Detector Calibration Status

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IPAC/Caltech

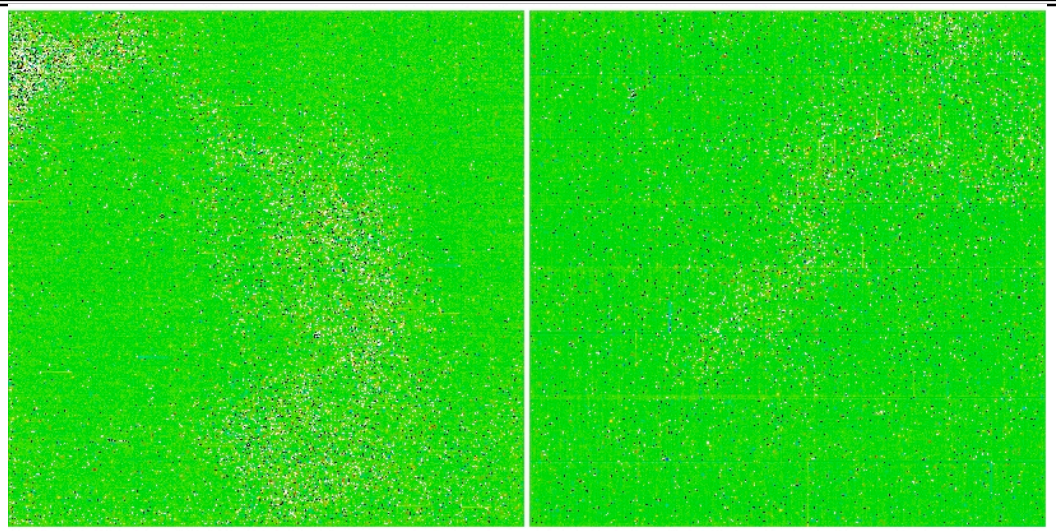
Updates Since Launch

product	where from?	median accuracy/pix (%)
Darks	W1,W2 (cover-on - Adam), W3,W4 (flight - Frank)	**NOW:** 1.8, 1.4, 11.0, 4.1 **MIC2:** 8.4, 7.9, 6.3, 1.2
Read-noise (RMS) maps	W1,W2 (cover-on - Adam), W3,W4 (ground - Amy)	-
Flats	W1,W2 (flight - Frank), W3,W4 (flight - Stefanie)	**NOW:** 0.54, 0.25, 0.11, 0.10 **MIC2:** 0.07, 0.08, 0.02, 0.01
Low-frequency flats	To be derived from flight data - all bands	-
Non-linearity	Ground - all bands. To be validated from IOC	**MIC2:** 0.78, 0.86, 1.30, 2.17
Gain (e-/DN) maps	Ground - all bands: for noise model initialization. To be validated from flight data	-
Droop	Flight - characterization in progress (Chao-Wei & Doug)	-
Bad-pixel masks	From above flight calibrations: all bands - Mike S.	-
Sky-offsets	Dynamic calibration - tuning in progress	-

Dark differences: flight - MIC2

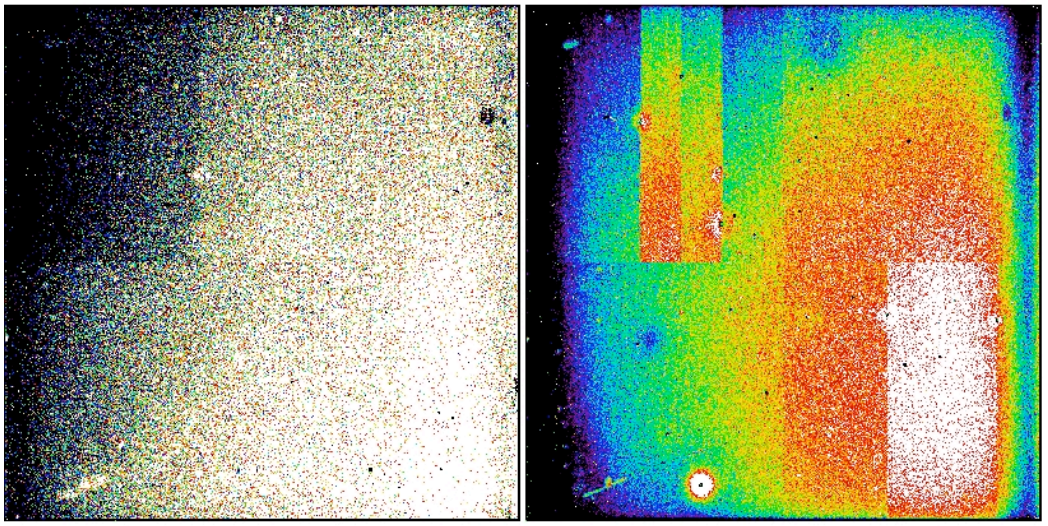
W1

W2

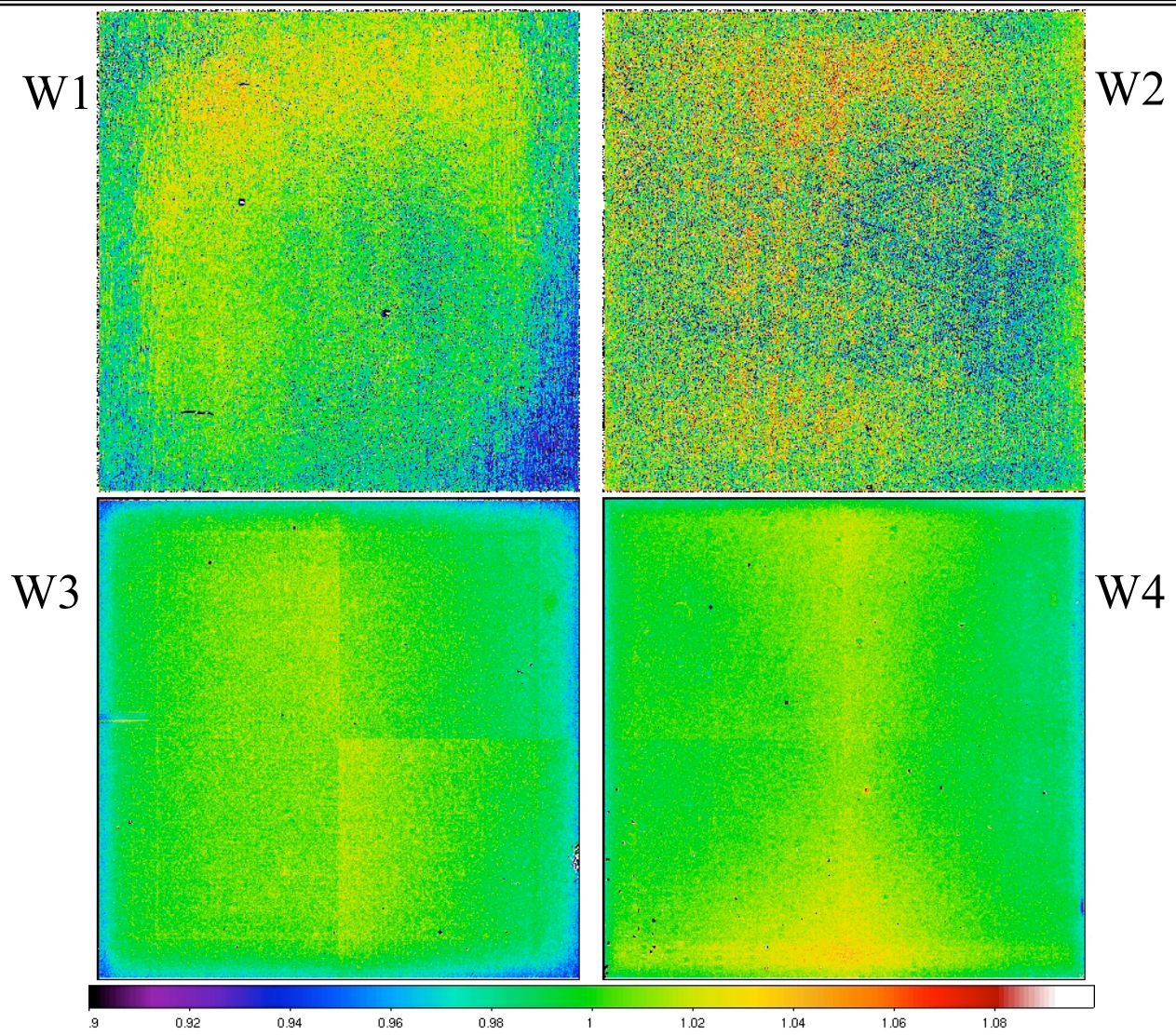


W3

W4



Flat ratios: flight / MIC2



W3, W4 flight darks

Derived with flats using "self-cal"

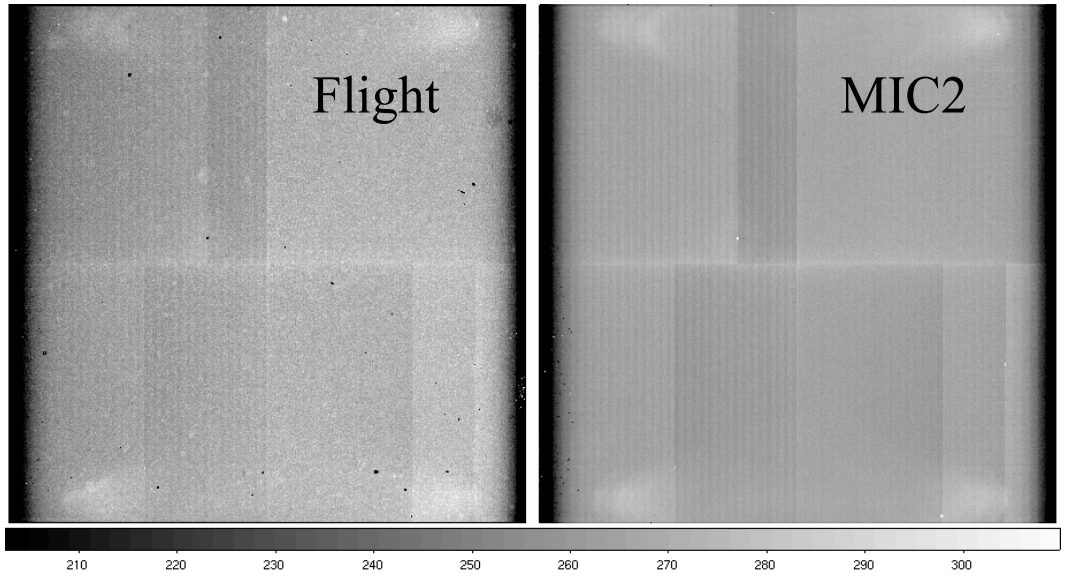
$$O_i = G_i S_i + D_i$$

flat

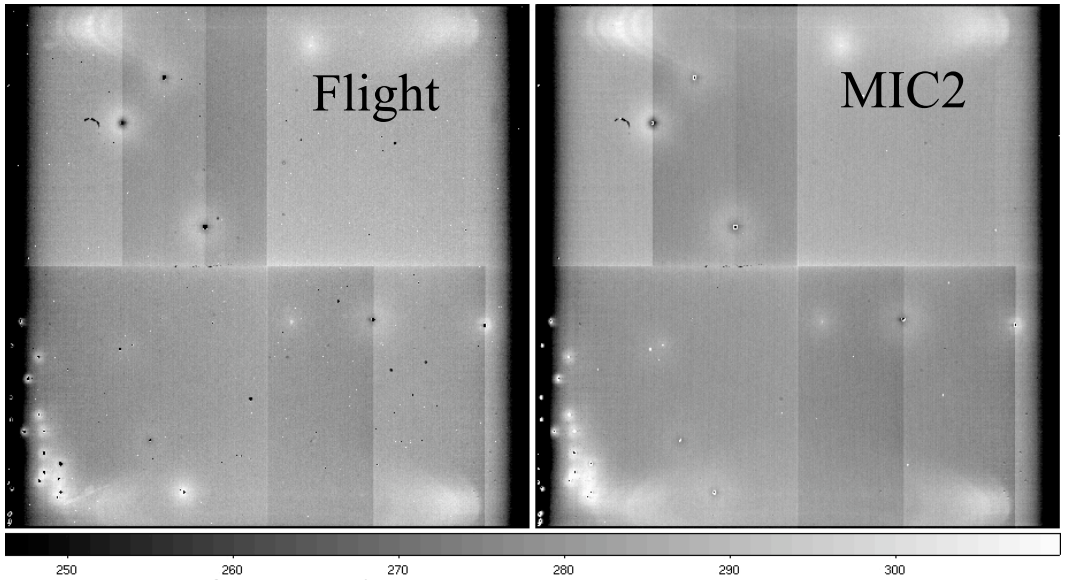
dark

Sky ≈ <L0 - absolute dark level>

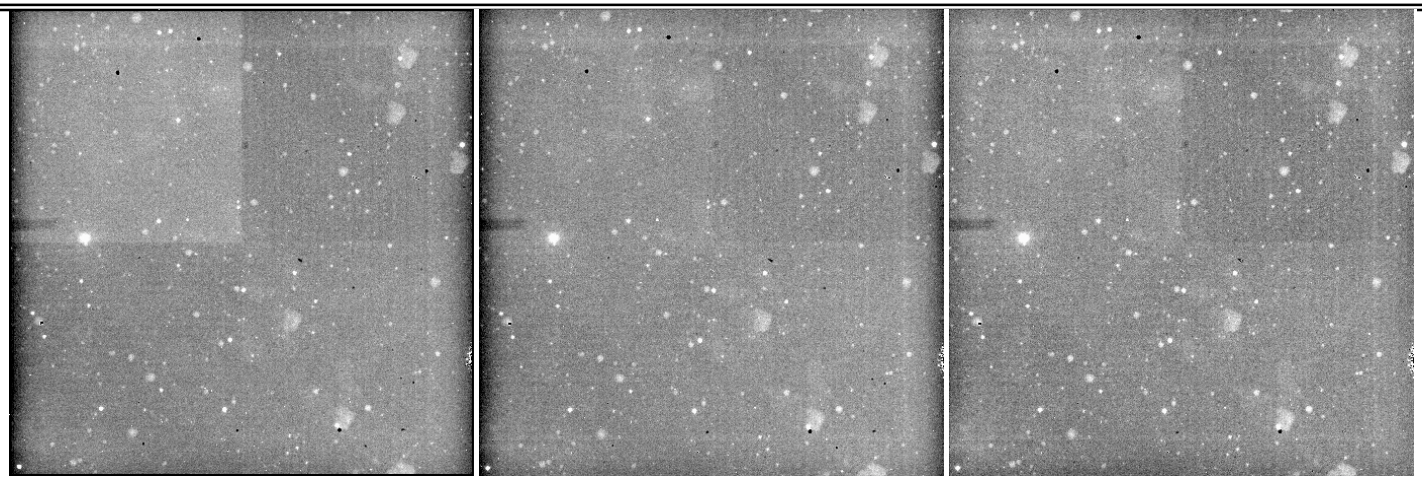
W3



W4



New Processing Flow (W3)

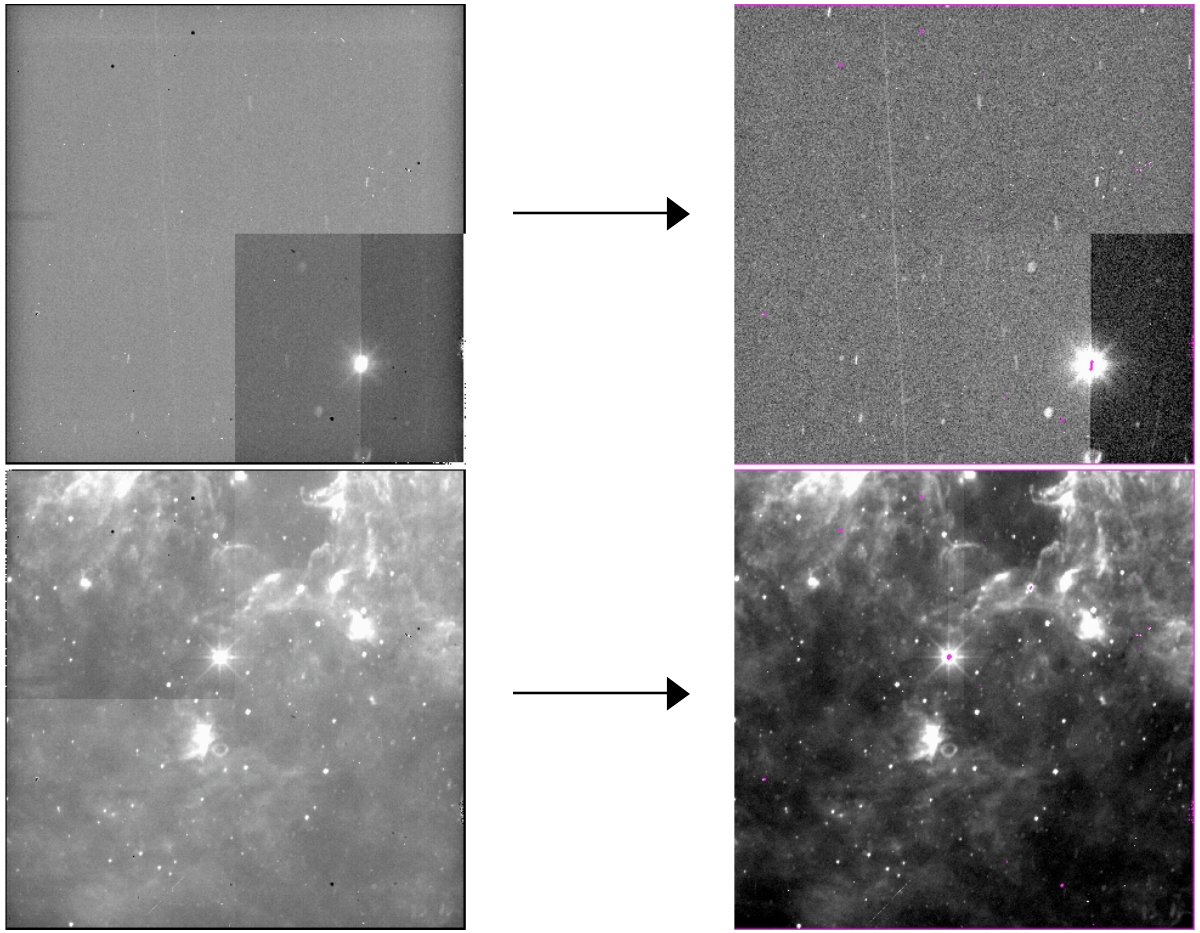


raw (L0 frame) → droop corrected → dark corrected

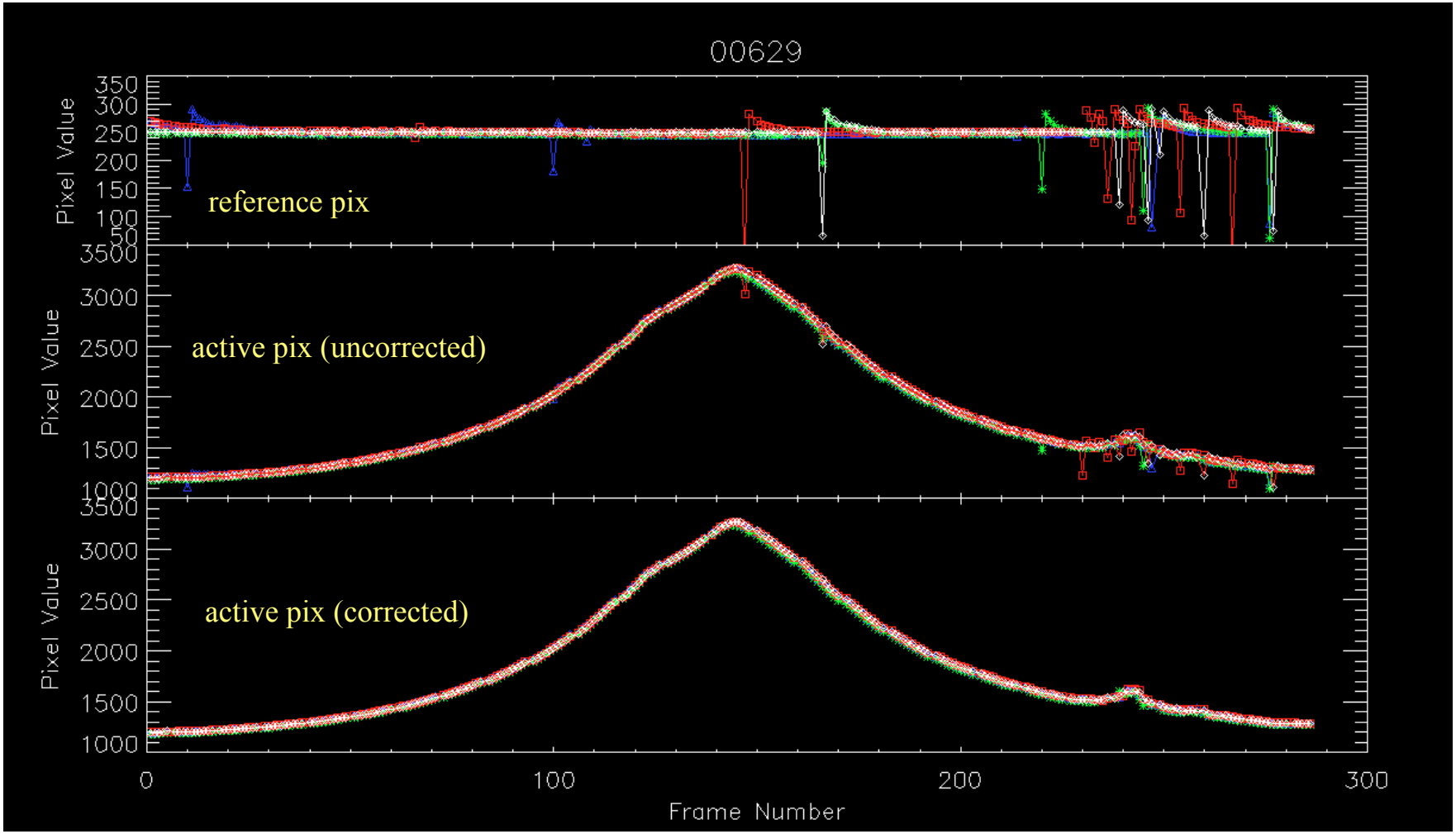
linearized → flattened → sky-offset corrected

First Order Droop Correction (W3 and W4)

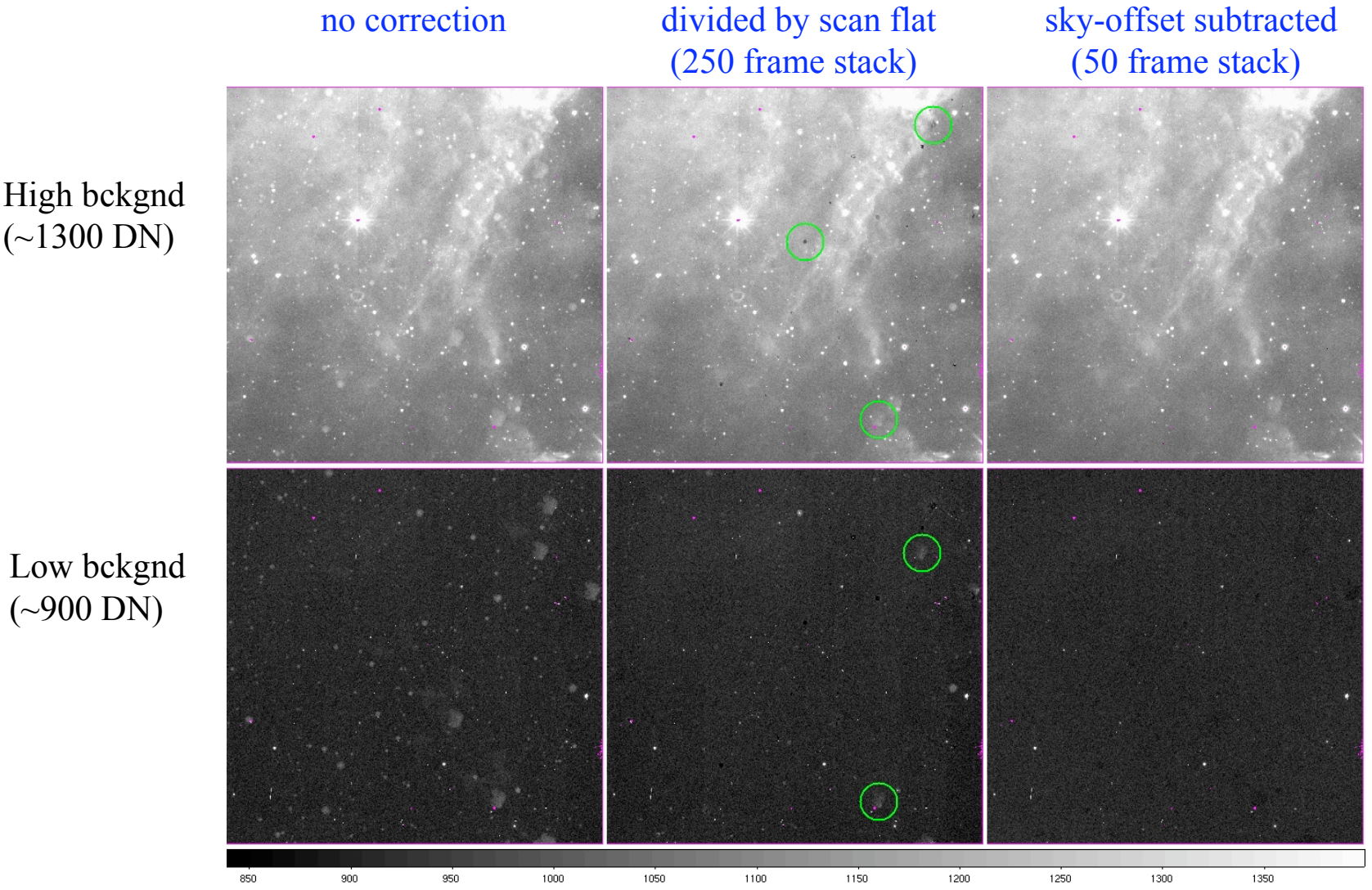
Provisional processing: only correct for quadrant-to-quadrant (global) droop effects.
Split-quadrant cases to be fixed in v3.5 delivery.



Droop correct using reference pixels



Dynamic cal: sky-offset vs. flat

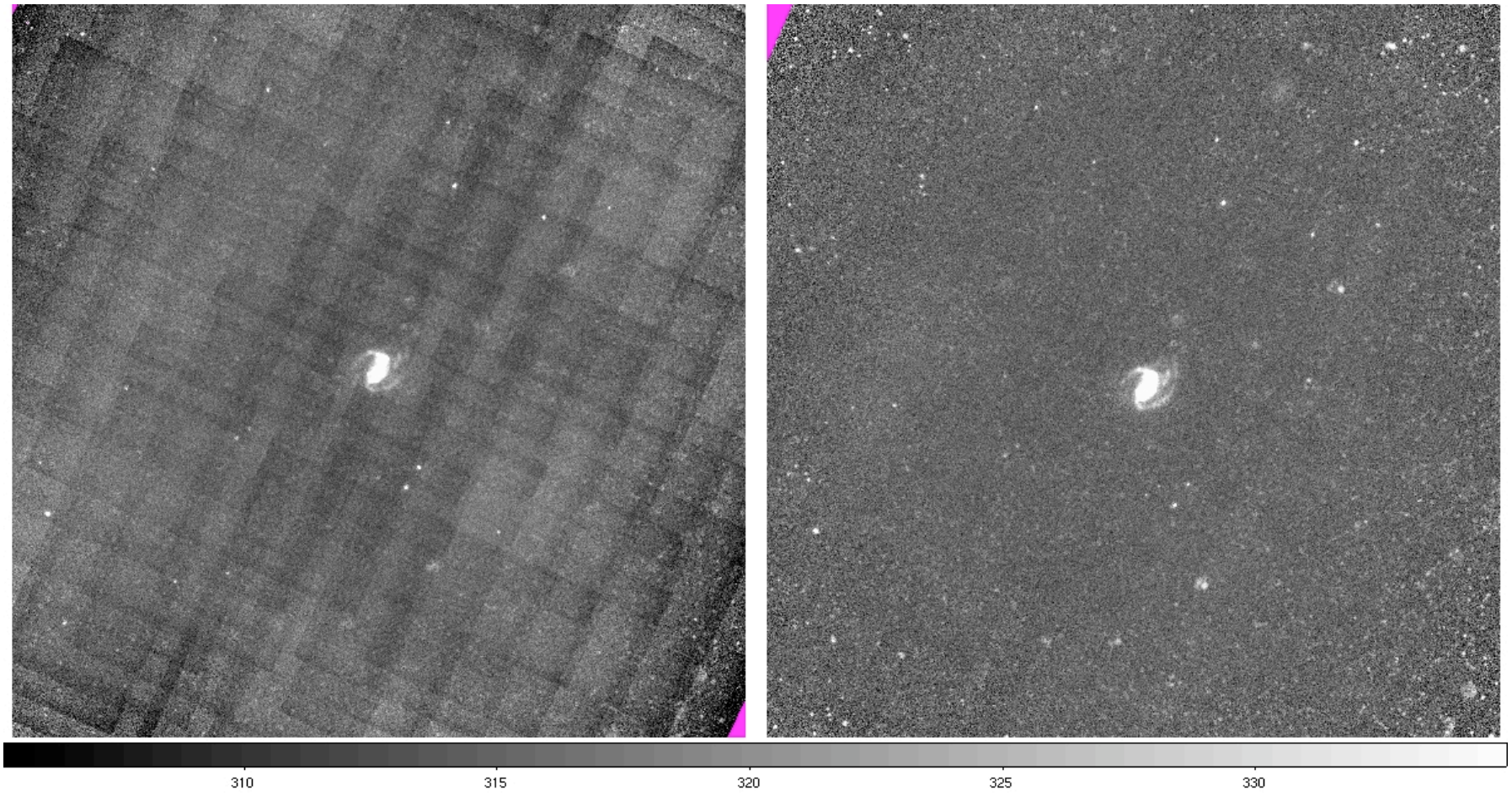


Impact on co-adds

W3 Atlas Image Dimensions with NGC1097

Using ground calibrations

New calibrations + droop (no sky-offset)



To do..

- linearity validation/updates
- split-quadrant droop effects
- refine W3, W4 flight darks (coupled with flats)
- flats:
  - far and close to anneals for w3,w4
  - account for non-linearity too in all bands
- Δdark + Δflat refinements to static calibrations
- sky-offset versus running flat to mitigate latents
- W1, W2 amplifier bias-structure correction?
- gain & read-noise check from flight data

M83 coadd (depth ~ 11; W321=RGB)