DC2 Production at IN2P3 & Difference Imaging Pipeline

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DC2 Production : definition

Goal: 300 sq degrees for 7+ yrs with a baseline cadence + 1sq. Degree DDF field with a somewhat unrealistic cadence

Imsim simulation

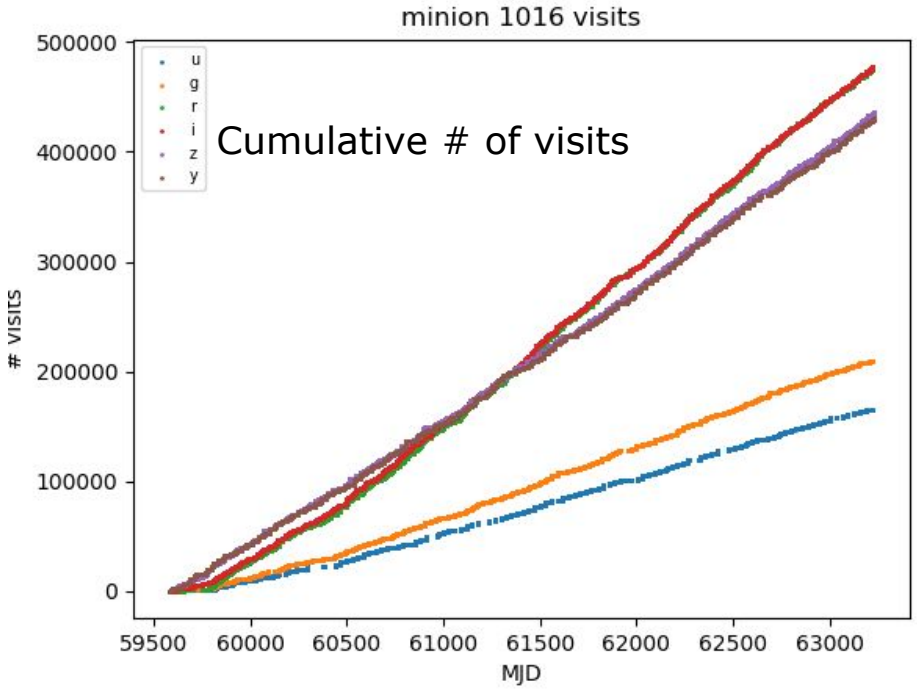
Current stack release w19 + a few custom packages

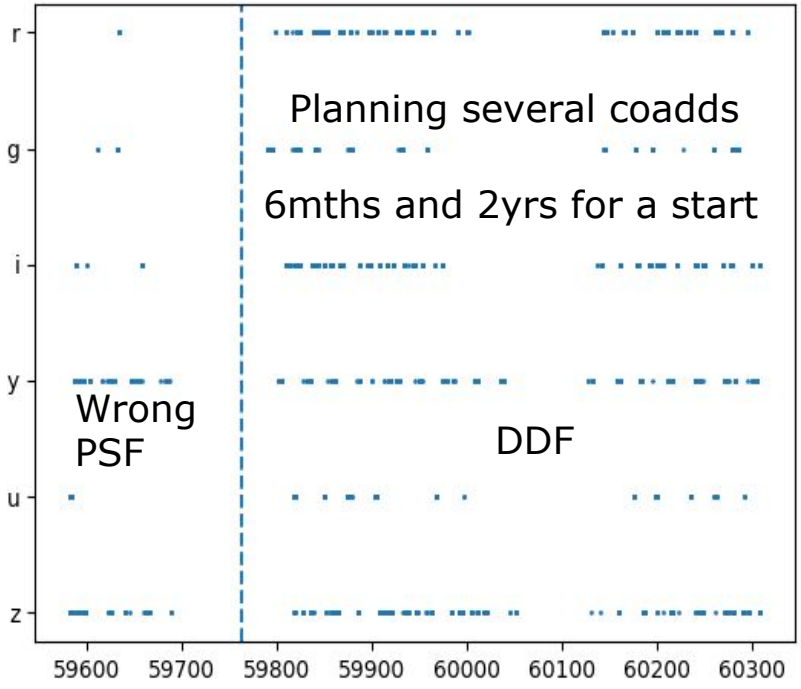
Code name : 2.1i

DC2 Production : image simulation

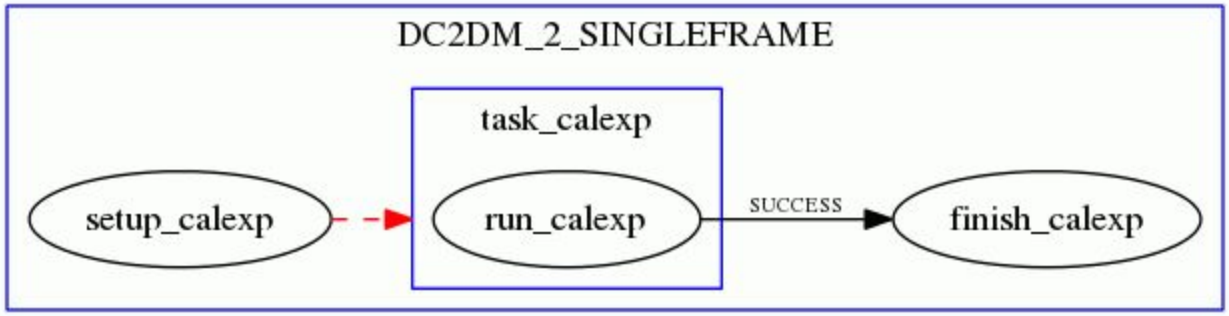
Goal: simulate 7 yrs WFD, then DDF, then hopefully 3 more years with the help of UK grid

Current status : instance catalogue ready for the 10 years, y1-y2-wfd simulated and transferred to CC, y3 almost ready for transferred

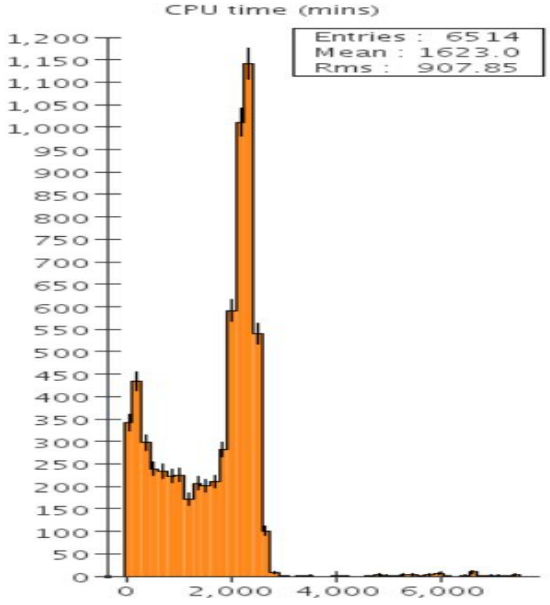


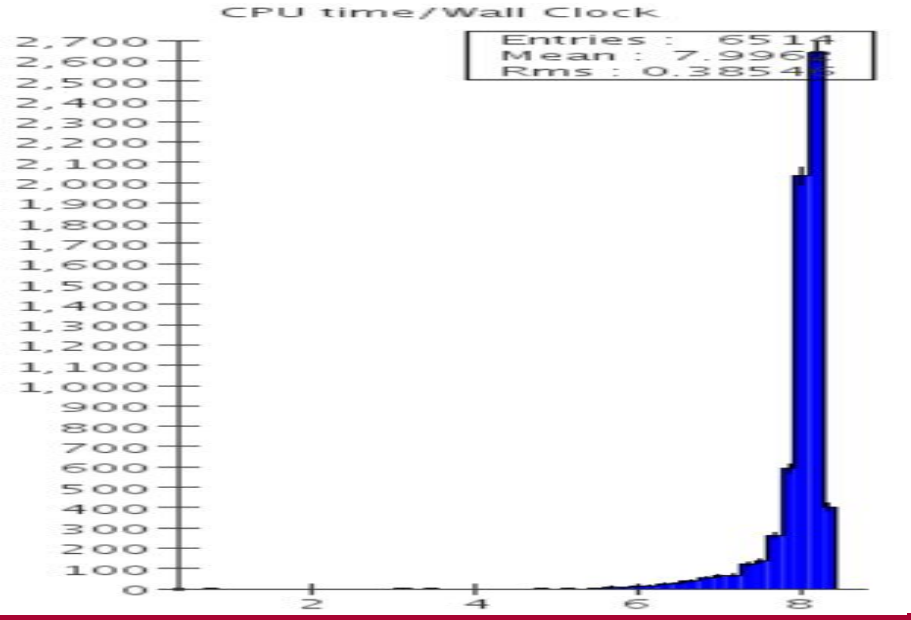


DC2 Production : calexp production

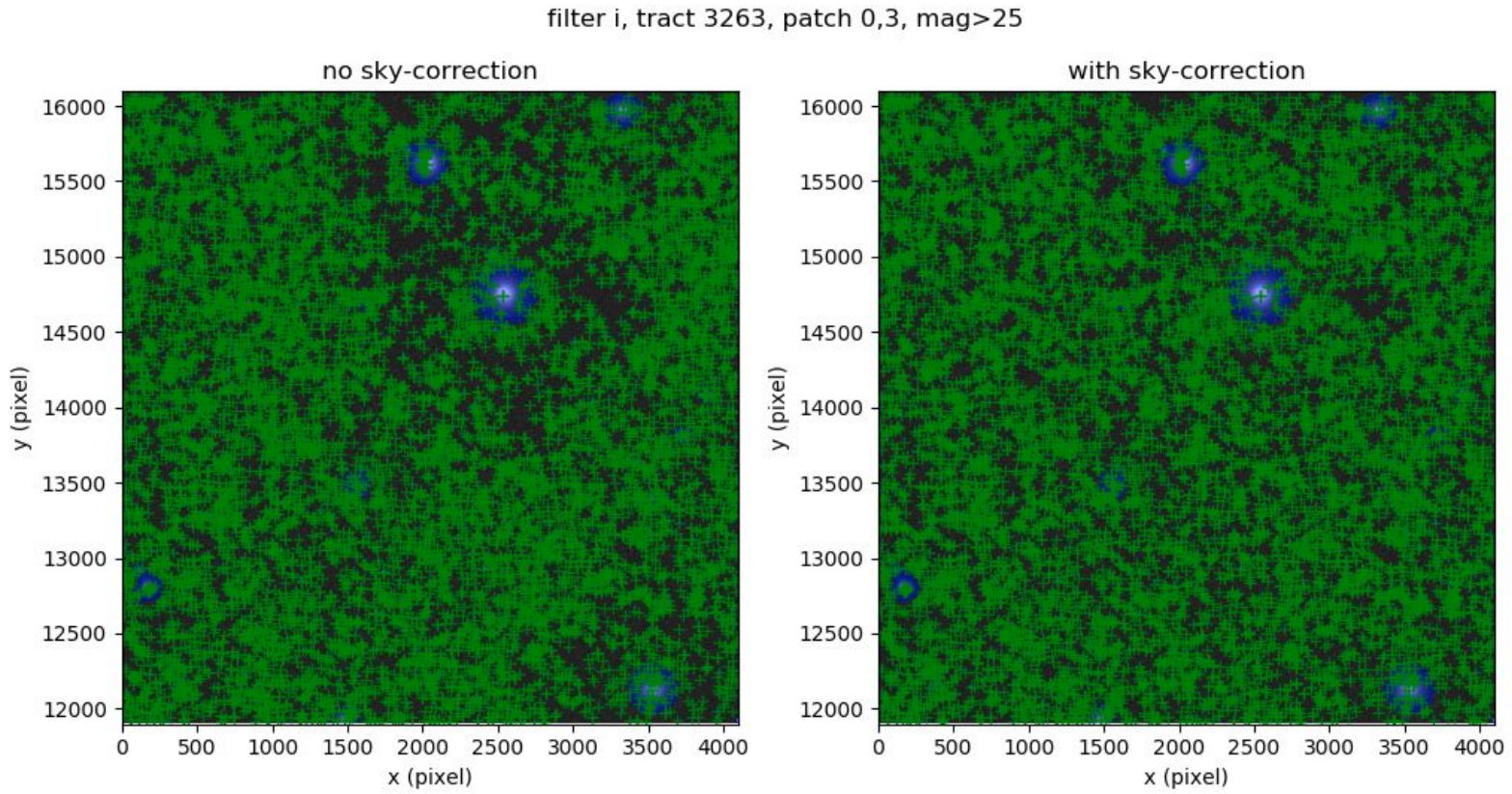


Status: y1-y2-wfd completed, but some visits seem to have faulty simulation and will likely need to be resimulated/processed





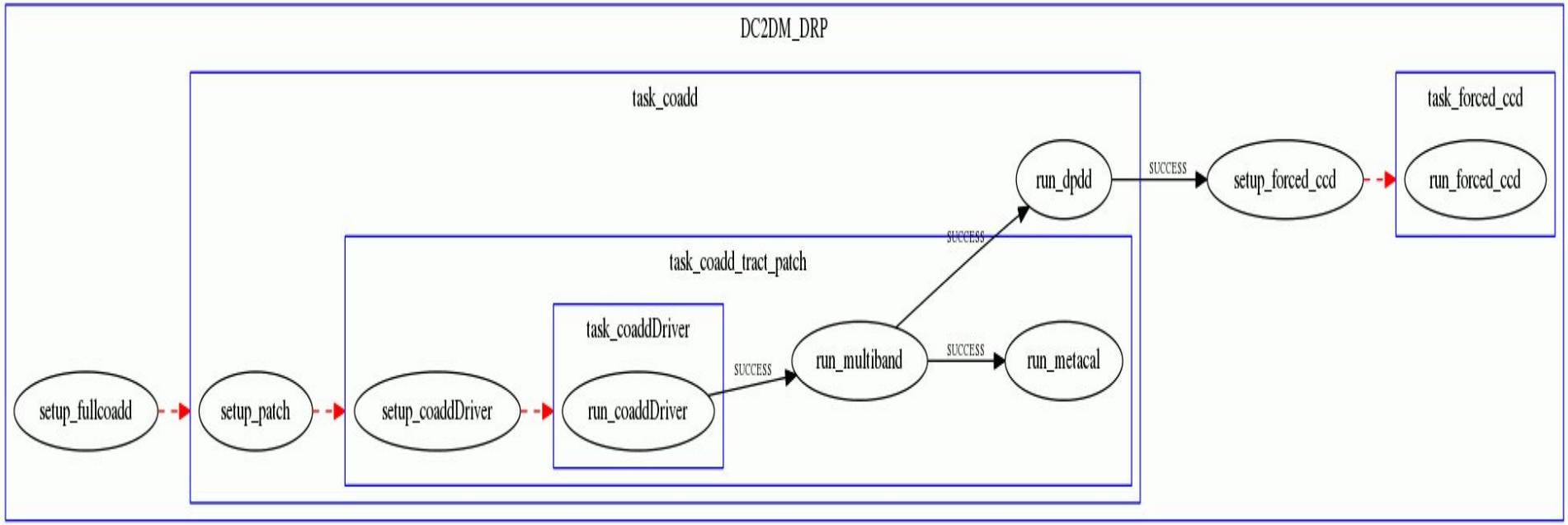
DC2 Production : Sky Correction



without

with

DC2 Production : coadd production



Status: Pseudo-6mths only 441 visits, transferred to NERSC and includes object_summary files (DPDD) and metacal products

Still some development on the pipeline layout….. But we expect a lot of overhaul with "Gen3 butler"

Transient detection of the simulated data

Goal: Search for transients in the difference images

- Match between the coadd, calexp and difference images of the truth and the diaSrc catalog
- Match between the coadd, calexp and difference images of the diaObject and the diaSrc catalogs

Used simulated data:

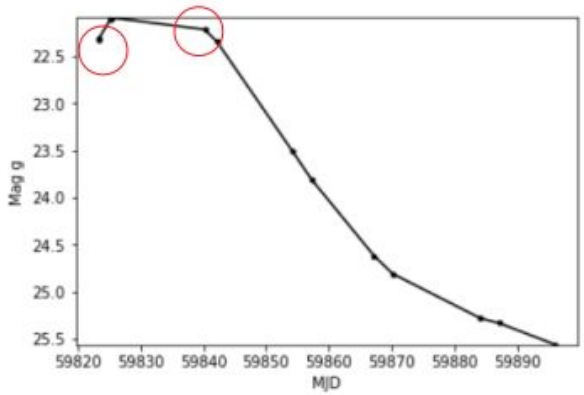
- Data release: Run1.2p, w_2019_38
- The coadd images: produced over 7 years of simulations

Study procedure

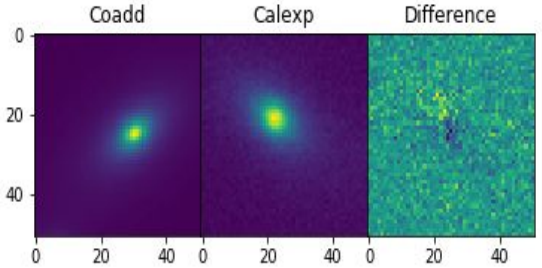
- There are 10 available visits at CC/Lyon
- Tract 5063 of DDF → For 4 patches
- Use the truth catalog '*dc2_truth_run1.2_variable_summary*' with filter: '*sn == 1*'
- Use the '*dc2_truth_run1.2_variable_lightcurve*' to select the light curves with more than 5 detections (pts)
- Find the coadd, calexp, diffimages of these object
- Display the 'src' objects on the calexp images, and the 'deepDiff_diaSrc' on the diffimages

truth-Diasrc detection

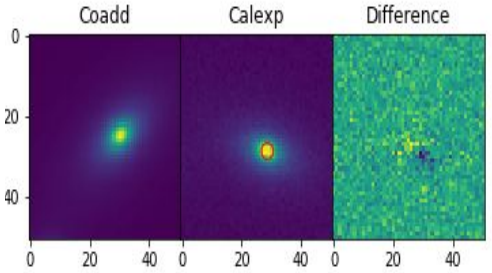
=== 53.066294486064734 -27.979514171682688 ===



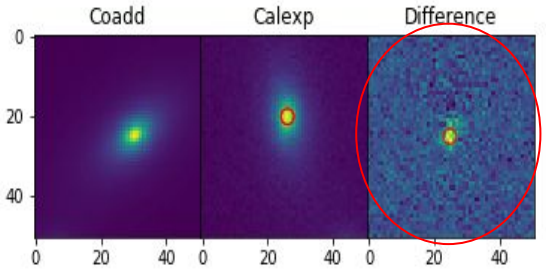
=== for visit : 250, ccd : 89, MJD : 59580.149254 ===



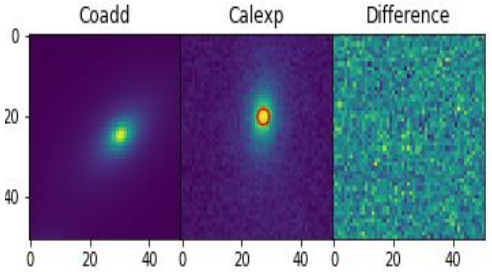
== for visit : 202460, ccd : 60, MJD : 59854.214662 ===



=== for visit : 185615, ccd : 83, MJD : 59825.265743 ===



== for visit : 204407, ccd : 44, MJD : 59857.193693 ===



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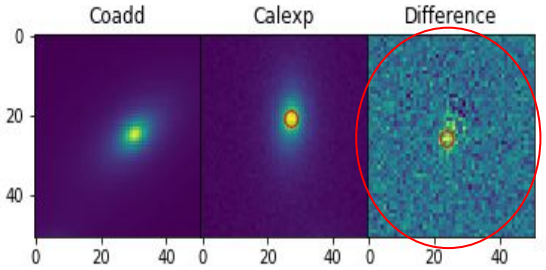
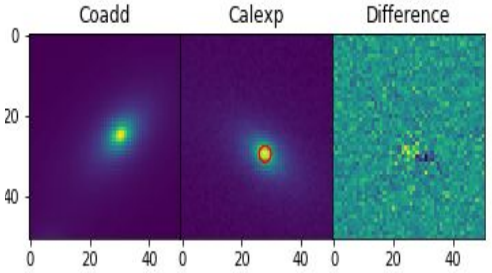
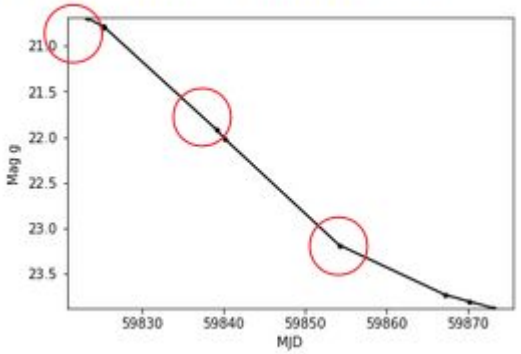


== for visit : 214335, ccd : 99, MJD : 59870.157806 ===



truth-Diasrc detection

=== 53.3716004651 -27.8967776517 ===



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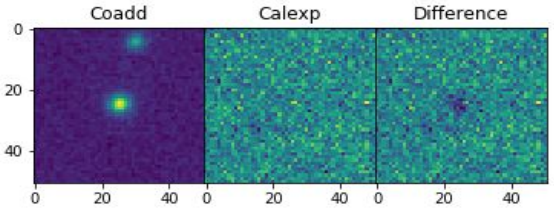

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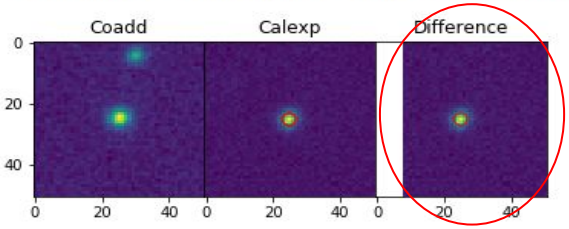

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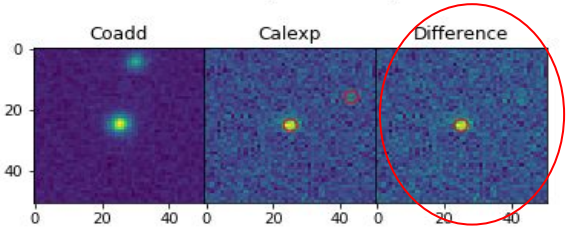

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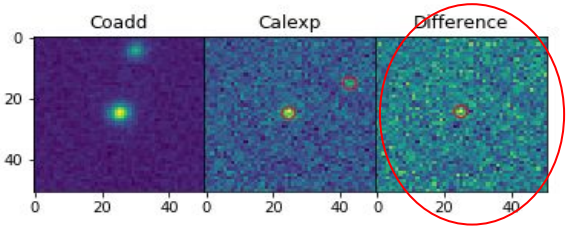
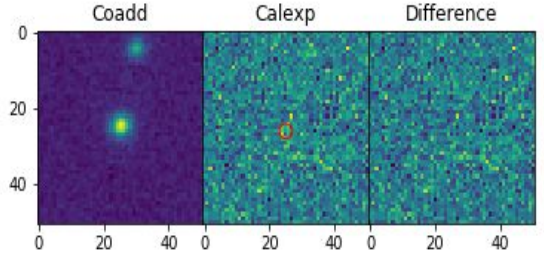
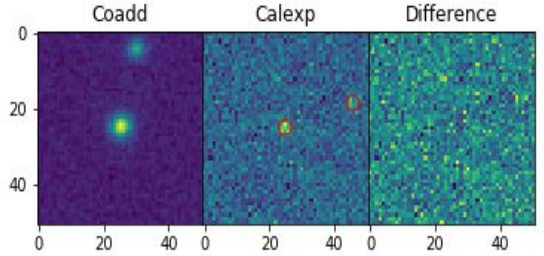


=== for visit : 211970, ccd : 51, MJD : 59867.165757 ===



=== for visit : 214335, ccd : 53, MJD : 59870.157806 ===



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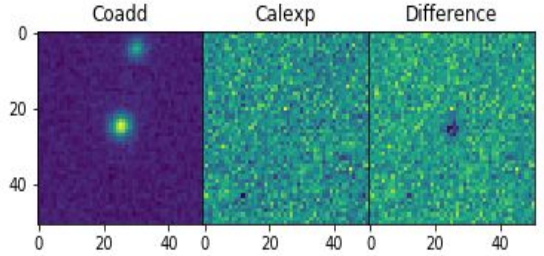
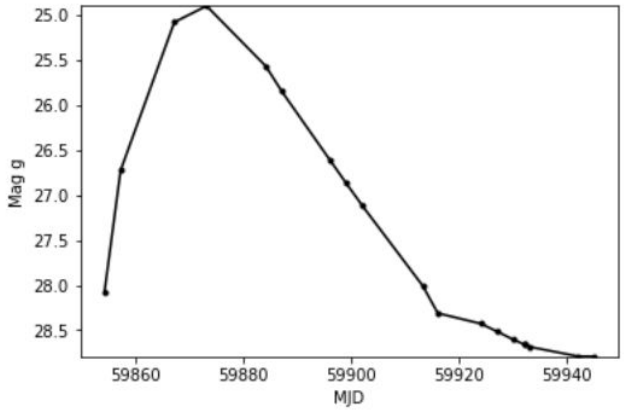


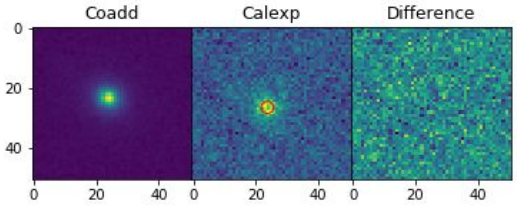
truth-Diasrc detection

=== 53.1723835841164 -27.89834631786601 ===



As expected, objects of mag > 24 are not detected

=== for visit : 250, ccd : 96, MJD : 59580.149254 ===



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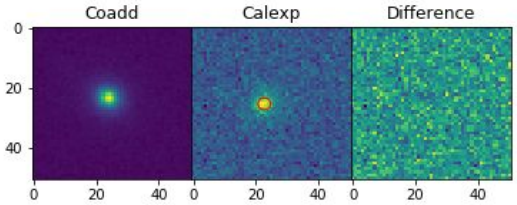

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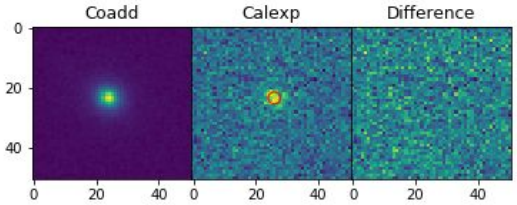
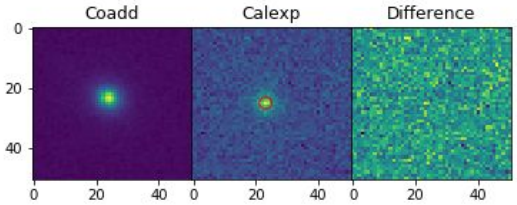
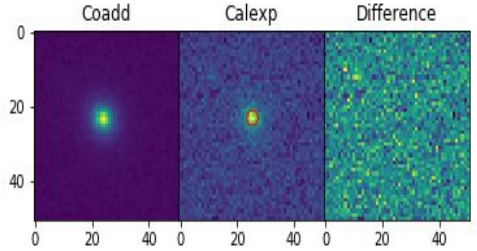


=== for visit : 195549, ccd : 83, MJD : 59842.204511 =



=== for visit : 202460, ccd : 53, MJD : 59854.214662 ===



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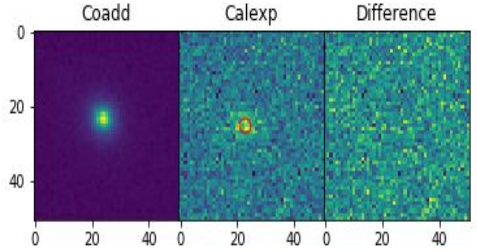

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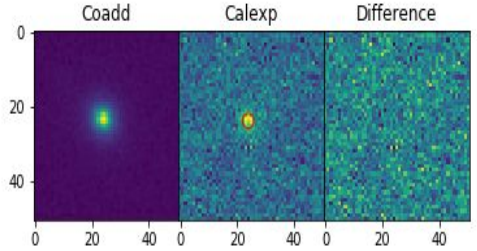
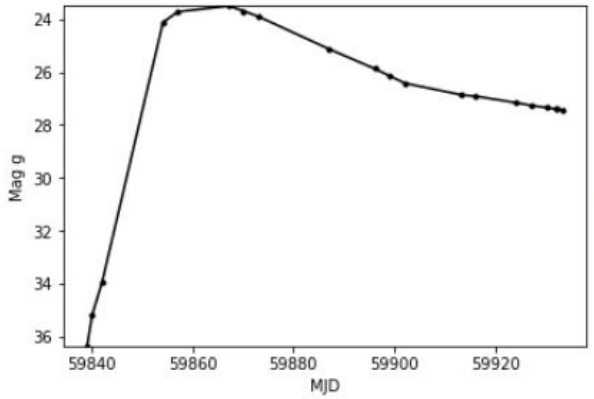


truth-Diasrc detection

=== 53.48863241498323 -27.77837539267209 ===



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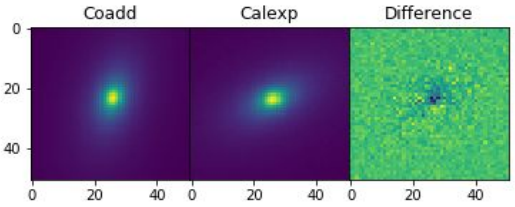

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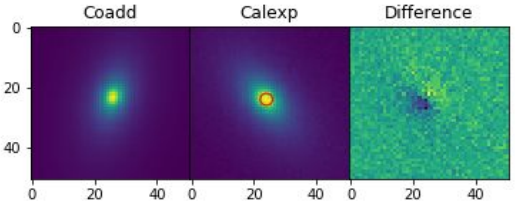
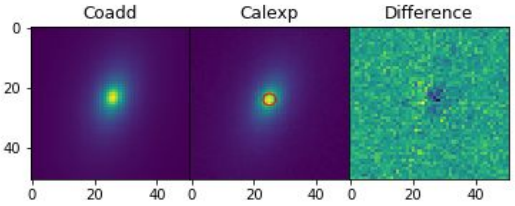


=== for visit : 211970, ccd : 51, MJD : 59867.165757 ===



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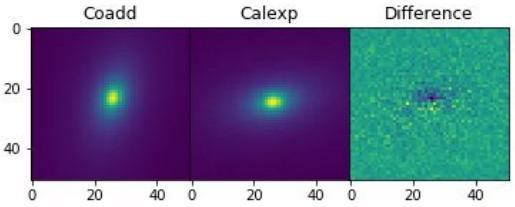

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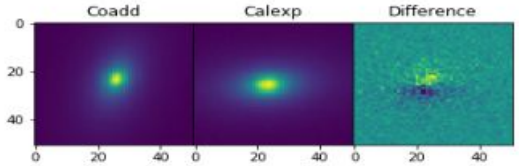
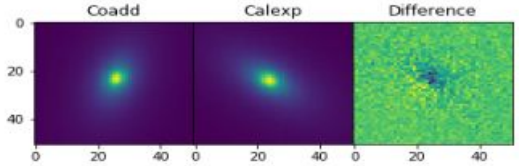


=== for visit : 185615, ccd : 89, MJD : 59825.265743 ===

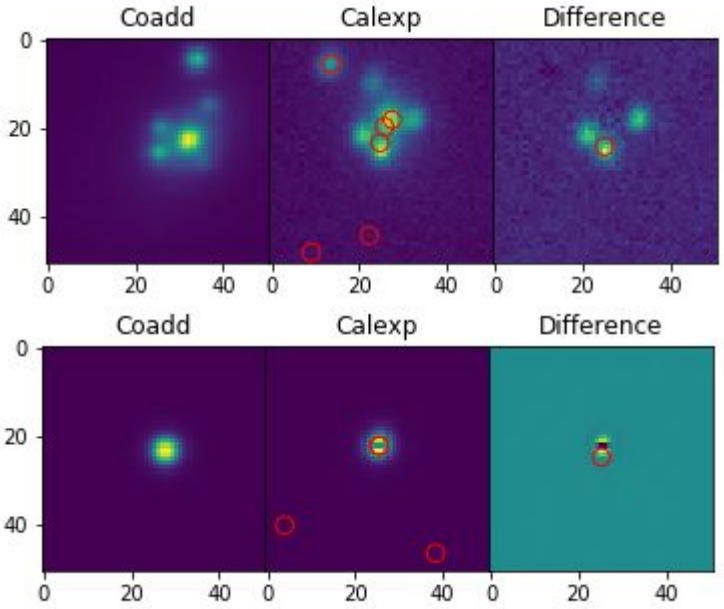


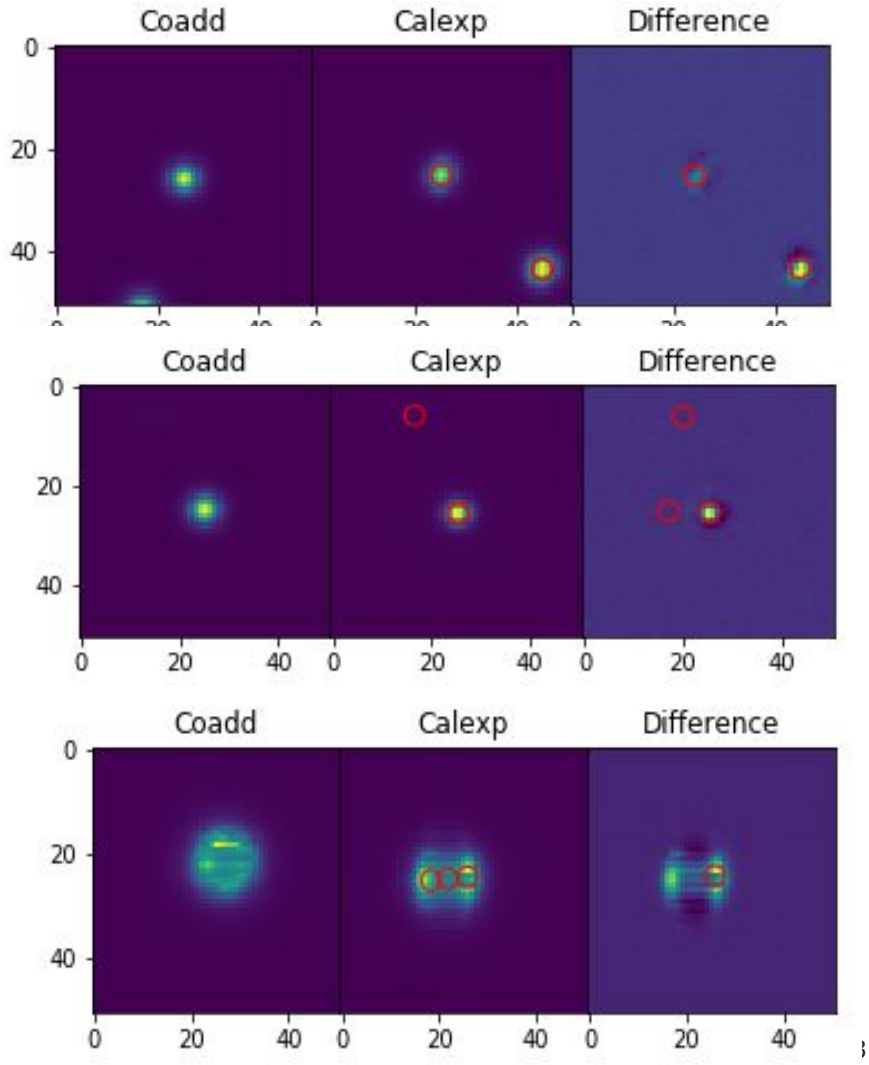
Next steps:

- Match diaObjects with the detected diaSrc
- Find the observed light curve of the detected sources

DiaObject-Diasrc detection

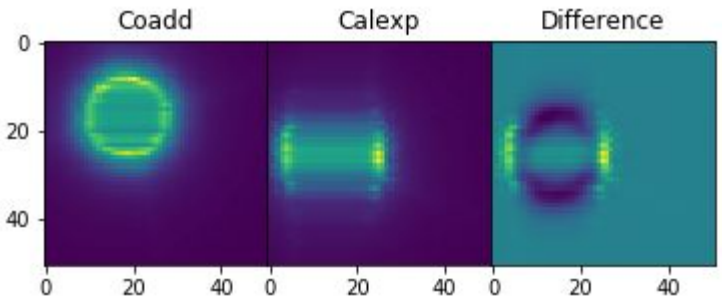
- Match of coadd, calexp and diff images of the diaObjects (independently of the simulation)
- Select objects of flux > 1e4
- Study in one patch (6, 3)
- Match with the diaSrc

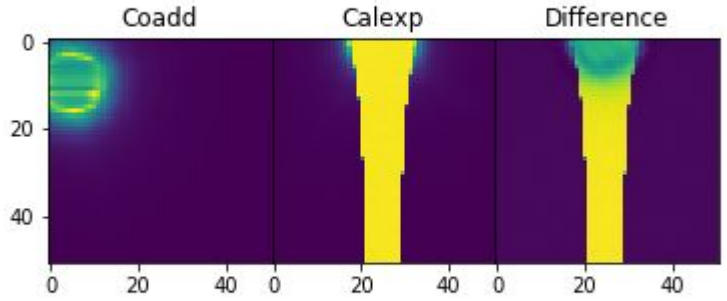


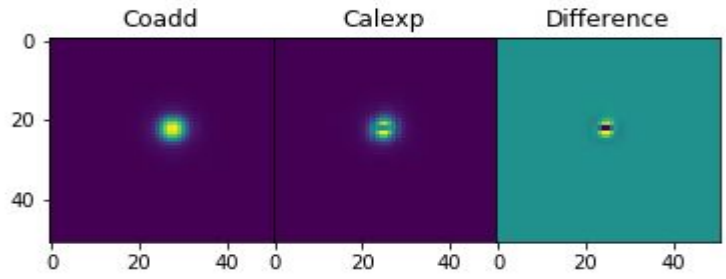


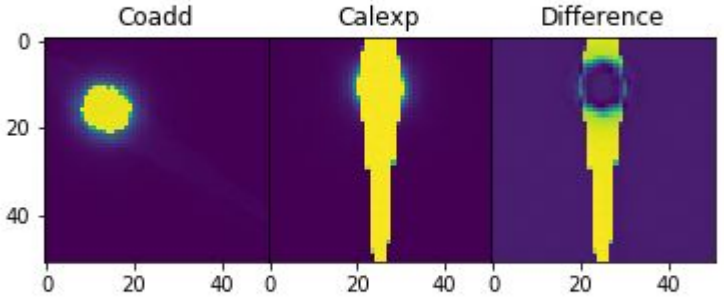
Bogus detection

Some bad detection ..



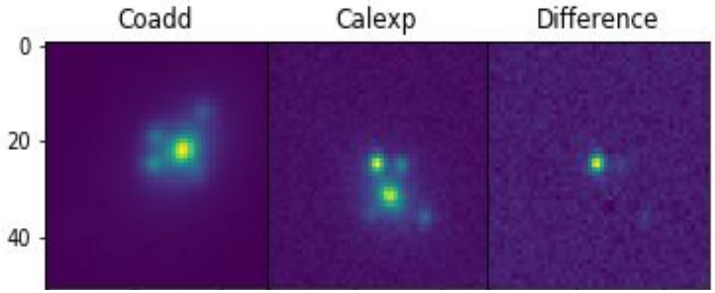


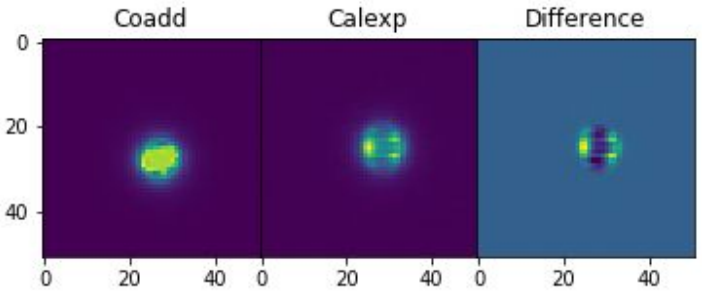


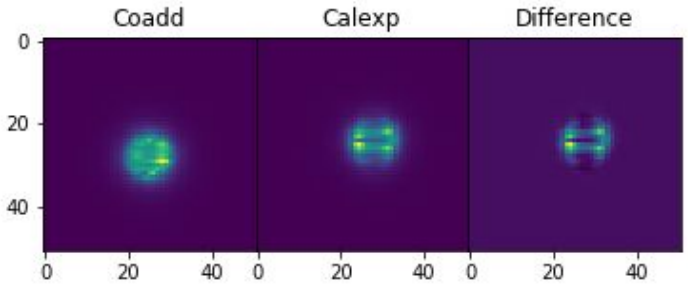


Bogus detection

- The calexp and diff images have different object position than the coadd image







➔ Use the warp data