Pipeline Calibration

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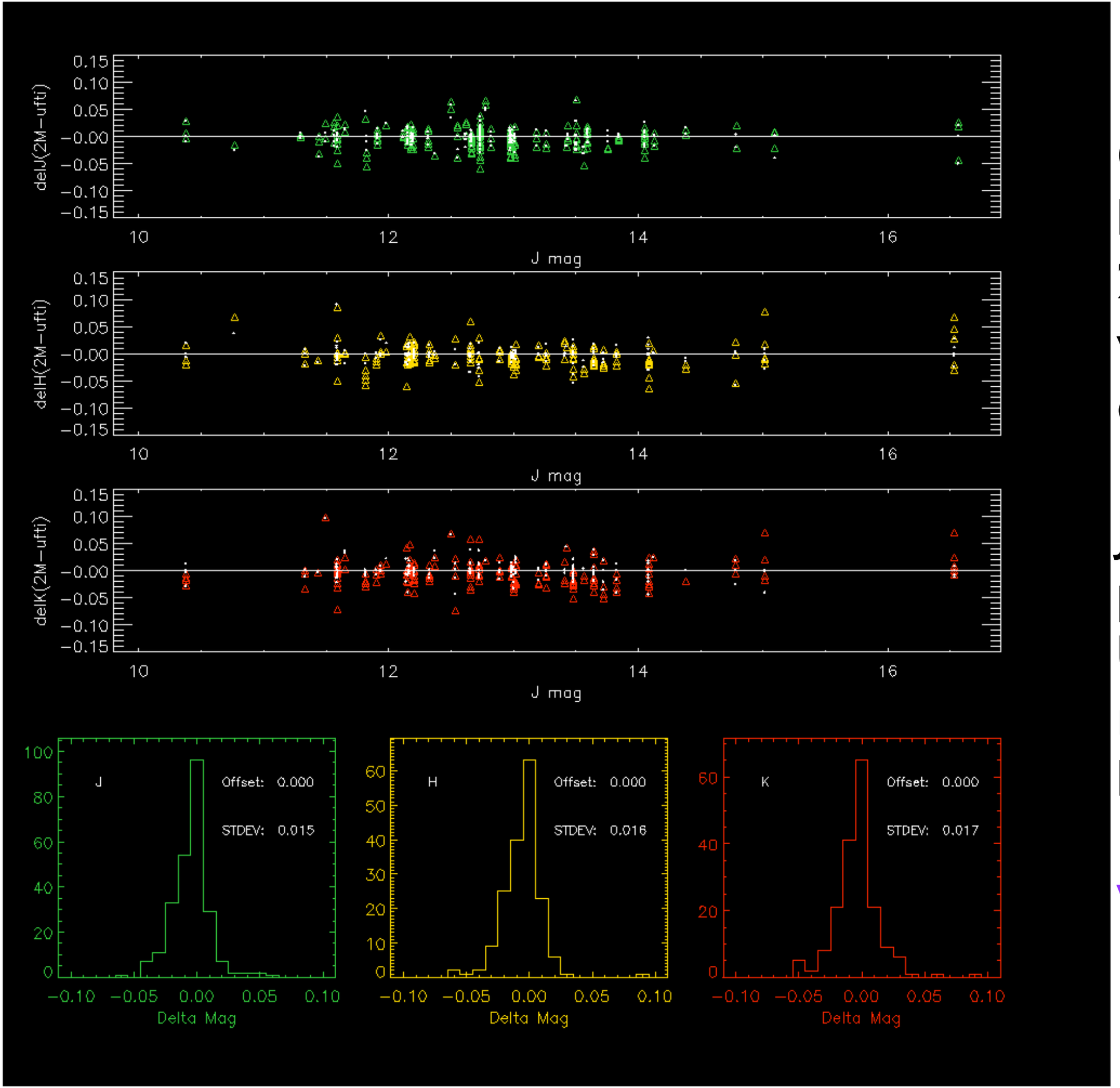
(paper in prep)

Outline

- UKIRT Faint Standards
- Linearity
- Z and Y filters
- Recalibration of 05A and 05B

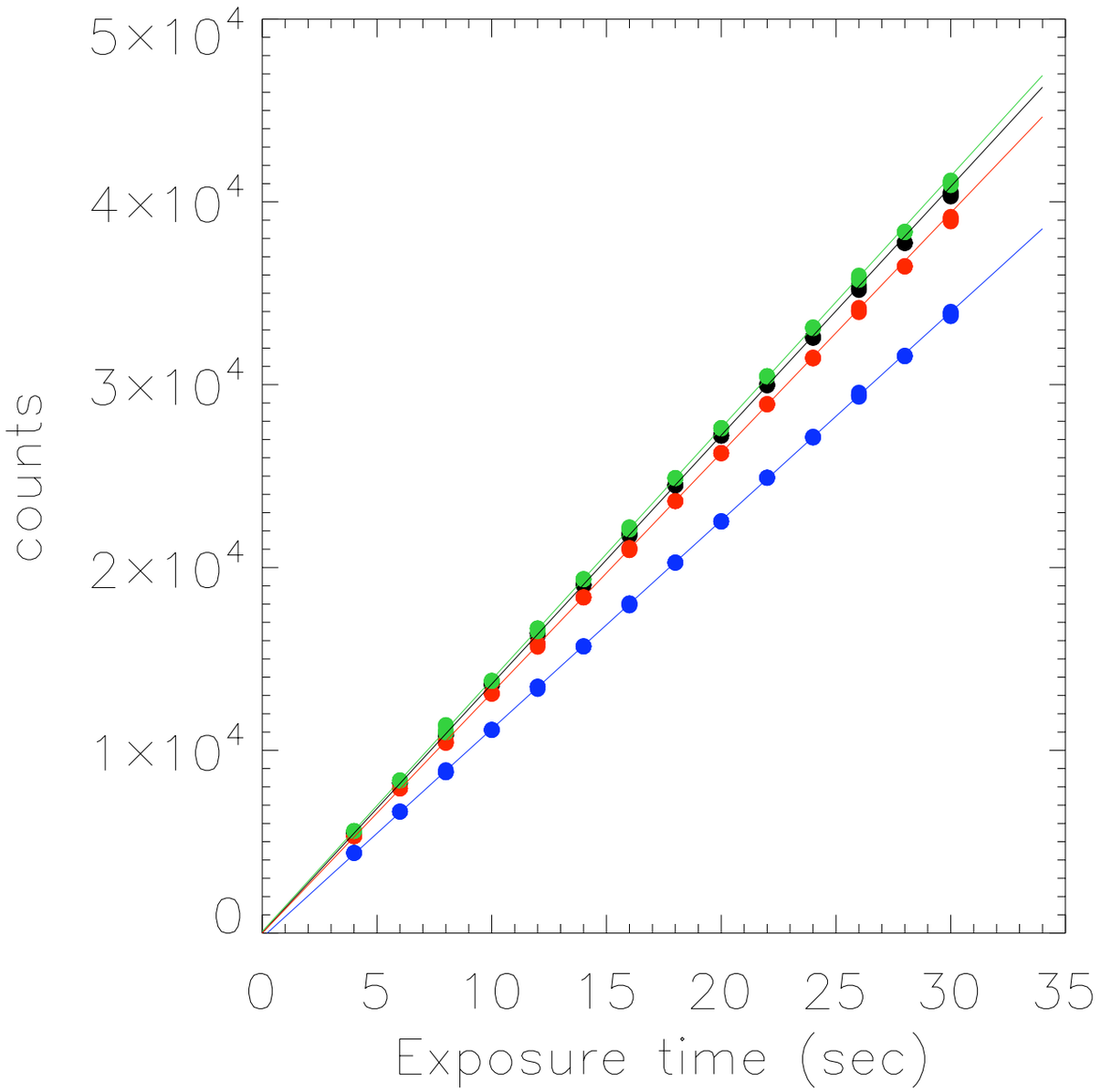


Calibration based on the 2MASS stars visible on each detector

JHK photometry of UKIRT FS reproduced to better than 2%

Well anchored

Linearity from dome flats



- dome sequences measured in March 2005 and May 2006

Assume that the data is linear, then fit a model

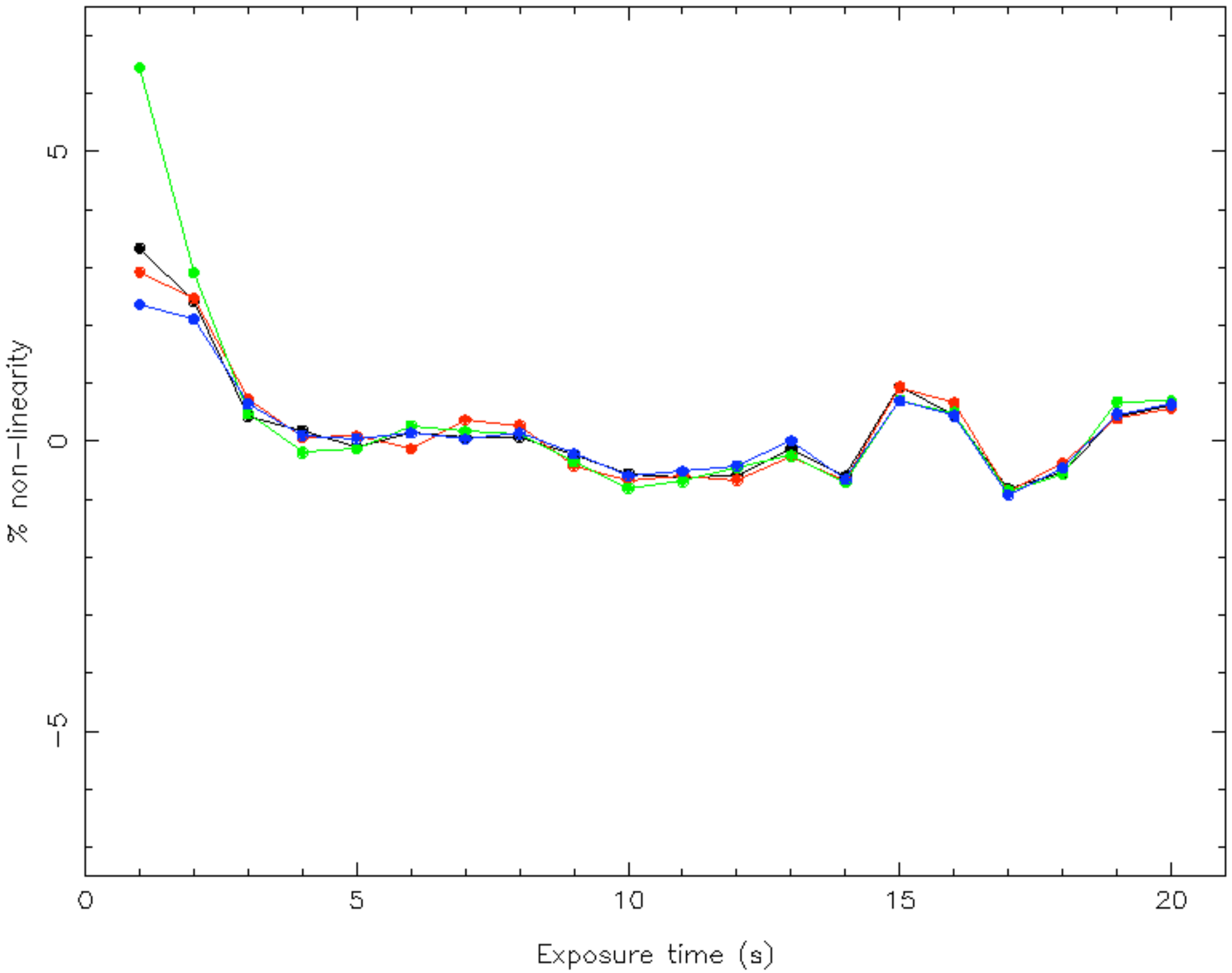
$d_i = A + Bt_i$

Residual non-linearity (%age) is defined as

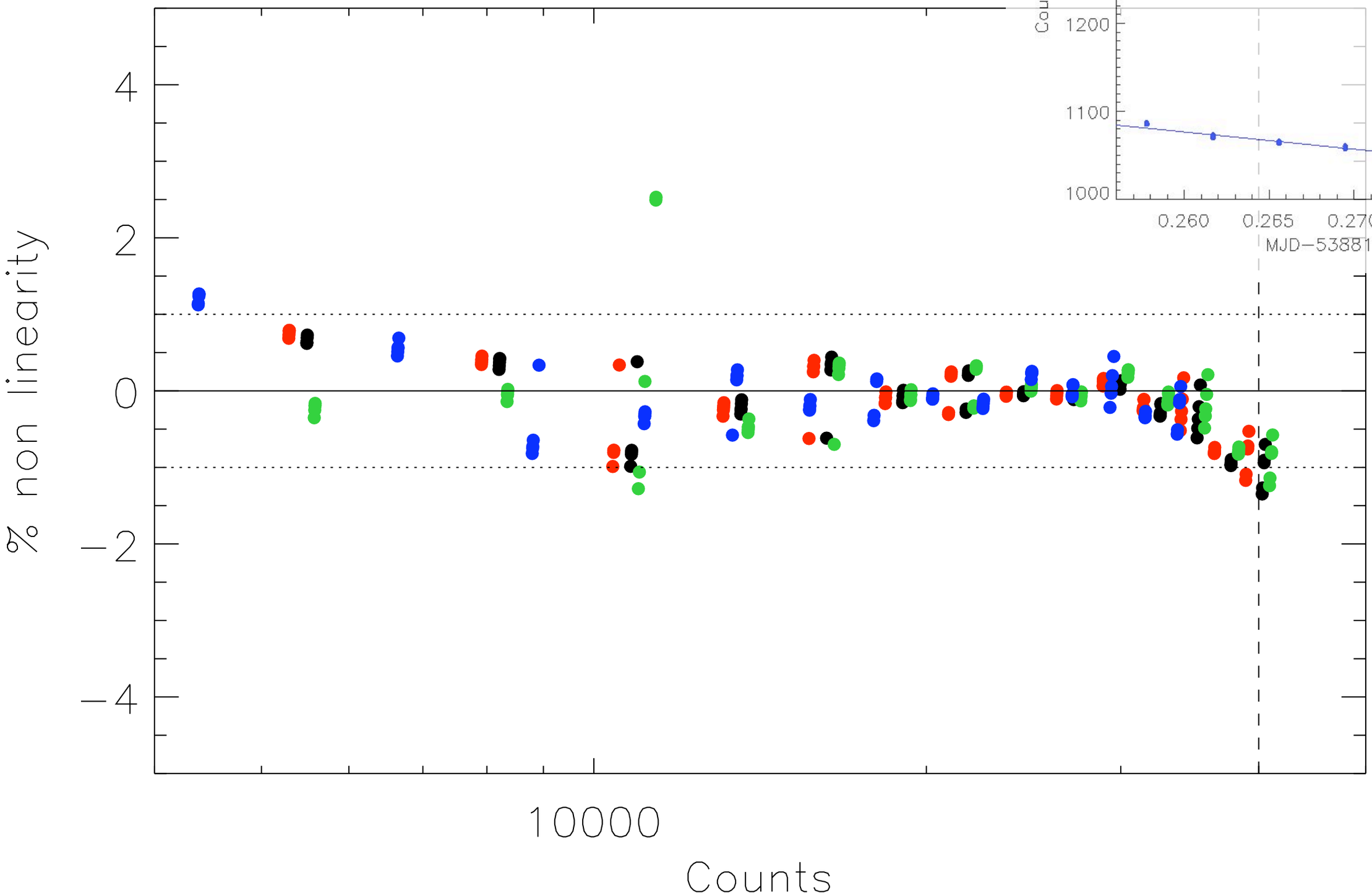
$100 \times [d_i - (A + Bt_i)] / d_i$

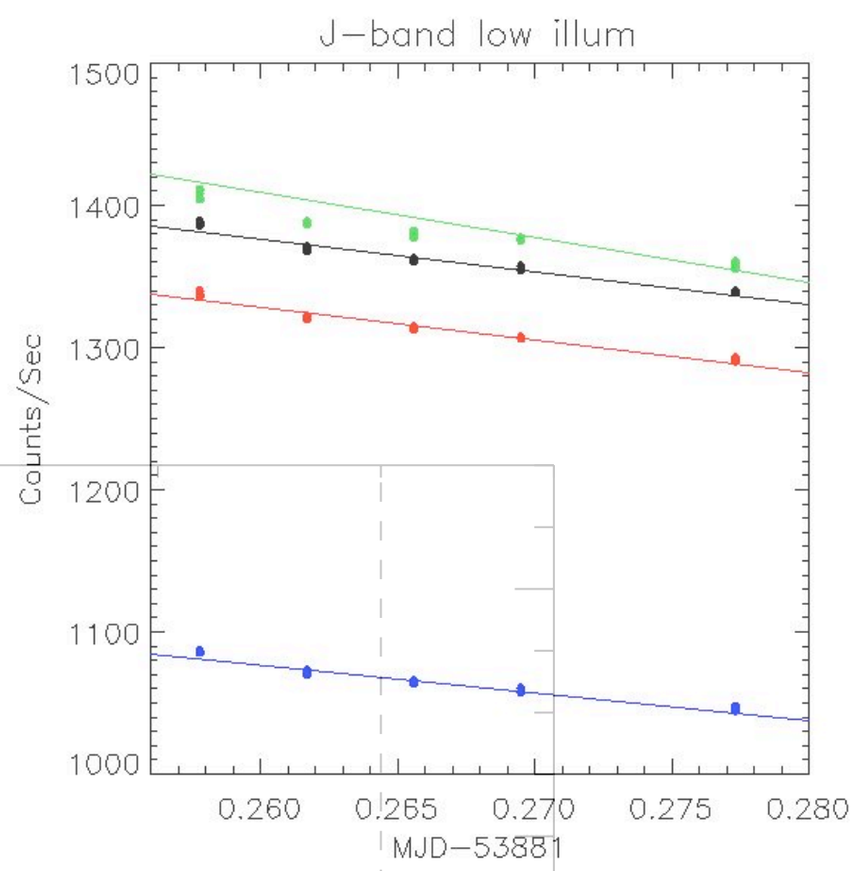
- show that WFCAM is linear to <=1%

March 2005

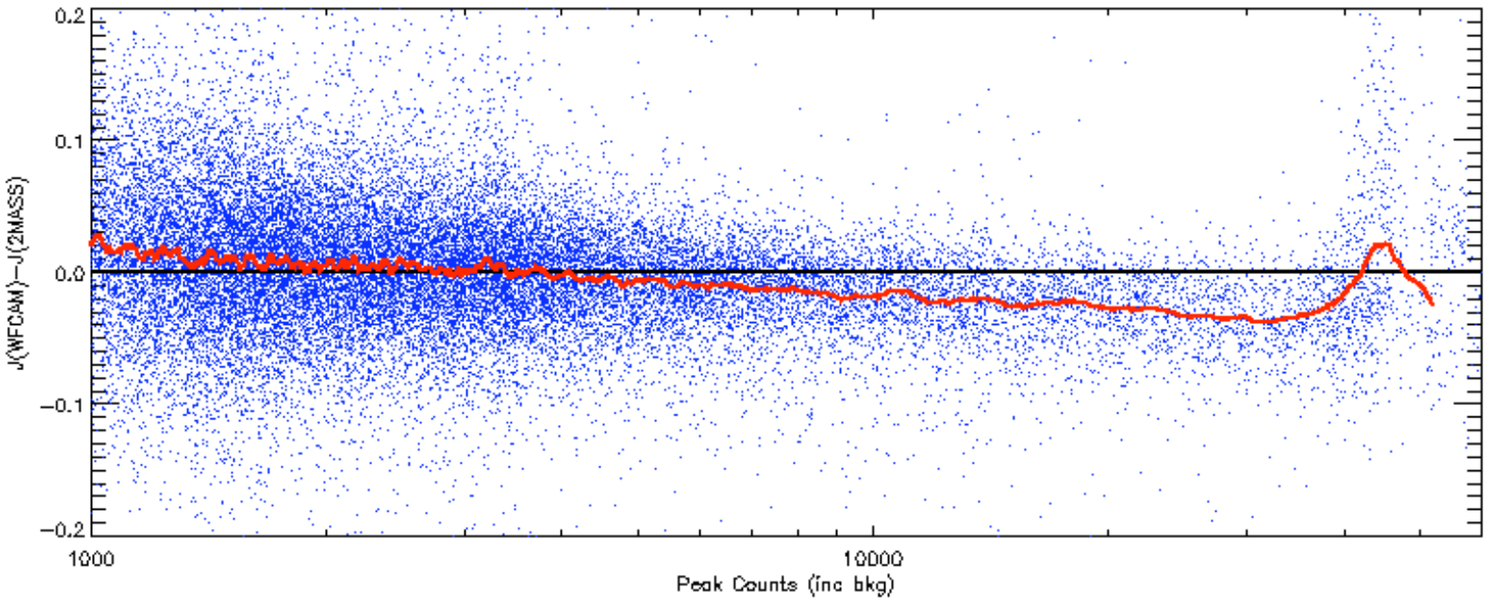


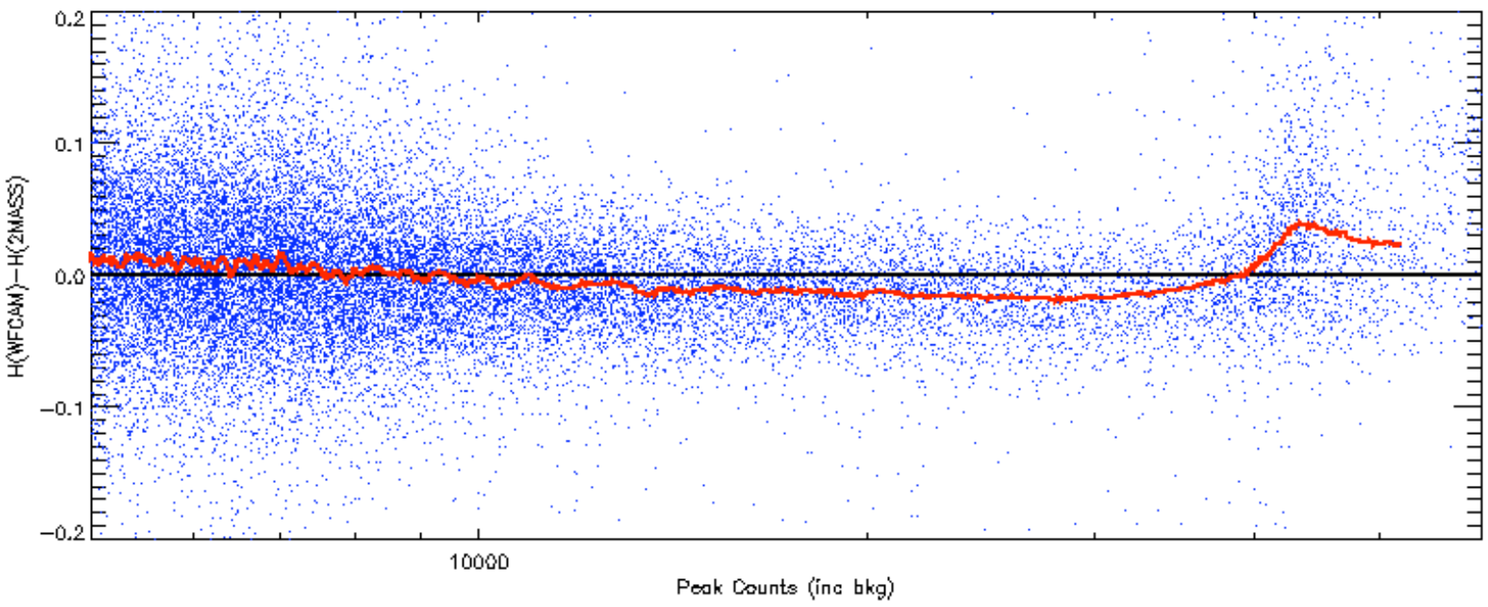
May 2006

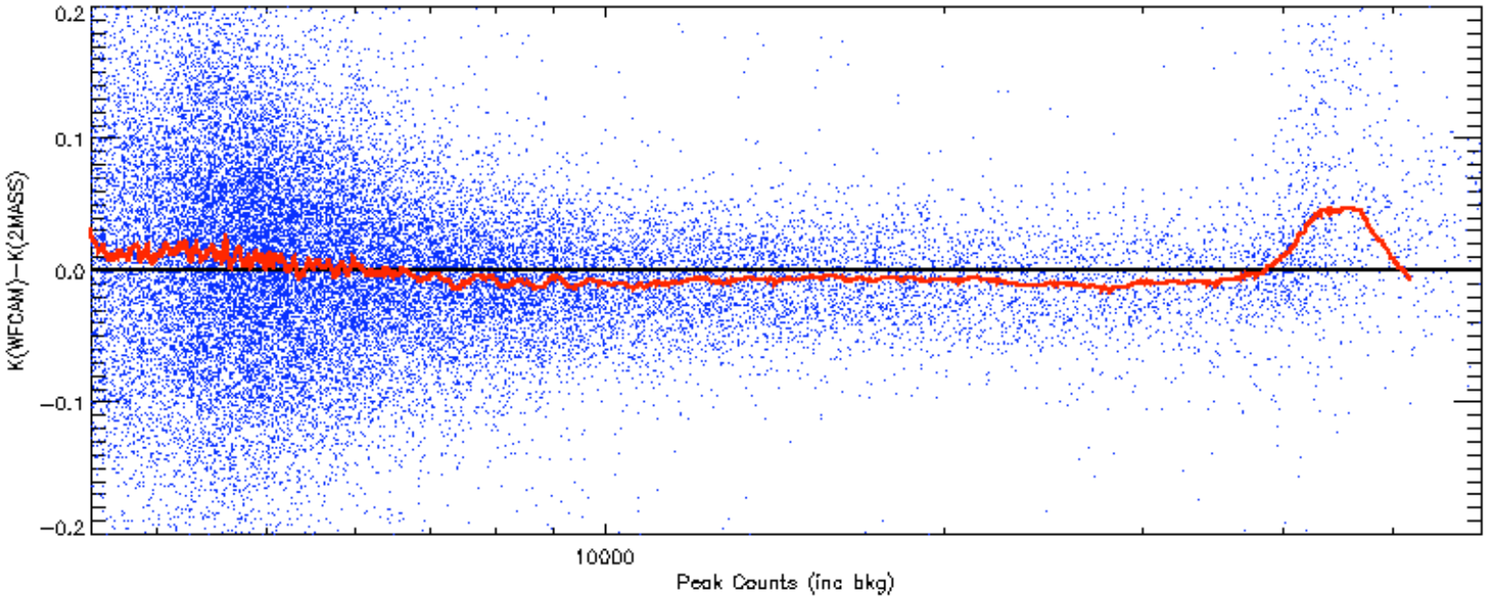

% non linearity
4
2
0
−2
−4
10000
Counts


J−band low illum
Counts/Sec
1500
1400
1300
1200
1100
1000
0.260
0.265
0.270
0.275
0.280
MJD−53881

Comparison with 2MASS

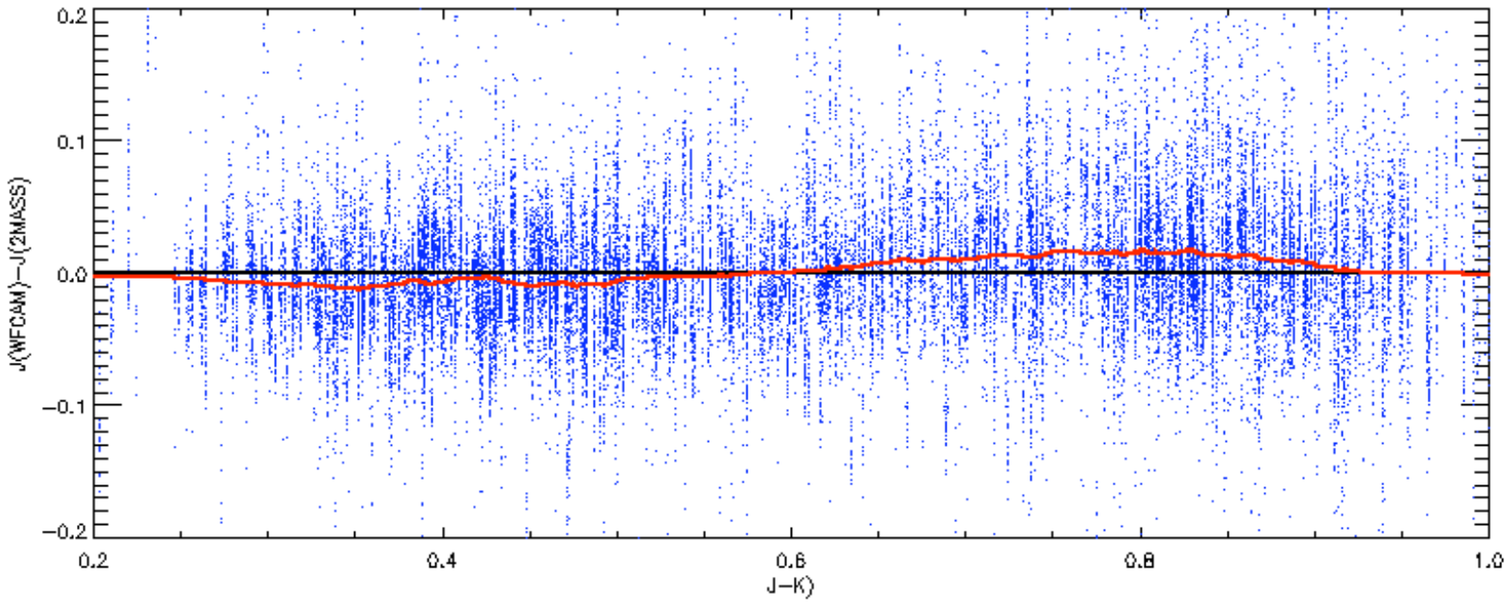


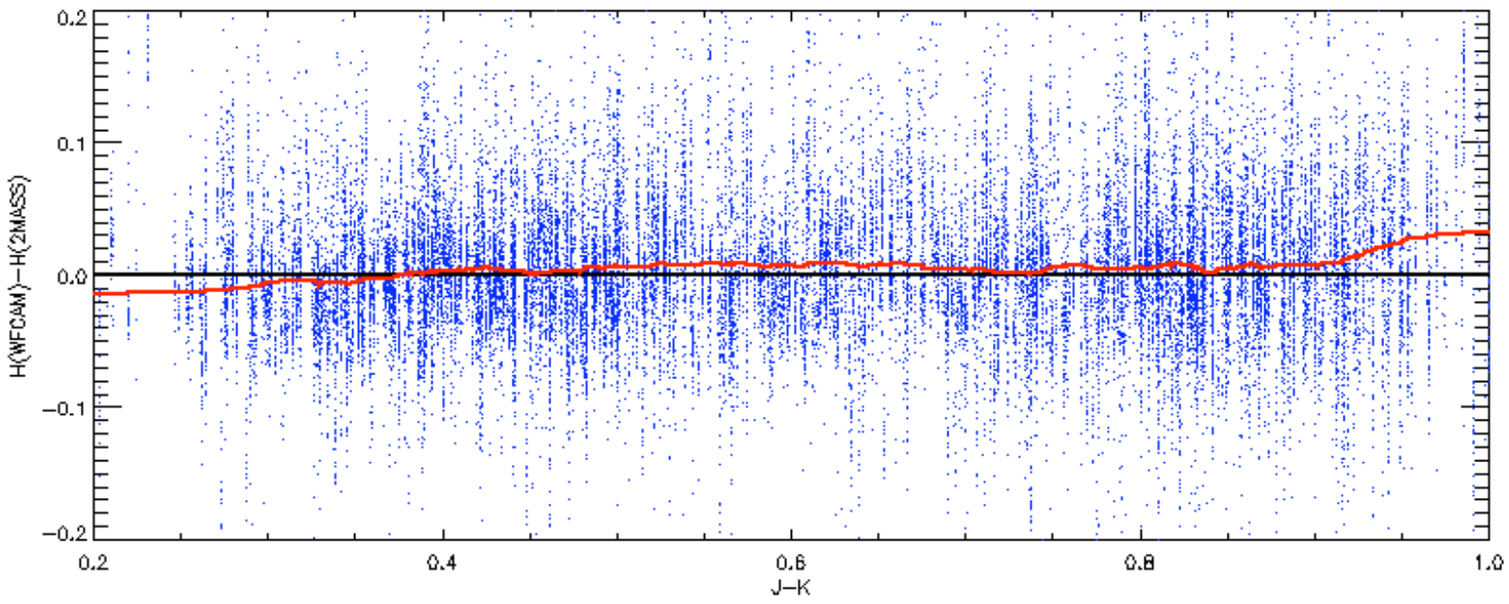


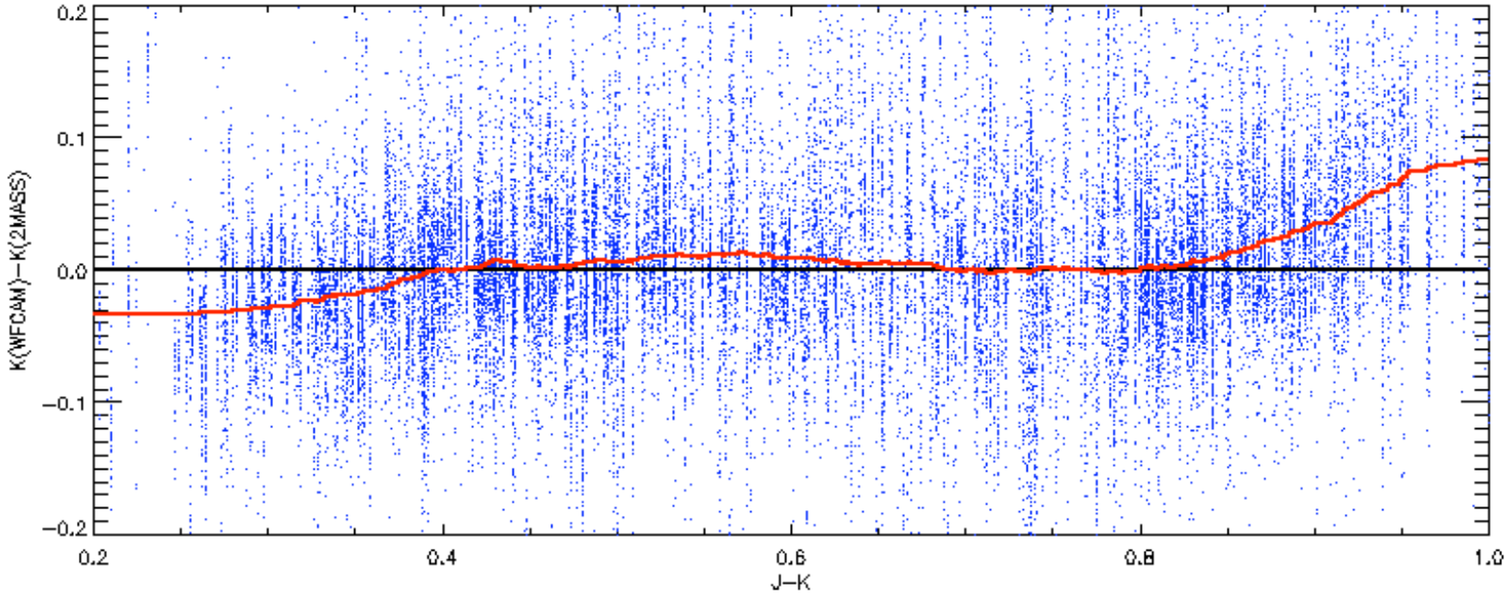


Delta magnitudes with 2MASS showing residuals reaching 3% in J just prior to saturation.

Slight evidence for wavelength effect: i.e. effect is more pronounced in the blue







No obvious residual trend with colour

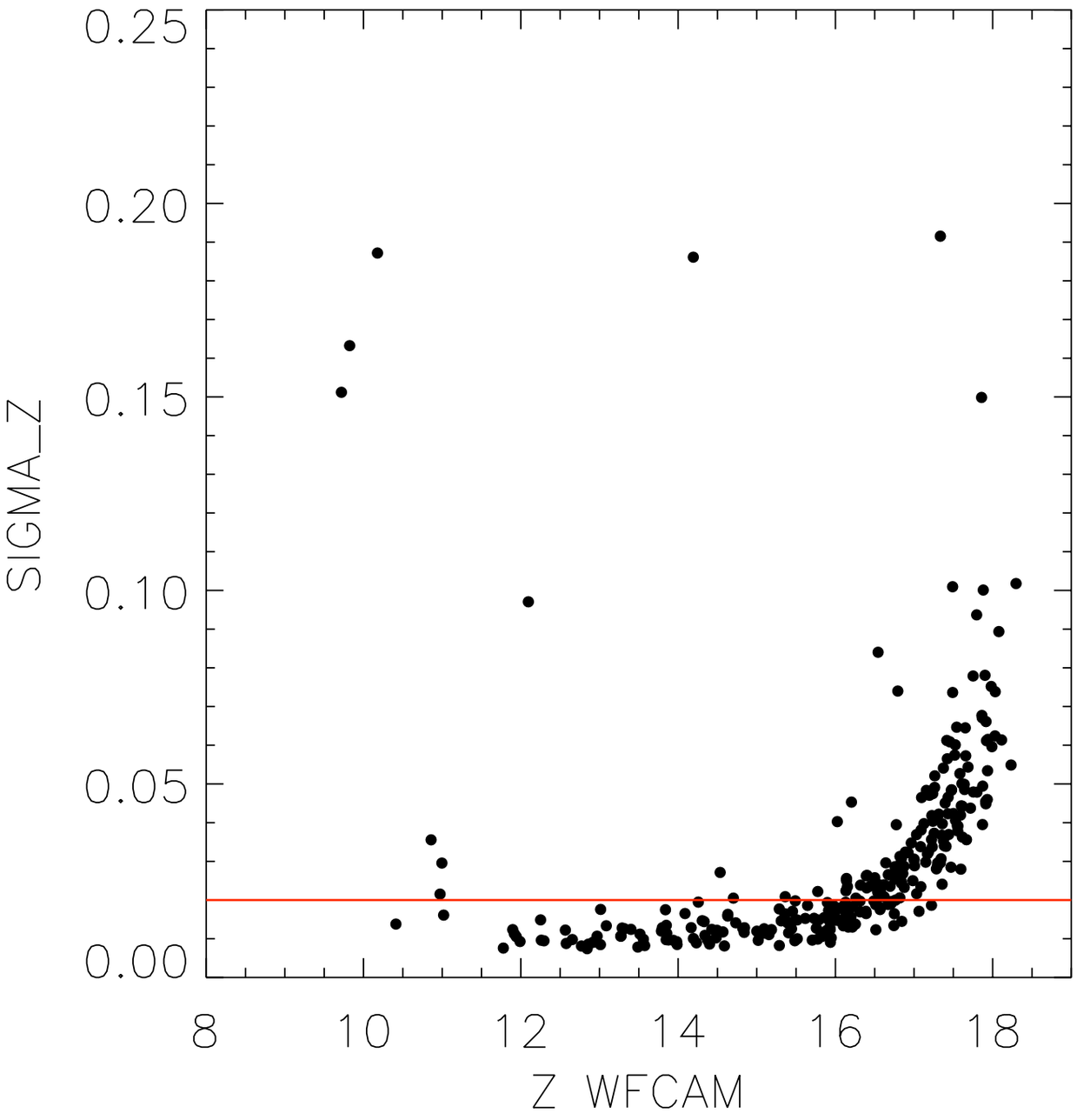
Cutri:

We did not apply any linearity corrections during the 2MASS data reduction. We tried to be conservative and flag pixels as saturated when they were in an intensity regime that deviated from linearity by >2%. We also did not apply any linearization over the full exposure regime. I believe that there may be 1-2% residual non-linearities over the full dynamic range in some of the arrays. However, that was within the required threshold for photometric uniformity for the survey, so we chose not to apply any correction.

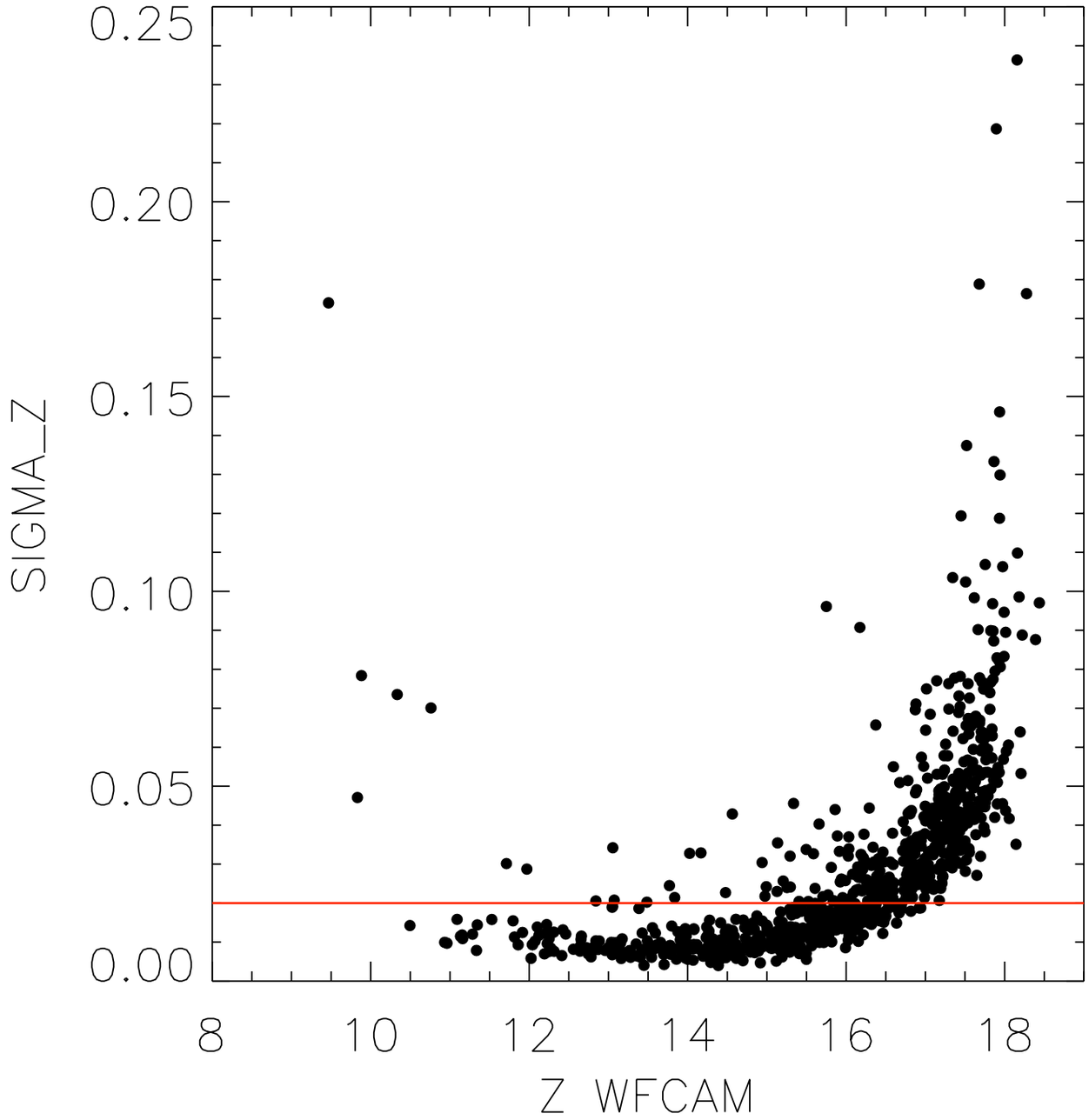
Z/Y filters
(photometric integrity)

Z-band

P272

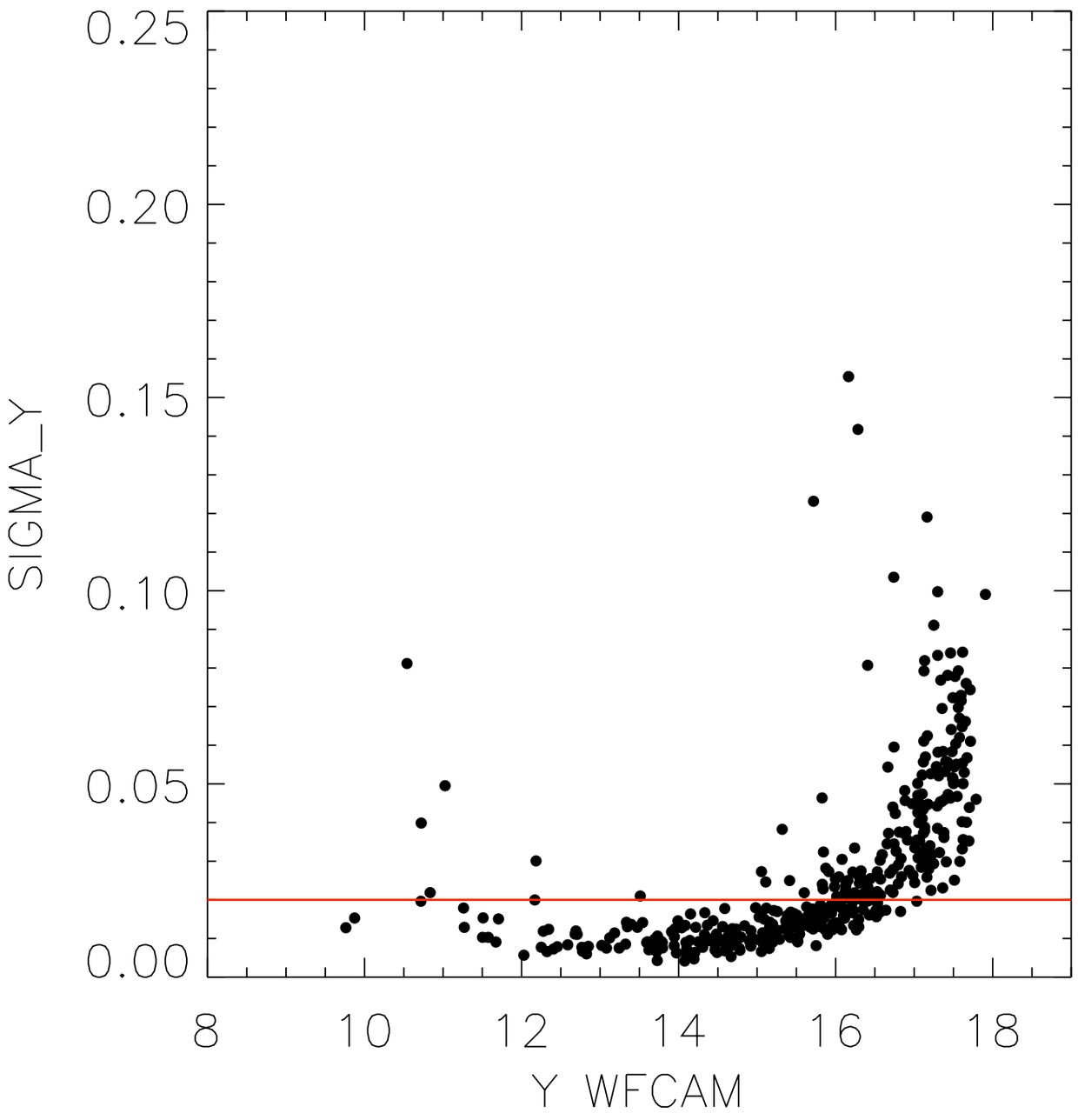


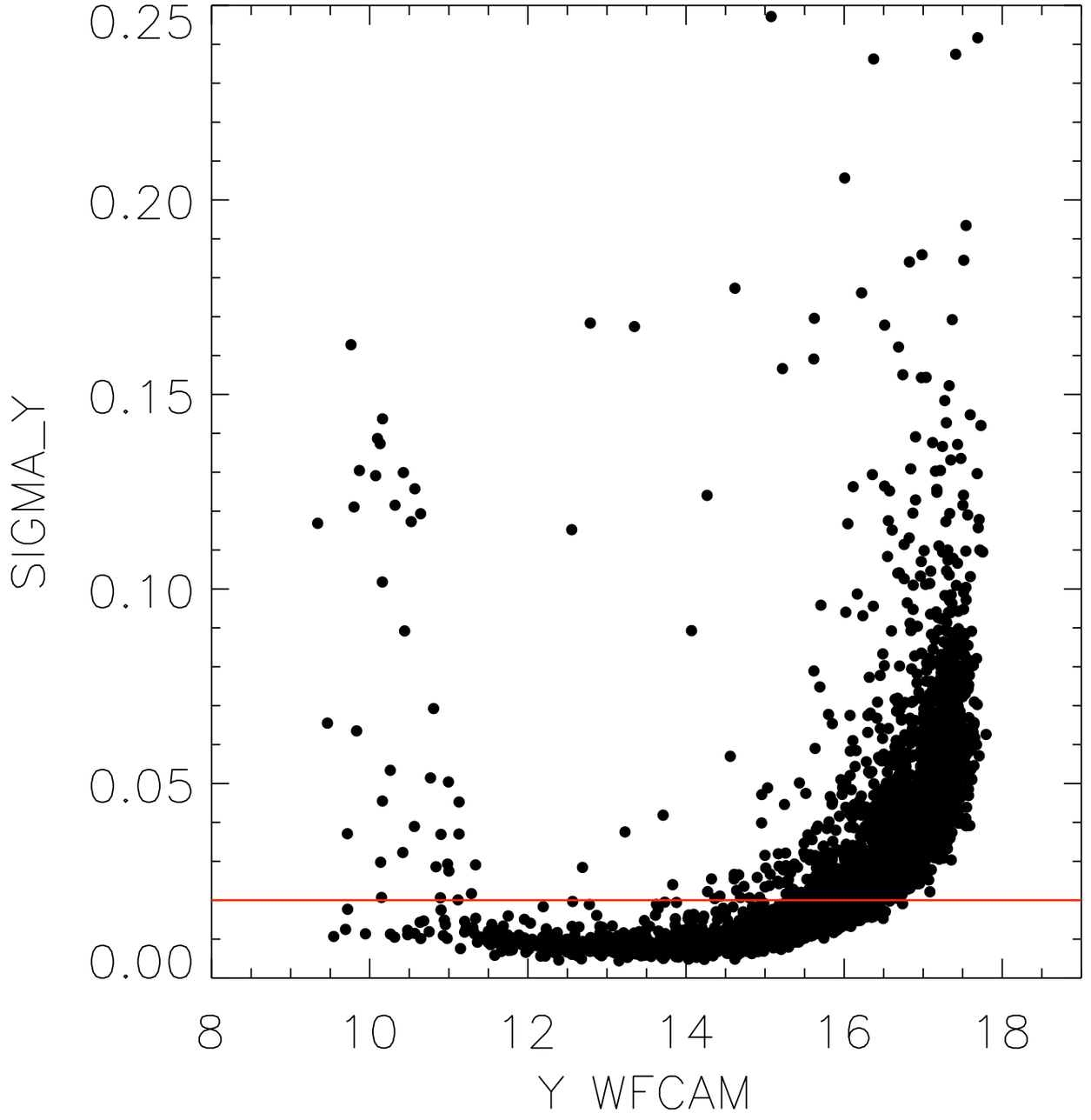
P545



Z-band RMS diagrams for uncrowded (300 stars) and rich (900 stars) fields measured on photometric nights. The observations span 05A and 05B, and comprise around 21 obs for the P272 field, and 24 for the P545 field.

GD50 Y-band GD71



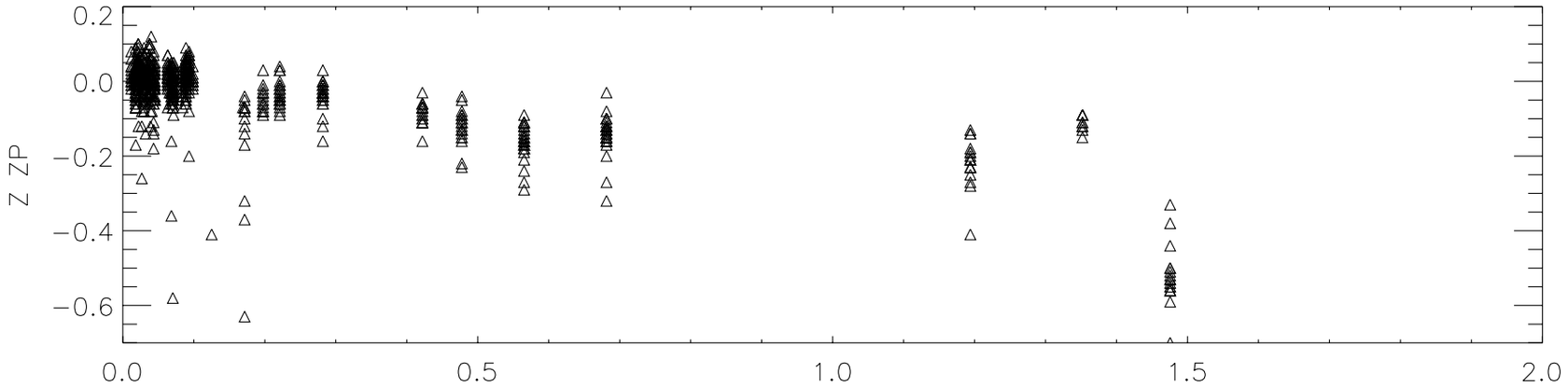


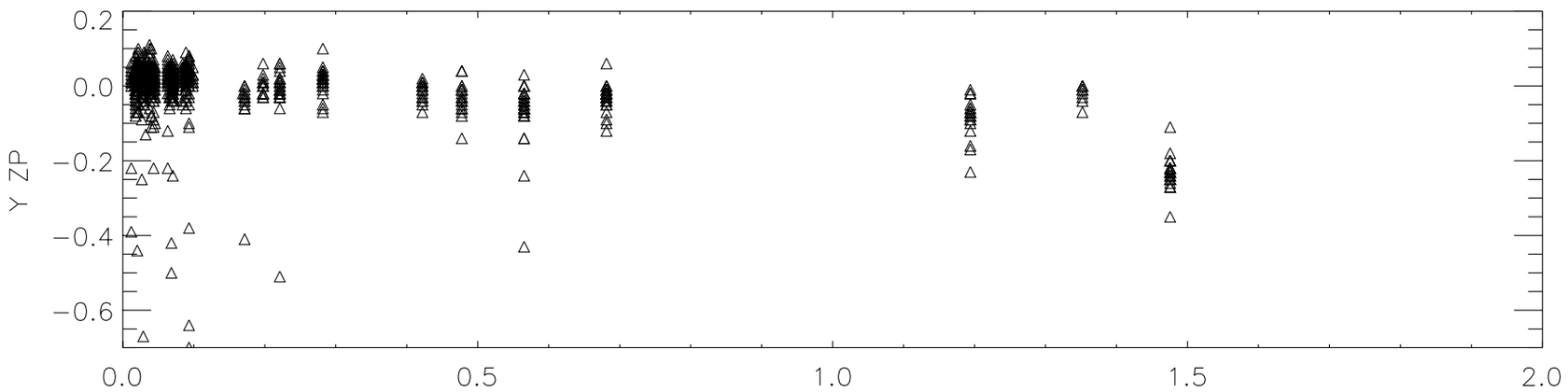
Y-band RMS diagrams for crowded (4000 stars) and uncrowded (400 stars) fields measured on photometric nights. The observations span 05A and 05B, and comprise around 18 obs for the GD51 field, and 36 for the GD71 field.

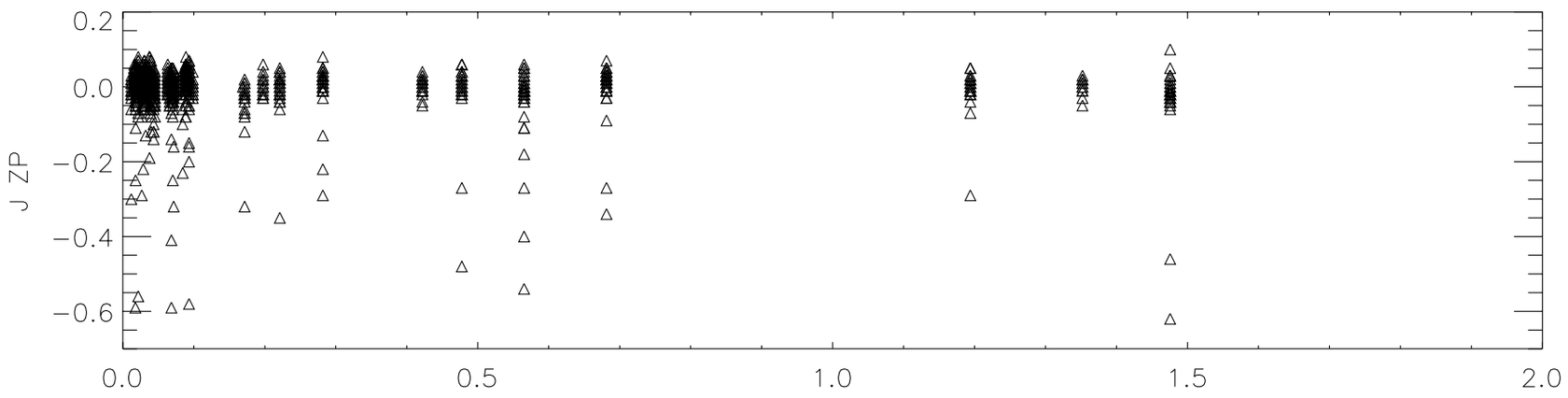
Spatial Dependence

ZP vs latitude

ZP vs extinction





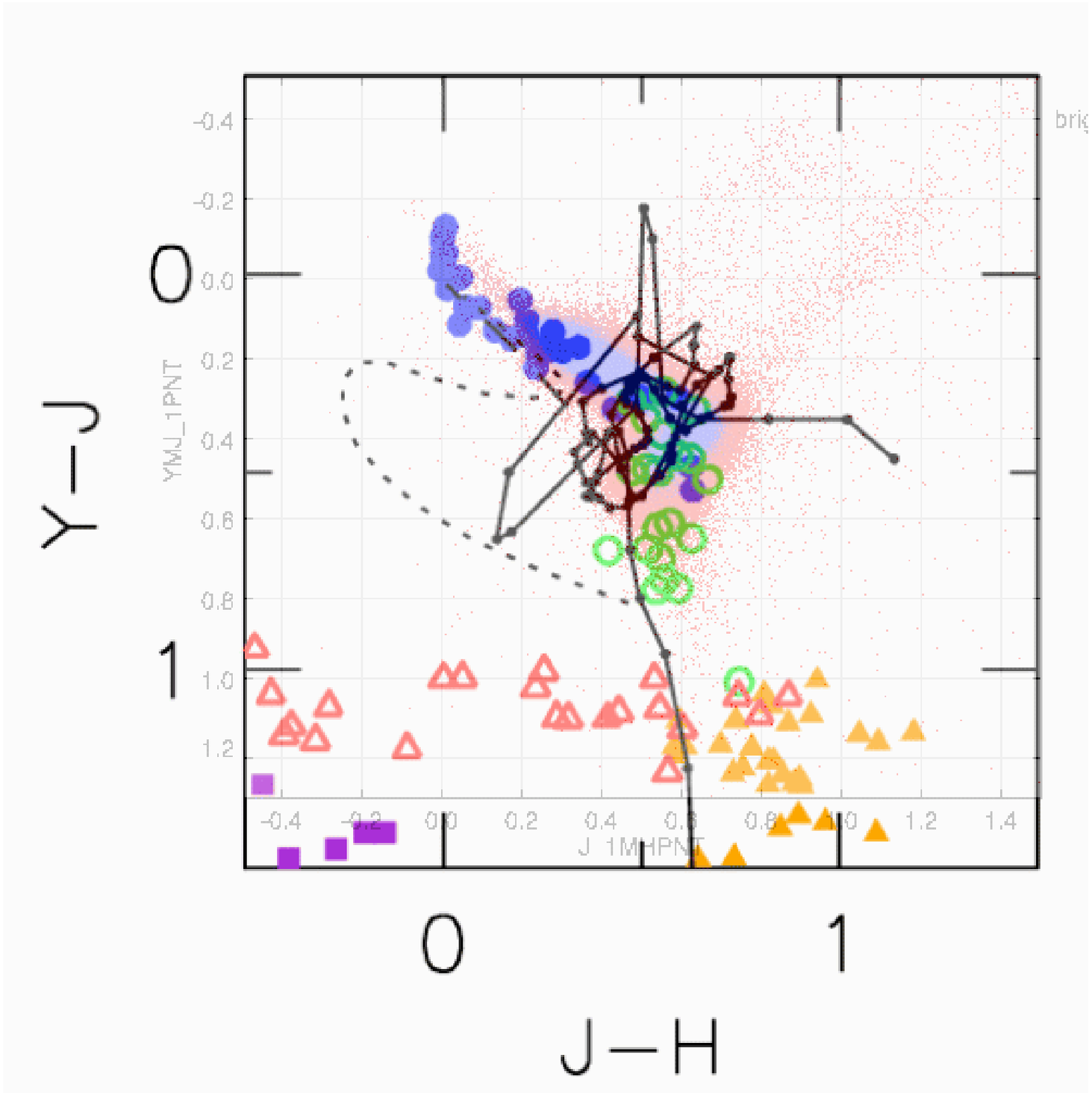


E(B-V) from Schlegel

Recalibration

- Use restricted colour range for 2MASS input catalogue (J-K<=1.0)
- New measures:
  - MAGZPT
  - MAGZRR (per frame ‘error’)
  - NIGHTZPT
  - NIGHTZRR (per night ‘error’)
- Adopt galactic extinction correction

Remaining Issues



Z and Y calibration is largely homogenous.

But not yet tied into an existing system.

Because there isn't one

We have:

- synthetic photometry
- spectroscopy
- SDSS Z-band