

KIC 009784222

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})
009784222-01	OBS	1513.01	0.798177	131.585652	78.4	1.039	12.3	12.8	1.03	6258	1.08	4860.45
009784222-02	OBS	No	0.798164	131.985345	45.1	0.997	9.9	7.4	1.03	6258	0.82	4860.56

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009784222-01	OBS	FP	0.00	0	1	1	1	MOD_SEC_DV—MOD_SEC_ALT—HAS_SEC_TCE—CENT_RESOLVED_OFFSET—EPHEM_MATCH
009784222-02	OBS	FP	0.00	1	1	1	1	IS_SEC_TCE—CENT_RESOLVED_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 009784222-01

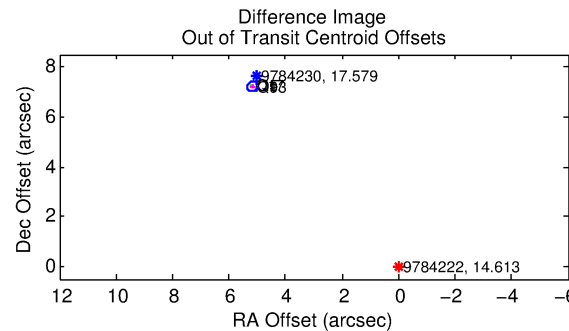
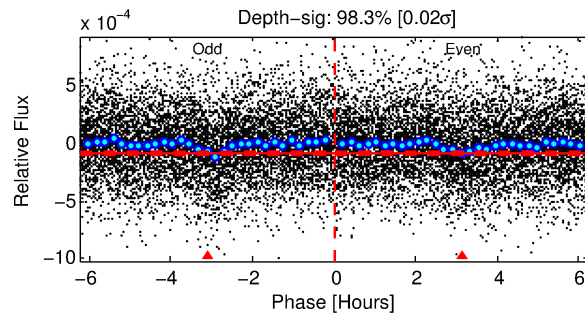
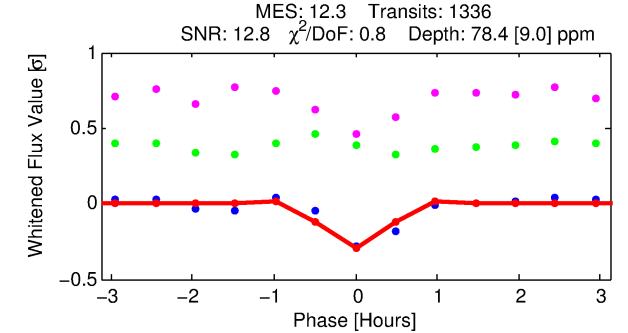
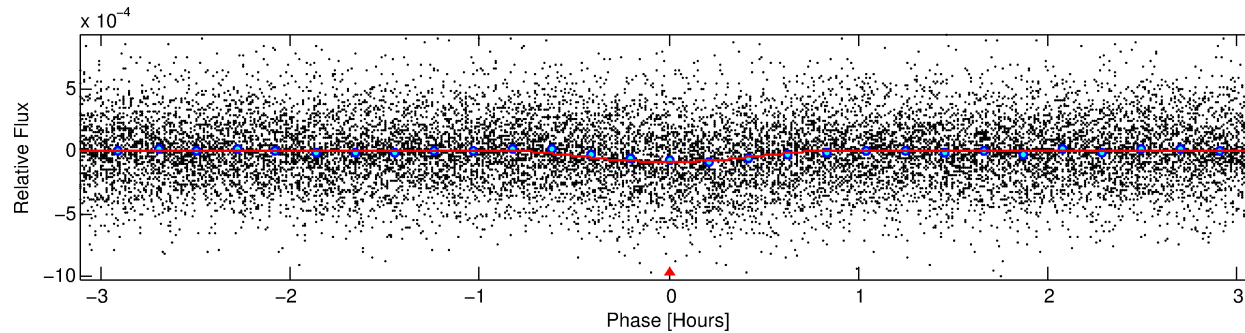
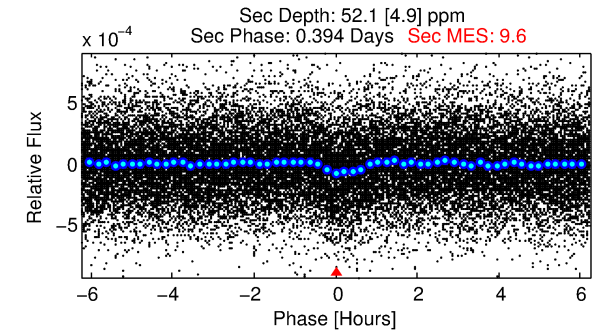
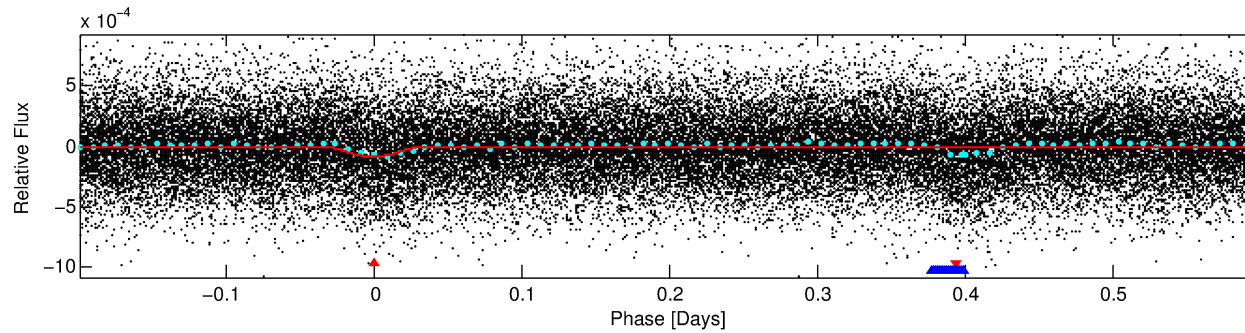
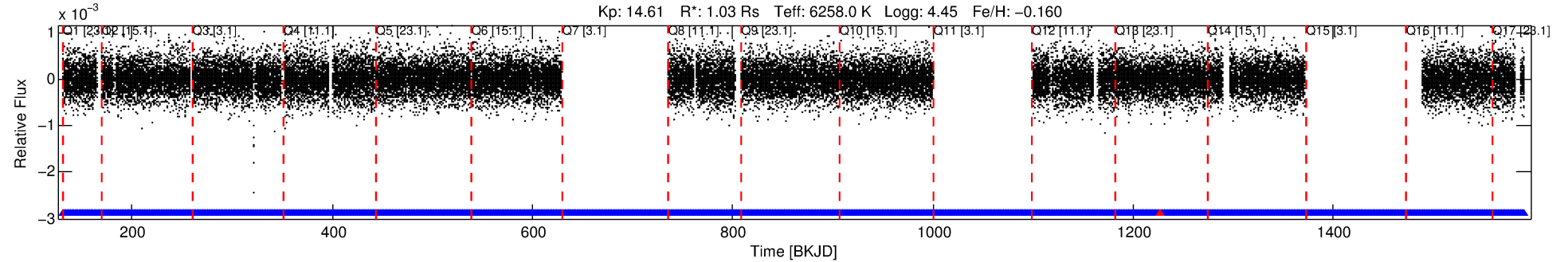
TCE (1)	KIC	Parent (2)	Parent KIC	$P_1:P_2$	Dist ($''$)	Δ Row	Δ Col	m_2	m_1	D_2/D_1	Mechanism	Flag	σ_P	σ_T
009784222-01	9784222	3851.01	9784230	1:1	9.1	-2	-1	17.58	14.61	4131.40	Direct-PRF	0	2.55	1.23

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: 9784222 Candidate: 1 of 2 Period: 0.798 d
KOI: K01513 Corr: No Ephemeris Match

Kp: 14.61 R*: 1.03 Rs Teff: 6258.0 K Logg: 4.45 Fe/H: -0.160



DV Fit Results:

Period = 0.79818 [0.00001] d
Epoch = 131.5857 [0.0014] BKJD
Rp/R* = 0.0096 [0.0033]
a/R* = 2.84 [4.63]
b = 0.90 [0.40]
Seff = 4860.46 [1875.99]
Teq = 2129 [205] K
Rp = 1.08 [0.49] Re
a = 0.0173 [0.0043] AU
Ag = 7.41 [5.81] [1.10σ]
Teff = 5431 [960] K [3.36σ]

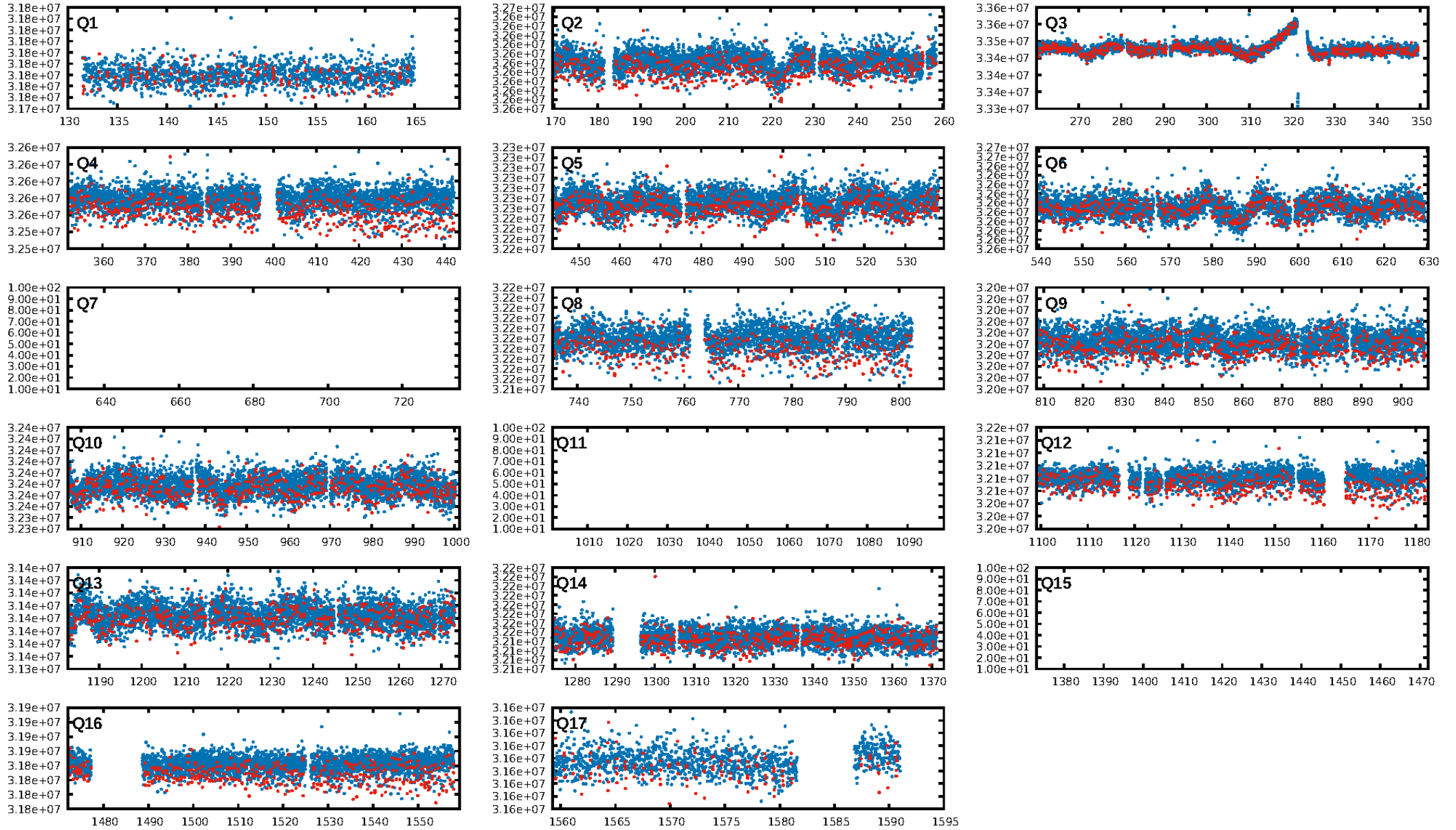
DV Diagnostic Results:

ShortPeriod-sig: 0.0% [0.00σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: N/A
ModelChiSquareGoF-sig: N/A
Bootstrap-pfa: 1.69e-35
RollingBand-fgt: 1.00 [1260/1261]
GhostDiagnostic-chr: N/A
Centroid-sig: N/A
Centroid-so: N/A
OotOffset-rm: 8.884 arcsec [132.50σ]
KicOffset-rm: 8.771 arcsec [127.42σ]
OotOffset-st: 0/0/0/4 [4]
KicOffset-st: 0/0/0/4 [4]
DiffImageQuality-fgm: 1.00 [4/4]
DiffImageOverlap-fno: 1.00 [14/14]

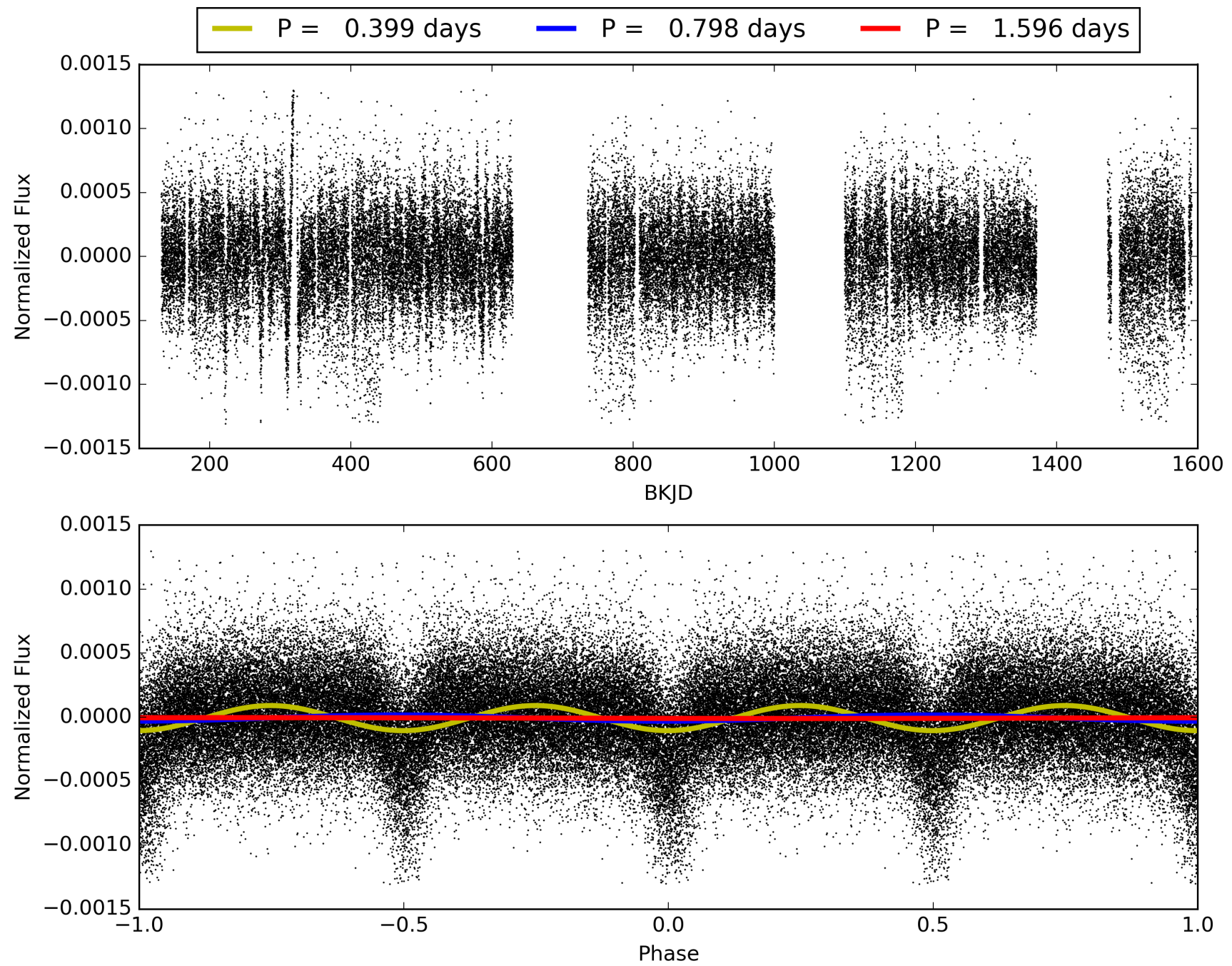
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 07:35:28 Z

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

TCE 009784222-01, PDC Light Curves

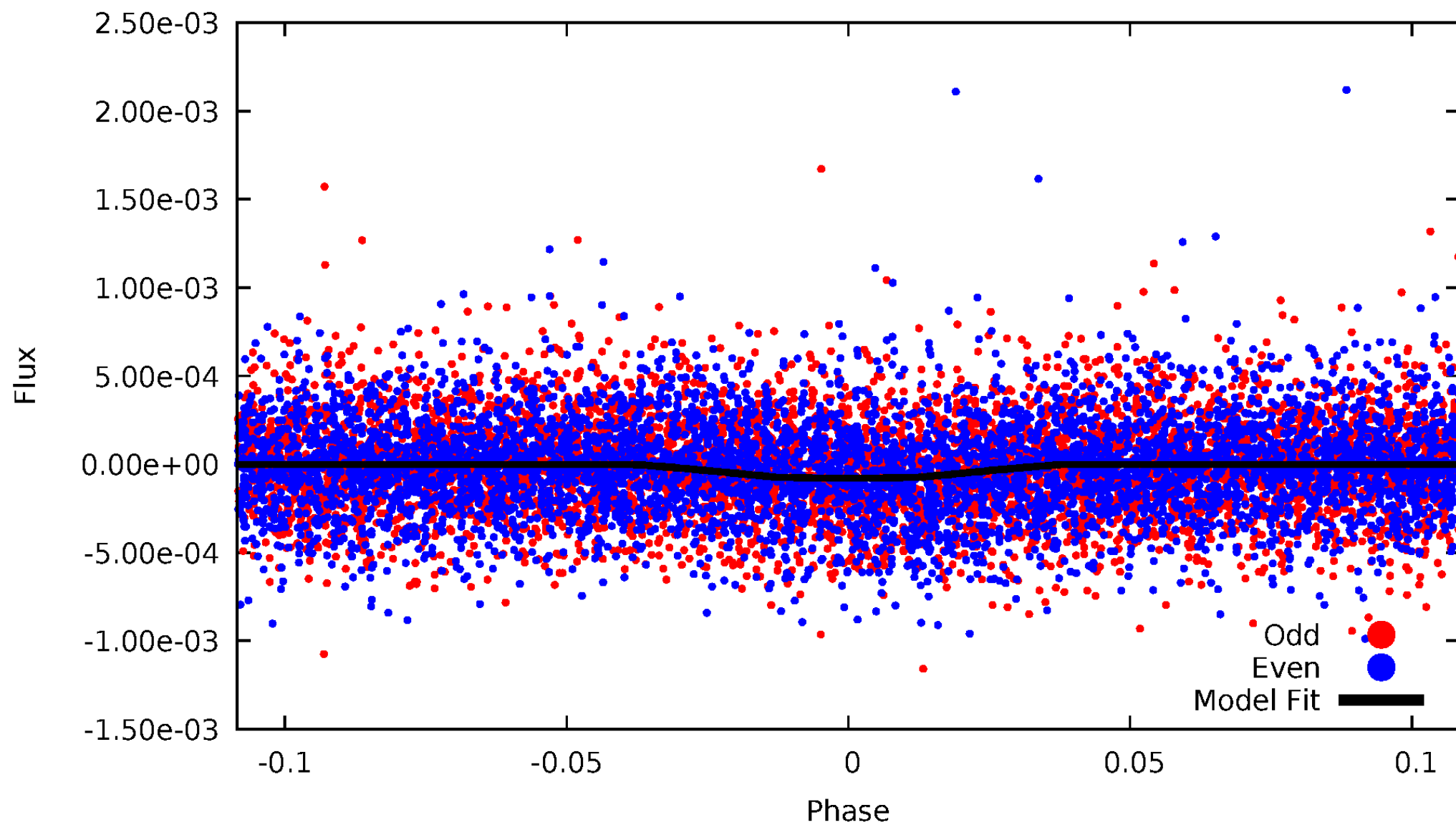


TCE 009784222-01



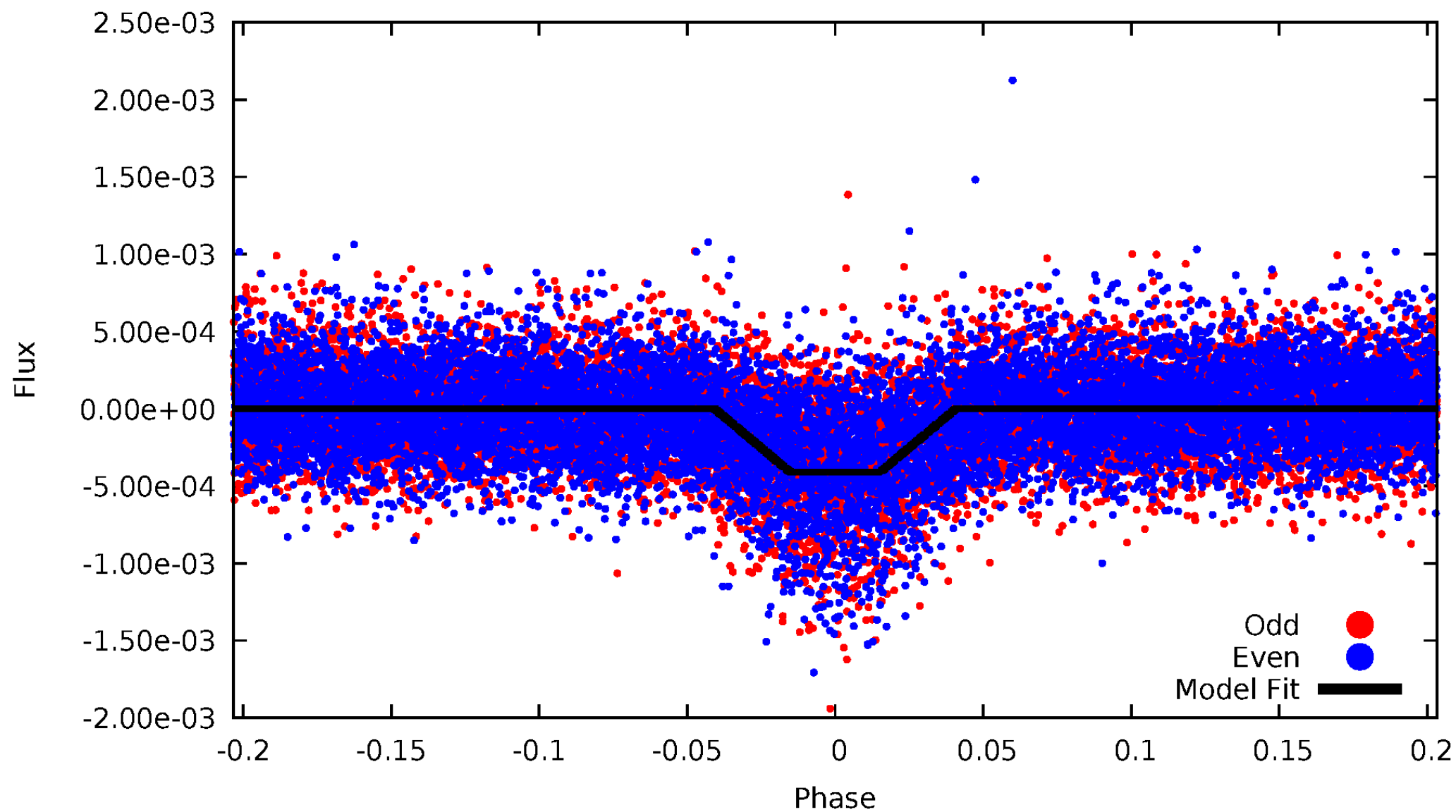
DV Odd/Even

TCE 009784222-01

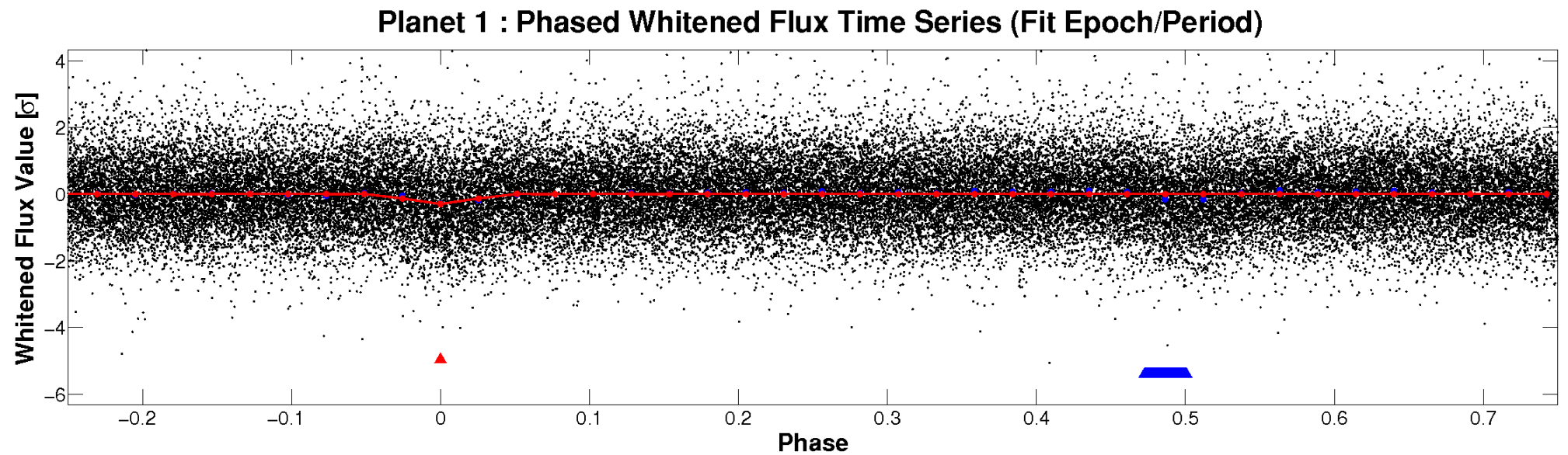
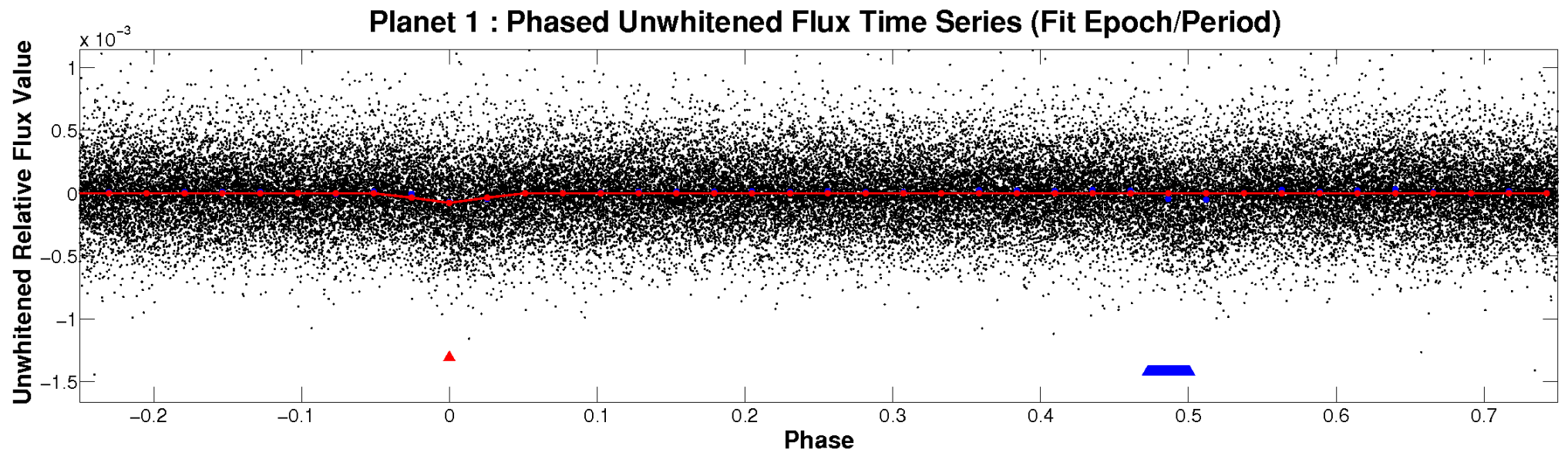


ALT Odd/Even

TCE 009784222-01

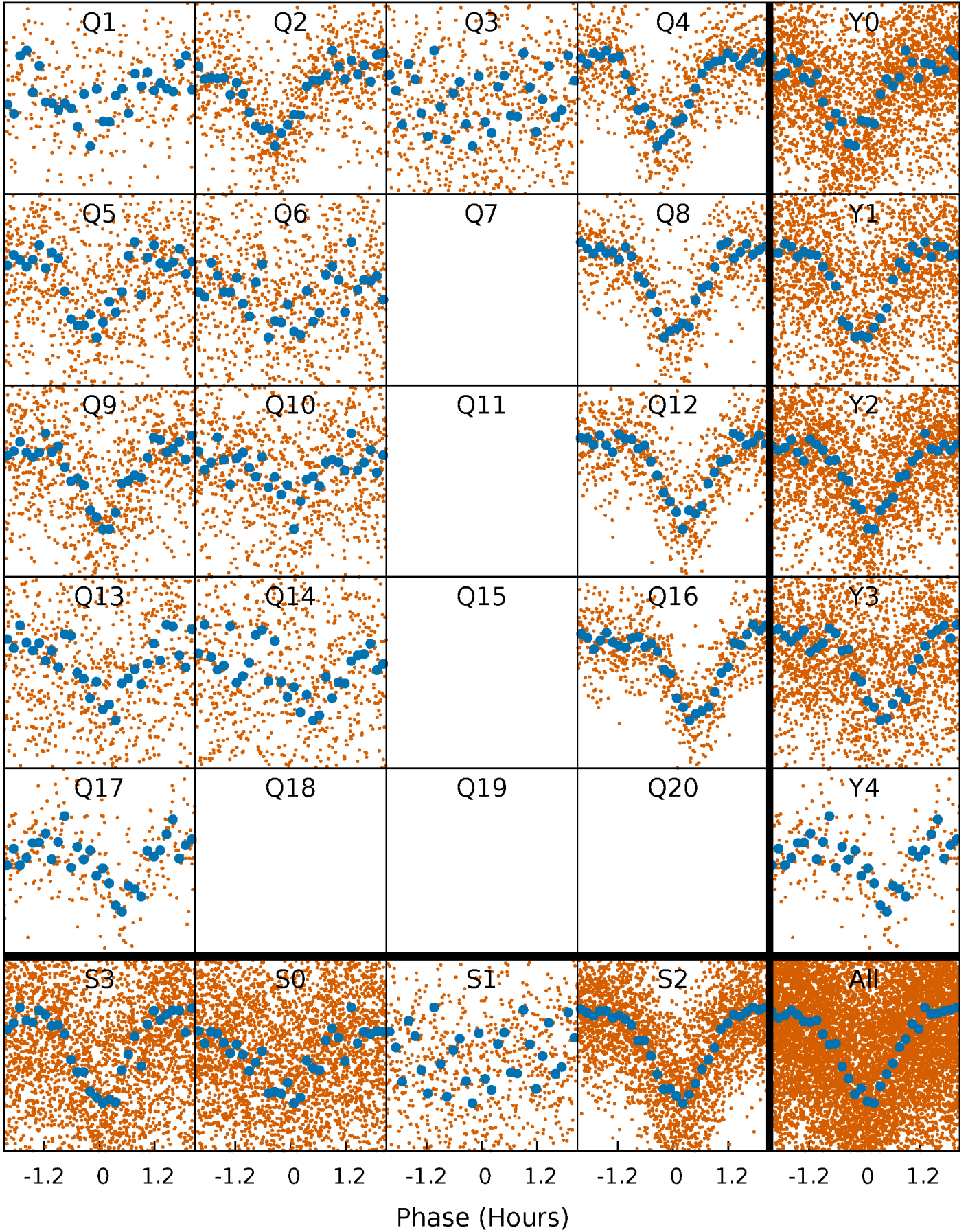


Non-Whitened Vs. Whitened Light Curve



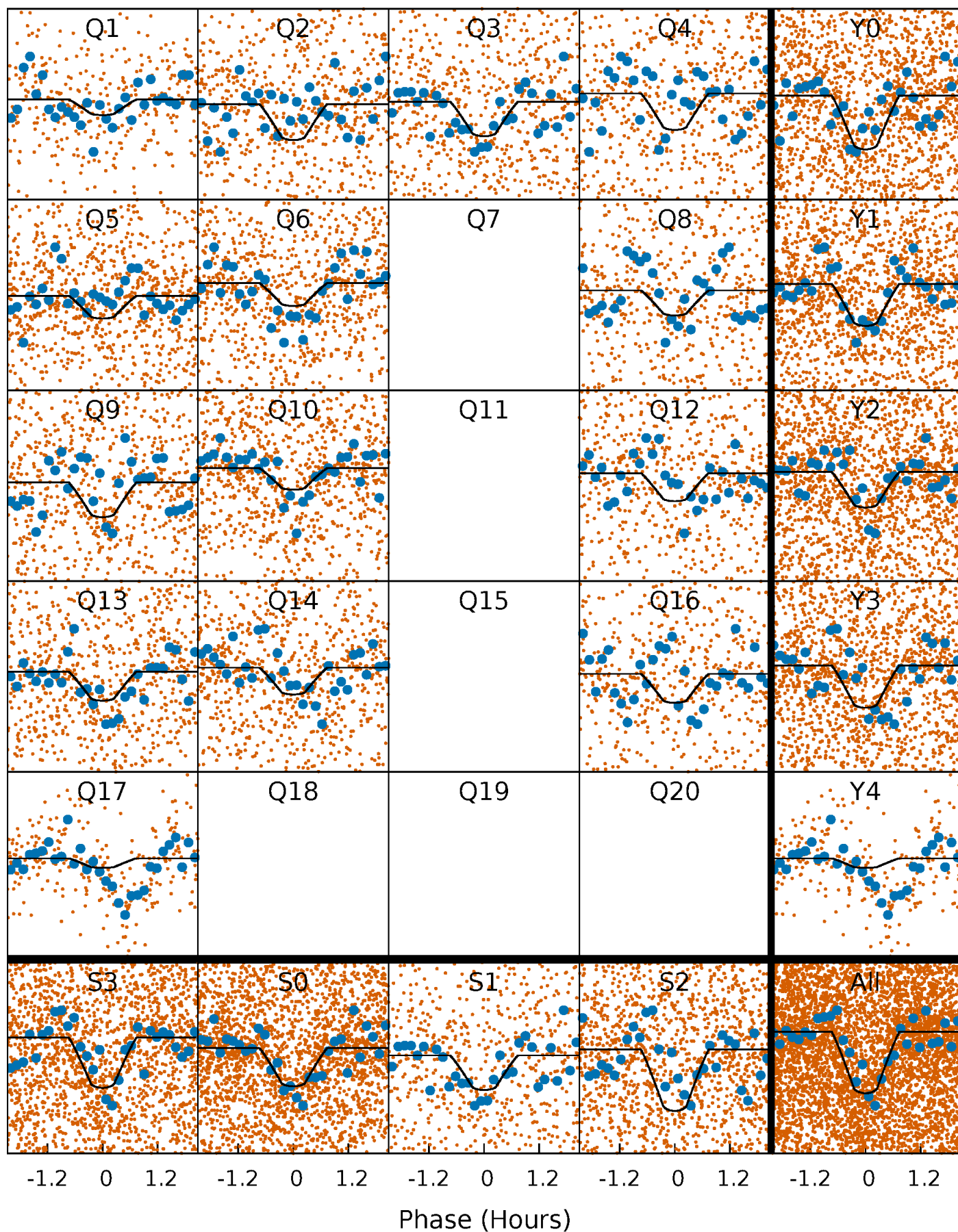
PDC Quarter-Phased Transit Curves

TCE 009784222-01 P= 0.798177 Days $T_0=131.585652$ (BKJD)



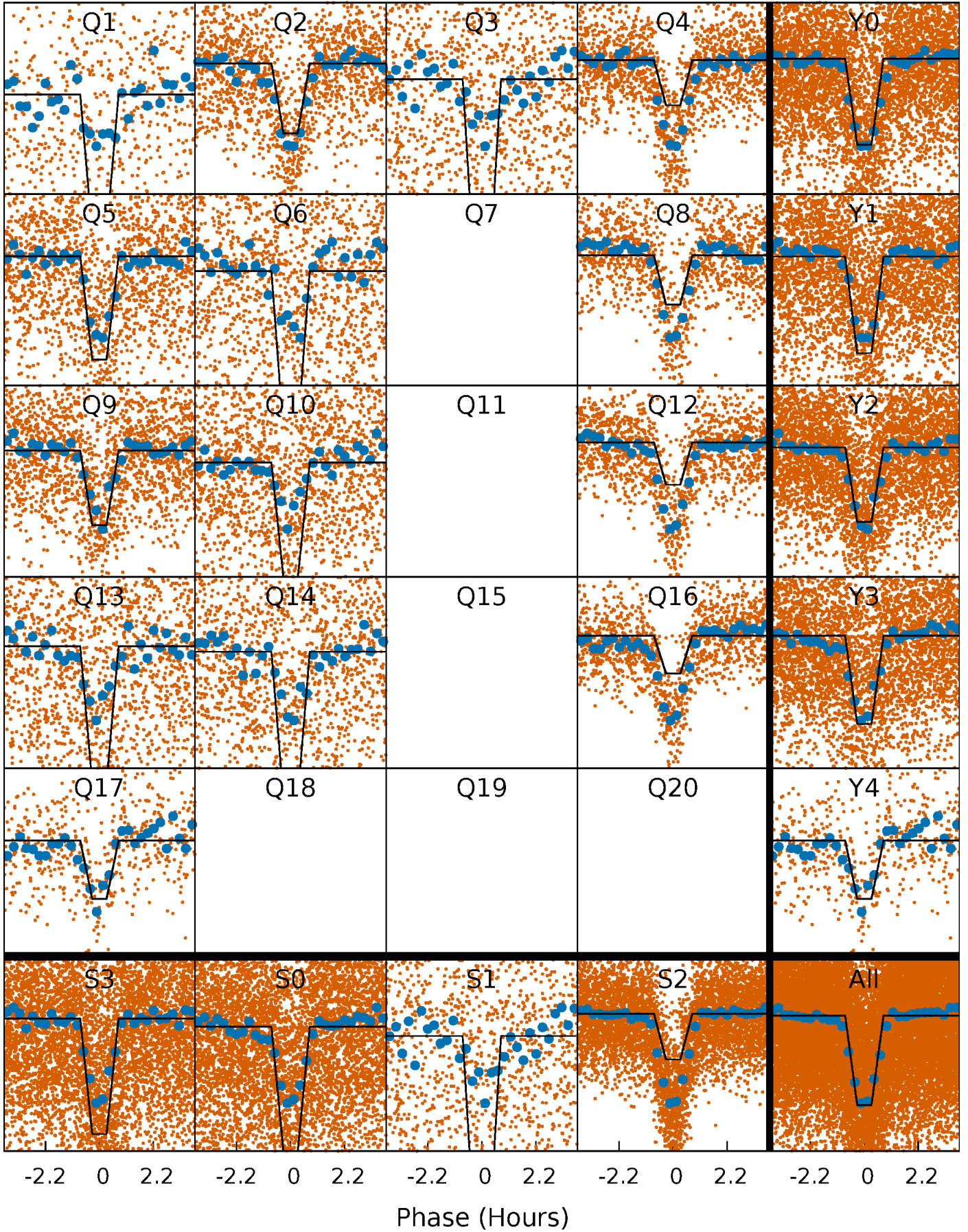
DV Quarter-Phased Transit Curves

TCE 009784222-01 P= 0.798177 Days $T_0=131.585652$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

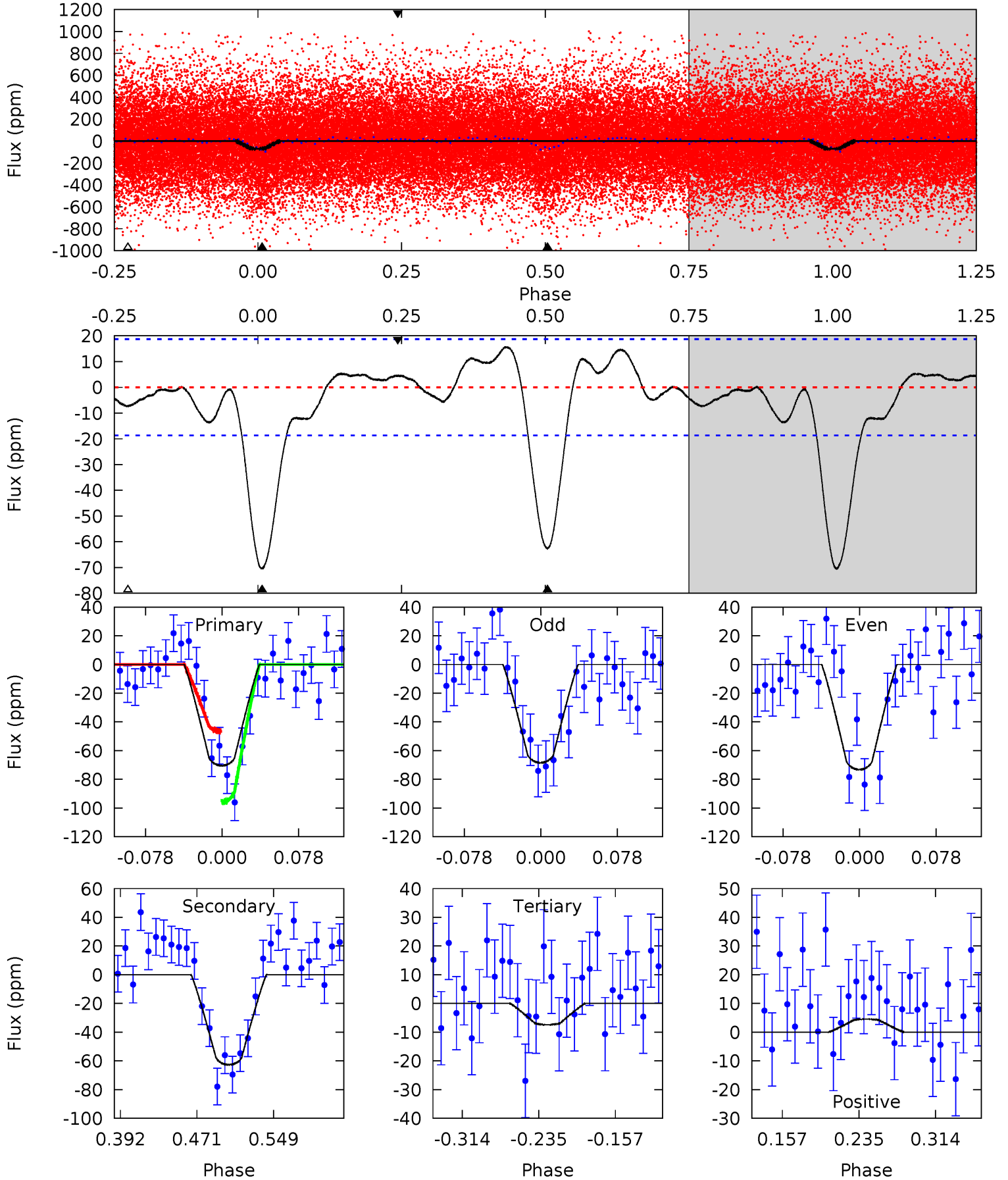
TCE 009784222-01 P= 0.798200 Days $T_0=131.567782$ (BKJD)



DV Model-Shift Uniqueness Test

009784222-01, P = 0.798177 Days, E = 130.787475 Days

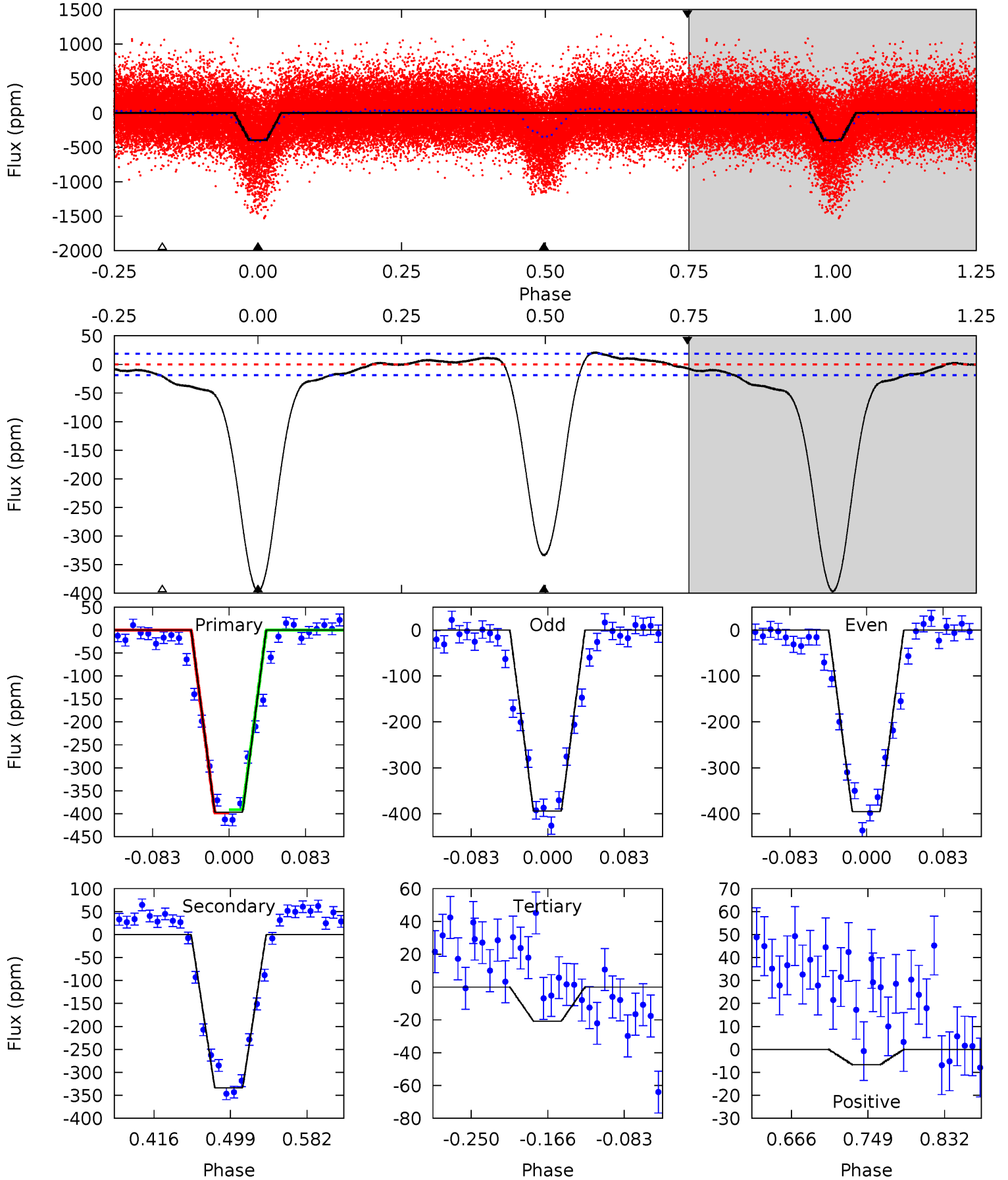
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
17.4	15.5	1.83	1.12	4.62	1.76	1.63	15.6	16.3	13.6	14.4	0.59	0.92	0.18	6.10



Alt Model-Shift Uniqueness Test

009784222-01, P = 0.798200 Days, E = 130.769582 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
98.0	82.4	5.13	-1.64	4.60	1.73	4.02	92.8	99.6	77.2	84.0	0.14	1.15	0.05	0.86



Stellar Parameters For KIC 009784222

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	6258^{+169}_{-206}	$4.449^{+0.050}_{-0.200}$	$-0.160^{+0.250}_{-0.300}$	$1.031^{+0.299}_{-0.107}$	$1.087^{+0.144}_{-0.144}$	$1.398^{+0.369}_{-0.704}$
	+3%/-3%	+1%/-4%	+156%/-188%	+29%/-10%	+13%/-13%	+26%/-50%
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 009784222-01 / KOI 1513.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-63 ± 4	$1.12^{+0.43}_{-0.41}$	3038^{+208}_{-143}	5702^{+1391}_{-797}	$8.217^{+11.643}_{-3.964}$
Alt.	-333 ± 4	$2.40^{+0.50}_{-0.44}$	3040^{+197}_{-136}	5877^{+610}_{-446}	$9.440^{+4.437}_{-2.812}$

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 $A_{obs} \gg 1.0$

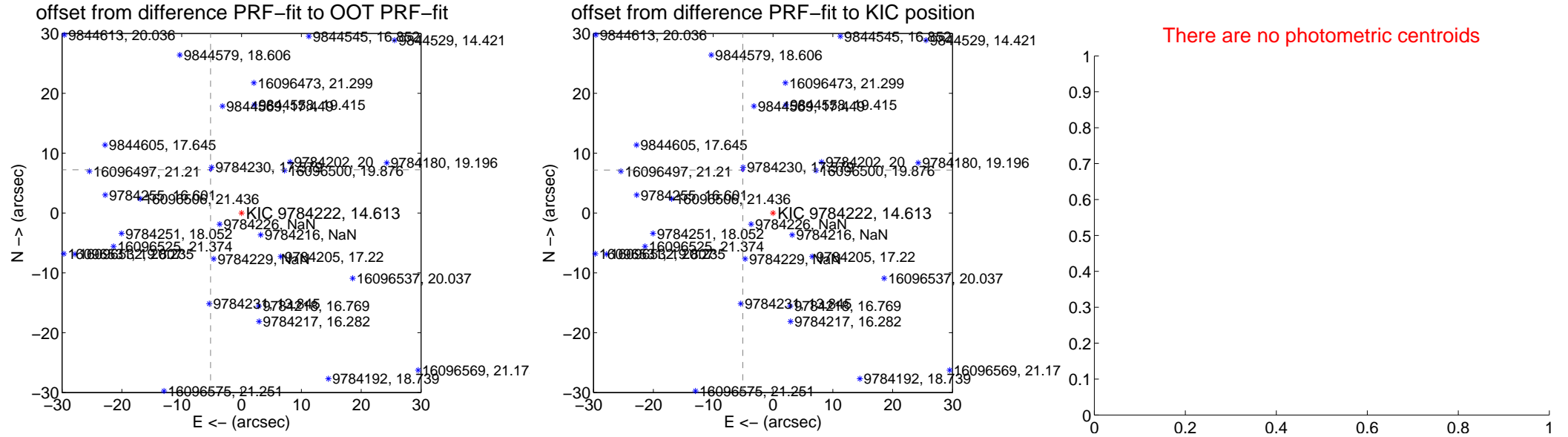
DV Centroid Data

Supplemental centroid analysis for 009784222-01. Kepler magnitude: 14.61. Transit SNR 12.78

There are 4 quarters with good PRF difference image offsets

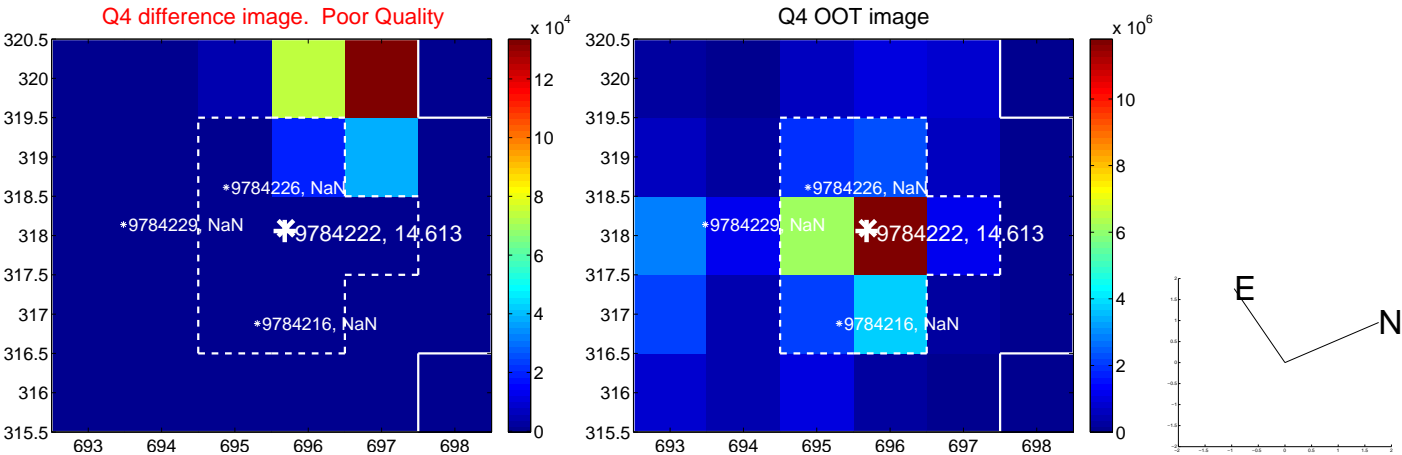
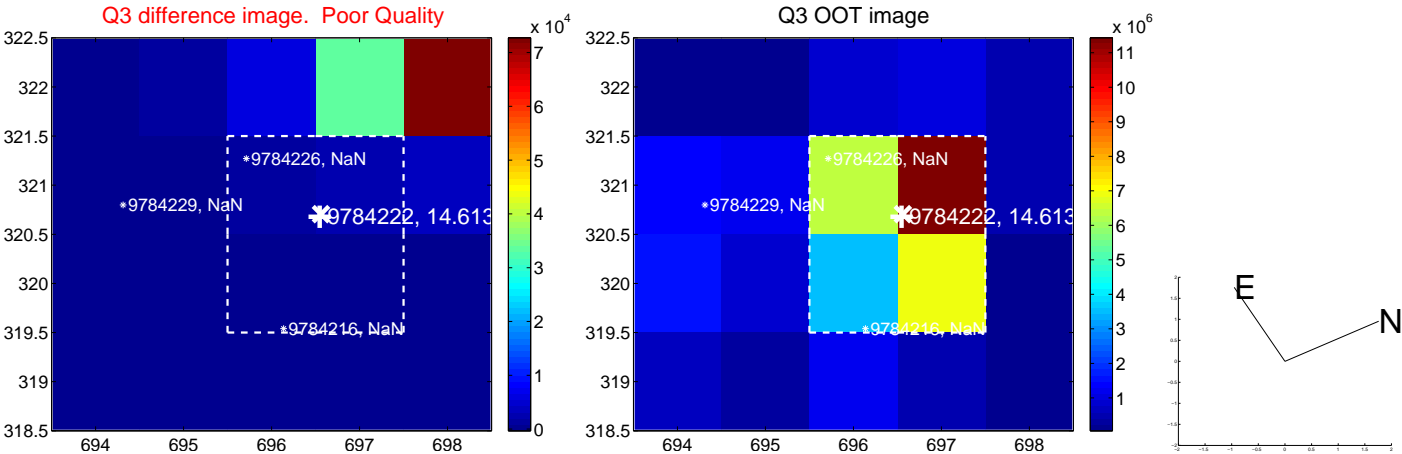
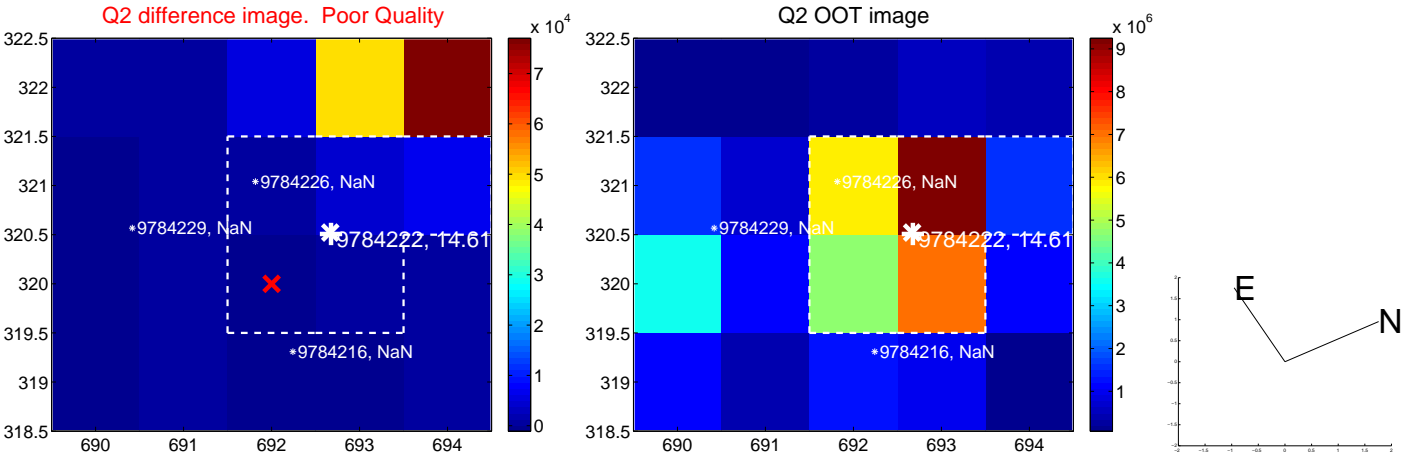
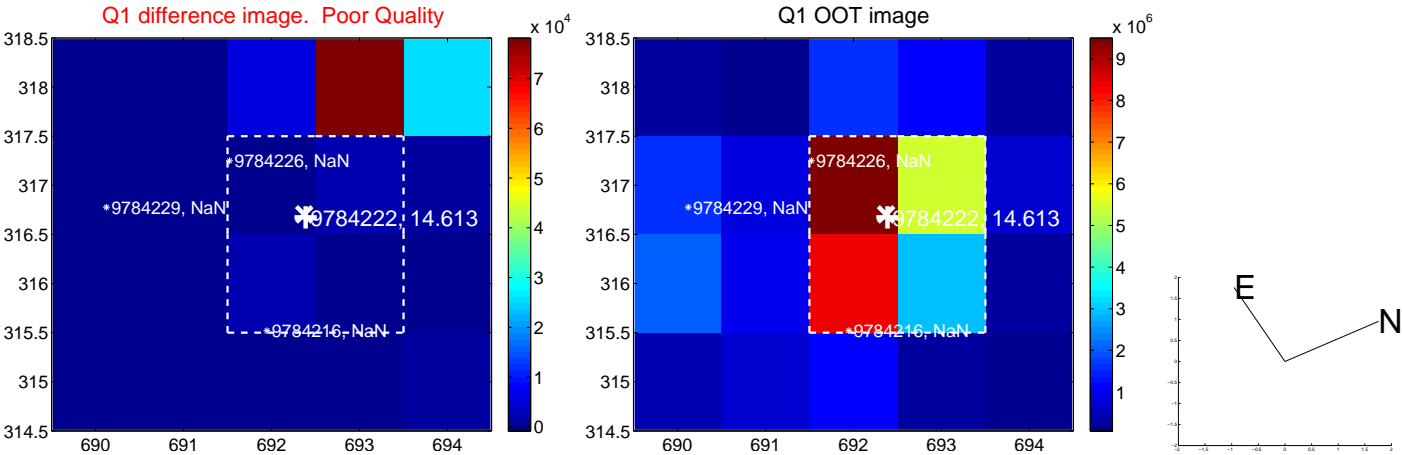
The direct PRF centroid is offset from the target star catalog position by about 0.13 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	8.884 \pm 0.067	132.50	5.178 \pm 0.067	7.219 \pm 0.067
PRF-fit source offset from KIC position	8.771 \pm 0.069	127.42	5.050 \pm 0.067	7.172 \pm 0.070
photometric centroid source offset	—	—	—	—

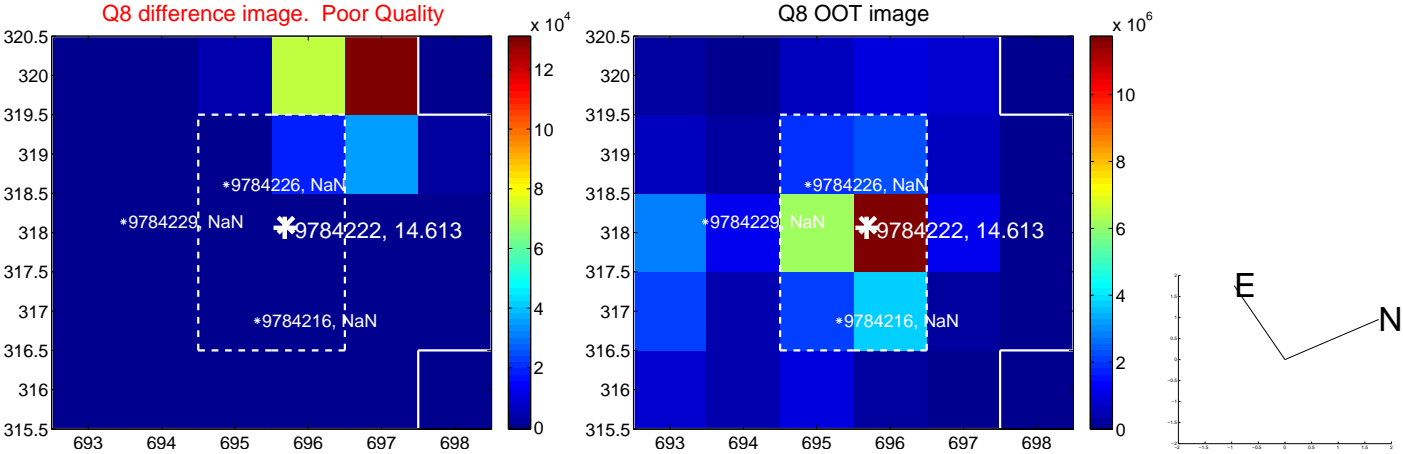
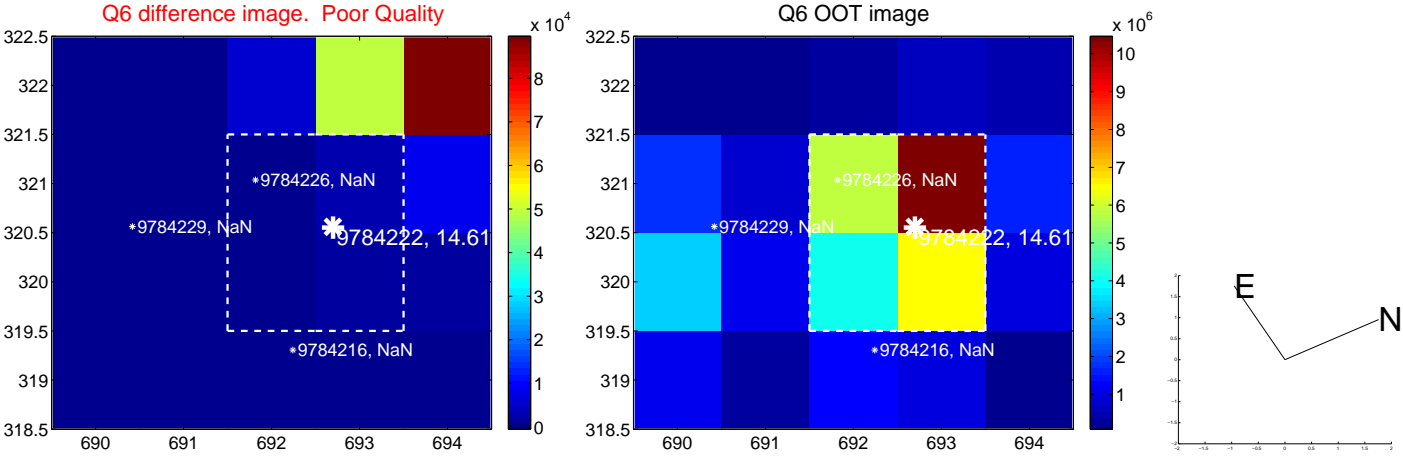
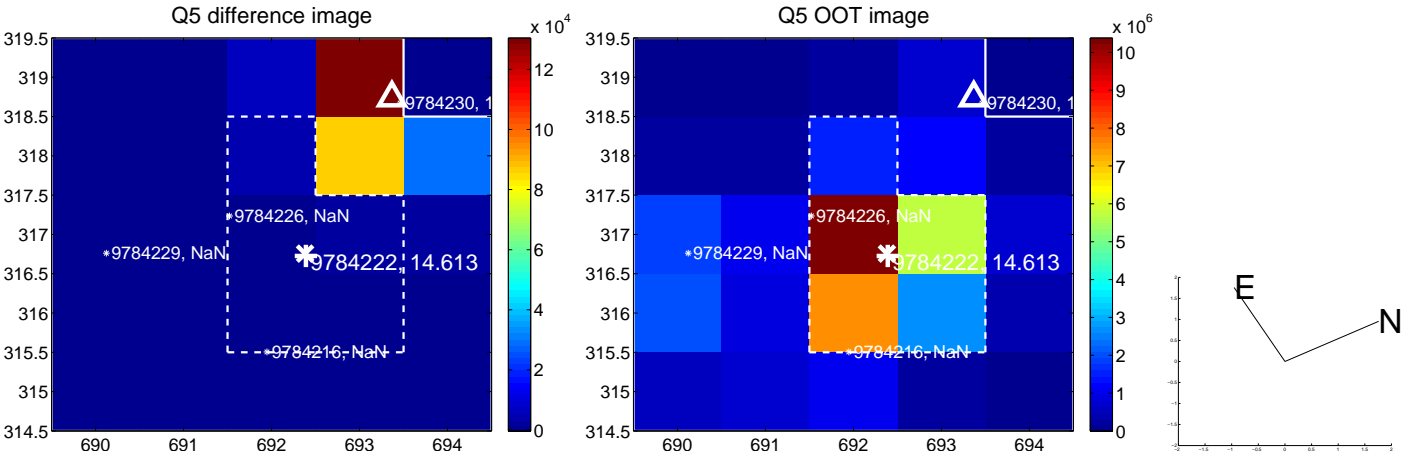


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

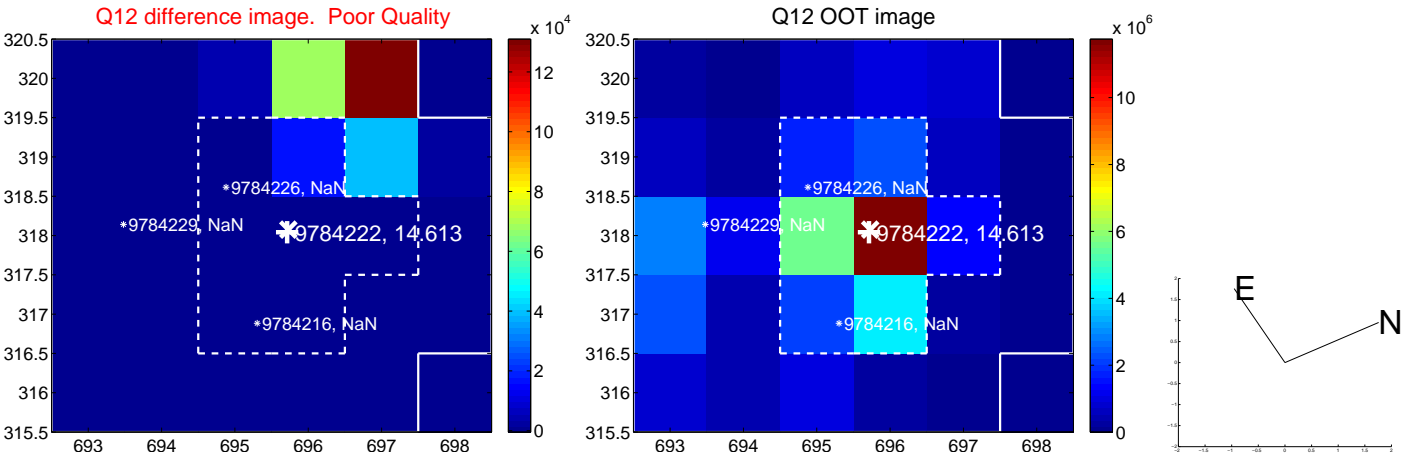
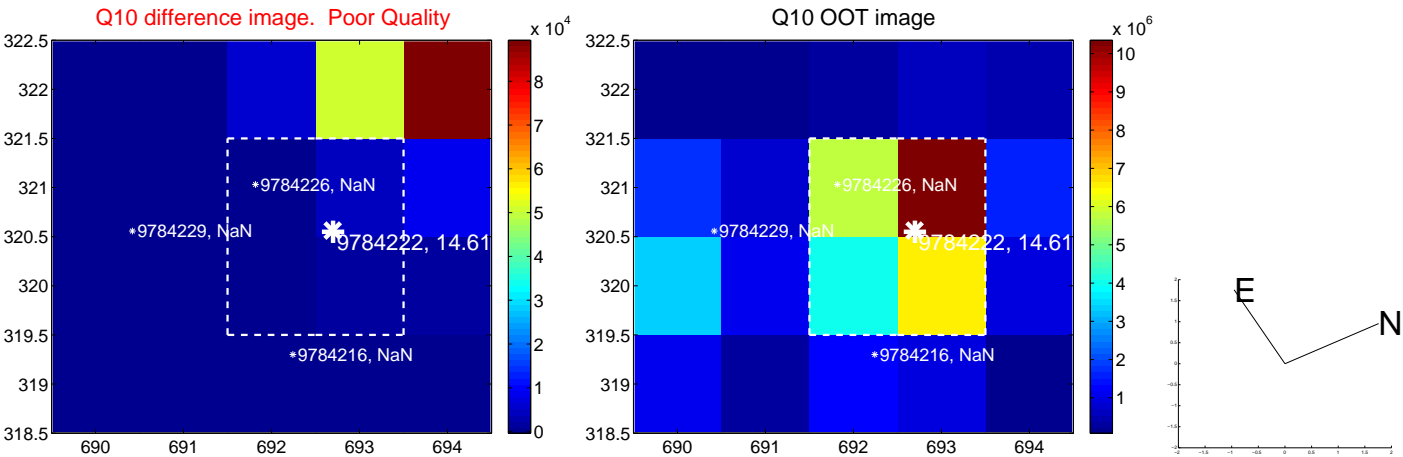
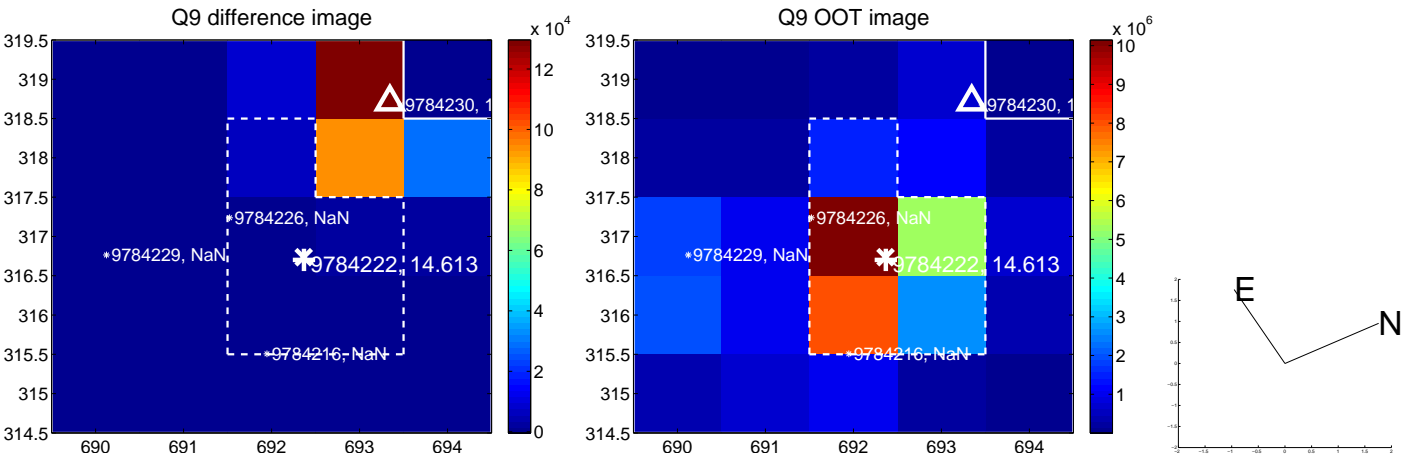
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



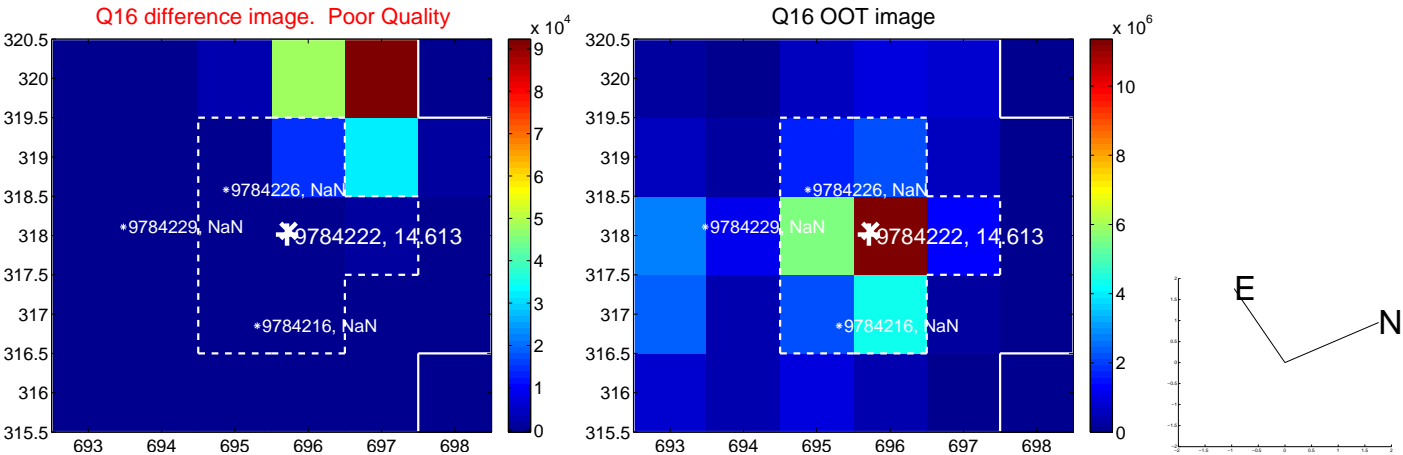
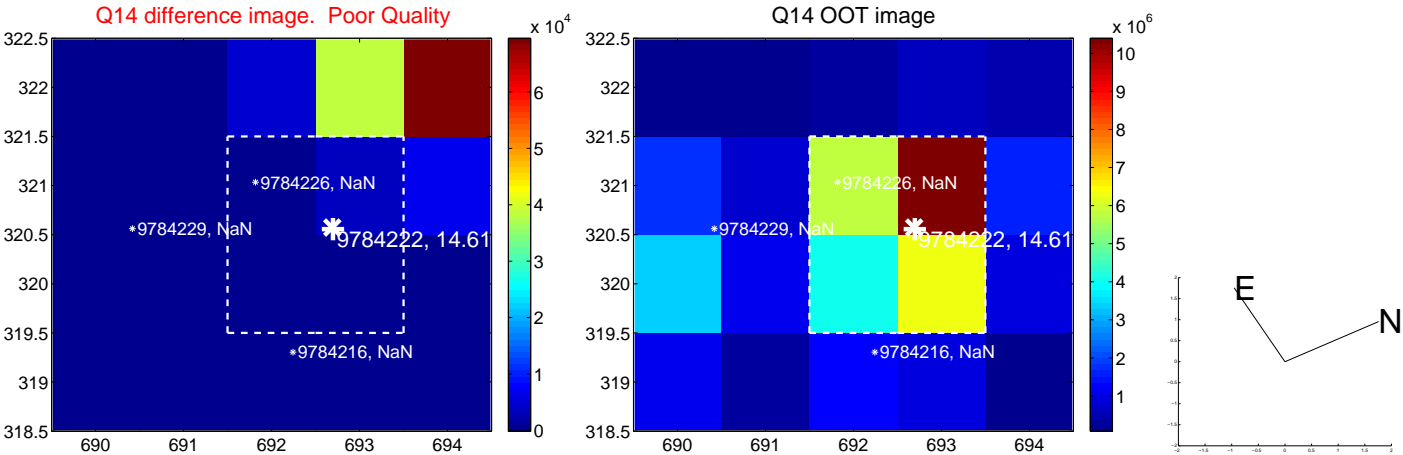
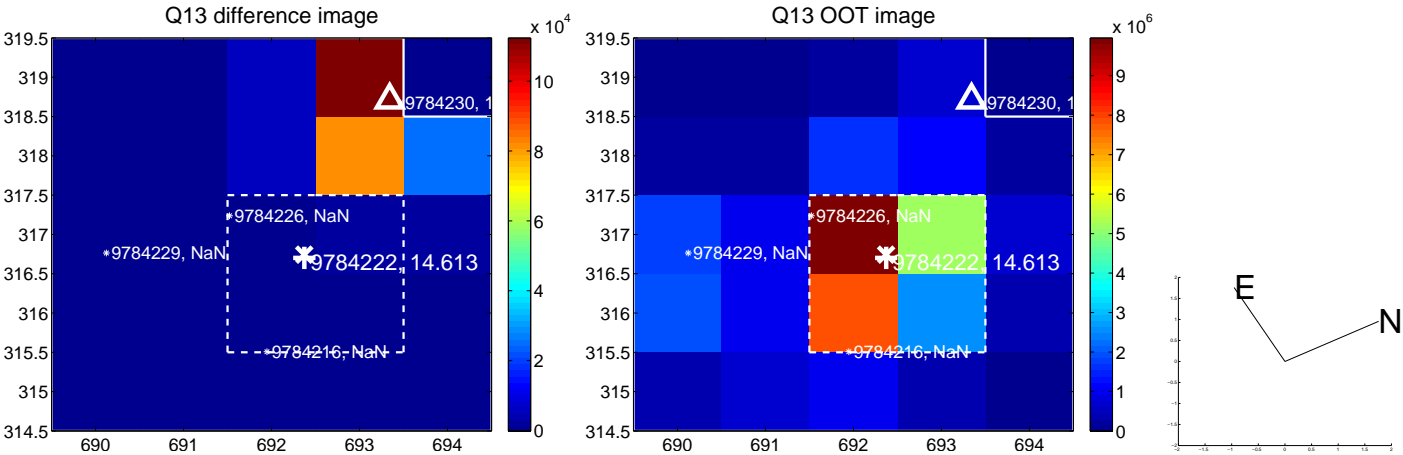
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



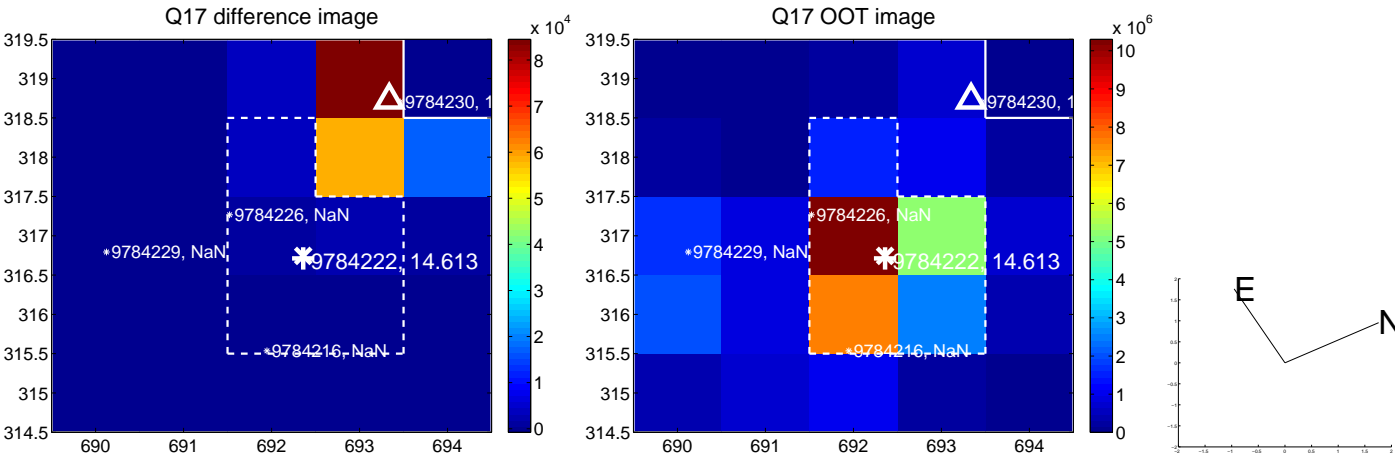
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

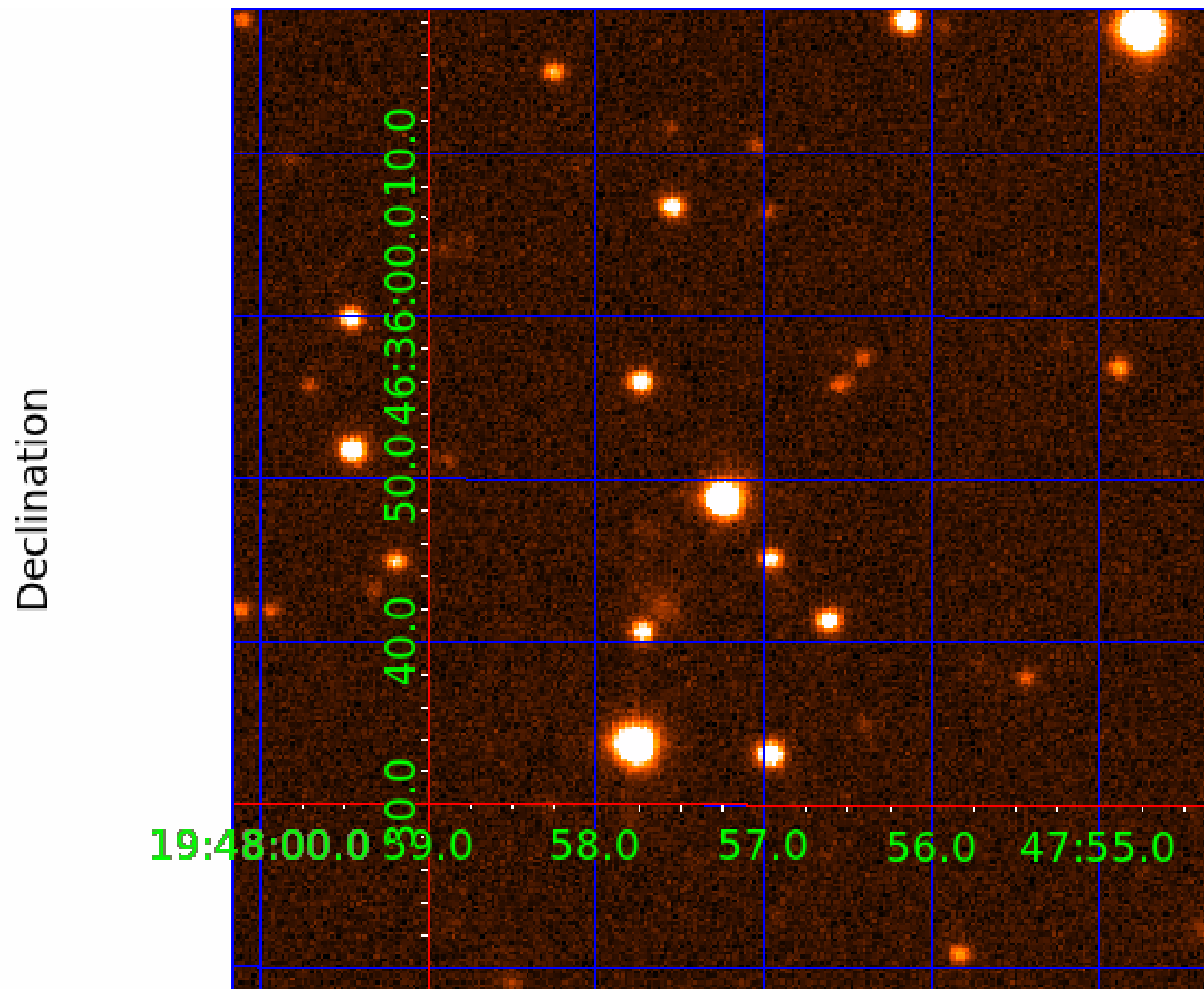


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



folded centroid time series figure for this object.

UKIRT Image



KIC 009784222

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})
009784222-01	OBS	1513.01	0.798177	131.585652	78.4	1.039	12.3	12.8	1.03	6258	1.08	4860.45
009784222-02	OBS	No	0.798164	131.985345	45.1	0.997	9.9	7.4	1.03	6258	0.82	4860.56

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009784222-01	OBS	FP	0.00	0	1	1	1	MOD_SEC_DV—MOD_SEC_ALT—HAS_SEC_TCE—CENT_RESOLVED_OFFSET—EPHEM_MATCH
009784222-02	OBS	FP	0.00	1	1	1	1	IS_SEC_TCE—CENT_RESOLVED_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 009784222-02

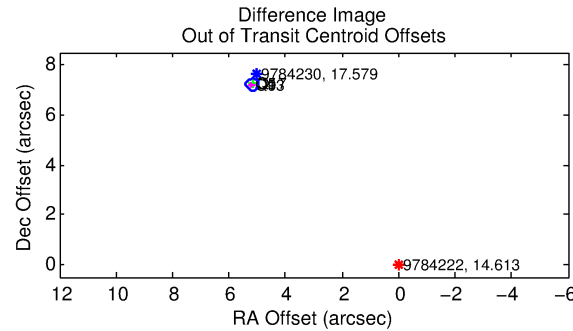
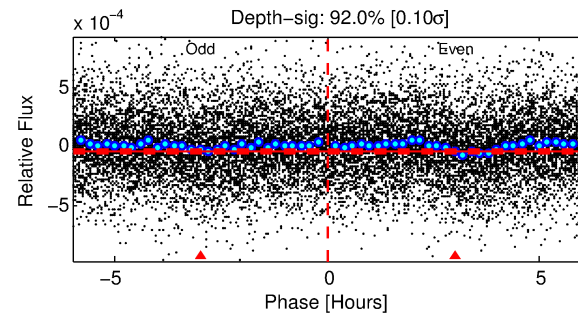
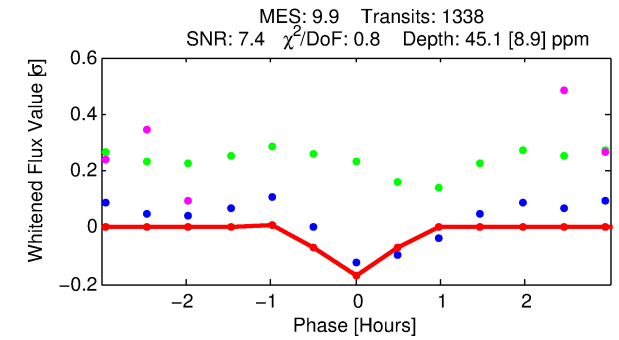
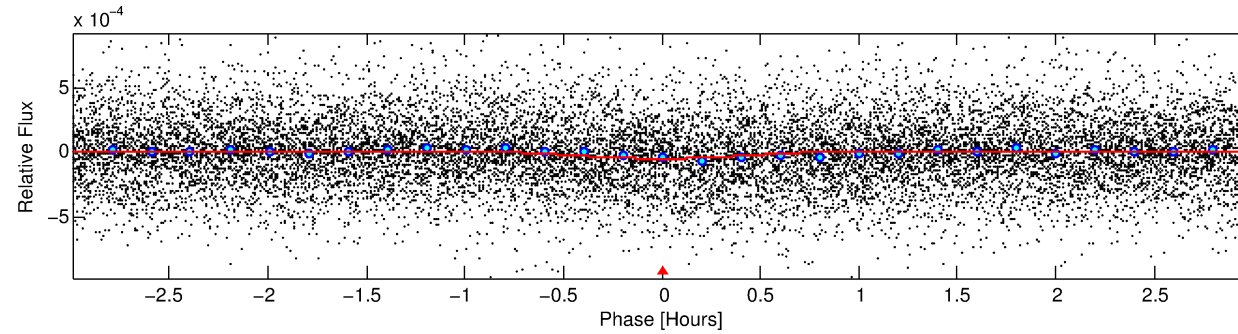
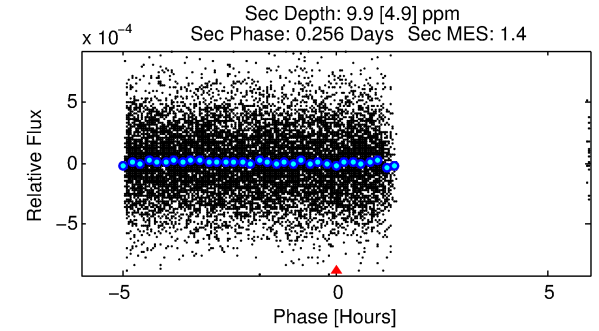
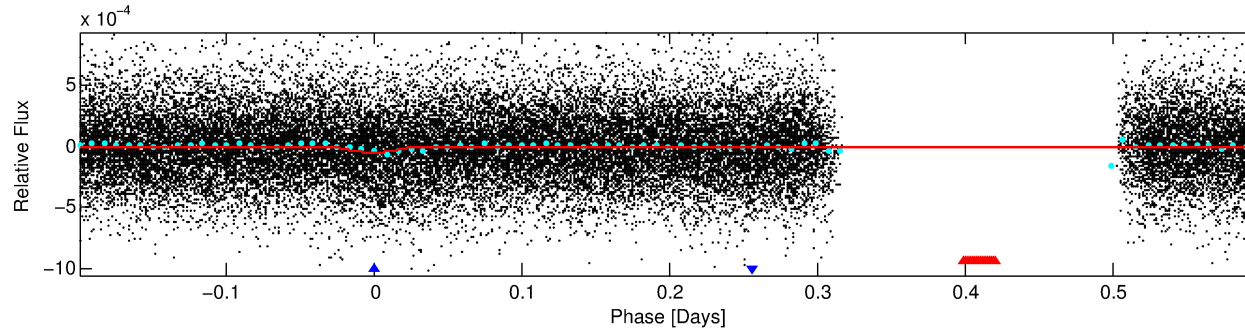
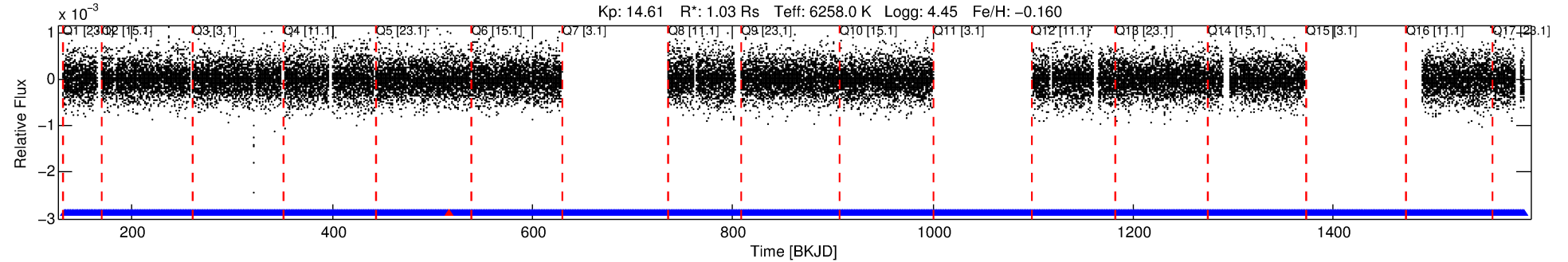
TCE (1)	KIC	Parent (2)	Parent KIC	$P_1:P_2$	Dist ($''$)	Δ Row	Δ Col	m_2	m_1	D_2/D_1	Mechanism	Flag	σ_P	σ_T
009784222-02	9784222	009784230-01	9784230	1:1	9.1	-2	-1	17.58	14.61	5090.60	Direct-PRF	0	4.01	1.17

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: 9784222 Candidate: 2 of 2 Period: 0.798 d
KOI: K01513 Corr: No Ephemeris Match

Kp: 14.61 R*: 1.03 Rs Teff: 6258.0 K Logg: 4.45 Fe/H: -0.160



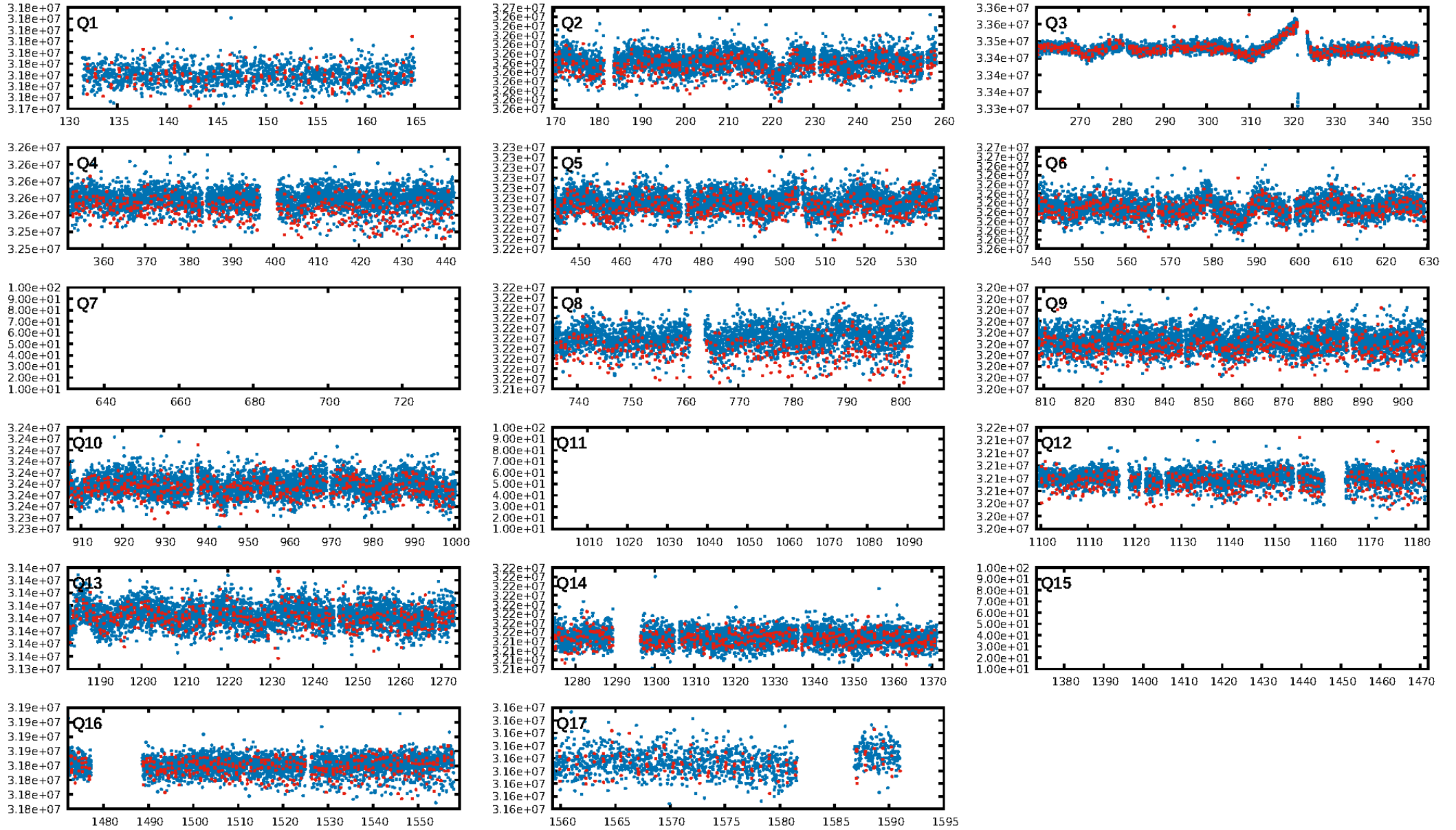
DV Fit Results:

Period = 0.79816 [0.00001] d
Epoch = 131.9853 [0.0024] BKJD
Rp/R* = 0.0073 [0.0029]
a/R* = 2.87 [5.39]
b = 0.90 [0.44]
Seff = 4860.56 [1876.03]
Teq = 2129 [205] K
Rp = 0.82 [0.40] Re
a = 0.0173 [0.0043] AU
Ag = 2.42 [2.43] [0.58σ]
Teff = 4104 [973] K [1.99σ]

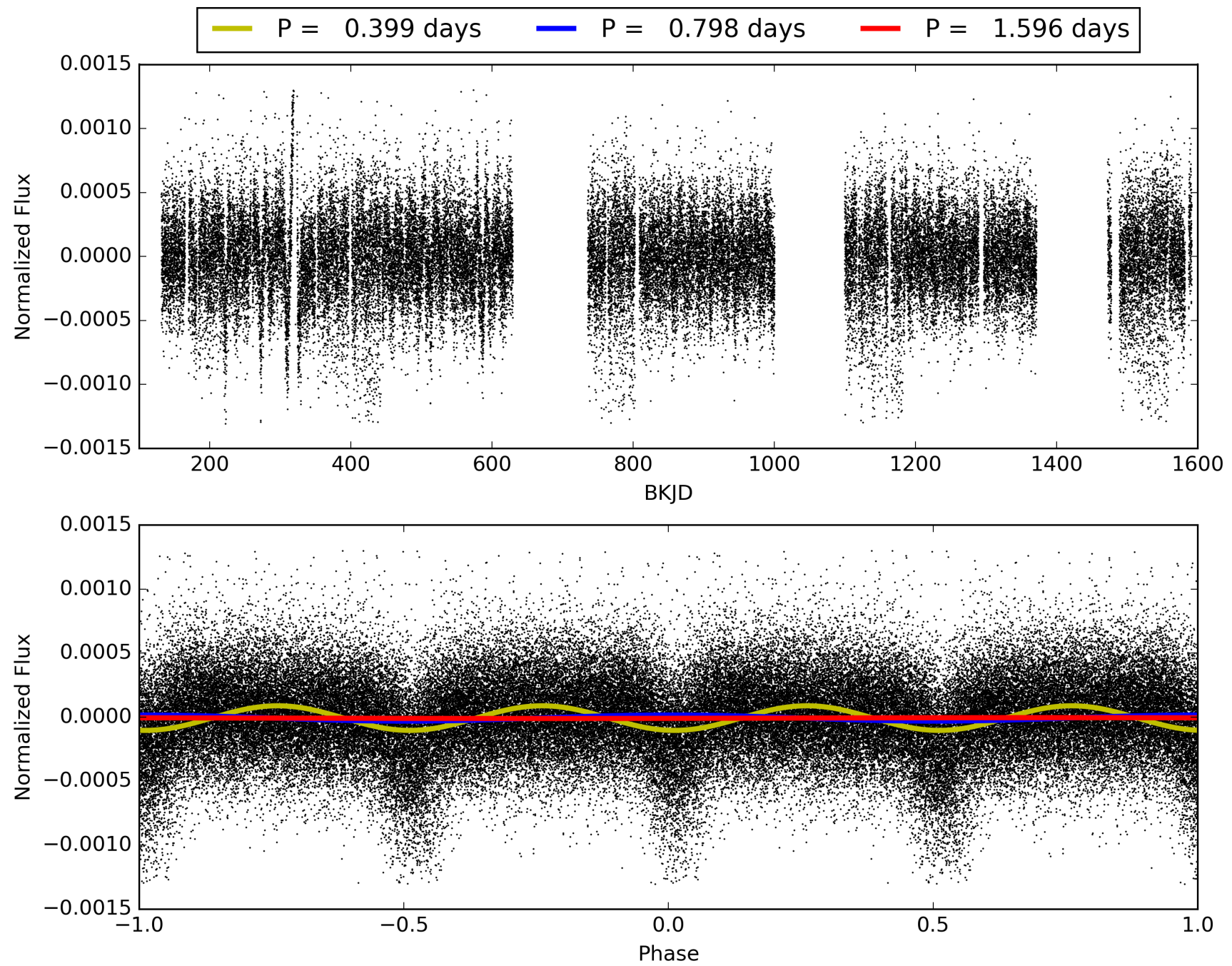
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 0.0% [0.00σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 1.54e-24
RollingBand-fgt: 1.00 [1261/1262]
GhostDiagnostic-chr: N/A
Centroid-sig: N/A
Centroid-so: N/A
OotOffset-rm: 8.889 arcsec [114.61σ]
KicOffset-rm: 8.788 arcsec [113.27σ]
OotOffset-st: 0/0/0/4 [4]
KicOffset-st: 0/0/0/4 [4]
DiffImageQuality-fgm: 1.00 [4/4]
DiffImageOverlap-fno: 1.00 [14/14]

TCE 009784222-02, PDC Light Curves

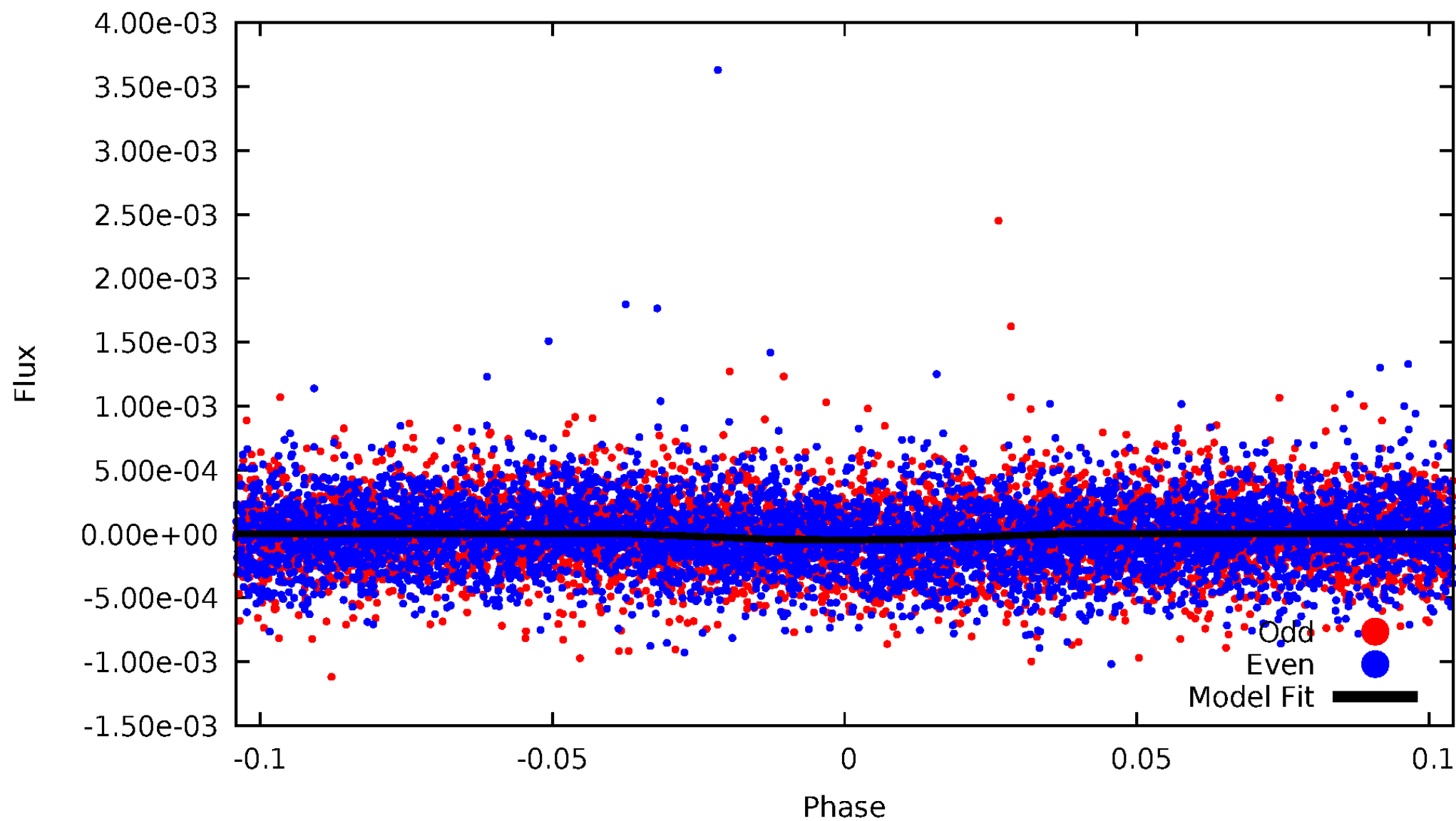


TCE 009784222-02



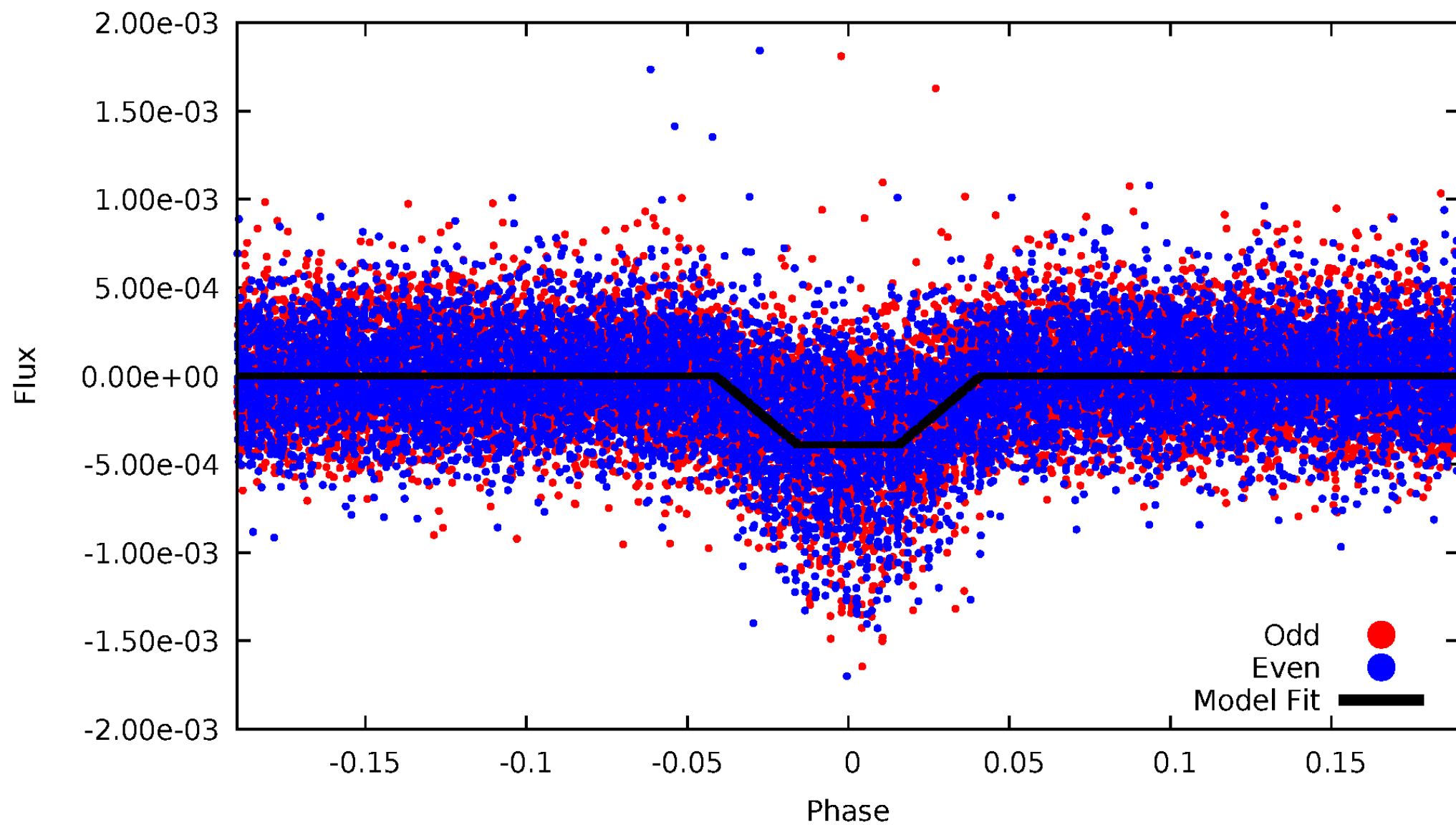
DV Odd/Even

TCE 009784222-02



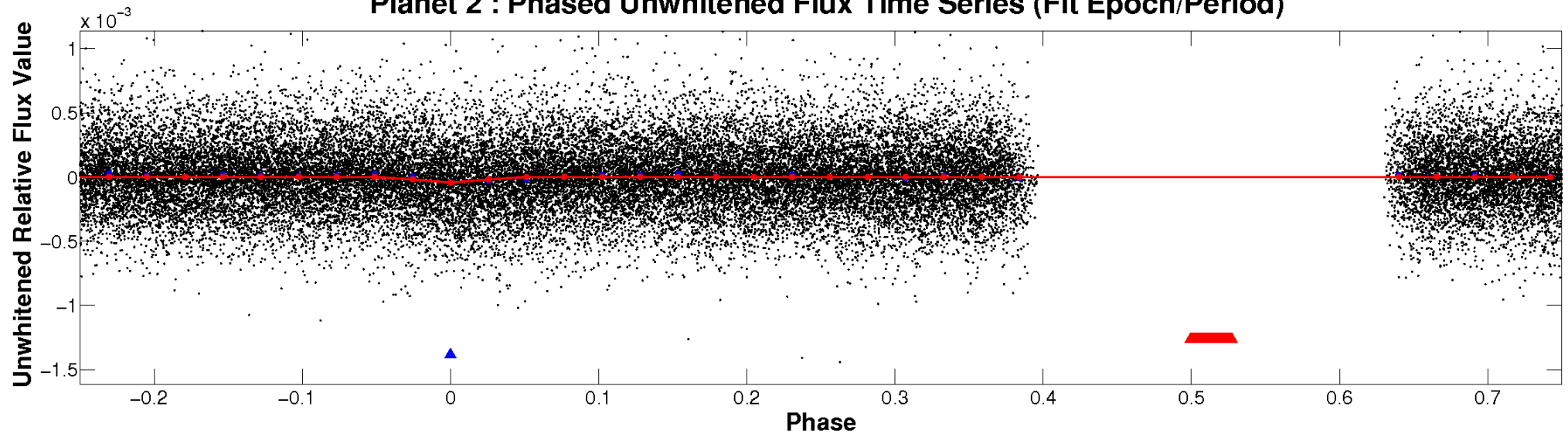
ALT Odd/Even

TCE 009784222-02

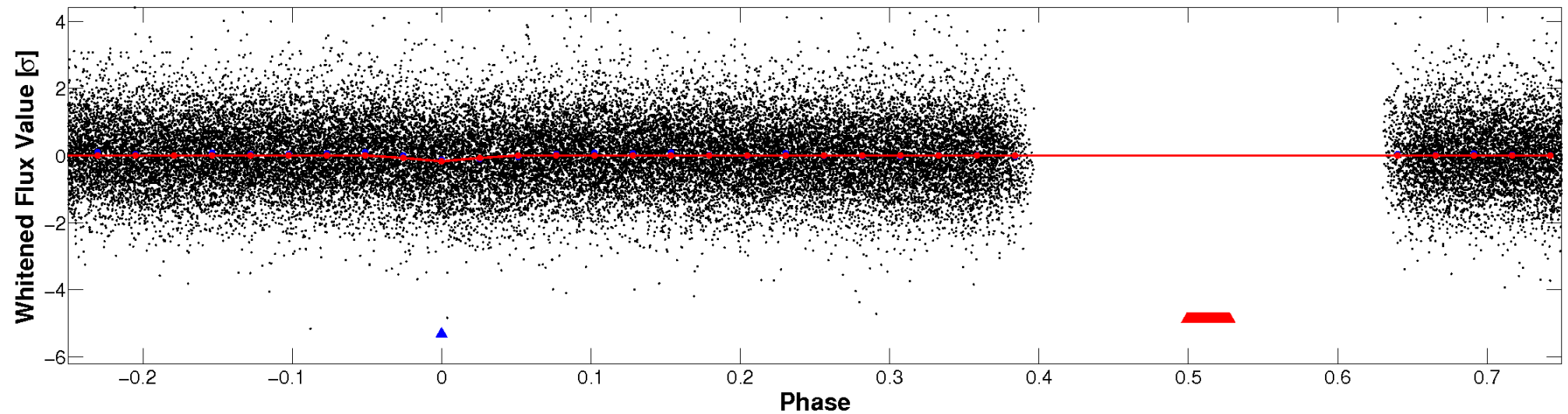


Non-Whitened Vs. Whitened Light Curve

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

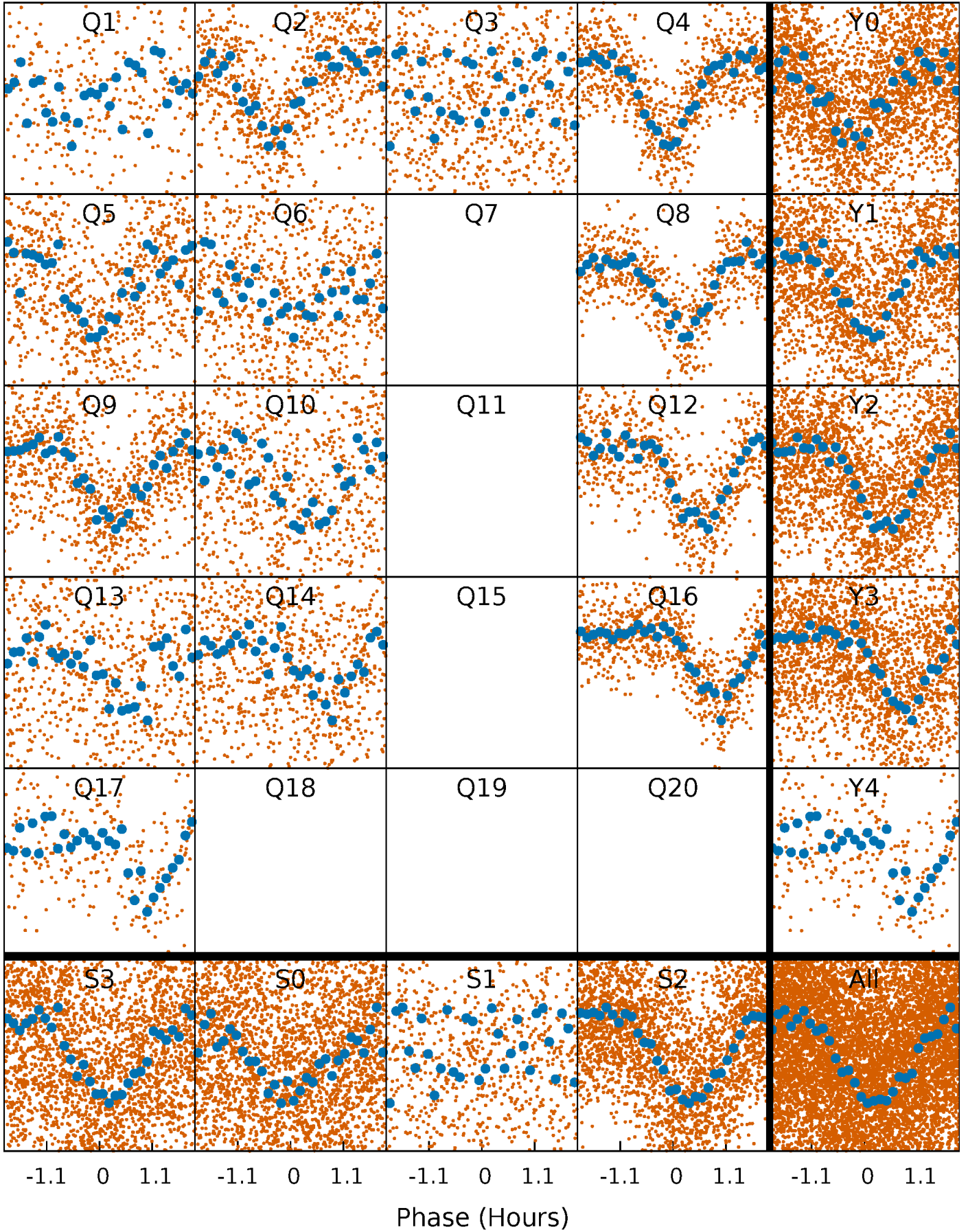


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



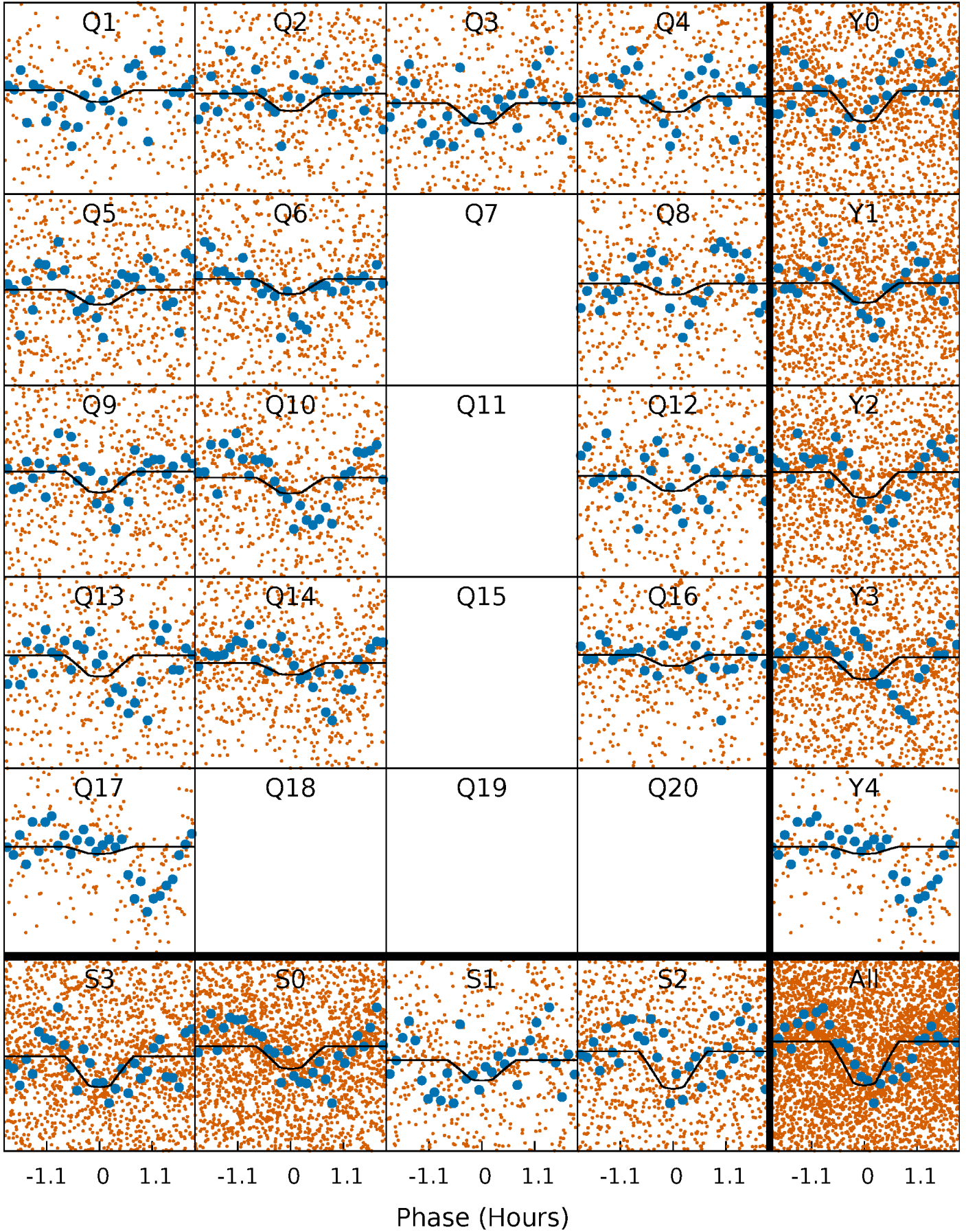
PDC Quarter-Phased Transit Curves

TCE 009784222-02 P= 0.798164 Days $T_0=131.985345$ (BKJD)



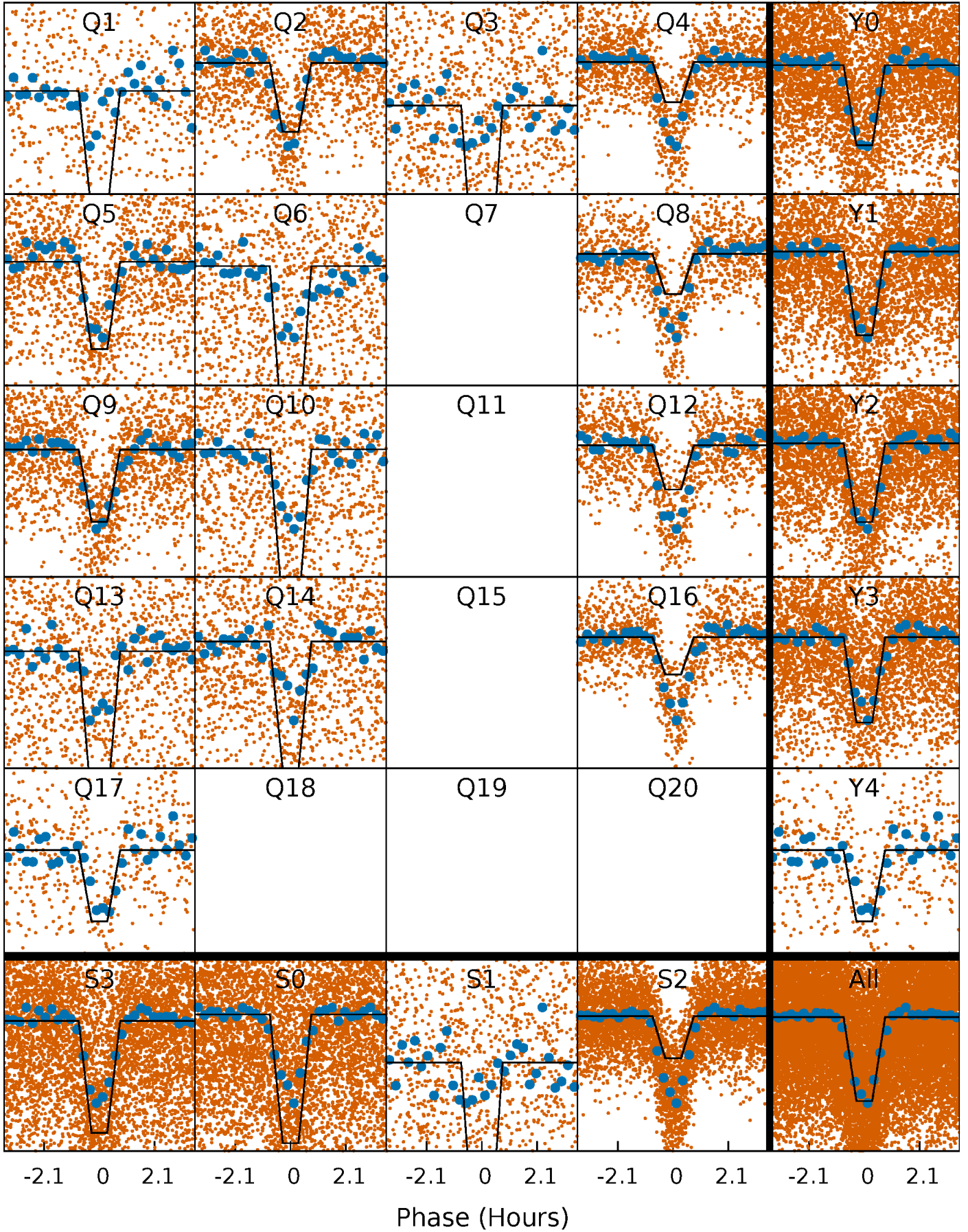
DV Quarter-Phased Transit Curves

TCE 009784222-02 P= 0.798164 Days $T_0=131.985345$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

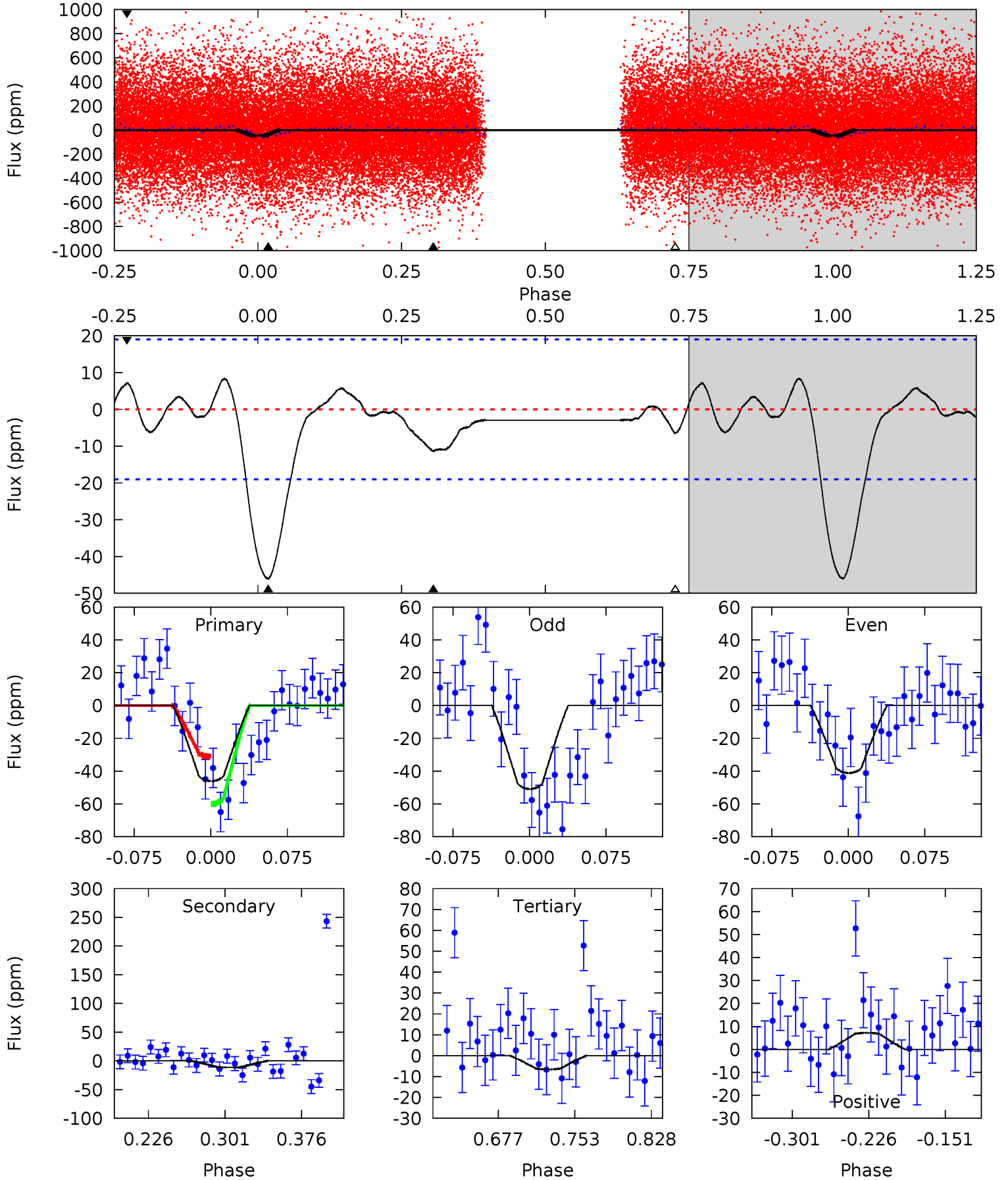
TCE 009784222-02 P= 0.798193 Days $T_0=131.971710$ (BKJD)



DV Model-Shift Uniqueness Test

009784222-02, P = 0.798164 Days, E = 131.187181 Days

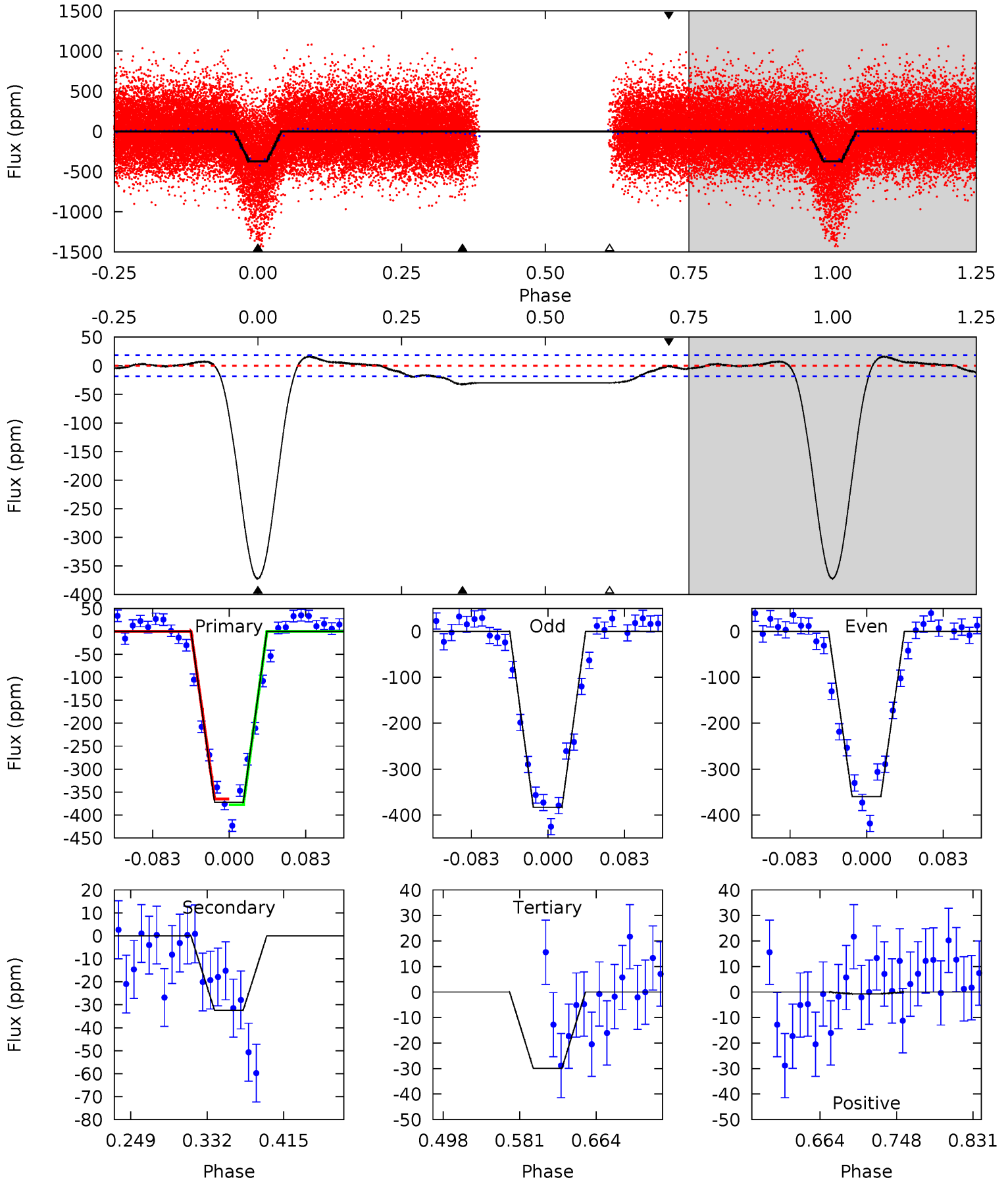
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
11.2	2.78	1.59	1.75	4.62	1.78	0.84	9.61	9.45	1.19	1.03	1.19	0.90	0.15	3.52



Alt Model-Shift Uniqueness Test

009784222-02, P = 0.798193 Days, E = 131.173517 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
92.8	8.07	7.45	-0.18	4.60	1.73	2.37	85.4	93.0	0.62	8.25	2.88	1.11	0.04	1.60



Stellar Parameters For KIC 009784222

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	6258^{+169}_{-206}	$4.449^{+0.050}_{-0.200}$	$-0.160^{+0.250}_{-0.300}$	$1.031^{+0.299}_{-0.107}$	$1.087^{+0.144}_{-0.144}$	$1.398^{+0.369}_{-0.704}$
	+3%/-3%	+1%/-4%	+156%/-188%	+29%/-10%	+13%/-13%	+26%/-50%
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 009784222-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-11 ± 4	$0.83^{+0.39}_{-0.35}$	3033^{+202}_{-148}	4400^{+1206}_{-775}	$2.698^{+4.765}_{-1.594}$
Alt.	-32 ± 4	$2.32^{+0.46}_{-0.39}$	3030^{+234}_{-138}	3507^{+297}_{-266}	$0.975^{+0.445}_{-0.329}$

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 $A_{obs} \gg 1.0$

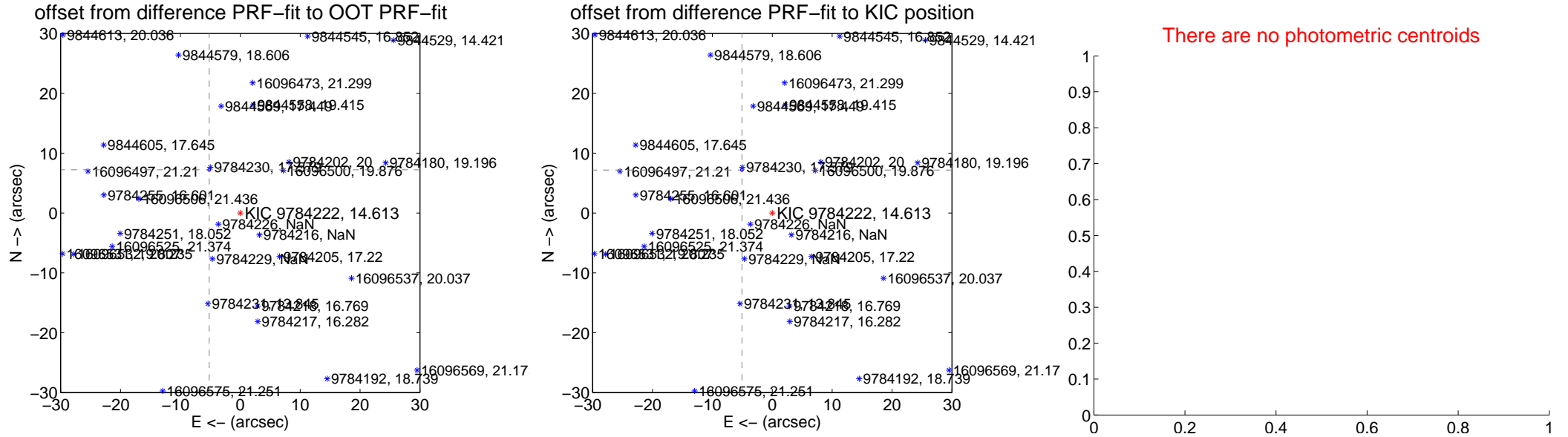
DV Centroid Data

Supplemental centroid analysis for 009784222-02. Kepler magnitude: 14.61. Transit SNR 7.42

There are 4 quarters with good PRF difference image offsets

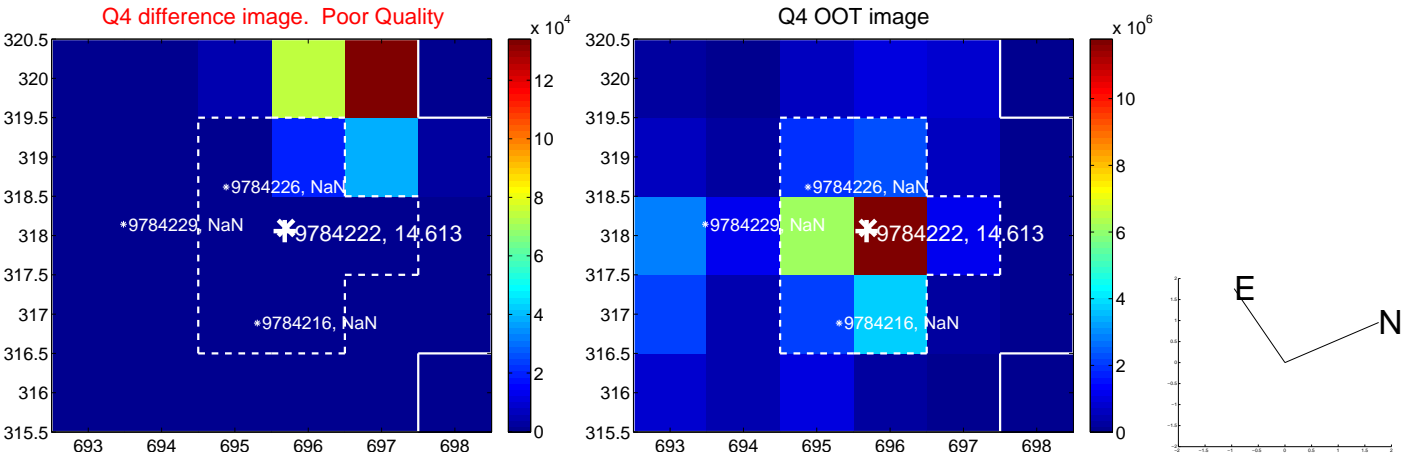
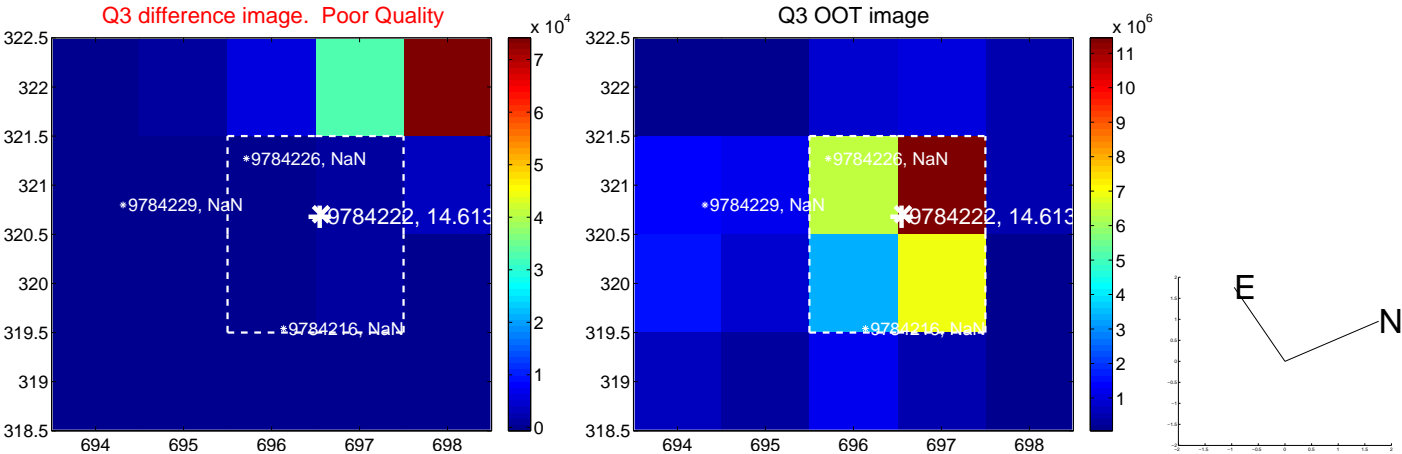
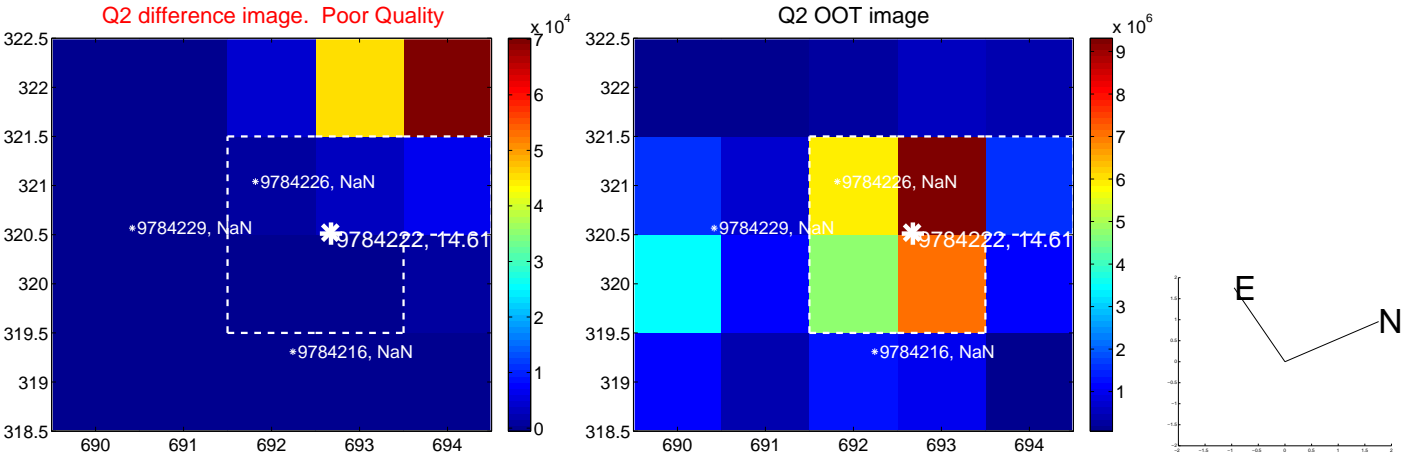
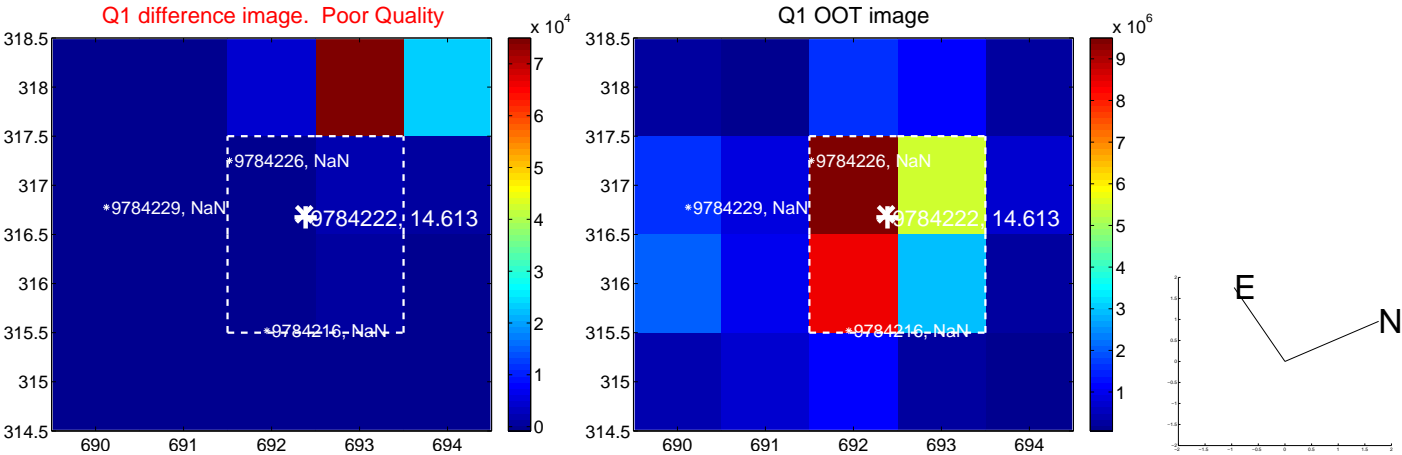
The direct PRF centroid is offset from the target star catalog position by about 0.12 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	8.889 \pm 0.078	114.61	5.188 \pm 0.076	7.218 \pm 0.078
PRF-fit source offset from KIC position	8.788 \pm 0.078	113.27	5.064 \pm 0.076	7.182 \pm 0.078
photometric centroid source offset	—	—	—	—

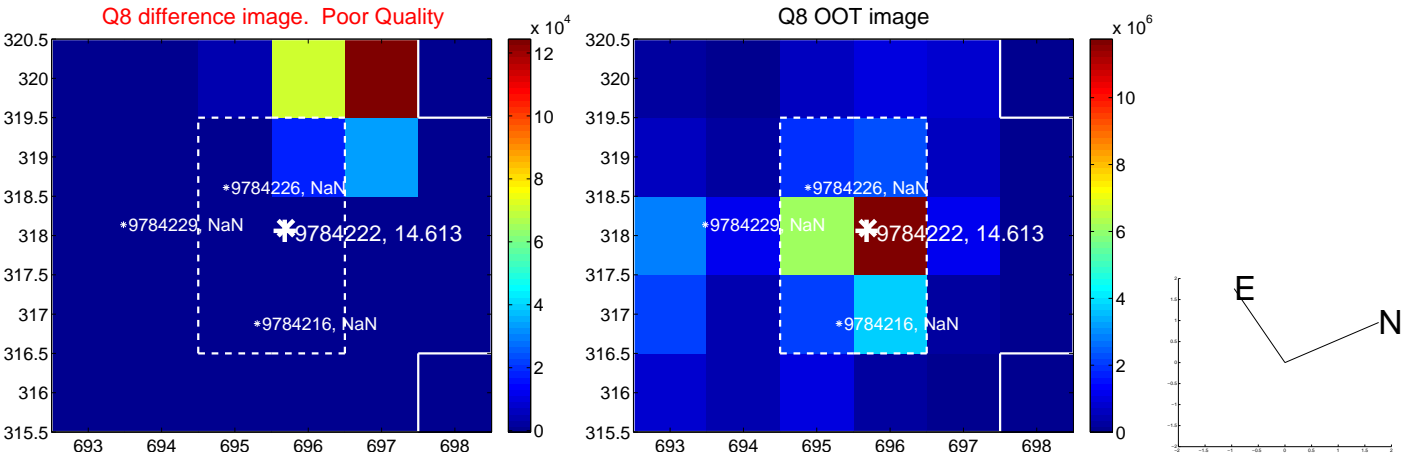
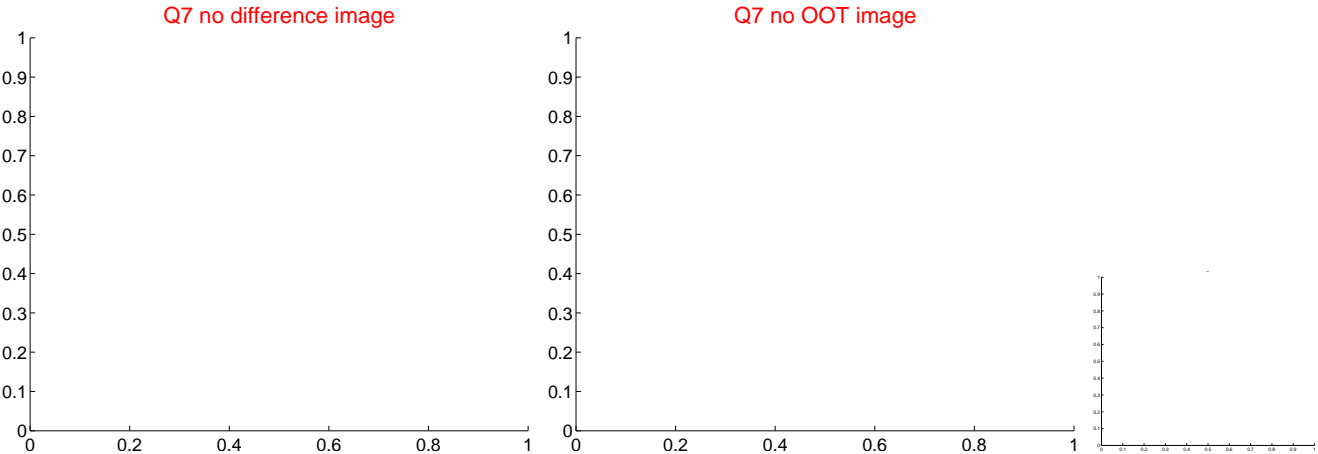
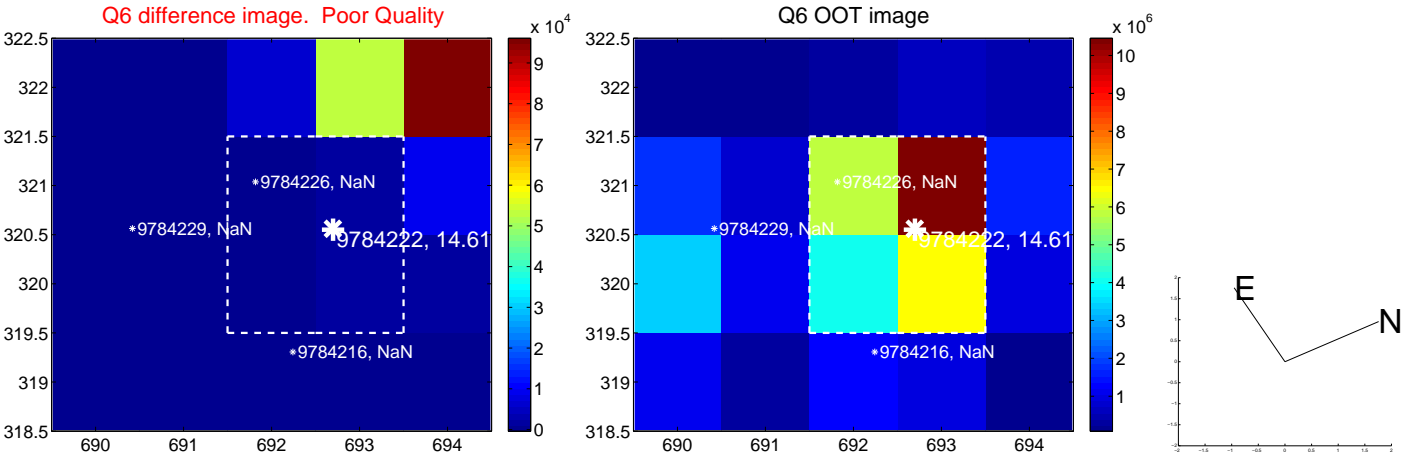
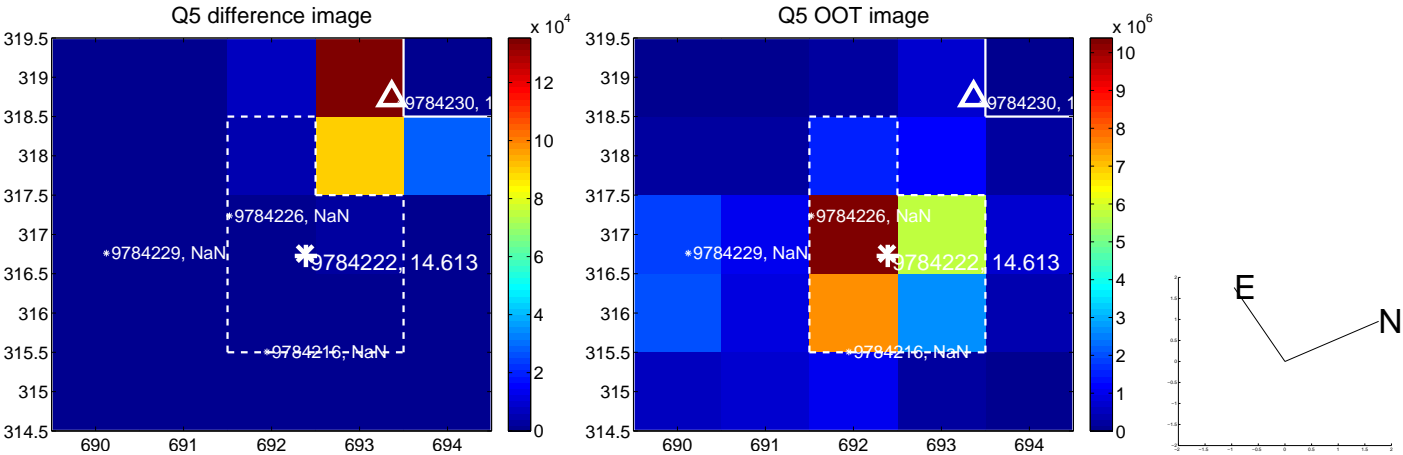


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

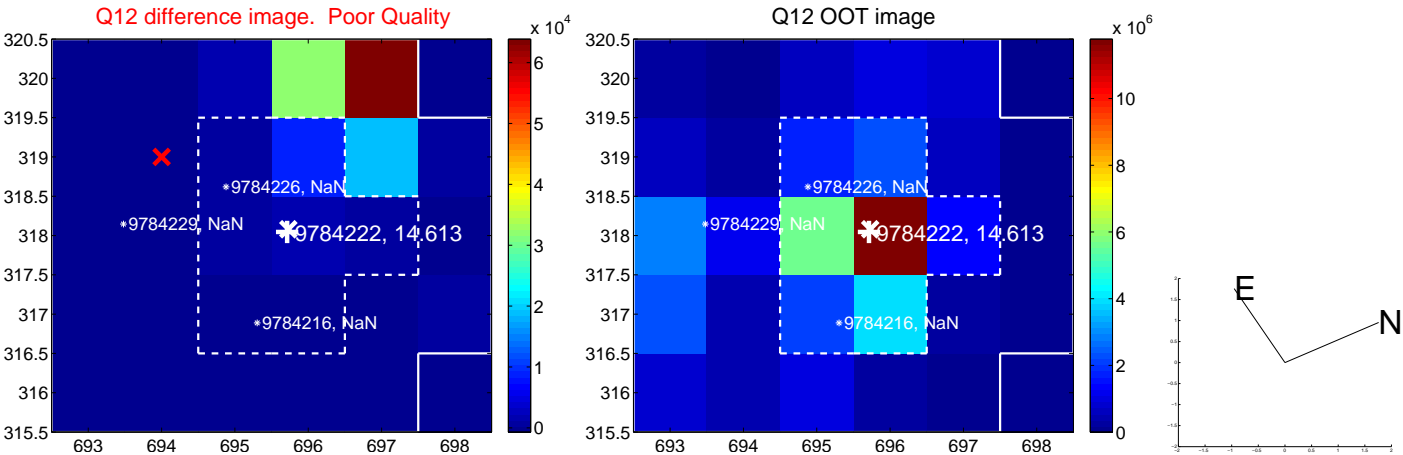
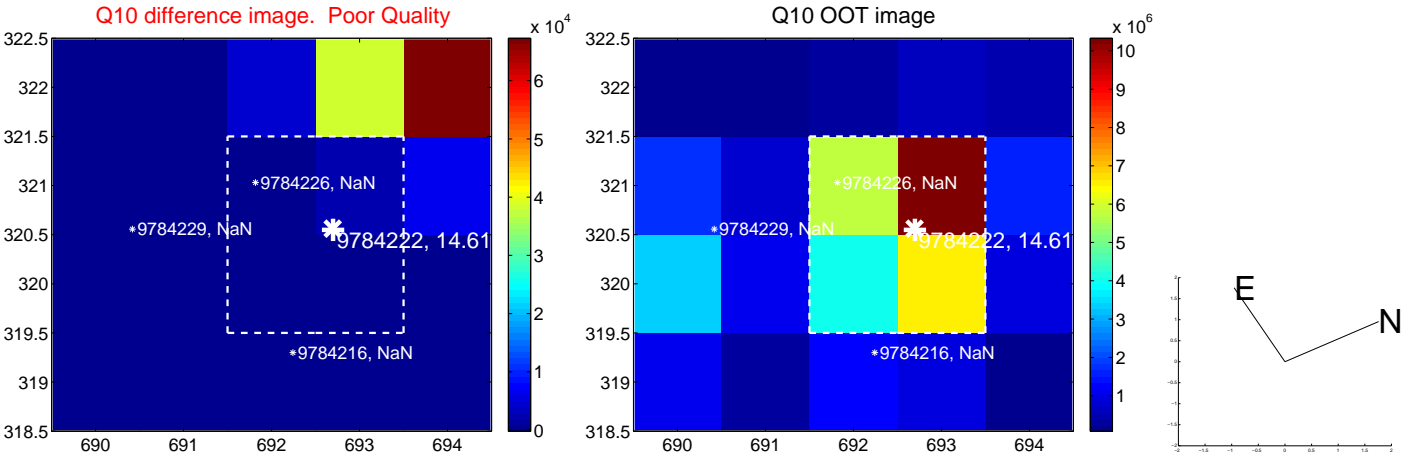
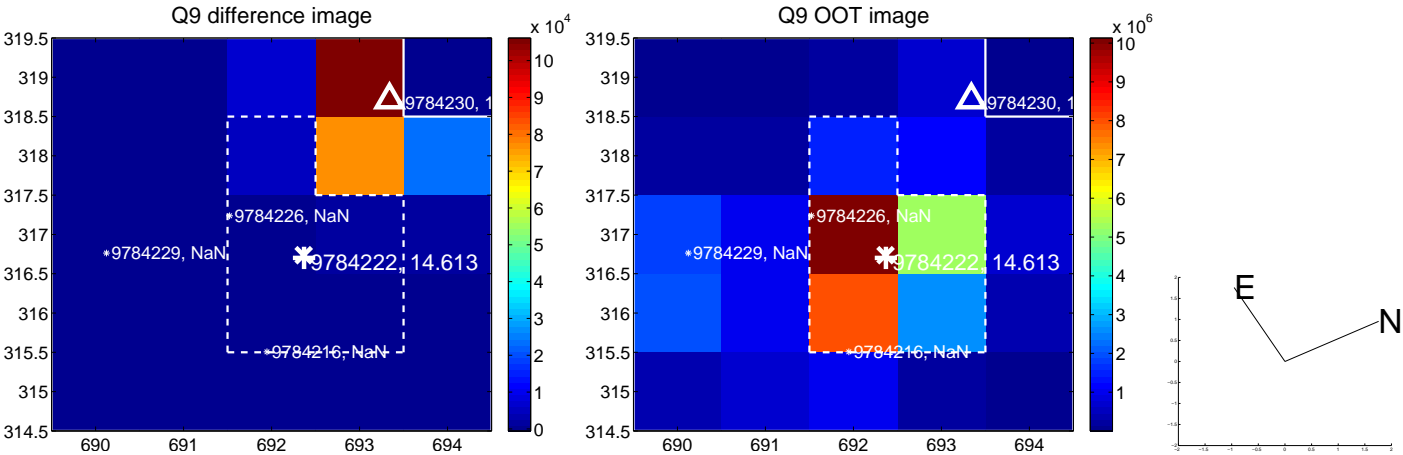
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



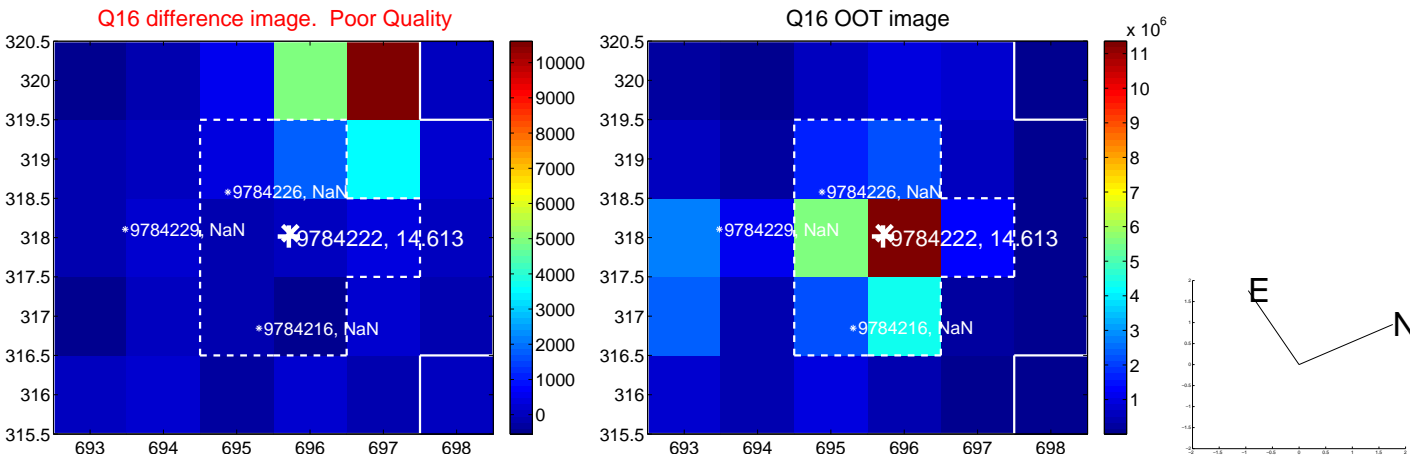
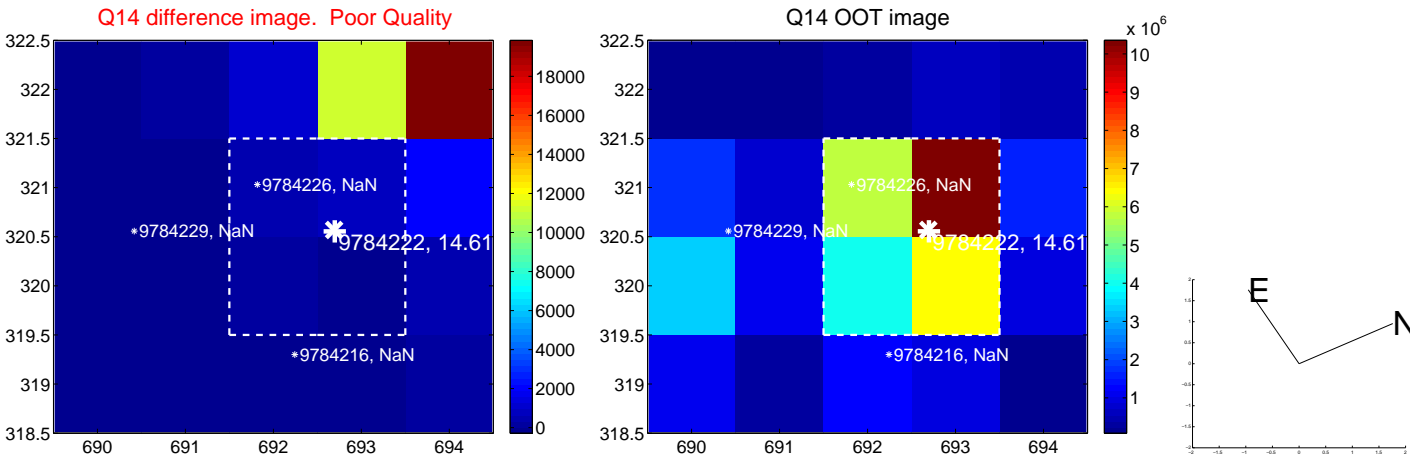
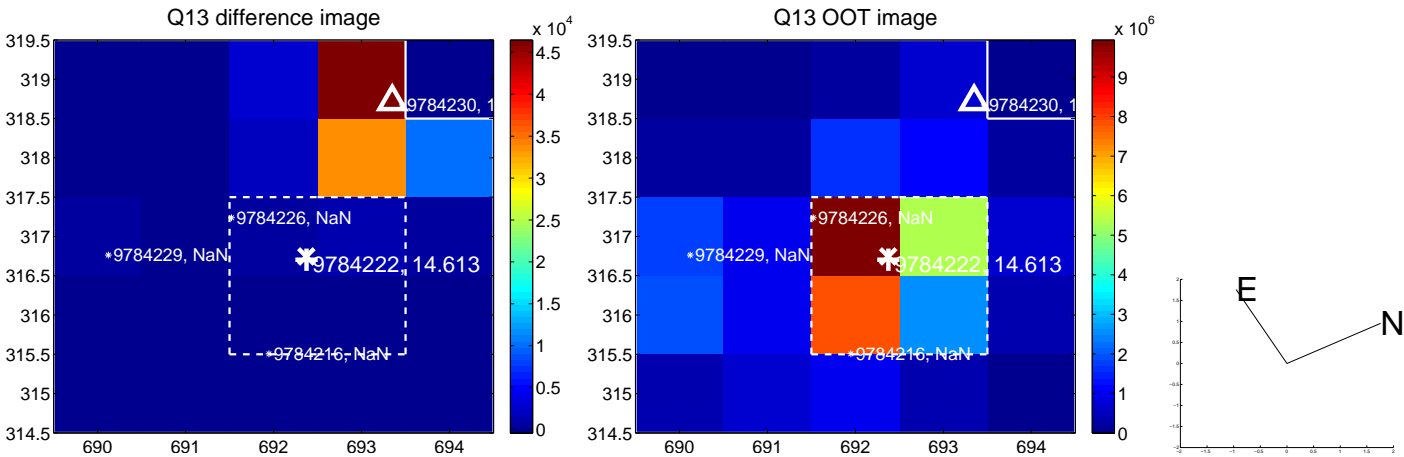
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



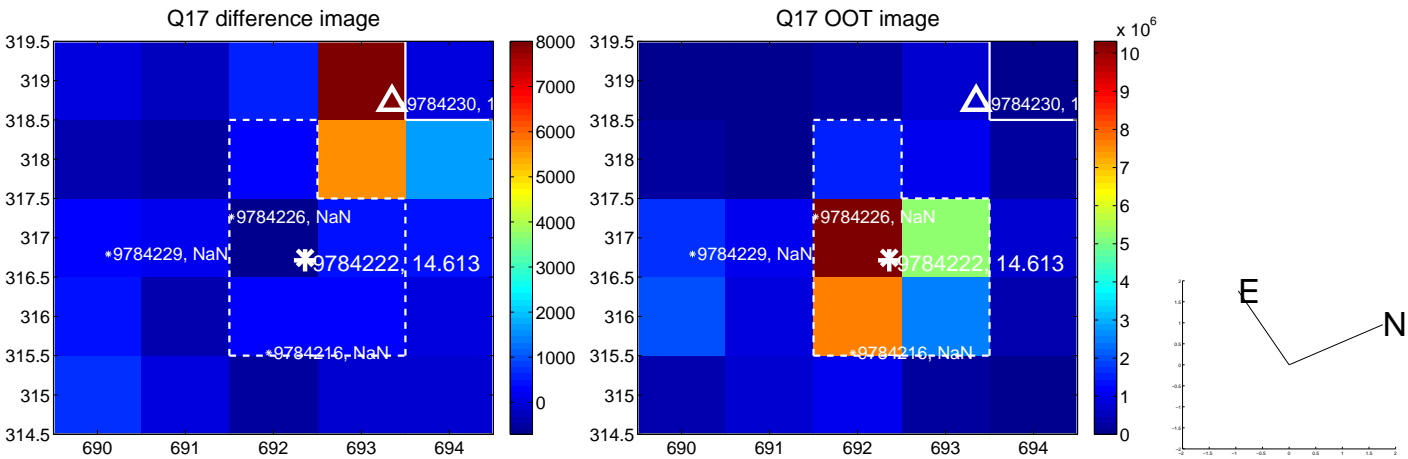
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



folded centroid time series figure for this object.

UKIRT Image

