

KIC 009093086

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}) |
|--------------|----------|---------|---------------|--------------|-------------|------------------|-----|------|-----------------------------|-----------------|------------------------|------------------------|
| 009093086-01 | OBS | 6191.01 | 9.704232 | 138.200218 | 147.2 | 4.315 | 9.7 | 10.8 | 1.04 | 6273 | 1.67 | 178.91 |
| 009093086-02 | OBS | 6191.02 | 12.771251 | 141.366258 | 150.4 | 3.406 | 8.6 | 9.5 | 1.04 | 6273 | 1.43 | 124.06 |

Robovetter Results

| TCE | Run Type | Disp | Score | N | S | C | E | Comments |
|--------------|----------|------|-------|---|---|---|---|------------|
| 009093086-01 | OBS | PC | 0.69 | 0 | 0 | 0 | 0 | NO_COMMENT |
| 009093086-02 | OBS | PC | 0.74 | 0 | 0 | 0 | 0 | NO_COMMENT |

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.

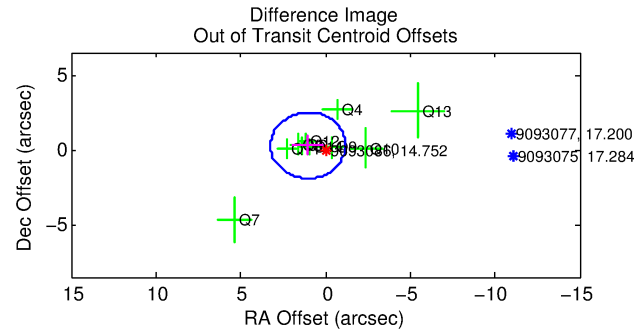
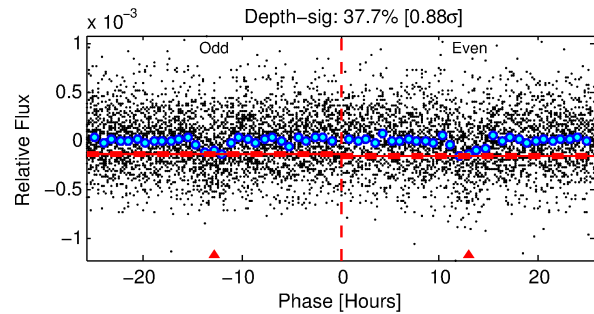
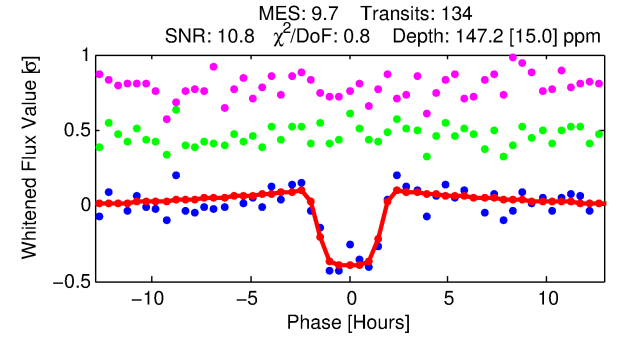
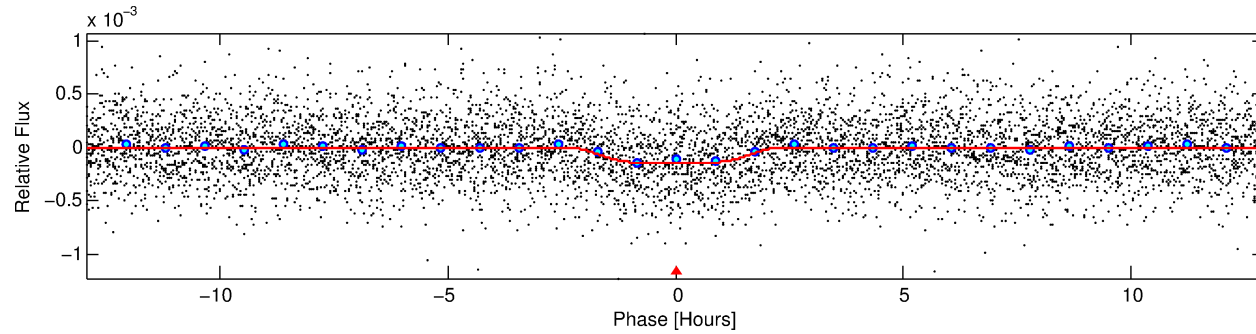
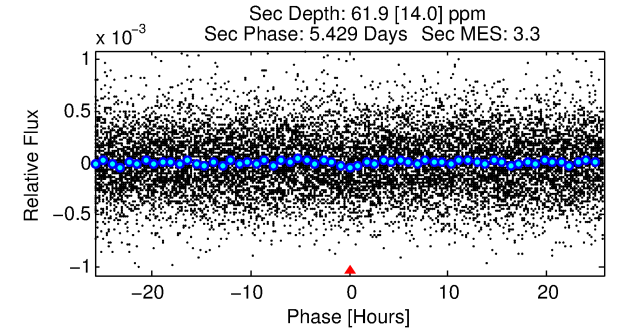
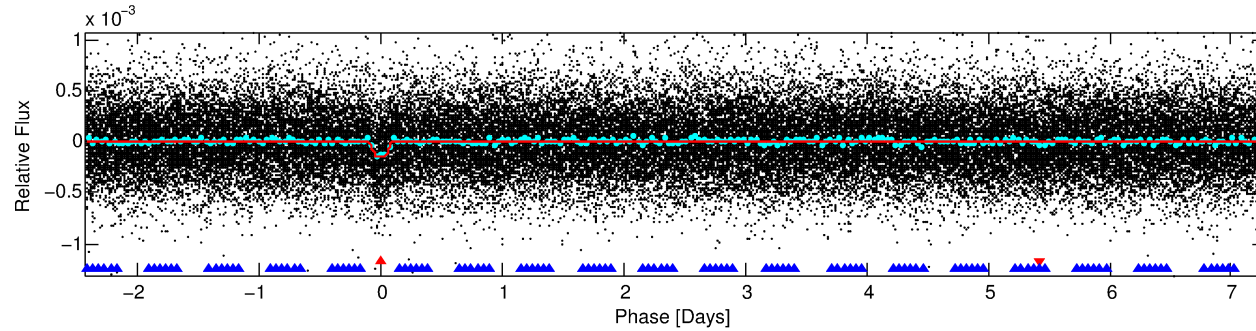
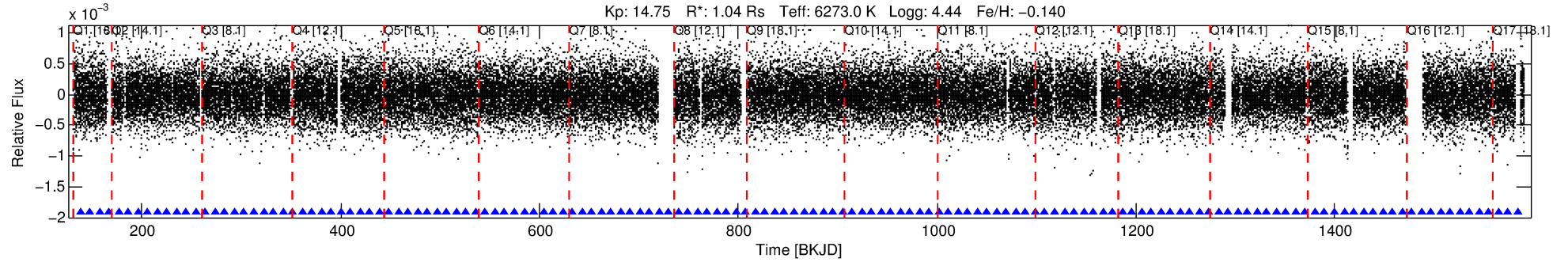
Ephemeris Match Information For 009093086-01

No Significant Match Found

DV One-Page Summary

KIC: 9093086 Candidate: 1 of 2 Period: 9.704 d

KOI: K06191.01 Corr: 0.921



DV Fit Results:

Period = 9.70423 [0.00009] d
Epoch = 138.2002 [0.0076] BKJD
Rp/R* = 0.0147 [0.0011]
a/R* = 4.87 [1.15]
b = 0.98 [0.01]
Seff = 178.92 [77.68]
Teff = 933 [101] K
Rp = 1.67 [0.57] Re
a = 0.0919 [0.0259] AU
Ag = 103.26 [50.73] [2.02σ]
Teffp = 4596 [352] K [9.99σ]

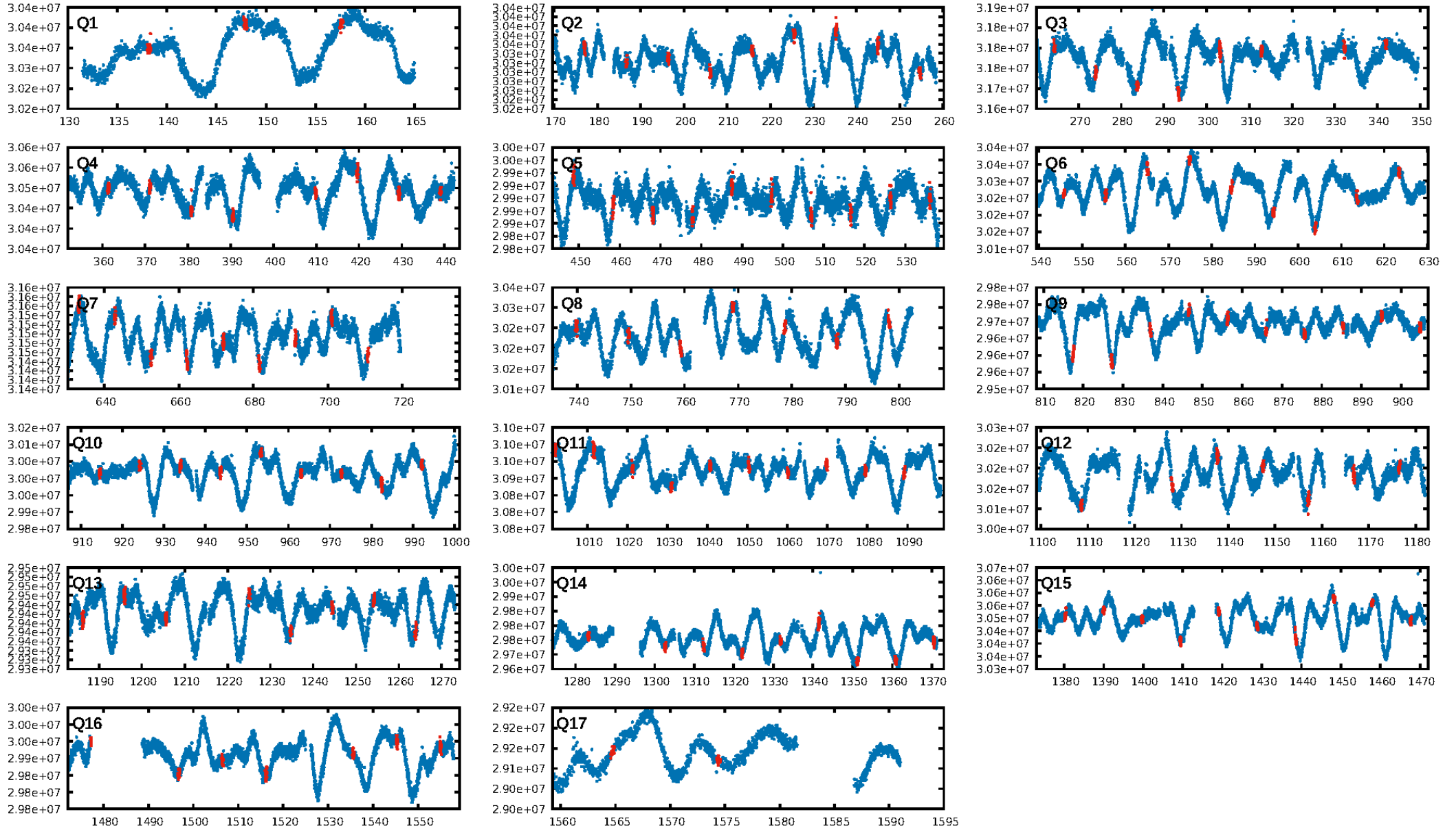
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [13.39σ]
ModelChiSquare2-sig: 100.0%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 4.54e-22
RollingBand-fgt: 1.00 [129/129]
GhostDiagnostic-chr: 2.719
Centroid-sig: 33.6%
Centroid-so: 0.684 arcsec [0.74σ]
OotOffset-rm: 1.074 arcsec [1.46σ]
KicOffset-rm: 0.978 arcsec [1.17σ]
OotOffset-st: 3/3/2/2 [10]
KicOffset-st: 3/3/2/2 [10]
DiffImageQuality-fgm: 0.60 [6/10]
DiffImageOverlap-fno: 1.00 [17/17]

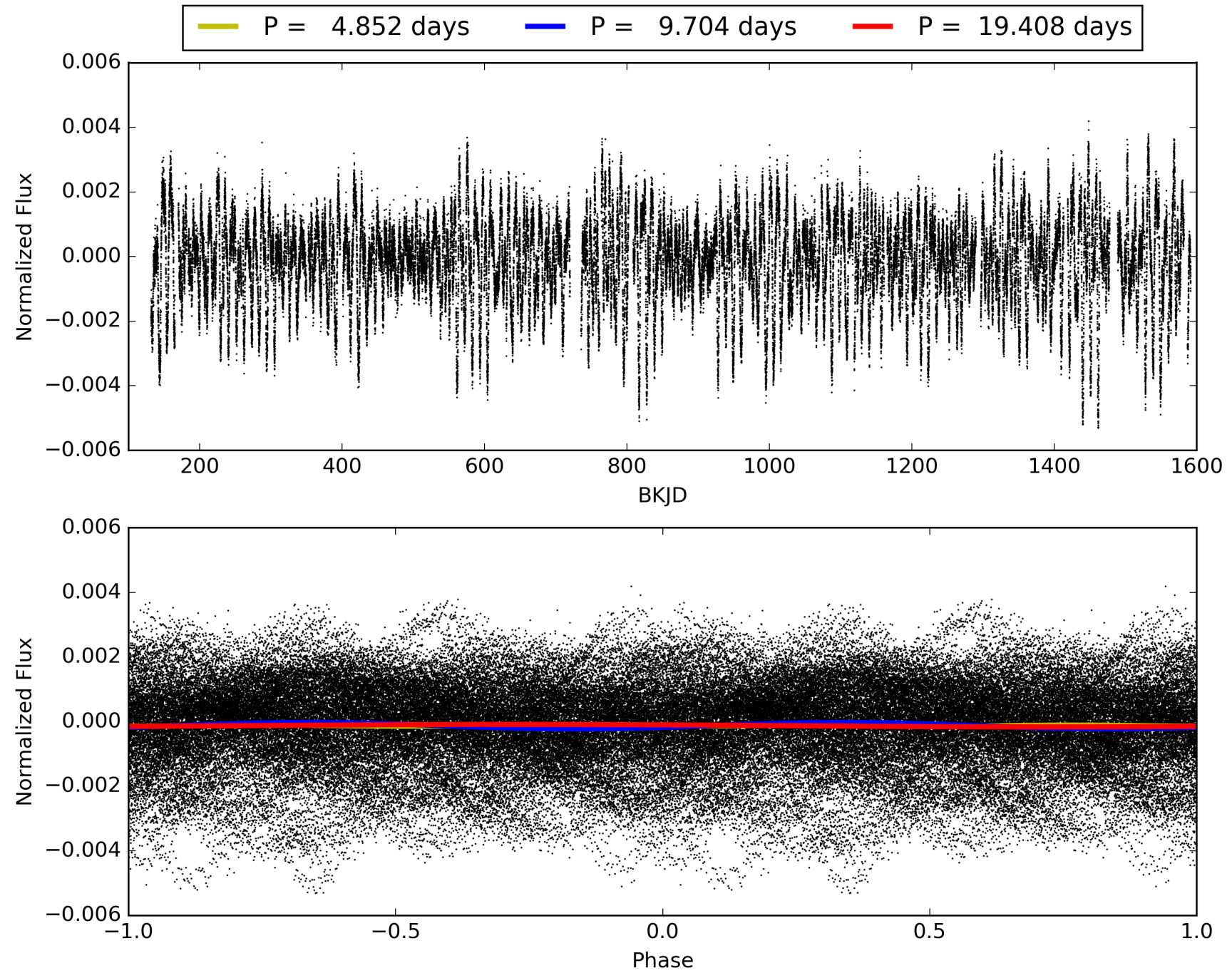
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 21:00:27 Z

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

TCE 009093086-01, PDC Light Curves

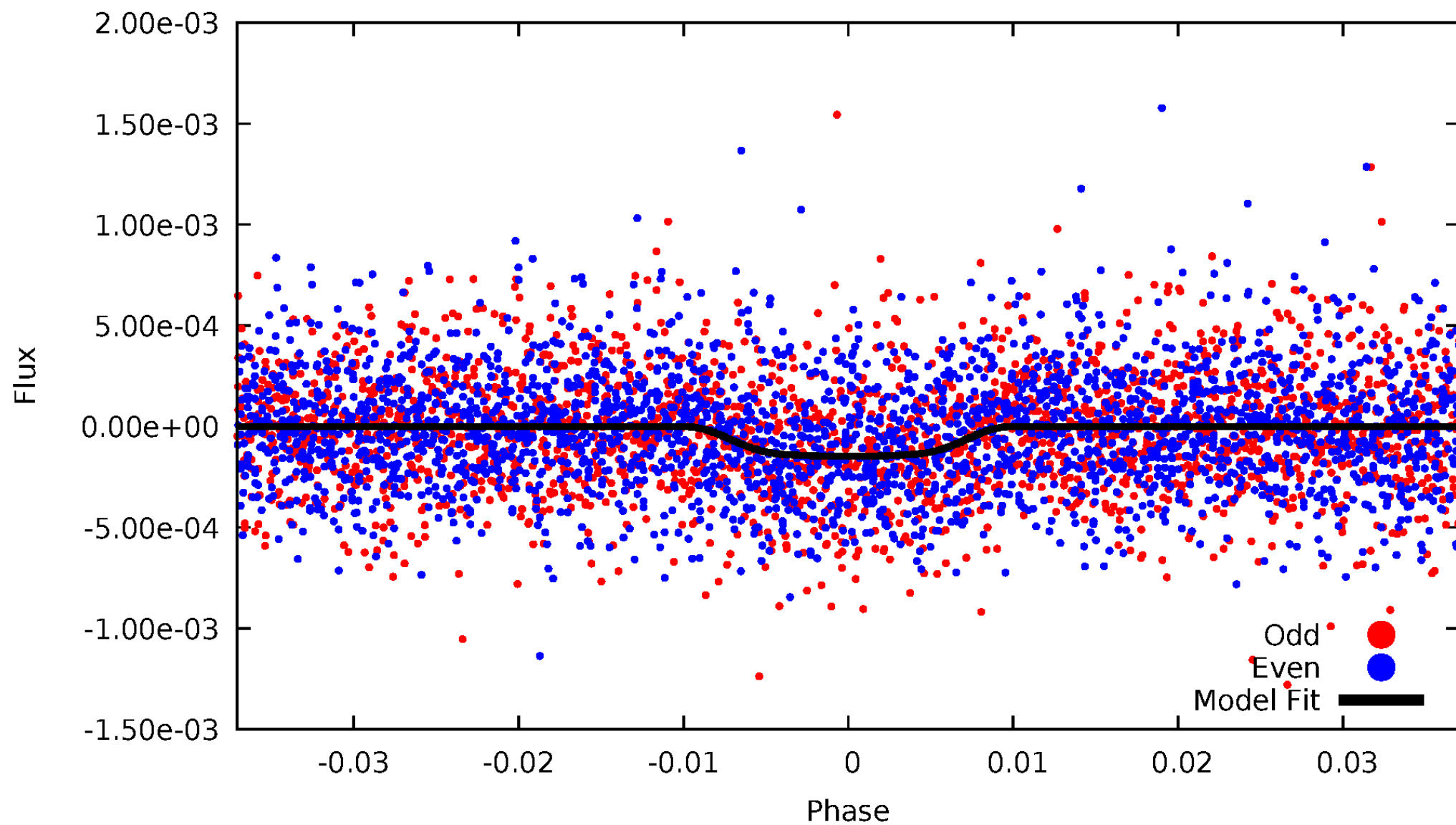


TCE 009093086-01



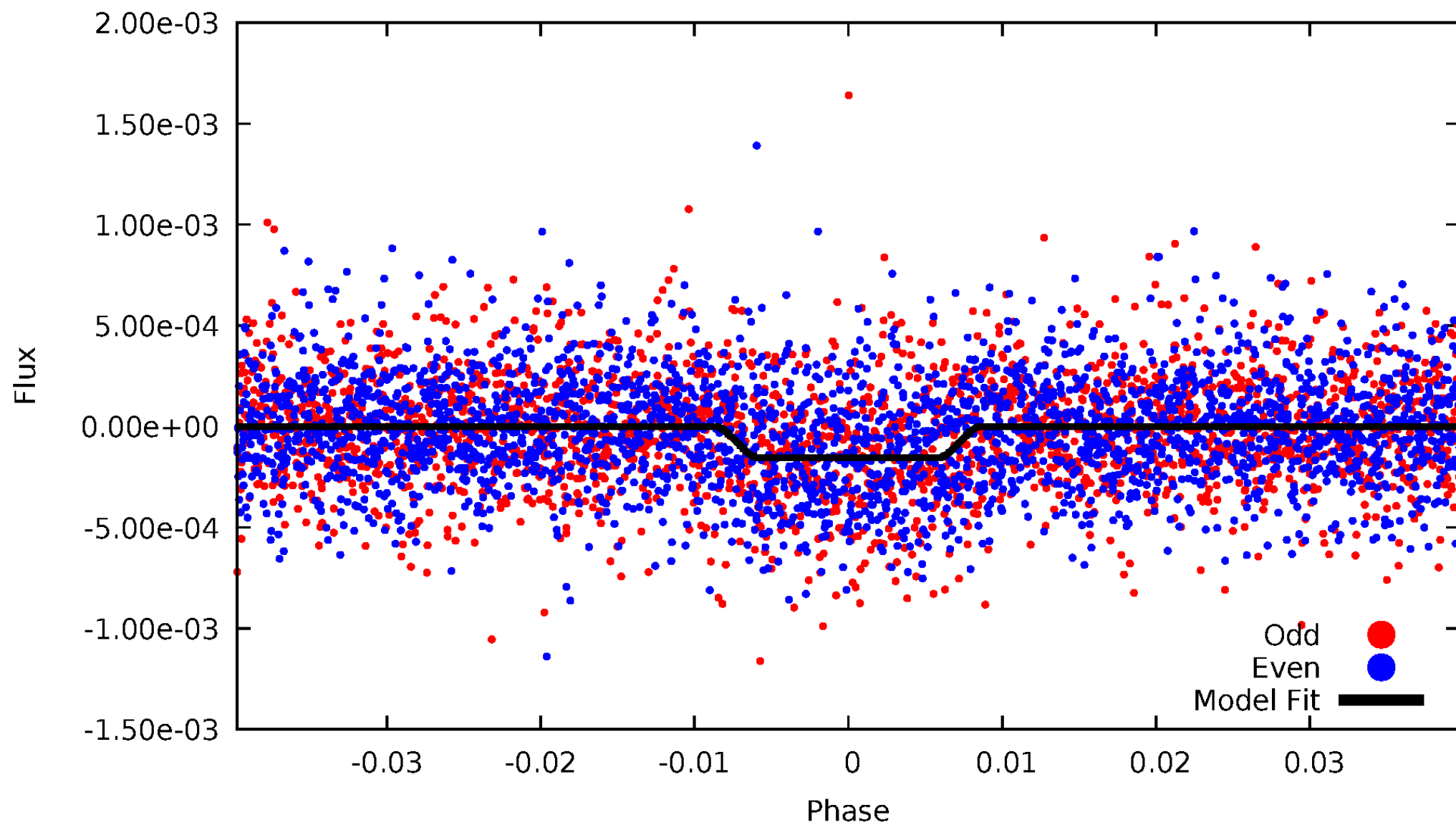
DV Odd/Even

TCE 009093086-01



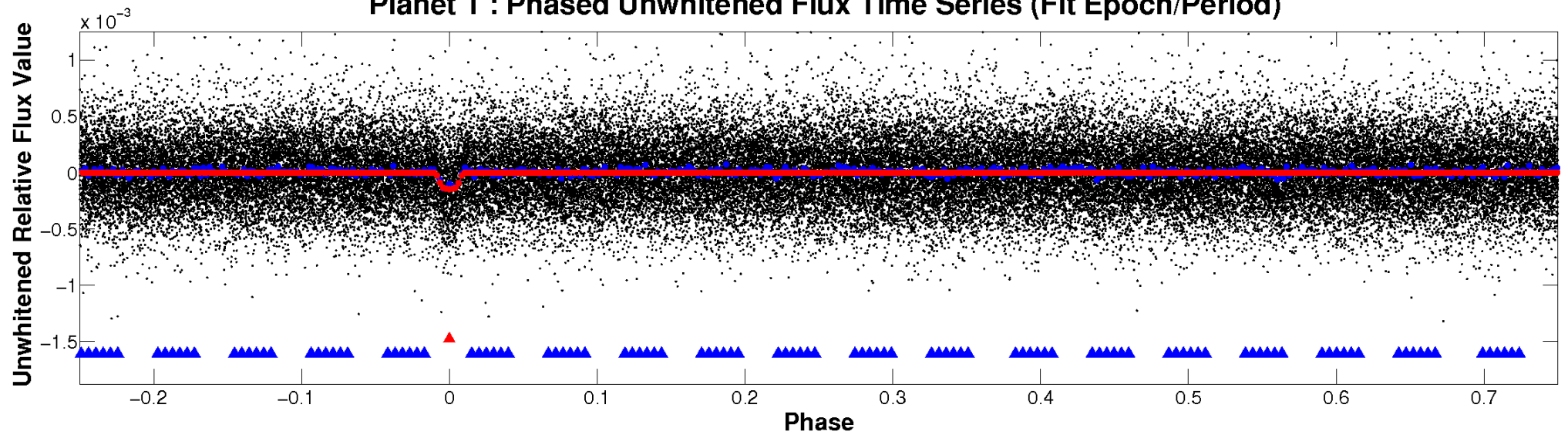
ALT Odd/Even

TCE 009093086-01

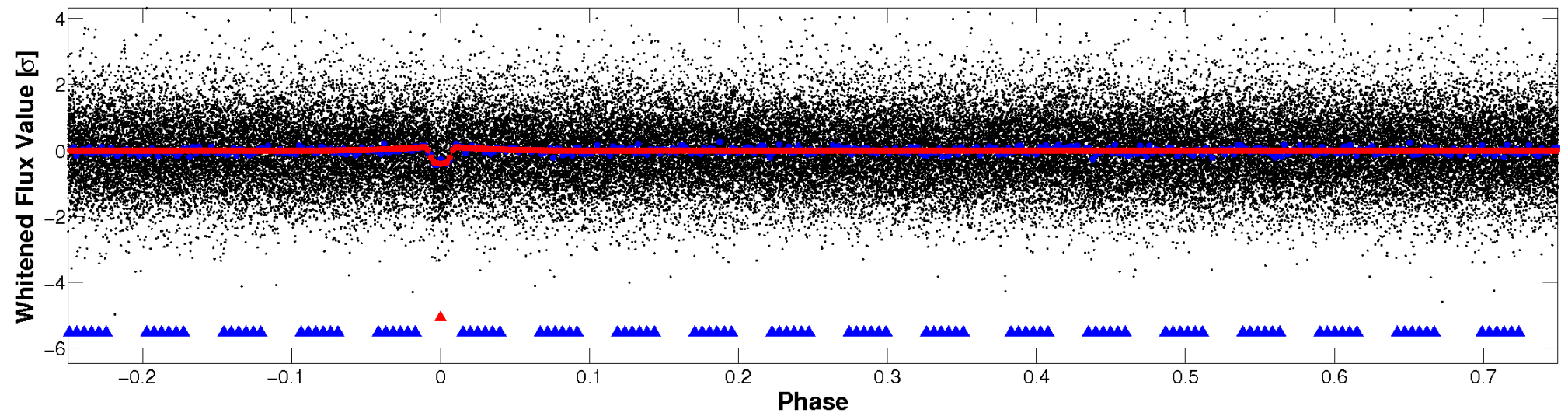


Non-Whitened Vs. Whitened Light Curve

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

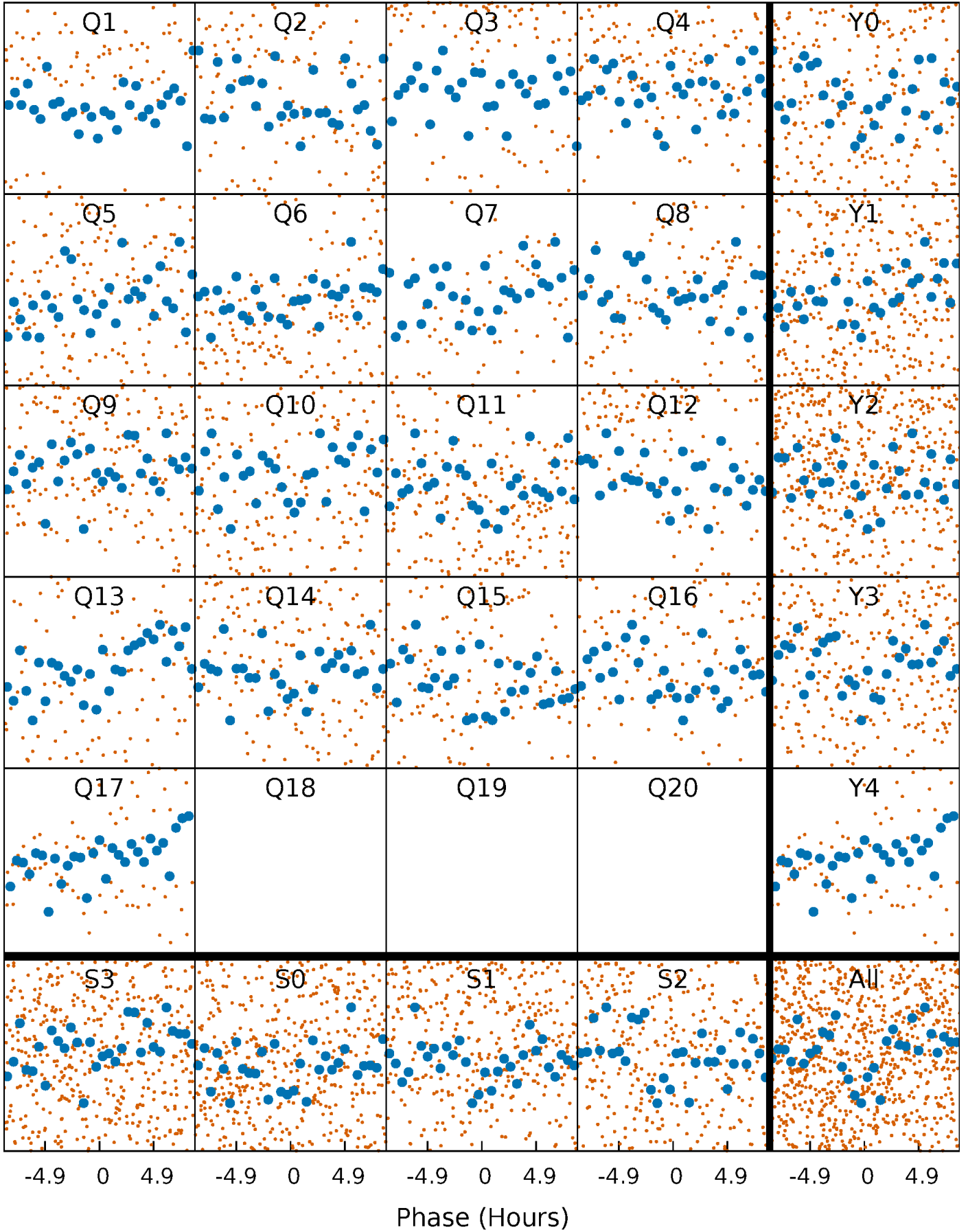


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



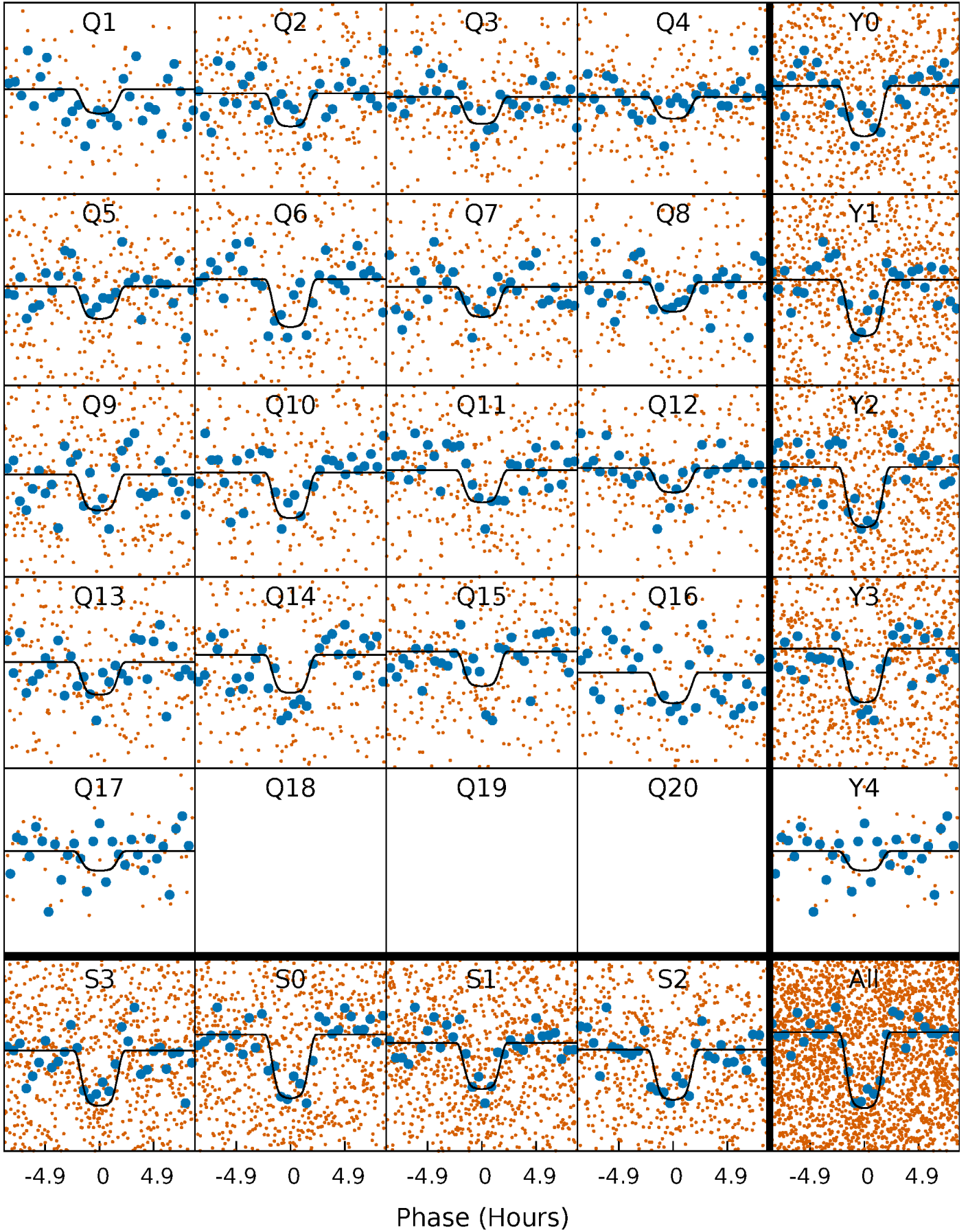
PDC Quarter-Phased Transit Curves

TCE 009093086-01 P= 9.704232 Days $T_0=138.200218$ (BKJD)



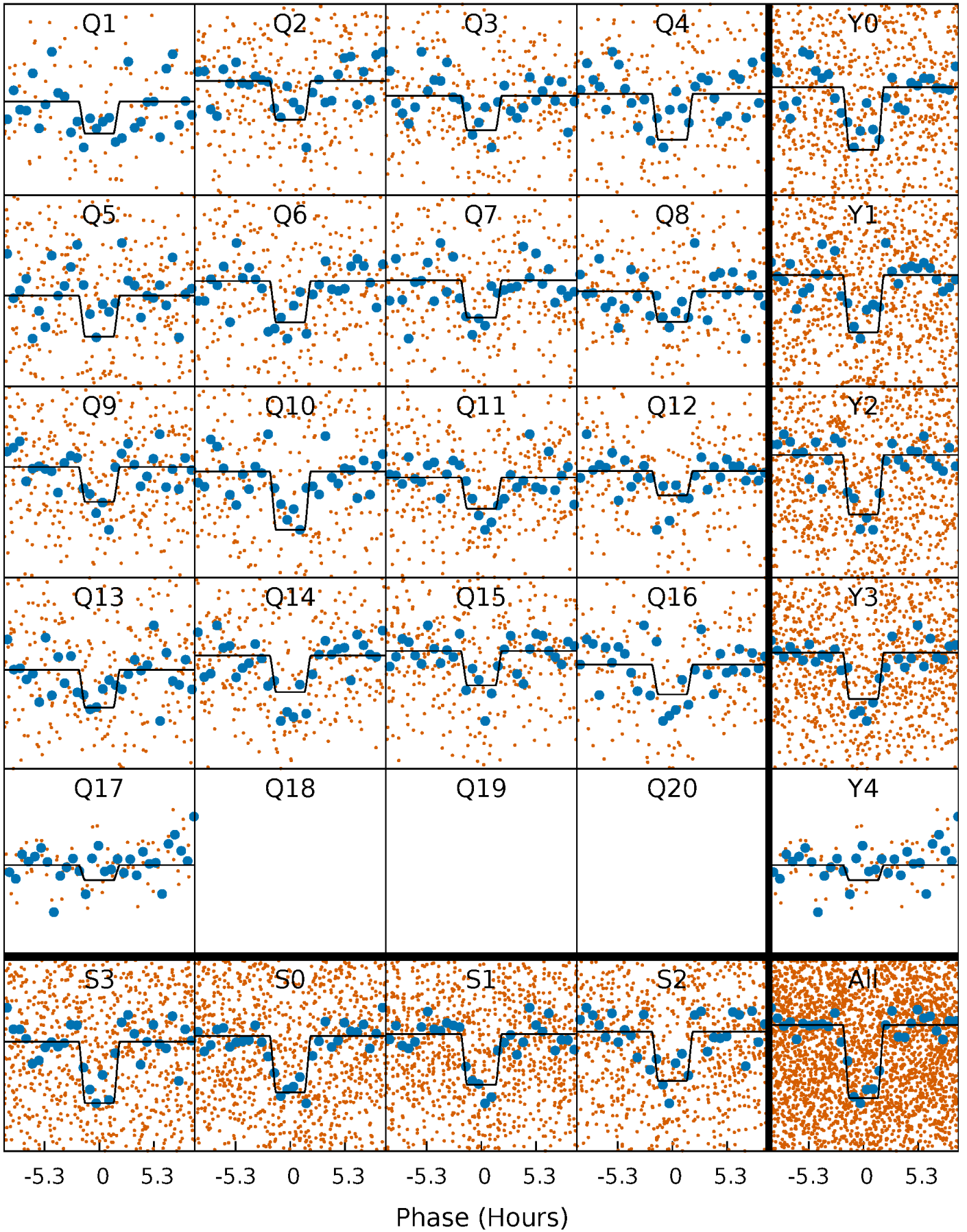
DV Quarter-Phased Transit Curves

TCE 009093086-01 P= 9.704232 Days $T_0=138.200218$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

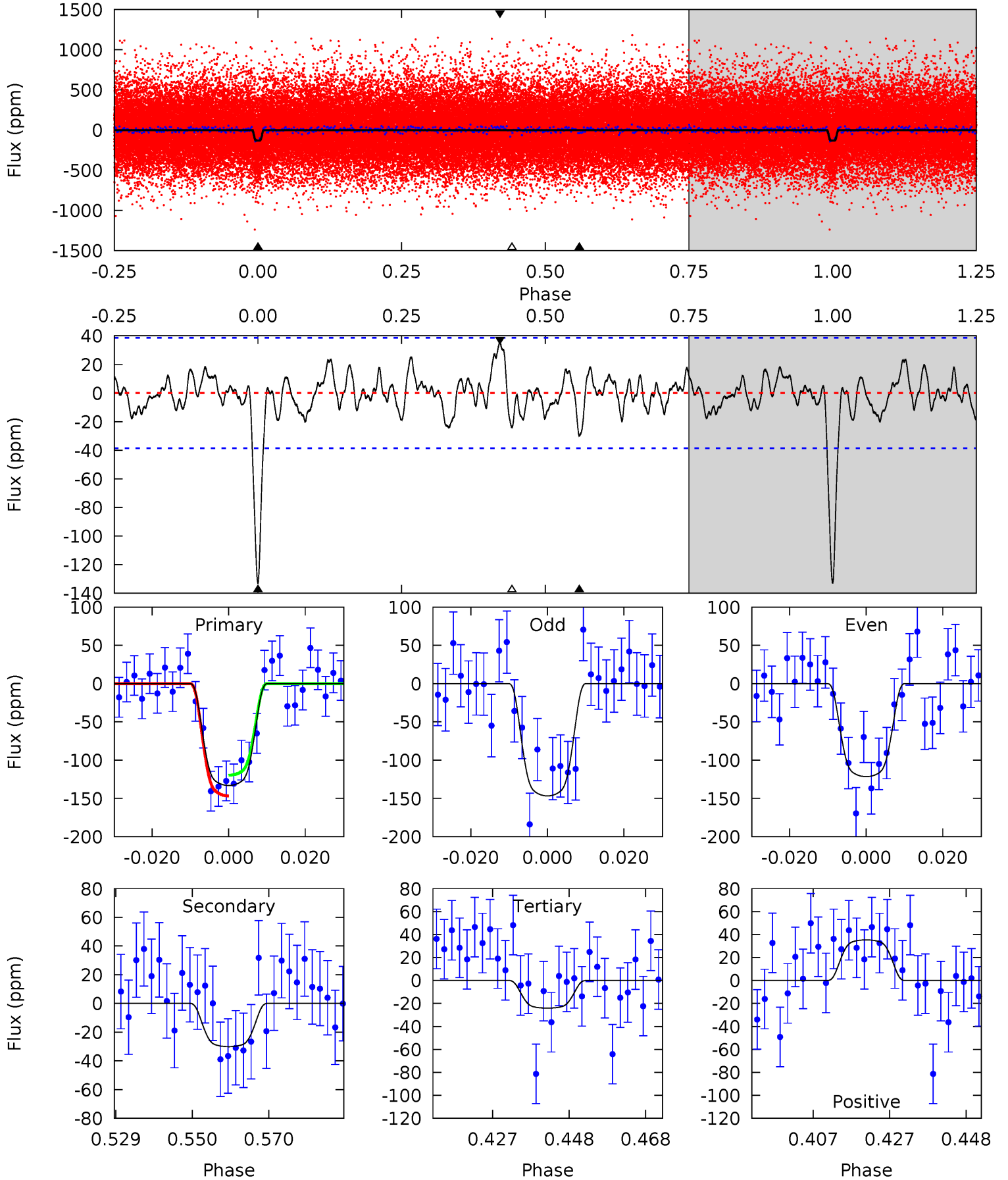
TCE 009093086-01 P= 9.704359 Days $T_0=138.190193$ (BKJD)



DV Model-Shift Uniqueness Test

009093086-01, P = 9.704232 Days, E = 128.495986 Days

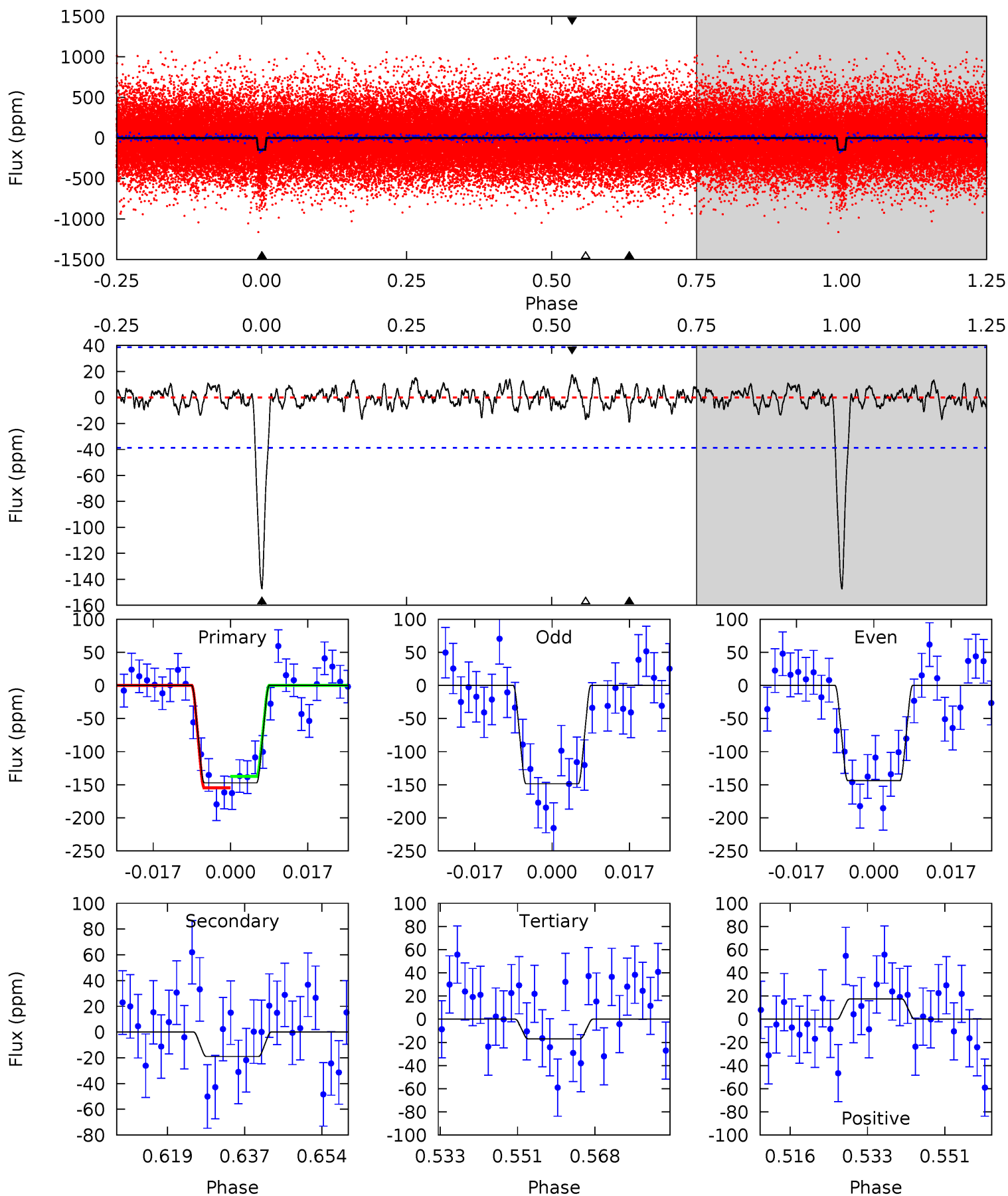
| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 16.8 | 3.81 | 3.05 | 4.47 | 4.89 | 2.32 | 1.34 | 13.8 | 12.4 | 0.76 | -0.66 | 1.59 | 0.97 | 0.21 | 1.72 |



Alt Model-Shift Uniqueness Test

009093086-01, P = 9.704359 Days, E = 128.485834 Days

| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 18.7 | 2.41 | 2.15 | 2.21 | 4.92 | 2.38 | 0.77 | 16.6 | 16.5 | 0.26 | 0.20 | 0.31 | 0.90 | 0.11 | 1.11 |



Stellar Parameters For KIC 009093086

| | $T_{\text{eff}}(K)$ | $\log(g)$ | [Fe/H] | R (R_{\odot}) | $M(M_{\odot})$ | p_{\star} ($\text{g}\cdot\text{cm}^{-3}$) |
|--------|----------------------|---------------------------|----------------------------|---------------------------|---------------------------|---|
| | 6273^{+169}_{-225} | $4.442^{+0.056}_{-0.224}$ | $-0.140^{+0.250}_{-0.300}$ | $1.044^{+0.349}_{-0.116}$ | $1.099^{+0.154}_{-0.139}$ | $1.359^{+0.409}_{-0.779}$ |
| | +3%/-4% | +1%/-5% | +179%/-214% | +33%/-11% | +14%/-13% | +30%/-57% |
| Source | PHO1 | 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 009093086-01 / KOI 6191.01

| Detrend | Depth (ppm) | R_p (R_{\oplus}) | T_{max} (K) | T_{obs} (K) | A_{obs} |
|---------|-------------|------------------------|----------------------|----------------------|------------------|
| DV | -30 ± 8 | $1.73^{+0.32}_{-0.20}$ | 1328^{+108}_{-70} | 4094^{+241}_{-253} | 44^{+19}_{-16} |
| Alt. | -19 ± 8 | $1.48^{+0.27}_{-0.18}$ | 1327^{+106}_{-68} | 4008^{+325}_{-405} | 38^{+23}_{-17} |

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

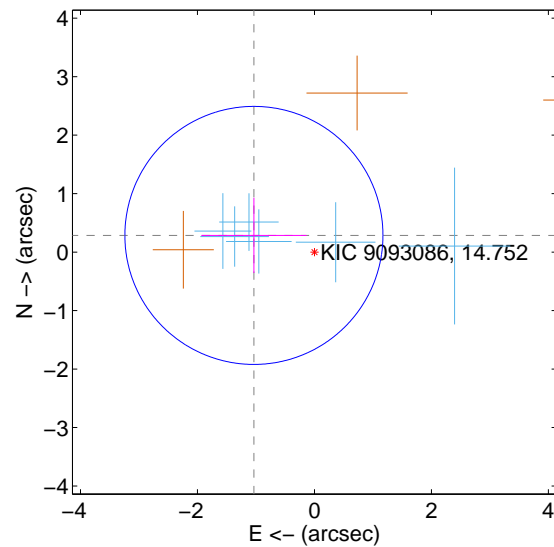
Supplemental centroid analysis for 009093086-01. Kepler magnitude: 14.75. Transit SNR 10.82

There are 6 quarters with good PRF difference image offsets

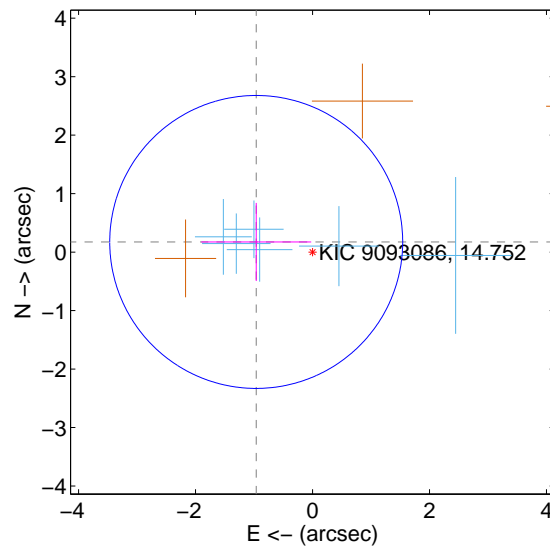
The direct PRF centroid is offset from the target star catalog position by about 0.15 arcsec

| | Distance in arcsec | Distance / σ | Δ RA | Δ Dec |
|---|--------------------|---------------------|-------------------|-------------------|
| PRF-fit source offset from OOT | 1.074 ± 0.735 | 1.46 | 1.035 ± 0.900 | 0.285 ± 0.643 |
| PRF-fit source offset from KIC position | 0.978 ± 0.835 | 1.17 | 0.963 ± 0.940 | 0.174 ± 0.668 |
| photometric centroid source offset | 0.68 ± 0.92 | 0.74 | 0.62 ± 0.92 | 0.29 ± 0.93 |

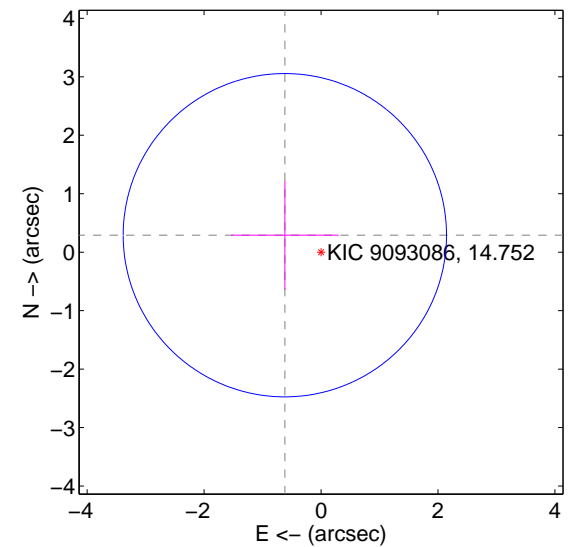
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

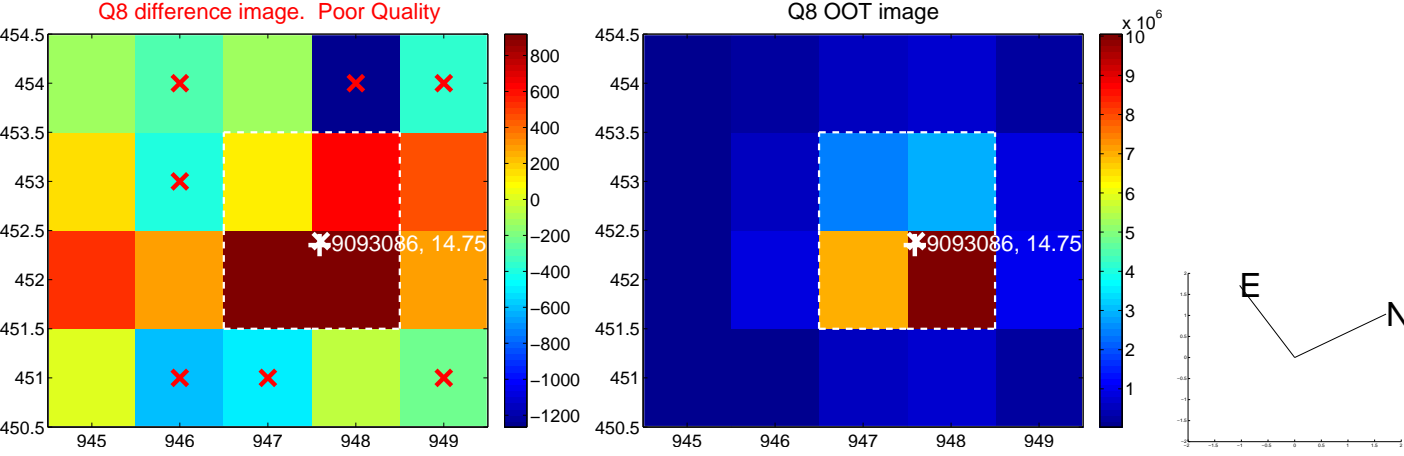
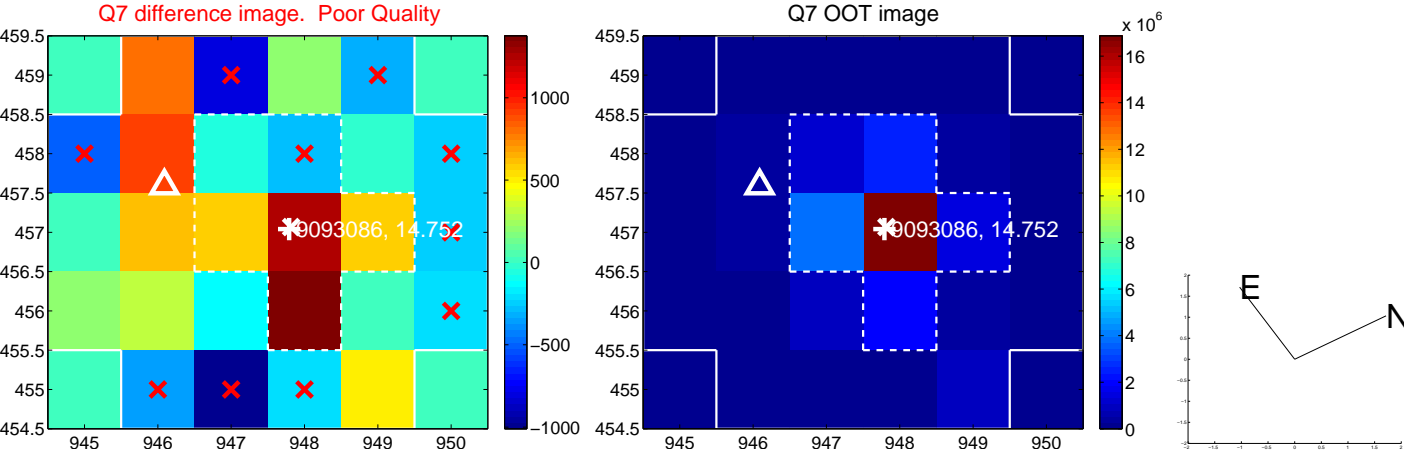
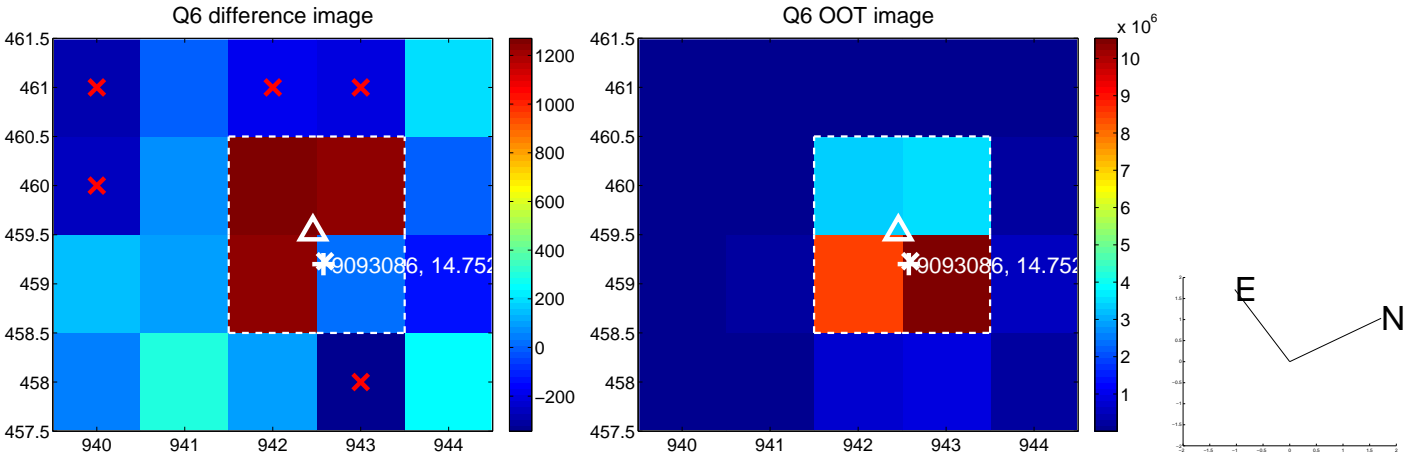
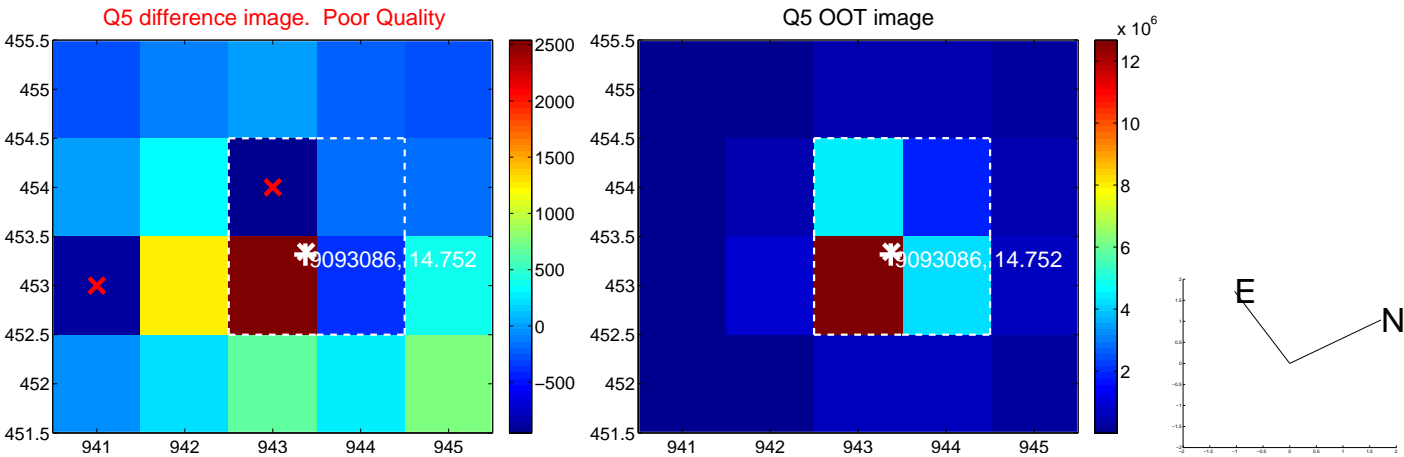


offset from photometric centroids

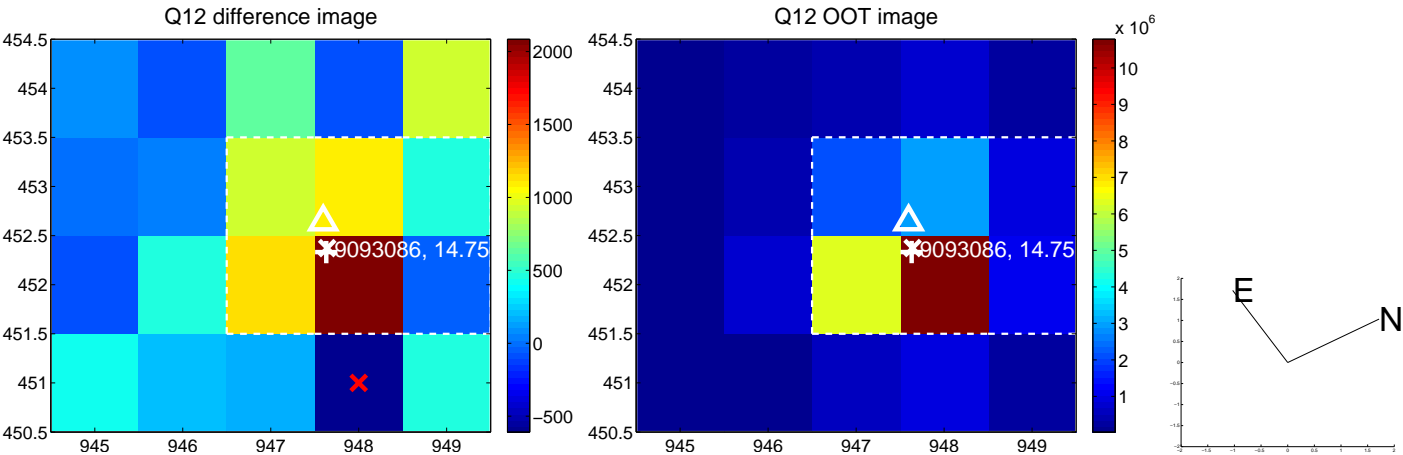
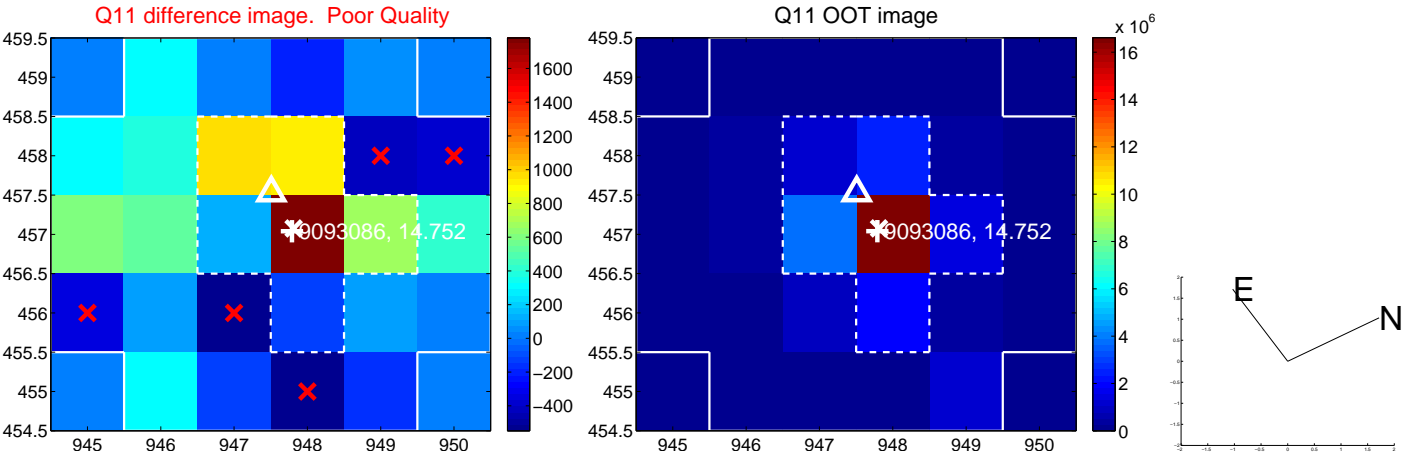
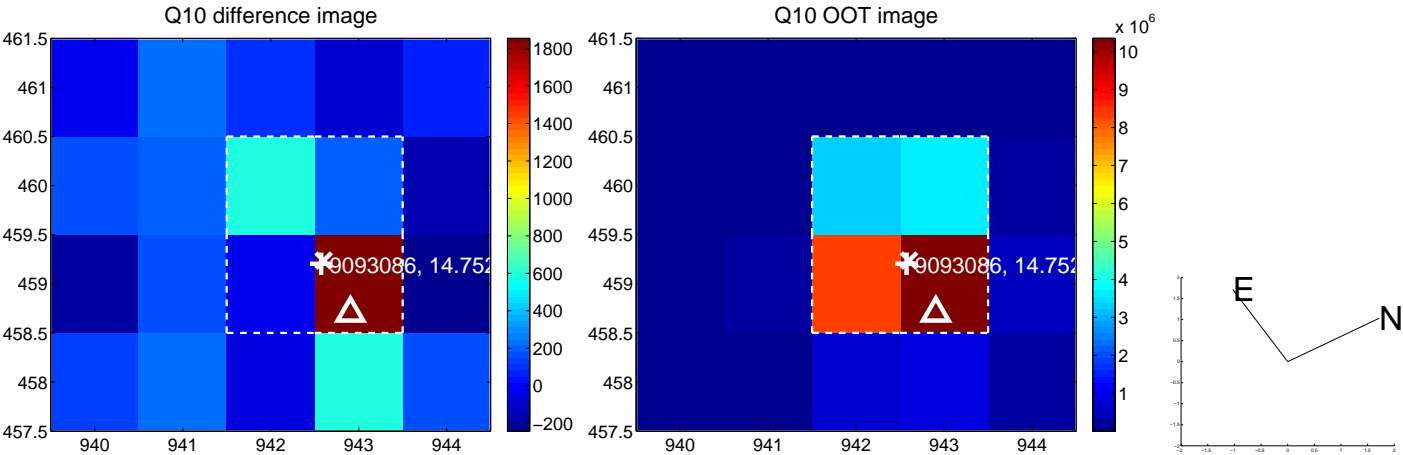
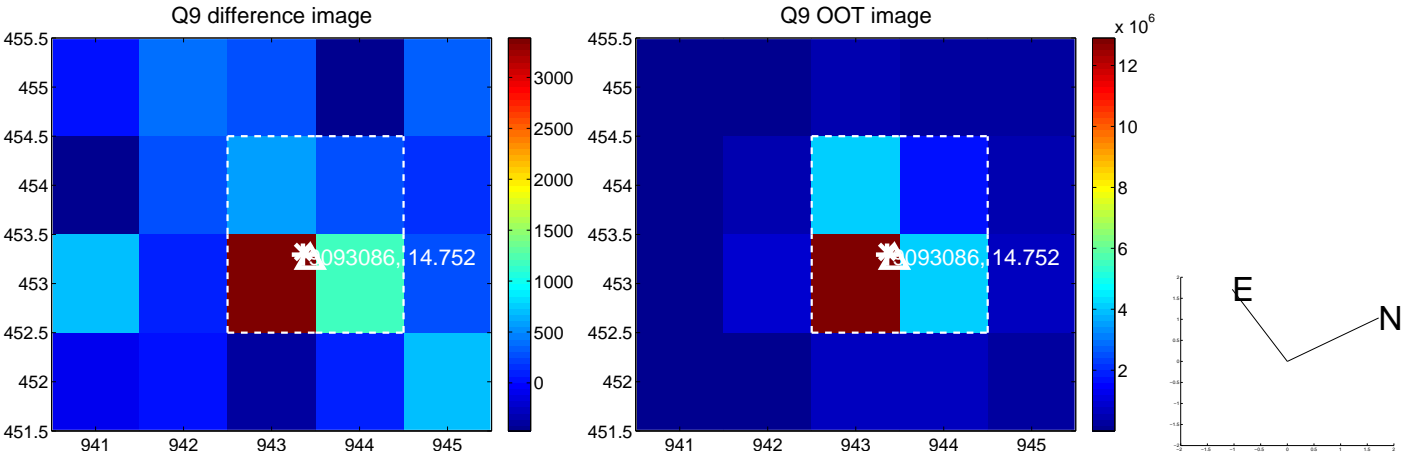


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets**; **Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

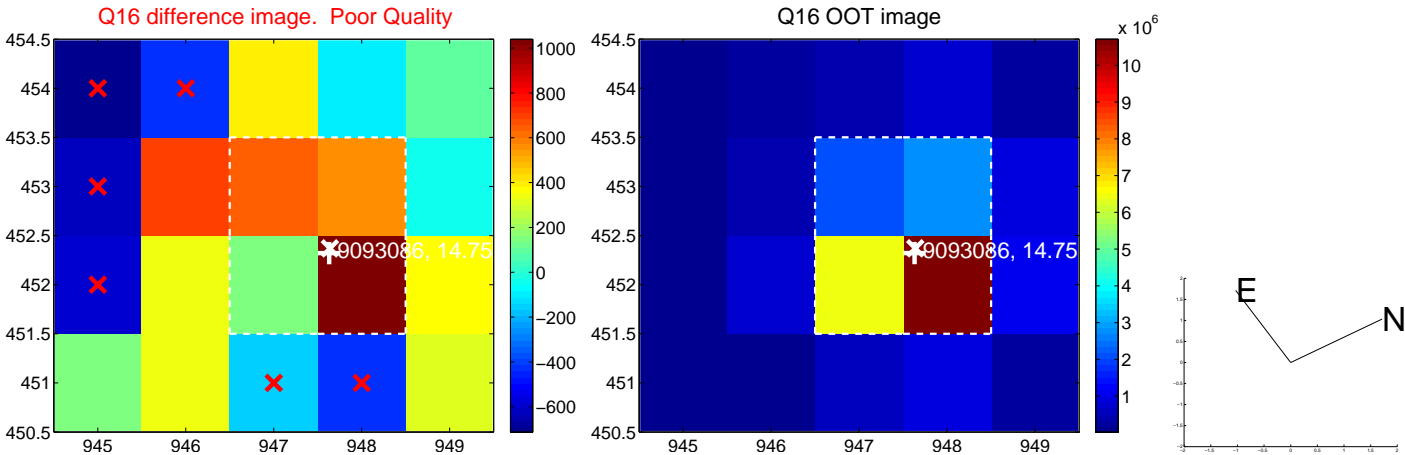
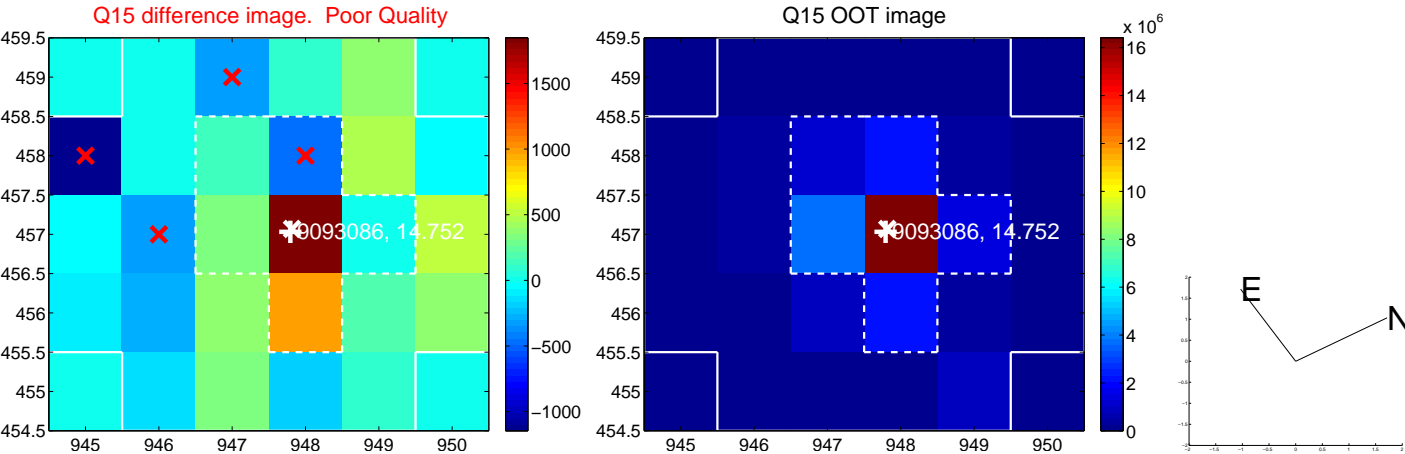
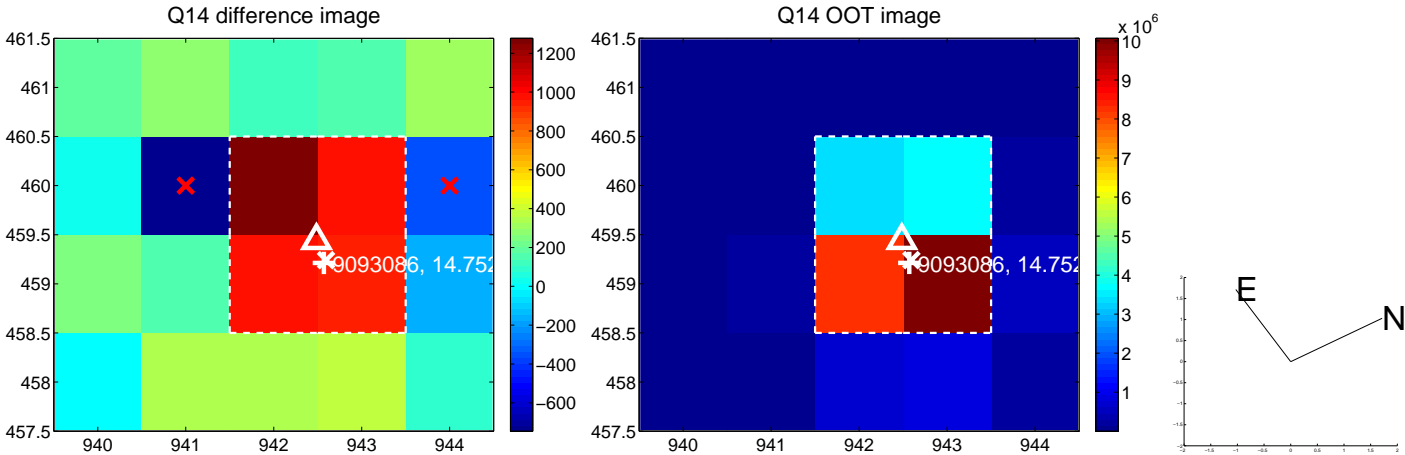
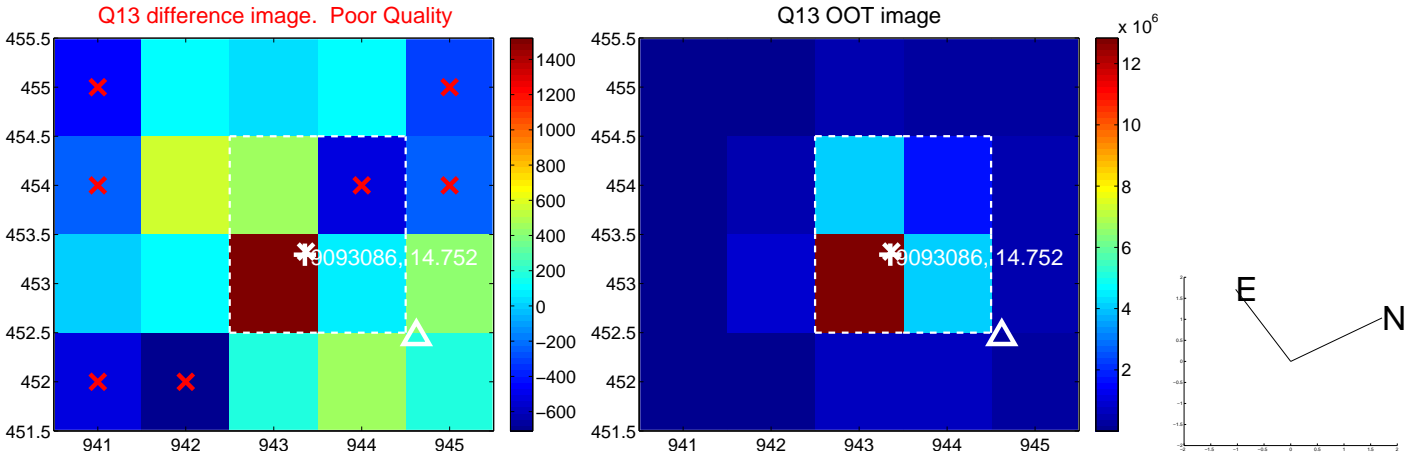
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



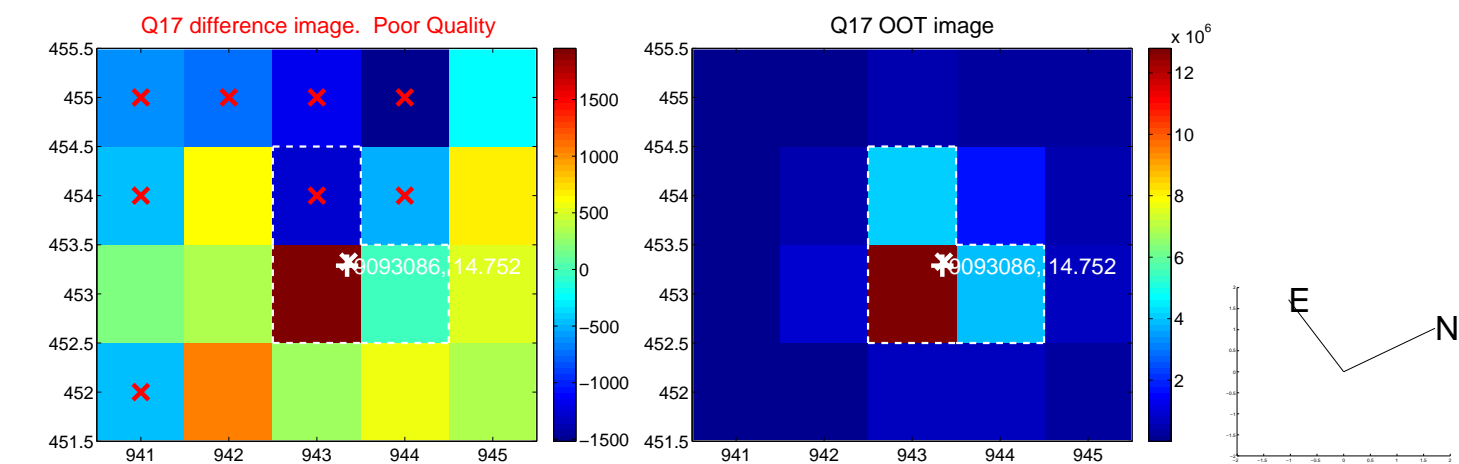
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



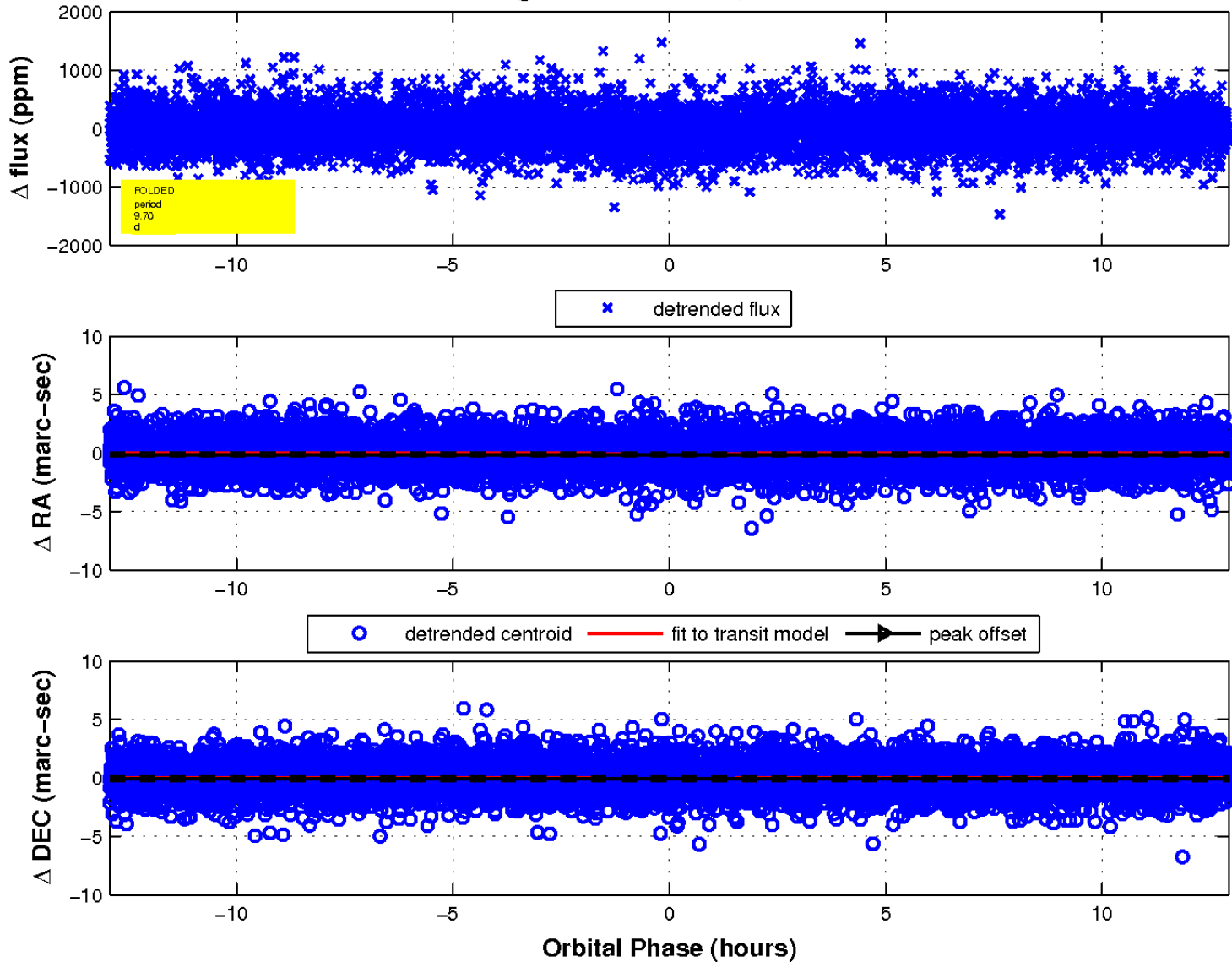
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

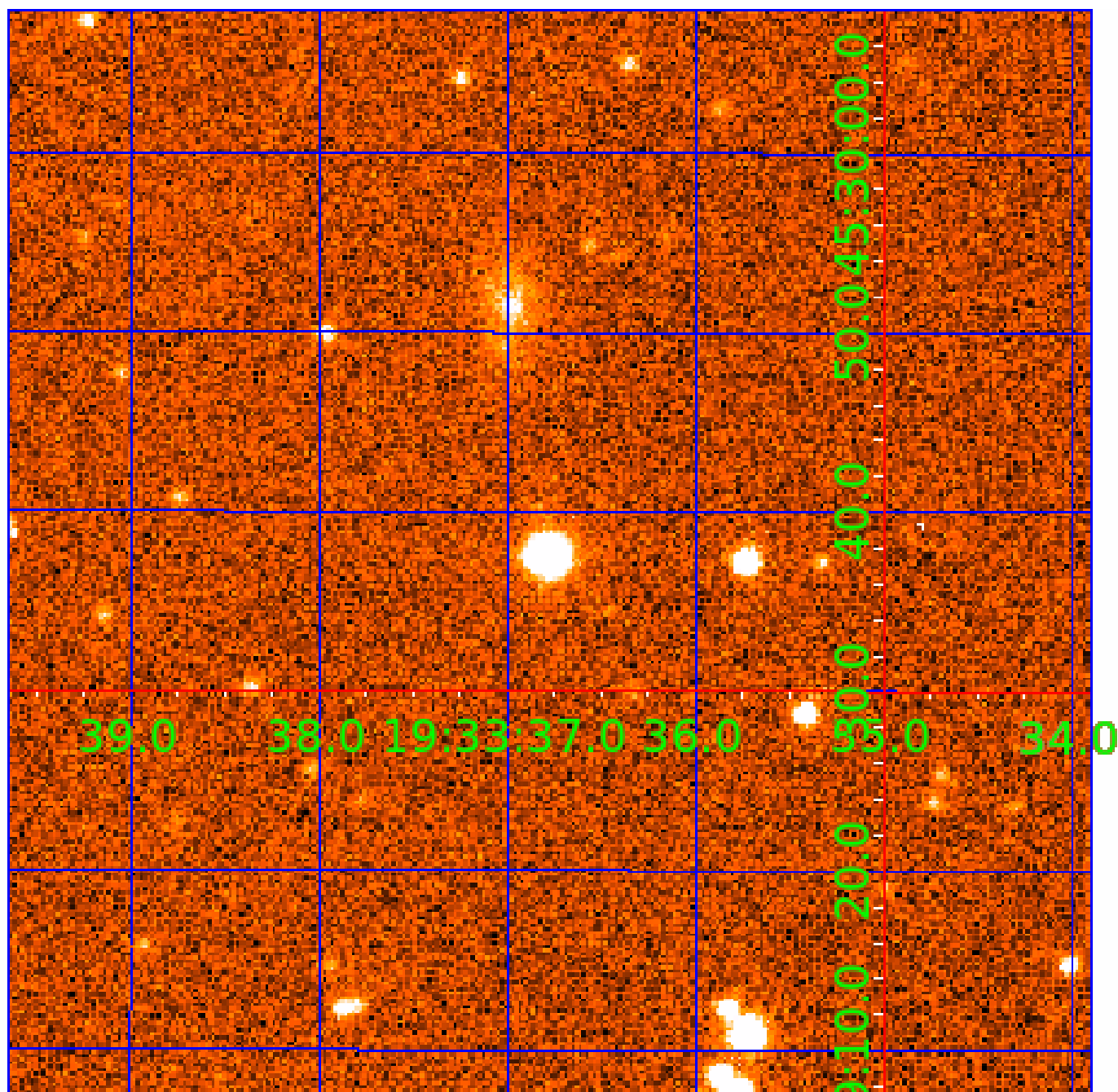


fluxWeightedCentroids, Planet 1 of 2



UKIRT Image

Declination



KIC 009093086

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}) |
|--------------|----------|---------|---------------|--------------|-------------|------------------|-----|------|-----------------------------|-----------------|------------------------|------------------------|
| 009093086-01 | OBS | 6191.01 | 9.704232 | 138.200218 | 147.2 | 4.315 | 9.7 | 10.8 | 1.04 | 6273 | 1.67 | 178.91 |
| 009093086-02 | OBS | 6191.02 | 12.771251 | 141.366258 | 150.4 | 3.406 | 8.6 | 9.5 | 1.04 | 6273 | 1.43 | 124.06 |

Robovetter Results

| TCE | Run Type | Disp | Score | N | S | C | E | Comments |
|--------------|----------|------|-------|---|---|---|---|------------|
| 009093086-01 | OBS | PC | 0.69 | 0 | 0 | 0 | 0 | NO_COMMENT |
| 009093086-02 | OBS | PC | 0.74 | 0 | 0 | 0 | 0 | NO_COMMENT |

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.

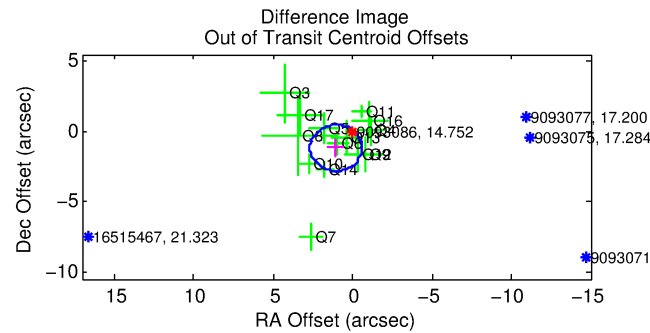
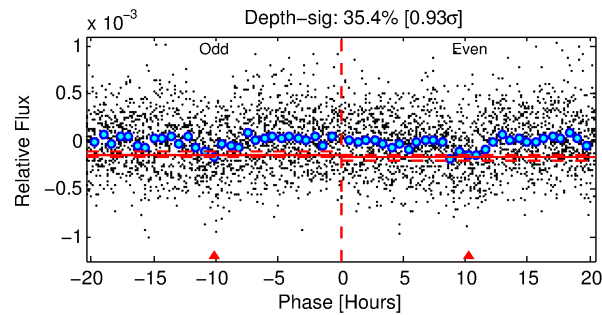
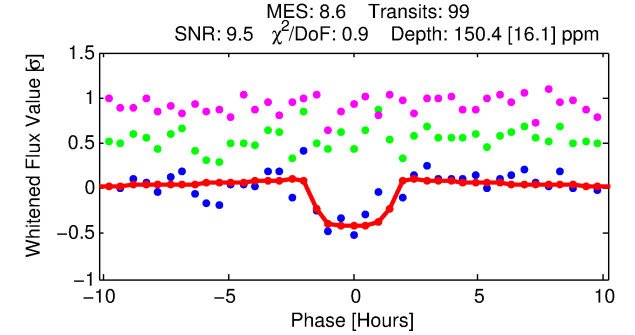
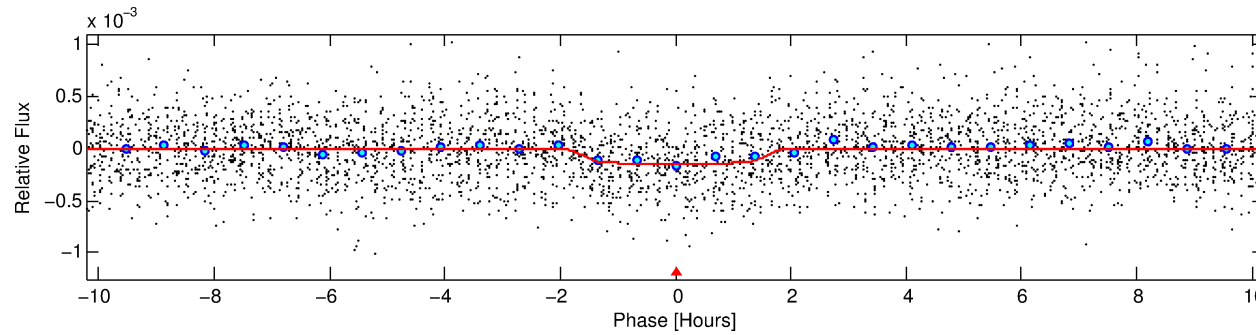
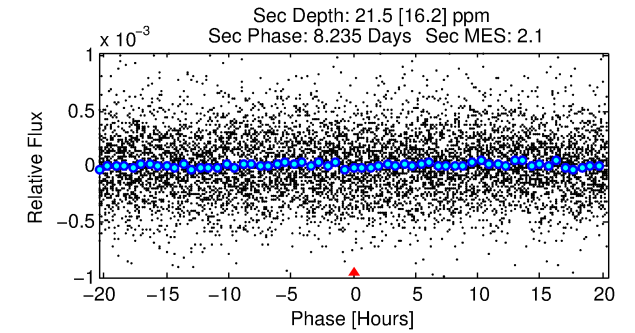
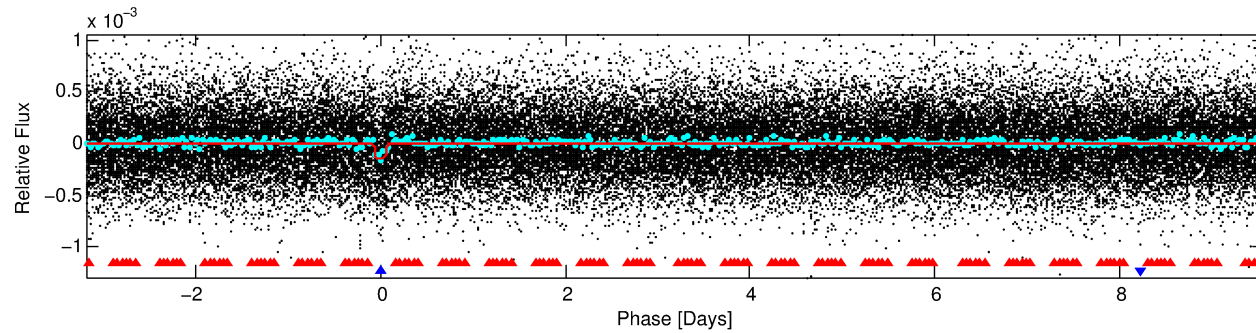
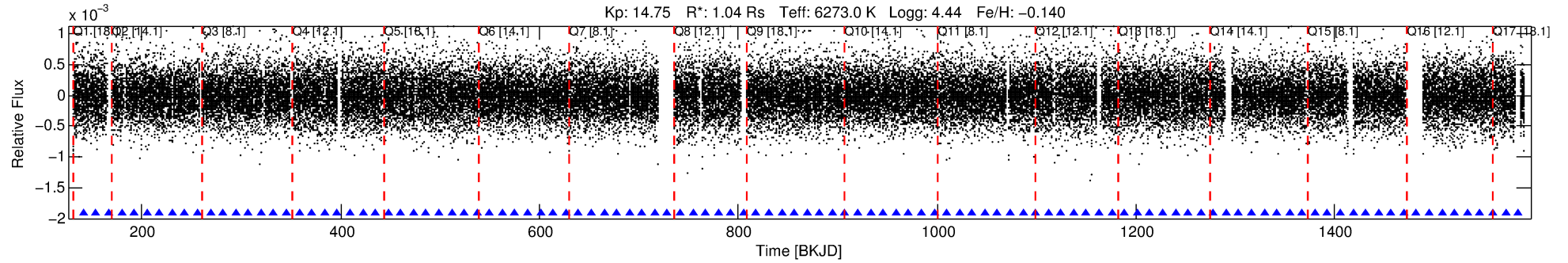
Ephemeris Match Information For 009093086-02

No Significant Match Found

DV One-Page Summary

KIC: 9093086 Candidate: 2 of 2 Period: 12.771 d

KOI: K06191.02 Corr: 0.979



DV Fit Results:

Period = 12.77125 [0.00011] d
Epoch = 141.3663 [0.0070] BKJD
Rp/R* = 0.0125 [0.0086]
a/R* = 17.11 [61.89]
b = 0.82 [1.49]
Seff = 124.06 [53.86]
Teq = 851 [92] K
Rp = 1.43 [1.09] Re
a = 0.1104 [0.0311] AU
Ag = 70.60 [114.05] [0.61σ]
Teffp = 3814 [1496] K [1.98σ]

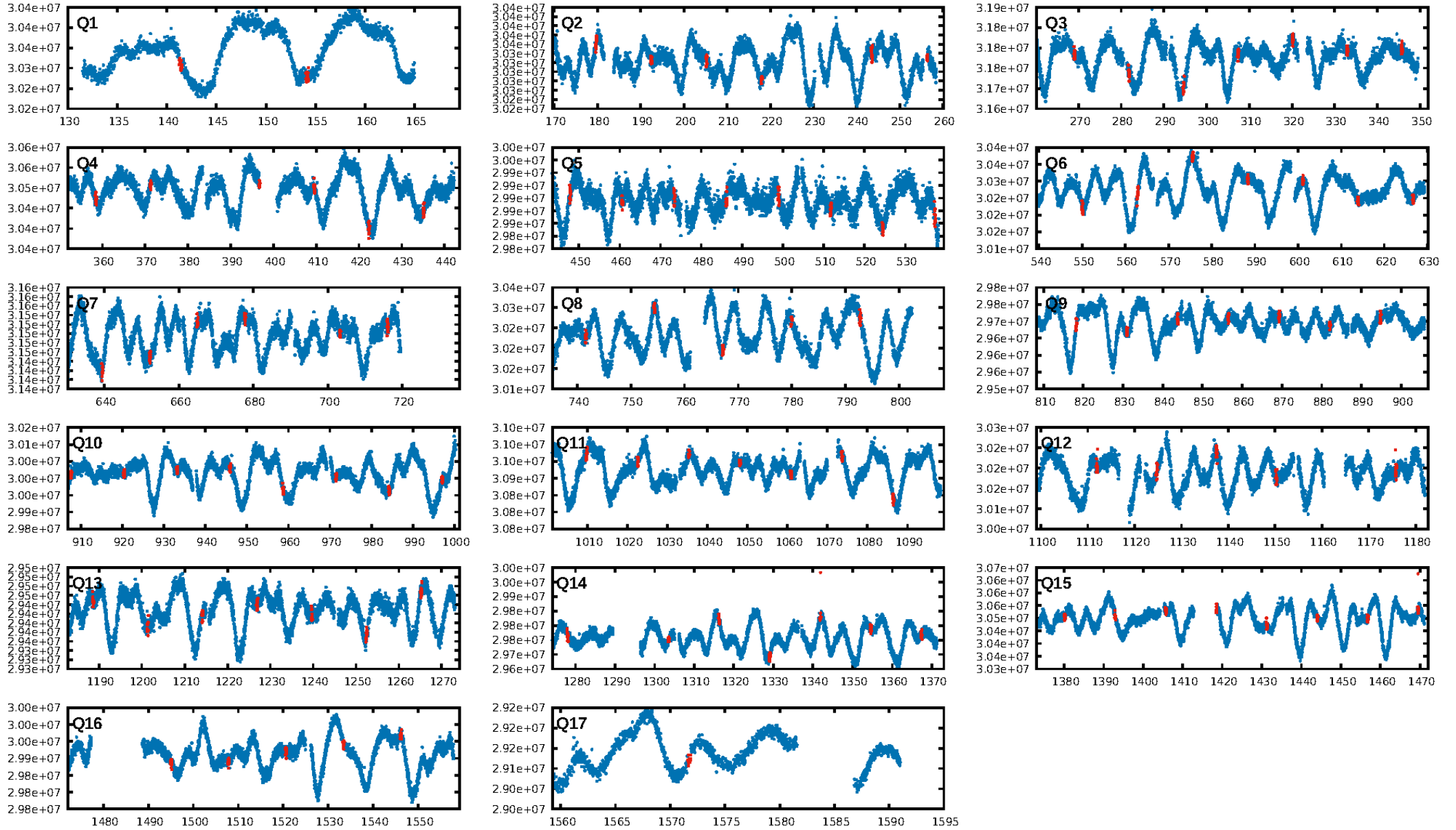
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [13.39σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 99.6%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 1.48e-17
RollingBand-fgt: 1.00 [96/96]
GhostDiagnostic-chr: 1.353
Centroid-sig: 2.7%
Centroid-so: 1.696 arcsec [1.61σ]
OotOffset-rm: 1.552 arcsec [2.84σ]
KicOffset-rm: 1.585 arcsec [2.56σ]
OotOffset-st: 3/3/4/4 [14]
KicOffset-st: 3/3/4/4 [14]
DiffImageQuality-fgm: 0.57 [8/14]
DiffImageOverlap-fno: 1.00 [17/17]

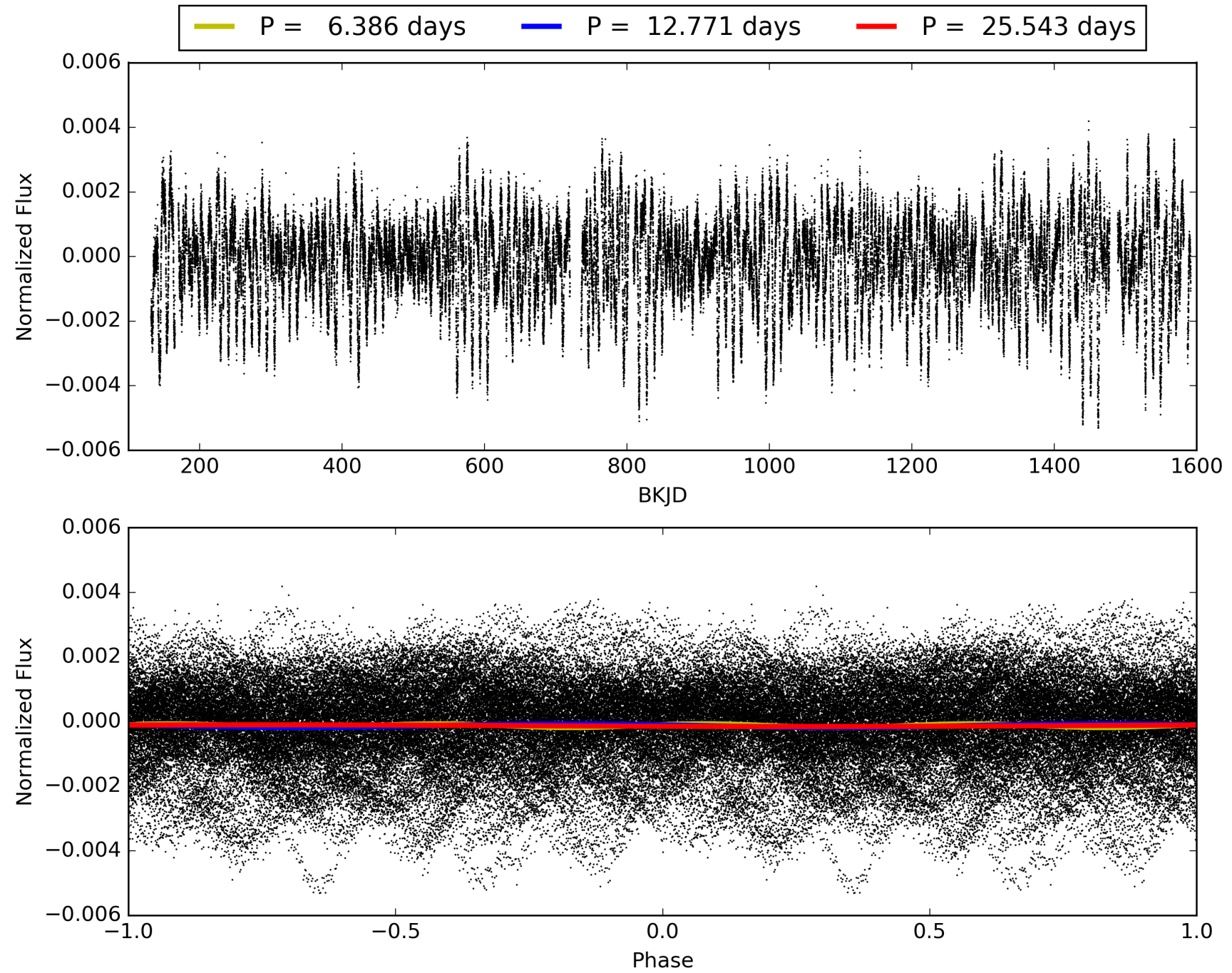
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 21:00:33 Z

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

TCE 009093086-02, PDC Light Curves

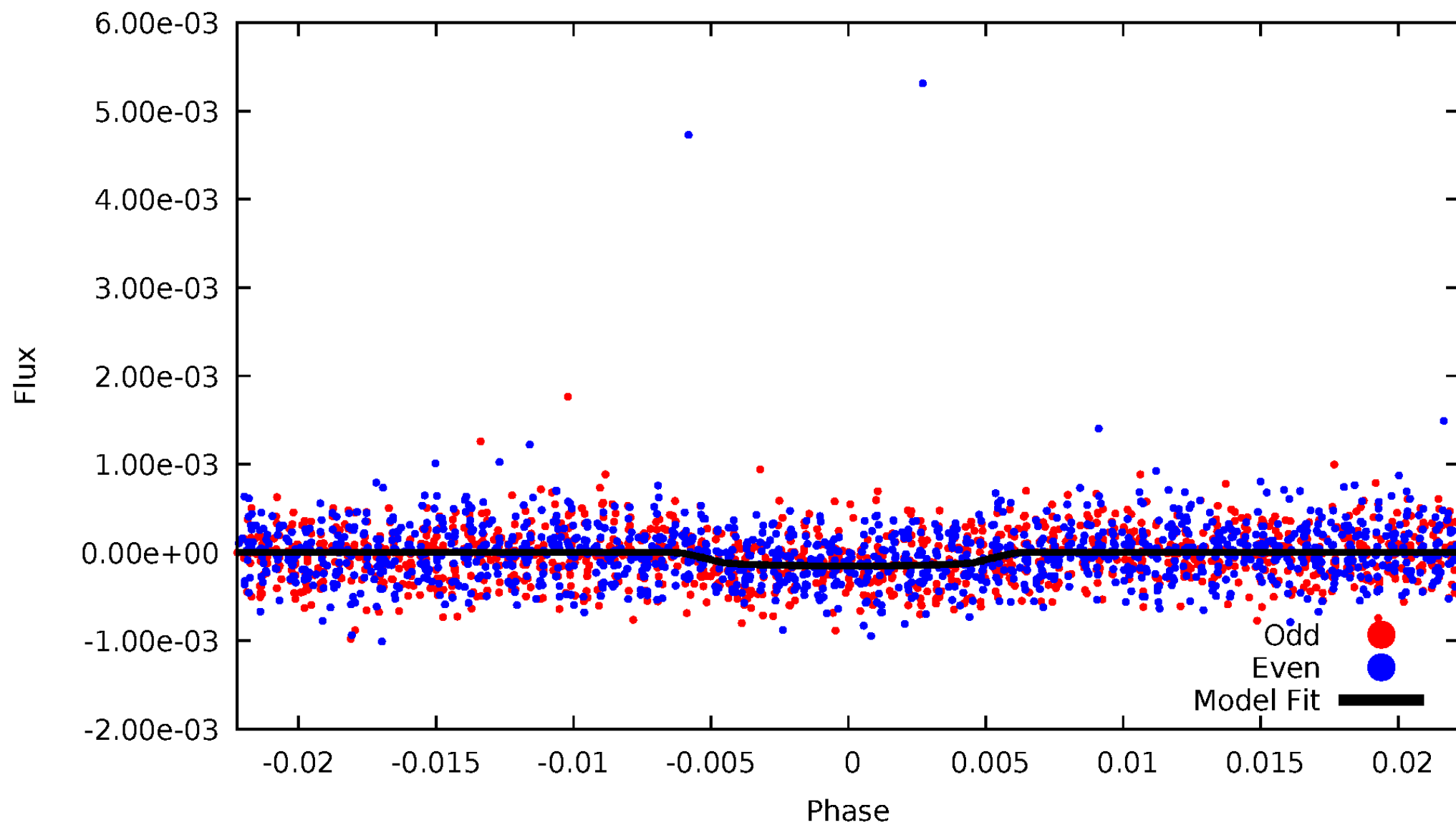


TCE 009093086-02



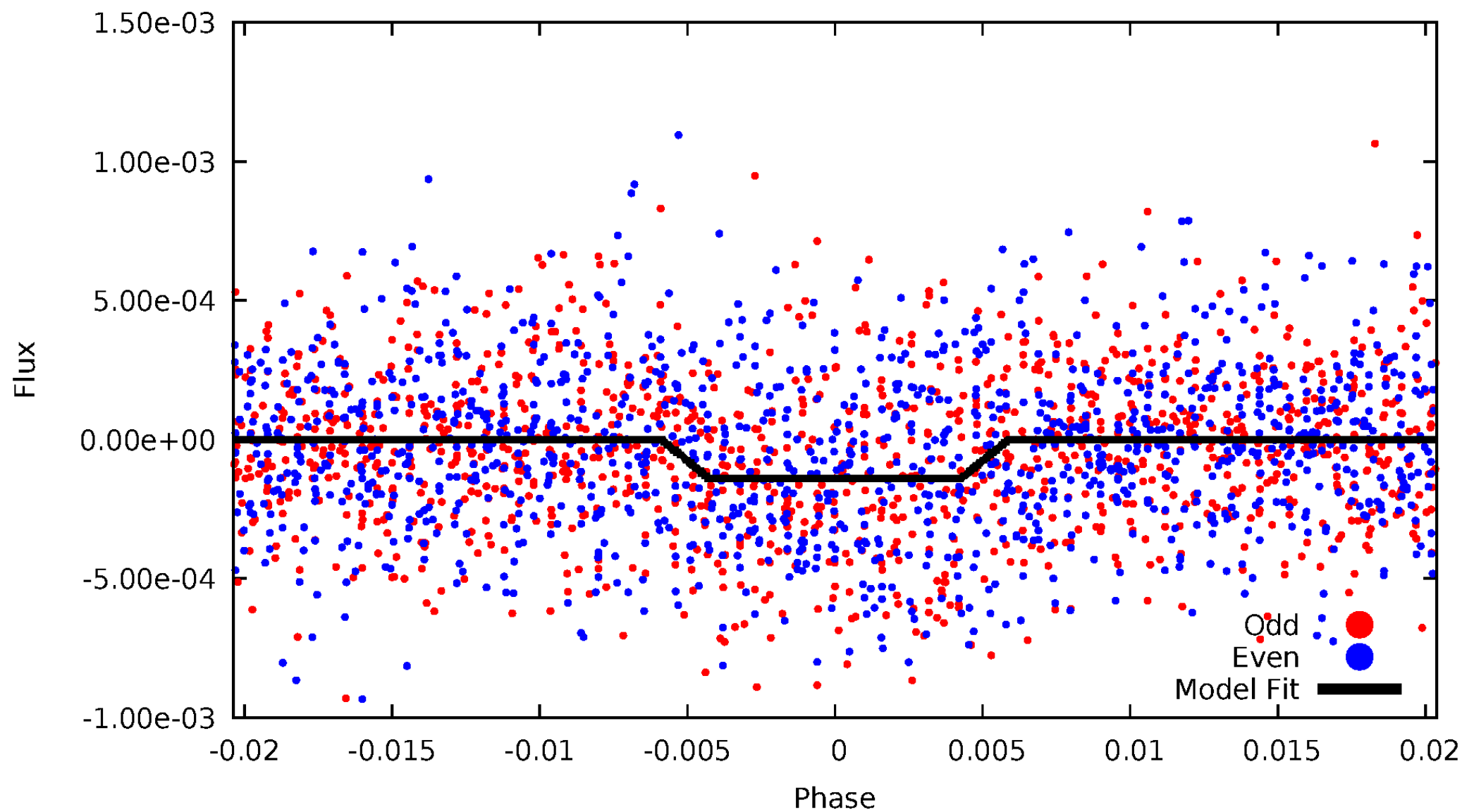
DV Odd/Even

TCE 009093086-02



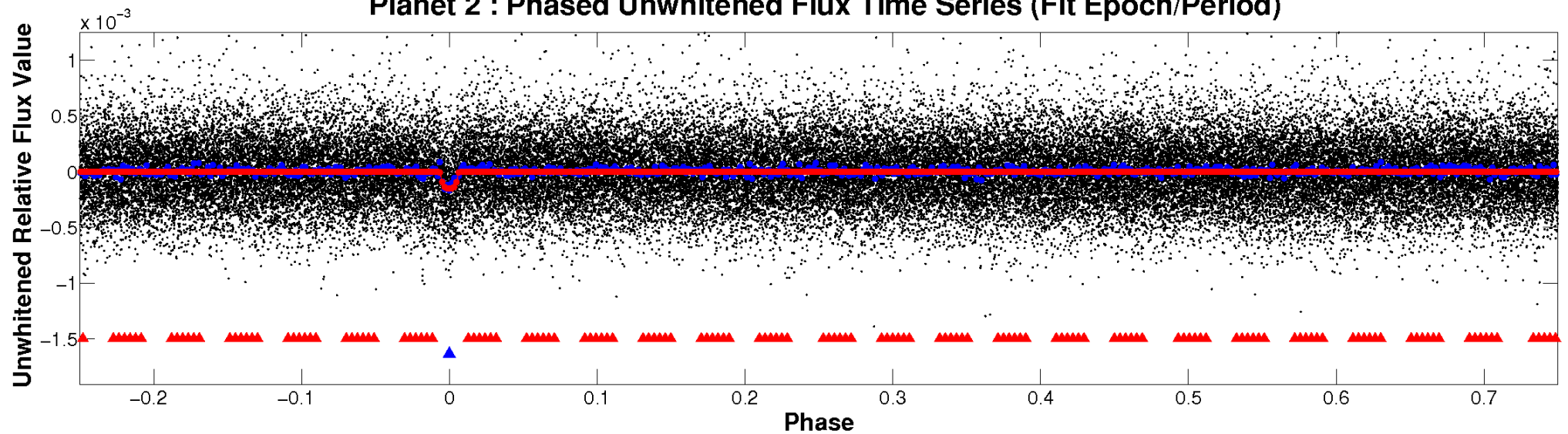
ALT Odd/Even

TCE 009093086-02

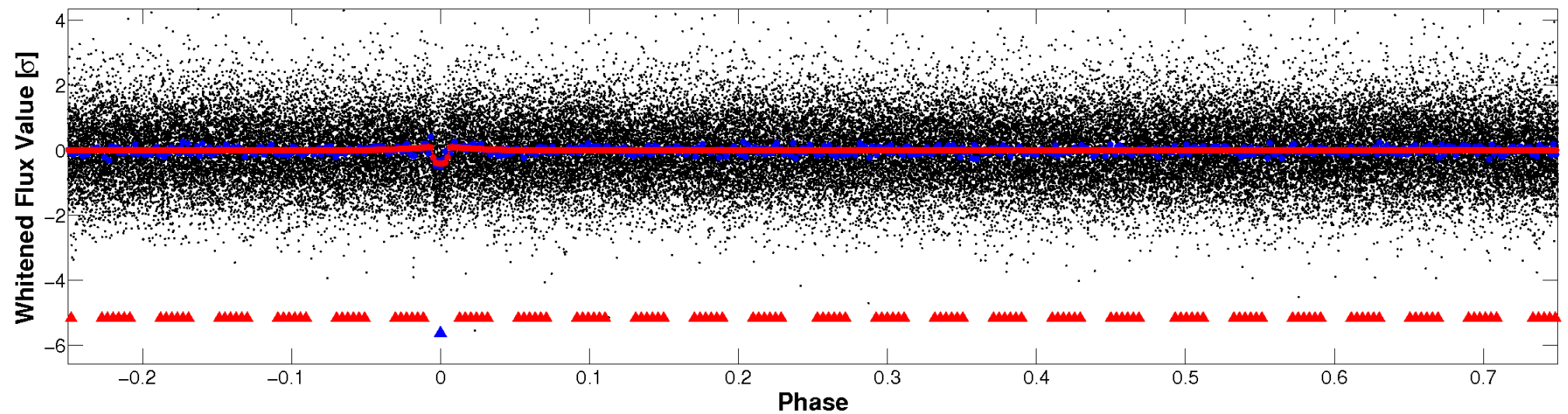


Non-Whitened Vs. Whitened Light Curve

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

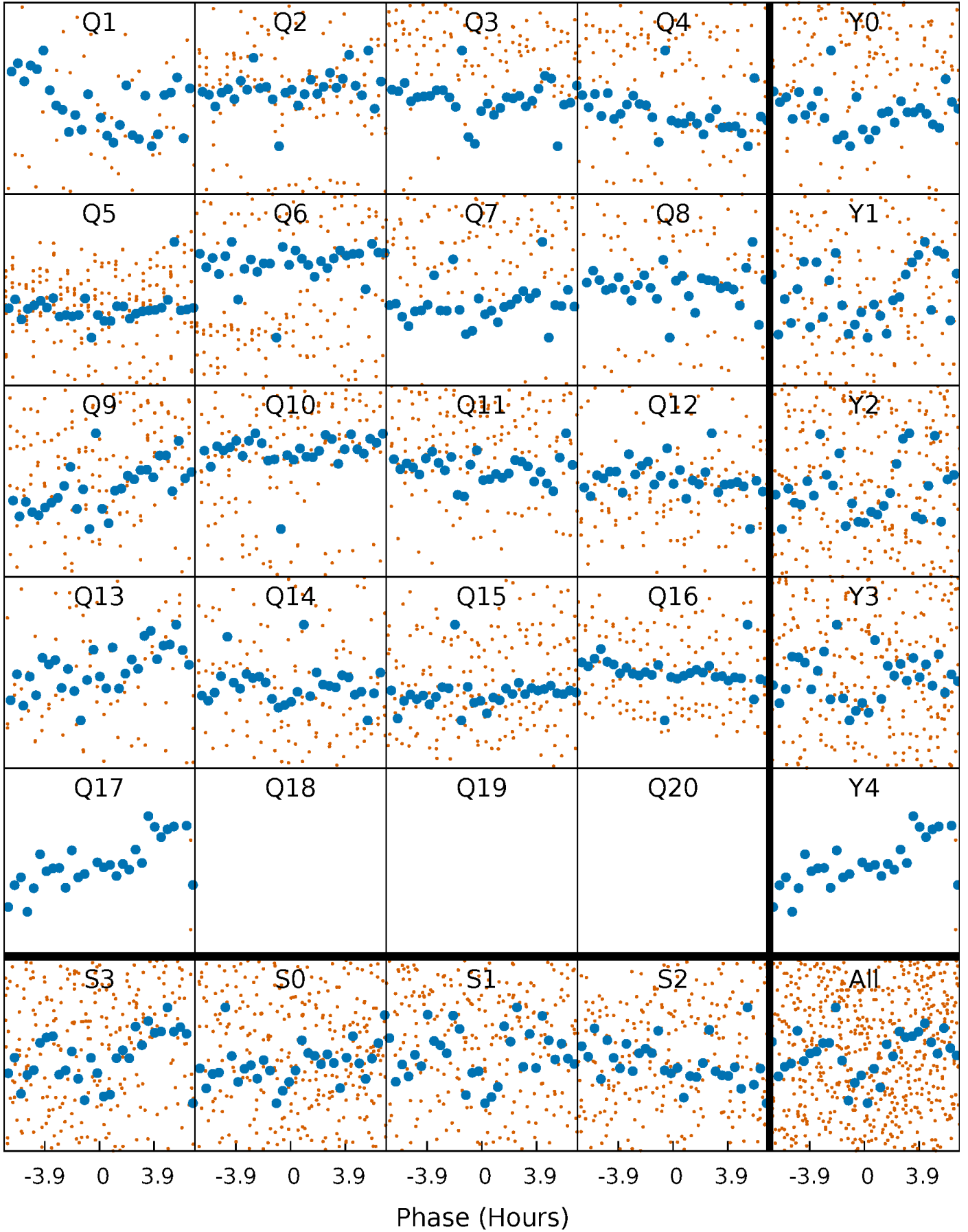


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



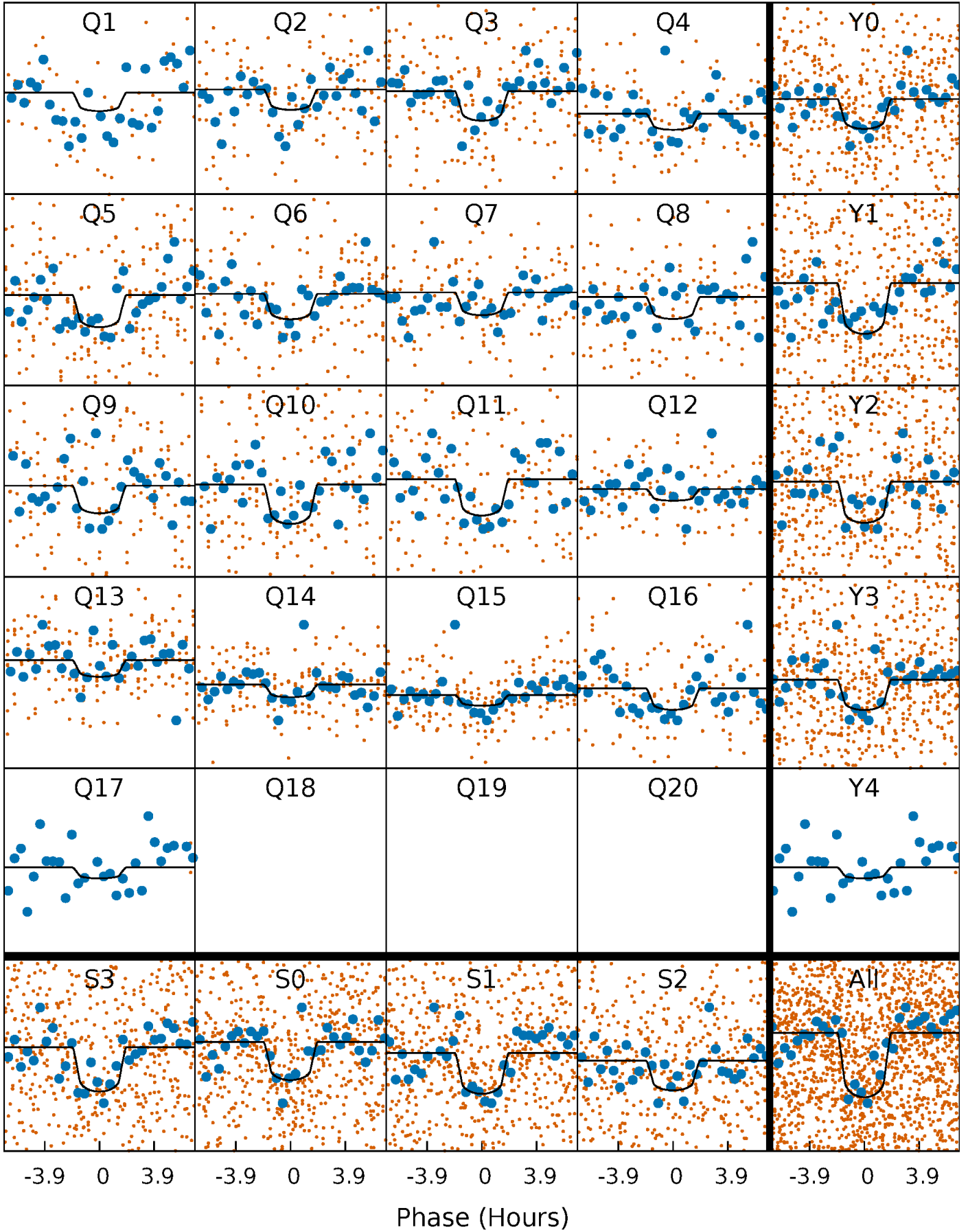
PDC Quarter-Phased Transit Curves

TCE 009093086-02 P= 12.771251 Days $T_0=141.366258$ (BKJD)



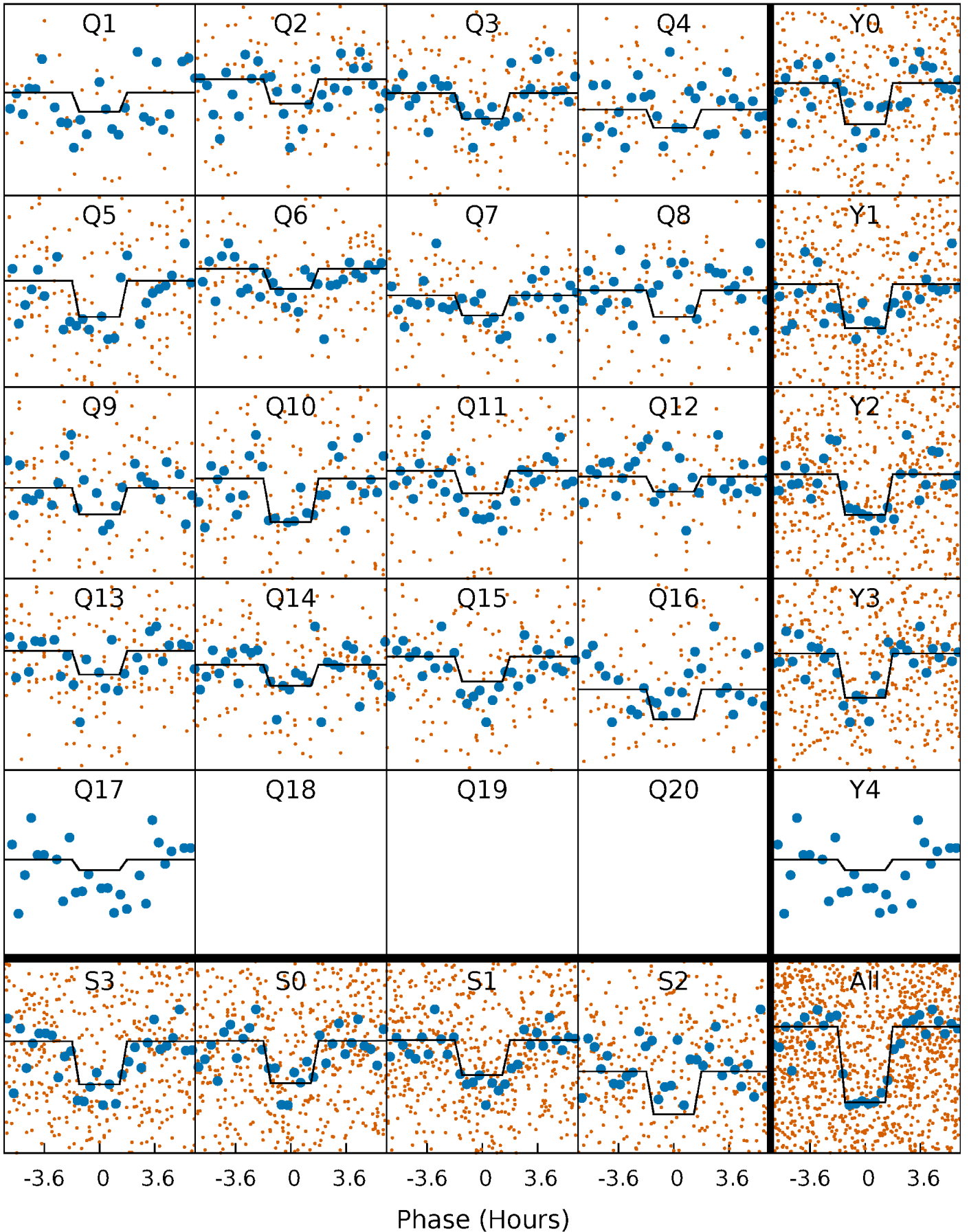
DV Quarter-Phased Transit Curves

TCE 009093086-02 P= 12.771251 Days $T_0=141.366258$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

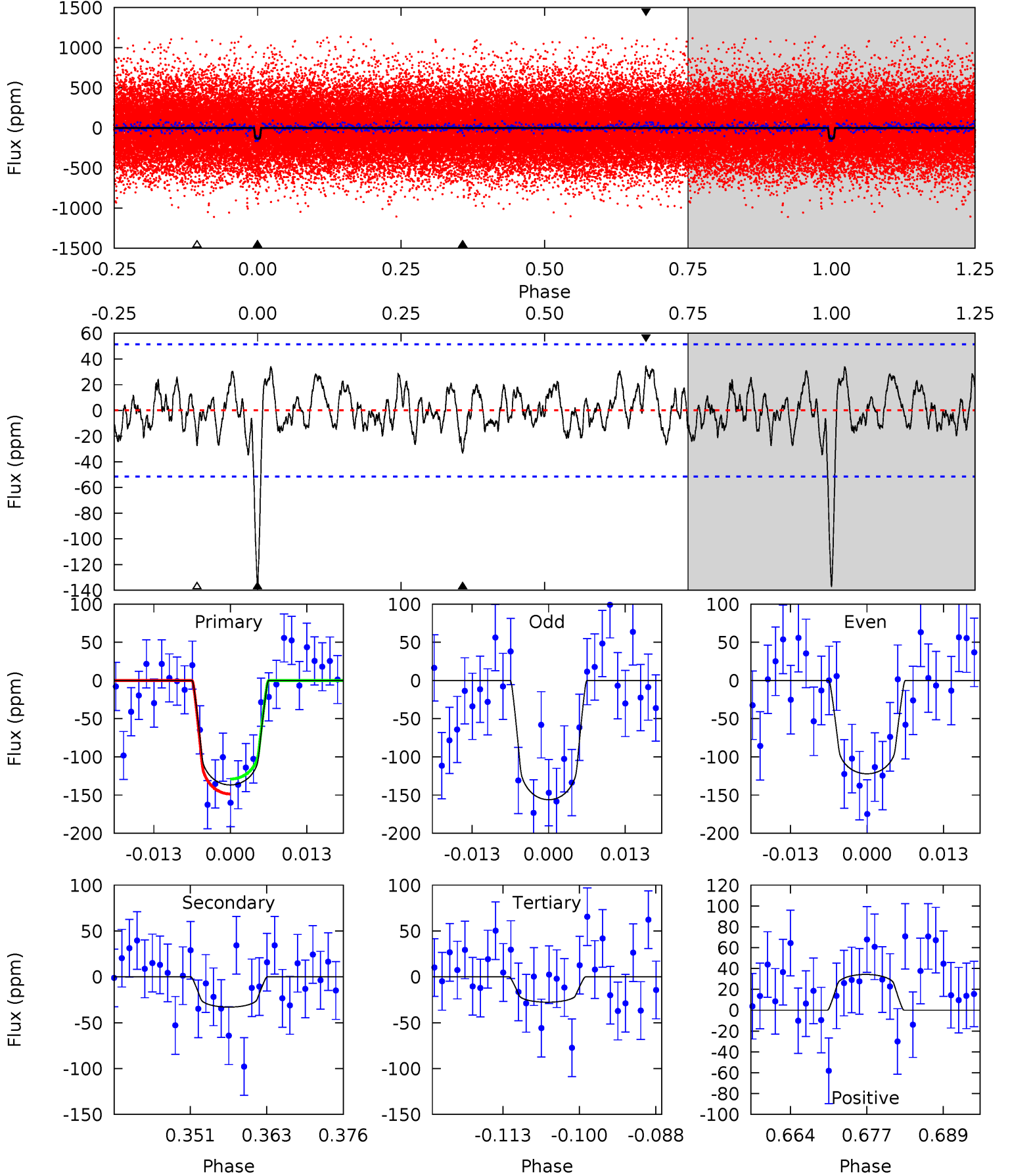
TCE 009093086-02 P= 12.771480 Days $T_0=141.347681$ (BKJD)



DV Model-Shift Uniqueness Test

009093086-02, $P = 12.771251$ Days, $E = 128.595007$ Days

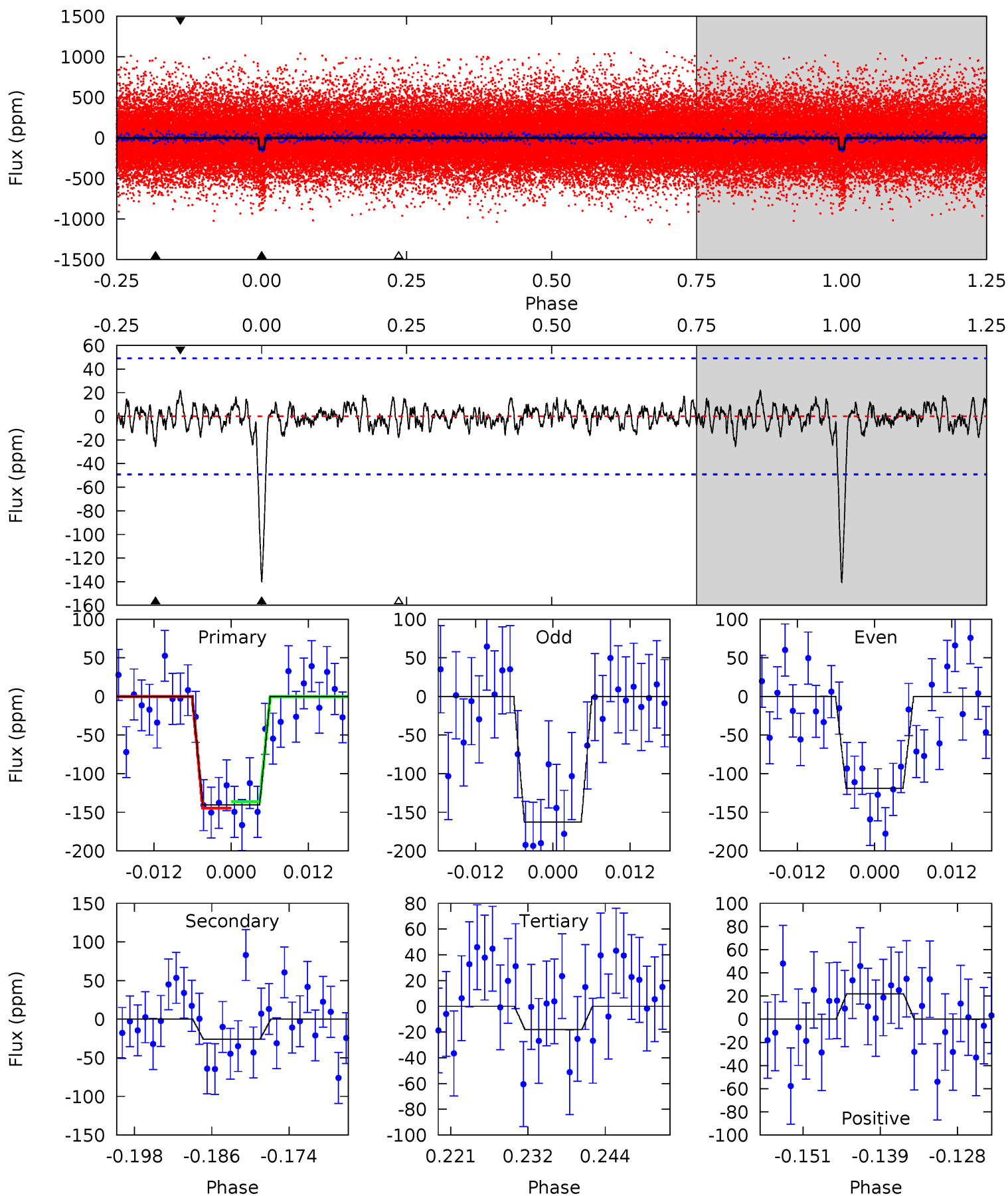
| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 13.2 | 3.20 | 2.68 | 3.32 | 4.98 | 2.50 | 1.27 | 10.6 | 9.92 | 0.52 | -0.12 | 1.64 | 0.98 | 0.20 | 0.95 |



Alt Model-Shift Uniqueness Test

009093086-02, $P = 12.771480$ Days, $E = 128.576201$ 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 | 2.62 | 1.84 | 2.23 | 5.00 | 2.52 | 0.72 | 12.4 | 12.1 | 0.78 | 0.39 | 2.22 | 0.95 | 0.13 | 0.42 |



Stellar Parameters For KIC 009093086

| | $T_{\text{eff}}(K)$ | $\log(g)$ | [Fe/H] | $R (R_{\odot})$ | $M(M_{\odot})$ | $p_{\star} (\text{g}\cdot\text{cm}^{-3})$ |
|--------|----------------------|---------------------------|----------------------------|---------------------------|---------------------------|---|
| | 6273^{+169}_{-225} | $4.442^{+0.056}_{-0.224}$ | $-0.140^{+0.250}_{-0.300}$ | $1.044^{+0.349}_{-0.116}$ | $1.099^{+0.154}_{-0.139}$ | $1.359^{+0.409}_{-0.779}$ |
| | +3%/-4% | +1%/-5% | +179%/-214% | +33%/-11% | +14%/-13% | +30%/-57% |
| Source | PHO1 | 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 009093086-02 / KOI 6191.02

| Detrend | Depth (ppm) | $R_p (R_{\oplus})$ | $T_{\text{max}} (K)$ | $T_{\text{obs}} (K)$ | A_{obs} |
|---------|--------------|------------------------|----------------------|-----------------------|-------------------|
| DV | -33 ± 10 | $1.59^{+1.00}_{-0.87}$ | 1216^{+90}_{-61} | 4288^{+1803}_{-656} | 83^{+319}_{-53} |
| Alt. | -26 ± 10 | $1.53^{+1.10}_{-0.86}$ | 1214^{+95}_{-63} | 4121^{+1822}_{-718} | 65^{+283}_{-45} |

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

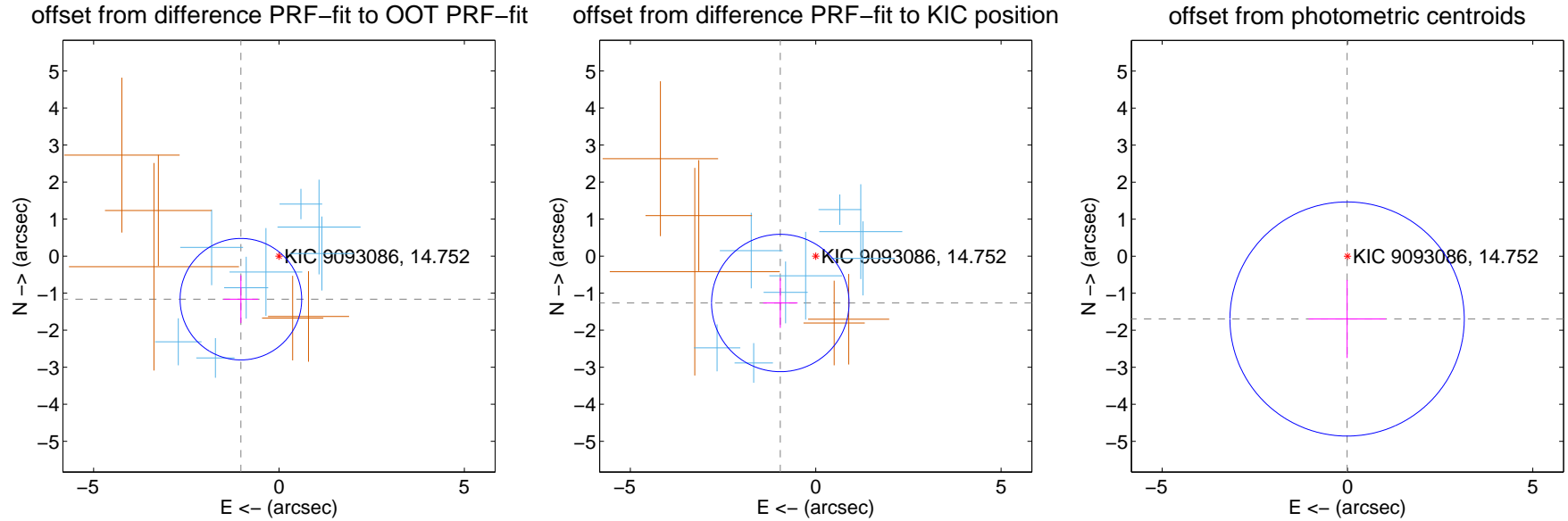
DV Centroid Data

Supplemental centroid analysis for 009093086-02. Kepler magnitude: 14.75. Transit SNR 9.45

There are 8 quarters with good PRF difference image offsets

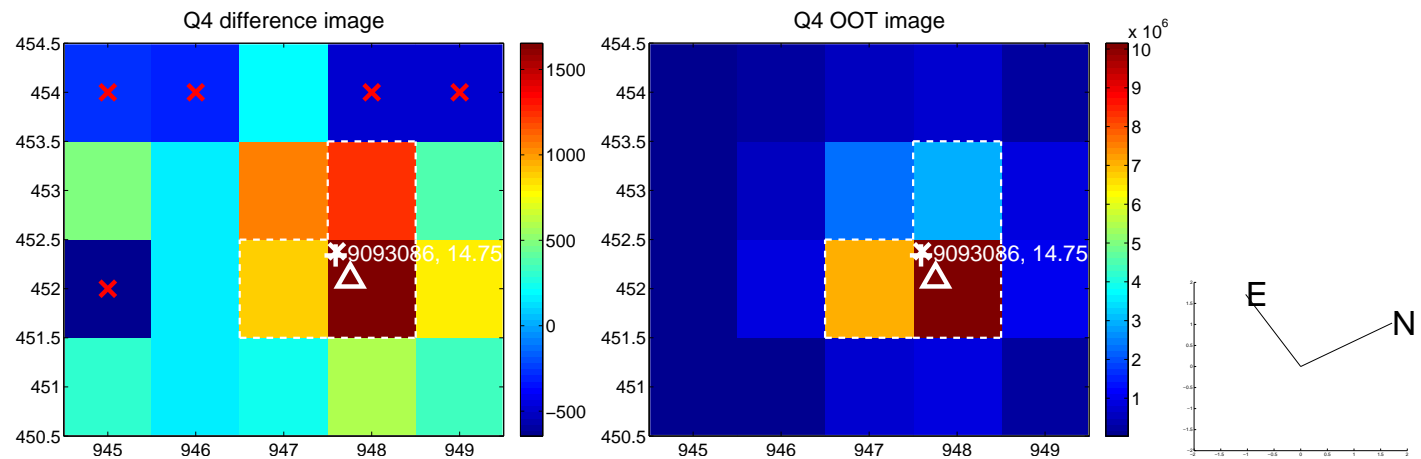
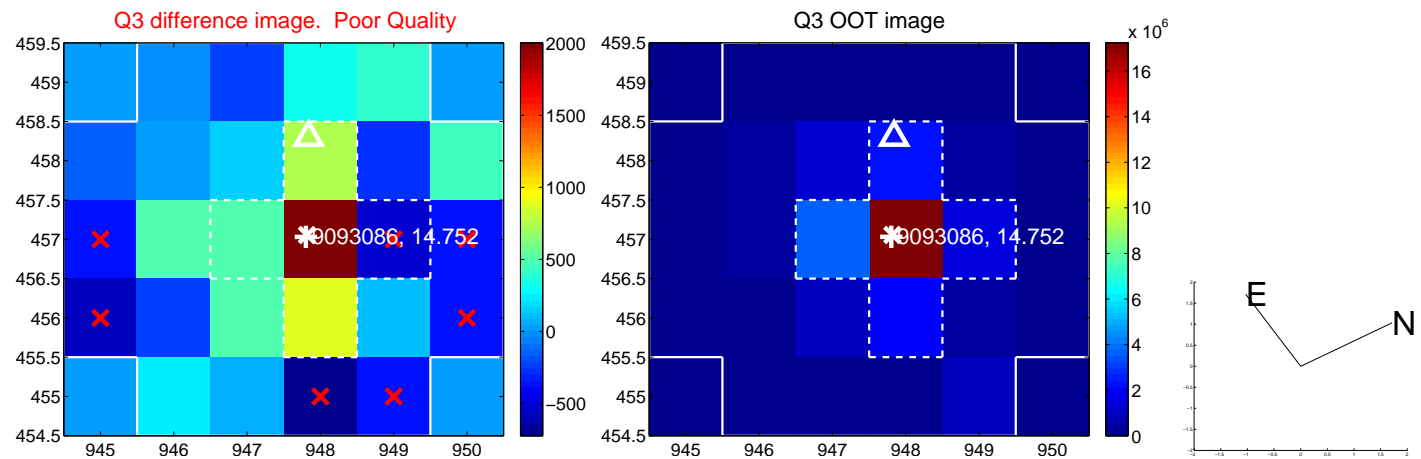
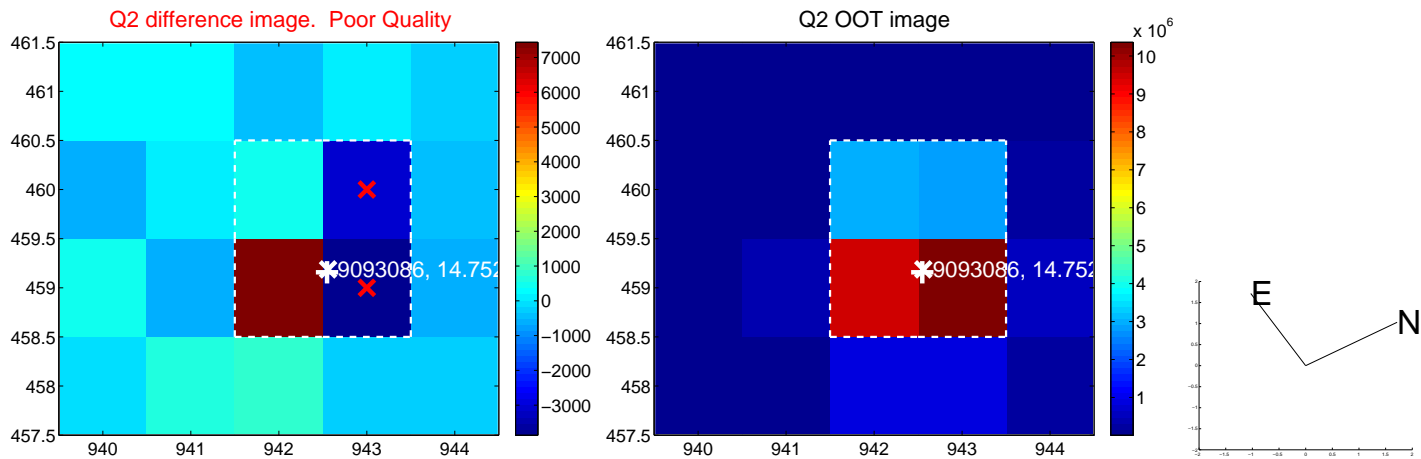
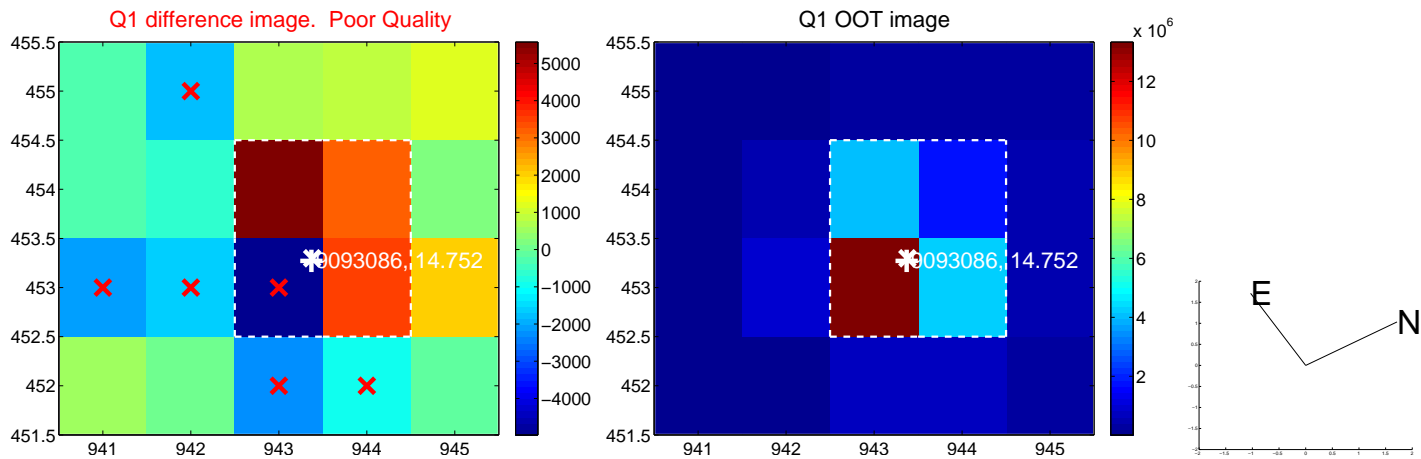
The direct PRF centroid is offset from the target star catalog position by about 0.17 arcsec

| | Distance in arcsec | Distance / σ | Δ RA | Δ Dec |
|---|--------------------|---------------------|-------------------|--------------------|
| PRF-fit source offset from OOT | 1.552 ± 0.547 | 2.84 | 1.028 ± 0.467 | -1.163 ± 0.643 |
| PRF-fit source offset from KIC position | 1.585 ± 0.618 | 2.56 | 0.955 ± 0.465 | -1.265 ± 0.672 |
| photometric centroid source offset | 1.70 ± 1.05 | 1.61 | 0.01 ± 1.04 | -1.70 ± 1.05 |

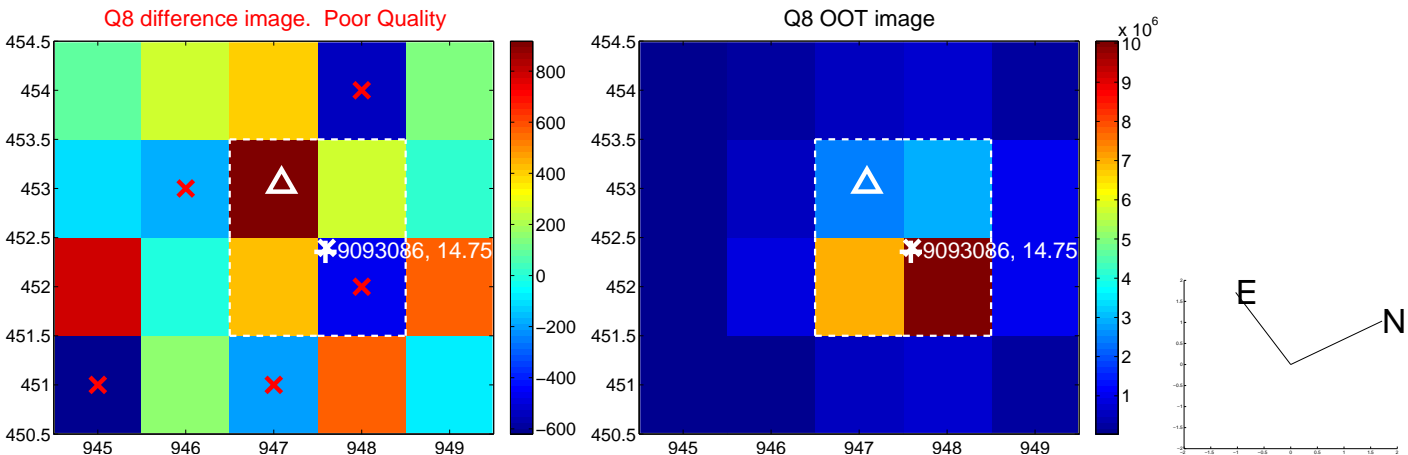
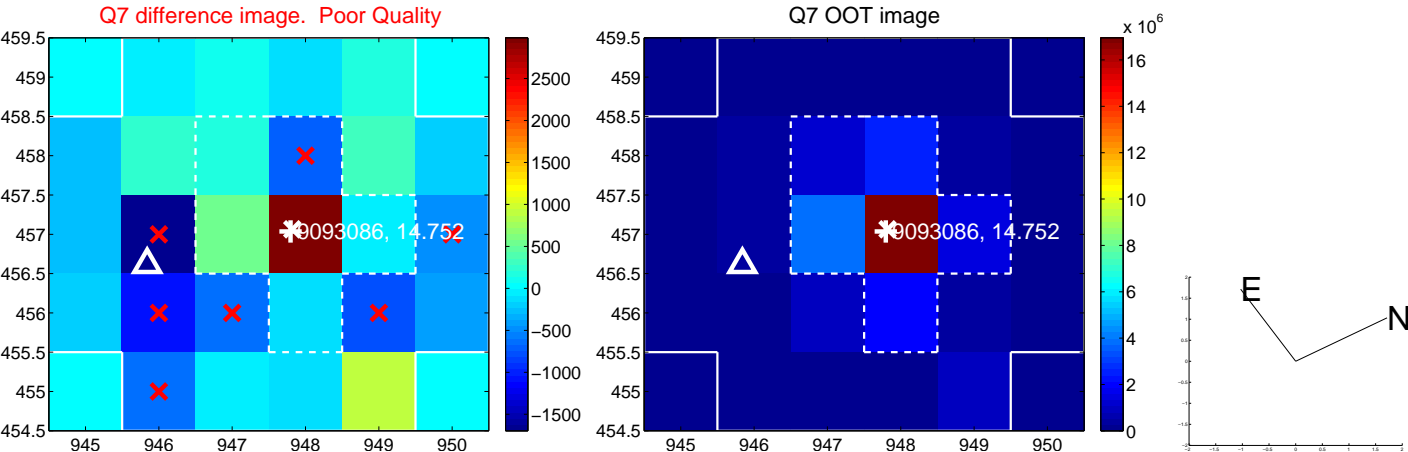
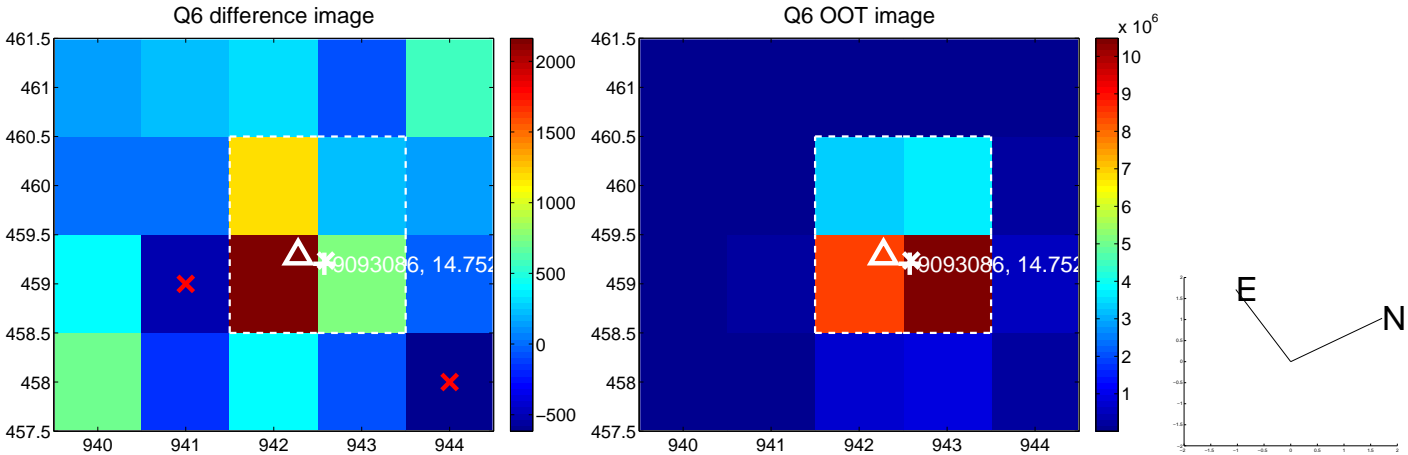
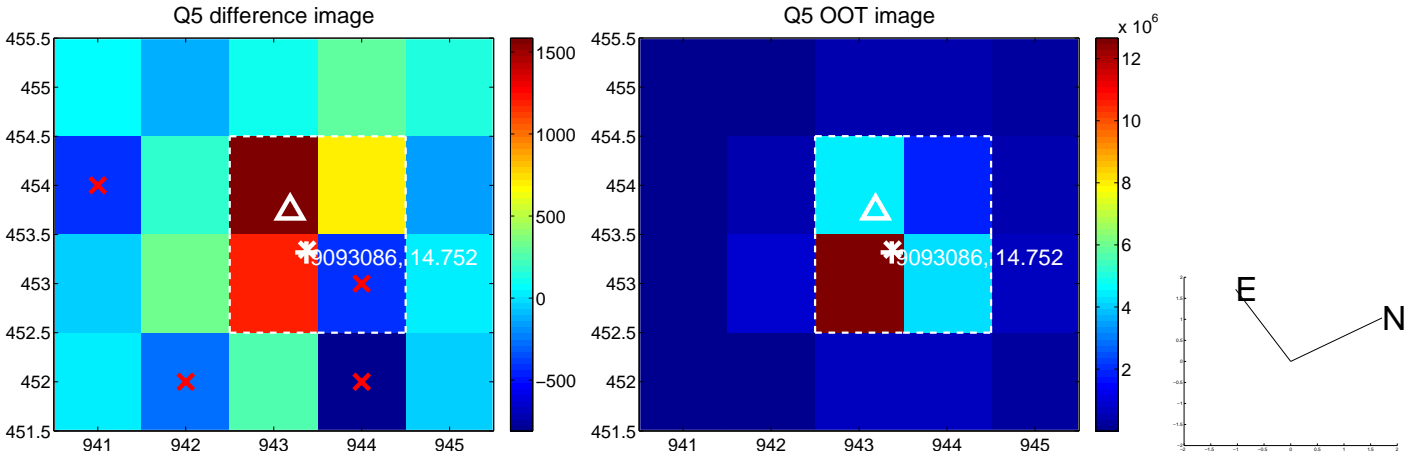


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

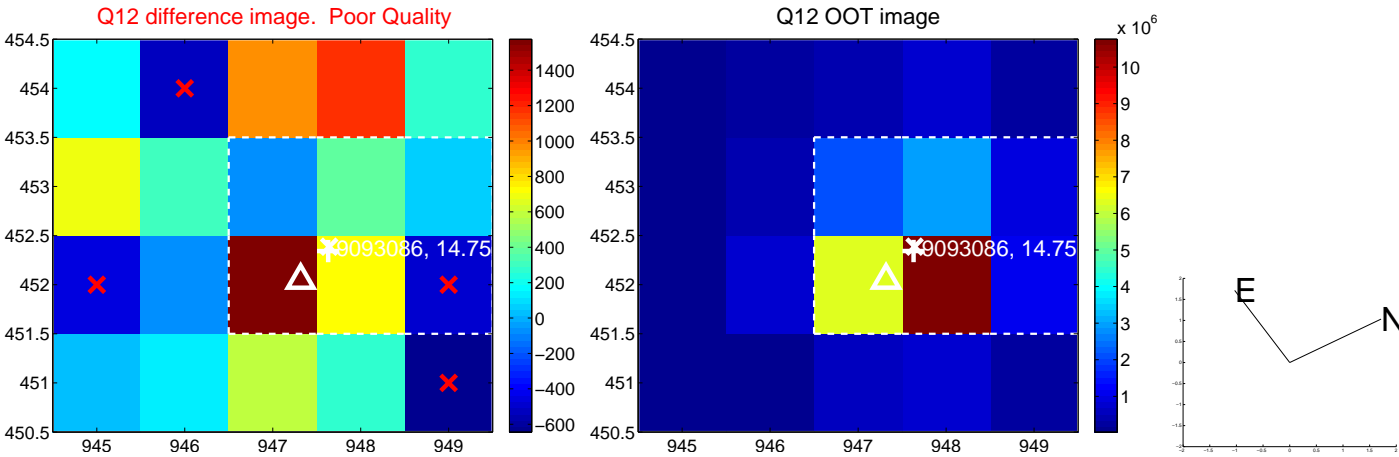
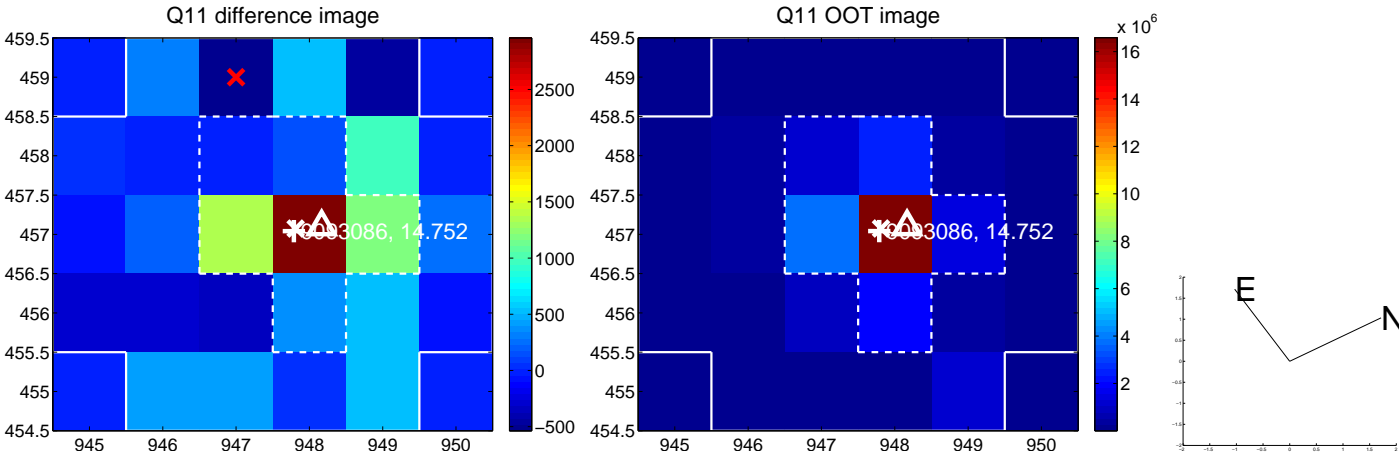
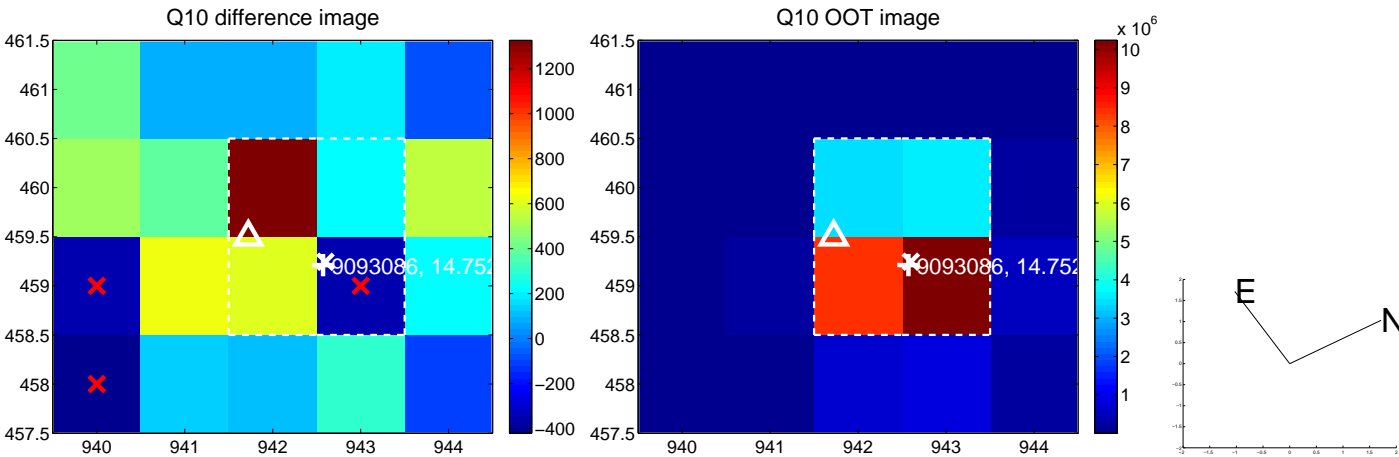
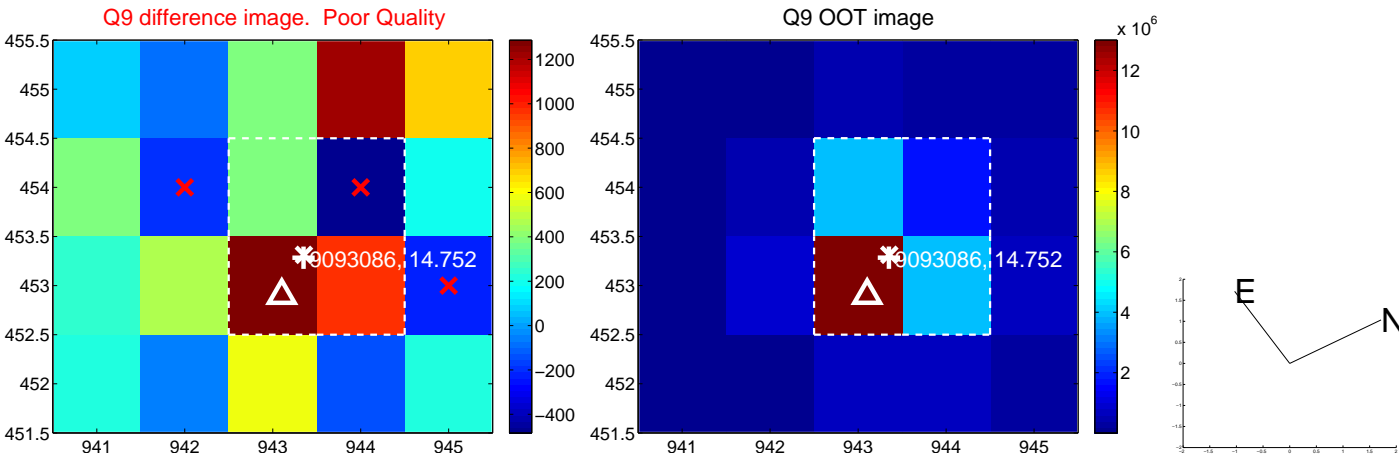
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



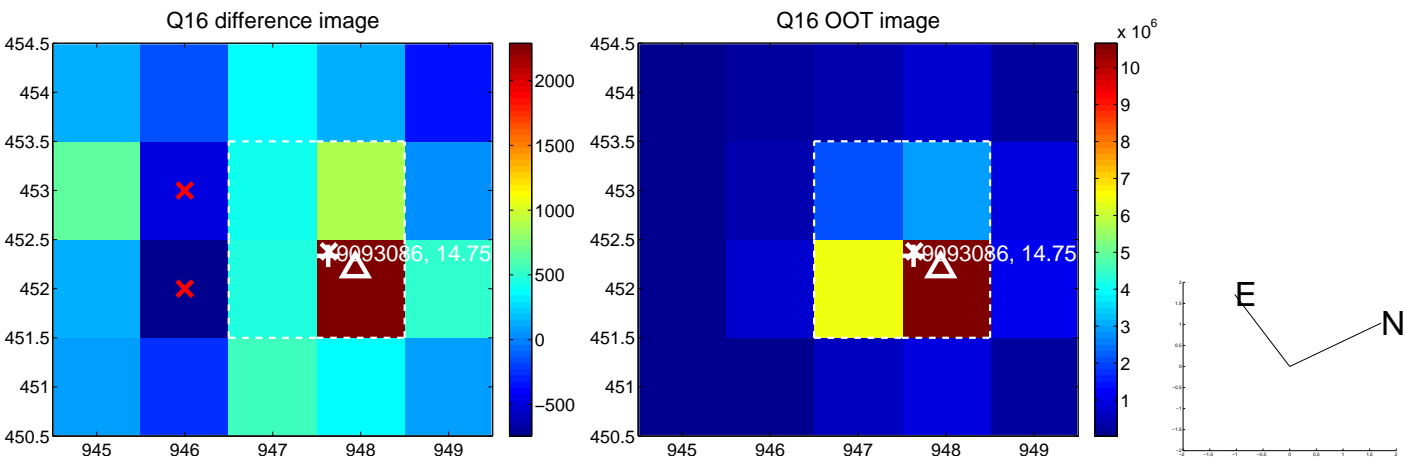
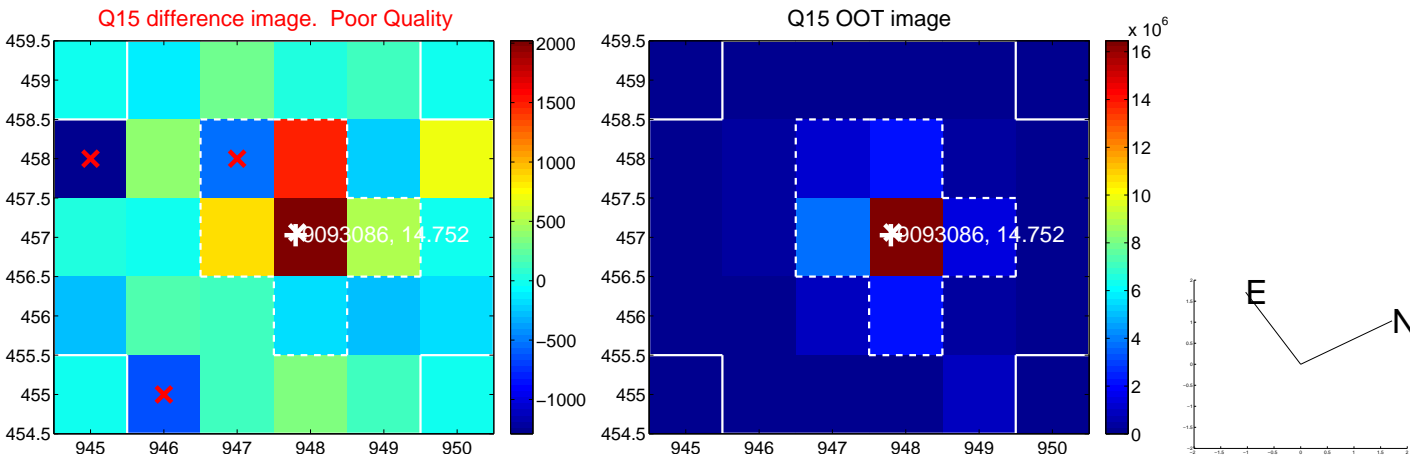
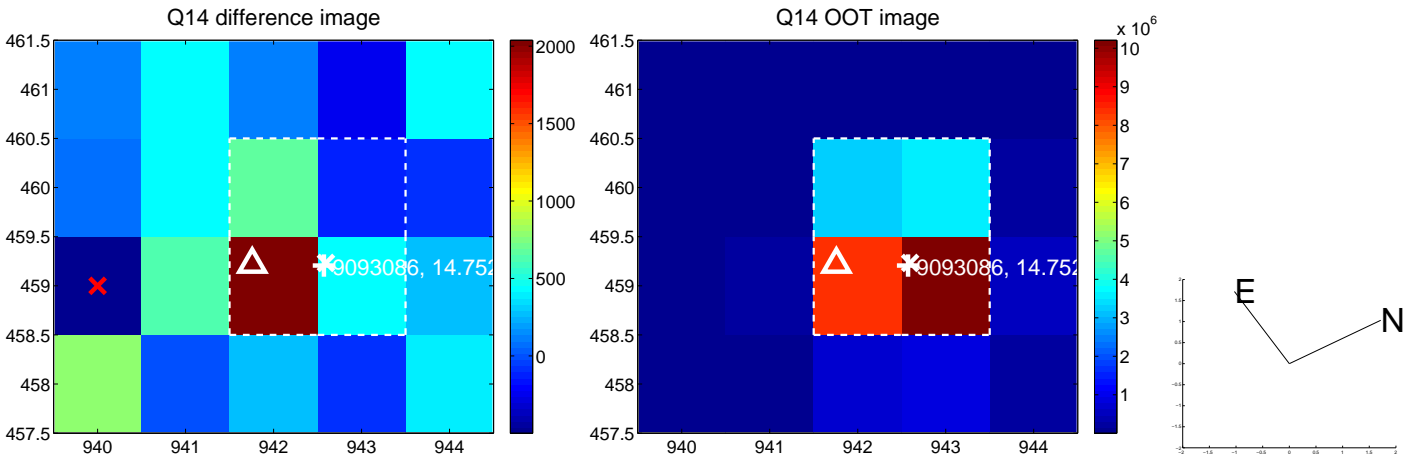
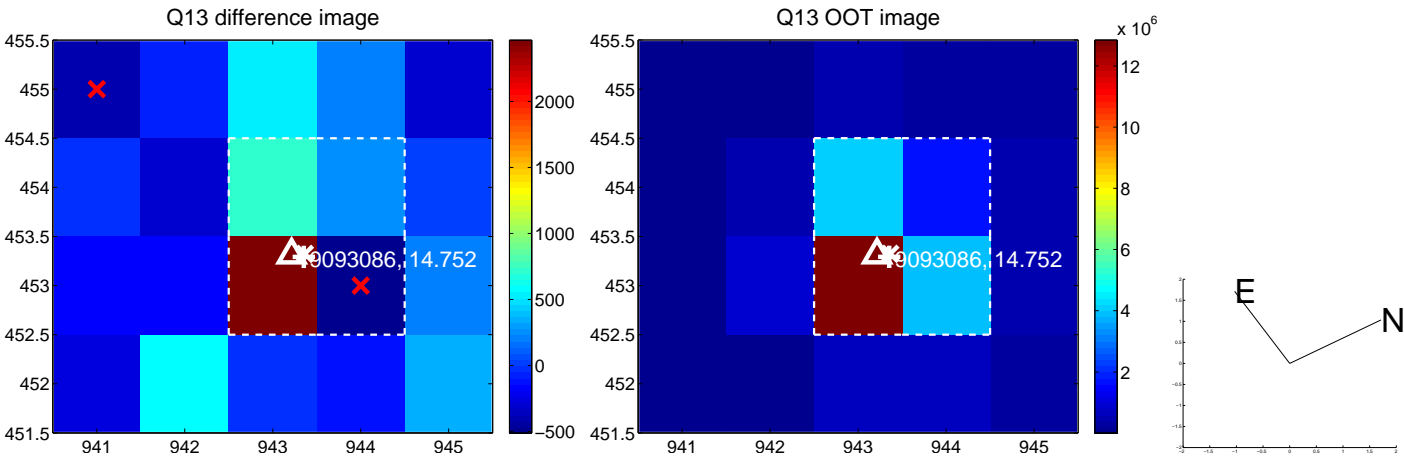
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



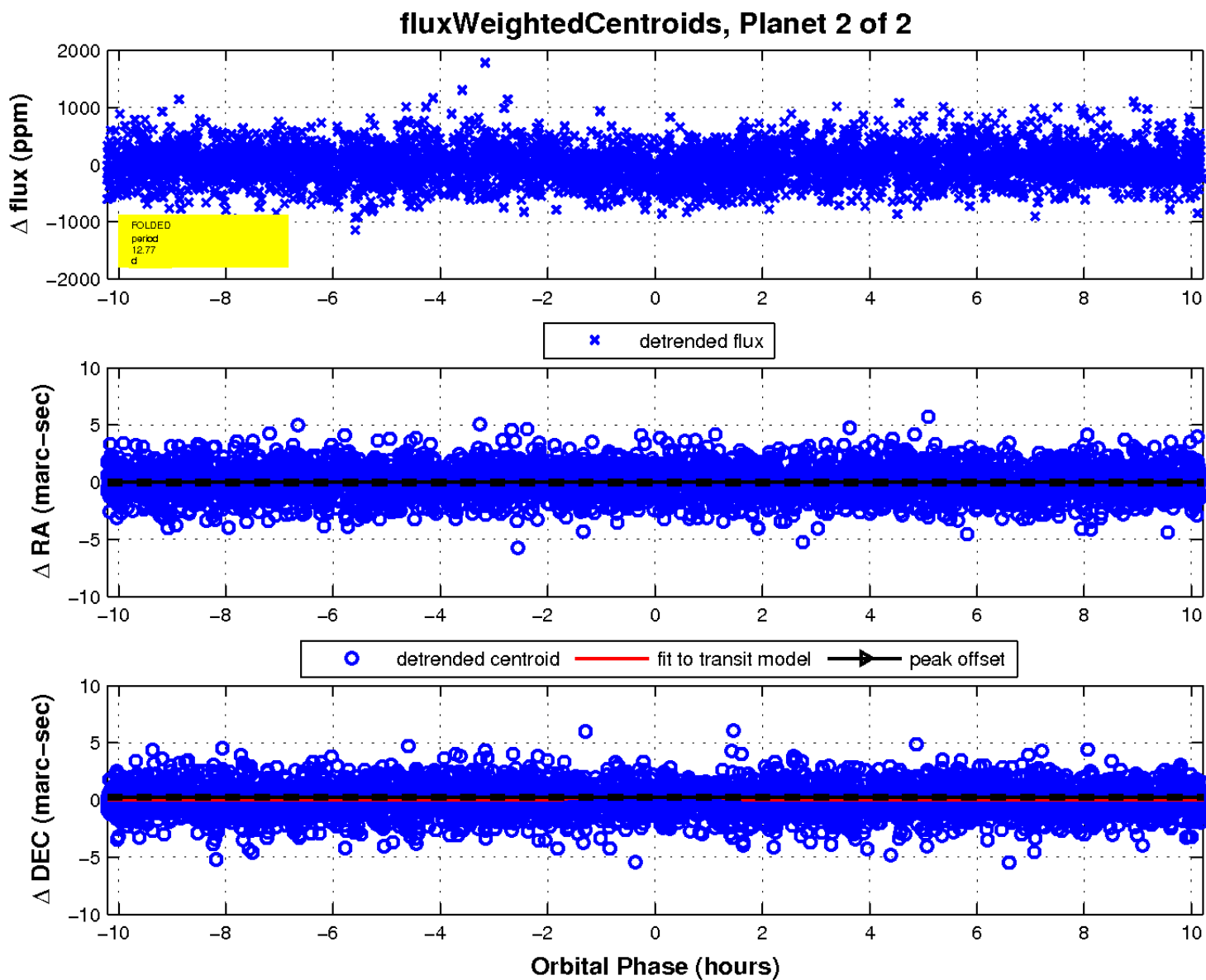
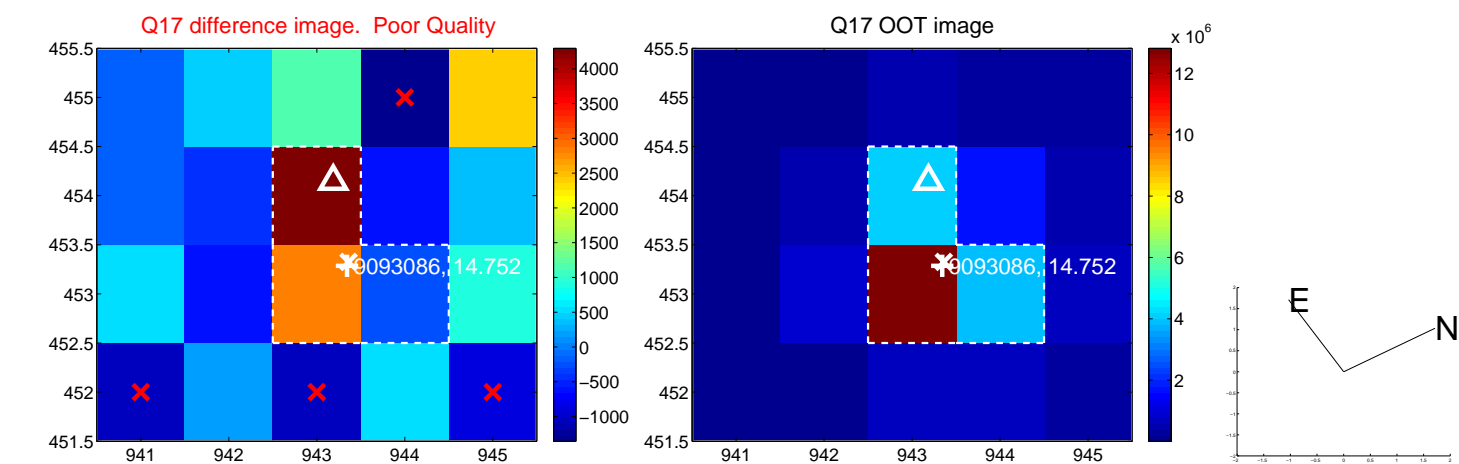
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



UKIRT Image

Declination

