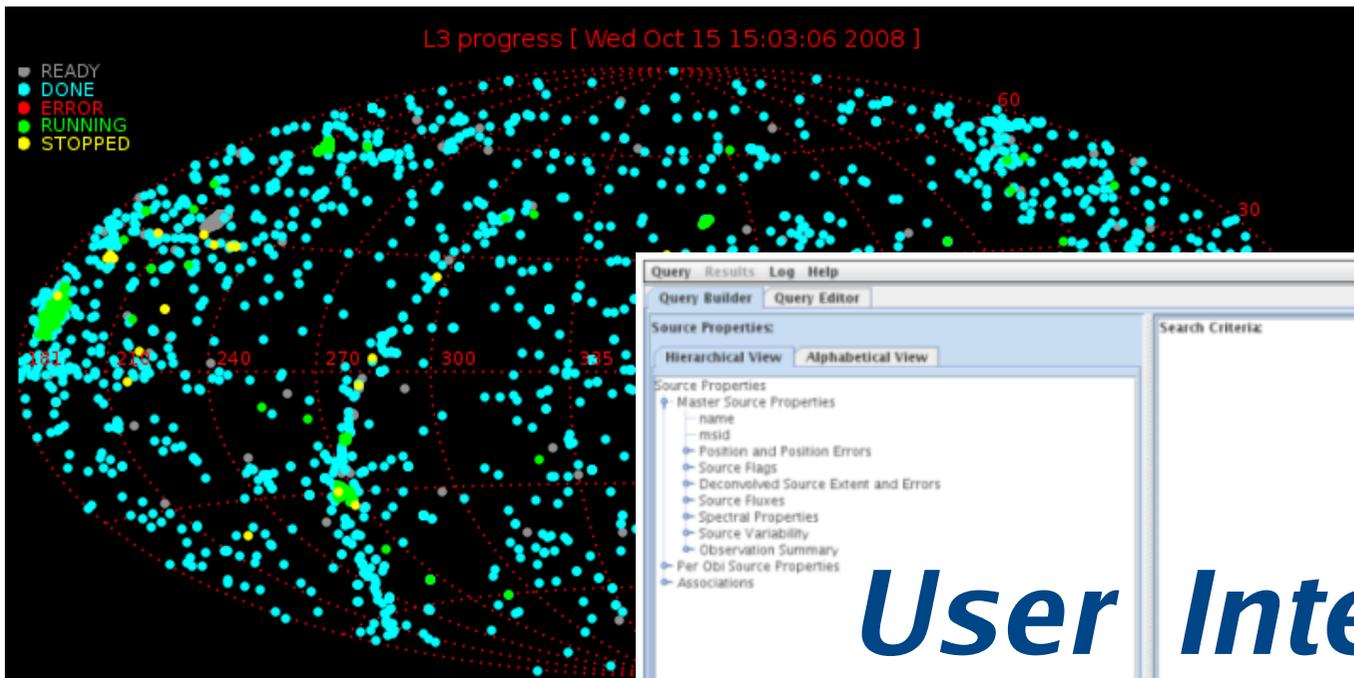




The Chandra Source Catalog



User Interface

Nina Bonaventura
Science Data Systems



The Chandra Source Catalog: *User Interface*

<http://cxc.harvard.edu/csc/columns/>

The Chandra Source Catalog (CSC) is presented to the user in two table views: the

Master Chandra Source Table and the Table of Individual Source Observations

Master Chandra Source Table

Each identified distinct X-ray source on the sky is represented in the catalog by a single "master source" entry and one or more "individual source" entries, one for each observation in which the source has been detected. The master source entry records the best estimates of the properties of a source, based on the data extracted from the set of observations in which the source has been detected.

Go to: [Catalog Columns Index](#) | [Alphabetical List](#)

Context	Column Name	Type	Units	Description
Source Name	name	string		source name in the form "CXO Jhhmmss.s+ddmms" [Chandra source names use the ICRS position to an accuracy of 0.1s in RA and 1.0s in Dec.]
Position and Position Errors	ra	double	deg	Source position, ICRS right ascension
	dec	double	deg	Source position, ICRS declination
	err_ellipse_r0	double	arcseconds	major radius of the 1σ error ellipse of the source position
	err_ellipse_r1	double	arcseconds	minor radius of the 1σ error ellipse of the source position
	err_ellipse_ang	double	deg	position angle of the major axis of the 1σ error ellipse
	gal_b	double	deg	Source position, galactic longitude
	gal_l	double	deg	Source position, galactic latitude

Master source properties represent the best estimates of the properties of a source, based on data derived from all observations in which a source has been detected.

Table of Individual Source Observations

Each identified distinct X-ray source on the sky is represented in the catalog by one or more "individual source" entries, one for each observation in which the source has been detected, and a single "master source" entry. The individual source entries record all of the properties about a detection extracted from a *single* observation, as well as associated file-based [data products](#), which are observation-specific.

Go to: [Catalog Columns Index](#) | [Alphabetical List](#)

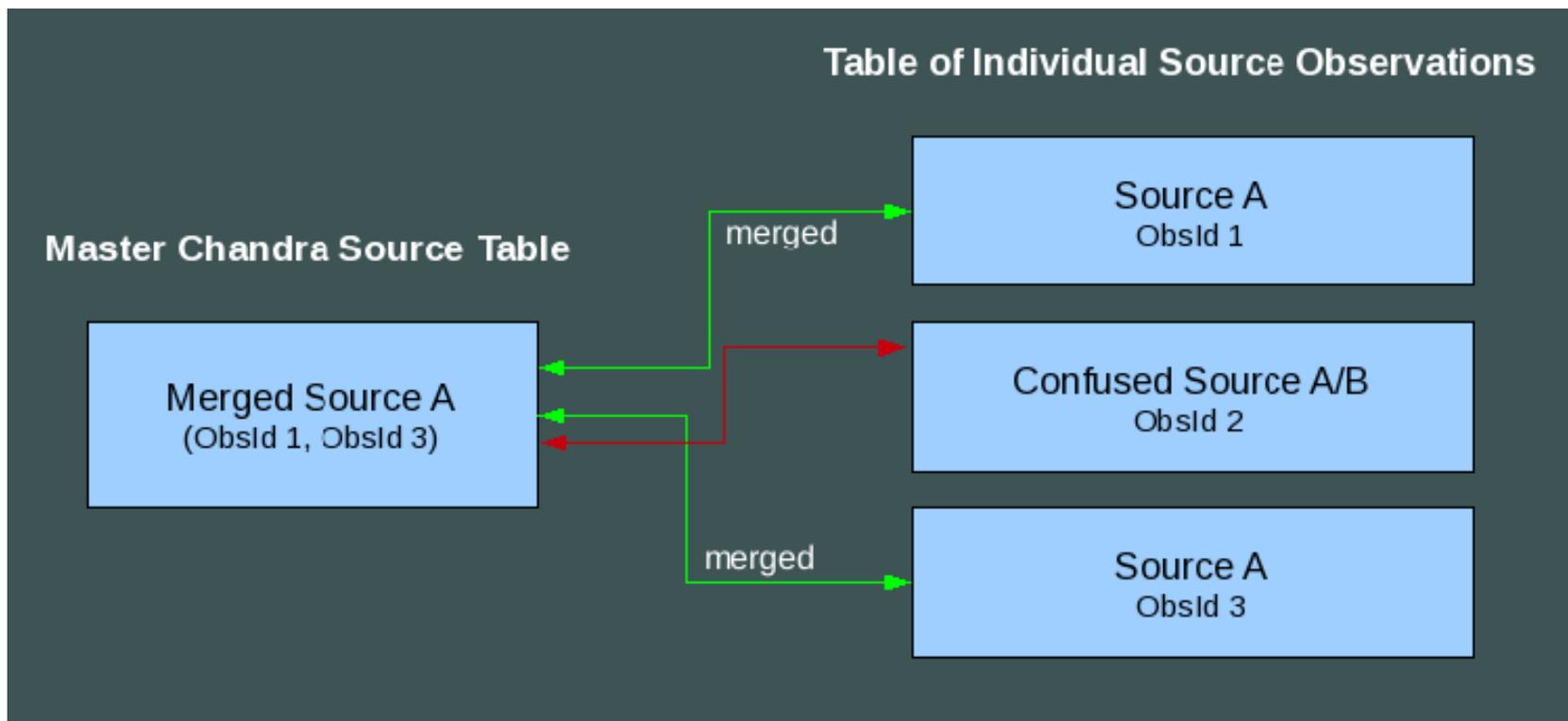
Context	Column Name	Type	Units	Description
Observation Identification	obsid	integer		Observation Id (ObsID)
	obi	integer		Observation Interval (ObI)
Pointing Information	targname	string		target name for the observation
	ra_targ	double	deg	ICRS right ascension of the target
	dec_targ	double	deg	ICRS declination of the target
	ra_pnt	double	deg	ICRS right ascension of the mean pointing
	dec_pnt	double	deg	ICRS declination of the mean pointing
	roll_pnt	double	deg	roll angle of the mean pointing
	ra_nom	double	deg	ICRS right ascension of the tangent point
	dec_nom	double	deg	ICRS declination of the tangent point
	roll_nom	double	deg	roll angle of the tangent point

In the Table of Individual Source Observations, source properties are recorded on a per-observation basis; i.e., it contains multiple entries for a source, one for each individual observation in which it has been detected.



The Chandra Source Catalog: *User Interface*

Individual source observations are linked to a corresponding single, merged master source. However, the properties of **confused and/or piled-up** individual sources do not contribute to the reported **master source properties**.



For more on the organization of the catalog, see:
<http://cxc.harvard.edu/csc/organization.html>



The Chandra Source Catalog: *User Interface*

The CSC contains source positions and multi-band fluxes, as well as derived spatial, spectral, and temporal source properties.

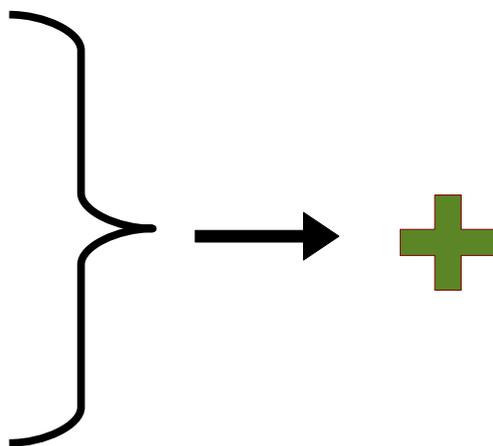
Source properties are presented in the following categories:

Master Source Properties

- Position and Position Errors
- Source Flags
- Source Extent and Errors
- Source Fluxes
- Source Significance
- Spectral Properties
- Source Variability

Individual (“Per Obi”) Source Properties

- Observation Identification
- Pointing Information
- Timing Information (Obi and Source)
- Instrument Information (Obi and Source)
- Processing Information
- Observing Cycle
- Source Identification



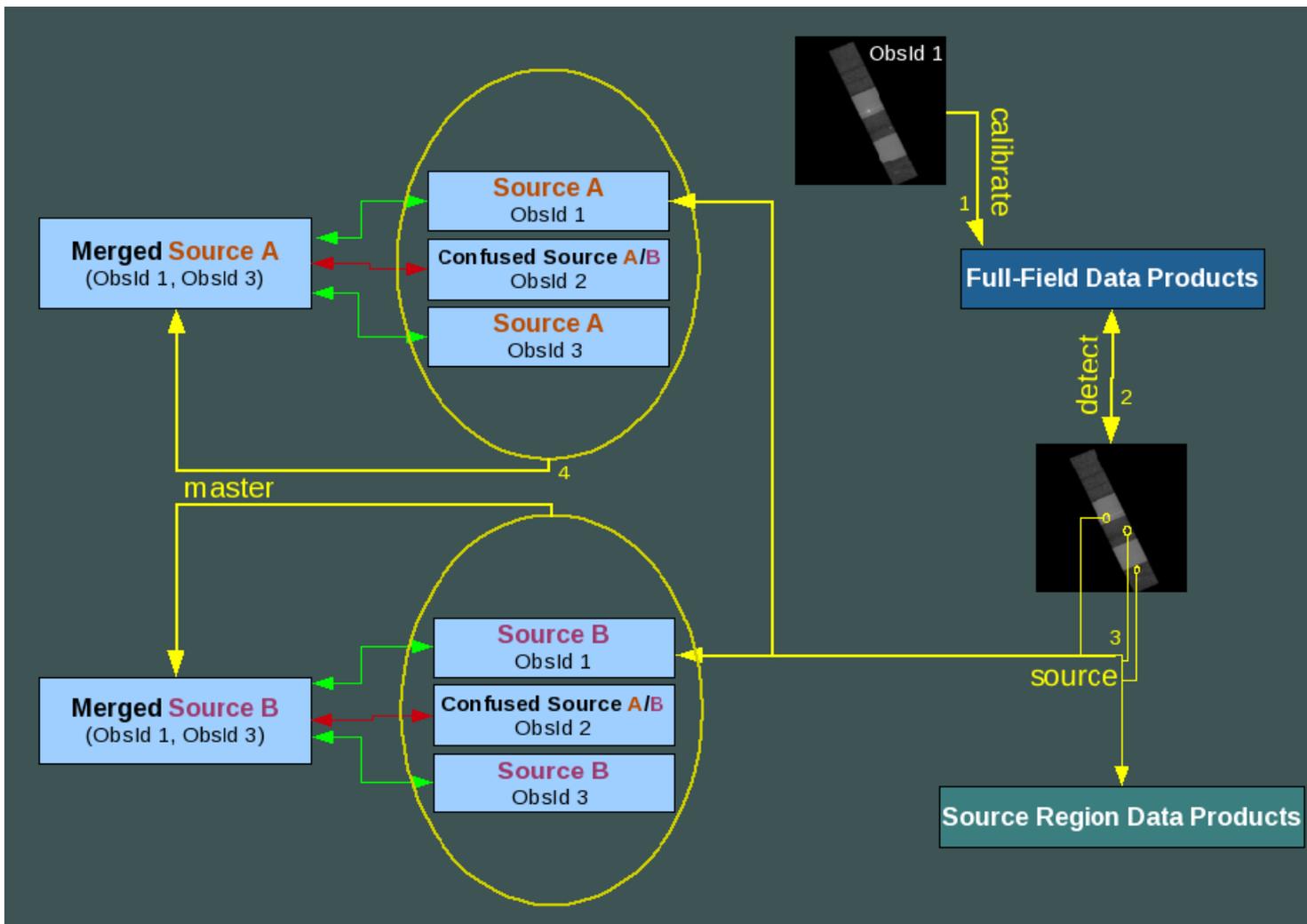
The CSC Column Descriptions pages describe how each source property is determined.

<http://cxc.harvard.edu/csc/columns/index.html#coldesc>



The Chandra Source Catalog: *User Interface*

The bird's-eye view of the CSC, with master source properties, individual source properties, and file-based data products connected by the catalog processing steps.



Catalog Processing Pipelines:

1. Calibrate
2. Detect
3. Source
4. Master

<http://cxc.harvard.edu/csc/proc/>



The Chandra Source Catalog: *User Interface*

CSC Homepage: <http://cxc.harvard.edu/csc>



[CSC Data Access \(CSCview\)](#)

[CSCview Software Requirements](#)

[CSCview Help](#)

[Catalog Processing Status](#)

[CSC Homepage](#)

About the Catalog

- [Catalog Organization](#)
- [Catalog Release Views and Database Access Views](#)
- [Schedule and Status](#)
- [Caveats and Limitations](#)

Creating the Catalog

- [Observation Selection](#)
- [Catalog Processing](#)
- [Data Products](#)
- [Chandra Data Archive](#)

Catalog Columns

Master Chandra Source Table:

- [alphabetical](#) | [by context](#)

Table of Individual Source Observations:

- [alphabetical](#) | [by context](#)

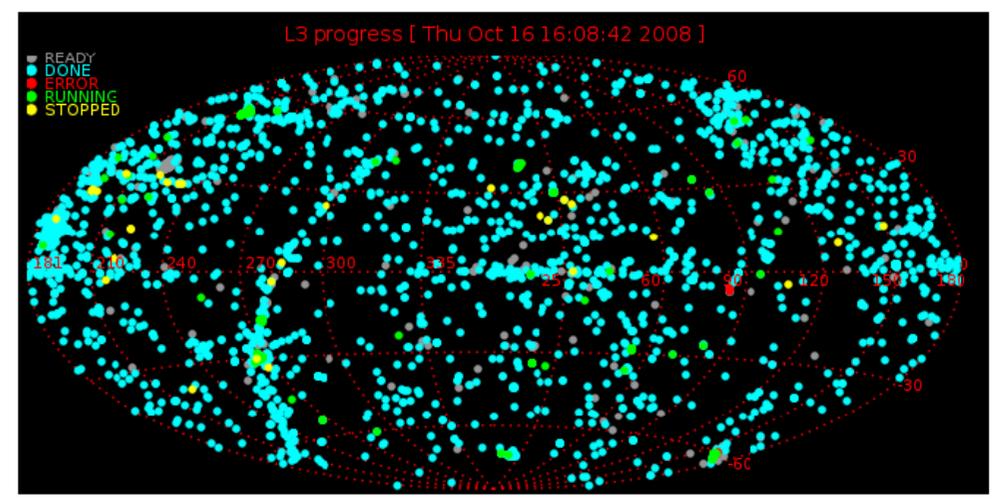
Column Descriptions

- [Position and Position Errors](#)
- [Source Flags](#)
- [Source Extent and Errors](#)
- [Energy Bands](#)
- [Source Fluxes](#)
- [Source Significance](#)
- [Spectral Properties](#)
- [Source Variability](#)

Documents

- [Dictionary](#)
- [How and Why Topics](#)
- [Memos](#)
- [Publications](#)

The Chandra Source Catalog



The Chandra Source Catalog (CSC) is the definitive catalog of all X-ray sources detected by the Chandra X-Ray Observatory. The CSC contains positions and multi-band count rates for the sources, as well as derived spatial, spectral and temporal calibrated source properties that may be compared with data obtained by other telescopes. The CSC also includes associated [data products](#) for each source, including images, photon event lists, light curves, and spectra.

The first release of the CSC (January 2009) will include information about sources detected in public ACIS imaging observations from roughly the first eight years of the Chandra mission. Only point sources, and compact sources with extents < ~30 arcsec, will be included. Highly extended sources, and sources located in selected fields containing bright, highly extended sources, will be excluded.

Each distinct source on the sky (i.e., object at a specific RA and Dec) is recorded in a single "[master source](#)" table entry and one or more "[individual source](#)" table entries. The individual source entries contain the properties of a single detection from a single observation. The master source entry is the best estimate of all the properties of a source, based on the data extracted from the individual source entries. The [Catalog Organization page](#) contains further details.

The [Schedule and Status page](#) has the current processing status and release schedule.

Users are urged to review the catalog [Caveats and Limitations](#) prior to using the CSC for their scientific investigations. Questions about the CSC may be submitted to the [CXC Helpdesk](#).

Request for Acknowledgment of Use of the Chandra Source Catalog

Users are kindly requested to acknowledge in the acknowledgment section of any resulting publications their use of the Chandra Source Catalog.

This will help us greatly to keep track of catalog usage, information that is essential for providing full accountability of our work and services, as well as for planning future services.



The Chandra Source Catalog: *User Interface*

L3 progress [Wed Oct 15 15:03:06 2008]

- READY
- DONE
- ERROR
- RUNNING
- STOPPED

The screenshot shows the CSCview GUI with a sidebar on the left containing a tree view of source properties: Master Source Properties, name, msid, Position and Position Errors, Source Flags, Decomolved Source Extent and Errors, Source Fluxes, Spectral Properties, Source Variability, Observation Summary, Per Obs Source Properties, and Associations. The main window has a 'Search Criteria' section with an 'Add cone search' dropdown, a 'Result Set' table, and buttons for 'Remove Column', 'Remove All Columns', 'Move Column Up', and 'Move Column Down'. Below the table are 'Sort By' options (Default order, ascending, descending) and a 'Max Rows Displayed' dropdown set to 50. At the bottom, there are 'Add to Search Criteria', 'Add to Result Set', 'Save results to file', and 'Submit Query' buttons. The footer includes the Chandra X-ray Center logo, a welcome message, and the Chandra Source Catalog logo.

CSCview

CSC Data Access GUI

CSCview provides direct access to the contents of the catalog via user-specified queries.



The Chandra Source Catalog: *User Interface*

The screenshot shows the Chandra Source Catalog user interface. Key elements include:

- Source Properties:** A tree view on the left containing categories like Master Source Properties, Position and Position Errors, Source Flags, etc.
- Search Criteria:** A large text area for defining search conditions.
- Add cone search:** A button to define a cone search.
- Result Set:** A table area for displaying search results.
- Sort By:** A dropdown menu set to 'Default order' with radio buttons for 'ascending' and 'descending'.
- Max Rows Displayed:** A dropdown menu set to '50'.
- Submit Query:** A button to execute the search.
- Save results to file:** A checkbox option.

Instructions overlaid on the interface:

1. Enter source property search conditions here.
- OR
- Define a cone search.
2. Enter desired results here.
3. Submit catalog query.

Additional annotations:

- Green arrows point from the 'Source Properties' tree to the 'Search Criteria' field.
- Red circles highlight the 'Source Properties', 'Search Criteria', 'Add cone search', 'Result Set', and 'Submit Query' buttons.
- Text labels 'Master Source Properties' and 'Per Obi Source and Observation Properties' are placed near the tree view.



The Chandra Source Catalog: *User Interface*

Query Results Log Help

Query Builder Query Editor

Source Properties:

Hierarchical View Alphabetical View

Source Properties

- Master Source Properties
 - name
 - msid
- Position and Position Errors
- Source Flags
- Deconvolved Source Extent and Errors
- Source Fluxes
- Spectral Properties
- Source Variability
- Observation Summary
- Per Obsi Source Properties
 - posid
 - Observation
 - obsid
 - ubi
 - Pointing Information
 - targname
 - ra_targ
 - dec_targ
 - ra_pnt
 - dec_pnt
 - roll_pnt
 - ra_norr
 - dec_nom
 - roll_nom
 - Timing Information
 - Instrument Information
 - Processing Information
 - ao
 - Source
 - Associations

Add to Search Criteria Add to Result Set

Catalog: Current database view Save results to file Submit Query

Chandra X-ray Center

CHANDRA SOURCE CATALOG

Appllet Chandra Source Catalog started

Search Criteria:

o.targname LIKE SN 1993%

Remove All Remove

Here, we establish a search on all Chandra observations which targeted supernova SN 1993 ; **'o.targname LIKE SN 1993%'** translates to *"find all sources in observations with a target name beginning with 'SN 1993', followed by any set of characters ."*

Add cone search

Result Set:

Remove Column Remove All Columns Move Column Up Move Column Down

Sort By: Default order ascending descending

Max Rows Displayed: 50

But the query isn't yet complete...

Running query...
Query completed: 10 rows found.
Running query...
Query completed: 10 rows found.



The Chandra Source Catalog: *User Interface*

Query Results Log Help

Query Builder Query Editor

Source Properties:

Hierarchical View Alphabetical View

Source Properties

- Master Source Properties
 - name
 - msid
- Position and Position Errors
 - Equatorial Coordinates
 - ra
 - dec
 - err_ellipse_ang
 - err_ellipse_r0
 - err_ellipse_r1
 - Galactic Coordinates
- Source Flags
- Deconvolved Source Extent and Errors
- Source Fluxes
 - Aperture Source Energy Fluxes
 - ACIS broad band
 - photflux_aper_b
 - photflux_aper_hilim_b
 - photflux_aper_lolim_b
 - photflux_aper90_b
 - photflux_aper90_hilim_b
 - photflux_aper90_lolim_b
 - flux_aper_b
 - flux_aper_hilim_b
 - flux_aper_lolim_b
 - flux_aper90_b
 - flux_aper90_hilim_b
 - flux_aper90_lolim_b

Search Criteria:

o.targname LIKE SN 1993%

Remove All Remove

We complete the query by specifying which source properties we would like returned for all sources located in the database search:

Add cone search

Remove Column Remove All Columns Move Column Up Move Column Down

Result Set:

- name
- ra
- dec
- o.obsid
- o.ra_targ
- o.dec_targ
- photflux_aper_b

Sort By: Default order

ascending descending

Max Rows Displayed: 10

Catalog: Current database view

Save results to file **Submit Query**



Welcome to CSCview.

We have the options to save the query and query results to individual text files before submitting the query.



Applet CSCview started



The Chandra Source Catalog: *User Interface*

Query Results Log Help

[Back to Query](#) 10 rows loaded at 2008-10-17T18:17:24 Page 1 of 1

name	ra	dec	o.obsid	o.ra_targ	o.dec_targ	photflux_aper_b
CXO J095239.2+685631	09 52 39.20	+68 56 31.12	735	09 55 25.00	+69 01 12.00	8.426e-06
CXO J095239.6+690400	09 52 39.64	+69 04 00.80	735	09 55 25.00	+69 01 12.00	8.843e-06
CXO J095259.9+690739	09 52 59.96	+69 07 39.10	735	09 55 25.00	+69 01 12.00	9.899e-06
CXO J095304.1+690140	09 53 04.11	+69 01 40.54	735	09 55 25.00	+69 01 12.00	2.851e-06
CXO J095317.7+690643	09 53 17.71	+69 06 43.85	735	09 55 25.00	+69 01 12.00	8.028e-06
CXO J095327.4+690420	09 53 27.40	+69 04 20.45	735	09 55 25.00	+69 01 12.00	9.312e-06
CXO J095328.2+685842	09 53 28.20	+68 58 42.27	735	09 55 25.00	+69 01 12.00	2.279e-06
CXO J095332.7+690220	09 53 32.78	+69 02 20.98	735	09 55 25.00	+69 01 12.00	2.977e-06
CXO J095333.8+685821	09 53 33.88	+68 58 21.66	735	09 55 25.00	+69 01 12.00	6.102e-06
CXO J095334.2+690344	09 53 34.25	+69 03 44.58	735	09 55 25.00	+69 01 12.00	2.967e-06

After the query is submitted, the query results interface appears, displaying a table of query results in which each row represents a source, and each column a selected property characterizing the source.

Data Products

Filetypes:

regevt3	sensity	asphist
evt3	bkgimg	badpix3
regimg	psf	fov3
ecorring	expmap	ecorring.jpg
spectrum	regexpmap	psf.jpg
srcreg	arf	regimg.jpg
lightcurve	rmf	reg3img.jpg

[Browse Products](#)
[Download Products](#)
[Download Batch File](#)

We now have the option to browse and download data files associated with each source in the query results table.

Welcome to CSCview
Running query...
Query completed: 10 rows found.




Applet CSCview started



The Chandra Source Catalog: *User Interface*

Query Results Log Help

Back to Query 10 rows loaded at 2008-10-17T18:29:11 Page 1 of 1

name	ra	dec	o.obsid	o.a_targ	o.dec_targ	photflux_aper_b
CXO J095239.2+685631	09 52 39.20	+68 56 31.12	735	09 55 25.00	+69 01 12.00	8.426e-06
CXO J095239.6+690400	09 52 39.64	+69 04 00.80	735	09 55 25.00	+69 01 12.00	8.843e-06
CXO J095259.9+690739	09 52 59.96	+69 07 39.10	735	09 55 25.00	+69 01 12.00	9.899e-06
CXO J095304.1+690140	09 53 04.11	+69 01 40.54	735	09 55 25.00	+69 01 12.00	2.851e-06
CXO J095317.7+690045	09 53 17.71	+69 06 42.85	735	09 55 25.00	+69 01 12.00	8.028e-06
CXO J095327.4+690420	09 53 27.40	+69 04 20.45	735	09 55 25.00	+69 01 12.00	9.312e-06
CXO J095328.2+685842	09 53 28.20	+68 58 42.27	735	09 55 25.00	+69 01 12.00	2.279e-06
CXO J095332.7+690220	09 53 32.78	+69 02 20.98	735	09 55 25.00	+69 01 12.00	2.977e-06
CXO J095333.8+685821	09 53 33.88	+68 58 21.66	735	09 55 25.00	+69 01 12.00	6.102e-06
CXO J095334.2+690344	09 53 34.25	+69 03 44.58	735	09 55 25.00	+69 01 12.00	2.967e-06

To download data products, we select the source(s) of interest in the query results table, and the desired filetype(s) in the list of Level 3 data products.

Save Product Package

Save In: nina

- cdapackage.33.20080930.174505
- correspondence
- cccds_param
- cccds_param4
- cccds_param_beta
- Desktop
- Documents
- Download
- L3_Documentation
- Mail
- mail
- menu_files

File Name: SN_1993_files.tar

Files of Type: All Files

Save Cancel

Data Products

Filetypes:

regevt3	density	asphist
evt3	bkimg	badpix3
regimg	psf	fov3
ecorring	expmap	ecorring
spectrum	regexpmap	psf_jpg
srcreg	arf	regimg_j
lightcurve	rmf	reg3img

We have the option to download data products to a tar or batch file.

Chandra X-ray Center

CHANDRA SOURCE CATALOG

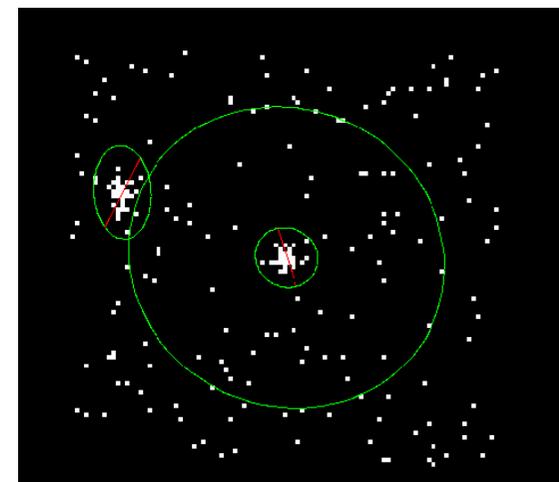
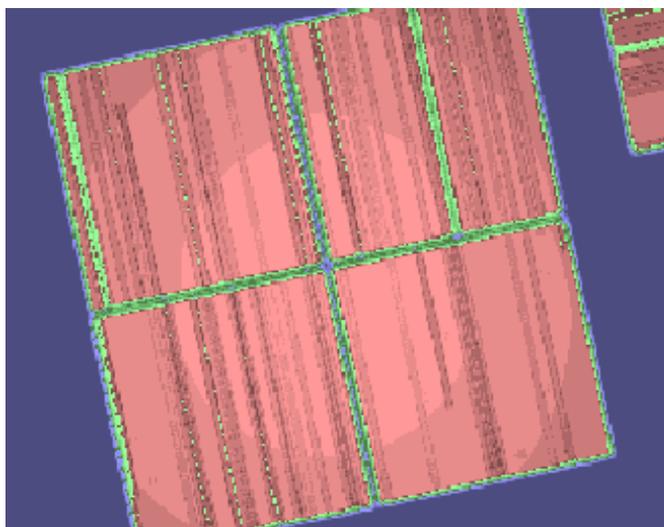
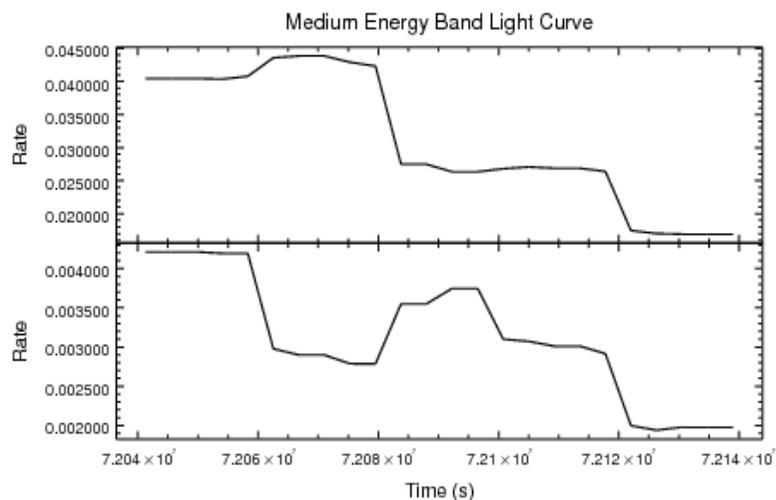
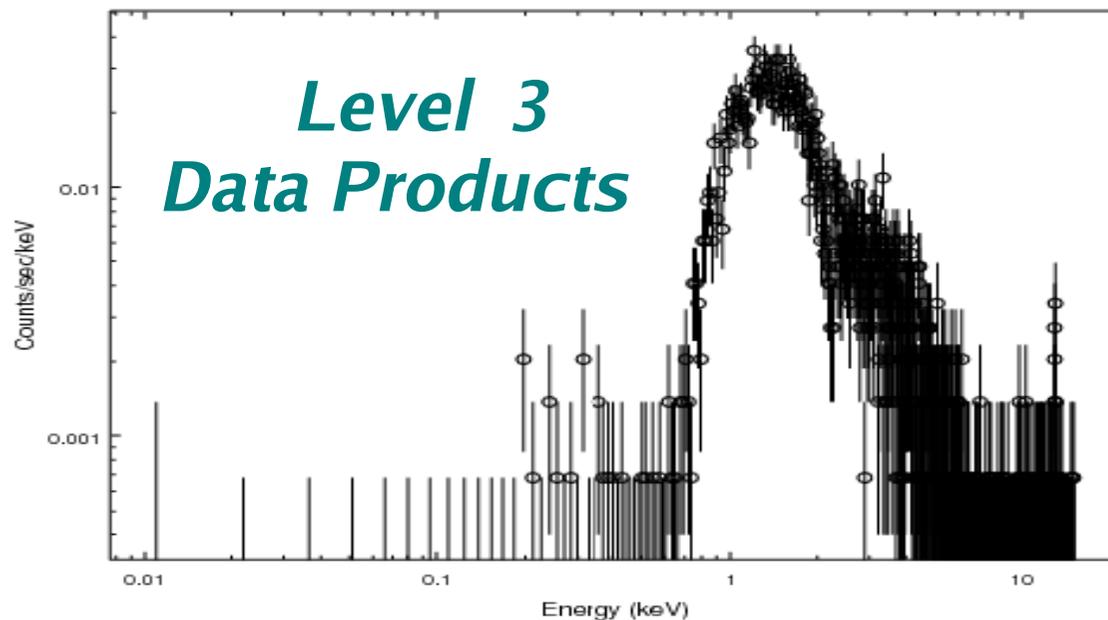
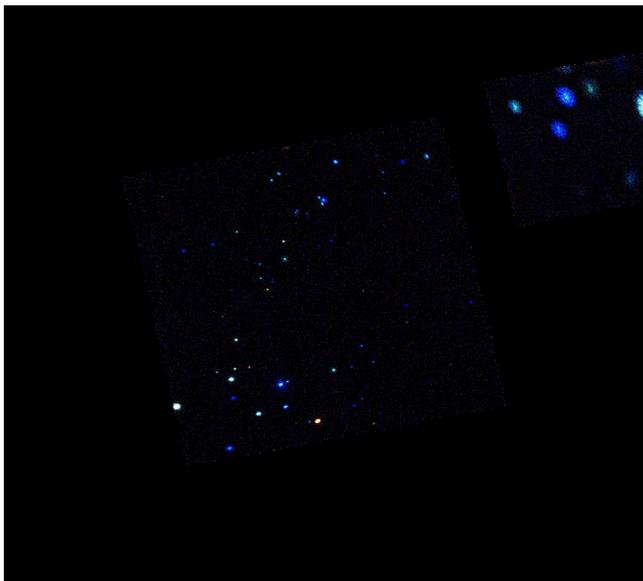
Down Down Running query.. Query completed: 10 rows found.

Applet CSCview started



The Chandra Source Catalog: *User Interface*

See the full list of Level 3 data products at http://cxc.harvard.edu/csc/data_products/





The Chandra Source Catalog: *User Interface*

Query Results Log Help

Query Builder **Query Editor**

Import from Builder

```
SELECT TOP 10 m.name, m.ra, m.dec, o.obsid, o.ra_targ, o.dec_targ, m.photflux_aper_b FROM cscat WHERE o.targname LIKE "SN 1993%"
```

As an alternative to submitting web-style queries in the Query Builder of CSCview, users may enter SQL-like query expressions in the Query Editor of CSCview. For example,

```
'SELECT m.name, m.ra, m.dec, o.obsid, m.photflux_aper_b FROM cscat WHERE o.targname LIKE "SN 1993%"'
```

translates to “*return the master source catalog name, equatorial coordinates and broad band photon flux, and the per obi ObsID associated with all sources found in observations with a target name beginning with 'SN 1993'.*”

Validate Query

Catalog: Current database view Save results to file Submit Query

Chandra X-ray Center

Download package canceled.
Running query..
Query completed: 10 rows found.
Download package canceled.

CHANDRA SOURCE CATALOG

Applet CSCview started



The Chandra Source Catalog: User Interface

If the CSCview GUI is to be avoided altogether, the user may access tables of catalog data and file-based data products from the command line, using **cURL** or **Wget**.

```
unix% curl --form query='SELECT TOP 10 m.name, m.ra, m.dec, o.obsid,  
o.ra_targ, o.dec_targ, m.photflux_aper_b FROM cscat WHERE o.targname LIKE "SN  
1993%"' 'http://cda/cscview/getProperties'
```

cURL and **Wget** are tools which allow a user to retrieve files with URL syntax from the command line, simulating the user's actions at a web browser.

```
unix% wget -O out.file 'http://cda.cfa.harvard.edu/cscview/getPropertiesquery=SELECT  
TOP 10 m.name, m.ra, m.dec, o.obsid, o.ra_targ, o.dec_targ, m.photflux_aper_b  
FROM cscat WHERE o.targname LIKE "SN 1993%"' 'http://cda/cscview/getProperties'
```



The Chandra Source Catalog: User Interface

Questions about the CSC should be submitted to the

CXO HelpDesk
<http://cxc.harvard.edu/helpdesk>