

KIC 008344004

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})
008344004-01	OBS	0573.01	5.996516	136.528830	690.2	3.499	58.0	64.8	1.09	5622	3.34	261.38
008344004-02	OBS	0573.02	2.061901	133.201322	208.8	1.976	23.6	26.5	1.09	5622	1.72	1085.06

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008344004-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
008344004-02	OBS	PC	1.00	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.

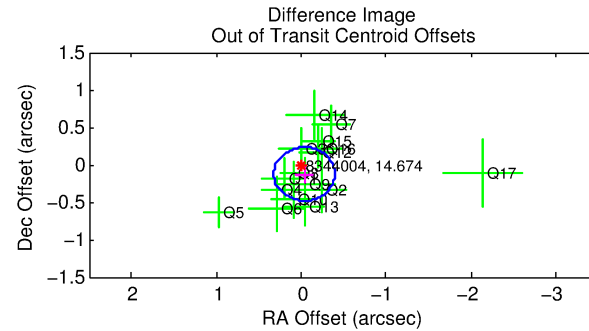
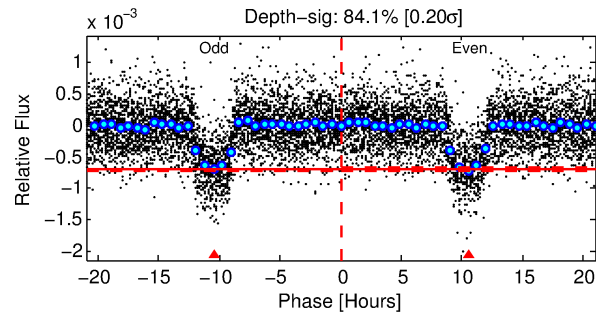
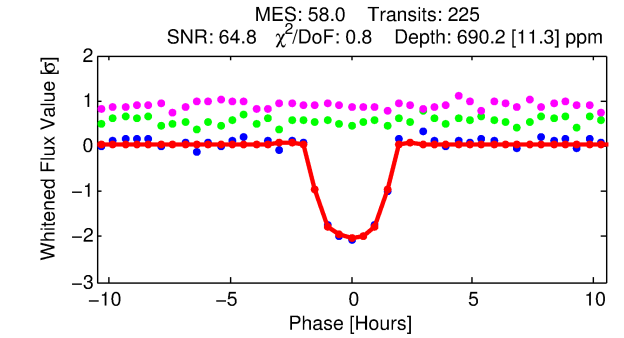
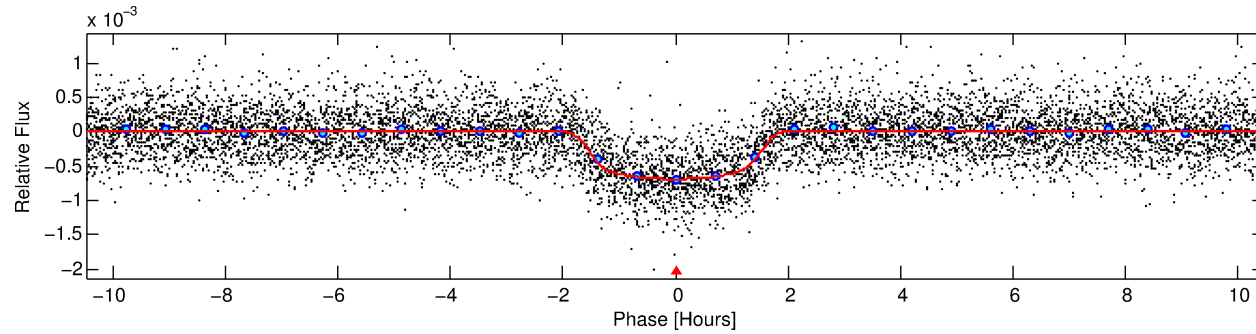
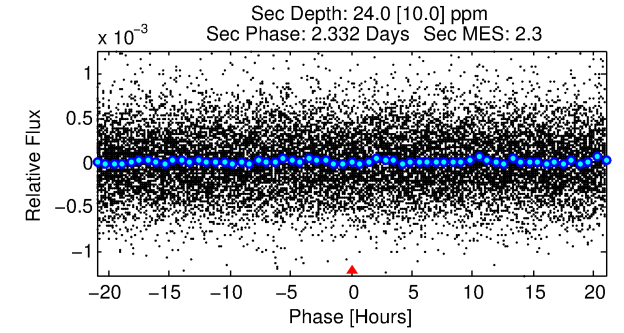
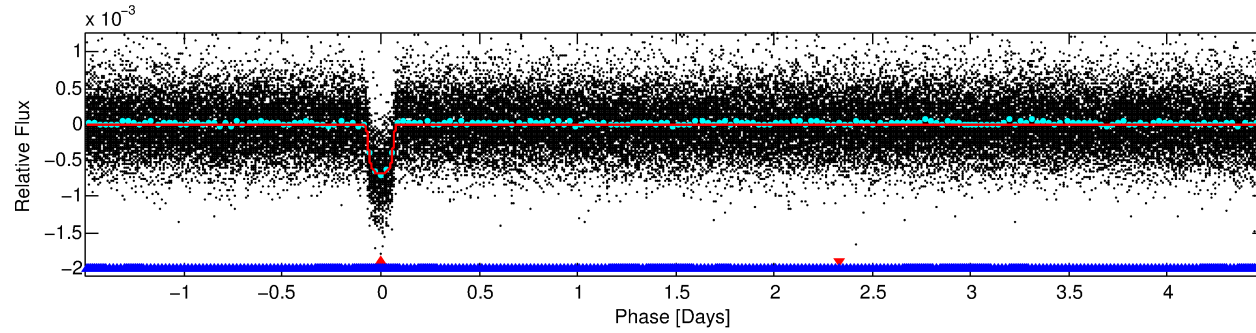
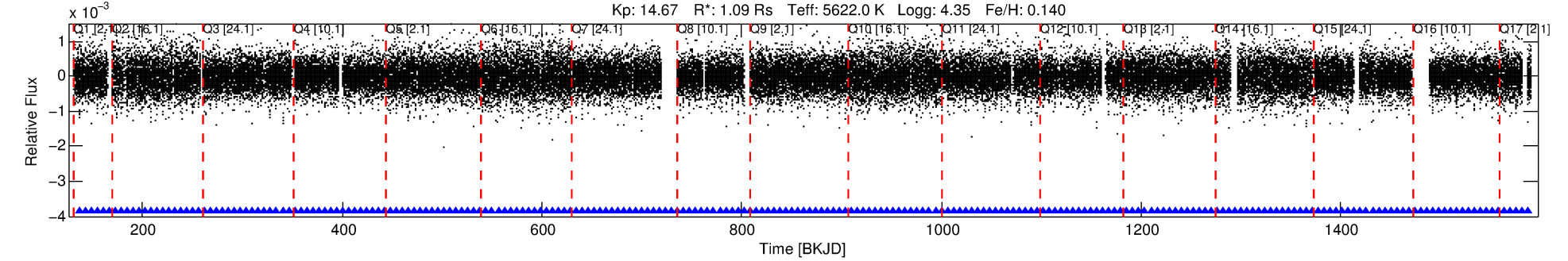
Ephemeris Match Information For 008344004-01

No Significant Match Found

DV One-Page Summary

KIC: 8344004 Candidate: 1 of 2 Period: 5.997 d
KOI: K00573.01 Name: Kepler-188c Corr: 0.967

Kp: 14.67 R*: 1.09 Rs Teff: 5622.0 K Logg: 4.35 Fe/H: 0.140



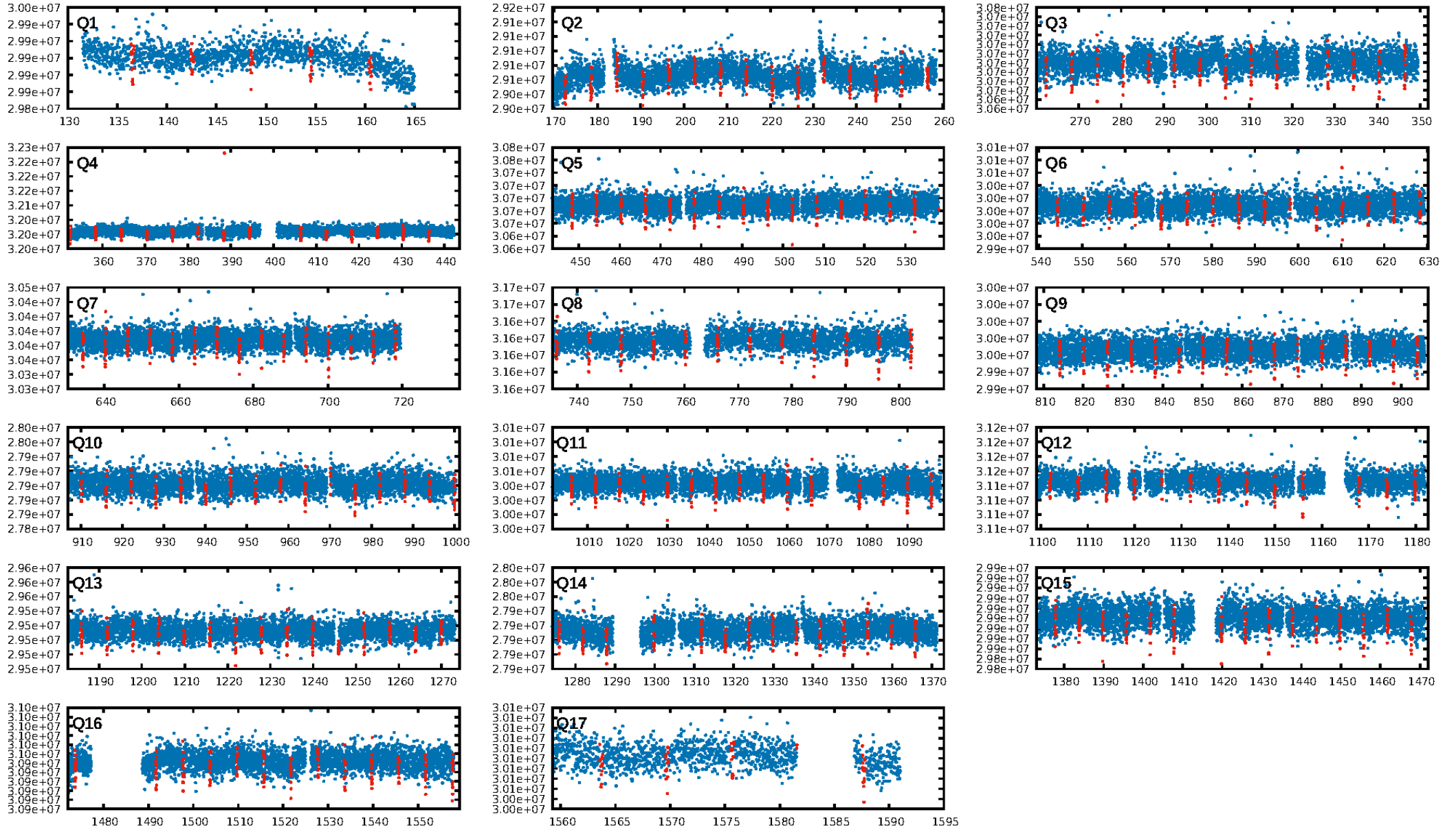
DV Fit Results:

Period = 5.99652 [0.00001] d
Epoch = 136.5288 [0.0010] BKJD
Rp/R* = 0.0281 [0.0016]
a/R* = 7.19 [1.74]
b = 0.87 [0.07]
Seff = 261.38 [58.78]
Teff = 1025 [58] K
Rp = 3.34 [0.53] Re
a = 0.0637 [0.0088] AU
Ag = 4.81 [2.33] [1.64σ]
Teffp = 2347 [256] K [5.04σ]

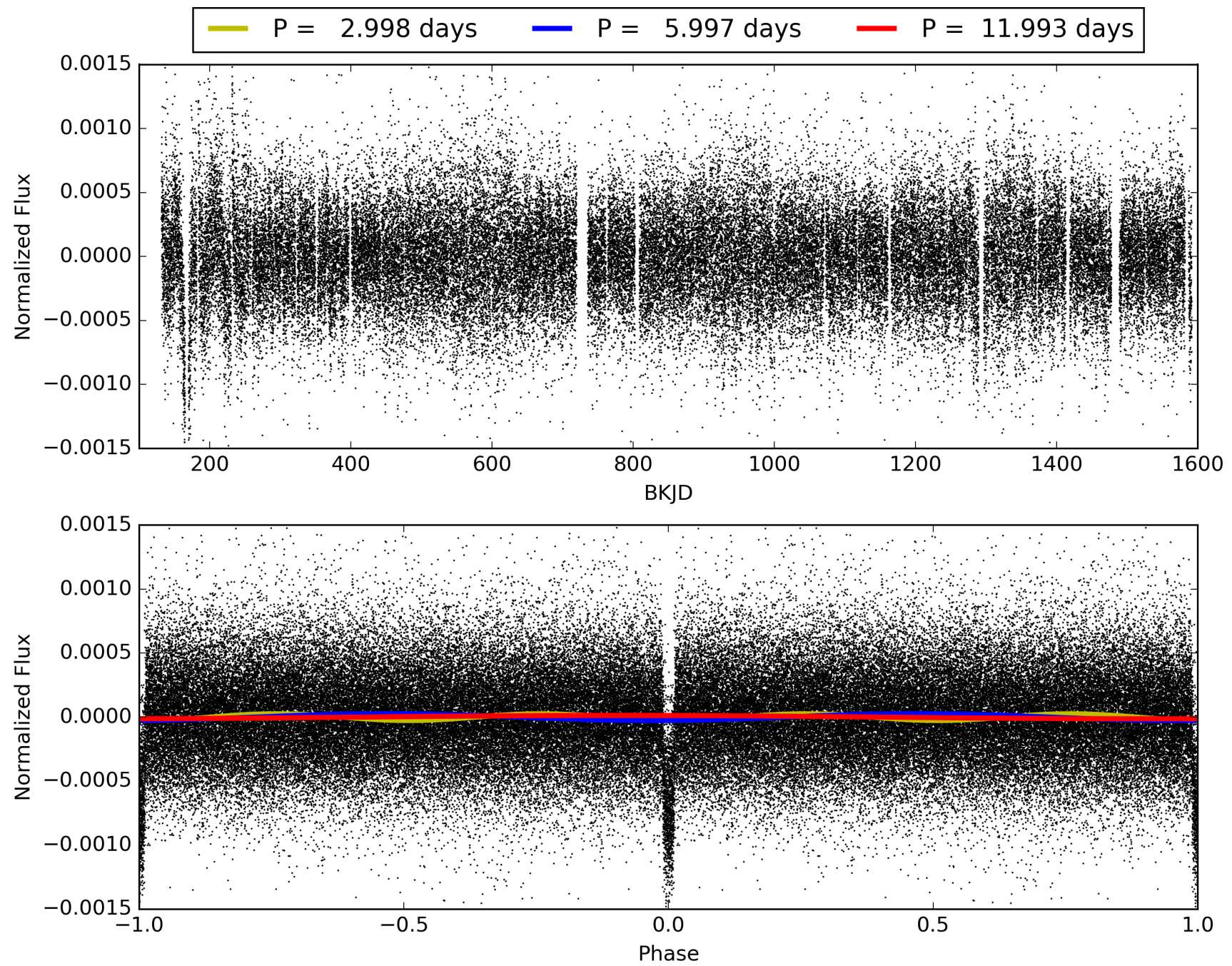
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [23.50σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 0.00e+00
RollingBand-fgt: 1.00 [216/216]
GhostDiagnostic-chr: 3.722
Centroid-sig: 0.1%
Centroid-so: 0.322 arcsec [1.50σ]
OotOffset-rm: 0.131 arcsec [1.10σ]
KicOffset-rm: 0.270 arcsec [2.20σ]
OotOffset-st: 4/4/4/4 [16]
KicOffset-st: 4/4/4/4 [16]
DiffImageQuality-fgm: 0.94 [15/16]
DiffImageOverlap-fno: 1.00 [17/17]

TCE 008344004-01, PDC Light Curves

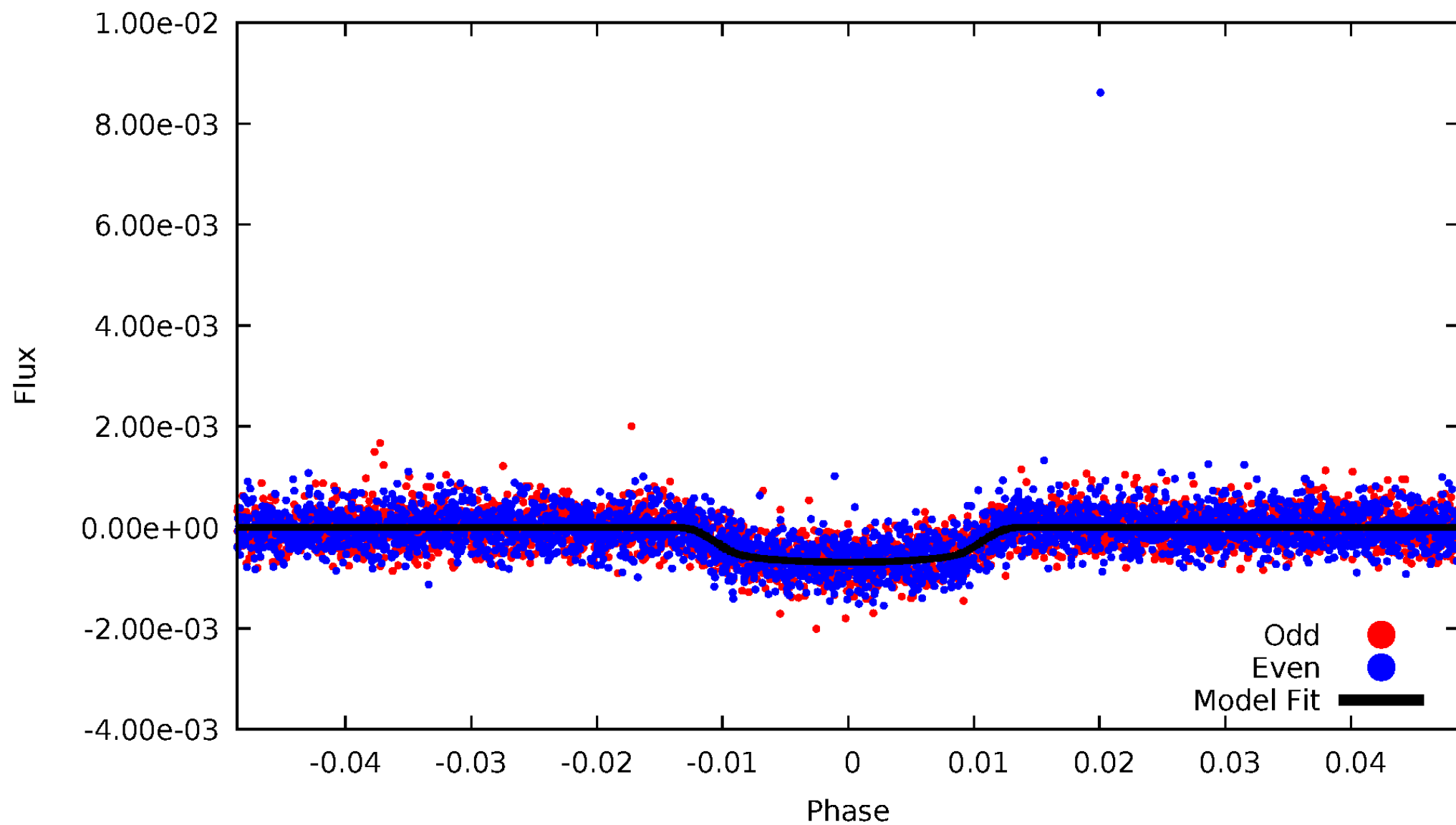


TCE 008344004-01



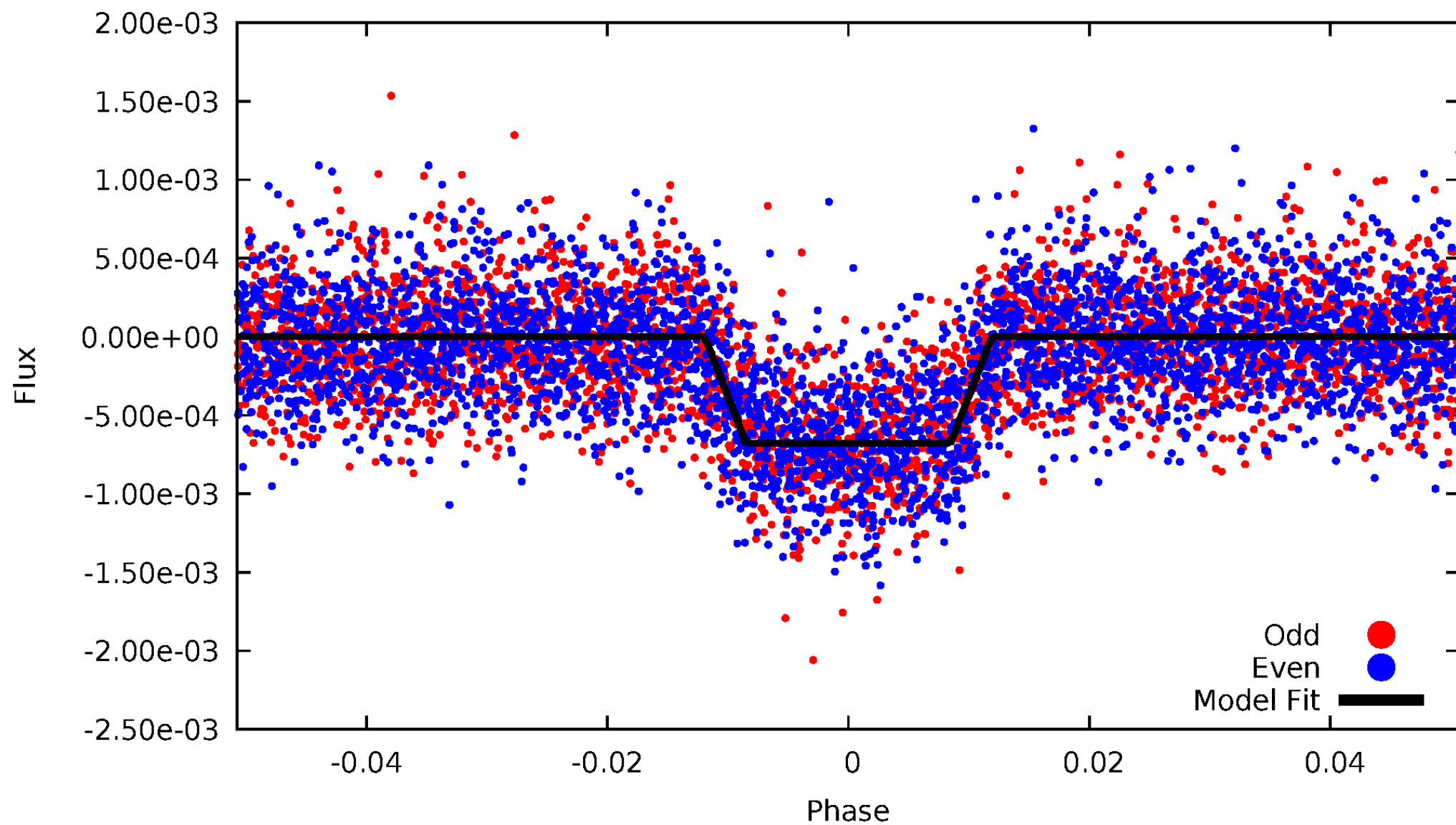
DV Odd/Even

TCE 008344004-01



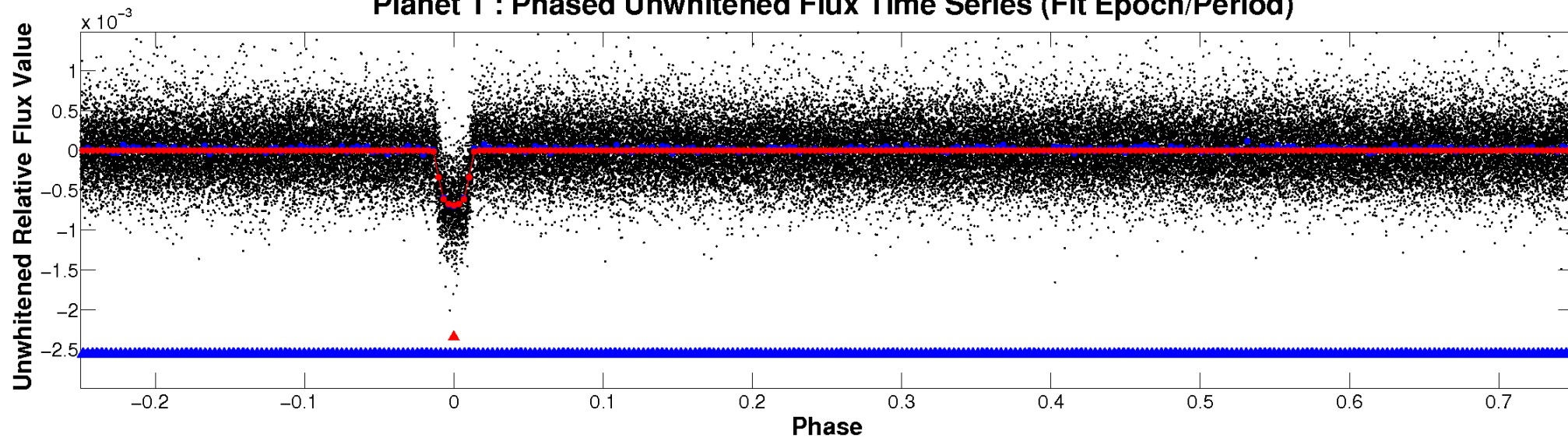
ALT Odd/Even

TCE 008344004-01

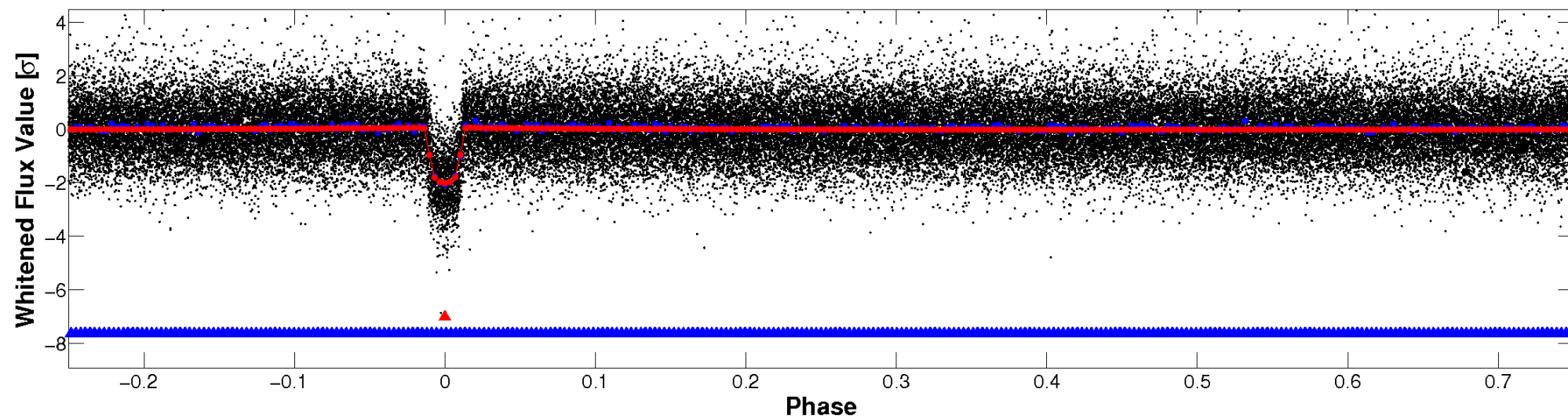


Non-Whitened Vs. Whitened Light Curve

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

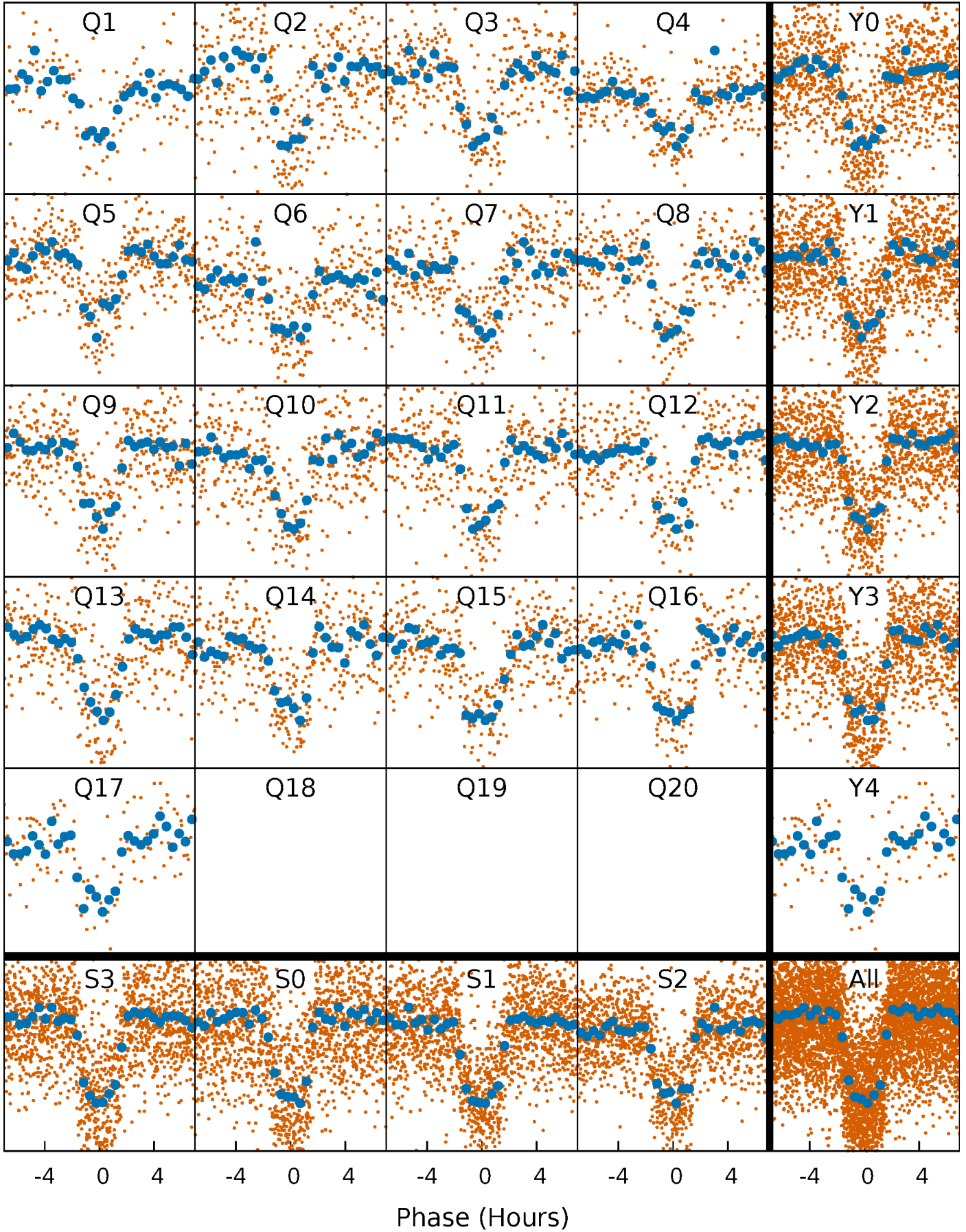


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



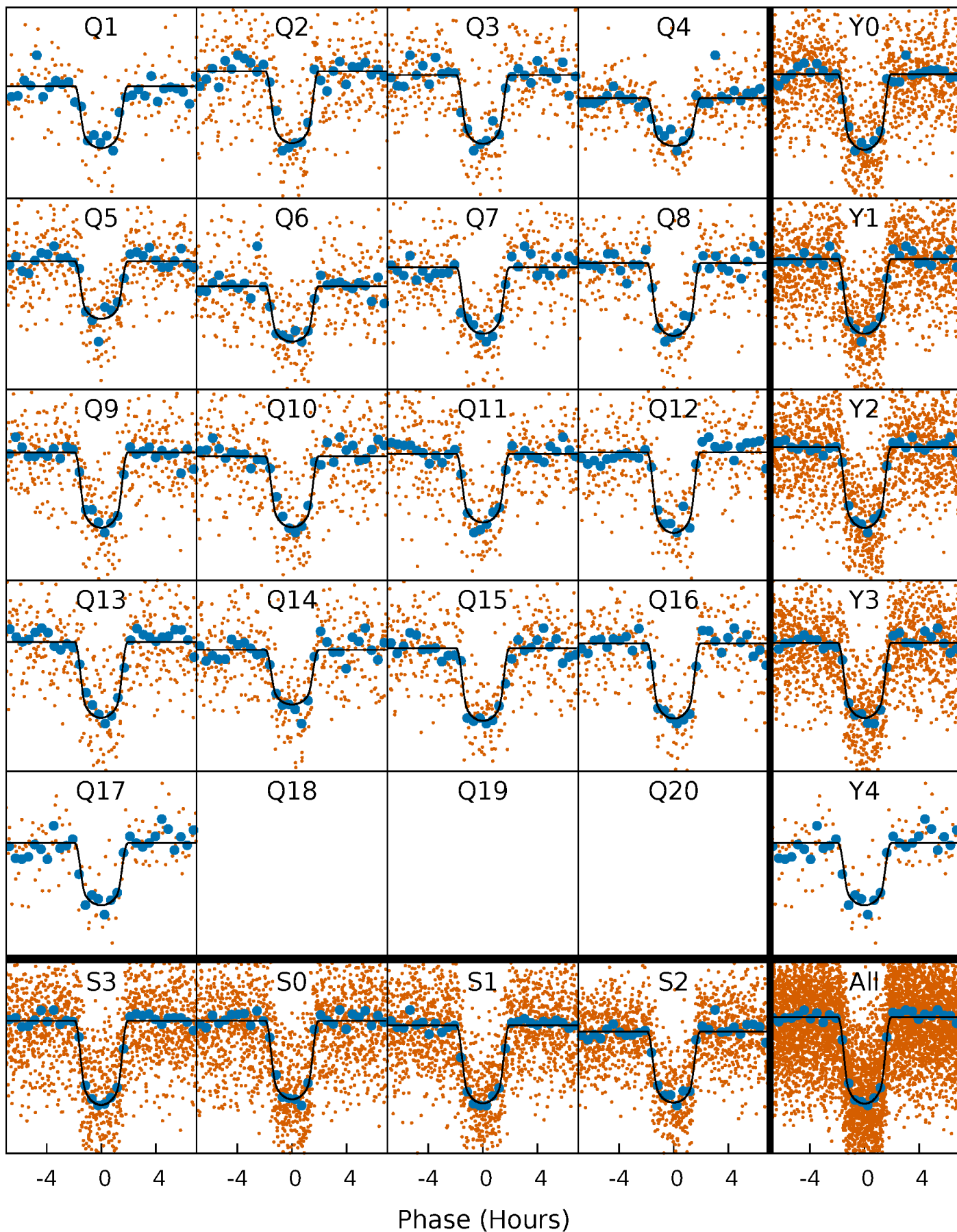
PDC Quarter-Phased Transit Curves

TCE 008344004-01 P= 5.996516 Days $T_0=136.528830$ (BKJD)



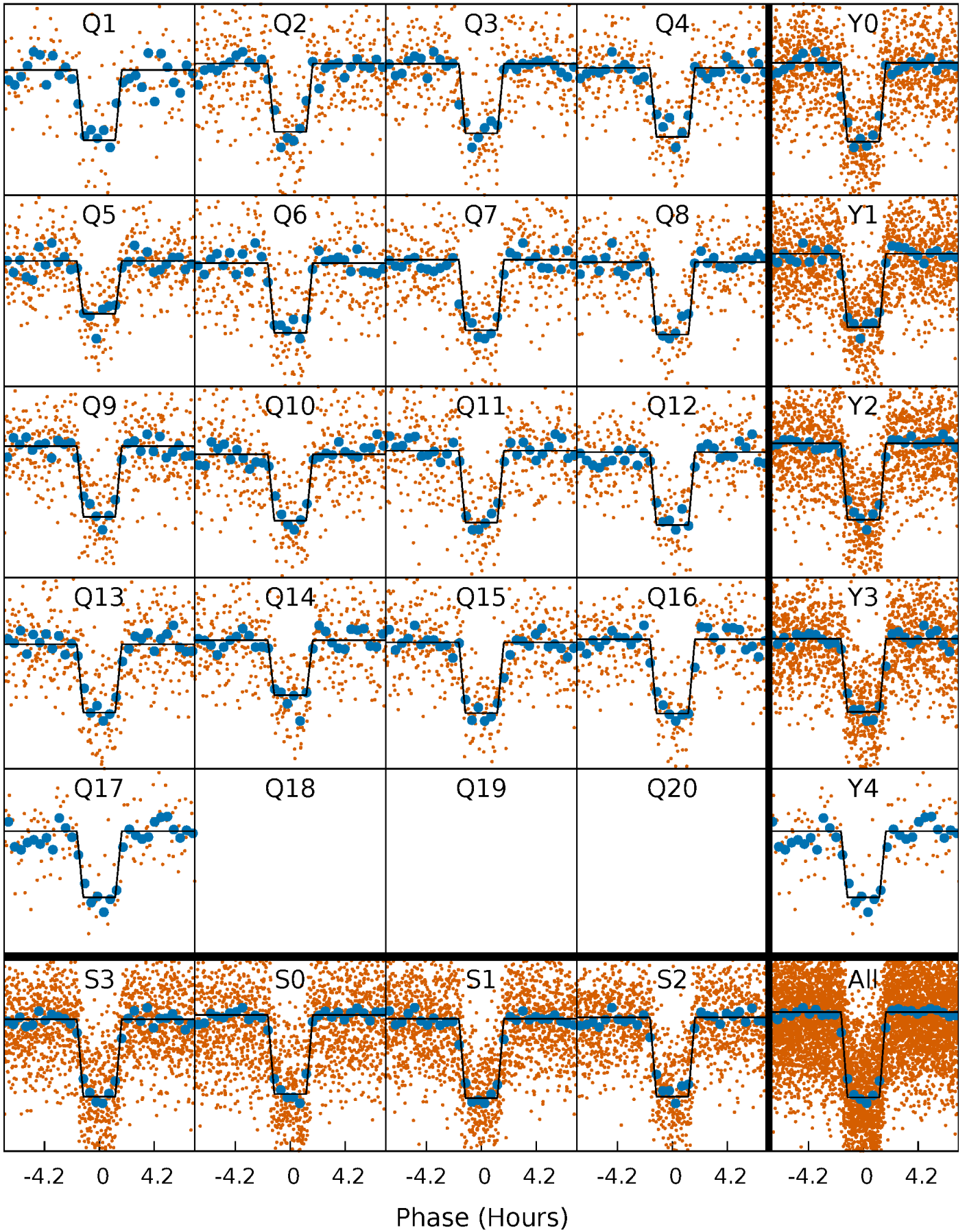
DV Quarter-Phased Transit Curves

TCE 008344004-01 P= 5.996516 Days $T_0=136.528830$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

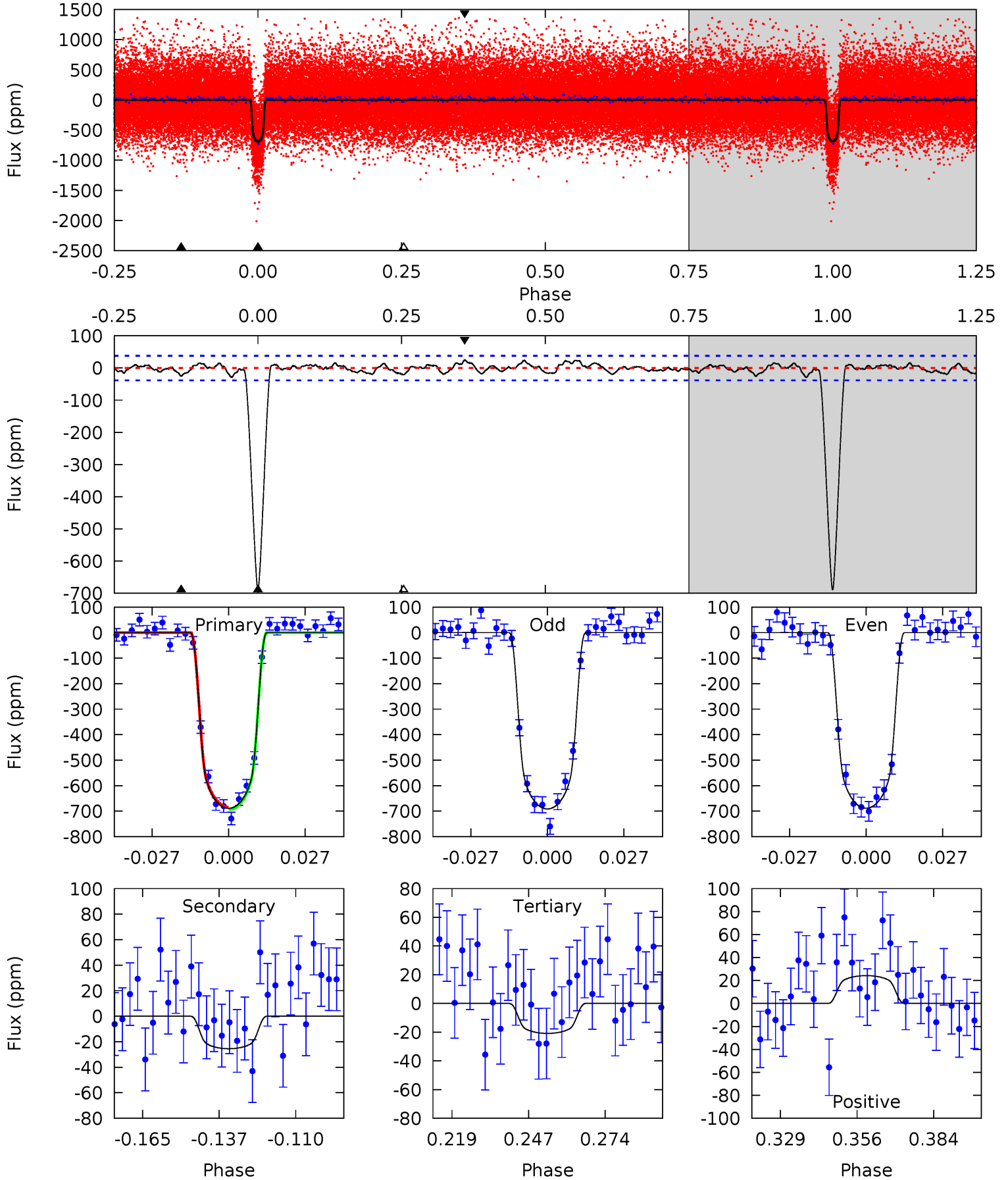
TCE 008344004-01 P= 5.996478 Days $T_0=136.533316$ (BKJD)



DV Model-Shift Uniqueness Test

008344004-01, P = 5.996516 Days, E = 130.532314 Days

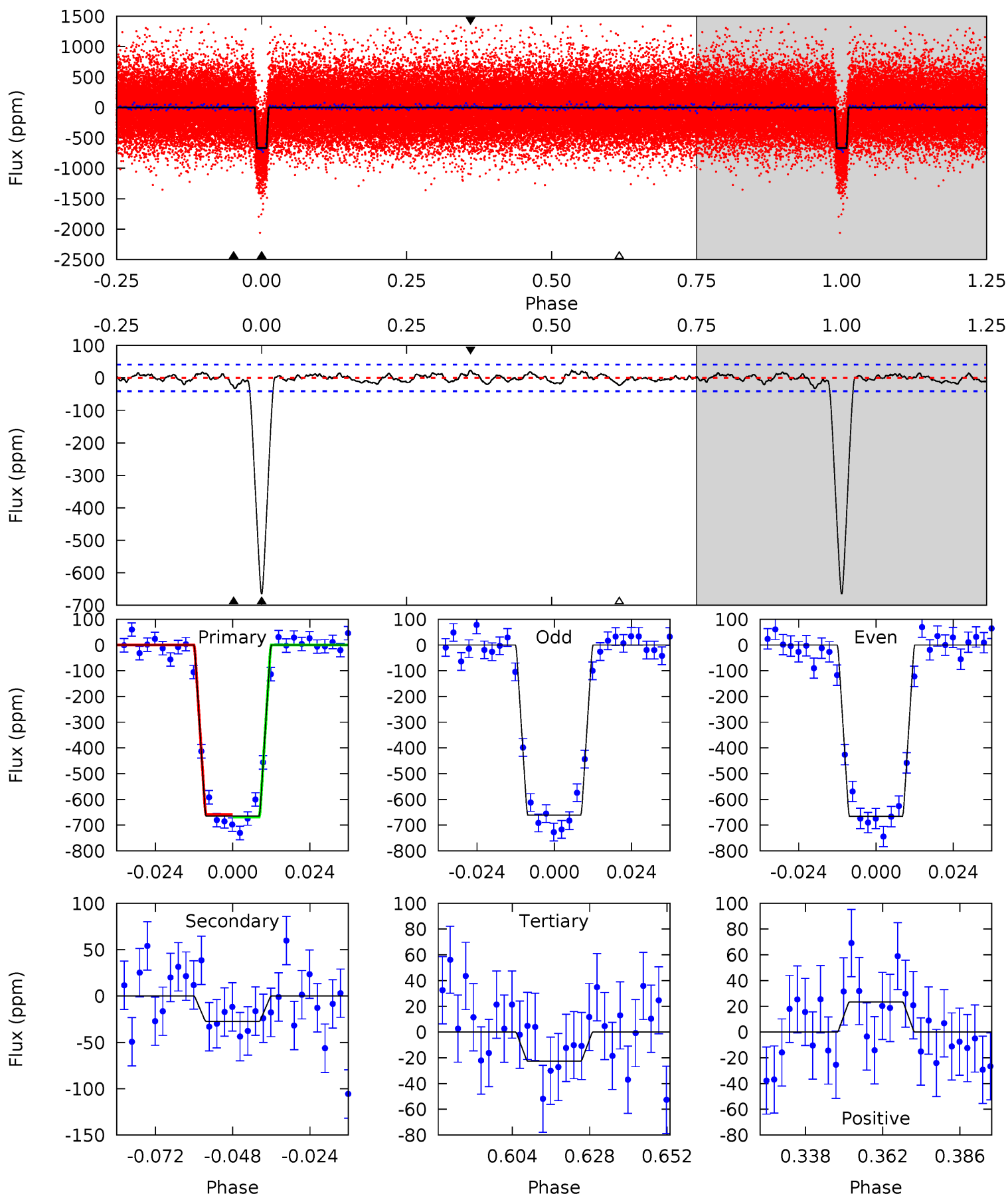
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
87.1	3.22	2.64	3.06	4.83	2.21	1.30	84.4	84.0	0.58	0.16	0.18	1.01	0.03	0.55



Alt Model-Shift Uniqueness Test

008344004-01, P = 5.996478 Days, E = 130.536838 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
79.1	3.27	2.69	2.79	4.85	2.25	1.09	76.5	76.4	0.57	0.48	0.31	1.02	0.03	0.60



Stellar Parameters For KIC 008344004

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	5622^{+76}_{-84}	$4.346^{+0.126}_{-0.103}$	$0.140^{+0.150}_{-0.150}$	$1.089^{+0.160}_{-0.128}$	$0.958^{+0.068}_{-0.050}$	$1.045^{+0.524}_{-0.350}$
	+1%/-1%	+3%/-2%	+107%/-107%	+15%/-12%	+7%/-5%	+50%/-33%
Source	SPE90	SPE90	SPE90	DSEP		

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

Secondary Eclipse Parameters for KIC 008344004-01 / KOI 0573.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-25 ± 8	$3.33^{+0.34}_{-0.31}$	1426^{+64}_{-54}	3009^{+134}_{-152}	$5.145^{+2.059}_{-1.657}$
Alt.	-27 ± 8	$3.08^{+0.30}_{-0.30}$	1427^{+59}_{-55}	3109^{+145}_{-153}	$6.466^{+2.506}_{-1.970}$

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

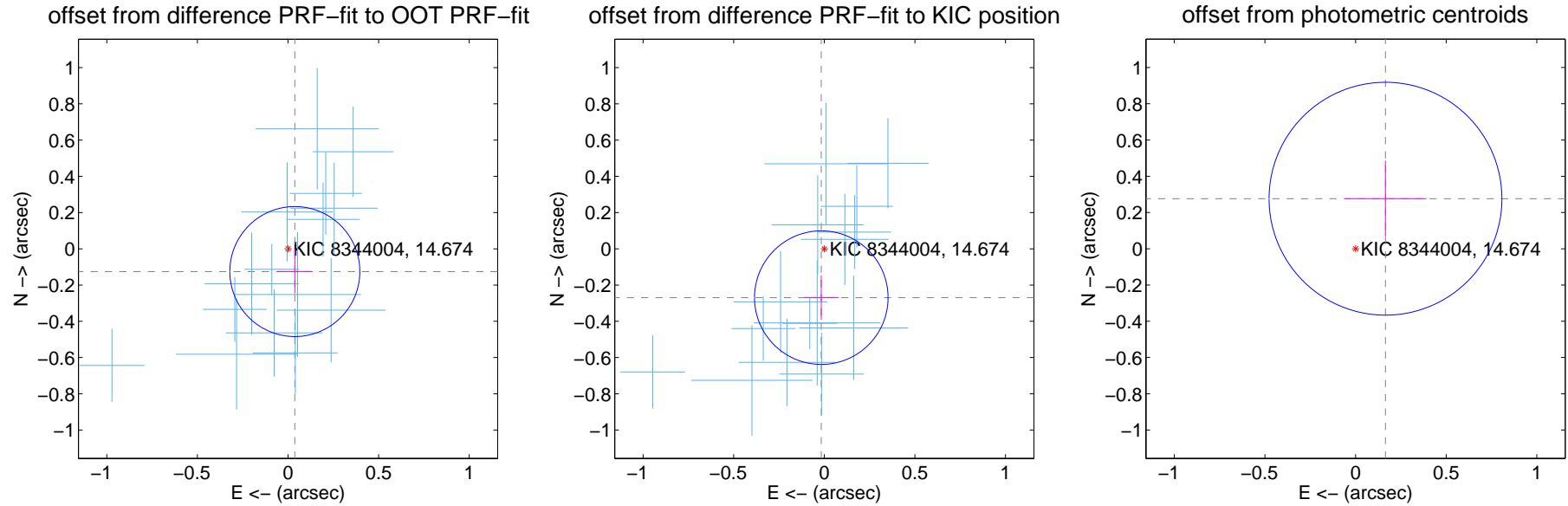
DV Centroid Data

Supplemental centroid analysis for 008344004-01. Kepler magnitude: 14.67. Transit SNR 64.76

There are 15 quarters with good PRF difference image offsets

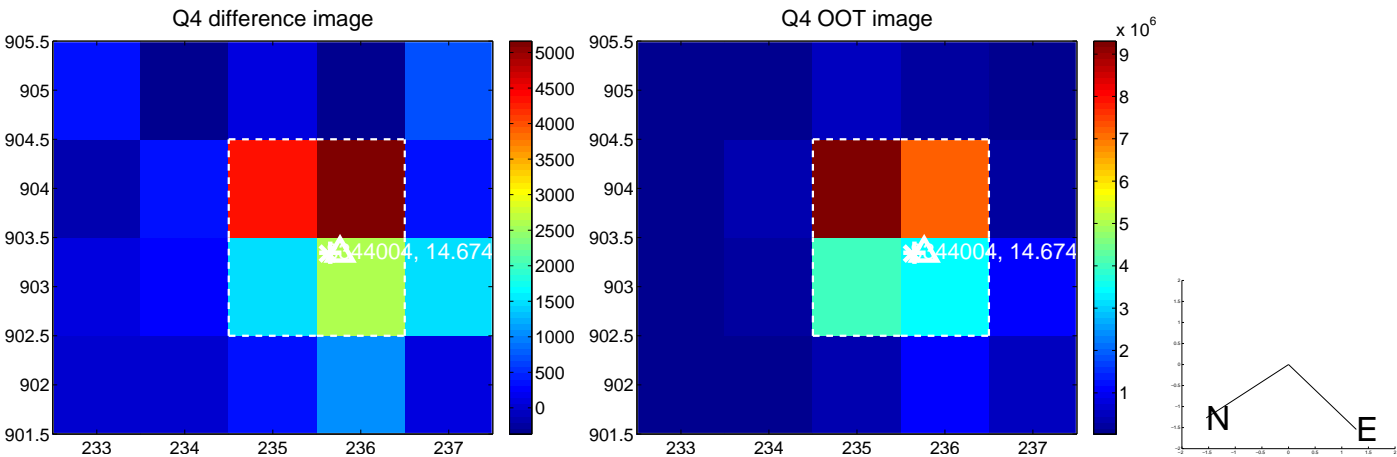
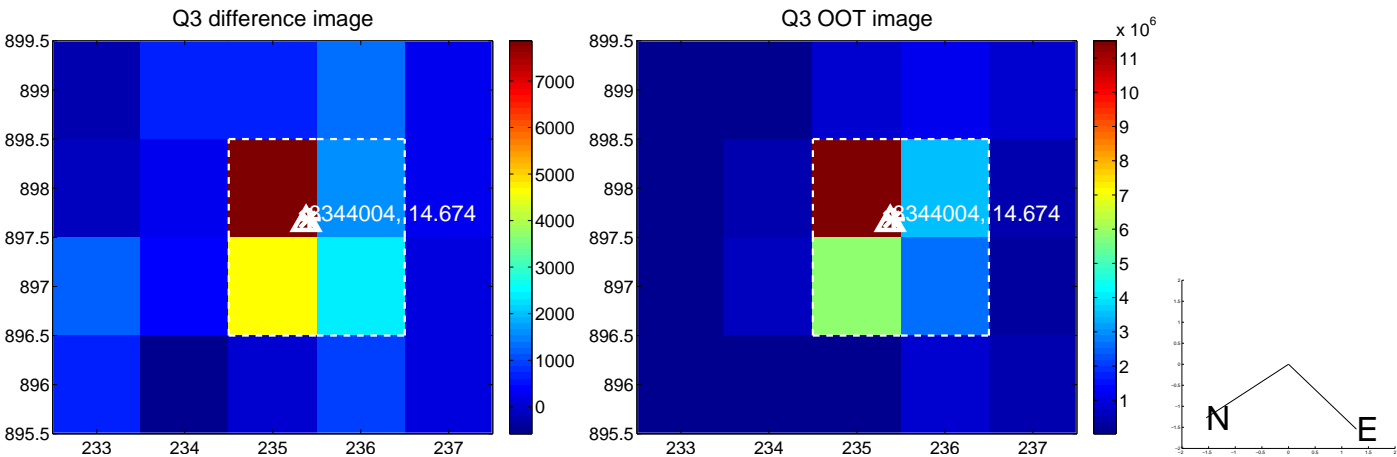
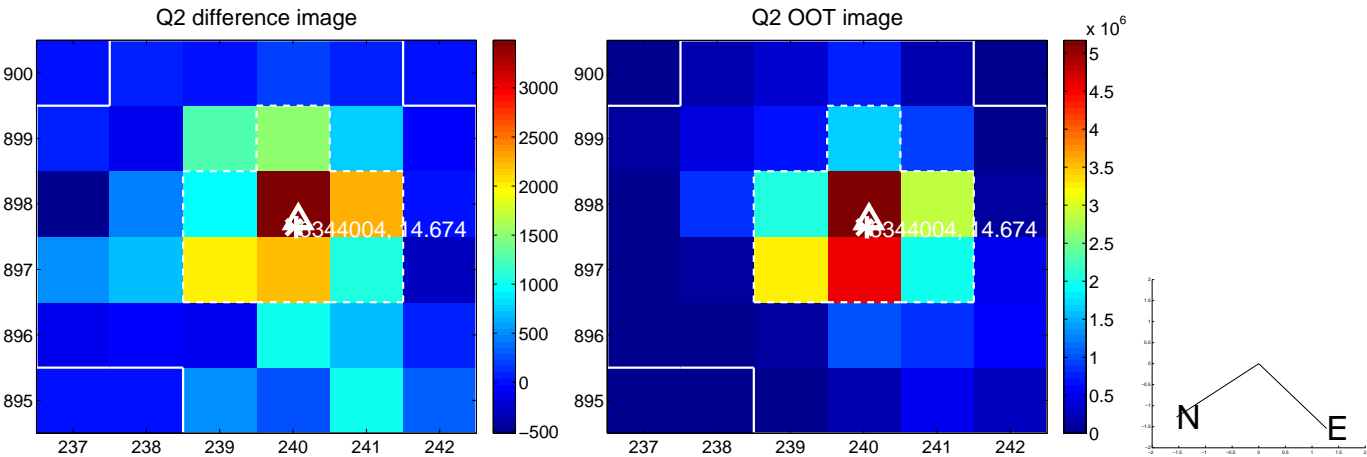
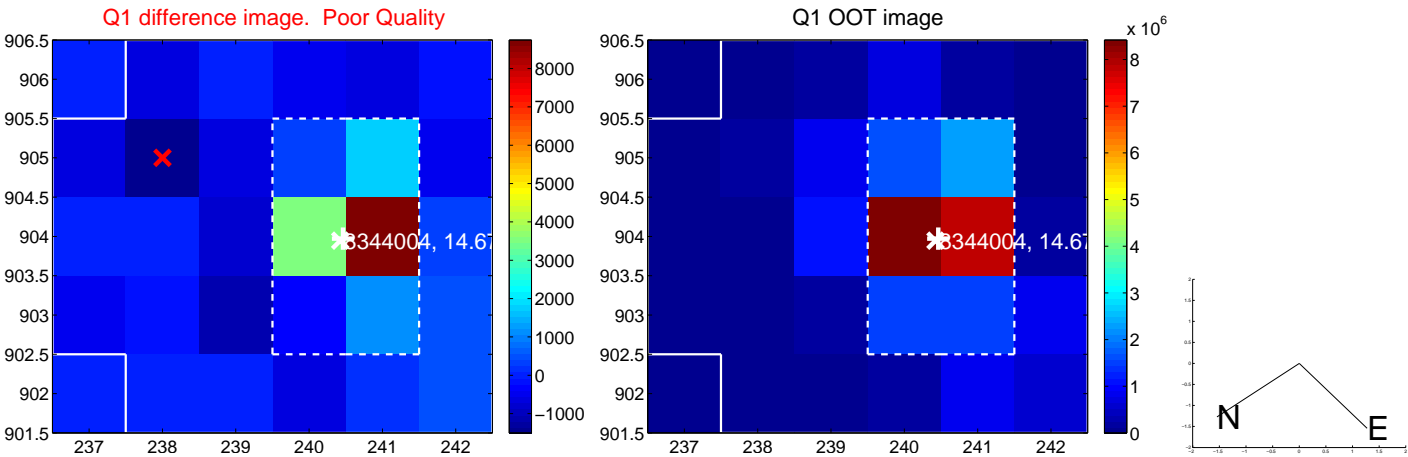
The direct PRF centroid is offset from the target star catalog position by about 0.17 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.131 ± 0.120	1.10	-0.038 ± 0.099	-0.125 ± 0.121
PRF-fit source offset from KIC position	0.270 ± 0.123	2.20	0.017 ± 0.097	-0.269 ± 0.123
photometric centroid source offset	0.32 ± 0.21	1.50	-0.17 ± 0.22	0.28 ± 0.21

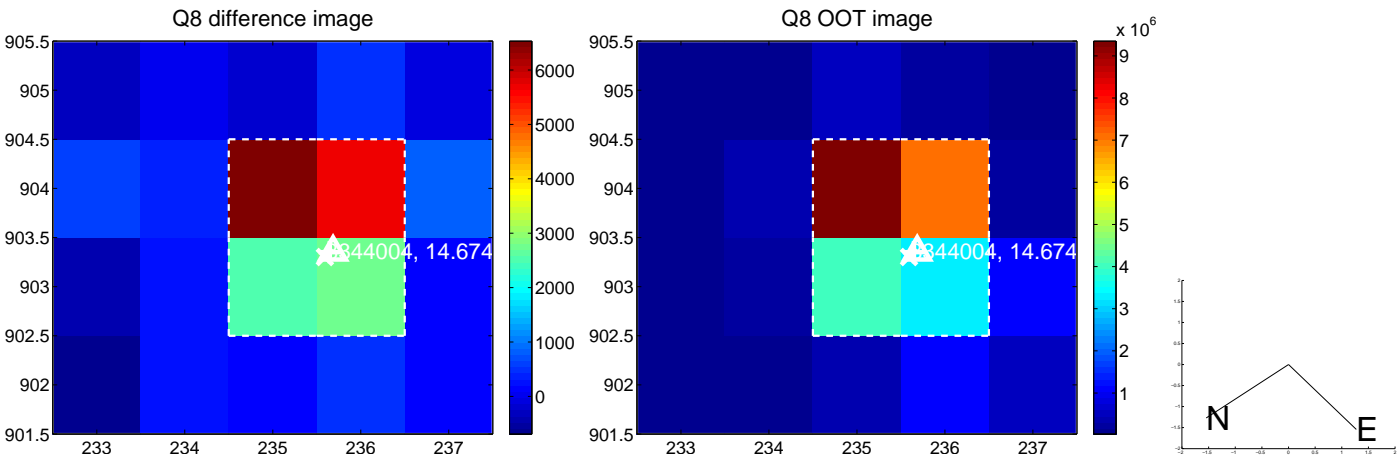
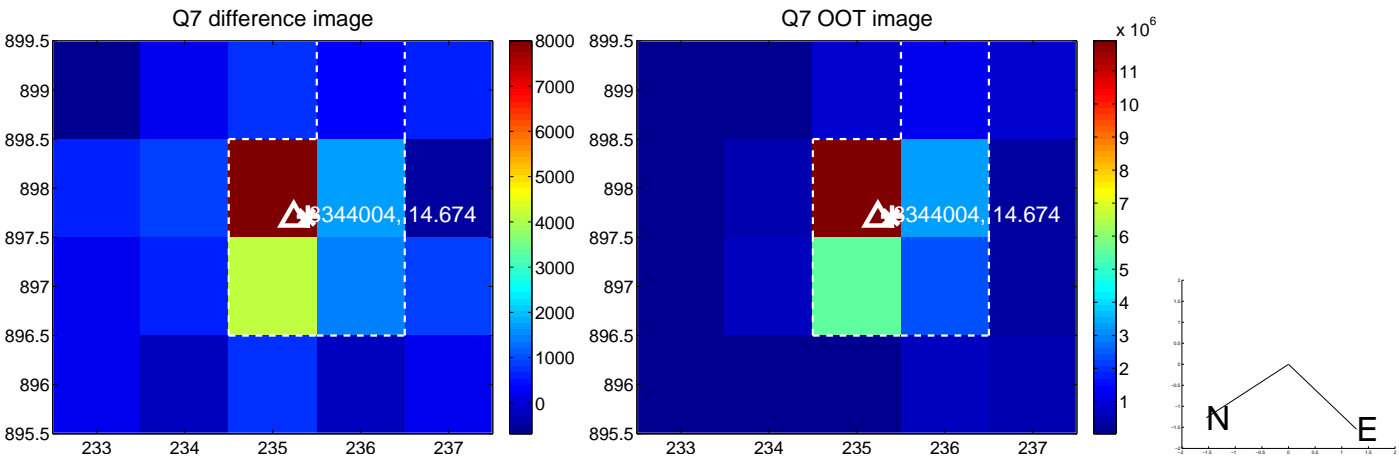
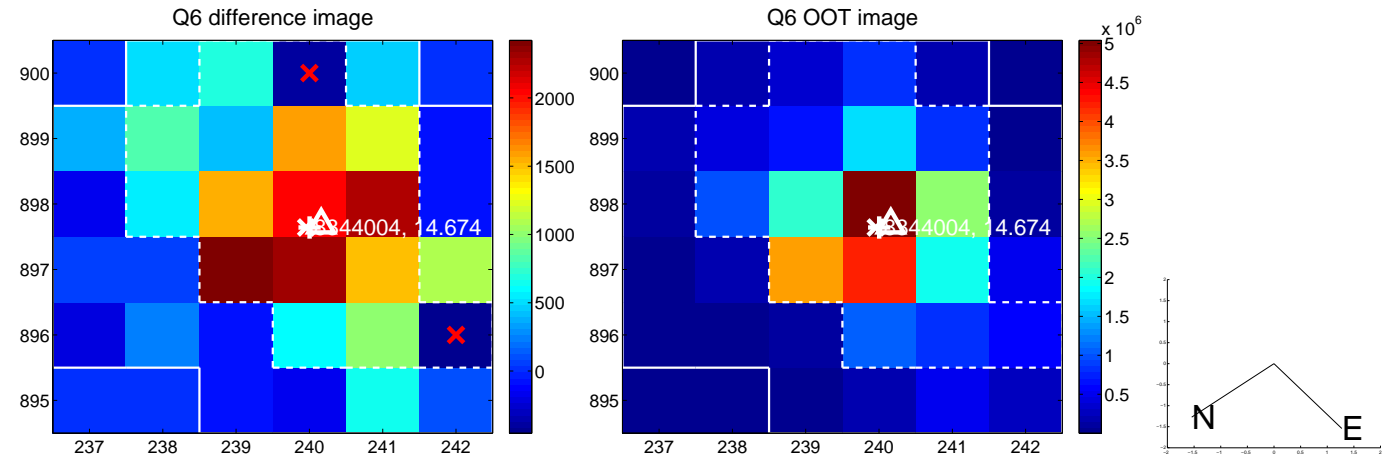
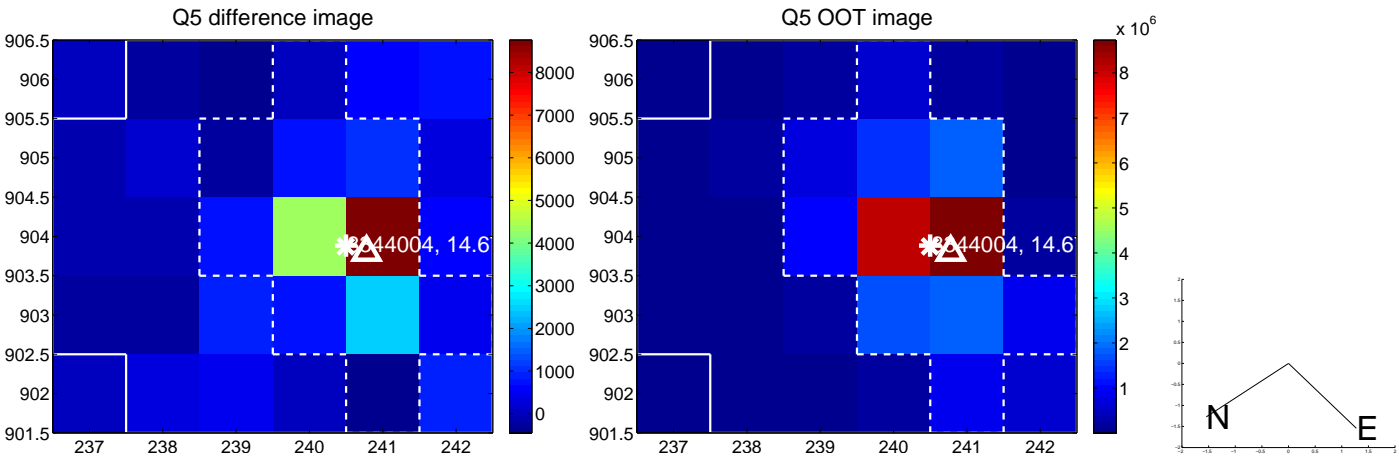


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

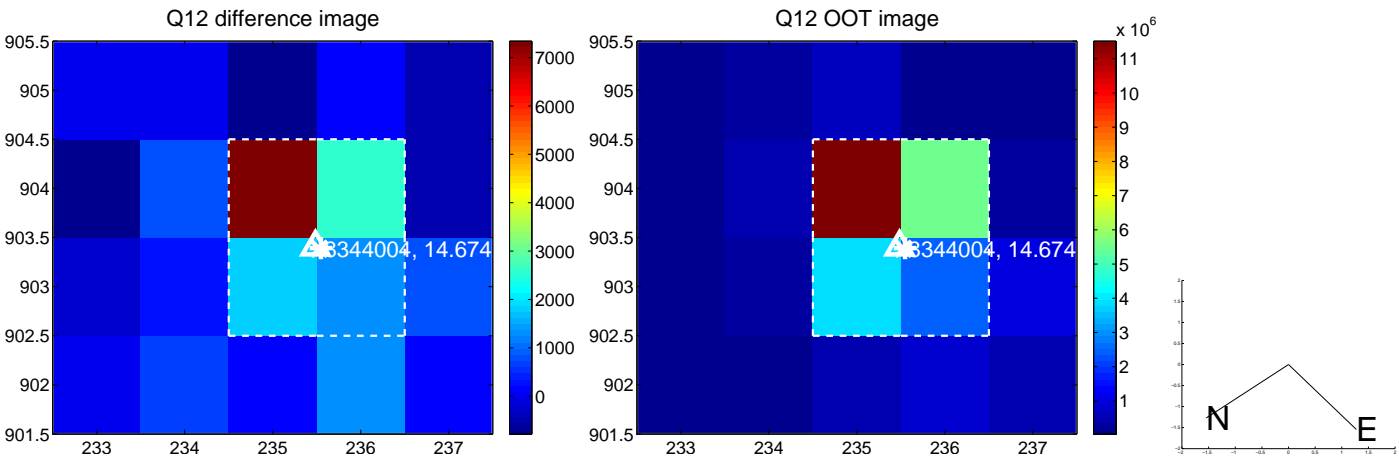
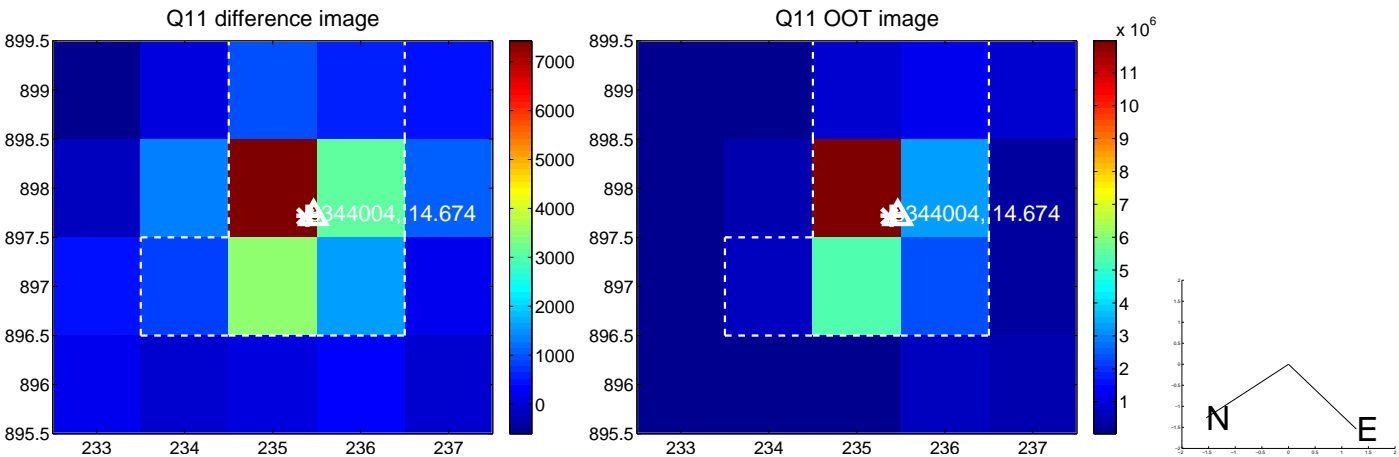
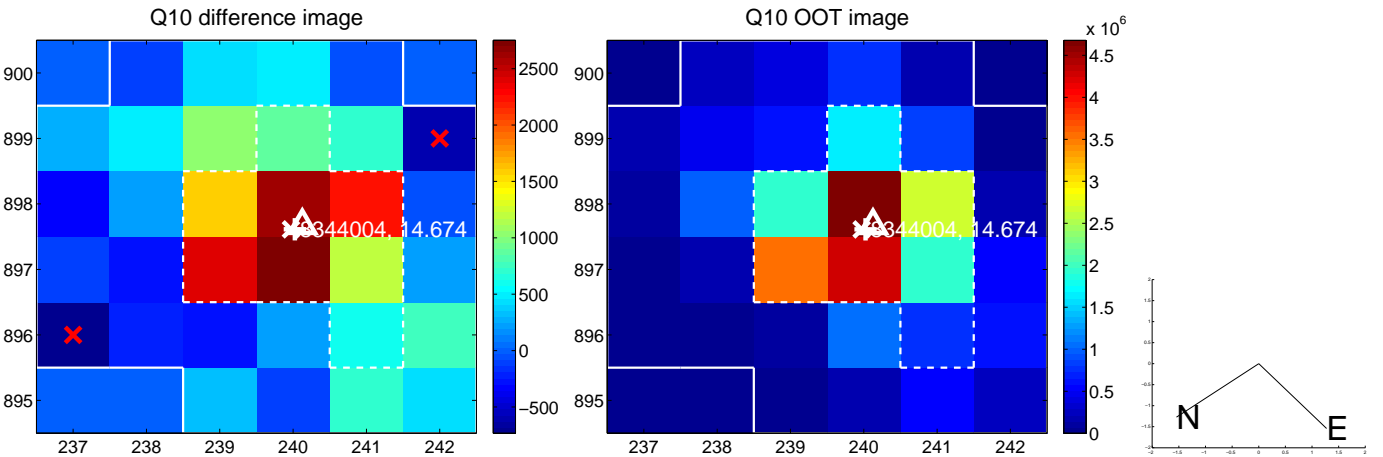
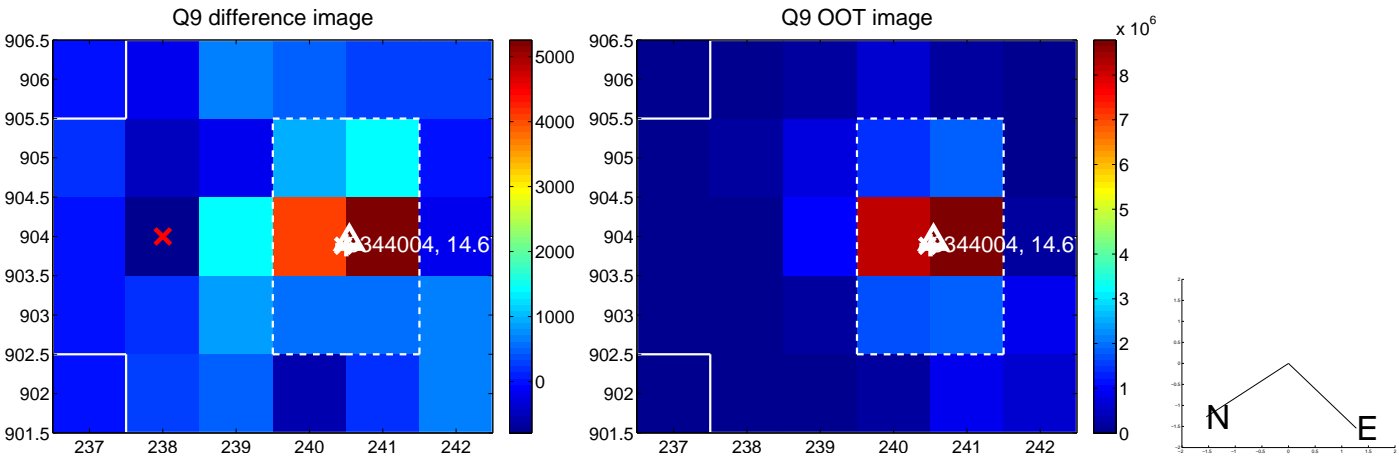
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



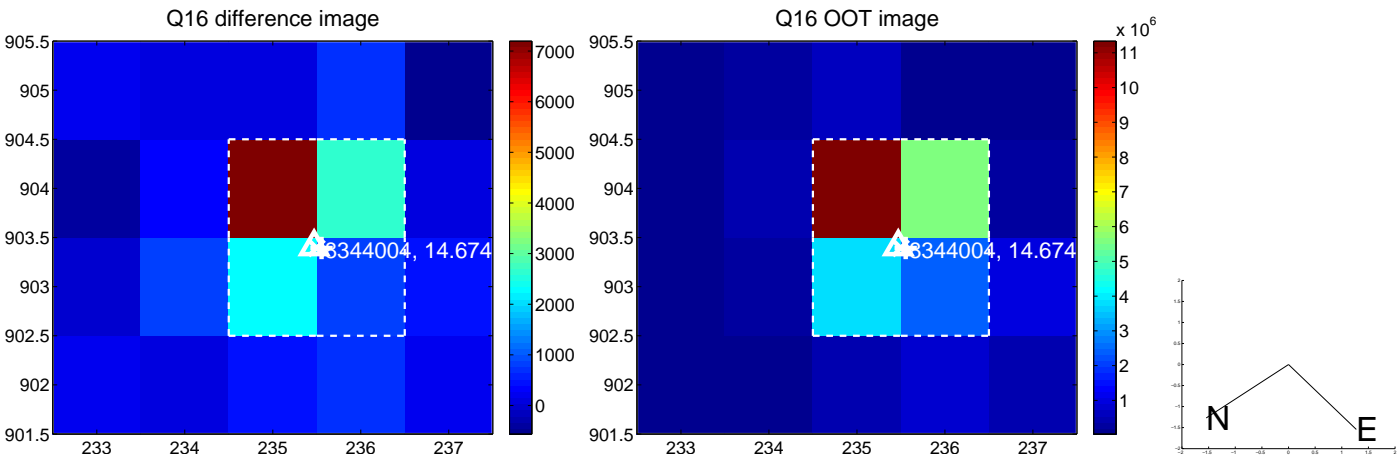
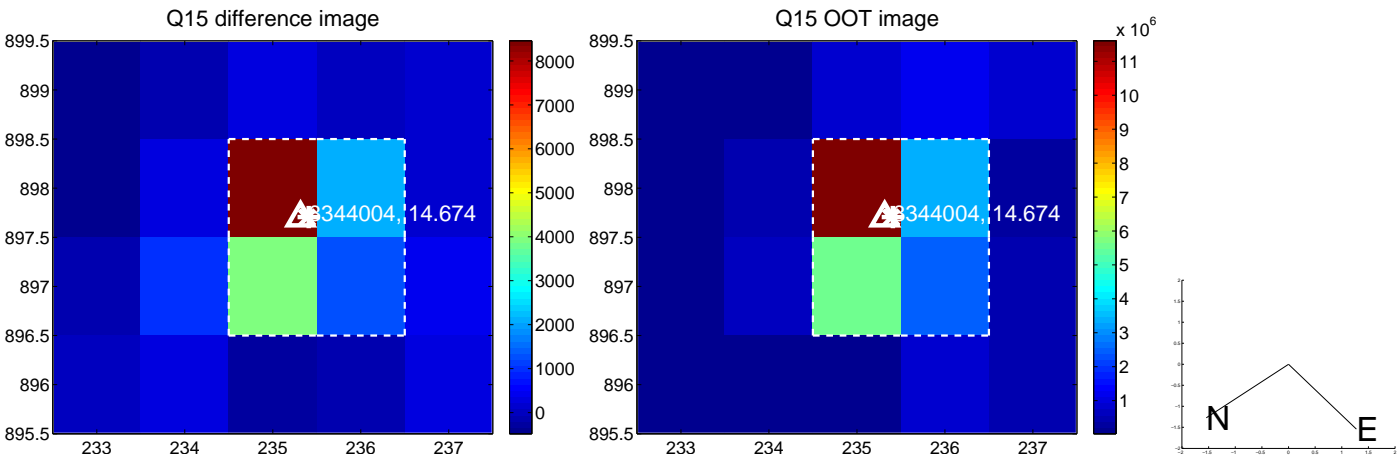
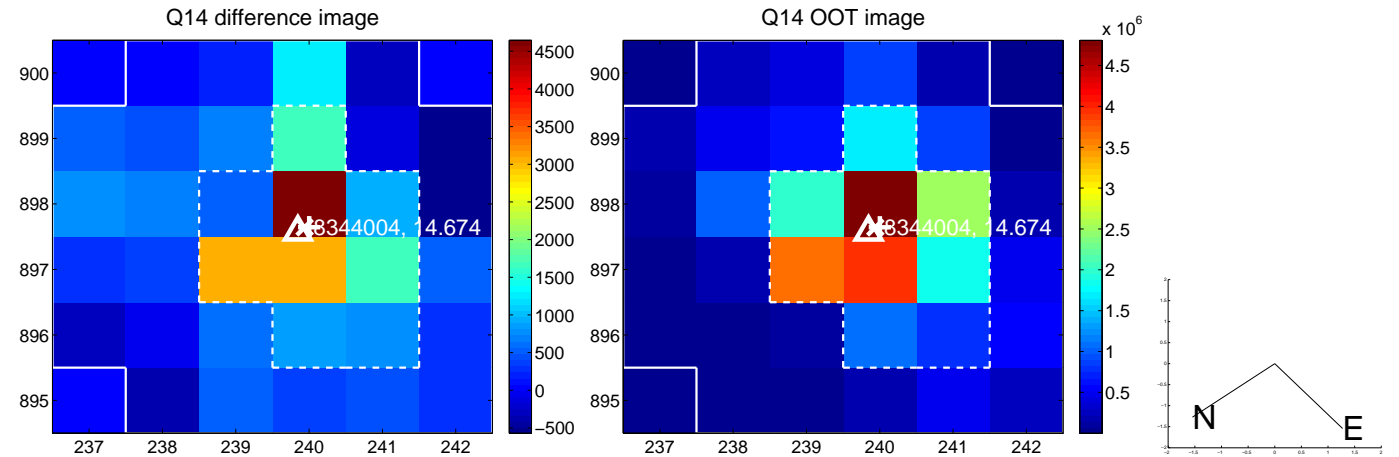
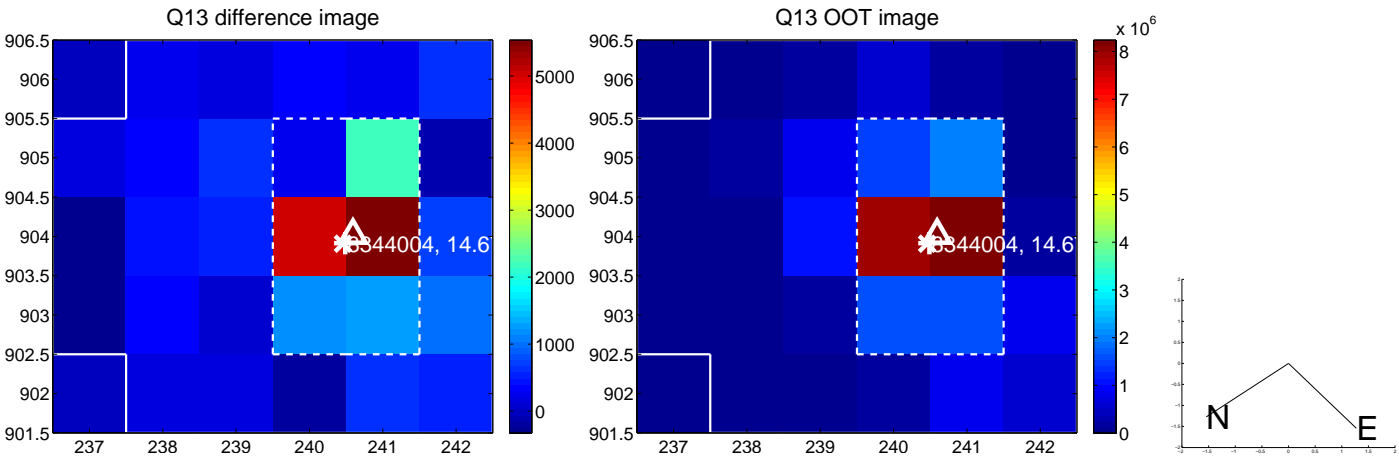
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



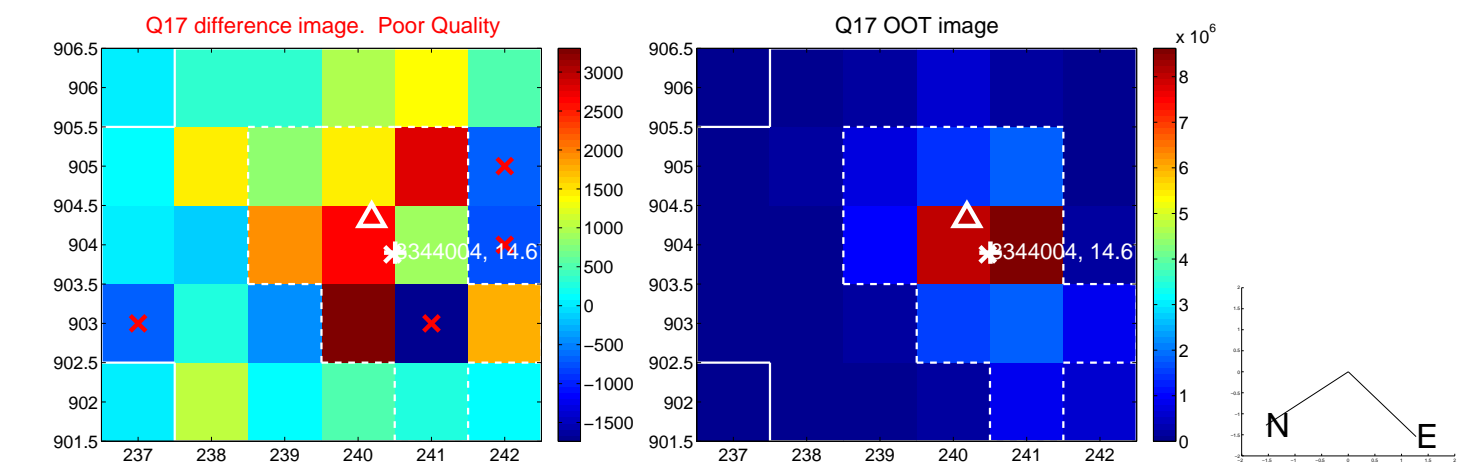
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



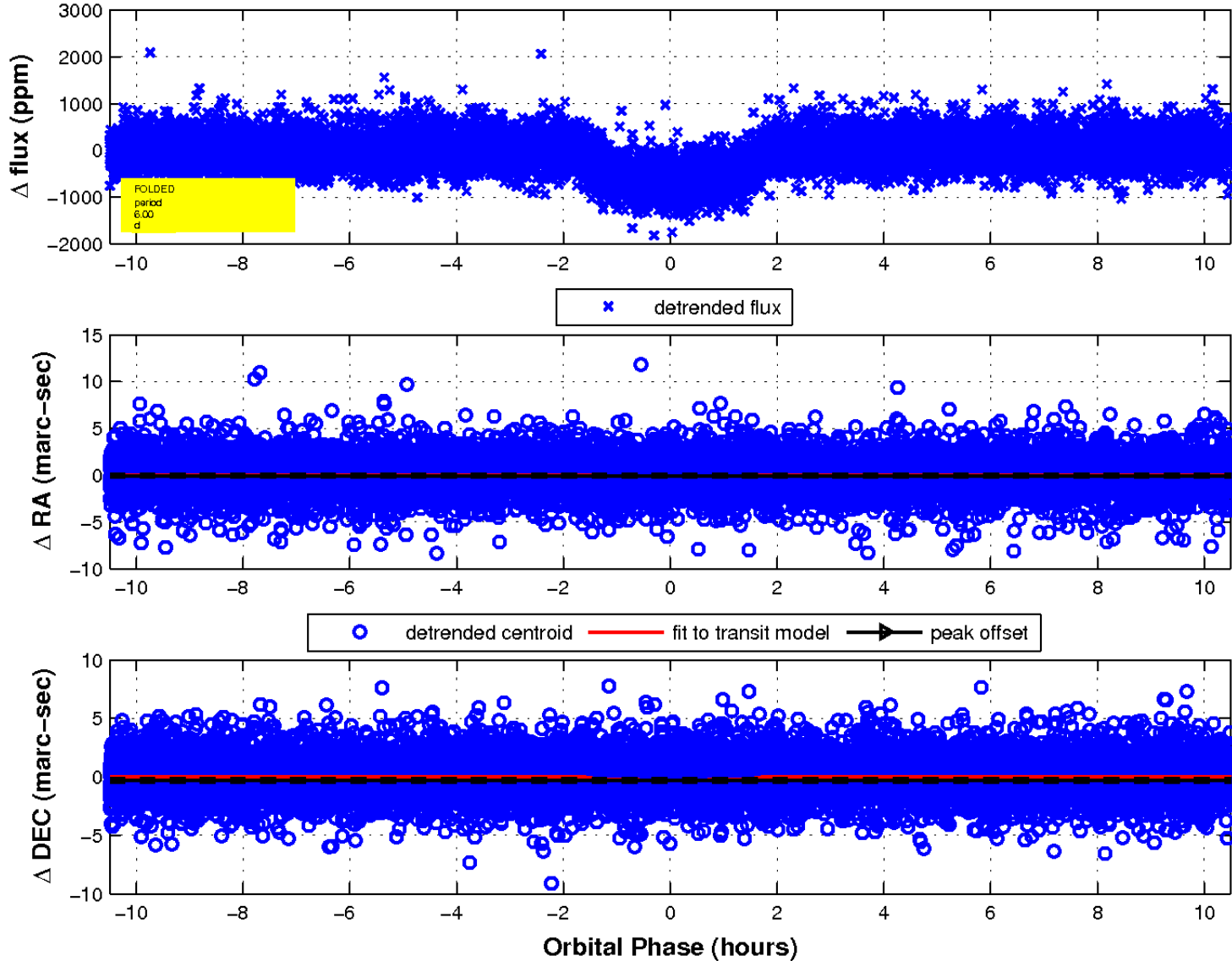
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

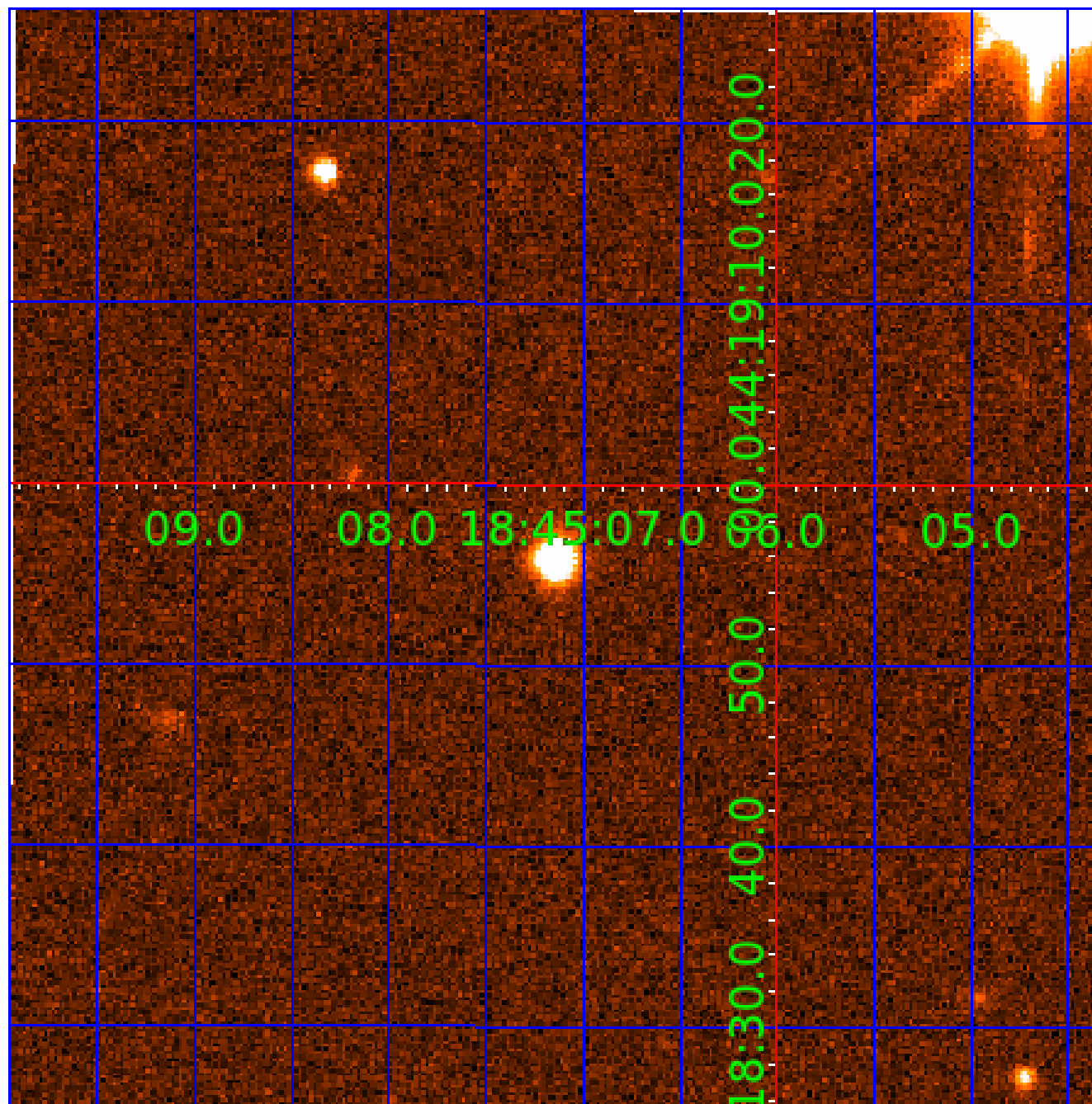


fluxWeightedCentroids, Planet 1 of 2



UKIRT Image

Declination



KIC 008344004

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})
008344004-01	OBS	0573.01	5.996516	136.528830	690.2	3.499	58.0	64.8	1.09	5622	3.34	261.38
008344004-02	OBS	0573.02	2.061901	133.201322	208.8	1.976	23.6	26.5	1.09	5622	1.72	1085.06

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008344004-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
008344004-02	OBS	PC	1.00	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.

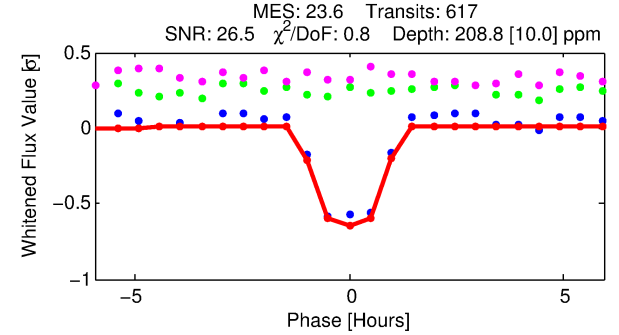
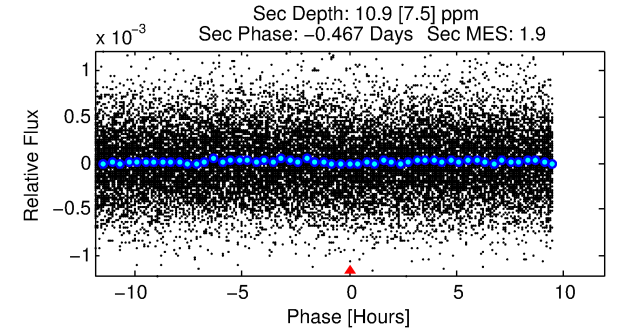
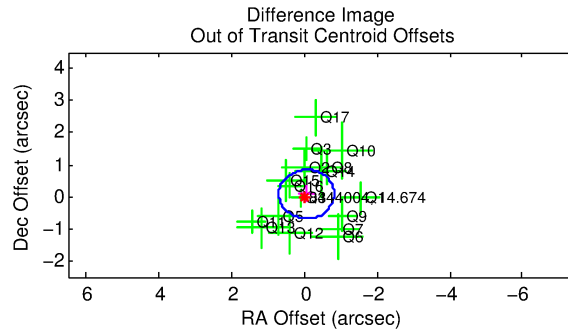
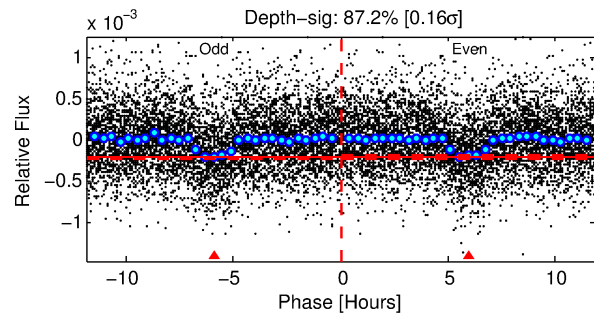
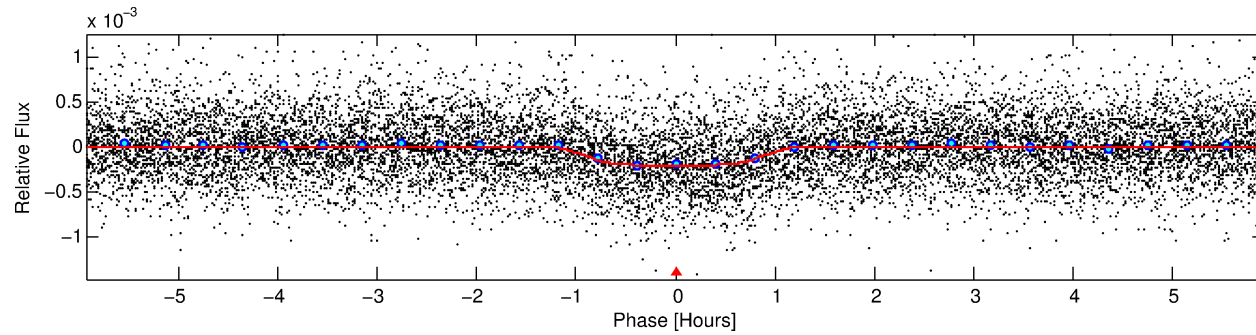
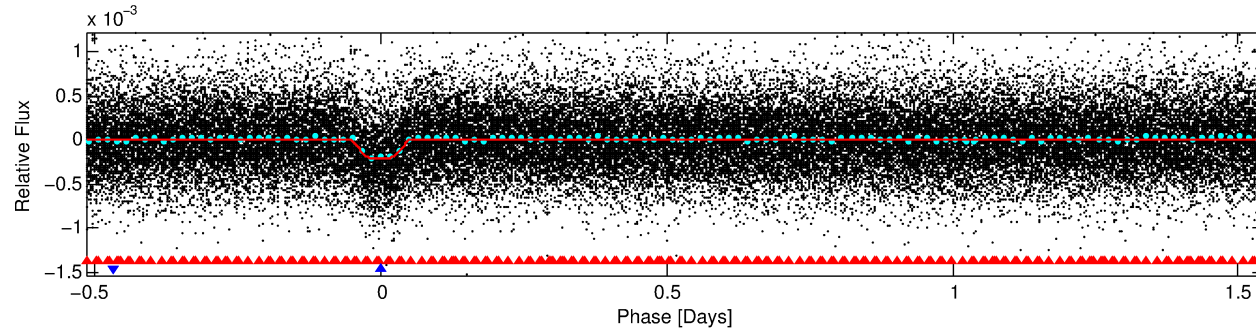
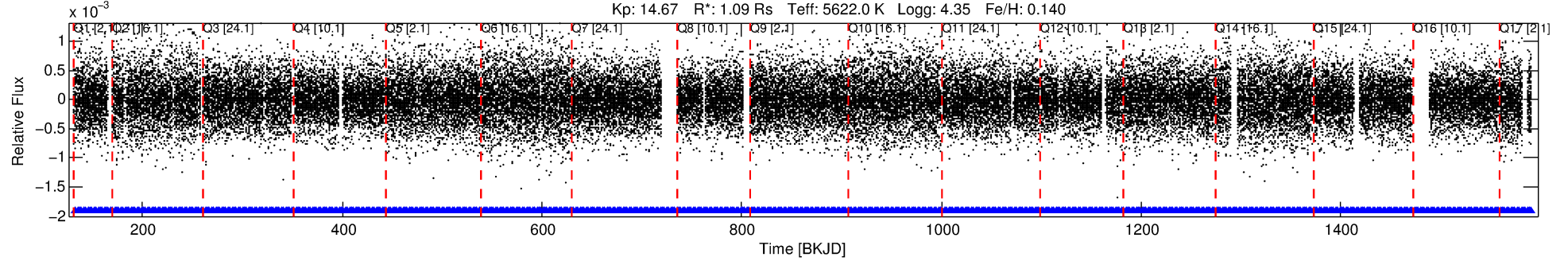
Ephemeris Match Information For 008344004-02

No Significant Match Found

DV One-Page Summary

KIC: 8344004 Candidate: 2 of 2 Period: 2.062 d
KOI: K00573.02 Name: Kepler-188b Corr: 0.972

Kp: 14.67 R*: 1.09 Rs Teff: 5622.0 K Logg: 4.35 Fe/H: 0.140



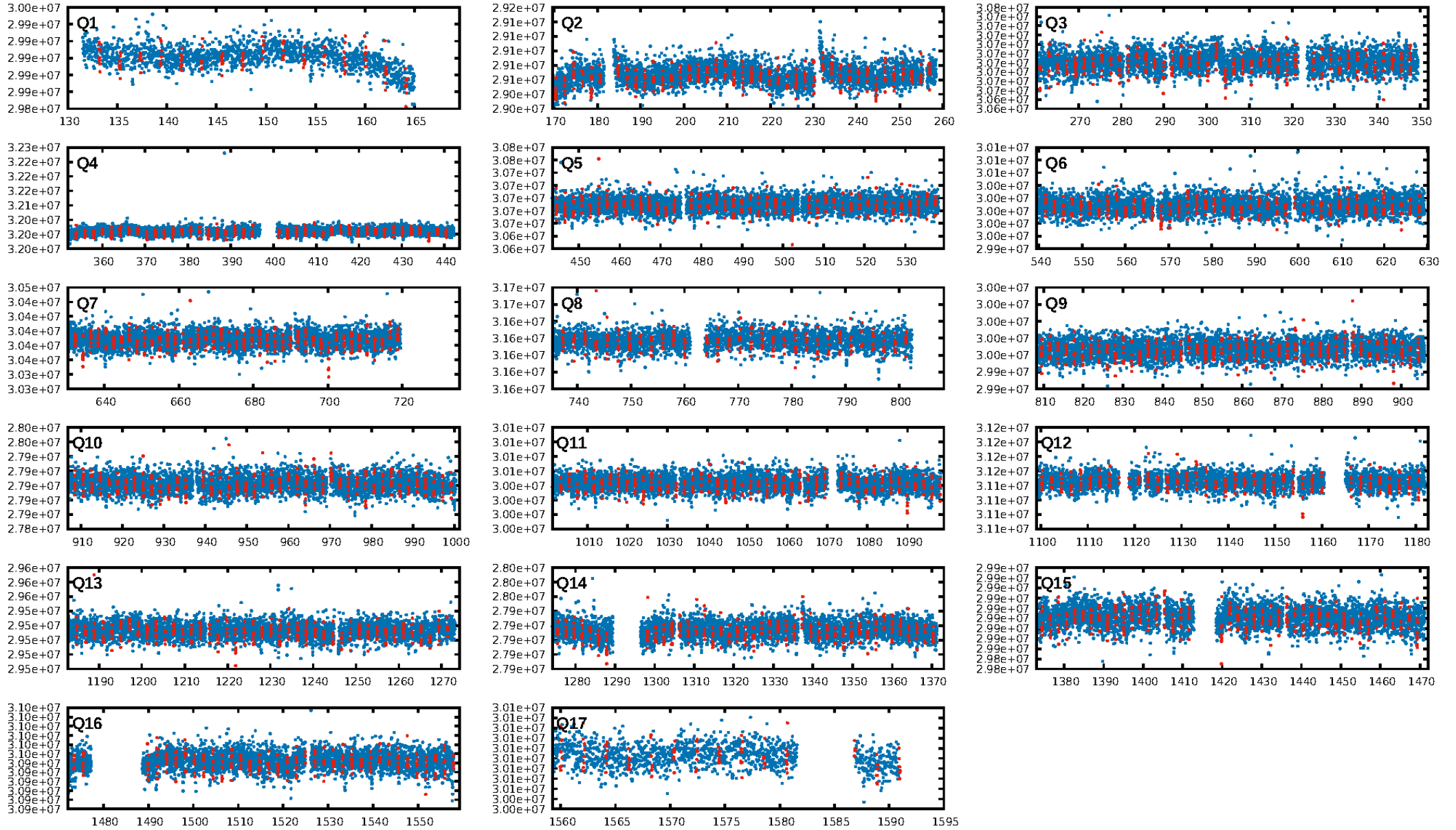
DV Fit Results:

Period = 2.06190 [0.00001] d
Epoch = 133.2013 [0.0013] BKJD
Rp/R* = 0.0145 [0.0071]
a/R* = 5.46 [10.86]
b = 0.76 [1.19]
Seff = 1085.06 [244.02]
Teff = 1463 [82] K
Rp = 1.72 [0.88] Re
a = 0.0313 [0.0043] AU
Ag = 1.98 [2.43] [0.40σ]
Teffp = 2685 [811] K [1.50σ]

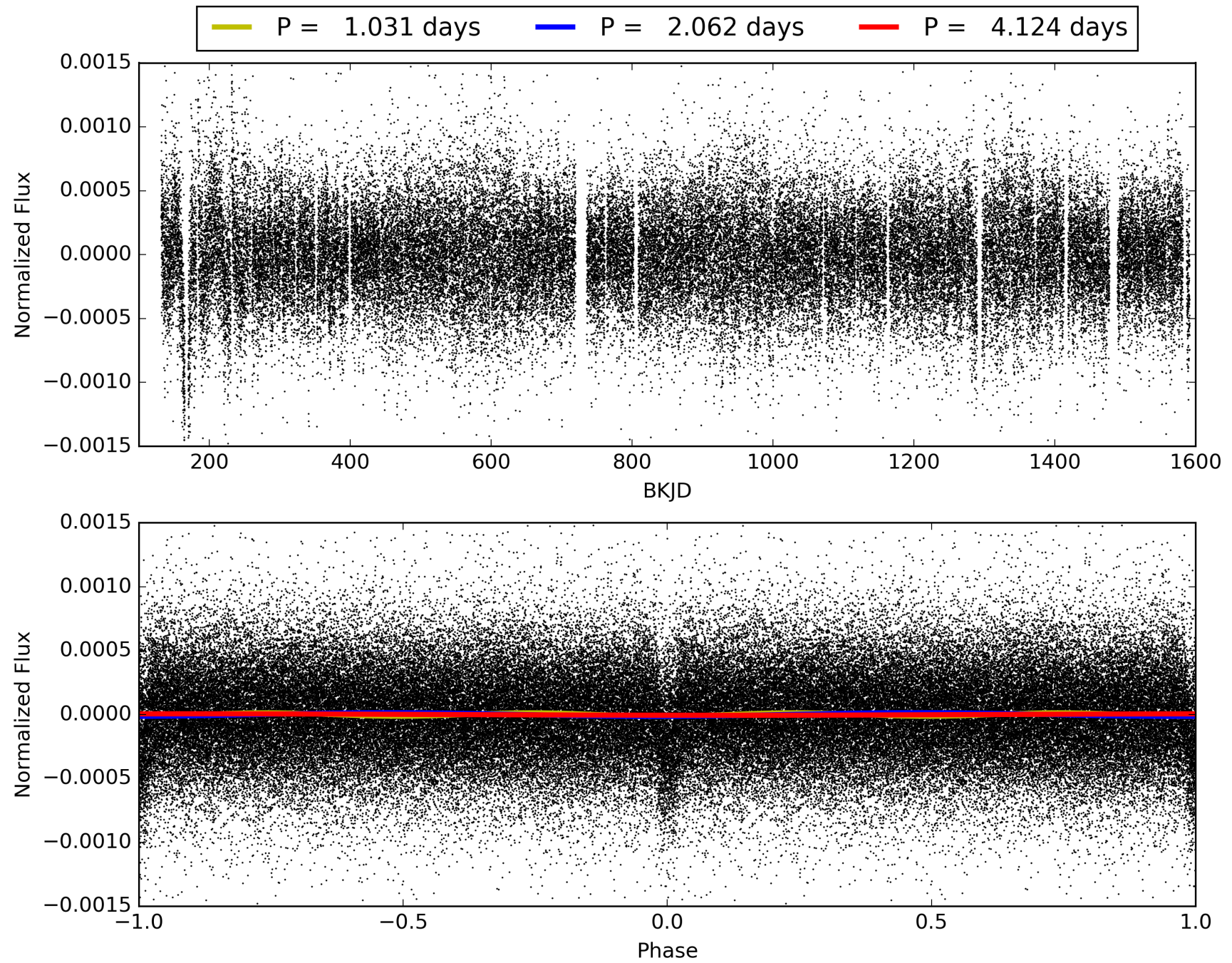
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [23.50σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 3.39e-122
RollingBand-fgt: 1.00 [587/587]
GhostDiagnostic-chr: 2.972
Centroid-sig: 0.6%
Centroid-so: 1.334 arcsec [2.40σ]
OotOffset-rm: 0.098 arcsec [0.38σ]
KicOffset-rm: 0.058 arcsec [0.22σ]
OotOffset-st: 4/4/4/5 [17]
KicOffset-st: 4/4/4/5 [17]
DiffImageQuality-fgm: 1.00 [17/17]
DiffImageOverlap-fno: 1.00 [17/17]

TCE 008344004-02, PDC Light Curves

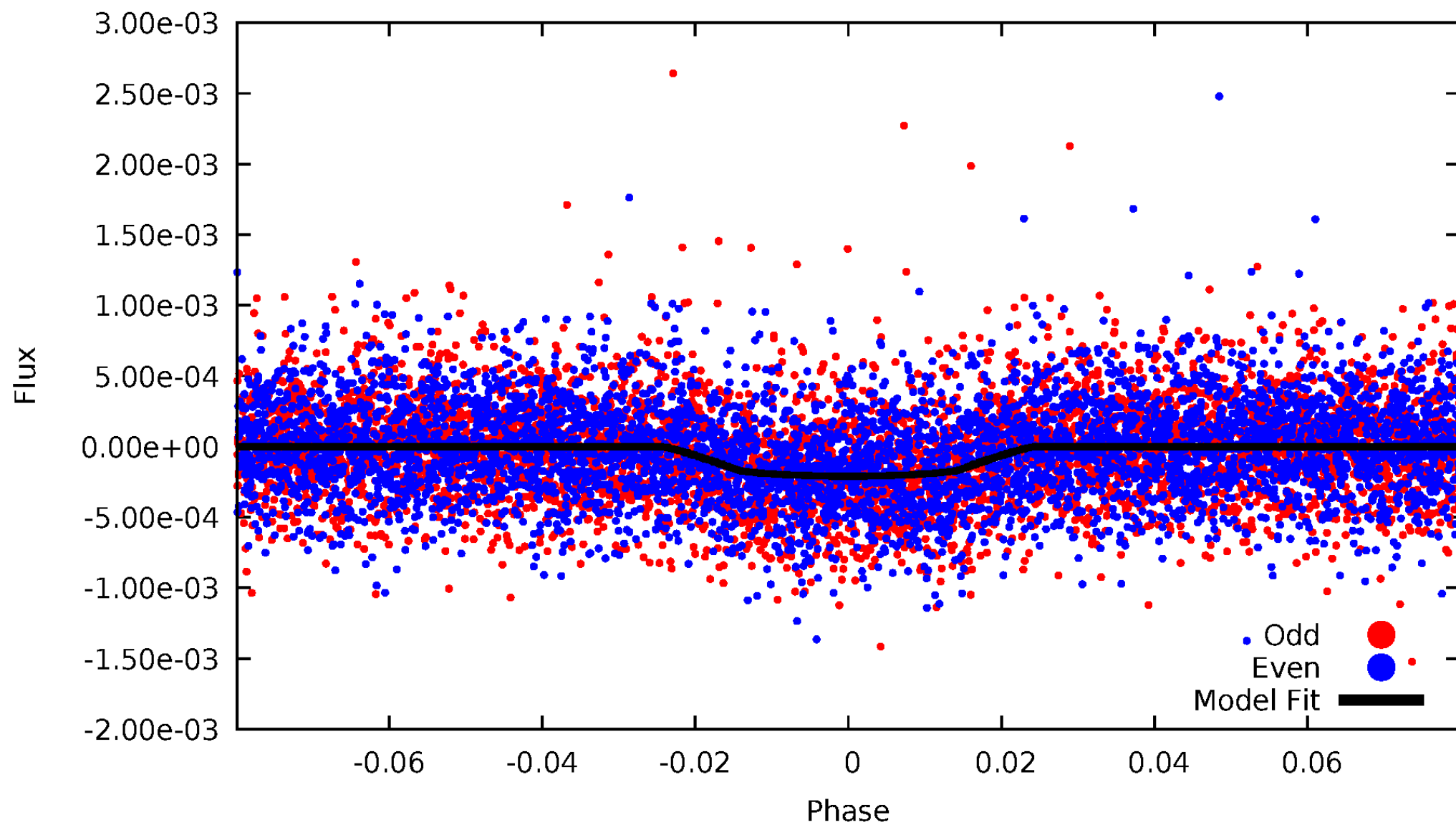


TCE 008344004-02



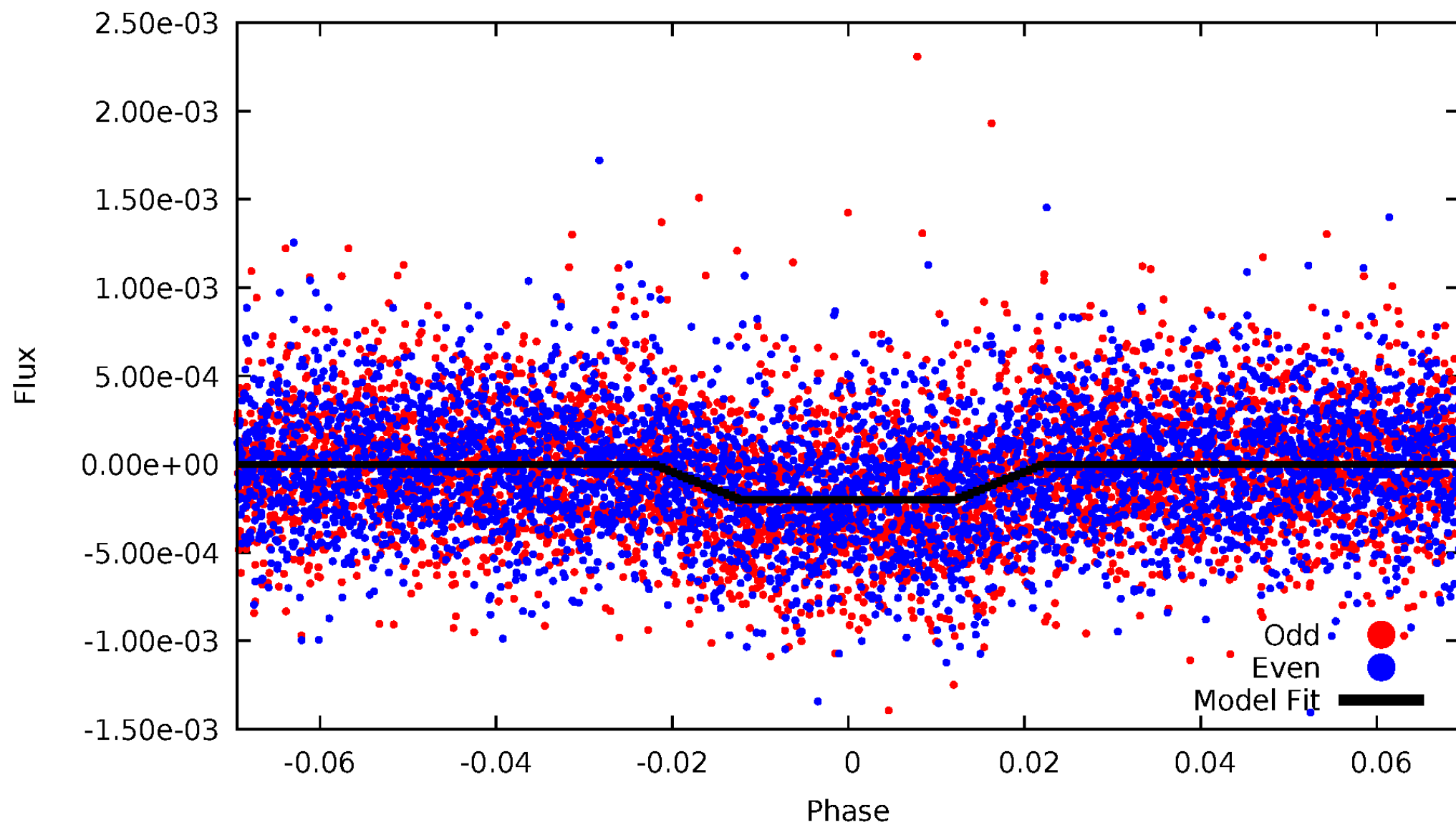
DV Odd/Even

TCE 008344004-02



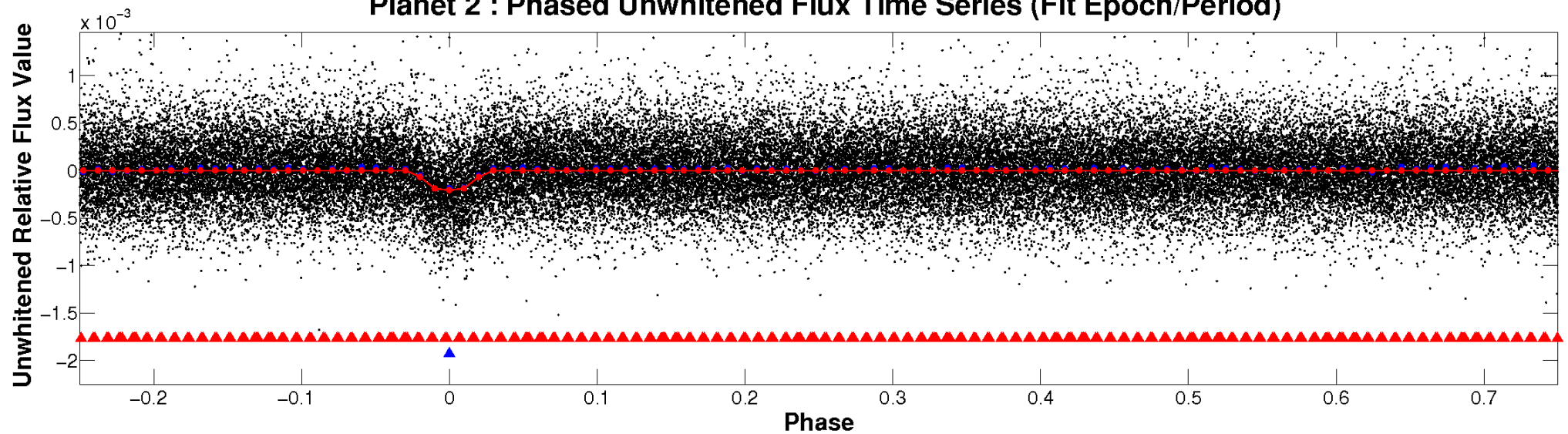
ALT Odd/Even

TCE 008344004-02

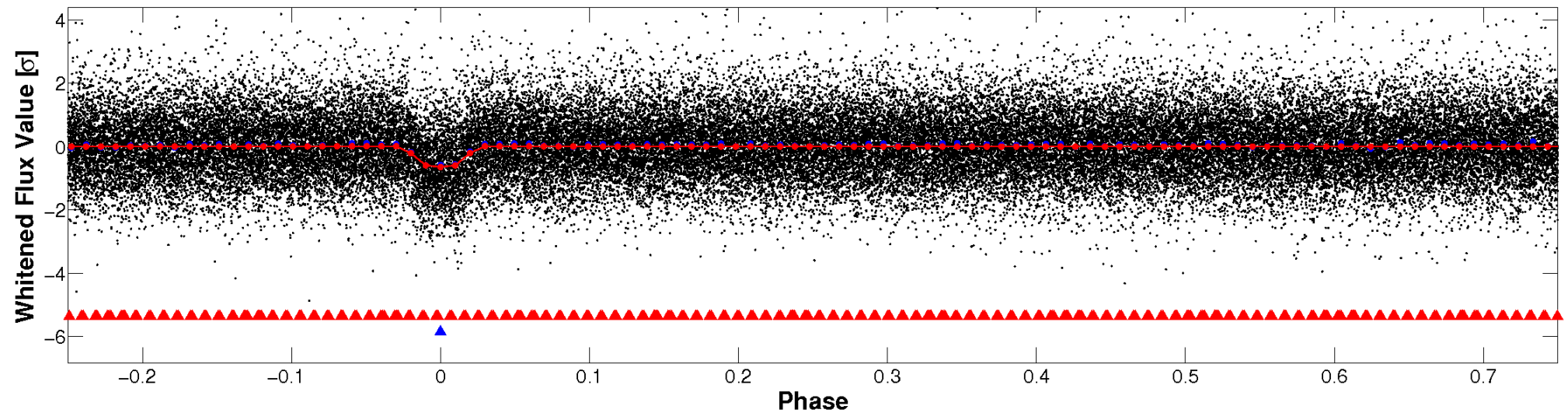


Non-Whitened Vs. Whitened Light Curve

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

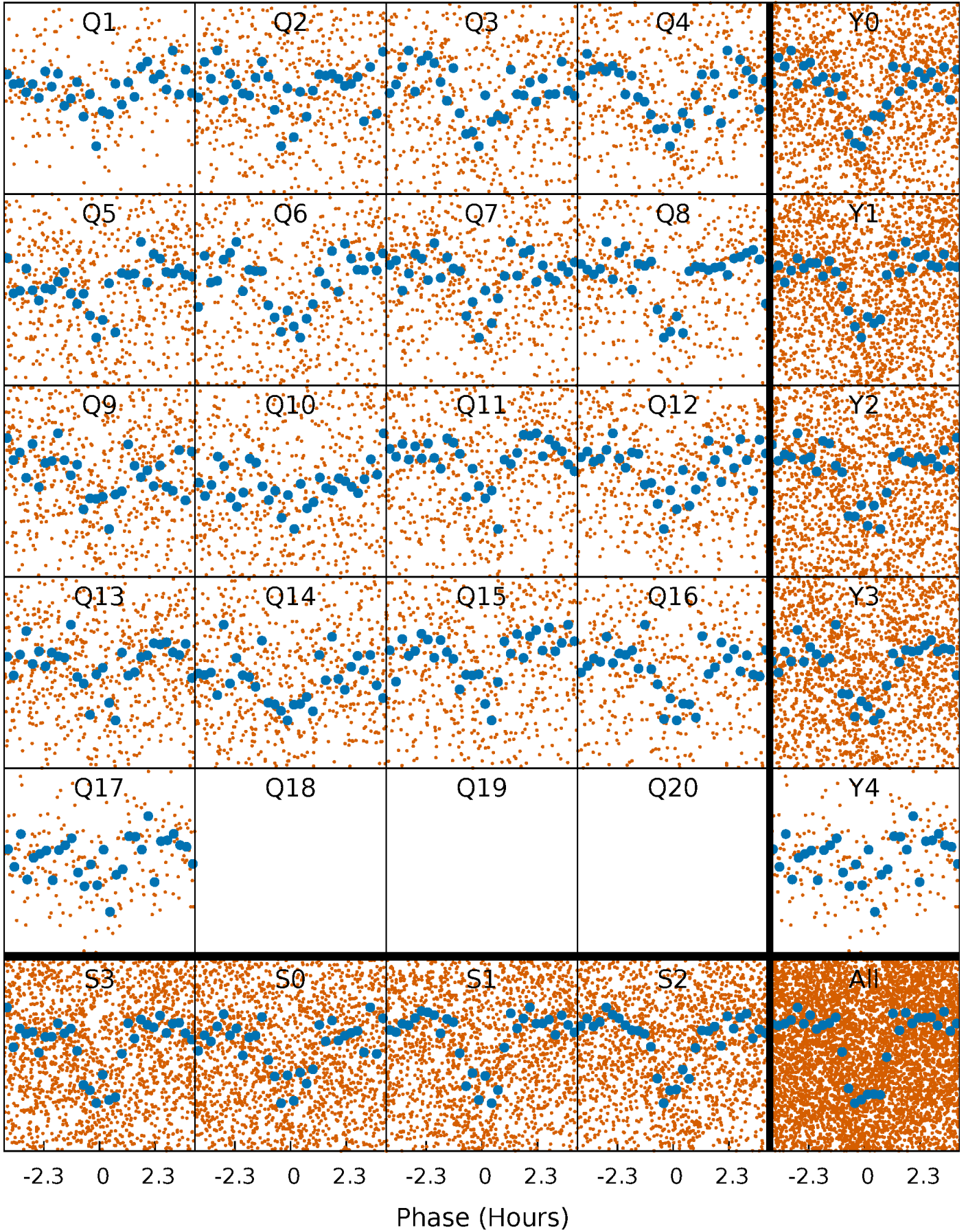


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



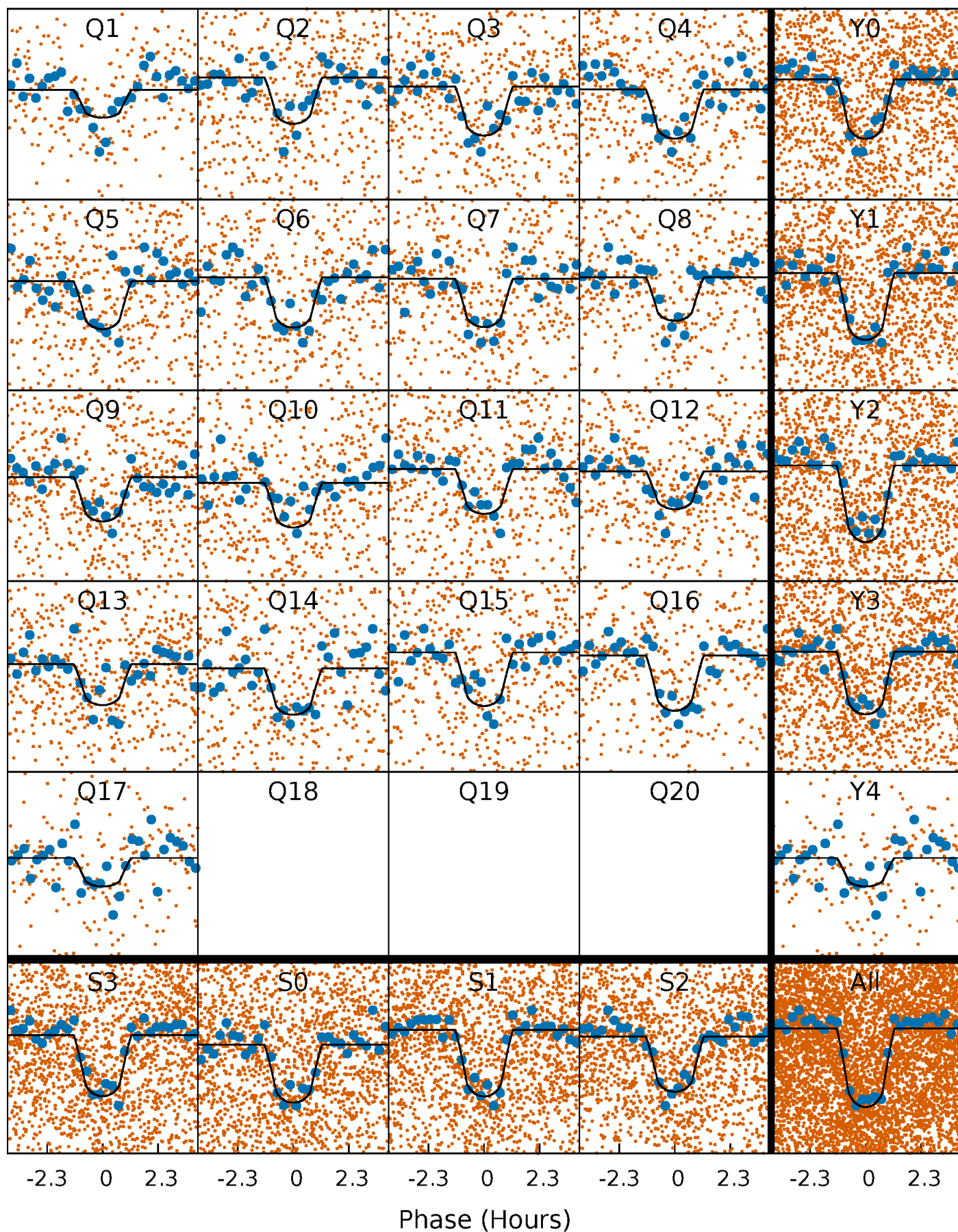
PDC Quarter-Phased Transit Curves

TCE 008344004-02 P= 2.061901 Days $T_0=133.201322$ (BKJD)



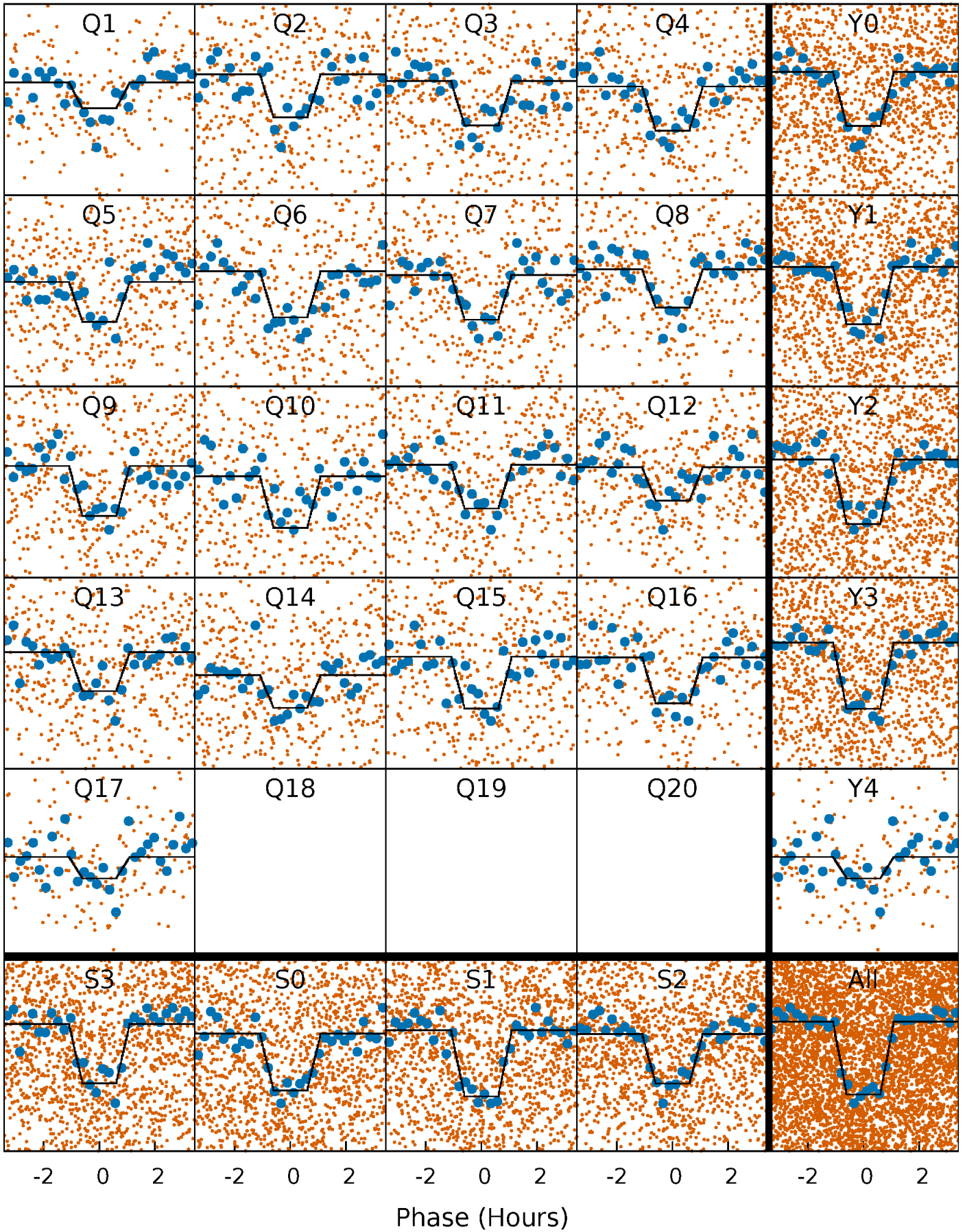
DV Quarter-Phased Transit Curves

TCE 008344004-02 P= 2.061901 Days $T_0=133.201322$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

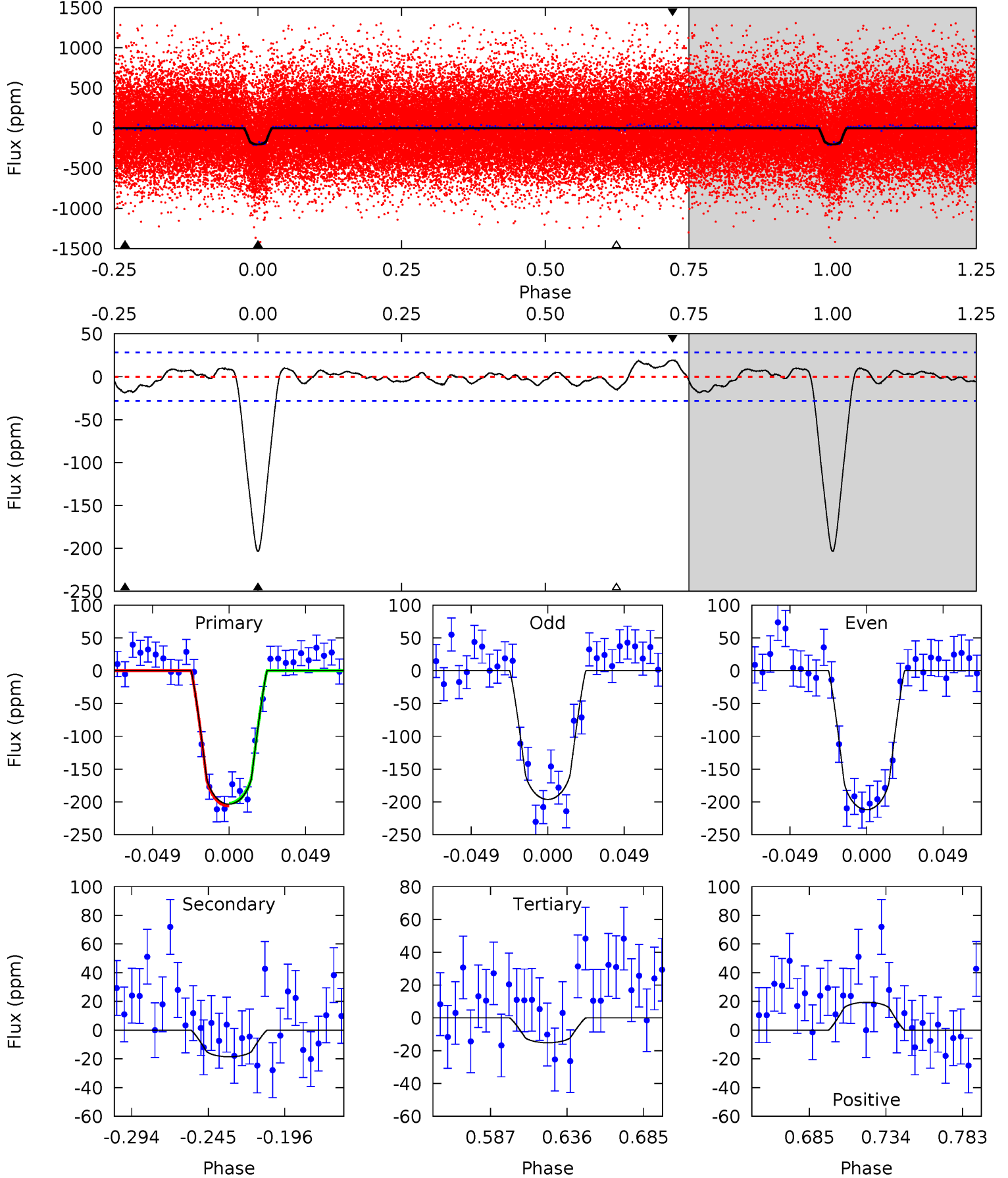
TCE 008344004-02 P= 2.061906 Days $T_0=133.199384$ (BKJD)



DV Model-Shift Uniqueness Test

008344004-02, P = 2.061901 Days, E = 131.139421 Days

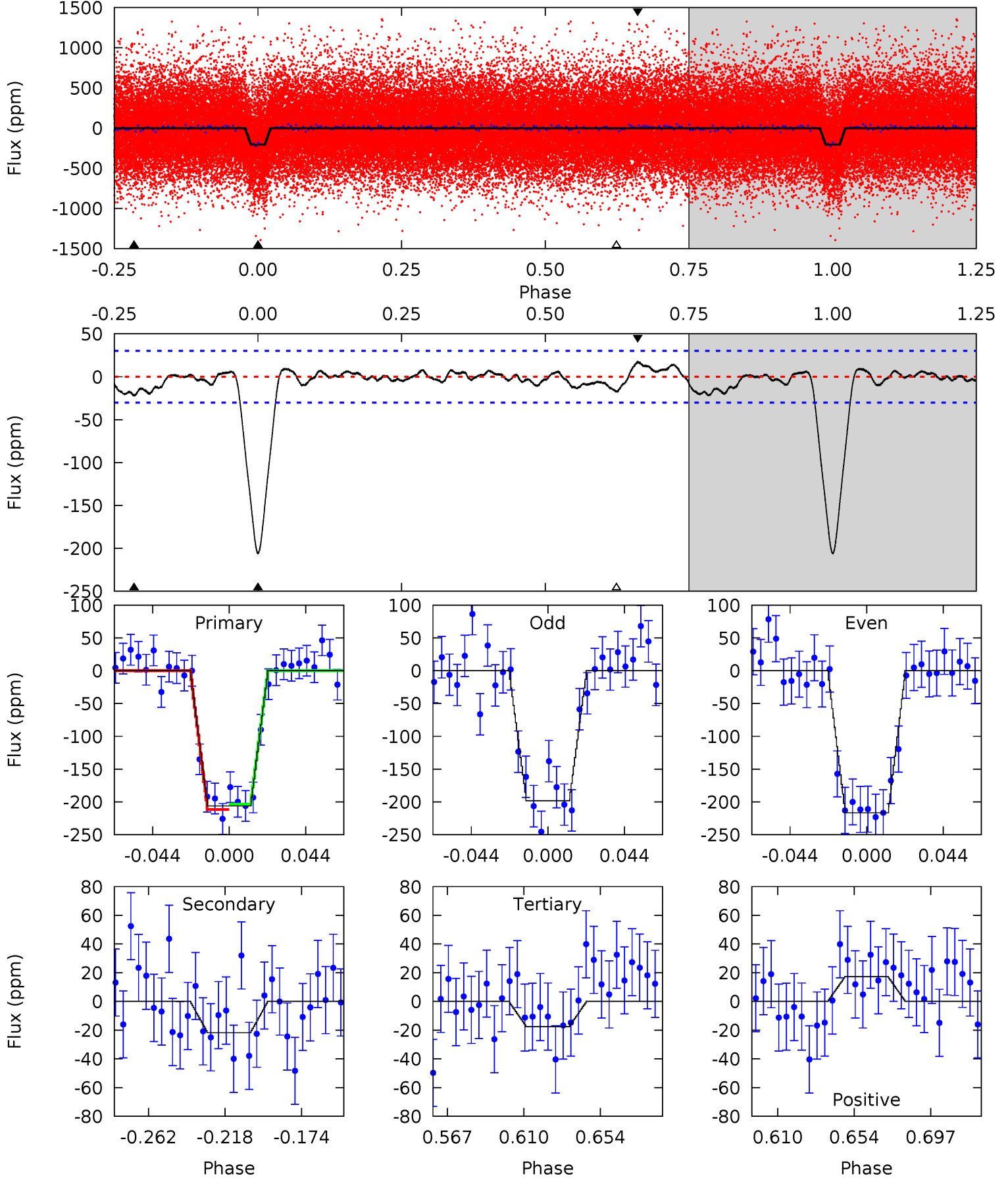
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
33.8	3.08	2.52	3.23	4.71	1.97	1.15	31.3	30.6	0.56	-0.15	1.30	0.98	0.09	0.31



Alt Model-Shift Uniqueness Test

008344004-02, P = 2.061906 Days, E = 131.137478 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
32.2	3.40	2.74	2.71	4.74	2.02	1.01	29.5	29.5	0.66	0.70	1.43	0.98	0.08	0.63



Stellar Parameters For KIC 008344004

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	5622^{+76}_{-84}	$4.346^{+0.126}_{-0.103}$	$0.140^{+0.150}_{-0.150}$	$1.089^{+0.160}_{-0.128}$	$0.958^{+0.068}_{-0.050}$	$1.045^{+0.524}_{-0.350}$
	+1%/-1%	+3%/-2%	+107%/-107%	+15%/-12%	+7%/-5%	+50%/-33%
Source	SPE90	SPE90	SPE90	DSEP		

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

Secondary Eclipse Parameters for KIC 008344004-02 / KOI 0573.02

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-19 ± 6	$1.76^{+0.87}_{-0.80}$	2036^{+89}_{-73}	3448^{+854}_{-511}	$3.180^{+7.614}_{-1.904}$
Alt.	-22 ± 6	$1.65^{+0.85}_{-0.78}$	2037^{+86}_{-87}	3576^{+1002}_{-492}	$4.060^{+10.722}_{-2.353}$

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 $A_{obs} \gg 1.0$

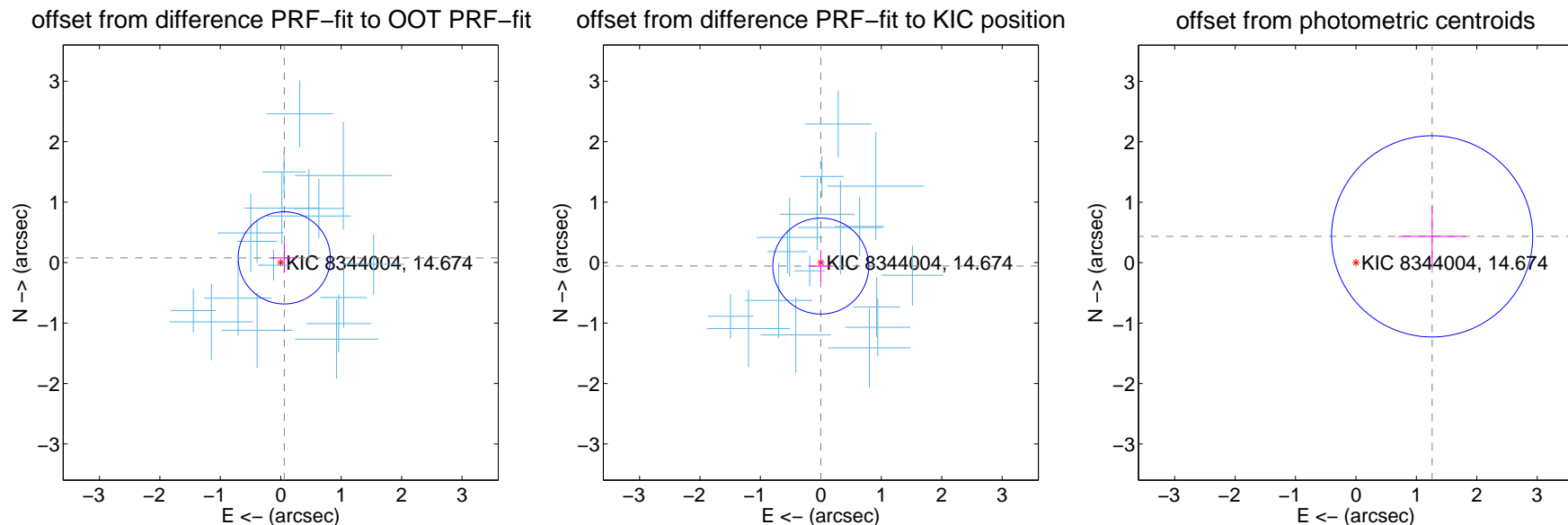
DV Centroid Data

Supplemental centroid analysis for 008344004-02. Kepler magnitude: 14.67. Transit SNR 26.48

There are 17 quarters with good PRF difference image offsets

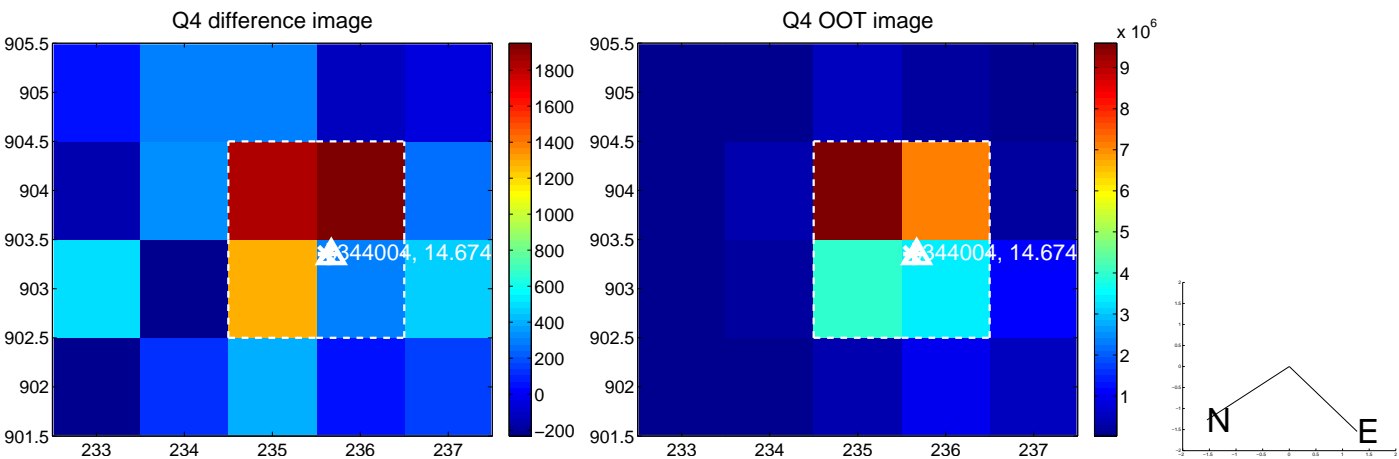
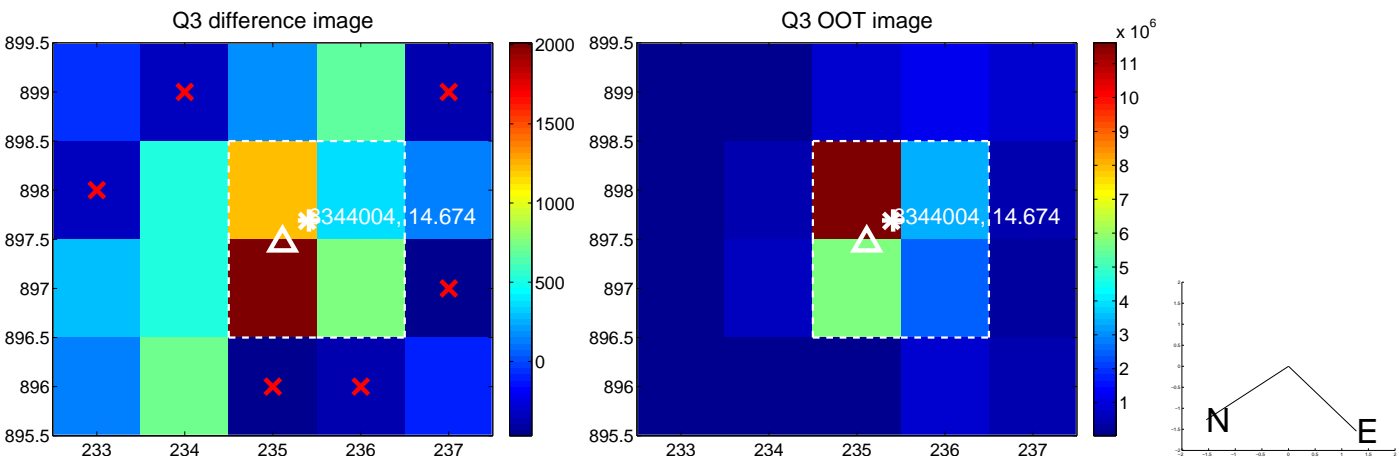
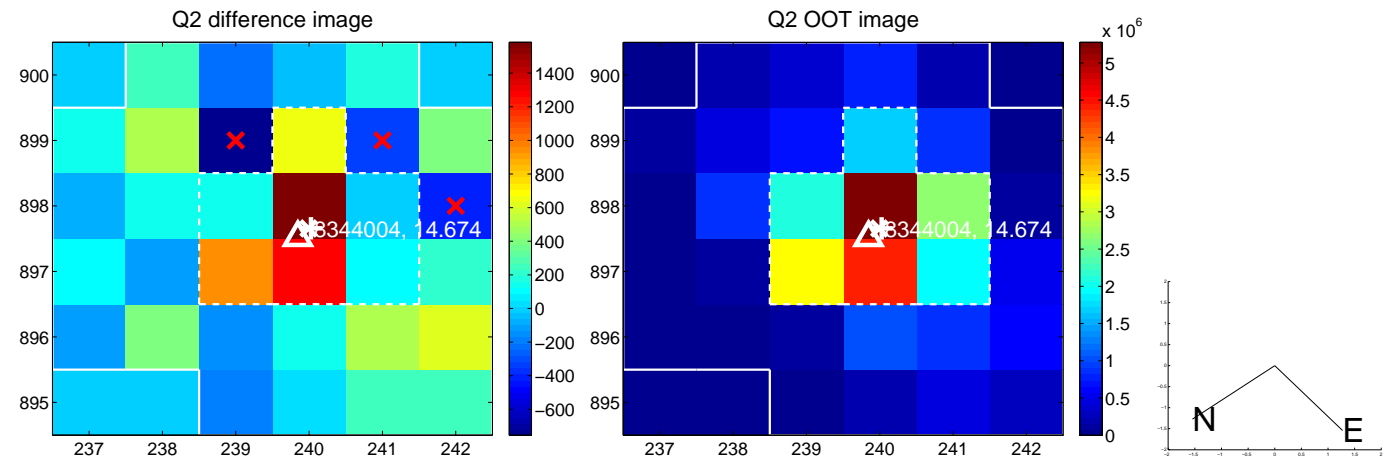
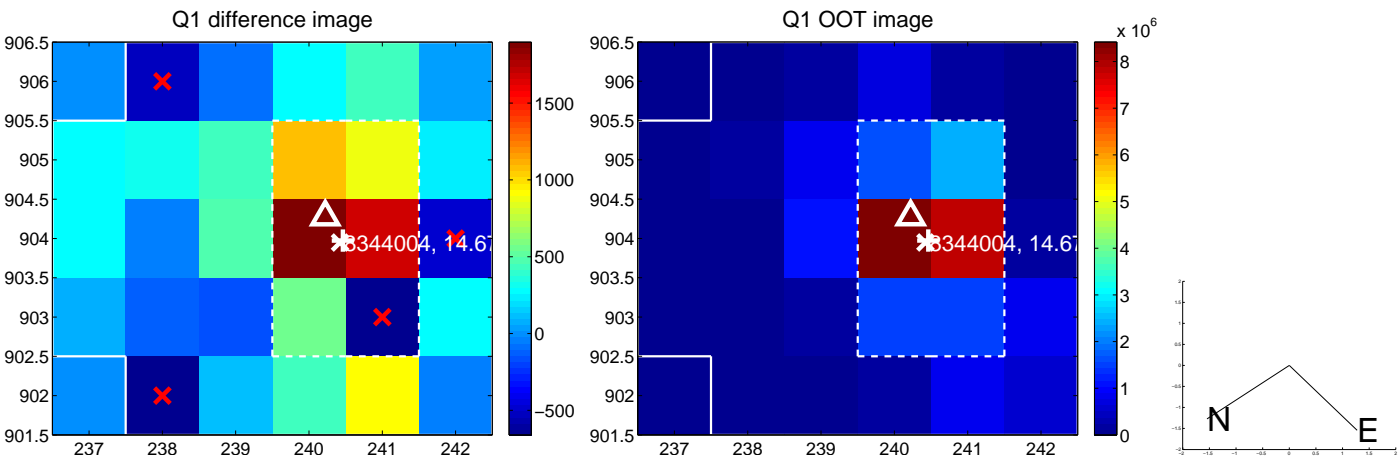
The direct PRF centroid is offset from the target star catalog position by about 0.17 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.098 ± 0.254	0.38	-0.058 ± 0.213	0.078 ± 0.244
PRF-fit source offset from KIC position	0.058 ± 0.265	0.22	0.001 ± 0.206	-0.058 ± 0.264
photometric centroid source offset	1.33 ± 0.56	2.40	-1.26 ± 0.56	0.44 ± 0.52

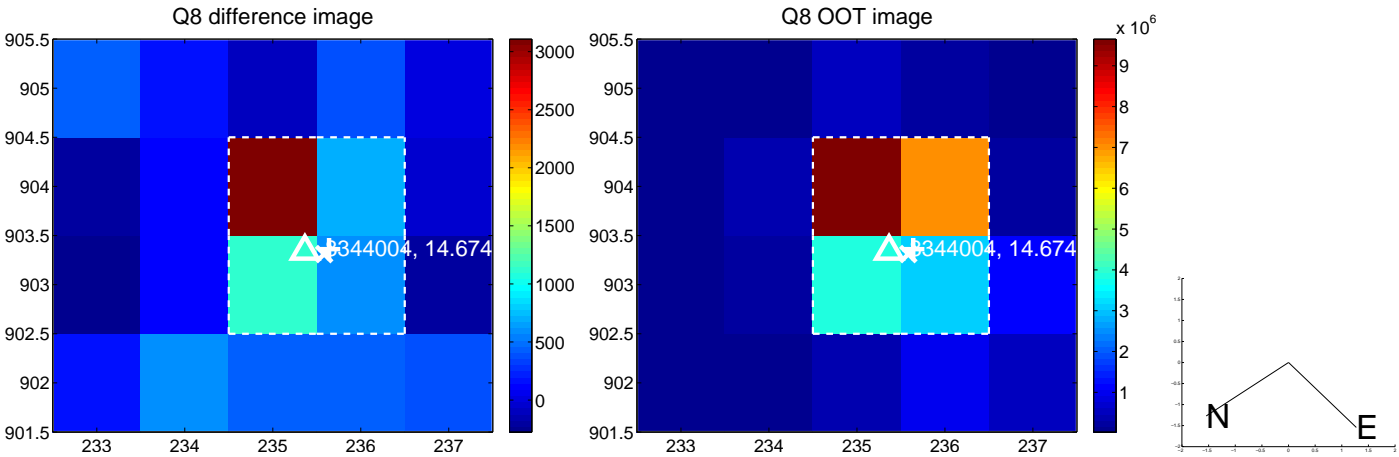
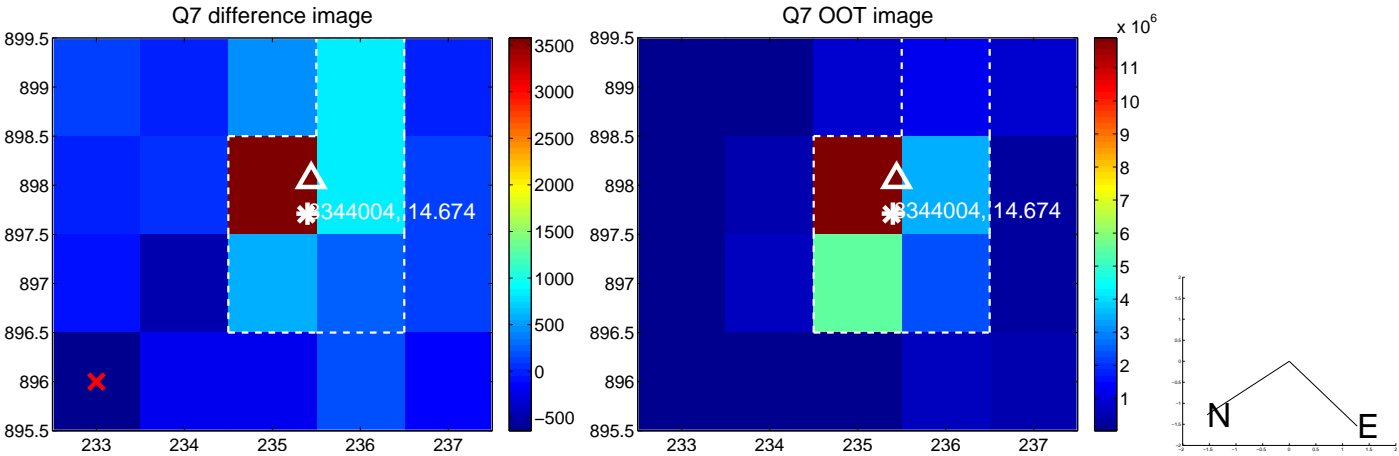
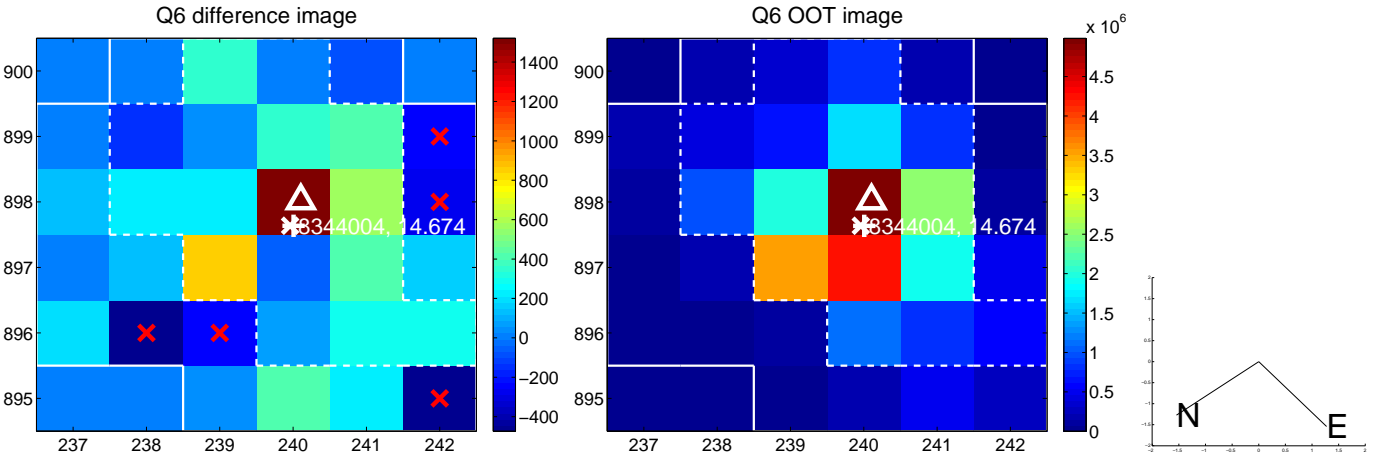
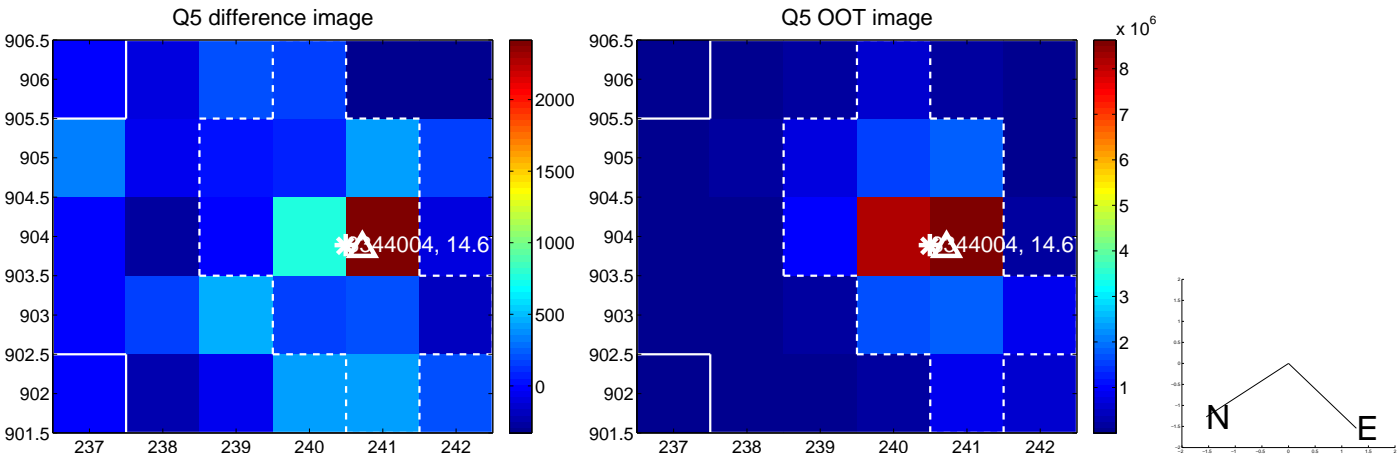


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

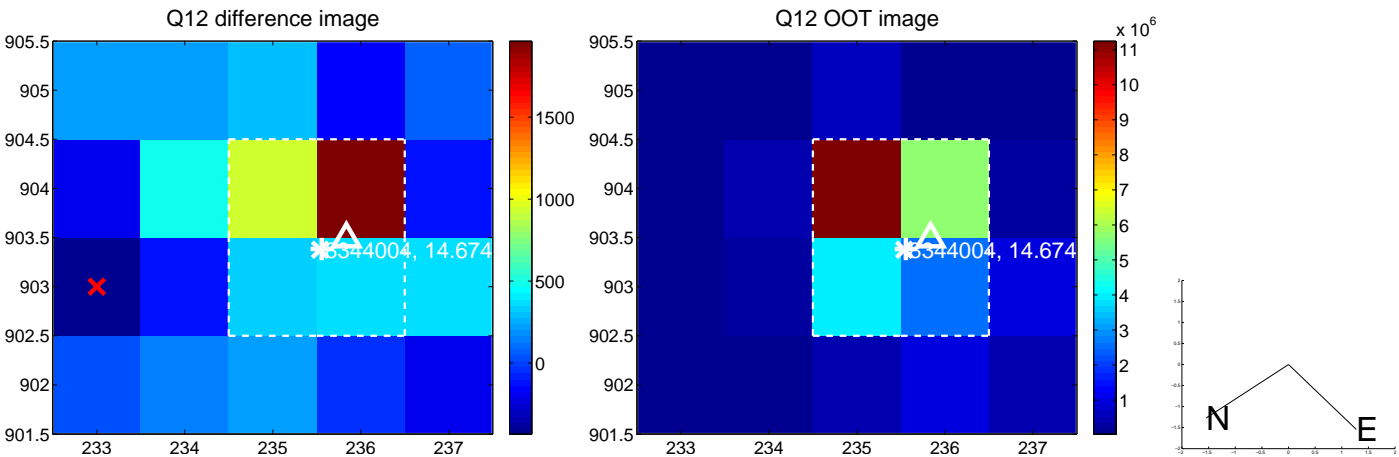
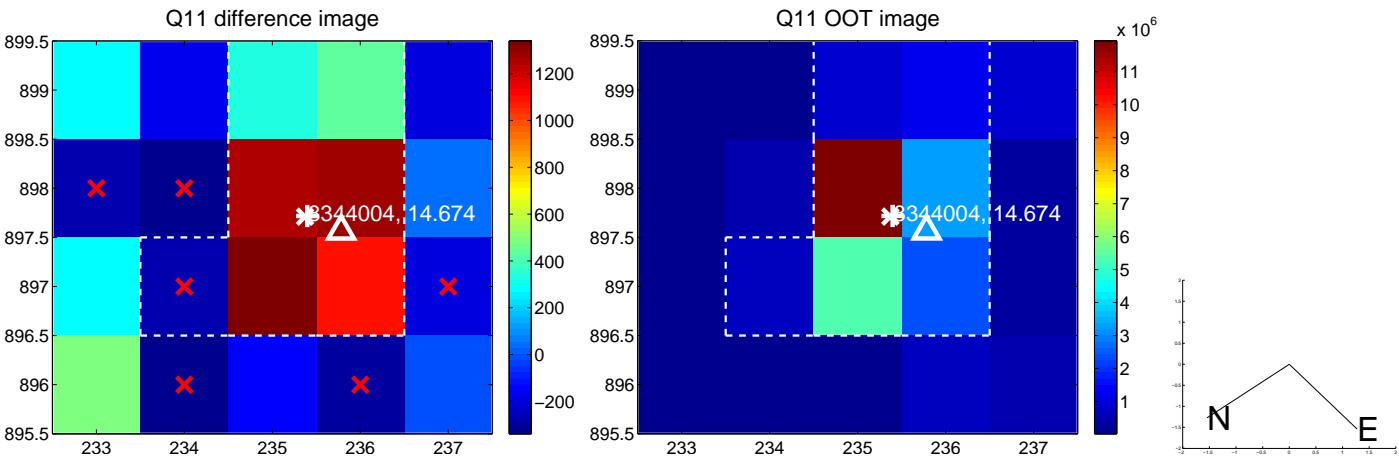
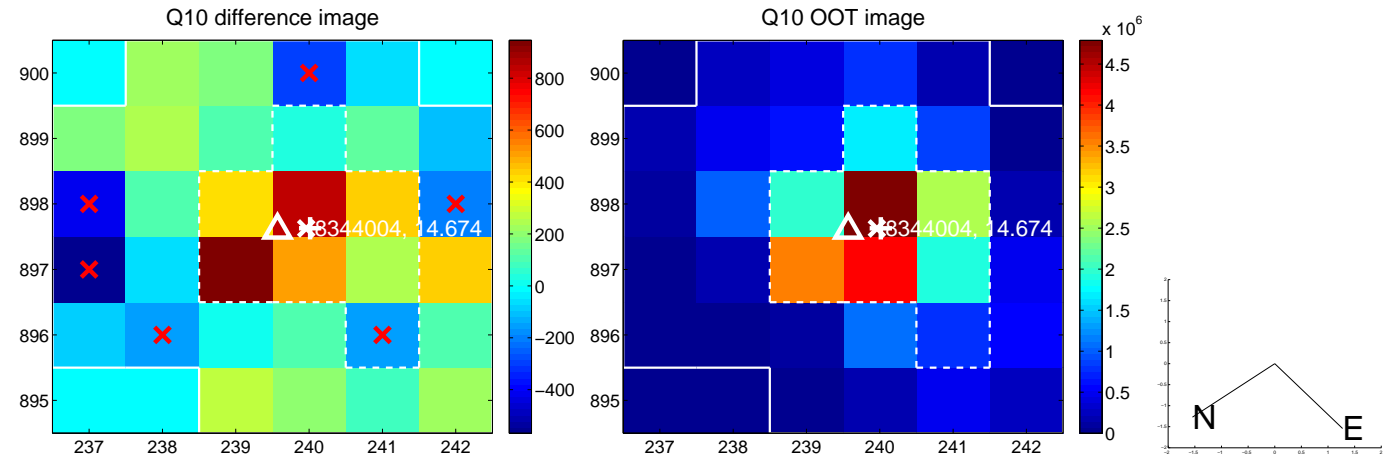
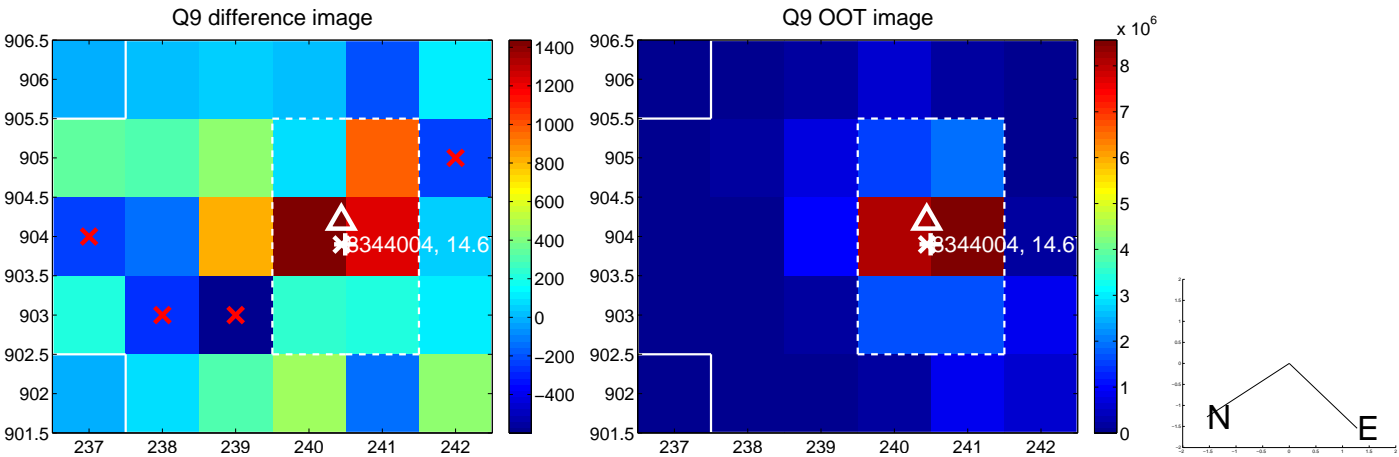
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



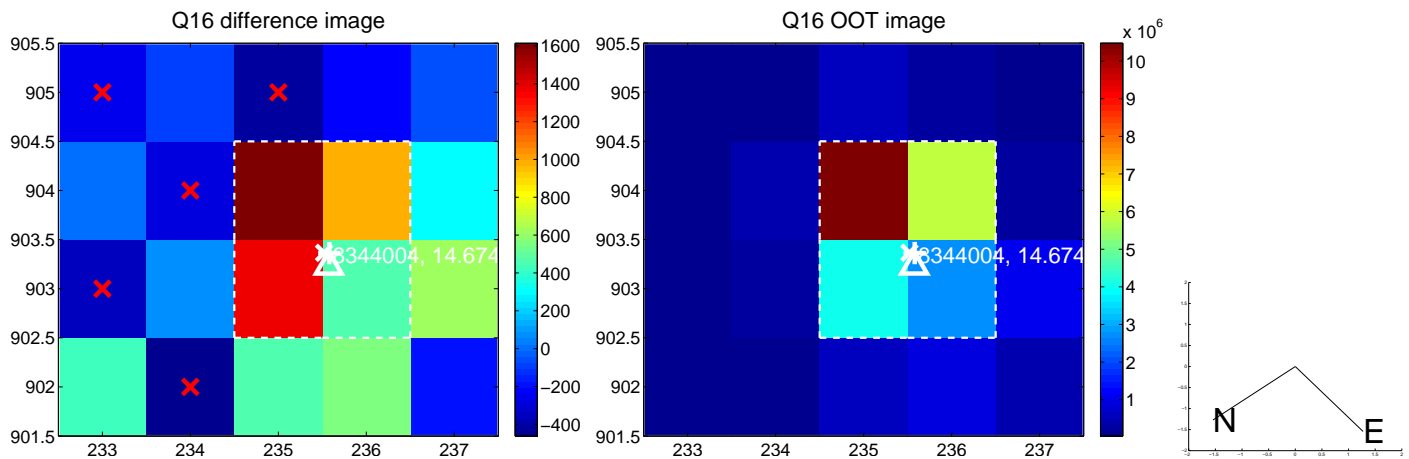
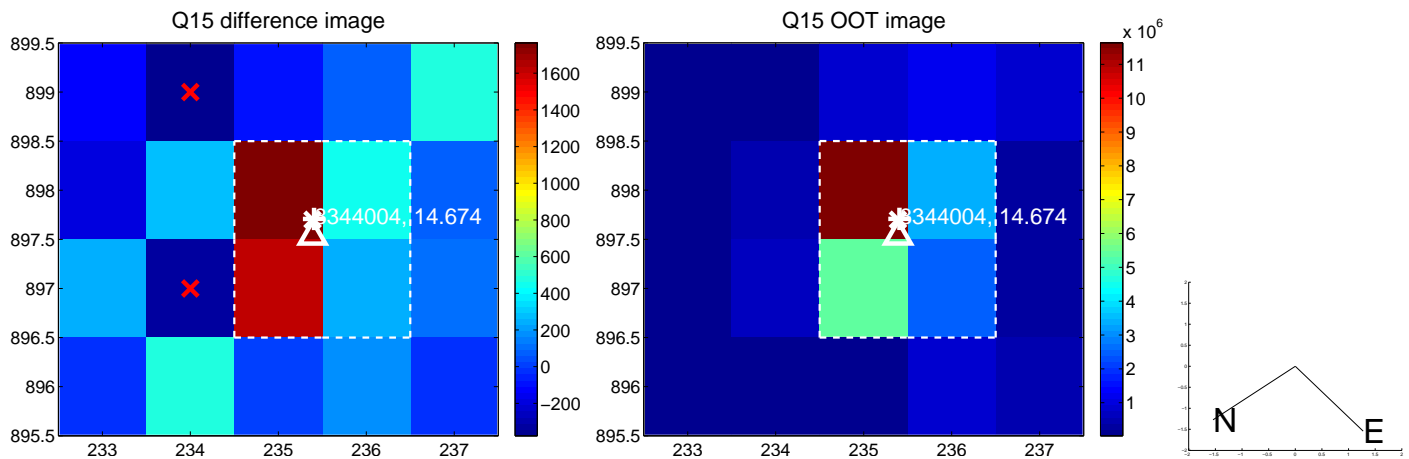
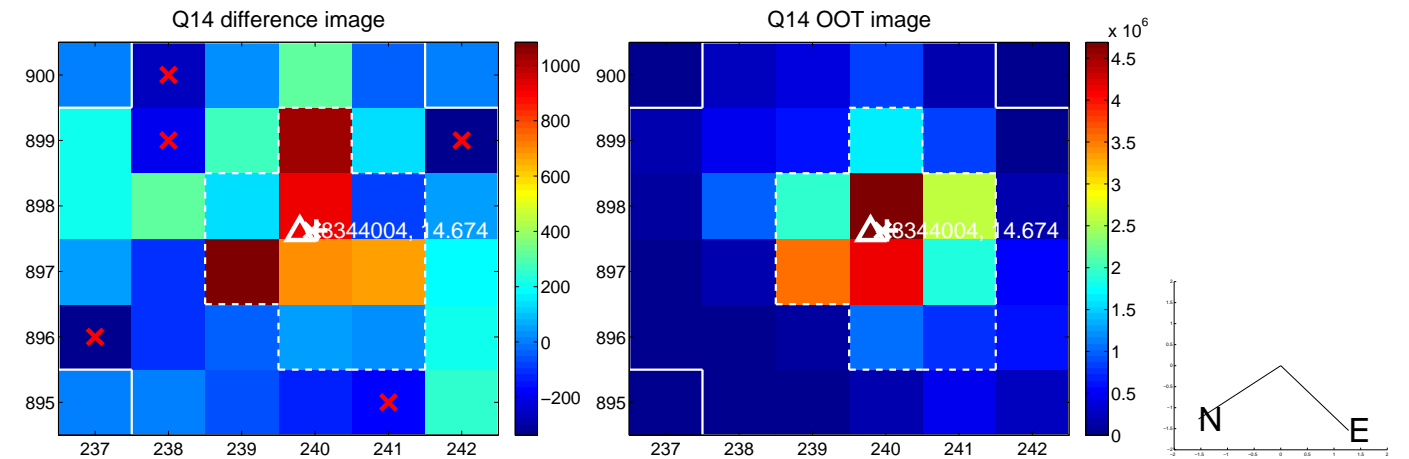
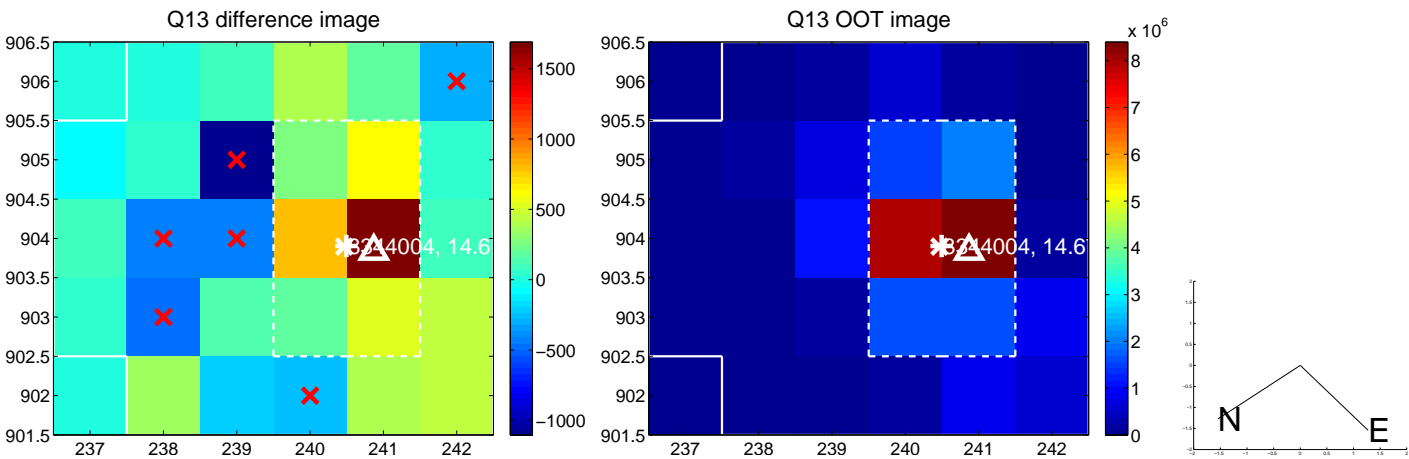
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



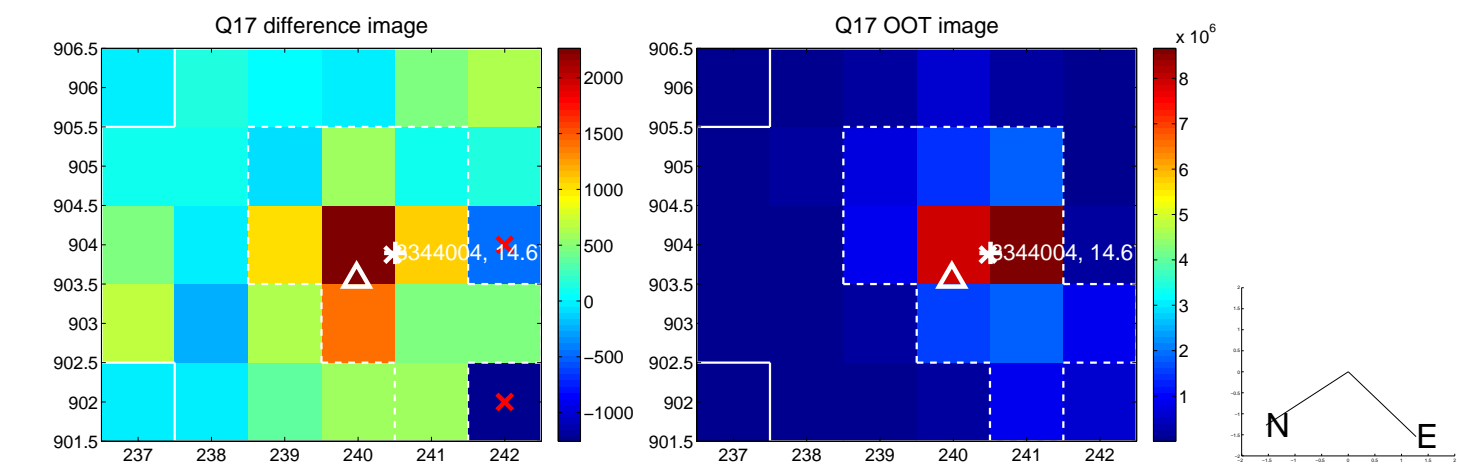
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



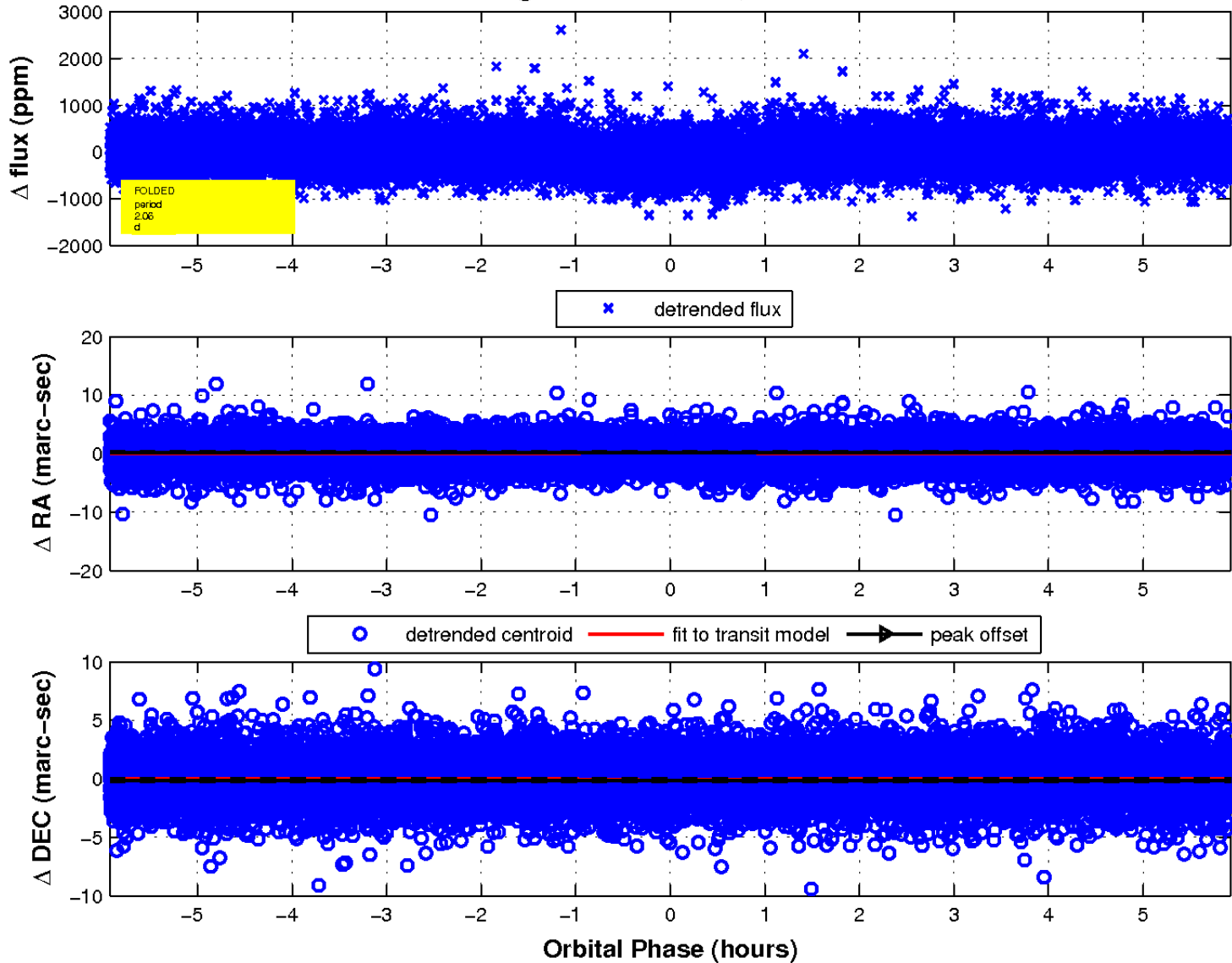
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



fluxWeightedCentroids, Planet 2 of 2



UKIRT Image

Declination

