

KIC 009033354

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})
009033354-01	OBS	No	0.782848	131.820838	1.0	0.746	8.5	0.6	3.57	6851	0.47	63174.57
009033354-02	OBS	No	487.734450	535.687339	288.0	10.181	9.6	4.9	3.57	6851	6.44	11.87

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009033354-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED
009033354-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_SATURATED

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

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

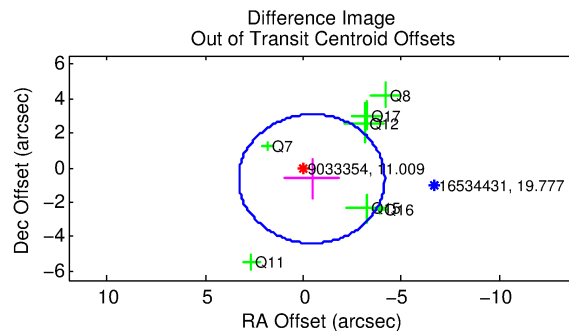
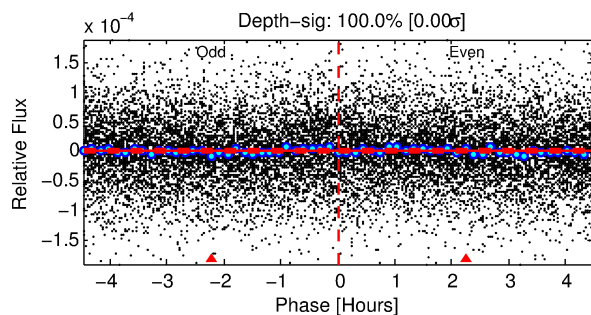
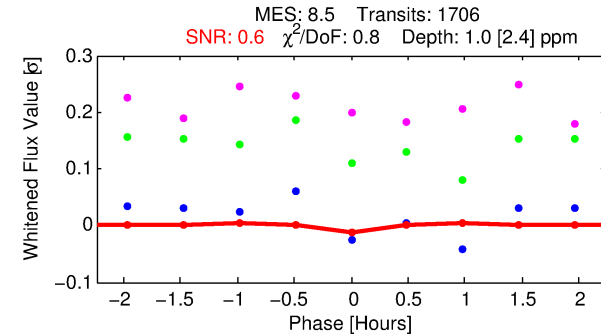
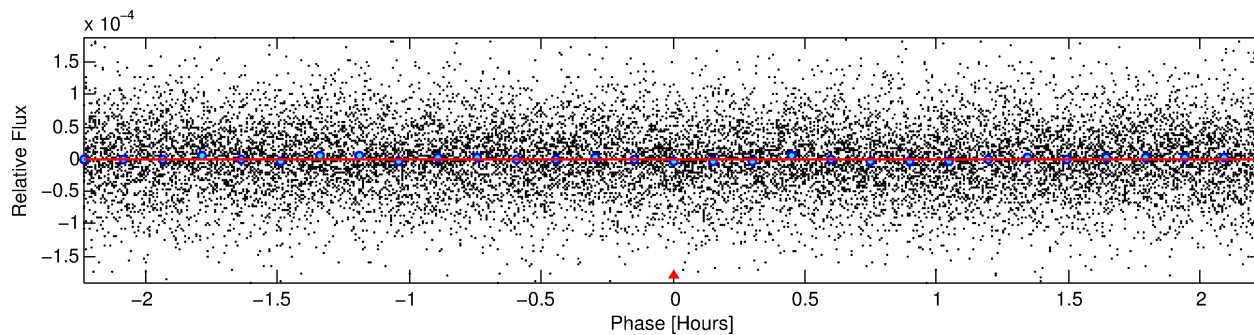
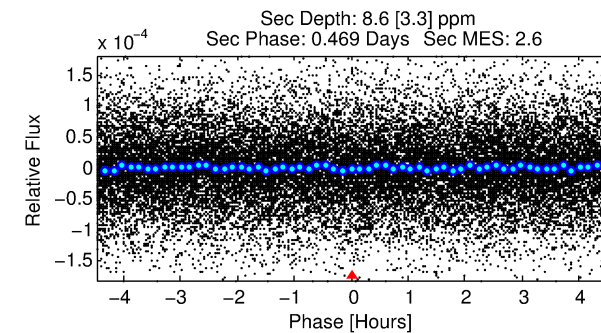
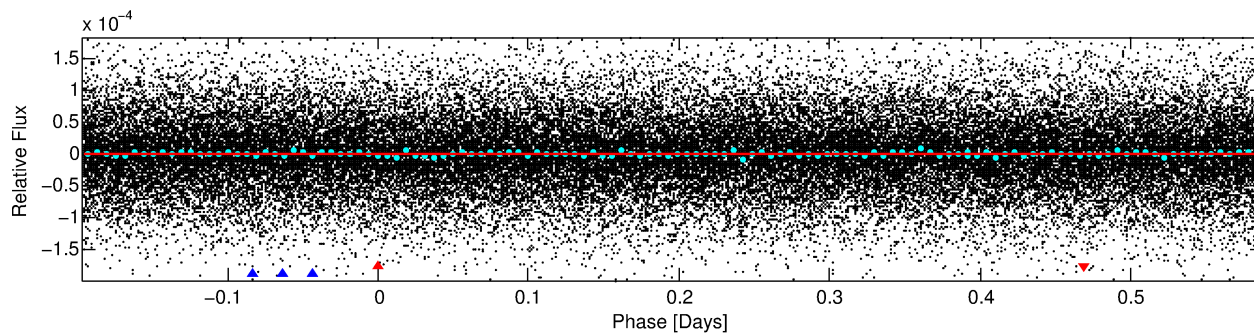
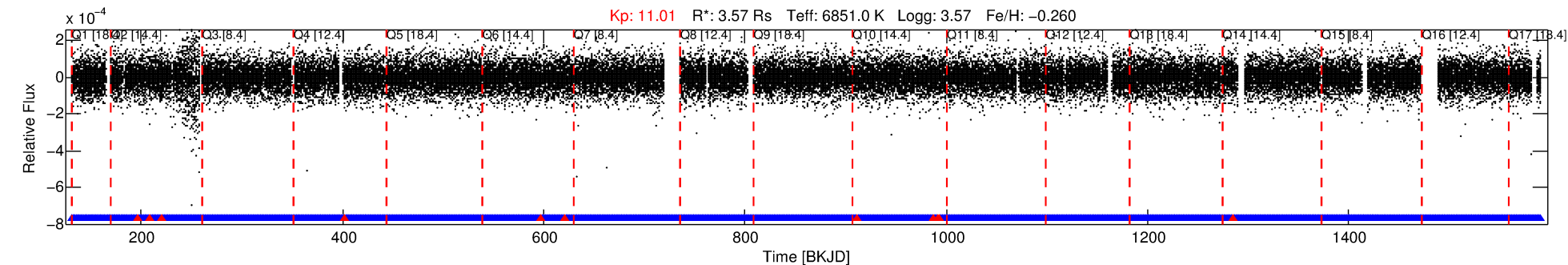
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009033354-01

No Significant Match Found

DV One-Page Summary

KIC: 9033354 Candidate: 1 of 2 Period: 0.783 d



DV Fit Results:

Period = 0.78285 [0.00016] d
Epoch = 131.8208 [0.0198] BKJD
 $R_p/R^* = 0.0012$ [0.0019]
 $a/R^* = 2.02$ [10.31]
 $b = 0.98$ [0.33]
 $\text{Seff} = 63174.57$ [38550.32]
 $T_{\text{eq}} = 4043$ [617] K
 $R_p = 0.47$ [0.75] R_e
 $a = 0.0199$ [0.0076] AU
 $A_g = 8.52$ [27.14] [0.28σ]
 $T_{\text{eff}} = 10678$ [8361] K [0.79σ]

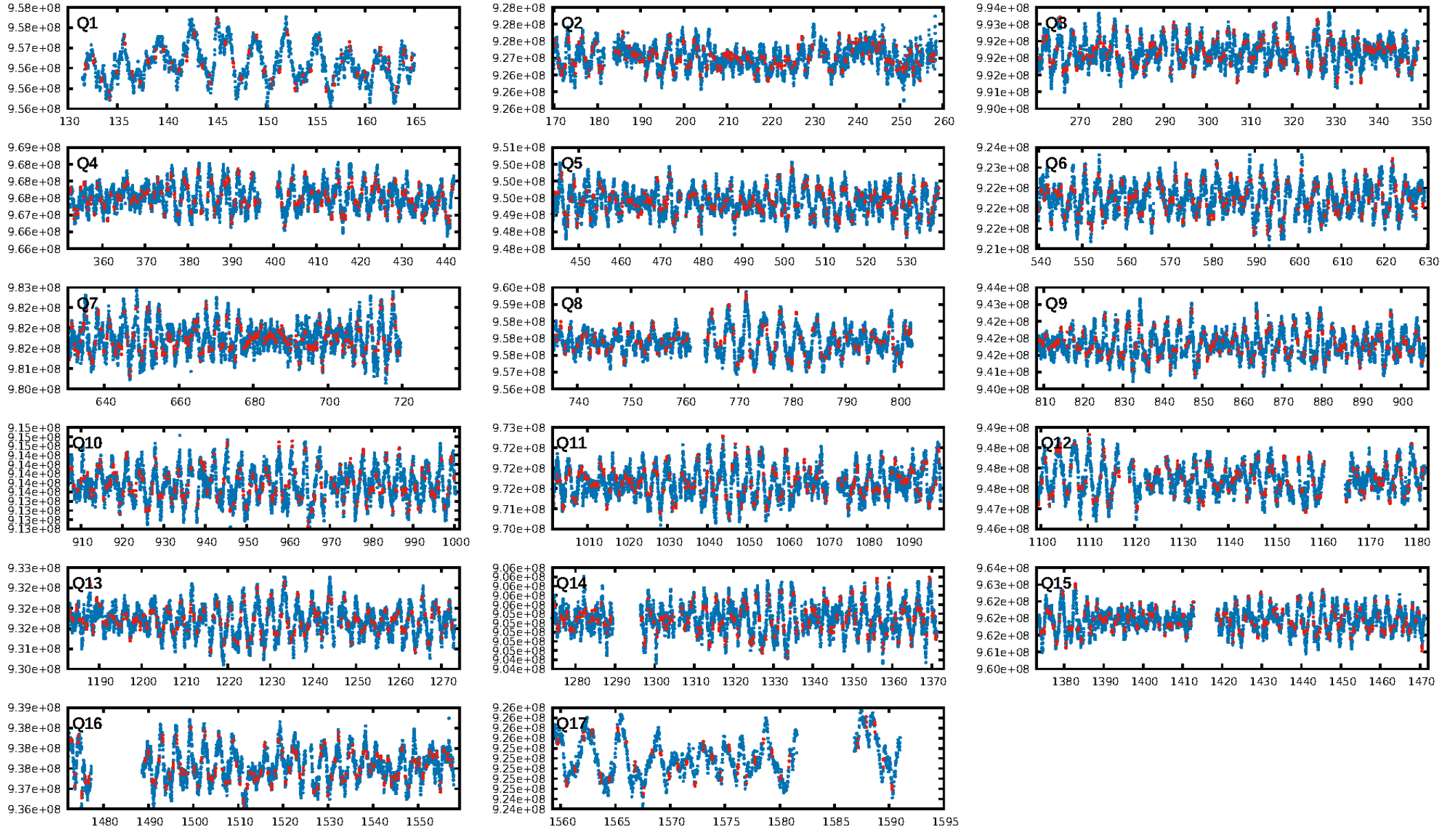
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [1144.90σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 6.69e-16
RollingBand-fgt: 0.99 [1619/1630]
GhostDiagnostic-chr: N/A
Centroid-sig: N/A
Centroid-so: N/A
OotOffset-rm: 0.777 arcsec [0.63σ]
KicOffset-rm: 0.097 arcsec [0.08σ]
OotOffset-st: 0/3/3/1 [7]
KicOffset-st: 0/3/3/1 [7]
DiffImageQuality-fgm: 0.14 [1/7]
DiffImageOverlap-fno: 1.00 [17/17]

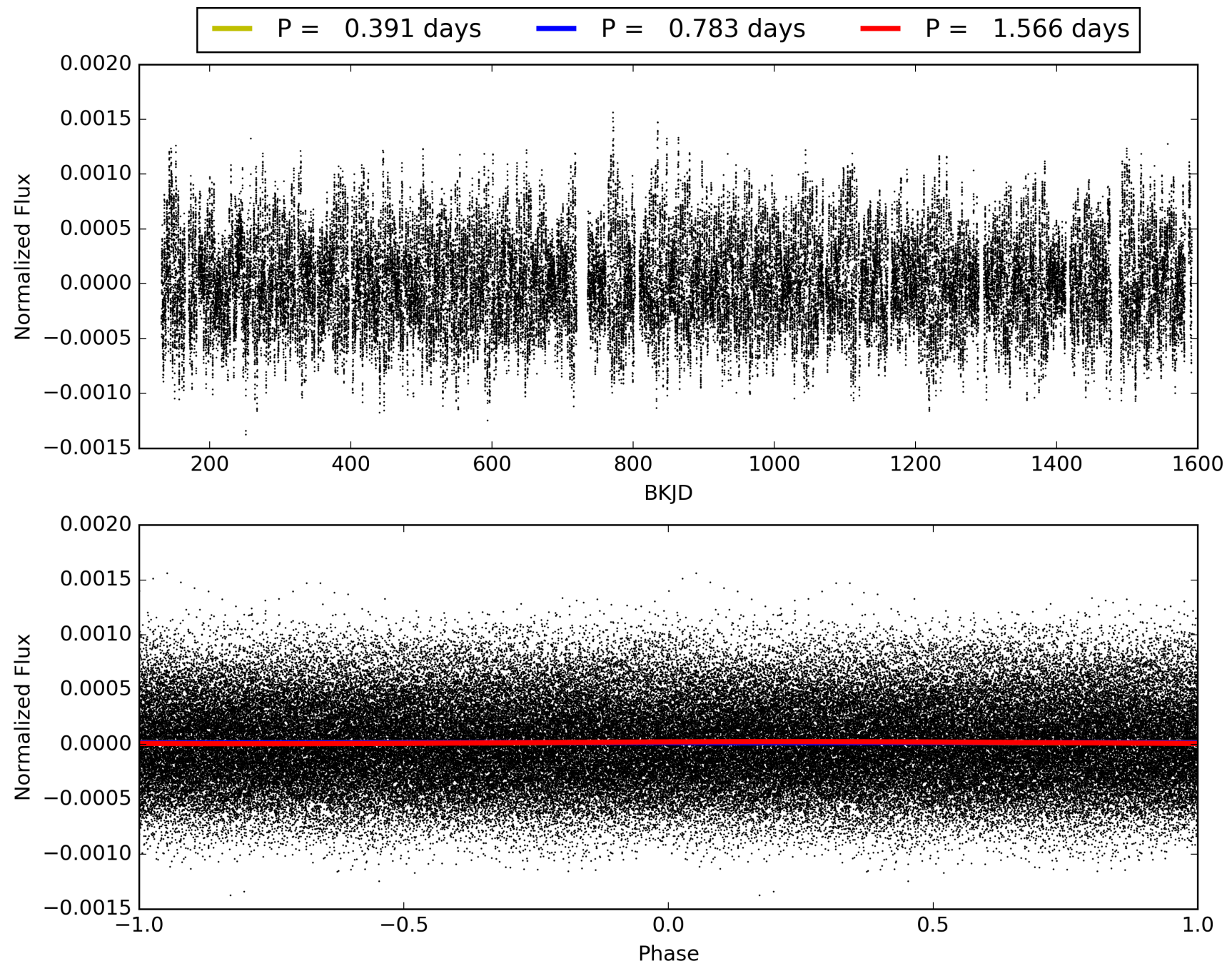
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 09:37:16 Z

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

TCE 009033354-01, PDC Light Curves

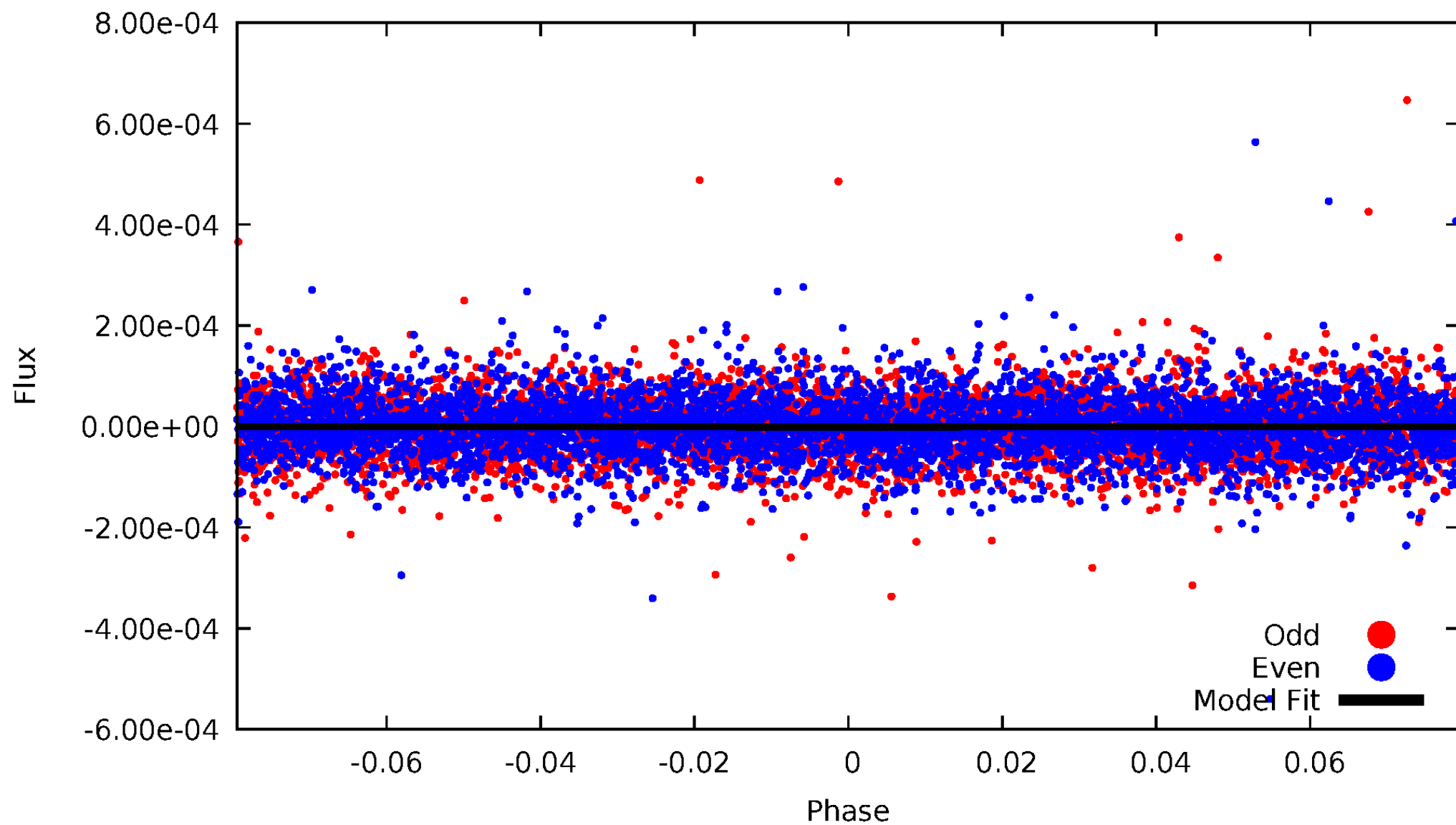


TCE 009033354-01



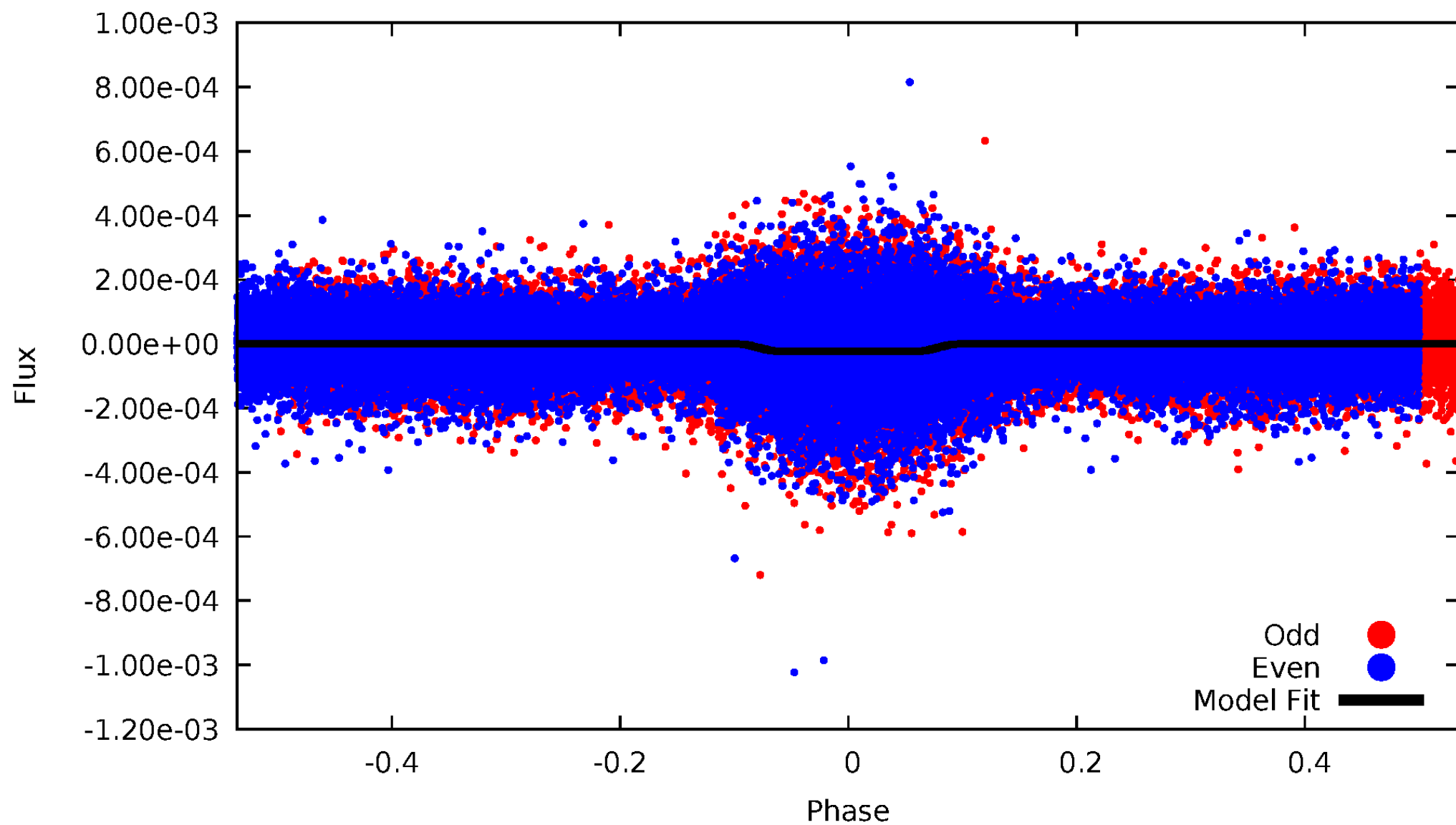
DV Odd/Even

TCE 009033354-01

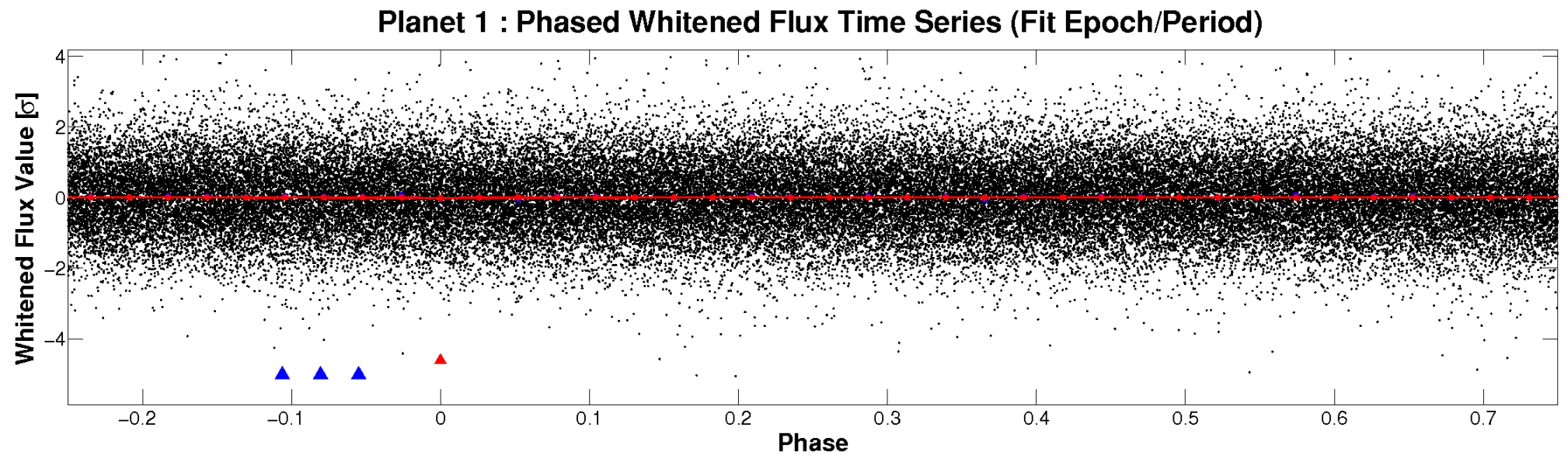
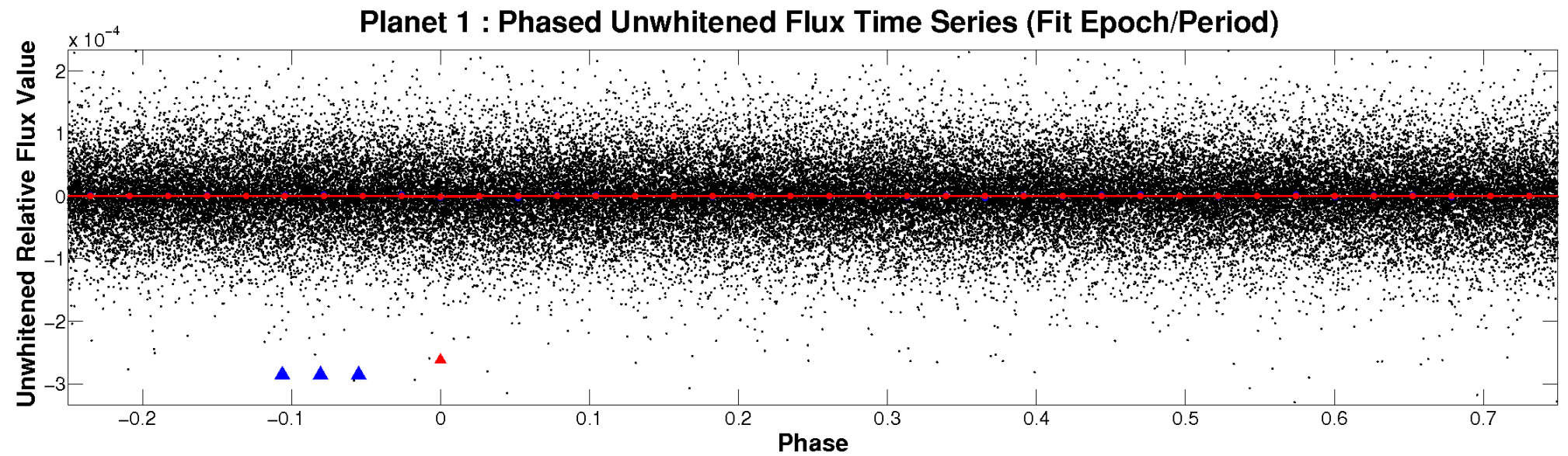


ALT Odd/Even

TCE 009033354-01

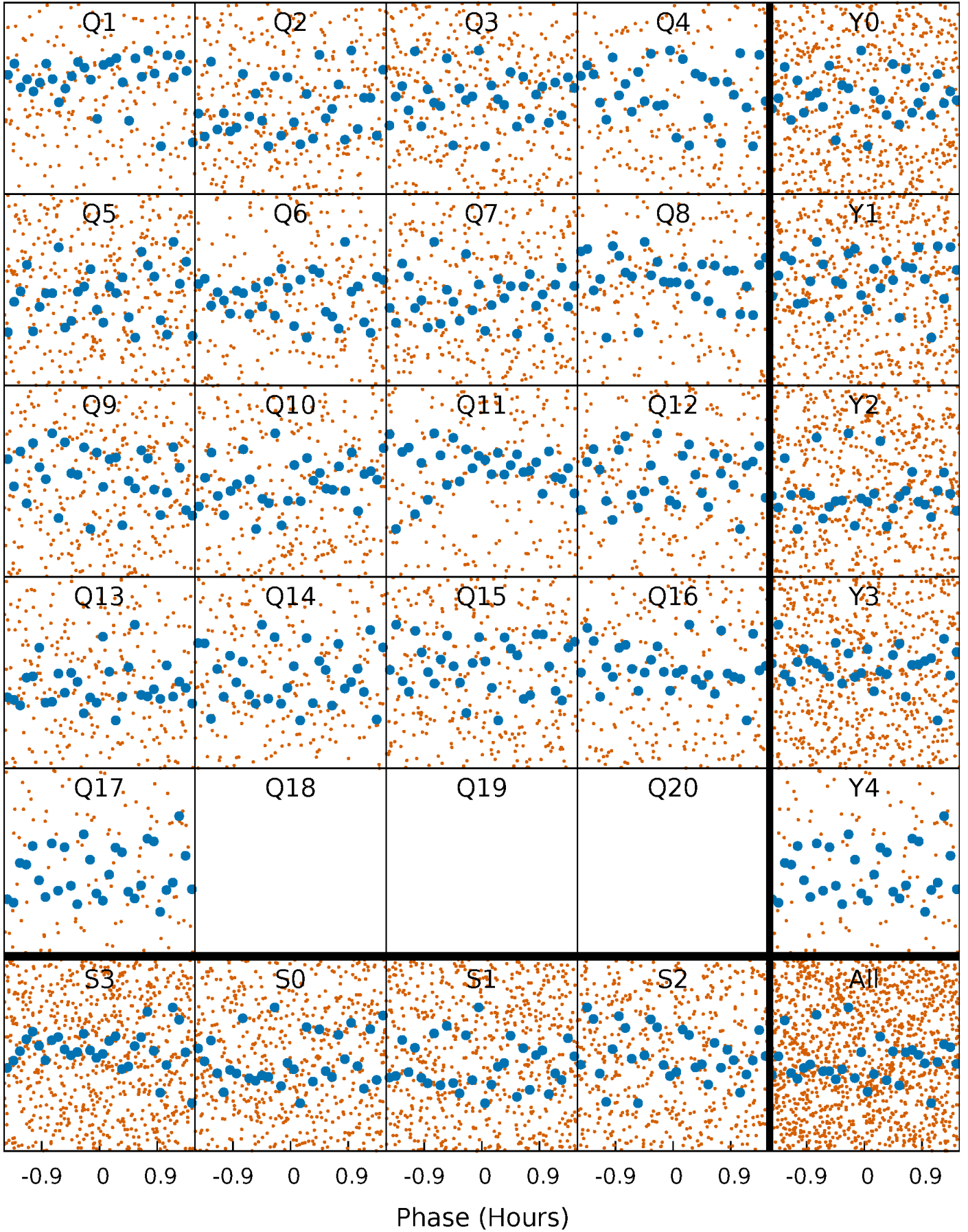


Non-Whitened Vs. Whitened Light Curve



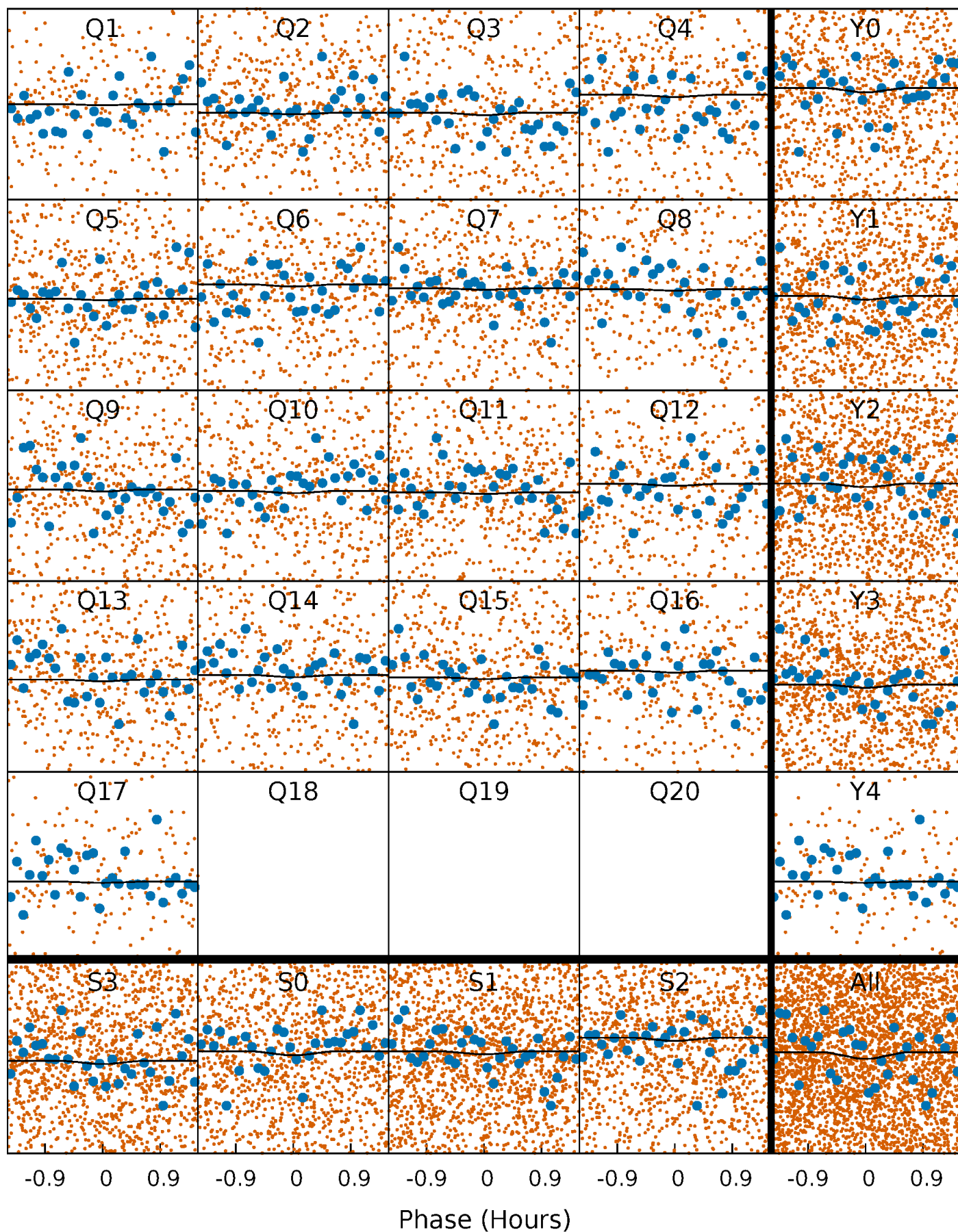
PDC Quarter-Phased Transit Curves

TCE 009033354-01 P= 0.782848 Days $T_0=131.820838$ (BKJD)



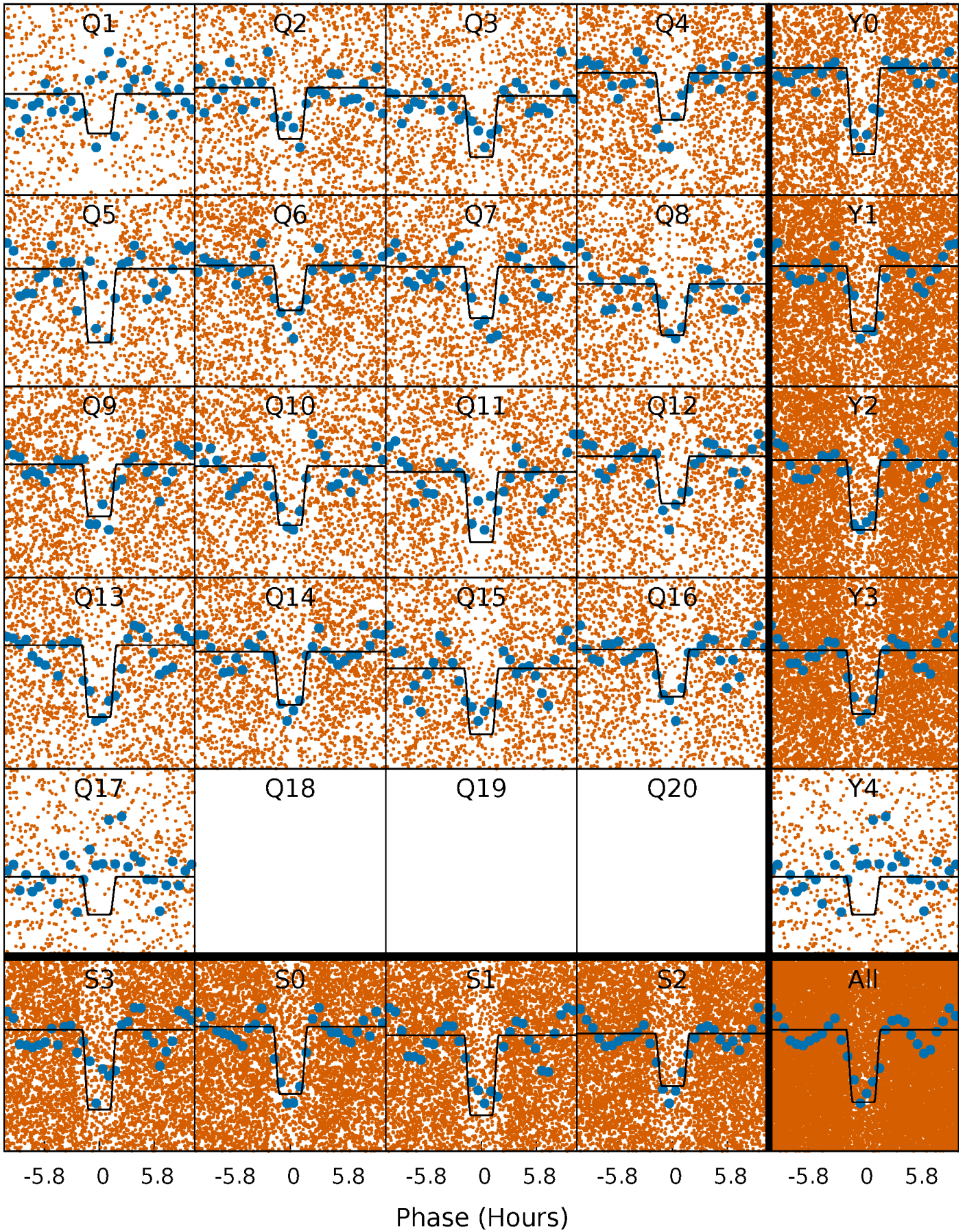
DV Quarter-Phased Transit Curves

TCE 009033354-01 P= 0.782848 Days $T_0=131.820838$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

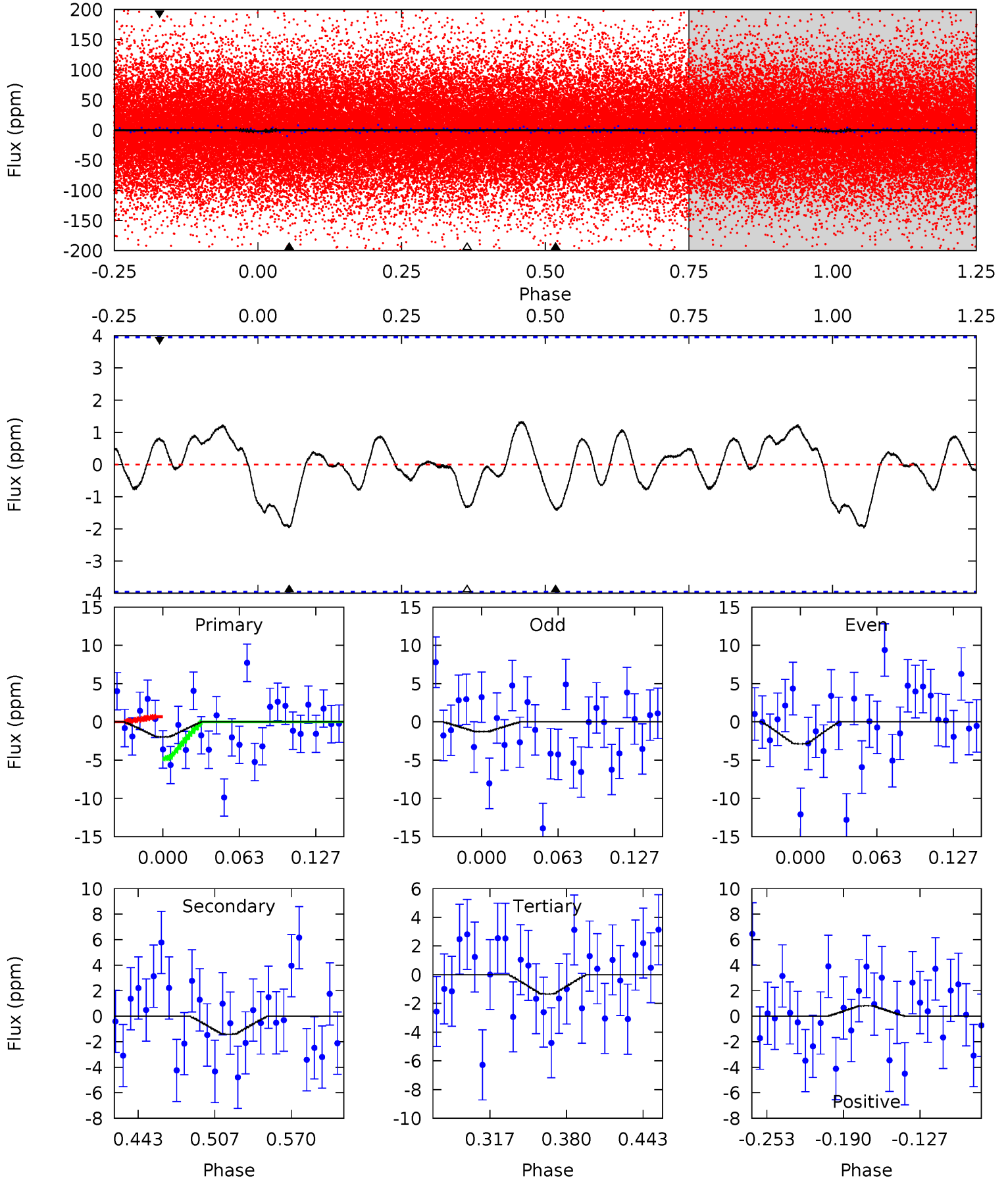
TCE 009033354-01 P= 0.785637 Days $T_0=131.568799$ (BKJD)



DV Model-Shift Uniqueness Test

009033354-01, P = 0.782848 Days, E = 131.037990 Days

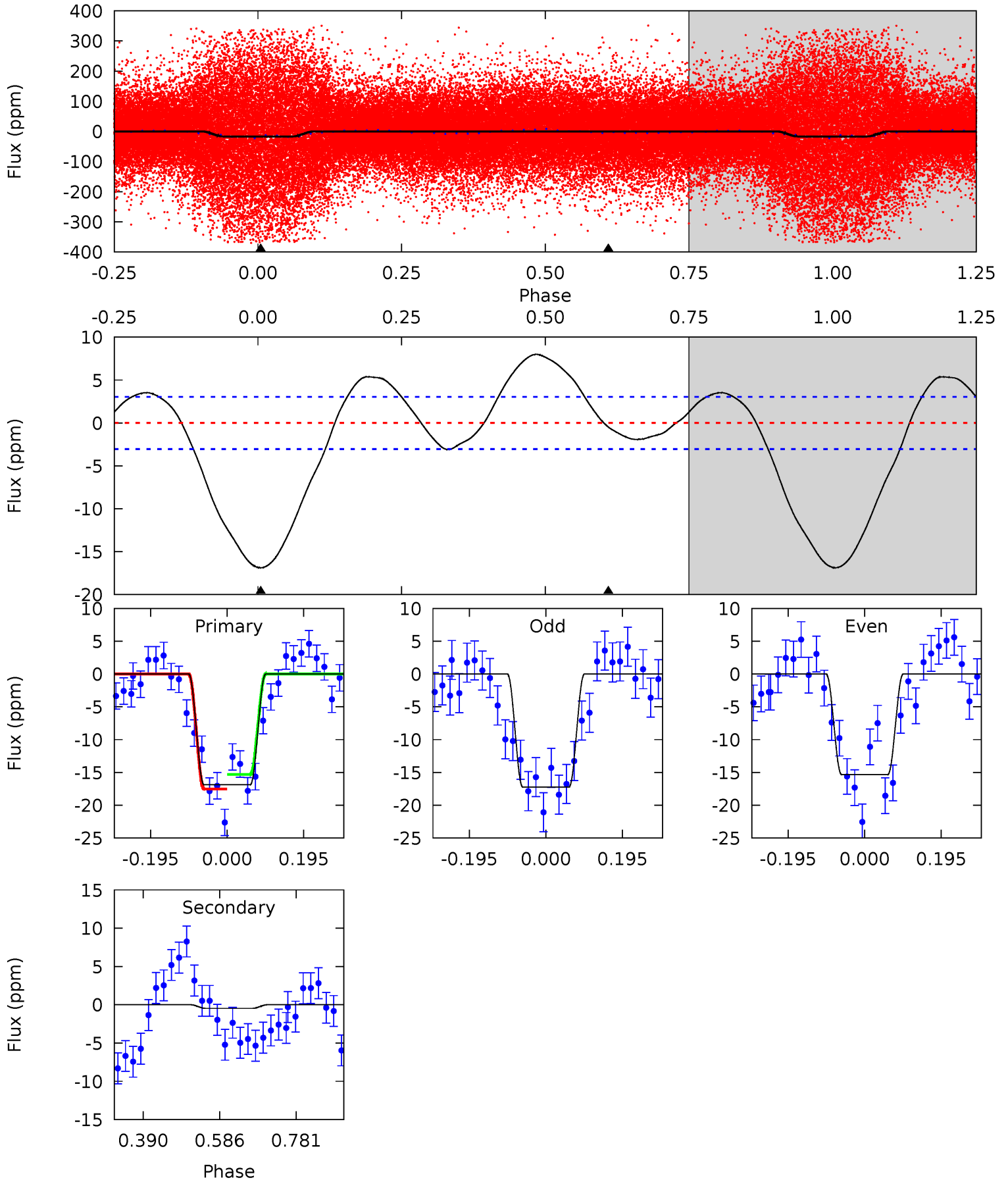
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
2.31	1.67	1.58	0.96	4.66	1.86	0.66	0.73	1.35	0.09	0.70	0.95	0.84	0.40	2.41



Alt Model-Shift Uniqueness Test

009033354-01, P = 0.785637 Days, E = 130.783162 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
24.5	0.69	0	0	4.42	1.30	4.05	24.5	24.5	0.69	0.69	1.39	1.40	0.32	1.64



Stellar Parameters For KIC 009033354

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	6851^{+154}_{-222}	$3.570^{+0.344}_{-0.065}$	$-0.260^{+0.300}_{-0.250}$	$3.567^{+0.349}_{-1.482}$	$1.723^{+0.169}_{-0.366}$	$0.053^{+0.147}_{-0.011}$
	+2%/-3%	+10%/-2%	+115%/-96%	+10%/-42%	+10%/-21%	+275%/-21%
Source	PHO1	FLK73	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 009033354-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-1 ± 1	$0.65^{+0.58}_{-0.47}$	5520^{+276}_{-513}	4668^{+6570}_{-8864}	$0.671^{+7.448}_{-0.544}$
Alt.	-0 ± 1	$1.76^{+0.74}_{-0.72}$	5491^{+301}_{-577}	-4491^{+539}_{-286}	$0.033^{+0.091}_{-0.047}$

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 $A_{obs} \gg 1.0$

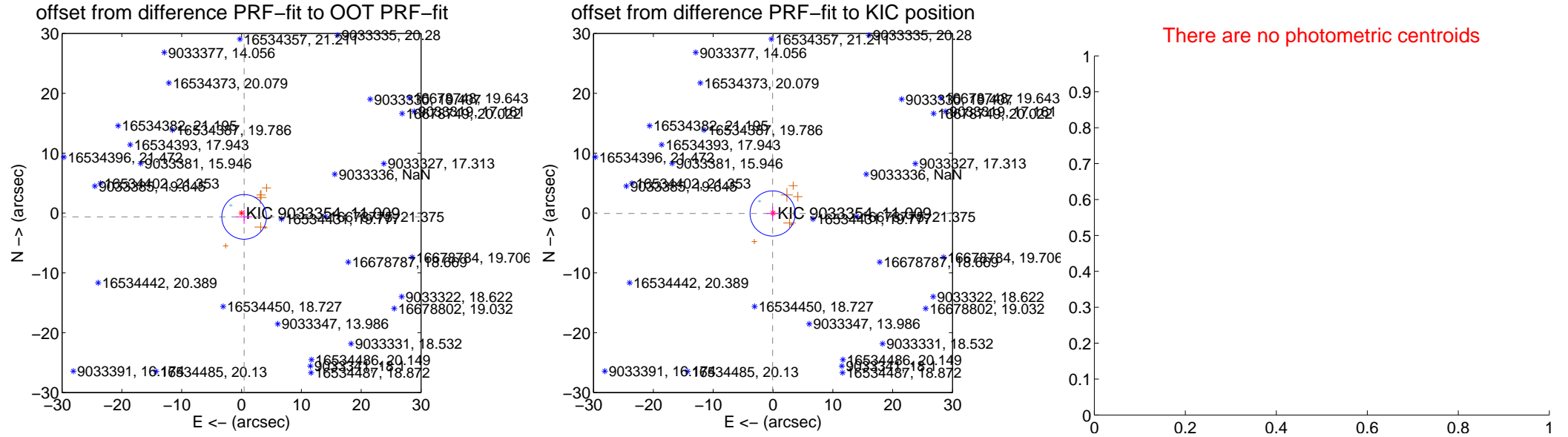
DV Centroid Data

Supplemental centroid analysis for 009033354-01. **Kepler magnitude: 11.01.** Transit SNR 0.60

There are 1 quarters with good PRF difference image offsets

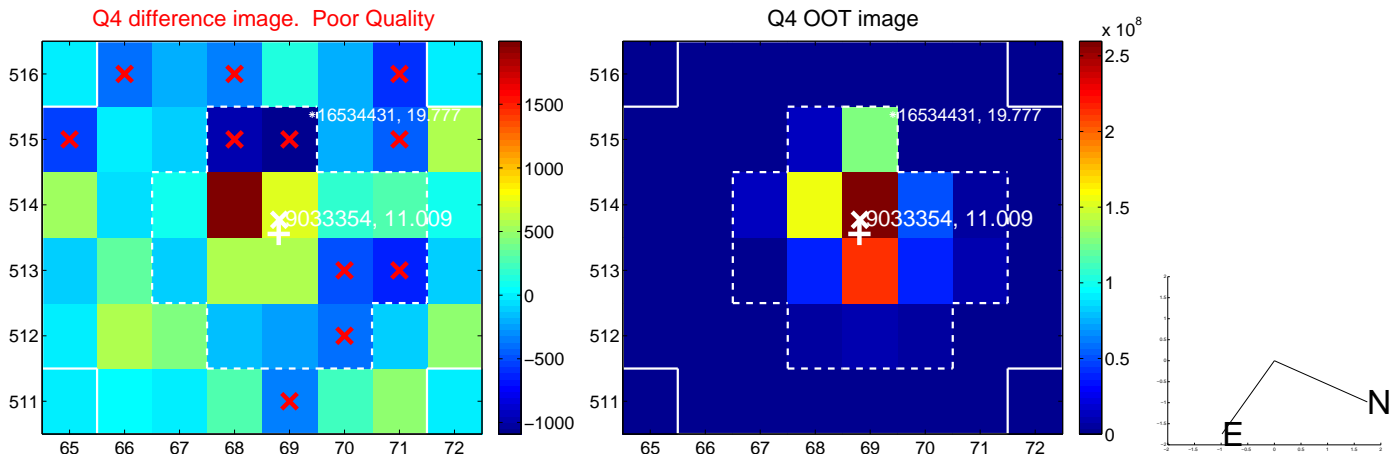
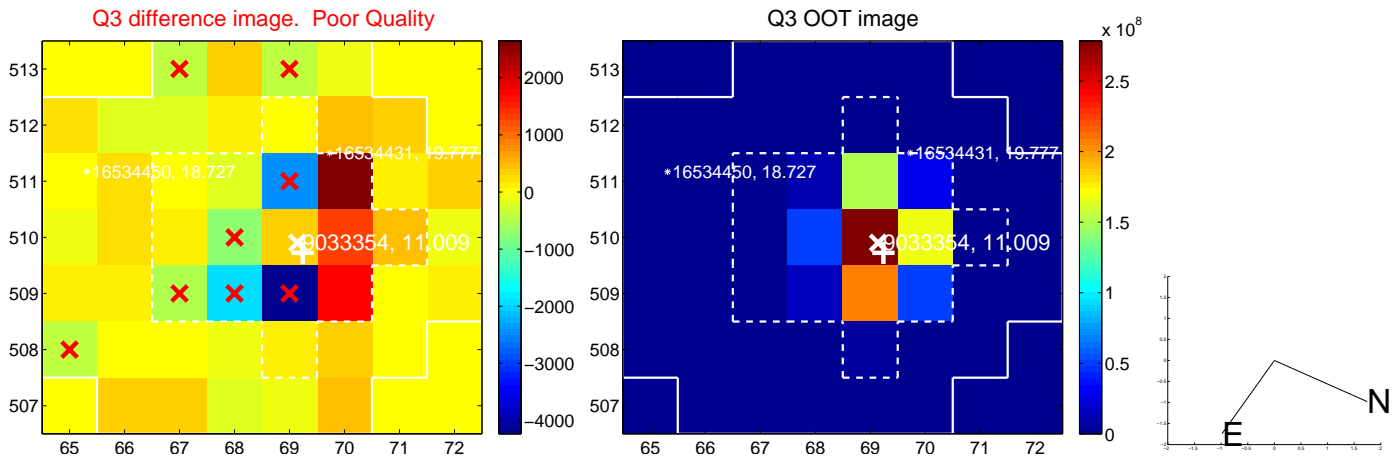
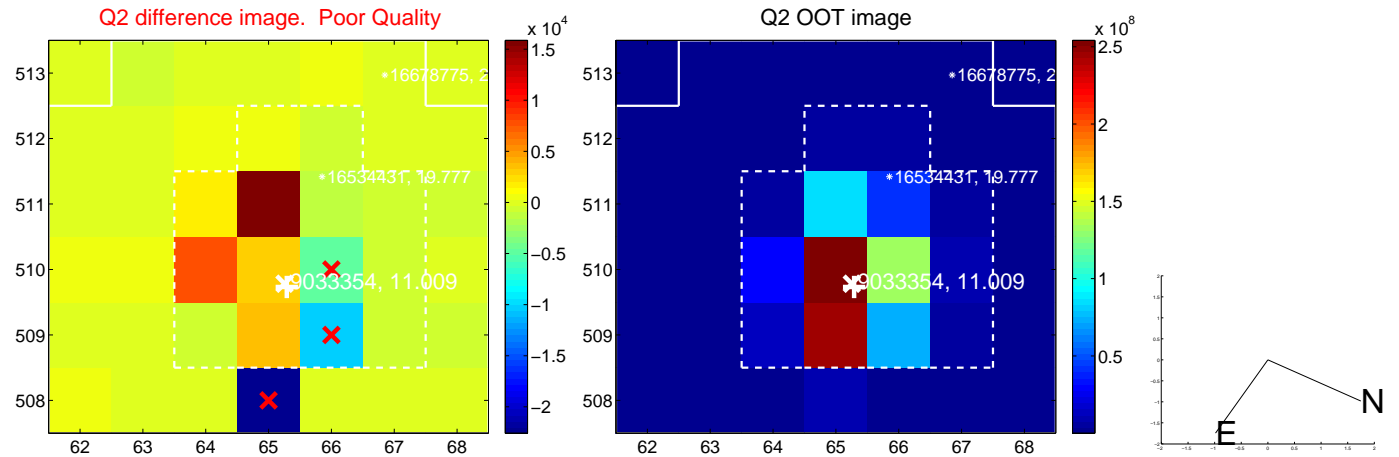
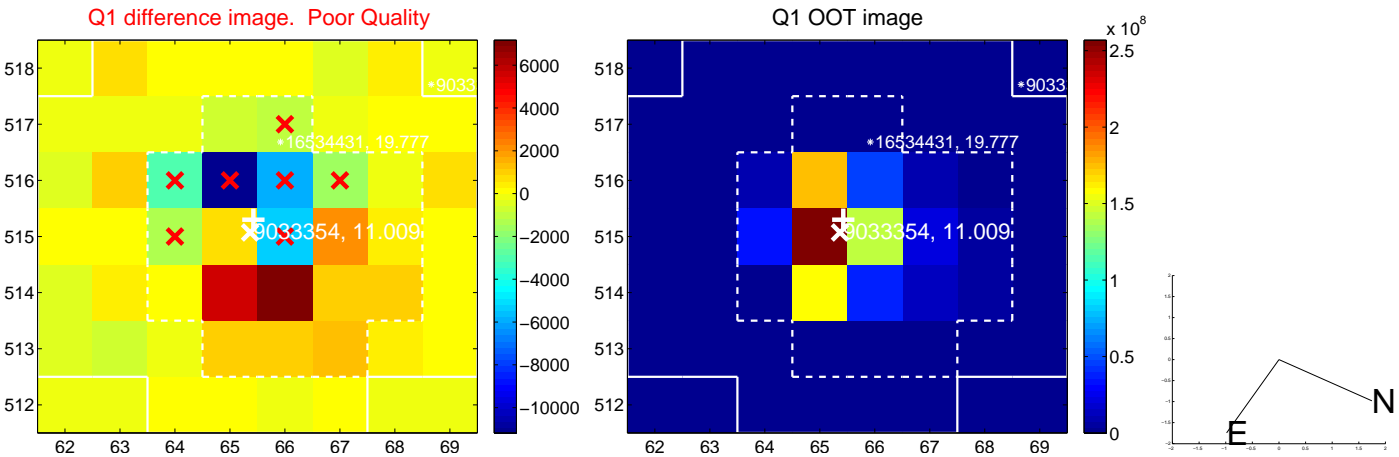
The direct PRF centroid is offset from the target star catalog position by about 0.93 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.777 ± 1.243	0.63	-0.430 ± 1.362	-0.648 ± 1.187
PRF-fit source offset from KIC position	0.097 ± 1.260	0.08	0.061 ± 1.051	-0.076 ± 1.147
photometric centroid source offset	—	—	—	—

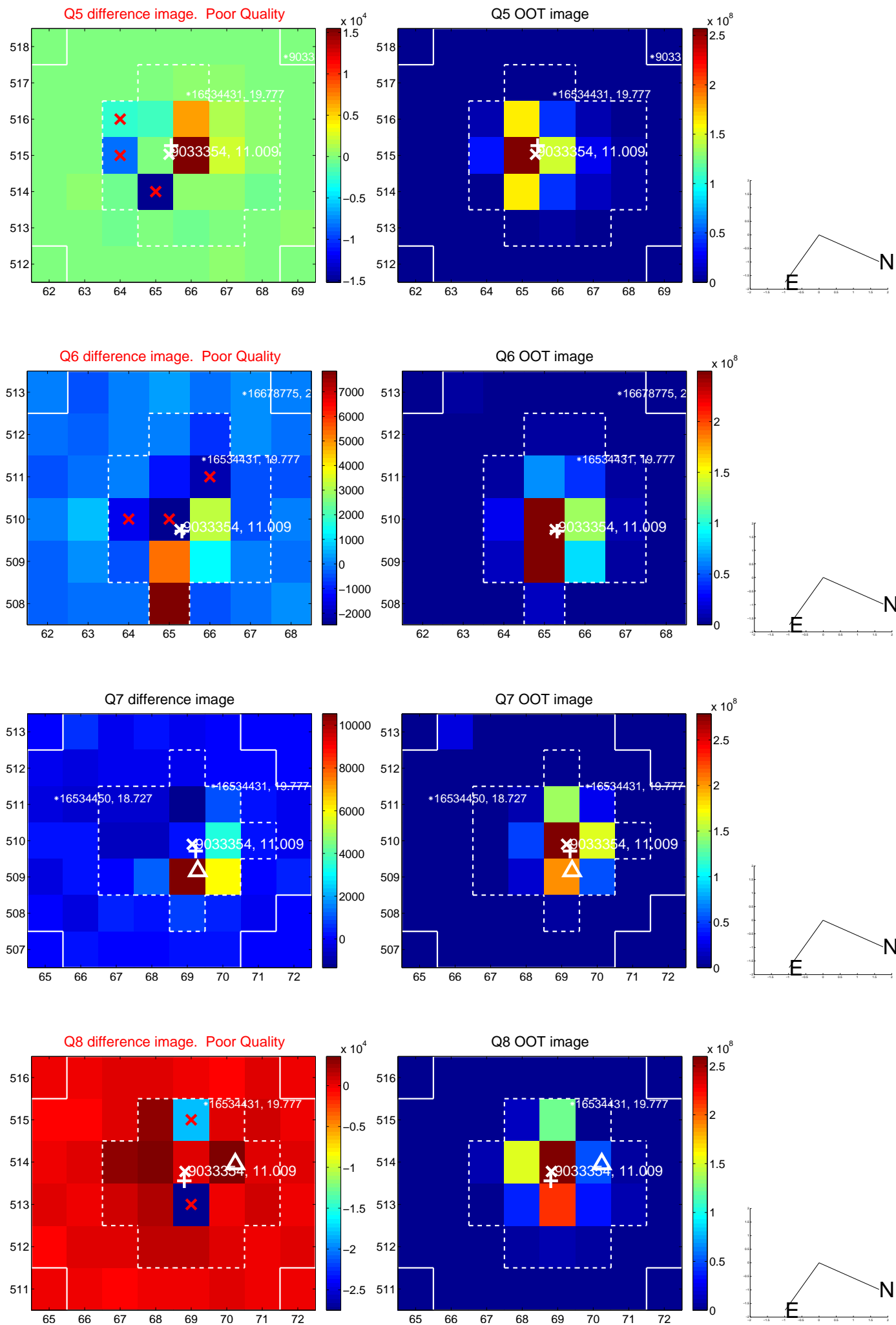


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

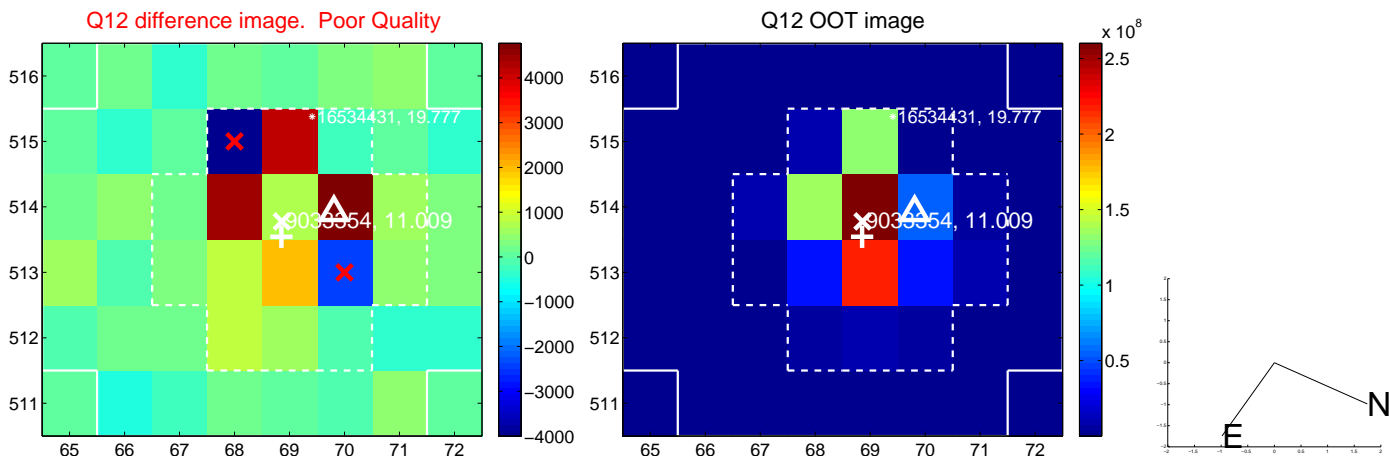
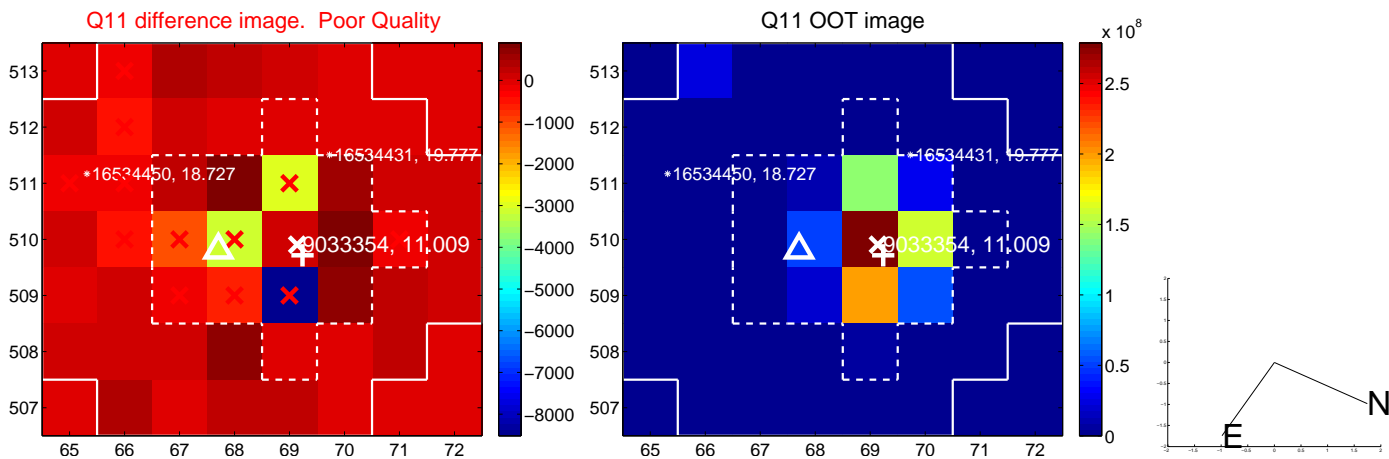
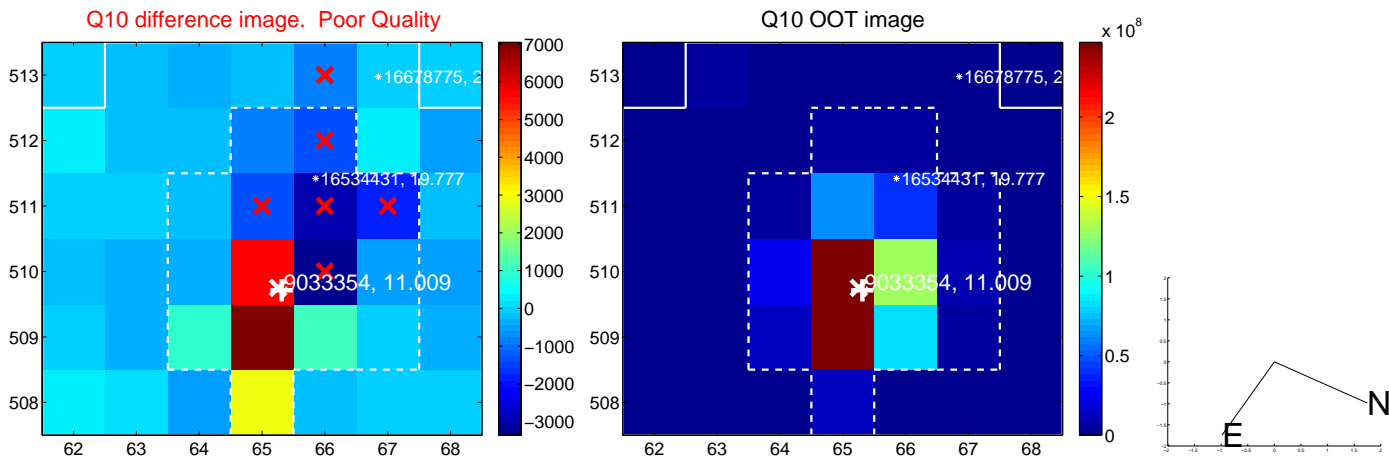
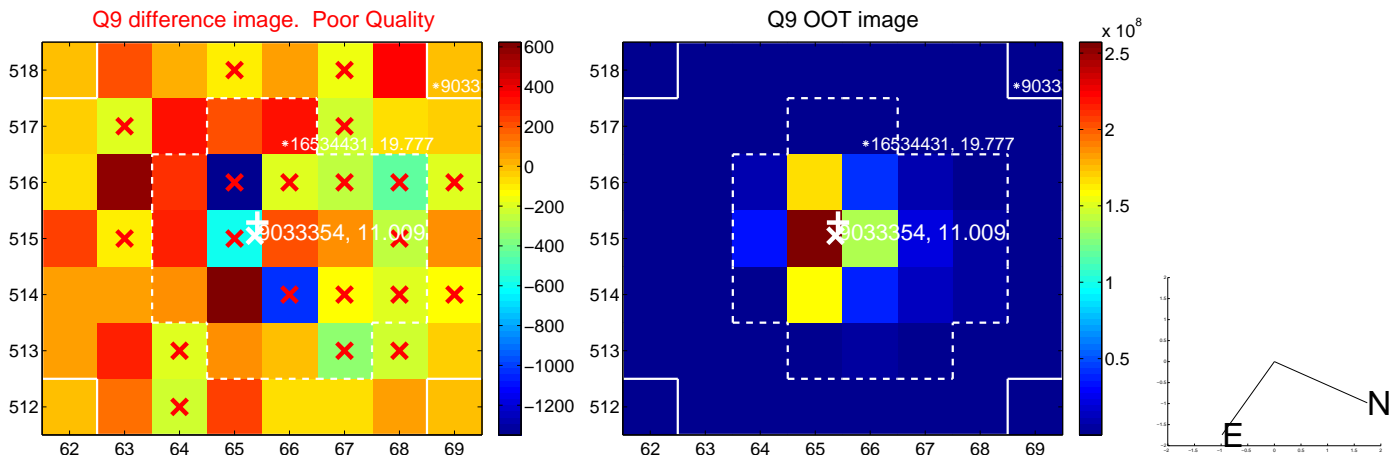
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



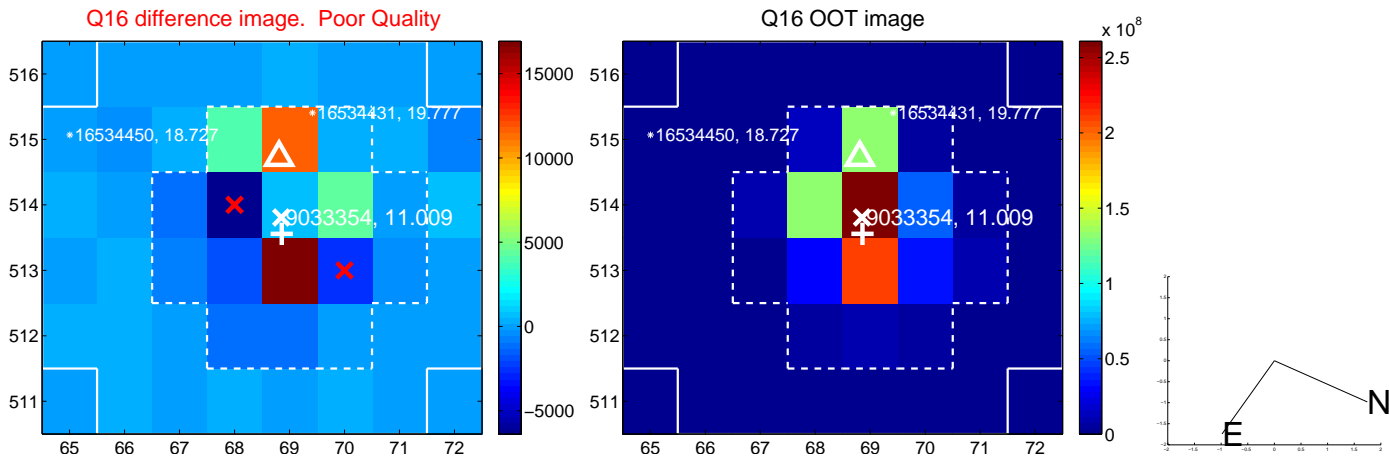
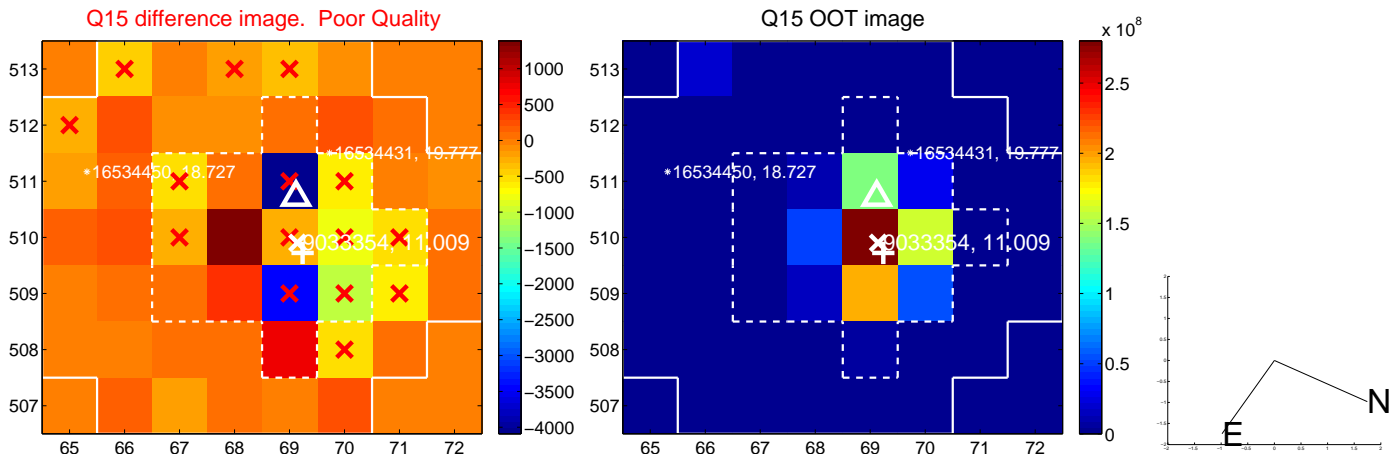
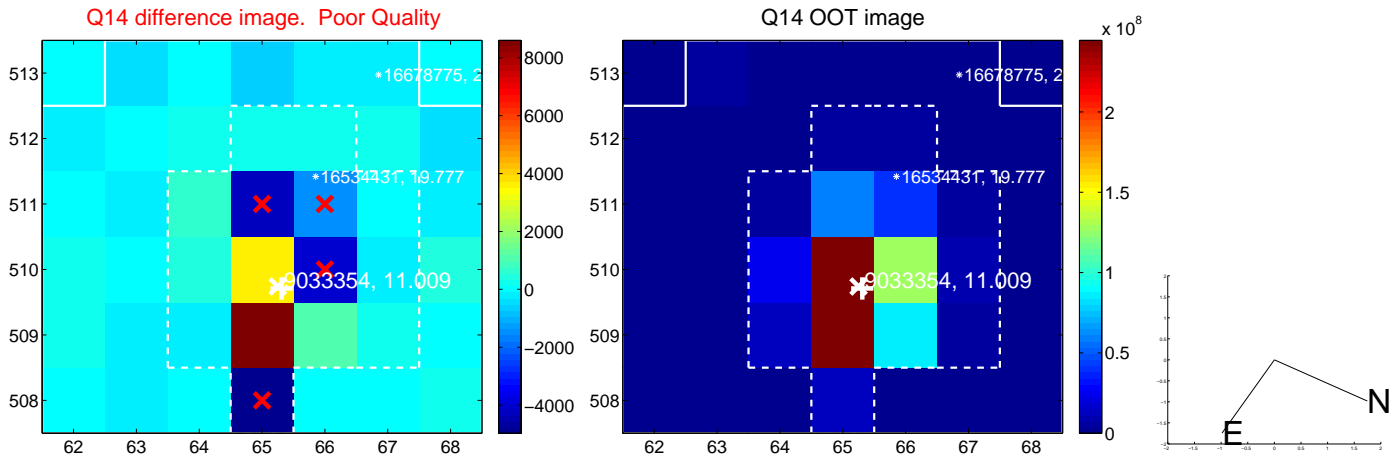
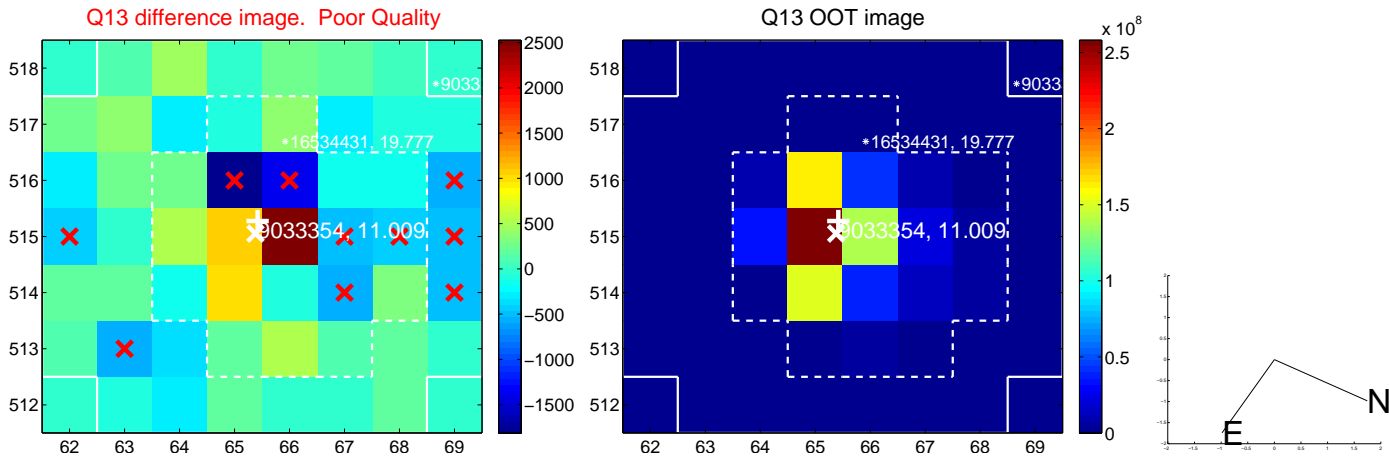
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



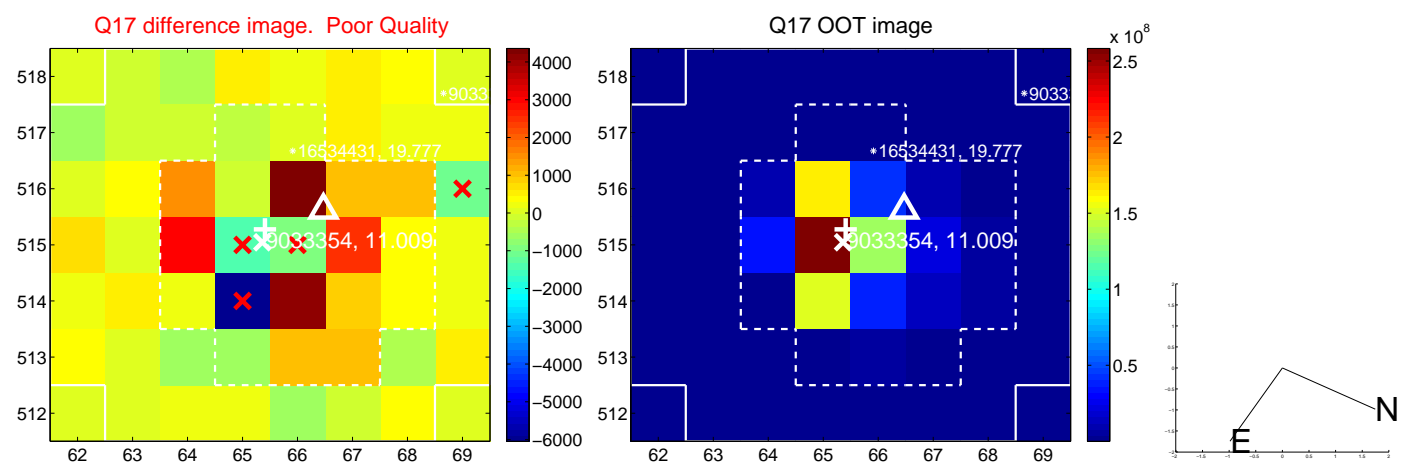
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



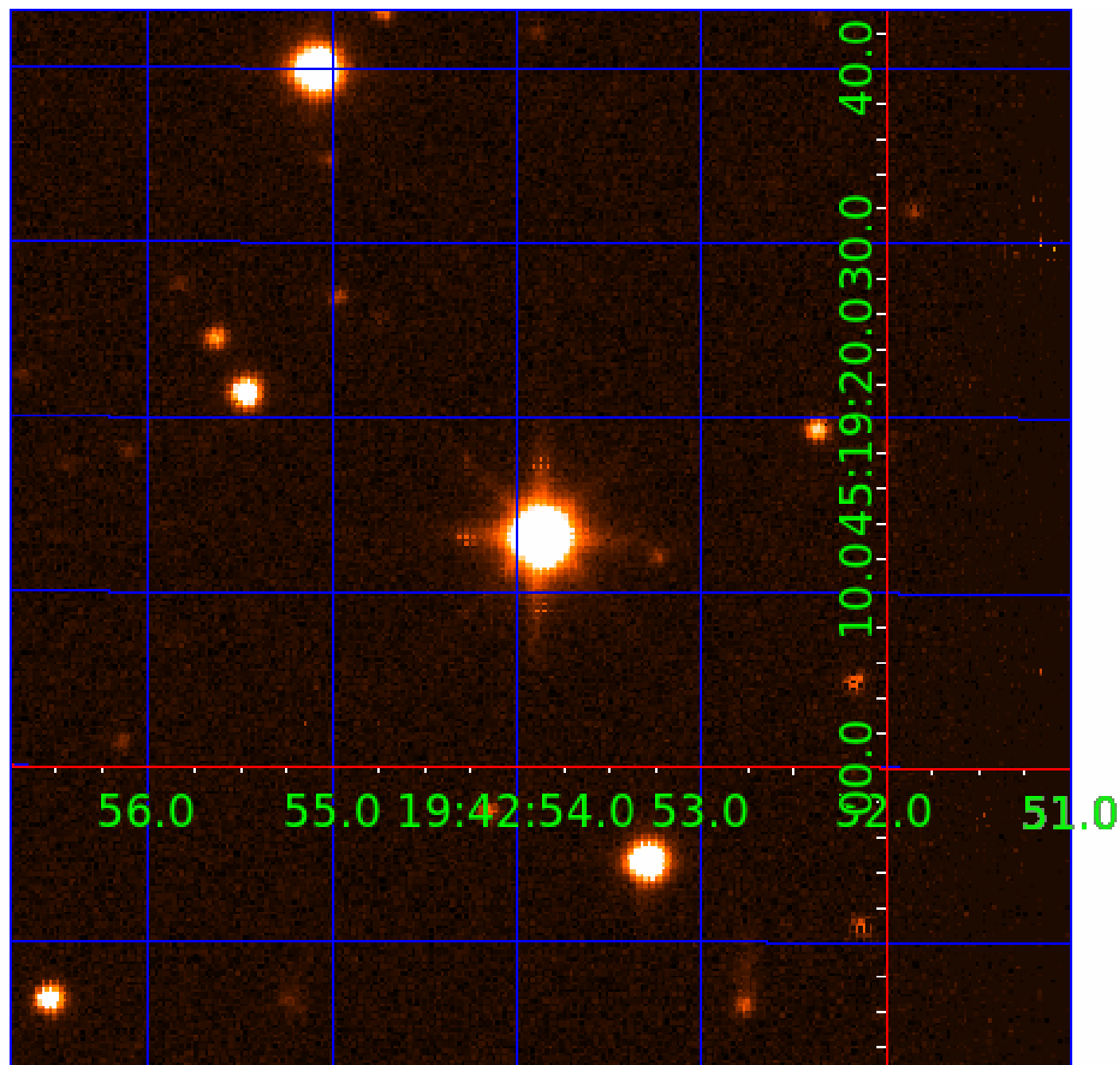
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



folded centroid time series figure for this object.

UKIRT Image

Declination



KIC 009033354

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})
009033354-01	OBS	No	0.782848	131.820838	1.0	0.746	8.5	0.6	3.57	6851	0.47	63174.57
009033354-02	OBS	No	487.734450	535.687339	288.0	10.181	9.6	4.9	3.57	6851	6.44	11.87

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009033354-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED
009033354-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_SATURATED

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

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

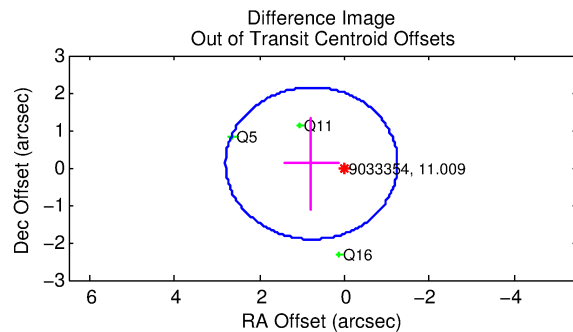
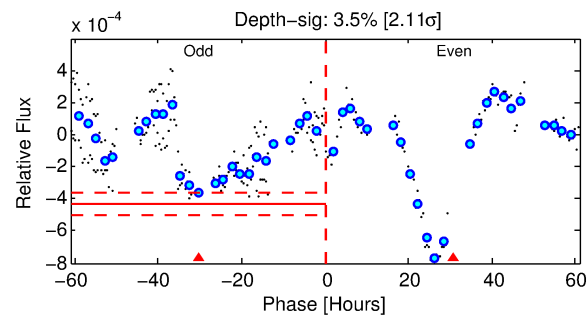
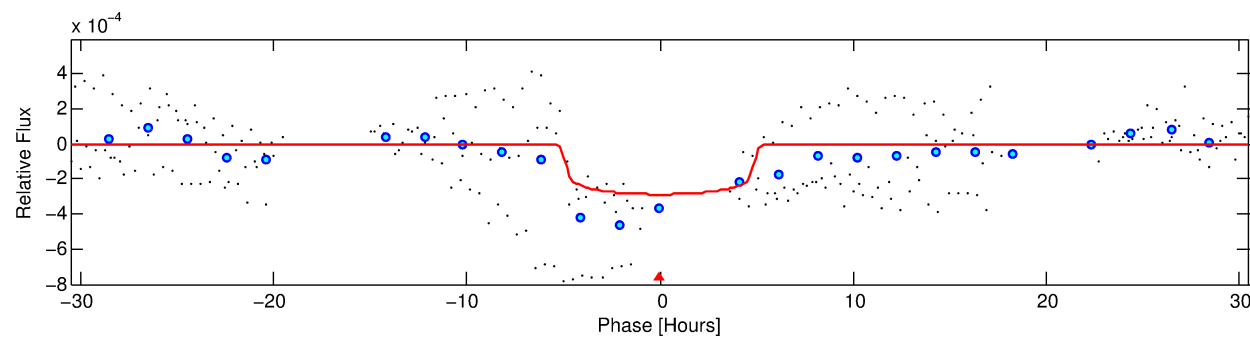
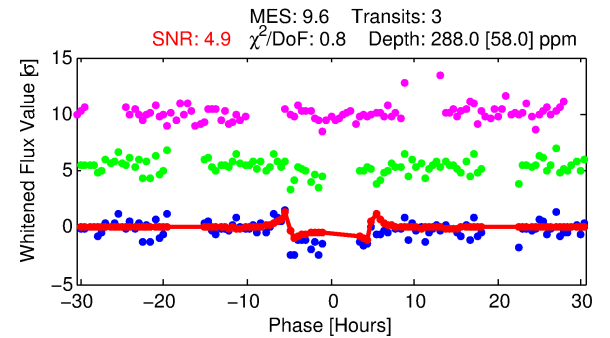
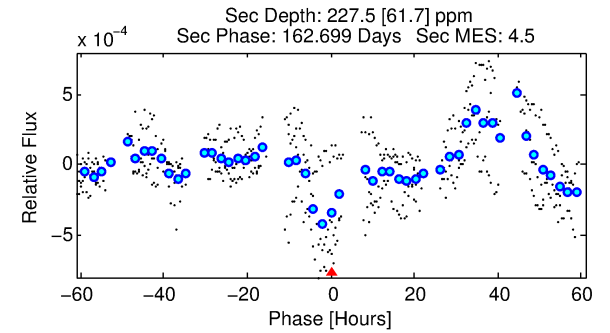
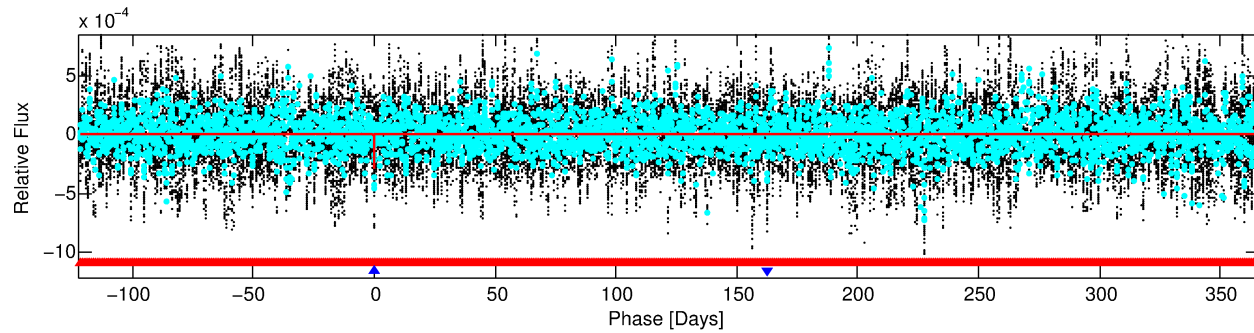
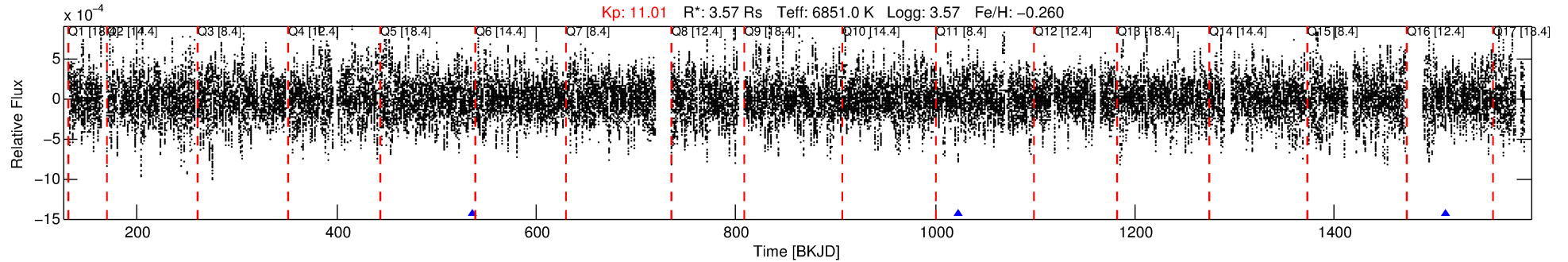
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009033354-02

No Significant Match Found

DV One-Page Summary

KIC: 9033354 Candidate: 2 of 2 Period: 487.734 d



DV Fit Results:

Period = 487.73445 [0.00455] d
Epoch = 535.6873 [0.0051] BKJD
Rp/R* = 0.0165 [0.0035]
a/R* = 280.80 [261.71]
b = 0.67 [0.78]
Seff = 11.87 [7.24]
Teq = 473 [72] K
Rp = 6.44 [3.00] Re
a = 1.4544 [0.5566] AU
Ag = 6393.03 [4995.10] [1.28σ]
Teffp = 6544 [853] K [7.09σ]

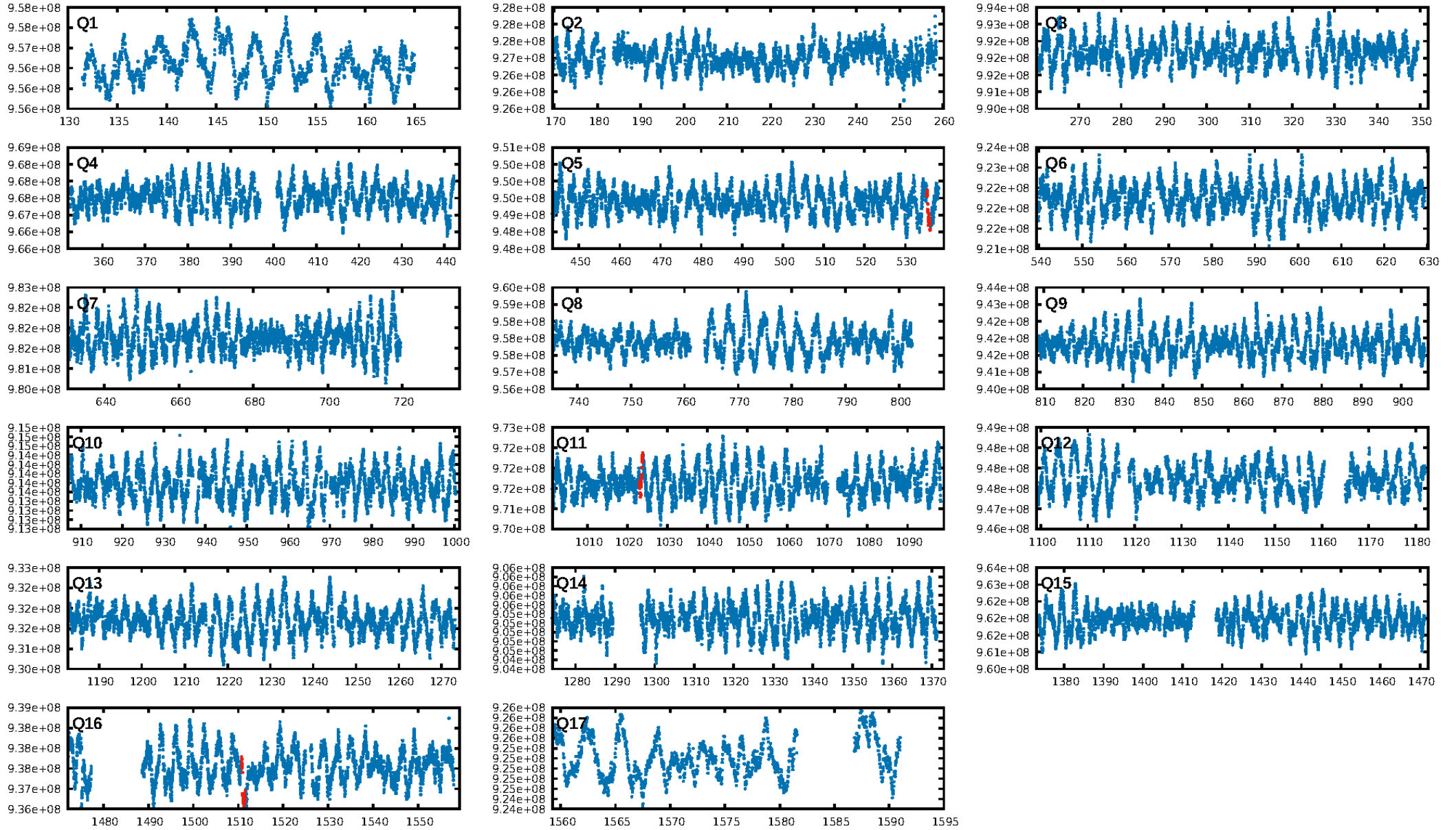
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [1144.90σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 99.6%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 1.78e-13
RollingBand-fgt: 1.00 [3/3]
GhostDiagnostic-chr: 3.627
Centroid-sig: 6.2%
Centroid-so: 1.227 arcsec [1.64σ]
OotOffset-rm: 0.776 arcsec [1.15σ]
OotOffset-st: 0/1/1/1 [3]
KicOffset-rm: 1.544 arcsec [1.99σ]
KicOffset-st: 0/1/1/1 [3]
DiffImageQuality-fgm: 1.00 [3/3]
DiffImageOverlap-fno: 0.00 [0/3]

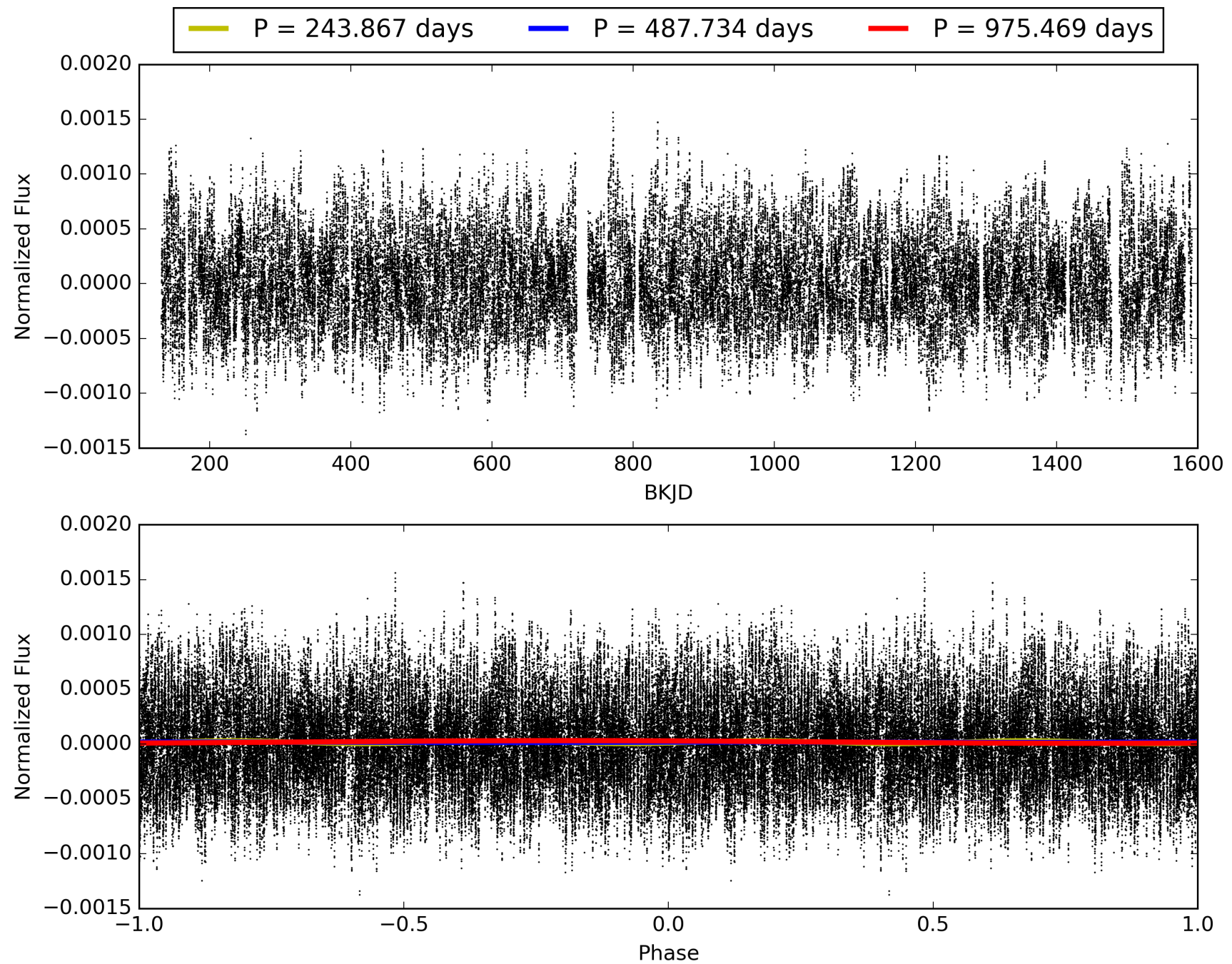
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 09:37:26 Z

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

TCE 009033354-02, PDC Light Curves

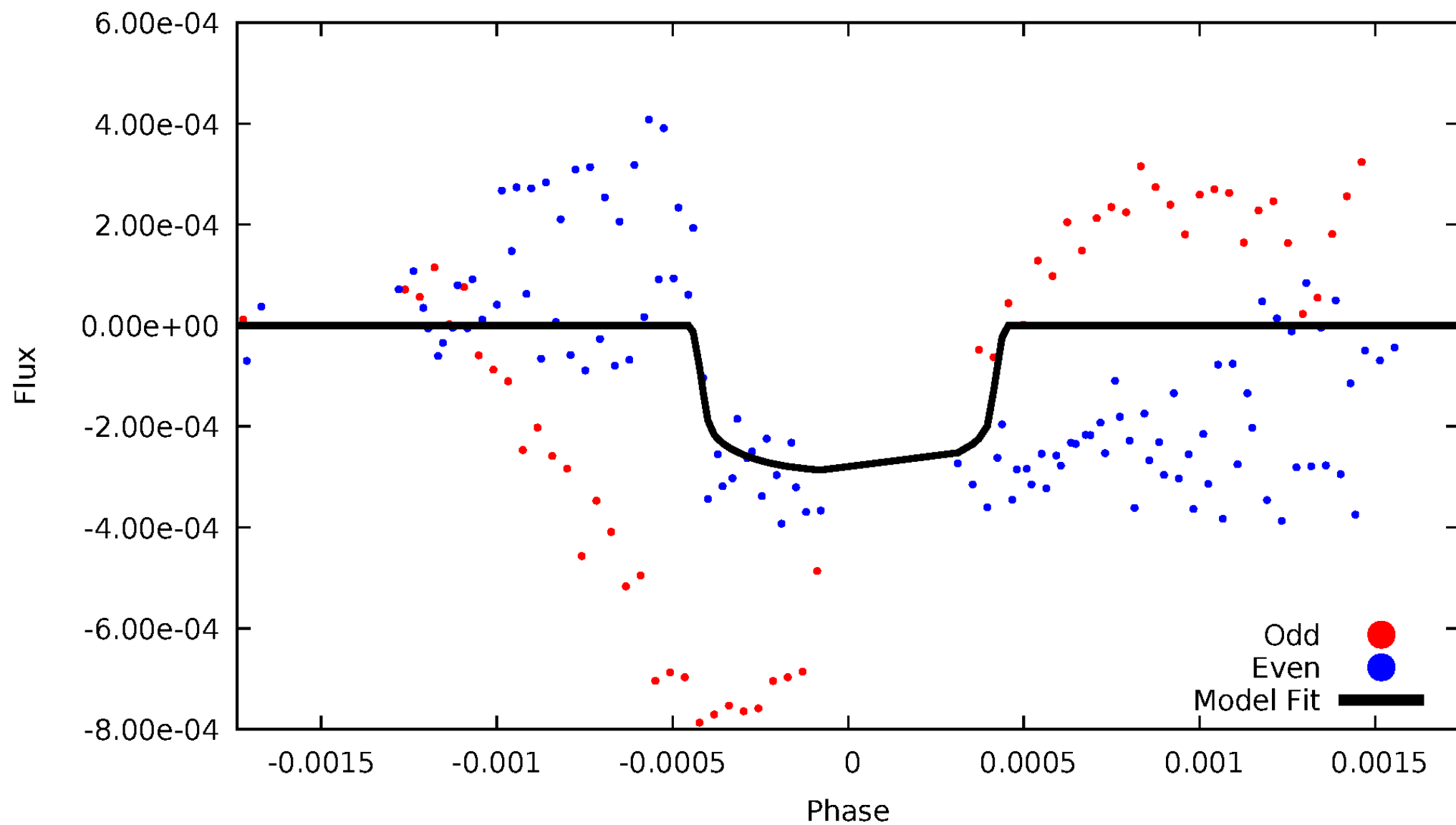


TCE 009033354-02



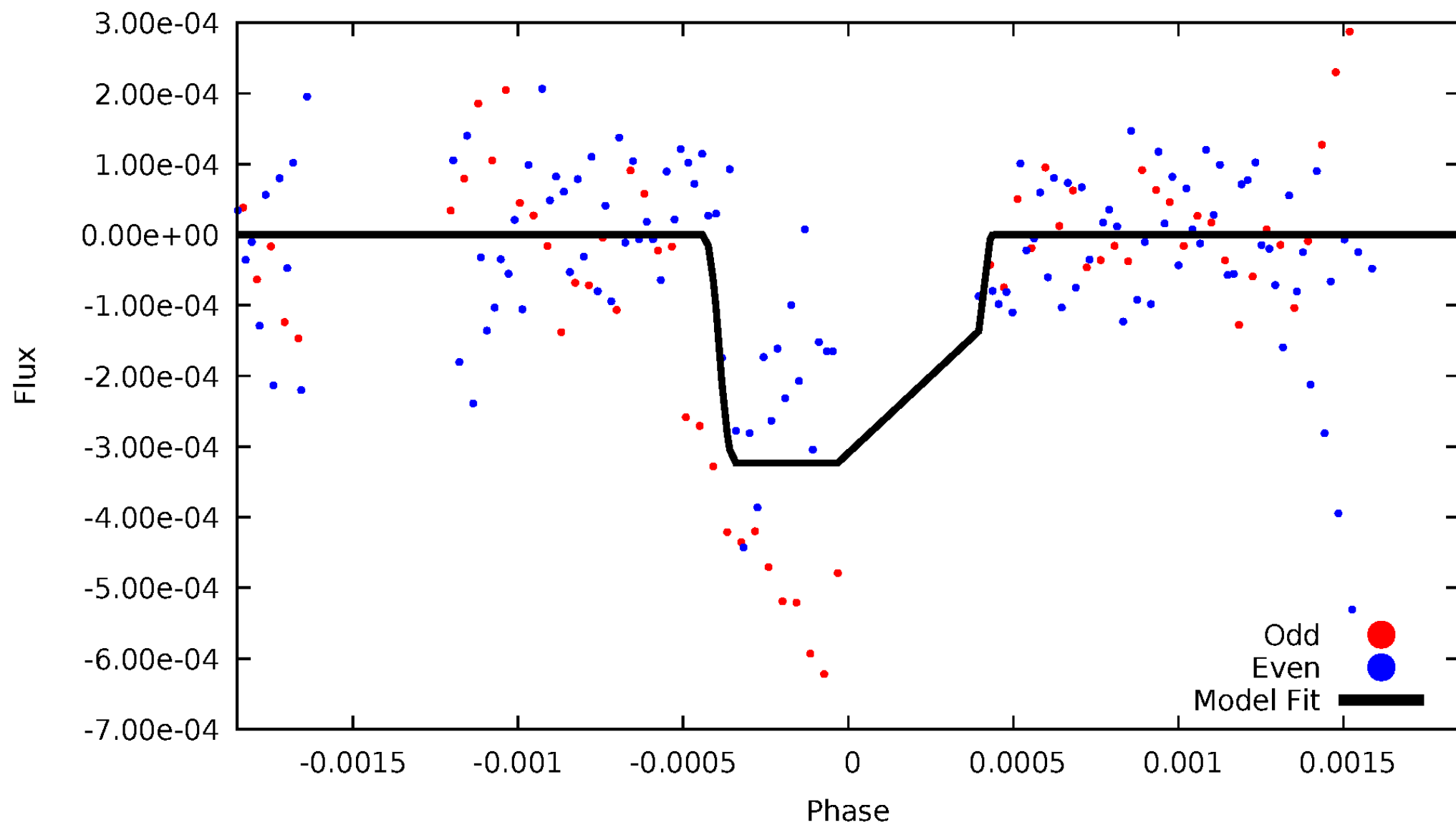
DV Odd/Even

TCE 009033354-02



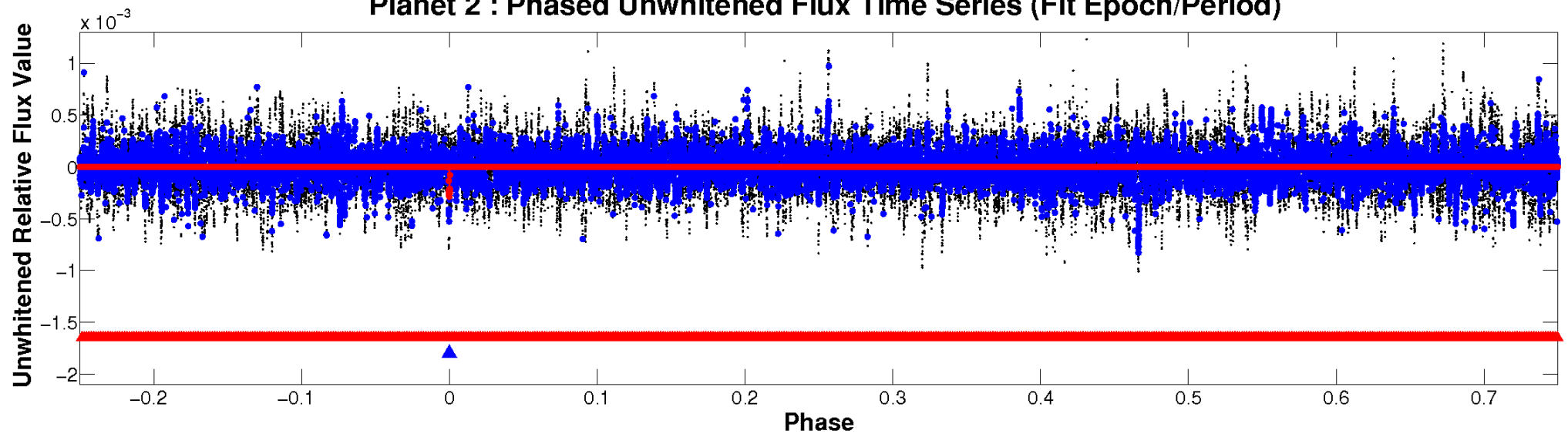
ALT Odd/Even

TCE 009033354-02

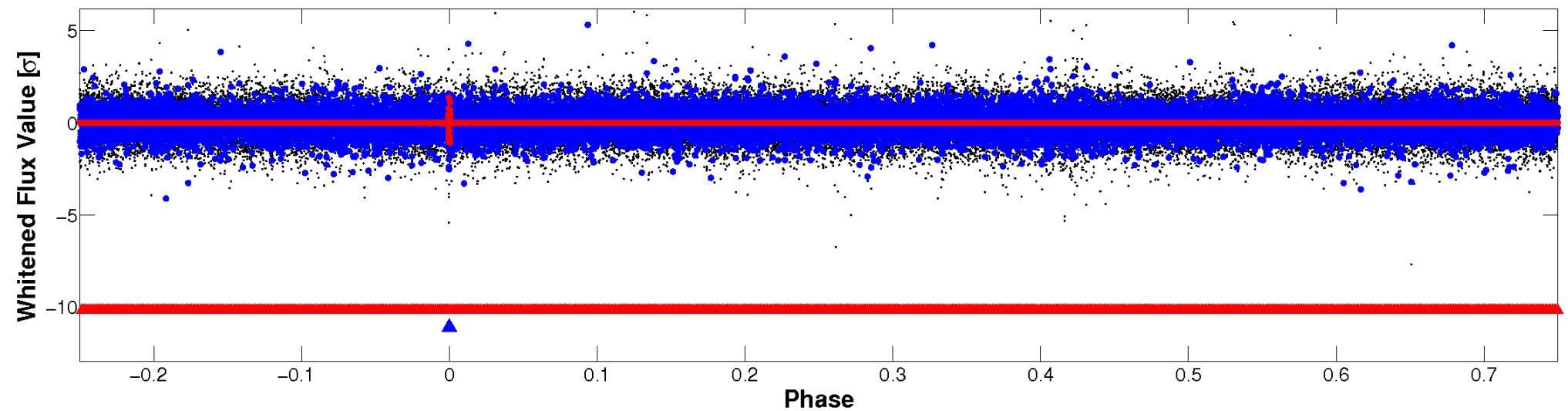


Non-Whitened Vs. Whitened Light Curve

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

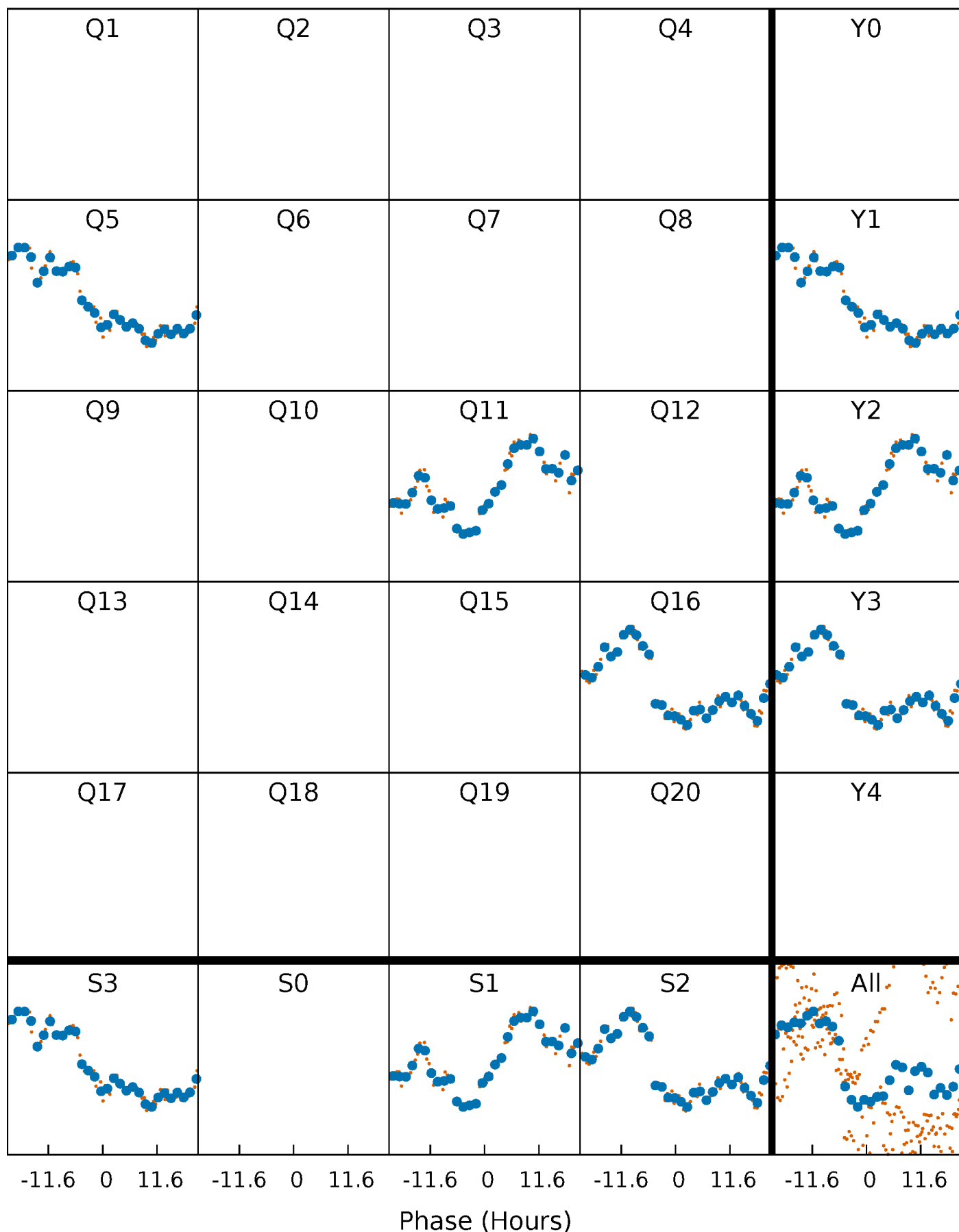


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



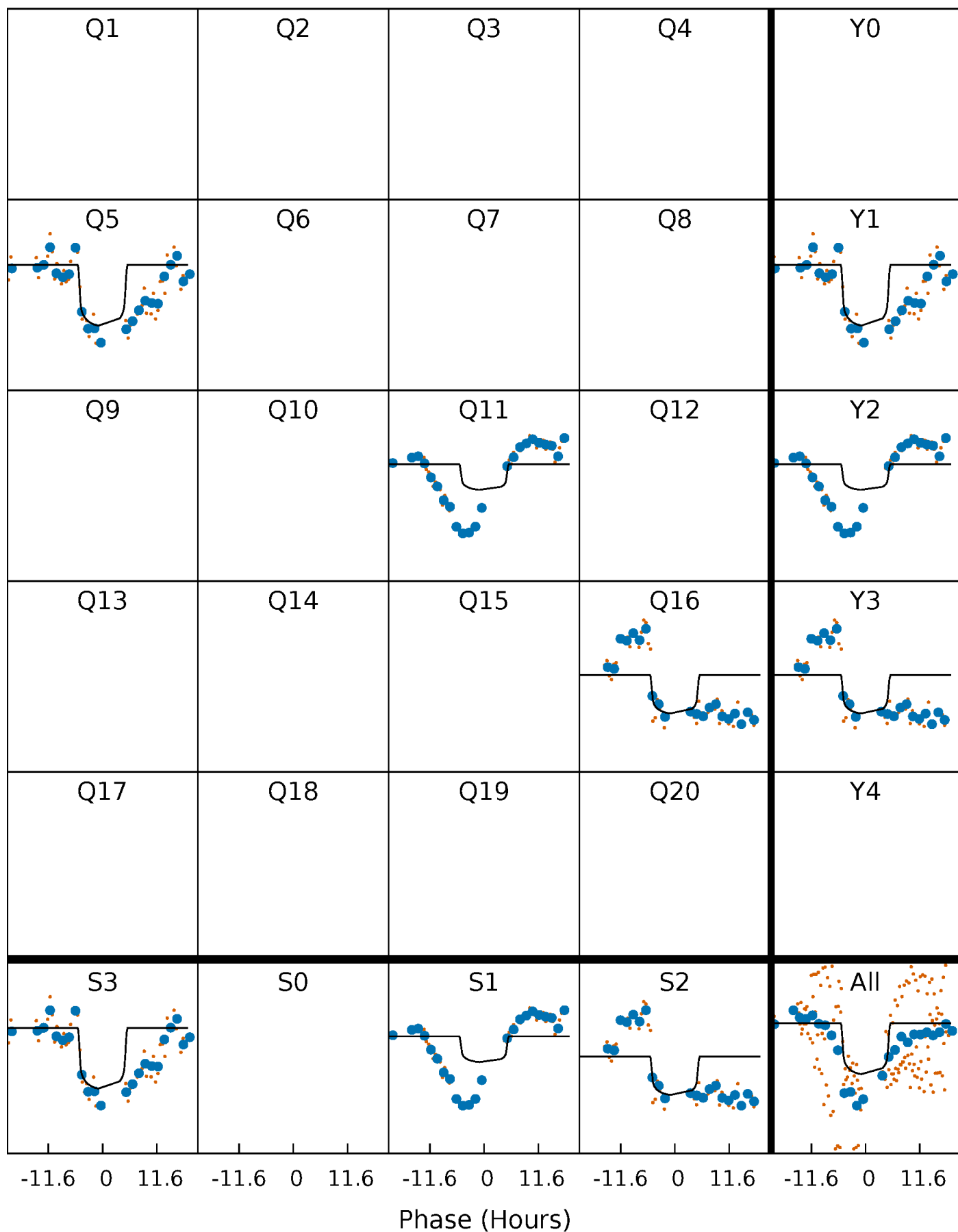
PDC Quarter-Phased Transit Curves

TCE 009033354-02 $P=487.734450$ Days $T_0=535.687339$ (BKJD)



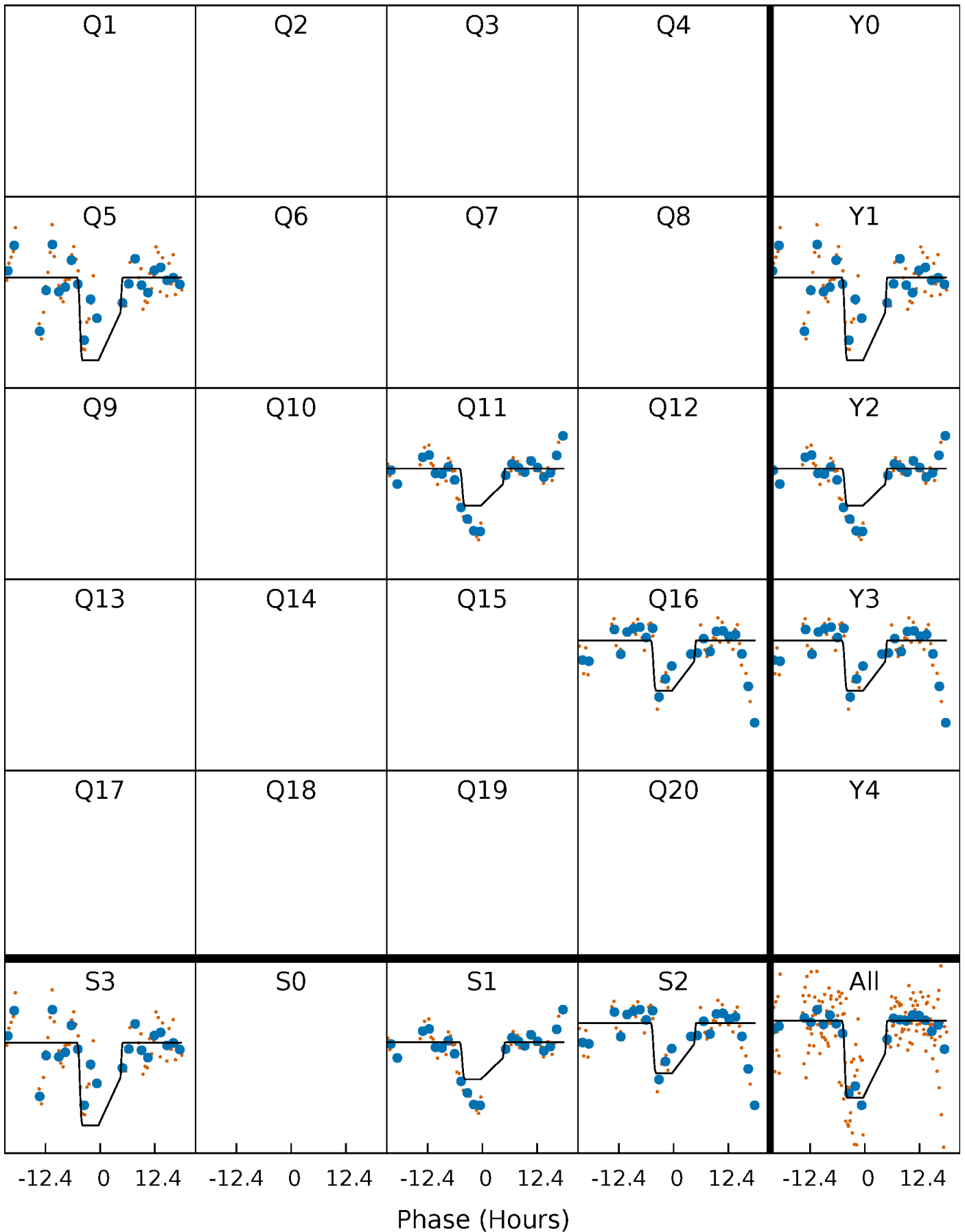
DV Quarter-Phased Transit Curves

TCE 009033354-02 $P=487.734450$ Days $T_0=535.687339$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

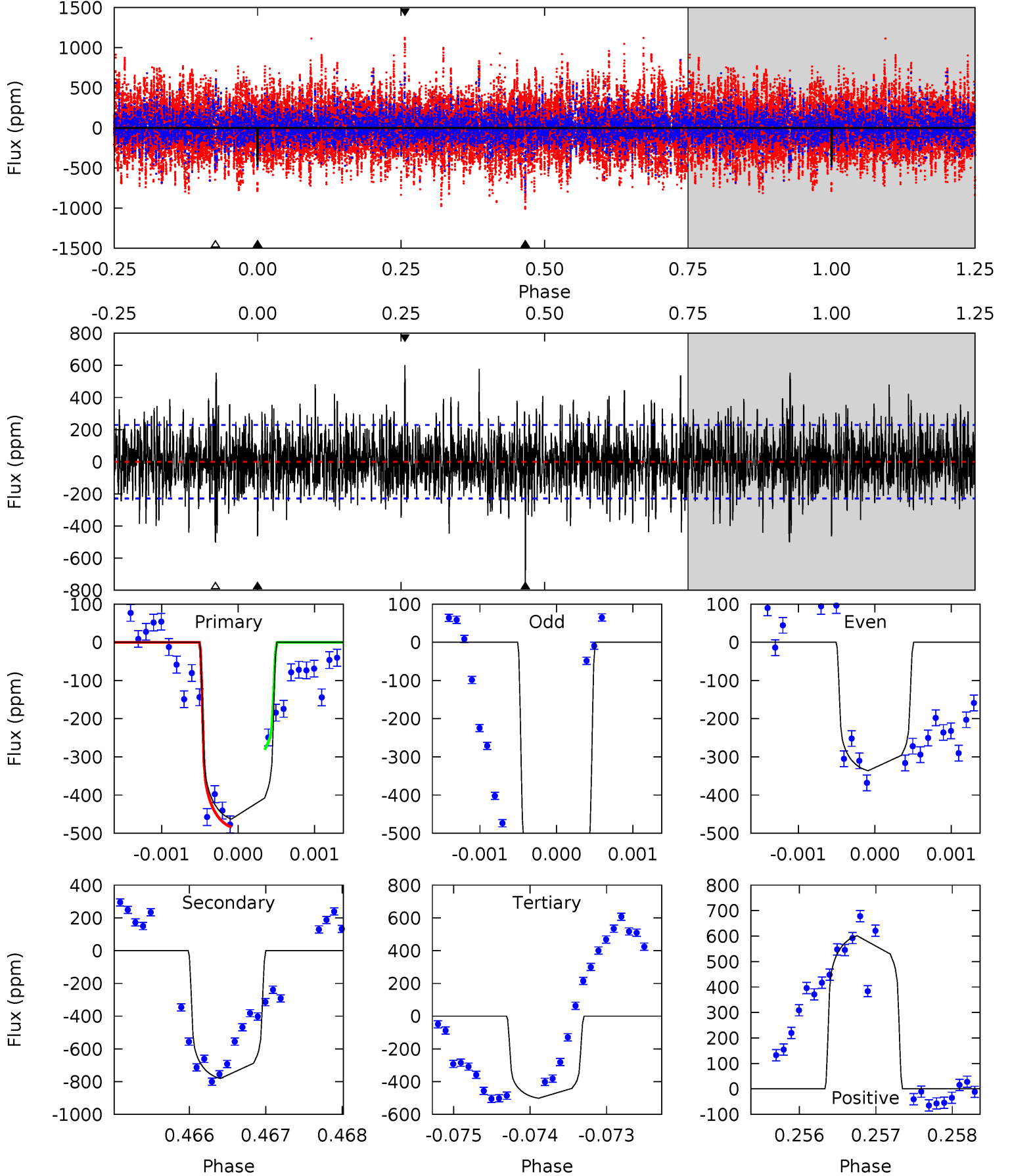
TCE 009033354-02 $P=487.721832$ Days $T_0=535.672067$ (BKJD)



DV Model-Shift Uniqueness Test

009033354-02, P = 487.734450 Days, E = 47.952889 Days

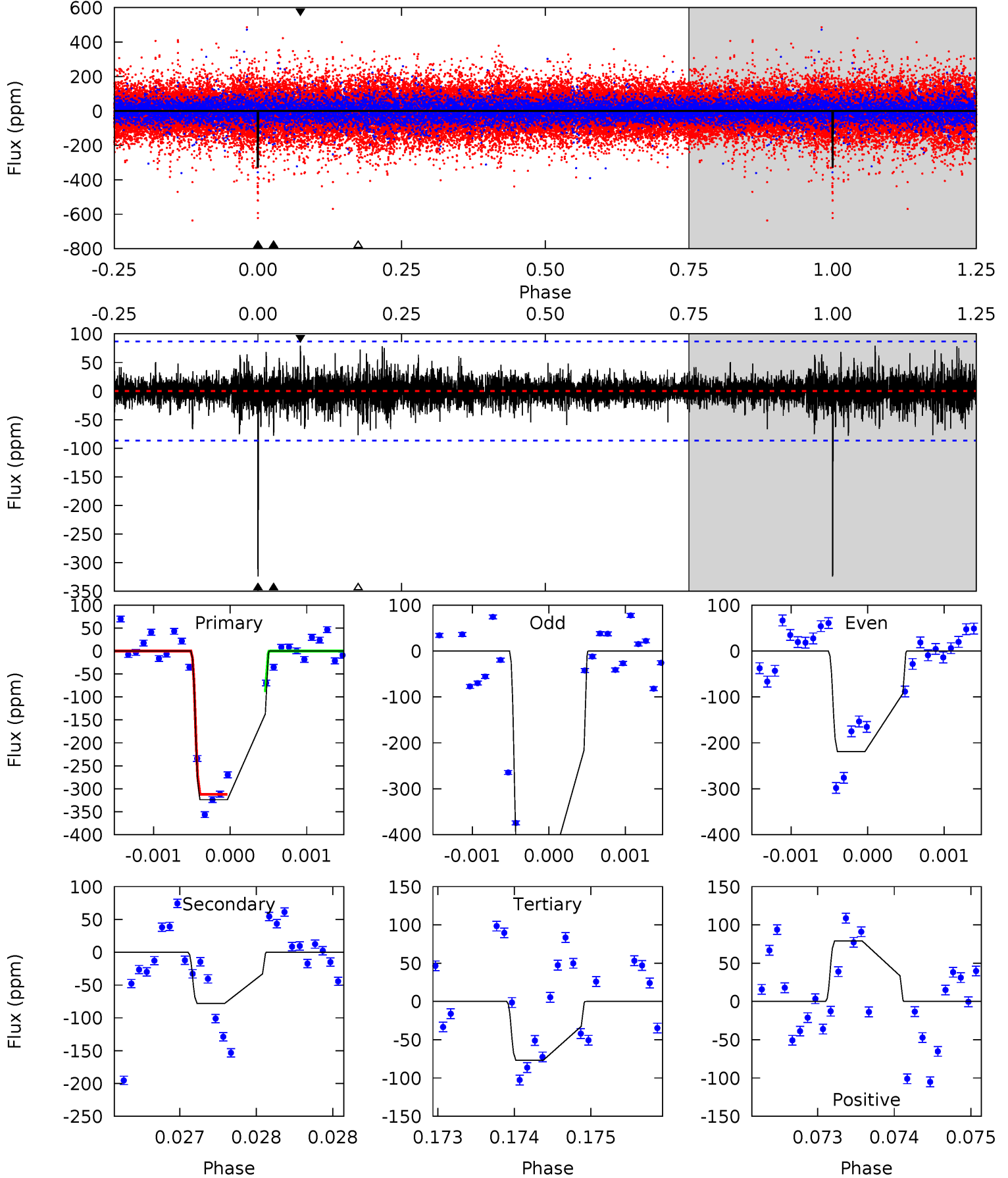
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
11.1	18.7	12.0	14.4	5.47	3.32	3.31	-0.92	-3.31	6.68	4.29	4.18	1.34	0.44	2.04



Alt Model-Shift Uniqueness Test

009033354-02, $P = 487.721832$ Days, $E = 47.950235$ Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
20.5	4.95	4.86	5.01	5.48	3.33	1.01	15.6	15.5	0.08	-0.06	8.91	1.29	0.20	3.41



Stellar Parameters For KIC 009033354

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	6851^{+154}_{-222}	$3.570^{+0.344}_{-0.065}$	$-0.260^{+0.300}_{-0.250}$	$3.567^{+0.349}_{-1.482}$	$1.723^{+0.169}_{-0.366}$	$0.053^{+0.147}_{-0.011}$
	+2%/-3%	+10%/-2%	+115%/-96%	+10%/-42%	+10%/-21%	+275%/-21%
Source	PHO1	FLK73	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 009033354-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-781 ± 42	$5.91^{+1.65}_{-1.51}$	647^{+34}_{-67}	9433^{+1952}_{-1185}	25849^{+19993}_{-9858}
Alt.	-78 ± 16	$6.55^{+1.54}_{-1.70}$	648^{+33}_{-63}	4900^{+514}_{-415}	2108^{+1738}_{-768}

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

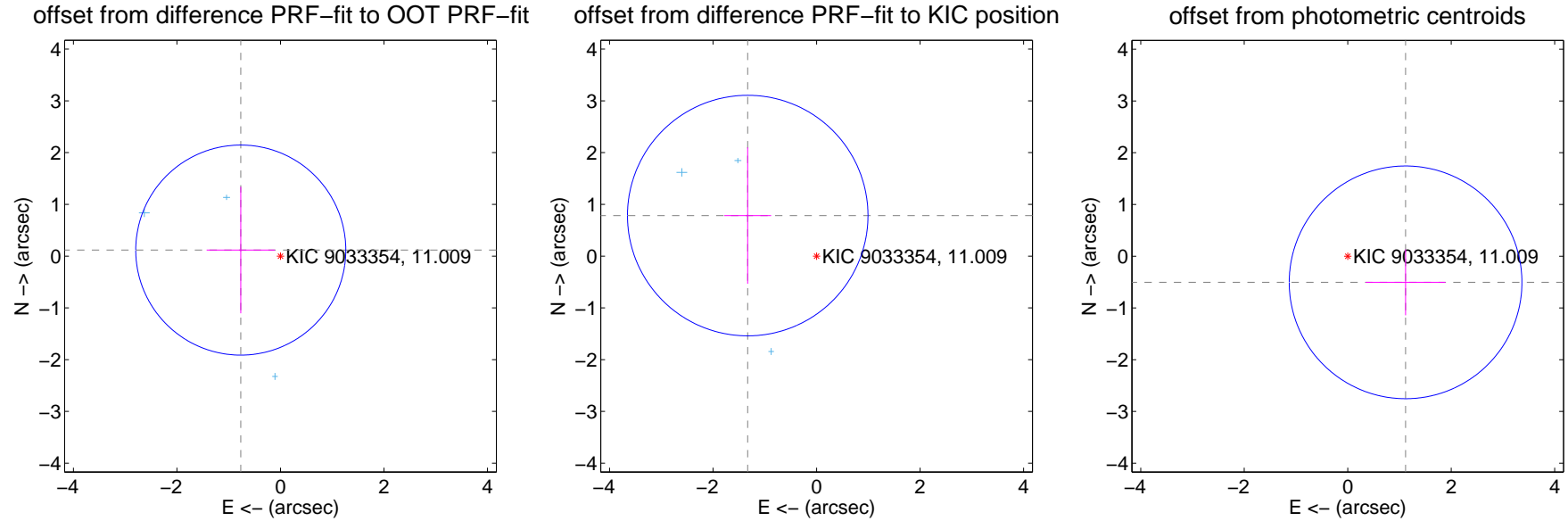
DV Centroid Data

Supplemental centroid analysis for 009033354-02. **Kepler magnitude: 11.01.** Transit SNR 4.88

There are 3 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.91 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.776 ± 0.676	1.15	0.767 ± 0.658	0.117 ± 1.222
PRF-fit source offset from KIC position	1.544 ± 0.774	1.99	1.330 ± 0.453	0.783 ± 1.318
photometric centroid source offset	1.23 ± 0.75	1.64	-1.12 ± 0.77	-0.51 ± 0.64

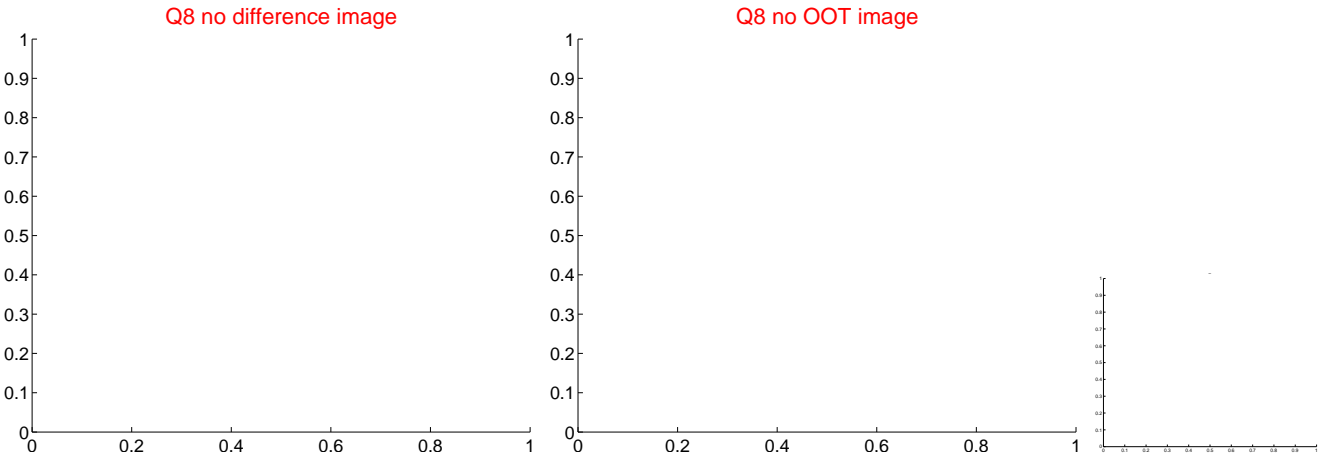
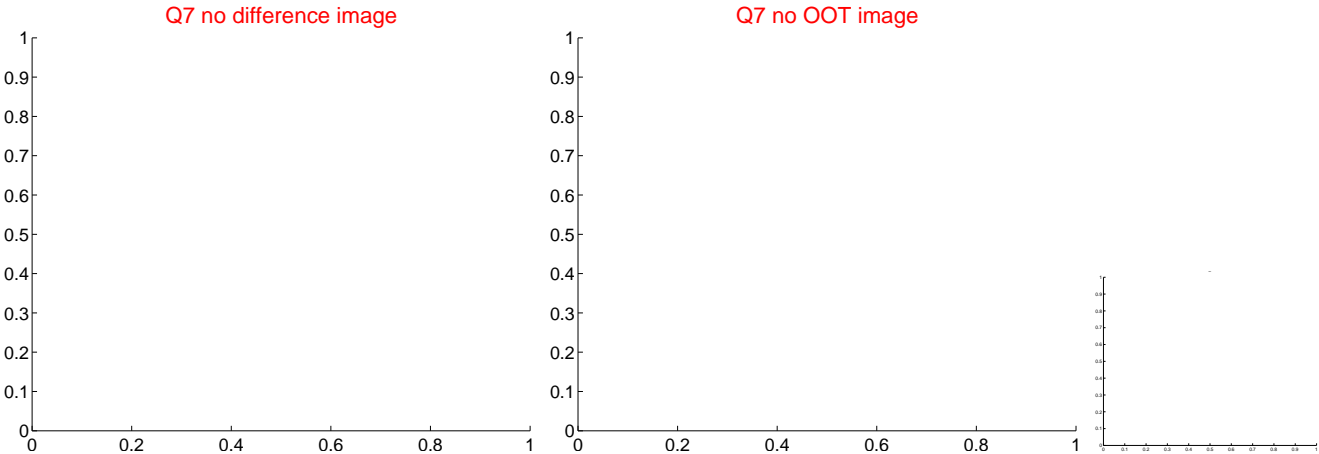
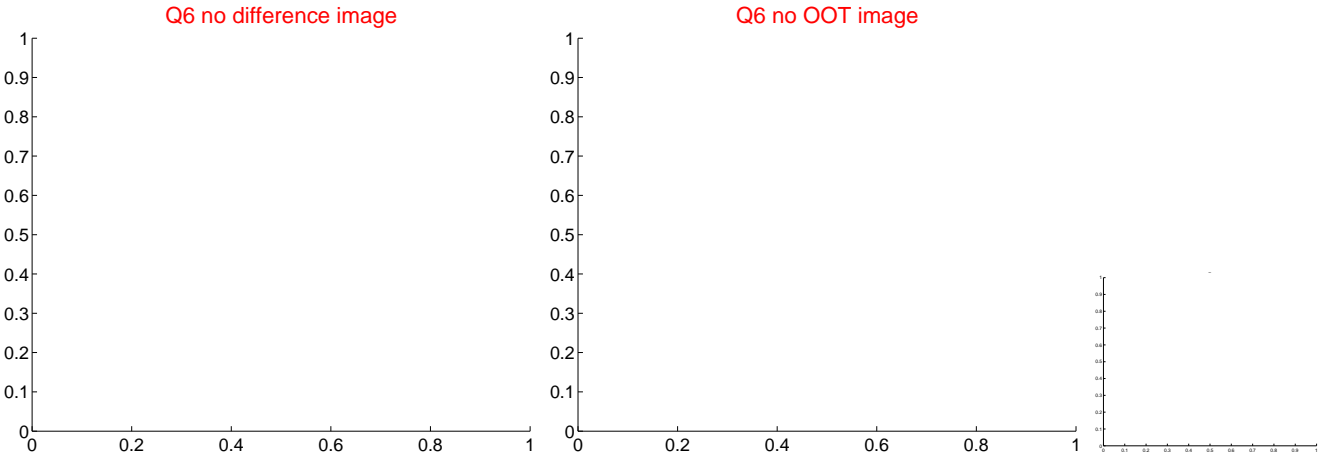
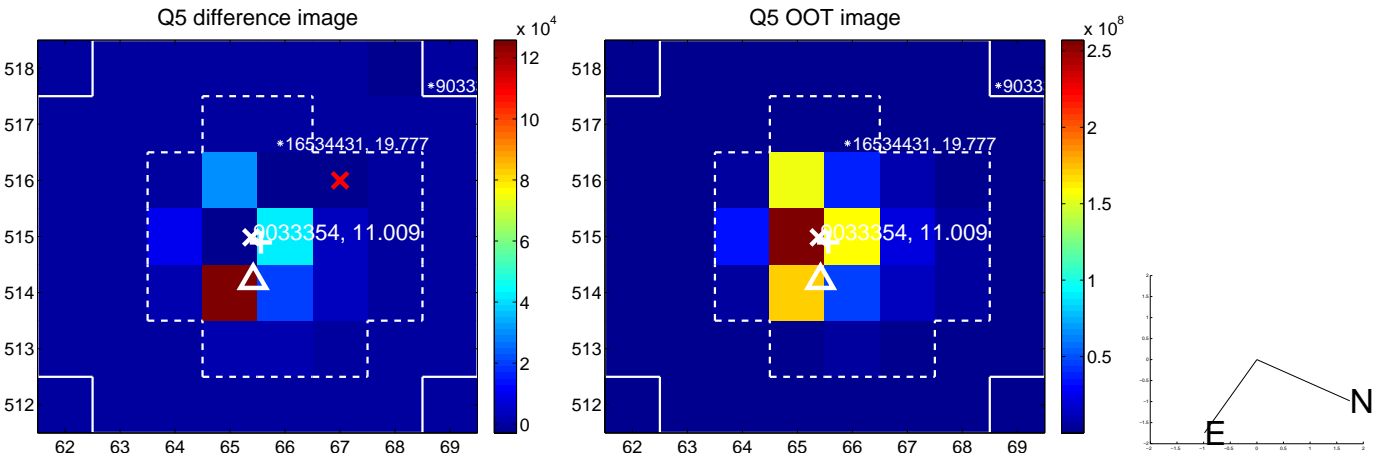


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

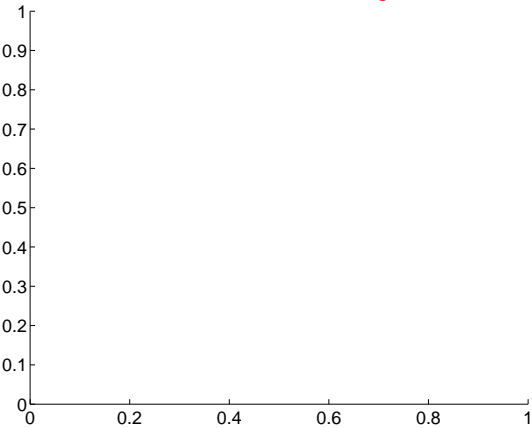
Q9 no difference image



Q9 no OOT image



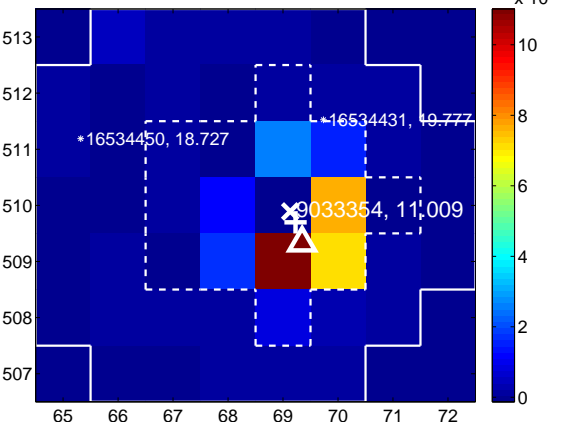
Q10 no difference image



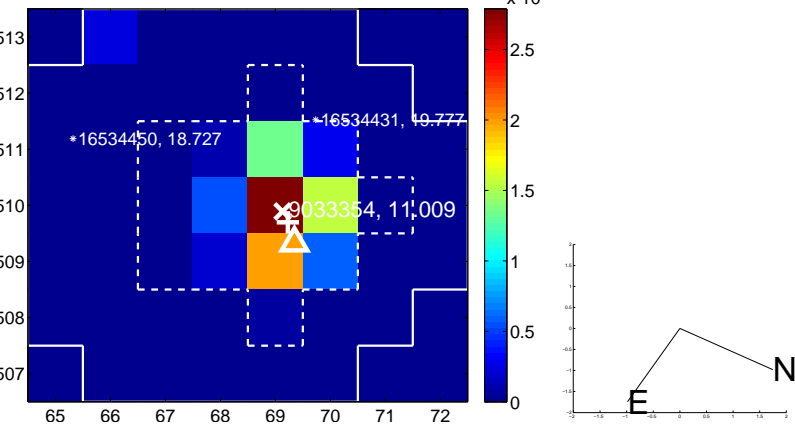
Q10 no OOT image



Q11 difference image



Q11 OOT image



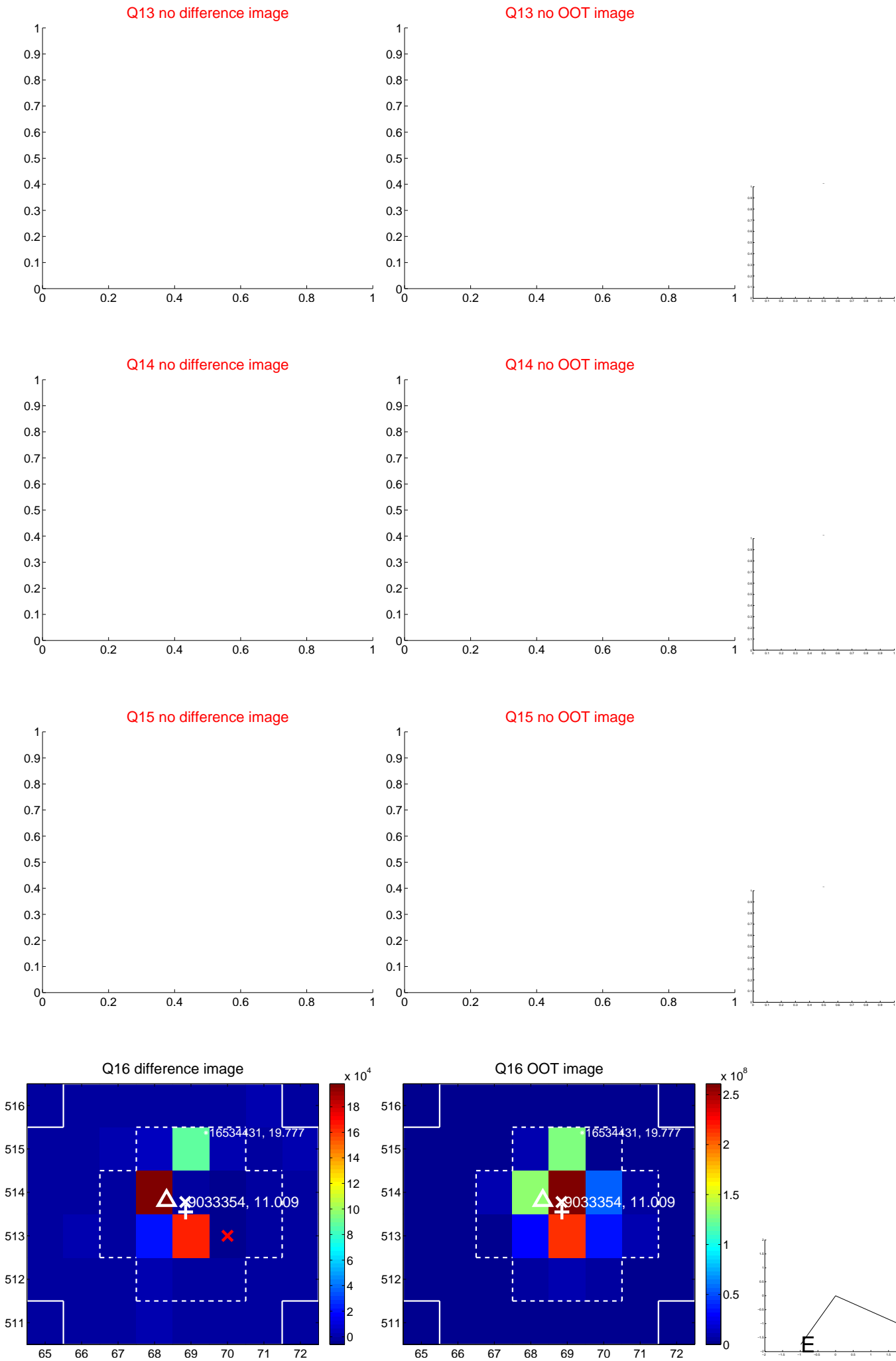
Q12 no difference image



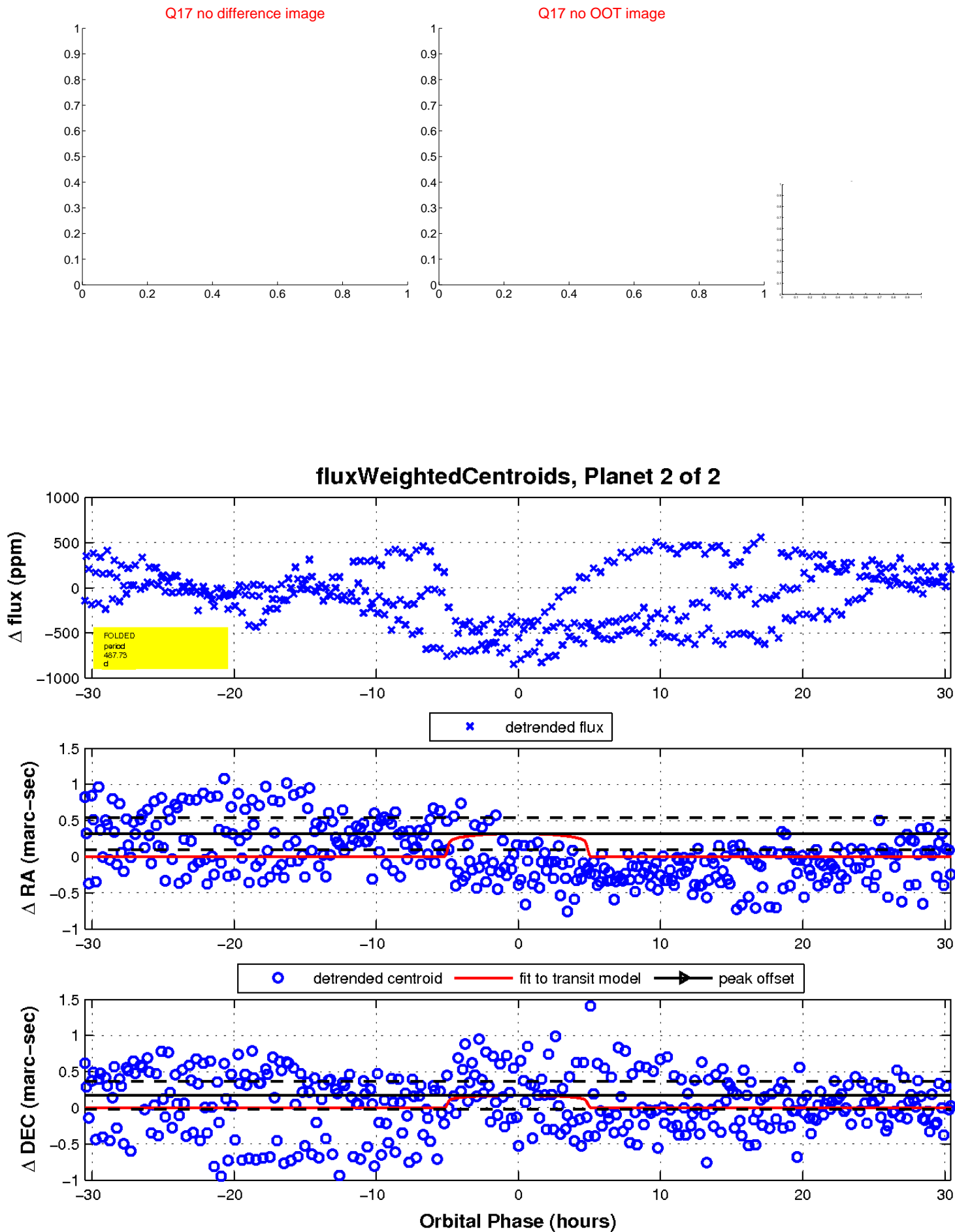
Q12 no OOT image



white \times : KIC target position; $+$: OOT centroid; Δ : 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

