

KIC 009836020

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})
009836020-01	OBS	No	0.920152	131.775763	46.9	3.691	11.5	10.1	1.98	7709	1.39	24860.93
009836020-02	OBS	No	0.682135	131.803437	72.0	7.266	7.2	12.9	1.98	7709	1.70	37054.12

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009836020-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT
009836020-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA—TRANS_GAPPED—LPP_DV—LPP_ALT—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.

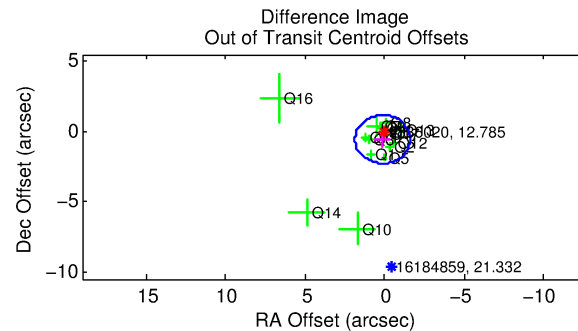
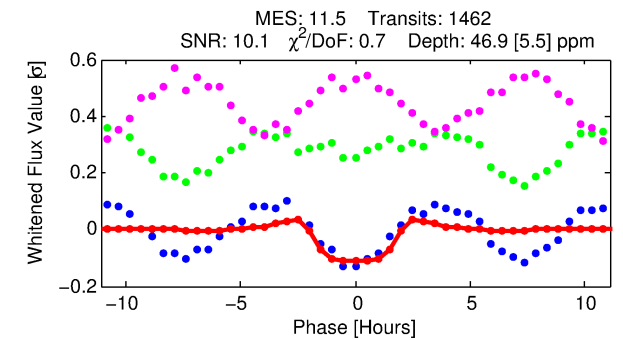
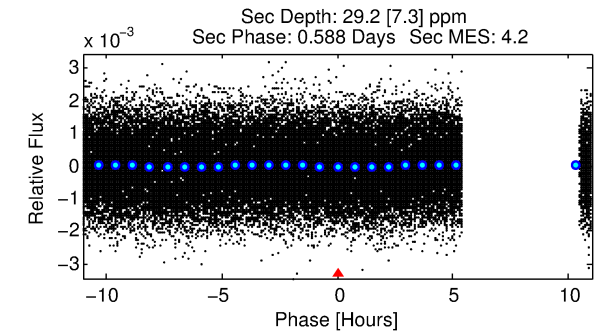
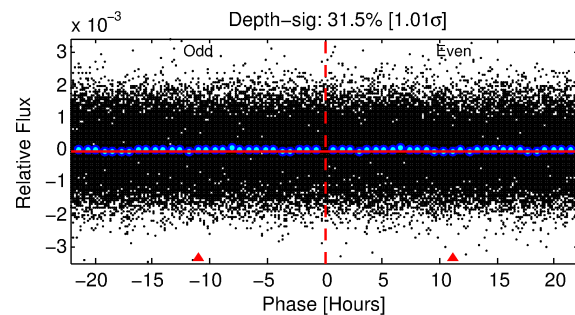
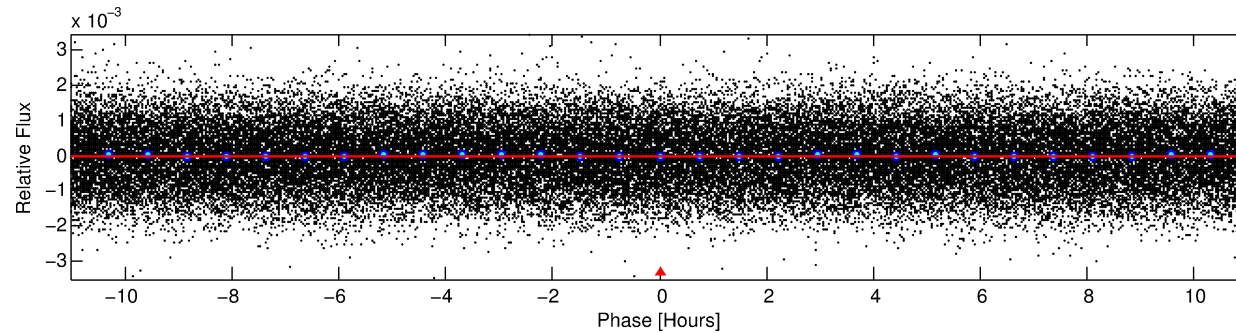
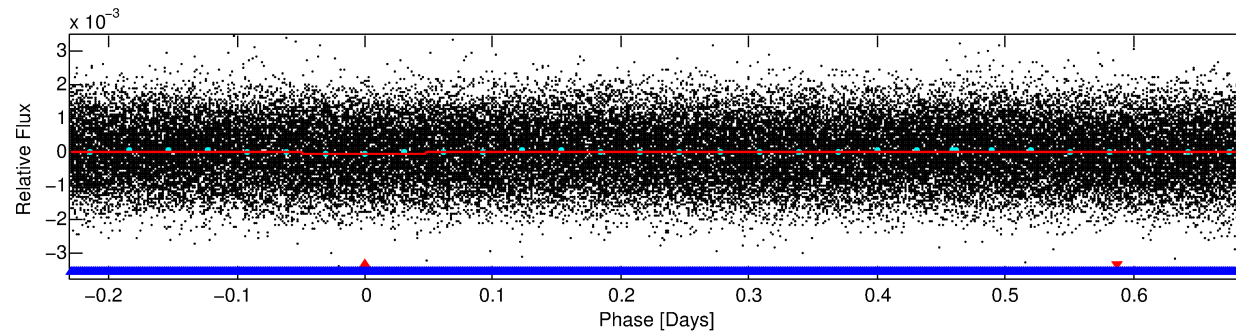
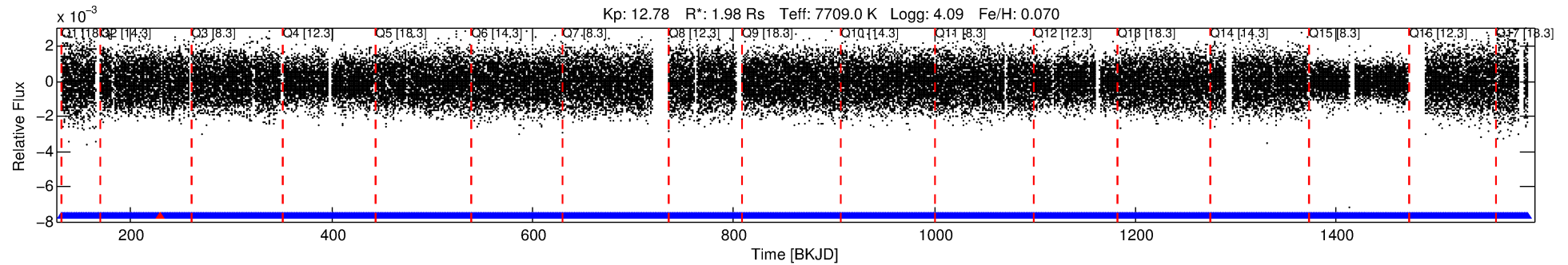
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009836020-01

No Significant Match Found

DV One-Page Summary

KIC: 9836020 Candidate: 1 of 2 Period: 0.920 d



DV Fit Results:

Period = 0.92015 [0.00001] d
Epoch = 131.7758 [0.0041] BKJD
Rp/R* = 0.0064 [0.0042]
a/R* = 1.92 [5.54]
b = 0.34 [10.29]
Seff = 24860.93 [9043.20]
Teq = 3202 [291] K
Rp = 1.39 [0.99] Re
a = 0.0223 [0.0050] AU
Ag = 4.14 [5.72] [0.55 σ]
Teffp = 7063 [2386] K [1.61 σ]

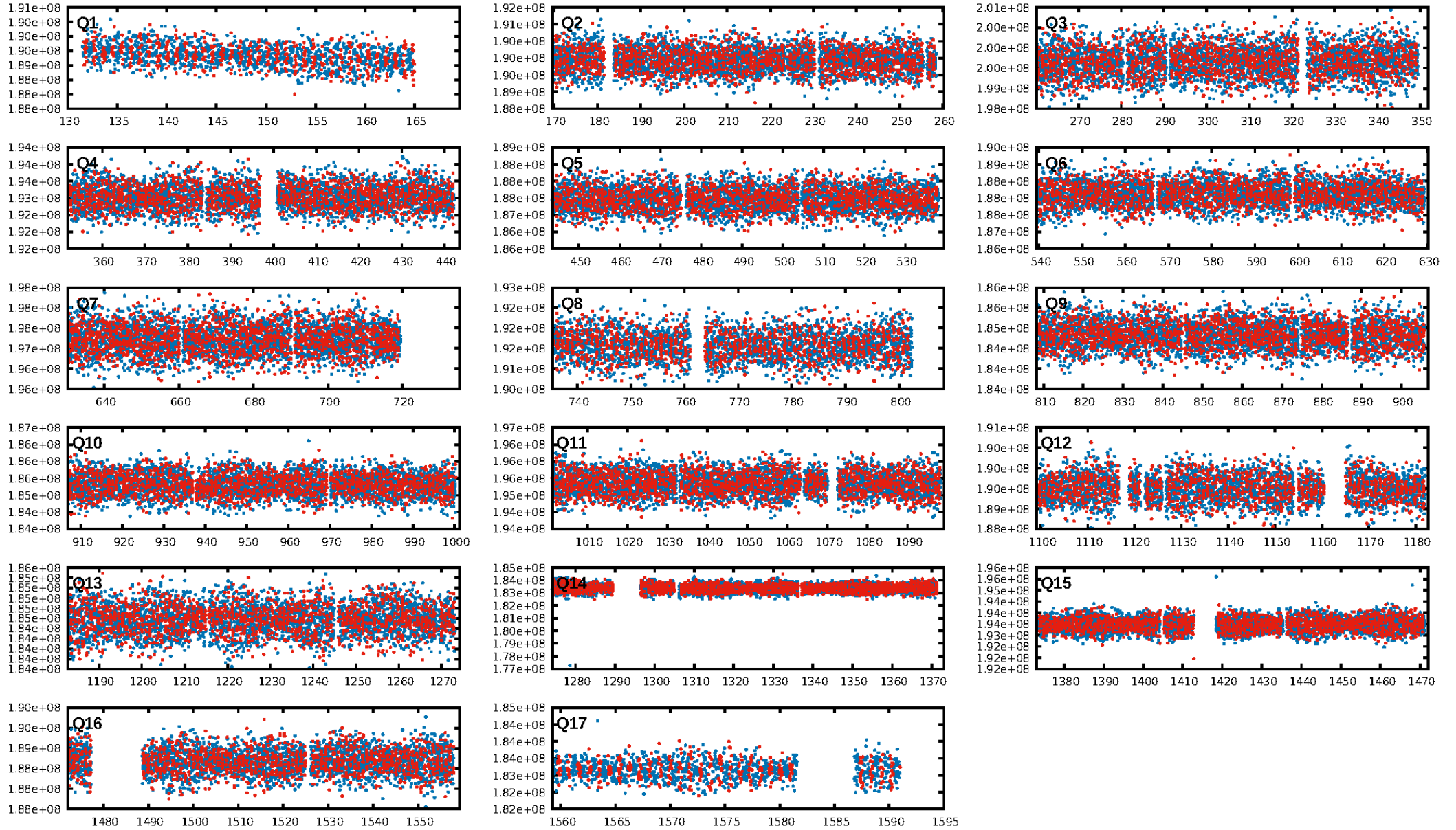
DV Diagnostic Results:

ShortPeriod-sig: 51.7% [0.70 σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: N/A
RollingBand-fgt: 1.00 [1396/1397]
GhostDiagnostic-chr: 3.286
Centroid-sig: 50.8%
Centroid-so: 0.093 arcsec [0.33 σ]
OotOffset-rm: 0.561 arcsec [0.98 σ]
OotOffset-st: 4/3/4/5 [16]
KicOffset-rm: 0.584 arcsec [1.00 σ]
KicOffset-st: 4/3/4/5 [16]
DiffImageQuality-fgm: 0.75 [12/16]
DiffImageOverlap-fno: 0.00 [0/17]

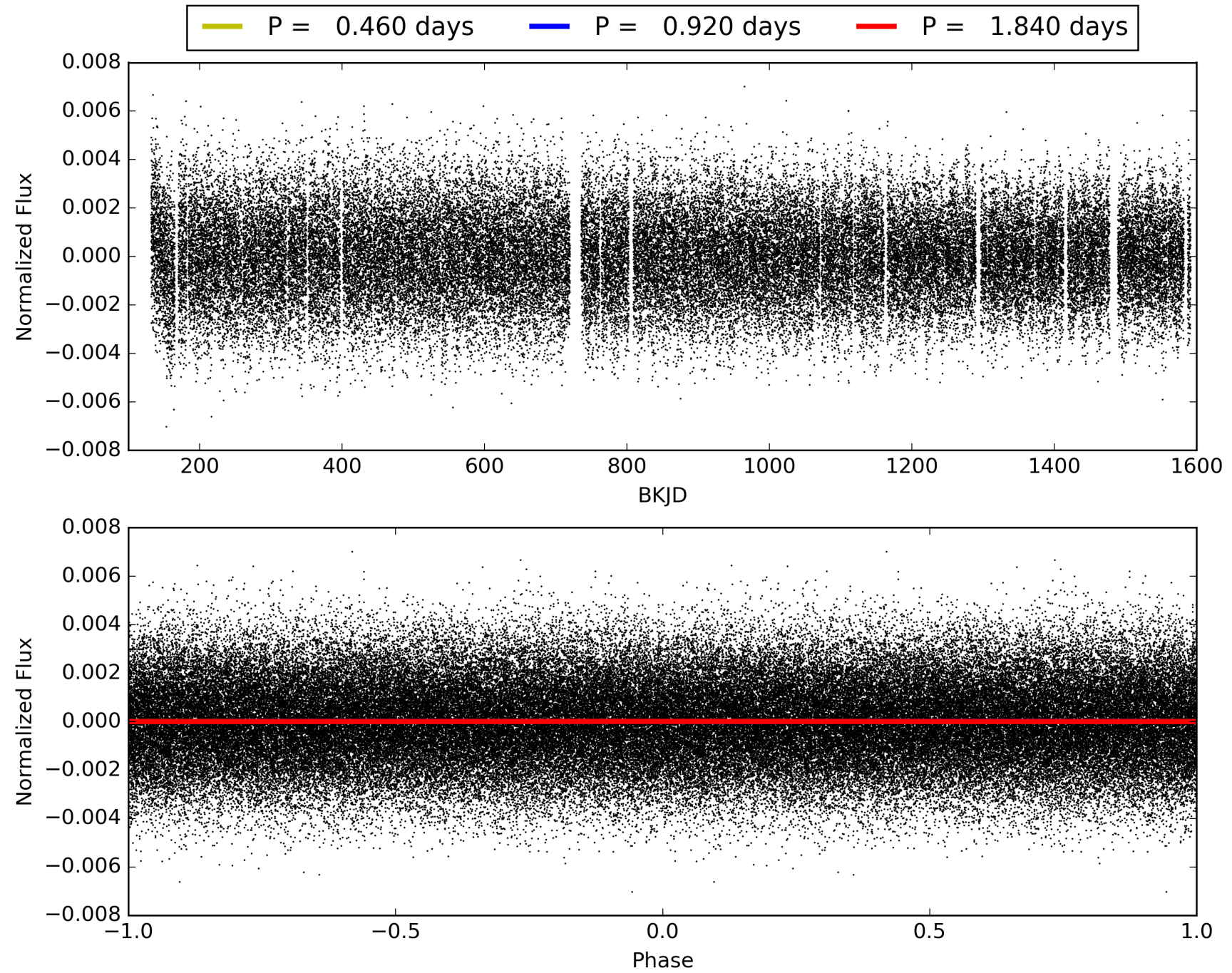
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 01:36:13 Z

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

TCE 009836020-01, PDC Light Curves

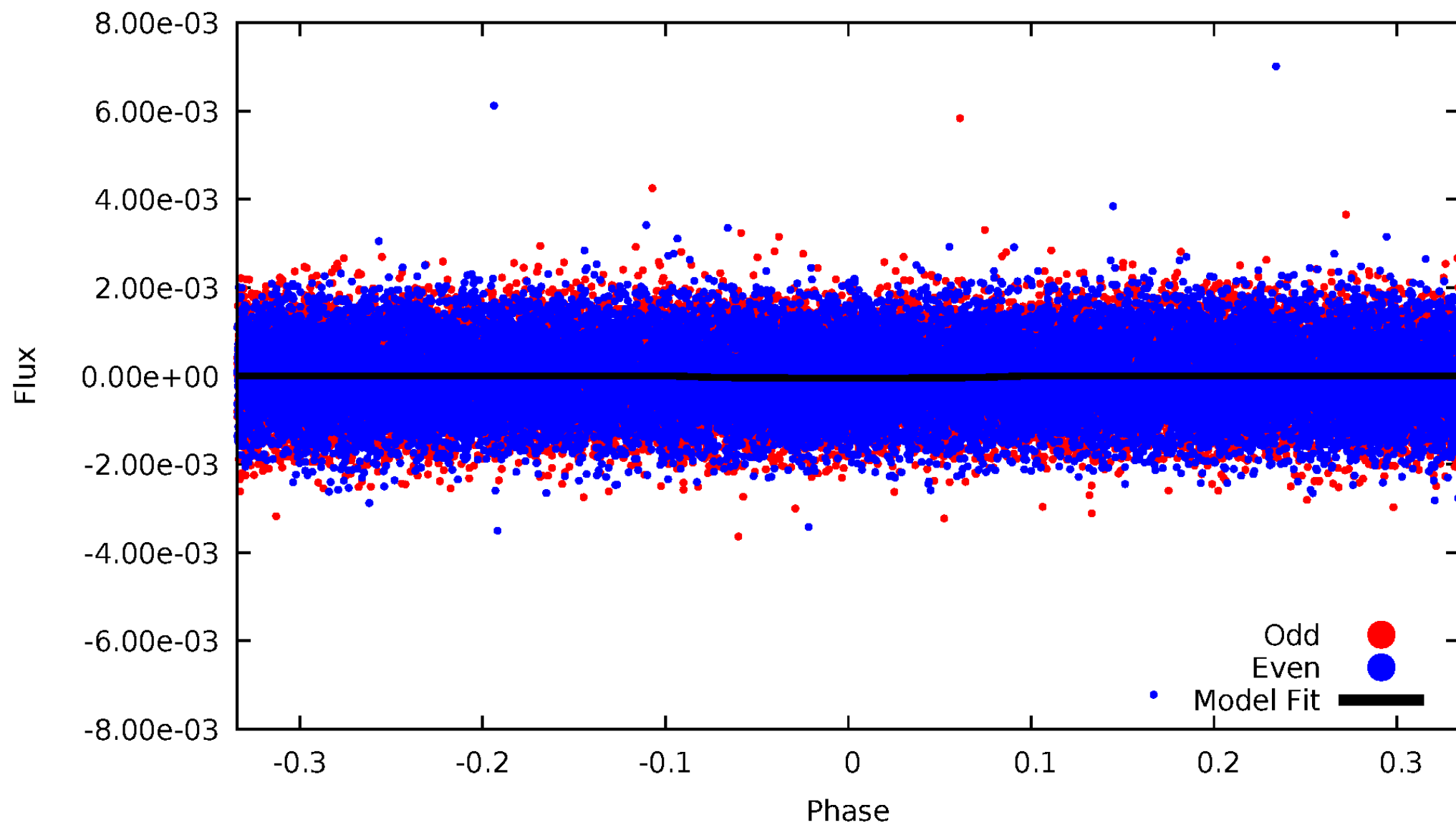


TCE 009836020-01



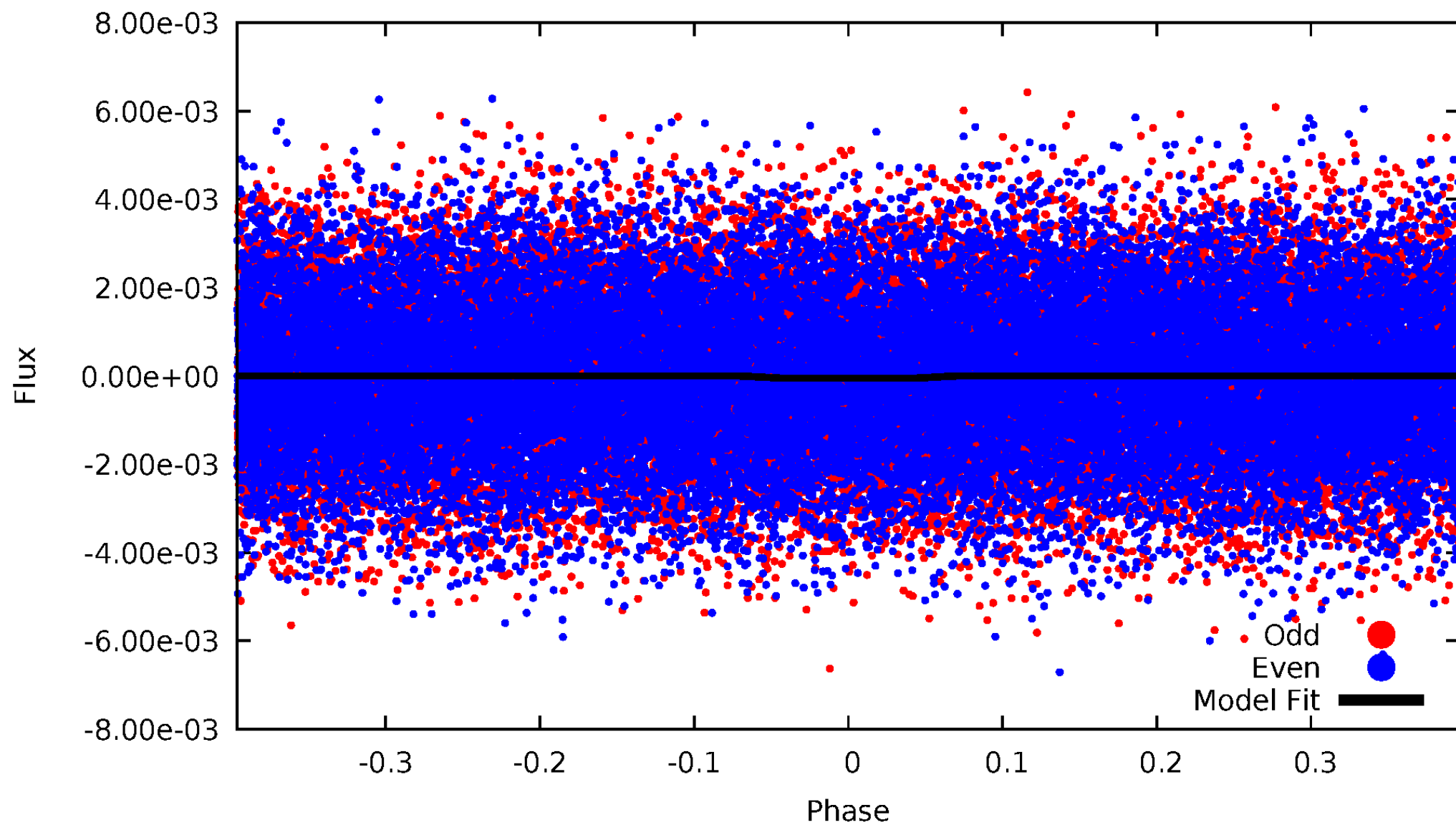
DV Odd/Even

TCE 009836020-01

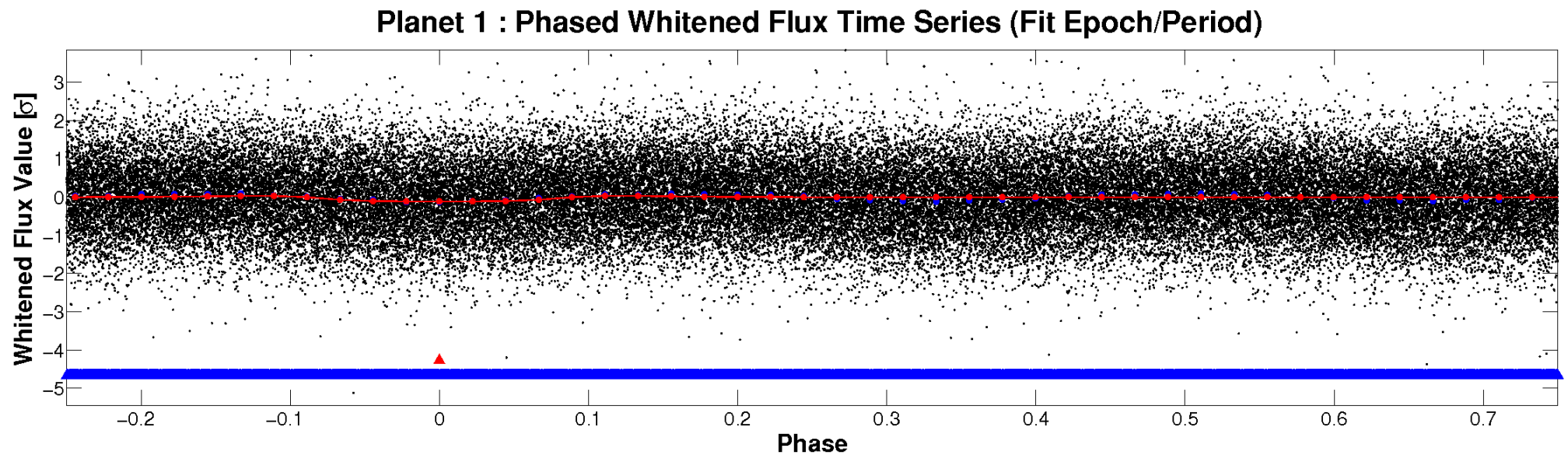
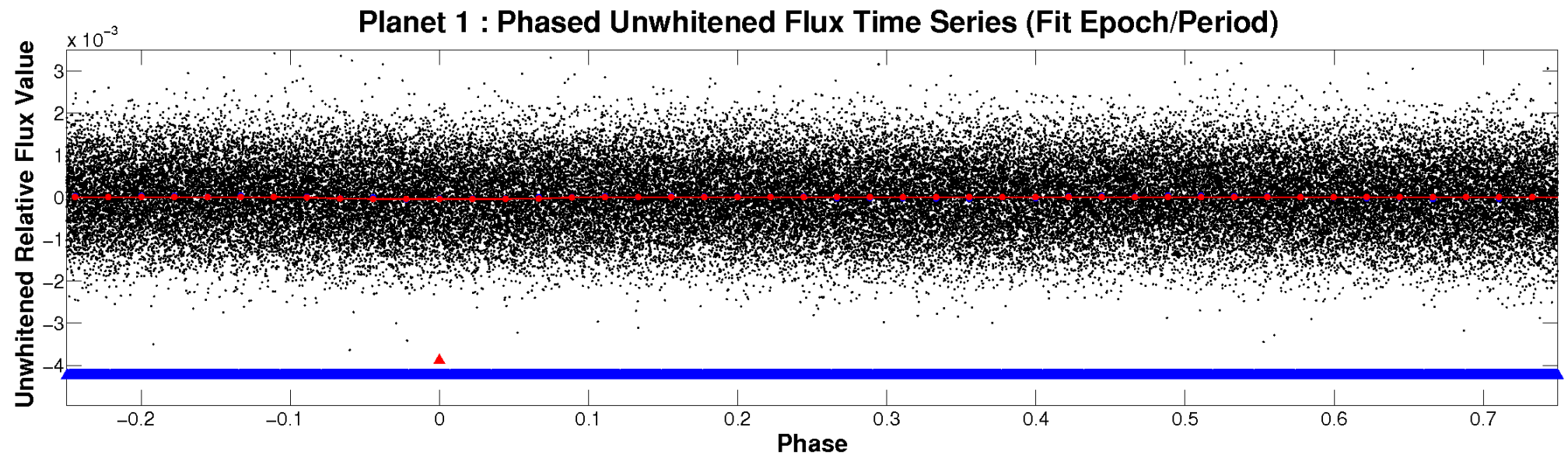


ALT Odd/Even

TCE 009836020-01

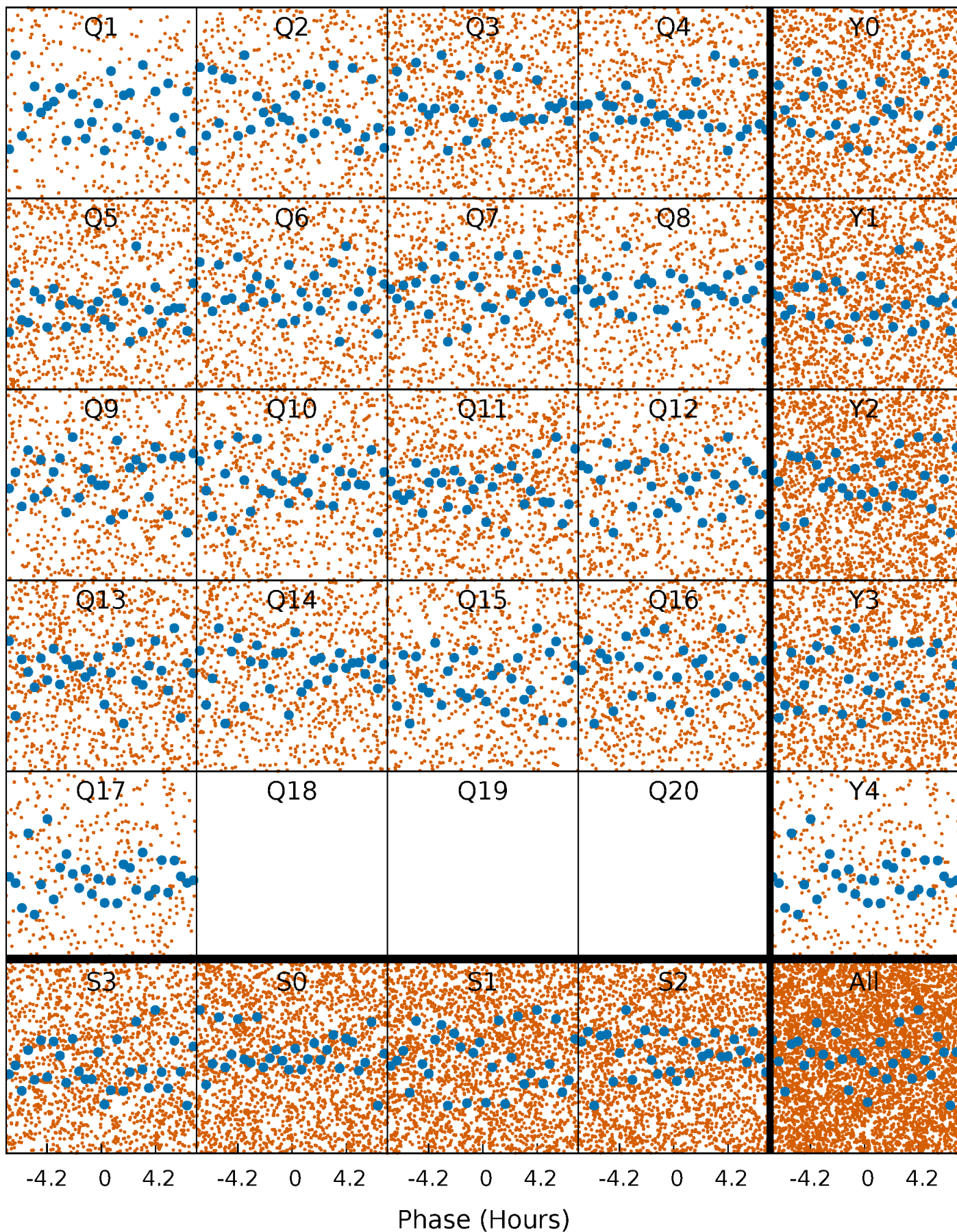


Non-Whitened Vs. Whitened Light Curve



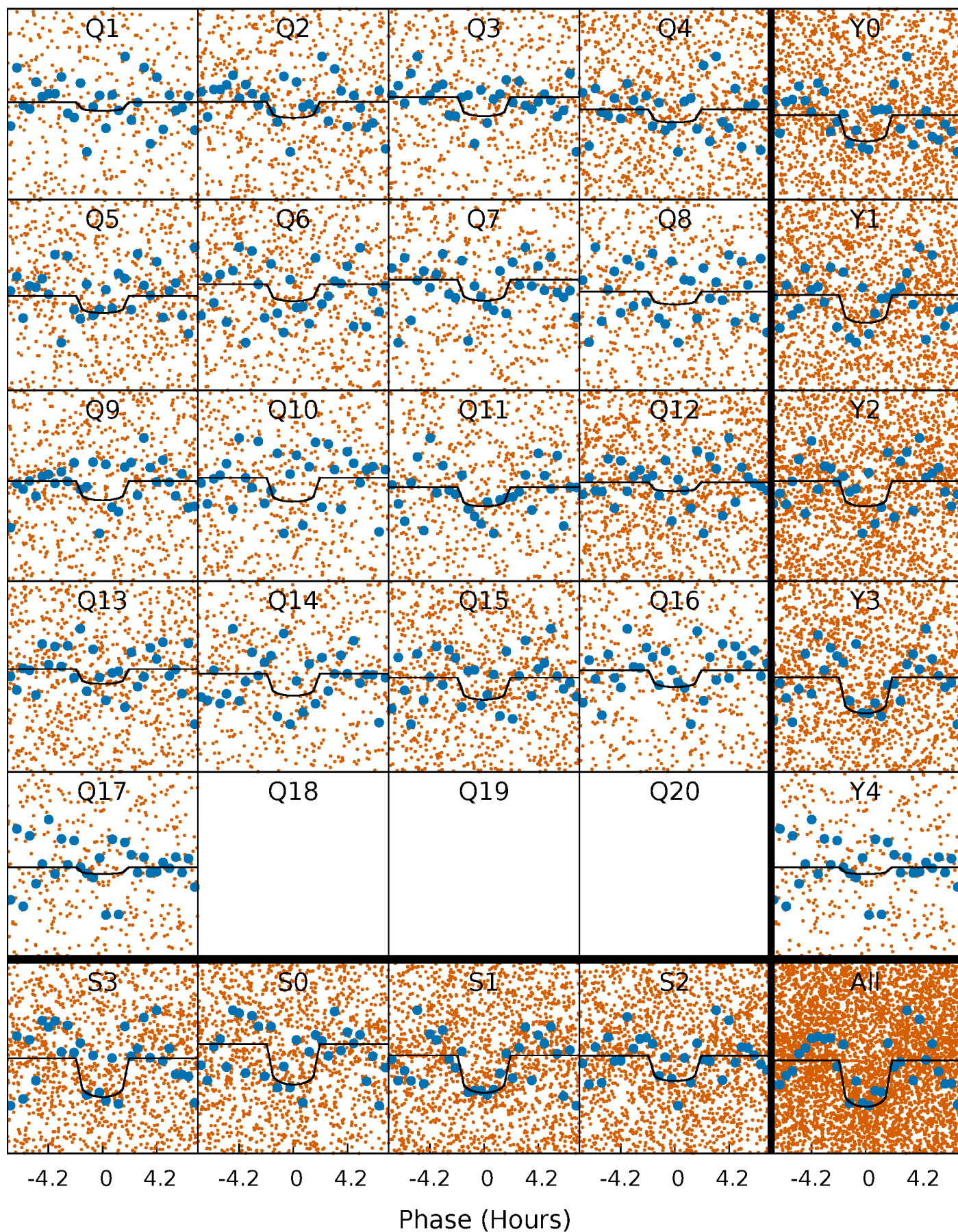
PDC Quarter-Phased Transit Curves

TCE 009836020-01 P= 0.920152 Days $T_0=131.775763$ (BKJD)



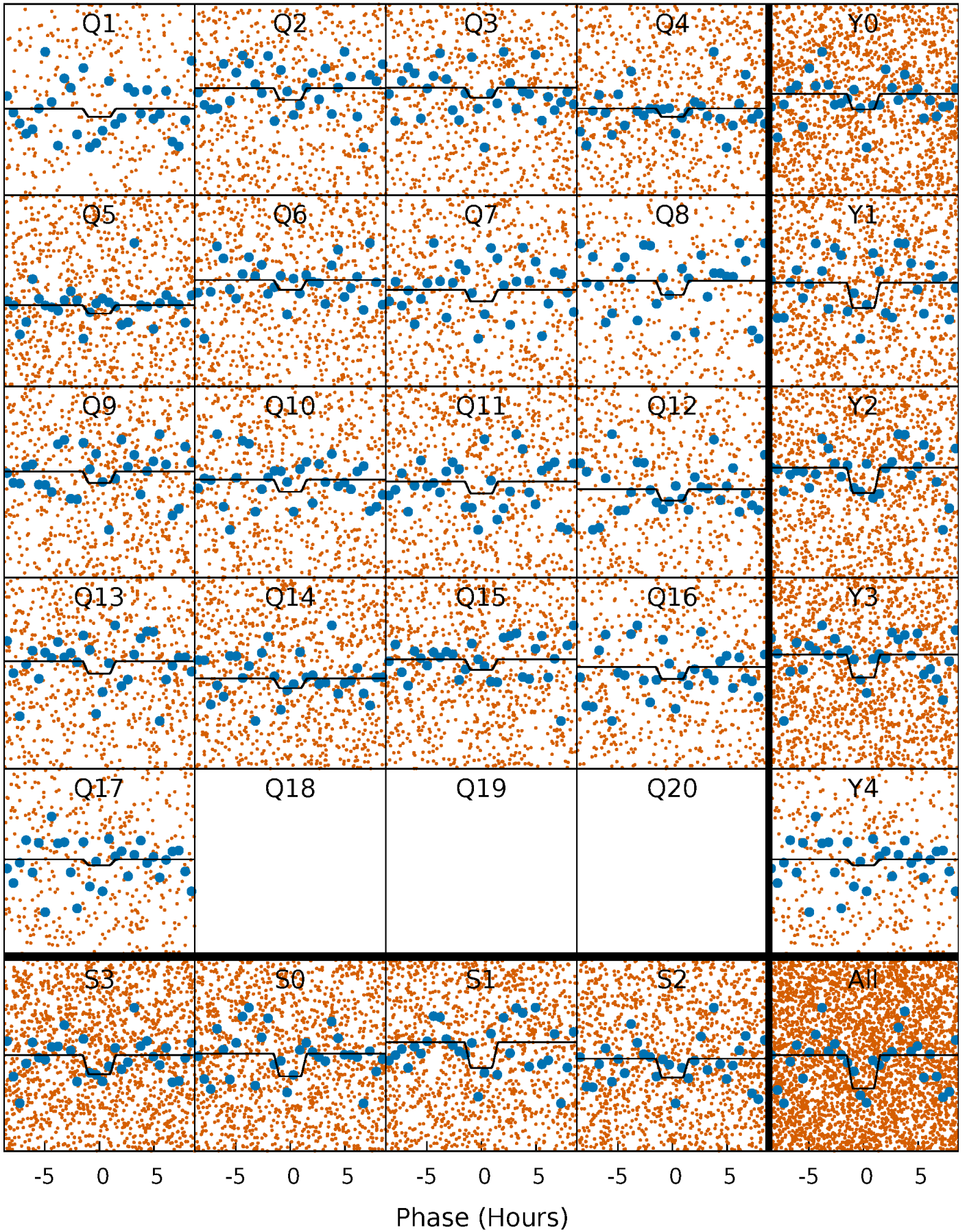
DV Quarter-Phased Transit Curves

TCE 009836020-01 P= 0.920152 Days $T_0=131.775763$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

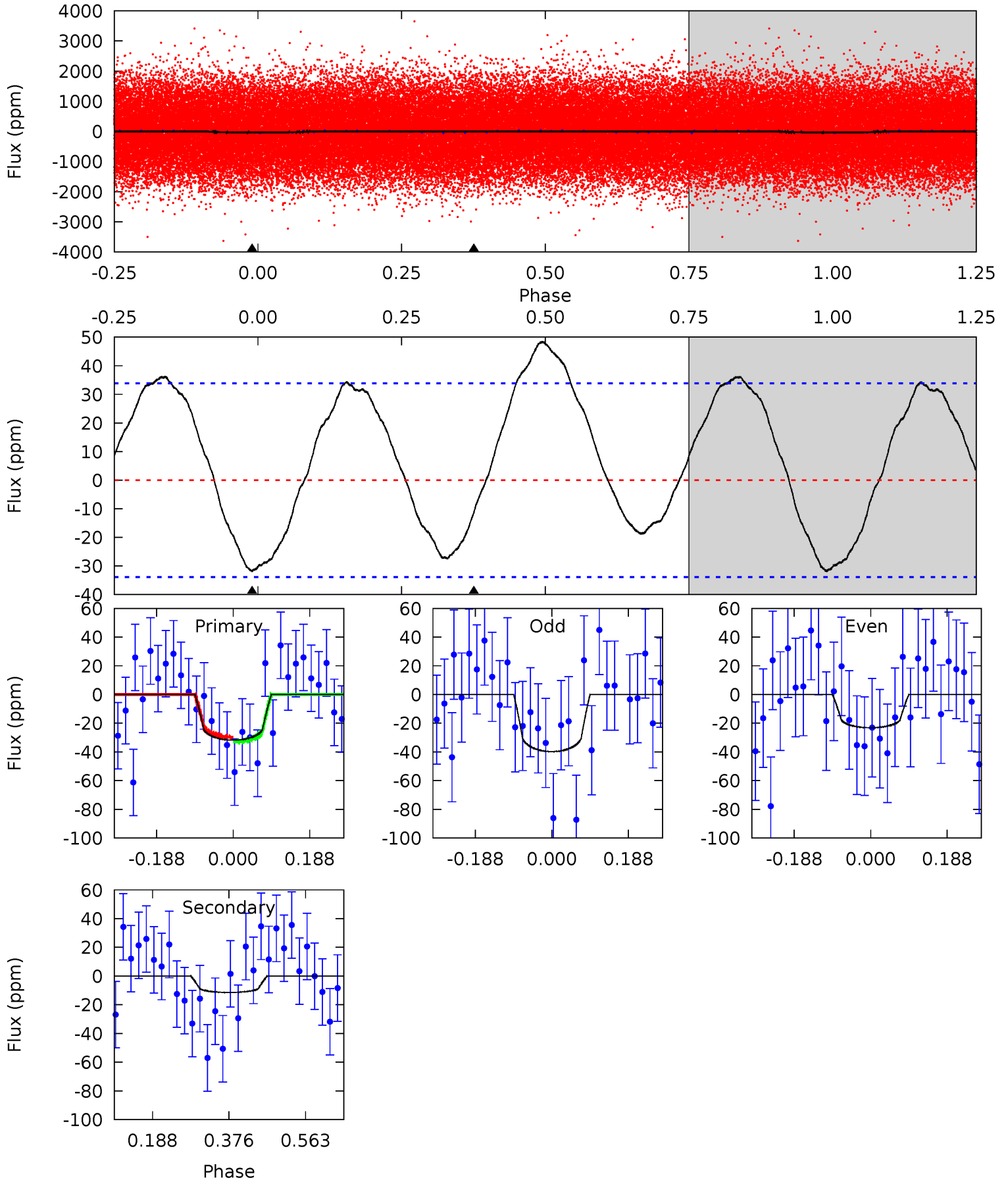
TCE 009836020-01 P= 0.920208 Days $T_0=131.732624$ (BKJD)



DV Model-Shift Uniqueness Test

009836020-01, P = 0.920152 Days, E = 130.855611 Days

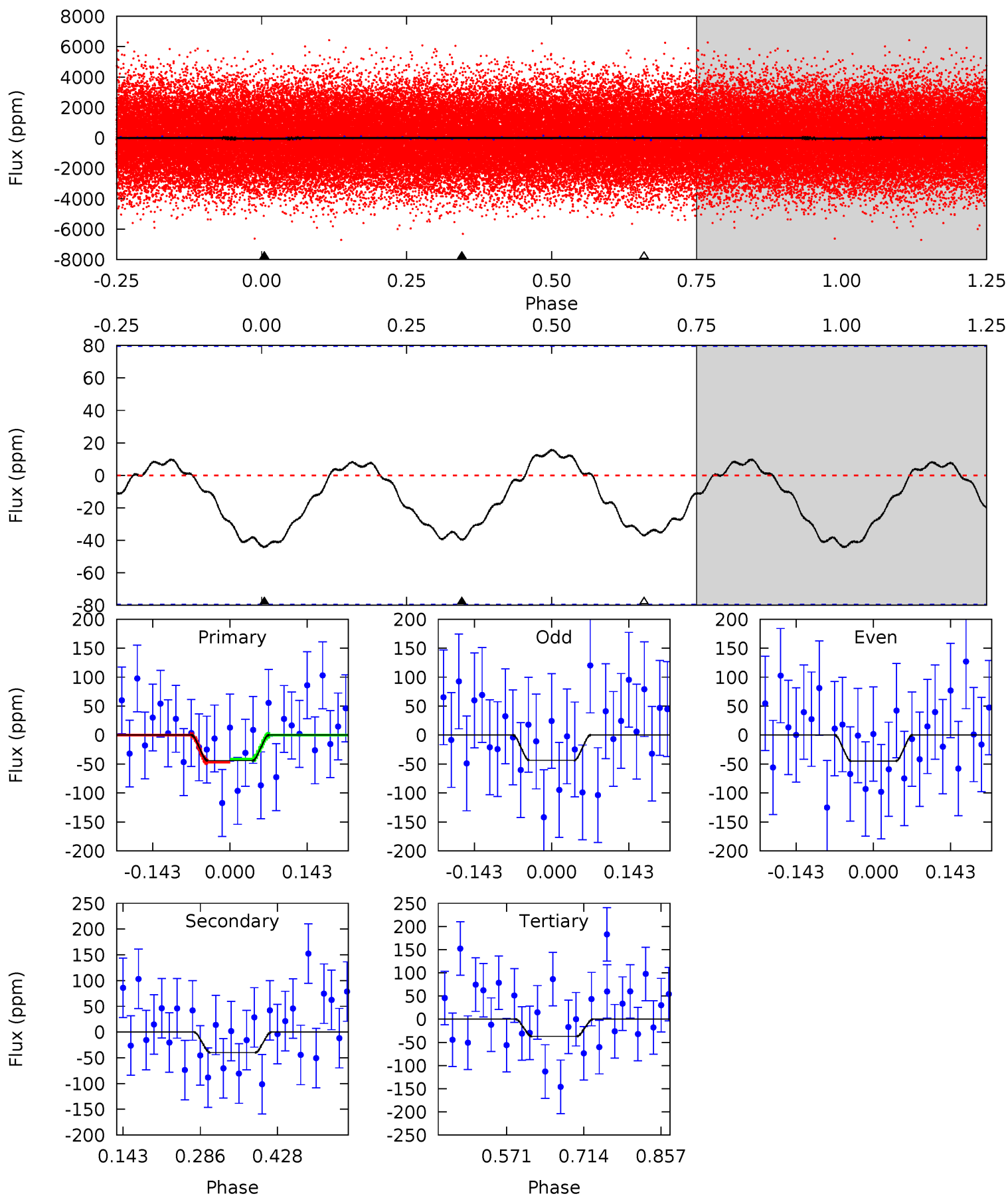
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
4.16	1.49	0	0	4.43	1.32	2.10	4.16	4.16	1.49	1.49	1.09	0.85	0.60	0.22



Alt Model-Shift Uniqueness Test

009836020-01, P = 0.920208 Days, E = 130.812416 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
2.49	2.24	2.09	0	4.49	1.47	0.95	0.40	2.49	0.16	2.24	0.03	1.21	0.26	0.13



Stellar Parameters For KIC 009836020

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	7709^{+214}_{-322}	$4.089^{+0.116}_{-0.174}$	$0.070^{+0.200}_{-0.350}$	$1.980^{+0.540}_{-0.405}$	$1.754^{+0.204}_{-0.249}$	$0.318^{+0.213}_{-0.149}$
	+3%/-4%	+3%/-4%	+286%/-500%	+27%/-20%	+12%/-14%	+67%/-47%
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 009836020-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-11 ± 8	$1.51^{+0.84}_{-0.86}$	4496^{+311}_{-257}	4947^{+3165}_{-7806}	$1.300^{+5.922}_{-1.029}$
Alt.	-40 ± 18	$1.66^{+0.85}_{-0.87}$	4489^{+338}_{-264}	6750^{+4253}_{-1759}	$3.875^{+13.027}_{-2.618}$

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 $A_{obs} \gg 1.0$

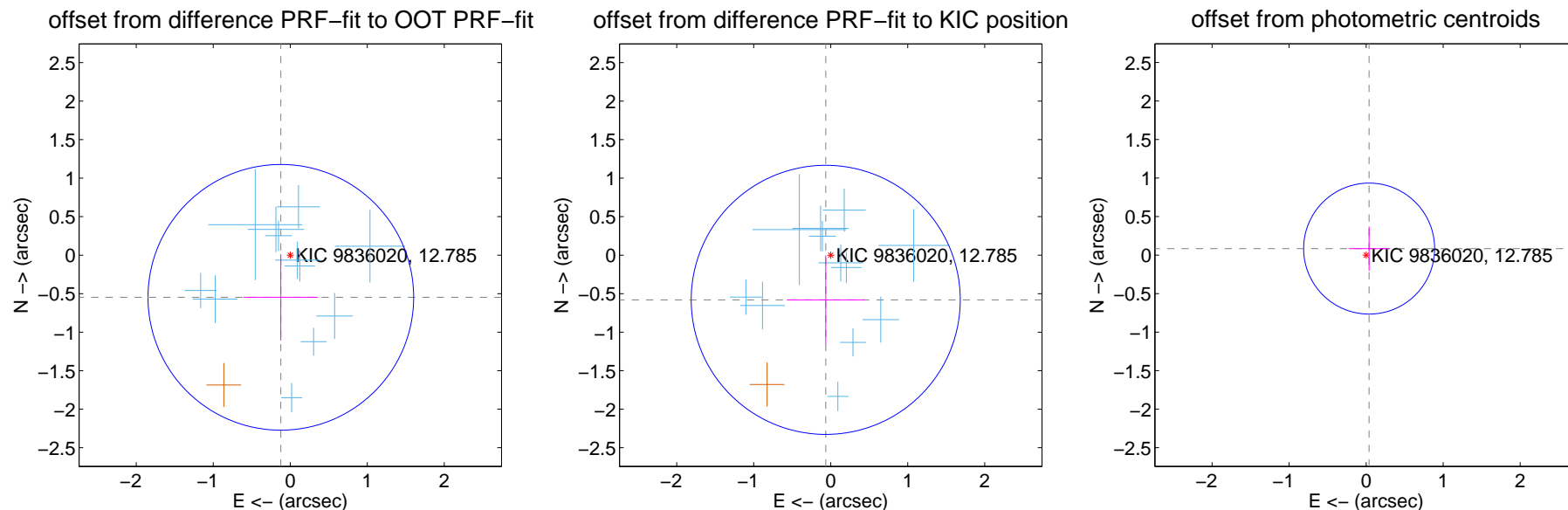
DV Centroid Data

Supplemental centroid analysis for 009836020-01. Kepler magnitude: 12.79. Transit SNR 10.13

There are 12 quarters with good PRF difference image offsets

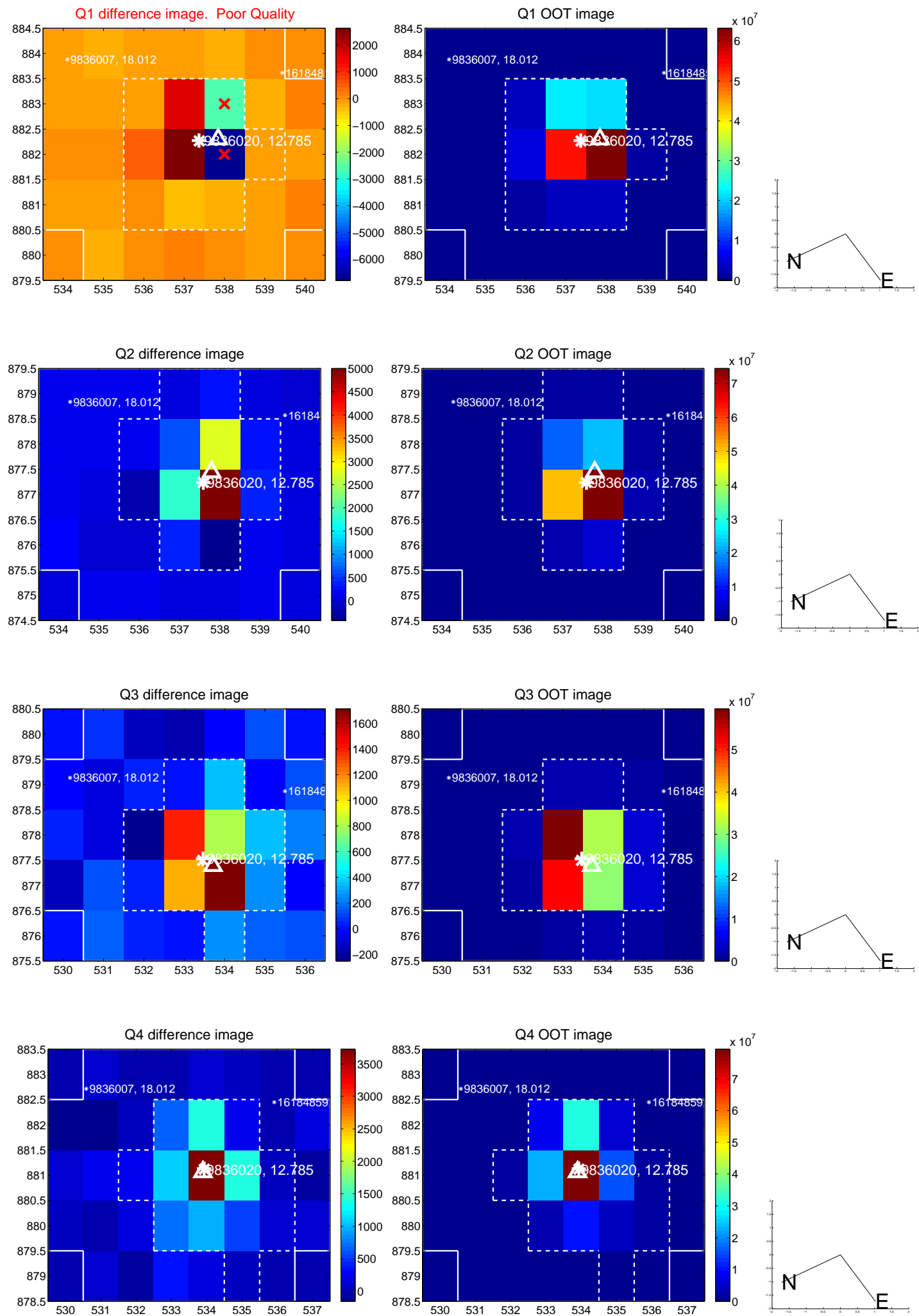
The direct PRF centroid is offset from the target star catalog position by about 0.08 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.561 ± 0.575	0.98	0.122 ± 0.484	-0.548 ± 0.561
PRF-fit source offset from KIC position	0.584 ± 0.582	1.00	0.065 ± 0.506	-0.581 ± 0.578
photometric centroid source offset	0.09 ± 0.28	0.33	-0.04 ± 0.27	0.08 ± 0.29

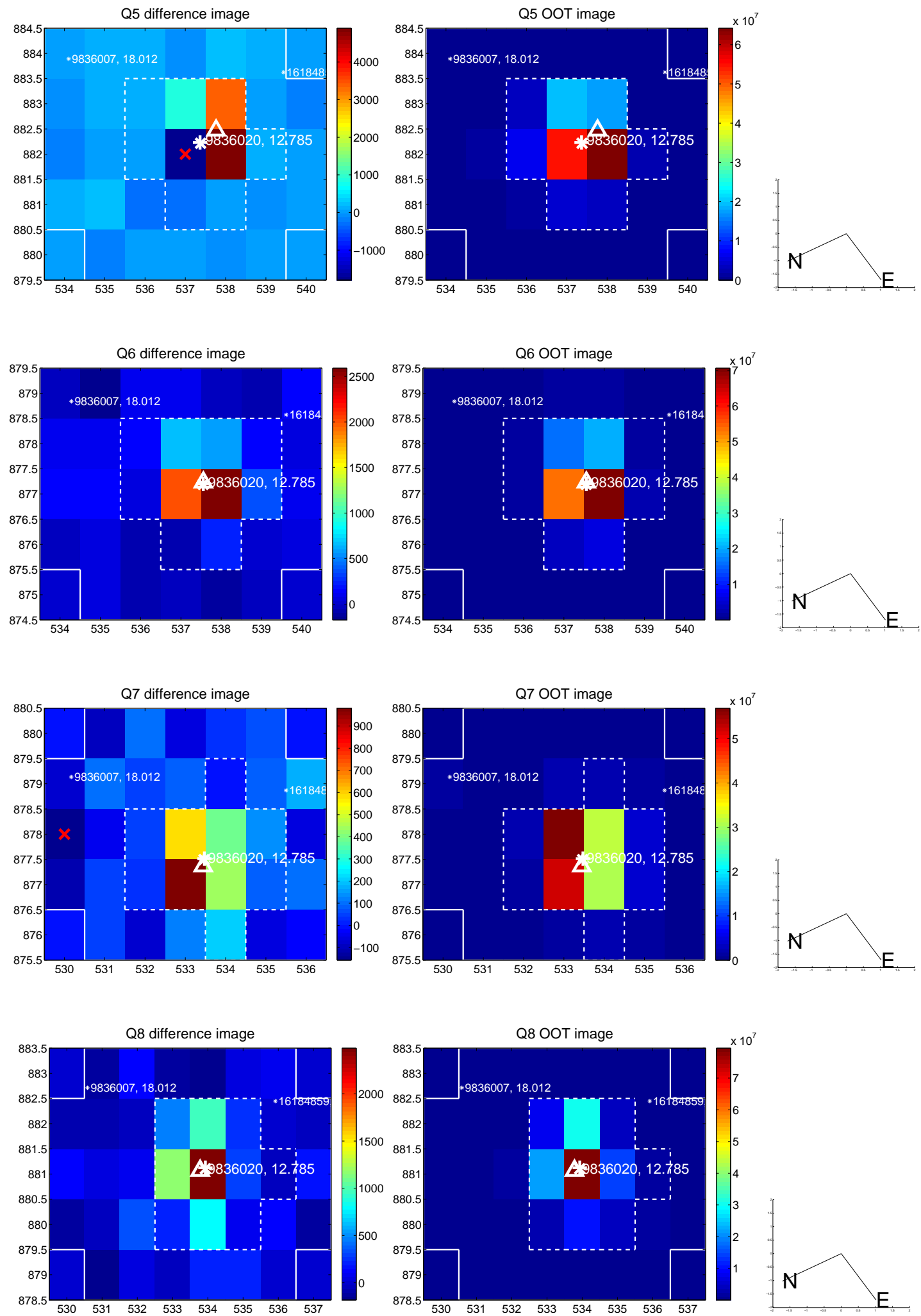


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets**; **Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

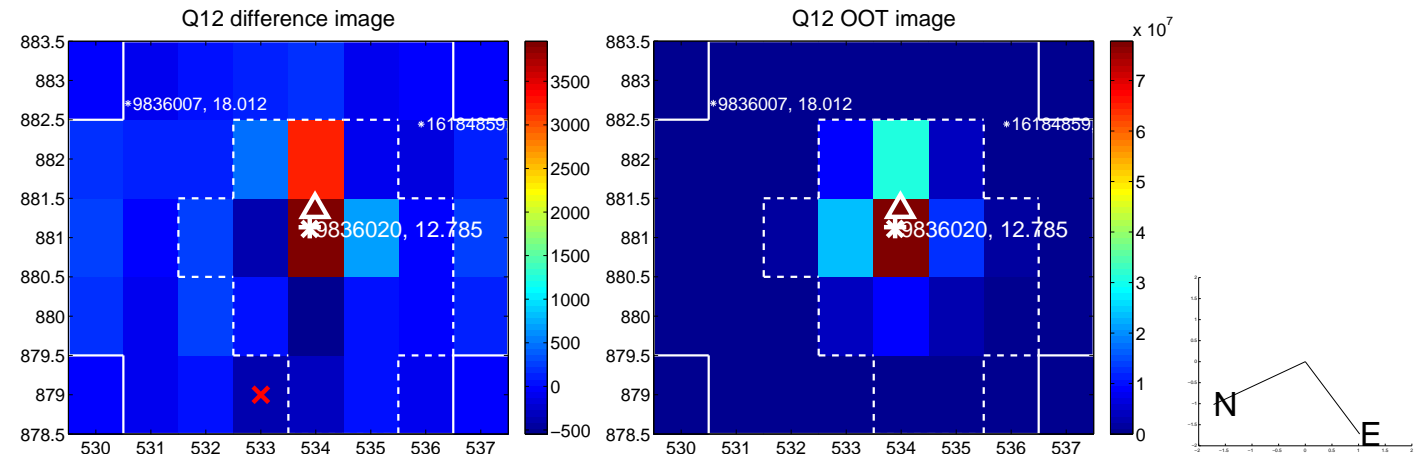
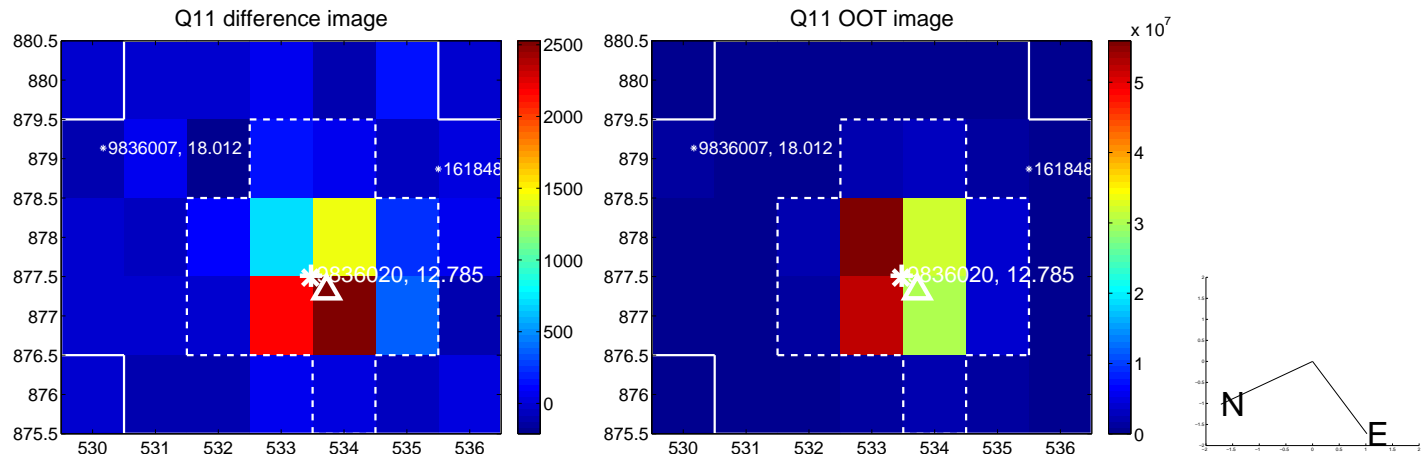
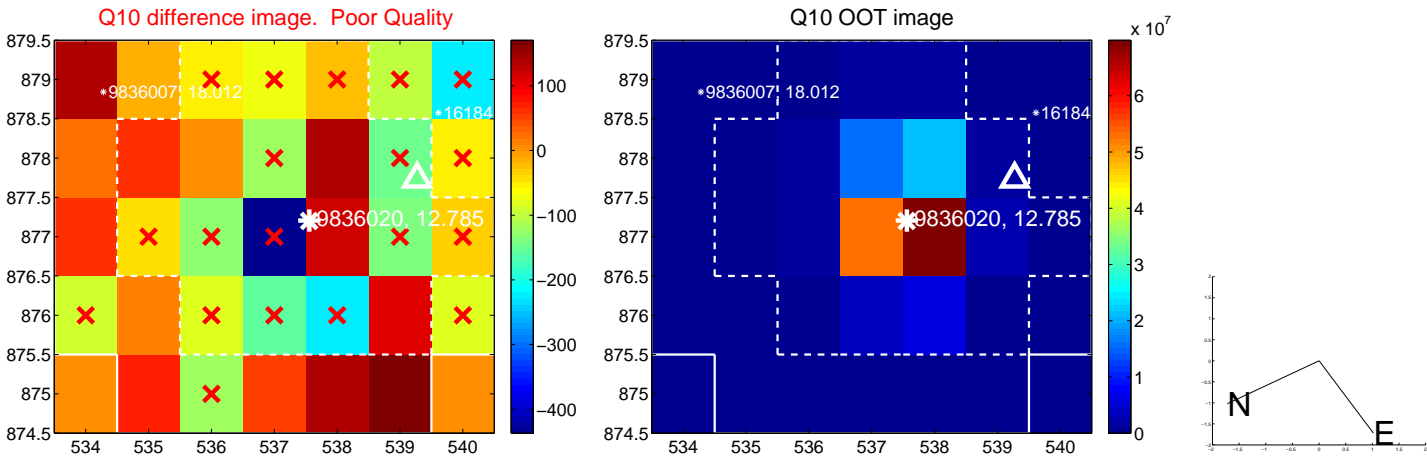
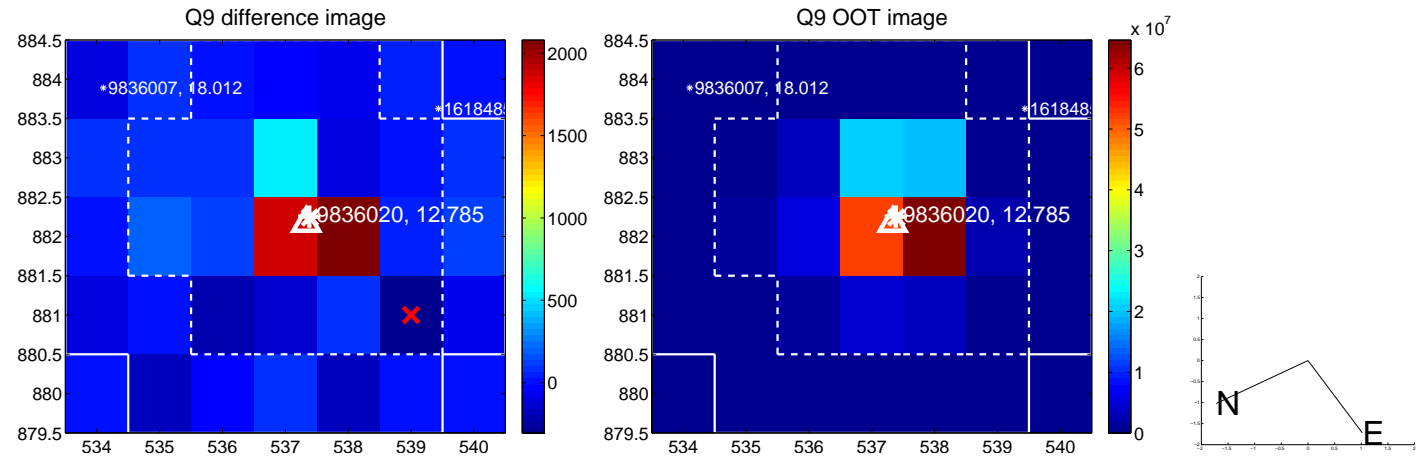
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



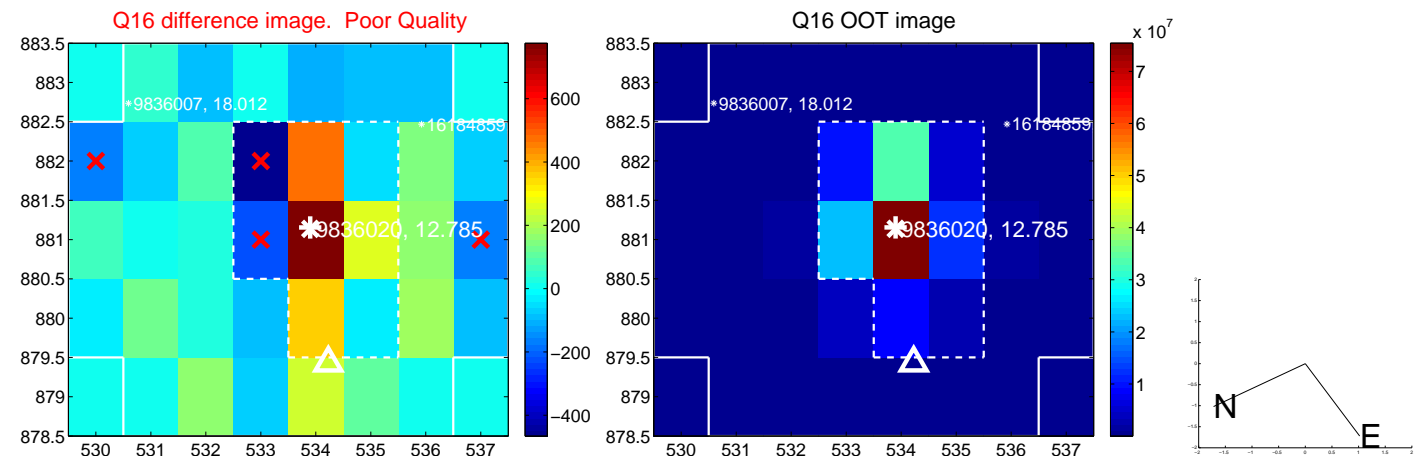
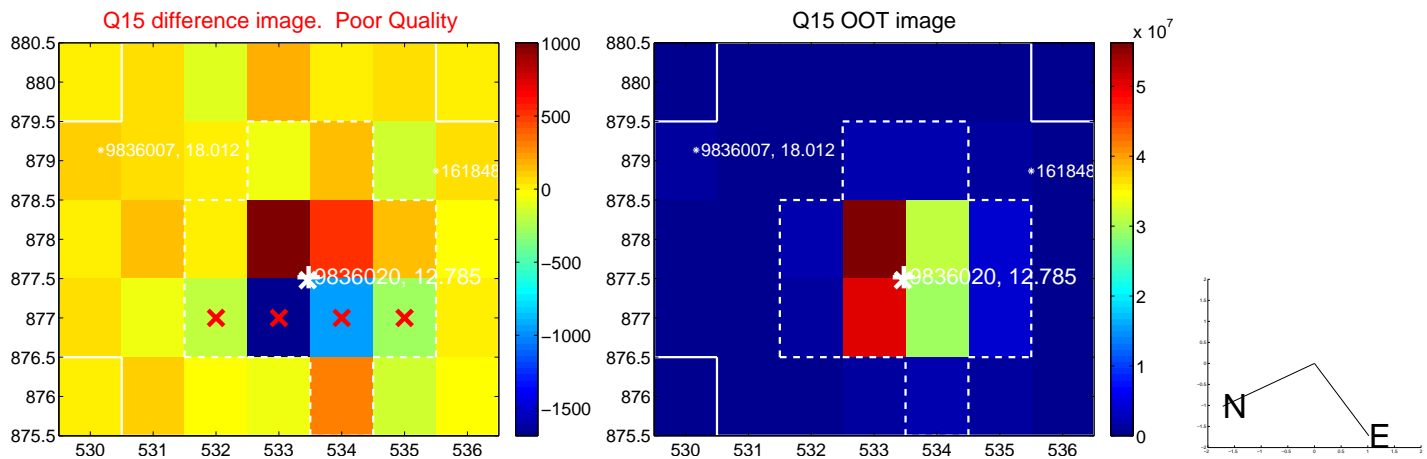
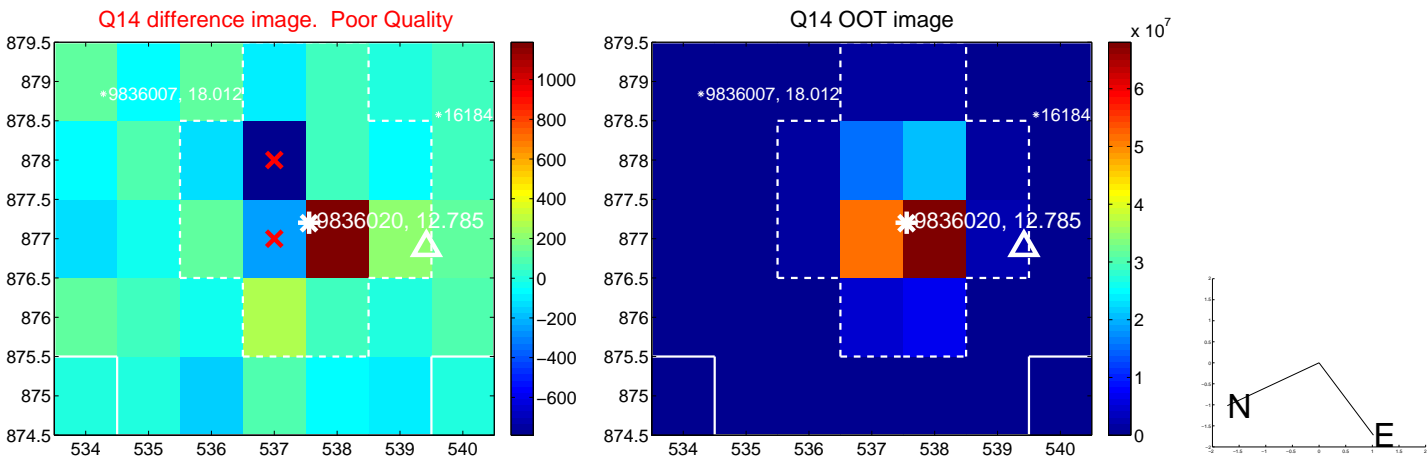
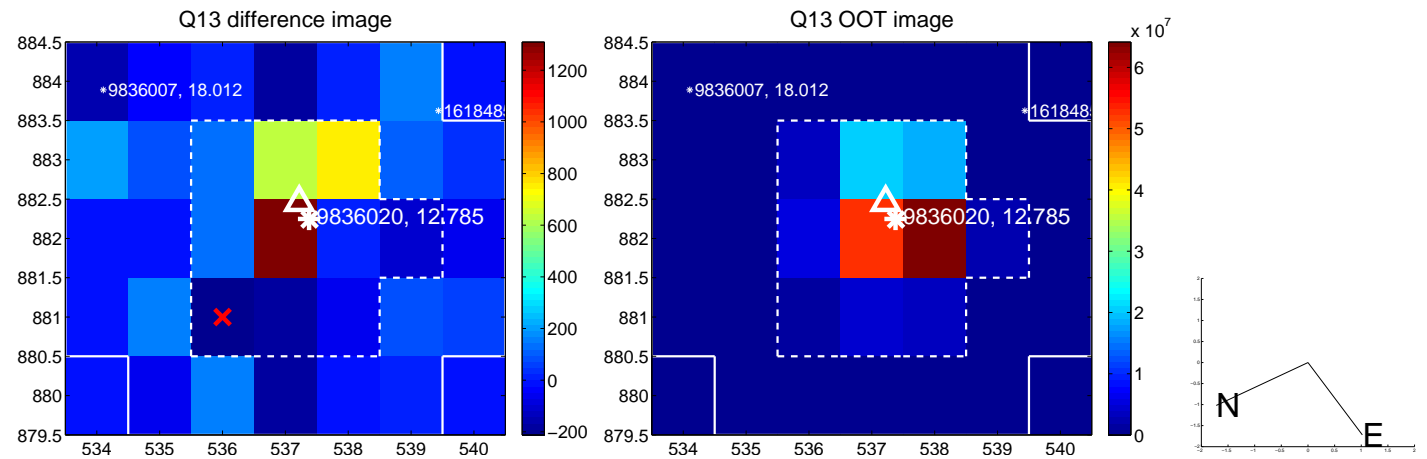
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



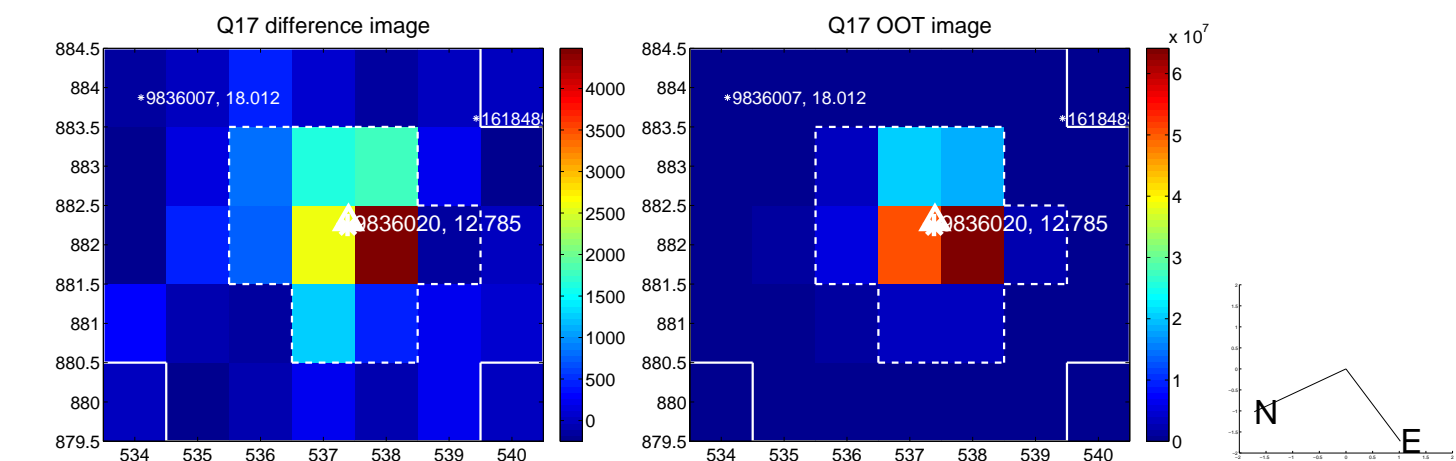
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



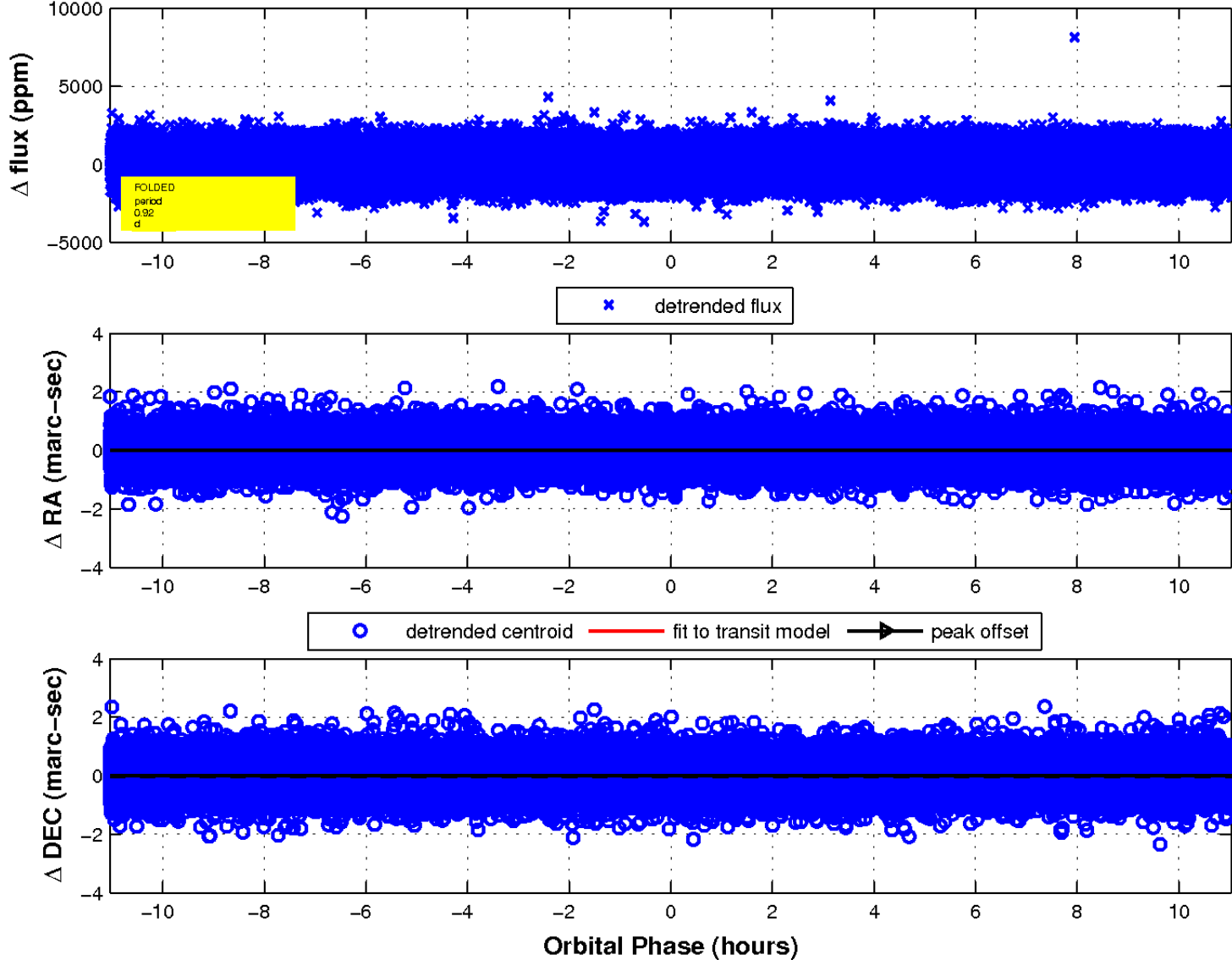
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



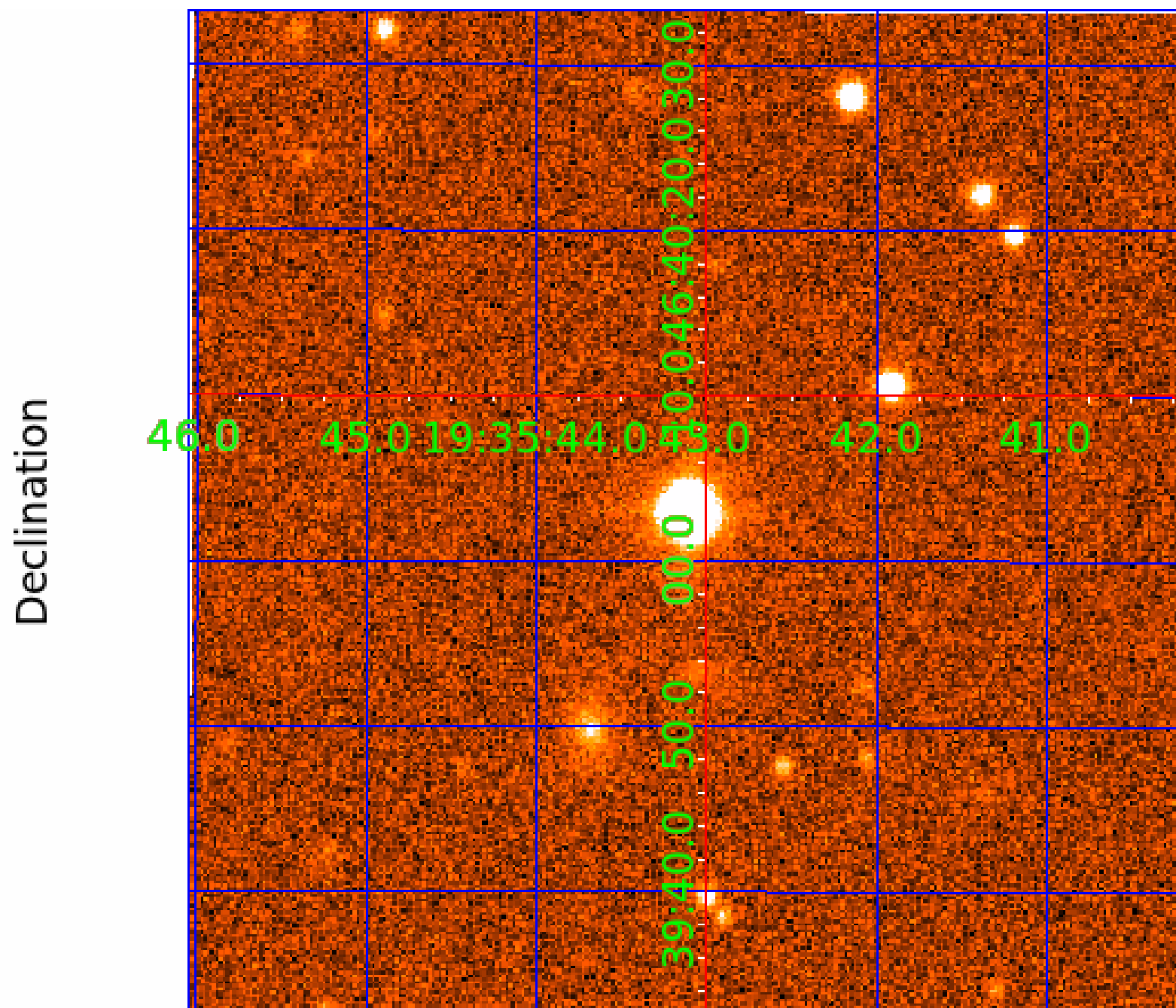
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



fluxWeightedCentroids, Planet 1 of 2



UKIRT Image



KIC 009836020

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})
009836020-01	OBS	No	0.920152	131.775763	46.9	3.691	11.5	10.1	1.98	7709	1.39	24860.93
009836020-02	OBS	No	0.682135	131.803437	72.0	7.266	7.2	12.9	1.98	7709	1.70	37054.12

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009836020-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT
009836020-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA—TRANS_GAPPED—LPP_DV—LPP_ALT—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.

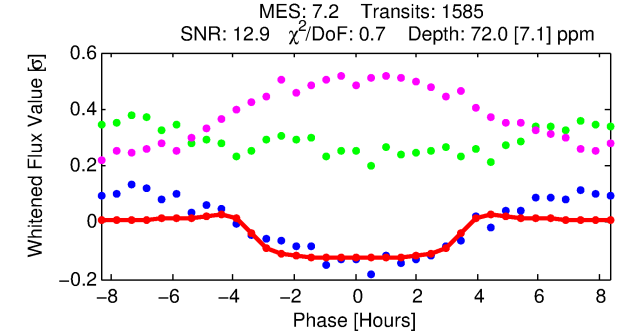
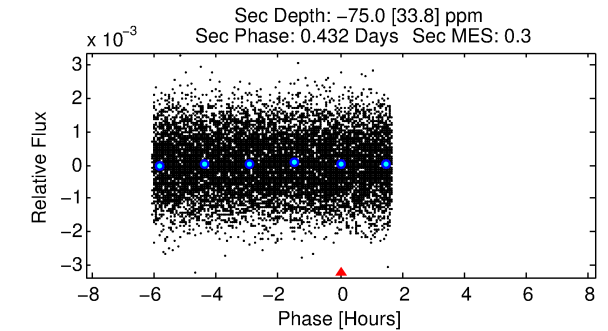
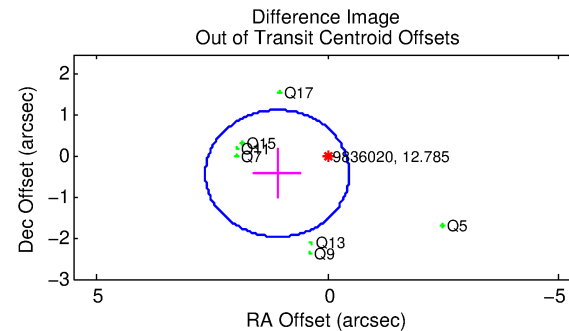
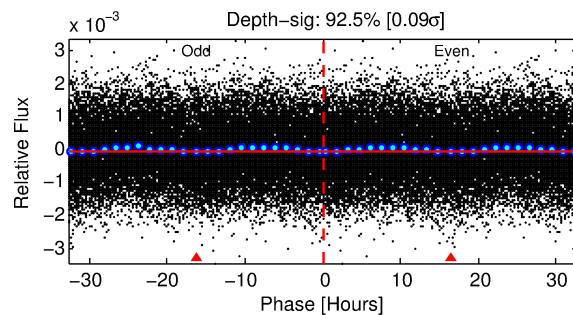
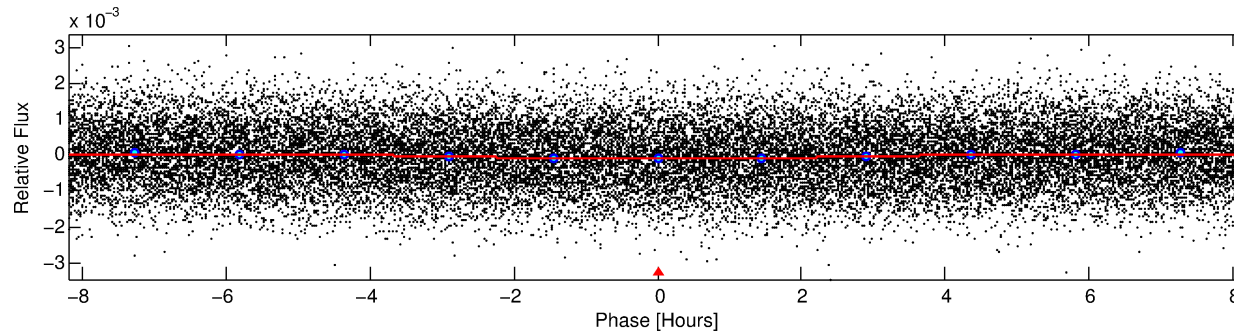
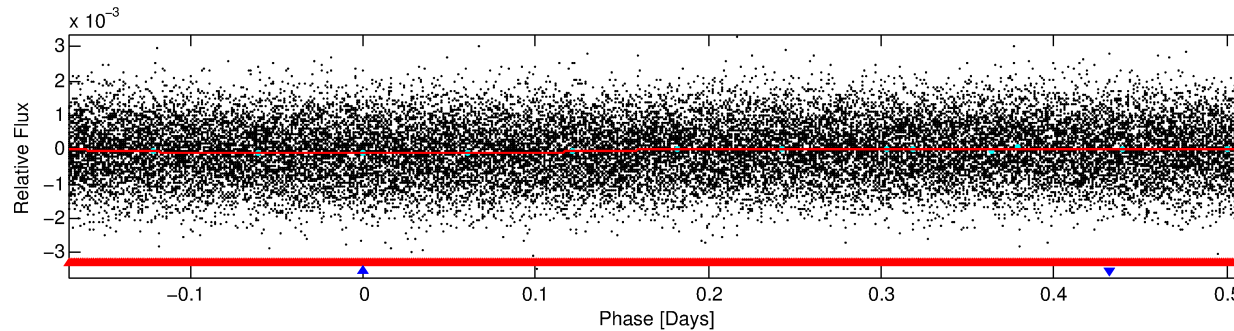
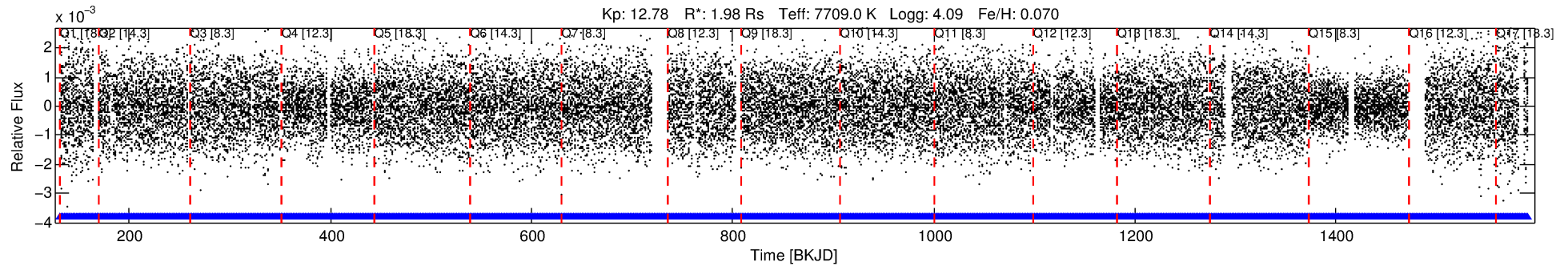
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009836020-02

No Significant Match Found

DV One-Page Summary

KIC: 9836020 Candidate: 2 of 2 Period: 0.682 d



DV Fit Results:

Period = 0.68213 [0.00001] d
Epoch = 131.8034 [0.0055] BKJD
Rp/R* = 0.0079 [0.0060]
a/R* = 1.02 [0.20]
b = 0.00 [1207.10]
Seff = 37054.12 [13478.49]
Teff = 3538 [322] K
Rp = 1.70 [1.37] Re
a = 0.0183 [0.0041] AU
Ag = N/A
Teffp = N/A

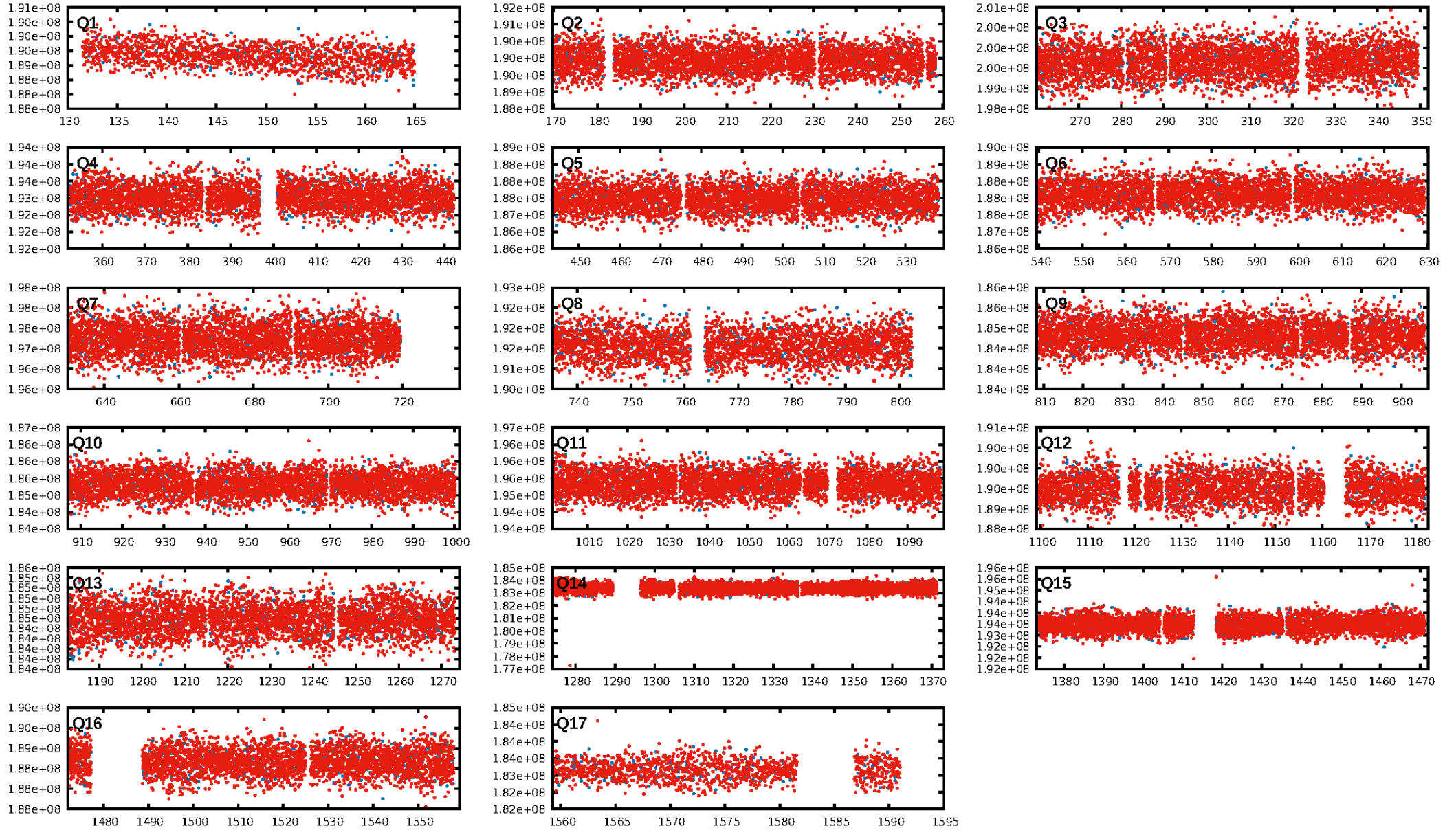
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 51.7% [0.70 σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: N/A
RollingBand-fgt: 1.00 [1512/1512]
GhostDiagnostic-chr: 4.875
Centroid-sig: 0.0%
Centroid-so: 0.264 arcsec [2.30 σ]
OotOffset-rm: 1.162 arcsec [2.25 σ]
KicOffset-rm: 1.126 arcsec [2.17 σ]
OotOffset-st: 0/3/0/4 [7]
KicOffset-st: 0/3/0/4 [7]
DiffImageQuality-fgm: 0.57 [4/7]
DiffImageOverlap-fno: 0.00 [0/17]

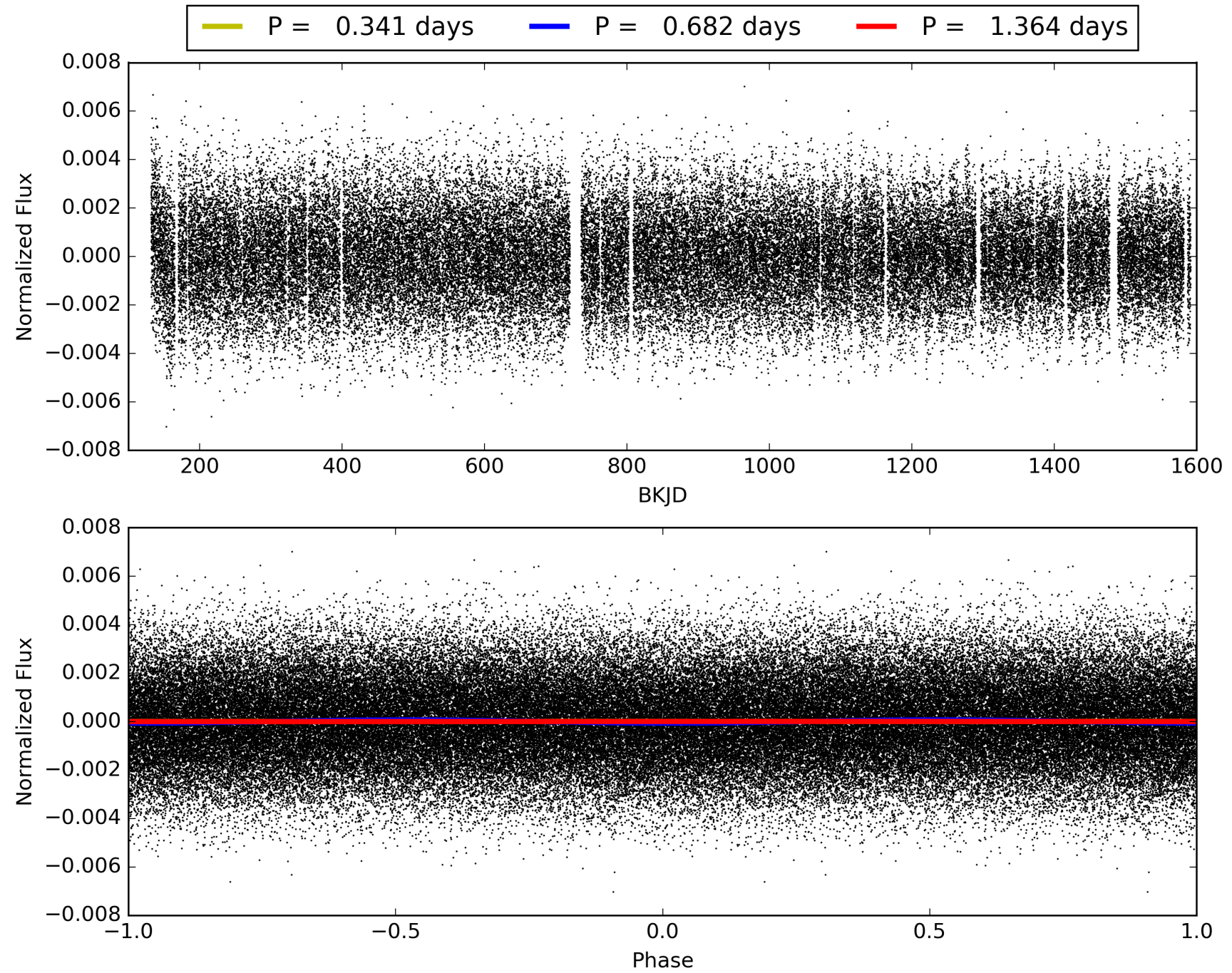
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 01:36:29 Z

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

TCE 009836020-02, PDC Light Curves

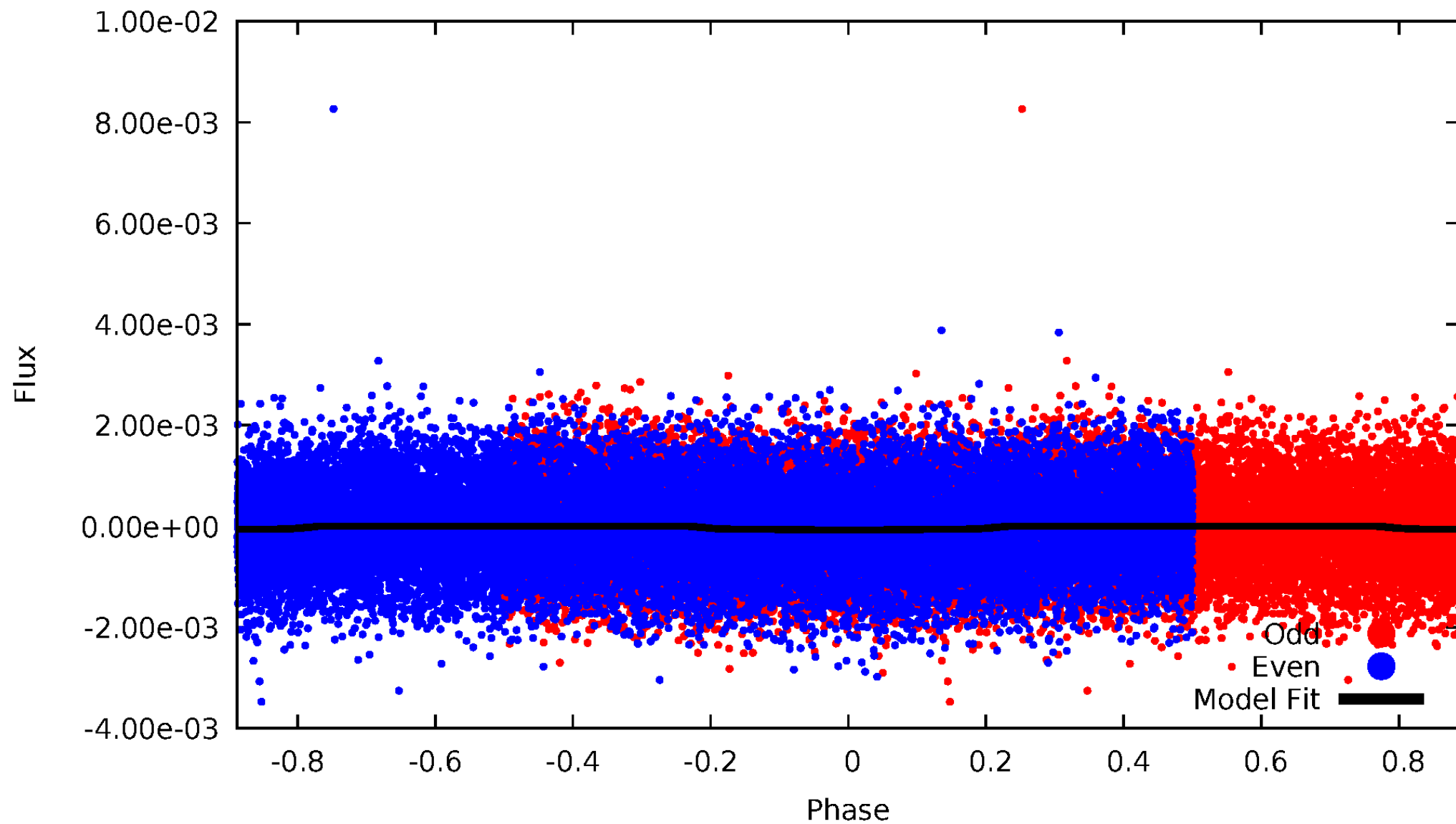


TCE 009836020-02



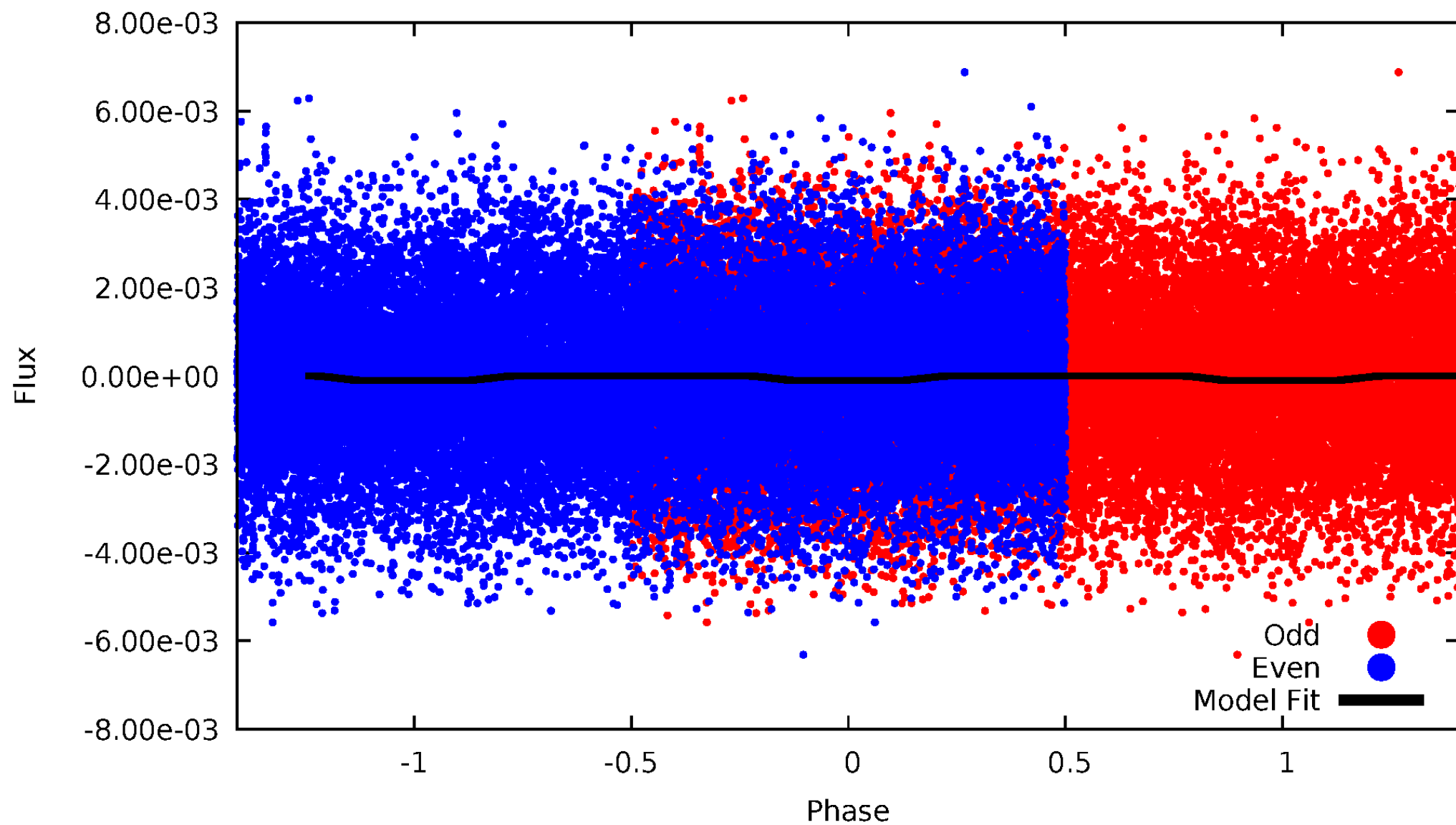
DV Odd/Even

TCE 009836020-02



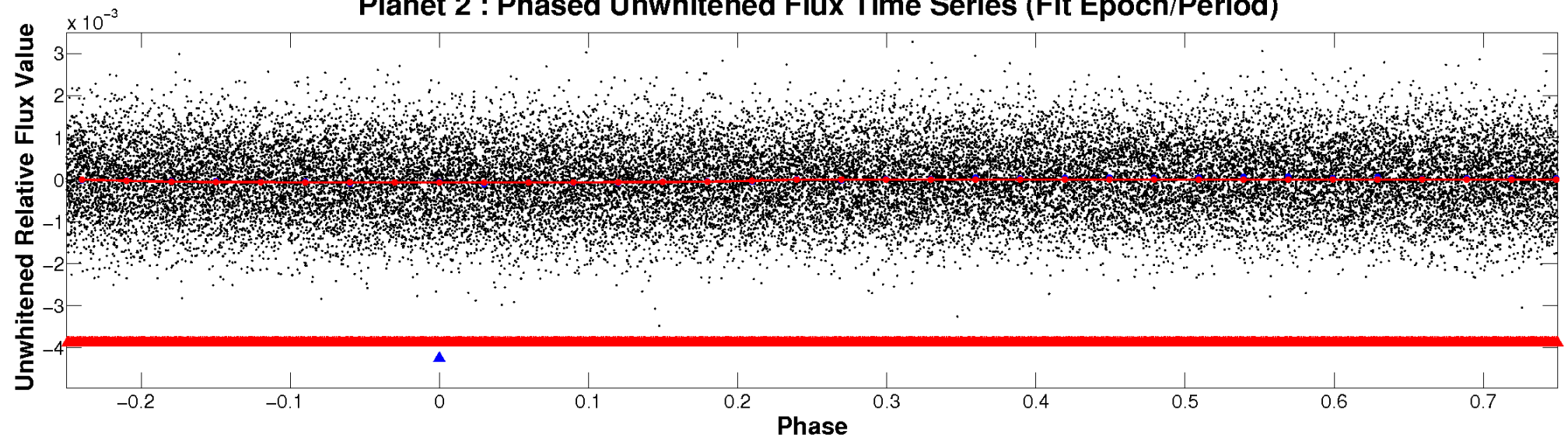
ALT Odd/Even

TCE 009836020-02

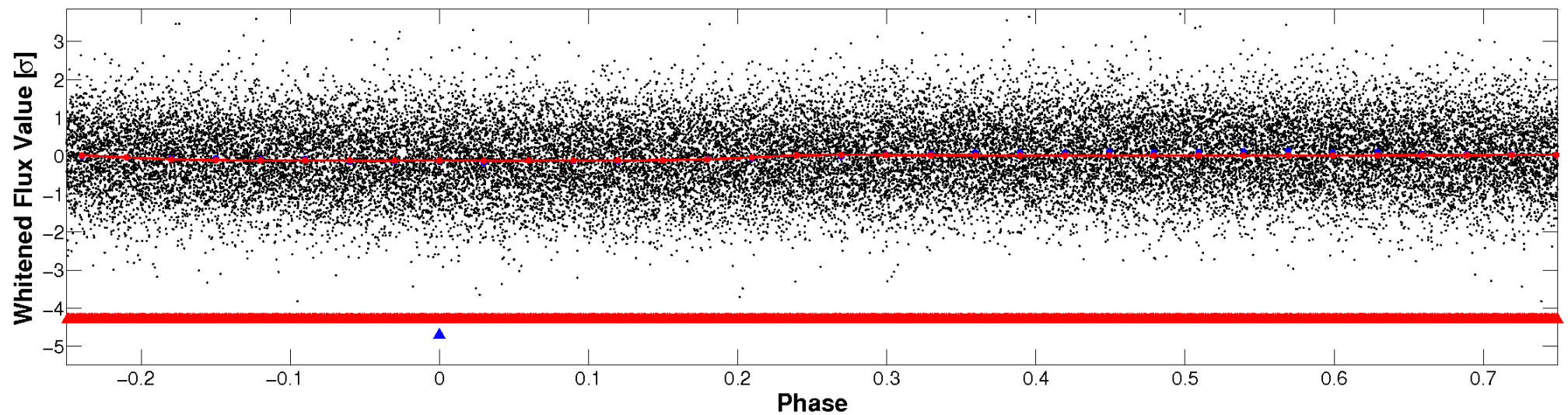


Non-Whitened Vs. Whitened Light Curve

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

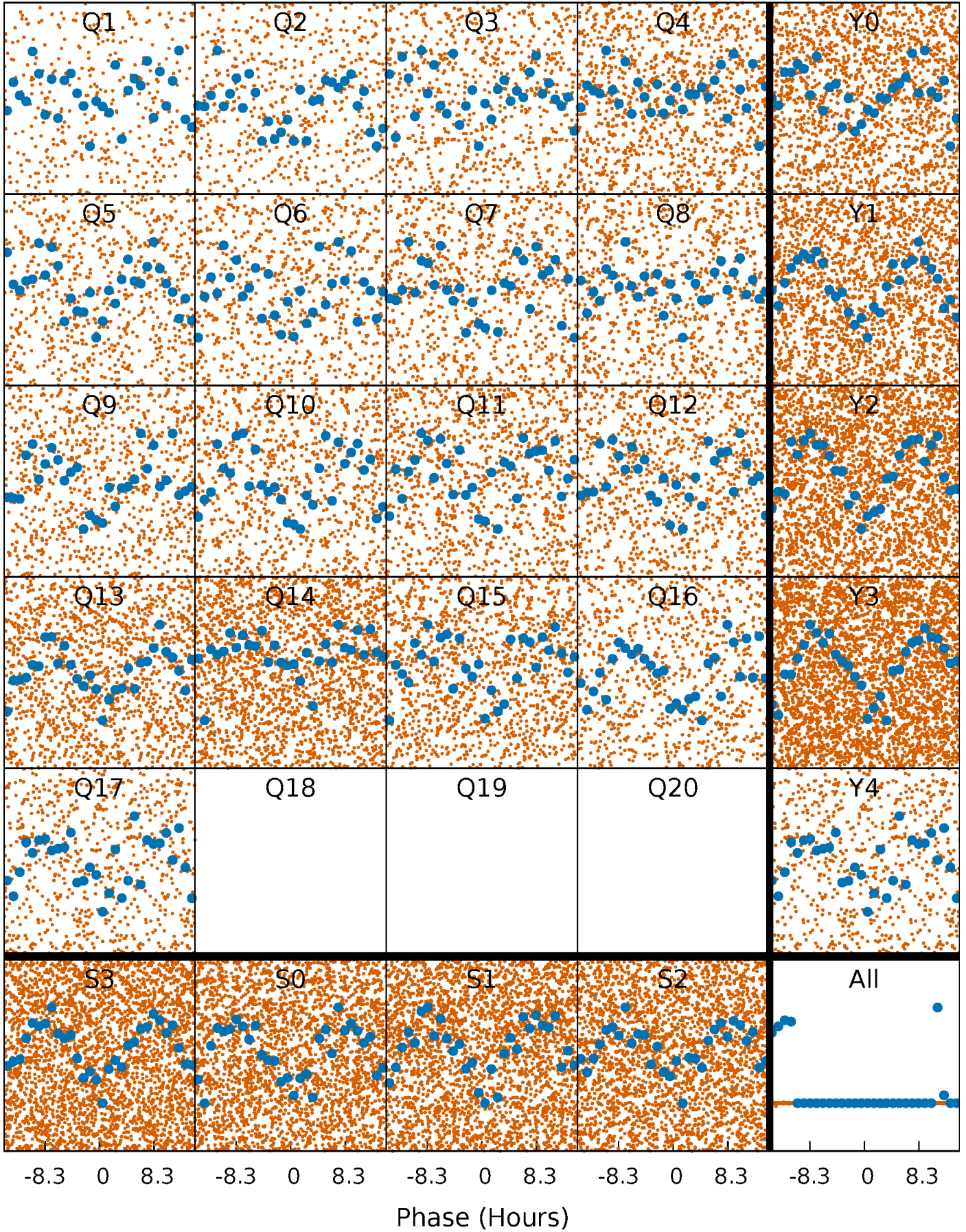


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



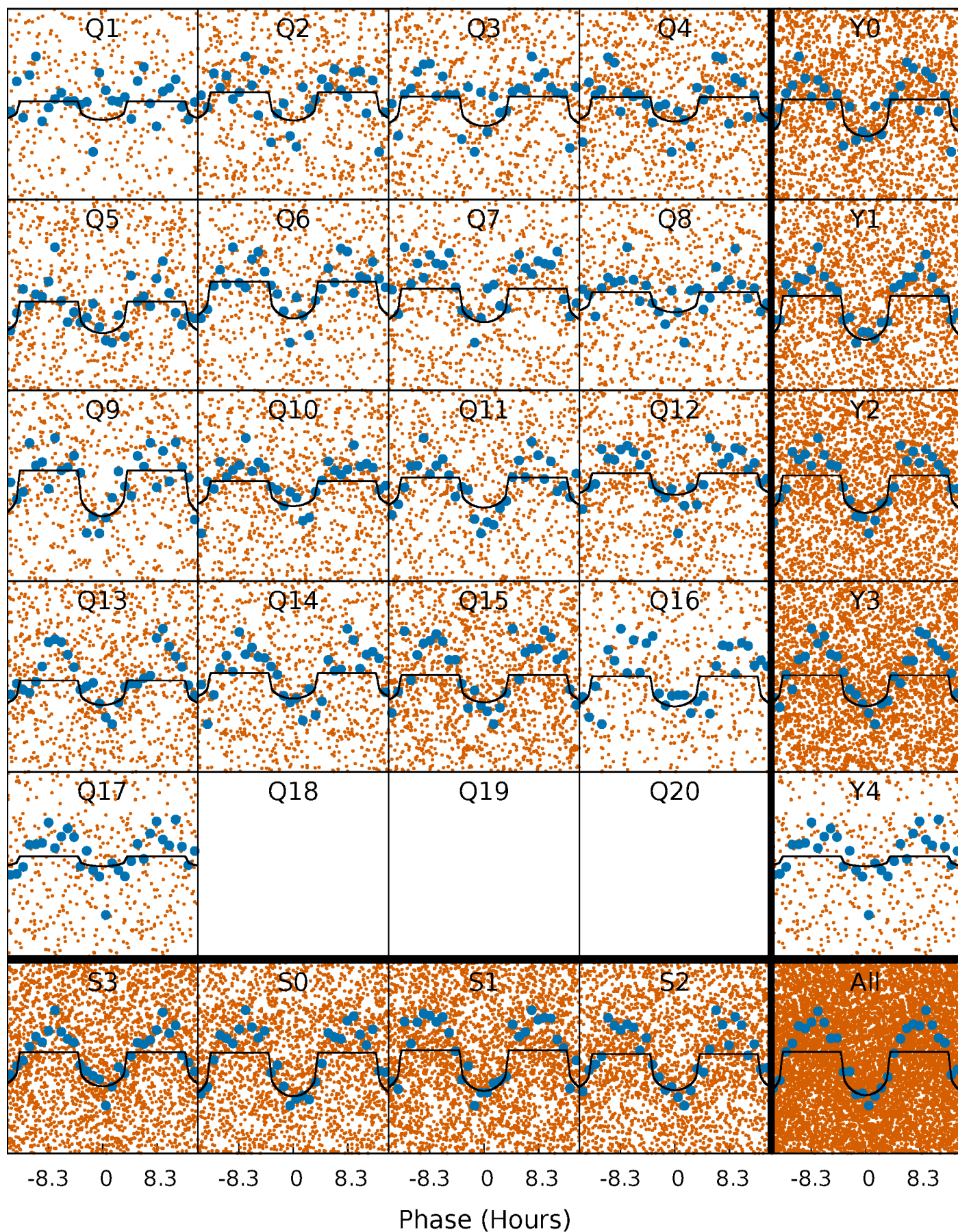
PDC Quarter-Phased Transit Curves

TCE 009836020-02 P= 0.682135 Days $T_0=131.803437$ (BKJD)



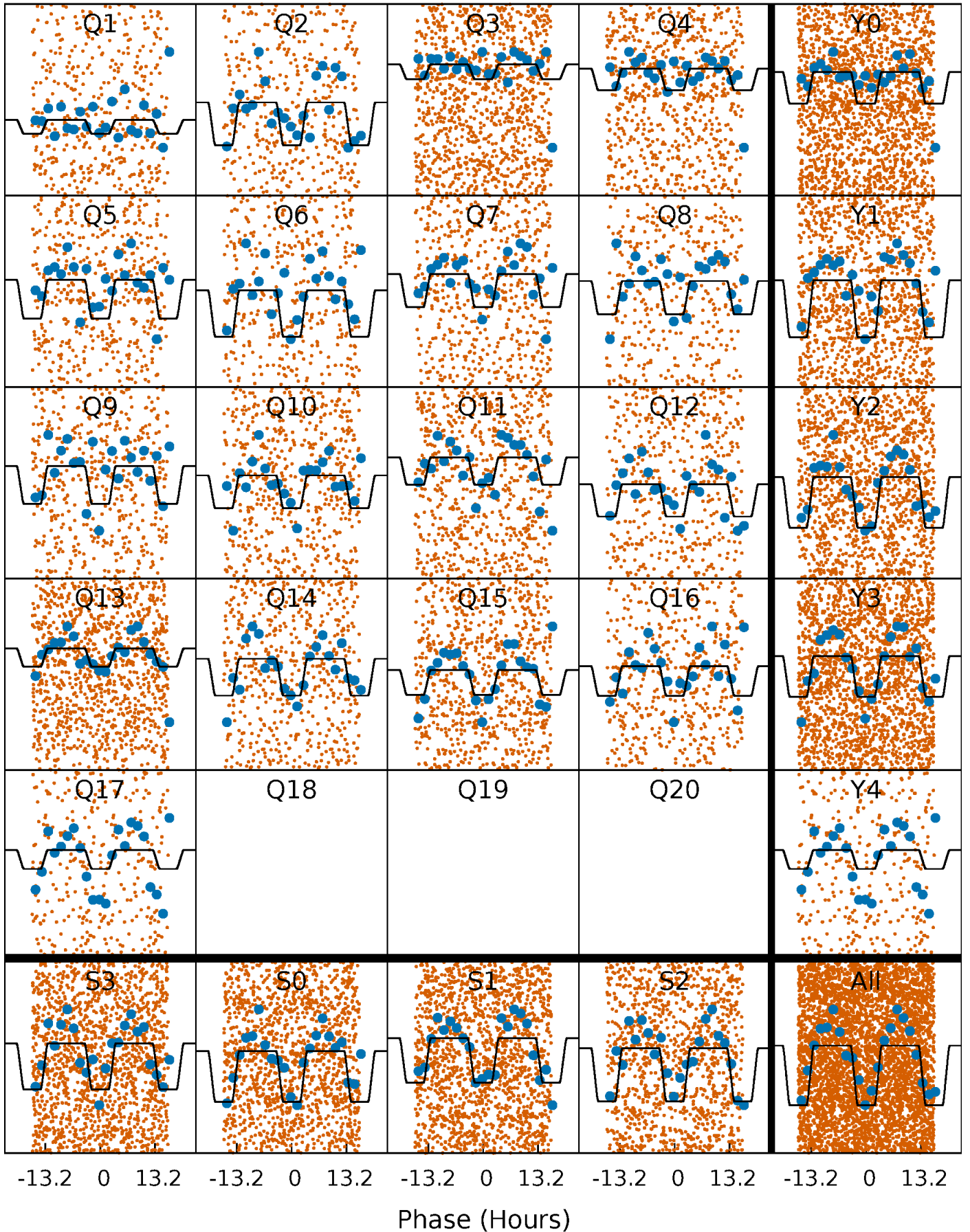
DV Quarter-Phased Transit Curves

TCE 009836020-02 P= 0.682135 Days $T_0=131.803437$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

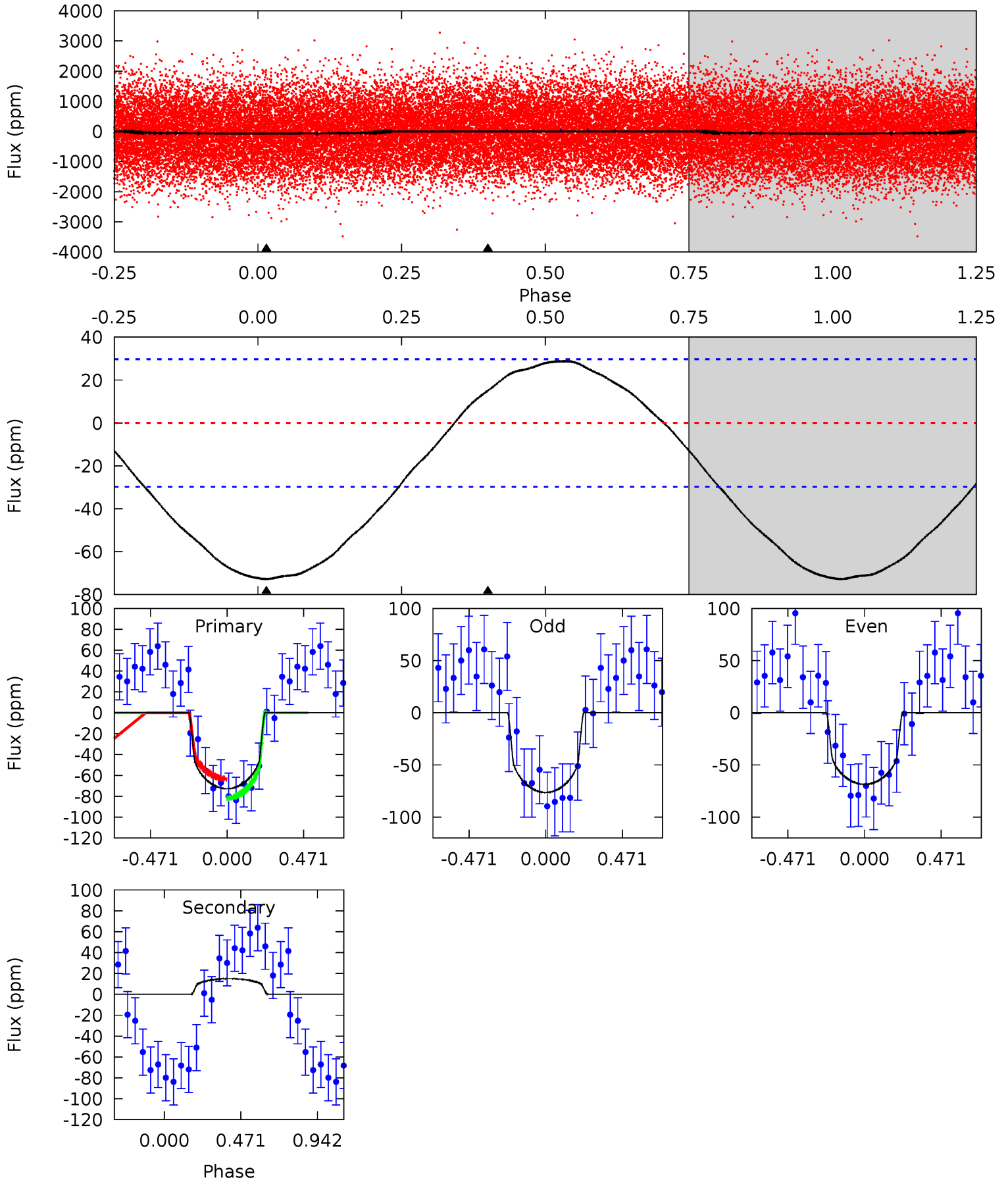
TCE 009836020-02 $P = 0.682163$ Days $T_0 = 131.795378$ (BKJD)



DV Model-Shift Uniqueness Test

009836020-02, P = 0.682135 Days, E = 131.121302 Days

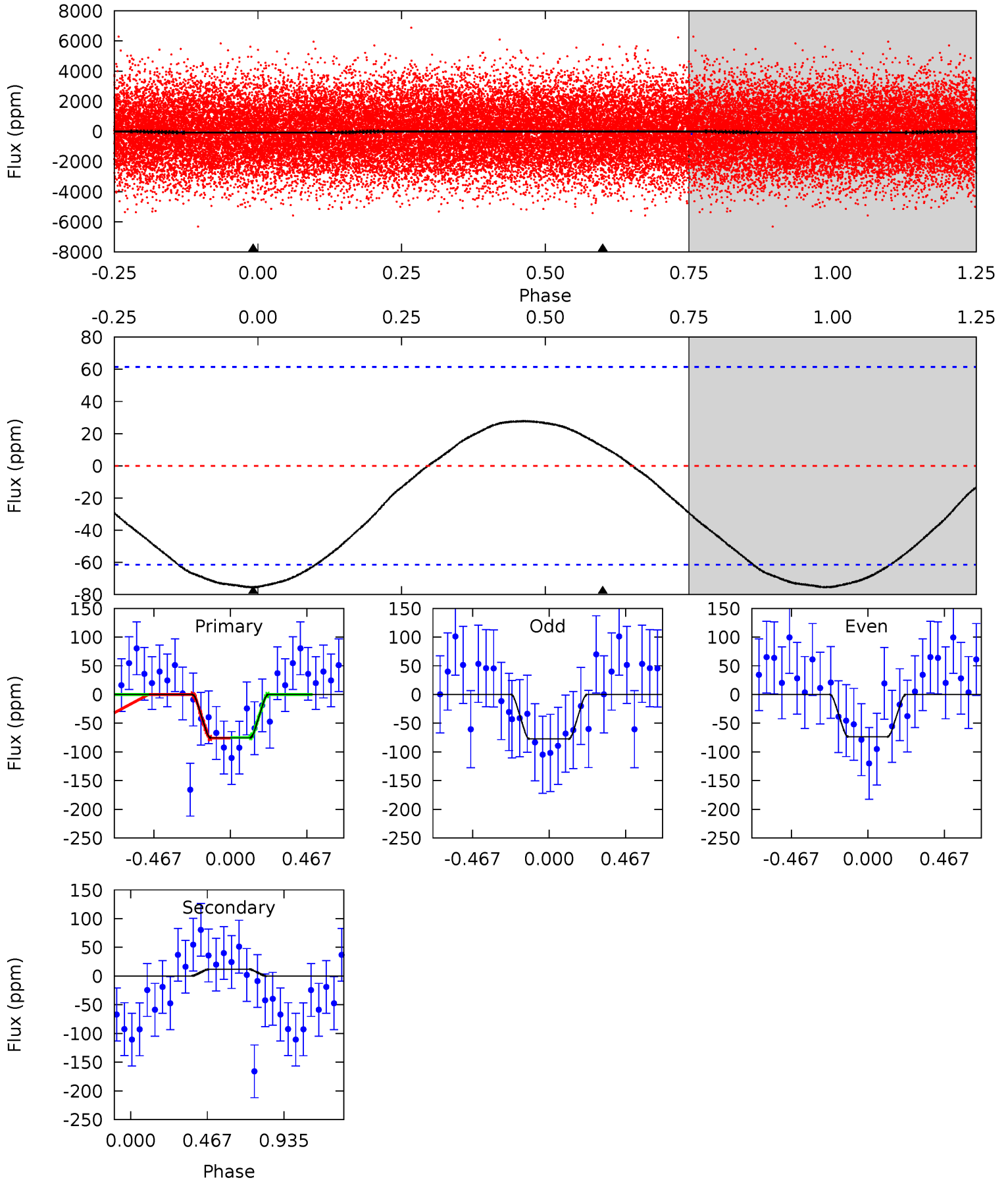
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
10.4	-2.14	0	0	4.23	0.72	1.13	10.4	10.4	-2.14	-2.14	0.56	0.95	0.28	1.31



Alt Model-Shift Uniqueness Test

009836020-02, P = 0.682163 Days, E = 131.113215 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
5.20	-0.82	0	0	4.23	0.73	0.56	5.20	5.20	-0.82	-0.82	0.13	0.99	0.27	0.05



Stellar Parameters For KIC 009836020

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	7709^{+214}_{-322}	$4.089^{+0.116}_{-0.174}$	$0.070^{+0.200}_{-0.350}$	$1.980^{+0.540}_{-0.405}$	$1.754^{+0.204}_{-0.249}$	$0.318^{+0.213}_{-0.149}$
	+3%/-4%	+3%/-4%	+286%/-500%	+27%/-20%	+12%/-14%	+67%/-47%
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 009836020-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	15 ± 7	$1.86^{+1.33}_{-1.16}$	4976^{+334}_{-323}	-5541^{+819}_{-3358}	$-0.772^{+0.571}_{-4.787}$
Alt.	12 ± 15	$2.23^{+1.35}_{-1.19}$	4973^{+376}_{-343}	-4975^{+957}_{-1654}	$-0.345^{+0.406}_{-1.574}$

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 $A_{obs} \gg 1.0$

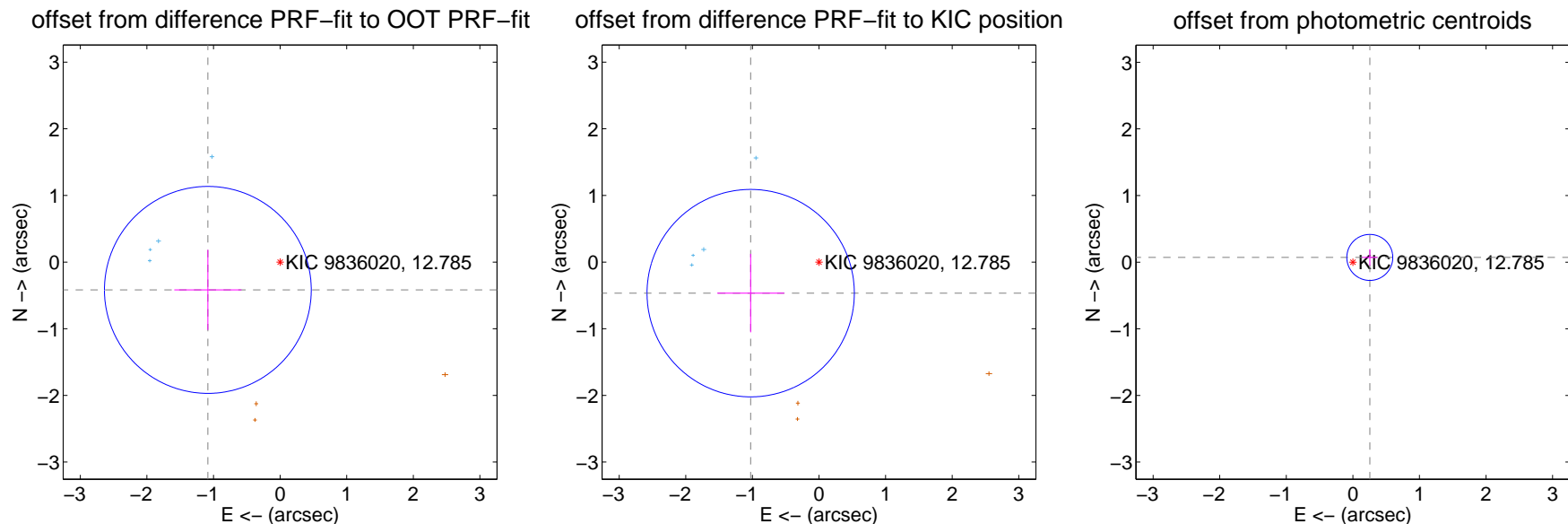
DV Centroid Data

Supplemental centroid analysis for 009836020-02. Kepler magnitude: 12.79. Transit SNR 12.85

There are 4 quarters with good PRF difference image offsets

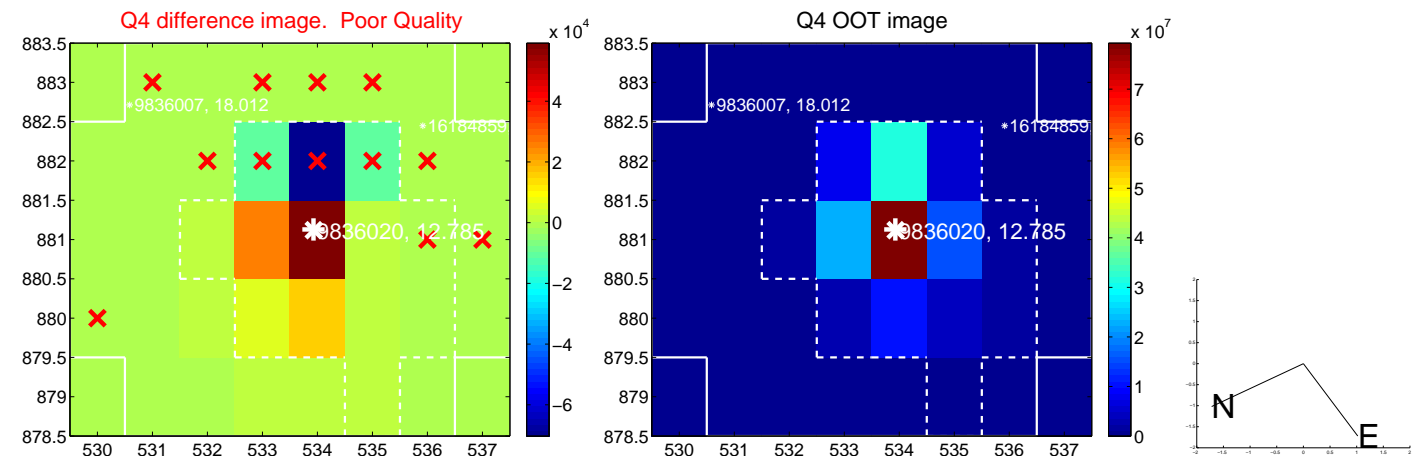
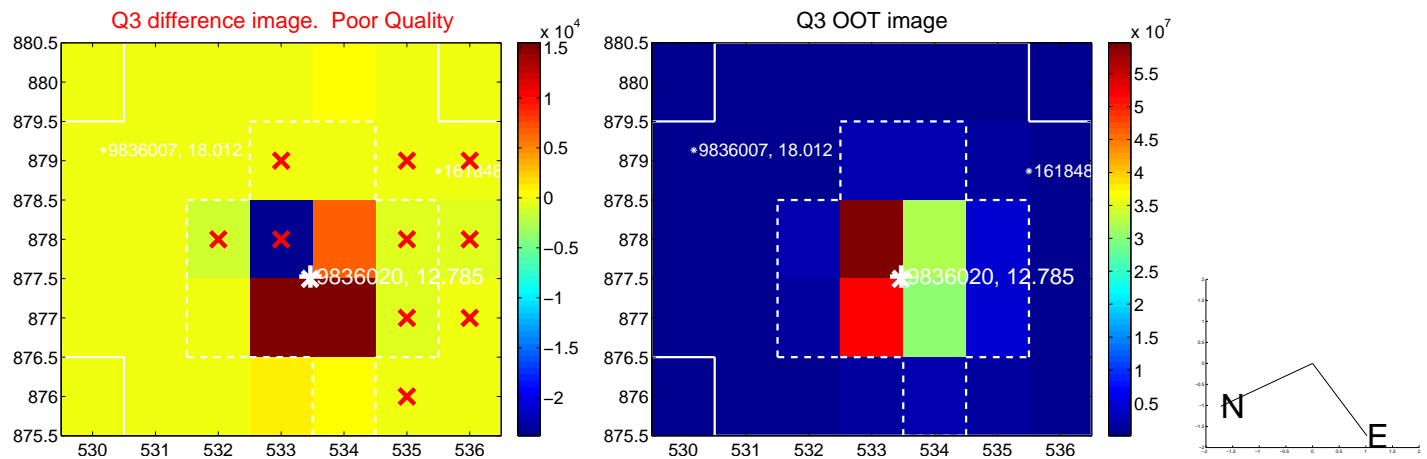
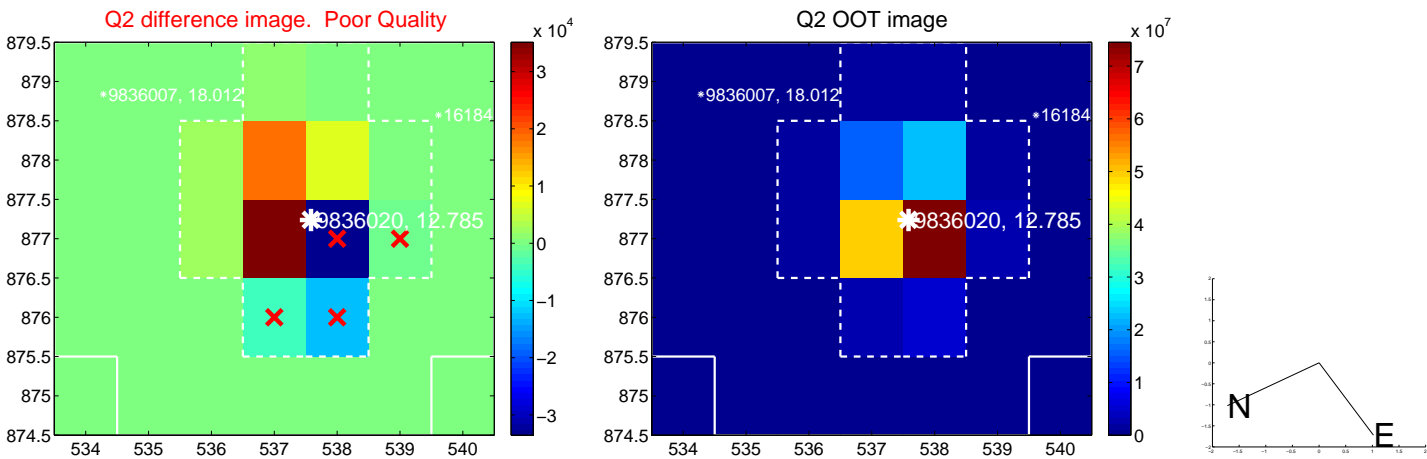
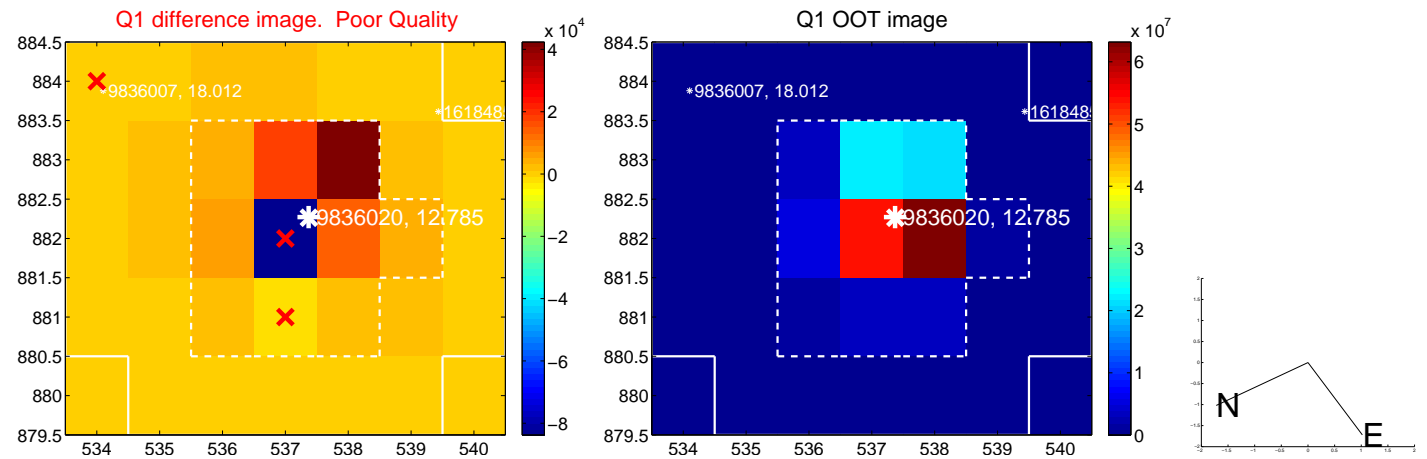
The direct PRF centroid is offset from the target star catalog position by about 0.08 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	1.162 ± 0.518	2.25	1.085 ± 0.504	-0.417 ± 0.601
PRF-fit source offset from KIC position	1.126 ± 0.519	2.17	1.026 ± 0.503	-0.466 ± 0.589
photometric centroid source offset	0.26 ± 0.12	2.30	-0.25 ± 0.11	0.07 ± 0.12

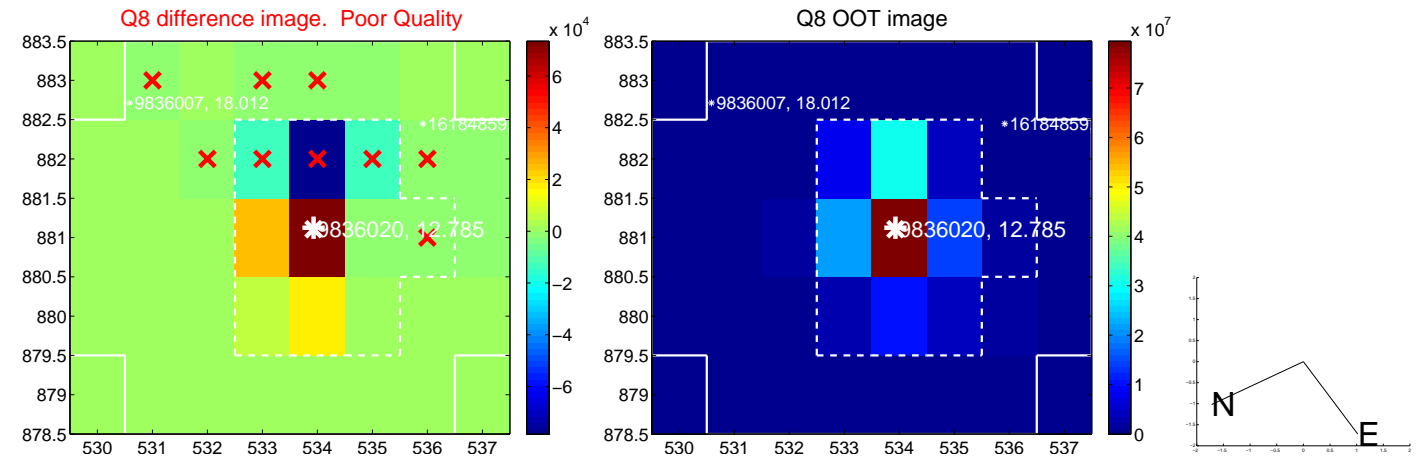
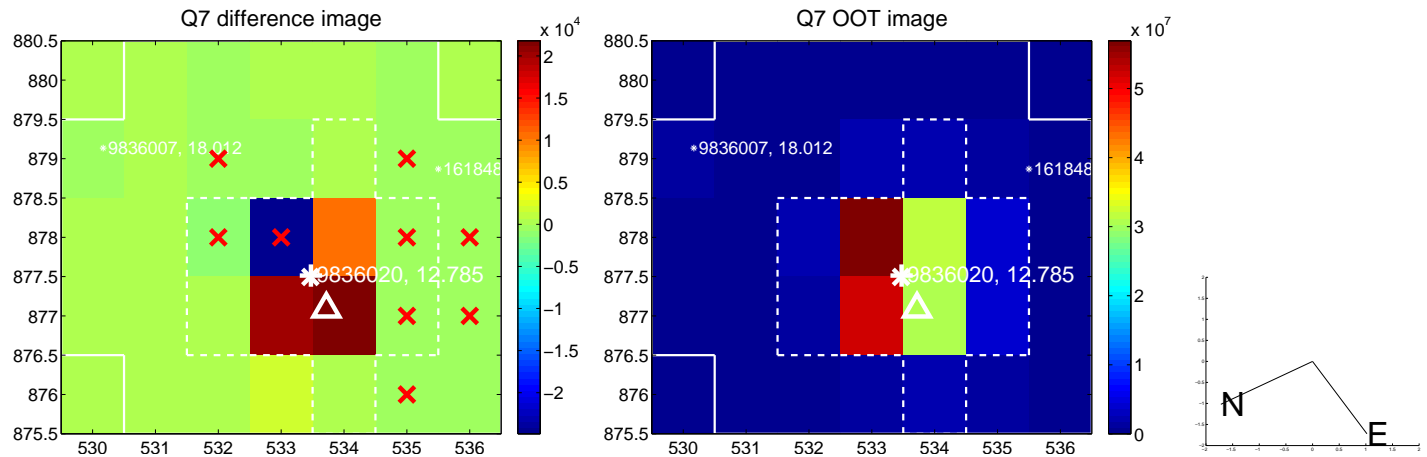
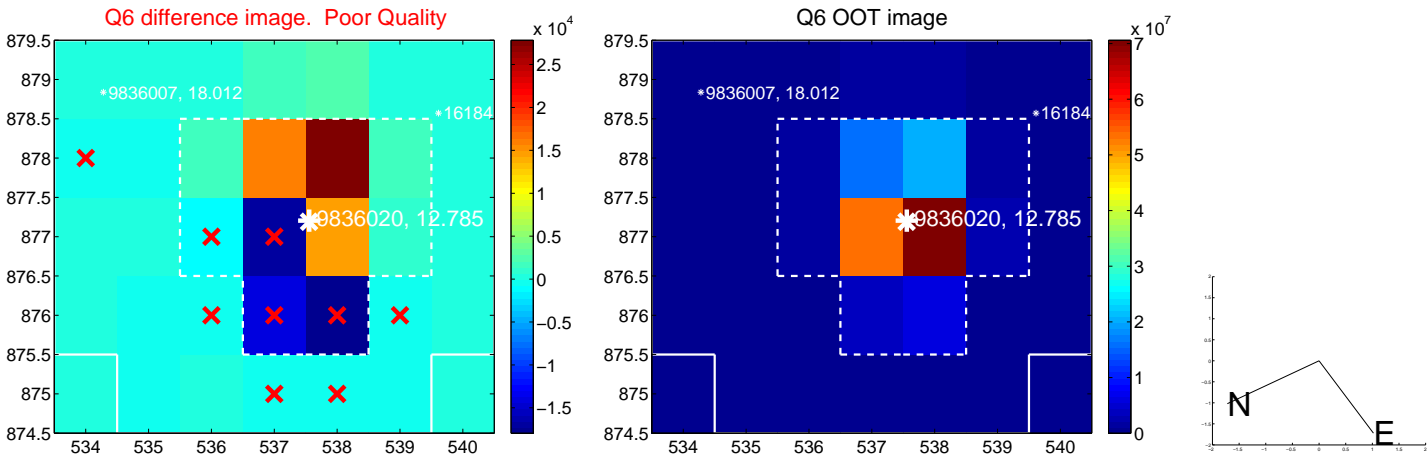
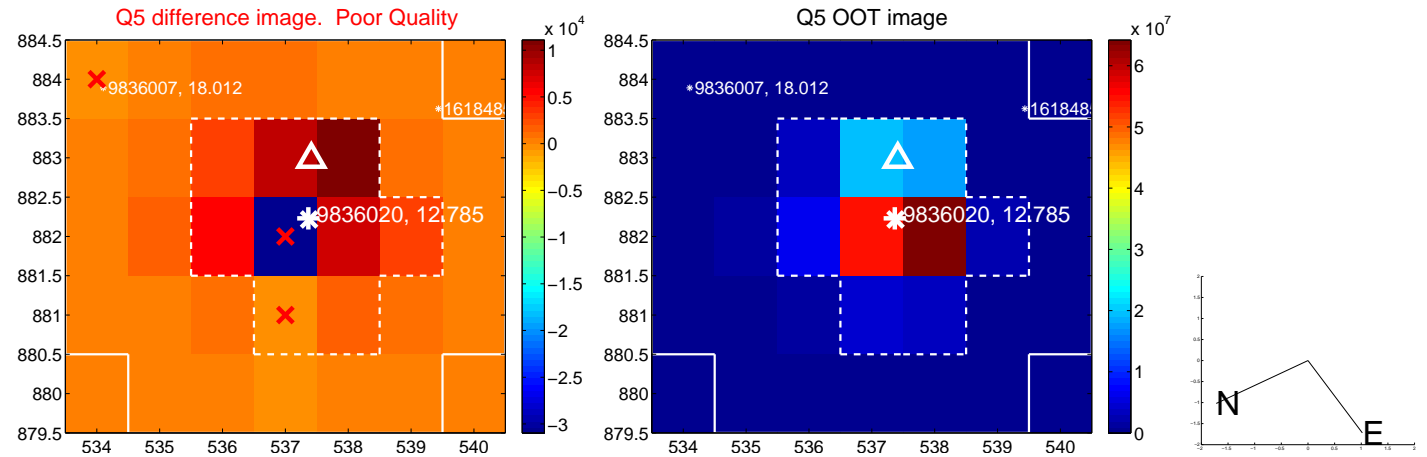


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ . Red *: target star. Blue *: Other stars. Text next to a star gives its KIC ID and kepmag. KIC IDs > 15,000,000 are from the UKIRT catalog.

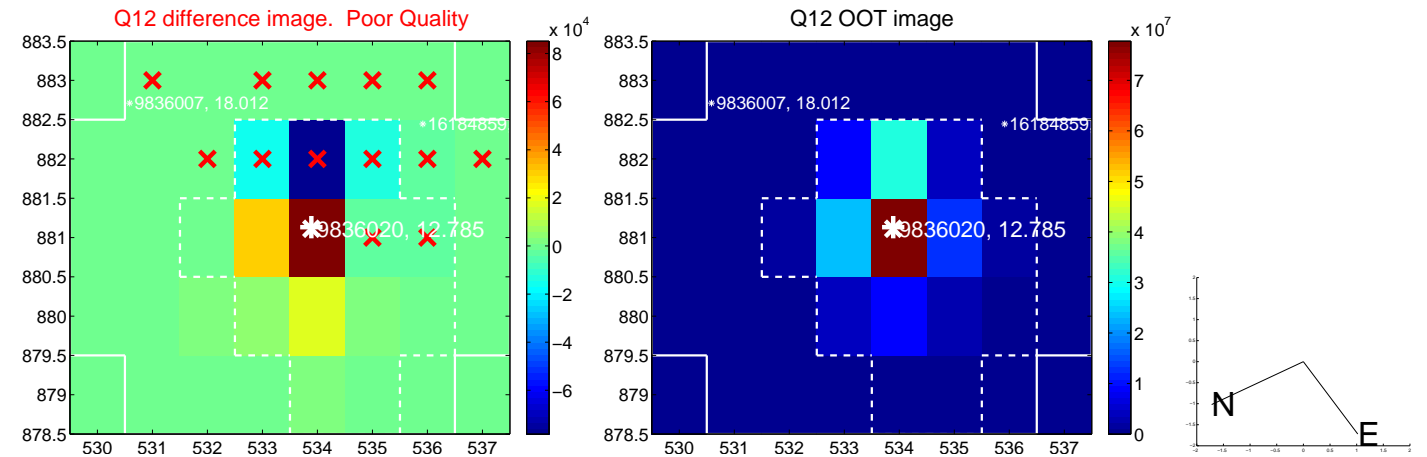
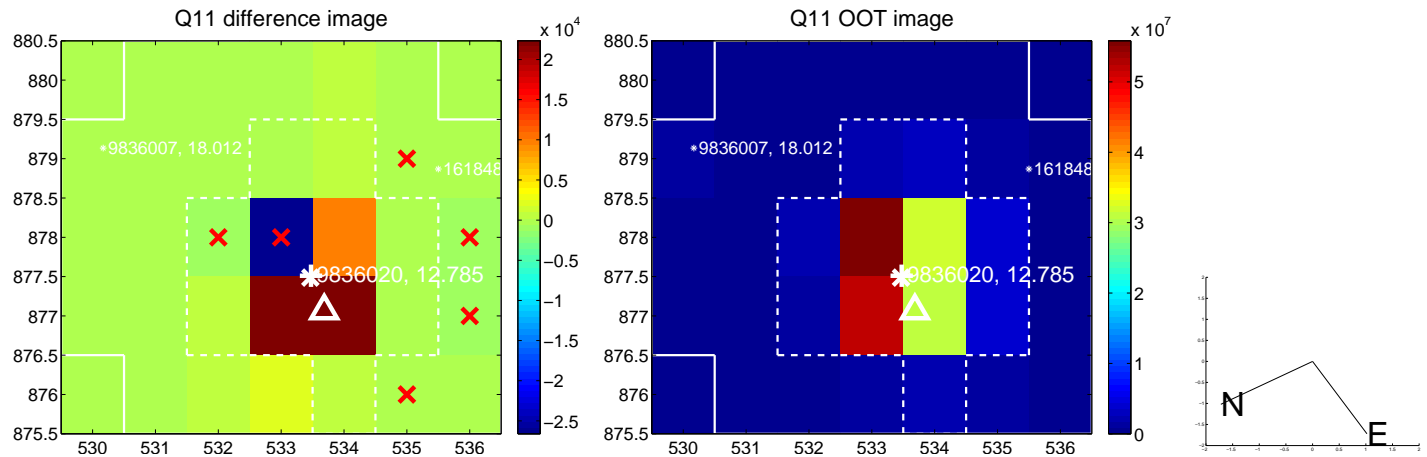
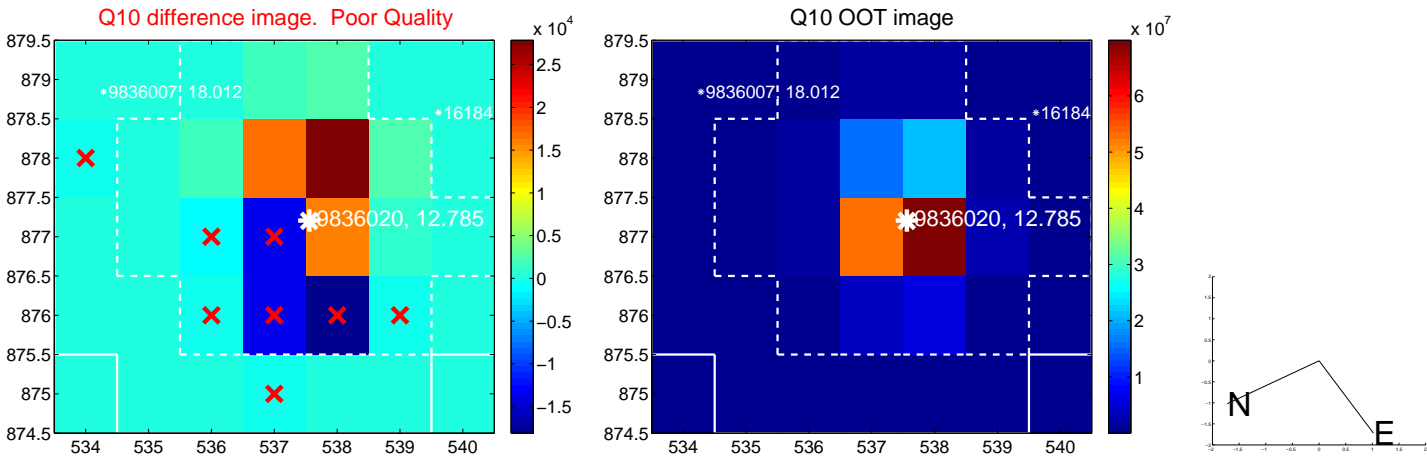
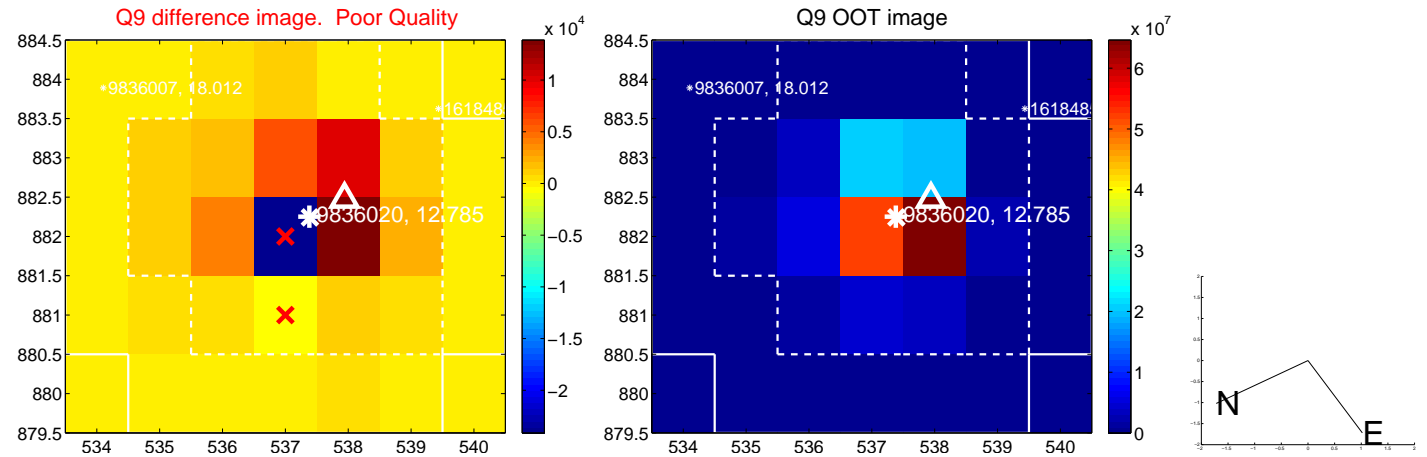
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



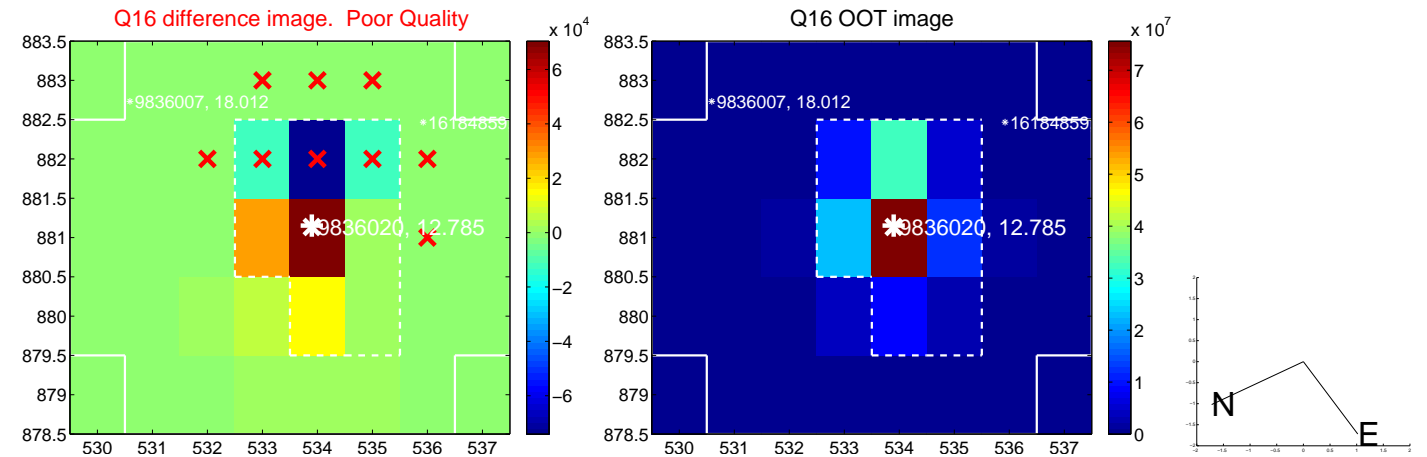
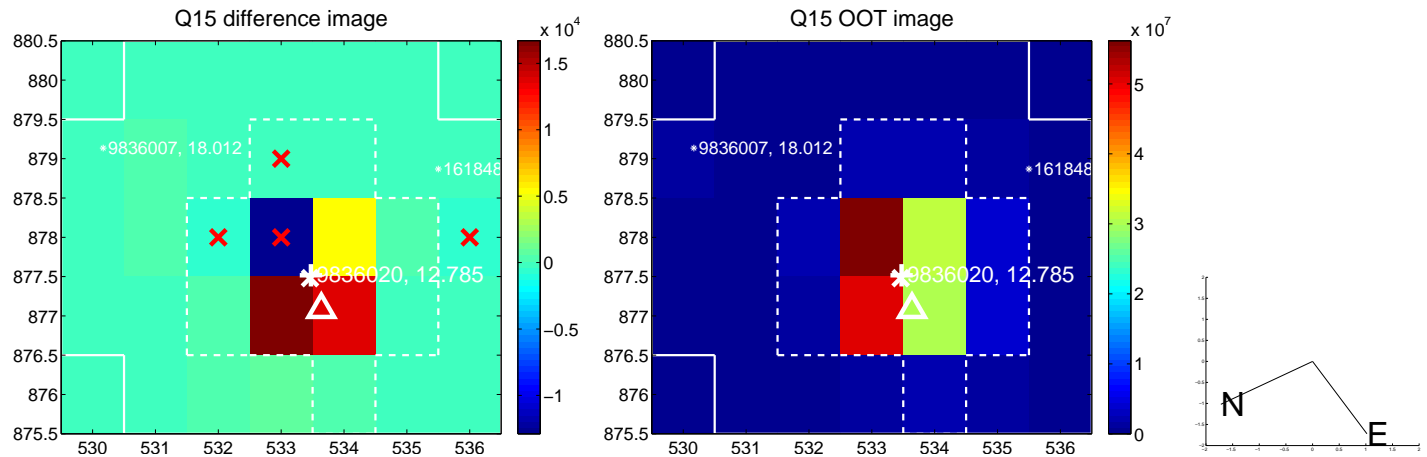
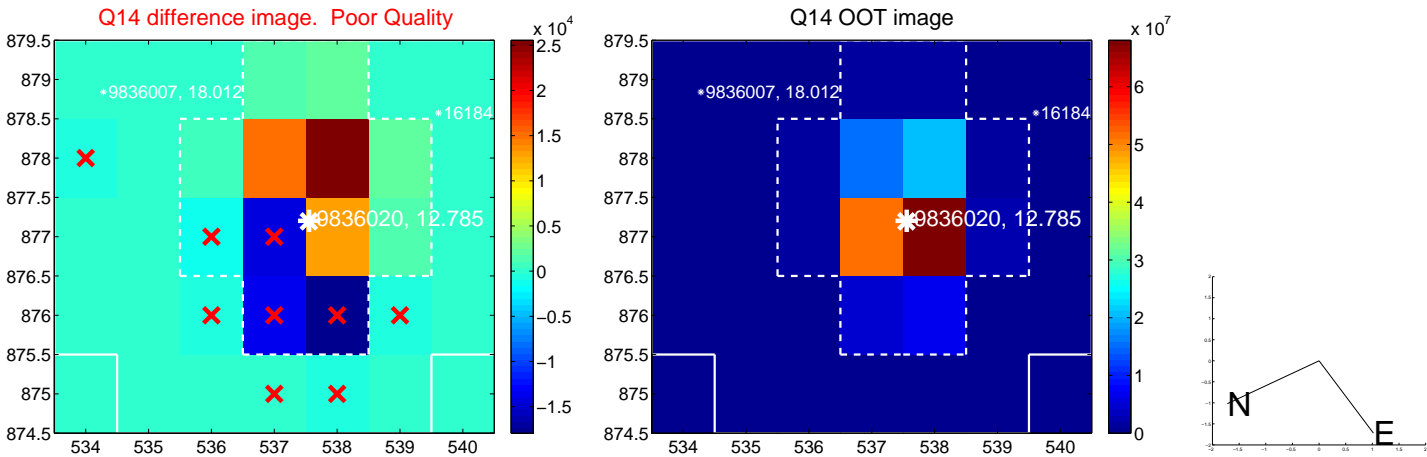
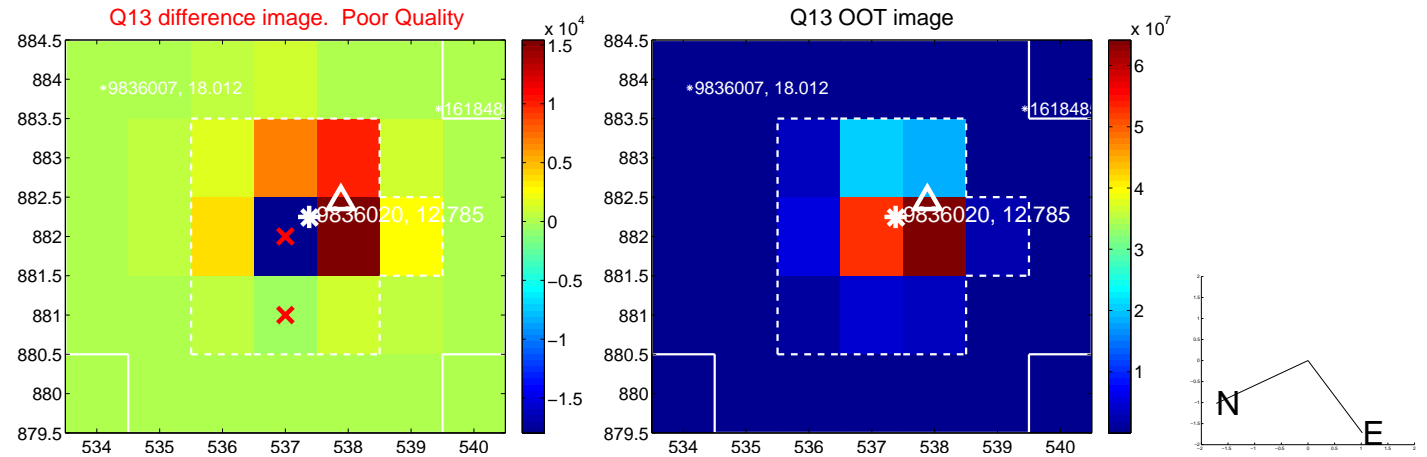
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



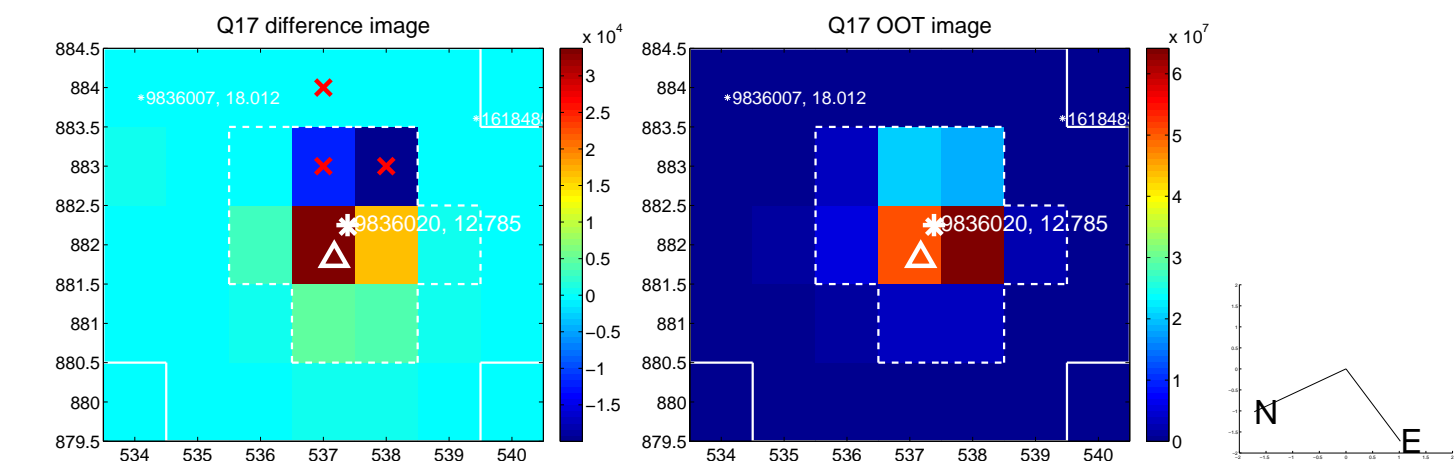
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



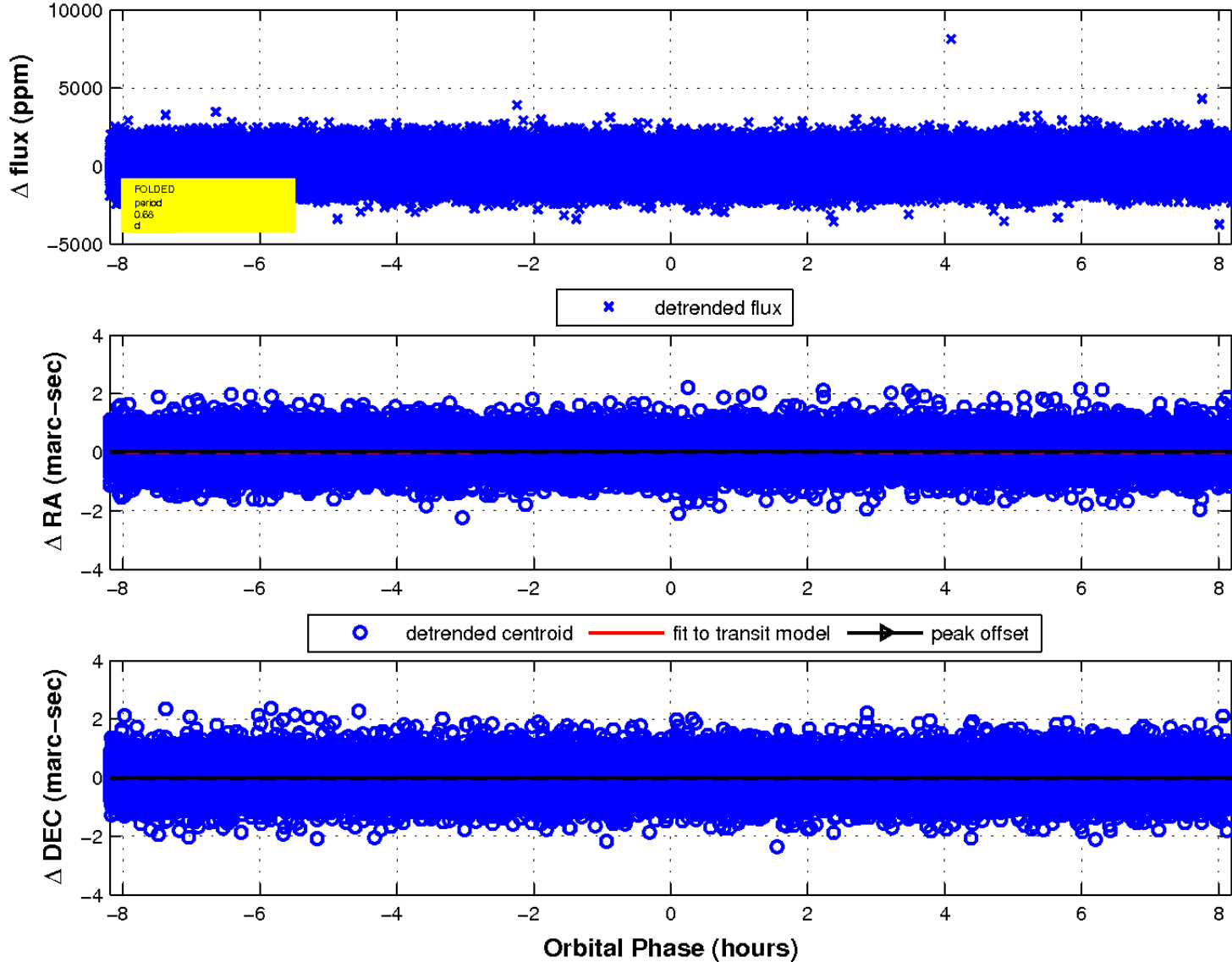
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



fluxWeightedCentroids, Planet 2 of 2



UKIRT Image

