

EPN-TAP services: Using TopCat as a client

S. Erard, B. Cecconi, P. Le Sidaner

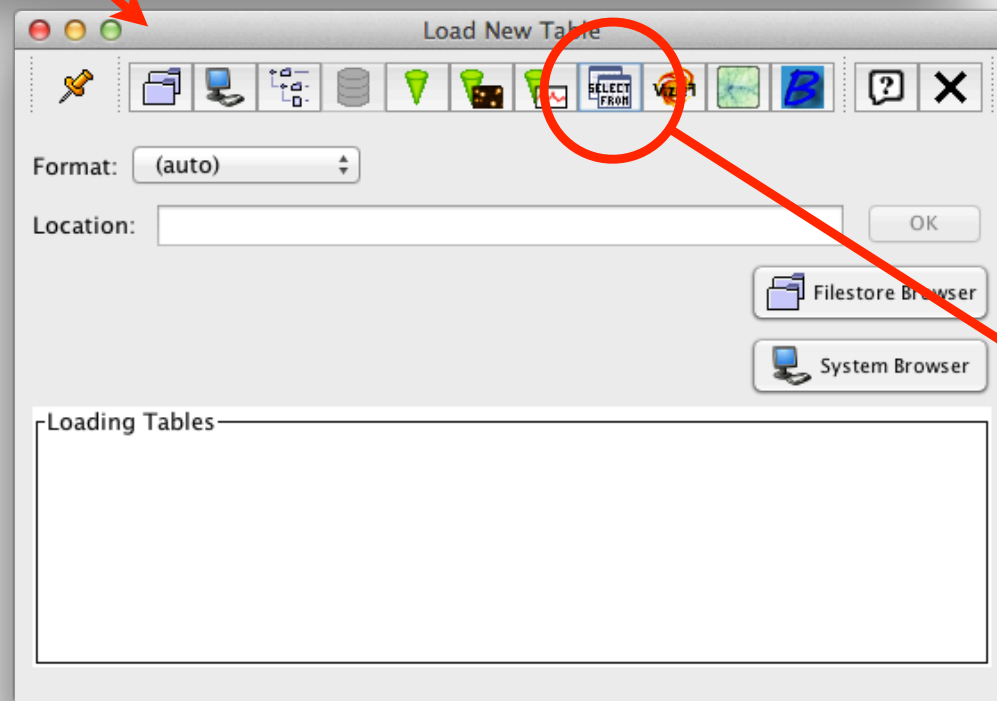
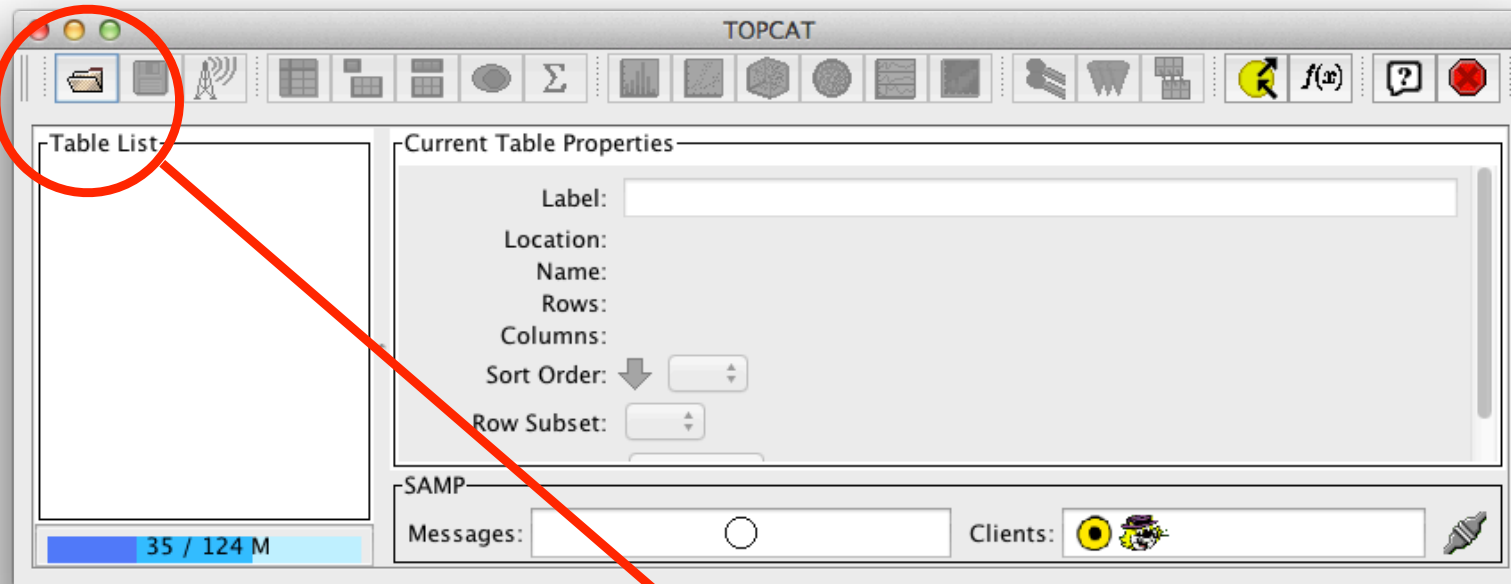
v1.1, 20/7/2012





Launch TopCat

<http://www.star.bris.ac.uk/~mbt/topcat/topcat-full.jnlp>



Open Table /
query remote database

Table Access Protocol (TAP) Query

Select Service | Enter Query | Resume Job | Running Jobs

Available TAP Services

Registry: <http://registry.astrogrid.org/astrogrid-registry/services/RegistryQueryv>

Keywords:

Match Fields: Short Name Title Subjects ID Publisher Description

Accept Resource Lists

Short Name	Title	Subjects	Id
apis	auroral planetary imaging and spectroscopy	Virtual Observatory, Planets	ivo:
apis	auroral planetary imaging and spectroscopy	Virtual Observatory, Planets	ivo:

Enter keyword and select service from registry,
or enter EPN-TAP URL

TAP Parameters

TAP URL:

OK

Table Access Protocol (TAP) Query

Select Service Enter Query Resume Job Running Jobs

Table Metadata

Service: auroral planetary imaging and spectroscopy (12 tables)

Table: **apis.epn_core** plasma in planetary atmosphere.

Columns:

Name	DataType	Indexed	Unit	Description
resource_type	char	<input type="checkbox"/>		ressource type can be data
dataproduct_type	char	<input type="checkbox"/>		product type can be image, s
target_name	char	<input type="checkbox"/>		name of the target from IAU i
target_class	char	<input type="checkbox"/>		type of target from enumerat
t_min	float	<input type="checkbox"/>	d	started time of observation
t_max	float	<input type="checkbox"/>	d	stop time of observation
t_scale	char	<input type="checkbox"/>		time scale taken from STC

Foreign Keys:

Target Table	Links	Description	Utype

Service Capabilities

Query Language: ADQL-2.0 Max Rows: 2000 (default) Uploads: :0Mb

ADQL Text

Synchronous [Examples](#) [Clear](#) [Parse Errors](#)

```
SELECT TOP 1000 * FROM apis.epn_core
```

OK

Select table

Current services:
 BDIP
 APIS
 Titan profiles
 Mars profiles

Enter ADQL
 query

The image shows the TOPCAT software interface. The main window displays 'Current Table Properties' for a table named 'TAP_1_bdip.epn_core'. The properties include: Label: TAP_1_bdip.epn_core, Location: TAP_1_bdip.epn_core, Name: epn_core, Rows: 2 000, Columns: 45, Sort Order: (indicated by an upward arrow), Row Subset: All, and Activation Action: (no action). A red circle highlights a toolbar icon, and a red arrow points from it to the 'Table Browser' window.

The 'Table Browser' window displays a table with the following columns: `access_url`, `access_format`, `access_estsize`, `target_r...`, and `ra`. The table contains 22 rows of data, with the 16th row highlighted in green.

	<code>access_url</code>	<code>access_format</code>	<code>access_estsize</code>	<code>target_r...</code>	<code>ra</code>
1	http://www.lesia.obspm.fr/BDIP/bdip_jpeg/bdip0001.jpg	jpeg	36	PLANET	20,9946
2	http://www.lesia.obspm.fr/BDIP/bdip_jpeg/bdip0001.jpg	tiff	260	PLANET	20,9946
3	http://www.lesia.obspm.fr/BDIP/bdip_jpeg/bdip0002.jpg	jpeg	44	PLANET	20,9357
4	http://www.lesia.obspm.fr/BDIP/bdip_jpeg/bdip0002.jpg	tiff	712	PLANET	20,9357
5	http://www.lesia.obspm.fr/BDIP/bdip_jpeg/bdip0003.jpg	jpeg	48	PLANET	20,9357
6	http://www.lesia.obspm.fr/BDIP/bdip_jpeg/bdip0003.jpg	tiff	712	PLANET	20,9357
7	http://www.lesia.obspm.fr/BDIP/bdip_jpeg/bdip0004.jpg	jpeg	60	PLANET	20,9357
8	http://www.lesia.obspm.fr/BDIP/bdip_jpeg/bdip0004.jpg	tiff	712	PLANET	20,9357
9	http://www.lesia.obspm.fr/BDIP/bdip_jpeg/bdip0005.jpg	jpeg	52	PLANET	20,9356
10	http://www.lesia.obspm.fr/BDIP/bdip_jpeg/bdip0005.jpg	tiff	712	PLANET	20,9356
11	http://www.lesia.obspm.fr/BDIP/bdip_jpeg/bdip0006.jpg	jpeg	56	PLANET	20,9357
12	http://www.lesia.obspm.fr/BDIP/bdip_jpeg/bdip0006.jpg	tiff	712	PLANET	20,9357
13	http://www.lesia.obspm.fr/BDIP/bdip_jpeg/bdip0007.jpg	jpeg	60	PLANET	20,9356
14	http://www.lesia.obspm.fr/BDIP/bdip_jpeg/bdip0007.jpg	tiff	712	PLANET	20,9356
15	http://www.lesia.obspm.fr/BDIP/bdip_jpeg/bdip0008.jpg	jpeg	48	PLANET	20,9356
16	http://www.lesia.obspm.fr/BDIP/bdip_jpeg/bdip0008.jpg	tiff	712	PLANET	20,9356
17	http://www.lesia.obspm.fr/BDIP/bdip_jpeg/bdip0009.jpg	jpeg	52	PLANET	20,9355
18	http://www.lesia.obspm.fr/BDIP/bdip_jpeg/bdip0009.jpg	tiff	712	PLANET	20,9355
19	http://www.lesia.obspm.fr/BDIP/bdip_jpeg/bdip0010.jpg	jpeg	60	PLANET	20,9355
20	http://www.lesia.obspm.fr/BDIP/bdip_jpeg/bdip0010.jpg	tiff	712	PLANET	20,9355
21	http://www.lesia.obspm.fr/BDIP/bdip_jpeg/bdip0011.jpg	jpeg	52	PLANET	20,8976
22	http://www.lesia.obspm.fr/BDIP/bdip_jpeg/bdip0011.jpg	tiff	712	PLANET	20,8976

Display table
[shows data description]

The image shows two overlapping windows from the TOPCAT software. The top window, titled "TOPCAT(1): Table Browser", displays a table with columns: access_url, access_format, access_estsize, target_r..., ra, and dec. The bottom window, titled "TOPCAT", shows a "Table List" with "1: TAP_1_bdip.epn_core" selected, and "Current Table Properties" for that table. The "Row Subset" dropdown is set to "Subset_2".

Table Browser for 1: TAP_1_bdip.epn_core

	access_url	access_format	access_estsize	target_r...	ra	dec
1	http://www.lesia.obspm.fr/BDIP/bdip_jpeg/bdip0001.jpg	jpeg	36	PLANET	20,9946	-17,5548
2	http://www.lesia.obspm.fr/BDIP/bdip_jpeg/bdip0001.jpg	tiff	260	PLANET	20,9946	-17,5548
3	http://www.lesia.obspm.fr/BDIP/bdip_jpeg/bdip0002.jpg	jpeg	44	PLANET	20,9357	-18,0593
4	http://www.lesia.obspm.fr/BDIP/bdip_jpeg/bdip0002.jpg	tiff	712	PLANET	20,9357	-18,0593
5	http://www.lesia.obspm.fr/BDIP/bdip_jpeg/bdip0003.jpg	jpeg	48	PLANET	20,9357	-18,0594
6	http://www.lesia.obspm.fr/BDIP/bdip_jpeg/bdip0003.jpg	tiff	712	PLANET	20,9357	-18,0594
7	http://www.lesia.obspm.fr/BDIP/bdip_jpeg/bdip0004.jpg	jpeg	60	PLANET	20,9357	-18,0593
8	http://www.lesia.obspm.fr/BDIP/bdip_jpeg/bdip0004.jpg	tiff	712	PLANET	20,9357	-18,0593
9	http://www.lesia.obspm.fr/BDIP/bdip_jpeg/bdip0005.jpg	jpeg	52	PLANET	20,9356	-18,0595
10	http://www.lesia.obspm.fr/BDIP/bdip_jpeg/bdip0005.jpg	tiff	712	PLANET	20,9356	-18,0595
11	http://www.lesia.obspm.fr/BDIP/bdip_jpeg/bdip0006.jpg	jpeg	56	PLANET	20,9357	-18,0595
12	http://www.lesia.obspm.fr/BDIP/bdip_jpeg/bdip0006.jpg	tiff	712	PLANET	20,9357	-18,0595

Table List

- 1: TAP_1_bdip.epn_core

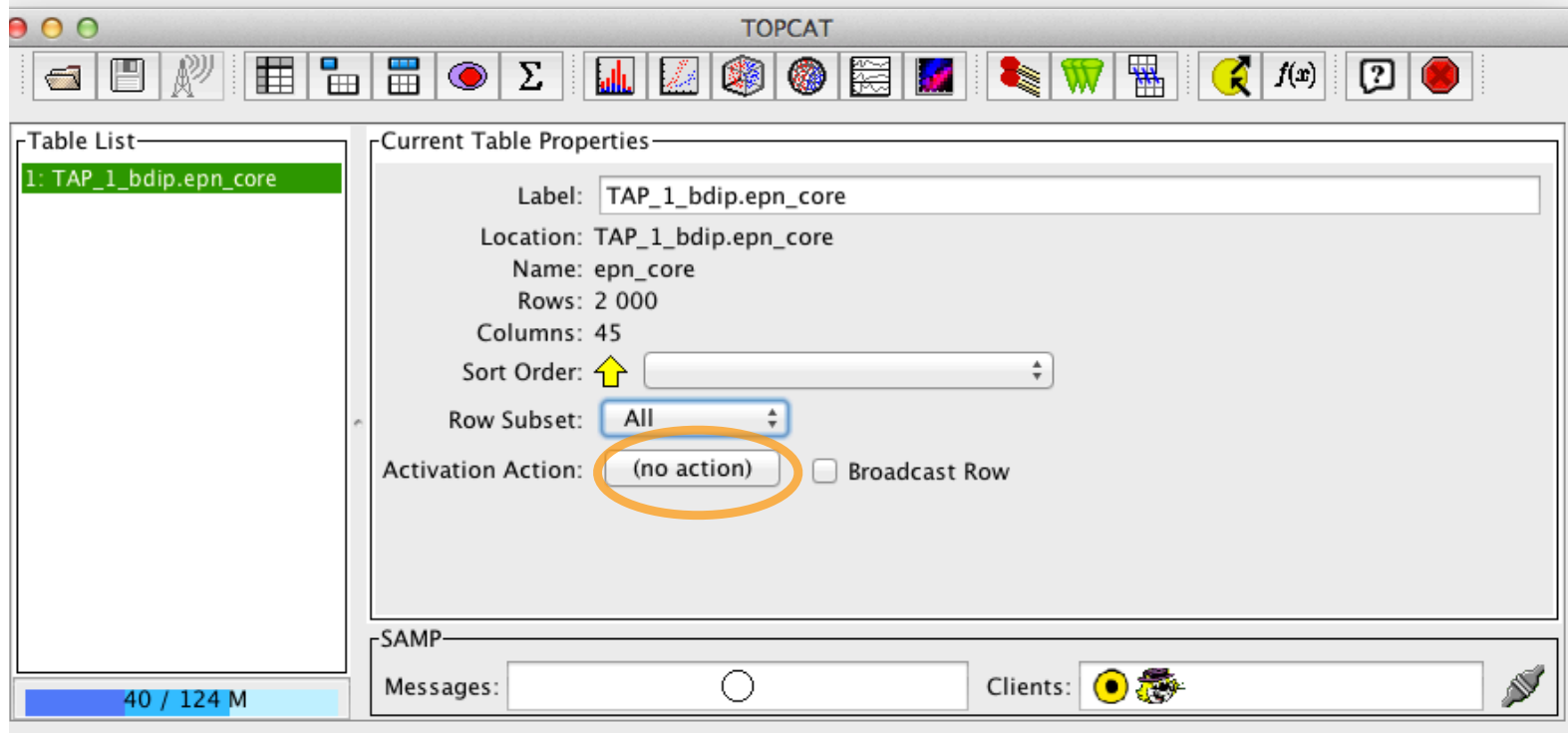
Current Table Properties

Label: TAP_1_bdip.epn_core
Location: TAP_1_bdip.epn_core
Name: epn_core
Rows: 2 000 (12 apparent)
Columns: 45
Sort Order: ↑
Row Subset: Subset_2
Activation Action: (no action) Broadcast Row

SAMP
Messages: Clients:

39 / 124 M

Browse table,
select elements



Configure activation

[click on button to invoke action menu]

f(x) ? X



No Action

Display Cutout Image

View URL as Image

View URL as Spectrum

View URL as Web Page

Transmit Row

Transmit Coordinates

Execute Custom Code

Cutout Service: SuperCOSMOS All-Sky Blue

RA column: ra degrees

Dec column: dec degrees

Width/Height in Pixels: 100 (0.67 arcsec)

Image Location column: access_url

Image Format: FITS

Image Viewer: SoG (internal)

Spectrum Location column:

Spectrum Viewer: All Clients

Web Page Location column:

Browser Type: basic browser

Target Application: All Clients

RA Column: ra degrees

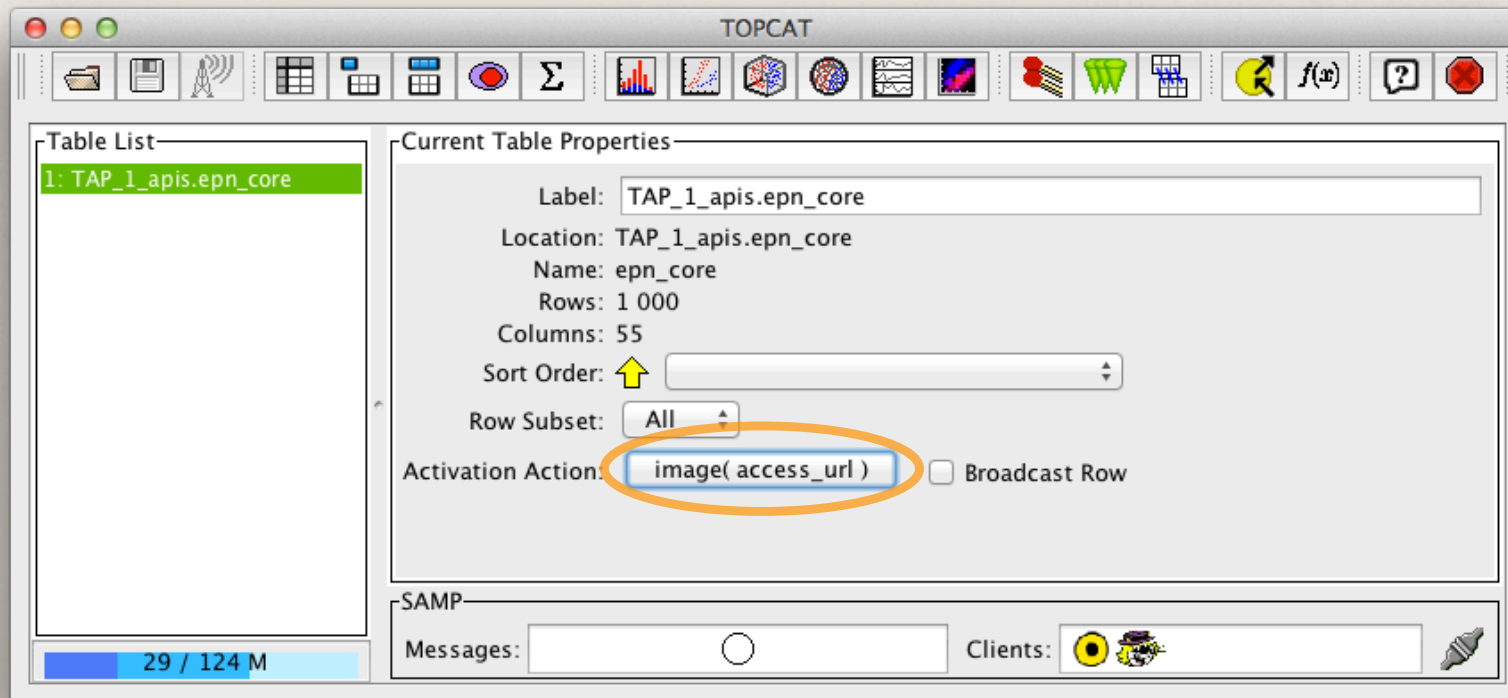
Dec Column: dec degrees

Target Application: All Clients

Executable Expression:

OK Cancel

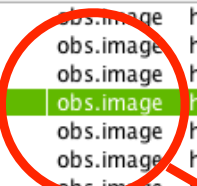
If results = image
previews are available
[2 different viewers]



TOPCAT(1): Table Browser

1: TAP_1_apis.epn_core

instrument_...	measur...	access_url	access...	access_e...	processin...	publisher	reference	tit
SBC	obs.image	http://voparis-srv.obspm.fr/vo/planeto/apis/dat...	fits	22000	calibrated	vo paris data centre on behalf of LESIA	no information	A
SBC	obs.image	http://voparis-srv.obspm.fr/vo/planeto/apis/dat...	fits	22000	calibrated	vo paris data centre on behalf of LESIA	no information	A
SBC	obs.image	http://voparis-srv.obspm.fr/vo/planeto/apis/dat...	fits	22000	calibrated	vo paris data centre on behalf of LESIA	no information	A
SBC	obs.image	http://voparis-srv.obspm.fr/vo/planeto/apis/dat...	fits	22000	calibrated	vo paris data centre on behalf of LESIA	no information	A
SBC	obs.image	http://voparis-srv.obspm.fr/vo/planeto/apis/dat...	fits	22000	calibrated	vo paris data centre on behalf of LESIA	no information	A
SBC	obs.image	http://voparis-srv.obspm.fr/vo/planeto/apis/dat...	fits	22000	calibrated	vo paris data centre on behalf of LESIA	no information	A
SBC	obs.image	http://voparis-srv.obspm.fr/vo/planeto/apis/dat...	fits	22000	calibrated	vo paris data centre on behalf of LESIA	no information	A
SBC	obs.image	http://voparis-srv.obspm.fr/vo/planeto/apis/dat...	fits	22000	calibrated	vo paris data centre on behalf of LESIA	no information	A
SBC	obs.image	http://voparis-srv.obspm.fr/vo/planeto/apis/dat...	fits	22000	calibrated	vo paris data centre on behalf of LESIA	no information	A
SBC	obs.image	http://voparis-srv.obspm.fr/vo/planeto/apis/dat...	fits	22000	calibrated	vo paris data centre on behalf of LESIA	no information	A
SBC	obs.image	http://voparis-srv.obspm.fr/vo/planeto/apis/dat...	fits	22000	calibrated	vo paris data centre on behalf of LESIA	no information	A
FUV-MAMA	obs.image	http://voparis-srv.obspm.fr/vo/planeto/apis/dat...	fits	22000	calibrated	vo paris data centre on behalf of LESIA	no information	A
SBC	obs.image	http://voparis-srv.obspm.fr/vo/planeto/apis/dat...	fits	22000	calibrated	vo paris data centre on behalf of LESIA	no information	A
SBC	obs.image	http://voparis-srv.obspm.fr/vo/planeto/apis/dat...	fits	22000	calibrated	vo paris data centre on behalf of LESIA	no information	A
SBC	obs.image	http://voparis-srv.obspm.fr/vo/planeto/apis/dat...	fits	22000	calibrated	vo paris data centre on behalf of LESIA	no information	A
SBC	obs.image	http://voparis-srv.obspm.fr/vo/planeto/apis/dat...	fits	22000	calibrated	vo paris data centre on behalf of LESIA	no information	A
SBC	obs.image	http://voparis-srv.obspm.fr/vo/planeto/apis/dat...	fits	22000	calibrated	vo paris data centre on behalf of LESIA	no information	A
SBC	obs.image	http://voparis-srv.obspm.fr/vo/planeto/apis/dat...	fits	22000	calibrated	vo paris data centre on behalf of LESIA	no information	A
SBC	obs.image	http://voparis-srv.obspm.fr/vo/planeto/apis/dat...	fits	22000	calibrated	vo paris data centre on behalf of LESIA	no information	A
SBC	obs.image	http://voparis-srv.obspm.fr/vo/planeto/apis/dat...	fits	22000	calibrated	vo paris data centre on behalf of LESIA	no information	A
SBC	obs.image	http://voparis-srv.obspm.fr/vo/planeto/apis/dat...	fits	22000	calibrated	vo paris data centre on behalf of LESIA	no information	A
SBC	obs.image	http://voparis-srv.obspm.fr/vo/planeto/apis/dat...	fits	22000	calibrated	vo paris data centre on behalf of LESIA	no information	A
SBC	obs.image	http://voparis-srv.obspm.fr/vo/planeto/apis/dat...	fits	22000	calibrated	vo paris data centre on behalf of LESIA	no information	A
SBC	obs.image	http://voparis-srv.obspm.fr/vo/planeto/apis/dat...	fits	22000	calibrated	vo paris data centre on behalf of LESIA	no information	A



Open Back Forward Cut Levels Catalogs Grid

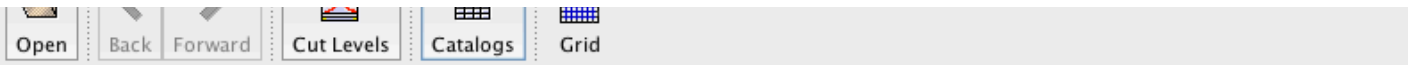
Progress

Downloading image data ...

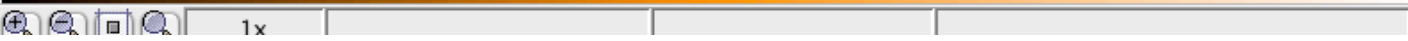
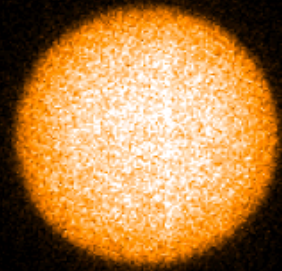
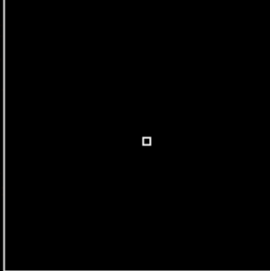
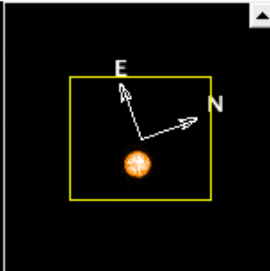
Stop




1 % Reading File: 330600 bytes


Click table elements



Other options available if FITS
images with WCS coordinates
[grid, background sky...]



 No Action

Display Cutout Image

View URL as Image

View URL as Spectrum

View URL as Web Page

Transmit Row

Transmit Coordinates

Execute Custom Code

Cutout Service: SuperCOSMOS All-Sky Blue

RA column: ra degrees

Dec column: dec degrees

Width/Height in Pixels: 100 (0.67 arcsec)

Image Location column: access_url_calibrated_preview

Image Format: JPEG

Image Viewer: SoG (internal)

Spectrum Location column:

Spectrum Viewer: All Clients

Web Page Location column:

Browser Type: basic browser

Target Application: All Clients

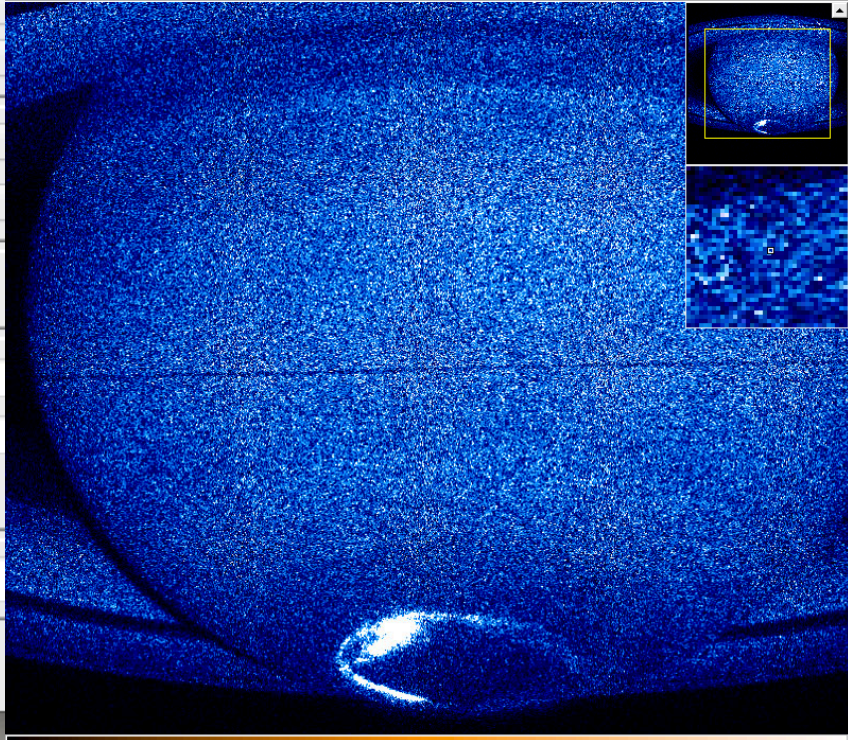
RA Column: ra

Dec Column: dec

Target Application: All Clients

Executable Expression:

OK Cancel



Other formats supported



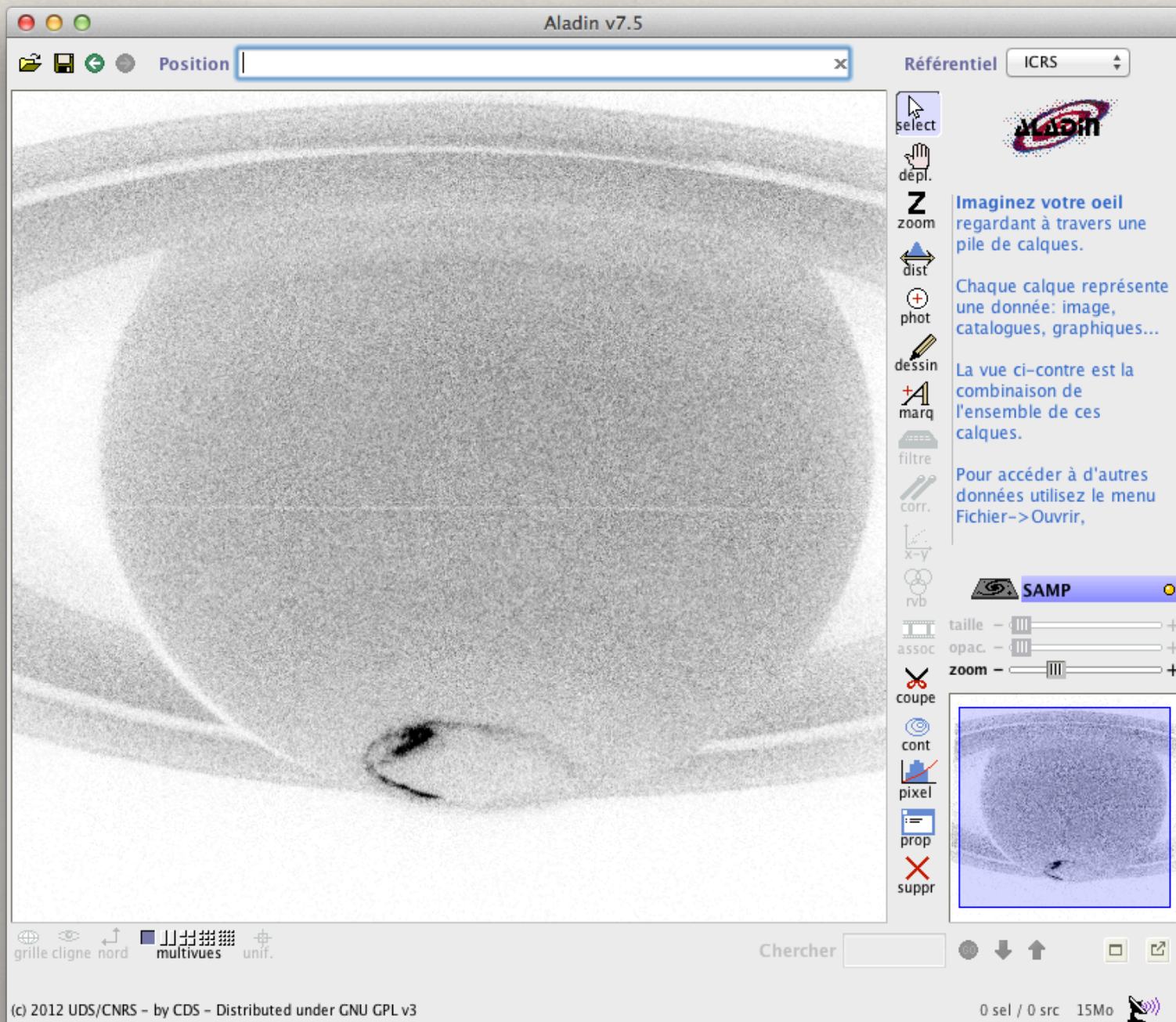
- No Action
- Display Cutout Image
- View URL as Image
- View URL as Spectrum
- View URL as Web Page
- Transmit Row
- Transmit Coordinates
- Execute Custom Code

Cutout Service:	SuperCOSMOS All-Sky Blue	
RA column:	ra	degrees
Dec column:	dec	degrees
Width/Height in Pixels:	100	(0.67 arcsec)
Image Location column:	access_url_processed_filename	
Image Format:	FITS	
Image Viewer:	Aladin	
Spectrum Location column:		
Spectrum Viewer:	All Clients	
Web Page Location column:		
Browser Type:	basic browser	
Target Application:	All Clients	
RA Column:	ra	degrees
Dec Column:	dec	degrees
Target Application:	All Clients	
Executable Expression:		

Image analysis using Aladin
[to be started independently]

<http://aladin.u-strasbg.fr/>

OK Cancel



Set Activation Action

No Action

Display Cutout Image

View URL as Image

View URL as Spectrum

View URL as Web Page

Transmit Row

Transmit Coordinates

Execute Custom Code

Cutout Service: SuperCOSMOS All-Sky Blue

RA column: degrees

Dec column: degrees

Width/Height in Pixels: 100 (0.67 arcsec)

Image Location column:

Image Format: FITS

Image Viewer: Basic viewer (internal)

Spectrum Location column: access_url

Spectrum Viewer: All Clients

Web Page Location column: access_url

Browser Type: system browser

Target Application: VOPlot

RA Column: degrees

Dec Column: degrees

Target Application: All Clients




Executable Expression:


OK Cancel

If result = spectra
plot / analysis using VOspec, etc...
[to be started independently]

<http://www.sciops.esa.int/index.php?project=SAT&page=vospec>

Set Activation Action

 No Action

Display Cutout Image

View URL as Image

View URL as Spectrum

View URL as Web Page

Transmit Row

Transmit Coordinates

Execute Custom Code

Cutout Service: SuperCOSMOS All-Sky Blue

RA column: degrees

Dec column: degrees

Width/Height in Pixels: 100 (0.67 arcsec)

Image Location column:

Image Format: FITS

Image Viewer: Basic viewer (internal)

Spectrum Location column: access_url

Spectrum Viewer: All Clients

Web Page Location column: access_url

Browser Type: system browser

Target Application: VOPlot

RA Column: degrees

Dec Column: degrees

Target Application: All Clients

Executable Expression:

OK Cancel

If results are numbers
can be viewed as VOTable

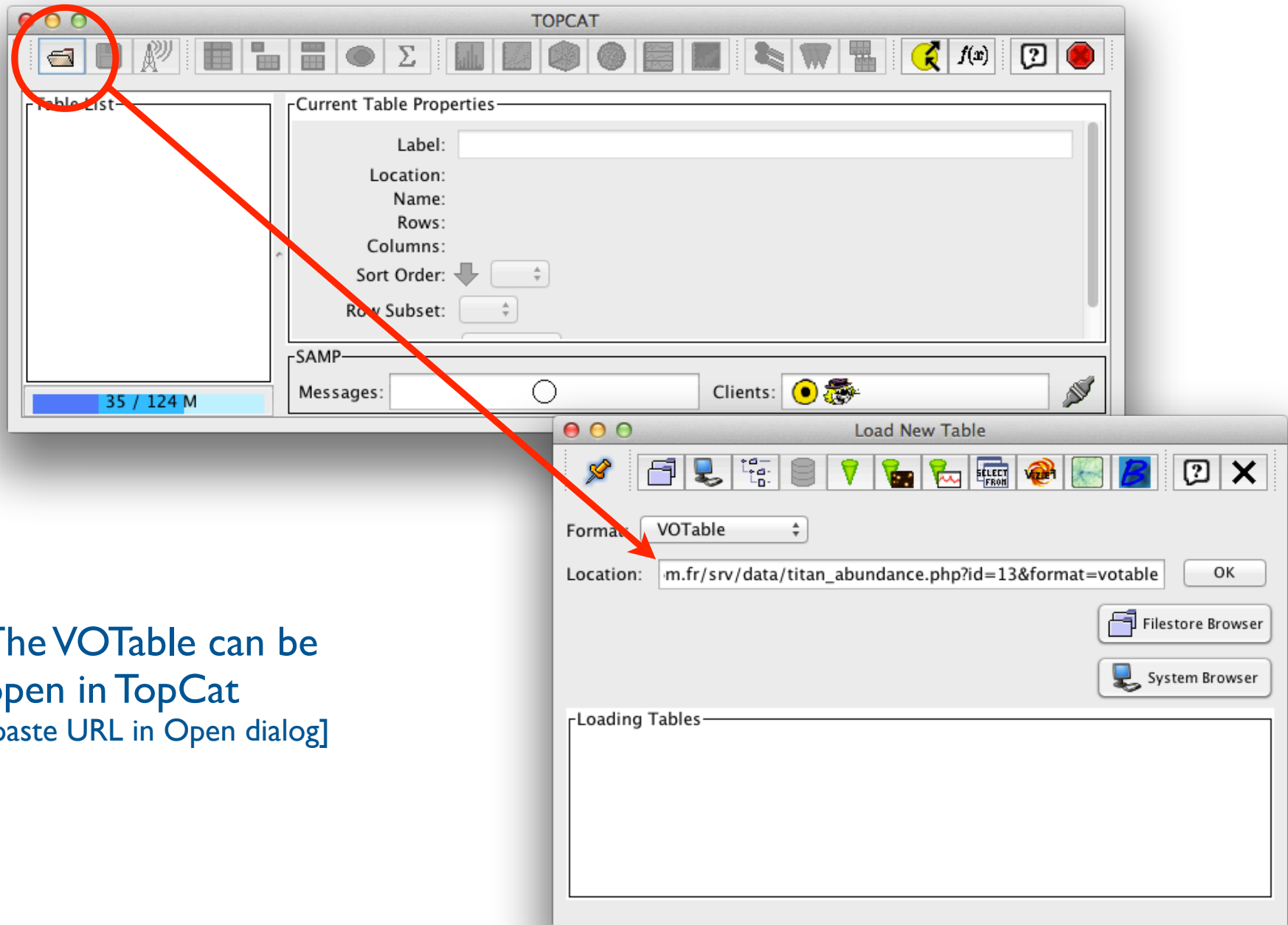
http://voparis-srv.obspm.fr/srv/data/titan_abundance.php?id=83&format=votable

This XML file does not appear to have any style information associated with it. The document tree is shown below.

```
<?xml version="1.2" encoding="UTF-8" standalone="no" >
<VOTABLE xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns="http://www.ivoa.net/xml/VOTable/v1.2" version="1.2"
xsi:schemaLocation="http://www.ivoa.net/xml/VOTable/v1.2 http://www.ivoa.net/xml/VOTable/VOTable-1.2.xsd">
  <RESOURCE type="results">
    <DESCRIPTION>Vertical abundance of HC3N in Titan's atmosphere</DESCRIPTION>
    <TABLE>
      <PARAM ID="element" name="Element" ucd="phys.atmol.element" datatype="char" unit="--" value="HC3N"/>
      <PARAM ID="latitude" name="Latitude" ucd="pos.latitude" datatype="double" unit="deg" value="78.5"/>
      <PARAM ID="longitude" name="Longitude" ucd="pos.longitude" datatype="double" unit="deg" value="-80"/>
      <FIELD ID="altitude" name="Altitude" ucd="pos.titan.altitude" datatype="double" unit="km">
        <DESCRIPTION>Altitude</DESCRIPTION>
      </FIELD>
      <FIELD ID="pressure" name="P" ucd="phys.pressure" datatype="double" unit="mbar">
        <DESCRIPTION>Pressure</DESCRIPTION>
      </FIELD>
      <FIELD ID="temperature" name="T" ucd="phys.temperature" datatype="double" unit="K">
        <DESCRIPTION>Temperature</DESCRIPTION>
      </FIELD>
      <FIELD ID="q_HC3N" name="q_HC3N" ucd="phys.abund.HC3N" datatype="double" unit="--">
        <DESCRIPTION>Abundance of HC3N</DESCRIPTION>
      </FIELD>
      <FIELD ID="q_min" name="q_min" ucd="stat.error;phys.abund;stat.min" datatype="double" unit="--">
        <DESCRIPTION>Max error on abundance value</DESCRIPTION>
      </FIELD>
      <FIELD ID="q_max" name="q_max" ucd="stat.error;phys.abund;stat.max" datatype="double" unit="--">
        <DESCRIPTION>Min error on abundance value</DESCRIPTION>
      </FIELD>
      <DATA>
        <TABLEDATA>
          <TR>
            <TD>485.46</TD>
            <TD>0.2135E-02</TD>
            <TD>184.69</TD>
            <TD>0.6334E-06</TD>
            <TD>5.13285e-07</TD>
            <TD>7.53515e-07</TD>
          </TR>
          <TR>
            <TD>474.43</TD>
            <TD>0.2584E-02</TD>
            <TD>187.94</TD>
            <TD>0.5981E-06</TD>
            <TD>4.86148e-07</TD>
            <TD>7.10052e-07</TD>
          </TR>
          <TR>
            <TD>463.28</TD>
            <TD>0.3127E-02</TD>
            <TD>191.27</TD>
            <TD>0.5656E-06</TD>
          </TR>
        </TABLEDATA>
      </DATA>
    </TABLE>
  </RESOURCE>
</VOTABLE>
```

[copy URL for next step]

VOTable can be read
[ascii files]

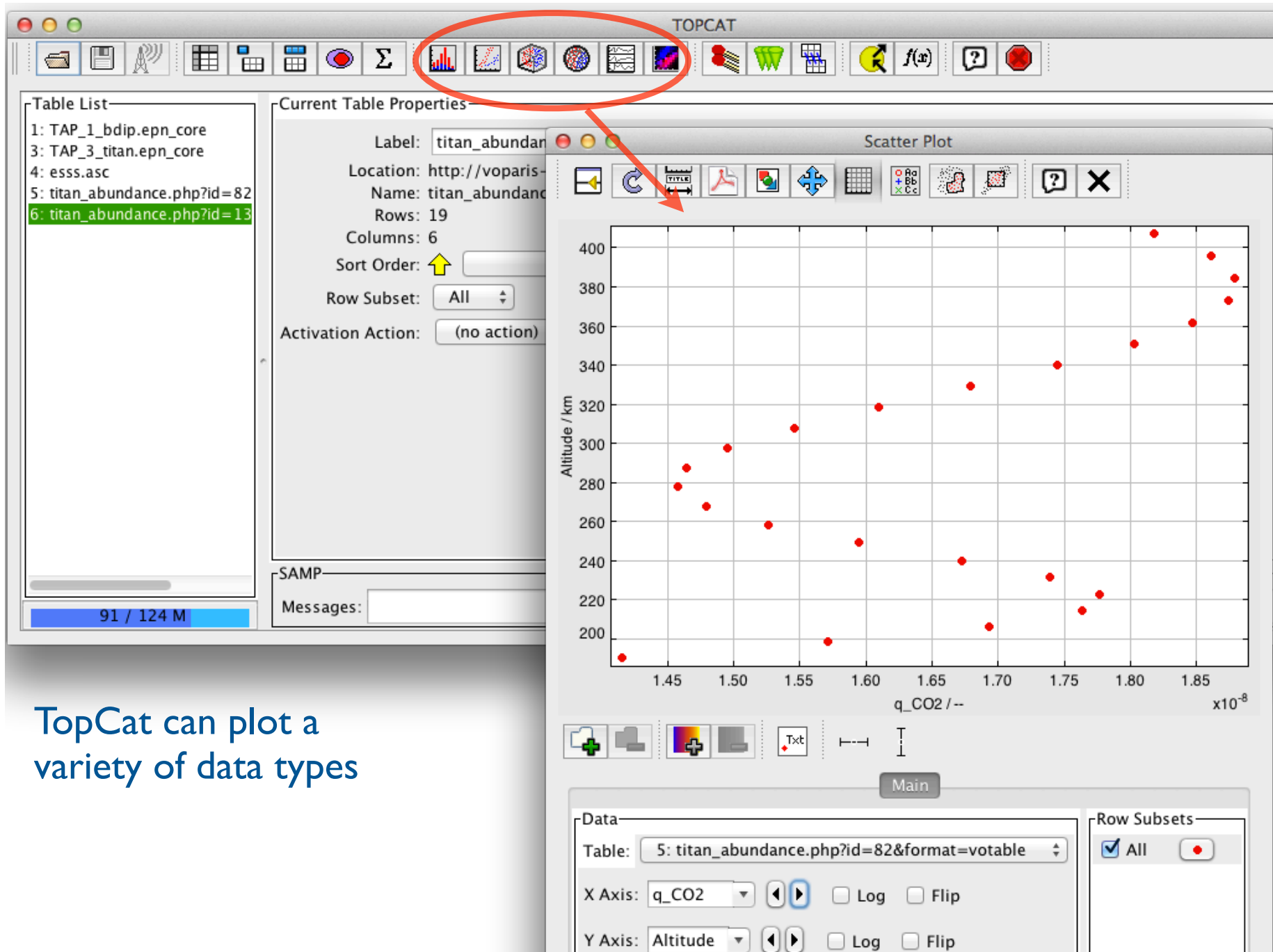


The VOTable can be
open in TopCat
[paste URL in Open dialog]

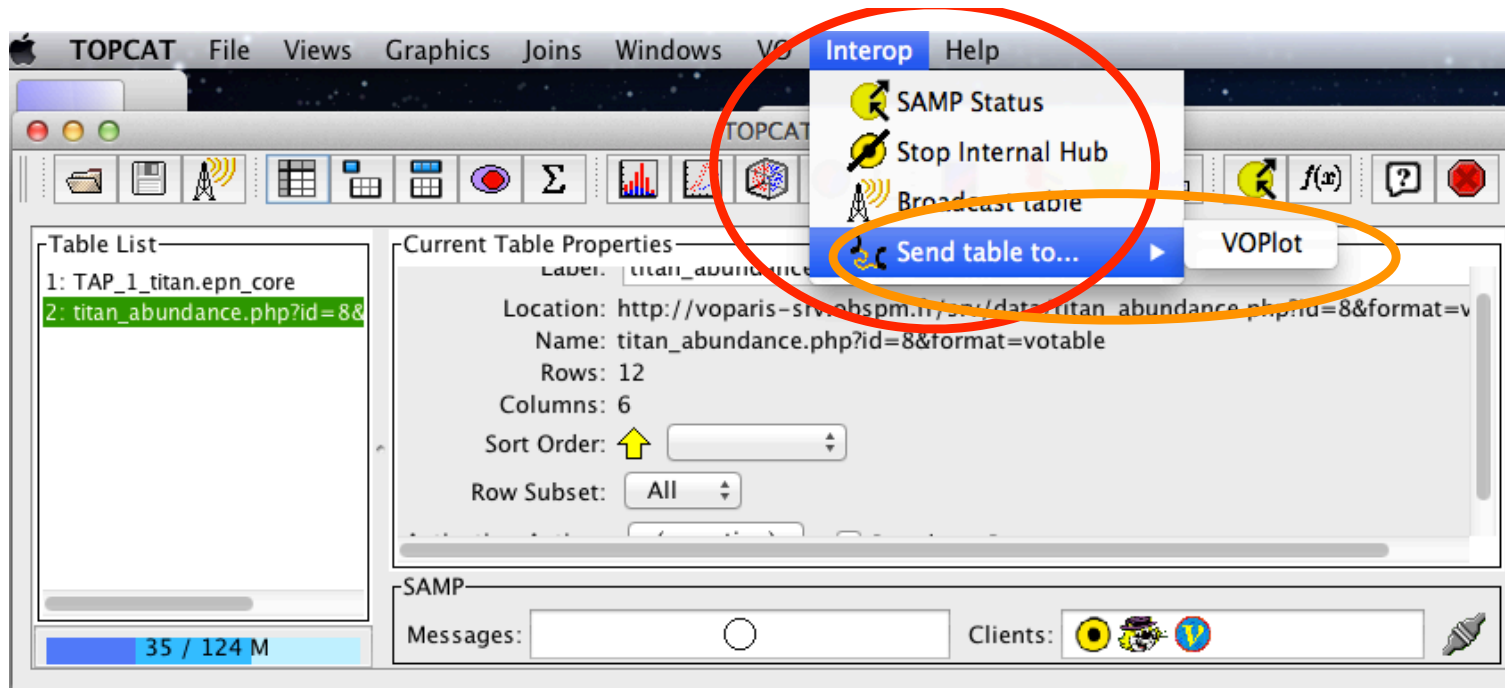
The image shows the TOPCAT software interface. On the left, a 'Table List' pane contains several entries, with '6: titan_abundance.php?id=13' highlighted in green. A red circle highlights a table icon in the toolbar, with a red arrow pointing to a 'TOPCAT(2): Table Browser' window. This window displays a table with the following data:

	Altitude	P	T	q_HC3N	q_min	q_max
1	222,62	0,4586	178,29	7,424000E-10	4,616930E-10	1,023110E-9
2	214,92	0,5417	177,12	6,280000E-10	3,784290E-10	8,775710E-10
3	207,33	0,6397	175,35	5,172000E-10	2,979530E-10	7,364470E-10
4	199,86	0,7556	173,48	4,153000E-10	2,261550E-10	6,044450E-10
5	192,51	0,8923	171,61	3,258000E-10	1,661420E-10	4,854580E-10
6	185,27	1,054	169,79	2,505000E-10	1,184770E-10	3,825230E-10
7	178,14	1,245	168,07	1,895000E-10	8,259970E-11	2,964000E-10
8	171,13	1,47	166,32	1,416000E-10	5,638990E-11	2,268100E-10
9	164,23	1,736	164,3	1,050000E-10	3,799340E-11	1,720070E-10
10	157,45	2,051	162,12	7,764000E-11	2,537590E-11	1,299040E-10
11	150,79	2,422	160,11	5,758000E-11	1,687960E-11	9,828040E-11
12	144,59	2,835	158,	4,371000E-11	1,150320E-11	7,591680E-11

This new table contains the data themselves



TopCat can plot a variety of data types



The VOTable can be transmitted
to other VO plotting tools
[or paste URL in VOplot's Open dialog]

