VST processing and science products at

Mike Irwin
Jim Lewis
Eduardo Gonzalez-Solares
Aybüke Küpcü Yoldaş

UKIRT @ Mauna Kea

VISTA @ Paranal

VST @ Paranal

Internet transfer

~ 500GB/night

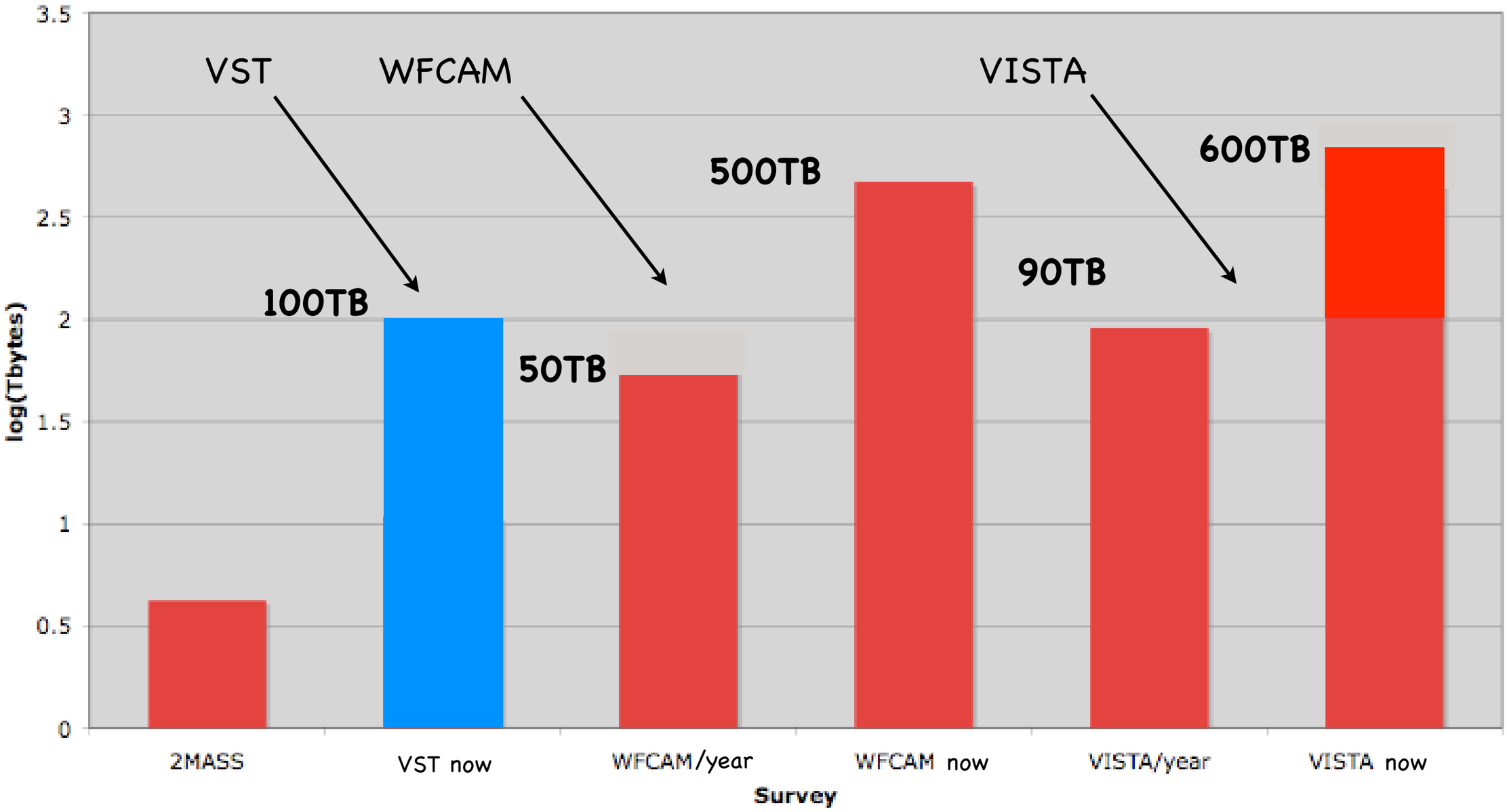
Processing

Database ingestion and QC

Data serving

CASU

Data products volume



VST data flow @CASU

- raw data transfers via Internet from ESO archive
- ingest & verification -> raw data archive
  - off-line tape backups
- update calibration files as necessary
  - bias, fringe frames nightly, flatfields monthly
- parallel nightly processing
  - astrometric & 1st-pass photometric calibration
- check derived QC info & sample of images
  - processing web page updates
- monthly illumination corrections -> fixed catalogues
- add ESO OB grades and completion information
- ingest to post-processing database enables checks
  - FITS header contents, long-term trends
  - survey progress, data access

http://casu.ast.cam.ac.uk/vstsp/

Cambridge Astronomy Survey Unit

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VISTA

Technical Documentation

Data Processing Status

Survey Progress and Data Access

more...

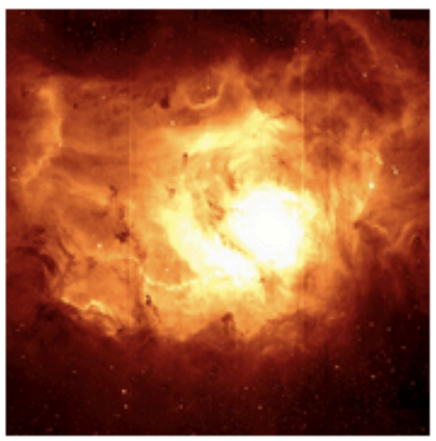
WFCAM

Technical Documentation

Data Processing Status

Survey Progress and Data Access

more...



VST

Technical Documentation

Data Processing Status

Survey Progress and Data Access

more...

http://casu.ast.cam.ac.uk

NEW: CASUTools Software Release (more information)

Log in

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Home | Surveys & Projects | Documents | Publications

You are here: Home / Surveys & Projects / VST / Data Processing

Back

VST Data Reduction Progress: P92

01 Oct 2013 to 31 Mar 2014

This page displays the reduction progress of VST data. Information is automatically updated hourly.

Night	Status	Data	N_{raw}	Version	Released	Summary Plots	Photom Plots	Summary Info	Observation Log	Paranal ambient conditions	Size red [GB]	ATLAS	VPHAS	KIDS
20131001	REDUCED	D	151	1.0	20140218	GIF1 GIF2	GIF	summary	index ∴ eso	nightmon	36.64	56	17	0
20131002	REDUCED	D	151	1.0	20140218	GIF1 GIF2	GIF	summary	index ∴ eso	nightmon	43.58	0	0	0
20131003	REDUCED	D	232	1.0	20140218	GIF1 GIF2	GIF	summary	index ∴ eso	nightmon	49.03	0	0	0
20131004	REDUCED	D	171	1.0	20140218	GIF1 GIF2	GIF	summary	index ∴ eso	nightmon	41.75	22	0	0
20131005	REDUCED	D	285	1.0	20140218	GIF1 GIF2	GIF	summary	index ∴ eso	nightmon	82.88	172	0	0
20131006	REDUCED	D	79	1.0	20140218	GIF1 GIF2	GIF	summary	index ∴ eso	nightmon	27.97	14	0	30
20131007	REDUCED	D	235	1.0	20140218	GIF1 GIF2	GIF	summary	index ∴ eso	nightmon	66.63	170	0	0
20131008	REDUCED	D	183	1.0	20140218	GIF1 GIF2	GIF	summary	index ∴ eso	nightmon	58.29	116	0	17
20131009	REDUCED	D	188	1.0	20140218	GIF1 GIF2	GIF	summary	index ∴ eso	nightmon	31.90	0	0	26
20131010	REDUCED	D	99	1.0	20140218	GIF1 GIF2	GIF	summary	index ∴ eso	nightmon	38.56	12	0	24
20131011	REDUCED	D	85	1.0	20140218	GIF1 GIF2	GIF	summary	index ∴ eso	nightmon	30.13	34	0	8
20131012	REDUCED	D	124	1.0	20140218	GIF1 GIF2	GIF	summary	index ∴ eso	nightmon	38.43	0	0	10
20131013	REDUCED	D	87	1.0	20140218	GIF1 GIF2	GIF	summary	index ∴ eso	nightmon	32.82	0	0	0
20131014	REDUCED	D	211	1.0	20140218	GIF1 GIF2	GIF	summary	index ∴ eso	nightmon	77.29	136	0	30
20131015	REDUCED	D	98	1.0	20140218	GIF1 GIF2	GIF	summary	index ∴ eso	nightmon	26.41	0	0	0
20131016	REDUCED	D	145	1.0	20140218	GIF1 GIF2	GIF	summary	index ∴ eso	nightmon	49.16	56	0	0
20131017	REDUCED	D	164	1.0	20140218	GIF1 GIF2	GIF	summary	index ∴ eso	nightmon	66.20	136	0	0
20131018	REDUCED	D	303	1.0	20140218	GIF1 GIF2	GIF	summary	index ∴ eso	nightmon	101.62	204	0	5
20131019	REDUCED	D	274	1.0	20140218	GIF1 GIF2	GIF	summary	index ∴ eso	nightmon	90.90	170	0	15
20131020	REDUCED	D	214	1.0	20140218	GIF1 GIF2	GIF	summary	index ∴ eso	nightmon	82.31	170	0	10
20131021	REDUCED	D	129	1.0	20140218	GIF1 GIF2	GIF	summary	index ∴ eso	nightmon	33.01	34	0	8
20131022	REDUCED	D	95	1.0	20140218	GIF1 GIF2	GIF	summary	index ∴ eso	nightmon	36.48	68	0	0
20131023	REDUCED	D	269	1.0	20140218	GIF1 GIF2	GIF	summary	index ∴ eso	nightmon	78.88	126	0	5
20131024	REDUCED	D	188	1.0	20140218	GIF1 GIF2	GIF	summary	index ∴ eso	nightmon	56.15	68	0	0
20131025	REDUCED	D	69	1.0	20140218	GIF1 GIF2	GIF	summary	index ∴ eso	nightmon	23.46	0	0	29

20140223	REDUCED		144	1.0		GIF1 GIF2	GIF	summary	index ∴ eso	nightmon	41.91	0	21	65
20140224	REDUCED		158	1.0		GIF1 GIF2	GIF	summary	index ∴ eso	nightmon	44.66	56	21	10
20140225	REDUCED		111	1.0		GIF1 GIF2	GIF	summary	index ∴ eso	nightmon	23.63	0	21	10
20140226	REDUCED		206	1.0		GIF1 GIF2	GIF	summary	index ∴ eso	nightmon	37.26	0	56	20
20140227	REDUCED		133	1.0		GIF1 GIF2	GIF	summary	index ∴ eso	nightmon	44.54	34	0	24
20140228	REDUCED		126	1.0		GIF1 GIF2	GIF	summary	index ∴ eso	nightmon	38.84	0	30	50
20140301	REDUCED		71			GIF1 GIF2	GIF	summary	index ∴ eso	nightmon	16.56	0	0	0
20140302	REDUCED		146			GIF1 GIF2	GIF	summary	index ∴ eso	nightmon	38.26	10	21	0
20140303	REDUCED		91			GIF1 GIF2	GIF	summary	index ∴ eso	nightmon	31.82	0	21	0
20140304	REDUCED		170			GIF1 GIF2	GIF	summary	index ∴ eso	nightmon	32.20	0	69	0
20140305	REDUCED		215			GIF1 GIF2	GIF	summary	index ∴ eso	nightmon	50.23	70	42	8
20140306	REDUCED		173			GIF1 GIF2	GIF	summary	index ∴ eso	nightmon	49.81	68	21	20
20140307	REDUCED		135			GIF1 GIF2	GIF	summary	index ∴ eso	nightmon	31.53	0	42	18
20140308	REDUCED		157			GIF1 GIF2	GIF	summary	index ∴ eso	nightmon	35.27	0	42	33
20140309	REDUCED		199			GIF1 GIF2	GIF	summary	index ∴ eso	nightmon	52.43	34	84	17
20140310	REDUCED		225			GIF1 GIF2	GIF	summary	index ∴ eso	nightmon	64.81	102	21	14
20140311	REDUCED		195			GIF1 GIF2	GIF	summary	index ∴ eso	nightmon	64.88	68	21	47
20140312	REDUCED		150			GIF1 GIF2	GIF	summary	index ∴ eso	nightmon	48.46	34	0	40
20140313	REDUCED		183			GIF1 GIF2	GIF	summary	index ∴ eso	nightmon	57.77	34	0	45
20140314	REDUCED		148			GIF1 GIF2	GIF	summary	index ∴ eso	nightmon	53.43	68	0	5
20140315	REDUCED		131			GIF1 GIF2	GIF	summary	index ∴ eso	nightmon	50.58	34	0	0
20140316	REDUCED		140			GIF1 GIF2	GIF	summary	index ∴ eso	nightmon	45.80	0	0	35
20140317	REDUCED		107			GIF1 GIF2	GIF	summary	index ∴ eso	nightmon	43.01	0	0	0
20140318	REDUCED		108			GIF1 GIF2	GIF	summary	index ∴ eso	nightmon	42.64	0	0	0
20140319	REDUCED		119			GIF1 GIF2	GIF	summary	index ∴ eso	nightmon	22.47	0	0	7
20140320	REDUCED		127			GIF1 GIF2	GIF	summary	index ∴ eso	nightmon	27.68	0	0	25
20140321	REDUCED		221			GIF1 GIF2	GIF	summary	index ∴ eso	nightmon	72.10	143	18	10
20140322	REDUCED		145			GIF1 GIF2	GIF	summary	index ∴ eso	nightmon	41.77	0	21	35
20140323	REDUCED		172			GIF1 GIF2	GIF	summary	index ∴ eso	nightmon	51.45	34	51	34
20140324	REDUCED		130			GIF1 GIF2	GIF	summary	index ∴ eso	nightmon	35.47	0	39	43
20140325	REDUCED		91			GIF1 GIF2	GIF	summary	index ∴ eso	nightmon	33.32	0	0	59
20140326	PROCESSING		210						index ∴ eso	nightmon		64	0	37
20140327	PROCESSING		134						index ∴ eso	nightmon		0	21	33
20140328	PROCESSING		252						index ∴ eso	nightmon		116	0	7
20140329	PROCESSING		181						index ∴ eso	nightmon		68	21	26
20140330	UNPROCESSED		16						index ∴ eso	nightmon				
20140331	PROCESSING		100						index ∴ eso	nightmon		0	69	0

Table description :

- **N_{raw}**: total number of raw images for the given night (this includes darks, flats, focus runs etc.).
- **Version**: process version number.
- **DQC Plots**: i.e. columns Summary Plots and Photometry Plots, refer to the corresponding description document.
- **Summary Info**: ASCII file with DQC information for each image chip-by-chip. The same image name appears once per chip, from 1 to 16.
- **Observation Log**: provides an handy summary of what was observed.
- **Size raw/red [GB]**: these two columns display the total size (compressed) of raw/reduced data directory for the night in GB.

Exact meaning of the status values :

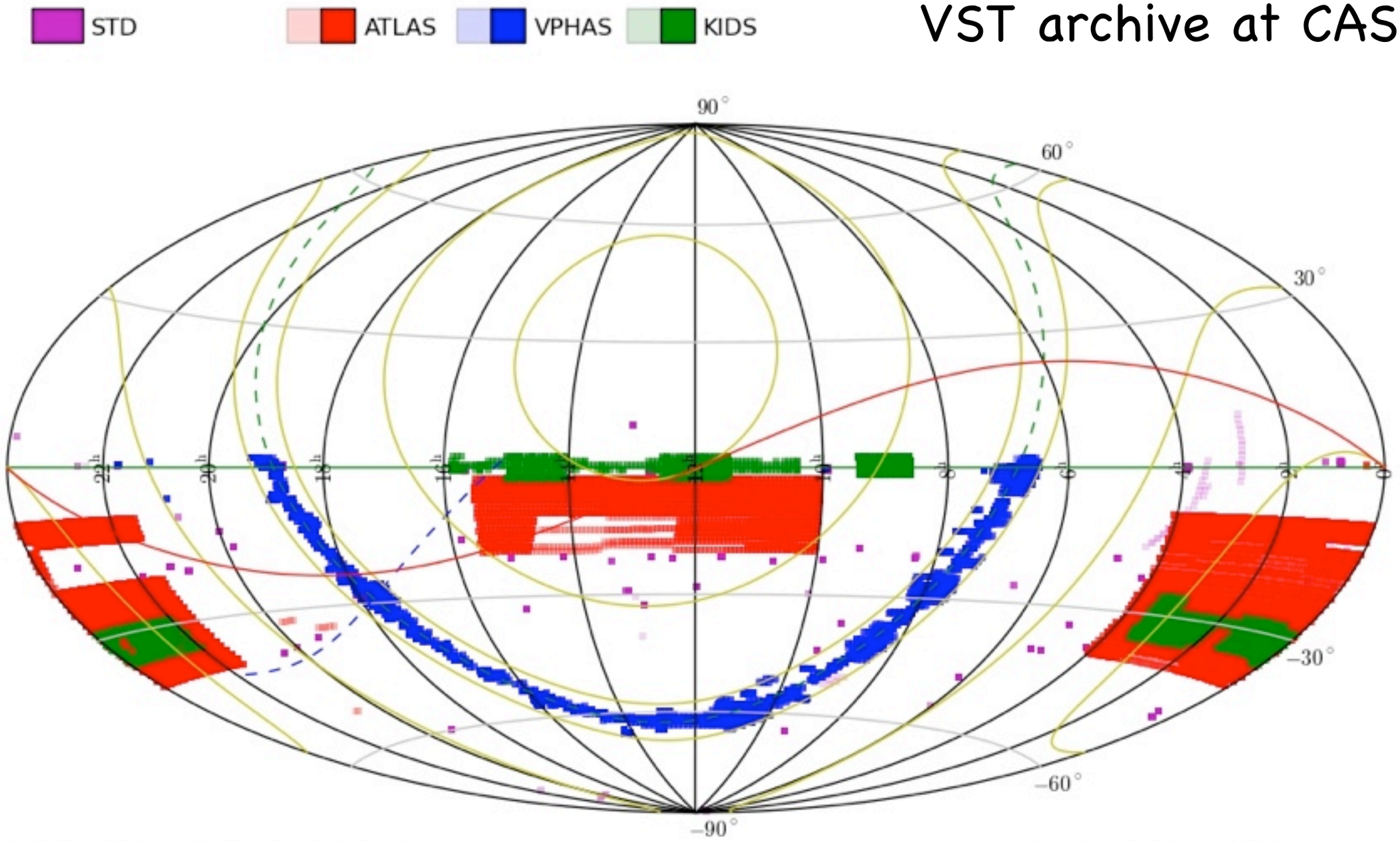
Home | Search | Data processing | Technical Information | QC Tables | Help

→ index

All | u_SDSS | g_SDSS | r_SDSS | i_SDSS | z_SDSS | NB_659

Distribution of all VST observations in the sky using three different projections, Aitoff, Zenithal Equal Area and Cartesian.

VST archive at CASU



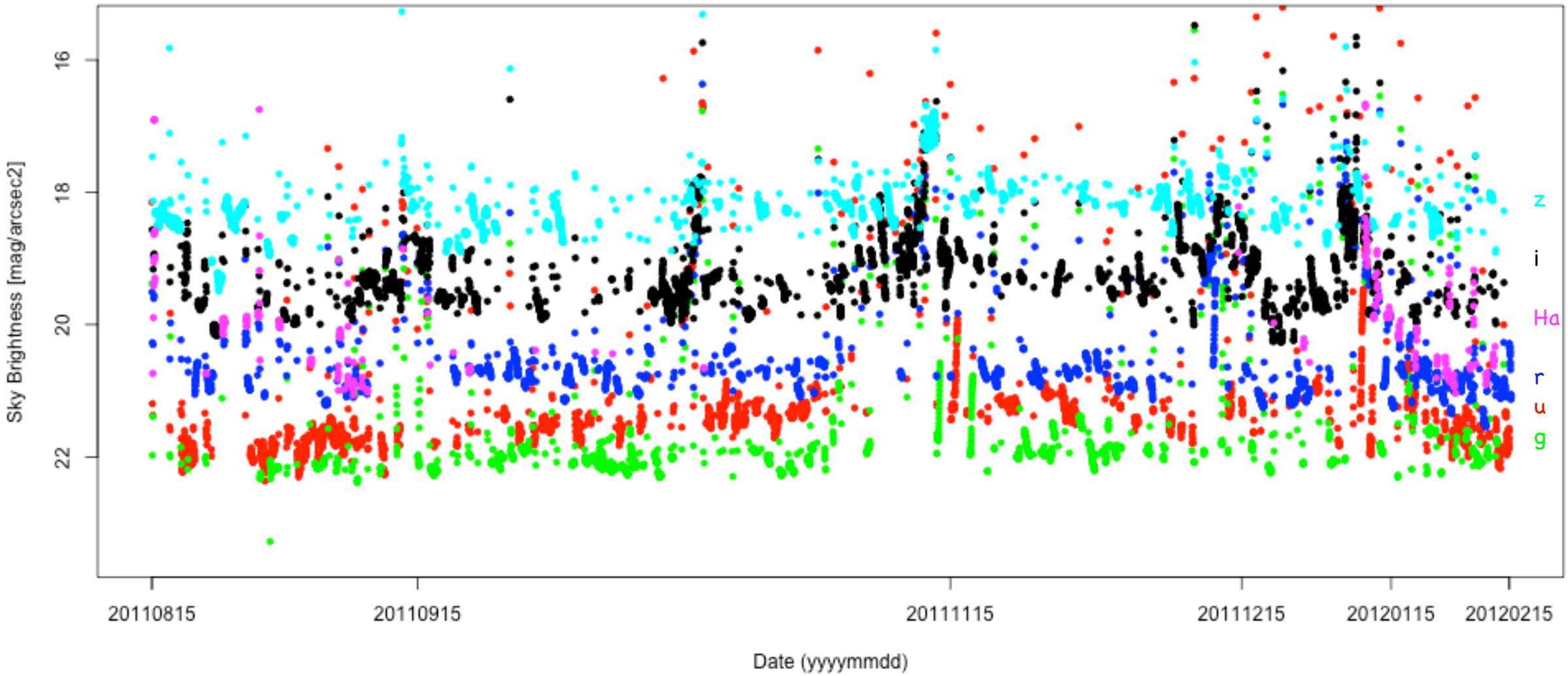
Observing dates: 20110606 - 20140318

Last Updated: 11/04/2014

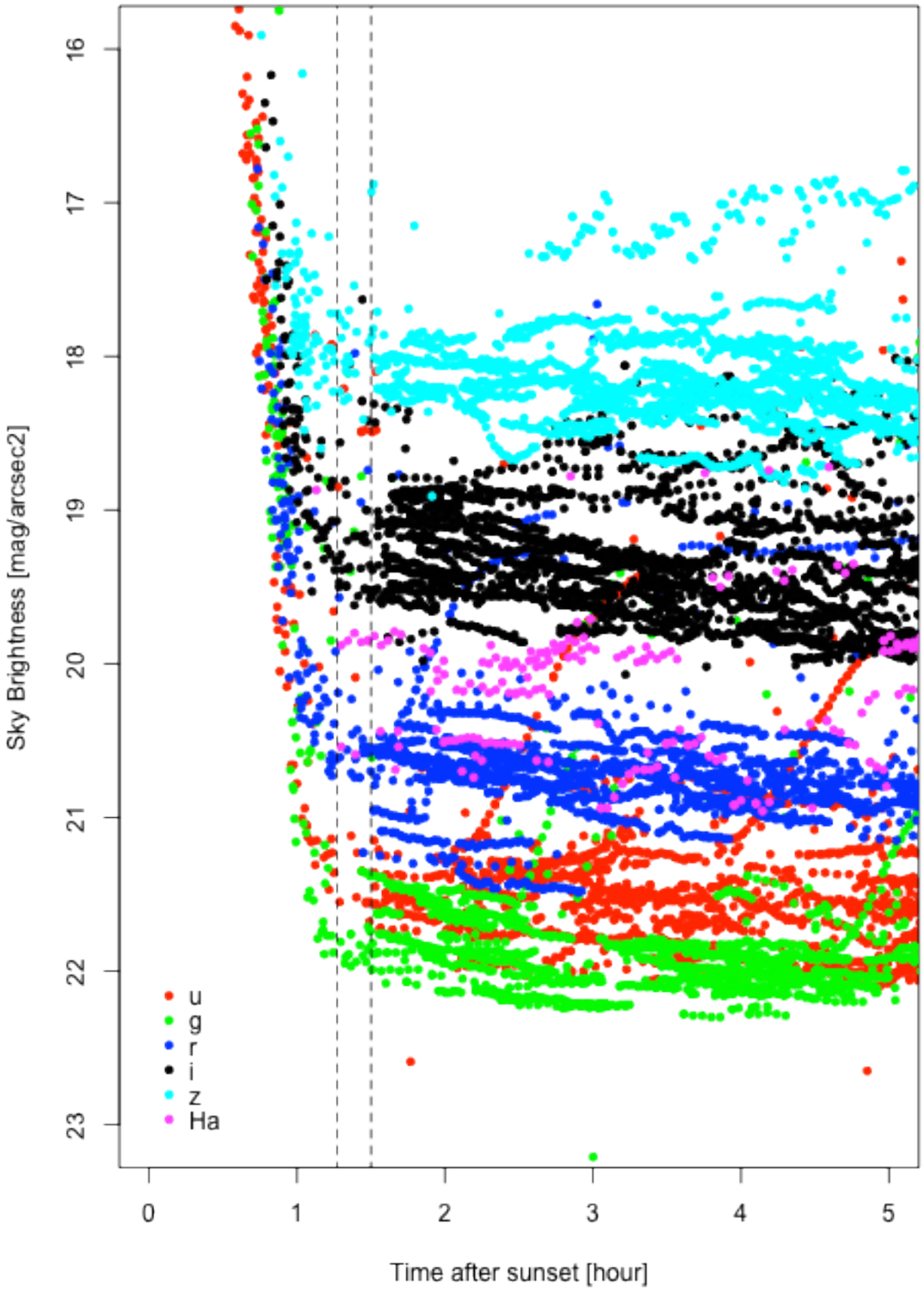
Cambridge Astronomy Survey Unit

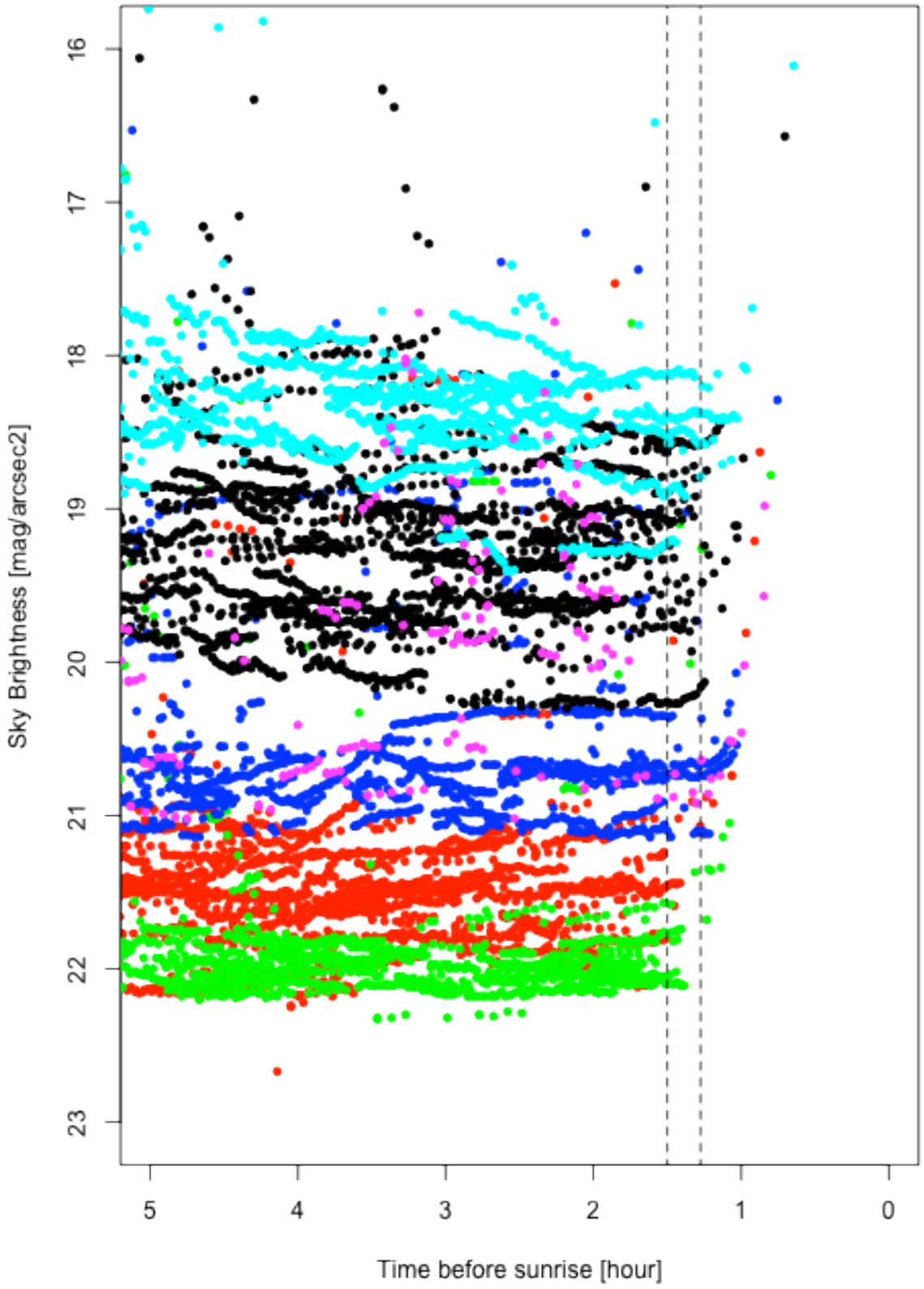
http://casu.ast.cam.ac.uk/vstsp/

Monitoring sky surface brightness

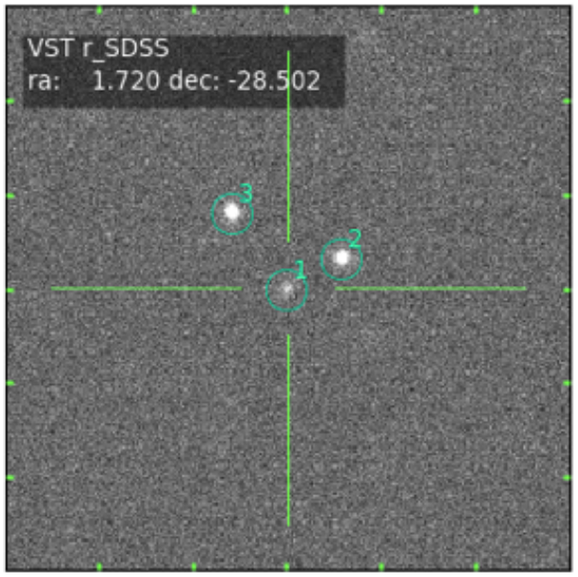


Monitoring sky surface brightness





o20110926_00214_st.fit[11] - r_SDSS



Obs date	2011-09-27 07:00:52
Airmass	1.211
Exposure Time [sec]	45.0
Average seeing [arcsec]	1.37
WCS fit rms	0.09
Ellipticity	0.04
Magnitude limit [Vega]	22.56
Programme	177.A-3011 (ATLAS)

Current cutout size 60 arcsec

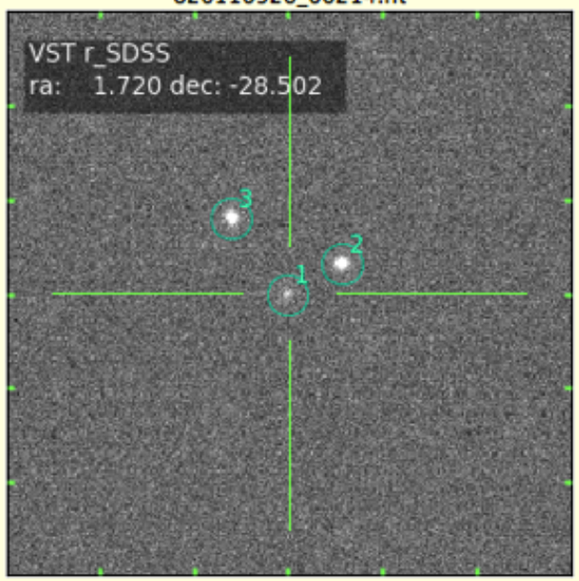
30 arcsec | 60 arcsec | 90 arcsec | 120 arcsec

A search by position returns images that contain that position and allows preview of postage stamps,catalogue sources and a view of provenance images.

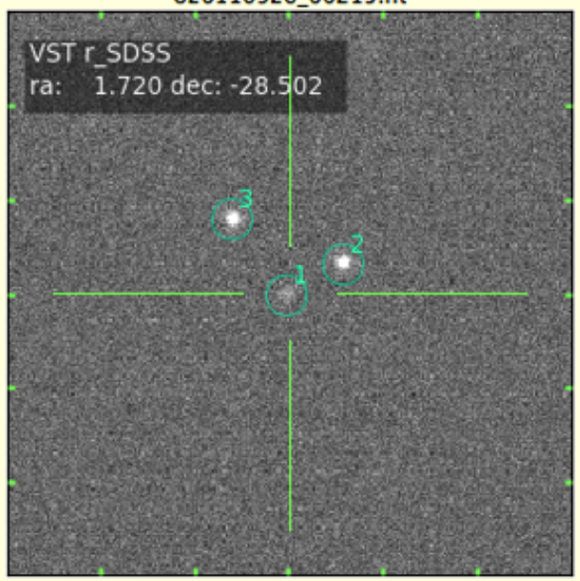
ID	Coords (J2000)	Apermag3	Class	Ellipt	Pos Ang	X	Y	AvConf	ErrBit
1	00:06:52.766 -28:30:07.622	21.168 (0.062)	extended	0.11	-11.95	356.714	1180.97	100.606	0.0
2	00:06:52.325 -28:30:04.273	19.982 (0.025)	pointlike	0.09	79.33	329.41	1196.59	100.618	0.0
3	00:06:53.211 -28:29:59.505	19.650 (0.020)	pointlike	0.10	25.62	384.081	1219.12	100.582	0.0
4	00:06:53.409 -28:29:33.547	22.443 (0.182)	pointlike	0.09	50.23	395.974	1340.87	100.817	0.0
5	00:06:53.223 -28:30:56.738	22.085 (0.135)	extended	0.50	6.14	385.536	950.749	100.76	0.0

Individual Images

o20110926_00214.fit



o20110926_00215.fit



VST processing schema

(ATLAS, VPHAS+, KiDS)

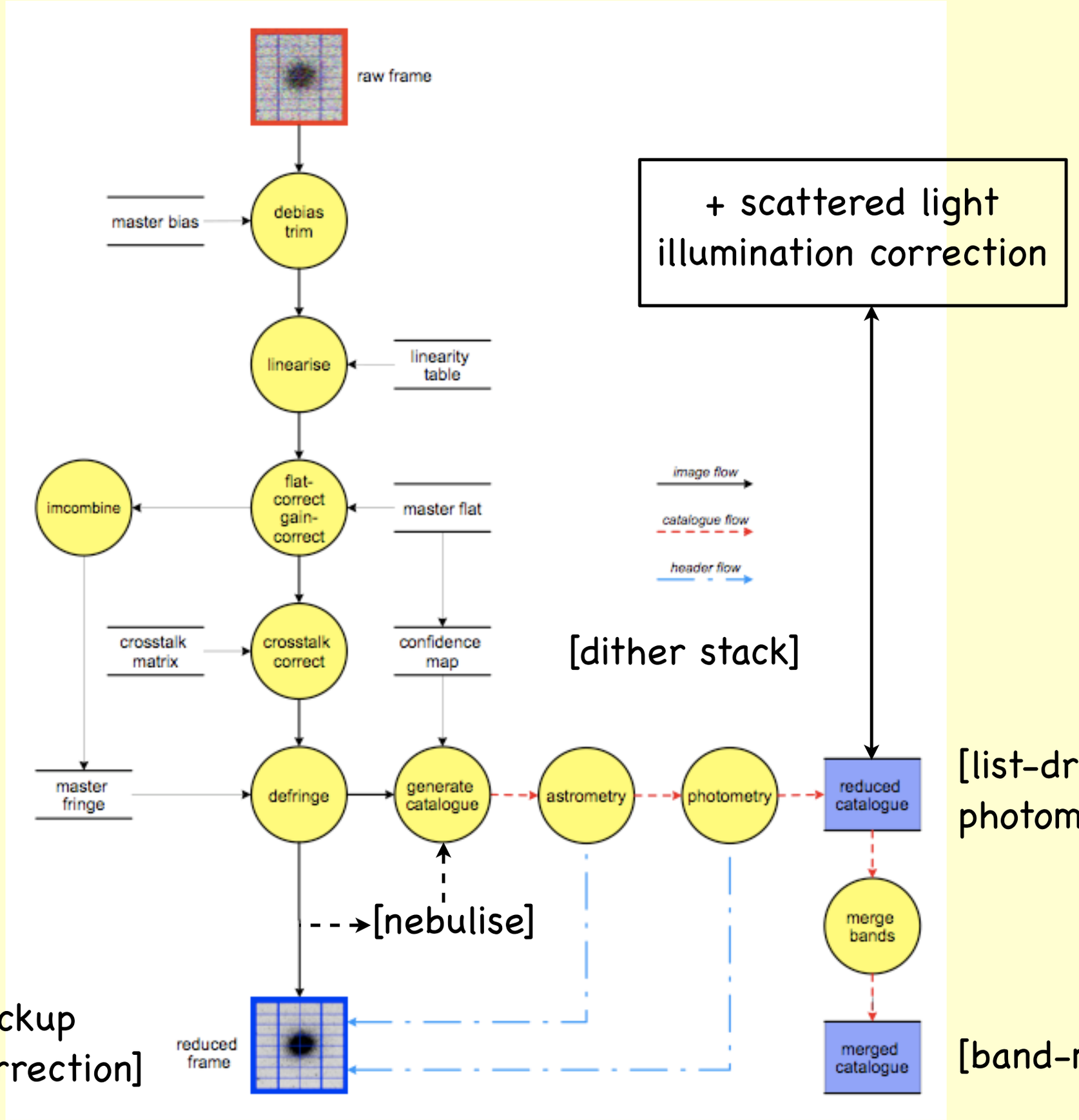
original plan based on processing for other optical mosaic cameras

+

illumination correction

+

[extra options]



Astrometric Calibration 2MASS - VST

WCS - TAN projection $\quad r' = tan(r)$

Linear solution
per detector

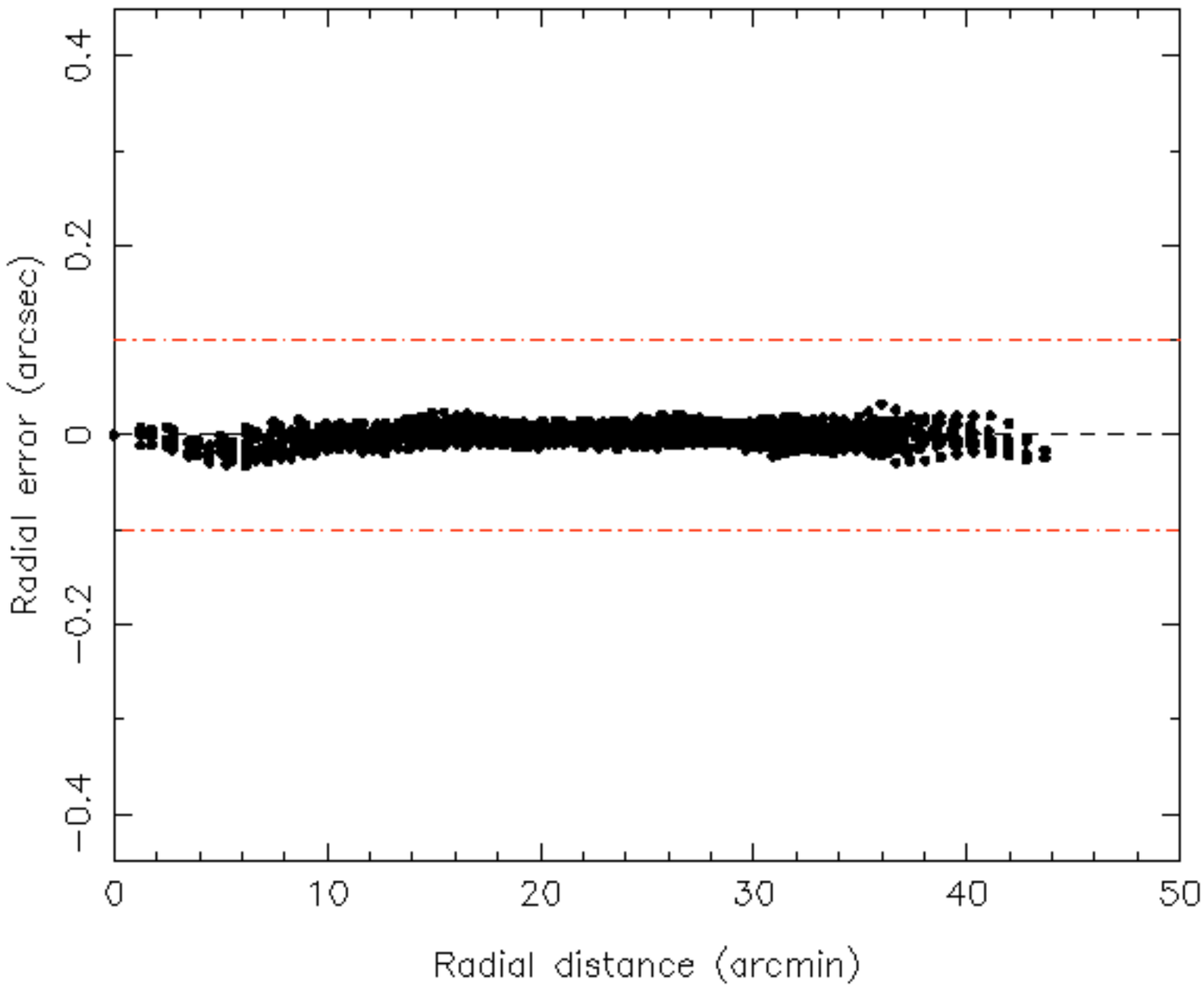
$$\xi' = ax' + by' + c$$

$$\eta' = dx' + ey' + f$$

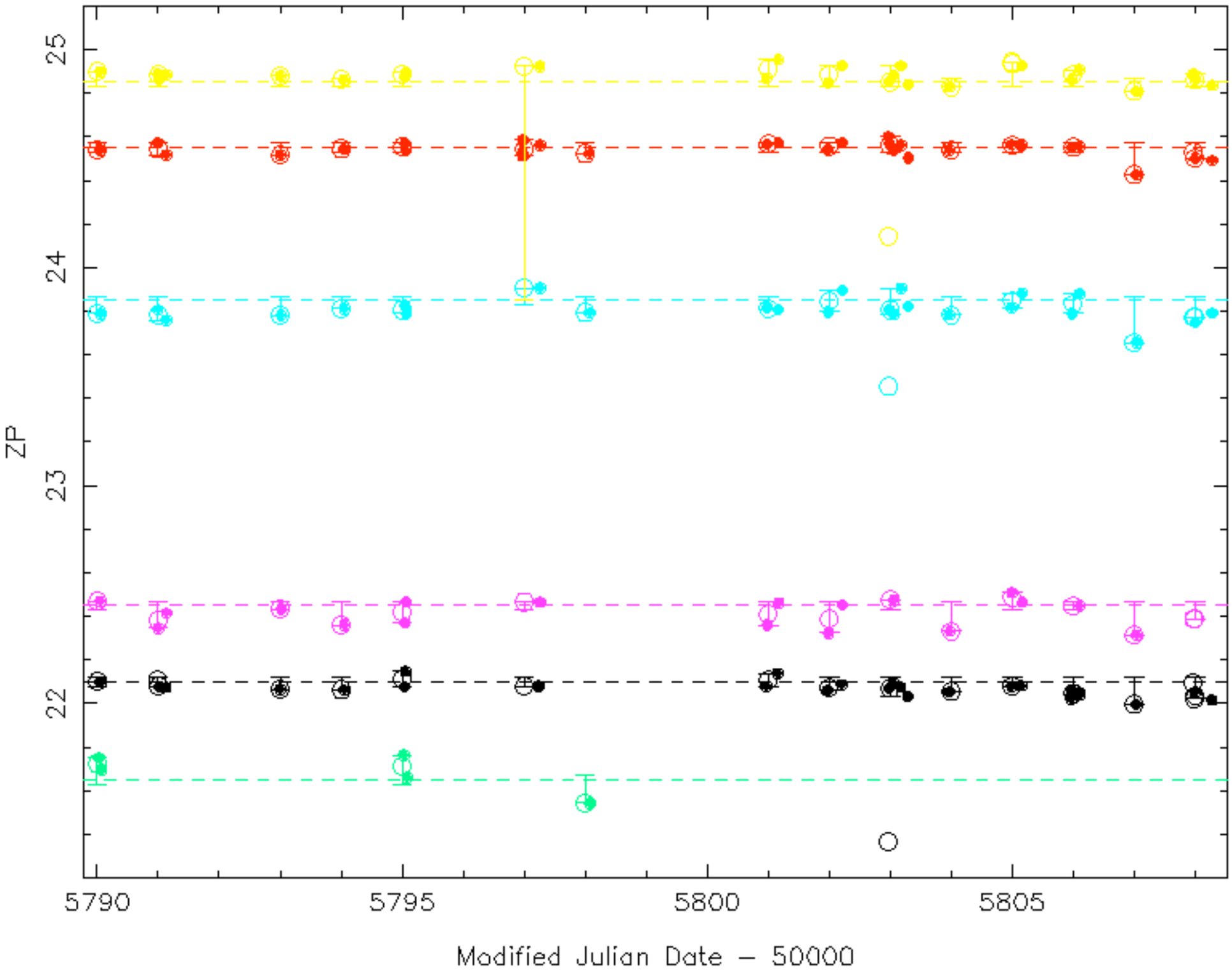
⟶ rms < 80 mas

Tabulated
systematics
from stacked
residuals

⟶ sys < 20 mas



Photometric Calibration SA's



g

r

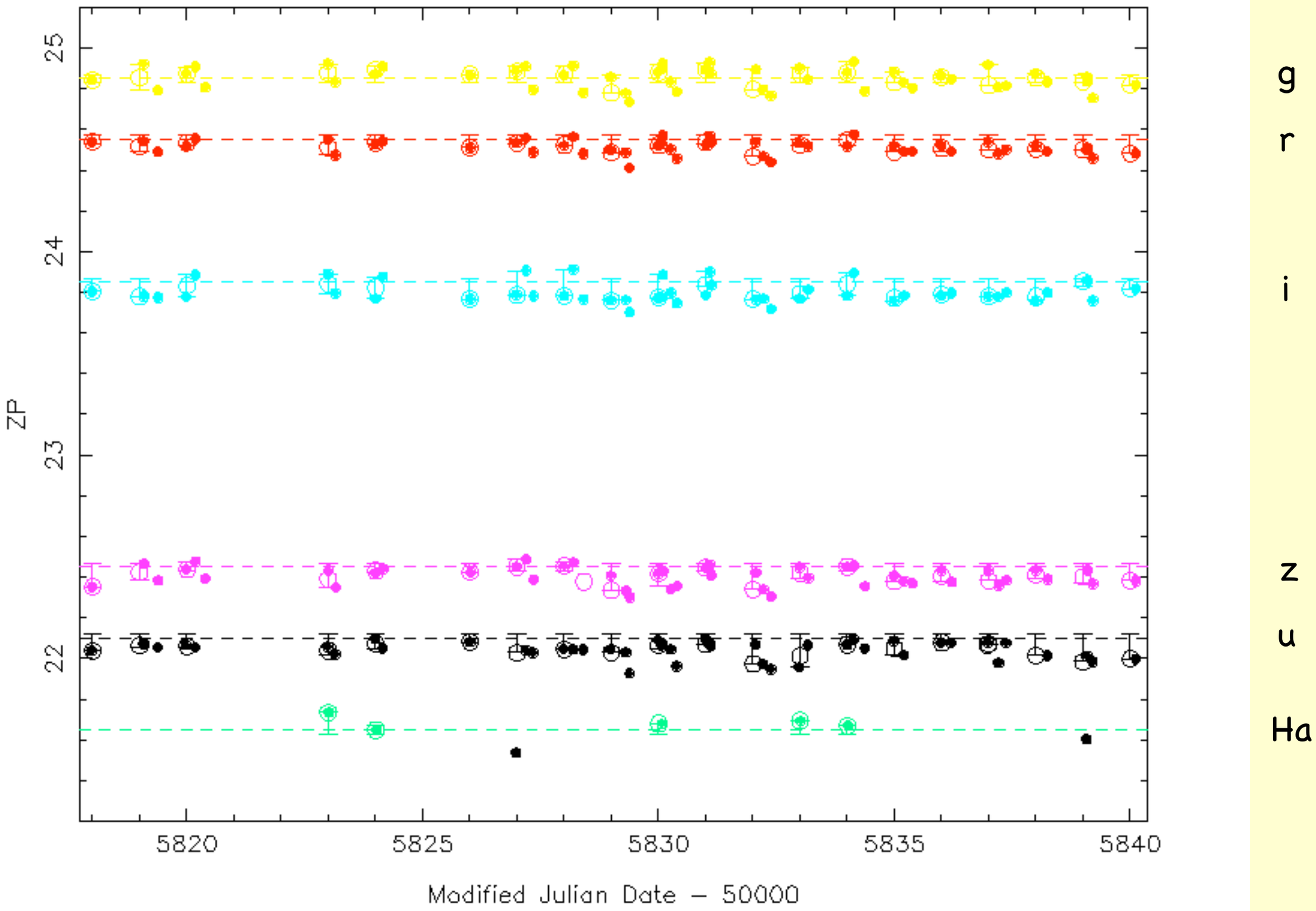
i

z

u

Ha

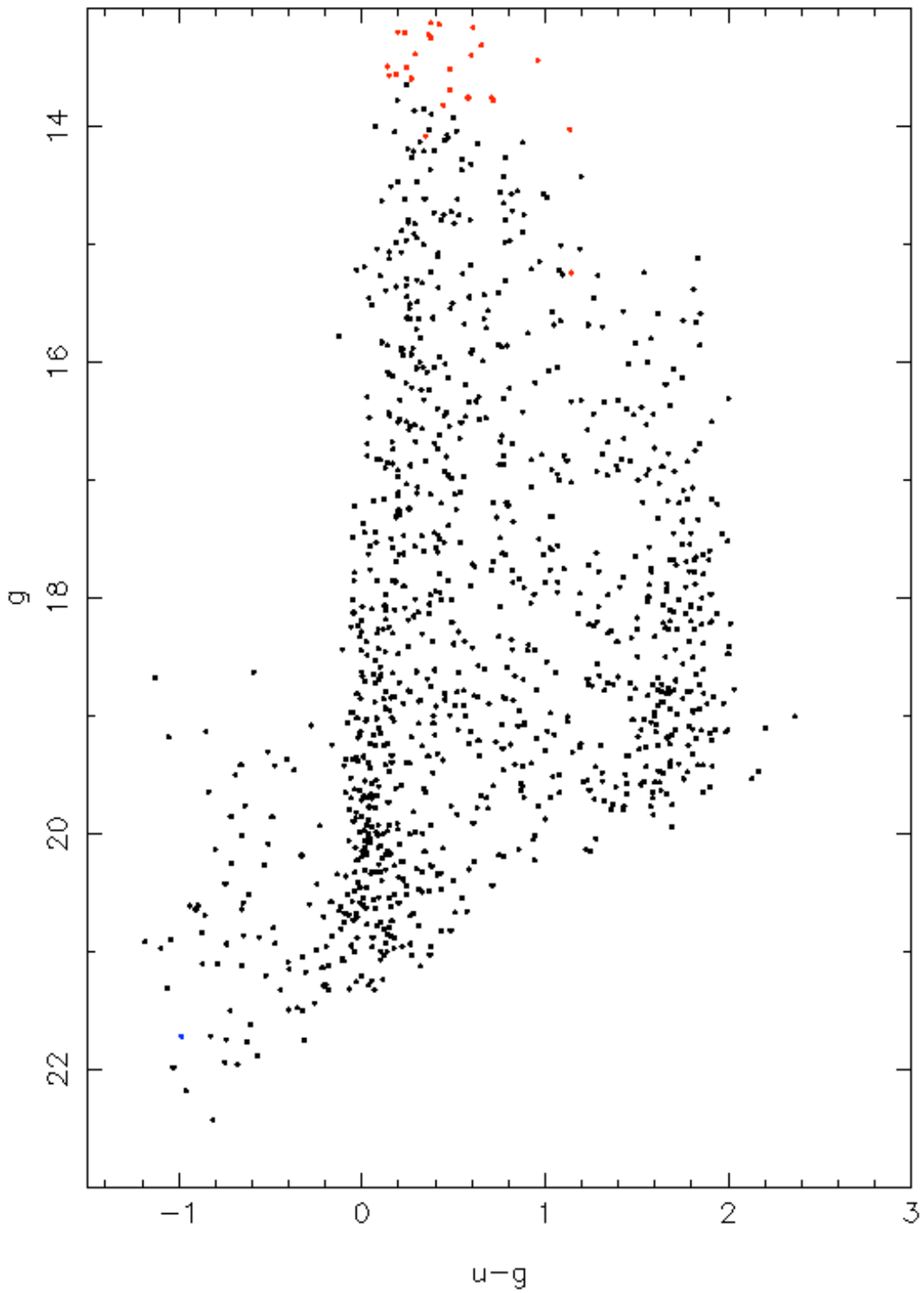
Photometric Calibration SA's



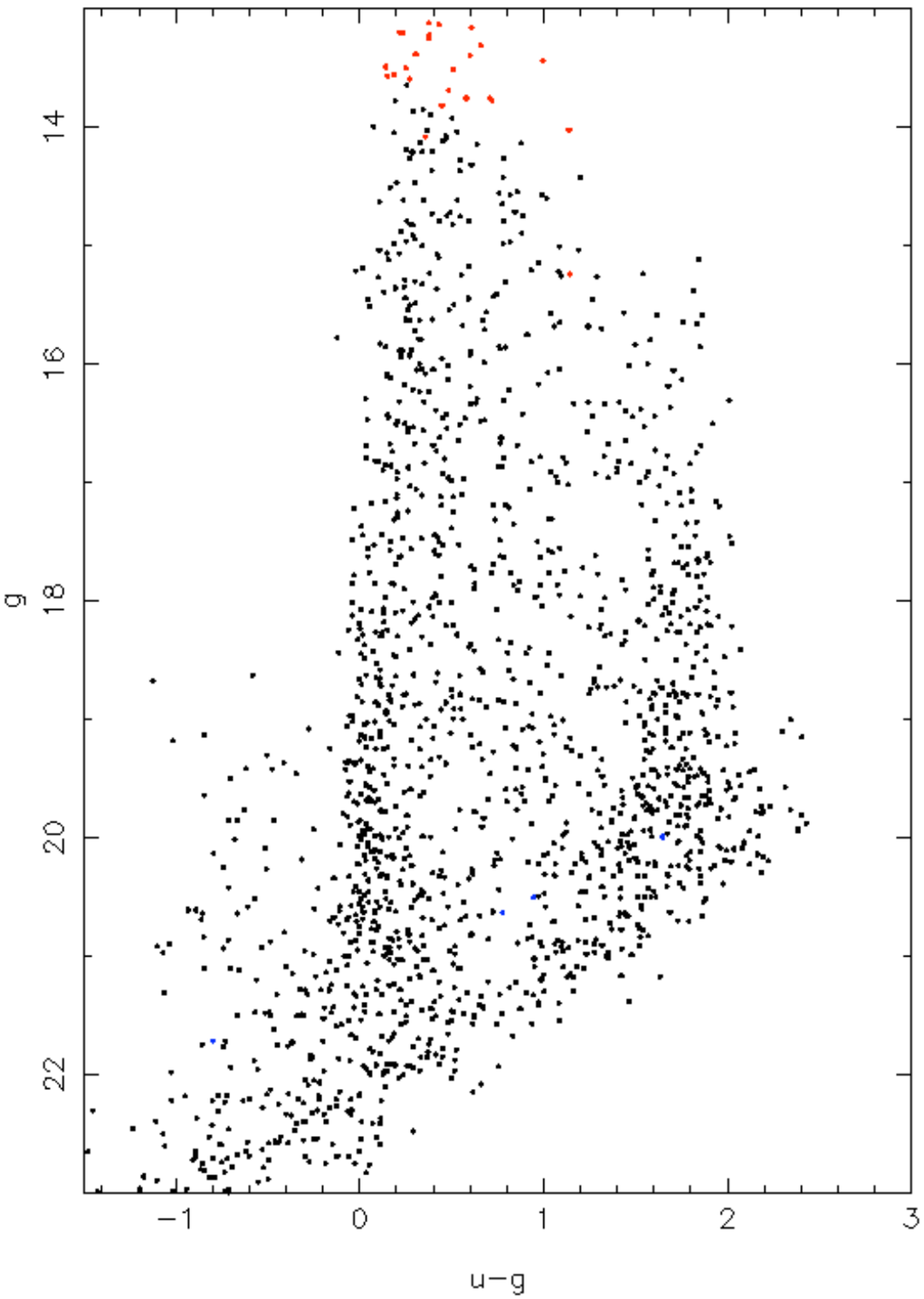
u-band faint source
detection problems

use g-band
detections
+list-driven
photometry

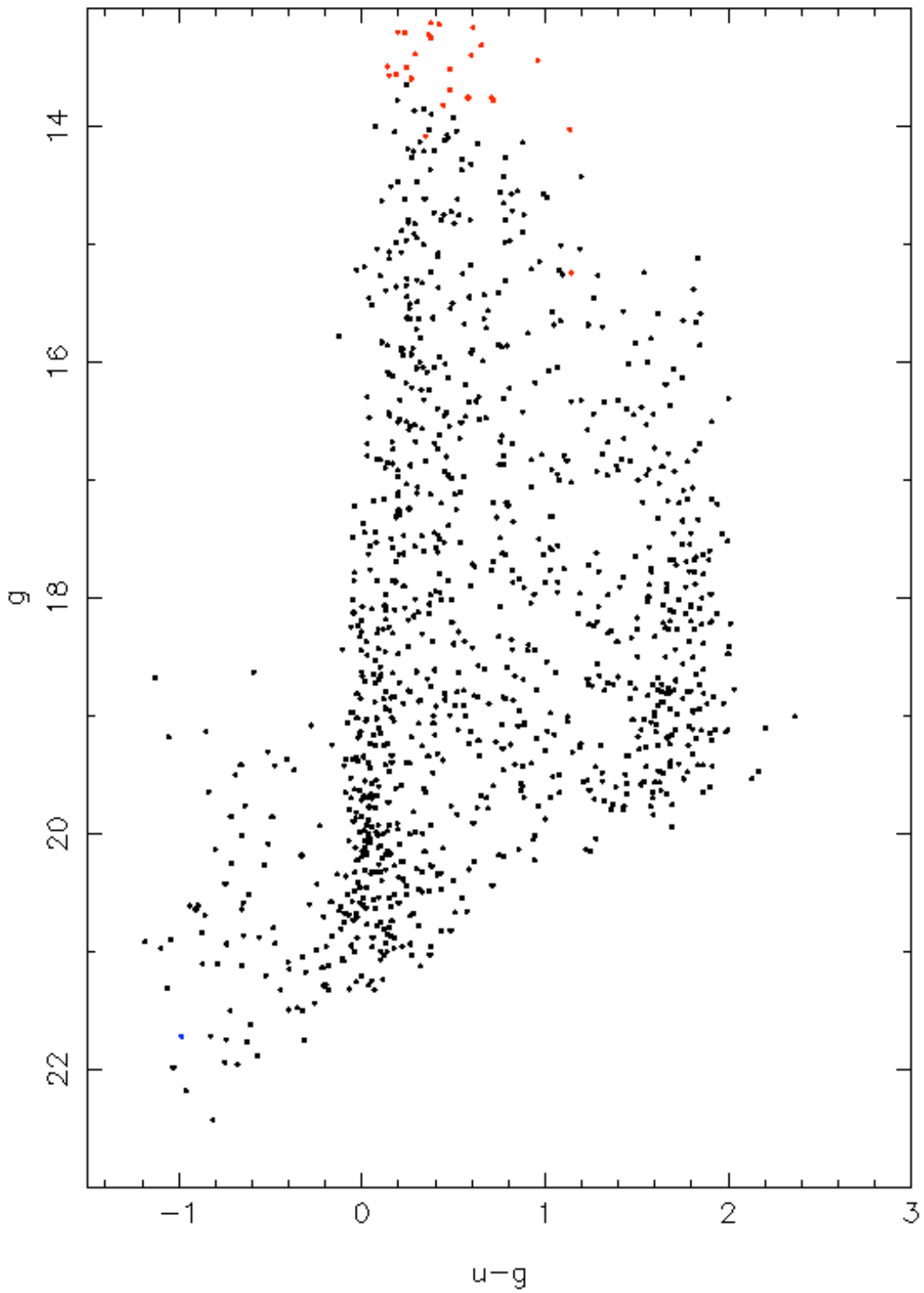
independent u,g catalogues



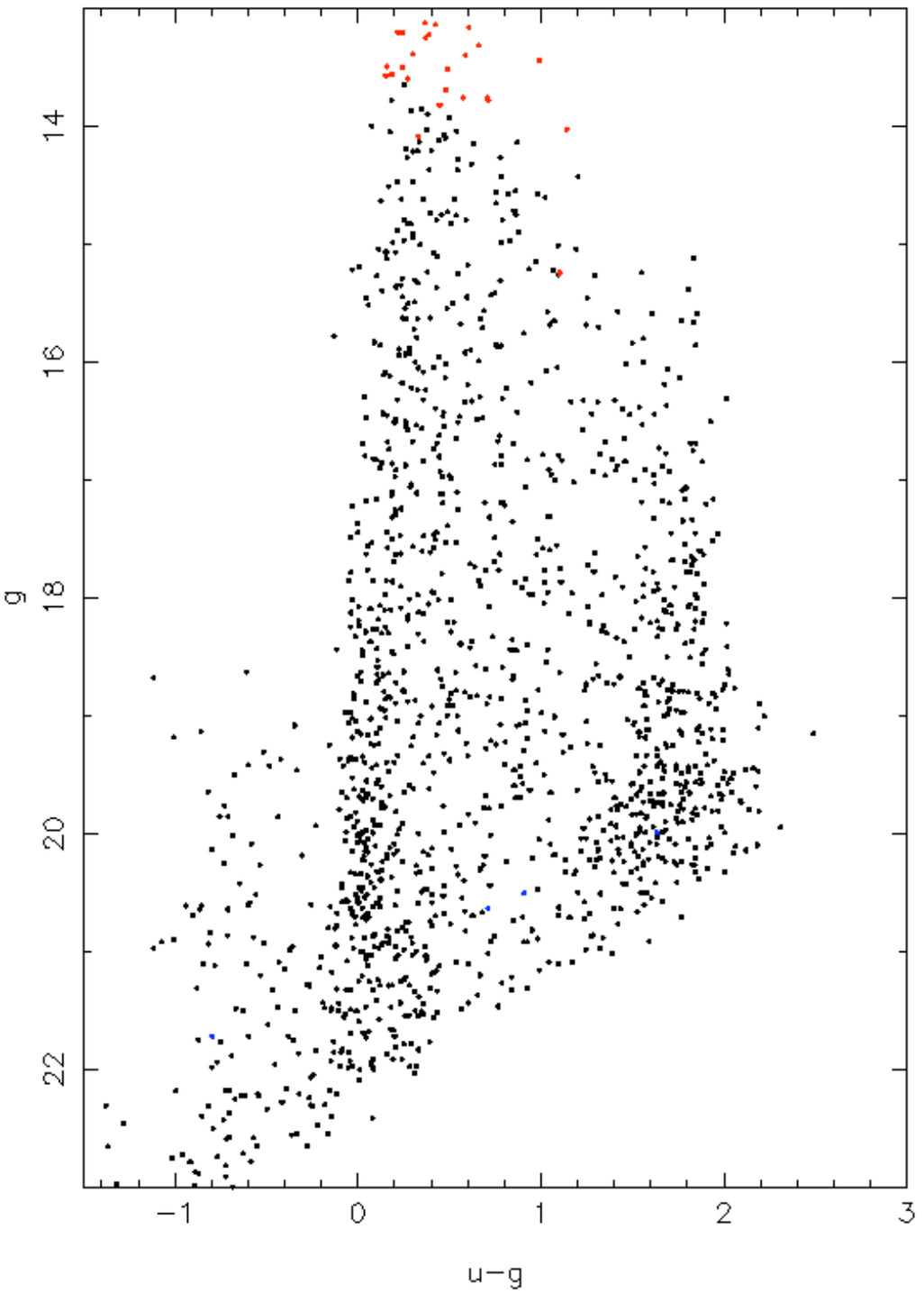
list-driven u-band catalogues



independent u,g catalogues



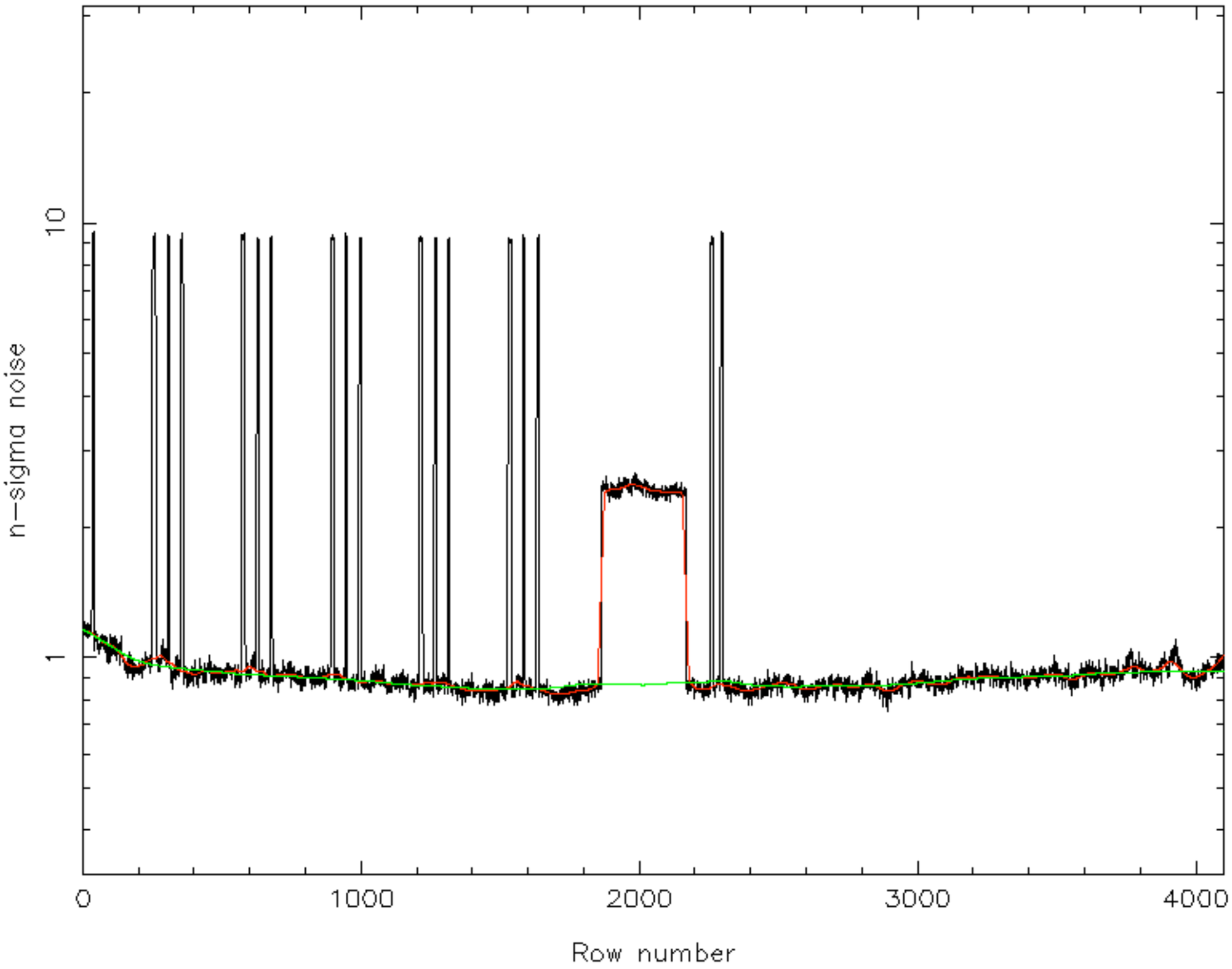
list-driven u-band catalogues



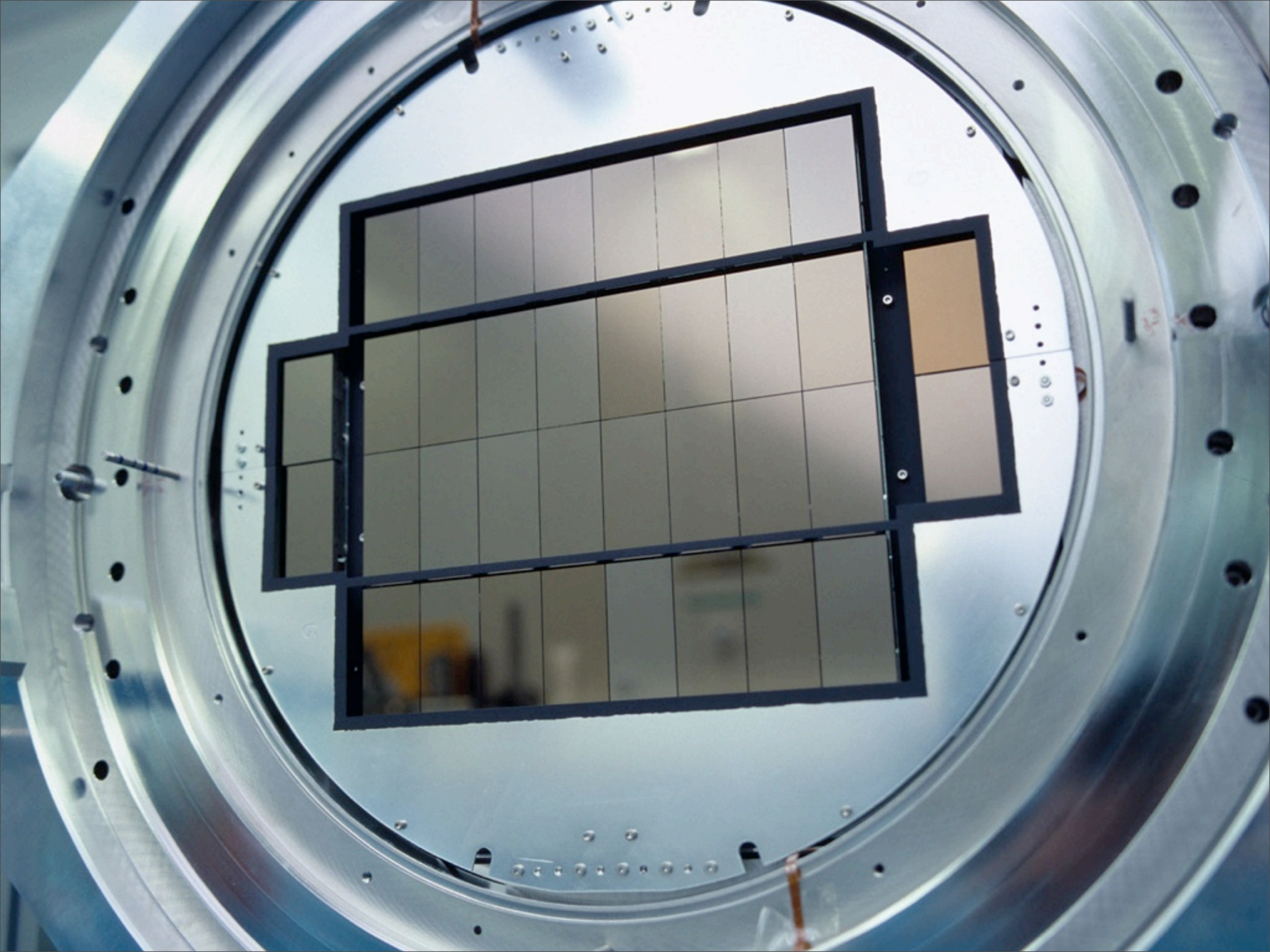
Example of VST pickup 20130605

imcombine of pickup pattern using all 32 CCDS

diagnostic detecting pickup



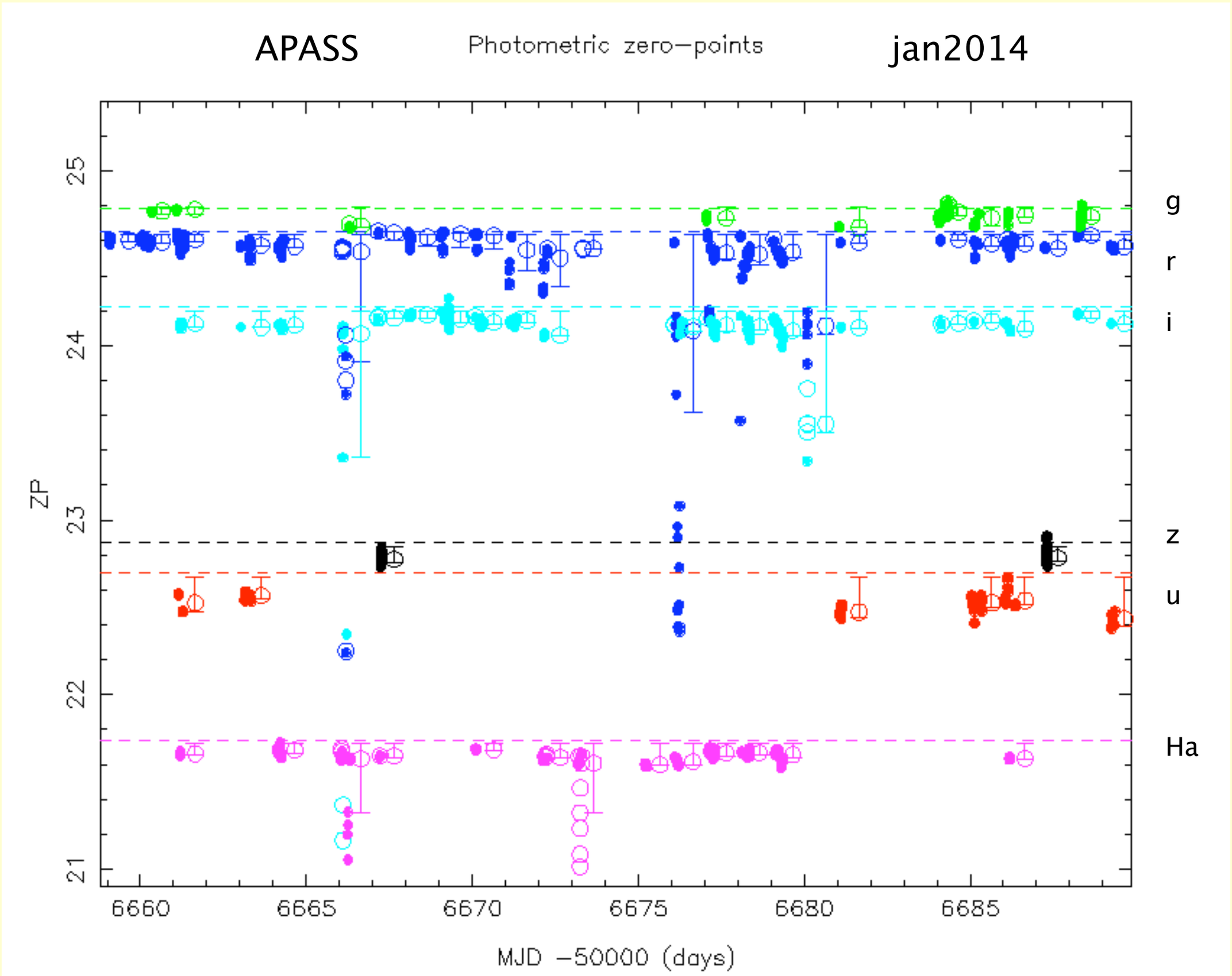
scaled
removal
of pickup



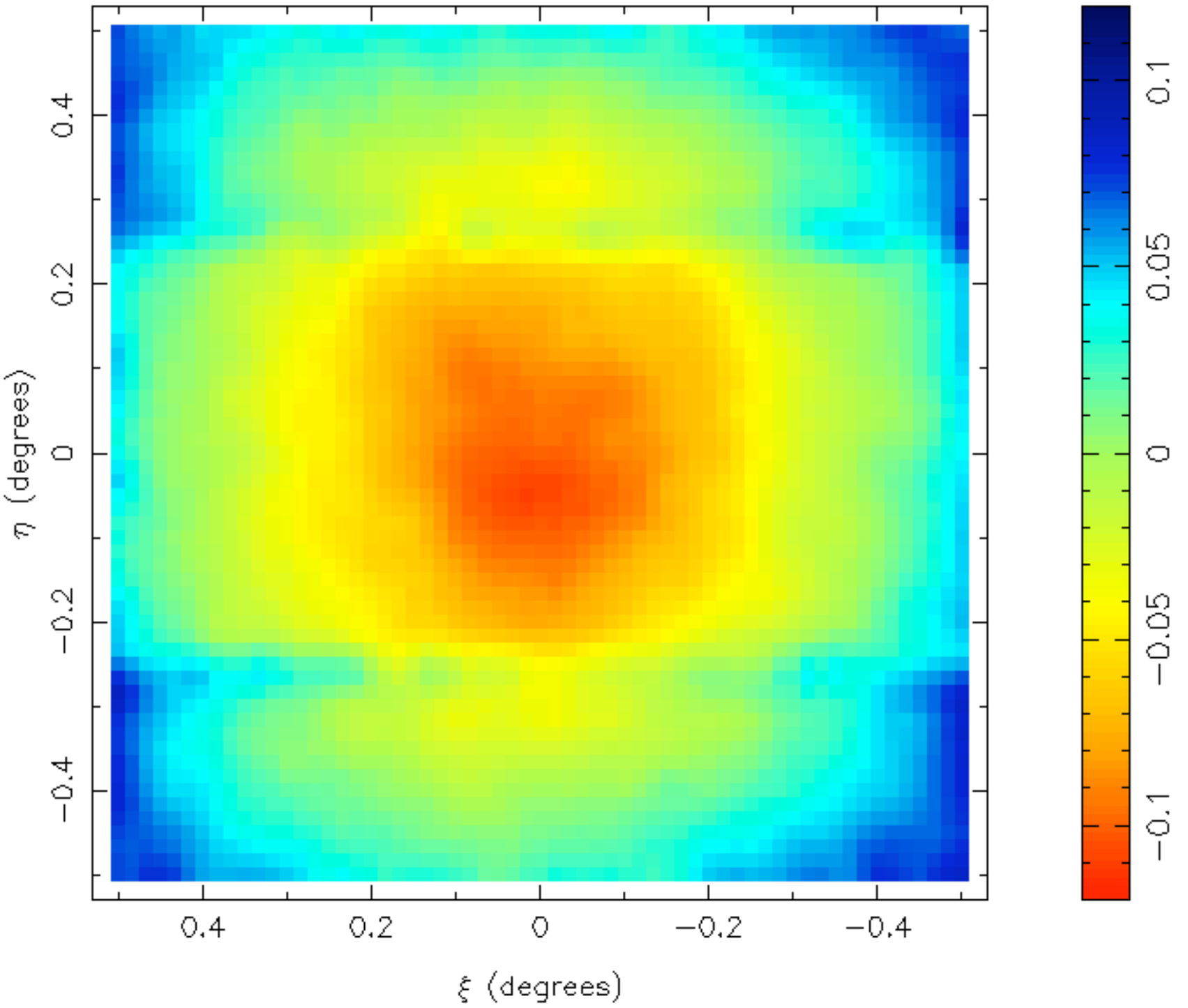
Illumination correction

- radial concentration of scattered light in optics
- detector level zero-point differences
- non-uniform non-astronomical scattered light
- scattering off masking strips and edges

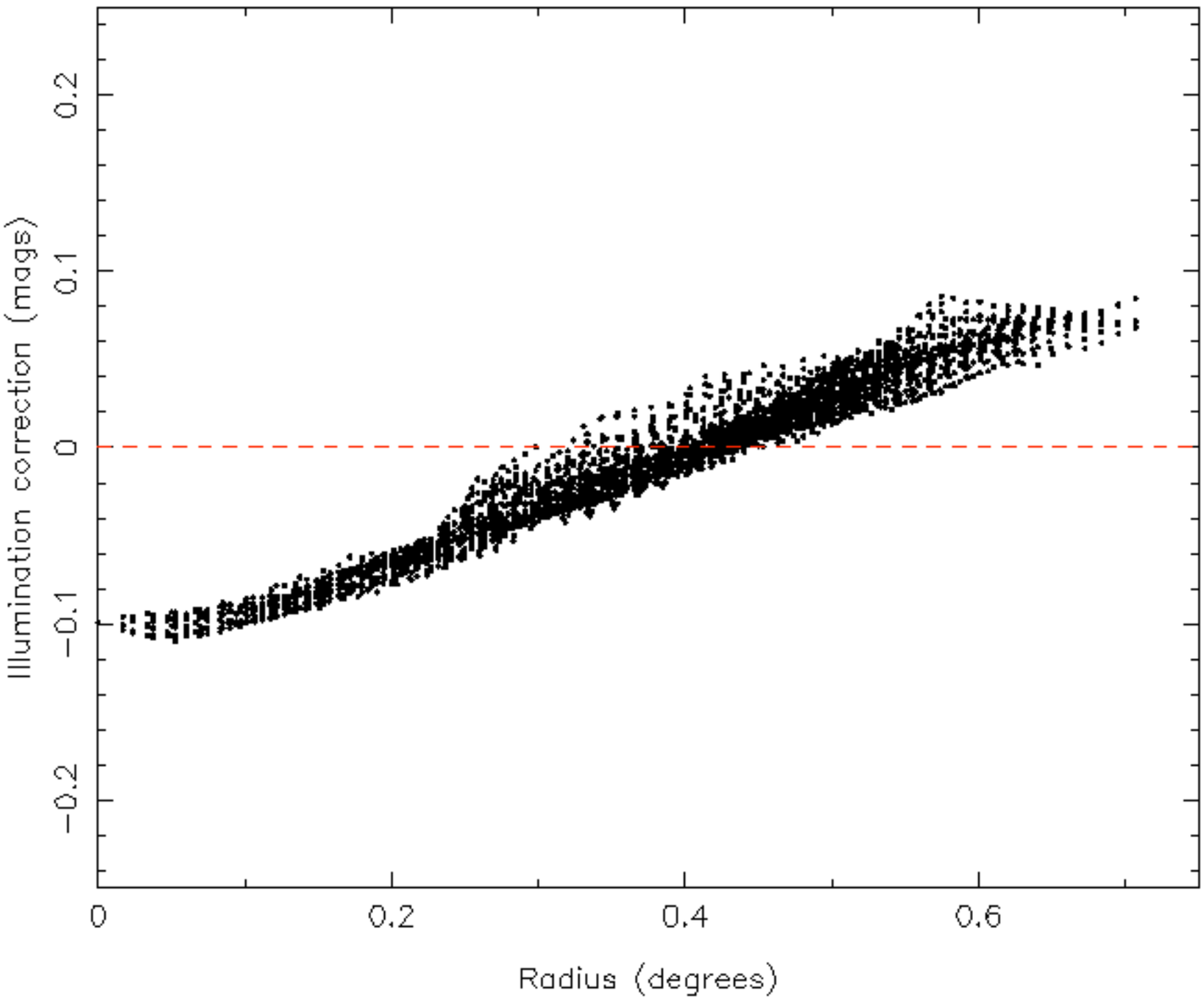
- solution -> APASS (now v7) + monthly stacks
- achieving robust +/-1% accuracy at a resolution of
  < 1 arcmin directly is difficult
  -> current method achieves this for monolithic filters


APASS
Photometric zero−points
jan2014
ZP
25
24
23
22
21
6660
6665
6670
6675
6680
6685
MJD −50000 (days)
g
r
i
z
u
Ha

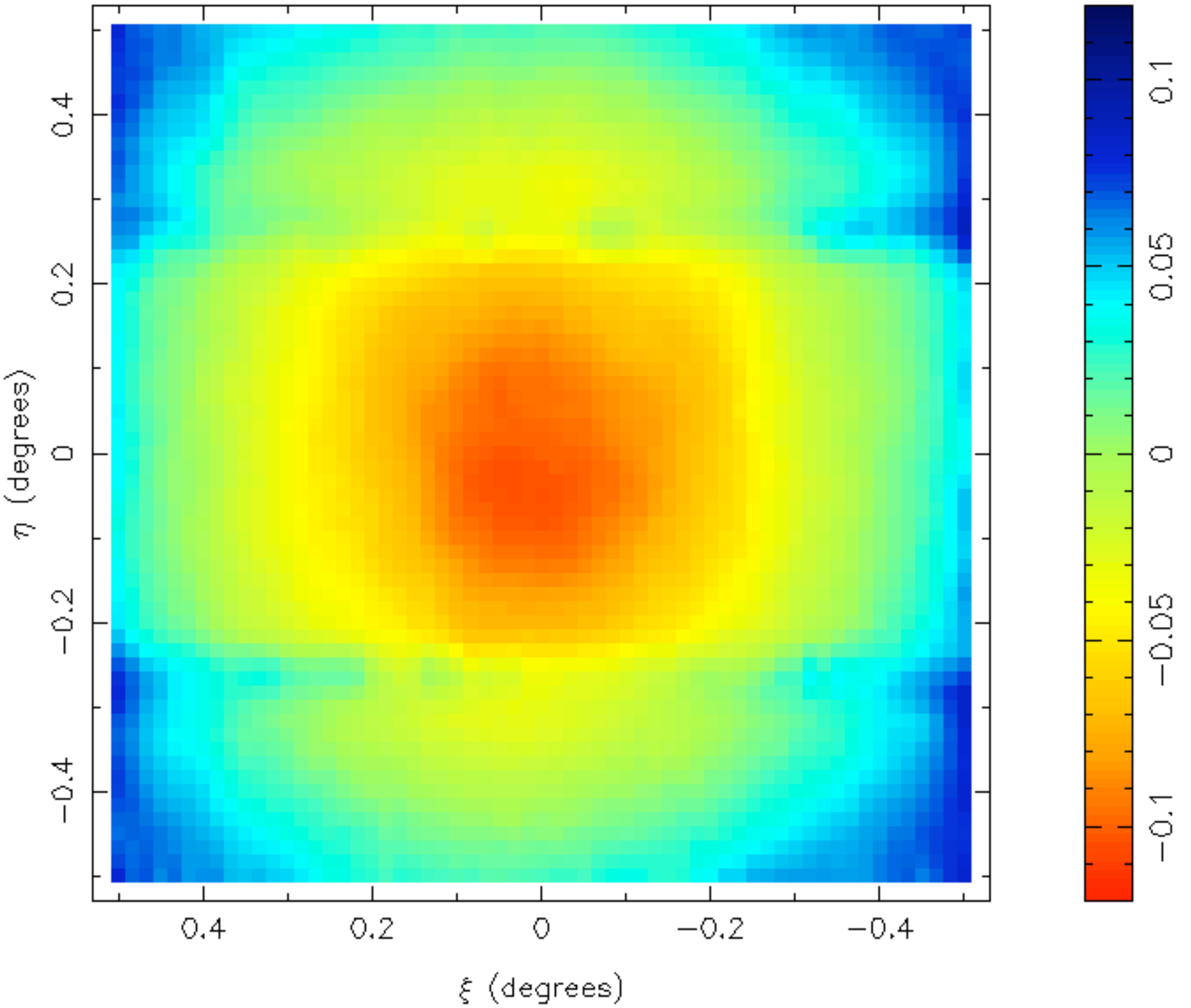
illumination correction anatomy r-band (jun2013)



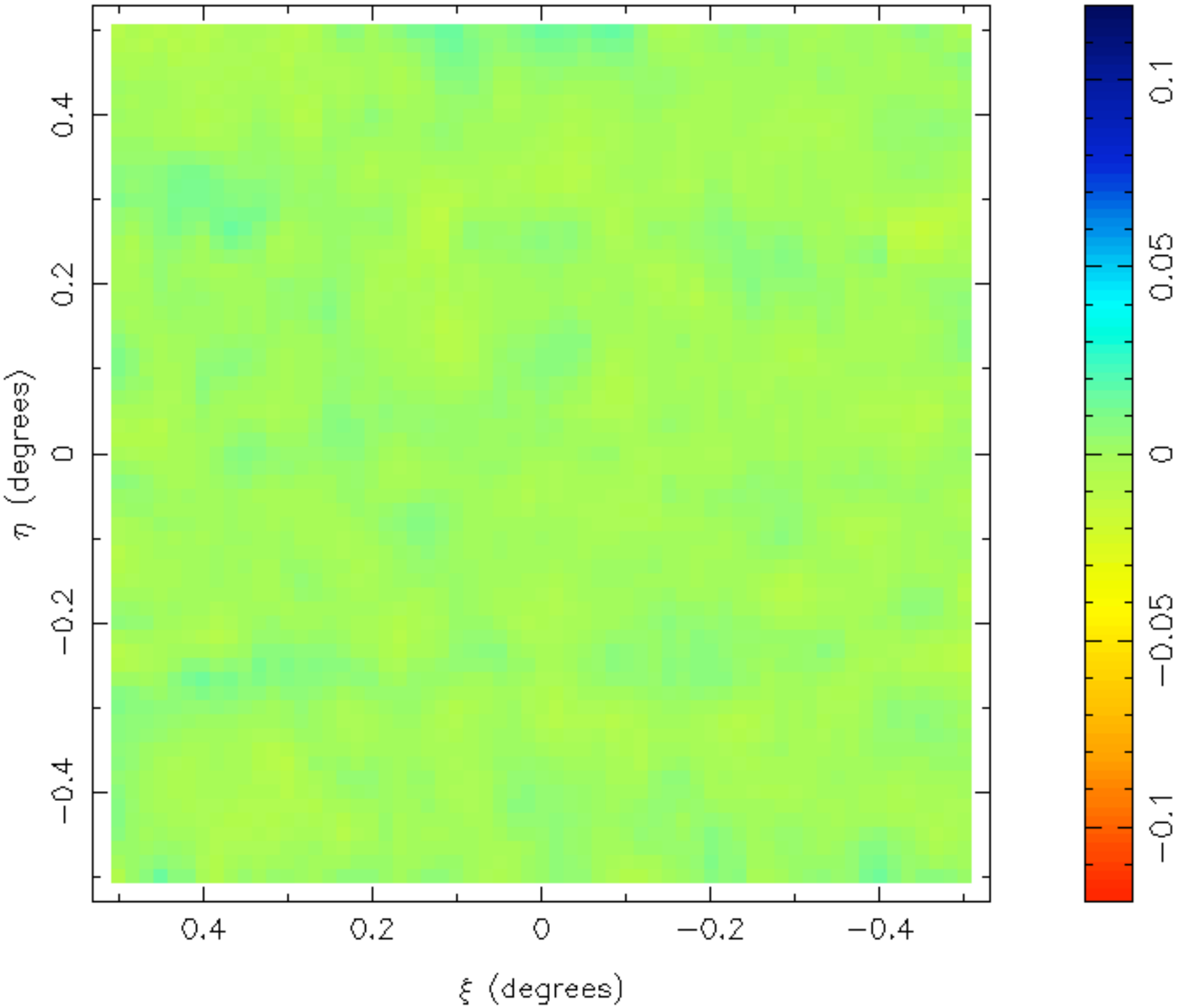
illumination correction anatomy r-band (jun2013)



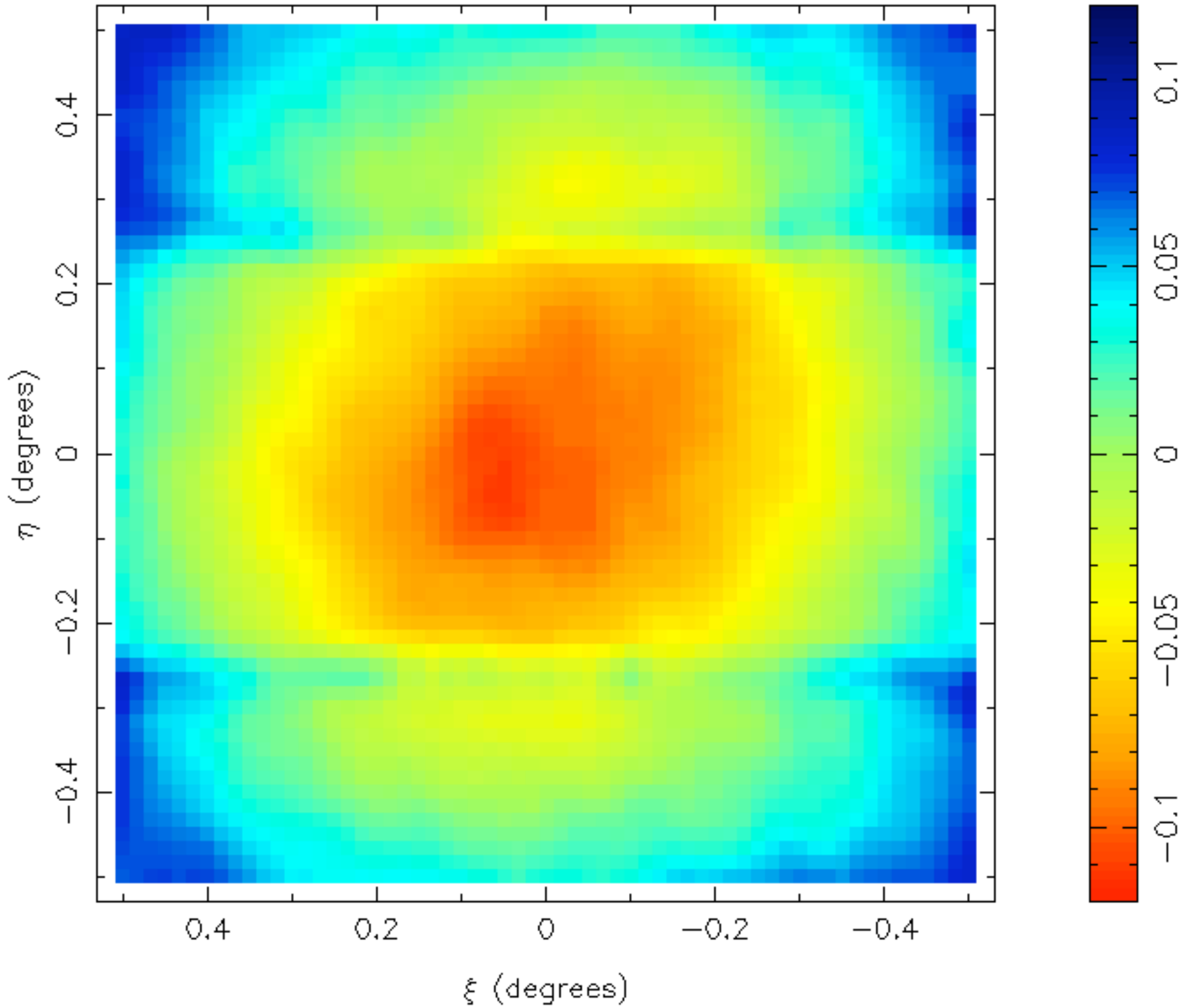
illumination correction anatomy r-band (jun2013)



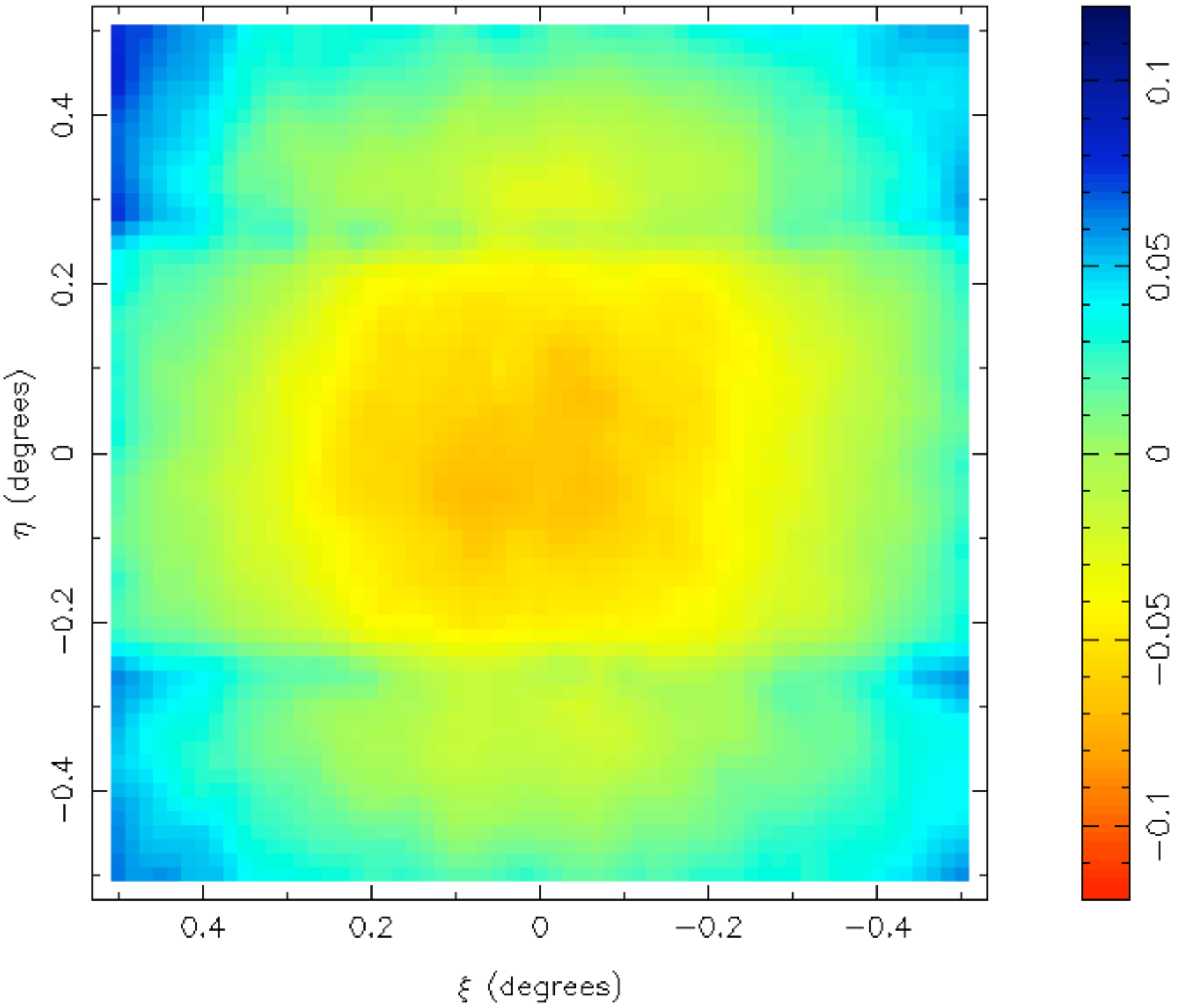
illumination correction anatomy r-band (jun2013)



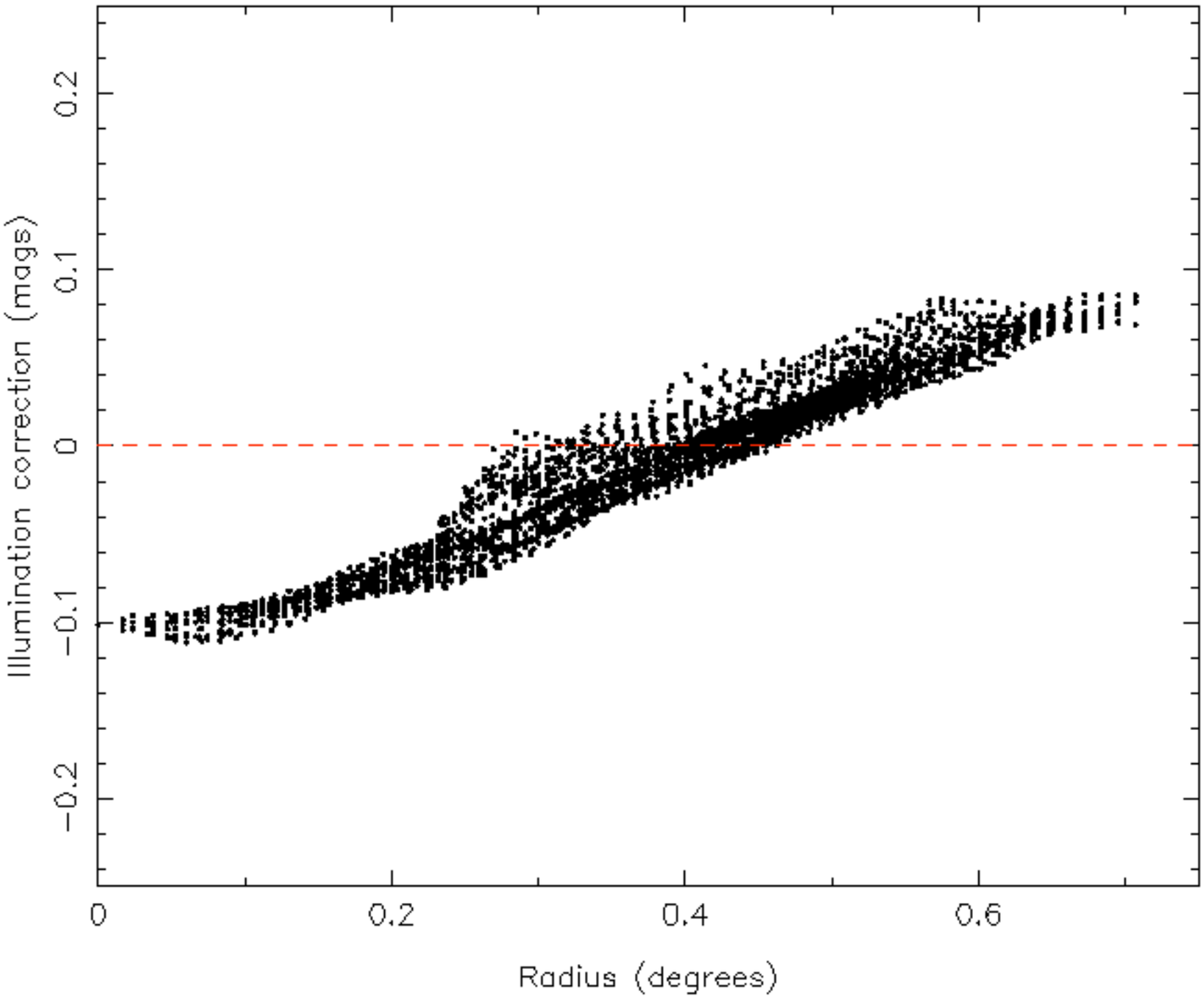
illumination correction r-band (dec2013-v-feb2014)



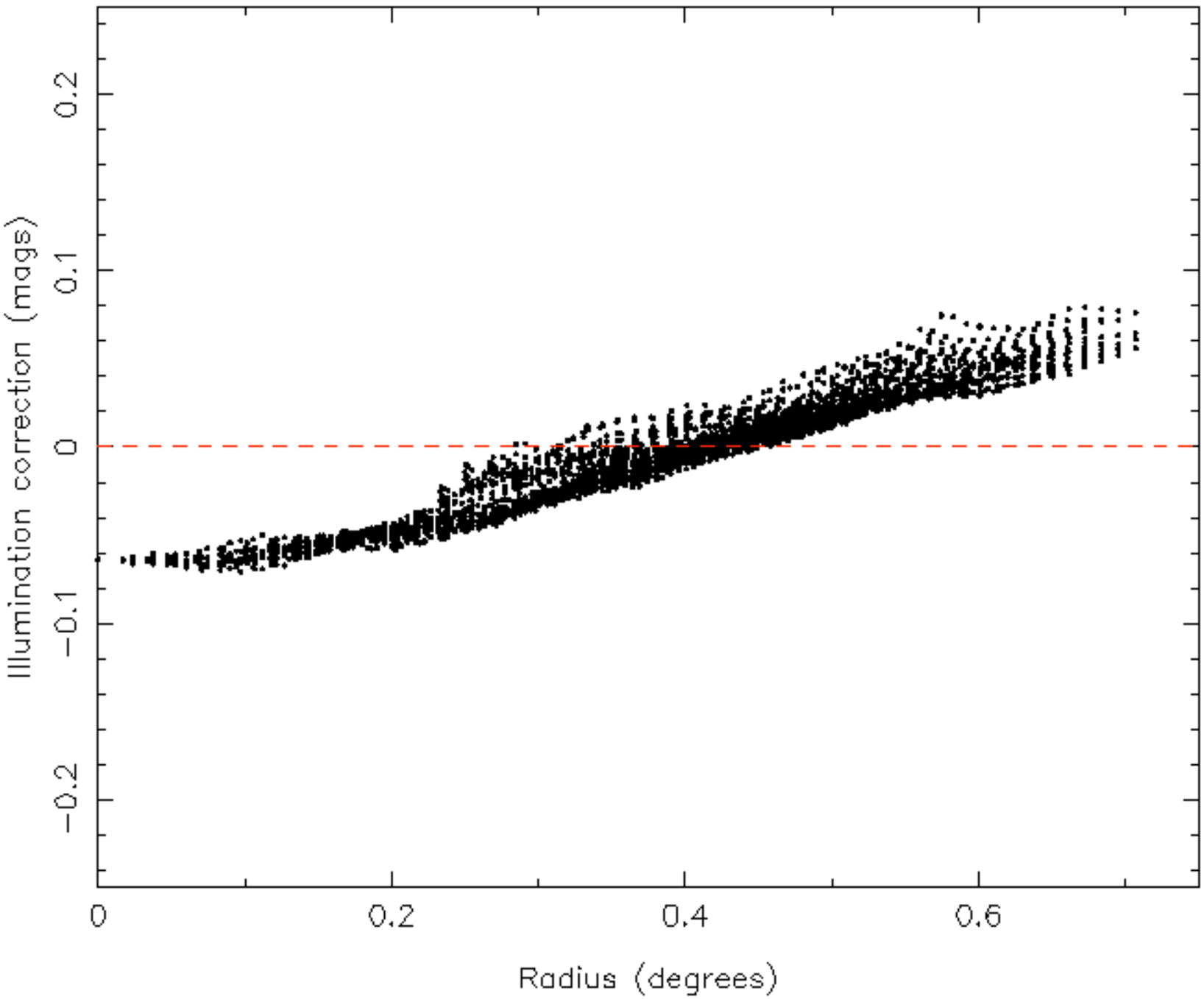
illumination correction r-band (dec2013-v-feb2014)

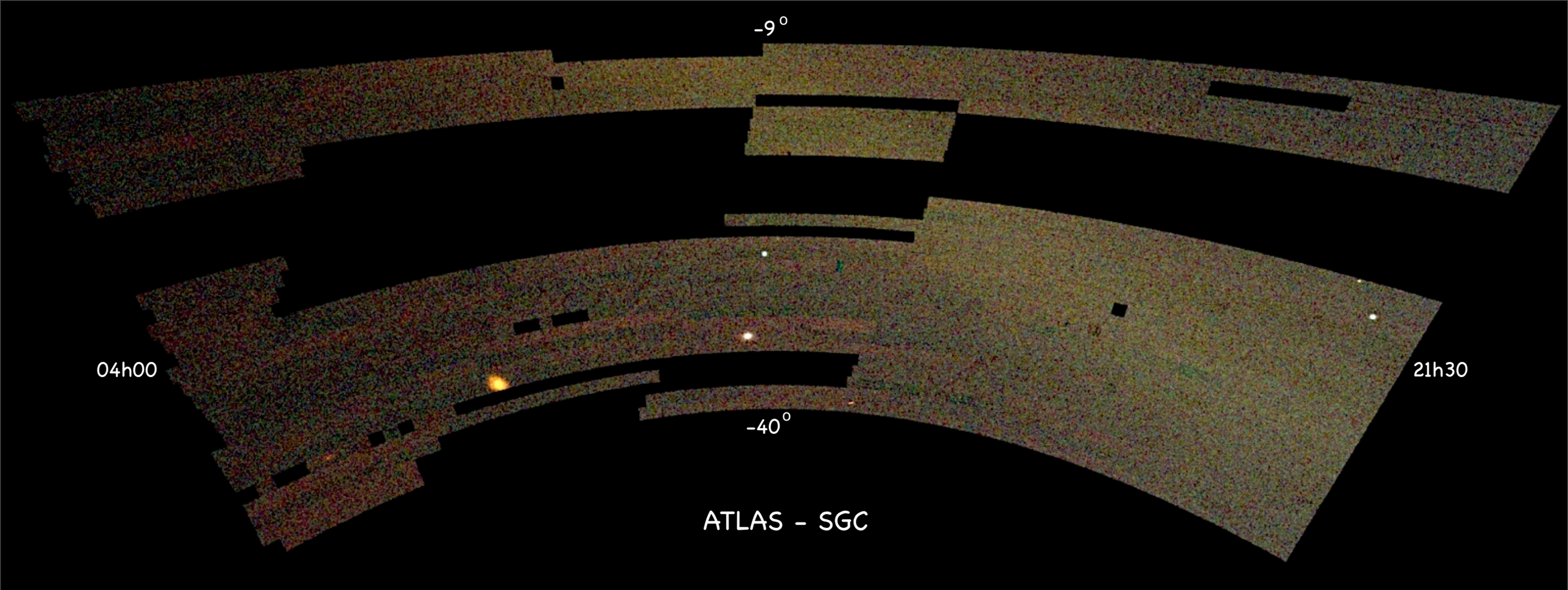


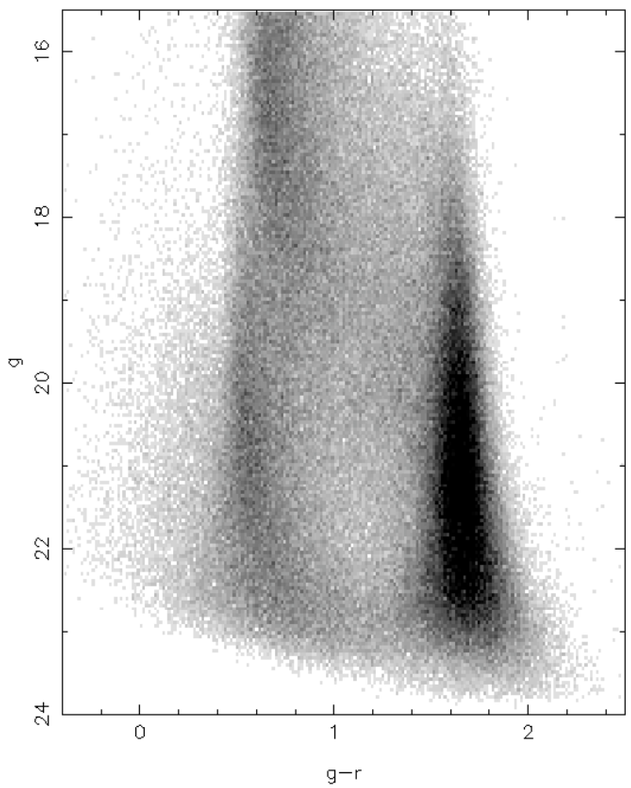
illumination correction r-band (dec2013-v-feb2014)



illumination correction r-band (dec2013-v-feb2014)




-9°
04h00
21h30
-40°
ATLAS - SGC


g
16
18
20
22
24
0
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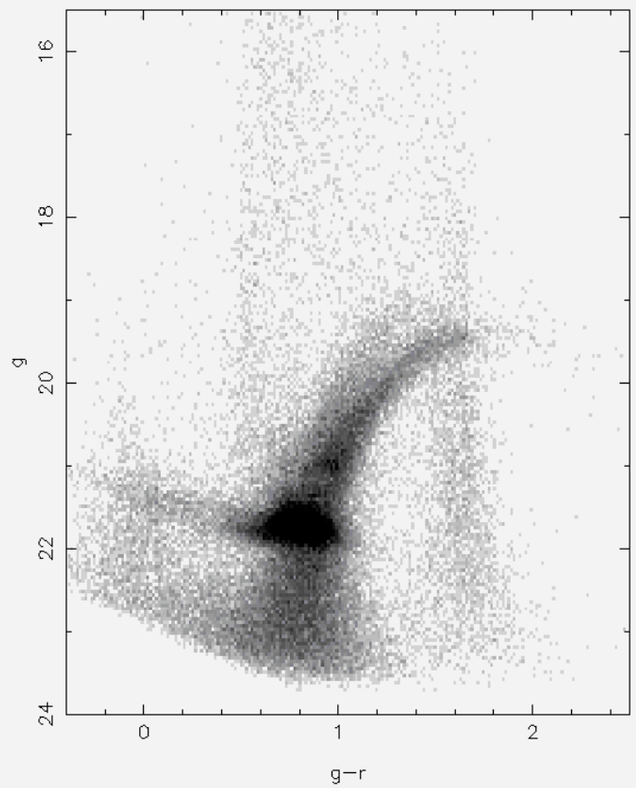
2
g−r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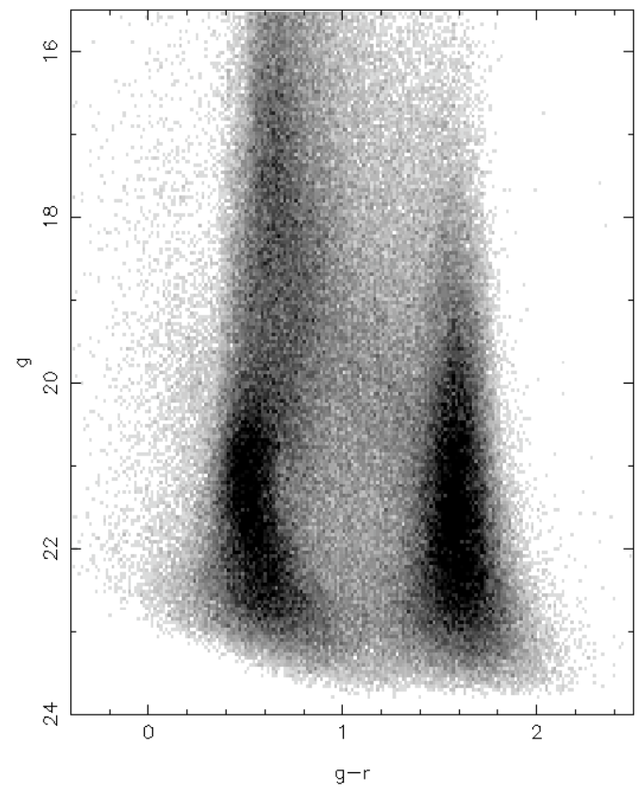
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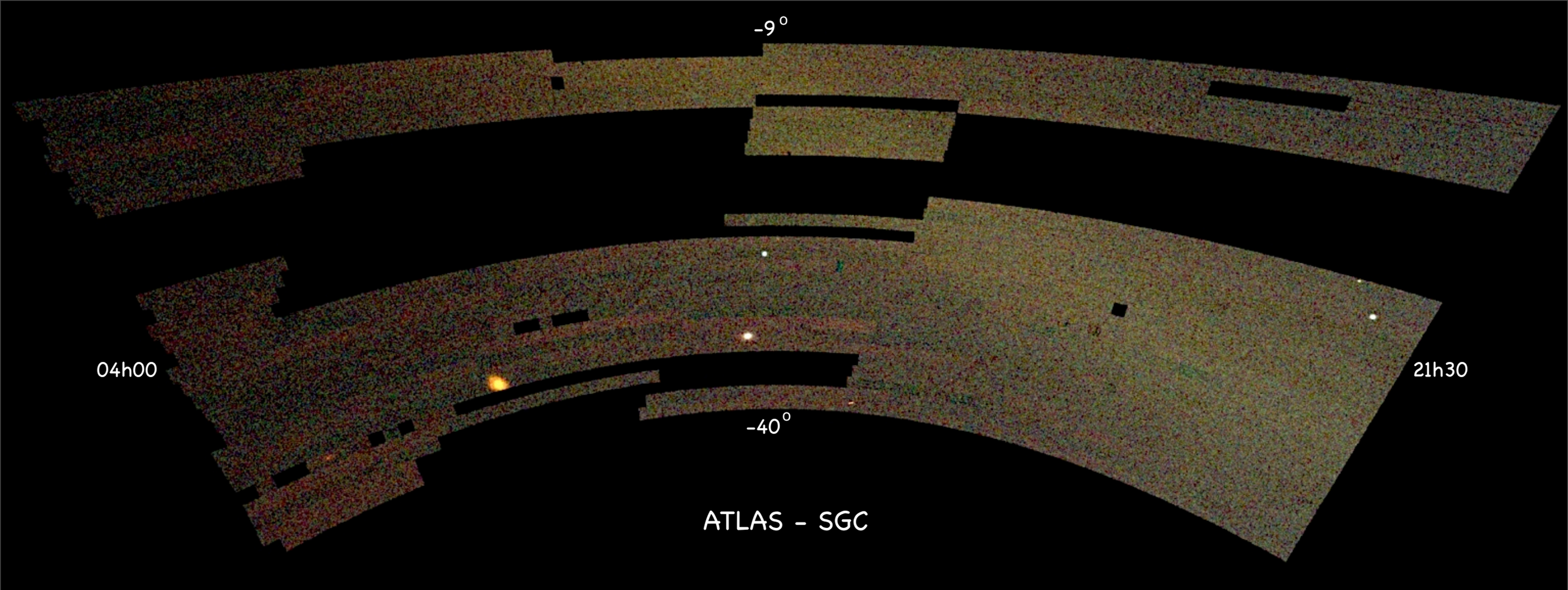
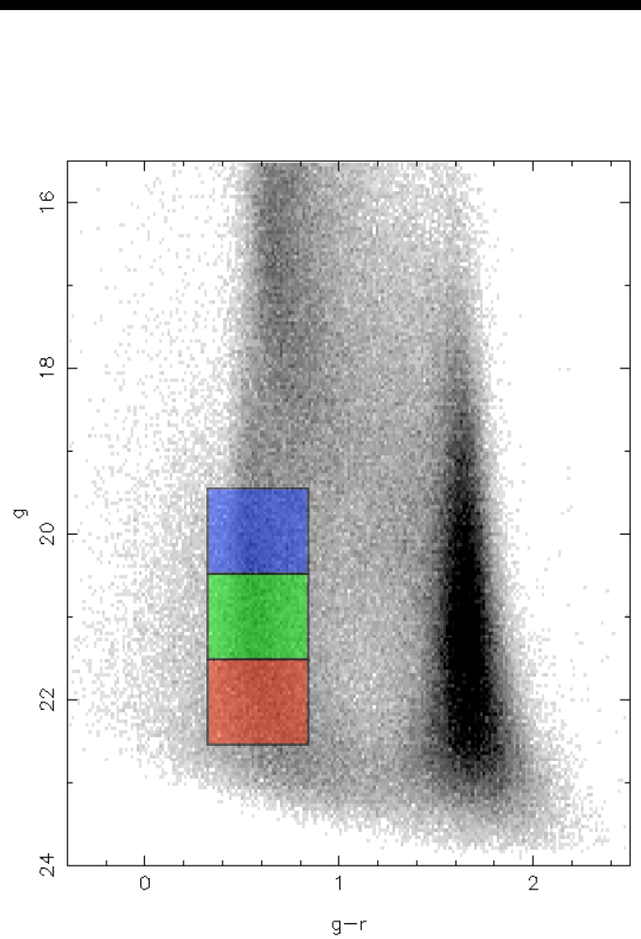

-9°
04h00
21h30
-40°
ATLAS - SGC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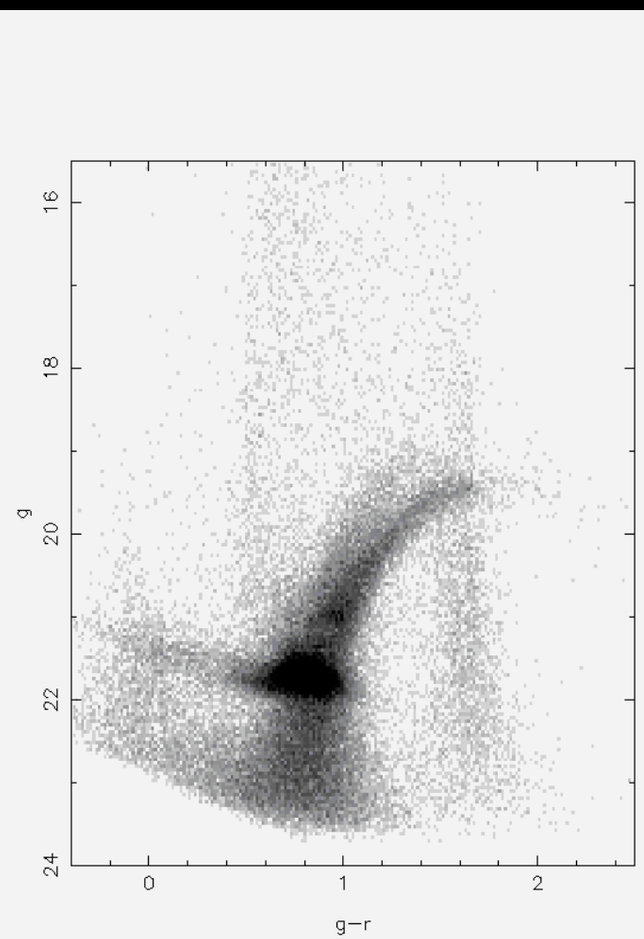
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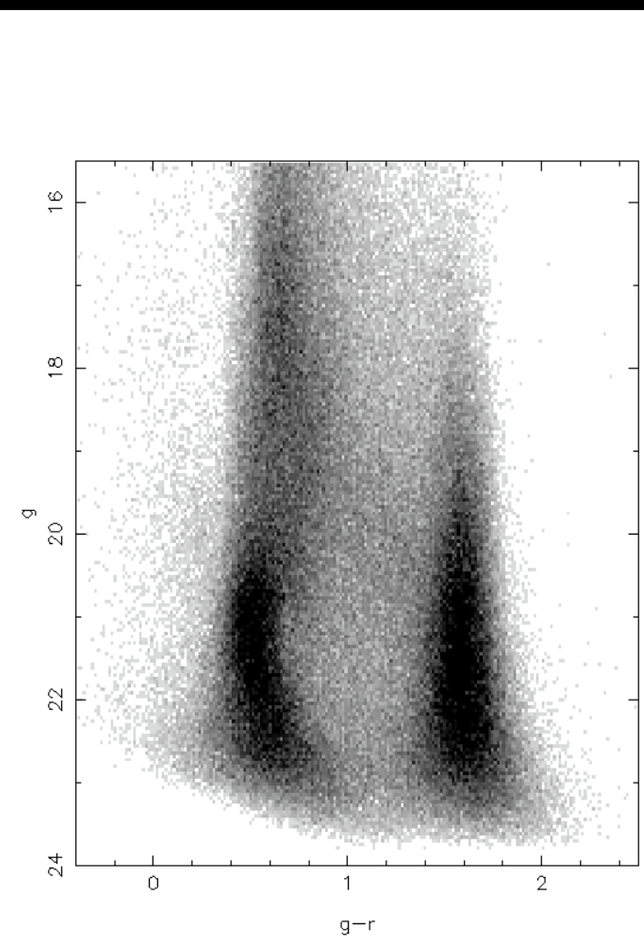
g
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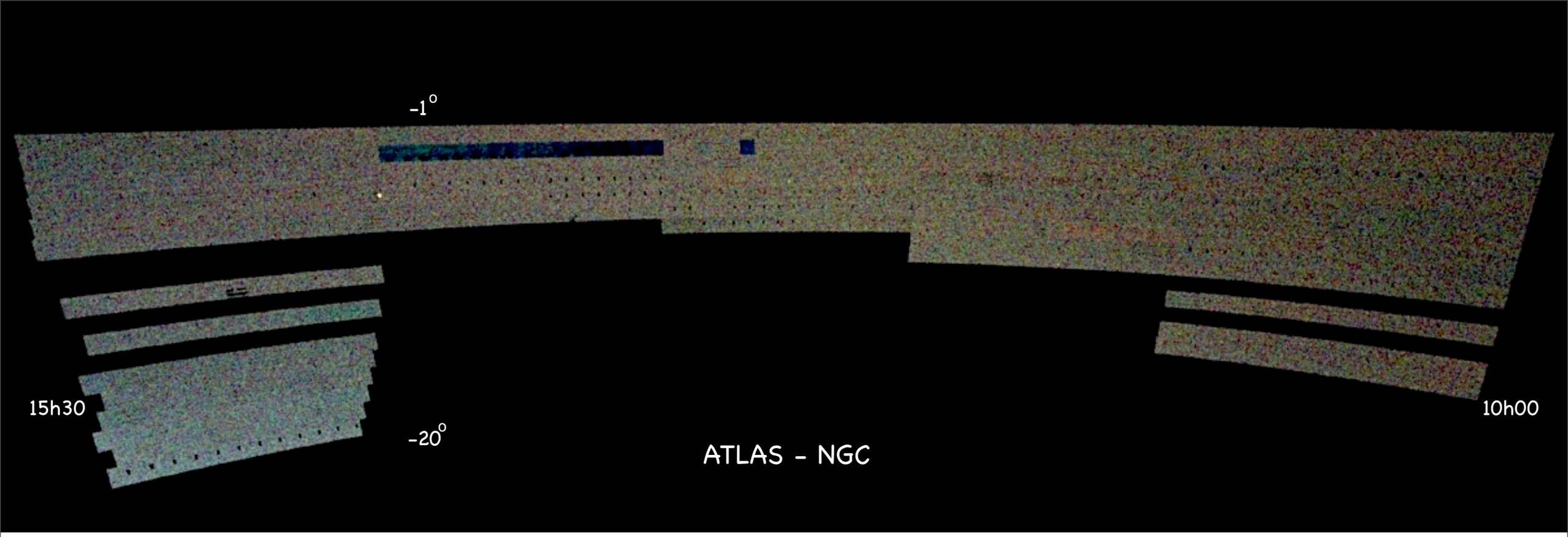
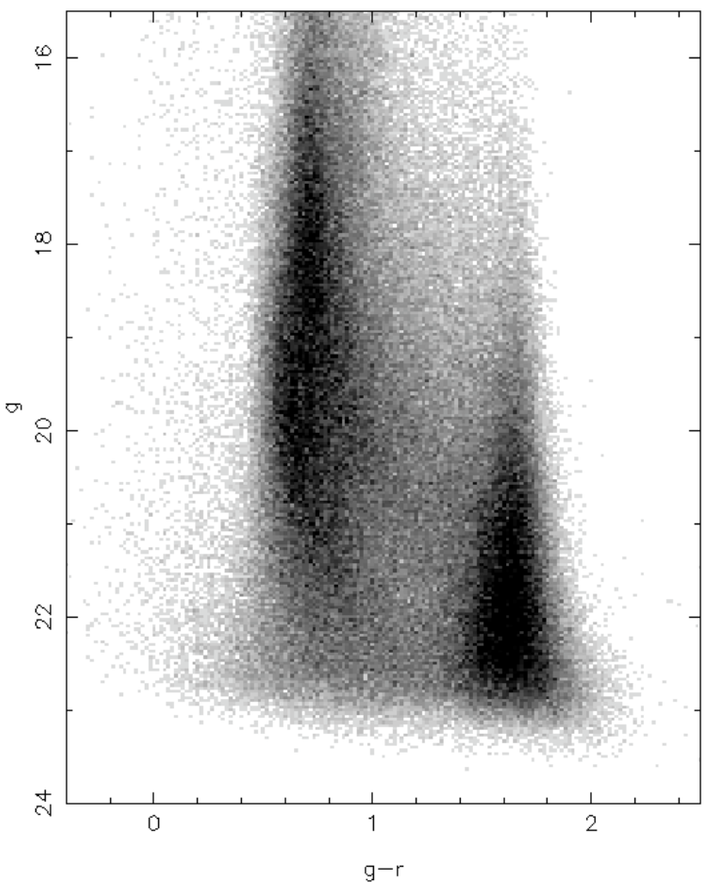
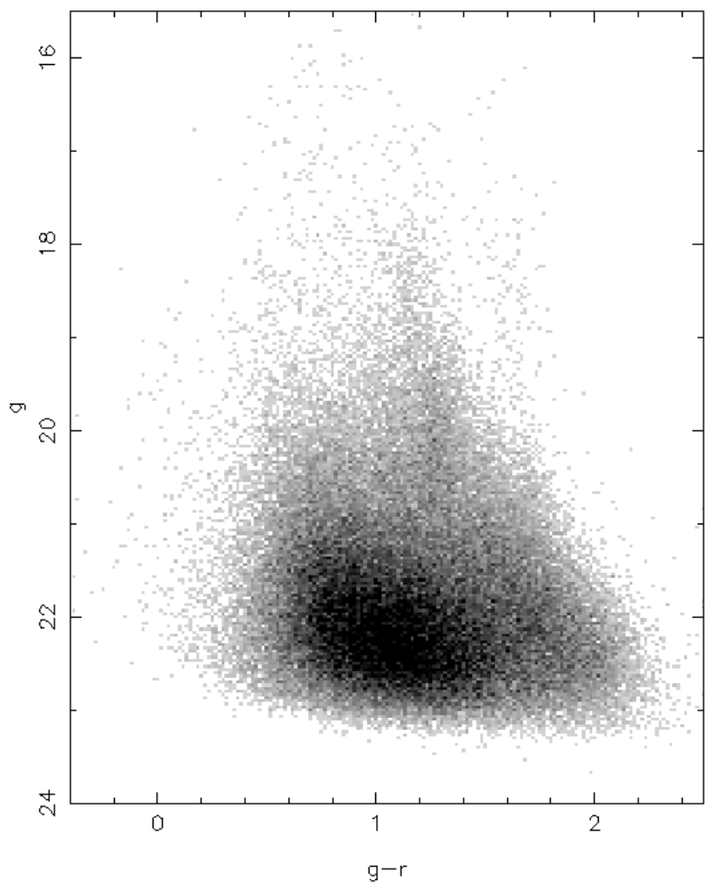
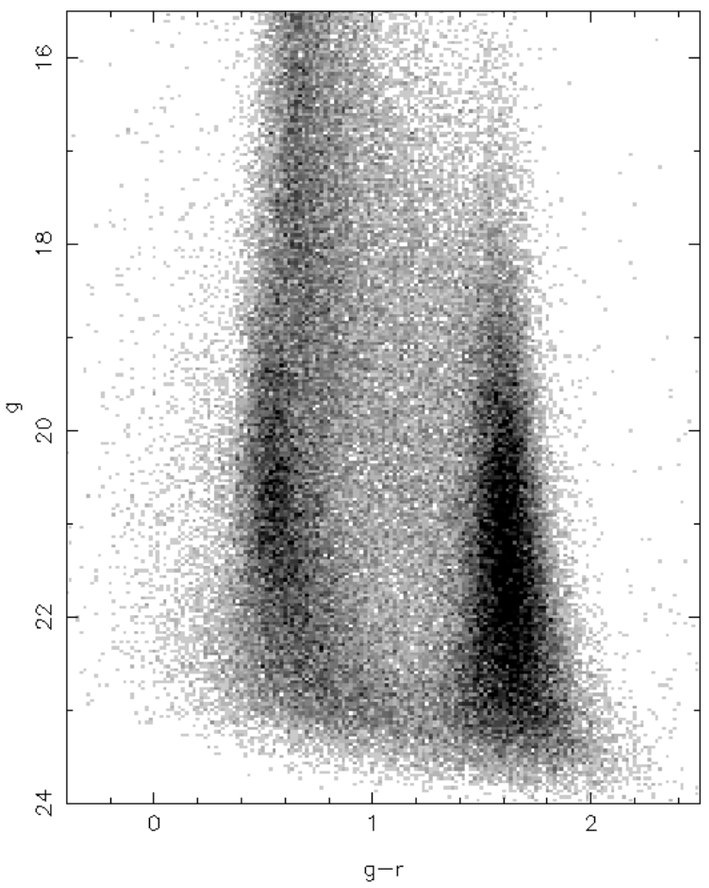


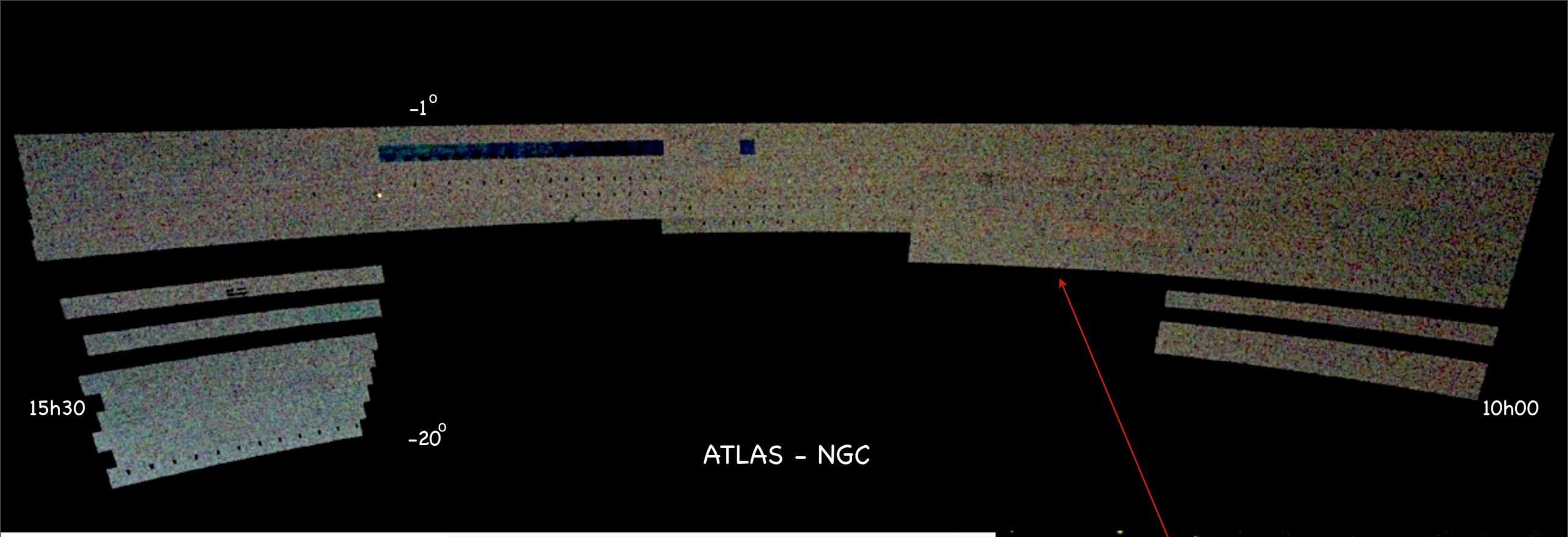
Non-stellar



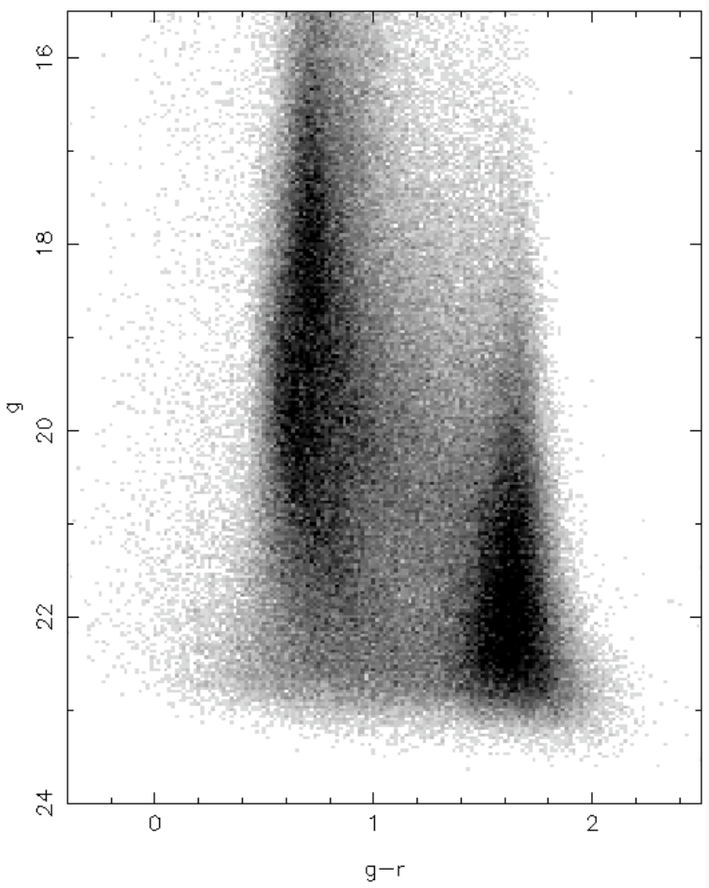


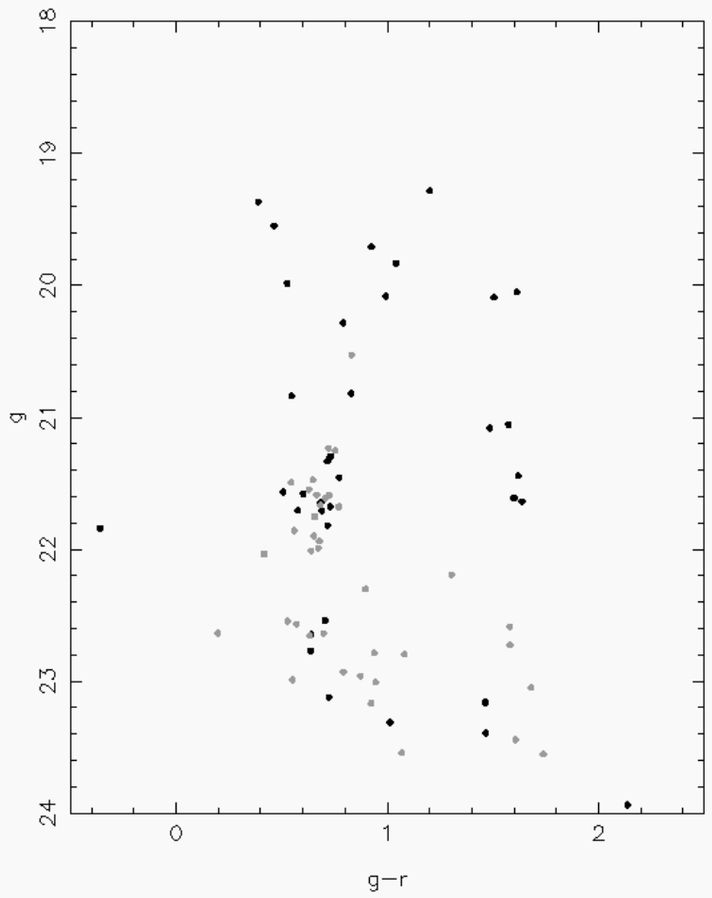
Stellar

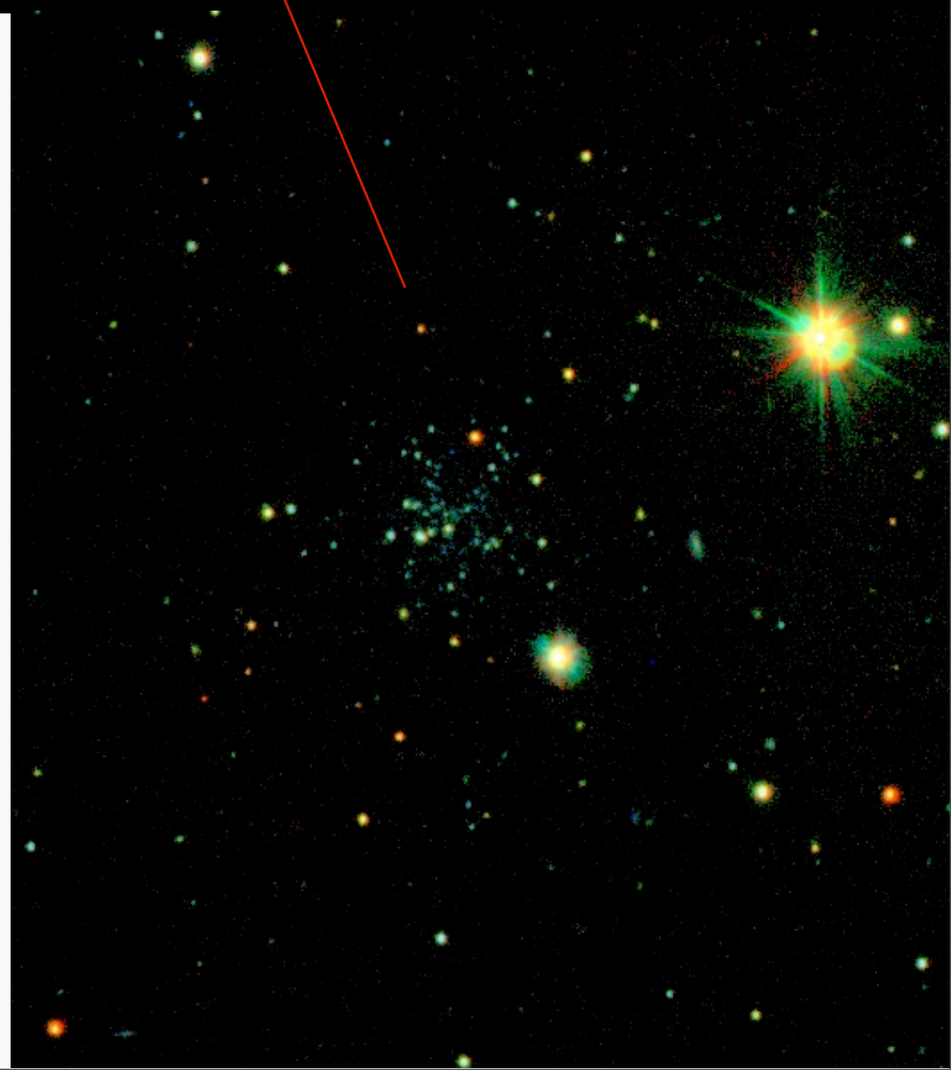




Crater - new MW satellite







Photometric calibration - summary

- internal gain calibration from twilight flats
- STD field observations for 1st-pass nightly calibration [excluding -89deg ugri extinction measure observations]
- APASS to measure u g r i z and Halpha illumination corrections [and from v1.1 -> provide AB mag zpts]
- SDSS/Panstarrs overlap to independently monitor/ measure illumination correction for u,g,r,i,z bands
- ce's variation with detector and/or radius taken care of by illumination correction
- overlap calibration from contiguous areas and/or via more extensive use of APASS [skymapper may eventually provide alternative global calibration]