



National Aeronautics and Space
Administration
Jet Propulsion Laboratory
California Institute of Technology



WSDC Status

WISE Operations MMR

IPAC/WSDS Weekly Status Report

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MOS MMR – 22 July 2010



Moon-filtering analysis



- Testing of multiframe pipeline in progress
 - refinement of moon contamination filtering to optimize products ongoing
 - exploring impacts on global depth-of-coverage, photometric accuracy, reliability
- Results for an Atlas Image footprint with frames badly affected by moon-glow follow
 - in this test, 116 out of 220 framesets were rejected by a prototype moon-filter
 - we explored overall photometric accuracy, stack variance with/without filtering
 - coadder does its own optimal (outlier) filtering, however, it can benefit from prior filtering of frames in low depth-of-coverage regions where coadder may have trouble





Altas-Image test field at elat $\sim 8^\circ$ w/ heavy moonshine



- Number of input framesets touching footprint before any filtering = 220
- Number of frames filtered by moon-mask, bad qa-score, outlier rejection in coadder:

band	m=0,s=1	m=1,s=0	m=0,s=0	m=1,s=1
1	0, 56, 0	116, 0, 0	0, 0, 17	60, 56, 0
2	0, 56, 3	116, 0, 0	0, 0, 28	60, 56, 0
3	0, 56, 9	116, 0, 0	0, 0, 45	60, 56, 0
4	0, 56, 8	116, 0, 5	0, 0, 47	60, 56, 5

legend

m = pre-coadd moon filtering off/on

s = qascore filtering off/on

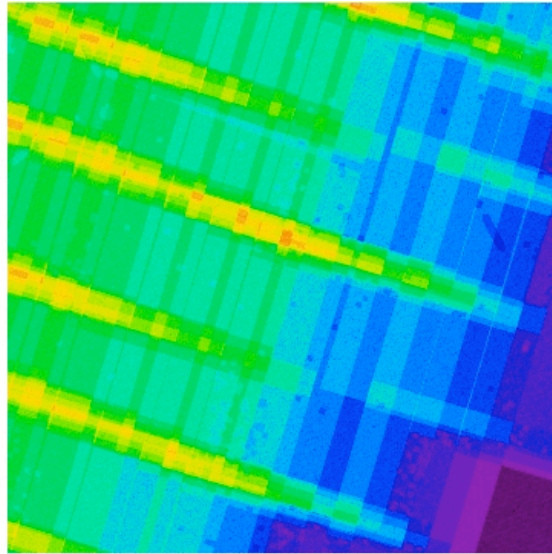




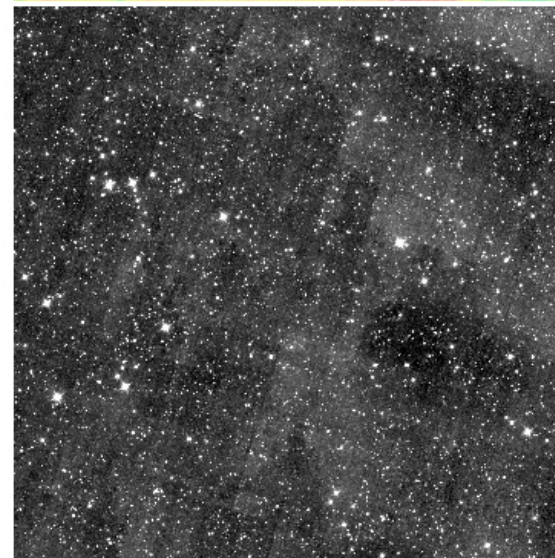
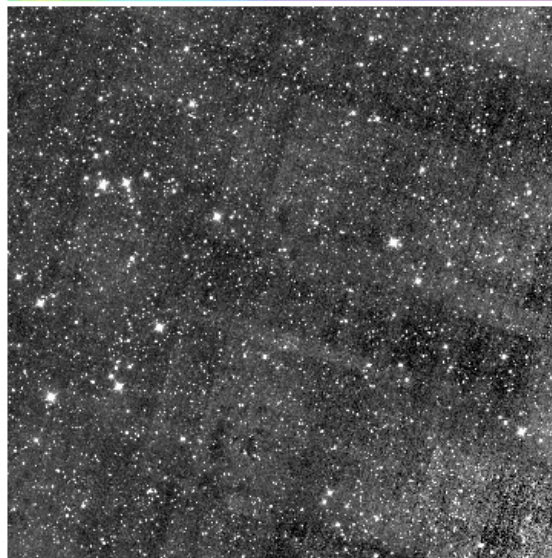
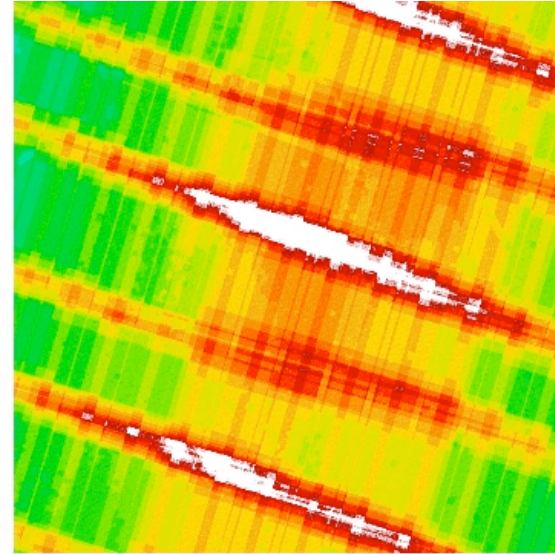
W2 moon vs. no-moon (but coadd-only) filtering



with moon
masking



no moon
masking

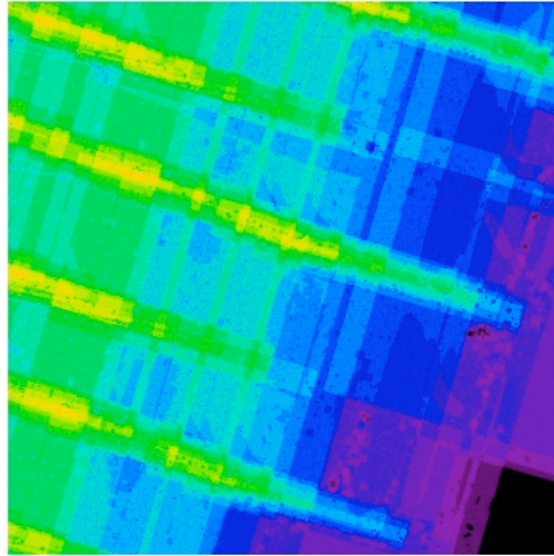




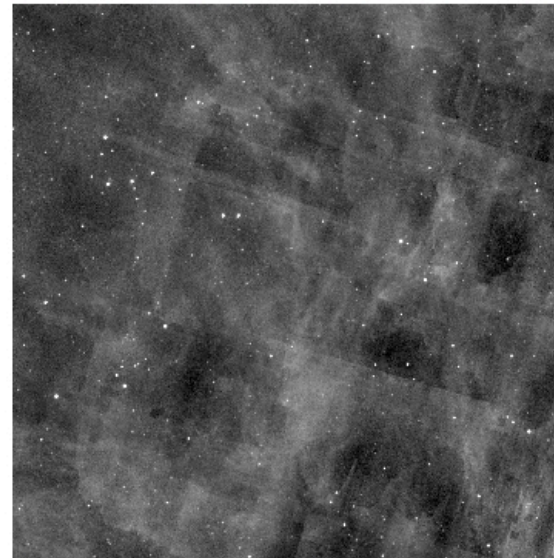
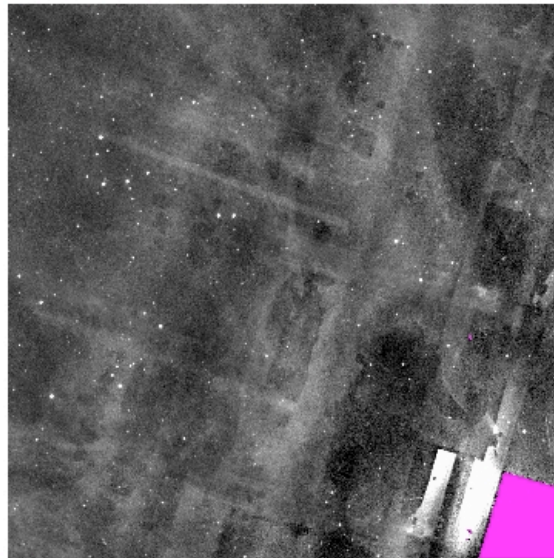
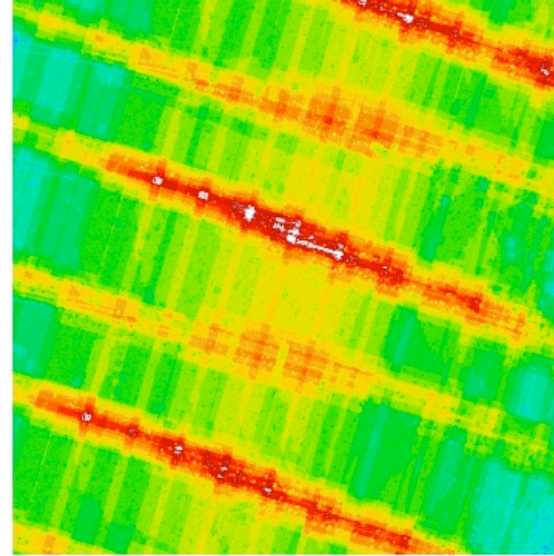
W3 moon vs. no-moon (but coadd-only) filtering



with moon
masking



no moon
masking

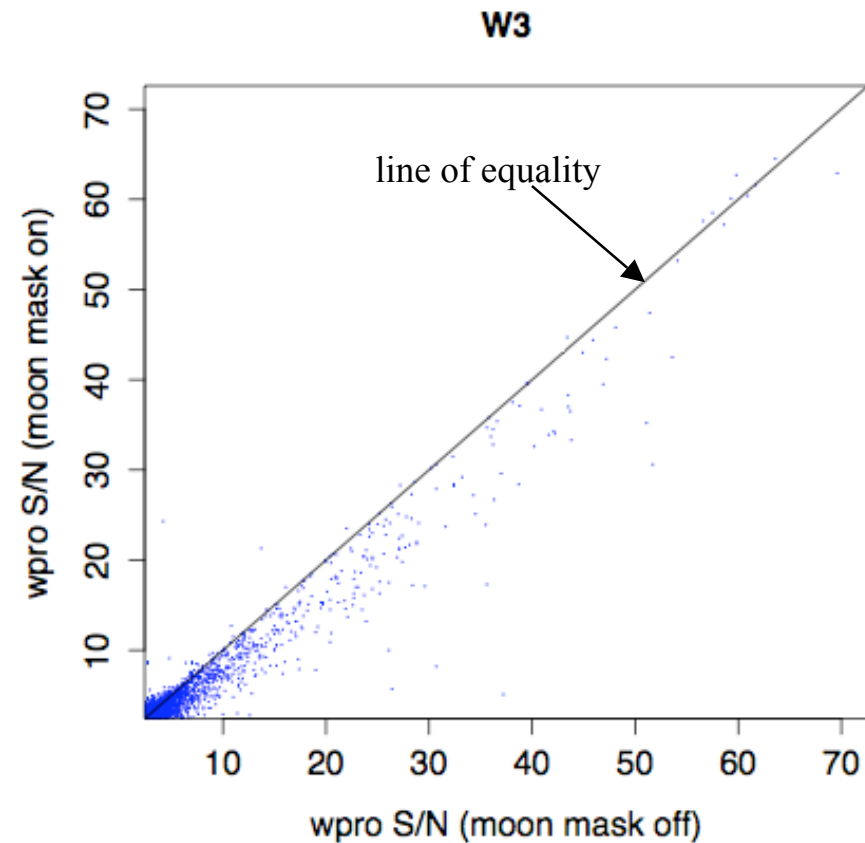
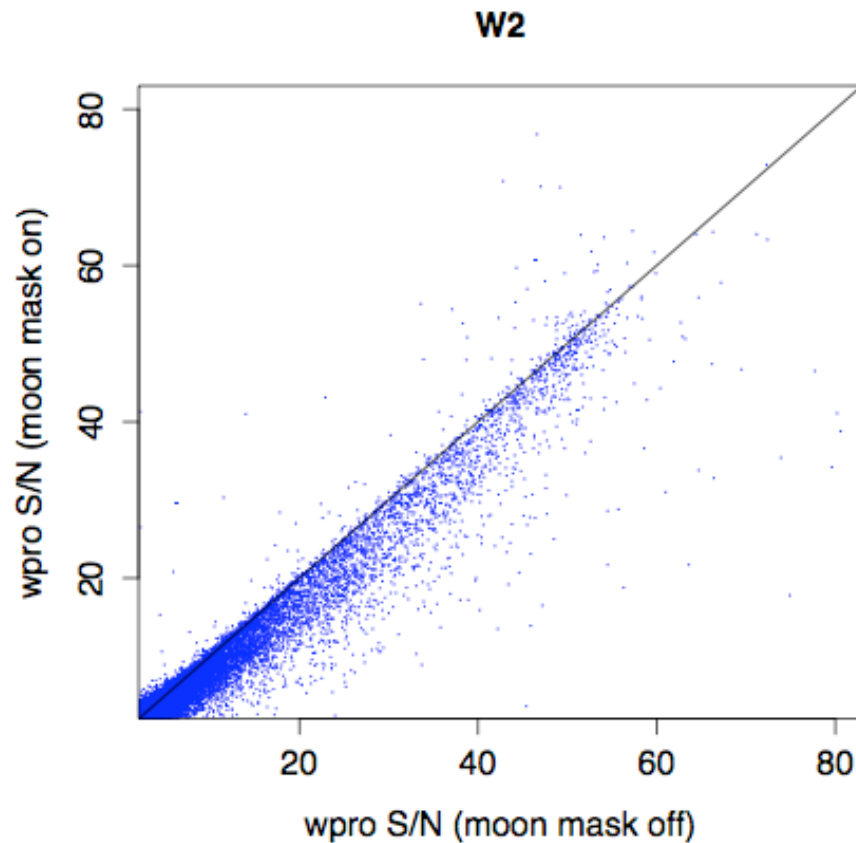




Photometric S/N check: with vs. without moon filter



- Signal-to-Noise ratio scales as $\sim \sqrt{\text{depth-of-coverage}}$ (no surprise)
- Sources selected using $|\chi^2 - 1| < 0.3$, no upper limits, no blends

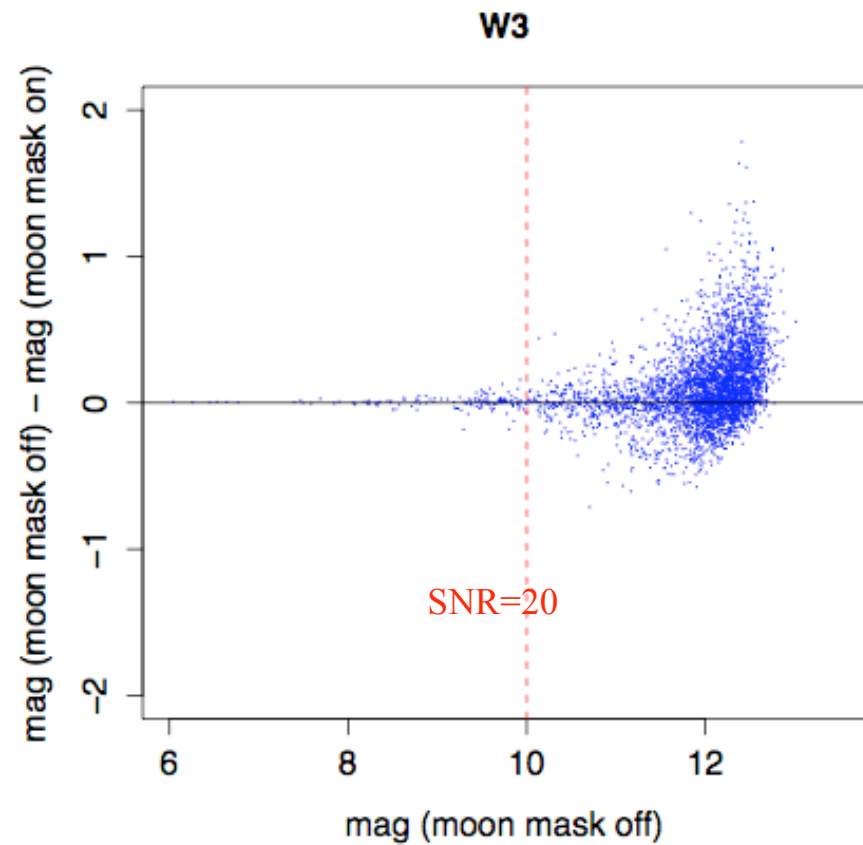
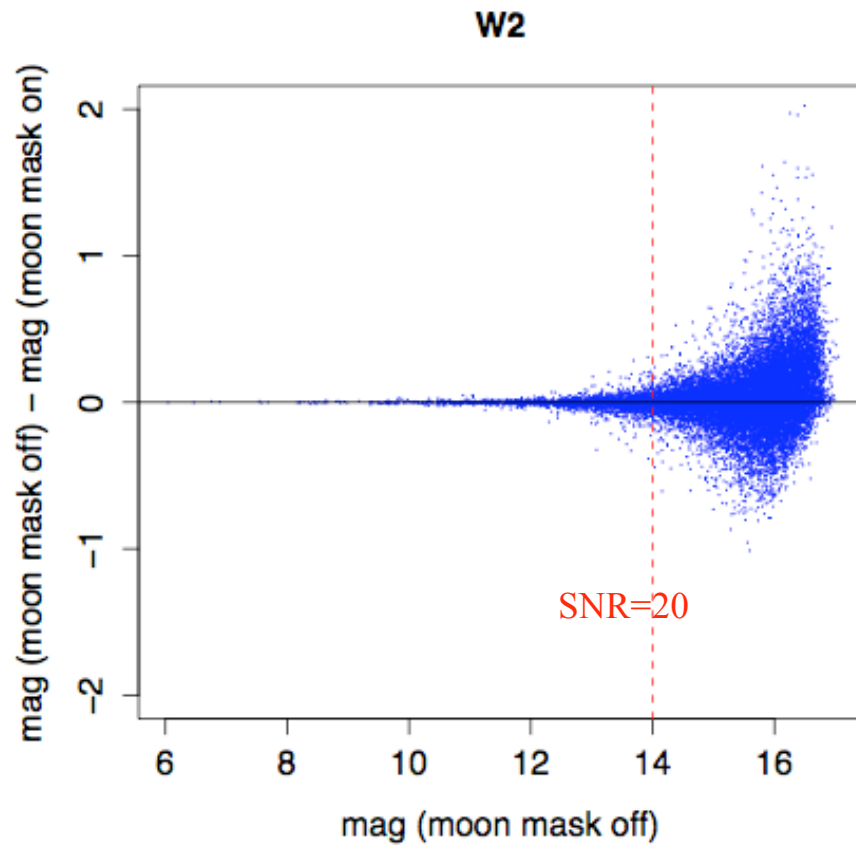




Photometric check: with vs. without moon filter



No systematic differences in photometry





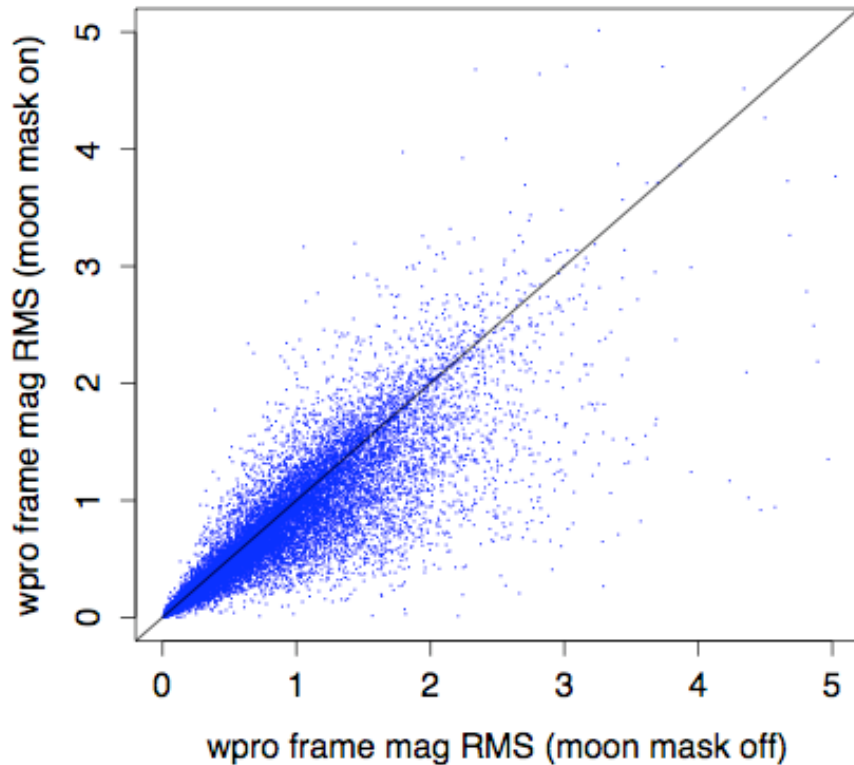
RMS over single frame mag measurements



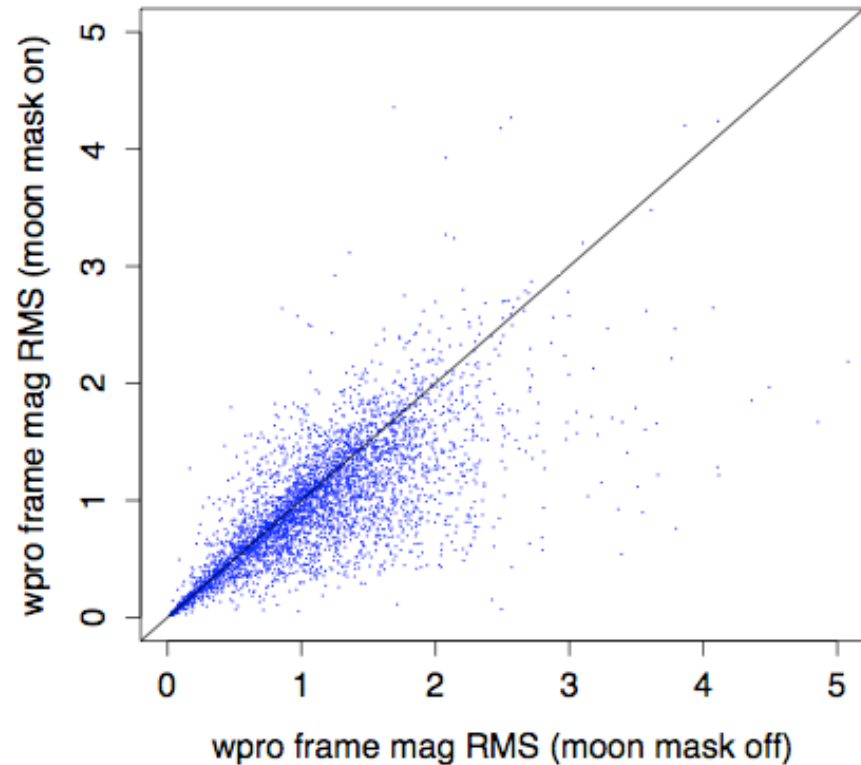
Coadder-only (outlier) filtering with prior moon mask off:

=> source stack variance not significantly inflated from additional frames, S/N
mostly driven by depth-of-coverage

W2



W3



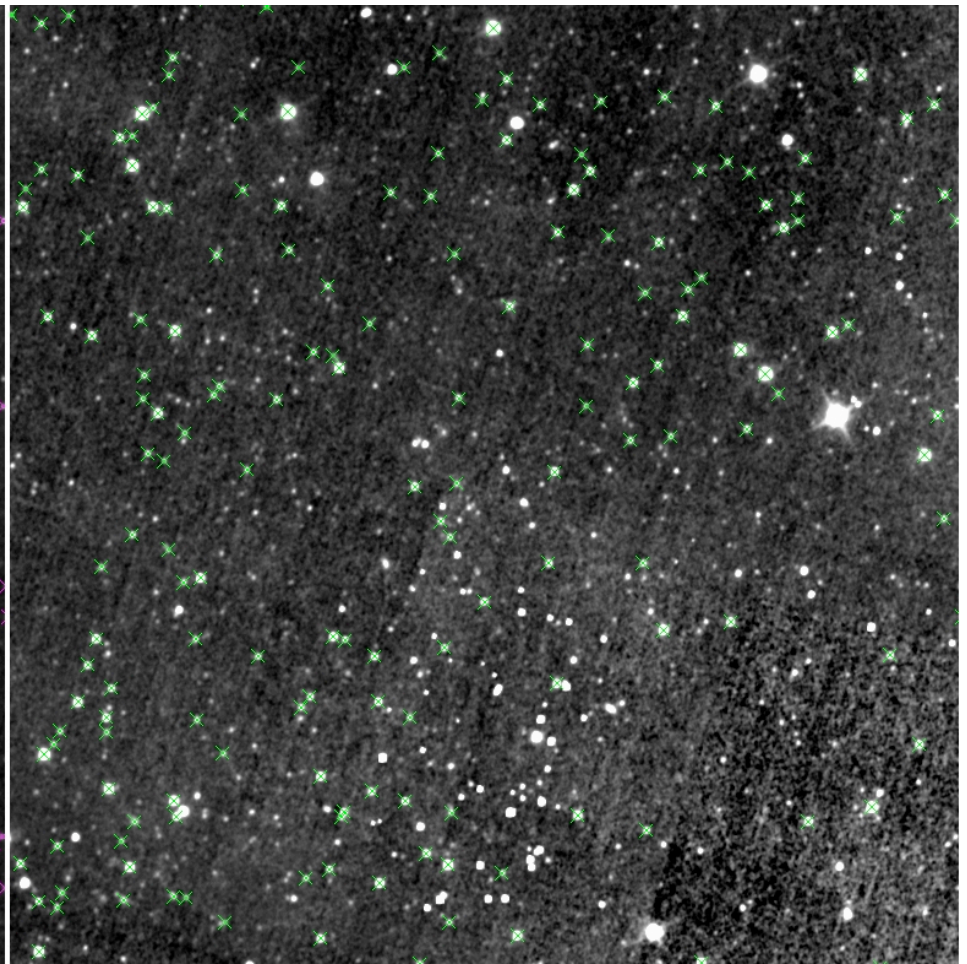
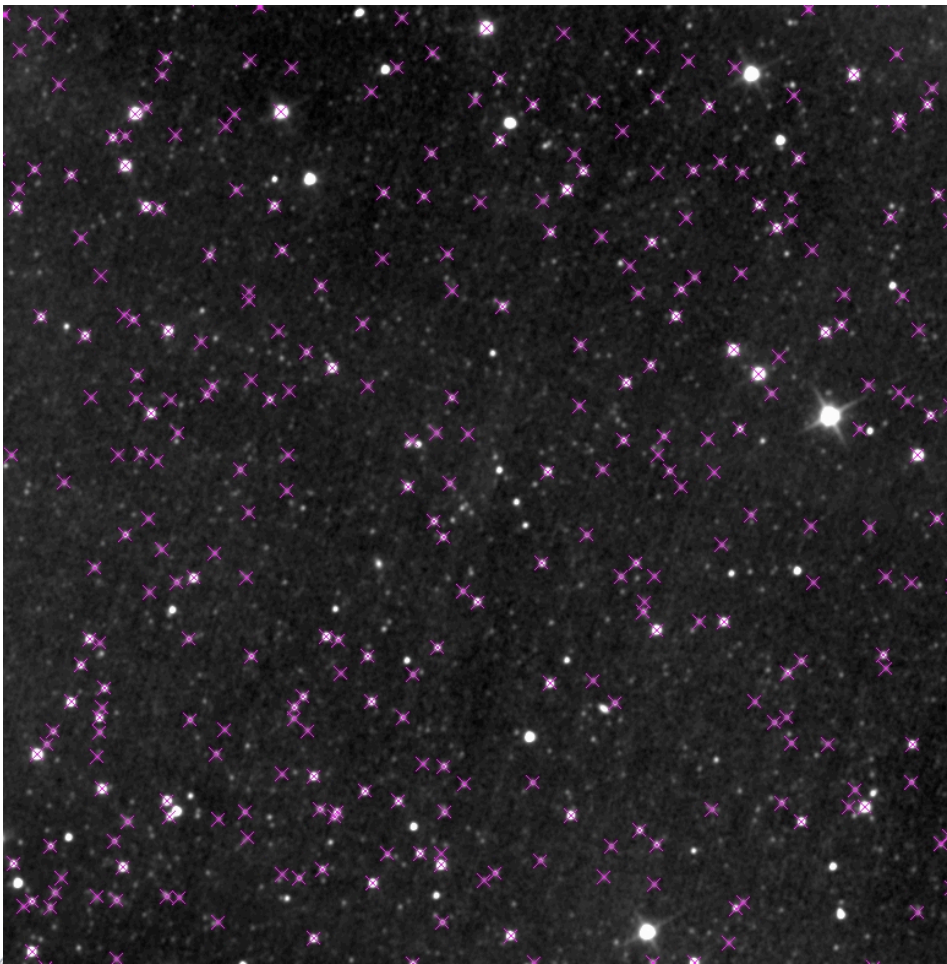


W2 S/N > 20 source overlays



Atlas Image-zoom with moon-masking off
(note: coadd outlier-filtering always on)

Atlas Image-zoom with moon-masking on



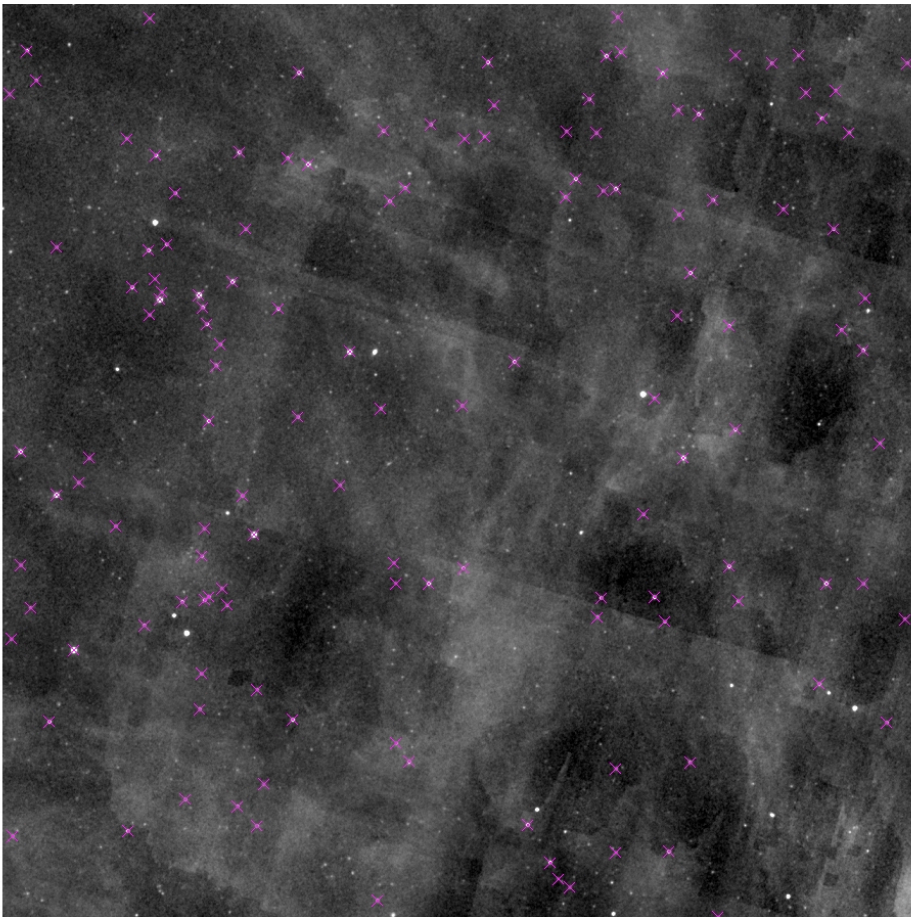


W3 S/N > 20 source overlays



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Atlas Image with moon-masking off
(note: coadd outlier-filtering always on)



Atlas Image with moon-masking on

