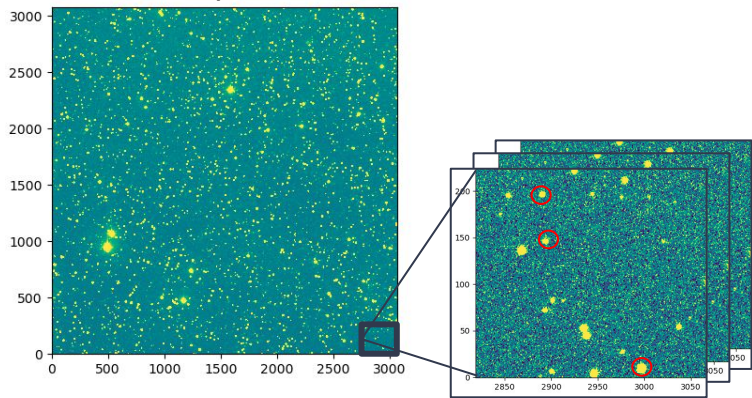


What's happening with Starflats?

1 ZTF quadrant



Starflat procedure

Aperture photometry

Source	ccdid	qid	x	y	...	f_10	colormag
825758177630227072	15	3	1790.861682	3044.395583	...	95.722356	2.257168

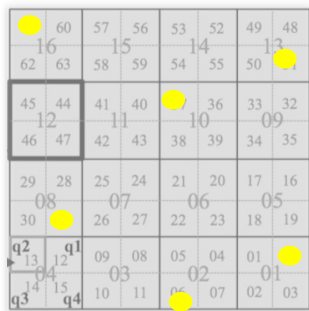
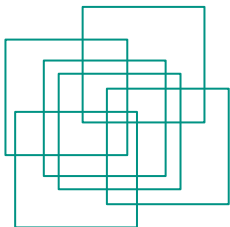


basename	Source							
	f_0	f_1						
ztf_20180221283542_700366_zg_c04_o_q1_psfcat.fits	815009596771365760	29425.714794	56384.578507					
	gmag	e_gmag	rpmag	e_rpmag	bpmag	e_bpmag	colormag	psfcat
	13.628071	0.002762	13.170574	0.003818	13.922994	0.002867	0.752420	85422.953125
	18.535330	0.003196	17.447903	0.014245	19.797472	0.052044	2.349569	305.170135
	19.012016	0.003399	17.877924	0.014084	20.312551	0.057139	2.434627	146.495590
	16.609867	0.002895	15.637225	0.004785	17.560944	0.008178	1.923719	2084.296143
ztf_20180221317141_700394_zg_c04	19.557554	0.003992	18.504904	0.027041	20.538500	0.088147	2.033596	354.749329

	18.966047	0.003462	17.918194	0.016825	20.125122	0.054040	2.206928	260.950012
	19.160720	0.003679	18.111618	0.018353	20.308075	0.084216	2.196457	180.012039
	16.694715	0.002848	16.126848	0.005150	16.773775	0.005598	0.646927	6457.491699
	18.851212	0.003431	17.730696	0.015658	19.982006	0.059003	2.251310	NaN
	19.335558	0.003839	18.491396	0.020409	20.250107	0.066143	1.758711	NaN

301856 rows x 76 columns

Sequence



61	60	57	56	53	52	49	48
16		15		14		13	
62	63	58	59	54	55	50	51
45	44	41	40	37	36	33	32
12		11		10		09	
46	47	42	43	38	39	34	35
29	28	25	24	21	20	17	16
08		07		06		05	
30	31	26	27	22	23	18	19
q2	q1	09	08	05	04	01	00
13	12	03		02		01	
q3	q4	10	11	06	07	02	03
14	15						

Fit

Linear model:

$$m_{ADU} = m + \delta ZP(x)$$

Measurements
($\sim 10^7$)

Star mags
(parameters)
($\sim 10^5$)

Non uniformities
(parameters)
($\sim 10^{3-4}$)

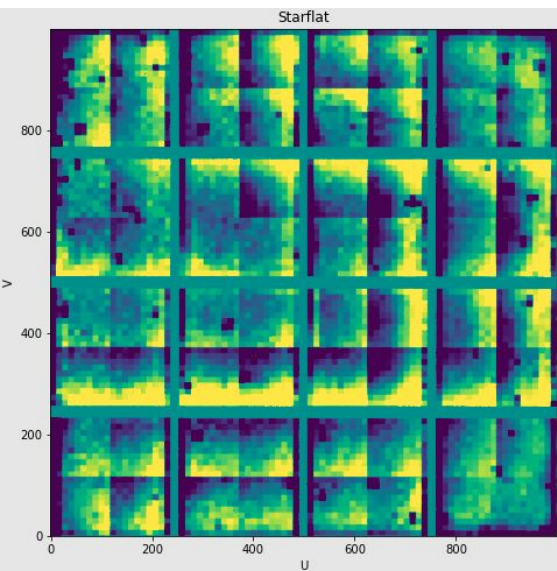
Superpixels

01				00			
		01					
02				03			

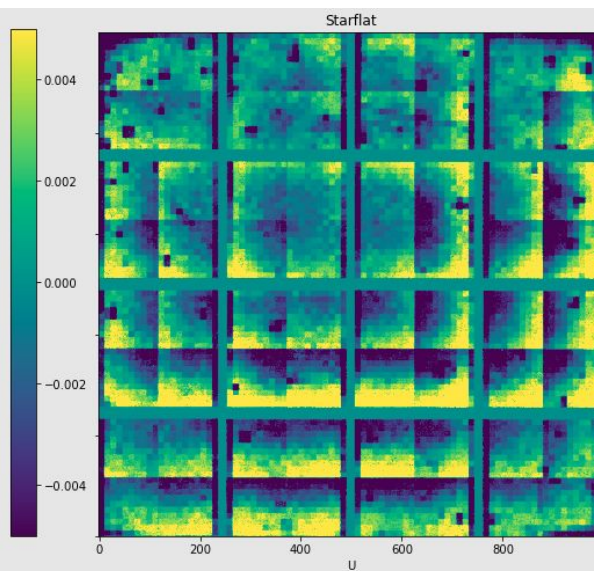
Gain subtracted: superpix = 10×10

g band
aperture photometry

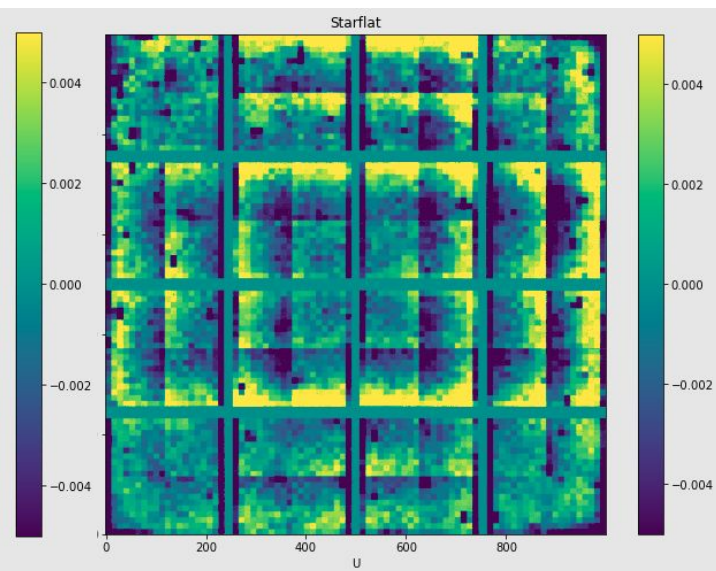
$$m_{ADU} = m + \delta ZP(x)$$



2018



march 2019



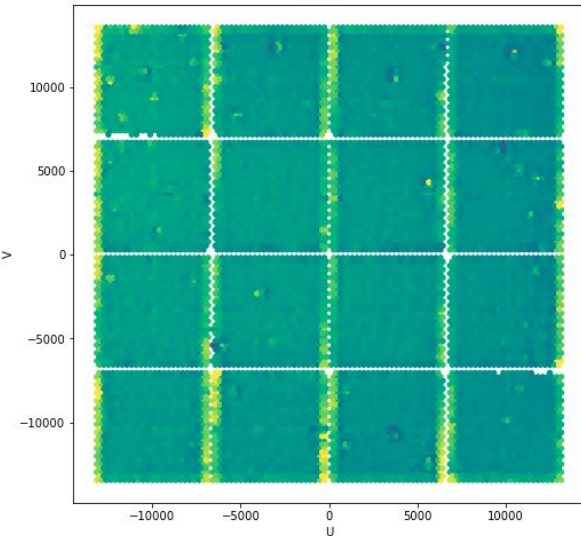
november 2021

After iteration, gain non-subtracted: superpix = 10*10

g band
aperture photometry

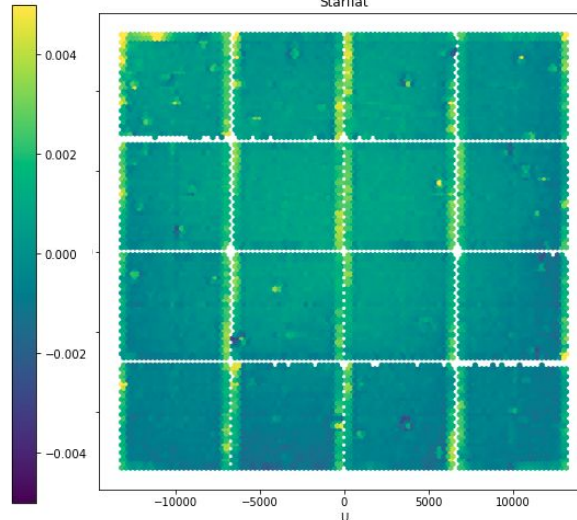
$$m_{ADU} = m + \delta ZP(x)$$

Starflat



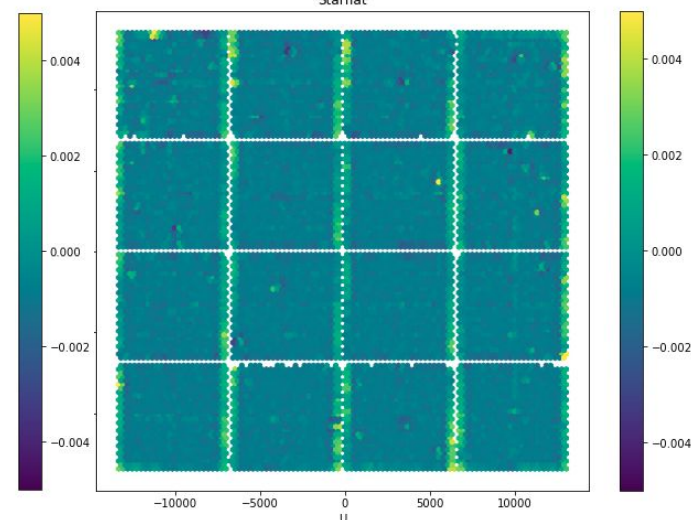
2018

Starflat



march 2019

Starflat

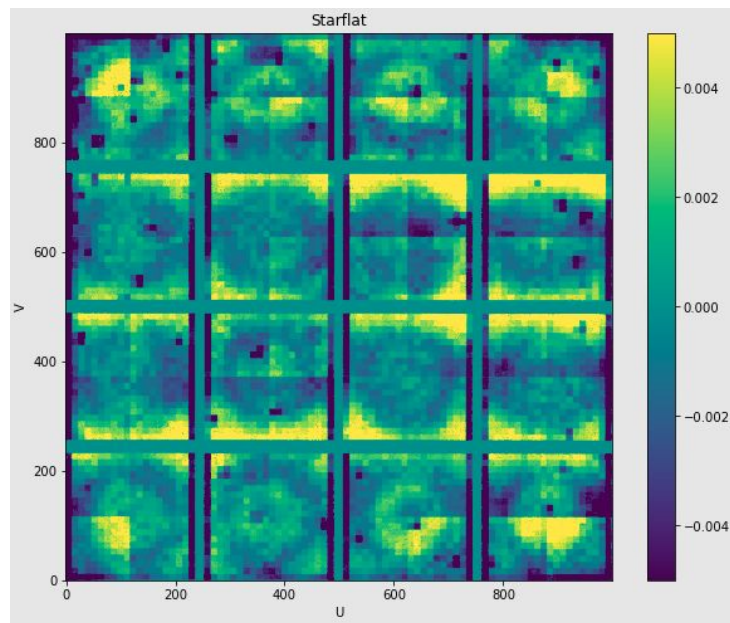


november 2021

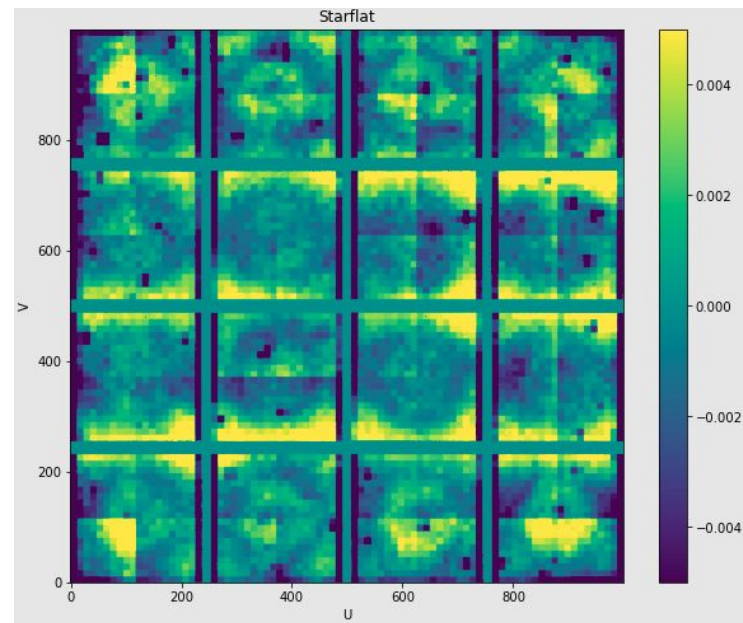
Gain subtracted: superpix = 10×10

r band
aperture photometry

$$m_{ADU} = m + \delta ZP(x)$$



march 2019

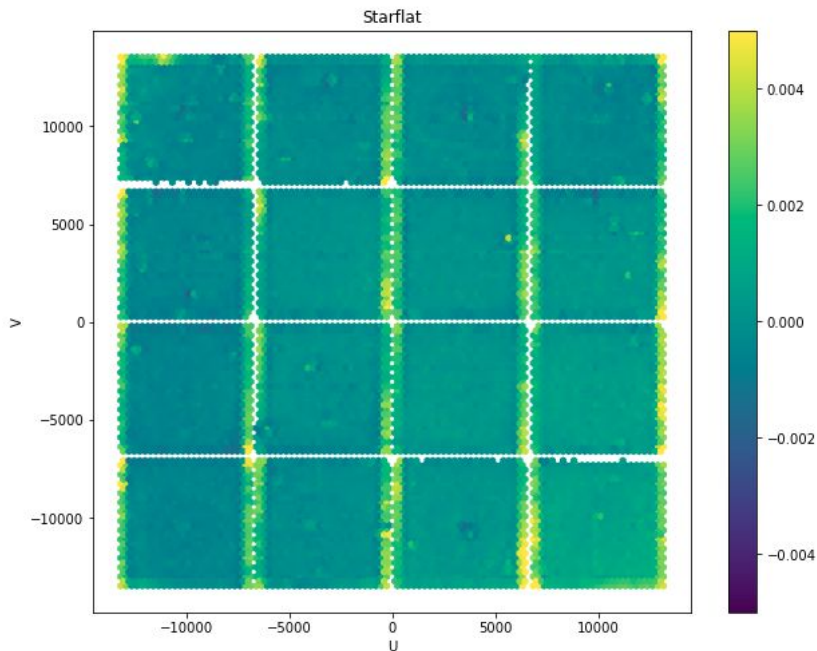


november 2021

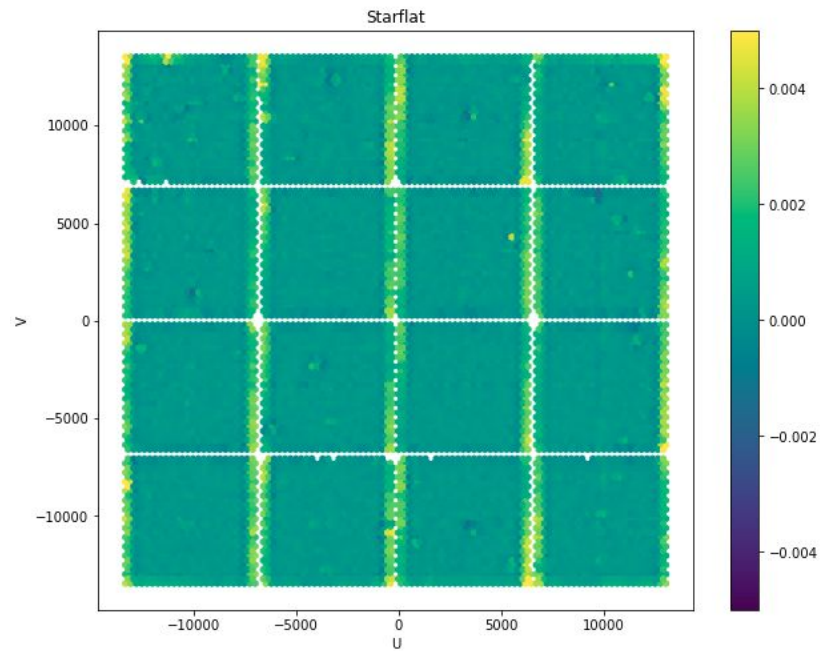
After iteration, gain non-subtracted: superpix = 10*10

r band
aperture photometry

$$m_{ADU} = m + \delta ZP(x)$$

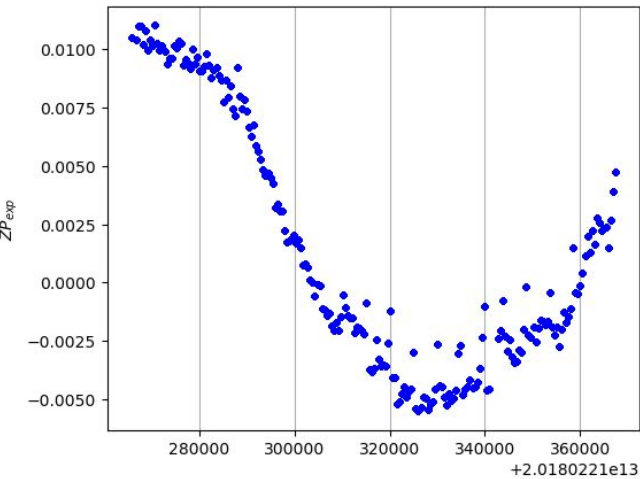


march 2019

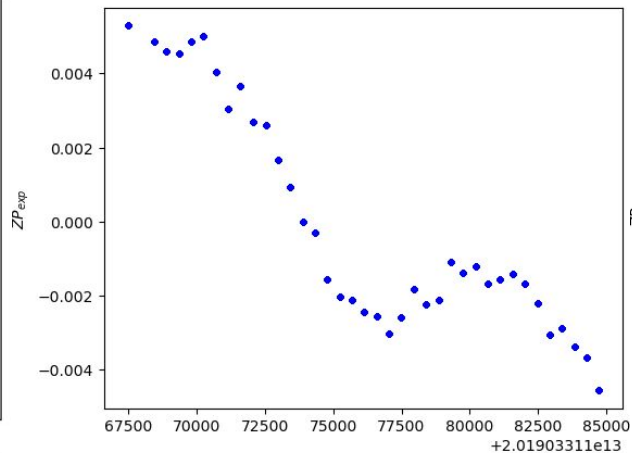


november 2021

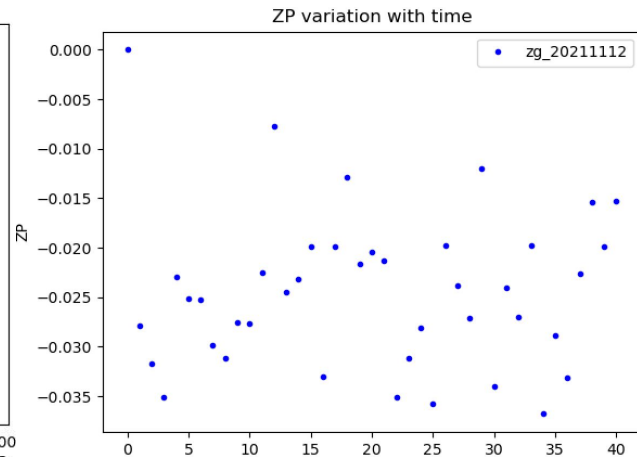
ZP Variations with time



g band 2018



g band march 2019



g band november 2021

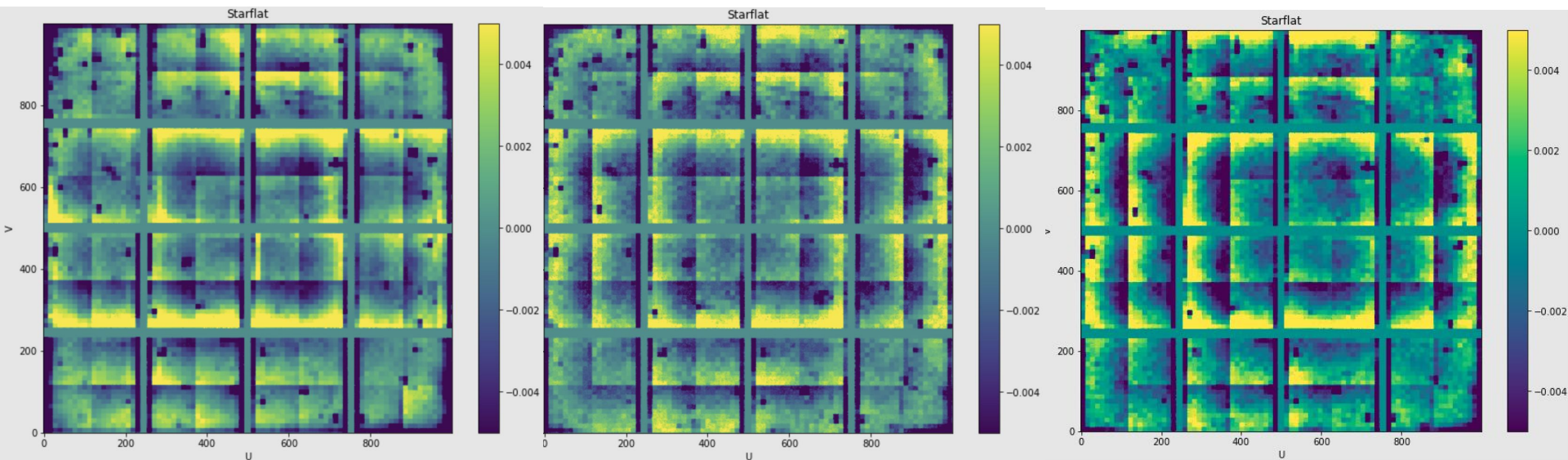
Fit

$$m_{ADU} = m + \delta ZP(x) + ZP_{exp}$$

Gain subtracted: superpix = 10×10

g band
aperture photometry

$$m_{ADU} = m + \delta ZP(x) + ZP_{exp}$$



2018

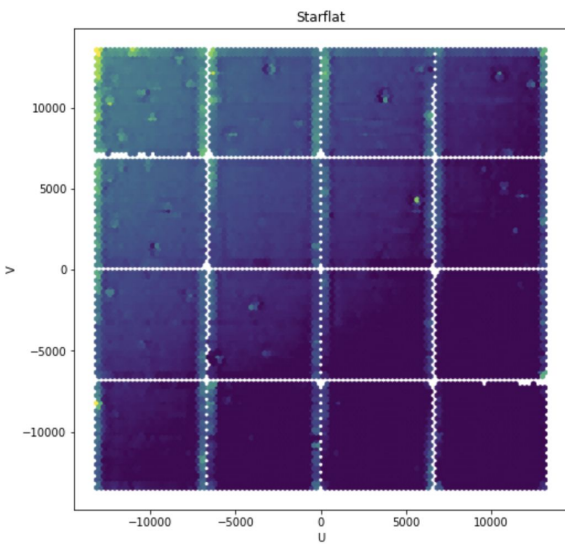
march 2019

november 2021

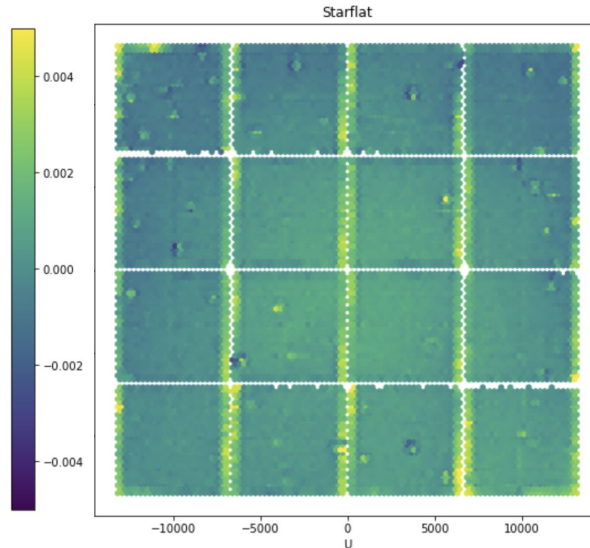
After iteration, gain non-subtracted: superpix = 10*10

g band
aperture photometry

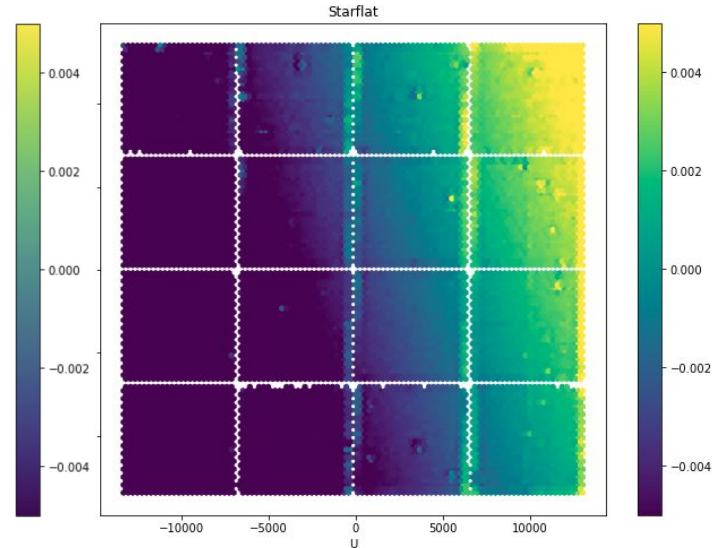
$$m_{ADU} = m + \delta ZP(x) + ZP_{exp}$$



2018



march 2019

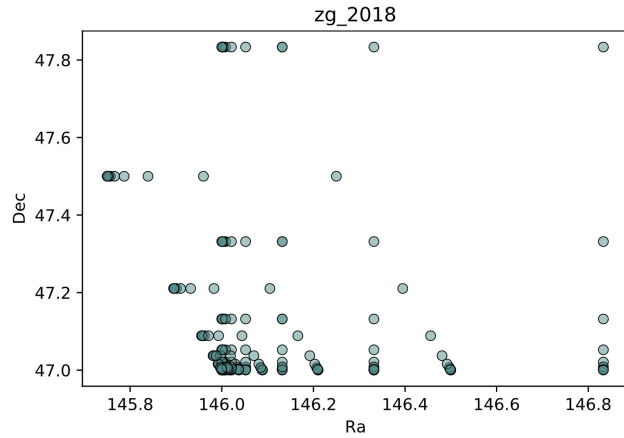


november 2021

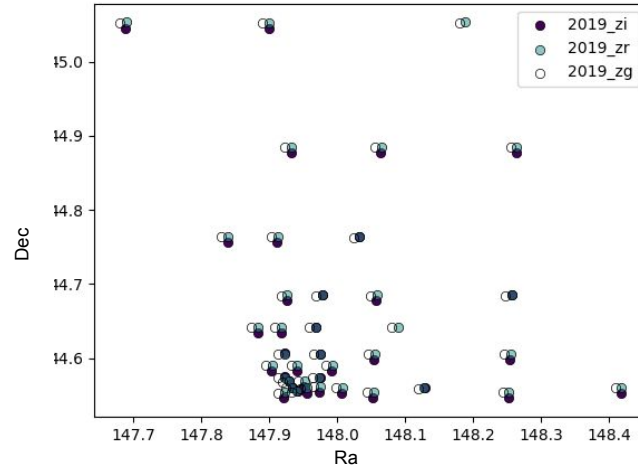
Main pb: gradient in maps

- Model with ZP smooth dev on spline
- Fit with PS1 -> ZP?
- Dithering simulation

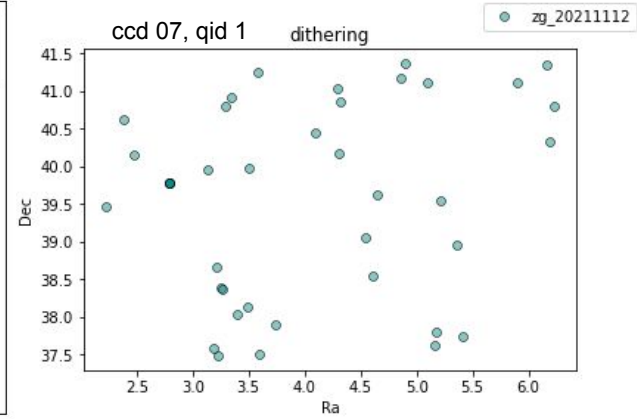
Dithering



g band 2018



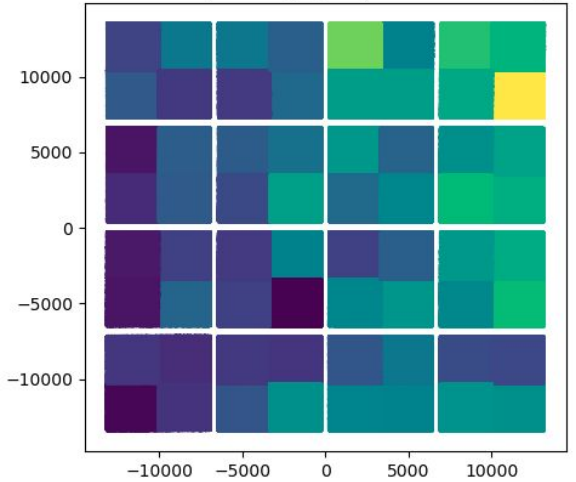
g band march 2019



g band november 2021

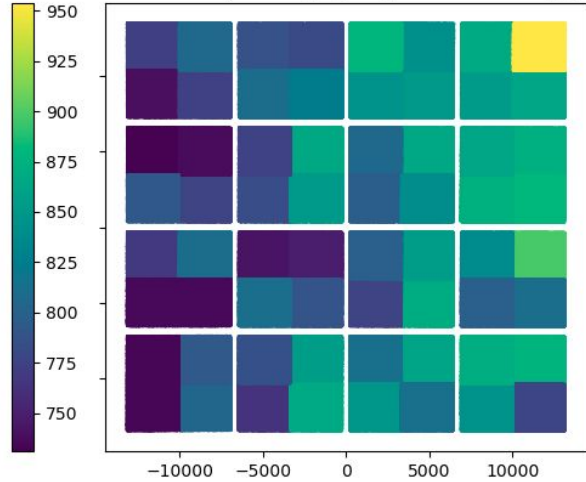
Statistics

nb of stars per image per quad: 20180221_zg



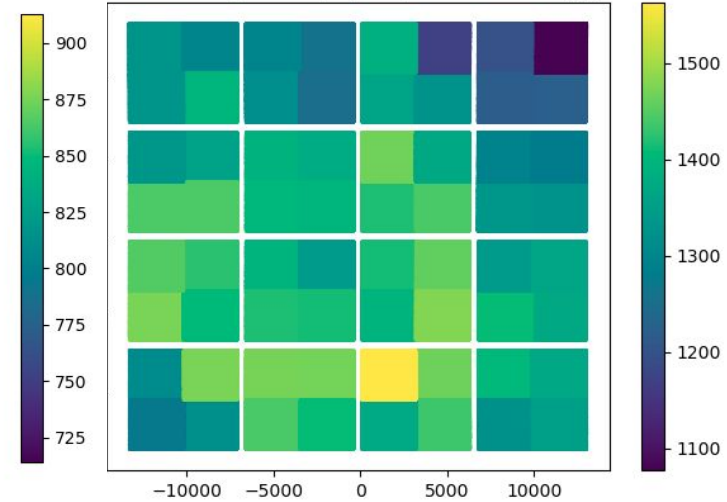
g band 2018

nb of stars per image per quad: 20190331_zg



g band march 2019

nb of stars per image per quad: 20211112_zg



g band november 2021