

KIC 002438264

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})
002438264-01	OBS	0440.01	15.906898	146.115980	934.1	4.156	55.4	59.3	0.80	5097	2.71	28.38
002438264-02	OBS	0440.02	4.973455	136.071737	732.0	1.699	51.7	60.6	0.80	5097	2.58	133.74

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
002438264-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
002438264-02	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.

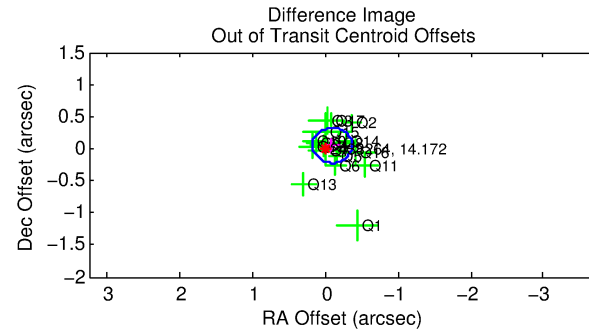
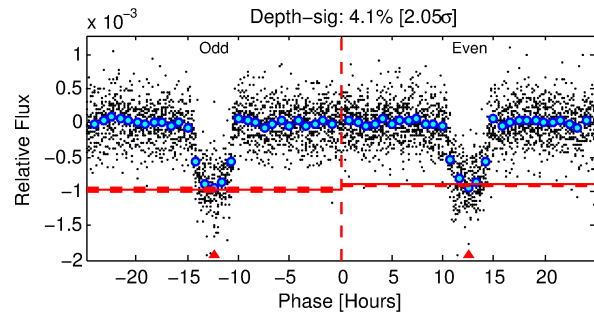
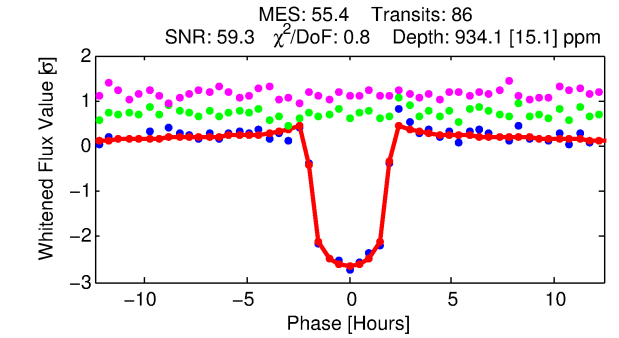
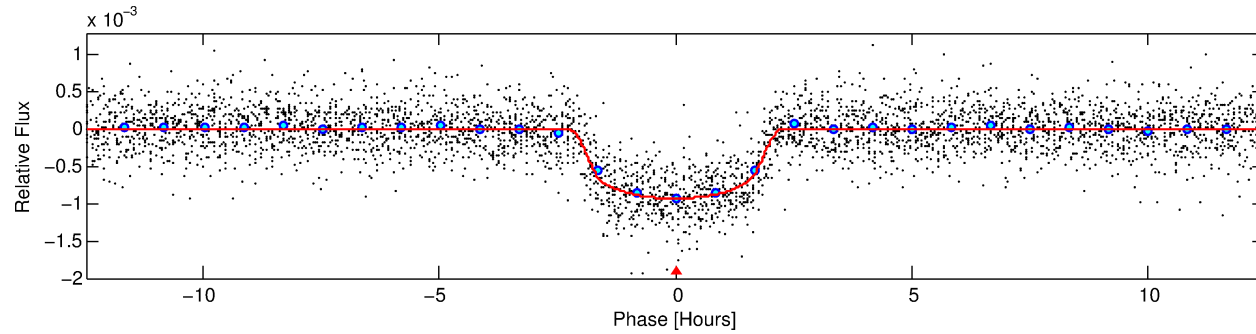
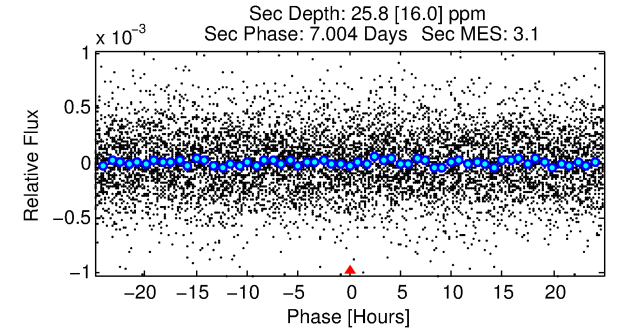
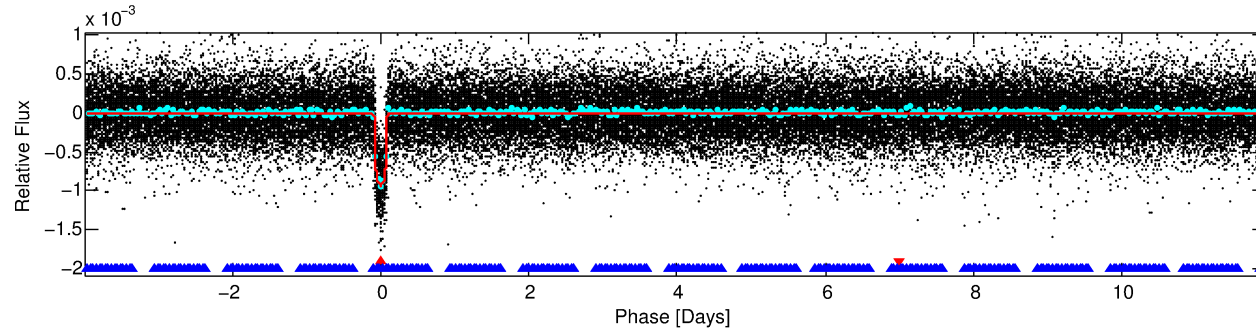
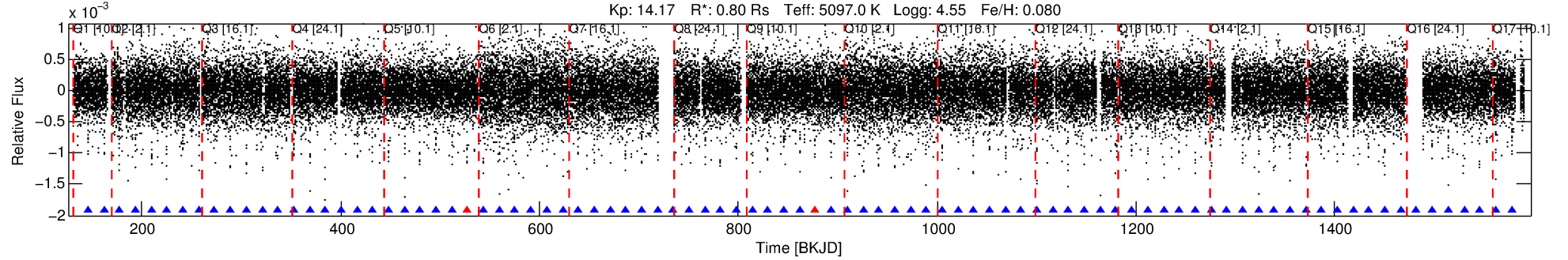
Ephemeris Match Information For 002438264-01

No Significant Match Found

DV One-Page Summary

KIC: 2438264 Candidate: 1 of 2 Period: 15.907 d
KOI: K00440.01 Name: Kepler-156c Corr: 0.984

Kp: 14.17 R*: 0.80 Rs Teff: 5097.0 K Logg: 4.55 Fe/H: 0.080



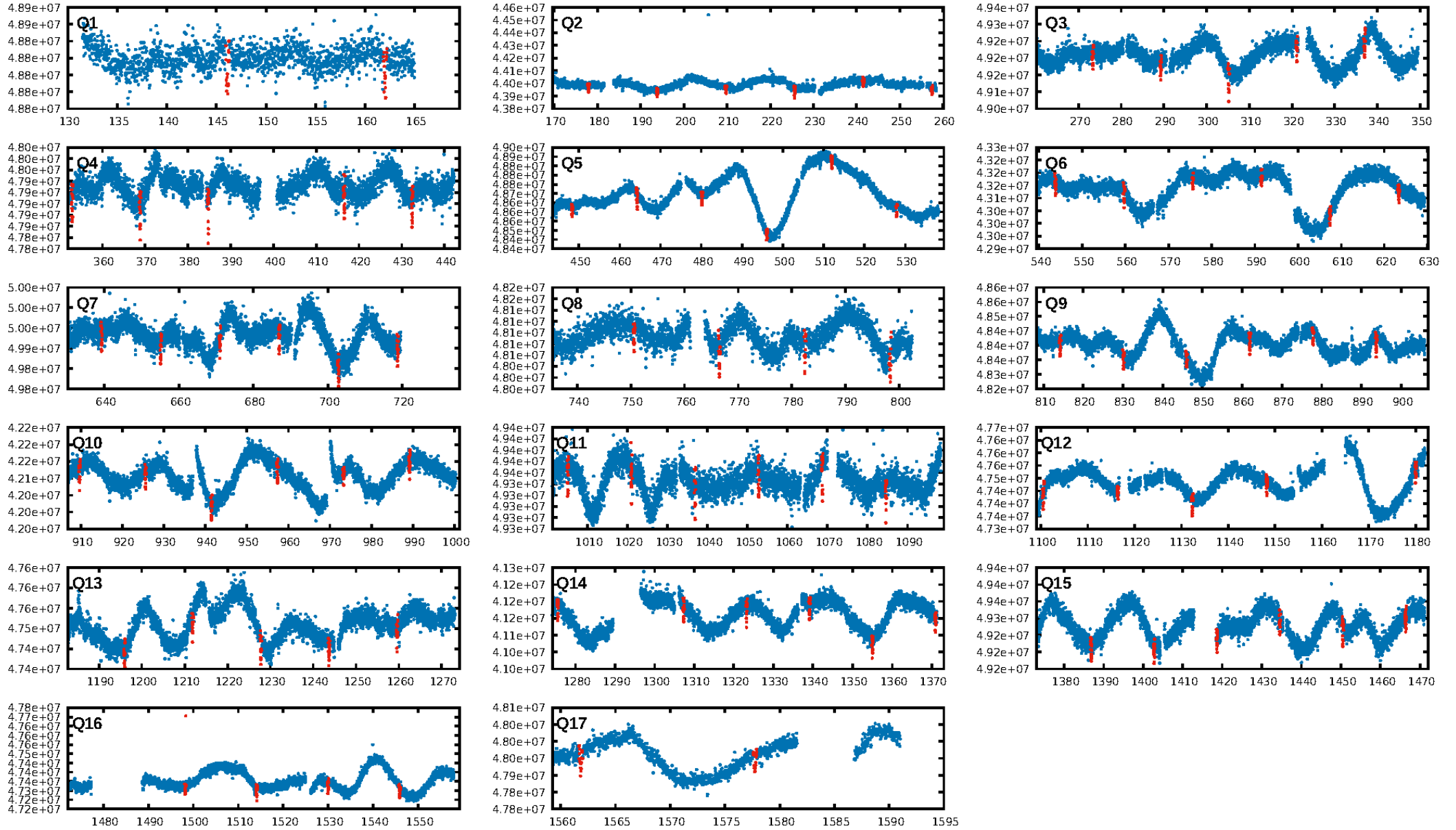
DV Fit Results:

Period = 15.90690 [0.00002] d
Epoch = 146.1160 [0.0012] BKJD
Rp/R* = 0.0311 [0.0027]
a/R* = 19.45 [6.08]
b = 0.79 [0.15]
Seff = 28.38 [3.37]
Teff = 589 [17] K
Rp = 2.71 [0.29] Re
a = 0.1163 [0.0067] AU
Ag = 26.21 [17.05] [1.48 σ]
Teffp = 2059 [334] K [4.39 σ]

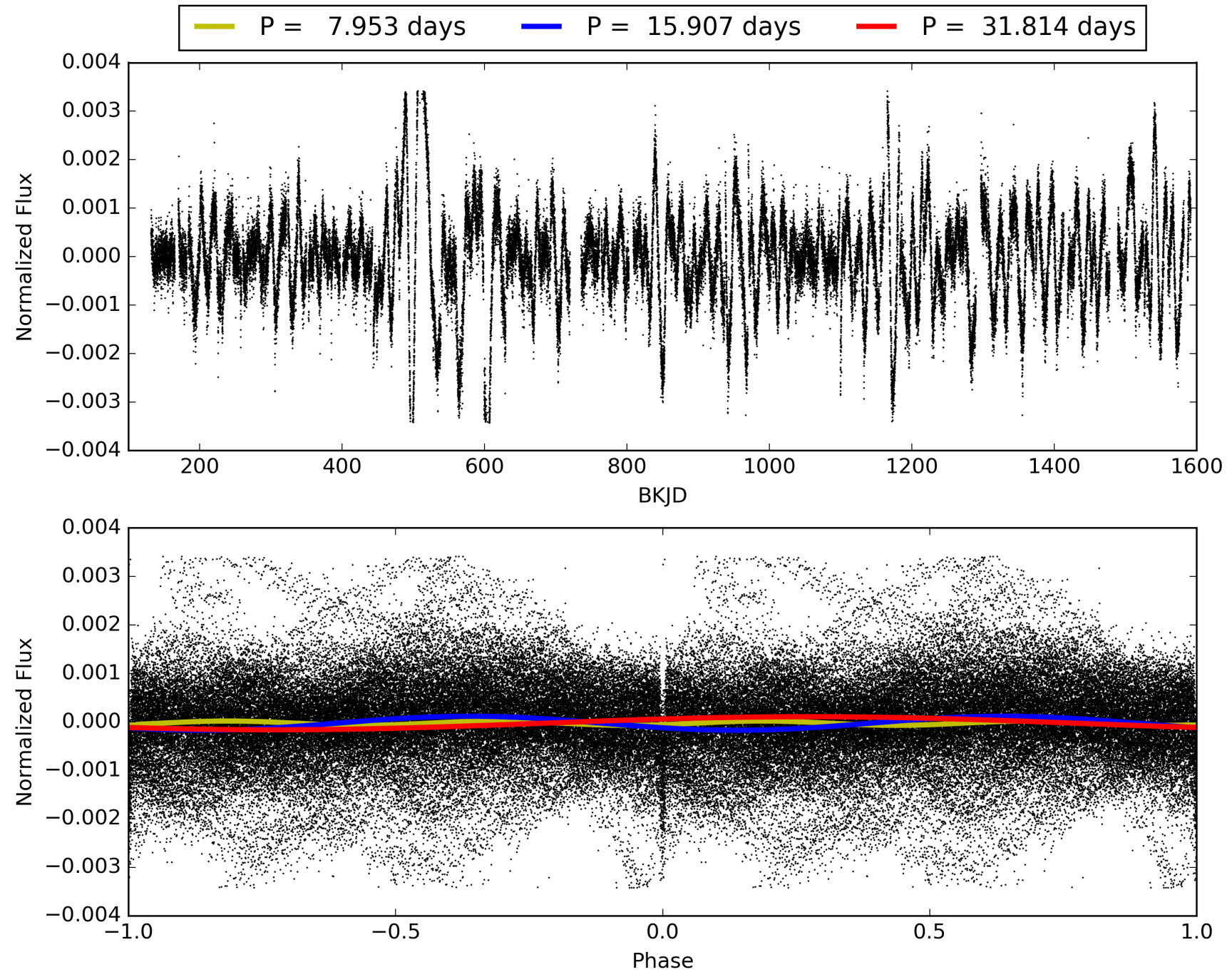
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [58.44 σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 91.1%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 0.00e+00
RollingBand-fgt: 0.98 [80/82]
GhostDiagnostic-chr: 2.486
Centroid-sig: 0.0%
Centroid-so: 0.650 arcsec [4.59 σ]
OotOffset-rm: 0.107 arcsec [1.17 σ]
KicOffset-rm: 0.347 arcsec [3.28 σ]
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 002438264-01, PDC Light Curves

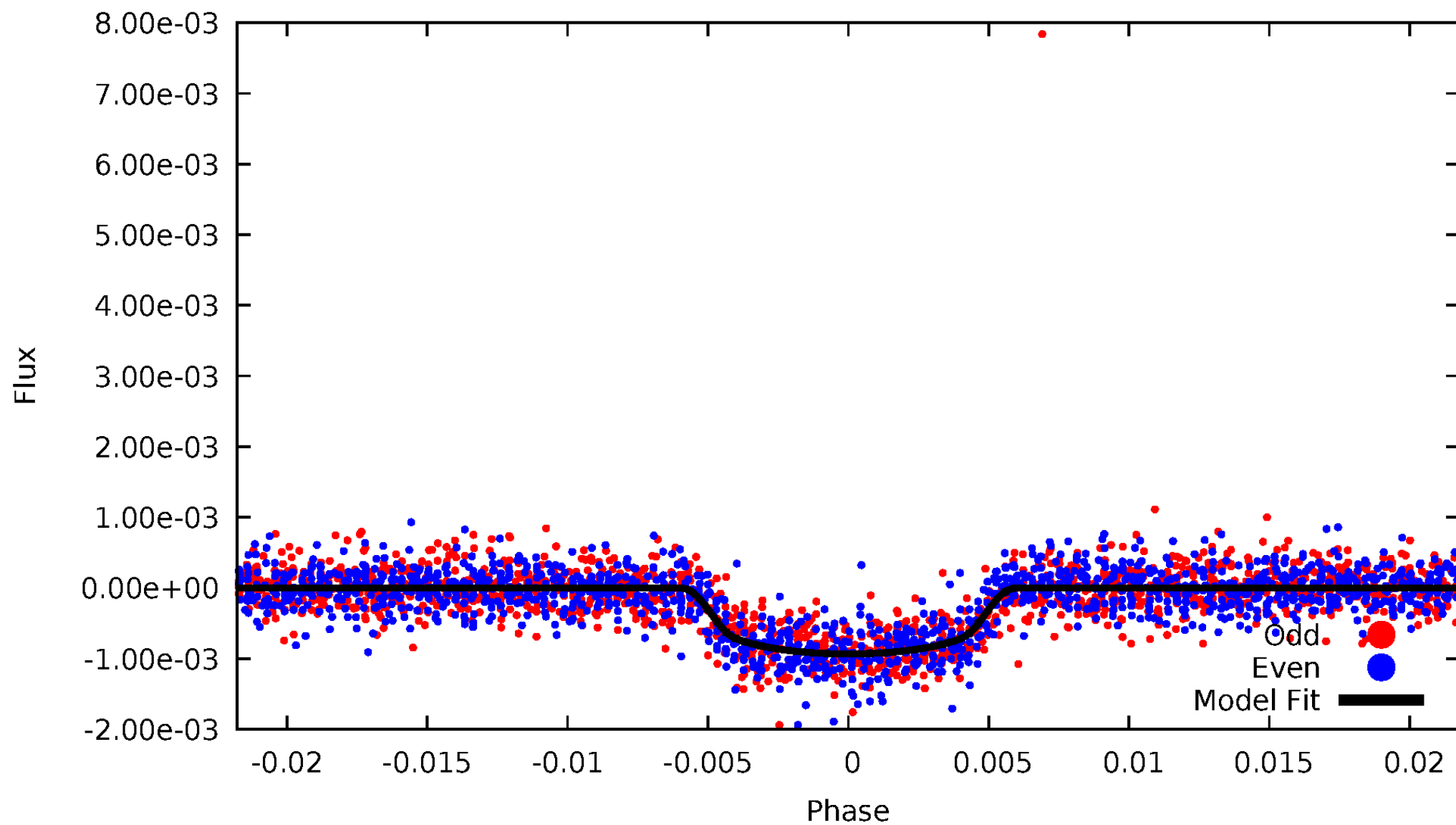


TCE 002438264-01



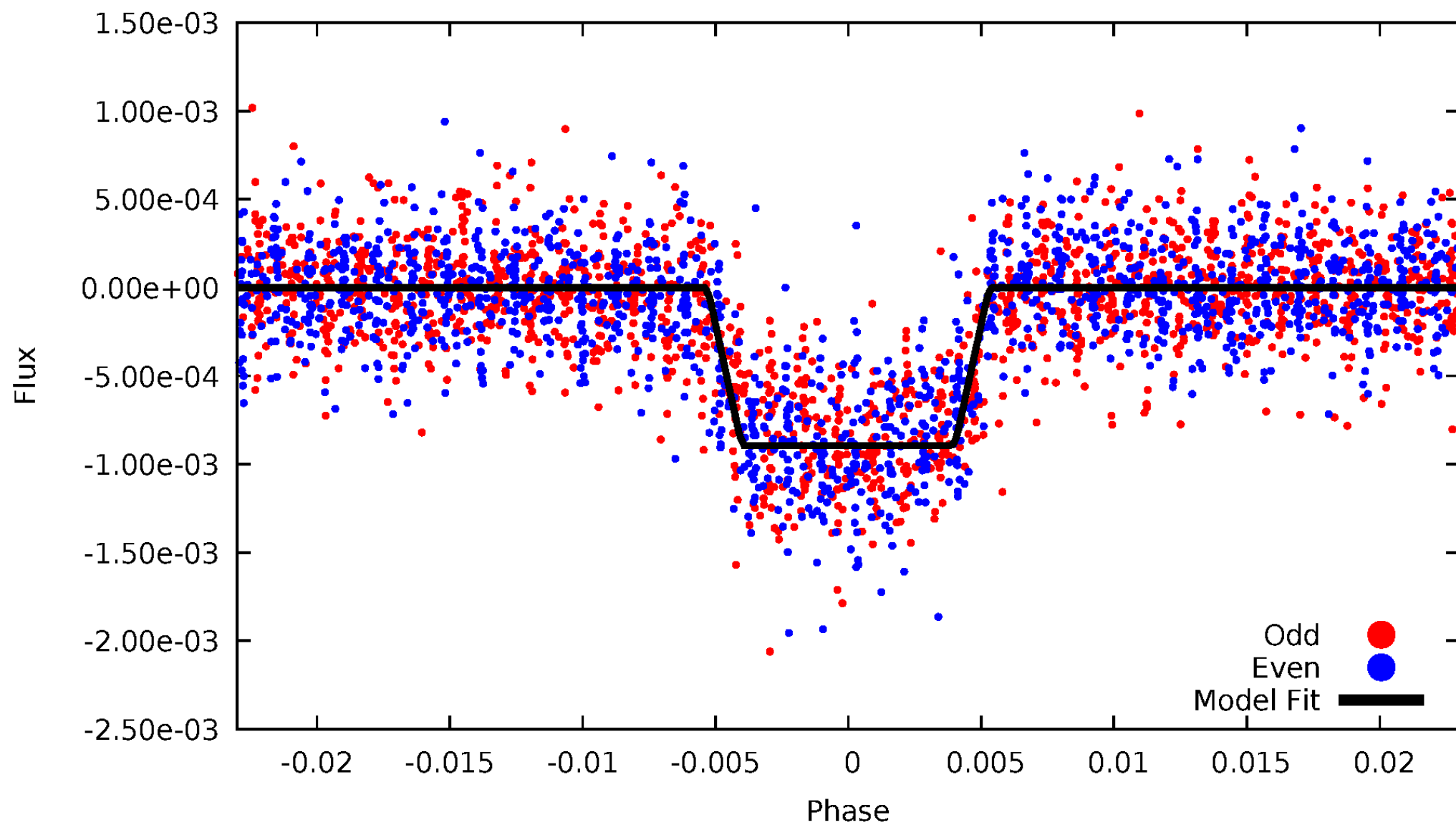
DV Odd/Even

TCE 002438264-01

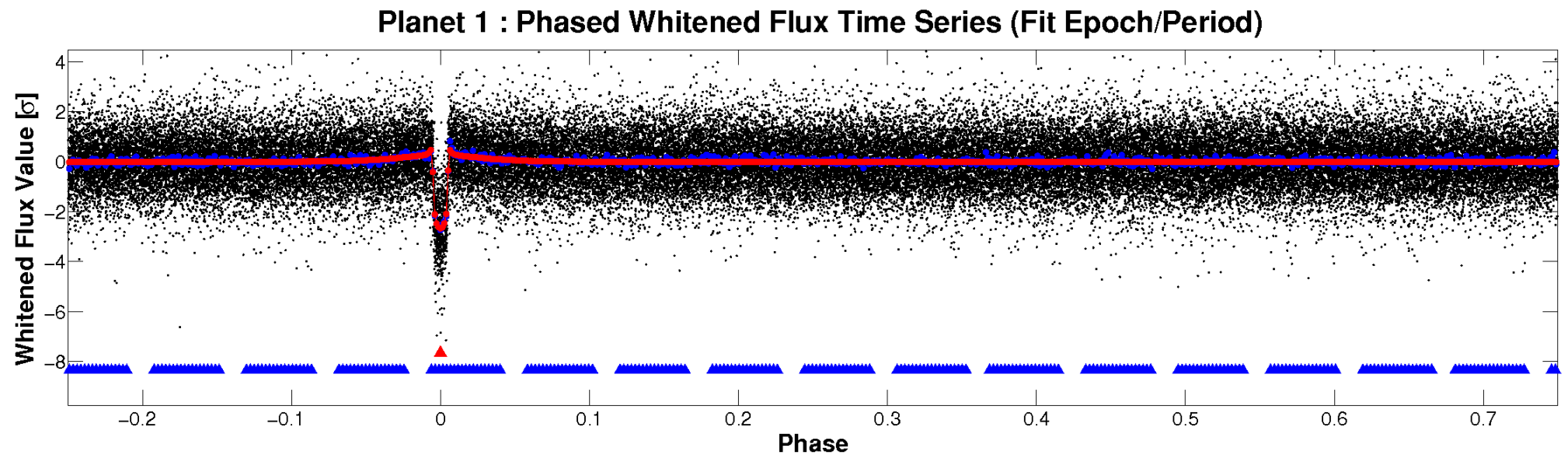
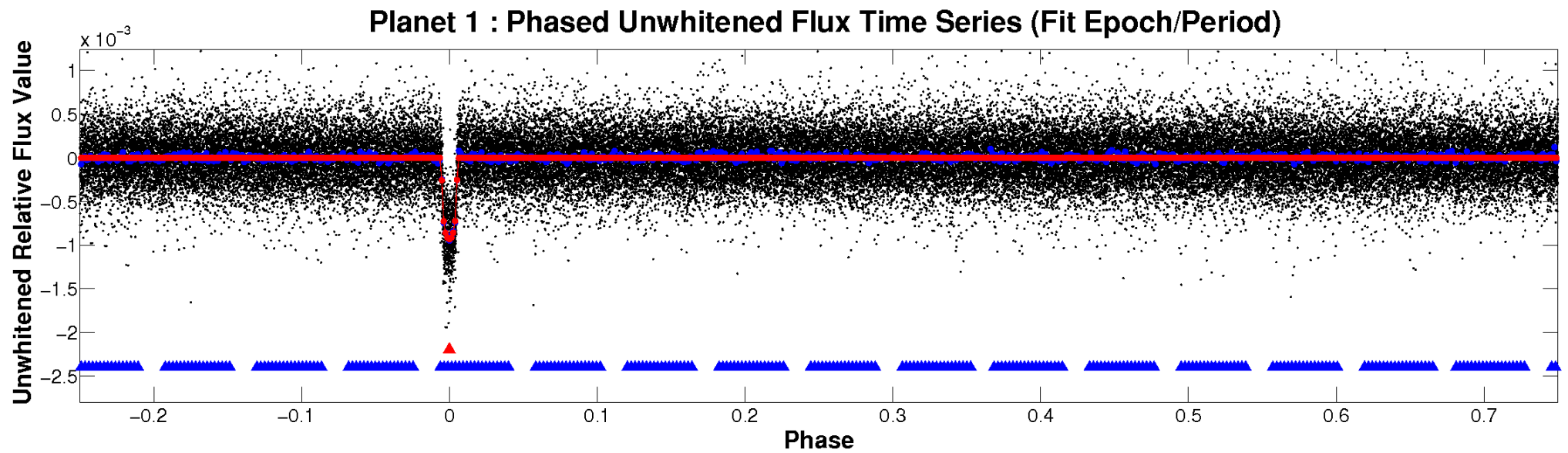


ALT Odd/Even

TCE 002438264-01

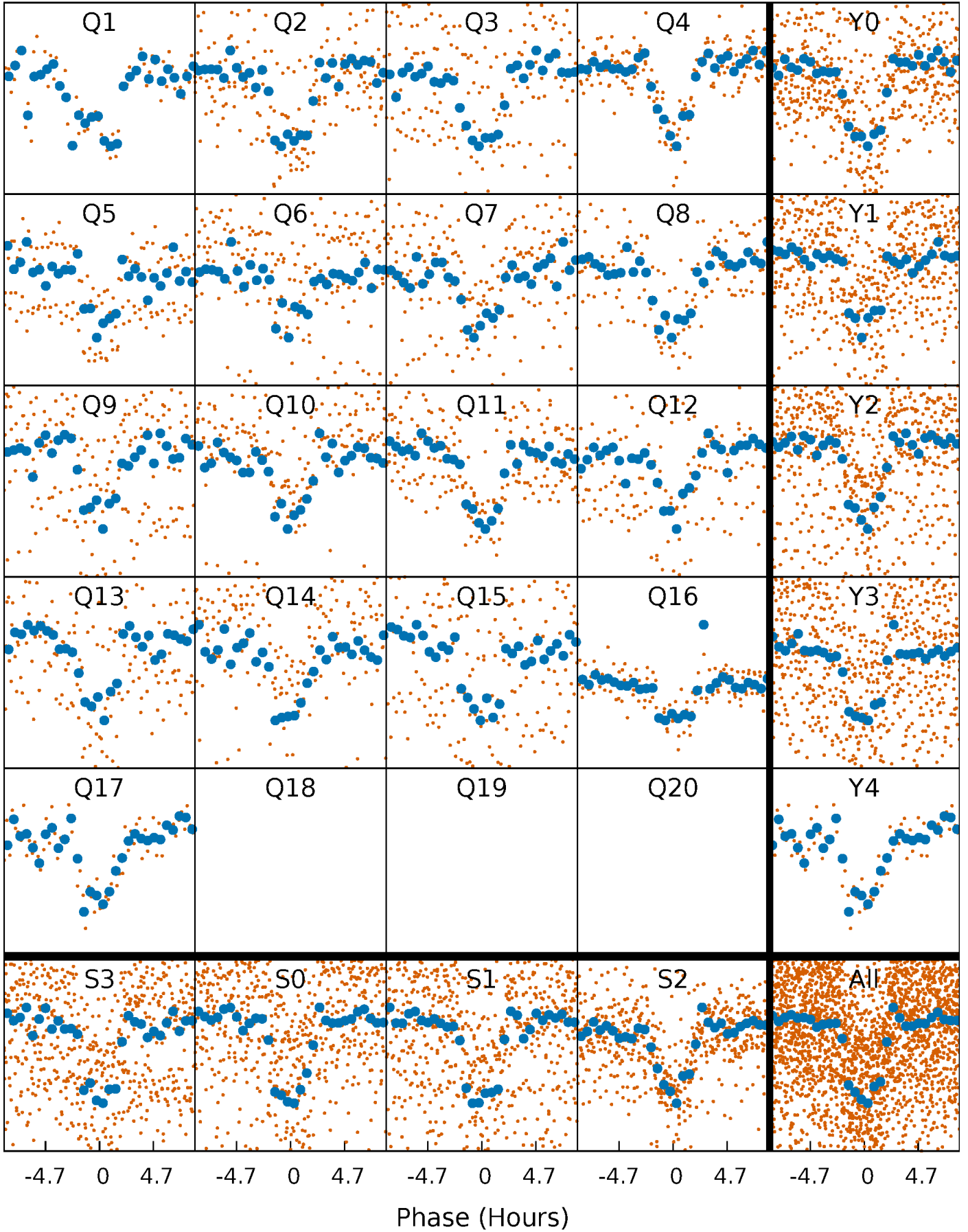


Non-Whitened Vs. Whitened Light Curve



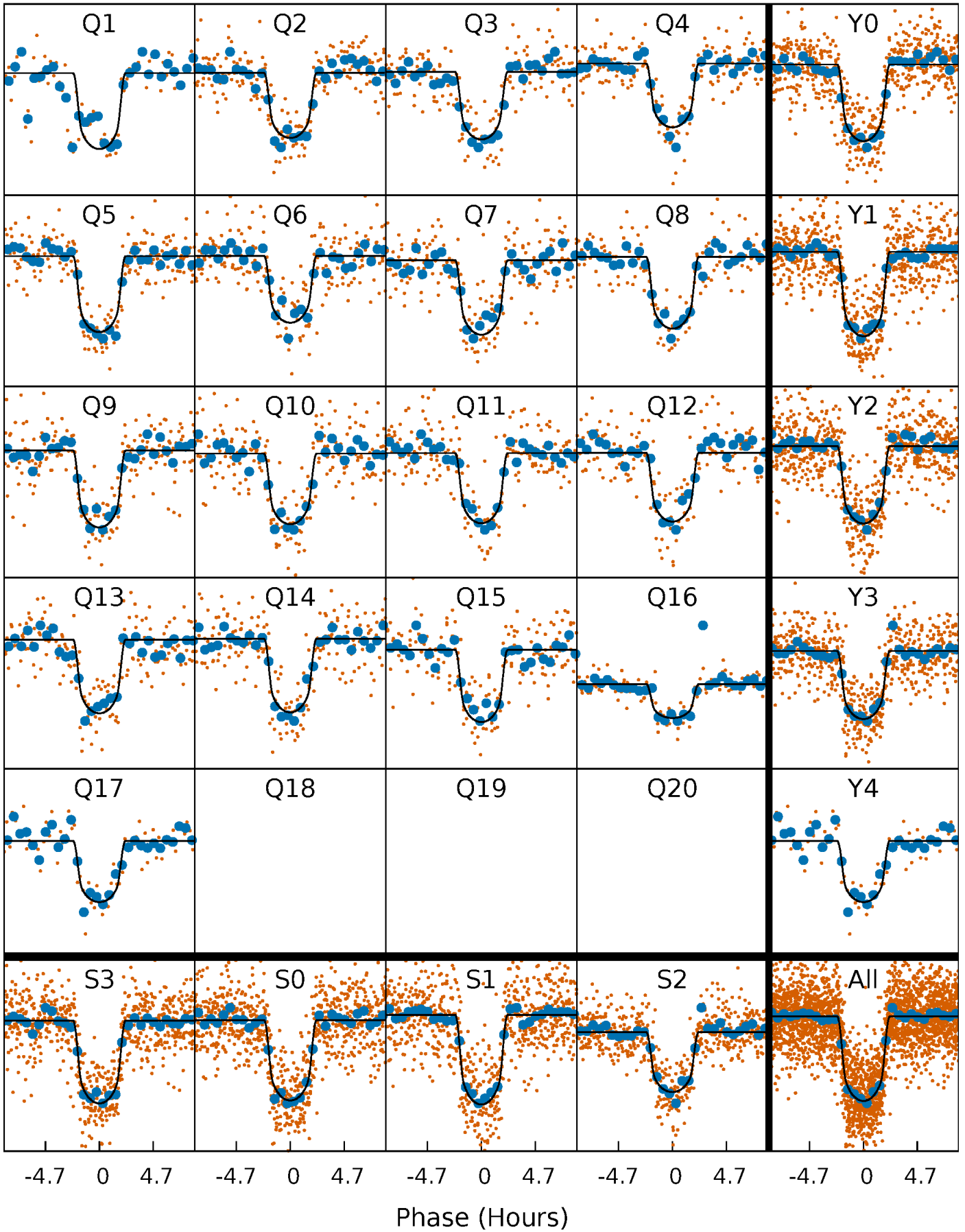
PDC Quarter-Phased Transit Curves

TCE 002438264-01 P= 15.906898 Days $T_0=146.115980$ (BKJD)



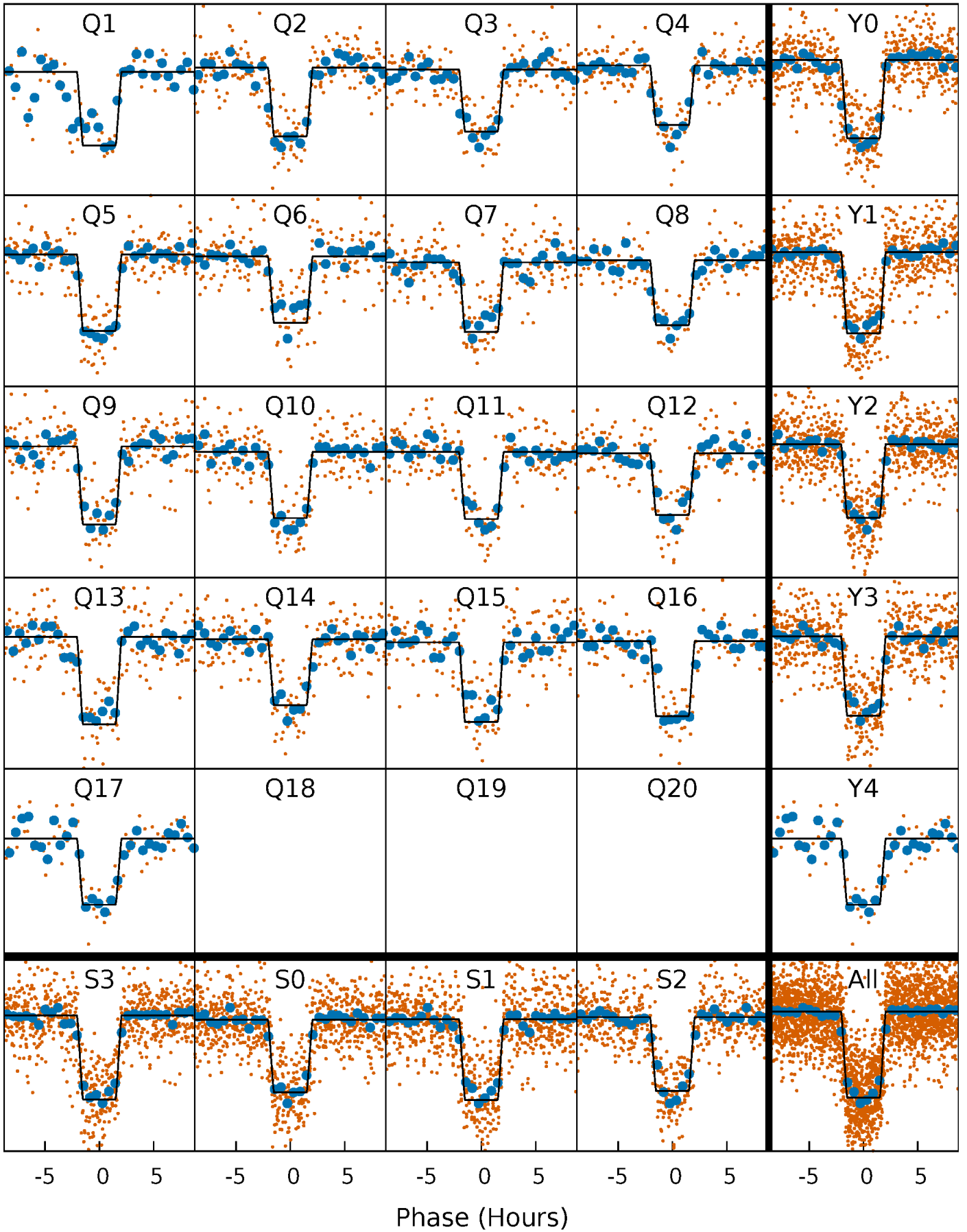
DV Quarter-Phased Transit Curves

TCE 002438264-01 P= 15.906898 Days $T_0=146.115980$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

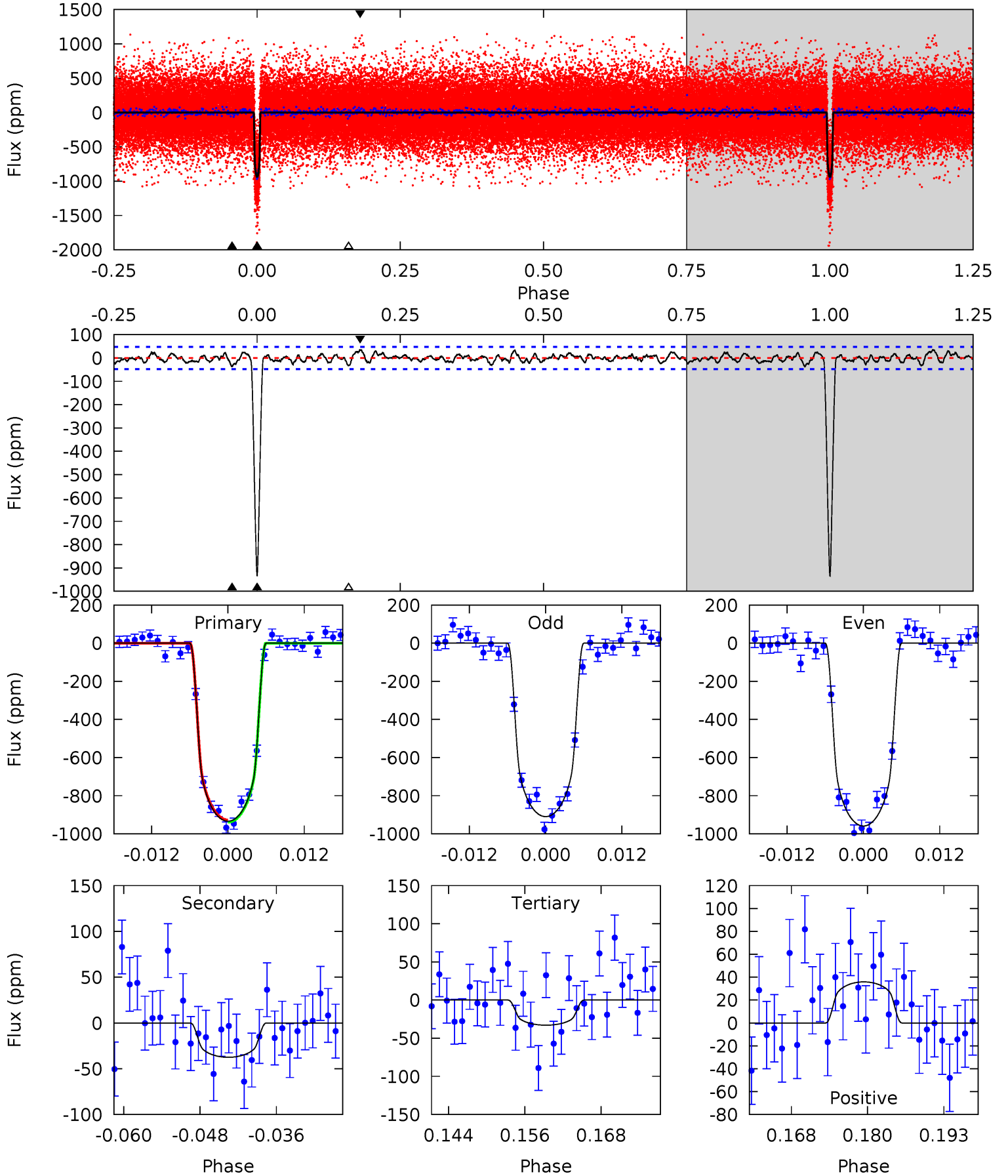
TCE 002438264-01 P= 15.906706 Days $T_0=146.124845$ (BKJD)



DV Model-Shift Uniqueness Test

002438264-01, $P = 15.906898$ Days, $E = 130.209082$ Days

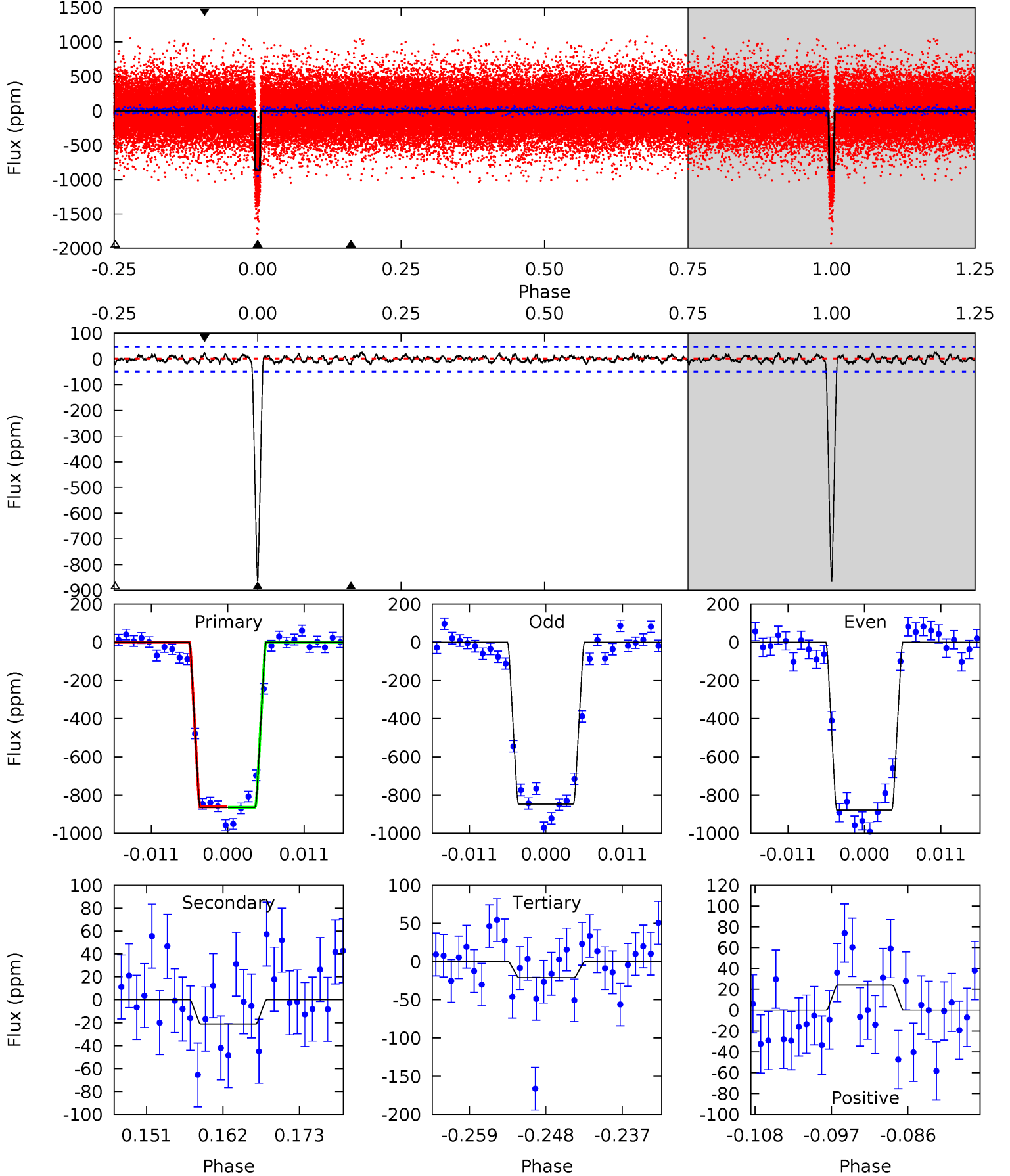
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
97.4	3.91	3.44	3.74	4.99	2.51	1.26	93.9	93.6	0.47	0.17	2.58	1.00	0.04	0.54



Alt Model-Shift Uniqueness Test

002438264-01, $P = 15.906706$ Days, $E = 130.218139$ Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
89.6	2.20	2.20	2.49	5.01	2.55	0.88	87.4	87.1	0.01	-0.29	1.61	1.00	0.03	0.16



Stellar Parameters For KIC 002438264

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	5097^{+101}_{-101}	$4.554^{+0.036}_{-0.050}$	$0.080^{+0.150}_{-0.150}$	$0.797^{+0.052}_{-0.042}$	$0.829^{+0.043}_{-0.043}$	$2.304^{+0.318}_{-0.375}$
	+2%/-2%	+1%/-1%	+188%/-188%	+7%/-5%	+5%/-5%	+14%/-16%
Source	SPE58	SPE58	SPE58	DSEP		

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

Secondary Eclipse Parameters for KIC 002438264-01 / KOI 0440.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-37 ± 10	$2.69^{+0.26}_{-0.24}$	824^{+20}_{-22}	2928^{+123}_{-141}	38^{+13}_{-11}
Alt.	-21 ± 10	$2.61^{+0.28}_{-0.24}$	825^{+20}_{-21}	2730^{+172}_{-199}	23^{+13}_{-10}

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 $A_{obs} \gg 1.0$

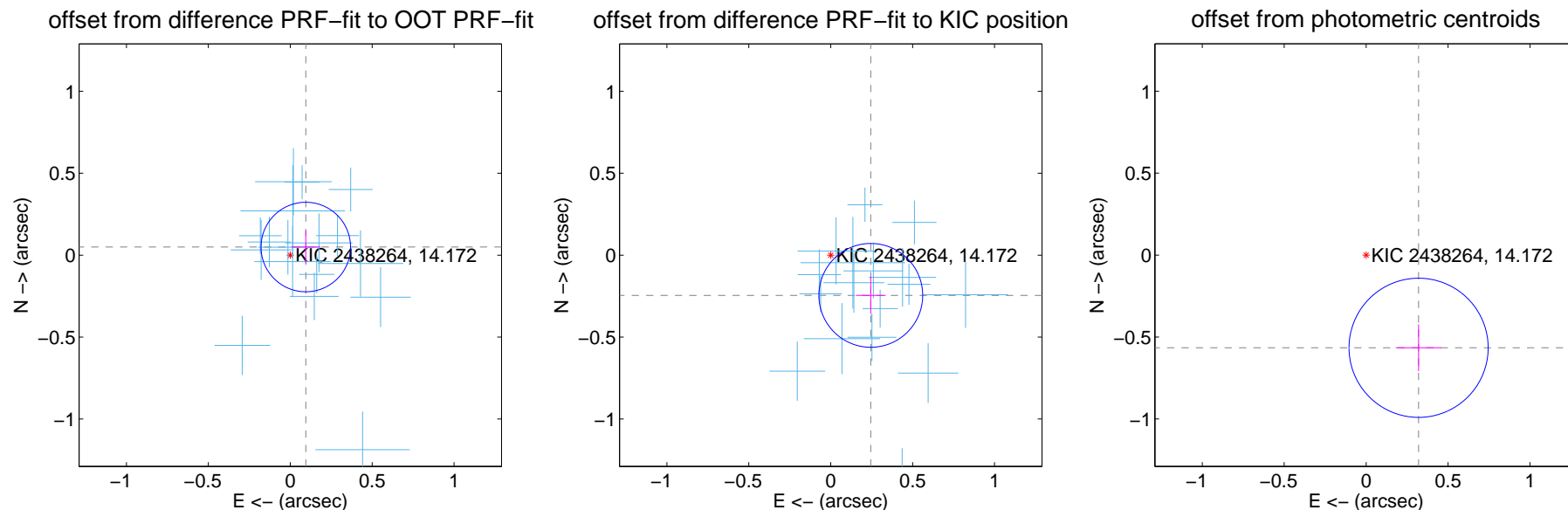
DV Centroid Data

Supplemental centroid analysis for 002438264-01. Kepler magnitude: 14.17. Transit SNR 59.26

There are 17 quarters with good PRF difference image offsets

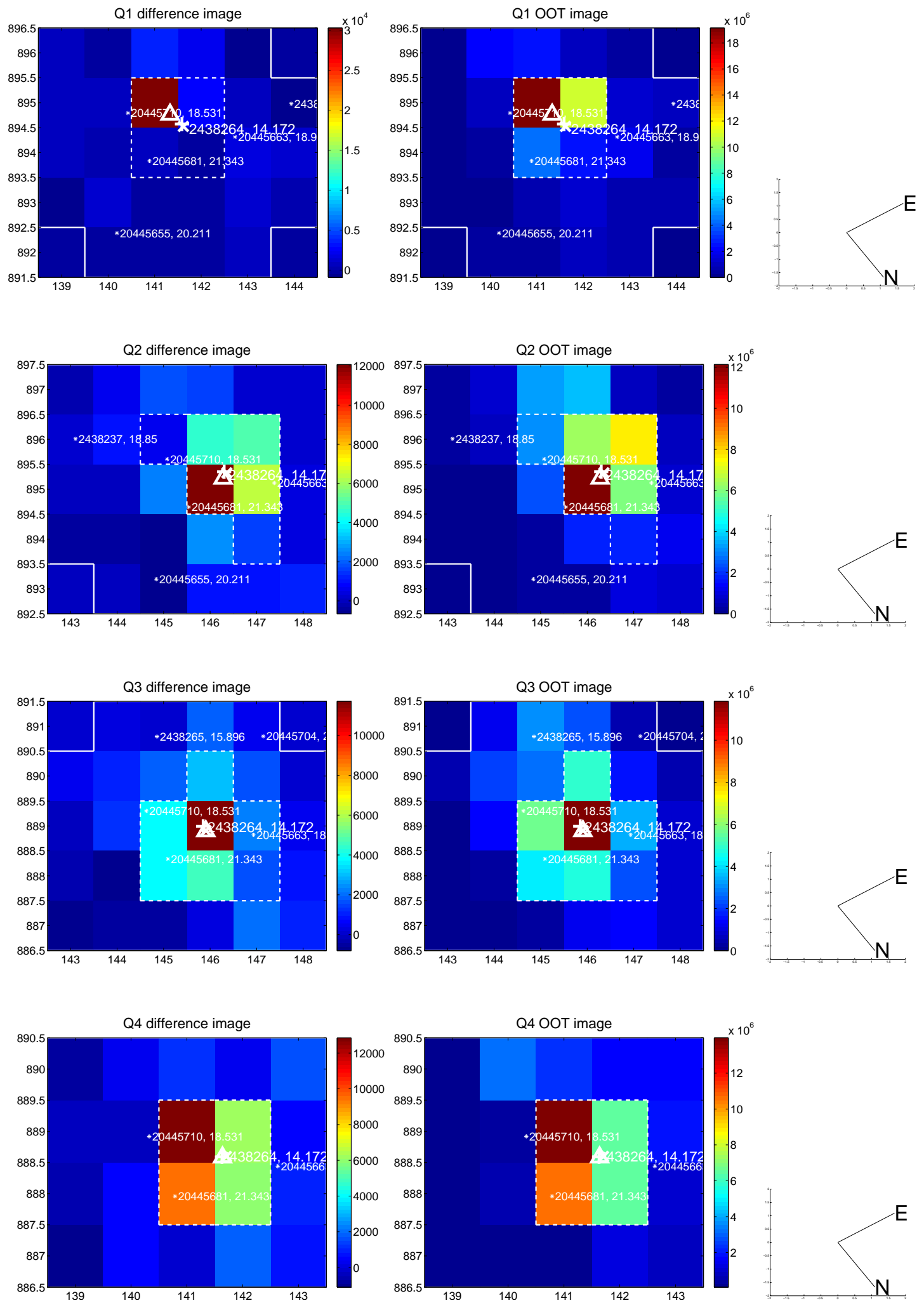
The direct PRF centroid is offset from the target star catalog position by about 0.19 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.107 ± 0.091	1.17	-0.095 ± 0.088	0.050 ± 0.100
PRF-fit source offset from KIC position	0.347 ± 0.106	3.28	-0.245 ± 0.091	-0.245 ± 0.114
photometric centroid source offset	0.65 ± 0.14	4.59	-0.32 ± 0.14	-0.57 ± 0.14

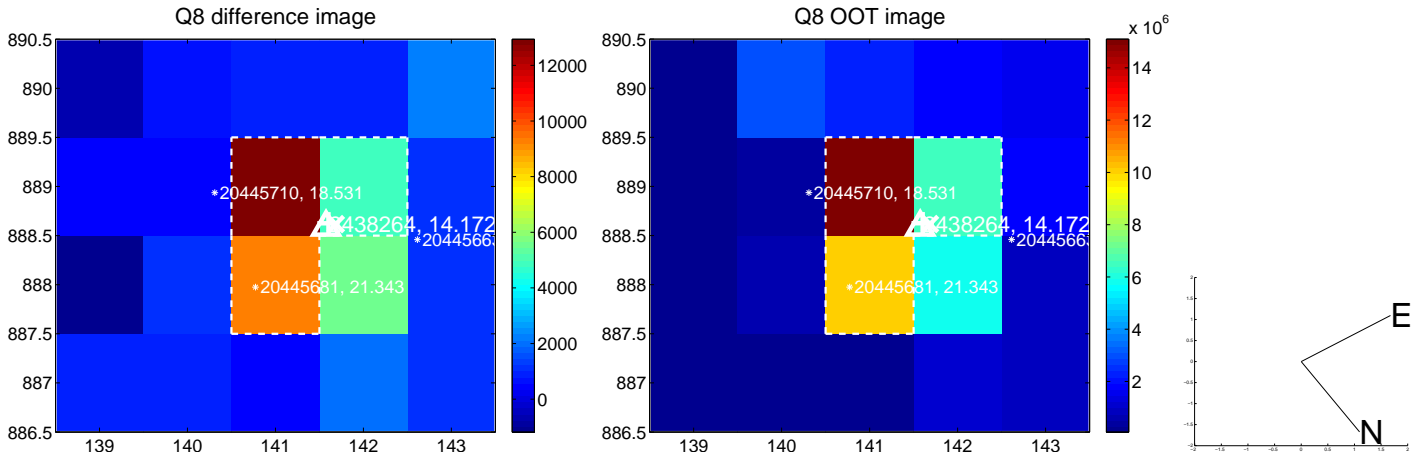
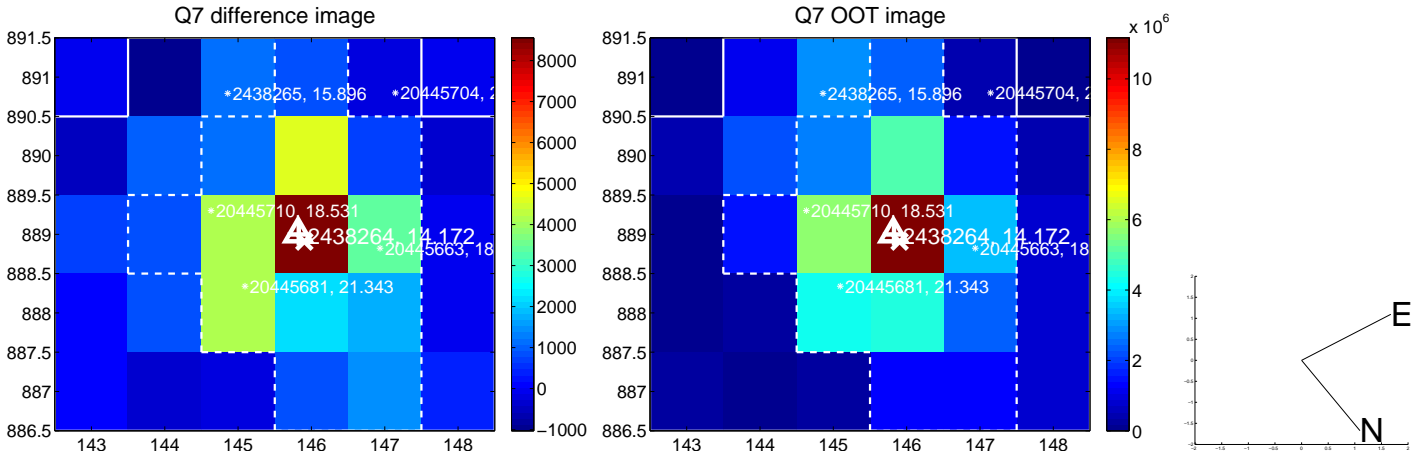
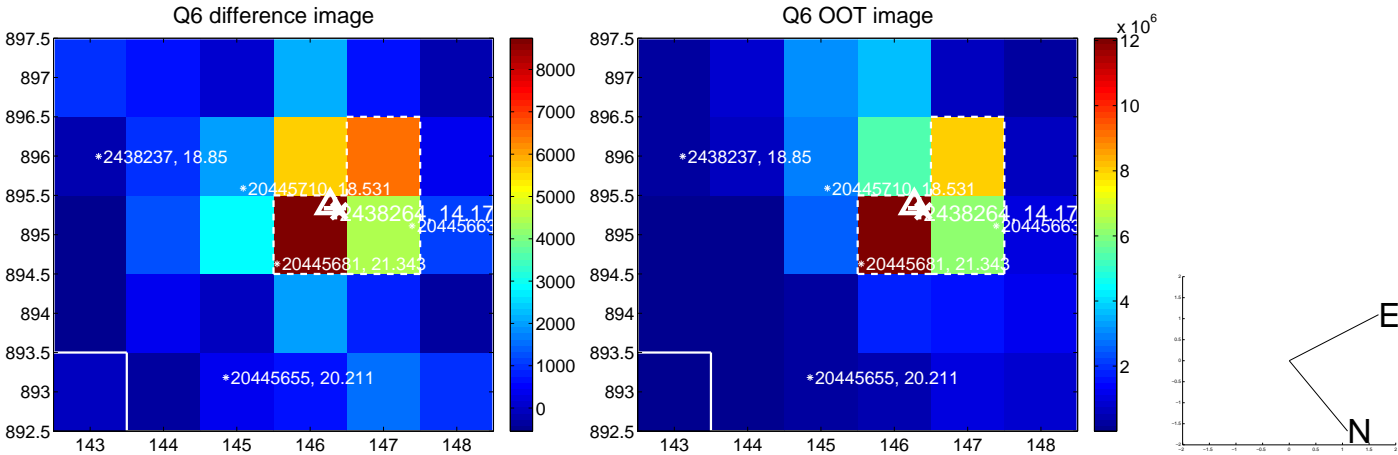
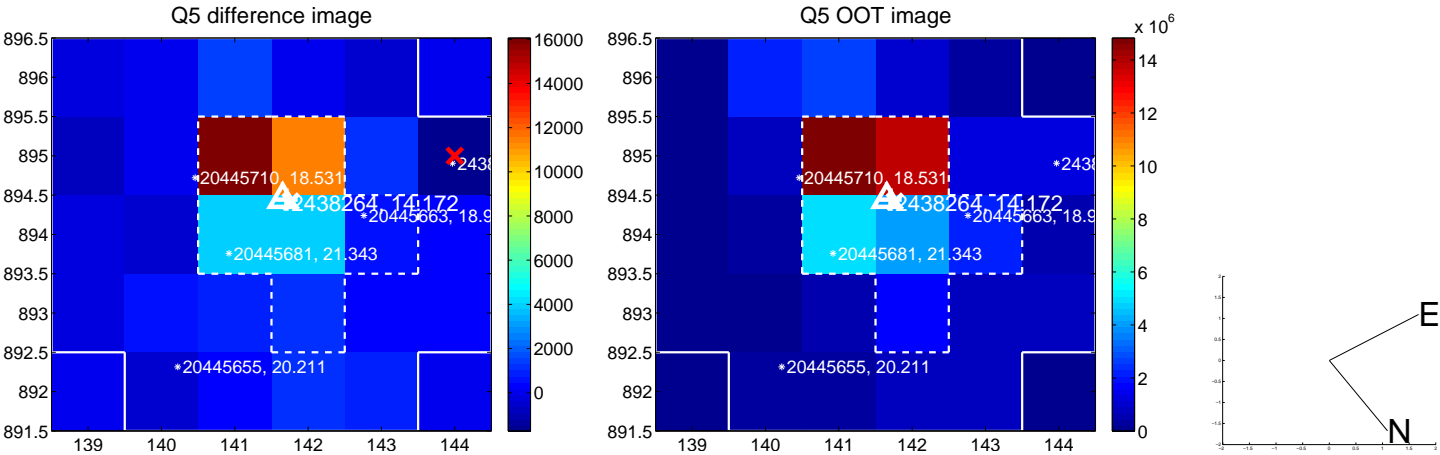


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

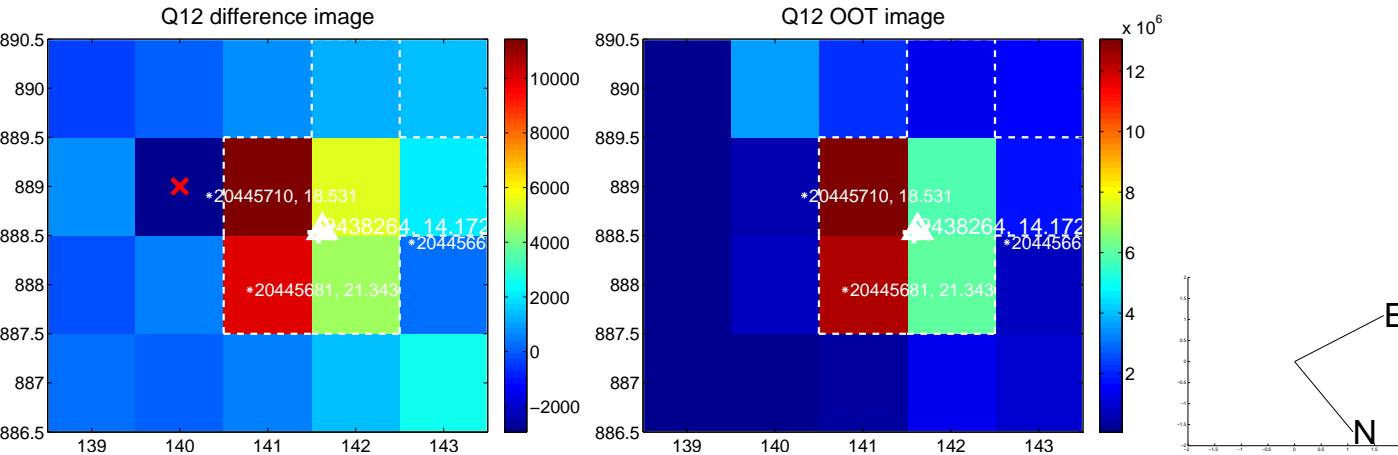
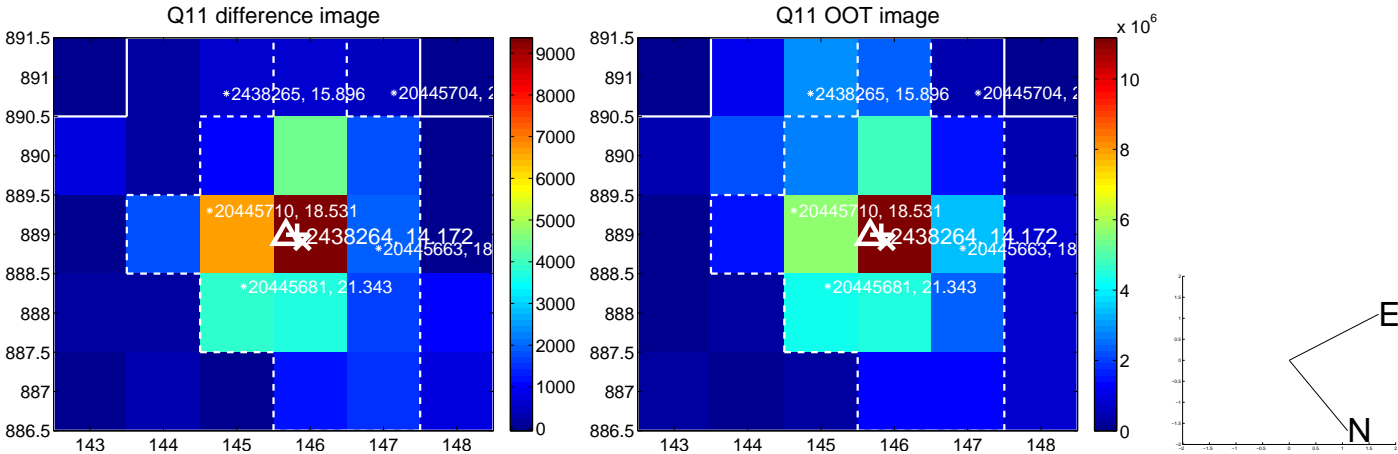
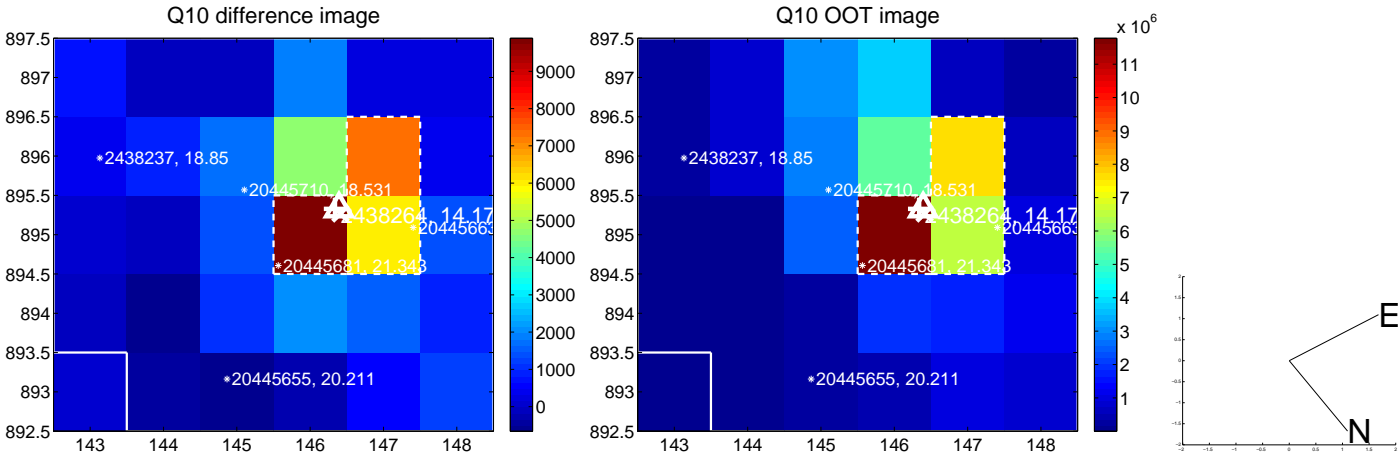
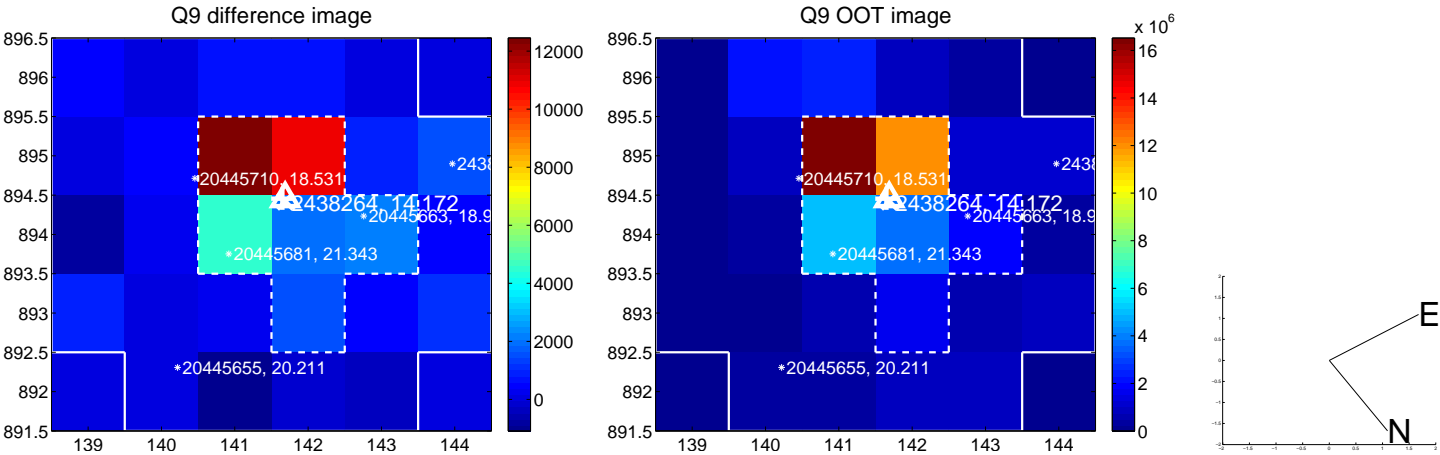
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



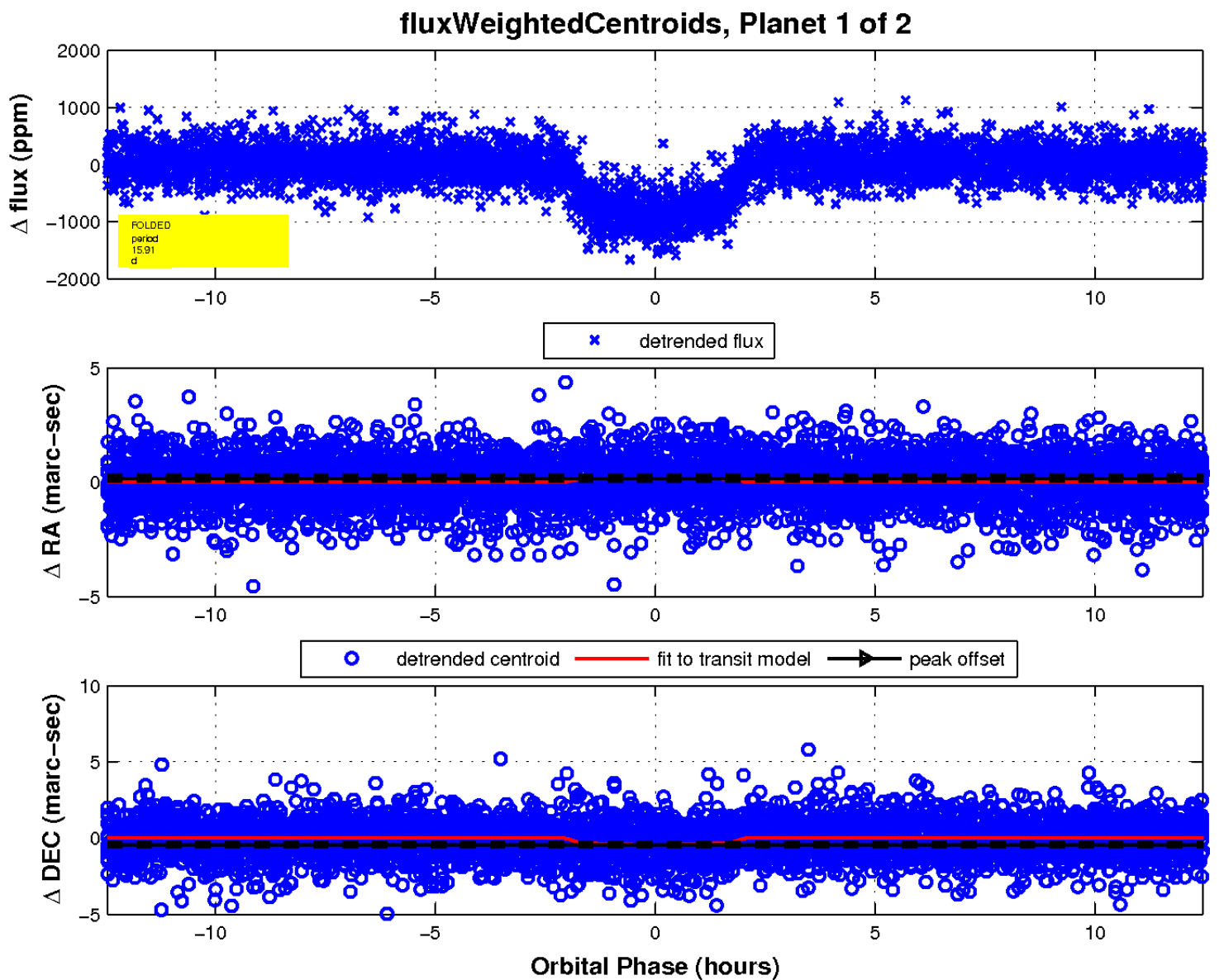
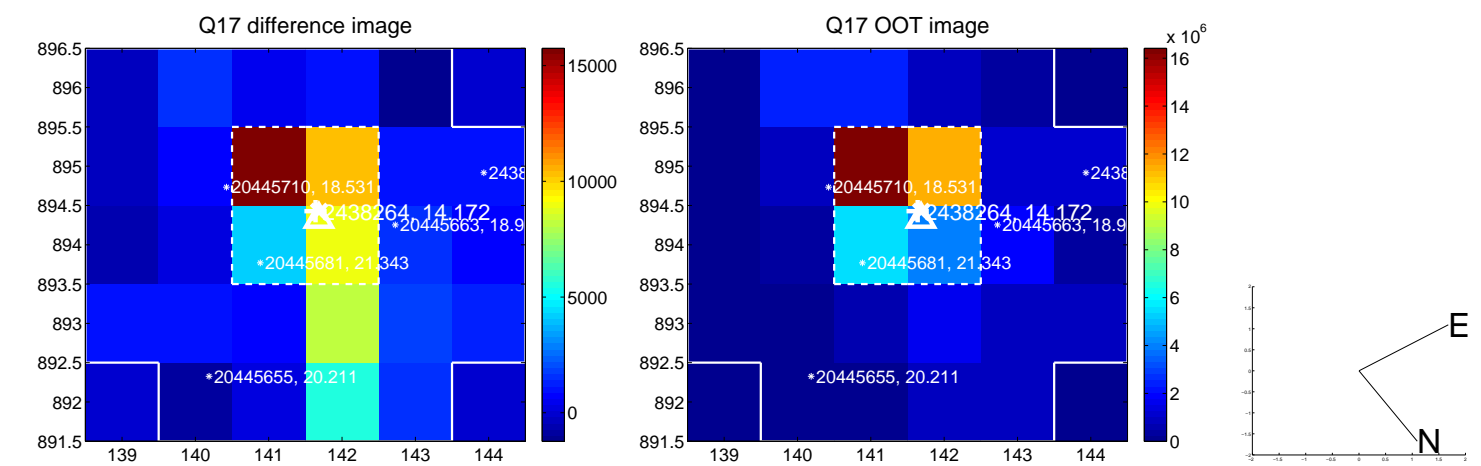
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

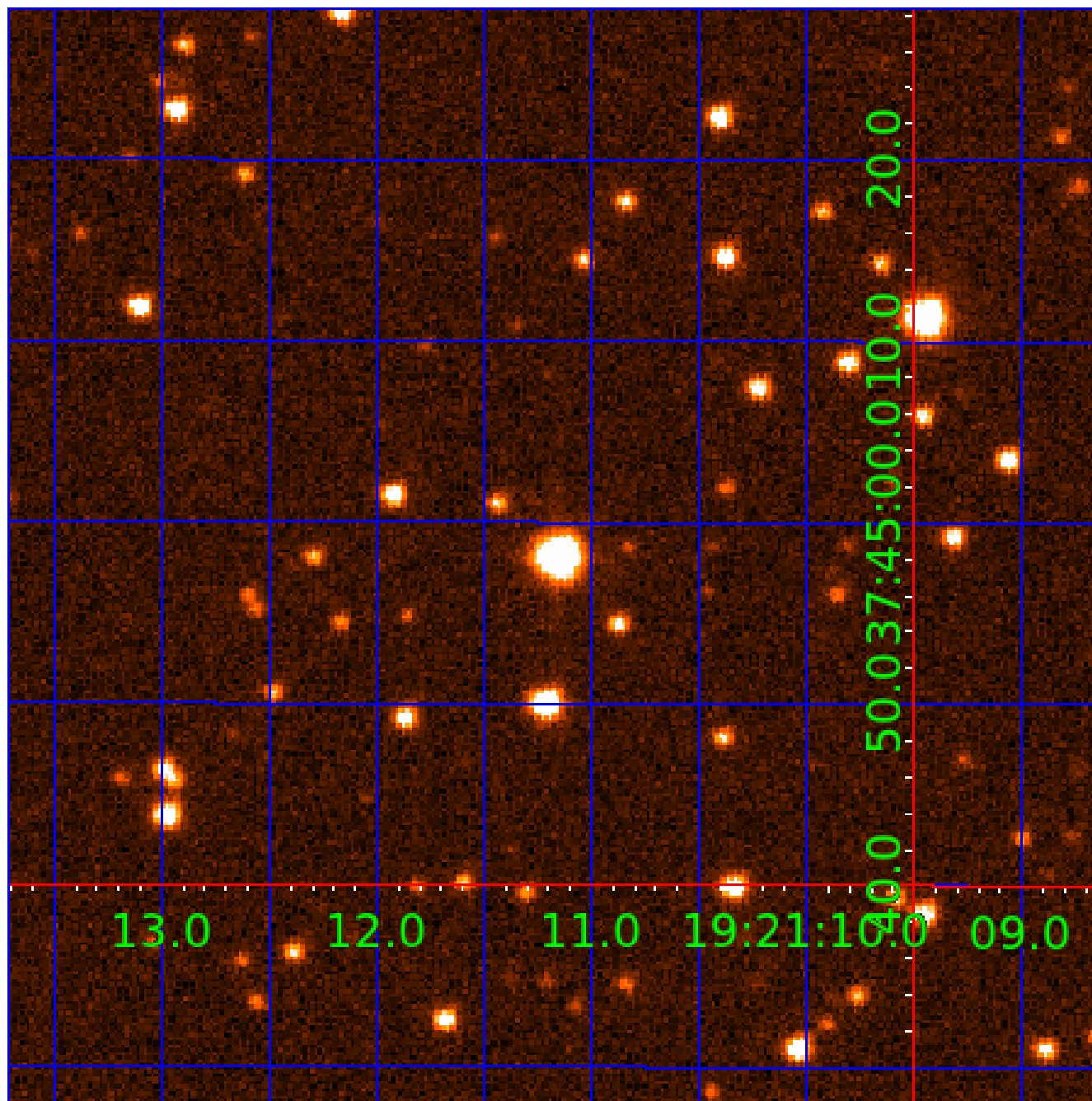


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 002438264

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})
002438264-01	OBS	0440.01	15.906898	146.115980	934.1	4.156	55.4	59.3	0.80	5097	2.71	28.38
002438264-02	OBS	0440.02	4.973455	136.071737	732.0	1.699	51.7	60.6	0.80	5097	2.58	133.74

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
002438264-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
002438264-02	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.

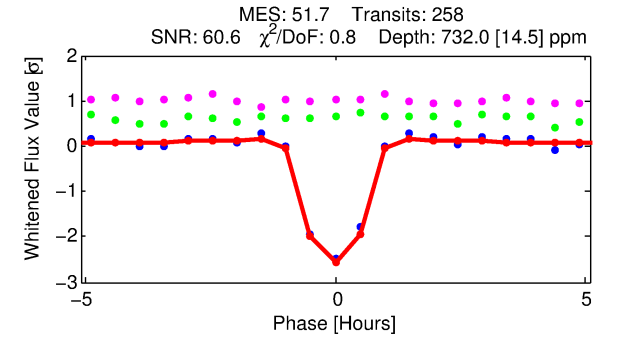
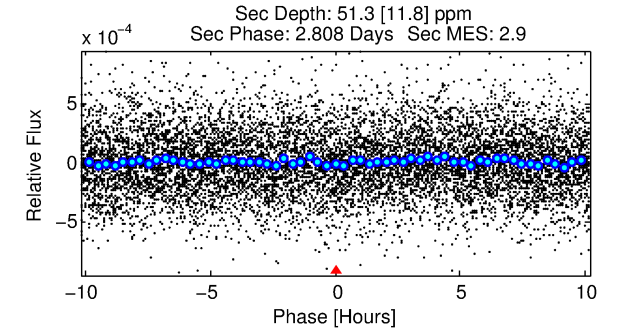
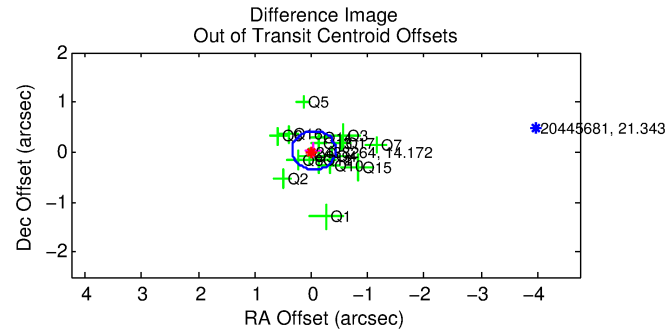
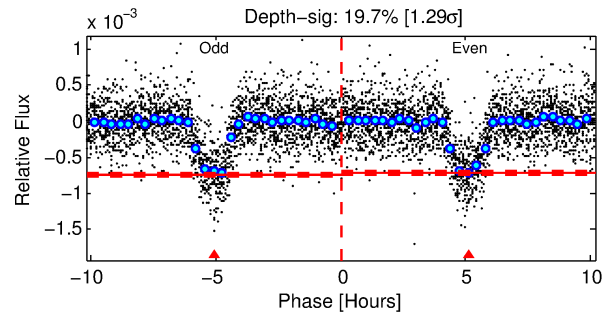
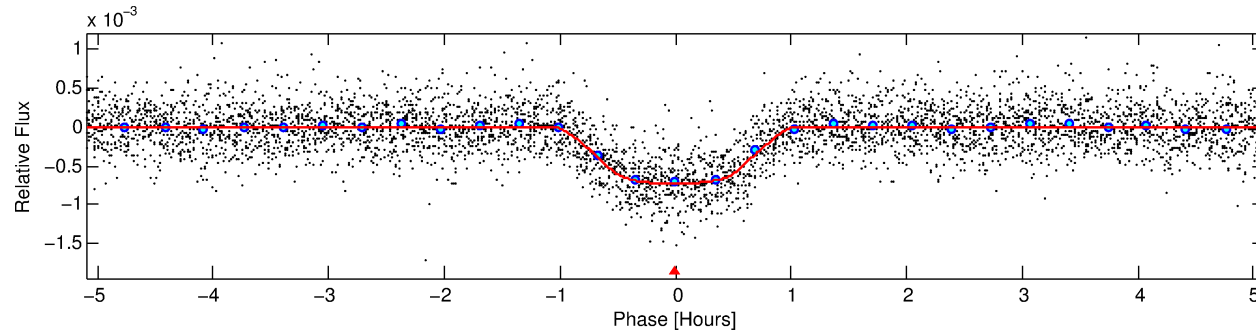
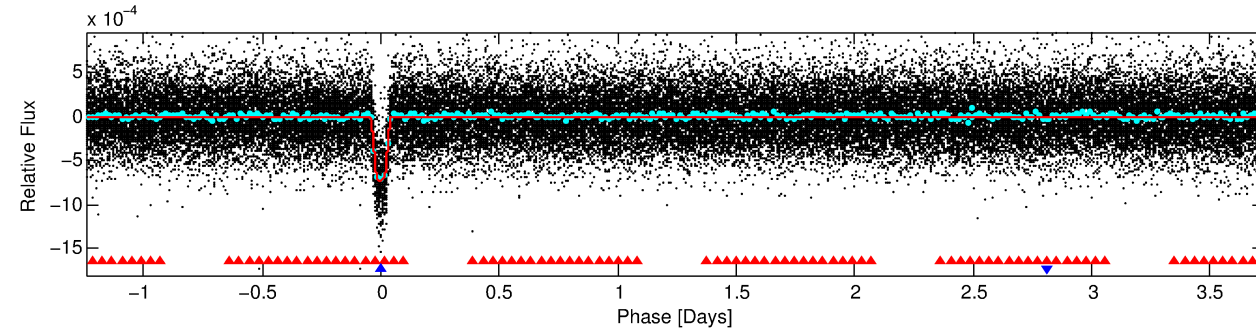
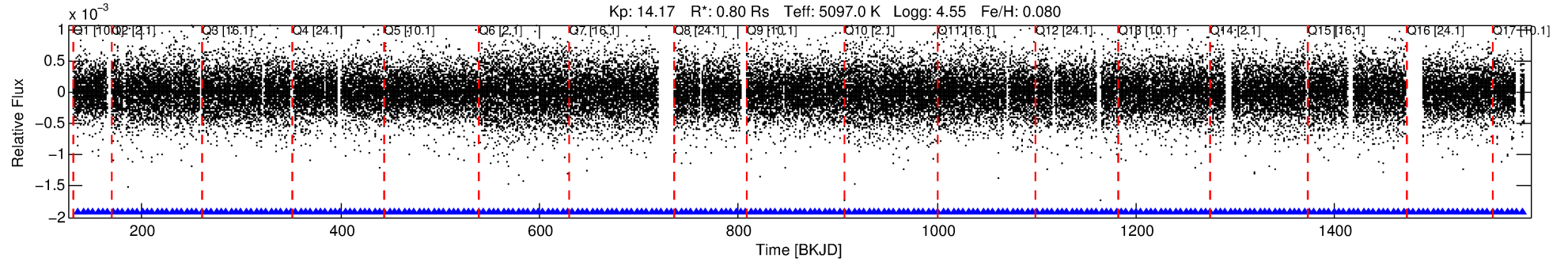
Ephemeris Match Information For 002438264-02

No Significant Match Found

DV One-Page Summary

KIC: 2438264 Candidate: 2 of 2 Period: 4.973 d
KOI: K00440.02 Name: Kepler-156b Corr: 0.993

Kp: 14.17 R*: 0.80 Rs Teff: 5097.0 K Logg: 4.55 Fe/H: 0.080



DV Fit Results:

Period = 4.97346 [0.00000] d
Epoch = 136.0717 [0.0005] BKJD
Rp/R* = 0.0296 [0.0034]
a/R* = 11.96 [5.13]
b = 0.88 [0.11]
Seff = 133.74 [15.86]
Teff = 867 [26] K
Rp = 2.58 [0.34] Re
a = 0.0536 [0.0031] AU
Ag = 12.19 [4.09] [2.74σ]
Teffp = 2505 [209] K [7.79σ]

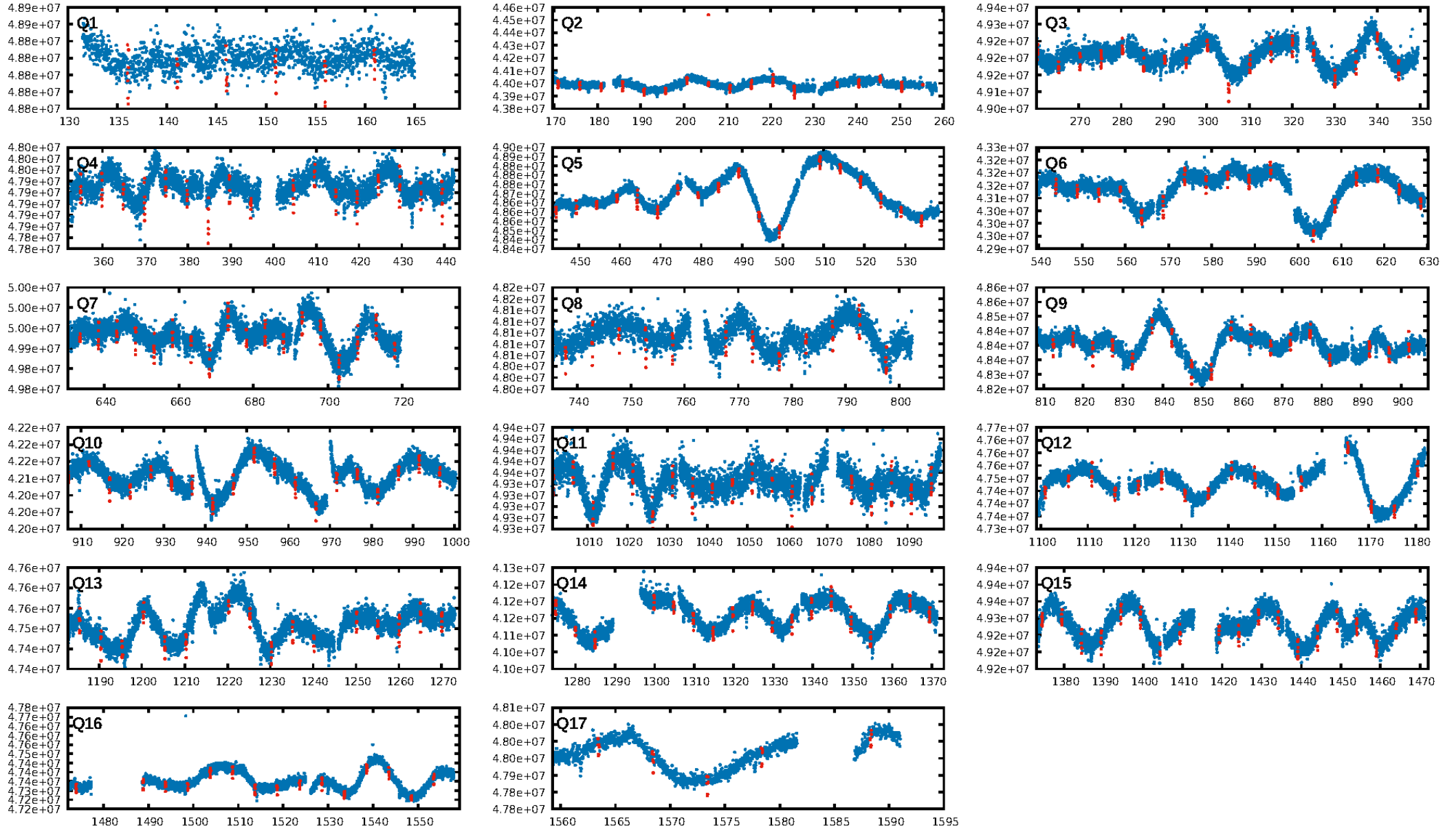
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [58.44σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 0.00e+00
RollingBand-fgt: 1.00 [248/248]
GhostDiagnostic-chr: 4.263
Centroid-sig: 0.0%
Centroid-so: 0.398 arcsec [2.49σ]
OotOffset-rm: 0.059 arcsec [0.46σ]
KicOffset-rm: 0.299 arcsec [2.36σ]
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]

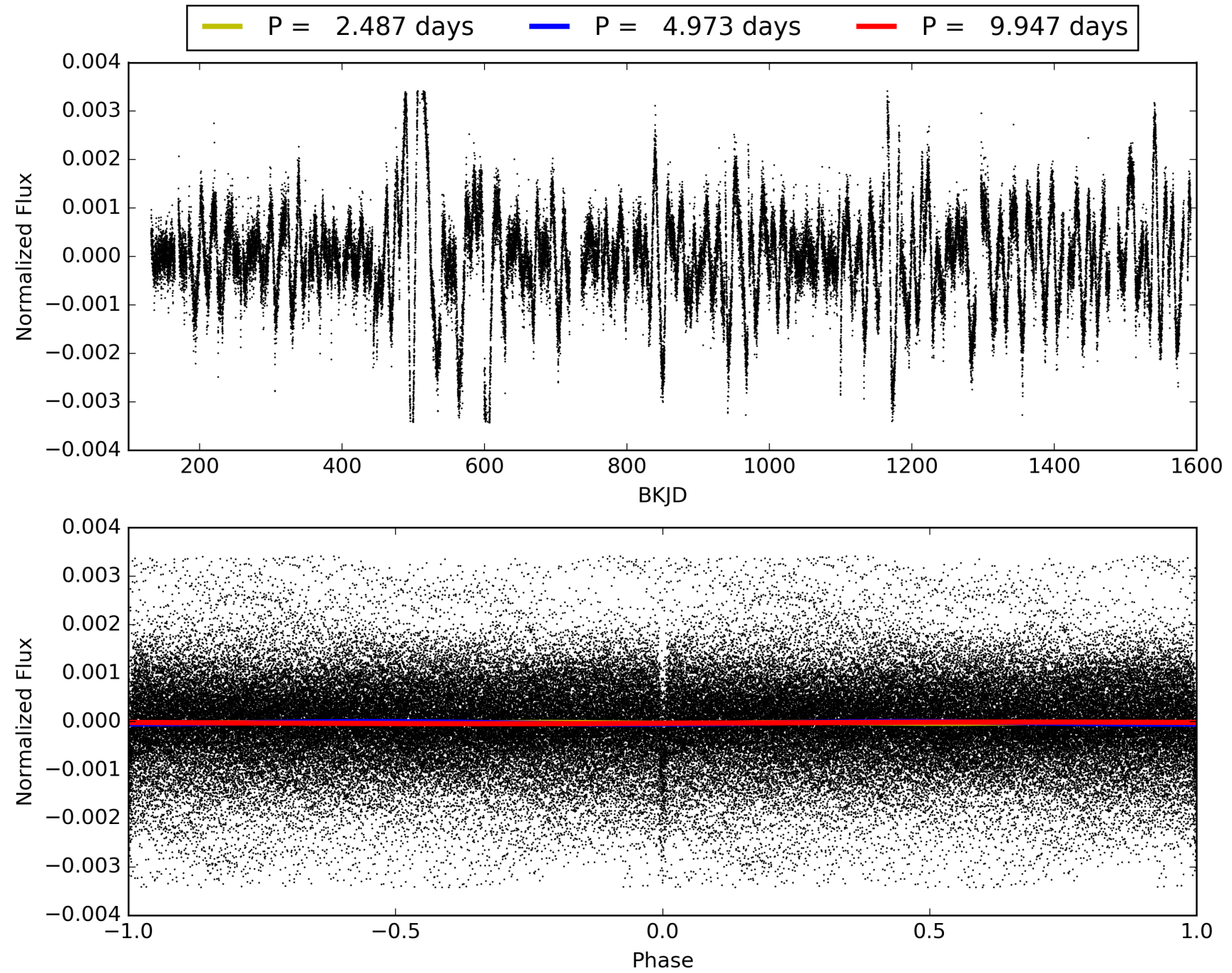
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 21:13:03 Z

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

TCE 002438264-02, PDC Light Curves

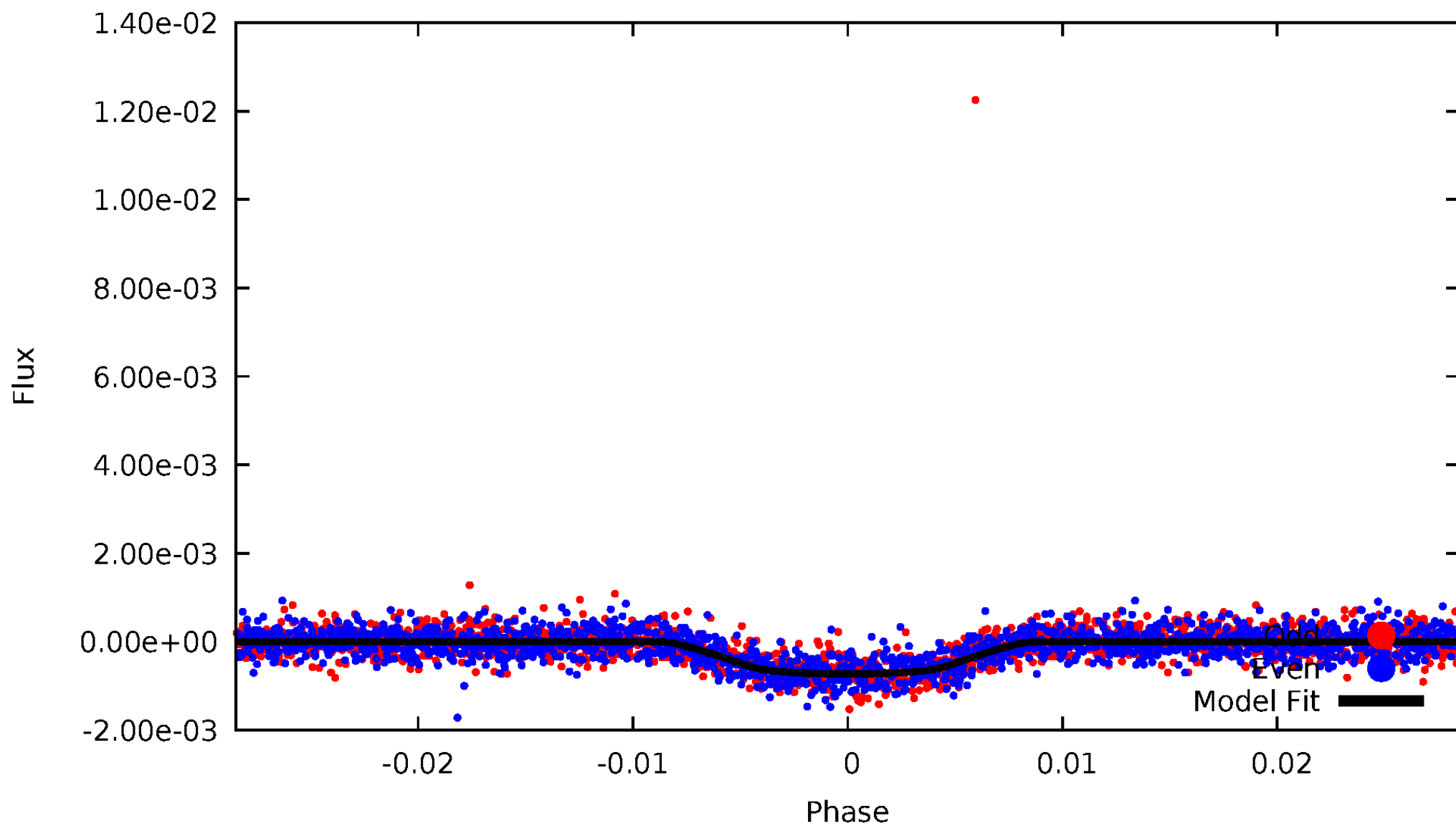


TCE 002438264-02



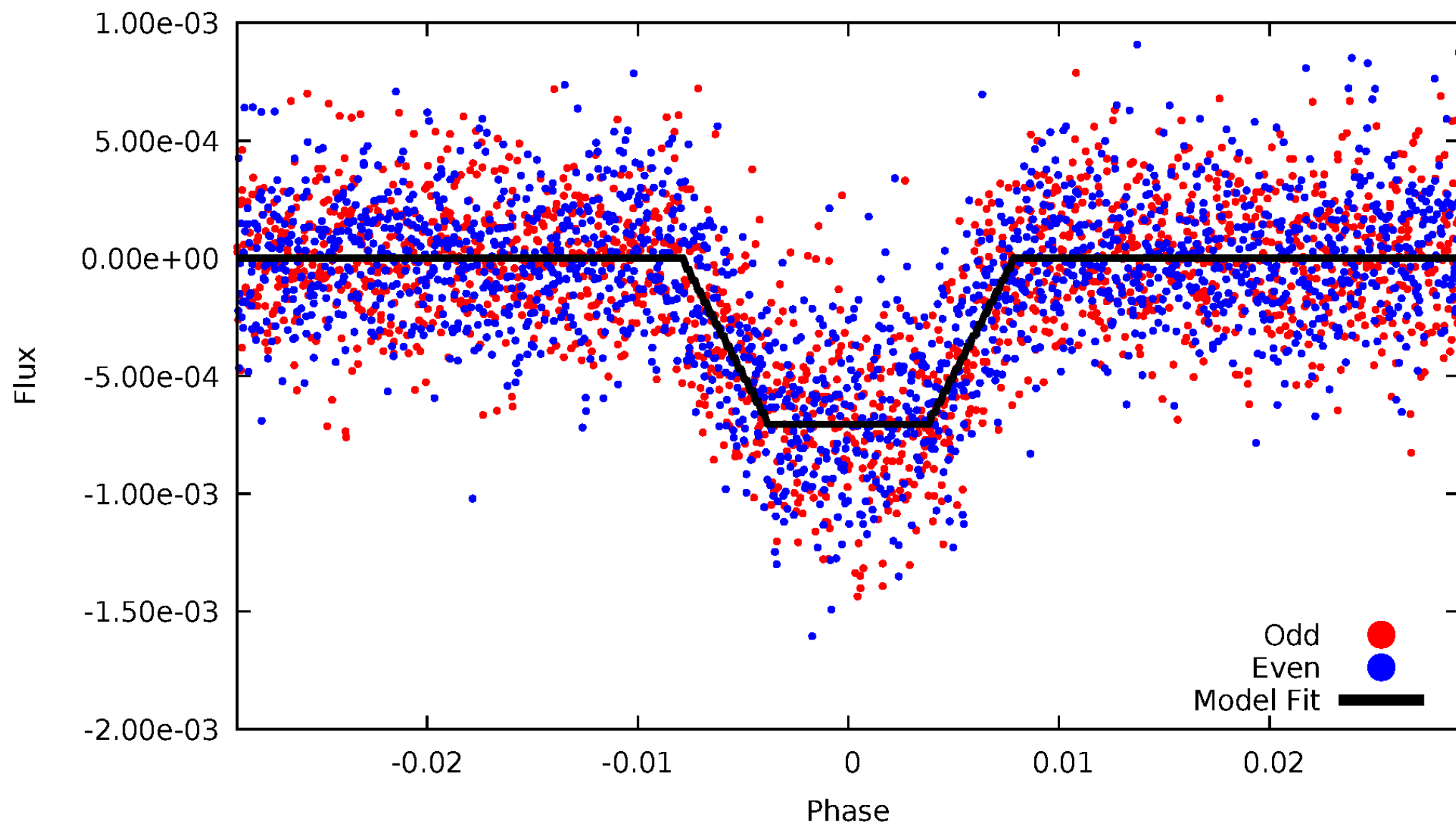
DV Odd/Even

TCE 002438264-02



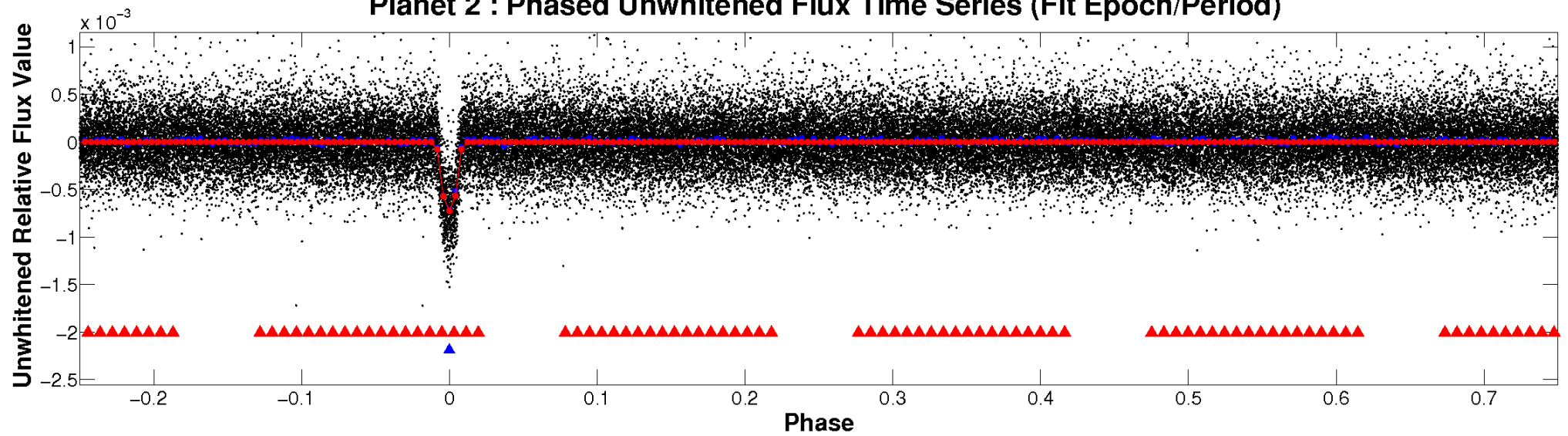
ALT Odd/Even

TCE 002438264-02

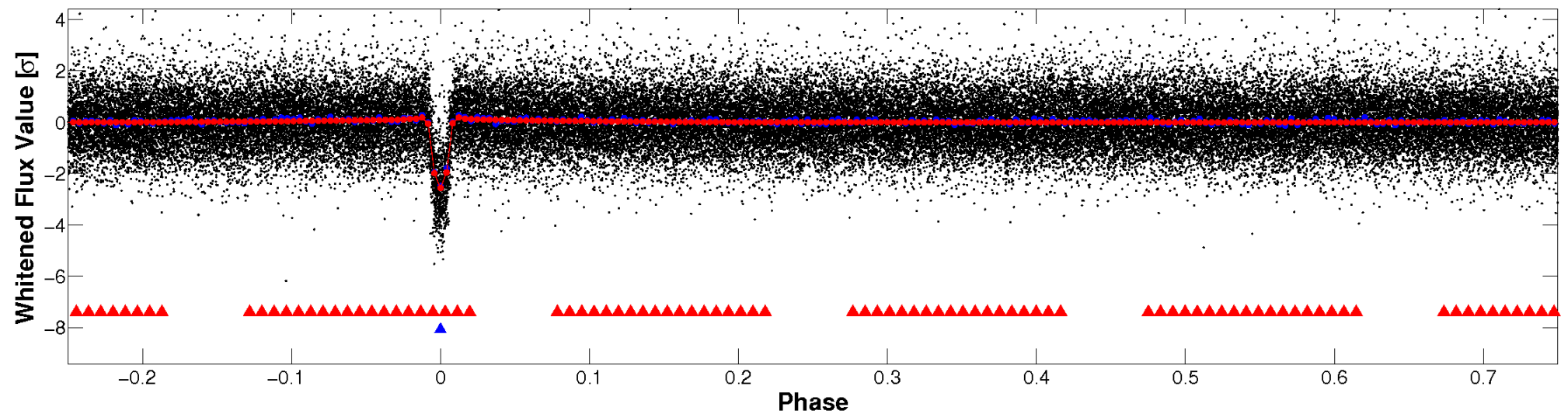


Non-Whitened Vs. Whitened Light Curve

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

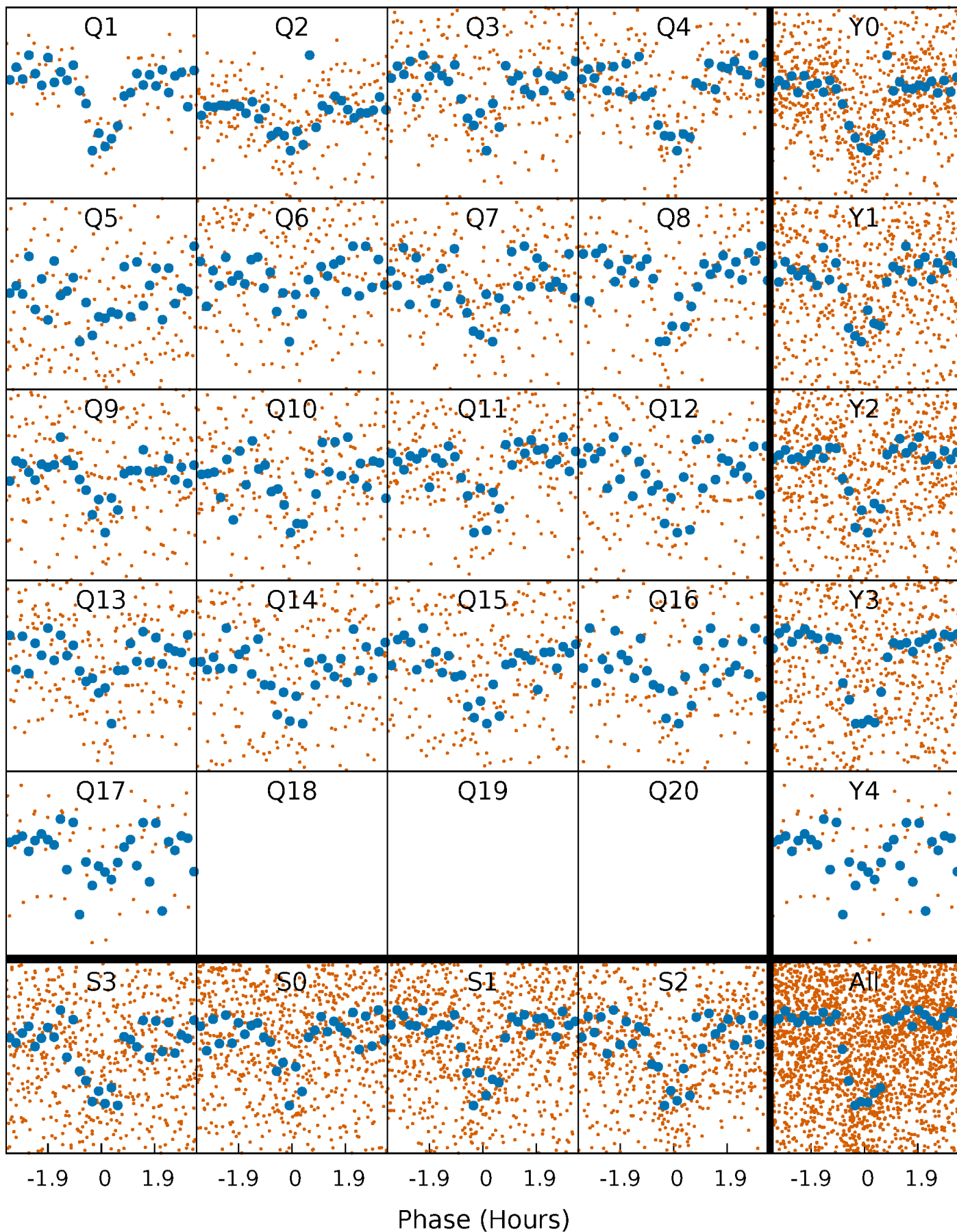


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



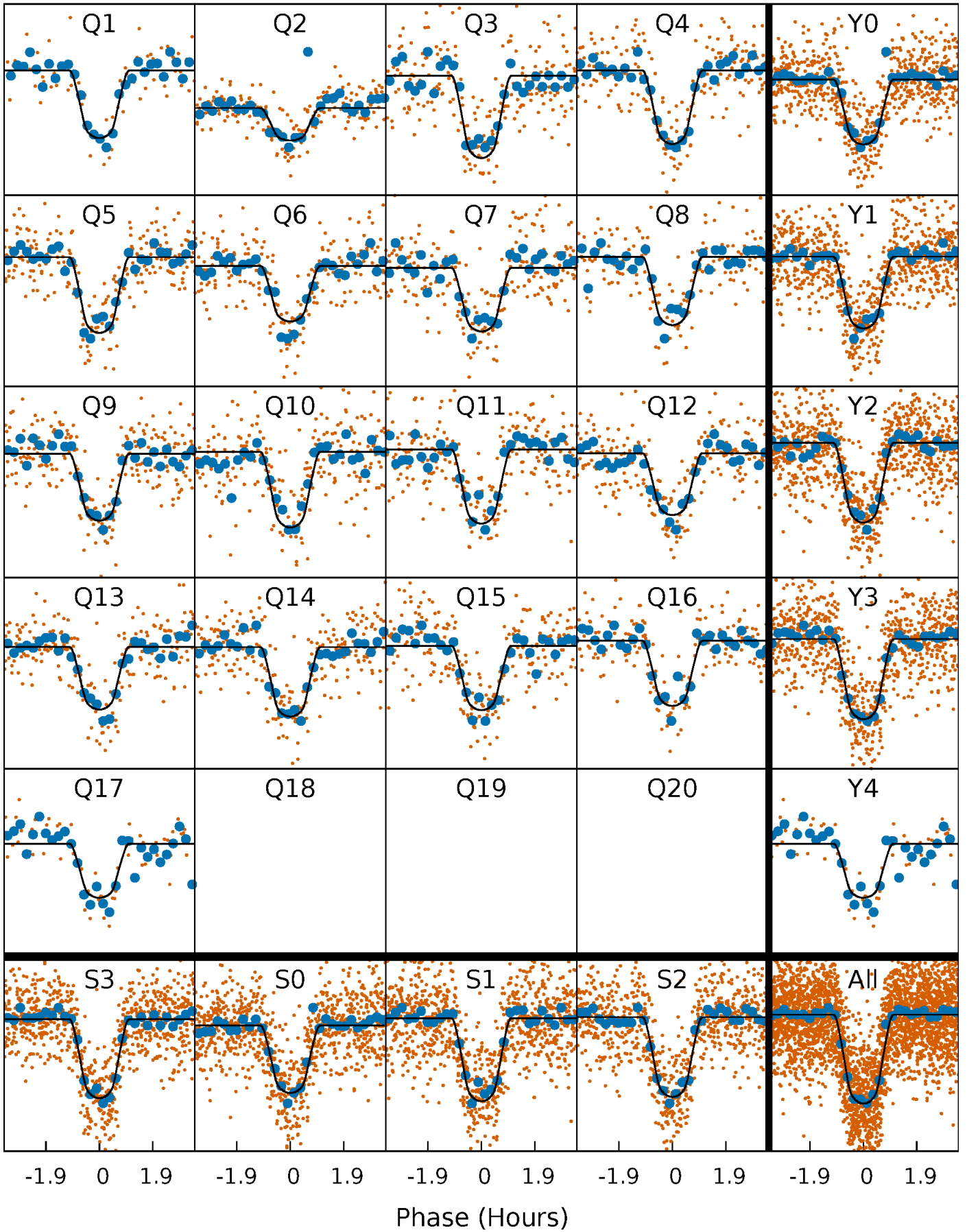
PDC Quarter-Phased Transit Curves

TCE 002438264-02 P= 4.973455 Days $T_0=136.071737$ (BKJD)



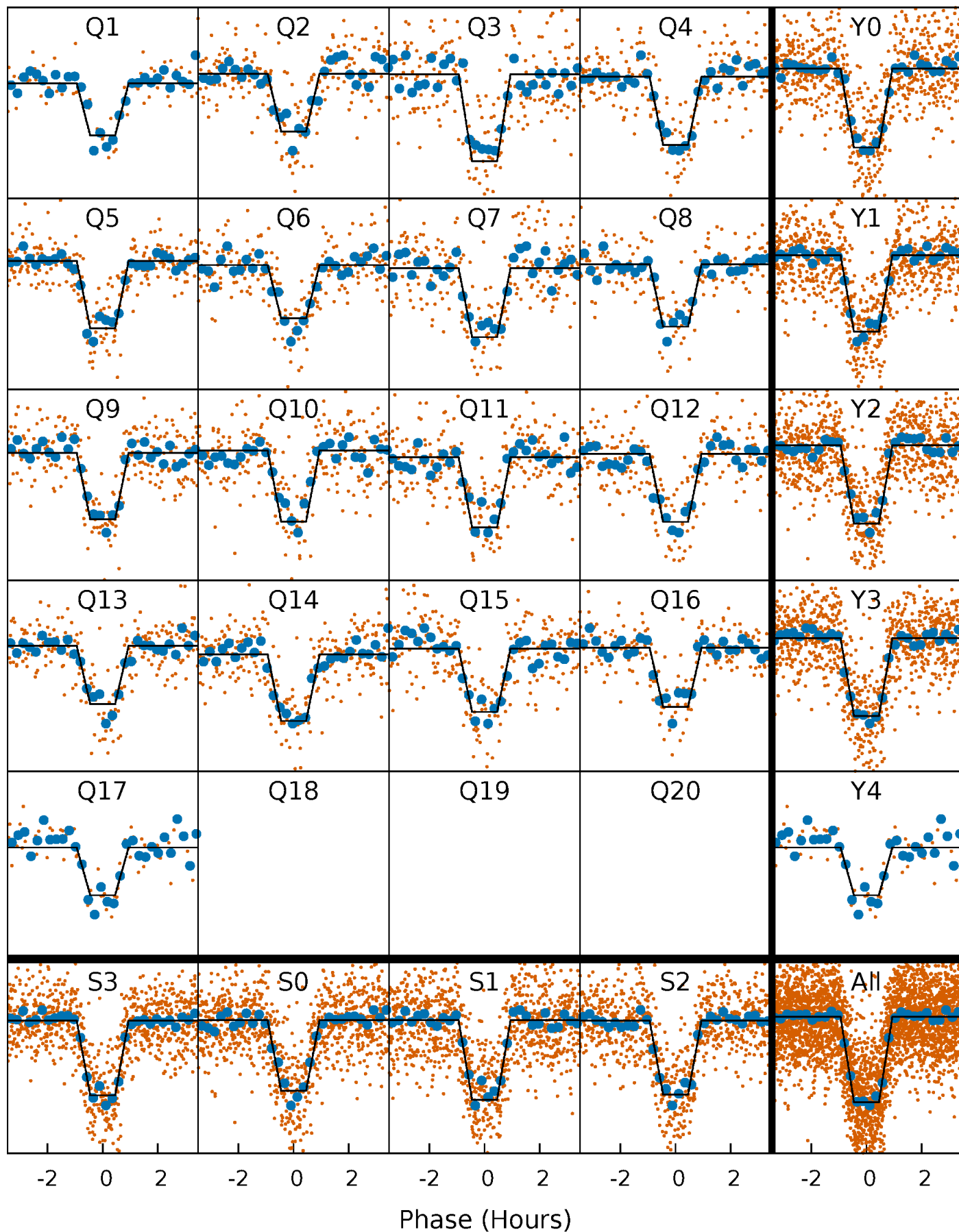
DV Quarter-Phased Transit Curves

TCE 002438264-02 P= 4.973455 Days $T_0=136.071737$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

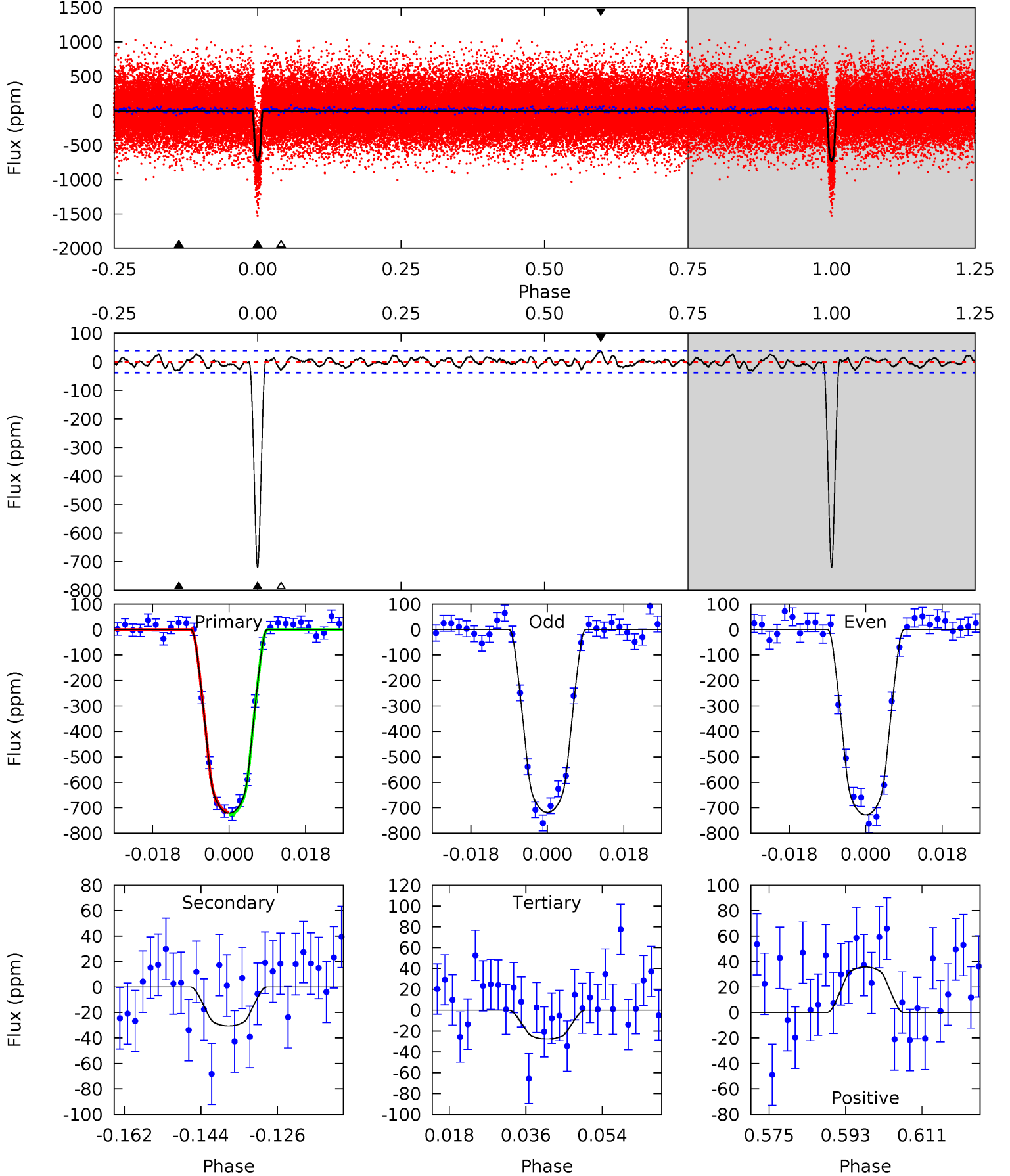
TCE 002438264-02 P= 4.973467 Days $T_0=136.069850$ (BKJD)



DV Model-Shift Uniqueness Test

002438264-02, P = 4.973455 Days, E = 131.098282 Days

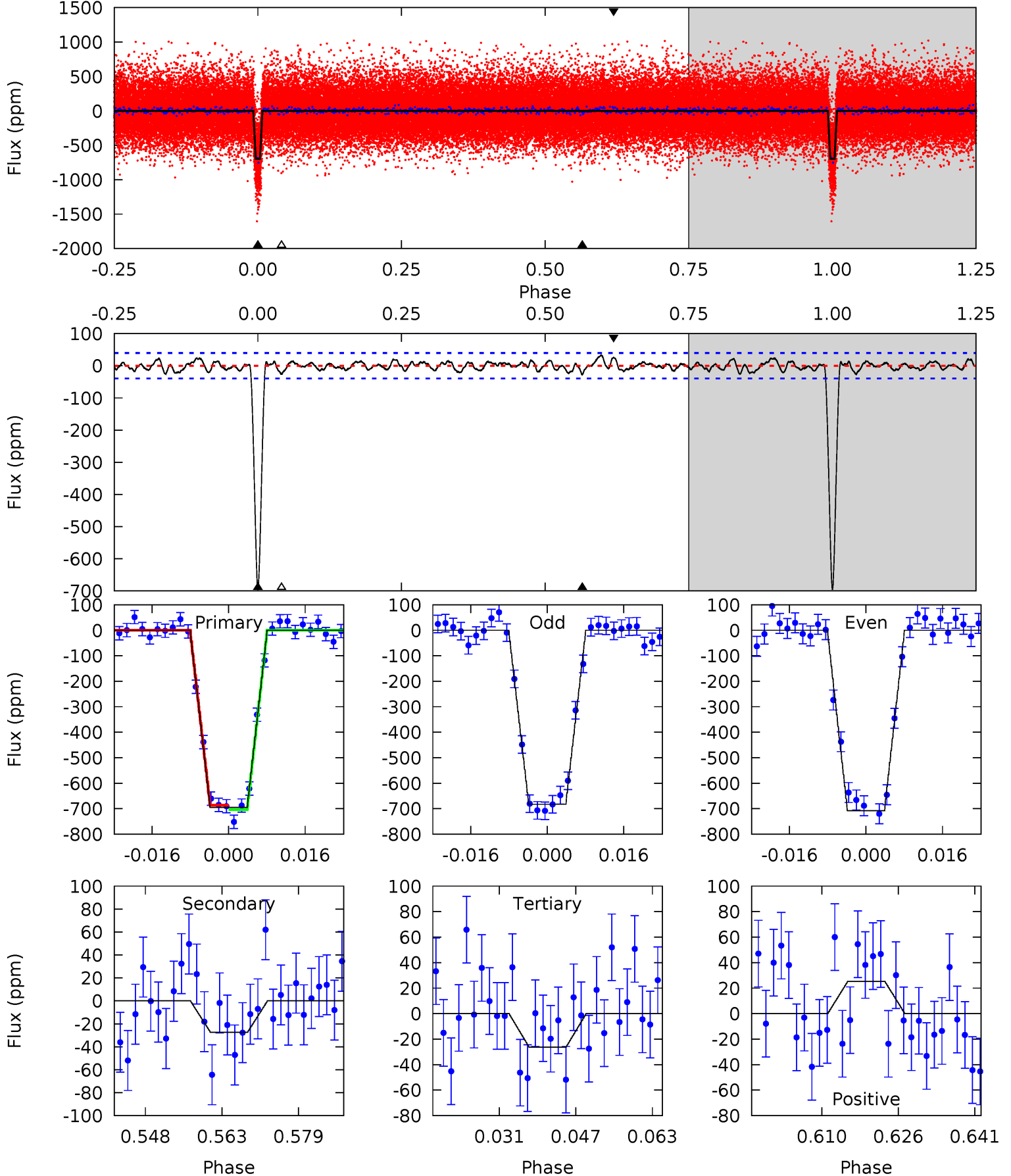
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
93.1	3.94	3.58	4.61	4.91	2.37	1.49	89.5	88.5	0.36	-0.67	0.66	0.98	0.05	0.64



Alt Model-Shift Uniqueness Test

002438264-02, P = 4.973467 Days, E = 131.096383 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
86.7	3.41	3.27	3.16	4.94	2.42	1.34	83.4	83.5	0.14	0.25	1.53	0.99	0.05	1.07



Stellar Parameters For KIC 002438264

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	5097^{+101}_{-101}	$4.554^{+0.036}_{-0.050}$	$0.080^{+0.150}_{-0.150}$	$0.797^{+0.052}_{-0.042}$	$0.829^{+0.043}_{-0.043}$	$2.304^{+0.318}_{-0.375}$
	+2%/-2%	+1%/-1%	+188%/-188%	+7%/-5%	+5%/-5%	+14%/-16%
Source	SPE58	SPE58	SPE58	DSEP		

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

Secondary Eclipse Parameters for KIC 002438264-02 / KOI 0440.02

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-31 ± 8	$2.57^{+0.33}_{-0.29}$	1214^{+33}_{-30}	2868^{+150}_{-142}	$7.207^{+3.014}_{-2.199}$
Alt.	-27 ± 8	$2.30^{+0.35}_{-0.30}$	1214^{+34}_{-32}	2921^{+163}_{-177}	$8.105^{+3.688}_{-2.789}$

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

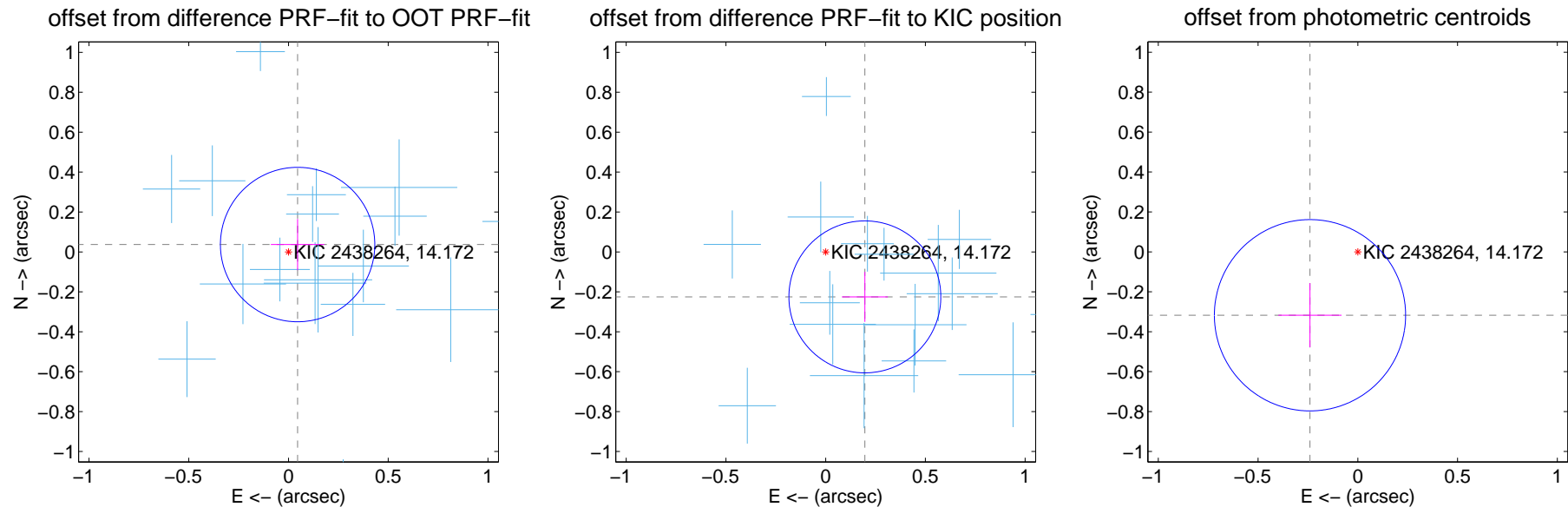
DV Centroid Data

Supplemental centroid analysis for 002438264-02. Kepler magnitude: 14.17. Transit SNR 60.62

There are 17 quarters with good PRF difference image offsets

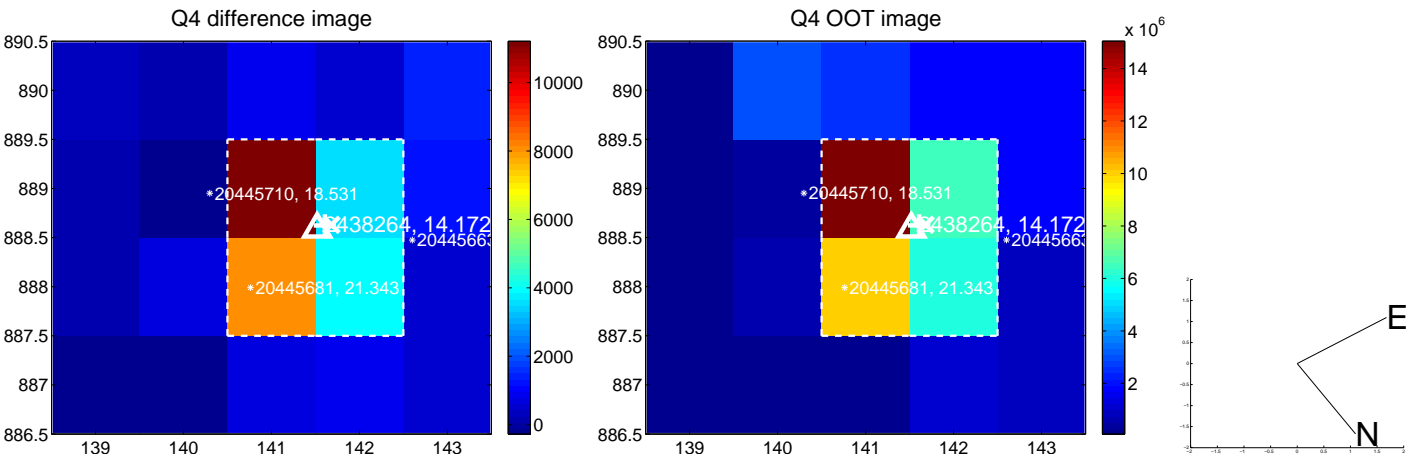
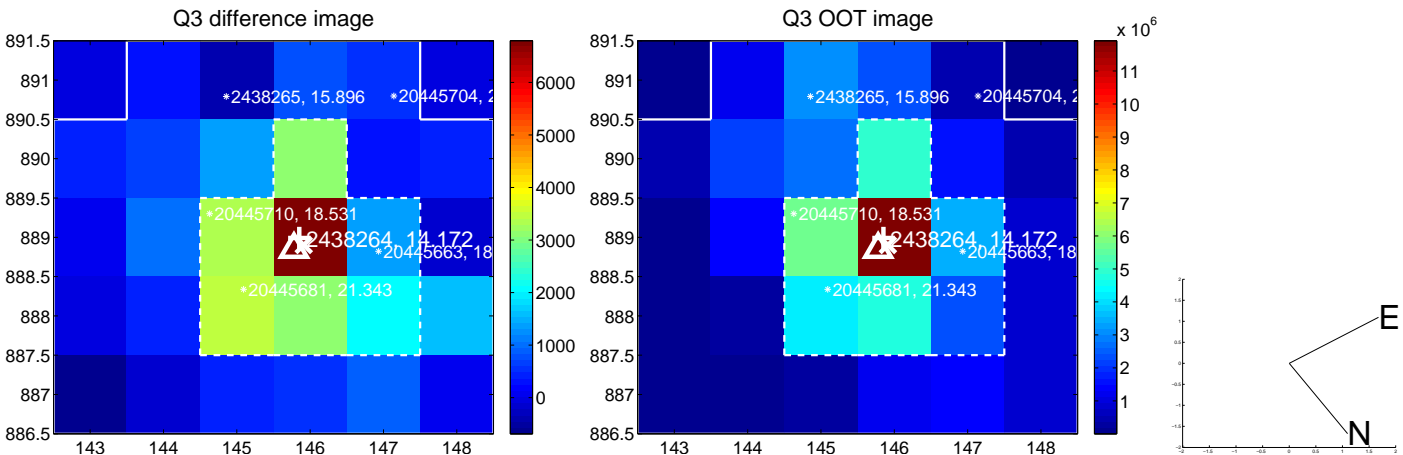
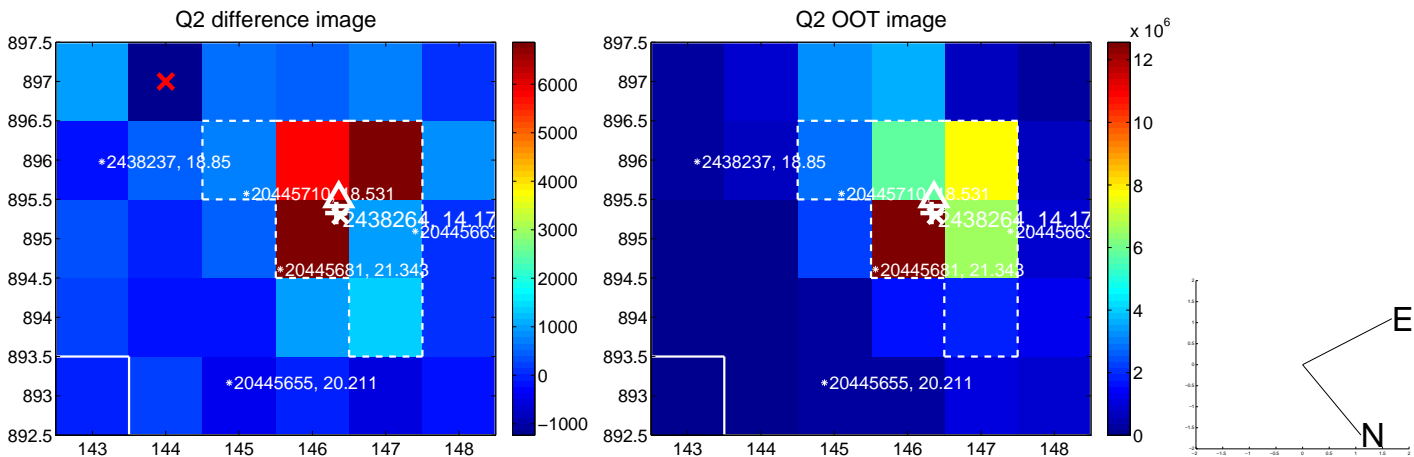
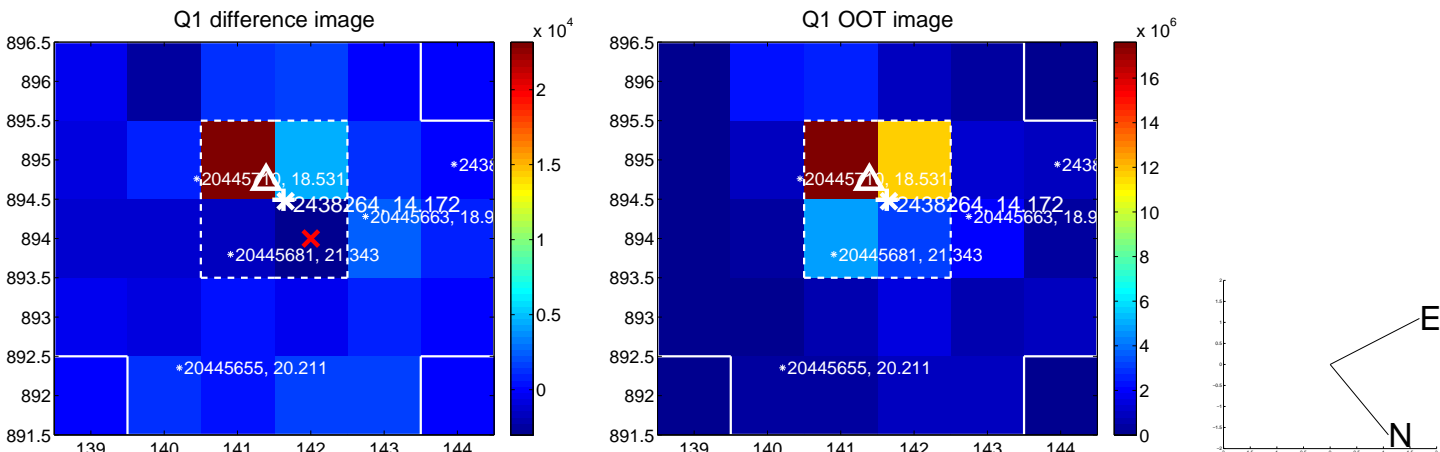
The direct PRF centroid is offset from the target star catalog position by about 0.18 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.059 ± 0.129	0.46	-0.046 ± 0.134	0.037 ± 0.128
PRF-fit source offset from KIC position	0.299 ± 0.127	2.36	-0.196 ± 0.115	-0.225 ± 0.125
photometric centroid source offset	0.40 ± 0.16	2.49	0.24 ± 0.16	-0.32 ± 0.16

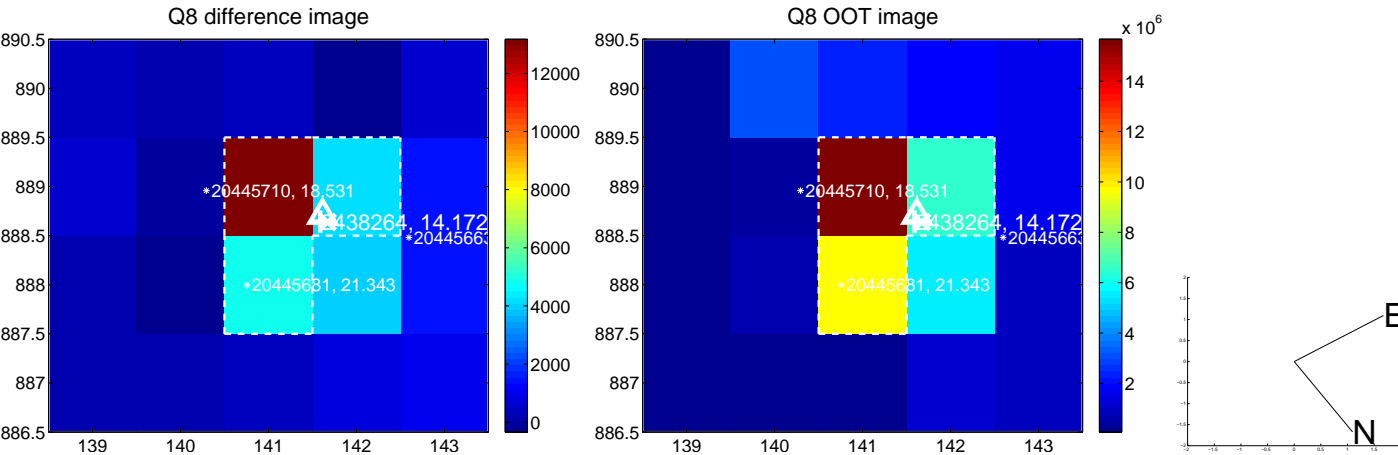
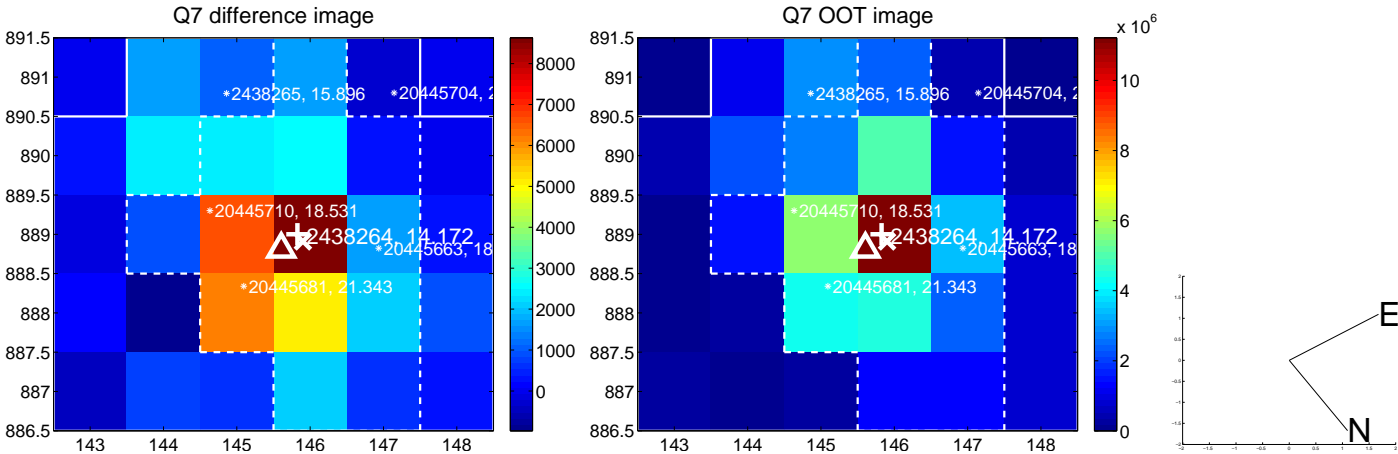
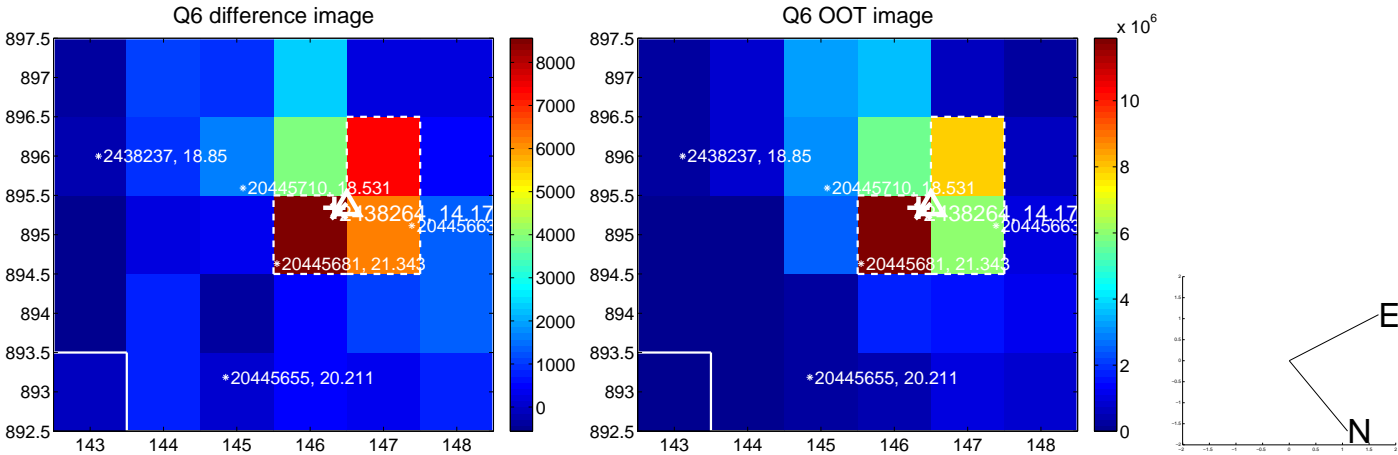
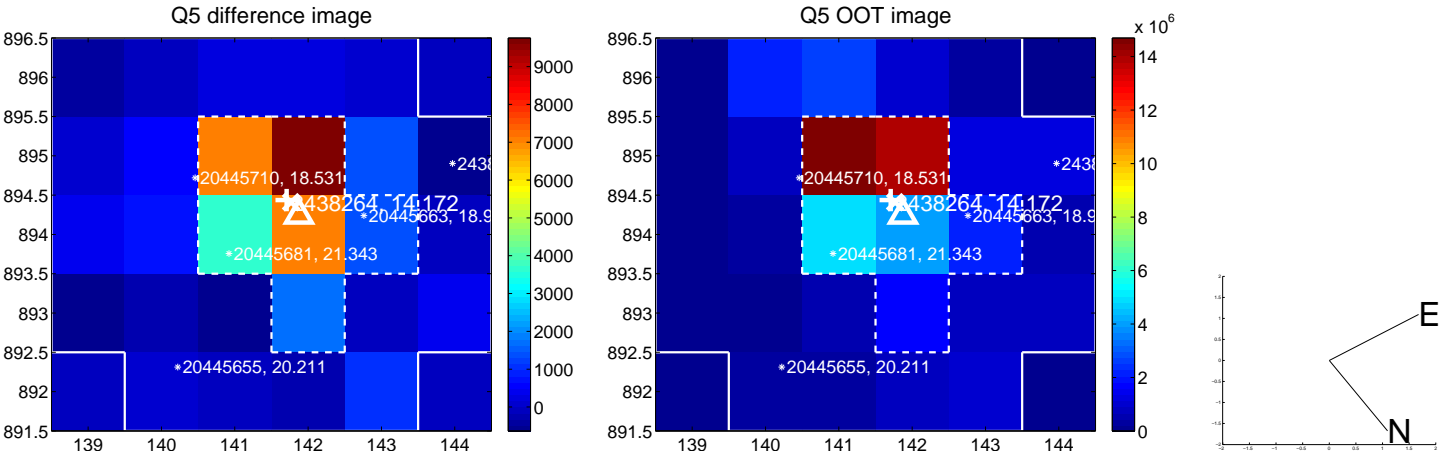


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

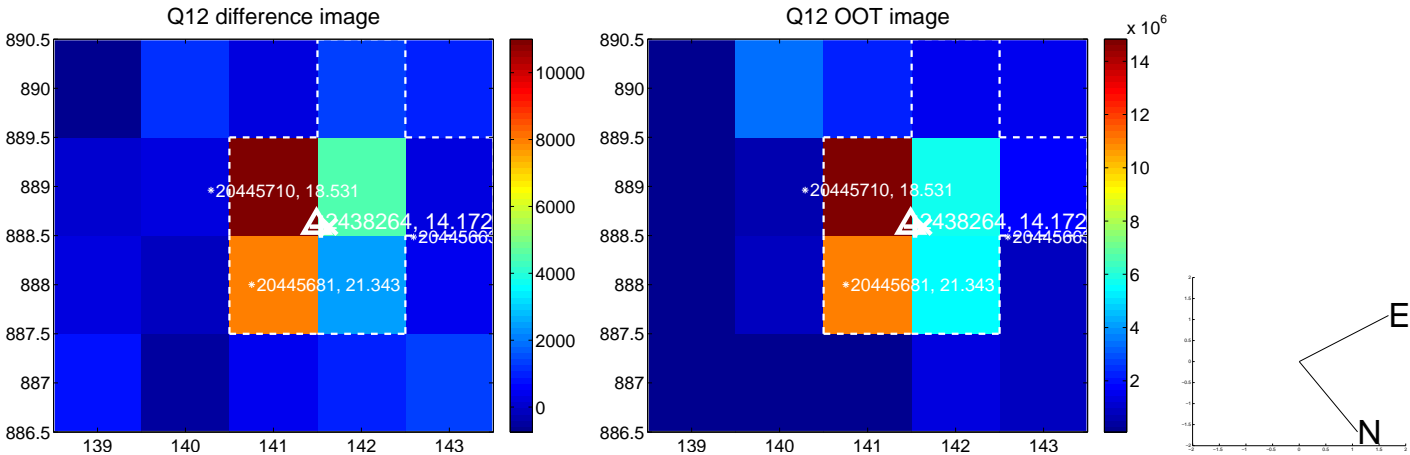
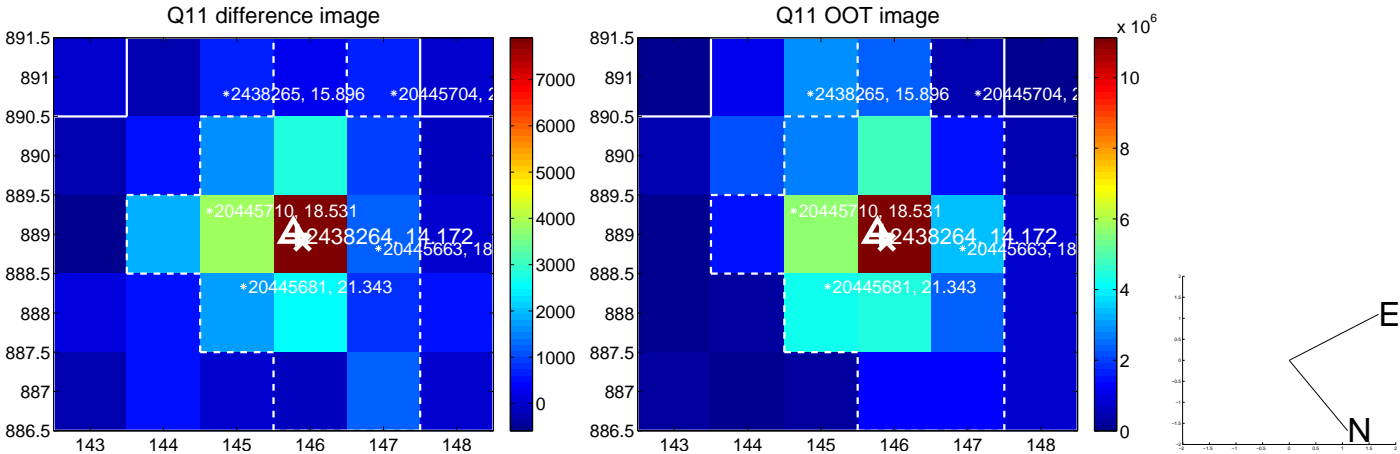
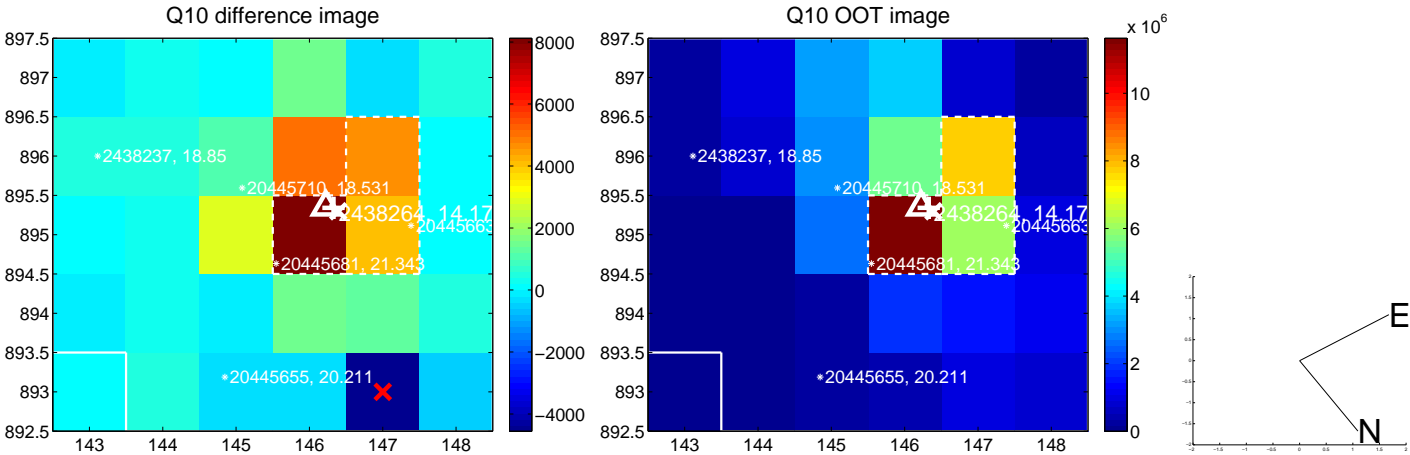
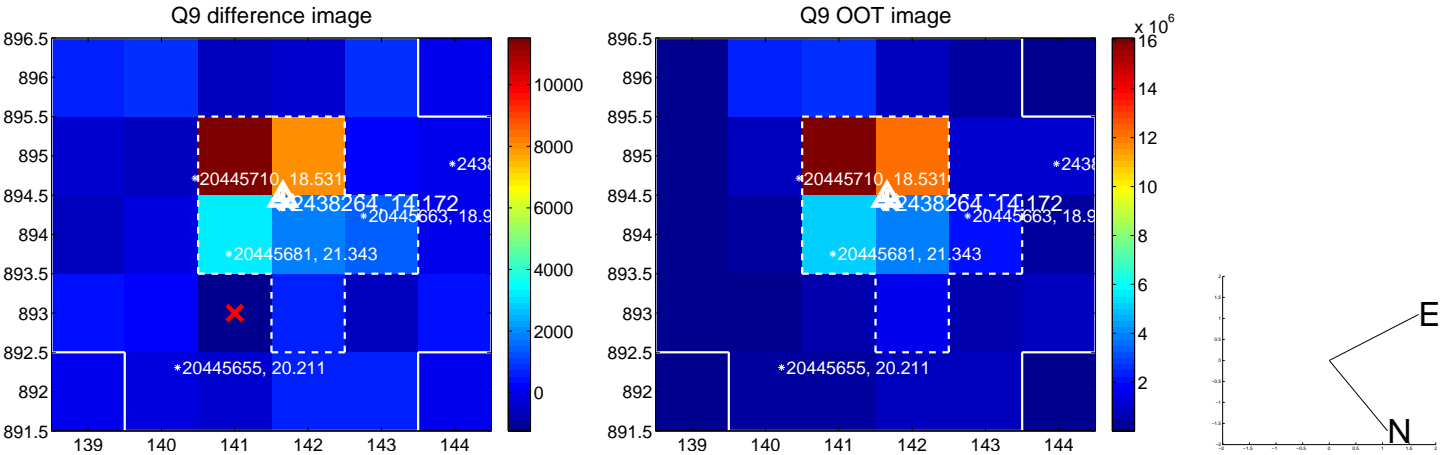
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



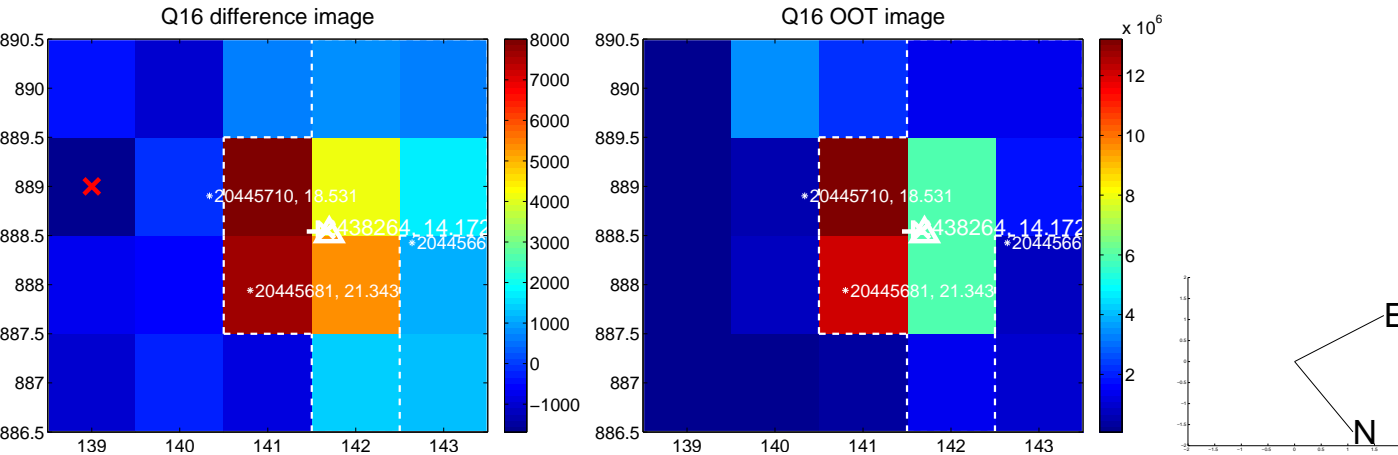
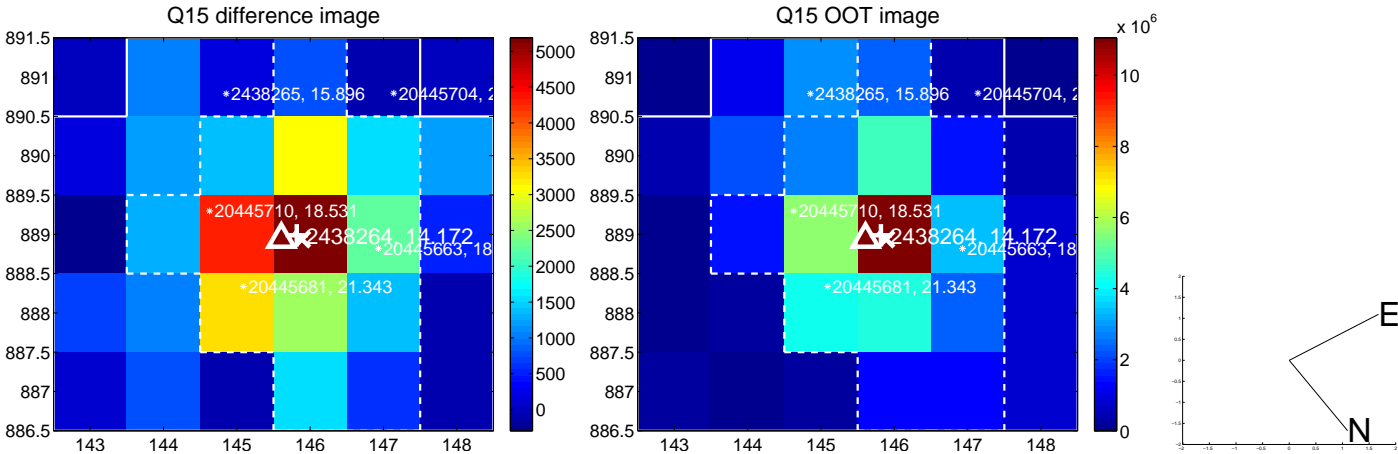
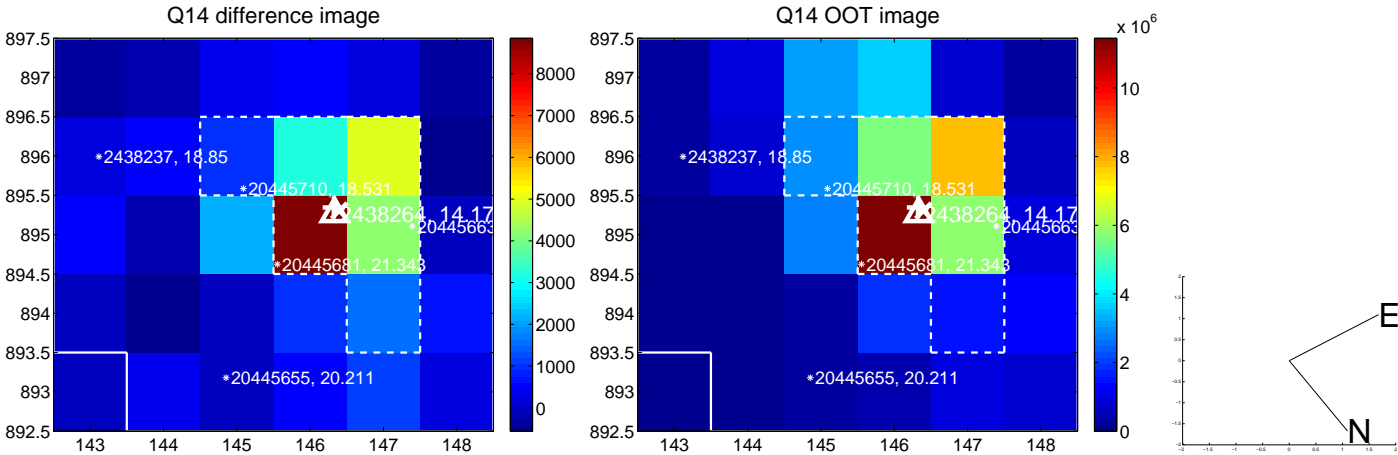
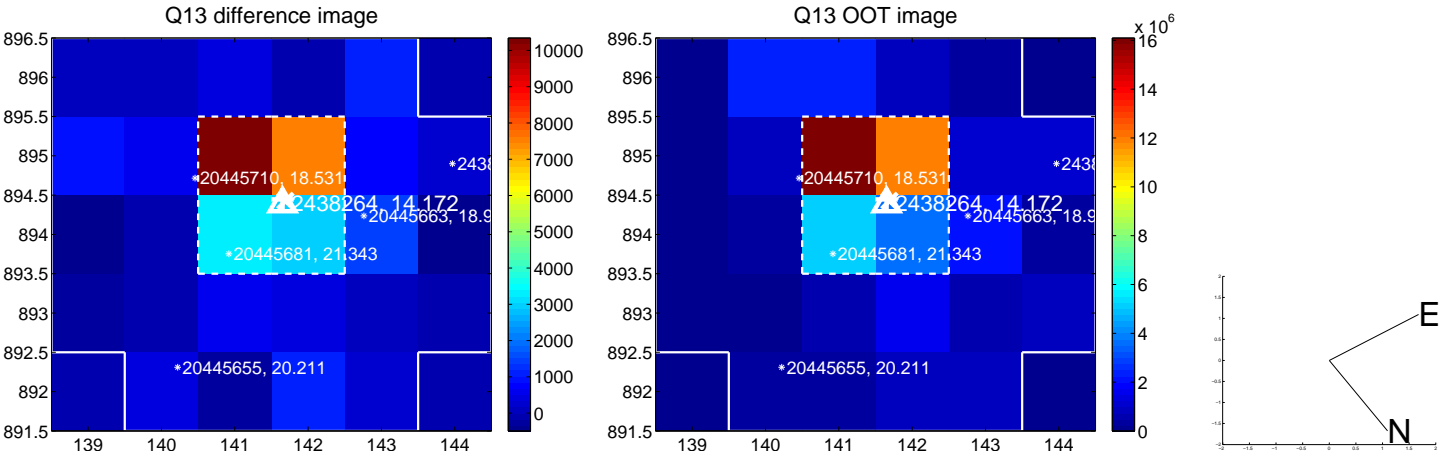
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

