Comparison of Kyoto FM and TV FNC-N Data Processed with FTOOLS

Data & Processing

- Kyoto FM calibration data are downloaded from here:
  http://www-cr.scphys.kyoto-u.ac.jp/member/nobukawa/SXI/data/KyotoFMcalibration/20160114_FFF-format-fits_AC_normal/
  sxi_ev_FFFevt_55Fe_cor-CTI_CCD1AB_delete-down-burst_20140820.evt.gz
  sxi_ev_FFFevt_55Fe_cor-CTI_CCD1CD_delete-down-burst_20140820.evt.gz
  sxi_ev_FFFevt_55Fe_cor-CTI_CCD2AB_delete-down-burst_20140820.evt.gz
  sxi_ev_FFFevt_55Fe_cor-CTI_CCD2CD_delete-down-burst_20140820.evt.gz
  sxi_ev_FFFevt_55Fe_cor-CTI_CCD3AB_delete-down-burst_20140820.evt.gz
  sxi_ev_FFFevt_55Fe_cor-CTI_CCD3CD_delete-down-burst_20140820.evt.gz
  sxi_ev_FFFevt_55Fe_cor-CTI_CCD4AB_delete-down-burst_20140820.evt.gz
  sxi_ev_FFFevt_55Fe_cor-CTI_CCD4CD_delete-down-burst_20140820.evt.gz

- ThermalVac FNC-N data are:
  ah000506304sxi_p010000220_uf.evt.gz
  and associated files from
  20160119_inputandoutput/000506304/ingest/ah_000506304

- FTOOLS is AstroH_Release_00
  CALDB is current as of 2016-02-08, all files are
  ah_sxi_*_20140101v001.fits (using video temperature of 25 C for the Kyoto FM data even/odd correction)

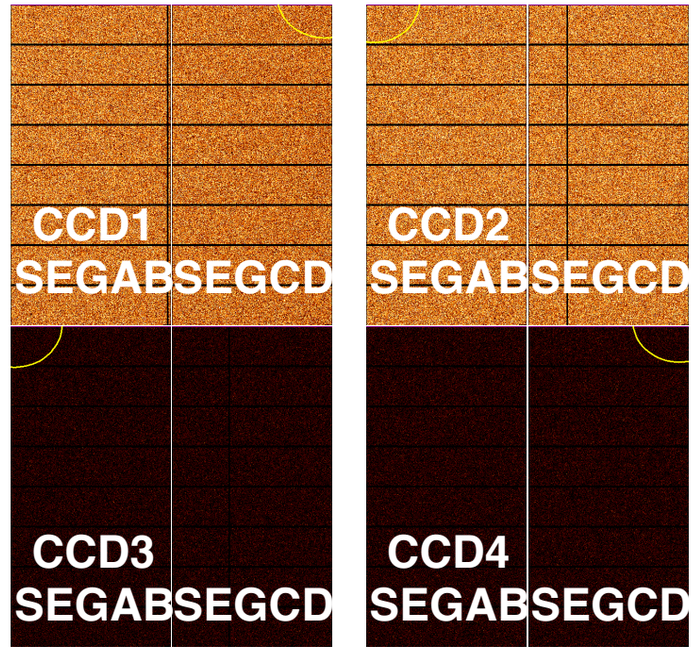
- FTOOLS processing: in order: coordevt, coordevt (hotpix), sxiphas, sxiflagpix, sxipi (with no grade-dependent CTI), sxipi (with grade-dependent CTI), selection of good grades, searchflickpix, coordevt (flickpix), sxiflagpix

- Two version of processed TV FNC-N data were produced:
  sxipi with Video Temperature (VT) correction, with T~10 C from the HK file
  sxipi with **no** VT correction, using T=25 C for all events (like Kyoto FM data)

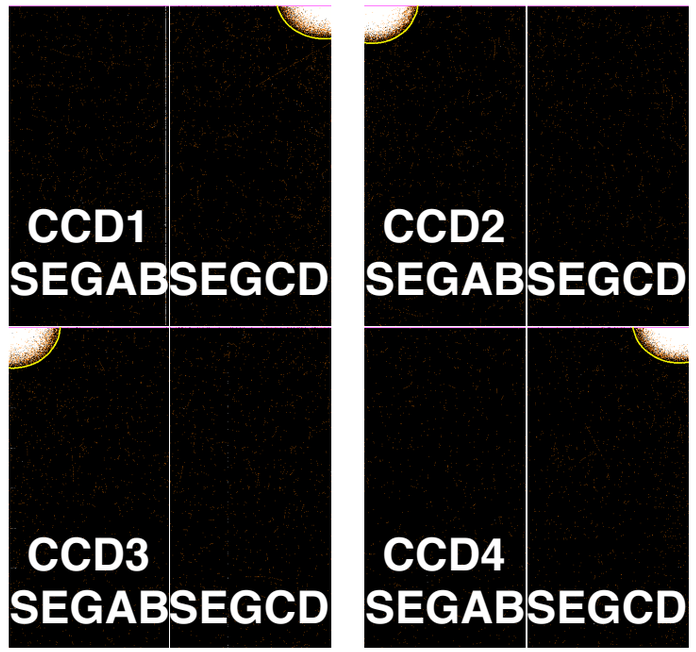
- Filter to include only events with STATUS[1,10,20]==b0 and GRADE==0,2,3,4,6

- Bin the final PI values and compare in only in the cal source regions (as defined by STATUS[2]==b1 filter); shown in the yellow regions in the images to the right

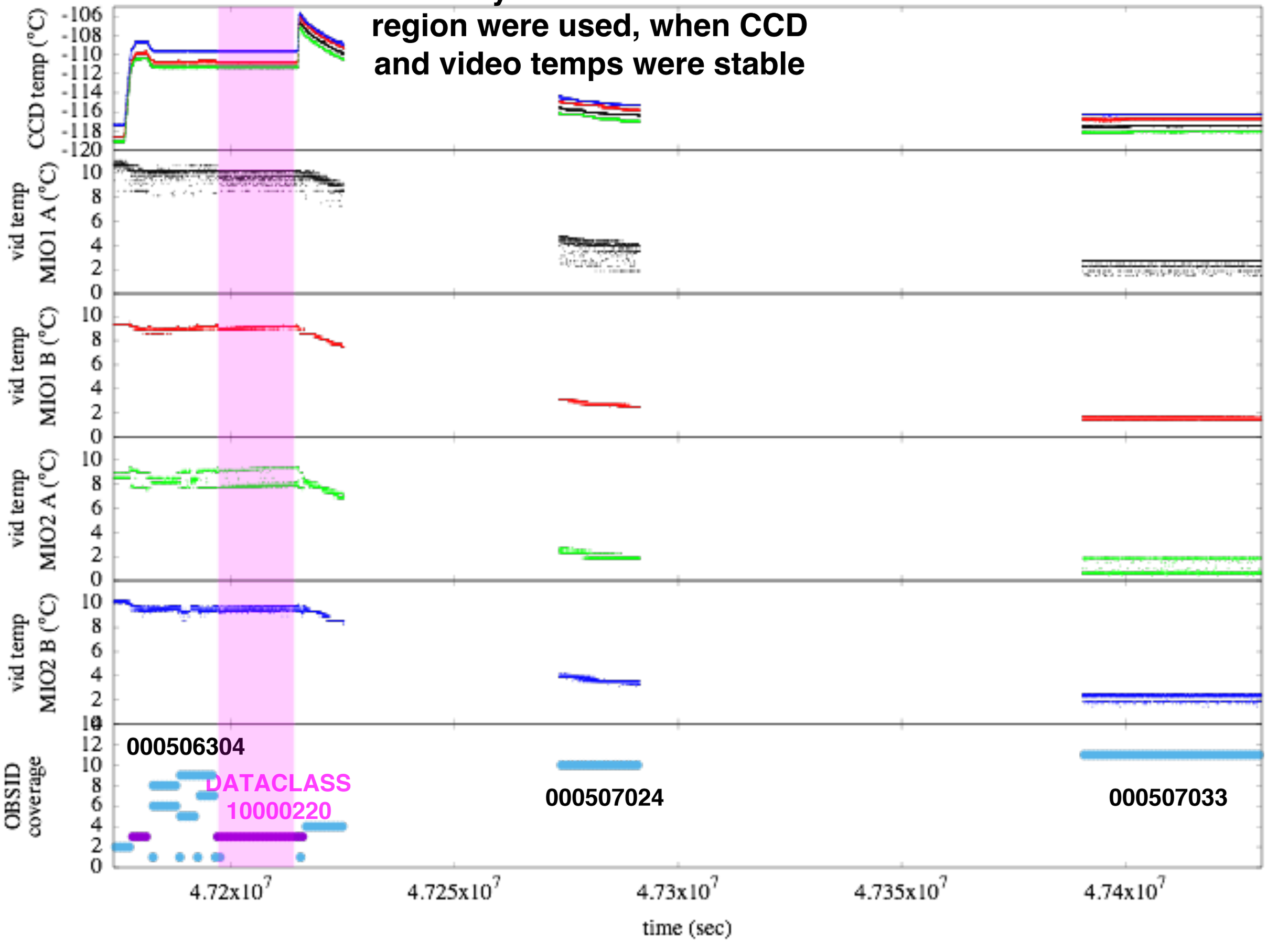
Kyoto FM data



TV FNC-N data



Only data in shaded region were used, when CCD and video temps were stable



Mn Kα - CCD1, cal source region

PI offset:
Kyoto FM: -2.7 chan, -16.3 eV
TV FNC-N: 0.3 chan, 1.9 eV
TV w/o VT: -1.8 chan, -10.6 eV

FWHM: CCD1
29.9 chan, 179.4 eV
29.4 chan, 176.2 eV
29.2 chan, 175.5 eV

PI offset from Kyoto FM:
TV FNC-N: 3.0 chan, 18.1 eV
TV w/o VT: 1.0 chan, 5.7 eV

Mn Ka
PI=982.5

num. counts

0
100
200
300
400
500
600

940
960
980
1000
1020

PI (channels)

Mn Kα - CCD2, cal source region

PI offset:
Kyoto FM: 2.5 chan, 15.0 eV
TV FNC-N: 6.7 chan, 39.9 eV
TV w/o VT: 4.3 chan, 25.9 eV

FWHM: CCD2
28.9 chan, 173.4 eV
28.4 chan, 170.3 eV
28.7 chan, 172.2 eV

PI offset from Kyoto FM:
TV FNC-N: 4.1 chan, 24.9 eV
TV w/o VT: 1.8 chan, 10.8 eV

Mn Ka
PI=982.5

num. counts

800
700
600
500
400
300
200
100
0

940
960
980
1000
1020

PI (channels)

Mn Kα - CCD3, cal source region

PI offset:
Kyoto FM: 1.4 chan, 8.4 eV
TV FNC-N: 1.8 chan, 10.9 eV
TV w/o VT: -0.1 chan, -0.9 eV

FWHM: CCD3
26.8 chan, 160.7 eV
28.7 chan, 171.9 eV
28.7 chan, 172.1 eV

PI offset from Kyoto FM:
TV FNC-N: 0.4 chan, 2.5 eV
TV w/o VT: -1.5 chan, -9.2 eV

Mn Ka
PI=982.5

num. counts

0
50
100
150
200
250
300
350
400
450

940
960
980
1000
1020

PI (channels)

Mn Kα - CCD4, cal source region

PI offset:
Kyoto FM: 0.3 chan, 2.1 eV
TV FNC-N: 4.4 chan, 26.5 eV
TV w/o VT: 2.3 chan, 14.1 eV

FWHM: CCD4
27.5 chan, 165.2 eV
28.8 chan, 172.9 eV
28.8 chan, 172.9 eV

PI offset from Kyoto FM:
TV FNC-N: 4.1 chan, 24.4 eV
TV w/o VT: 2.0 chan, 12.0 eV

Mn Ka
PI=982.5

num. counts

600
500
400
300
200
100
0

940
960
980
1000
1020

PI (channels)

Summary
PI Shift in Kyoto FM Data vs. TV FNC-N Data

- average PI value of TV data is larger than Kyoto data for all 4 CCDs in the cal source region:
  CCD1: 3.0 chan, 18 eV
  CCD2: 4.1 chan, 25 eV
  CCD3: 0.4 chan,   3 eV
  CCD4: 4.1 chan, 24 eV

- without the video temperature correction, average PI values are much closer, within 2 channels (VT vs. Kyoto)