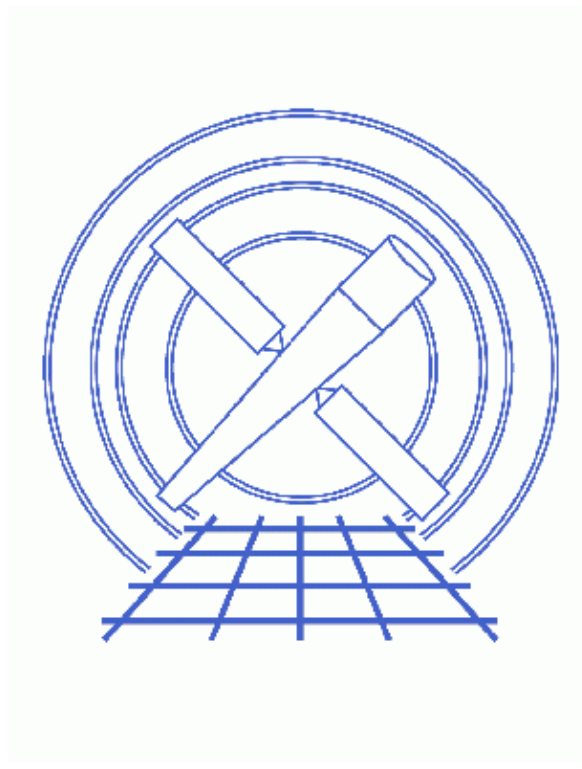


Correcting Responses for ACIS Contamination



CIAO 3.4 Science Threads

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Correcting Responses for ACIS Contamination

CIAO 3.4 Science Threads

Overview

Last Update: 1 Dec 2006 – reviewed for CIAO 3.4: no changes

Synopsis:

The CIAO response tools are designed to incorporate corrections for ACIS contamination via ARDLIB and a CALDB contamination file. The necessary calibration file was first made available in CALDB 2.26, and was updated in CALDB 3.0.0.

Purpose:

To explain the choices that are currently available to account for the ACIS QE degradation.

Read this thread if:

- you are working with any ACIS data (imaging or grating) and would like to account for the continuous degradation in the effective low-energy ACIS QE when creating an ARF.
- you have created an ARF with a previous version of CIAO and want to now apply the correction.
- you are working with ACIS exposure maps and wish to take the degradation into account.

Calibration Updates:

- **CALDB v3.0.0** (15 Dec 2004): New contamination calibration files account for spatial variations in the contamination on the ACIS optical blocking filters. The contamination is now expressed as a function of time, energy, and ACIS chip coordinate.
- **CALDB v2.26** (2 Feb 2004): The ACIS contamination files were added to the CALDB.

Related Links:

- Why topic: [ACIS QE Degradation](#)

Proceed to the [HTML](#) or [hardcopy \(PDF: \[A4\]\(#\) / \[letter\]\(#\)\)](#) version of the thread.

Imaging and Grating ARFs

Create a new ARF

The tools used to create ARFs for imaging data:

- [mkarf](#)

- [mkwarf](#)
- [specextract](#) (calls mkwarf)
- [psextract](#) (calls mkwarf)
- [acisspec](#) (calls mkwarf)

and for grating data:

- [mkgarf](#)
- [fullgarf](#) (calls mkgarf)

will now automatically pick up the contamination file from the CALDB. Before beginning the analysis, be sure to follow the steps in the [ACIS Contamination File Parameter](#) section.

Correct an existing ARF

All previous contamination corrections are deprecated as of CALDB 2.26. We no longer recommend using either ACISABS or contamarf to correct existing ARFs.

The official recommendation of the "ACIS Modeling and Analysis Team" is that [creating a new ARF](#) with the new calibration is the best way to correct for the QE degradation issue.

What if I applied a correction before CALDB 2.26?

If you have already corrected your ARF – either with ACISABS or with contamarf and the draft contamination file (version N0001) – it recommended that you [create a new ARF](#) with the most recent calibration.

Instrument and Exposure Maps

Prior to the CALDB 2.26 release, there was no method to account for the continuous degradation in the ACIS QE when creating an instrument map. Now [mkinstmap](#) will automatically pick up the file from the CALDB; this also applies to the [merge_all](#) script, which calls that tool.

Before running either, be sure to follow the steps in the [ACIS Contamination File Parameter](#) section.

Note that if you re-run mkinstmap to pick up the correction, you will also need to create a new exposure map with [mkexpmap](#), as it takes the instrument map as one of the inputs. More information may be found in the "Exposure Maps" section of the [Imaging threads](#).

ACIS Contamination File Parameter (ardlib.par)

Each of the tools which uses the new calibration file (listed in the [Create a new ARF](#) section) contains an `ardlibparfile` parameter with the value "ardlib.par."

The location of the calibration file is specified in the [ardlib.par](#) file by a set of 10 parameters (one per CCD):

```
unix% plist ardlib | grep CONTAM
```

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```
AXAF_ACIS0_CONTAM_FILE = CALDB      Enter ACIS Contamination File
AXAF_ACIS1_CONTAM_FILE = CALDB      Enter ACIS Contamination File
AXAF_ACIS2_CONTAM_FILE = CALDB      Enter ACIS Contamination File
AXAF_ACIS3_CONTAM_FILE = CALDB      Enter ACIS Contamination File
AXAF_ACIS4_CONTAM_FILE = CALDB      Enter ACIS Contamination File
AXAF_ACIS5_CONTAM_FILE = CALDB      Enter ACIS Contamination File
AXAF_ACIS6_CONTAM_FILE = CALDB      Enter ACIS Contamination File
AXAF_ACIS7_CONTAM_FILE = CALDB      Enter ACIS Contamination File
AXAF_ACIS8_CONTAM_FILE = CALDB      Enter ACIS Contamination File
AXAF_ACIS9_CONTAM_FILE = CALDB      Enter ACIS Contamination File
```

If *anything* other than "CALDB" is returned, issue the following command so that the tool will be able to find the correct file:

```
unix% foreach d ( 0 1 2 3 4 5 6 7 8 9 )
foreach? pset ardlb AXAF_ACIS${d}_CONTAM_FILE="CALDB"
foreach? end
```

You may also use "punlearn ardlb" to reset all the ardlb parameters to the default values. This will also clear out any other information that has been set, however, such as bad pixel filenames.

Turning Off the Correction

It is possible to "turn off" the contamination correction, e.g. if you would like to compare results with and without it applied. To do so, the ARDLIB qualifier "CONTAM=NO" must be specified in the appropriate parameter, as given in the following table:

<i>Tool</i>	<i>Parameter</i>
mkarf	<u>detsubsys</u>
mkgarf	<u>detsubsys</u>
mkwarf	<u>detsubsysmod</u>
mkinstmap	<u>detsubsys</u>

There are examples in the help files on how to use the qualifier with each tool. For example, when running `mkarf` on an ACIS-S3 observation:

```
unix% pset mkarf detsubsys="ACIS-S3;CONTAM=NO"
```

History

- 03 Jan 2005 updated for CIAO 3.2: new calibration file
- 12 Dec 2005 reviewed for CIAO 3.3: no changes
- 16 Feb 2006 added `specextract` to list of response tools
- 01 Dec 2006 reviewed for CIAO 3.4: no changes

URL: <http://cxc.harvard.edu/ciao/threads/aciscontam/>

Last modified: 1 Dec 2006

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