

KIC 008456679

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}) |
|--------------|----------|---------|---------------|--------------|-------------|------------------|-------|-------|-----------------------------|-----------------|------------------------|------------------------|
| 008456679-01 | OBS | 0102.01 | 1.735129 | 131.592490 | 934.1 | 2.544 | 432.9 | 421.1 | 1.07 | 5751 | 3.91 | 1380.23 |
| 008456679-02 | OBS | 0102.02 | 4.068432 | 132.279535 | 80.1 | 2.916 | 22.5 | 24.4 | 1.07 | 5751 | 1.19 | 443.09 |

Robovetter Results

| TCE | Run Type | Disp | Score | N | S | C | E | Comments |
|--------------|----------|------|-------|---|---|---|---|----------------------|
| 008456679-01 | OBS | PC | 1.00 | 0 | 0 | 0 | 0 | CENT_KIC_POS |
| 008456679-02 | OBS | FP | 0.49 | 0 | 0 | 1 | 0 | CENT_RESOLVED_OFFSET |

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

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

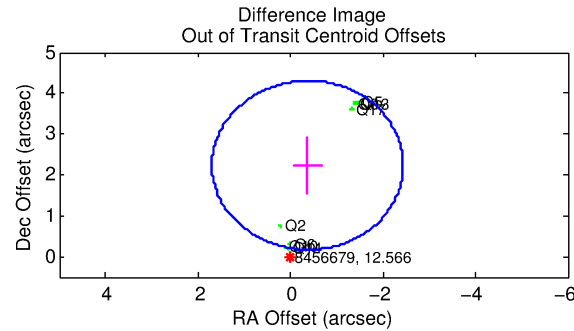
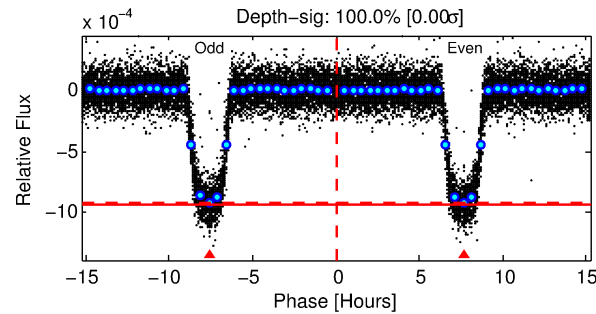
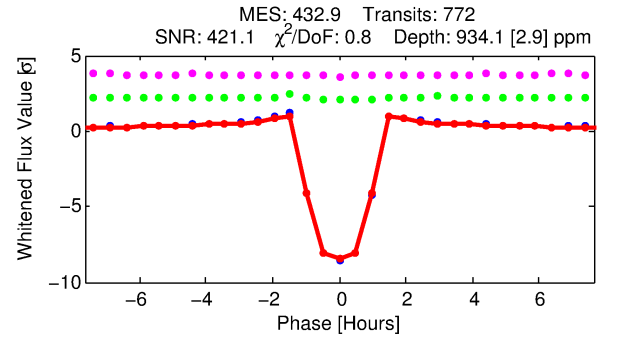
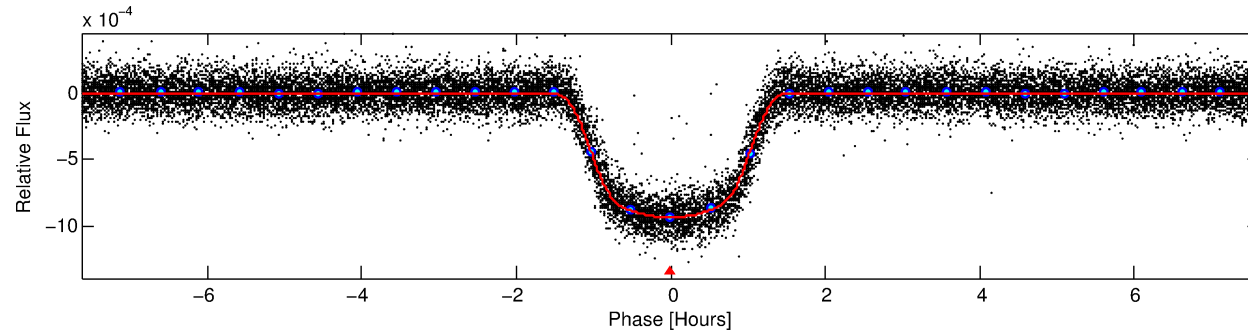
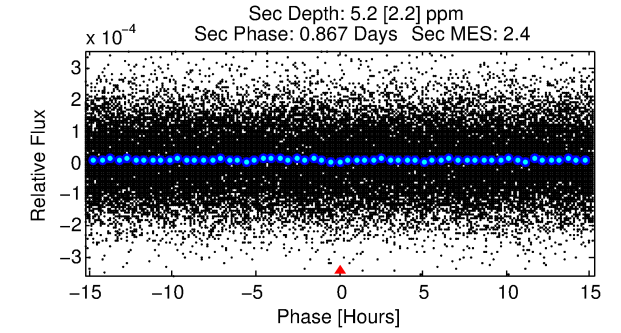
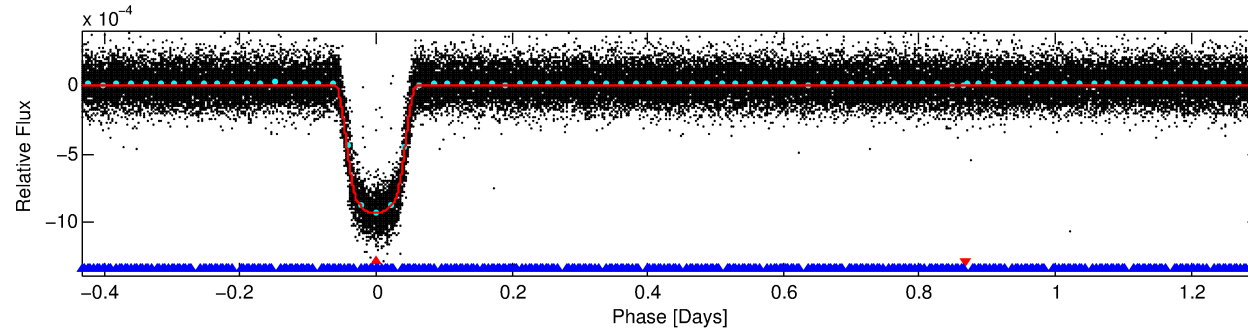
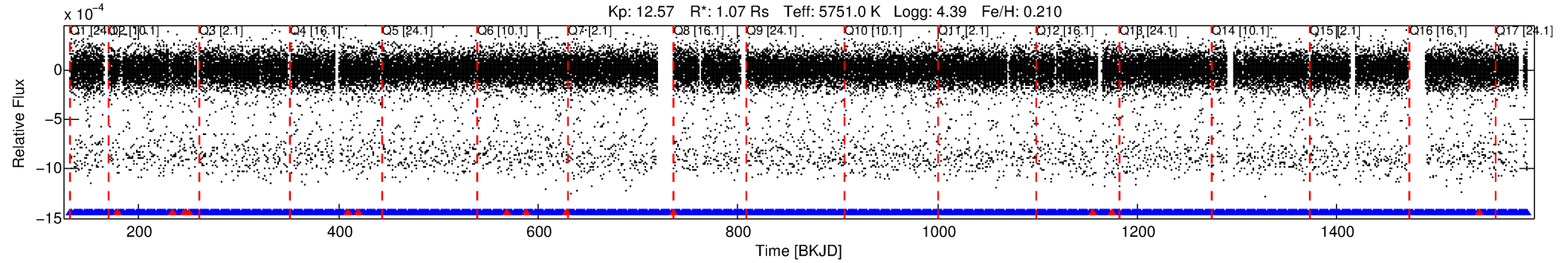
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 008456679-01

No Significant Match Found

DV One-Page Summary

KIC: 8456679 Candidate: 1 of 2 Period: 1.735 d
KOI: K00102.01 Corr: 0.946



DV Fit Results:

Period = 1.73513 [0.00000] d
Epoch = 131.5925 [0.0001] BKJD
Rp/R* = 0.0335 [0.0002]
a/R* = 2.81 [0.06]
b = 0.90 [0.01]
Seff = 1380.23 [315.82]
Teq = 1554 [89] K
Rp = 3.91 [0.65] Re
a = 0.0285 [0.0041] AU
Ag = 0.15 [0.07] [-11.80 σ]
Teffp = 1499 [162] K [-0.30 σ]

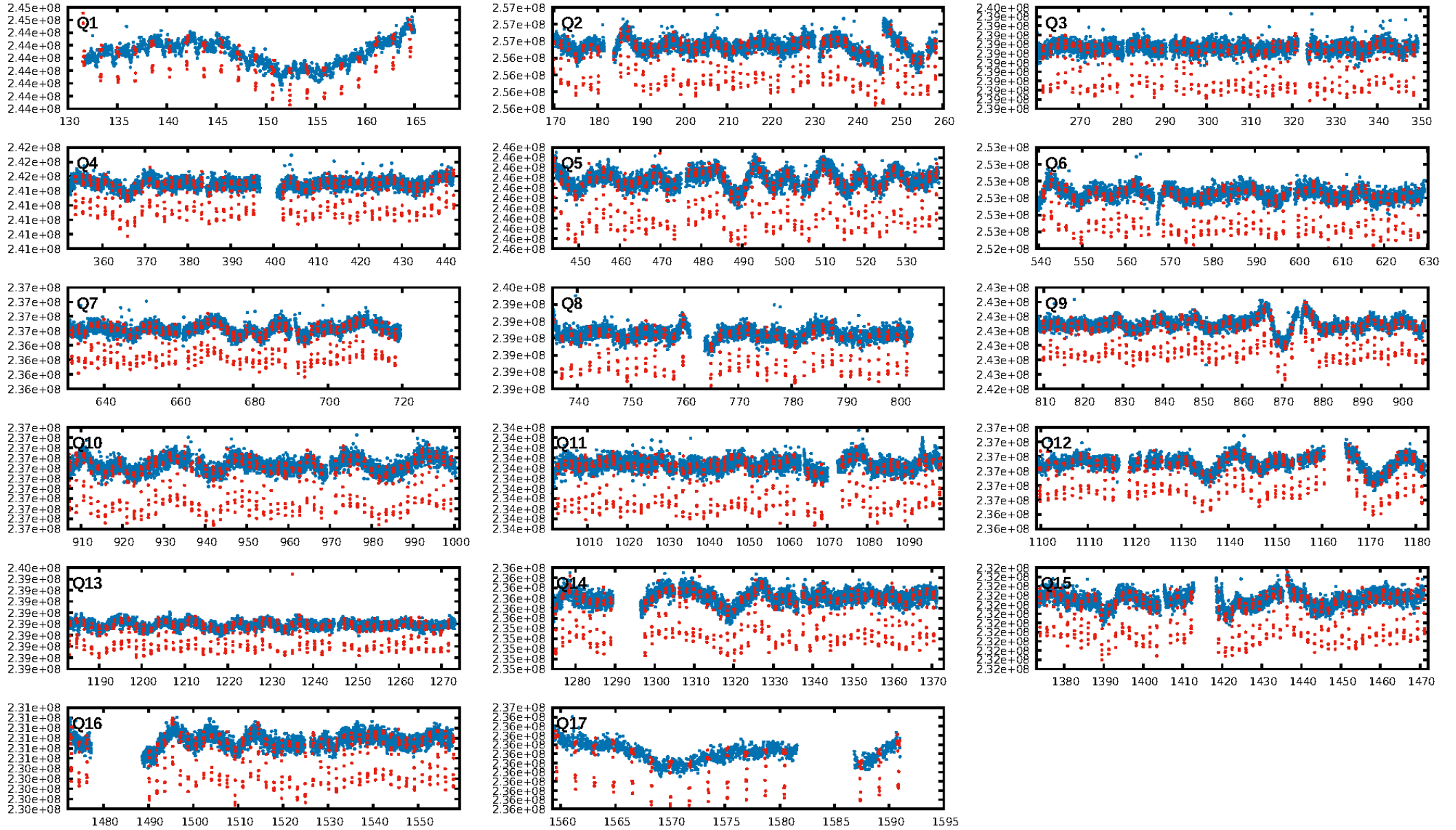
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [14.47 σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 0.00e+00
RollingBand-fgt: 0.98 [723/736]
GhostDiagnostic-chr: 13.1
Centroid-sig: 0.0%
Centroid-so: 1.271 arcsec [22.21 σ]
OotOffset-rm: 2.266 arcsec [3.29 σ]
KicOffset-rm: 0.072 arcsec [0.97 σ]
OotOffset-st: 4/0/0/4 [8]
KicOffset-st: 4/4/4/4 [16]
DiffImageQuality-fgm: 0.81 [13/16]
DiffImageOverlap-fno: 1.00 [17/17]

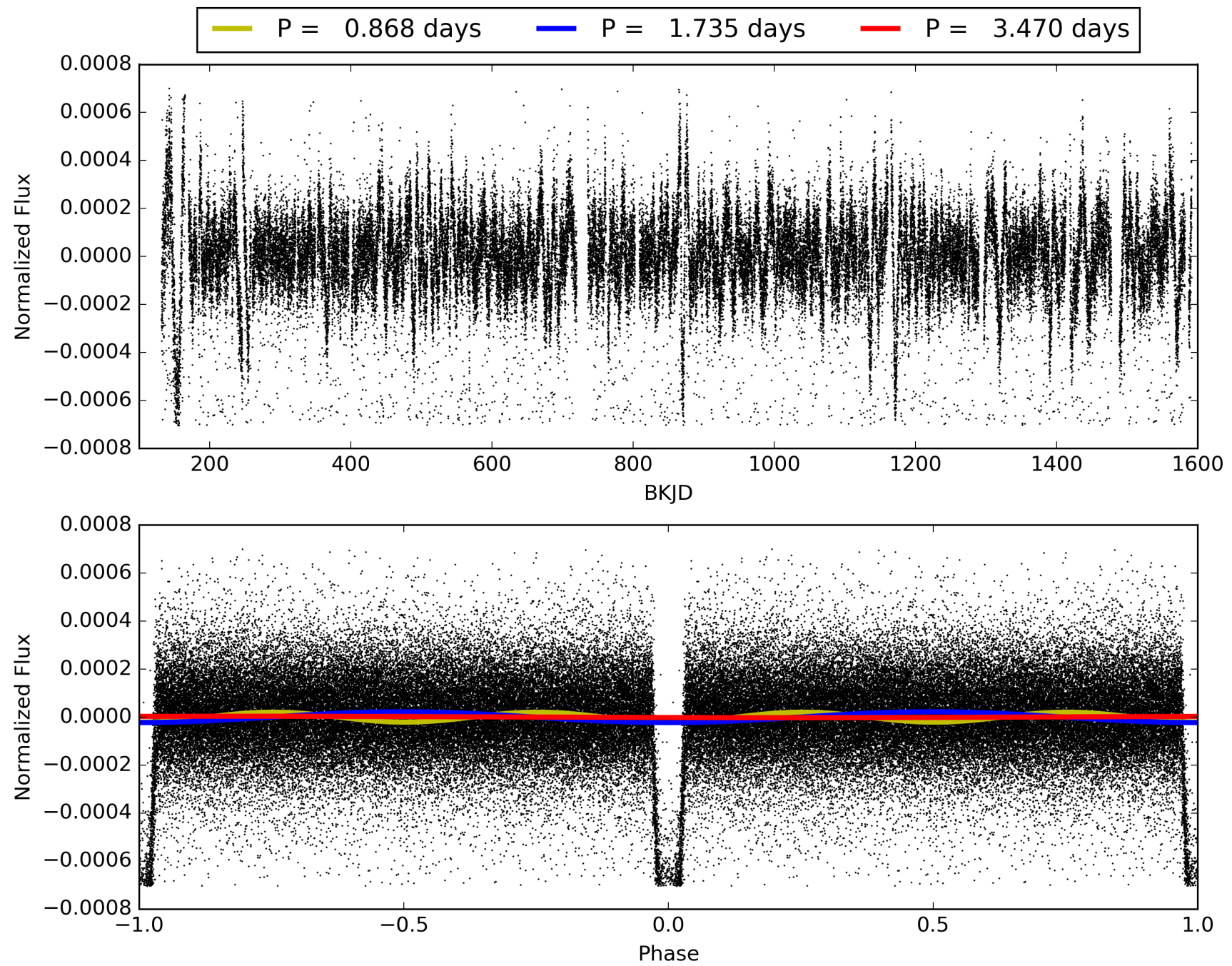
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 23:05:52 Z

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

TCE 008456679-01, PDC Light Curves

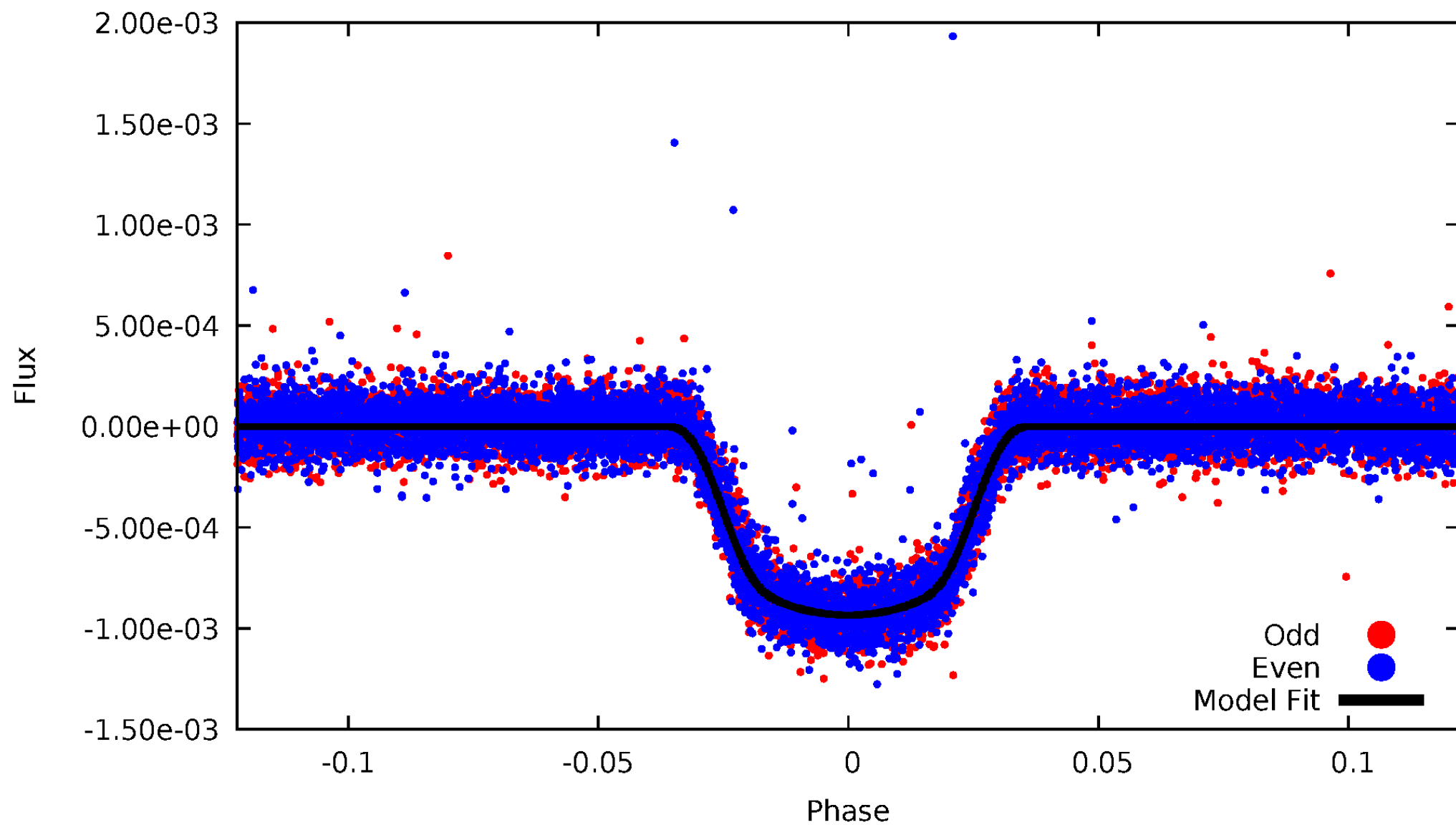


TCE 008456679-01



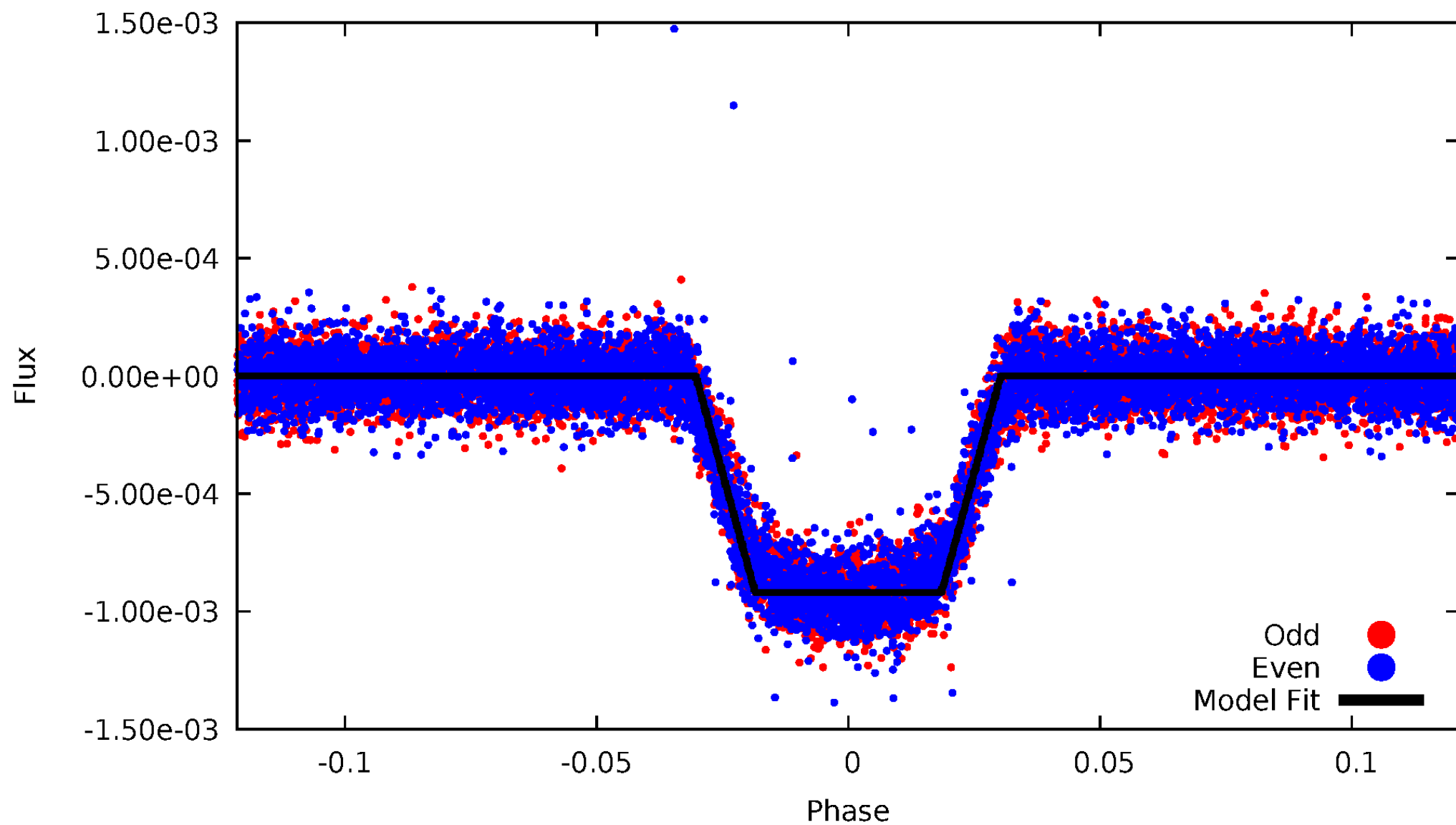
DV Odd/Even

TCE 008456679-01



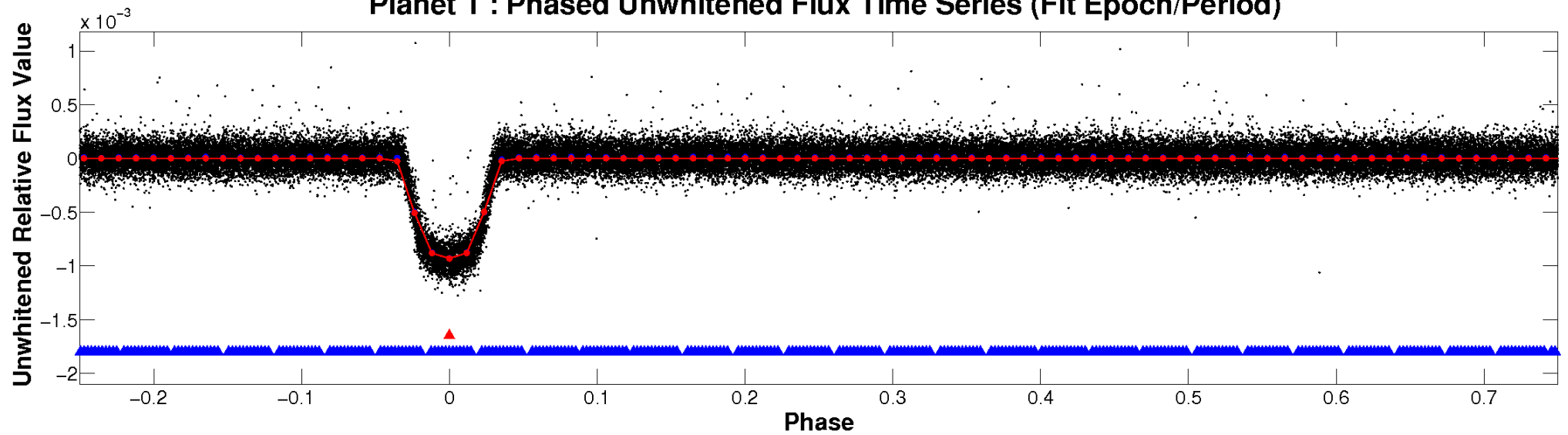
ALT Odd/Even

TCE 008456679-01

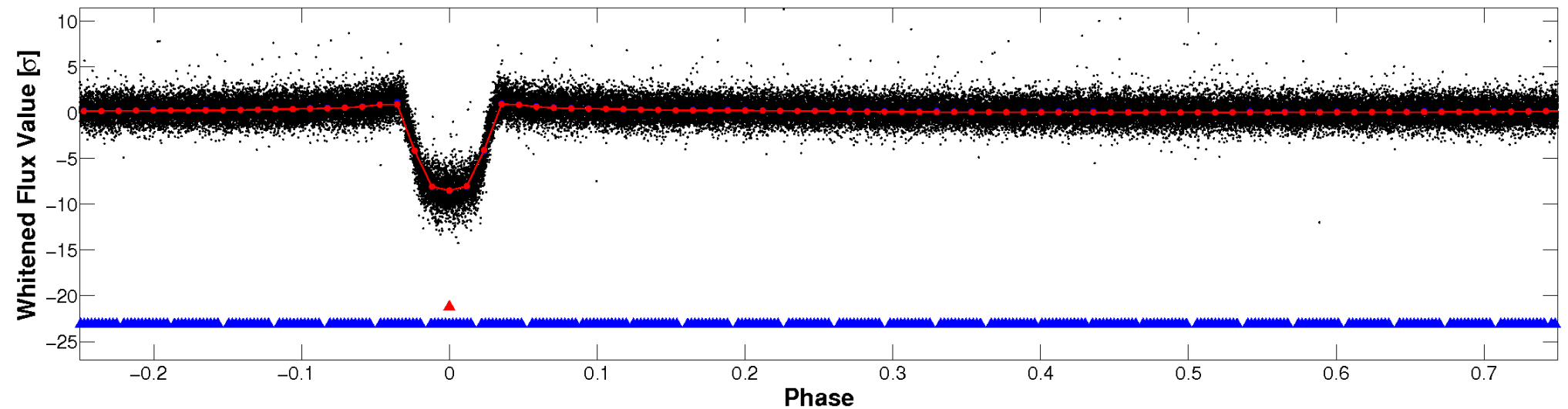


Non-Whitened Vs. Whitened Light Curve

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

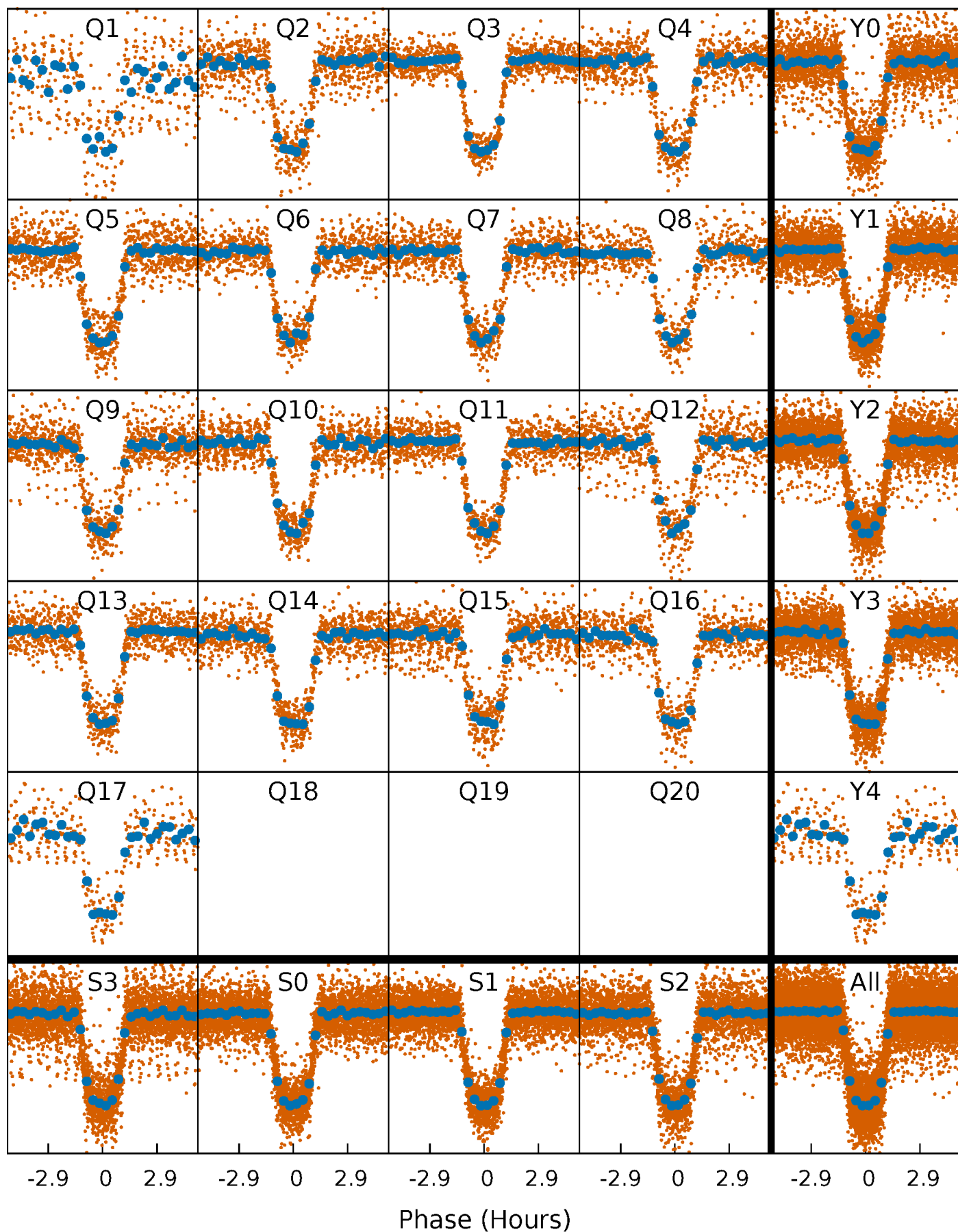


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



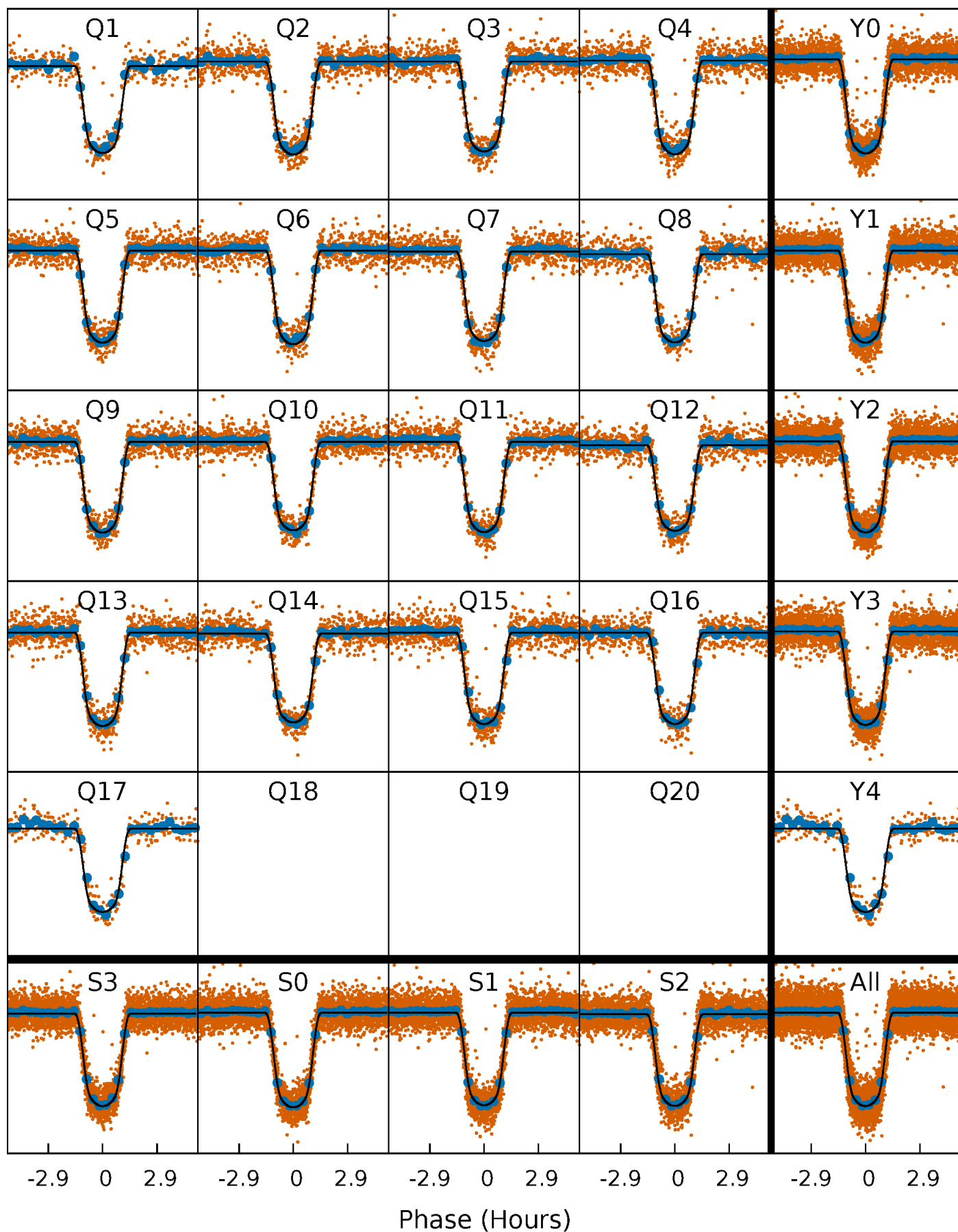
PDC Quarter-Phased Transit Curves

TCE 008456679-01 P= 1.735129 Days $T_0=131.592490$ (BKJD)



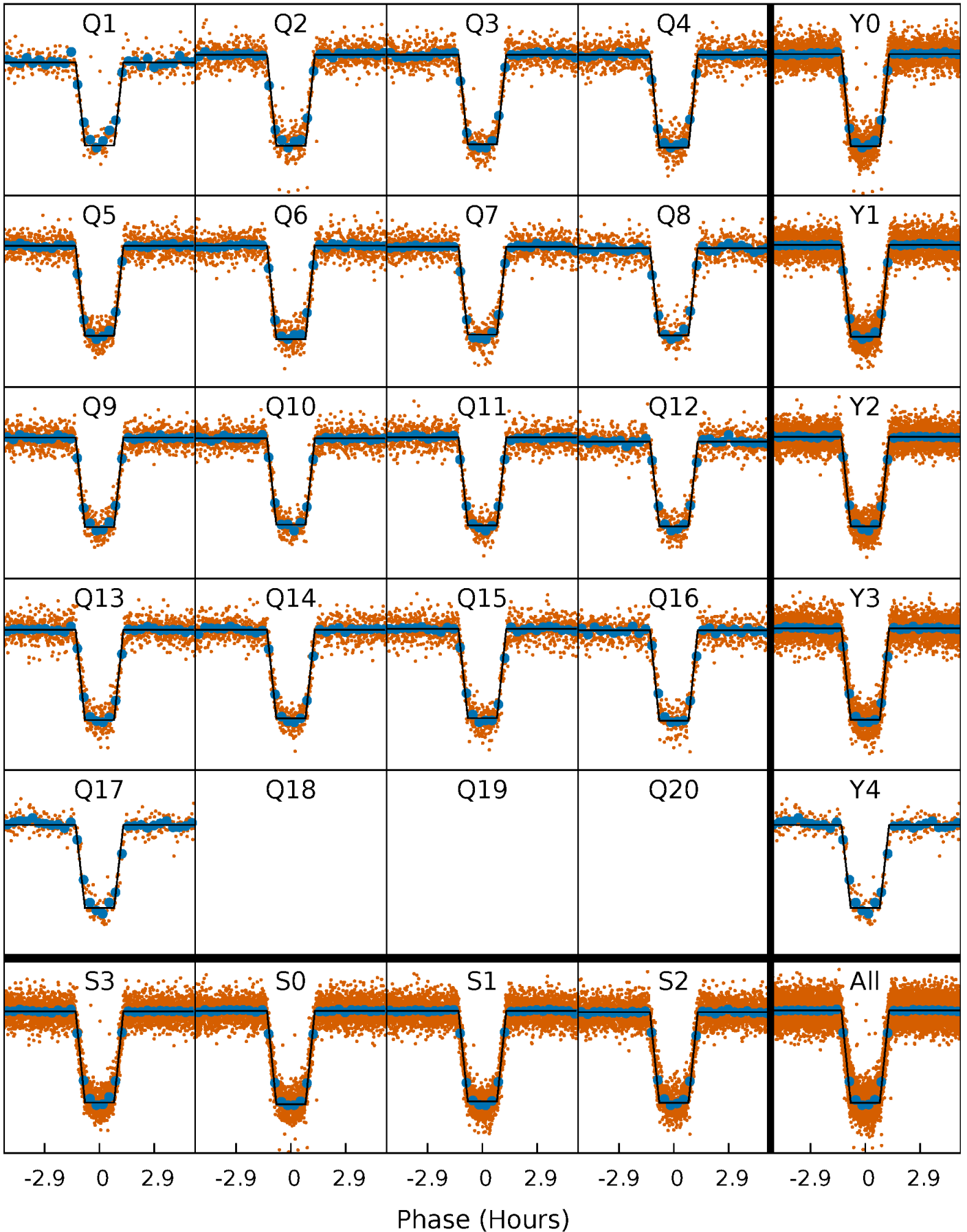
DV Quarter-Phased Transit Curves

TCE 008456679-01 P= 1.735129 Days $T_0=131.592490$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

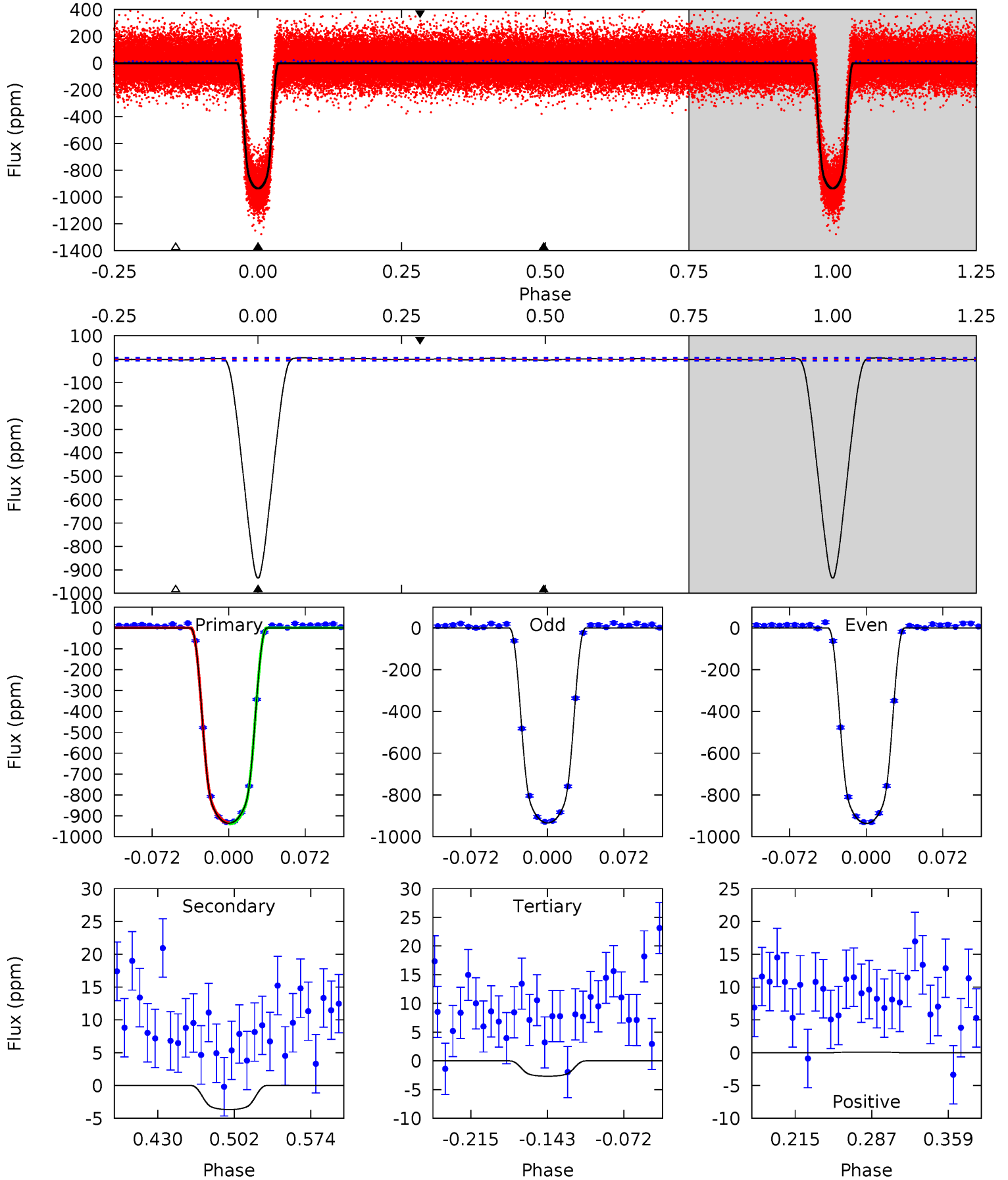
TCE 008456679-01 P= 1.735131 Days $T_0=131.592195$ (BKJD)



DV Model-Shift Uniqueness Test

008456679-01, P = 1.735129 Days, E = 129.857361 Days

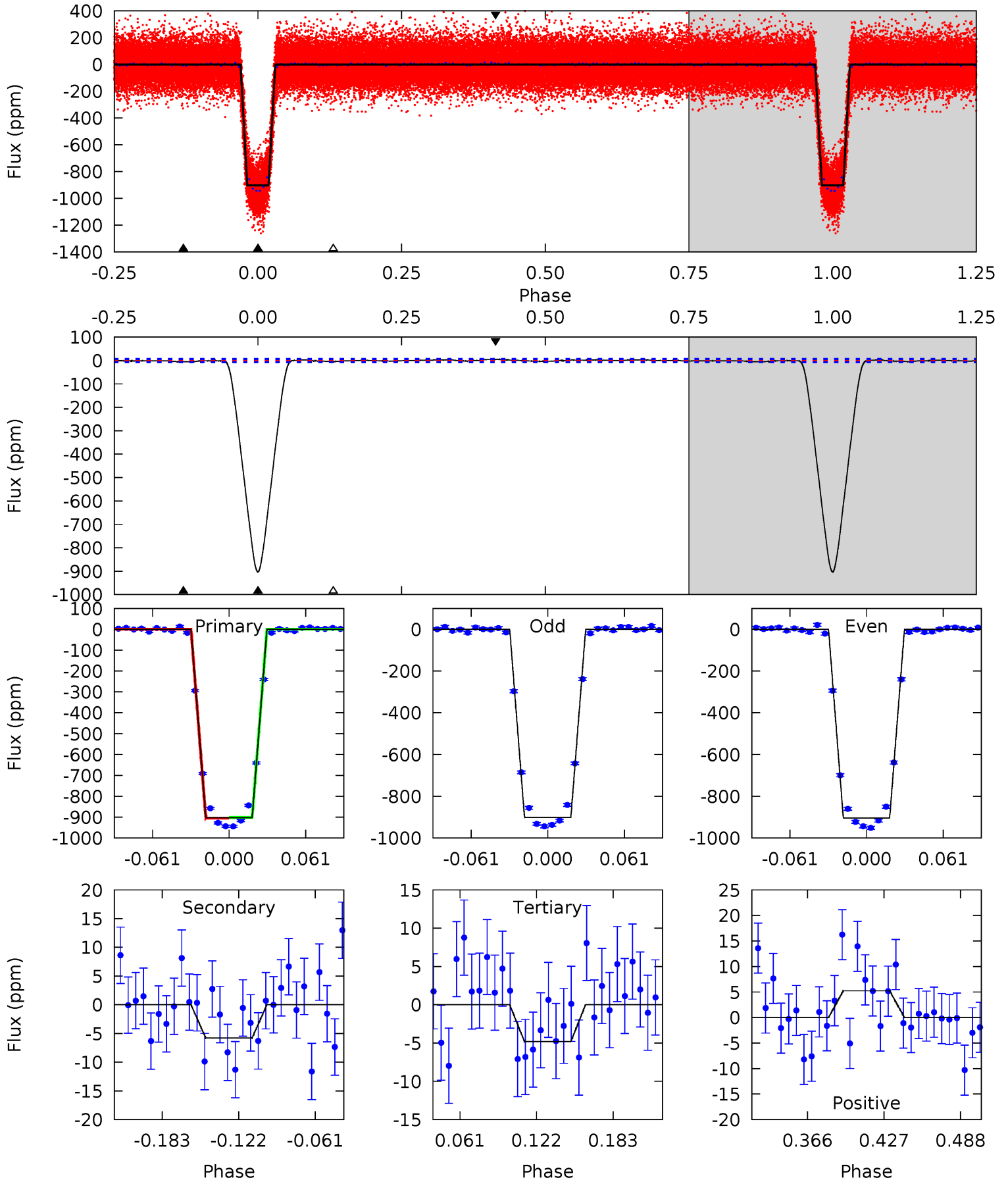
| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|-------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 671.4 | 2.64 | 1.92 | 0.07 | 4.63 | 1.80 | 1.36 | 669.5 | 671.3 | 0.72 | 2.57 | 0.71 | 1.00 | 0.01 | 2.21 |



Alt Model-Shift Uniqueness Test

008456679-01, P = 1.735131 Days, E = 129.857064 Days

| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|-------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 595.8 | 3.81 | 3.17 | 3.45 | 4.67 | 1.87 | 1.35 | 592.6 | 592.3 | 0.64 | 0.36 | 0.82 | 1.00 | 0.01 | 1.00 |



Stellar Parameters For KIC 008456679

| | $T_{\text{eff}}(K)$ | $\log(g)$ | [Fe/H] | R (R_{\odot}) | $M(M_{\odot})$ | p_{\star} ($\text{g}\cdot\text{cm}^{-3}$) |
|--------|----------------------|---------------------------|---------------------------|---------------------------|---------------------------|---|
| | 5751^{+103}_{-114} | $4.391^{+0.080}_{-0.120}$ | $0.210^{+0.150}_{-0.150}$ | $1.071^{+0.177}_{-0.109}$ | $1.028^{+0.074}_{-0.067}$ | $1.178^{+0.372}_{-0.396}$ |
| | +2%/-2% | +2%/-3% | +71%/-71% | +17%/-10% | +7%/-7% | +32%/-34% |
| Source | SPE59 | SPE59 | SPE59 | DSEP | | |

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

Secondary Eclipse Parameters for KIC 008456679-01 / KOI 0102.01

| Detrend | Depth (ppm) | R_p (R_{\oplus}) | T_{max} (K) | T_{obs} (K) | A_{obs} |
|---------|-------------|------------------------|--------------------|-----------------------|---------------------------|
| DV | -4 ± 1 | $3.94^{+0.37}_{-0.25}$ | 2180^{+99}_{-78} | -2473^{+99}_{-91} | $0.099^{+0.050}_{-0.037}$ |
| Alt. | -6 ± 2 | $3.56^{+0.32}_{-0.21}$ | 2178^{+95}_{-80} | -2286^{+239}_{-156} | $0.196^{+0.066}_{-0.057}$ |

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 $T_{obs} \gg T_{max}$ AND $A_{obs} \gg 1.0$

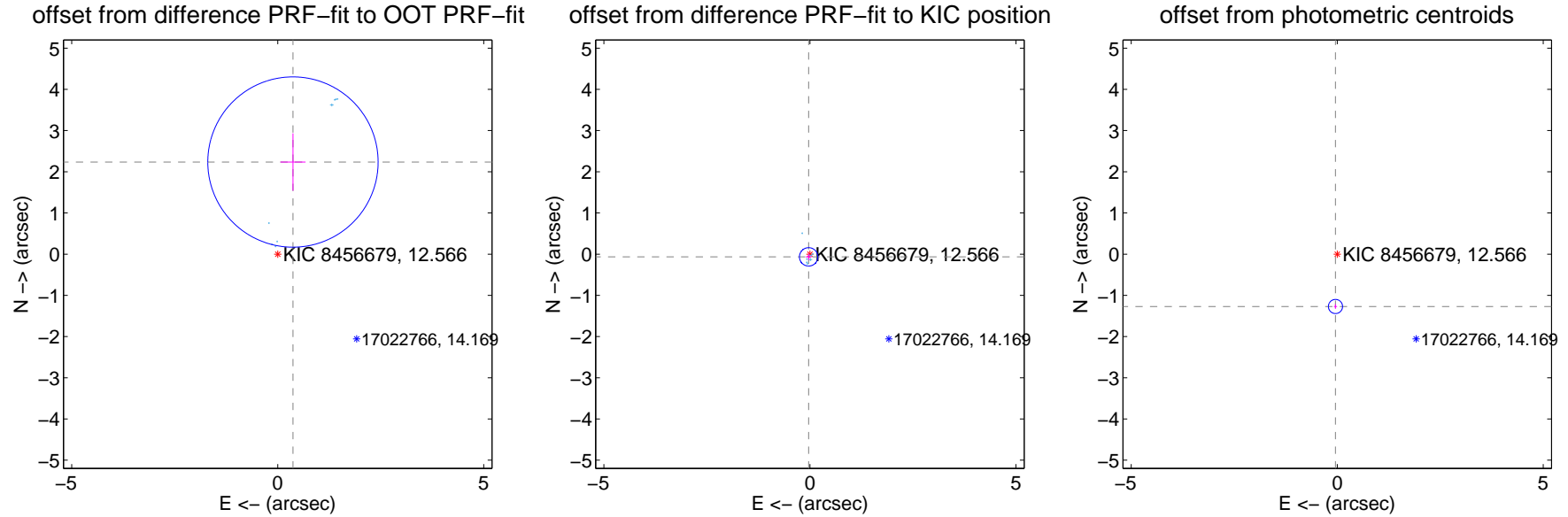
DV Centroid Data

Supplemental centroid analysis for 008456679-01. Kepler magnitude: 12.57. Transit SNR 421.06

There are 13 quarters with good PRF difference image offsets

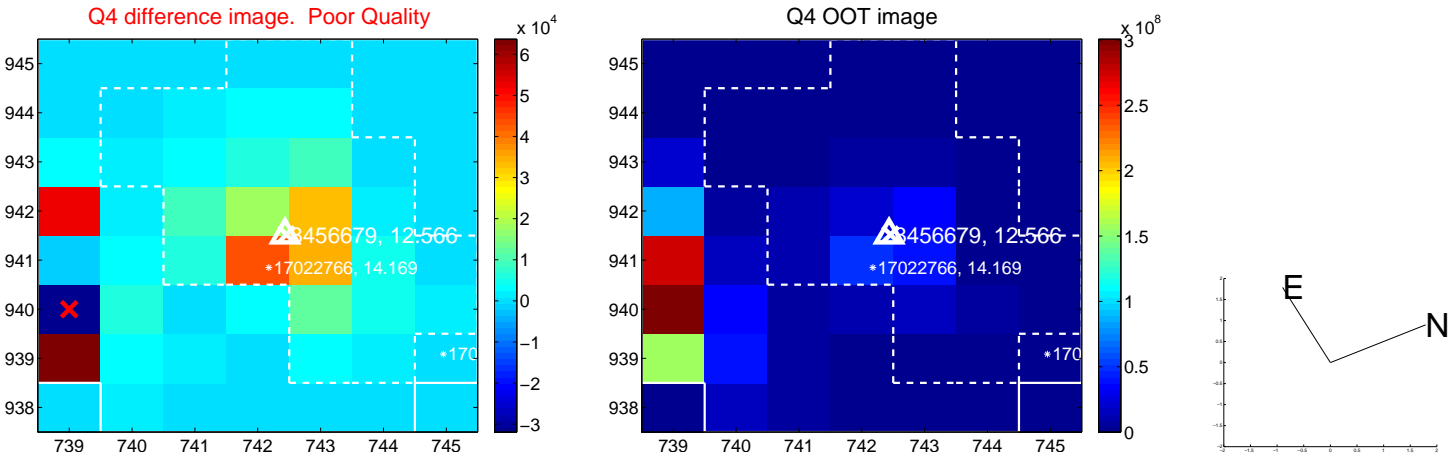
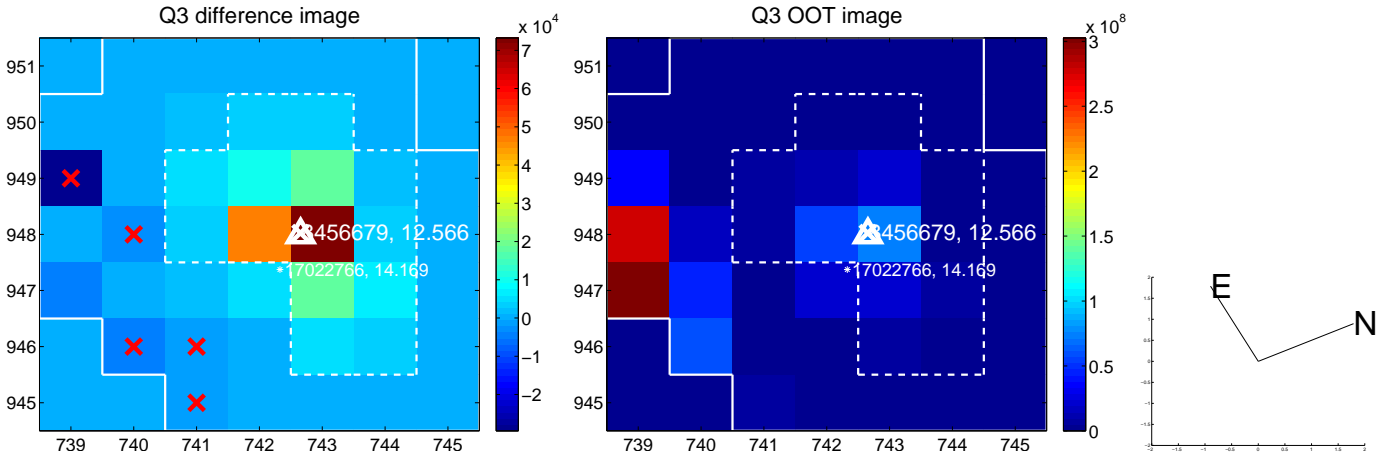
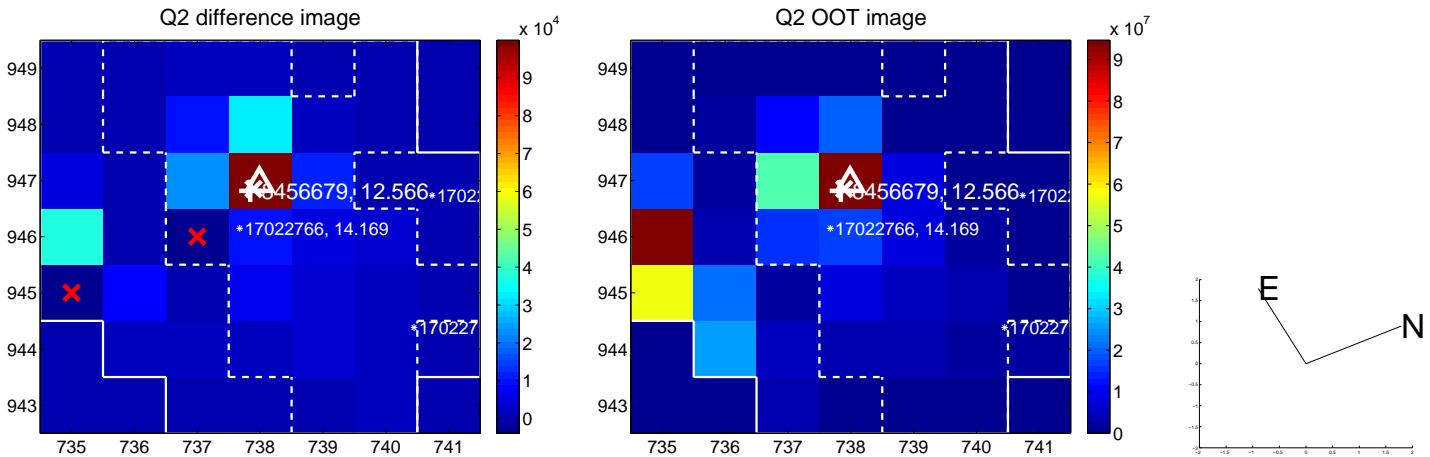
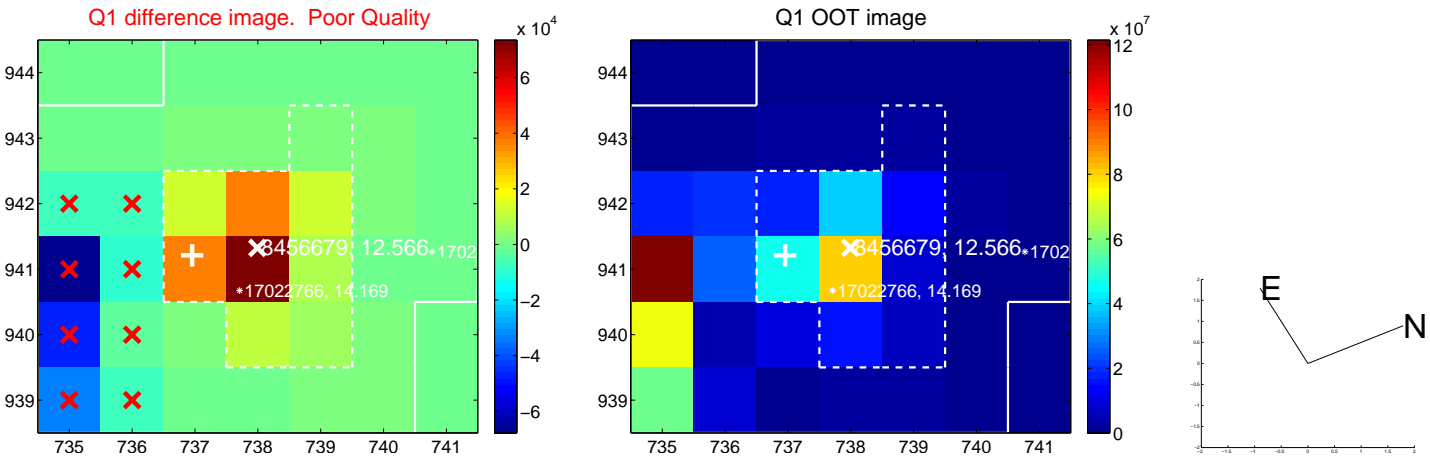
The OOT PRF centroid is offset from the target star catalog position by about 3.97 arcsec so the offset from difference PRF-fit to OOT-fit may be invalid.

| | Distance in arcsec | Distance / σ | Δ RA | Δ Dec |
|---|--------------------|---------------------|--------------------|--------------------|
| PRF-fit source offset from OOT | 2.266 ± 0.689 | 3.29 | -0.370 ± 0.305 | 2.236 ± 0.696 |
| PRF-fit source offset from KIC position | 0.072 ± 0.074 | 0.97 | 0.030 ± 0.071 | -0.065 ± 0.078 |
| photometric centroid source offset | 1.27 ± 0.06 | 22.21 | 0.04 ± 0.04 | -1.27 ± 0.06 |

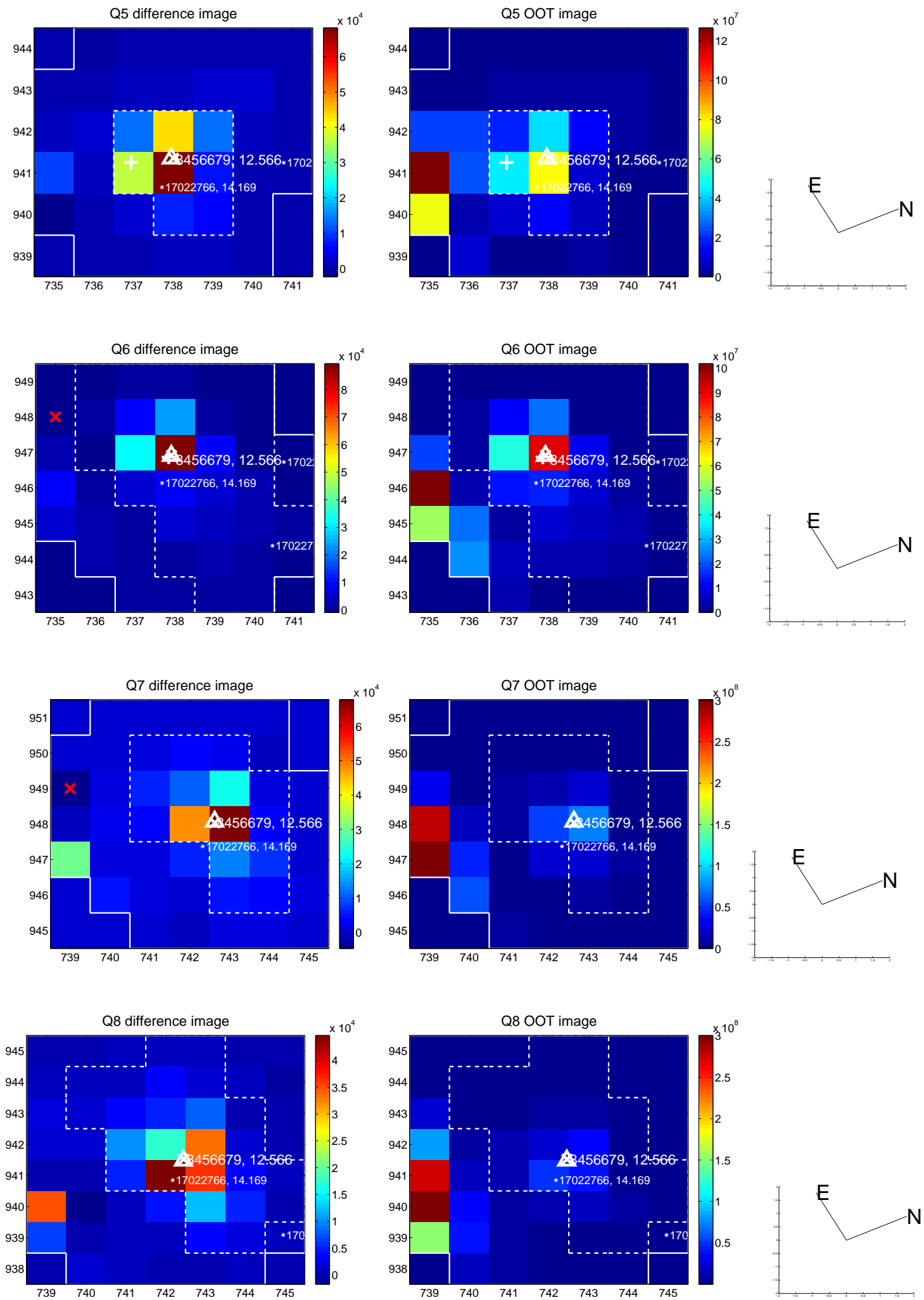


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ . 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.

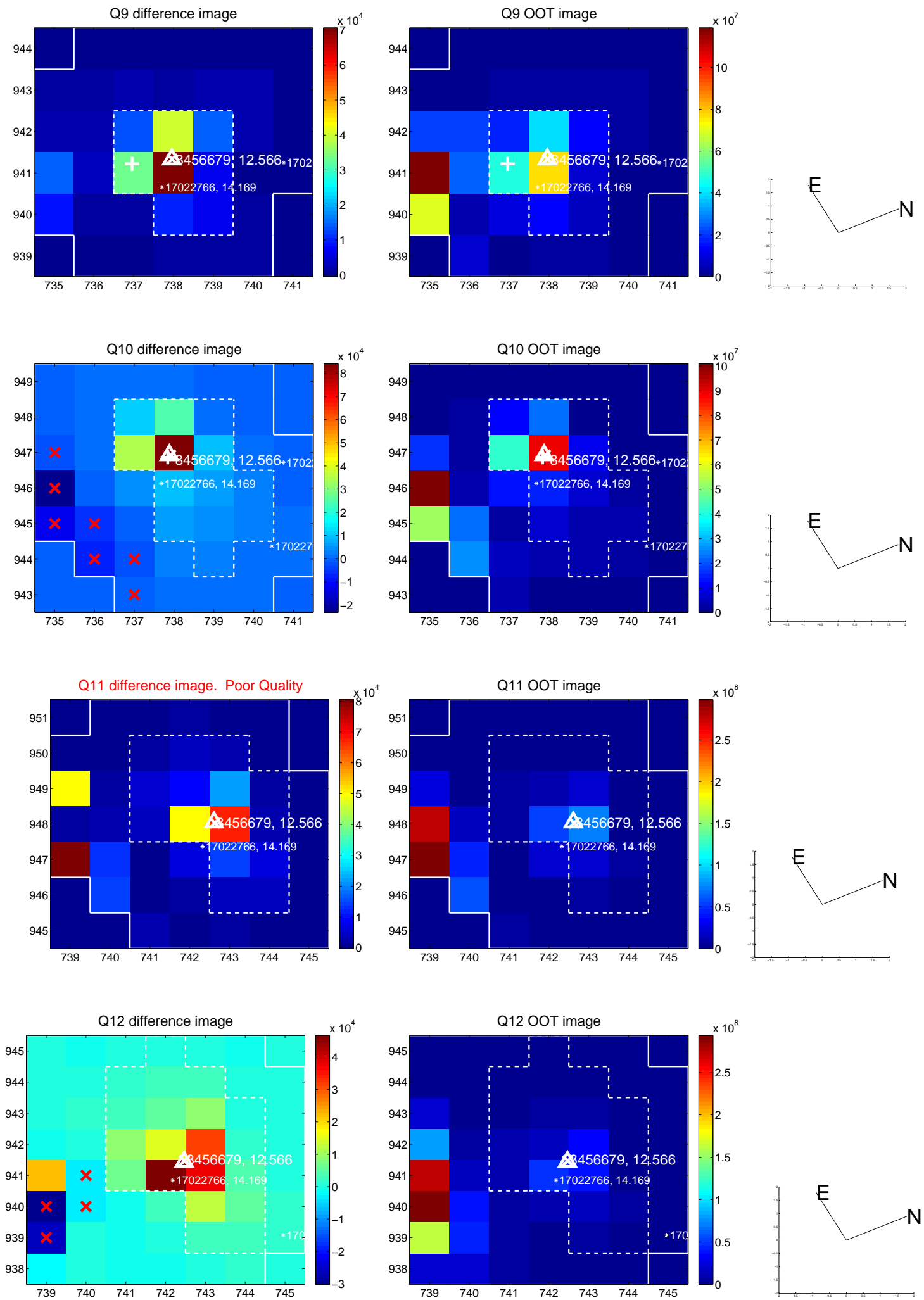
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



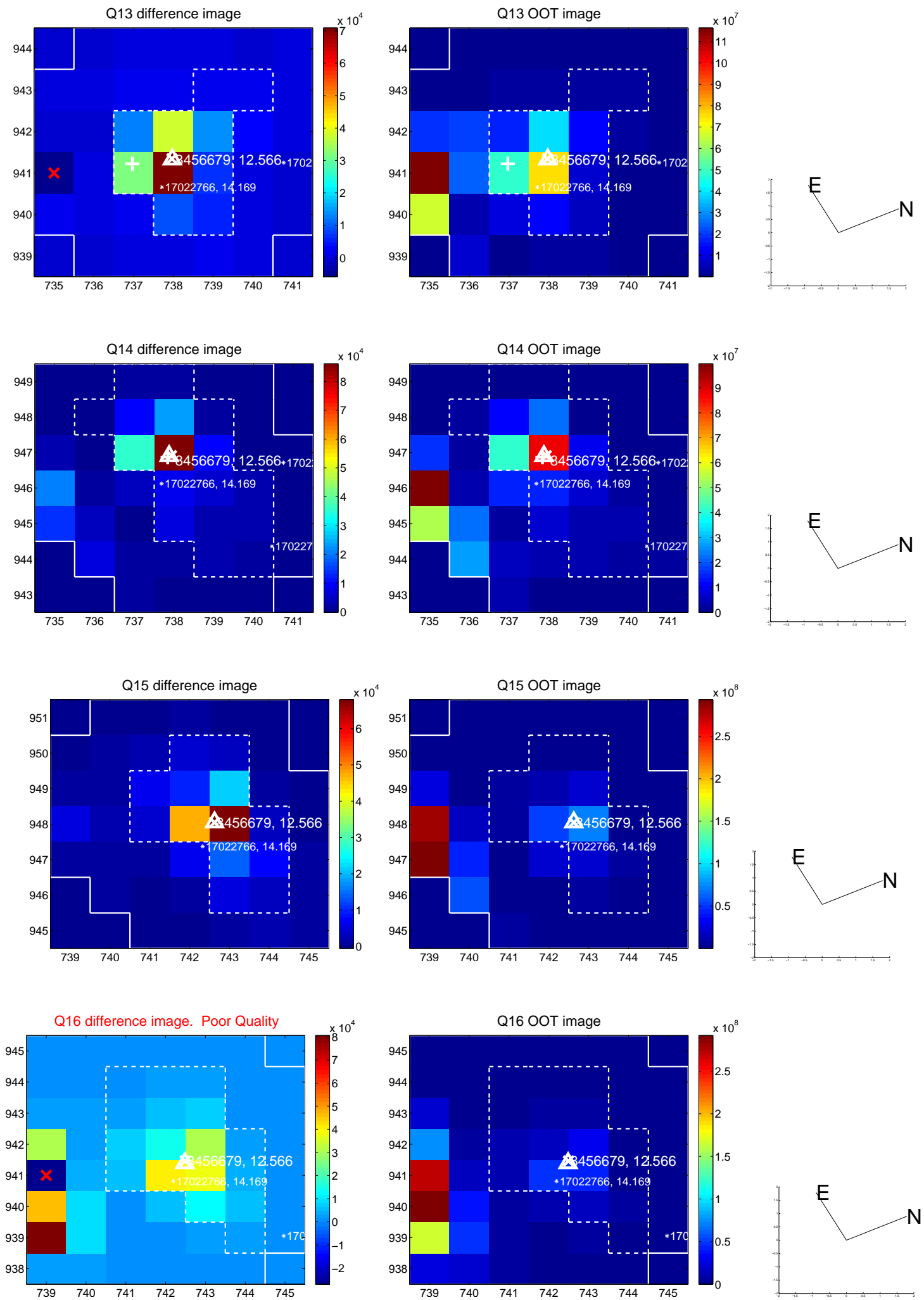
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



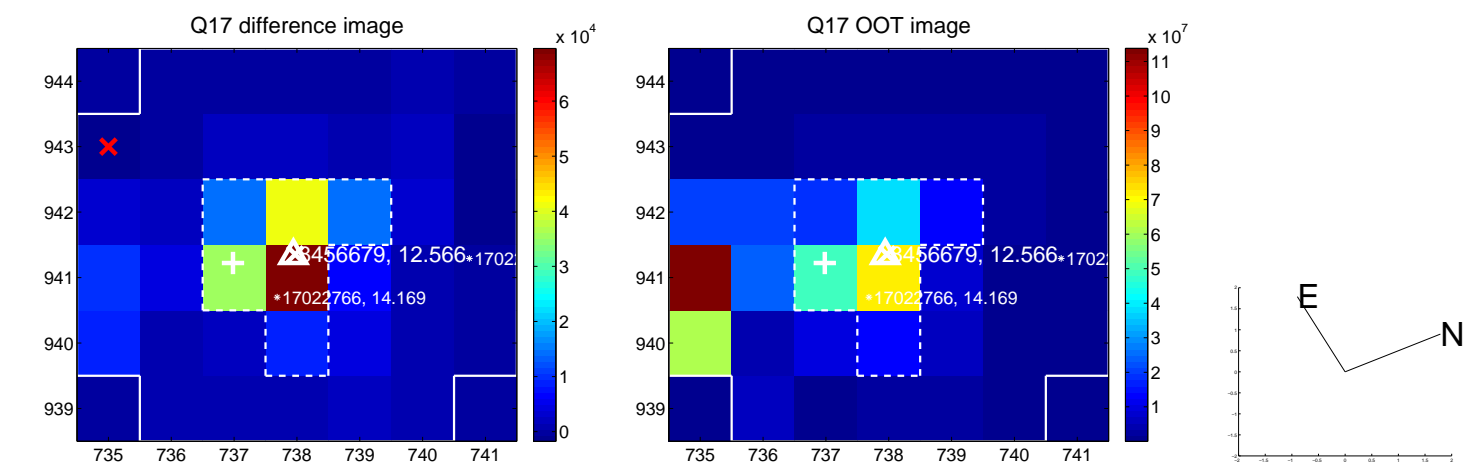
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



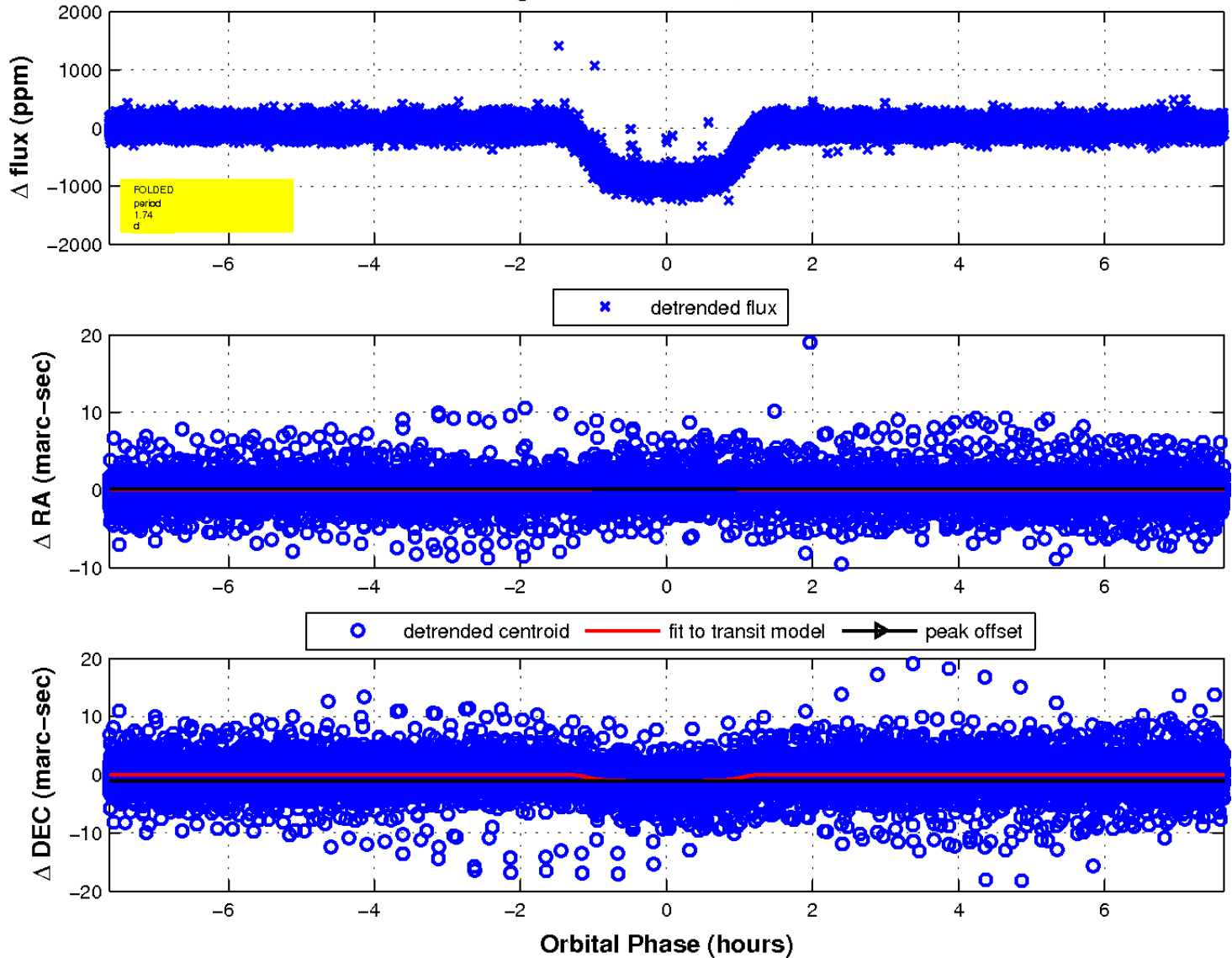
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

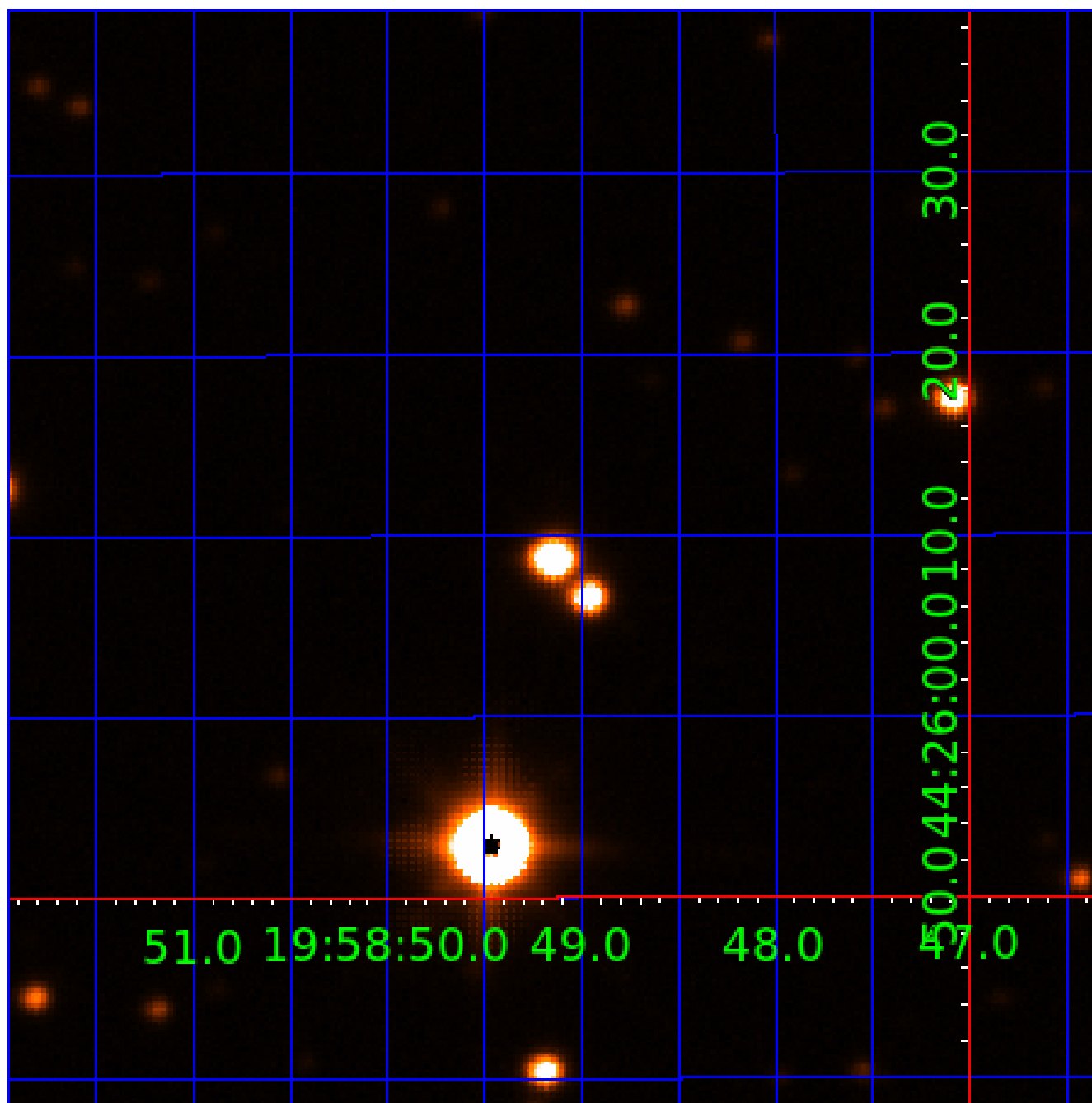


fluxWeightedCentroids, Planet 1 of 2



UKIRT Image

Declination



KIC 008456679

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}) |
|--------------|----------|---------|---------------|--------------|-------------|------------------|-------|-------|-----------------------------|-----------------|------------------------|------------------------|
| 008456679-01 | OBS | 0102.01 | 1.735129 | 131.592490 | 934.1 | 2.544 | 432.9 | 421.1 | 1.07 | 5751 | 3.91 | 1380.23 |
| 008456679-02 | OBS | 0102.02 | 4.068432 | 132.279535 | 80.1 | 2.916 | 22.5 | 24.4 | 1.07 | 5751 | 1.19 | 443.09 |

Robovetter Results

| TCE | Run Type | Disp | Score | N | S | C | E | Comments |
|--------------|----------|------|-------|---|---|---|---|----------------------|
| 008456679-01 | OBS | PC | 1.00 | 0 | 0 | 0 | 0 | CENT_KIC_POS |
| 008456679-02 | OBS | FP | 0.49 | 0 | 0 | 1 | 0 | CENT_RESOLVED_OFFSET |

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

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

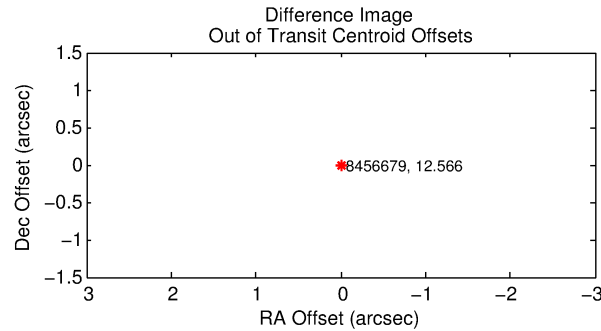
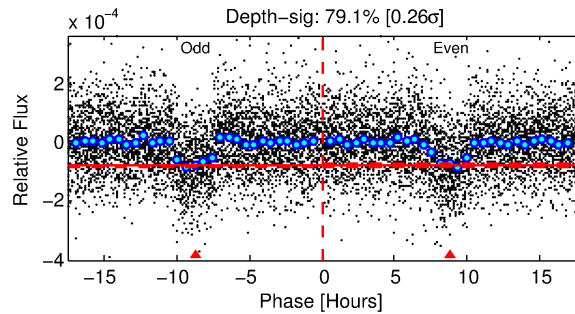
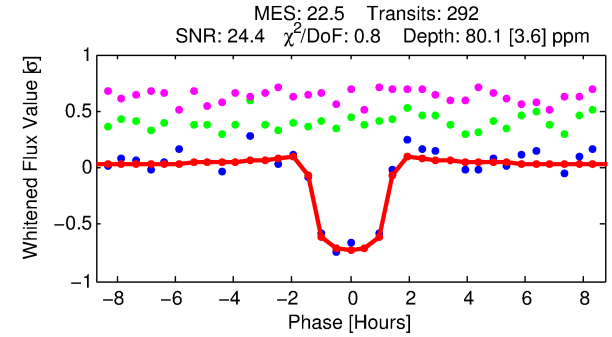
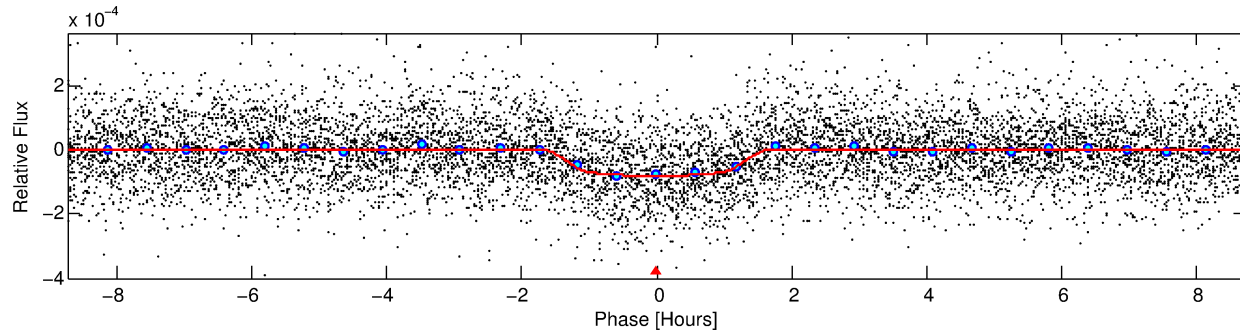
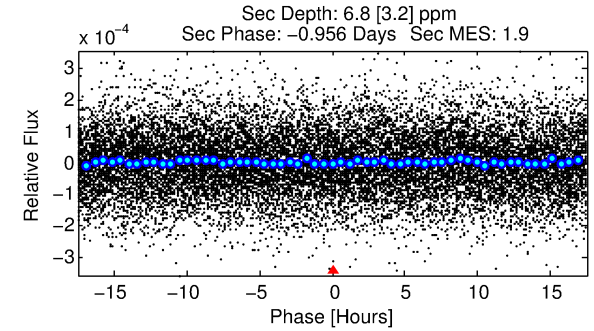
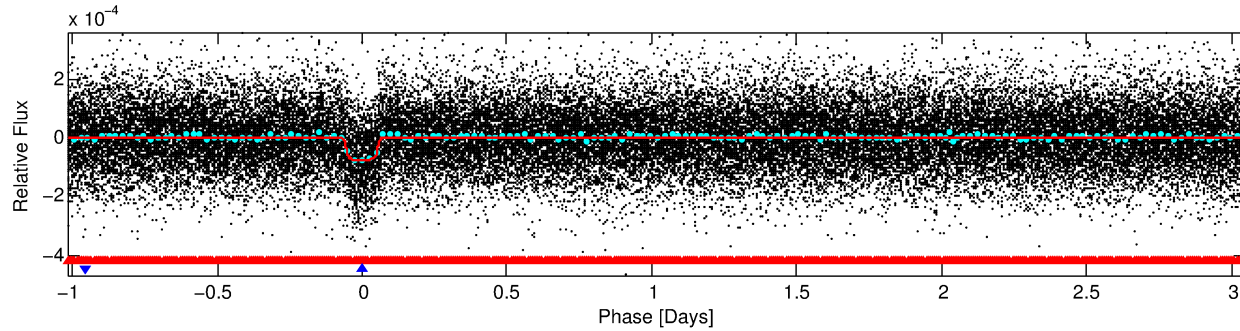
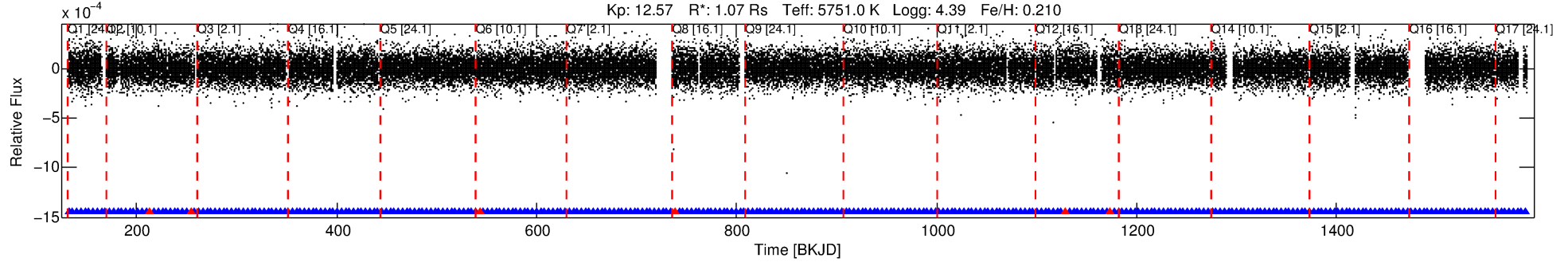
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 008456679-02

No Significant Match Found

DV One-Page Summary

KIC: 8456679 Candidate: 2 of 2 Period: 4.068 d
KOI: K00102.02 Corr: 0.979



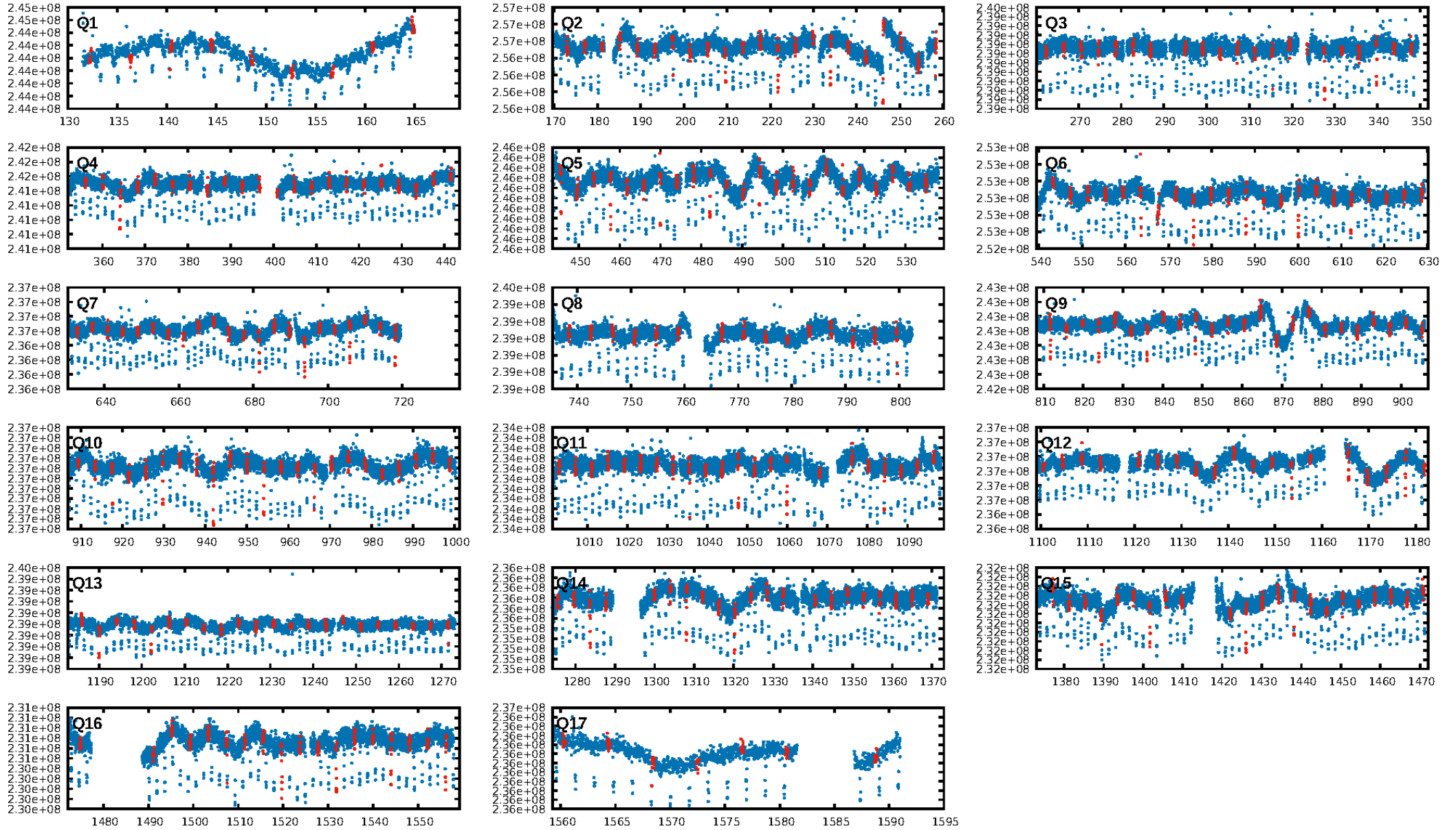
DV Fit Results:

Period = 4.06843 [0.00001] d
Epoch = 132.2795 [0.0018] BKJD
Rp/R* = 0.0102 [0.0020]
a/R* = 4.27 [3.85]
b = 0.93 [0.14]
Seff = 443.09 [101.39]
Teff = 1170 [67] K
Rp = 1.19 [0.30] Re
a = 0.0504 [0.0072] AU
Ag = 6.73 [4.35] [1.32σ]
Teffp = 2913 [448] K [3.85σ]

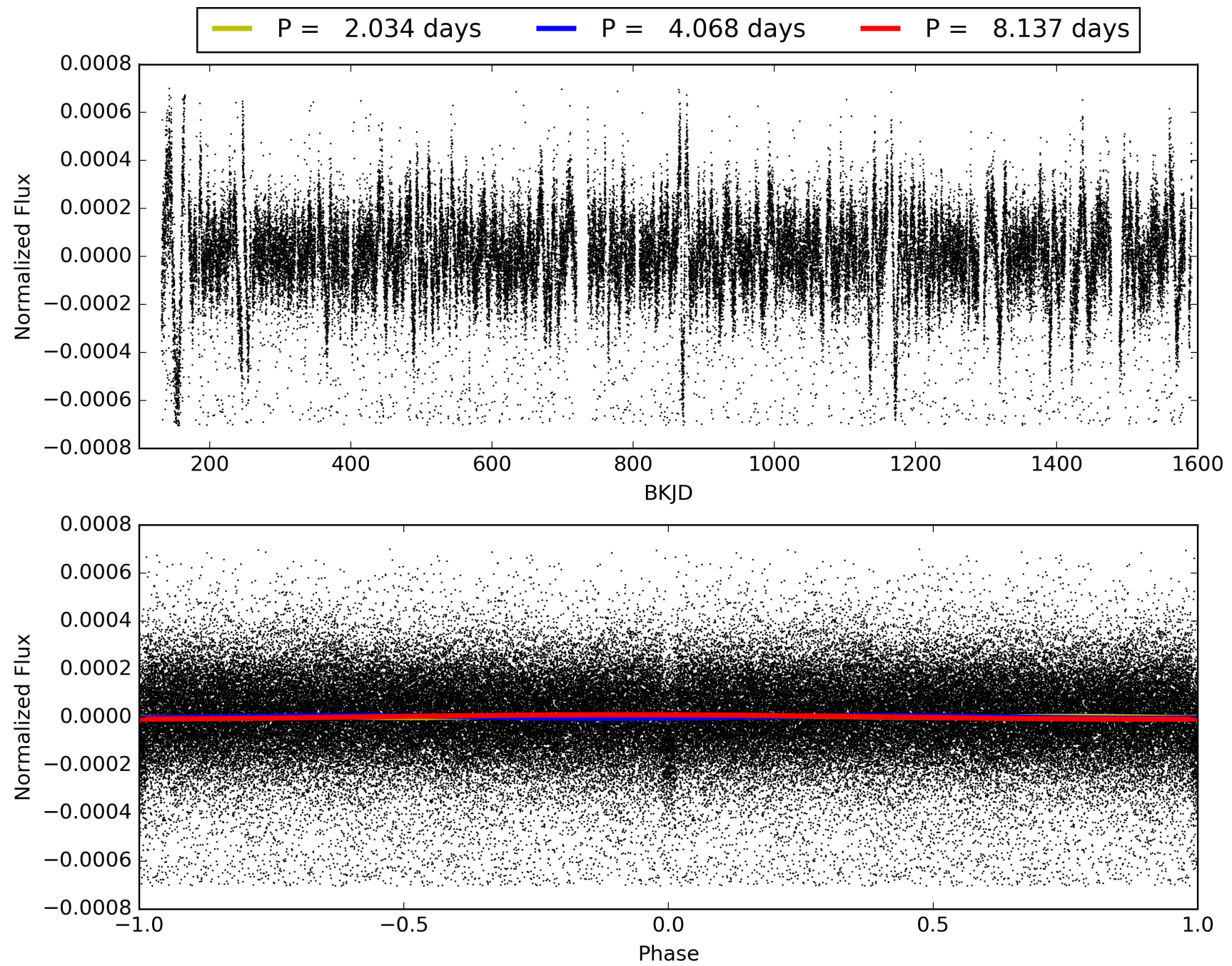
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [14.47σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 4.96e-102
RollingBand-fgt: 0.98 [270/276]
GhostDiagnostic-chr: -7.916
Centroid-sig: 37.1%
Centroid-so: 1.617 arcsec [1.57σ]
OotOffset-rm: N/A
KicOffset-rm: 2.034 arcsec [5.14σ]
OotOffset-st: 0/0/0 [0]
KicOffset-st: 0/1/0 [1]
DiffImageQuality-fgm: 0.00 [0/1]
DiffImageOverlap-fno: 1.00 [17/17]

TCE 008456679-02, PDC Light Curves

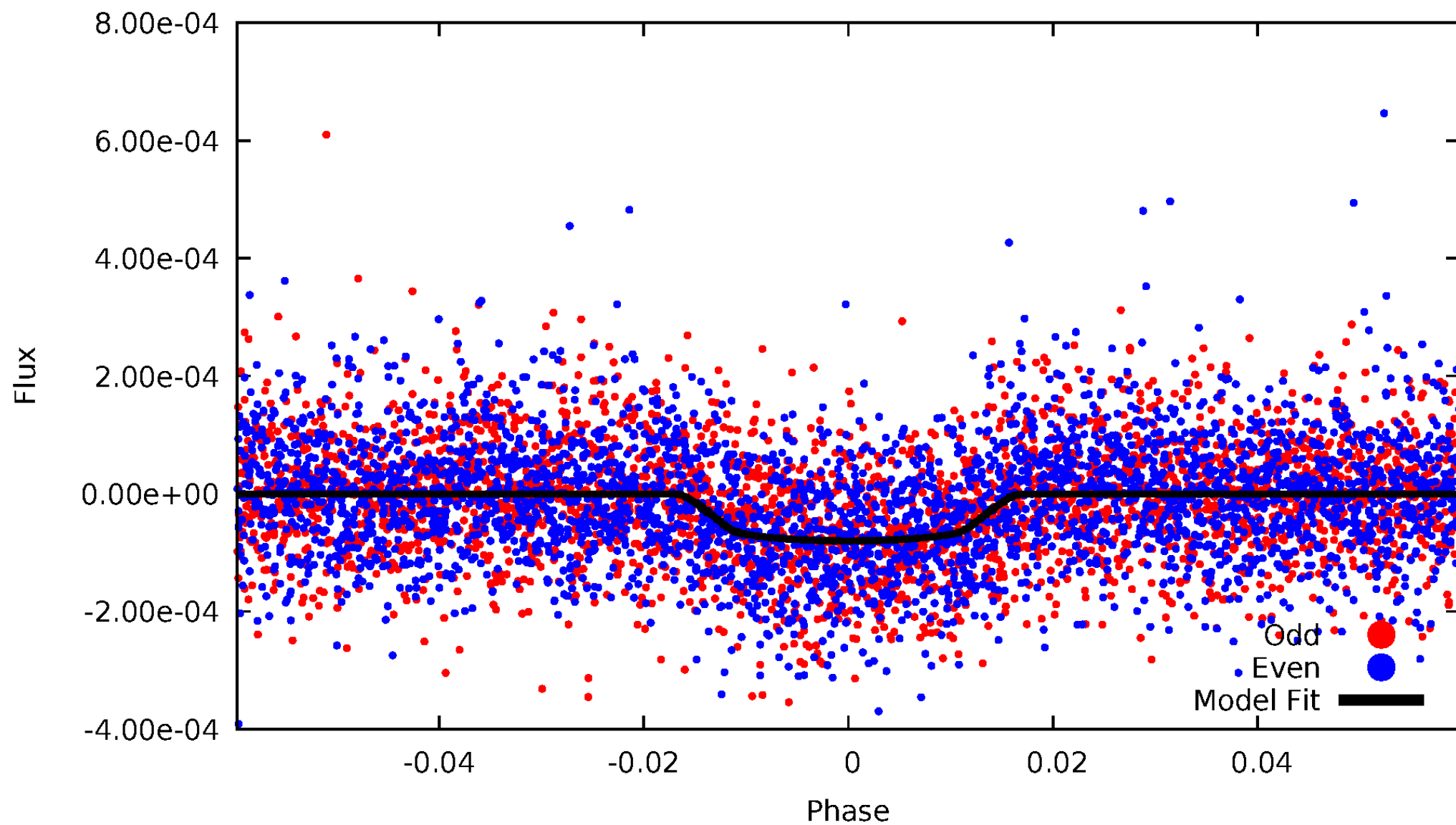


TCE 008456679-02



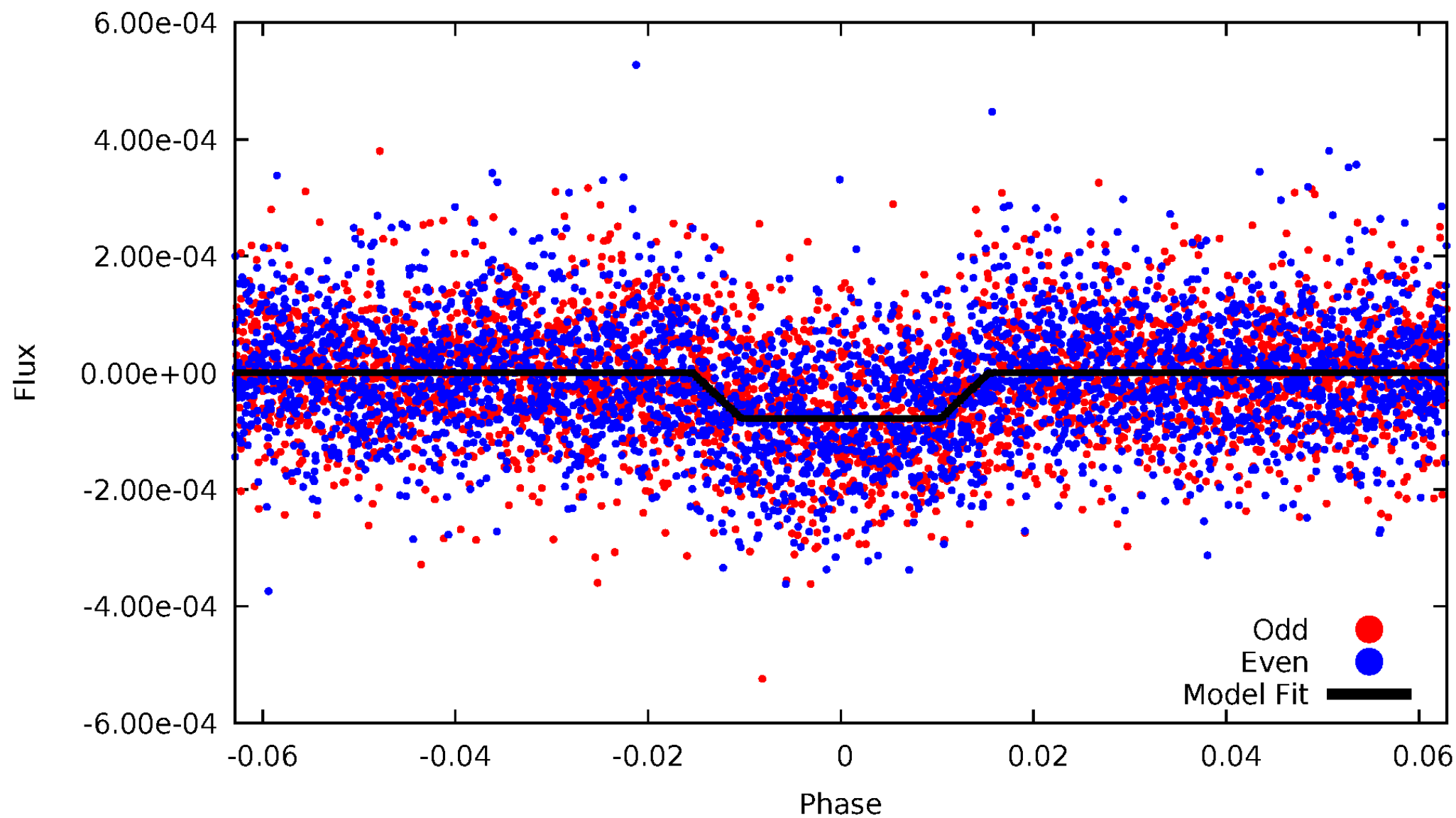
DV Odd/Even

TCE 008456679-02



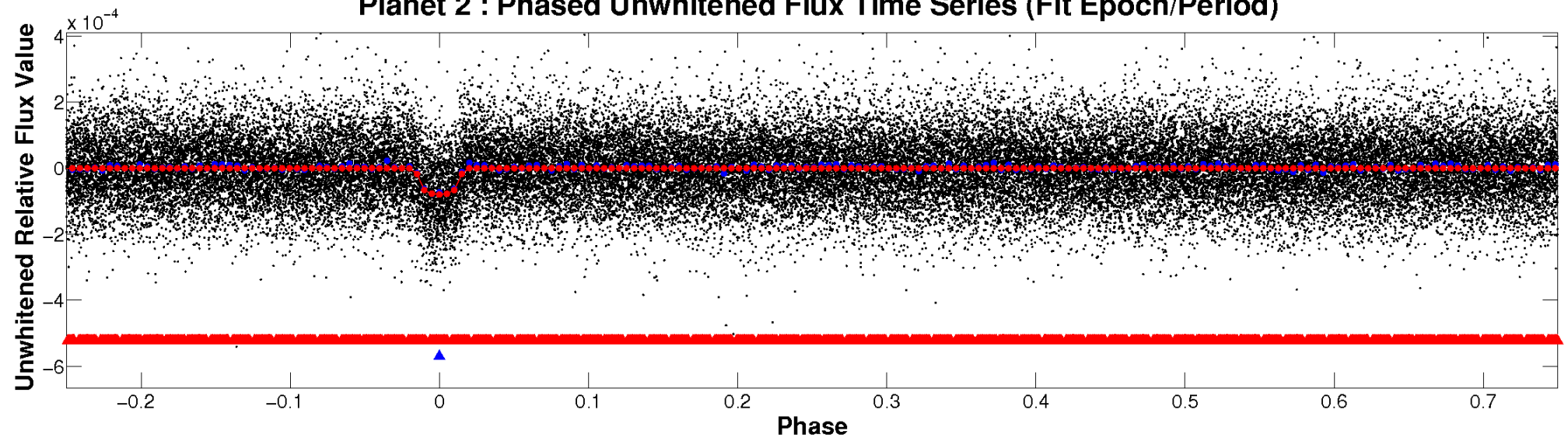
ALT Odd/Even

TCE 008456679-02

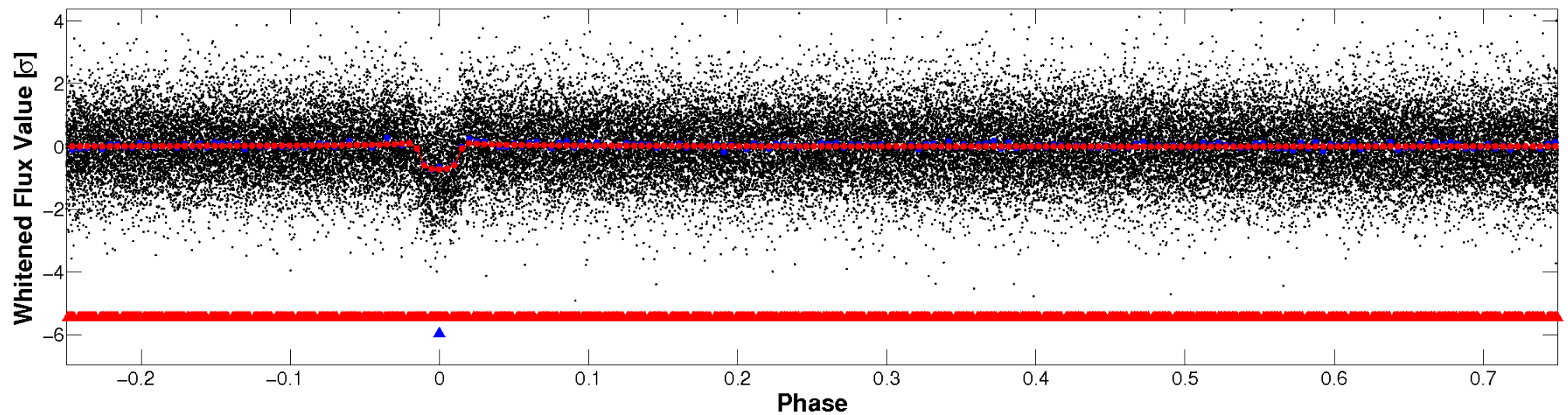


Non-Whitened Vs. Whitened Light Curve

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

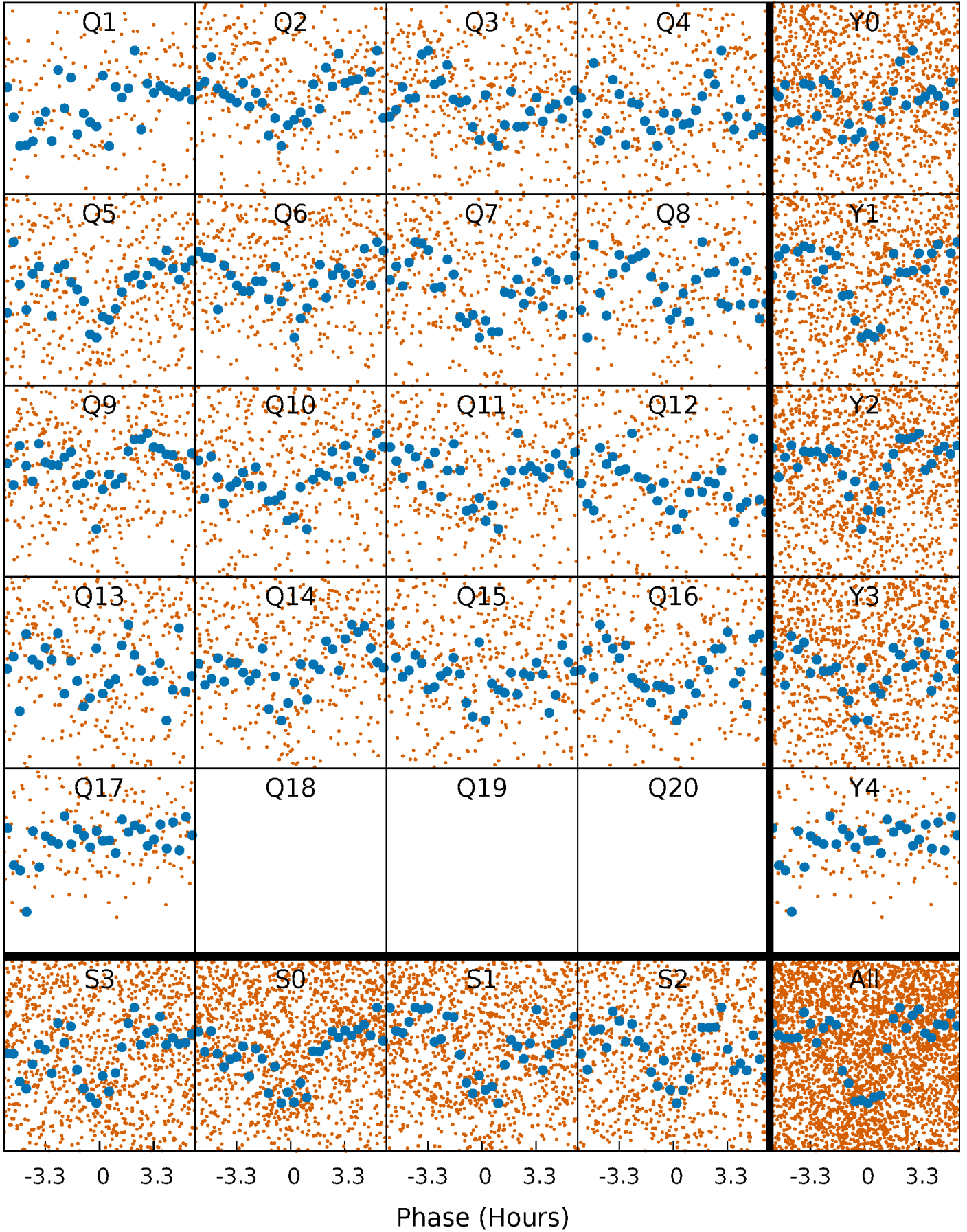


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



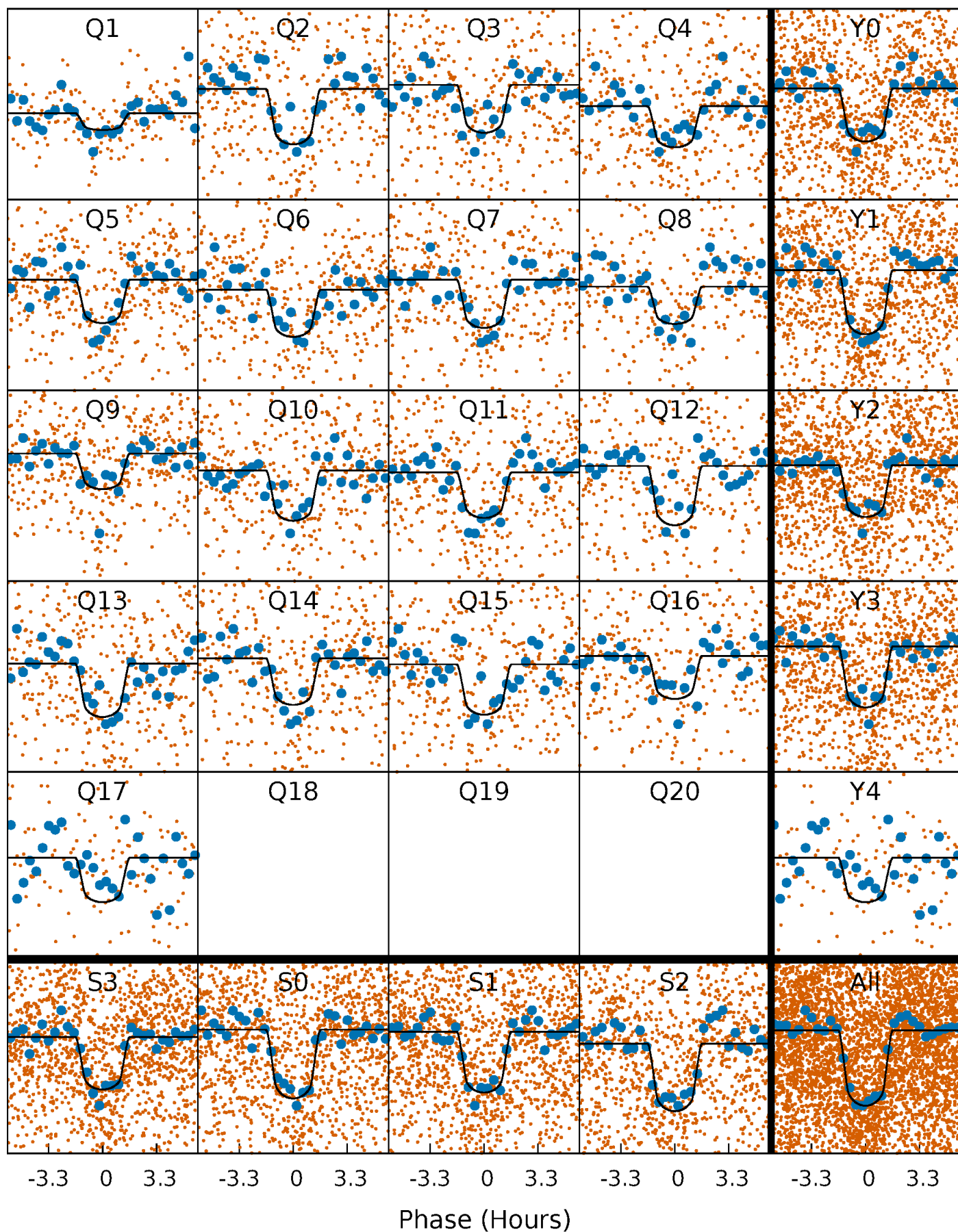
PDC Quarter-Phased Transit Curves

TCE 008456679-02 P= 4.068432 Days $T_0=132.279536$ (BKJD)



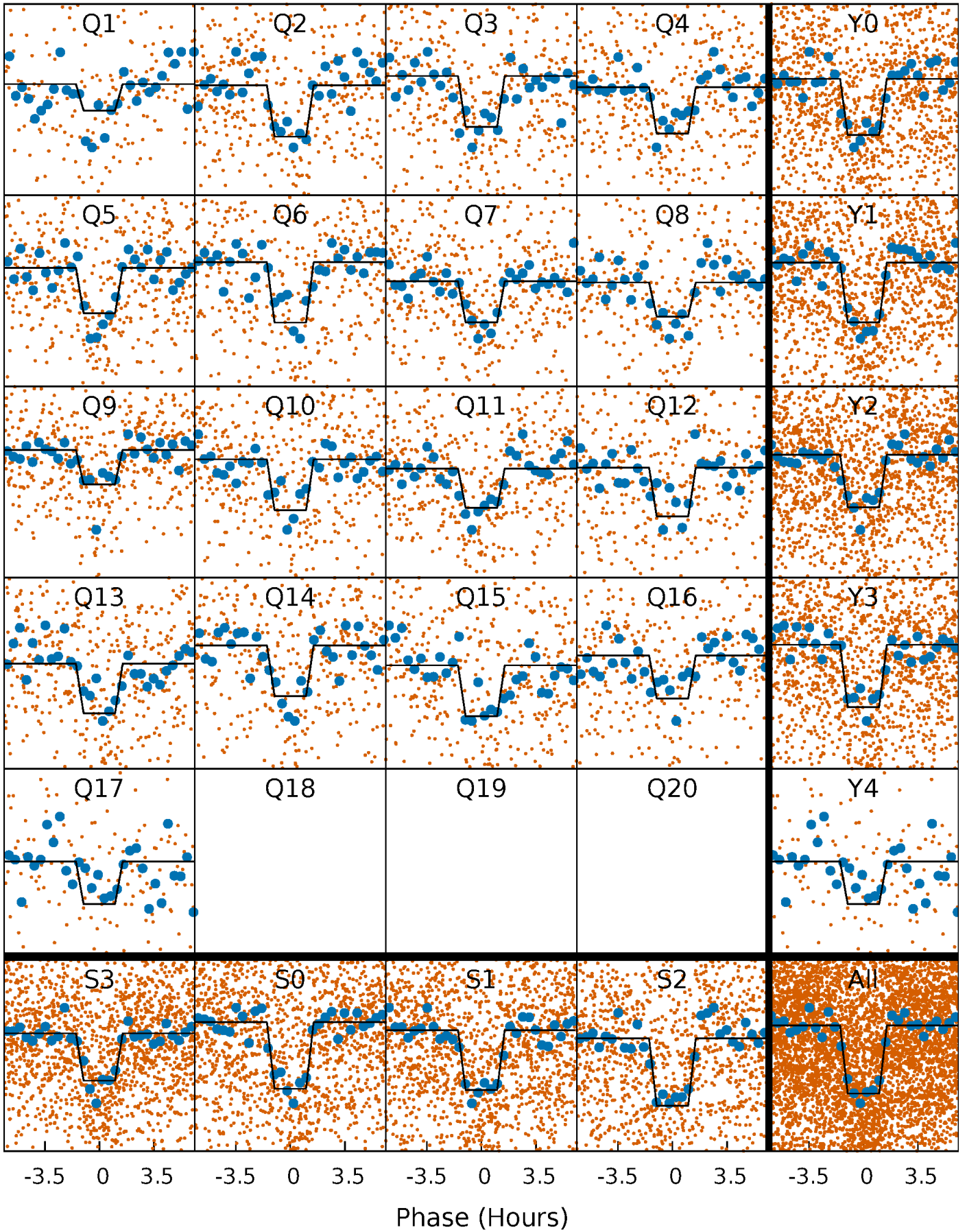
DV Quarter-Phased Transit Curves

TCE 008456679-02 P= 4.068432 Days $T_0=132.279536$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

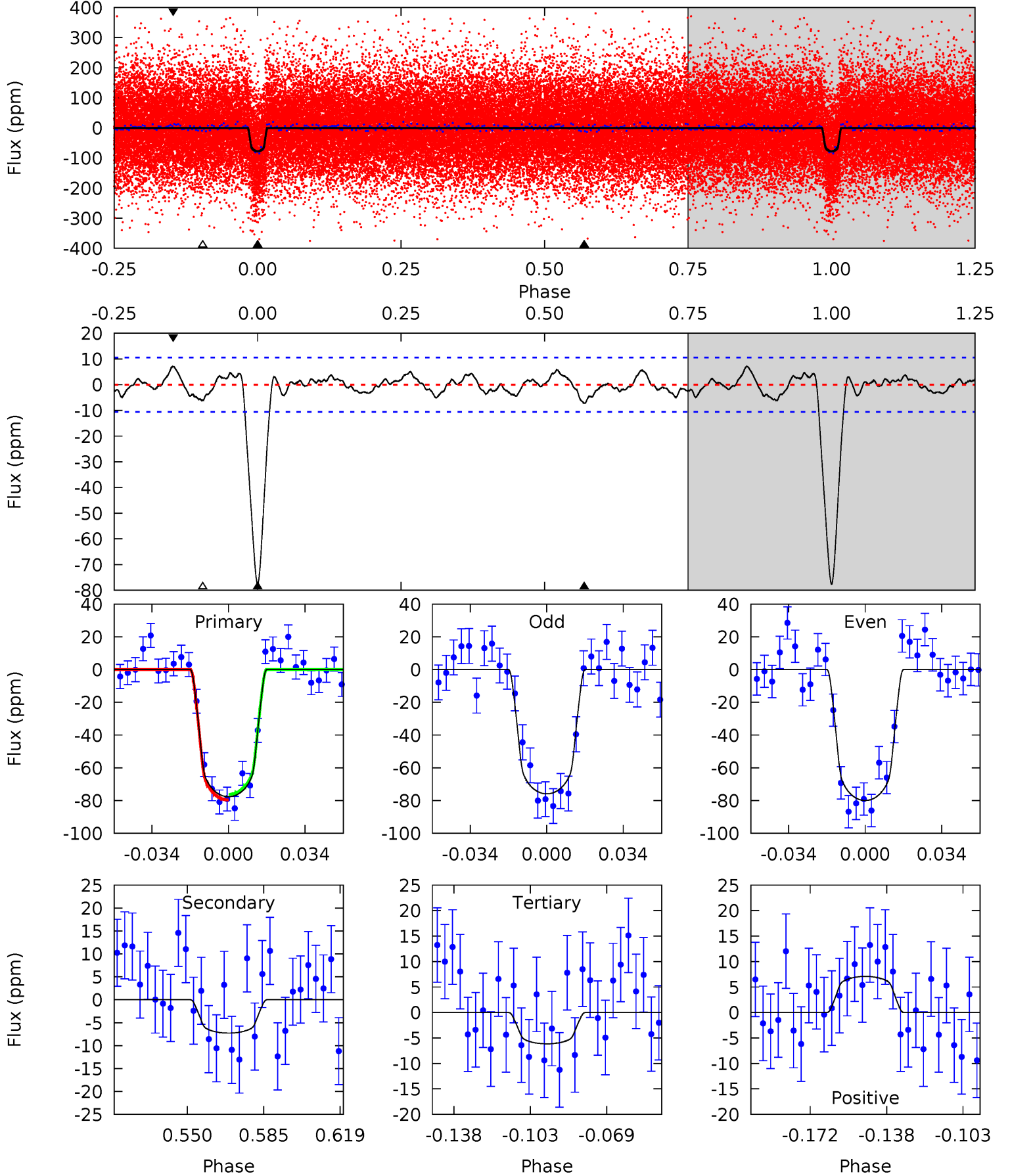
TCE 008456679-02 $P = 4.068436$ Days $T_0 = 132.278578$ (BKJD)



DV Model-Shift Uniqueness Test

008456679-02, P = 4.068432 Days, E = 128.211104 Days

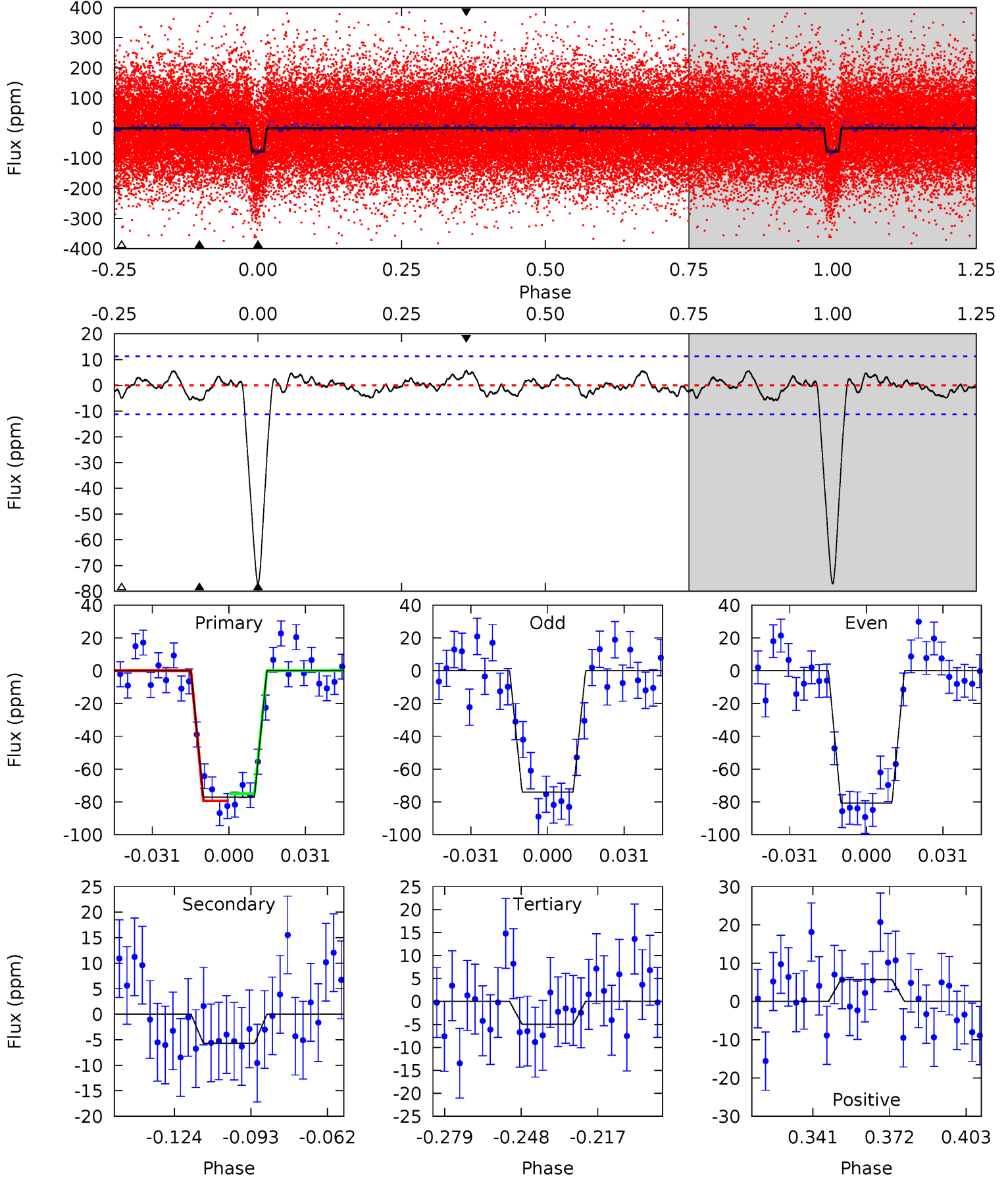
| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 35.1 | 3.29 | 2.78 | 3.20 | 4.78 | 2.12 | 1.22 | 32.4 | 31.9 | 0.51 | 0.09 | 0.93 | 0.98 | 0.08 | 0.77 |



Alt Model-Shift Uniqueness Test

008456679-02, P = 4.068436 Days, E = 128.210142 Days

| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 32.9 | 2.44 | 2.12 | 2.42 | 4.80 | 2.16 | 1.01 | 30.7 | 30.4 | 0.31 | 0.01 | 1.46 | 0.97 | 0.07 | 0.94 |



Stellar Parameters For KIC 008456679

| | $T_{\text{eff}}(K)$ | $\log(g)$ | [Fe/H] | R (R_{\odot}) | $M(M_{\odot})$ | p_{\star} ($\text{g}\cdot\text{cm}^{-3}$) |
|--------|----------------------|---------------------------|---------------------------|---------------------------|---------------------------|---|
| | 5751^{+103}_{-114} | $4.391^{+0.080}_{-0.120}$ | $0.210^{+0.150}_{-0.150}$ | $1.071^{+0.177}_{-0.109}$ | $1.028^{+0.074}_{-0.067}$ | $1.178^{+0.372}_{-0.396}$ |
| | +2%/-2% | +2%/-3% | +71%/-71% | +17%/-10% | +7%/-7% | +32%/-34% |
| Source | SPE59 | SPE59 | SPE59 | DSEP | | |

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

Secondary Eclipse Parameters for KIC 008456679-02 / KOI 0102.02

| Detrend | Depth (ppm) | R_p (R_{\oplus}) | T_{max} (K) | T_{obs} (K) | A_{obs} |
|---------|-------------|------------------------|----------------------|----------------------|---------------------------|
| DV | -7 ± 2 | $1.19^{+0.25}_{-0.24}$ | 1641^{+75}_{-58} | 3437^{+300}_{-277} | $6.832^{+5.056}_{-2.772}$ |
| Alt. | -6 ± 2 | $1.04^{+0.23}_{-0.24}$ | 1637^{+73}_{-63} | 3446^{+381}_{-333} | $7.200^{+6.663}_{-3.344}$ |

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 $A_{\text{obs}} \gg 1.0$

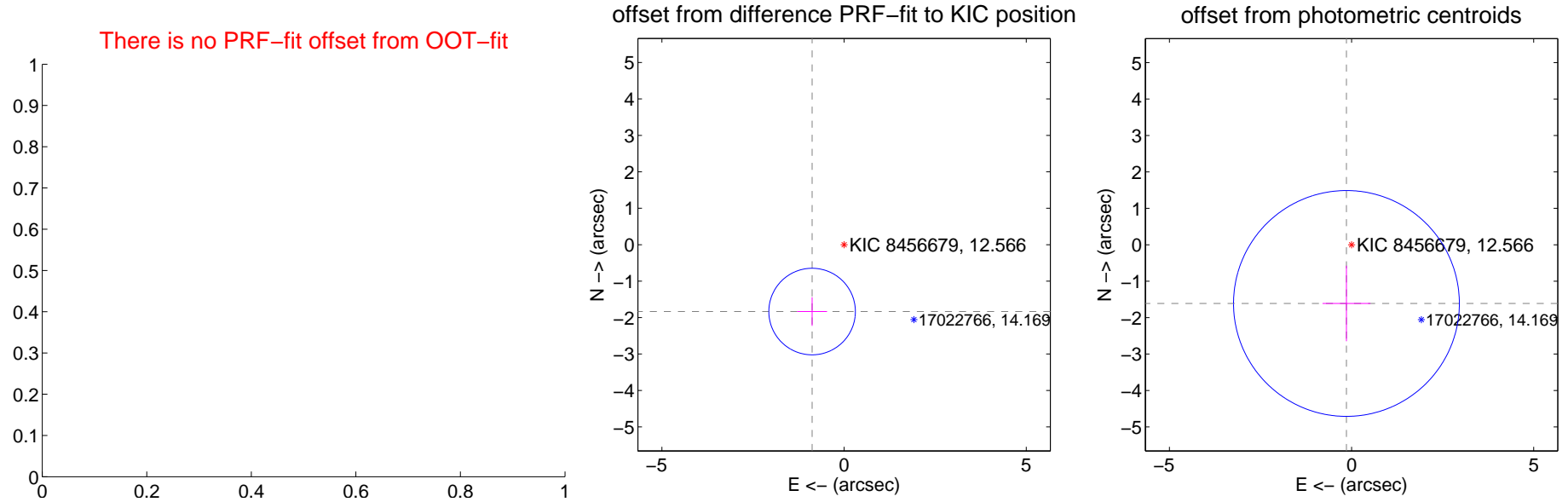
DV Centroid Data

Supplemental centroid analysis for 008456679-02. Kepler magnitude: 12.57. Transit SNR 24.43

There are 0 quarters with good PRF difference image offsets

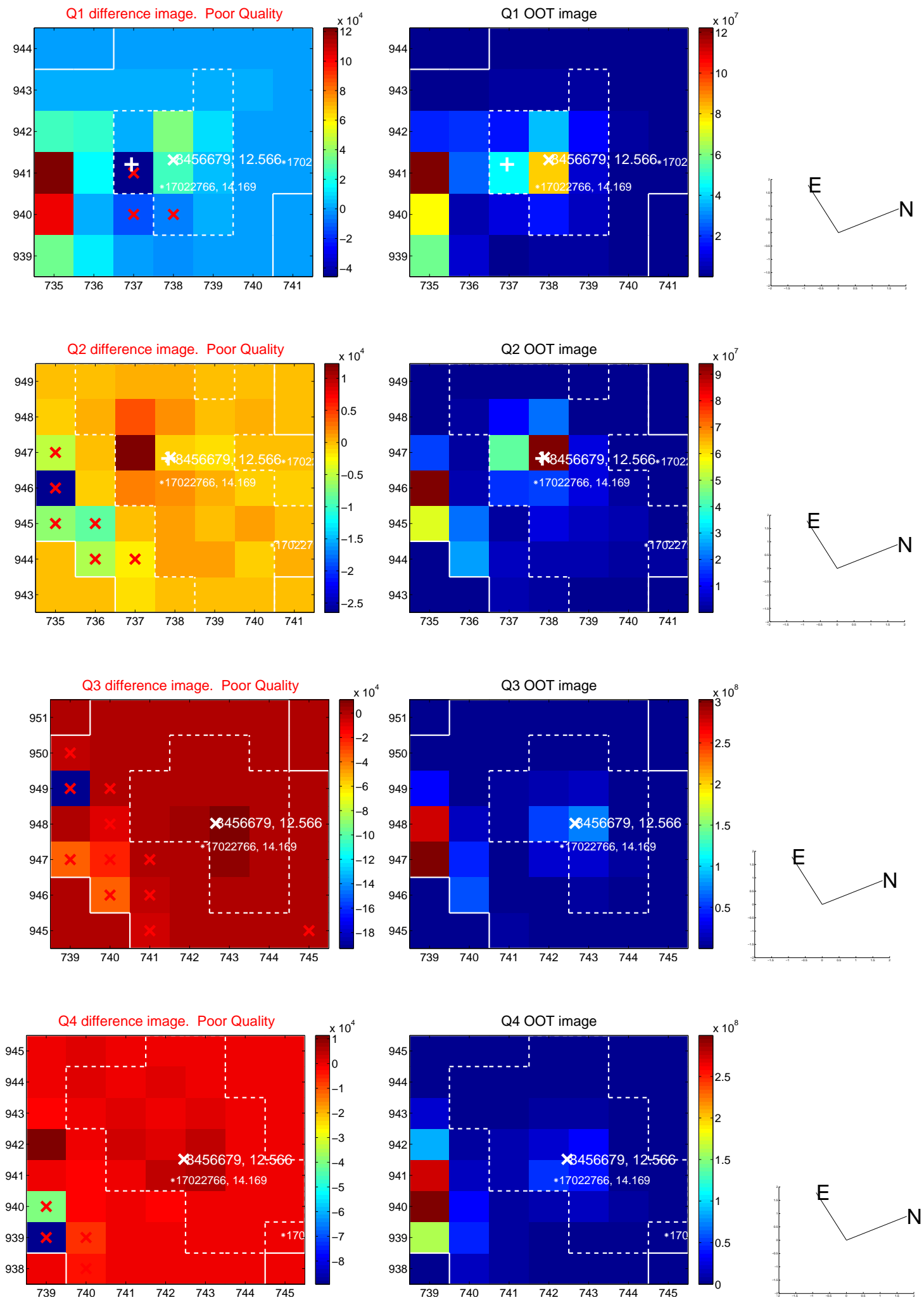
The direct PRF centroid is offset from the target star catalog position by about NaN arcsec

| | Distance in arcsec | Distance / σ | Δ RA | Δ Dec |
|---|--------------------|---------------------|-------------------|--------------------|
| PRF-fit source offset from OOT | — | — | — | — |
| PRF-fit source offset from KIC position | 2.034 ± 0.396 | 5.14 | 0.878 ± 0.410 | -1.834 ± 0.393 |
| photometric centroid source offset | 1.62 ± 1.03 | 1.57 | 0.14 ± 0.66 | -1.61 ± 1.04 |

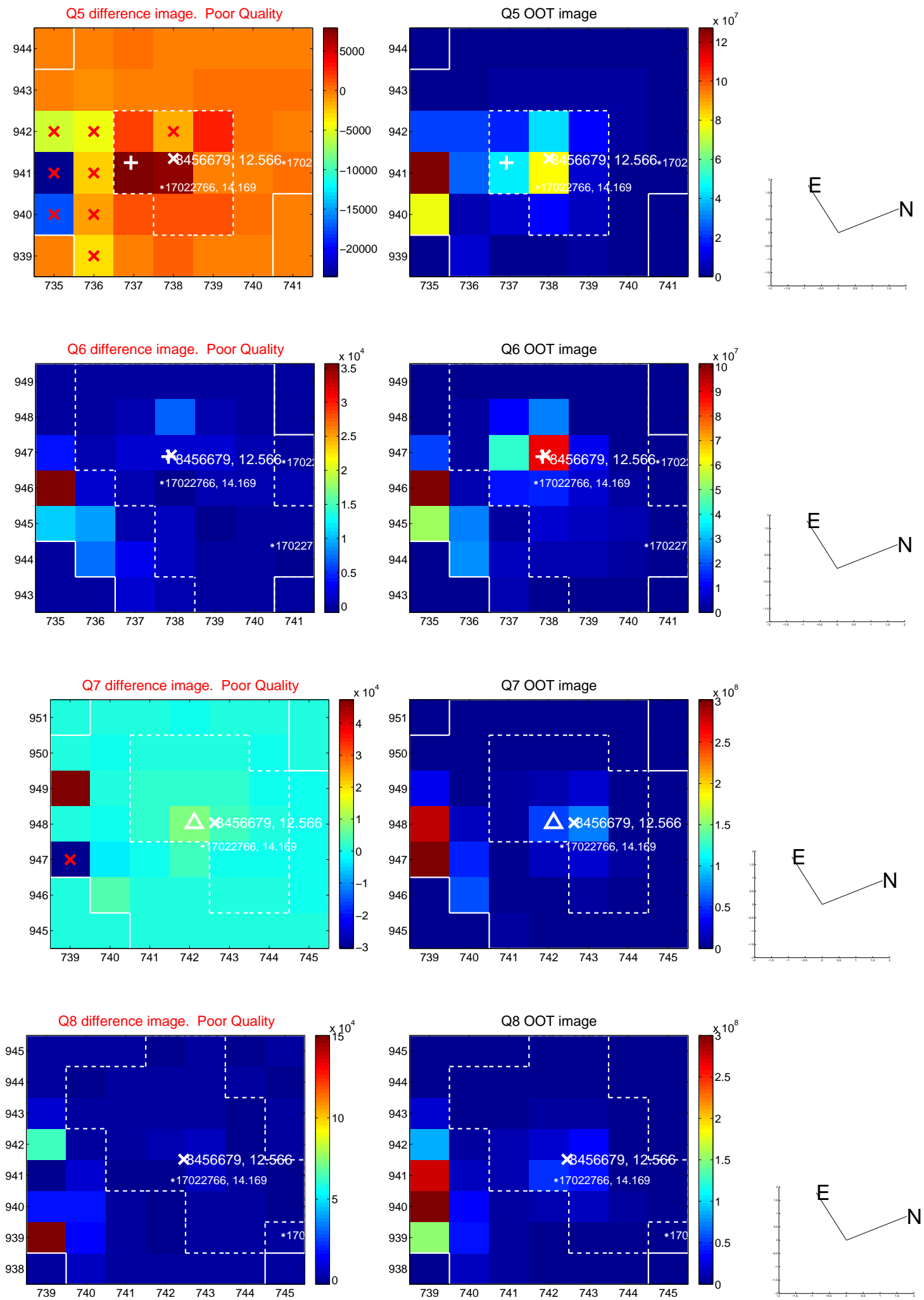


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ . 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.

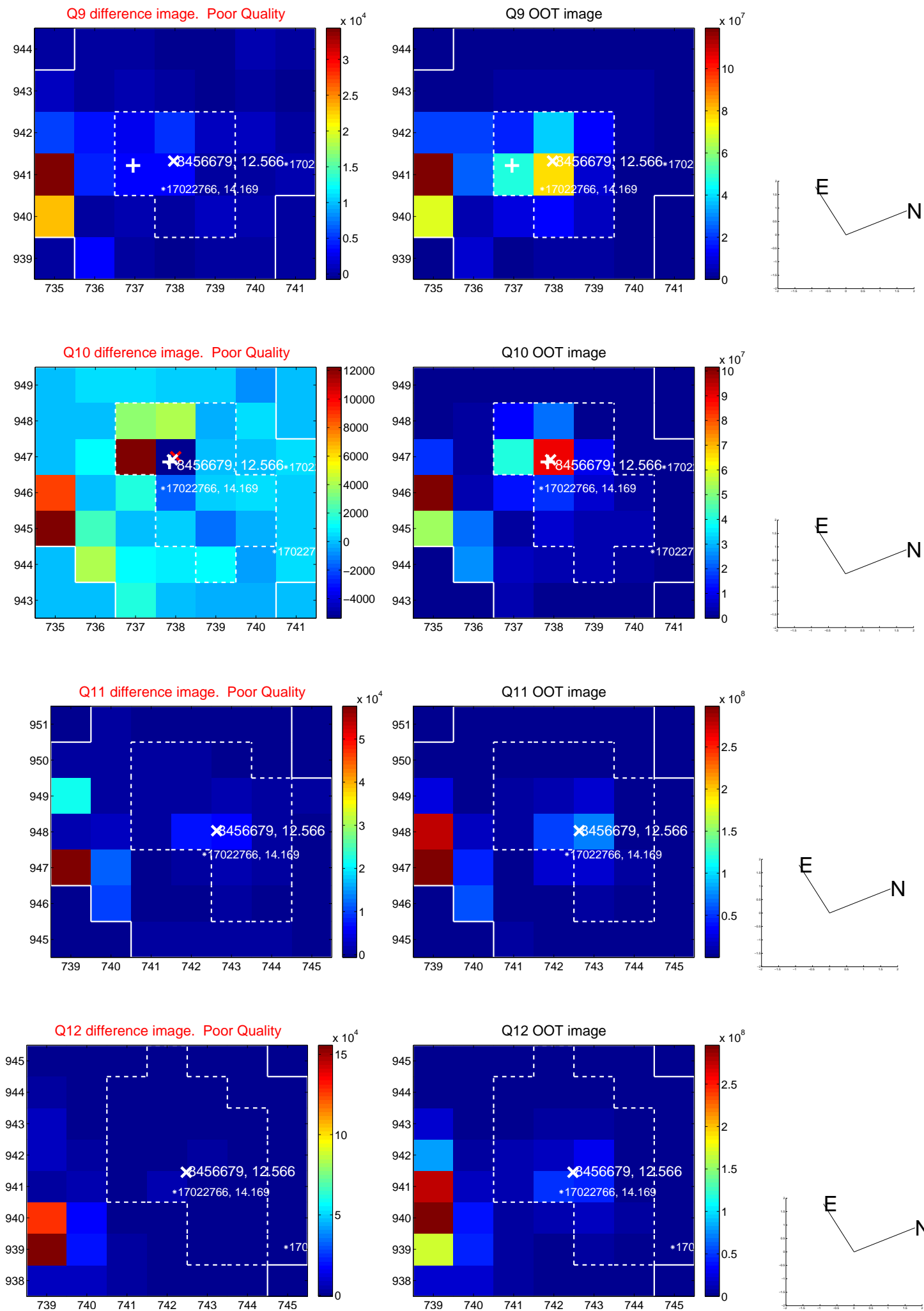
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



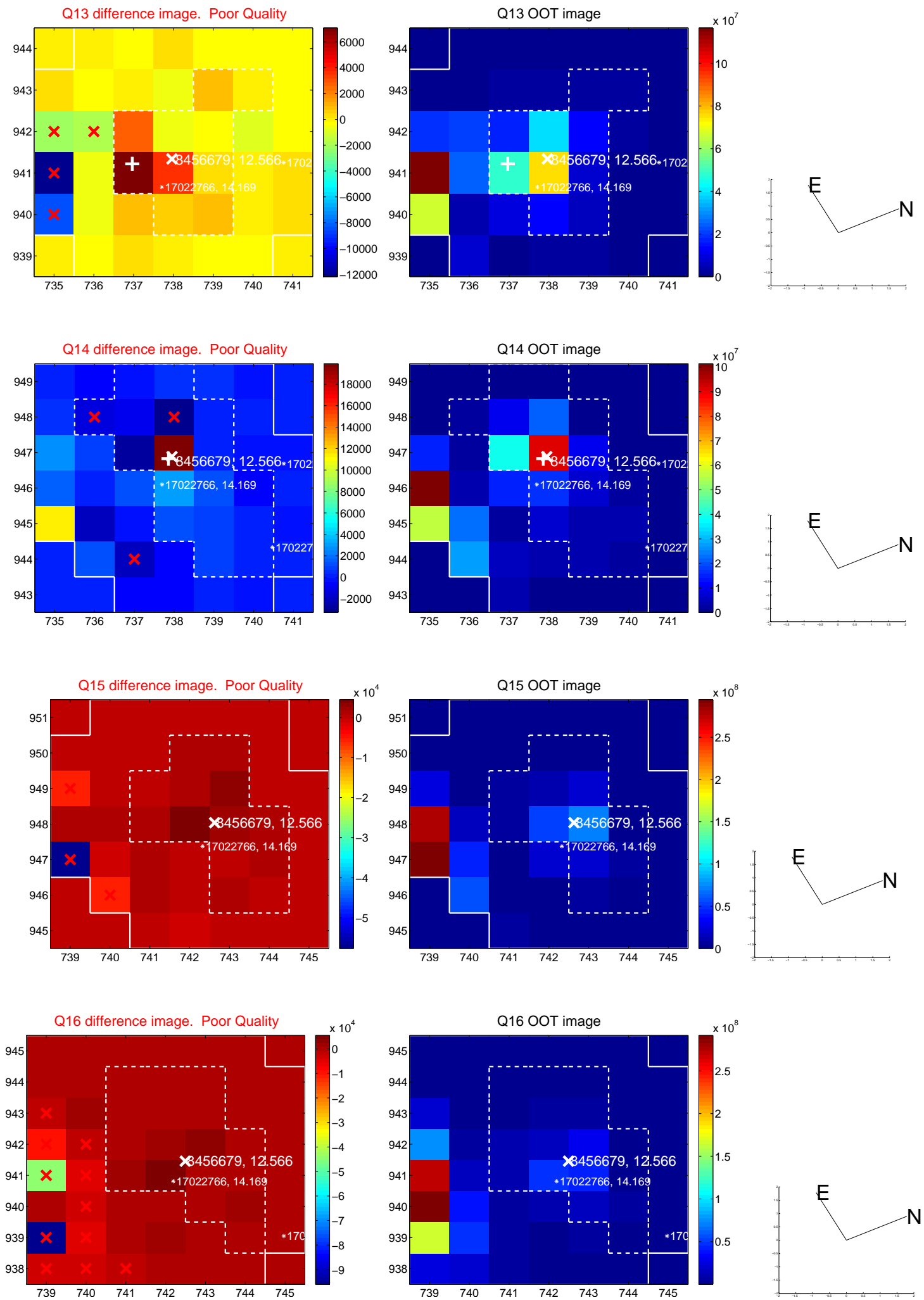
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



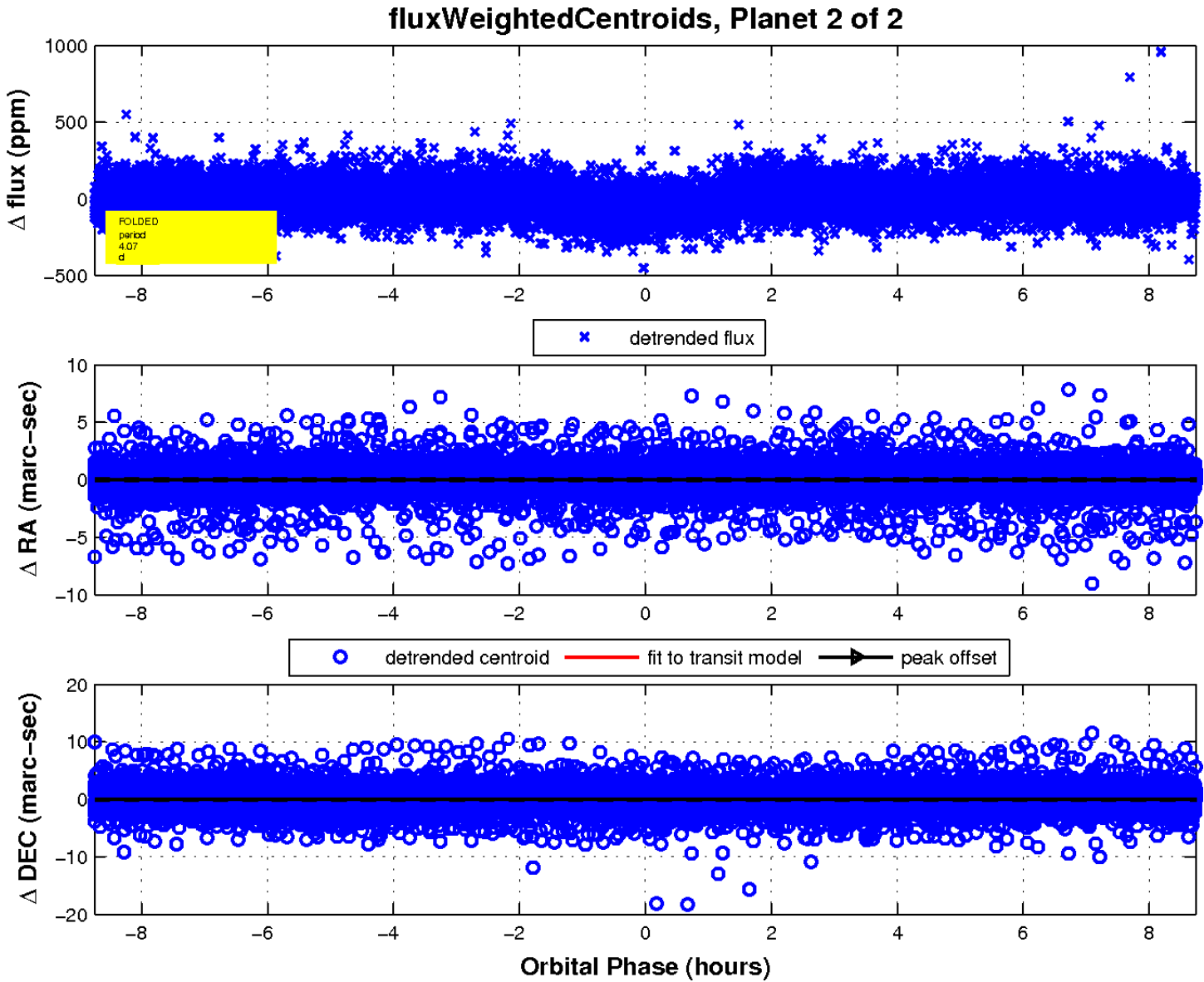
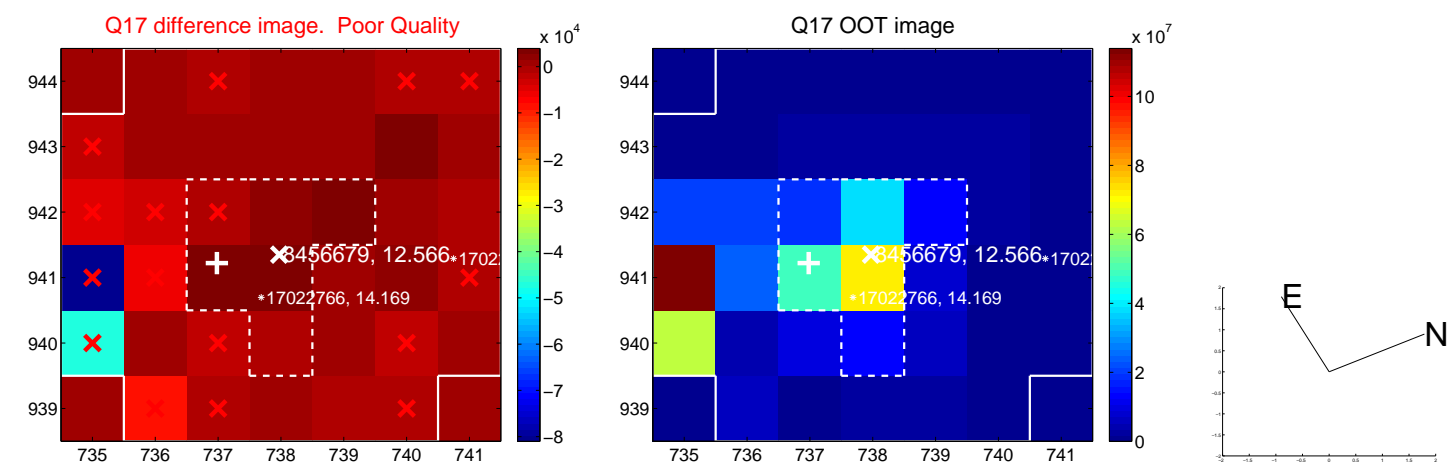
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

