

KIC 002449074

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})
002449074-01	OBS	0378.01	4.944084	134.194034	298.8	3.175	27.5	28.7	1.70	6013	3.48	959.64
002449074-02	OBS	No	4.944059	131.709343	106.8	2.846	9.7	10.6	1.70	6013	2.01	959.65

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
002449074-01	OBS	FP	0.00	0	1	1	1	MOD_SEC_DV—MOD_SEC_ALT—HAS_SEC_TCE—CENT_RESOLVED_OFFSET—EPHEM_MATCH
002449074-02	OBS	FP	0.00	1	1	1	1	IS_SEC_TCE—CENT_RESOLVED_OFFSET—HALO_GHOST—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 002449074-01

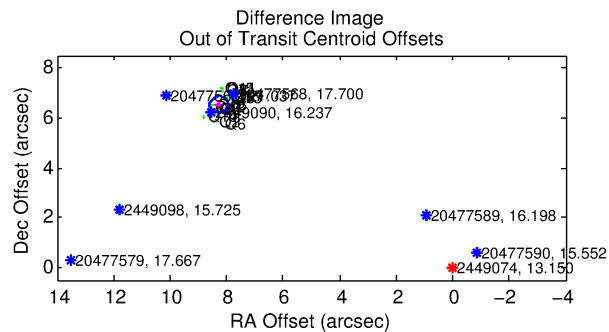
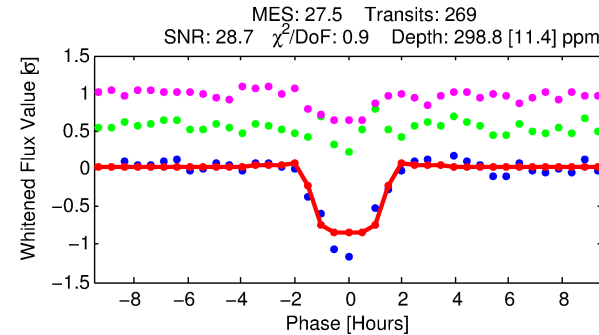
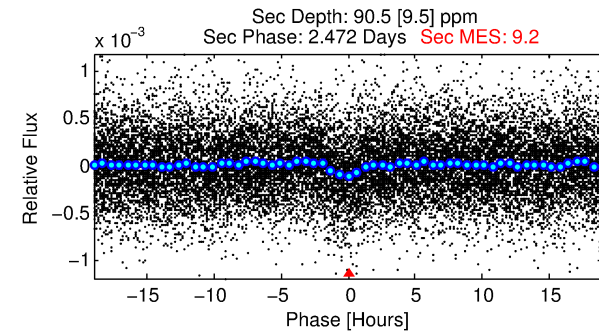
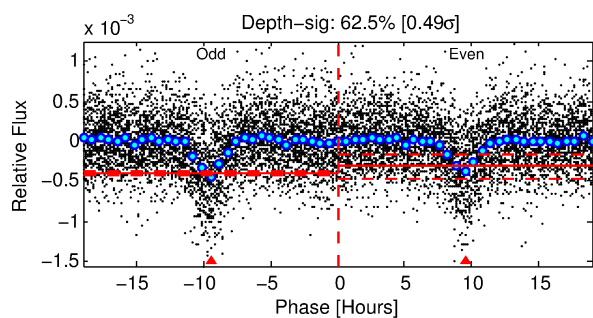
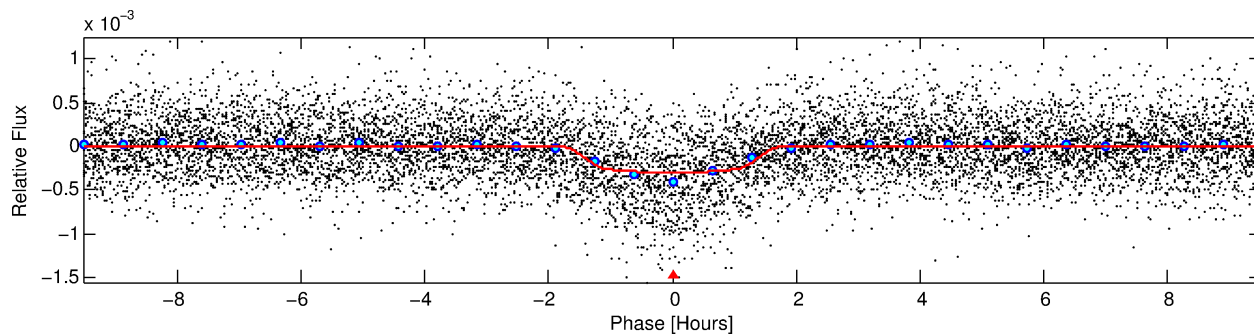
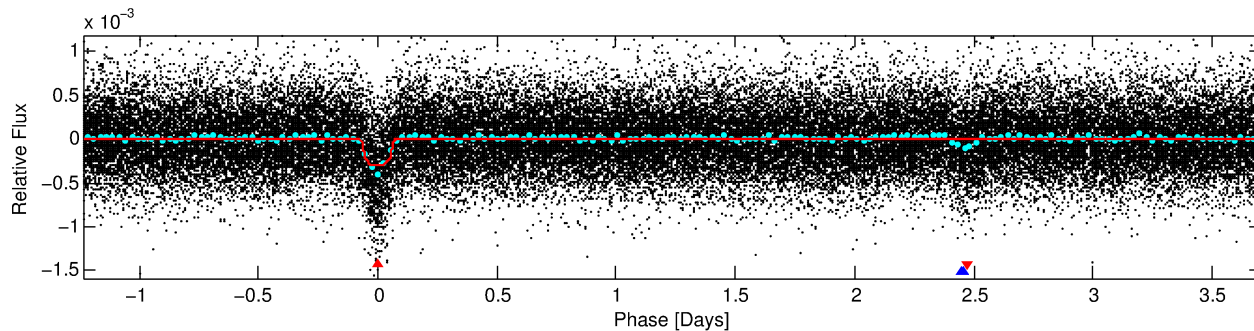
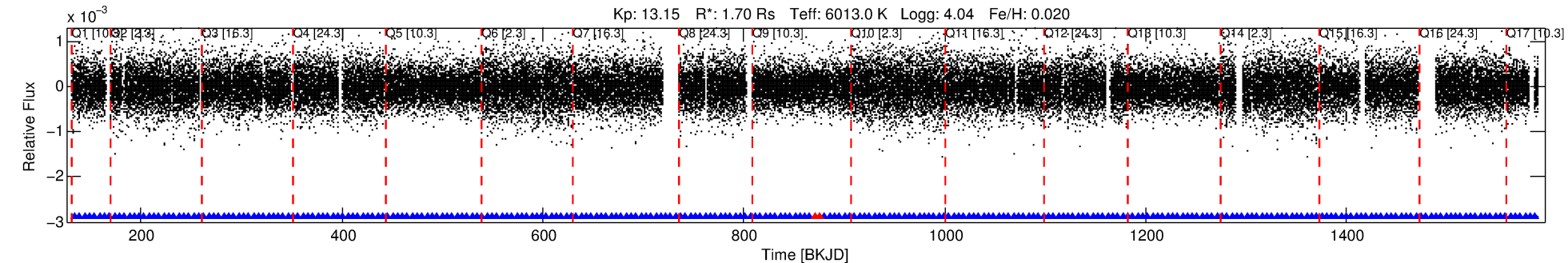
TCE (1)	KIC	Parent (2)	Parent KIC	$P_1:P_2$	Dist ($''$)	Δ Row	Δ Col	m_2	m_1	D_2/D_1	Mechanism	Flag	σ_P	σ_T
002449074-01	2449074	002449090-pri	2449090	1:1	10.6	-1	3	16.24	13.15	554.52	Direct-PRF	0	0.86	0.37

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: 2449074 Candidate: 1 of 2 Period: 4.944 d
KOI: K00378.01 Corr: 0.852

Kp: 13.15 R*: 1.70 Rs Teff: 6013.0 K Logg: 4.04 Fe/H: 0.020



DV Fit Results:

Period = 4.94408 [0.00001] d
Epoch = 134.1940 [0.0018] BKJD
Rp/R* = 0.0187 [0.0025]
a/R* = 5.71 [3.64]
b = 0.90 [0.14]
Seff = 959.65 [599.50]
Teq = 1419 [222] K
Rp = 3.48 [1.41] Re
a = 0.0594 [0.0223] AU
Ag = 14.52 [9.75] [1.39σ]
Teff = 4283 [339] K [7.0σ]

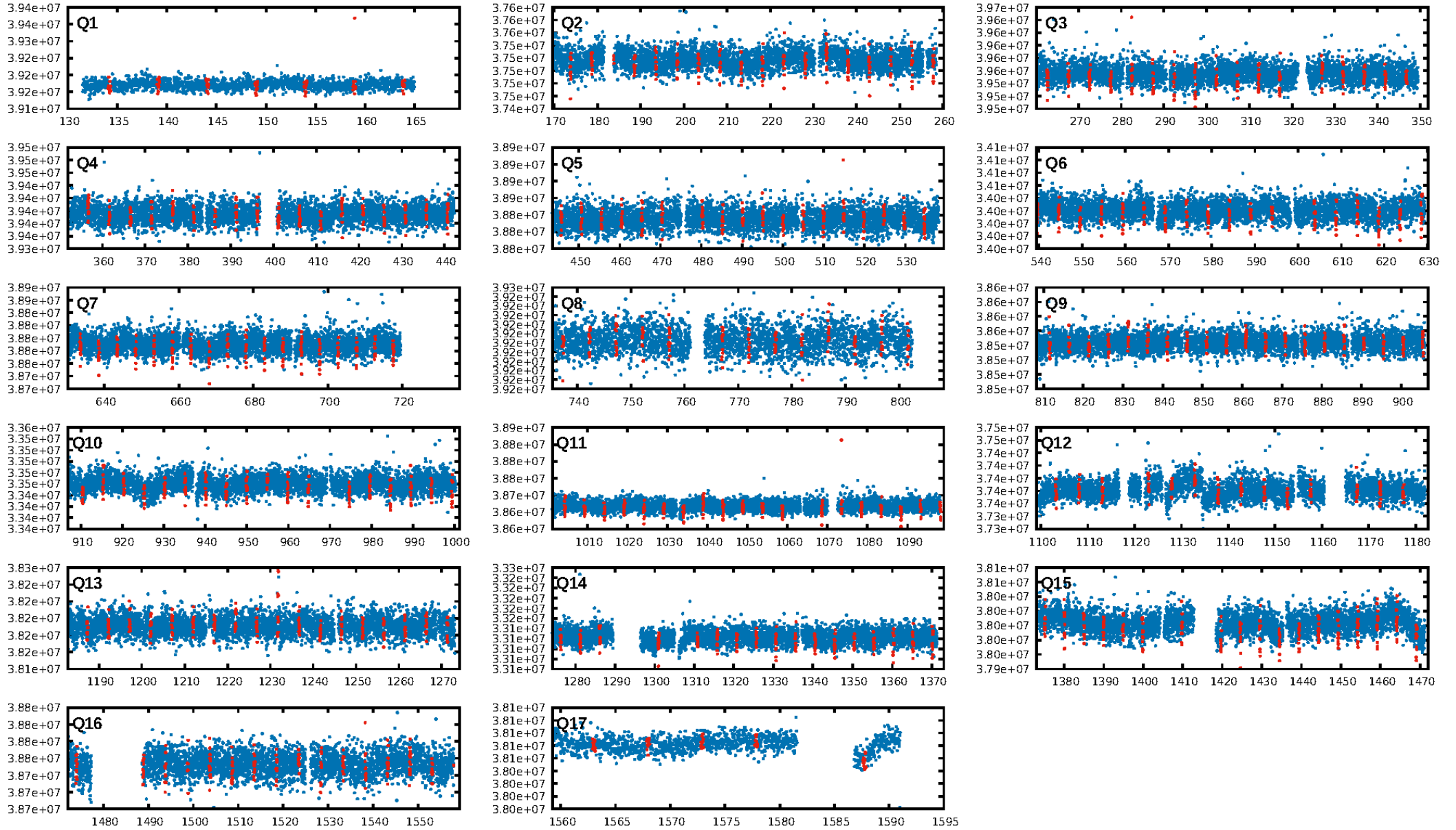
DV Diagnostic Results:

ShortPeriod-sig: 0.0% [0.00σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 8.55e-157
RollingBand-fgt: 0.99 [255/257]
GhostDiagnostic-chr: -0.2698
Centroid-sig: 0.0%
Centroid-so: 44.609 arcsec [104.07σ]
OotOffset-rm: 10.542 arcsec [93.71σ]
KicOffset-rm: 10.422 arcsec [128.09σ]
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]

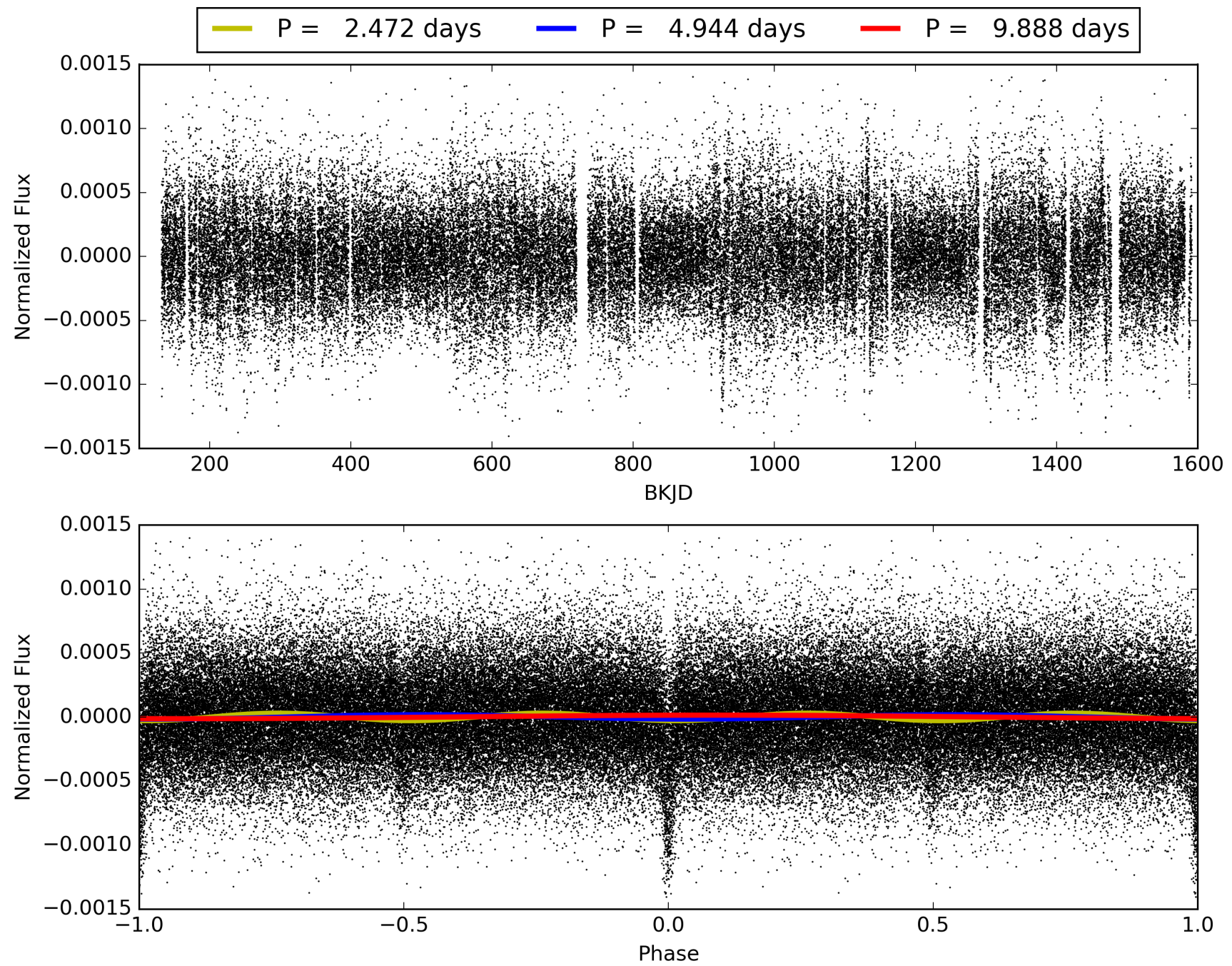
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 04:55:47 Z

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

TCE 002449074-01, PDC Light Curves

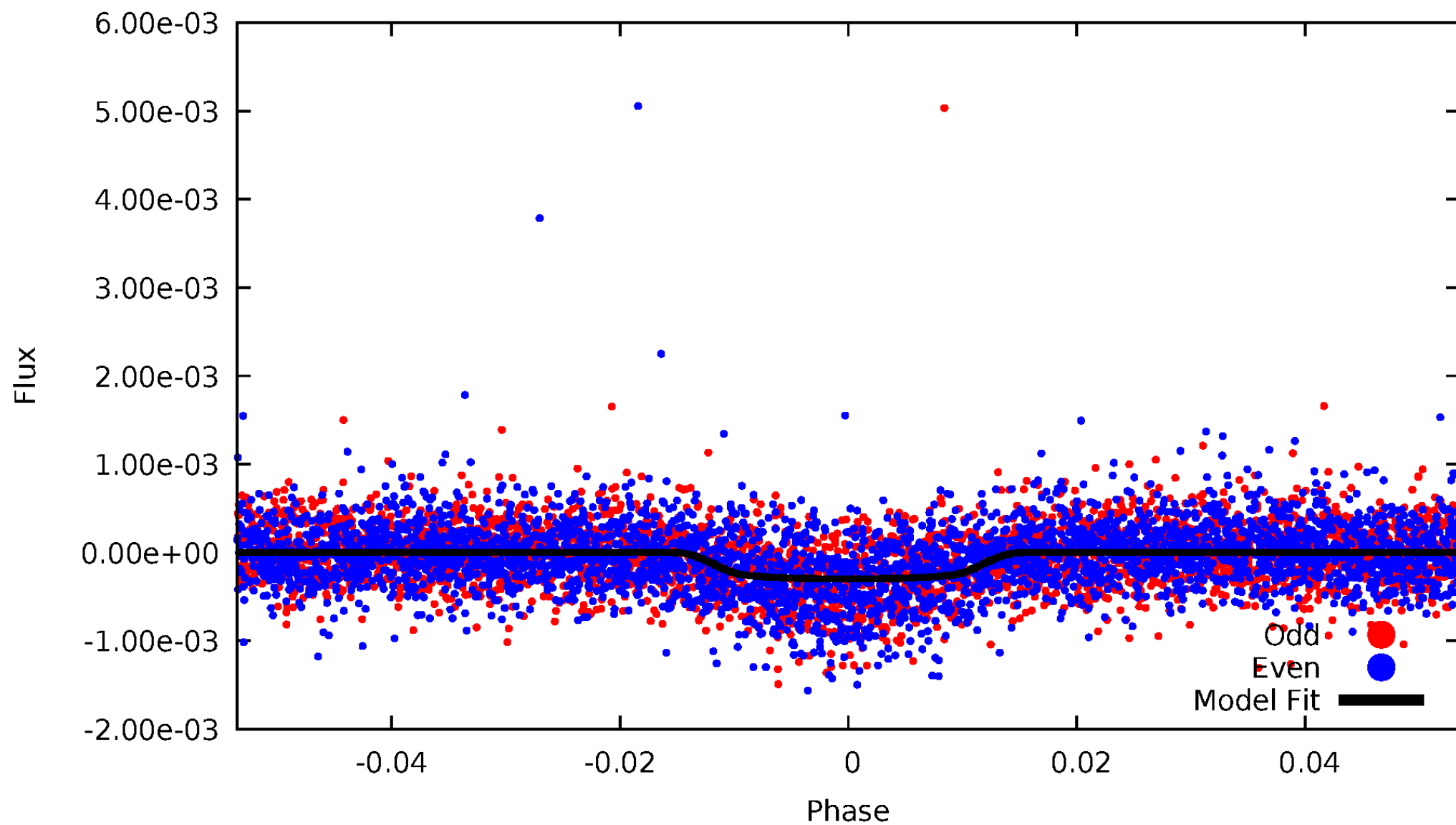


TCE 002449074-01



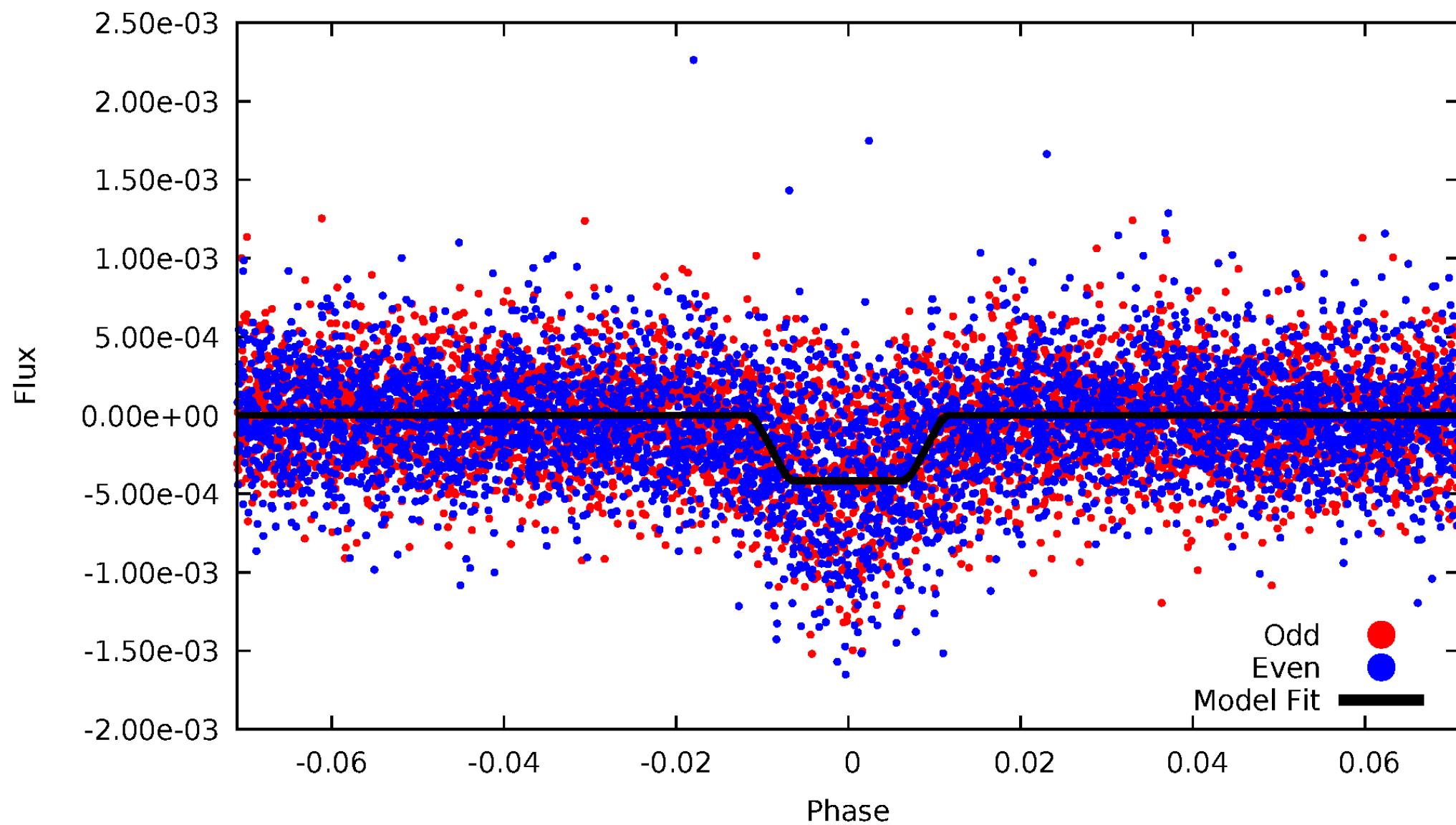
DV Odd/Even

TCE 002449074-01



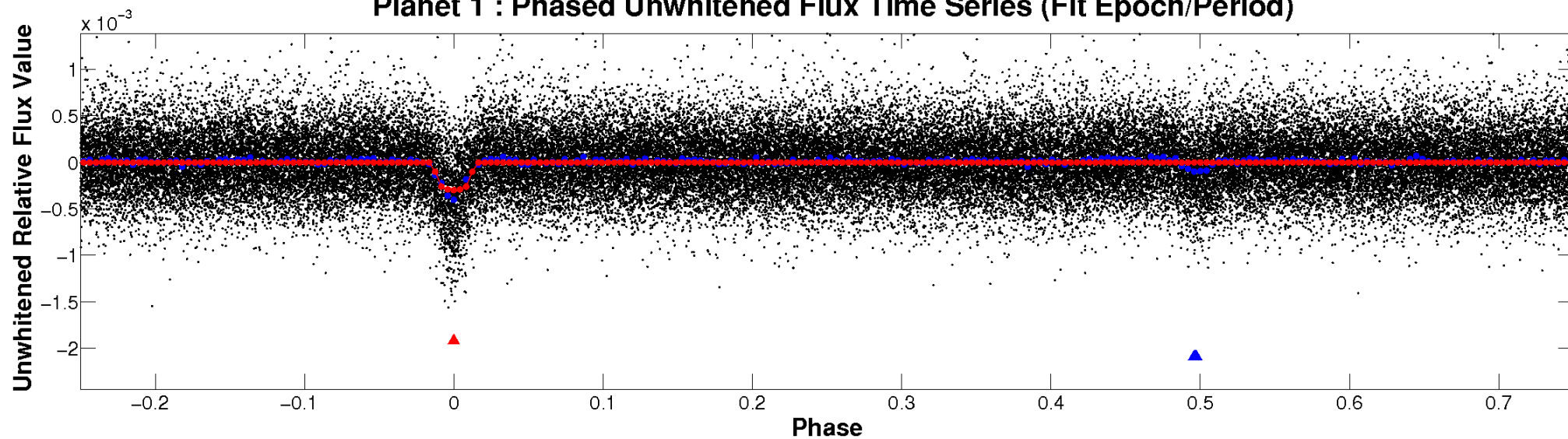
ALT Odd/Even

TCE 002449074-01

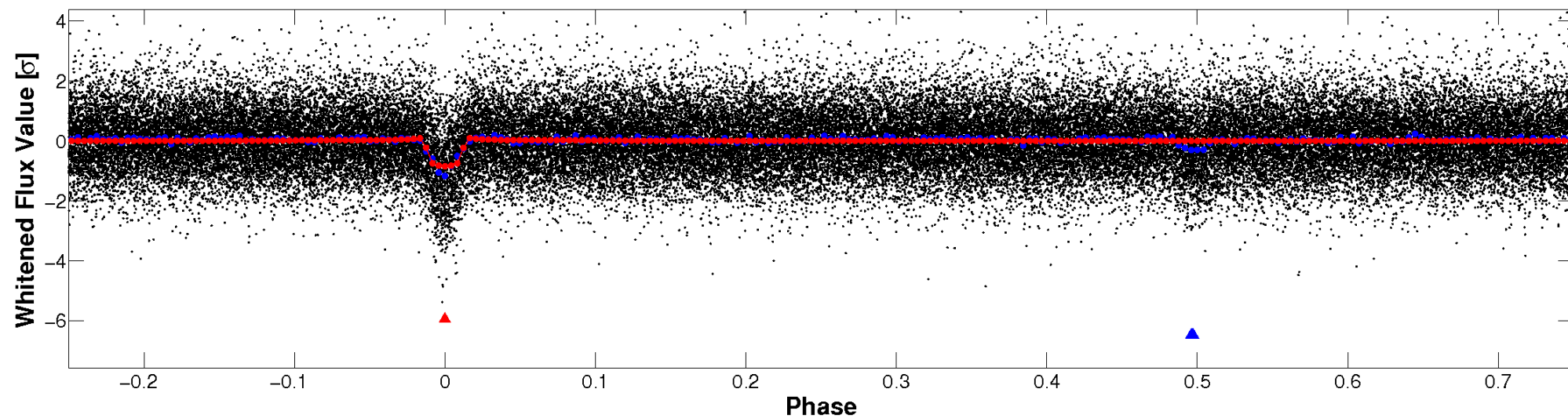


Non-Whitened Vs. Whitened Light Curve

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

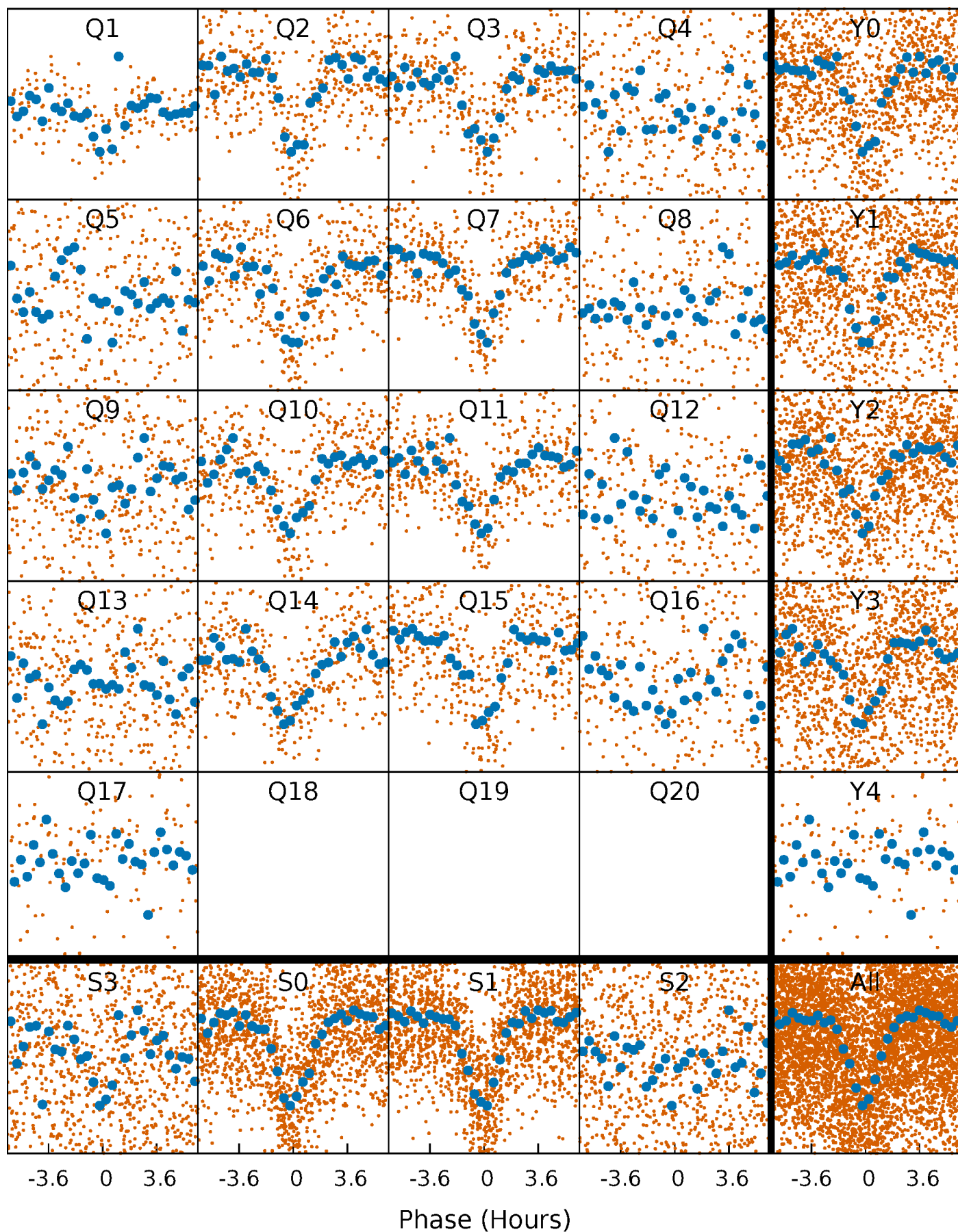


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



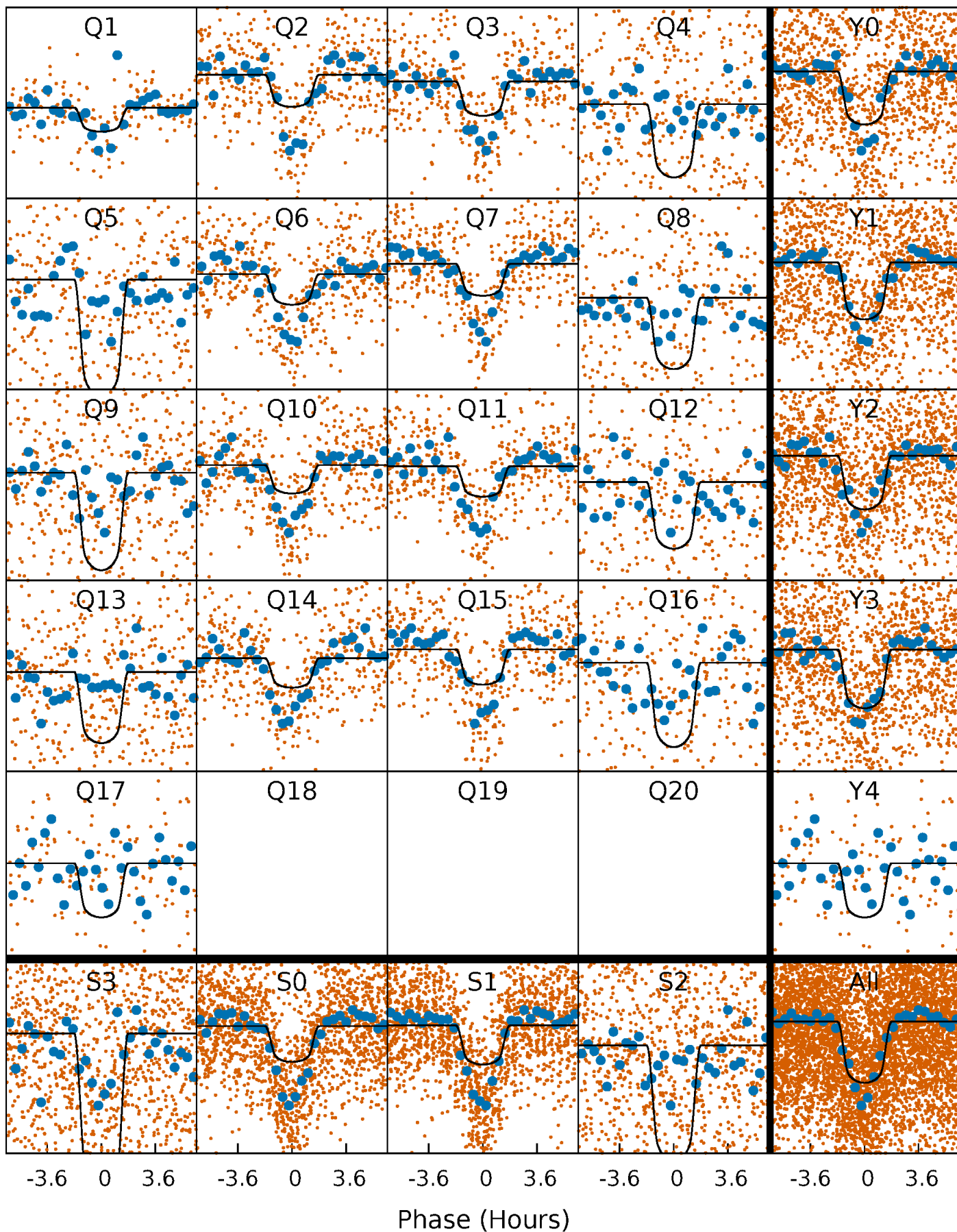
PDC Quarter-Phased Transit Curves

TCE 002449074-01 P= 4.944084 Days $T_0=134.194034$ (BKJD)



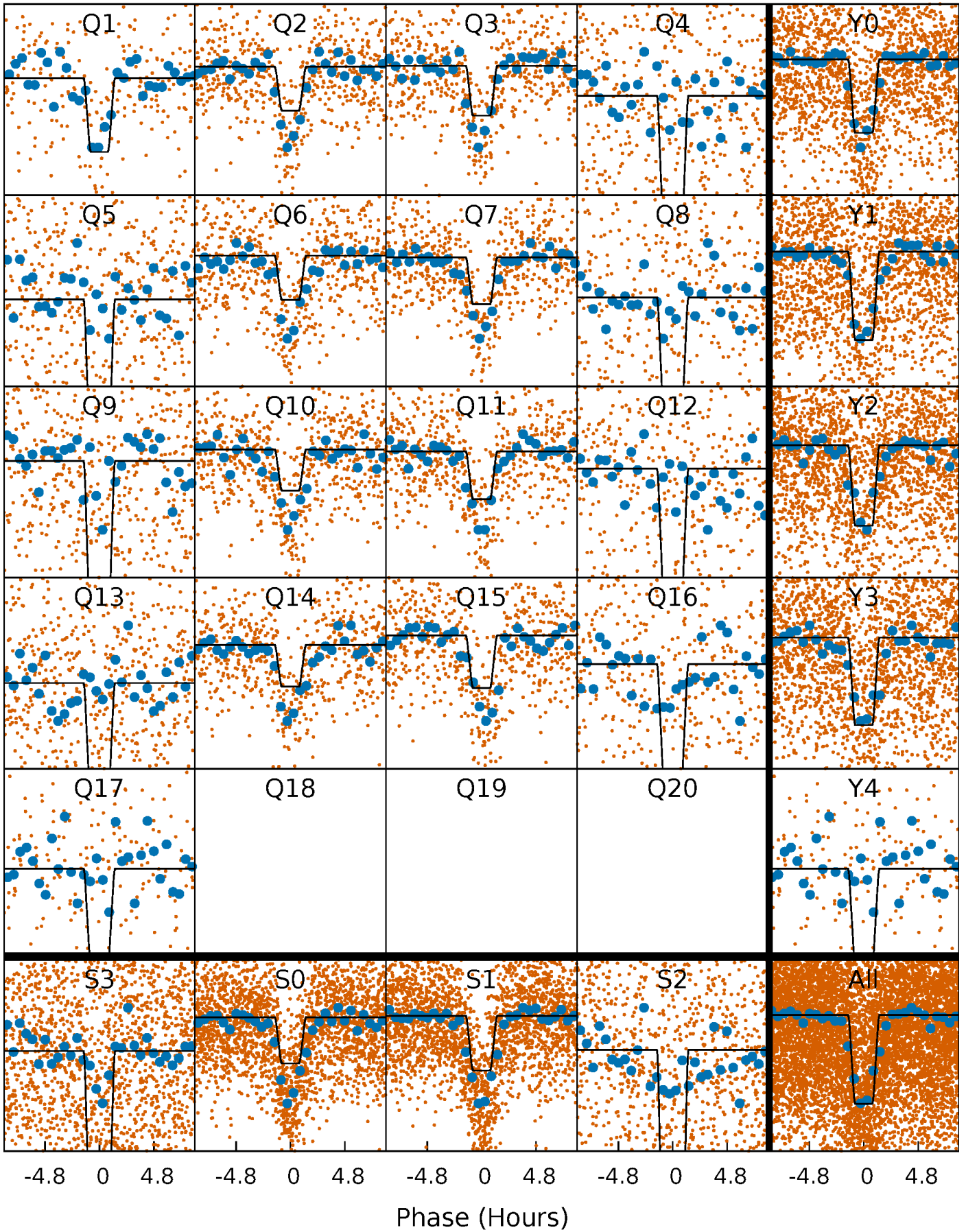
DV Quarter-Phased Transit Curves

TCE 002449074-01 P= 4.944084 Days $T_0=134.194034$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

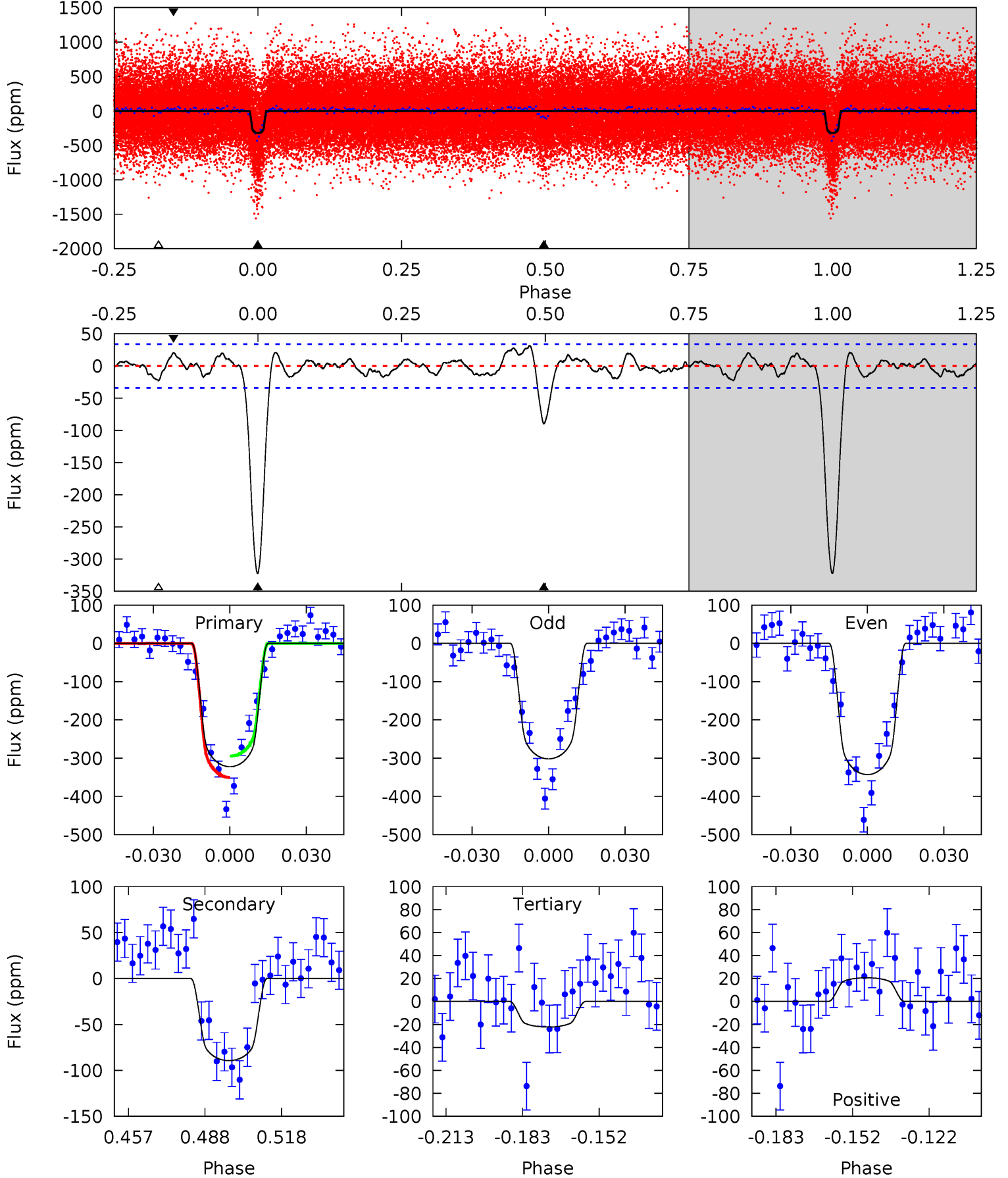
TCE 002449074-01 P= 4.943975 Days $T_0=134.205155$ (BKJD)



DV Model-Shift Uniqueness Test

002449074-01, P = 4.944084 Days, E = 129.249950 Days

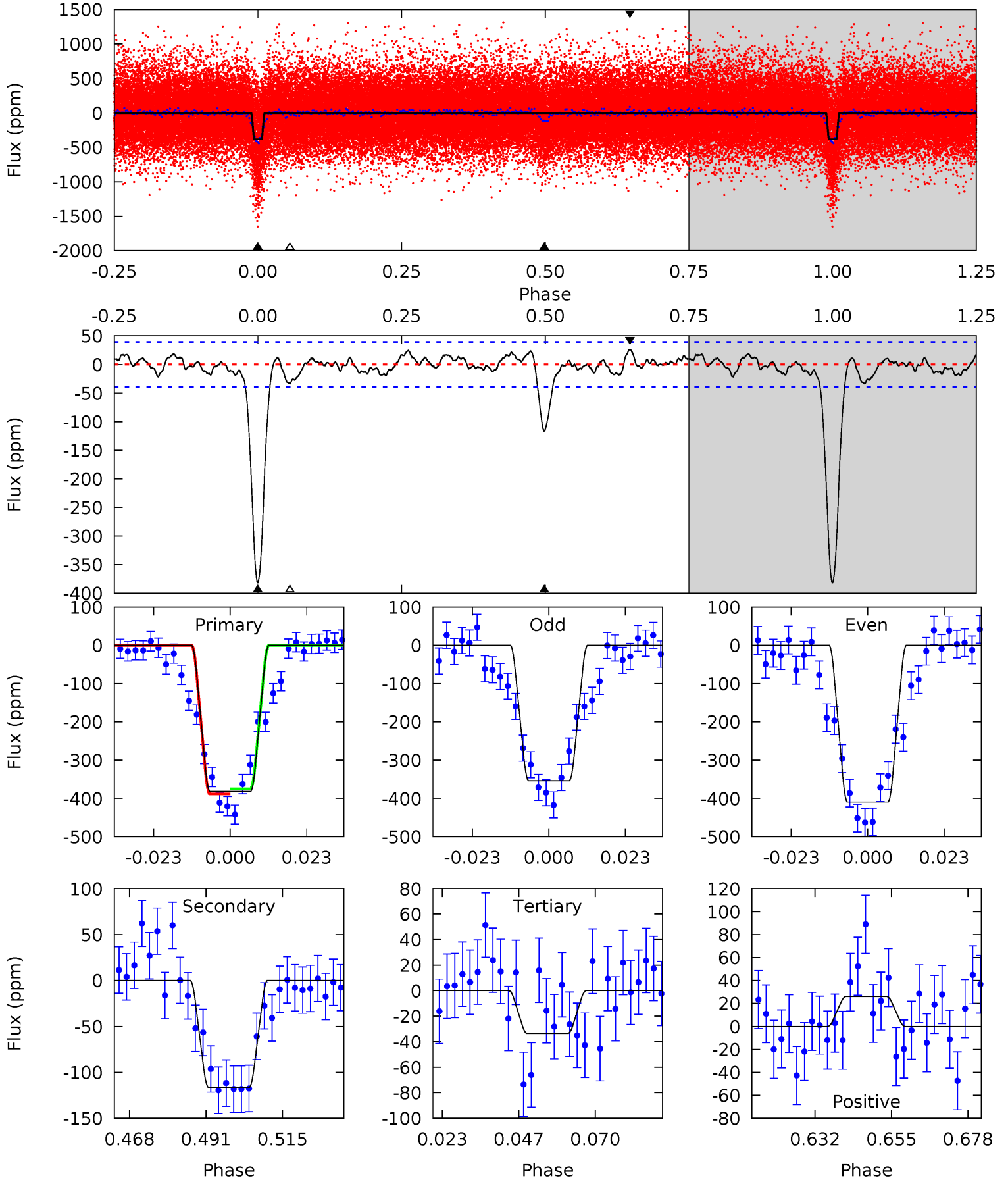
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
45.6	12.6	3.15	2.92	4.81	2.16	1.47	42.4	42.7	9.50	9.73	2.91	0.98	0.09	3.95



Alt Model-Shift Uniqueness Test

002449074-01, P = 4.943975 Days, E = 129.261180 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
47.4	14.4	4.17	3.24	4.86	2.27	1.38	43.2	44.1	10.3	11.2	3.44	1.00	0.06	0.82



Stellar Parameters For KIC 002449074

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	6013^{+211}_{-211}	$4.035^{+0.360}_{-0.144}$	$0.020^{+0.250}_{-0.300}$	$1.700^{+0.434}_{-0.651}$	$1.141^{+0.176}_{-0.176}$	$0.327^{+0.796}_{-0.132}$
	+4%/-4%	+9%/-4%	+1250%/-1500%	+26%/-38%	+15%/-15%	+243%/-40%
Source	PHO54	PHO54	PHO54	DSEP		

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

Secondary Eclipse Parameters for KIC 002449074-01 / KOI 0378.01

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-89 ± 7	$3.33^{+0.73}_{-0.78}$	1942^{+162}_{-201}	4443^{+310}_{-233}	16^{+11}_{-5}
Alt.	-116 ± 8	$3.68^{+0.85}_{-0.86}$	1951^{+167}_{-208}	4519^{+297}_{-242}	17^{+12}_{-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 $A_{\text{obs}} \gg 1.0$

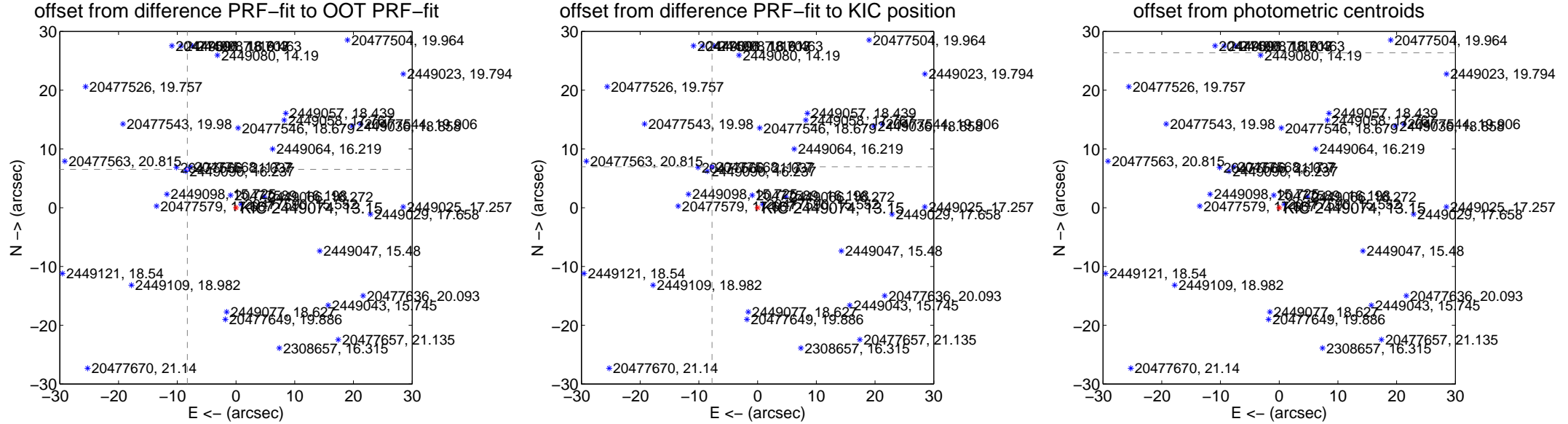
DV Centroid Data

Supplemental centroid analysis for 002449074-01. Kepler magnitude: 13.15. Transit SNR 28.71

There are 17 quarters with good PRF difference image offsets

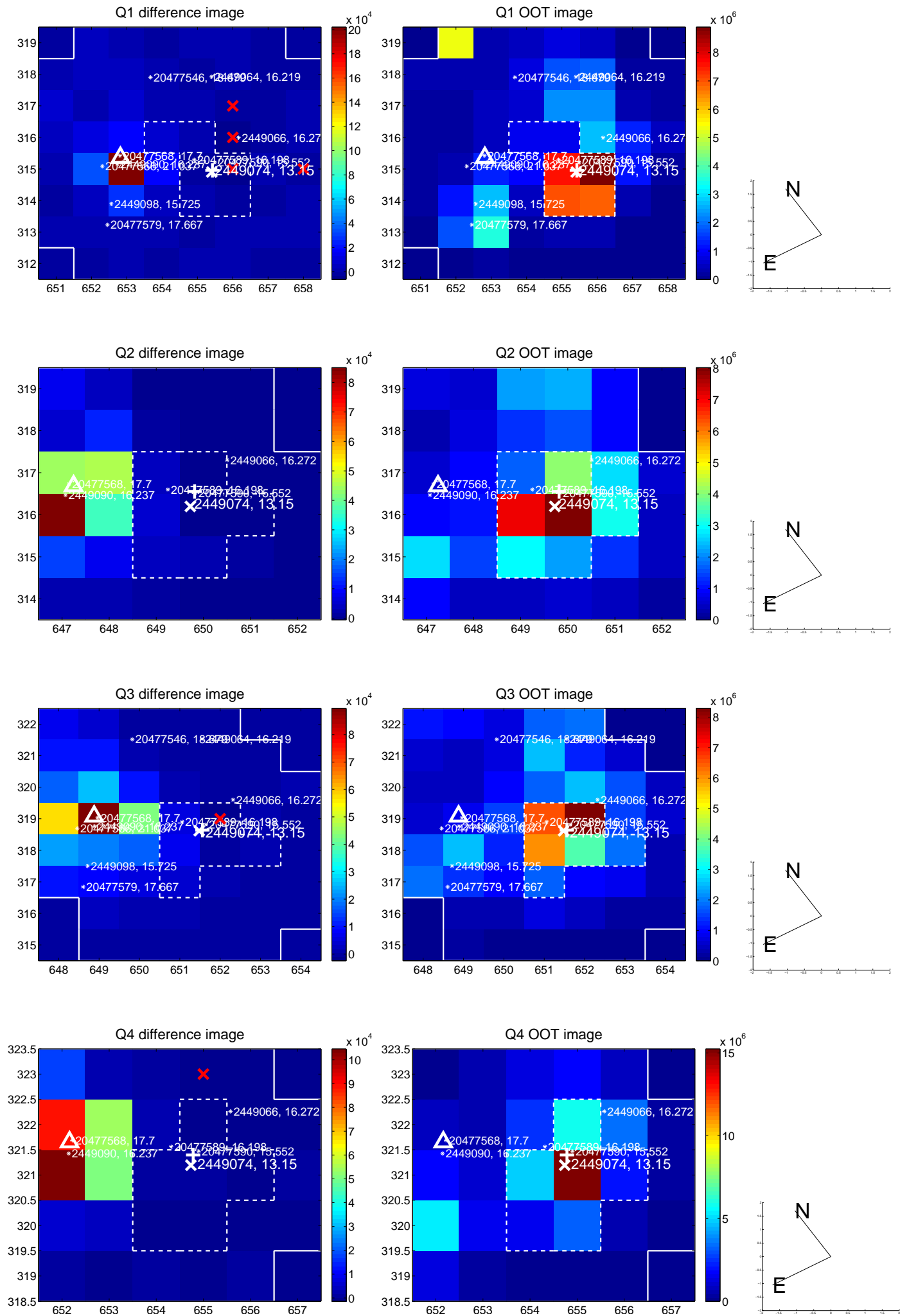
The direct PRF centroid is offset from the target star catalog position by about 0.15 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	10.542 \pm 0.112	93.71	8.286 \pm 0.101	6.518 \pm 0.128
PRF-fit source offset from KIC position	10.422 \pm 0.081	128.09	7.758 \pm 0.080	6.959 \pm 0.071
photometric centroid source offset	44.61 \pm 0.43	104.07	35.98 \pm 0.43	26.36 \pm 0.43

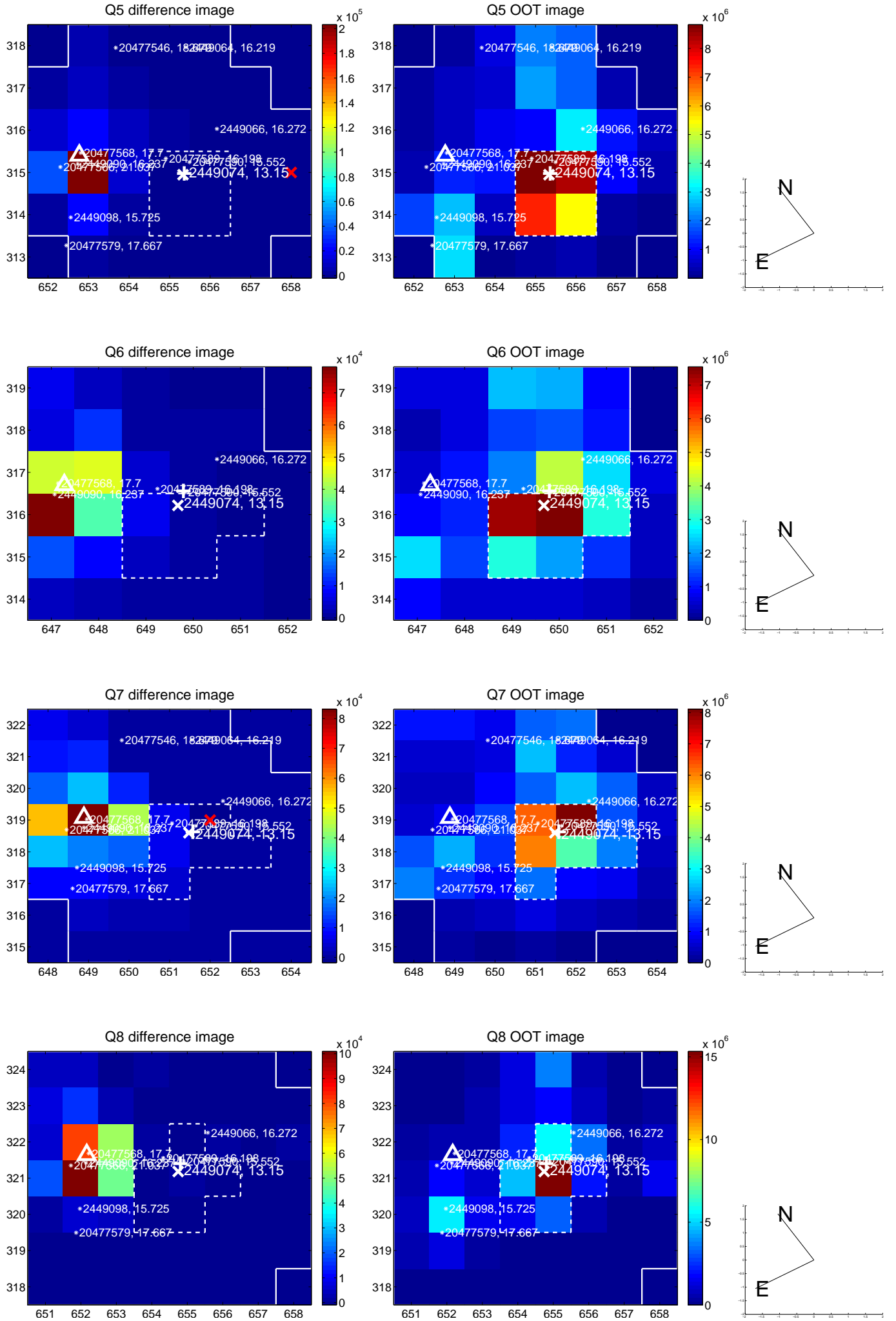


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

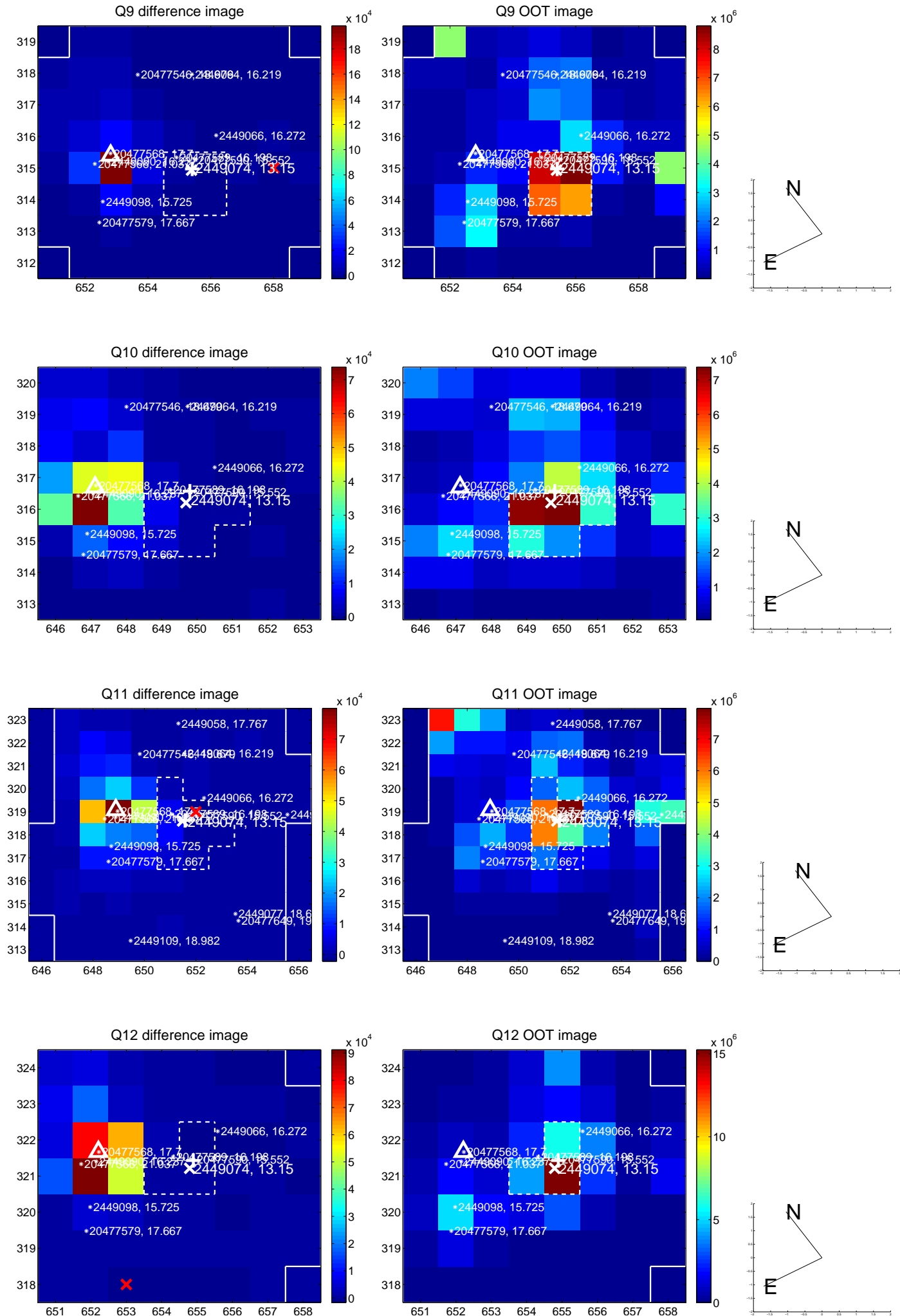
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



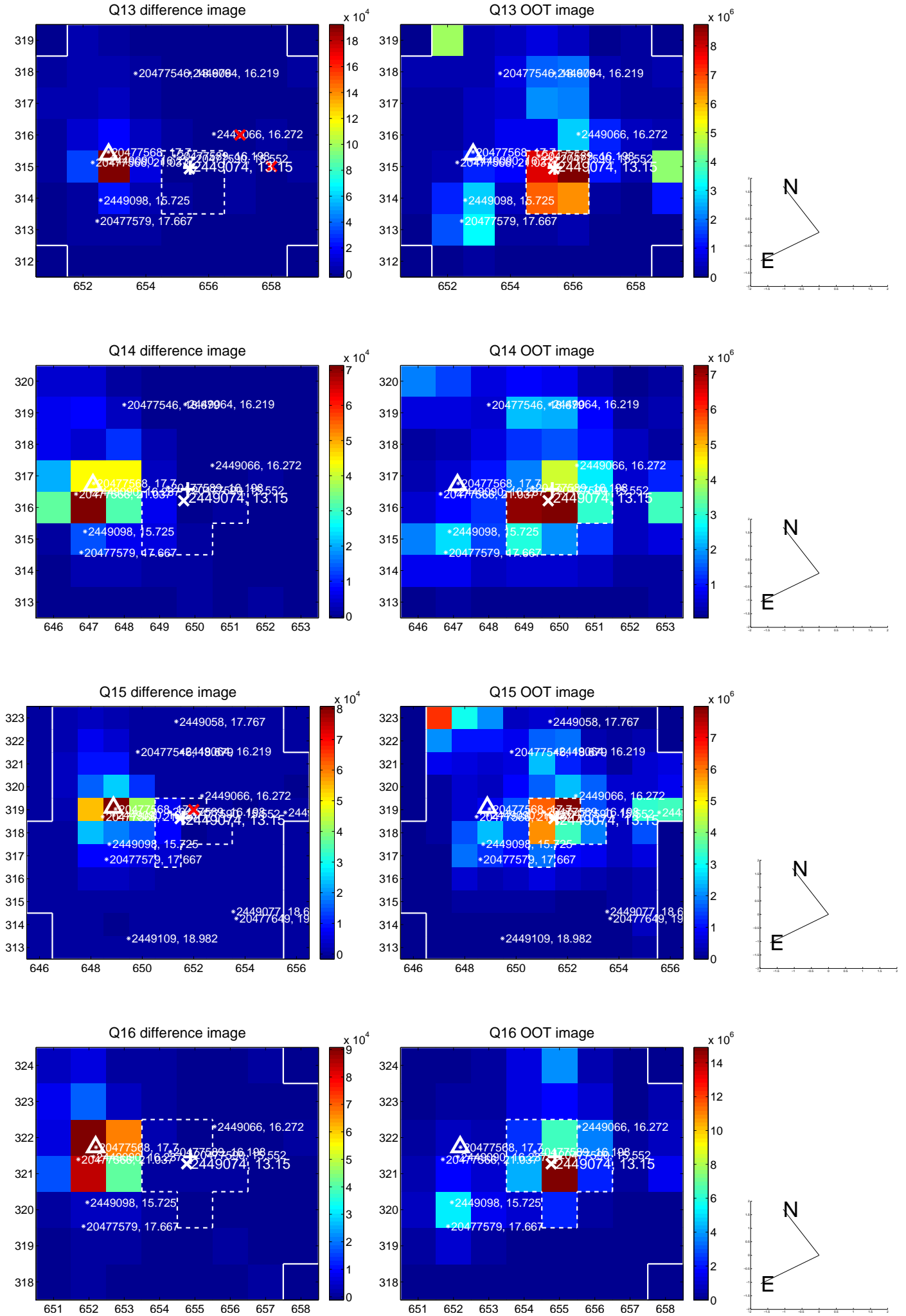
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



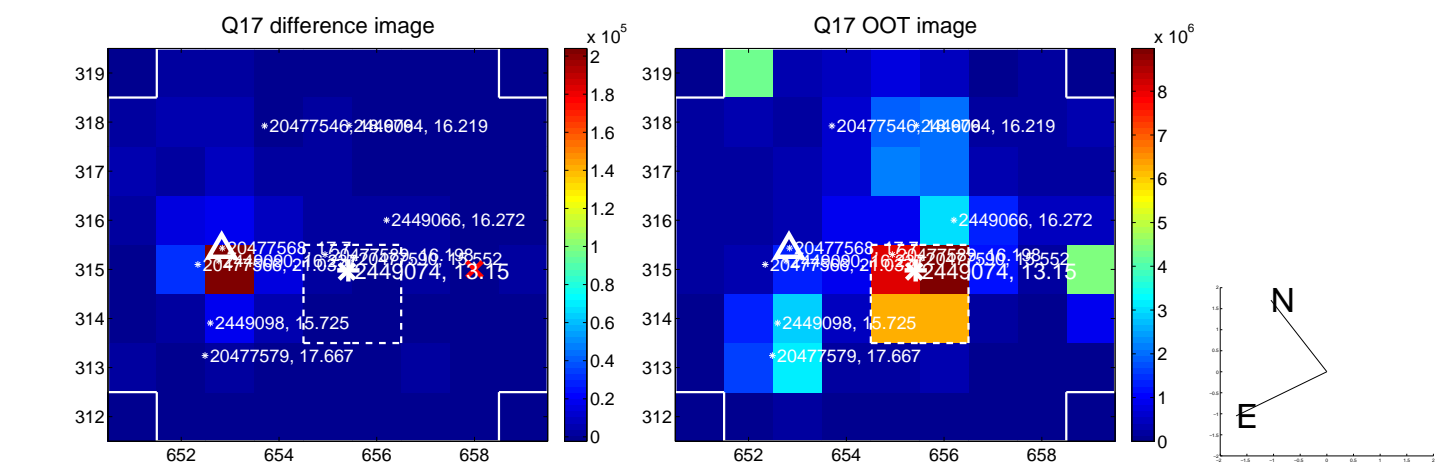
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



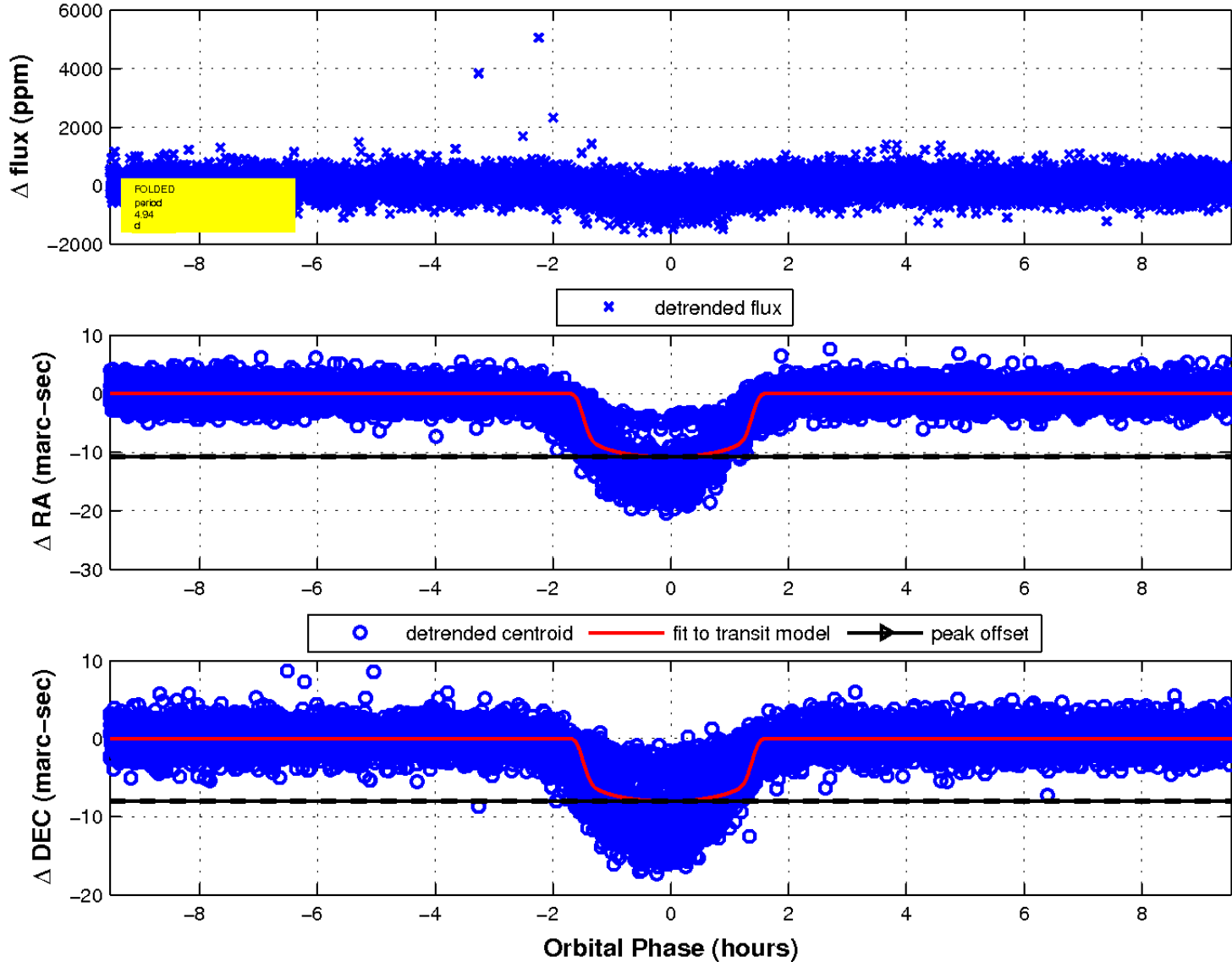
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

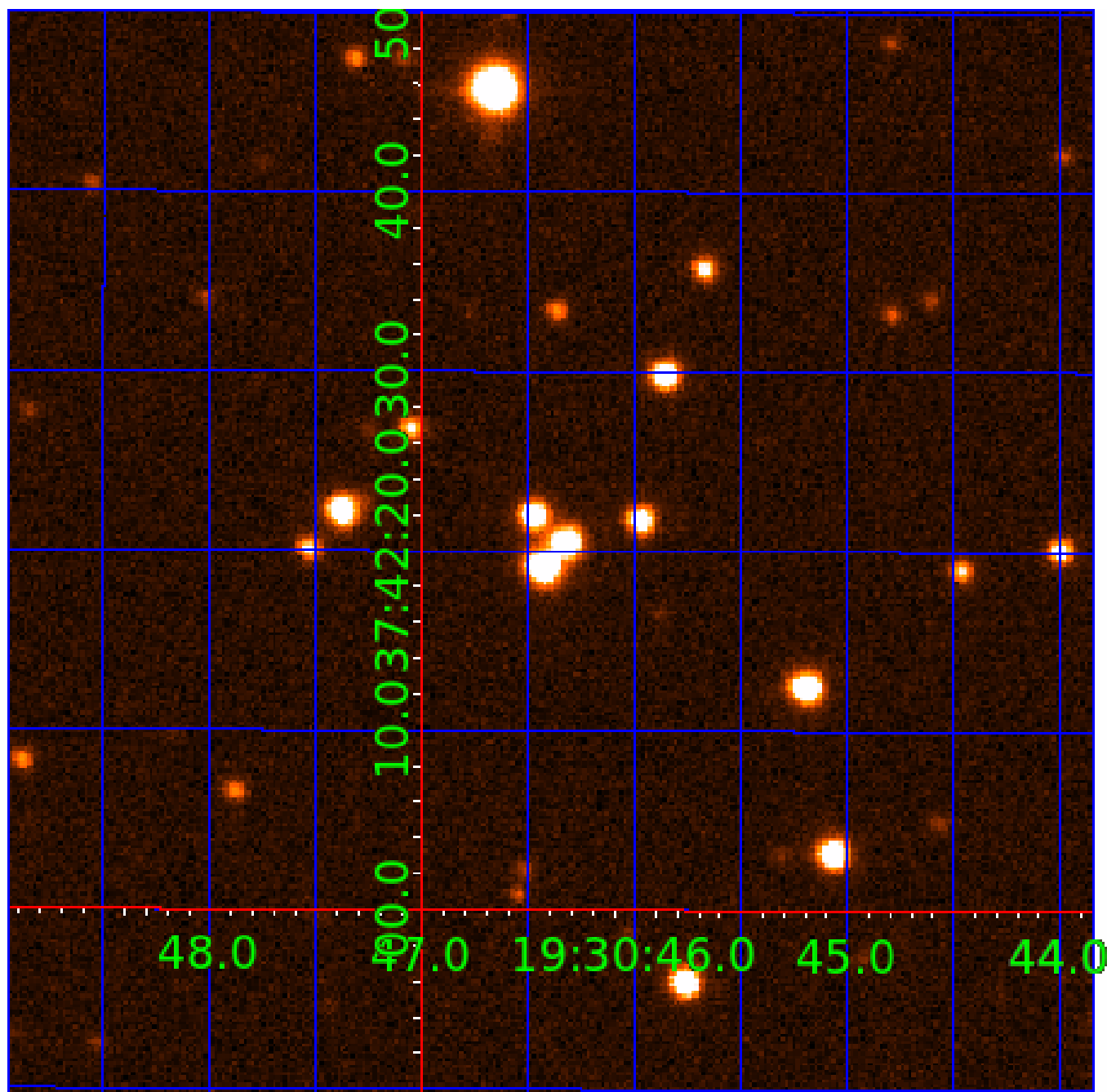


fluxWeightedCentroids, Planet 1 of 2



UKIRT Image

Declination



KIC 002449074

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})
002449074-01	OBS	0378.01	4.944084	134.194034	298.8	3.175	27.5	28.7	1.70	6013	3.48	959.64
002449074-02	OBS	No	4.944059	131.709343	106.8	2.846	9.7	10.6	1.70	6013	2.01	959.65

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
002449074-01	OBS	FP	0.00	0	1	1	1	MOD_SEC_DV—MOD_SEC_ALT—HAS_SEC_TCE—CENT_RESOLVED_OFFSET—EPHEM_MATCH
002449074-02	OBS	FP	0.00	1	1	1	1	IS_SEC_TCE—CENT_RESOLVED_OFFSET—HALO_GHOST—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 002449074-02

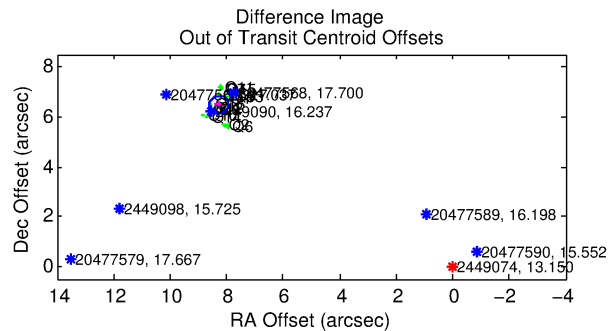
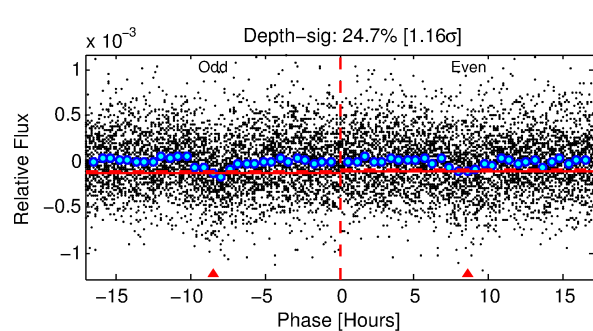
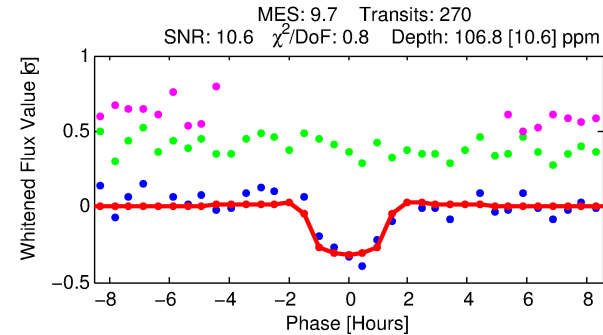
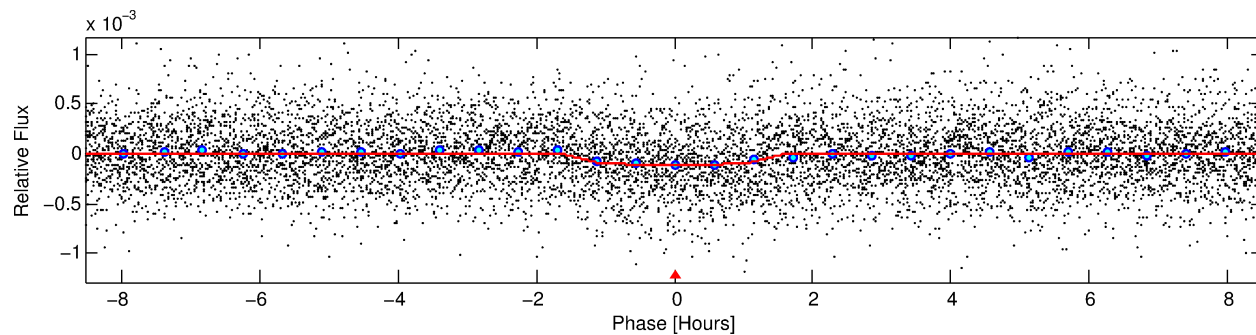
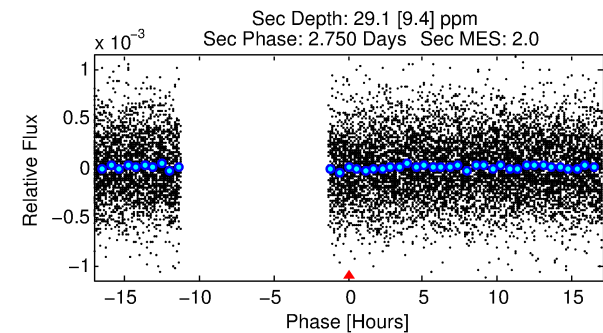
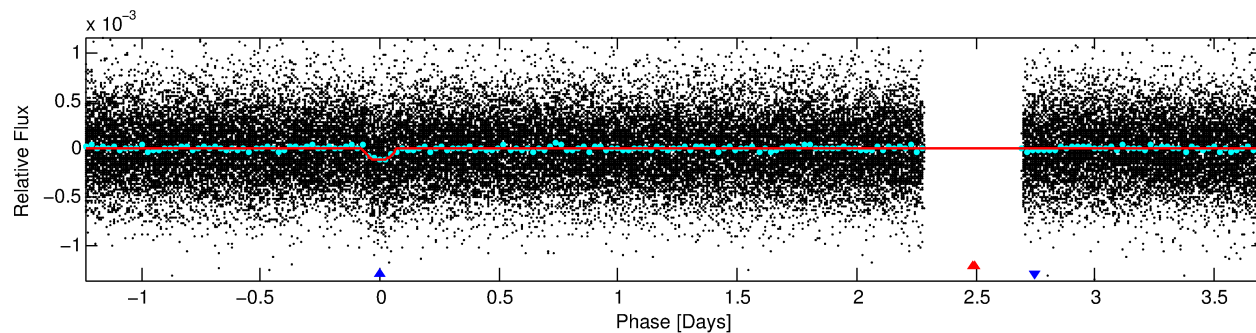
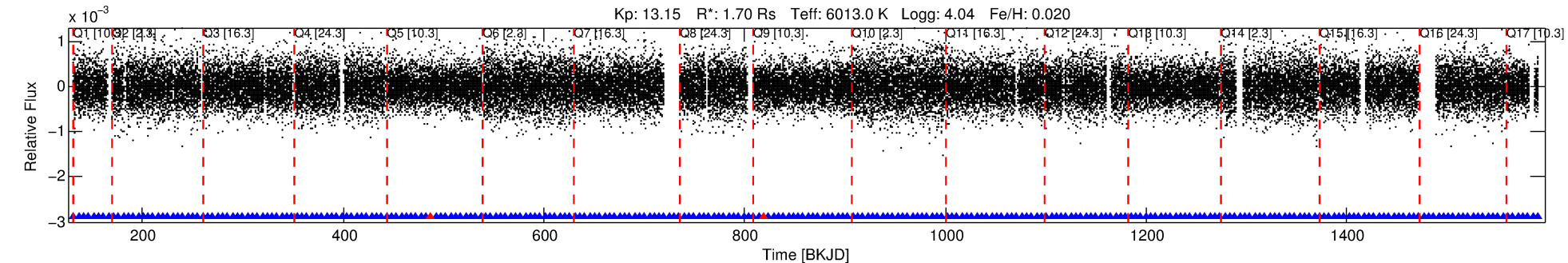
TCE (1)	KIC	Parent (2)	Parent KIC	$P_1:P_2$	Dist ($''$)	Δ Row	Δ Col	m_2	m_1	D_2/D_1	Mechanism	Flag	σ_P	σ_T
002449074-02	2449074	002449090-sec	2449090	1:1	10.6	-1	3	16.24	13.15	421.50	Direct-PRF	0	0.60	0.77

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: 2449074 Candidate: 2 of 2 Period: 4.944 d
KOI: K00378 Corr: No Ephemeris Match

Kp: 13.15 R*: 1.70 Rs Teff: 6013.0 K Logg: 4.04 Fe/H: 0.020



DV Fit Results:

Period = 4.94406 [0.00003] d
Epoch = 131.7093 [0.0046] BKJD
Rp/R* = 0.0108 [0.0077]
a/R* = 7.13 [24.98]
b = 0.86 [1.11]
Seff = 959.65 [599.51]
Teq = 1419 [222] K
Rp = 2.01 [1.63] Re
a = 0.0594 [0.0223] AU
Ag = 13.99 [22.20] [0.59σ]
Teff = 4244 [1562] K [1.79σ]

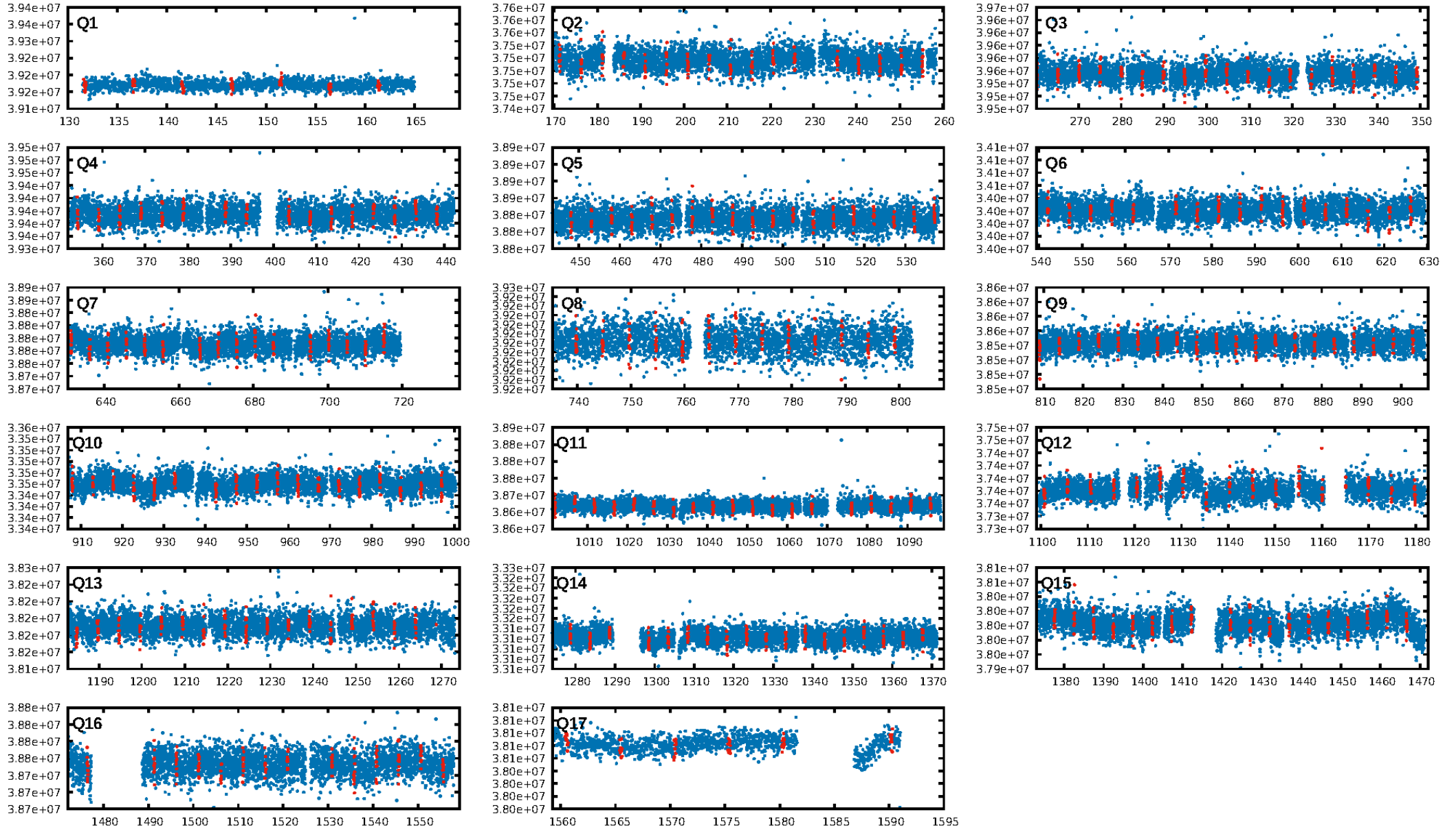
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 0.0% [0.00σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 9.85e-22
RollingBand-fgt: 0.99 [255/257]
GhostDiagnostic-chr: -0.1704
Centroid-sig: 0.0%
Centroid-so: 40.890 arcsec [34.09σ]
OotOffset-rm: 10.523 arcsec [90.76σ]
KicOffset-rm: 10.405 arcsec [107.08σ]
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]

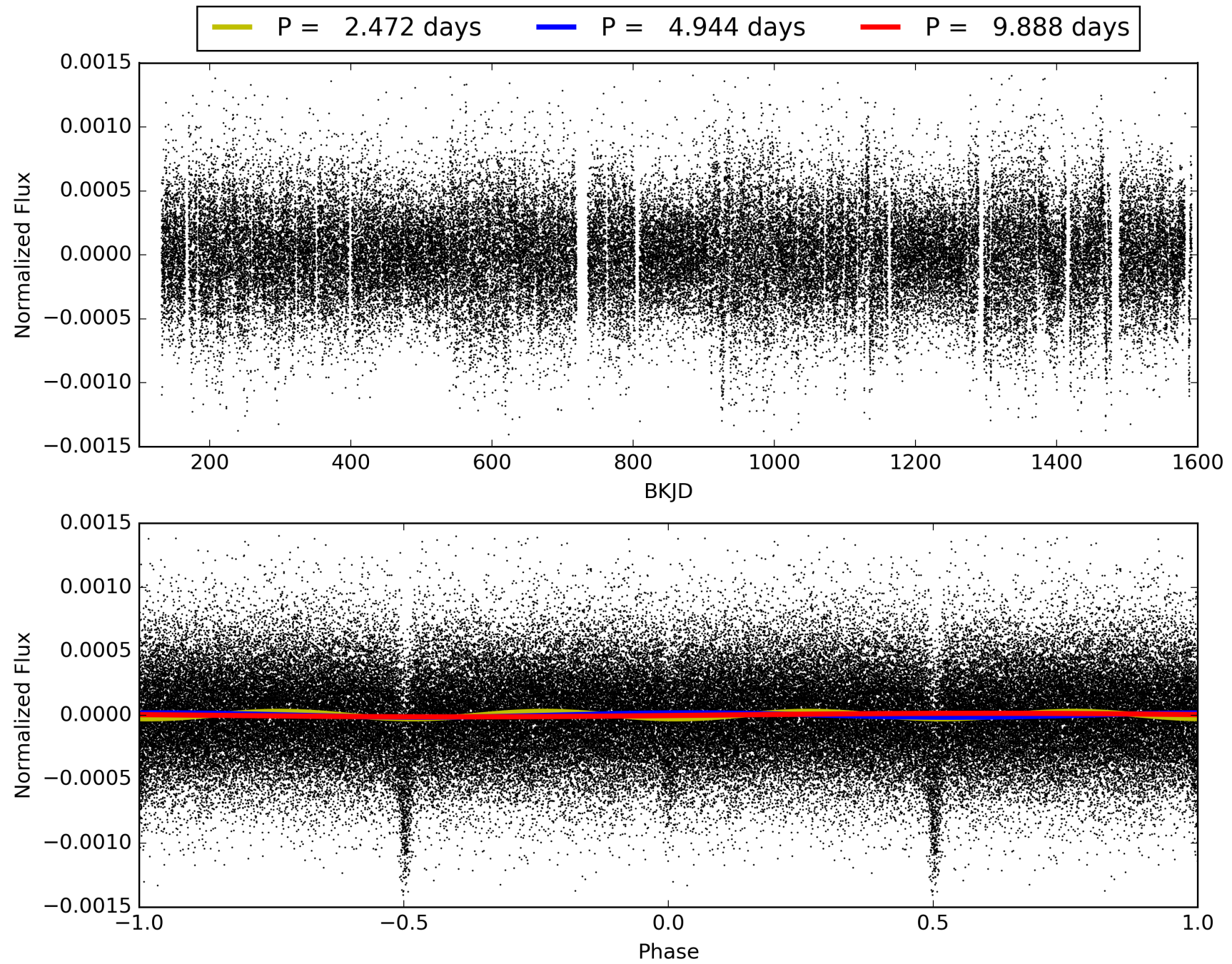
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 04:55:54 Z

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

TCE 002449074-02, PDC Light Curves

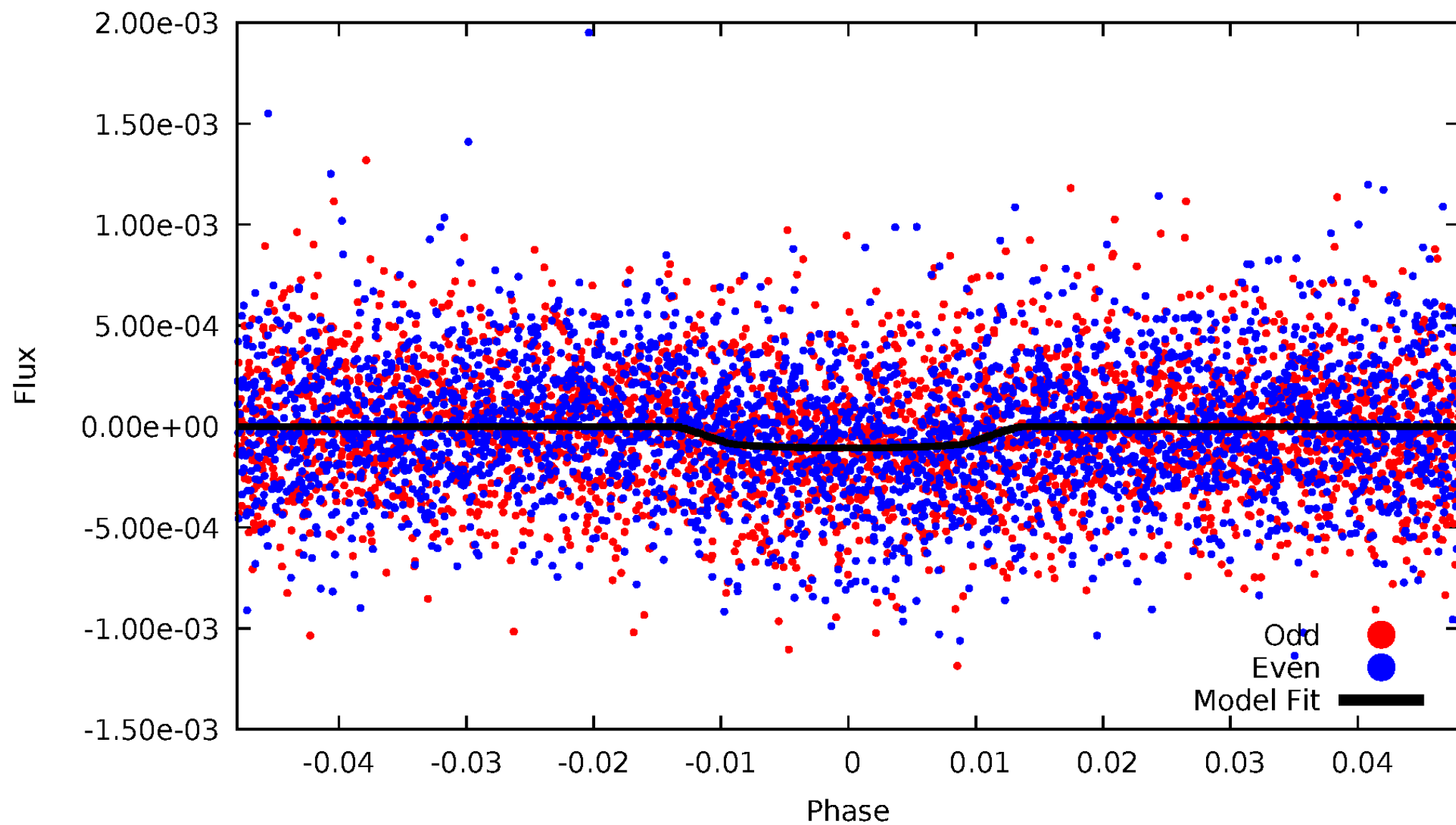


TCE 002449074-02



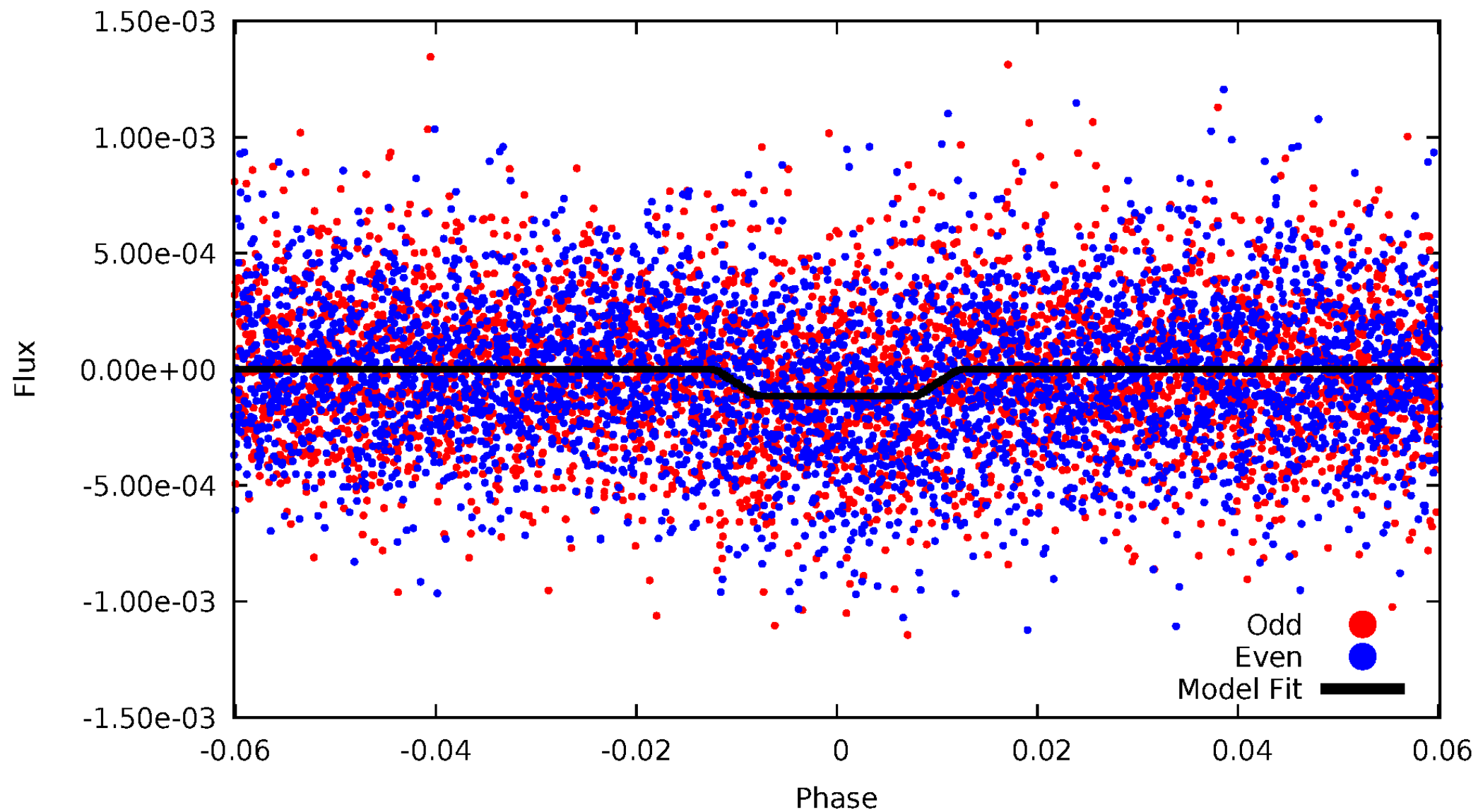
DV Odd/Even

TCE 002449074-02



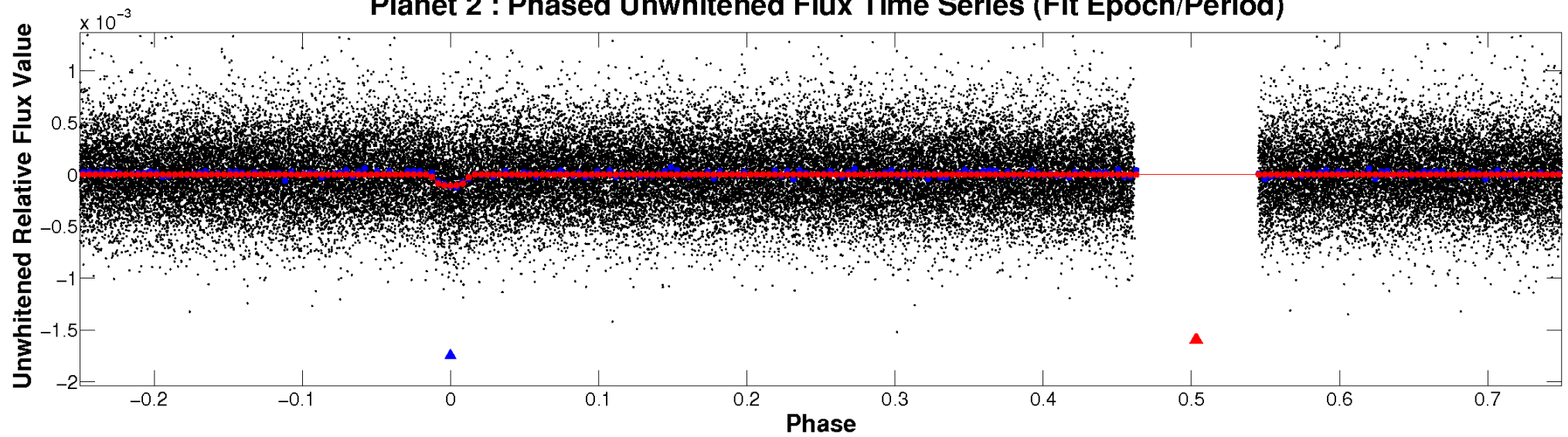
ALT Odd/Even

TCE 002449074-02

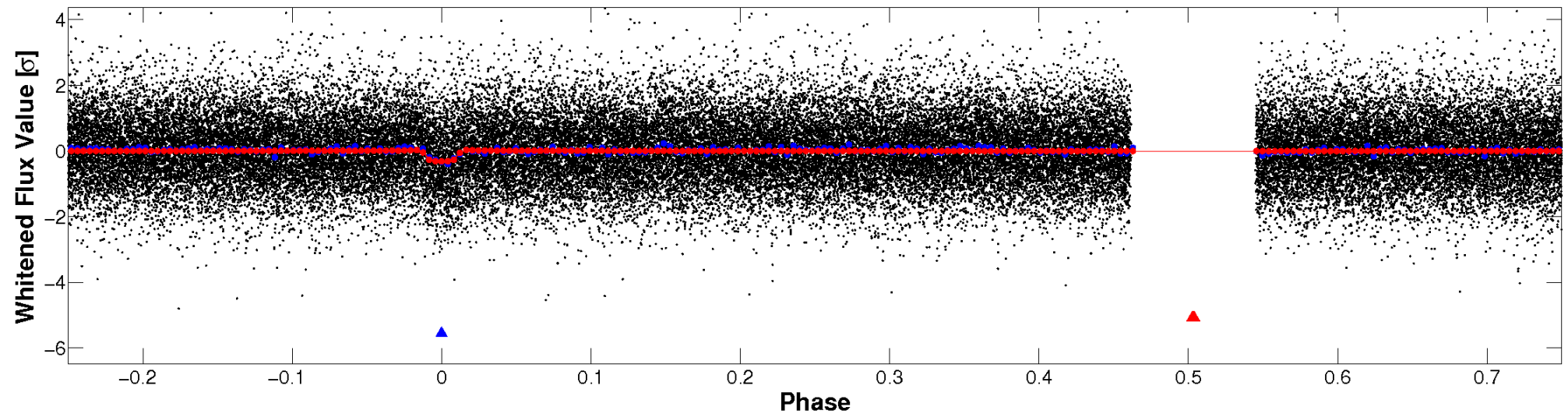


Non-Whitened Vs. Whitened Light Curve

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

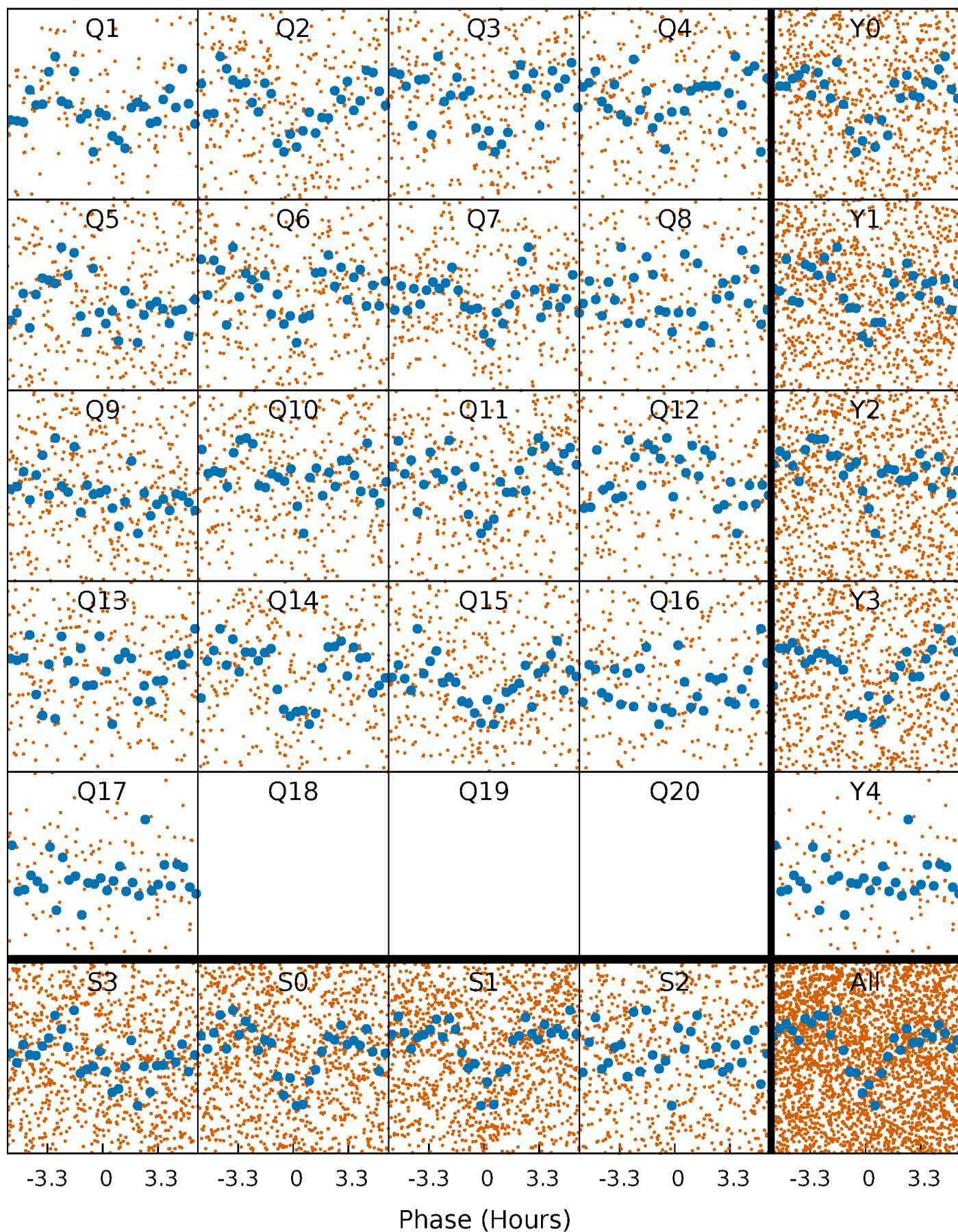


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



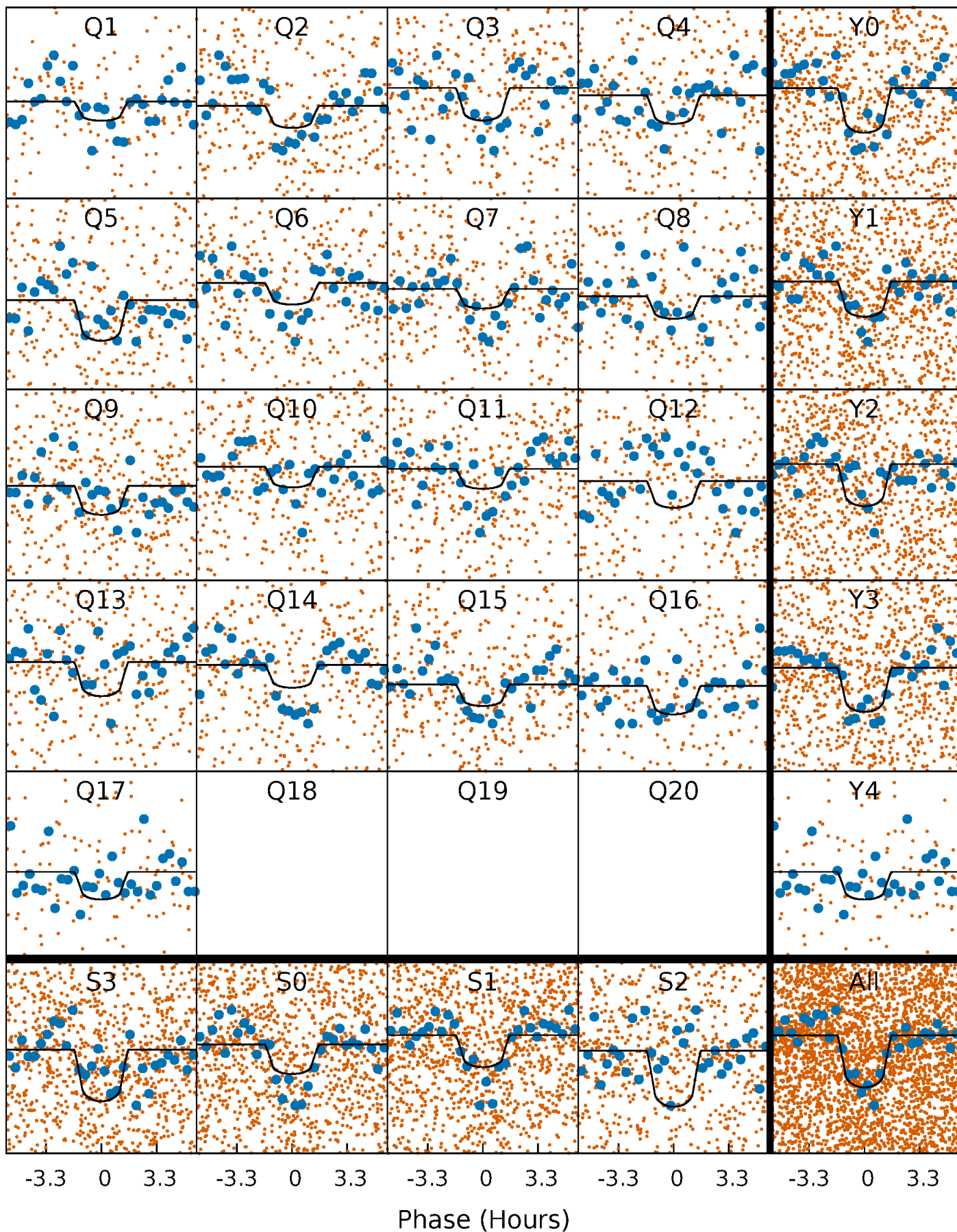
PDC Quarter-Phased Transit Curves

TCE 002449074-02 P= 4.944059 Days $T_0=131.709343$ (BKJD)



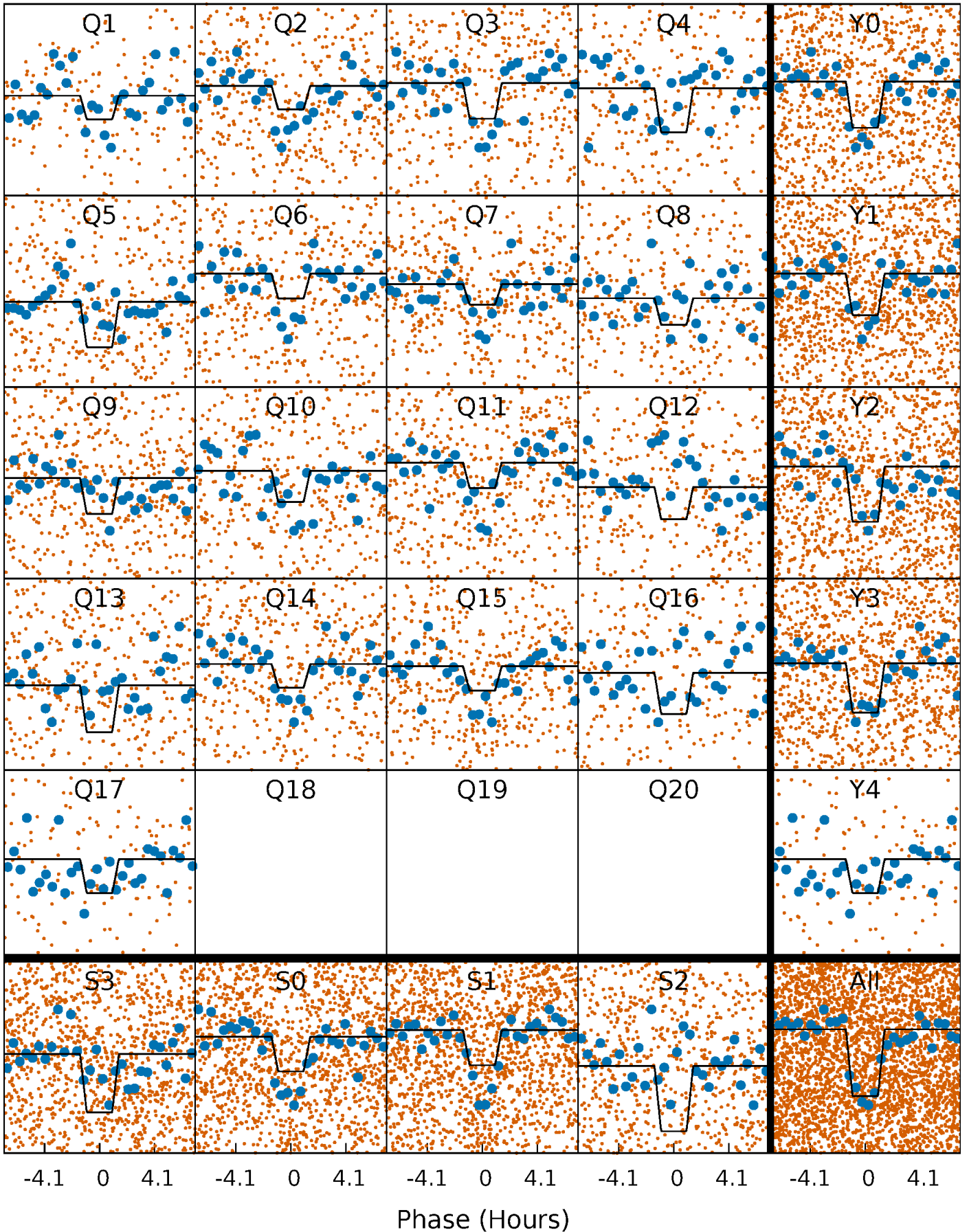
DV Quarter-Phased Transit Curves

TCE 002449074-02 $P = 4.944059$ Days $T_0 = 131.709343$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

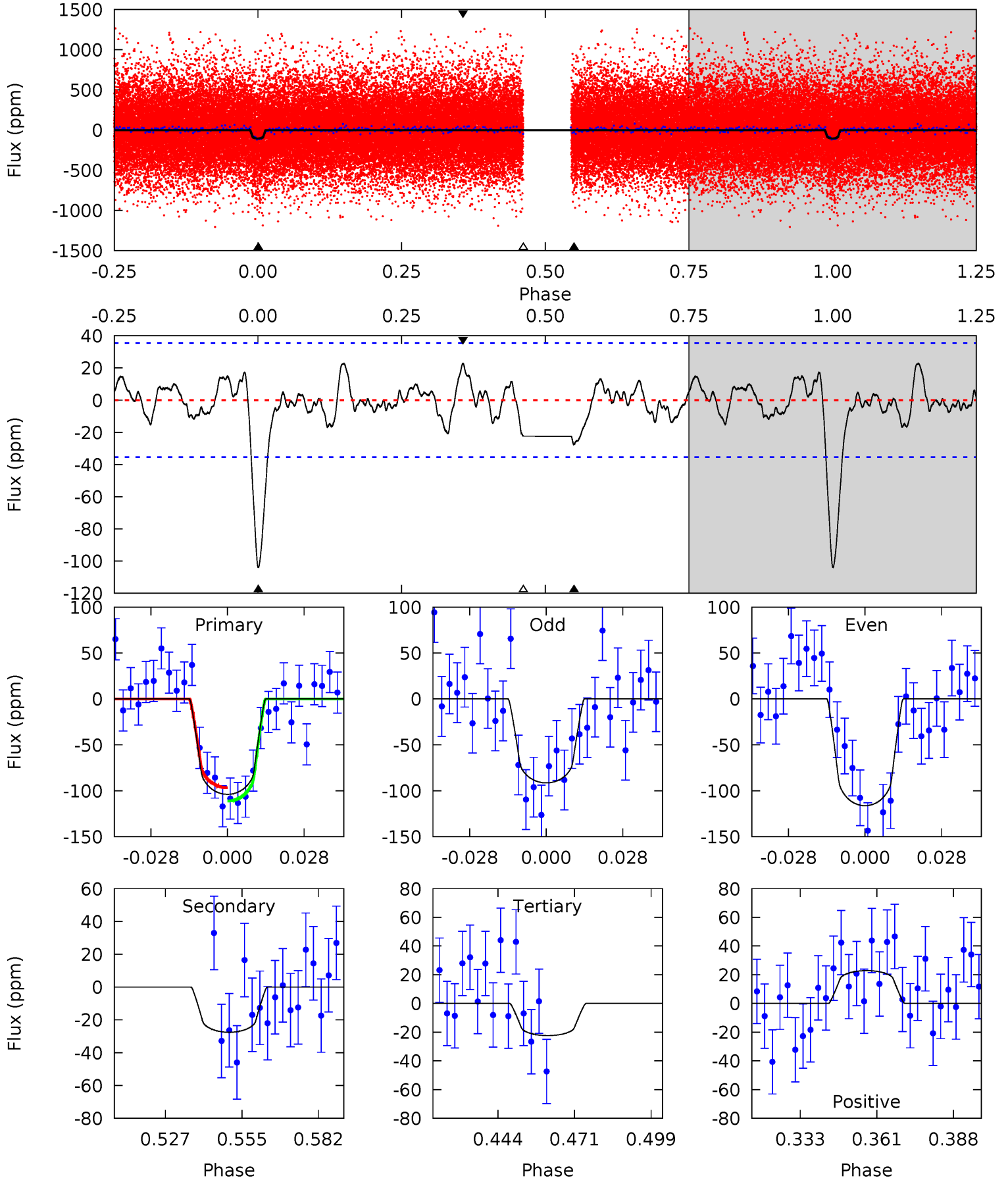
TCE 002449074-02 P= 4.944012 Days $T_0=131.723080$ (BKJD)



DV Model-Shift Uniqueness Test

002449074-02, P = 4.944059 Days, E = 126.765284 Days

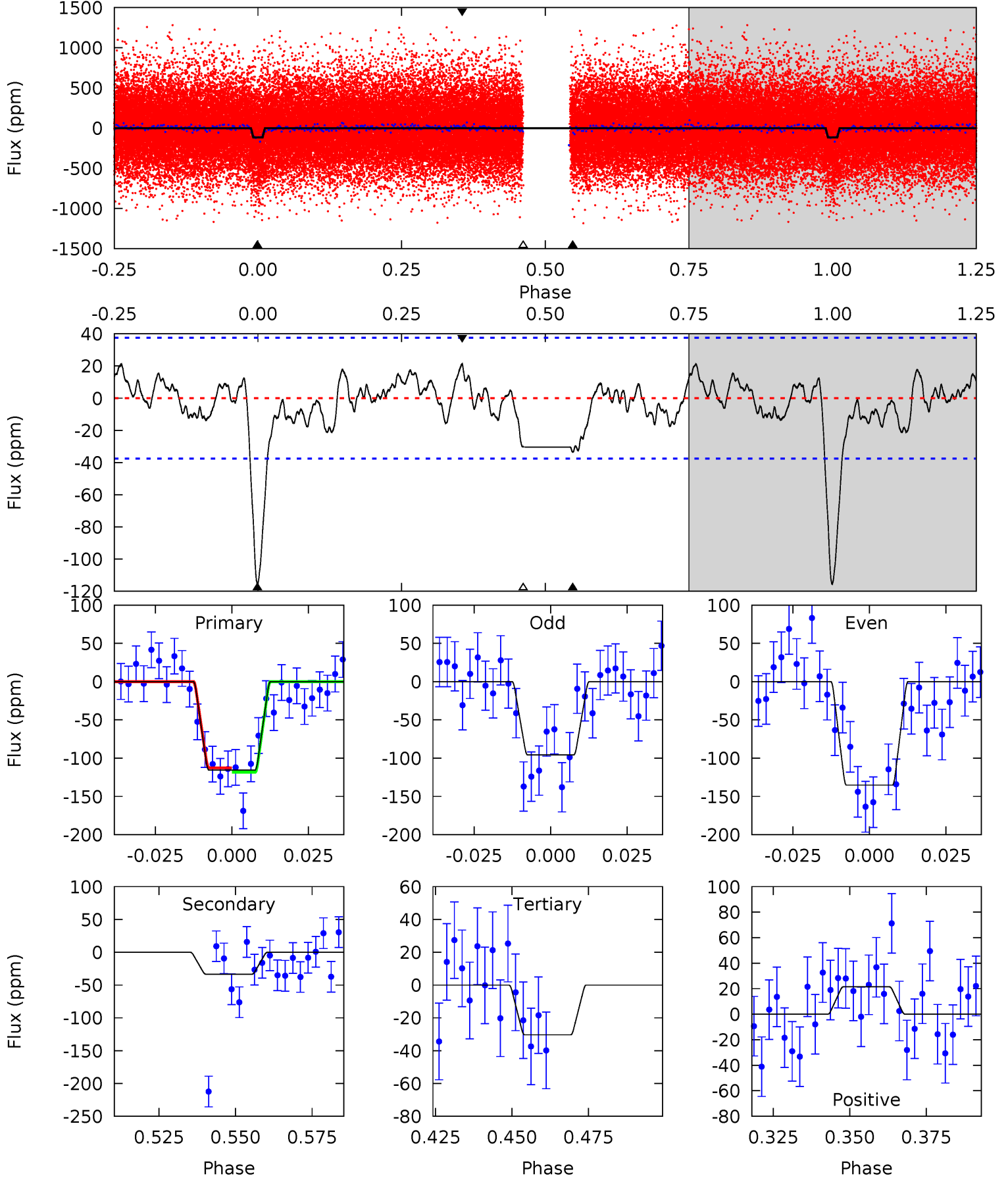
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
14.1	3.75	3.05	3.12	4.83	2.20	1.16	11.1	11.0	0.70	0.64	1.70	1.02	0.18	0.99



Alt Model-Shift Uniqueness Test

002449074-02, P = 4.944012 Days, E = 126.779068 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
14.9	4.31	3.91	2.77	4.85	2.24	1.24	11.0	12.1	0.40	1.54	2.54	1.01	0.16	0.36



Stellar Parameters For KIC 002449074

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	6013^{+211}_{-211}	$4.035^{+0.360}_{-0.144}$	$0.020^{+0.250}_{-0.300}$	$1.700^{+0.434}_{-0.651}$	$1.141^{+0.176}_{-0.176}$	$0.327^{+0.796}_{-0.132}$
	+4%/-4%	+9%/-4%	+1250%/-1500%	+26%/-38%	+15%/-15%	+243%/-40%
Source	PHO54	PHO54	PHO54	DSEP		

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

Secondary Eclipse Parameters for KIC 002449074-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-28 ± 7	$1.94^{+1.44}_{-1.08}$	1965^{+148}_{-199}	4318^{+1821}_{-779}	14^{+58}_{-10}
Alt.	-33 ± 8	$2.00^{+1.45}_{-1.11}$	1959^{+153}_{-216}	4363^{+1998}_{-697}	16^{+64}_{-11}

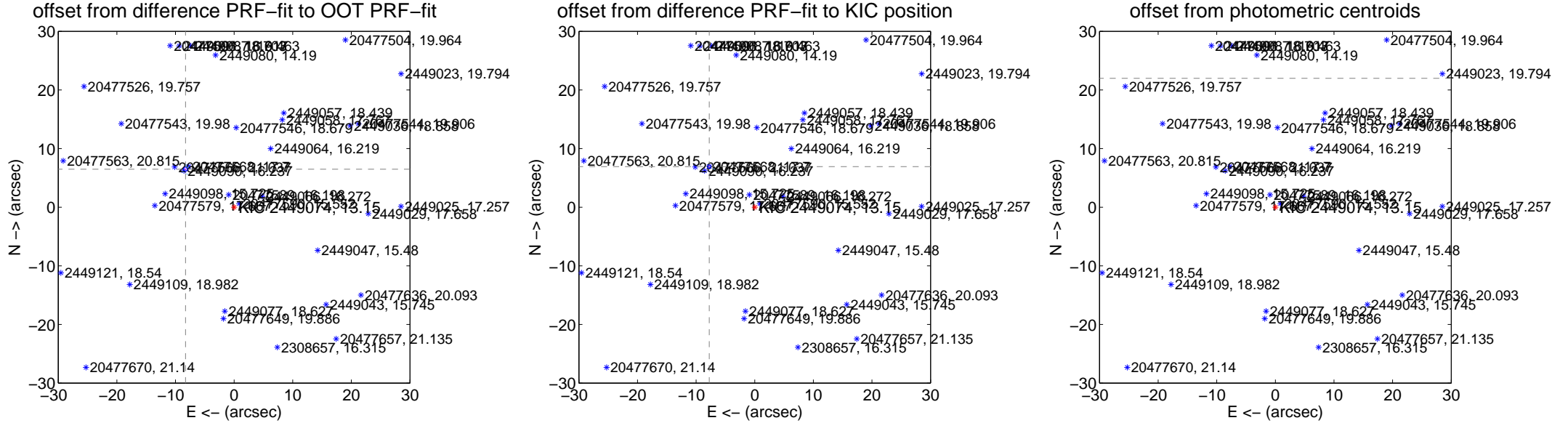
T_{max} = Theoretical Maximum Planetary Temperature
 T_{obs} = Observed Planetary Temperature (Assuming $A=0.3$)
 A_{obs} = Observed Albedo (Assuming $T=0$)

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

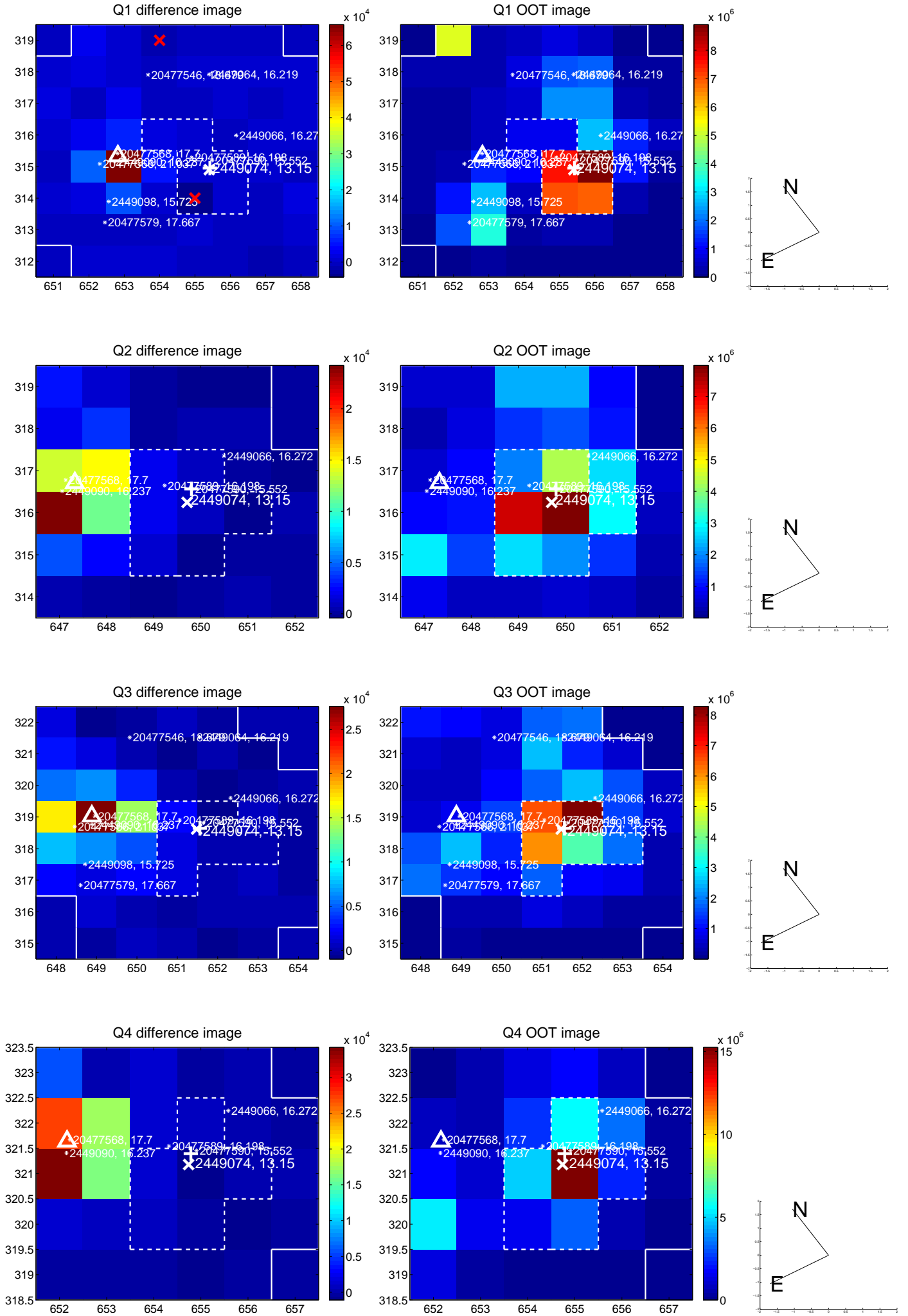
Supplemental centroid analysis for 002449074-02. Kepler magnitude: 13.15. Transit SNR 10.58
 There are 17 quarters with good PRF difference image offsets
 The direct PRF centroid is offset from the target star catalog position by about 0.15 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	10.523 \pm 0.116	90.76	8.285 \pm 0.108	6.488 \pm 0.128
PRF-fit source offset from KIC position	10.405 \pm 0.097	107.08	7.766 \pm 0.094	6.925 \pm 0.077
photometric centroid source offset	40.89 \pm 1.20	34.09	34.48 \pm 1.20	21.98 \pm 1.20

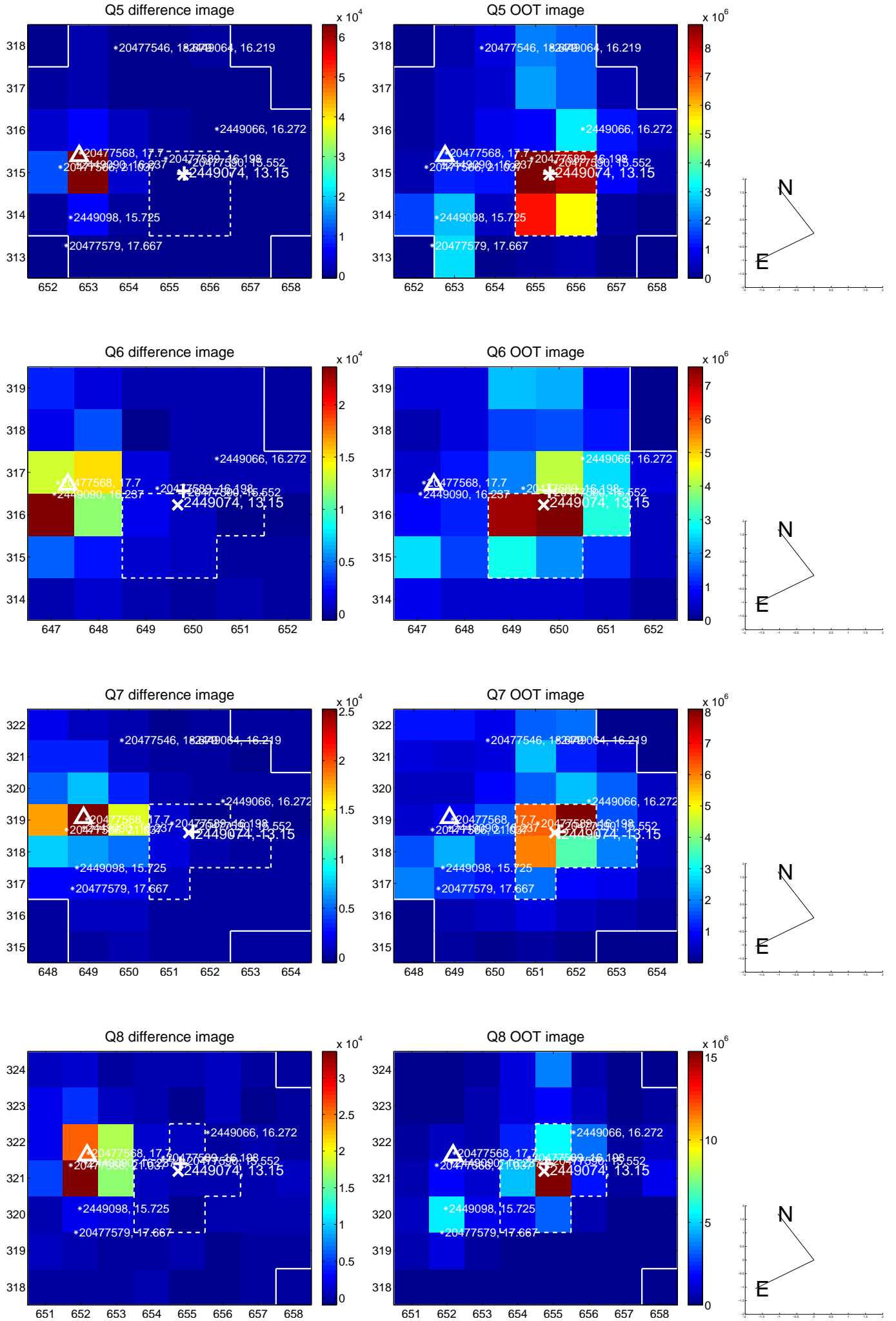


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

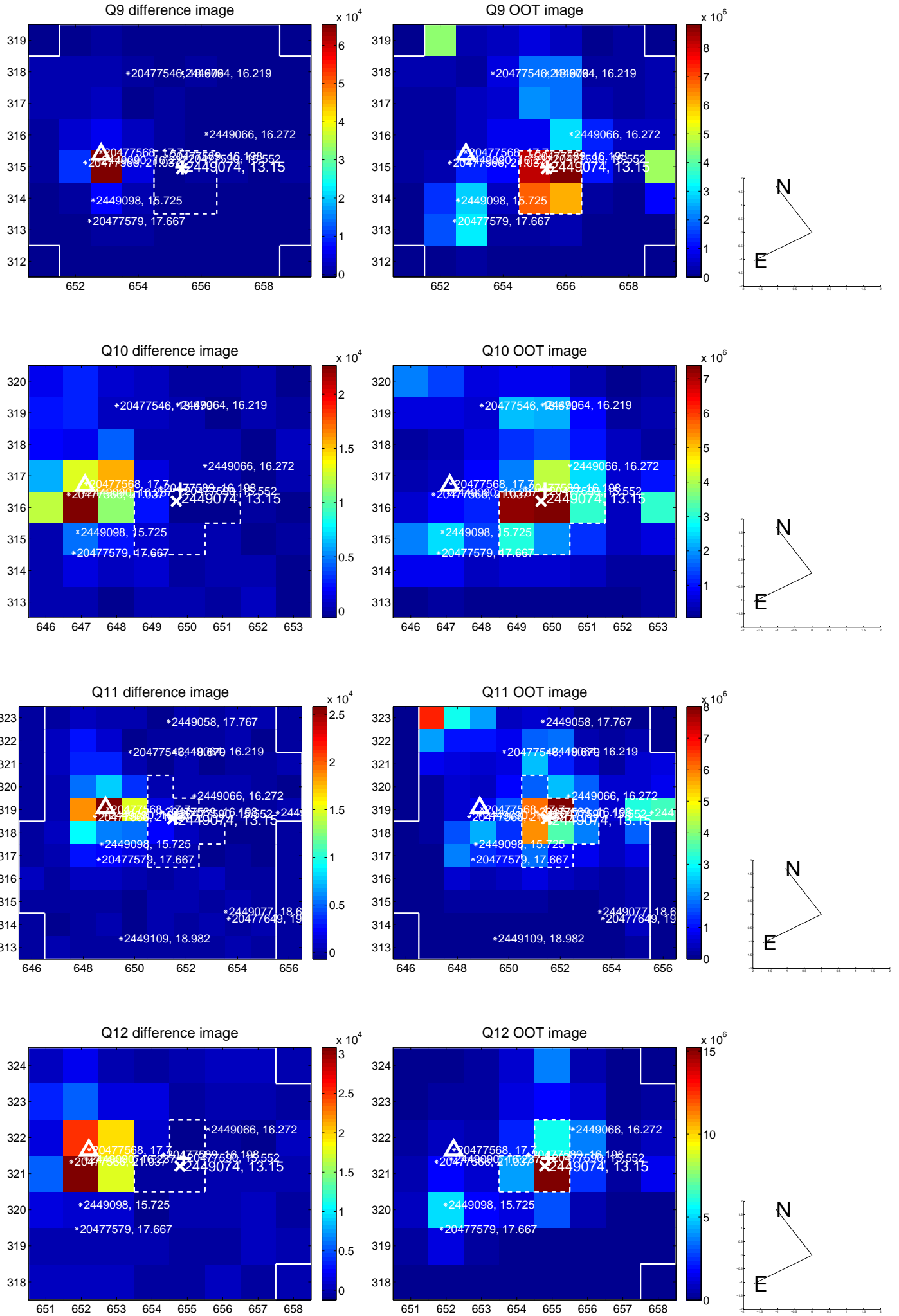
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



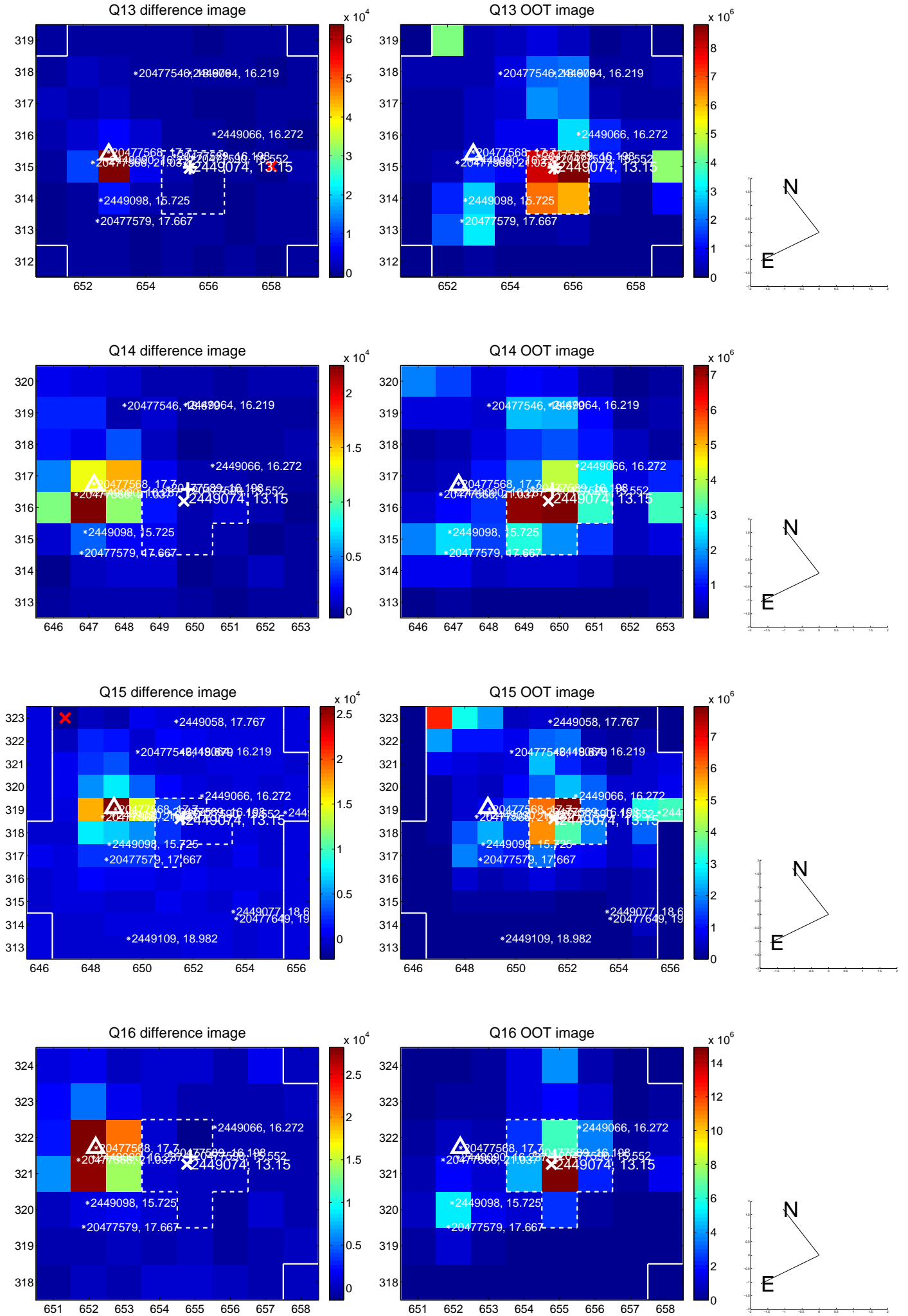
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



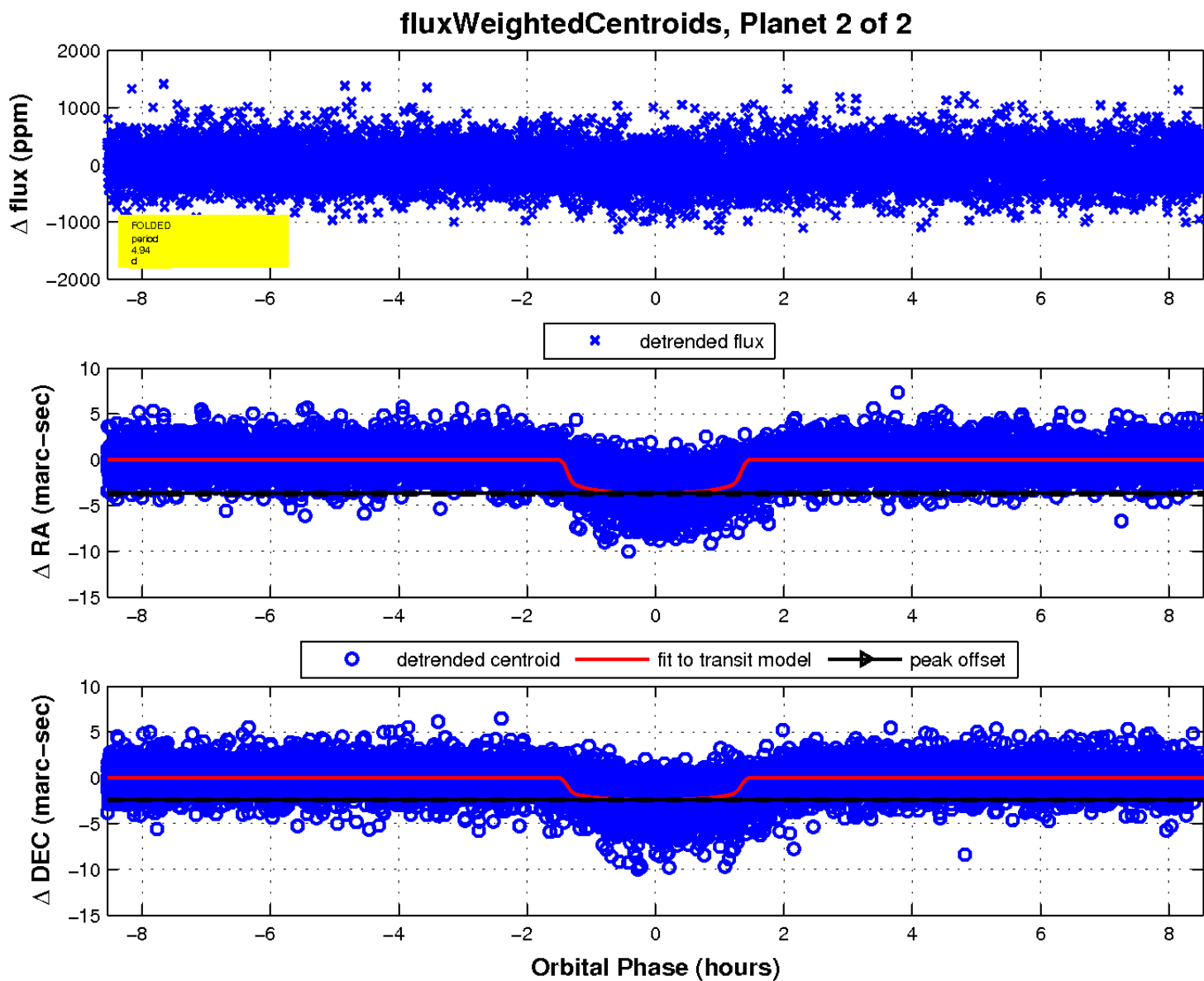
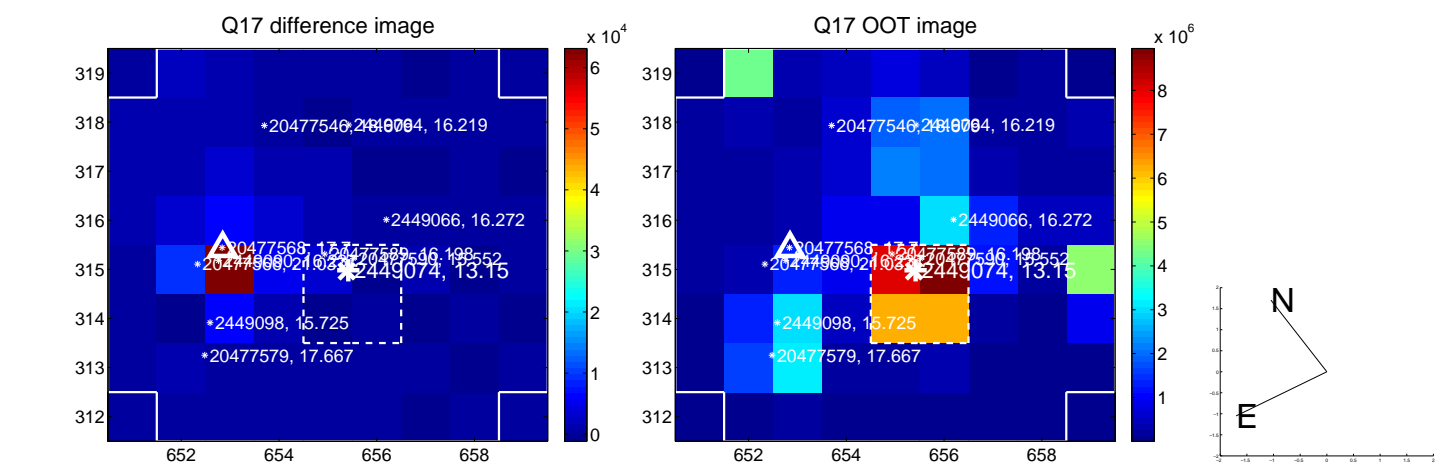
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



UKIRT Image

Declination

