

KIC 010538176

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})
010538176-01	OBS	1301.01	12.699014	134.193259	769.5	3.204	25.2	27.2	0.88	5291	2.97	52.60
010538176-02	OBS	1301.02	37.514396	151.783923	930.4	5.451	24.4	25.7	0.88	5291	2.95	12.41

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010538176-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
010538176-02	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.

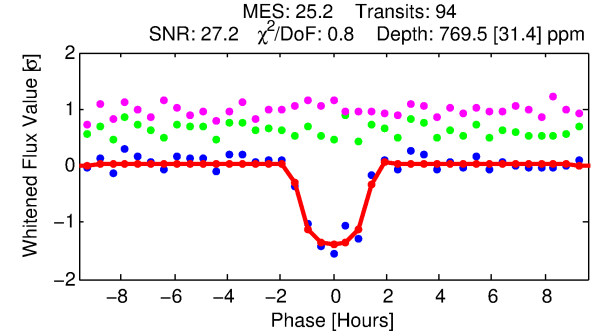
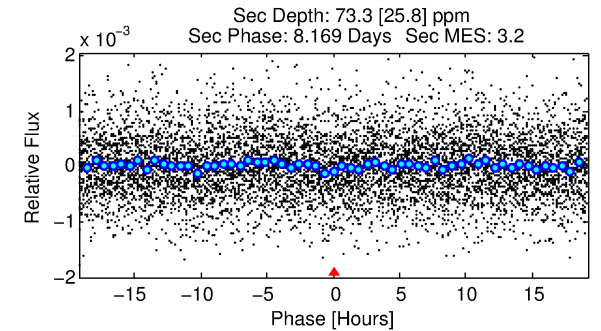
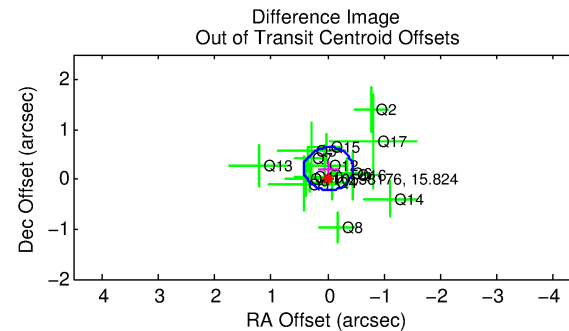
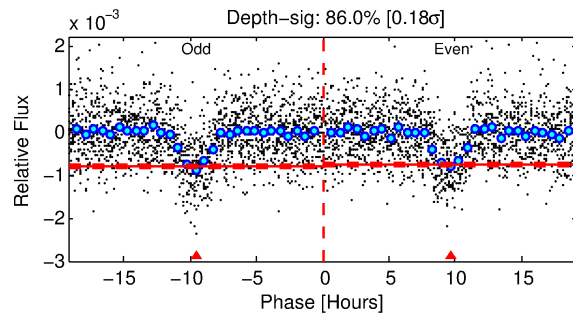
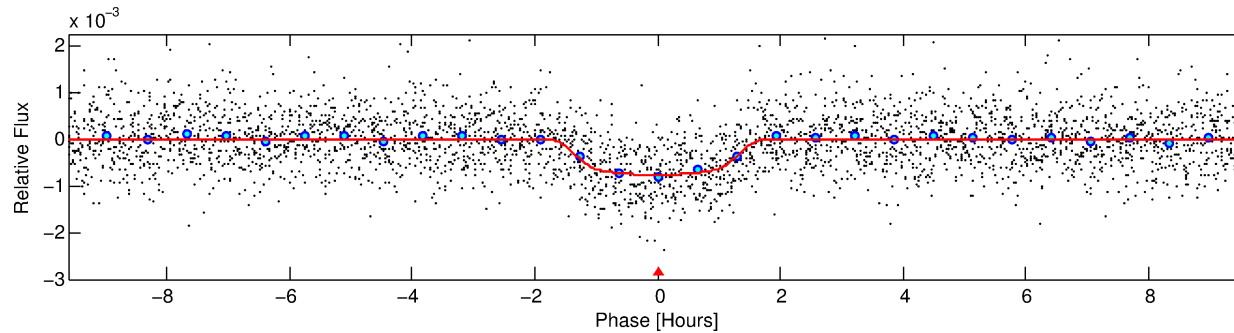
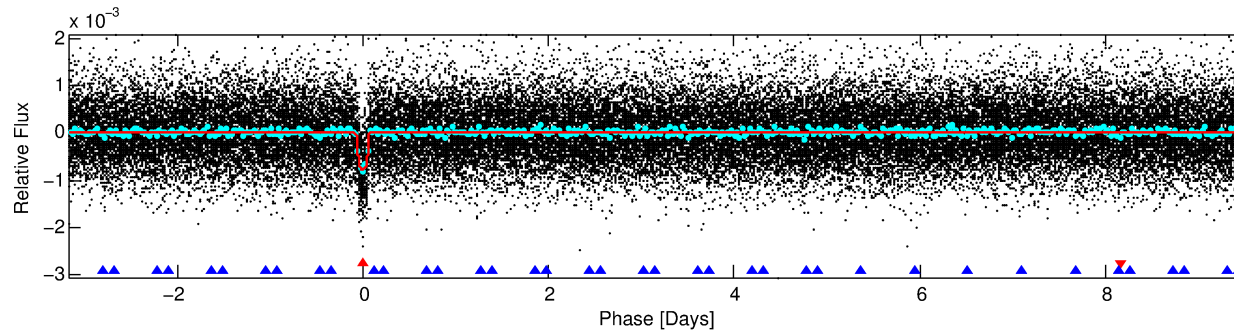
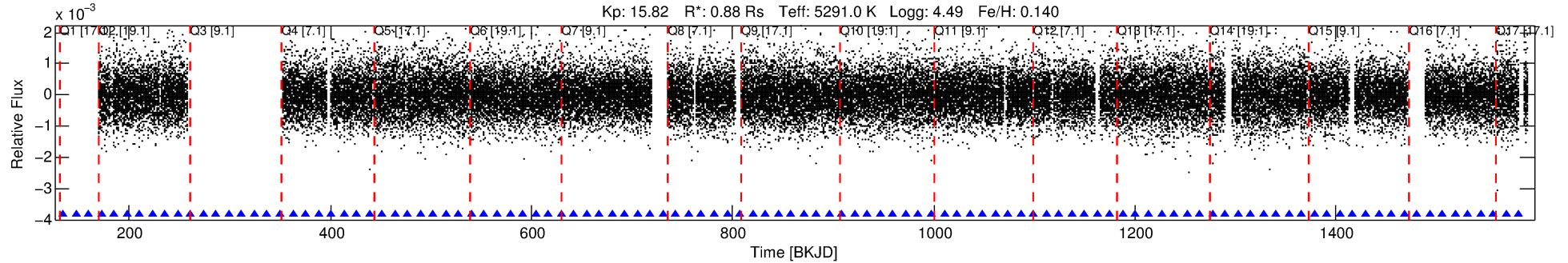
Ephemeris Match Information For 010538176-01

No Significant Match Found

DV One-Page Summary

KIC: 10538176 Candidate: 1 of 2 Period: 12.699 d
KOI: K01301.01 Name: Kepler-284b Corr: 0.955

Kp: 15.82 R*: 0.88 Rs Teff: 5291.0 K Logg: 4.49 Fe/H: 0.140



DV Fit Results:

Period = 12.69901 [0.00005] d
Epoch = 134.1933 [0.0031] BKJD
Rp/R* = 0.0309 [0.0031]
a/R* = 15.09 [5.85]
b = 0.90 [0.08]
Seff = 52.60 [6.85]
Teq = 687 [22] K
Rp = 2.97 [0.38] Re
a = 0.1019 [0.0075] AU
Ag = 47.46 [19.97] [2.33σ]
Teffp = 2787 [286] K [7.33σ]

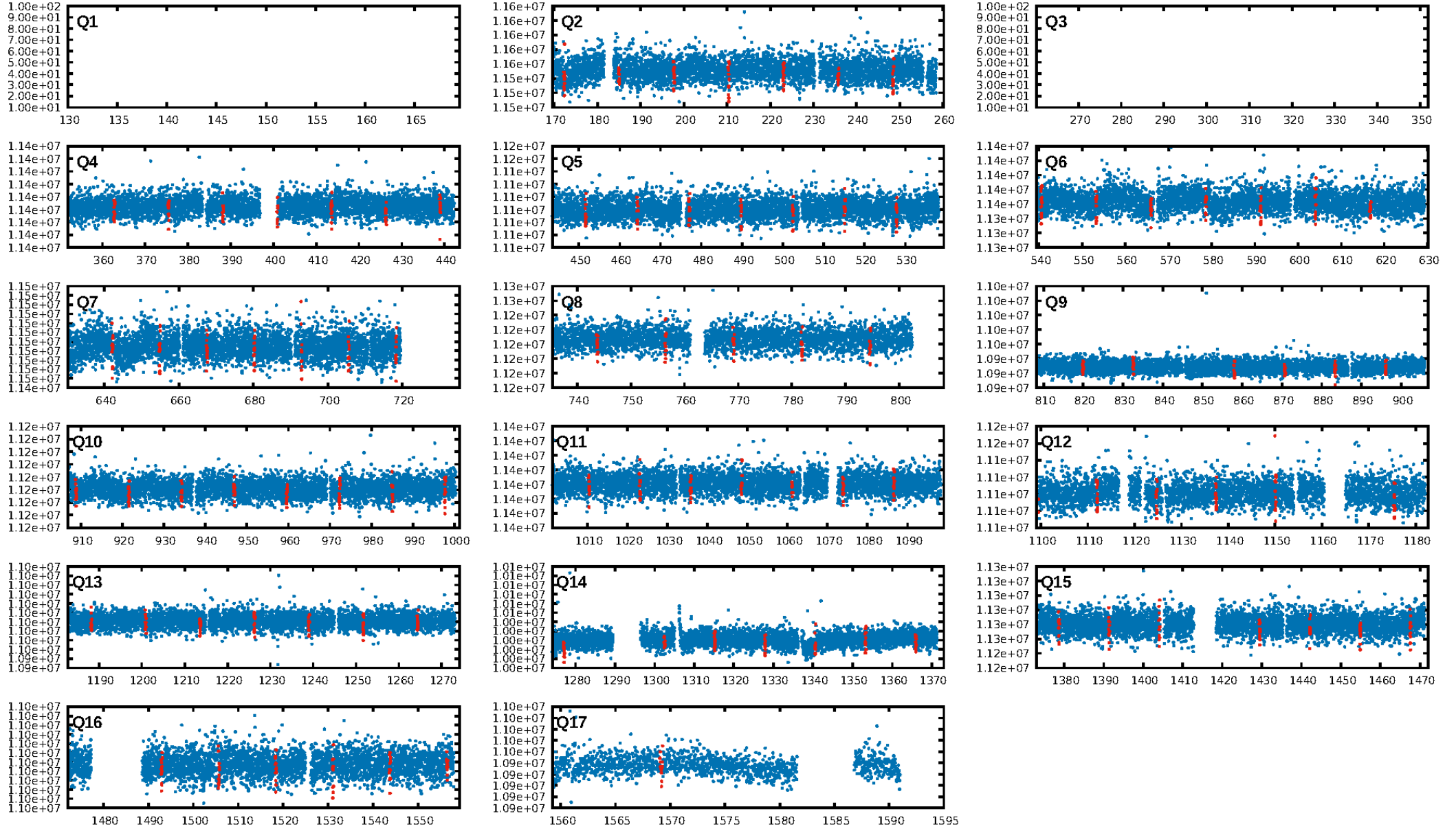
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [94.19σ]
ModelChiSquare2-sig: 98.2%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 2.82e-138
RollingBand-fgt: 1.00 [93/93]
GhostDiagnostic-chr: 1.536
Centroid-sig: 19.9%
Centroid-so: 0.835 arcsec [1.78σ]
OotOffset-rm: 0.208 arcsec [1.44σ]
KicOffset-rm: 0.506 arcsec [3.37σ]
OotOffset-st: 4/3/4/4 [15]
KicOffset-st: 4/3/4/4 [15]
DiffImageQuality-fgm: 1.00 [15/15]
DiffImageOverlap-fno: 1.00 [15/15]

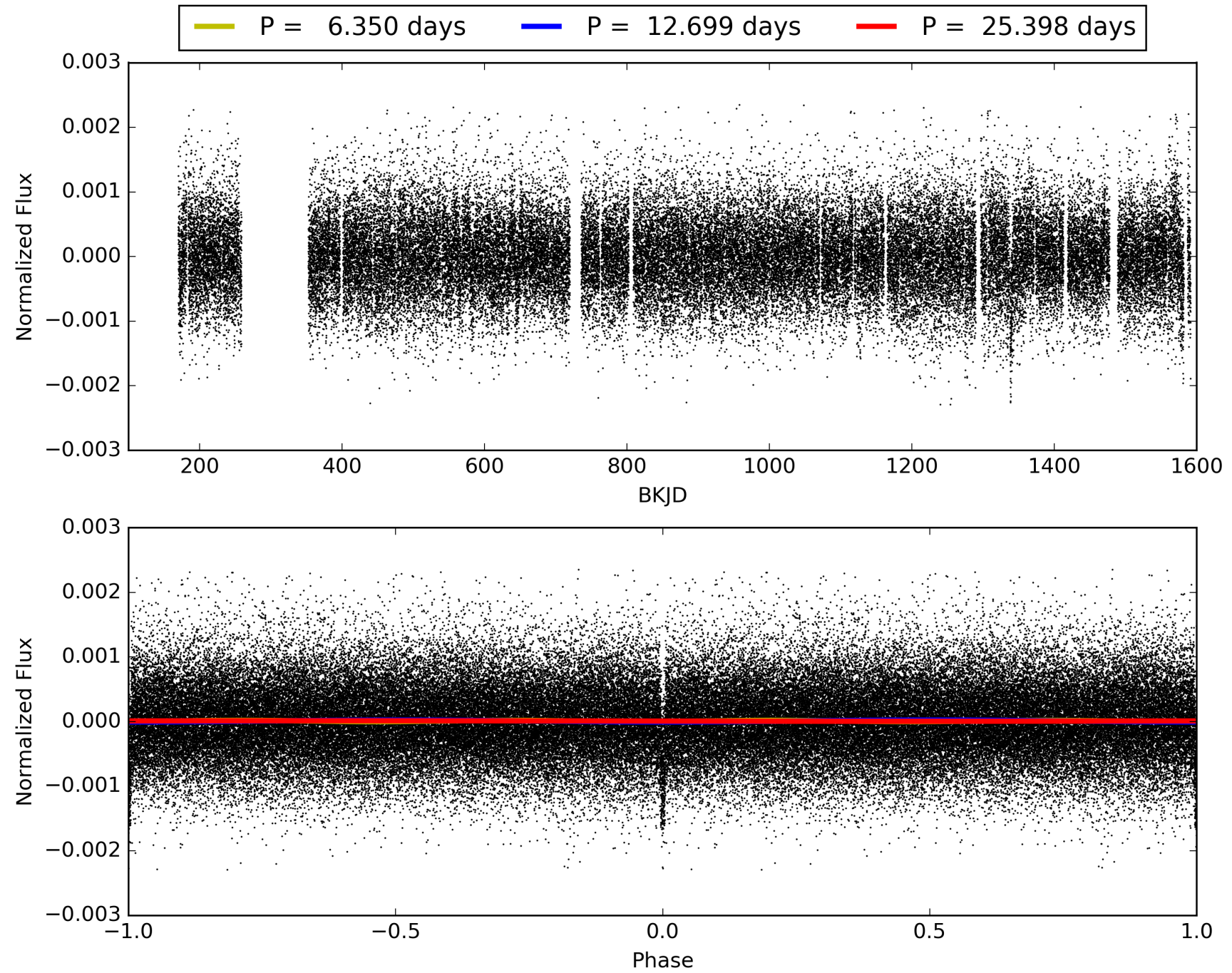
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 28-Jan-2016 22:47:33 Z

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

TCE 010538176-01, PDC Light Curves

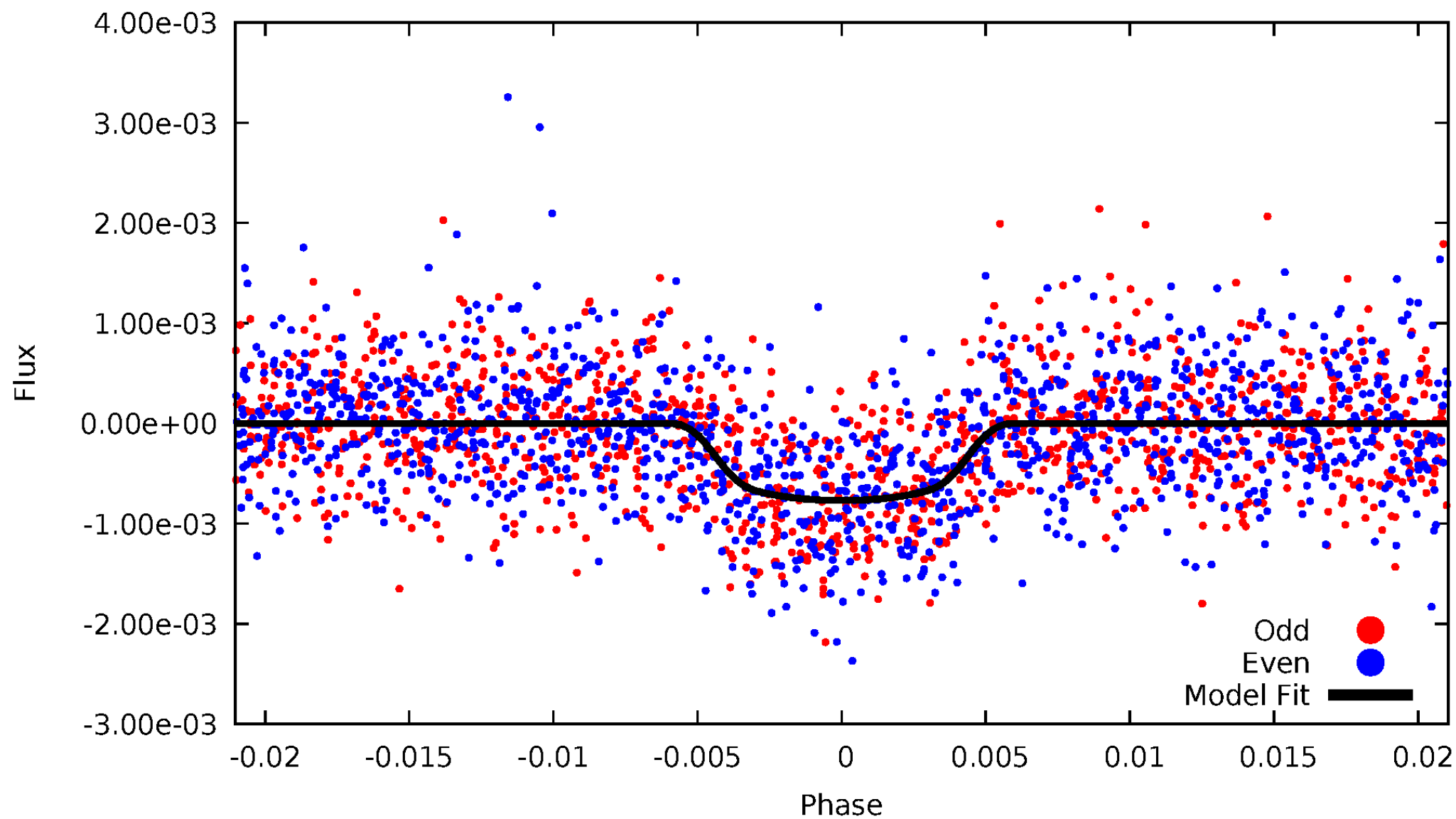


TCE 010538176-01



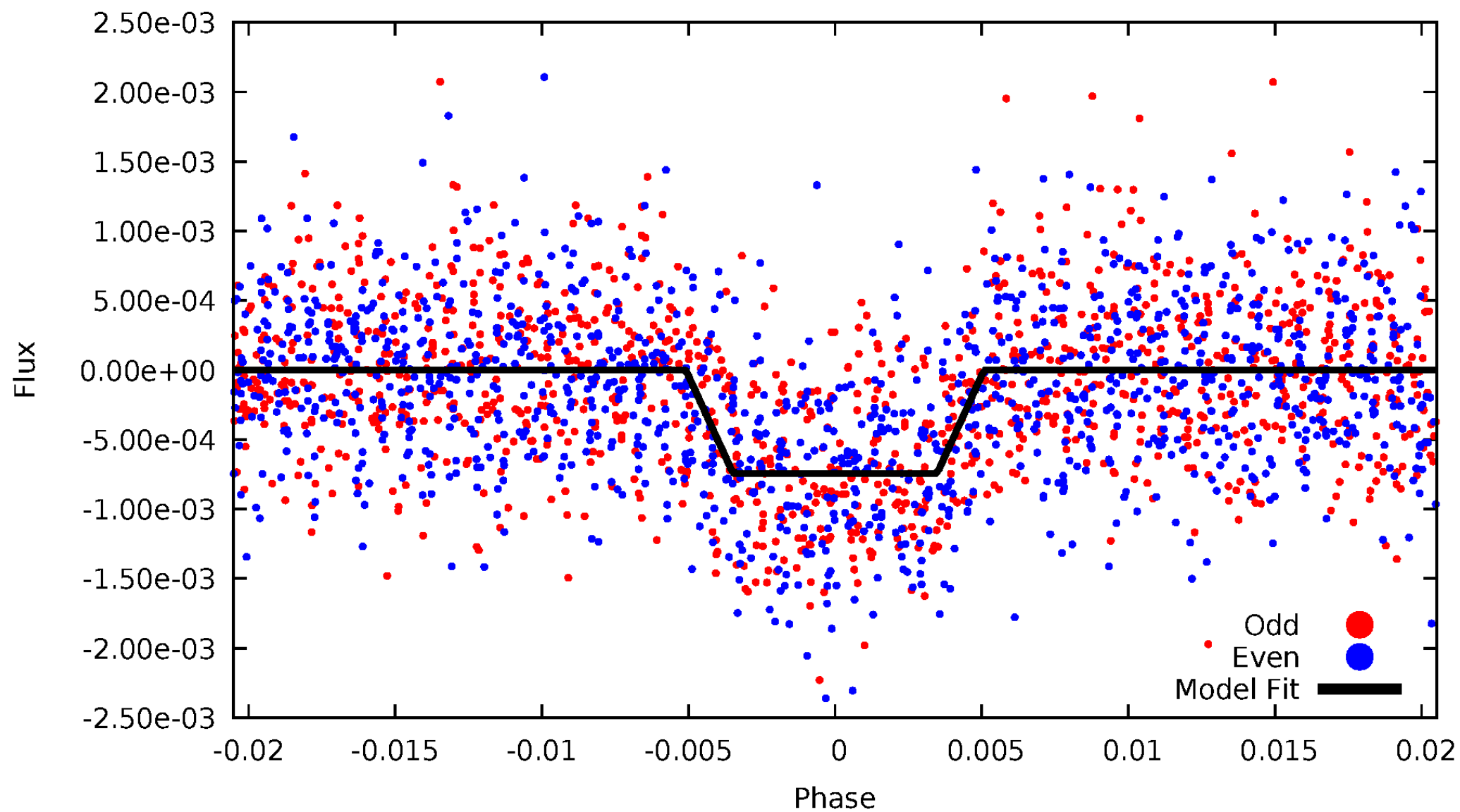
DV Odd/Even

TCE 010538176-01



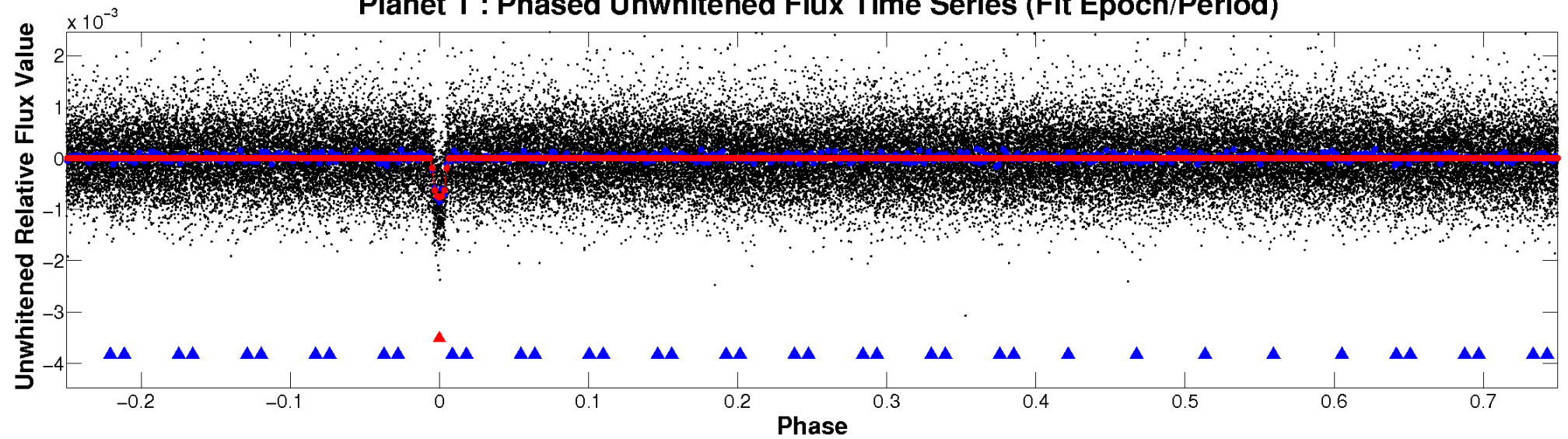
ALT Odd/Even

TCE 010538176-01

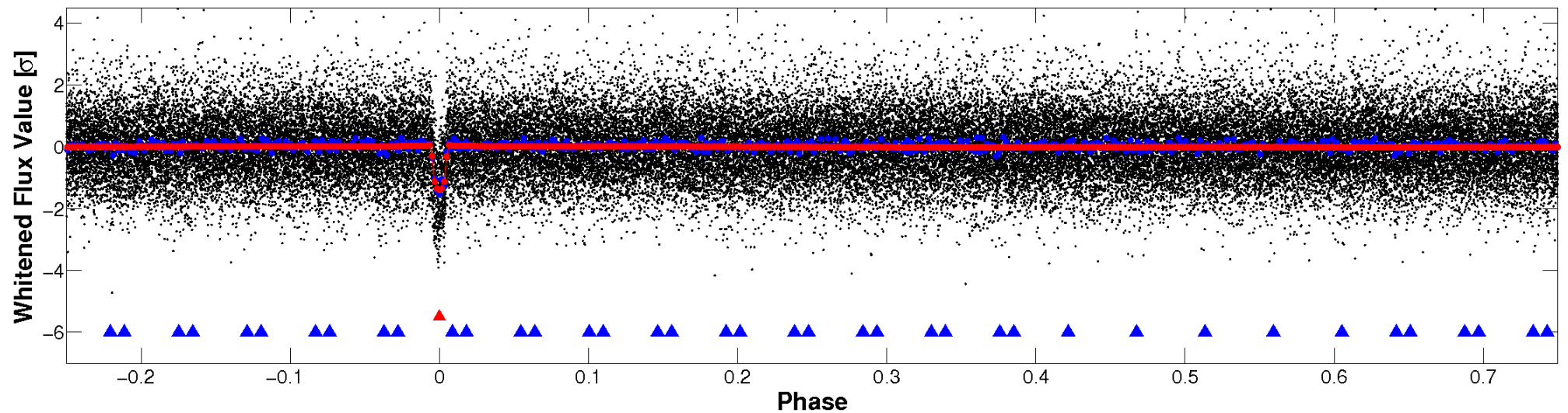


Non-Whitened Vs. Whitened Light Curve

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

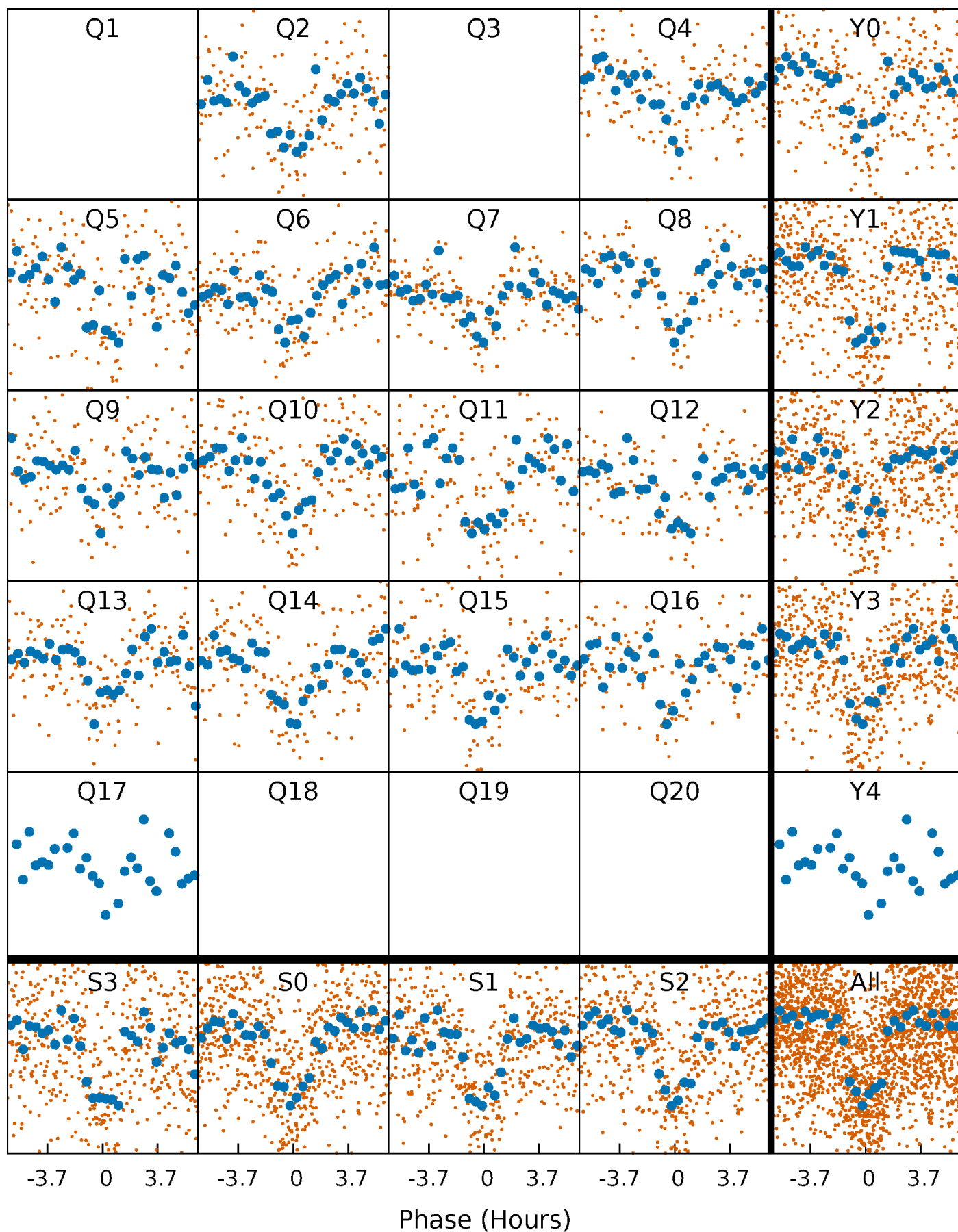


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



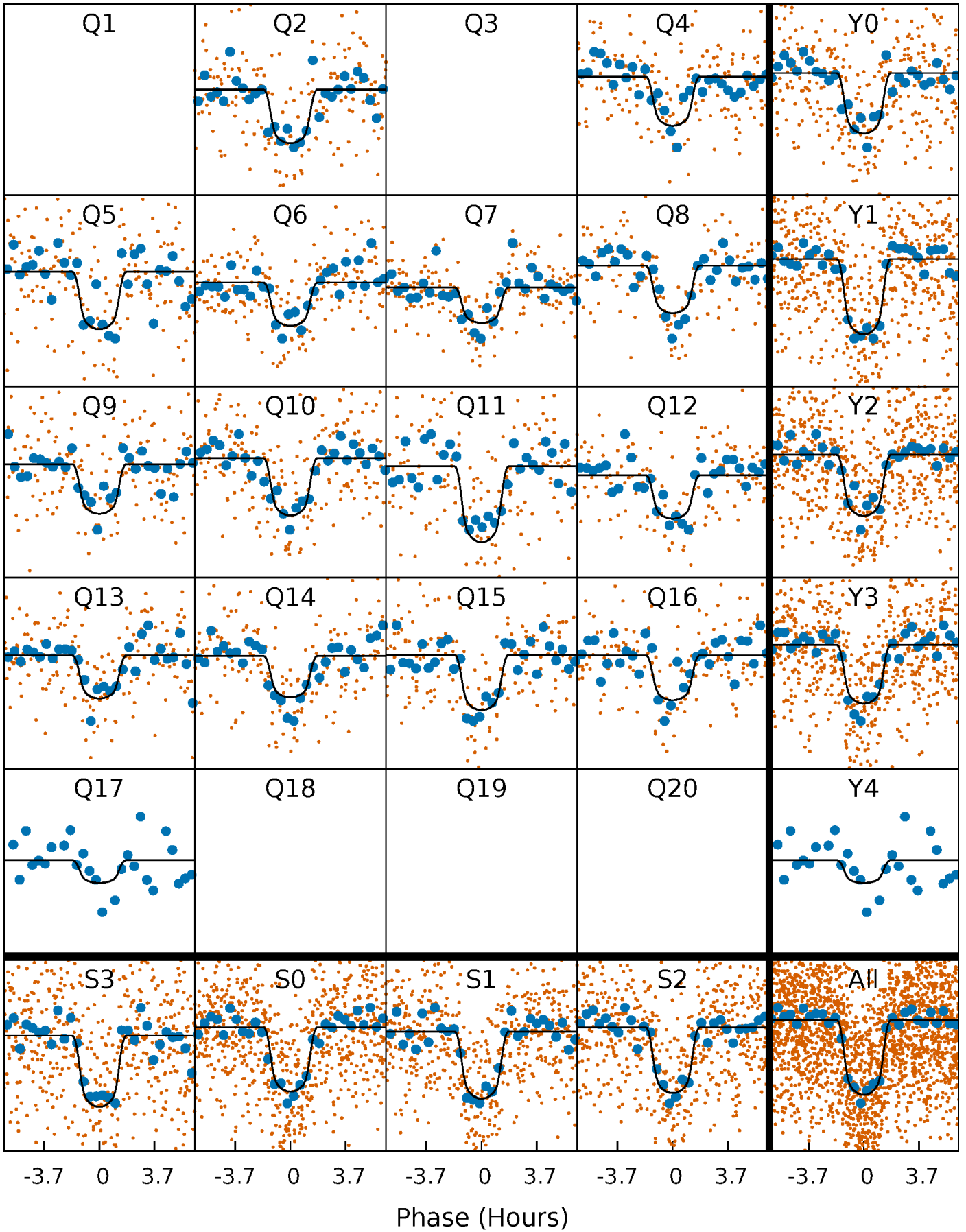
PDC Quarter-Phased Transit Curves

TCE 010538176-01 P= 12.699014 Days $T_0=134.193259$ (BKJD)



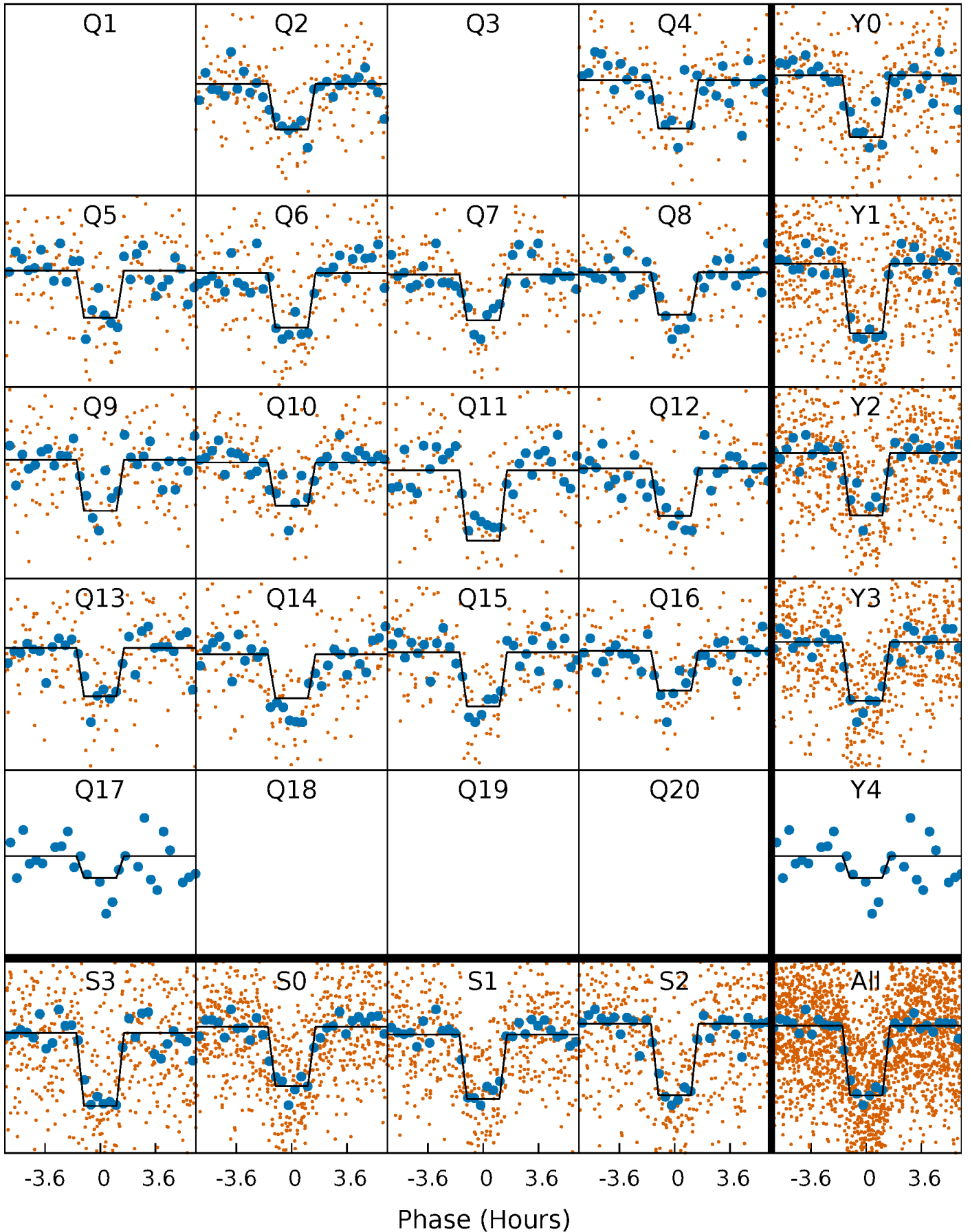
DV Quarter-Phased Transit Curves

TCE 010538176-01 P= 12.699014 Days $T_0=134.193259$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

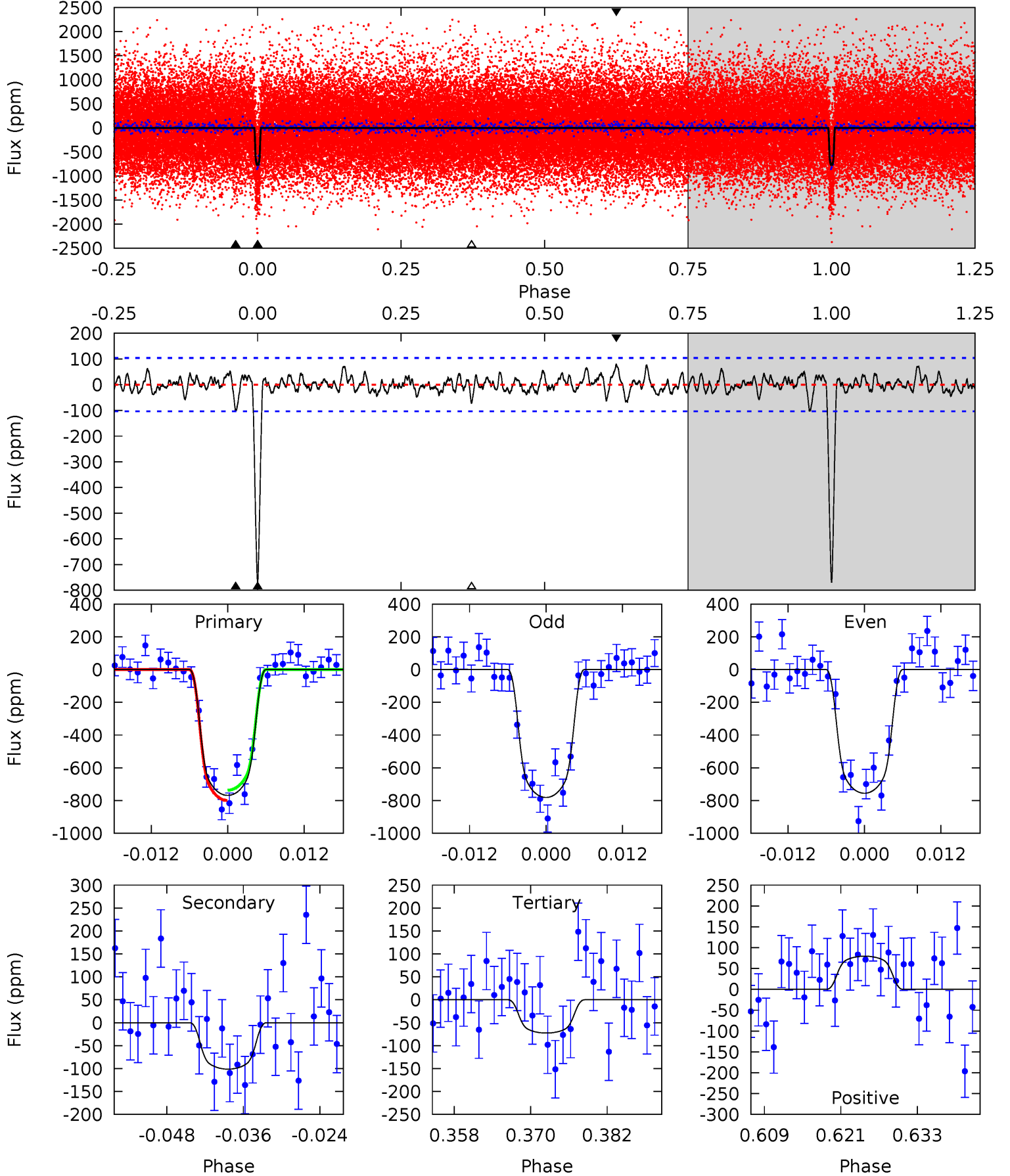
TCE 010538176-01 P= 12.699084 Days $T_0=134.188664$ (BKJD)



DV Model-Shift Uniqueness Test

010538176-01, P = 12.699014 Days, E = 134.193259 Days

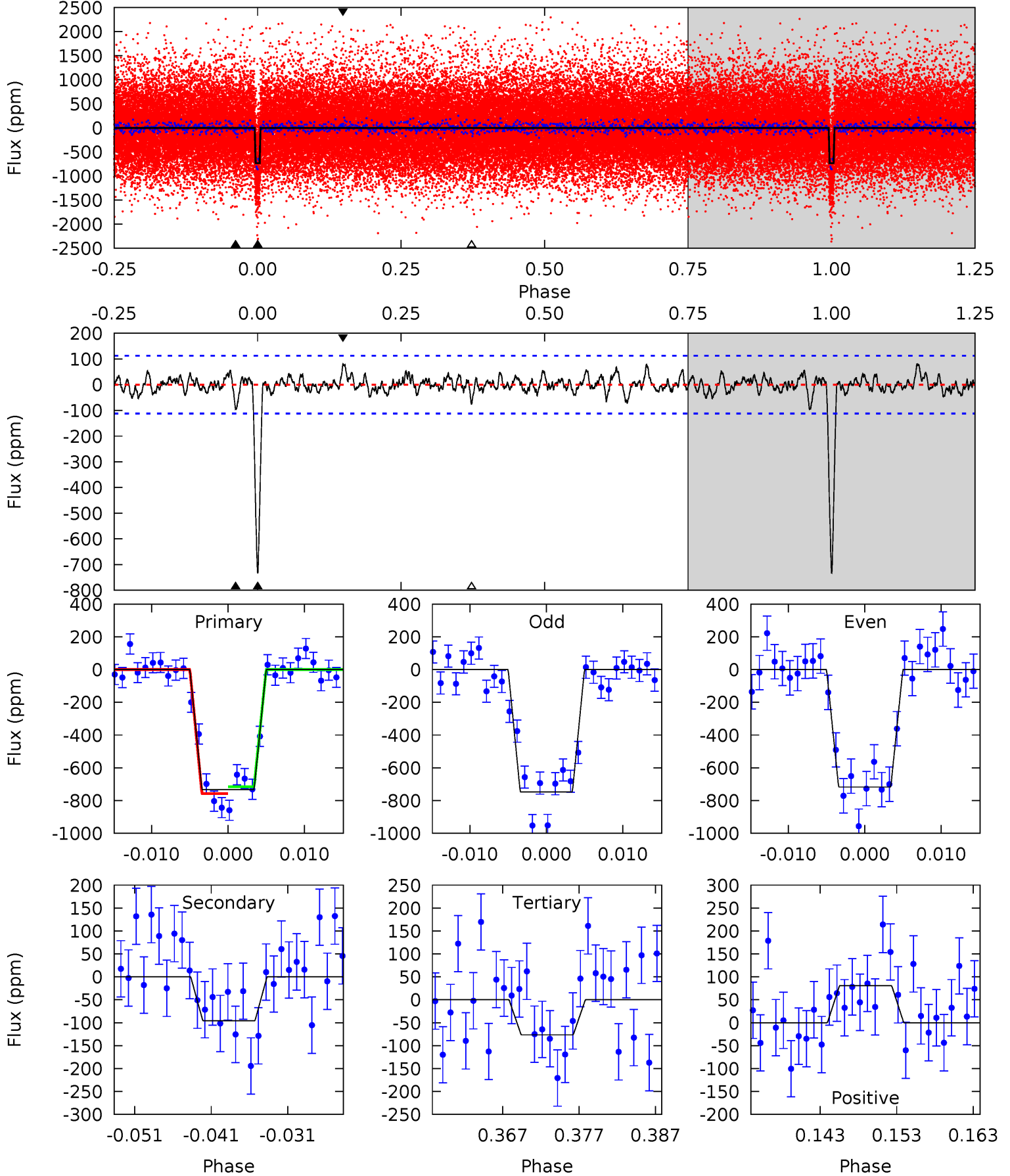
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
36.9	4.87	3.49	3.82	4.99	2.51	1.19	33.4	33.1	1.38	1.05	0.62	0.99	0.09	1.52



Alt Model-Shift Uniqueness Test

010538176-01, P = 12.699084 Days, E = 134.188664 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
32.7	4.28	3.41	3.61	5.02	2.57	1.08	29.3	29.1	0.87	0.67	0.67	0.97	0.10	0.95



Stellar Parameters For KIC 010538176

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	5291^{+84}_{-73}	$4.489^{+0.058}_{-0.065}$	$0.140^{+0.150}_{-0.150}$	$0.882^{+0.072}_{-0.059}$	$0.875^{+0.050}_{-0.041}$	$1.796^{+0.390}_{-0.383}$
	+2%/-1%	+1%/-1%	+107%/-107%	+8%/-7%	+6%/-5%	+22%/-21%
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 010538176-01 / KOI 1301.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-101 ± 21	$2.99^{+0.35}_{-0.34}$	963^{+25}_{-25}	3489^{+173}_{-167}	65^{+23}_{-17}
Alt.	-96 ± 22	$2.65^{+0.34}_{-0.33}$	963^{+26}_{-25}	3598^{+204}_{-199}	78^{+34}_{-23}

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 $A_{obs} \gg 1.0$

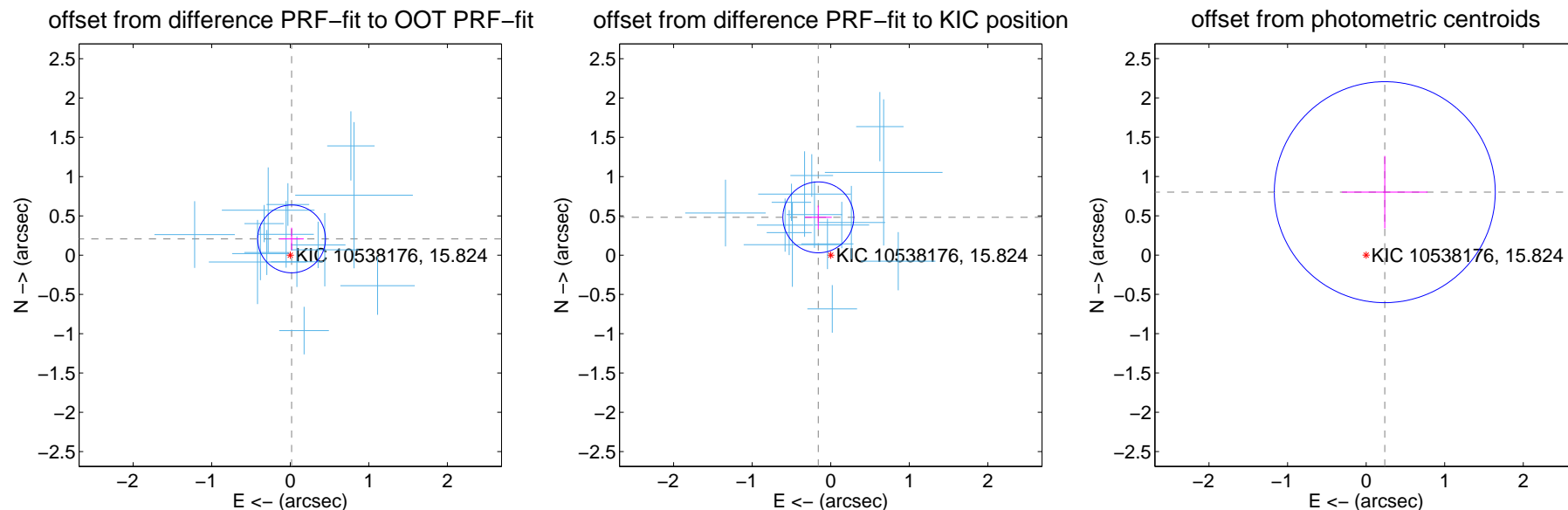
DV Centroid Data

Supplemental centroid analysis for 010538176-01. Kepler magnitude: 15.82. Transit SNR 27.20

There are 15 quarters with good PRF difference image offsets

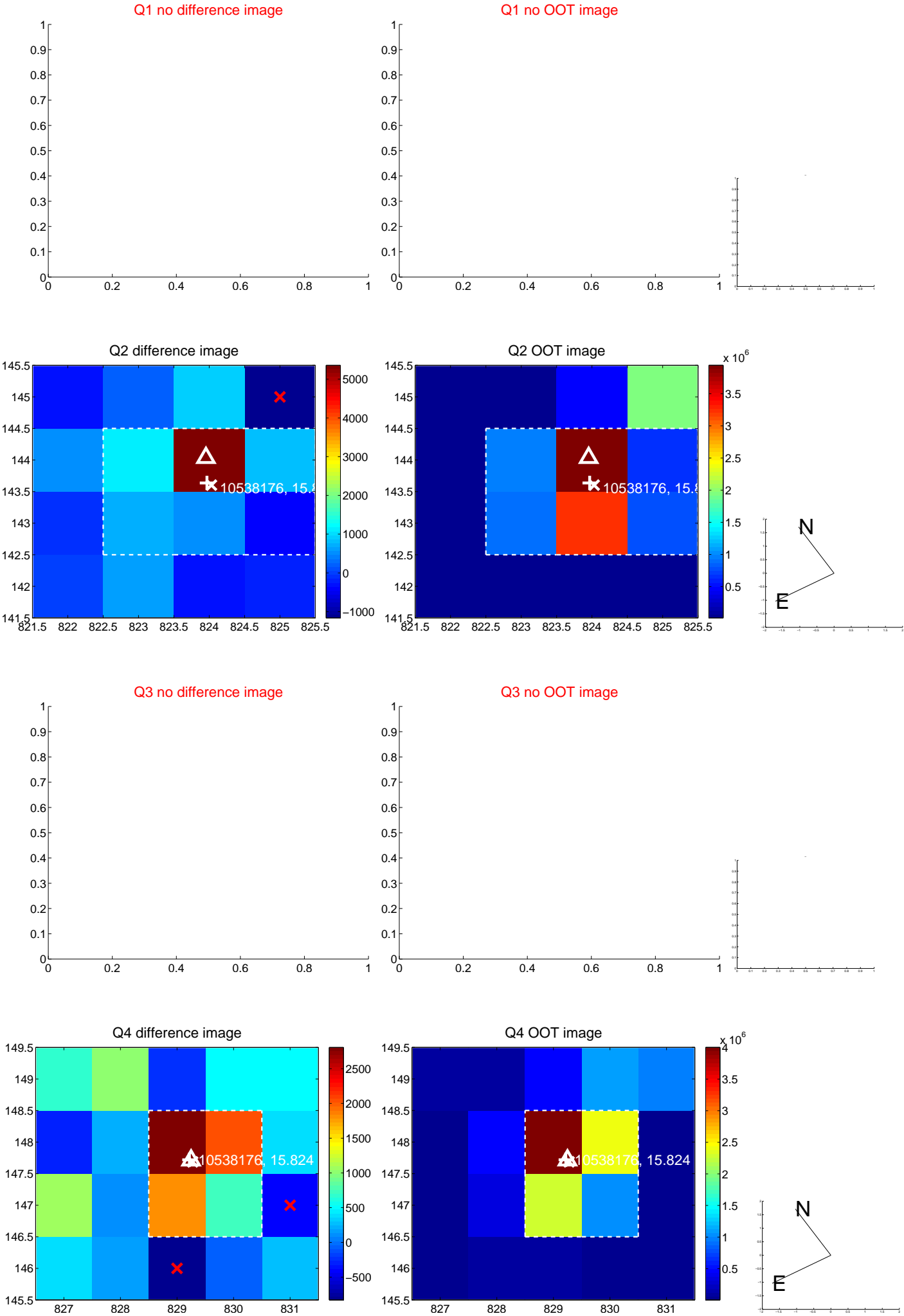
The direct PRF centroid is offset from the target star catalog position by about 0.32 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.208 ± 0.144	1.44	-0.017 ± 0.154	0.207 ± 0.142
PRF-fit source offset from KIC position	0.506 ± 0.150	3.37	0.158 ± 0.171	0.481 ± 0.149
photometric centroid source offset	0.84 ± 0.47	1.78	-0.24 ± 0.54	0.80 ± 0.46

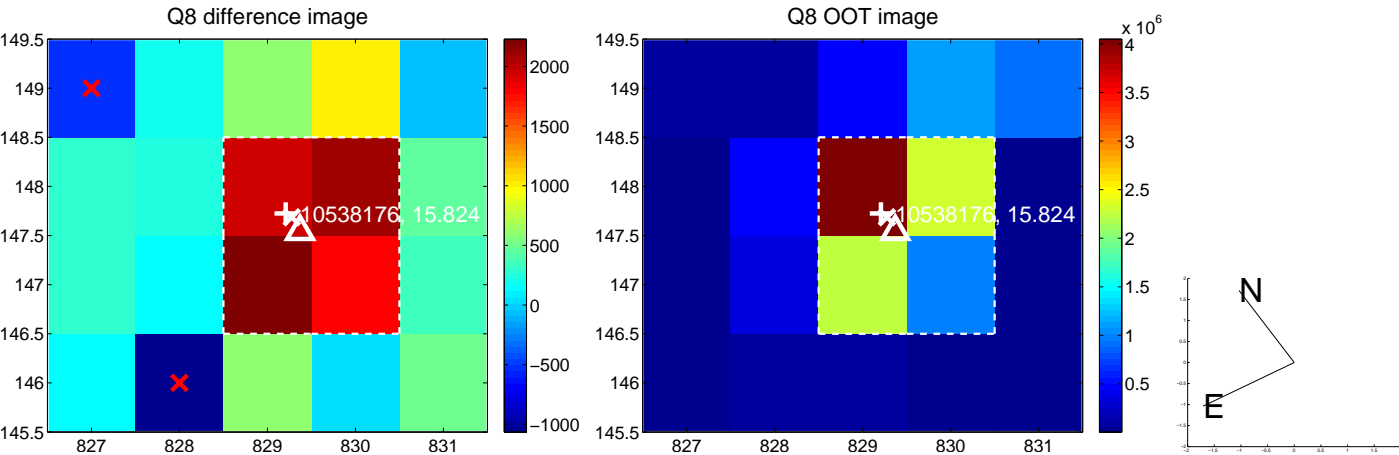
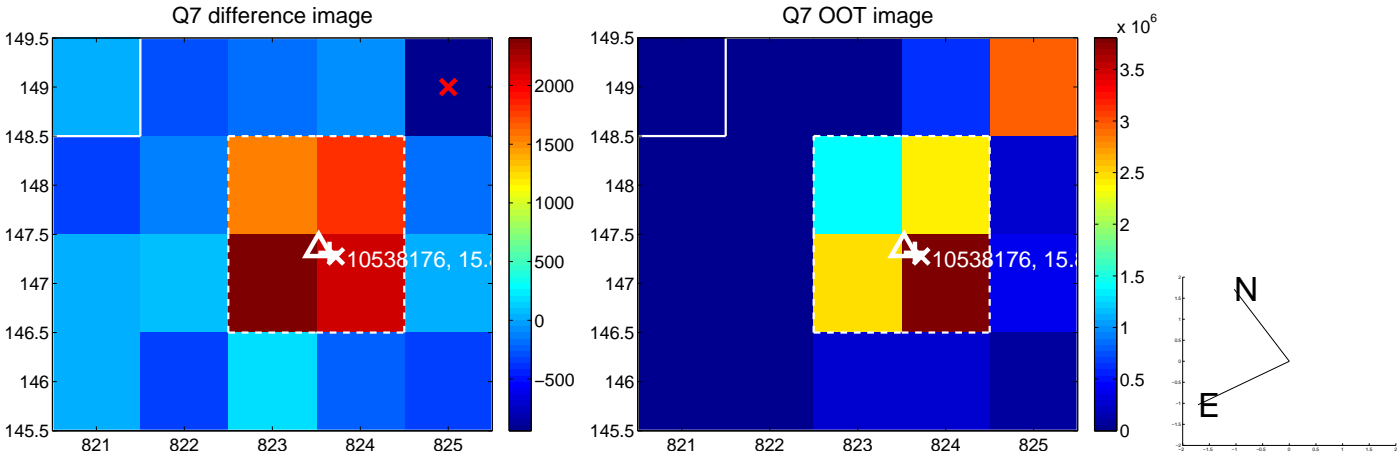
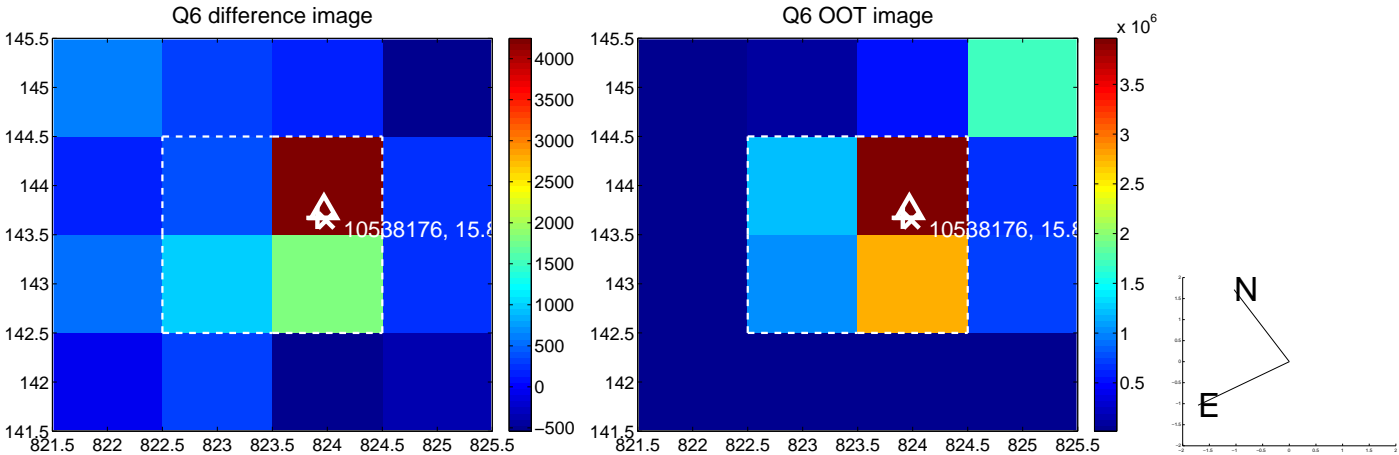
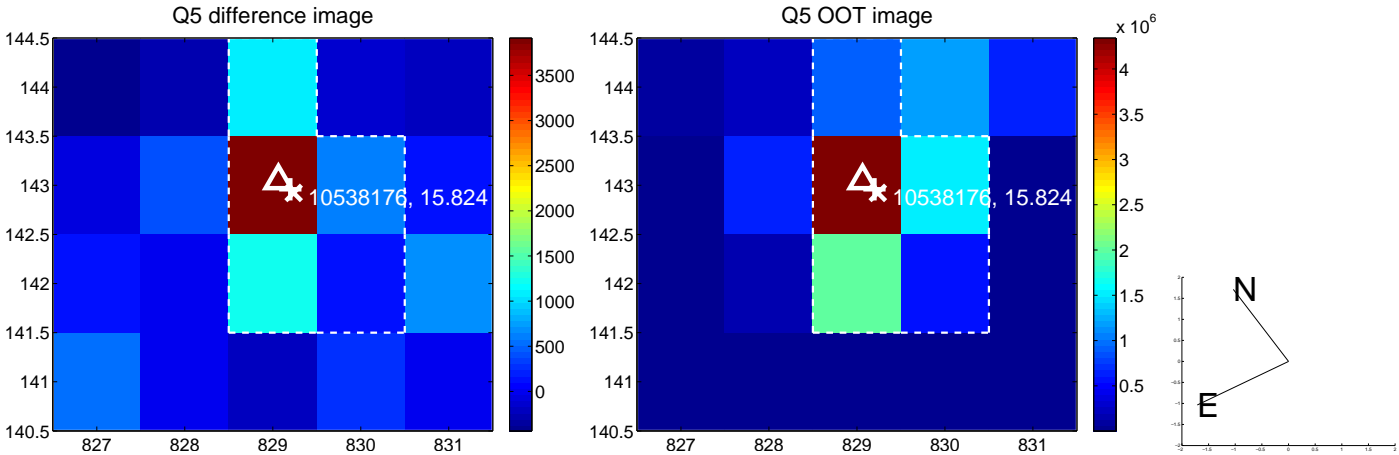


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

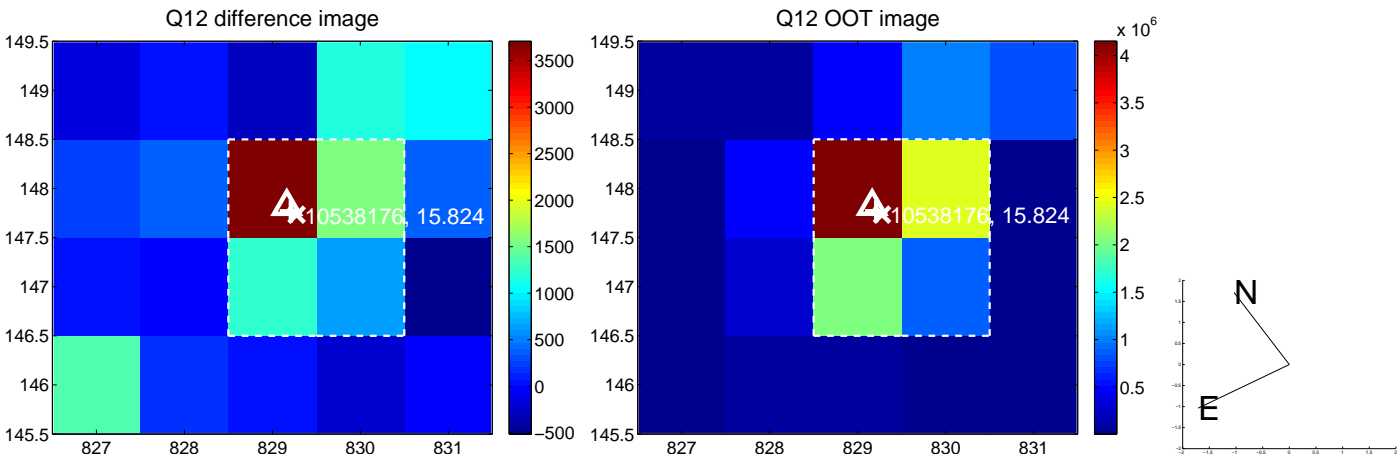
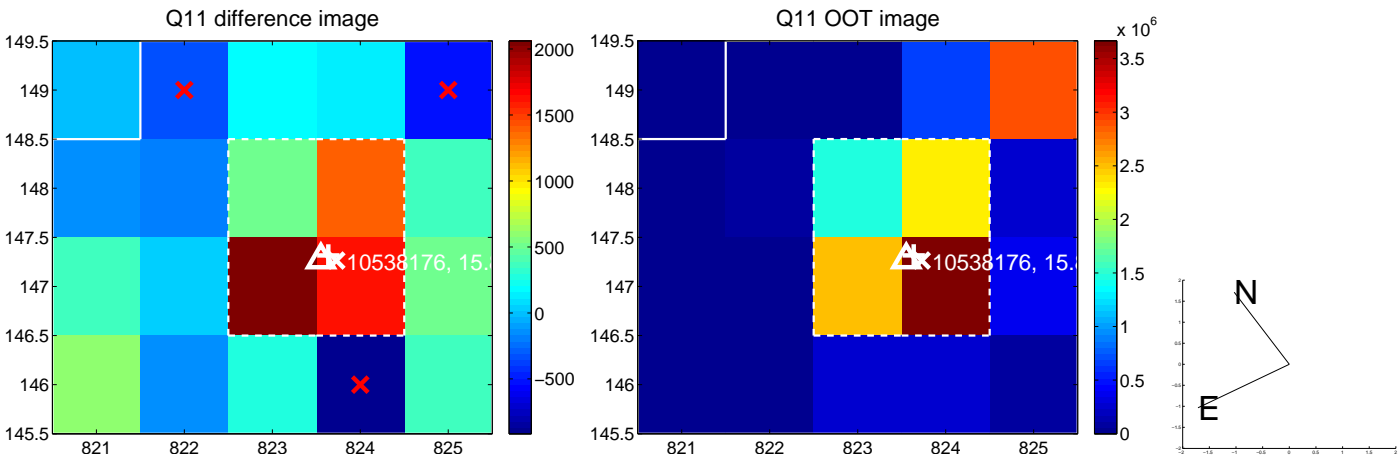
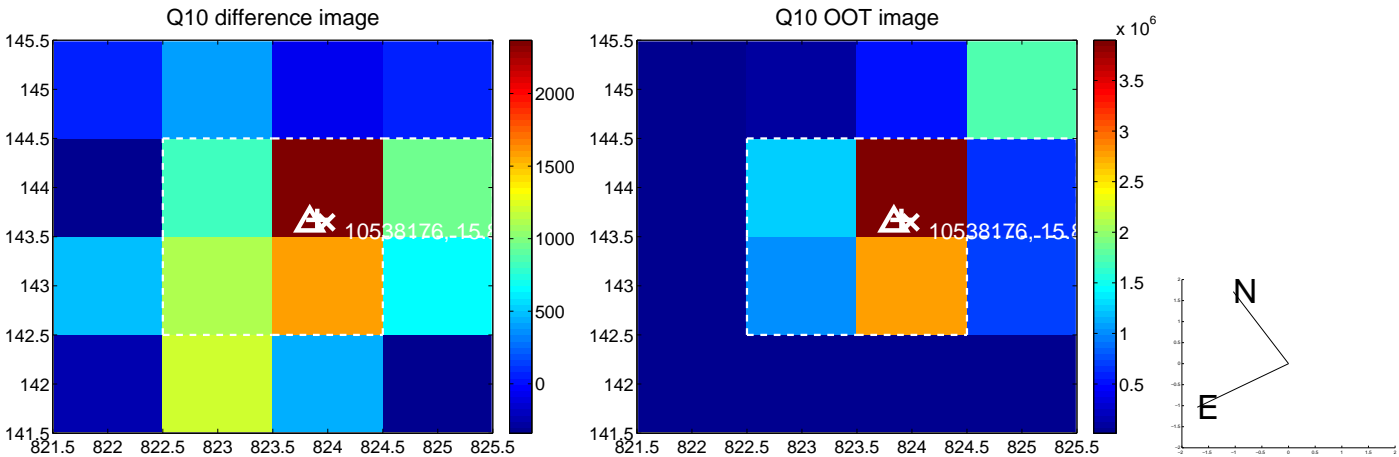
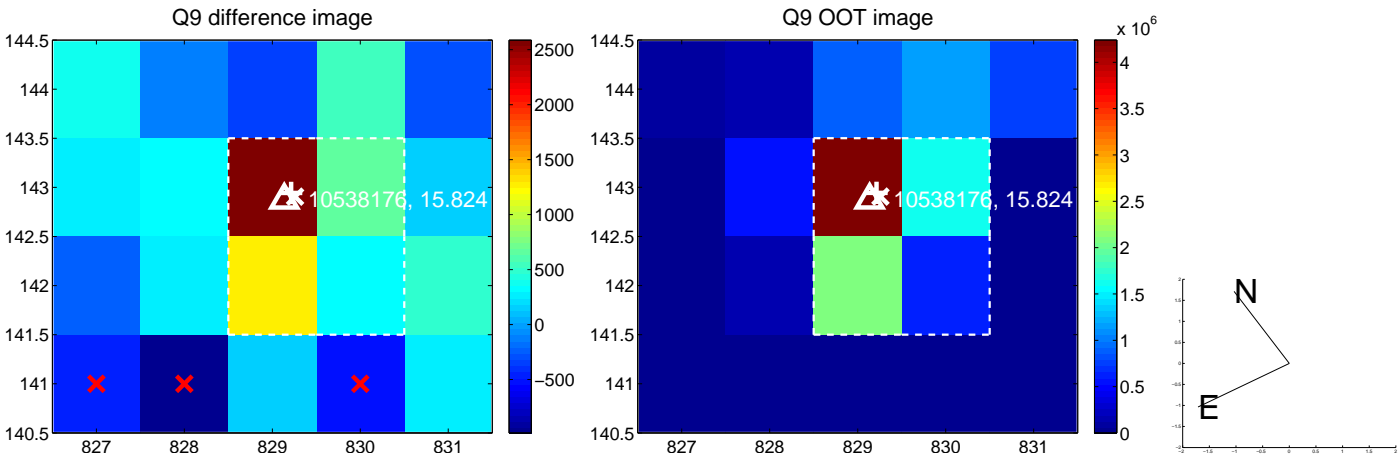
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



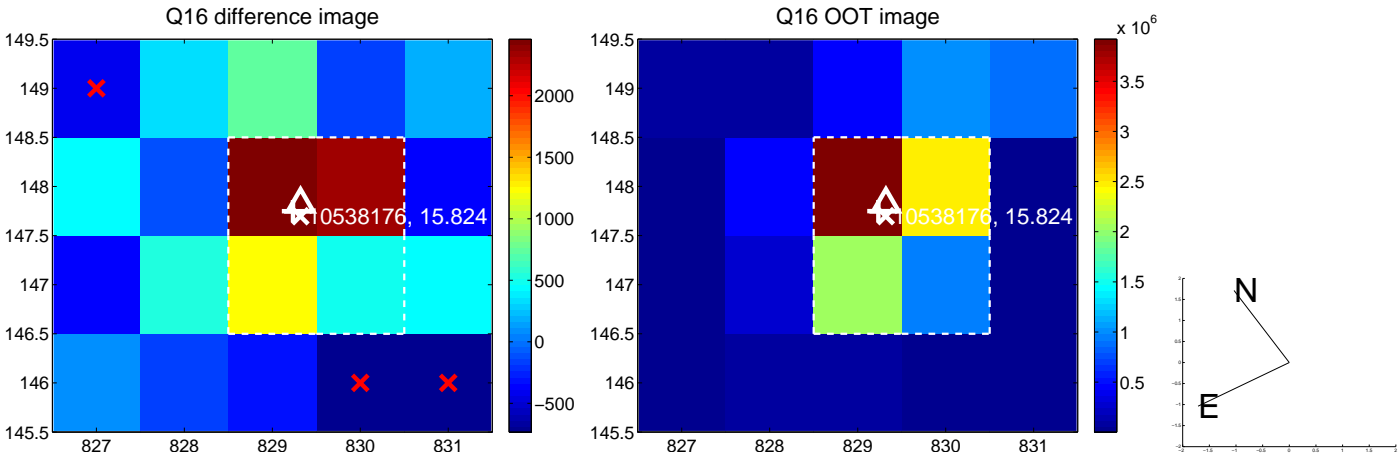
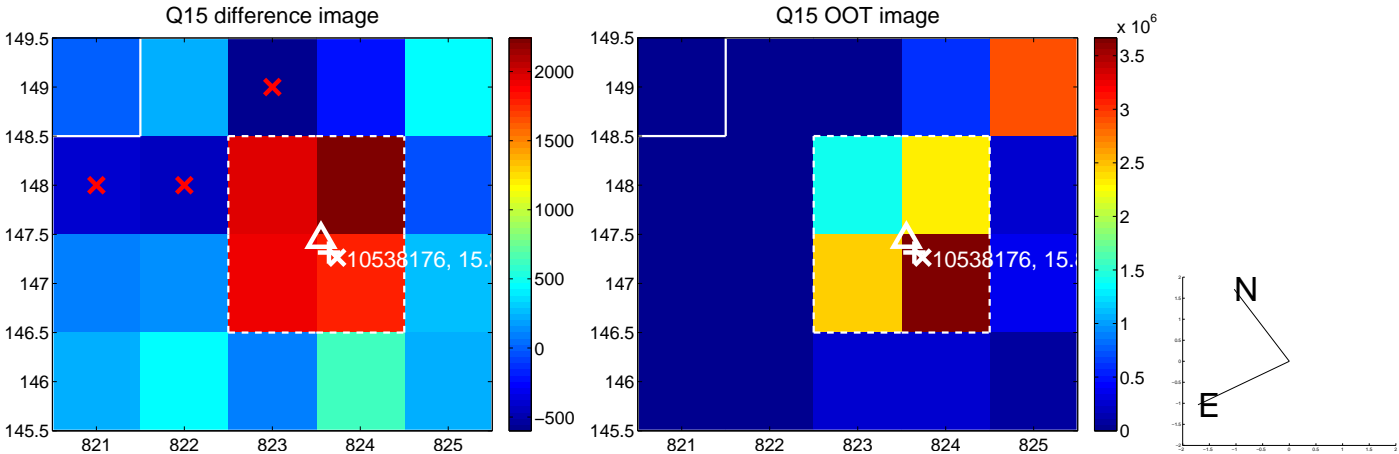
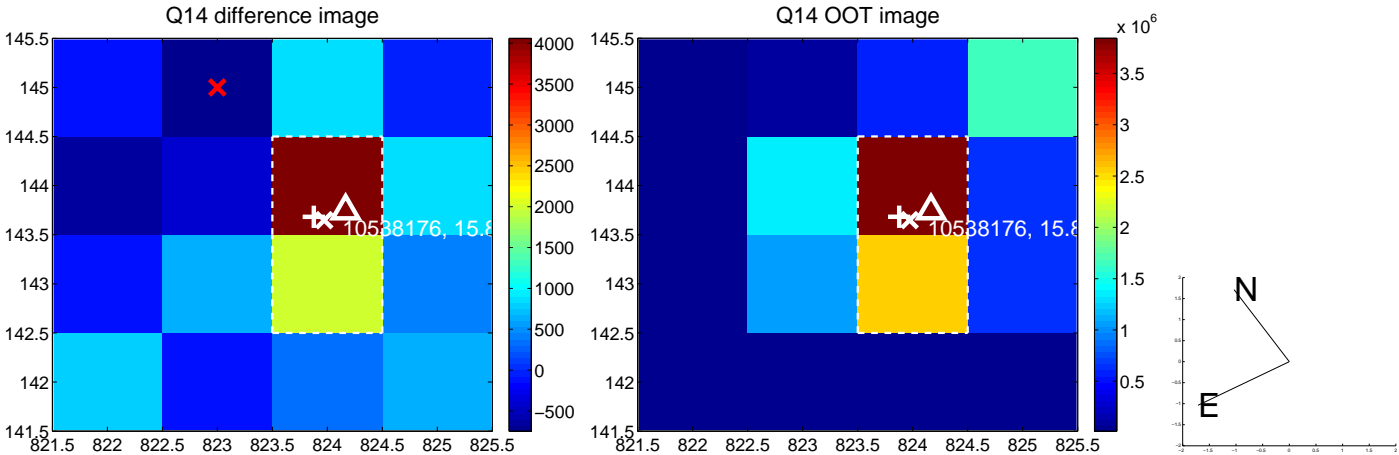
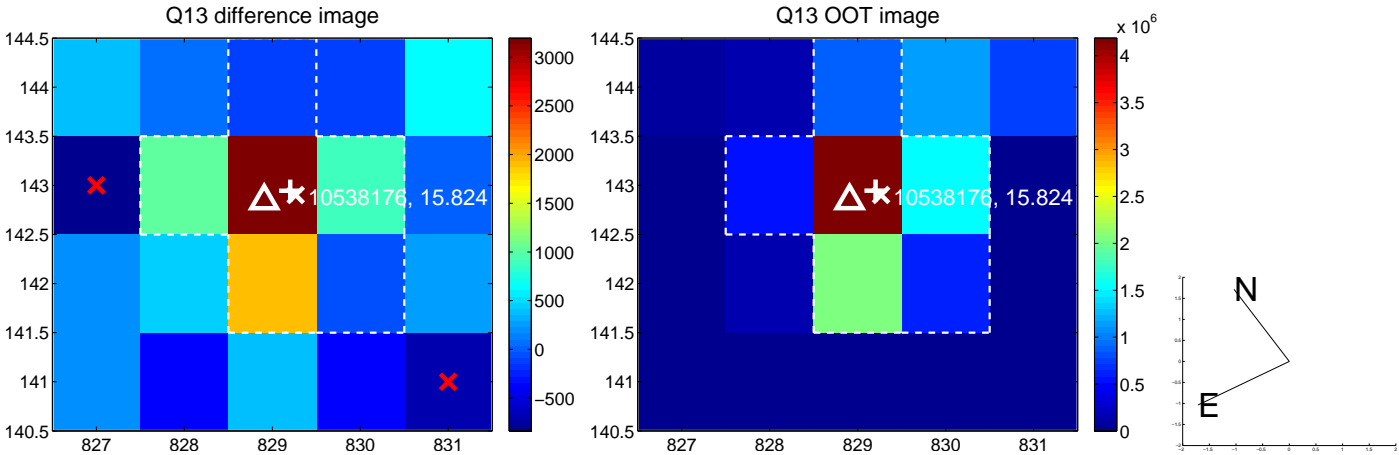
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



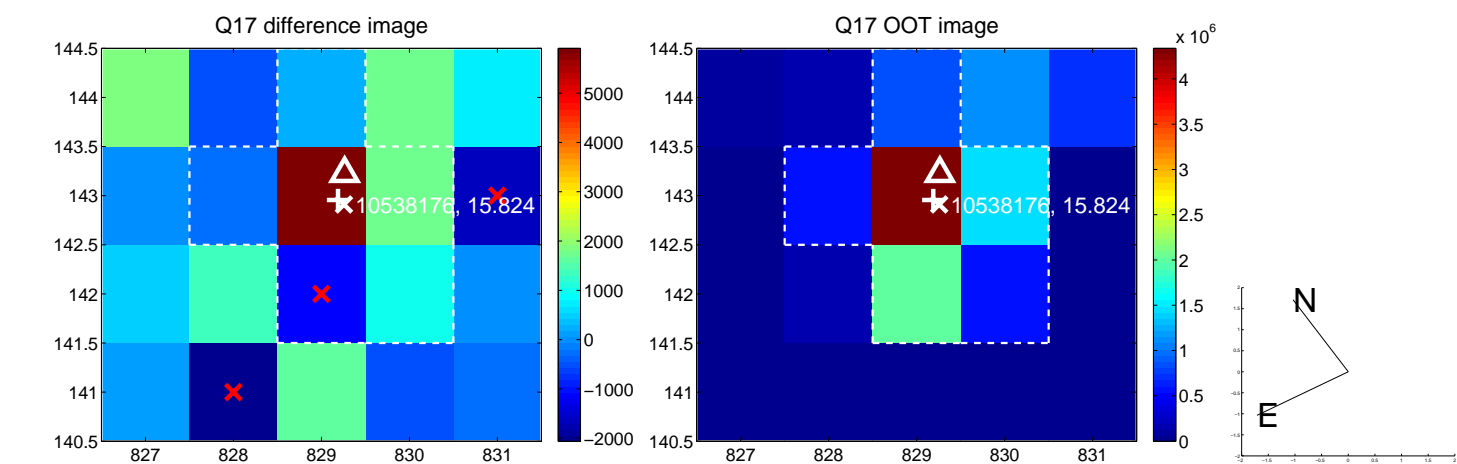
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



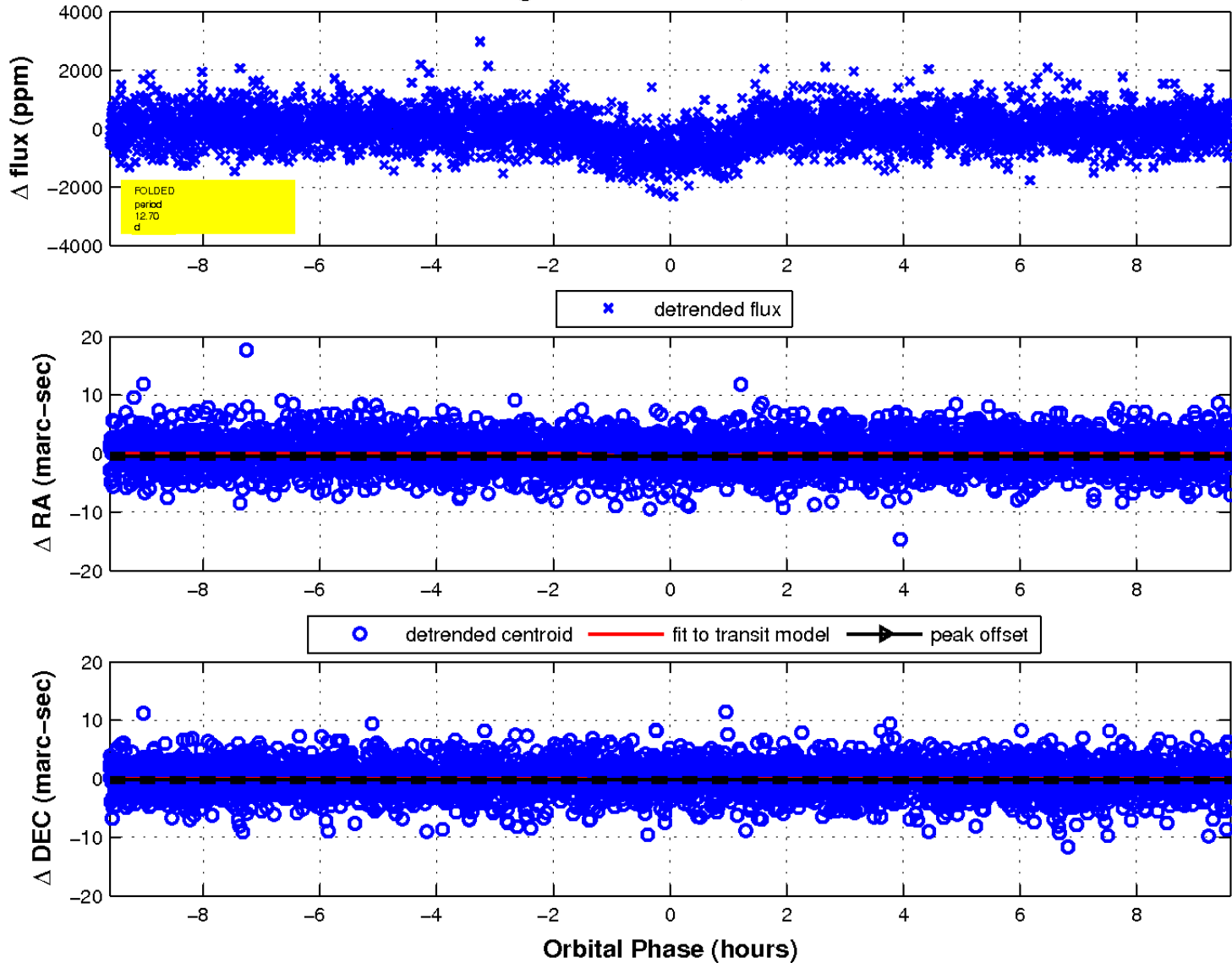
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

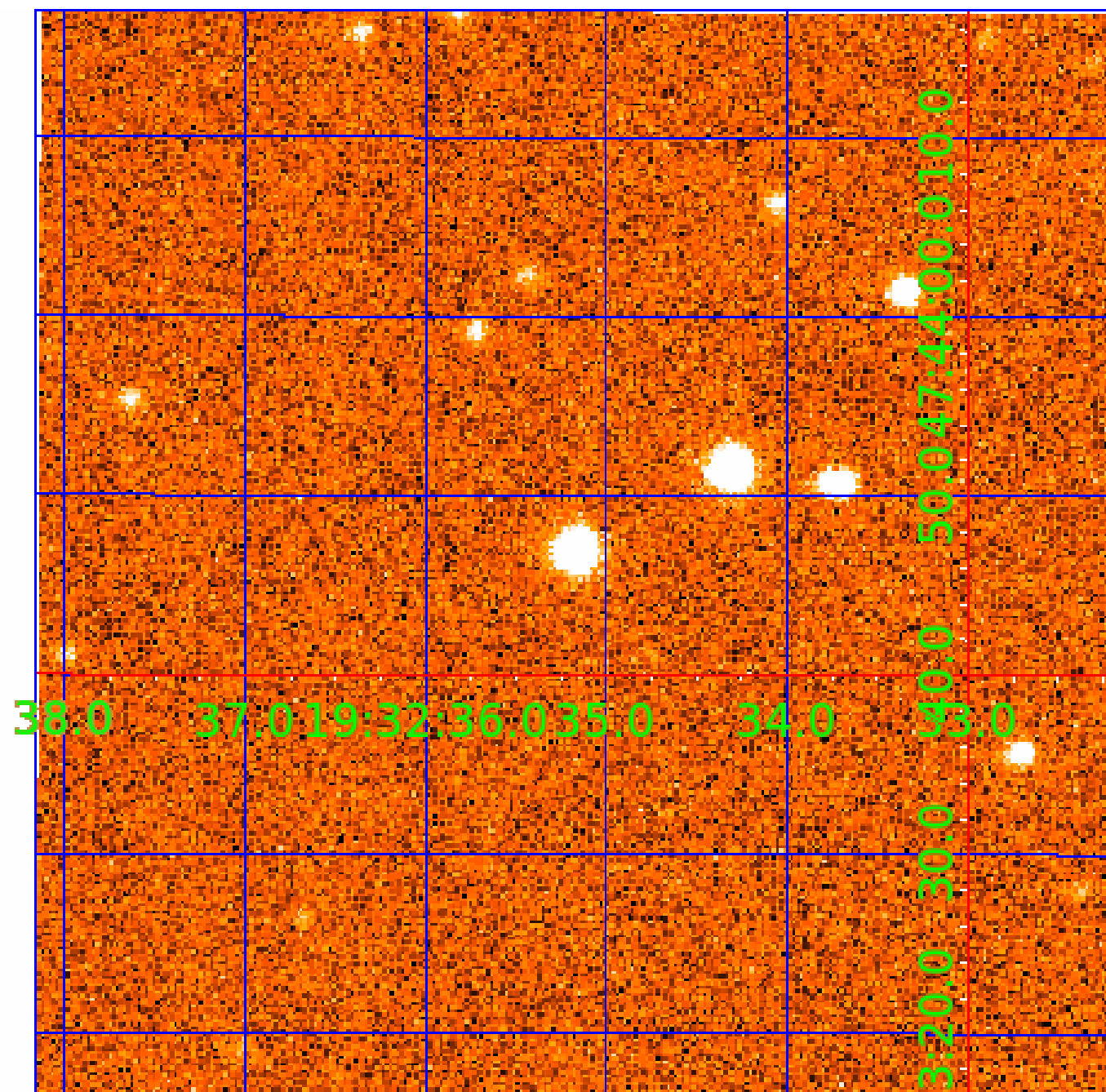


fluxWeightedCentroids, Planet 1 of 2



UKIRT Image

Declination



KIC 010538176

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})
010538176-01	OBS	1301.01	12.699014	134.193259	769.5	3.204	25.2	27.2	0.88	5291	2.97	52.60
010538176-02	OBS	1301.02	37.514396	151.783923	930.4	5.451	24.4	25.7	0.88	5291	2.95	12.41

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010538176-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
010538176-02	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.

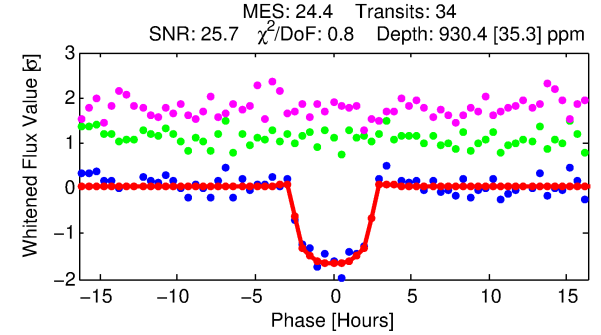
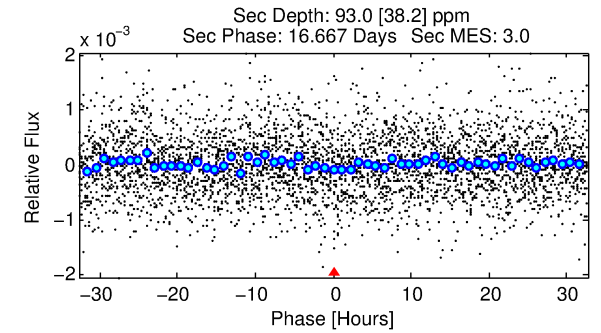
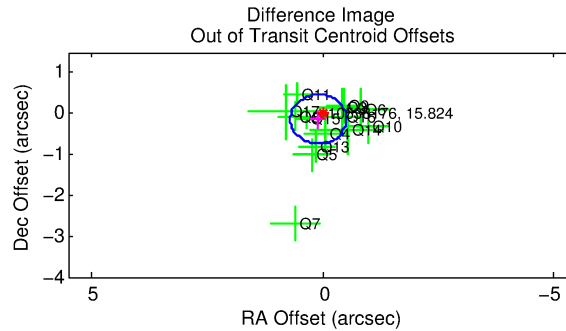
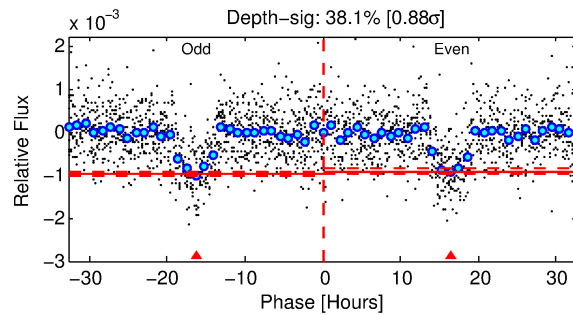
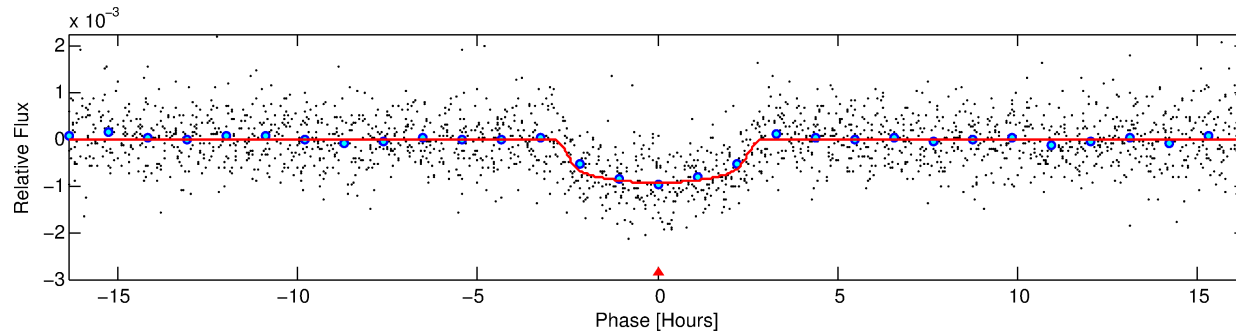
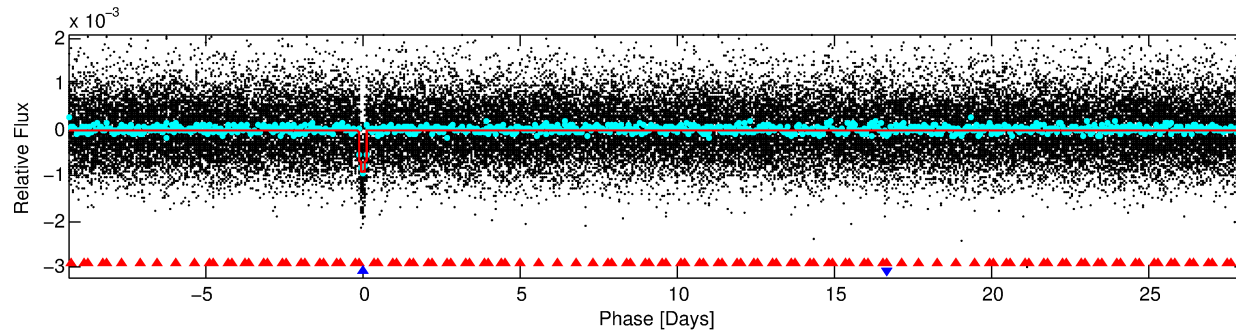
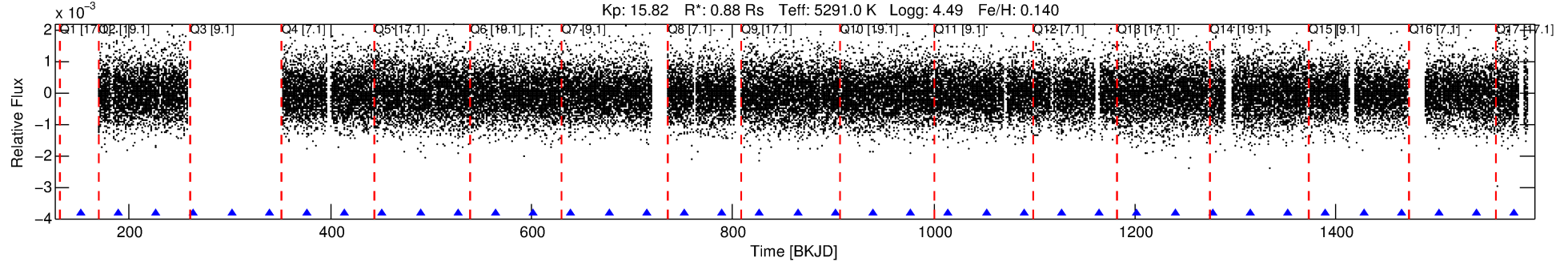
Ephemeris Match Information For 010538176-02

No Significant Match Found

DV One-Page Summary

KIC: 10538176 Candidate: 2 of 2 Period: 37.514 d
KOI: K01301.02 Name: Kepler-284c Corr: 0.984

Kp: 15.82 R*: 0.88 Rs Teff: 5291.0 K Logg: 4.49 Fe/H: 0.140



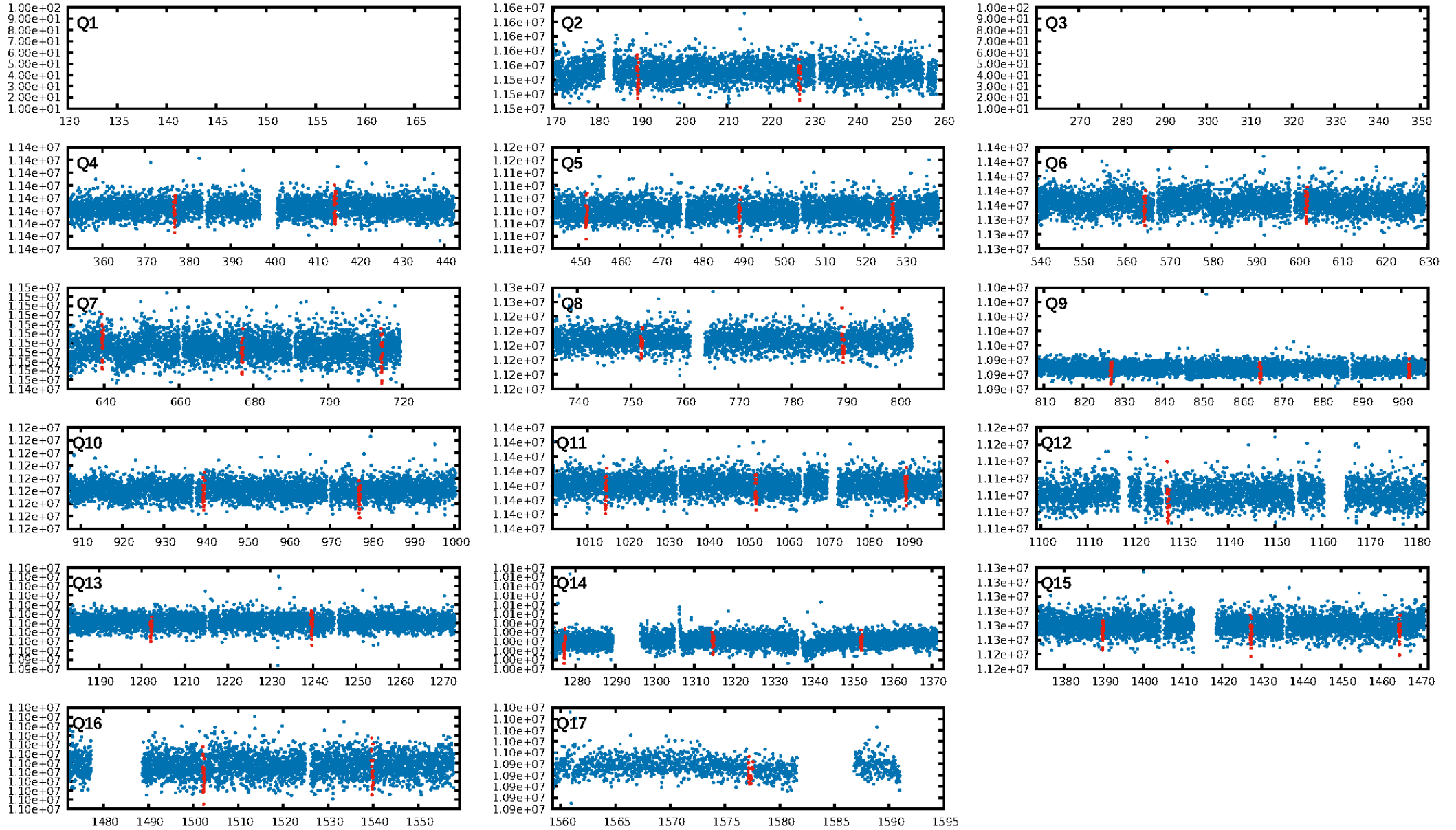
DV Fit Results:

Period = 37.51440 [0.00020] d
Epoch = 151.7839 [0.0047] BKJD
Rp/R* = 0.0306 [0.0071]
a/R* = 36.42 [31.66]
b = 0.76 [0.48]
Seff = 12.41 [1.62]
Teq = 479 [16] K
Rp = 2.95 [0.72] Re
a = 0.2098 [0.0155] AU
Ag = 259.18 [162.71] [1.59σ]
Teffp = 2969 [461] K [5.40σ]

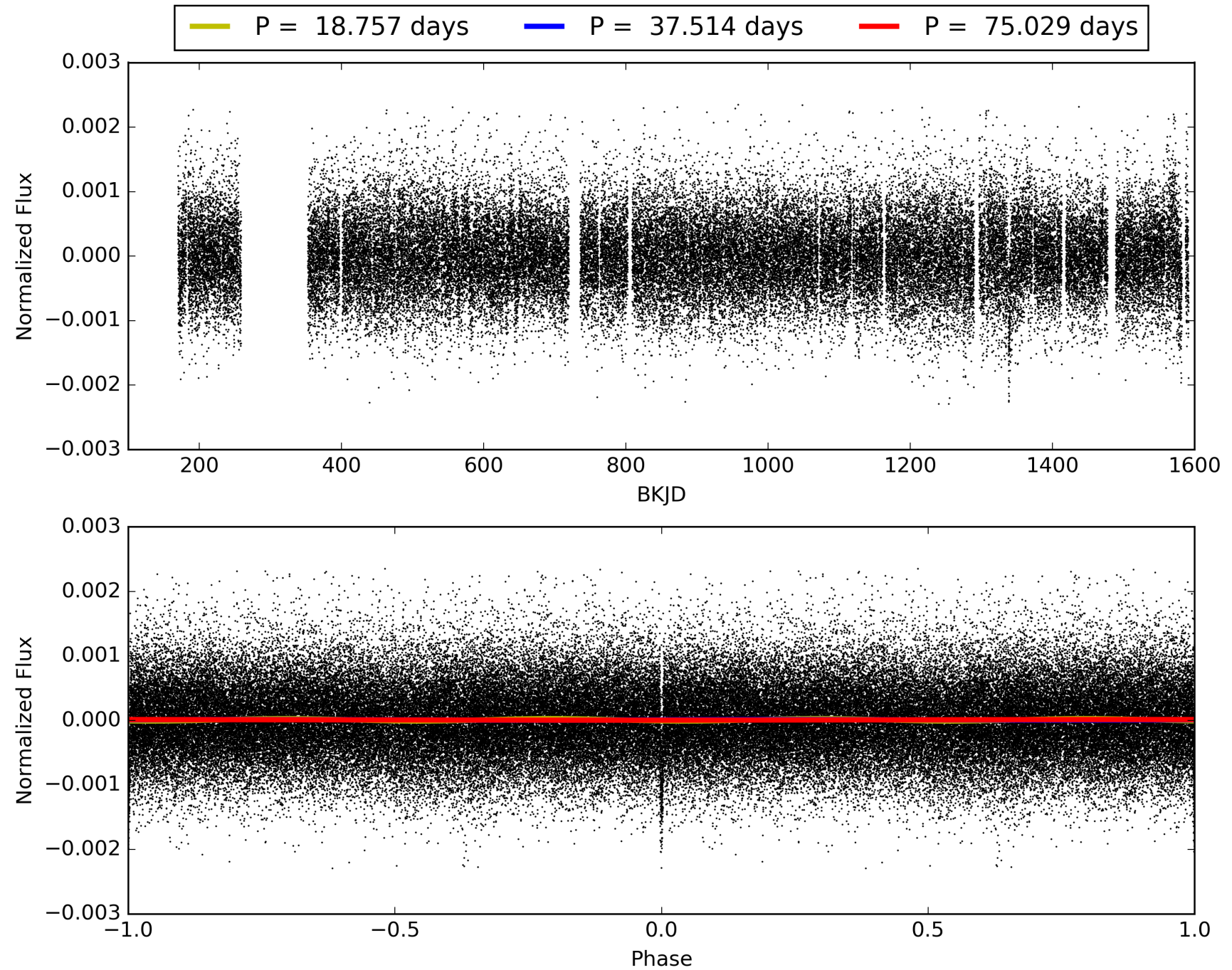
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [94.19σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 98.1%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 1.26e-126
RollingBand-fgt: 1.00 [33/33]
GhostDiagnostic-chr: 5.059
Centroid-sig: 0.5%
Centroid-so: 0.251 arcsec [0.51σ]
OotOffset-rm: 0.167 arcsec [0.83σ]
KicOffset-rm: 0.288 arcsec [1.79σ]
OotOffset-st: 4/3/3/4 [14]
KicOffset-st: 4/3/3/4 [14]
DiffImageQuality-fgm: 1.00 [14/14]
DiffImageOverlap-fno: 1.00 [14/14]

TCE 010538176-02, PDC Light Curves

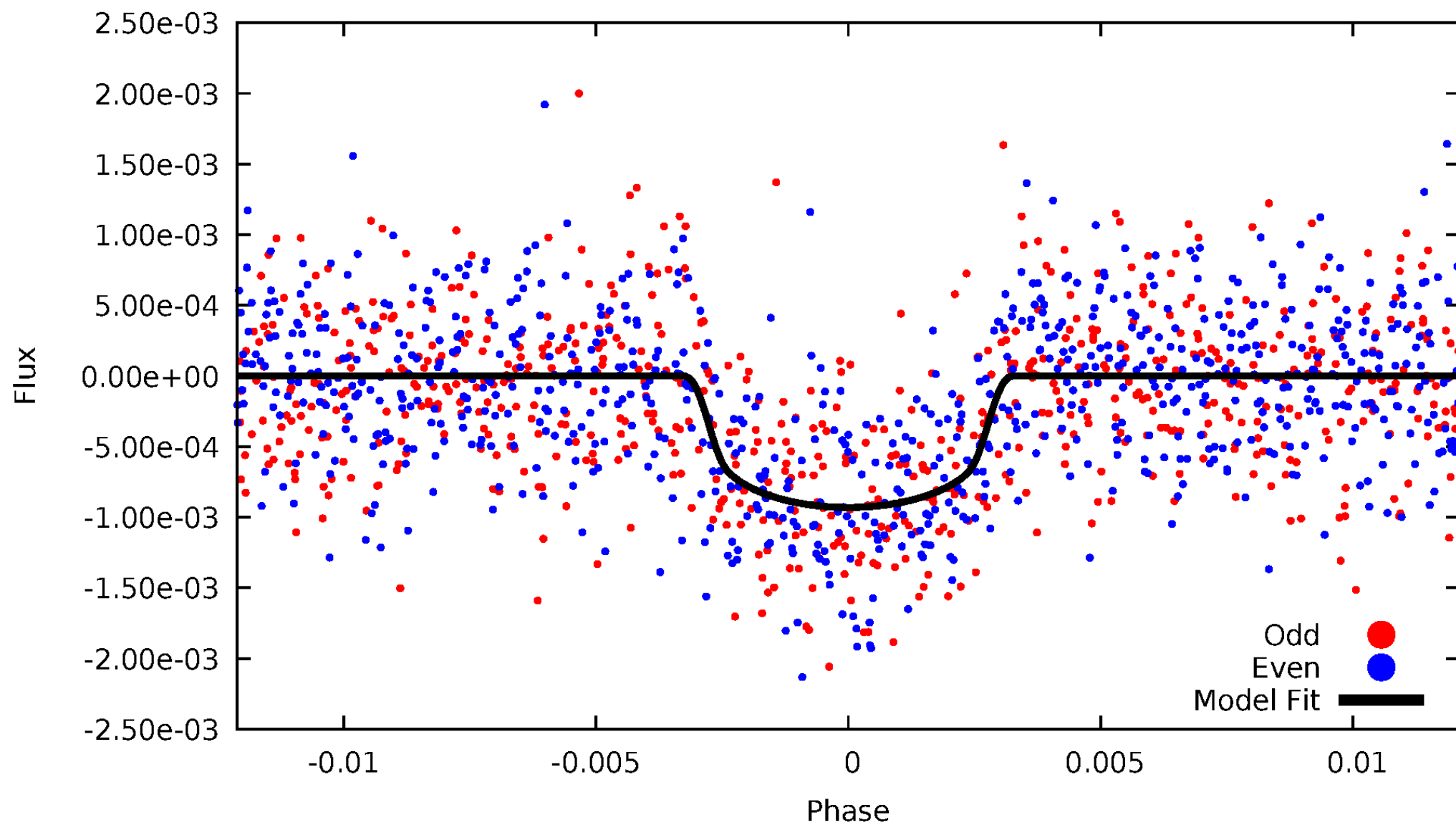


TCE 010538176-02



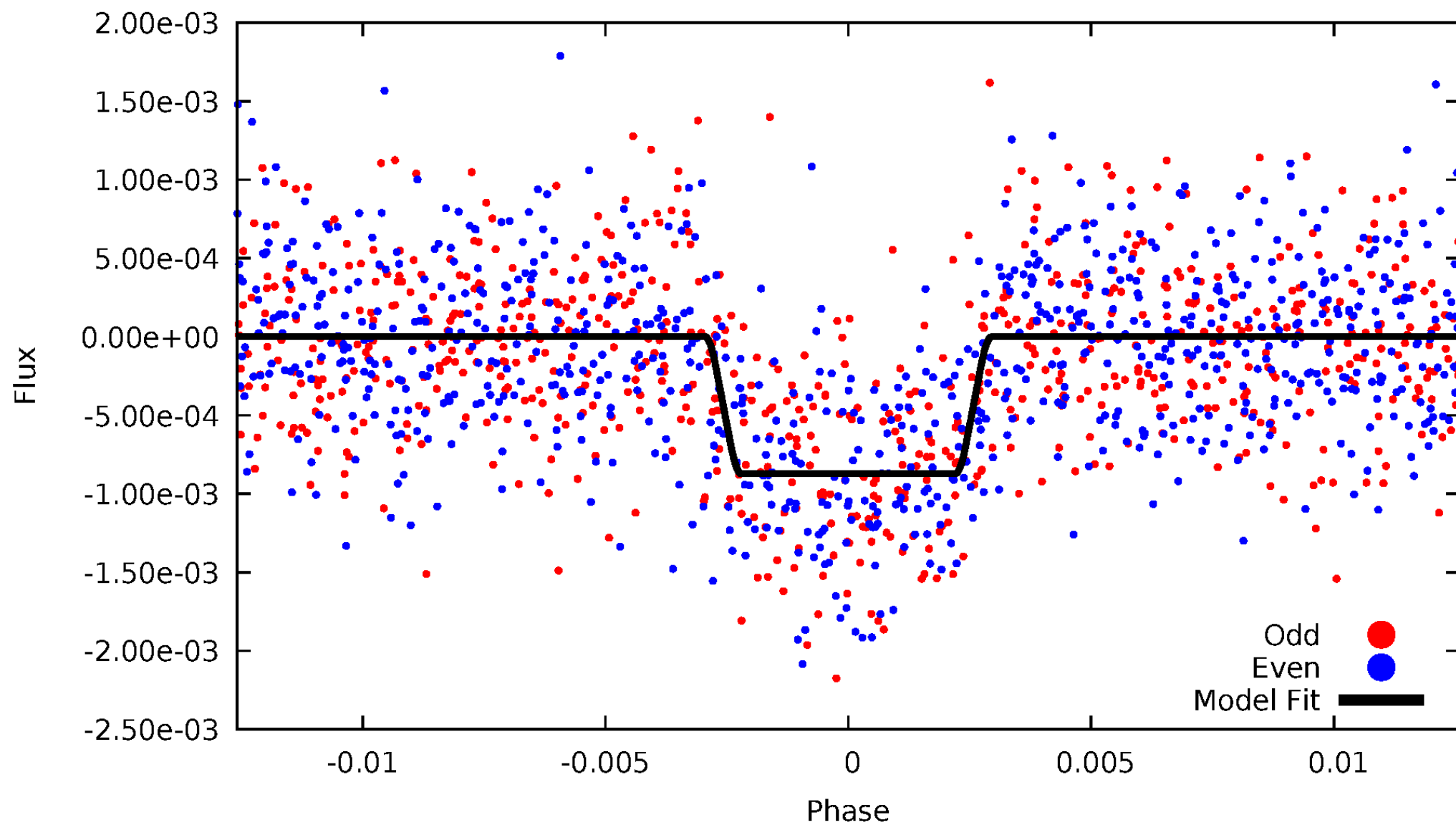
DV Odd/Even

TCE 010538176-02



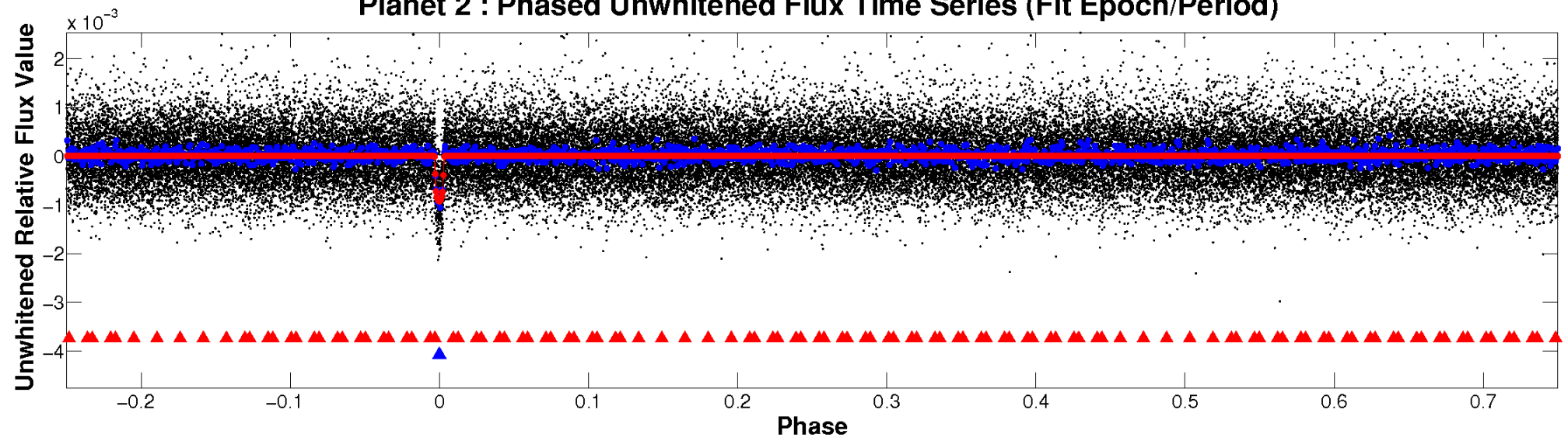
ALT Odd/Even

TCE 010538176-02

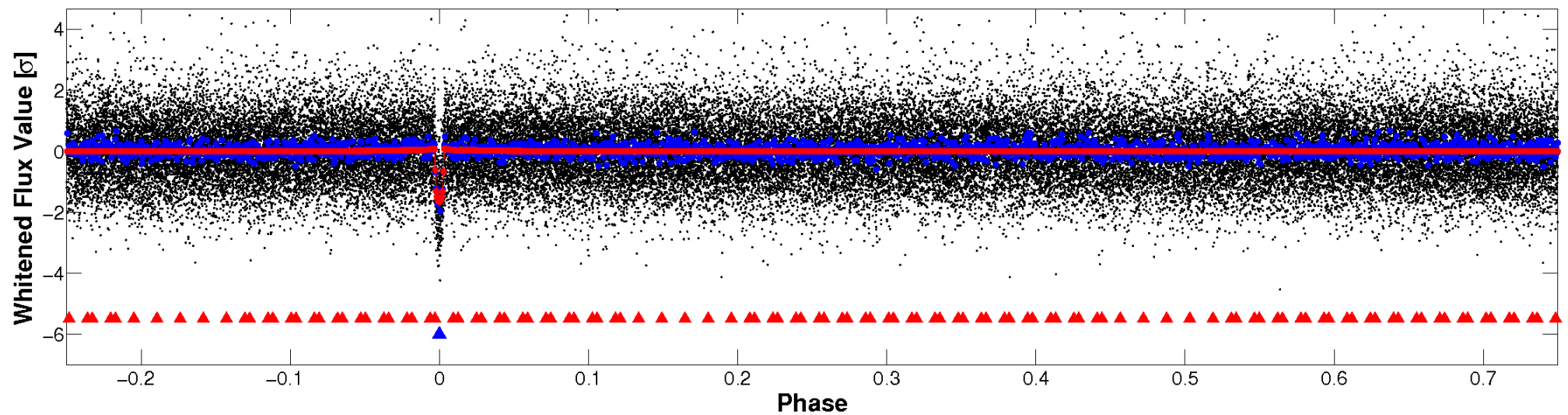


Non-Whitened Vs. Whitened Light Curve

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

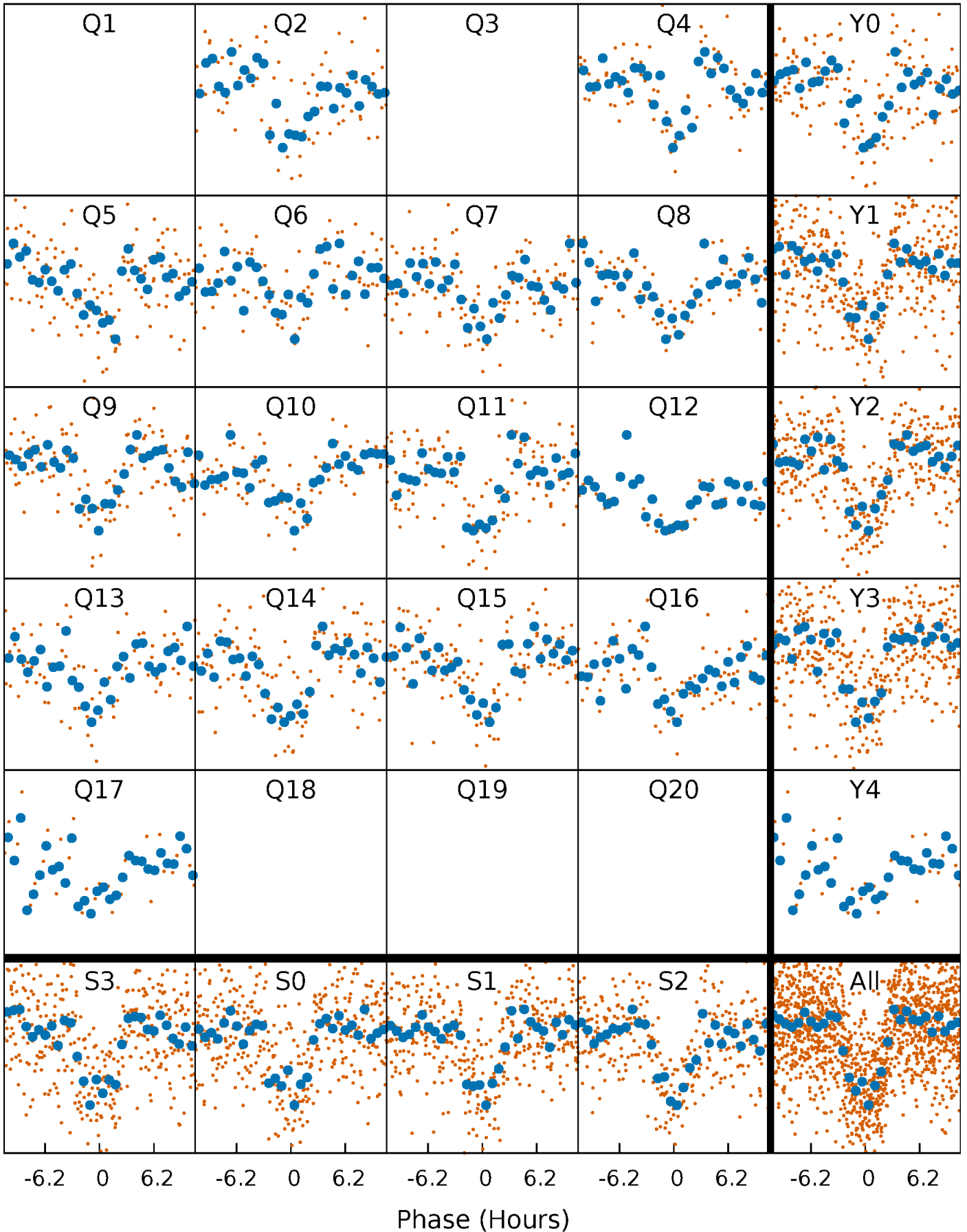


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



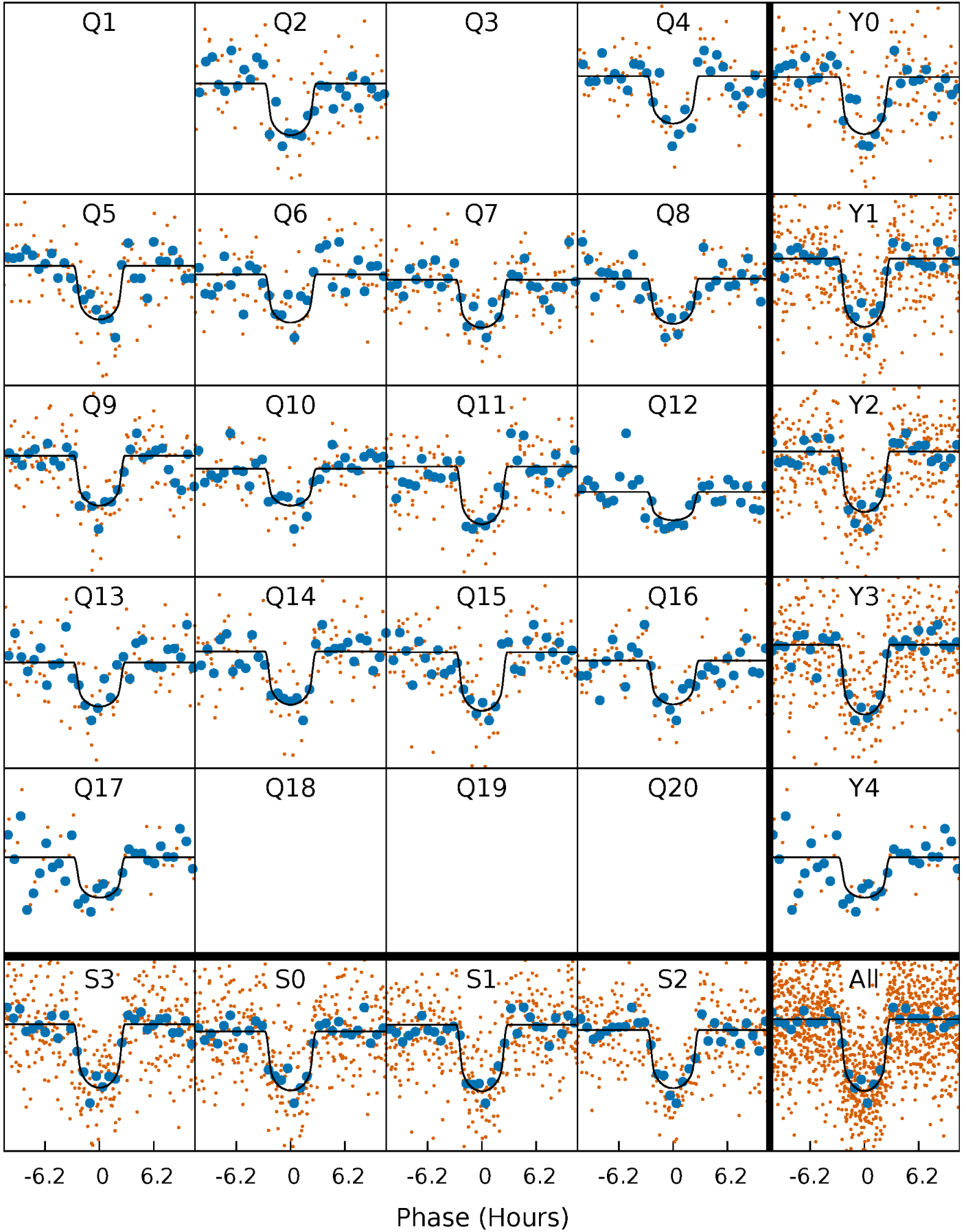
PDC Quarter-Phased Transit Curves

TCE 010538176-02 P= 37.514396 Days $T_0=151.783923$ (BKJD)



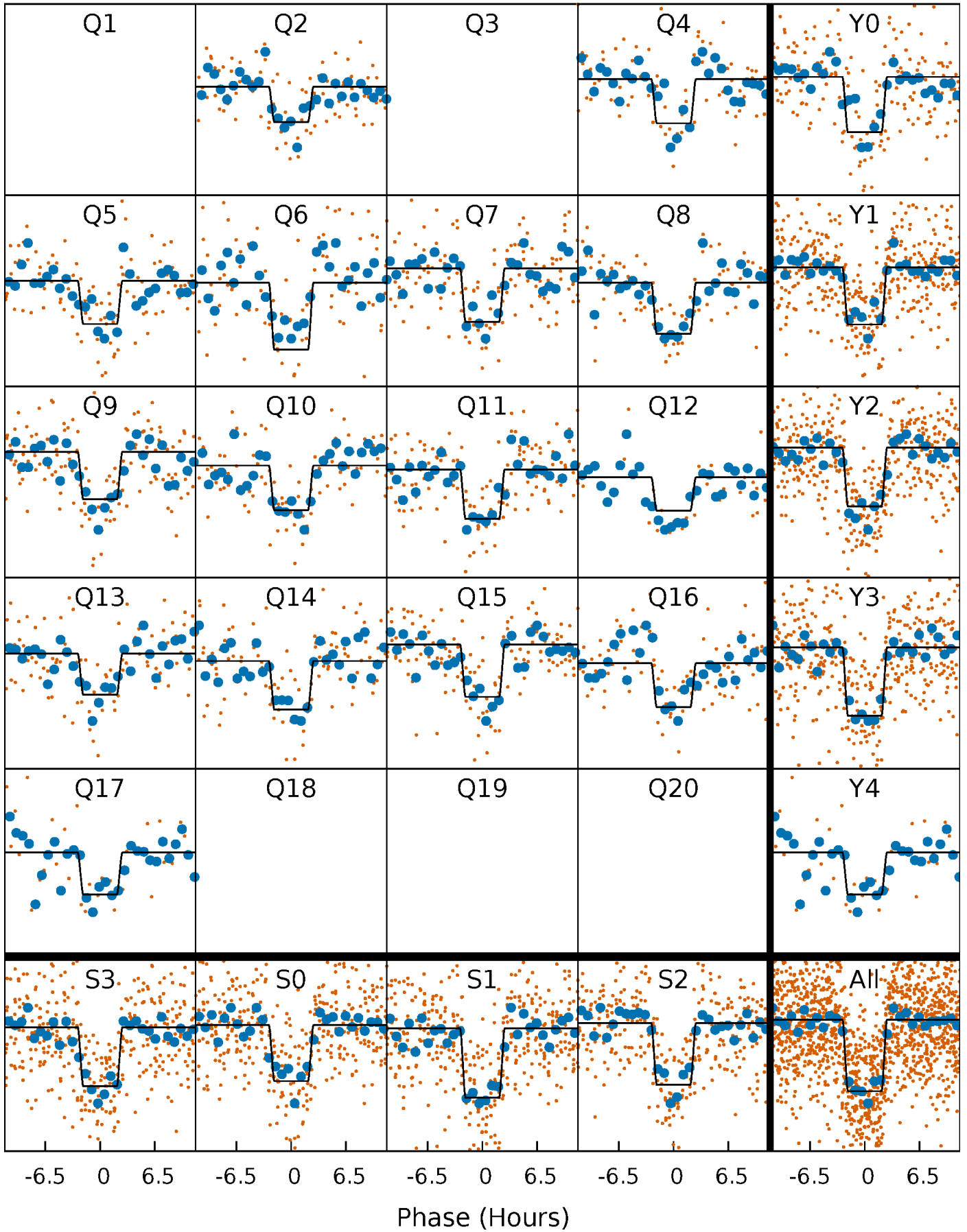
DV Quarter-Phased Transit Curves

TCE 010538176-02 $P = 37.514396$ Days $T_0 = 151.783923$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

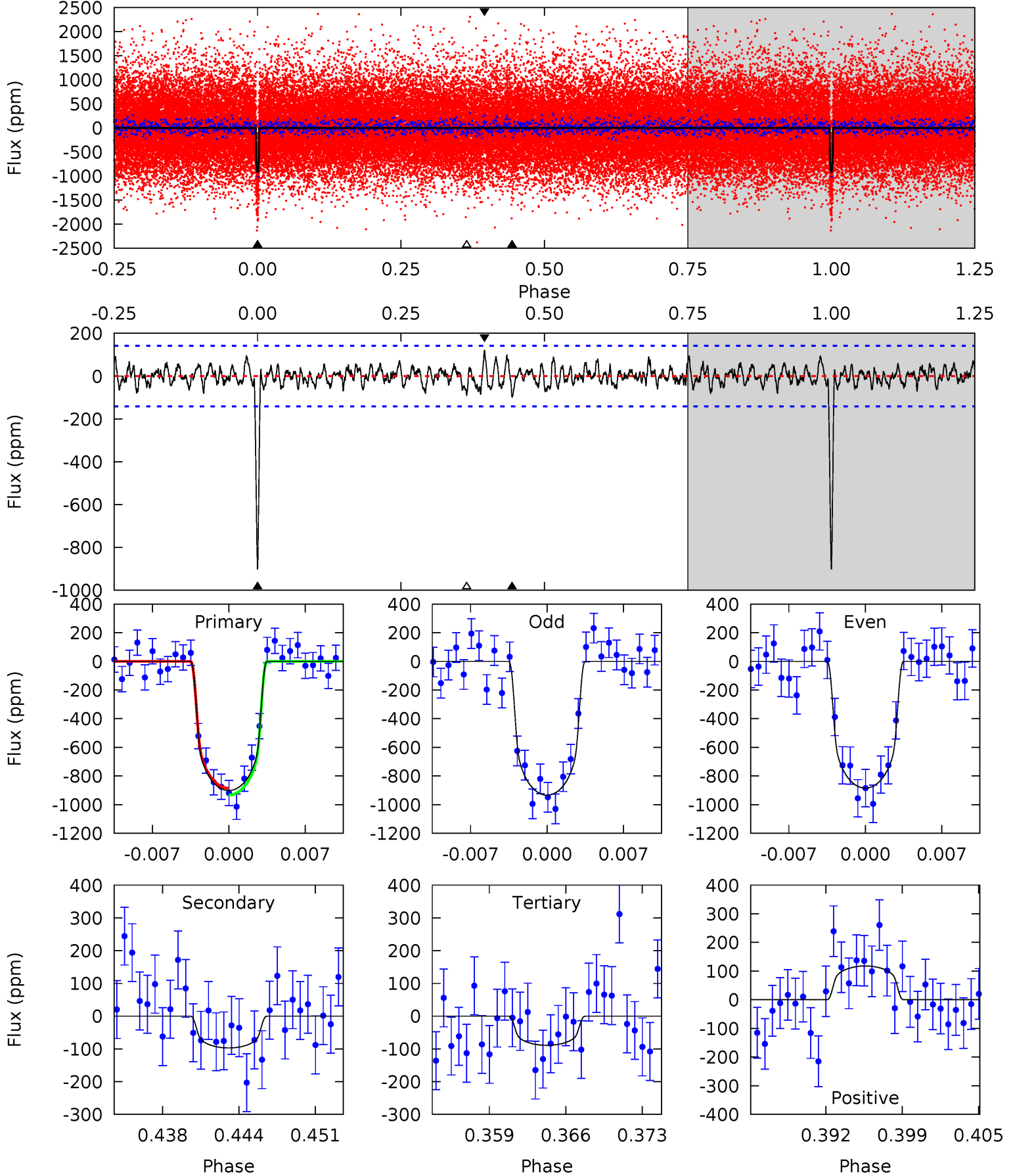
TCE 010538176-02 P= 37.513853 Days $T_0=151.794694$ (BKJD)



DV Model-Shift Uniqueness Test

010538176-02, P = 37.514396 Days, E = 151.783923 Days

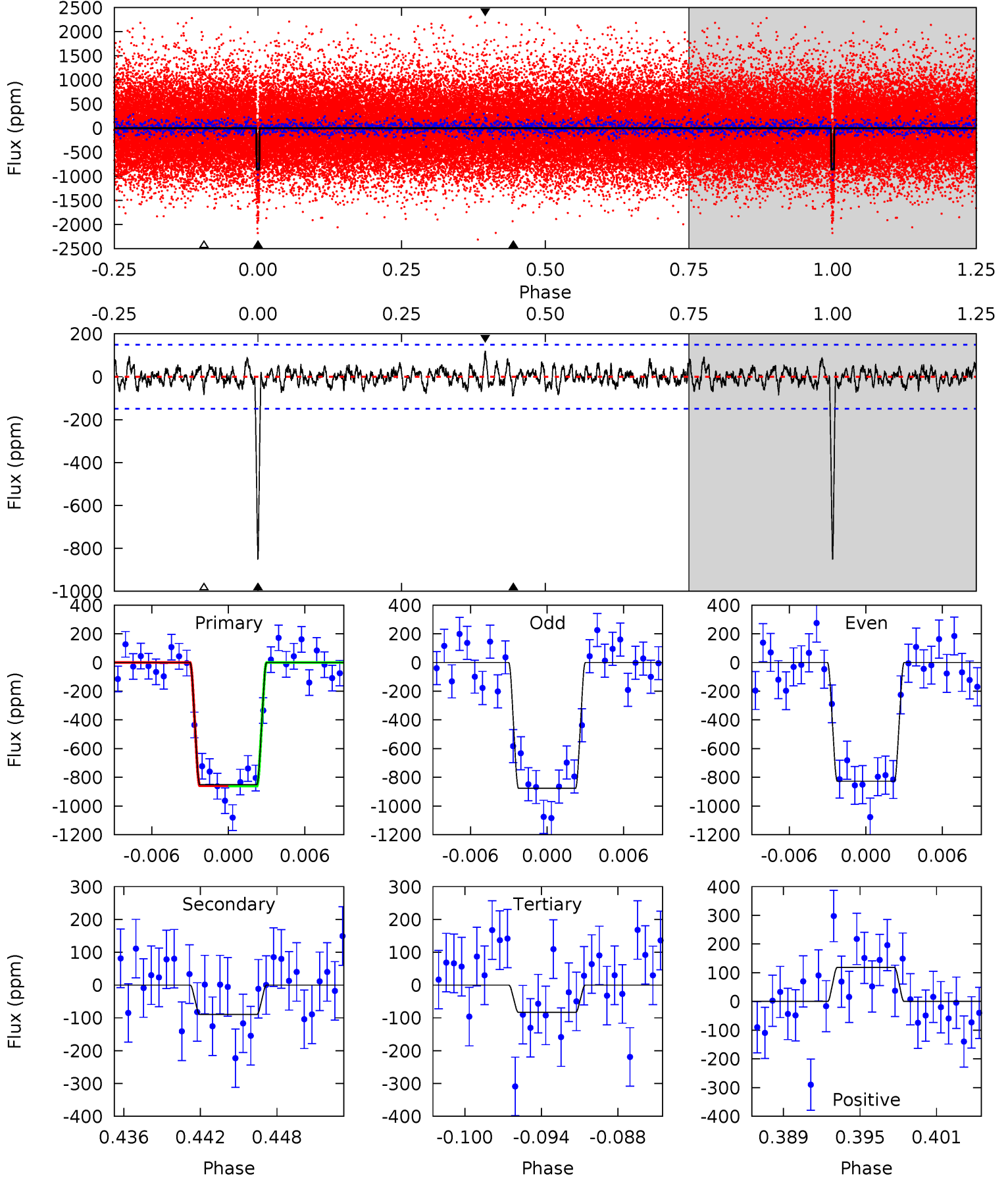
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
32.5	3.50	3.21	4.24	5.11	2.72	1.19	29.3	28.2	0.29	-0.75	0.89	1.01	0.12	0.86



Alt Model-Shift Uniqueness Test

010538176-02, P = 37.513853 Days, E = 151.794694 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
29.3	3.08	2.86	4.07	5.13	2.75	1.05	26.4	25.2	0.22	-0.98	0.84	1.04	0.12	0.03



Stellar Parameters For KIC 010538176

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	5291^{+84}_{-73}	$4.489^{+0.058}_{-0.065}$	$0.140^{+0.150}_{-0.150}$	$0.882^{+0.072}_{-0.059}$	$0.875^{+0.050}_{-0.041}$	$1.796^{+0.390}_{-0.383}$
	+2%/-1%	+1%/-1%	+107%/-107%	+8%/-7%	+6%/-5%	+22%/-21%
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 010538176-02 / KOI 1301.02

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-97 ± 28	$2.94^{+0.71}_{-0.68}$	670^{+17}_{-17}	3469^{+346}_{-276}	271^{+204}_{-116}
Alt.	-90 ± 29	$2.84^{+0.74}_{-0.67}$	672^{+17}_{-16}	3476^{+361}_{-306}	266^{+214}_{-122}

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 $A_{obs} \gg 1.0$

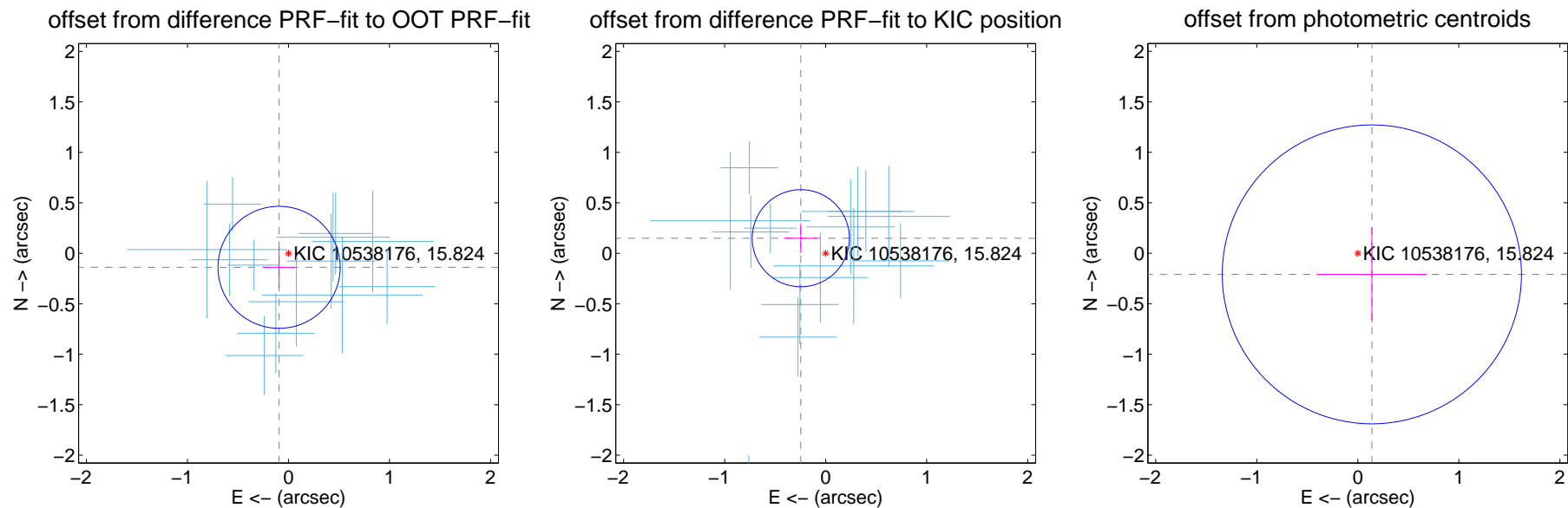
DV Centroid Data

Supplemental centroid analysis for 010538176-02. Kepler magnitude: 15.82. Transit SNR 25.73

There are 14 quarters with good PRF difference image offsets

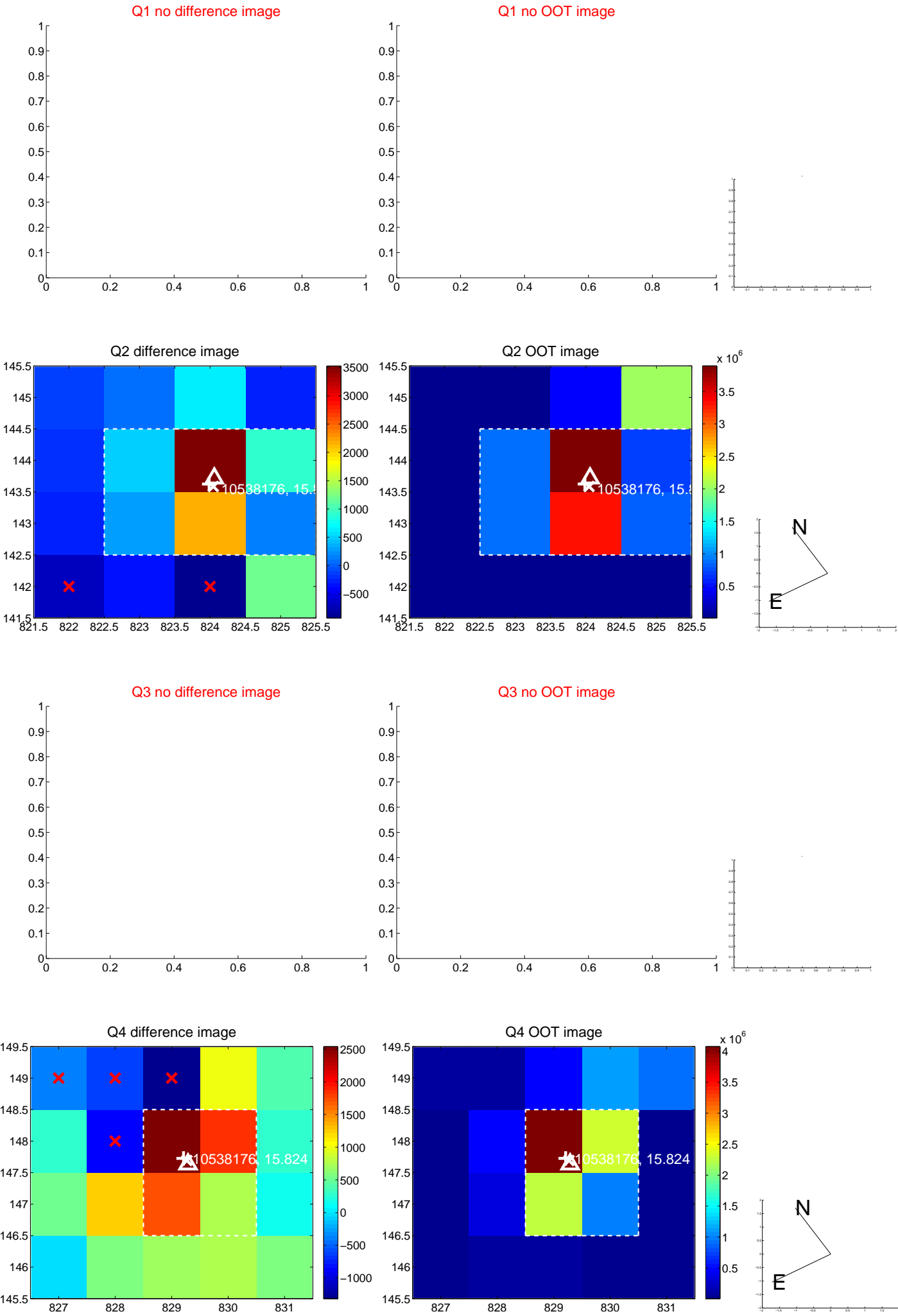
The direct PRF centroid is offset from the target star catalog position by about 0.32 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.167 ± 0.202	0.83	0.093 ± 0.158	-0.139 ± 0.204
PRF-fit source offset from KIC position	0.288 ± 0.160	1.79	0.246 ± 0.165	0.149 ± 0.146
photometric centroid source offset	0.25 ± 0.49	0.51	-0.14 ± 0.54	-0.21 ± 0.47

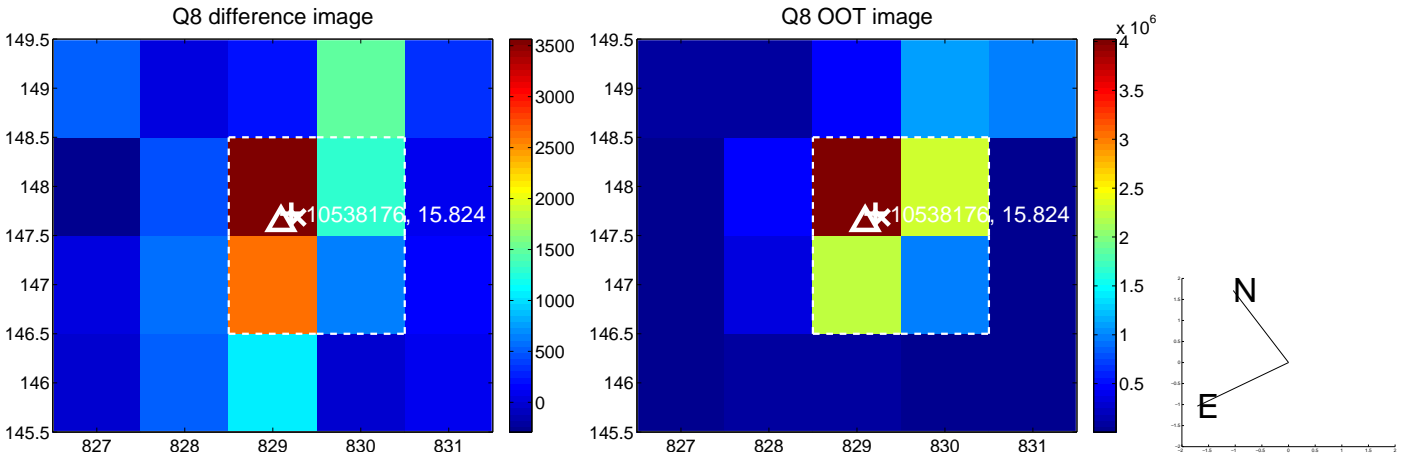
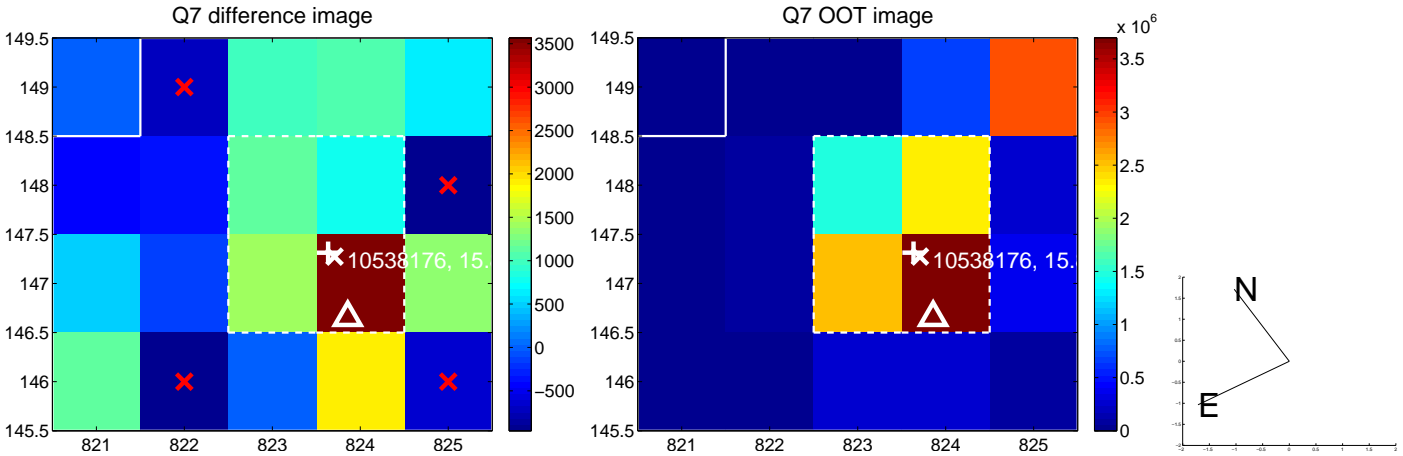
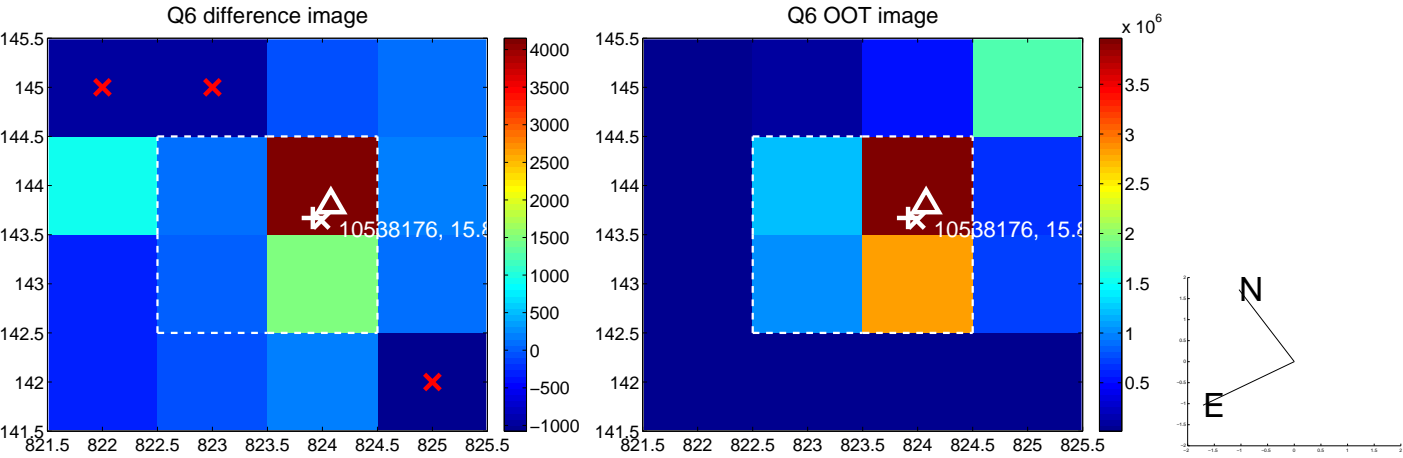
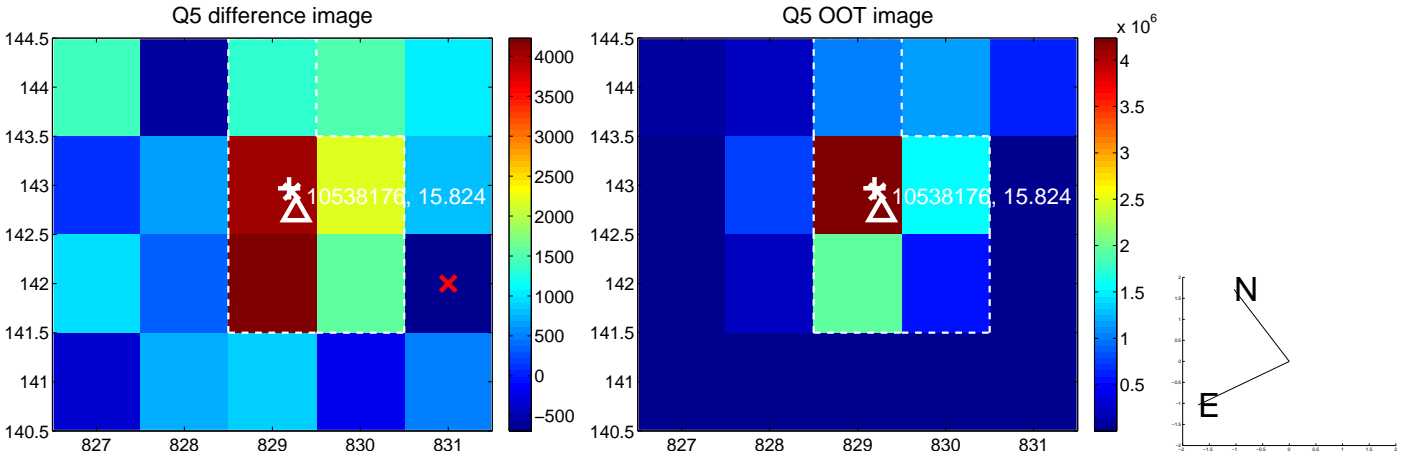


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

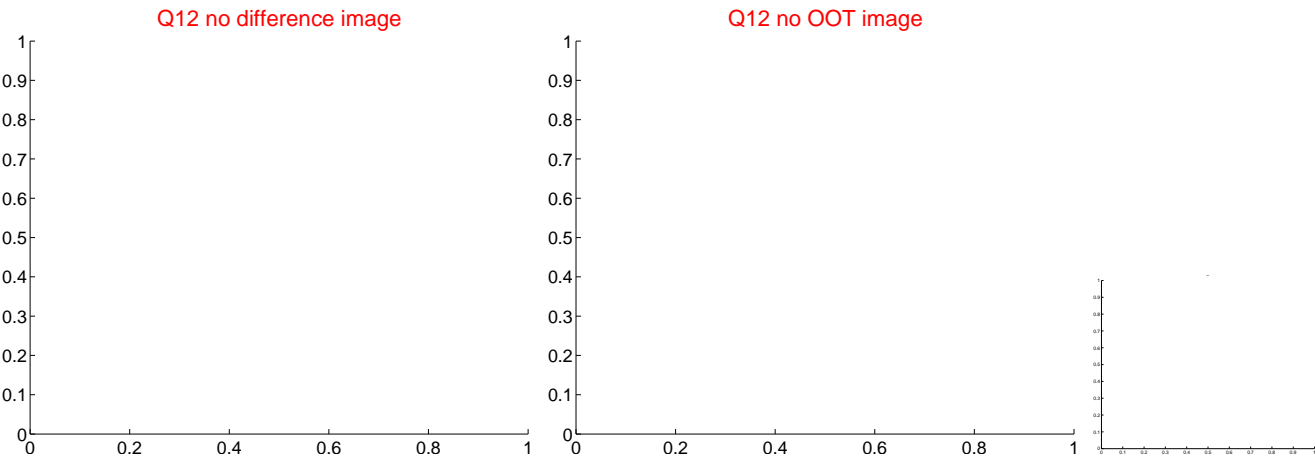
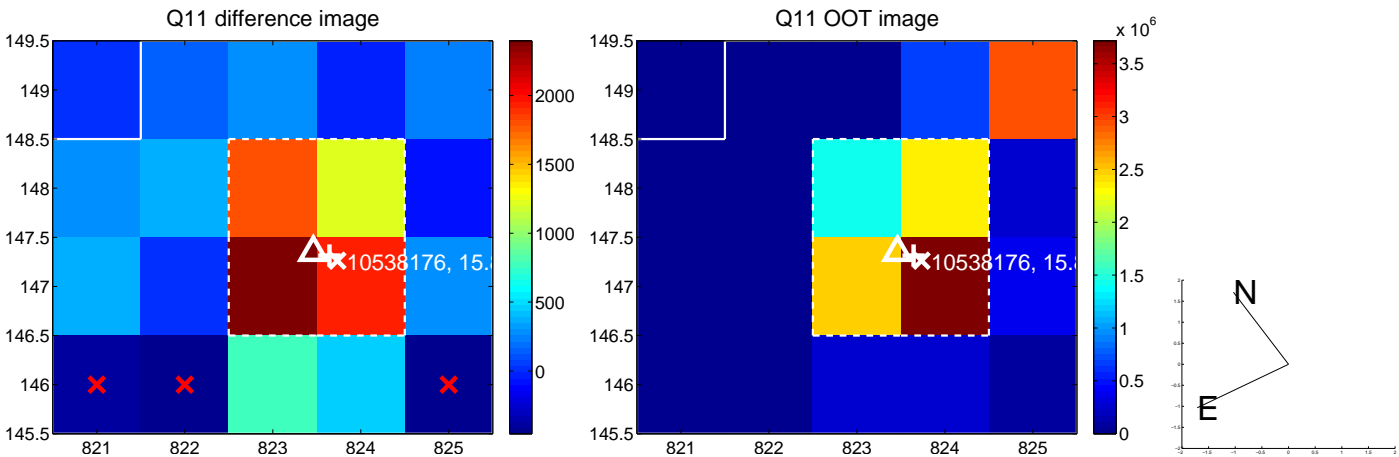
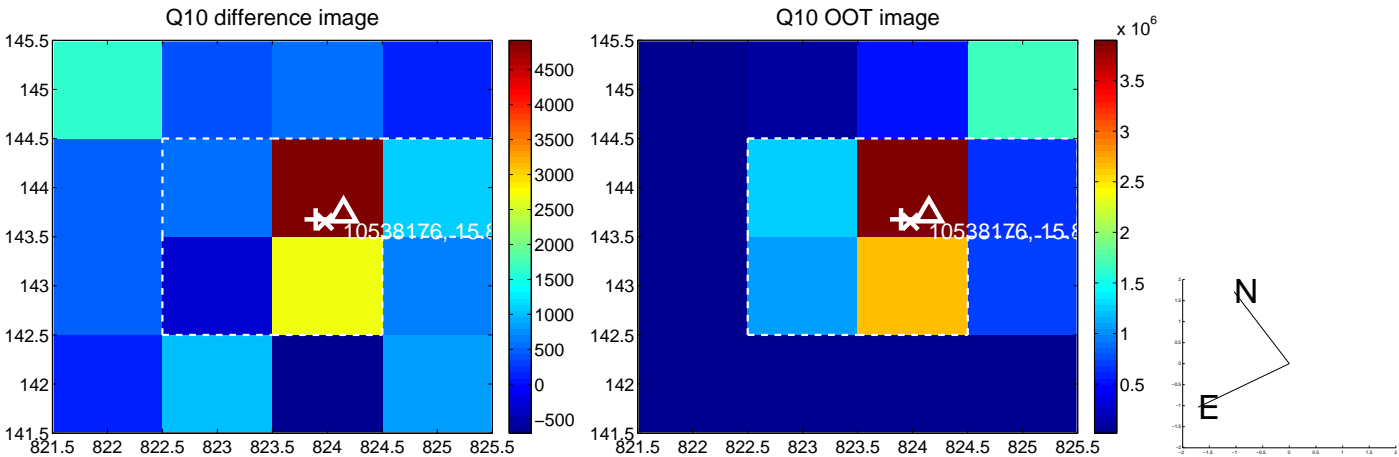
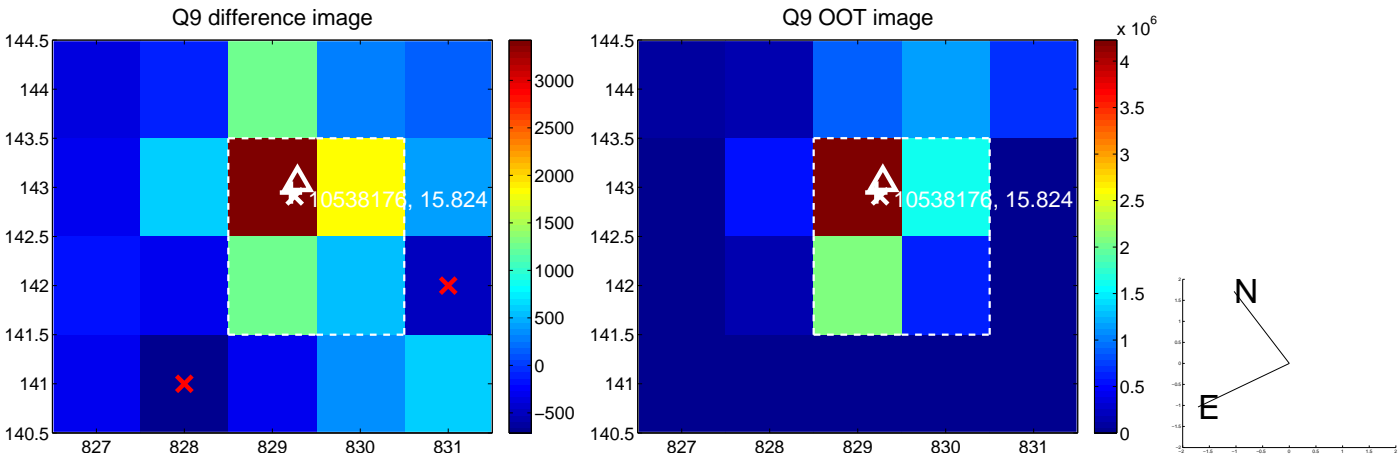
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



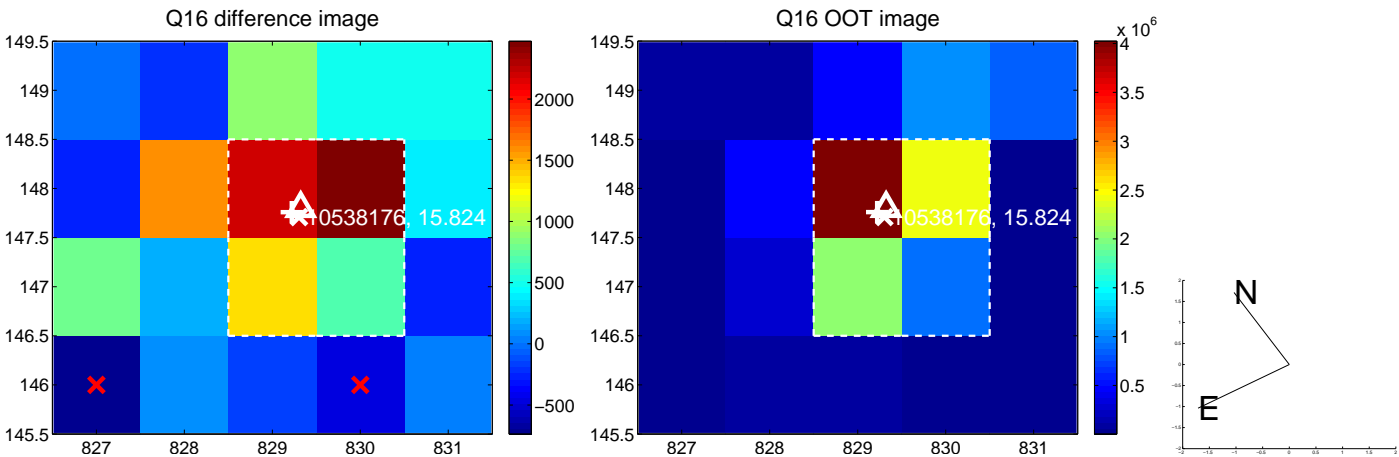
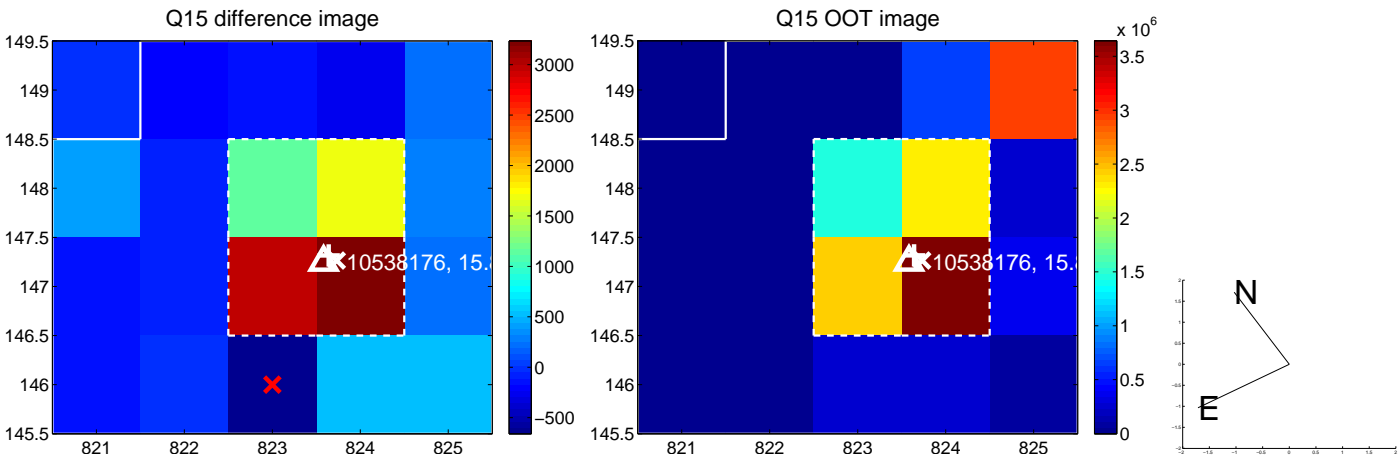
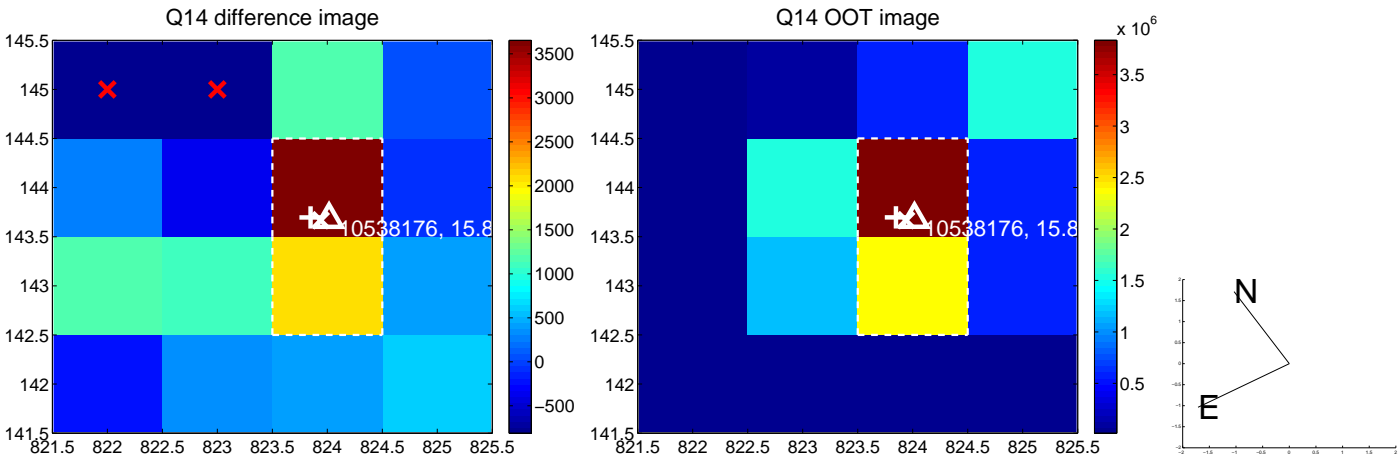
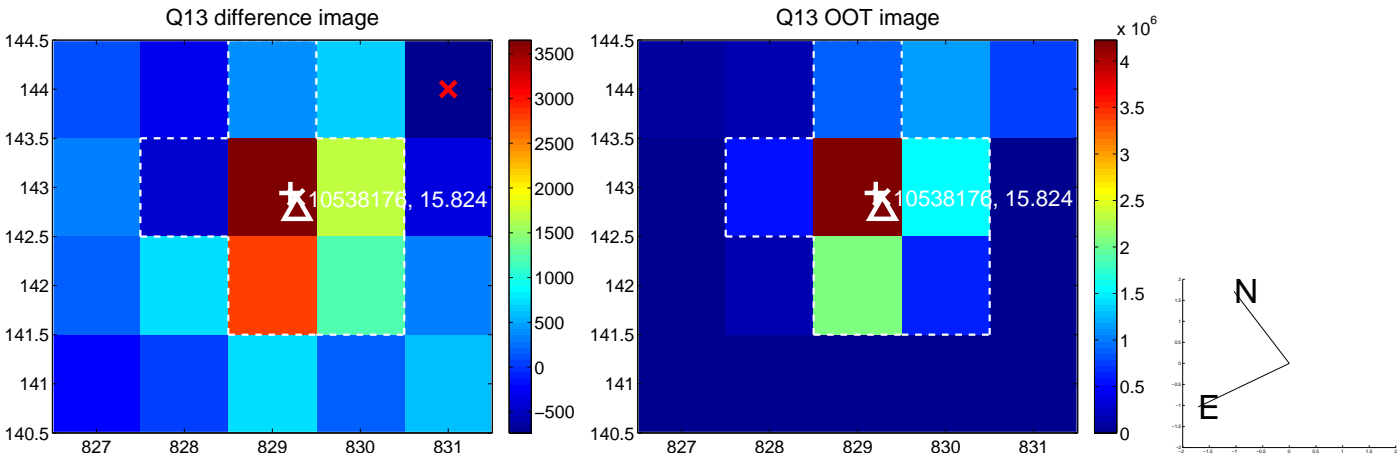
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



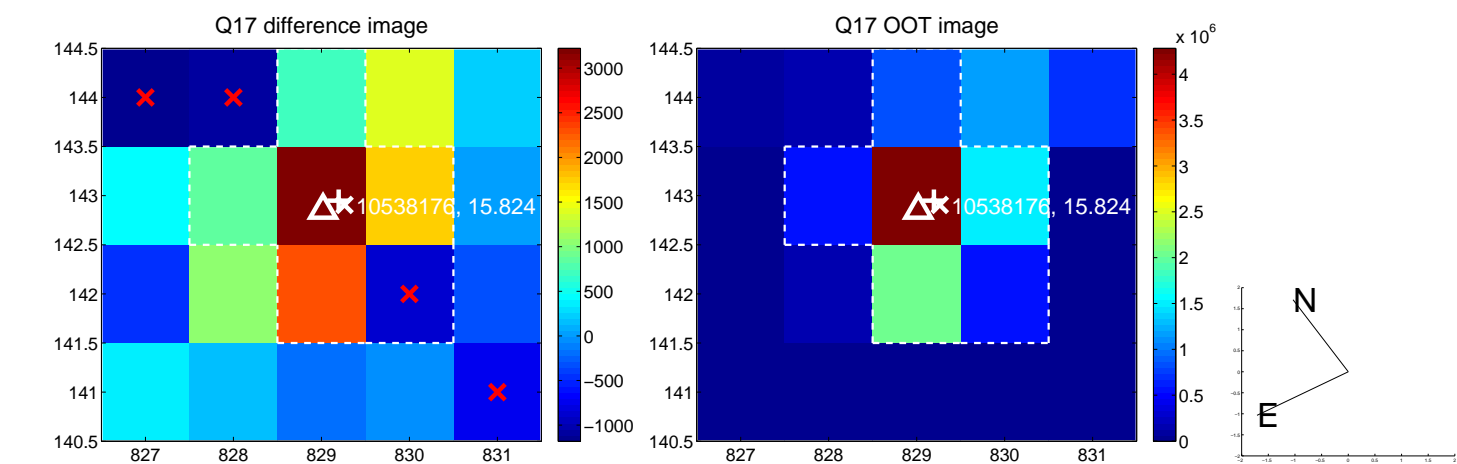
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



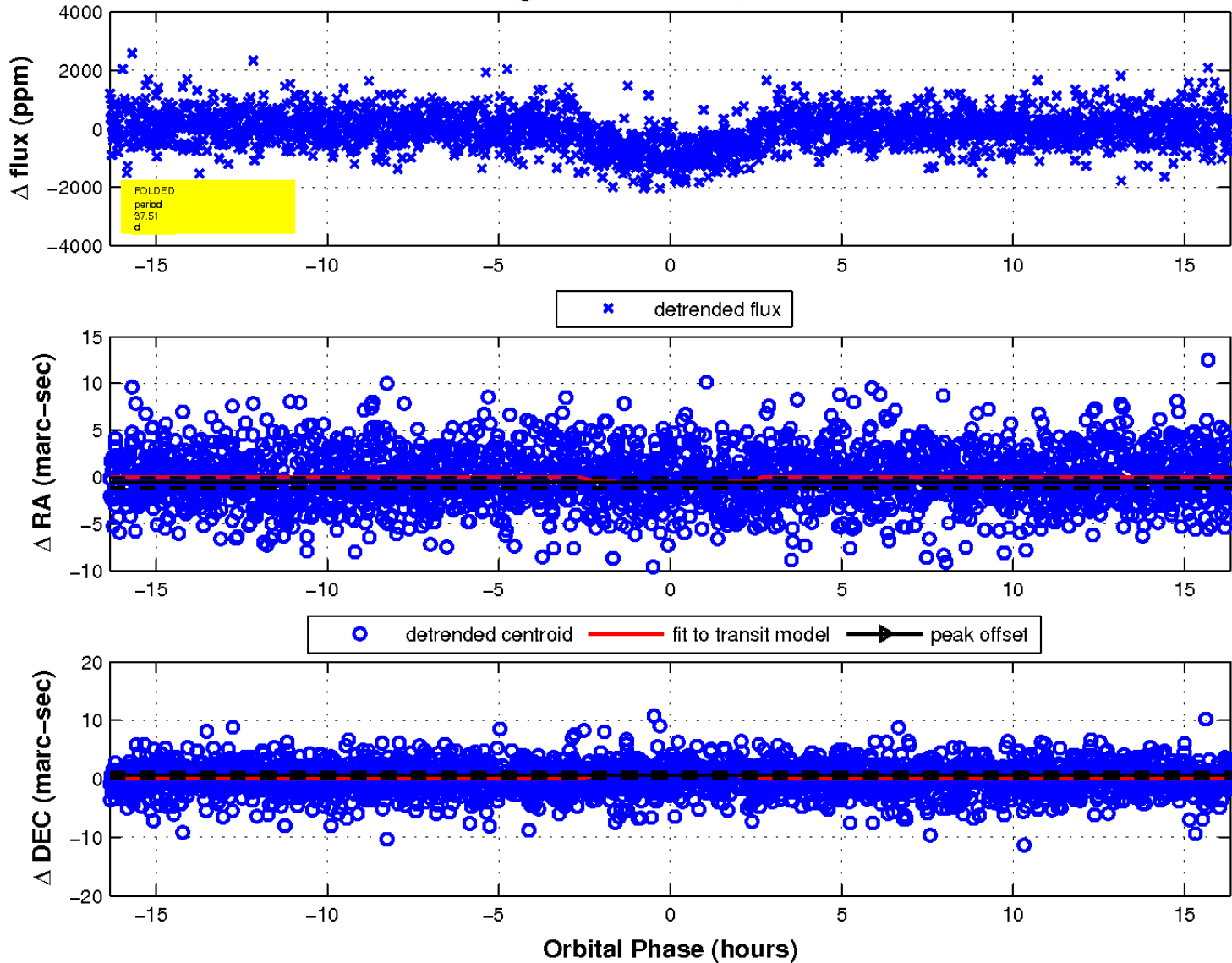
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



fluxWeightedCentroids, Planet 2 of 2



UKIRT Image

Declination

