XMM-Newton CCF Release Note

XMM-CCF-REL-120

OM Photometry

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July 5, 2002

1 CCF components

Name of CCF	VALDATE	List of Blocks changed	CAL VERSION	XSCS flag
OM_COLORTRANS_0007	2000-01-01T00:00:00	COLORMAG		No

2 Changes

The zero-points and color-transformations for optical filters are set based on observations of several hundreds standard stars. For the UV filters, the zero-points and color-transformations are still based on the simulations because we do not have enough calibration data yet.

3 Scientific Impact of this update

Current zero-points are based on two spectrophotometric standards (LLB 227, GD153) and the color-transformations are set by folding the Bruzual-Persson-Gunn-Stryker spectra with the in-flight response curves of the OM. This new CCF is based on our ground-based calibration program. Though the simulations and the observations agree well in general (now at a level of 0.02 mag). this new CCF will improve the accuracy of the OM photometry.

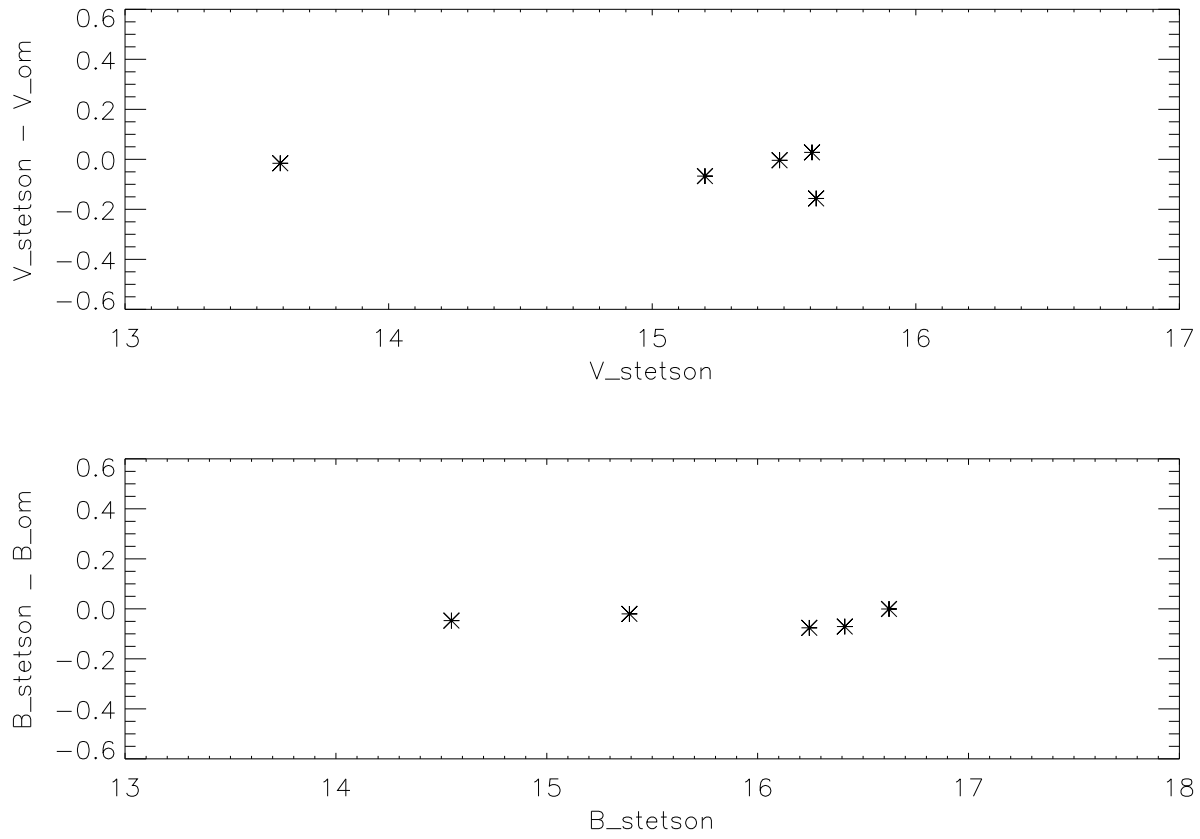

Figure 1: The difference in standard magnitude between Stetson's measurement and OM measurement as a function of Stetson standard magnitude.

4 Estimated Scientific Quality

The photometric accuracies are better than 3% for B, V filters, and 5% for U filter. For the UV filters, the calibrations, which are based on simulation, are more uncertain and can have errors up to 10%.

5 Test procedures

This new CCF has been tested using SAS public version 5.3.3 at xvsas01.vilspa.esa.es. I use a new OM calibration observation in rev. 407 to test OM photometry. The ODF has been run through SAS "omichain" task. Everything looks OK. Once "omichain" finished, instrument magnitudes from each filters are written into source lists. These source lists are combined using "omsrclistcomb" to get the whole-observation source list, which include the standard magnitudes and colours. Then I compared these standard magnitudes derived from OM with existed standard photometry published by Stetson (2002).

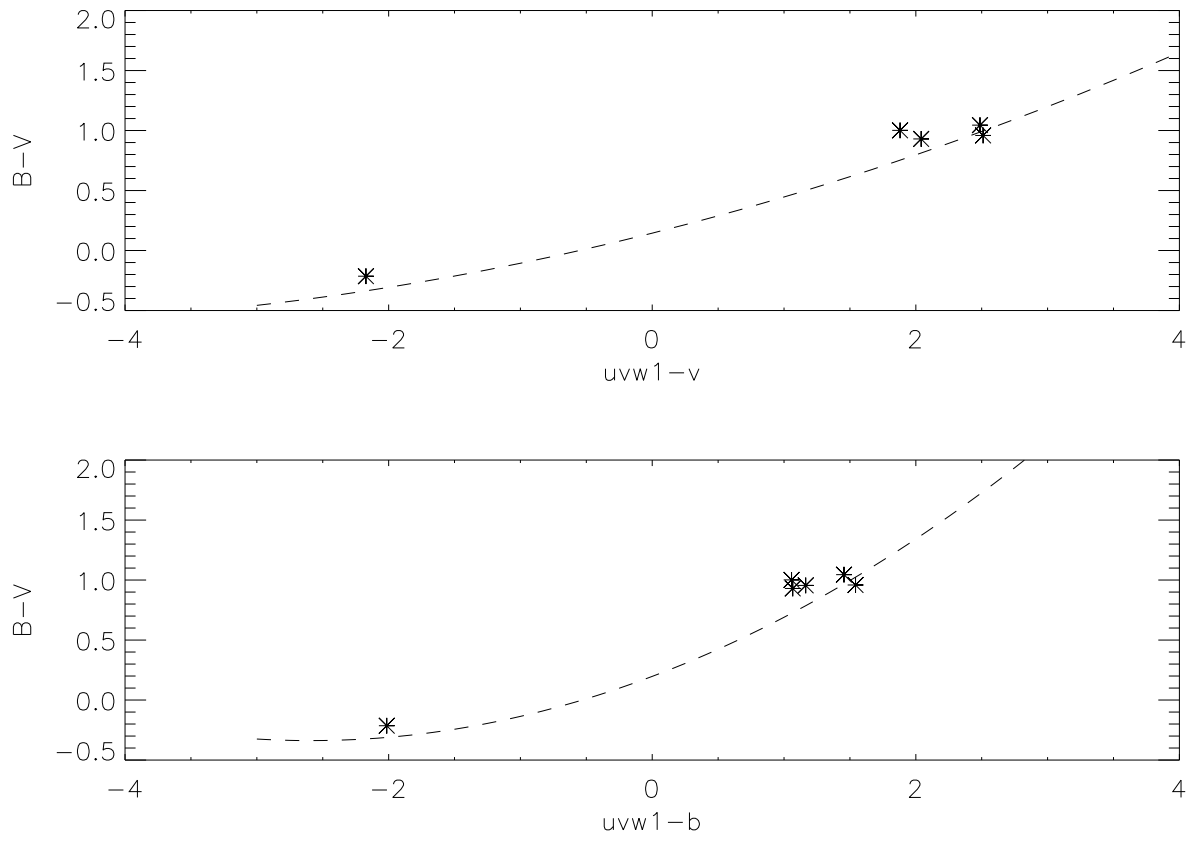

Figure 2: Comparing the simulated UV color-transformation (dashed lines) with the data in the SA95 field. The lower case letters denote the OM instrumental system, the upper case letters the Johnson system

6 Summary of the test results

In Figure 1, we plotted the difference in standard magnitude between Stetson's measurement and OM measurement as a function of Stetson standard magnitude. From this figure, we found that the OM standard magnitudes are in good agreement with the Stetson's measurements. Because Stetson standards have very high photometric accuracy ($\sim$ 0.005 mag), the standard deviation on the residuals between the Stetson and OM measurements can be used to derive the OM photometric accuracy. From Figure 1, we found that the OM photometric accuracies are 0.01 and 0.03 mag for B and V filters.

In Figure 2, the simulated UV color transformations (the dashed lines) are compared with the data in the SA95 field. We can see that the simulated UV color-transformation based on this new CCF can represent the observations. A small offset between the observations and the simulations is probably due to error on the zeropoint determination of UVW1 filter.

7 Expected updates

New CCF is based on all available observations. We don't see that a new update is needed soon for optical filters unless OM response changes significantly. UV color-transformations need to be updated when more calibration data have been taken.

8 Acknowledgements

Thanks to OM team members, especially Igor Antokhin for his contributions.