

KIC 009640976

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})
009640976-01	OBS	0712.01	2.178118	132.037367	138.1	2.085	28.8	31.2	0.84	5691	1.17	639.26
009640976-02	OBS	No	2.178124	133.121054	37.5	2.643	9.8	9.7	0.84	5691	0.61	639.26

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009640976-01	OBS	FP	0.00	0	1	1	1	MOD_SEC_DV—MOD_SEC_ALT—HAS_SEC_TCE—HALO_GHOST—EPHEM_MATCH
009640976-02	OBS	FP	0.00	1	1	1	1	IS_SEC_TCE—CENT_UNRESOLVED_OFFSET—EPHEM_MATCH

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.

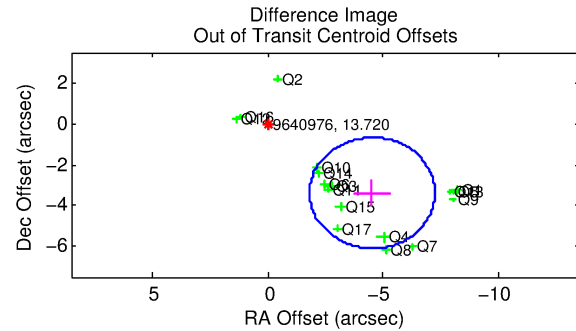
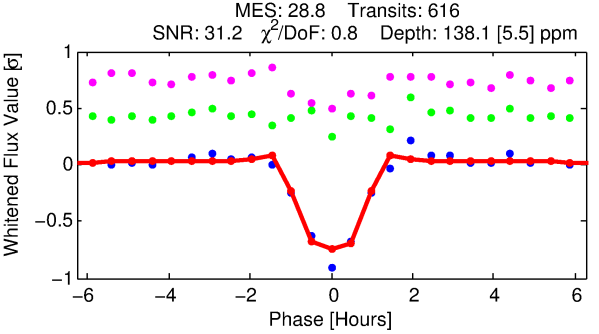
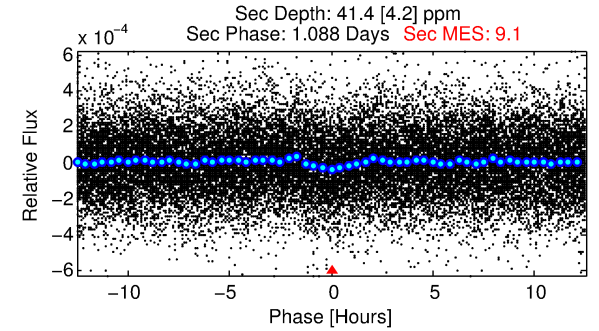
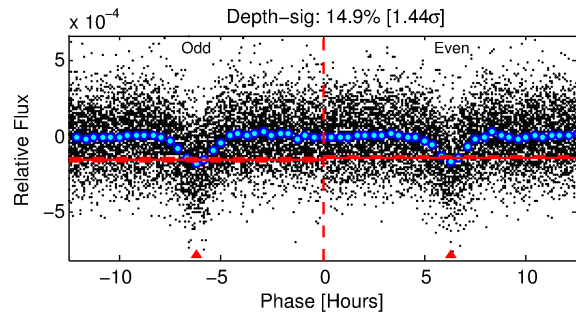
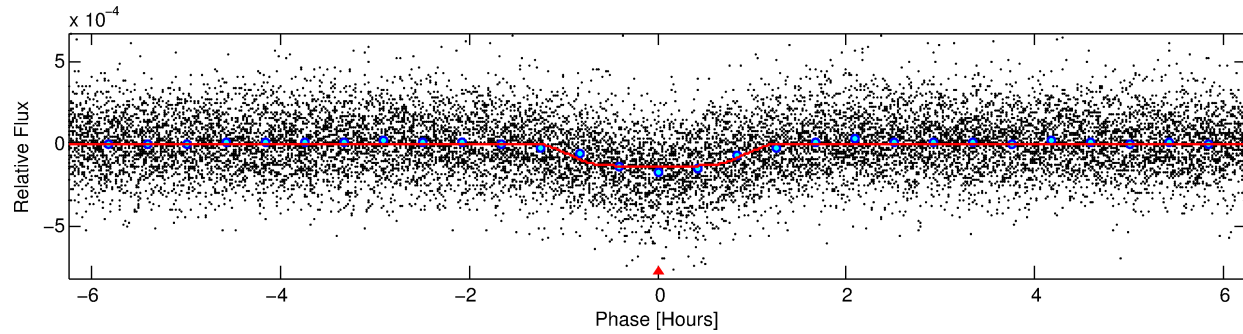
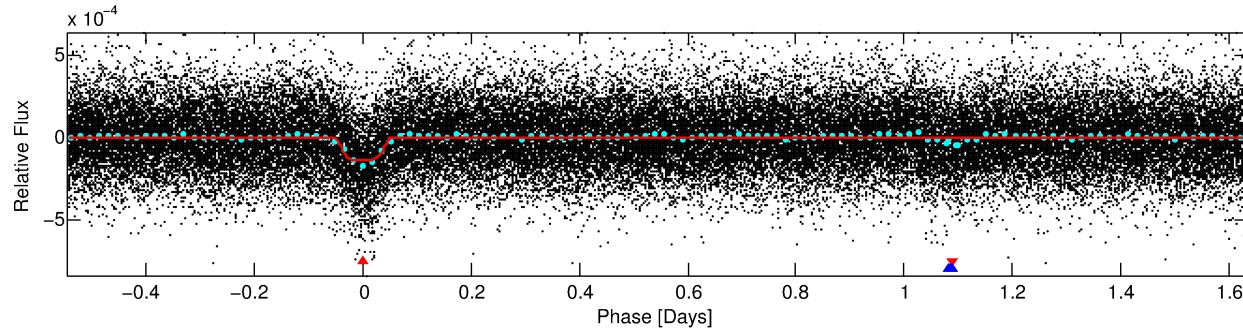
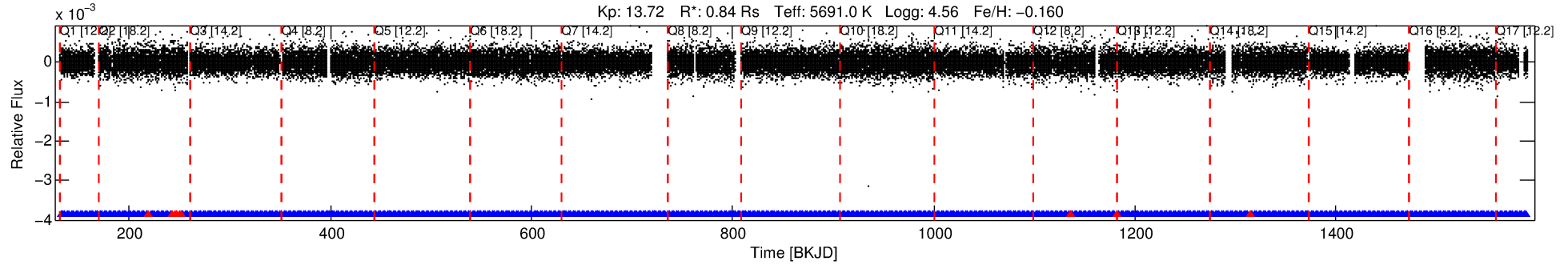
Ephemeris Match Information For 009640976-01

TCE (1)	KIC	Parent (2)	Parent KIC	$P_1:P_2$	Dist ($''$)	Δ Row	Δ Col	m_2	m_1	D_2/D_1	Mechanism	Flag	σ_P	σ_T
009640976-01	9640976	FL-Lyr-pri	9641031	1:1	138.2	35	2	9.18	13.72	3152.60	Direct-PRF	0	1.14	0.85

Notes: $P_1:P_2$ is the period ratio. Dist is the distance in arcseconds. Δ Row and Δ Col are the number of pixels apart in row and column. m_2 and m_1 are the magnitudes of the parent and child. D_2/D_1 is the parent's transit depth divided by the child's. σ_P and σ_T are the significance of the match in period and epoch. For a match to be considered significant $\sigma_P < 5.0$ and $\sigma_T < 5.0$. Matches which have σ_P and σ_T very close to this cutoff should receive extra scrutiny, especially if the period ratio is very large.

DV One-Page Summary

KIC: 9640976 Candidate: 1 of 2 Period: 2.178 d
KOI: K00712.01 Corr: 0.942



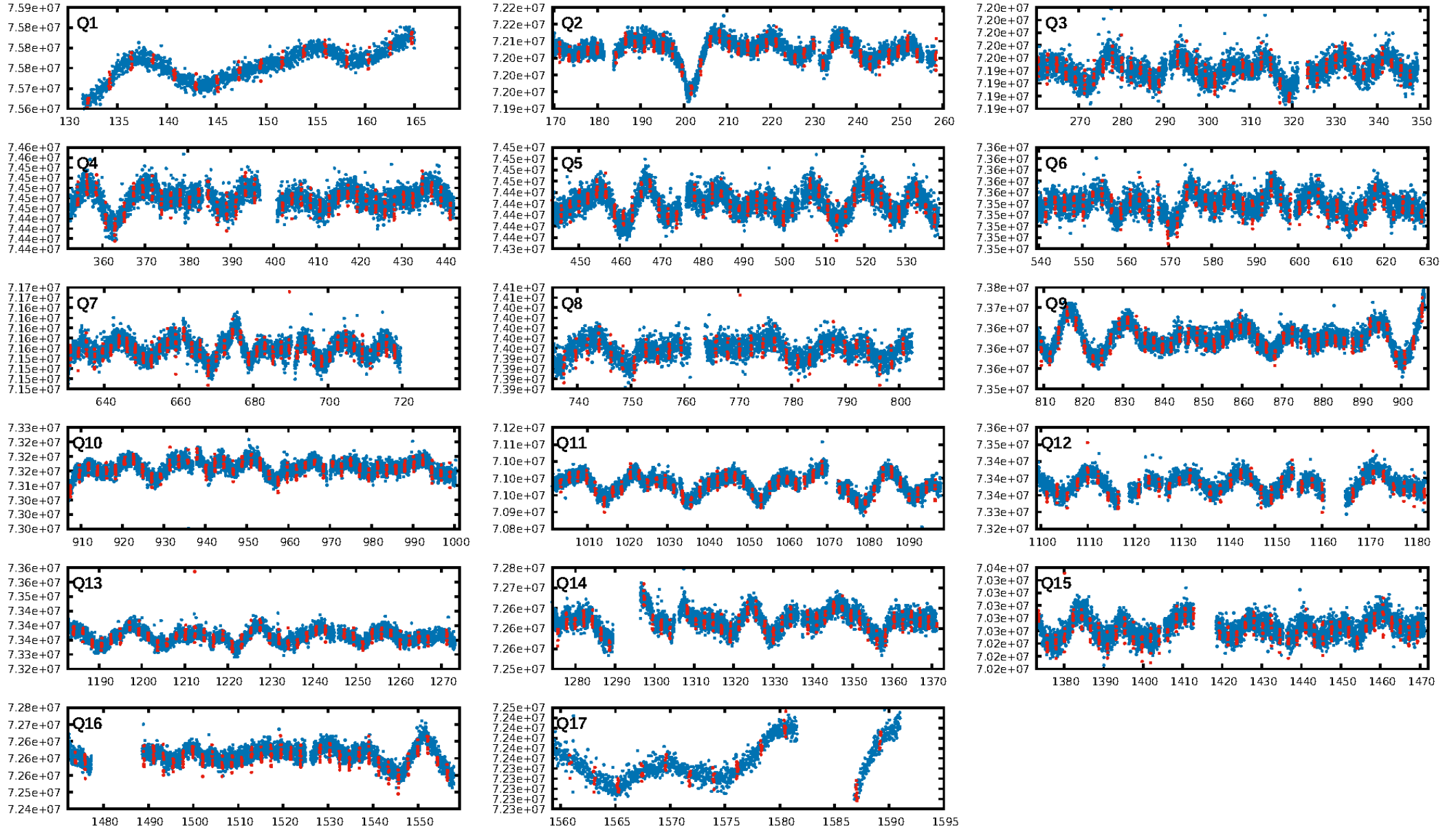
DV Fit Results:

Period = 2.17812 [0.00000] d
Epoch = 132.0374 [0.0010] BKJD
Rp/R* = 0.0128 [0.0029]
a/R* = 3.80 [3.78]
b = 0.90 [0.23]
Seff = 639.26 [207.31]
Teq = 1282 [104] K
Rp = 1.17 [0.39] Re
a = 0.0321 [0.0067] AU
Ag = 17.05 [9.39] [1.71 σ]
Teffp = 4028 [473] K [5.67 σ]

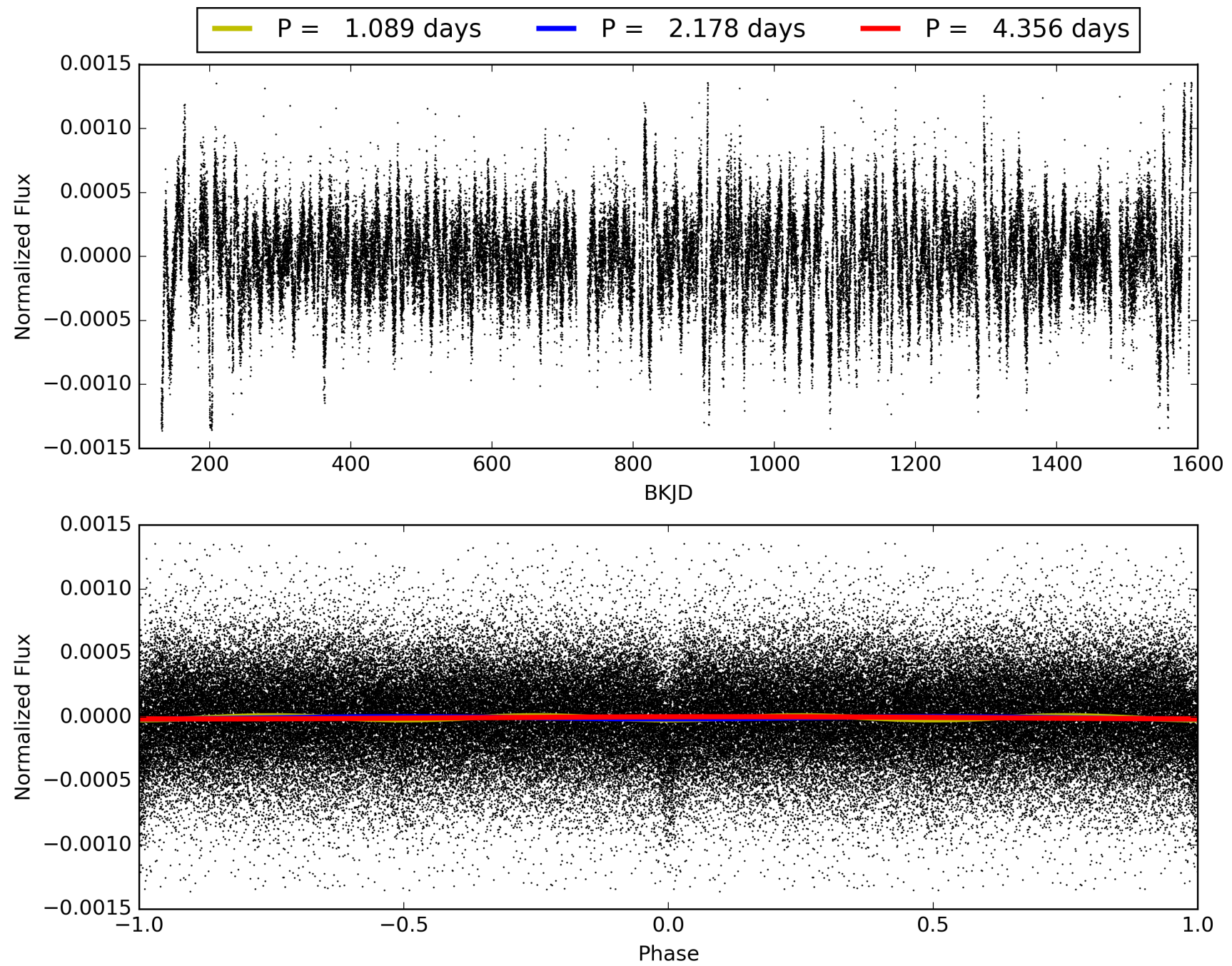
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 0.0% [0.00 σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 5.31e-170
RollingBand-fgt: 0.98 [579/588]
GhostDiagnostic-chr: 0.221
Centroid-sig: 0.0%
Centroid-so: 4.650 arcsec [13.25 σ]
OotOffset-rm: 5.646 arcsec [6.25 σ]
KicOffset-rm: 5.434 arcsec [6.10 σ]
OotOffset-st: 4/4/4/5 [17]
KicOffset-st: 4/4/4/5 [17]
DiffImageQuality-fgm: 0.18 [3/17]
DiffImageOverlap-fno: 1.00 [17/17]

TCE 009640976-01, PDC Light Curves

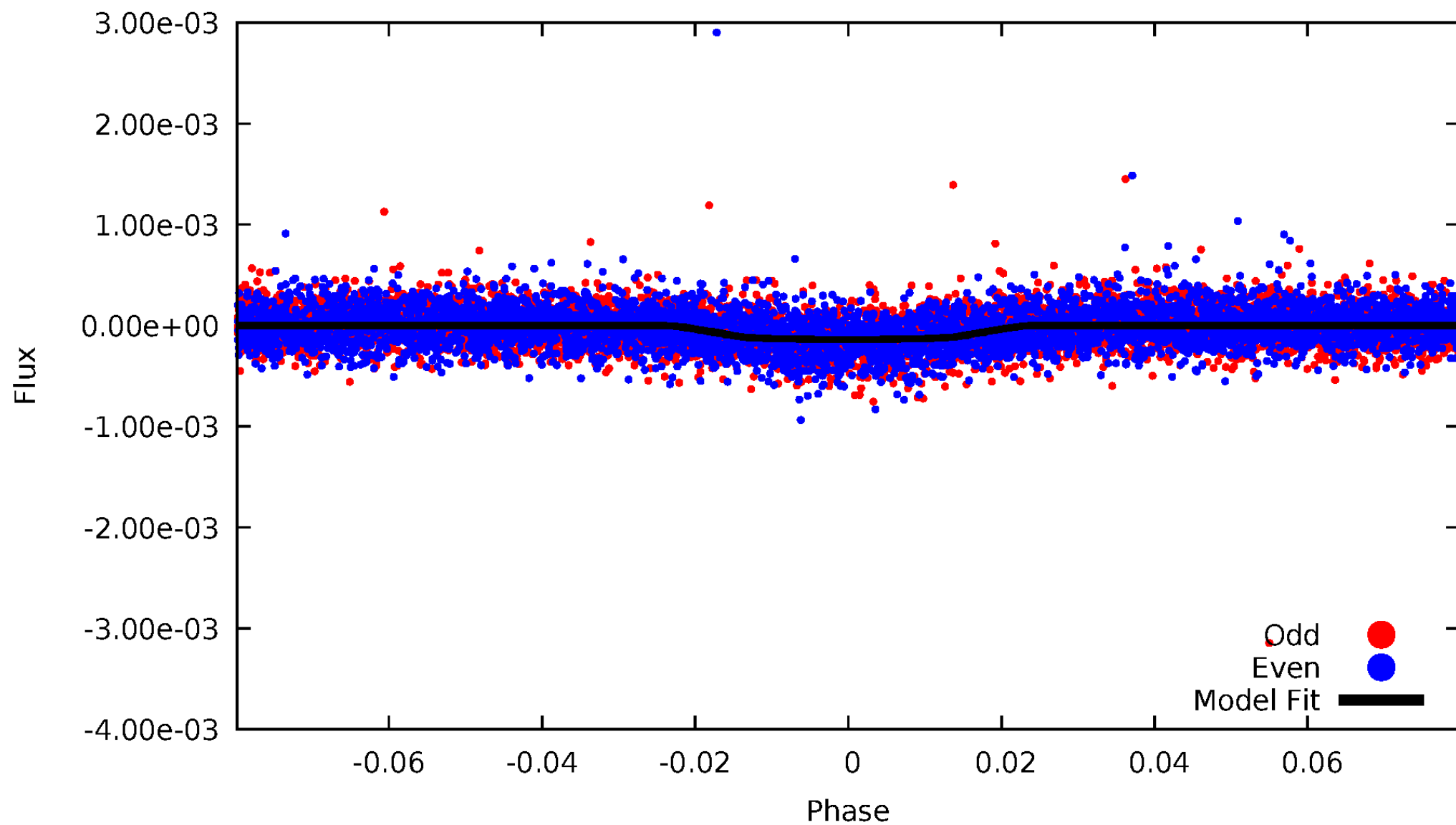


TCE 009640976-01



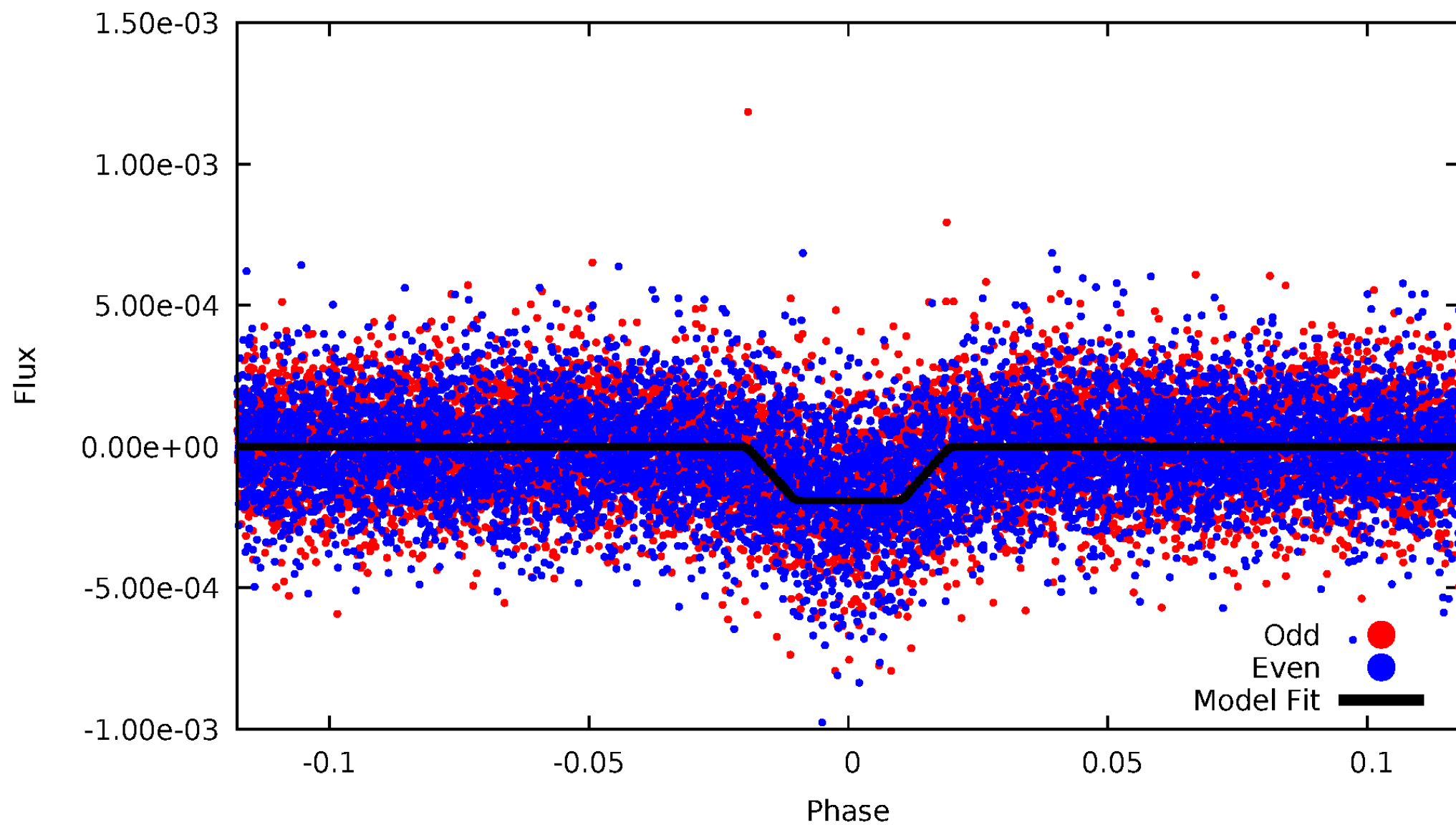
DV Odd/Even

TCE 009640976-01

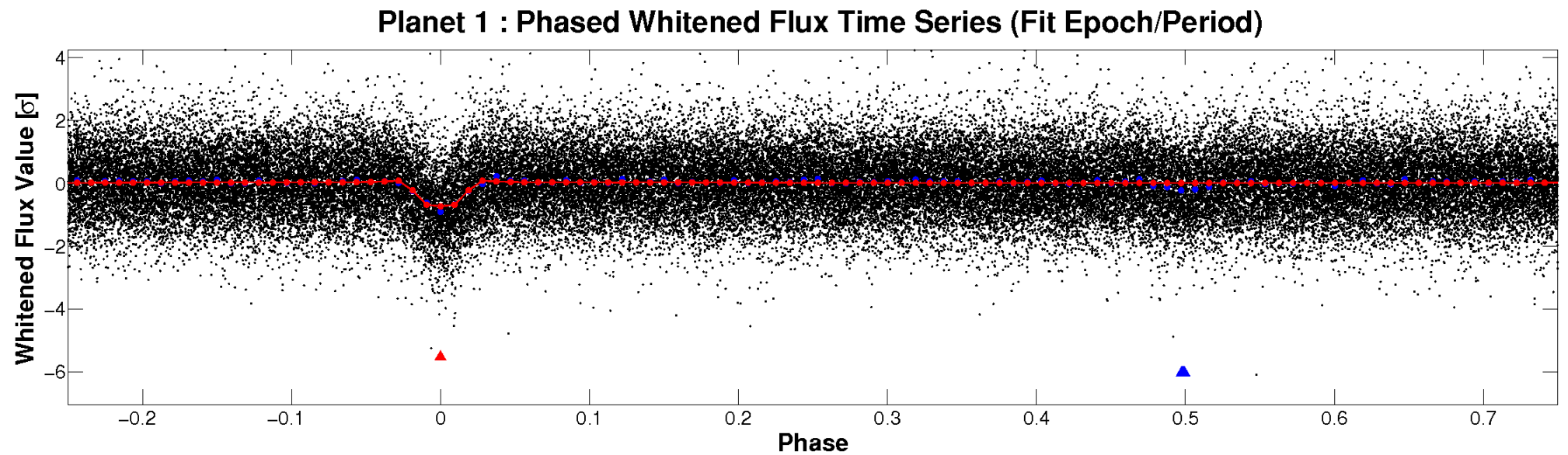
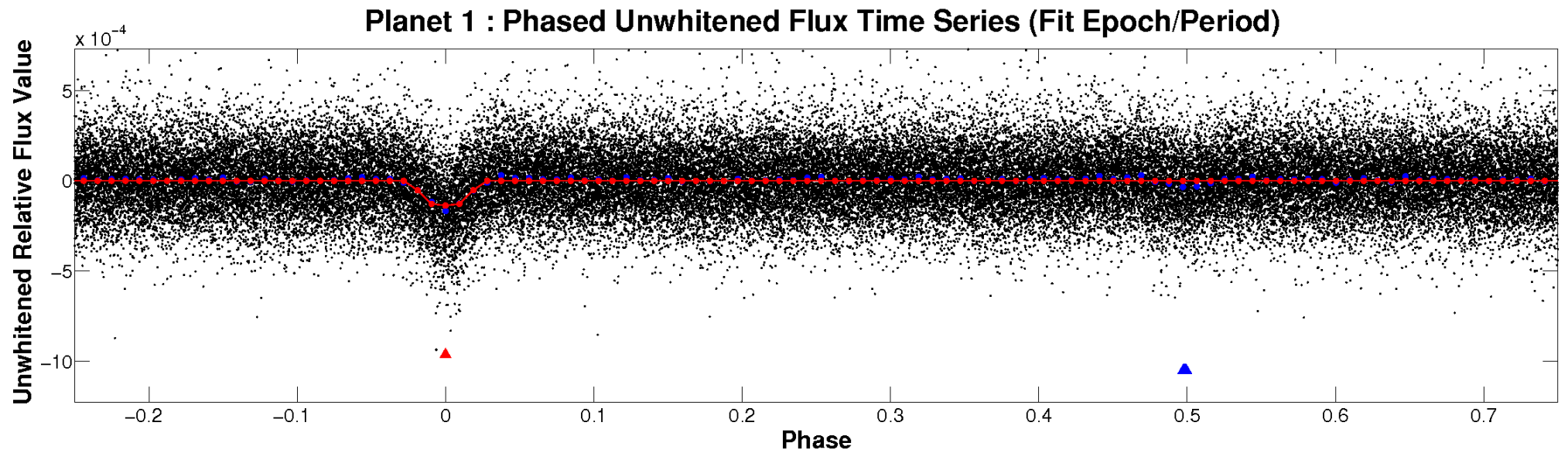


ALT Odd/Even

TCE 009640976-01

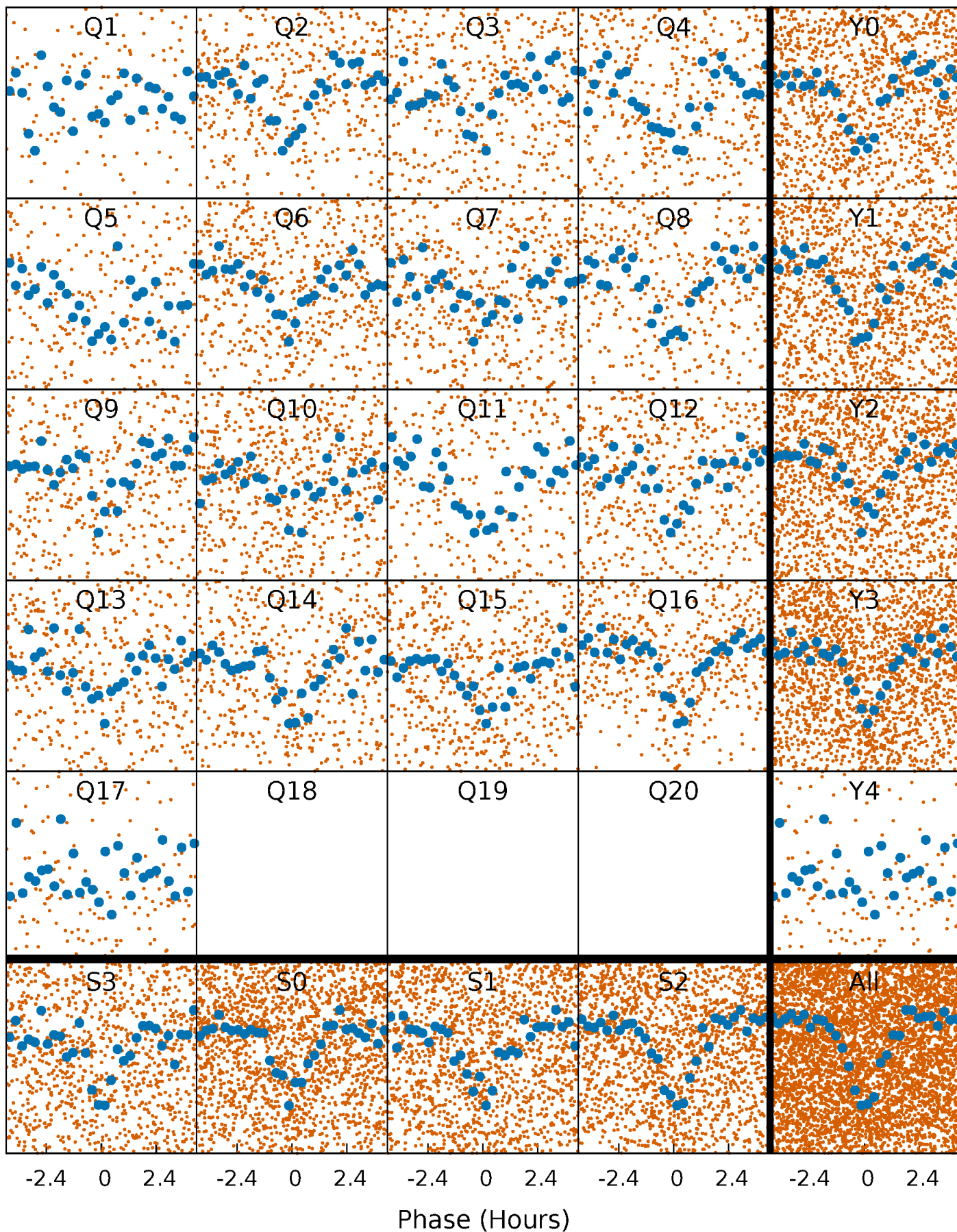


Non-Whitened Vs. Whitened Light Curve



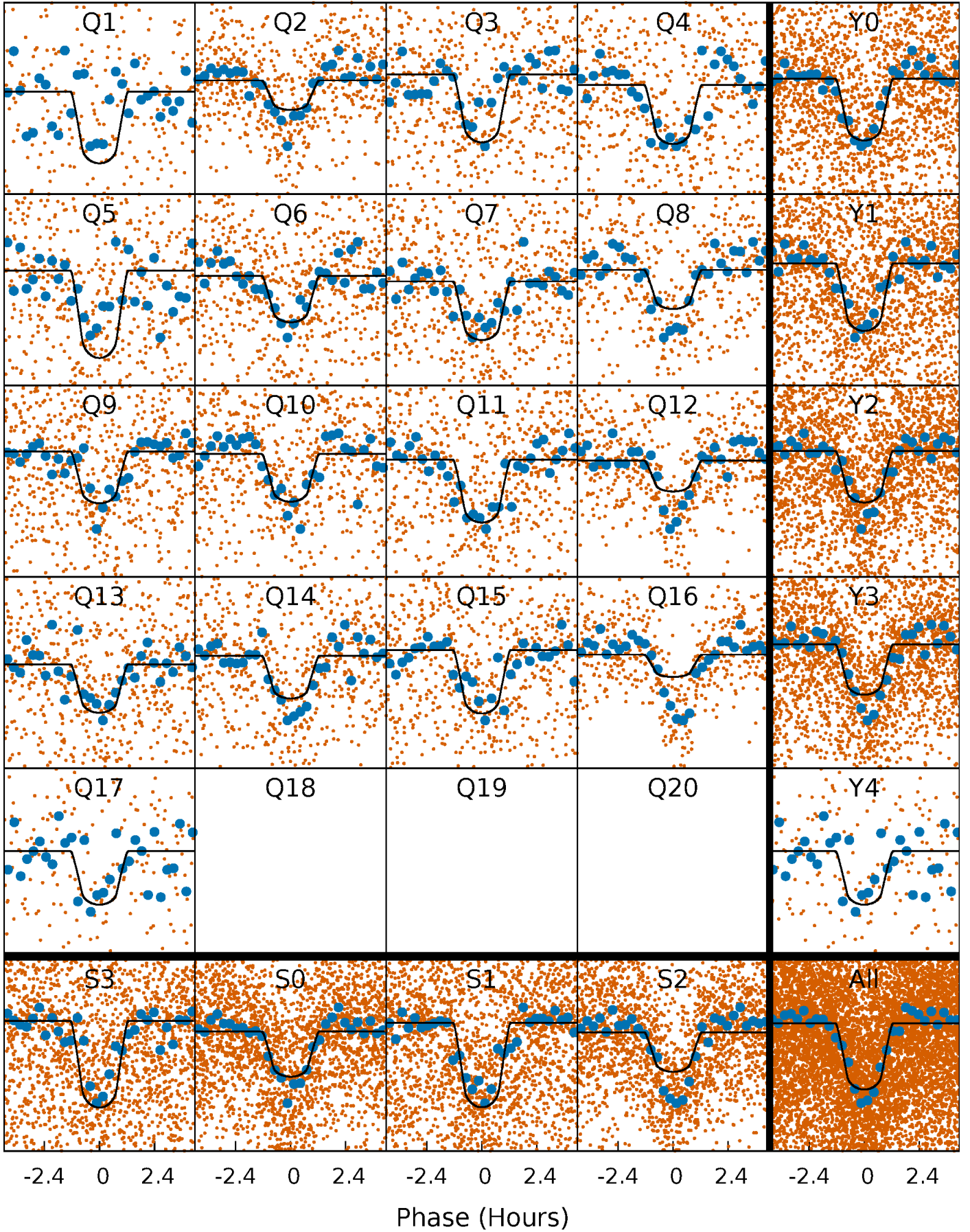
PDC Quarter-Phased Transit Curves

TCE 009640976-01 P= 2.178118 Days $T_0=132.037367$ (BKJD)



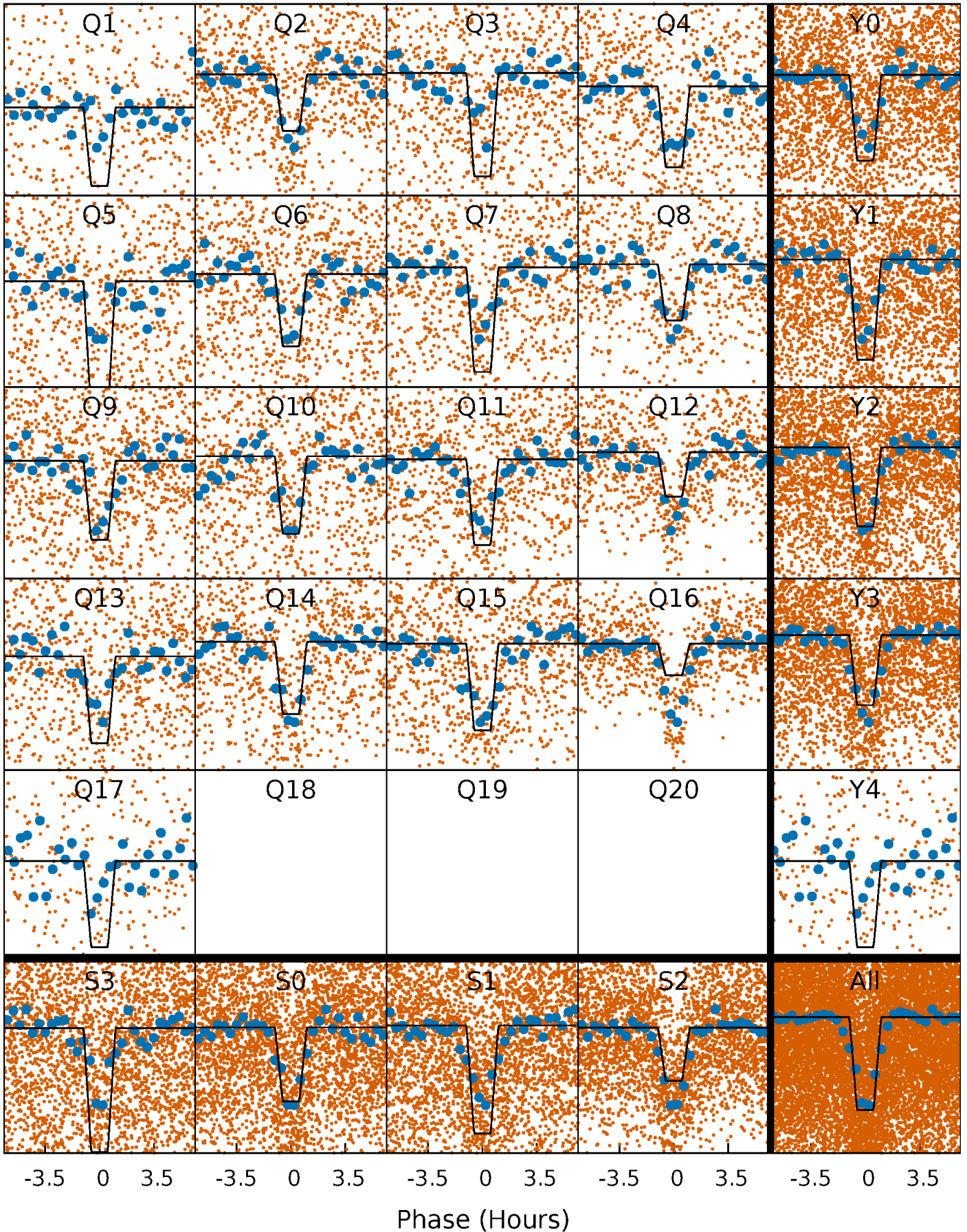
DV Quarter-Phased Transit Curves

TCE 009640976-01 P= 2.178118 Days $T_0=132.037367$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

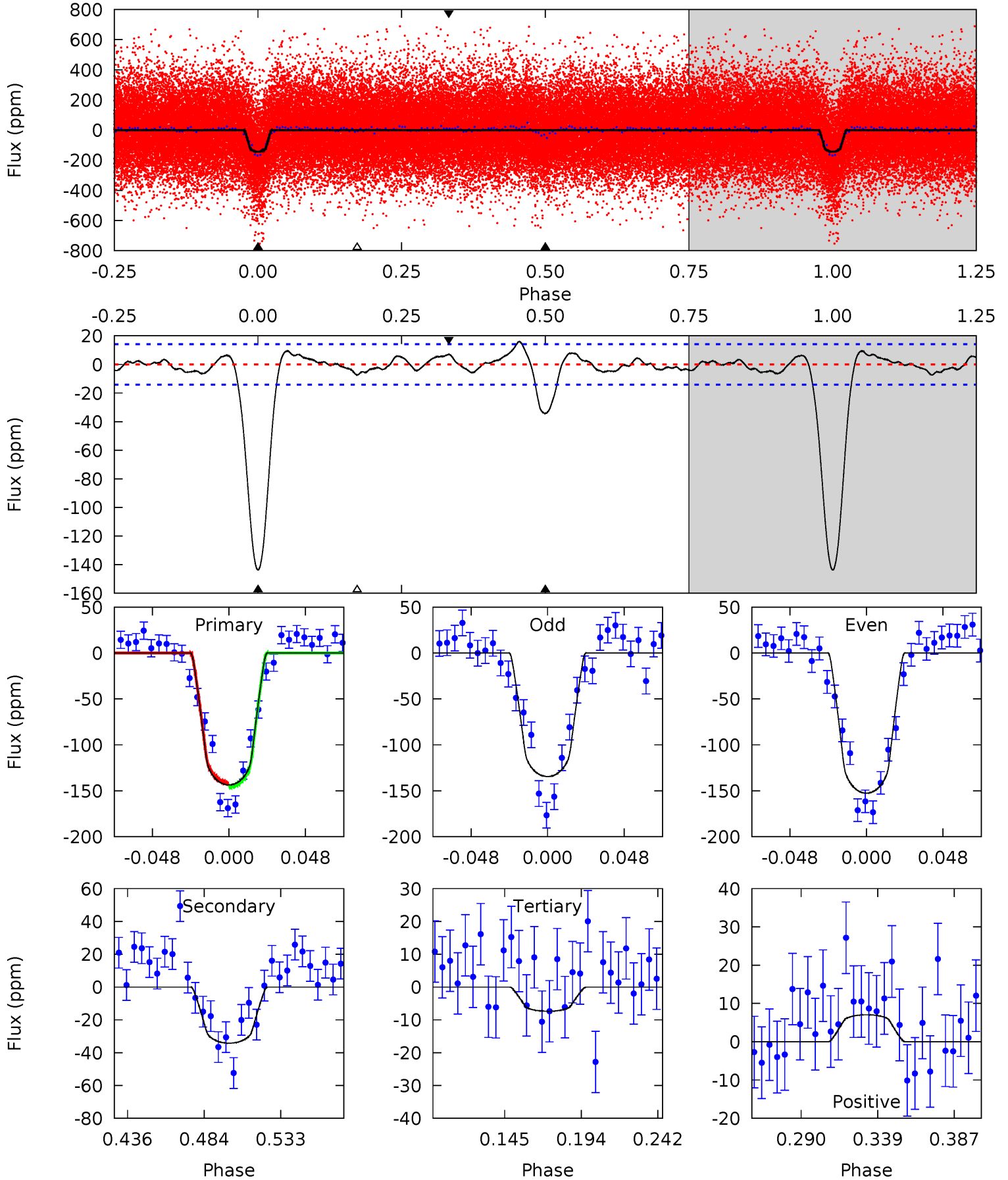
TCE 009640976-01 P= 2.178142 Days $T_0=132.029079$ (BKJD)



DV Model-Shift Uniqueness Test

009640976-01, P = 2.178118 Days, E = 129.859249 Days

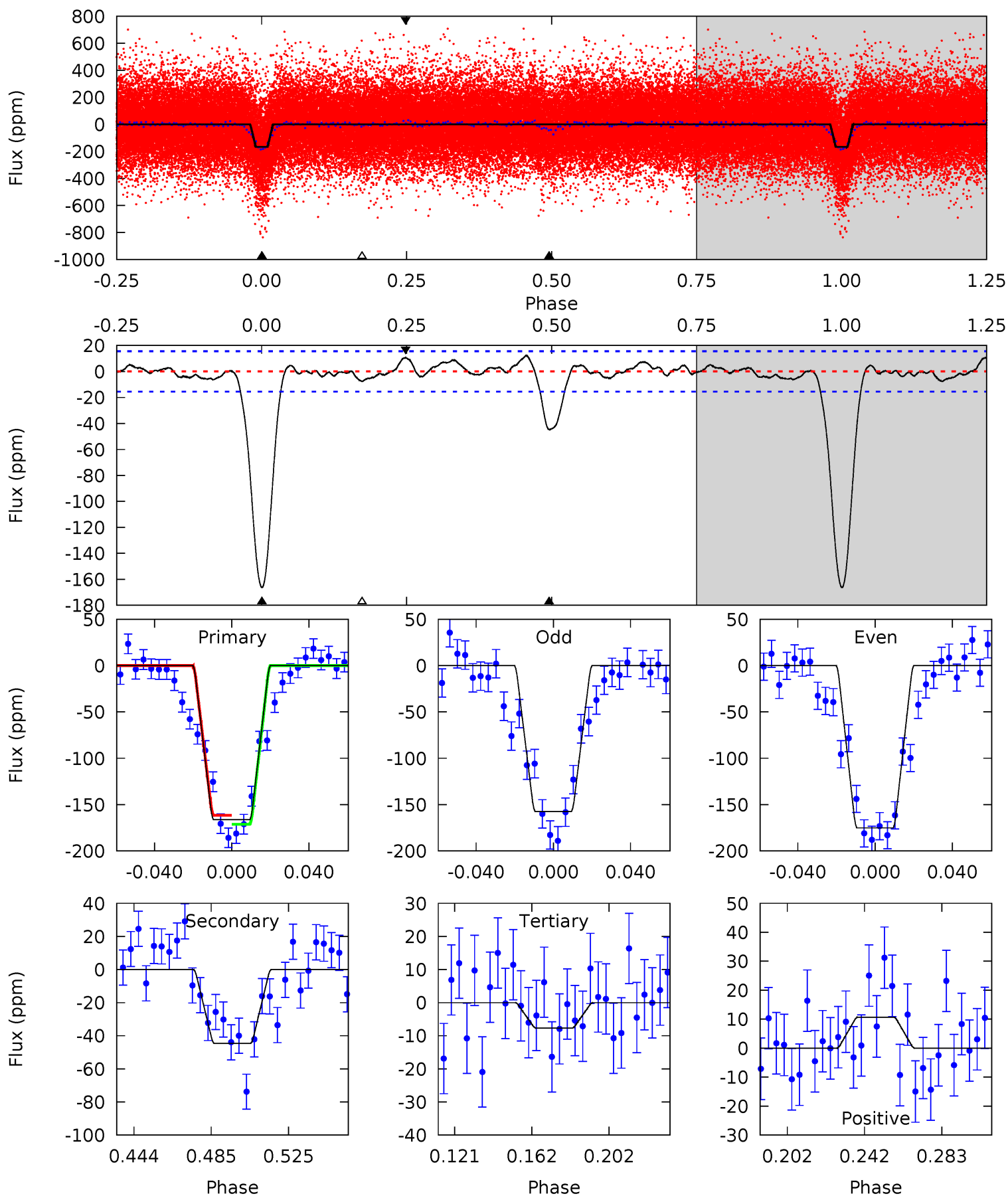
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
47.9	11.4	2.46	2.35	4.71	1.97	1.36	45.4	45.6	8.95	9.06	3.02	1.02	0.10	0.71



Alt Model-Shift Uniqueness Test

009640976-01, P = 2.178142 Days, E = 129.850937 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
50.7	13.6	2.34	3.26	4.75	2.05	1.18	48.4	47.5	11.3	10.4	2.71	1.02	0.07	1.45



Stellar Parameters For KIC 009640976

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	M (M_{\odot})	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	5691^{+135}_{-152}	$4.560^{+0.042}_{-0.168}$	$-0.160^{+0.300}_{-0.300}$	$0.836^{+0.207}_{-0.069}$	$0.928^{+0.094}_{-0.104}$	$2.238^{+0.381}_{-0.999}$
	+2%/-3%	+1%/-4%	+188%/-188%	+25%/-8%	+10%/-11%	+17%/-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 009640976-01 / KOI 0712.01

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-34 ± 3	$1.23^{+0.30}_{-0.28}$	1822^{+112}_{-70}	4067^{+446}_{-280}	12^{+9}_{-4}
Alt.	-45 ± 3	$1.30^{+0.32}_{-0.27}$	1815^{+101}_{-68}	4178^{+417}_{-283}	15^{+9}_{-5}

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

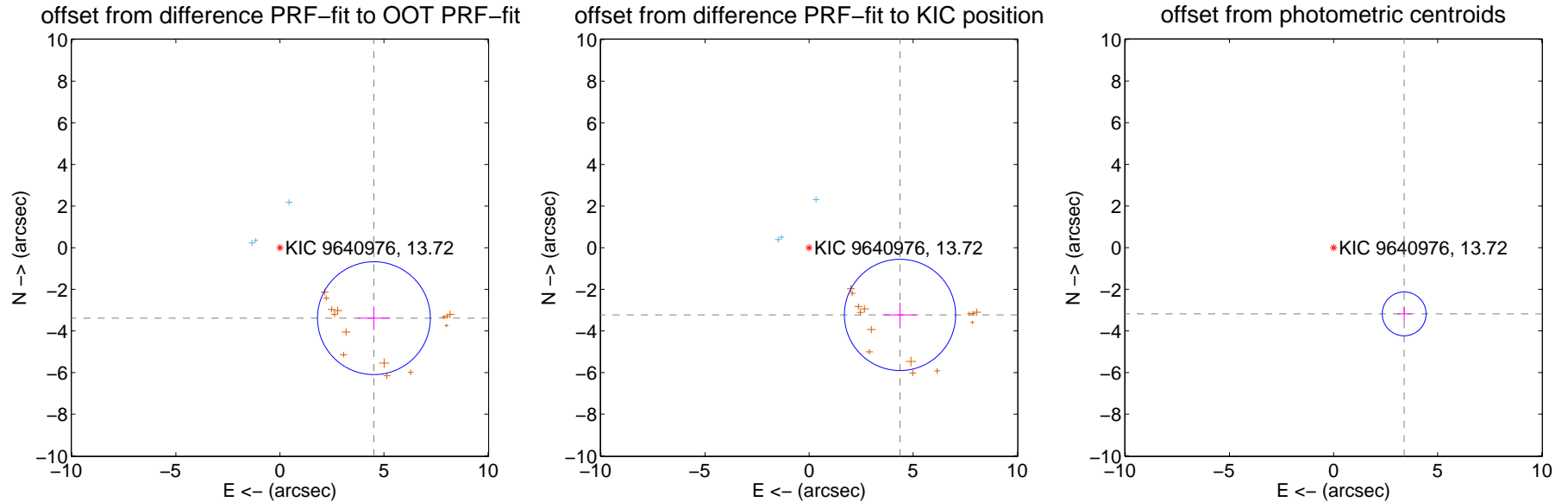
DV Centroid Data

Supplemental centroid analysis for 009640976-01. Kepler magnitude: 13.72. Transit SNR 31.16

There are 3 quarters with good PRF difference image offsets

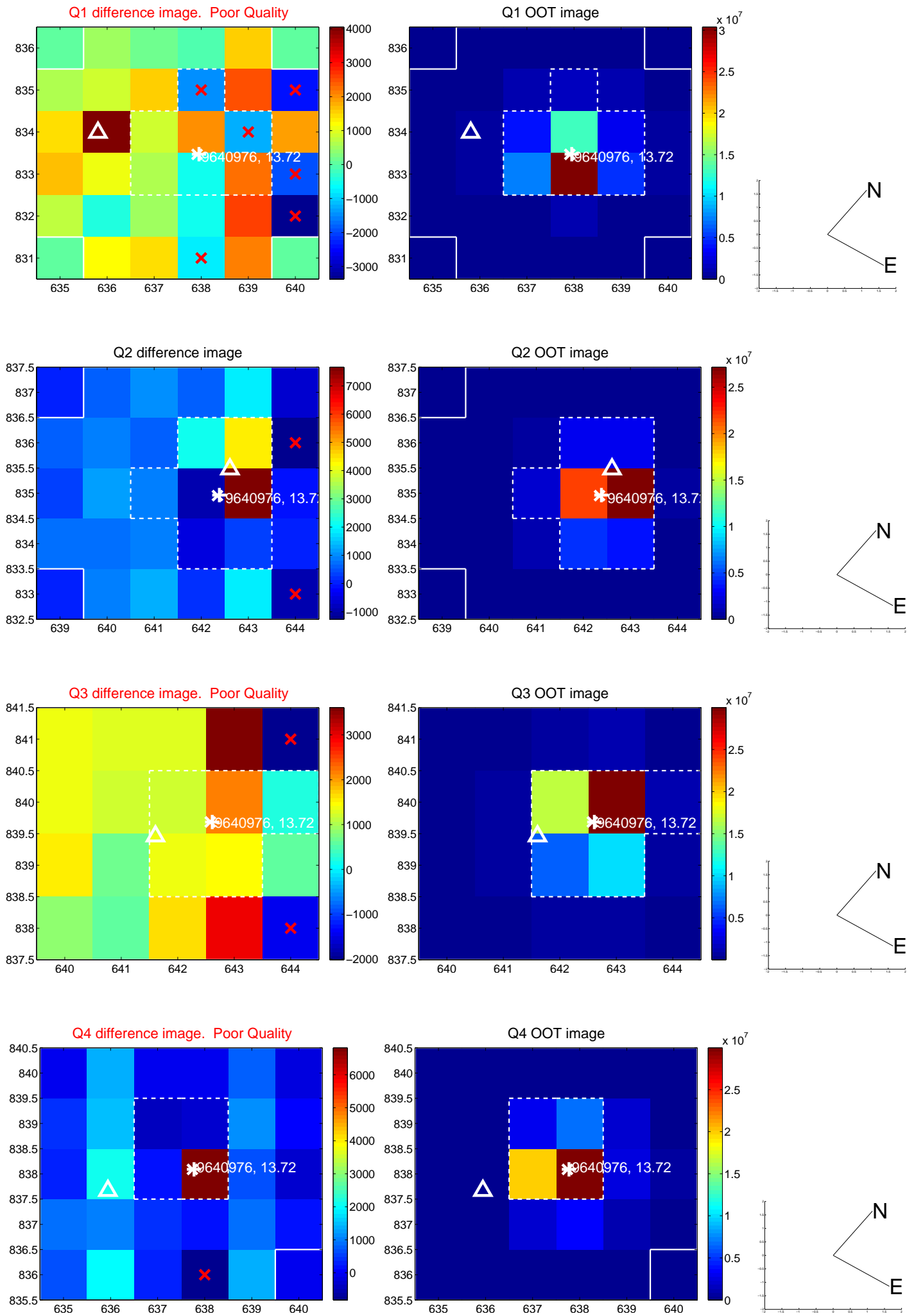
The direct PRF centroid is offset from the target star catalog position by about 0.21 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	5.646 ± 0.903	6.25	-4.517 ± 0.791	-3.387 ± 0.564
PRF-fit source offset from KIC position	5.434 ± 0.891	6.10	-4.370 ± 0.783	-3.230 ± 0.584
photometric centroid source offset	4.65 ± 0.35	13.25	-3.39 ± 0.34	-3.18 ± 0.36

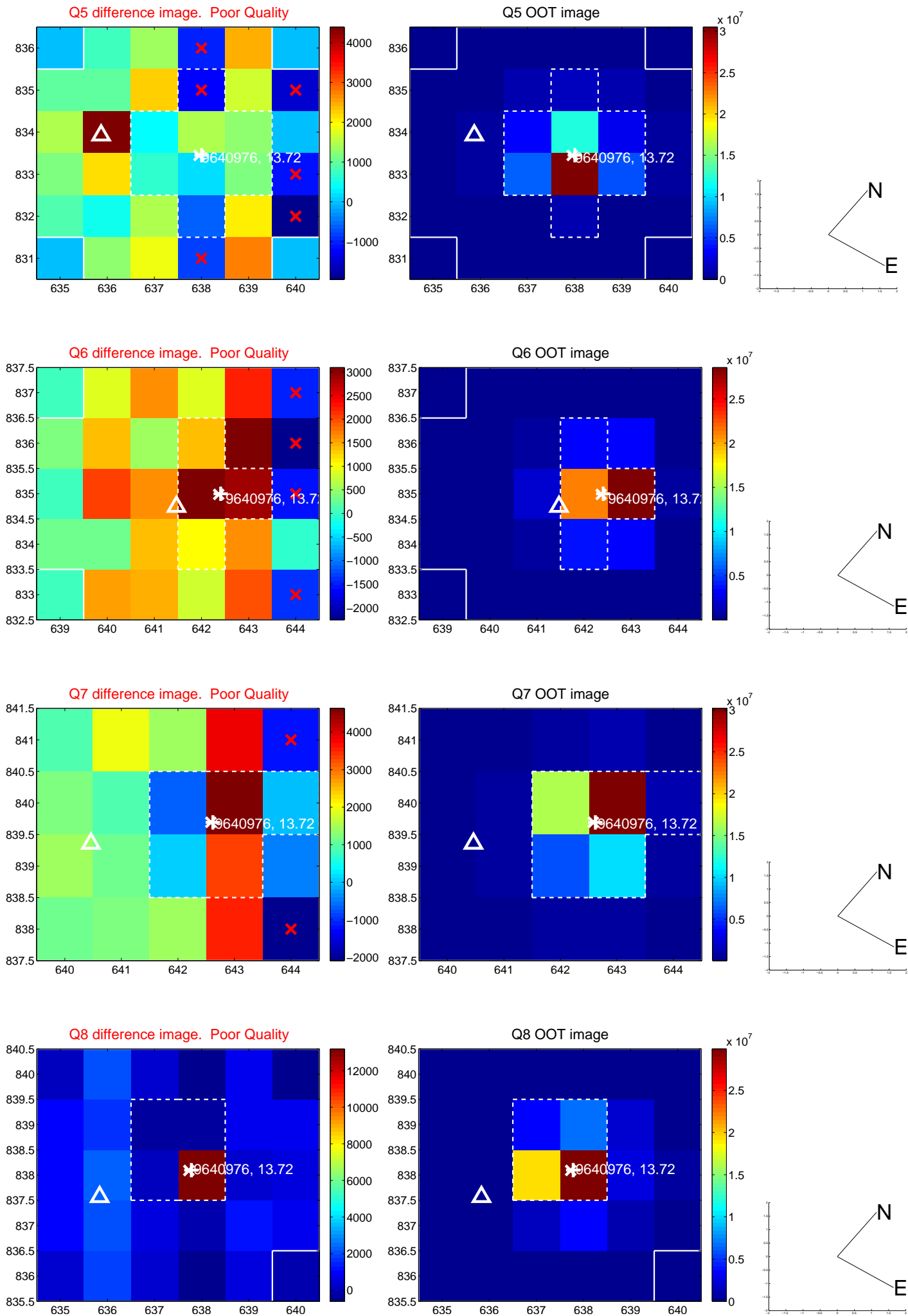


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

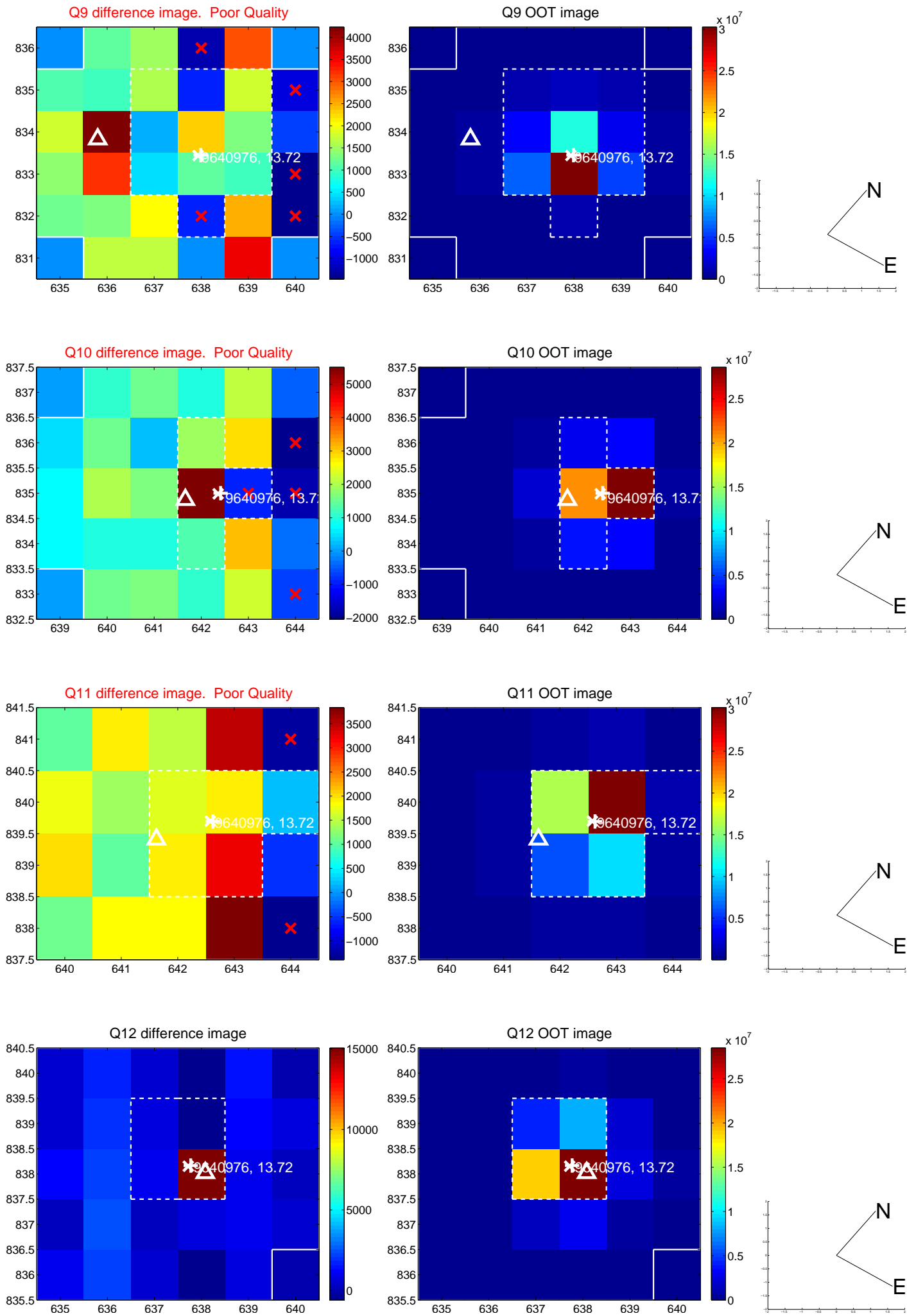
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



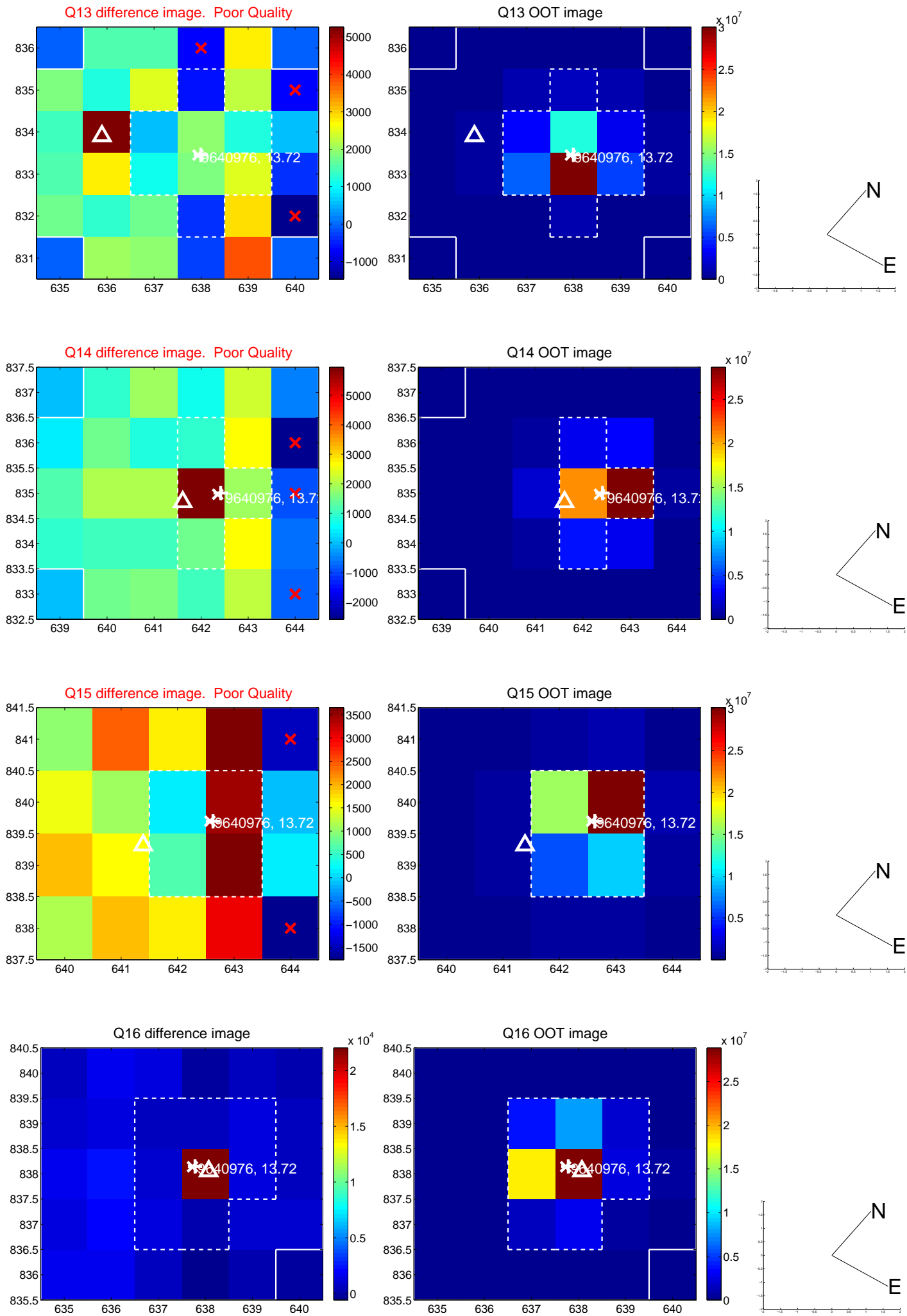
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



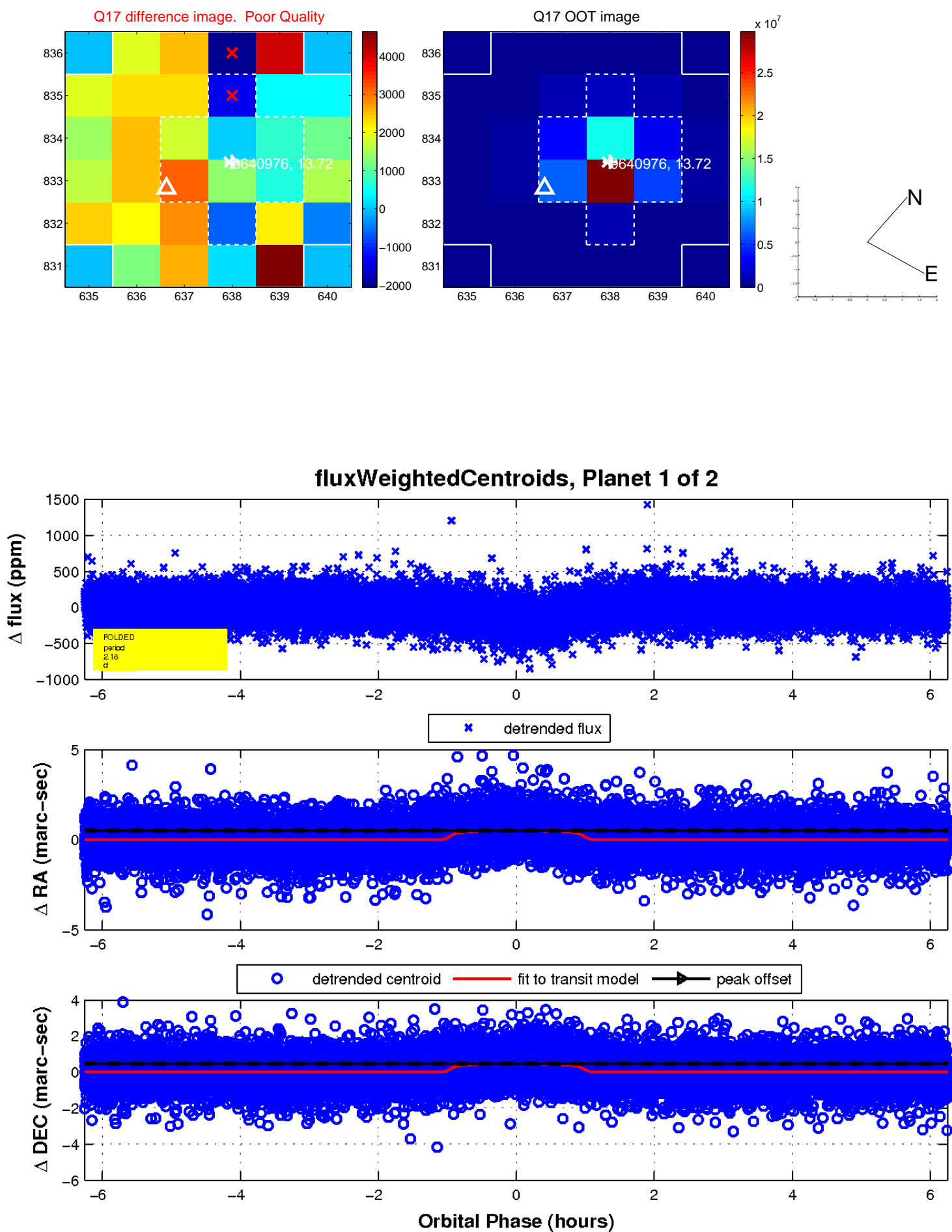
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

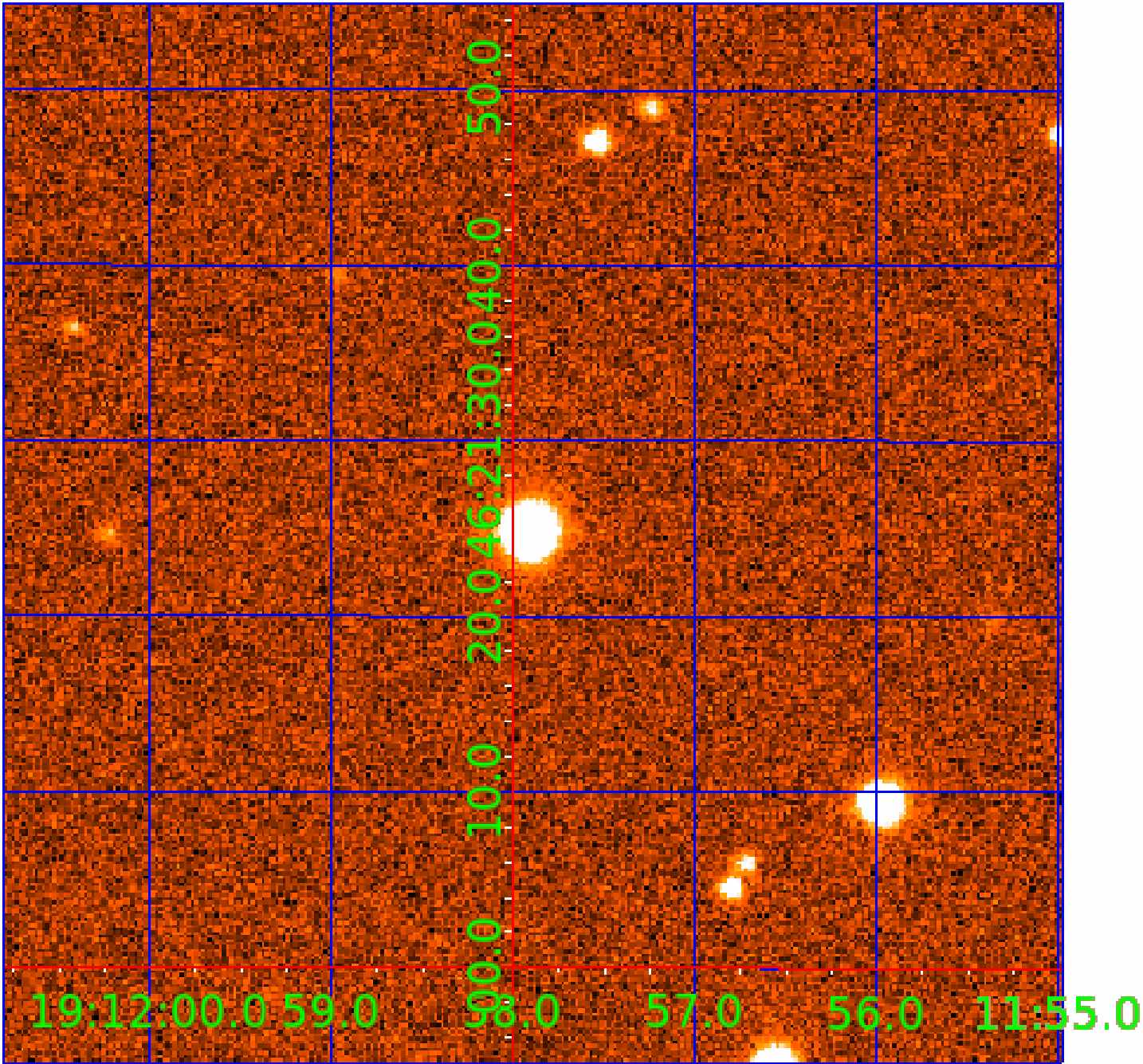


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 009640976

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})
009640976-01	OBS	0712.01	2.178118	132.037367	138.1	2.085	28.8	31.2	0.84	5691	1.17	639.26
009640976-02	OBS	No	2.178124	133.121054	37.5	2.643	9.8	9.7	0.84	5691	0.61	639.26

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009640976-01	OBS	FP	0.00	0	1	1	1	MOD_SEC_DV—MOD_SEC_ALT—HAS_SEC_TCE—HALO_GHOST—EPHEM_MATCH
009640976-02	OBS	FP	0.00	1	1	1	1	IS_SEC_TCE—CENT_UNRESOLVED_OFFSET—EPHEM_MATCH

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.

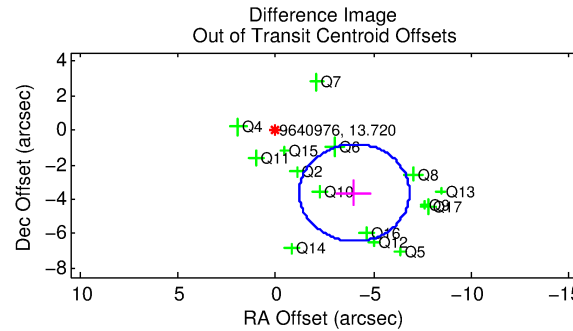
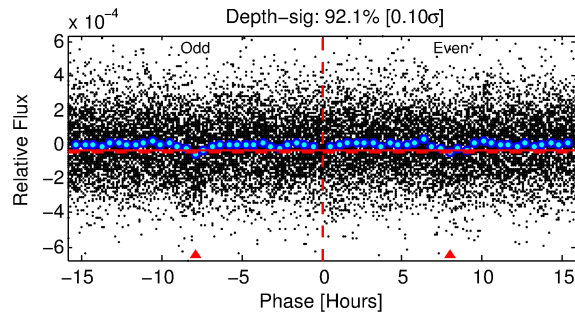
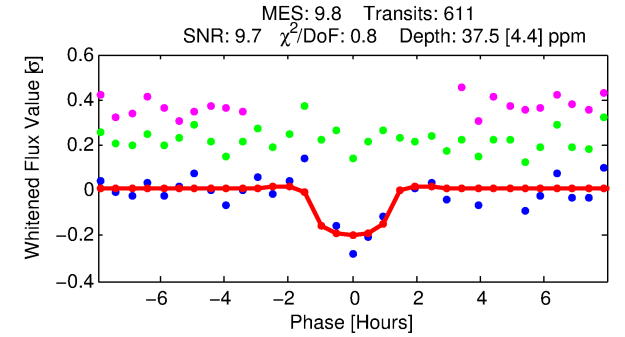
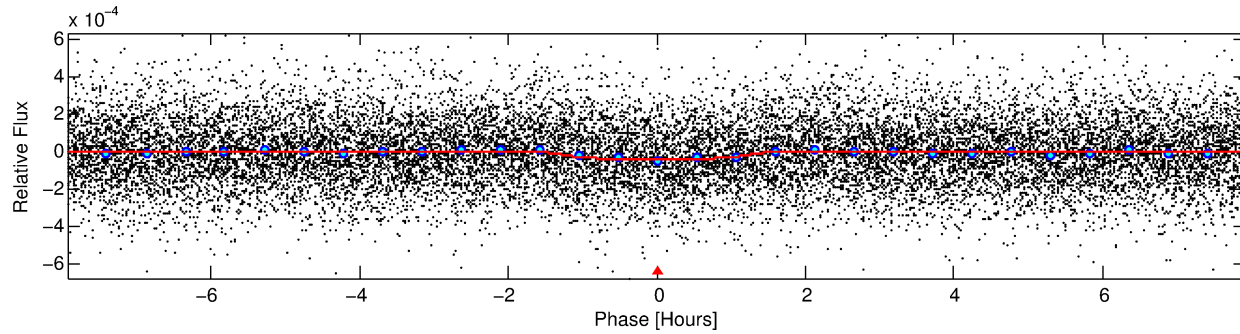
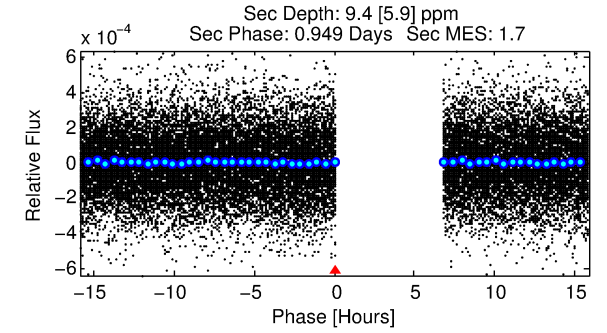
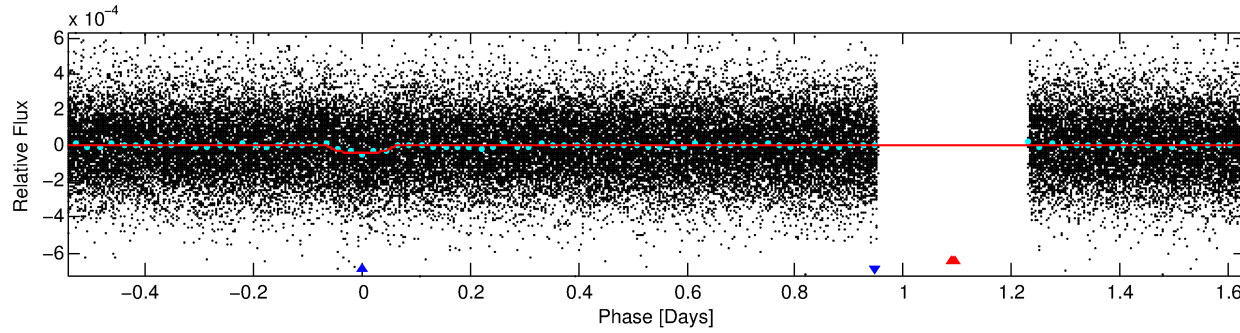
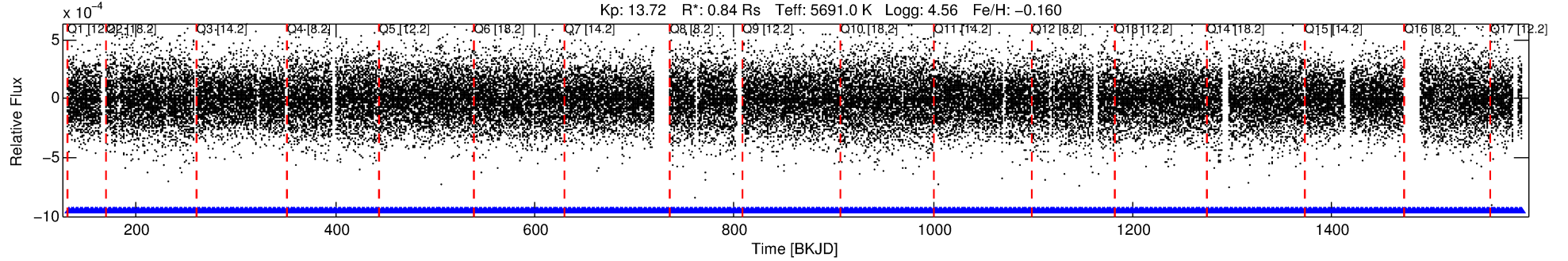
Ephemeris Match Information For 009640976-02

TCE (1)	KIC	Parent (2)	Parent KIC	$P_1:P_2$	Dist ($''$)	Δ Row	Δ Col	m_2	m_1	D_2/D_1	Mechanism	Flag	σ_P	σ_T
009640976-02	9640976	7211.01	9641031	2:1	138.2	35	2	9.18	13.72	8187.60	Direct-PRF	0	2.51	0.73

Notes: $P_1:P_2$ is the period ratio. Dist is the distance in arcseconds. Δ Row and Δ Col are the number of pixels apart in row and column. m_2 and m_1 are the magnitudes of the parent and child. D_2/D_1 is the parent's transit depth divided by the child's. σ_P and σ_T are the significance of the match in period and epoch. For a match to be considered significant $\sigma_P < 5.0$ and $\sigma_T < 5.0$. Matches which have σ_P and σ_T very close to this cutoff should receive extra scrutiny, especially if the period ratio is very large.

DV One-Page Summary

KIC: 9640976 Candidate: 2 of 2 Period: 2.178 d
KOI: K00712 Corr: No Ephemeris Match



DV Fit Results:

Period = 2.17812 [0.00002] d
Epoch = 133.1211 [0.0038] BKJD
Rp/R* = 0.0067 [0.0031]
a/R* = 2.99 [5.85]
b = 0.90 [0.48]
Seff = 639.26 [207.31]
Teq = 1282 [104] K
Rp = 0.61 [0.32] Re
a = 0.0321 [0.0067] AU
Ag = 14.28 [16.49] [0.81σ]
Teffp = 3854 [1078] K [2.37σ]

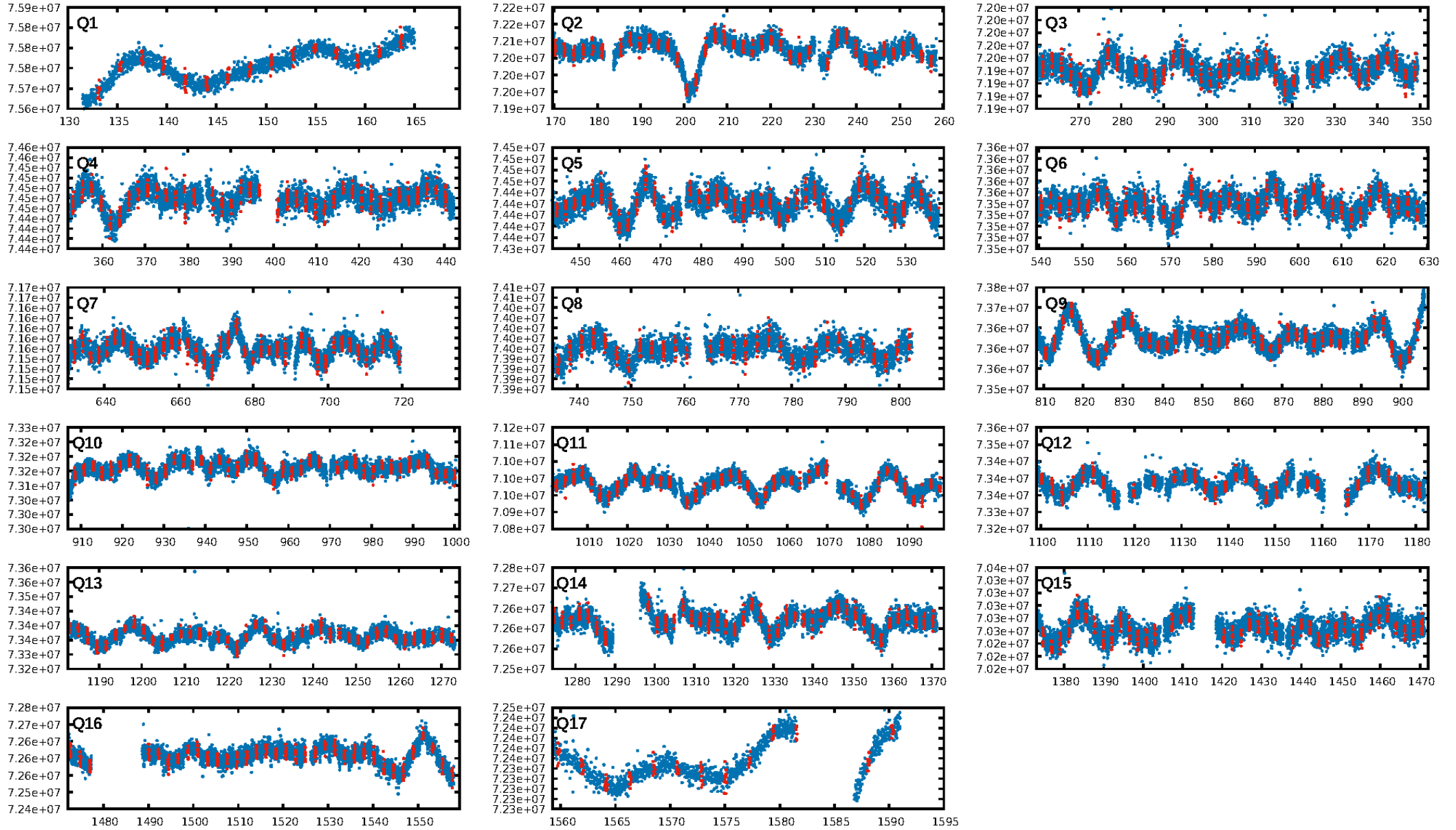
DV Diagnostic Results:

ShortPeriod-sig: 0.0% [0.00σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 6.02e-22
RollingBand-fgt: 1.00 [583/583]
GhostDiagnostic-chr: 0.3204
Centroid-sig: 0.0%
Centroid-so: 8.435 arcsec [7.40σ]
OotOffset-rm: 5.413 arcsec [5.77σ]
KicOffset-rm: 5.203 arcsec [5.58σ]
OotOffset-st: 4/3/4/4 [15]
KicOffset-st: 4/3/4/4 [15]
DiffImageQuality-fgm: 0.07 [1/15]
DiffImageOverlap-fno: 1.00 [17/17]

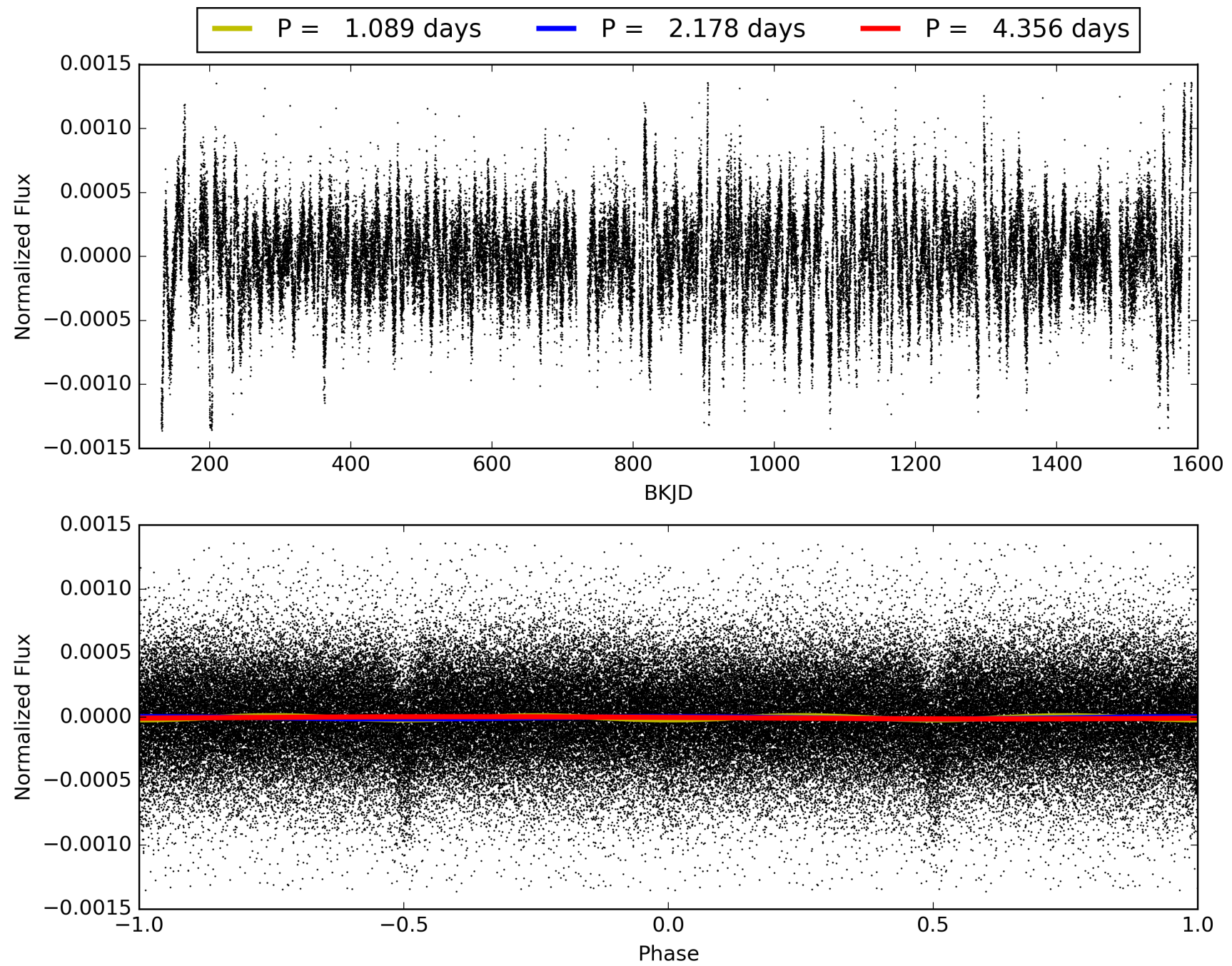
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 08:27:23 Z

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

TCE 009640976-02, PDC Light Curves

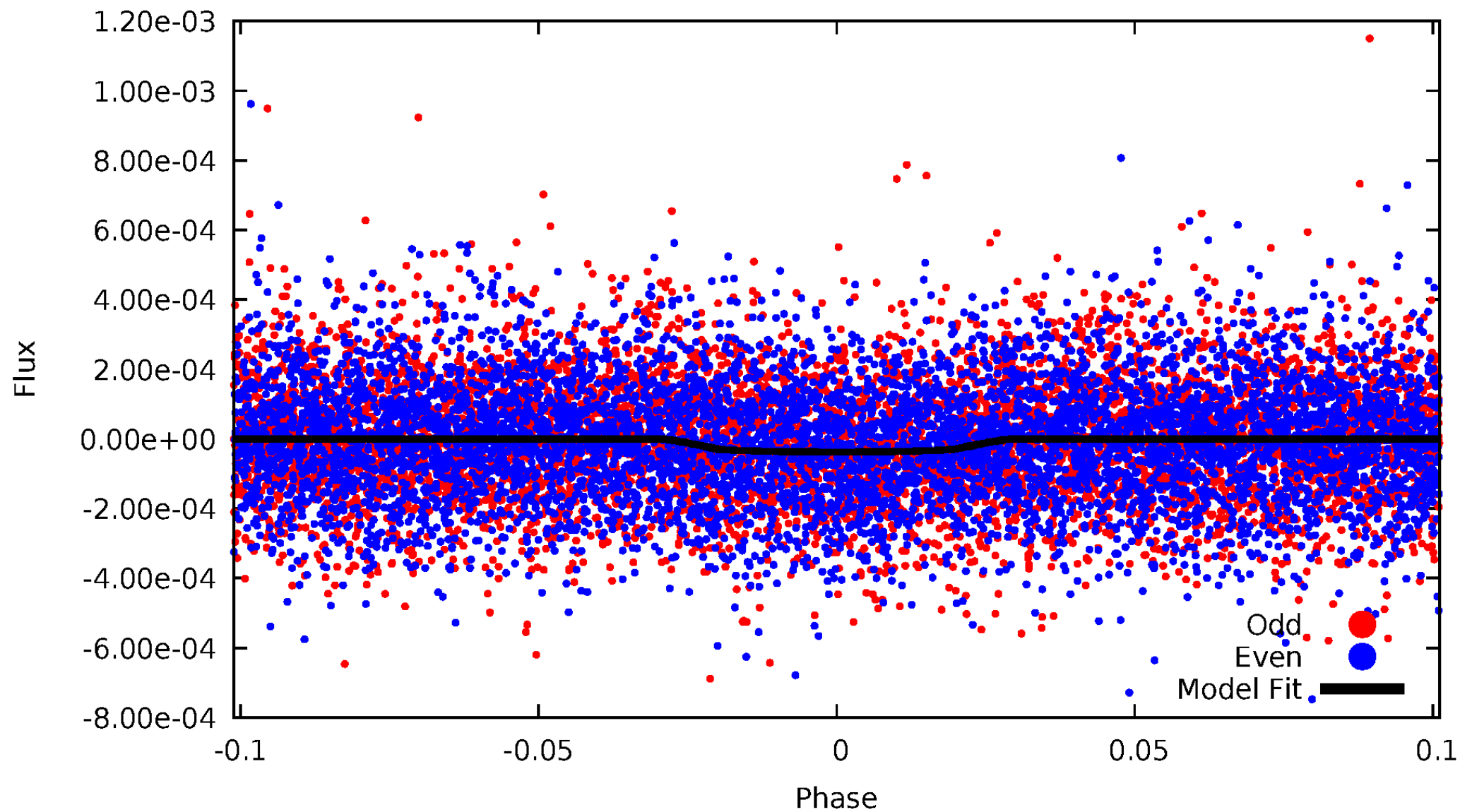


TCE 009640976-02



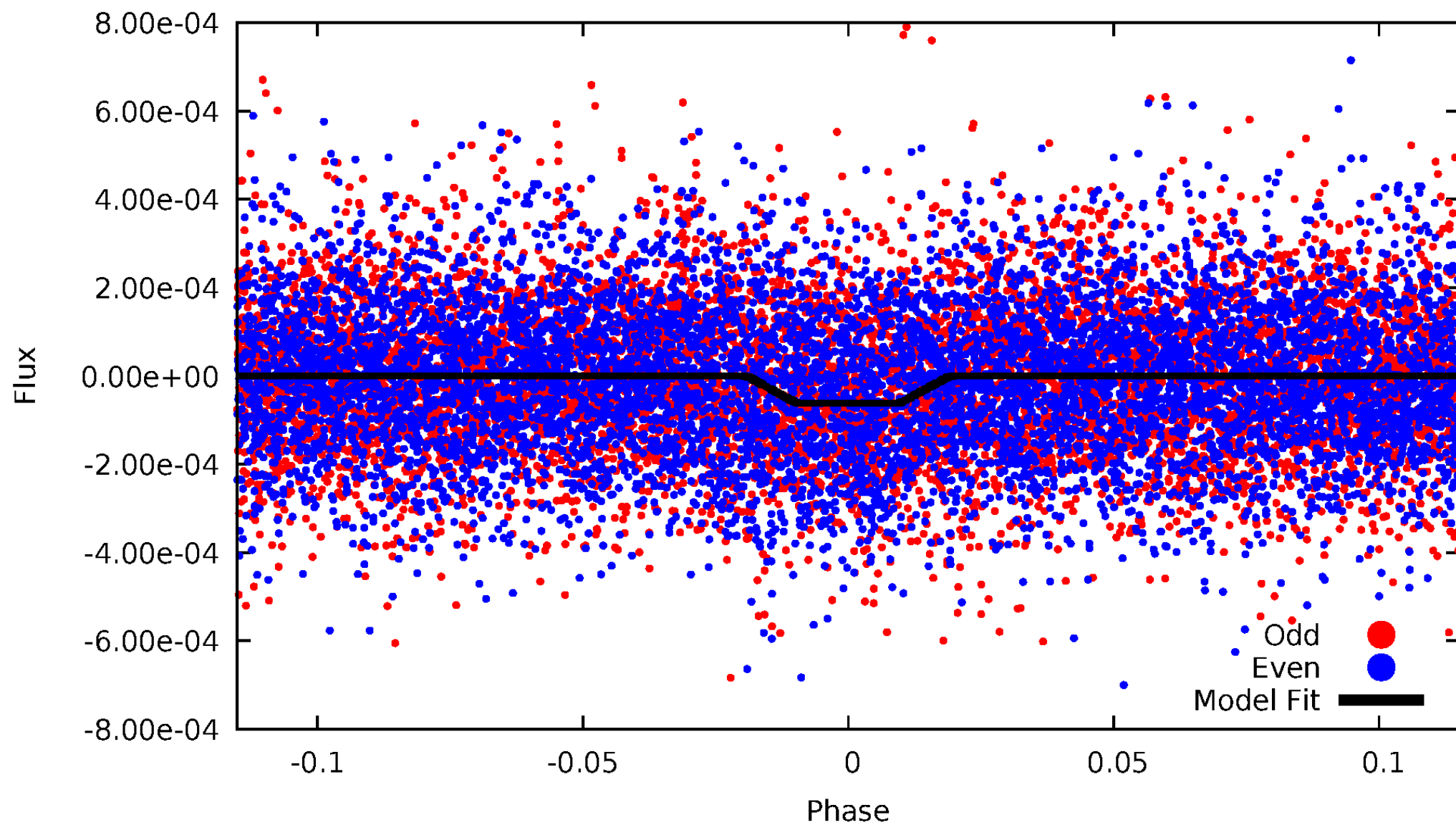
DV Odd/Even

TCE 009640976-02



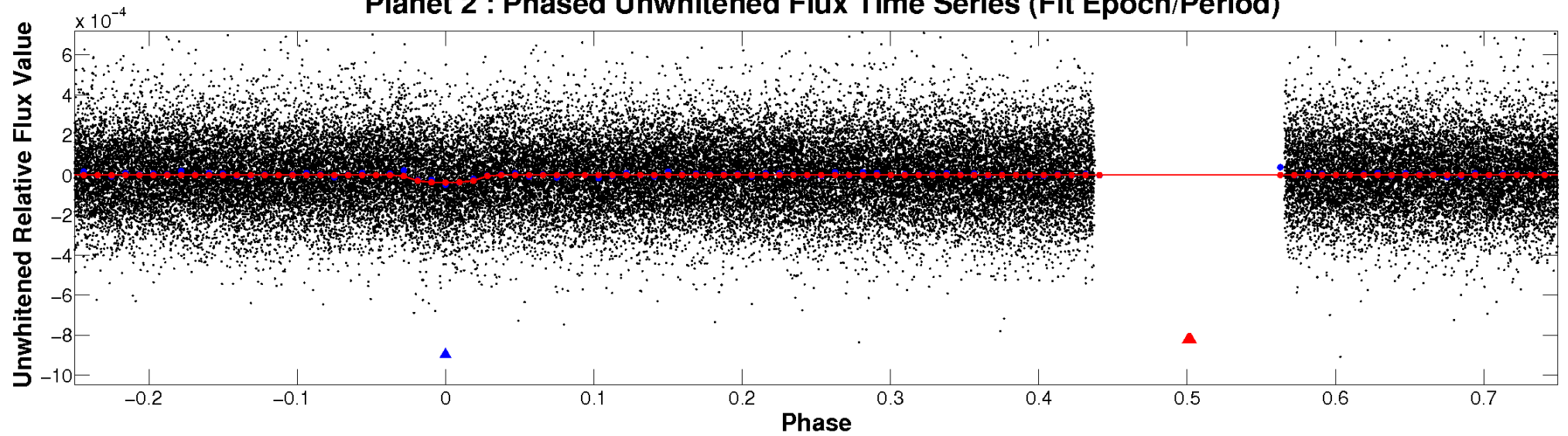
ALT Odd/Even

TCE 009640976-02

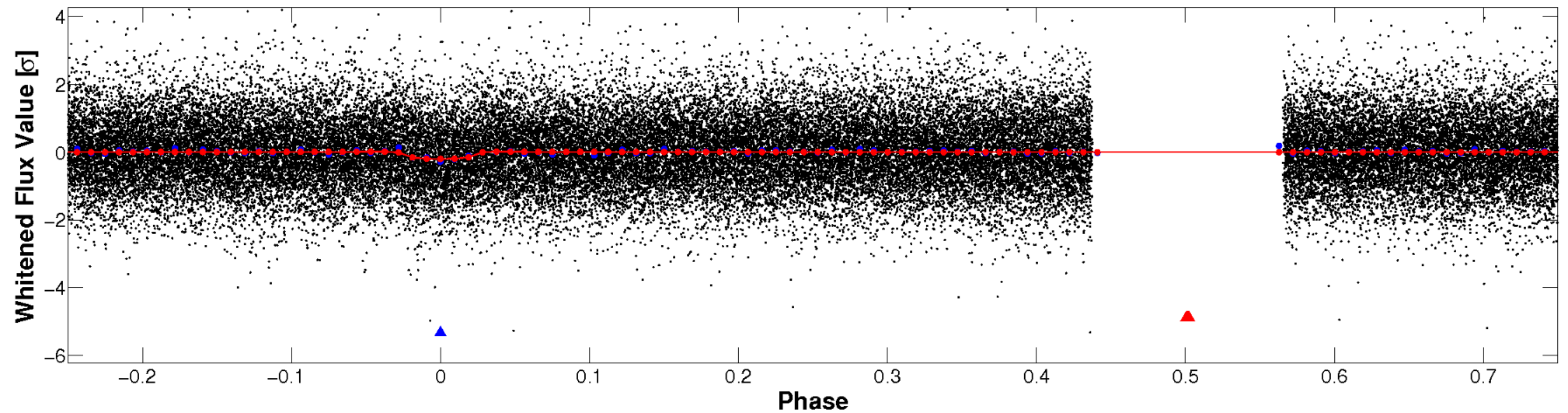


Non-Whitened Vs. Whitened Light Curve

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

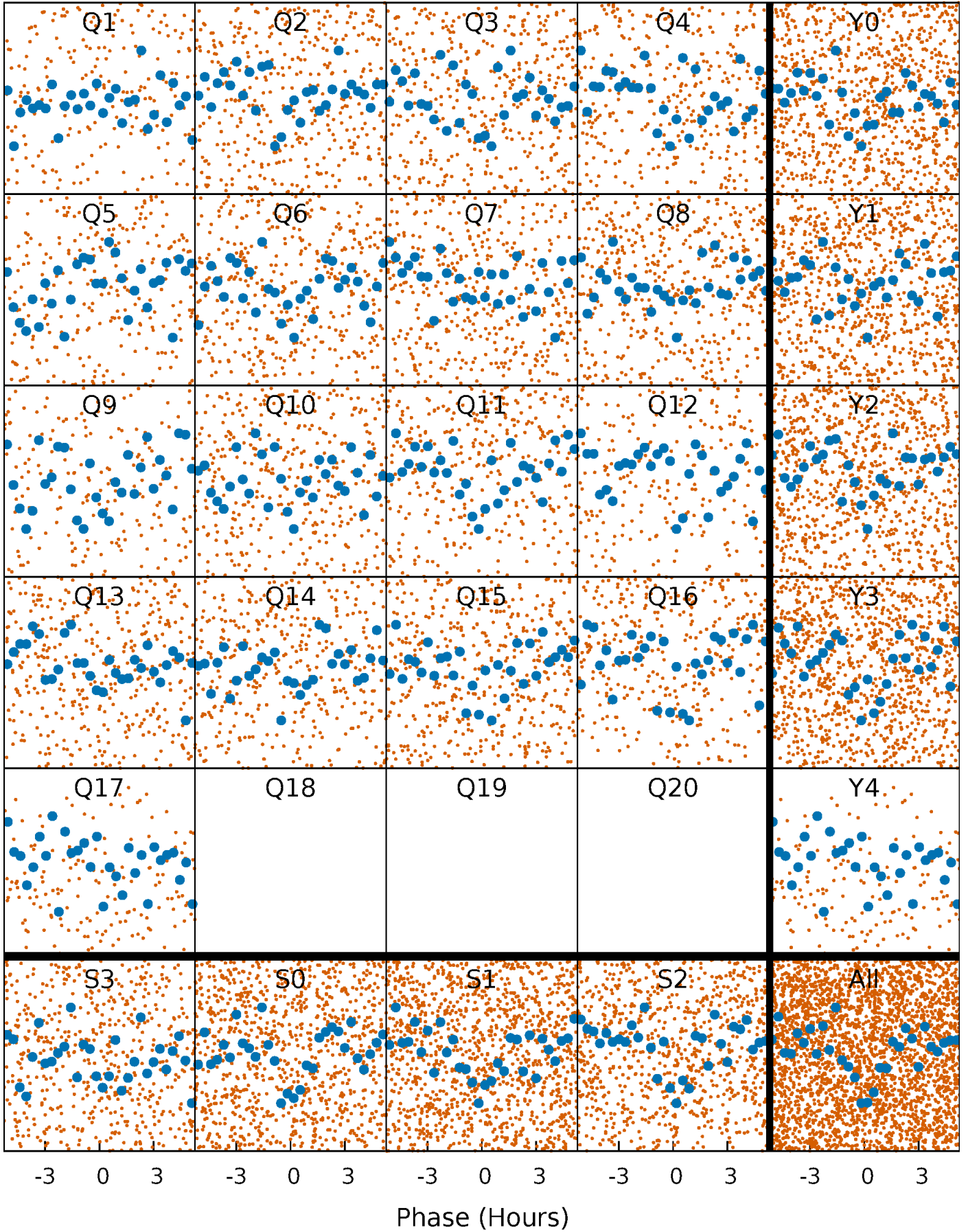


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



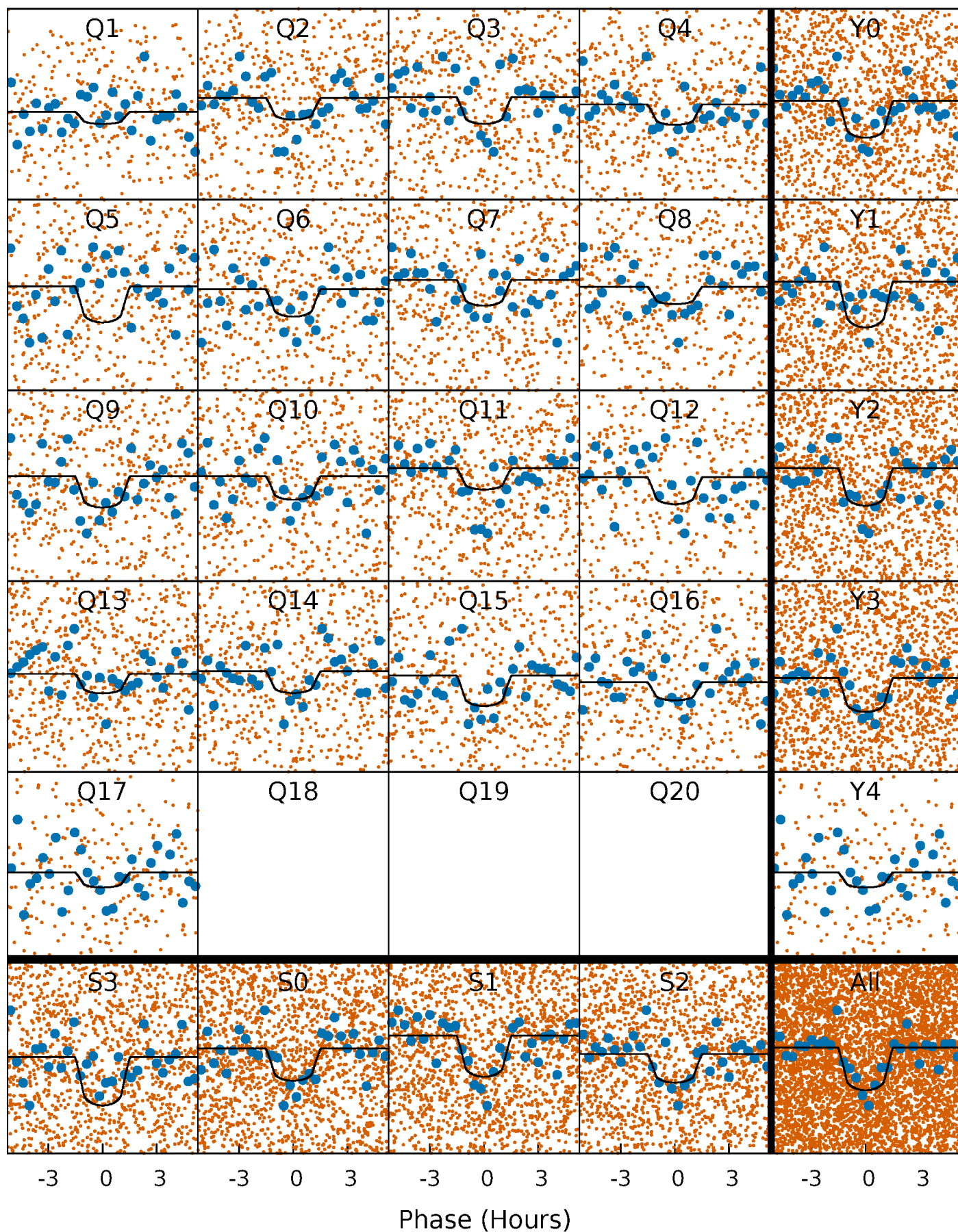
PDC Quarter-Phased Transit Curves

TCE 009640976-02 P= 2.178124 Days $T_0=133.121054$ (BKJD)



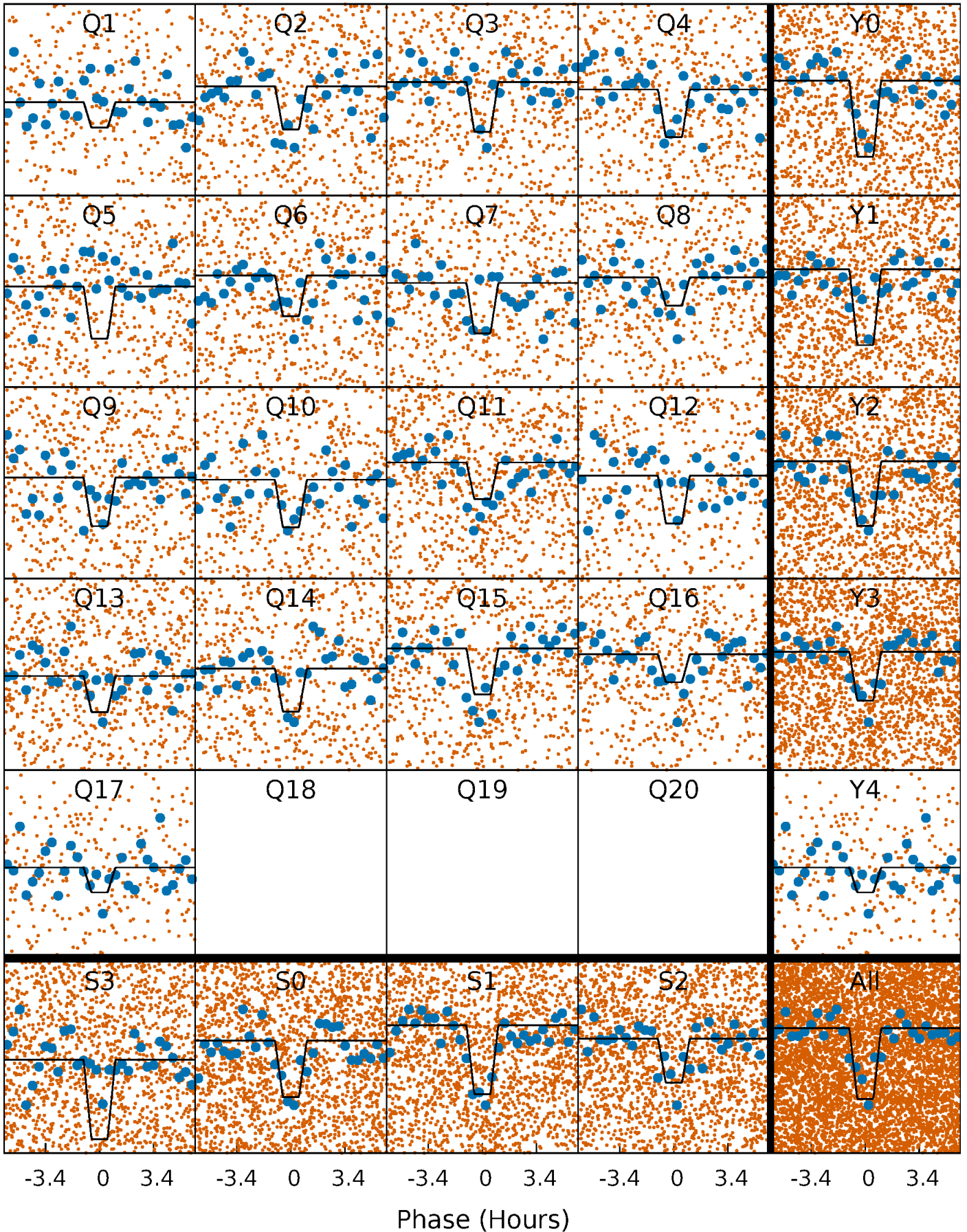
DV Quarter-Phased Transit Curves

TCE 009640976-02 $P = 2.178124$ Days $T_0 = 133.121054$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

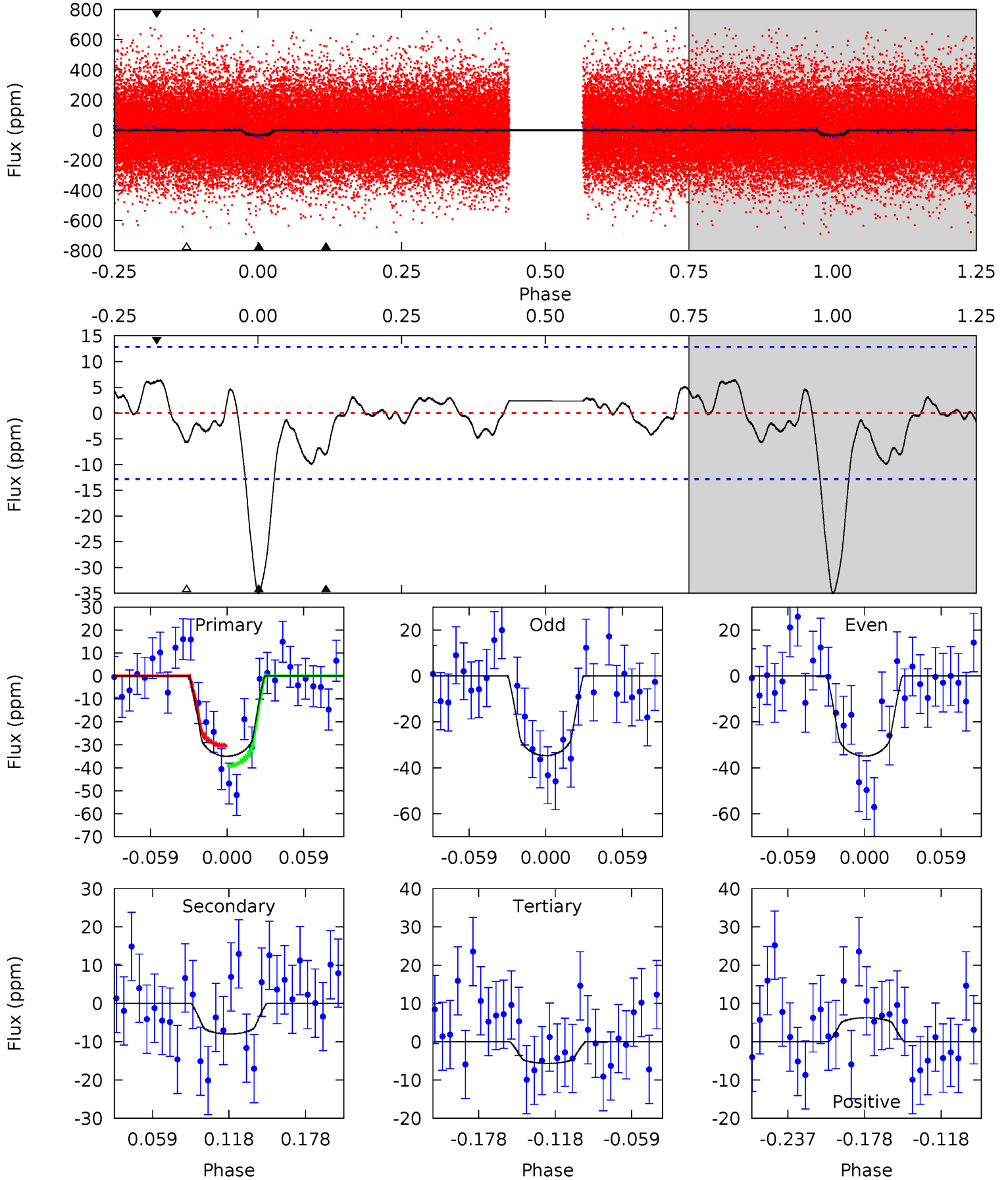
TCE 009640976-02 P= 2.178139 Days $T_0=133.118639$ (BKJD)



DV Model-Shift Uniqueness Test

009640976-02, P = 2.178124 Days, E = 130.942930 Days

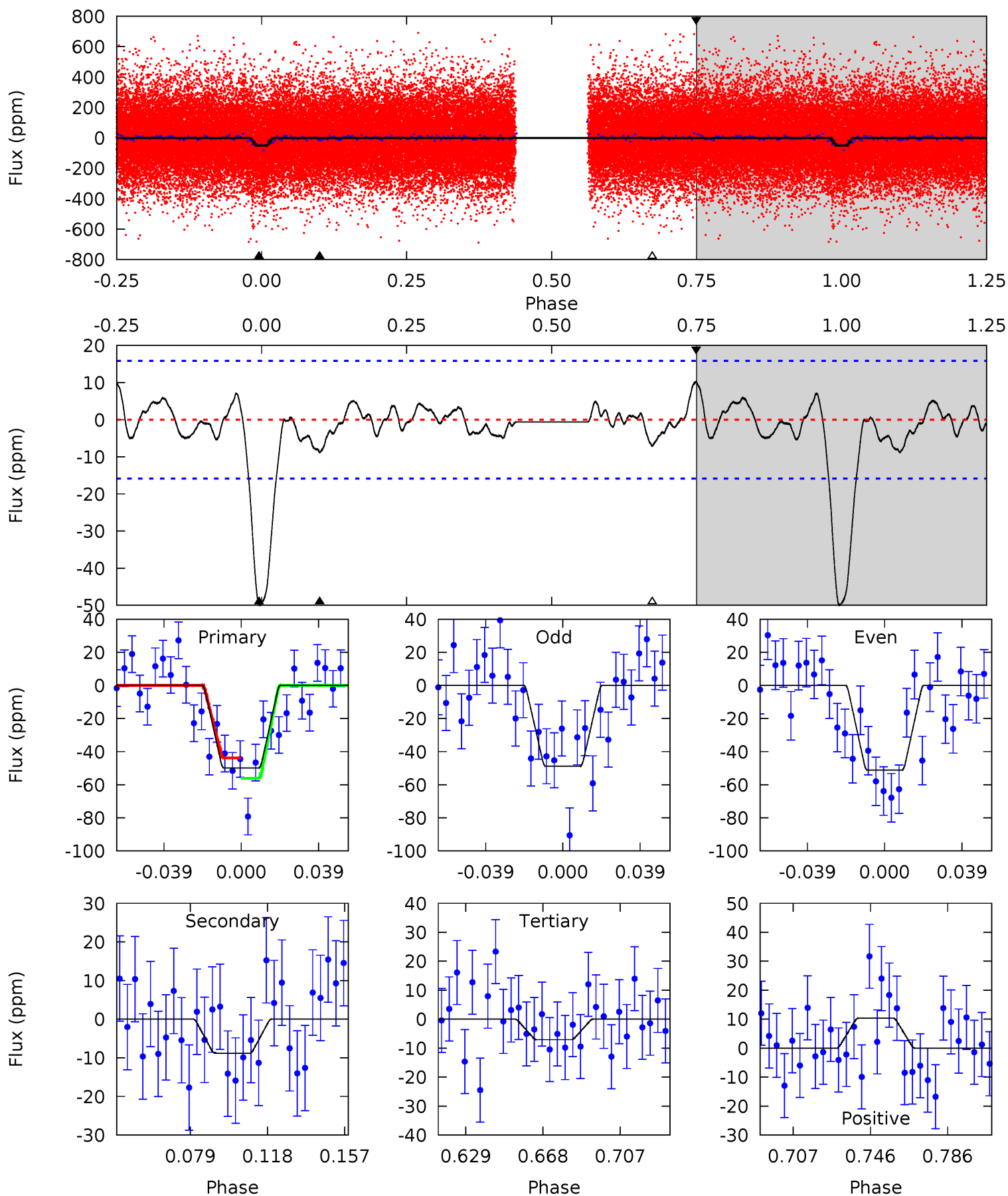
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
12.8	2.91	2.07	2.29	4.67	1.89	1.01	10.7	10.5	0.85	0.63	0.04	0.93	0.15	1.57



Alt Model-Shift Uniqueness Test

009640976-02, P = 2.178139 Days, E = 130.940500 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
15.0	2.64	2.11	3.10	4.76	2.06	0.99	12.9	11.9	0.53	-0.46	0.36	0.89	0.17	1.85



Stellar Parameters For KIC 009640976

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	M (M_{\odot})	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	5691^{+135}_{-152}	$4.560^{+0.042}_{-0.168}$	$-0.160^{+0.300}_{-0.300}$	$0.836^{+0.207}_{-0.069}$	$0.928^{+0.094}_{-0.104}$	$2.238^{+0.381}_{-0.999}$
	+2%/-3%	+1%/-4%	+188%/-188%	+25%/-8%	+10%/-11%	+17%/-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 009640976-02 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-8 ± 3	$0.62^{+0.30}_{-0.27}$	1822^{+103}_{-77}	4000^{+1044}_{-561}	11^{+26}_{-7}
Alt.	-9 ± 3	$0.74^{+0.32}_{-0.28}$	1820^{+96}_{-73}	3792^{+797}_{-488}	$8.268^{+14.682}_{-4.575}$

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

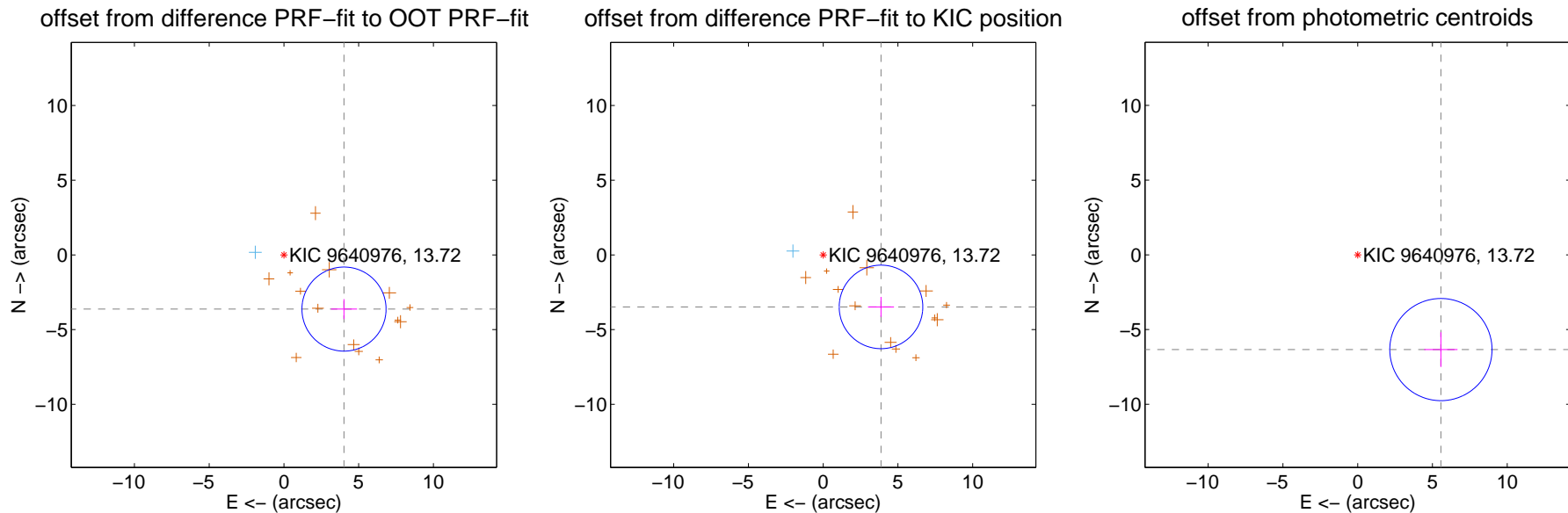
DV Centroid Data

Supplemental centroid analysis for 009640976-02. Kepler magnitude: 13.72. Transit SNR 9.66

There are 1 quarters with good PRF difference image offsets

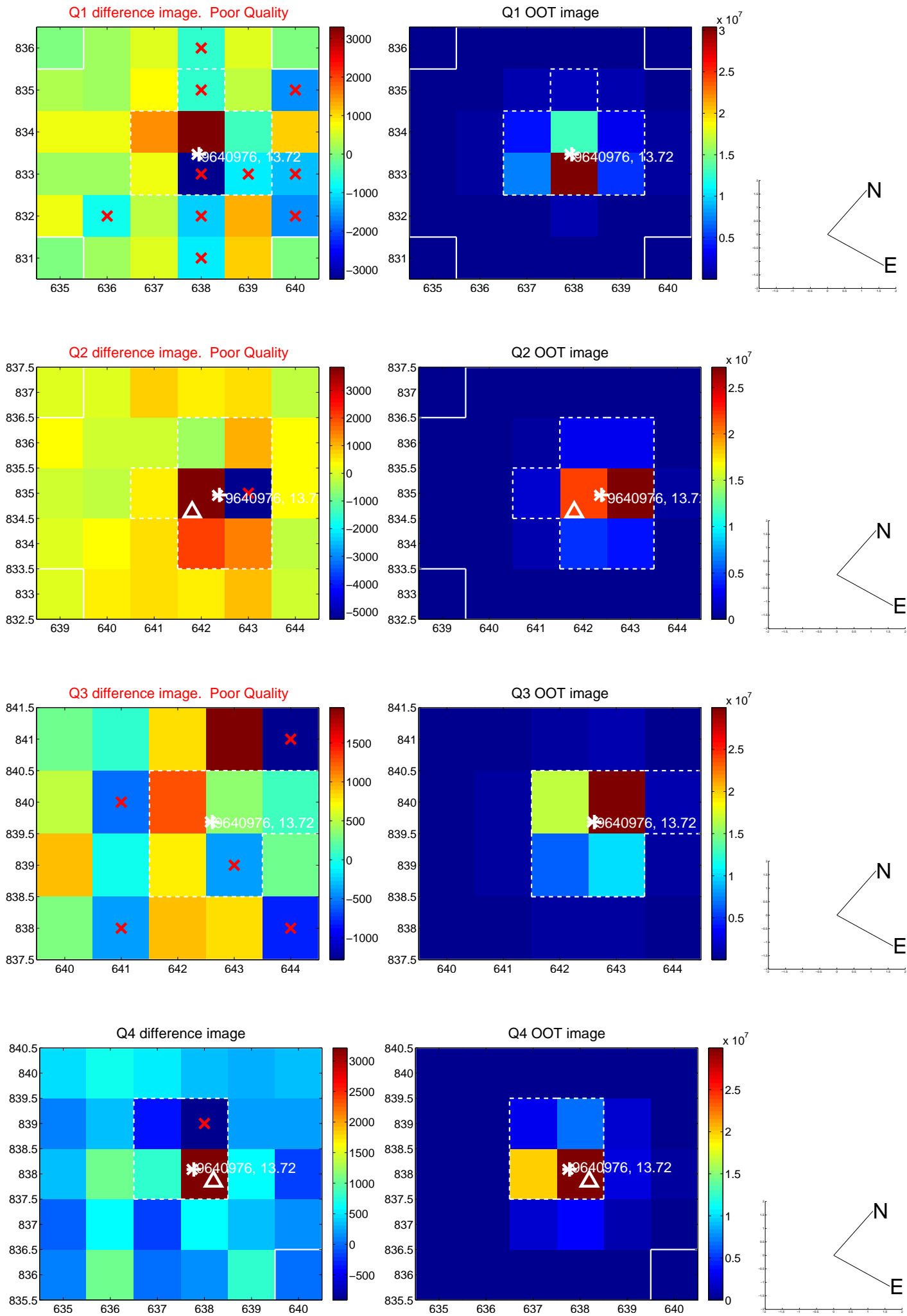
The direct PRF centroid is offset from the target star catalog position by about 0.21 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	5.413 ± 0.938	5.77	-4.018 ± 0.871	-3.626 ± 0.665
PRF-fit source offset from KIC position	5.203 ± 0.932	5.58	-3.867 ± 0.871	-3.481 ± 0.670
photometric centroid source offset	8.43 ± 1.14	7.40	-5.56 ± 1.11	-6.34 ± 1.16

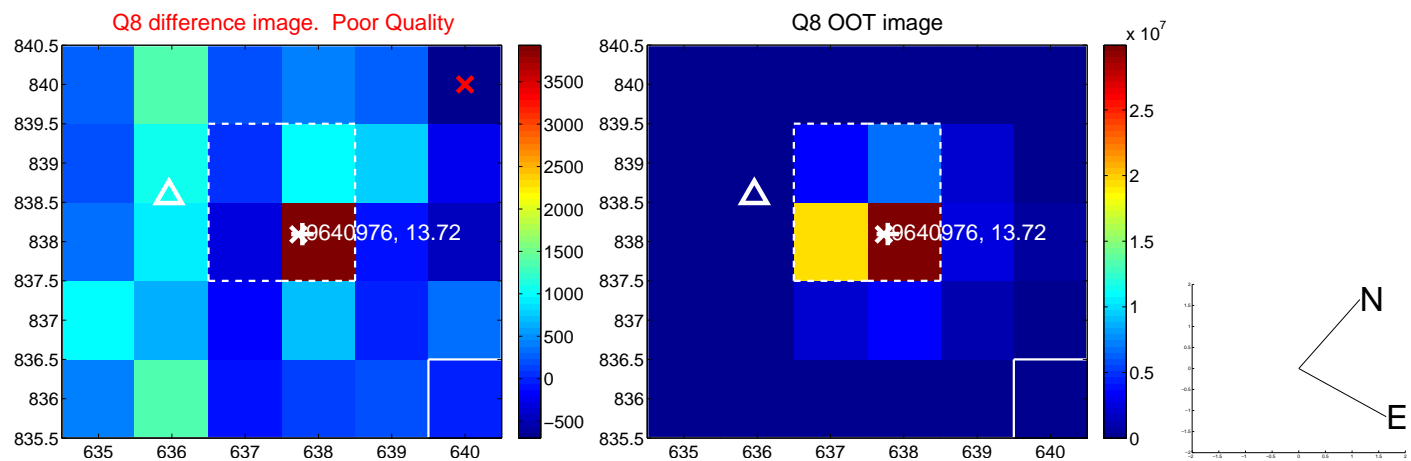
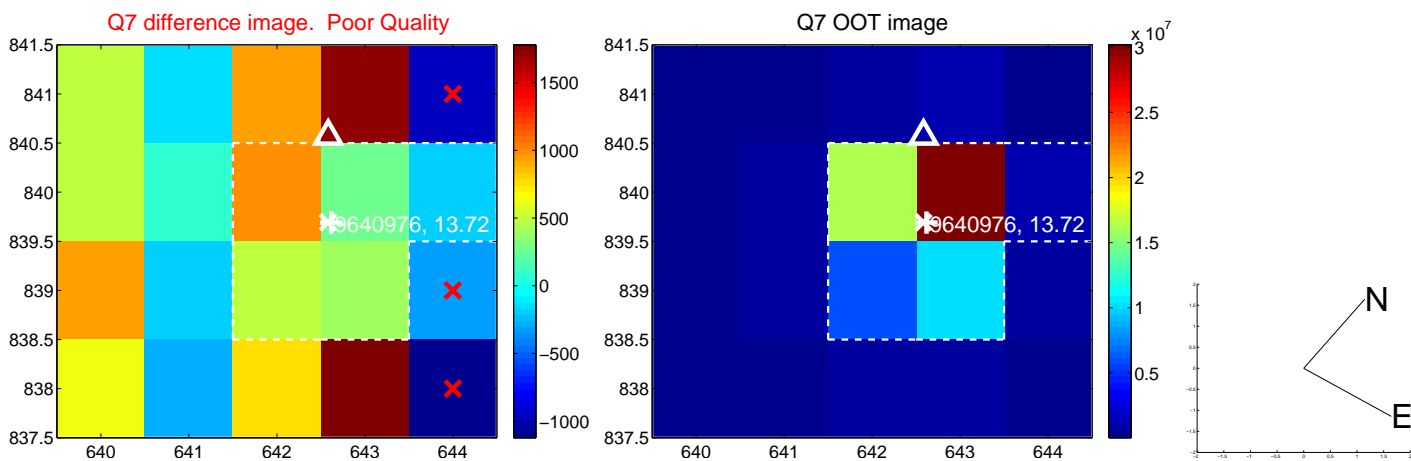
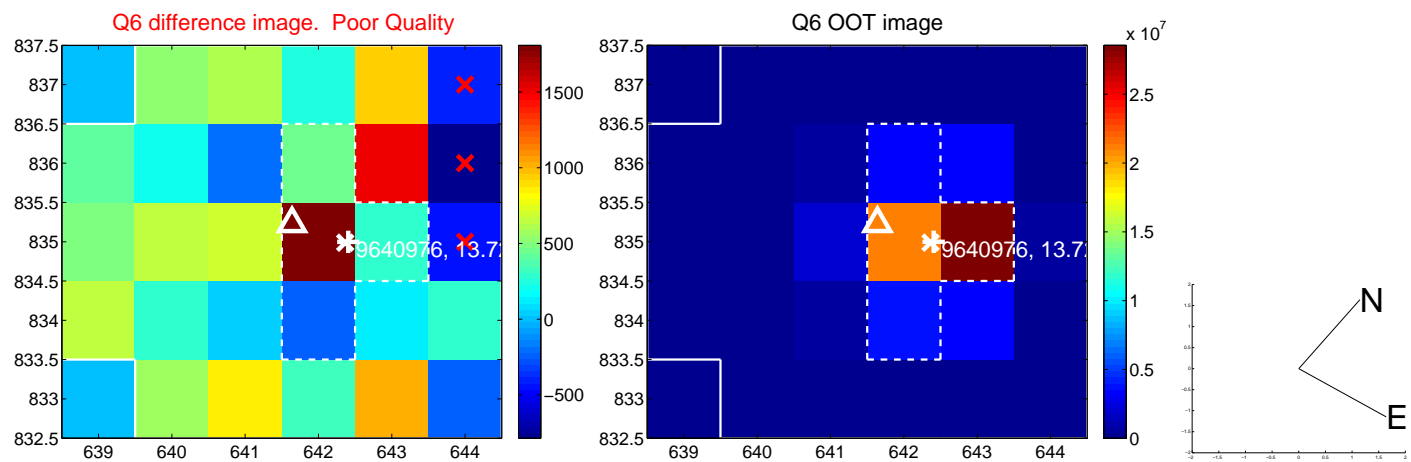
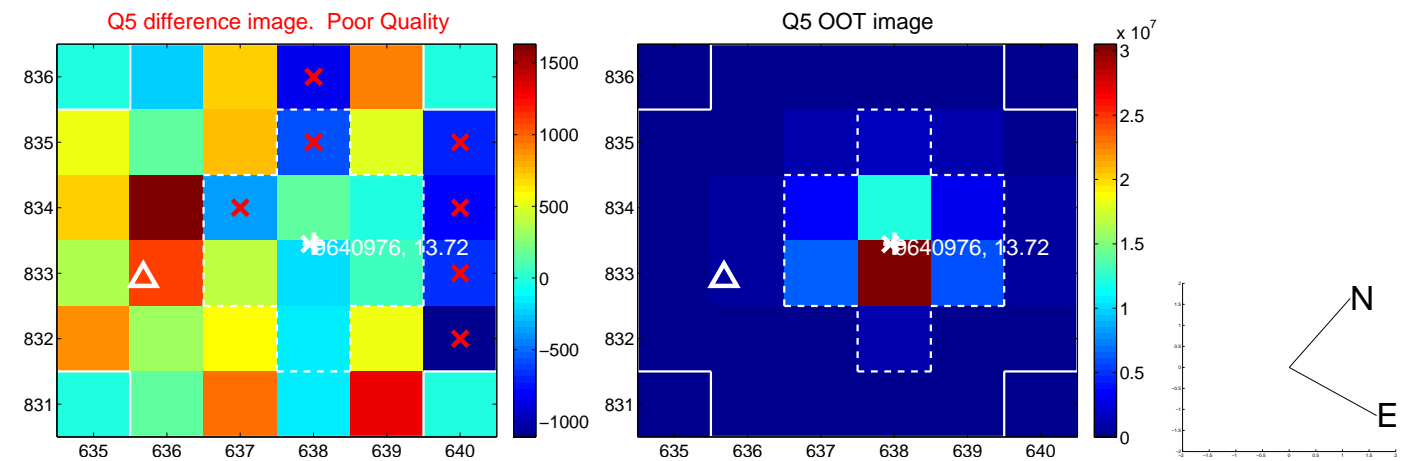


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

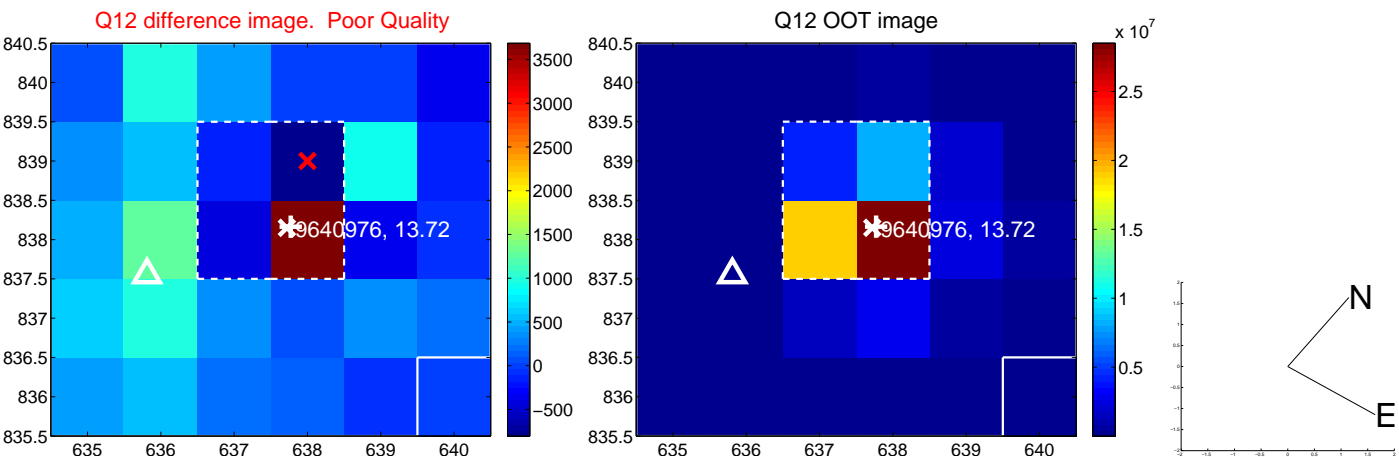
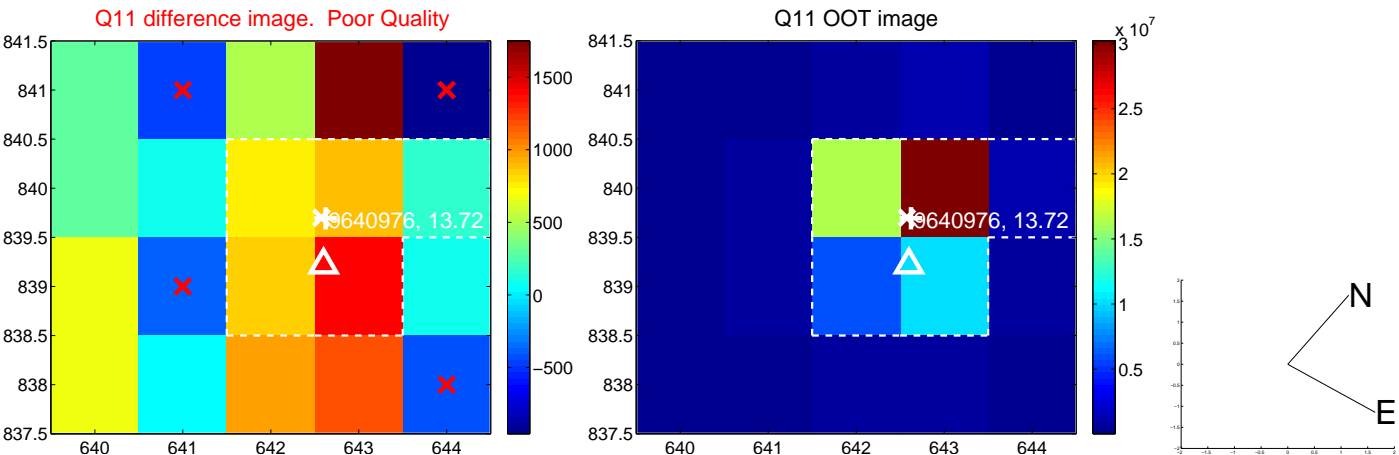
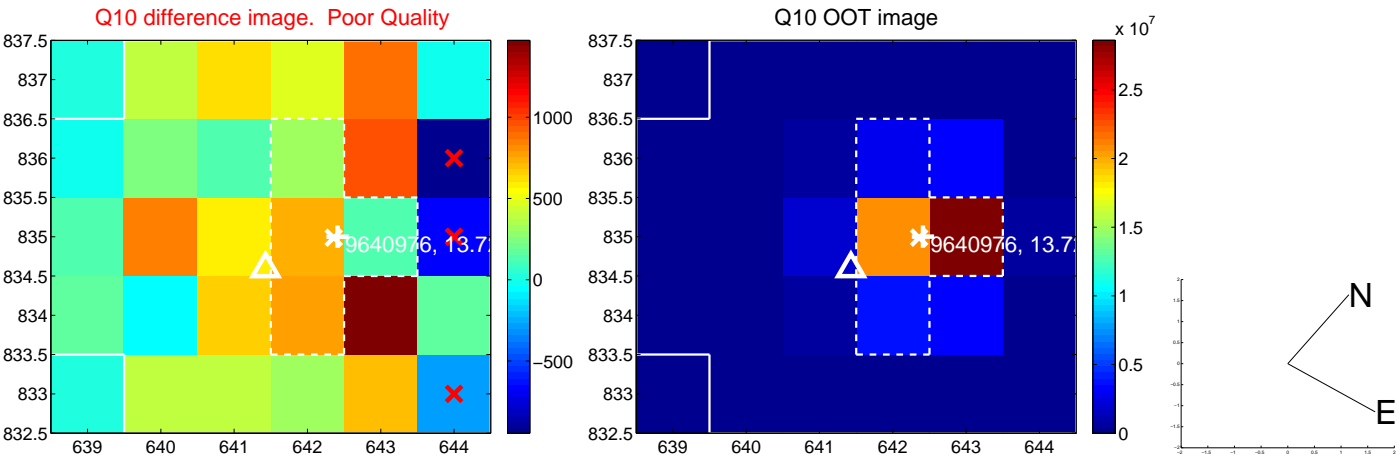
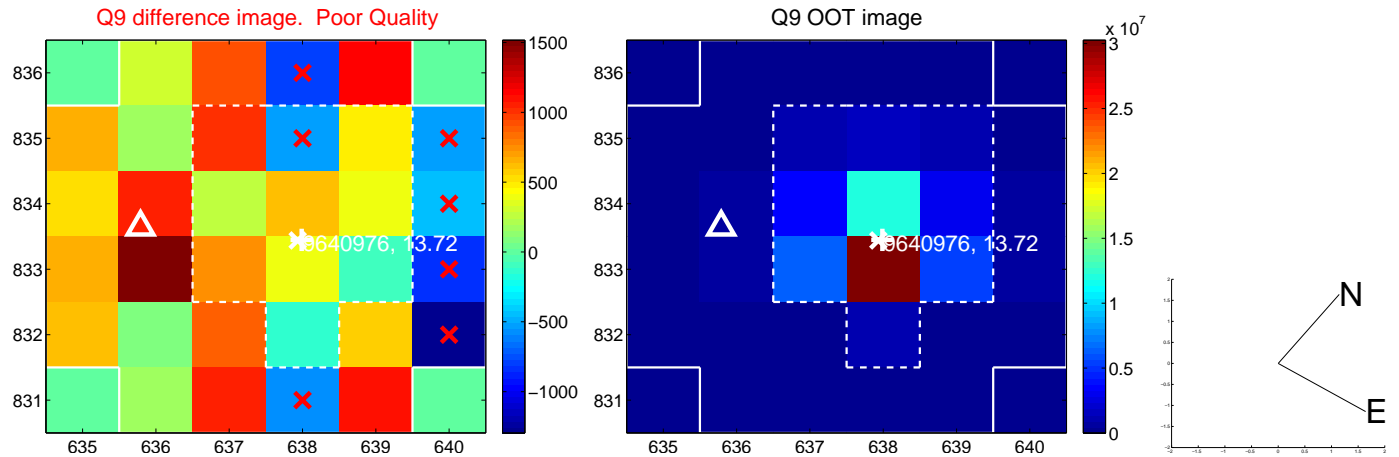
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



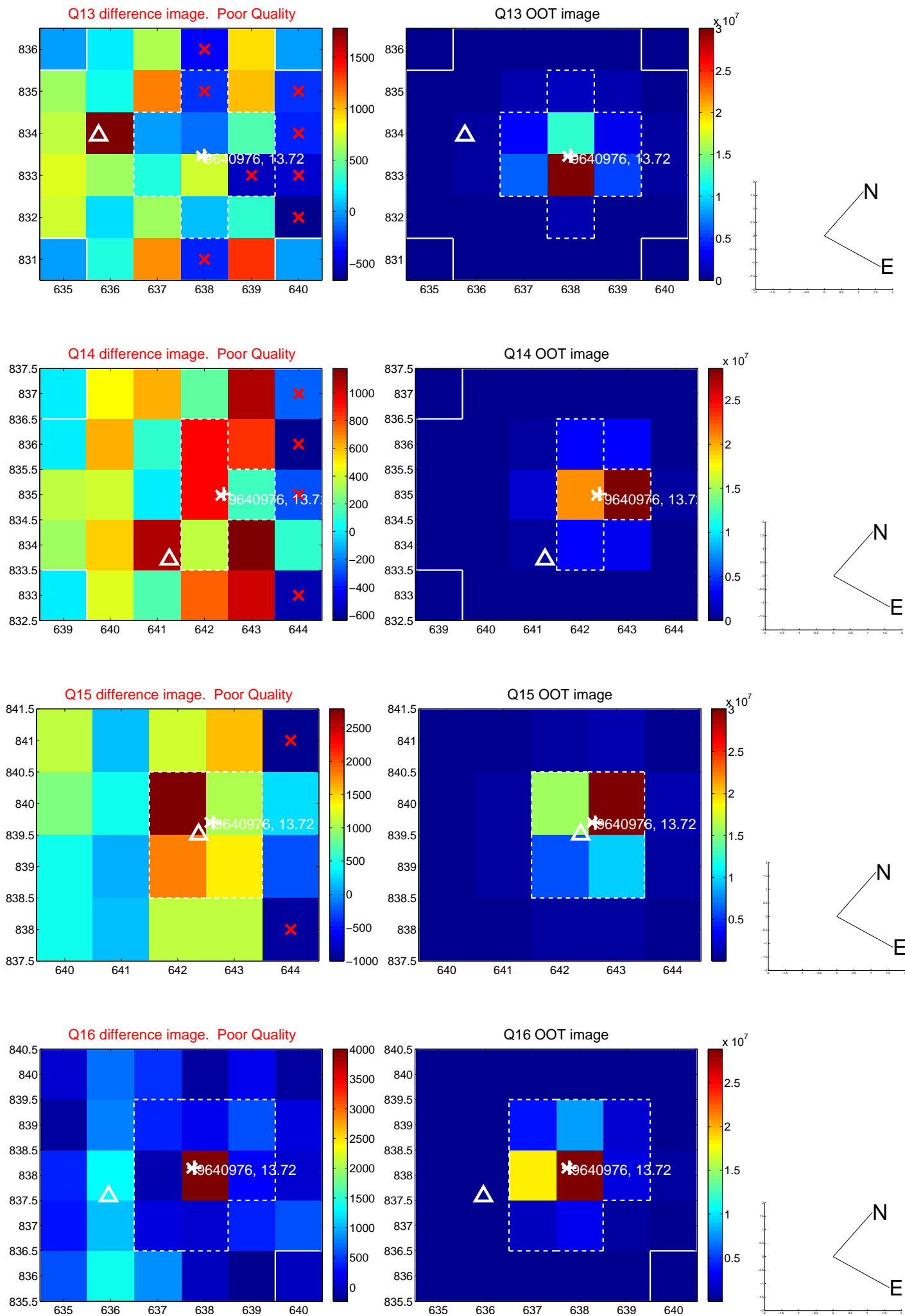
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



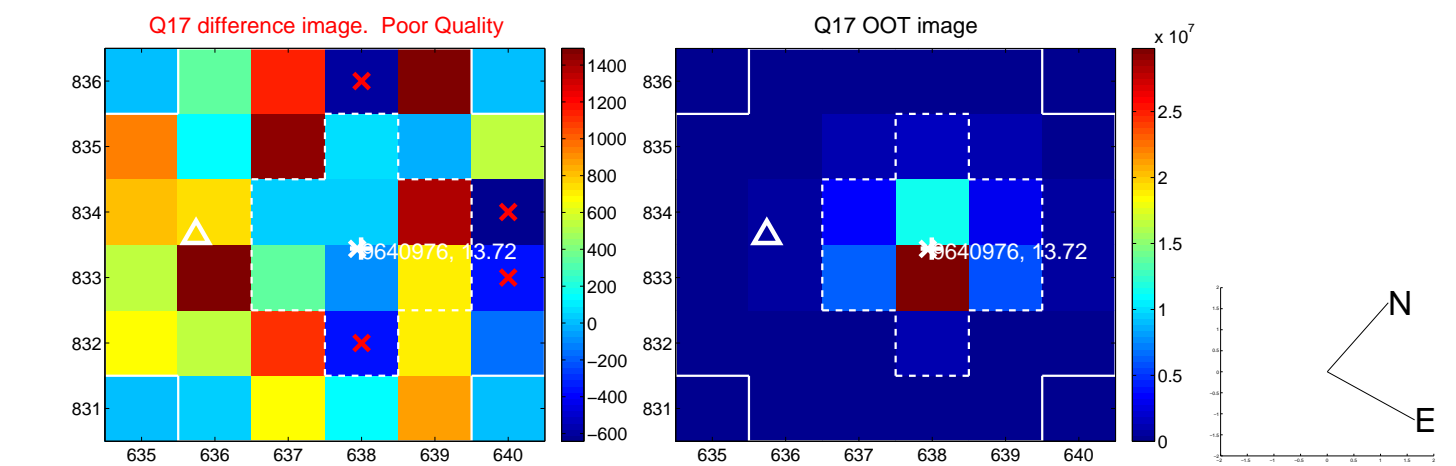
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



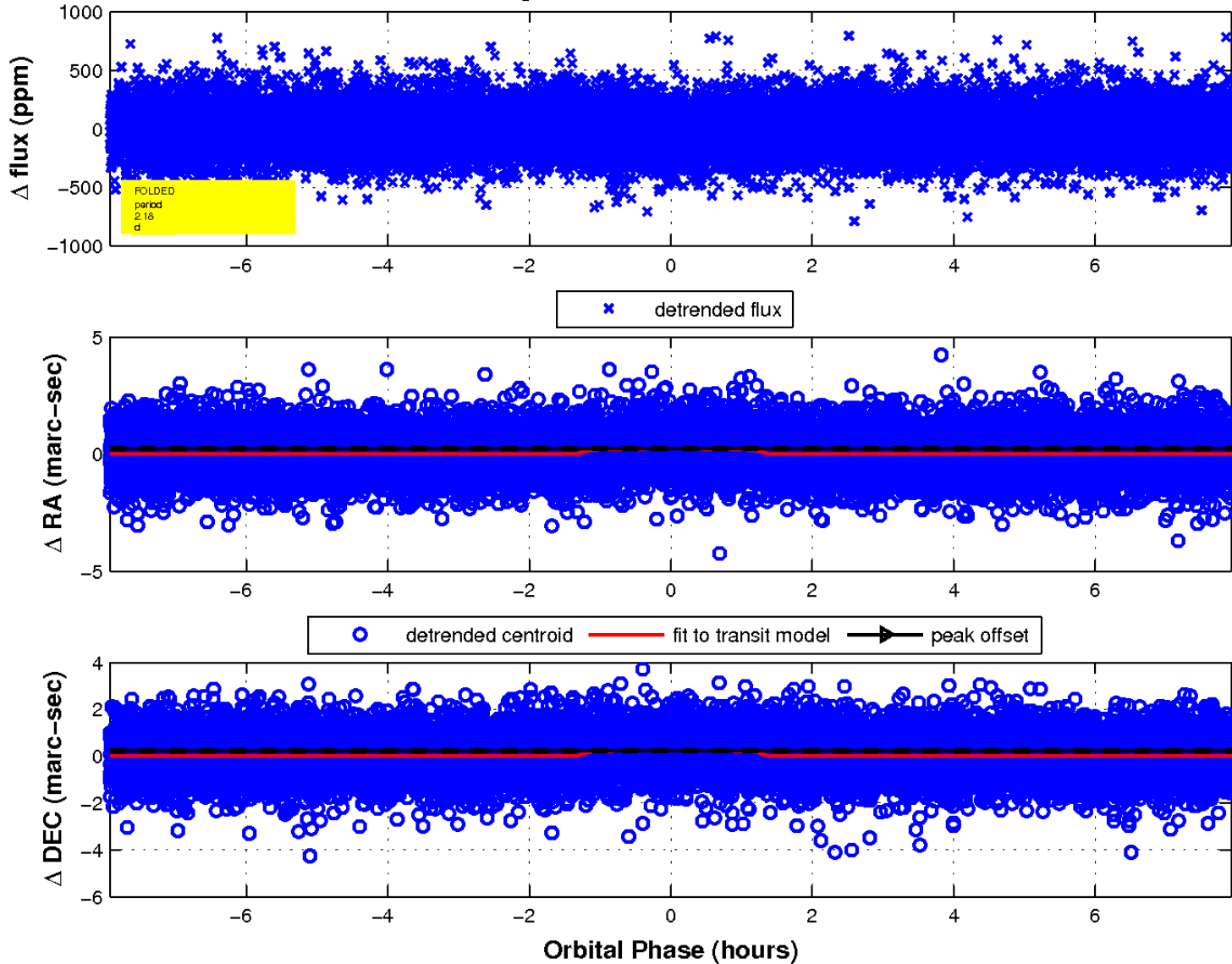
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



fluxWeightedCentroids, Planet 2 of 2



UKIRT Image

Declination

