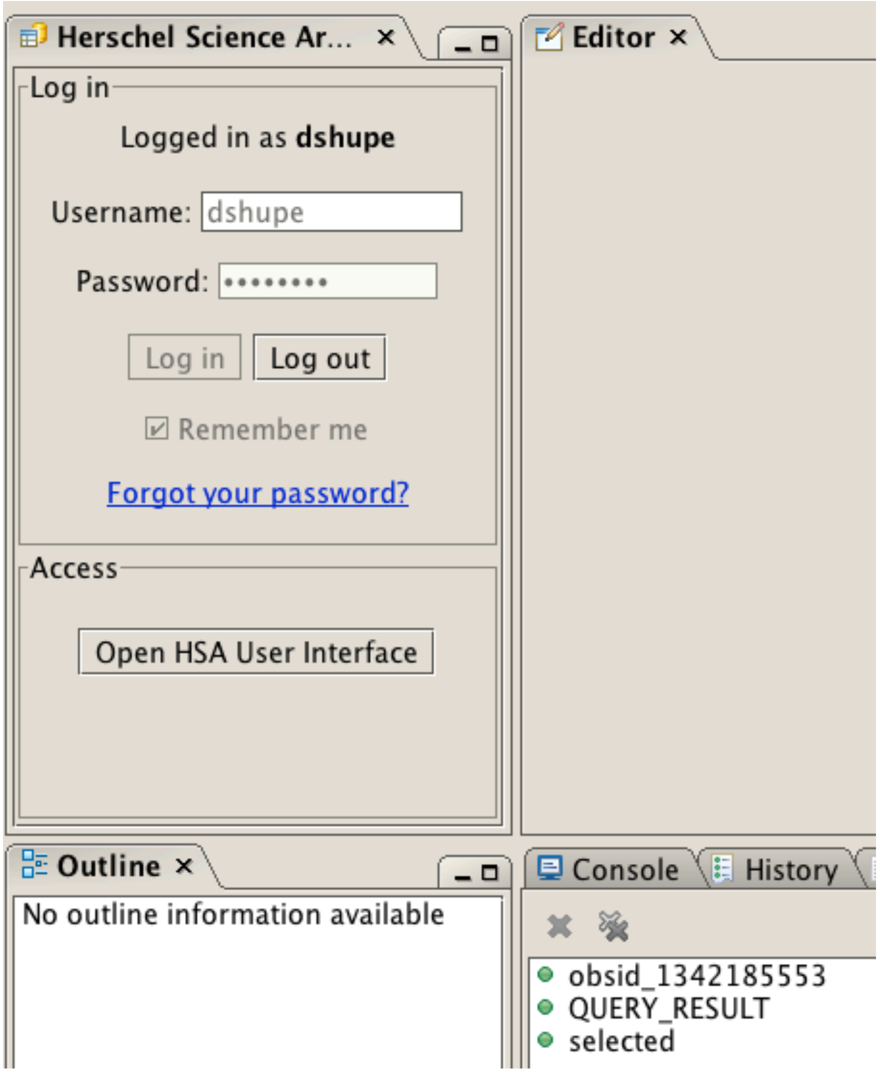
obsid	odNumber	startDate	aot	instrument	obsMode	object	proposa
1342185553	148	2009-10-09T11:...	Photom...	PACS	Scan map	rcw 120	SDP_fmo
1342185554	148	2009-10-09T11:...	Photom...	PACS	Scan map	rcw 120	SDP_fmo
1342186799	178	2009-11-08T15:...	Line Spe...	PACS	Pointed	M82	SDP_est..
1342189191	244	2010-01-12T21:...	Photom...	PACS	Scan map	delta Dra	Calibrati
1342202119	440	2010-07-28T02:...	Line Spe...	PACS	Pointed	Arp 220	Calibrati
1342218642	701	2011-04-15T04:...	Parallel...	SPIRE	Parallel Mode	Field 22_0	KPOT_s..
1342231345	892	2011-10-23T13:...	Photom...	SPIRE	Small Map	IRAS 20414-1651	OT1_dfa
1342189124	240	2010-01-09T15:...	Spectro...	SPIRE	Single Pointing	NGC 7027	SDP_mg.
1342222819	765	2011-06-17T21:...	Photom...	SPIRE	Large Map	COSMOS	KPGT_so
1342222853	766	2011-06-19T12:...	Photom...	SPIRE	Large Map	COSMOS	KPGT_so
1342222853	766	2011-06-19T12:...	Photom...	SPIRE	Large Map	COSMOS	KPGT_so
1342211401	587	2010-12-22T11:...	Photom...	SPIRE	Small Map	Dark Sky	Calibrati

Interact directly with the archive using the HSA perspective

Log in using your Herschel credentials

(one-time only, if you tick “Remember me”)

Start the HSA User Interface



Logged in as **dshupe**

Username: dshupe

Password: ••••••••

☑ Remember me

No outline information available

- obsid_1342185553
- QUERY_RESULT
- selected

Introduction to HIPE

- Key Data Concepts
- A Visual Tour of the HIPE Interface
- The HSA User Interface
  - Querying the archive
  - Retrieving observations
- Help and Documentation
- Introduction to Scripting

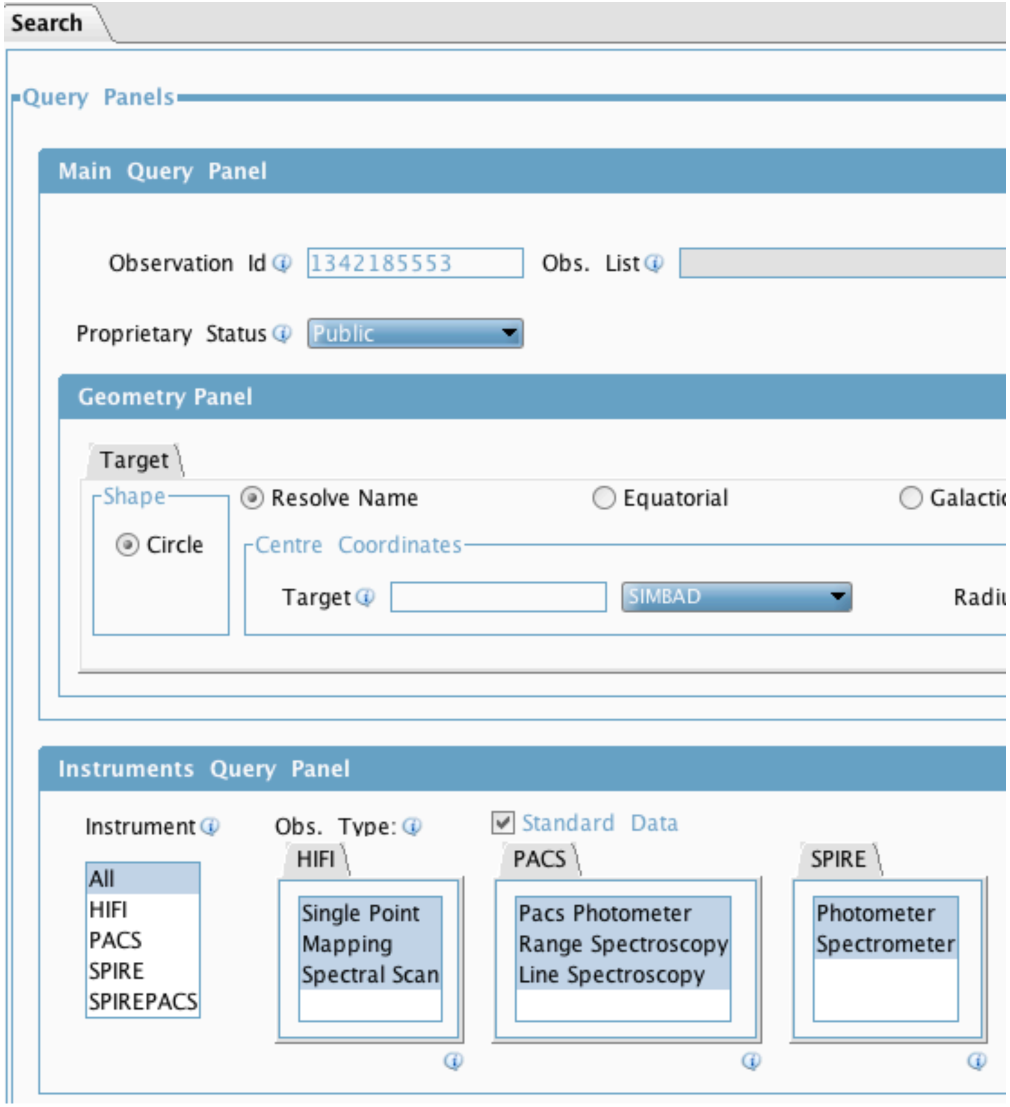
Query the archive by obsid, target name, instrument, public status

If OBSID is known…

Set to "Public" to browse released data

Search by target name

Specify instrument



Search

Query Panels

Main Query Panel

Observation Id: 1342185553

Obs. List:

Proprietary Status: Public

Geometry Panel

Target

Shape: ● Circle

● Resolve Name ○ Equatorial ○ Galacti

Centre Coordinates

Target: SIMBAD

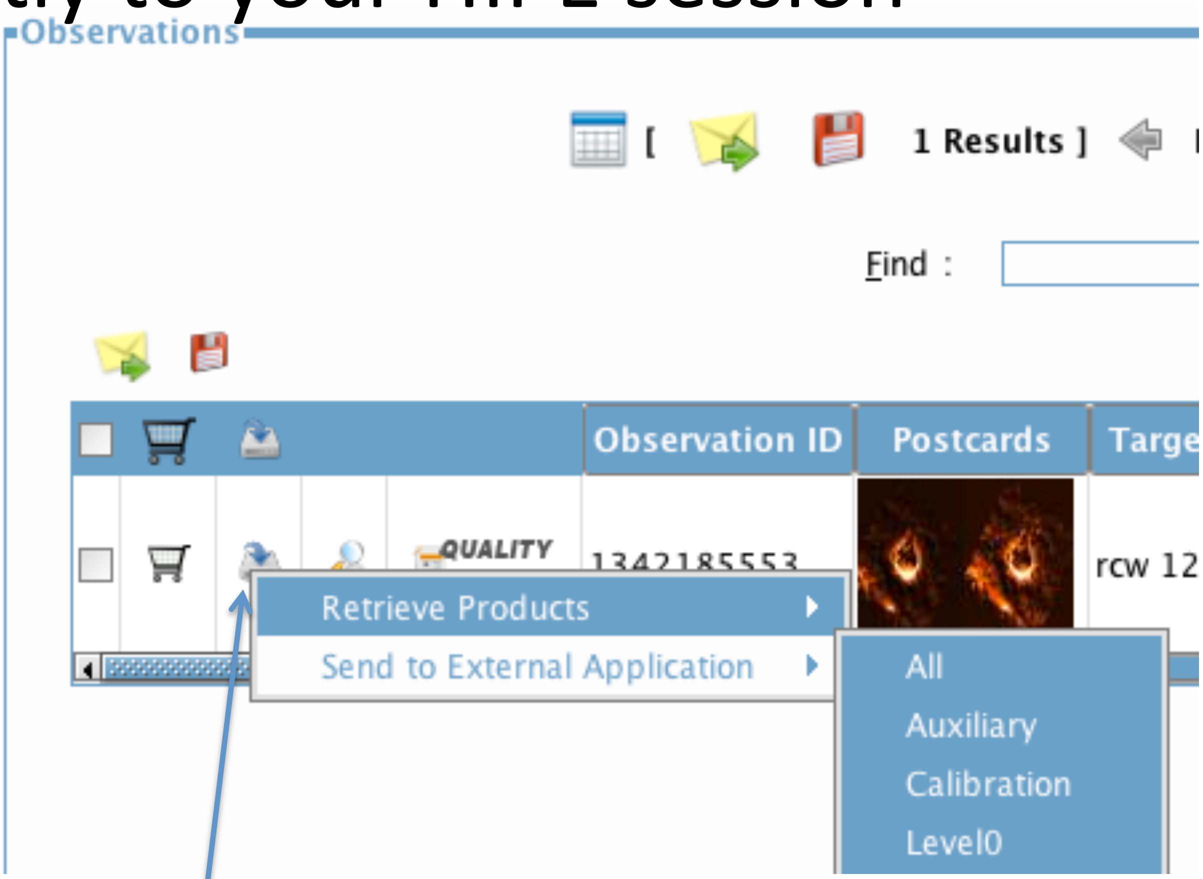
Radi

Instruments Query Panel

Instrument: All

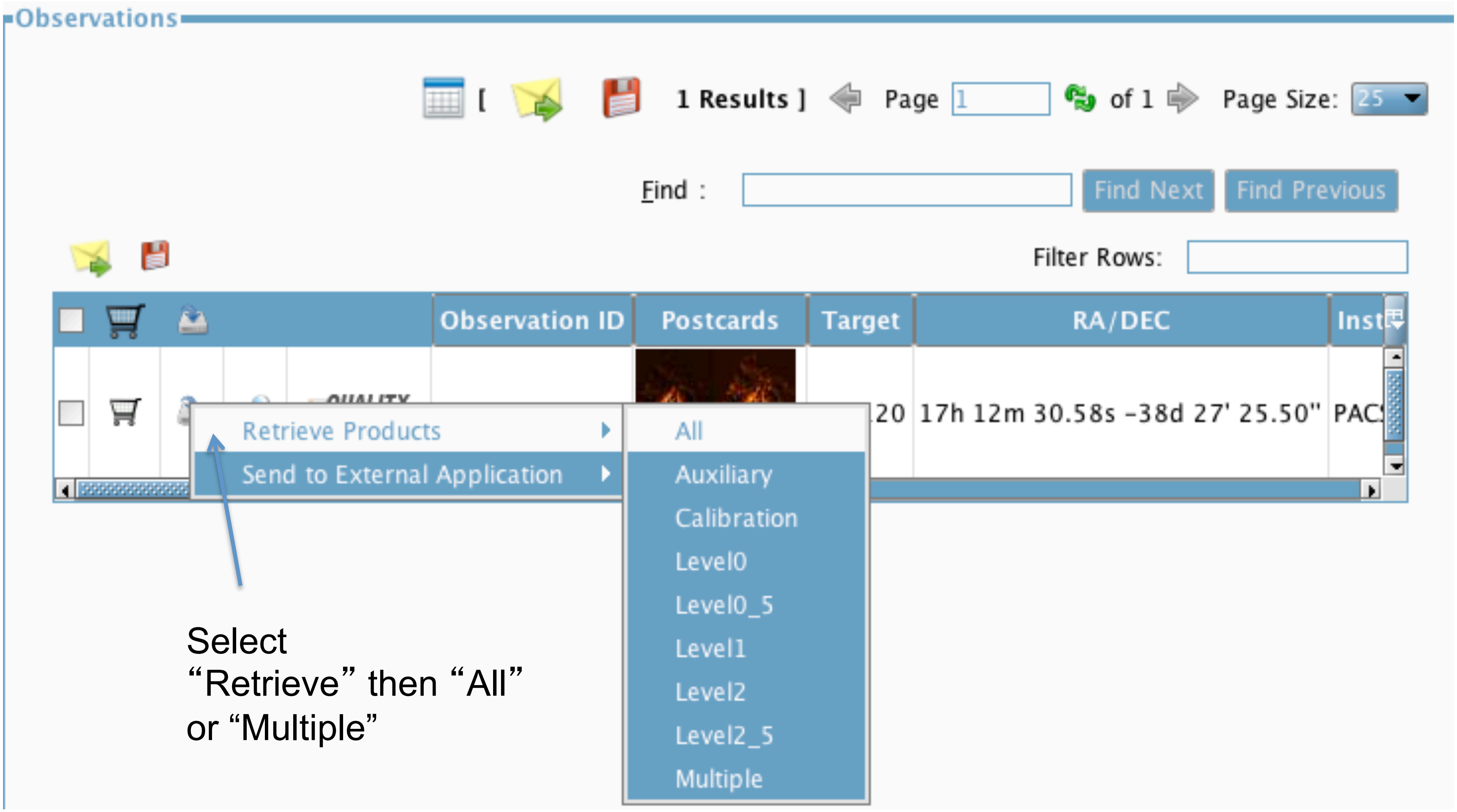
☑ Standard Data

The HSA Applet can send data directly to your HIPE session



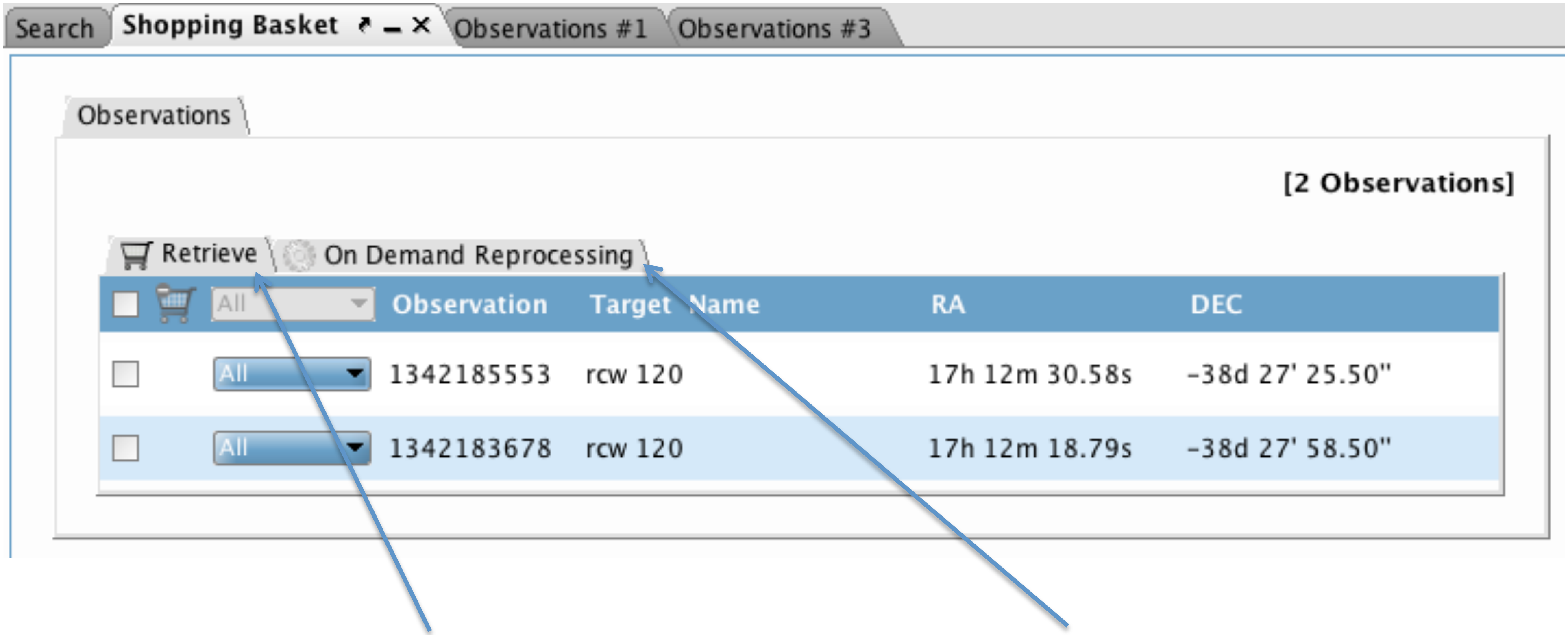
Select
“Send to External Application”
then
“All”

Use “Retrieve” to receive a tarfile



Select
“Retrieve” then “All”
or “Multiple”

The Shopping Basket collects several observations



[2 Observations]

□		All	Observation	Target Name	RA	DEC
□		All	1342185553	rcw 120	17h 12m 30.58s	-38d 27' 25.50"
□		All	1342183678	rcw 120	17h 12m 18.79s	-38d 27' 58.50"

You can retrieve all the observations in one tarfile…

…or reprocess with last released version

Introduction to HIPE

- Key Data Concepts
- A Visual Tour of the HIPE Interface
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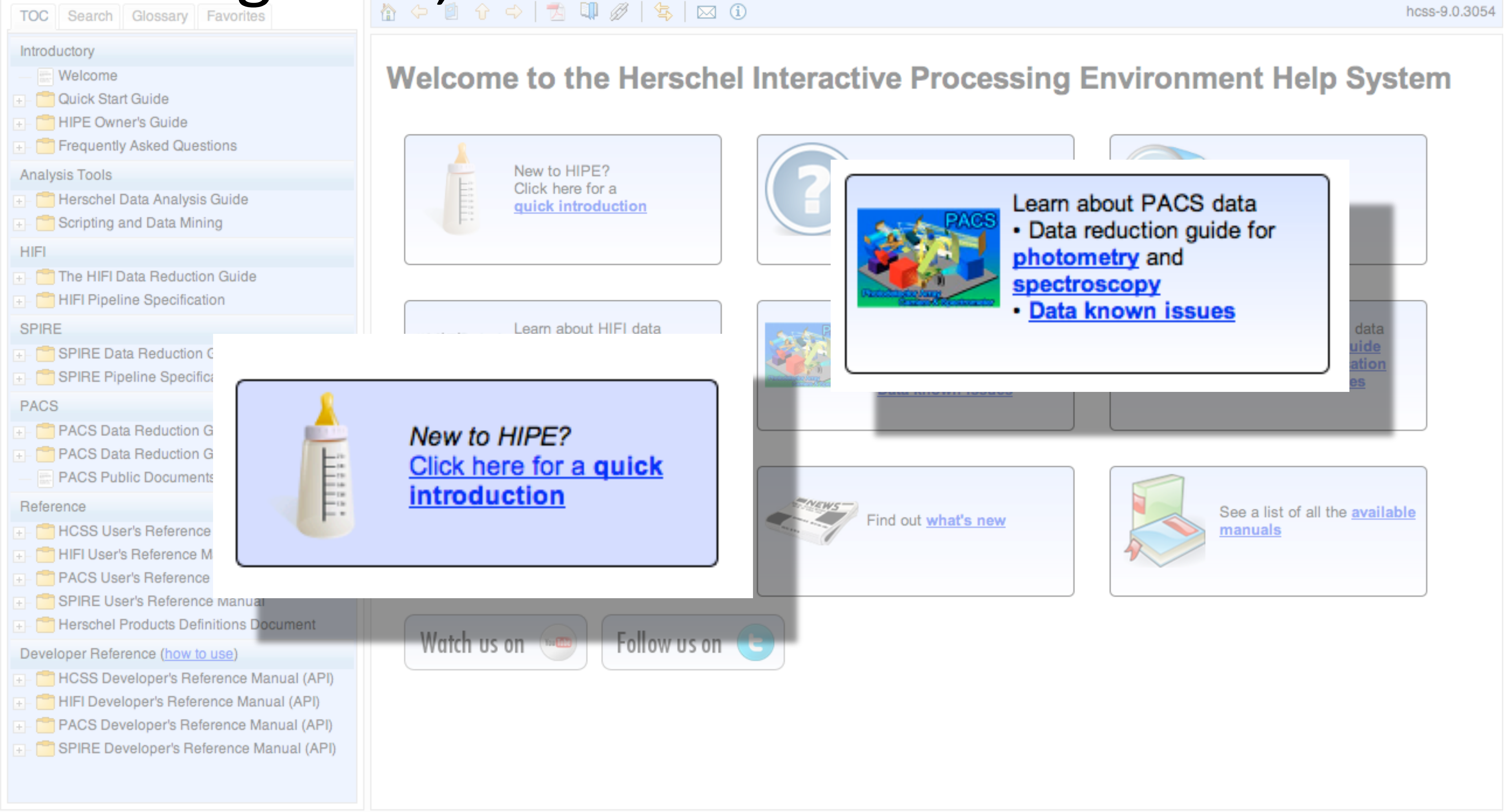
- Help and Documentation
  - Starting the Help system
  - User Guides, Tutorials and How-Tos
  - Searching the Documentation
- Introduction to Scripting

The Help and Documentation are accessed in your web browser

- Start the help system by 1 of 4 ways:
  - Menu “Help” -> Help Contents
  - “hipe_help” in the app directory of HIPE
  - Right-click on variable
    - Help in URM (Users Ref. Manual)
    - Help in DRM (Developers Ref. Manual)
  - Online at http://herschel.esac.esa.int/hipe-doc-9.0/

The Help system includes user guides, tutorials and how-tos



TOC Search Glossary Favorites

hcss-9.0.3054

Introductory
- Welcome
- Quick Start Guide
- HIPE Owner's Guide
- Frequently Asked Questions

Analysis Tools
- Herschel Data Analysis Guide
- Scripting and Data Mining

HIFI
- The HIFI Data Reduction Guide
- HIFI Pipeline Specification

SPIRE
- SPIRE Data Reduction G
- SPIRE Pipeline Specifica

PACS
- PACS Data Reduction G
- PACS Data Reduction G
- PACS Public Documents

Reference
- HCSS User's Reference
- HIFI User's Reference M
- PACS User's Reference
- SPIRE User's Reference Manual
- Herschel Products Definitions Document

Developer Reference (how to use)
- HCSS Developer's Reference Manual (API)
- HIFI Developer's Reference Manual (API)
- PACS Developer's Reference Manual (API)
- SPIRE Developer's Reference Manual (API)

Welcome to the Herschel Interactive Processing Environment Help System

New to HIPE? Click here for a quick introduction

Learn about HIFI data

Find out what's new

See a list of all the available manuals

Watch us on

Follow us on

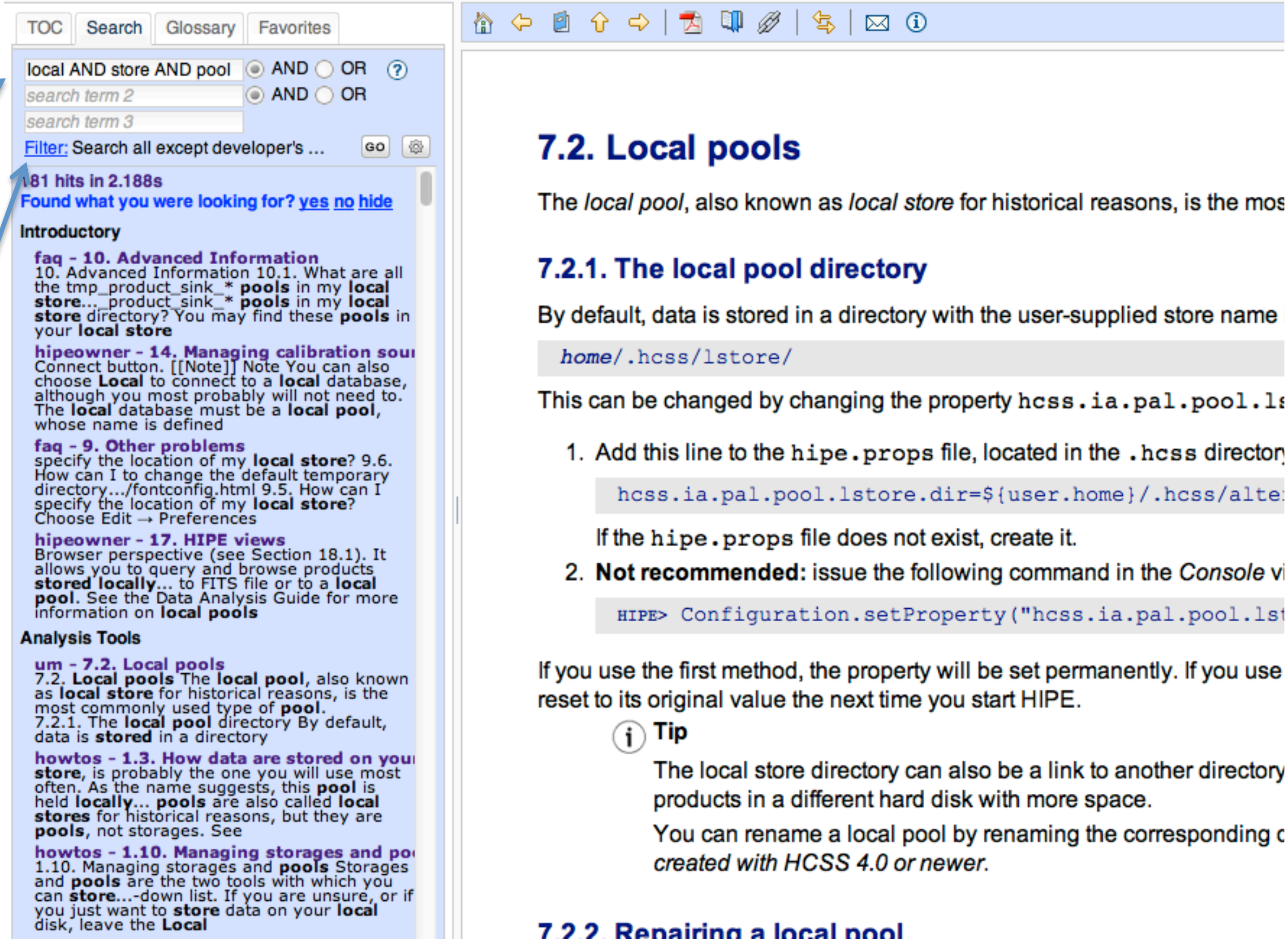
New to HIPE?
*Click here for a **quick introduction***

Learn about PACS data
- Data reduction guide for **photometry** and **spectroscopy**
- **Data known issues**

The Search tab allows filtering by manual

Combine terms with AND for better results

Filter by specific manuals, or “all but developer's documentation”



local AND store AND pool ● AND ○ OR ?
search term 2 ● AND ○ OR
search term 3

Filter: Search all except developer's ... GO

181 hits in 2.188s
Found what you were looking for? yes no hide

Introductory

faq - 10. Advanced Information
10. Advanced Information 10.1. What are all the tmp_product_sink_* **pools** in my **local store**... _product_sink_* **pools** in my **local store** directory? You may find these **pools** in your **local store**

hipeowner - 14. Managing calibration sou
Connect button. [[Note]] Note You can also choose **Local** to connect to a **local** database, although you most probably will not need to. The **local** database must be a **local pool**, whose name is defined

faq - 9. Other problems
specify the location of my **local store**? 9.6. How can I to change the default temporary directory.../fontconfig.html 9.5. How can I specify the location of my **local store**? Choose Edit → Preferences

hipeowner - 17. HIPE views
Browser perspective (see Section 18.1). It allows you to query and browse products **stored locally**... to FITS file or to a **local pool**. See the Data Analysis Guide for more information on **local pools**

Analysis Tools

um - 7.2. Local pools
7.2. **Local pools** The **local pool**, also known as **local store** for historical reasons, is the most commonly used type of **pool**. 7.2.1. The **local pool** directory By default, data is **stored** in a directory

howtos - 1.3. How data are stored on you
store, is probably the one you will use most often. As the name suggests, this **pool** is held **locally**... **pools** are also called **local stores** for historical reasons, but they are **pools**, not storages. See

howtos - 1.10. Managing storages and po
1.10. Managing storages and **pools** Storages and **pools** are the two tools with which you can **store**...-down list. If you are unsure, or if you just want to **store** data on your **local** disk, leave the **Local**

7.2. Local pools

The *local pool*, also known as *local store* for historical reasons, is the mos

7.2.1. The local pool directory

By default, data is stored in a directory with the user-supplied store name

```
home/.hcss/lstore/
```

This can be changed by changing the property `hcss.ia.pal.pool.ls`

1. Add this line to the `hipe.props` file, located in the `.hcss` director

   ```
   hcss.ia.pal.pool.lstore.dir=${user.home}/.hcss/alte
   ```

   If the `hipe.props` file does not exist, create it.

2. **Not recommended:** issue the following command in the *Console* vi

   ```
   HIPE> Configuration.setProperty("hcss.ia.pal.pool.lst
   ```

If you use the first method, the property will be set permanently. If you use reset to its original value the next time you start HIPE.

Tip

The local store directory can also be a link to another directory products in a different hard disk with more space.

You can rename a local pool by renaming the corresponding c *created with HCSS 4.0 or newer.*

7.2.2. Repairing a local pool

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Variables are simply names that point to data items

- No ‘type’ or declaration needed
- Assignment creates the variable:

```
a = 1
b = 2
```

- Strings can use single or double quotes:

```
c = “hello world”
e = ‘hi there’
```

- Reference: Scripting and Data Mining, Sections 1.5 & 1.7

Comments, continuations, and printing have a simple syntax

- The comment character is the pound sign

```
# this is a comment
```

- The continuation character is the backslash

```
x = a + b + \
       c * d * e
```

- A formatted string uses C-style format characters and the percent sign

```
print “integer = %d, real = %f” %
(j,x)
```

if-then-else blocks are denoted by indentation

- Reference: Scripting and Data Mining, Sec 1.17
- Syntax:
  ```
  if condition1:
     block1
  elif condition2:
     block2
  else:
     block3
  ```
- Notice that blocks are denoted by *indentation only*
- Example:
  ```
  if (0 <= x <= 10):
     y = y - 10
     print “Value is in range [0,10]”
  elif (10 < x < 20):
     print “Value is in range [10,20]”
  else:
     print “Value not in range [0,20]”
  ```

for loops are not just for integers

- Reference: Scripting and Data Mining, Sec. 1.18
- Syntax of a for loop:

  ```
  for var in sequence:
    block
  ```

- The *sequence* can be any list, array, etc. Examples:

  ```
  for pet in [“cat”, “dog”, “bird”]:
    print pet
  for i in range(10): # [0, 1, …, 9]
    print i # prints numbers 0-9
  ```

- The **`range`** function returns a list of integers. In general `range(`*`start`*`,`*`end`*`,`*`stepsize`*`)` where *start* defaults to 0 and *stepsize* to 1.

  ```
  print range(5)
  # [0, 1, 2, 3, 4]
  ```