XMM-Newton CCF Release Note

XMM-CCF-REL-115

EPIC Filter Transmission (Regions)

D Lumb

April 18, 2002

1 CCF components

Name of CCF	VALDATE	List of Blocks changed	CAL VERSION	XSCS flag
EMOS1_FILTRANSX_0010	2000_01_01T00:00:00	FILTER-THICK, THIN ,MEDIUM, OPEN		NO
EMOS2_FILTRANSX_0010	2000_01_01T00:00:00	FILTER-THICK ,THIN ,MEDIUM, OPEN		NO
EPN_FILTRANSX_0013	2000_01_01T00:00:00	FILTER-THICK ,THIN ,MEDIUM, OPEN		NO

2 Changes

The spatial region selection expression has been expanded from 1000 arcsec to 1100 arcsec, so that future changes of greater than 1 arcminute in telescope axis location will be accommodated in the filter location. An editorial change also to anchor the low energy point at 0eV instead of 40eV prevents a small negative excursion in filter transmission, albeit at energies below the nominal range of EPIC.

3 Scientific Impact of this Update

Editorial change, necessary to make tasks such as *eexpmap* and *evigweight* work (and possibly other tasks) in the case where the opticsx,opticsy keywords would be modified to account for possible offset of the telescope axis from the detetcor centre.

4 Estimated Scientific Quality

See previous version

5 Expected Updates

Whenever we have sufficient data to map the spatial variation of transmission (the THICK filters in particular), then spatial region expressions will be introduced to describe the variation projected at the detector.

There may be improvements in existing transmission vs. E curves as we analyse more calibration data.

6 Test Procedures

Using *calview* the transmission curves on-axis for the filters were compared with the existing sets.

The application of the existing and new data files to the vignetting weighting maps was compared, and the validity of the improved spatial region demonstrated by finding a complete image map.

7 Test Results

All filter data files were *identically* modified by changing only the radius of the selection region, and the addition of a 0eV anchor point. The concerns for verifying changes then are that the transmission vs. energy values are not modified, and that the new spatial region correctly accounts for shifts in opticsx,opticsy.

7.1 Transmisison

Figure 1 shows a comparison of transmission for the case of MOS1 THICK filter. The curves are identical, with the expected exception of the range 0 - 40eV, where the addition of an anchor point removes aphysical -ve transmisison values seen in the old data sets.

7.2 Spatial selection

A test CCF was built using $OPTICSX, OPTICSY$ keywords arbitrarily moved about 1 arcminute from the existing centre. A typical event list set was processed through SAS v5.3 *evigweight*, and

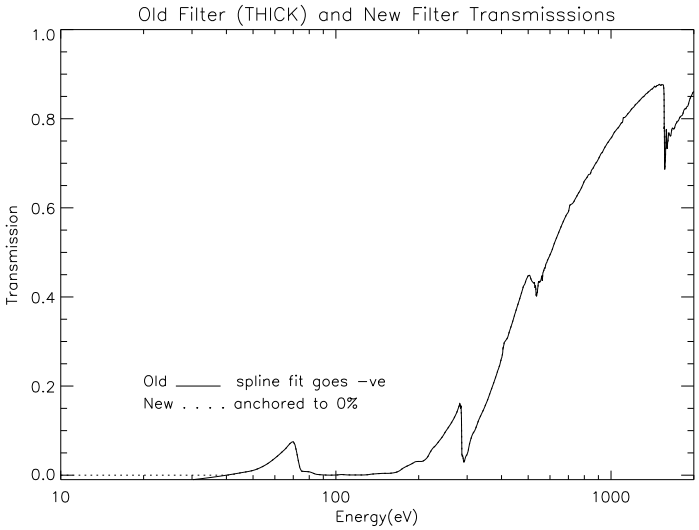

Figure 1: Comparison of transmission curves

the image displayed with weighting. Due to the lack of valid data points at the greatest extreme, a NULL value of weighting produces an incorrect truncation of the image to lower left (Figure 2).

Application of the new *FILTRANSX* files was made to the test CCF and the procedure repeated. The image recovered the whole valid range as expected (Figure 3).

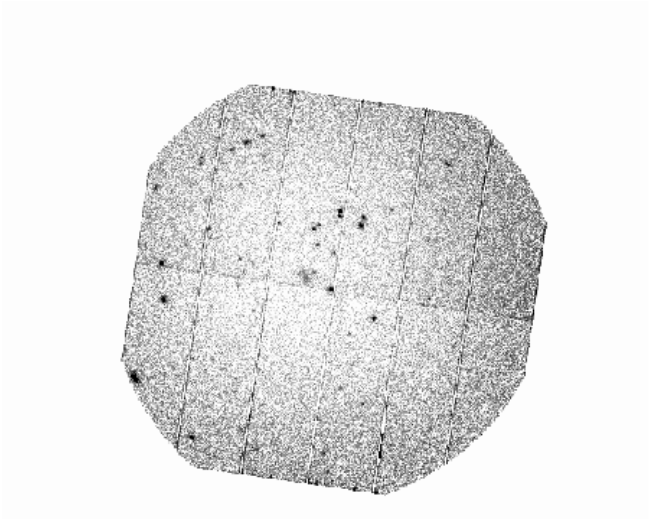

Figure 2: Vignetting weighted image - due to shift in telescope axis w.r.t. filter, the lack of valid data points at the extreme edge reuls in loss of data towards the southwest

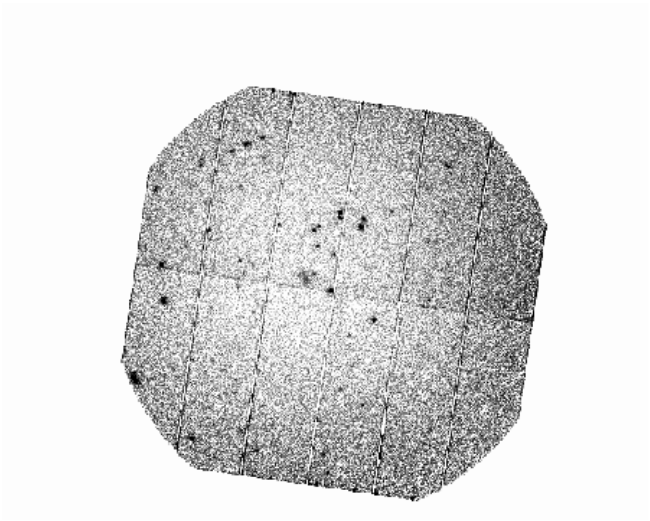

Figure 3: Vignetting weighted image - the improved data file with larger selection region recovers the data at the edge of field