
Chandra Source Catalog

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Release 2.0 of the *Chandra* Source Catalog (CSC) includes observations released publicly through the end of 2014, and will include information for of order 350,000 source detections from roughly 10,000 *Chandra* ACIS and HRC-I imaging observations. For each source the CSC will tabulate numerous properties (with their associated confidence intervals) and include extensive FITS data products for each field and source region that will be directly usable for scientific analyses. Multiple observations of the same field (pointings co-located within 60 arcsec and obtained using the same instrument) are co-added, or “stacked,” prior to source detection to maximize detectability of sources. An improved source detection method allows detection of point sources reliably down to roughly 5 net counts on-axis, for exposures shorter than the median *Chandra* observation duration.

At the time of writing, roughly 98% of the 7,289 stacked fields have completed the source detection phase, while the remaining 2% are expected to complete processing and quality assurance assessment in the next few weeks. Roughly 5% of the fields that have completed processing will require some level of reprocessing due to problems identified in quality assurance assessment. Once these final fields complete source detection processing, we will immediately update the “preliminary detections list” with the complete set of detections that will be included in the final catalog release. The preliminary detections list is a FITS binary table that is available on the CSC release 2.0 website (<http://cxc.cfa.harvard.edu/csc2/>) that includes position, likelihood, and intensity estimates (a proxy for aperture photometry) in multiple energy bands for ACIS observations and a single energy band for HRC-I observations, together with their associated confidence intervals.

Following the source detection phase, all of the detections from overlapping fields that include the same location on the sky will be matched to identify sources on the sky. Because the size of the *Chandra* PSF is a function of off-axis angle, a single off-axis detection may be resolved into multiple sources by matched on-axis detections. These matches will be reconciled as part of this “master match” phase. This phase will also assign names to distinct sources on the sky, following IAU standard nomenclature. Following master match processing, we will update the CSC release 2.0 website with a “preliminary sources list” that identifies distinct X-ray sources on the sky and matches them to the individual detections in the preliminary detections list.

The remaining steps required to complete the official catalog release include extracting source properties, generating limiting sensitivity maps, and populating the final catalog database. These steps can be executed independently for each set of overlapping stacked fields on the sky, as soon as master match processing is completed for the sources included in those fields. Data for those sources will subsequently be made available through the CSCview web interface. Once these steps are completed for all of the catalog fields, release 2.0 will be made the official catalog release and will be accessible by default through all of our standard catalog interfaces.

The current version of the catalog (release 1.1) as well as extensive user documentation, may be accessed through the CSC website (<http://cxc.cfa.harvard.edu/csc/>). The documentation describes the content and organization of the catalog in detail, and lists important caveats and limitations that should be reviewed prior to using the catalog data. The various user interfaces are described, and there are several examples and user threads that demonstrate the use of these tools to access the catalog. Updates and news about release 2.0 of the catalog will continue to be added to the website (<http://cxc.cfa.harvard.edu/csc2/>) through the end of production.

The 2016 *Chandra* X-ray Observatory Senior Review Committee (SRC) identified the second major release of the *Chandra* Source Catalog (CSC) as a major mission initiative that “... will be one of the most significant CXO legacies.” The *Chandra* Source Catalog team appreciates the strong endorsement of CSC project by the SRC. Our plan for the foreseeable future is to provide incremental releases with new data added every few years. A new major version of the entire catalog will be constructed only if there are significant algorithm improvements that warrant full reprocessing. The last legacy release of the CSC will be completed after the end of the *Chandra* mission once all data are reprocessed with the final set of mission calibrations. We hope and expect that this will be many years away!

We are looking forward to providing the community with release 2.0 of the CSC this (Northern) summer, which will (in the words of the SRC) “[enable] studies of a variety of astrophysical objects both on its own and in combination with other multiwavelength surveys.” ■