DRP Metrics Monitoring 2021-11-01

Mondays 12pm - 12:50pm ET

Yusra's Zoom: https://princeton.zoom.us/my/yusra

Attendees:

Yusra AlSayyad

Jim Bosch

Arun Kannawadi

Christopher Waters

Clare Saunders

Colin Slater

Dan Taranu

Eli Rykoff

Fred Moolekamp

Lauren MacArthur

Andrés Alejandro Plazas Malagón

Ian Sullivan

Jeffrey Carlin

Joshua Meyers

Lee Kelvin

Matthias Wittgen

Nate Lust

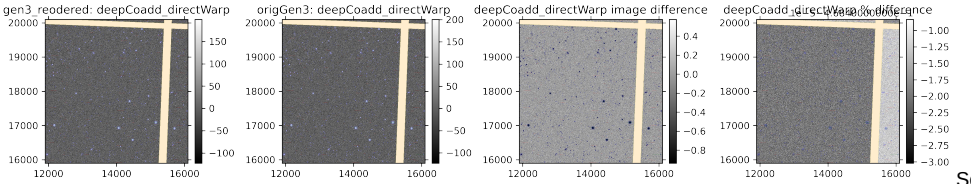
Robert Lupton

Simon Krughoff

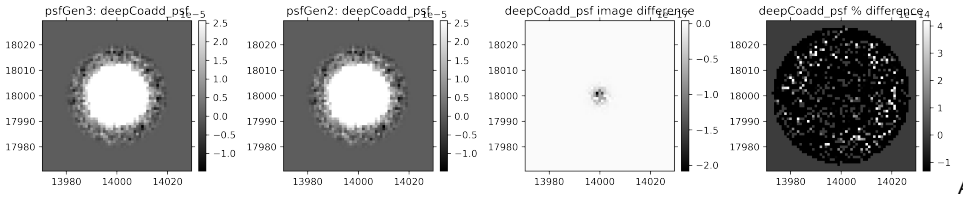
Agenda:

- Announcements:
- Review Action items from last week
  - Action on Yusra to grab Eric M.'s logs converted to action on Lauren to make things in Eric's home directory available in public_html as needed.
  - Lee will be making new SKY calibration frames (DM-32378, instead of DM-31401), discussing with Paul et al. Previous criteria was to use nights with > 20 observation in one band to make a SKY frame, and then use the closest of those for other nights. Original ticket with this info was DM-9147. These will be native Gen3, and Gen3-only.
- Processing Status
- Review HSC RC2 rerun w_2021_42
  - What was noteworthy in this rerun?
    - Gen2 (DM-32419 - Jira project doesn't exist or you don't have permission to view it.)
      - This is getting underway and is also a w42+ run where I will be setting up the DM-30284 - Jira project doesn't exist or you don't have permission to view it. branches (see below).

- Gen3 (DM-32248 - Jira project doesn't exist or you don't have permission to view it.)
    - Underway, issues reported on ticket include OOM problems when consolidating forced sources.
  - What changed? Annotate
    - Repeatability metrics have fluctuated because of differences in usage of best photometric/astromeric calibrations; code changes should now make this harder to get wrong.
    - Gen2 (pipe_analysis) wPerp has gone up, while Gen3 wPerp (faro) has remained unchanged. Known changes include FGCM robustness that shouldn't have caused this kind of problem. Looking for other potential culprits; other pipe_analysis coadd plots have changed, too. Want to see how faro wPerp looks on Gen2Gen3 converted run.
    - Look into what happened between w_2021_34 and w_2021_38 gen2 reruns to the stellar locus width in the gen2 reruns?
    - Why is faro measuring the same for 9615 and not 9813? Yusra will take a quick look, but let's revisit with w42.
  - What do we expect from w_2021_46?
    - Processing changes:
      - since w42 faro steps have been added to the HSC DRP pipeline (before w40 for obs_lsst). Need memory requests.
      - If we run DRPFakes.yaml on 9813, do we have any automatically generated plotDMs or metrics that will make it worth our while. Is having the fakes output needed for developing such plots/metrics? w46 or wait until Sophie has time to do that after V&V ops time or in Jan?
      - DM-31777 is blocking adding dia to rc2_subset
      - DM-32129 default which applies to obs_subaru threshold 0.5 arcsec and obs_lsst/imsim 0.05 arcsec
      - Ask John whether we are thresholding from his new jointcal metrics, to limit what is going into the coadds.
      - FM: I have some deblender bug fixes in the works. At least the memory leak fix and improper footprint threshold will be in (DM-32079 - Jira project doesn't exist or you don't have permission to view it.). It's possible it might have an affect on PSF metrics? Prob not since they're based on pixels that haven't been touched by scarlet.
      - DM-30284: is going to sort by detector in makeCoaddTempExp.
    - Changes toward Gen2-Gen3 parity:
    - What new metric can we expect next time
- Review DC2
  - w_2021_40
    - gen3:
    - gen2 (DM-32071 - Jira project doesn't exist or you don't have permission to view it.): this processing was done having set up w_2021_40 + the ticket branches from DM-30284 - Jira project doesn't exist or you don't have permission to view it. in efforts to achieve gen2 /gen3 parity. In that ticket, various gen2 updates are made to mimic the gen3 behavior of the setting of exposureIds. These are important as they are typically used for random number seeing, thus will have an effect on the results. Those issues should all be solved in this run, but there is one lingering difference which is due to gen3 order of inputs not being deterministic. I missed it at first as the inputs are sorted by visit in the code, but it turns out the detector order also matters. In gen2 it seems to be systematic (and always in increasing id order), but it can vary in gen3 (and I think can vary with how the pipeline is run it seems to be the same for the gen3/bps/DRP vs. gen2, but in some one-off testing, I ended up with a different ordering and was freaking out just a little since thus far the warps had been comparing identical!) Here is and example of the difference in the warps just from a different detector input ordering:

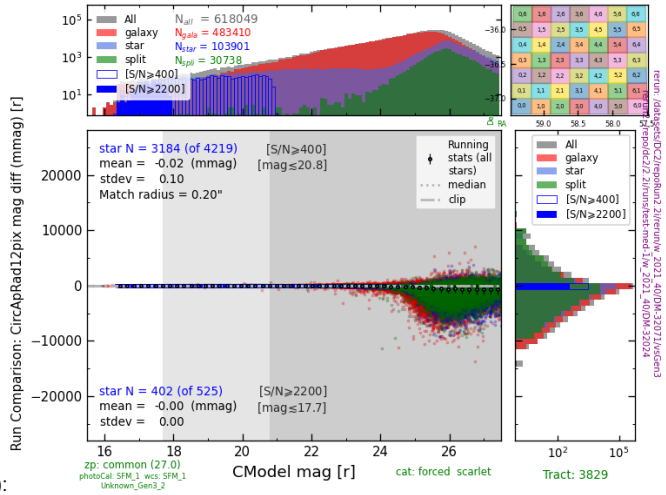


So, with all the exposureId fixes, we are only left with a slight difference in the PSFs (for which the detector ordering in gen3 just doesn't seem to ever match that of gen2:

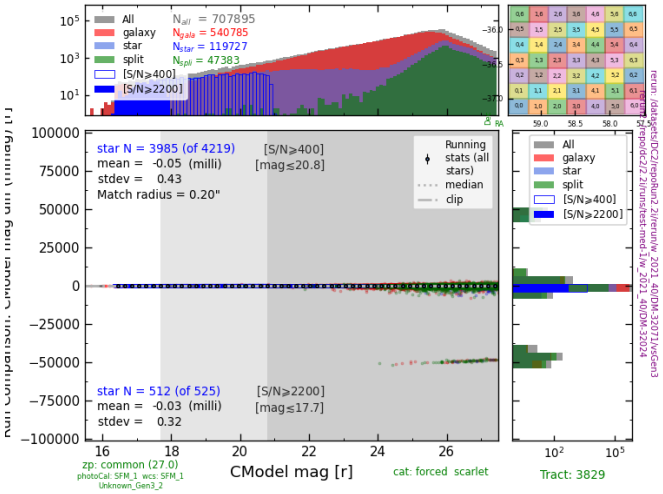


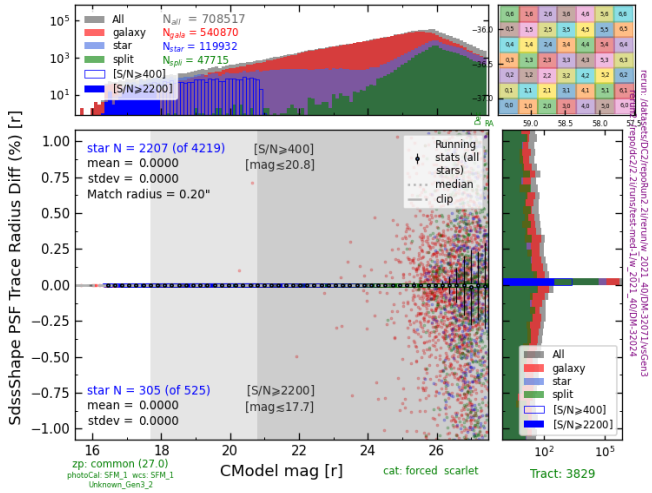
At this stage I was left with differences appearing in the deblender phase. Since scarlet is expected to be rather unstable in certain (numerical) circumstances, I had attributed these differences to the above tiny differences in the PSF – all other inputs are identical as far as I can glean. However, with the ordering of the detectors in gen3, I ran the coadd stages again and indeed got identical coaddPsfs...but I still get differences at the deblender stage. So, paging Fred Moolekamp as to whether he can think of any reason gen2 vs. gen3 scarlet runs could differ (again, as far as I can tell, all inputs going in with all the fixes on DM-30284 are identical).

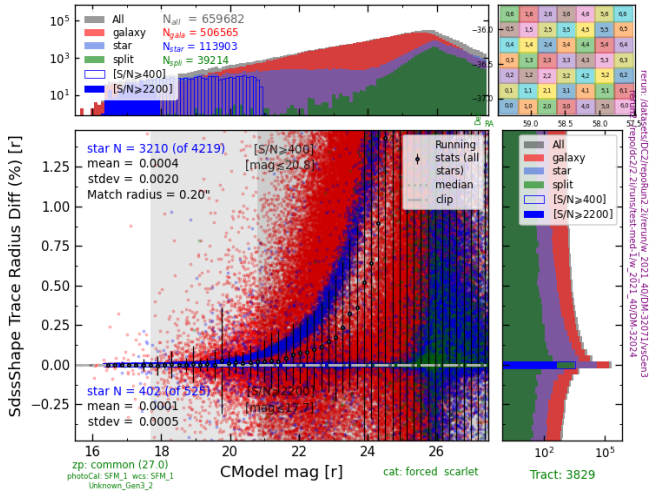
- Ok, so where are we with the current run which only suffers the above small PSF differences going in? Even better than before and at difference levels so small as to potentially be scientifically uninteresting. Direct gen2/gen3 comparison plot can be perused at https://lsst.ncsa.illinois.edu/~lauren/DC2.2i_gen2/w_2021_40/vsGen3/plots and

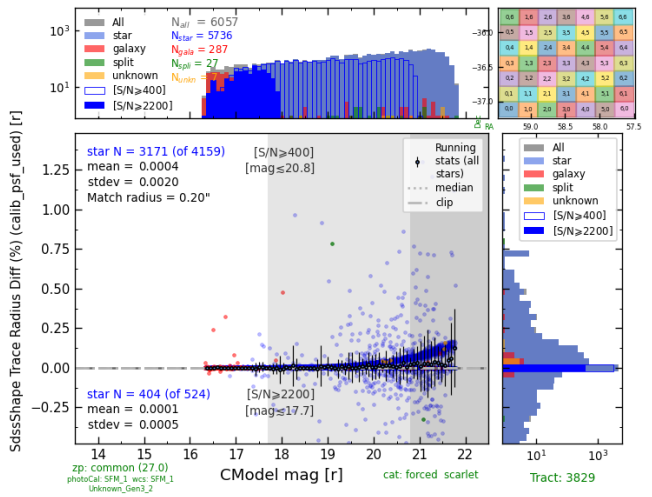


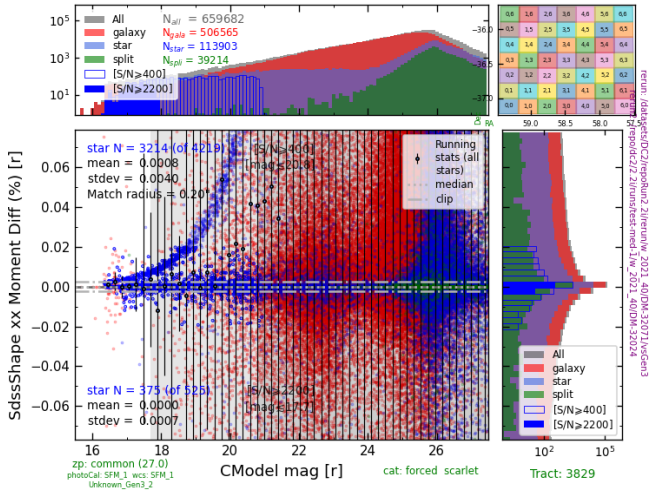
here are a few examples (all r-band):

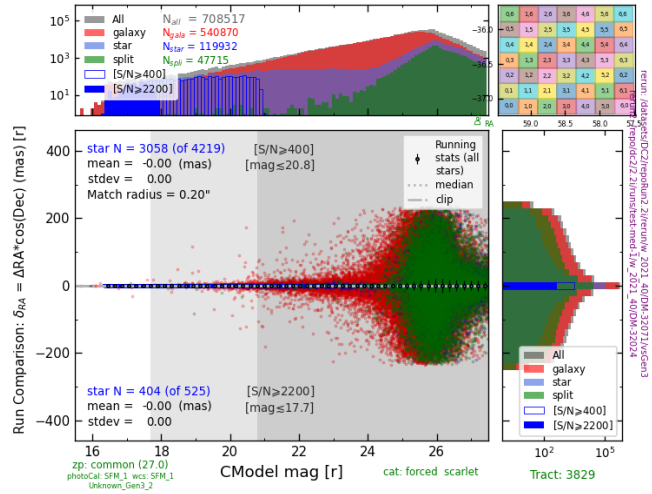



All N_all = 708517
galaxy N_gala = 540870
star N_star = 119932
split N_spli = 47715
[S/N≥400]
[S/N≥2200]
star N = 2207 (of 4219) [S/N≥400]
mean = 0.0000 [mag≤20.8]
stdev = 0.0000
Match radius = 0.20"
Running stats (all stars)
median
clip
star N = 305 (of 525) [S/N≥2200]
mean = 0.0000 [mag≤17.7]
stdev = 0.0000
SdssShape PSF Trace Radius Diff (%) [r]
CModel mag [r]
zp: common (27.0)
photoCal: SFM_1 wcs: SFM_1
Unknown_Gen3_2
cat: forced scarlet
Tract: 3829
rerun: /datasets/DC2/repoRun2.2i/rerun/w_2021_40/DM-32071/vsGen3
/repo/dc2/2.2i/runs/test-med-1/w_2021_40/DM-32024


All N_all = 659682
galaxy N_gala = 506565
star N_star = 113903
split N_spli = 39214
[S/N≥400]
[S/N≥2200]
star N = 3210 (of 4219) [S/N≥400]
mean = 0.0004 [mag≤20.8]
stdev = 0.0020
Match radius = 0.20"
Running stats (all stars)
median
clip
star N = 402 (of 525) [S/N≥2200]
mean = 0.0001 [mag≤17.7]
stdev = 0.0005
SdssShape Trace Radius Diff (%) [r]
CModel mag [r]
zp: common (27.0)
photoCal: SFM_1 wcs: SFM_1
Unknown_Gen3_2
cat: forced scarlet
Tract: 3829
rerun: /datasets/DC2/repoRun2.2i/rerun/w_2021_40/DM-32071/vsGen3
/repo/dc2/2.2i/runs/test-med-1/w_2021_40/DM-32024

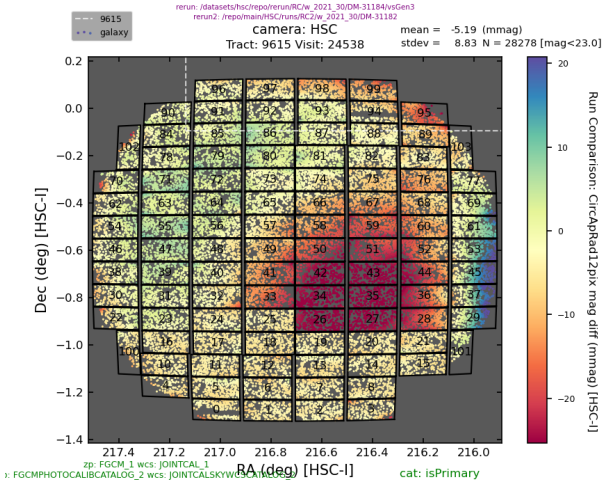

All N_all = 6057
star N_star = 5736
galaxy N_gala = 287
split N_spli = 27
unknown N_unkn = 7
[S/N≥400]
[S/N≥2200]
star N = 3171 (of 4159) [S/N≥400]
mean = 0.0004 [mag≤20.8]
stdev = 0.0020
Match radius = 0.20"
Running stats (all stars)
median
clip
star N = 404 (of 524) [S/N≥2200]
mean = 0.0001 [mag≤17.7]
stdev = 0.0005
SdssShape Trace Radius Diff (%) (calib_psf_used) [r]
CModel mag [r]
zp: common (27.0)
photoCal: SFM_1 wcs: SFM_1
Unknown_Gen3_2
cat: forced scarlet
Tract: 3829



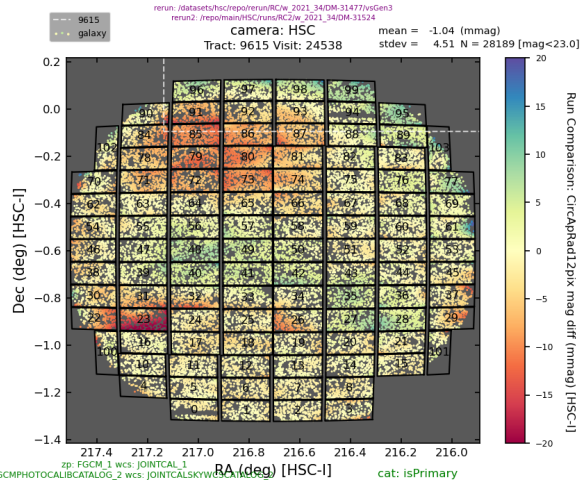


- I still feel slightly uncomfortable not knowing the root cause of these differences (and the possibility that the deblender is sensitive to some as yet unknown cause that may lead to non-reproducability), but it may be time to start considering the cost/benefit of chasing these lingering differences down.
  - Gen3 Pipeline for DP0.2 (backport-v23 label)

- AOB
  - Next metrics meeting to review w46 Nov 29th after Thanksgiving will be the last of the year.
  - I owe a follow-up on Eli's recent fixes to fgcm (towards parity, but also serendipitously improving on some fgcm specifics). Here is a brief history of gen2 vs. gen3 fgcm for one of the most problematic/red-flag visits in the RC2 dataset:



  - **w_2021_30:**



- **w_2021_34:**
- **w_2021_38 (with the random seed fix of**

> DM-31462 - Jira project doesn't exist or you don't have permission to view it.

and survey edge/ref star outlier handling improvements of

> DM-31505 - Jira project doesn't exist or you don't have permission to view it.

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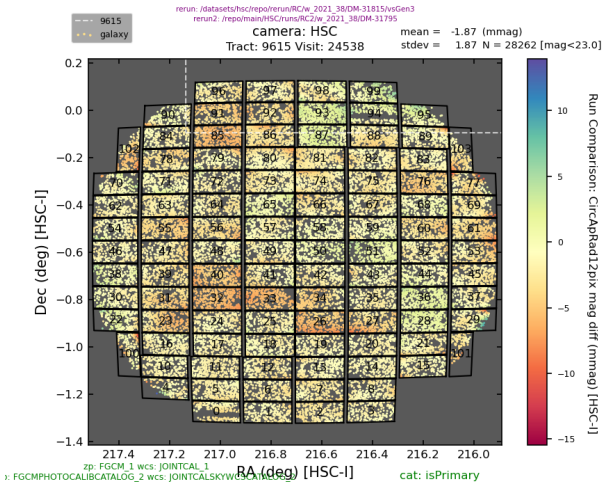

This is now looking really close! However, I am somewhat surprised that there was a jump in the stellar locus width on the w_2021_38 run – see the chronograph dashboard. I'm not aware of any other significant changes between w34 & w38 that may have impacted the stellar locus...

Action Items

Description	Due date	Assignee	Task appears on

☐	Add a plot with fakes stats to the dashboard. Sophie Reed04 Sep 2020	04 Sep 2020	Sophie Reed	DRP Metrics Monitoring 2020-08-07
☐	Sophie to add field in metric definition to hold thresholds. DM-43364 - Getting issue details... STATUS : We need to talk about this when Sophie is back!			DRP Metrics Monitoring 2024-04-22
☐	Sophie to add field in metric definition to hold thresholds. DM-43364 - Getting issue details... STATUS			DRP Metrics Monitoring 2024-03-18
☐	Clare: add analyzeMatchedVisitsCore to drp_pipe step8			DRP Metrics Monitoring 2023-06-26
☐	Sophie: make a new list for outstanding analysis_drp plots that require moving, send to Jim			DRP Metrics Monitoring 2023-06-26
☐	turn catchFailures on in calibrate. Add flag to indicate that deblender failed because PSF is bad.			DRP Metrics Monitoring 2022-10-31
☐	Yusra AlSayyad Eric's account was deleted; we need to make sure he has all his logs.		Yusra AlSayyad	DRP Metrics Monitoring 2021-06-14
☐	Arun Kannawadi Modify rho stats in pipe_analysis to use debiased moments (see DM-30751 - Getting issue details... STATUS).		Arun Kannawadi	DRP Metrics Monitoring 2021-04-19
☐	Investigate rho-stats an ellipticity resids in w_2020_06 post-Scarlet Arun Kannawadi Fred Moolekamp		Arun Kannawadi	DRP Metrics Monitoring 2021-03-01
☐	Yusra AlSayyad Do a rerun with w50 PS1 refcat and one with shrunk refcat errors.		Yusra AlSayyad	DRP Metrics Monitoring 2021-01-04
☐	Jeffrey Carlin Add an absolute astrometry match-to-refcat metric to dashboard DM-34153 - Getting issue details... STATUS		Jeffrey Carlin	DRP Metrics Monitoring 2021-01-04