

KIC 009083470

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})
009083470-01	OBS	4731.01	0.918355	131.644902	112.8	4.989	9.8	9.8	0.74	5288	0.78	1280.95
009083470-02	OBS	No	338.093400	219.868875	1375.6	9.870	10.1	7.5	0.74	5288	2.93	0.48

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009083470-01	OBS	FP	0.00	1	0	1	1	LPP_DV—CENT_FEW_DIFFS—HALO_GHOST—EPHEM_MATCH
009083470-02	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT— INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST

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 009083470-01

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
009083470-01	9083470	7128.01	9083503	1:1	29.6	-5	-6	15.91	15.90	1.58	Direct-PRF	1	4.98	2.62

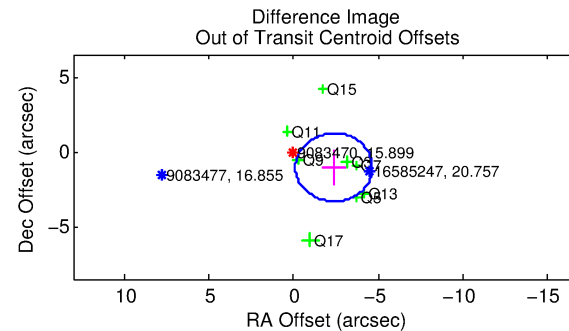
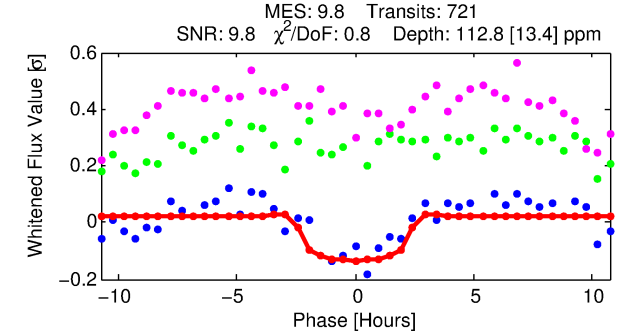
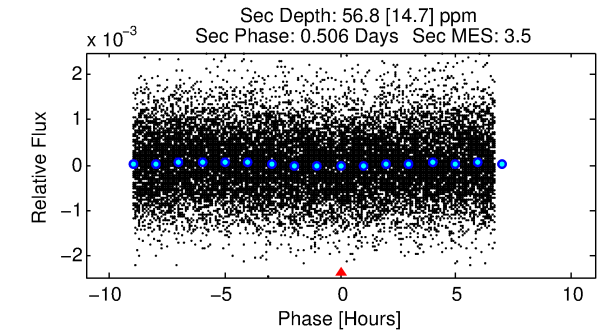
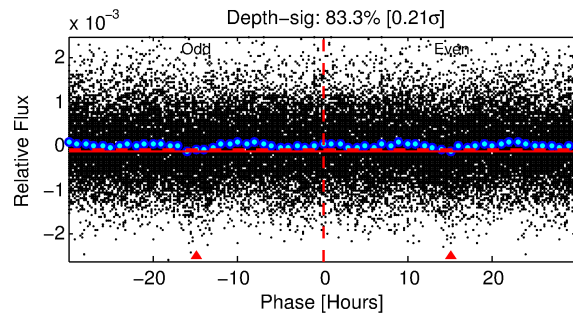
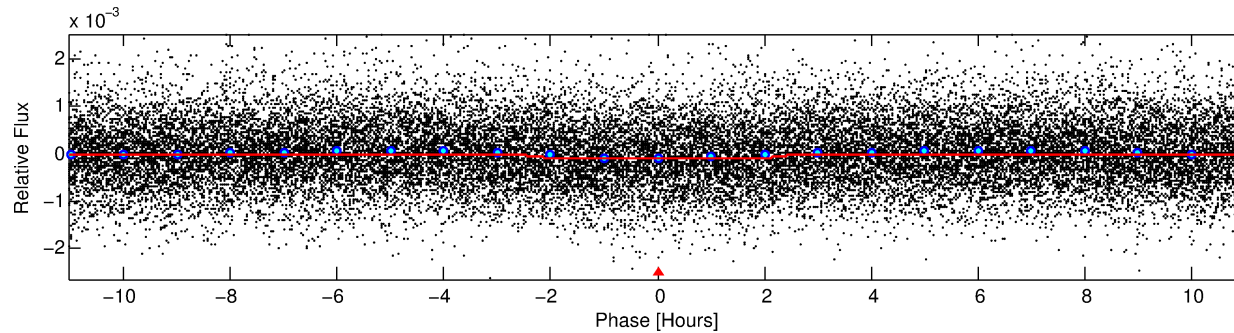
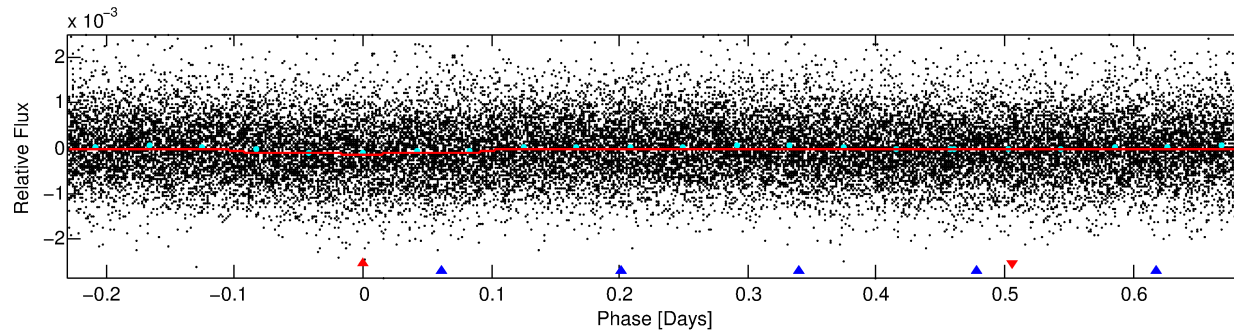
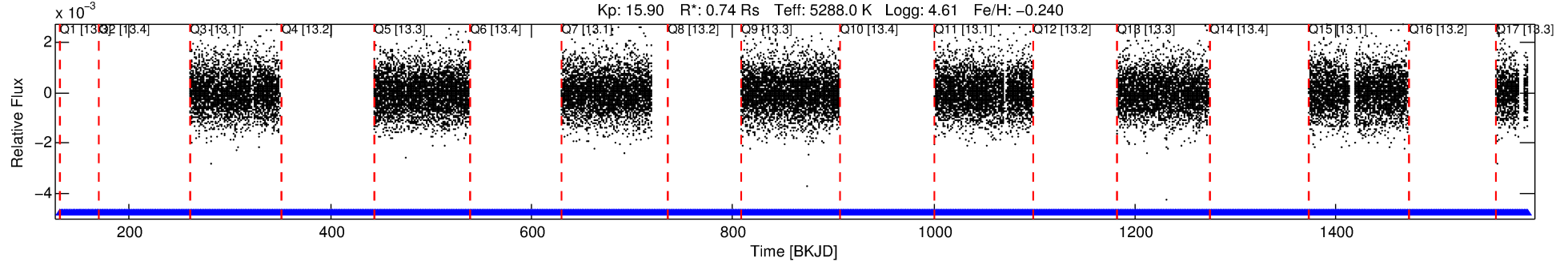
Notes: $P_1:P_2$ is the period ratio. Dist is the distance in arcseconds. Δ Row and Δ Col are the number of pixels apart in row and column. m_2 and m_1 are the magnitudes of the parent and child. D_2/D_1 is the parent's transit depth divided by the child's. σ_P and σ_T are the significance of the match 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: 9083470 Candidate: 1 of 2 Period: 0.918 d

KOI: K04731.01 Corr: 0.860

Kp: 15.90 R*: 0.74 Rs Teff: 5288.0 K Logg: 4.61 Fe/H: -0.240



DV Fit Results:

Period = 0.91835 [0.00001] d
Epoch = 131.6449 [0.0053] BKJD
Rp/R* = 0.0096 [0.0152]
a/R* = 1.51 [5.15]
b = 0.29 [19.37]
Seff = 1280.96 [306.23]
Teff = 1525 [91] K
Rp = 0.78 [1.23] Re
a = 0.0173 [0.0024] AU
Ag = 15.46 [49.04] [0.29σ]
Teffp = 4677 [3706] K [0.85σ]

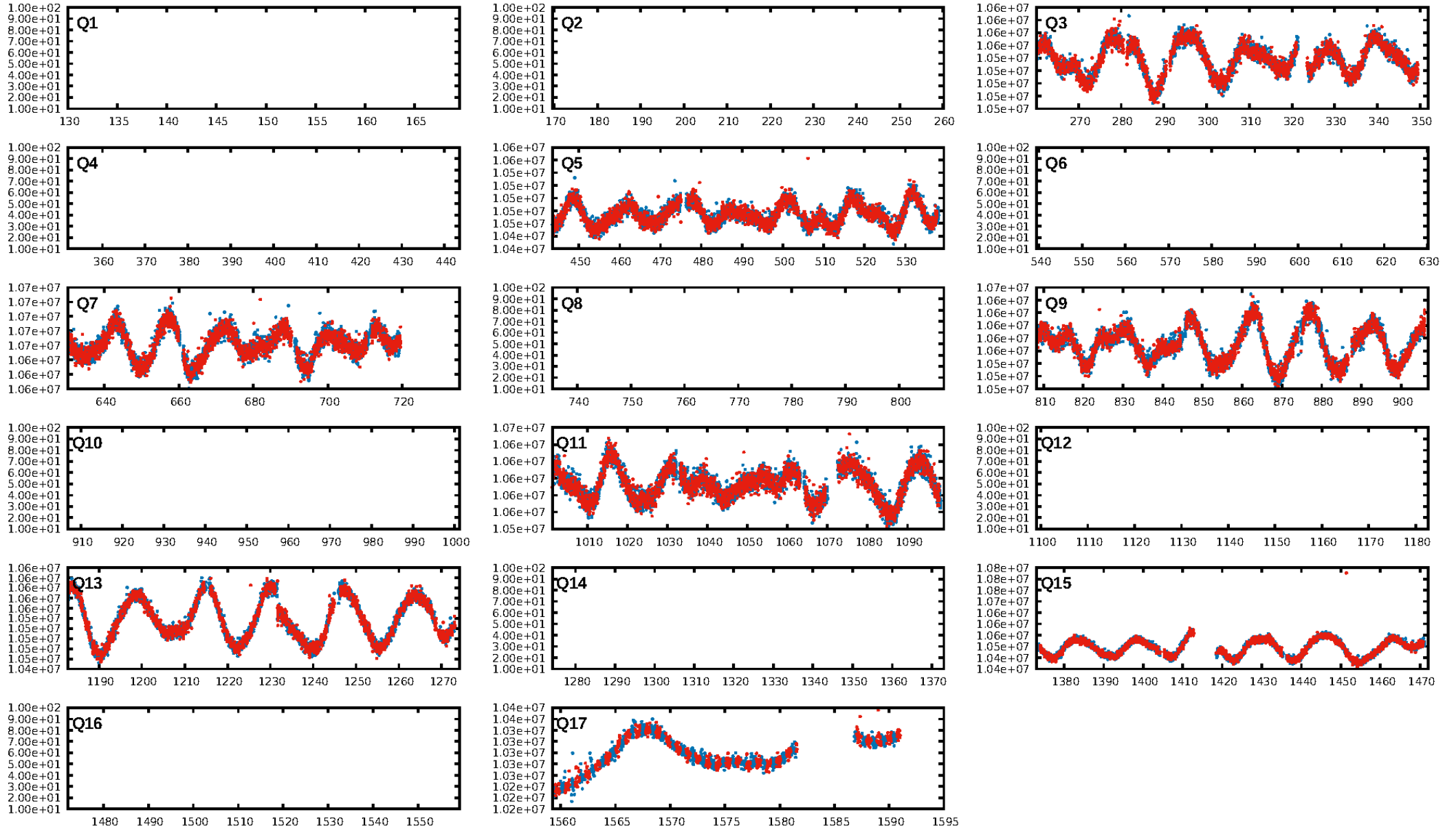
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [731.72σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 4.93e-15
RollingBand-fgt: 1.00 [692/692]
GhostDiagnostic-chr: 0.04127
Centroid-sig: 0.0%
Centroid-so: 4.297 arcsec [3.21σ]
OotOffset-rm: 2.591 arcsec [3.43σ]
KicOffset-rm: 2.430 arcsec [3.05σ]
OotOffset-st: 0/4/0/4 [8]
KicOffset-st: 0/4/0/4 [8]
DiffImageQuality-fgm: 0.00 [0/8]
DiffImageOverlap-fno: 1.00 [8/8]

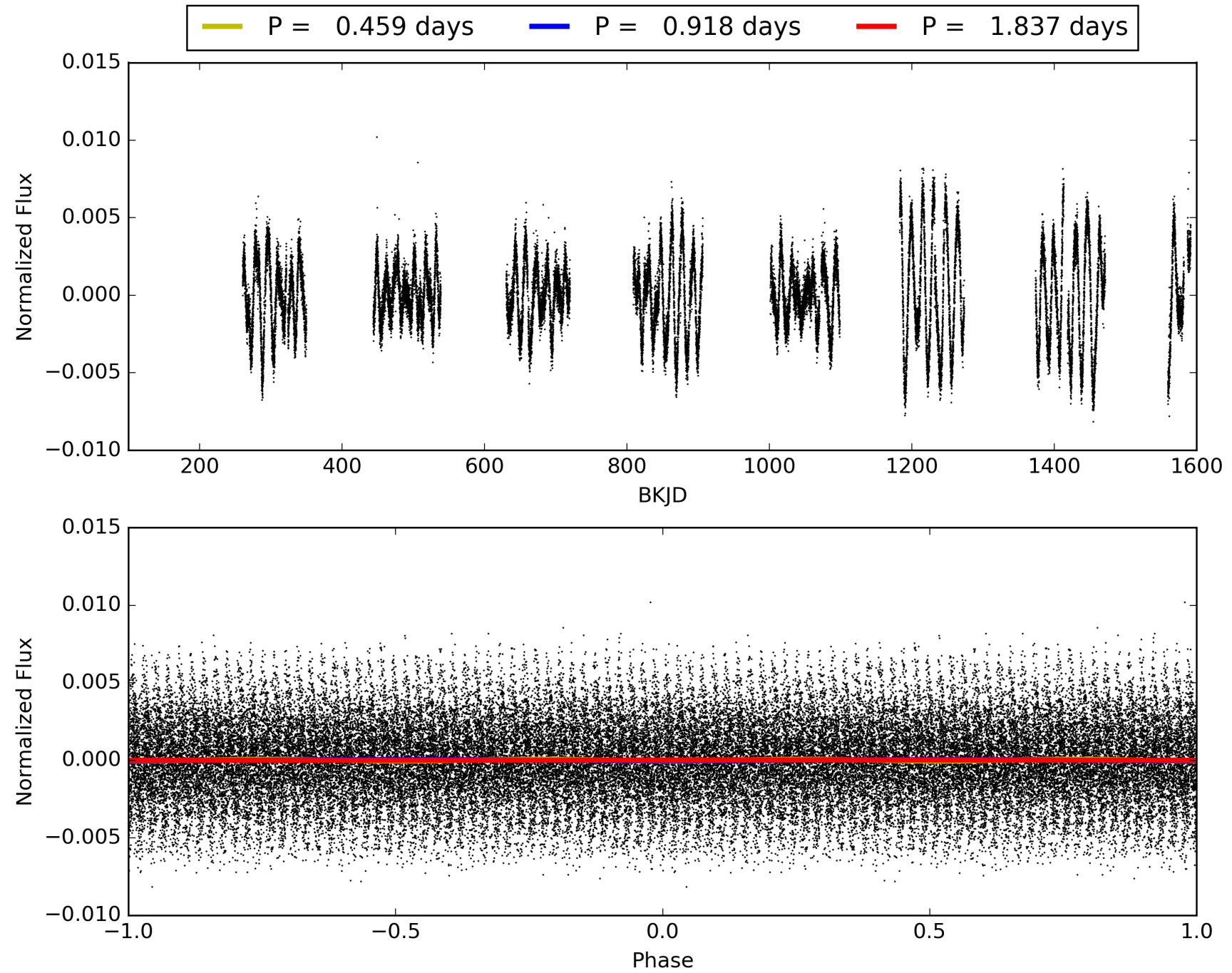
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 22:45:02 Z

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

TCE 009083470-01, PDC Light Curves

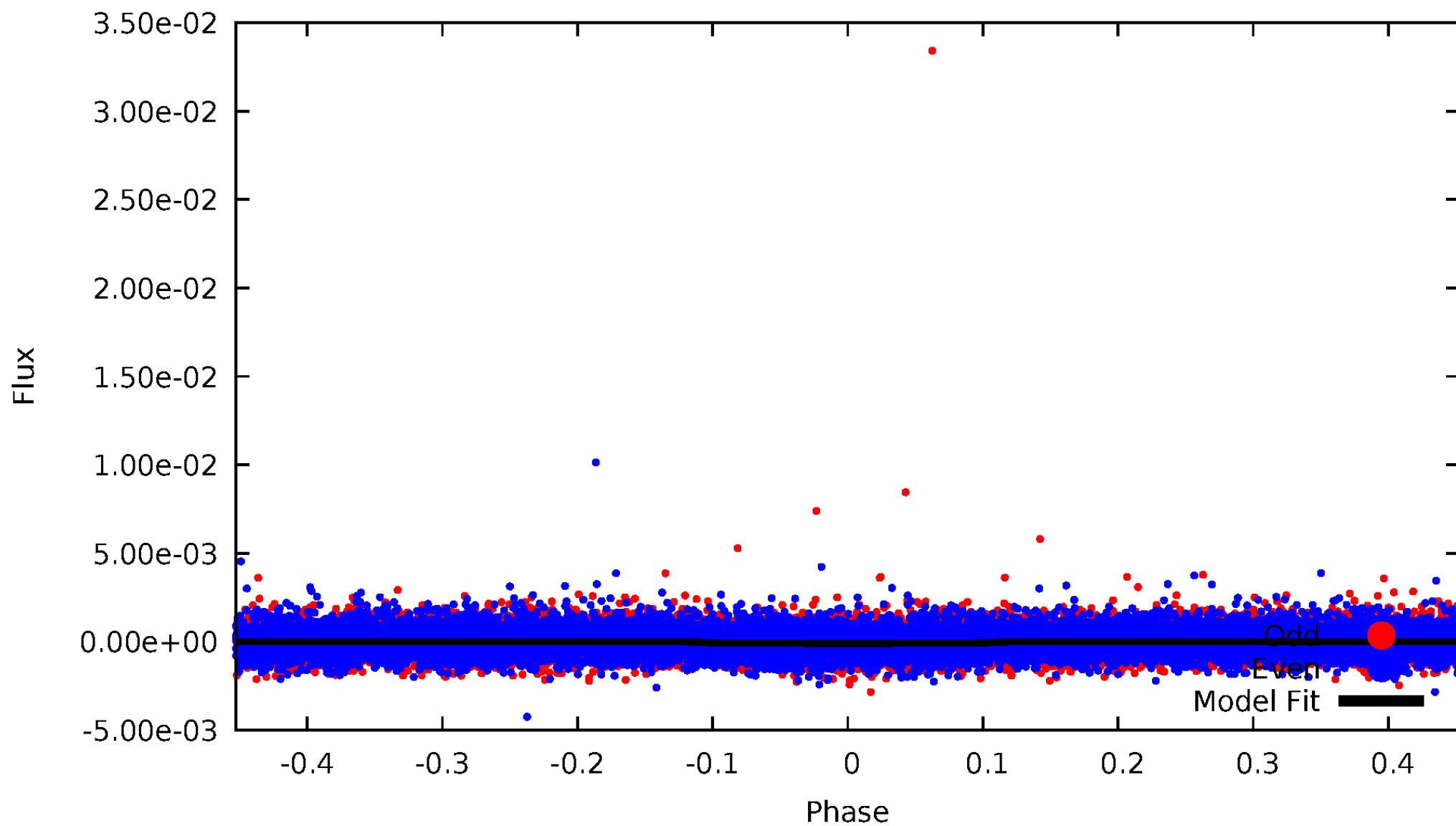


TCE 009083470-01



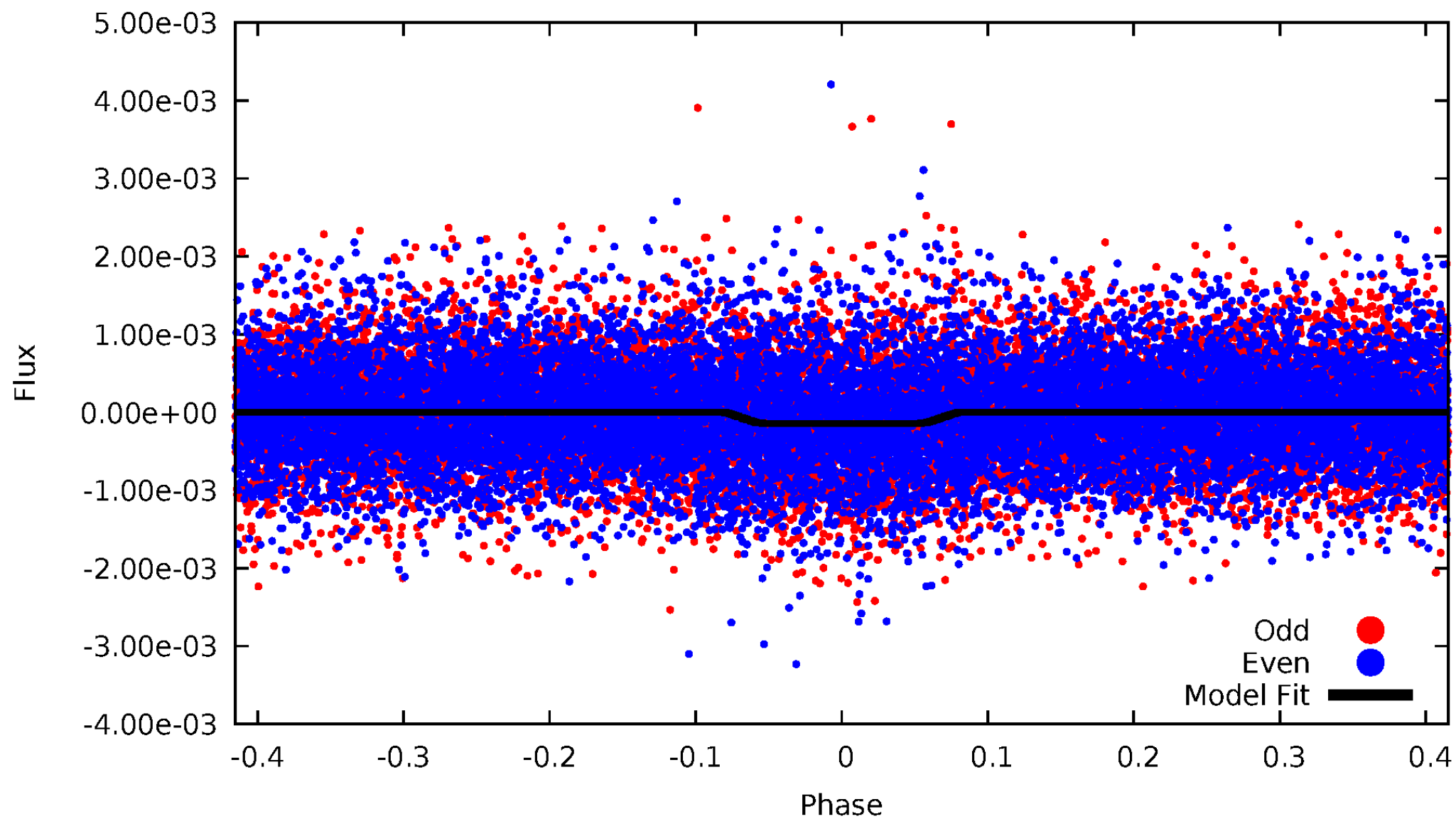
DV Odd/Even

TCE 009083470-01

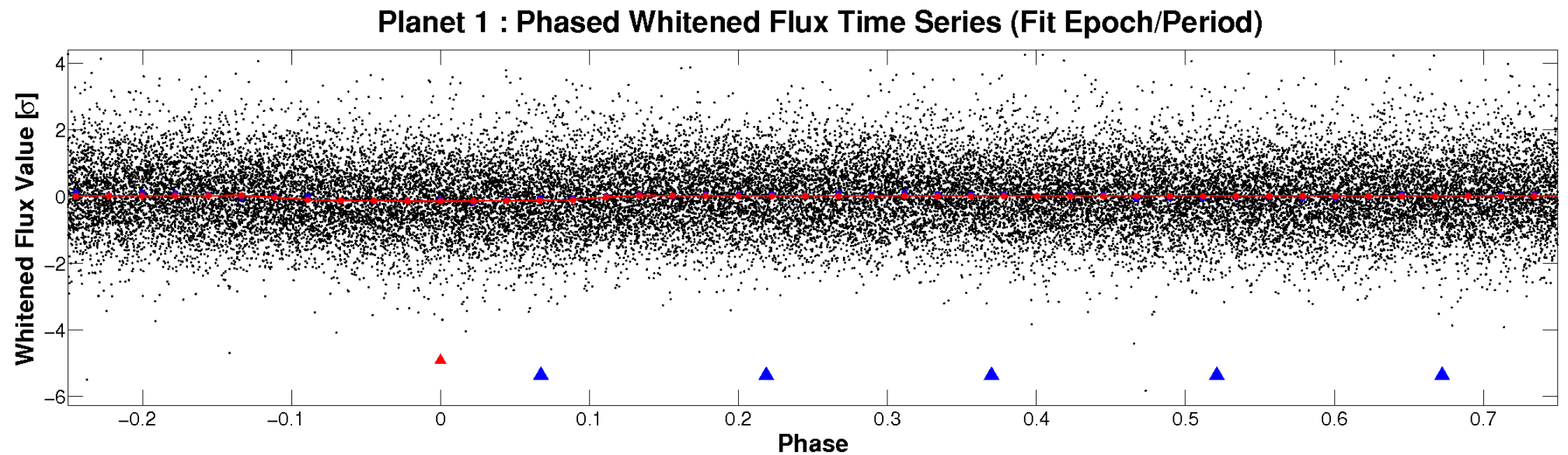
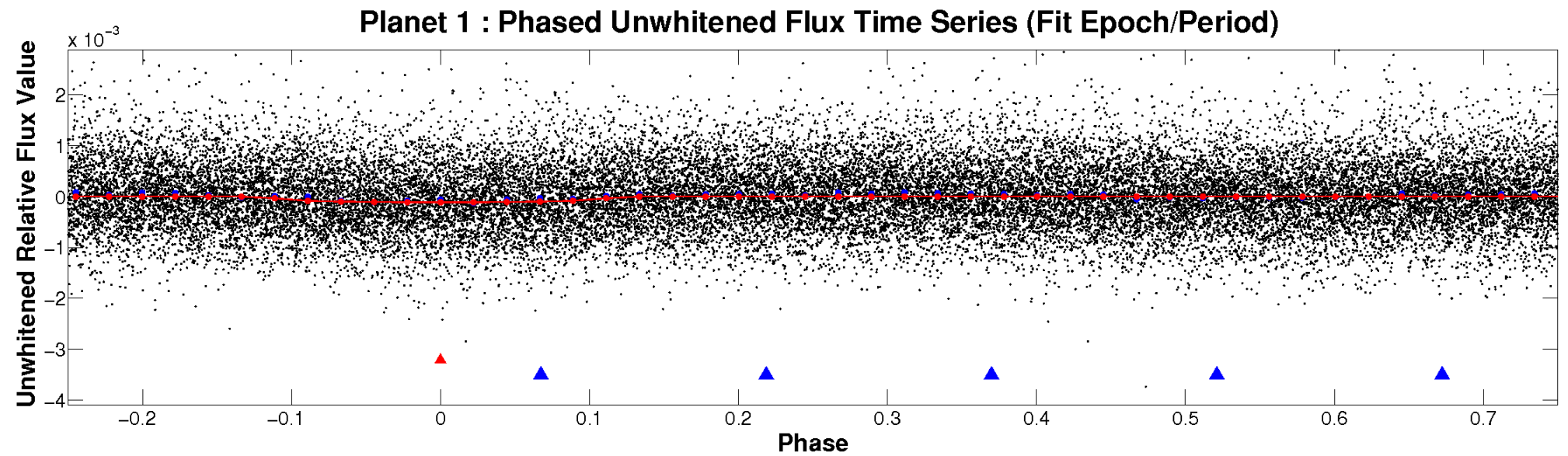


ALT Odd/Even

TCE 009083470-01

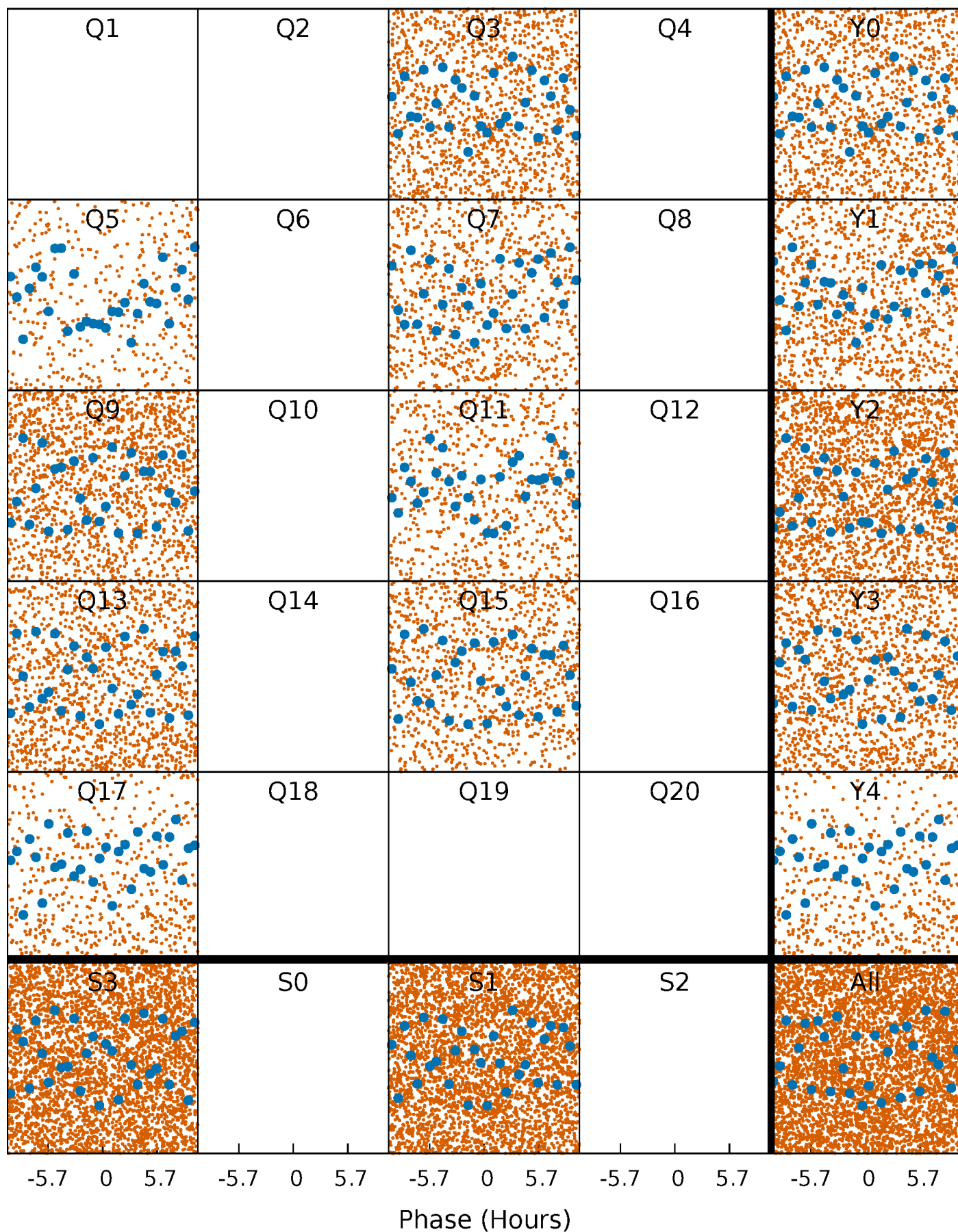


Non-Whitened Vs. Whitened Light Curve



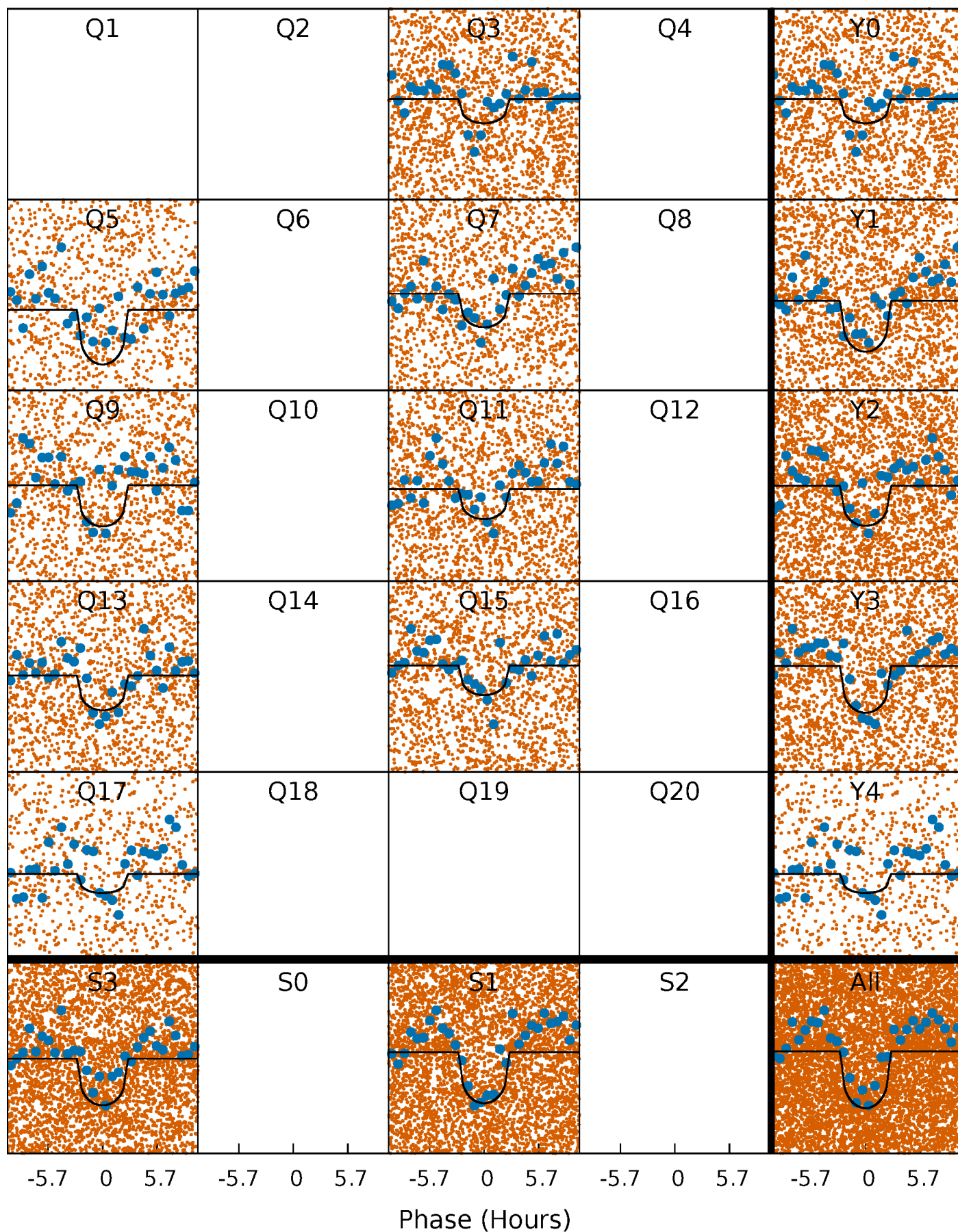
PDC Quarter-Phased Transit Curves

TCE 009083470-01 P= 0.918355 Days $T_0=131.644902$ (BKJD)



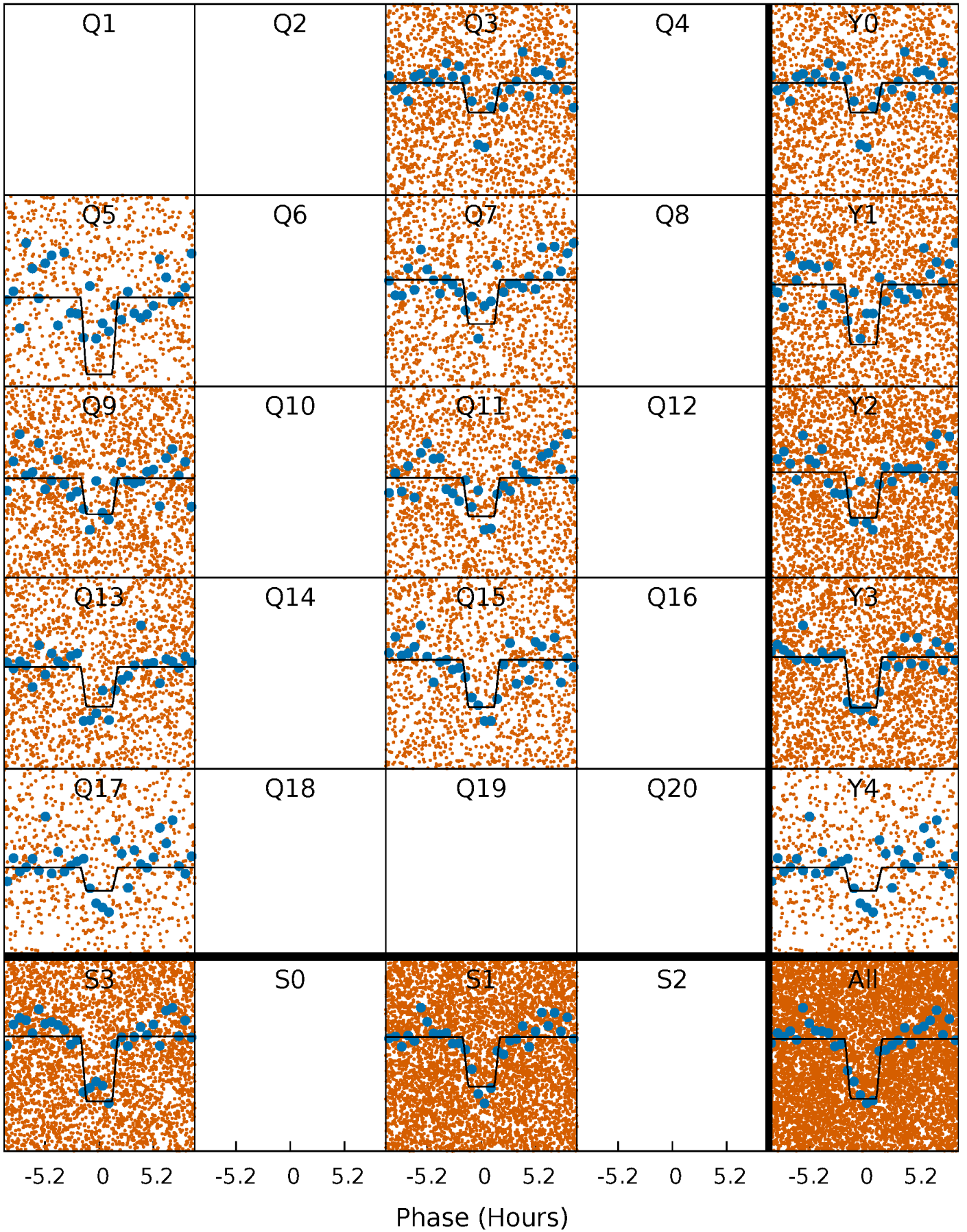
DV Quarter-Phased Transit Curves

TCE 009083470-01 P= 0.918355 Days $T_0=131.644902$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

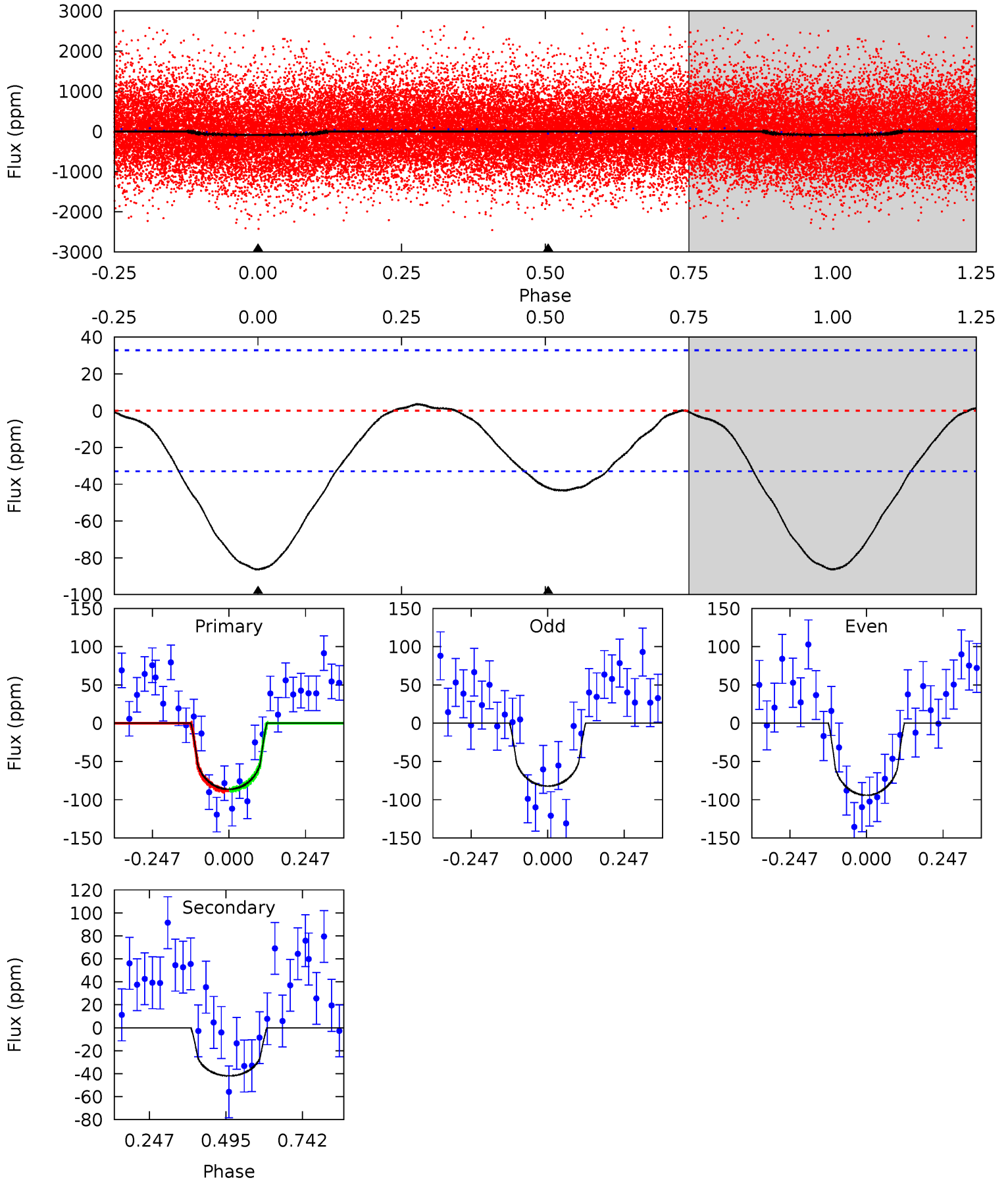
TCE 009083470-01 P= 0.918414 Days $T_0=131.589097$ (BKJD)



DV Model-Shift Uniqueness Test

009083470-01, $P = 0.918355$ Days, $E = 131.644902$ Days

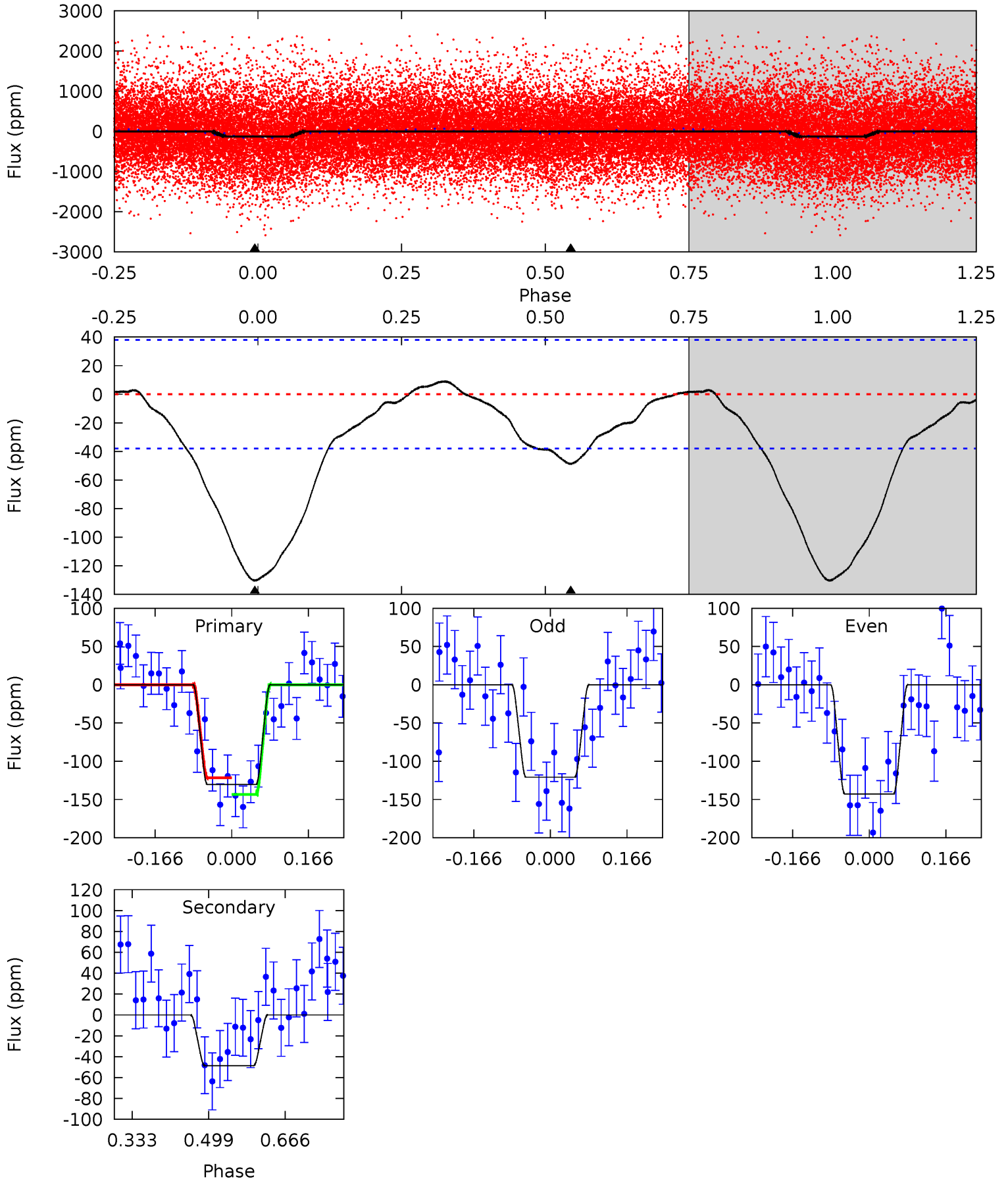
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
11.5	5.57	0	0	4.37	1.16	0.27	11.5	11.5	5.57	5.57	0.80	0.89	0.04	0.10



Alt Model-Shift Uniqueness Test

009083470-01, P = 0.918414 Days, E = 131.589097 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
15.3	5.71	0	0	4.46	1.38	0.97	15.3	15.3	5.71	5.71	1.29	0.92	0.06	1.28



Stellar Parameters For KIC 009083470

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	5288^{+185}_{-185}	$4.613^{+0.032}_{-0.104}$	$-0.240^{+0.300}_{-0.300}$	$0.740^{+0.122}_{-0.066}$	$0.828^{+0.078}_{-0.096}$	$2.883^{+0.516}_{-0.917}$
	+3%/-3%	+1%/-2%	+125%/-125%	+16%/-9%	+9%/-12%	+18%/-32%
Source	KIC0	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 009083470-01 / KOI 4731.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-42 ± 8	$1.20^{+1.08}_{-0.79}$	2166^{+103}_{-89}	3829^{+2202}_{-789}	$4.780^{+36.736}_{-3.462}$
Alt.	-49 ± 9	$1.31^{+1.07}_{-0.84}$	2165^{+104}_{-91}	3779^{+2039}_{-694}	$4.462^{+31.636}_{-3.105}$

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

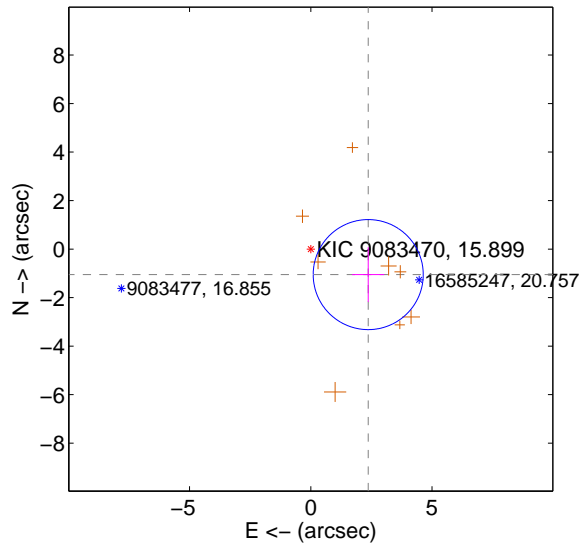
Supplemental centroid analysis for 009083470-01. Kepler magnitude: 15.90. Transit SNR 9.77

There are 0 quarters with good PRF difference image offsets

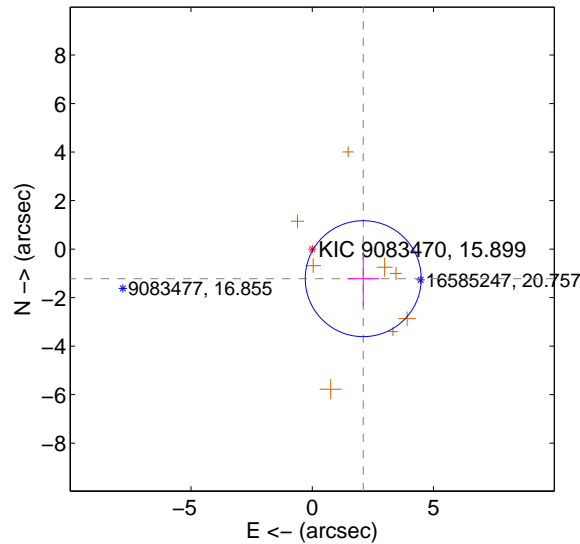
The direct PRF centroid is offset from the target star catalog position by about 0.27 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	2.591 ± 0.756	3.43	-2.368 ± 0.659	-1.051 ± 1.127
PRF-fit source offset from KIC position	2.430 ± 0.797	3.05	-2.102 ± 0.652	-1.219 ± 1.122
photometric centroid source offset	4.30 ± 1.34	3.21	-3.88 ± 1.40	1.85 ± 1.05

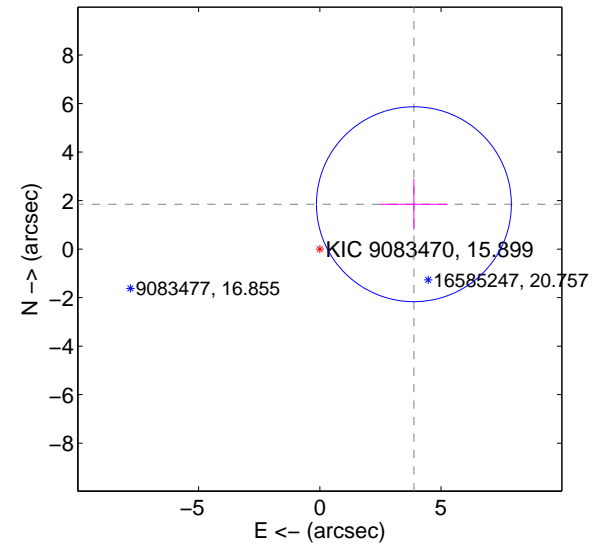
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

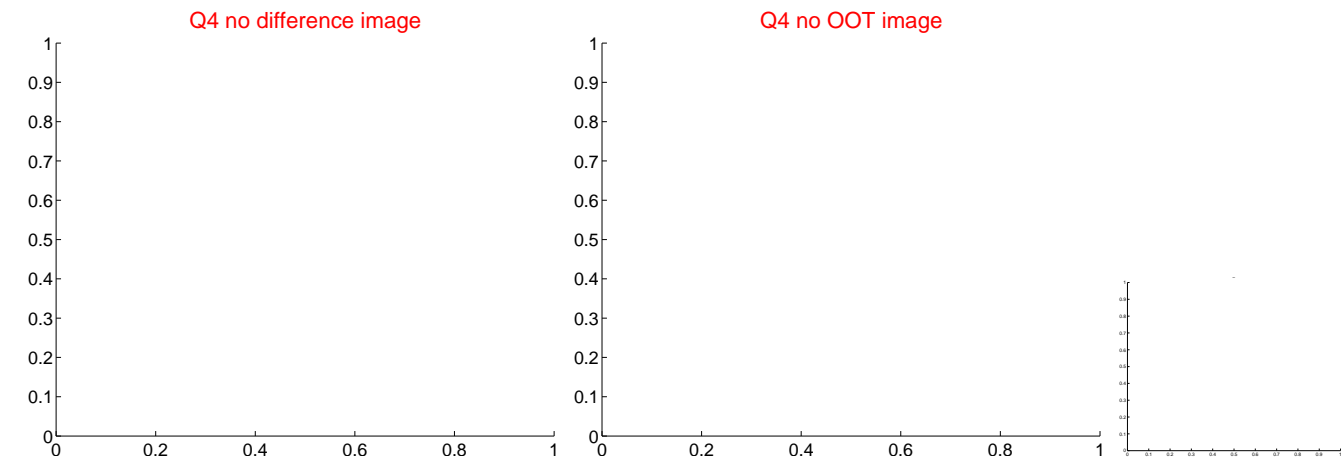
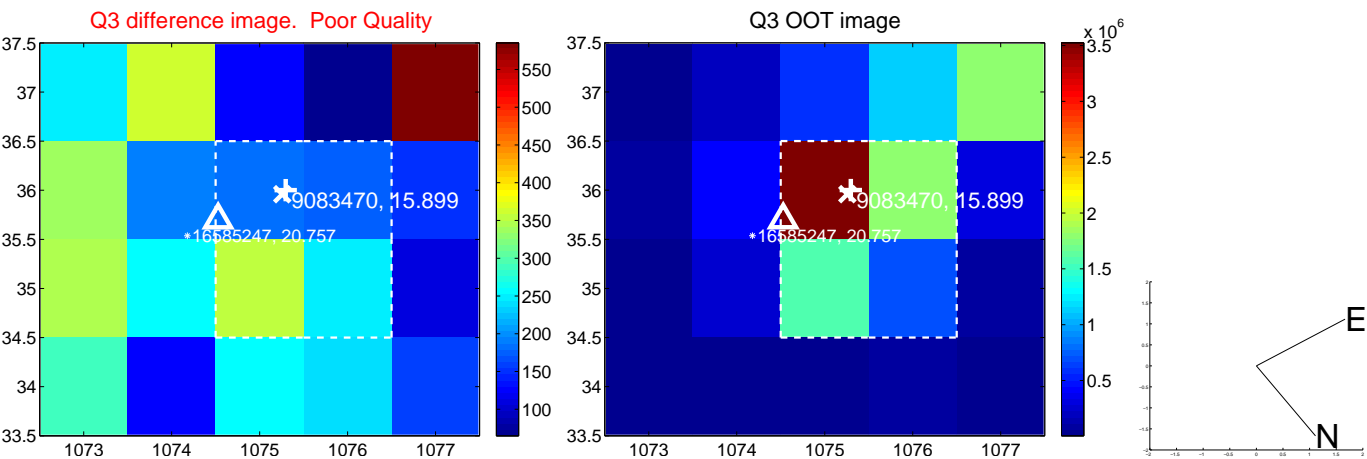
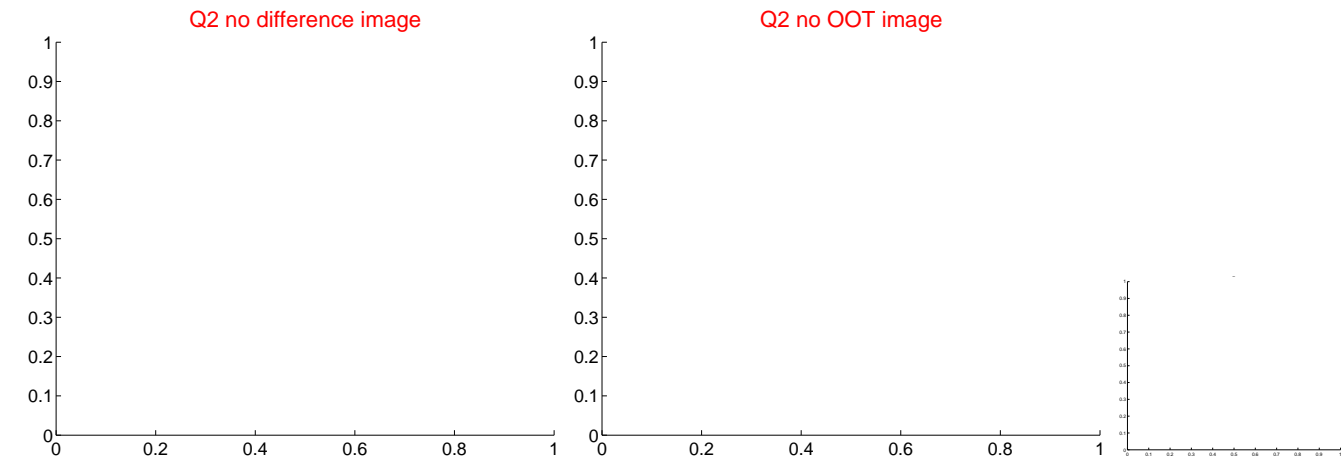
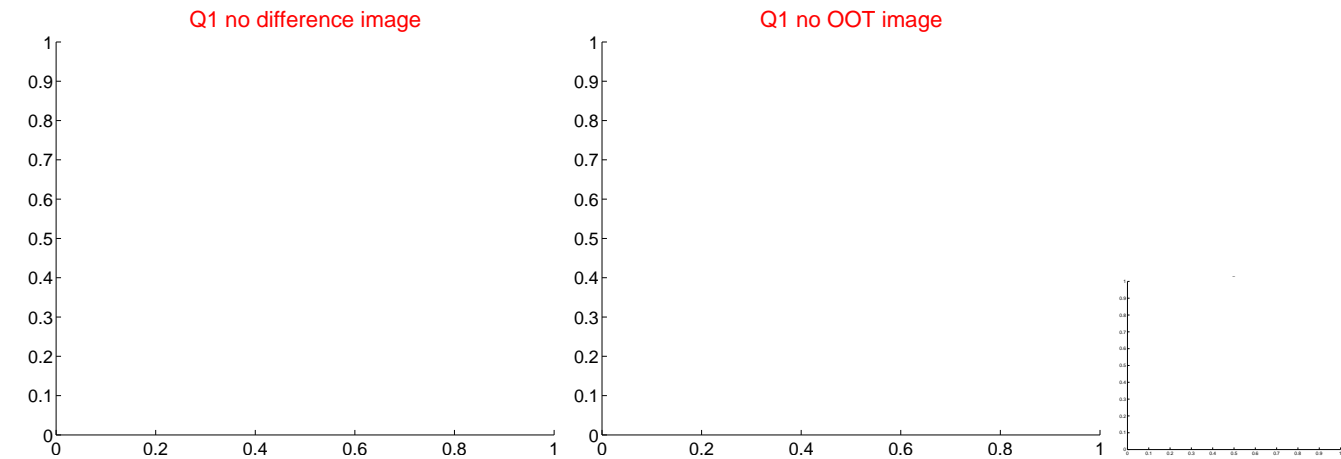


offset from photometric centroids

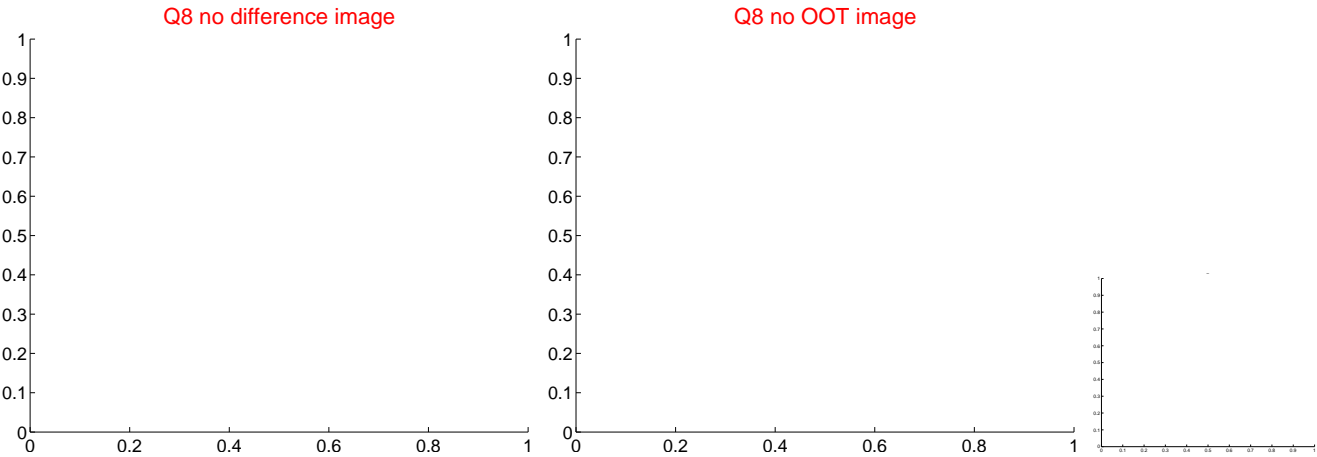
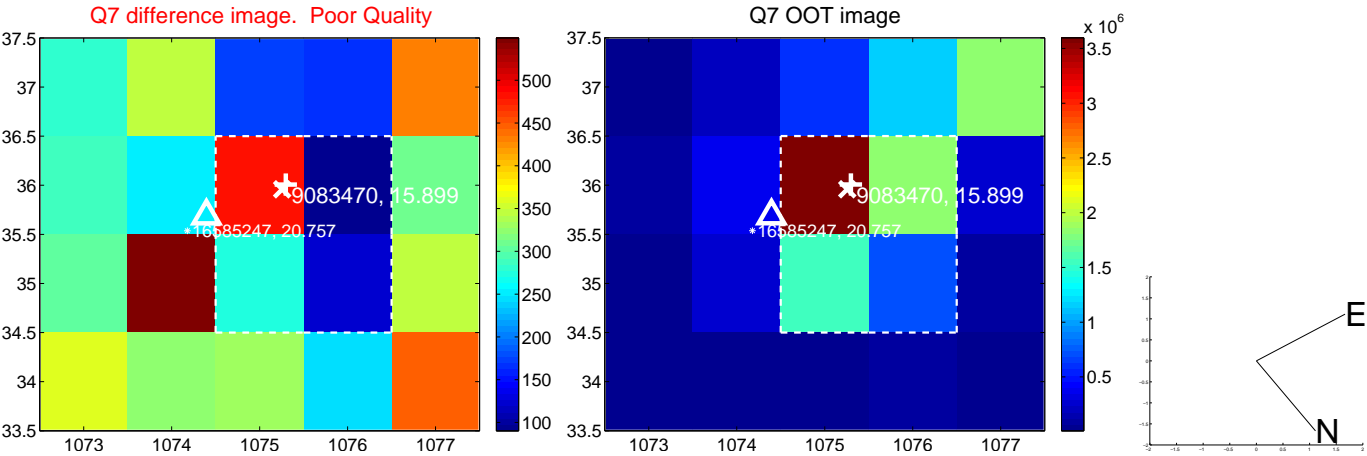
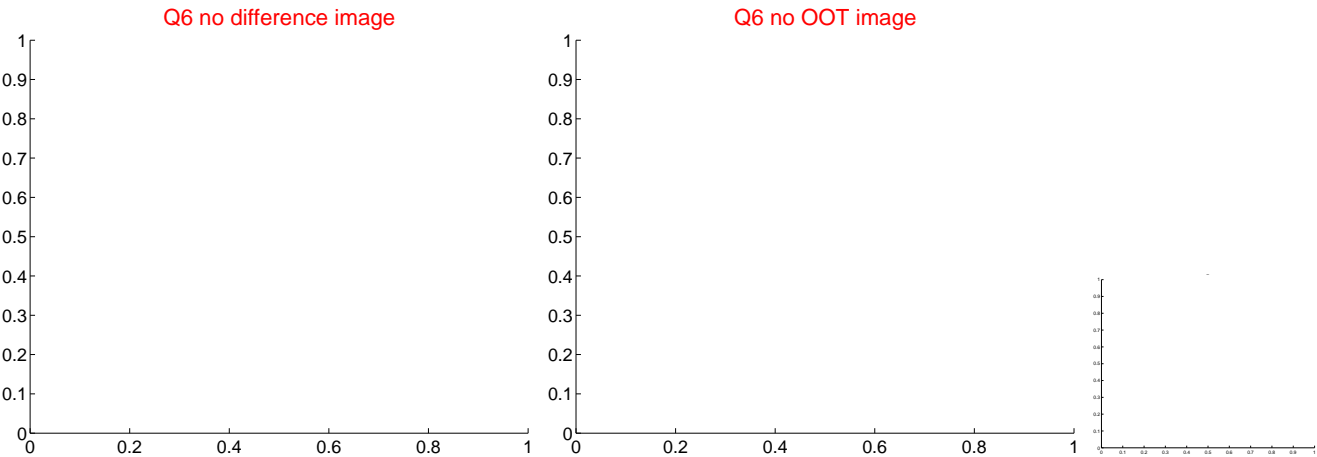
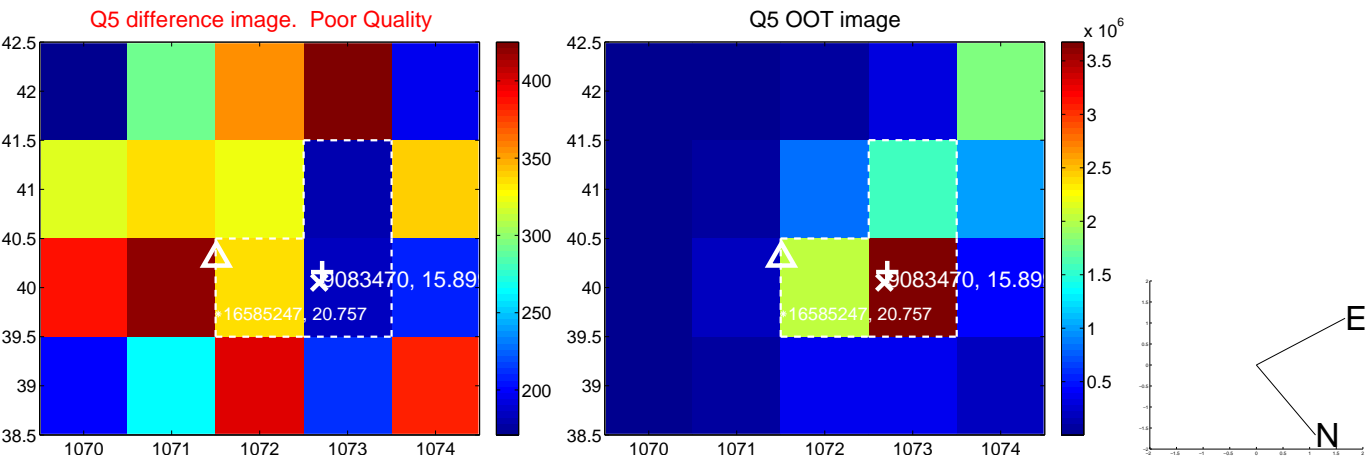


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

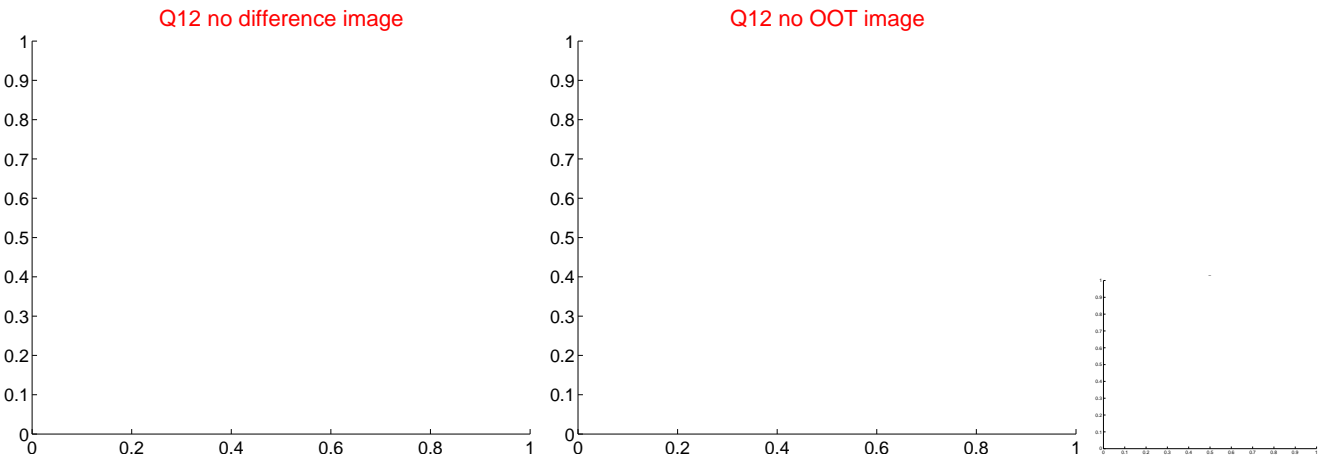
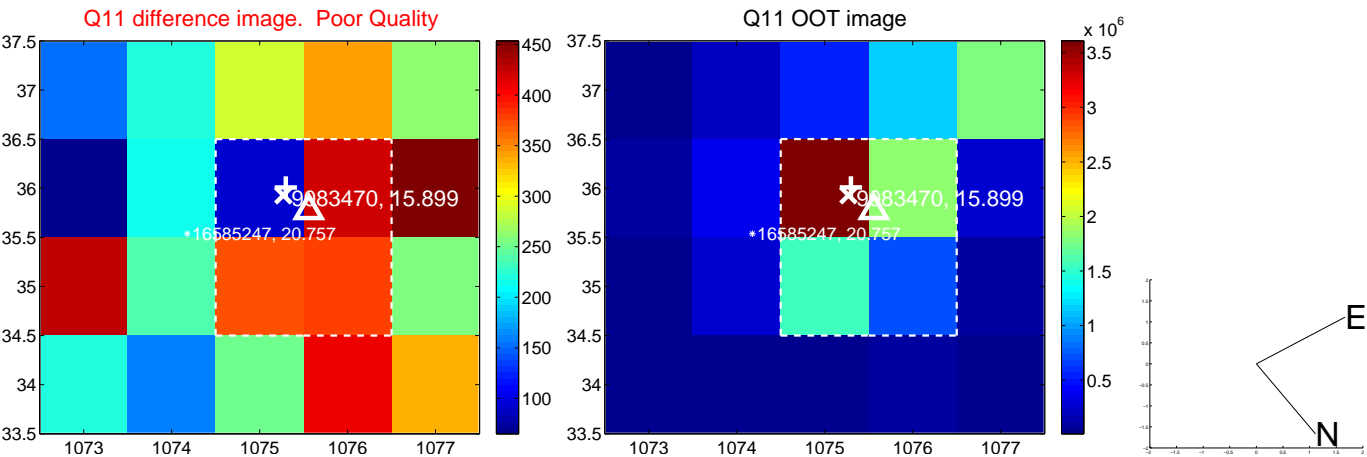
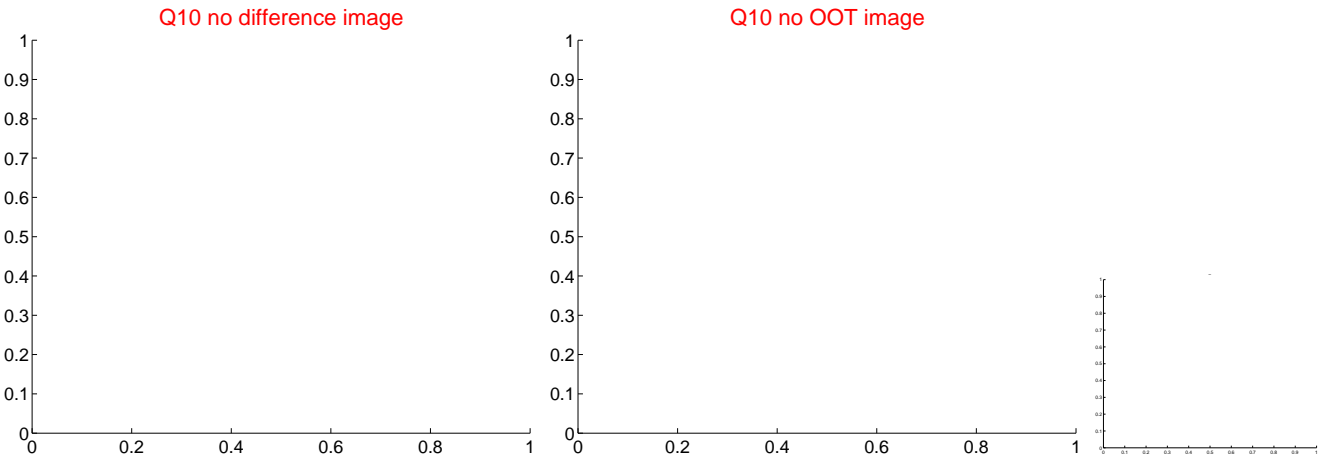
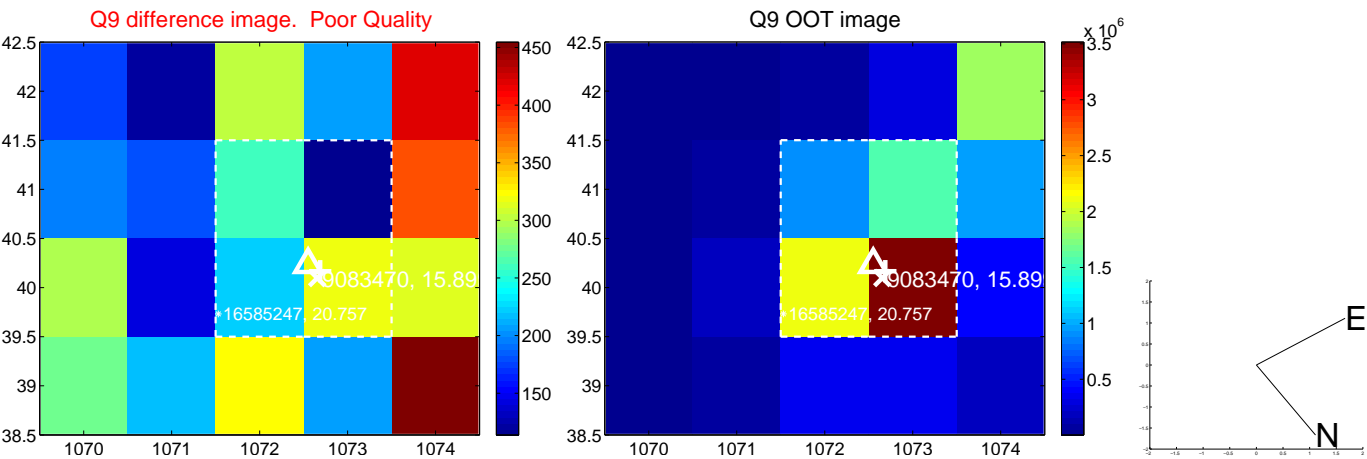
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



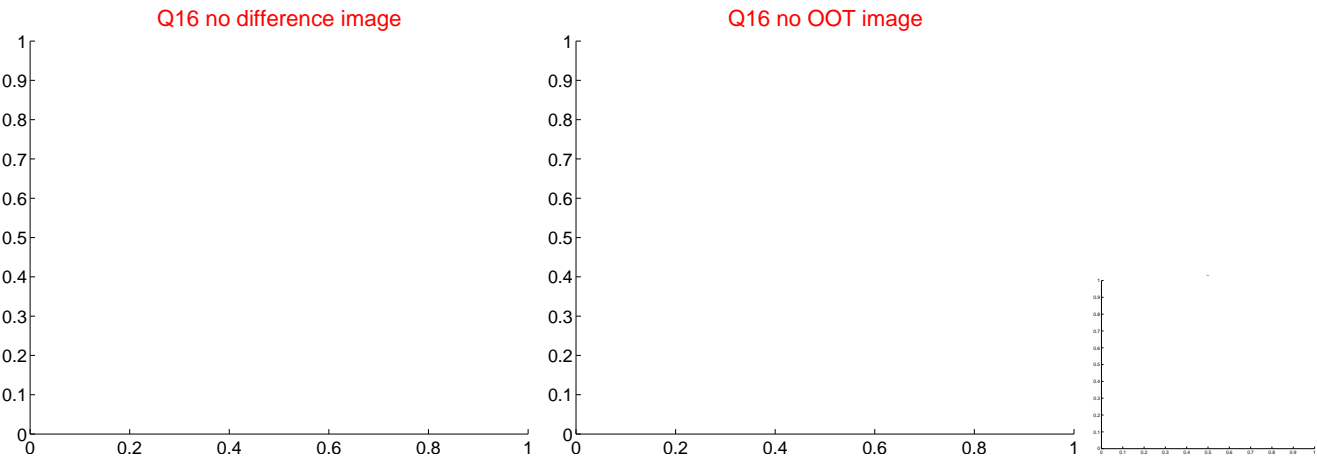
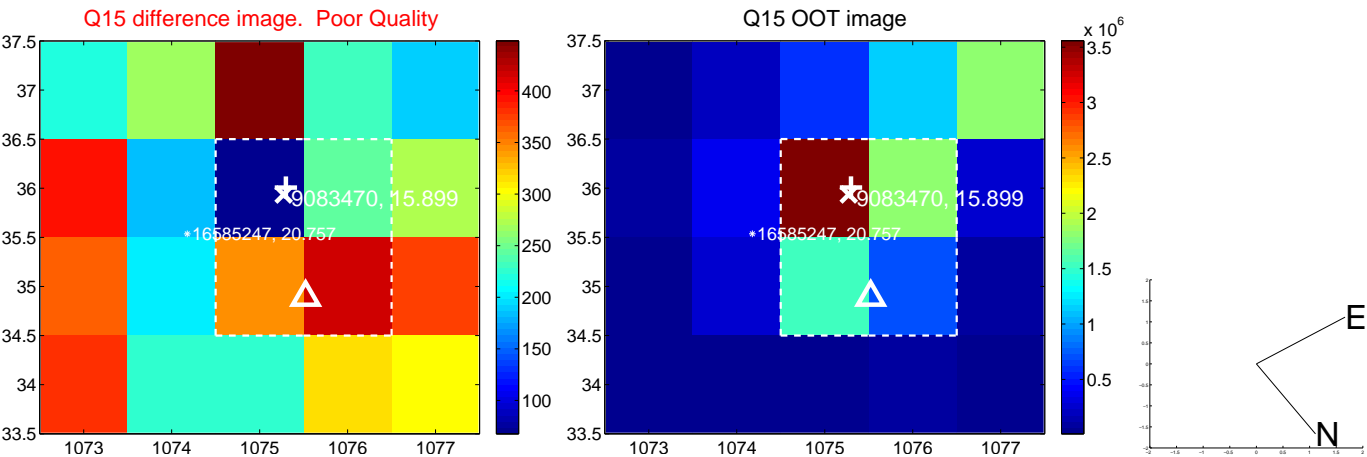
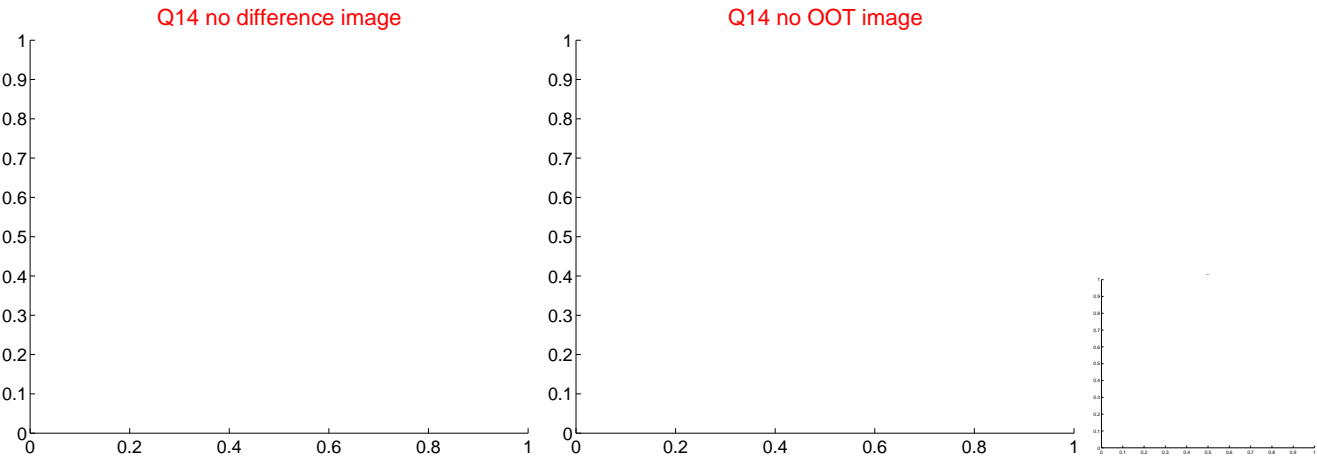
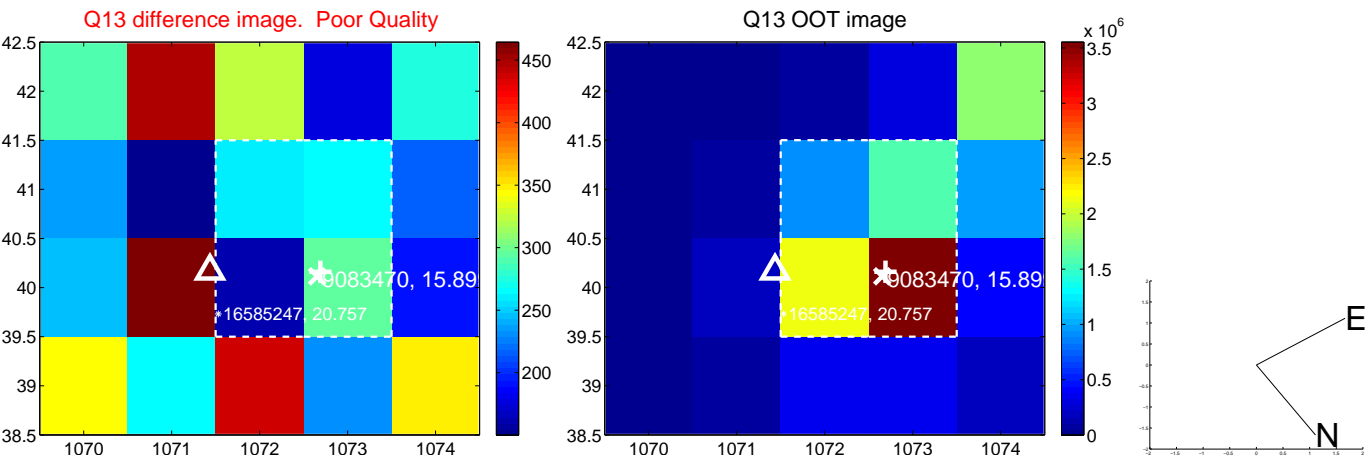
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



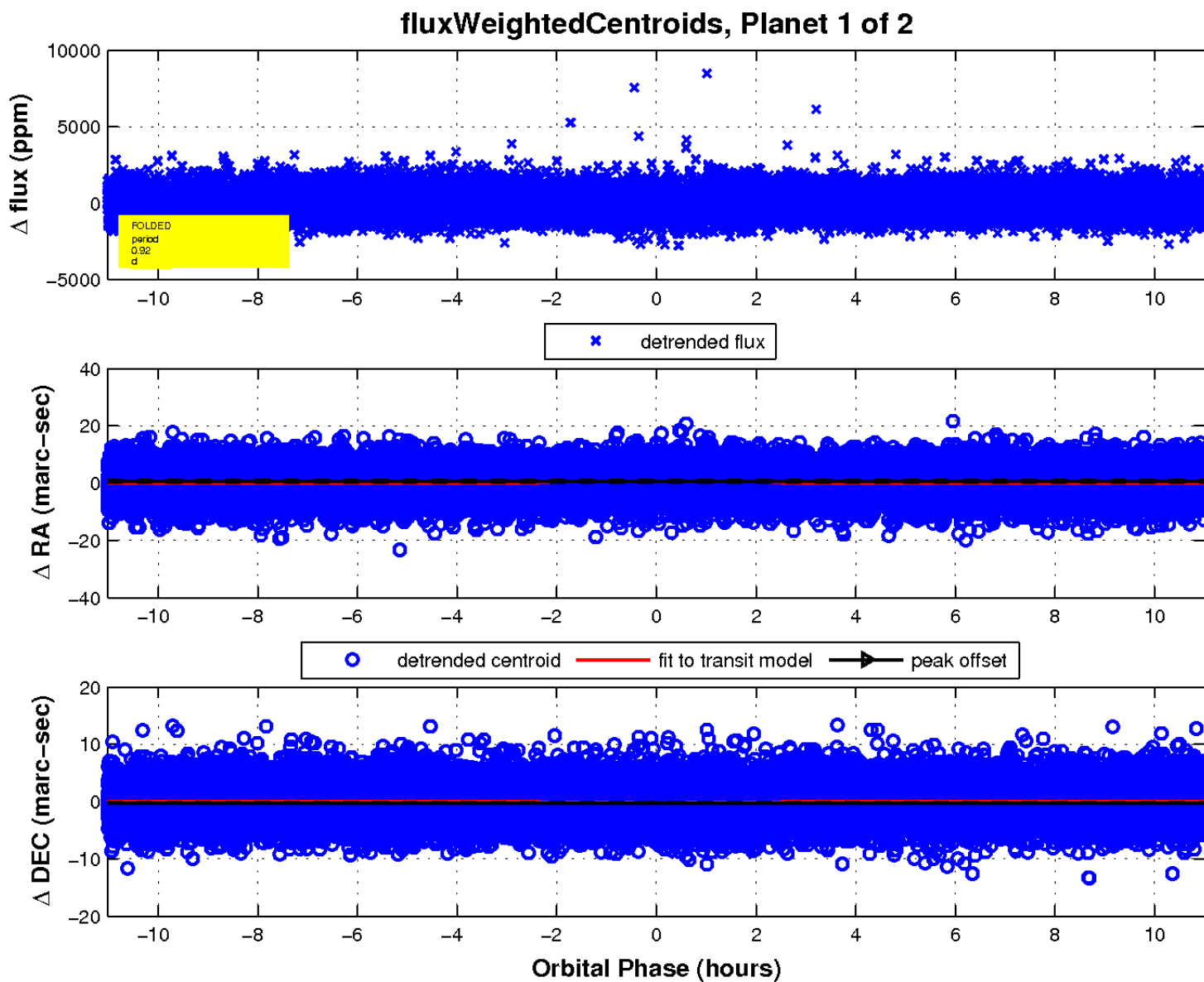
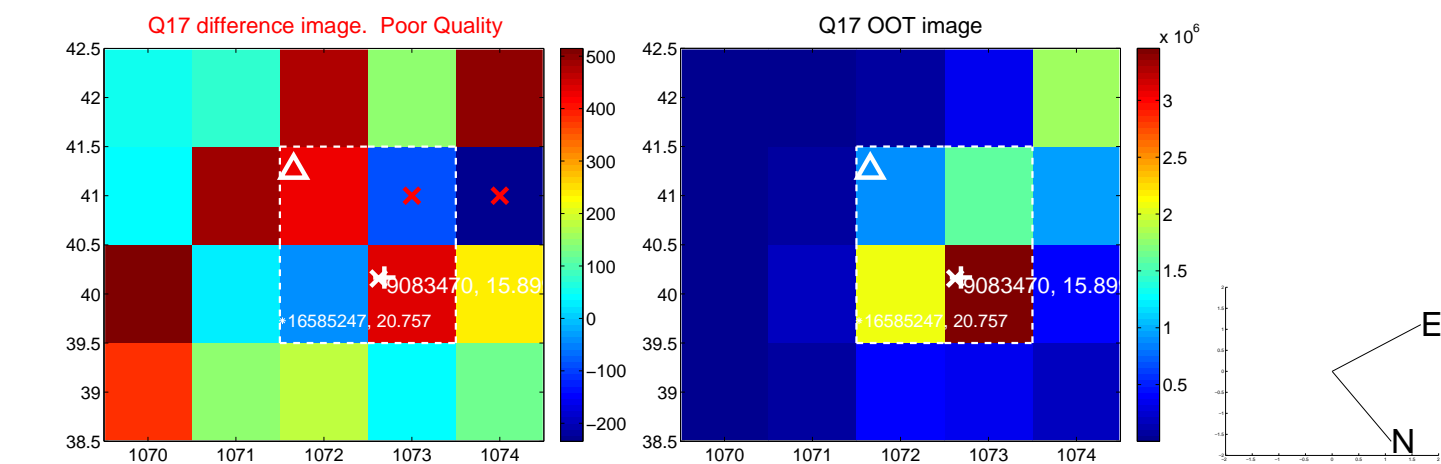
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

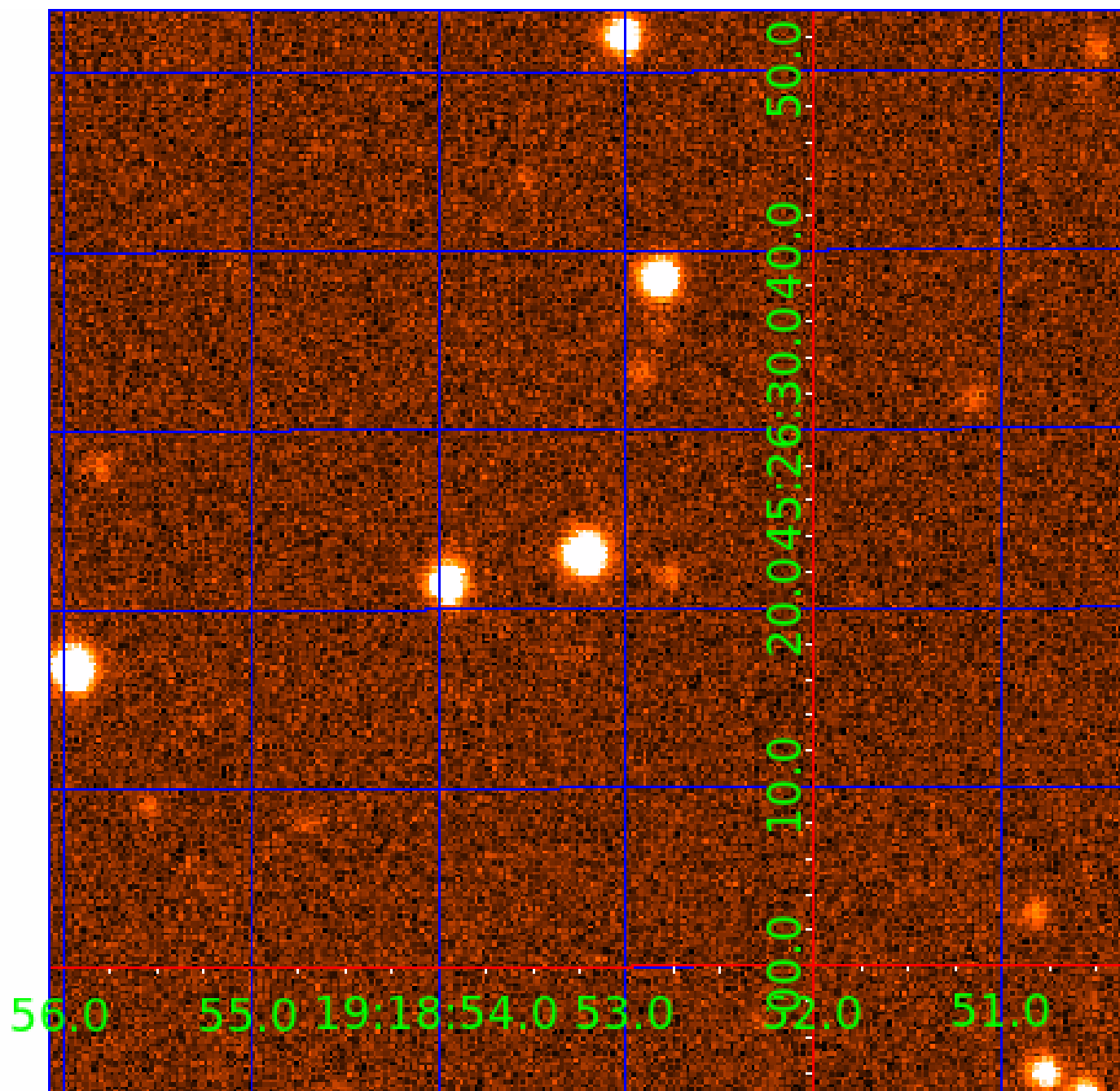


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 009083470

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})
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Robovetter Results

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009083470-02	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT— INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST

Notes: OBS = Observed. INJ = Injected. INV = Inverted. SCR = Scrambled.

N = Not Transit-Like. S = Stellar Eclipse. C = Centroid Offset. E = Ephemeris Match.

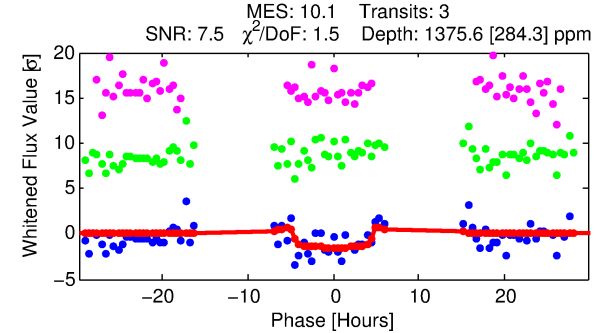
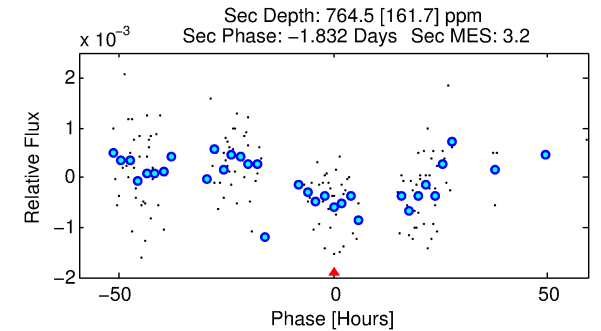
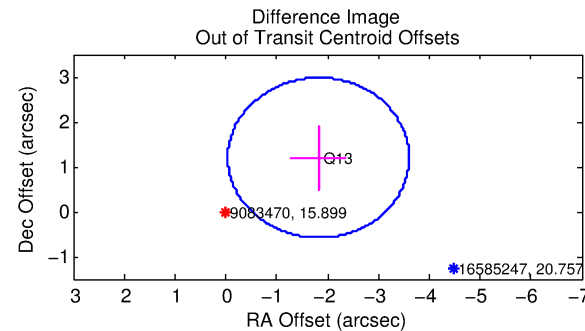
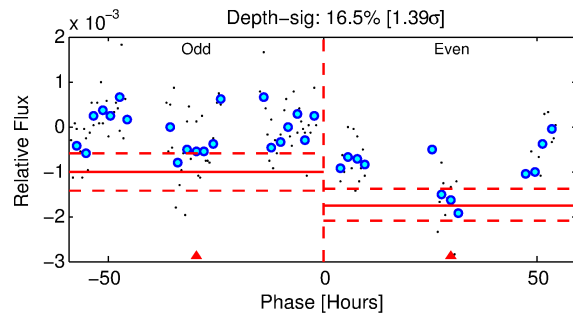
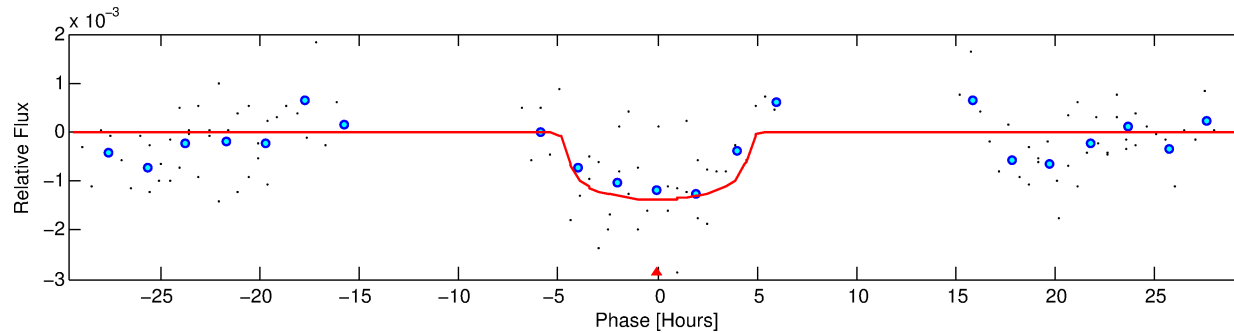
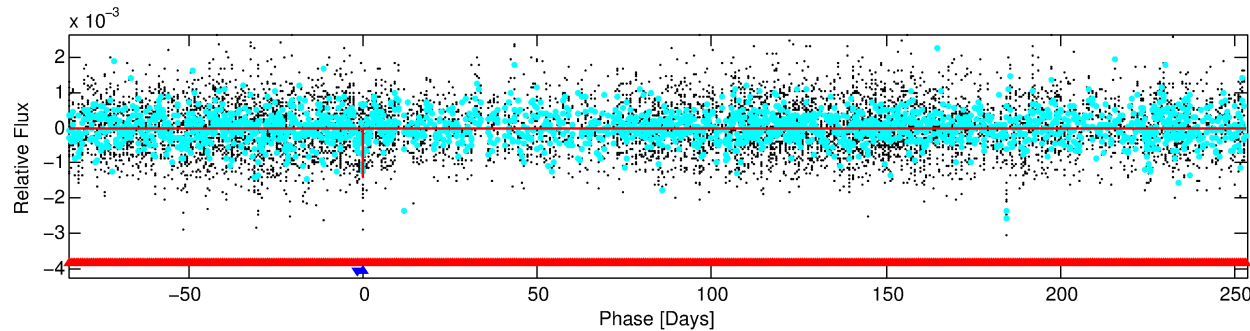
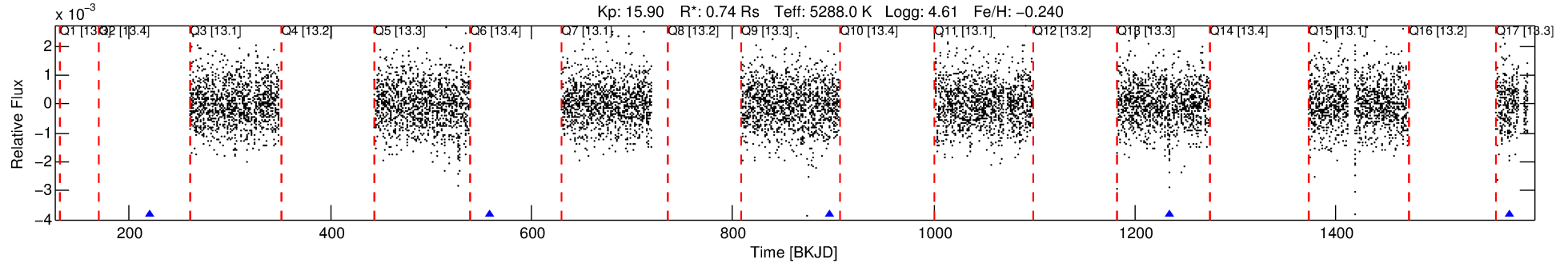
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009083470-02

No Significant Match Found

DV One-Page Summary

KIC: 9083470 Candidate: 2 of 2 Period: 338.093 d
KOI: K04731 Corr: No Ephemeris Match



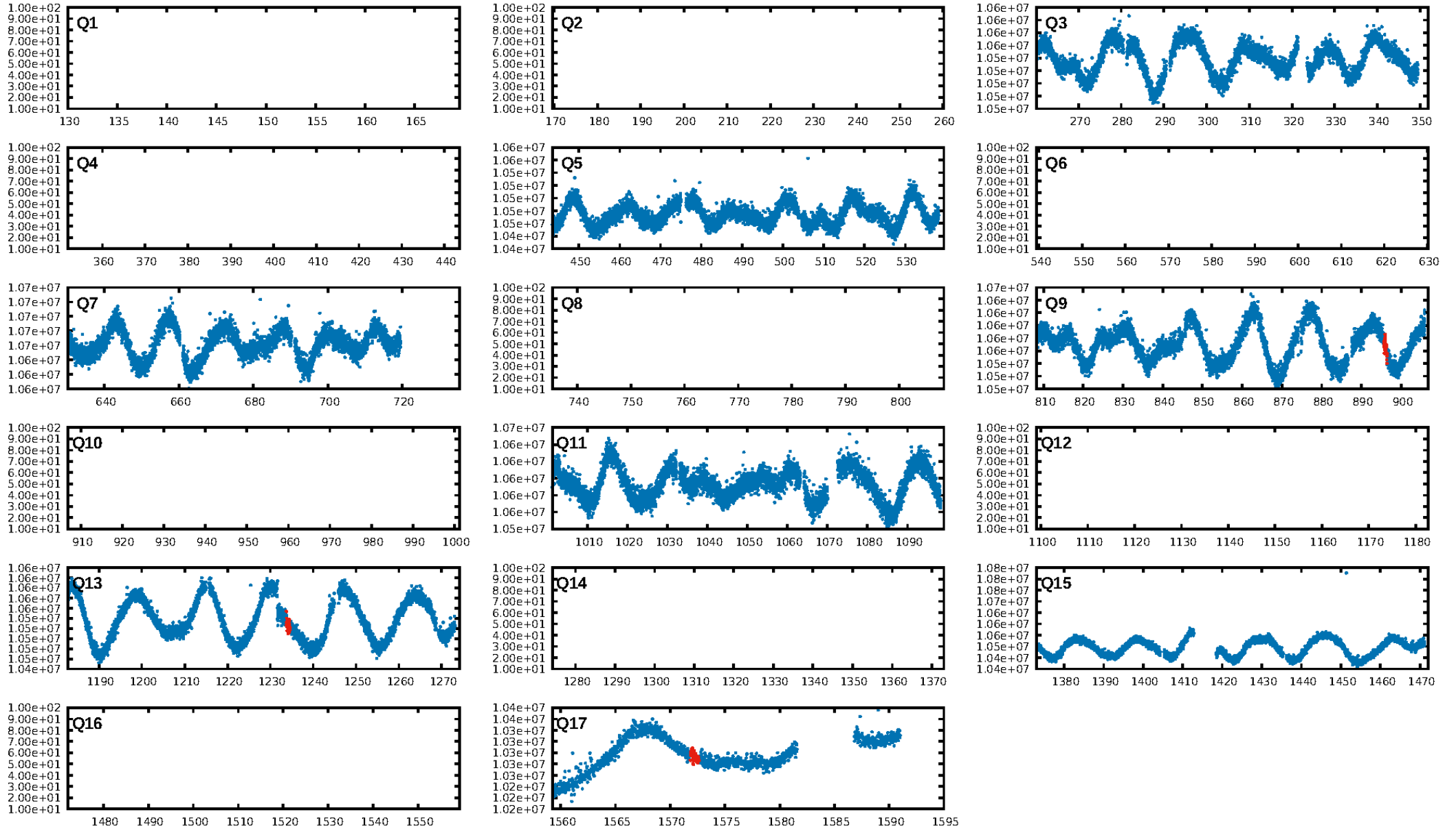
DV Fit Results:

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Epoch = 219.8689 [0.2947] BKJD
Rp/R* = 0.0363 [0.0431]
a/R* = 199.86 [981.35]
b = 0.70 [3.26]
Seff = 0.49 [0.12]
Teq = 213 [13] K
Rp = 2.93 [3.52] Re
a = 0.8889 [0.1208] AU
Ag = 38780.71 [92936.78] [0.42 σ]
Teffp = 4618 [2763] K [1.59 σ]

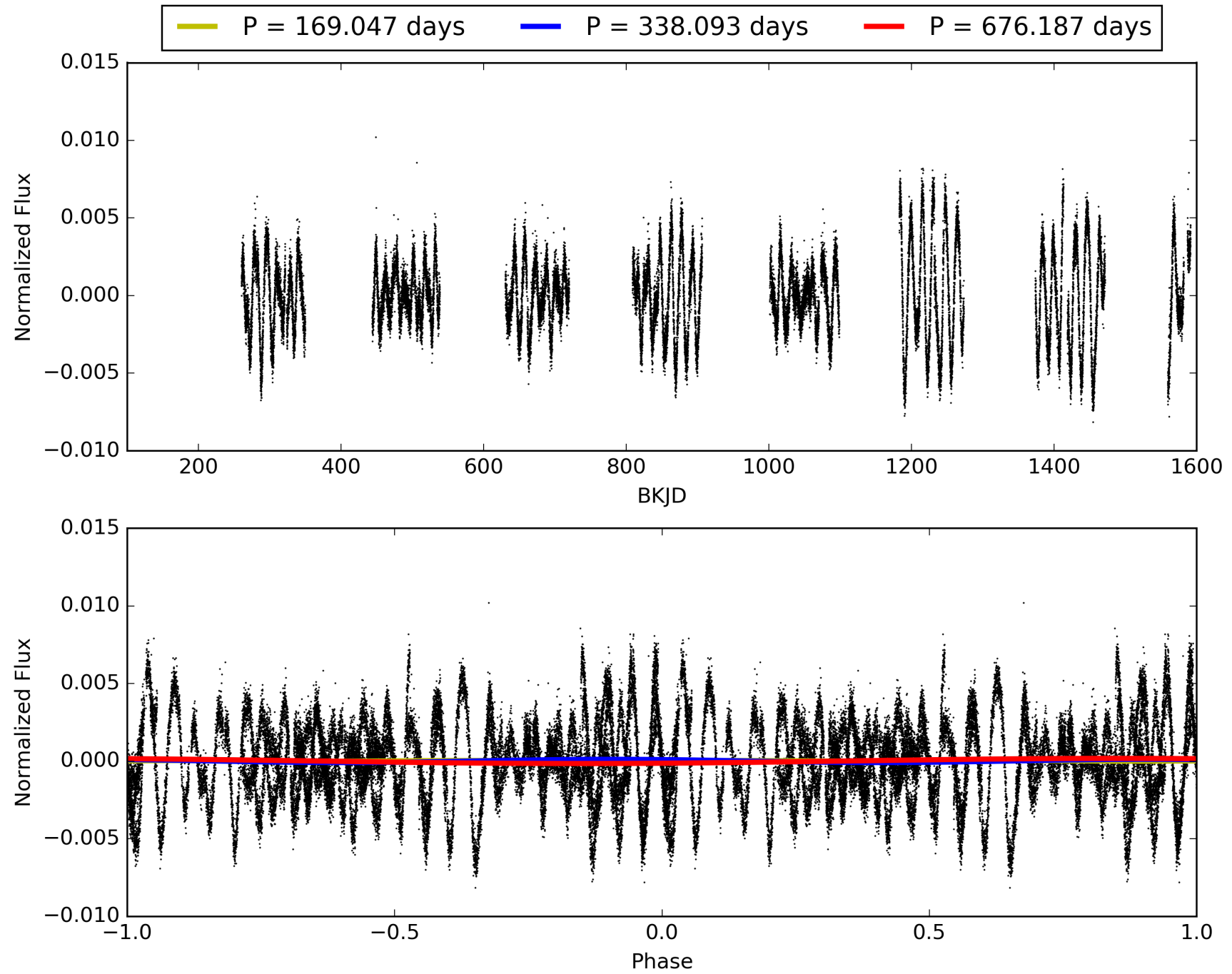
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [731.72 σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 4.9%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 8.27e-16
RollingBand-fgt: 1.00 [2/2]
GhostDiagnostic-chr: 0.2395
Centroid-sig: 1.0%
Centroid-so: 5.157 arcsec [3.07 σ]
OotOffset-rm: 2.181 arcsec [3.67 σ]
KicOffset-rm: 1.921 arcsec [3.22 σ]
OotOffset-st: 0/0/0/1 [1]
KicOffset-st: 0/0/0/1 [1]
DiffImageQuality-fgm: 1.00 [1/1]
DiffImageOverlap-fno: 0.00 [0/3]

TCE 009083470-02, PDC Light Curves

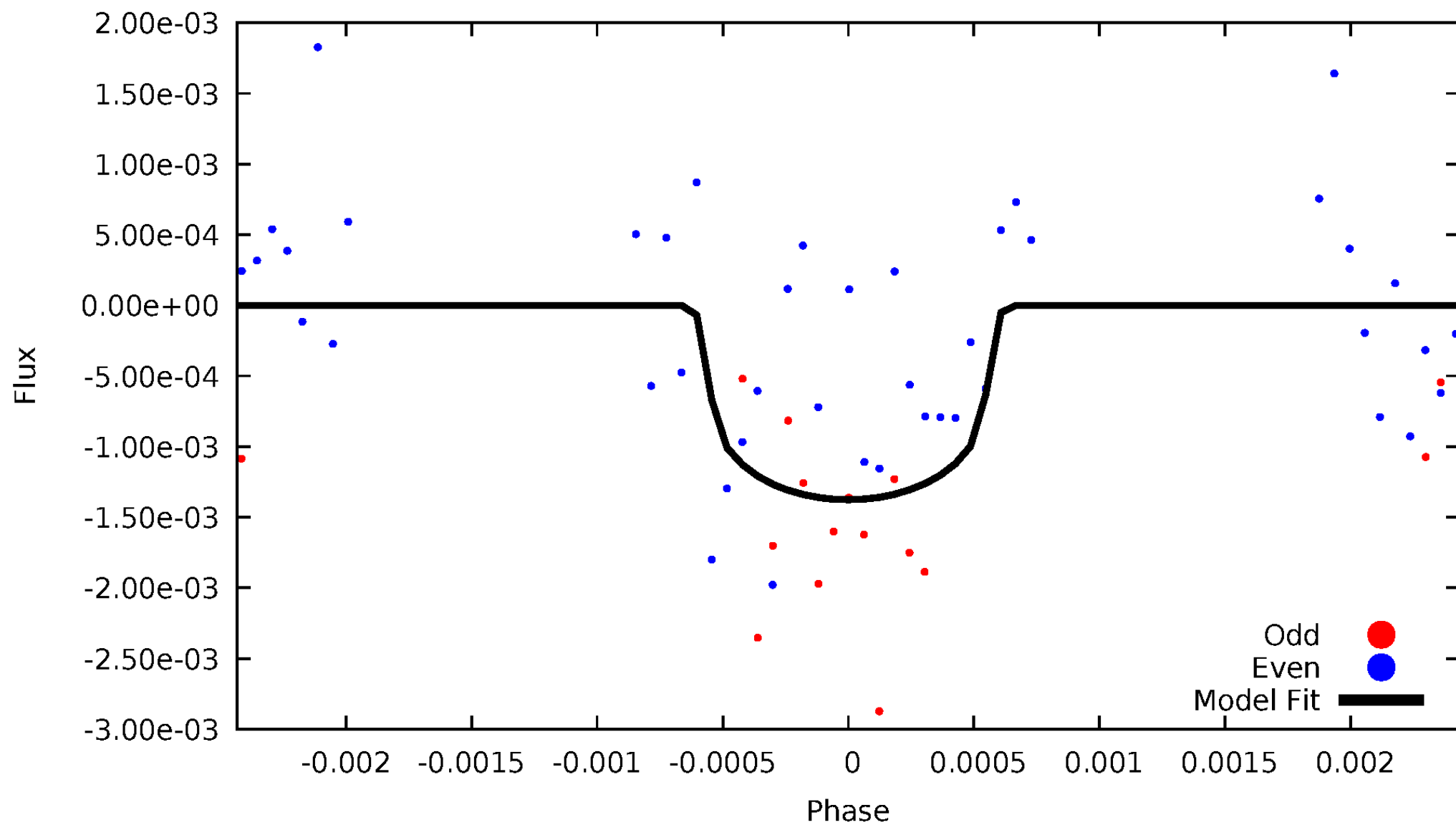


TCE 009083470-02



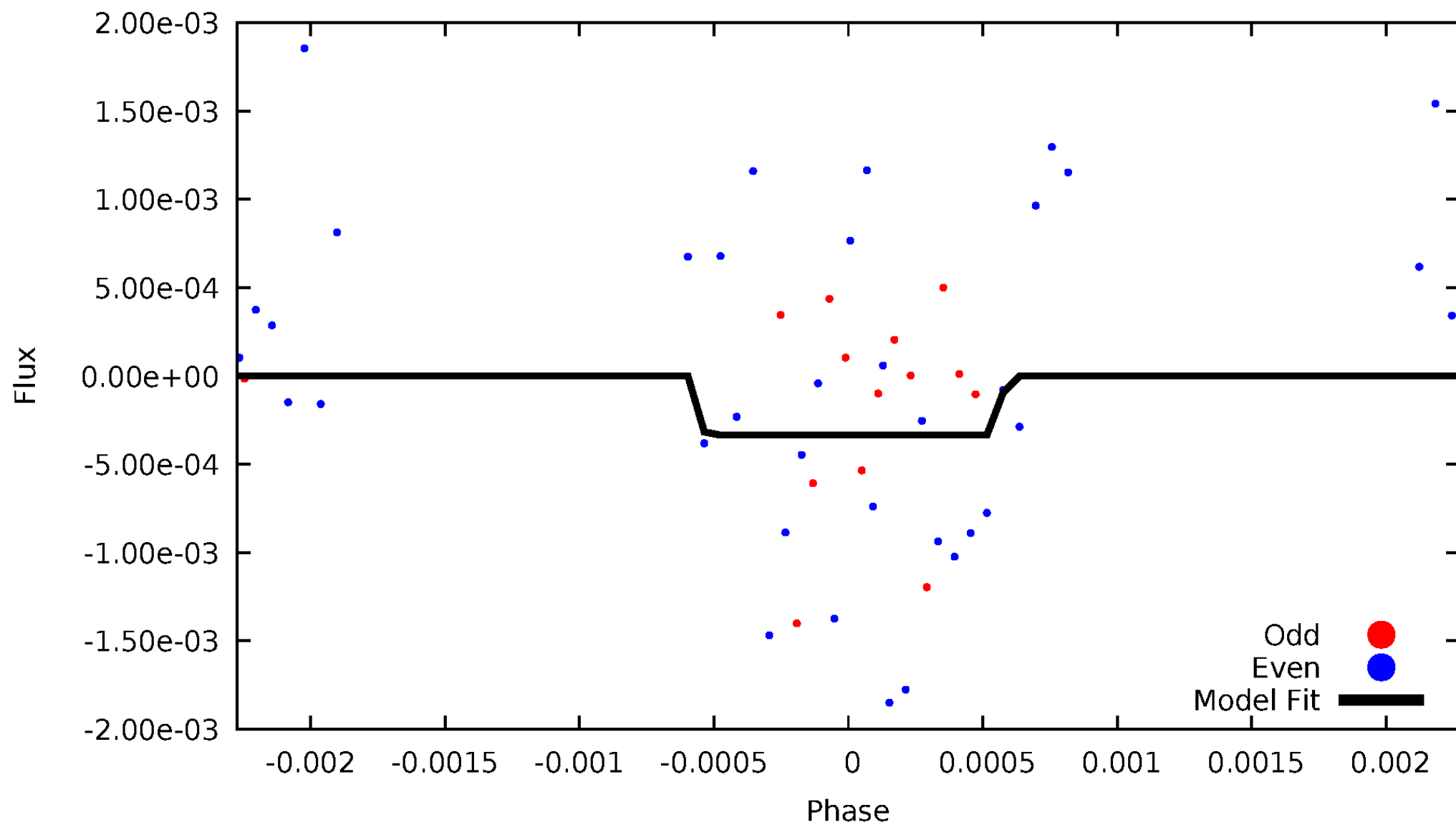
DV Odd/Even

TCE 009083470-02



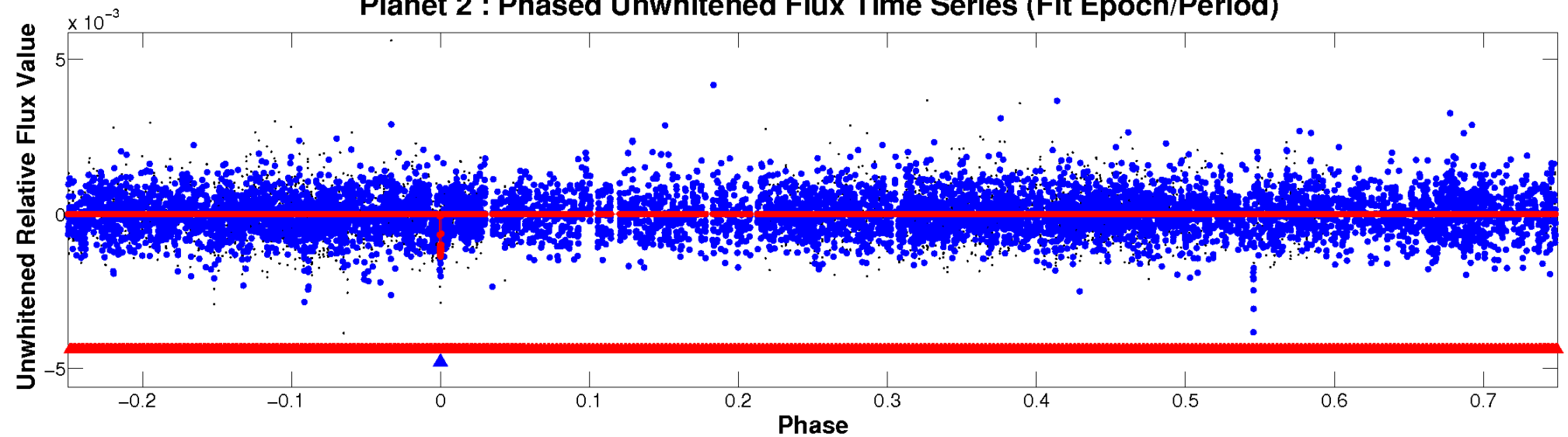
ALT Odd/Even

TCE 009083470-02

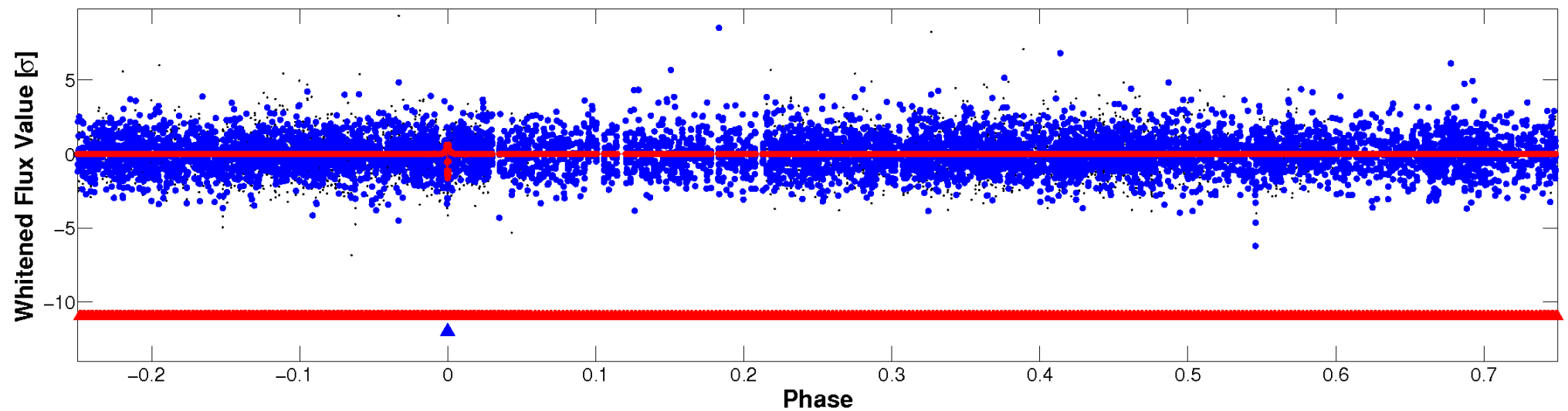


Non-Whitened Vs. Whitened Light Curve

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

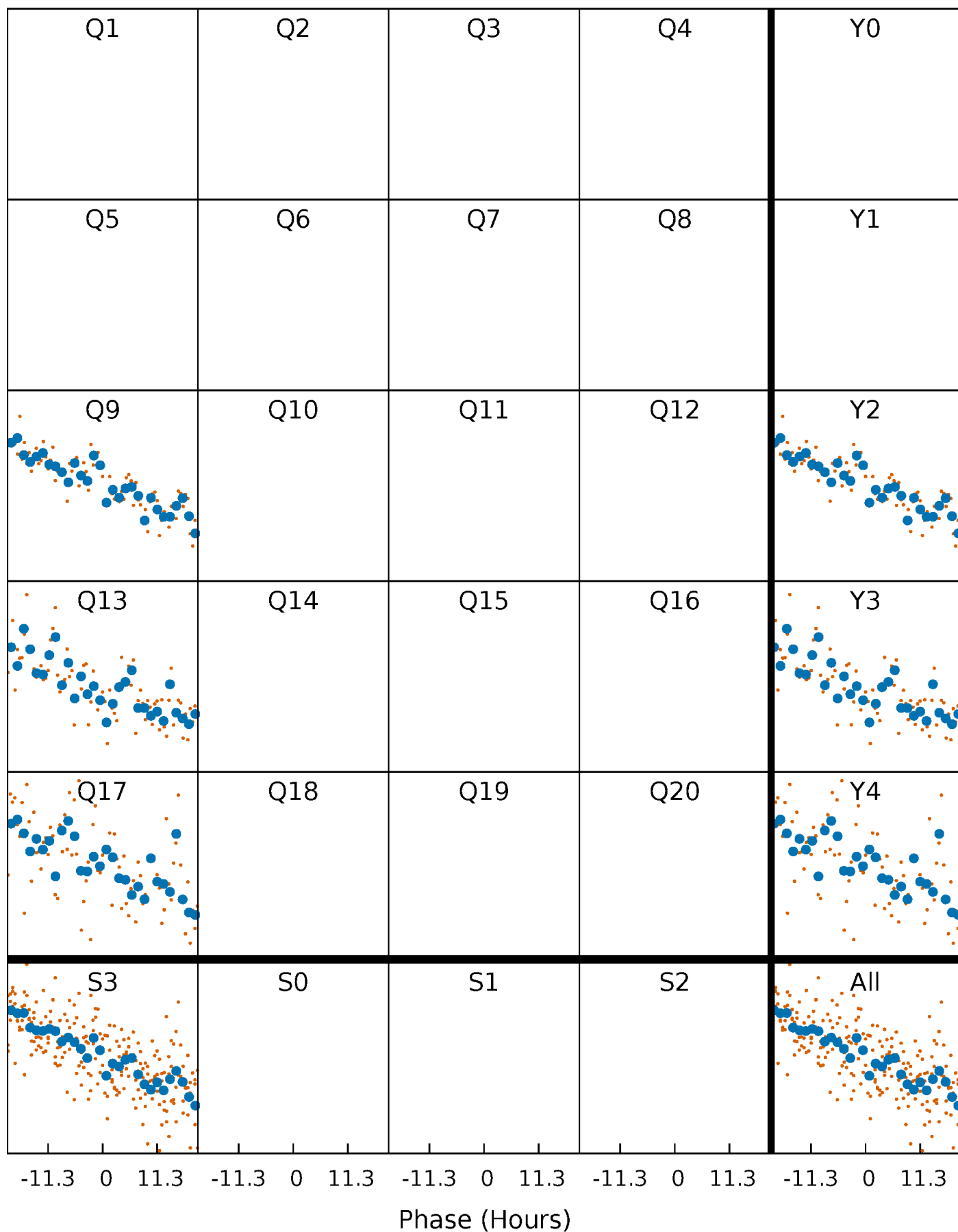


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



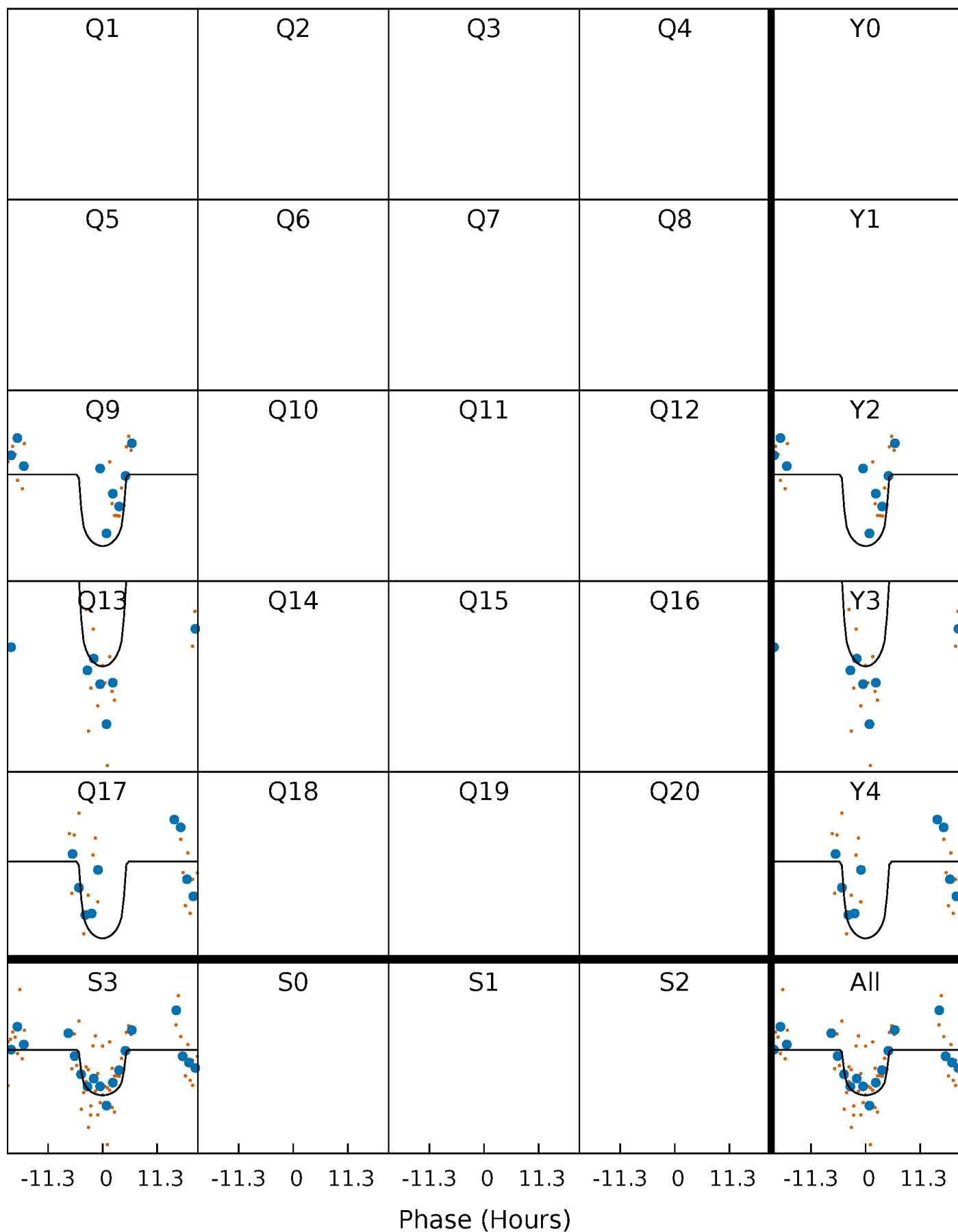
PDC Quarter-Phased Transit Curves

TCE 009083470-02 $P=338.093400$ Days $T_0=219.868875$ (BKJD)



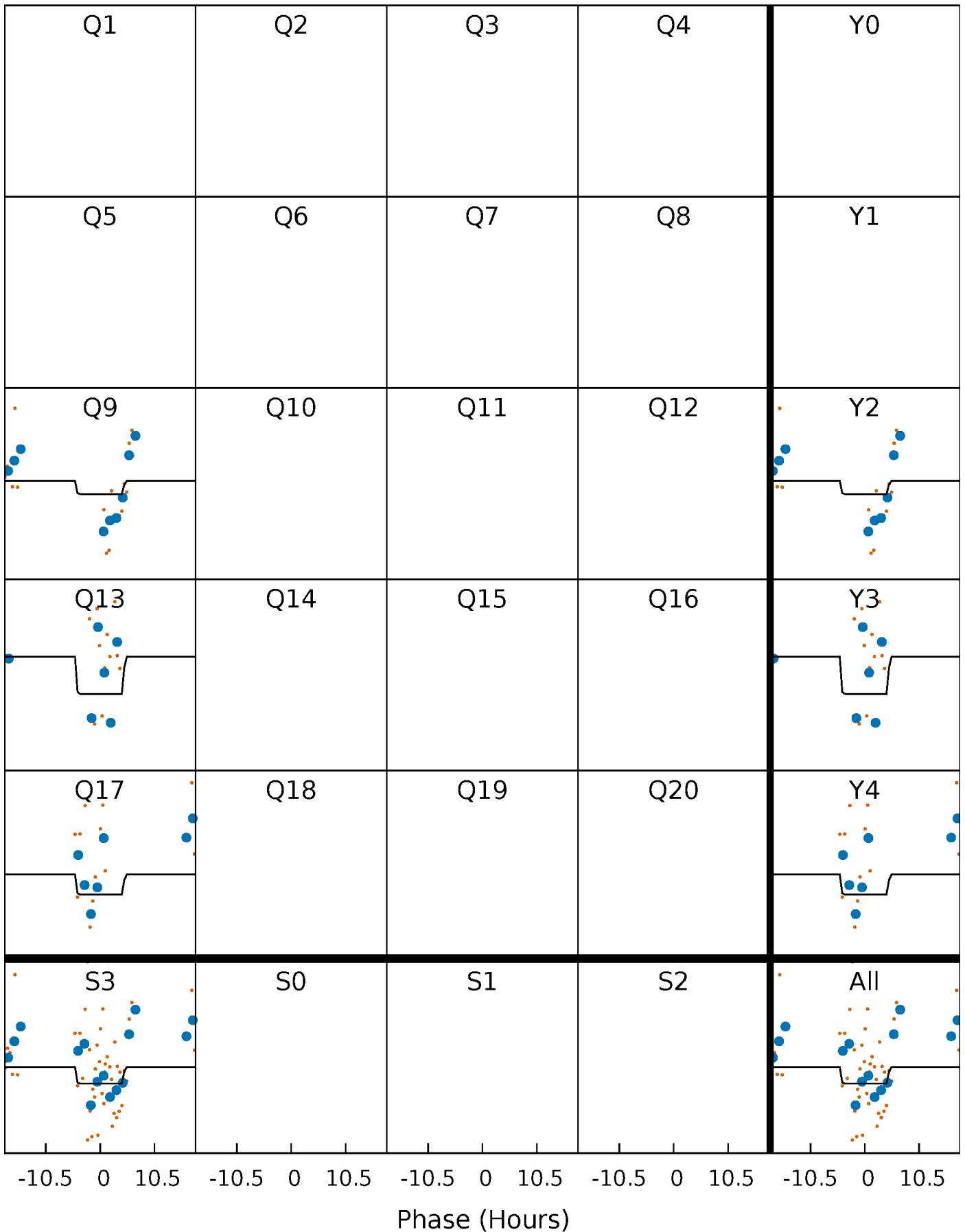
DV Quarter-Phased Transit Curves

TCE 009083470-02 $P=338.093400$ Days $T_0=219.868875$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

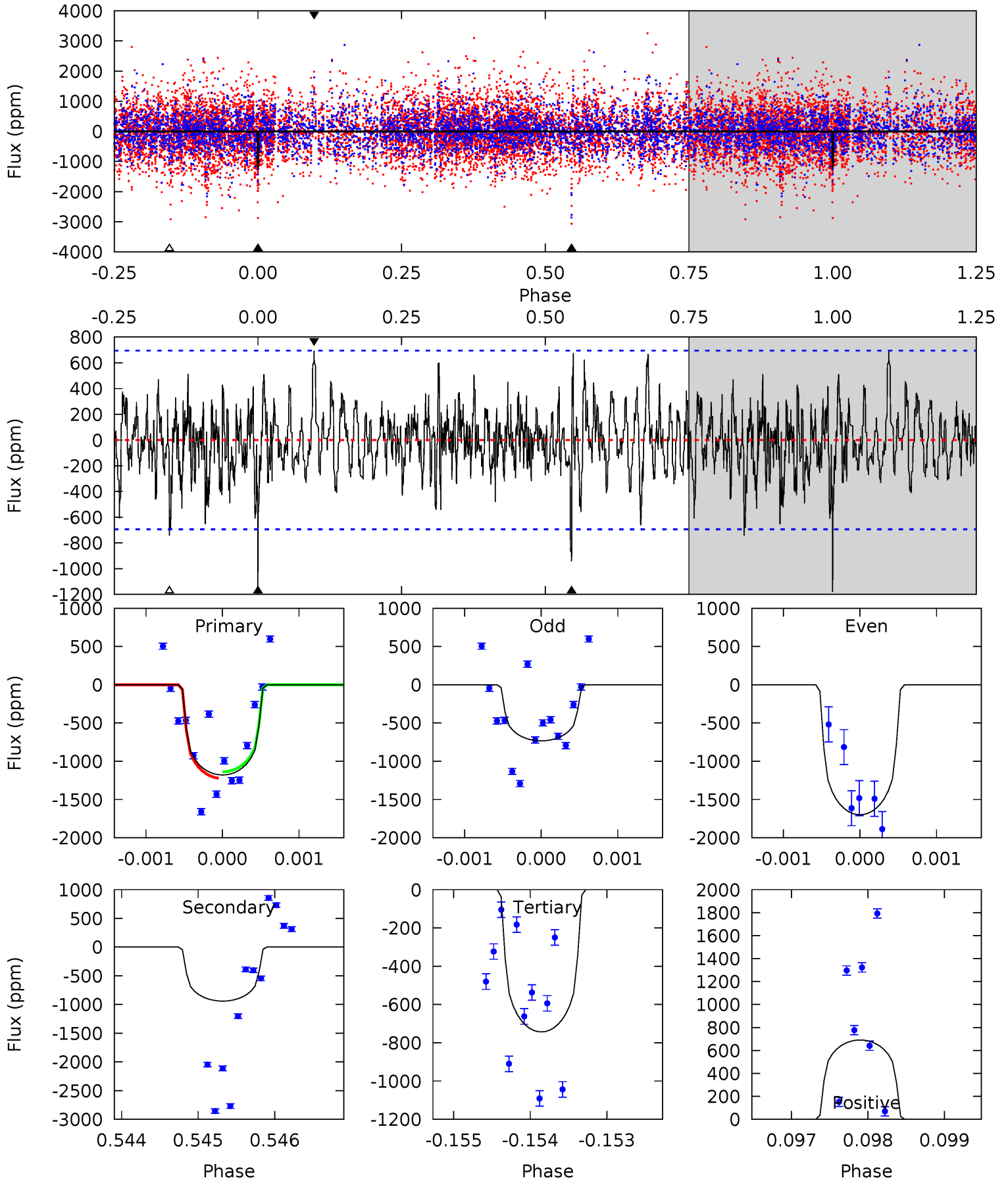
TCE 009083470-02 $P=338.066439$ Days $T_0=219.892559$ (BKJD)



DV Model-Shift Uniqueness Test

009083470-02, P = 338.093400 Days, E = 219.868875 Days

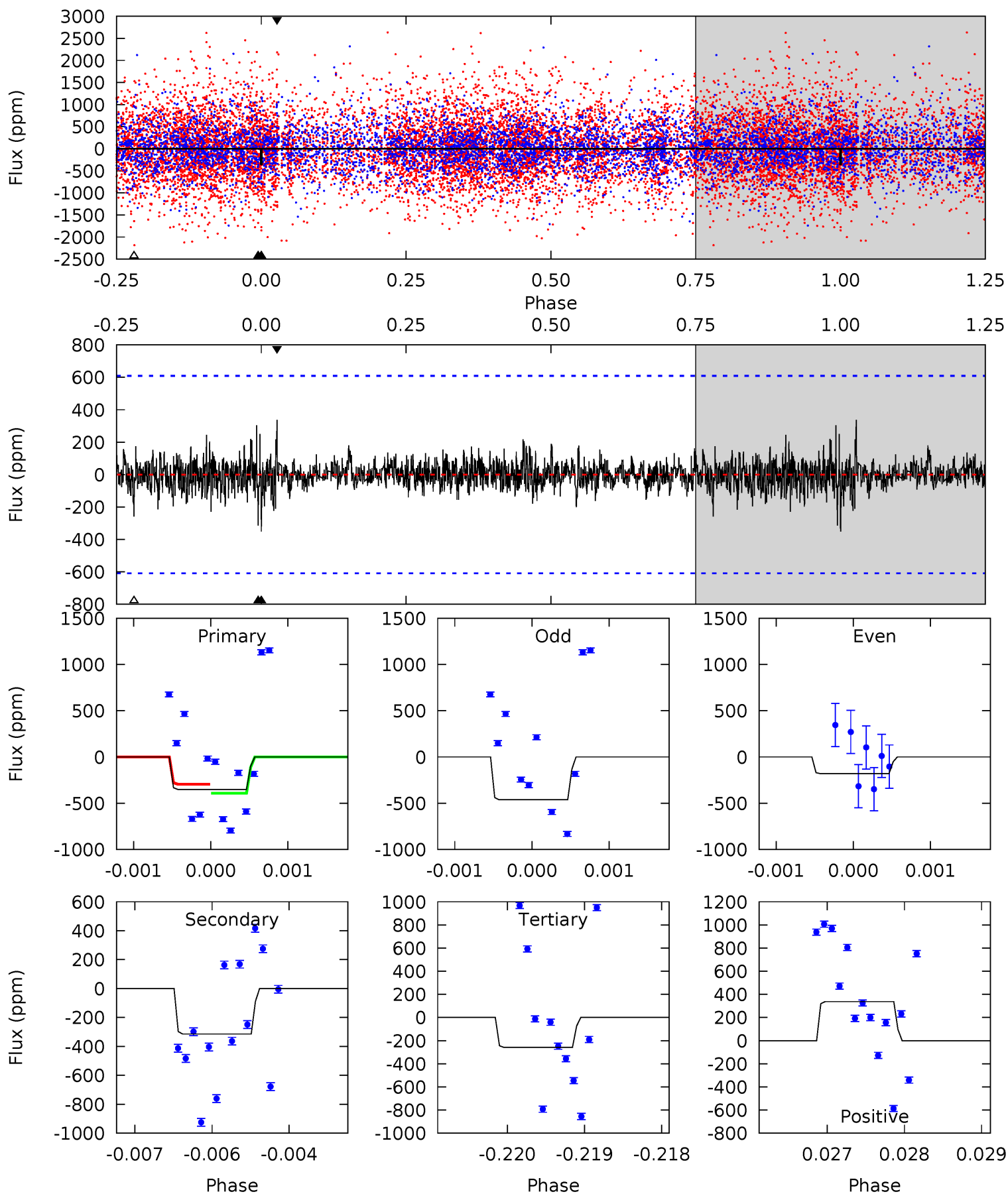
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
9.21	7.35	5.81	5.40	5.43	3.25	1.64	3.41	3.82	1.54	1.95	3.75	1.23	0.37	0.33



Alt Model-Shift Uniqueness Test

009083470-02, P = 338.066439 Days, E = 219.892559 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
3.13	2.80	2.30	3.00	5.43	3.26	0.57	0.83	0.13	0.50	-0.20	1.25	2.38	0.49	0.42



Stellar Parameters For KIC 009083470

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	5288^{+185}_{-185}	$4.613^{+0.032}_{-0.104}$	$-0.240^{+0.300}_{-0.300}$	$0.740^{+0.122}_{-0.066}$	$0.828^{+0.078}_{-0.096}$	$2.883^{+0.516}_{-0.917}$
	+3%/-3%	+1%/-2%	+125%/-125%	+16%/-9%	+9%/-12%	+18%/-32%
Source	KIC0	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 009083470-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-940 ± 128	$4.01^{+3.01}_{-2.61}$	302^{+14}_{-13}	4367^{+2779}_{-778}	$24205^{+182524}_{-16264}$
Alt.	-314 ± 112	$3.22^{+2.77}_{-2.23}$	303^{+14}_{-13}	3885^{+2522}_{-735}	$12881^{+119523}_{-9506}$

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

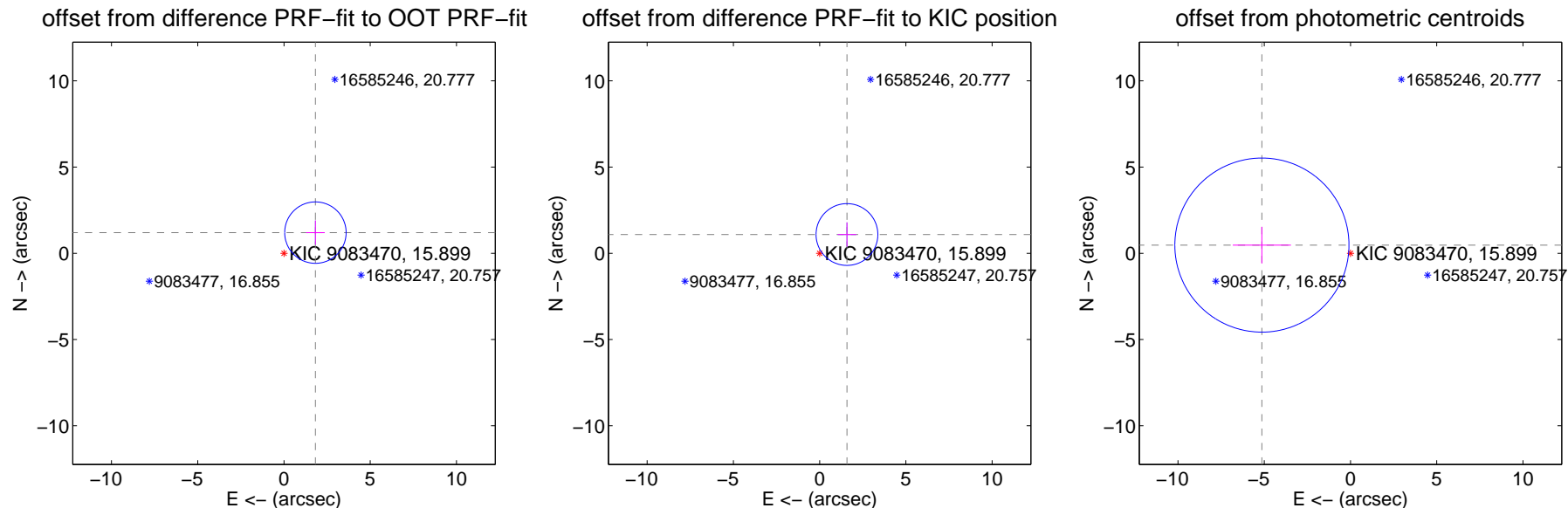
DV Centroid Data

Supplemental centroid analysis for 009083470-02. Kepler magnitude: 15.90. Transit SNR 7.54

There are 1 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.26 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	2.181 ± 0.594	3.67	-1.822 ± 0.538	1.199 ± 0.705
PRF-fit source offset from KIC position	1.921 ± 0.597	3.22	-1.583 ± 0.538	1.088 ± 0.705
photometric centroid source offset	5.16 ± 1.68	3.07	5.14 ± 1.69	0.48 ± 1.06

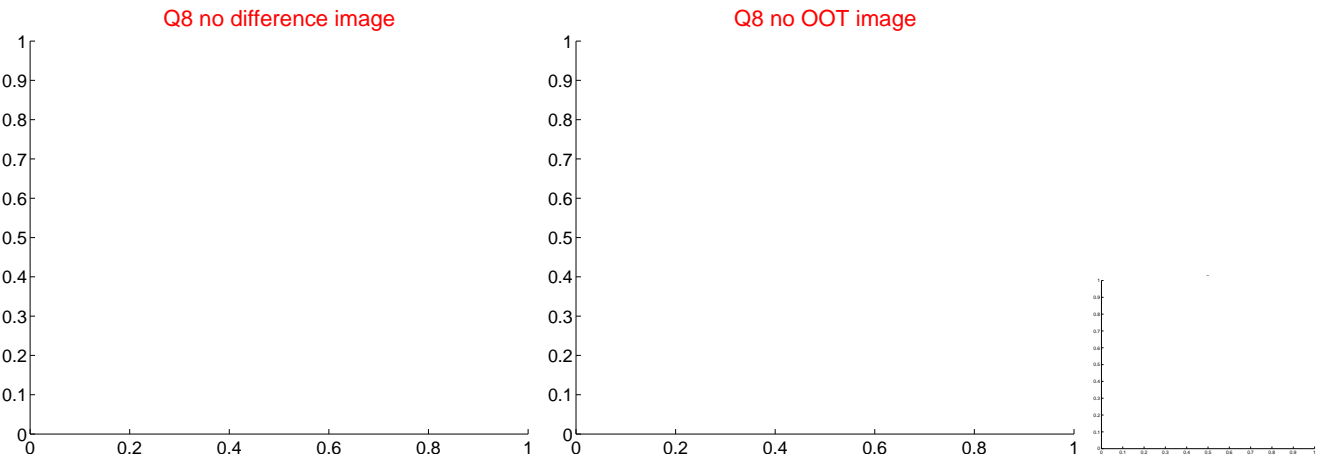
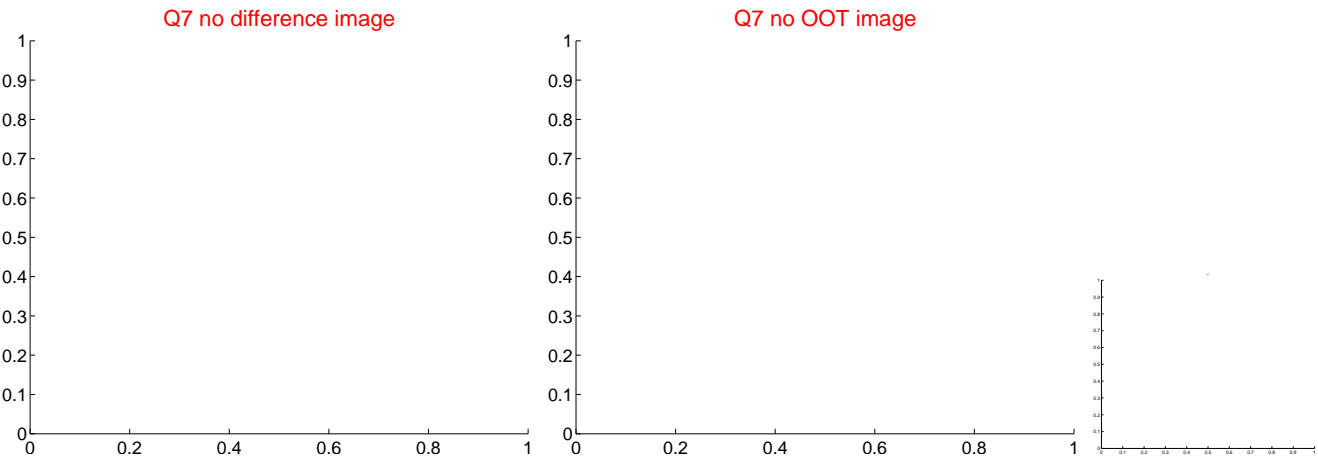
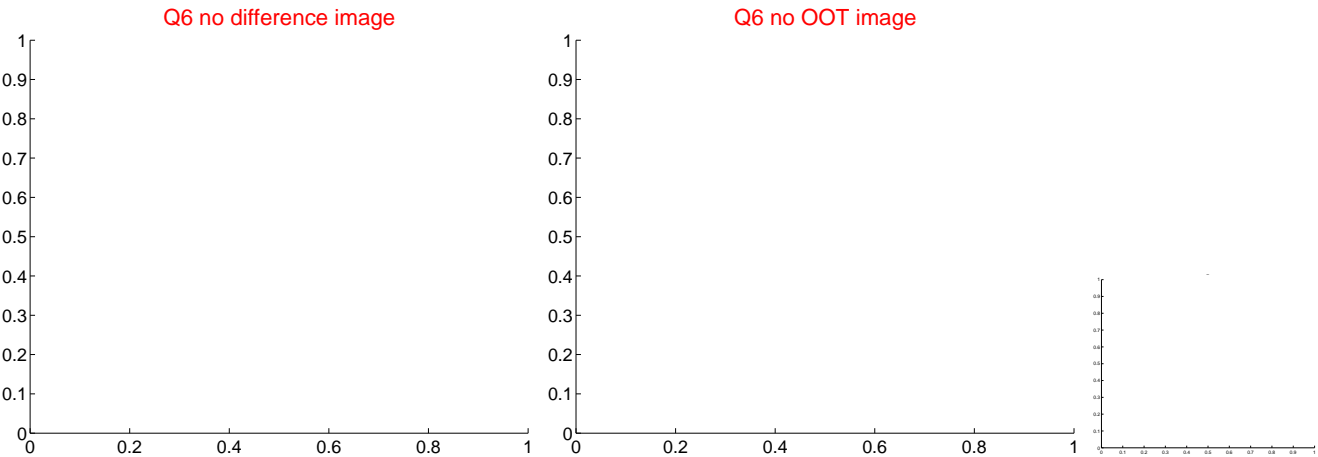
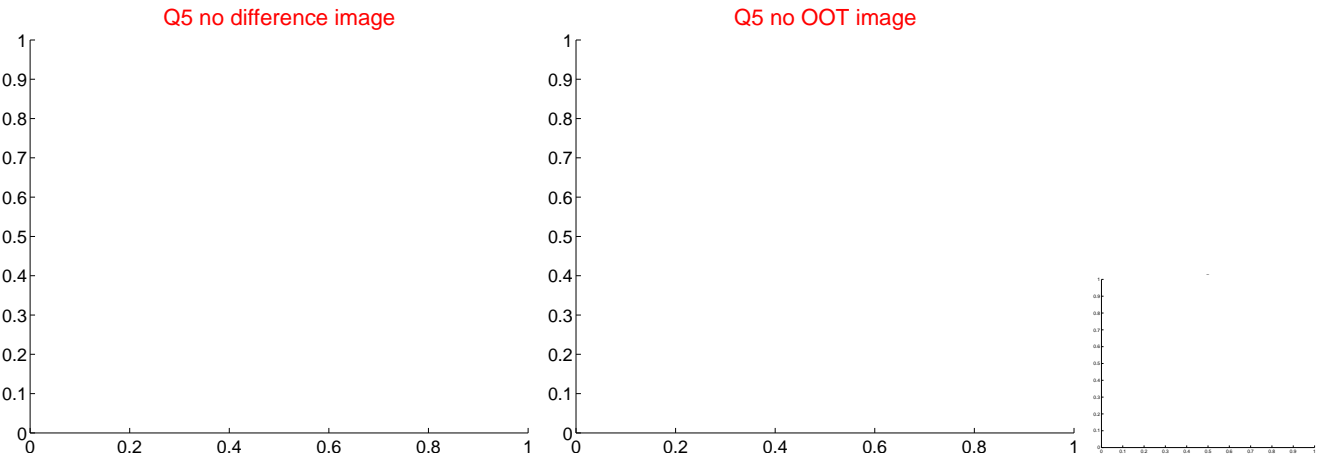


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

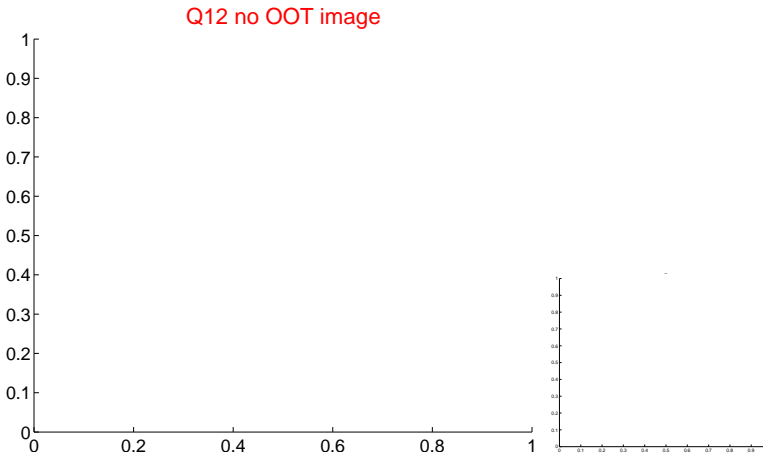
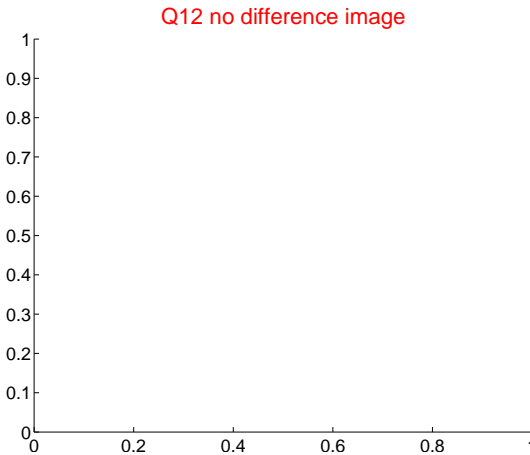
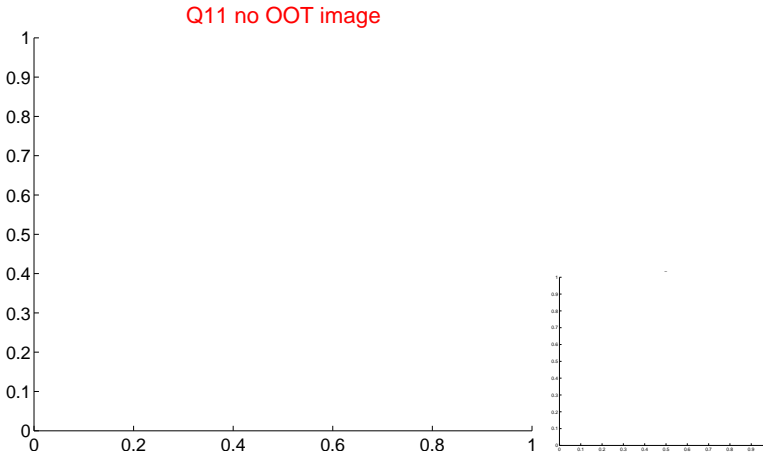
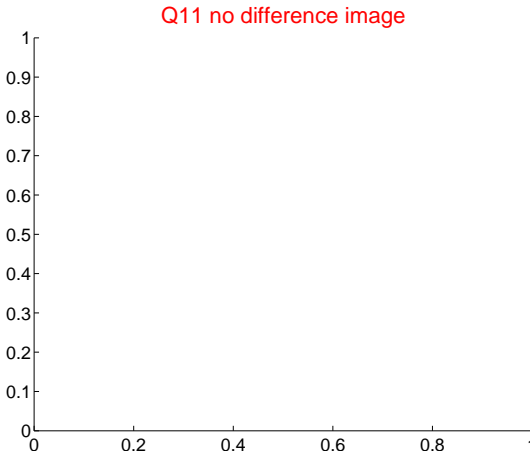
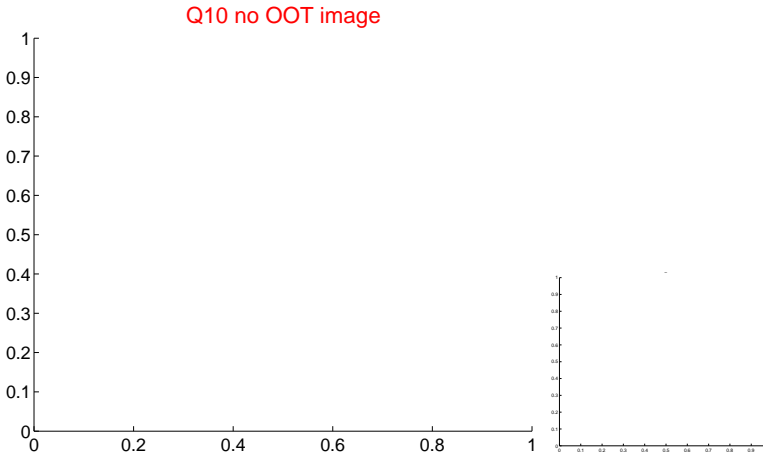
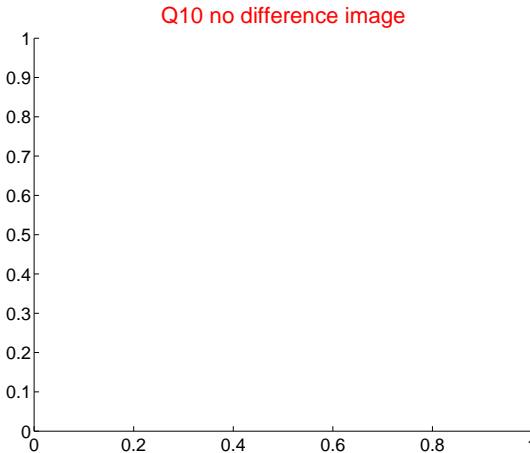
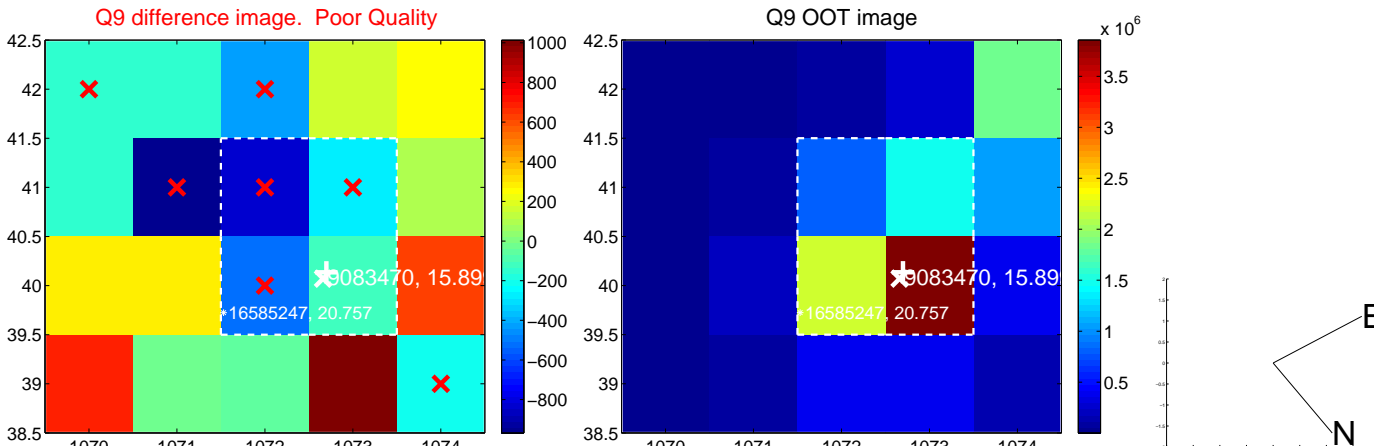
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



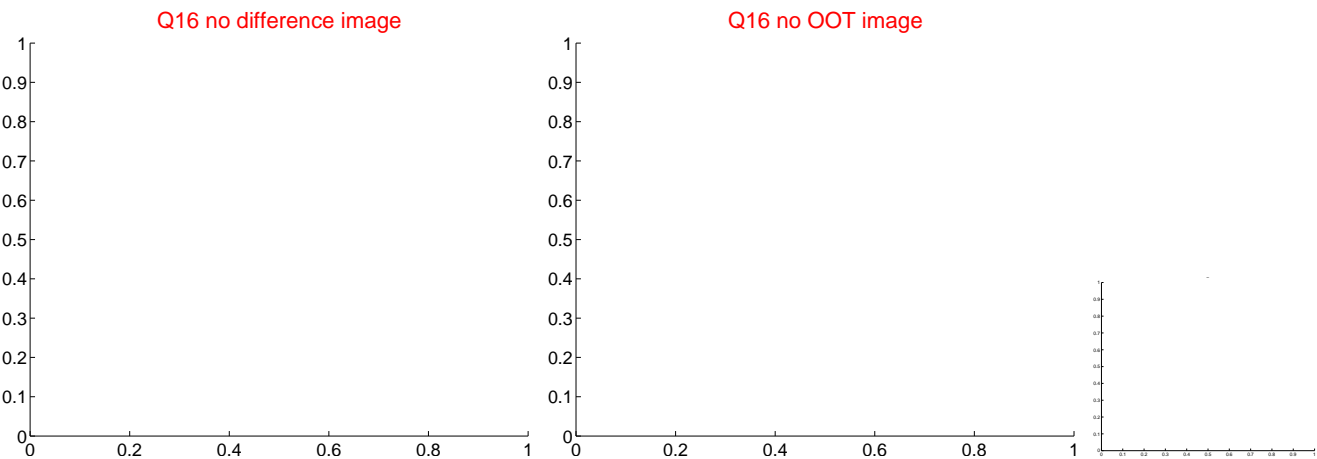
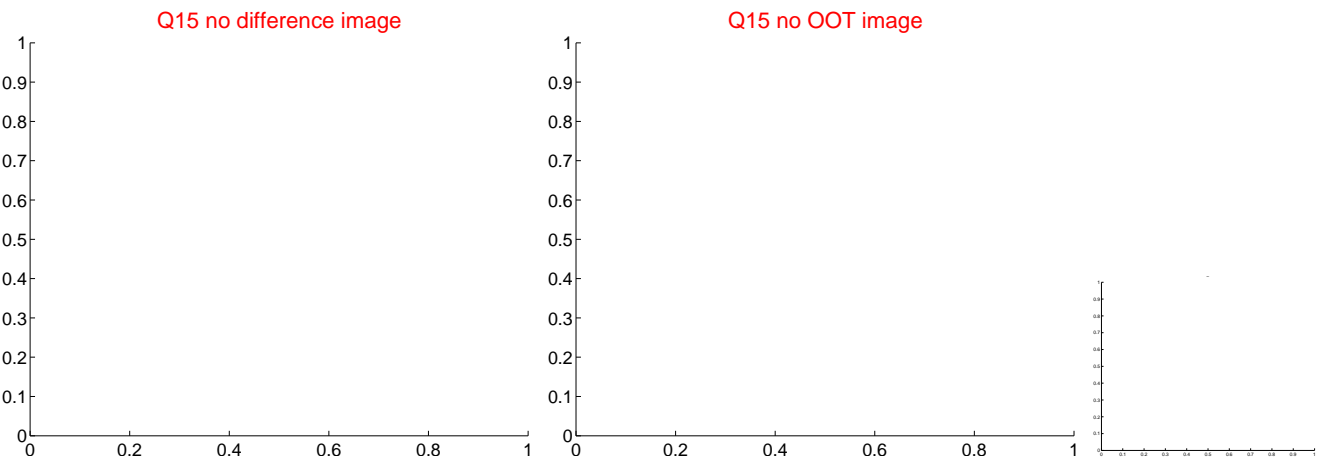
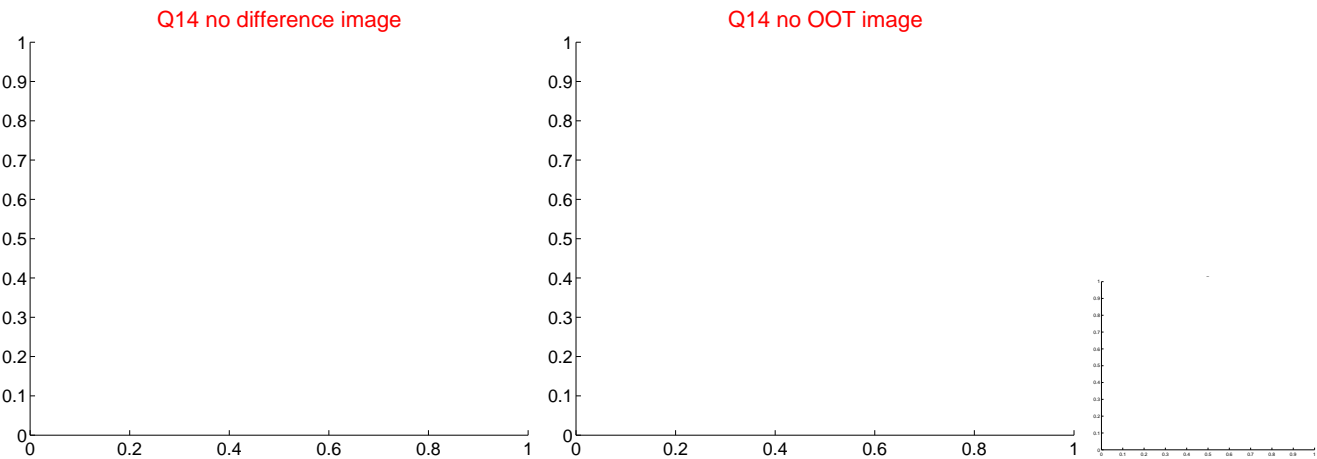
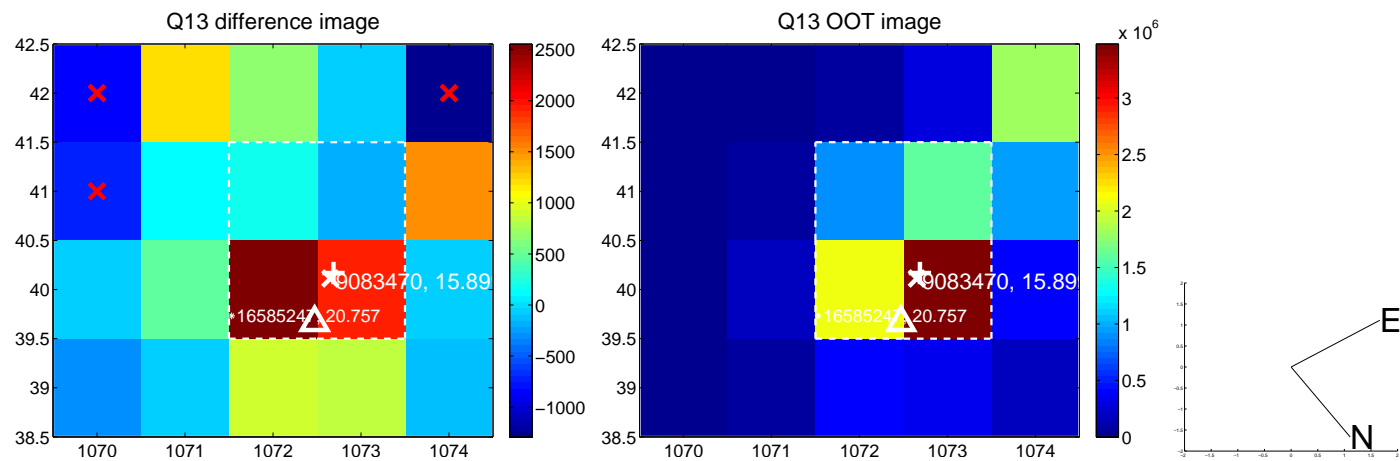
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



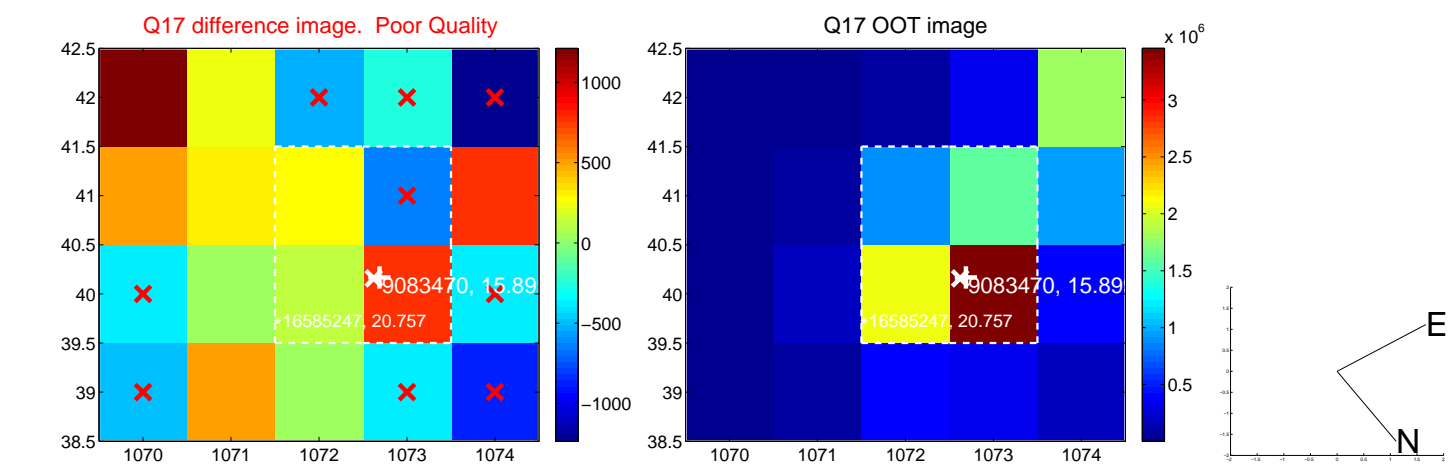
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value



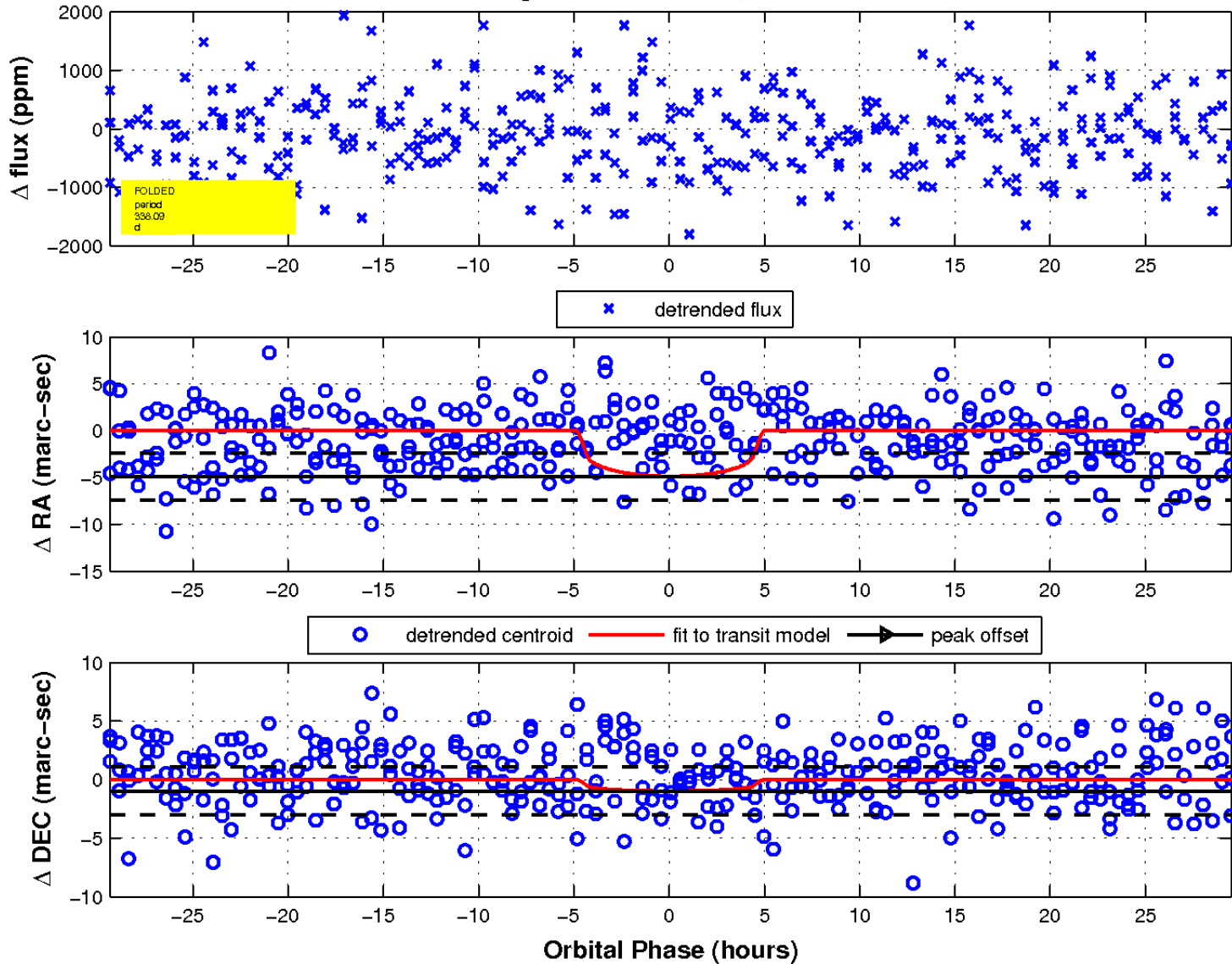
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.



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



fluxWeightedCentroids, Planet 2 of 2



UKIRT Image

Declination

