

KIC 008560996

Q1-17 DR25 TCE Parameters

| TCE | Run Type | KOI? | Period (Days) | Epoch (BKJD) | Depth (ppm) | Duration (Hours) | MES | SNR | R_{\star} (R_{\odot}) | T_{\star} (K) | R_p (R_{\oplus}) | S_p (S_{\oplus}) |
|--------------|----------|------|---------------|--------------|-------------|------------------|------|------|-----------------------------|-----------------|------------------------|------------------------|
| 008560996-01 | OBS | No | 0.510374 | 132.002896 | 10.9 | 1.546 | 11.3 | 13.4 | 3.29 | 8083 | 1.16 | 164872.80 |
| 008560996-02 | OBS | No | 1.020766 | 132.237345 | 11.3 | 3.379 | 9.7 | 11.0 | 3.29 | 8083 | 1.29 | 65428.28 |

Robovetter Results

| TCE | Run Type | Disp | Score | N | S | C | E | Comments |
|--------------|----------|------|-------|---|---|---|---|---|
| 008560996-01 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | LPP_DV—LPP_ALT—CENT_SATURATED |
| 008560996-02 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | LPP_DV—LPP_ALT—SAME_NTL_PERIOD—CENT_SATURATED |

Notes: OBS = Observed. INJ = Injected. INV = Inverted. SCR = Scrambled.

N = Not Transit-Like. S = Stellar Eclipse. C = Centroid Offset. E = Ephemeris Match.

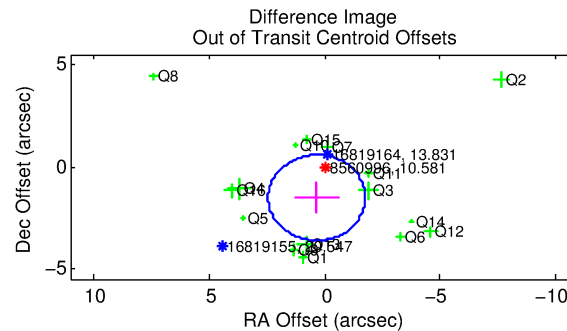
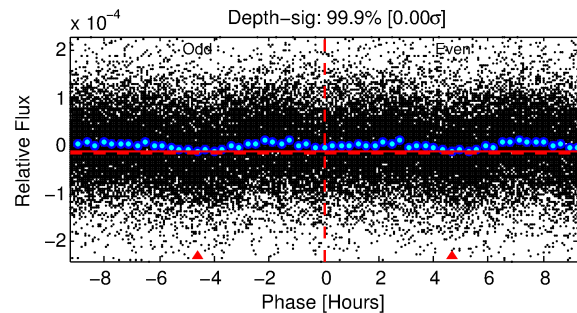
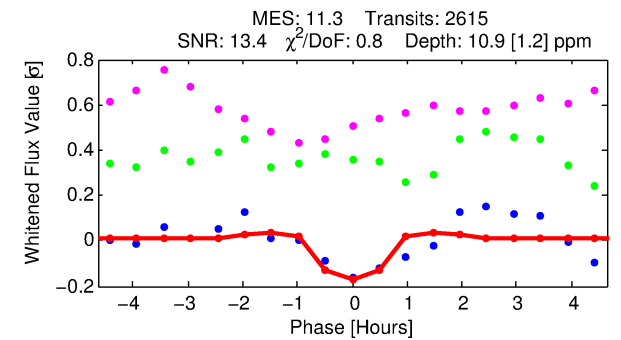
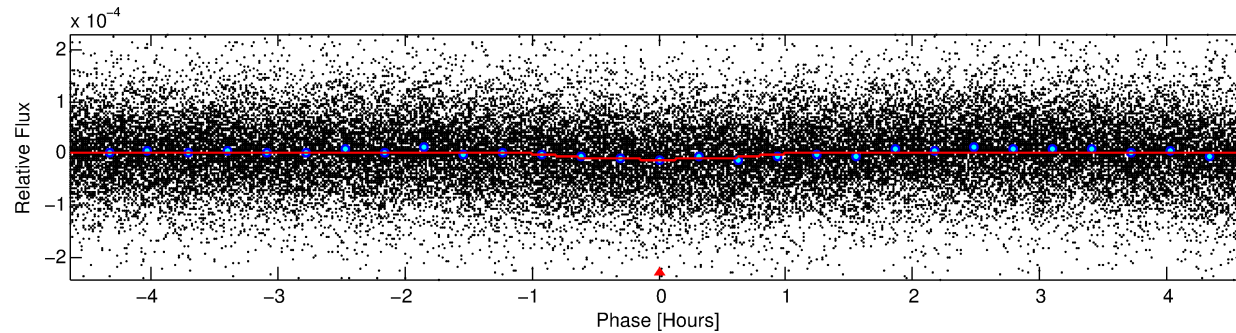
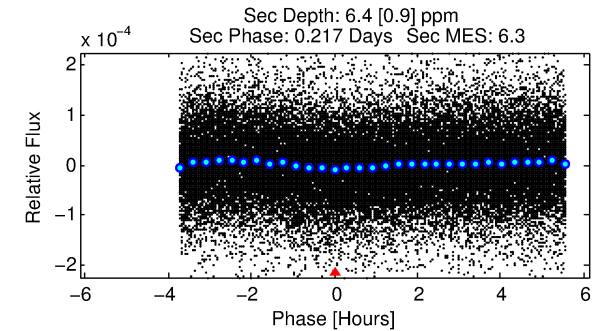
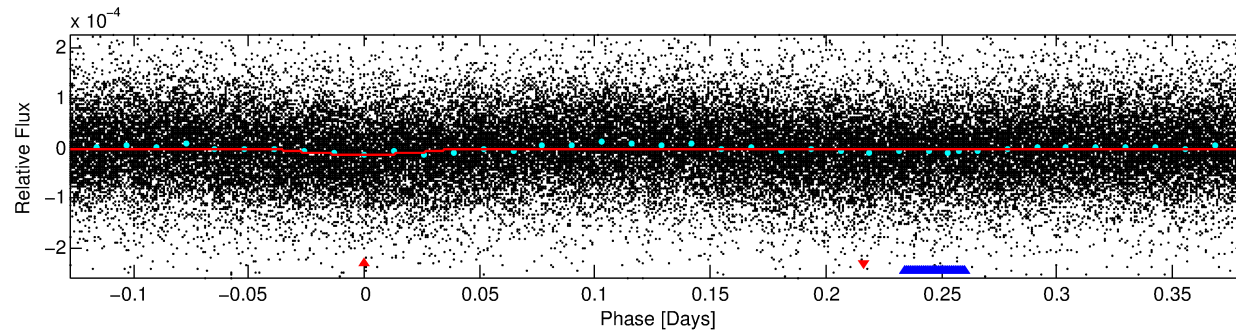
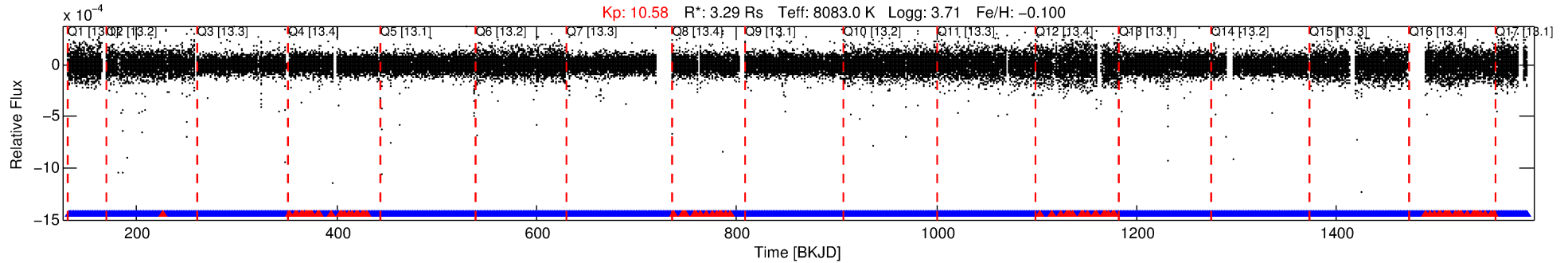
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 008560996-01

No Significant Match Found

DV One-Page Summary

KIC: 8560996 Candidate: 1 of 2 Period: 0.510 d



DV Fit Results:

Period = 0.51037 [0.00001] d
Epoch = 132.0029 [0.0015] BKJD
 $R_p/R^* = 0.0032$ [0.0004]
 $a/R^* = 2.09$ [0.87]
 $b = 0.64$ [0.49]
 $S_{\text{eff}} = 164872.80$ [119594.51]
 $T_{\text{eq}} = 5138$ [932] K
 $R_p = 1.16$ [0.55] R_e
 $a = 0.0159$ [0.0070] AU
 $A_g = 0.66$ [0.50] [-0.68σ]
 $T_{\text{eff}} = 7164$ [562] K [1.86σ]

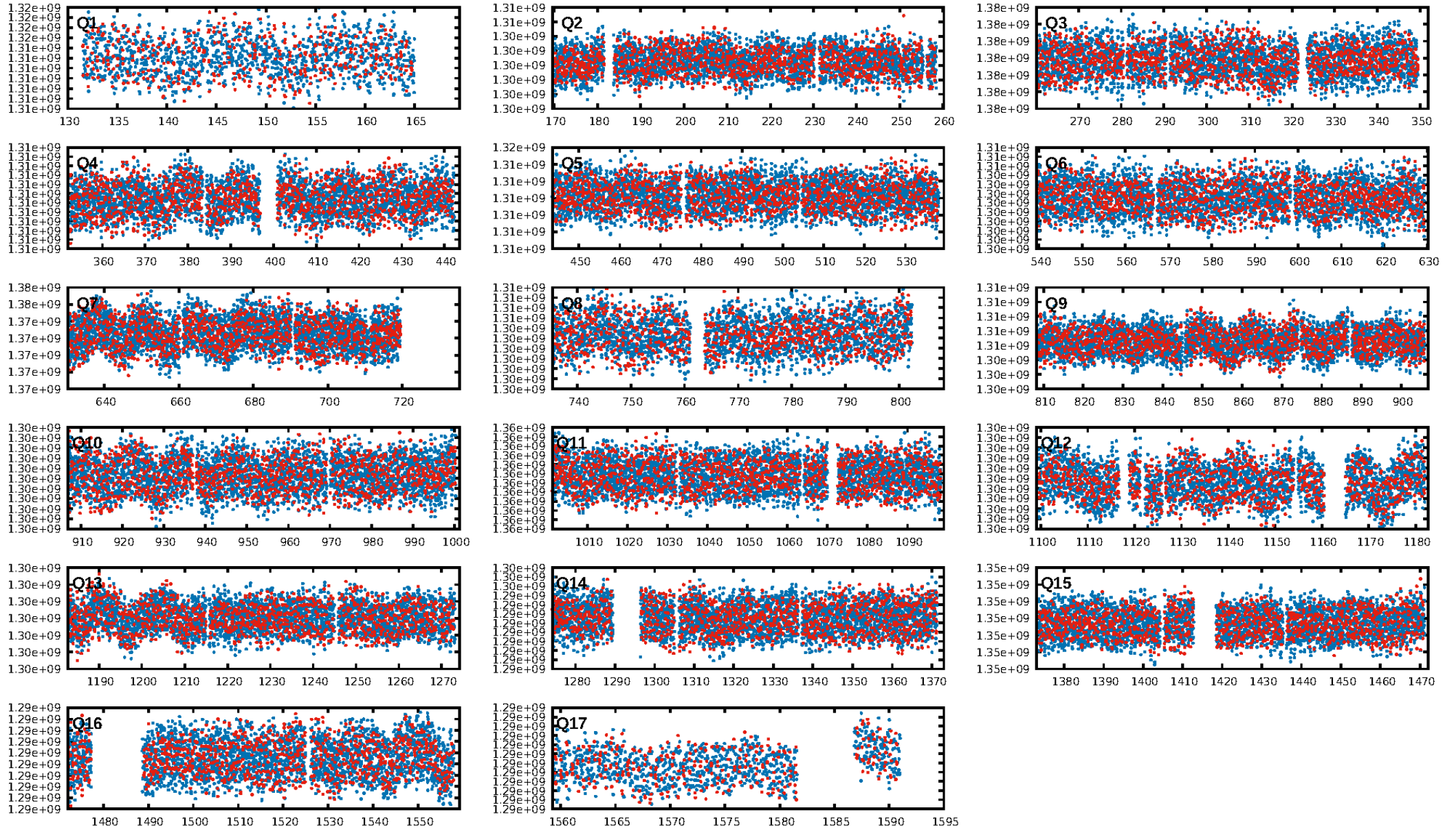
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 99.9% [3.30σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 1.02e-34
RollingBand-fgt: 0.97 [2414/2497]
GhostDiagnostic-chr: 5.211
Centroid-sig: 0.0%
Centroid-so: 2.918 arcsec [3.87σ]
OotOffset-rm: 1.560 arcsec [2.23σ]
KicOffset-rm: 1.739 arcsec [2.54σ]
OotOffset-st: 4/4/4/4 [16]
KicOffset-st: 4/4/4/4 [16]
DiffImageQuality-fgm: 0.38 [6/16]
DiffImageOverlap-fno: 0.00 [0/17]

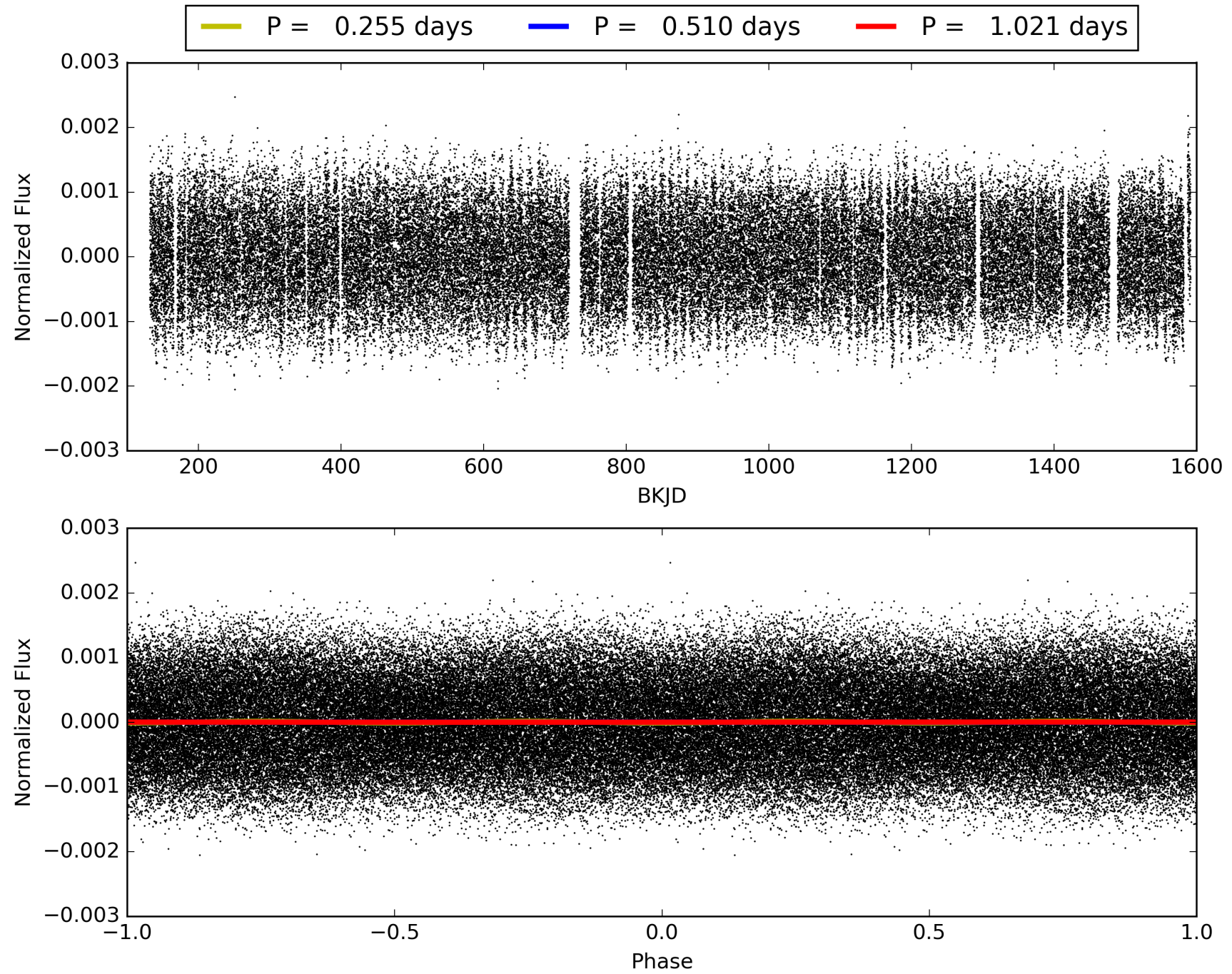
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 04:41:58 Z

This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

TCE 008560996-01, PDC Light Curves

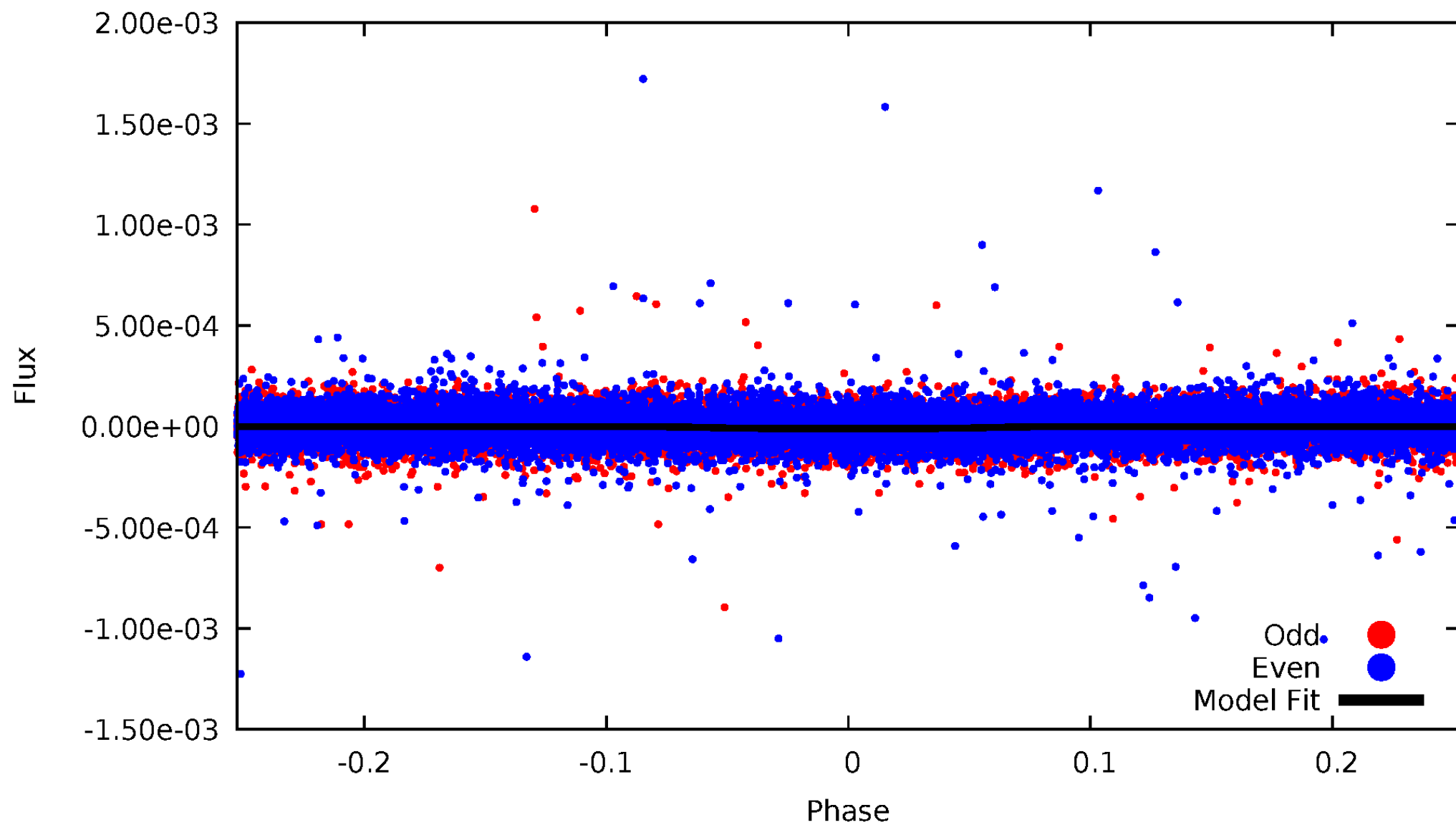


TCE 008560996-01



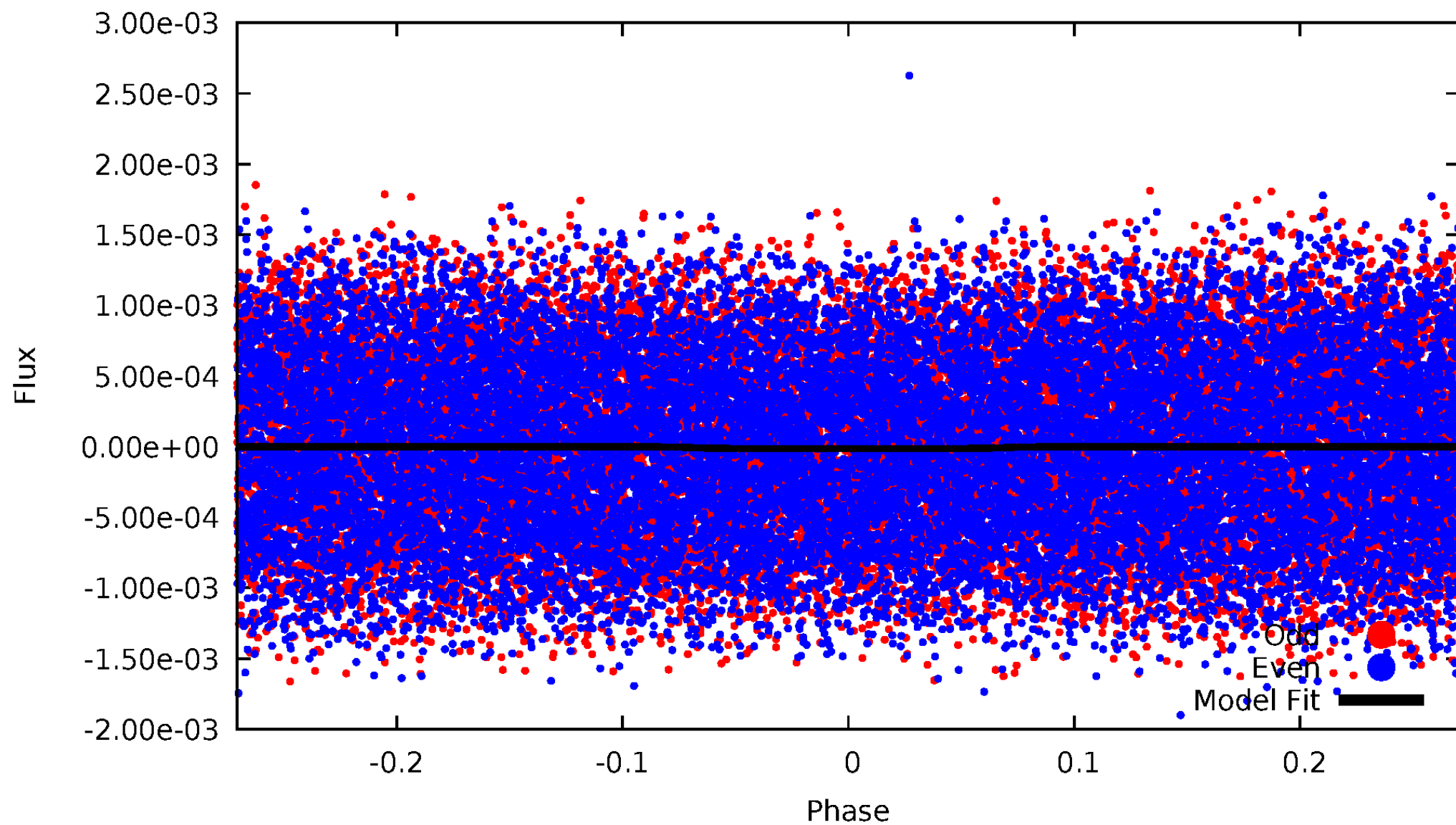
DV Odd/Even

TCE 008560996-01



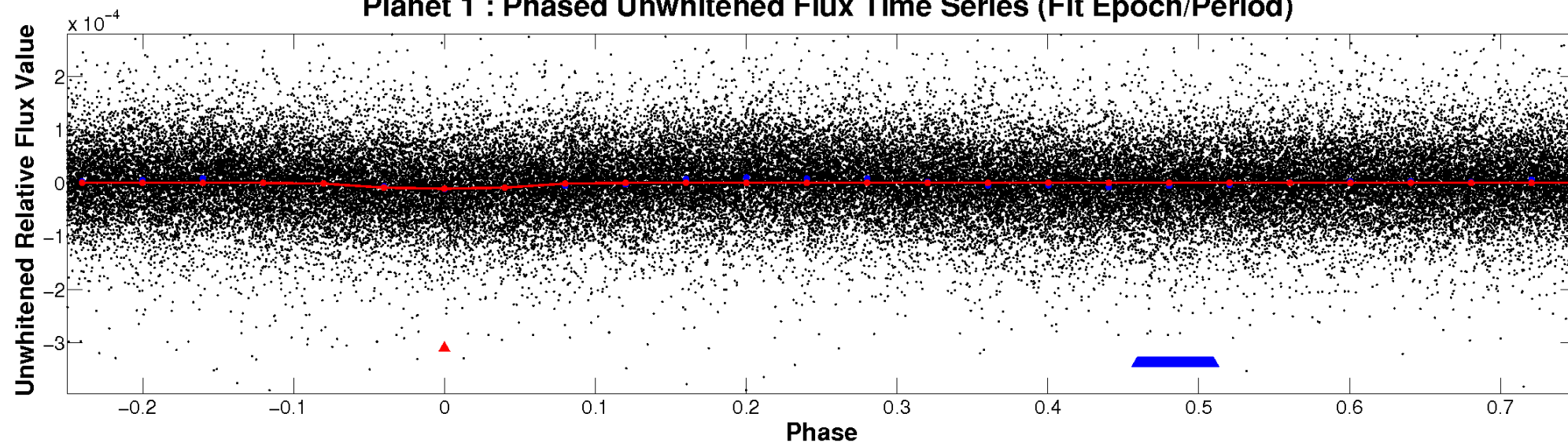
ALT Odd/Even

TCE 008560996-01

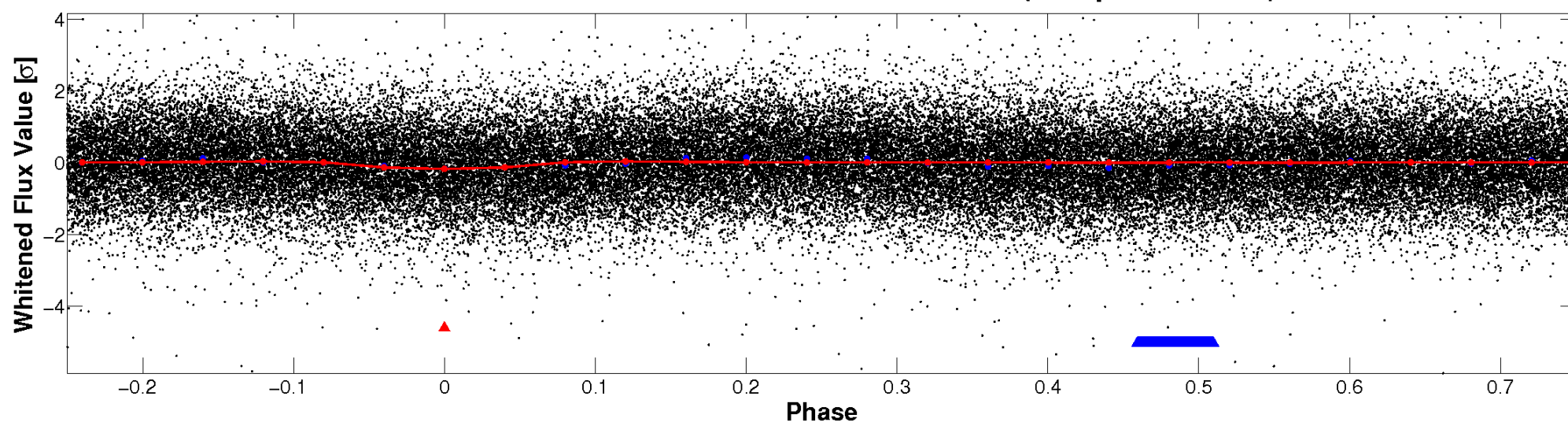


Non-Whitened Vs. Whitened Light Curve

Planet 1 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

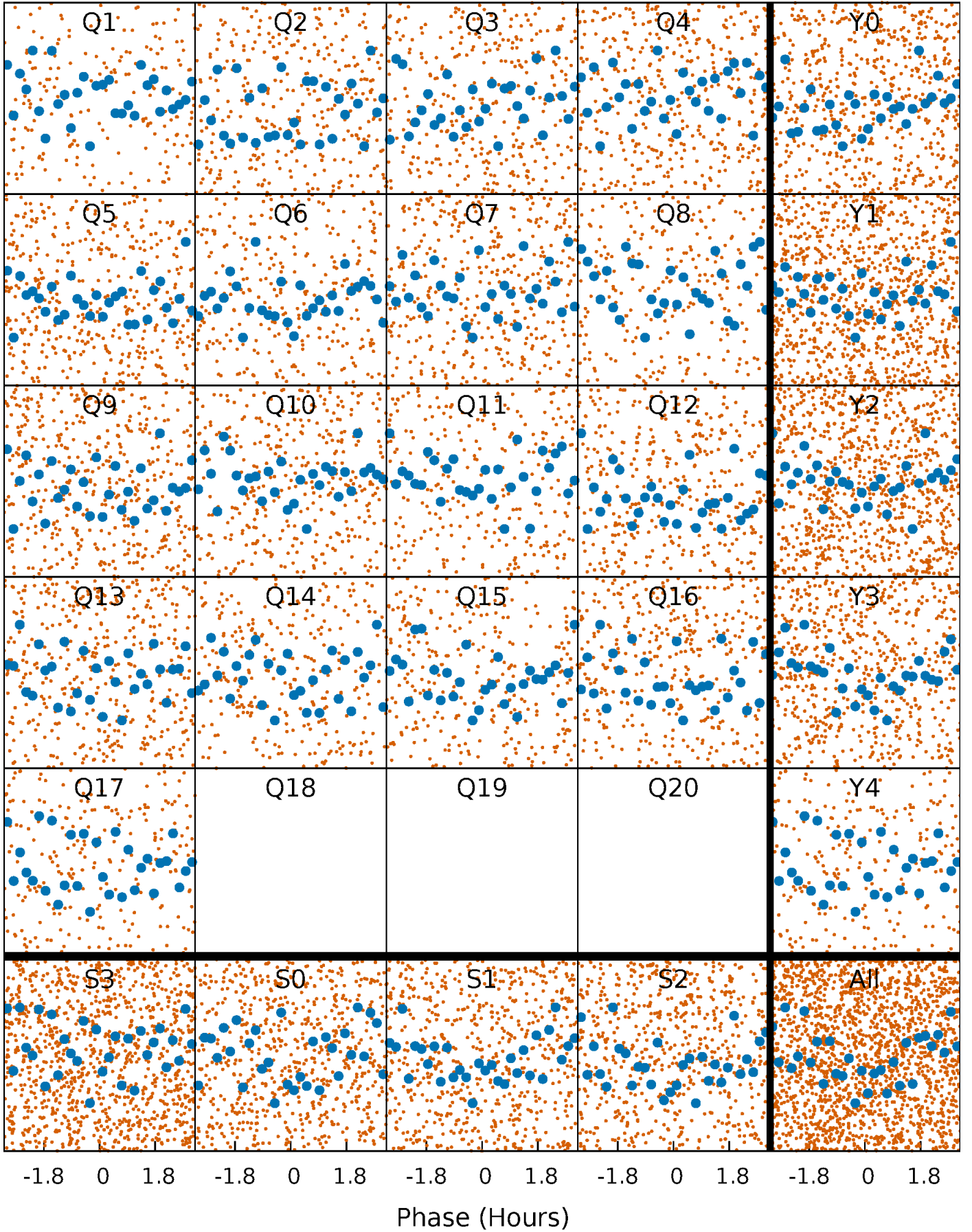


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



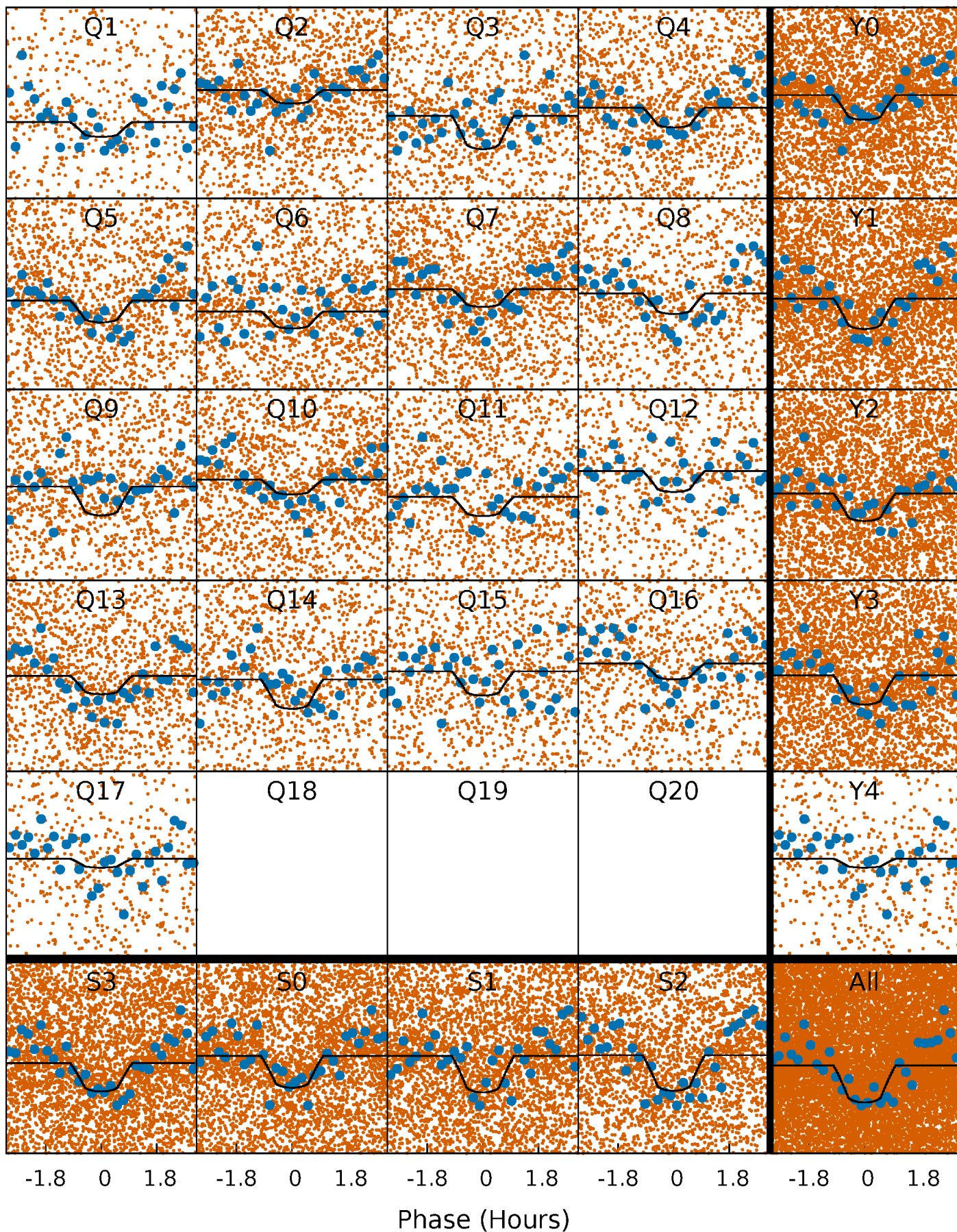
PDC Quarter-Phased Transit Curves

TCE 008560996-01 P= 0.510374 Days $T_0=132.002896$ (BKJD)



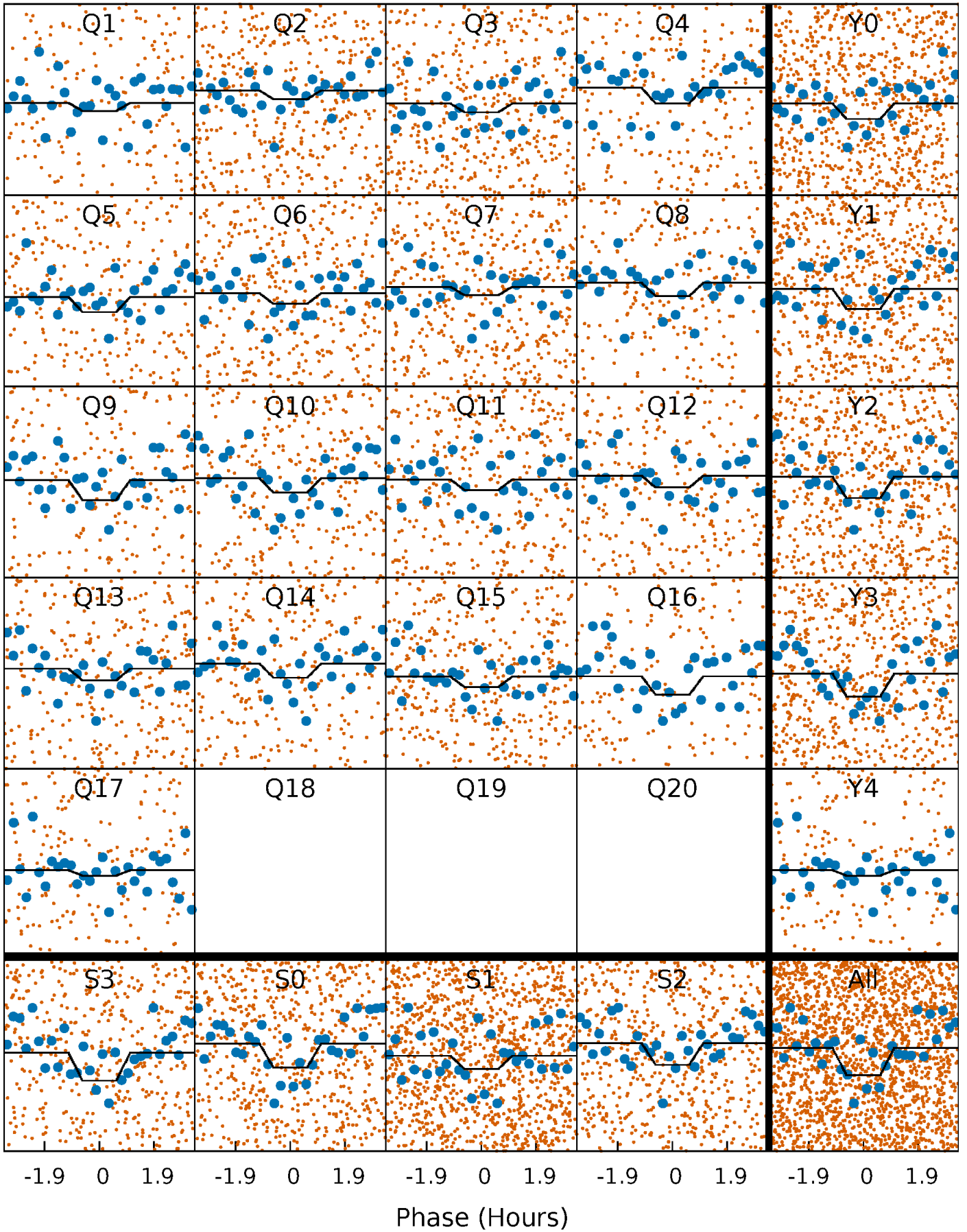
DV Quarter-Phased Transit Curves

TCE 008560996-01 P= 0.510374 Days $T_0=132.002896$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

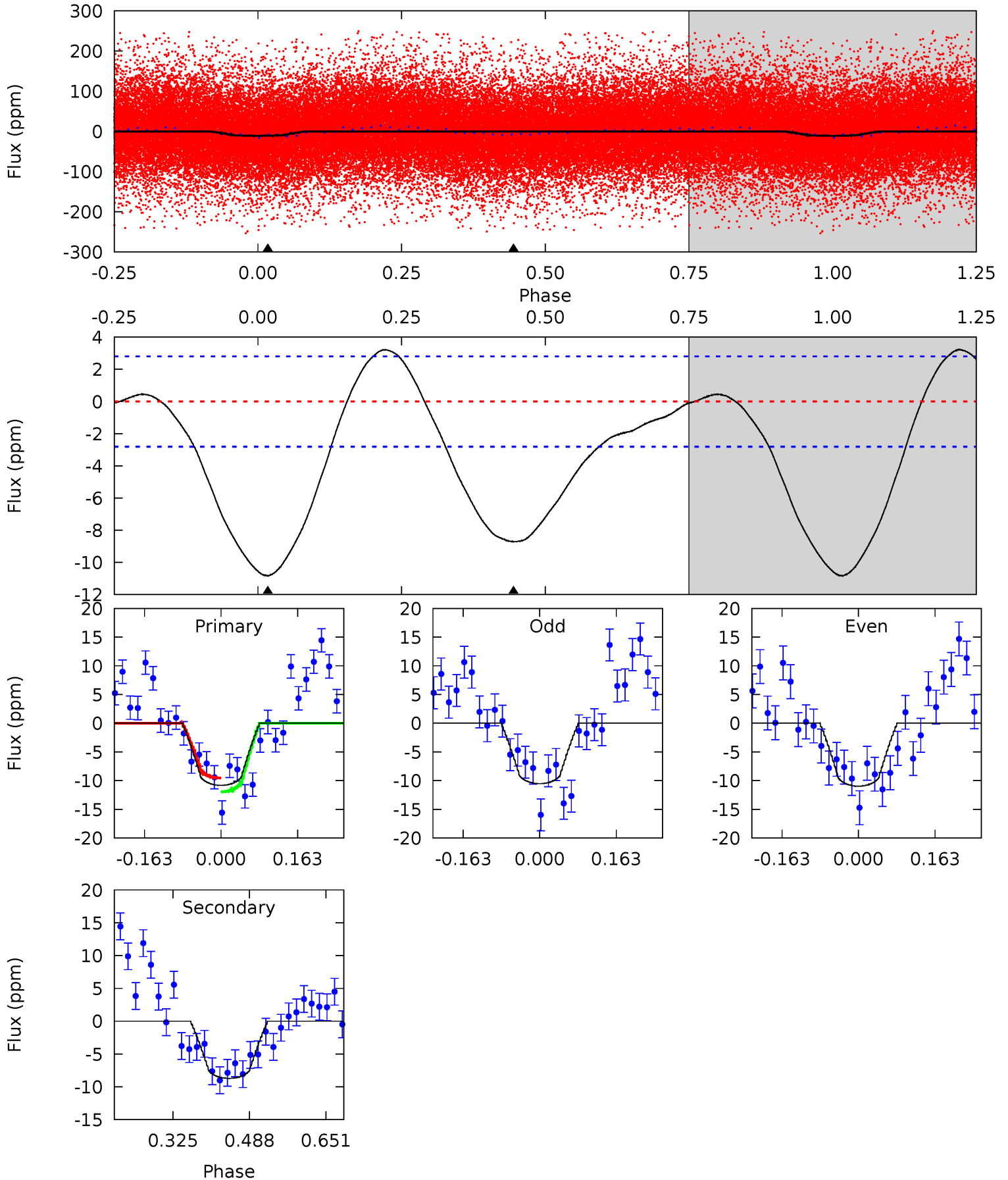
TCE 008560996-01 P= 0.510382 Days $T_0=131.995031$ (BKJD)



DV Model-Shift Uniqueness Test

008560996-01, P = 0.510374 Days, E = 131.492522 Days

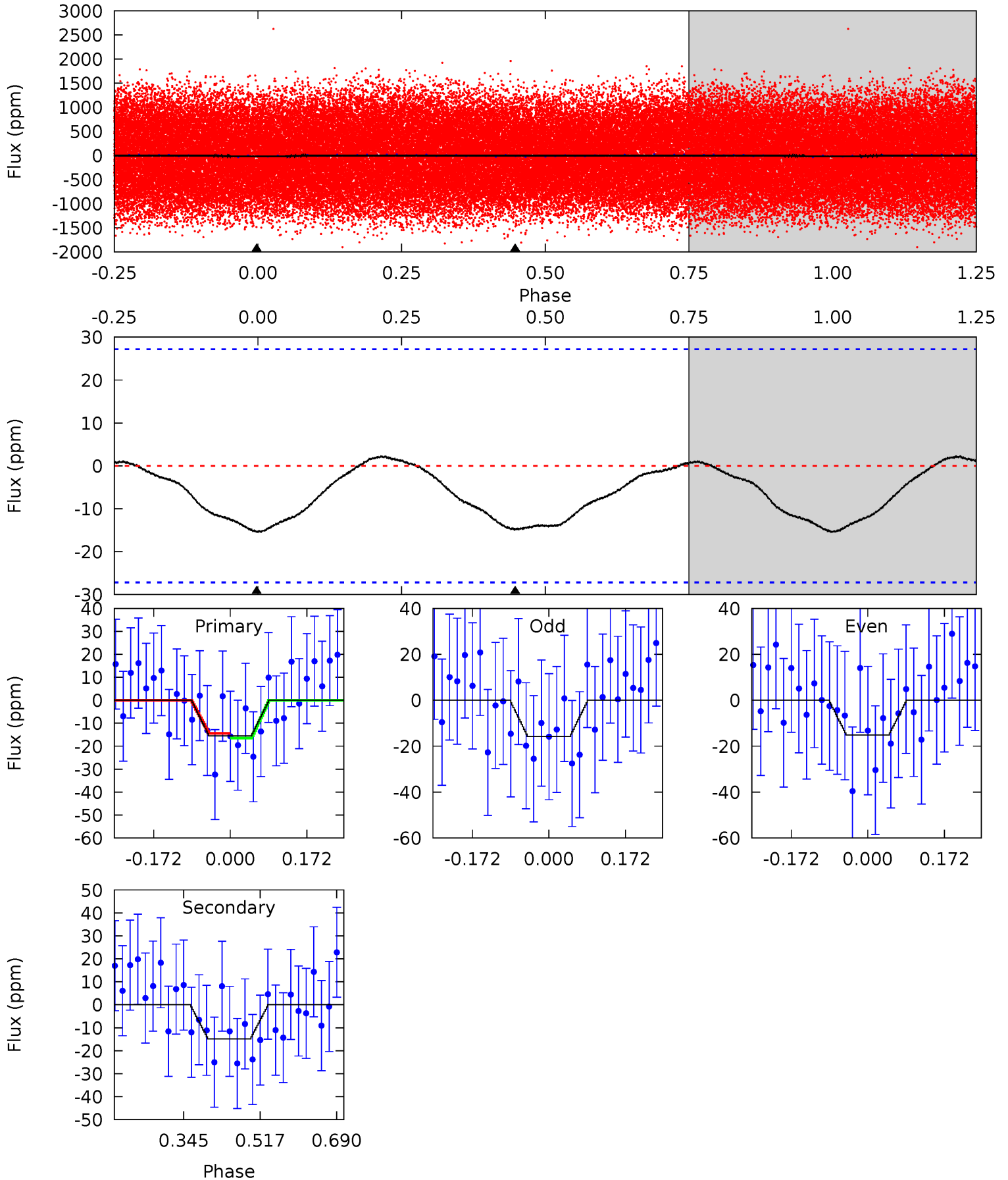
| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|-----|-----|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 17.2 | 13.9 | 0 | 0 | 4.46 | 1.40 | 2.66 | 17.2 | 17.2 | 13.9 | 13.9 | 0.35 | 0.96 | 0.23 | 1.92 |



Alt Model-Shift Uniqueness Test

008560996-01, P = 0.510382 Days, E = 131.484649 Days

| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|-----|-----|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 2.54 | 2.44 | 0 | 0 | 4.45 | 1.36 | 0.33 | 2.54 | 2.54 | 2.44 | 2.44 | 0.05 | 1.18 | 0.13 | 0.17 |



Stellar Parameters For KIC 008560996

| | $T_{\text{eff}}(K)$ | $\log(g)$ | [Fe/H] | R (R_{\odot}) | $M(M_{\odot})$ | p_{\star} ($\text{g}\cdot\text{cm}^{-3}$) |
|--------|----------------------|---------------------------|----------------------------|---------------------------|---------------------------|---|
| | 8083^{+225}_{-338} | $3.713^{+0.413}_{-0.110}$ | $-0.100^{+0.200}_{-0.350}$ | $3.294^{+0.826}_{-1.533}$ | $2.046^{+0.387}_{-0.472}$ | $0.081^{+0.307}_{-0.033}$ |
| | +3%/-4% | +11%/-3% | +200%/-350% | +25%/-47% | +19%/-23% | +381%/-41% |
| Source | KIC0 | KIC0 | KIC0 | DSEP | | |

KIC = Kepler Input Catalog; PHO = Photometry; SPE = Spectroscopy; AST = Asteroseismology
 TRA = Transits; DESP = Dartmouth Models; MULT = Multiple Models

Secondary Eclipse Parameters for KIC 008560996-01 / KOI

| Detrend | Depth (ppm) | R_p (R_{\oplus}) | T_{max} (K) | T_{obs} (K) | A_{obs} |
|---------|-------------|------------------------|----------------------|------------------------|---------------------------|
| DV | -9 ± 1 | $1.10^{+0.21}_{-0.26}$ | 6957^{+542}_{-842} | 6928^{+711}_{-679} | $1.023^{+0.685}_{-0.309}$ |
| Alt. | -15 ± 6 | $1.34^{+0.28}_{-0.30}$ | 6971^{+547}_{-857} | 7261^{+1237}_{-1505} | $1.143^{+0.908}_{-0.522}$ |

T_{max} = Theoretical Maximum Planetary Temperature
 T_{obs} = Observed Planetary Temperature (Assuming $A=0.3$)
 A_{obs} = Observed Albedo (Assuming $T=0$)

If a secondary eclipse is present, the system is likely an EB if $T_{\text{obs}} \gg T_{\text{max}}$ AND $A_{\text{obs}} \gg 1.0$

DV Centroid Data

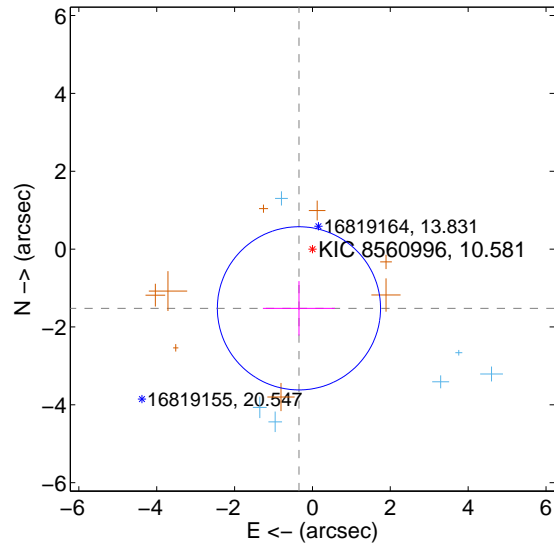
Supplemental centroid analysis for 008560996-01. **Kepler magnitude: 10.58.** Transit SNR 13.36

There are 6 quarters with good PRF difference image offsets

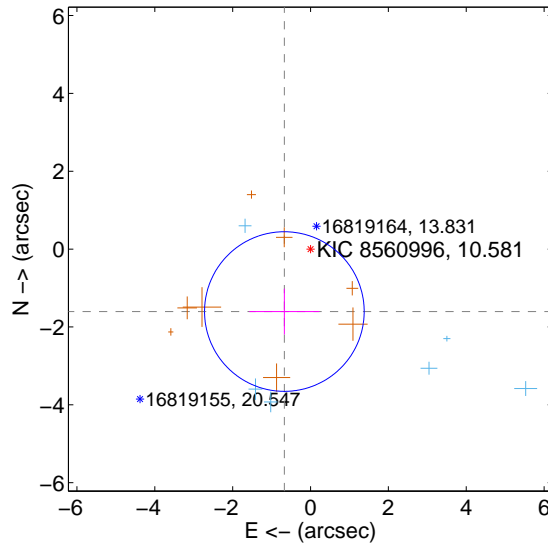
The direct PRF centroid is offset from the target star catalog position by about 0.93 arcsec

| | Distance in arcsec | Distance / σ | Δ RA | Δ Dec |
|---|-----------------------------------|---------------------|-------------------|--------------------|
| PRF-fit source offset from OOT | 1.560 ± 0.699 | 2.23 | 0.347 ± 0.925 | -1.521 ± 0.698 |
| PRF-fit source offset from KIC position | 1.739 ± 0.683 | 2.54 | 0.672 ± 0.900 | -1.604 ± 0.589 |
| photometric centroid source offset | 2.92 ± 0.75 | 3.87 | 0.66 ± 0.72 | -2.84 ± 0.76 |

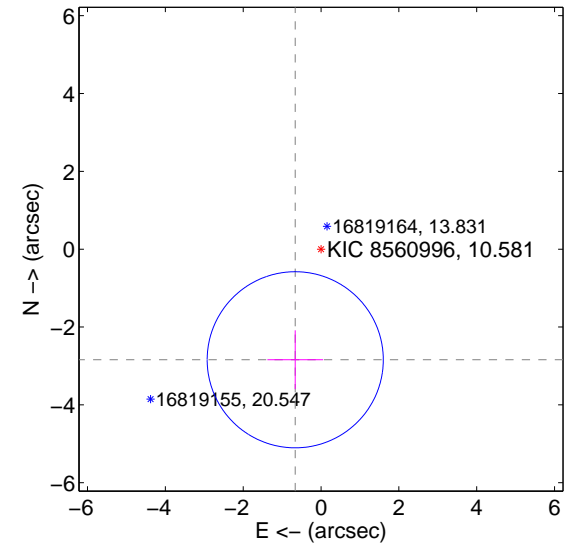
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

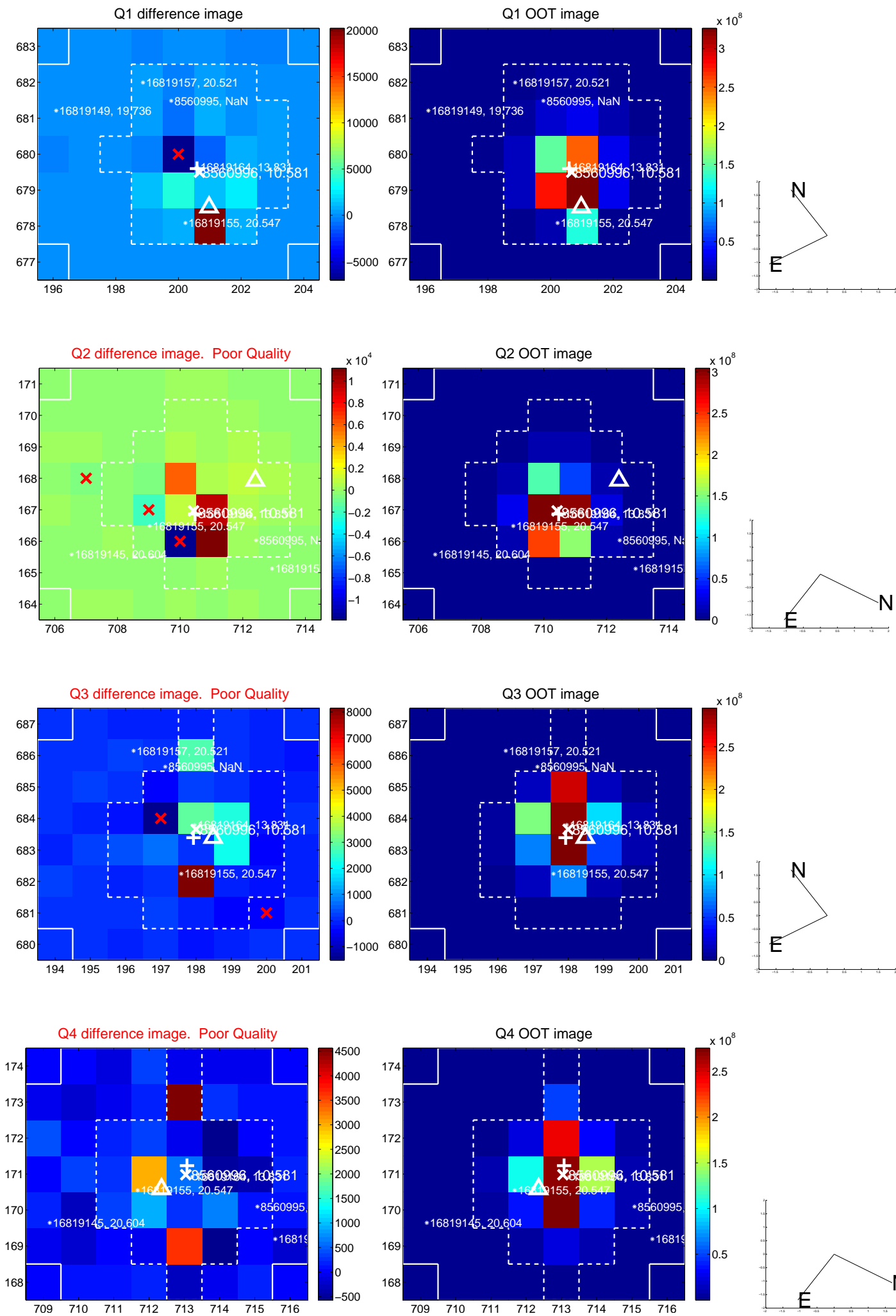


offset from photometric centroids

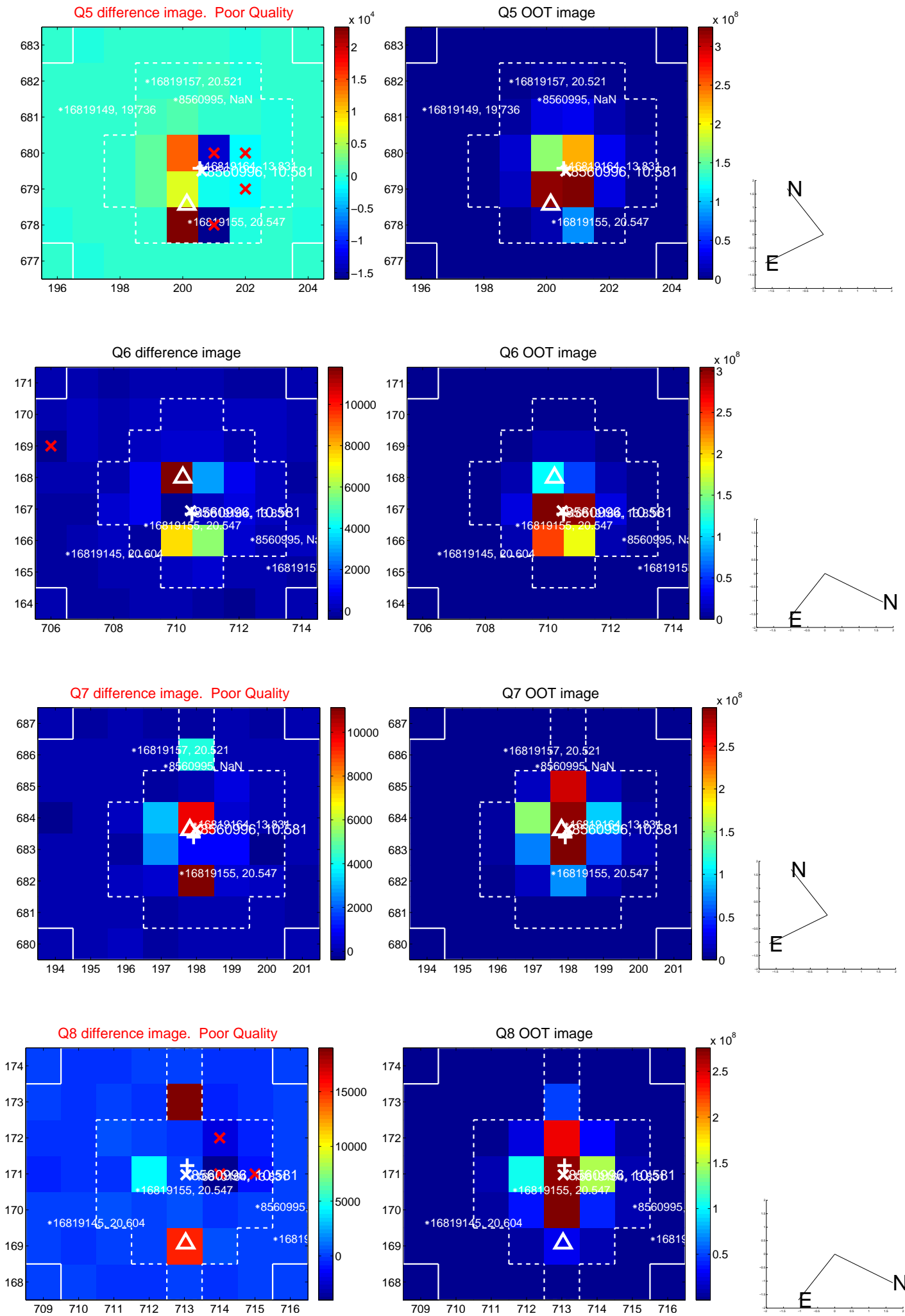


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ . Red *: target star. Blue *: Other stars. Text next to a star gives its KIC ID and kepmag. KIC IDs > 15,000,000 are from the UKIRT catalog.

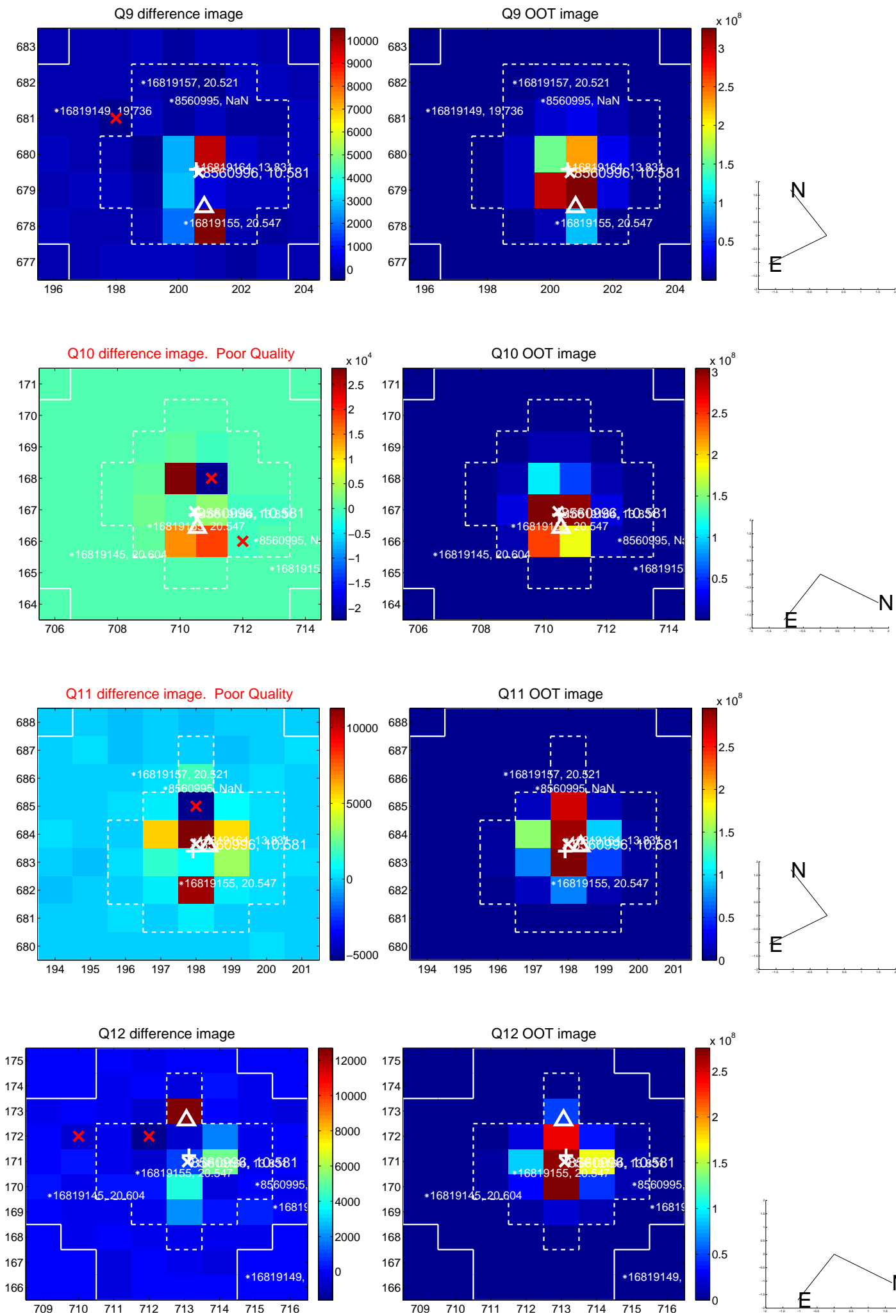
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



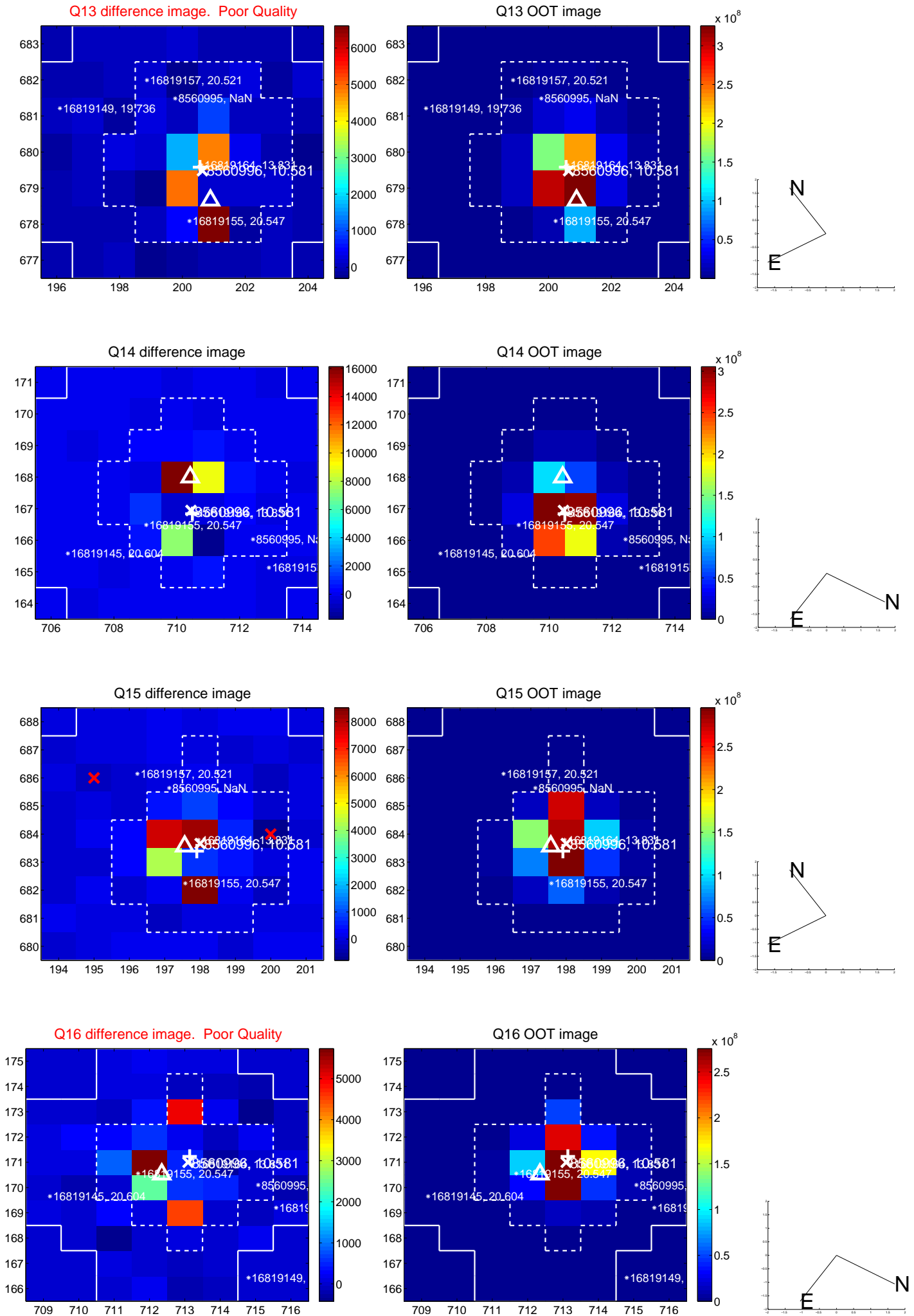
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



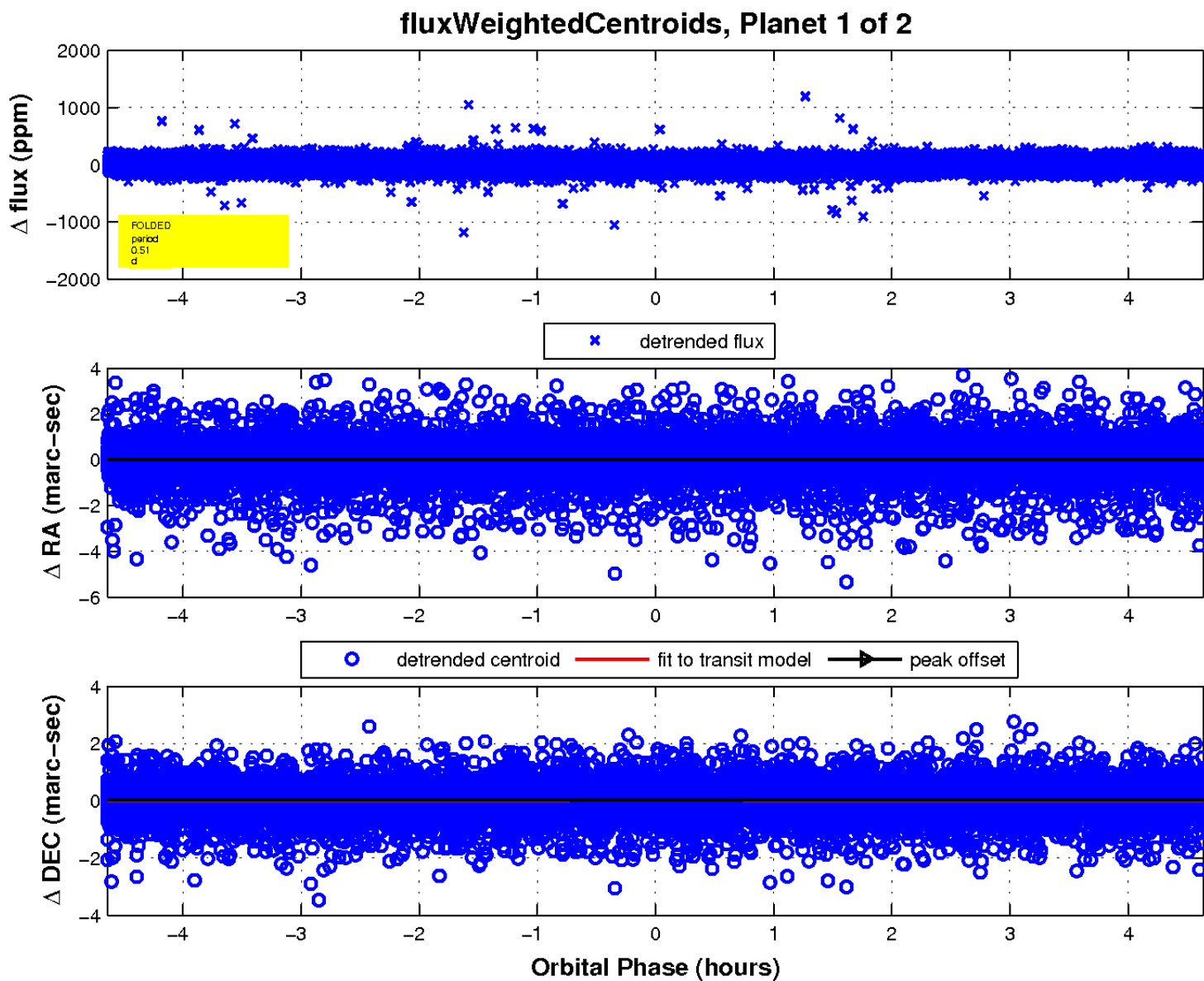
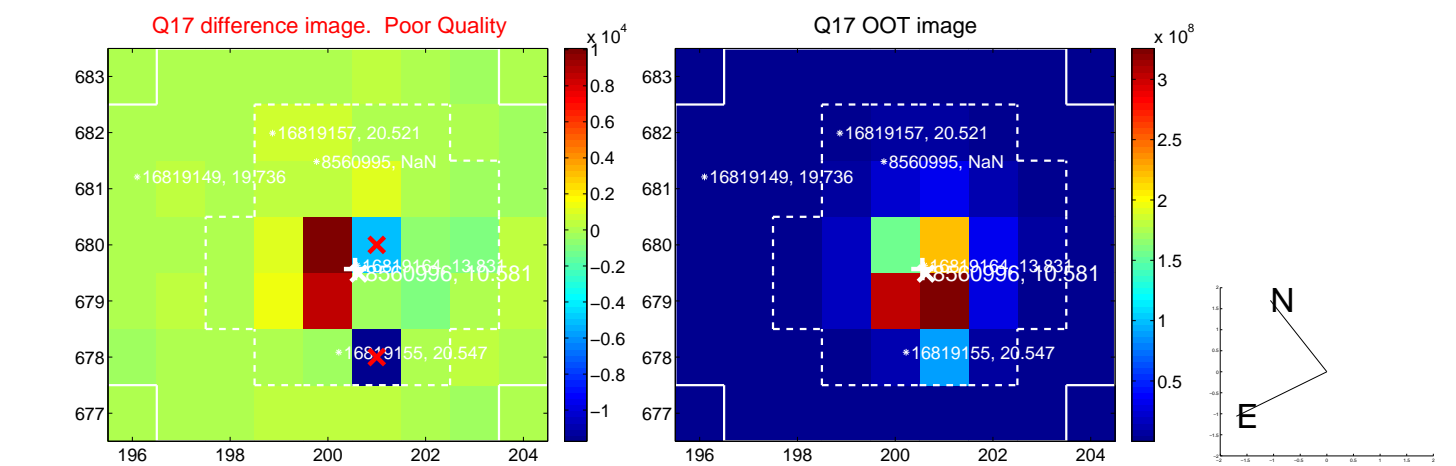
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.

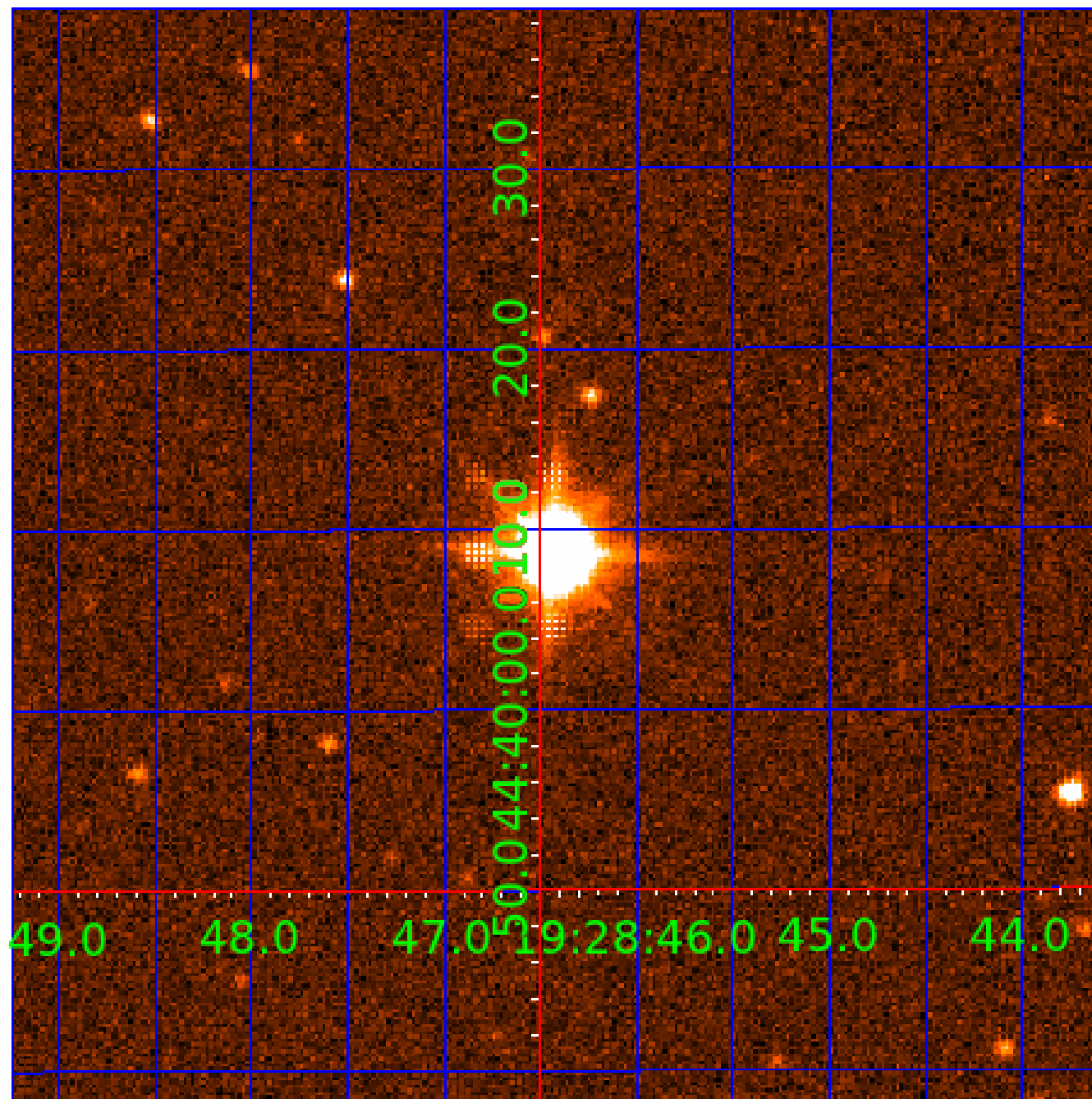


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 008560996

Q1-17 DR25 TCE Parameters

| TCE | Run Type | KOI? | Period (Days) | Epoch (BKJD) | Depth (ppm) | Duration (Hours) | MES | SNR | R_{\star} (R_{\odot}) | T_{\star} (K) | R_p (R_{\oplus}) | S_p (S_{\oplus}) |
|--------------|----------|------|---------------|--------------|-------------|------------------|------|------|-----------------------------|-----------------|------------------------|------------------------|
| 008560996-01 | OBS | No | 0.510374 | 132.002896 | 10.9 | 1.546 | 11.3 | 13.4 | 3.29 | 8083 | 1.16 | 164872.80 |
| 008560996-02 | OBS | No | 1.020766 | 132.237345 | 11.3 | 3.379 | 9.7 | 11.0 | 3.29 | 8083 | 1.29 | 65428.28 |

Robovetter Results

| TCE | Run Type | Disp | Score | N | S | C | E | Comments |
|--------------|----------|------|-------|---|---|---|---|---|
| 008560996-01 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | LPP_DV—LPP_ALT—CENT_SATURATED |
| 008560996-02 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | LPP_DV—LPP_ALT—SAME_NTL_PERIOD—CENT_SATURATED |

Notes: OBS = Observed. INJ = Injected. INV = Inverted. SCR = Scrambled.

N = Not Transit-Like. S = Stellar Eclipse. C = Centroid Offset. E = Ephemeris Match.

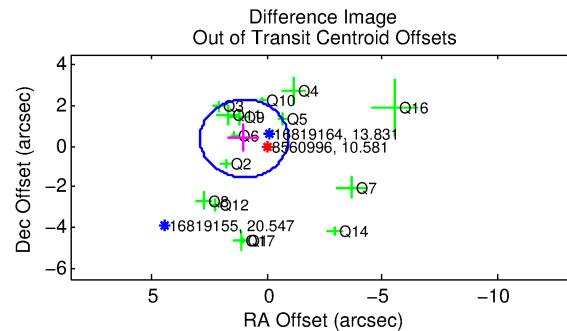
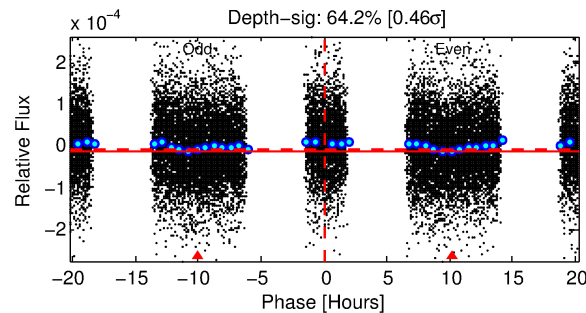
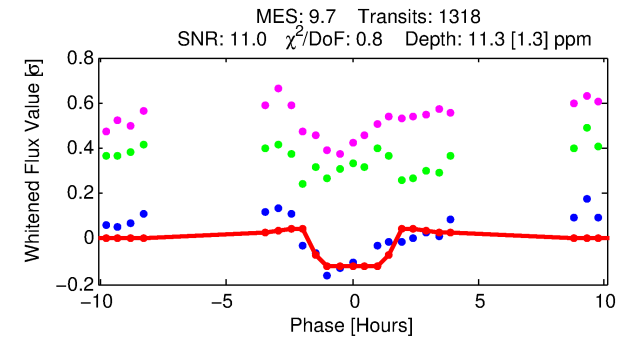
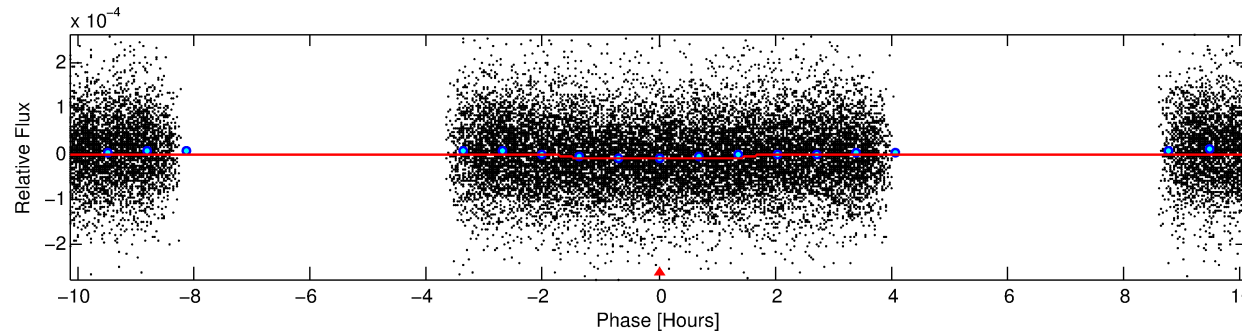
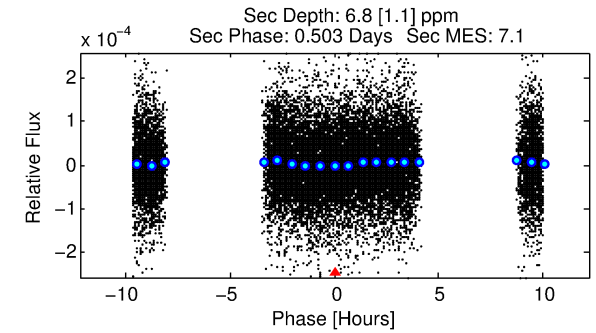
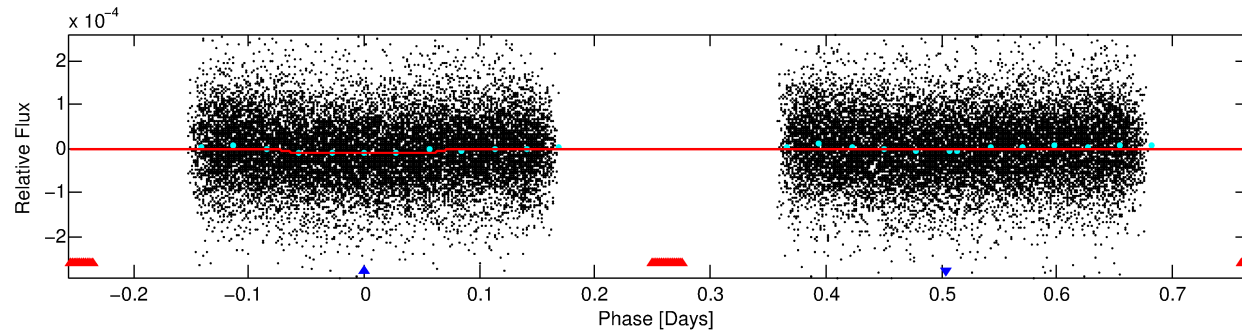
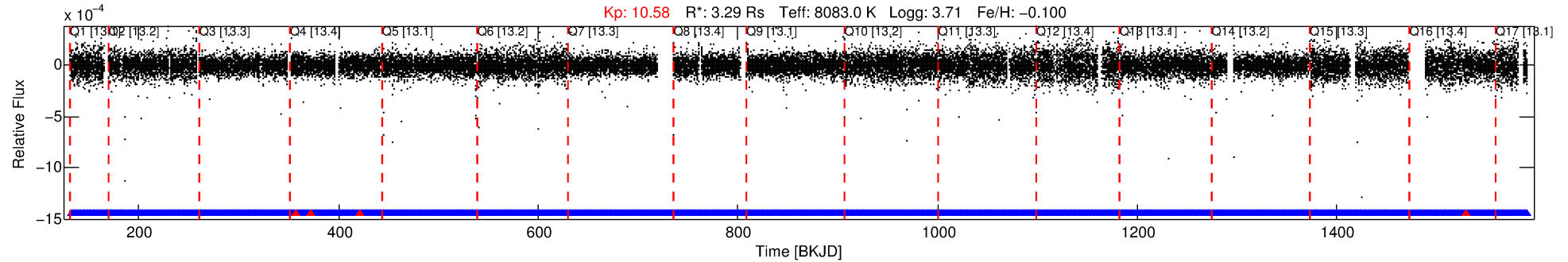
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 008560996-02

No Significant Match Found

DV One-Page Summary

KIC: 8560996 Candidate: 2 of 2 Period: 1.021 d



DV Fit Results:

Period = 1.02077 [0.00001] d
Epoch = 132.2373 [0.0028] BKJD
Rp/R* = 0.0036 [0.0006]
a/R* = 1.39 [0.71]
b = 0.90 [0.23]
Seff = 65428.28 [47460.00]
Teq = 4078 [740] K
Rp = 1.29 [0.64] Re
a = 0.0252 [0.0112] AU
Ag = 1.43 [1.16] [0.37σ]
Teffp = 6898 [743] K [2.69σ]

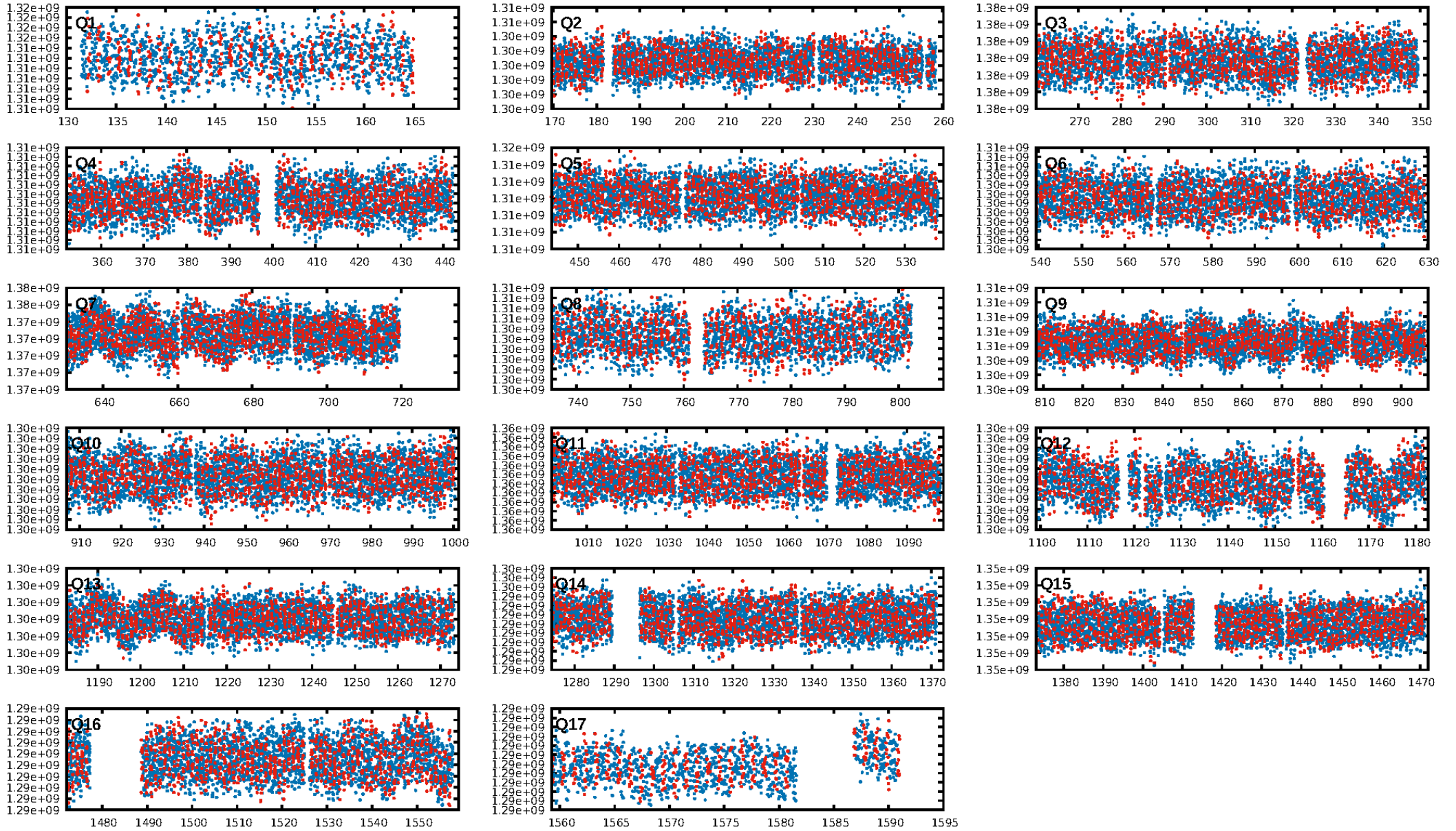
DV Diagnostic Results:

ShortPeriod-sig: 99.9% [3.30σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 2.28e-21
RollingBand-fgt: 1.00 [1254/1258]
GhostDiagnostic-chr: 0.3444
Centroid-sig: 30.2%
Centroid-so: 0.938 arcsec [1.27σ]
OotOffset-rm: 1.054 arcsec [1.66σ]
OotOffset-st: 4/3/4/4 [15]
KicOffset-rm: 1.174 arcsec [1.84σ]
KicOffset-st: 4/3/4/4 [15]
DiffImageQuality-fgm: 0.27 [4/15]
DiffImageOverlap-fno: 0.00 [0/17]

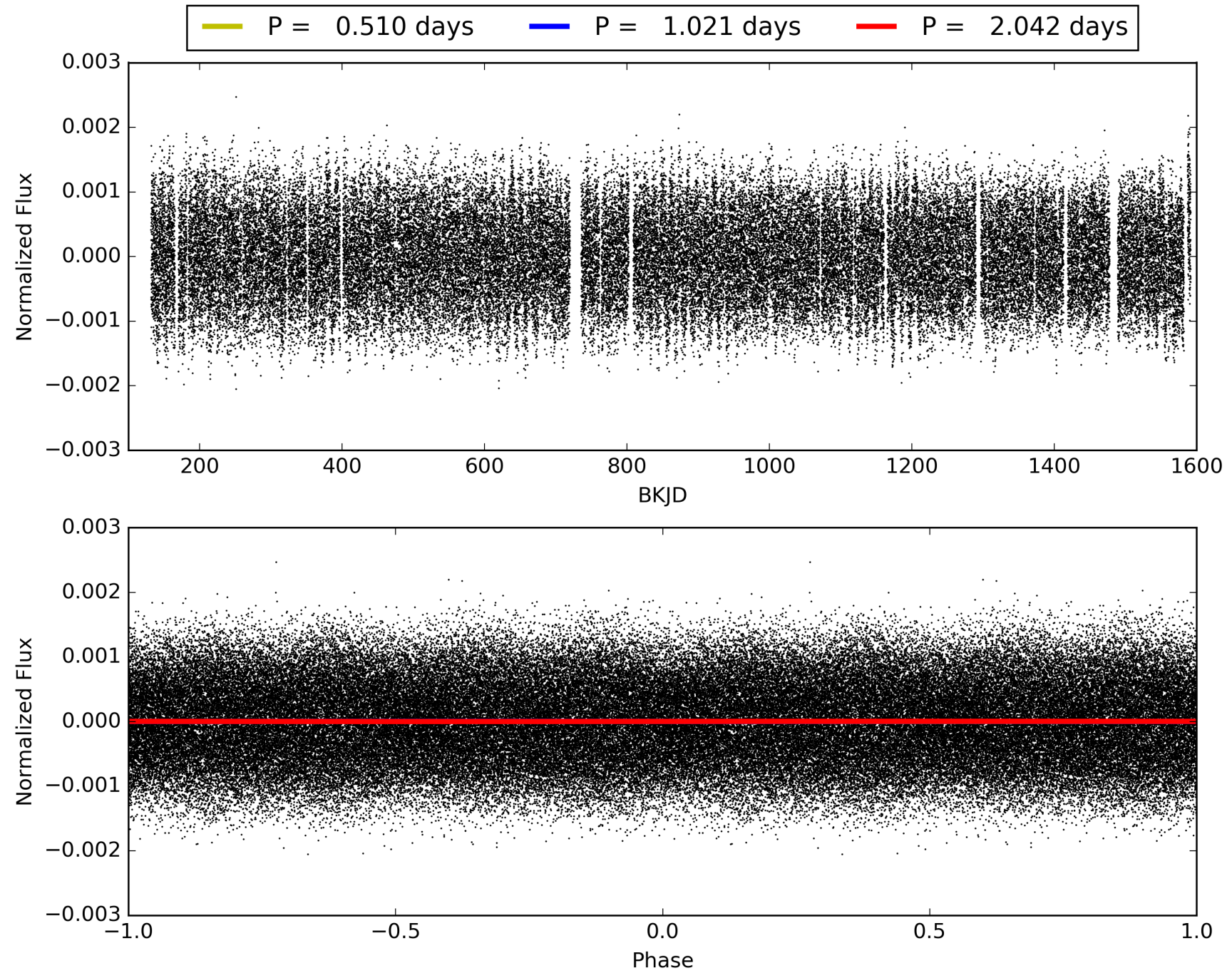
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 04:42:10 Z

This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

TCE 008560996-02, PDC Light Curves

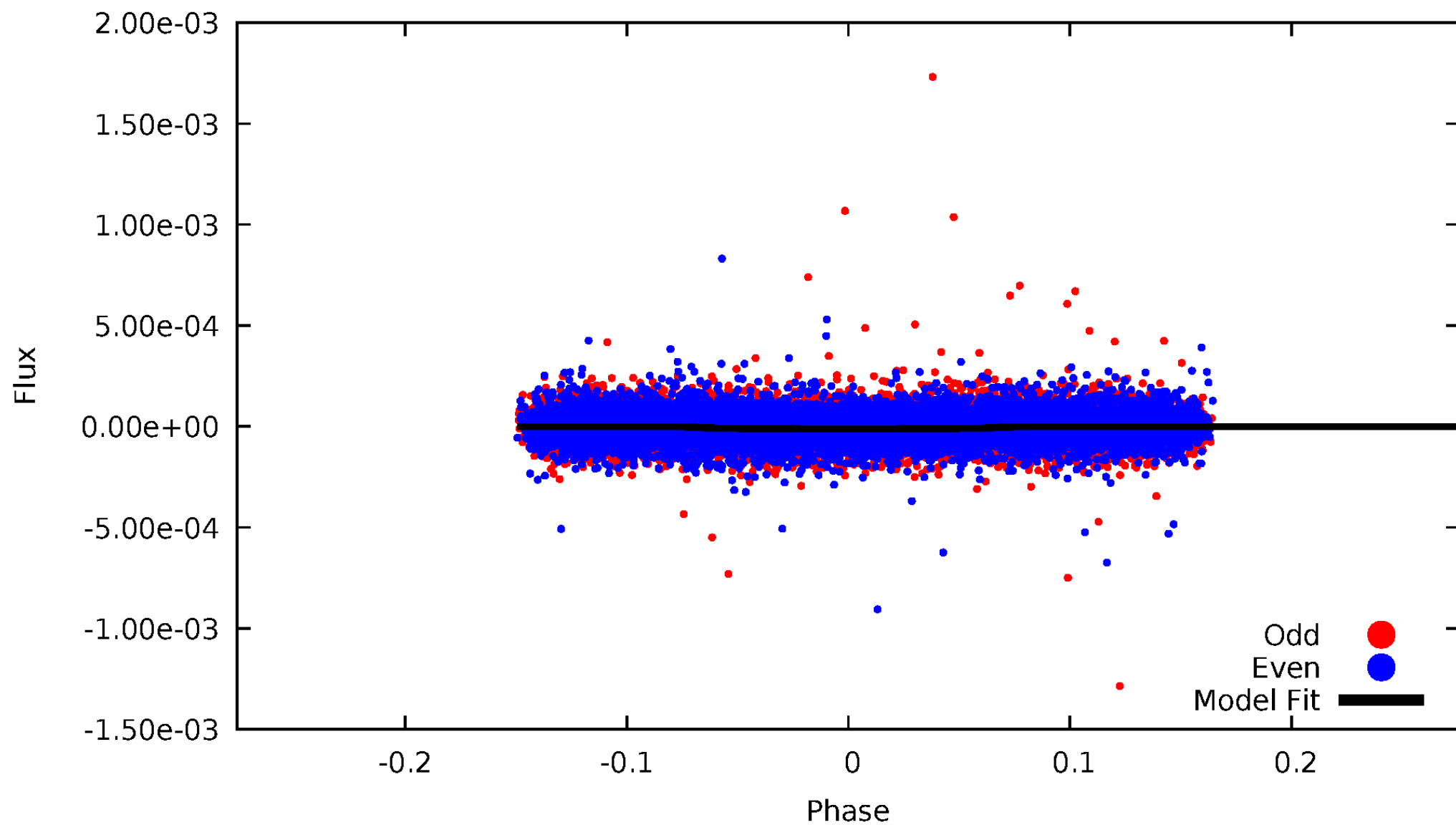


TCE 008560996-02



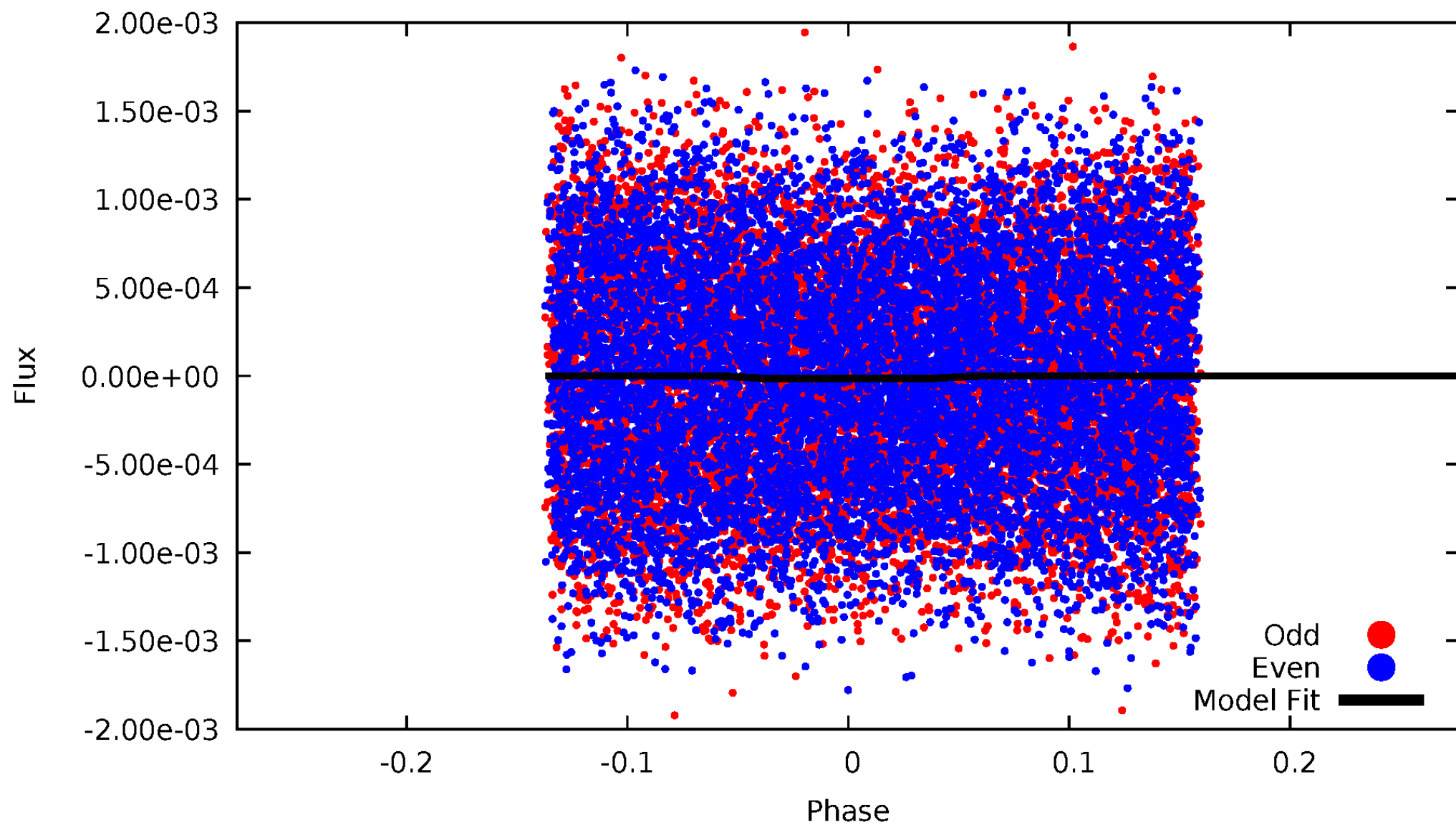
DV Odd/Even

TCE 008560996-02



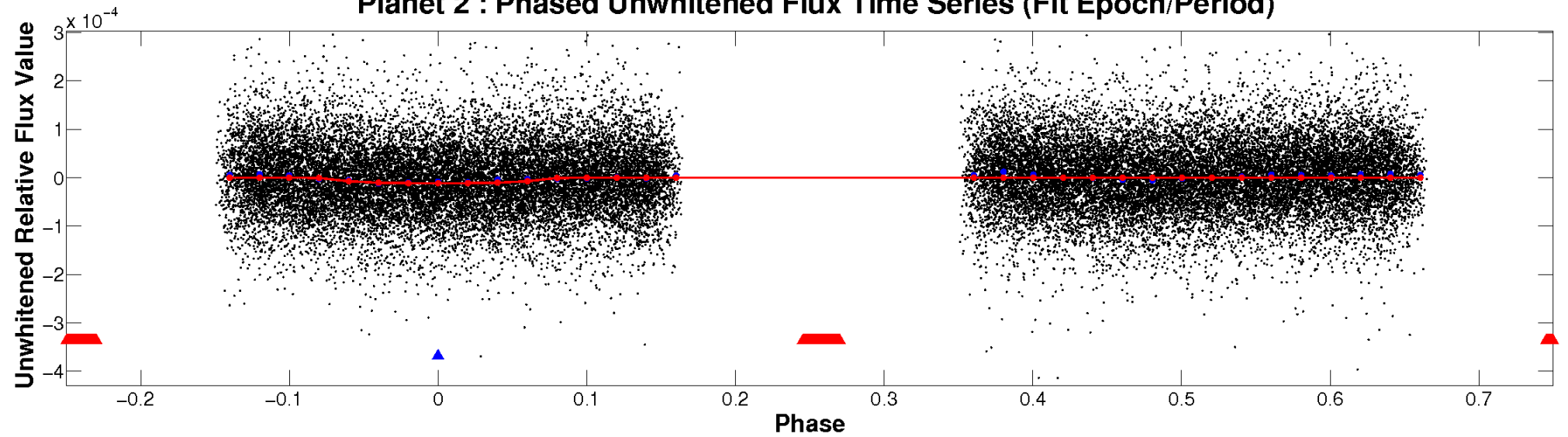
ALT Odd/Even

TCE 008560996-02

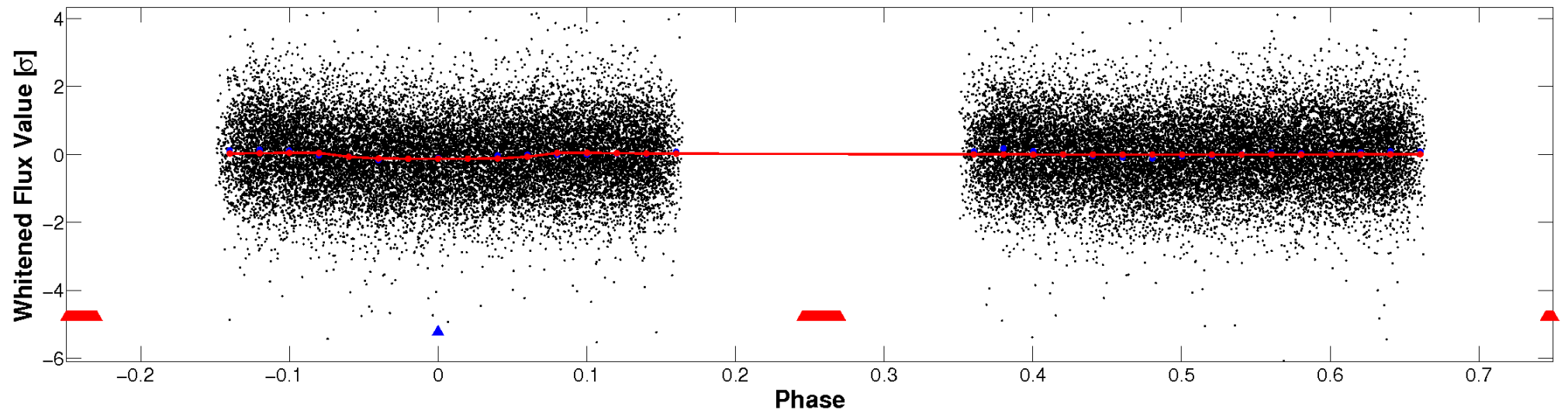


Non-Whitened Vs. Whitened Light Curve

Planet 2 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

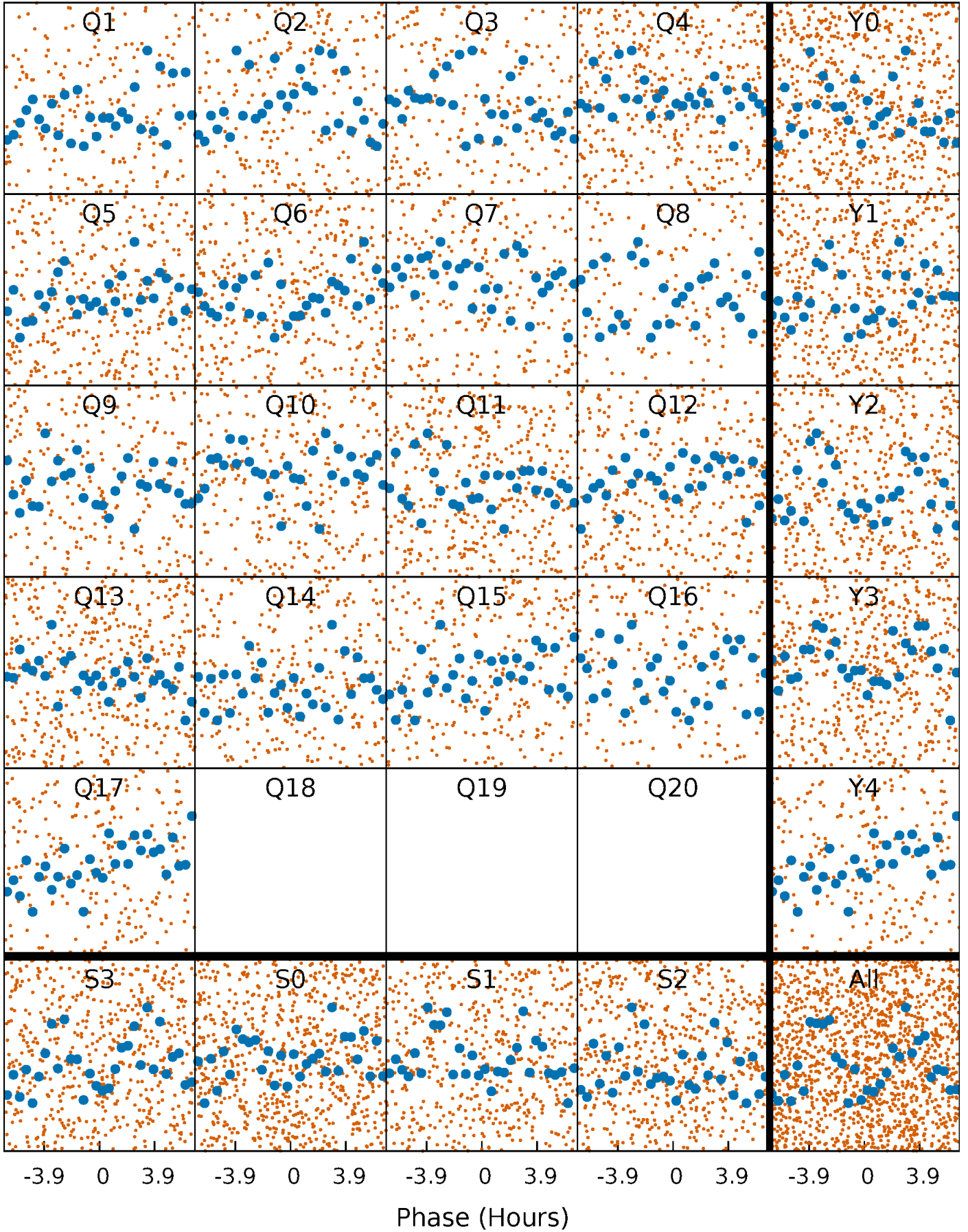


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



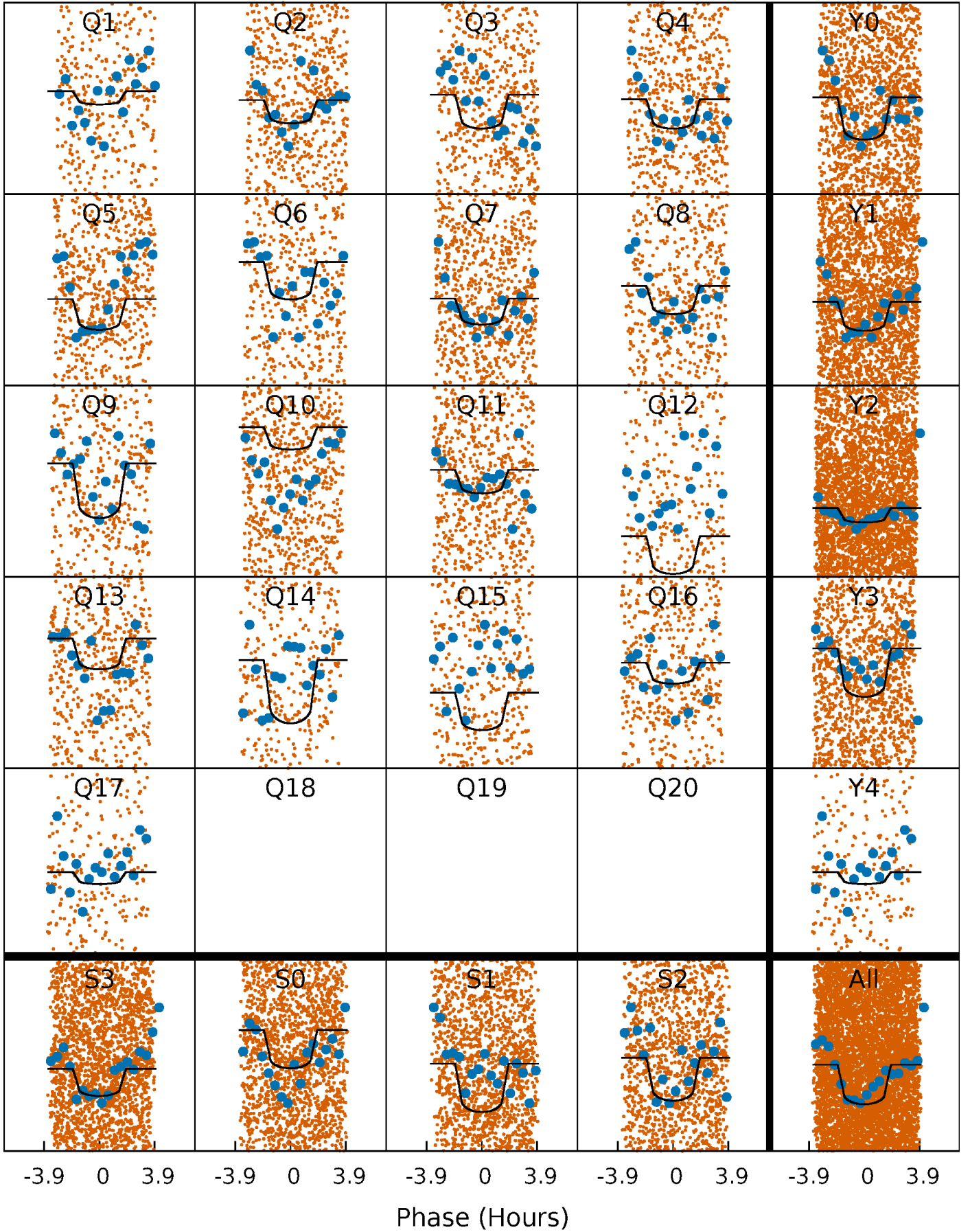
PDC Quarter-Phased Transit Curves

TCE 008560996-02 P= 1.020766 Days $T_0=132.237345$ (BKJD)



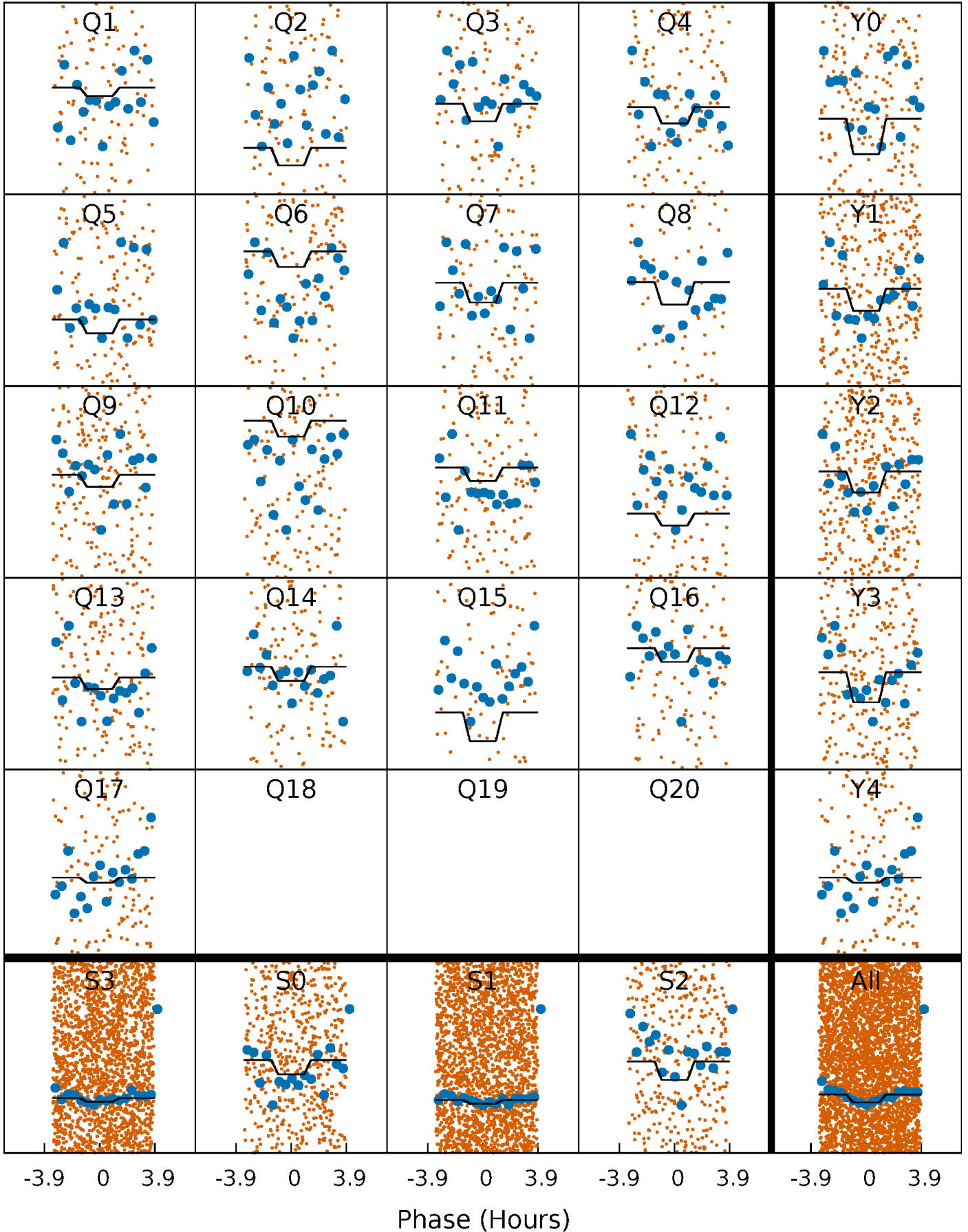
DV Quarter-Phased Transit Curves

TCE 008560996-02 P= 1.020766 Days $T_0=132.237345$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

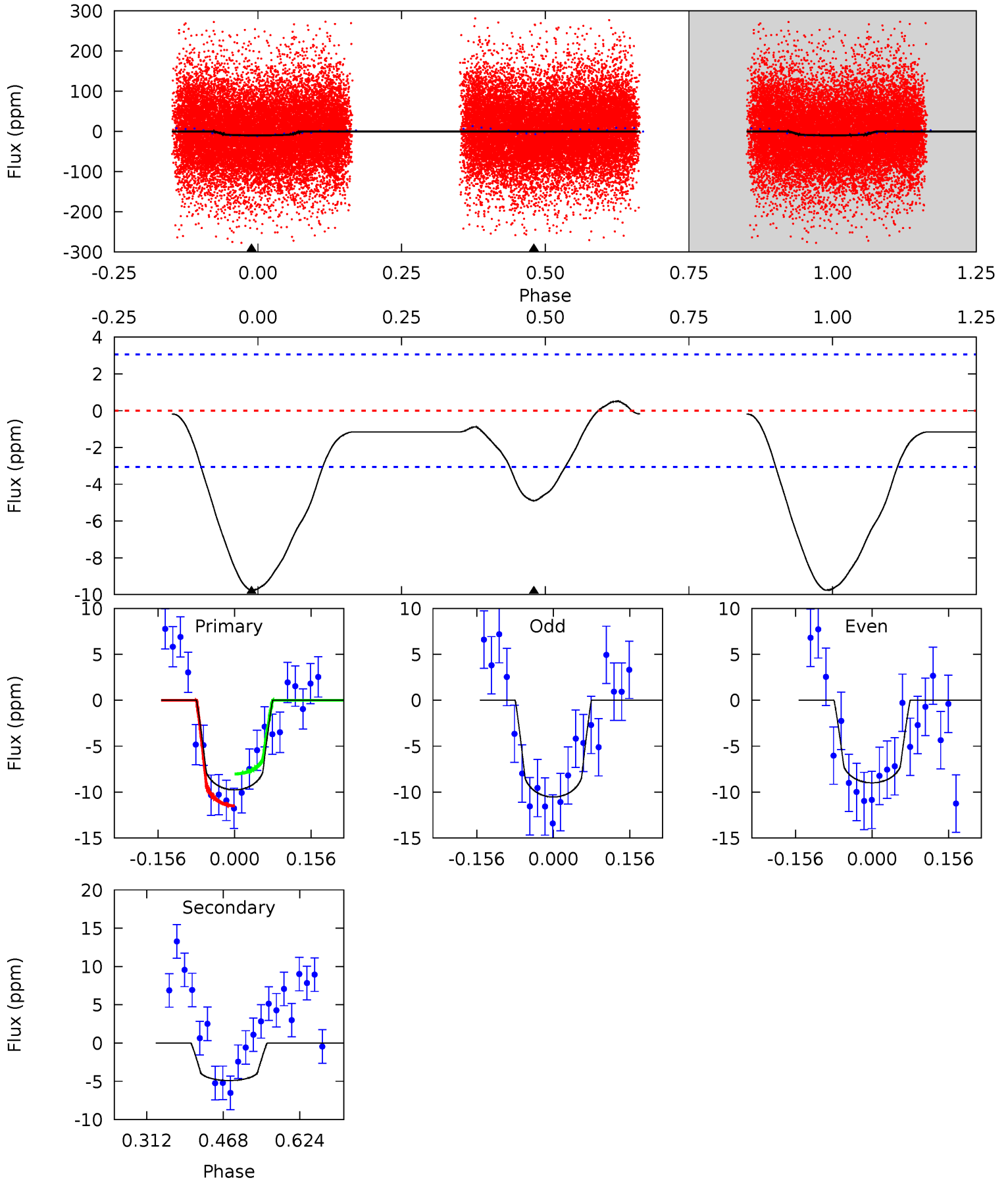
TCE 008560996-02 $P = 1.020753$ Days $T_0 = 132.242809$ (BKJD)



DV Model-Shift Uniqueness Test

008560996-02, P = 1.020766 Days, E = 131.216579 Days

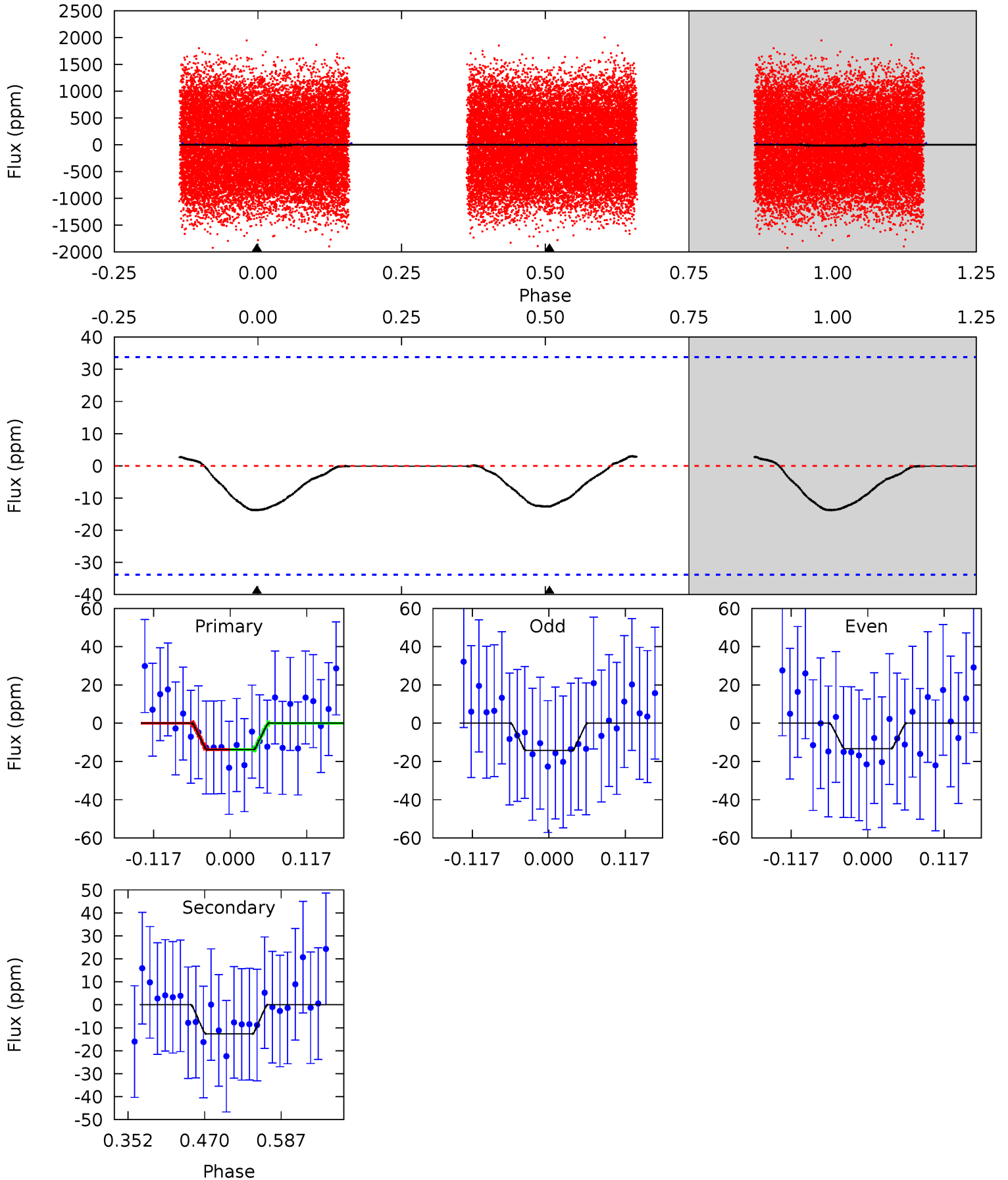
| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|-----|-----|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 14.3 | 7.16 | 0 | 0 | 4.47 | 1.42 | 1.36 | 14.3 | 14.3 | 7.16 | 7.16 | 1.14 | 1.04 | 0.05 | 2.54 |



Alt Model-Shift Uniqueness Test

008560996-02, P = 1.020753 Days, E = 131.222056 Days

| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|-----|-----|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 1.84 | 1.70 | 0 | 0 | 4.53 | 1.57 | 0.21 | 1.84 | 1.84 | 1.70 | 1.70 | 0.07 | 1.00 | 0.18 | 0.00 |



Stellar Parameters For KIC 008560996

| | $T_{\text{eff}}(K)$ | $\log(g)$ | [Fe/H] | R (R_{\odot}) | $M(M_{\odot})$ | p_{\star} ($\text{g}\cdot\text{cm}^{-3}$) |
|--------|----------------------|---------------------------|----------------------------|---------------------------|---------------------------|---|
| | 8083^{+225}_{-338} | $3.713^{+0.413}_{-0.110}$ | $-0.100^{+0.200}_{-0.350}$ | $3.294^{+0.826}_{-1.533}$ | $2.046^{+0.387}_{-0.472}$ | $0.081^{+0.307}_{-0.033}$ |
| | +3%/-4% | +11%/-3% | +200%/-350% | +25%/-47% | +19%/-23% | +381%/-41% |
| Source | KIC0 | KIC0 | KIC0 | DSEP | | |

KIC = Kepler Input Catalog; PHO = Photometry; SPE = Spectroscopy; AST = Asteroseismology
 TRA = Transits; DESP = Dartmouth Models; MULT = Multiple Models

Secondary Eclipse Parameters for KIC 008560996-02 / KOI

| Detrend | Depth (ppm) | R_p (R_{\oplus}) | T_{max} (K) | T_{obs} (K) | A_{obs} |
|---------|-------------|------------------------|----------------------|------------------------|---------------------------|
| DV | -5 ± 1 | $1.19^{+0.33}_{-0.33}$ | 5498^{+443}_{-624} | 5670^{+854}_{-681} | $1.173^{+1.012}_{-0.442}$ |
| Alt. | -13 ± 7 | $1.28^{+0.37}_{-0.31}$ | 5535^{+402}_{-645} | 7333^{+1606}_{-1843} | $2.664^{+2.651}_{-1.669}$ |

T_{max} = Theoretical Maximum Planetary Temperature

T_{obs} = Observed Planetary Temperature (Assuming $A=0.3$)

A_{obs} = Observed Albedo (Assuming $T=0$)

If a secondary eclipse is present, the system is likely an EB if $T_{\text{obs}} \gg T_{\text{max}}$ AND $A_{\text{obs}} \gg 1.0$

DV Centroid Data

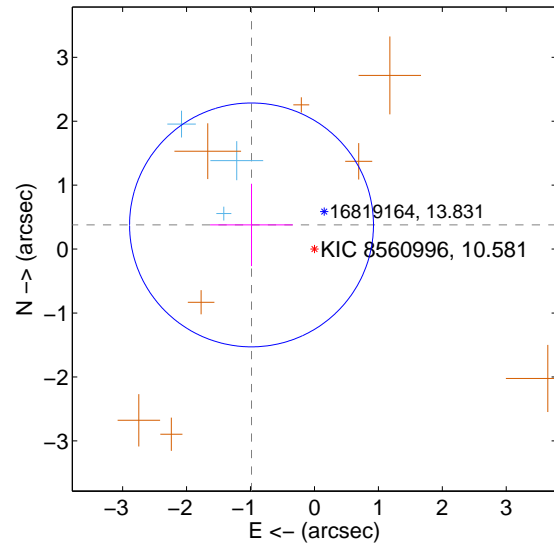
Supplemental centroid analysis for 008560996-02. **Kepler magnitude: 10.58.** Transit SNR 11.03

There are 4 quarters with good PRF difference image offsets

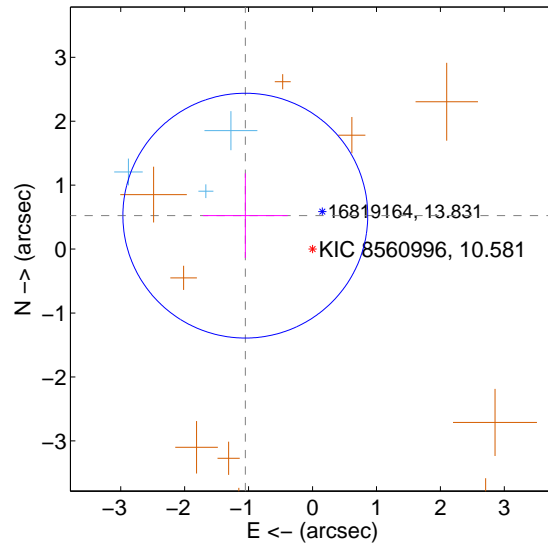
The direct PRF centroid is offset from the target star catalog position by about 0.43 arcsec

| | Distance in arcsec | Distance / σ | Δ RA | Δ Dec |
|---|--------------------|---------------------|-------------------|-------------------|
| PRF-fit source offset from OOT | 1.054 ± 0.636 | 1.66 | 0.984 ± 0.646 | 0.378 ± 0.644 |
| PRF-fit source offset from KIC position | 1.174 ± 0.638 | 1.84 | 1.051 ± 0.664 | 0.523 ± 0.662 |
| photometric centroid source offset | 0.94 ± 0.74 | 1.27 | 0.90 ± 0.74 | 0.28 ± 0.78 |

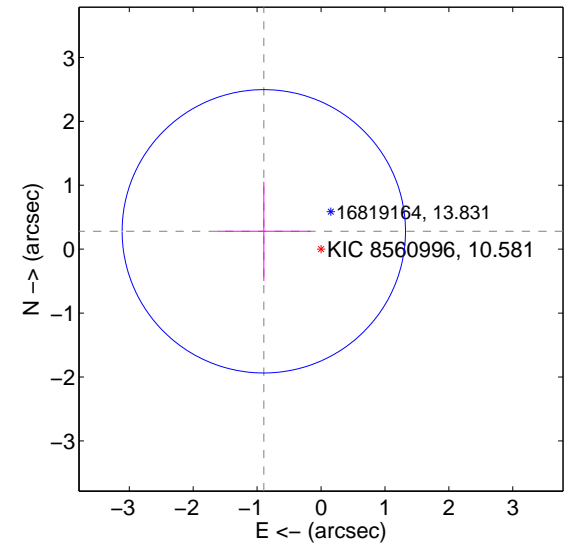
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

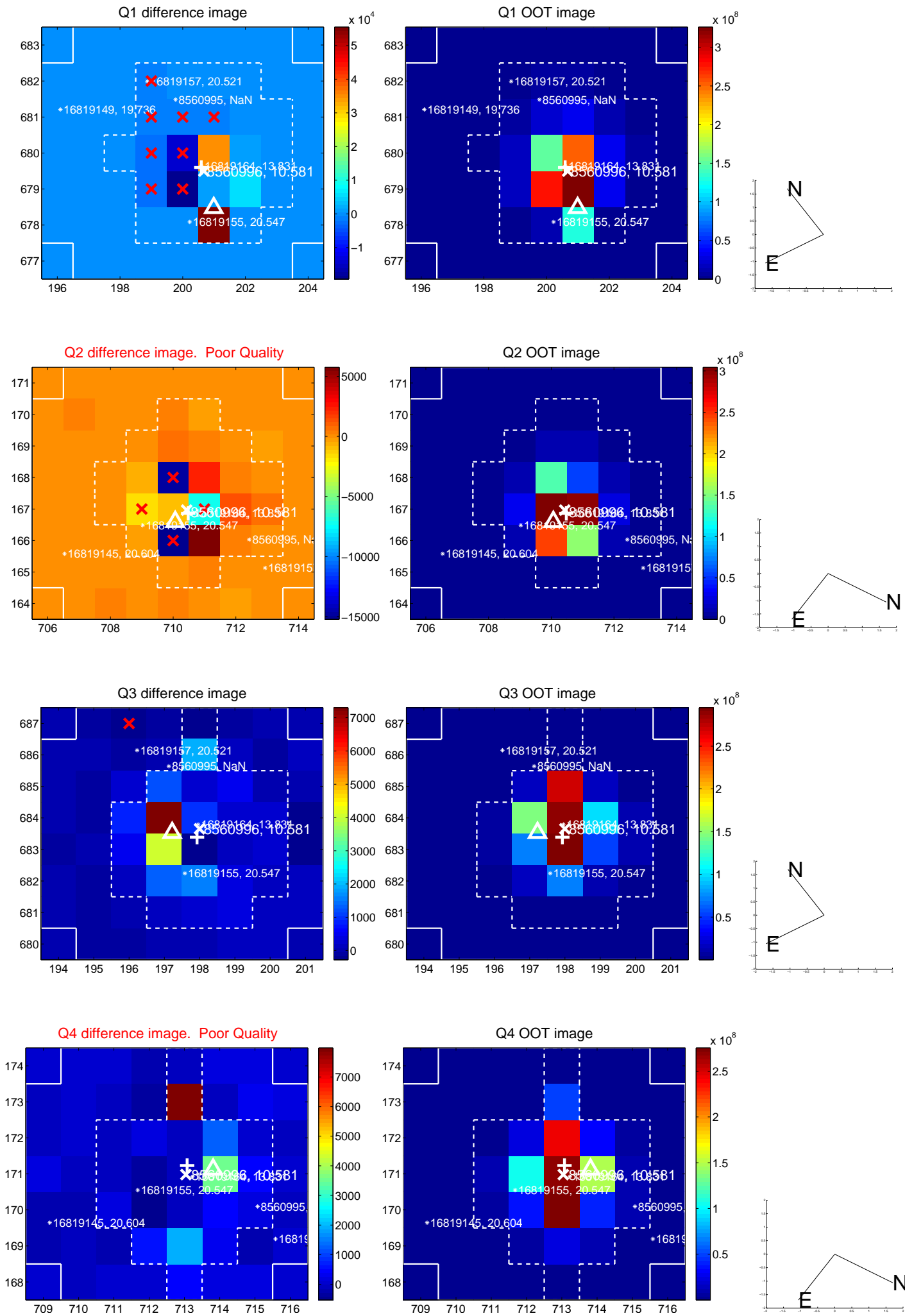


offset from photometric centroids

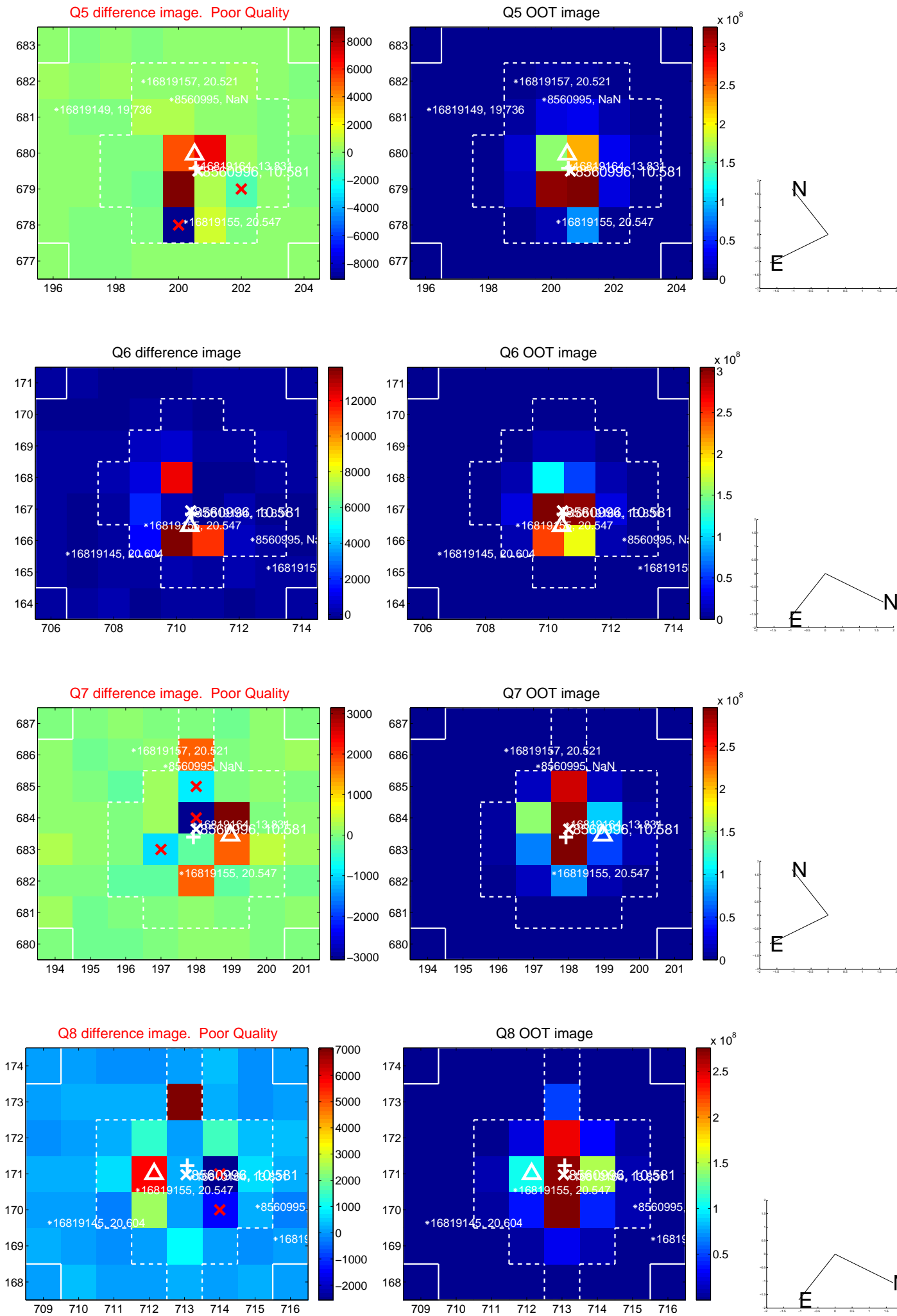


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ . Red *: target star. Blue *: Other stars. Text next to a star gives its KIC ID and kepmag. KIC IDs > 15,000,000 are from the UKIRT catalog.

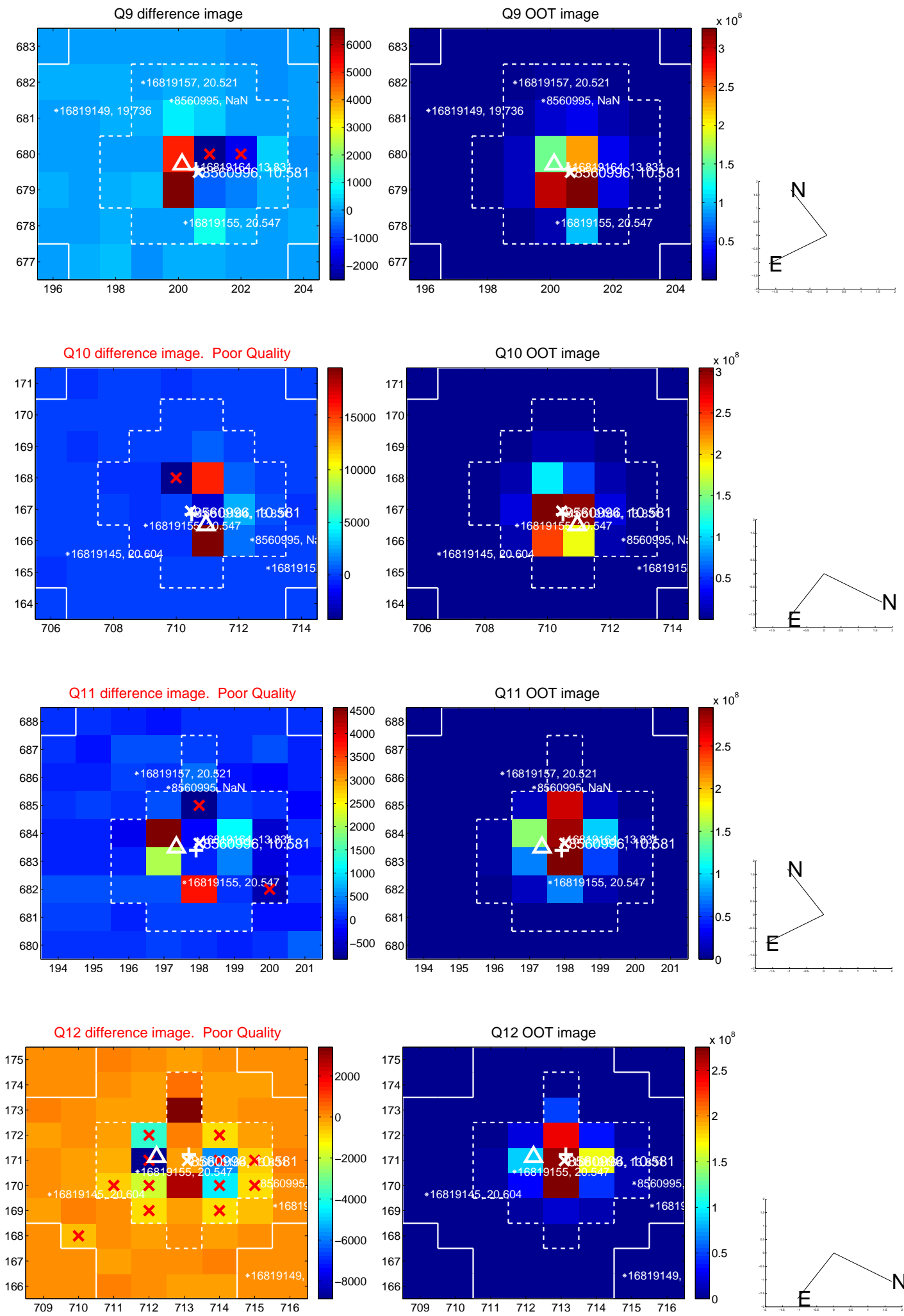
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



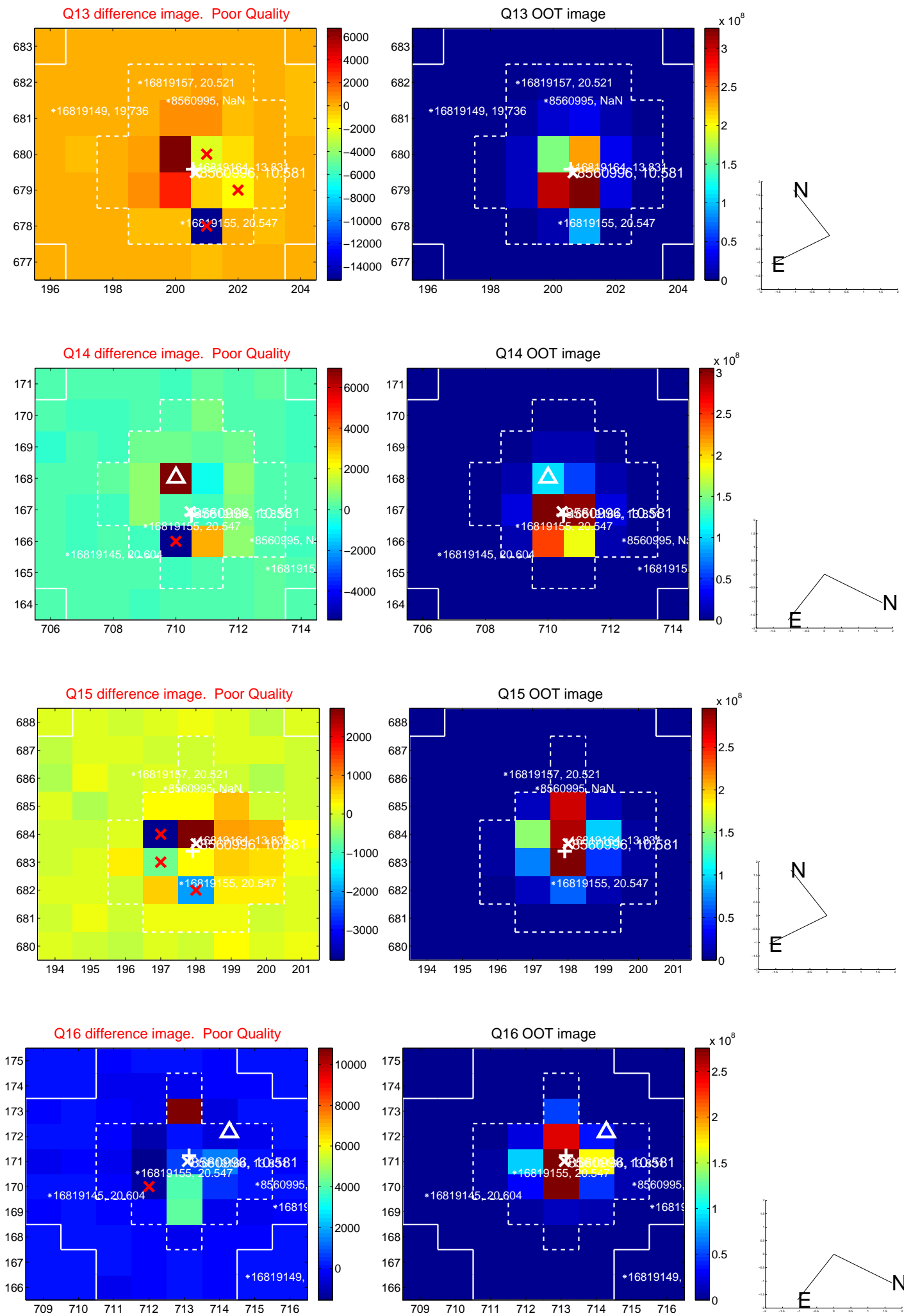
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



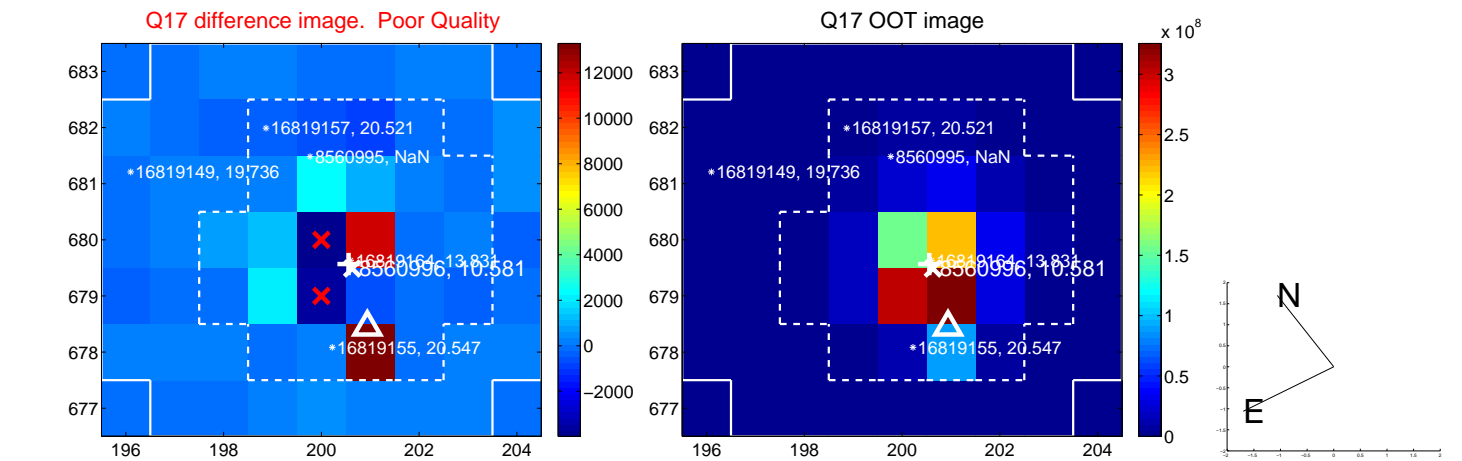
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.



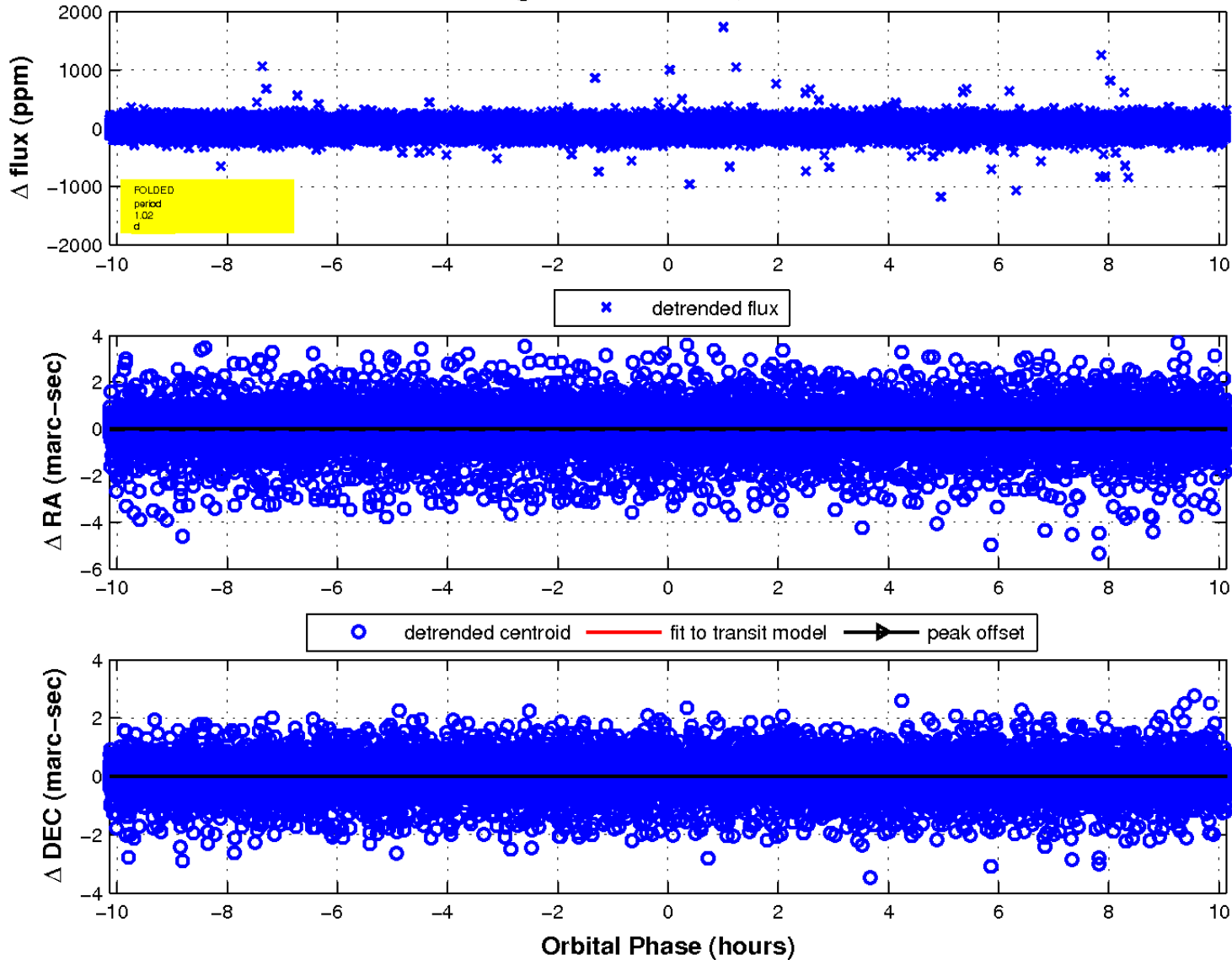
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



fluxWeightedCentroids, Planet 2 of 2



UKIRT Image

Declination

