

KIC 008806998

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}) |
|--------------|----------|------|---------------|--------------|-------------|------------------|-----|-----|-----------------------------|-----------------|------------------------|------------------------|
| 008806998-01 | OBS | No | 370.641647 | 231.453656 | 670.1 | 13.462 | 9.5 | 5.9 | 0.93 | 5841 | 2.47 | 0.86 |
| 008806998-03 | OBS | No | 493.101256 | 434.498637 | 538.9 | 14.304 | 7.4 | 7.2 | 0.93 | 5841 | 2.29 | 0.59 |

Robovetter Results

| TCE | Run Type | Disp | Score | N | S | C | E | Comments |
|--------------|----------|------|-------|---|---|---|---|--|
| 008806998-01 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | INDIV_TRANS_MARSHALL_SKYE—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_FEW_DIFFS |
| 008806998-03 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | INDIV_TRANS_MARSHALL_SKYE—MOD_POS_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS |

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

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

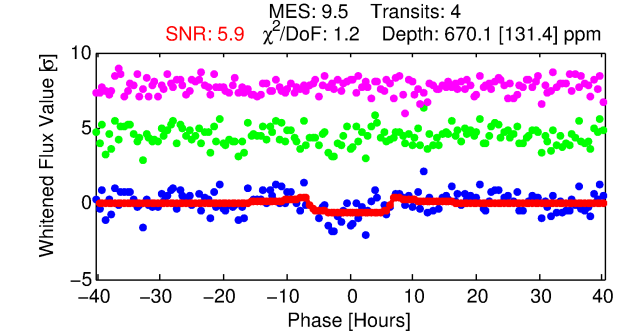
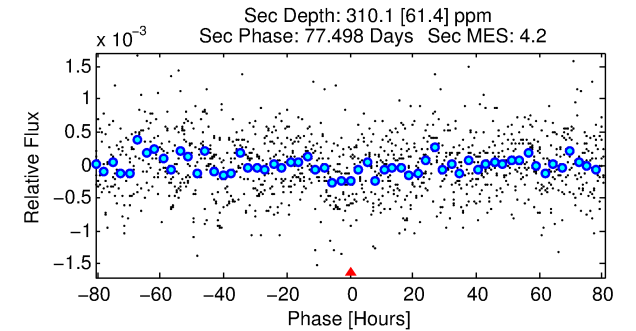
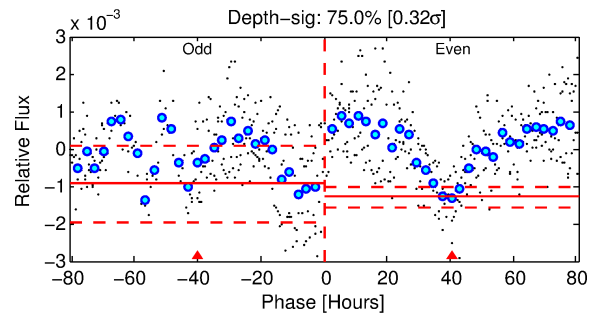
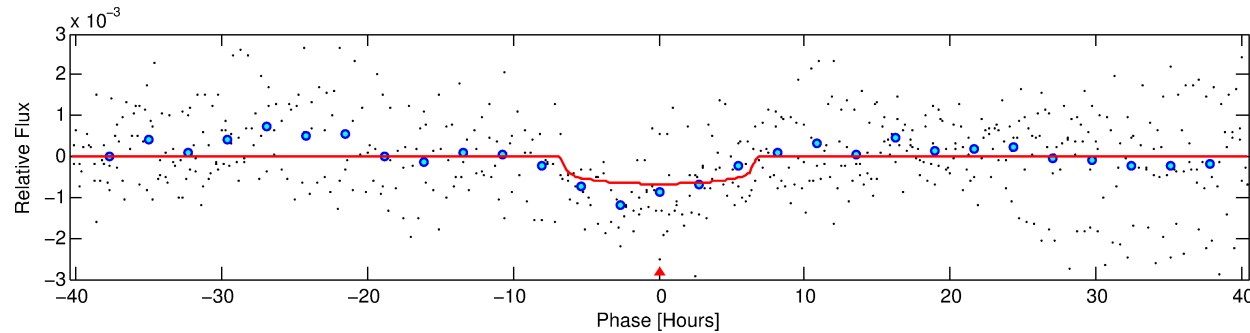
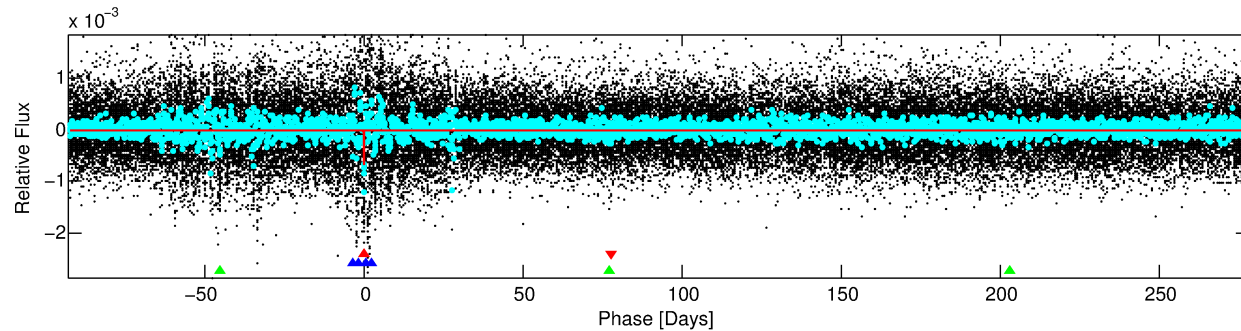
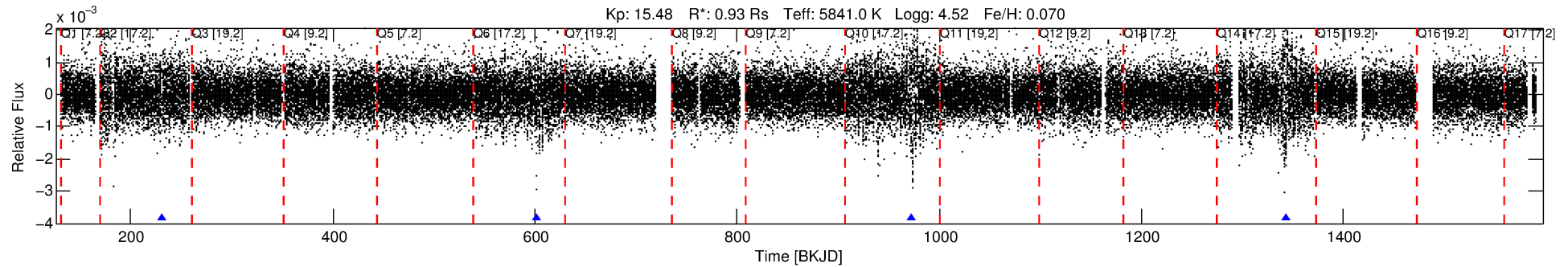
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 008806998-01

No Significant Match Found

DV One-Page Summary

KIC: 8806998 Candidate: 1 of 3 Period: 370.642 d



DV Fit Results:

Period = 370.64165 [0.01419] d
Epoch = 231.4537 [0.0271] BKJD
Rp/R* = 0.0243 [0.0195]
a/R* = 186.69 [649.92]
b = 0.51 [5.06]
Seff = 0.86 [0.32]
Teq = 246 [23] K
Rp = 2.47 [2.08] Re
a = 1.0256 [0.2359] AU
Ag = 29471.91 [48762.40] [0.60σ]
Teffp = 4974 [2018] K [2.34σ]

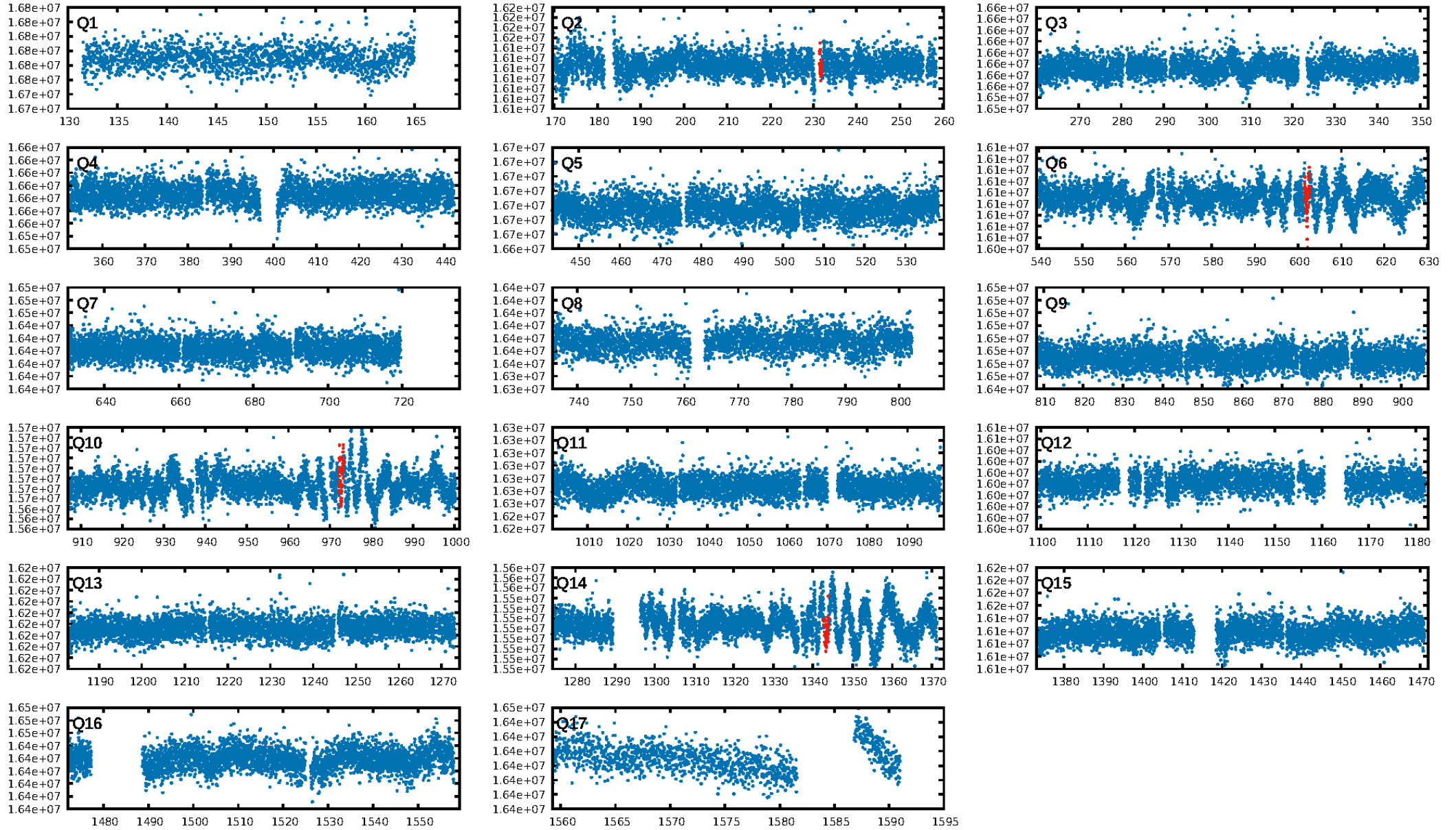
DV Diagnostic Results:

ShortPeriod-sig: 98.7% [2.49σ]
LongPeriod-sig: 100.0% [149.63σ]
ModelChiSquare2-sig: 1.6%
ModelChiSquareGof-sig: 99.9%
Bootstrap-pfa: 5.64e-13
RollingBand-fgt: 1.00 [4/4]
GhostDiagnostic-chr: -7.206
Centroid-sig: 0.0%
Centroid-so: 12.117 arcsec [4.06σ]
OotOffset-rm: N/A
KicOffset-rm: N/A
OotOffset-st: 0/0/0/0 [0]
KicOffset-st: 0/0/0/0 [0]
DiffImageQuality-fgm: N/A
DiffImageOverlap-fno: 0.67 [2/3]

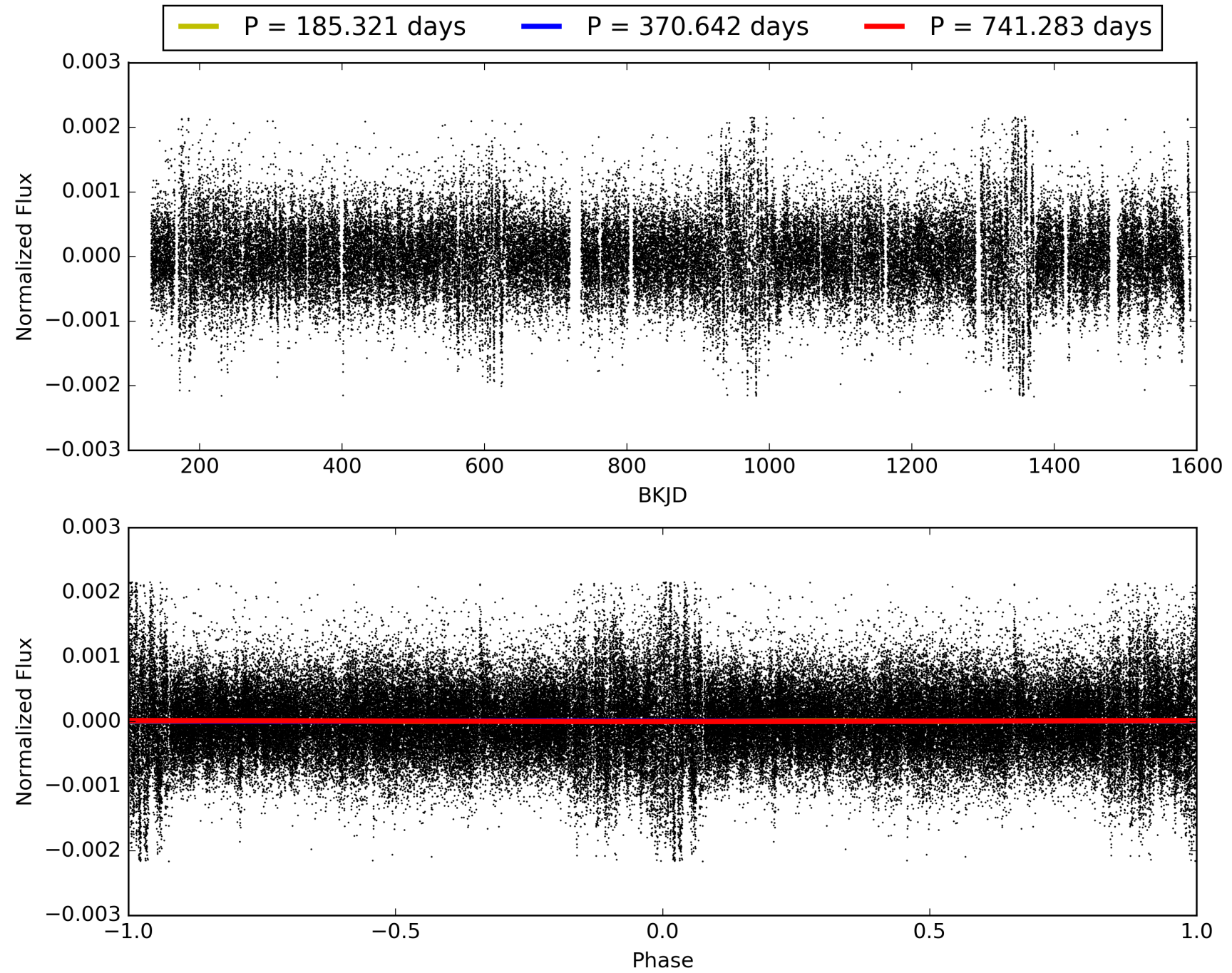
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 05:26:57 Z

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

TCE 008806998-01, PDC Light Curves

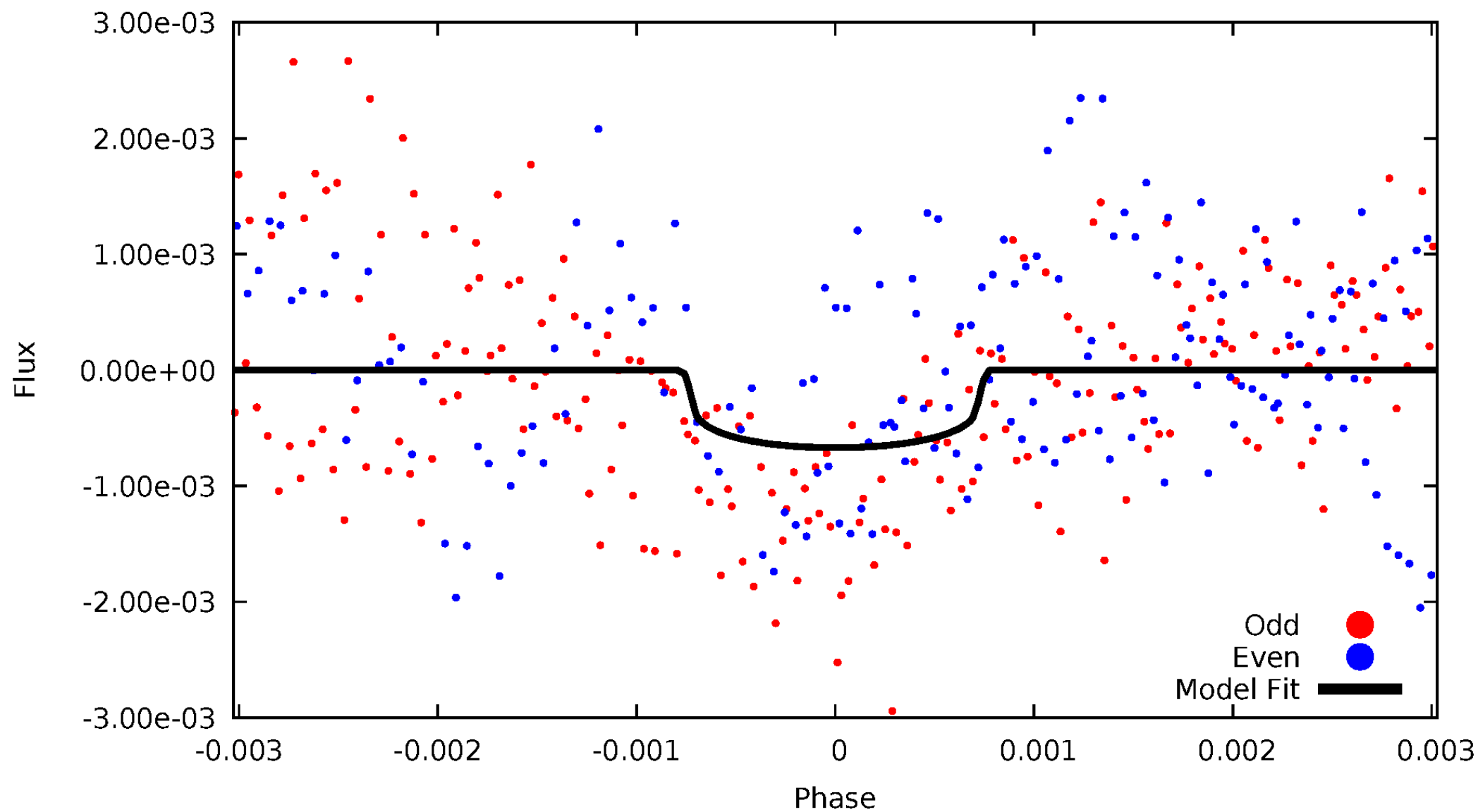


TCE 008806998-01



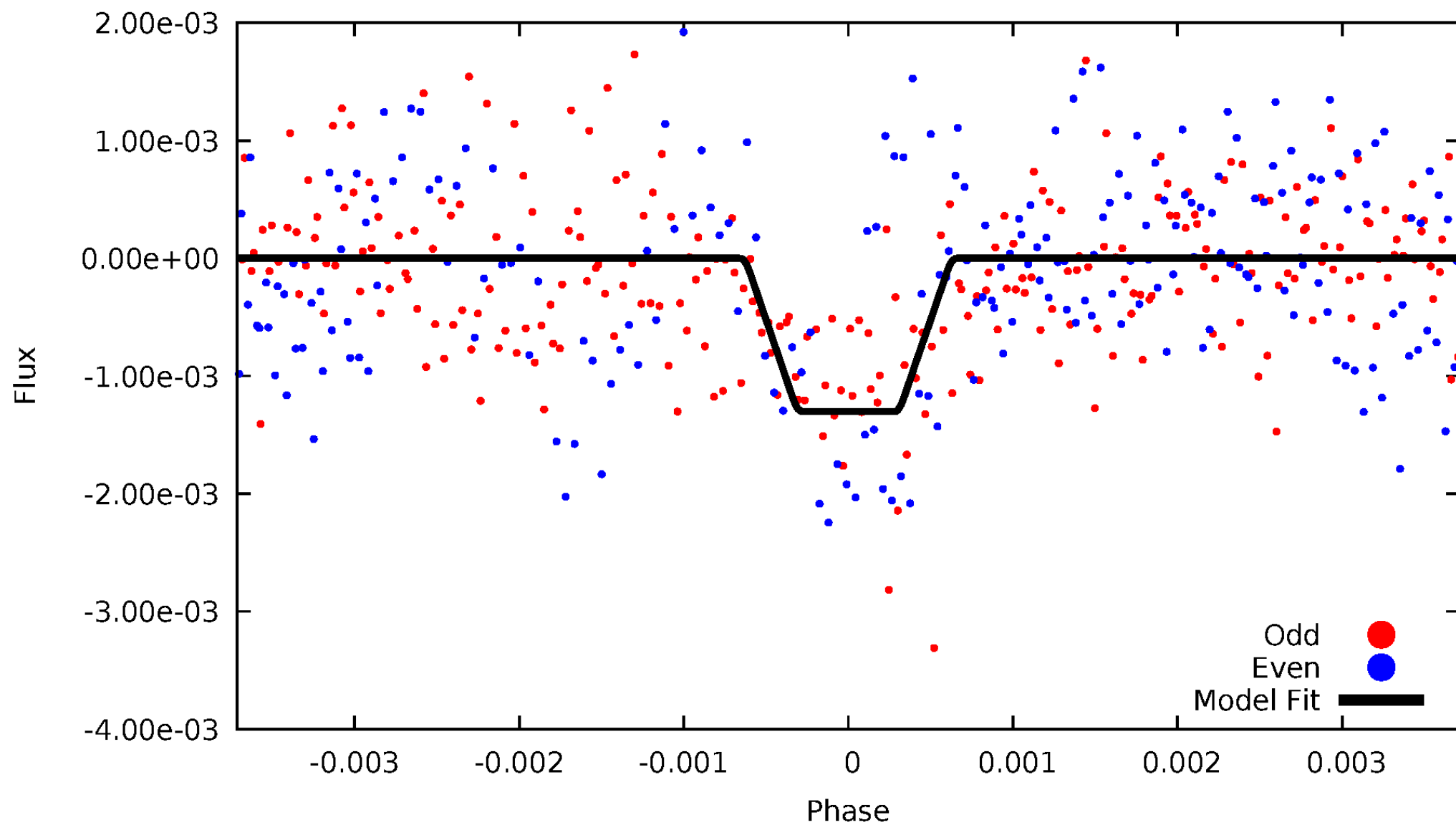
DV Odd/Even

TCE 008806998-01



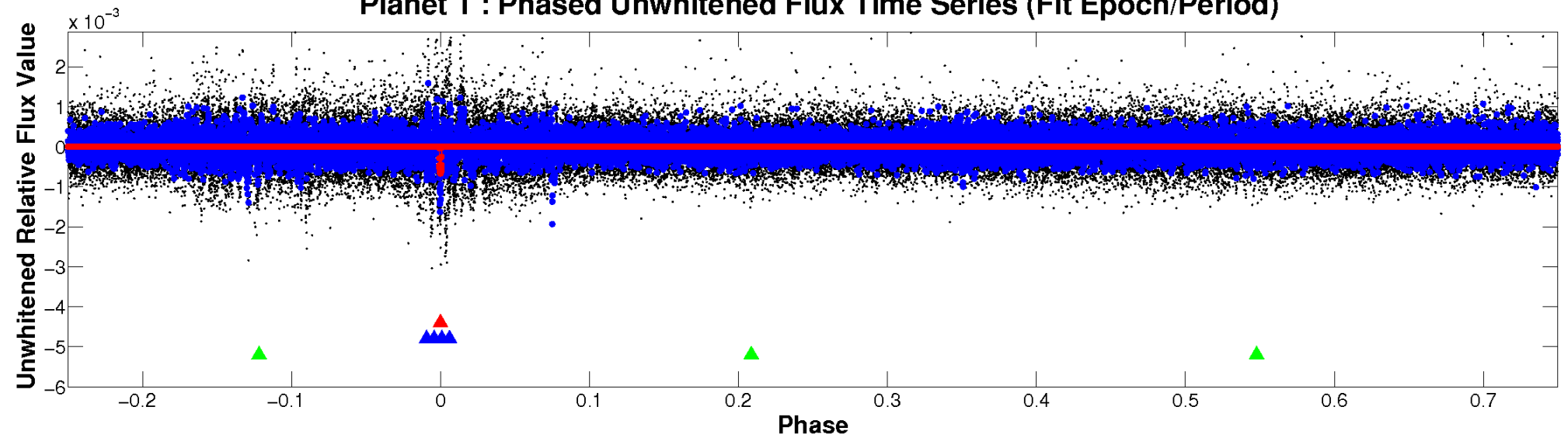
ALT Odd/Even

TCE 008806998-01

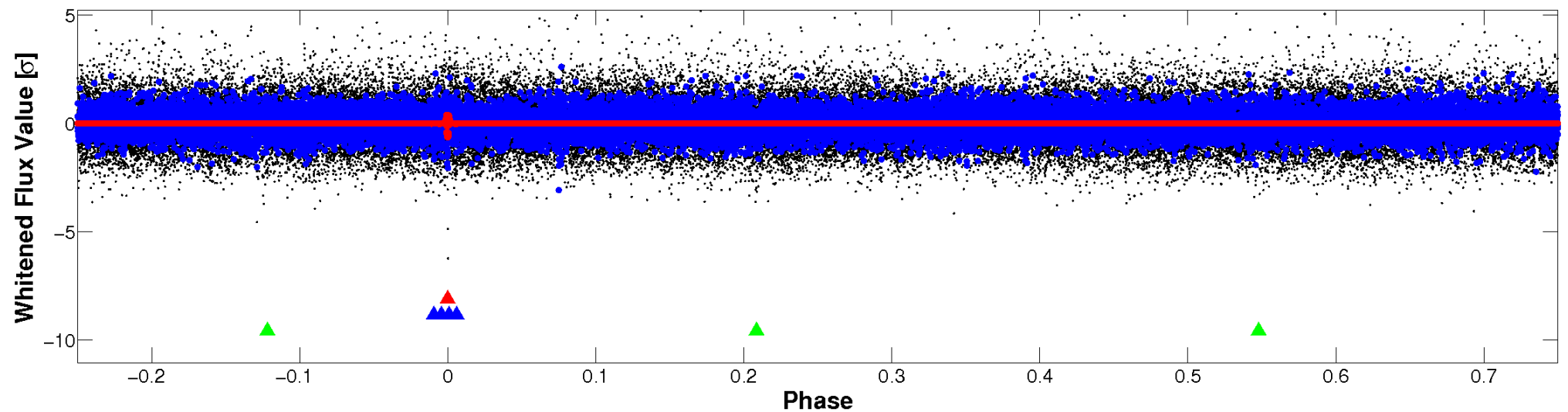


Non-Whitened Vs. Whitened Light Curve

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

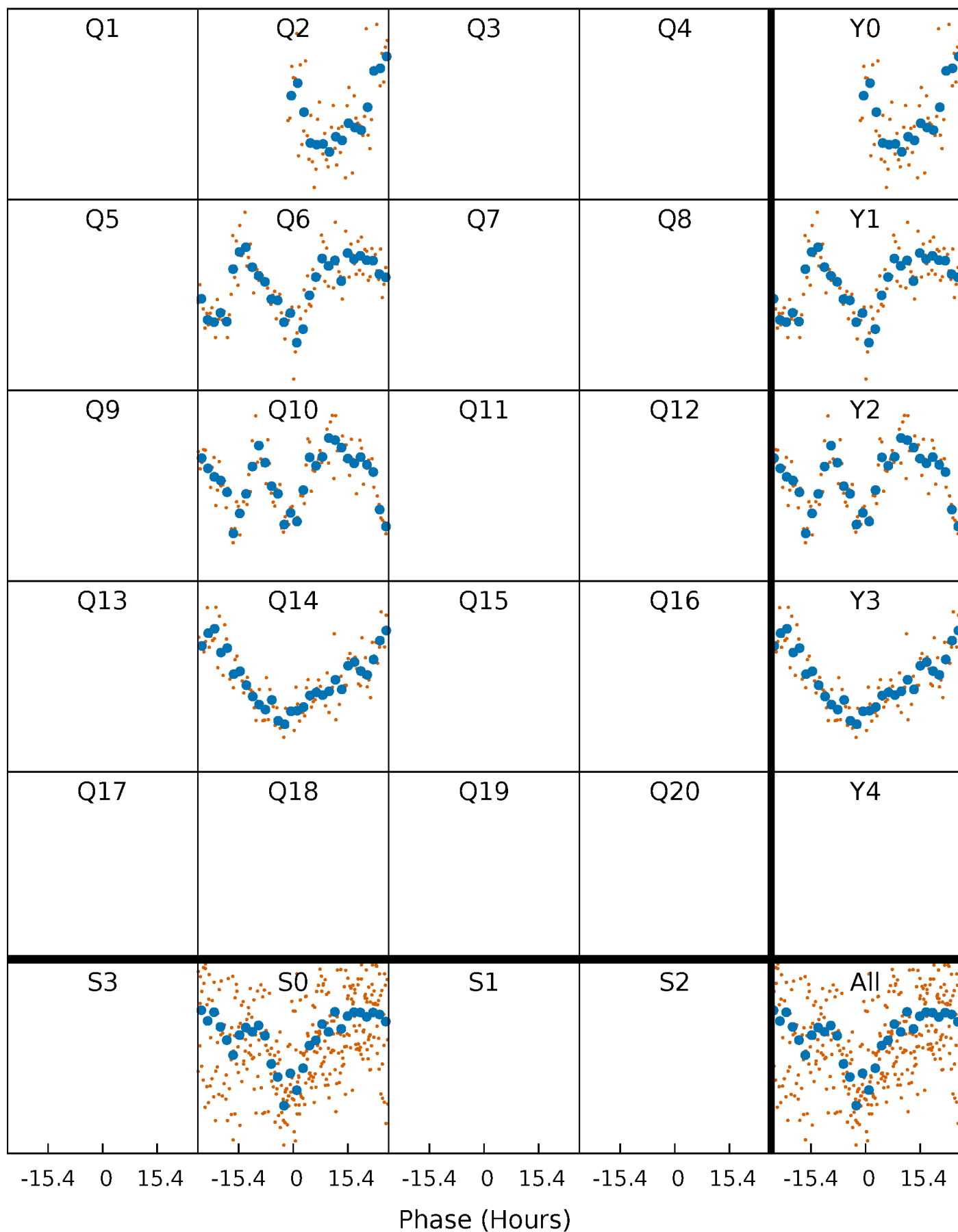


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



PDC Quarter-Phased Transit Curves

TCE 008806998-01 P=370.641647 Days $T_0=231.453656$ (BKJD)



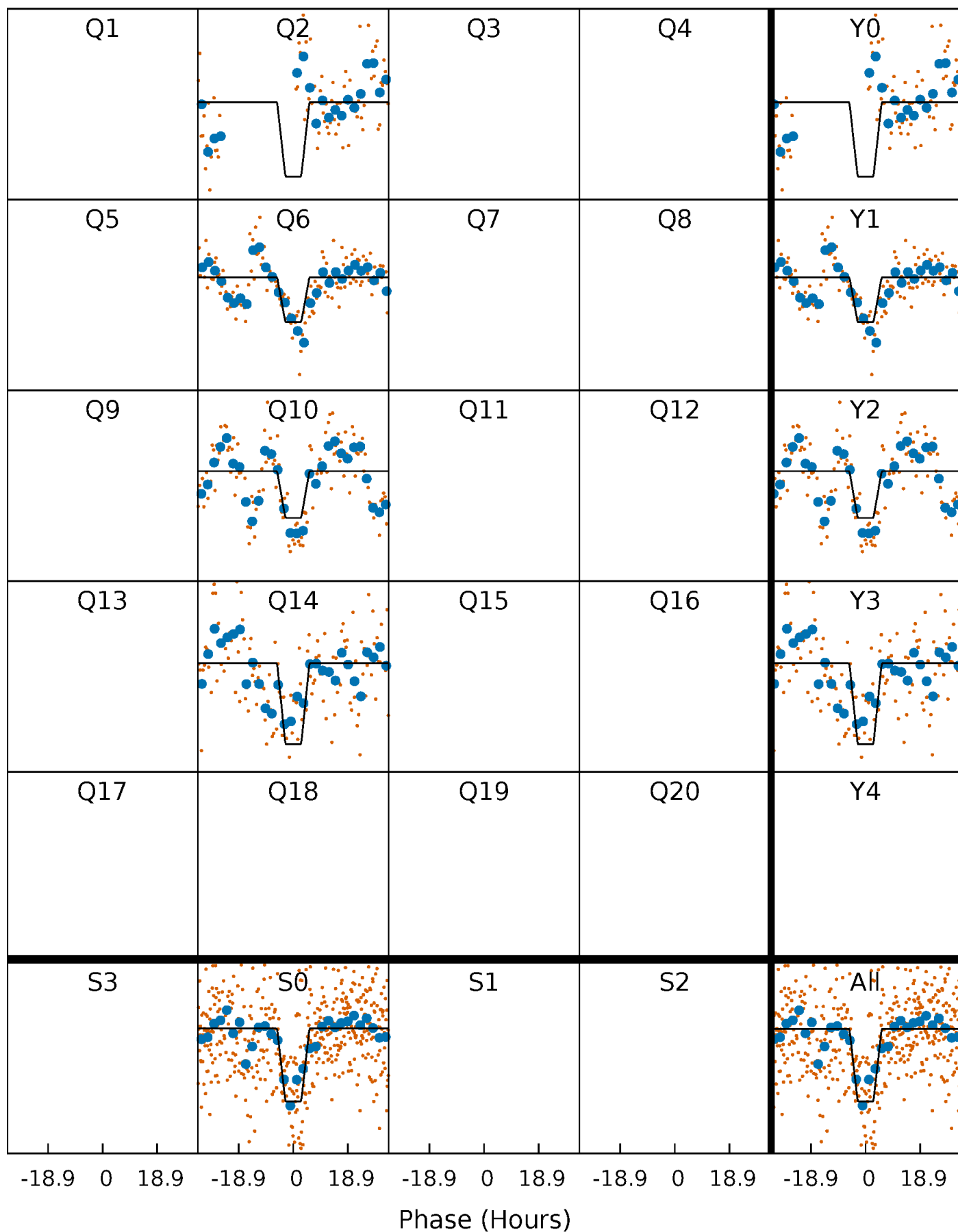
DV Quarter-Phased Transit Curves

TCE 008806998-01 P=370.641647 Days $T_0=231.453656$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

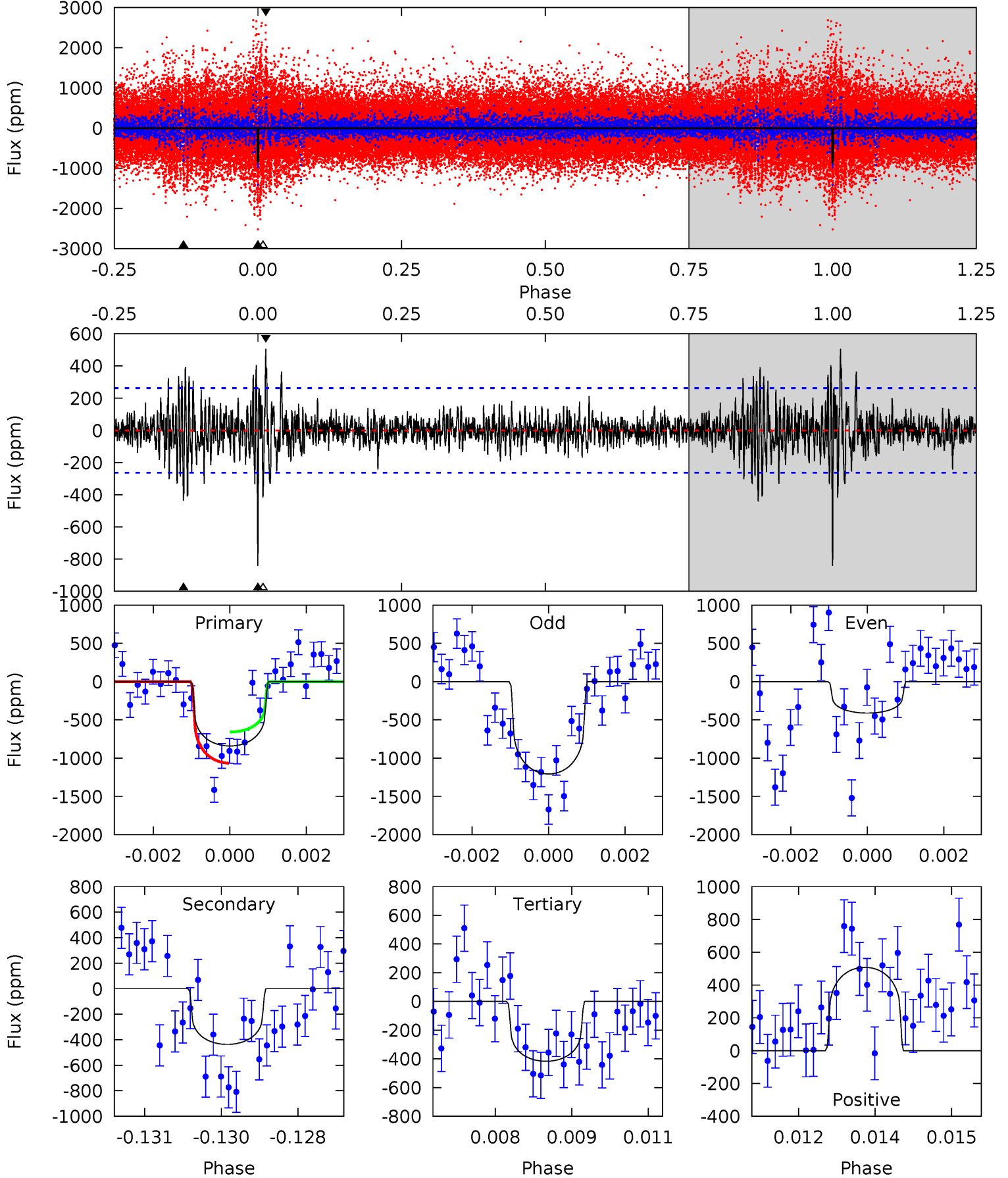
TCE 008806998-01 P=370.657967 Days $T_0=231.350752$ (BKJD)



DV Model-Shift Uniqueness Test

008806998-01, P = 370.641647 Days, E = 231.453656 Days

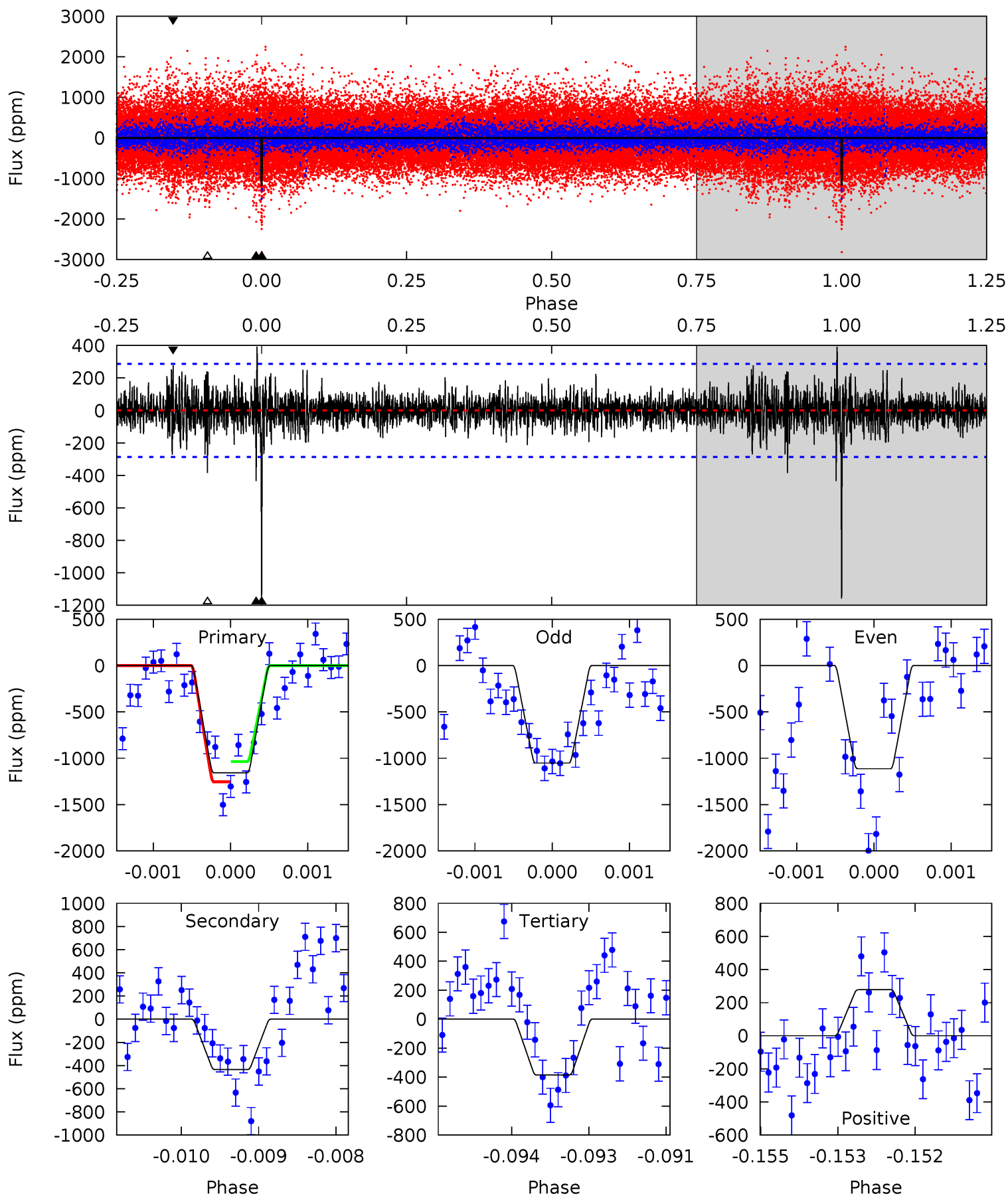
| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 17.2 | 8.90 | 8.50 | 10.4 | 5.37 | 3.17 | 1.74 | 8.66 | 6.79 | 0.40 | -1.46 | 8.16 | 0.92 | 0.38 | 4.13 |



Alt Model-Shift Uniqueness Test

008806998-01, P = 370.657967 Days, E = 231.350752 Days

| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 21.8 | 8.19 | 7.26 | 5.24 | 5.41 | 3.22 | 1.27 | 14.6 | 16.6 | 0.93 | 2.95 | 0.57 | 0.71 | 0.25 | 2.03 |



Stellar Parameters For KIC 008806998

| | $T_{\text{eff}}(K)$ | $\log(g)$ | [Fe/H] | R (R_{\odot}) | M (M_{\odot}) | p_{\star} ($\text{g}\cdot\text{cm}^{-3}$) |
|--------|----------------------|---------------------------|---------------------------|---------------------------|---------------------------|---|
| | 5841^{+157}_{-192} | $4.520^{+0.035}_{-0.196}$ | $0.070^{+0.250}_{-0.300}$ | $0.931^{+0.243}_{-0.087}$ | $1.047^{+0.104}_{-0.139}$ | $1.828^{+0.343}_{-0.911}$ |
| | +3%/-3% | +1%/-4% | +357%/-429% | +26%/-9% | +10%/-13% | +19%/-50% |
| 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 008806998-01 / KOI

| Detrend | Depth (ppm) | R_p (R_{\oplus}) | T_{max} (K) | T_{obs} (K) | A_{obs} |
|---------|---------------|------------------------|-------------------|------------------------|----------------------------|
| DV | -436 ± 49 | $2.83^{+2.16}_{-1.72}$ | 353^{+24}_{-16} | 5297^{+3238}_{-1116} | $31159^{+164977}_{-21357}$ |
| Alt. | -434 ± 53 | $3.82^{+2.16}_{-1.97}$ | 350^{+22}_{-15} | 4548^{+1730}_{-599} | 16416^{+51891}_{-9416} |

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 $A_{obs} \gg 1.0$

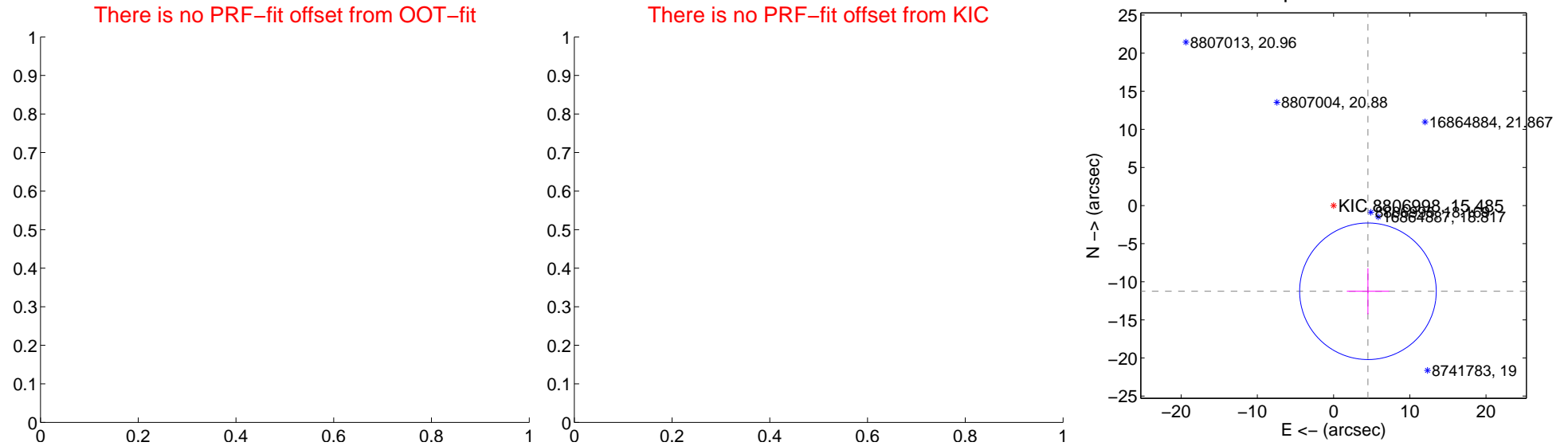
DV Centroid Data

Supplemental centroid analysis for 008806998-01. Kepler magnitude: 15.48. Transit SNR 5.94

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 | — | — | — | — |
| photometric centroid source offset | 12.12 ± 2.99 | 4.06 | -4.51 ± 2.77 | -11.25 ± 3.02 |

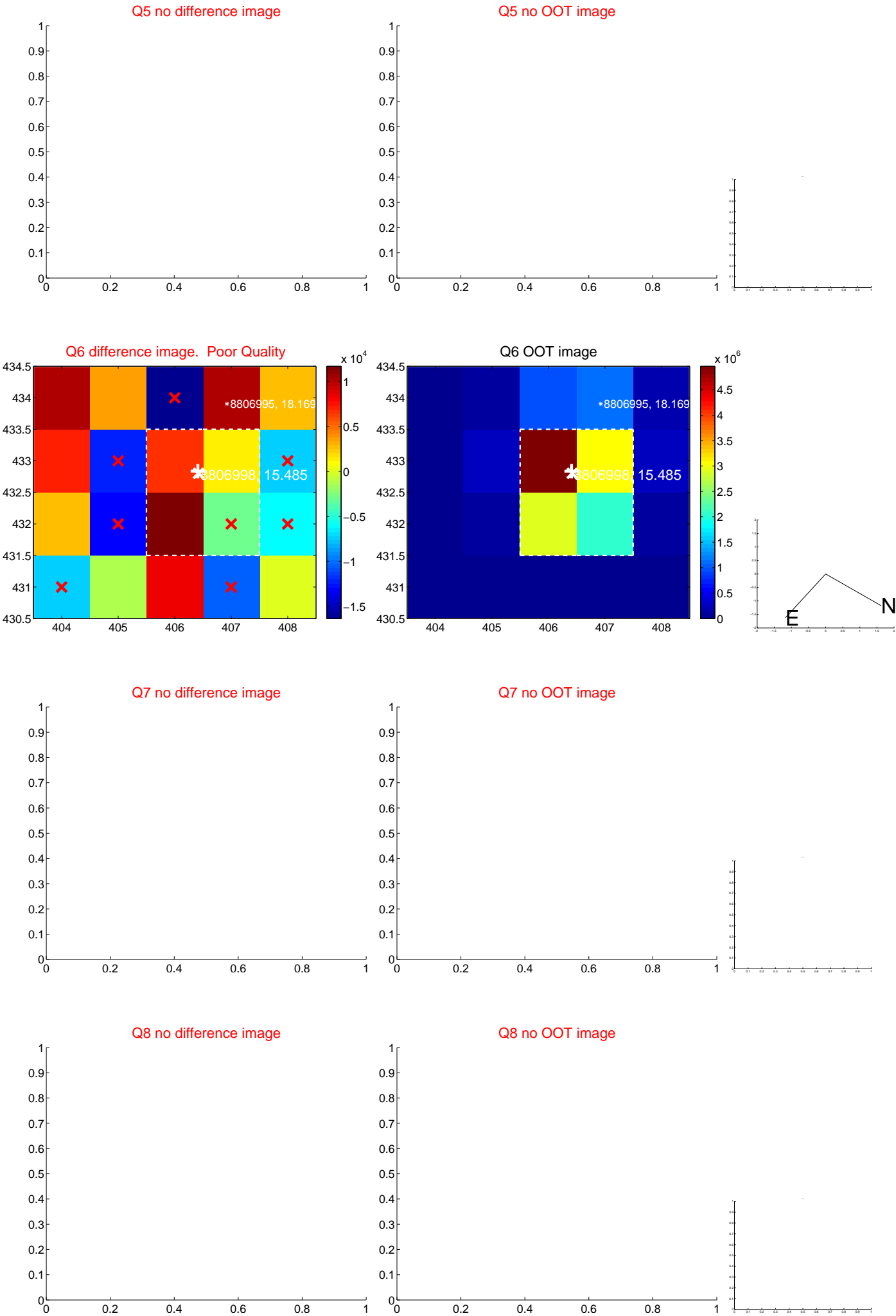


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ . 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 ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.

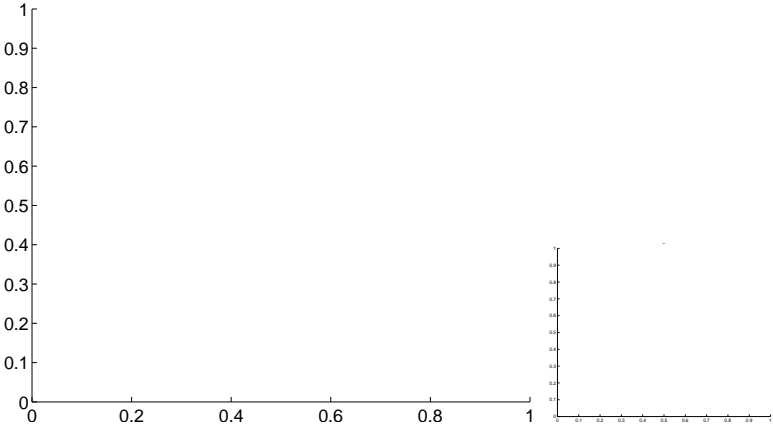


white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.

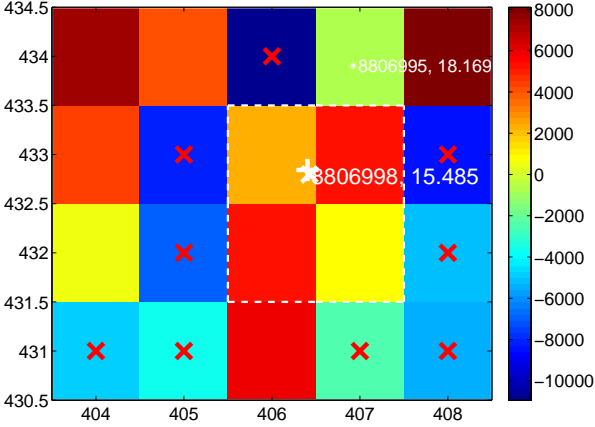
Q9 no difference image



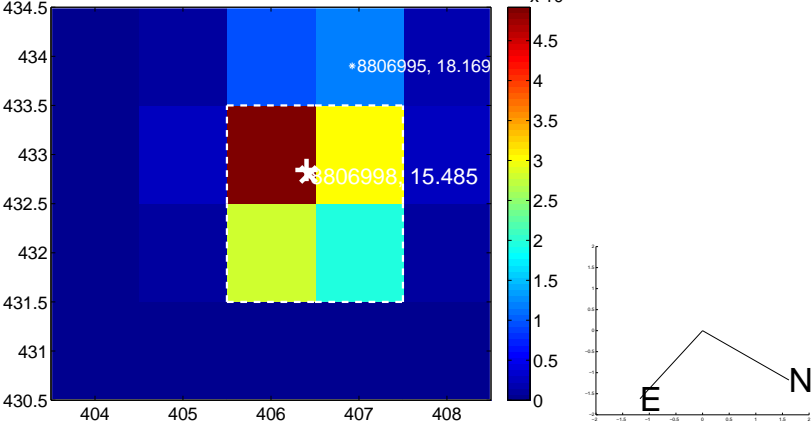
Q9 no OOT image



Q10 difference image. Poor Quality



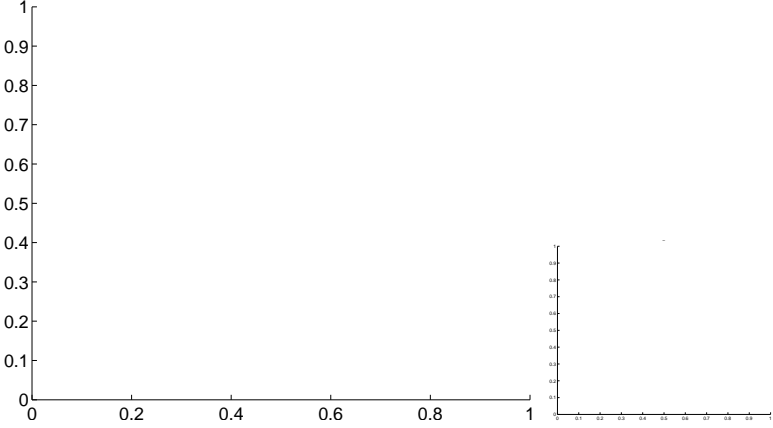
Q10 OOT image



Q11 no difference image



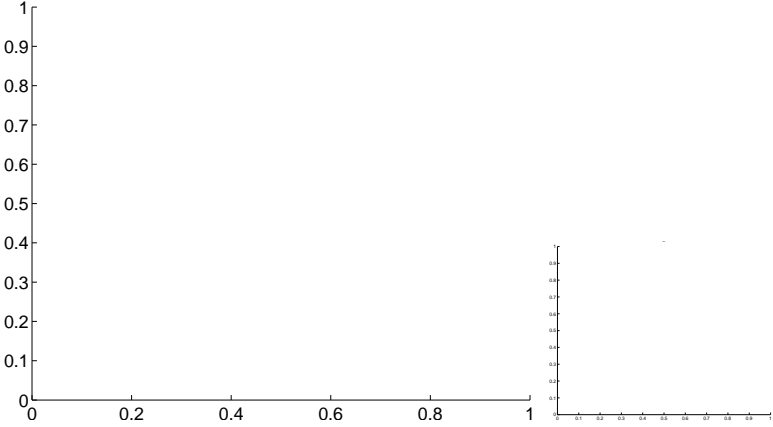
Q11 no OOT image



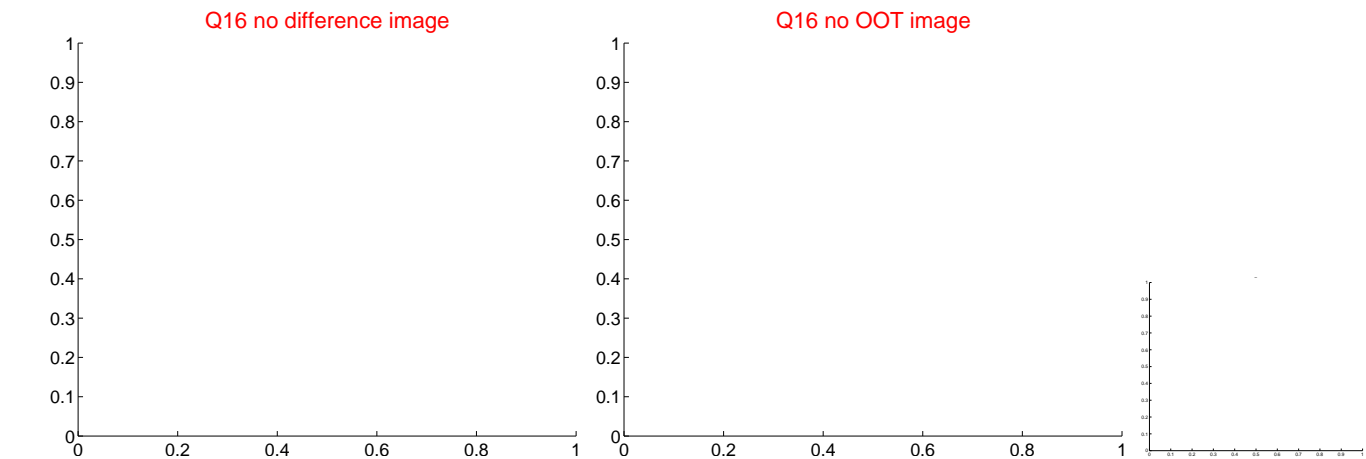
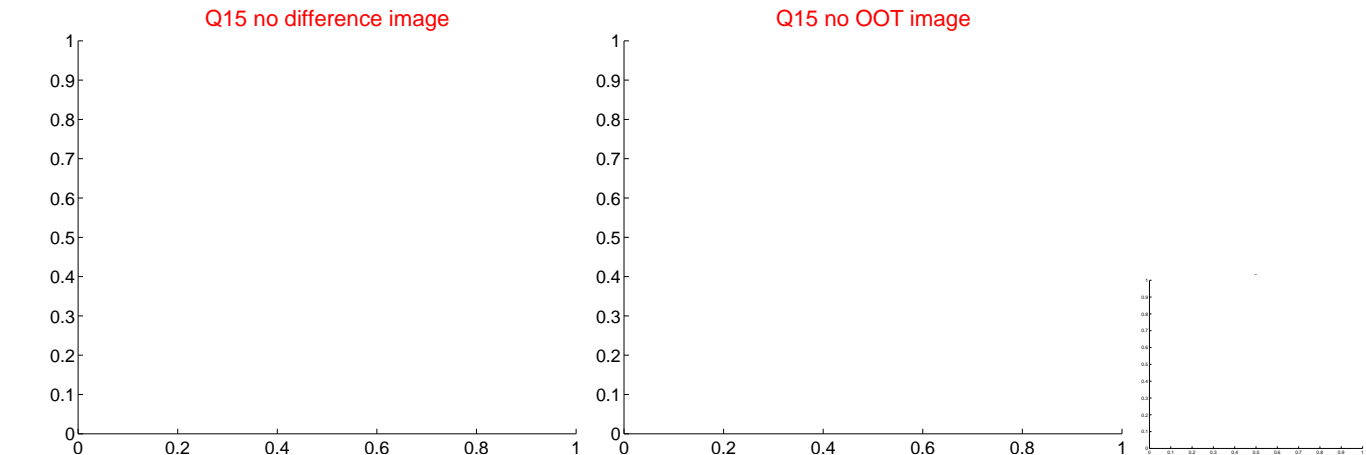
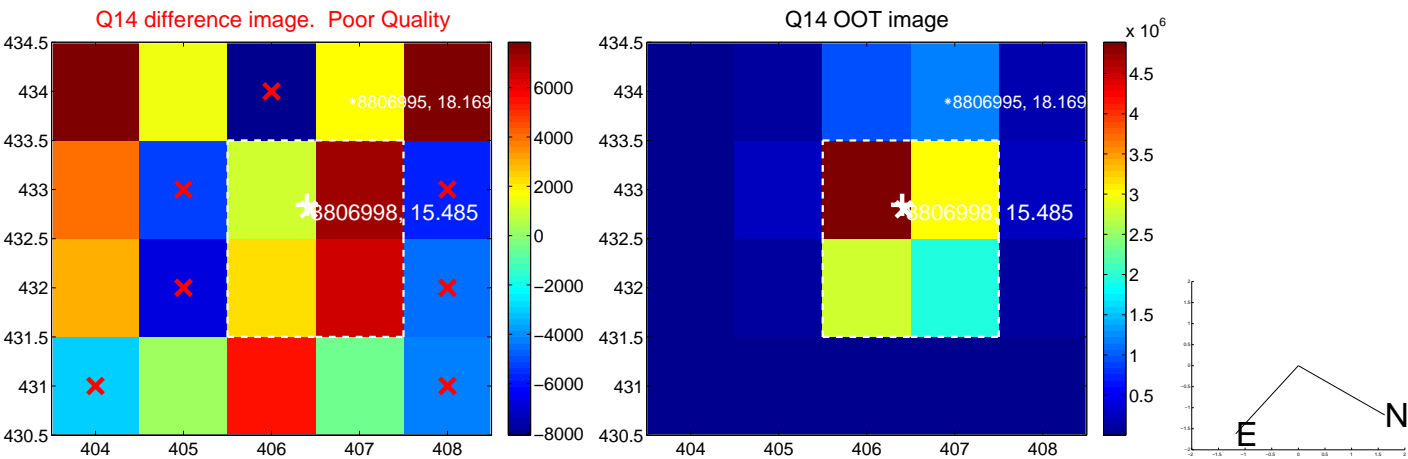
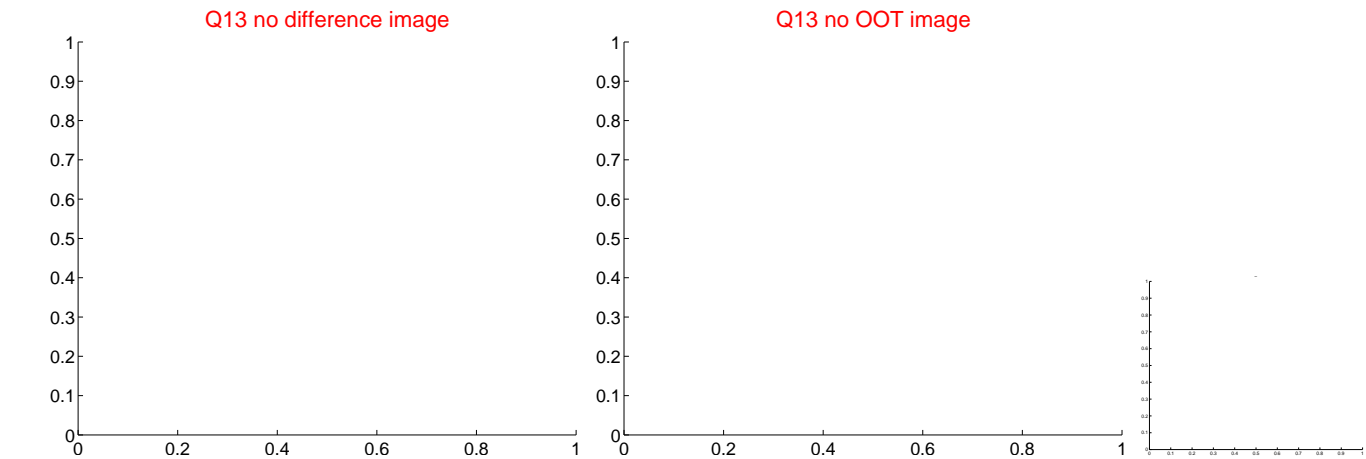
Q12 no difference image



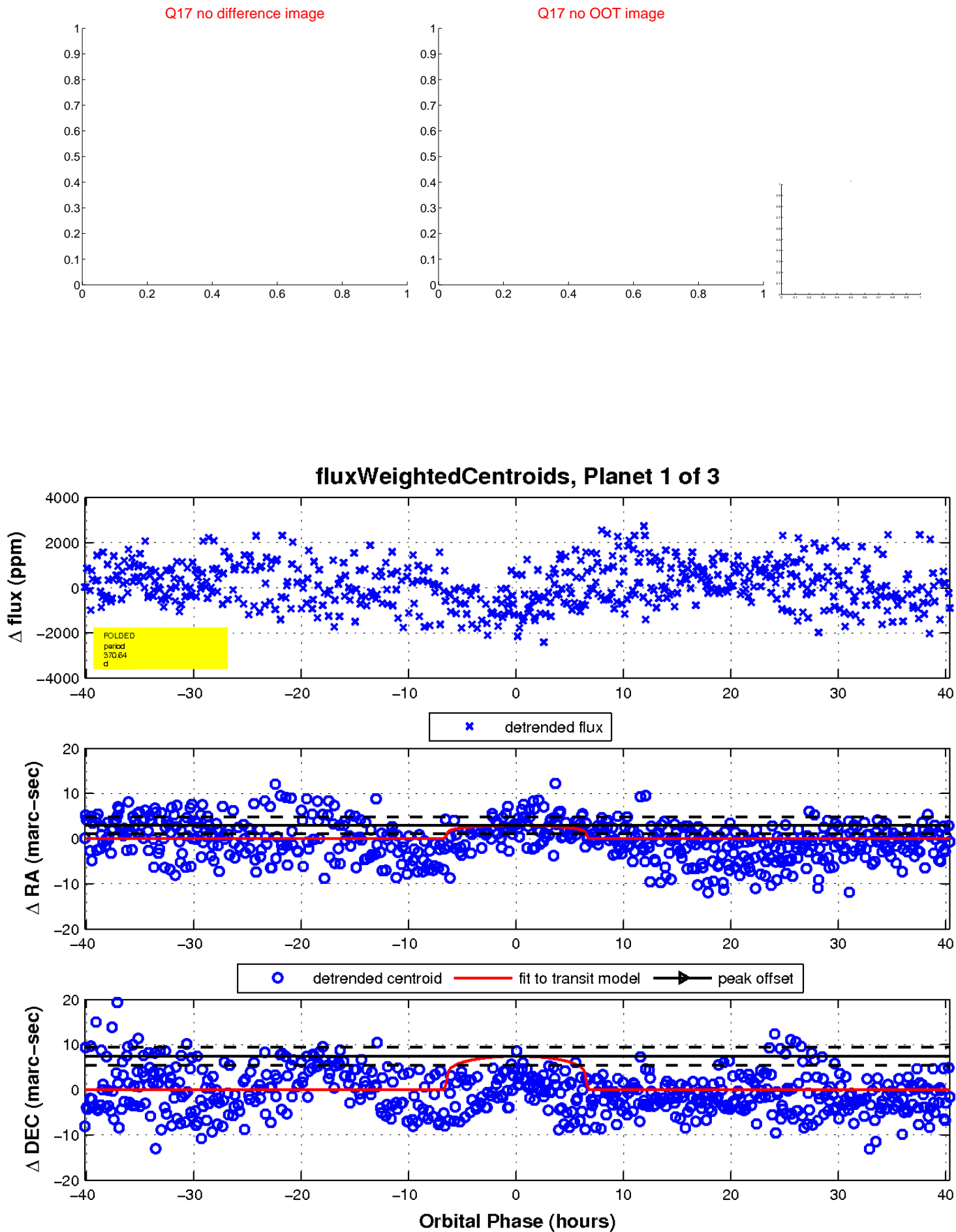
Q12 no OOT image



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

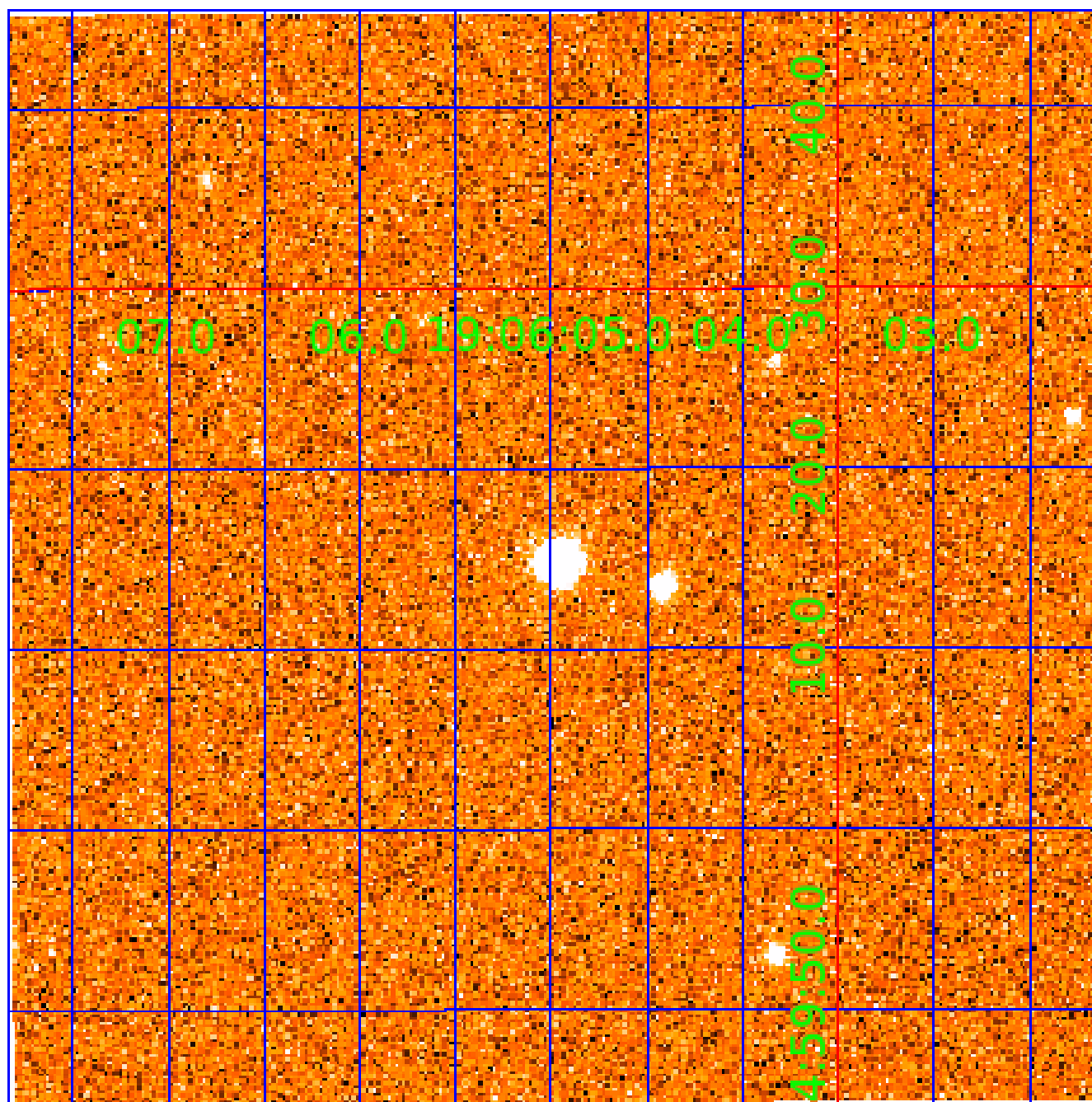


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 008806998

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}) |
|--------------|----------|------|---------------|--------------|-------------|------------------|-----|-----|-----------------------------|-----------------|------------------------|------------------------|
| 008806998-01 | OBS | No | 370.641647 | 231.453656 | 670.1 | 13.462 | 9.5 | 5.9 | 0.93 | 5841 | 2.47 | 0.86 |
| 008806998-03 | OBS | No | 493.101256 | 434.498637 | 538.9 | 14.304 | 7.4 | 7.2 | 0.93 | 5841 | 2.29 | 0.59 |

Robovetter Results

| TCE | Run Type | Disp | Score | N | S | C | E | Comments |
|--------------|----------|------|-------|---|---|---|---|--|
| 008806998-01 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | INDIV_TRANS_MARSHALL_SKYE—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_FEW_DIFFS |
| 008806998-03 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | INDIV_TRANS_MARSHALL_SKYE—MOD_POS_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS |

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

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

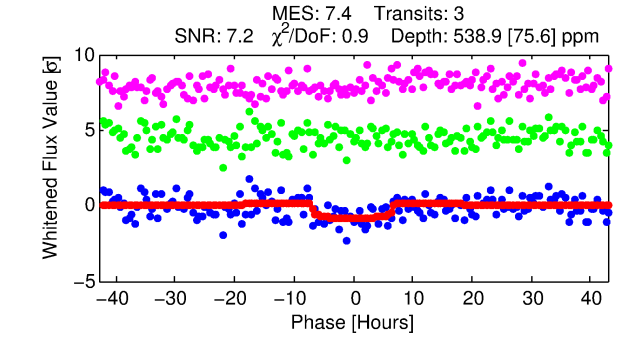
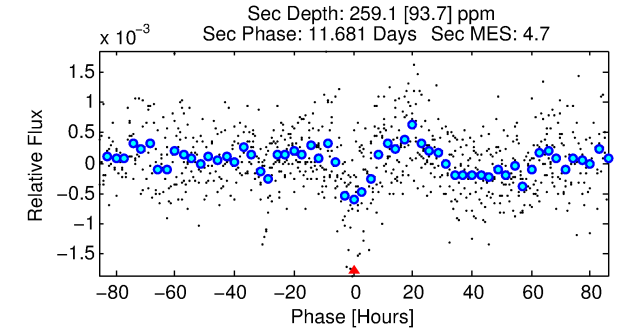
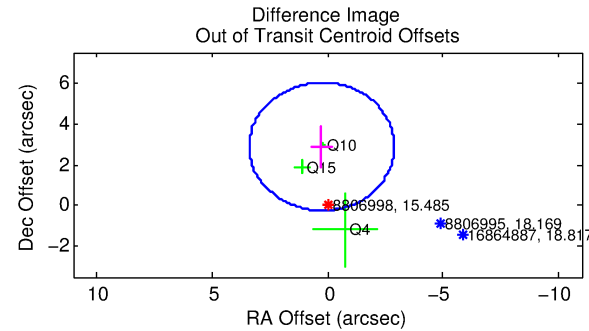
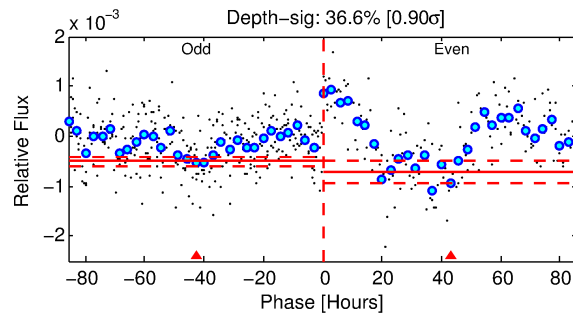
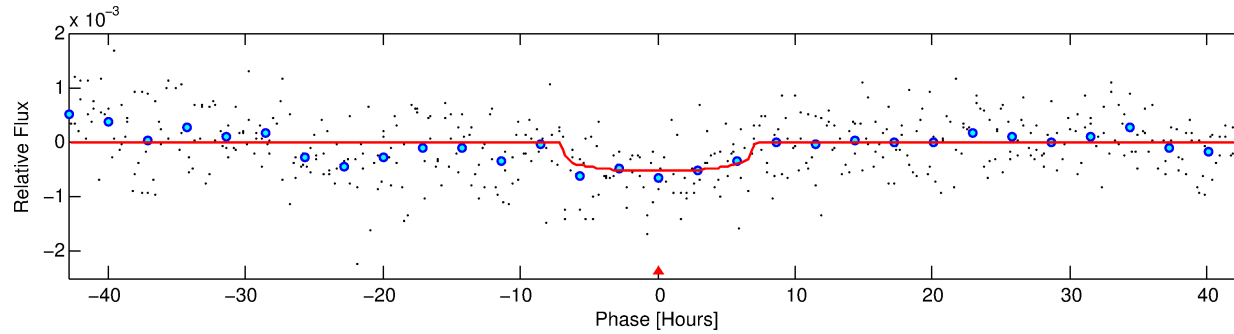
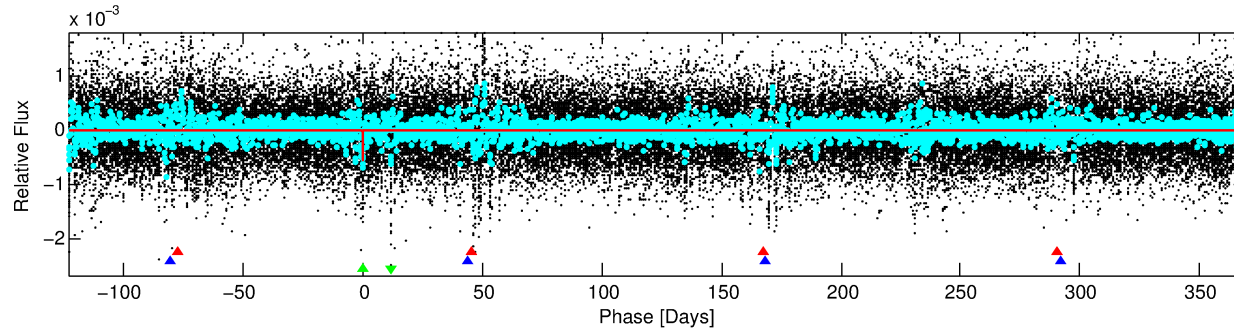
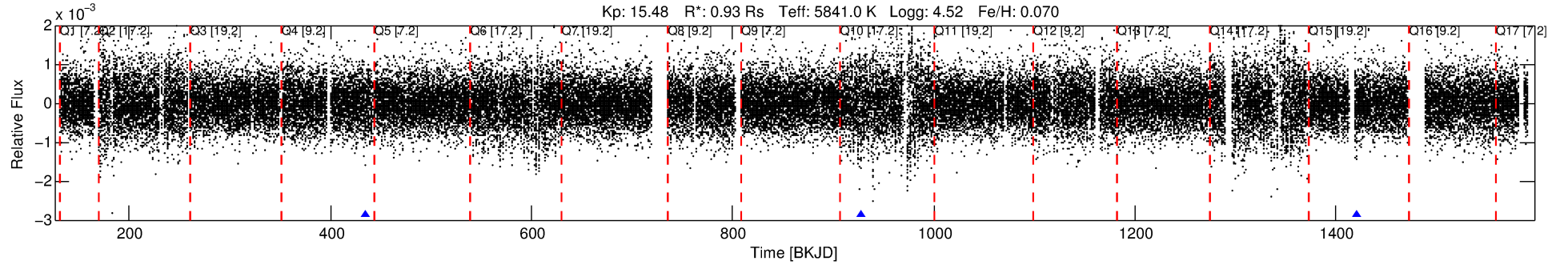
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 008806998-03

No Significant Match Found

DV One-Page Summary

KIC: 8806998 Candidate: 3 of 3 Period: 493.101 d



DV Fit Results:

Period = 493.10126 [0.01672] d
Epoch = 434.4986 [0.0219] BKJD
Rp/R* = 0.0225 [0.0108]
a/R* = 202.90 [425.67]
b = 0.67 [1.73]
Seff = 0.59 [0.22]
Teq = 223 [21] K
Rp = 2.29 [1.25] Re
a = 1.2406 [0.2854] AU
Ag = 41884.90 [45293.56] [0.92σ]
Teffp = 4937 [1274] K [3.70σ]

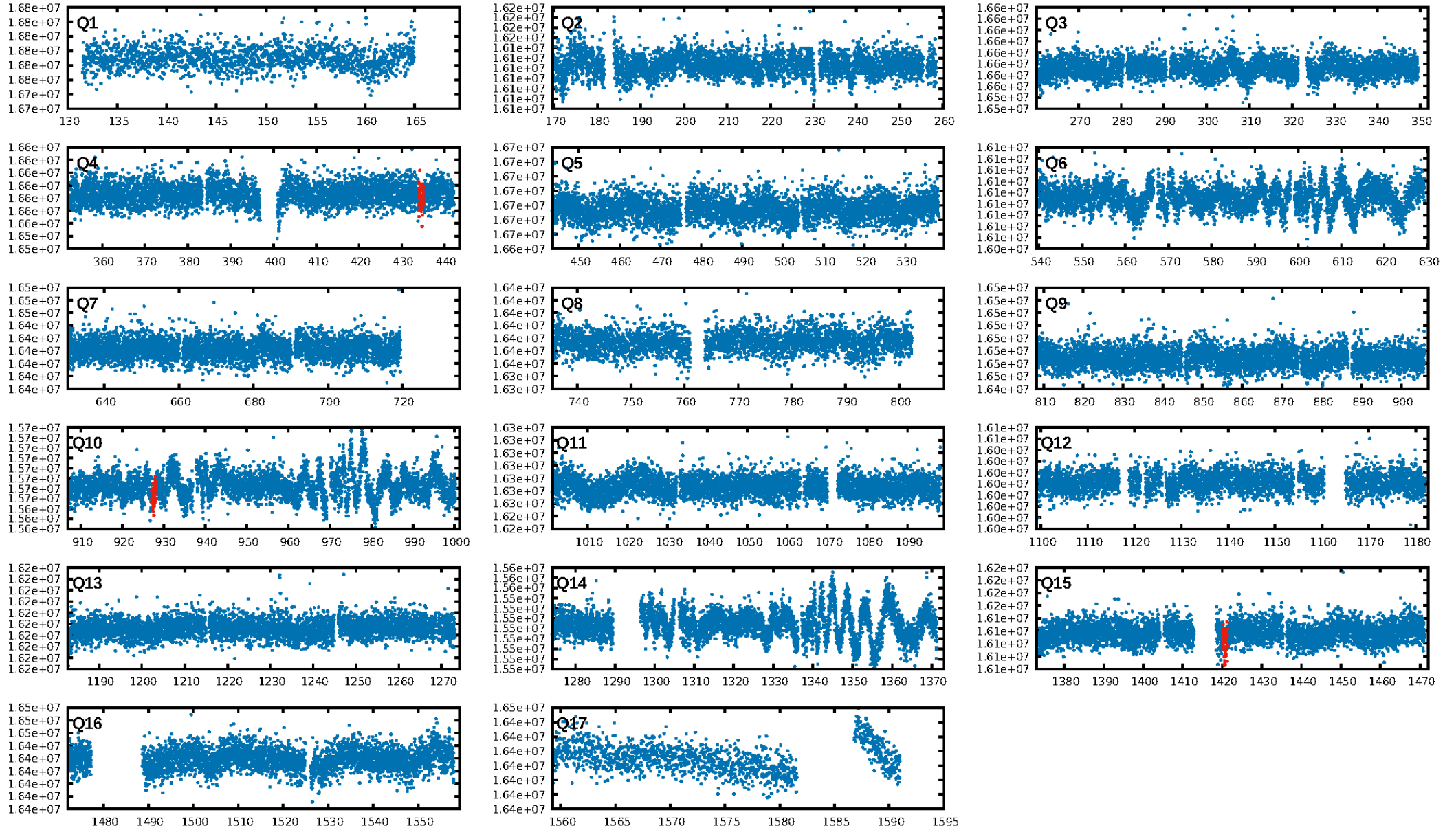
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [149.63σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 26.1%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 2.01e-08
RollingBand-fgt: 1.00 [3/3]
GhostDiagnostic-chr: -4.346
Centroid-sig: 1.1%
Centroid-so: 4.461 arcsec [1.67σ]
OotOffset-rm: 2.893 arcsec [2.77σ]
KicOffset-rm: 2.719 arcsec [2.74σ]
OotOffset-st: 1/1/1/0 [3]
KicOffset-st: 1/1/1/0 [3]
DiffImageQuality-fgm: 0.67 [2/3]
DiffImageOverlap-fno: 1.00 [3/3]

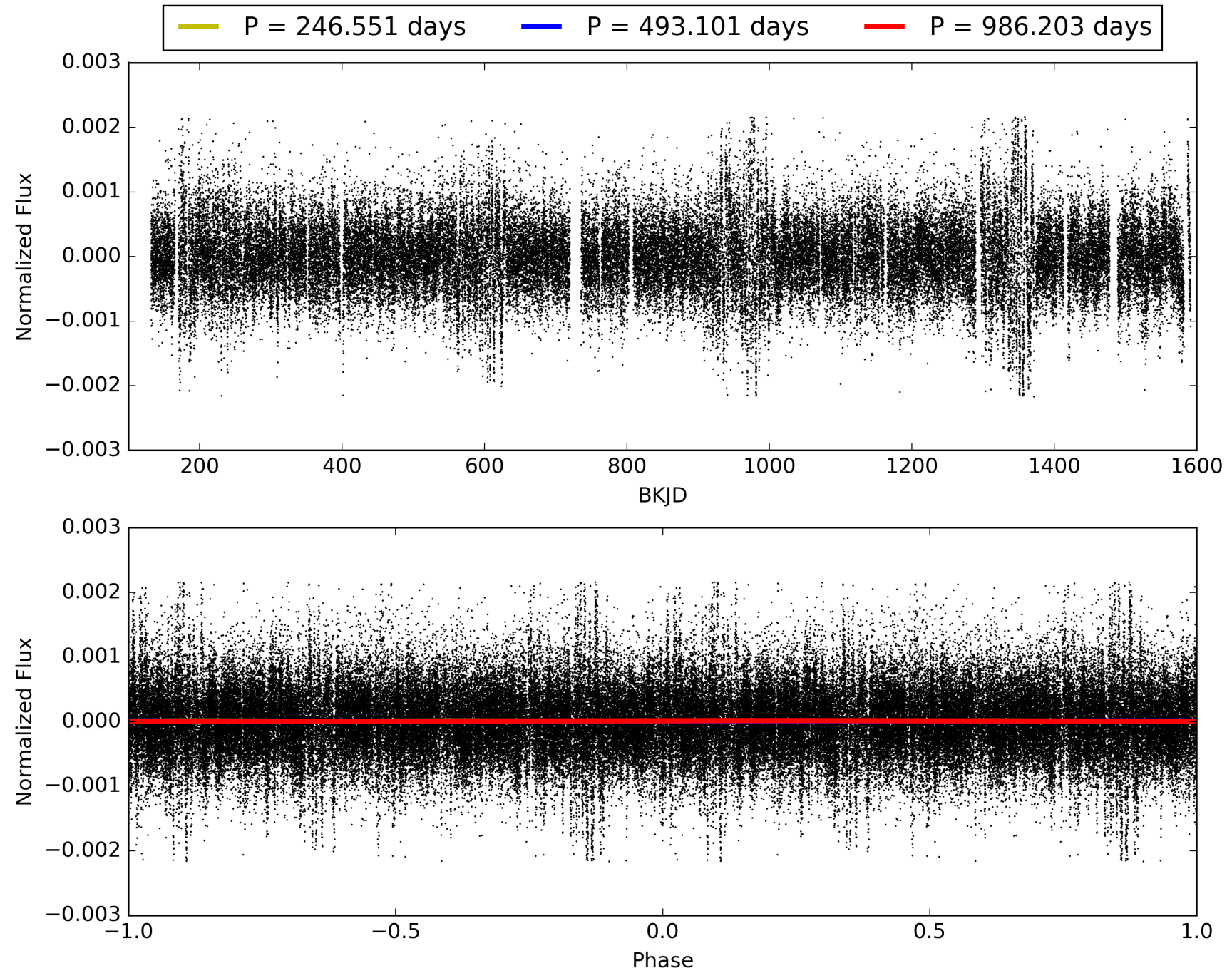
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 05:27:15 Z

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

TCE 008806998-03, PDC Light Curves

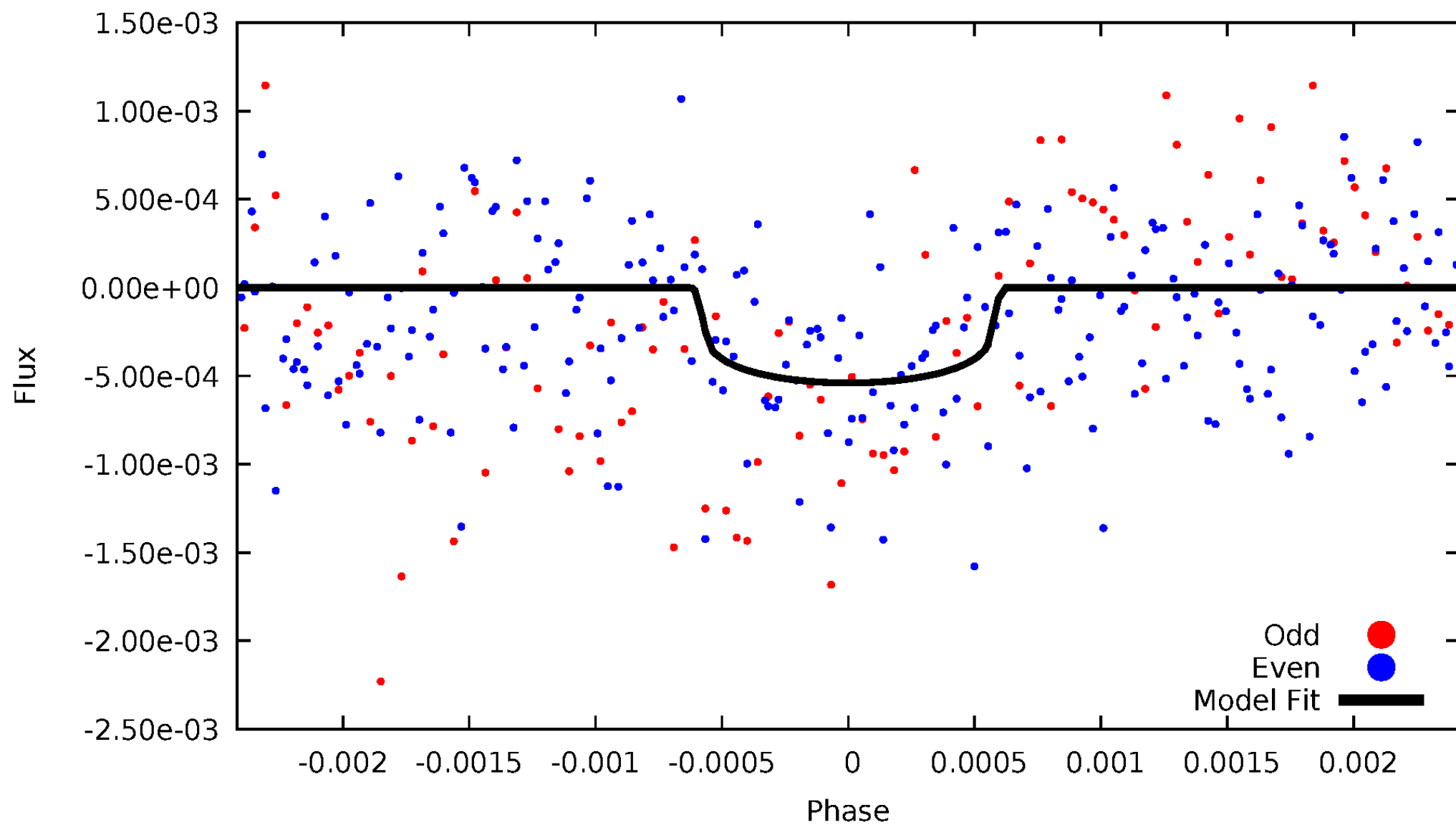


TCE 008806998-03



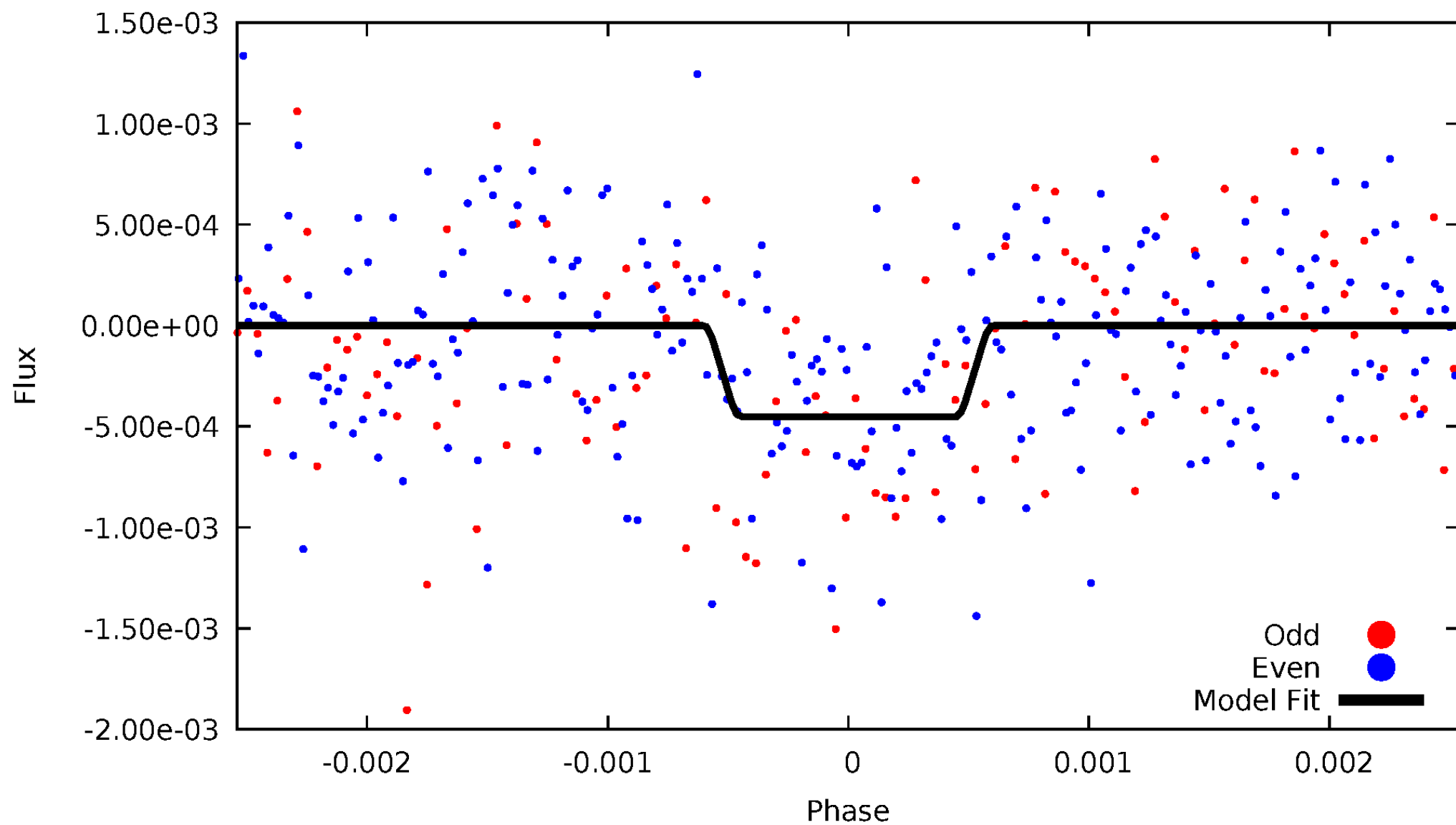
DV Odd/Even

TCE 008806998-03



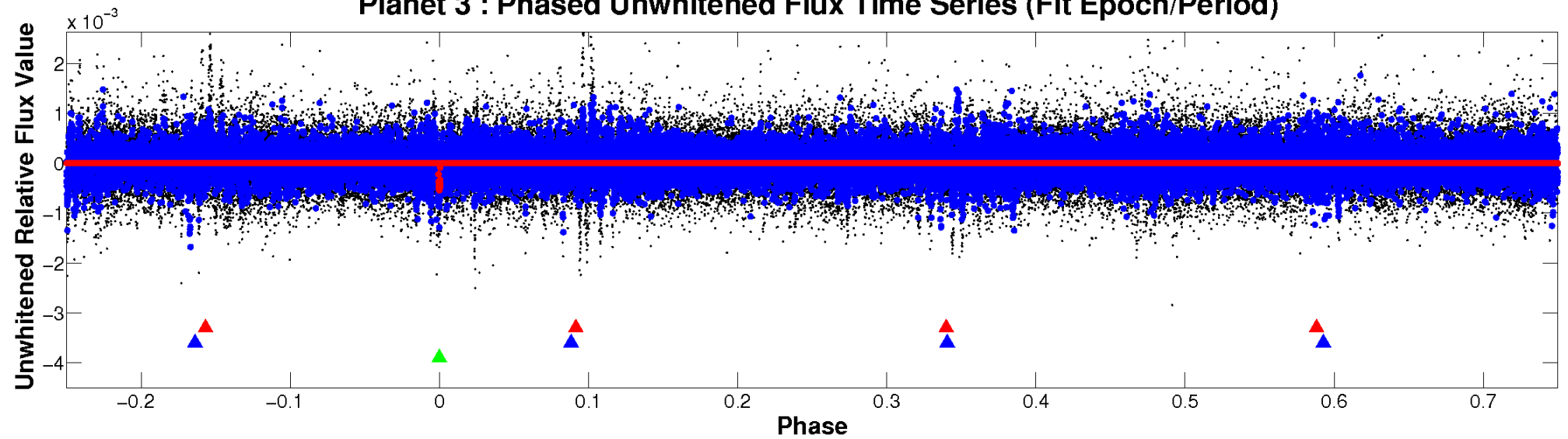
ALT Odd/Even

TCE 008806998-03

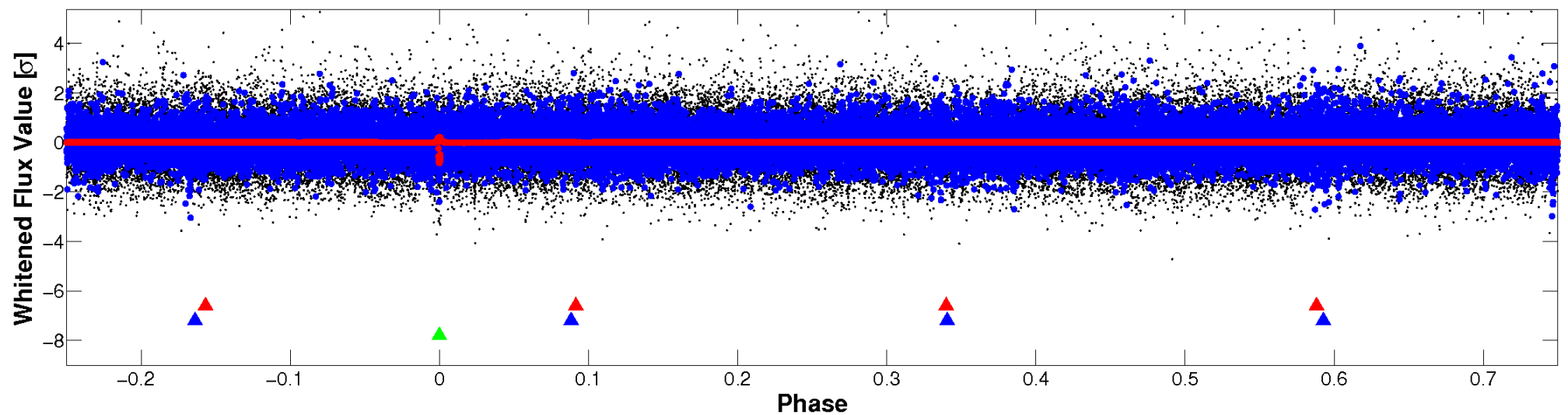


Non-Whitened Vs. Whitened Light Curve

Planet 3 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)



Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



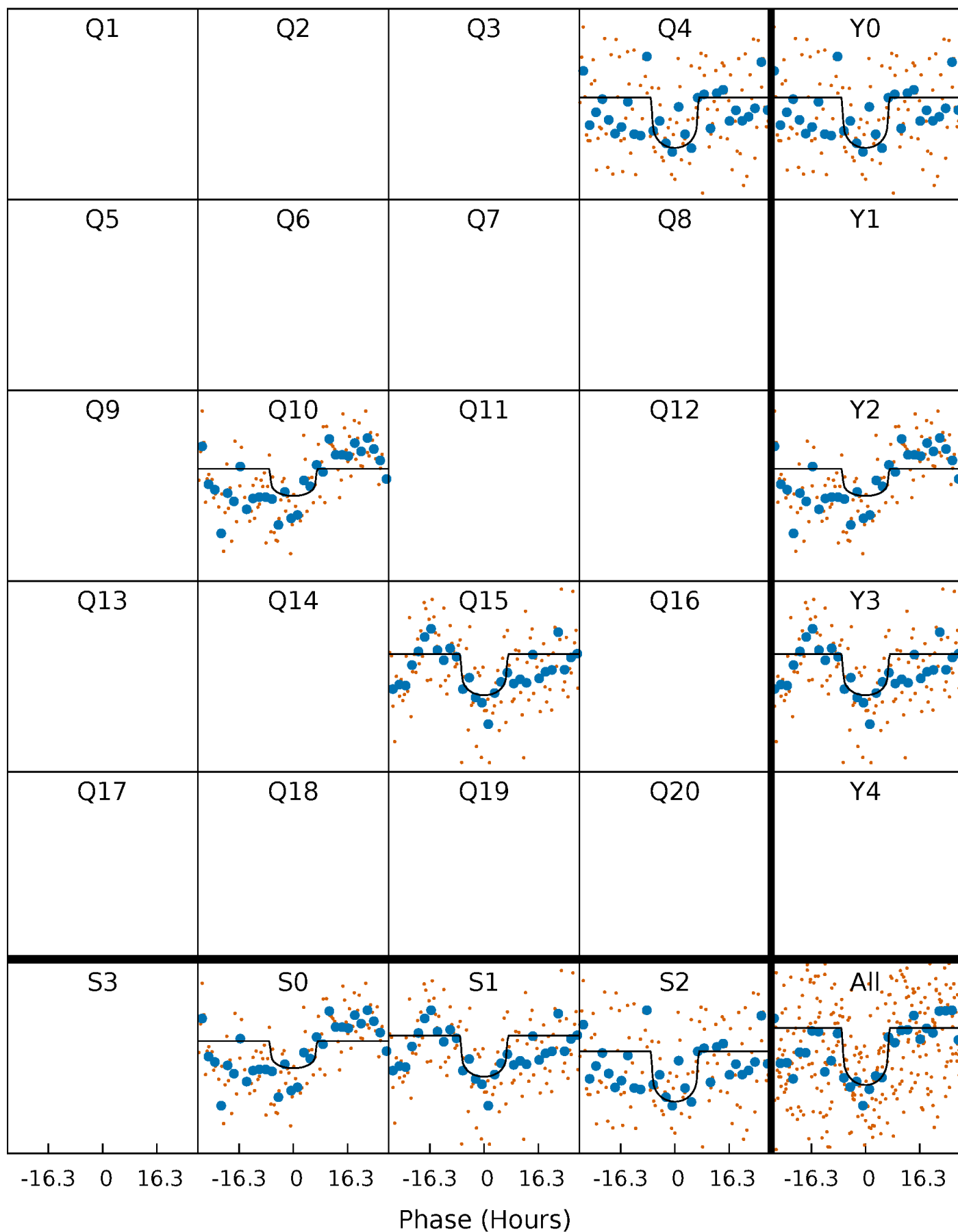
PDC Quarter-Phased Transit Curves

TCE 008806998-03 P=493.101256 Days $T_0=434.498637$ (BKJD)



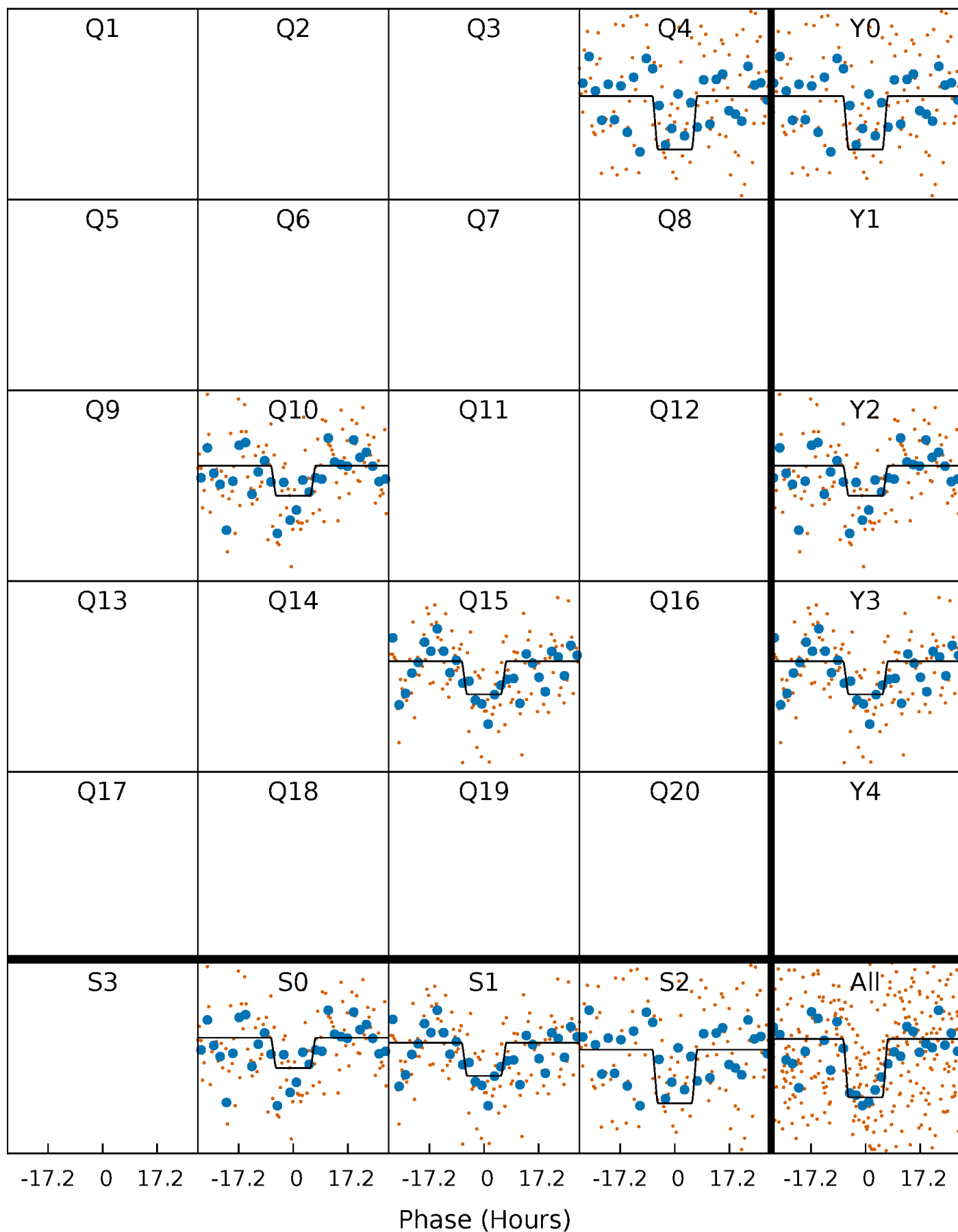
DV Quarter-Phased Transit Curves

TCE 008806998-03 $P=493.101256$ Days $T_0=434.498637$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

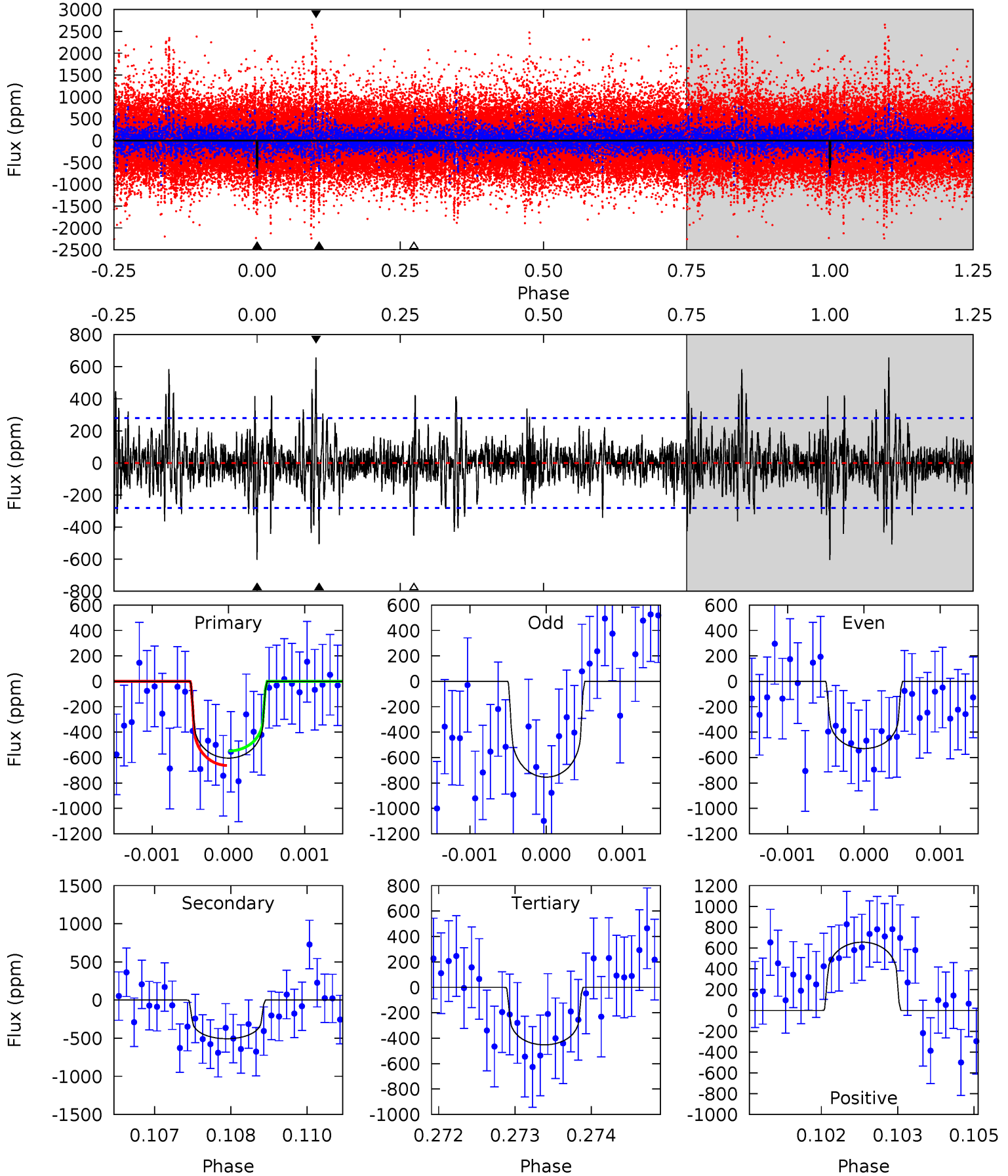
TCE 008806998-03 $P=493.109481$ Days $T_0=434.482386$ (BKJD)



DV Model-Shift Uniqueness Test

008806998-03, P = 493.101256 Days, E = 434.498637 Days

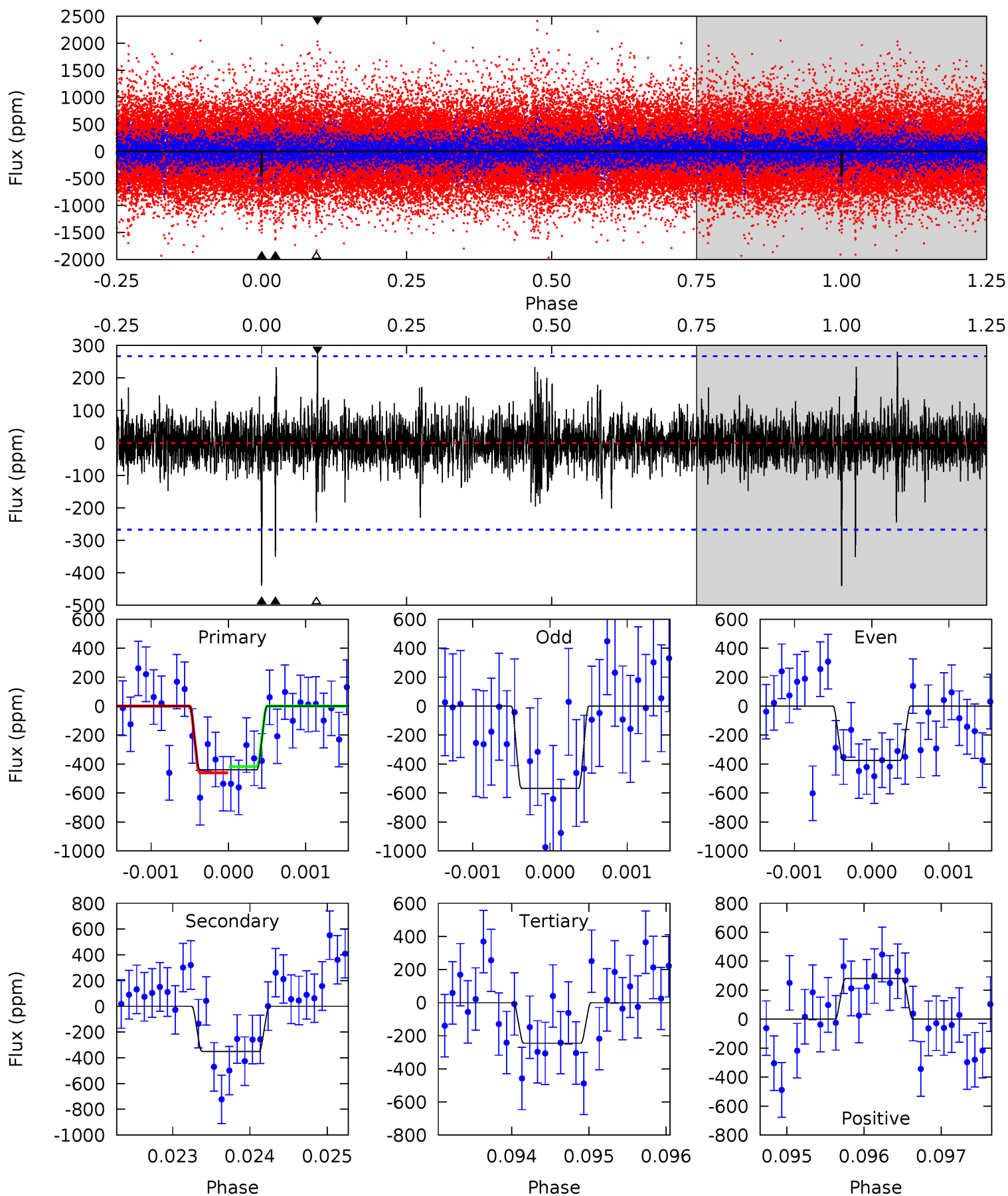
| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 11.7 | 9.79 | 8.73 | 12.7 | 5.41 | 3.23 | 2.10 | 2.94 | -1.01 | 1.06 | -2.89 | 2.04 | 0.95 | 0.52 | 1.11 |



Alt Model-Shift Uniqueness Test

008806998-03, P = 493.109481 Days, E = 434.482386 Days

| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 8.93 | 7.13 | 4.98 | 5.68 | 5.42 | 3.24 | 1.03 | 3.95 | 3.25 | 2.15 | 1.44 | 1.82 | 0.83 | 0.39 | 0.43 |



Stellar Parameters For KIC 008806998

| | $T_{\text{eff}}(K)$ | $\log(g)$ | [Fe/H] | R (R_{\odot}) | M (M_{\odot}) | p_{\star} ($\text{g}\cdot\text{cm}^{-3}$) |
|--------|----------------------|---------------------------|---------------------------|---------------------------|---------------------------|---|
| | 5841^{+157}_{-192} | $4.520^{+0.035}_{-0.196}$ | $0.070^{+0.250}_{-0.300}$ | $0.931^{+0.243}_{-0.087}$ | $1.047^{+0.104}_{-0.139}$ | $1.828^{+0.343}_{-0.911}$ |
| | +3%/-3% | +1%/-4% | +357%/-429% | +26%/-9% | +10%/-13% | +19%/-50% |
| 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 008806998-03 / KOI

| Detrend | Depth (ppm) | R_p (R_{\oplus}) | T_{max} (K) | T_{obs} (K) | A_{obs} |
|---------|---------------|------------------------|-------------------|-----------------------|----------------------------|
| DV | -507 ± 52 | $2.39^{+1.21}_{-1.10}$ | 318^{+19}_{-14} | 5810^{+2335}_{-956} | $72256^{+192083}_{-39920}$ |
| Alt. | -351 ± 49 | $2.30^{+1.13}_{-1.10}$ | 319^{+21}_{-15} | 5432^{+2216}_{-833} | $53732^{+135753}_{-29087}$ |

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 $A_{obs} \gg 1.0$

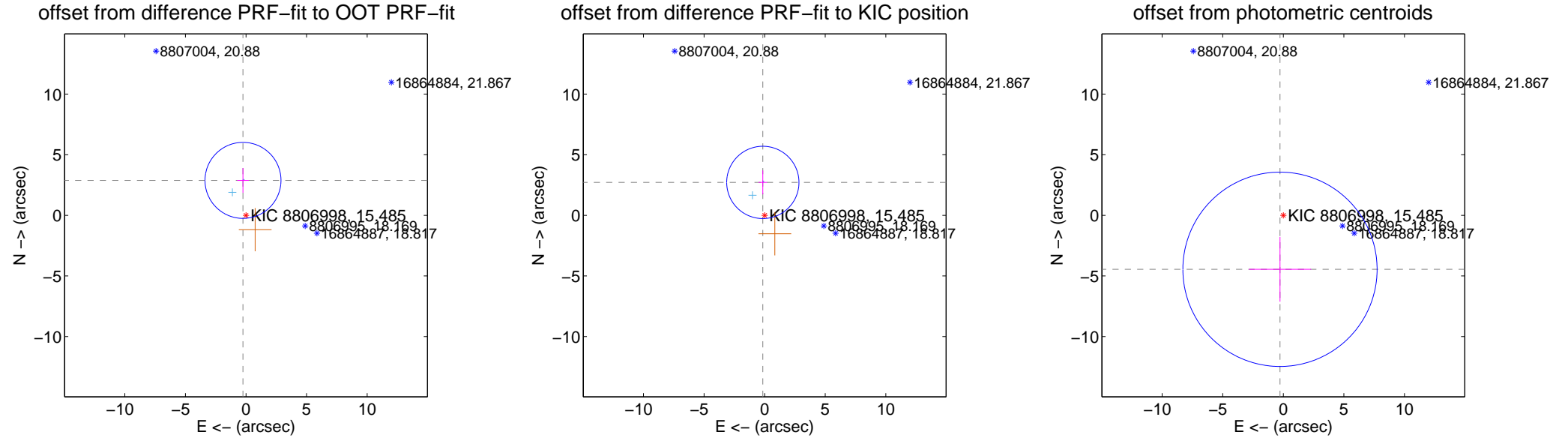
DV Centroid Data

Supplemental centroid analysis for 008806998-03. Kepler magnitude: 15.48. Transit SNR 7.19

There are 2 quarters with good PRF difference image offsets

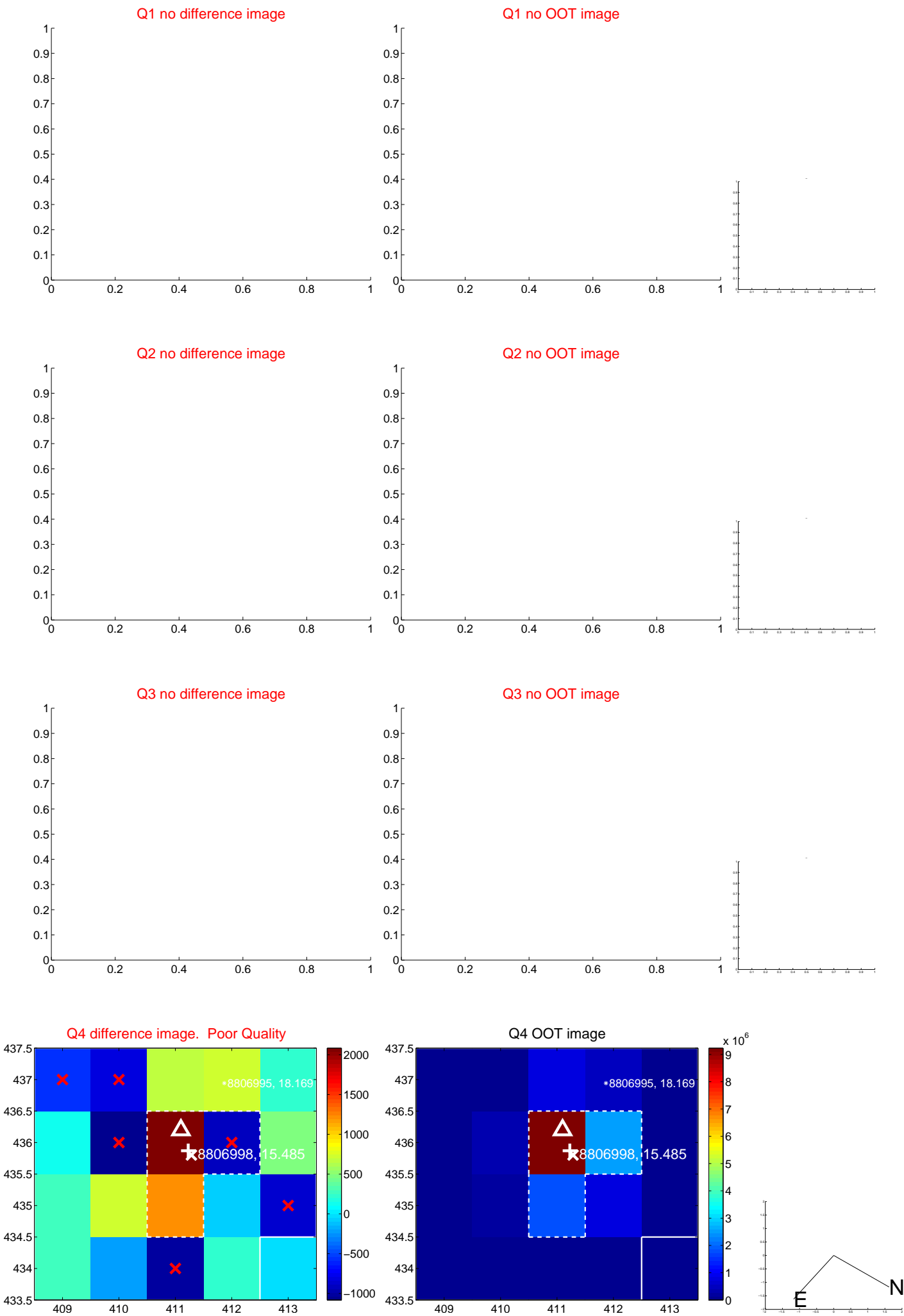
The direct PRF centroid is offset from the target star catalog position by about 0.27 arcsec

| | Distance in arcsec | Distance / σ | Δ RA | Δ Dec |
|---|--------------------|---------------------|-------------------|-------------------|
| PRF-fit source offset from OOT | 2.893 ± 1.045 | 2.77 | 0.248 ± 0.475 | 2.882 ± 1.020 |
| PRF-fit source offset from KIC position | 2.719 ± 0.994 | 2.74 | 0.151 ± 0.350 | 2.715 ± 0.984 |
| photometric centroid source offset | 4.46 ± 2.67 | 1.67 | 0.27 ± 2.56 | -4.45 ± 2.67 |



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.

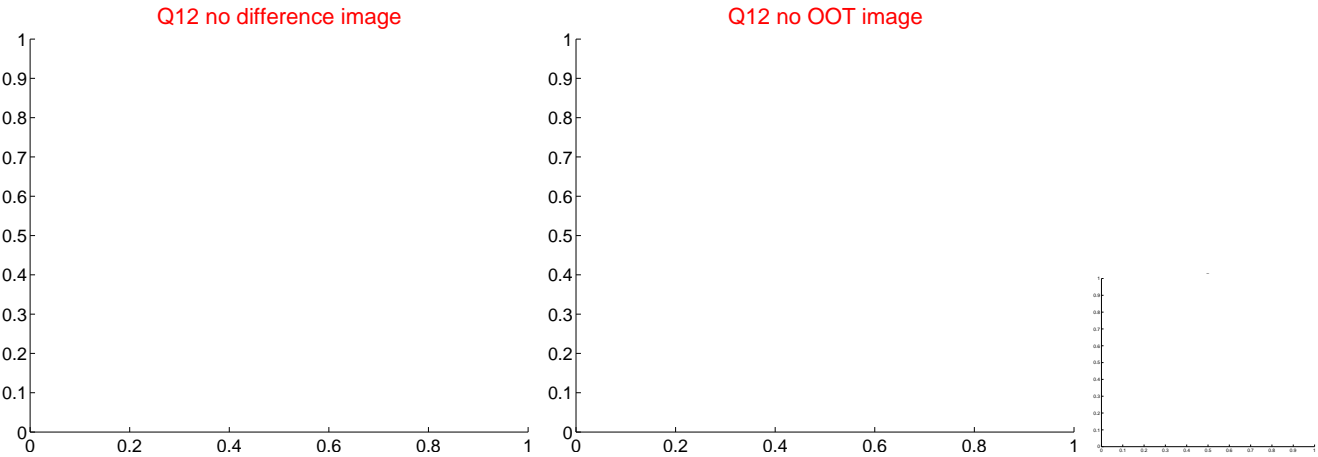
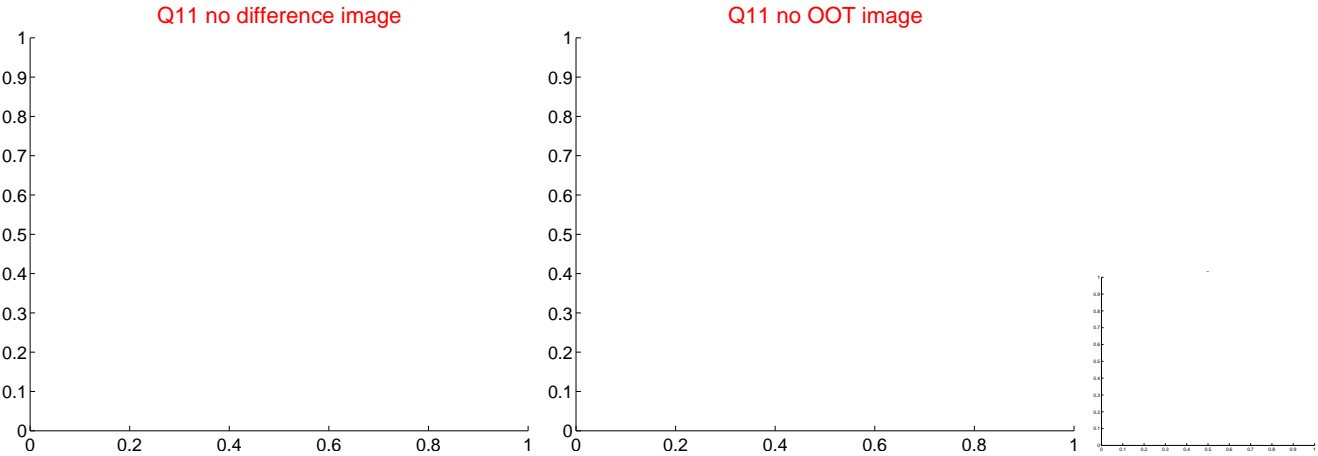
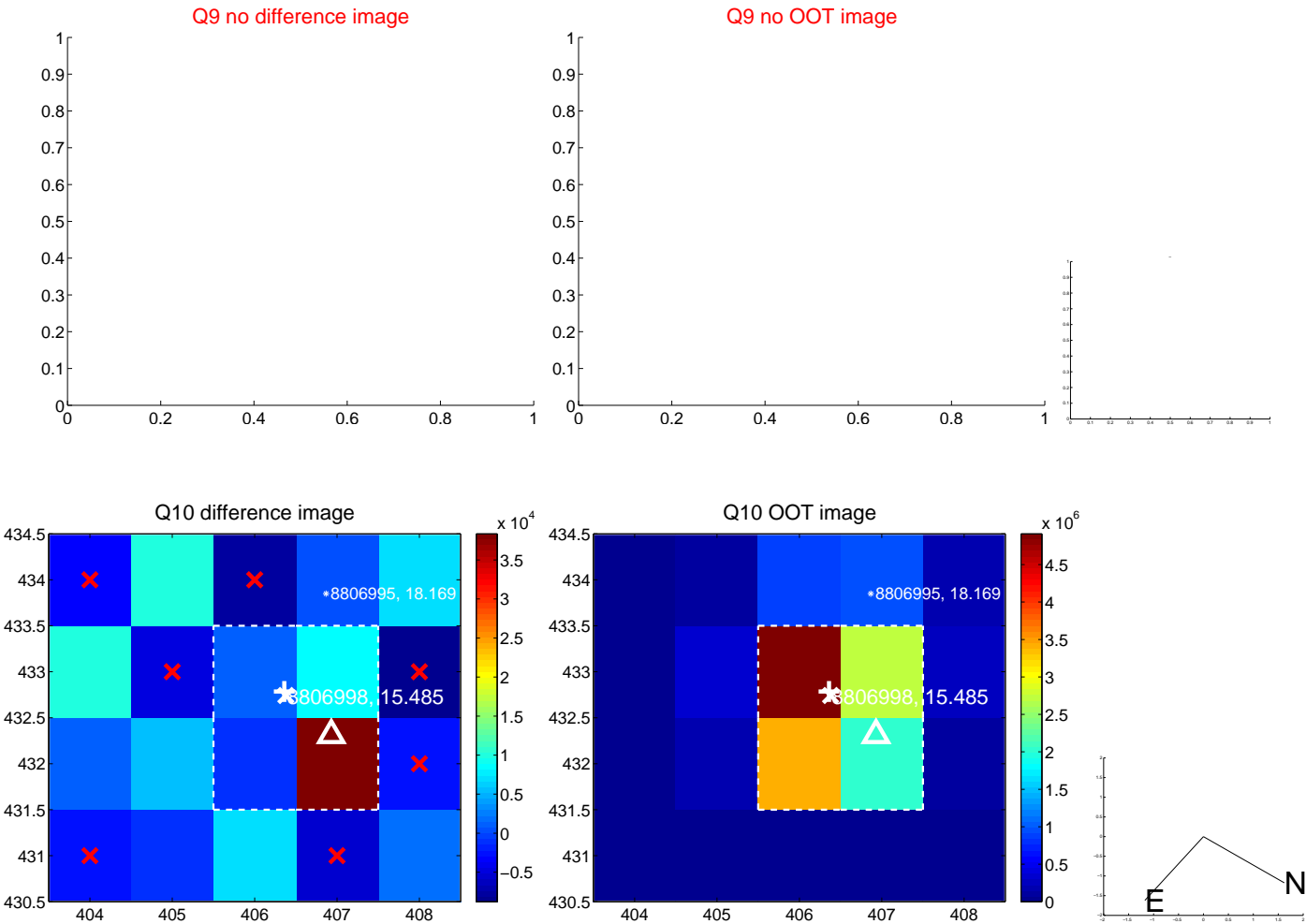
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.



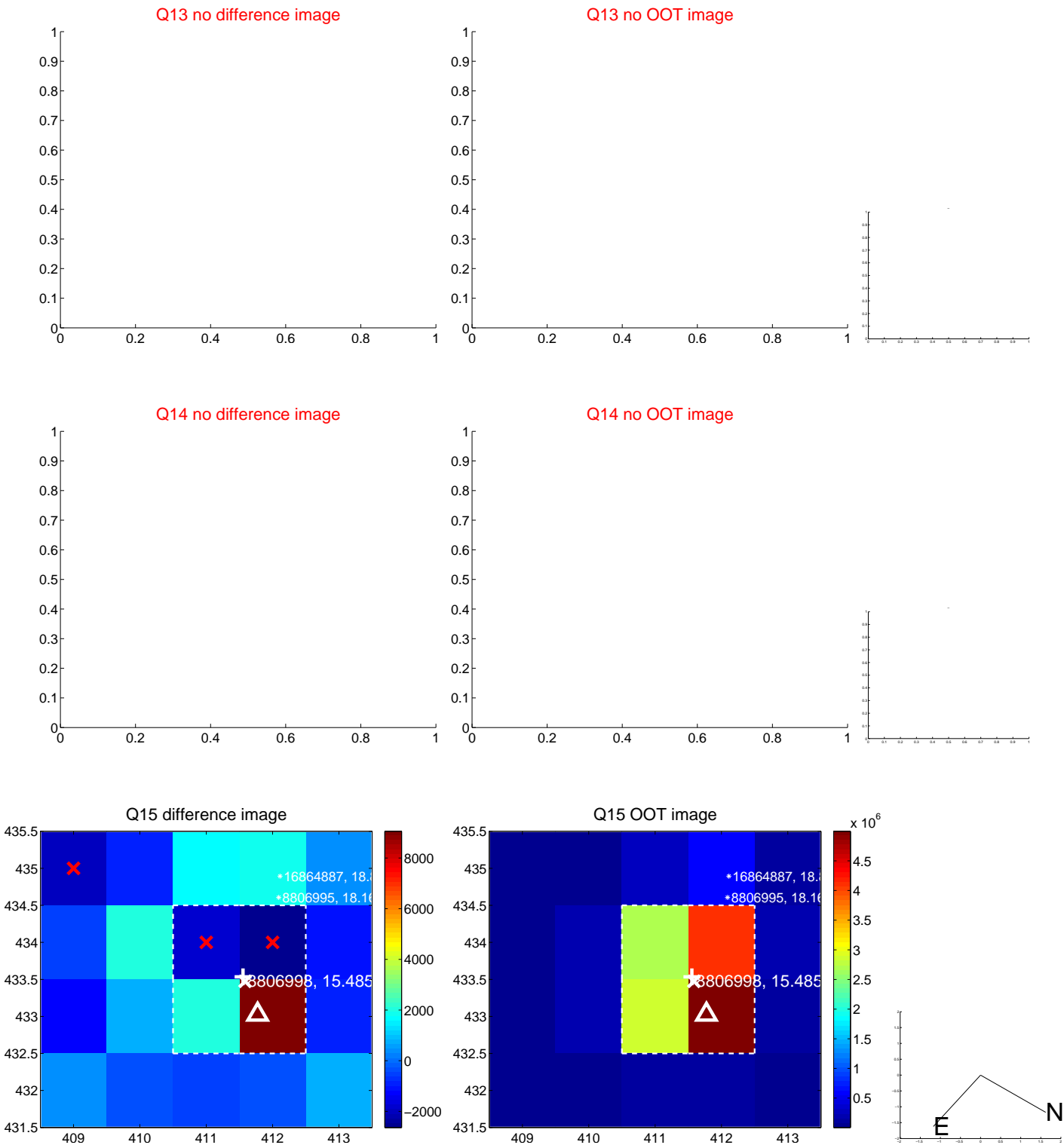
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



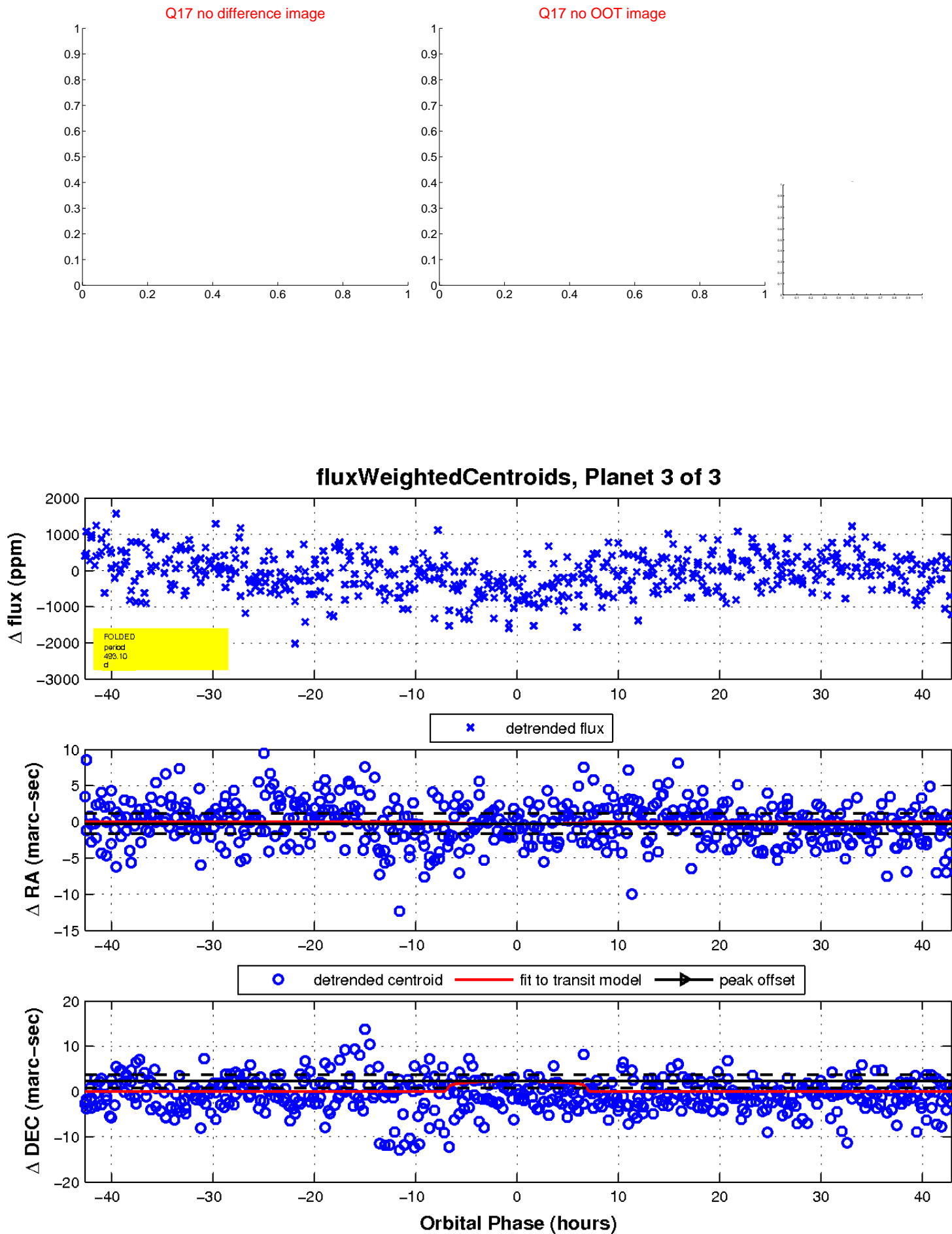
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.



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.



UKIRT Image

Declination

