Recovering depth-of-coverage

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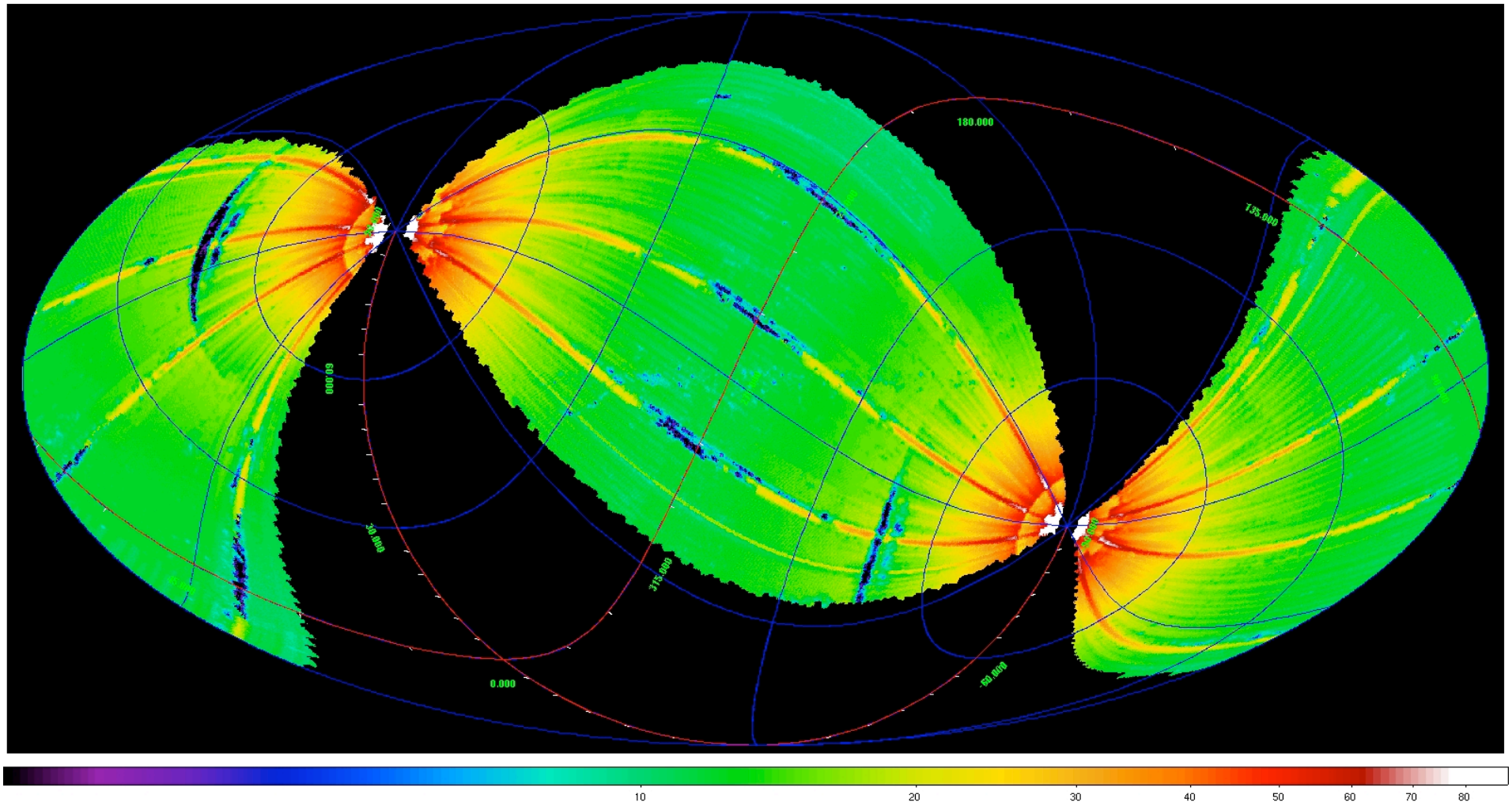
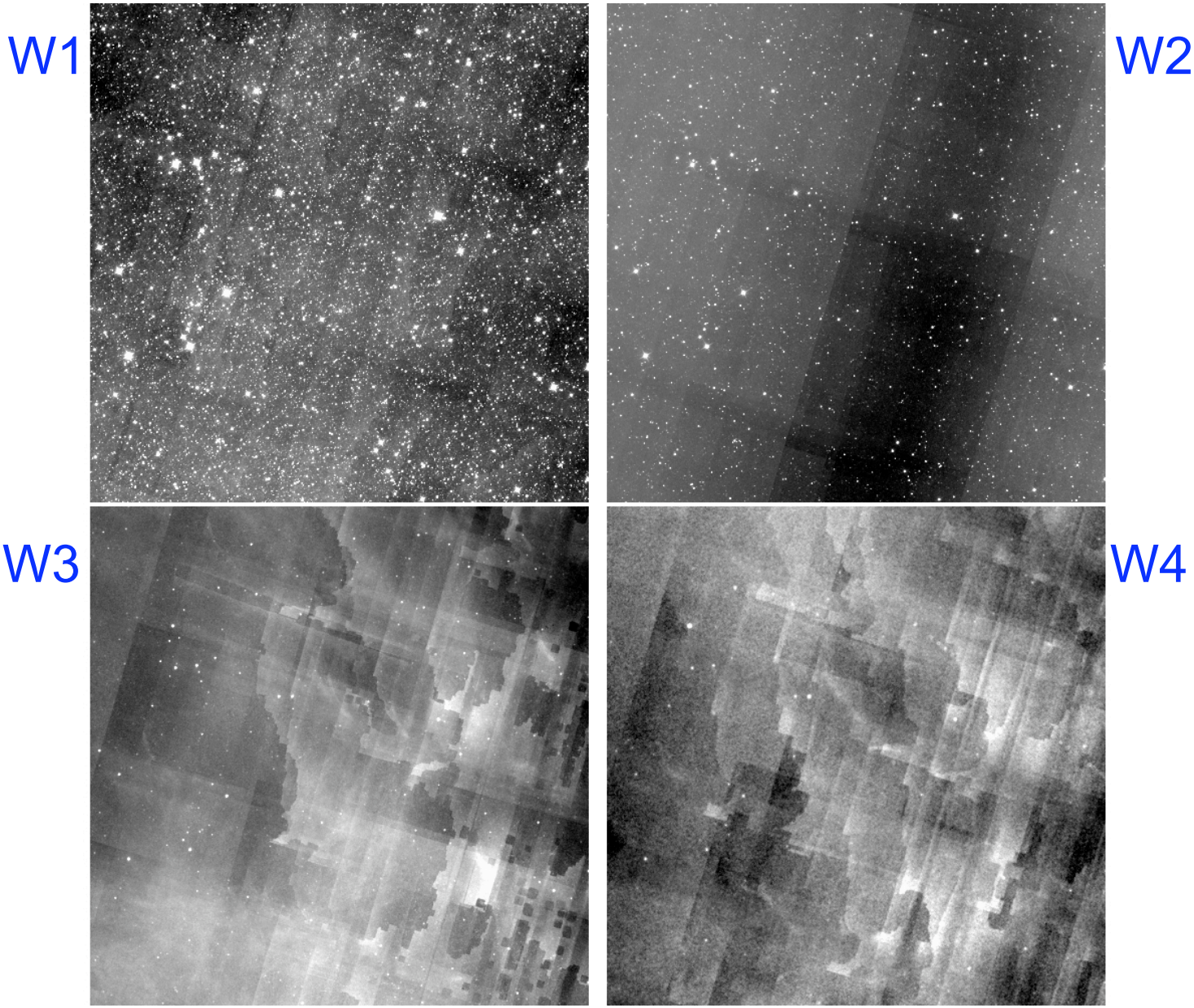
W3 preliminary release depth-of-coverage



Galactic projection with ecliptic coord-grid overlay

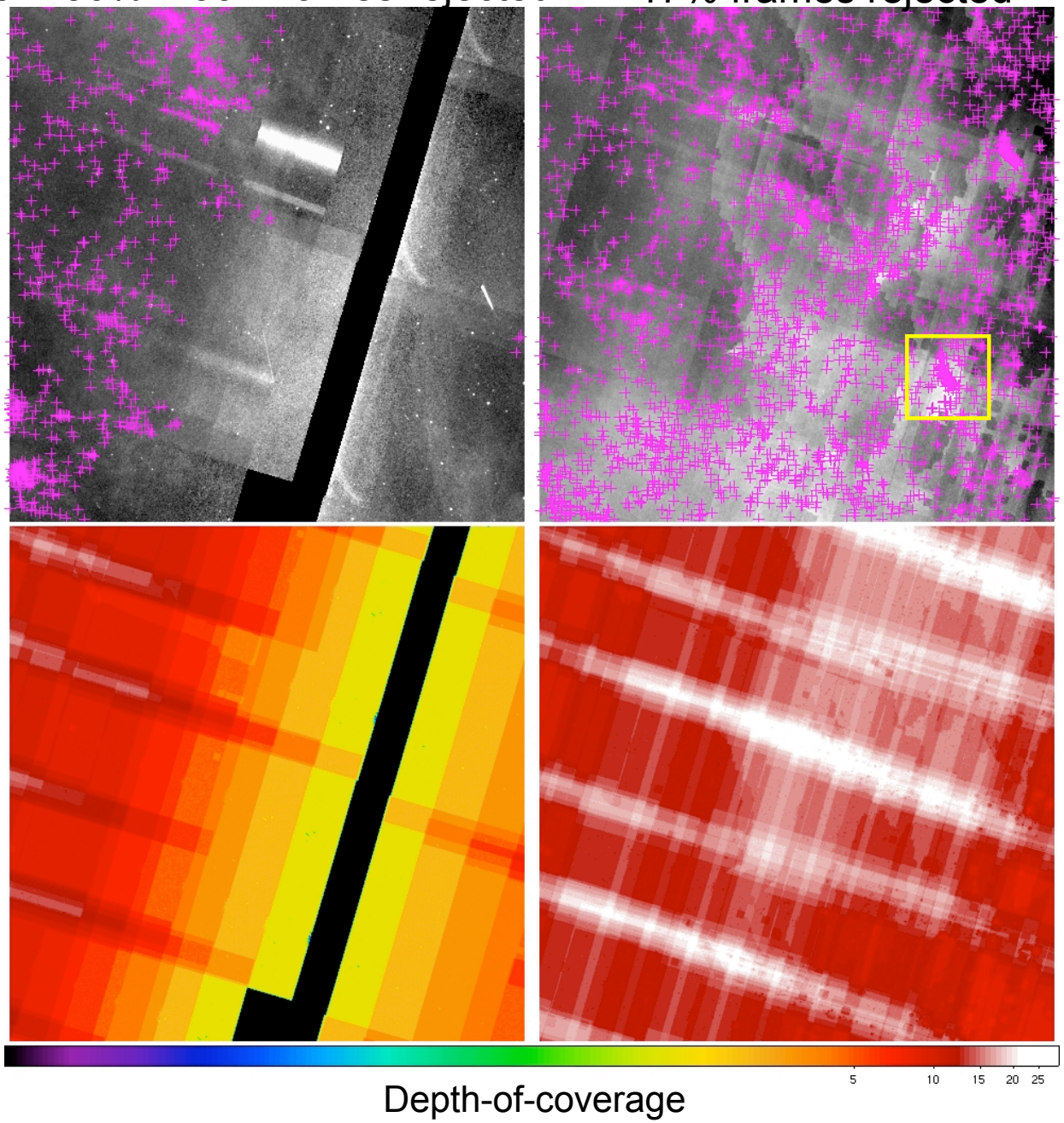
Atlas Image (coadds) of moon-contaminated field from recent test run



W3: ~50% moon frames rejected ~17% frames rejected

sources selected using:

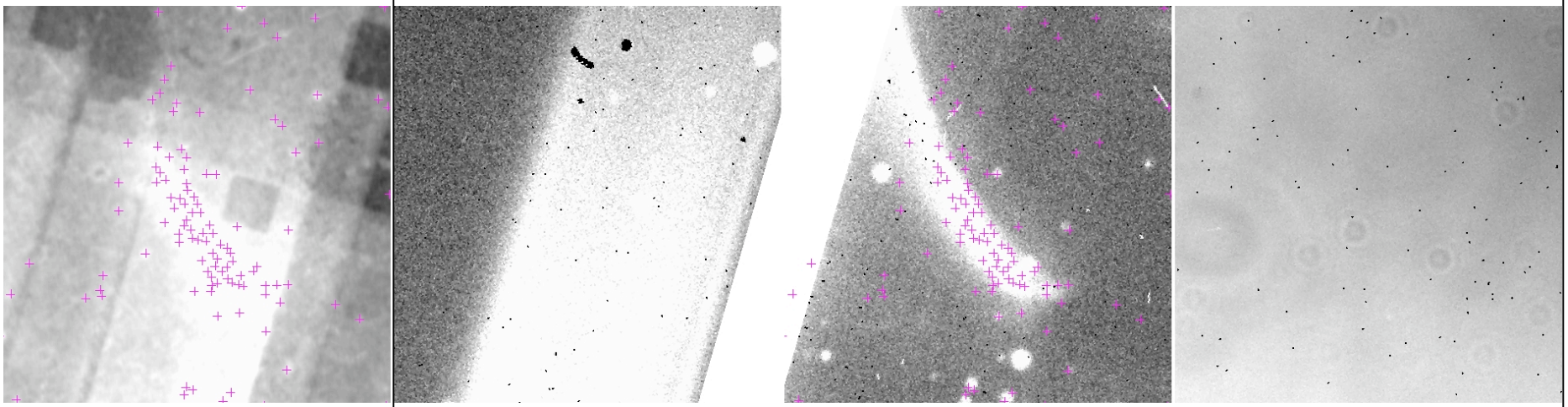
w3snr > 5 (>7 prelim) &
w3m > 5 (>4 prelim) &
w3sigmpro ne 'null' &
[w3mpro ≥10.1 or
w3nm/w3m > 0.4]



zoom into yellow box: culprit W3 frames?

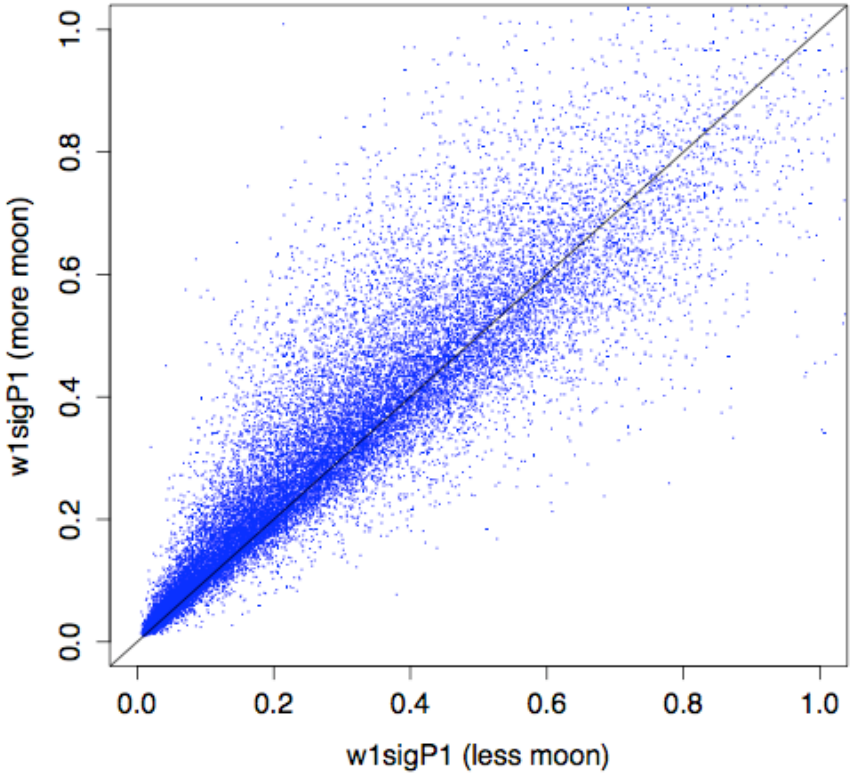
Atlas Image region
~ 8 arcmin

3 input frames covering this region

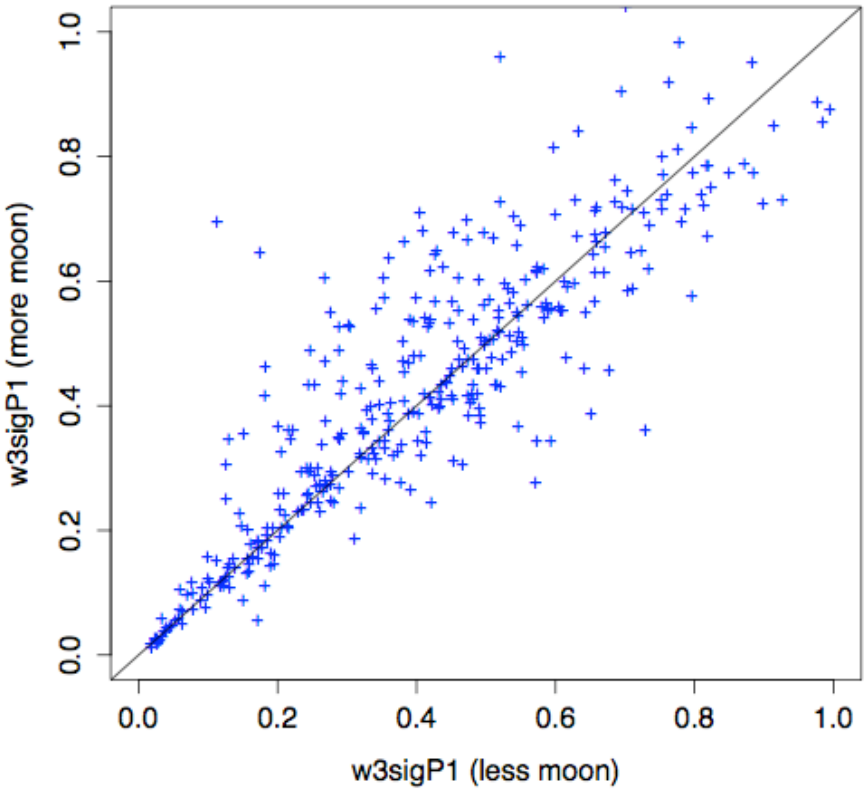


RMS in source-flux repeatability amongst frames in coadd stack: lots of moon vs. less moon.

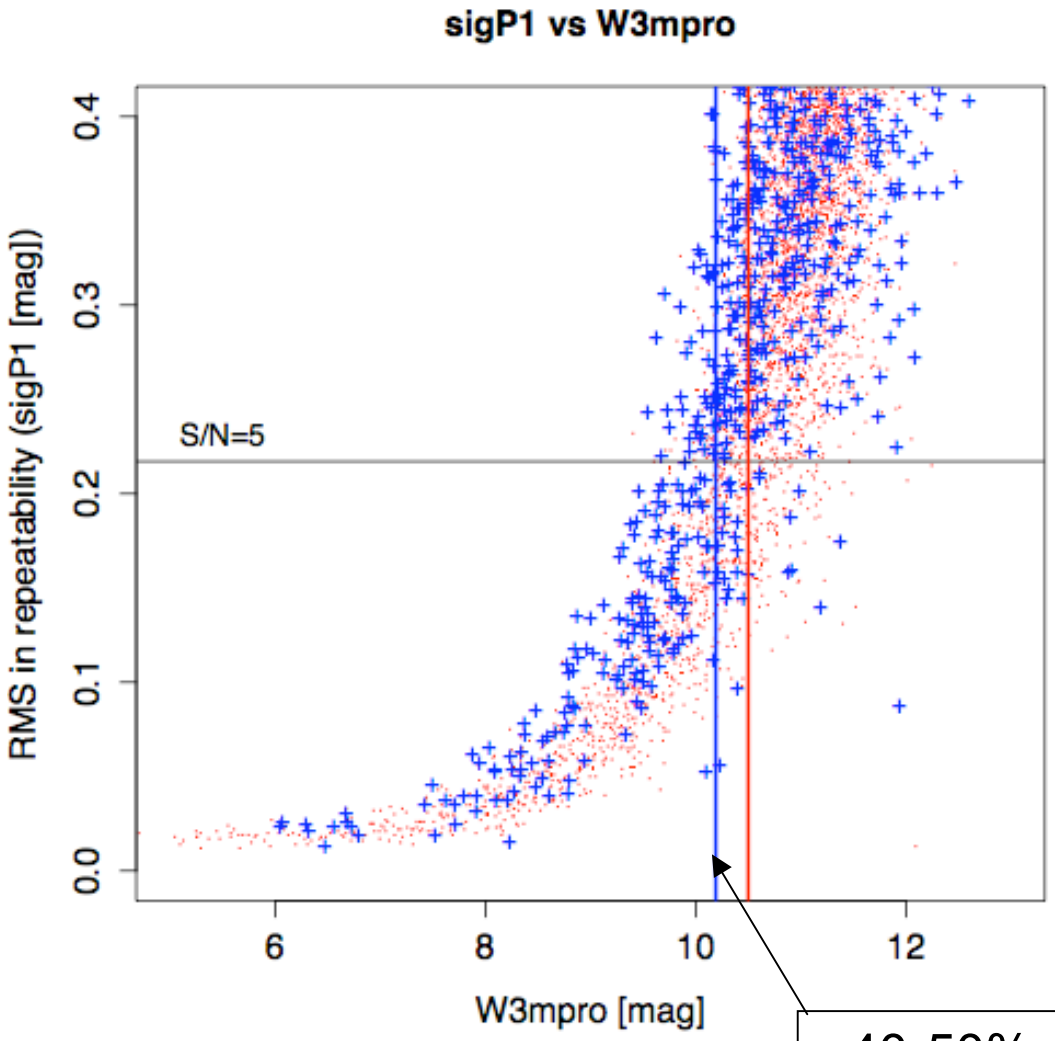
W1



W3



blue => moon-contaminated field (as before)
red => “clean” nearby field with similar depth-of-coverage



~40-50% drop in sensitivity

What shall we do?

If admit more moon-contaminated frames to recover depth:

- more spurious detections
- photometric accuracy reduced nonetheless (no significant gain in S/N from additional depth provided by ‘bad’ moon frames)

1. provide global warning flag per atlas-tile, per band, visible at source catalog/query level?
2. provide warning flag, or moon-affected depth fraction per source: indicator may be incomplete/unreliable at this resolution
3. design optimal source-selection criteria for final catalog to maximize reliability, especially at low S/N?
4. perform more aggressive moon-filtering as in prelim release?
5. combine 1 and 4? - simple and conservative. Consider 3 later.