

KIC 009836563

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})
009836563-01	OBS	4421.01	4.726960	135.286928	25.4	3.957	9.8	10.2	1.20	5950	0.73	496.60
009836563-02	OBS	4421.02	6.559531	132.037788	19.7	5.771	7.9	7.5	1.20	5950	0.62	320.84

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009836563-01	OBS	PC	0.98	0	0	0	0	NO_COMMENT
009836563-02	OBS	PC	0.97	0	0	0	0	NO_COMMENT

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

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

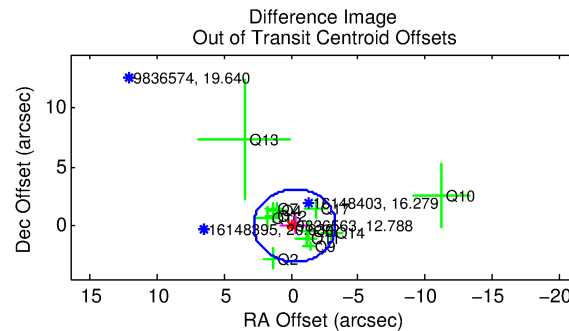
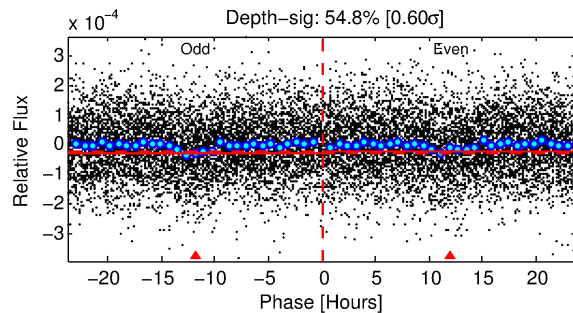
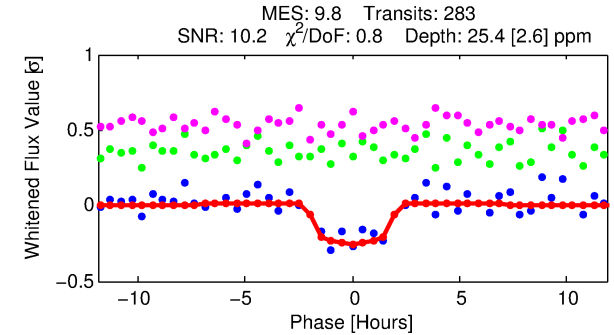
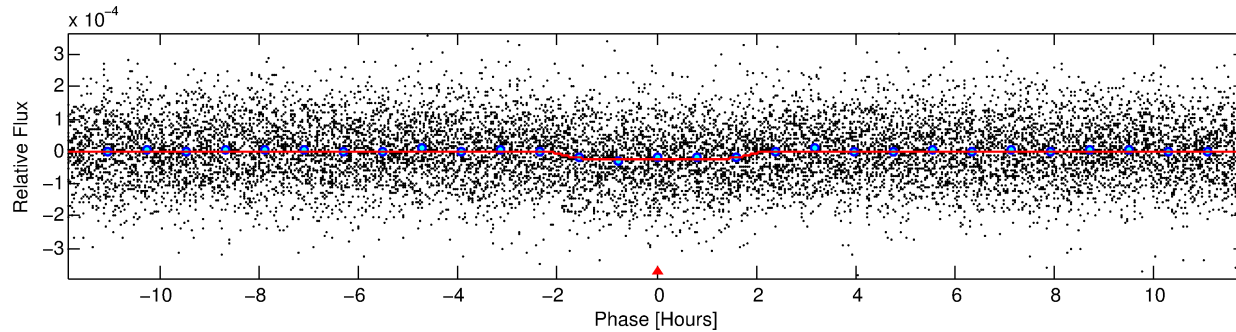
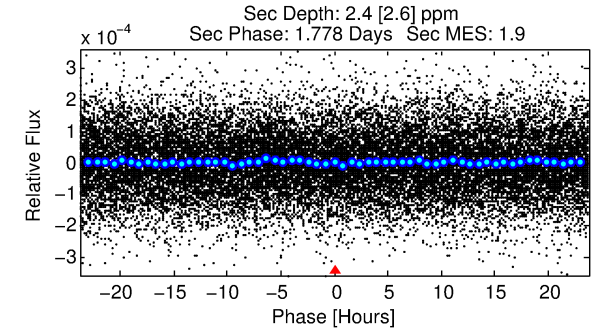
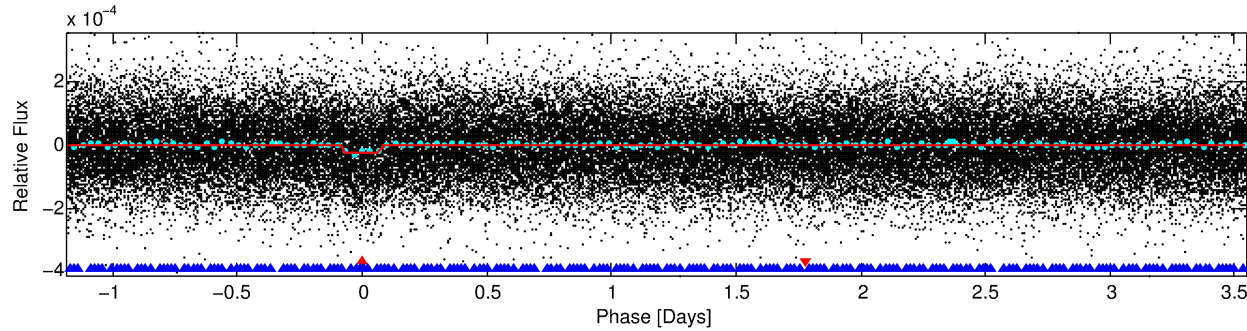
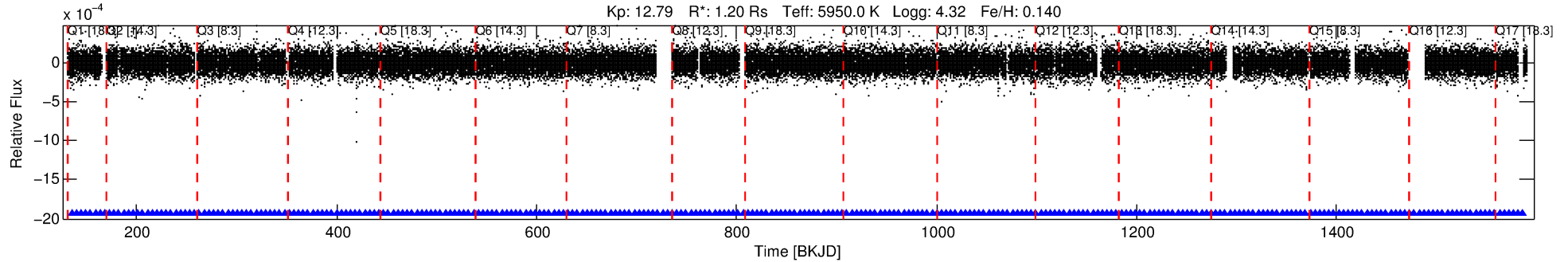
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009836563-01

No Significant Match Found

DV One-Page Summary

KIC: 9836563 Candidate: 1 of 2 Period: 4.727 d
KOI: K04421.01 Corr: 0.976



DV Fit Results:

Period = 4.72696 [0.00004] d
Epoch = 135.2869 [0.0061] BKJD
Rp/R* = 0.0056 [0.0022]
a/R* = 3.88 [7.25]
b = 0.92 [0.35]
Seff = 496.60 [130.57]
Teq = 1204 [79] K
Rp = 0.73 [0.32] Re
a = 0.0569 [0.0097] AU
Ag = 8.04 [11.07] [0.64σ]
Teffp = 3134 [1061] K [1.82σ]

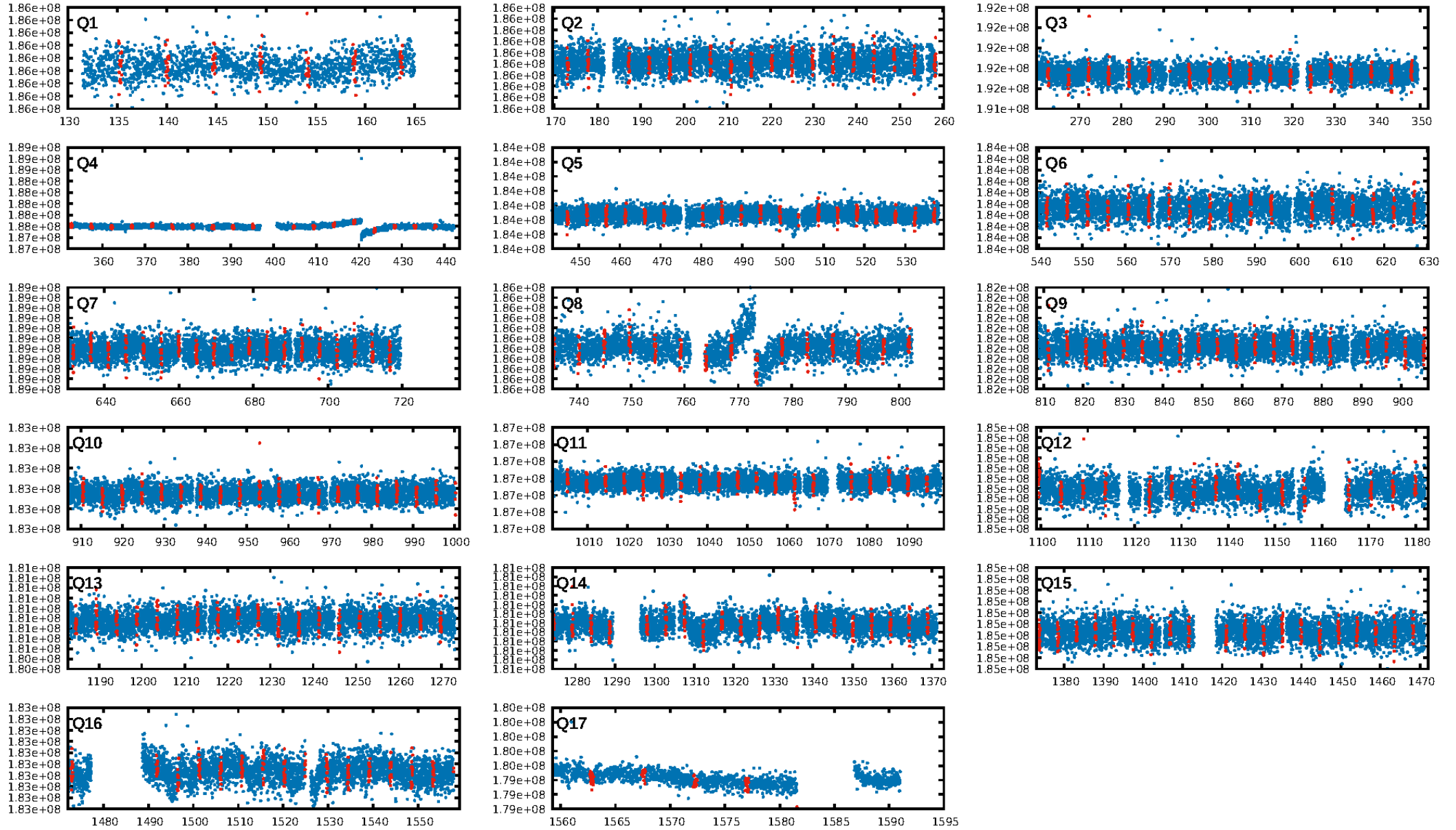
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [6.29σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGoF-sig: N/A
Bootstrap-pfa: 3.39e-22
RollingBand-fgt: 1.00 [272/272]
GhostDiagnostic-chr: -0.9713
Centroid-sig: 3.9%
Centroid-so: 2.986 arcsec [1.77σ]
OotOffset-rm: 0.266 arcsec [0.26σ]
KicOffset-rm: 0.395 arcsec [0.50σ]
OotOffset-st: 4/2/3/3 [12]
KicOffset-st: 4/2/3/3 [12]
DiffImageQuality-fgm: 0.50 [6/12]
DiffImageOverlap-fno: 1.00 [17/17]

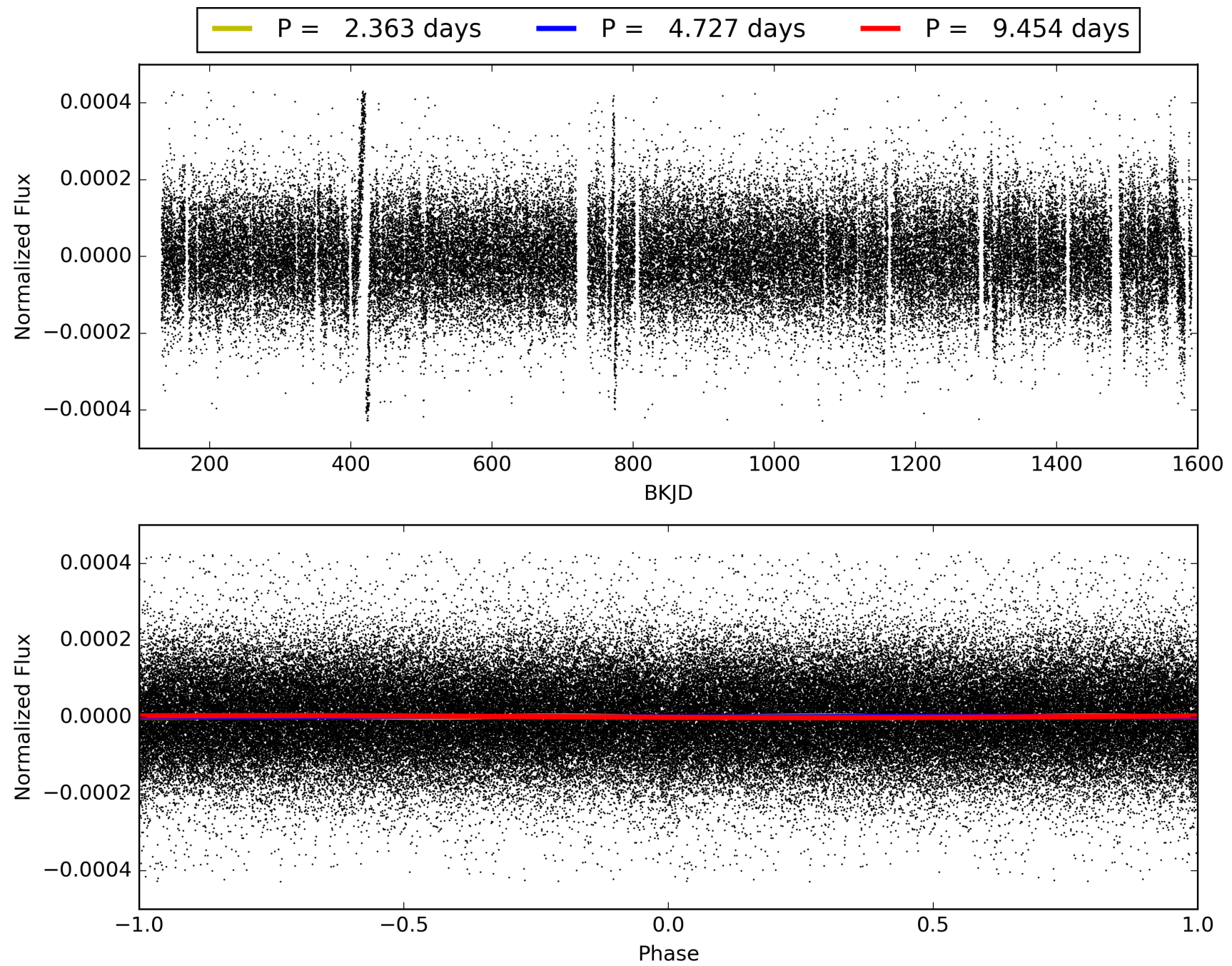
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 20:38:53 Z

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

TCE 009836563-01, PDC Light Curves

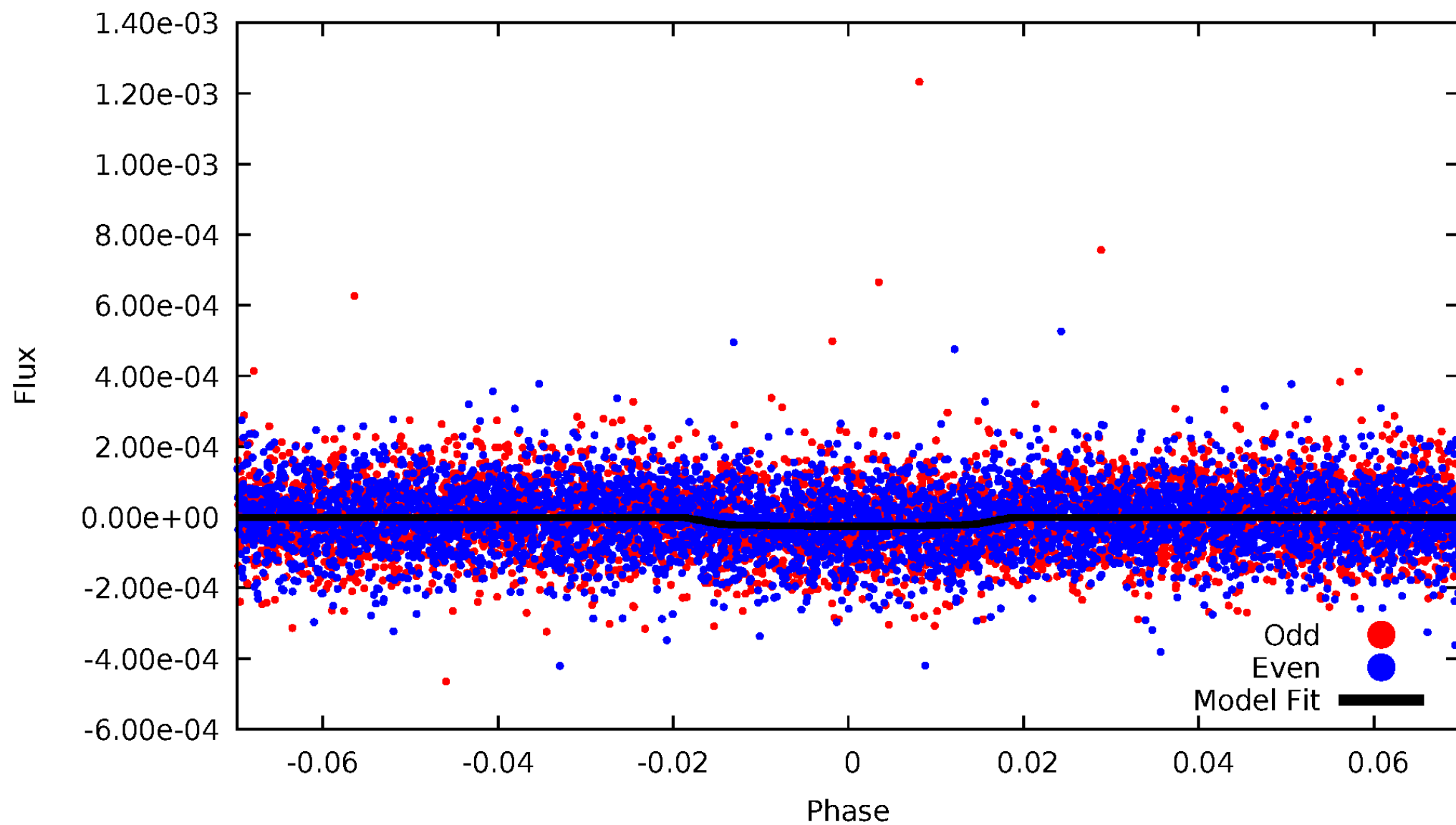


TCE 009836563-01



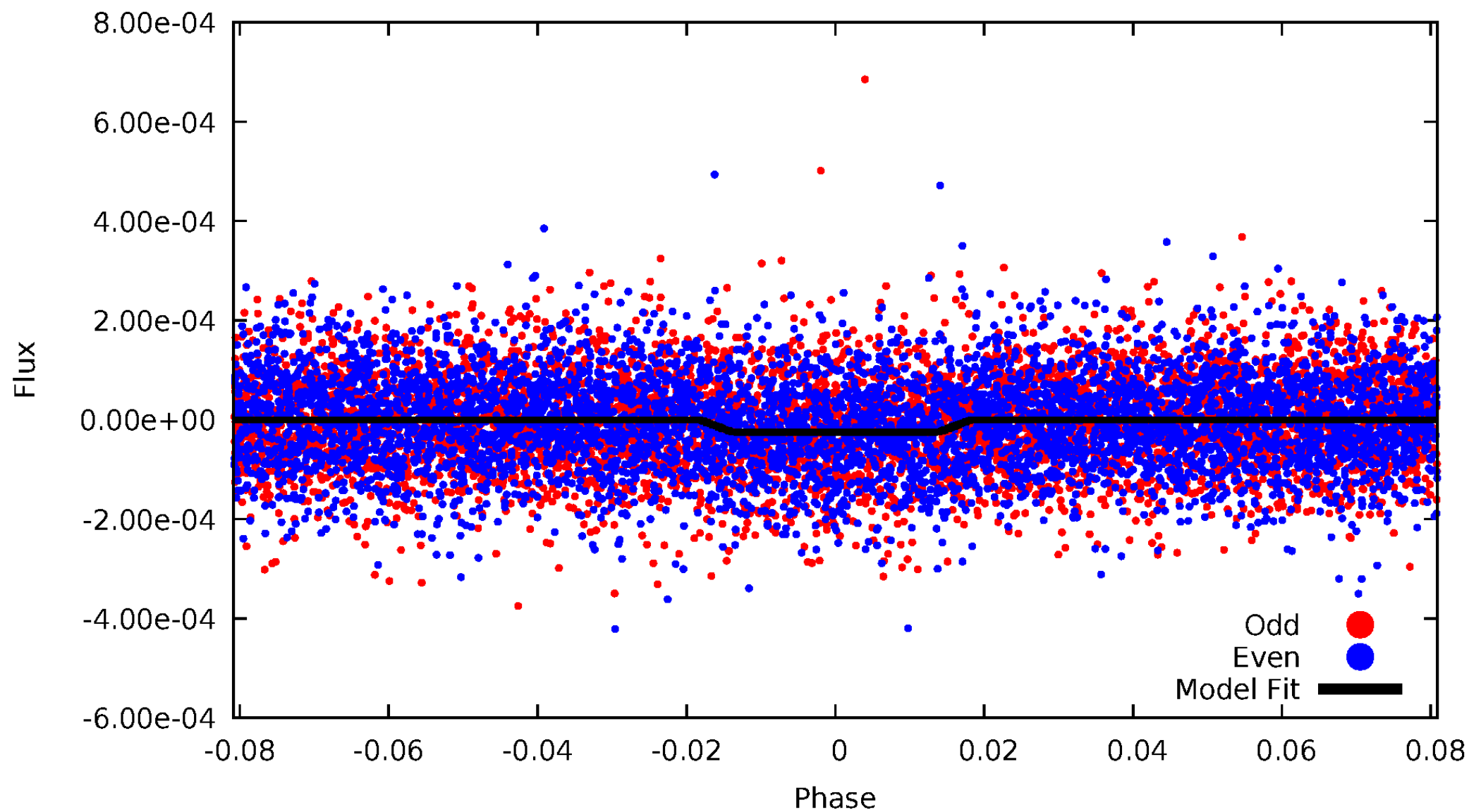
DV Odd/Even

TCE 009836563-01



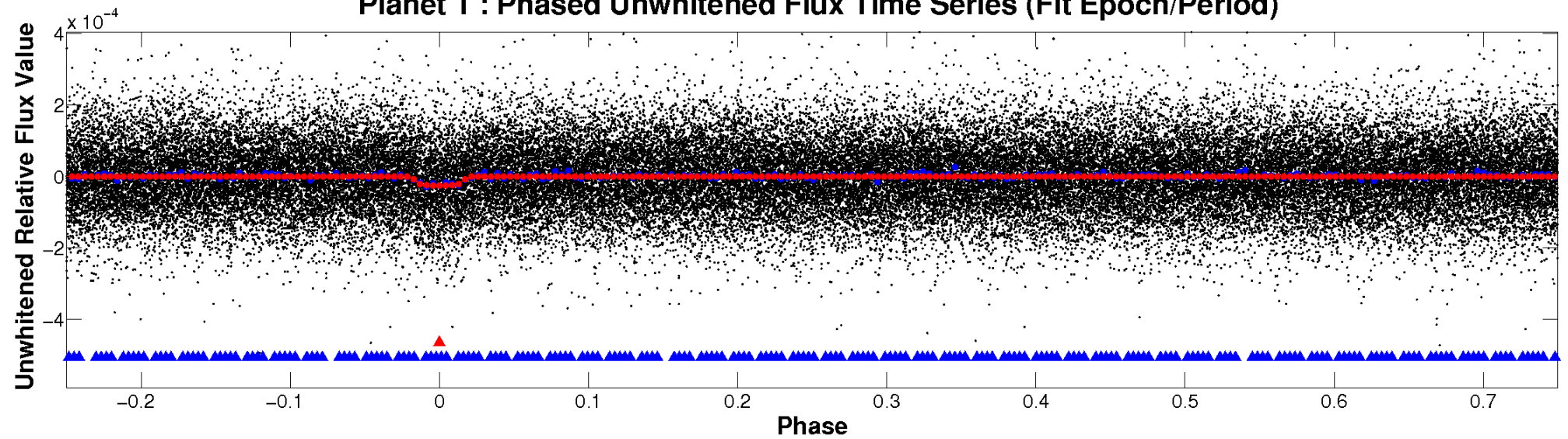
ALT Odd/Even

TCE 009836563-01

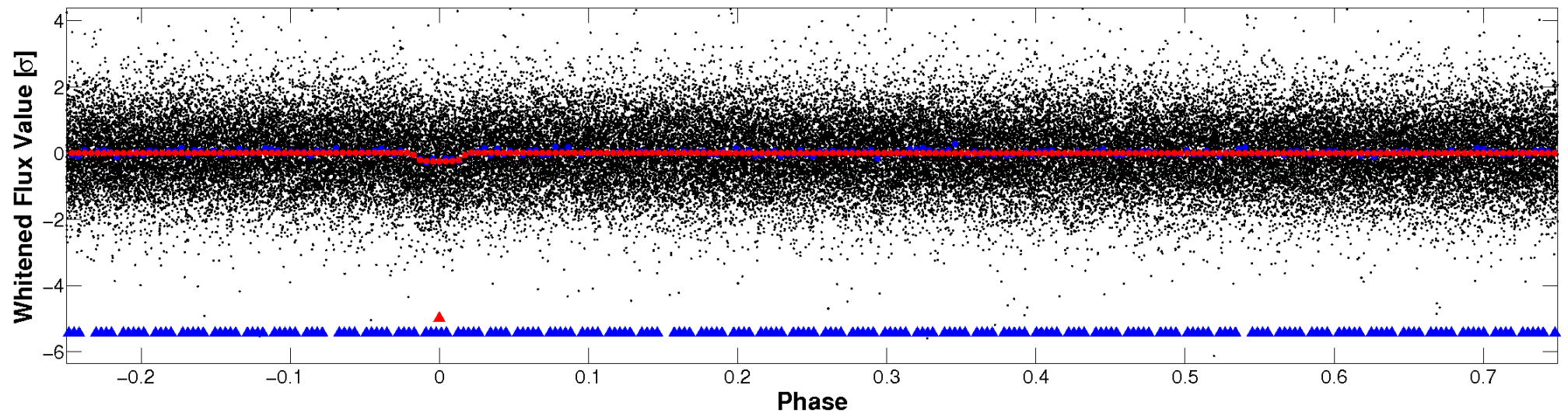


Non-Whitened Vs. Whitened Light Curve

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

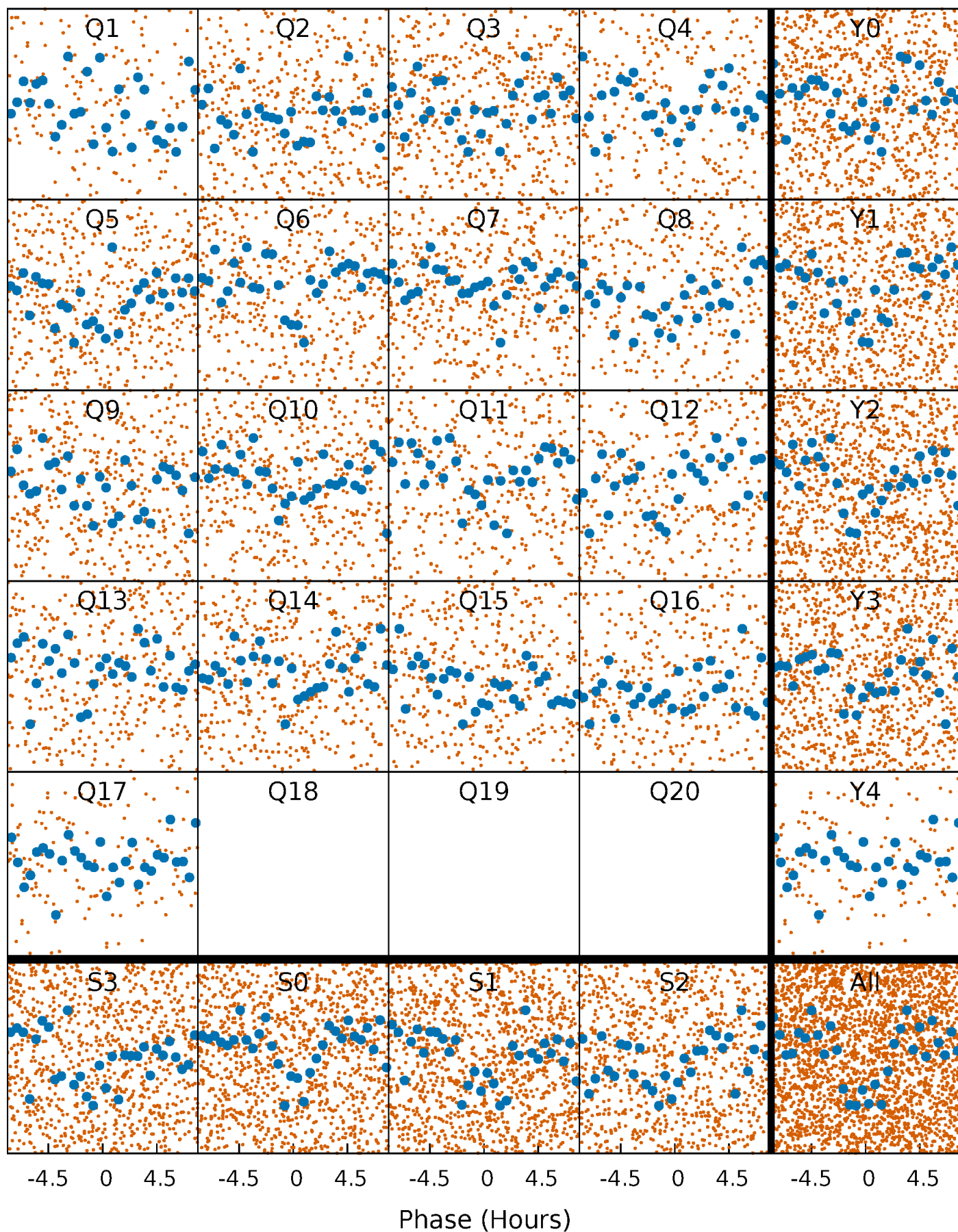


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



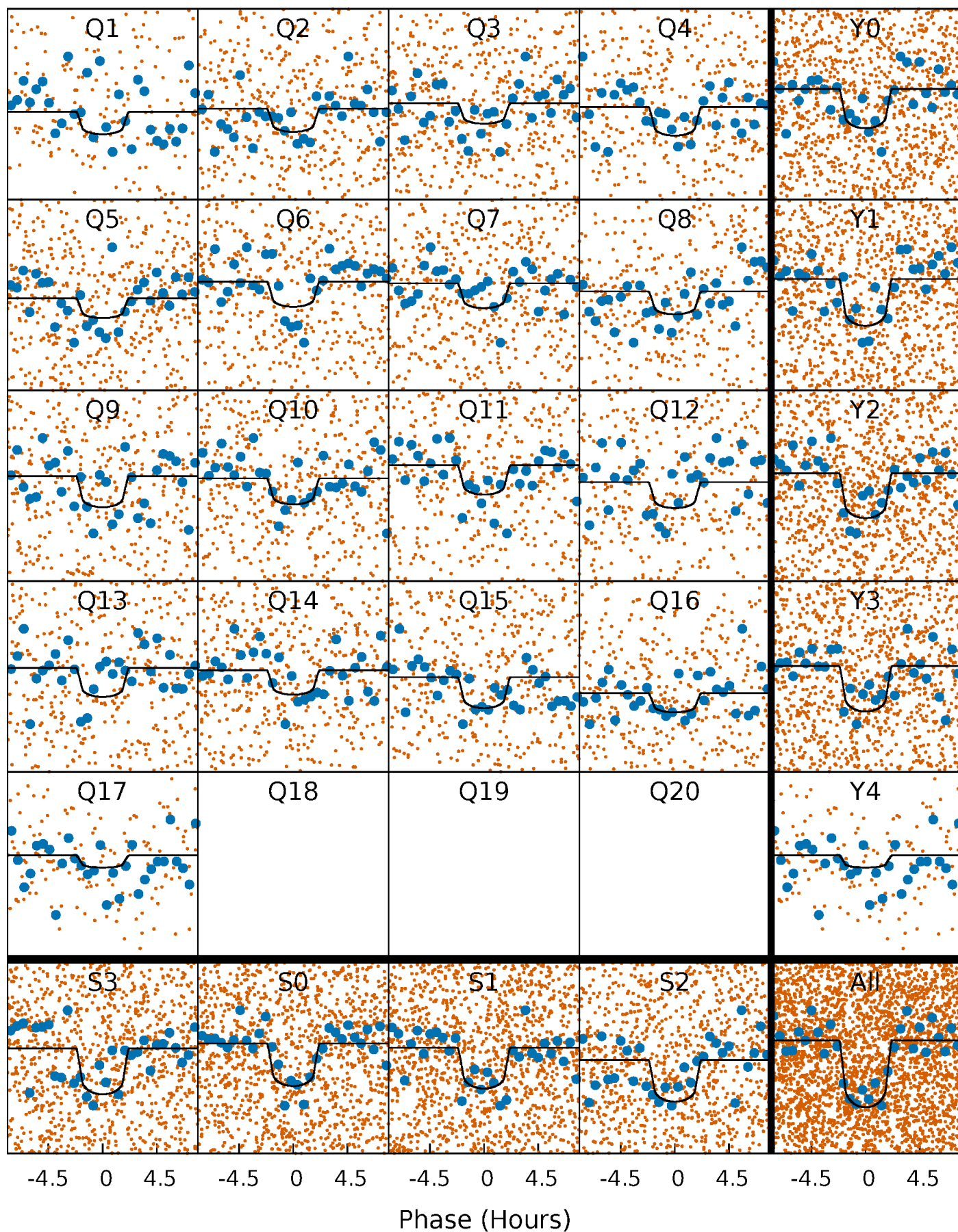
PDC Quarter-Phased Transit Curves

TCE 009836563-01 P= 4.726960 Days $T_0=135.286928$ (BKJD)



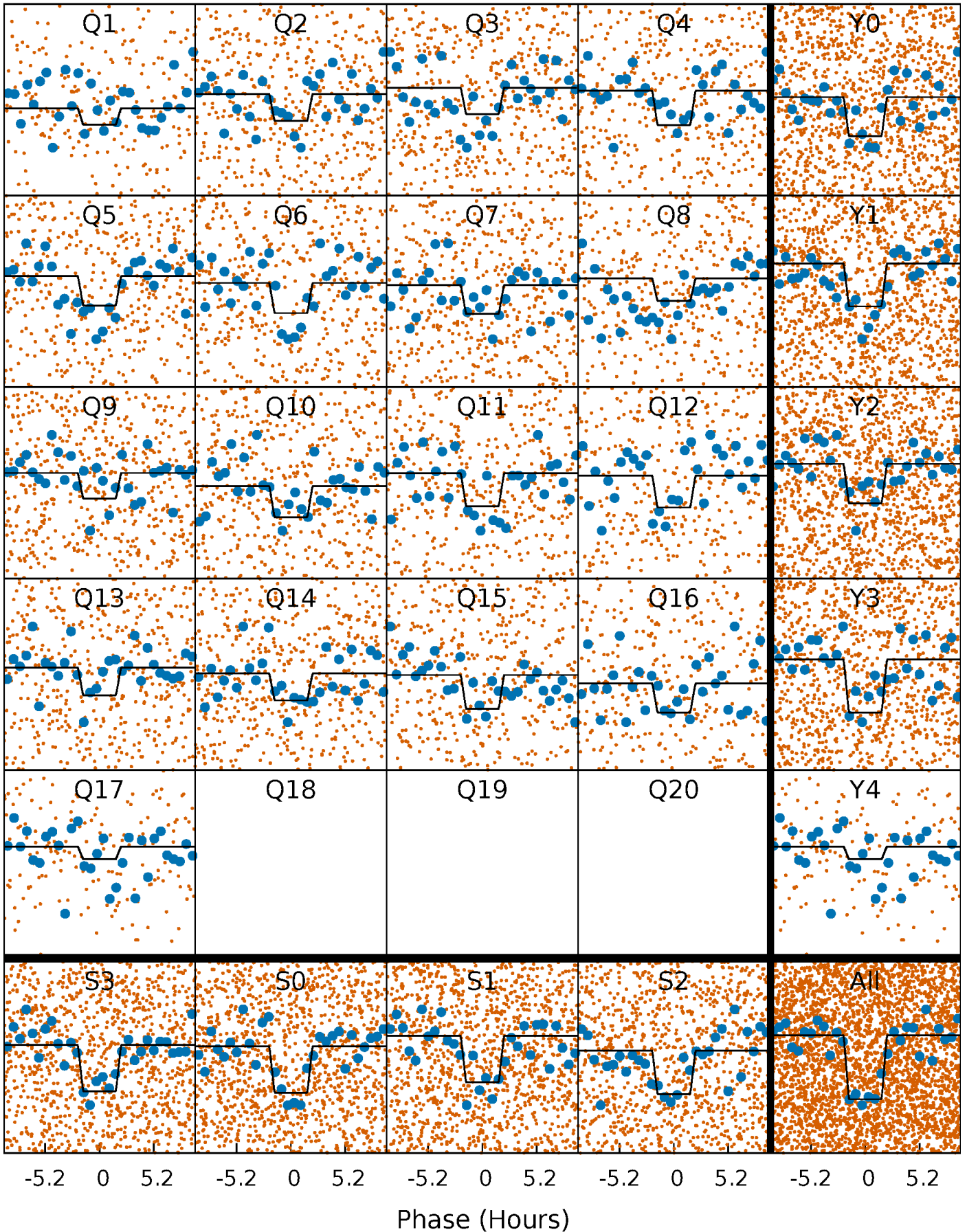
DV Quarter-Phased Transit Curves

TCE 009836563-01 P= 4.726960 Days $T_0=135.286928$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

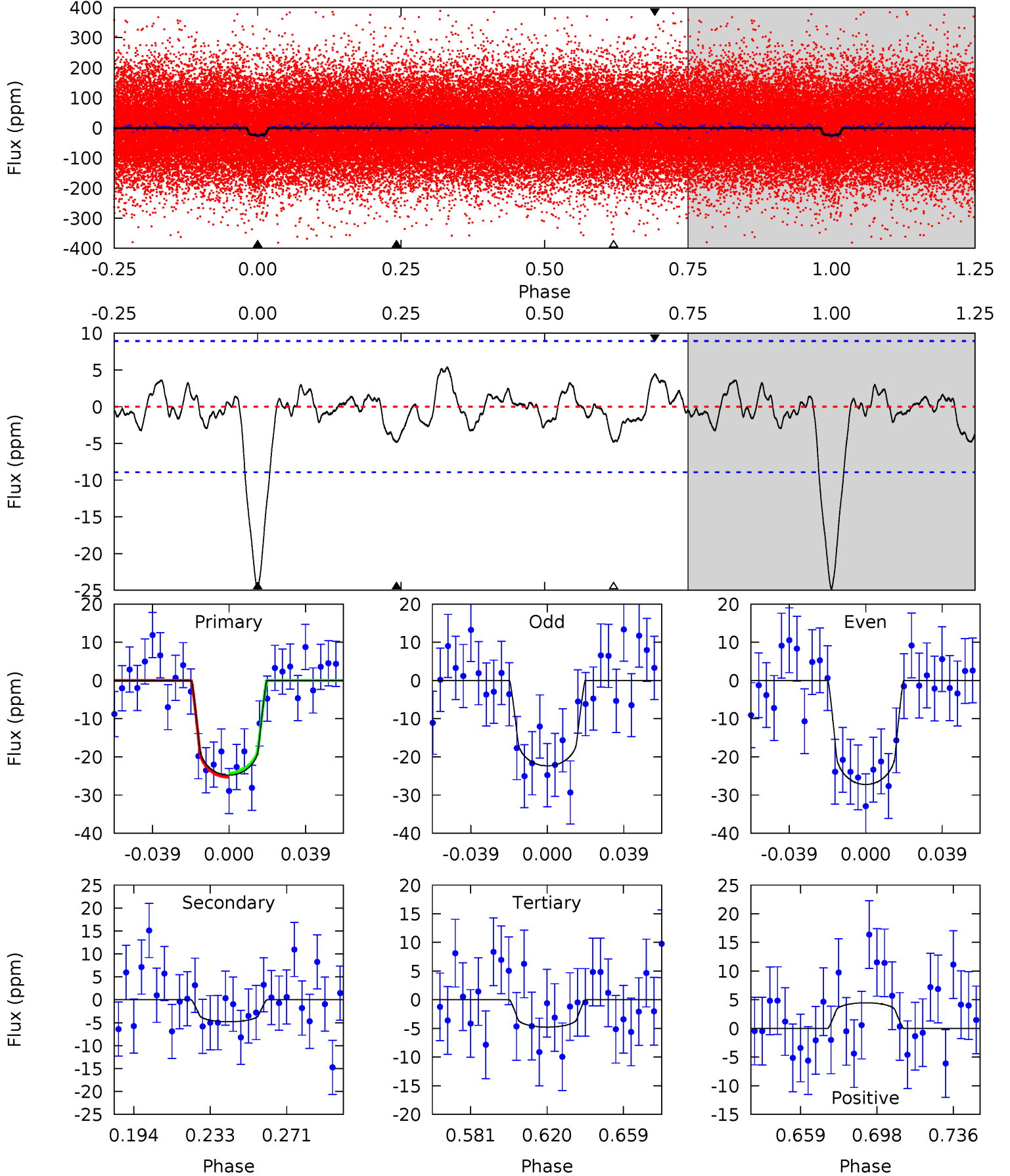
TCE 009836563-01 P= 4.726859 Days $T_0=135.302080$ (BKJD)



DV Model-Shift Uniqueness Test

009836563-01, P = 4.726960 Days, E = 130.559968 Days

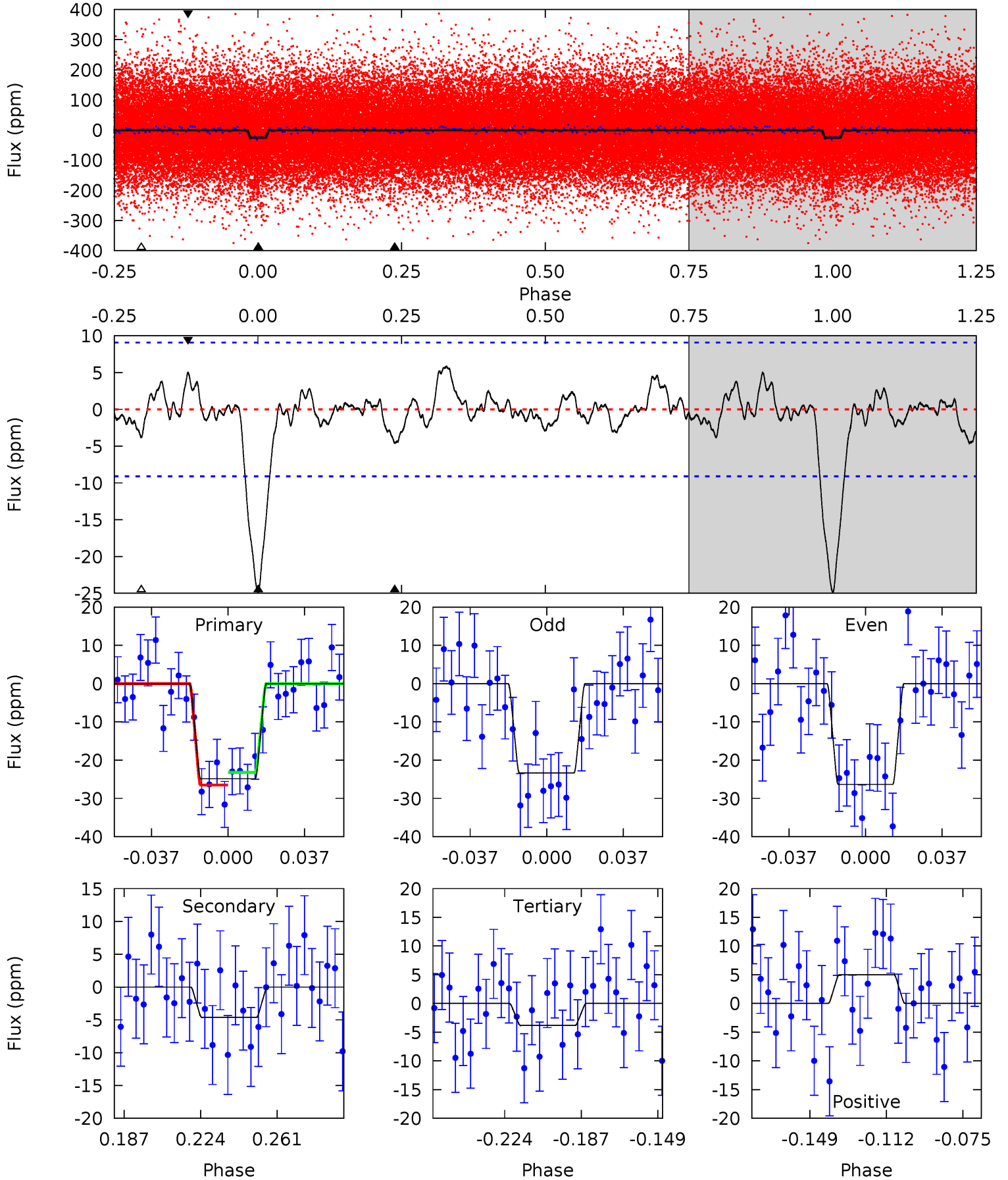
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
13.2	2.56	2.55	2.38	4.76	2.07	1.03	10.7	10.8	0.01	0.17	1.30	0.97	0.18	0.28



Alt Model-Shift Uniqueness Test

009836563-01, P = 4.726859 Days, E = 130.575221 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
13.0	2.43	2.01	2.63	4.77	2.08	0.96	11.0	10.4	0.42	-0.20	0.78	0.96	0.19	0.87



Stellar Parameters For KIC 009836563

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	5950^{+71}_{-83}	$4.323^{+0.096}_{-0.144}$	$0.140^{+0.150}_{-0.150}$	$1.196^{+0.235}_{-0.157}$	$1.100^{+0.077}_{-0.070}$	$0.905^{+0.375}_{-0.365}$
	+1%/-1%	+2%/-3%	+107%/-107%	+20%/-13%	+7%/-6%	+41%/-40%
Source	SPE90	FLK73	SPE90	DSEP		

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

Secondary Eclipse Parameters for KIC 009836563-01 / KOI 4421.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-5 ± 2	$0.76^{+0.32}_{-0.31}$	1691^{+83}_{-65}	3964^{+1010}_{-519}	14^{+30}_{-8}
Alt.	-5 ± 2	$0.66^{+0.31}_{-0.28}$	1686^{+92}_{-63}	4121^{+1059}_{-593}	18^{+38}_{-11}

T_{max} = Theoretical Maximum Planetary Temperature

T_{obs} = Observed Planetary Temperature (Assuming $A=0.3$)

A_{obs} = Observed Albedo (Assuming $T=0$)

If a secondary eclipse is present, the system is likely an EB if $T_{obs} \gg T_{max}$ AND $A_{obs} \gg 1.0$

DV Centroid Data

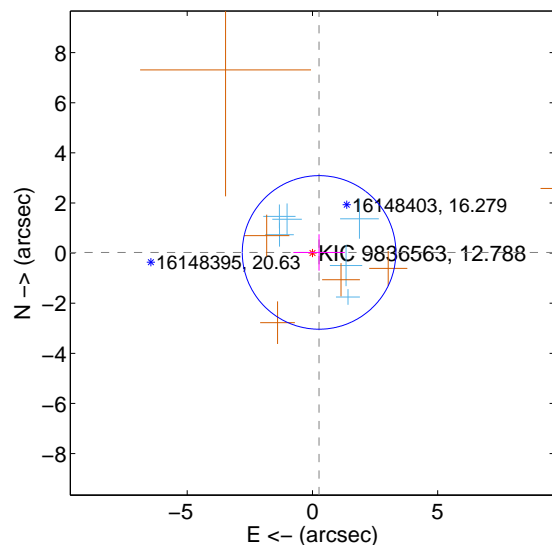
Supplemental centroid analysis for 009836563-01. Kepler magnitude: 12.79. Transit SNR 10.25

There are 6 quarters with good PRF difference image offsets

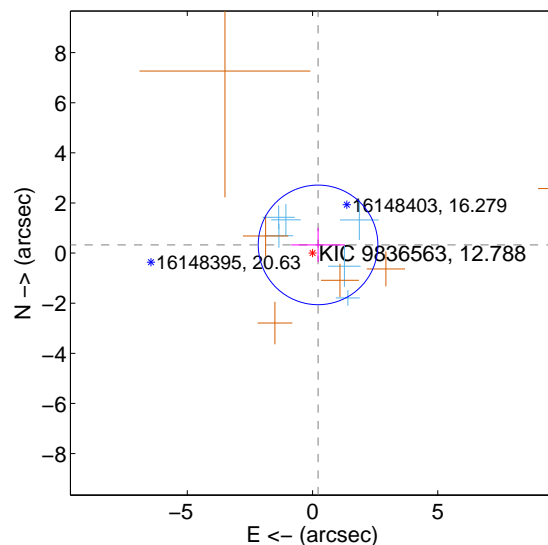
The direct PRF centroid is offset from the target star catalog position by about 0.05 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.266 ± 1.022	0.26	-0.265 ± 1.026	0.027 ± 0.727
PRF-fit source offset from KIC position	0.395 ± 0.796	0.50	-0.221 ± 1.072	0.327 ± 0.676
photometric centroid source offset	2.99 ± 1.69	1.77	0.58 ± 0.98	-2.93 ± 1.71

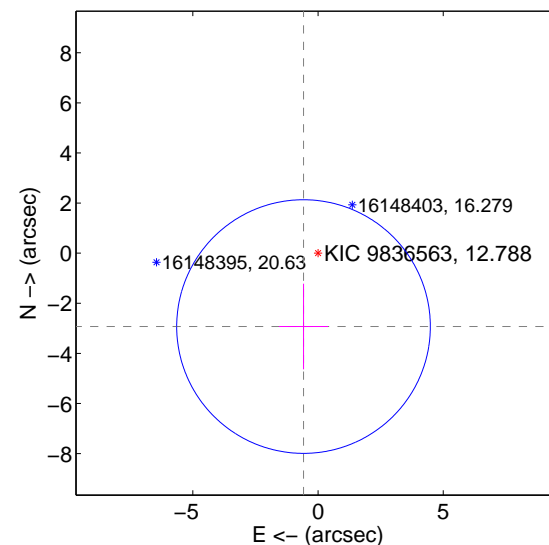
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

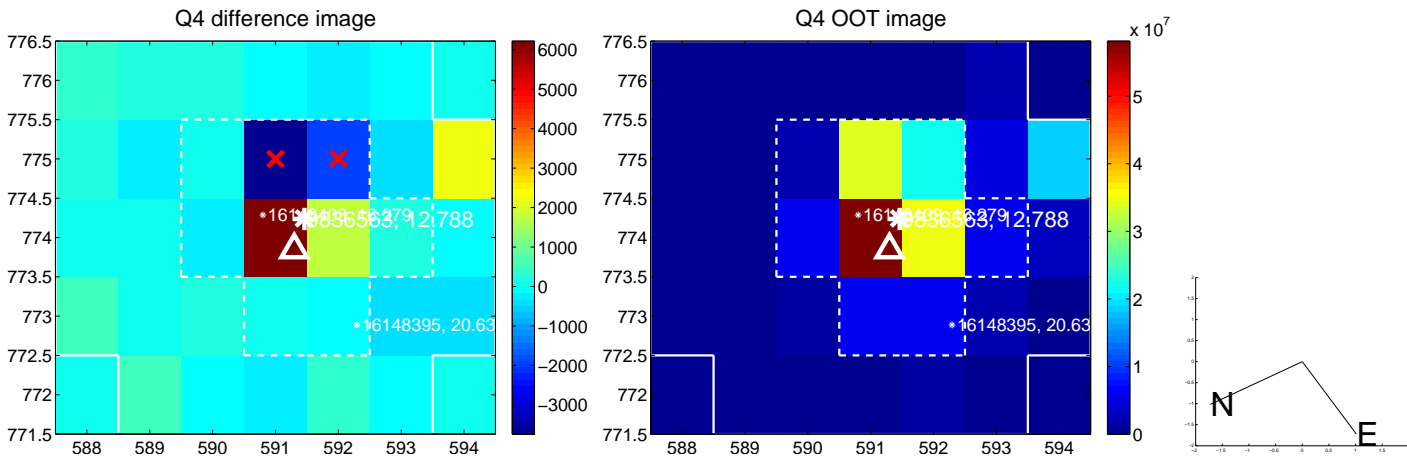
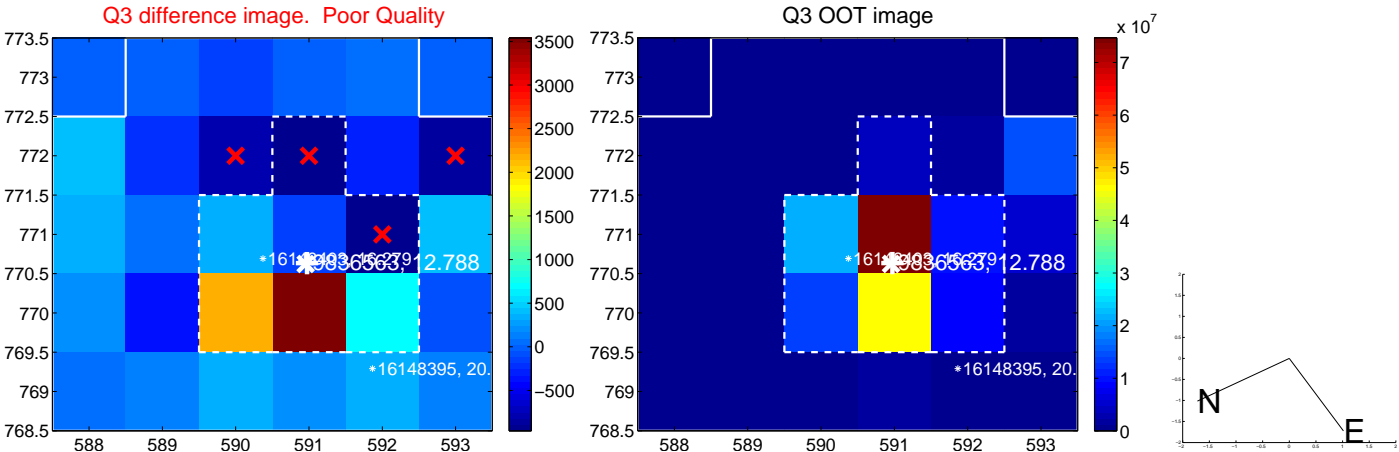
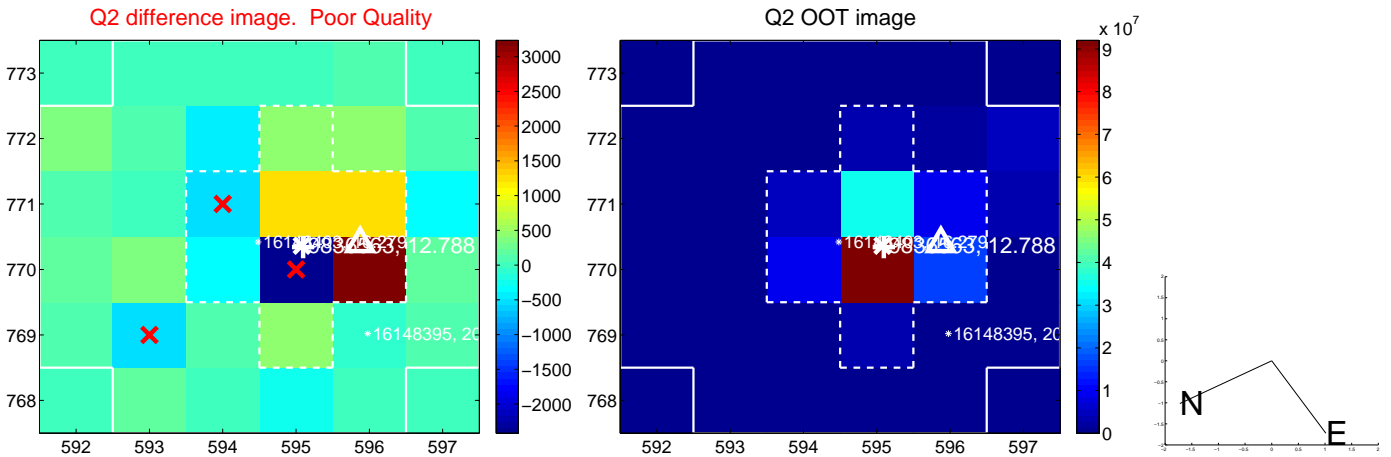
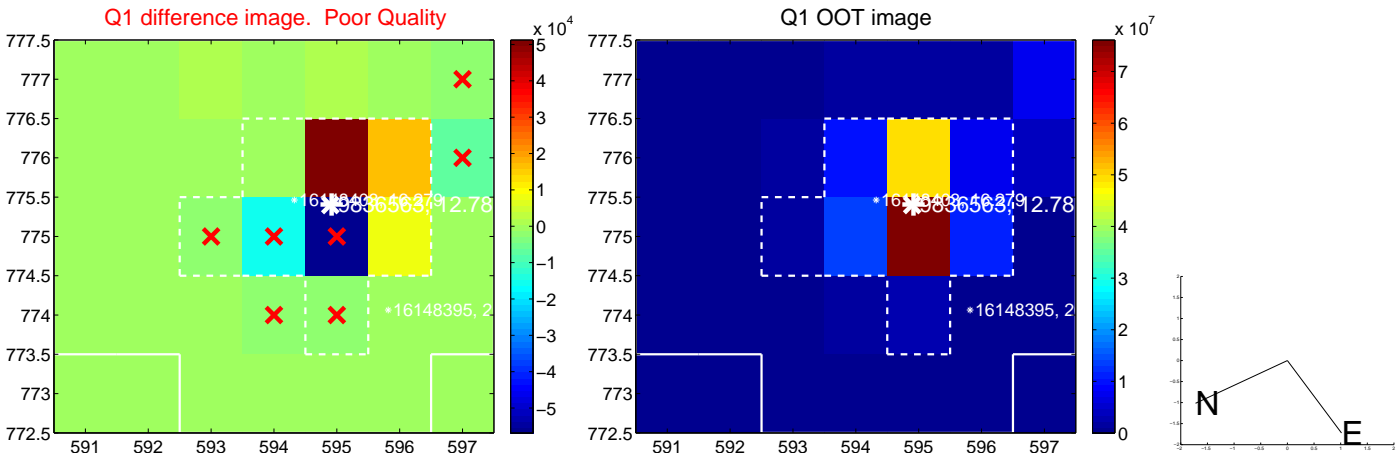


offset from photometric centroids

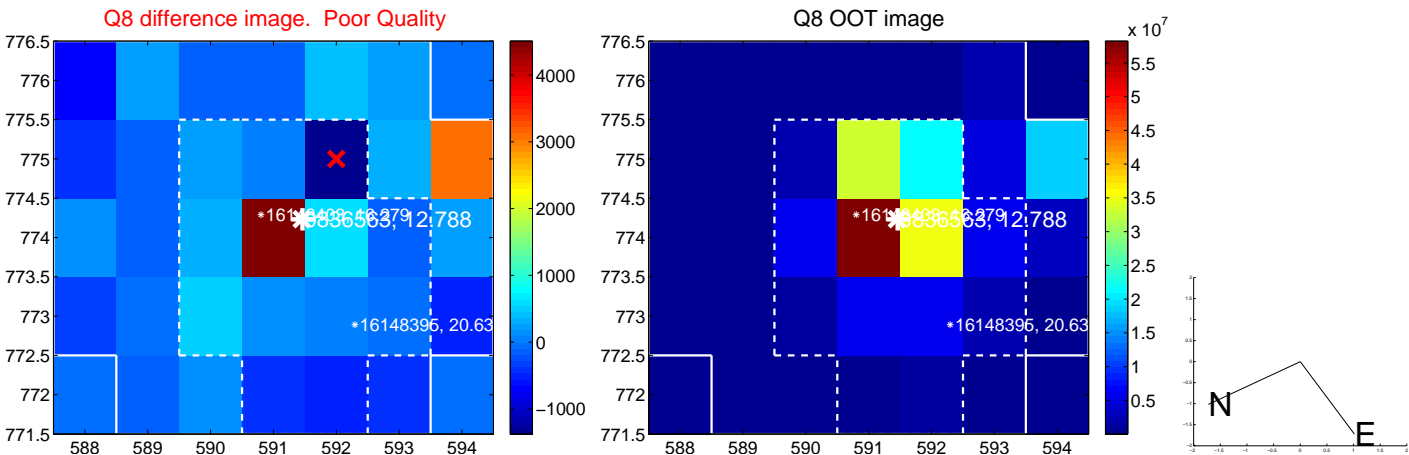
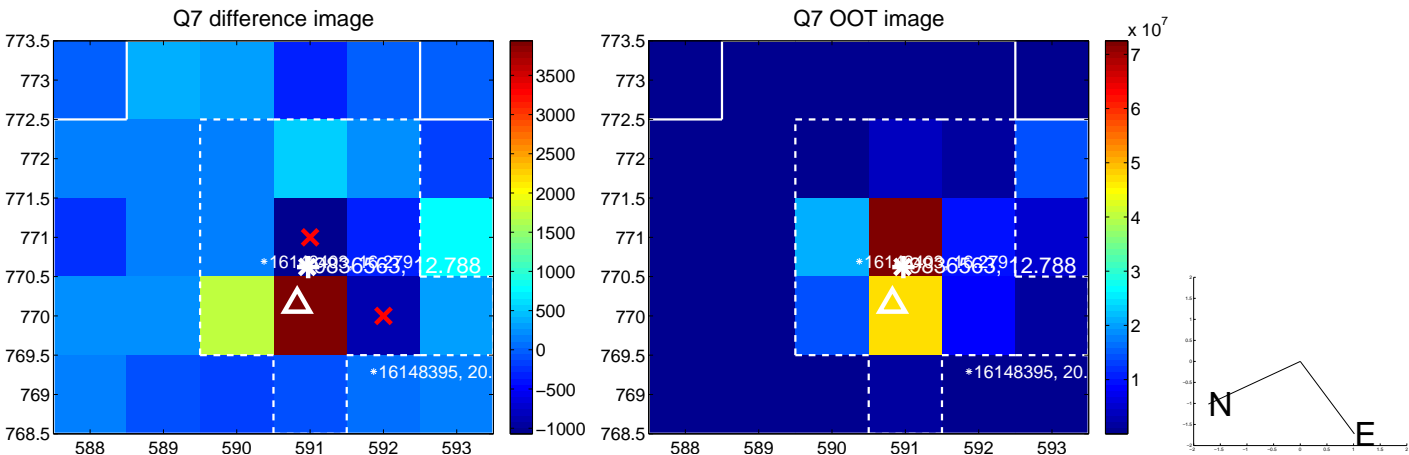
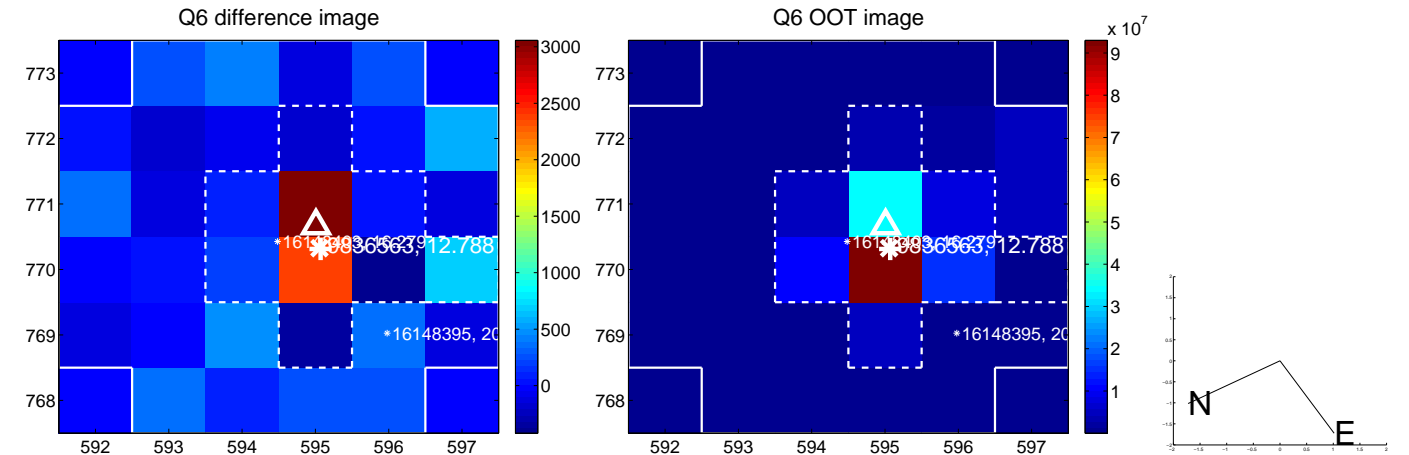
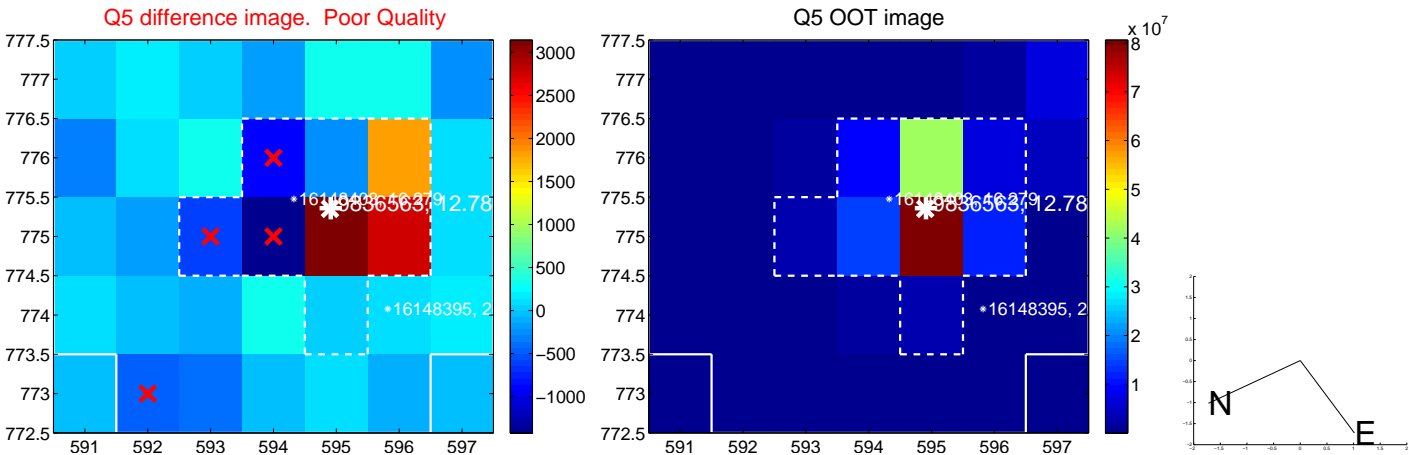


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

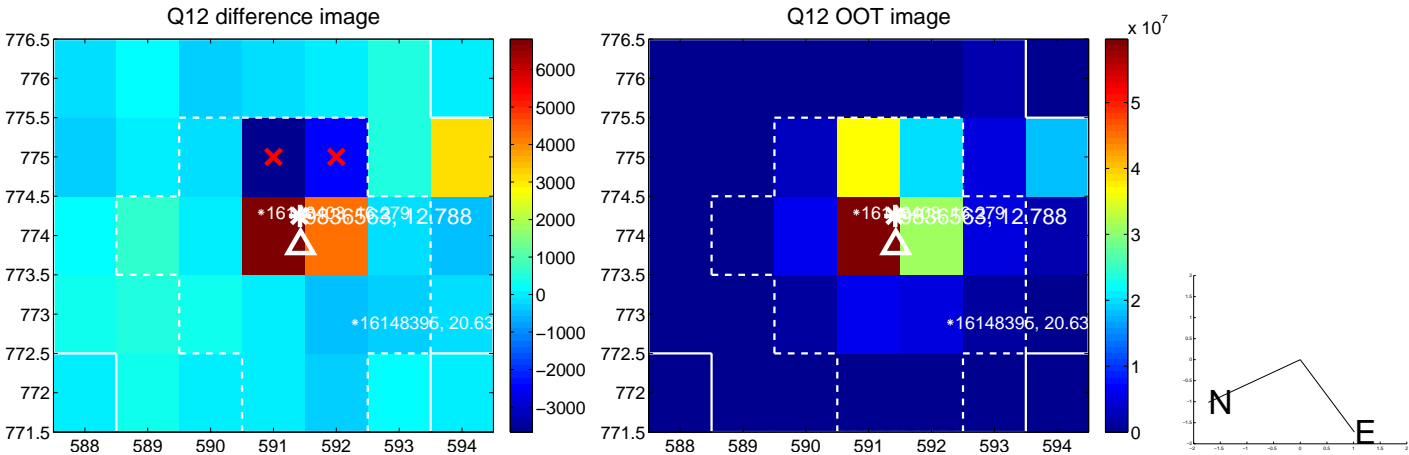
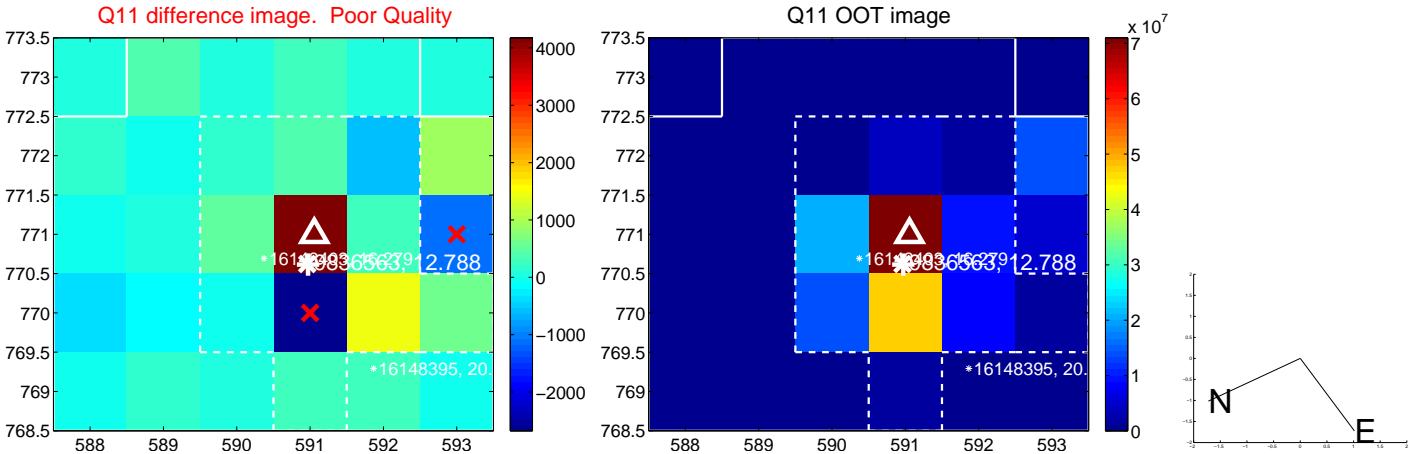
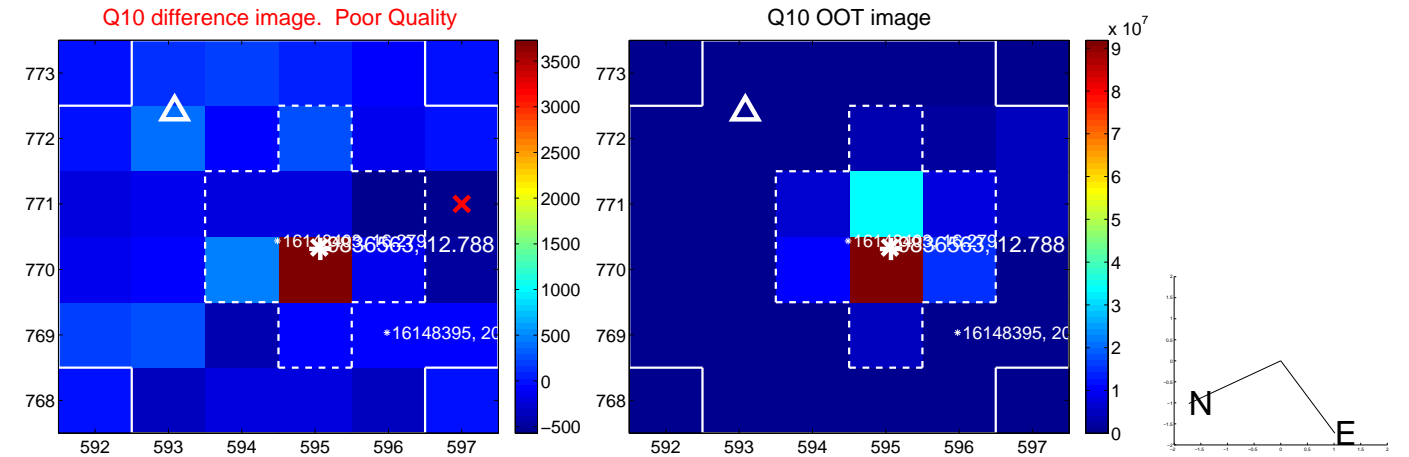
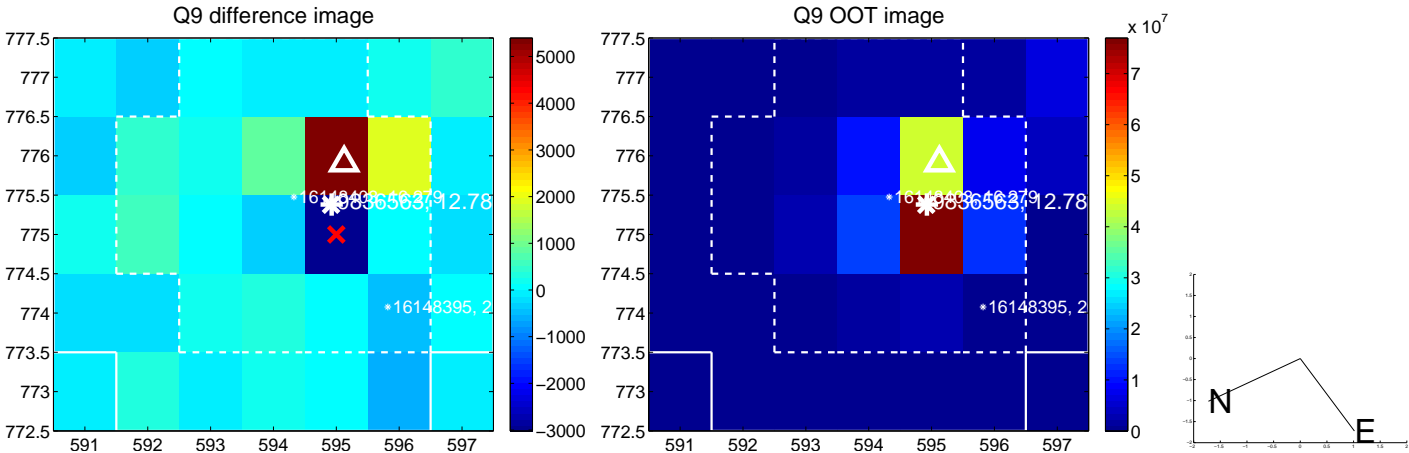
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



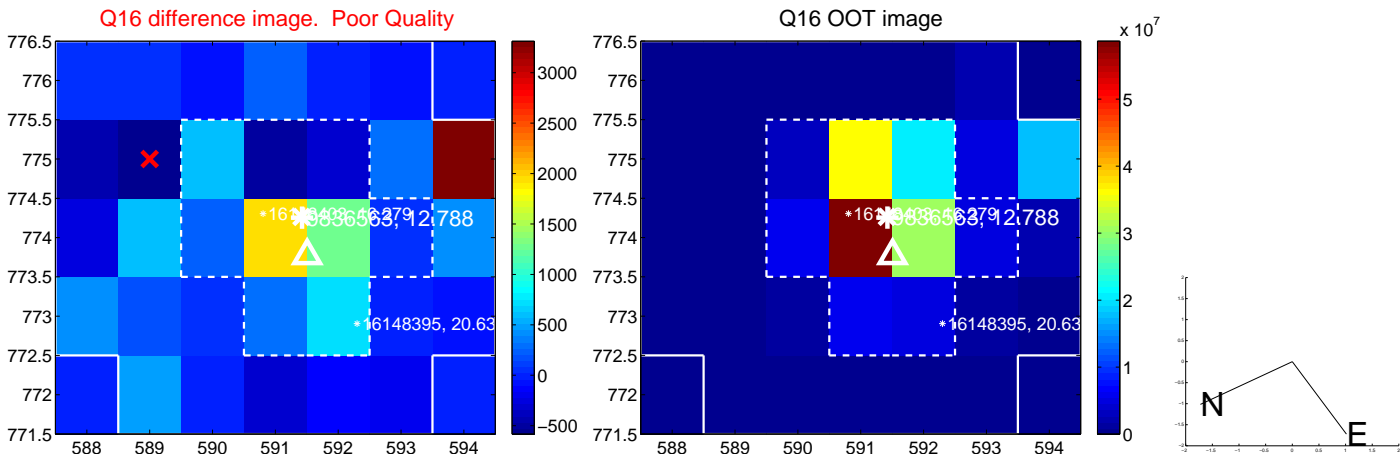
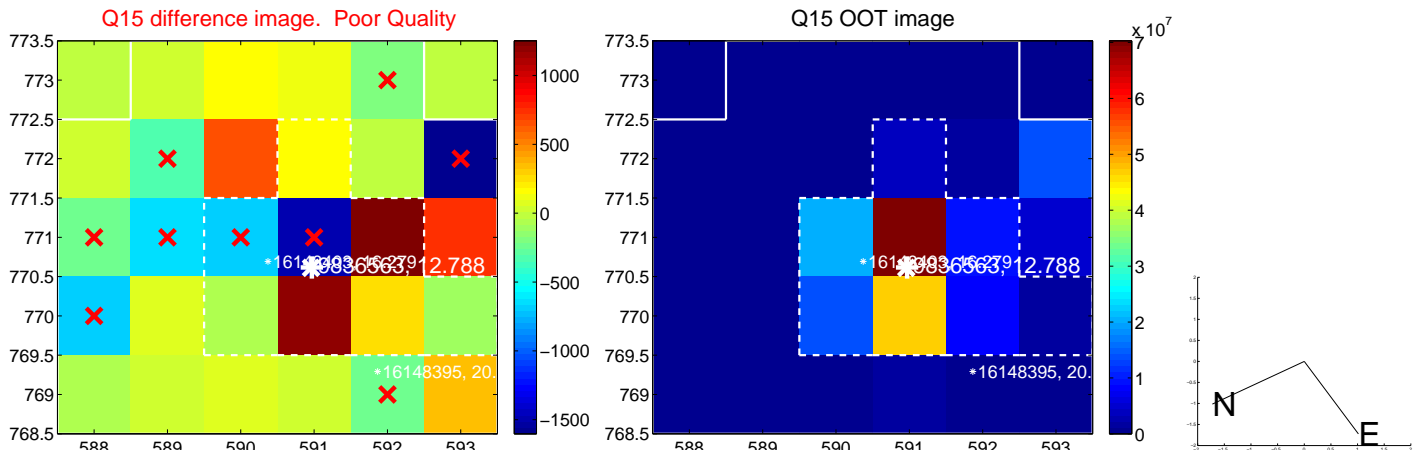
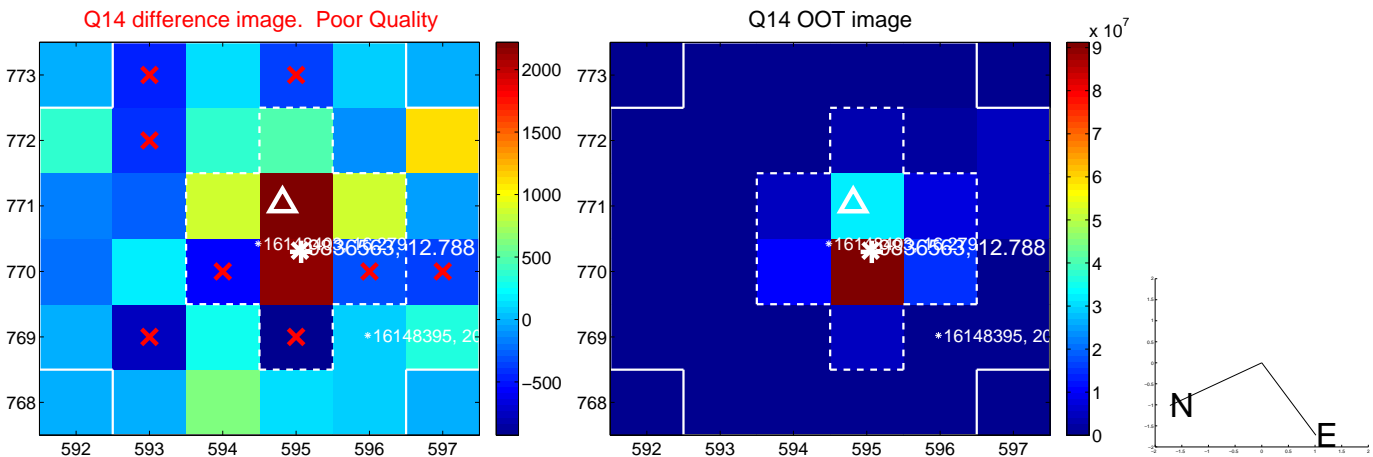
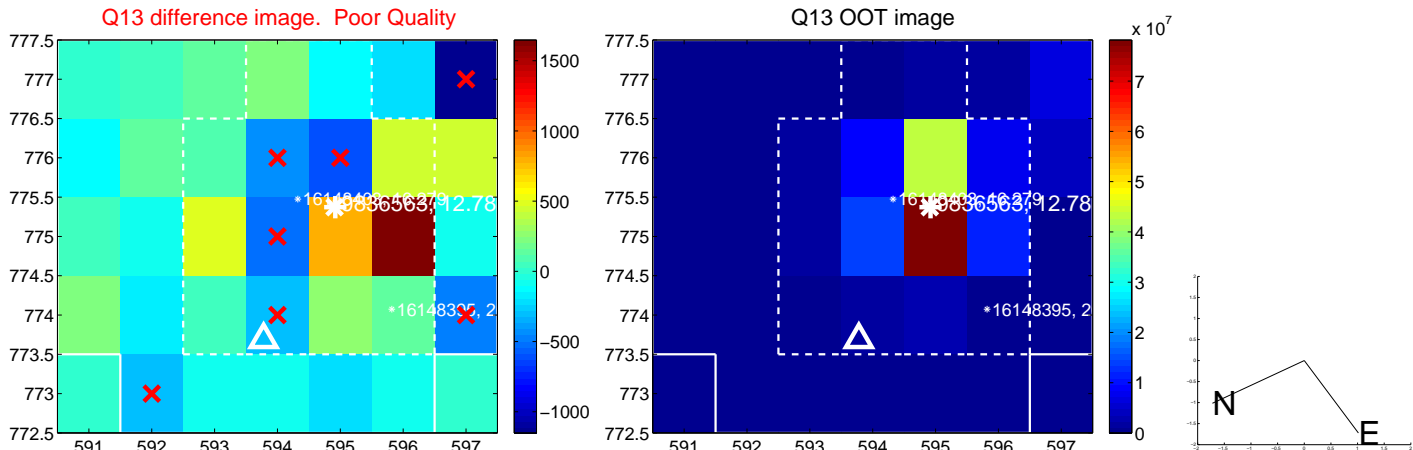
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



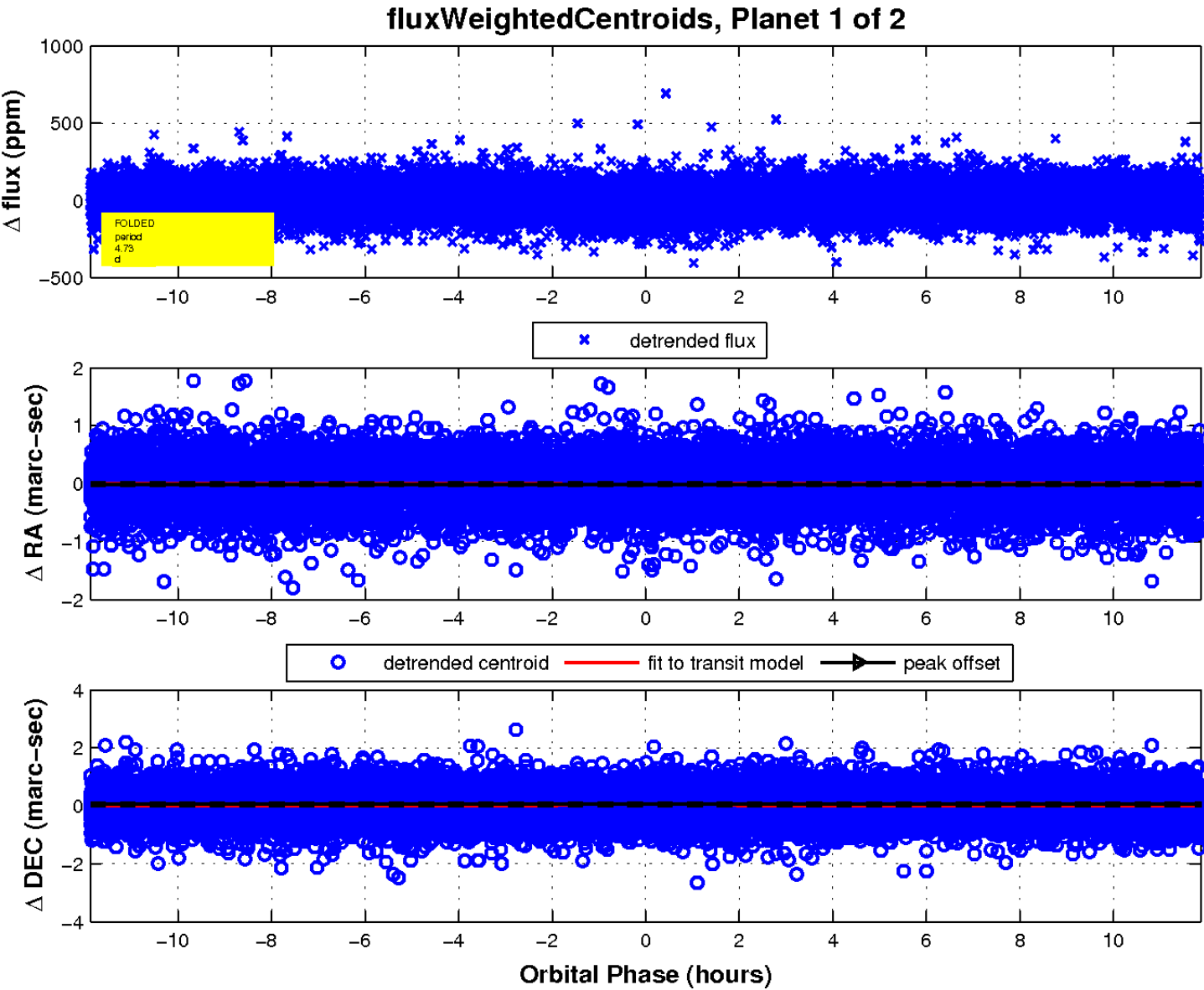
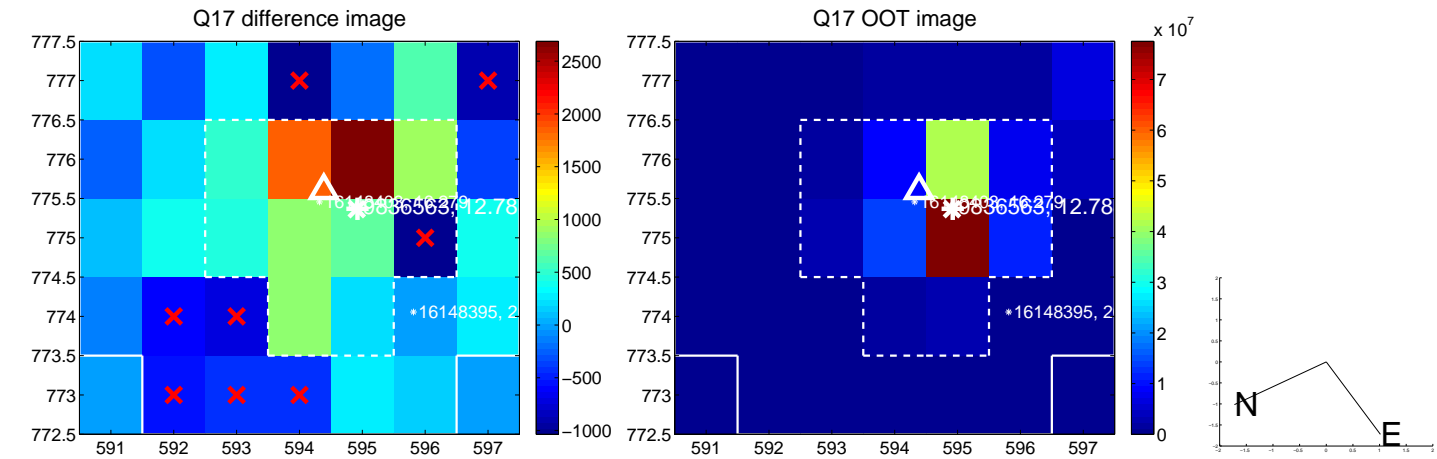
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

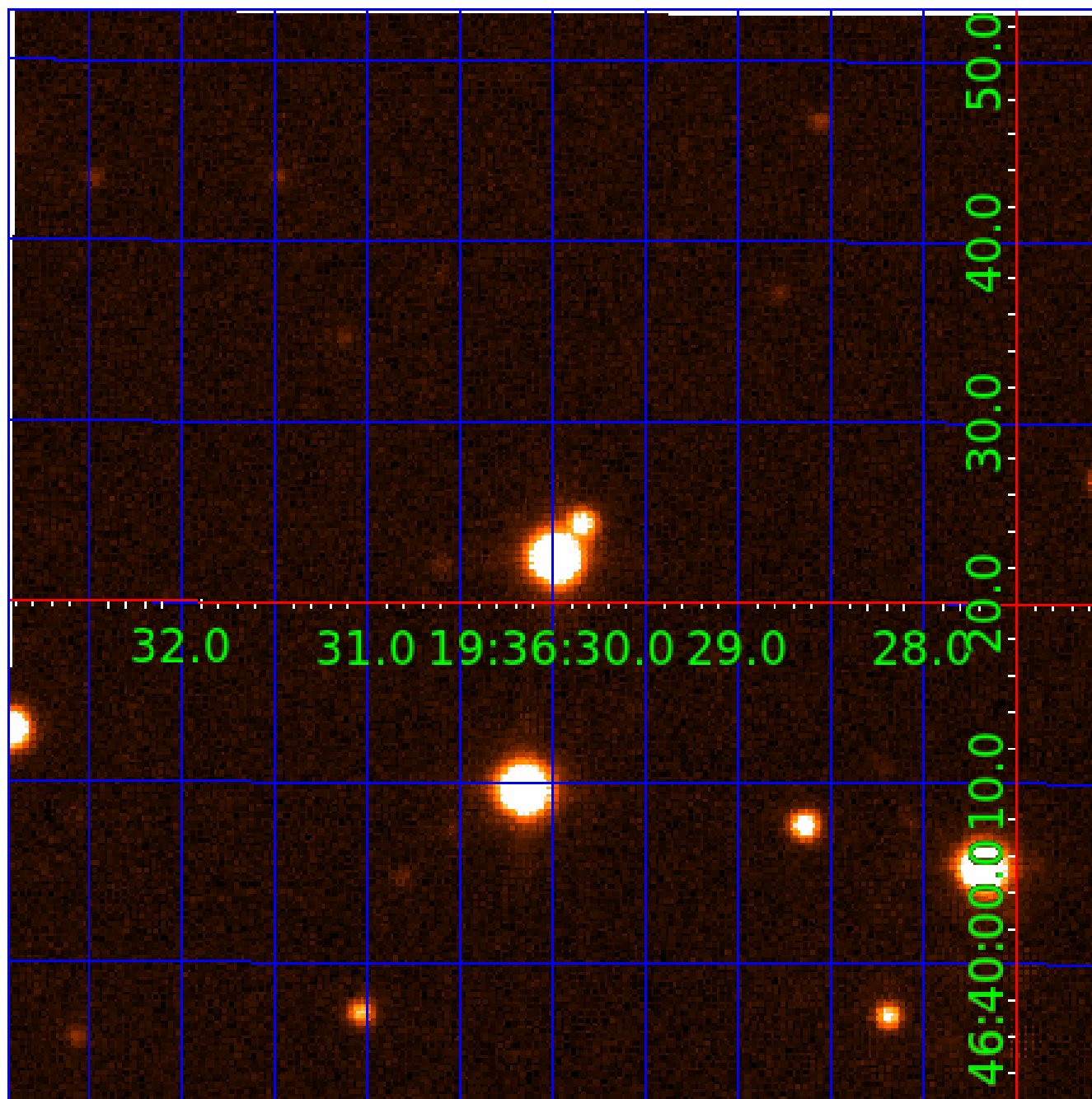


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 009836563

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})
009836563-01	OBS	4421.01	4.726960	135.286928	25.4	3.957	9.8	10.2	1.20	5950	0.73	496.60
009836563-02	OBS	4421.02	6.559531	132.037788	19.7	5.771	7.9	7.5	1.20	5950	0.62	320.84

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009836563-01	OBS	PC	0.98	0	0	0	0	NO_COMMENT
009836563-02	OBS	PC	0.97	0	0	0	0	NO_COMMENT

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

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

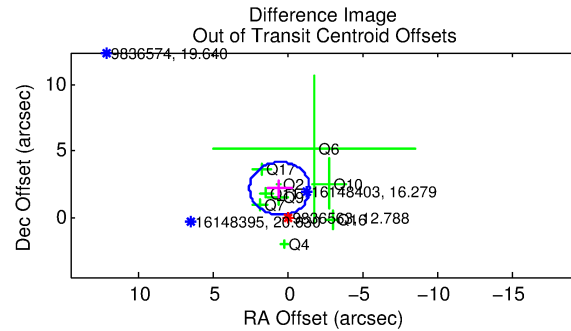
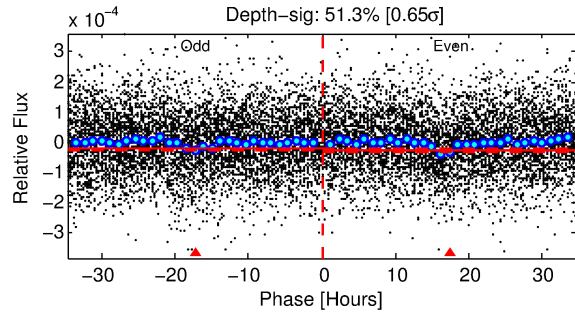
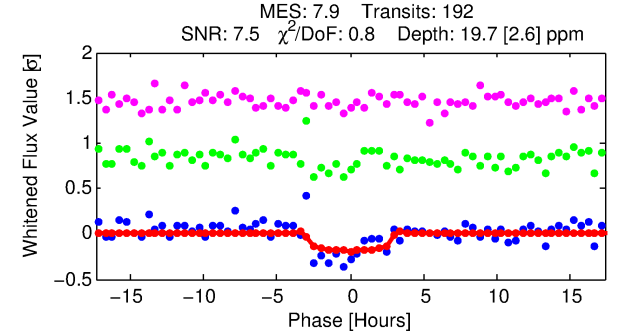
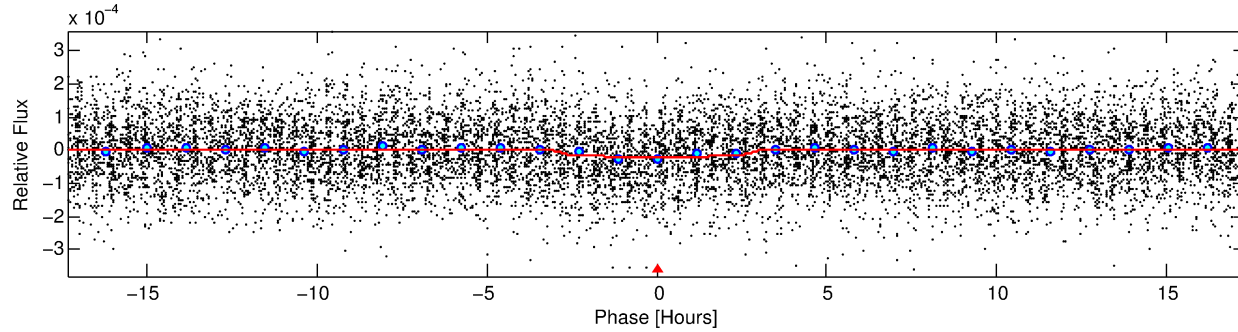
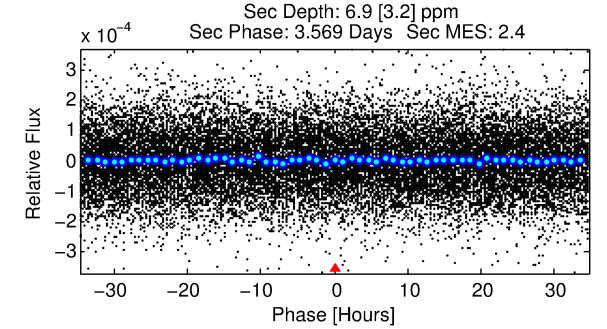
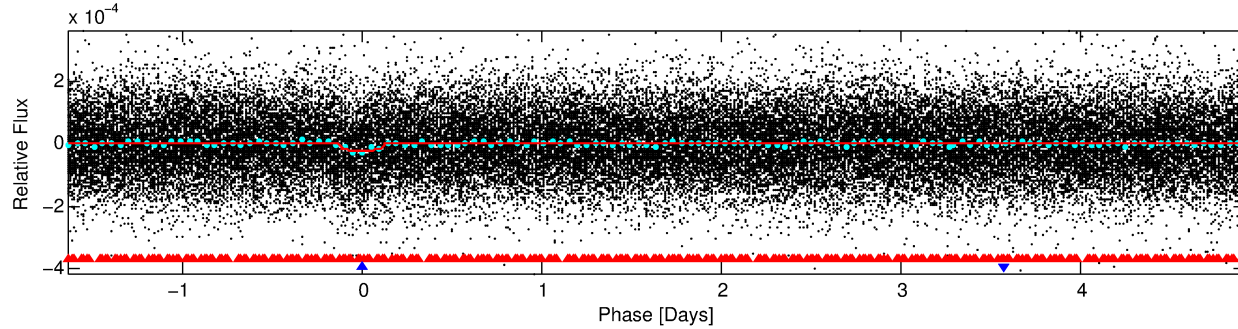
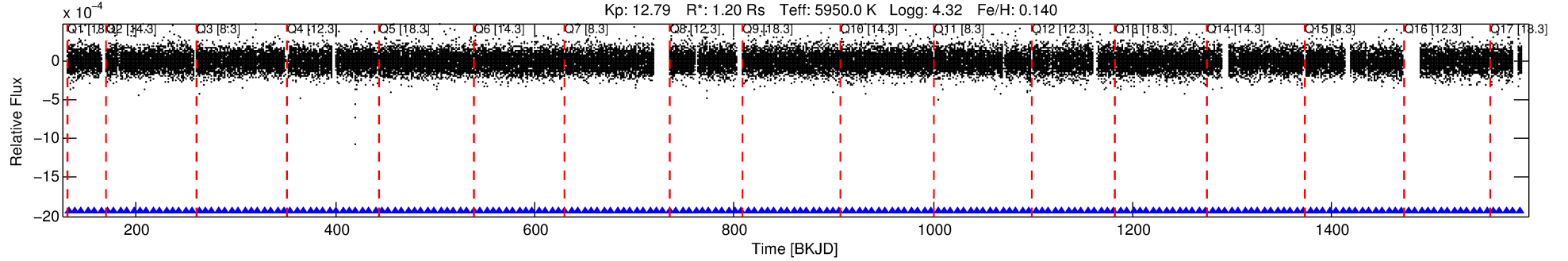
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009836563-02

No Significant Match Found

DV One-Page Summary

KIC: 9836563 Candidate: 2 of 2 Period: 6.560 d
KOI: K04421.02 Corr: 0.834



DV Fit Results:

Period = 6.55953 [0.00010] d
Epoch = 132.0378 [0.0112] BKJD
Rp/R* = 0.0048 [0.0019]
a/R* = 4.22 [7.84]
b = 0.89 [0.48]
Seff = 320.84 [84.36]
Teq = 1079 [71] K
Rp = 0.62 [0.28] Re
a = 0.0708 [0.0121] AU
Ag = 49.29 [47.23] [1.02σ]
Teffp = 4421 [1022] K [3.26σ]

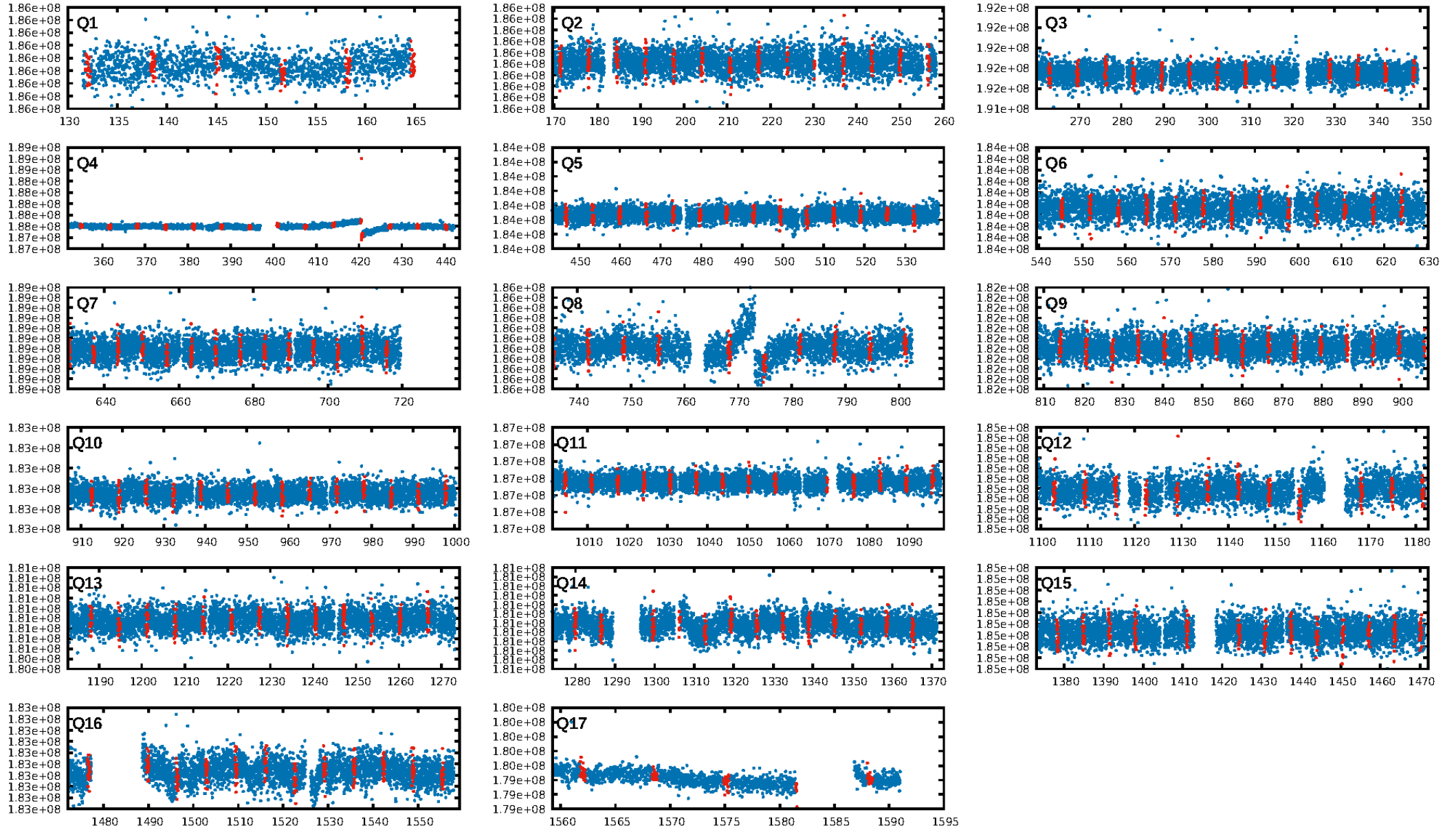
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [6.29σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 100.0%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 5.06e-15
RollingBand-fgt: 1.00 [182/182]
GhostDiagnostic-chr: -1.455
Centroid-sig: 5.1%
Centroid-so: 2.211 arcsec [1.02σ]
OotOffset-rm: 2.248 arcsec [3.35σ]
KicOffset-rm: 2.246 arcsec [3.34σ]
OotOffset-st: 3/2/2/2 [9]
KicOffset-st: 3/2/2/2 [9]
DiffImageQuality-fgm: 0.56 [5/9]
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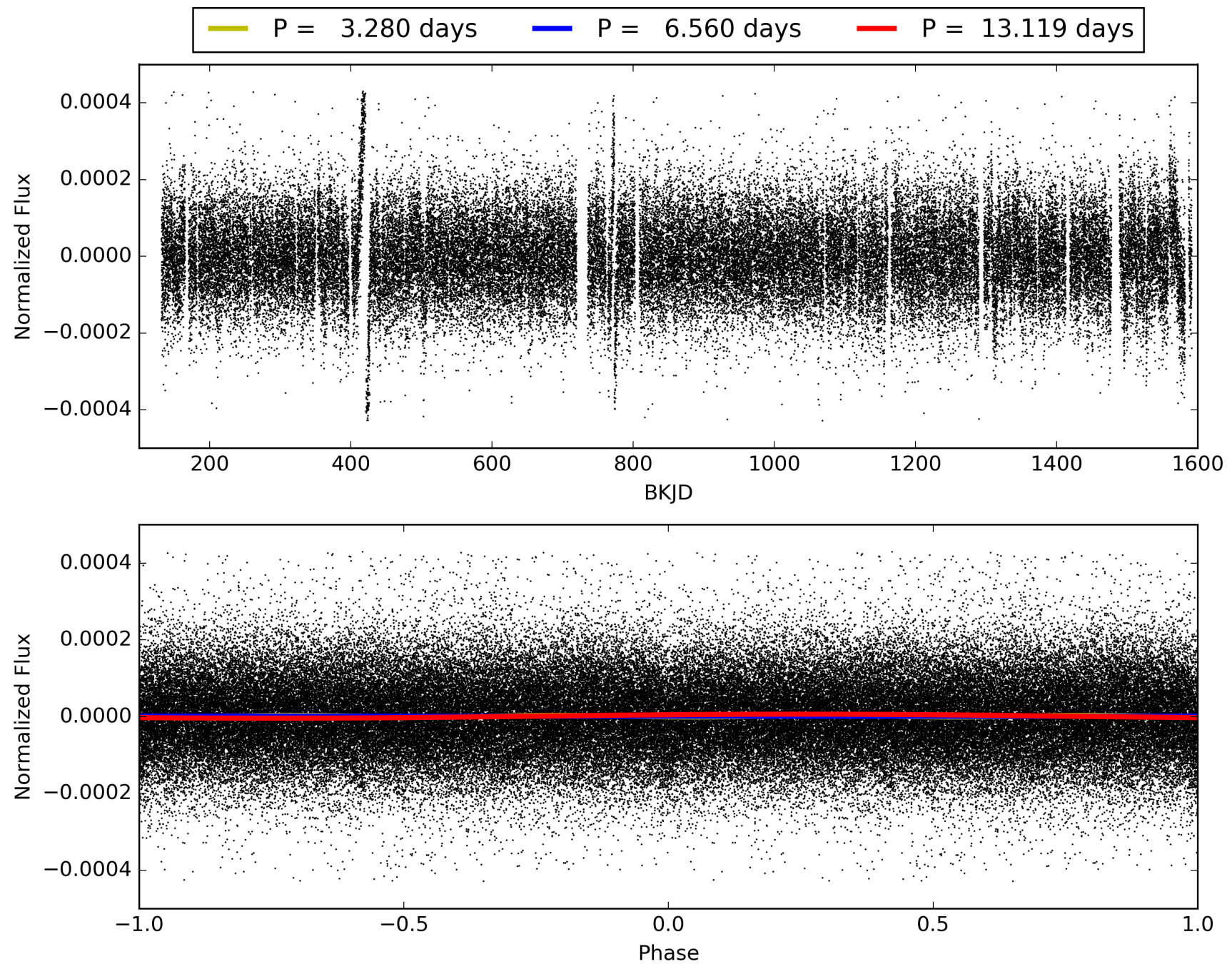
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 20:39:00 Z

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

TCE 009836563-02, PDC Light Curves

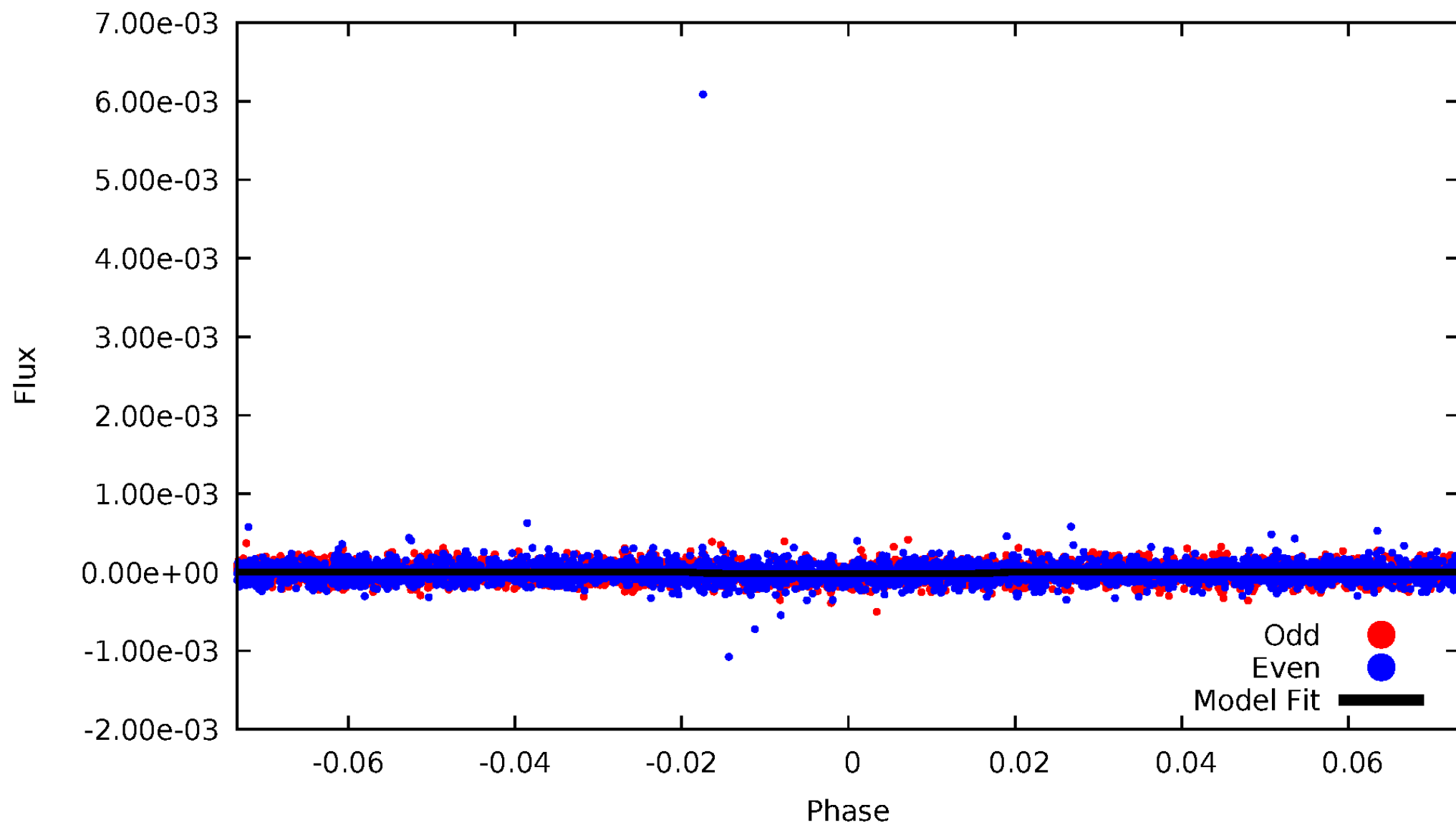


TCE 009836563-02



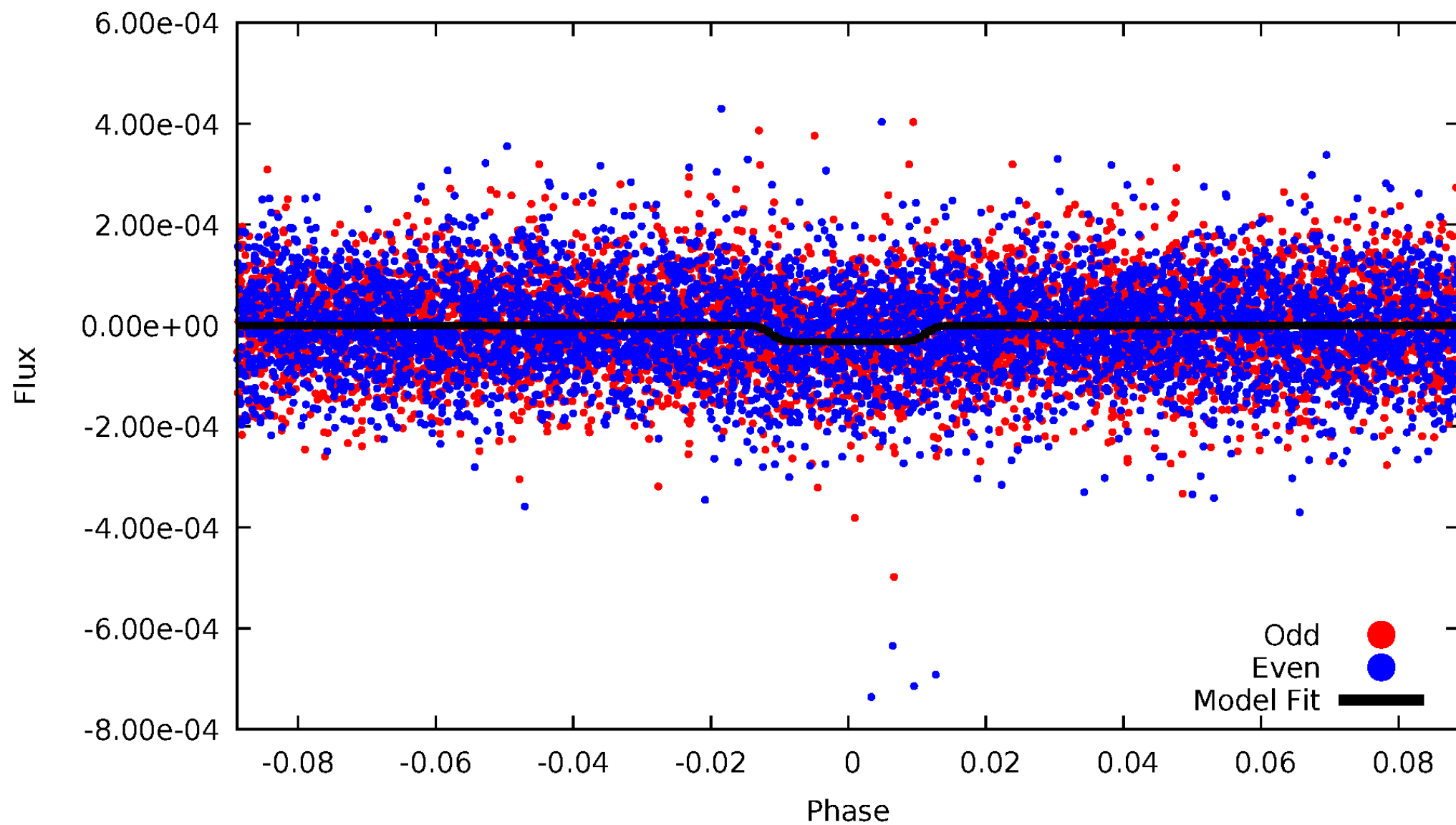
DV Odd/Even

TCE 009836563-02



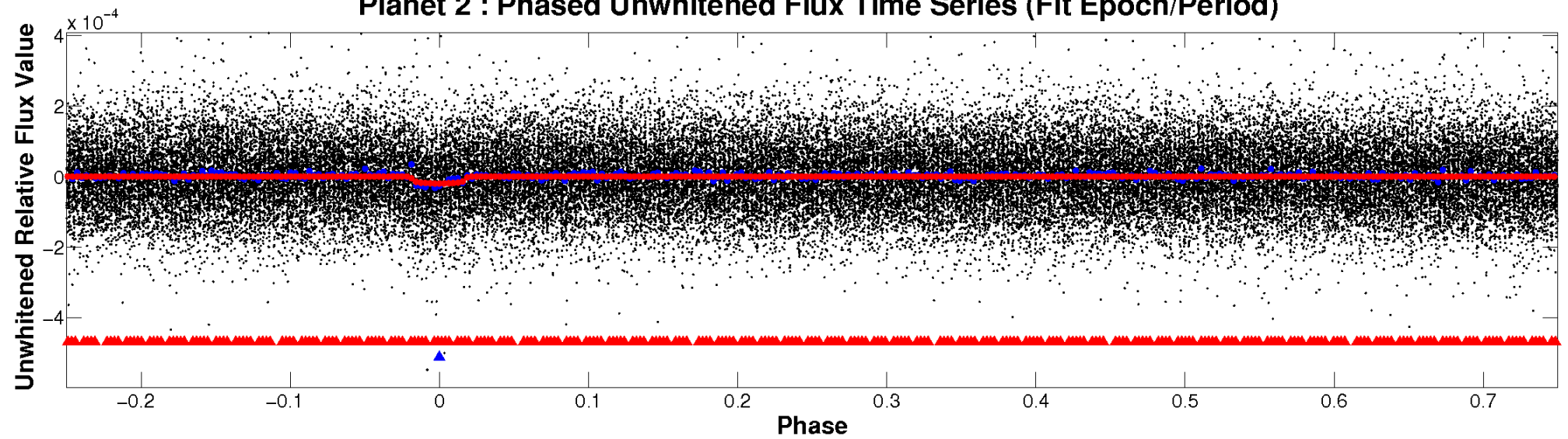
ALT Odd/Even

TCE 009836563-02

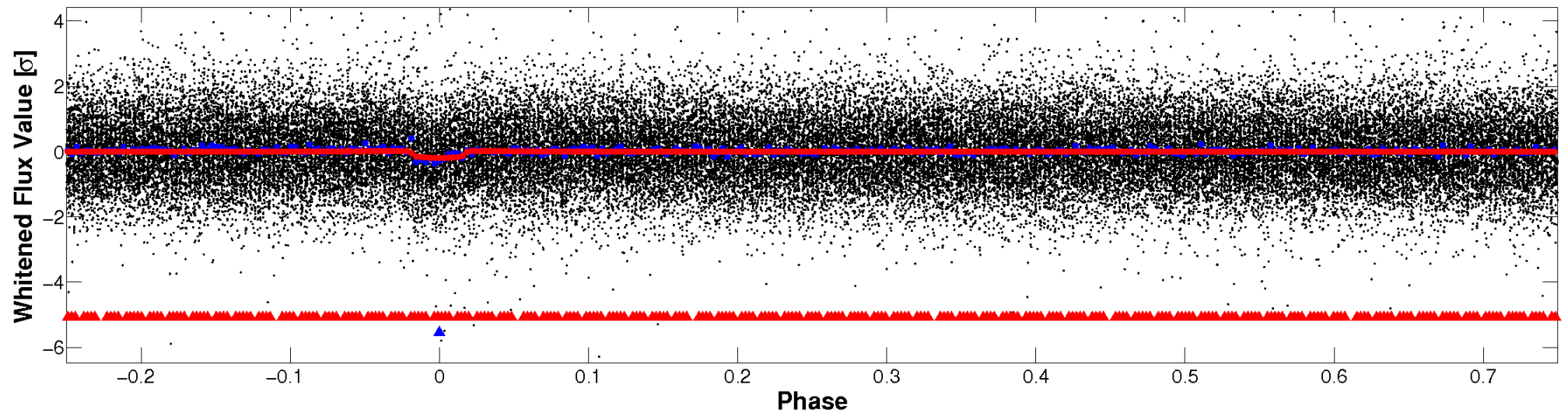


Non-Whitened Vs. Whitened Light Curve

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

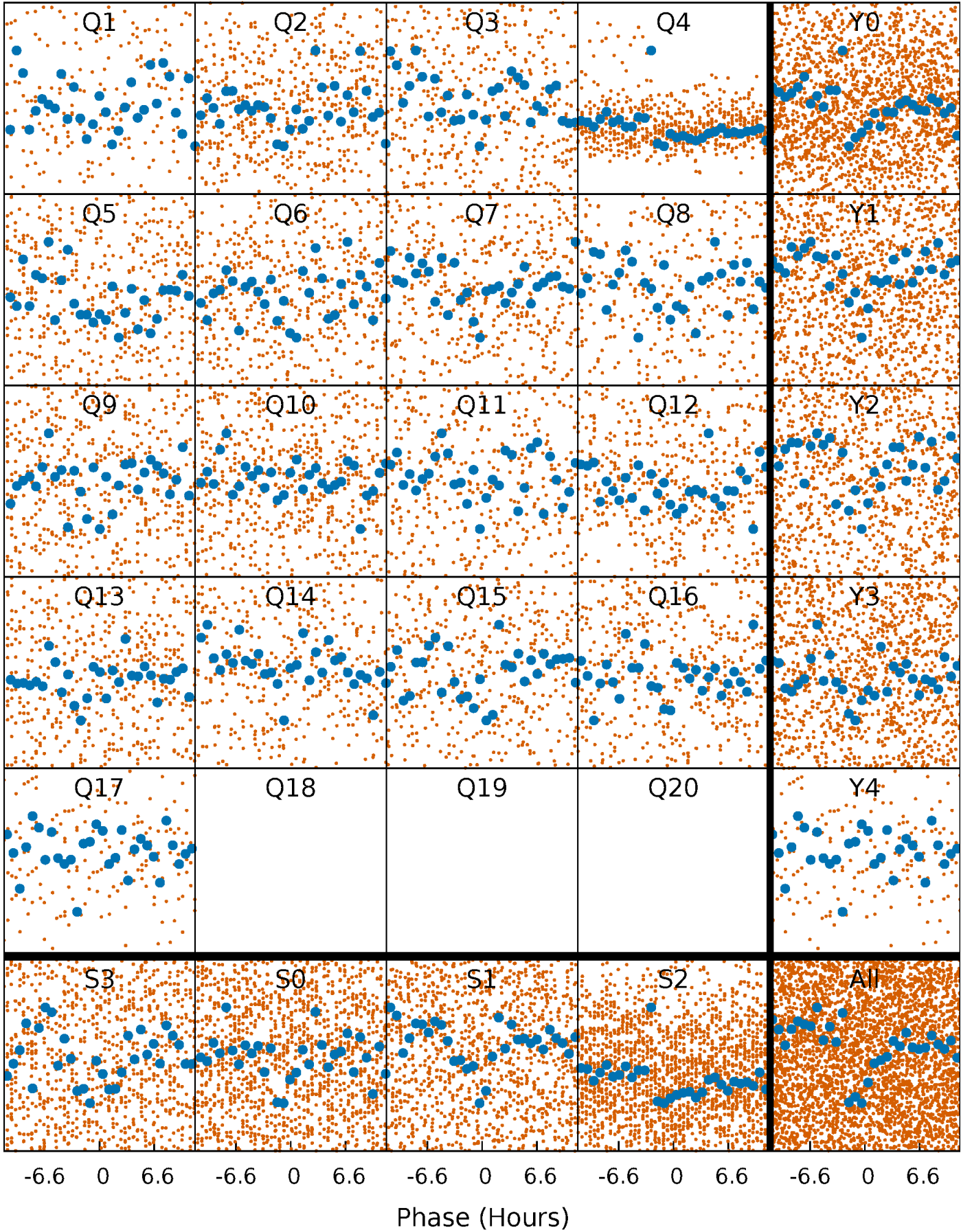


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



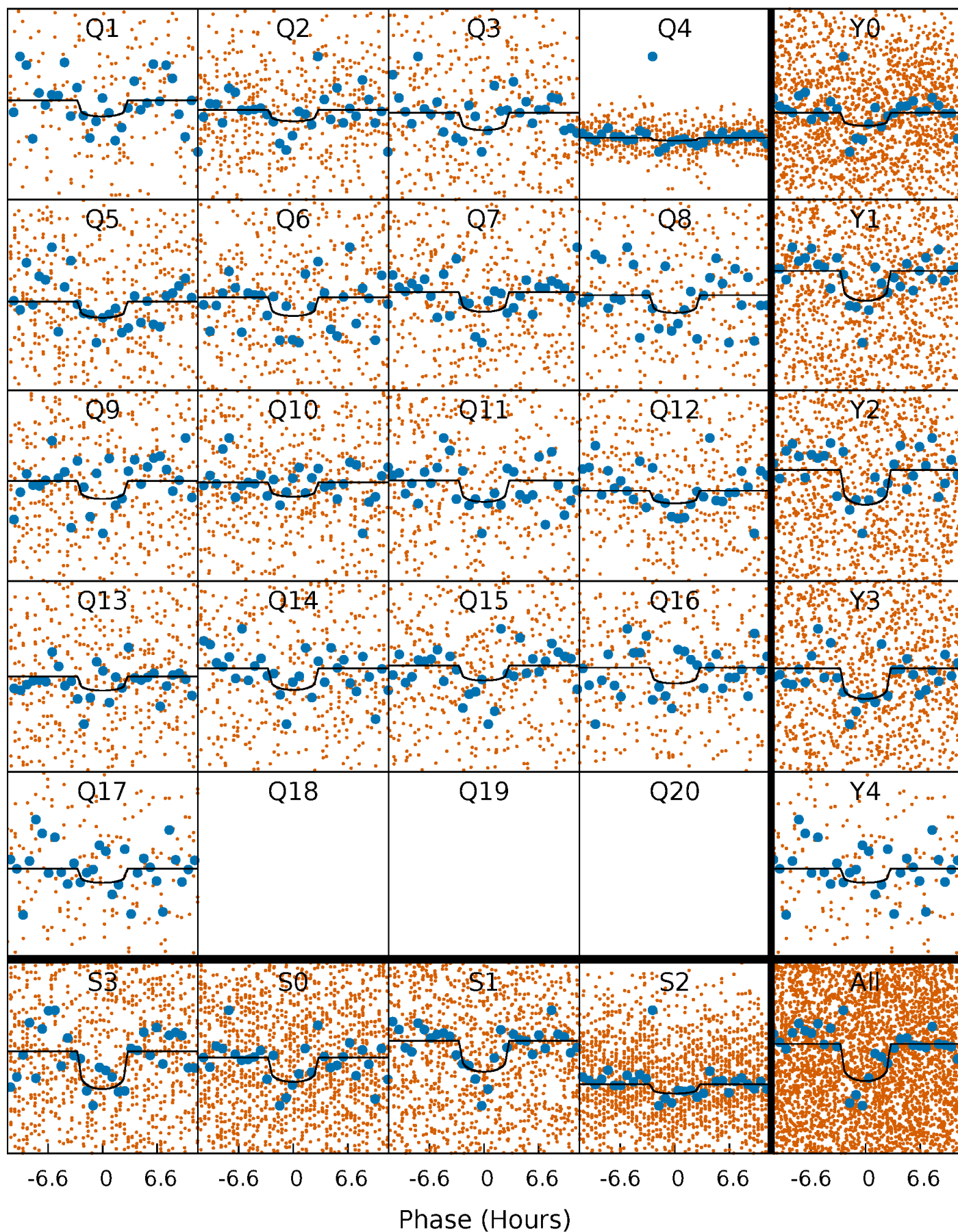
PDC Quarter-Phased Transit Curves

TCE 009836563-02 P= 6.559531 Days $T_0=132.037788$ (BKJD)



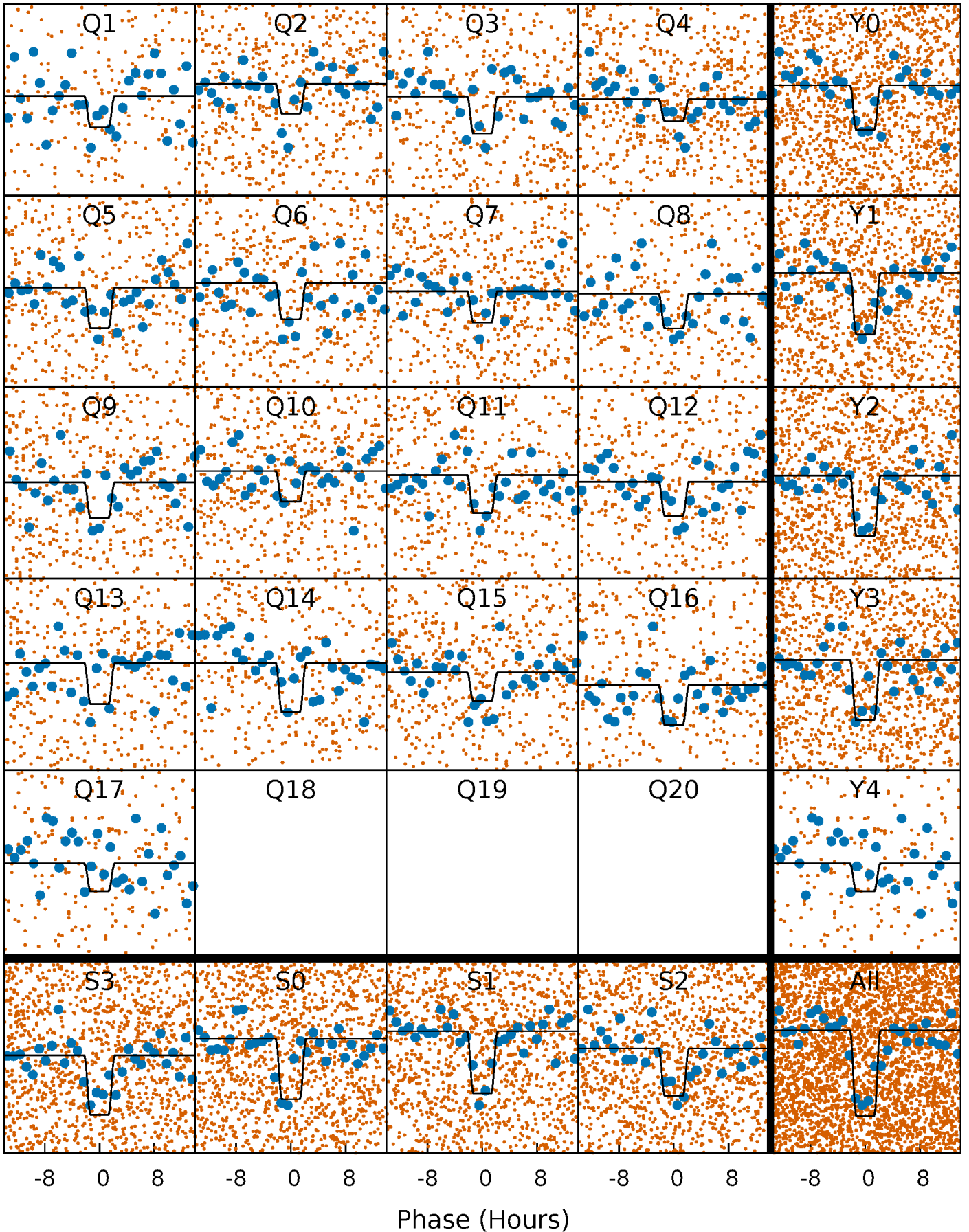
DV Quarter-Phased Transit Curves

TCE 009836563-02 P= 6.559531 Days $T_0=132.037788$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

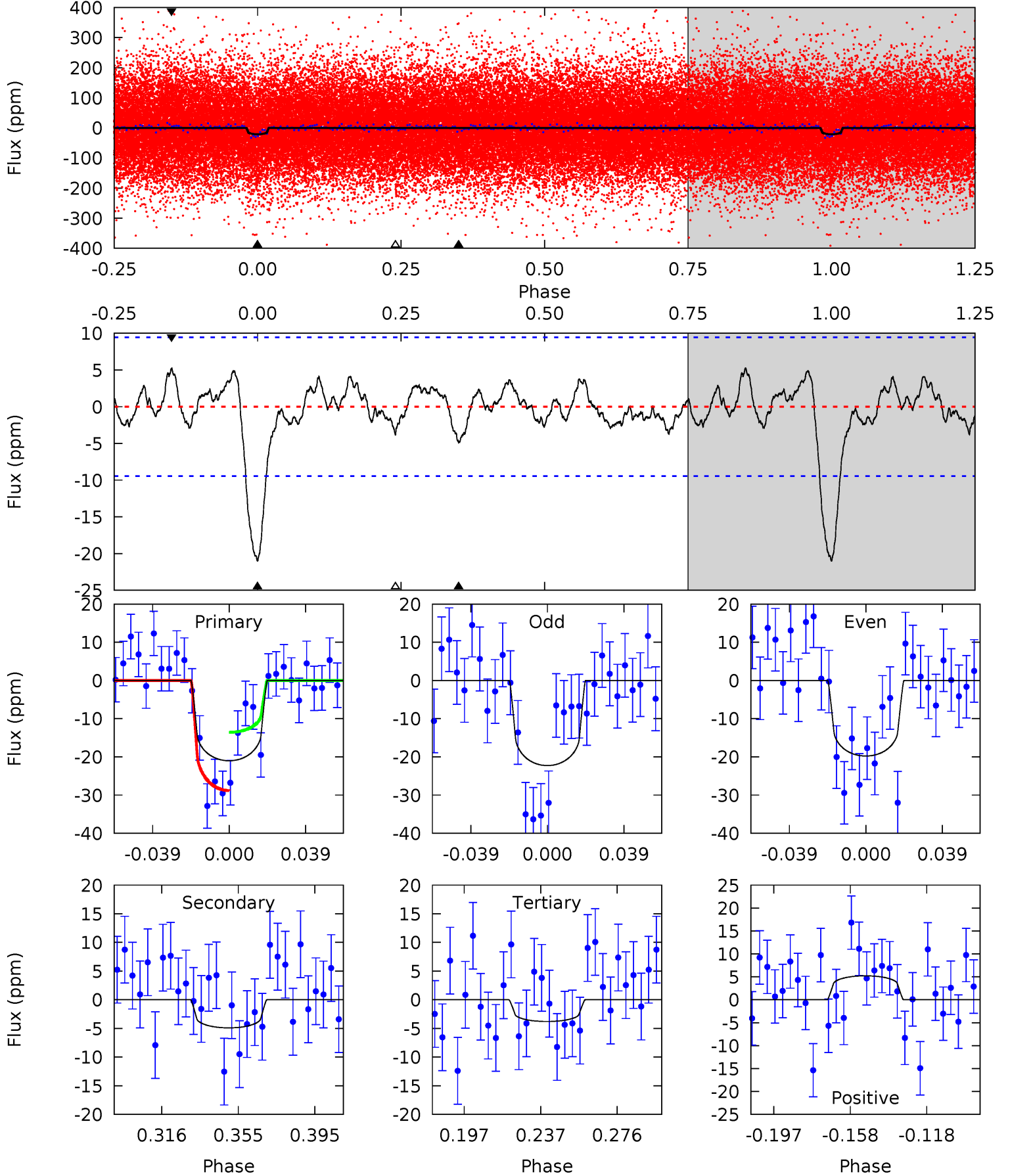
TCE 009836563-02 P= 6.559448 Days $T_0=132.027807$ (BKJD)



DV Model-Shift Uniqueness Test

009836563-02, P = 6.559531 Days, E = 125.478257 Days

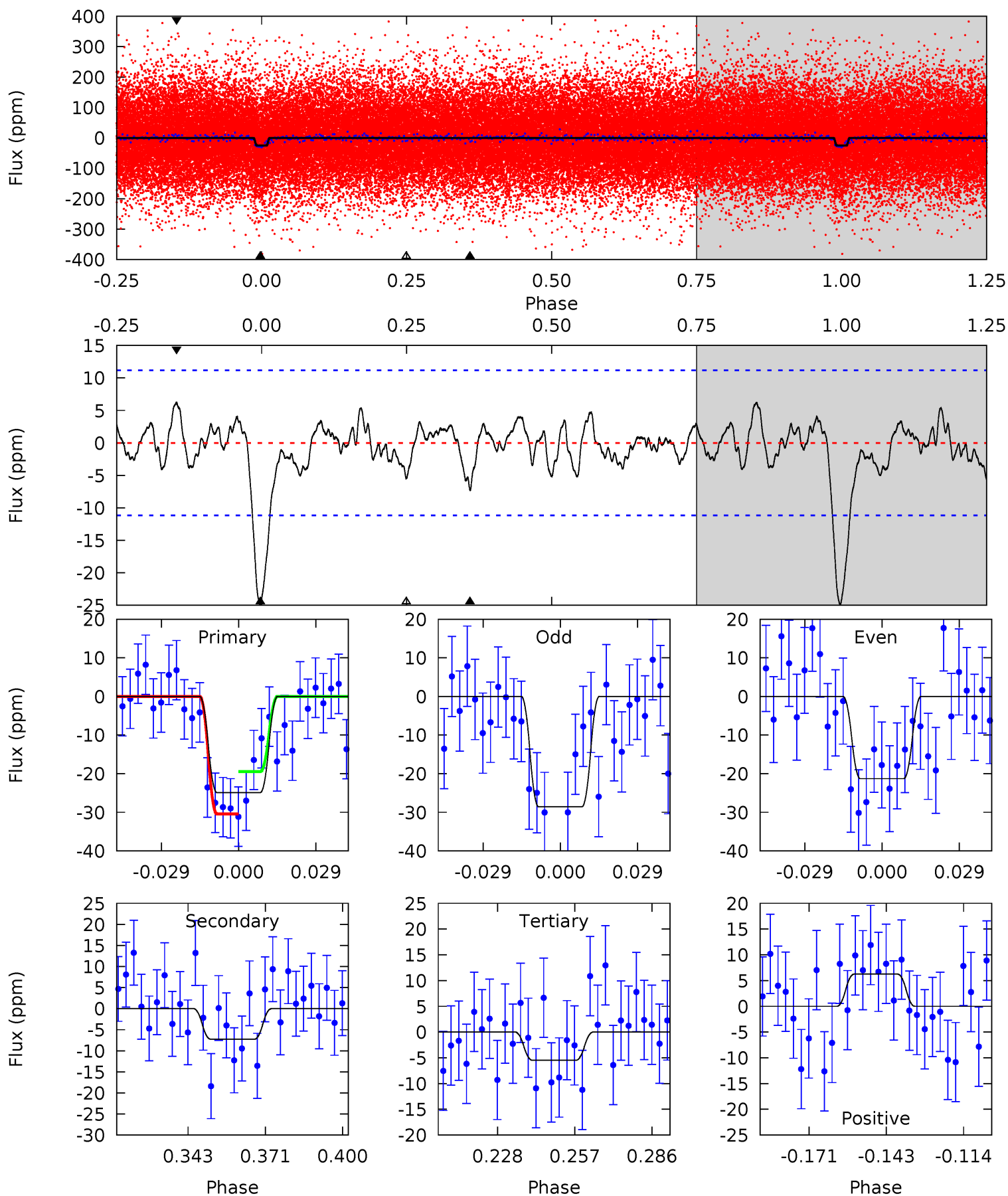
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
10.6	2.47	1.91	2.63	4.76	2.06	0.98	8.67	7.95	0.56	-0.16	0.63	0.94	0.20	3.84



Alt Model-Shift Uniqueness Test

009836563-02, P = 6.559448 Days, E = 125.468359 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
10.7	3.14	2.37	2.69	4.82	2.19	1.02	8.37	8.04	0.77	0.44	1.57	1.27	0.20	2.37



Stellar Parameters For KIC 009836563

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	5950^{+71}_{-83}	$4.323^{+0.096}_{-0.144}$	$0.140^{+0.150}_{-0.150}$	$1.196^{+0.235}_{-0.157}$	$1.100^{+0.077}_{-0.070}$	$0.905^{+0.375}_{-0.365}$
	+1%/-1%	+2%/-3%	+107%/-107%	+20%/-13%	+7%/-6%	+41%/-40%
Source	SPE90	FLK73	SPE90	DSEP		

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

Secondary Eclipse Parameters for KIC 009836563-02 / KOI 4421.02

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-5 ± 2	$0.63^{+0.26}_{-0.25}$	1516^{+81}_{-61}	4272^{+947}_{-612}	33^{+61}_{-19}
Alt.	-7 ± 2	$0.76^{+0.25}_{-0.26}$	1514^{+82}_{-56}	4313^{+766}_{-514}	35^{+44}_{-18}

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

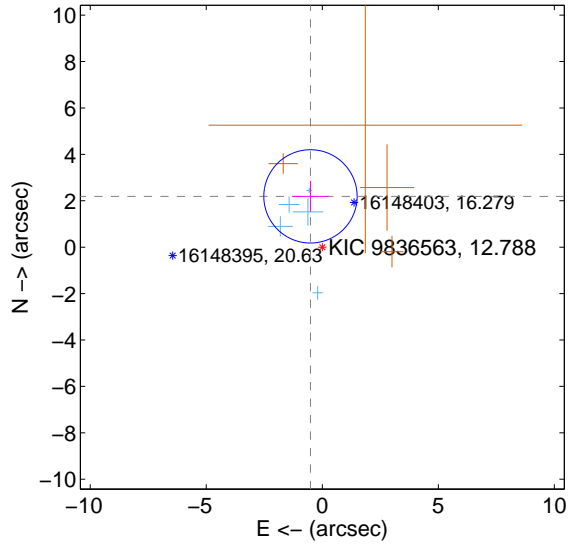
Supplemental centroid analysis for 009836563-02. Kepler magnitude: 12.79. Transit SNR 7.54

There are 5 quarters with good PRF difference image offsets

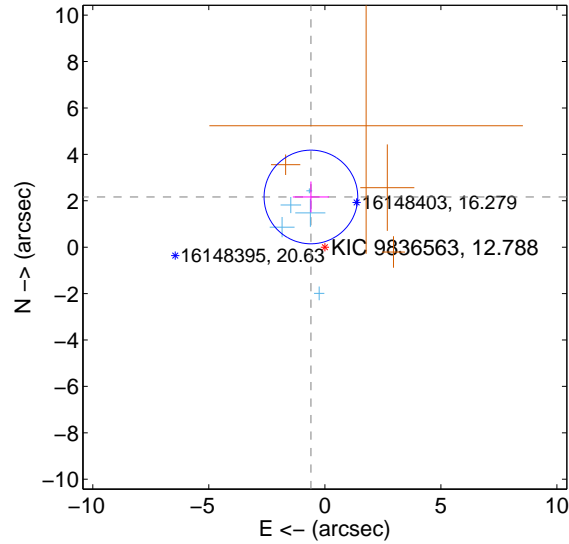
The direct PRF centroid is offset from the target star catalog position by about 0.05 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	2.248 \pm 0.670	3.35	0.510 \pm 0.778	2.189 \pm 0.664
PRF-fit source offset from KIC position	2.246 \pm 0.673	3.34	0.601 \pm 0.778	2.164 \pm 0.664
photometric centroid source offset	2.21 \pm 2.16	1.02	-0.84 \pm 1.25	2.04 \pm 2.28

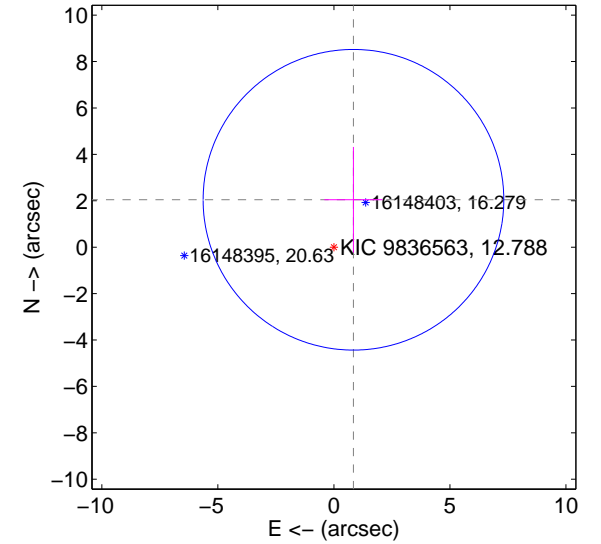
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

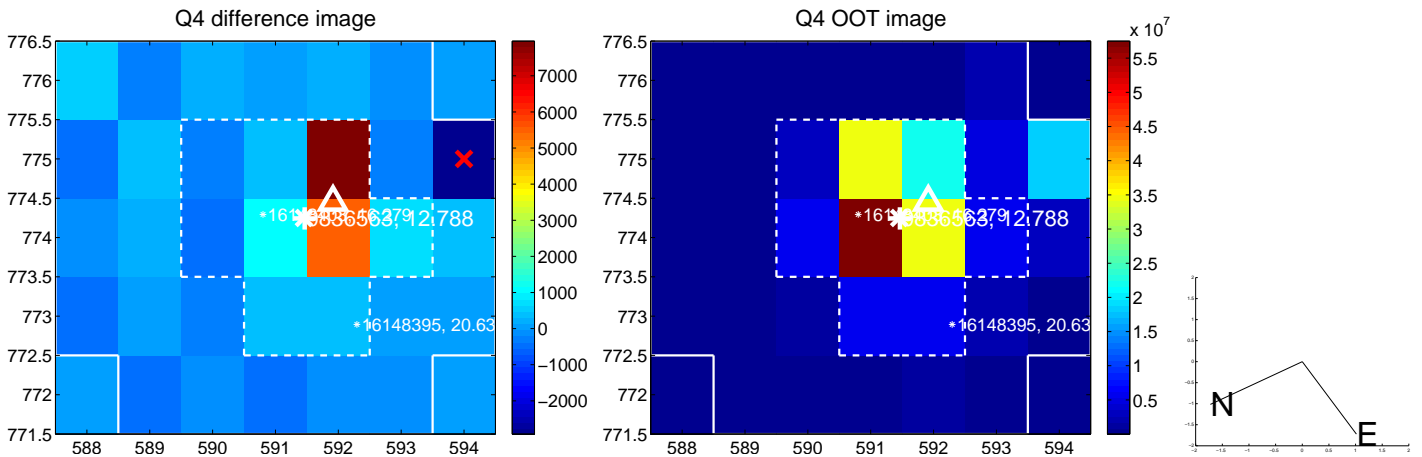
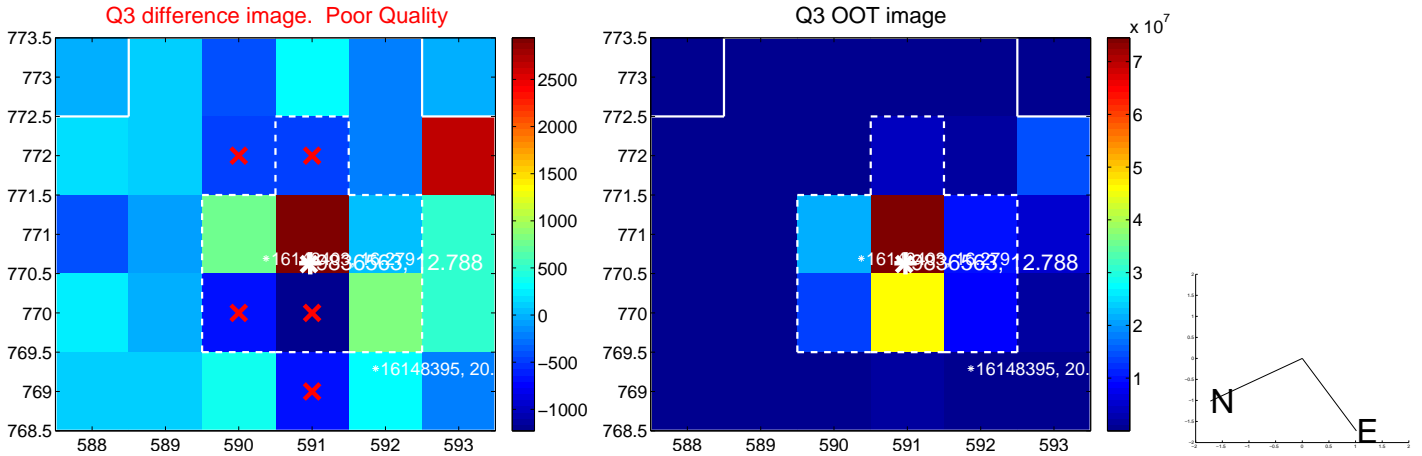
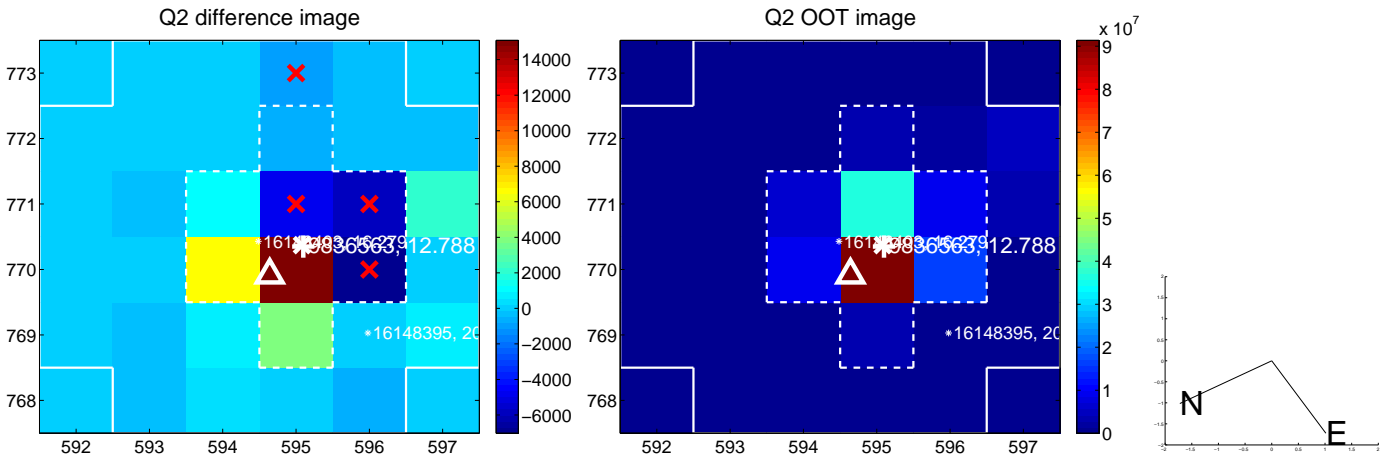
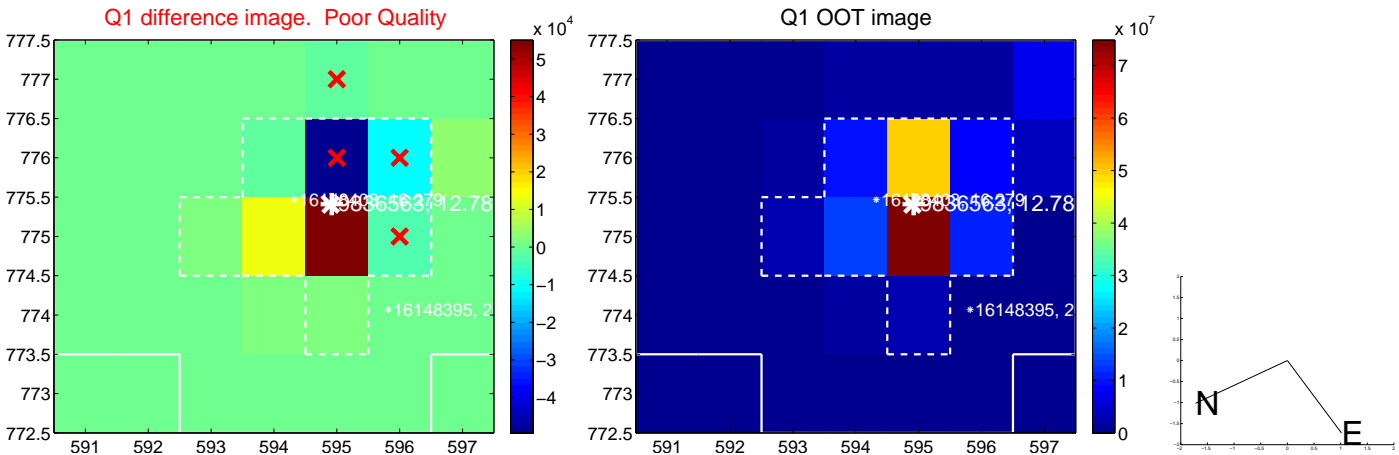


offset from photometric centroids

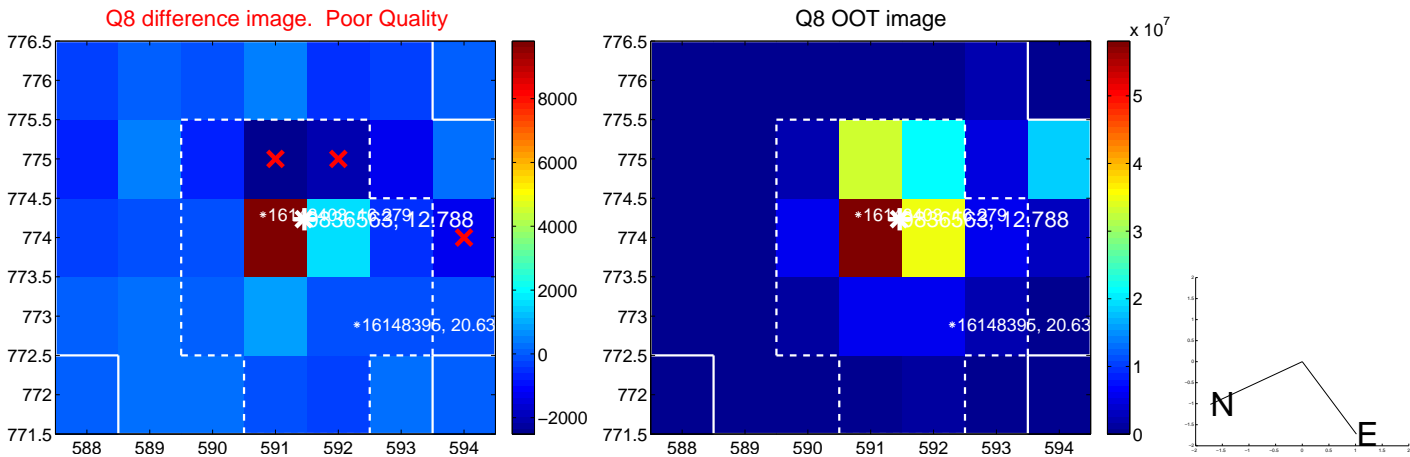
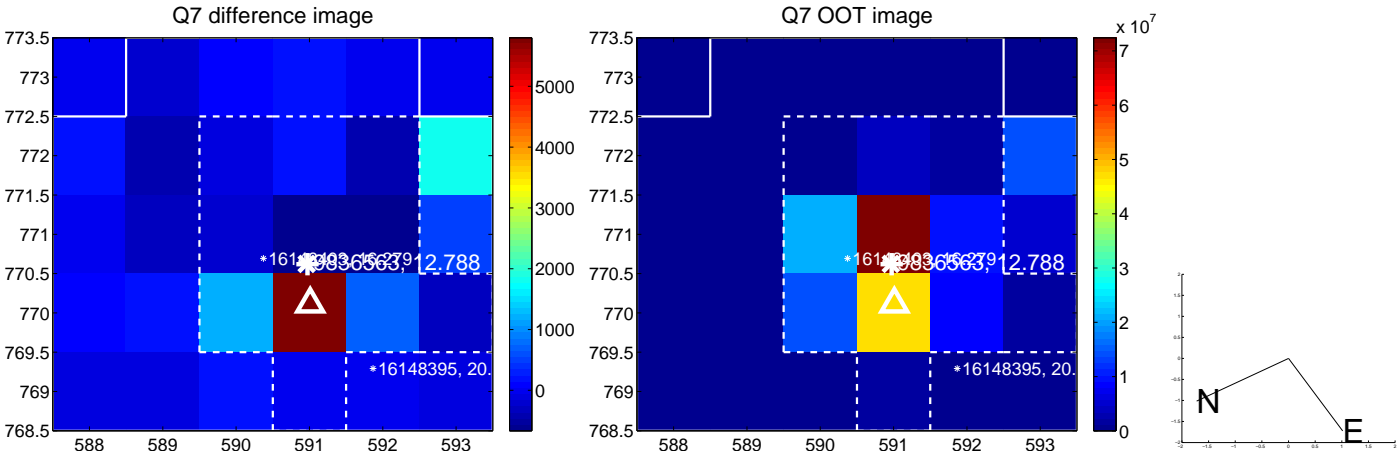
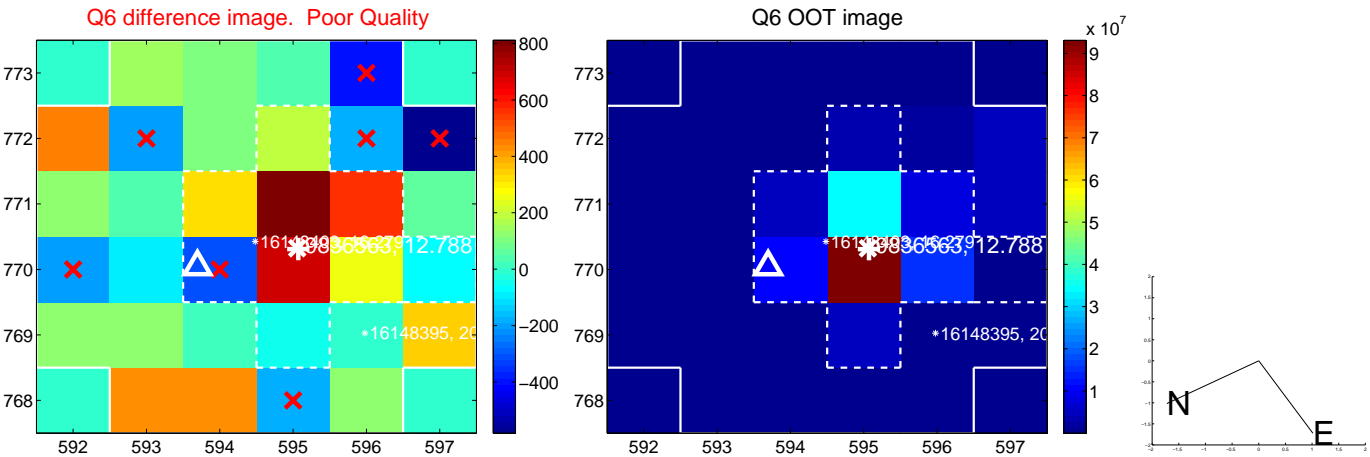
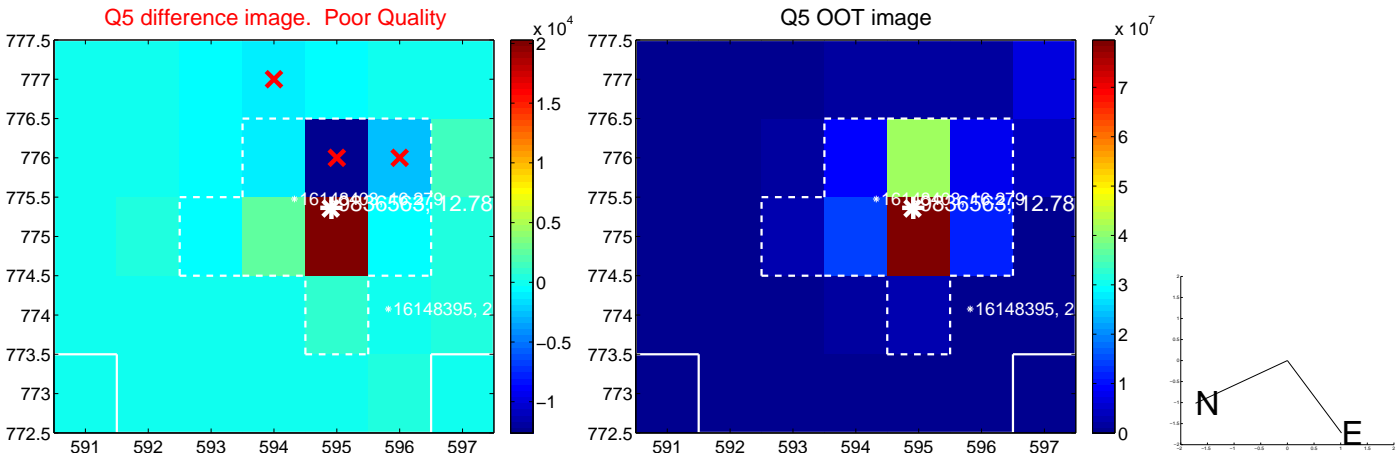


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets**; **Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

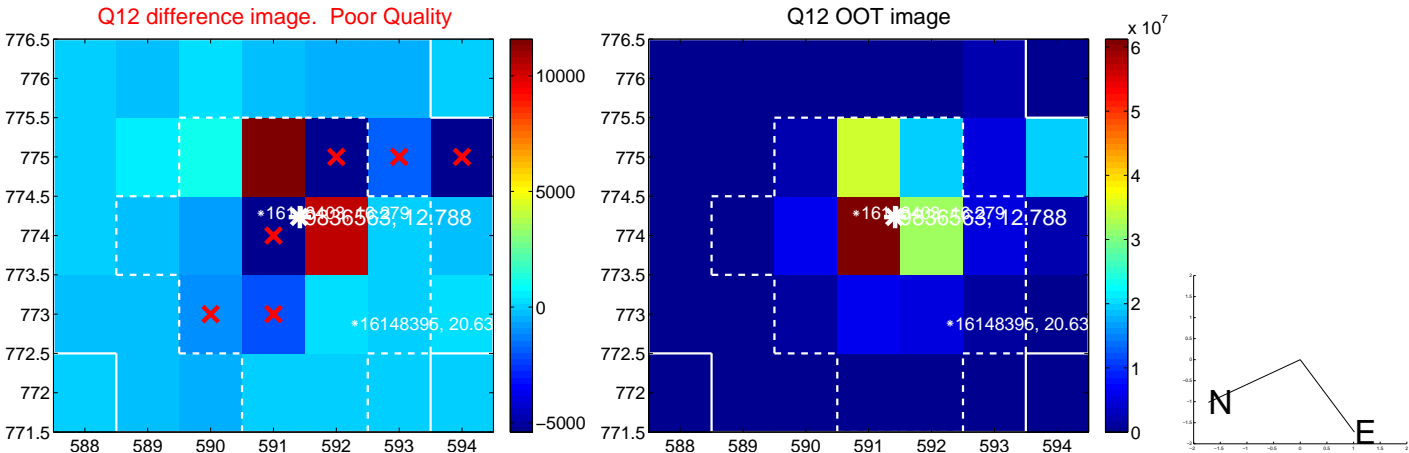
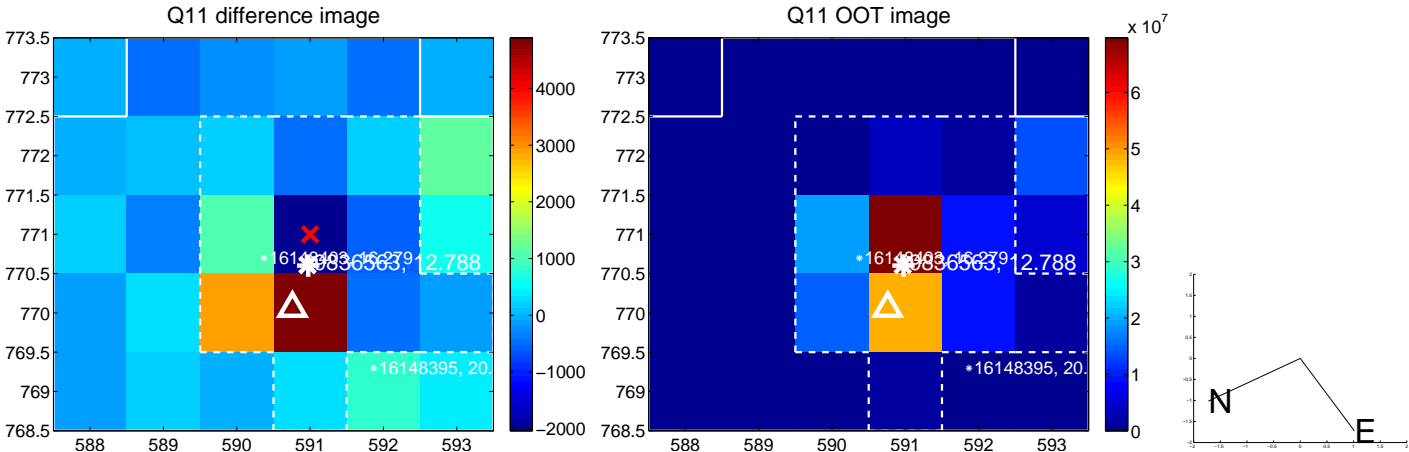
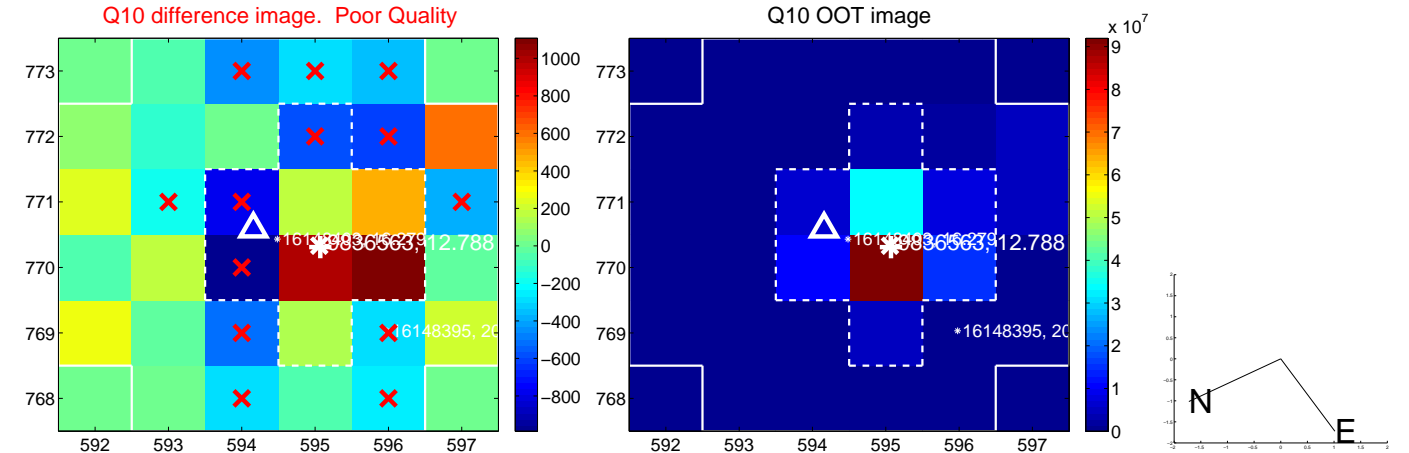
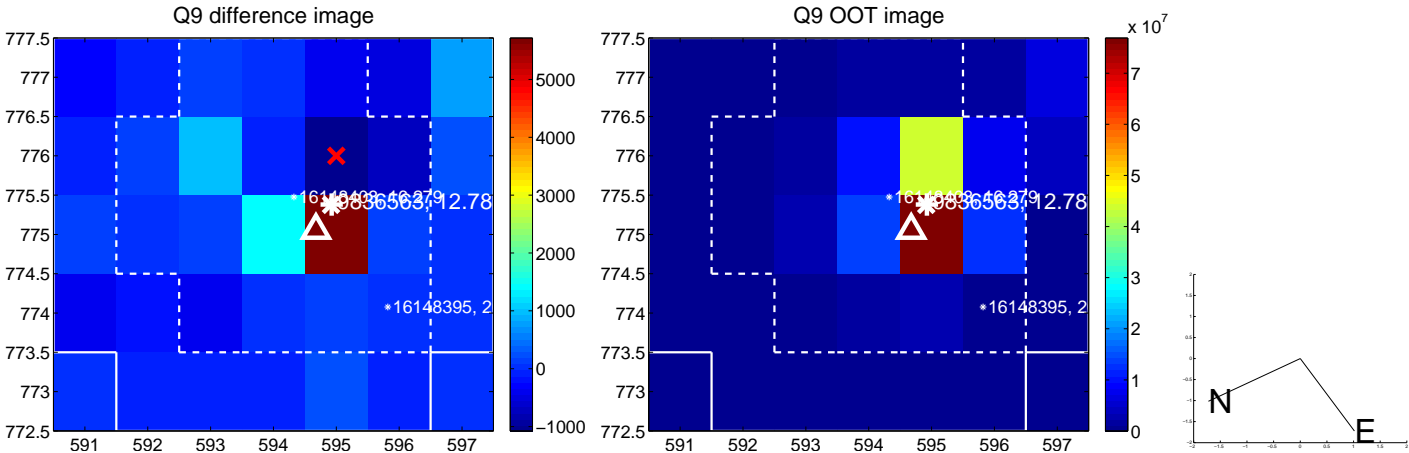
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



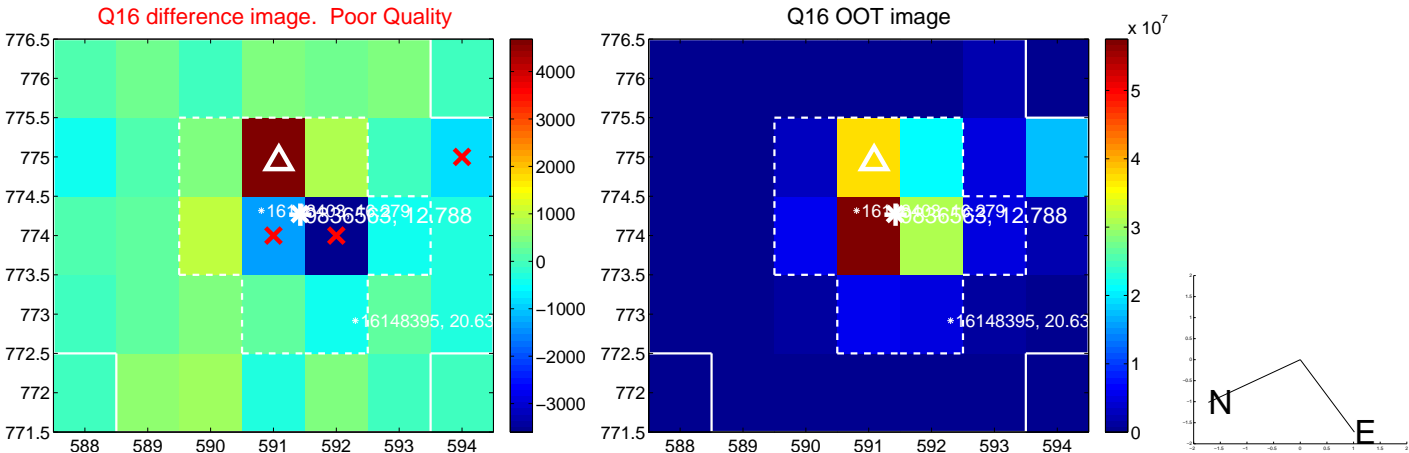
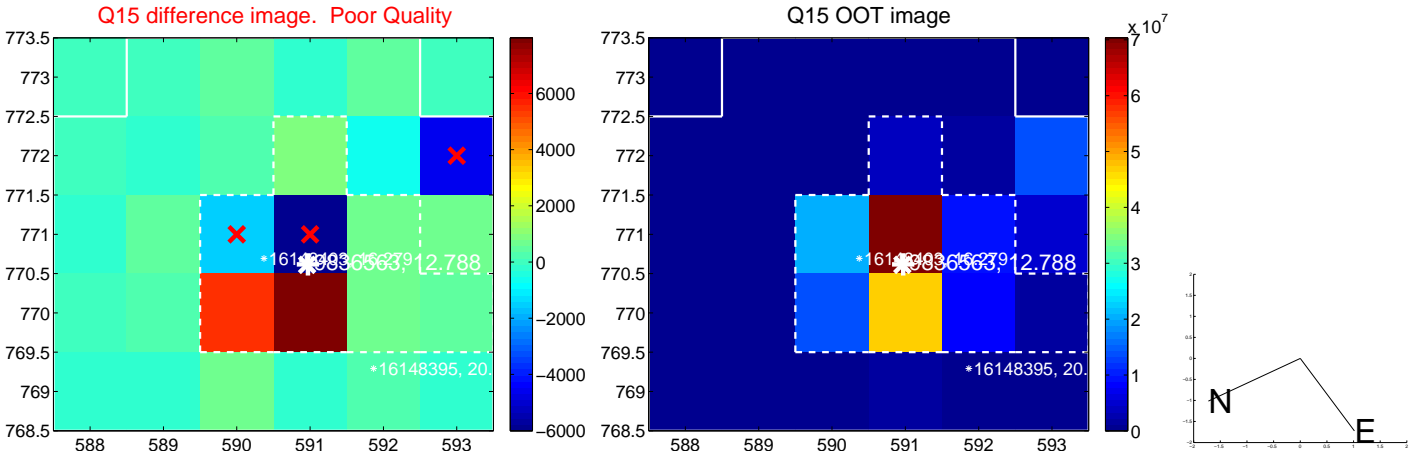
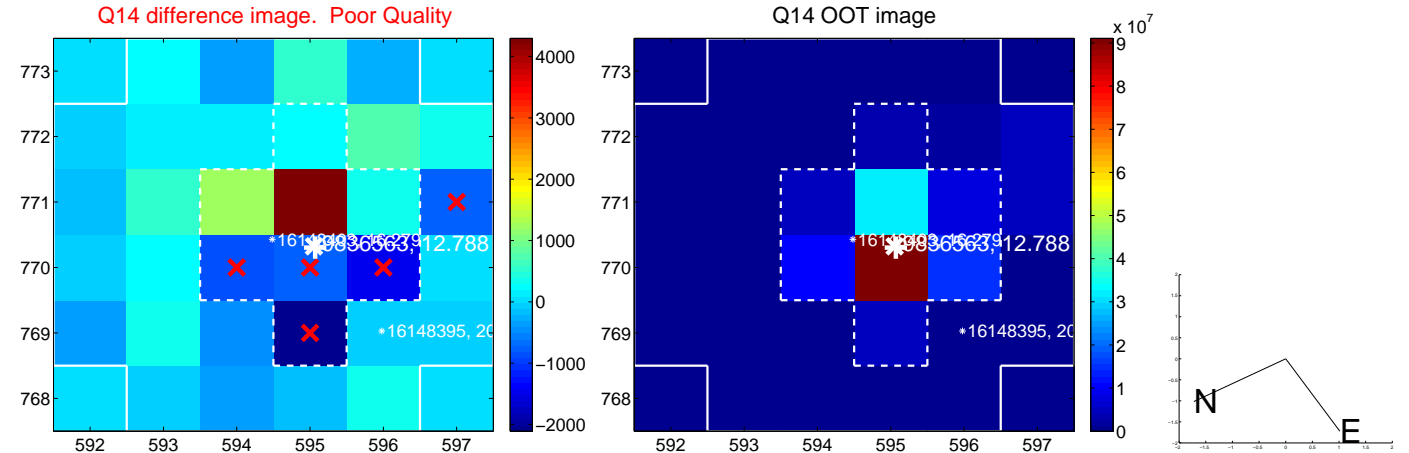
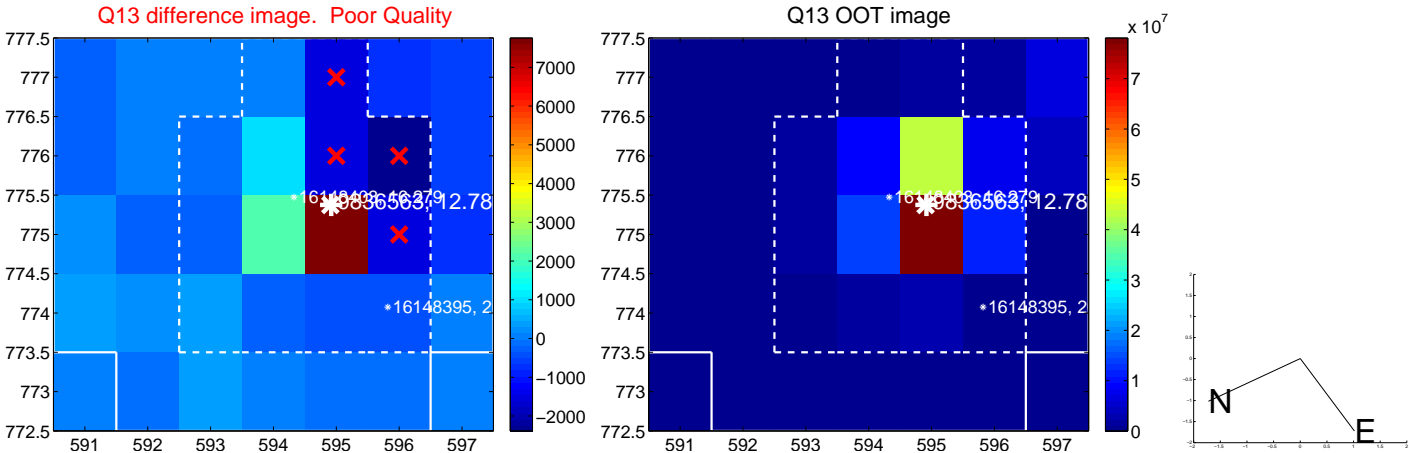
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



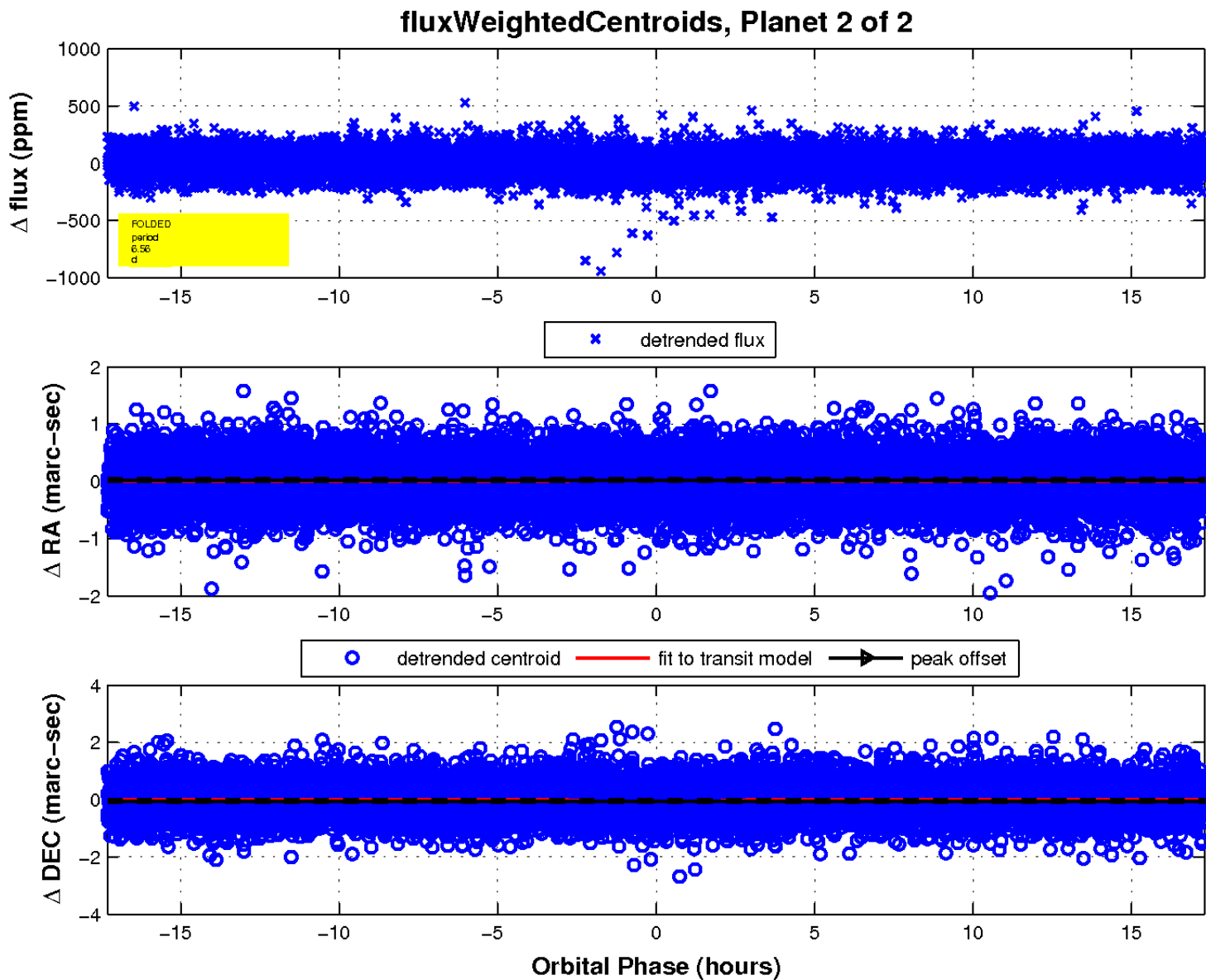
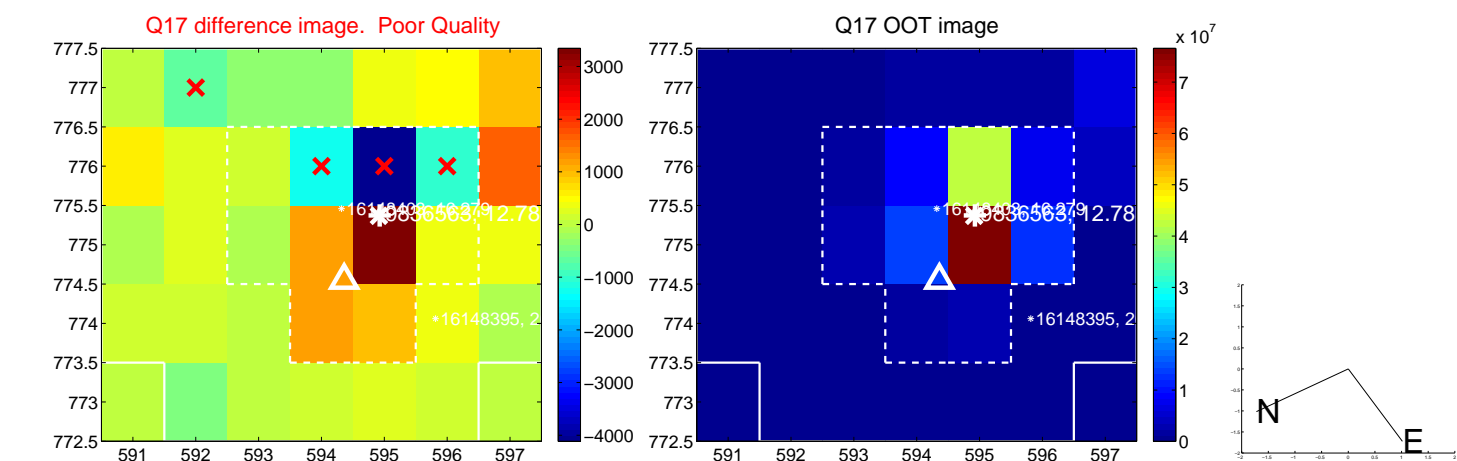
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

