

KIC 006862332

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})
006862332-01	OBS	4023.01	119.019568	222.240427	1943.4	8.286	22.7	26.0	0.91	5754	4.46	3.54
006862332-02	OBS	No	231.642927	258.567955	1074.2	4.706	7.2	6.9	0.91	5754	3.15	1.46

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
006862332-01	OBS	FP	0.00	0	0	1	1	CENT_RESOLVED_OFFSET—HALO_GHOST—EPHEM_MATCH
006862332-02	OBS	FP	0.01	1	0	0	0	INDIV_TRANS_MARSHALL—INCONSISTENT_TRANS—CENT_FEW_DIFFS

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 006862332-01

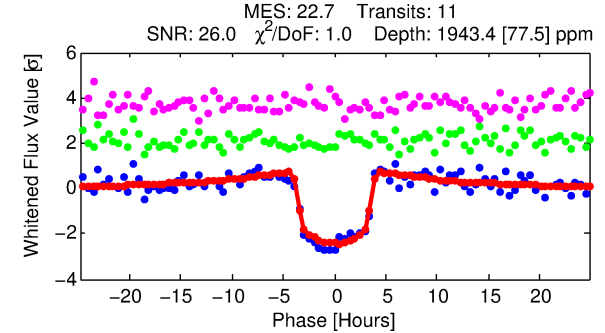
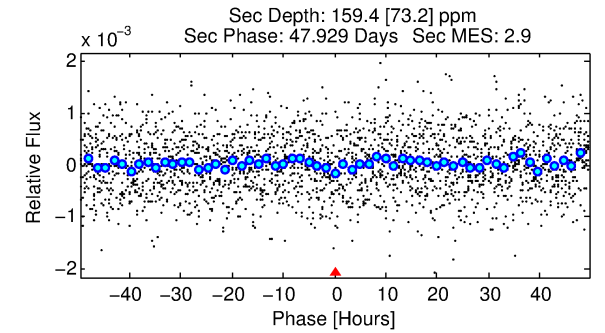
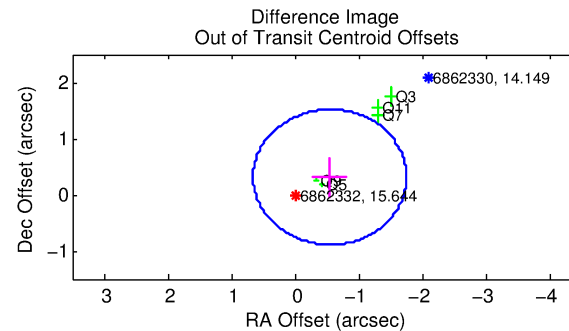
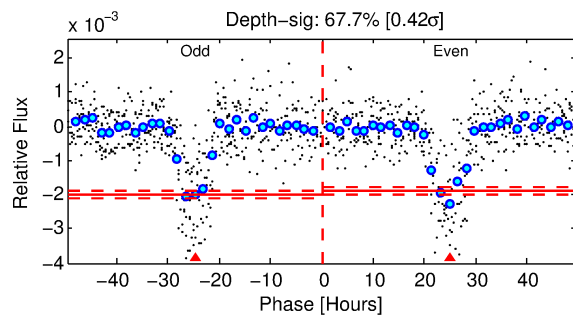
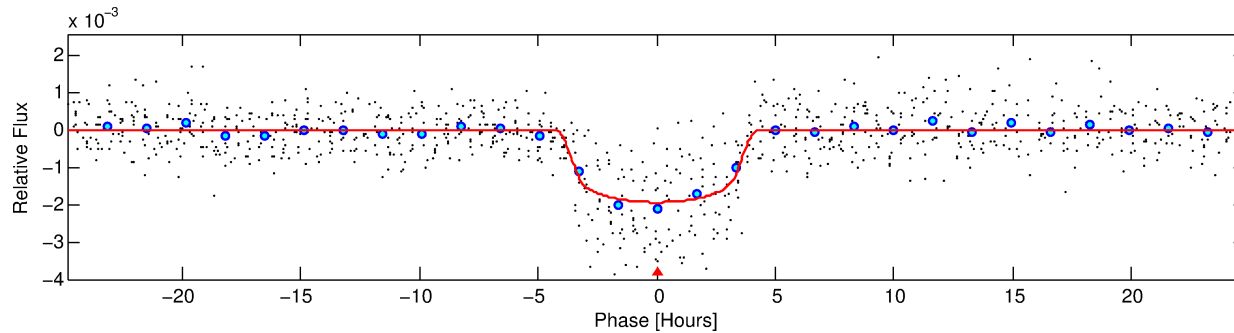
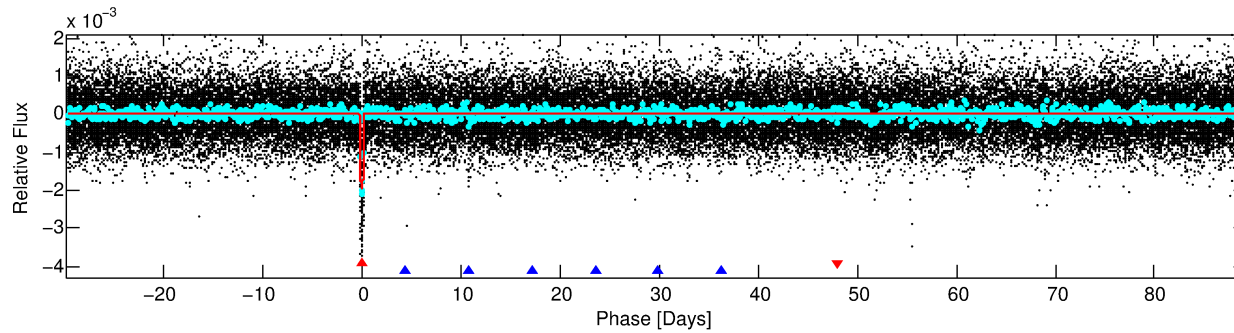
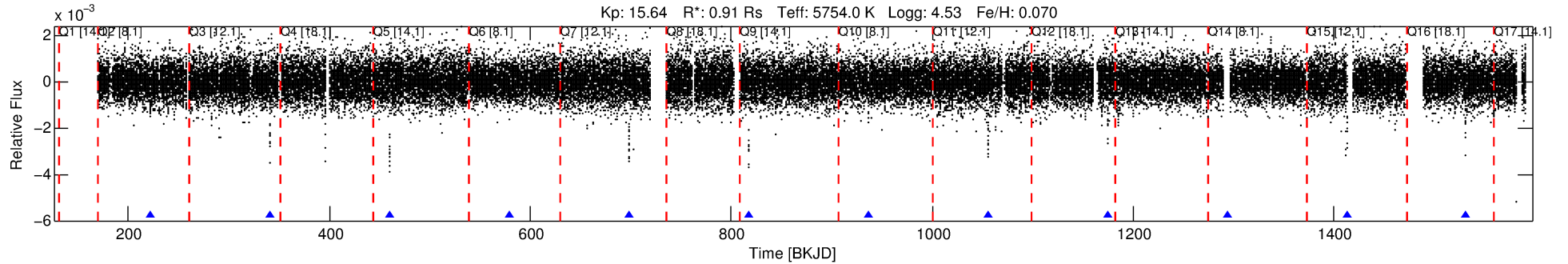
TCE (1)	KIC	Parent (2)	Parent KIC	$P_1:P_2$	Dist ($''$)	ΔRow	ΔCol	m_2	m_1	D_2/D_1	Mechanism	Flag	σ_P	σ_T
006862332-01	6862332	865.01	6862328	1:1	5.0	1	0	15.09	15.65	3.93	Direct-PRF	0	0.13	0.05

Notes: $P_1:P_2$ is the period ratio. Dist is the distance in arcseconds. ΔRow and ΔCol 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: 6862332 Candidate: 1 of 2 Period: 119.020 d
KOI: K04023 Corr: No Ephemeris Match

Kp: 15.64 R*: 0.91 Rs Teff: 5754.0 K Logg: 4.53 Fe/H: 0.070



DV Fit Results:

Period = 119.01957 [0.00077] d
Epoch = 222.2404 [0.0049] BKJD
Rp/R* = 0.0452 [0.0022]
a/R* = 72.08 [12.92]
b = 0.81 [0.08]
Seff = 3.53 [1.33]
Teq = 350 [33] K
Rp = 4.46 [1.21] Re
a = 0.4770 [0.1108] AU
Ag = 1001.61 [585.21] [1.71σ]
Teff = 3041 [372] K [7.20σ]

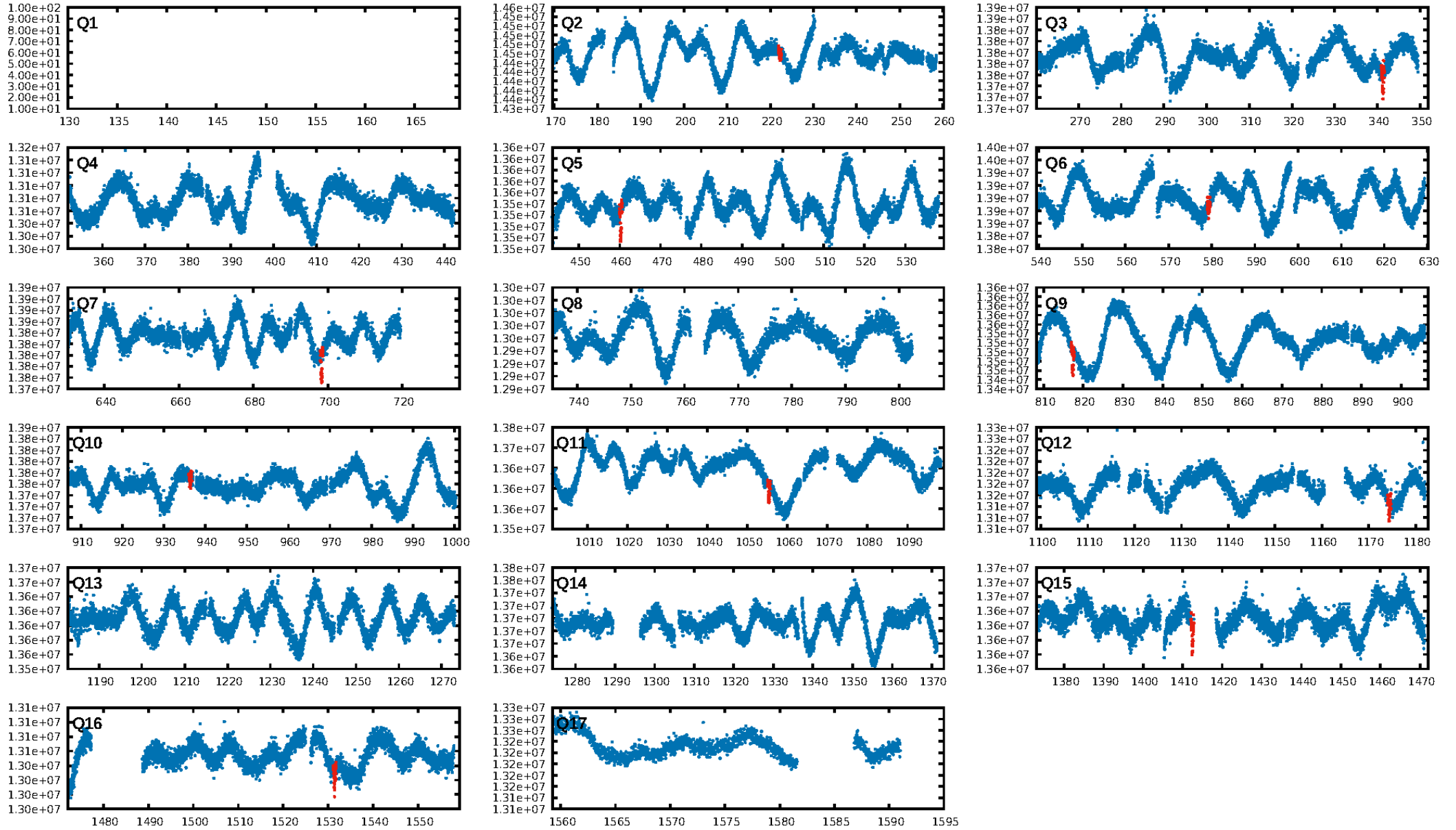
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [283.66σ]
ModelChiSquare2-sig: 0.0%
ModelChiSquareGof-sig: 85.8%
Bootstrap-pfa: 9.40e-82
RollingBand-fgt: 1.00 [11/11]
GhostDiagnostic-chr: -0.1129
Centroid-sig: 0.0%
Centroid-so: 6.065 arcsec [27.09σ]
OotOffset-rm: 0.632 arcsec [1.57σ]
KicOffset-rm: 4.962 arcsec [62.97σ]
OotOffset-st: 0/3/0/2 [5]
KicOffset-st: 0/3/0/2 [5]
DiffImageQuality-fgm: 1.00 [5/5]
DiffImageOverlap-fno: 1.00 [10/10]

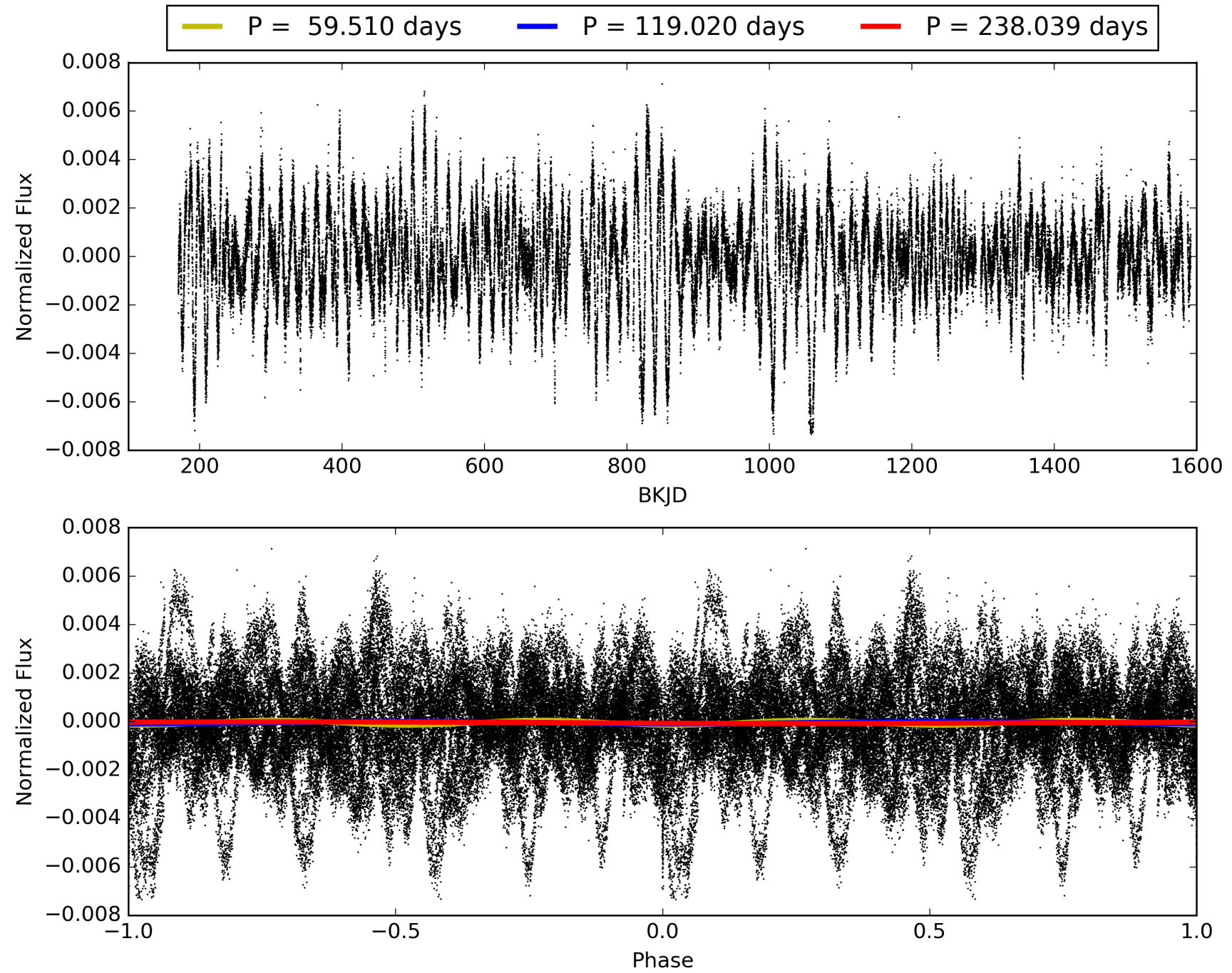
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 07:21:09 Z

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

TCE 006862332-01, PDC Light Curves

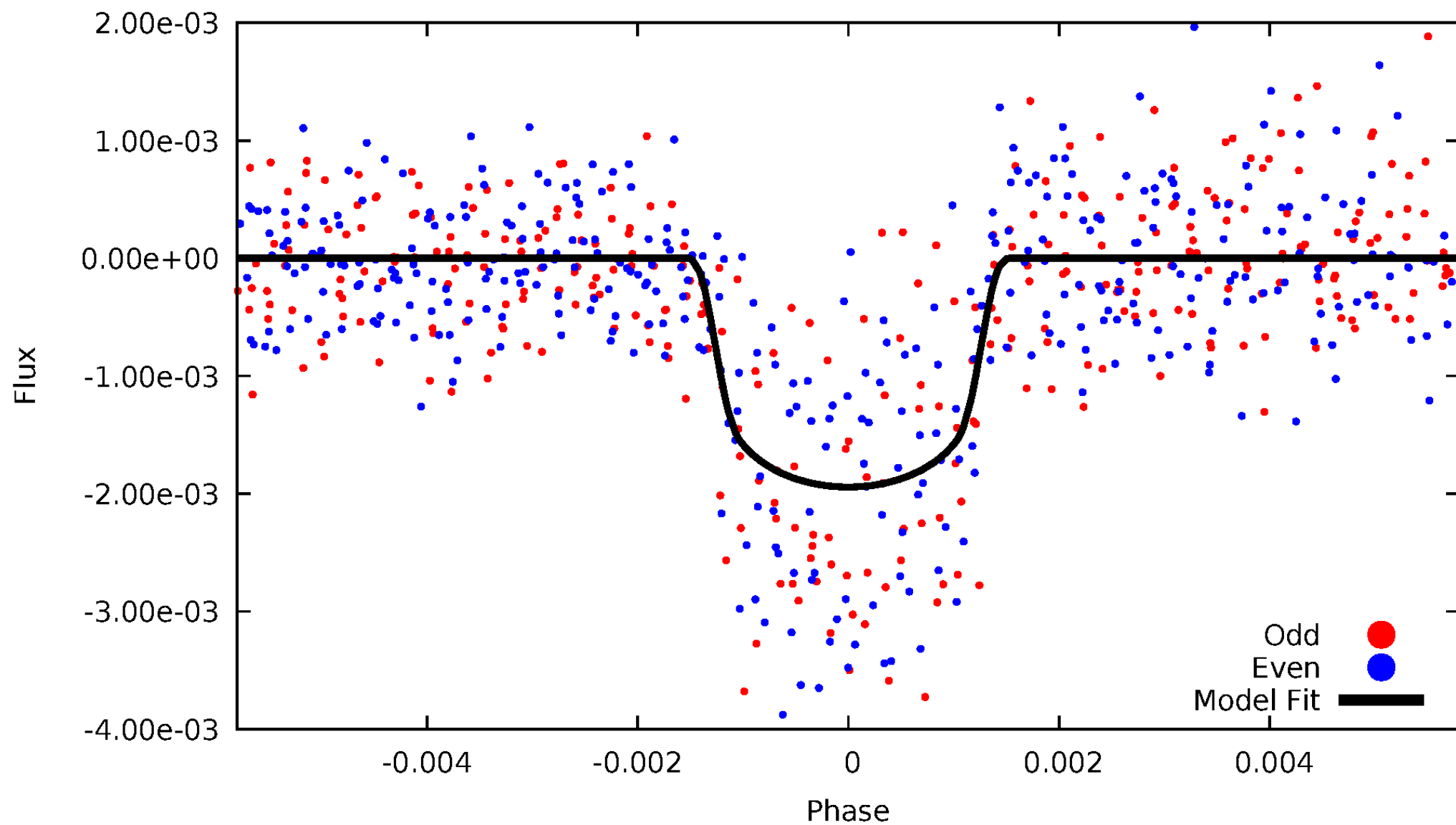


TCE 006862332-01



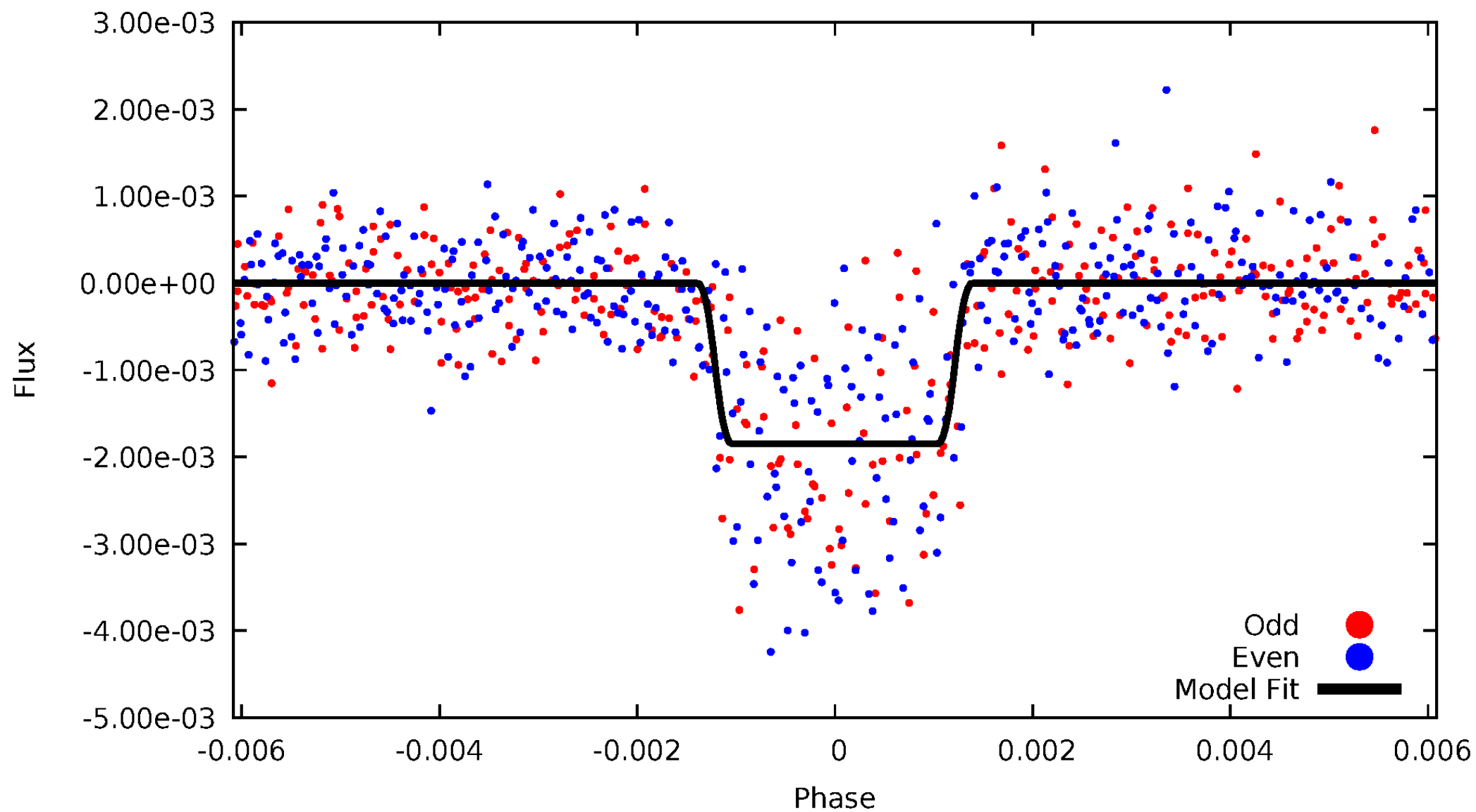
DV Odd/Even

TCE 006862332-01



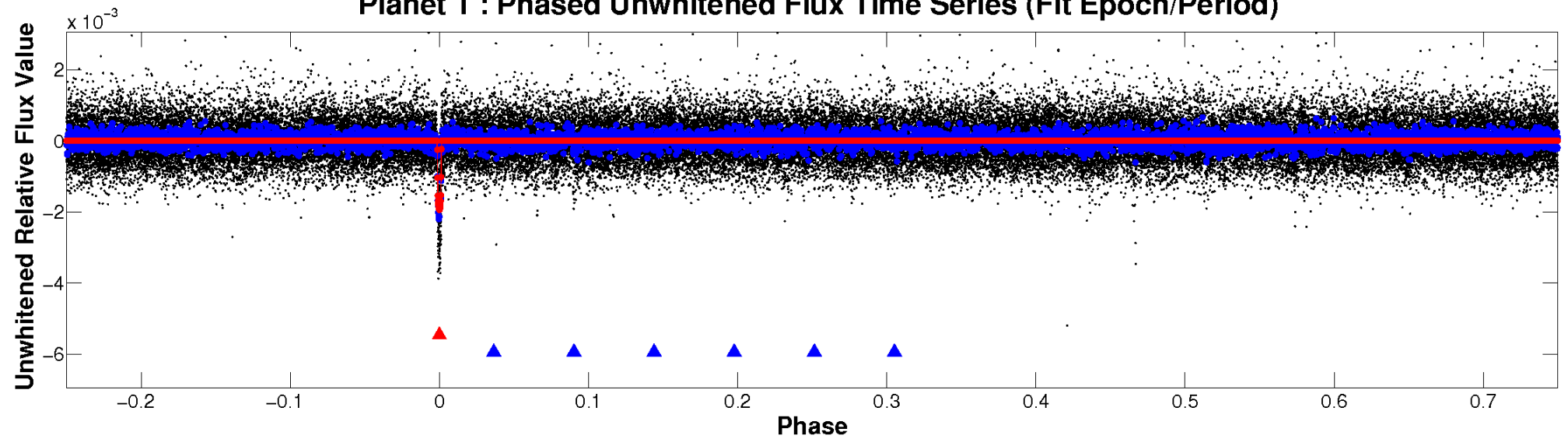
ALT Odd/Even

TCE 006862332-01

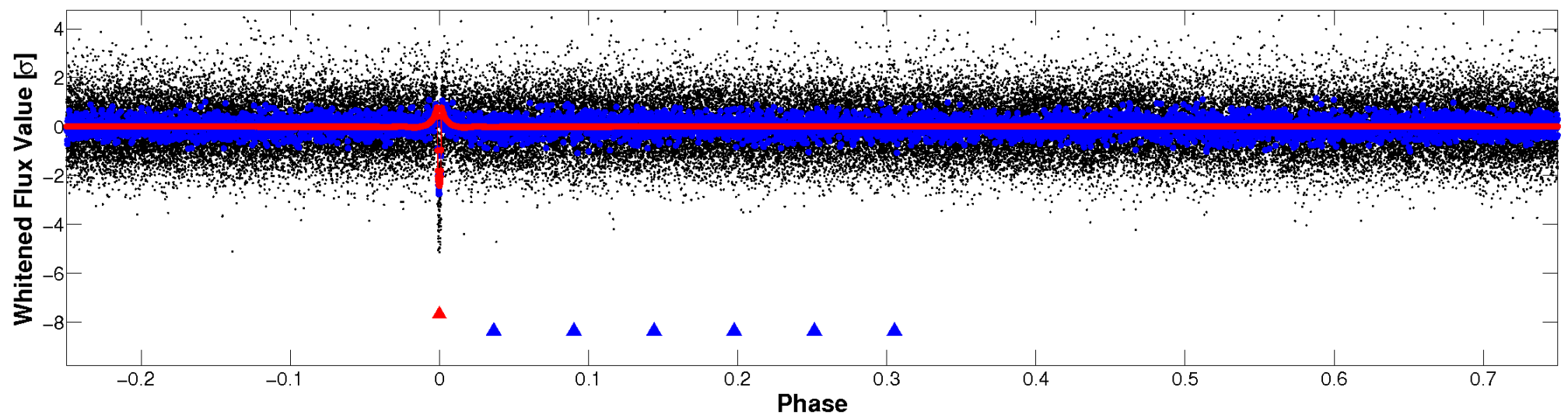


Non-Whitened Vs. Whitened Light Curve

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

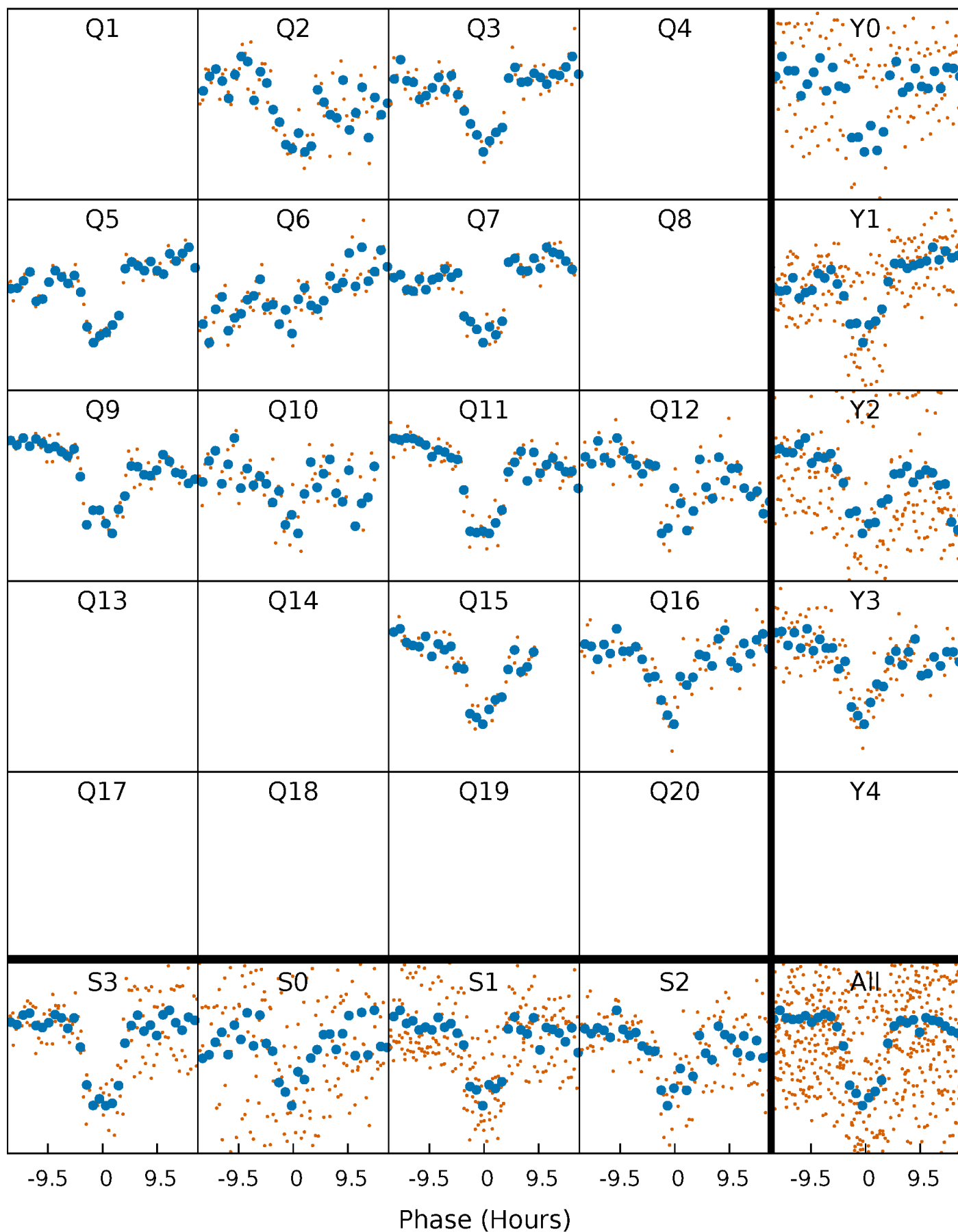


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



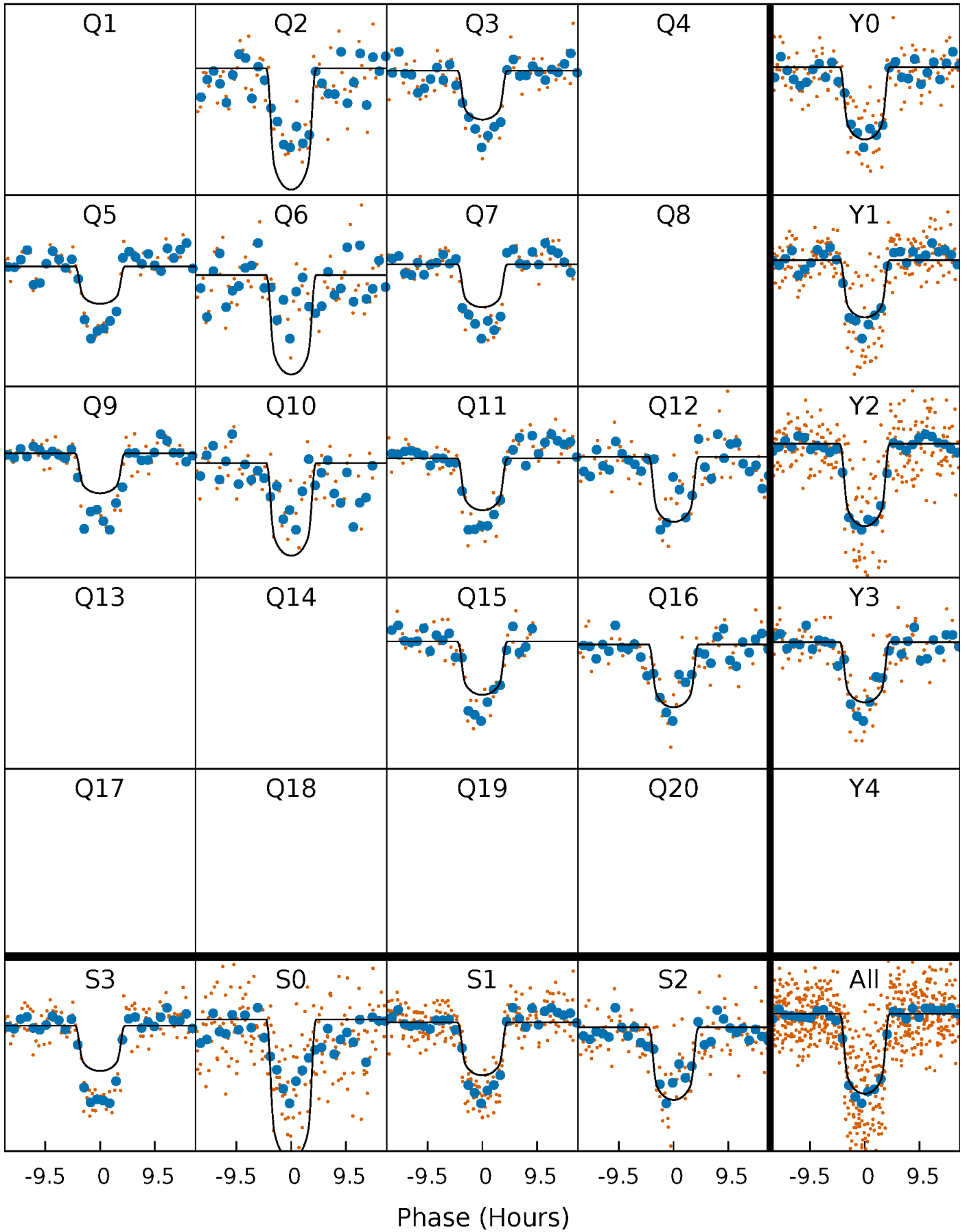
PDC Quarter-Phased Transit Curves

TCE 006862332-01 P=119.019568 Days $T_0=222.240427$ (BKJD)



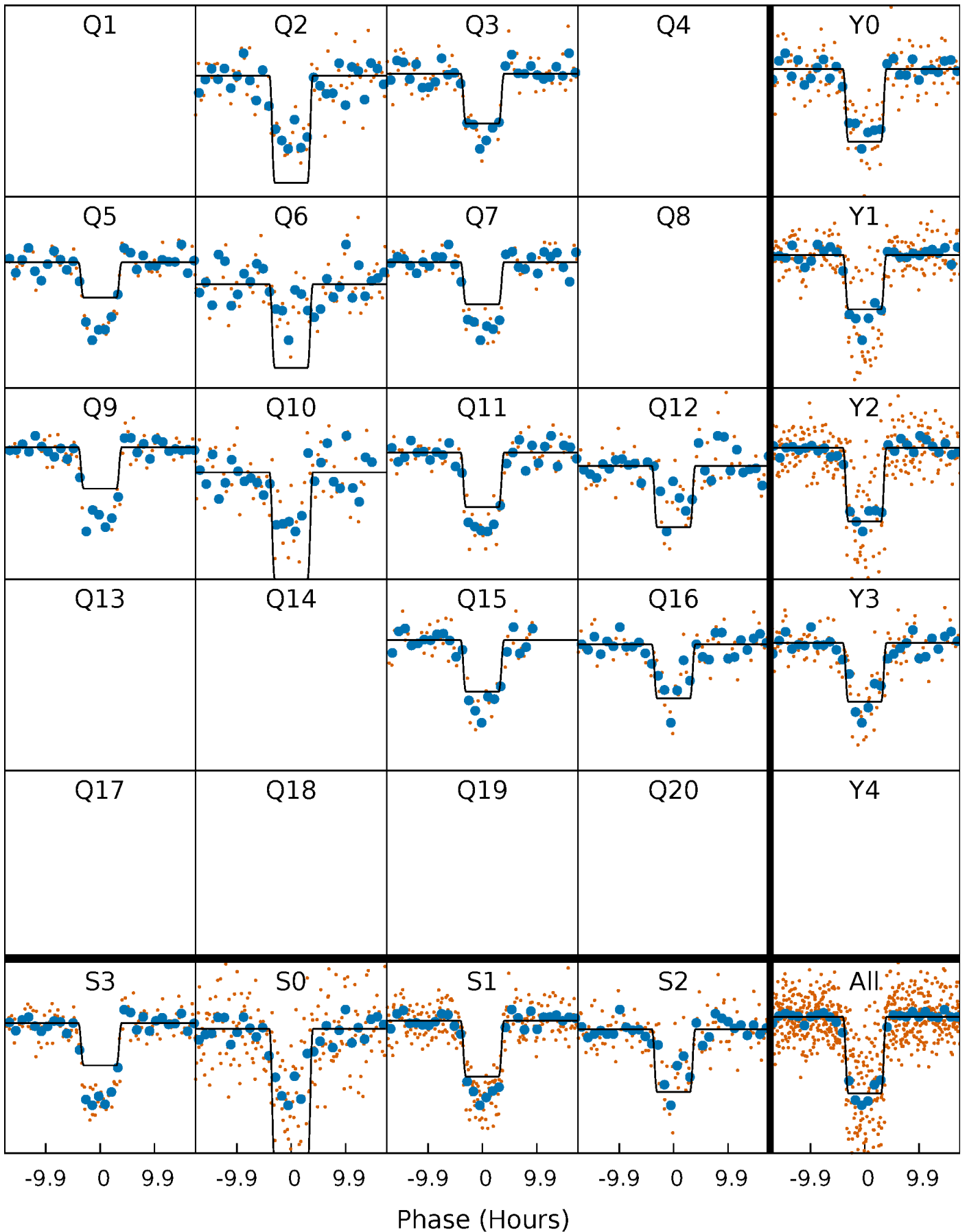
DV Quarter-Phased Transit Curves

TCE 006862332-01 P=119.019568 Days $T_0=222.240427$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

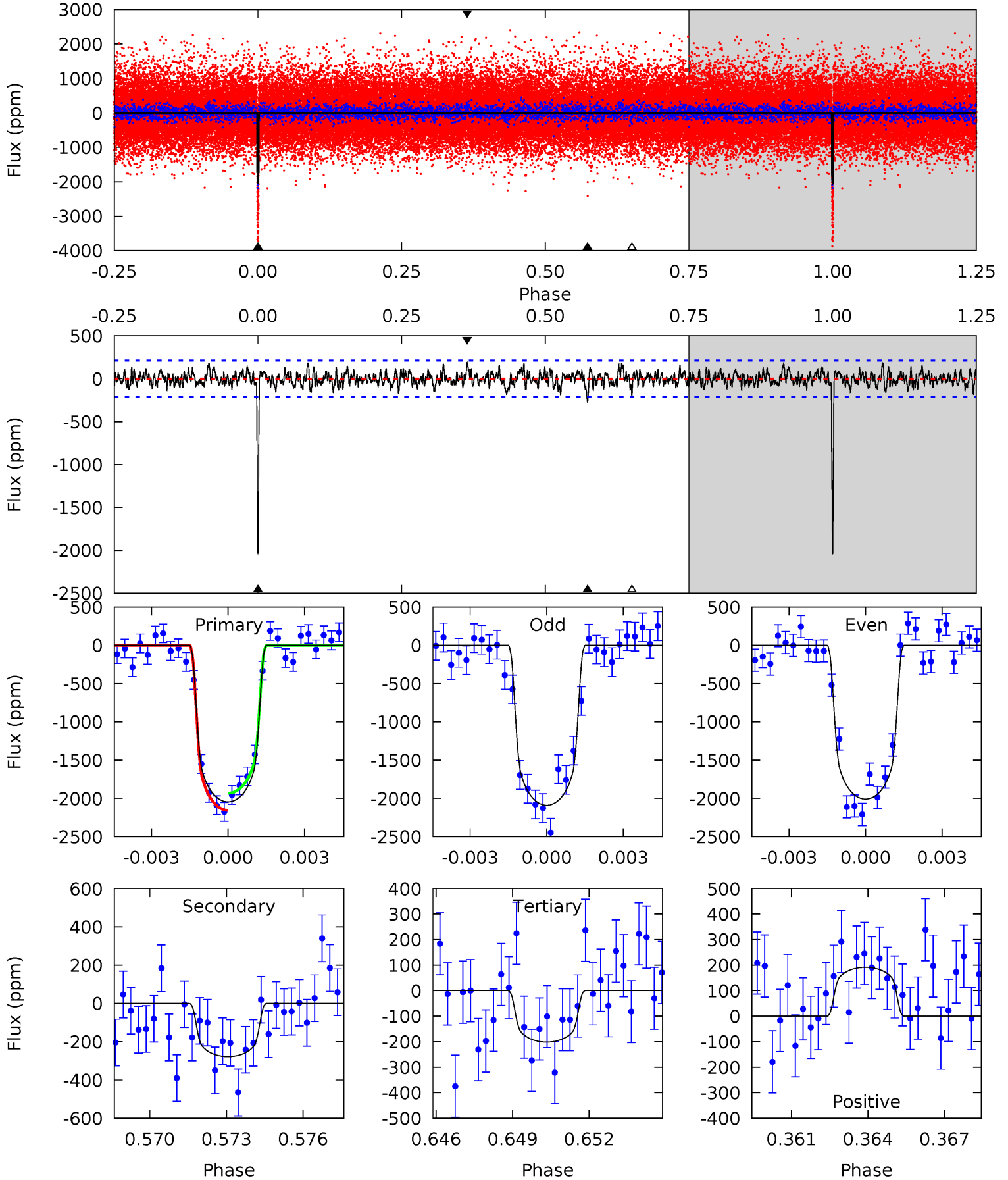
TCE 006862332-01 P=119.017655 Days $T_0=222.247483$ (BKJD)



DV Model-Shift Uniqueness Test

006862332-01, P = 119.019568 Days, E = 103.220859 Days

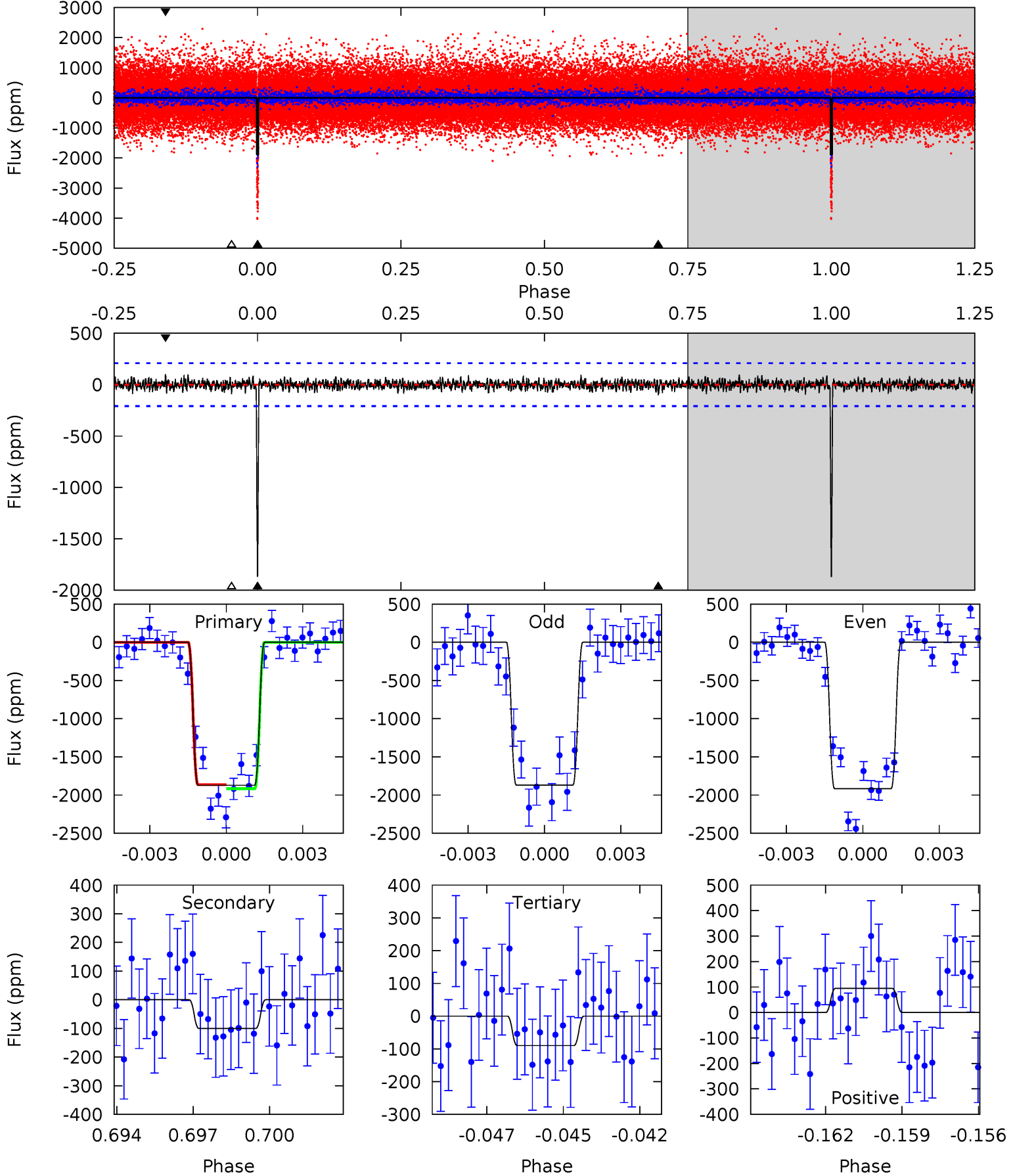
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
50.8	6.90	4.99	4.75	5.25	2.96	1.54	45.8	46.0	1.91	2.15	1.00	0.88	0.09	2.78



Alt Model-Shift Uniqueness Test

006862332-01, P = 119.017655 Days, E = 103.229828 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
47.3	2.53	2.27	2.40	5.27	2.99	0.70	45.0	44.9	0.26	0.14	0.56	0.89	0.05	0.67



Stellar Parameters For KIC 006862332

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	5754^{+182}_{-202}	$4.534^{+0.034}_{-0.195}$	$0.070^{+0.250}_{-0.300}$	$0.905^{+0.241}_{-0.086}$	$1.021^{+0.102}_{-0.136}$	$1.938^{+0.377}_{-0.991}$
	+3%/-4%	+1%/-4%	+357%/-429%	+27%/-10%	+10%/-13%	+19%/-51%
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 006862332-01 / KOI 4023.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-278 ± 40	$4.63^{+0.65}_{-0.45}$	500^{+34}_{-24}	3846^{+149}_{-143}	1548^{+415}_{-374}
Alt.	-100 ± 40	$4.44^{+0.60}_{-0.44}$	502^{+32}_{-23}	3304^{+205}_{-227}	579^{+296}_{-218}

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 $A_{obs} \gg 1.0$

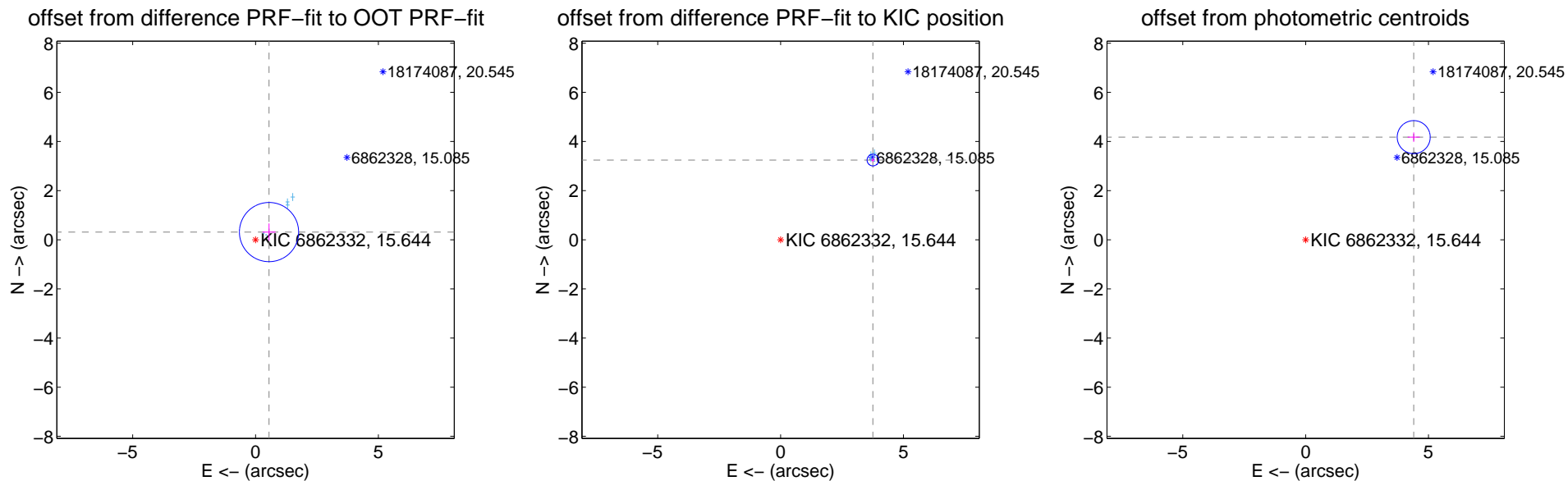
DV Centroid Data

Supplemental centroid analysis for 006862332-01. Kepler magnitude: 15.64. Transit SNR 26.02

There are 5 quarters with good PRF difference image offsets

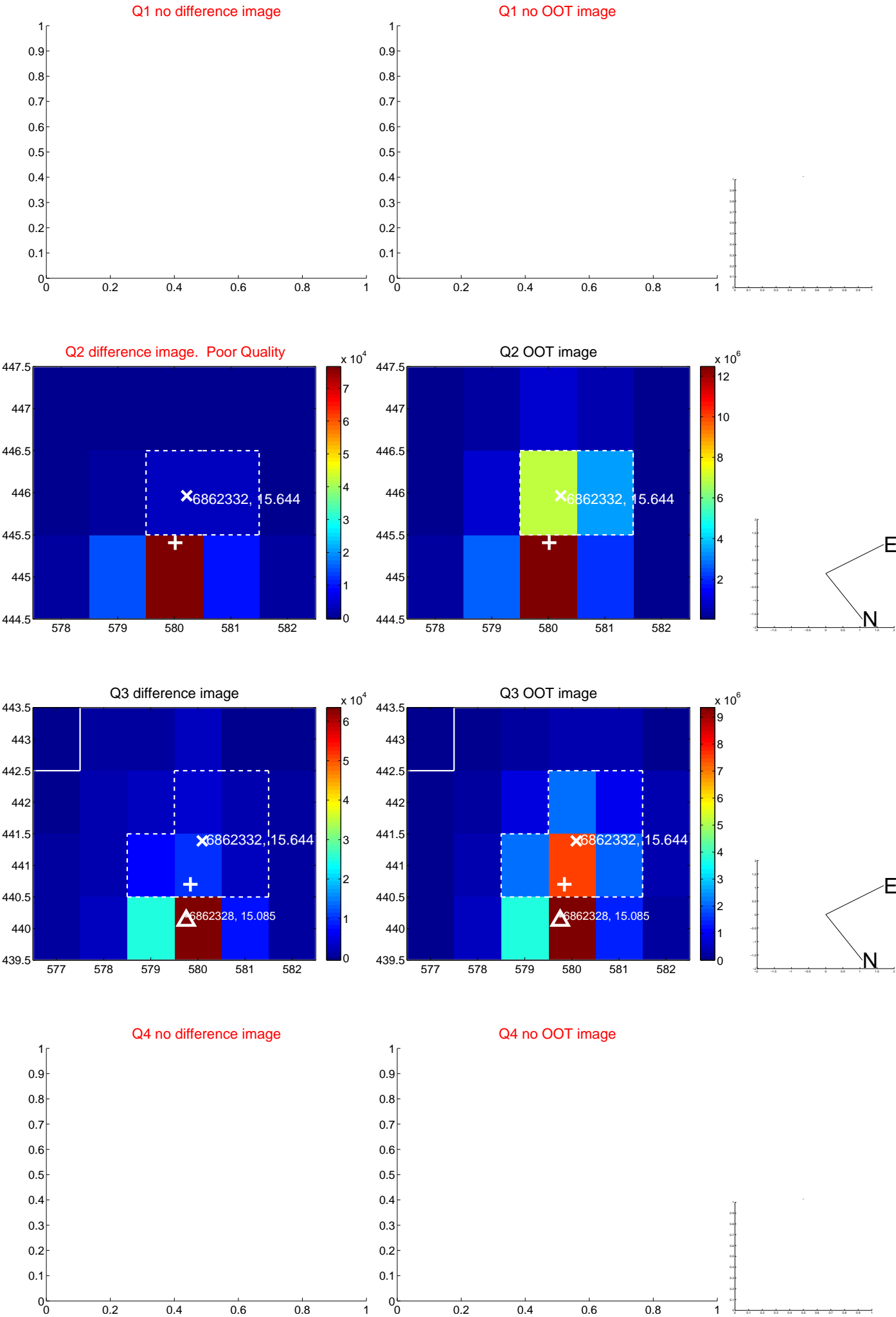
The OOT PRF centroid is offset from the target star catalog position by about 3.06 arcsec so the offset from difference PRF-fit to OOT-fit may be invalid.

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.632 ± 0.401	1.57	-0.549 ± 0.269	0.313 ± 0.350
PRF-fit source offset from KIC position	4.962 ± 0.079	62.97	-3.756 ± 0.072	3.243 ± 0.083
photometric centroid source offset	6.07 ± 0.22	27.09	-4.40 ± 0.25	4.18 ± 0.19

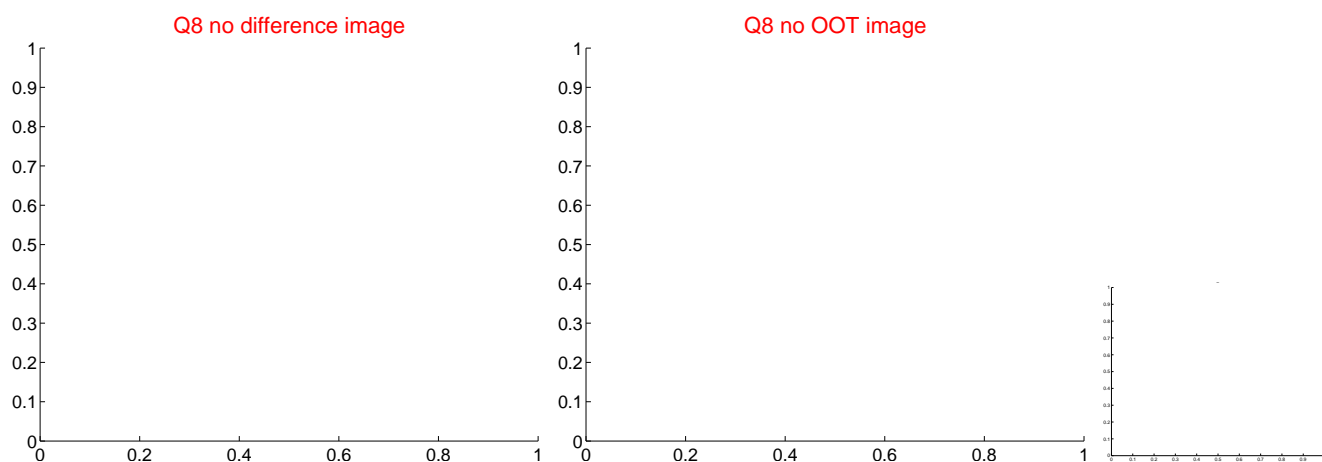
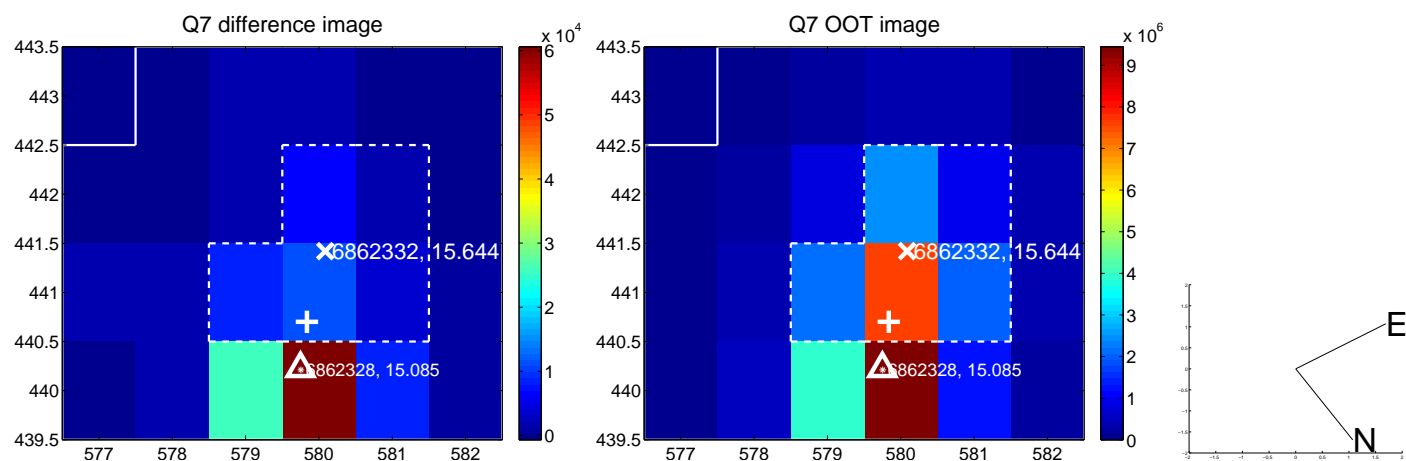
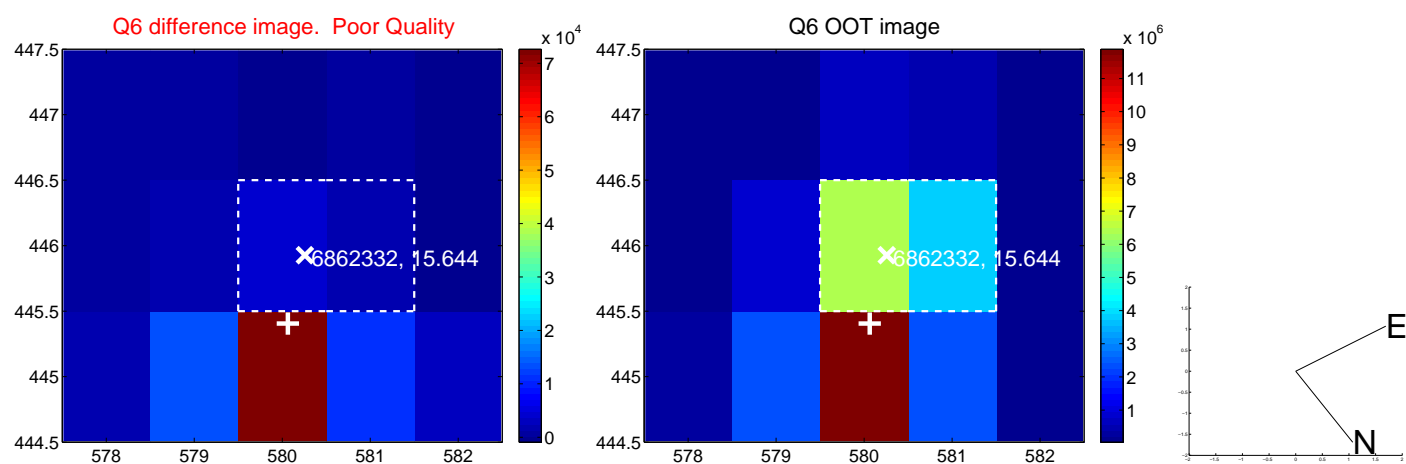
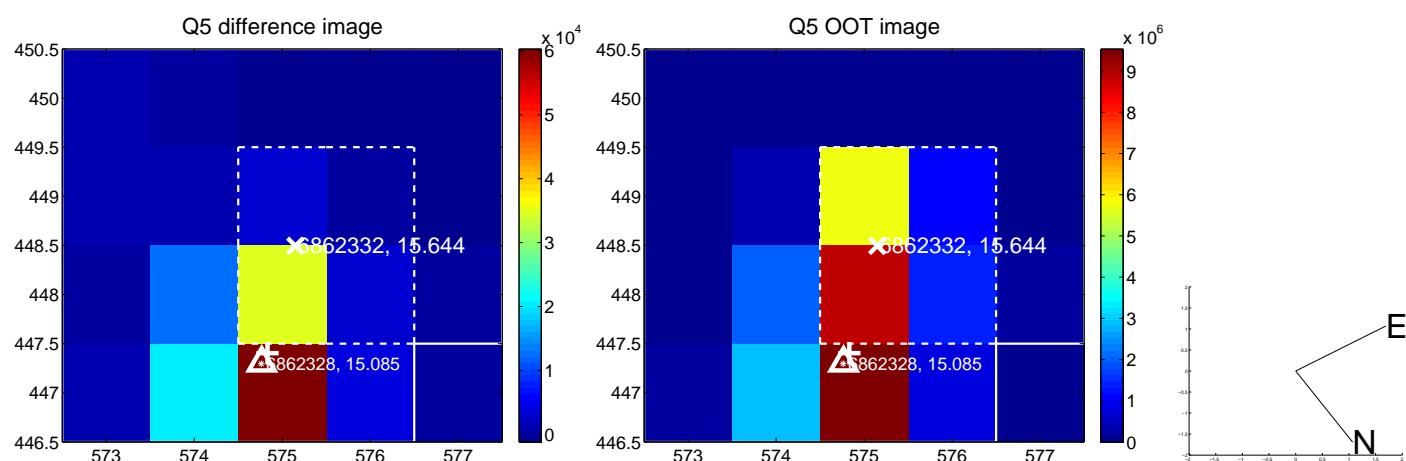


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets**; **Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

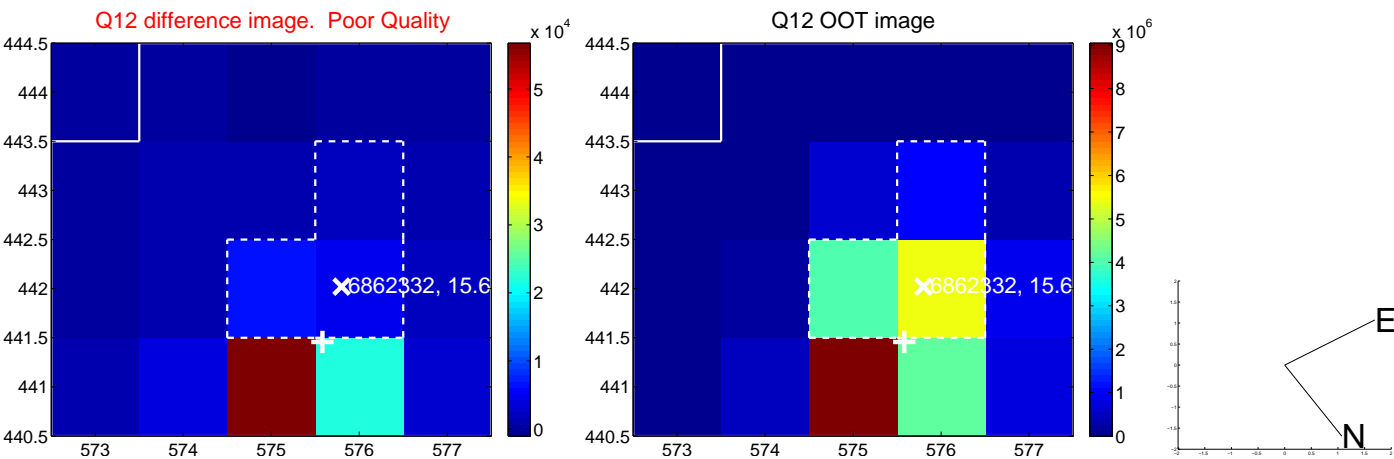
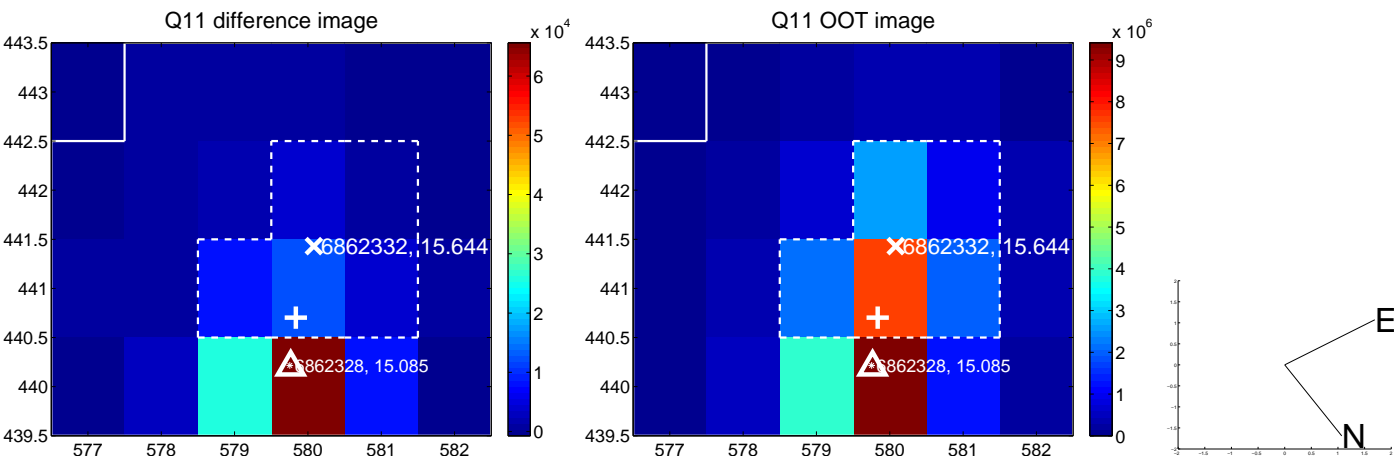
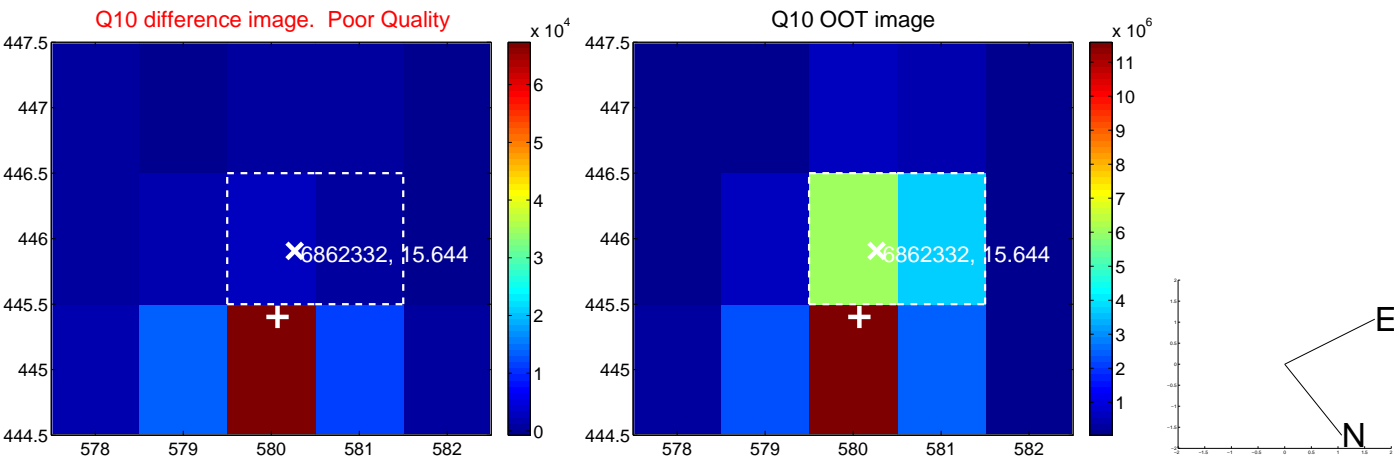
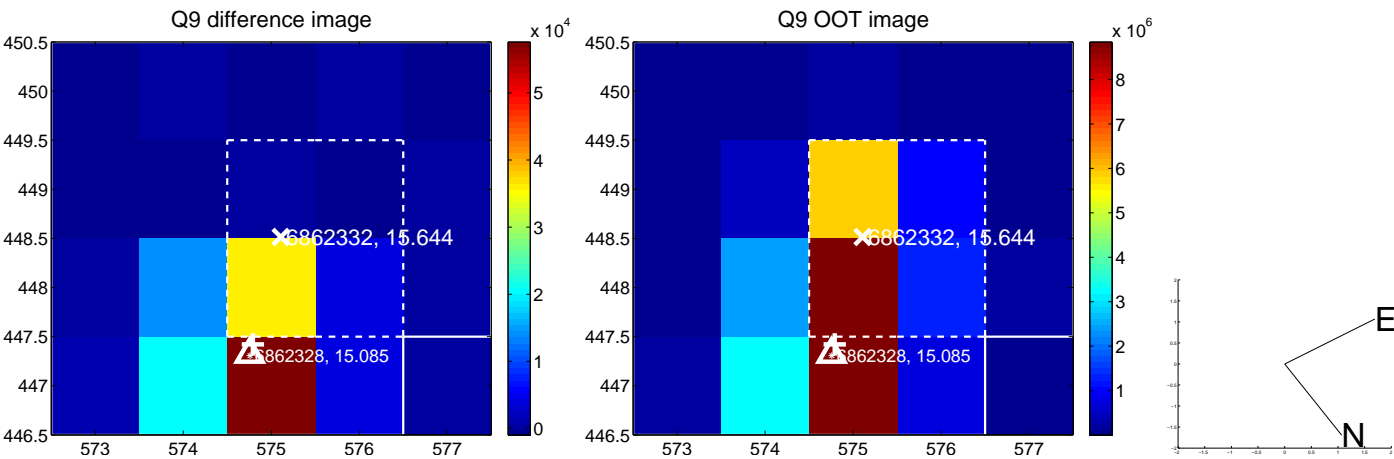
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



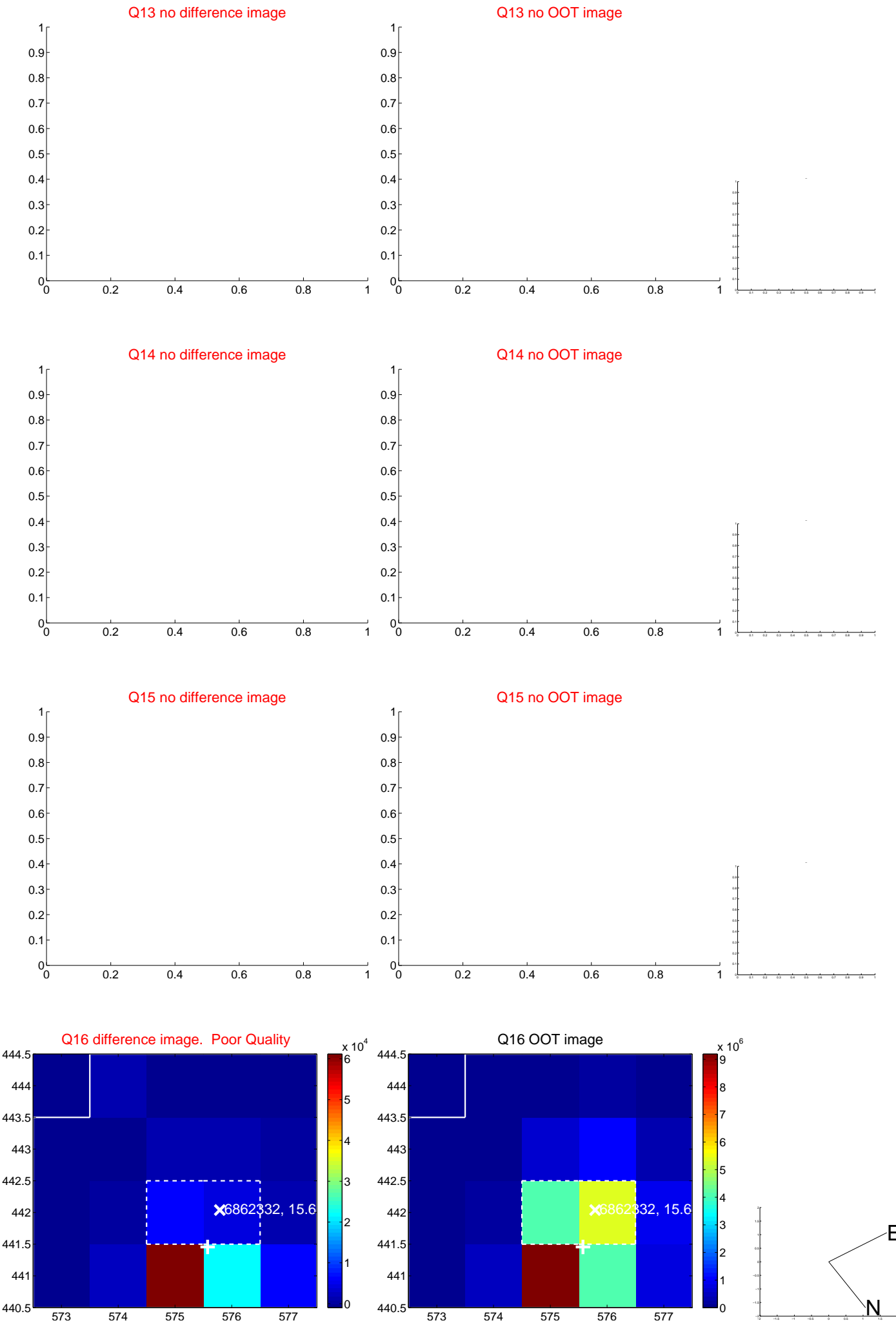
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value



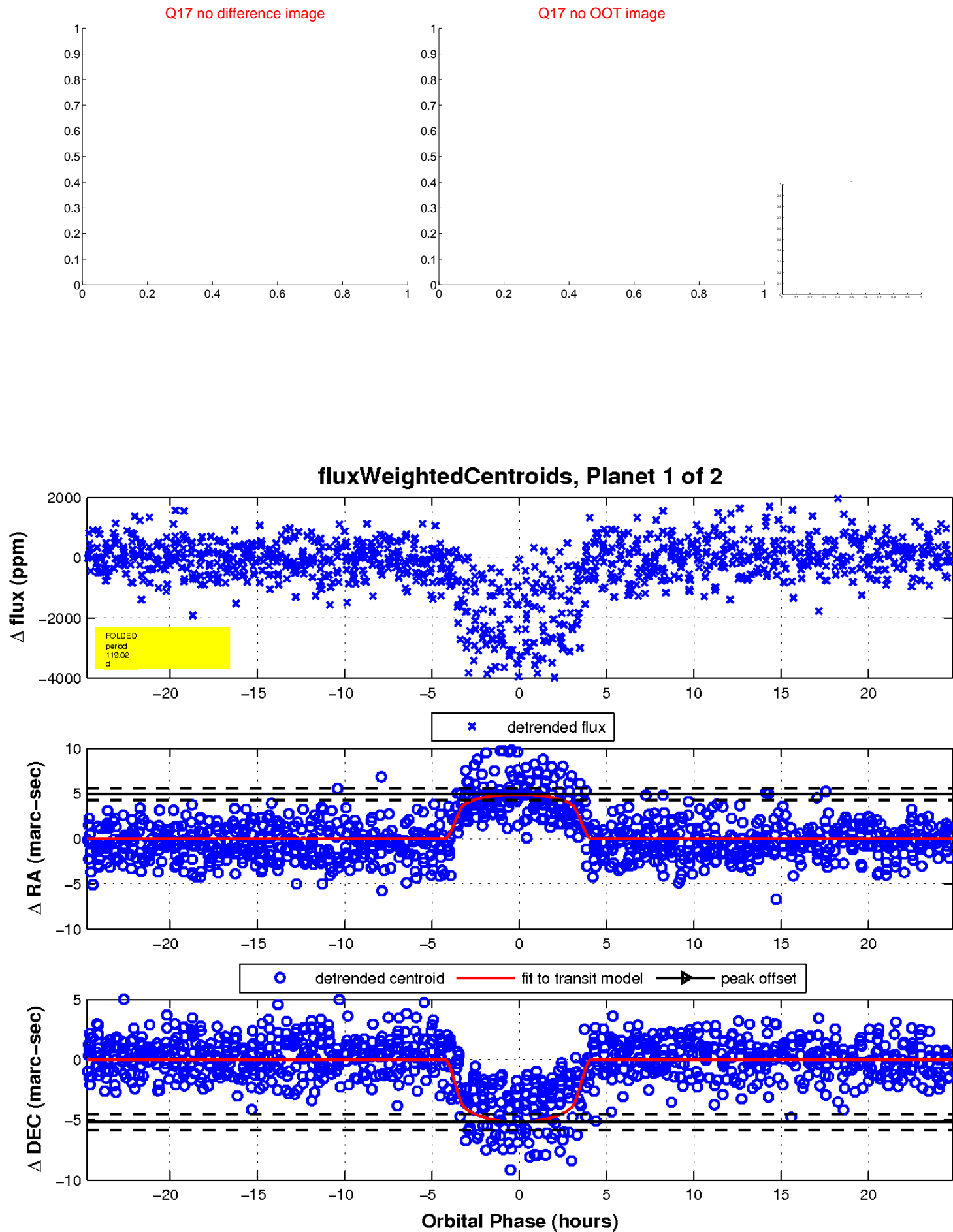
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

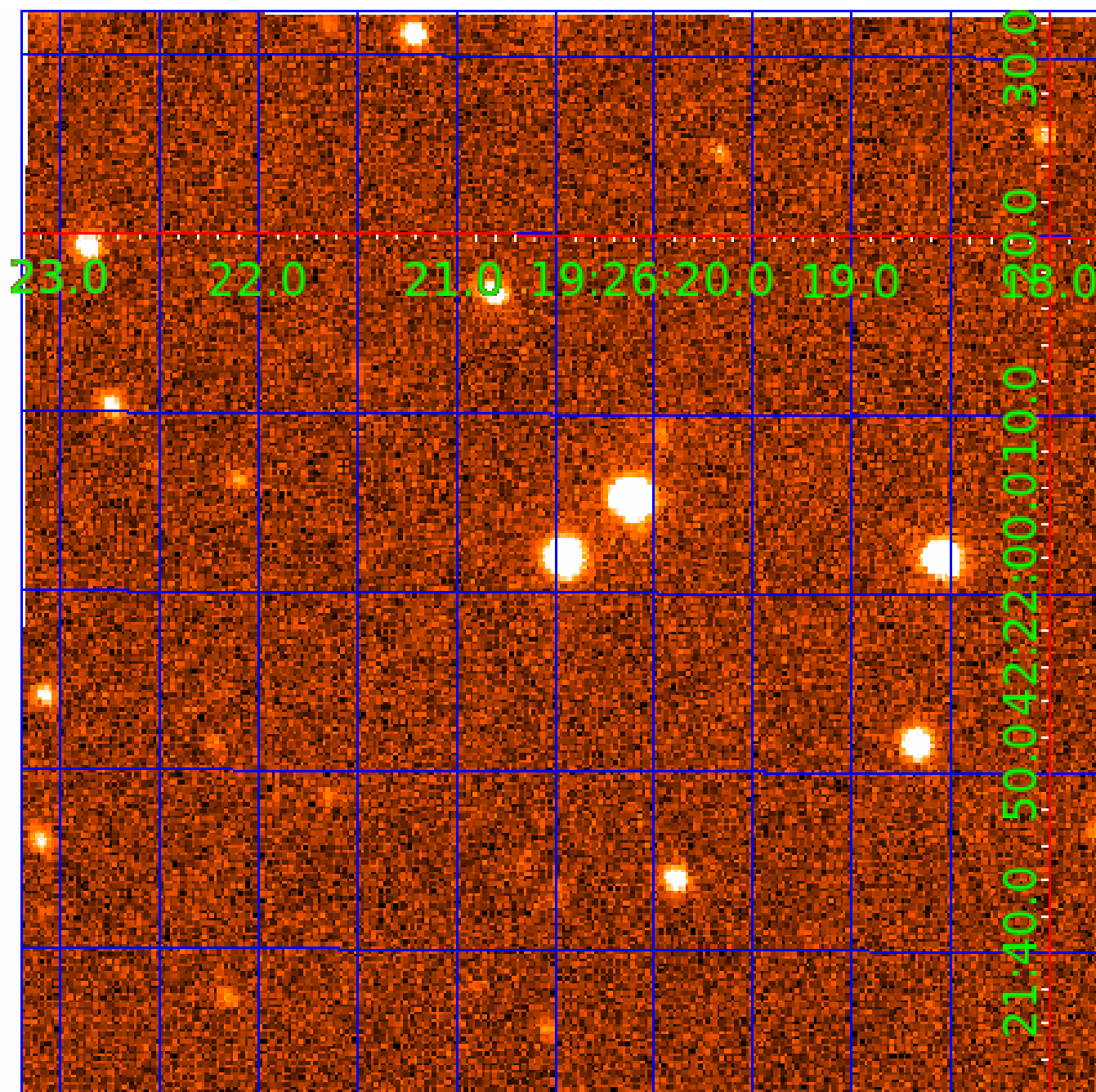


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 006862332

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})
006862332-01	OBS	4023.01	119.019568	222.240427	1943.4	8.286	22.7	26.0	0.91	5754	4.46	3.54
006862332-02	OBS	No	231.642927	258.567955	1074.2	4.706	7.2	6.9	0.91	5754	3.15	1.46

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
006862332-01	OBS	FP	0.00	0	0	1	1	CENT_RESOLVED_OFFSET—HALO_GHOST—EPHEM_MATCH
006862332-02	OBS	FP	0.01	1	0	0	0	INDIV_TRANS_MARSHALL—INCONSISTENT_TRANS—CENT_FEW_DIFFS

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 006862332-02

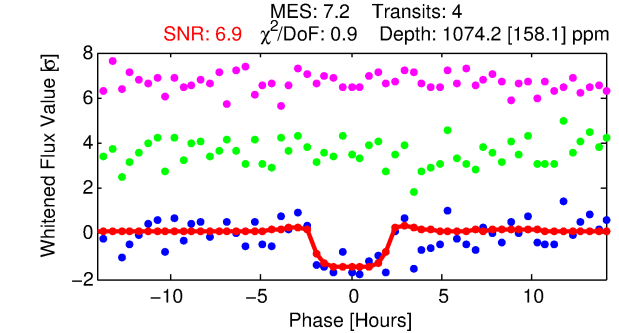
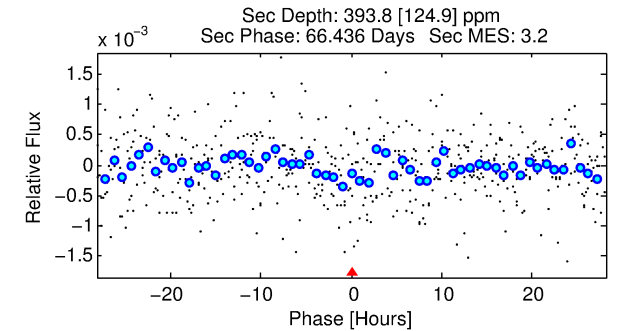
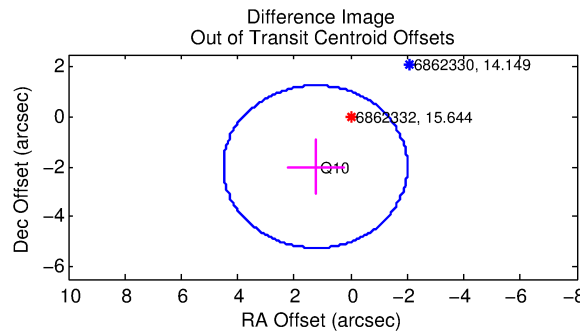
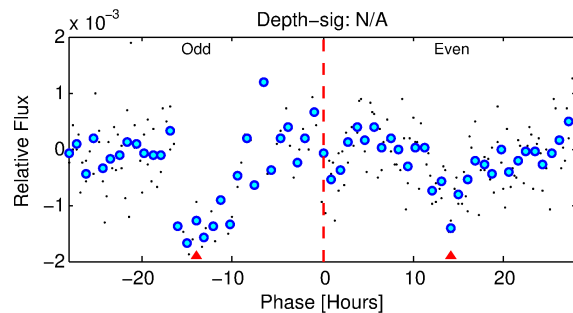
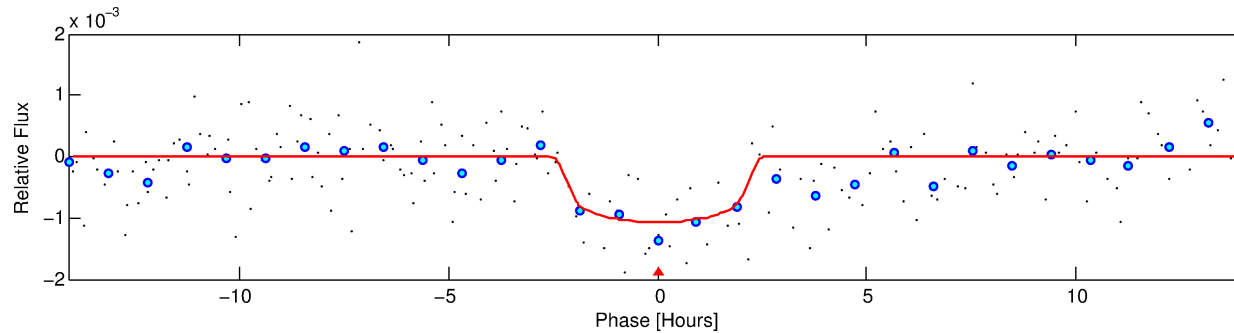
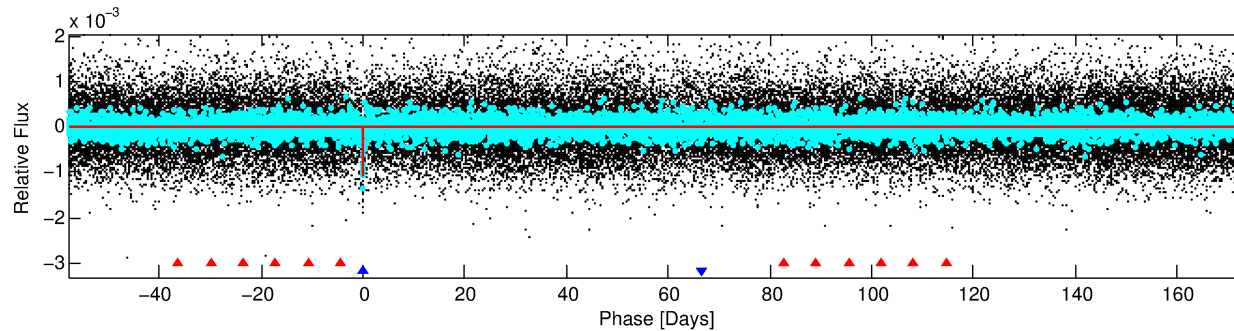
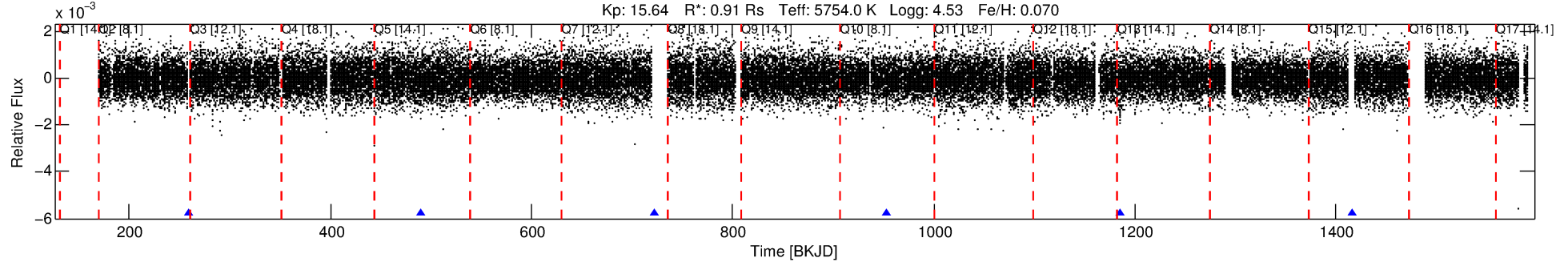
No Significant Match Found

DV One-Page Summary

KIC: 6862332 Candidate: 2 of 2 Period: 231.643 d

KOI: K04023 Corr: No Ephemeris Match

Kp: 15.64 R*: 0.91 Rs Teff: 5754.0 K Logg: 4.53 Fe/H: 0.070



DV Fit Results:

Period = 231.64293 [0.00517] d
Epoch = 258.5680 [0.0131] BKJD
Rp/R* = 0.0319 [0.0233]
a/R* = 292.56 [903.12]
b = 0.68 [2.50]
Seff = 1.45 [0.55]
Teq = 280 [26] K
Rp = 3.15 [2.45] Re
a = 0.7436 [0.1727] AU
Ag = 12104.58 [18587.48] [0.65σ]
Teffp = 4542 [1706] K [2.50σ]

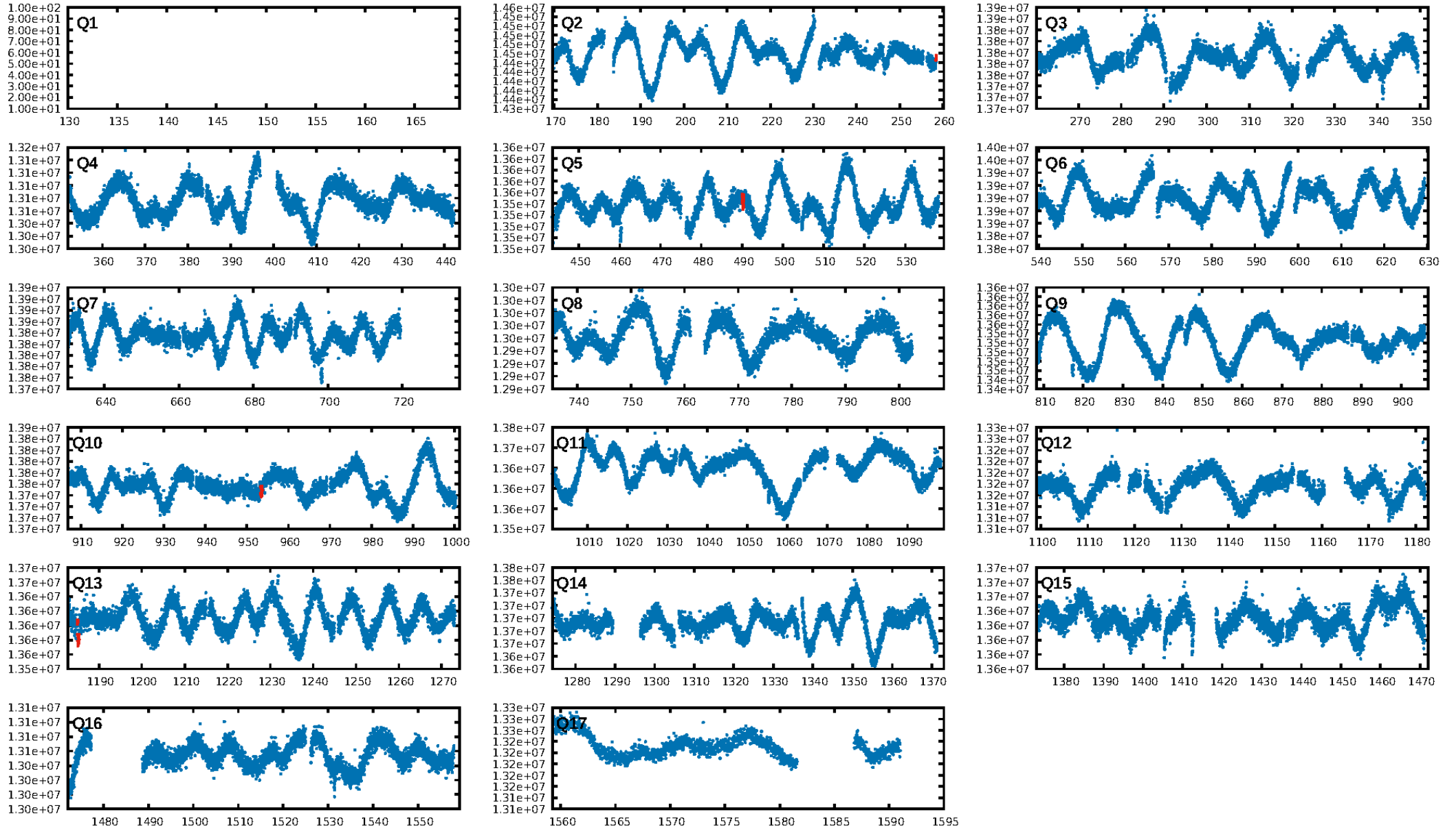
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [283.66σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 32.1%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 1.41e-10
RollingBand-fgt: 1.00 [4/4]
GhostDiagnostic-chr: -3.429
Centroid-sig: 49.0%
Centroid-so: 1.969 arcsec [2.52σ]
OotOffset-rm: 2.362 arcsec [2.18σ]
KicOffset-rm: 0.852 arcsec [0.80σ]
OotOffset-st: 1/0/0/0 [1]
KicOffset-st: 1/0/0/0 [1]
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DiffImageOverlap-fno: 1.00 [2/2]

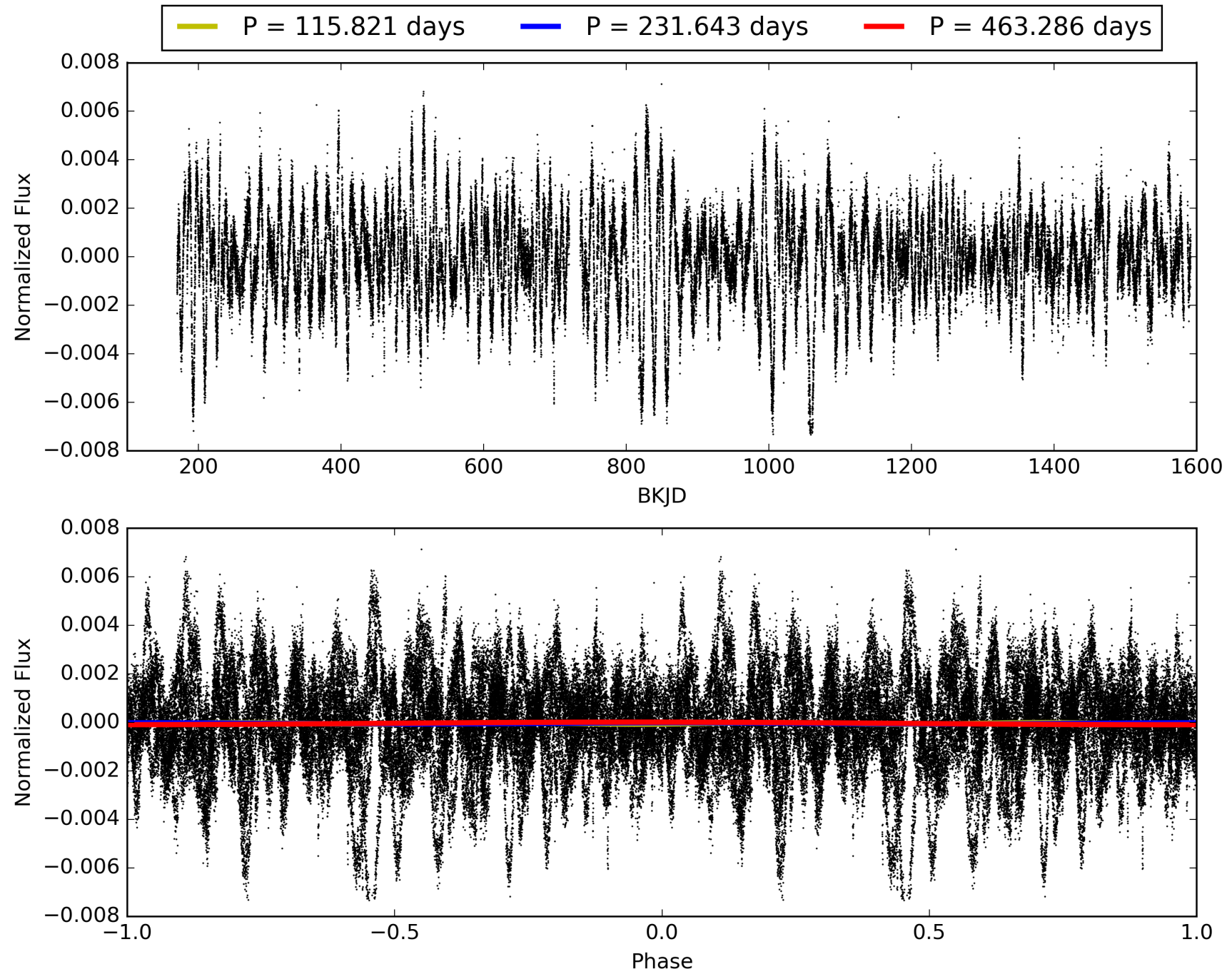
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 07:21:19 Z

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

TCE 006862332-02, PDC Light Curves

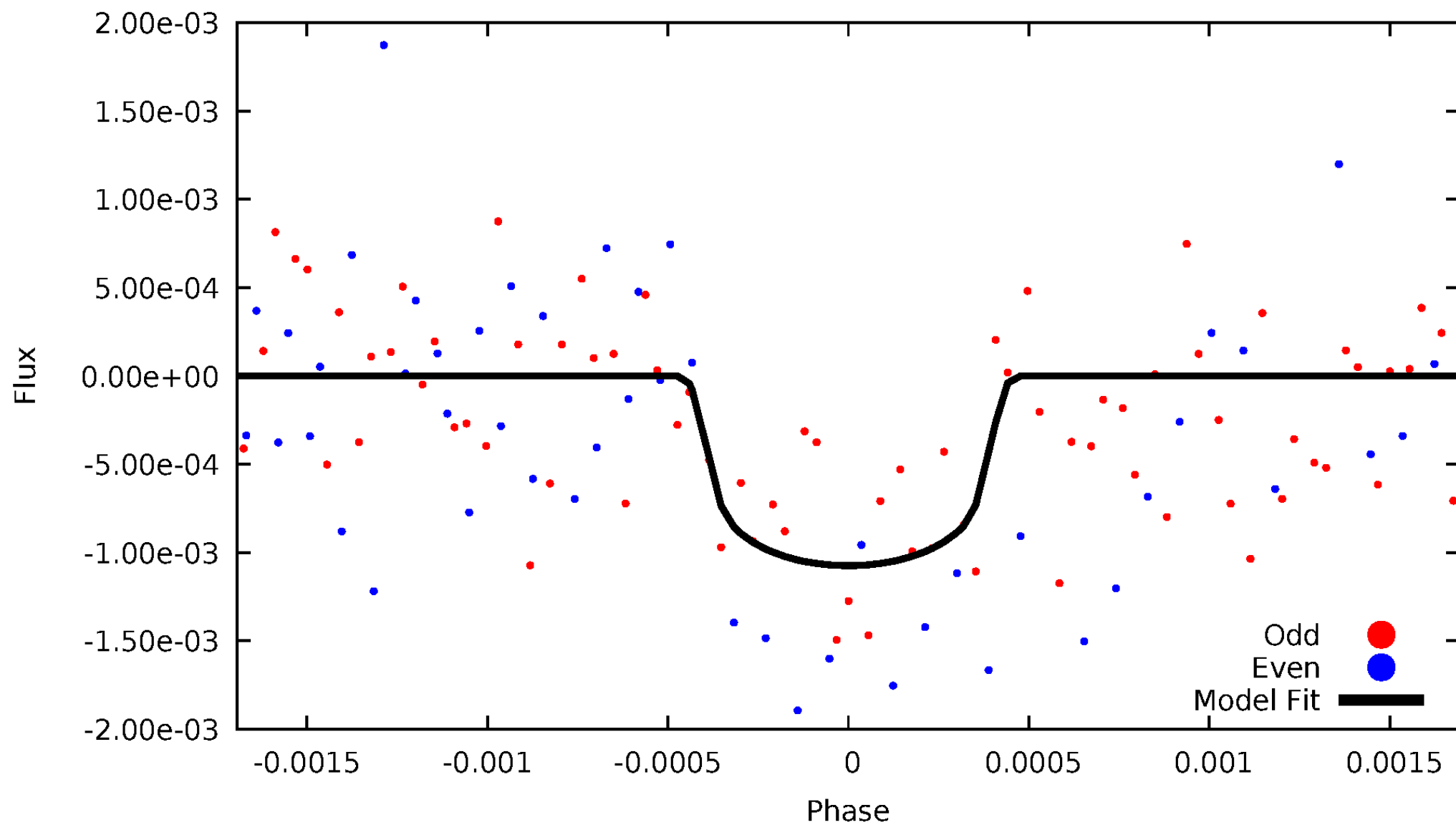


TCE 006862332-02



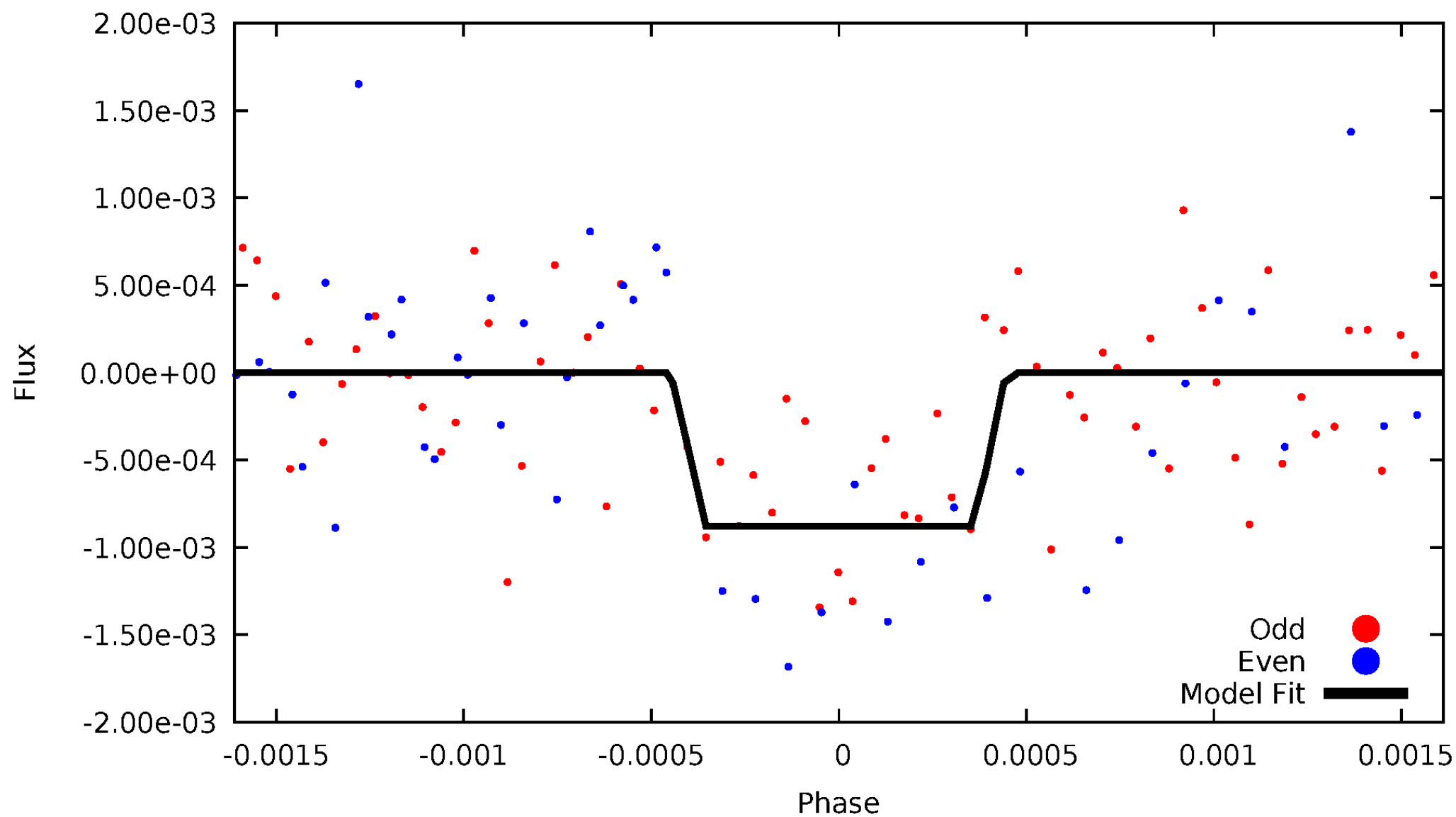
DV Odd/Even

TCE 006862332-02



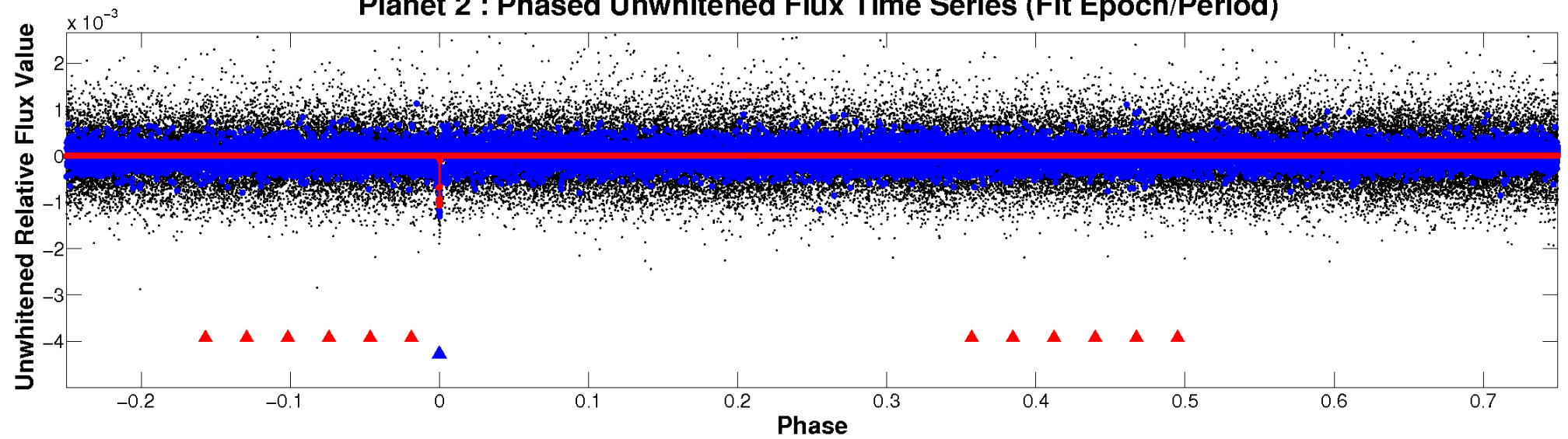
ALT Odd/Even

TCE 006862332-02

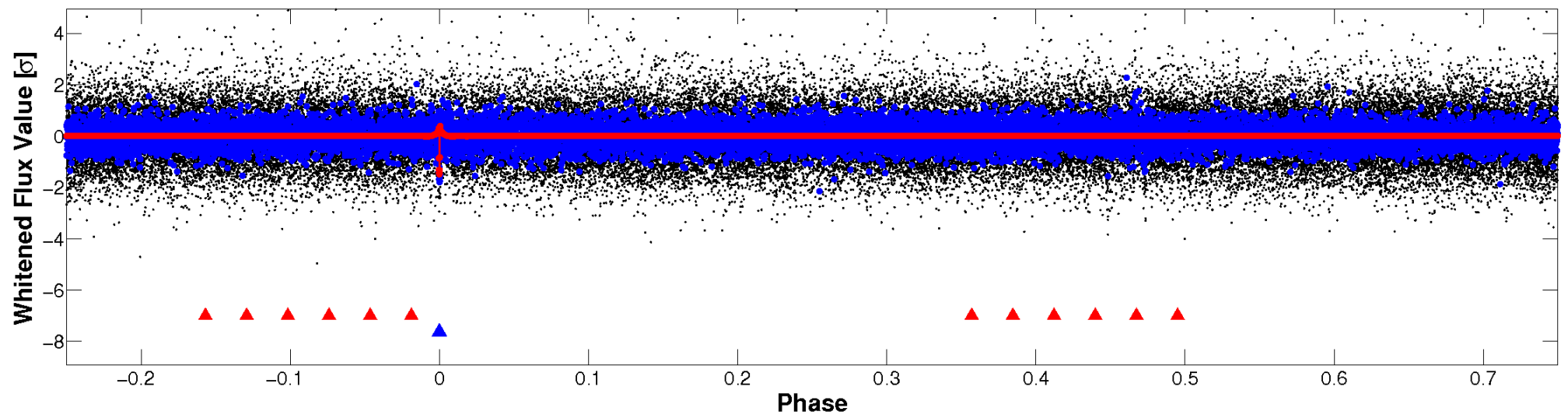


Non-Whitened Vs. Whitened Light Curve

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

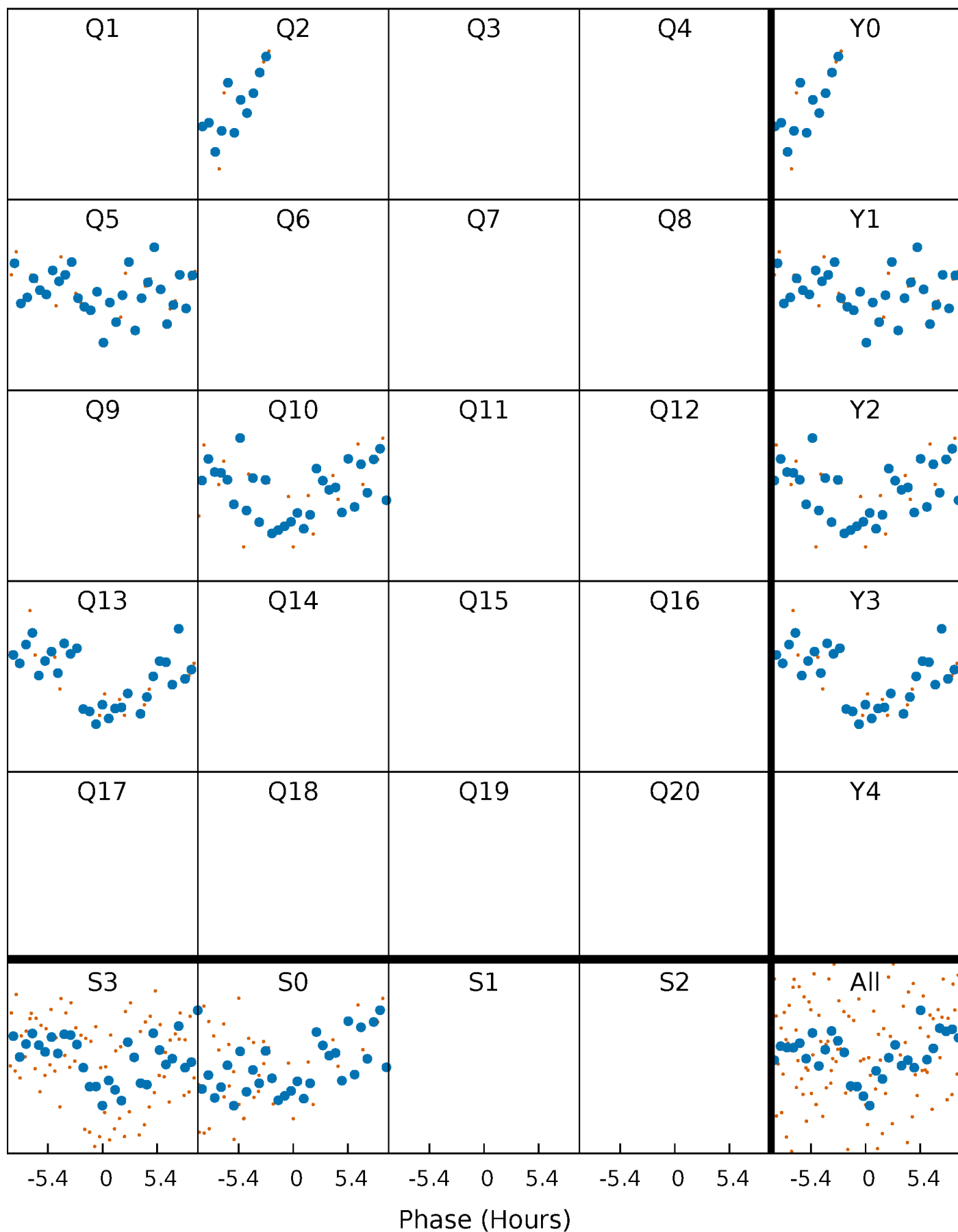


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



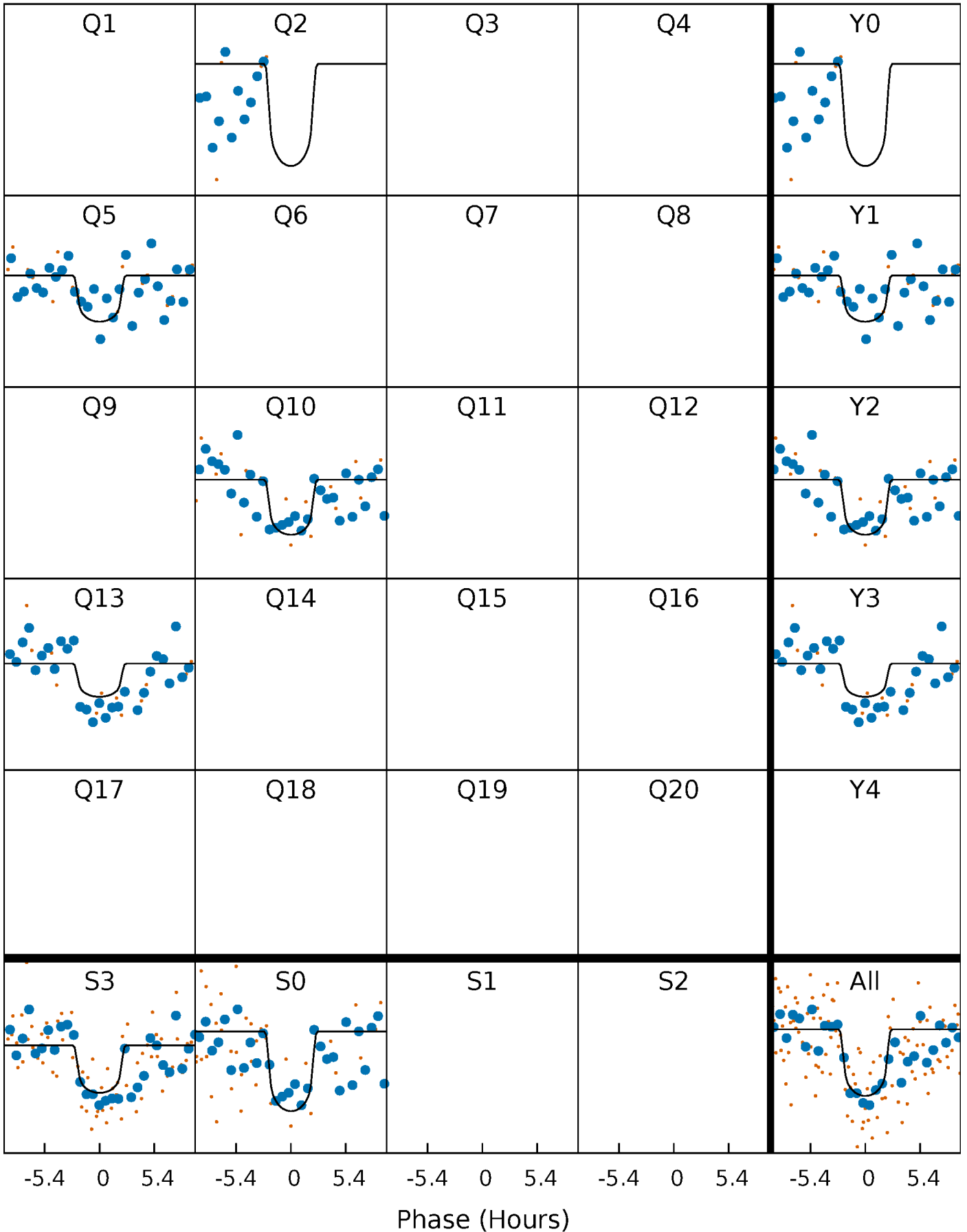
PDC Quarter-Phased Transit Curves

TCE 006862332-02 $P=231.642927$ Days $T_0=258.567955$ (BKJD)



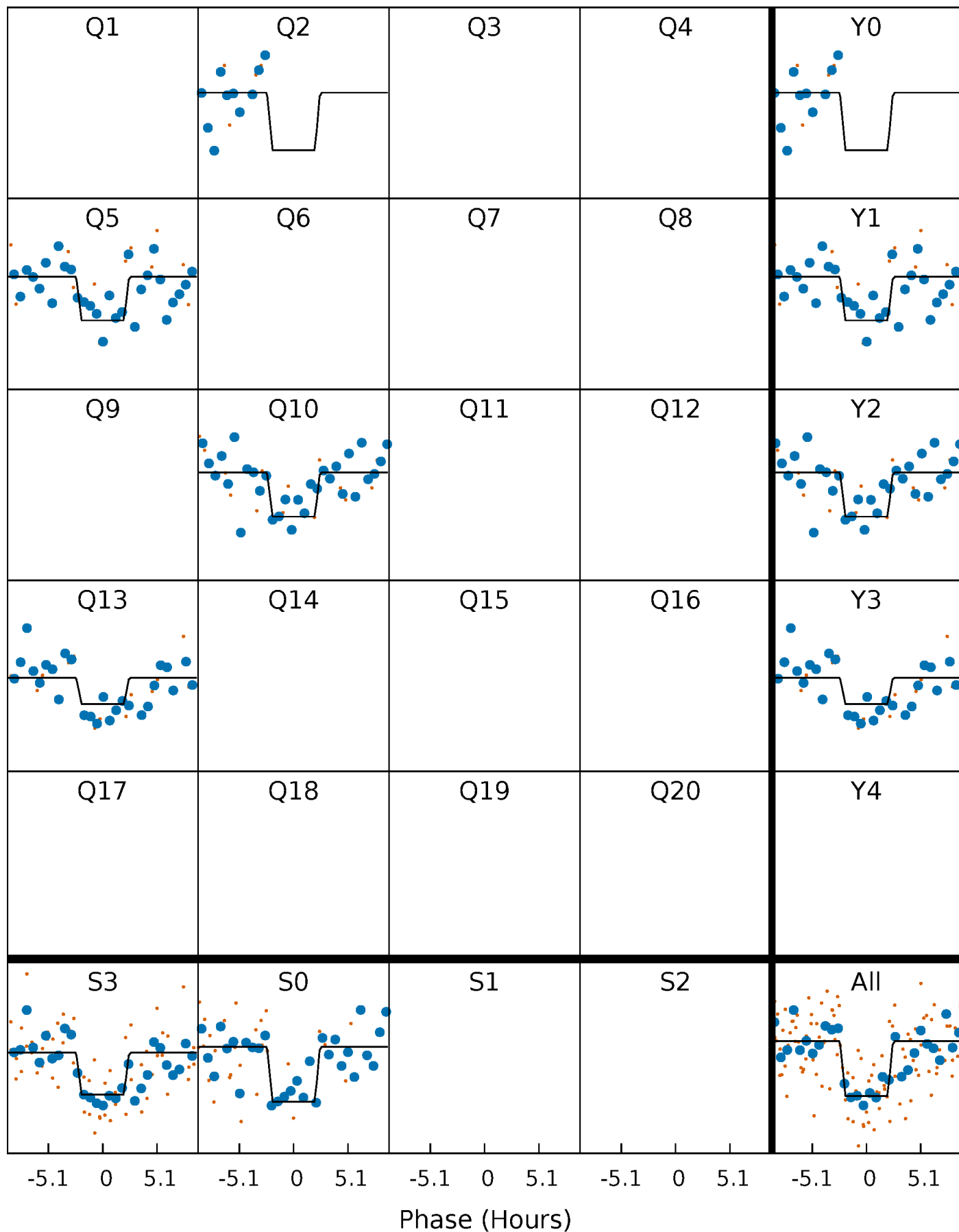
DV Quarter-Phased Transit Curves

TCE 006862332-02 P=231.642927 Days $T_0=258.567955$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

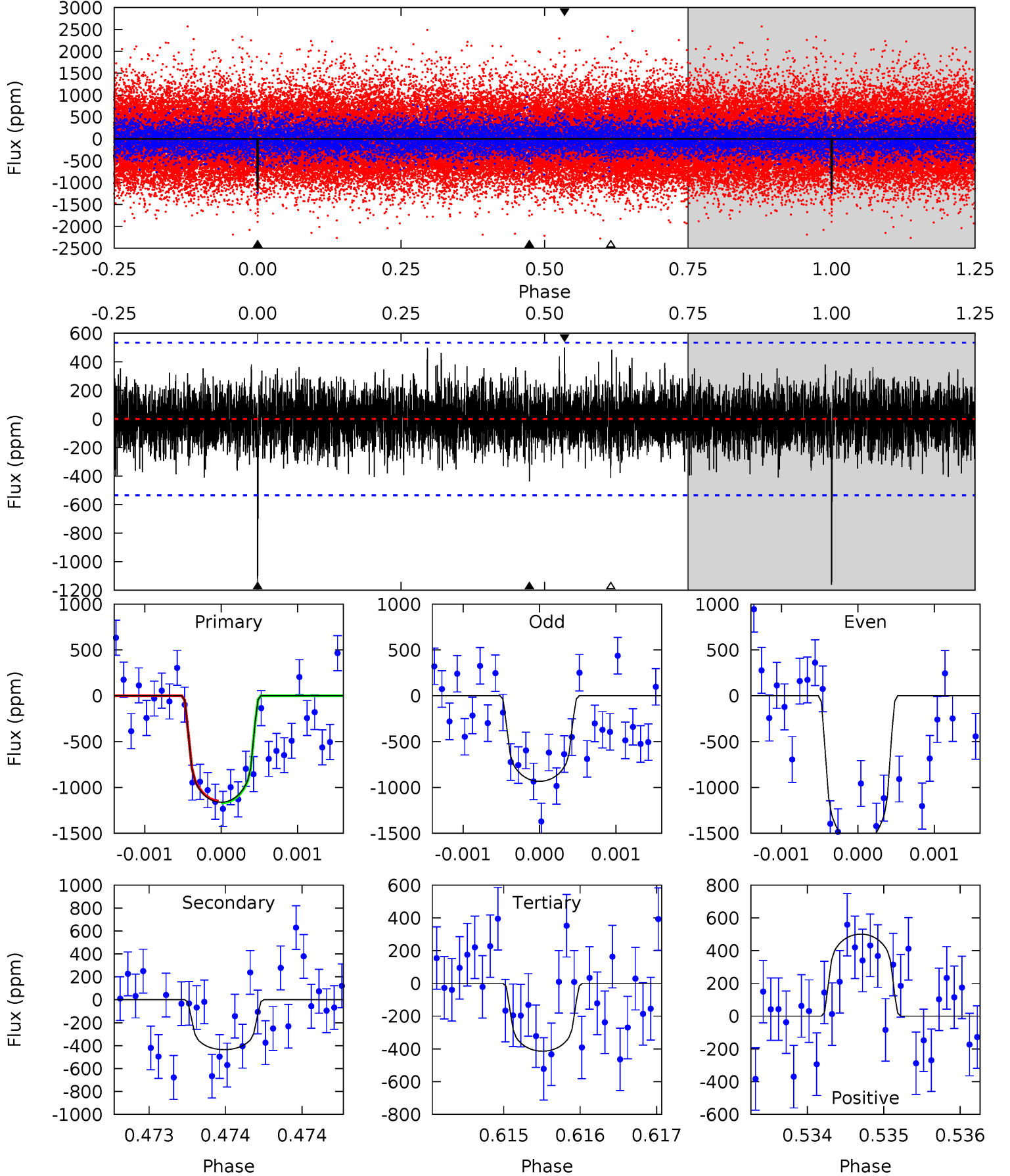
TCE 006862332-02 P=231.640982 Days $T_0=258.574253$ (BKJD)



DV Model-Shift Uniqueness Test

006862332-02, P = 231.642927 Days, E = 26.925028 Days

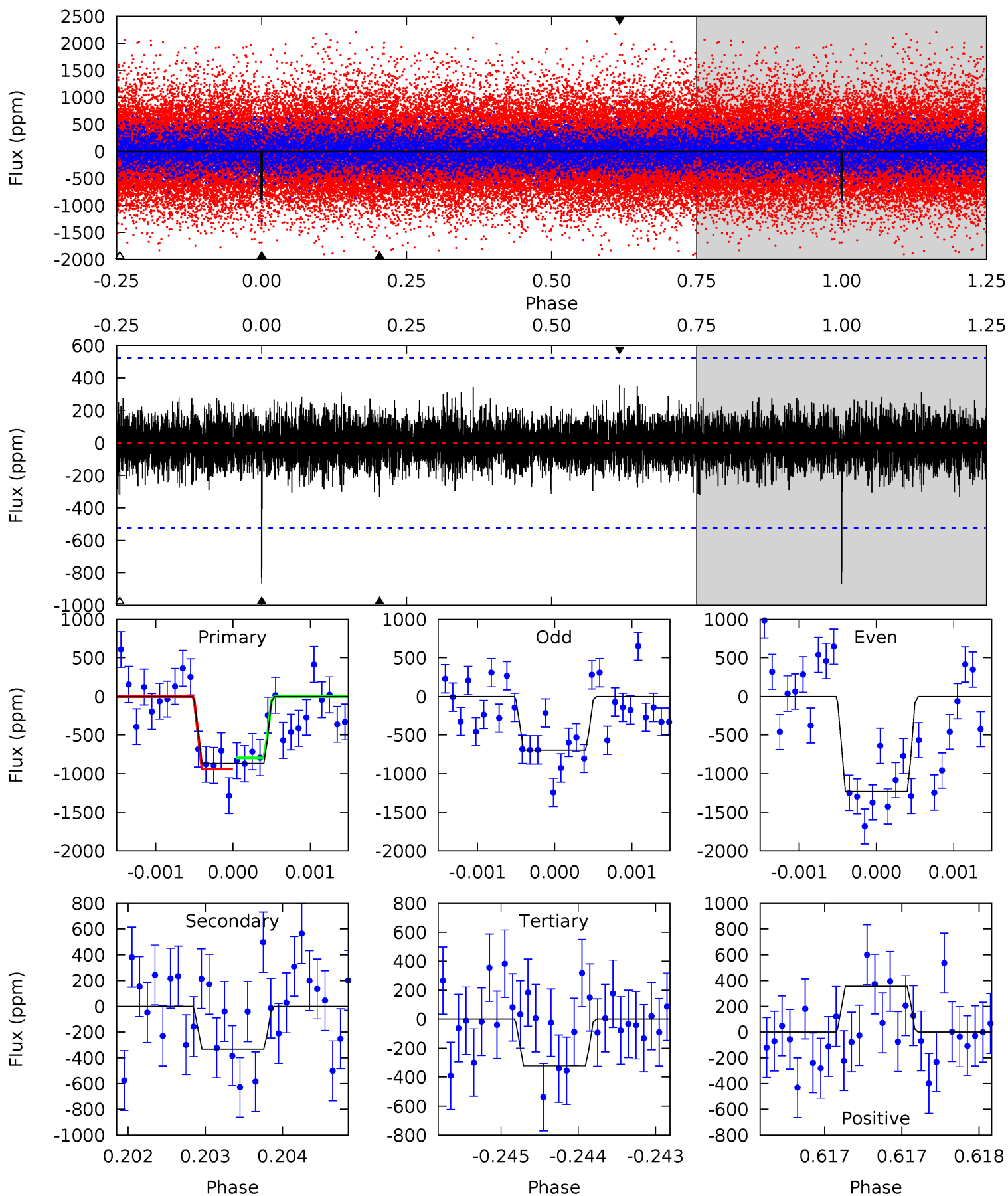
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
11.9	4.46	4.24	5.12	5.47	3.31	1.25	7.65	6.76	0.22	-0.67	3.42	1.25	0.30	0.10



Alt Model-Shift Uniqueness Test

006862332-02, P = 231.640982 Days, E = 26.933271 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
9.06	3.48	3.35	3.70	5.47	3.33	0.92	5.70	5.35	0.12	-0.23	2.58	1.21	0.29	0.76



Stellar Parameters For KIC 006862332

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	5754^{+182}_{-202}	$4.534^{+0.034}_{-0.195}$	$0.070^{+0.250}_{-0.300}$	$0.905^{+0.241}_{-0.086}$	$1.021^{+0.102}_{-0.136}$	$1.938^{+0.377}_{-0.991}$
	+3%/-4%	+1%/-4%	+357%/-429%	+27%/-10%	+10%/-13%	+19%/-51%
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 006862332-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-436 ± 98	$3.61^{+2.28}_{-2.00}$	402^{+27}_{-20}	4637^{+2117}_{-786}	10000^{+39631}_{-6381}
Alt.	-333 ± 96	$3.24^{+2.40}_{-1.98}$	402^{+25}_{-19}	4553^{+2463}_{-882}	8963^{+50663}_{-6110}

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 $A_{obs} \gg 1.0$

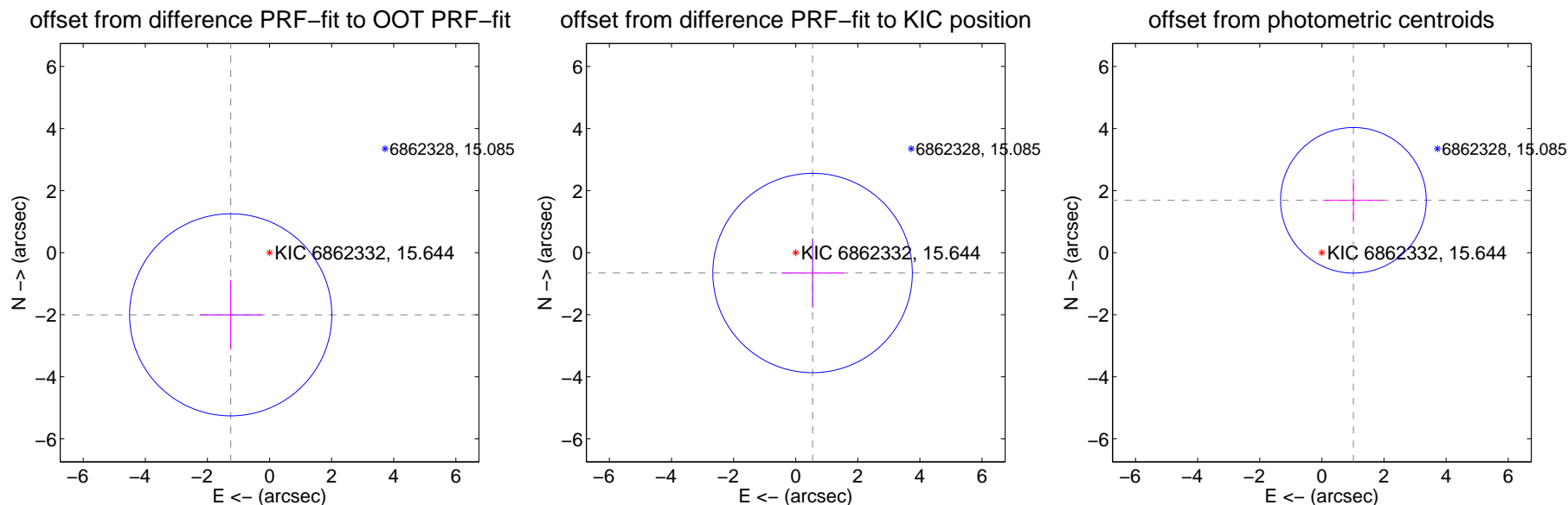
DV Centroid Data

Supplemental centroid analysis for 006862332-02. Kepler magnitude: 15.64. Transit SNR 6.93

There are 1 quarters with good PRF difference image offsets

The OOT PRF centroid is offset from the target star catalog position by about 2.24 arcsec so the offset from difference PRF-fit to OOT-fit may be invalid.

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	2.362 ± 1.085	2.18	1.250 ± 1.000	-2.003 ± 1.116
PRF-fit source offset from KIC position	0.852 ± 1.071	0.80	-0.544 ± 1.000	-0.656 ± 1.116
photometric centroid source offset	1.97 ± 0.78	2.52	-1.02 ± 0.98	1.69 ± 0.70

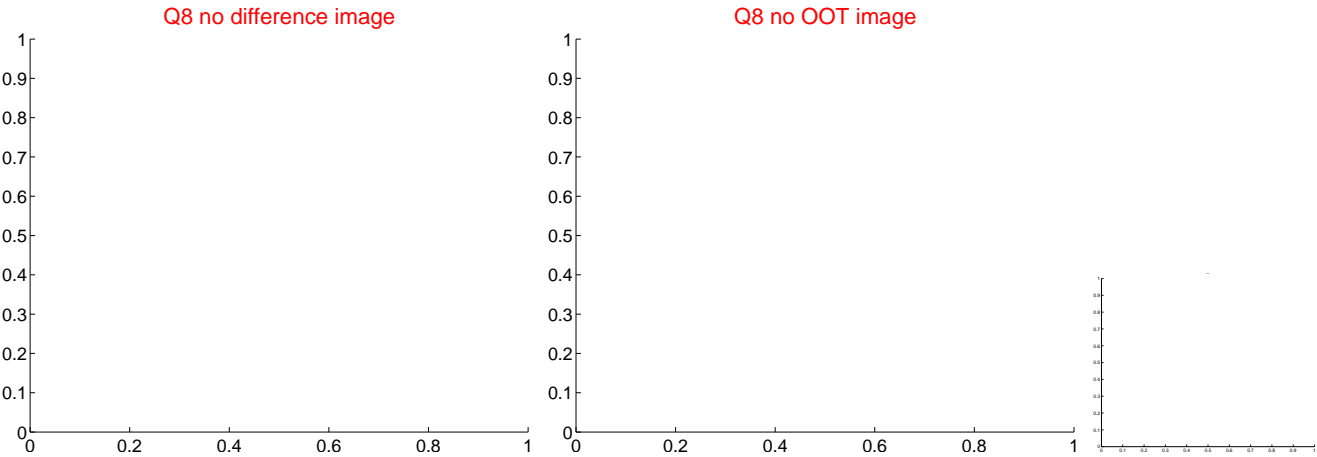
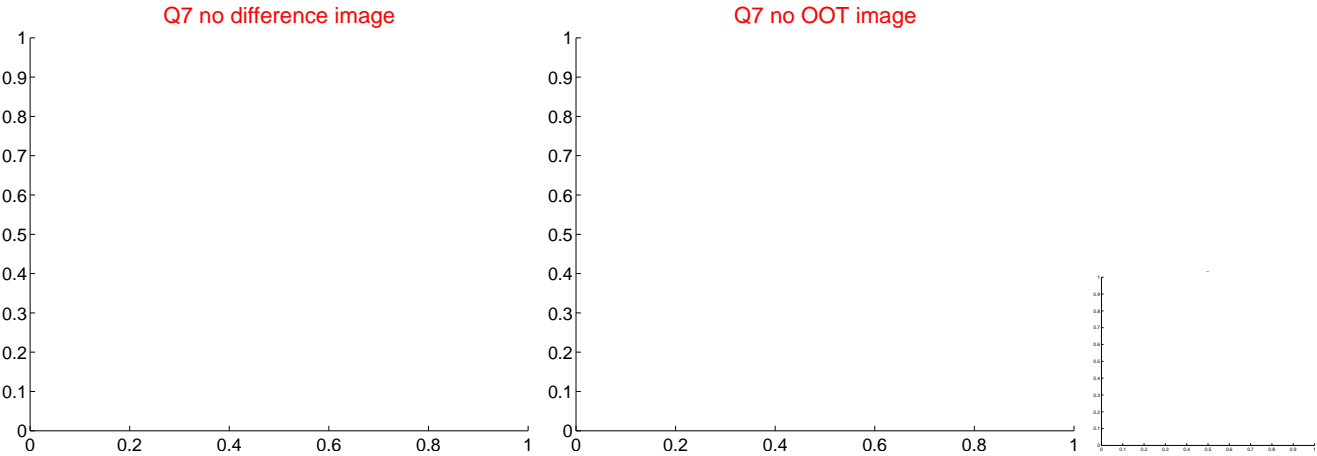
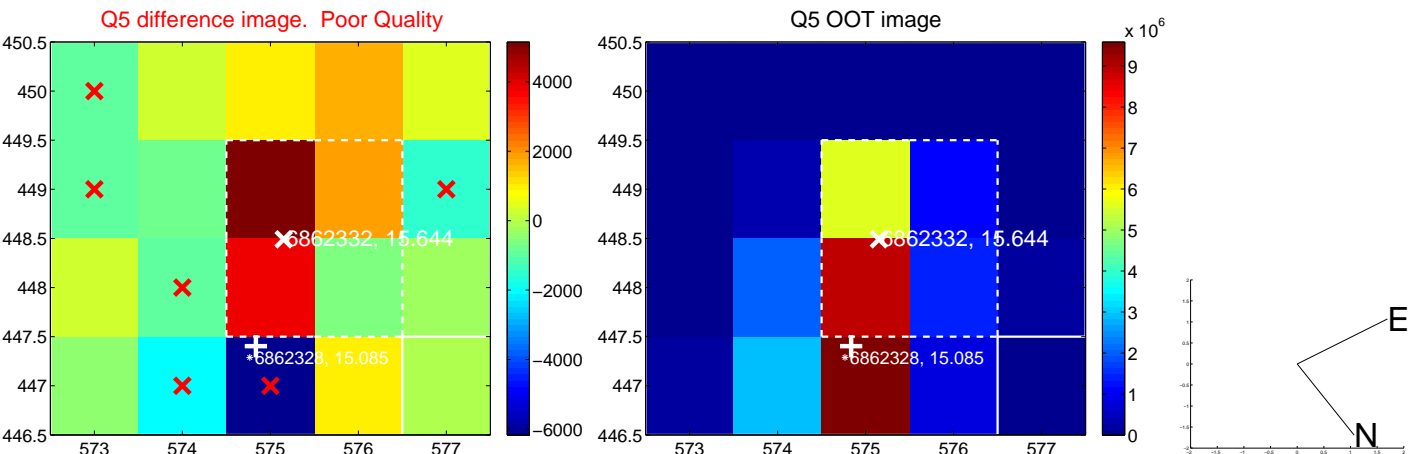


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

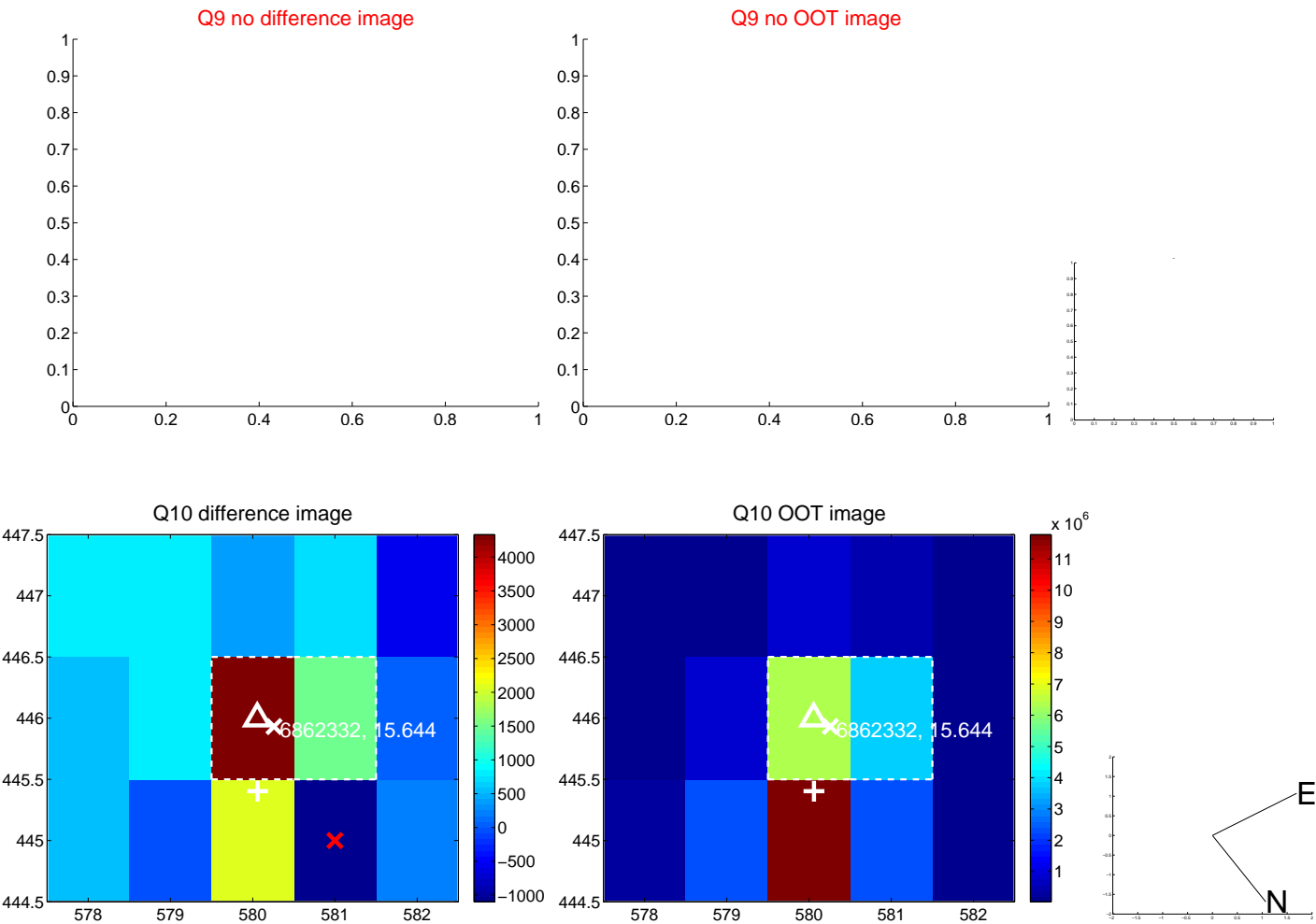
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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.



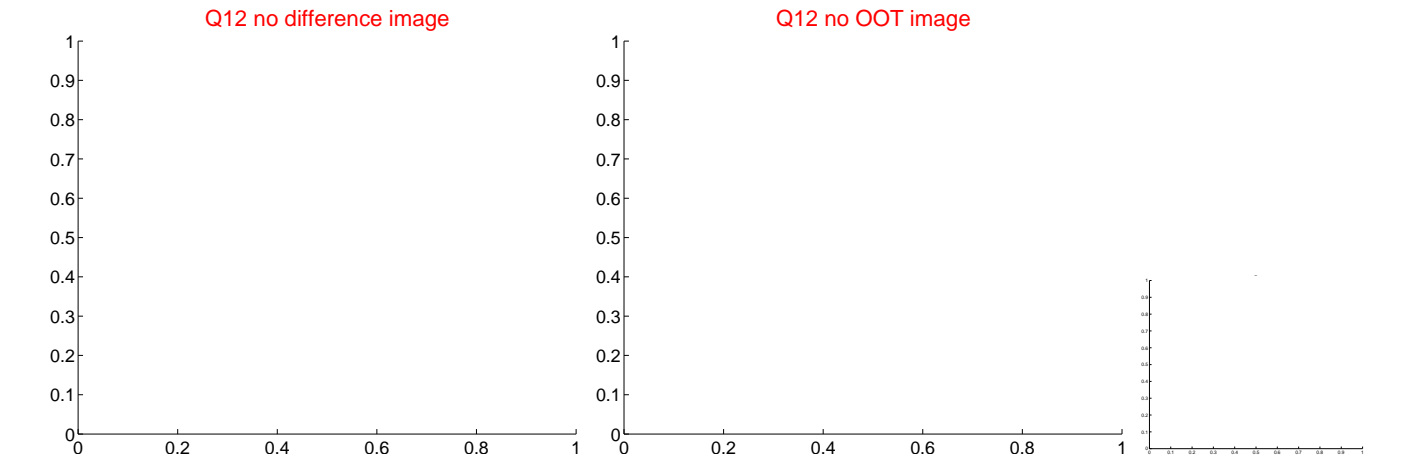
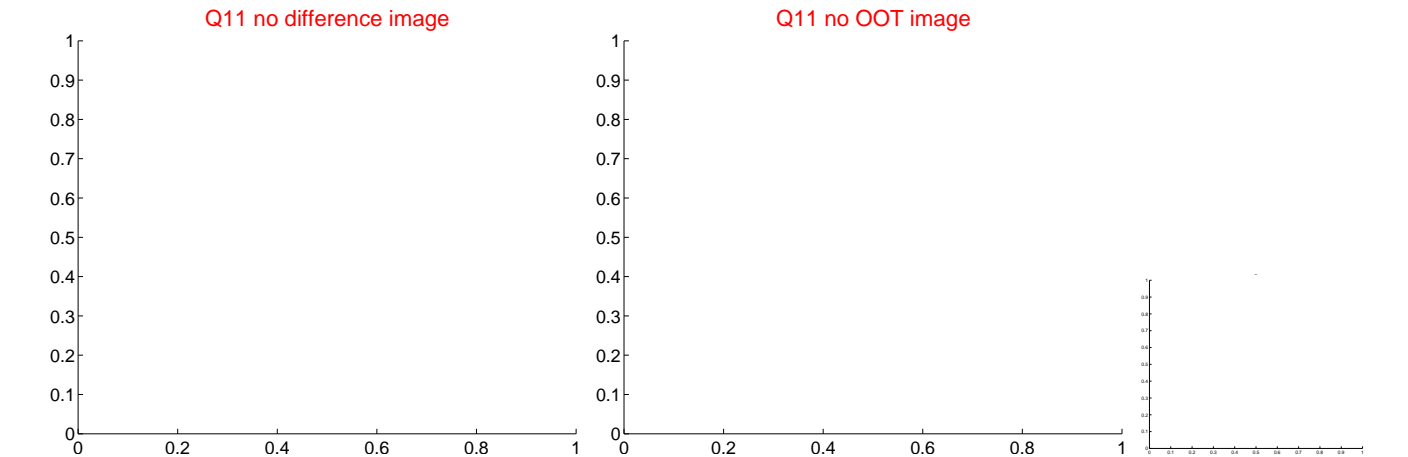
Q10 difference image



Q10 OOT image



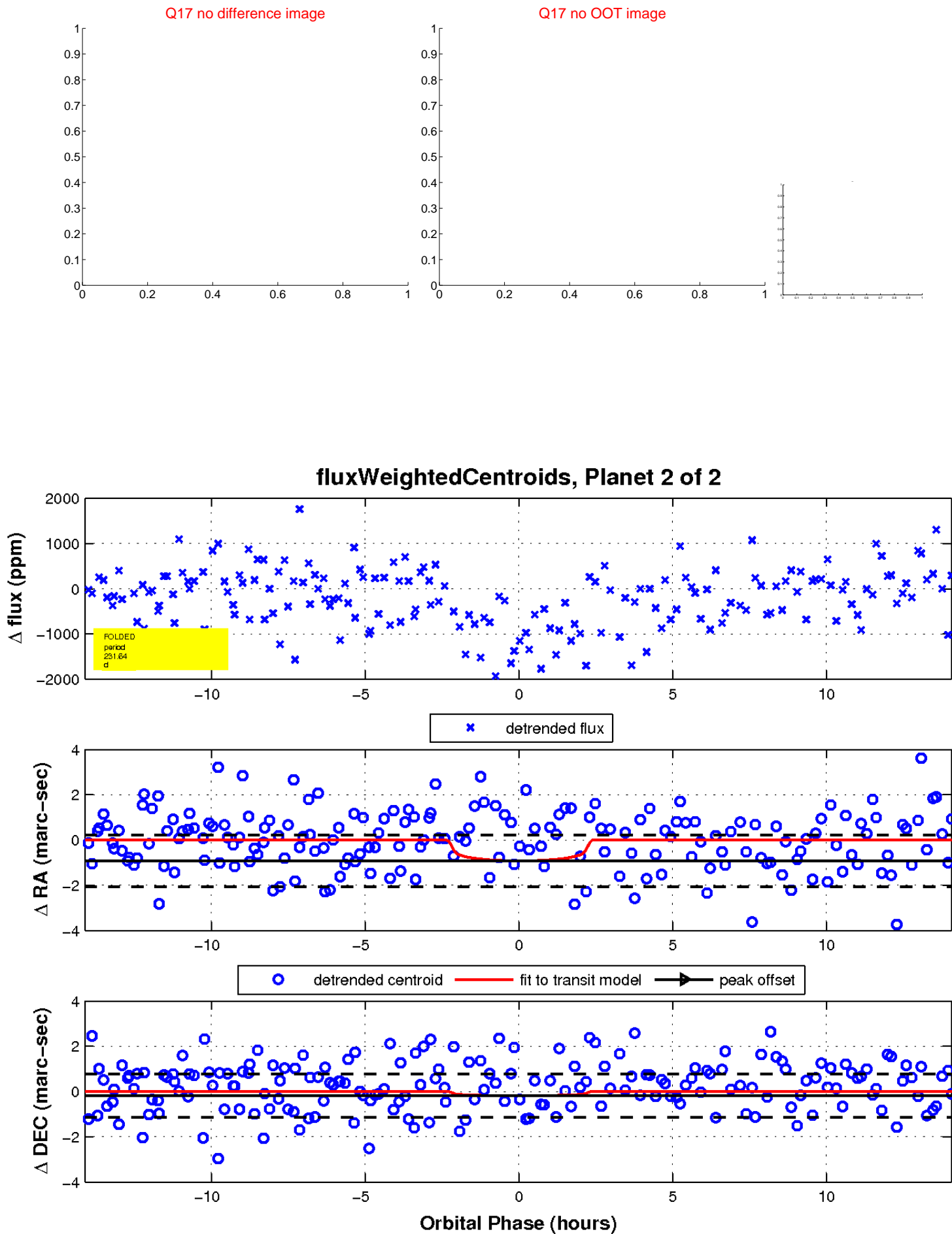




white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



UKIRT Image

Declination

