XMM-Newton CCF Release Note

XMM-CCF-REL-324

EPIC MOS HK GTI Selection

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1 CCF Components

Name of CCF	VALDATE	EVALDATE	Blocks Changed	XSCS Flag
EMOS1_HKPARMINT_0011.CCF	2014-11-06T15:15:00	2014-12-23T20:55:00	HKPARMINT	NO
EMOS2_HKPARMINT_0010.CCF	2014-11-06T15:15:00	2014-12-23T20:55:00	HKPARMINT	NO

2 Changes

During the 2014 winter eclipse season, gaps in ground station coverage around perigee resulted in delays in stabilising to the nominal MOS focal plane (FP) temperature. As a consequence, during this period most MOS exposures at the start of the science windows were subject to periods of higher than nominal FP temperature before the normal operating temperature was reached and maintained. A list of affected observations is given in Table 1. The duration of these periods varies from exposure to exposure, but is typically of the order of 3 ks, and up to 4.8 ks for MOS1 and 3.8 ks for MOS2.

Science data collected during these periods should be filtered out through SAS data processing for two reasons:

- the calibration impact, especially on the energy scale, of the temperature excursions is not well established;

- in many cases, the high temperature period gives rise to a substantial number of hot pixels or columns which subsequently return to normal once the nominal FP temperature has been

Revolution	Observation ID		Revolution	Observation ID
2731	0729160501		2744	0744490401
2732	0744370301		2745	0744220301
2733	0744370401		2746	0744413101
2734	0741033901		2747	0722480201
2735	0745010401		2748	0743010401
2736	0742820201		2749	0744490601
2737	0745120101		2750	0741031401
2738	0743910301		2751	0745320101
2739	0744220701		2752	0741031501
2740	0745010301		2753	0744440101
2742	0744040301		2754	0744440201
2743	0744040401			

Table 1: List of observations affected by non-nominal MOS FP temperatures at the start of the exposure.

> reached. However, standard SAS processing will remove associated events from the whole exposure, leading to an unnecessary loss of good data.

The current filtering based on FP temperature housekeeping data (parameters E1253, K1253) using an accepted range of [-125.0:-115.0] °C is too wide to effectively filter these cases. Hence this pair of CCFs (one per MOS unit) has been created with a narrower FP temperature tolerance of [-125.0:-120.0] °C to handle these cases. The validity of these CCFs is limited to the 2014 winter eclipse season (revolutions 2731 to 2754, roughly early November to late December).

3　Scientific Impact and Estimated Quality

The new CCFs were tested on all MOS observations taken during the 2014 winter eclipse season. The reduced temperature range upper limit effectively allows flagging and subsequent filtering of the non-nominal FP temperature periods at the start of affected exposures. Once the nominal FP temperature has been reached, it is maintained at a very stable level and remains within the new tolerance. In particular, it was verified that:

- exposures affected by non-nominal FP temperature were correctly filtered up to the point that the nominal temperature was reached;

- from that point onwards, the new temperature range tolerance did not result in any additional filtering;

- exposures which were not affected by non-nominal FP temperatures did not undergo any additional filtering due to the new FP temperature tolerance.

Additionally, compared with the use of the old CCFs, the new CCFs result in a reduced number of bad pixels and columns being flagged for many of the affected exposures.

4   Test Procedures

Verification of functionality with SAS 14.0: `calview`, `cifbuild`, `emproc`.

5   Expected Updates

Ground station coverage gaps during future eclipse seasons could give rise to temperature excursions which would have to be handled in a similar manner. However, operational changes are currently being developed with the aim to minimise the impact of such occurrences.