XMM-Newton CCF Release Note

XMM-CCF-REL-365

RGS Offsets - CCD values in RGS ADUCONV CCFs

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March 26, 2019

1 CCF components

Name of CCF	VALDATE	EVALDATE	Blocks changed	XSCS flag
RGS1_ADUCONV_0029	2016-11-11T07:00:00		OFFSET_GAIN	NO

2 Changes

In the last years, since around revolution 2700 in the last months of 2014, a continuous decrease of offset values corresponding to the RGS1 chain on the C side has been observed (see Fig. 1). All CCDs show similar decreasing slopes, resulting in around 9% decrease in the last 800 revolutions. Since the data from the D side is very stable, as well as the data from the RGS2 chain (where we have only one readout side), this effect has to be attributed to the electronics on the C-side of RGS1.

The RGS hardware experts have been consulted, and the conclusion was that this is not worrying for the moment. Furthermore, it seems that all the curves have flattened in the last months, and the data of the last 120 revolutions is more or less stable (see Fig. 2).

3 Analysis

The default subtraction of these offset values steered by the SAS processing metatask 'rgsproc' (and performed by 'rgsenergy'), is not done with the mean values contained in the ADUCONV files, but using the RGS Offset files contained in the ODF. They do of course reflect all the changes we see. Only in case 'rgsenergy' is called with "withdiagoffset=NO" the mean offset values present in the RGS ADUCONV CCF get used. The necessity of this non-default usage can arise in case of long periods (more than 3 revolutions) without Q-dumps obtained. In those cases there is no possibility

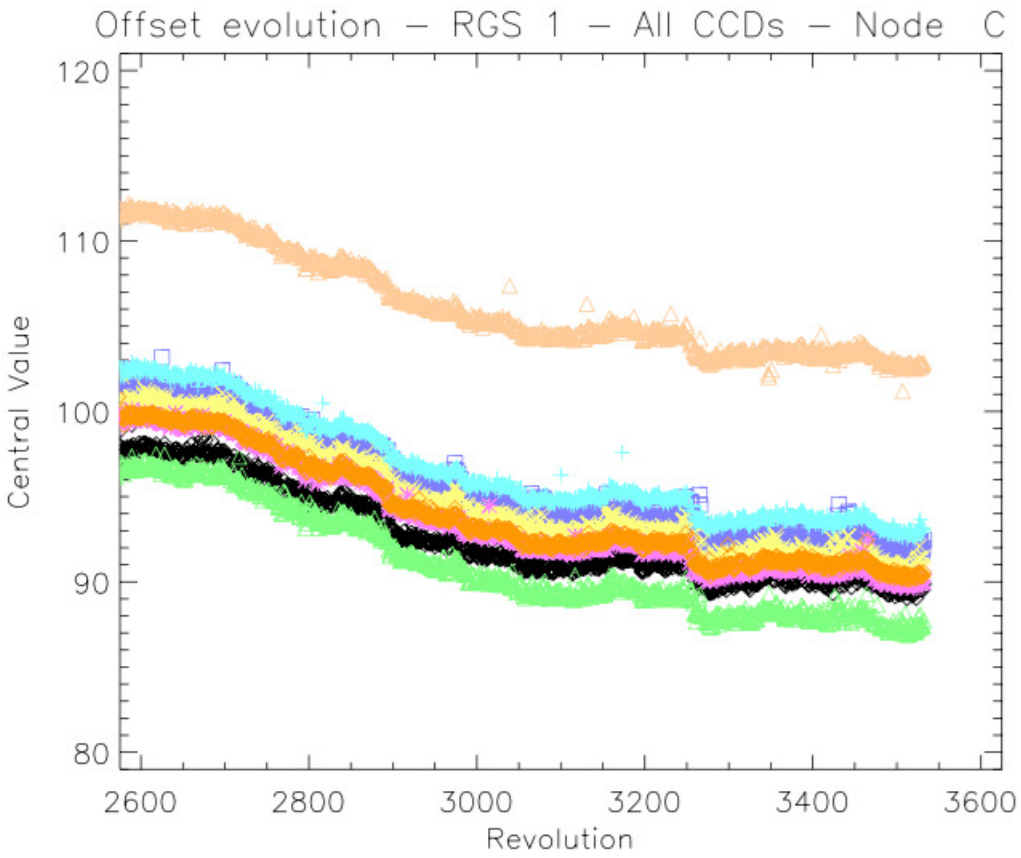

Figure 1: Fig. 1 - Evolution of the main offset values per CCD - C side

of deriving the proper RGS offset files for the mid revolution (the offset values in the RGS offset files are averages of every single pixel over three revolutions).

In any case an update of the mean values per CCD and node for this period should be updated. A tolerance of 5% in the accuracy of the values indicate that a single value for the whole period is enough. We have taken the approximate average values of the whole period for updating the offsets and set the start of validity to November 2016.

4 Scientific Impact of this Update

Using the new files the non-default offset subtraction (call to 'rgsenergy' with "withdiagoffset=NO") will avoid a clear incorrect subtraction for the RGS1 values from the C side.

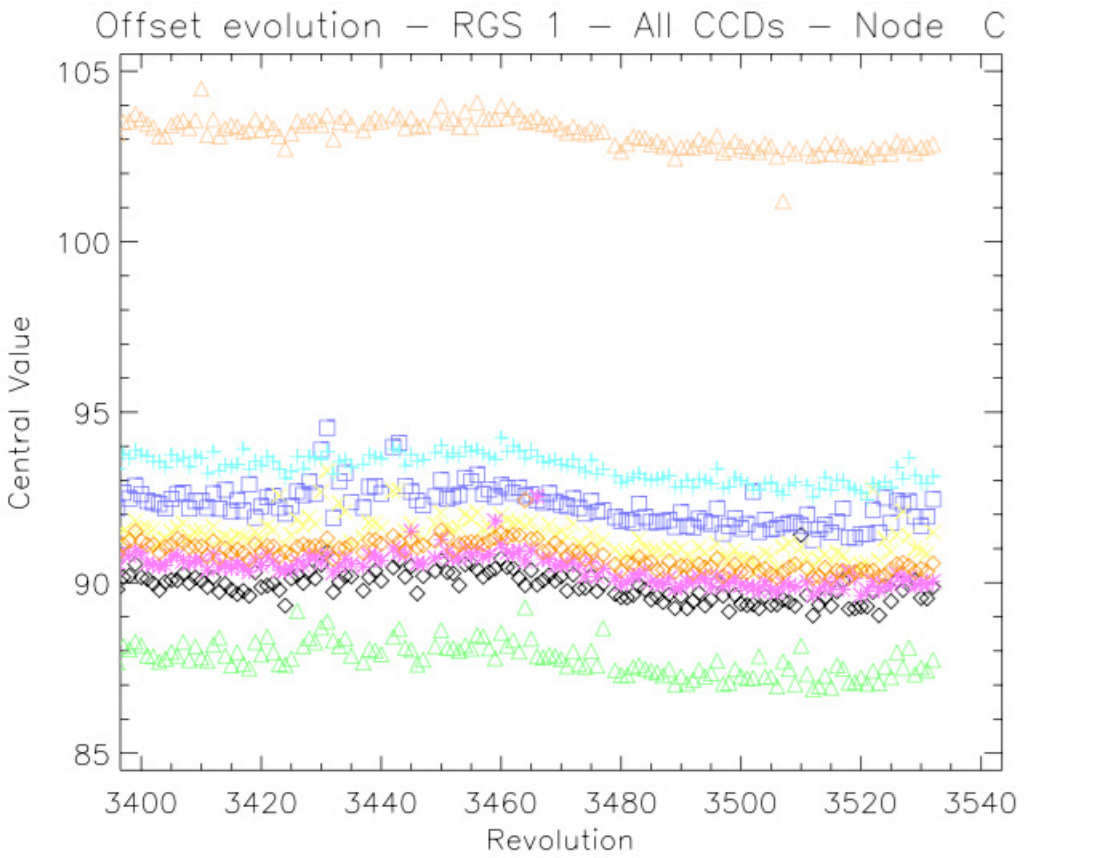

Figure 2: Fig. 1 - Main offset values per CCD - C side in the last 120 revolutions

5 Estimated Scientific Quality

6 Expected Updates

If large variations of the offset values would set up again this could lead to an update of the values at some point. A continuous monitoring of the values is done by the RGS Instrument Team.

7 Test procedures

General checks:

- use the FTOOLS 'fv' for file inspection. The file should contain 2 binary extensions (ADUCOEFF and OFFSET_GAIN). The offset values of C and D side present in the OFFSET_GAIN extension should show the updated values.

8 Summary of the test results

The fits viewer fv was used to inspect the updated CCF file, wrt their structure, validity date and contents of the two extensions. Everything OK.

The SAS task cifbuild was run using data corresponding to after November 2016 covered with the SAS_CCFPATH environment variable set to the public area in one case and including a directory with the new file in the other case to check the correct selection. Selection was correctly done.