

XMM-Newton CCF Release Note

XMM-CCF-REL-345

Evolution of the RGS Gain and CTI

R. González-Riestra and C. de Vries

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1 CCF components

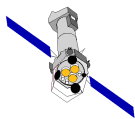
Name of CCF	VALDATE	List of Blocks changed	XSCS flag
RGS1.ADUCONV_0028	2016-01-01T00:00:00	OFFSET_GAIN	NO
RGS2.ADUCONV_0034	2016-01-01T00:00:00	OFFSET_GAIN	NO
RGS1.CTI_0015	2016-01-01T00:00:00	CTI CTIEXTENDED XCTI CTIY1-9	NO
RGS2.CTI_0016	2016-01-01T00:00:00	CTI CTIEXTENDED XCTI CTIY1-9	NO

2 Changes

Last revision of the RGS Gain and CTI took place in July 2014 [1]. The values of these parameters have now been revised by C. de Vries (SRON) using recent calibration observations of Mkn 421 (rev. 3005 and 3015) and Capella (rev. 3068).

Serial CTI and Gain are derived from on-axis observations of Capella and Mkn 421. Observations of the latter displaced ± 2 arcmin off-axis in the cross-dispersion direction are used to derive the parallel CTI.

Figures 1, 2 and 3 show the evolution of the Gain and the Serial and Parallel CTIs over the last years.



3 Scientific Impact of this Update

The values of the RGS CCDs Gain and CTI are used to compute the energy (PI) of each detected event. The regular monitoring of these parameters is important to verify the correct placement of the extraction masks in the Wavelength/PI plane, the separation of the spectral orders and the separation of the first order from the system peak at long wavelengths.

4 Test procedures & results

- The fits viewer `fv` has been used to inspect the new CCFs, their structure, validity dates and contents.
- The SAS task `cifbuild` has been run to confirm that the right CCFs version is selected.
- The observation of Mkn 421 in rev. 3096 (791780101) has been processed with SASv15 using the new CCFs. Output files have been compared with the result of the processing with the current CCFs (see Fig. 4). No significant differences have been found, as expected, given the small change in the CTI and Gain values.

5 Expected Updates

Both CCFs should be revised regularly to evaluate the degradation due to radiation. Observations of a bright continuum source off axis in the cross-dispersion direction must be performed every two years to monitor the parallel CTI.

6 References

- [1] “Update of RGS gain and CTI”, R. González-Riestra and C. de Vries, XMM-CCF-REL-319, July 2014
(<http://xmm2.esac.esa.int/docs/documents/CAL-SRN-0319-1-0.pdf>)

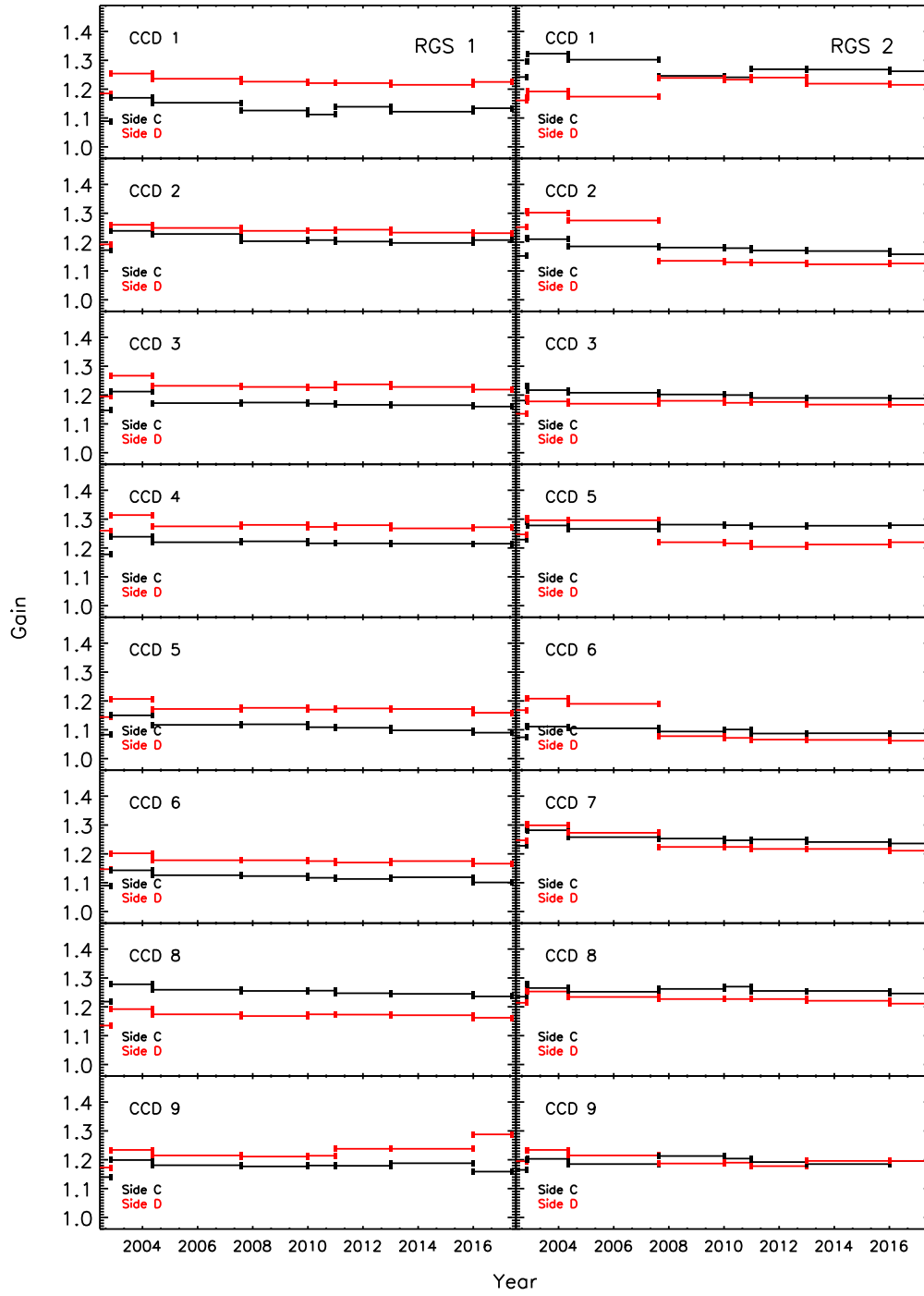
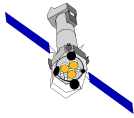


Figure 1: Evolution of the RGS Gain since 2003 (left RGS1, right RGS2). The horizontal lines mark the validity periods of the different CCF versions.

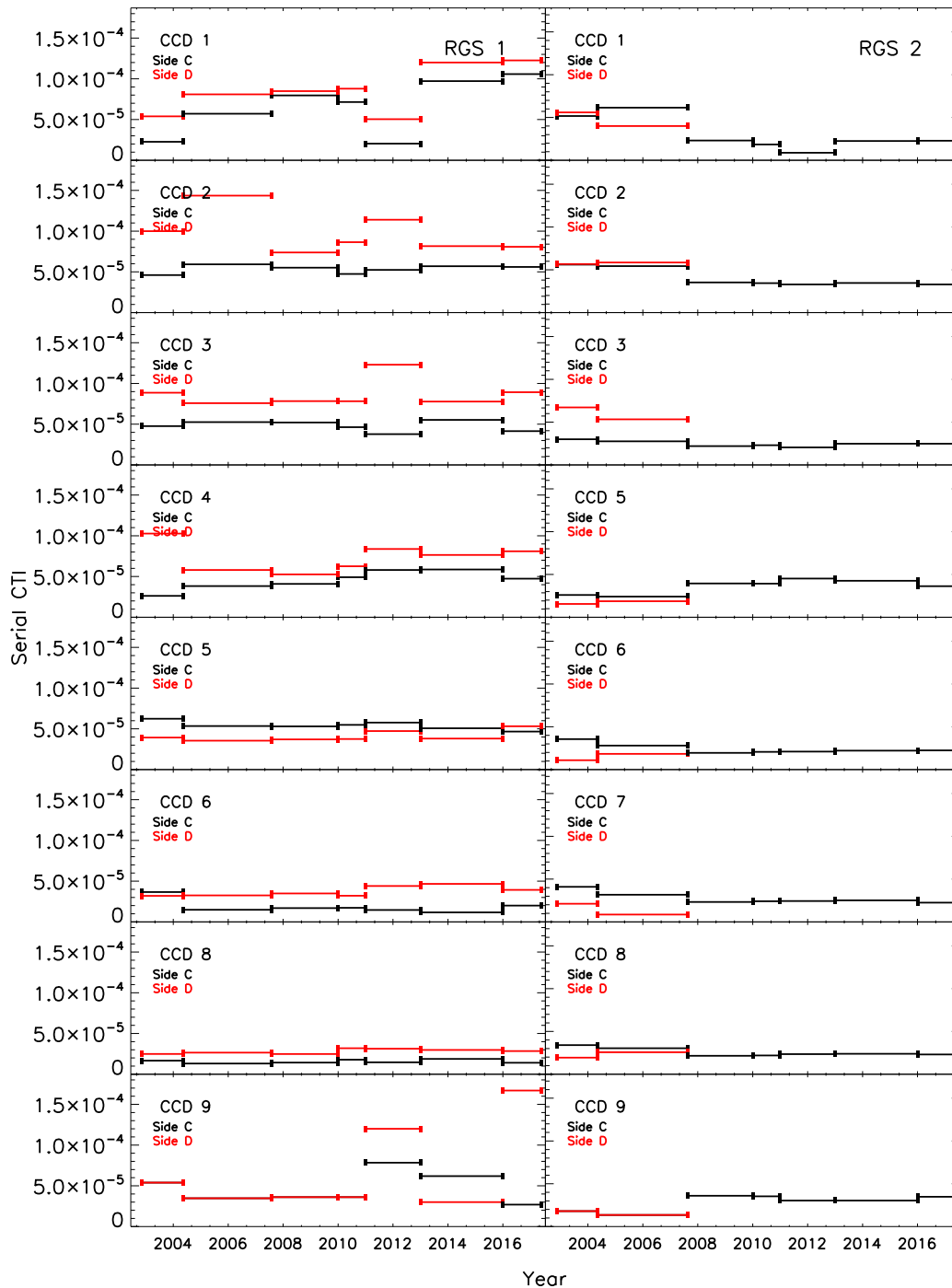
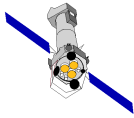


Figure 2: Evolution of the RGS Serial CTI since 2003 (left RGS1, right RGS2). RGS2 started to be read through a single node (C) in August 2007. Since then, the serial CTI for RGS2 (formerly) node D is simply the negative of the node C values. The horizontal lines mark the validity periods of the different CCF versions.

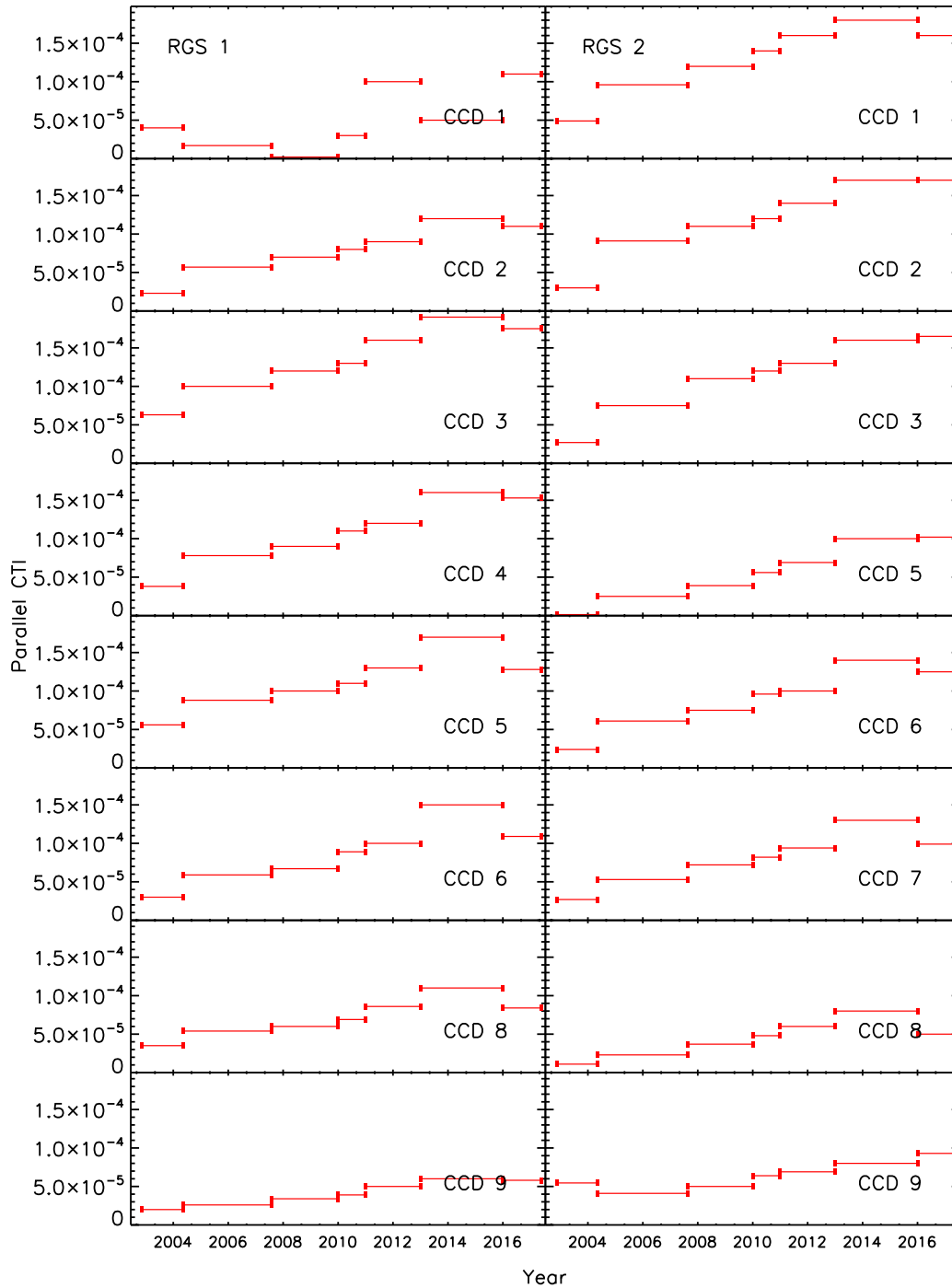
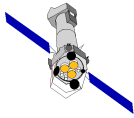


Figure 3: Evolution of the RGS Parallel CTI since 2003 (left RGS1, right RGS2). The points represented are the CTI values far from the chips edges. The horizontal lines mark the validity periods of the different CCF versions.

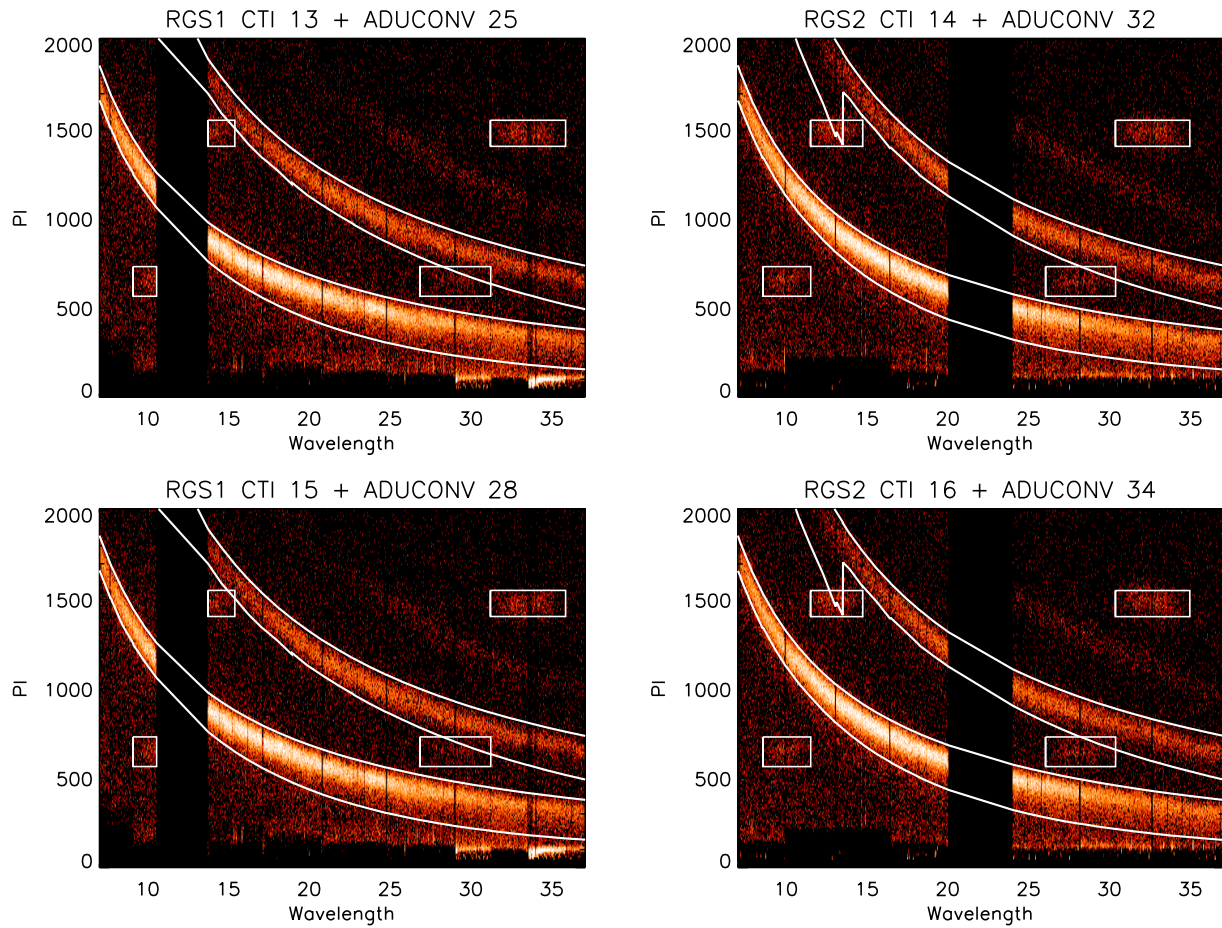
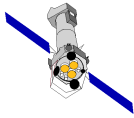


Figure 4: Result of processing the observation of Mkn 421 taken in rev. 3096 (791780101) with the current CCFs (top) and the new ones (bottom). The white lines are the default (95%) PI extraction regions for first and second orders. Rectangles mark the position of the calibration lamps.