

XMM-Newton CCF Release Note

XMM-CCF-REL-385

Evolution of the RGS Gain and CTI (2021)

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January 19, 2022

1 CCF components

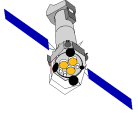
Name of CCF	VALDATE	List of Blocks changed	XSCS flag
RGS1_ADUCONV_0030	2018-01-01T00:00:00	OFFSET_GAIN	NO
RGS2_ADUCONV_0035	2018-01-01T00:00:00	OFFSET_GAIN	NO
RGS1_CTL0016	2018-01-01T00:00:00	CTI CTIEXTENDED XCTI CTIY1-9	NO
RGS2_CTL0017	2018-01-01T00:00:00	CTI CTIEXTENDED XCTI CTIY1-9	NO

2 Changes

Last revision of the RGS Gain and CTI took place in January 2017 [1]. The values of these parameters have now been revised by C. de Vries and J. de Plaa (SRON) using recent calibration observations of Mkn 421 (rev. 3741 and 3829) and AB Dor (rev. 3811).

Gain and Serial CTI are derived from on-axis observations of AB Dor and Mkn 421 (rev. 3829), respectively. Observations of the latter target displaced ± 2 arcmin off-axis in the cross-dispersion direction (rev. 3741) 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 3C 273 in rev. 3938 (obsid 810821601) has been processed with SASv19.1 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] “Evolution of the RGS gain and CTF”, R. González-Riestra and C. de Vries, XMM-CCF-REL-345, January 2017
(<https://xmmweb.esac.esa.int/docs/documents/CAL-SRN-0345-1-0.pdf>)

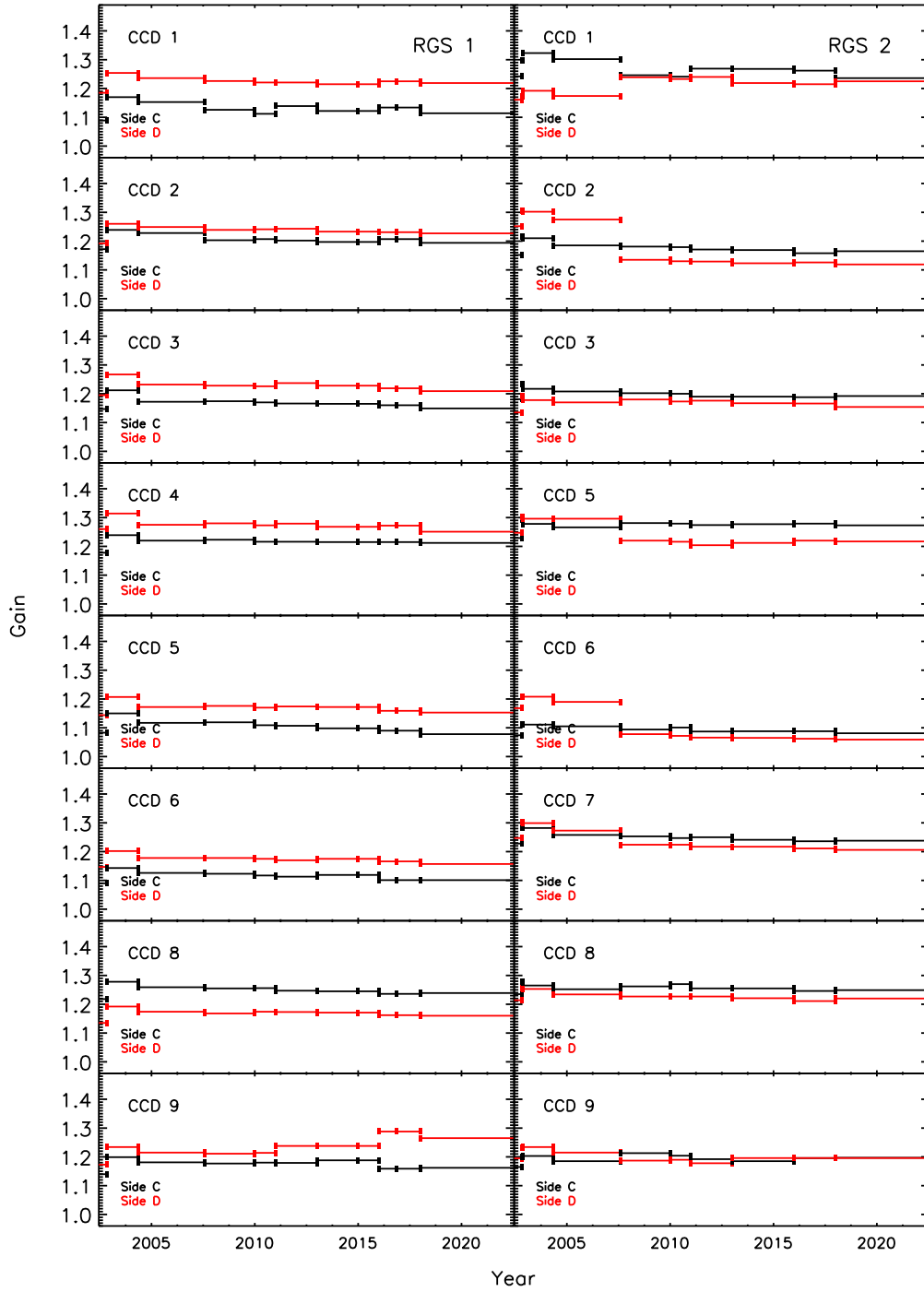
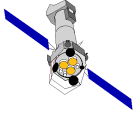


Figure 1: Evolution of the RGS Gain since 2003 (left RGS1, right RGS2). The horizontal lines mark the validity periods of the different CCF versions.

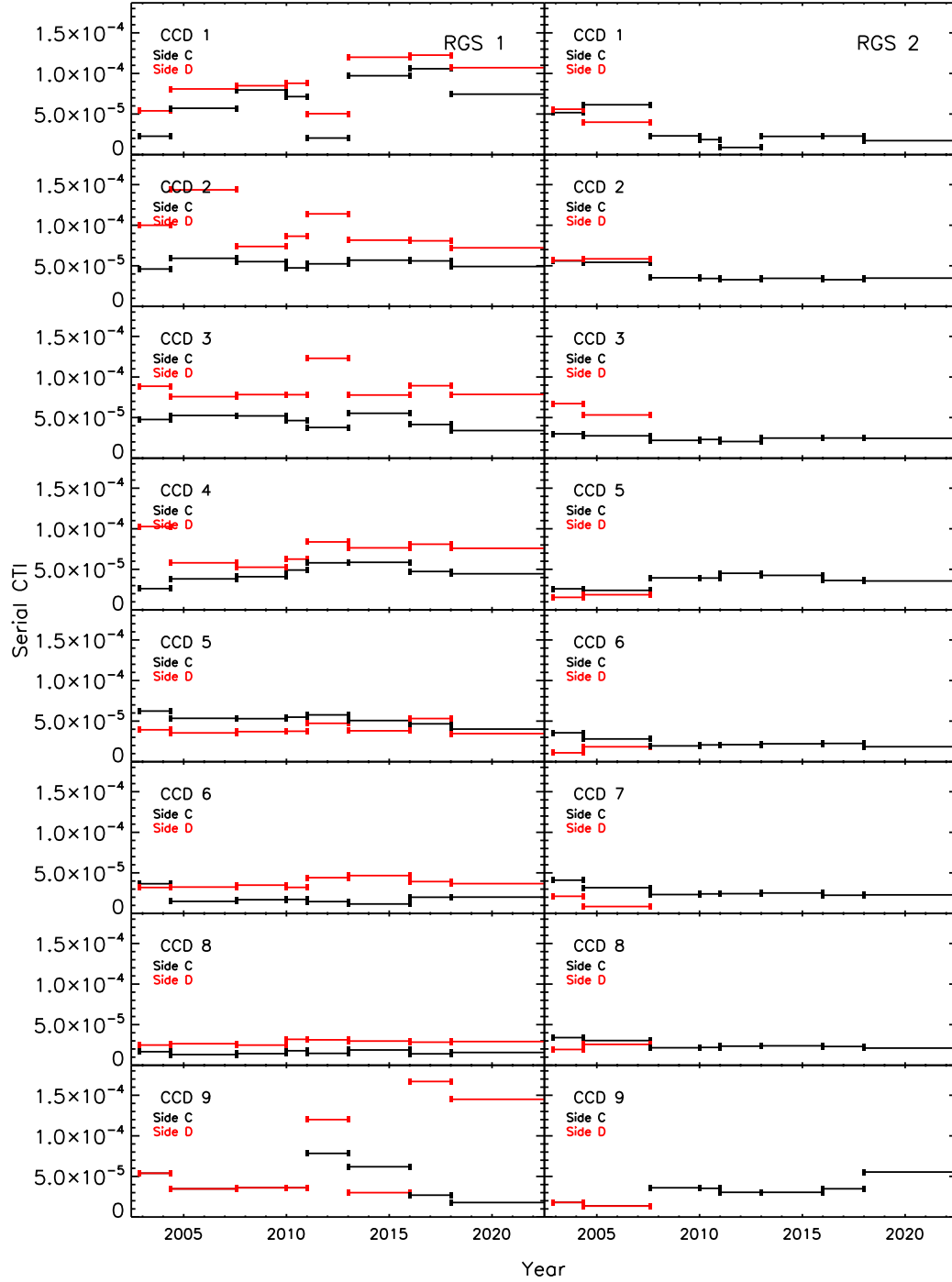
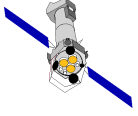


Figure 2: Evolution of the RGS Serial CTI since 2003 (left RGS1, right RGS2). RGS2 started to be read through a single node (C) in August 2007. Since then, the serial CTI for RGS2 (formerly) node D is simply the negative of the node C values. The horizontal lines mark the validity periods of the different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

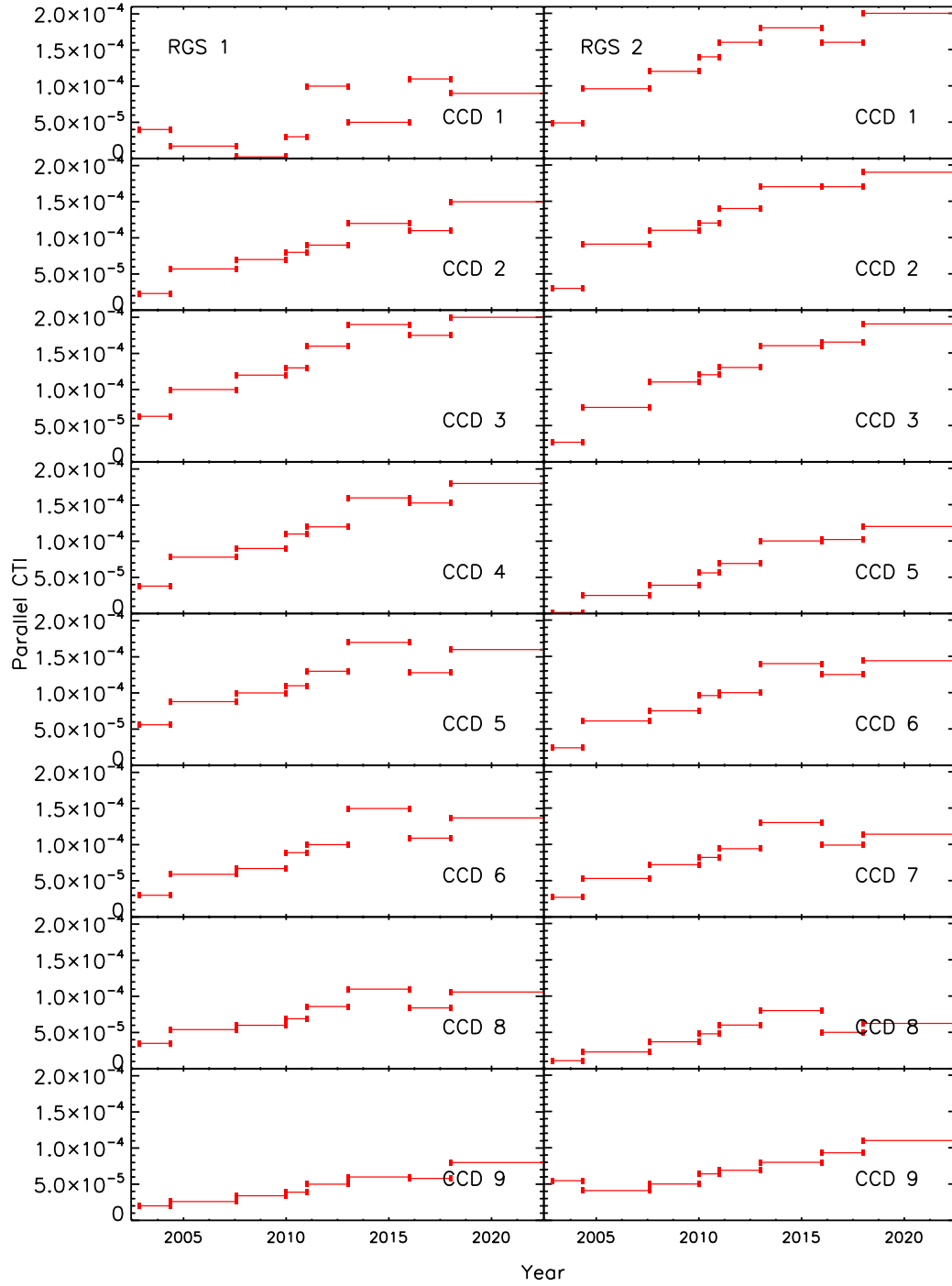
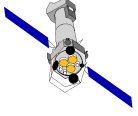


Figure 3: Evolution of the RGS Parallel CTI since 2003 (left RGS1, right RGS2). The points represented are the CTI values far from the chips edges. The horizontal lines mark the validity periods of the different CCF versions.

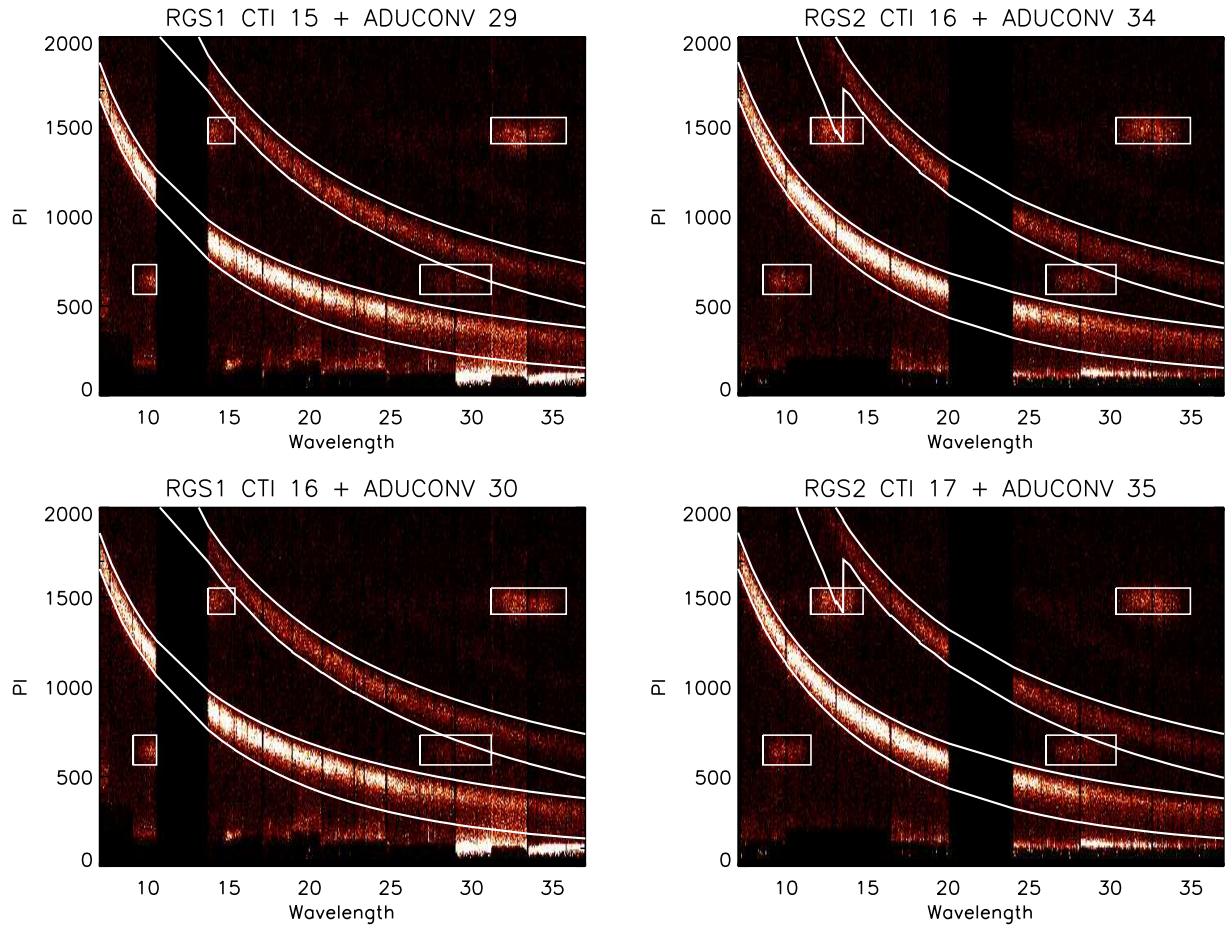
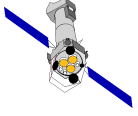


Figure 4: Result of processing the observation of 3C 273 taken in rev. 3938 (obsid 0810821601) with the current CCFs (top) and the new ones (bottom). The white lines are the default (95%) PI extraction regions for first and second orders. Rectangles mark the position of the calibration lamps.