

First results about ZTF Calibration using GAIA

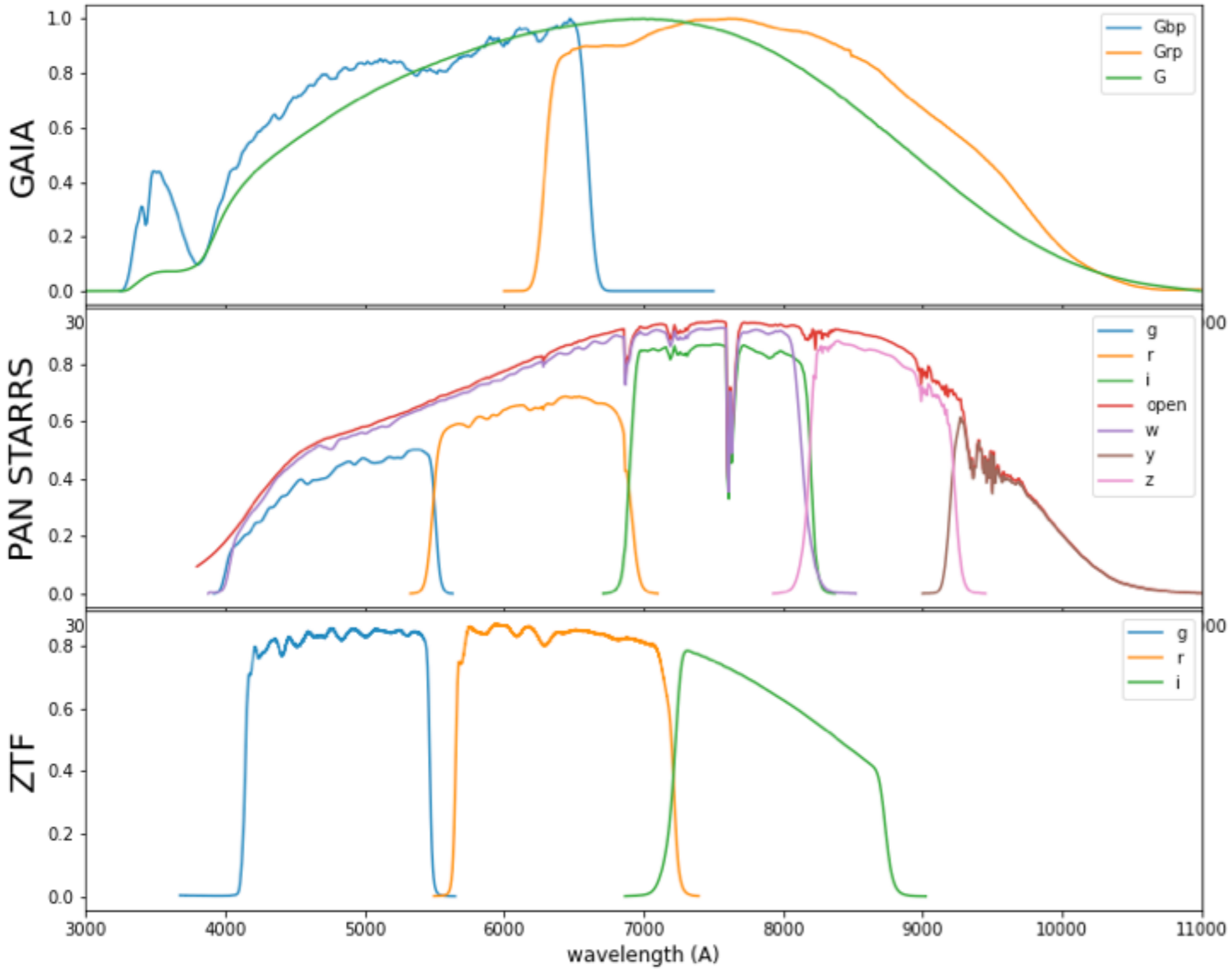
Maxime Cherrey
09/04/2021



- ZTF currently calibrated using **PAN STARRS**
- with linear fit: $r^{\text{ZTF}} = r^{\text{PS1}} - \text{ZP} - c_r(g^{\text{PS1}} - r^{\text{PS1}})$
- Possible to use **GAIA** instead?

I focus **only** on:

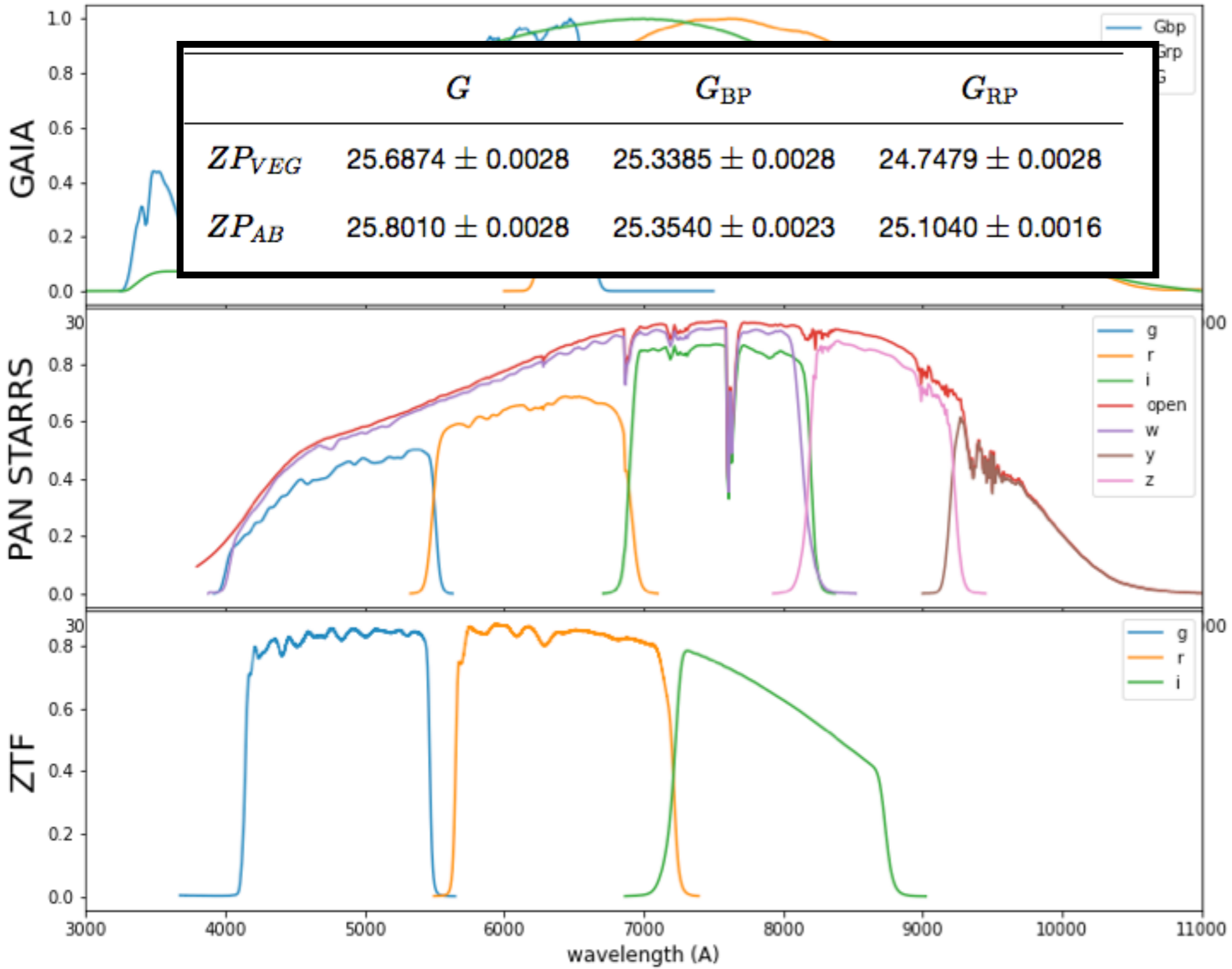
- r filter
- field of view 759
- 1st CCD
- 1st quadrant
- obs 505938 from 2020/02/01



space telescope
VEGA magnitudes

ground telescope
AB magnitudes

ground telescope
AB magnitudes



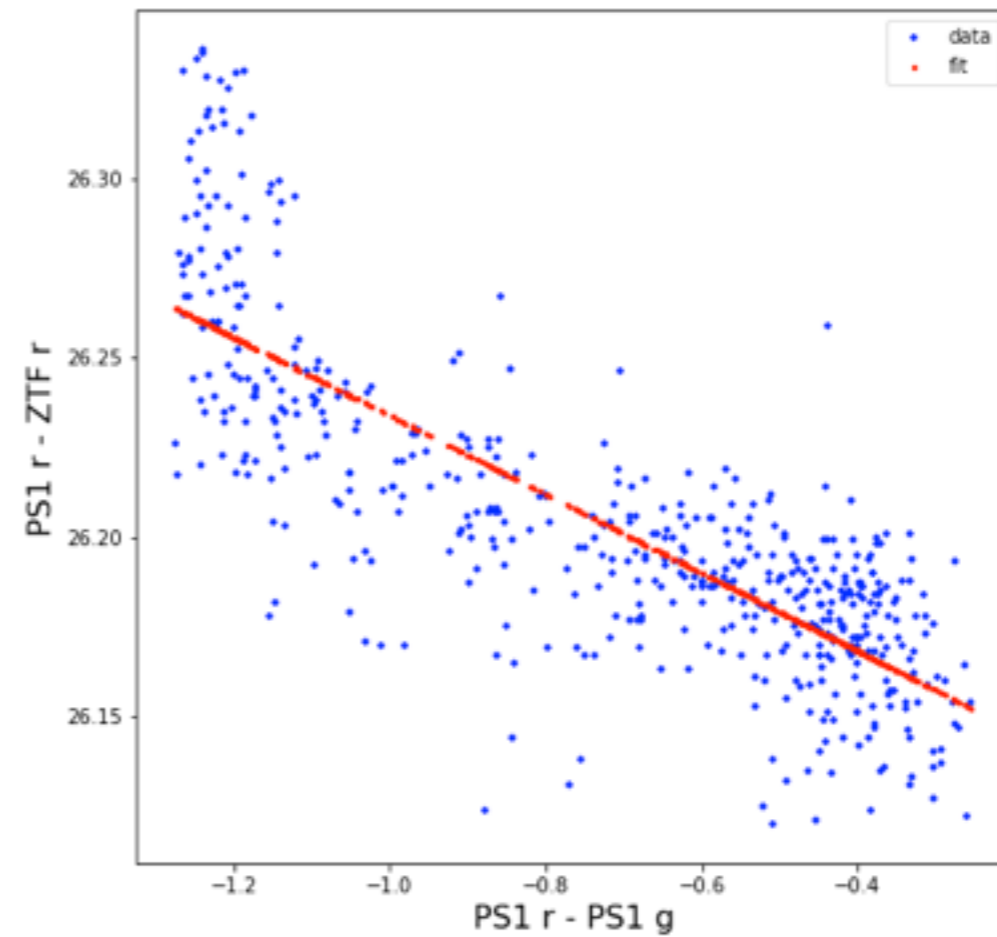
space telescope
VEGA magnitudes

ground telescope
AB magnitudes

ground telescope
AB magnitudes

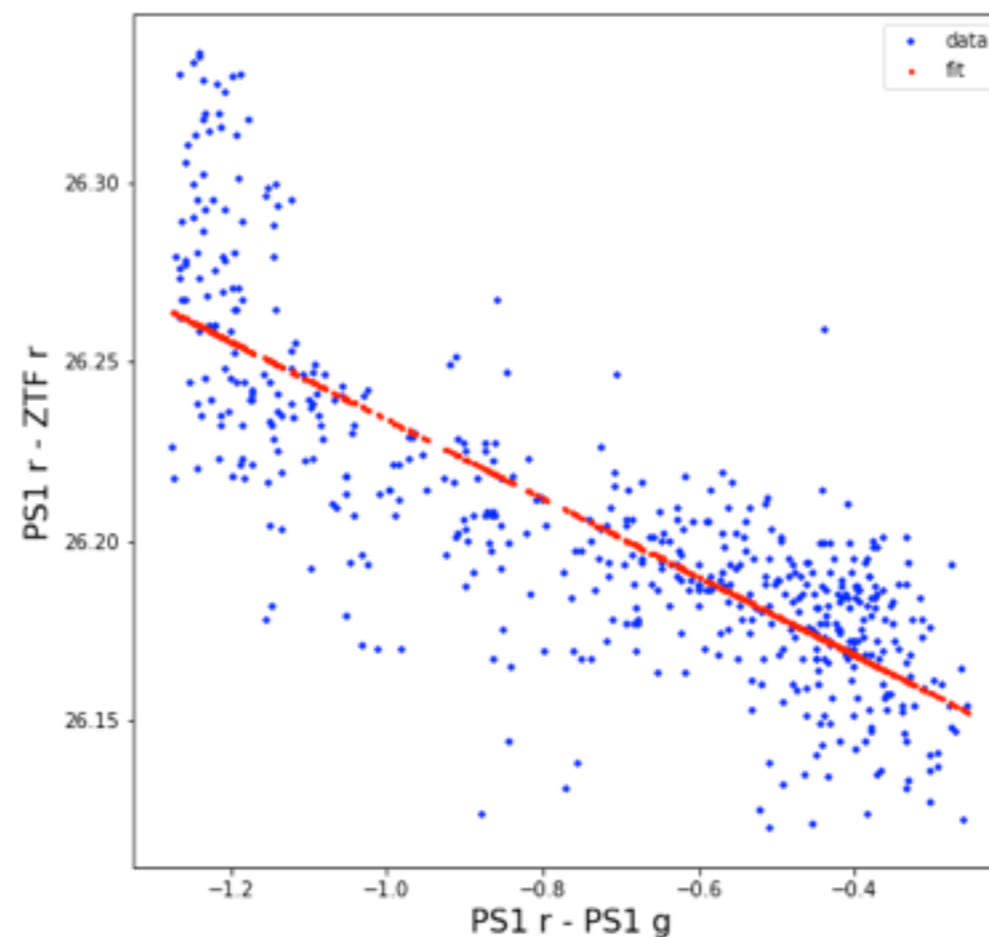
$$r^{\text{PS1}} - r^{\text{ZTF}} = \text{ZP} + C_r(g^{\text{PS1}} - r^{\text{PS1}})$$

- Current calibration fit reimplemented
- Same zero point and color term as in the header

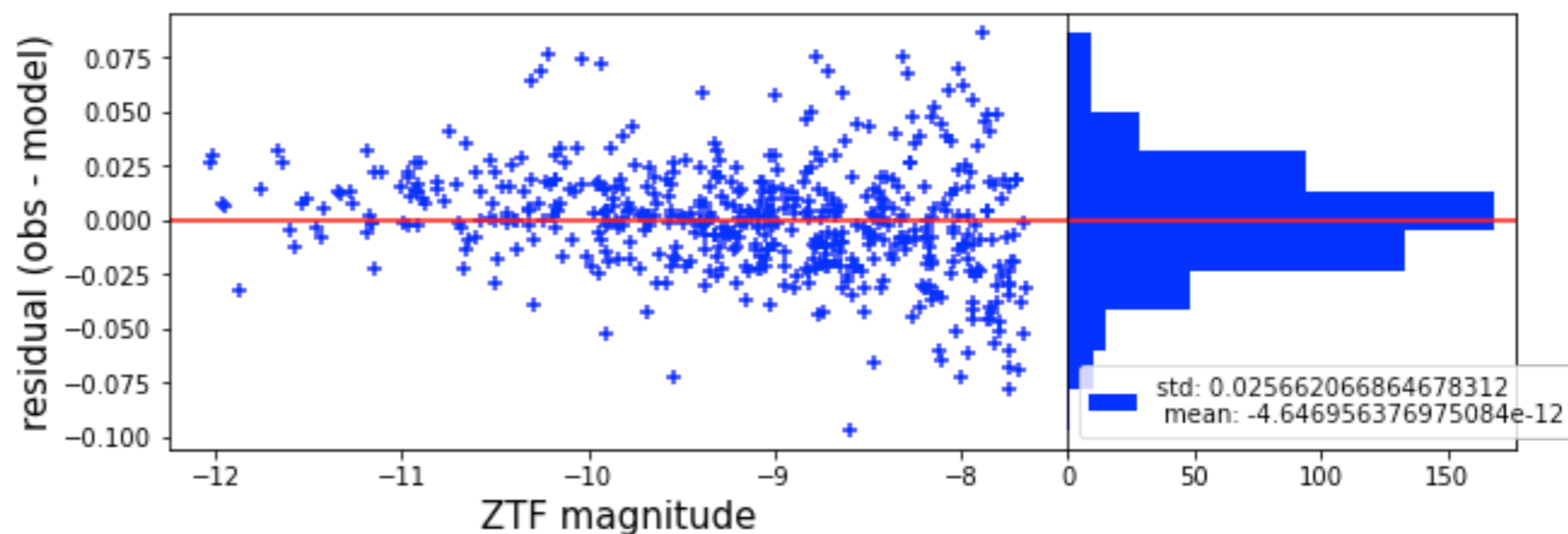


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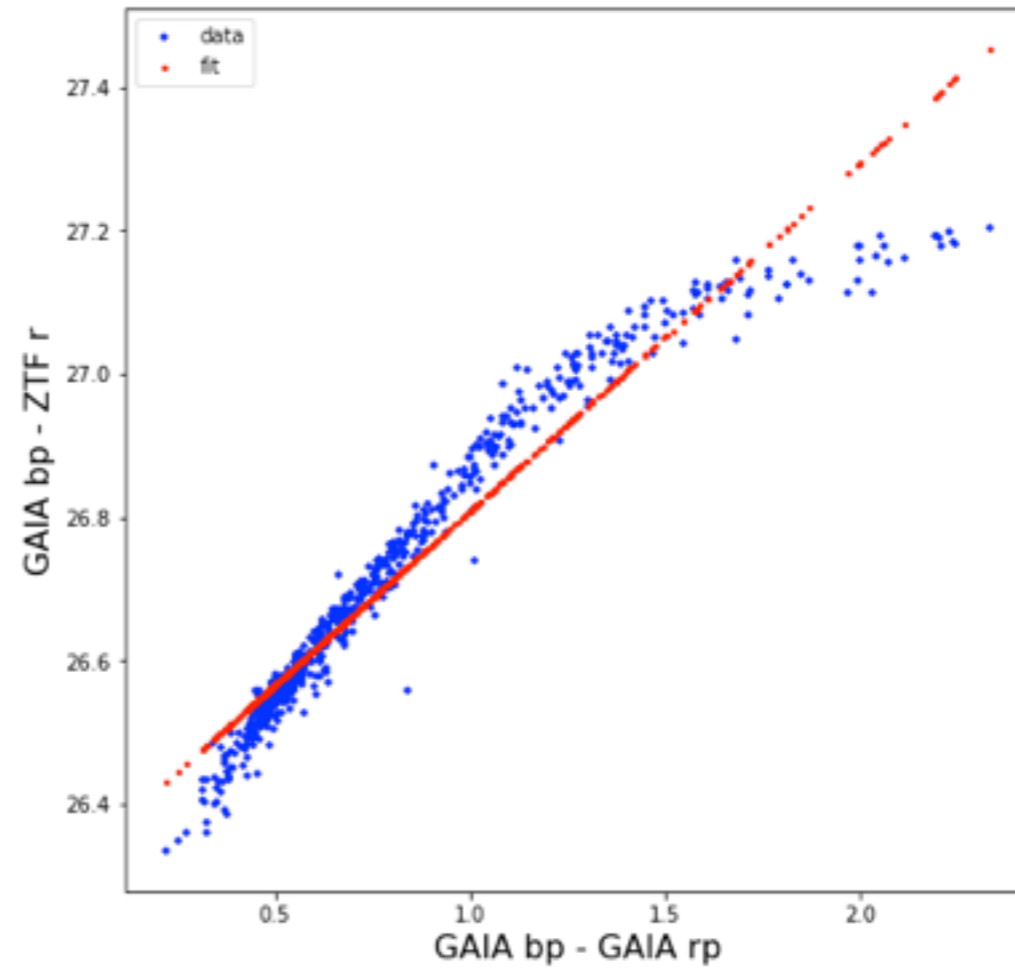


std = 0.026

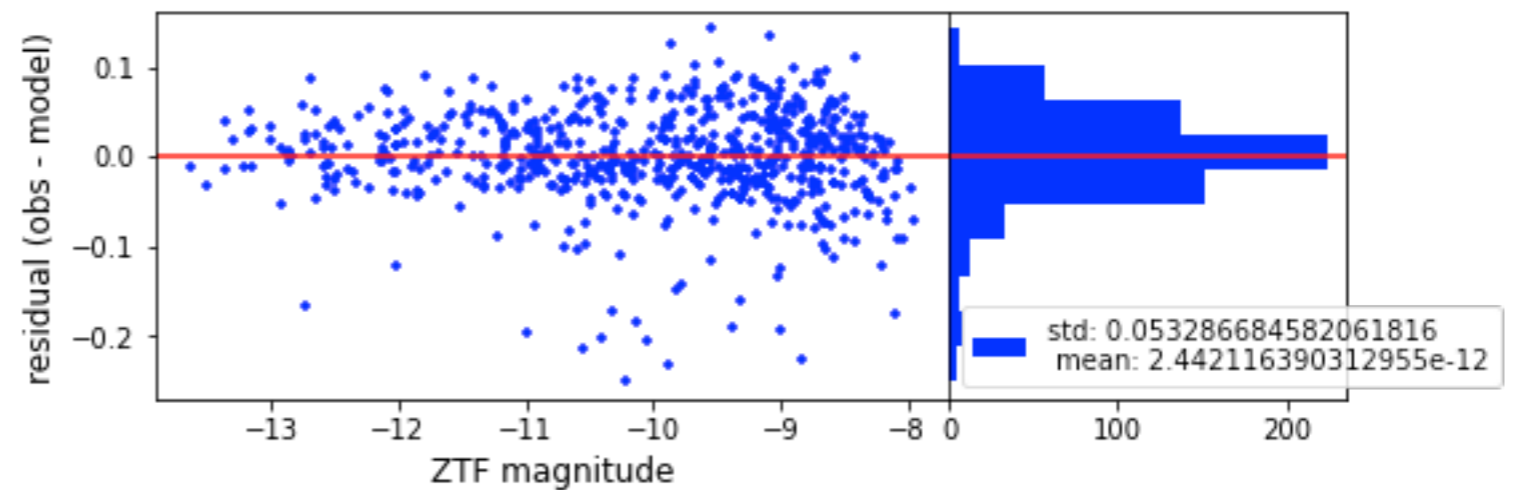


$$bp^{gaia} - r^{ZTF} = ZP + c_r(bp^{gaia} - rp^{gaia})$$

With GAIA :



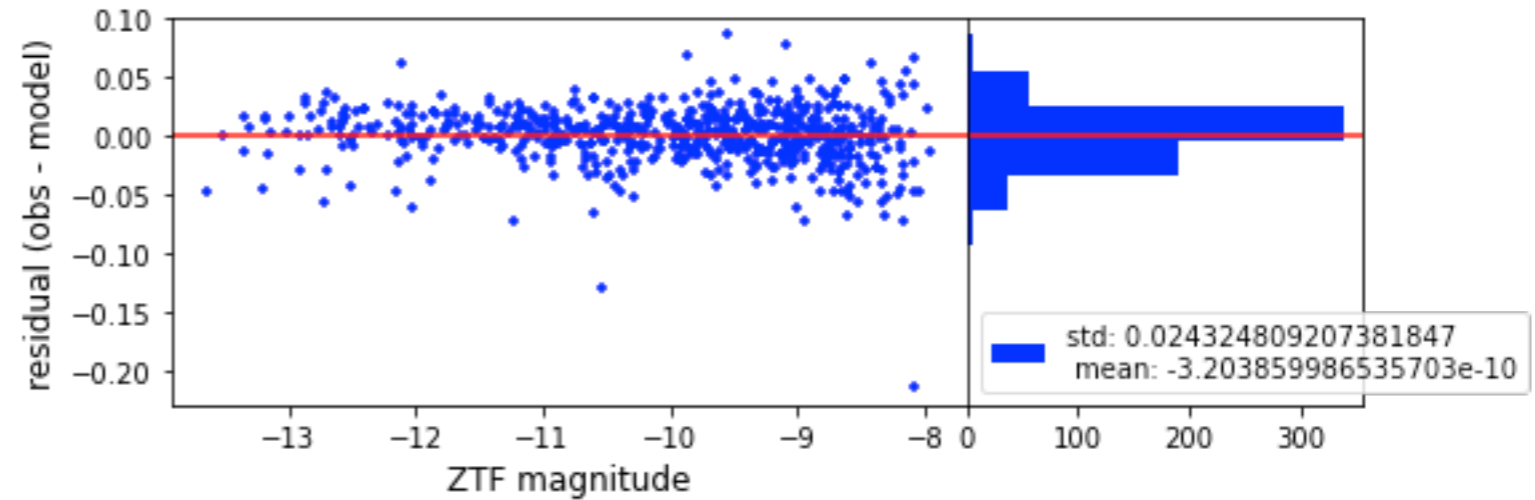
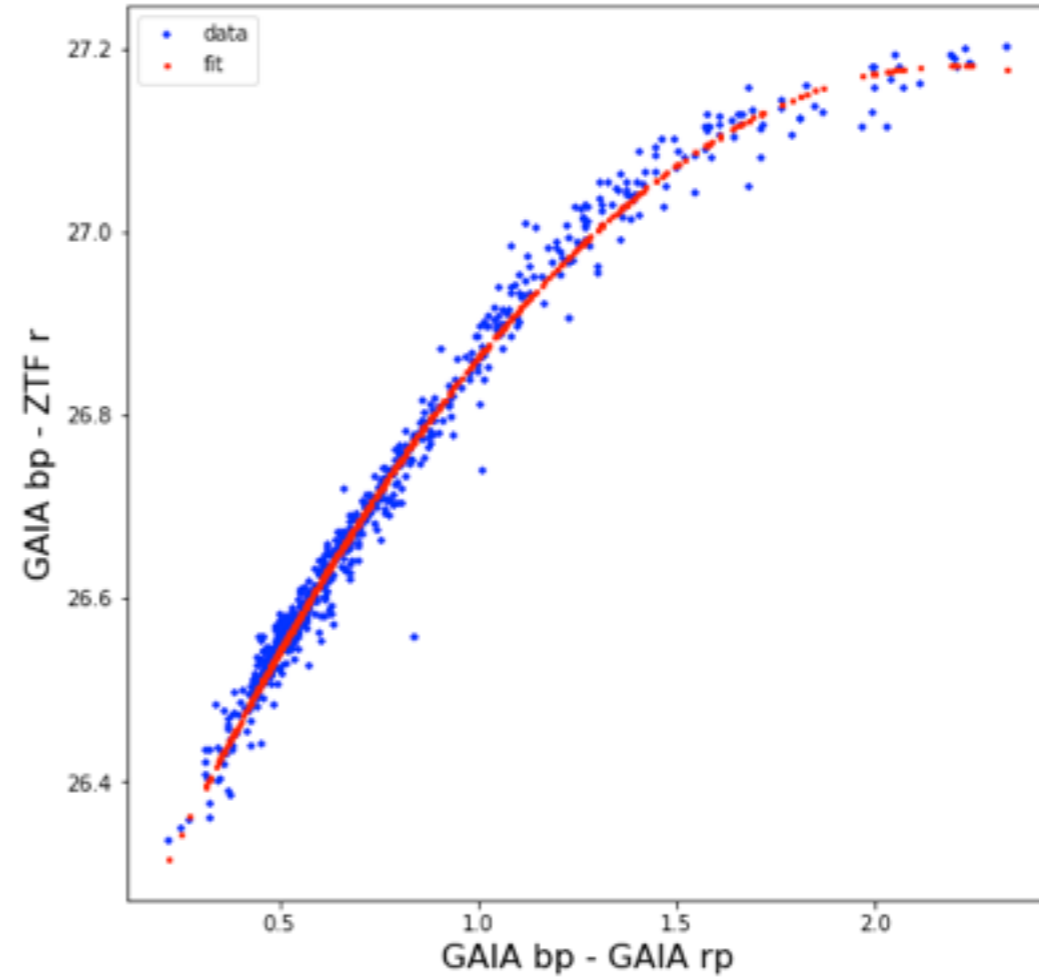
std = 0.053



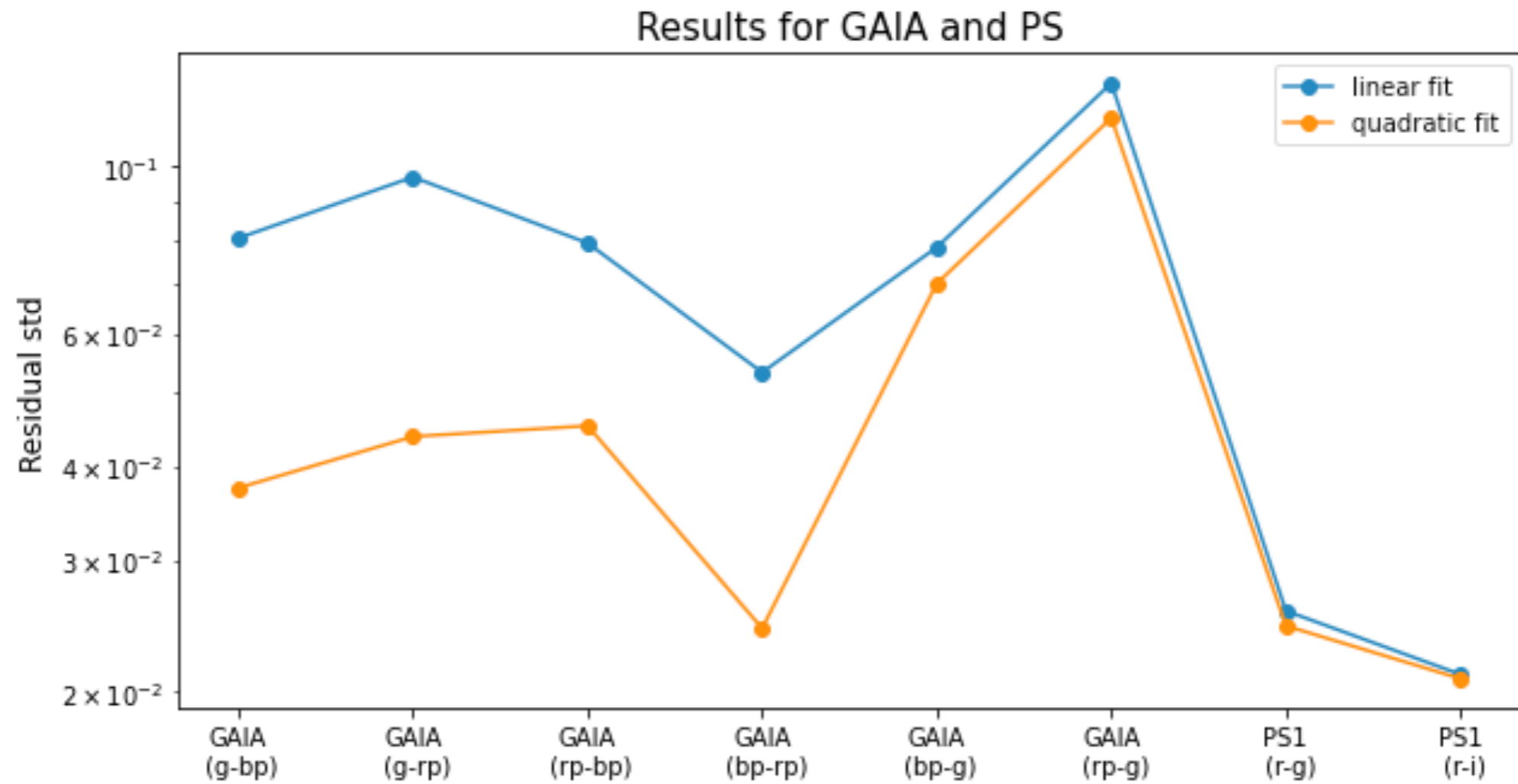
$$bp^{gaia} - r^{ZTF} = ZP + c_r(bp^{gaia} - rp^{gaia}) + c_{r2}(bp^{gaia} - rp^{gaia})^2$$

With GAIA :

-> Quadratic fit

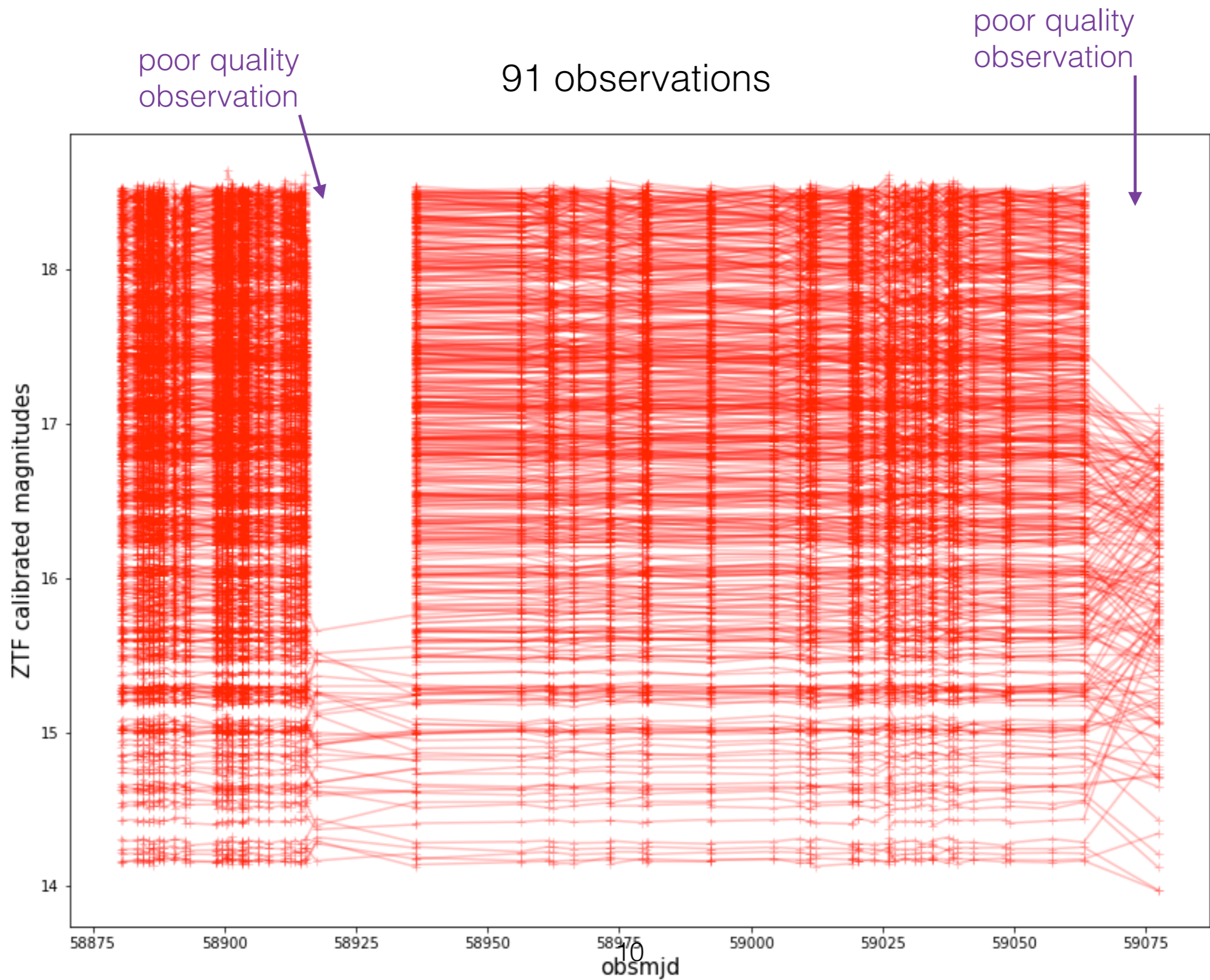


std = 0.024

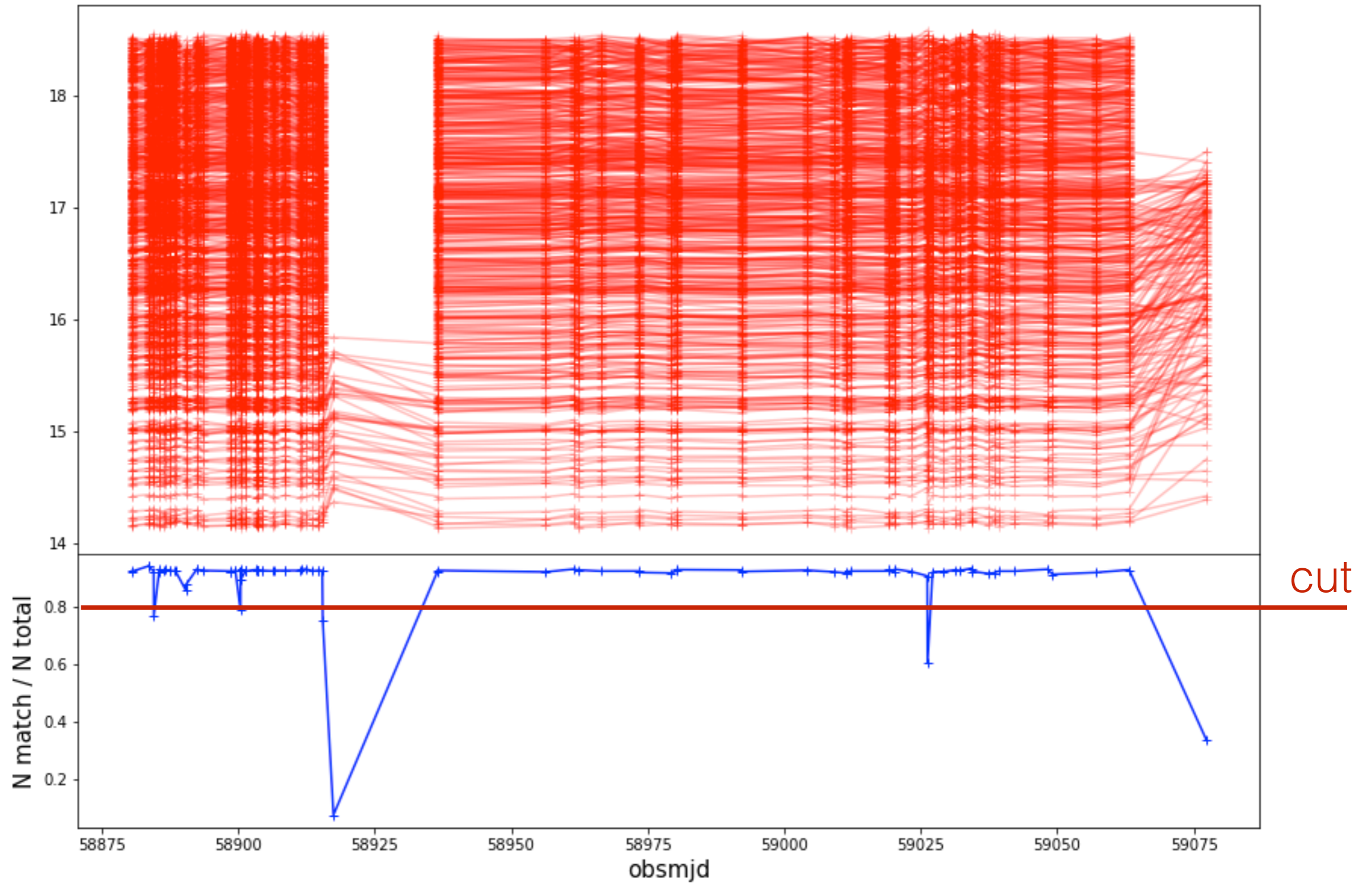


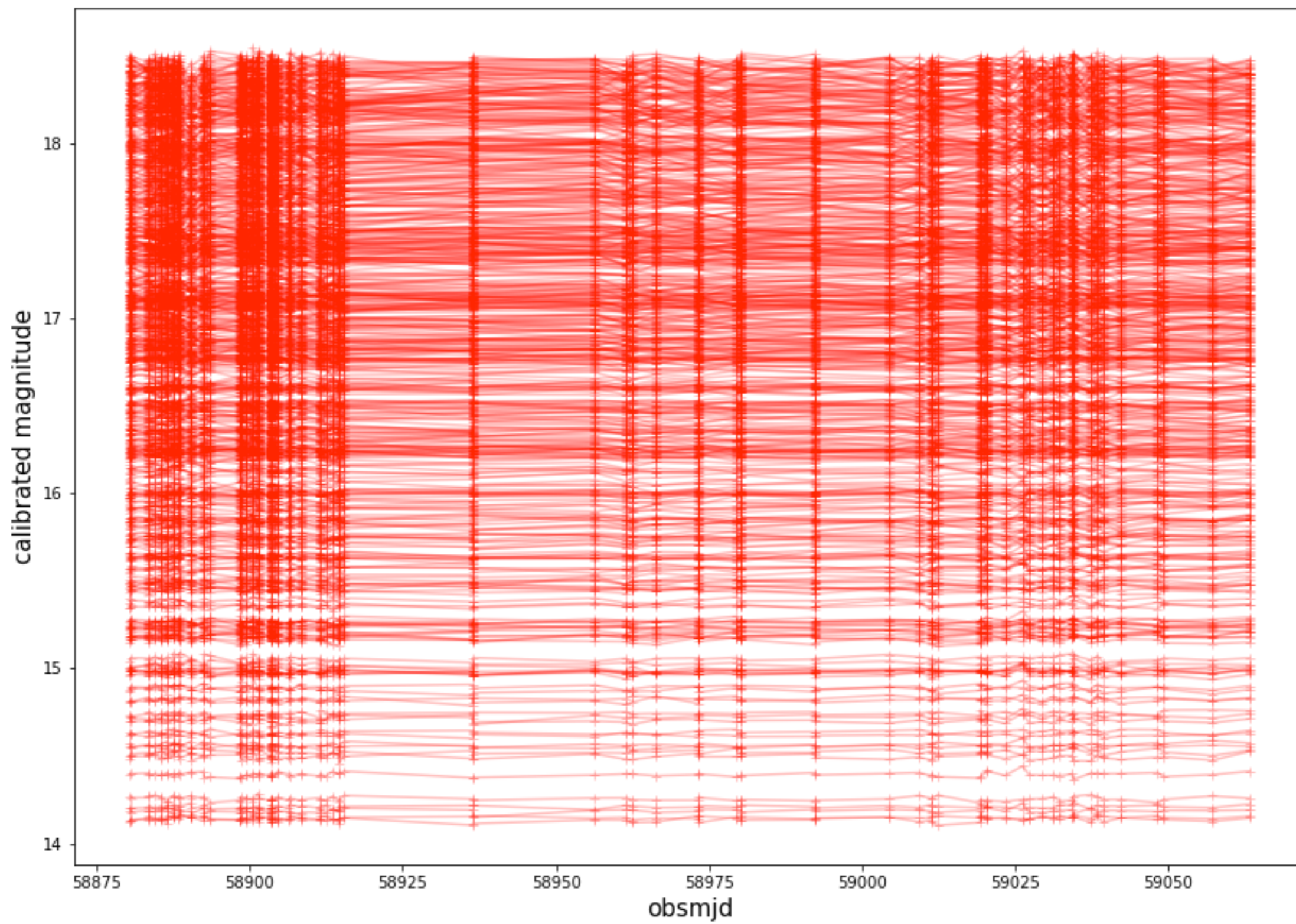
/!\ for a single observation, single quadrant, r band only

Time evolution (PS r corrected by g)

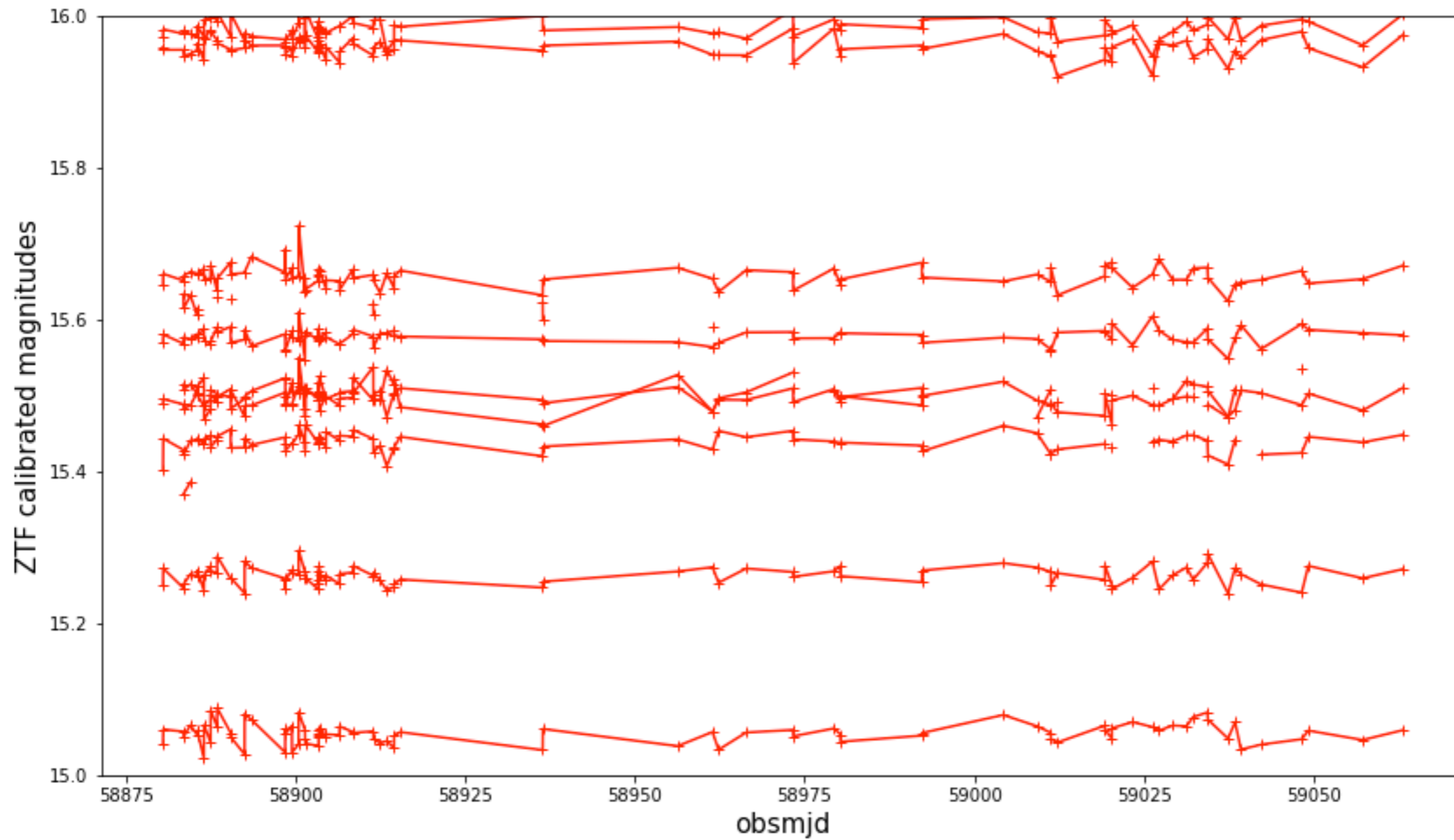


Time evolution (PS r corrected by g)

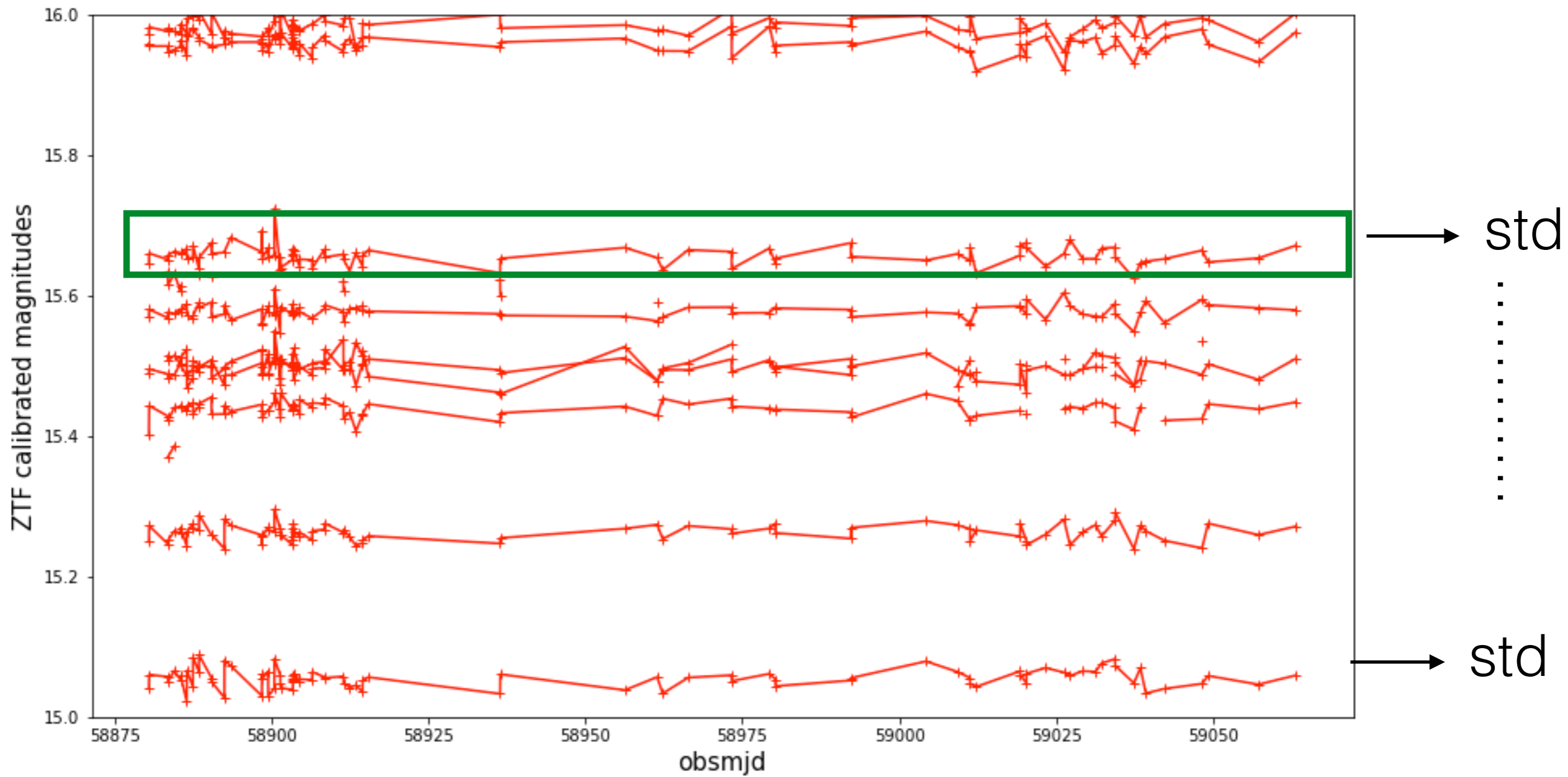


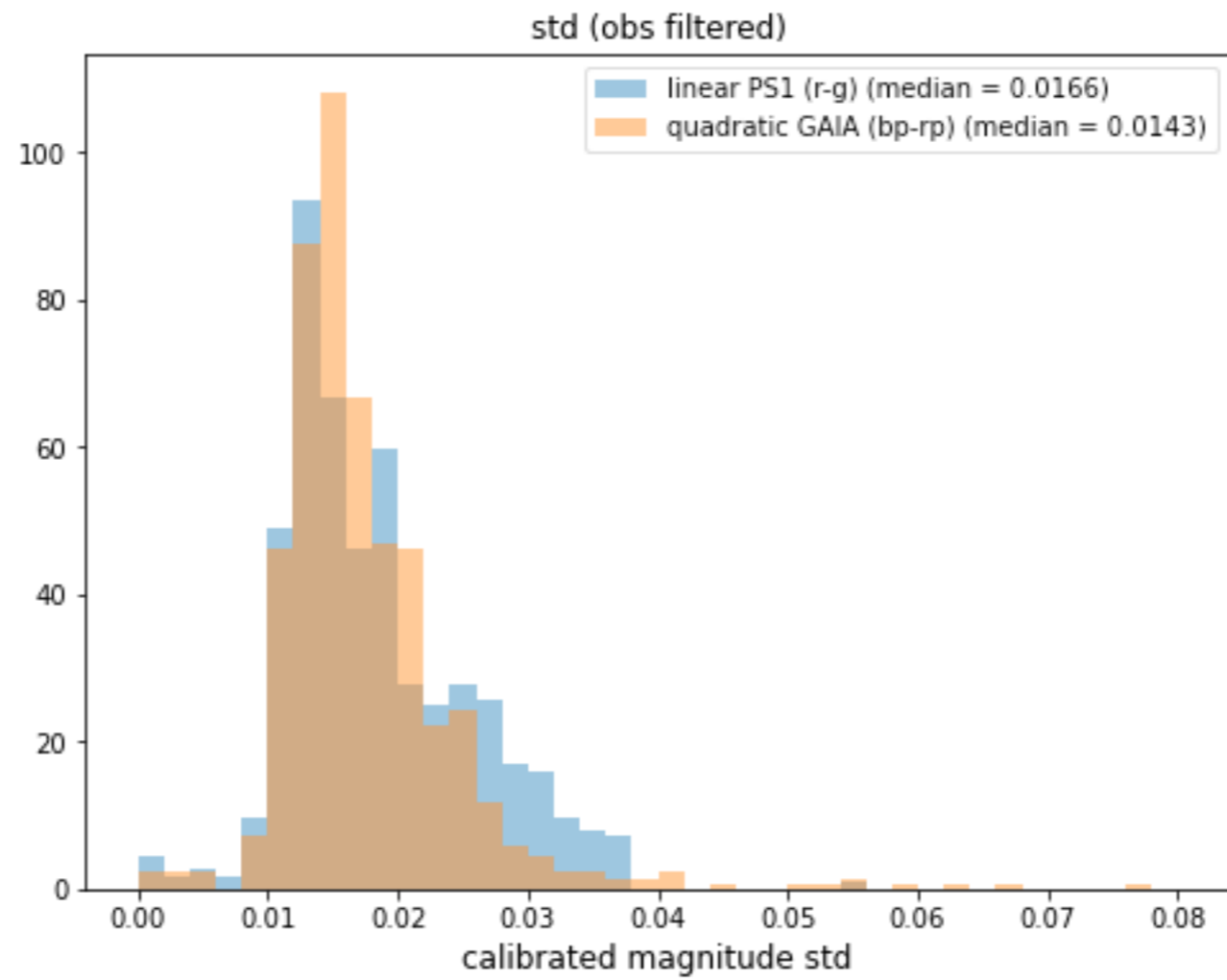


Time evolution (PS r corrected by g)

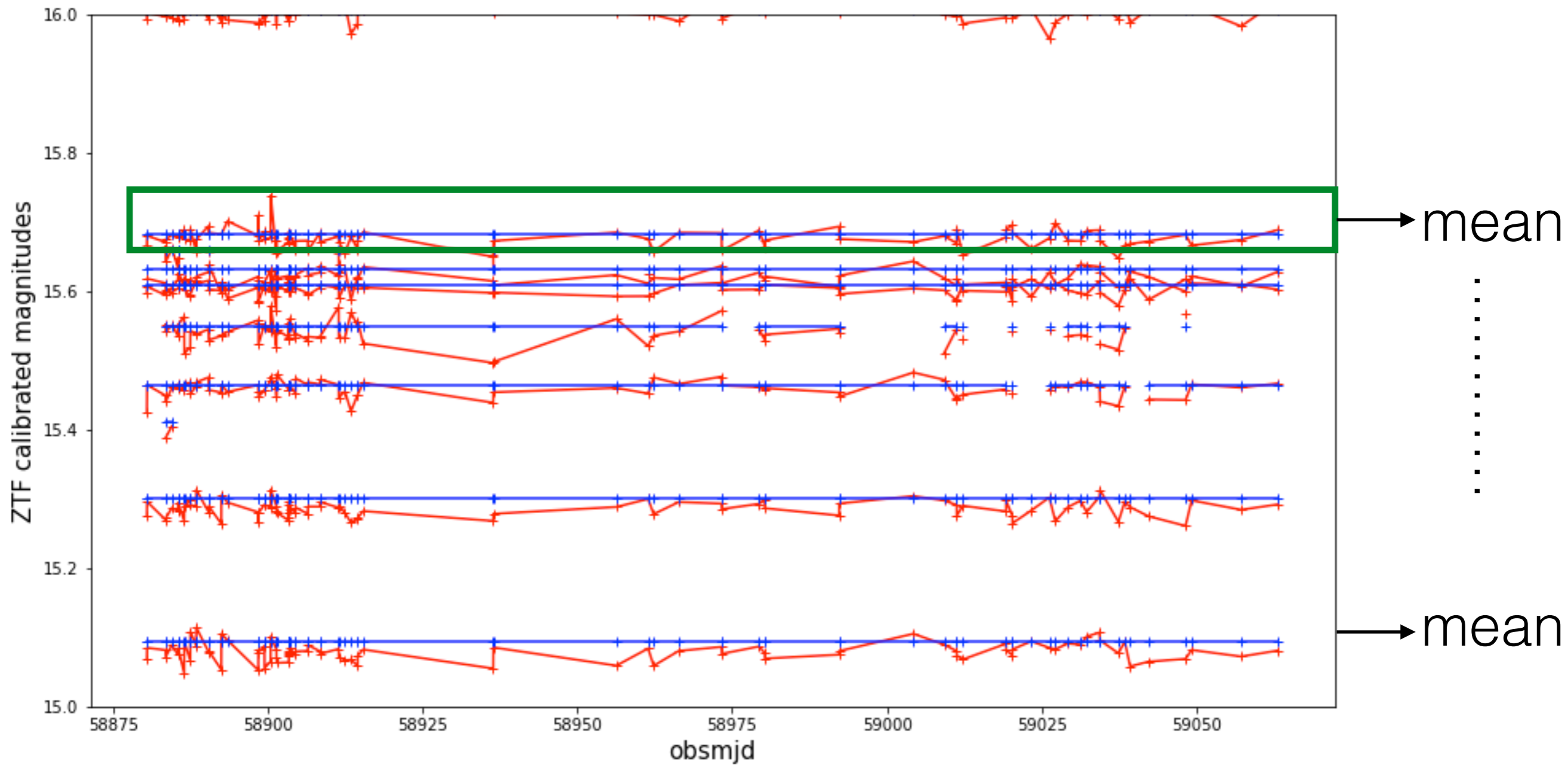


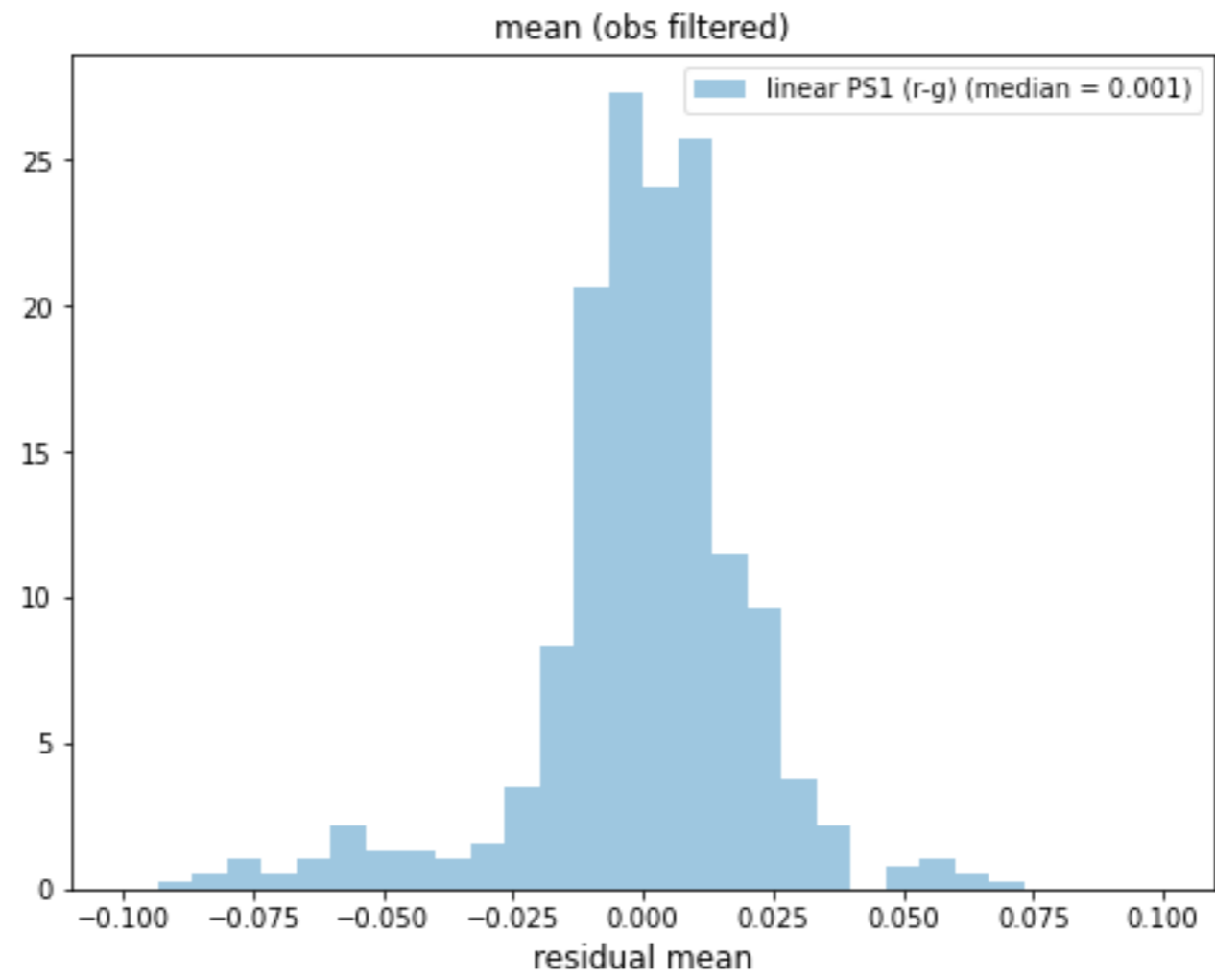
Time evolution (PS r corrected by g)

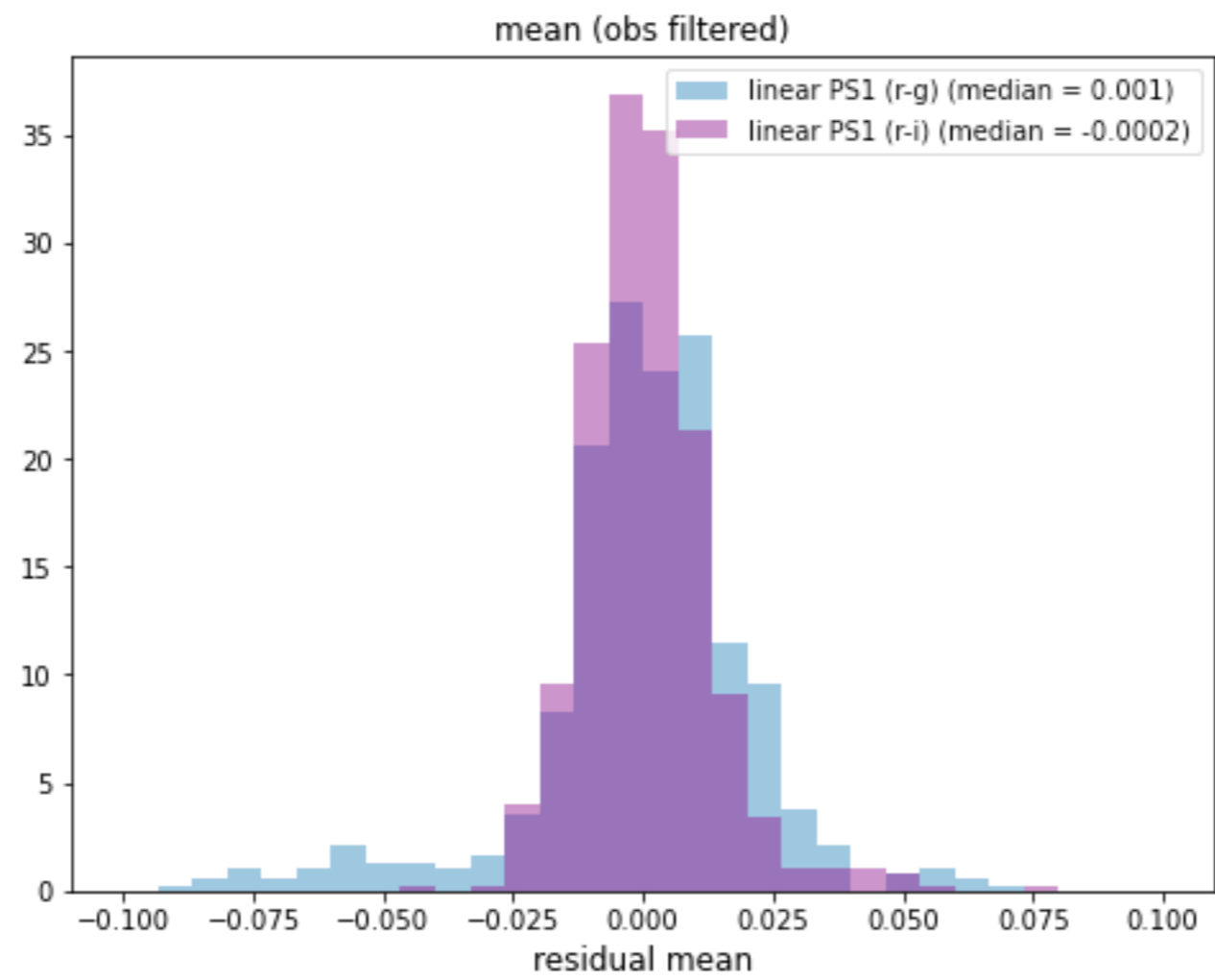


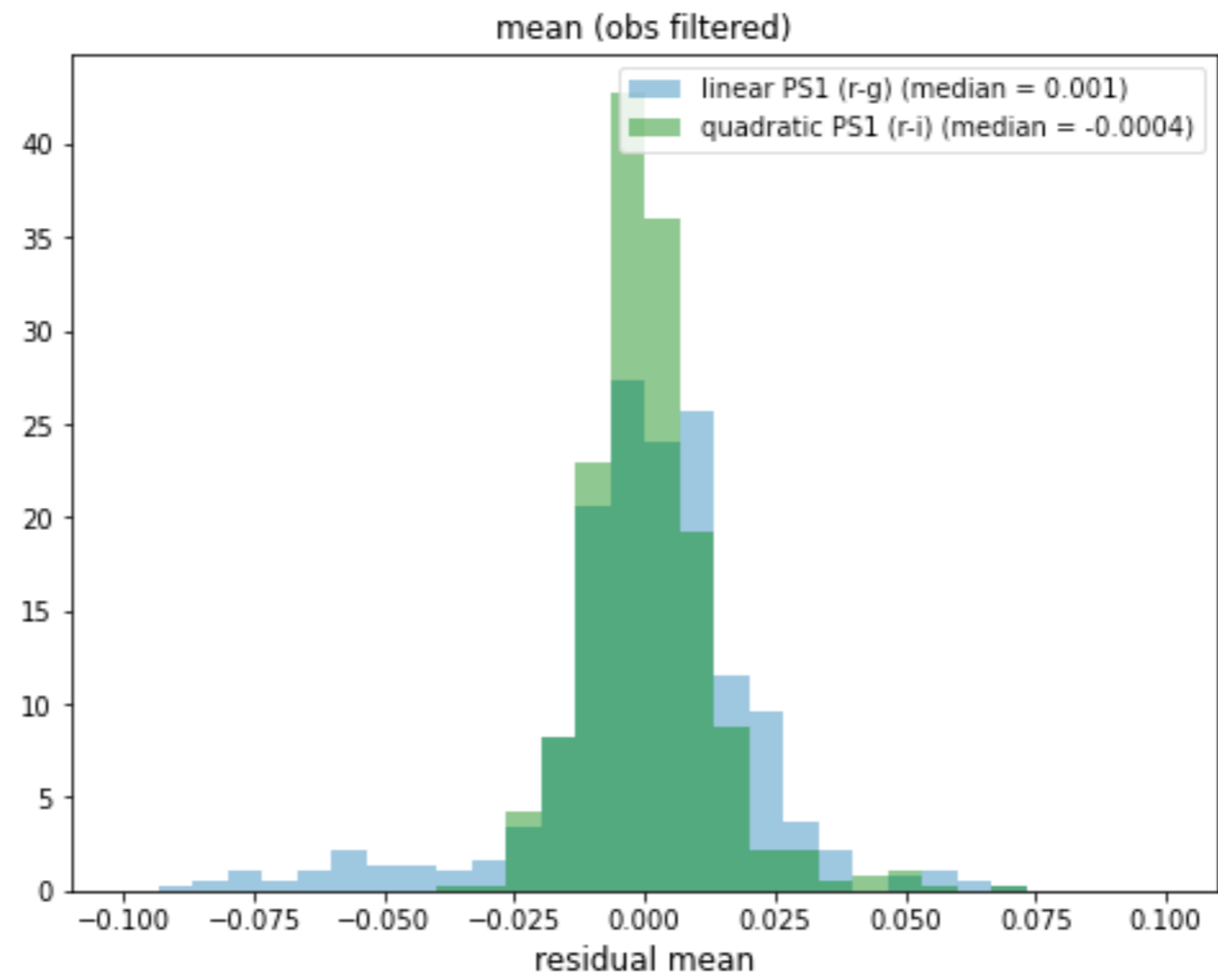


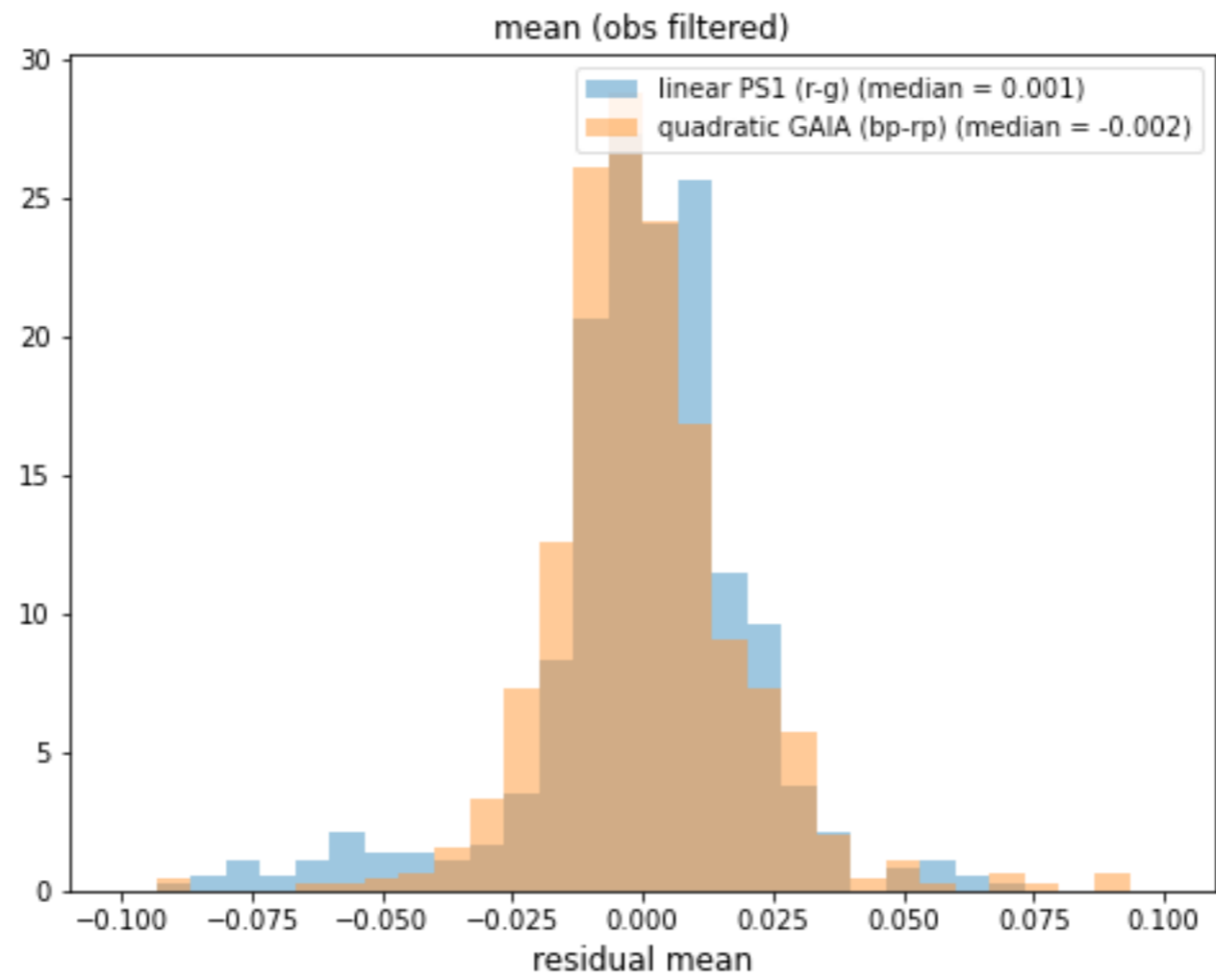
Time evolution (PS r corrected by g)





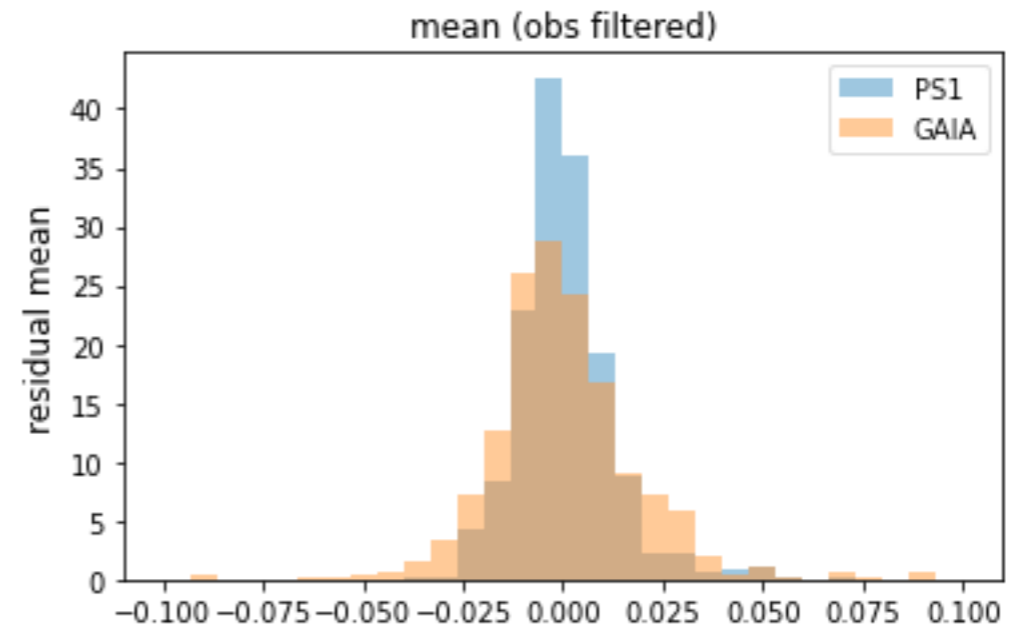
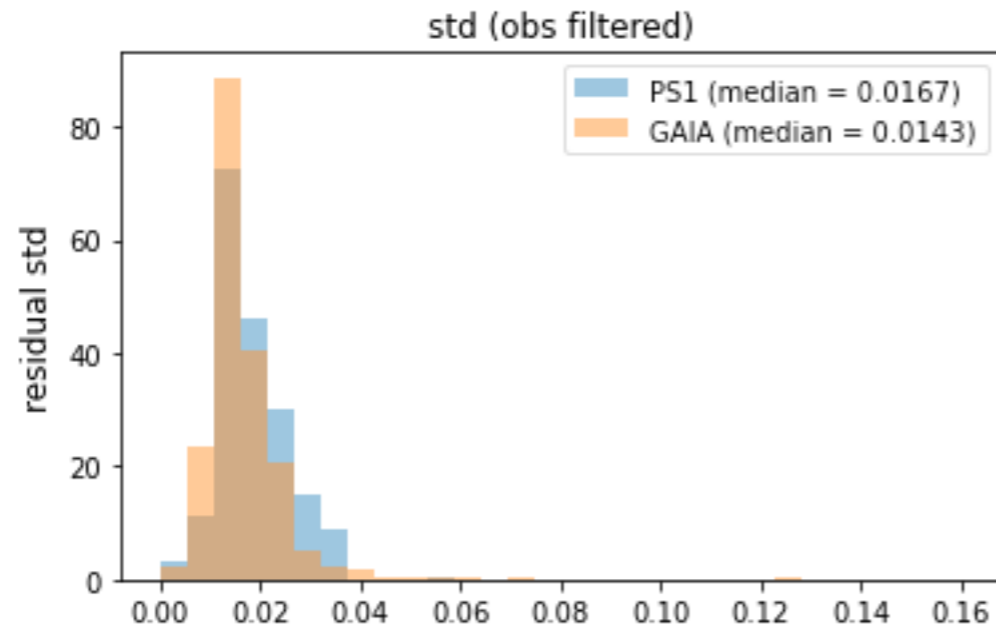
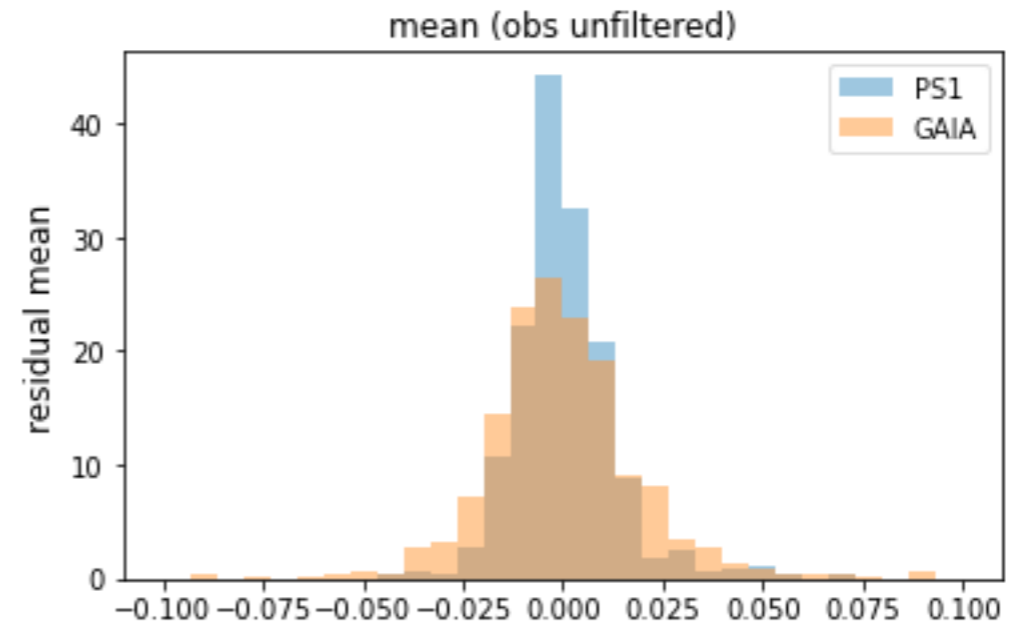
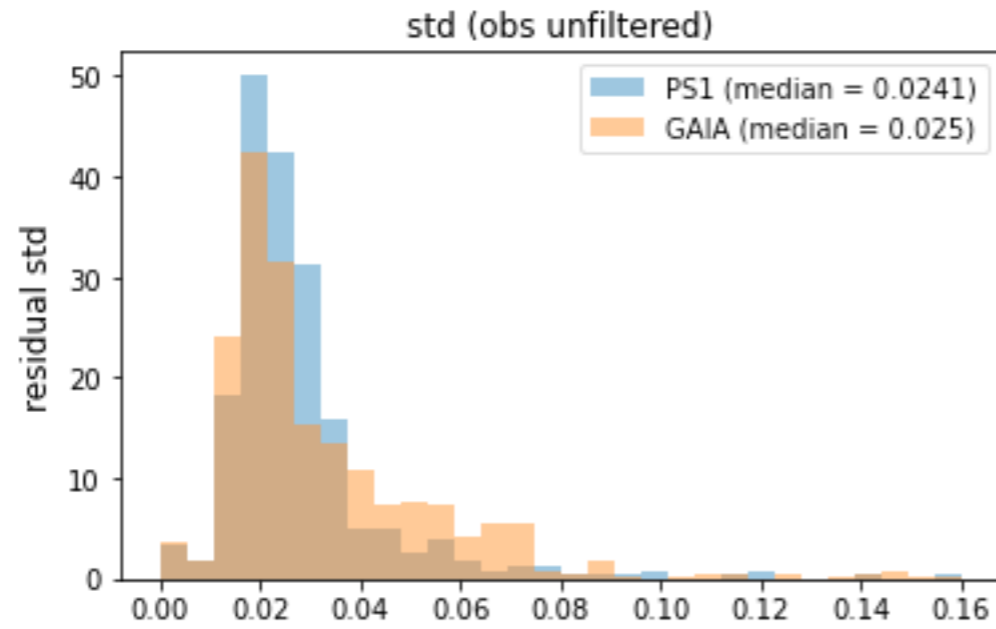




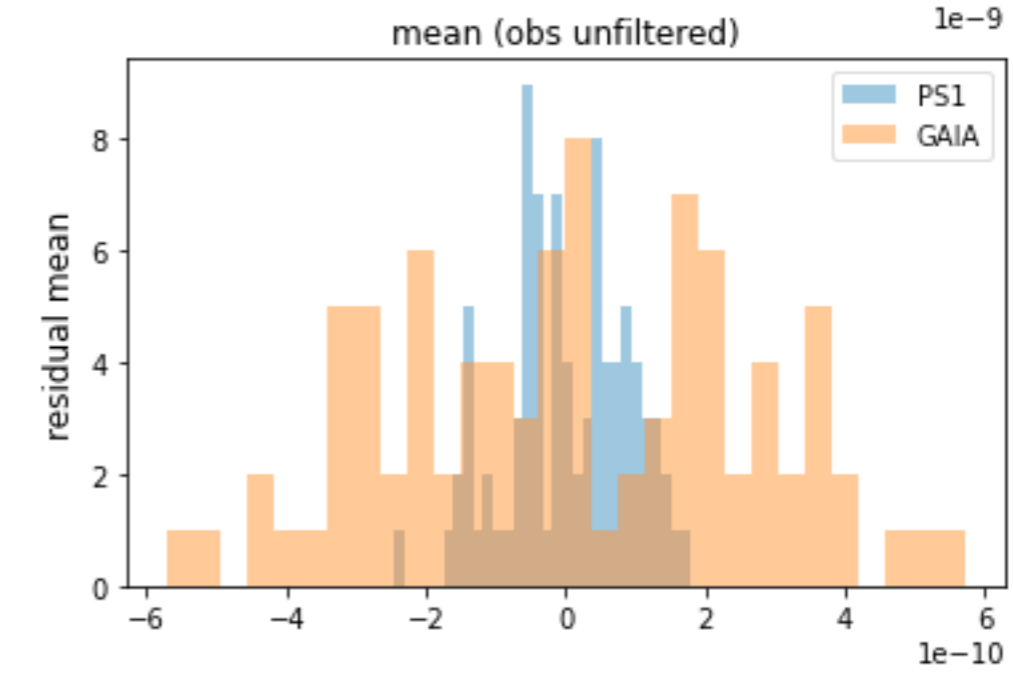
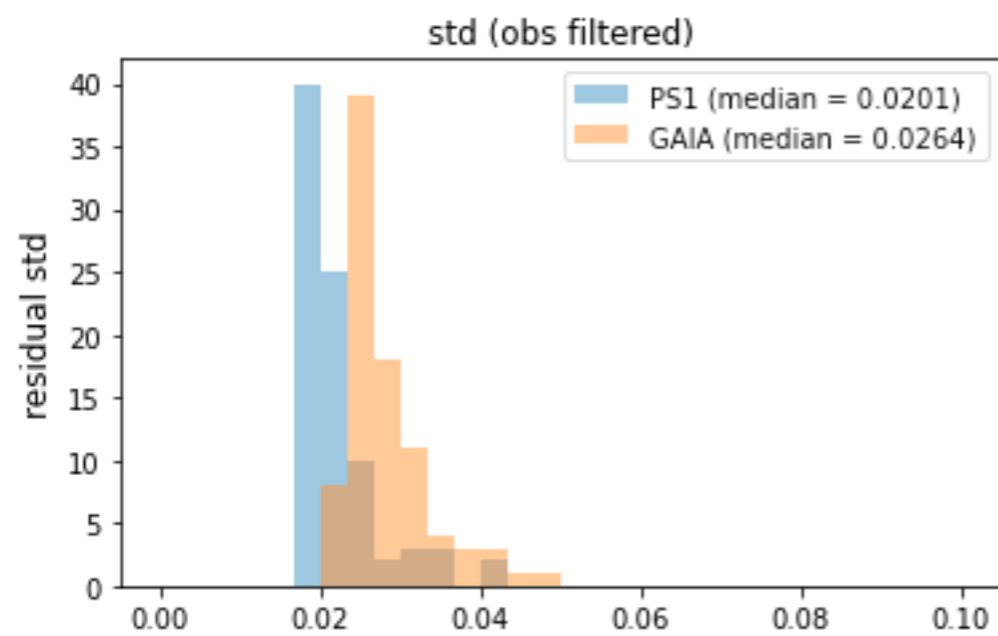
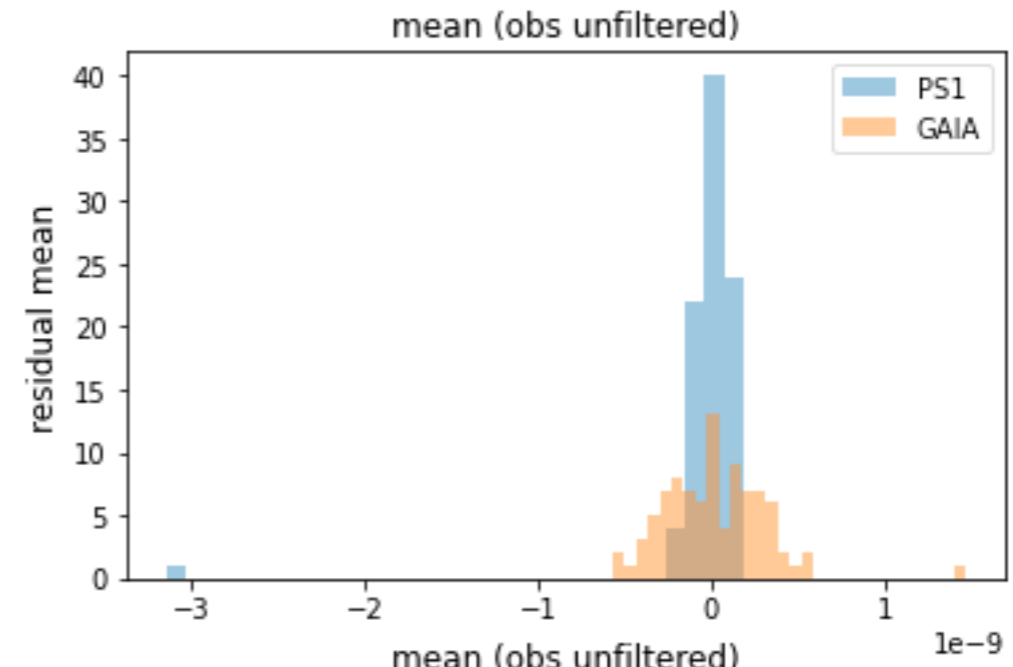
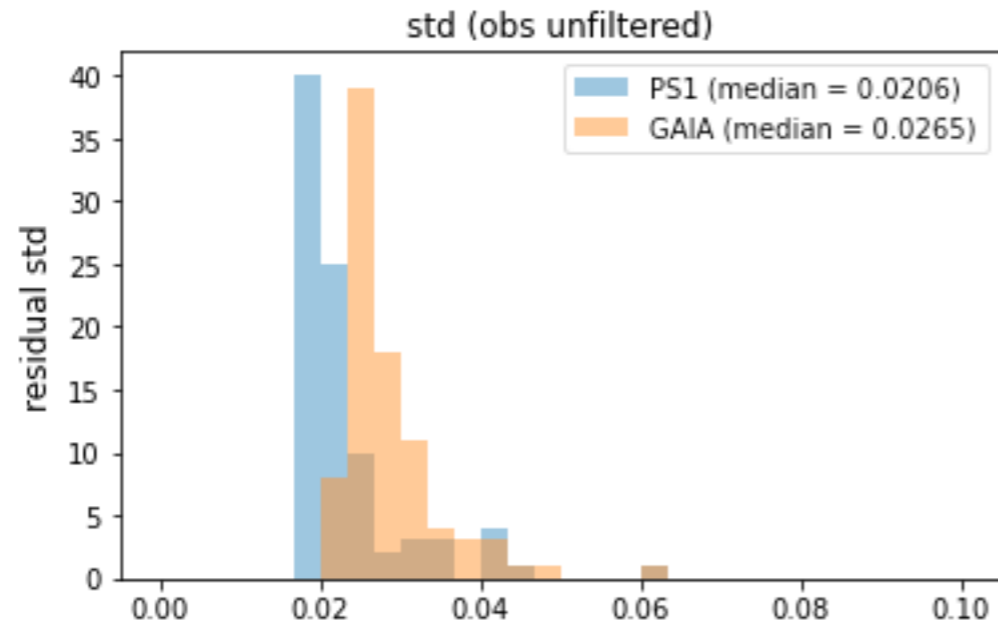


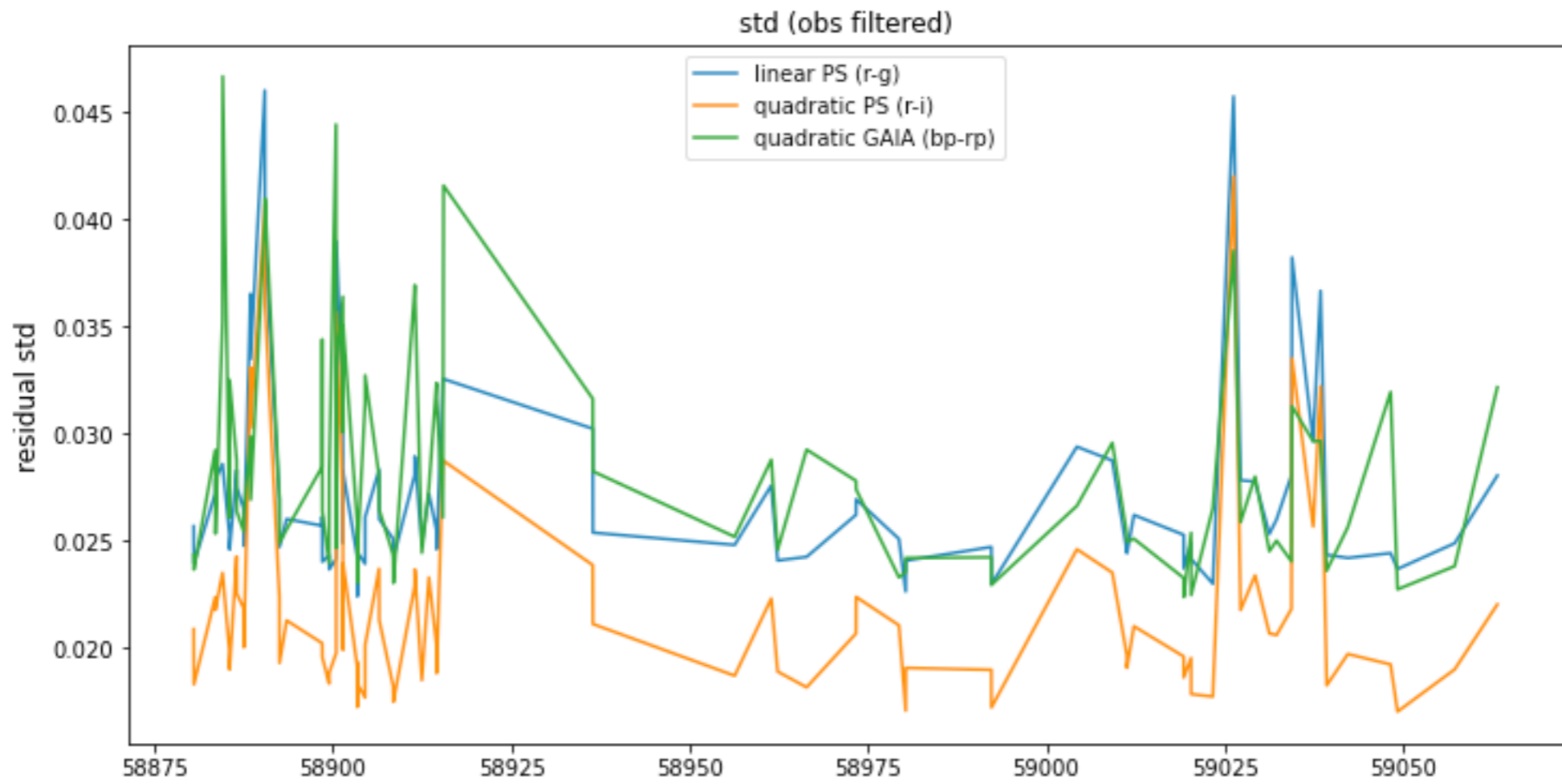
Thank you

time wise statistics



observation wise statistics





Linear fit vs Quadratic fit

$$g^{\text{GAIA}} - r^{\text{ZTF}} = ZP + c_r(g^{\text{GAIA}} - bp^{\text{GAIA}}) + c'_r(g^{\text{GAIA}} - bp^{\text{GAIA}})^2$$

Y

X

X^2

