

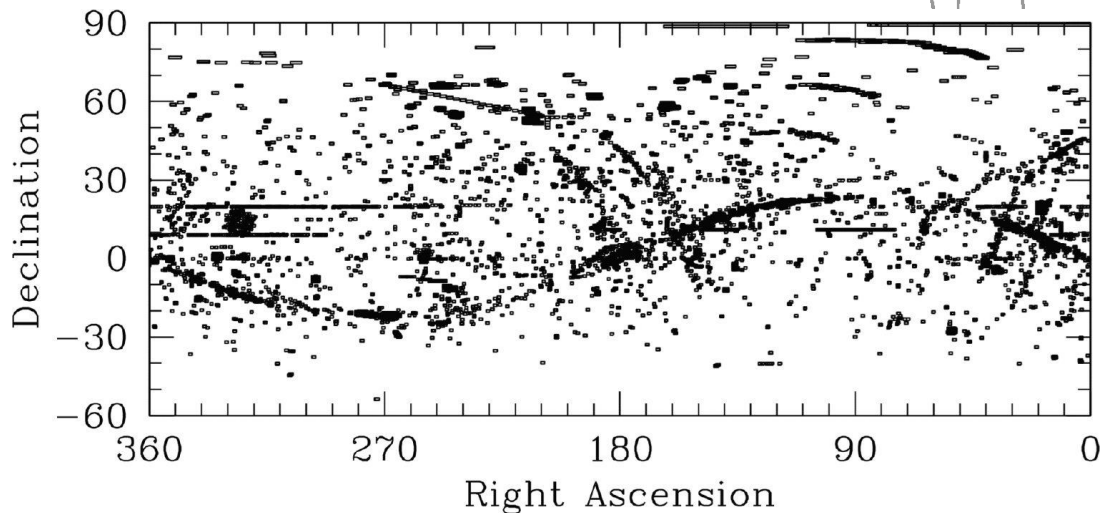
The Suprime-Cam Legacy Archive at the Canadian Astronomy Data Centre



Motivation

Increasing the value of the Suprime-Cam archive

- For many telescopes, half the papers are archival
- Another way to state this is that an archive doubles the value of the facility
- MegaPipe for MegaCam on CFHT produces ~30 papers per year
- Suprime-Cam vs. MegaCam
 - Same excellent seeing
 - Slightly smaller area
 - Much deeper
- Suprime-cam archive is an extremely valuable data set
 - 5000 square degrees
 - 82000 images
- **The Suprime-Cam Legacy Archive seeks to increase the value of the archive by providing science ready data products to astronomers**
- Many thanks to Ikuru Iwata for suggesting it
- Many thanks also to Hisanori Furusawa and Tsuyoshi Terai for invaluable advice



Warning

Boring talk ahead

(Unless you are a data pipeline otaku, you should take a short break now)



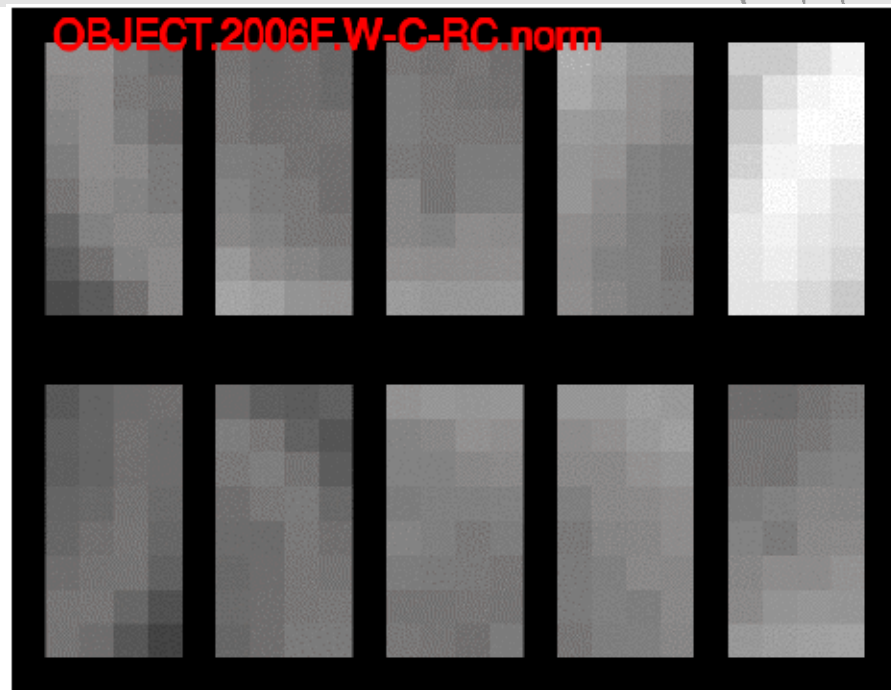
Detrending

- Bias removal and flatfield done with sdfred (Ouchi, Furusawa, Komiyama and Yagi)
- Bias frames built on a run-by-run basis
- Flat fields built from (in order of decreasing preference)
 - night sky flats (object flats)
 - twilight flats
 - dome flats
- Object flats produce slightly deeper images
- Object and twilight flats have better photometric flatness

Detrending

Photometric superflat

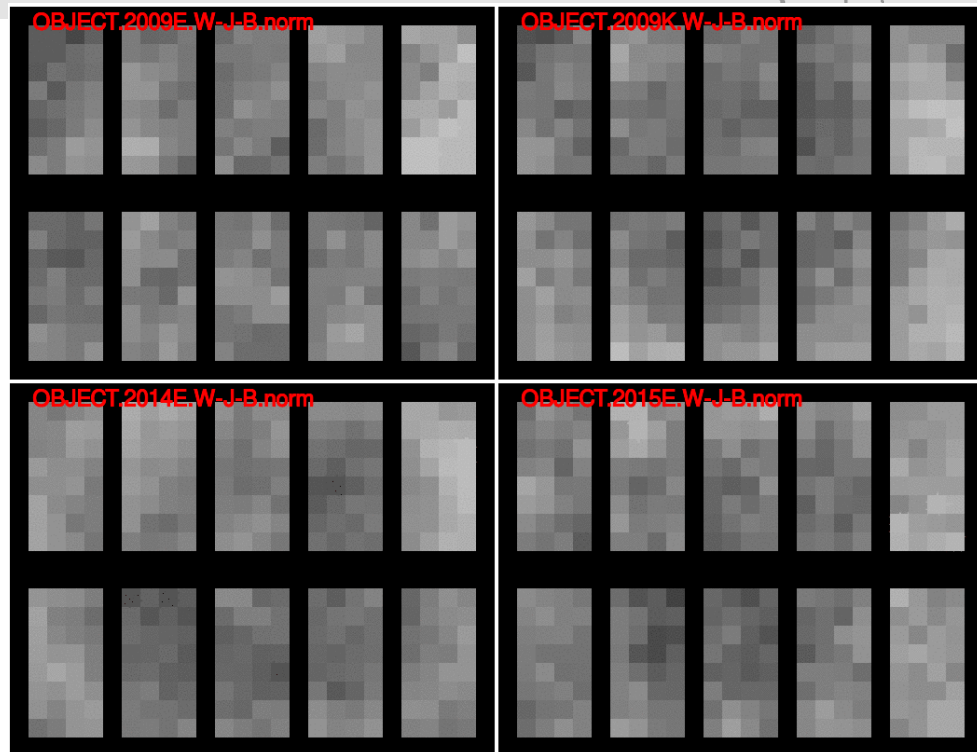
- Zeropoint varies across the focal plane by 5-10%
- Measured on a run-by-run, filter-by-filter basis by comparison with Pan-STARRS
- Typically small variations (depending on flat type)
- Occasionally large variations (detector change)
- Corrections applied as photometric superflat to each image before further processing



Detrending

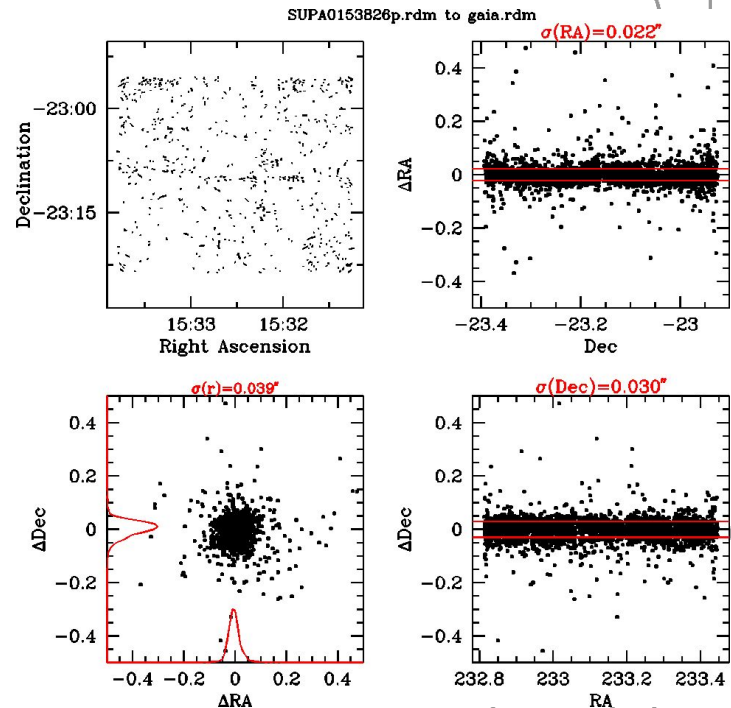
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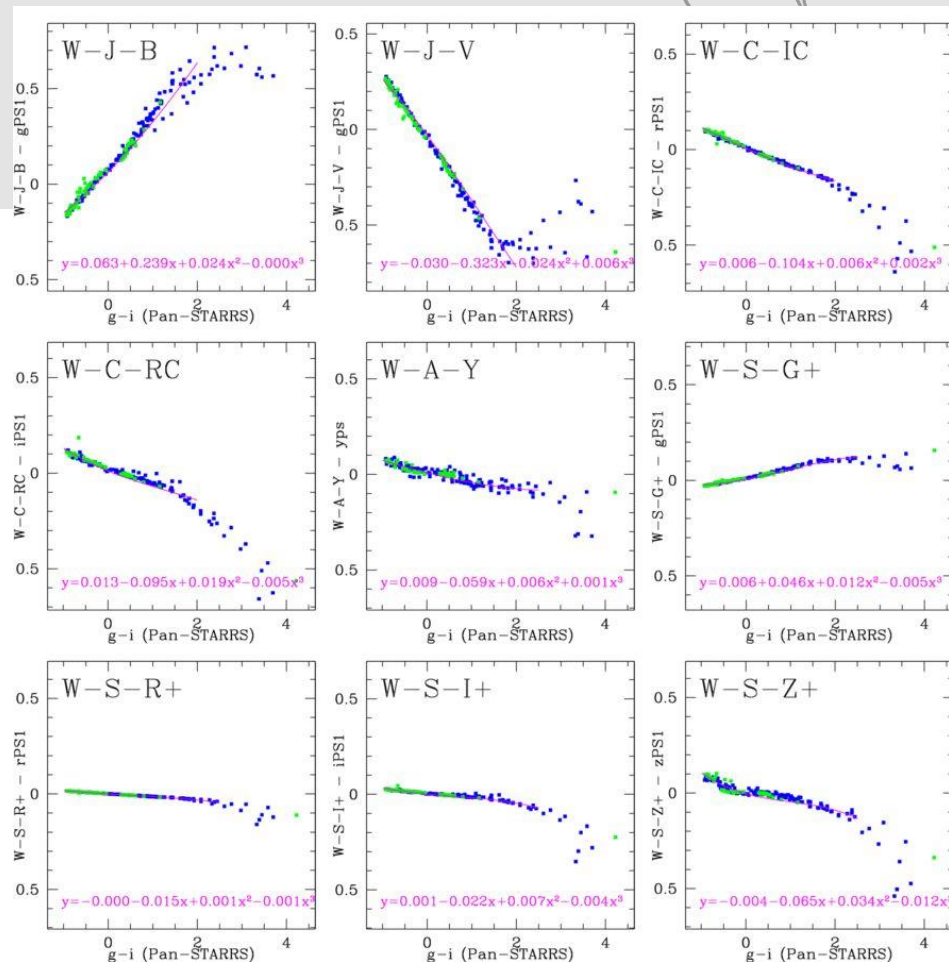
Astrometric calibration

- Astrometric calibration done using GAIA DR2 as a reference
- Each image calibrated completely independently
- Include effects proper motion
- Distortion model:
 - radial distortion: 5th order polynomial
 - chip shift and skew 1st order corrections chip-by-chip
 - Removes potential for over fitting
- Astrometric residuals measured:
 - with respect to GAIA
 - between overlapping images
 - typically 30-40 mas



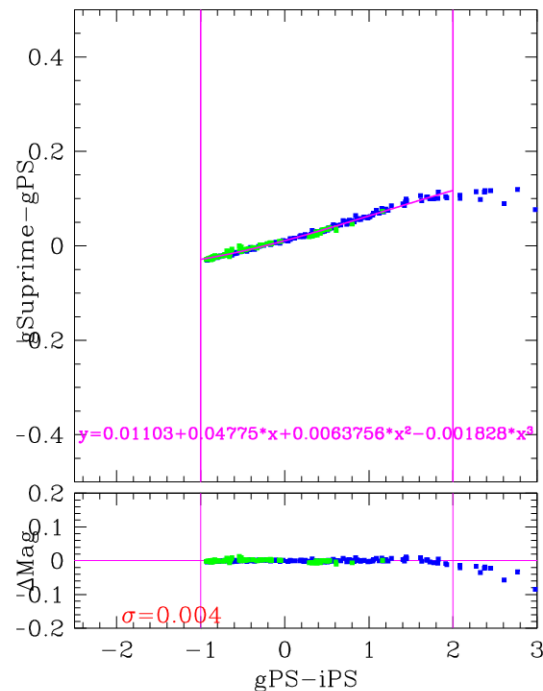
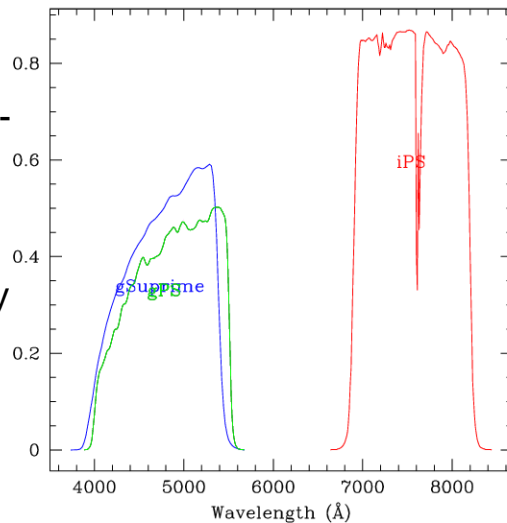
Photometric calibration

- Photometric calibration is done using Pan-STARRS 3PI as a reference
- Convert PS ugriz into Suprime-Cam photometric system using 3rd order polynomial based on synthetic photometry using Pickles and CALSPEC spectra
- Use PS stars as in-field standards
- Conversion is relatively simple for Sloan filters, less, so for others
- Each image measured independently
- Measure photometric residuals:
 - With respect to Pan-STARRS
 - between overlapping images
 - 0.01-0.03 magnitudes



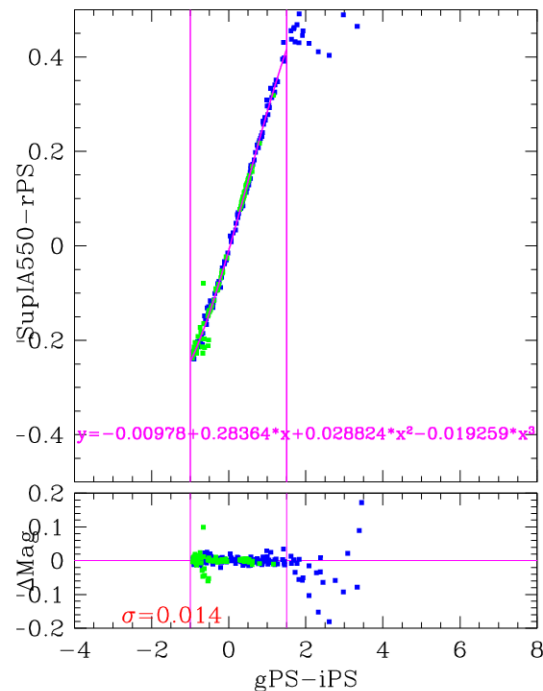
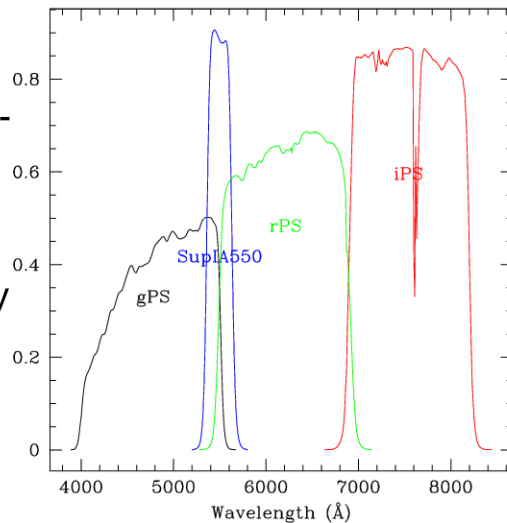
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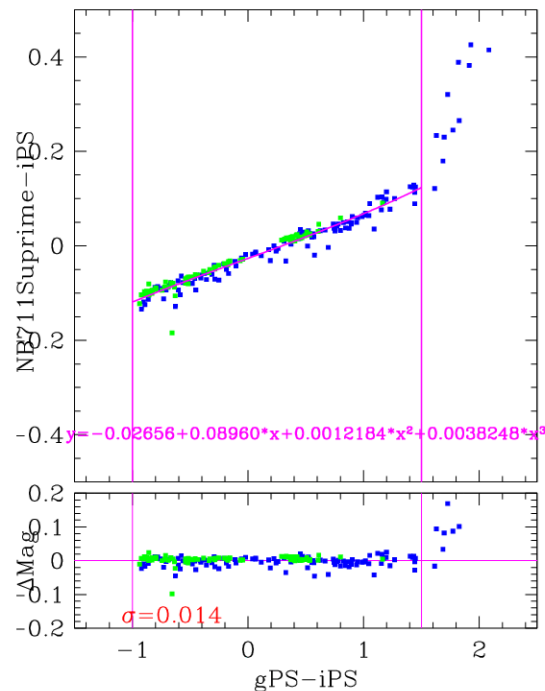
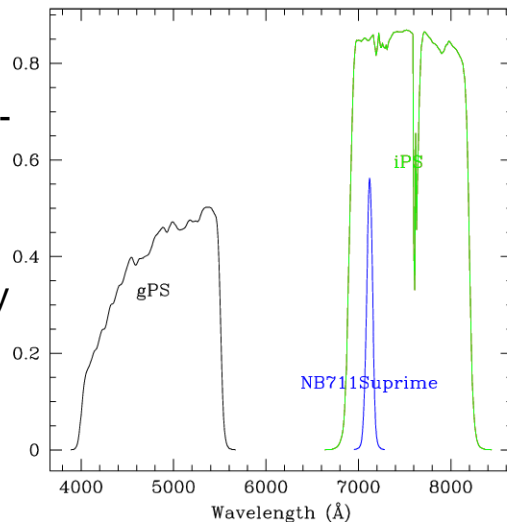
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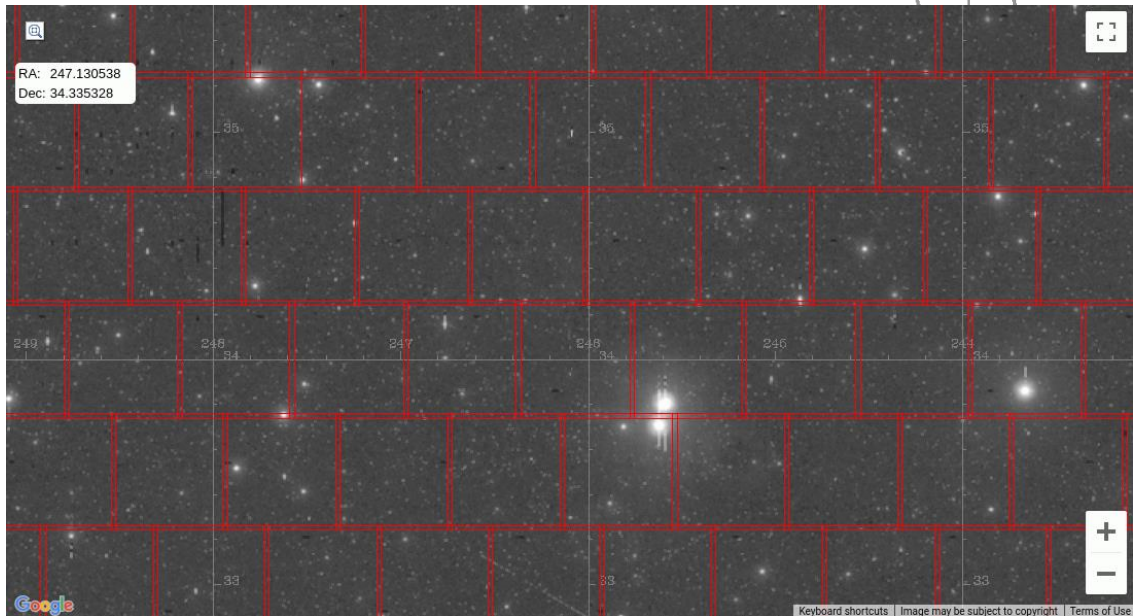
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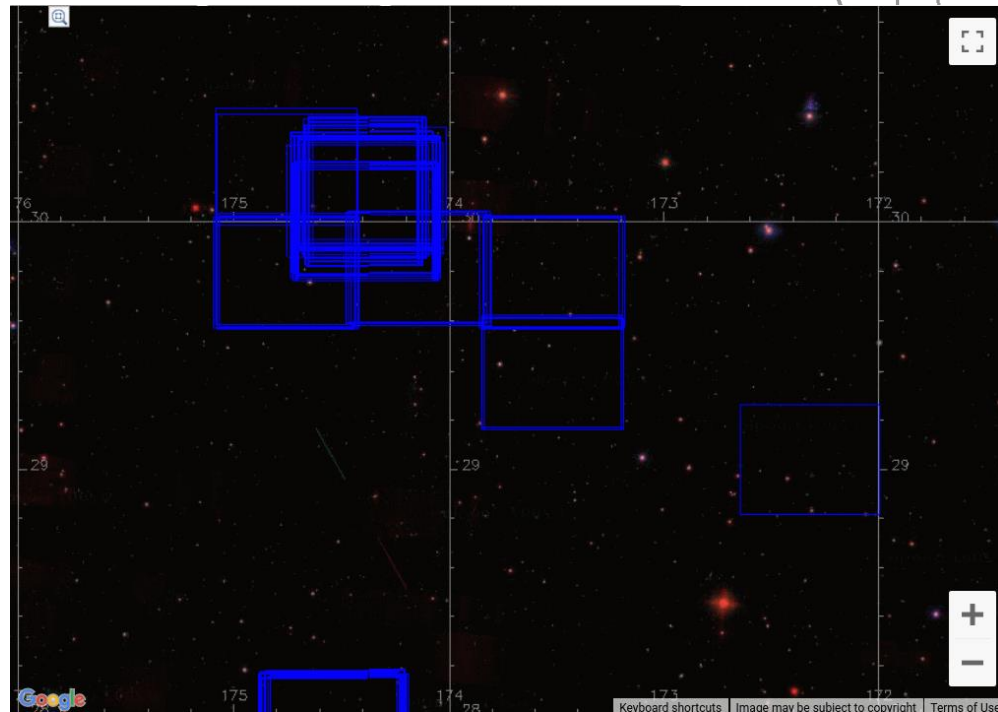
Resampling and coadding

- Resampling using astrometric calibration
- Scaling using photometric calibration
- Reject pixels using masks
- Coadd using a clipped mean
- Resample two ways:
 - Regular grid:
 - 10k x 10k pixel tiles
 - Spaced 0.5 degrees in Dec and RA
 - Same grid used for CFHT
 - Natural grouping of using a friends of friends algorithm



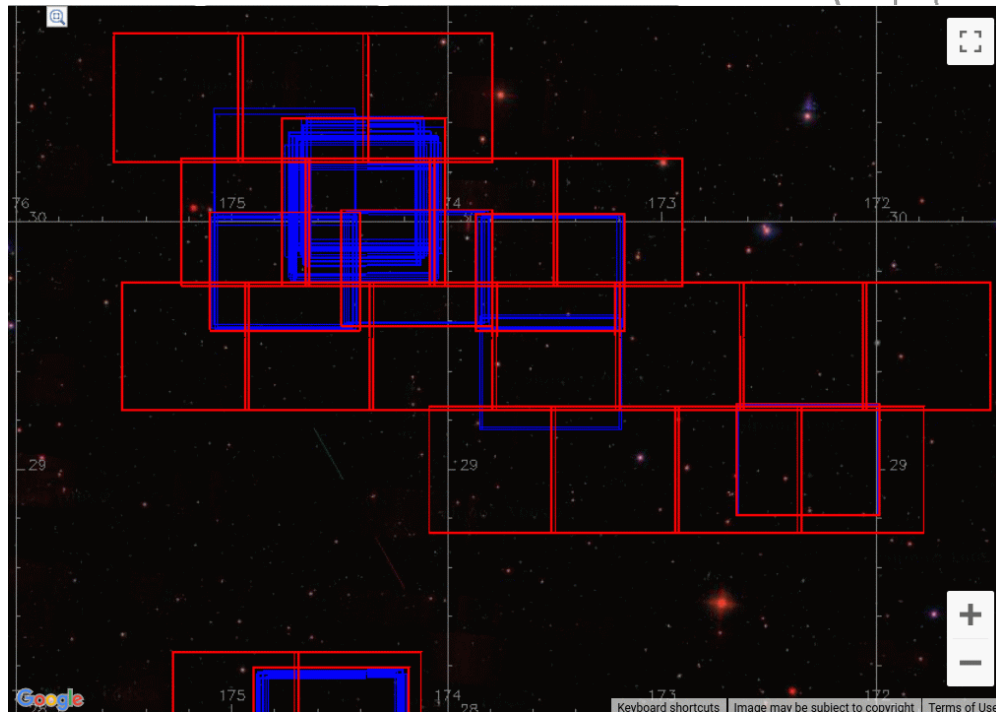
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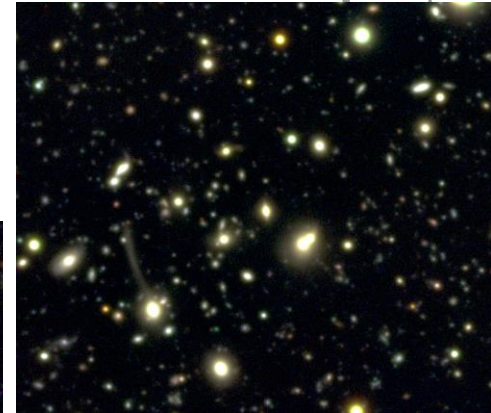
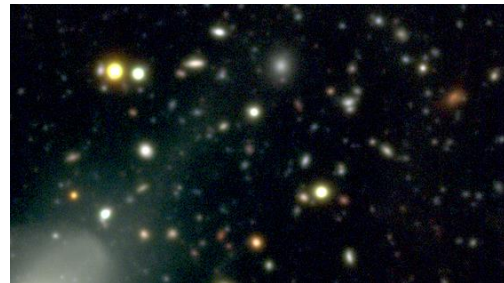
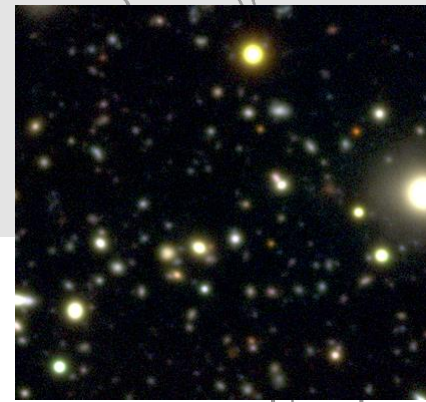
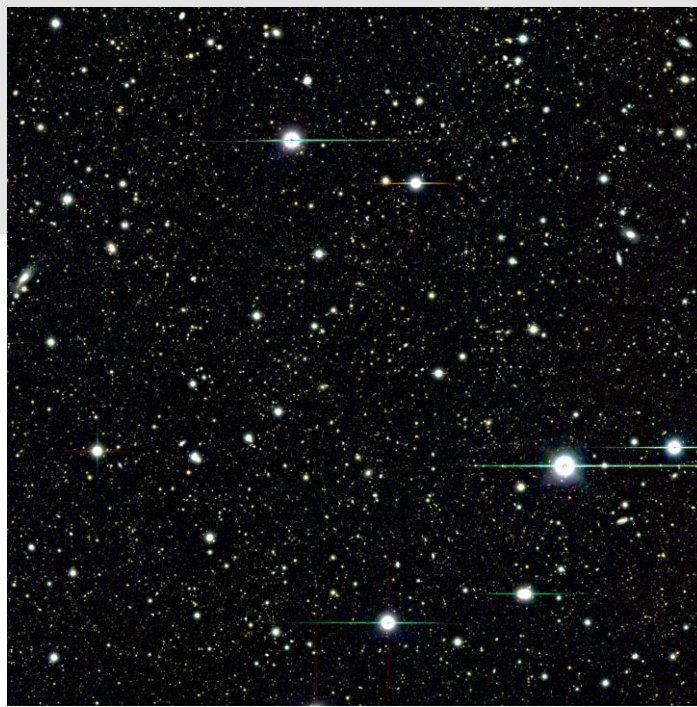
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Data products

- Individual calibrated images and associated masks
 - Useful for synoptic studies (e.g. moving objects, variables)
- Coadded images and associated, weight maps and catalogs
- Not available:
 - full source catalog equivalent to the NOIRLab Source Catalog
 - merged, all image catalog



Data interface

- Graphical Search Tool
- Regular query interface
- Programmatic VO tools
- Provide direct, persistent links to data

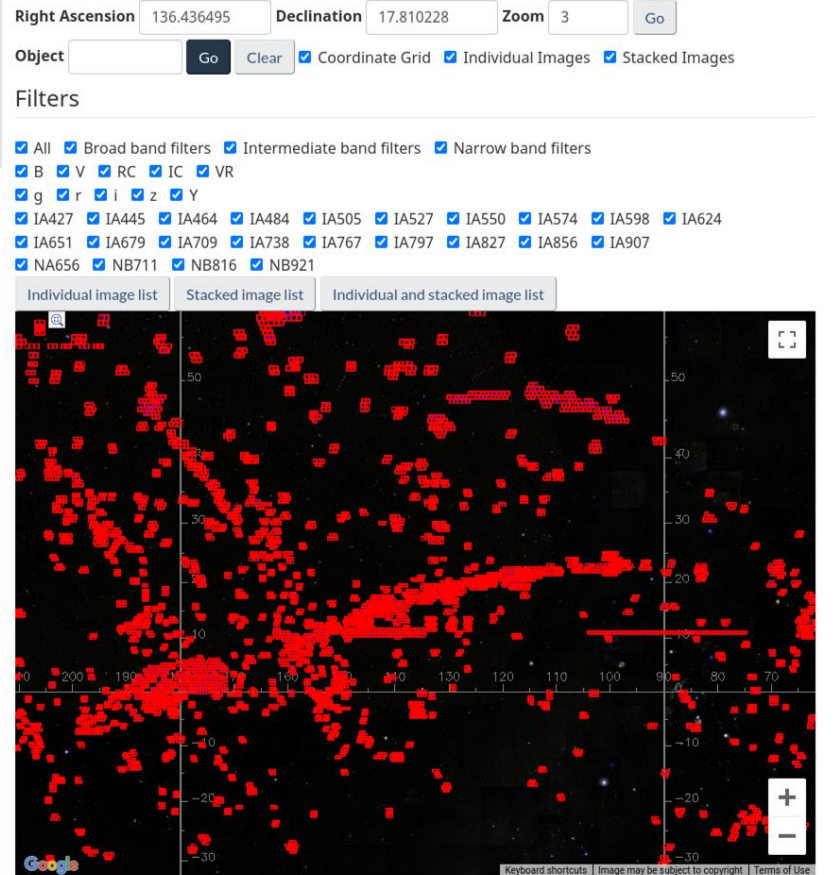
<https://www.cadc-ccda.hia-ihc.nrc-cnrc.gc.ca/en/scla/>

Search Results ADQL

Download complete query results: [VOTable](#) [CSV](#) [TSV](#)

[Download](#) [Showing 10 rows \(0/2 before filtering\)](#) [Change Columns](#) [View in sky](#)

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Summary

- The Suprime-Cam Legacy Archive as processed the data from the Suprime-Cam camera
- Astrometric precision: 30 mas
- Photometric precision: 10-20 mmag
- Available data:
 - Calibrated individual images
 - Coadded images
- It is hoped that the SCLA will contribute to increase of the re-use of the Suprime-Cam data

