XMM-Newton CCF Release Note

XMM-CCF-REL-227

Master offset maps for epreject

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1 CCF components

| Name of CCF	VALDATE	List of Blocks changed
EPN_REJECT_0004	2000-01-01T00:00:00	MASTER_OFFET_MAP
EPN_REJECT_0004	2000-01-01T00:00:00	MASTER_OFFET_TABLE_INDEX

2 Changes

In order to perform an improved correction of spatial energy shifts, a set of master offset maps is supplied to epreject, and the correction algorithm is updated.

The release includes 'master offset maps' for FF, eFF, LW, SW (3 * 12 + 1 = 37 additional extensions (64 x 200 pixel maps))

The new CCF needs Version 5.9 of *epreject*. The update of the software will not affect observations where no offset map for a particular exposure is available.

However, if the offset map is available, the master offset map is now subtracted from the residual offset map and this difference is used for the amplitude correction. In the previous version, the residual offset map was directly used for the correction.

The master offset maps were created by computing for each pixel the median value of a number of residual offset maps. The master offset maps contain persistent features of the offset maps which are not related to incorrect offsets due to charged particles hitting the detector during the offset map calculation. Subtracting the master offset maps from the residual offset maps thus enables a more precise selection of the pixels where incorrect offset shifts were applied on-board.
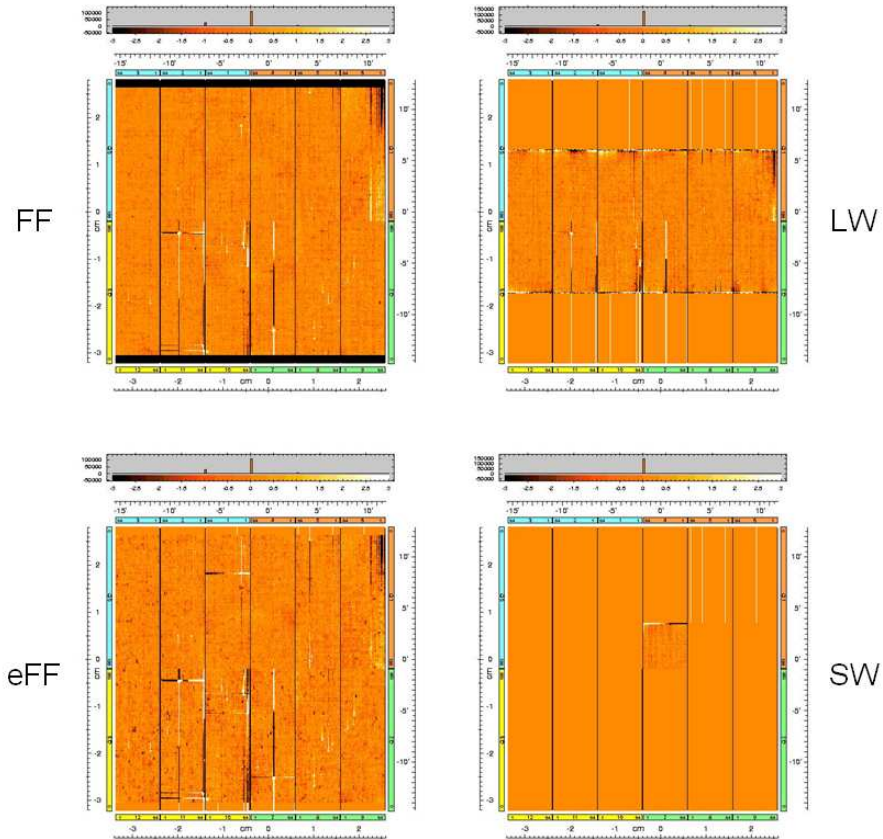
1
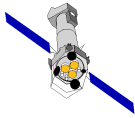
Master offset maps

Figure 1: Master offset maps which are included in the updated CCF, for all the imaging modes, all displayed in the same colour coding, which covers the range from −3 to +3 adu. Only pixels inside the transmitted windows are of relevance for the correction.

3   Scientific Impact of this Update

Almost no impact for sources close to the aim-point. Only sources at specific off-axis positions or very extended sources will be affected (see next point).

4   Estimated Scientific Quality

The use of master offset maps improves the overall scientific data quality, but the improvement is restricted to the pixels which appear bright or dark in Fig. 1. Only sources which fall onto such pixels will be affected from an improved amplitude correction. For the aim-point region in CCD 4, there should be almost no change in the correction.
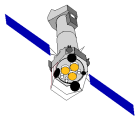
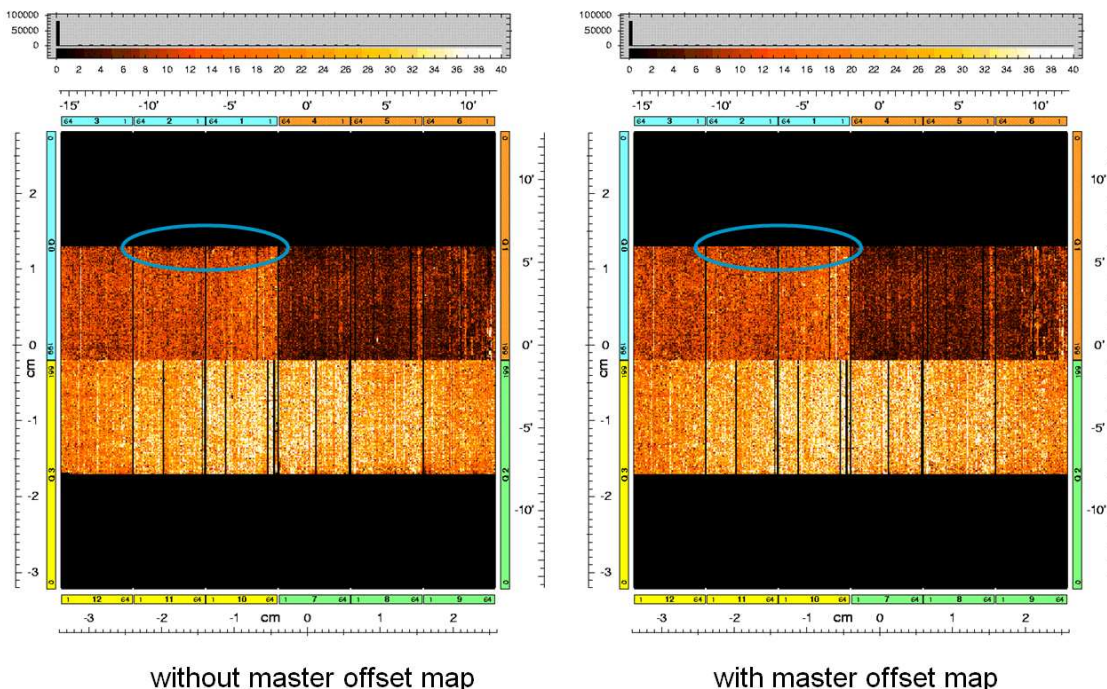XMM-CCF-REL-190: test (closed, rev 974, LW, rawevents, 20-22 adu)

without master offset map   with master offset map

Figure 2: Comparison of images from a closed exposure in LW mode (rev. 974, 0305920301_PNU027), accumulated from all events in the 20-22 adu range. Note that the edges of some CCDs, e.g. of CCD 1 and 2 (encircled) become more homogeneous when the master offset map is used.

5   Test procedures & results

Fig. 2 shows how the use of master offset maps affects images produced from all events between 20 and 22 adu. The use of the master offset maps makes the intensity distribution somewhat more homogeneous. This is most evident at the edges of some CCDs, which exhibit darker areas when no master offset is used. The dark areas were caused by the fact that offset shifts of more than +2 adu were applied there, so that no events were left in the 20-22 adu range. The use of the master offset map prevents the application of such offset shifts there.

6   Expected Updates

Further modification of the CCF may be needed if the persistent features in the residual offset maps will be found to change.