



Datalink

VizieR Team

□ When retrieving info from VizieR

J/AJ/153/35/table1:

<u>Name</u>	<u>Nrv</u>	<u>Vmag</u> <u>mag</u>	<u>Kmag</u> <u>mag</u>	<u>f_</u>	<u>H-K</u> <u>mag</u>	<u>f_</u>	<u>SpT</u>	<u>Per</u> <u>d</u>	<u>M92</u>	<u>B00</u>	<u>VP</u>	<u>Simbad</u>	<u>RA</u> <u>deg</u>	<u>DE</u> <u>deg</u>
Hen 3-461	30	12.26	3.84		0.37		M7	2271.0	M92	B00	VP	Simbad	159.78625	-51.40347
SY Mus	58	10.67	4.70		0.30		M4.5	624.4	M92	B00	VP	Simbad	173.04169	-65.41988
Hen 3-828	18	14.30	7.17		0.38		M6	660.5	M92	B00	VP	Simbad	192.74207	-57.84625
AR Pav	51	11.14	7.10	c	0.28	c	M5	603.9	M92	B00	VP	Simbad	275.11617	-66.07859

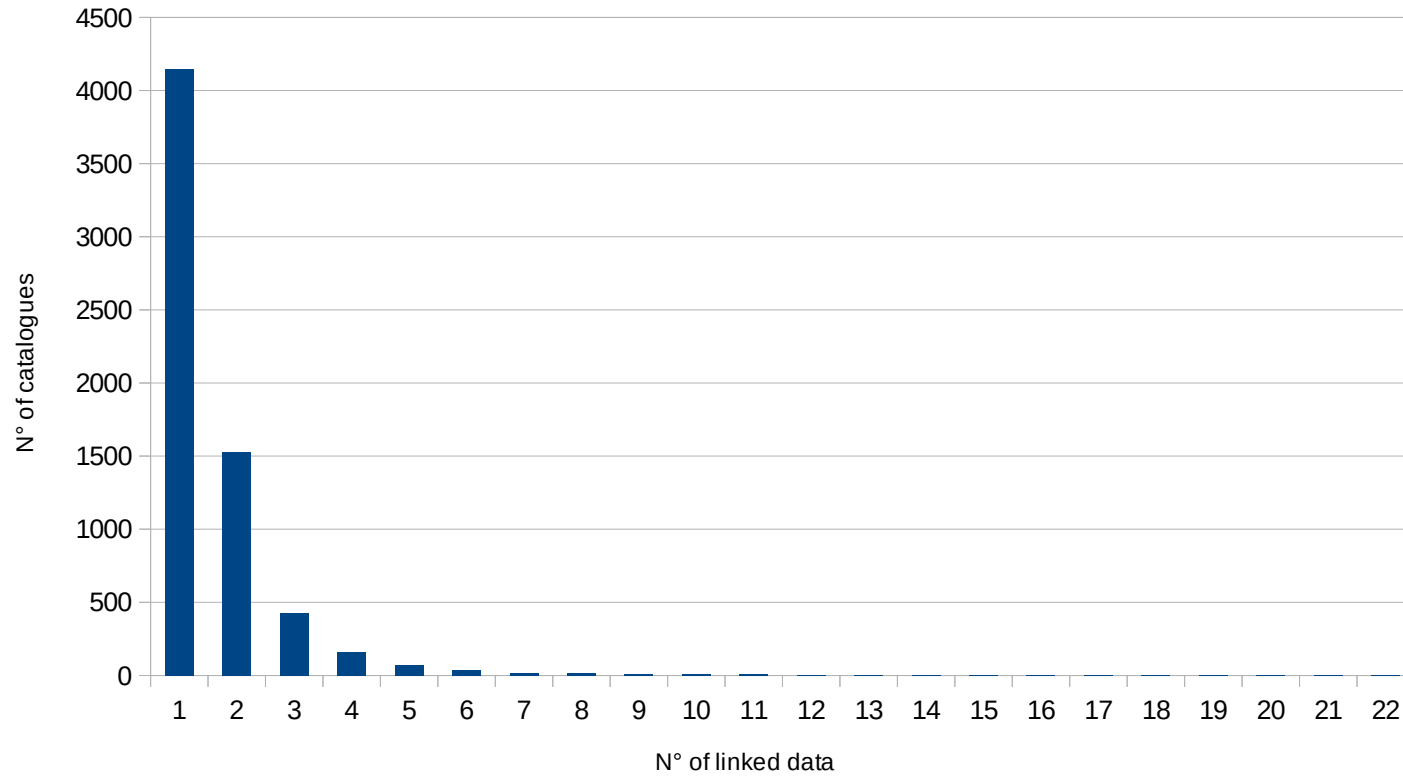
□ When retrieving info from VizieR

J/AJ/153/35/table1:

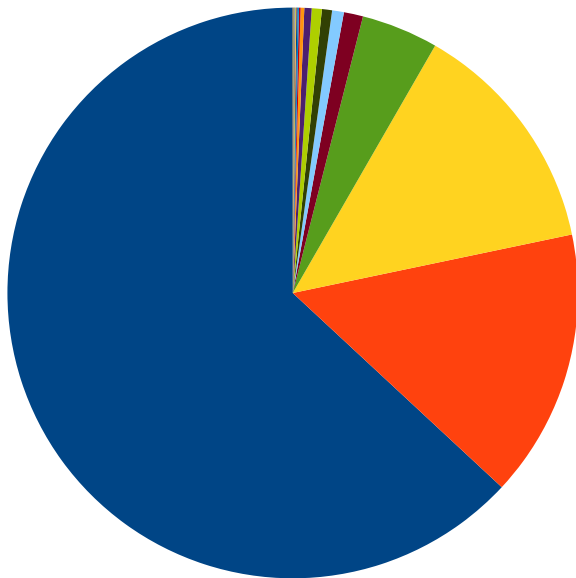
Name	Nrv	Vmag mag	Kmag mag	f_	H-K mag	f_	SpT	Per d	M92	B00	VP	Simbad	_RA deg	_DE deg
Hen 3-461	30	12.26	3.84		0.37		M7	2271.0	M92	B00	VP	Simbad	159.78625	-51.40347
SY Mus	58	10.67	4.70		0.30		M4.5	624.4	M92	B00	VP	Simbad	173.04169	-65.41988
Hen 3-828	18	14.30	7.17		0.38		M6	660.5	M92	B00	VP	Simbad	192.74207	-57.84625
AR Pav	51	11.14	7.10	c	0.28	c	M5	603.9	M92	B00	VP	Simbad	275.11617	-66.07859

Name	Nrv	Vmag mag	Kmag mag	f_Kmag	H-K mag	f_H-K	SpT	Per d	M92	B00	VP	Simbad	_RA deg	_DE deg
str9	int16	float32	float32	str1	float32	str1	str4	float32	str3	str3	str2	str6	float64	float64
Hen 3-461	30	12.26	3.84		0.37		M7	2271.0	M92	B00	VP	Simbad	159.78625	-51.40347
SY Mus	58	10.67	4.70		0.30		M4.5	624.4	M92	B00	VP	Simbad	173.04169	-65.41988
Hen 3-828	18	14.30	7.17		0.38		M6	660.5	M92	B00	VP	Simbad	192.74207	-57.84625
AR Pav	51	11.14	7.10	c	0.28	c	M5	603.9	M92	B00	VP	Simbad	275.11617	-66.07859

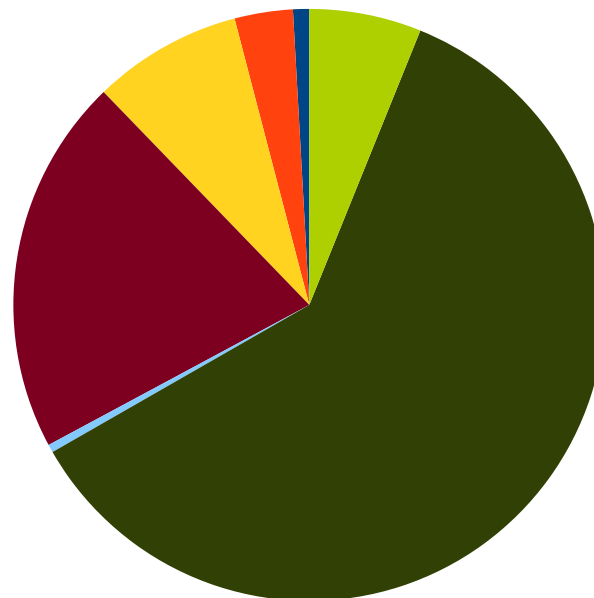
□ Not a rare issue



□ Not a rare issue



- spectrum
- timeserie
- spectrum/fits
- cube/fits
- profile
- model/evolutionary
- image/jpeg
- model/fits
- image/fits
- model
- image
- cube
- image/pdf
- profile/velocity
- image/gif
- model/evolution
- model/cluster
- profile/extinction



- assocdata
- file
- glulink
- graph
- link
- simbad
- vplot

□ A tool fitted to the issue



- What is Datalink ?
 - An IVOA tool designed to use metadata to access data ;
 - Authored by Patrick Dowler, François Bonnarel, Laurent Michel, Markus Demleitner, Mark Taylor ;
 - <https://www.ivoa.net/documents/DataLink/20231215/REC-DataLink-1.1.html>

□ What does it look like ?



```
--<VOTABLE version="1.4">
--<RESOURCE type="results">
--<TABLE>
  <FIELD name="ID" datatype="char" arraysize="*" ucd="meta.id;meta.main"/>
  <FIELD name="access_url" datatype="char" arraysize="*" ucd="meta.ref.url"/>
  <FIELD name="service_def" datatype="char" arraysize="*" ucd="meta.ref"/>
  <FIELD name="error_message" datatype="char" arraysize="*" ucd="meta.code.error"/>
  <FIELD name="semantics" datatype="char" arraysize="*" ucd="meta.code"/>
  <FIELD name="description" datatype="char" arraysize="*" ucd="meta.note"/>
  <FIELD name="content_type" datatype="char" arraysize="*" ucd="meta.code.mime"/>
  <FIELD name="content_qualifier" datatype="char" arraysize="*" ucd="meta.code.mime"/>
--<DATA>
--<TABLEDATA>
--<TR>
  <TD>ivo://CDS.VizieR/J/AJ/153/35?table1__recno=1</TD>
--<TD>
  http://cdsarc.cds.unistra.fr/viz-bin/vizgraph?-s=J/AJ/153/35&-i=.graph_sql&Name=Hen%203-461&Per=2271.0&--output=votable
  </TD>
  <TD/>
  <TD/>
  <TD>auxiliary</TD>
  <TD>Velocity Plot (timeserie) from J/AJ/153/35</TD>
  <TD>application/x-votable+xml?content=timeserie</TD>
  <TD>timeserie</TD>
</TR>
--<TR>
  <TD>ivo://CDS.VizieR/J/AJ/153/35?table1__recno=1</TD>
--<TD>
  https://simbad.cds.unistra.fr/simbad/sim-basic?Ident=Hen%25203-461
  </TD>
  <TD/>
  <TD/>
  <TD>counterpart</TD>
  <TD>Simbad column added by the CDS () from J/AJ/153/35</TD>
  <TD>text/html</TD>
  <TD>measurement</TD>
</TR>
</TABLEDATA>
</DATA>
</TABLE>
```

□ Description Data



```
-<VOTABLE version="1.4">  
  -<RESOURCE type="results">  
    -<TABLE>  
      <FIELD name="ID" datatype="char" arraysize="*" ucd="meta.id;meta.main"/>  
      <FIELD name="access_url" datatype="char" arraysize="*" ucd="meta.ref.url"/>  
      <FIELD name="service_def" datatype="char" arraysize="*" ucd="meta.ref"/>  
      <FIELD name="error_message" datatype="char" arraysize="*" ucd="meta.code.error"/>  
      <FIELD name="semantics" datatype="char" arraysize="*" ucd="meta.code"/>  
      <FIELD name="description" datatype="char" arraysize="*" ucd="meta.note"/>  
      <FIELD name="content_type" datatype="char" arraysize="*" ucd="meta.code.mime"/>  
      <FIELD name="content_qualifier" datatype="char" arraysize="*" ucd="meta.code.mime"/>
```


□ “Actual” Data



```
<TD>ivo://CDS.VizieR/J/AJ/153/35?table1__recno=1</TD>
```

```
-<TD>
```

```
  http://cdsarc.cds.unistra.fr/viz-bin/vizgraph?-s=J/AJ/153/35&-i=.graph_sql&Name=Hen%203-461&Per=2271.0&--output=votable
```

```
</TD>
```

```
<TD/>
```

```
<TD/>
```

```
<TD>auxiliary</TD>
```

```
<TD>Velocity Plot (timeserie) from J/AJ/153/35</TD>
```

```
<TD>application/x-votable+xml?content=timeserie</TD>
```

```
<TD>timeserie</TD>
```

□ “Actual” Data



<TD>ivo://CDS.VizieR/J/AJ/153/35?table1__recno=1</TD>

-<TD>

http://cdsarc.cds.unistra.fr/viz-bin/vizgraph?-s=J/AJ/153/35&-i=.graph_sql&Name=Hen%203-461&Per=2271.0&--output=votable

</TD>

<TD>

<TD>ivo://CDS.VizieR/J/AJ/153/35?table1__recno=1</TD>

<TD>

-<TD>

<TD>

<http://cdsarc.cds.unistra.fr/viz-bin/vizgraph?-s=J/AJ/153/35&-i=>

</TD>

<TD/>

<TD/>

<TD>auxiliary</TD>

<TD>Velocity Plot (timeserie) from J/AJ/153/35</TD>

<TD>application/x-votable+xml?content=timeserie</TD>

<TD>timeserie</TD>

□ Digging down...



- Following the `access_url`, we can get the data which makes up the plot...

```
--<TABLE name="MSO" id="MSO">  
  <FIELD name="HJD-2400000 [d]" ID="HJD-2400000 [d]" datatype="float"/>  
  <FIELD name="Radial velocity [km/s]" ID="Radial_velocity [km/s]" datatype="float"/>  
--<DATA>  
--<TABLEDATA>  
  --<TR>  
    <TD>51988.096 </TD>  
    <TD> 31.6</TD>  
  </TR>  
  --<TR>  
    <TD>52043.960 </TD>  
    <TD> 32.8</TD>  
  </TR>  
  --<TR>  
    <TD>52092.919 </TD>  
    <TD> 30.8</TD>  
  </TR>  
  --<TR>  
    <TD>52133.887 </TD>
```

□ Digging down...



- ...or access the linked simbad page

Query : Hen3-461

Basic data :

WRAY 15-619 -- Symbiotic Star

Other object types: [?](#) **Sy*** (), **MIR** (AKARI,WISEA,...), **SB*** (2004A&A,SBC9), **Em*** (Hen,WRAY), **PN** (PK), **LP?** (2022yCat), * (Gaia), **NIR** (2MASS), **IR** (IRAS)

ICRS coord. (*ep=J2000*) : **10 39 08.6786794704 -51 24 12.651866460** (Optical) [0.0412 0.0396 90] **A 2020yCat.1350....0G**

FK5 coord. (*ep=J2000 eq=2000*) : 10 39 08.6815032465 -51 24 12.667281930 [0.0412 0.0396 90]

FK4 coord. (*ep=B1950 eq=1950*) : 10 37 04.1432900507 -51 08 33.657188917 [0.0412 0.0396 90]

Gal coord. (*ep=J2000*) : 282.9046289183628 +06.2499921378949 [0.0412 0.0396 90]

Proper motions *mas/yr* : **-11.193 3.065 [0.059 0.052 90]** **A 2020yCat.1350....0G**

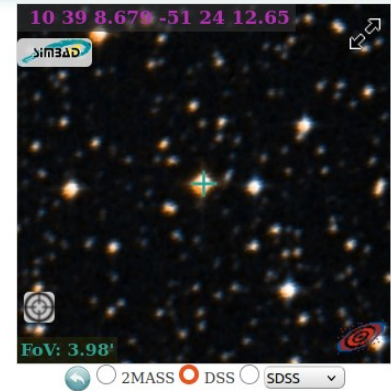
Radial velocity / Redshift / cz : **V(km/s) 43.29 [1.04] / z(spectroscopic) 0.000144 [0.000003] / cz 43.29 [1.04]**
(Opt) **B 2022yCat.1355....0G**

Parallaxes (*mas*): **0.6782 [0.0494]** **A 2020yCat.1350....0G**

Spectral type: **M7 D 1993yCat.3170....0M**

Fluxes (5) : **V 12.26 [-] D 1992A&AS...93..383M**
G 9.608948 [0.005816] C 2020yCat.1350....0G
J 5.235 [0.024] C 2003yCat.2246....0C
H 4.191 [0.232] D 2003yCat.2246....0C
K 3.864 [0.274] D 2003yCat.2246....0C

SIMBAD within



All (CDSPortal)

Send to



Photometry within [?](#)

□ Annexes : jupyter-notebook



Some tools we'll need:

```
: import pyvo as vo

from astropy.io.votable import parse

from pyvo.dal import DALResults, SCSResults

import matplotlib.pyplot as plt

import astropy.io.fits as fits
```

Making the catalogue URL

```
: VIZIER_ASU_URL = "http://cdsarc.cds.unistra.fr/viz-bin/votable?-out.add=_L&-source="
# -out.add=_L for datalink access
source = 'J/ApJS/240/16/dr1lcs'
max = 4

url = f"{VIZIER_ASU_URL}{source}&-out.max={max}"
```

□ Annexes : jupyter-notebook



▾ Getting the data ¶

```
|: asu = parse(url)

resultset = SCSResults(asu)

dls = []
for rec in resultset:
    dls.append(rec.getdatalink())
    dls[-1].table.pprint_all()
```

□ Annexes : jupyter-notebook



Getting the data

```
16]: asu = parse(url)

resultset = SCSResults(asu)

dls = []
for rec in resultset:
    dls.append(rec.getdatalink())
```

```
17]: d = dls[0].to_table()
d.keys()
```

```
17]: ['ID',
      'access_url',
      'service_def',
      'error_message',
      'semantics',
      'description',
      'content_type']
```

□ Annexes : jupyter-notebook



```
d.values()
```

```
odict_values([<MaskedColumn name='ID' dtype='object' length=2>
ivo://CDS.VizieR/J/ApJS/240/16?dr11cs__recno=1
ivo://CDS.VizieR/J/ApJS/240/16?dr11cs__recno=1, <MaskedColumn name='access_url' dtype='object' length=2>
https://cdsarc.cds.unistra.fr/viz-bin/nph-Cat?-plus=-+\&J/ApJS/240/16/lightcurves/detrended/Tess0
04/AST3II_Tess004_07.68_094.7145-73.3608_001866.dat
http://cdsarc.cds.unistra.fr/viz-bin/vizgraph?-s=J/ApJS/240/16&-i=.graph_sql&ID=FileName$_3&file=lightcurves/detrended/Tess004/AST3II_Tess004
_07.68_094.7145-73.3608_001866.dat&--output=votable, <MaskedColumn name='service_def' dtype='object' length=2>

, <MaskedColumn name='error_message' dtype='object' length=2>

, <MaskedColumn name='semantics' dtype='object' length=2>
auxiliary
auxiliary, <MaskedColumn name='description' dtype='object' length=2>
File name in subdirectories lightcurves/detrended/Field (timeserie) from J/ApJS/240/16
Interactive light curve plot for this source (timeserie) from J/ApJS/240/16, <MaskedColumn name='content_type' dtype='object' leng
th=2>
text
application/x-votable+xml?content=timeserie])
```


□ Annexes : jupyter-notebook



```
: t = parse(dls[0]["access_url"][1])  
tab = t.resources[0].tables[0]  
tab.to_table()
```

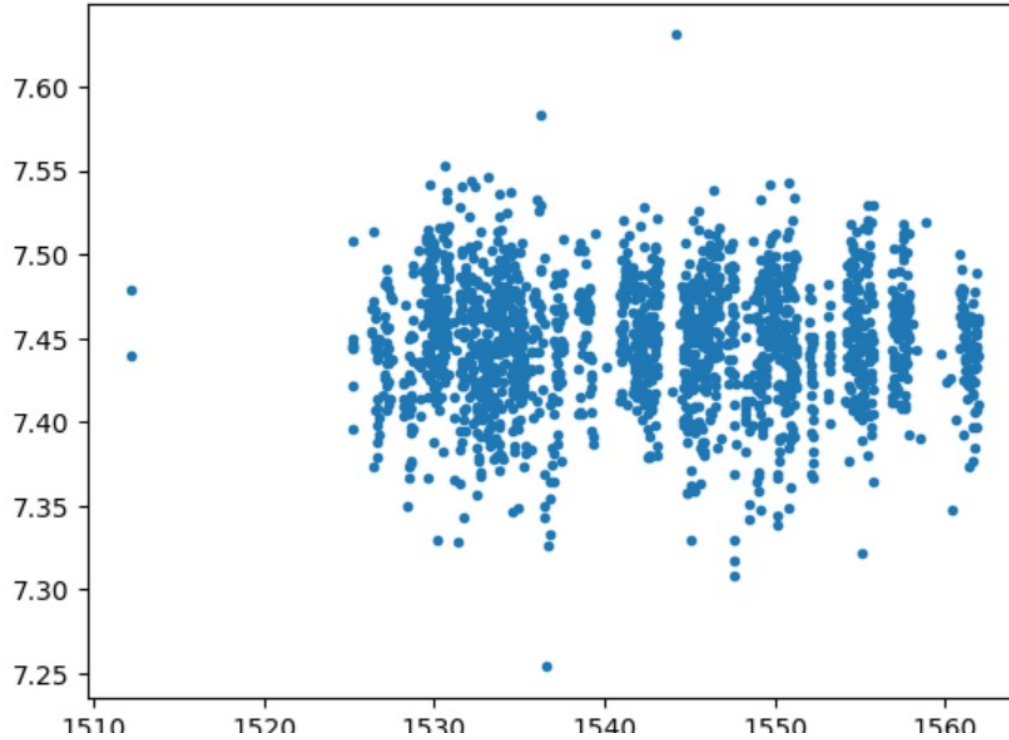
: *Table length=1863*

JD-2456000_[d]	i-band_detrended_magnitude_[mag]	ERROR
float32	float32	float32
1512.1908	7.43964	0.0008
1512.2034	7.47945	0.0008
1525.1797	7.39552	0.0003

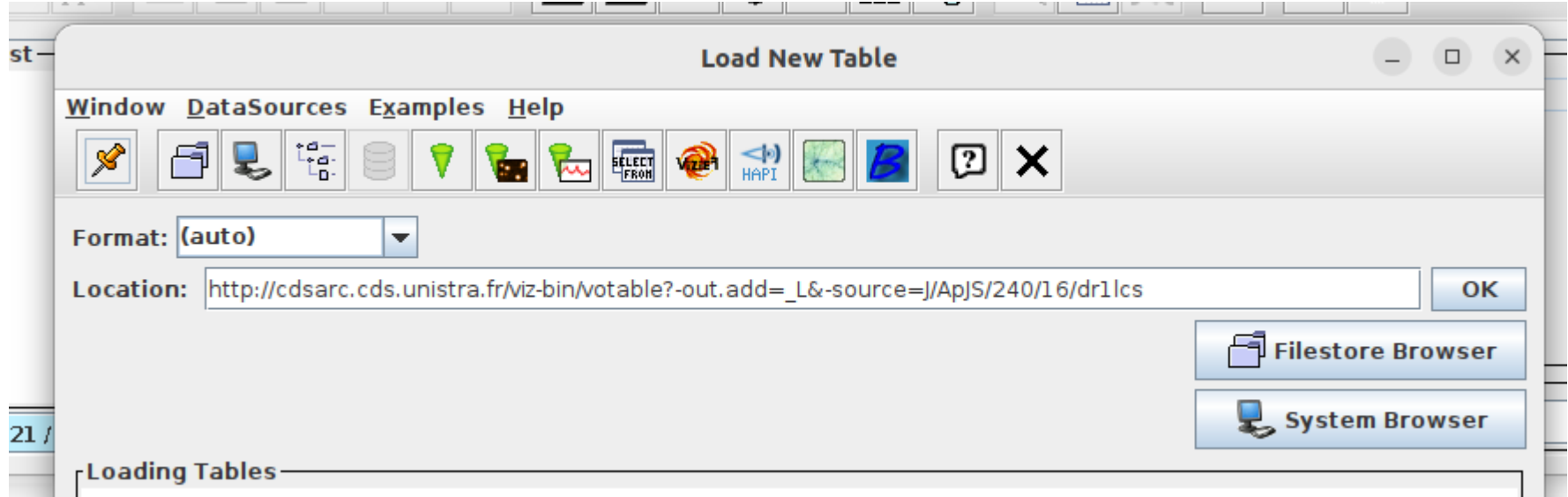
□ Annexes : jupyter-notebook



```
: c1 = tab.to_table().columns[0].name  
: c2 = tab.to_table().columns[1].name  
  
: plt.plot(tab.to_table()[c1], tab.to_table()[c2], linestyle='None', marker='.')  
  
: [<matplotlib.lines.Line2D at 0x7f19c02db5b0>]
```



□ Annexes : topcat



□ Annexes : topcat



ews Graphics Jobs Windows VO Interop Help

TOPCAT(3): Table Browser

Window Rows Help






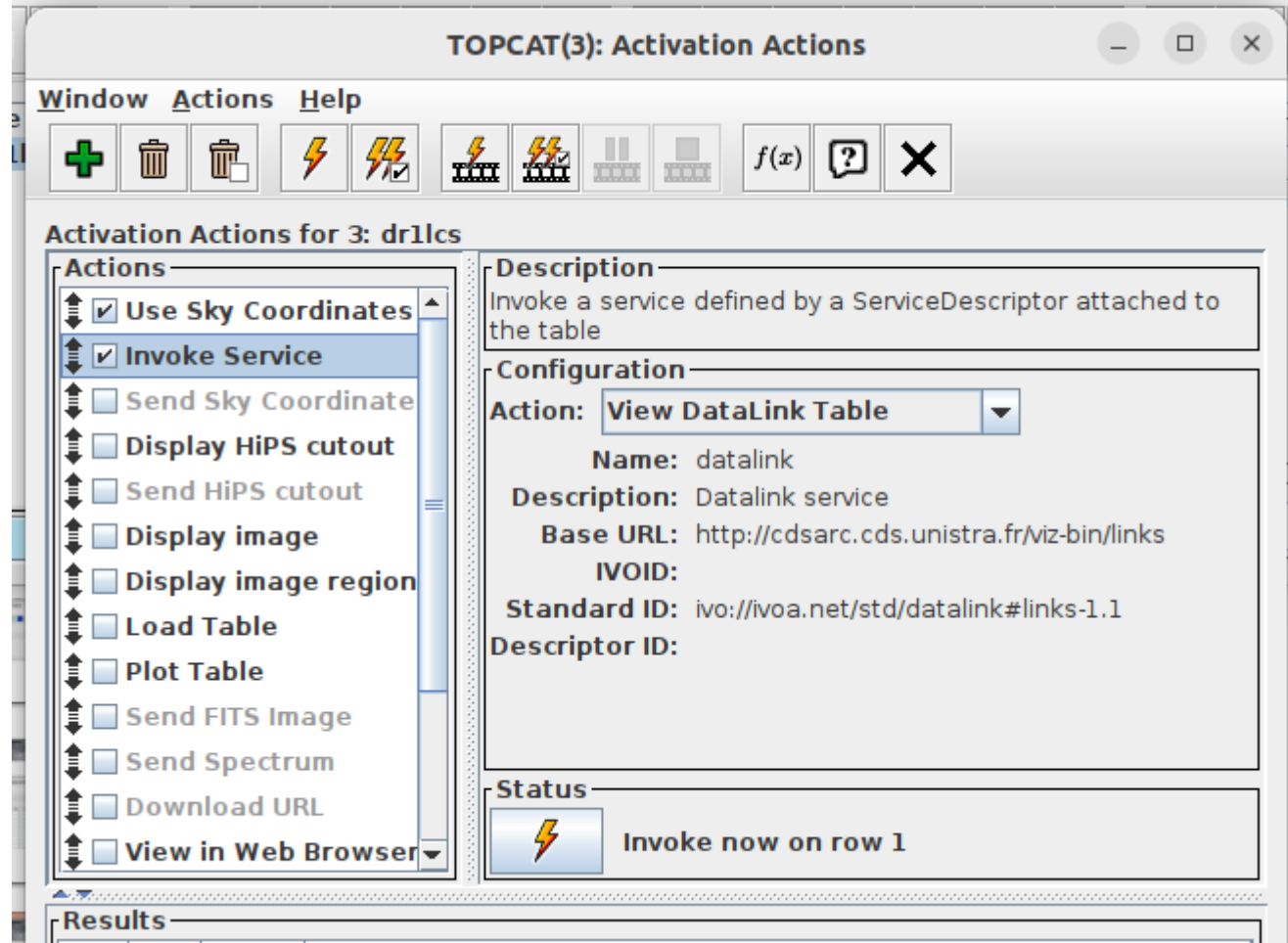
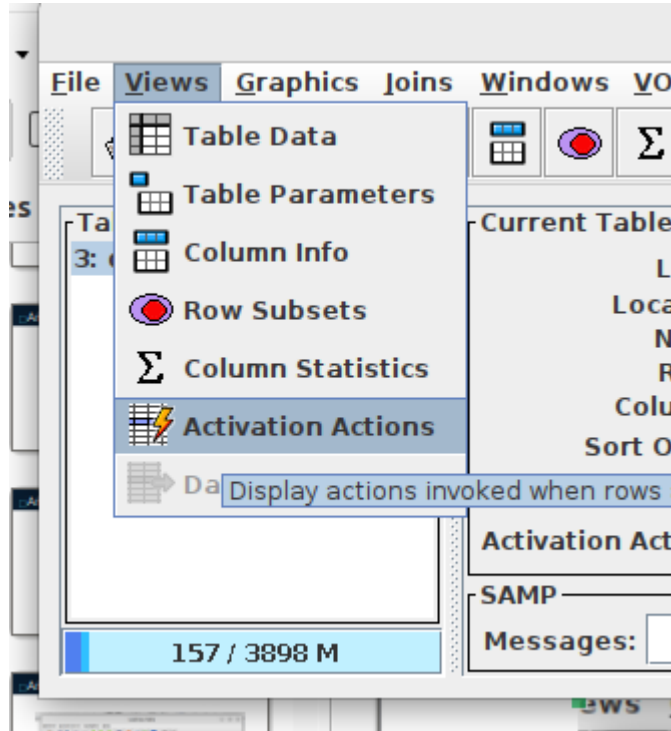
    

Table Browser for 3: dr1lcs

	_ivoid	Field	Var	imag	RAJ2000	DEJ2000	
1	ivo://CDS.VizieR//ApJS/240/16?dr1lcs_recno=1	Tess004	0	7,68	94,7145	-73,3608	Tess004_07.68_094
2	ivo://CDS.VizieR//ApJS/240/16?dr1lcs_recno=2	Tess004	0	7,81	93,6747	-73,6265	Tess004_07.81_093
3	ivo://CDS.VizieR//ApJS/240/16?dr1lcs_recno=3	Tess004	0	8,02	95,	-72,7517	Tess004_08.02_095
4	ivo://CDS.VizieR//ApJS/240/16?dr1lcs_recno=4	Tess004	0	8,12	91,4863	-72,6481	Tess004_08.12_091
5	ivo://CDS.VizieR//ApJS/240/16?dr1lcs_recno=5	Tess004	0	8,18	92,2981	-73,5978	Tess004_08.18_092
6	ivo://CDS.VizieR//ApJS/240/16?dr1lcs_recno=6	Tess004	0	8,21	92,6774	-73,013	Tess004_08.21_092
7	ivo://CDS.VizieR//ApJS/240/16?dr1lcs_recno=7	Tess004	0	8,27	93,976	-73,2164	Tess004_08.27_093
8	ivo://CDS.VizieR//ApJS/240/16?dr1lcs_recno=8	Tess004	0	8,42	93,8005	-73,4527	Tess004_08.42_093
9	ivo://CDS.VizieR//ApJS/240/16?dr1lcs_recno=9	Tess004	0	8,44	94,9015	-73,0871	Tess004_08.44_094
10	ivo://CDS.VizieR//ApJS/240/16?dr1lcs_recno=...	Tess004	0	8,51	93,7407	-72,4968	Tess004_08.51_093

Annexes : topcat



Annexes : topcat



TOPCAT(3): Invoke Service - View Datalink Table

s	description	content_type	ID	
1	File name in subdirectories lig...	text	ivo://CDS.VizieR/JApJS/240/16?d...	https://cdsa
2	Interactive light curve plot for t...	application/x-votable+xml?cont...	ivo://CDS.VizieR/JApJS/240/16?d...	http://cdsar

Row Link Type
Fixed Access URL

Row Detail

Access URL: [http://cdsarc.cds.unistra.fr/viz-bin/vizgraph?-s=JApJS/240/16&-i=.graph_sql&ID=FileName\\$_3&file=lightcurves/c](http://cdsarc.cds.unistra.fr/viz-bin/vizgraph?-s=JApJS/240/16&-i=.graph_sql&ID=FileName$_3&file=lightcurves/c)

Content Type: application/x-votable+xml?content=timeserie

Content Length:

Description: Interactive light curve plot for this source (timeserie) from JApJS/240/16

Semantics: auxiliary

URL: [http://cdsarc.cds.unistra.fr/viz-bin/vizgraph?-s=JApJS/240/16&-i=.graph_sql&ID=FileName\\$_3&file=lightcurves/c](http://cdsarc.cds.unistra.fr/viz-bin/vizgraph?-s=JApJS/240/16&-i=.graph_sql&ID=FileName$_3&file=lightcurves/c)

Type: TABLE Guess Action: Load Table Auto-Invoke

Result:

□ Annexes : topcat



TOPCAT

File Views Graphics Joins Windows VO Interop Help

Table List

- 3: dr1lcs
- 4: AST3II_Tess004_07.68_0

Current Table Properties

Label: AST3II_Tess004_07.68_094.7145-73.3608_001866.dat...

Location: [http://cdsarc.cds.unistra.fr/viz-bin/vizgraph?-s=J/ApJS/240/16&-i=.graph_sql&ID=FileName\\$_3&file=lightcurves/detrended/Tes](http://cdsarc.cds.unistra.fr/viz-bin/vizgraph?-s=J/ApJS/240/16&-i=.graph_sql&ID=FileName$_3&file=lightcurves/detrended/Tes)

Name: Sloan_i

Rows: 1 863

Columns: 3

Sort Order: +

Row Subset: All

SAMP

Messages: Clients:

78 / 3898 M

TOPCAT (5): Invoke Service - View Datalink Table

Annexes : topcat



Views Graphics Joins Windows VO Interop Help

TOPCAT(4): Table Browser

Window Rows Help

Table Browser for 4: AST3II_Tess004_07.68_094.7145-73.3608_001866.dat...

	JD-2456000 [d]	i-band detrended magnitude [mag]	ERROR
1	1512.19	7.43964	0.0008
2	1512.2	7.47945	0.0008
3	1525.18	7.39552	0.0003
4	1525.19	7.44629	0.0003
5	1525.2	7.44458	0.0003
6	1525.21	7.42131	0.0003
7	1525.22	7.44528	0.0003
8	1525.23	7.50811	0.0003
9	1525.25	7.4436	0.0003
10	1525.26	7.44934	0.0003
11	1526.29	7.46742	0.0004
12	1526.31	7.4547	0.0004
13	1526.32	7.45321	0.0004
14	1526.43	7.51334	0.0004
15	1526.45	7.47241	0.0004
16	1526.47	7.37297	0.0002
17	1526.5	7.46609	0.0004
18	1526.51	7.46184	0.0004
19	1526.52	7.40668	0.0004
20	1526.54	7.44363	0.0004
21	1526.55	7.44365	0.0004
22	1526.56	7.44913	0.0004
23	1526.57	7.44272	0.0004
24	1526.59	7.4384	0.0004
25	1526.6	7.44733	0.0004
26	1526.61	7.40782	0.0004
27	1526.62	7.43723	0.0004
28	1526.63	7.38756	0.0004
29	1526.65	7.39792	0.0004
30	1526.66	7.4134	0.0004
31	1526.67	7.44596	0.0004
32	1526.69	7.37862	0.0004
33	1526.7	7.40269	0.0004
34	1526.72	7.39258	0.0004
35	1526.74	7.4475	0.0004

Total: 1 863 Visible: 1 863 Selected: 0

