XMM-Newton CCF Release Note

XMM-CCF-REL-320

RGS Bad Pixels

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1 CCF components

Name of CCF	VALDATE	EVALDATE	Blocks changed	XSCS flag
RGS2_BADPIX_0033	2000-02-03T08:00:00	2000-02-14T08:00:00	BADPIX	NO

2 Changes

This release covers a very short period (11 days) in the beginning of the mission, period in which the CCD 4 of the RGS2 instrument was malfunctioning (giving no signal at all), but not switched off, and included for commanding in the observation planning. Later the CCD has been disabled, once it was understood that it could not be recovered anymore. As a result of its inclusion in that short period, the effective area corresponding to that CCD computed for several observations is wrong. We have studied different alternatives for avoiding this, concluding that for this case the simplest and most straightforward solution is to declare the whole CCD as (advisory) bad columns for that period.

3 Analysis

Fig. 1 shows the combined measured flux of PKS-0558-504 (RGS1 and RGS2), as produced by the XMM-Newton pipeline, and present in the XMM-Newton archive. The effect of including RGS2 - CCD 4 with its supposed effective area in the flux calculation is clearly visible through a dip between 20 and 24 Angstrom, due to the lack of any signal of RGS2 in that area.

Using the same data and calibration , except for the inclusion of RGS2_BADPIX_0033, in terms of bad columns identical to RGS2_BADPIX_0012.CCF (the BADPIX calibration file valid for that
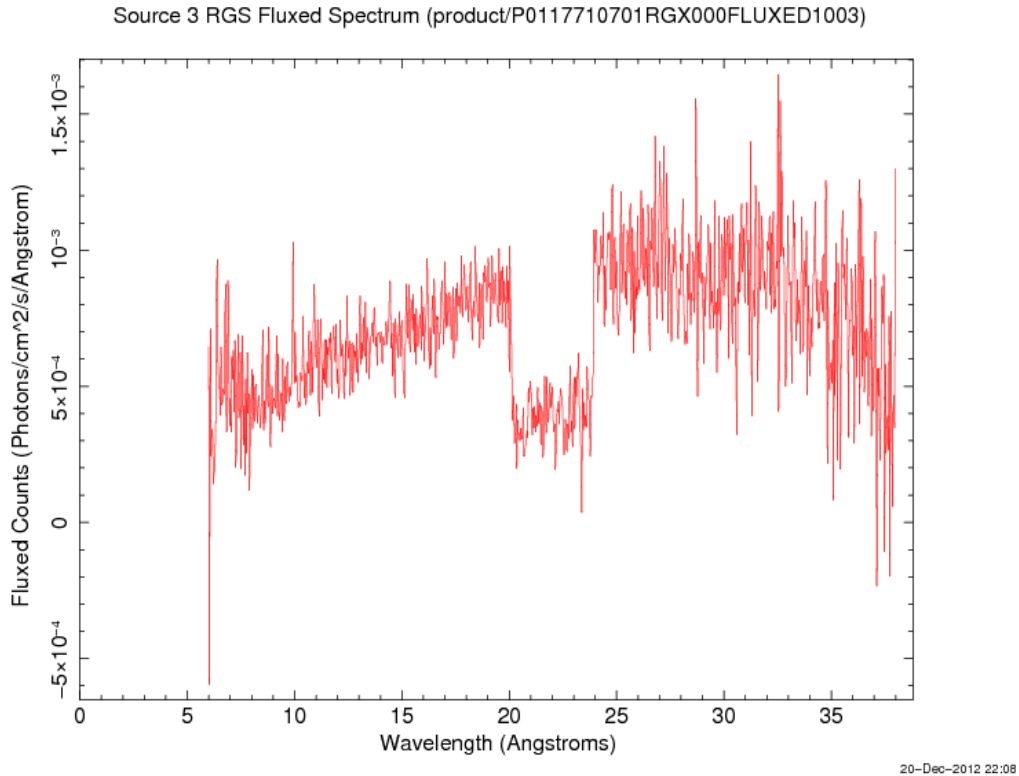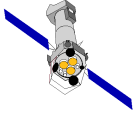
Figure 1: PKS-0558-504 RGS1/RGS2 combined flux - produced by the XMM-Newton PPS with current calibration

period) but adding all the CCD4 columns as advisory bad columns, we obtain the combined flux shown in Fig. 2. when running `rgsproc`, basically the same processing which runs in the XMM-Newton PPS. The error level increase in the [20-24]Angstrom region indicates that only RGS1 data is contributing there.

The effective areas of both RGS1 and RGS2 for the example observation are shown in Fig. 3, with the area corresponding to RGS2 CCD4 set to 0 through the inclusion of the advisory bad columns.

4　Scientific Impact of this Update

The whole RGS2 CCD4 is declared "hot" for a period of 11 days in February 2000, and so, all the observations which contained RGS2 exposures, taken with a malfunctioning CCD4 still switched on, can be properly reduced.
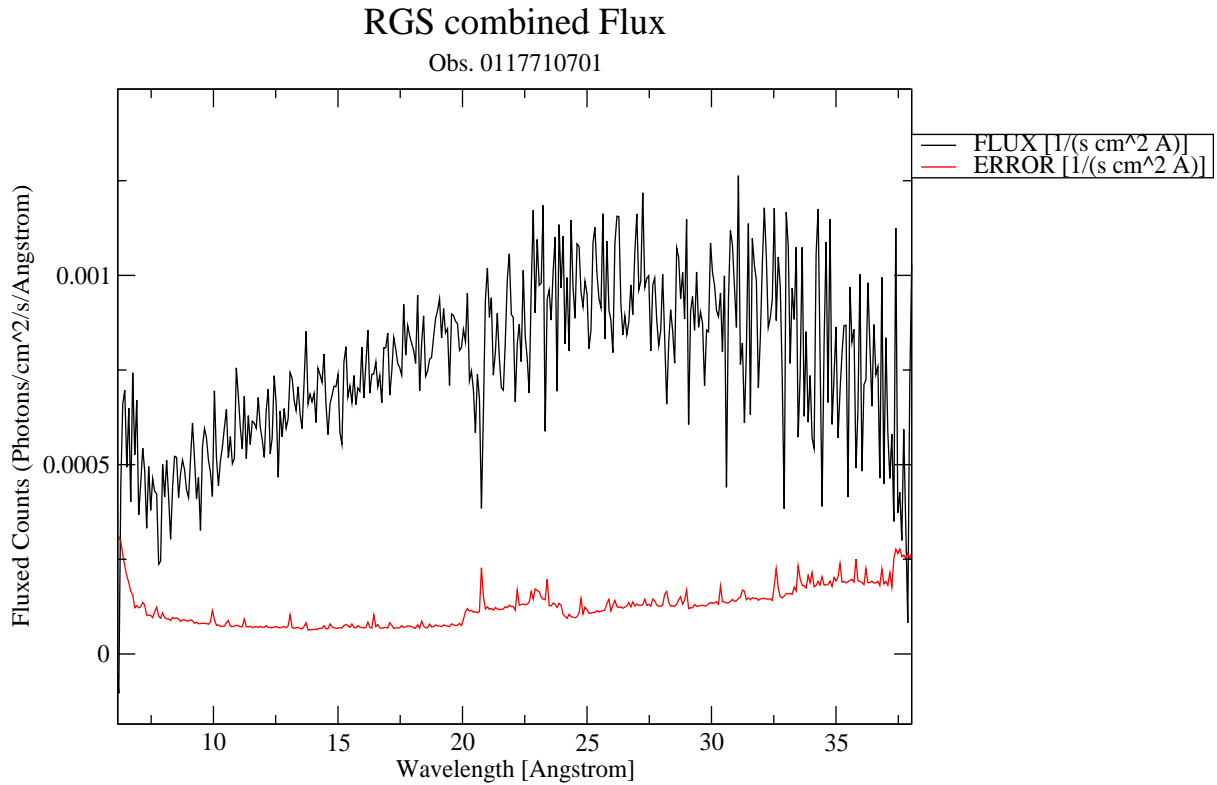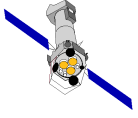
RGS combined Flux

Obs. 0117710701

Figure 2:   PKS-0558-504   RGS1&RGS2   combined   flux - produced   by   `rgsproc`   with RGS2_BADPIX_0033

5   Estimated Scientific Quality

The exclusion of RGS2 CCD4 in that period is necessary for a proper scientific analysis of the data.

6   Expected Updates

None.

7   Test procedures

General checks:

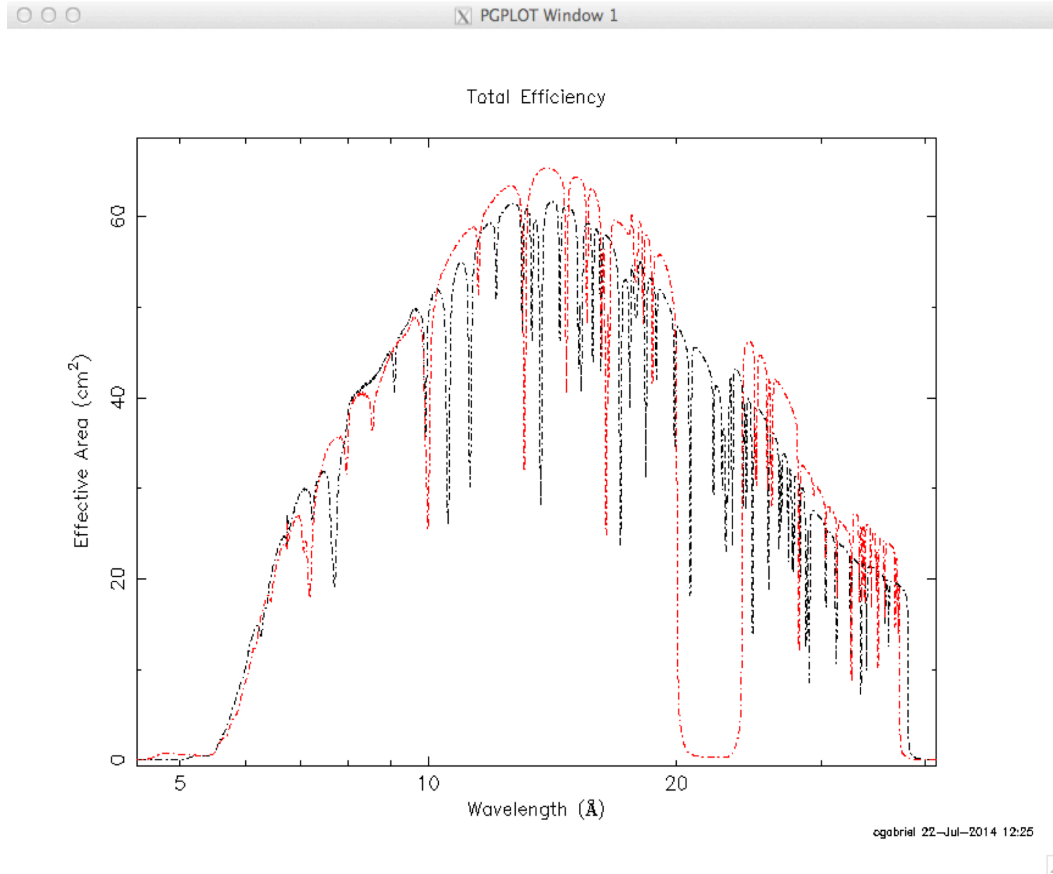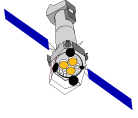- use fv for file inspection. It should contain 2 binary extensions (BADPIX and BADPIX1)

Figure 3: Effective area (black:RGS1, red:RGS2) as calculated by `rgsproc` with RGS2_BADPIX_0033

- use the SAS task CALVIEW to see if the CAL digests and uses the new files.

8   Summary of the test results

The fits viewer fv was used to inspect both CCF files, wrt their structure, validity dates and contents of the first extension (BADPIX). Everything OK.

The SAS task cifbuild was run several times using data corresponding to periods covered and not covered by this CCF in order to check the correct selections. Selections were correctly done.

The SAS task calview was used to prove that these calibration files are ingested correctly by the CAL, by pointing to the different Calibration Index Files and producing bad pixel plots.

Data was analysed including the calibration file via `cifbuild` pointing to the directory containing the file (results shown).