

KIC 005611160

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}) |
|--------------|----------|------|---------------|--------------|-------------|------------------|-----|-----|-----------------------------|-----------------|------------------------|------------------------|
| 005611160-01 | OBS | No | 0.532608 | 131.882763 | 136.4 | 0.969 | 8.9 | 7.7 | 1.81 | 6971 | 2.15 | 33999.83 |
| 005611160-02 | OBS | No | 0.532610 | 131.661754 | 169.9 | 1.230 | 8.6 | 9.8 | 1.81 | 6971 | 2.46 | 33999.63 |

Robovetter Results

| TCE | Run Type | Disp | Score | N | S | C | E | Comments |
|--------------|----------|------|-------|---|---|---|---|--|
| 005611160-01 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED |
| 005611160-02 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_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.

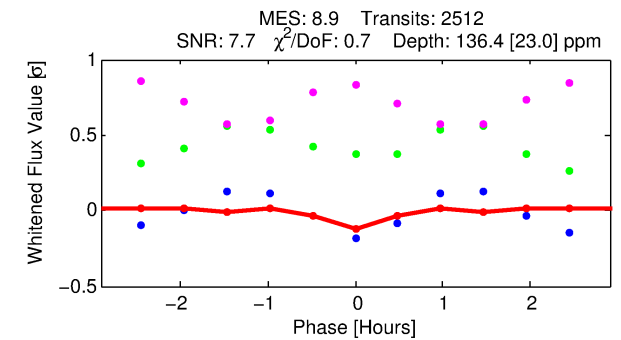
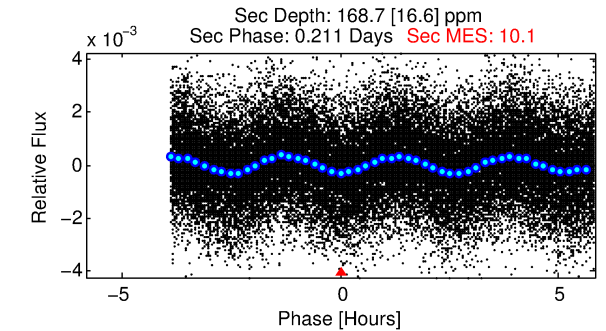
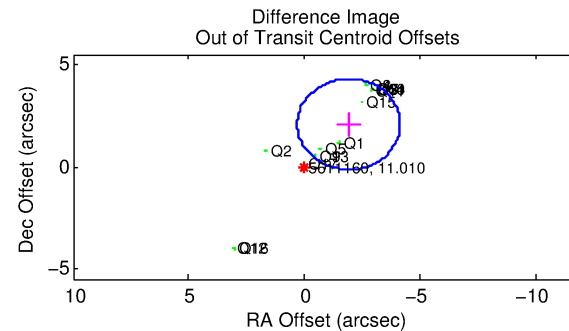
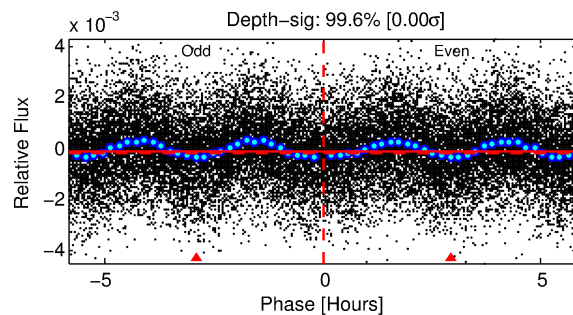
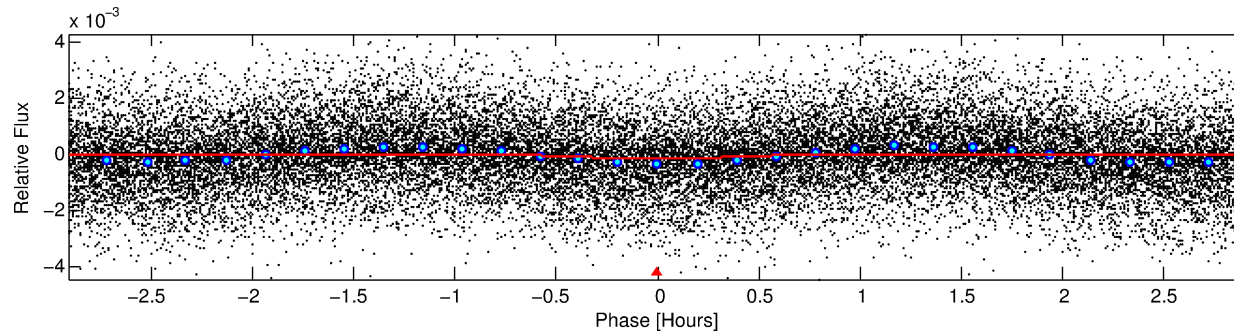
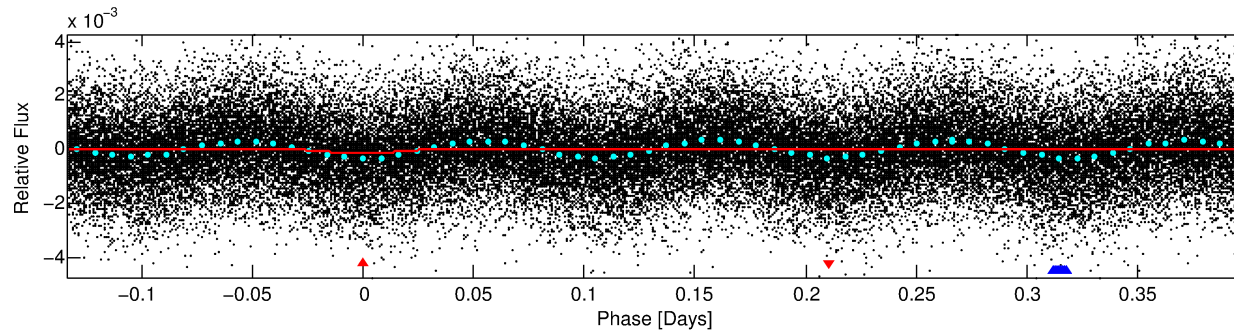
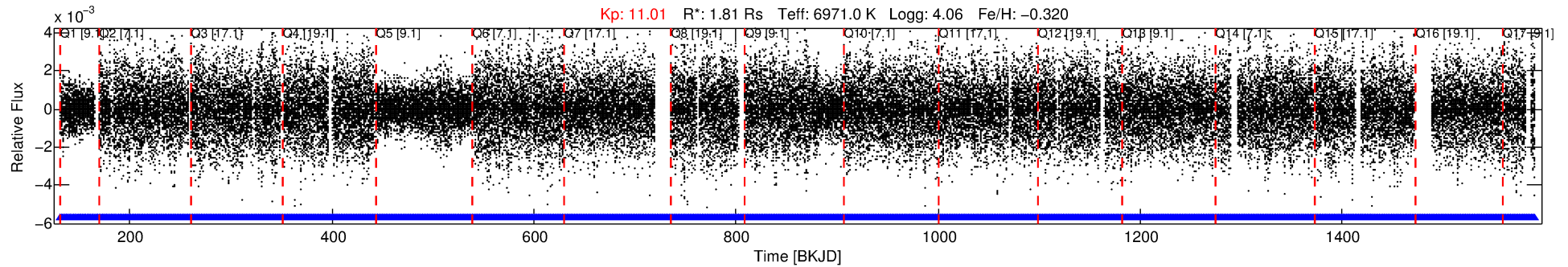
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 005611160-01

No Significant Match Found

DV One-Page Summary

KIC: 5611160 Candidate: 1 of 2 Period: 0.533 d



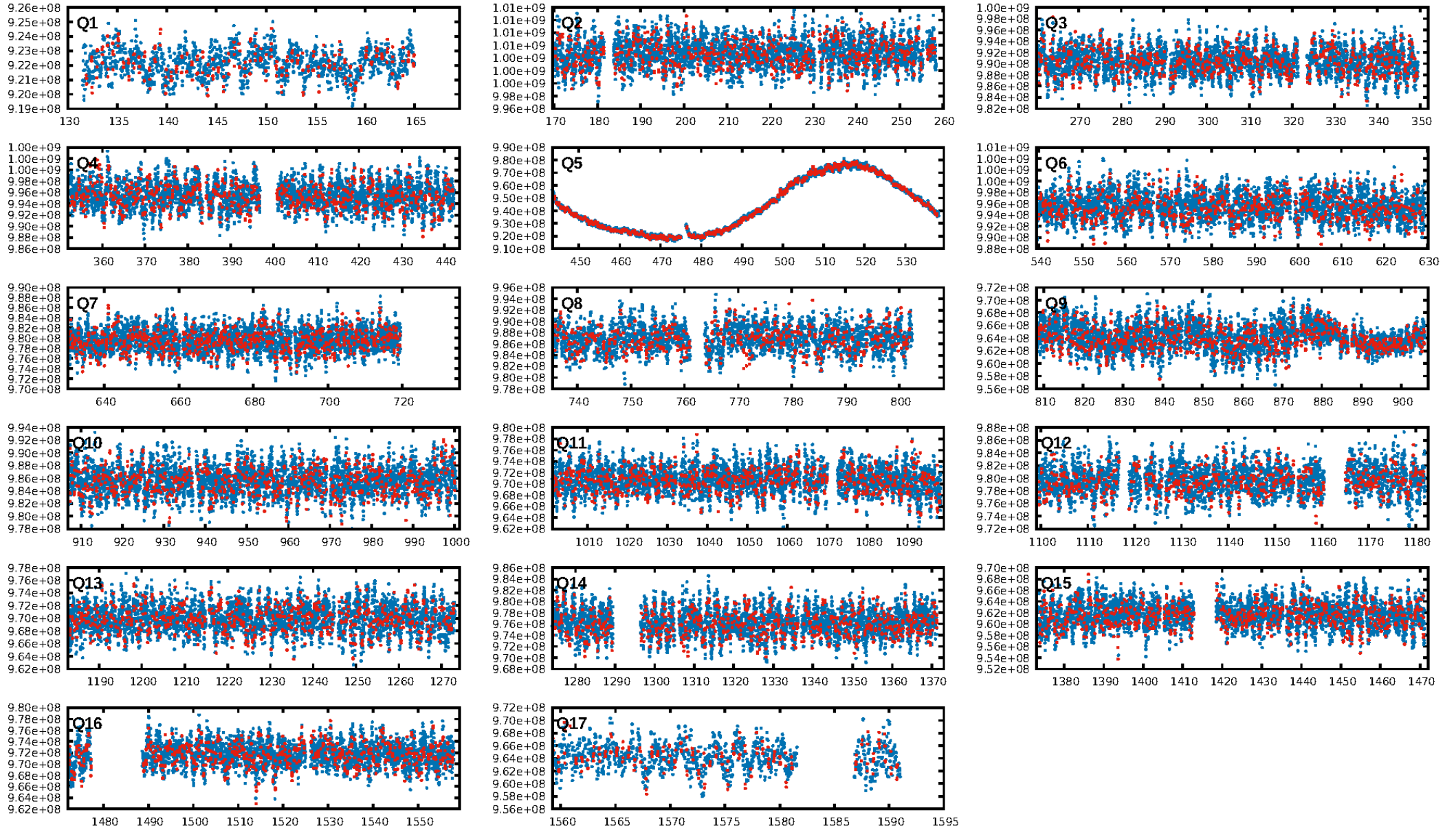
DV Fit Results:

Period = 0.53261 [0.00001] d
Epoch = 131.8828 [0.0016] BKJD
Rp/R* = 0.0109 [0.0113]
a/R* = 4.28 [23.57]
b = 0.06 [100.80]
Seff = 33999.83 [15044.86]
Teff = 3463 [383] K
Rp = 2.16 [2.33] Re
a = 0.0143 [0.0040] AU
Ag = 4.08 [8.61] [0.36 σ]
Teffp = 7607 [3945] K [1.05 σ]

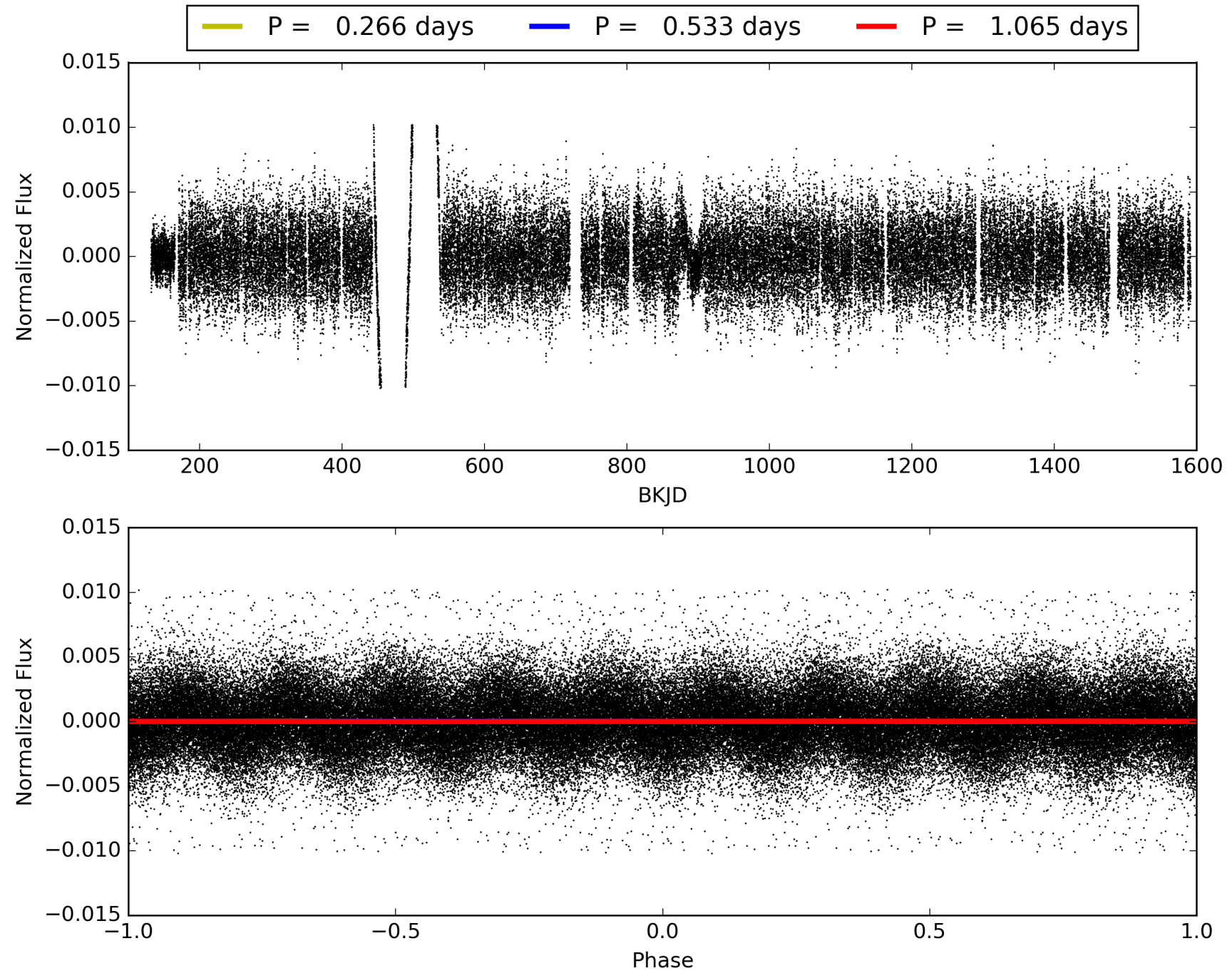
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 0.0% [0.00 σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 1.50e-22
RollingBand-fgt: 1.00 [2399/2399]
GhostDiagnostic-chr: 20.02
Centroid-sig: 0.0%
Centroid-so: 1.303 arcsec [4.64 σ]
OotOffset-rm: 2.825 arcsec [3.81 σ]
KicOffset-rm: 3.121 arcsec [3.83 σ]
OotOffset-st: 4/4/4/5 [17]
KicOffset-st: 4/4/4/5 [17]
DiffImageQuality-fgm: 0.94 [16/17]
DiffImageOverlap-fno: 0.00 [0/17]

TCE 005611160-01, PDC Light Curves

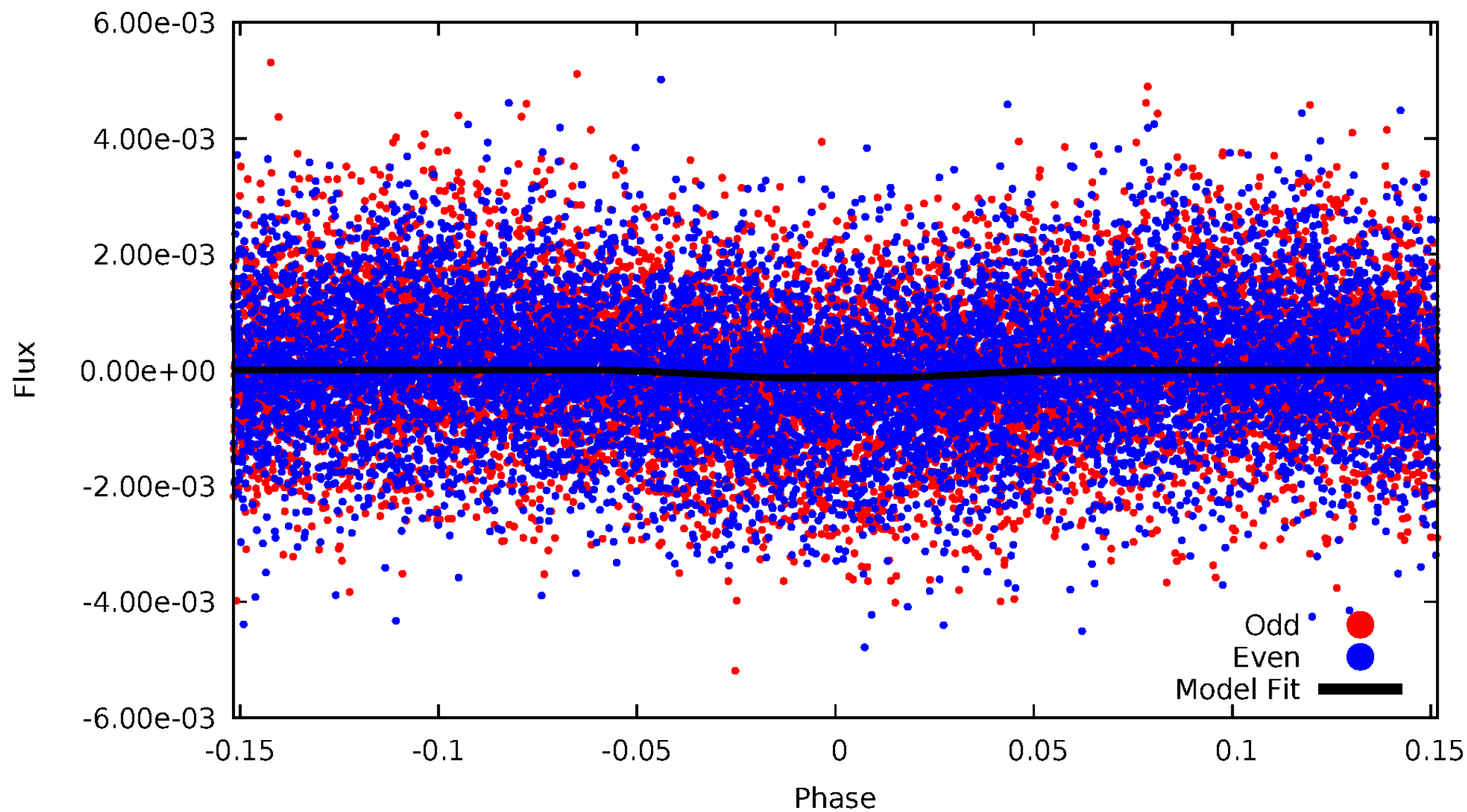


TCE 005611160-01



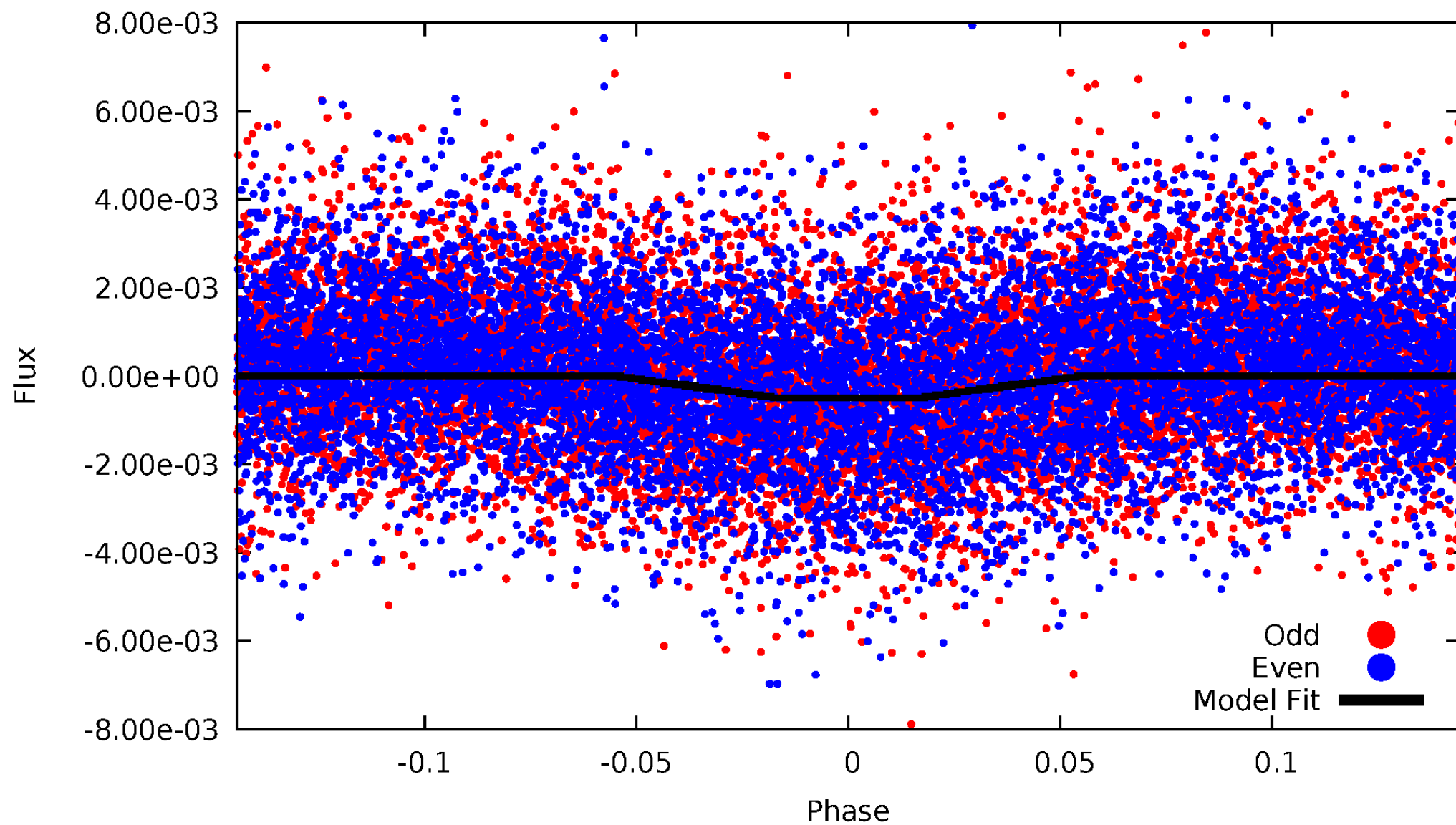
DV Odd/Even

TCE 005611160-01



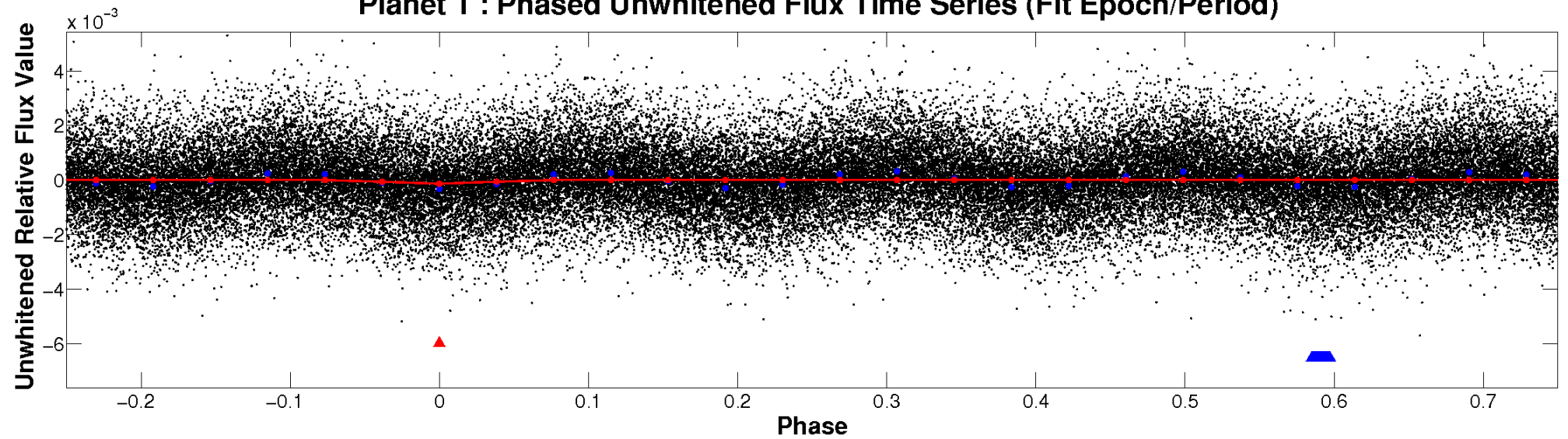
ALT Odd/Even

TCE 005611160-01

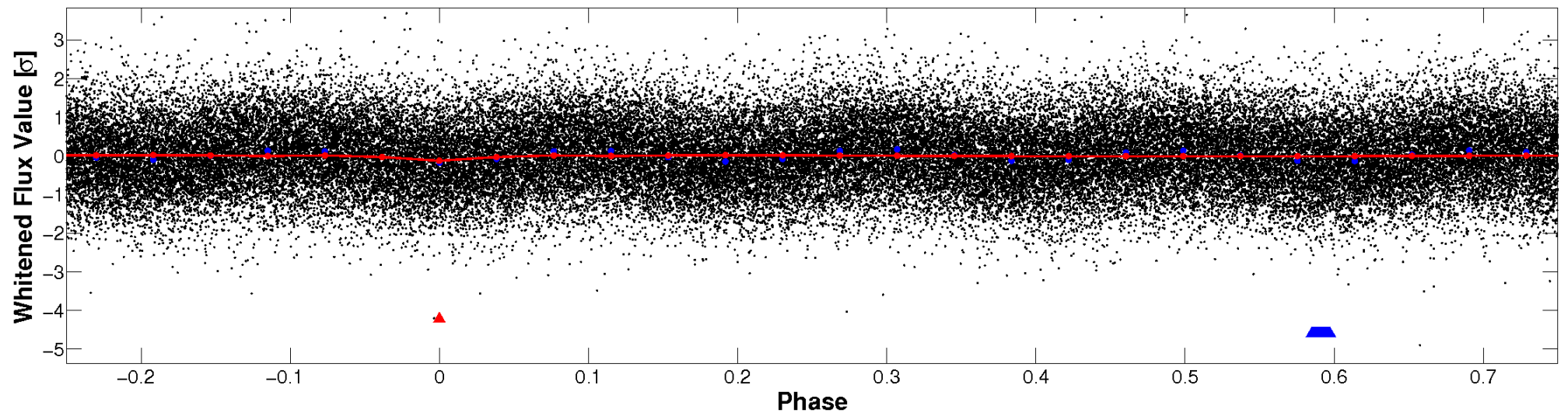


Non-Whitened Vs. Whitened Light Curve

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

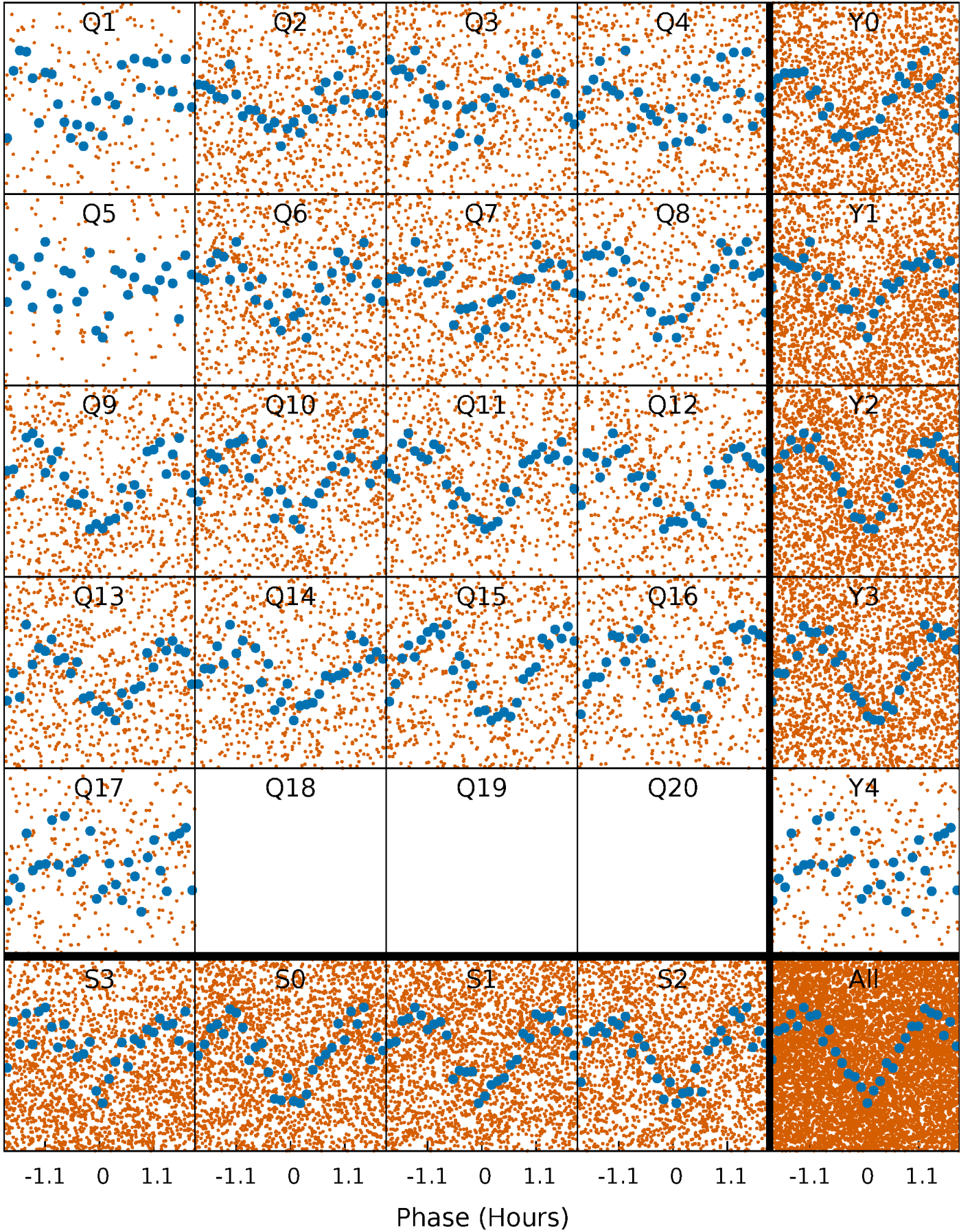


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



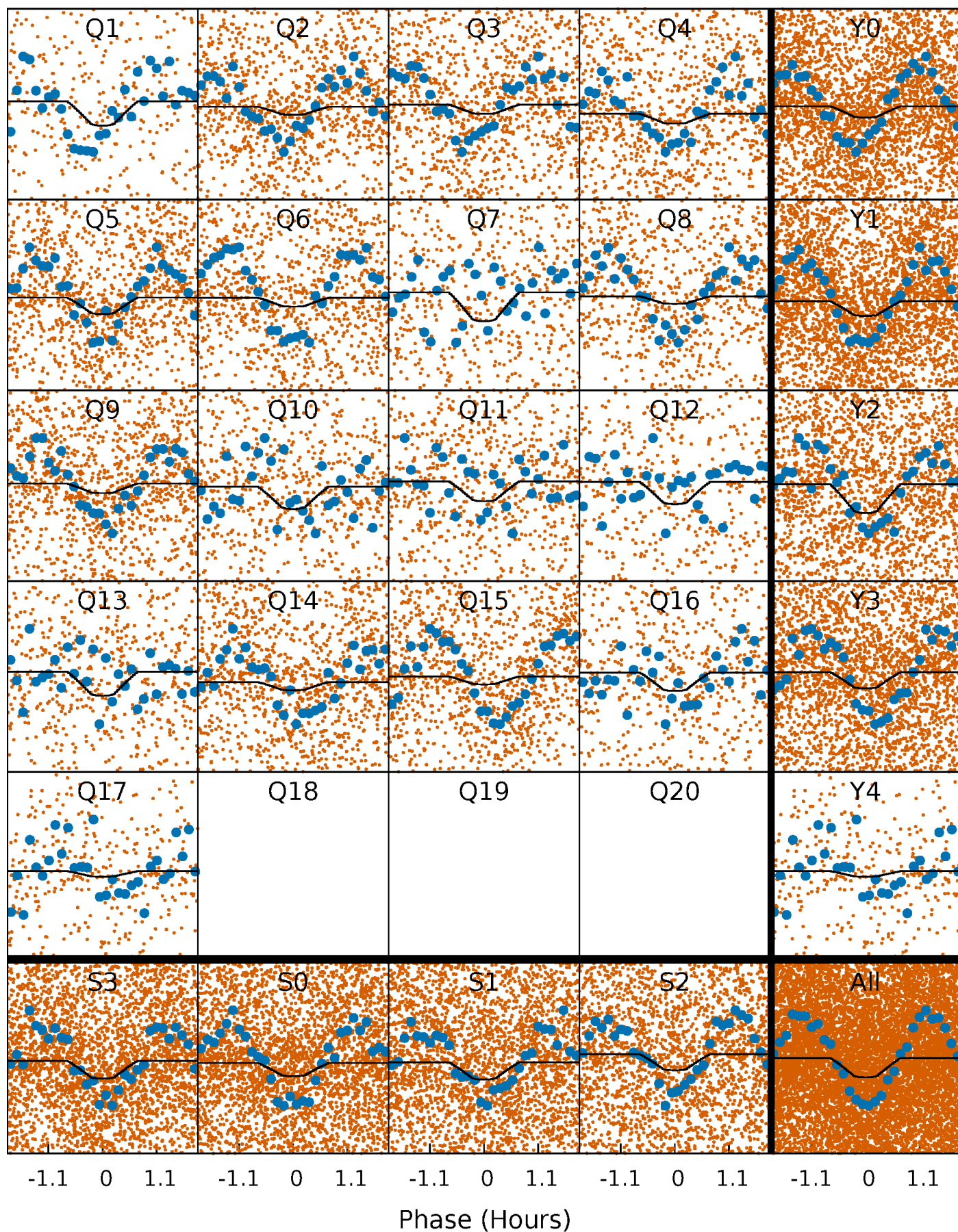
PDC Quarter-Phased Transit Curves

TCE 005611160-01 P= 0.532608 Days $T_0=131.882763$ (BKJD)



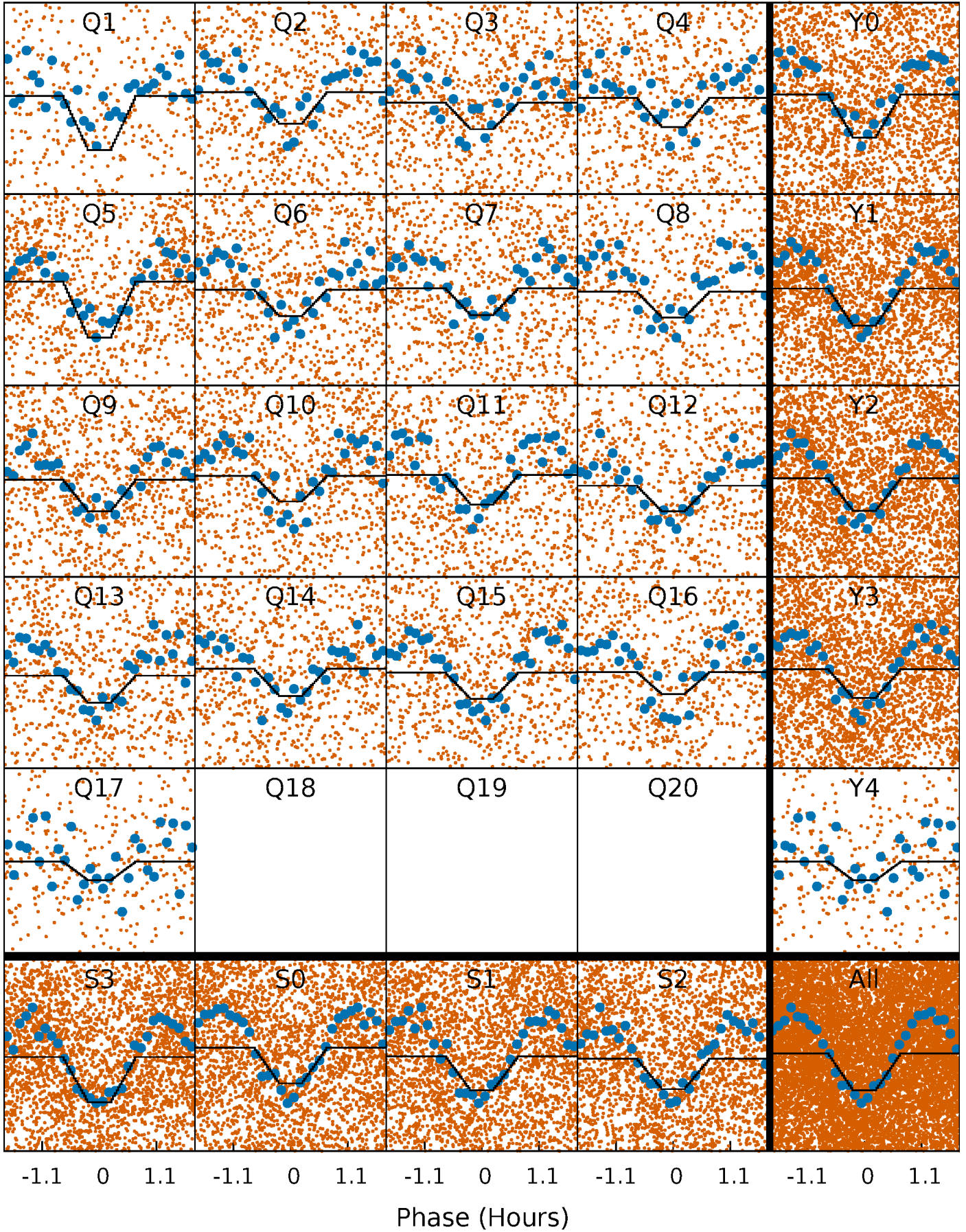
DV Quarter-Phased Transit Curves

TCE 005611160-01 P= 0.532608 Days $T_0=131.882763$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

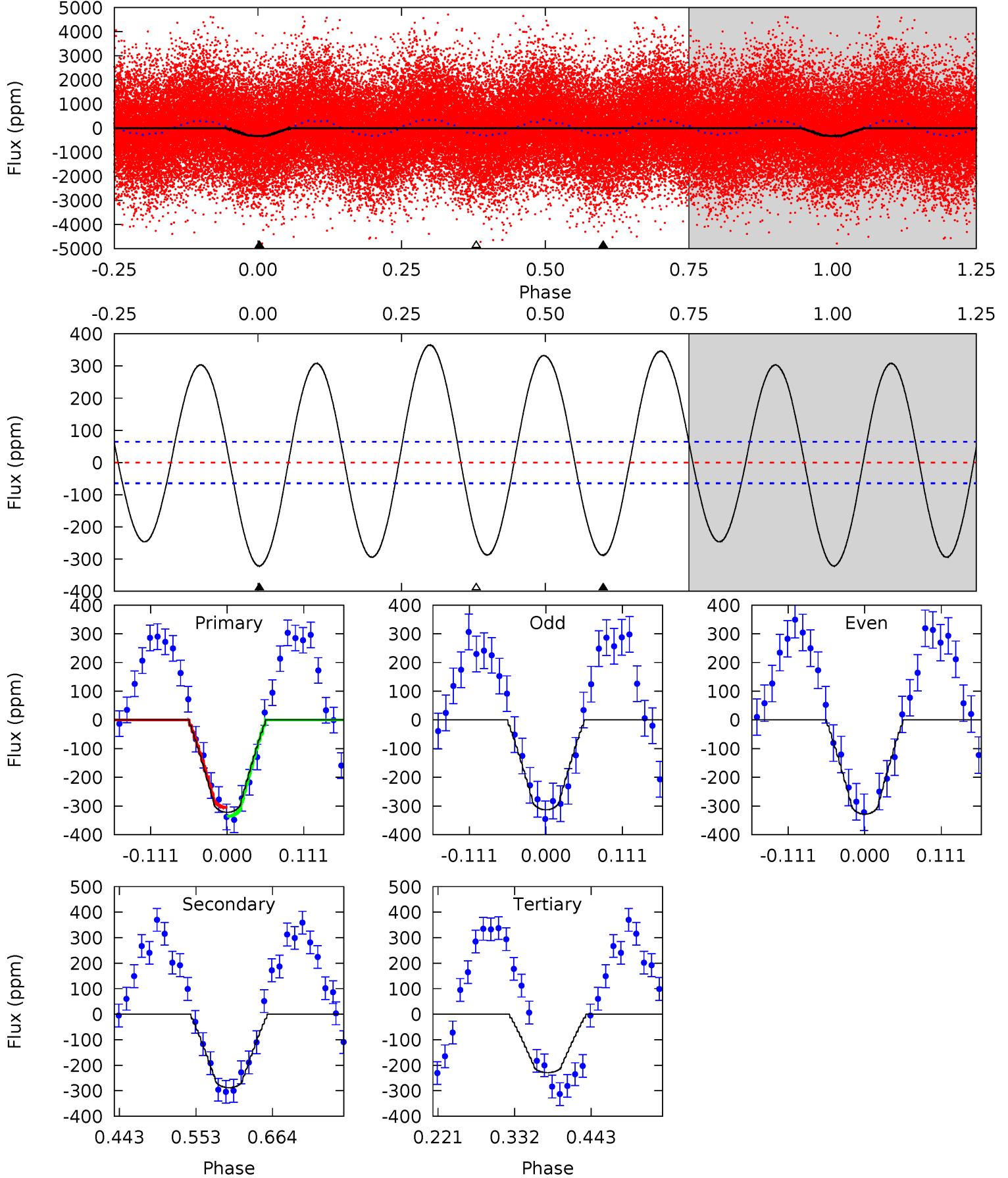
TCE 005611160-01 P= 0.532617 Days $T_0=131.873766$ (BKJD)



DV Model-Shift Uniqueness Test

005611160-01, P = 0.532608 Days, E = 131.350155 Days

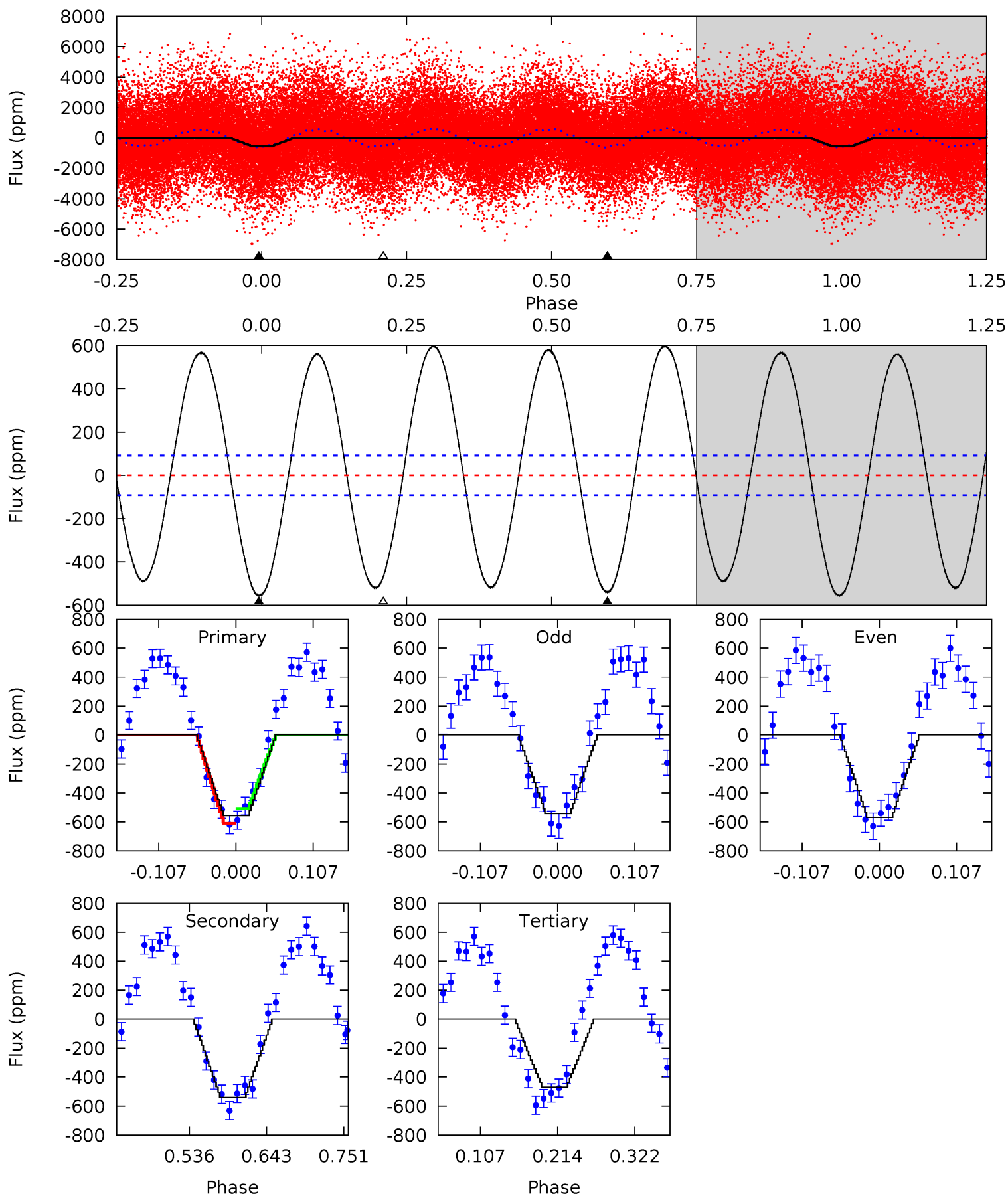
| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|-----|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 22.7 | 20.3 | 16.1 | 0 | 4.54 | 1.60 | 14.9 | 6.58 | 22.7 | 4.18 | 20.3 | 0.54 | 1.15 | 0.53 | 1.12 |



Alt Model-Shift Uniqueness Test

005611160-01, P = 0.532617 Days, E = 131.341149 Days

| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|-----|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 27.5 | 26.7 | 23.2 | 0 | 4.55 | 1.61 | 18.6 | 4.34 | 27.5 | 3.55 | 26.7 | 0.67 | 0.95 | 0.52 | 2.43 |



Stellar Parameters For KIC 005611160

| | $T_{\text{eff}}(K)$ | $\log(g)$ | [Fe/H] | R (R_{\odot}) | $M(M_{\odot})$ | ρ_{\star} ($\text{g}\cdot\text{cm}^{-3}$) |
|--------|----------------------|---------------------------|----------------------------|---------------------------|---------------------------|--|
| | 6971^{+164}_{-226} | $4.059^{+0.240}_{-0.160}$ | $-0.320^{+0.300}_{-0.300}$ | $1.811^{+0.513}_{-0.565}$ | $1.372^{+0.202}_{-0.247}$ | $0.325^{+0.483}_{-0.148}$ |
| | +2%/-3% | +6%/-4% | +94%/-94% | +28%/-31% | +15%/-18% | +149%/-45% |
| 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 005611160-01 / KOI

| Detrend | Depth (ppm) | R_p (R_{\oplus}) | T_{max} (K) | T_{obs} (K) | A_{obs} |
|---------|---------------|------------------------|----------------------|------------------------|----------------------------|
| DV | -288 ± 14 | $2.49^{+2.02}_{-1.49}$ | 4793^{+360}_{-357} | 7965^{+8422}_{-2372} | $5.241^{+27.222}_{-3.692}$ |
| Alt. | -541 ± 20 | $4.33^{+2.47}_{-1.98}$ | 4777^{+345}_{-372} | 6866^{+3357}_{-1451} | $3.250^{+7.453}_{-1.914}$ |

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

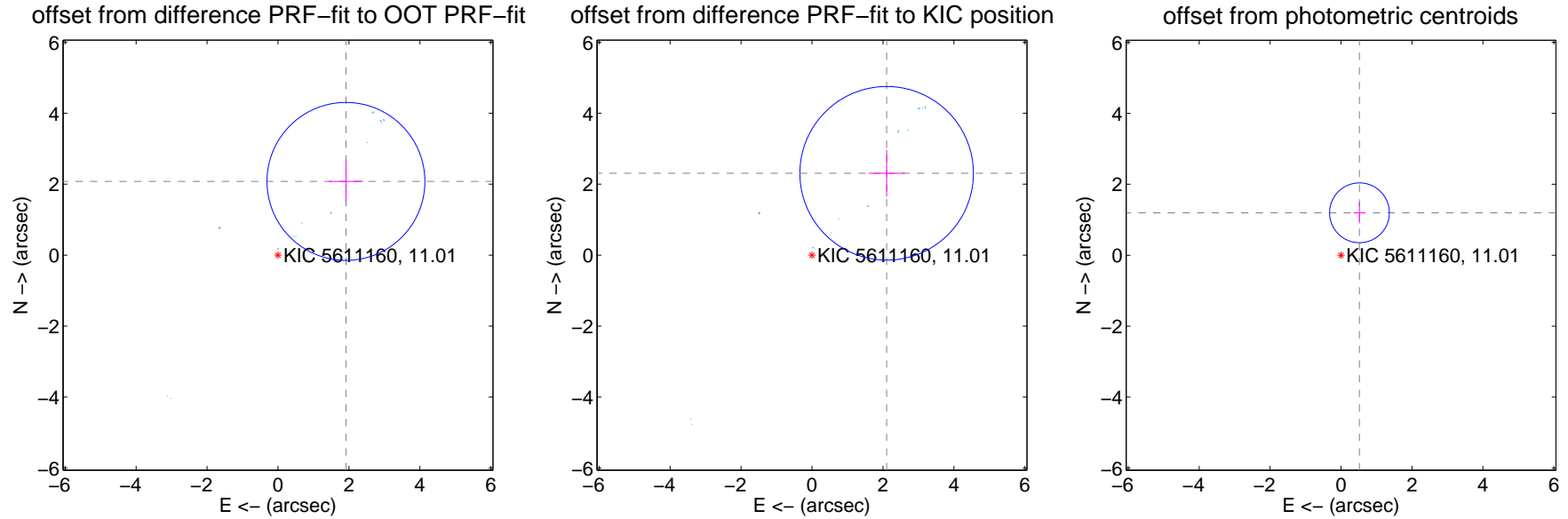
DV Centroid Data

Supplemental centroid analysis for 005611160-01. **Kepler magnitude: 11.01.** Transit SNR 7.72

There are 16 quarters with good PRF difference image offsets

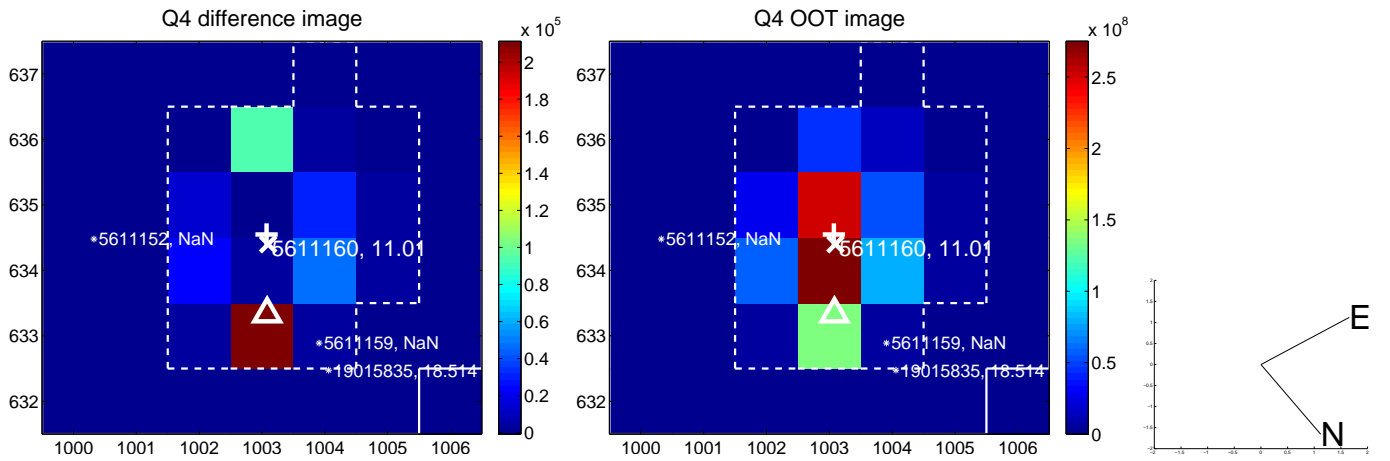
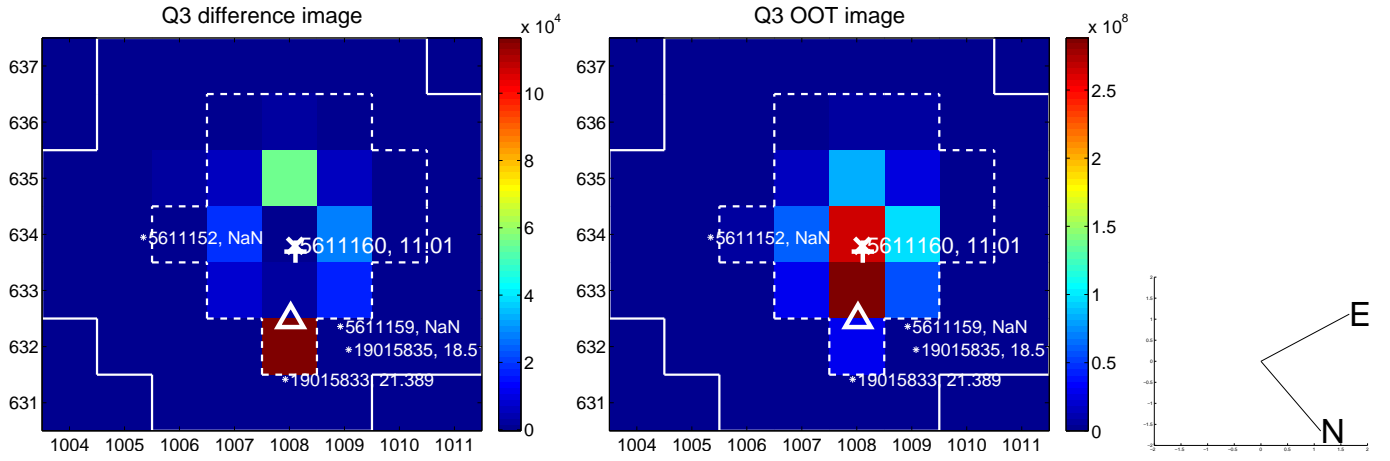
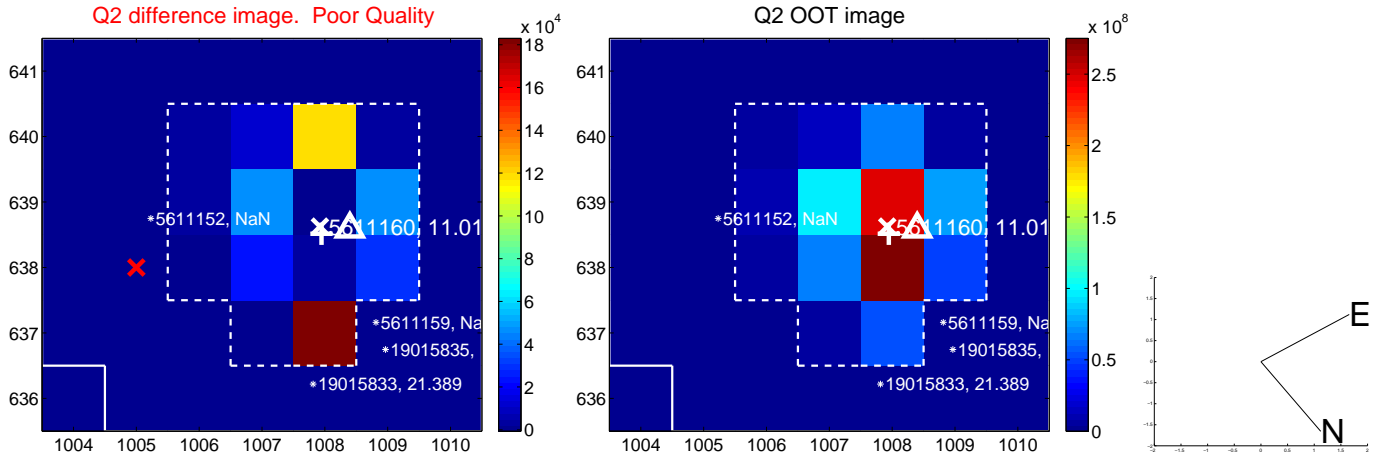
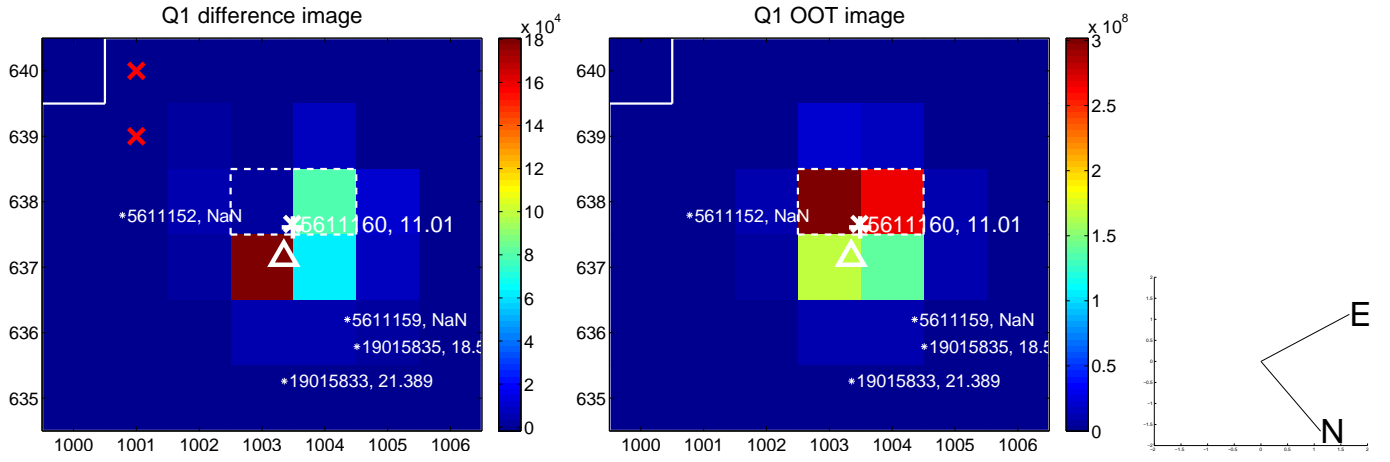
The direct PRF centroid is offset from the target star catalog position by about 0.04 arcsec

| | Distance in arcsec | Distance / σ | Δ RA | Δ Dec |
|---|-------------------------------------|---------------------|--------------------|-------------------|
| PRF-fit source offset from OOT | 2.825 ± 0.742 | 3.81 | -1.914 ± 0.481 | 2.077 ± 0.580 |
| PRF-fit source offset from KIC position | 3.121 ± 0.815 | 3.83 | -2.103 ± 0.507 | 2.306 ± 0.655 |
| photometric centroid source offset | 1.30 ± 0.28 | 4.64 | -0.52 ± 0.17 | 1.20 ± 0.30 |

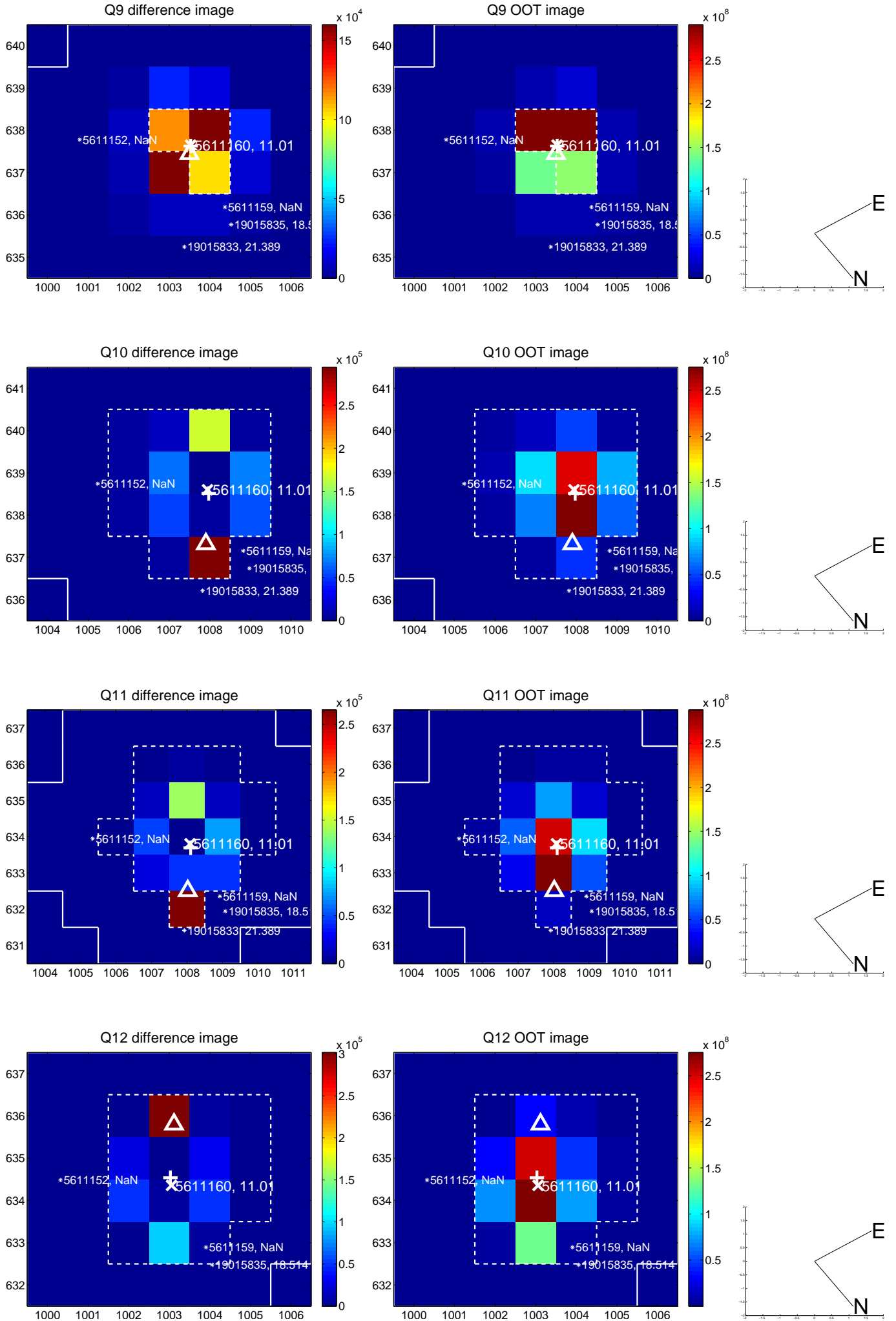


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

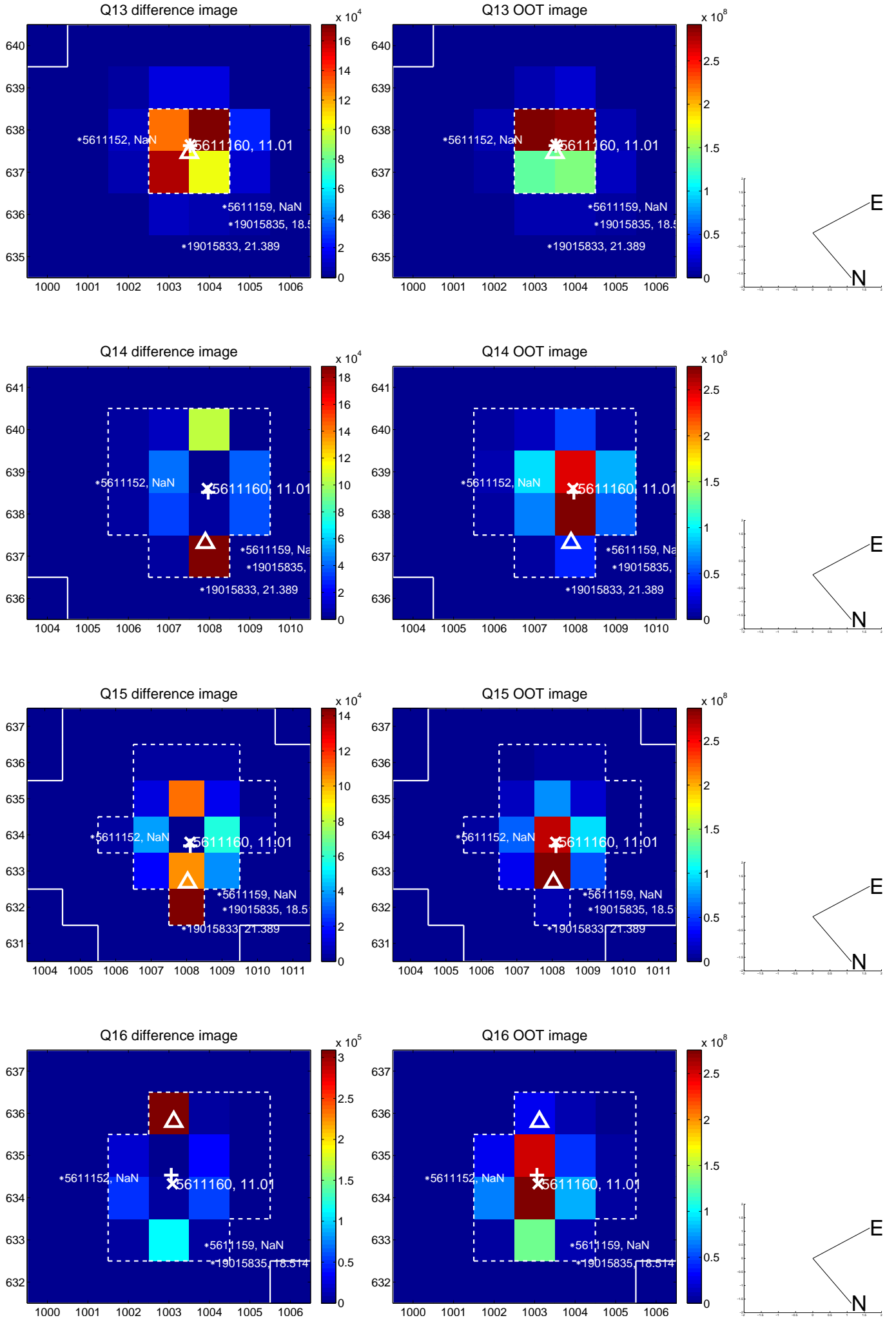
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



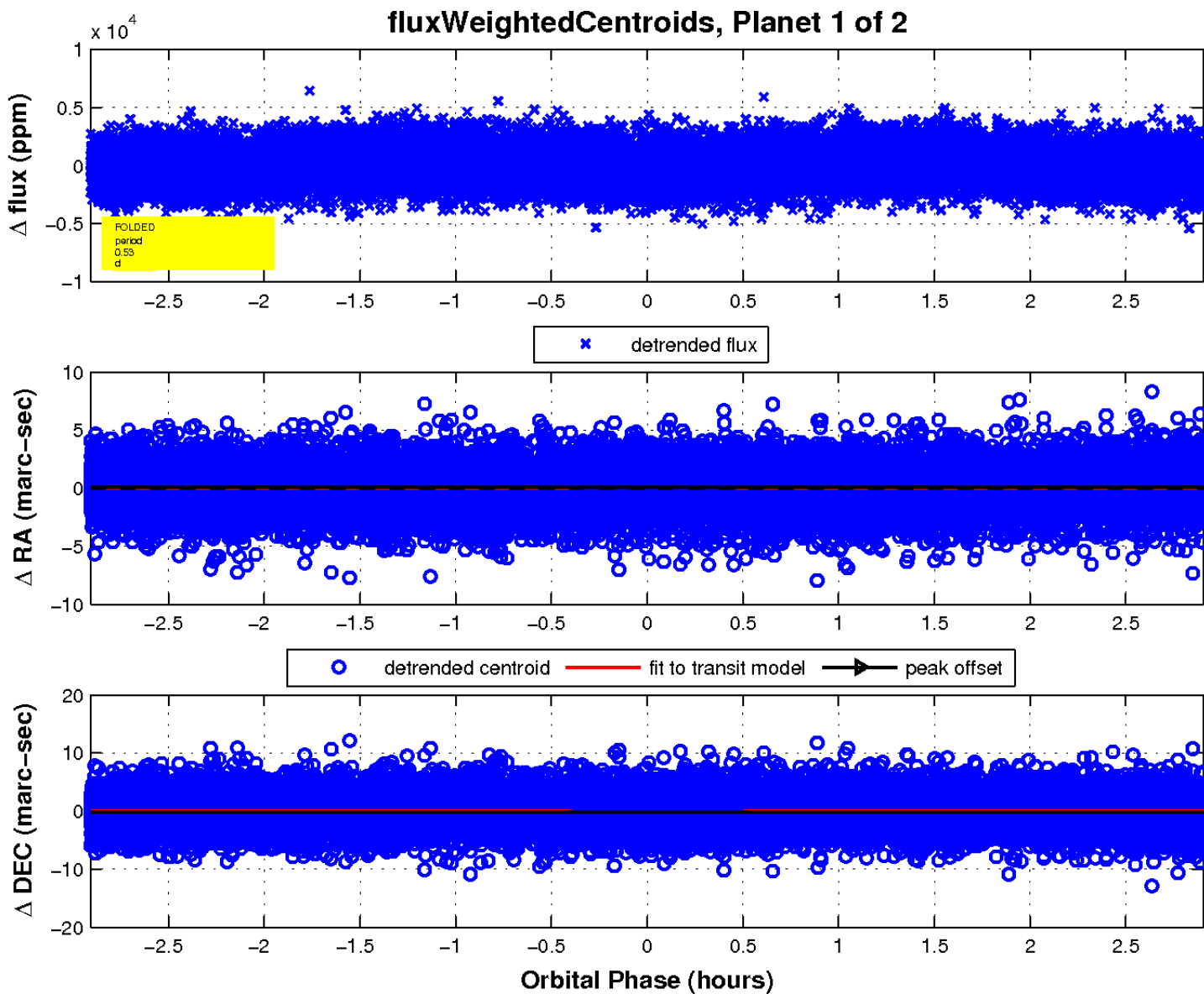
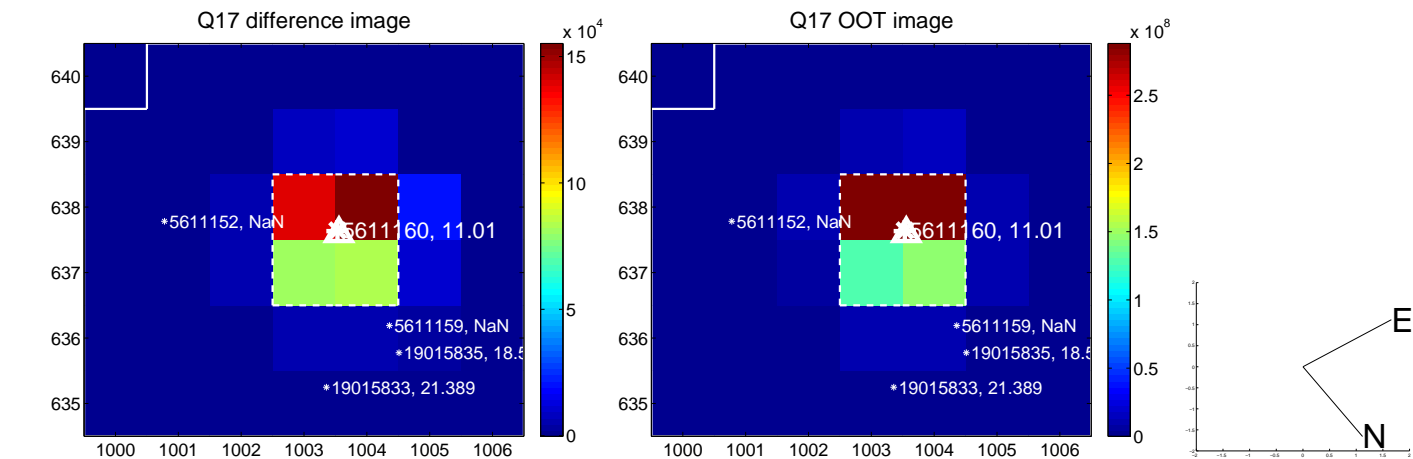
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

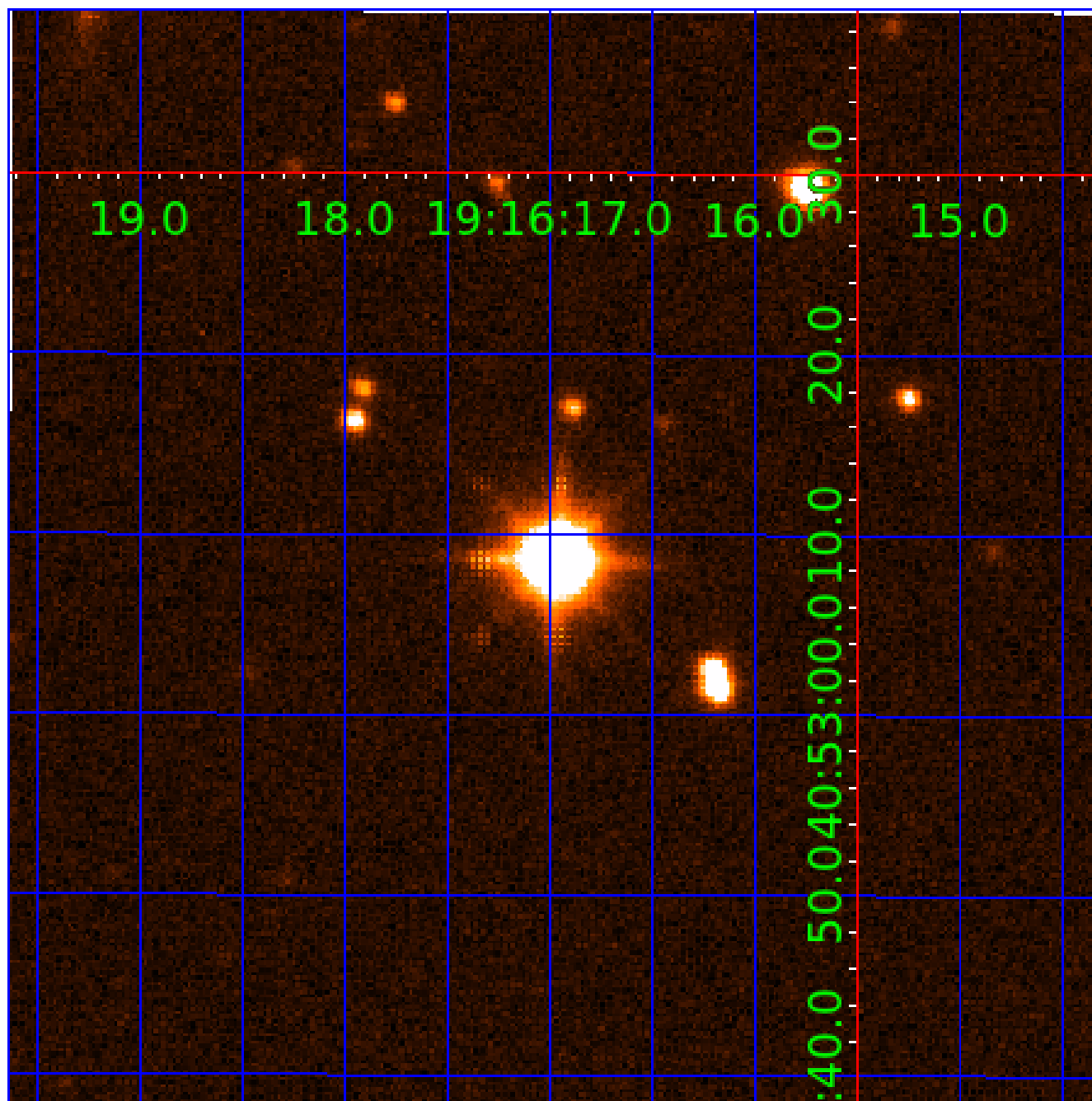


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 005611160

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}) |
|--------------|----------|------|---------------|--------------|-------------|------------------|-----|-----|-----------------------------|-----------------|------------------------|------------------------|
| 005611160-01 | OBS | No | 0.532608 | 131.882763 | 136.4 | 0.969 | 8.9 | 7.7 | 1.81 | 6971 | 2.15 | 33999.83 |
| 005611160-02 | OBS | No | 0.532610 | 131.661754 | 169.9 | 1.230 | 8.6 | 9.8 | 1.81 | 6971 | 2.46 | 33999.63 |

Robovetter Results

| TCE | Run Type | Disp | Score | N | S | C | E | Comments |
|--------------|----------|------|-------|---|---|---|---|--|
| 005611160-01 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED |
| 005611160-02 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_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.

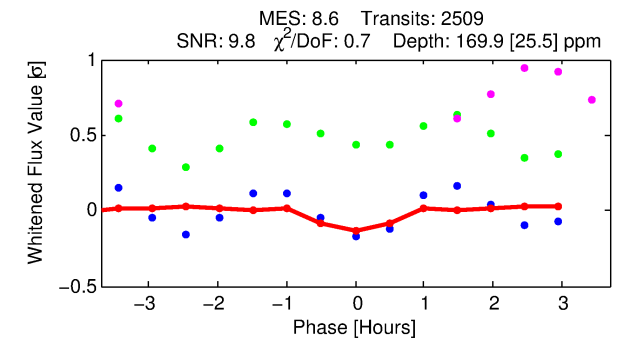
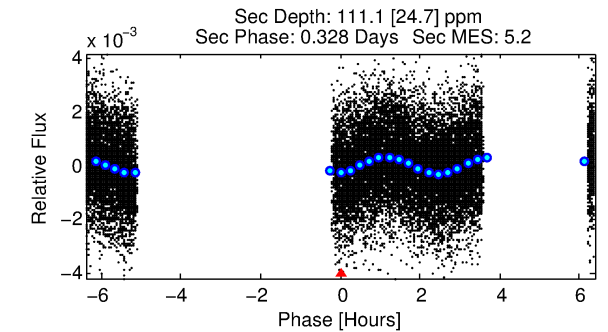
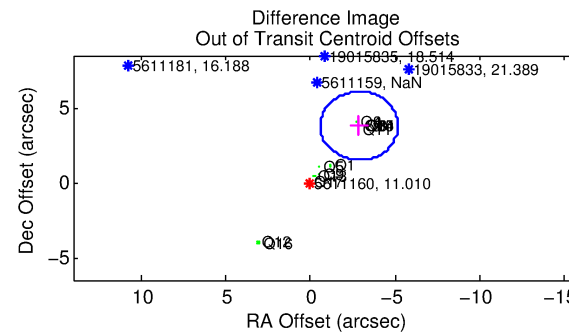
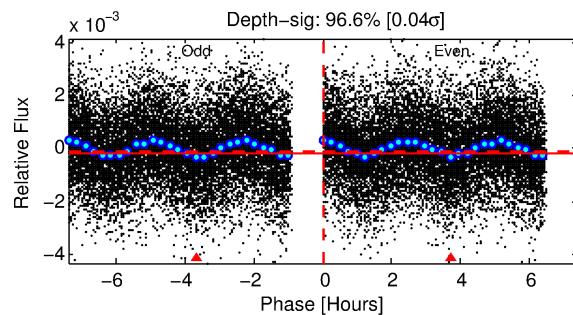
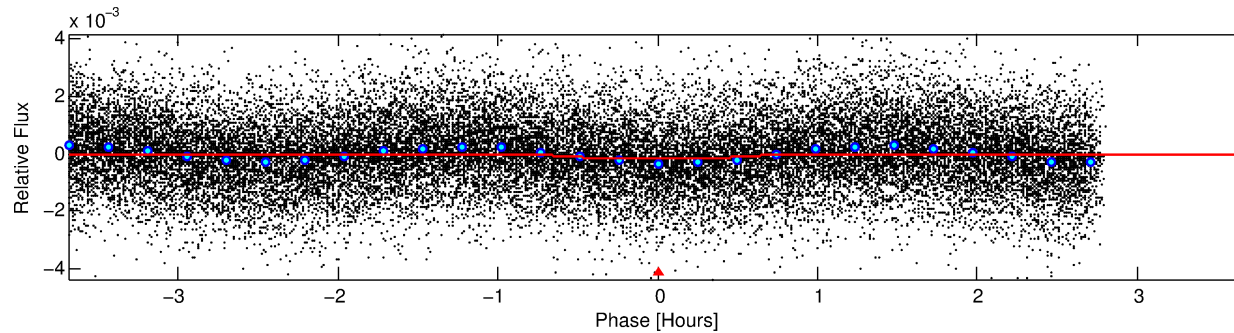
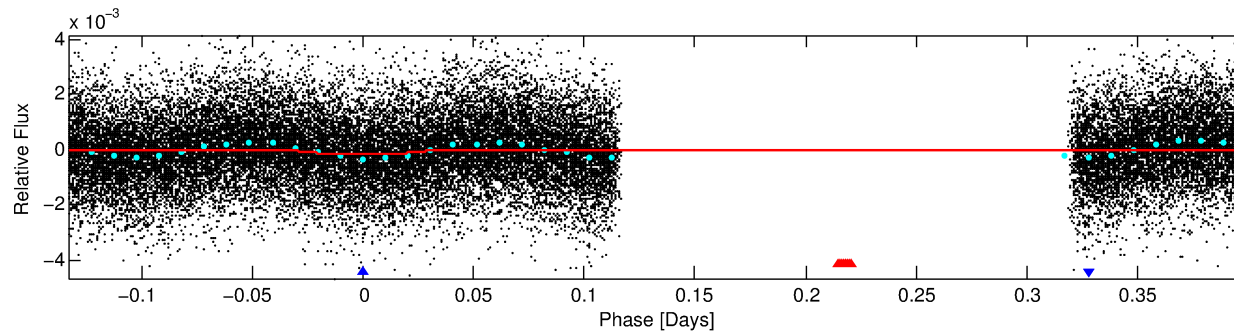
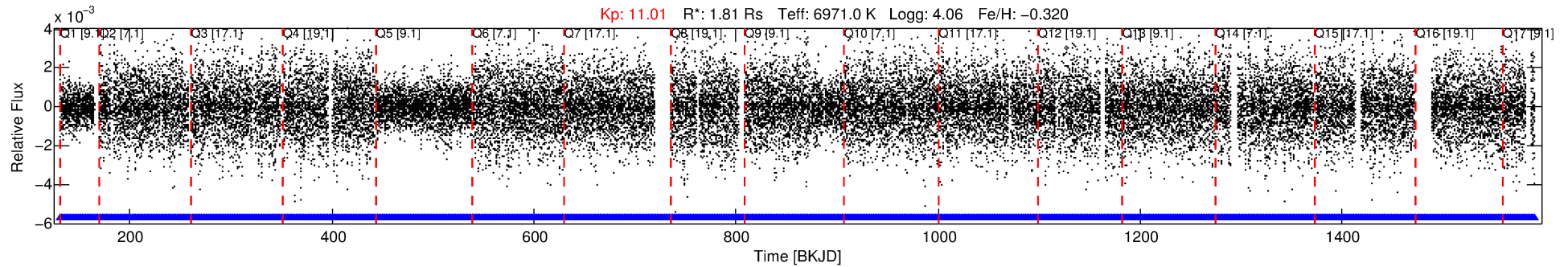
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 005611160-02

No Significant Match Found

DV One-Page Summary

KIC: 5611160 Candidate: 2 of 2 Period: 0.533 d



DV Fit Results:

Period = 0.53261 [0.00001] d
Epoch = 131.6618 [0.0015] BKJD
Rp/R* = 0.0124 [0.0052]
a/R* = 3.01 [6.43]
b = 0.50 [3.67]
Seff = 33999.63 [15044.77]
Teq = 3463 [383] K
Rp = 2.46 [1.29] Re
a = 0.0143 [0.0040] AU
Ag = 2.07 [2.00] [0.53 σ]
Teffp = 6418 [1410] K [2.02 σ]

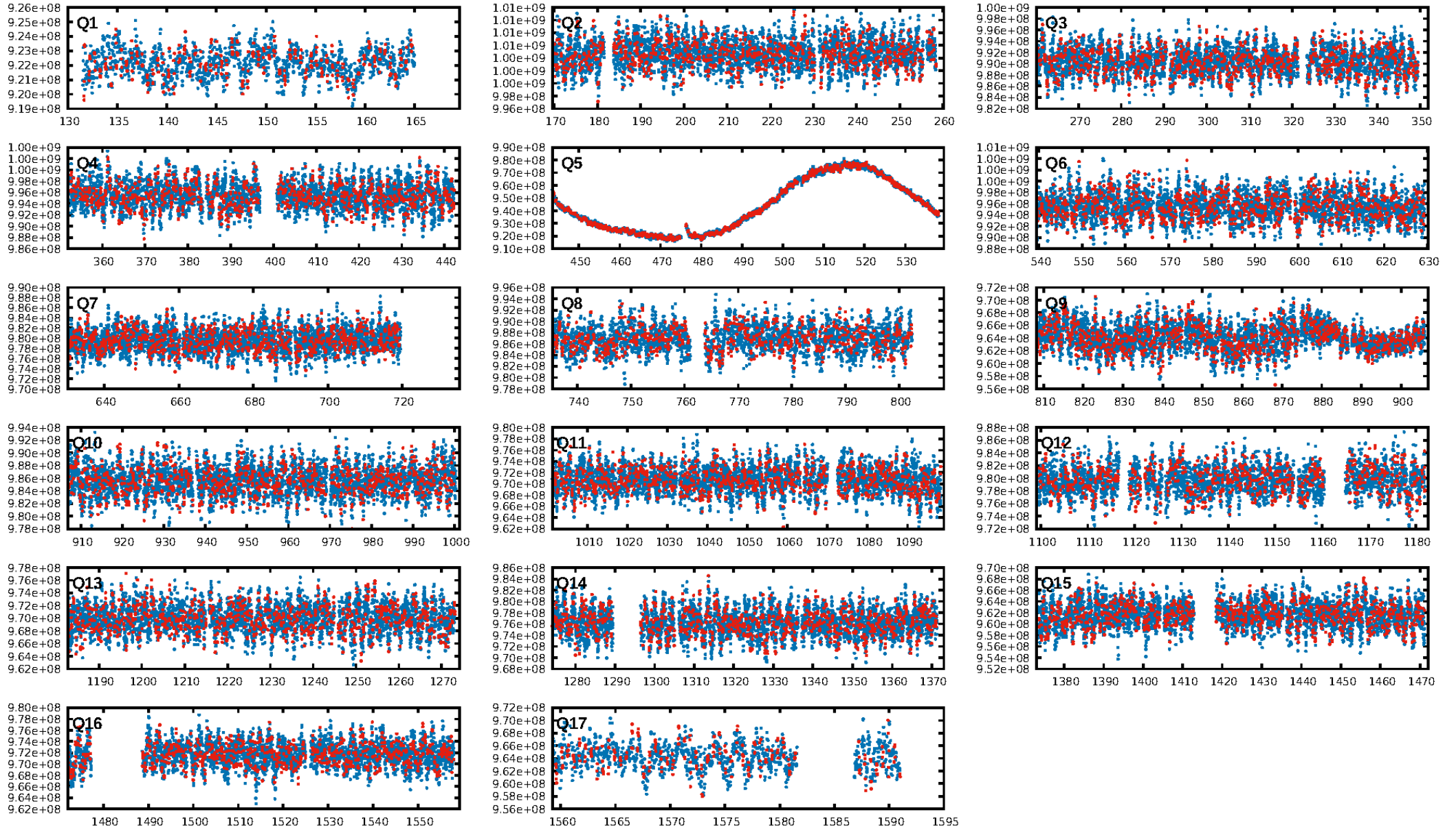
DV Diagnostic Results:

ShortPeriod-sig: 0.0% [0.00 σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 2.78e-21
RollingBand-fgt: 1.00 [2396/2396]
GhostDiagnostic-chr: 0.6855
Centroid-sig: 0.0%
Centroid-so: 0.782 arcsec [3.69 σ]
OotOffset-rm: 4.756 arcsec [6.23 σ]
KicOffset-rm: 4.223 arcsec [5.01 σ]
OotOffset-st: 4/4/4/5 [17]
KicOffset-st: 4/4/4/5 [17]
DiffImageQuality-fgm: 0.94 [16/17]
DiffImageOverlap-fno: 0.00 [0/17]

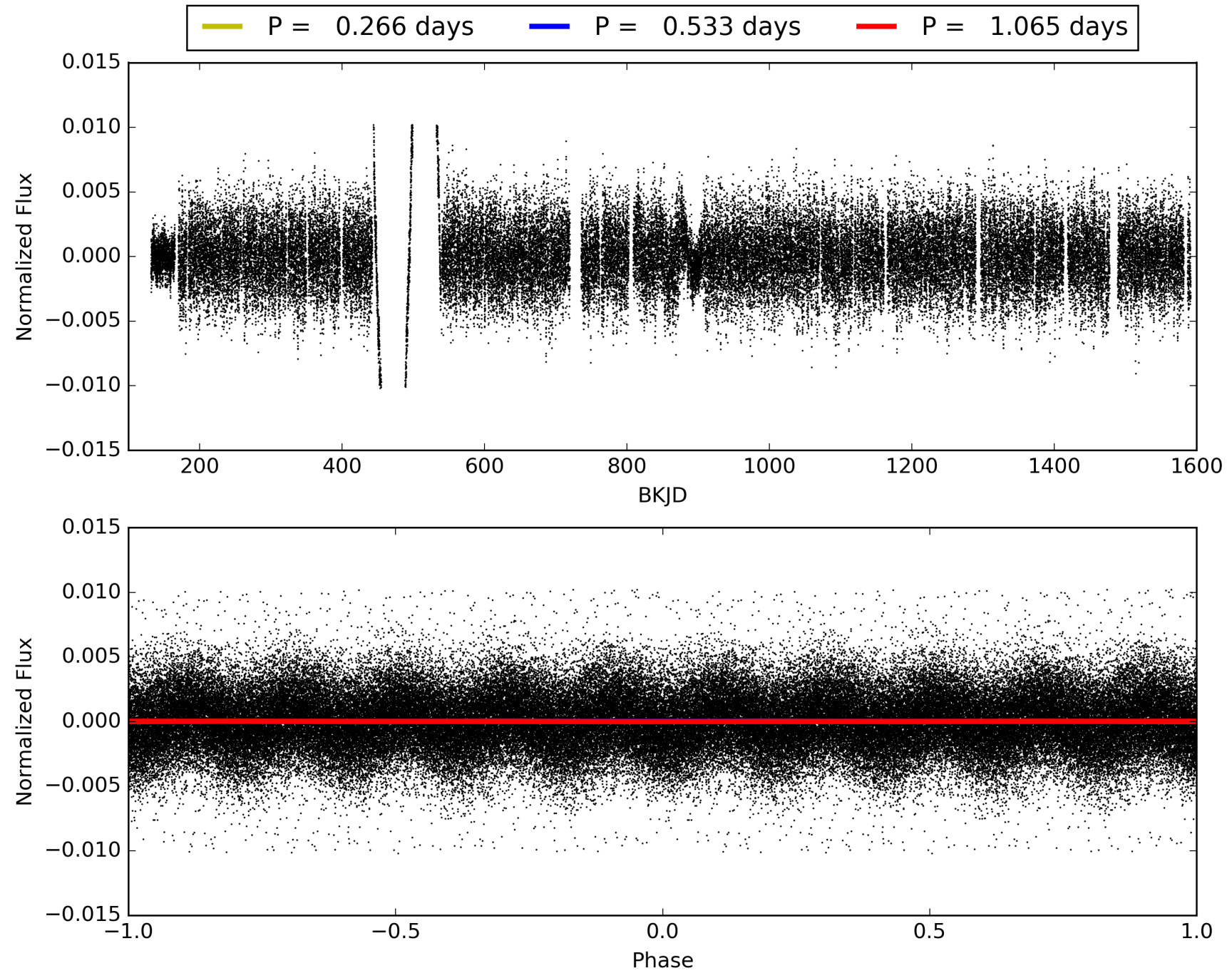
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 11:42:20 Z

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

TCE 005611160-02, PDC Light Curves

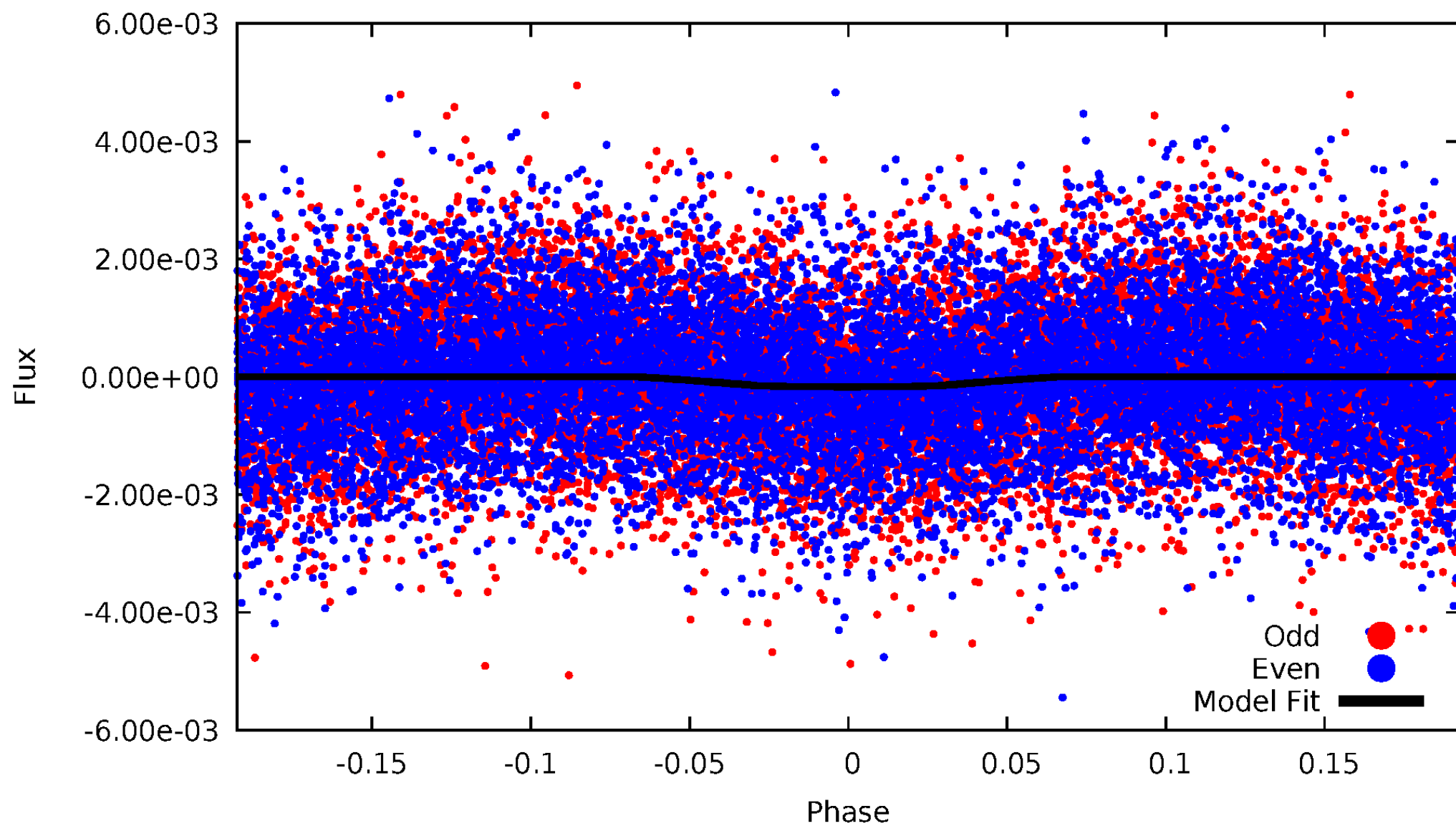


TCE 005611160-02



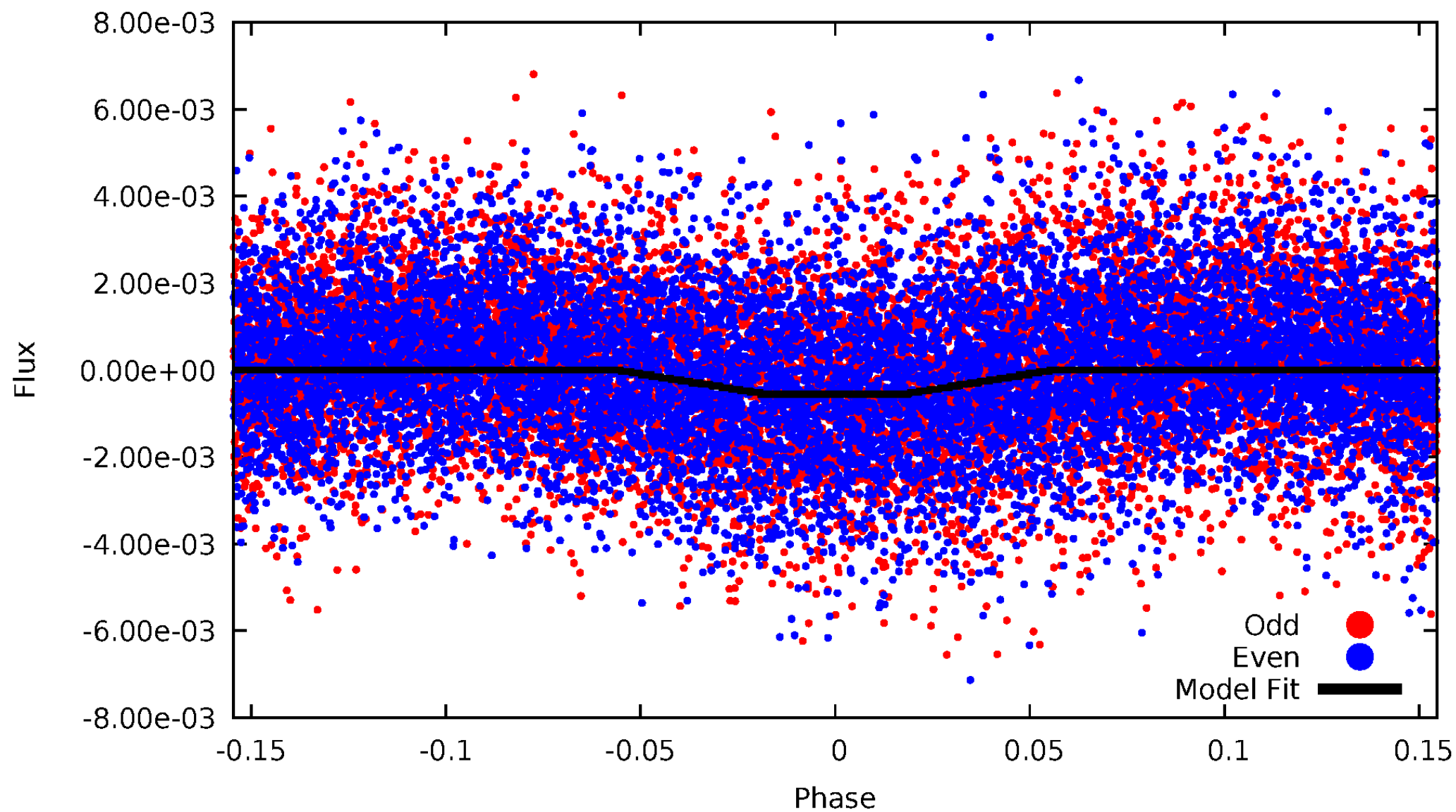
DV Odd/Even

TCE 005611160-02



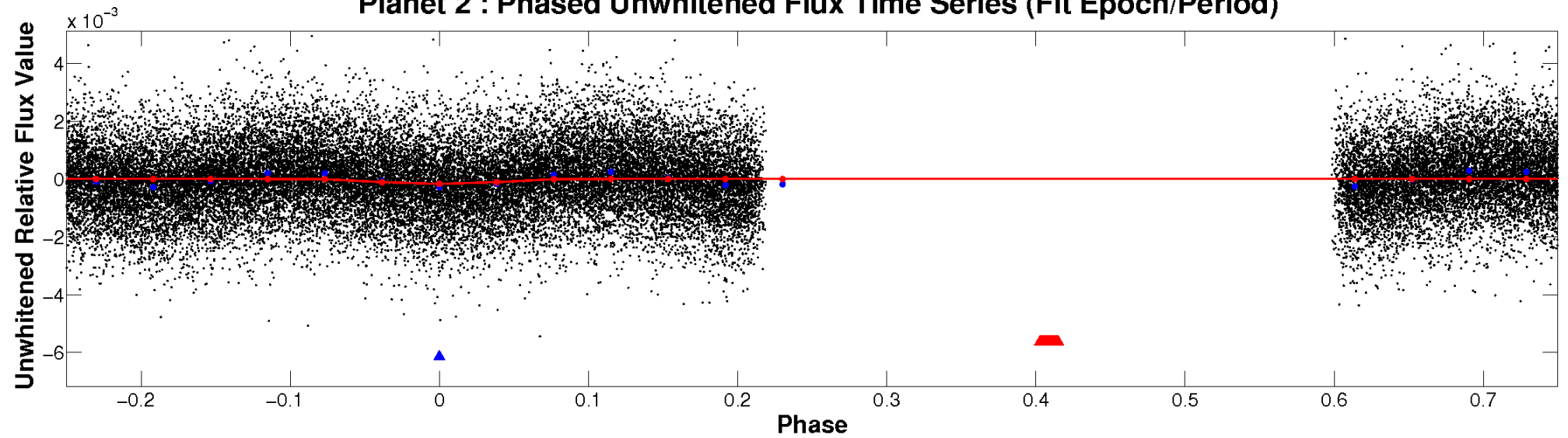
ALT Odd/Even

TCE 005611160-02

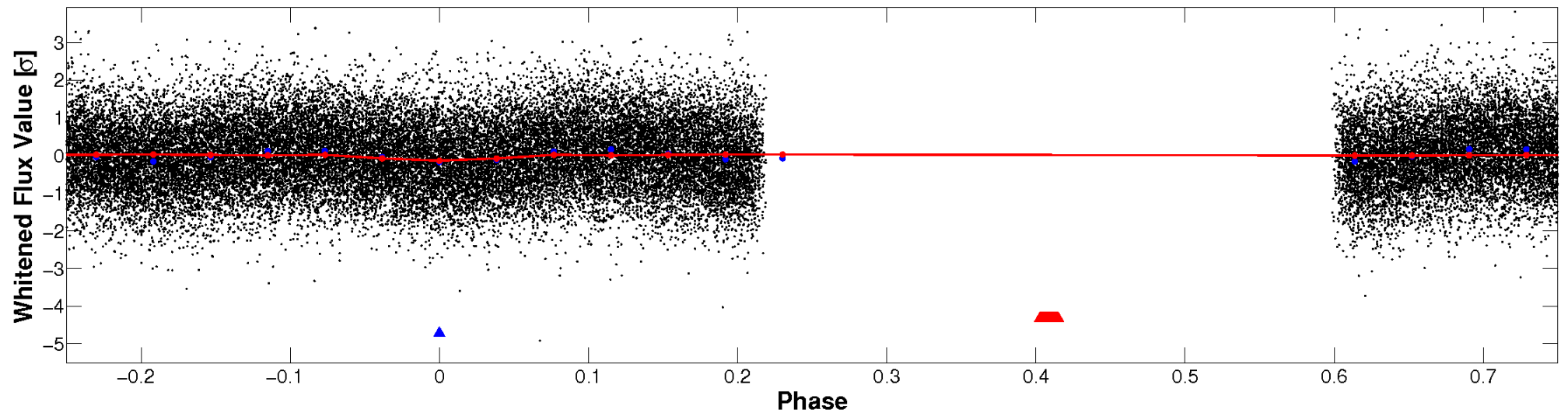


Non-Whitened Vs. Whitened Light Curve

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

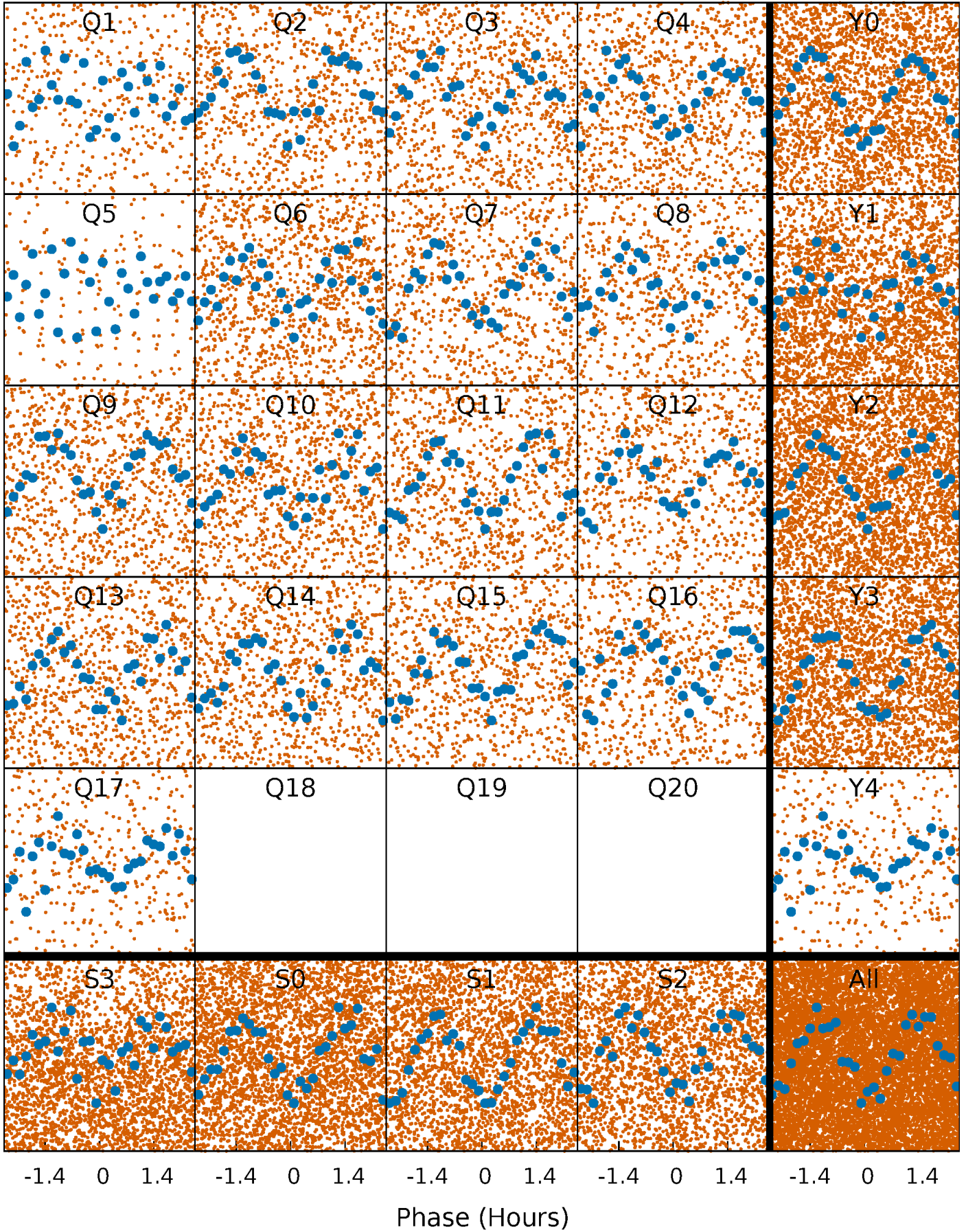


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



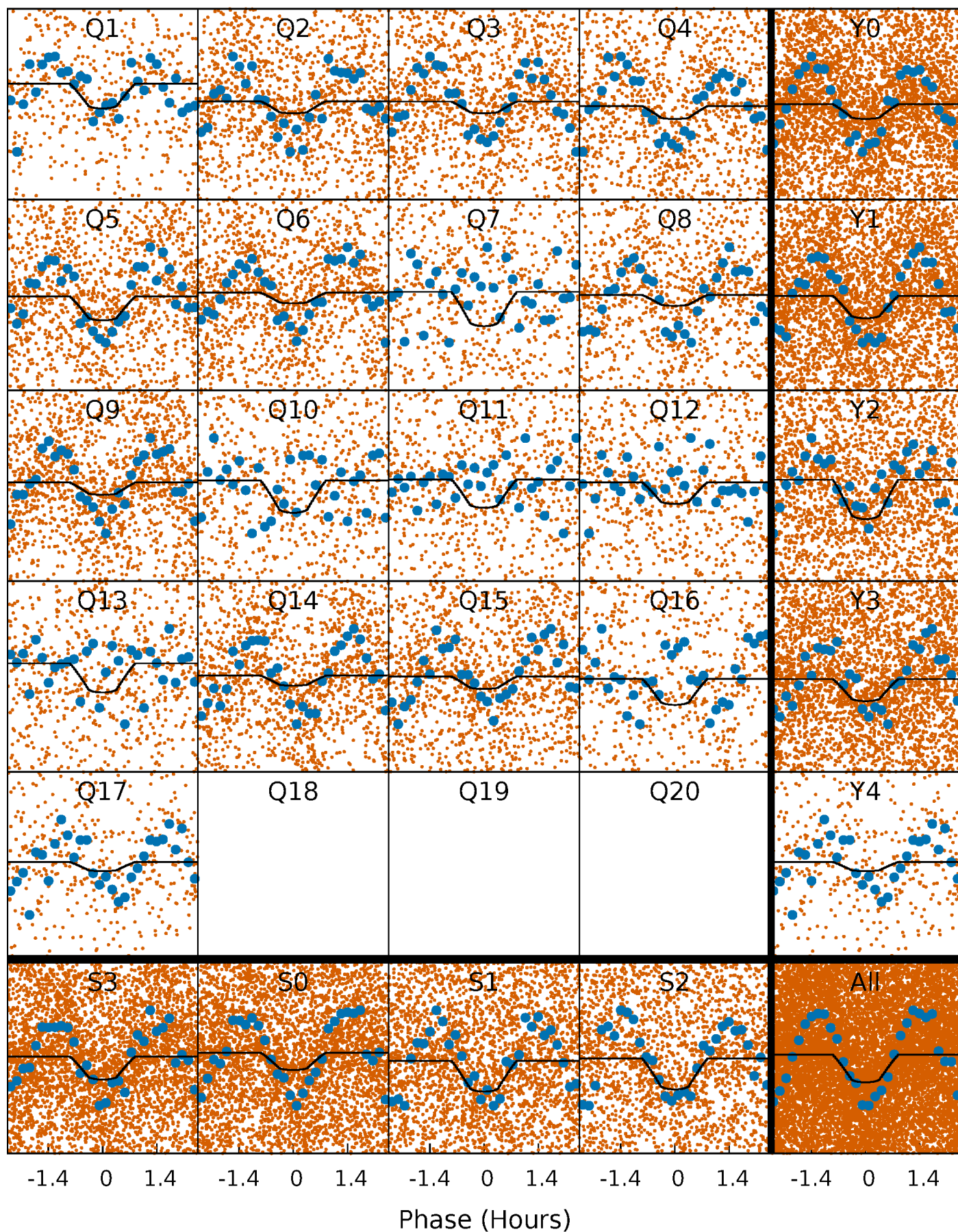
PDC Quarter-Phased Transit Curves

TCE 005611160-02 P= 0.532610 Days $T_0=131.661754$ (BKJD)



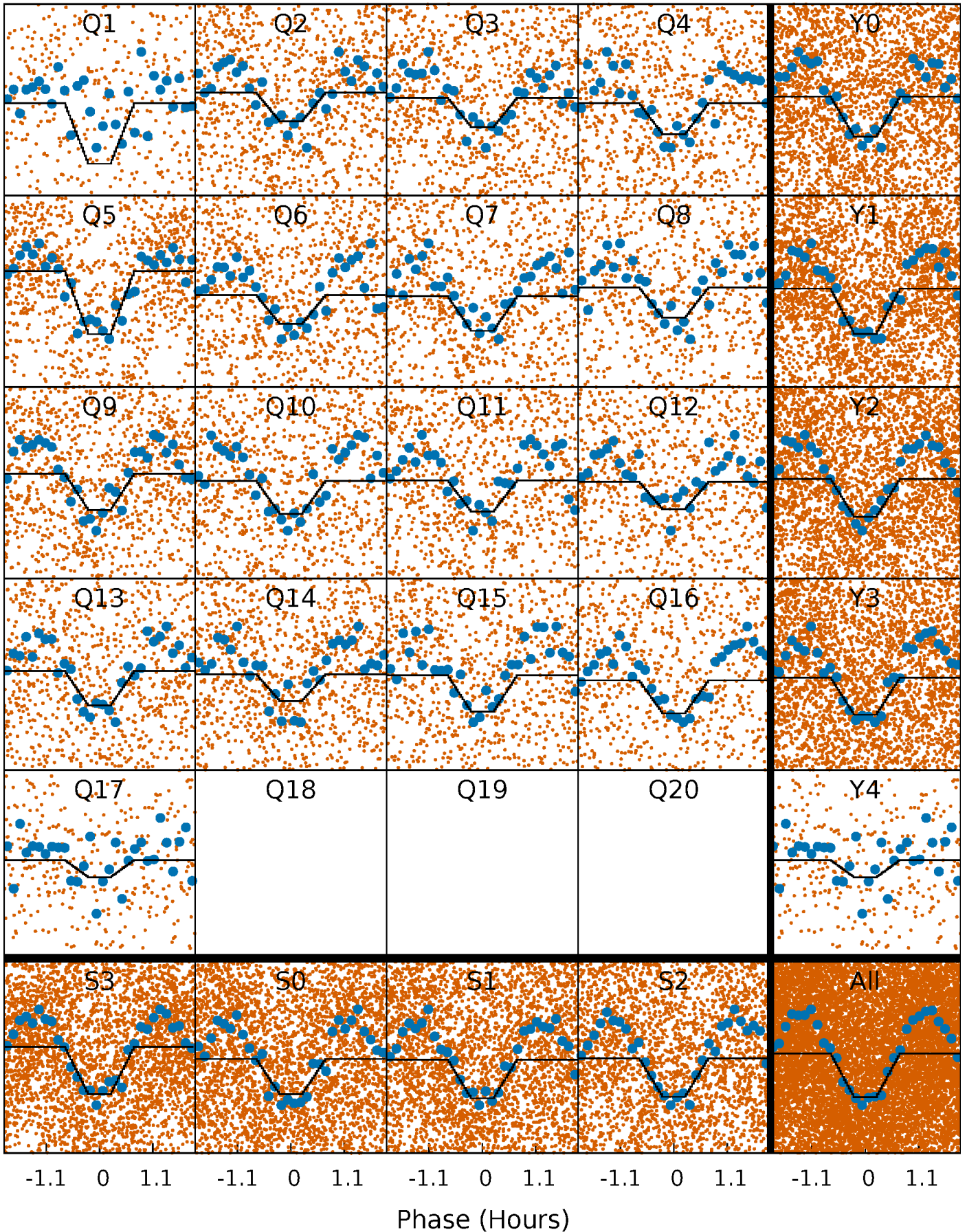
DV Quarter-Phased Transit Curves

TCE 005611160-02 P= 0.532610 Days $T_0=131.661754$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

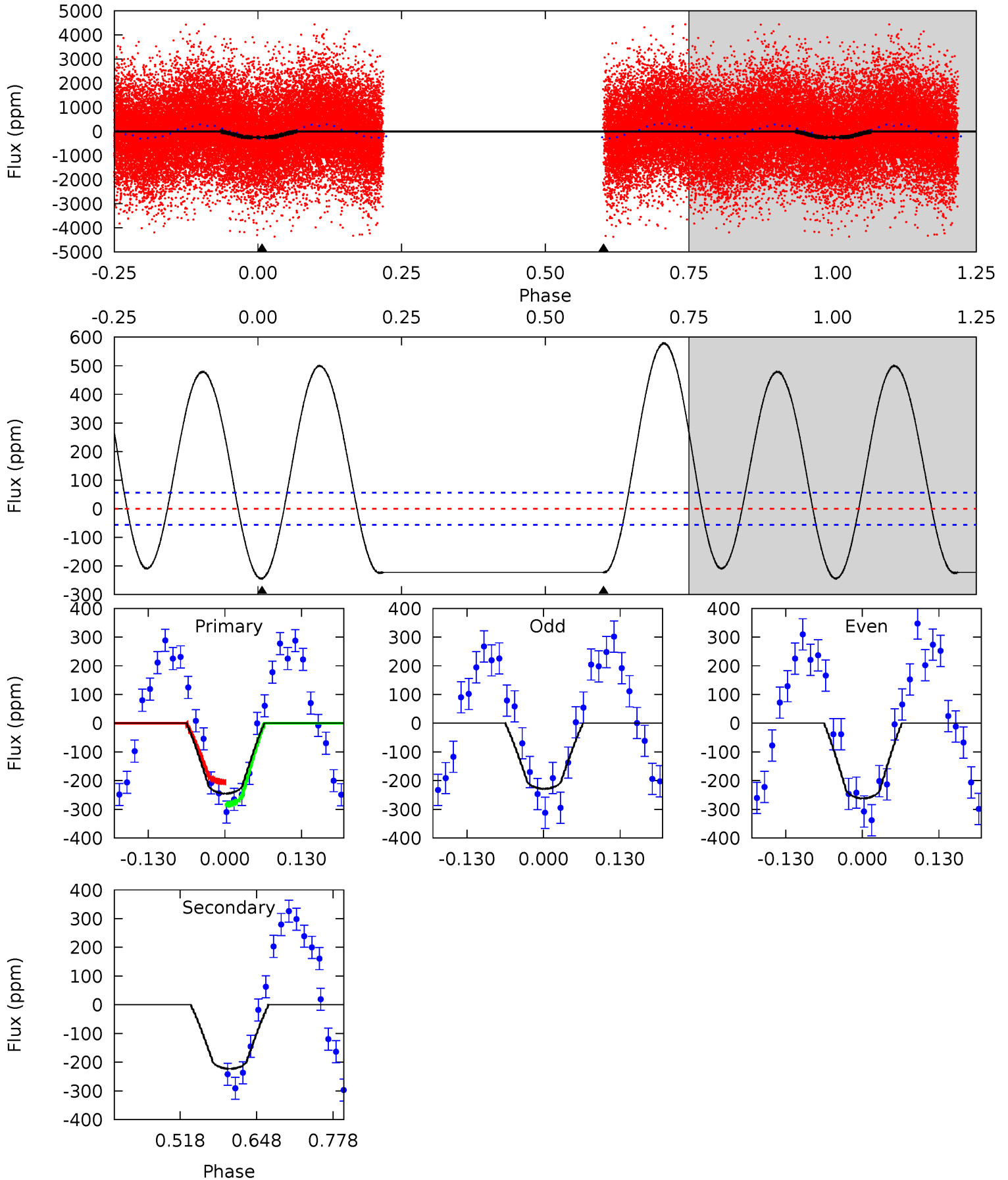
TCE 005611160-02 P= 0.532617 Days $T_0=131.658633$ (BKJD)



DV Model-Shift Uniqueness Test

005611160-02, P = 0.532610 Days, E = 131.129144 Days

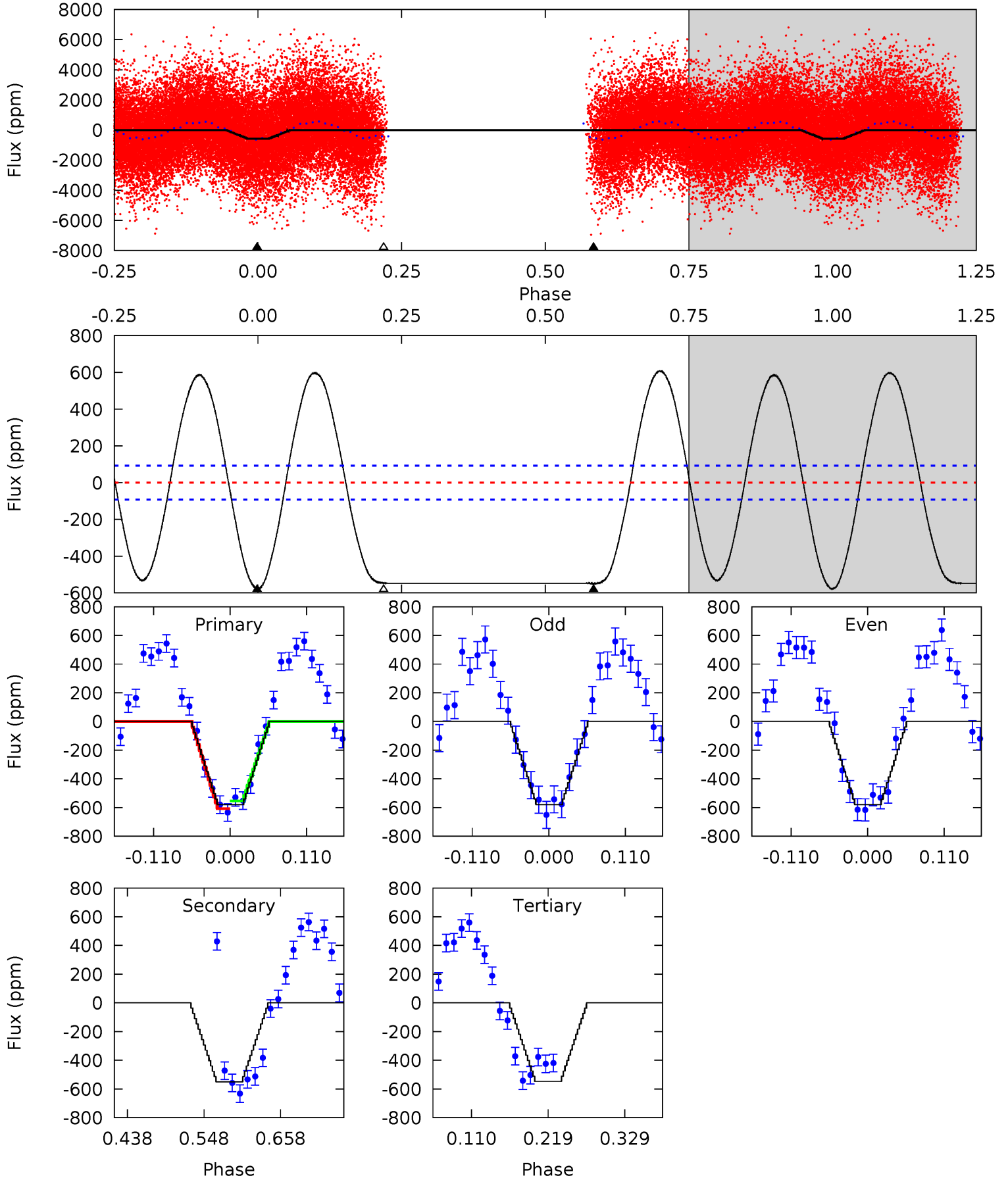
| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|-----|-----|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 19.6 | 17.9 | 0 | 0 | 4.51 | 1.52 | 16.1 | 19.6 | 19.6 | 17.9 | 17.9 | 1.34 | 1.05 | 0.70 | 3.17 |



Alt Model-Shift Uniqueness Test

005611160-02, P = 0.532617 Days, E = 131.126016 Days

| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|-----|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 28.6 | 27.1 | 27.0 | 0 | 4.55 | 1.60 | 19.3 | 1.55 | 28.6 | 0.11 | 27.1 | 0.01 | 1.02 | 0.51 | 1.26 |



Stellar Parameters For KIC 005611160

| | $T_{\text{eff}}(K)$ | $\log(g)$ | [Fe/H] | R (R_{\odot}) | M (M_{\odot}) | p_{\star} ($\text{g}\cdot\text{cm}^{-3}$) |
|--------|----------------------|---------------------------|----------------------------|---------------------------|---------------------------|---|
| | 6971^{+164}_{-226} | $4.059^{+0.240}_{-0.160}$ | $-0.320^{+0.300}_{-0.300}$ | $1.811^{+0.513}_{-0.565}$ | $1.372^{+0.202}_{-0.247}$ | $0.325^{+0.483}_{-0.148}$ |
| | +2%/-3% | +6%/-4% | +94%/-94% | +28%/-31% | +15%/-18% | +149%/-45% |
| 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 005611160-02 / KOI

| Detrend | Depth (ppm) | R_p (R_{\oplus}) | T_{max} (K) | T_{obs} (K) | A_{obs} |
|---------|---------------|------------------------|----------------------|------------------------|---------------------------|
| DV | -223 ± 12 | $2.43^{+1.12}_{-0.98}$ | 4774^{+368}_{-367} | 7436^{+3153}_{-1366} | $4.268^{+7.606}_{-2.305}$ |
| Alt. | -550 ± 20 | $4.57^{+1.27}_{-1.18}$ | 4795^{+344}_{-375} | 6758^{+1187}_{-790} | $3.070^{+2.259}_{-1.210}$ |

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

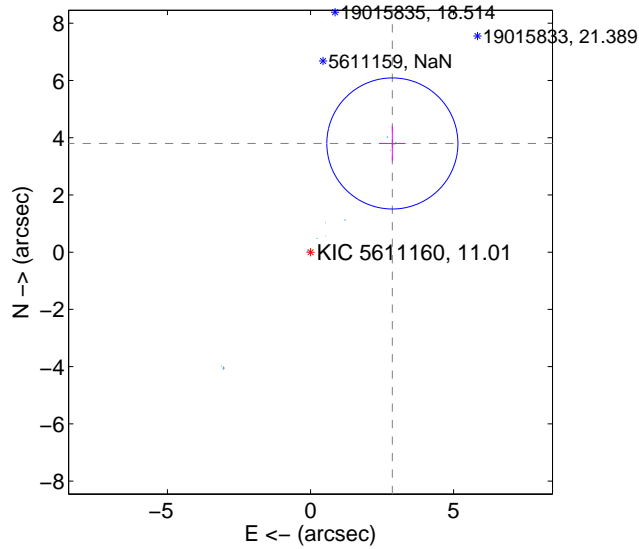
Supplemental centroid analysis for 005611160-02. **Kepler magnitude: 11.01.** Transit SNR 9.78

There are 16 quarters with good PRF difference image offsets

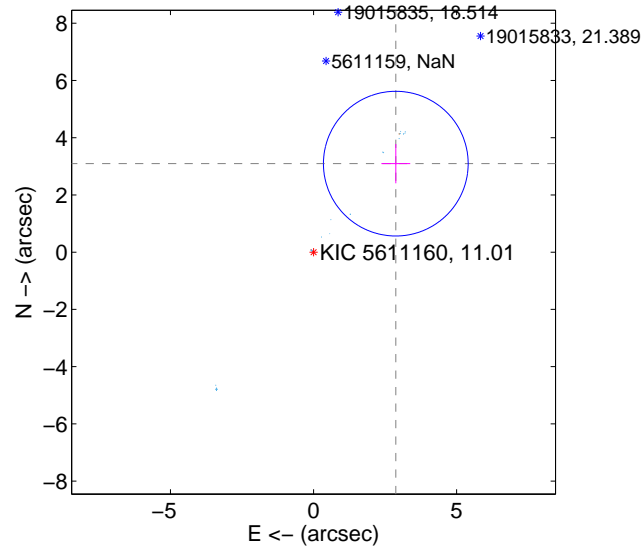
The direct PRF centroid is offset from the target star catalog position by about 0.04 arcsec

| | Distance in arcsec | Distance / σ | Δ RA | Δ Dec |
|---|-------------------------------------|---------------------|--------------------|-------------------|
| PRF-fit source offset from OOT | 4.756 \pm 0.763 | 6.23 | -2.861 \pm 0.467 | 3.799 \pm 0.609 |
| PRF-fit source offset from KIC position | 4.223 \pm 0.843 | 5.01 | -2.875 \pm 0.506 | 3.094 \pm 0.685 |
| photometric centroid source offset | 0.78 \pm 0.21 | 3.69 | -0.29 \pm 0.12 | 0.73 \pm 0.22 |

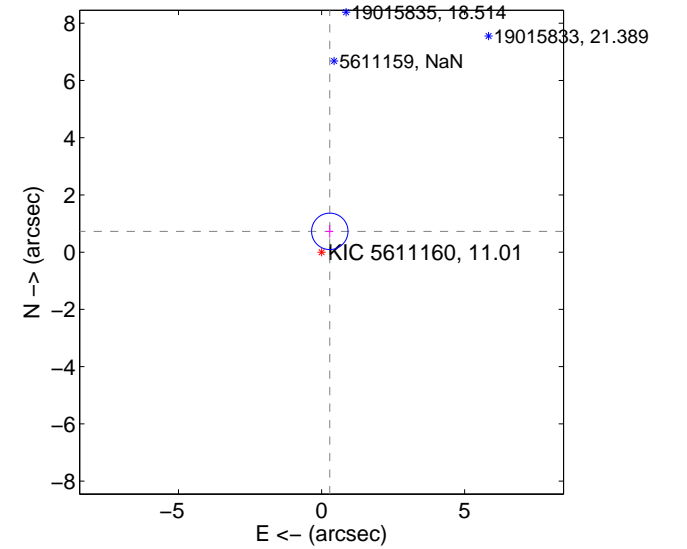
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

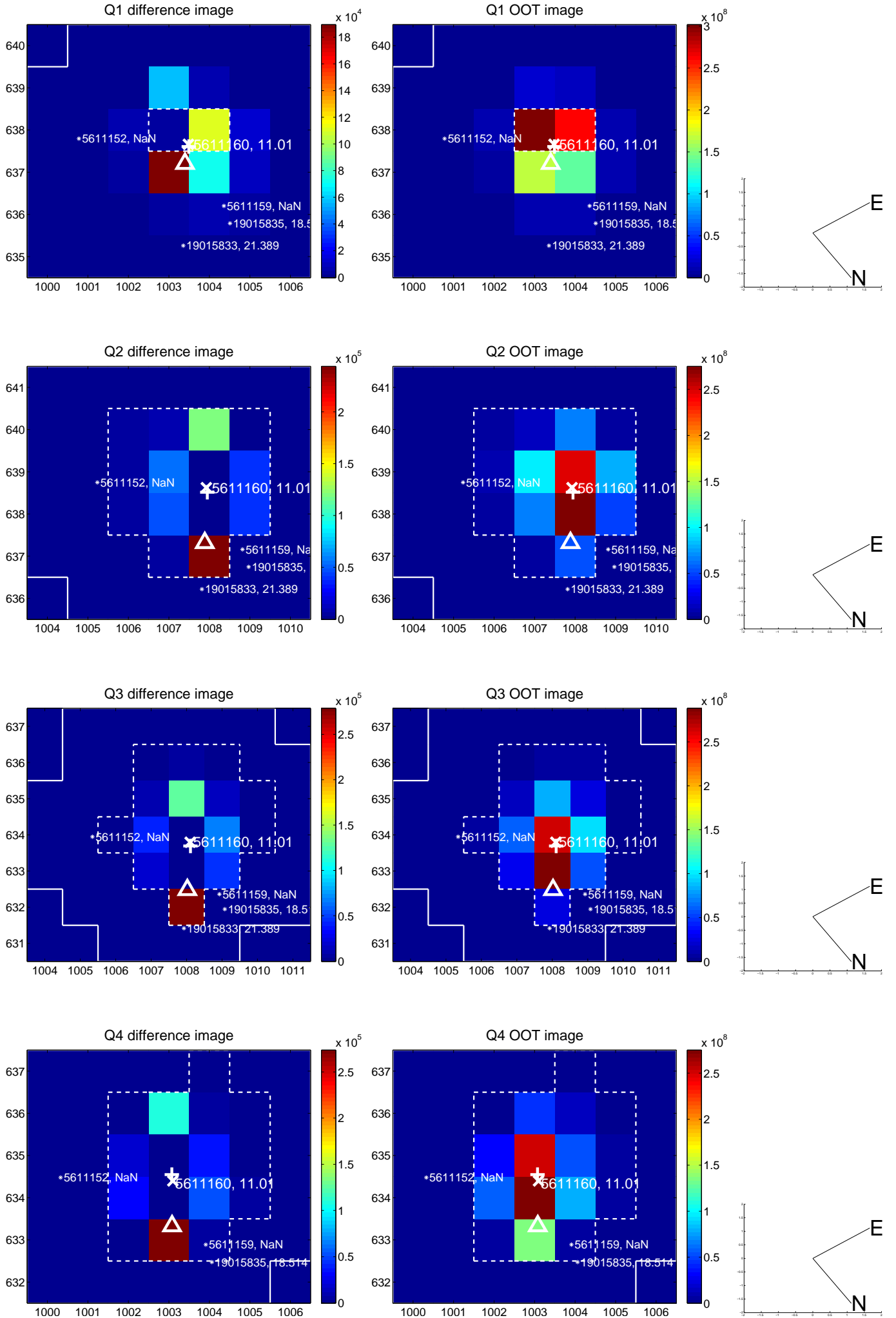


offset from photometric centroids

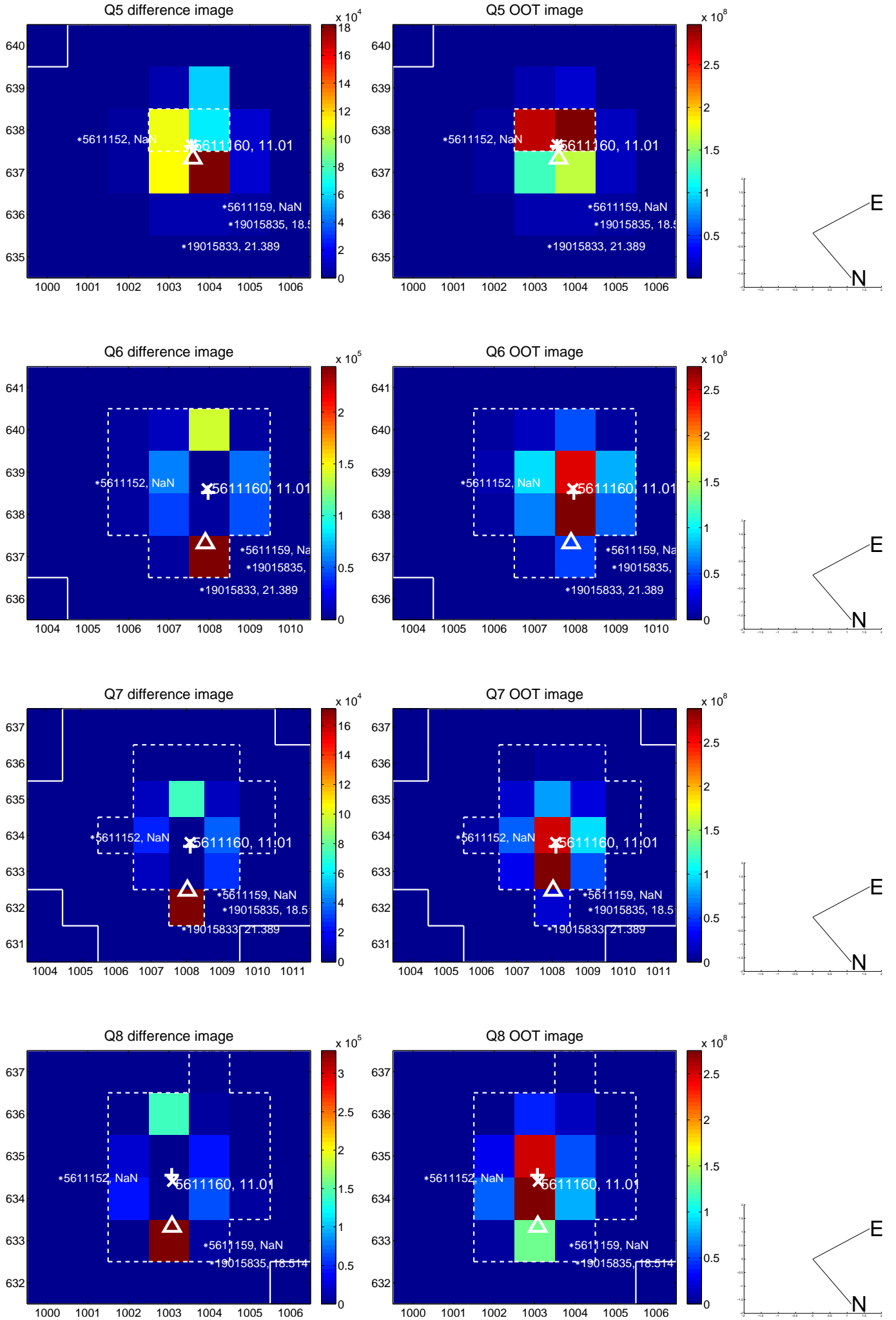


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

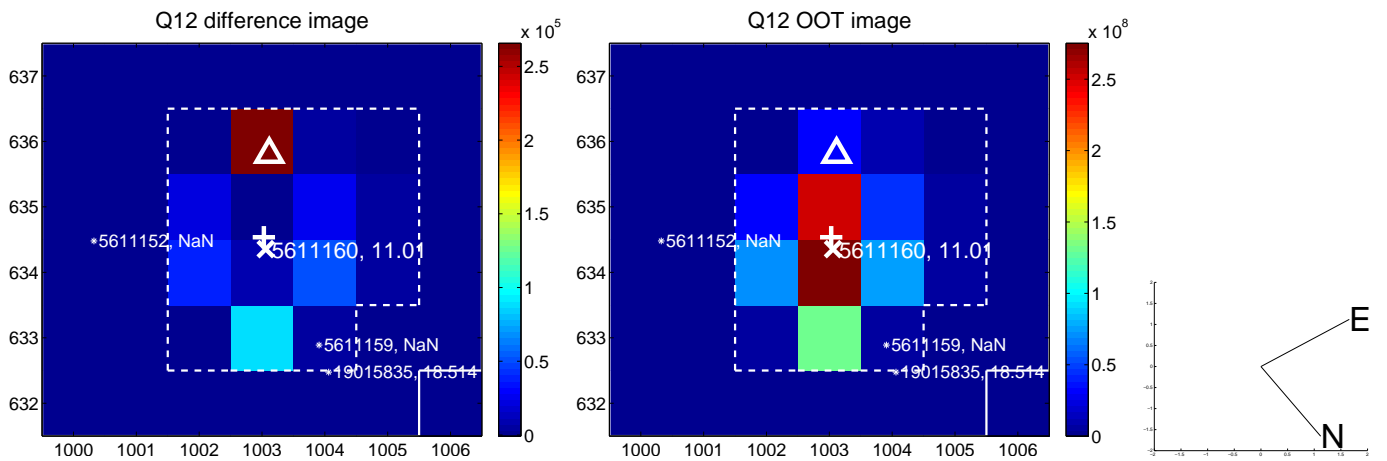
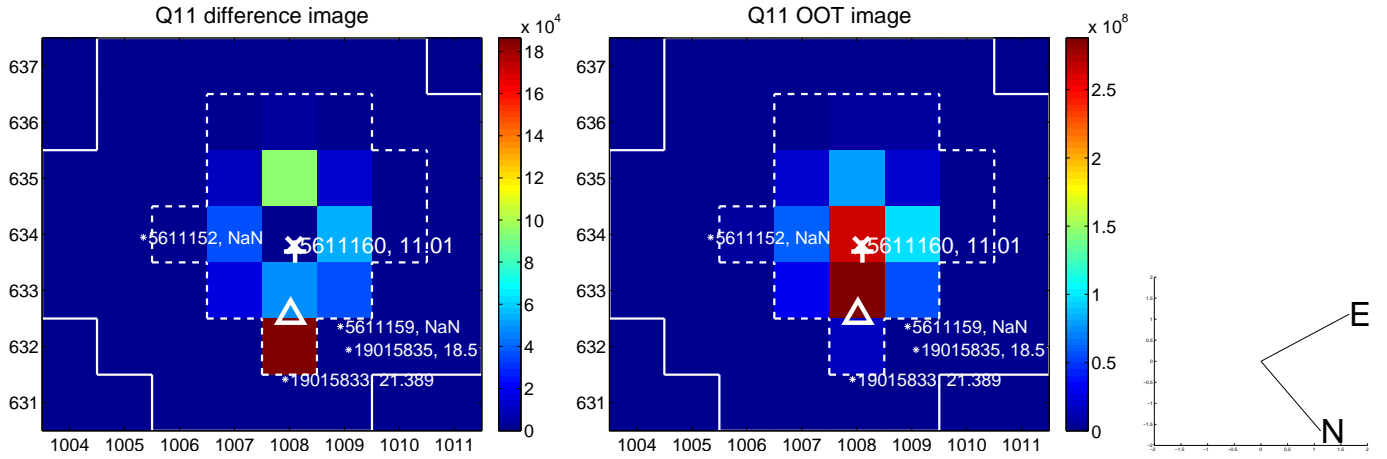
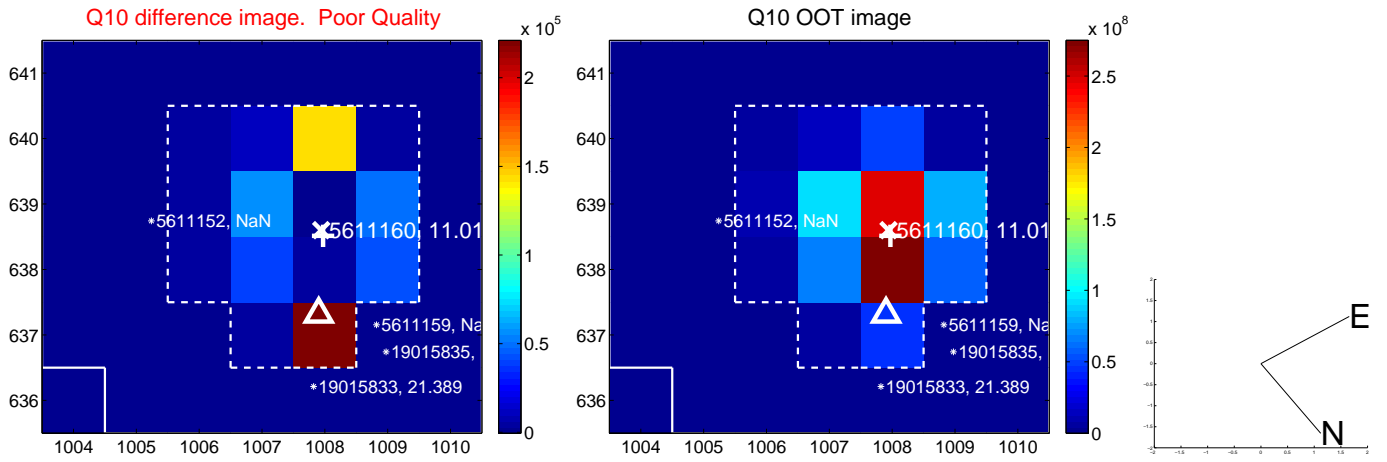
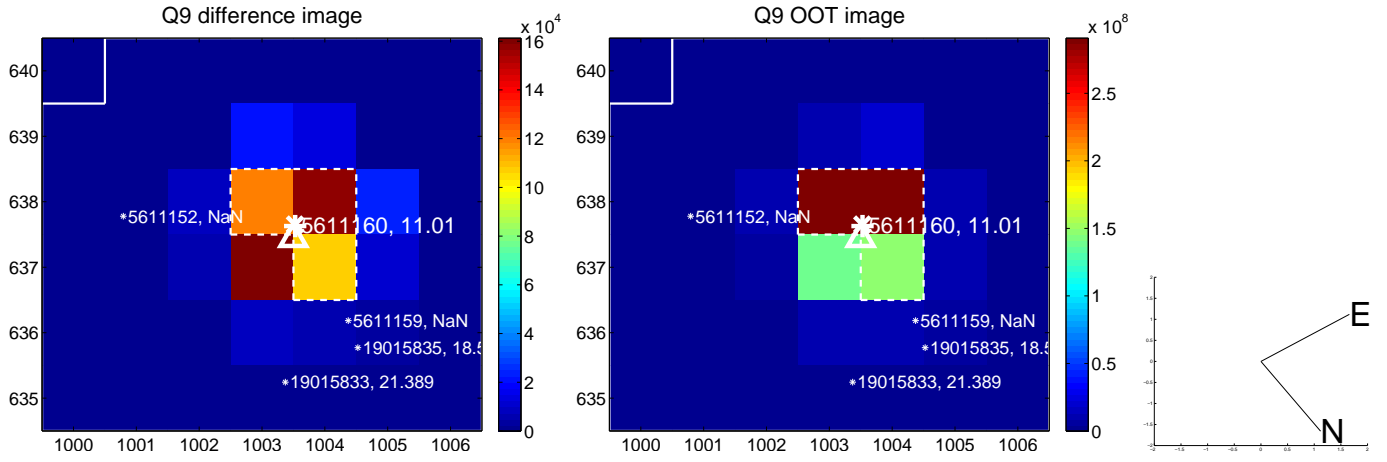
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



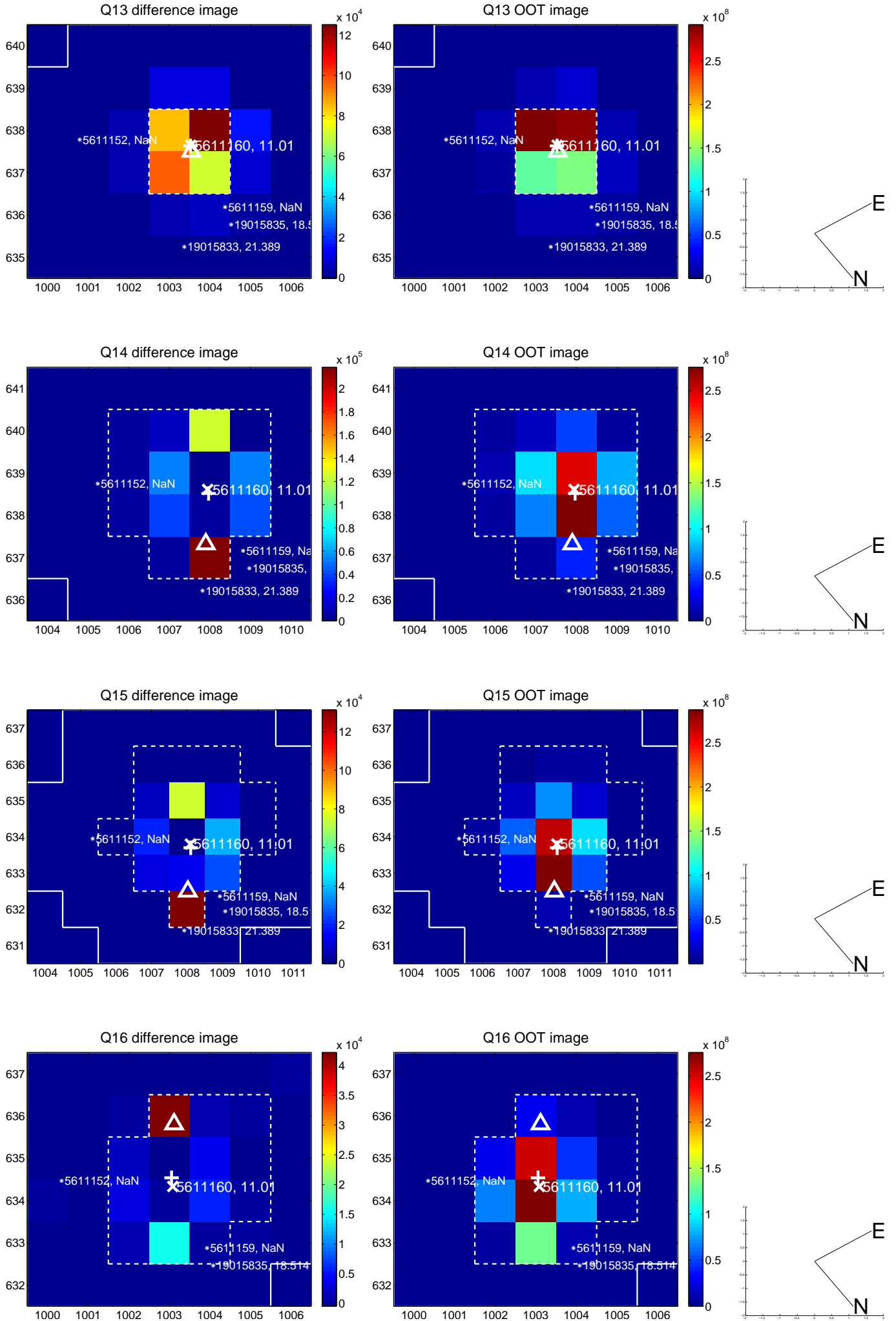
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



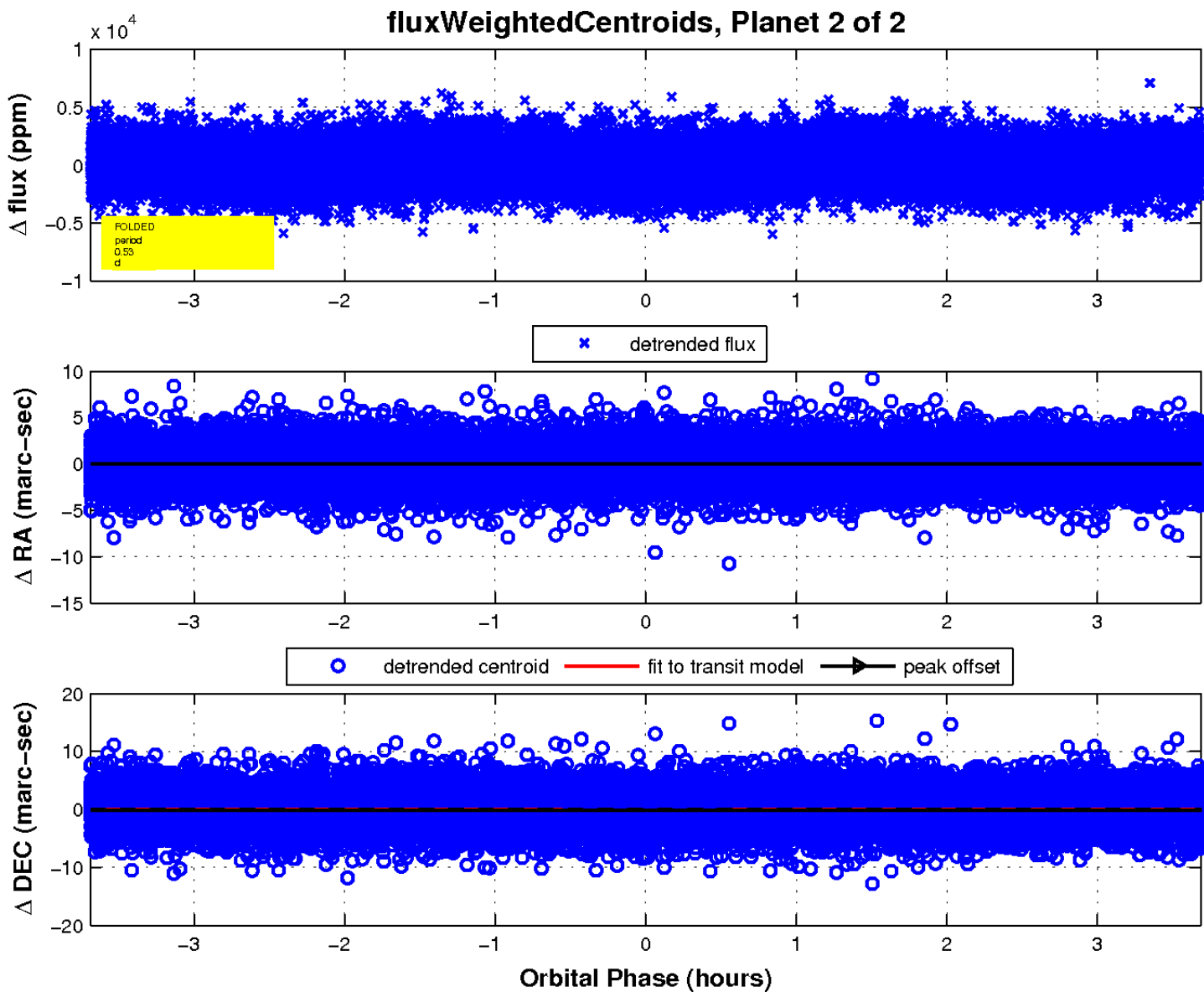
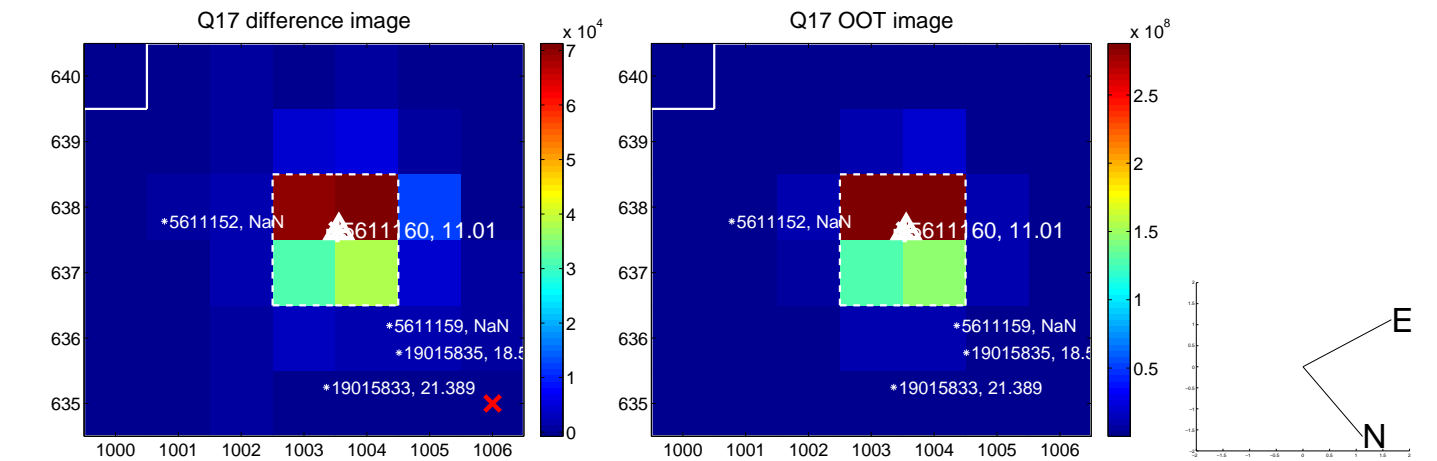
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

