MOS gain monitoring

MOS CTI Column Correction
MOS gain monitoring
All our monitoring plots can be seen at:

http://www.src.le.ac.uk/projects/xmm/monitoring/
Column Offsets

Observed spectra are **offset** in different columns

Each column (or part of) has a different offset…

…which changes over time
ODF

CTI correction

Column offset correction

Gain correction (adu>eV)

Calibrated Event list
The offsets are measured from stacking all the CalClosed’s in the following revolution periods:

0-109

109-248

248-359

359-533

533-717

717-936

936-1072

1072-….

Rule: sum inter-flare periods until > 100 orbits worth
How the offsets are calculated

- Study the Al calibration line in given period & fifth of a column
- Find the spectral peak, and model as a gaussian
- The value of the offset may change at some point down a column! So search for (and model) other significant/believable peaks (maximum of 2 gaussians per fifth of a column/120 pixels)
- Using relative height of gaussians, assume a relative length
- Main assumption: there is no temporal change within a period

1/3rd of photons, so 1/3rd of length, so 40 pixels long
80 pixels long
The size of the corrections...

- Period 0 (rev 0-109)
- Period 3 (rev 359-533)

Number of Column Segments vs. Offset (ADU)

- c391
- c32
- c534
- p0:c287
- p0:c360
- p3:c208
Note: Double gaussian is now single gaussian
Applying the corrections to real science columns
Applying the corrections to real science columns
Applying the corrections to real science columns

![Graph showing the comparison of various spectra and averages. The x-axis represents energy (keV) ranging from 0.5 to 1.2, and the y-axis represents counts normalized to peak. The graph includes lines for Column 287 corrected spectrum, Original column 287 spectrum, and Original Entire CCD Average.]
Global improvement

Counts, normalised to peak

Corrected columns 286–315 spectrum
Original columns 286–315 spectrum
Original Entire CCD Average

Energy (10 eV bins)
Global improvement

Counts, normalised to peak

Energy (10 eV bins)

Corrected columns 281–354 spectrum
Original columns 281–354 spectrum
Original Entire CCD Average
Global improvement

Counts, normalised to peak

Corrected columns 198–274 spectrum
Original columns 198–274 spectrum
Original Entire CCD Average

Energy (10 eV bins)
Global improvement

From fitting O VIII, Ne IX, Mg XI in 1E0102 and O VIII, Ne IX in N132D
Column Offsets

These will be implemented soon…!

Final CCF will include:
- Column number
- Offset value
- Ystart
- Ylength