XMM-Newton CCF Release Note

XMM-CCF-REL-239

RGS Bad Pixels

C. Gabriel

September 4, 2007

1 CCF components

Name of CCF	VALDATE	EVALDATE	Blocks changed	XSCS flag
RGS1_BADPIX_0023	2007-09-04T00:00:00	—	BADPIX	NO

2 Changes

This release adresses an issue concerning bad segments, which has already been discussed in a former CCF release note (XMM-CCF-REL-226). Flagging of two areas with increased offsets ("hot spots"), on both upper part sides of CCD 1 in RGS1, so each one corresponding to a readout node became necessary. This was done so far through a number of advisory hot segments masking the area of the spots, as long as they were not uploaded to the instrument. From revolution 1416 these hot segments are uploaded to the instrument, to avoid increased telemetry.

3 Analysis

As part of the continous monitoring of the RGS instruments, offset maps are produced, as the averages of the diagnostic images over three consecutive revolutions. They are then taken into the ODF data for the offset subtraction. The two hot spots are clearly seen in Figure 1a, showing the offset map corresponding to revolution 1323. The hot spots are attributed to stress produced in CCD1 at the bond places. The temporal evolution of the "spot" central pixel signal (Fig. 1b) shows that the signal is still increasing, although flattening, and has surpassed the threshold level. This means that a definitive signal is contributing more and more to increased telemetry (although part of the spots are filtered on board). Since further expansion of the spot could be compromising telemetry rates, provision has been taken to upload bad column segments, masking fully off the spot areas.

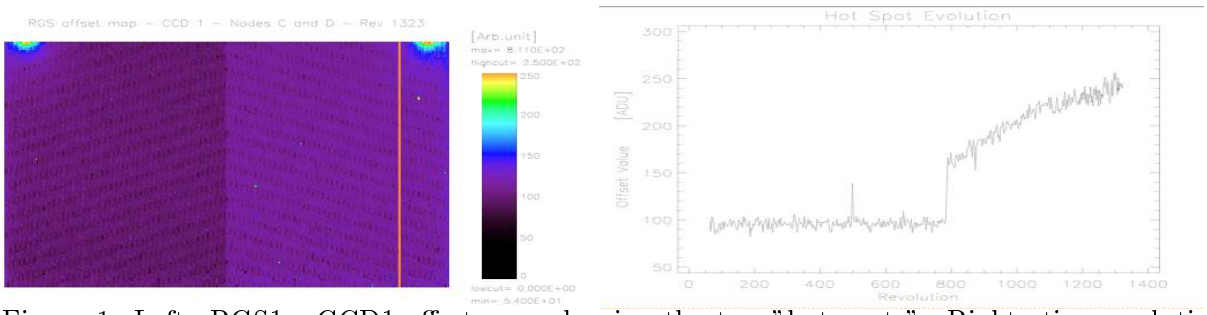

Figure 1: Left: RGS1 - CCD1 offset map showing the two "hot spots". Right: time evolution of signal from one spot central pixel.

4 Scientific Impact of this Update

The start date of validity is set to 4 September 2007 when the new bad pixel tables including masking of the hot spots started to be uploaded to the instrument. SAS will notice through this CCF that the masked regions are not telemetered.

5 Estimated Scientific Quality

The inclusion of the new hot segments in this CCF will insure a proper calculation of effective areas.

6 Expected Updates

Further analysis of bad pixels with diagnostic and science data should lead to updates, although this is expected to happen very infrequently.

7 Test procedures

General checks:

- use fv (or another fits viewer) for file inspection. It should contain 2 binary extensions (BADPIX and BADPIX1)
- use the SAS task CALVIEW to see if the CAL digests and uses the new files.
- check that the differences between RGS1_BADPIX_0020 and _0023 are exclusively the change from advisory ("H") to uploaded ("h") of the segments corresponding to the hot spots.

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.

Finally, fdiff (FTOOLS) has been used to check that the only differences to the former valid bad pixel CCF file (RGS1_BADPIX_0020) are that all segments corresponding to the hot spots are marked with "h" for uploaded instead of "H" for advisory.