



Readnoise vs Readtime Impacts

Lynne Jones, based on read noise values provided by the
Aaron Roodman & Steve Ritz & the camera team

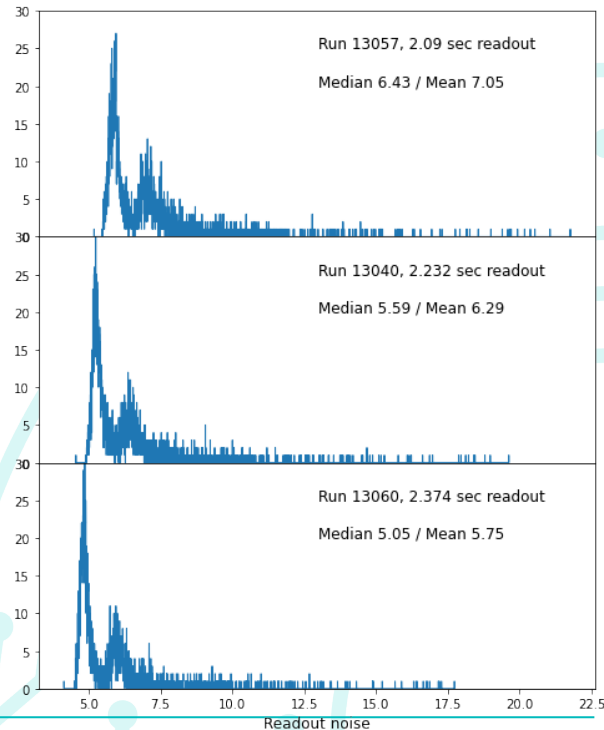


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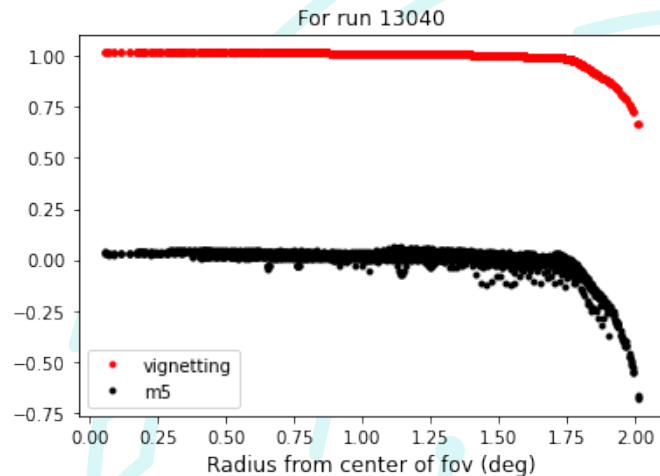
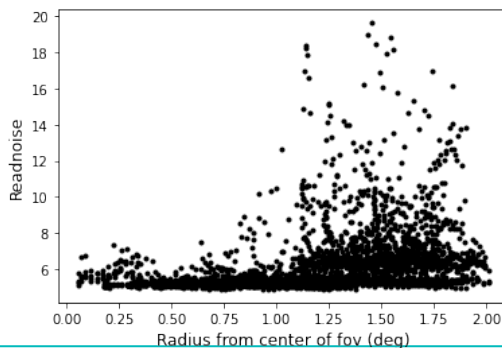
Readnoise values

- Camera team provided 3 files containing read noise per amplifier, generated by running camera electronics at 3 different readout times
 - Run 13057 == 2.090s readout
 - Run 13040 == 2.232s readout
 - Run 13060 == 2.374s readout



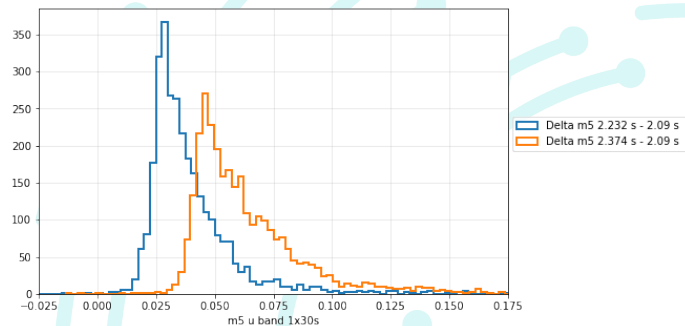
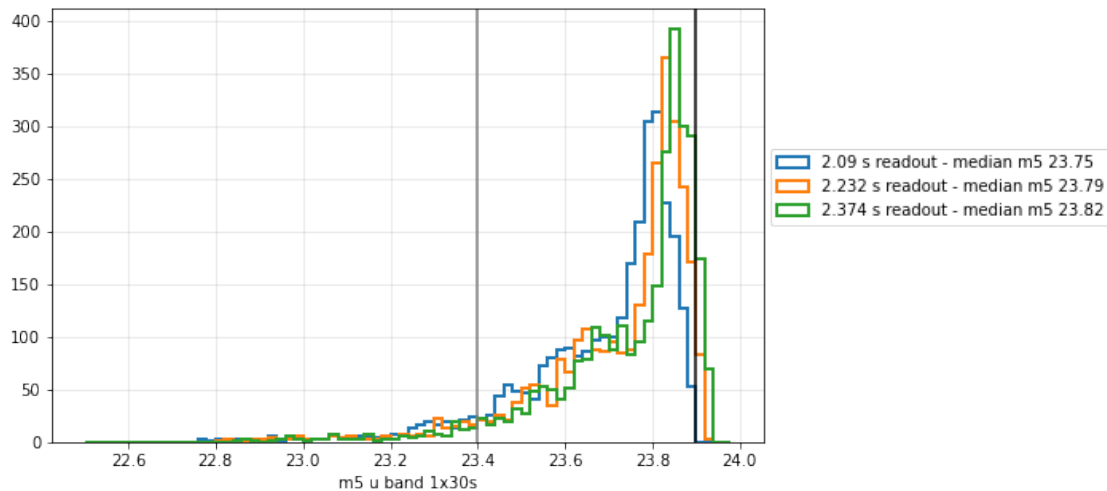
Calculate m5 per amplifier

- Calculate m5 values per amplifier (using Bo's code)
 - Throughput curves for most components from syseng_throughputs
 - QE curves per amp from butler / camera measurements
 - Readnoise values per amp from test files
 - Includes vignetting
 - Using fiducial seeing, dark-sky, @zenith



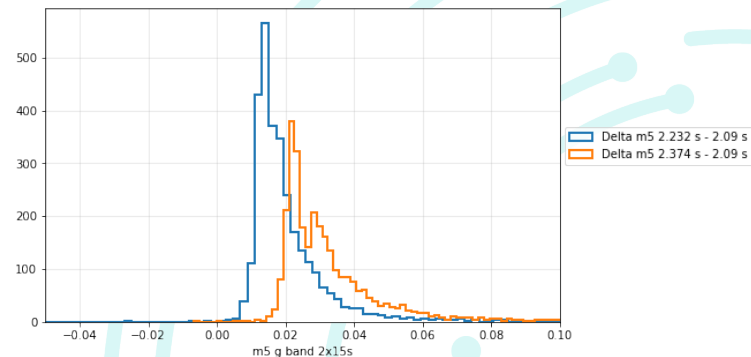
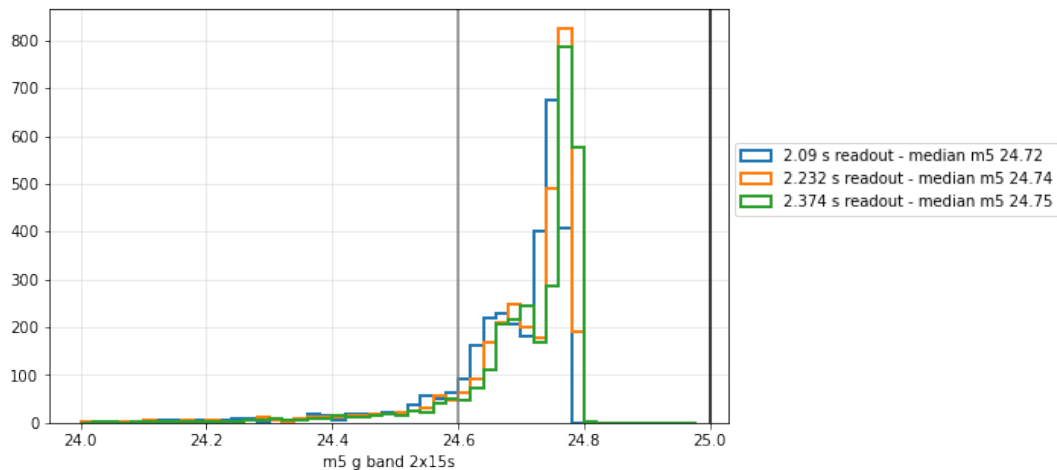
Five Sigma Depth variations

- Readout time change increases median depth in u band by 0.02 to 0.04 magnitudes in a 1x30s visit
 - 2x15s visit shows 0.07 to 0.11 mag increase



Five Sigma Depth variations

- Readout time change increases median depth in g band by 0.02 to 0.03 magnitudes in a 2x15s visit



Changes in median m5 value across all amps

- Assuming 1x30s visits in u band, 2x15s in other bands

Delta M5

	13057	13040	13060
u	0.0	0.042318	0.069156
g	0.0	0.021859	0.034826
r	0.0	0.012275	0.020206
i	0.0	0.007395	0.012346
z	0.0	0.004899	0.008307
y	0.0	0.004023	0.006650

IQR in m5

	13057	13040	13060
u	0.208170	0.198656	0.187571
g	0.105150	0.098861	0.094488
r	0.092232	0.088900	0.086441
i	0.053139	0.051446	0.049958
z	0.032213	0.031253	0.030502
y	0.053529	0.052816	0.052831

Change in effective survey time

- Assuming 1x30s visits in u band, 2x15s in other bands
- (Calculated per amp, then summed)
- Combine across filters using SRD expected ratio of visits per filter

	13057	13040	13060
weighted teff 30u/2x15grizy	0.999	1.020472	1.035452

- Assuming visit = 39s (on-sky + slew),

	13057	13040	13060
Visit Time Ratio	1.0	1.003649	1.007299

	13057	13040	13060
u	1.0	1.076983	1.134202
g	1.0	1.039794	1.067662
r	1.0	1.021806	1.036678
i	1.0	1.016134	1.027044
z	1.0	1.011191	1.018731
y	1.0	1.008999	1.015048

Effects

- Overall gain in effective time of 2-3%

	13057	13040	13060
weighted teff 30u/2x15grizy	0.999	1.020472	1.035452

	13057	13040	13060
Visit Time Ratio	1.0	1.003649	1.007299

- Simulations using baseline_v2.0_10yrs with updated read times to follow