

KIC 008978630

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})
008978630-01	OBS	No	0.904101	131.763205	14.4	3.636	8.7	8.0	2.18	7097	0.96	25910.40
008978630-02	OBS	No	101.947074	197.459819	232.9	3.949	8.2	8.6	2.18	7097	6.46	47.56

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008978630-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED
008978630-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED

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

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

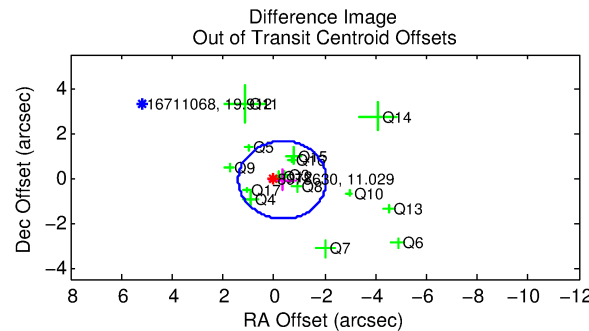
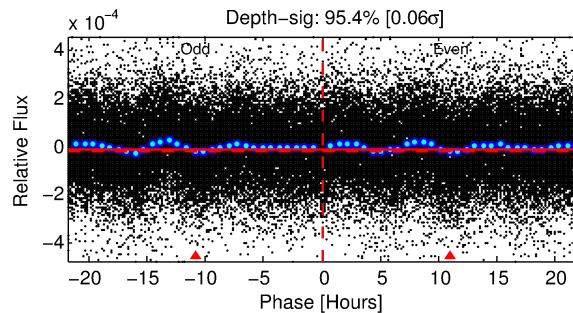
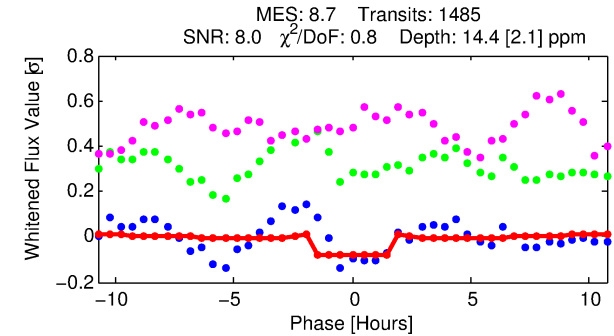
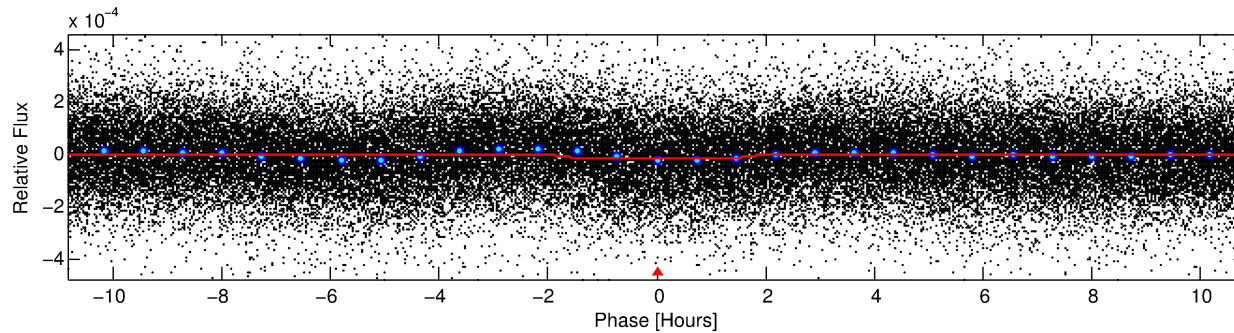
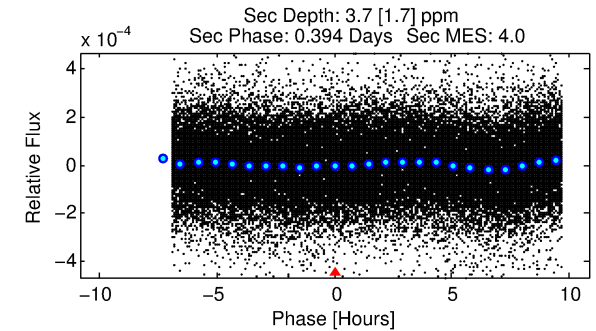
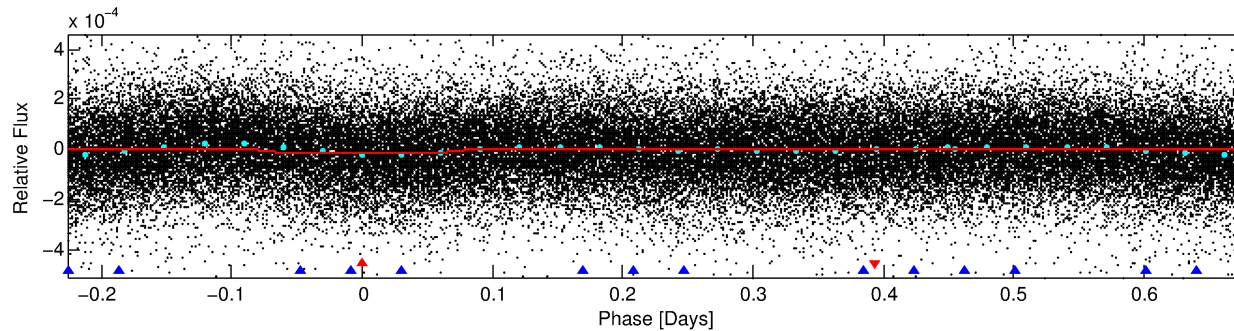
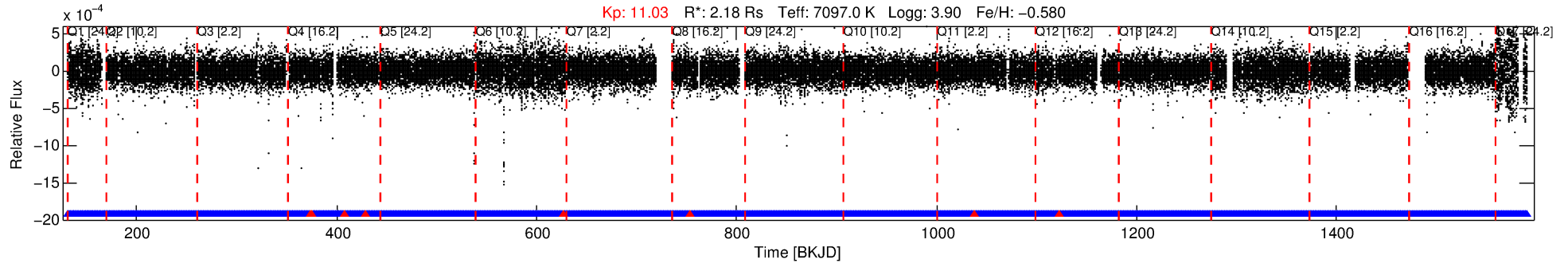
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 008978630-01

No Significant Match Found

DV One-Page Summary

KIC: 8978630 Candidate: 1 of 2 Period: 0.904 d



DV Fit Results:

Period = 0.90410 [0.00001] d
Epoch = 131.7632 [0.0032] BKJD
 $R_p/R^* = 0.0040$ [0.0008]
 $a/R^* = 1.26$ [0.58]
 $b = 0.90$ [0.26]
 $\text{Seff} = 25910.40$ [17248.54]
 $T_{\text{eq}} = 3235$ [538] K
 $R_p = 0.96$ [0.46] R_e
 $a = 0.0204$ [0.0084] AU
 $A_g = 0.93$ [0.83] [-0.09σ]
 $T_{\text{eff}} = 4907$ [779] K [1.77σ]

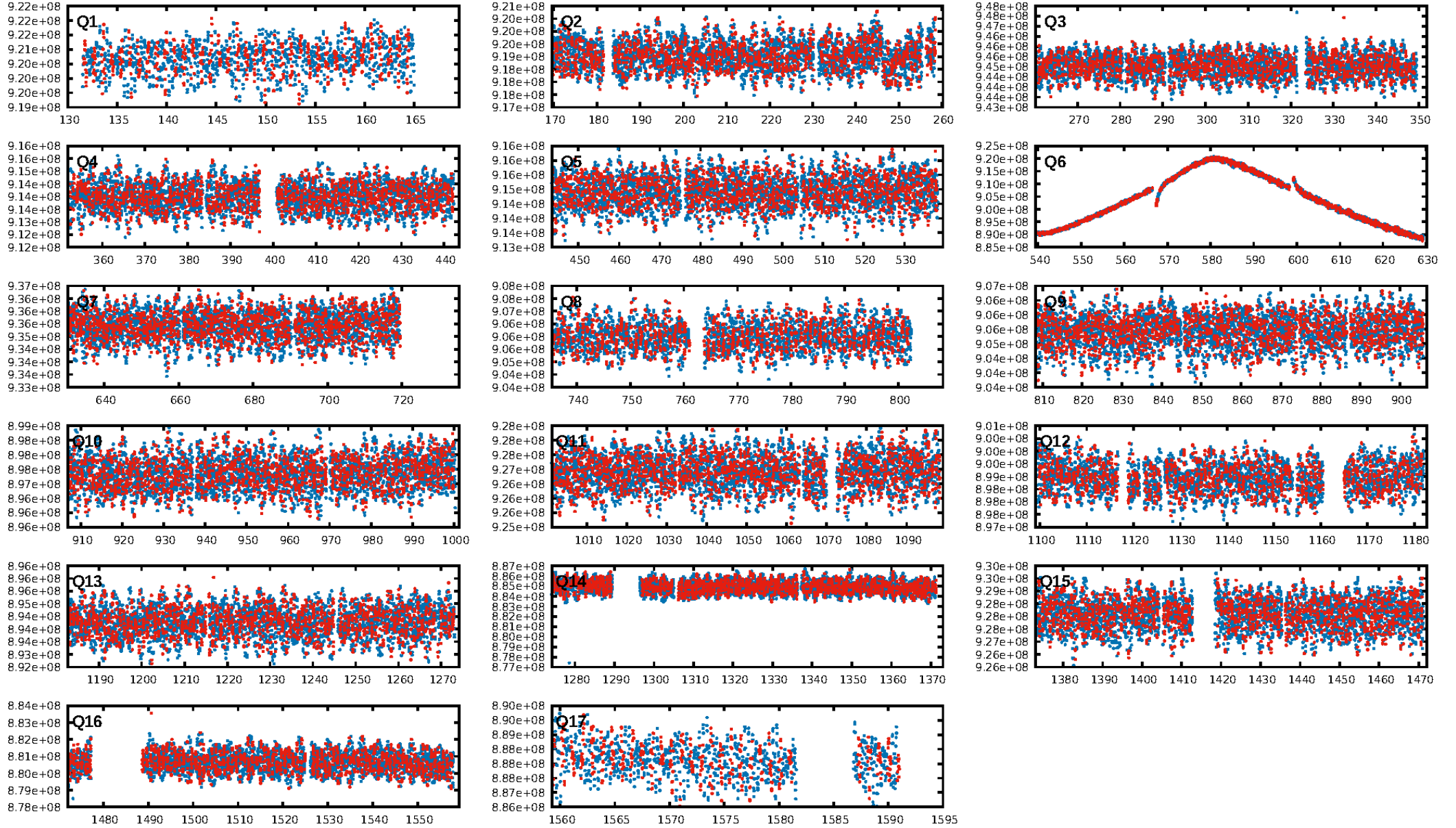
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [451.74σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 5.63e-14
RollingBand-fgt: 0.99 [1410/1418]
GhostDiagnostic-chr: 4.963
Centroid-sig: 13.6%
Centroid-so: 1.491 arcsec [1.75σ]
OotOffset-rm: 0.349 arcsec [0.61σ]
OotOffset-st: 3/4/4/4 [15]
KicOffset-rm: 0.448 arcsec [0.77σ]
KicOffset-st: 3/4/4/4 [15]
DiffImageQuality-fgm: 0.47 [7/15]
DiffImageOverlap-fno: 1.00 [17/17]

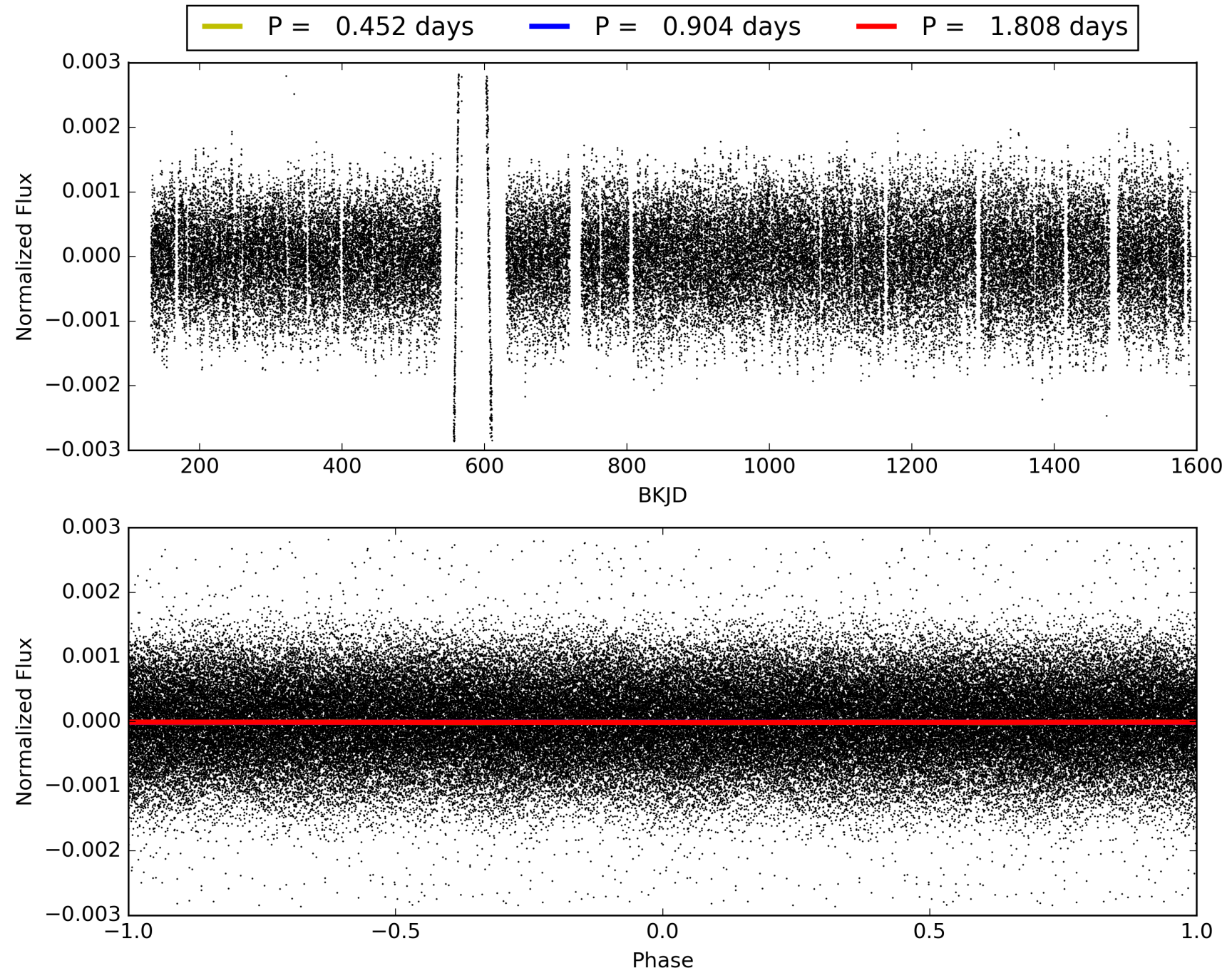
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This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

TCE 008978630-01, PDC Light Curves

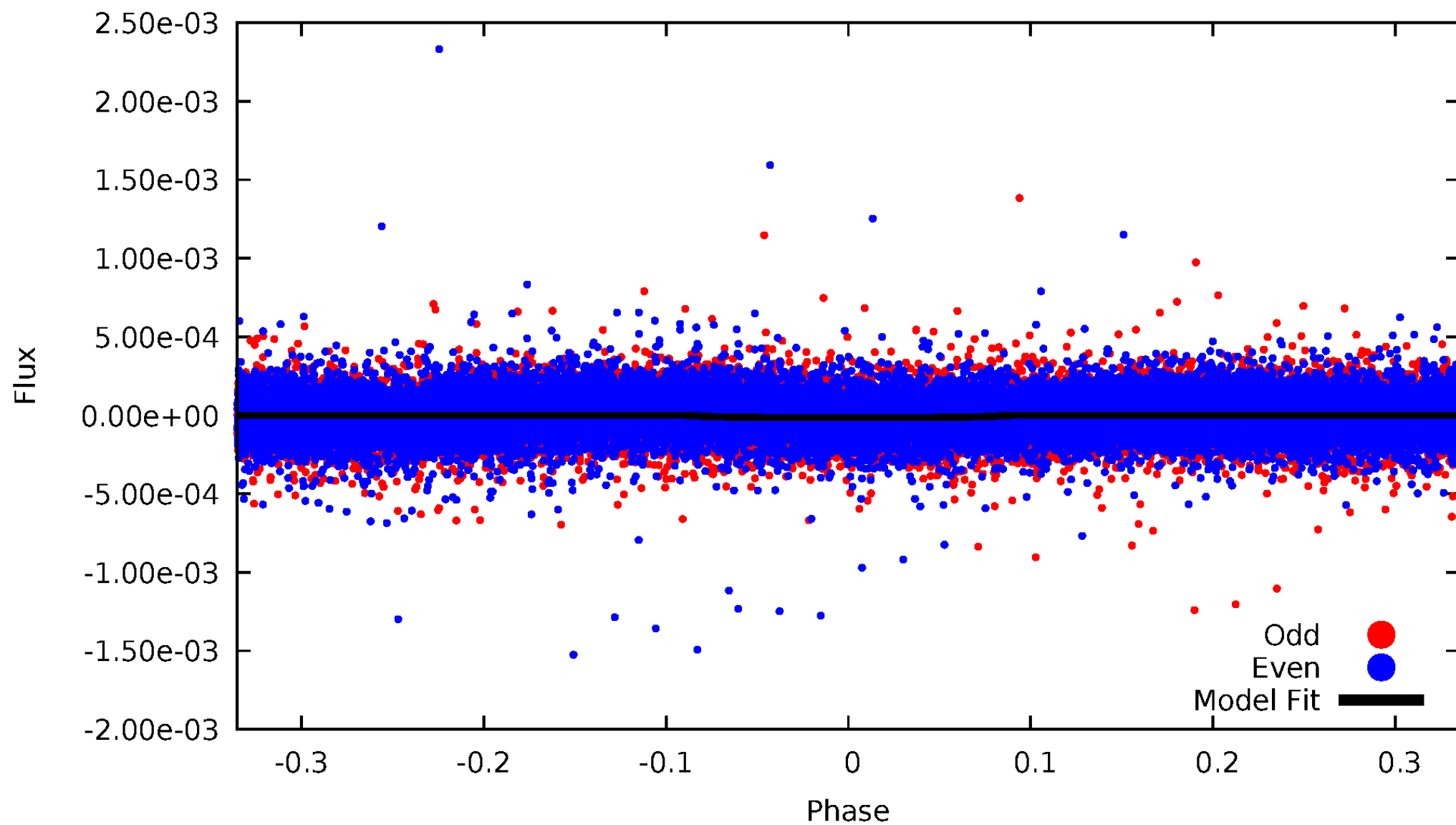


TCE 008978630-01



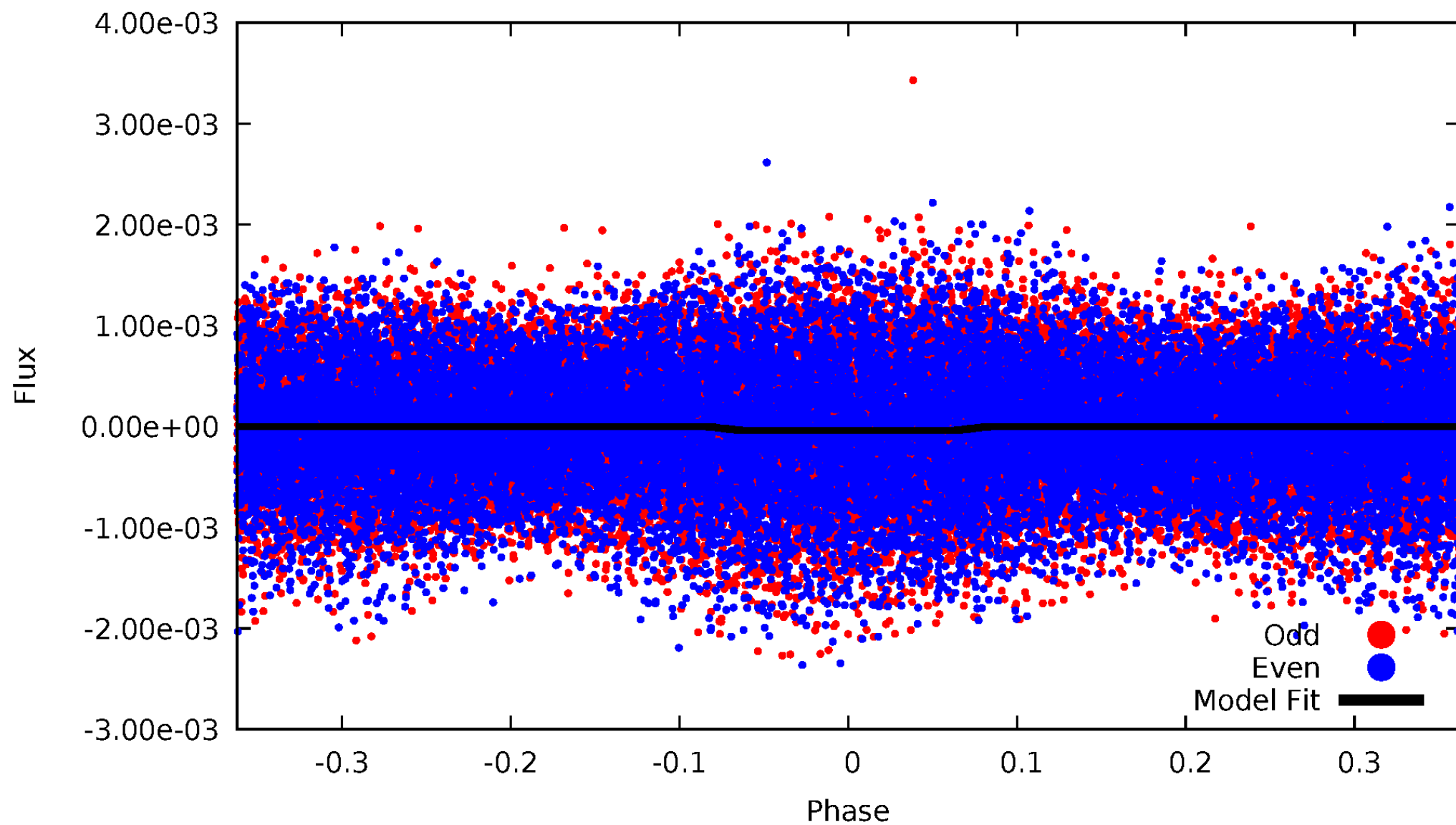
DV Odd/Even

TCE 008978630-01

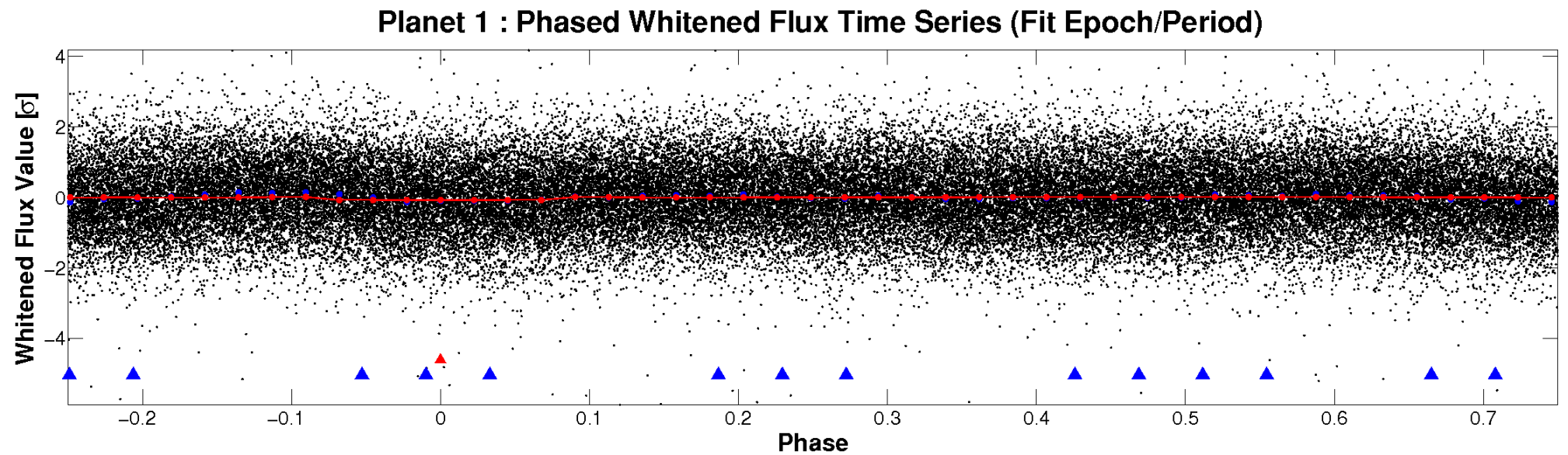
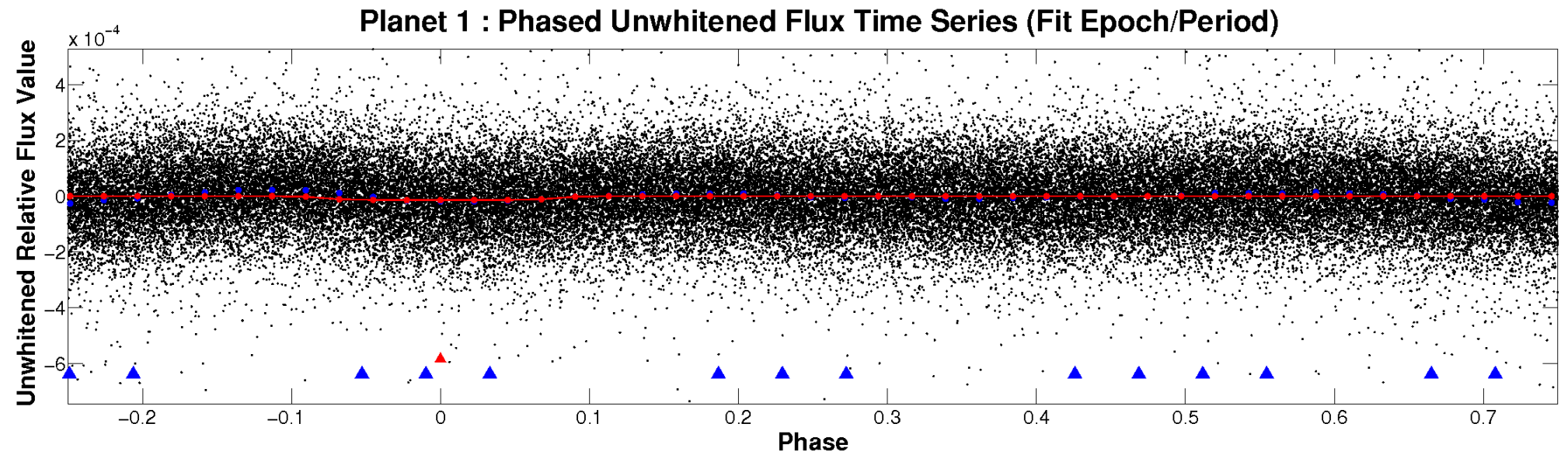


ALT Odd/Even

TCE 008978630-01

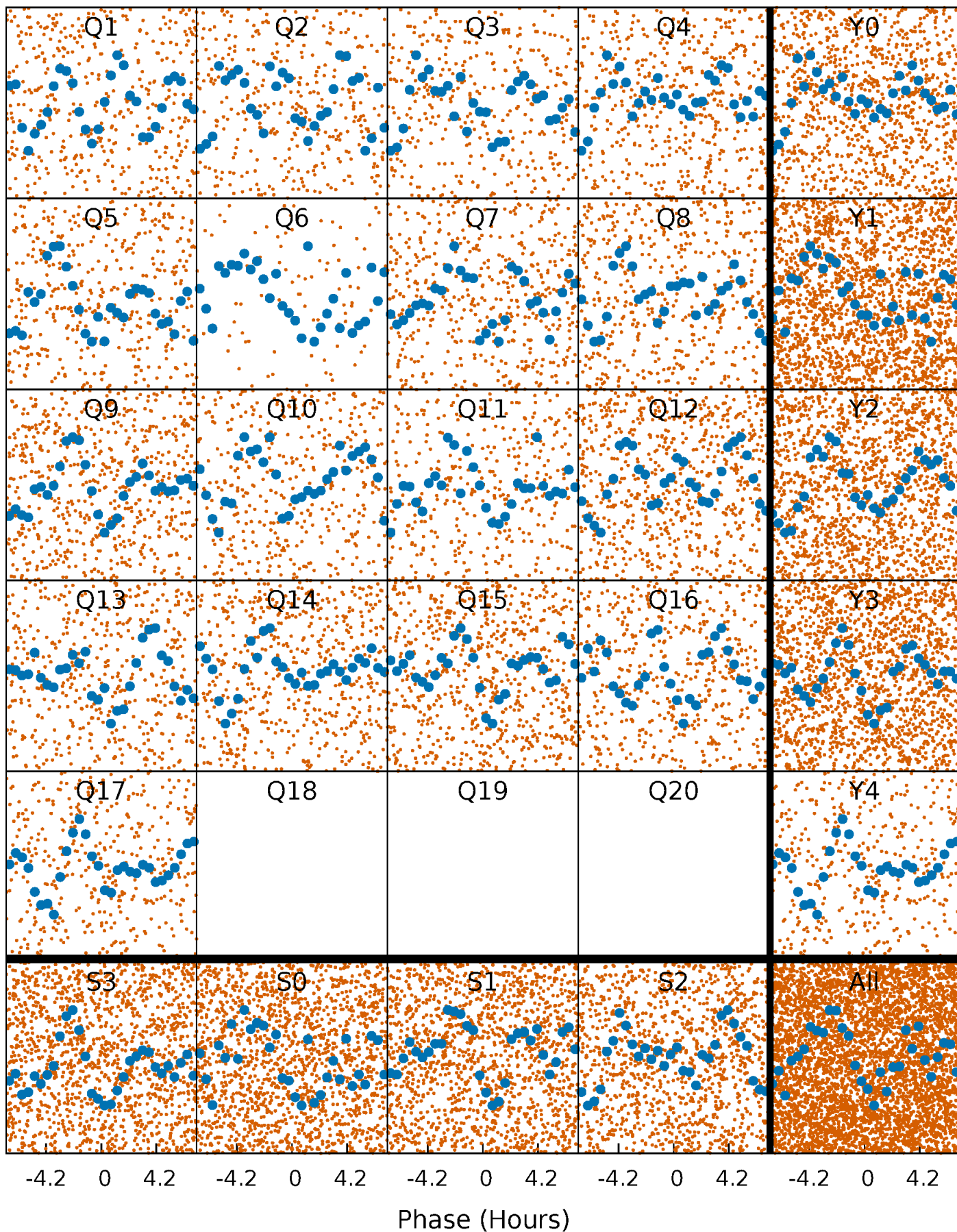


Non-Whitened Vs. Whitened Light Curve



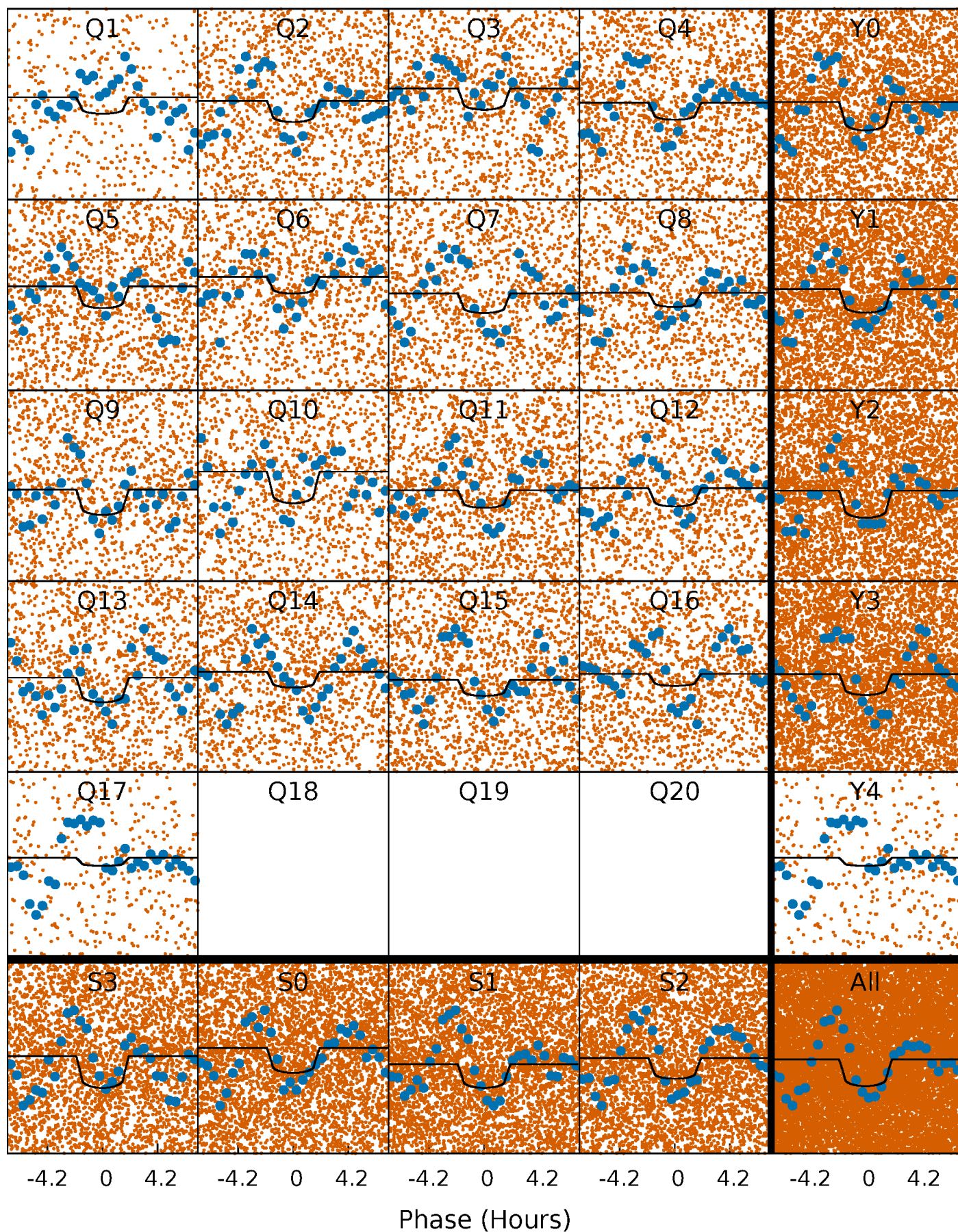
PDC Quarter-Phased Transit Curves

TCE 008978630-01 P= 0.904101 Days $T_0=131.763205$ (BKJD)



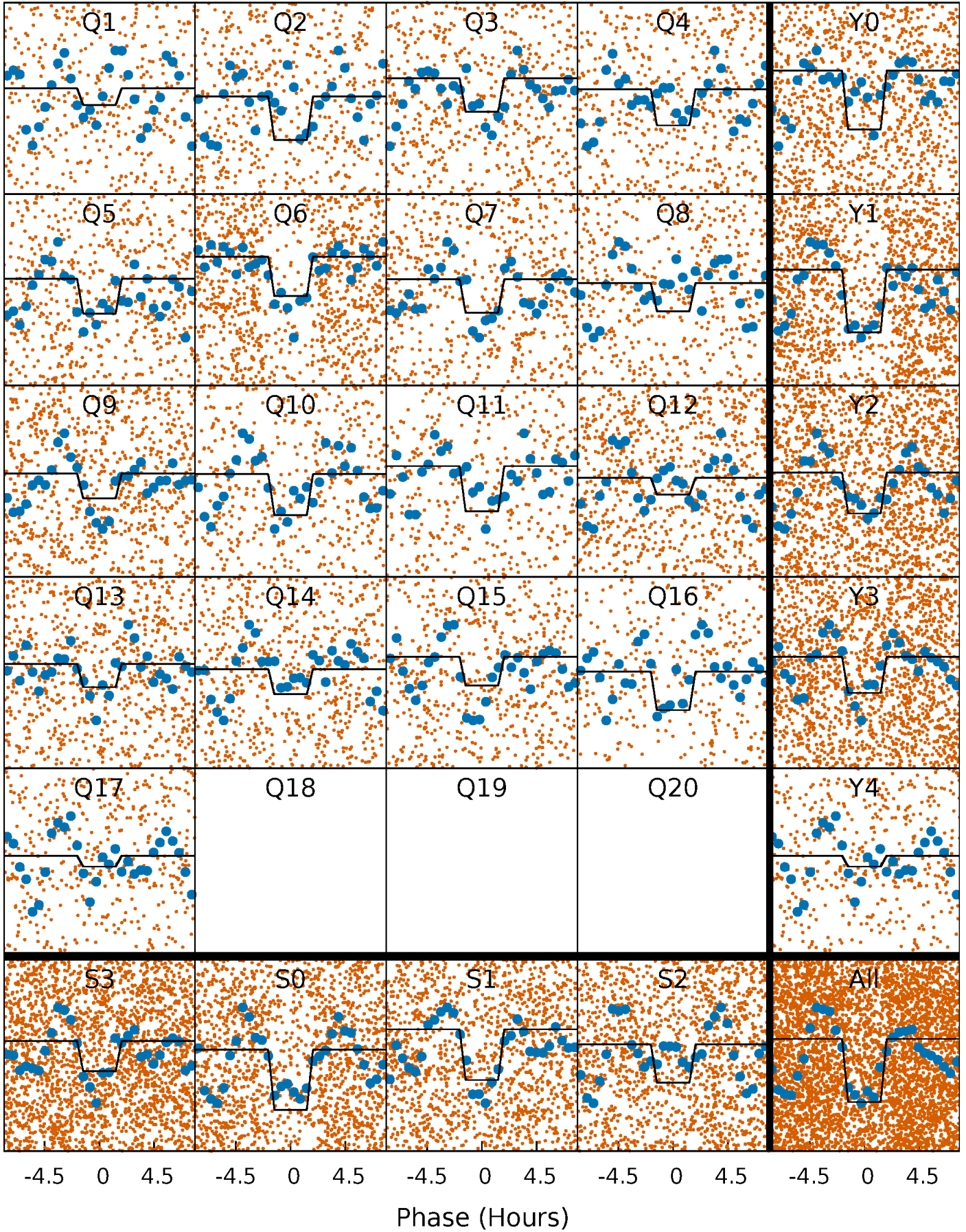
DV Quarter-Phased Transit Curves

TCE 008978630-01 P= 0.904101 Days $T_0=131.763205$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

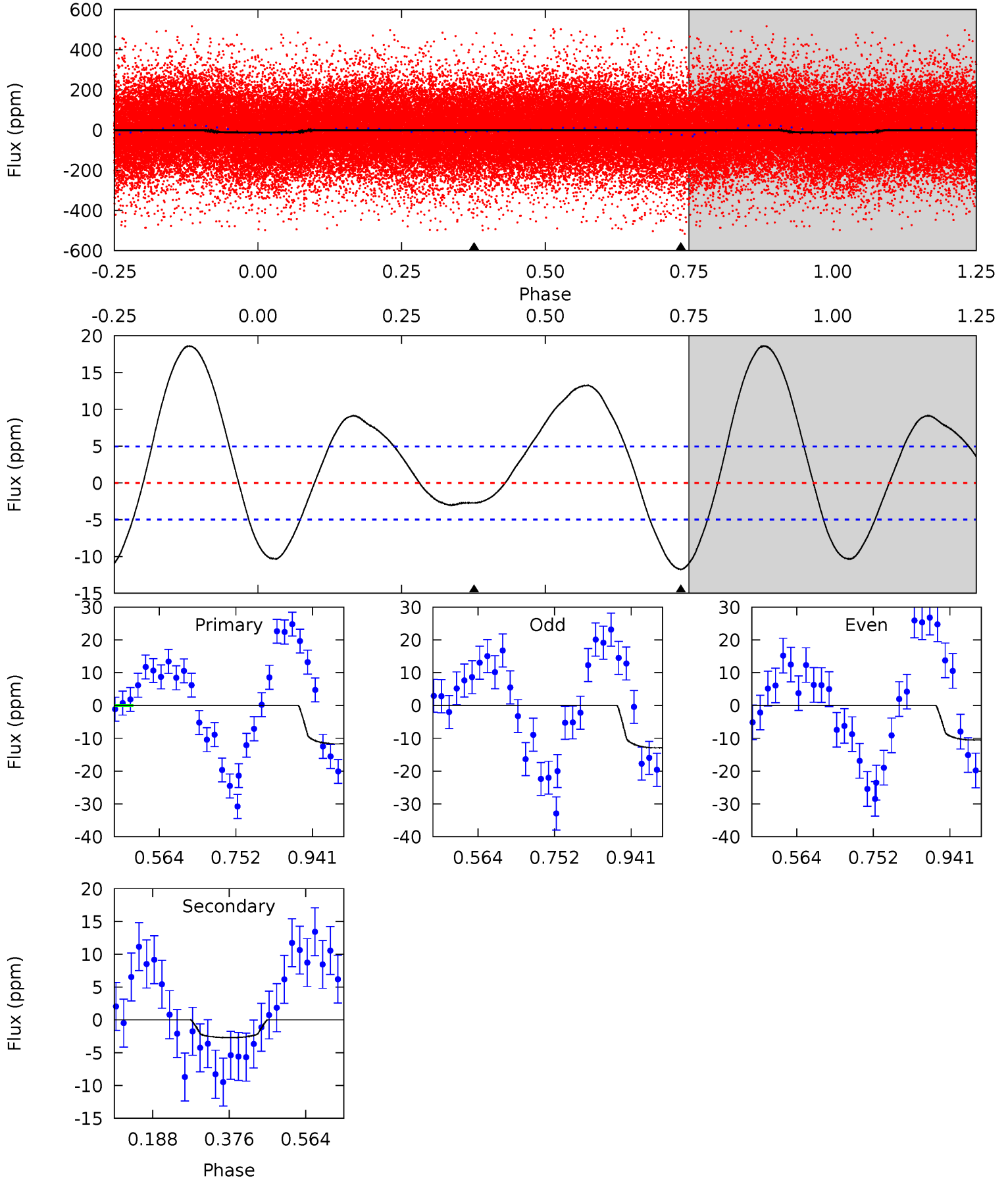
TCE 008978630-01 P= 0.904136 Days $T_0=131.760262$ (BKJD)



DV Model-Shift Uniqueness Test

008978630-01, P = 0.904101 Days, E = 130.859104 Days

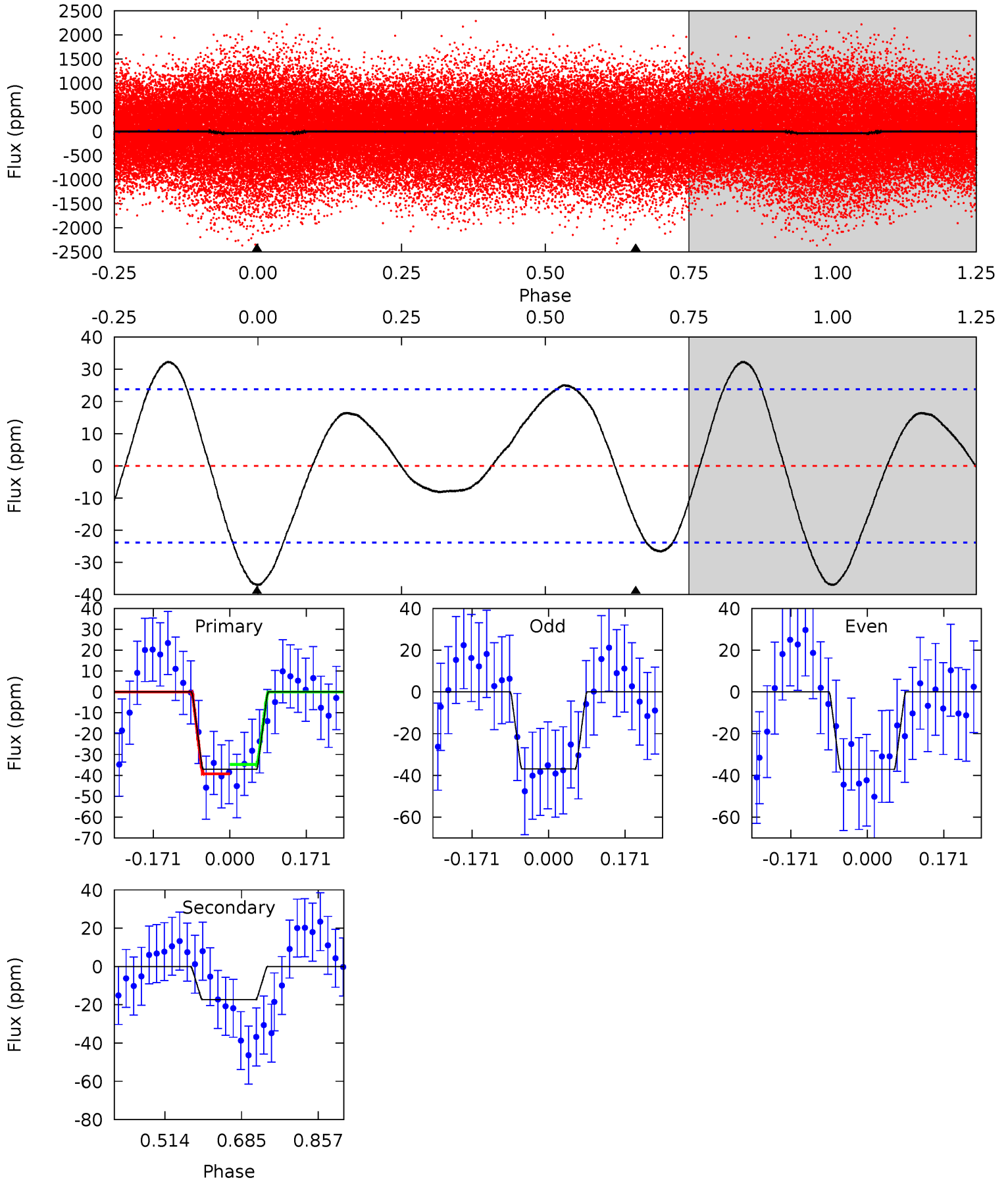
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
10.5	2.43	0	0	4.43	1.32	6.47	10.5	10.5	2.43	2.43	1.06	1.12	0.61	6.07



Alt Model-Shift Uniqueness Test

008978630-01, P = 0.904136 Days, E = 130.856126 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
6.92	3.24	0	0	4.45	1.37	1.58	6.92	6.92	3.24	3.24	0.02	0.82	0.47	0.37



Stellar Parameters For KIC 008978630

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	M (M_{\odot})	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	7097^{+193}_{-236}	$3.904^{+0.382}_{-0.127}$	$-0.580^{+0.250}_{-0.300}$	$2.182^{+0.503}_{-0.935}$	$1.394^{+0.193}_{-0.289}$	$0.189^{+0.632}_{-0.074}$
	+3%/-3%	+10%/-3%	+43%/-52%	+23%/-43%	+14%/-21%	+334%/-39%
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 008978630-01 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-3 ± 1	$0.90^{+0.26}_{-0.25}$	4417^{+325}_{-470}	4157^{+799}_{-1054}	$0.737^{+0.795}_{-0.364}$
Alt.	-17 ± 5	$1.48^{+0.31}_{-0.33}$	4439^{+353}_{-451}	5402^{+615}_{-695}	$1.787^{+1.249}_{-0.735}$

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 $A_{obs} \gg 1.0$

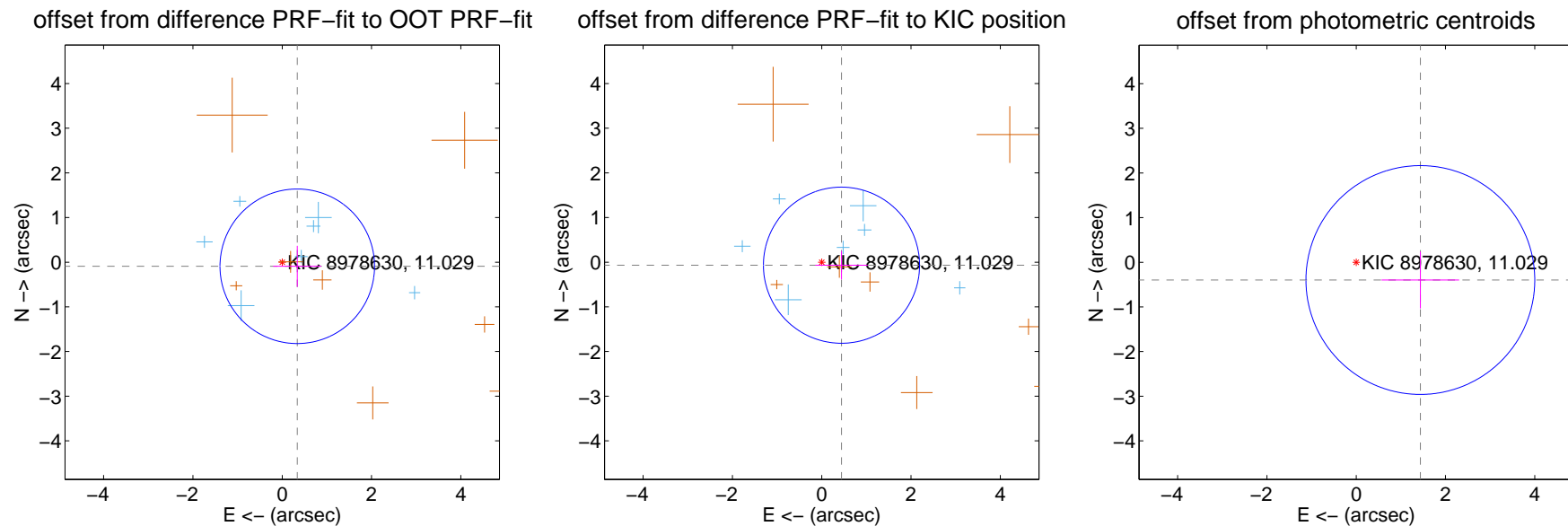
DV Centroid Data

Supplemental centroid analysis for 008978630-01. **Kepler magnitude: 11.03.** Transit SNR 7.99

There are 7 quarters with good PRF difference image offsets

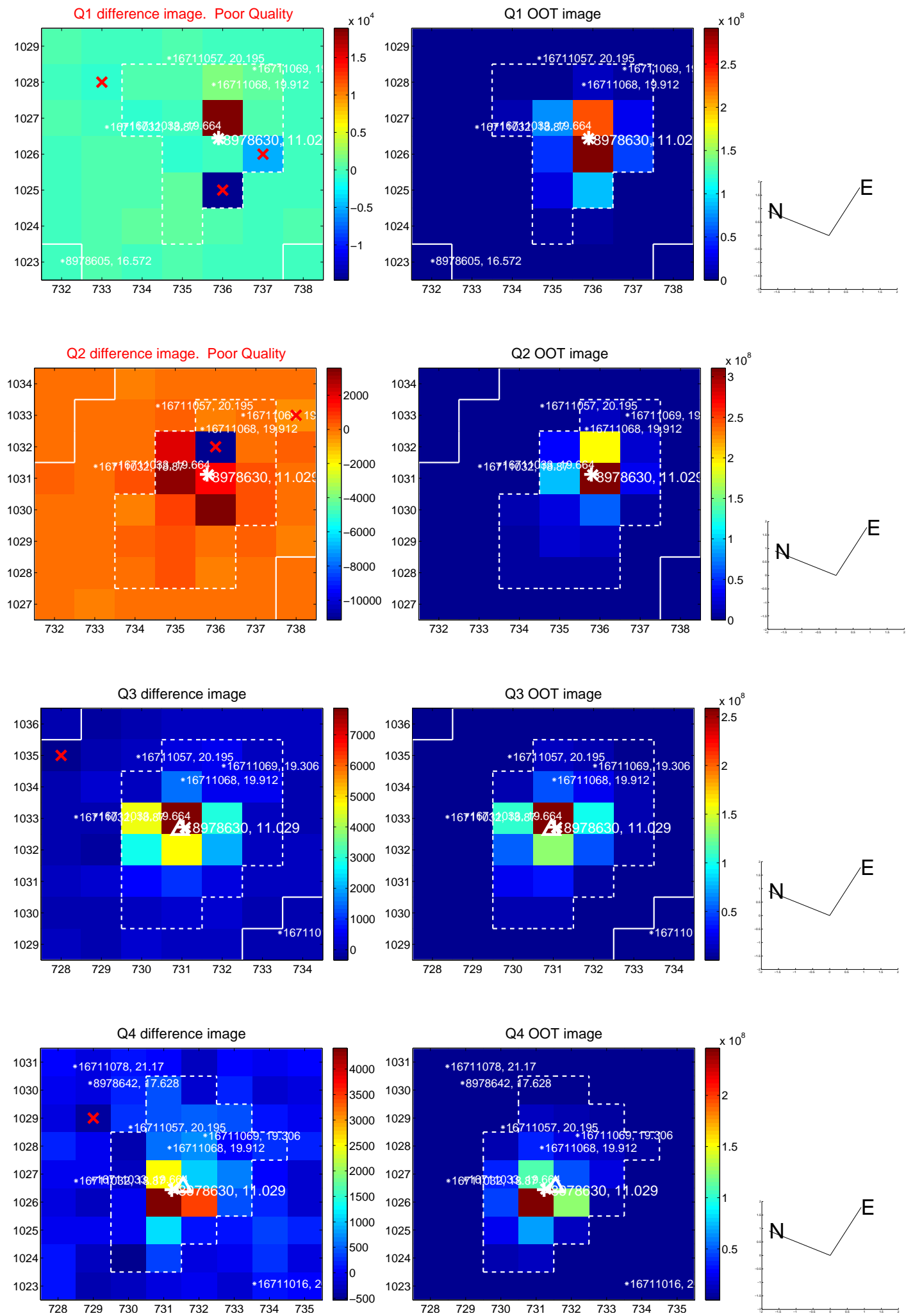
The direct PRF centroid is offset from the target star catalog position by about 0.04 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.349 ± 0.577	0.61	-0.337 ± 0.538	-0.091 ± 0.459
PRF-fit source offset from KIC position	0.448 ± 0.583	0.77	-0.443 ± 0.587	-0.067 ± 0.318
photometric centroid source offset	1.49 ± 0.85	1.75	-1.44 ± 0.87	-0.40 ± 0.64

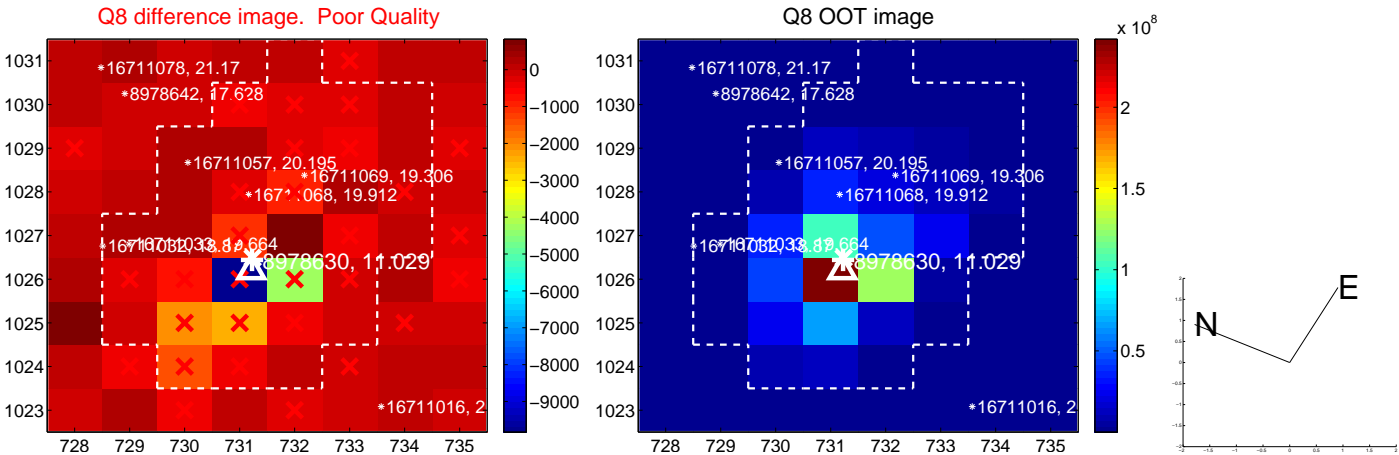
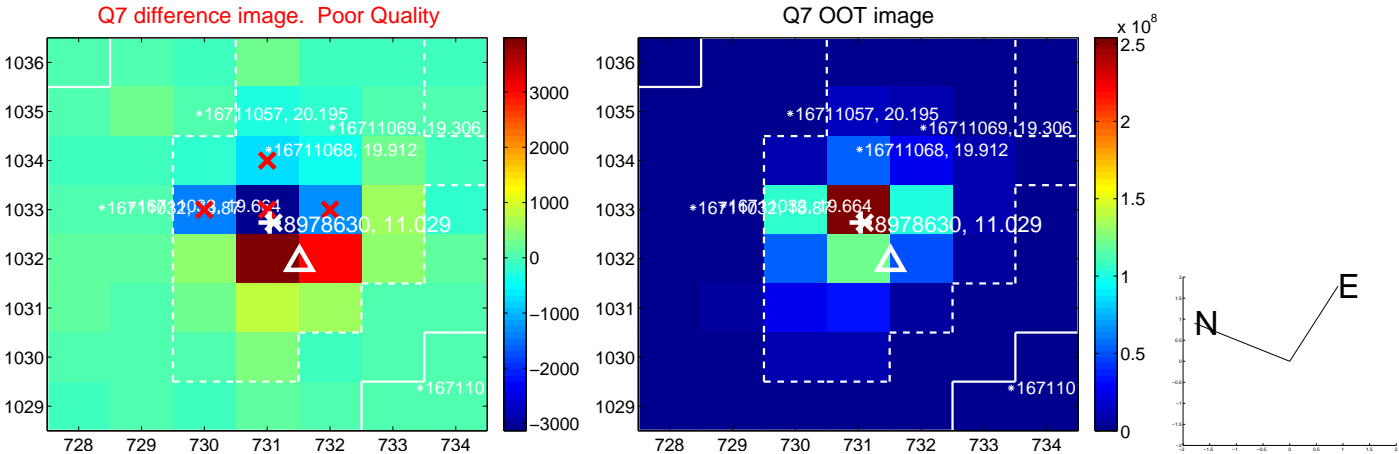
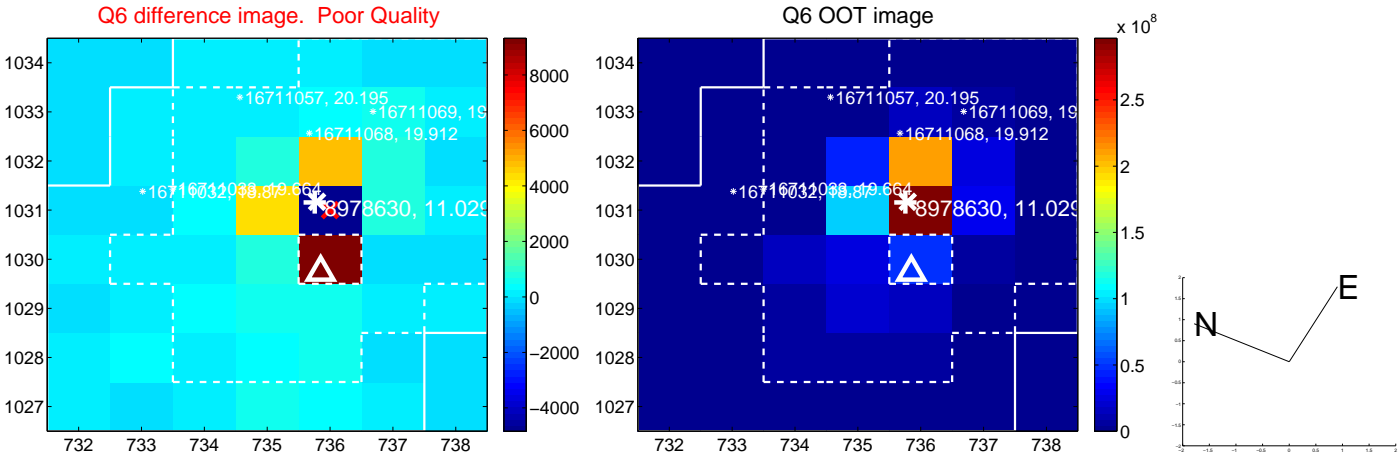
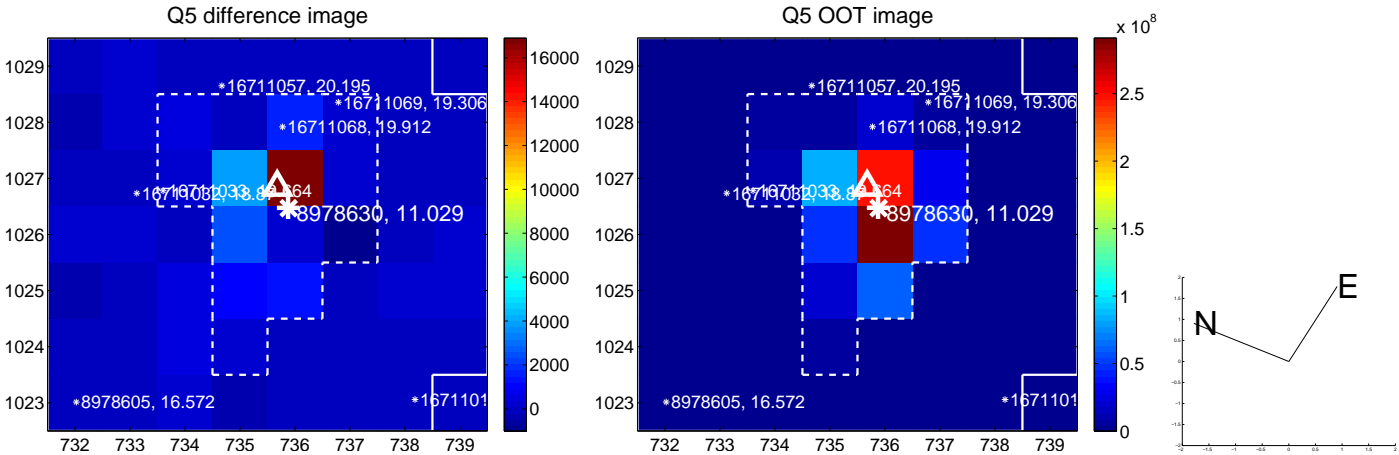


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

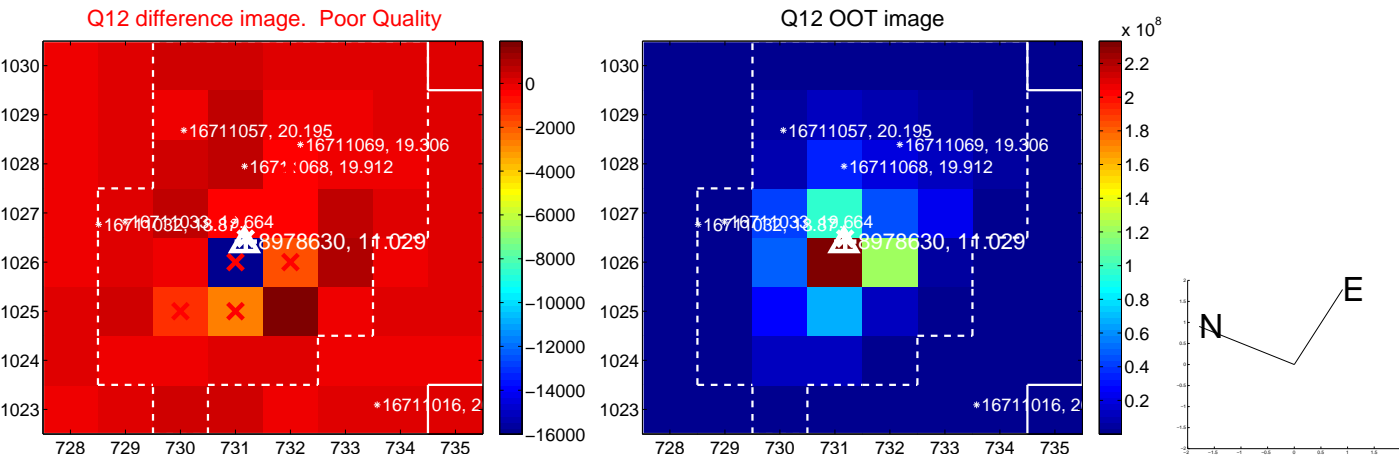
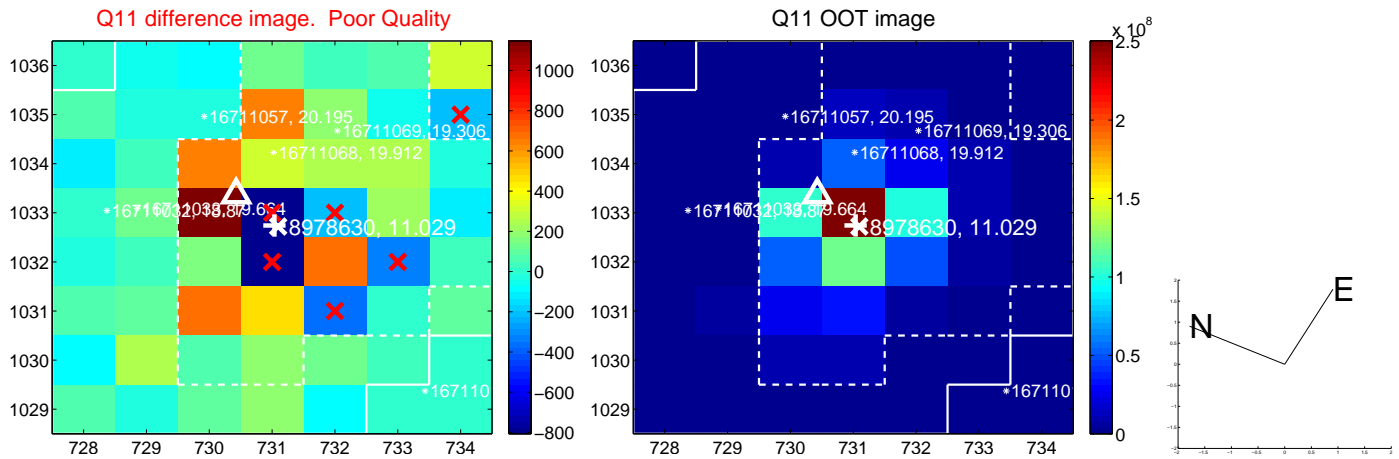
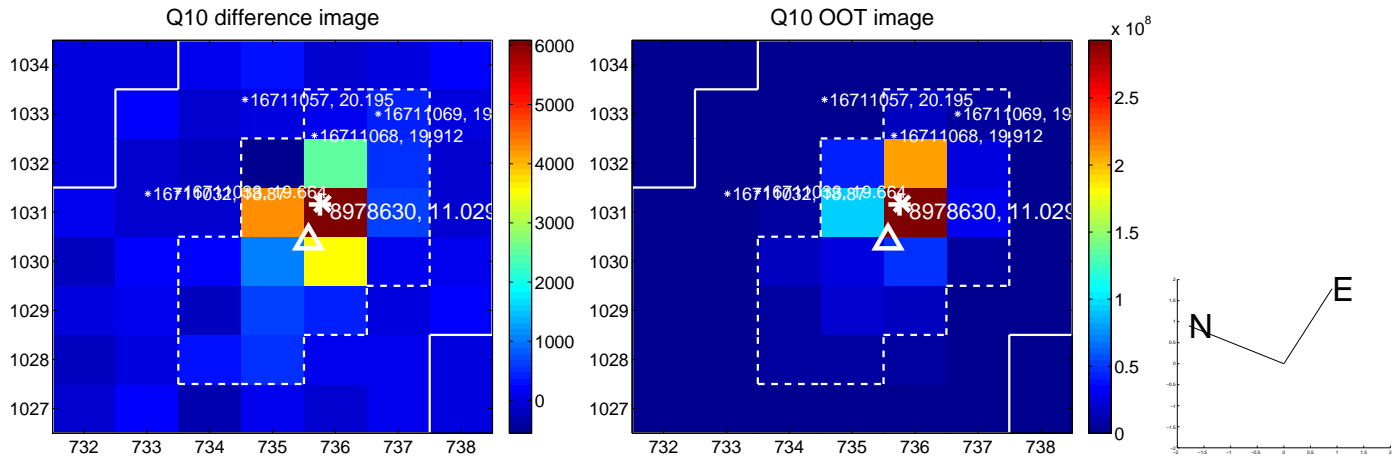
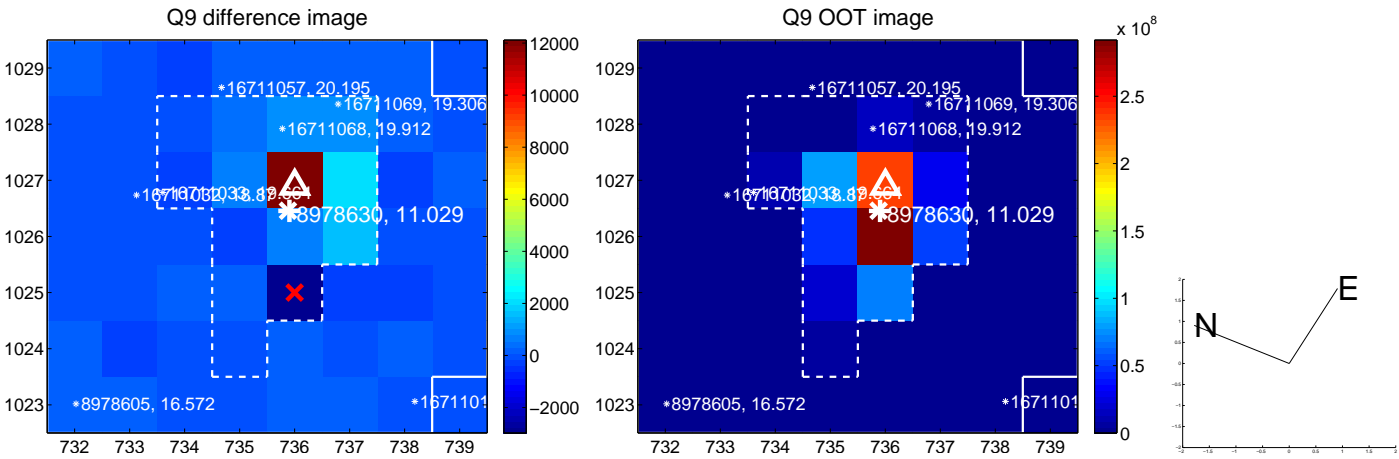
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



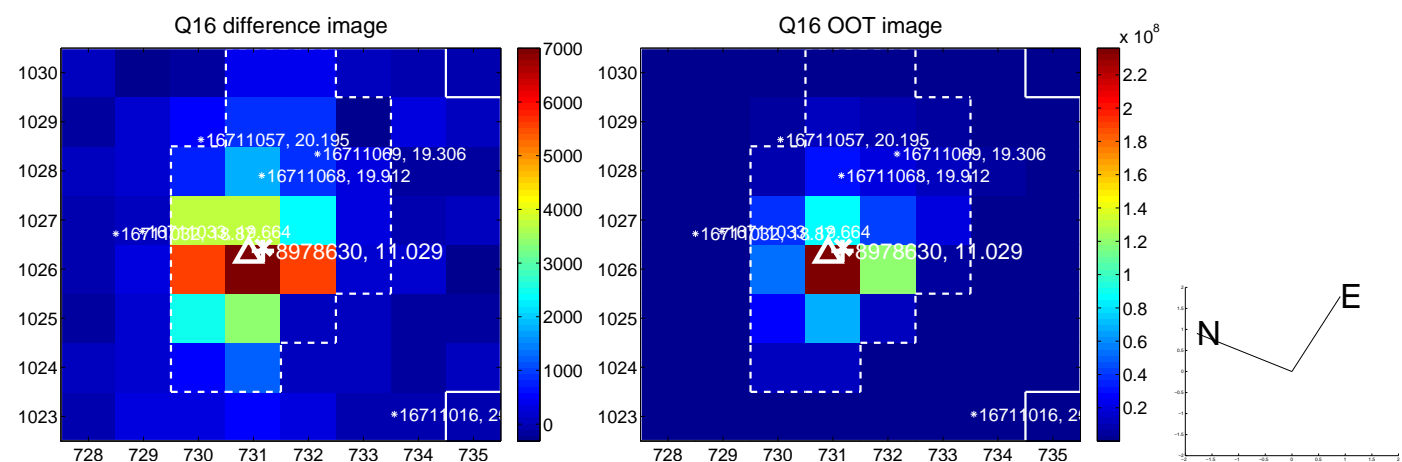
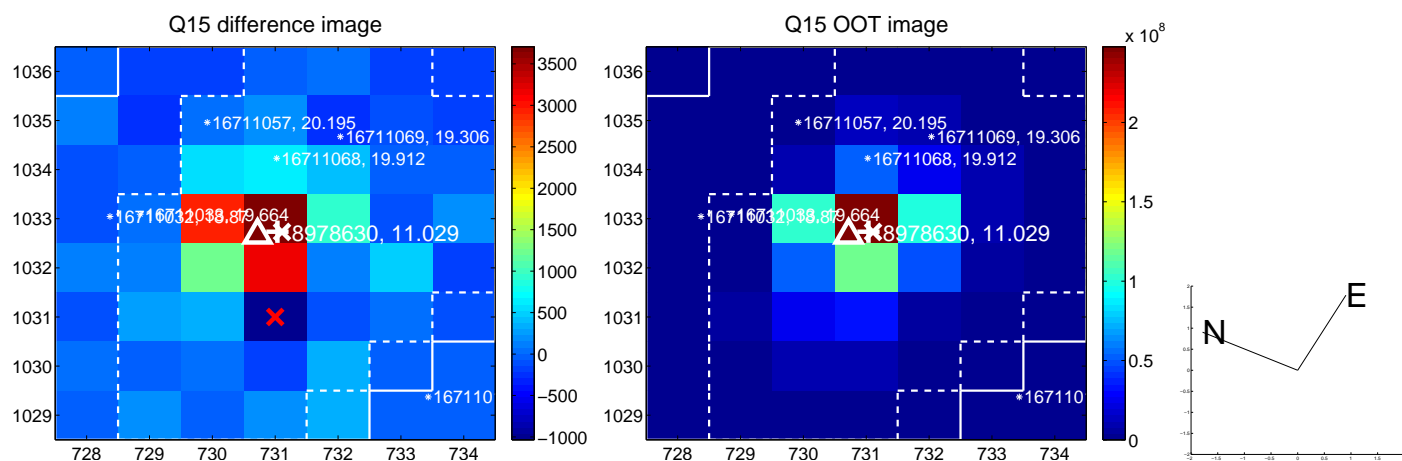
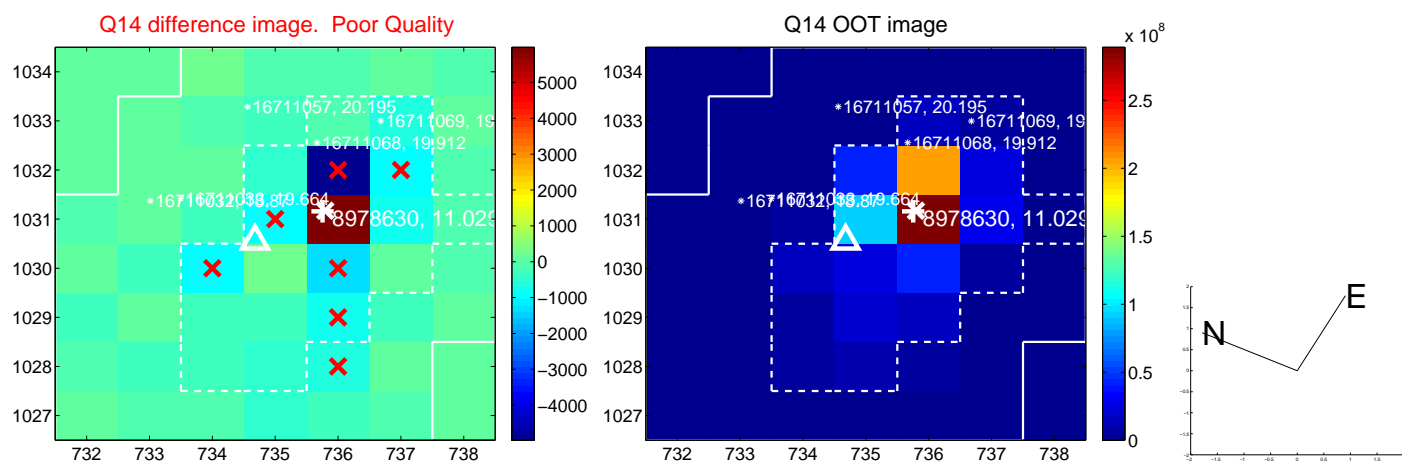
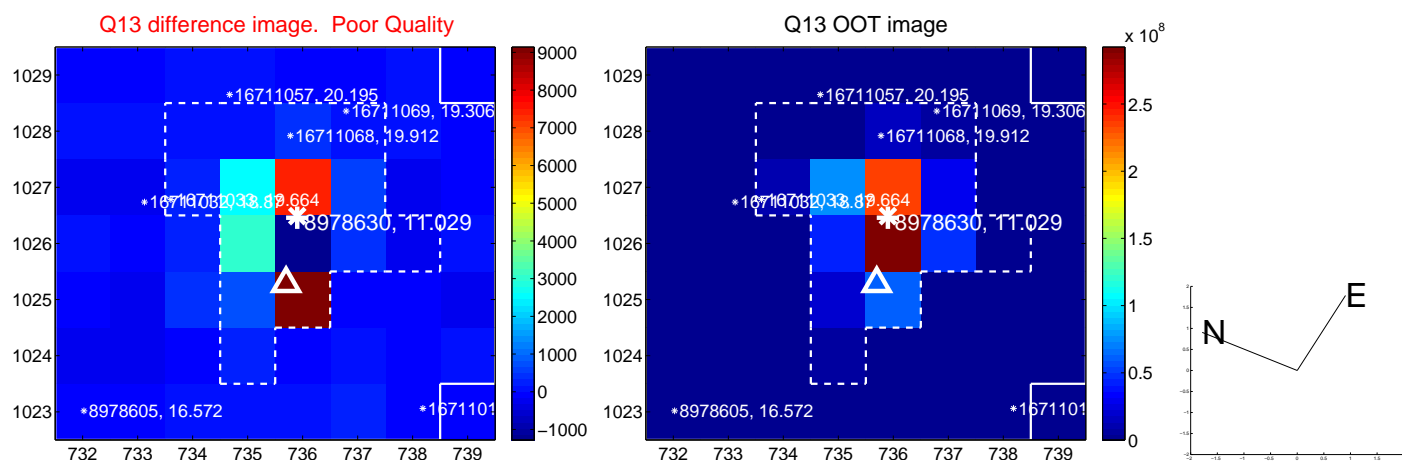
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



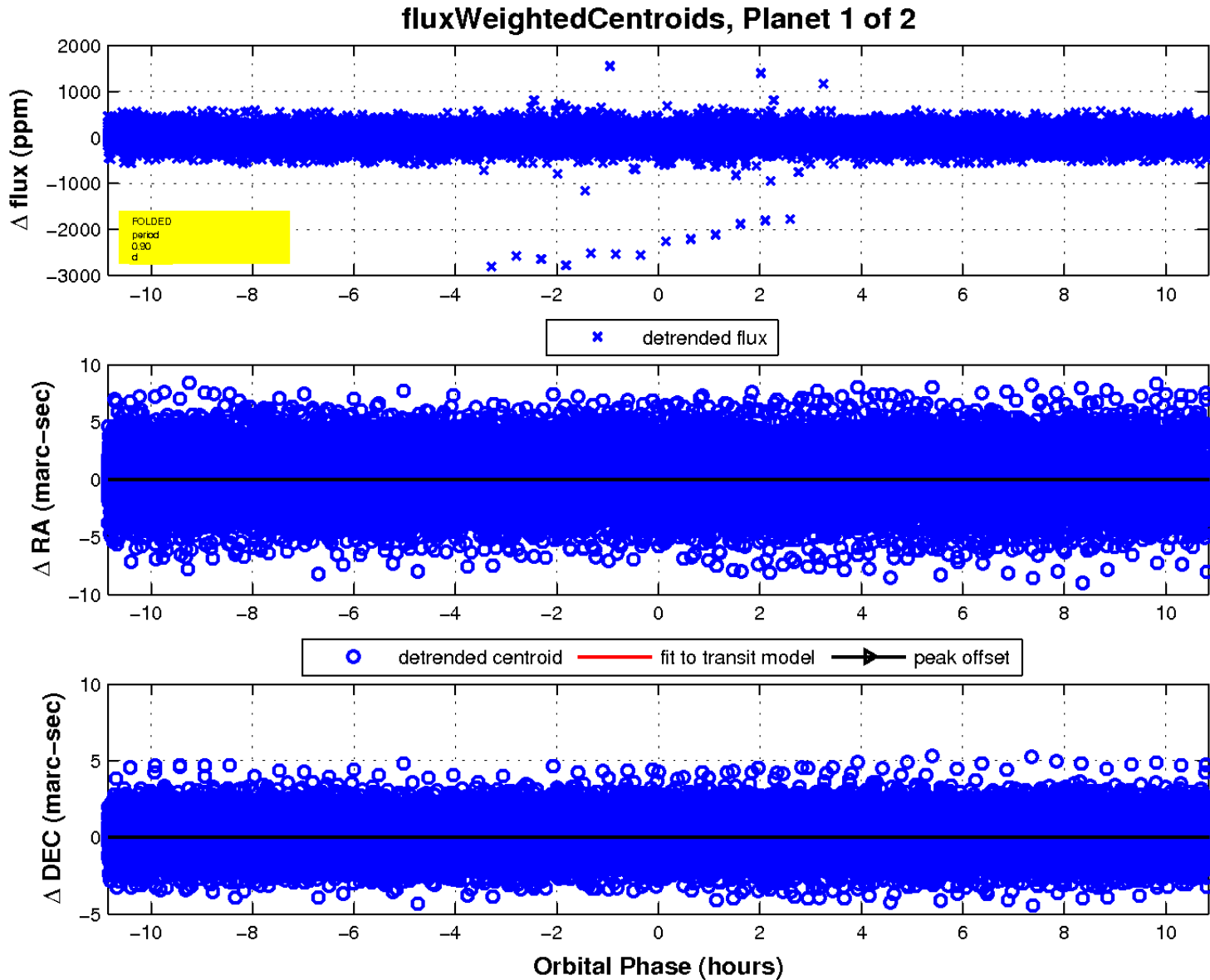
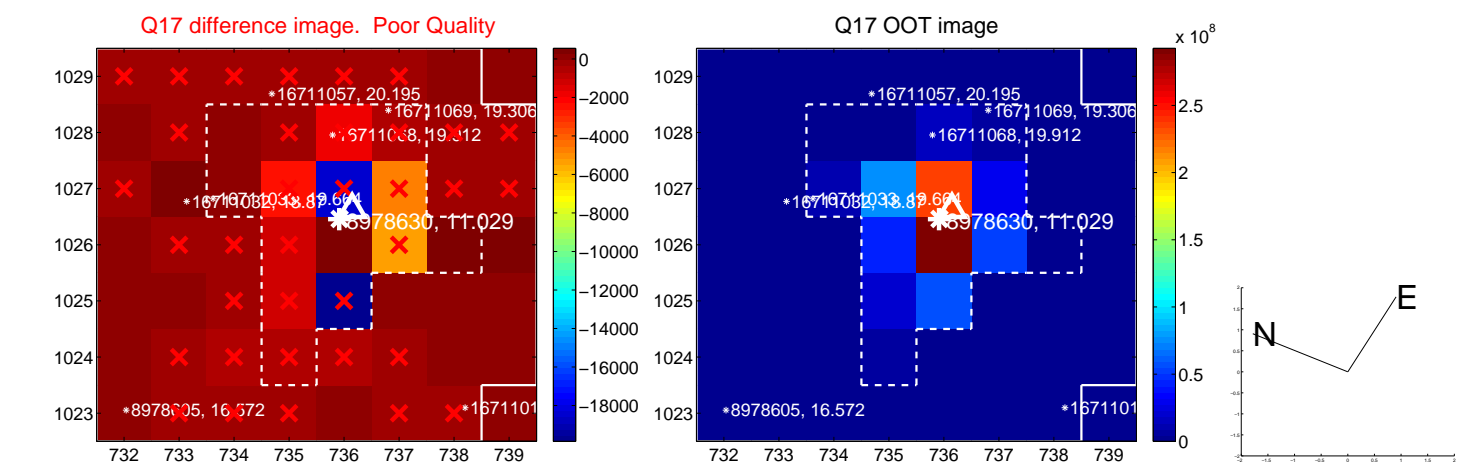
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

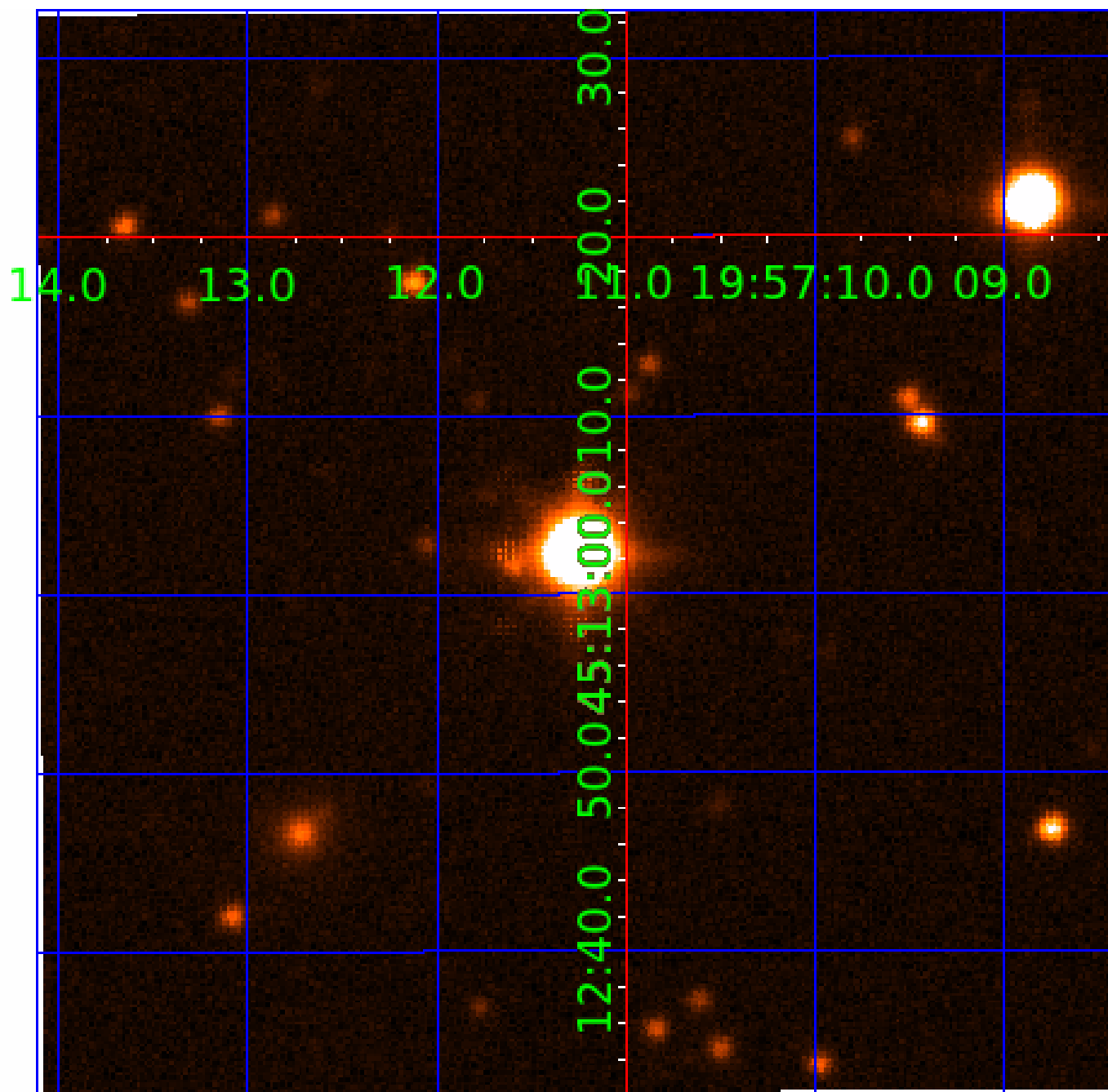


white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 008978630

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})
008978630-01	OBS	No	0.904101	131.763205	14.4	3.636	8.7	8.0	2.18	7097	0.96	25910.40
008978630-02	OBS	No	101.947074	197.459819	232.9	3.949	8.2	8.6	2.18	7097	6.46	47.56

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008978630-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED
008978630-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED

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

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

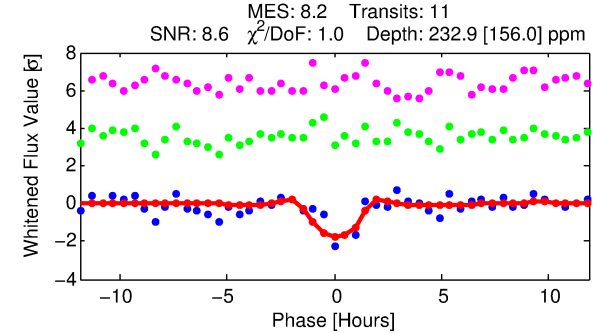
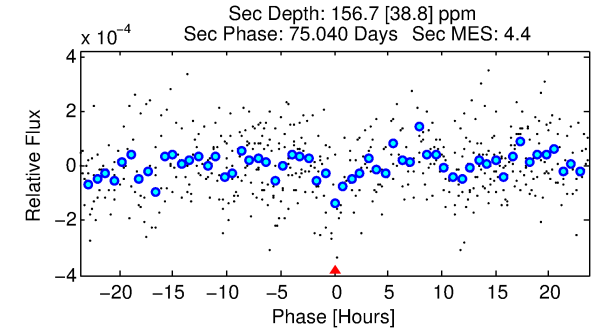
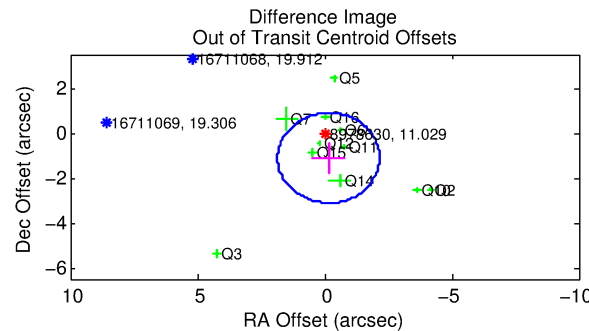
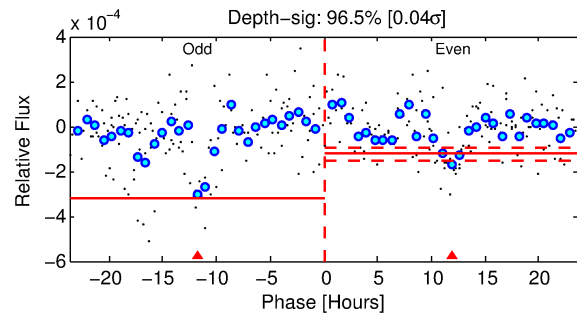
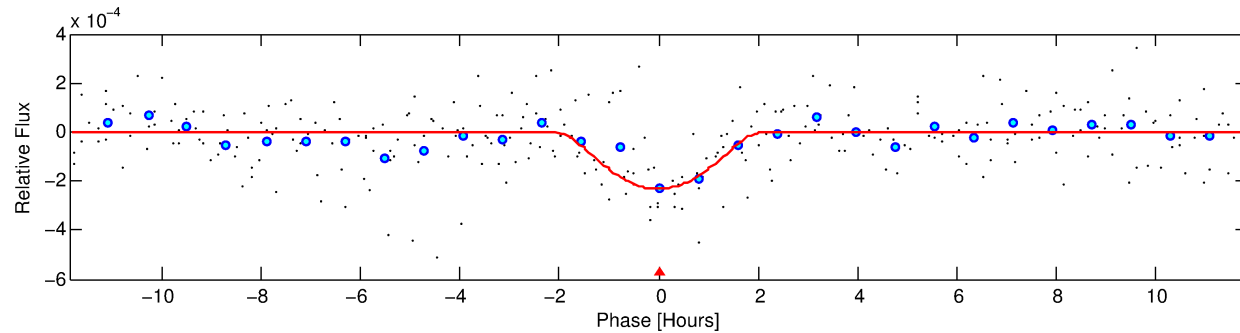
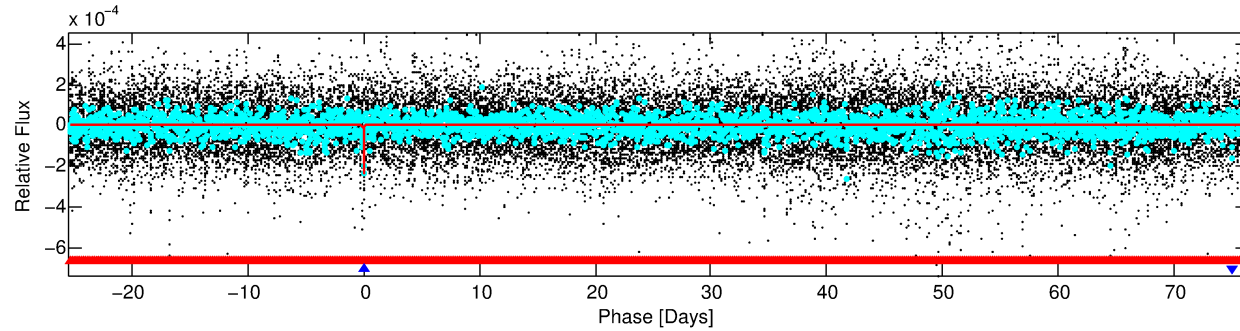
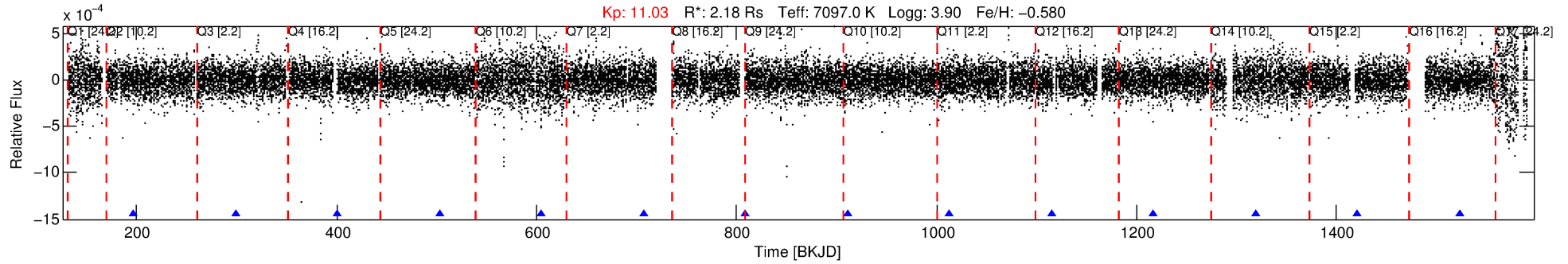
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 008978630-02

No Significant Match Found

DV One-Page Summary

KIC: 8978630 Candidate: 2 of 2 Period: 101.947 d



DV Fit Results:

Period = 101.94707 [0.00107] d
Epoch = 197.4598 [0.0075] BKJD
Rp/R* = 0.0271 [0.0891]
a/R* = 46.29 [41.75]
b = 1.00 [0.12]
Seff = 47.56 [31.66]
Teq = 670 [111] K
Rp = 6.46 [21.39] Re
a = 0.4770 [0.1953] AU
Ag = 469.83 [3102.19] [0.15 σ]
Teffp = 4820 [7919] K [0.52 σ]

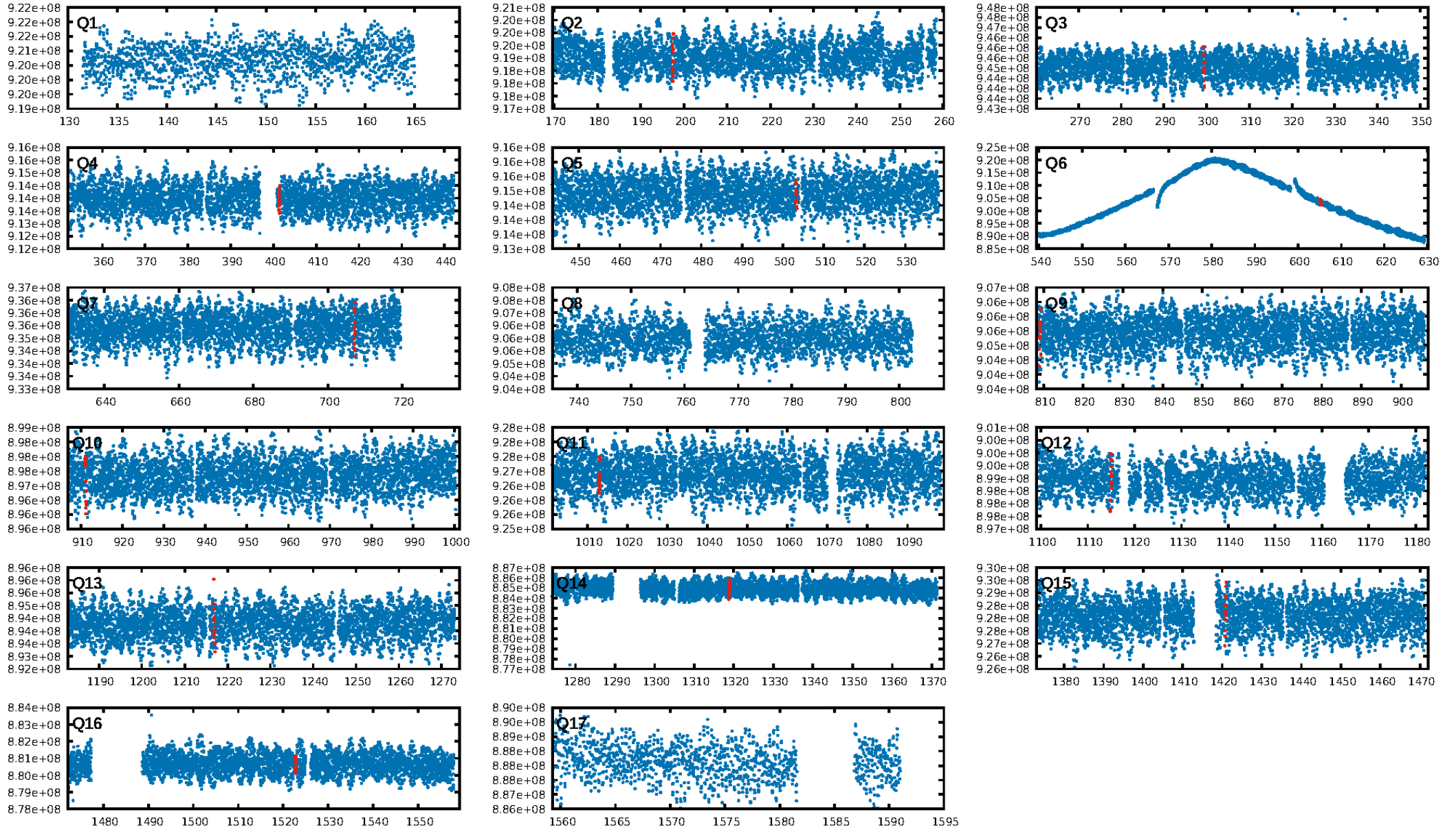
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [451.74 σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 6.7%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 3.95e-10
RollingBand-fgt: 1.00 [11/11]
GhostDiagnostic-chr: -7.344
Centroid-sig: 2.5%
Centroid-so: 1.173 arcsec [1.81 σ]
OotOffset-rm: 1.122 arcsec [1.68 σ]
KicOffset-rm: 1.092 arcsec [1.65 σ]
OotOffset-st: 4/4/2/1 [11]
KicOffset-st: 4/4/2/1 [11]
DiffImageQuality-fgm: 0.36 [4/11]
DiffImageOverlap-fno: 0.00 [0/11]

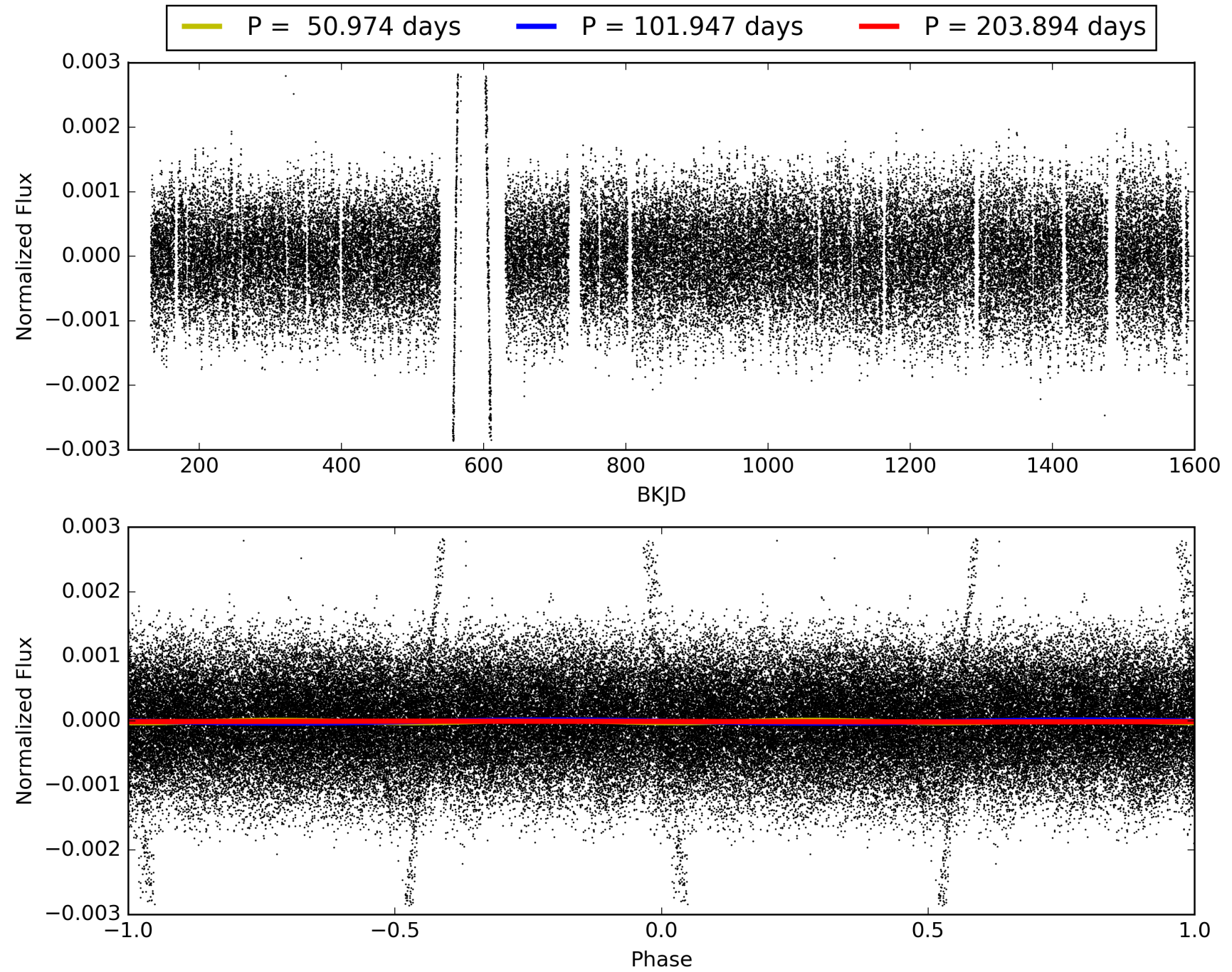
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 04:55:04 Z

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

TCE 008978630-02, PDC Light Curves

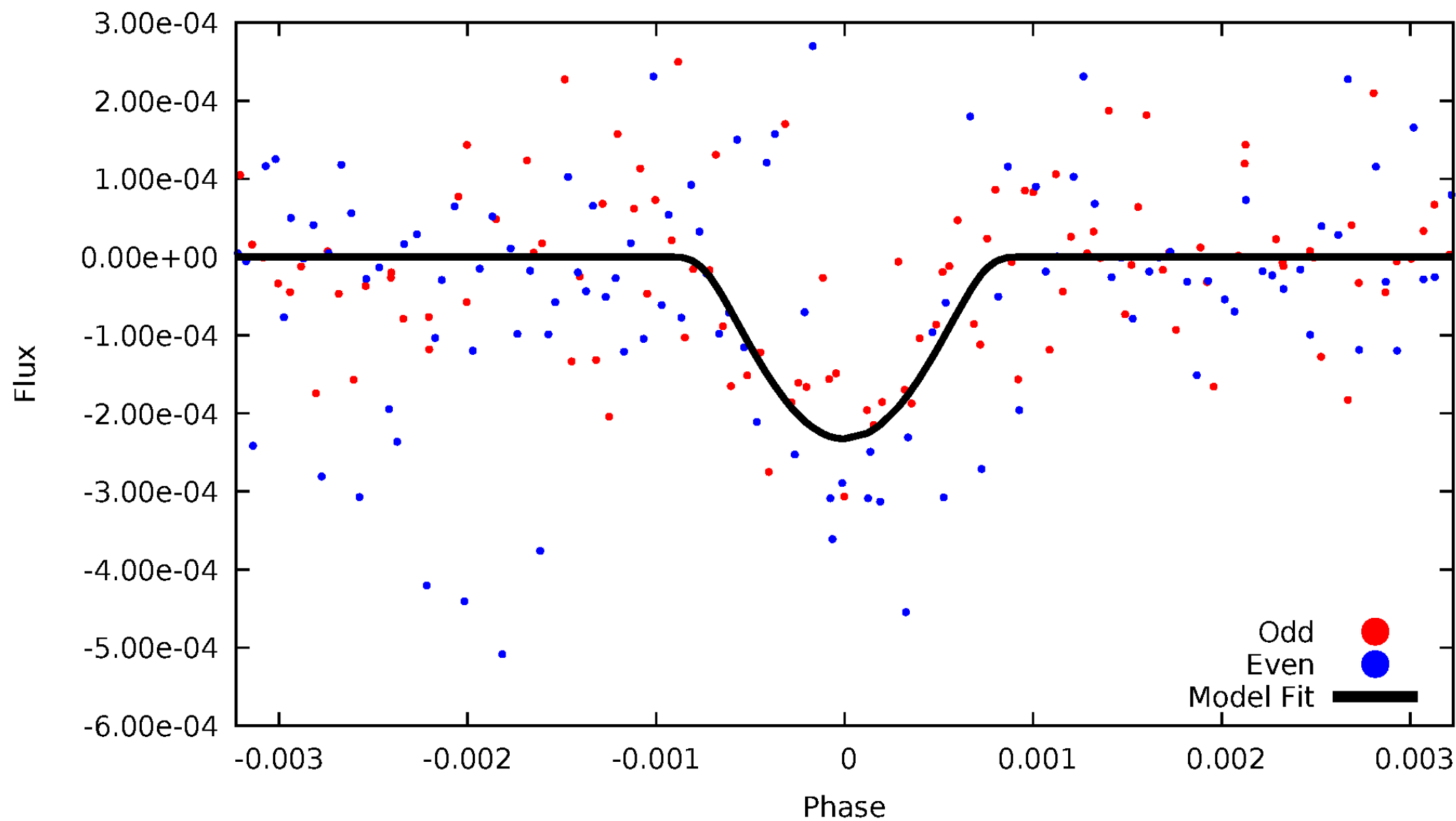


TCE 008978630-02



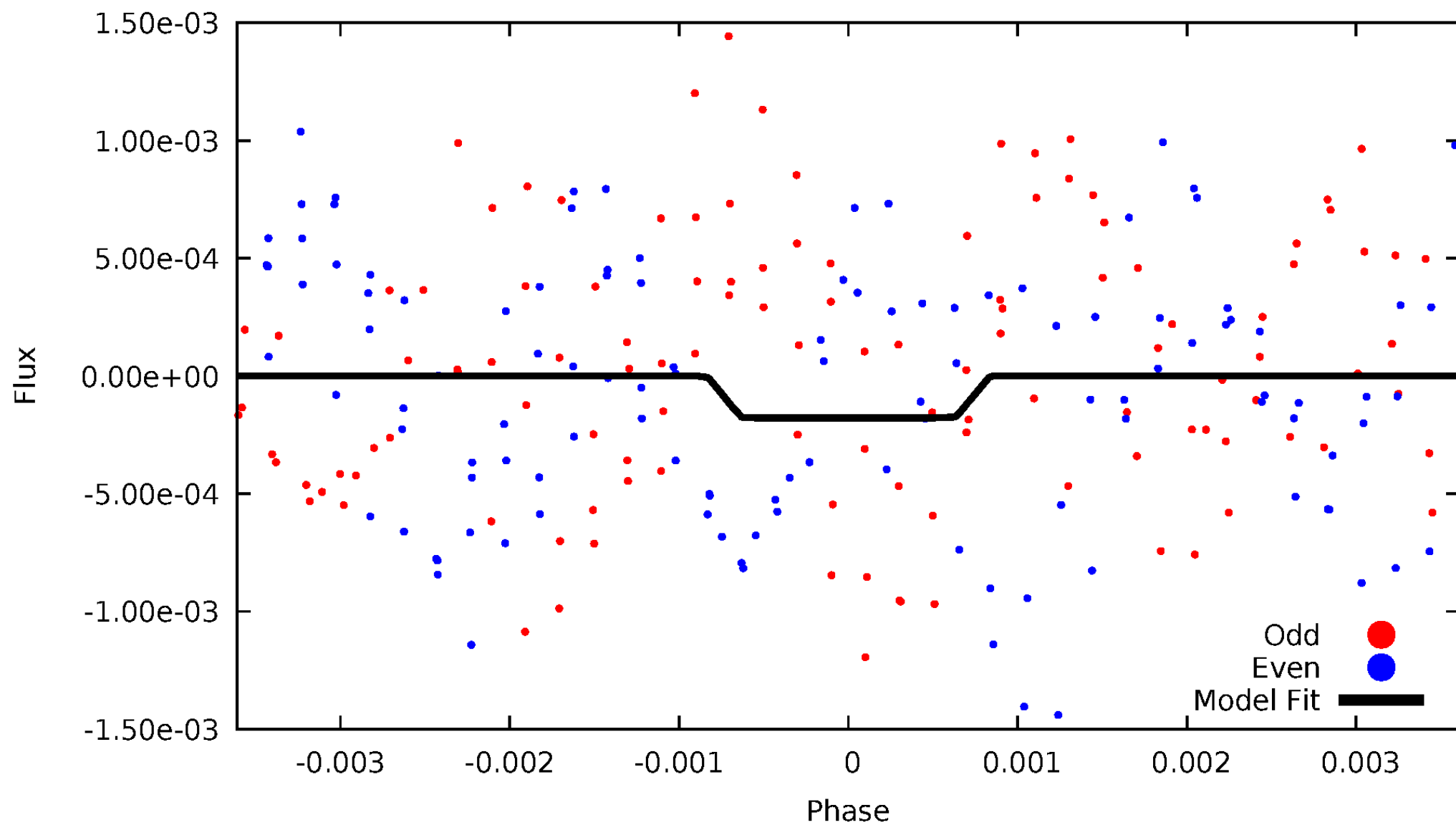
DV Odd/Even

TCE 008978630-02



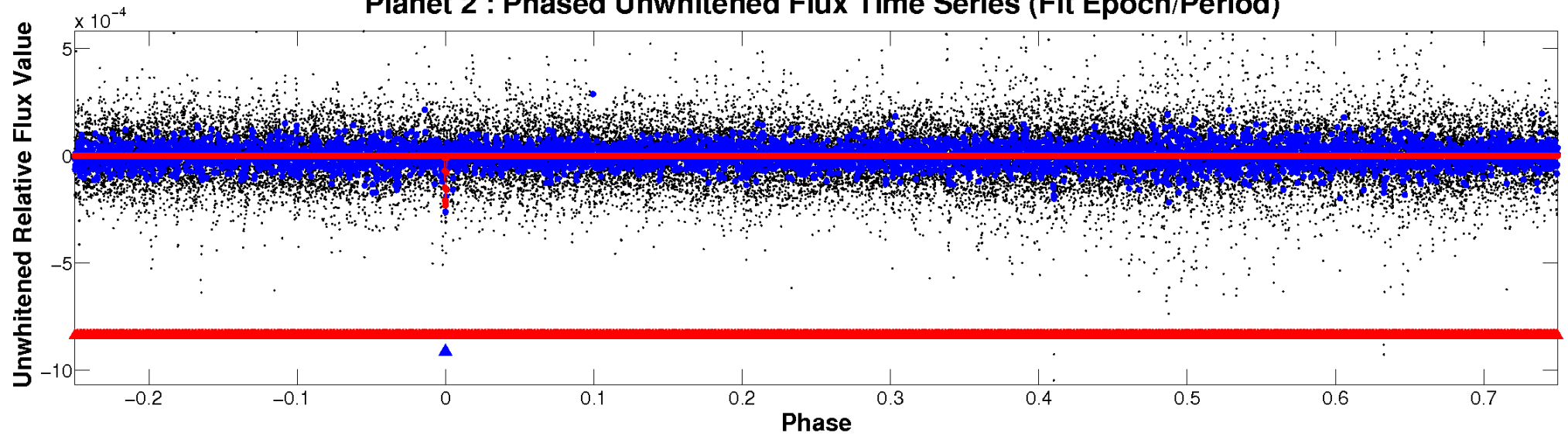
ALT Odd/Even

TCE 008978630-02

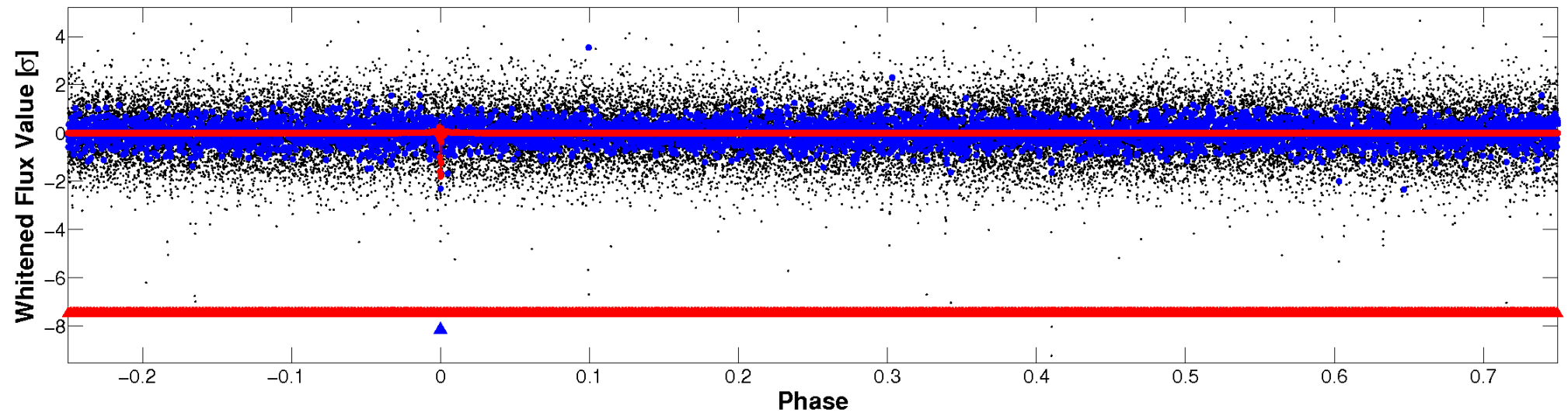


Non-Whitened Vs. Whitened Light Curve

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

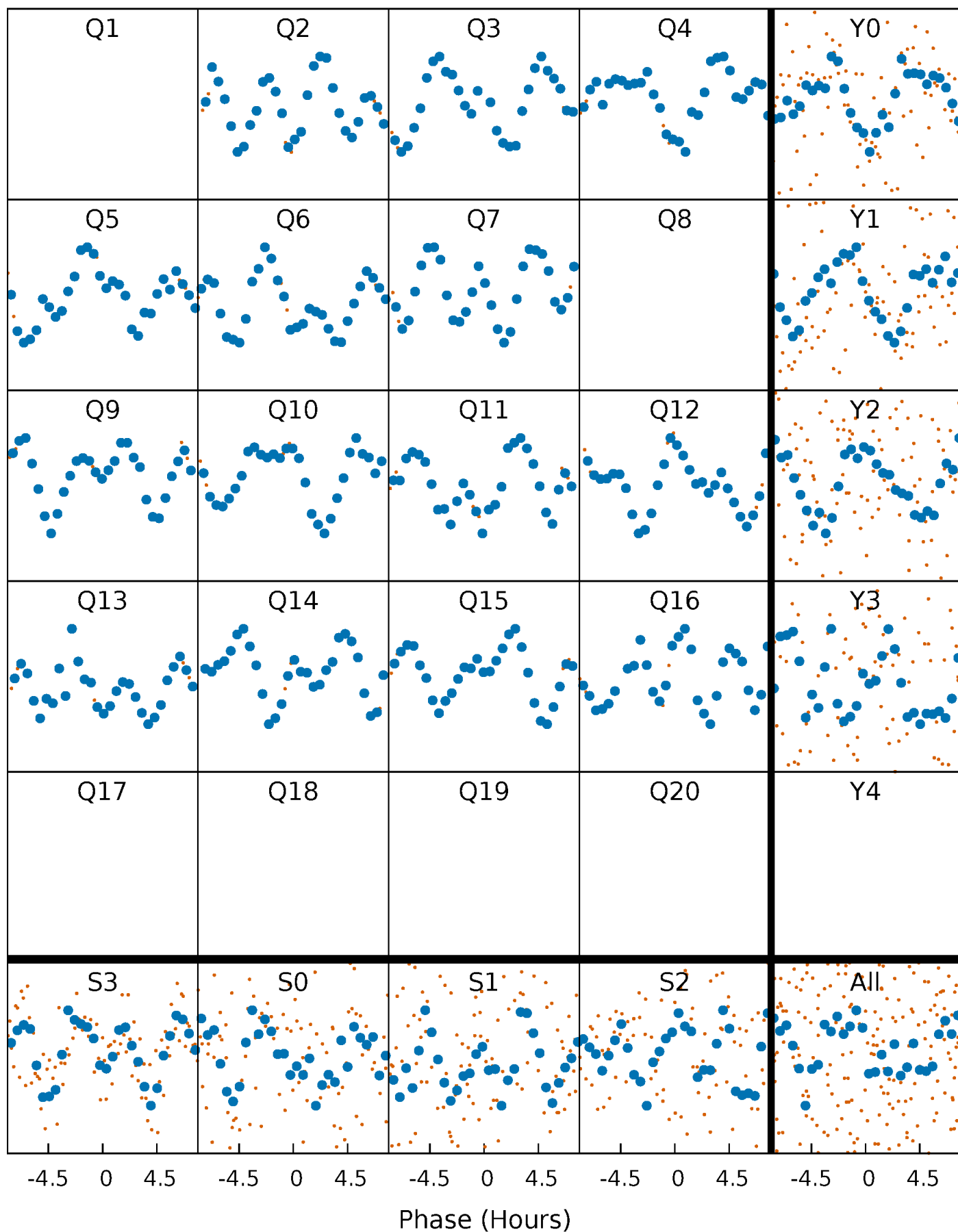


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



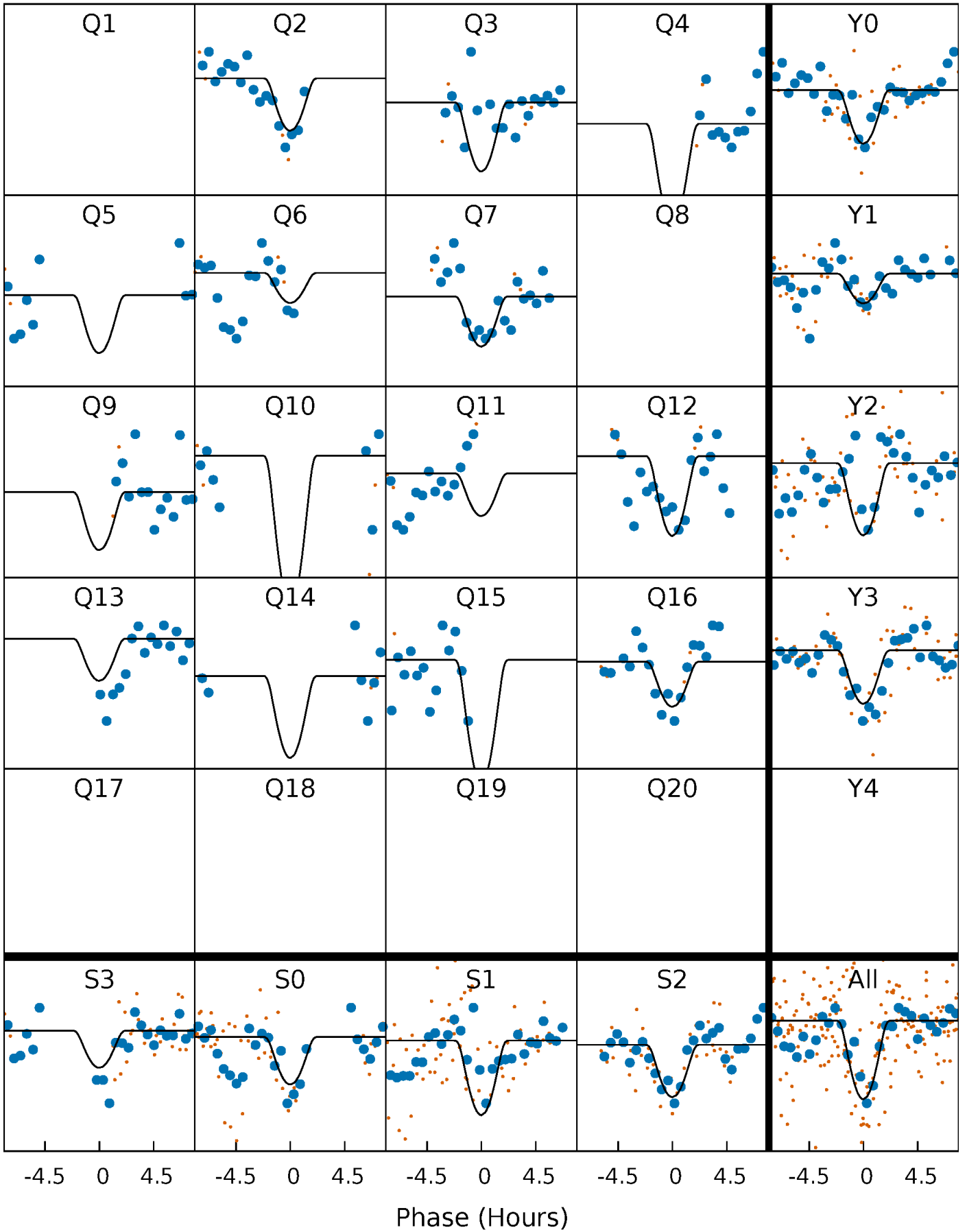
PDC Quarter-Phased Transit Curves

TCE 008978630-02 P=101.947074 Days $T_0=197.459819$ (BKJD)



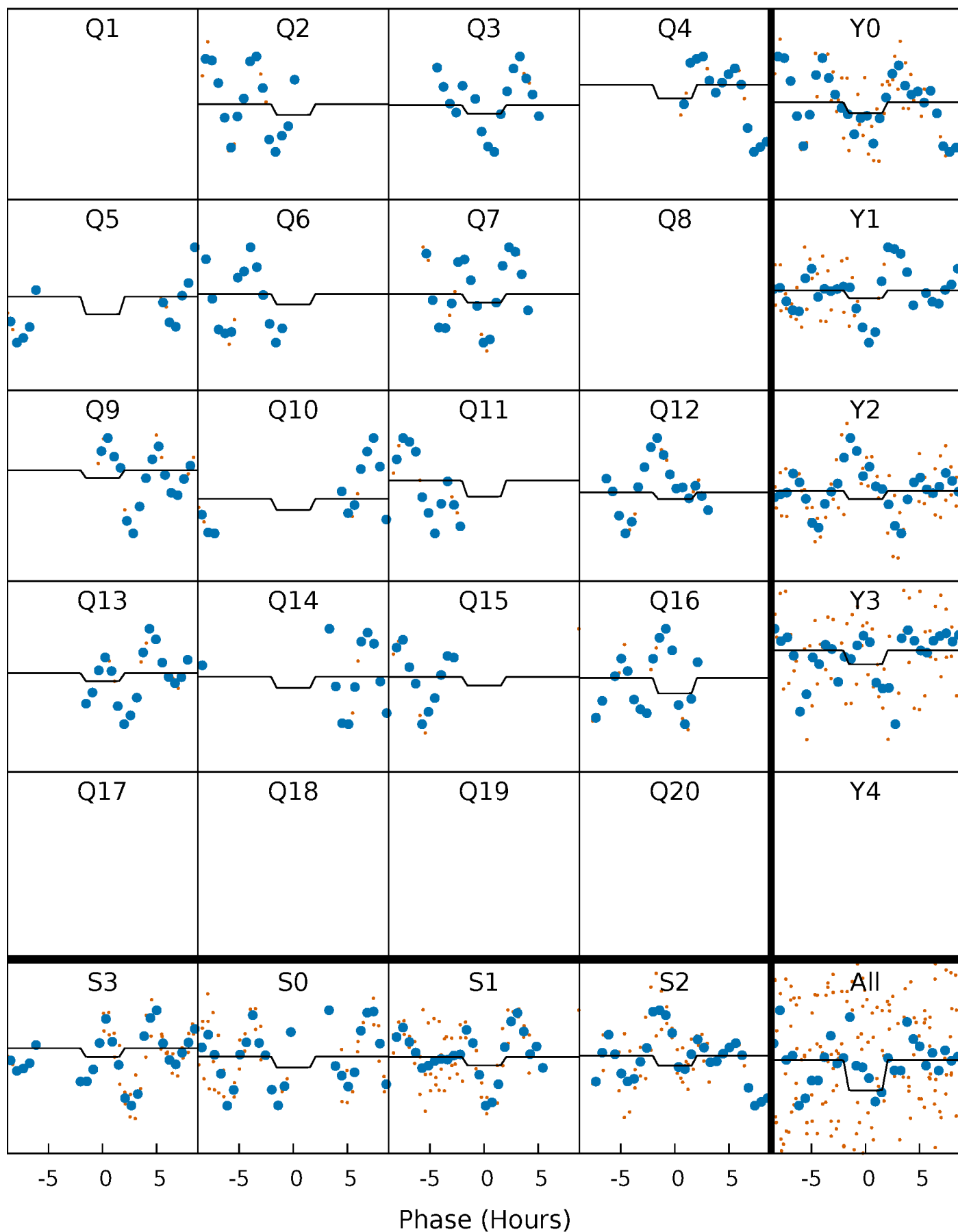
DV Quarter-Phased Transit Curves

TCE 008978630-02 $P=101.947074$ Days $T_0=197.459819$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

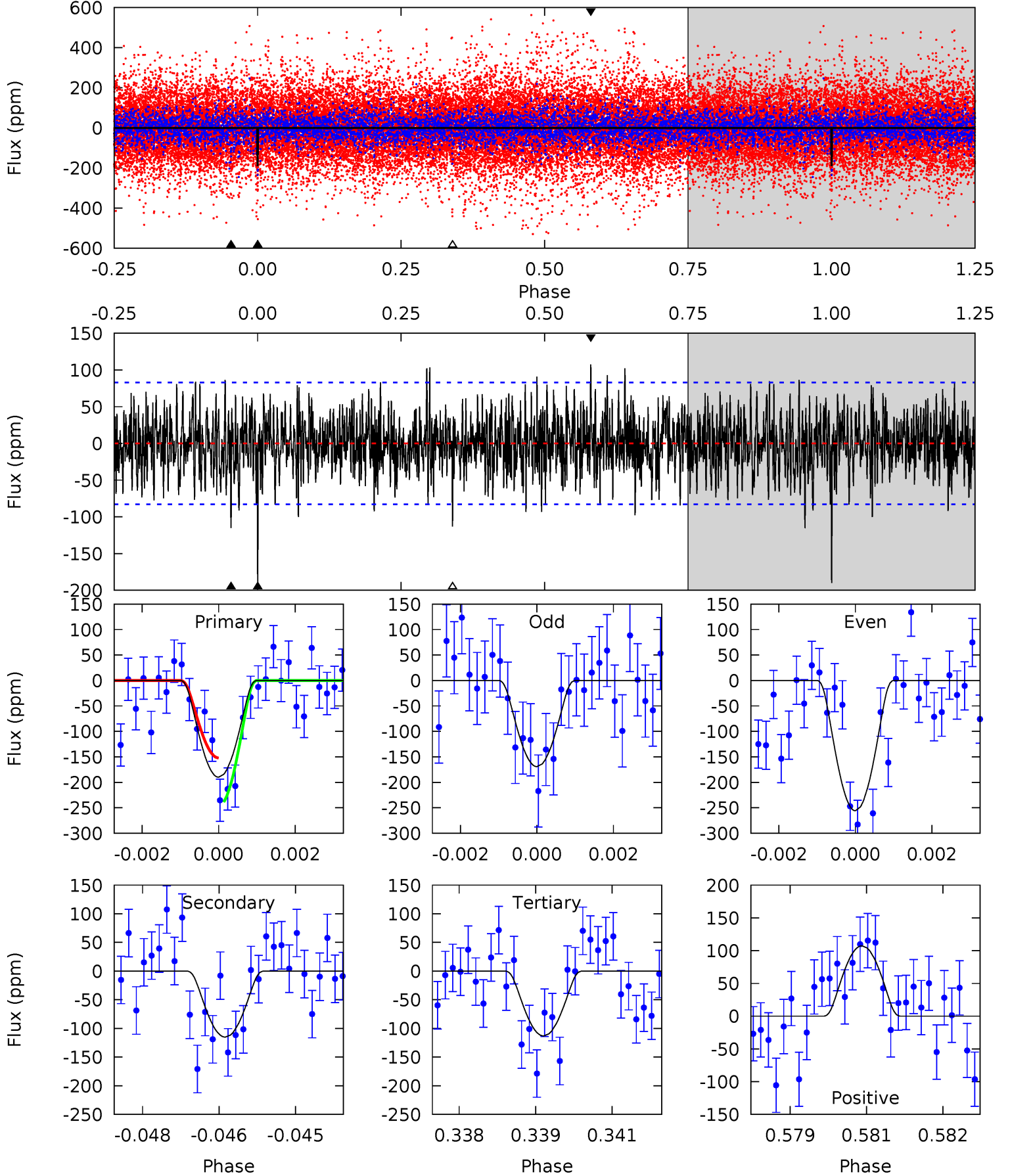
TCE 008978630-02 P=101.948138 Days $T_0=197.517607$ (BKJD)



DV Model-Shift Uniqueness Test

008978630-02, P = 101.947074 Days, E = 95.512745 Days

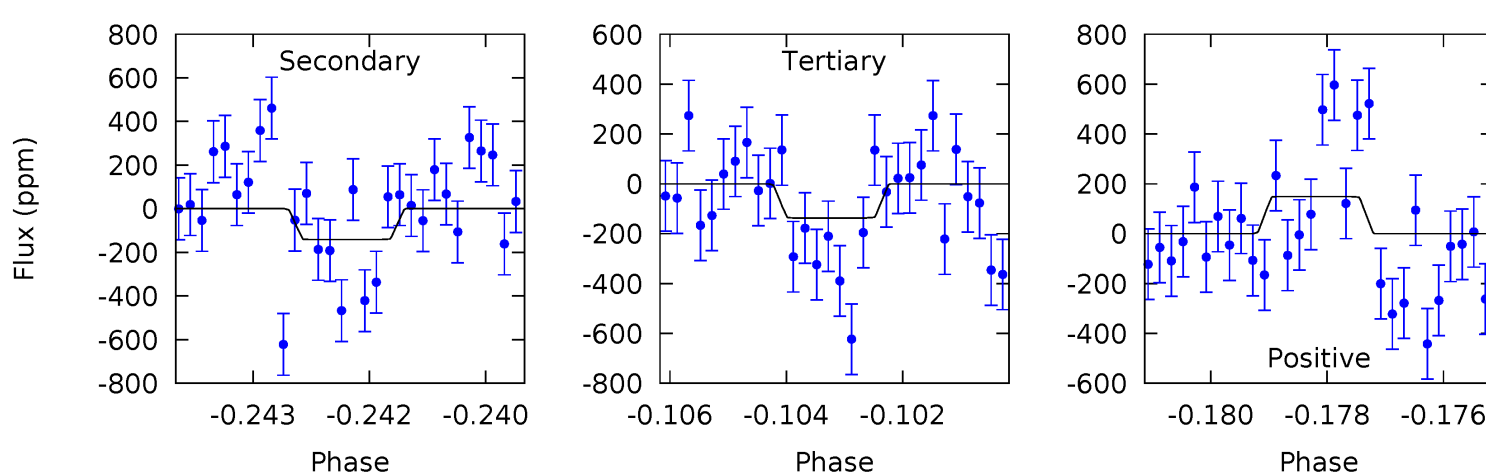
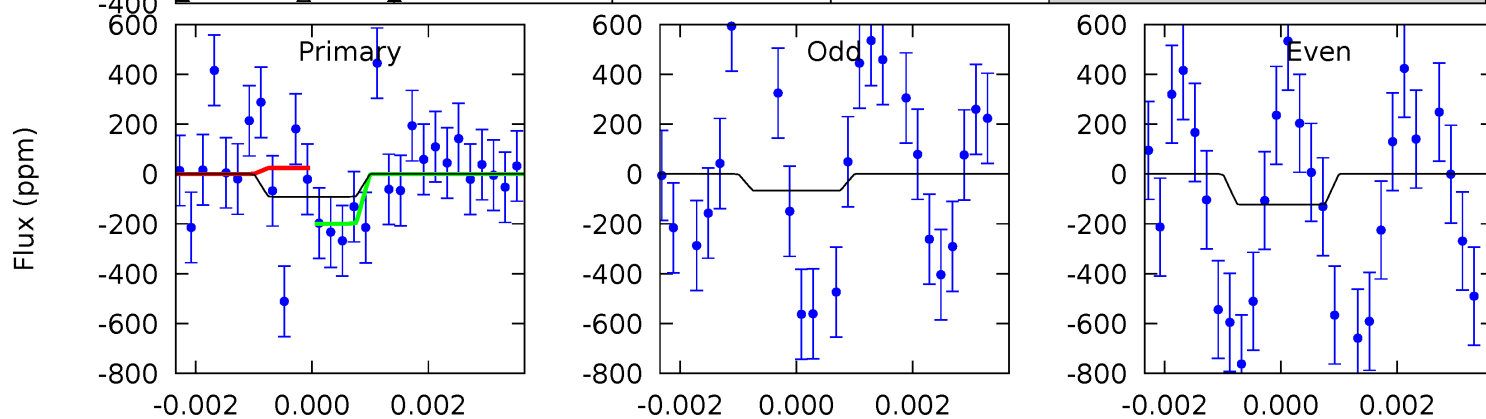
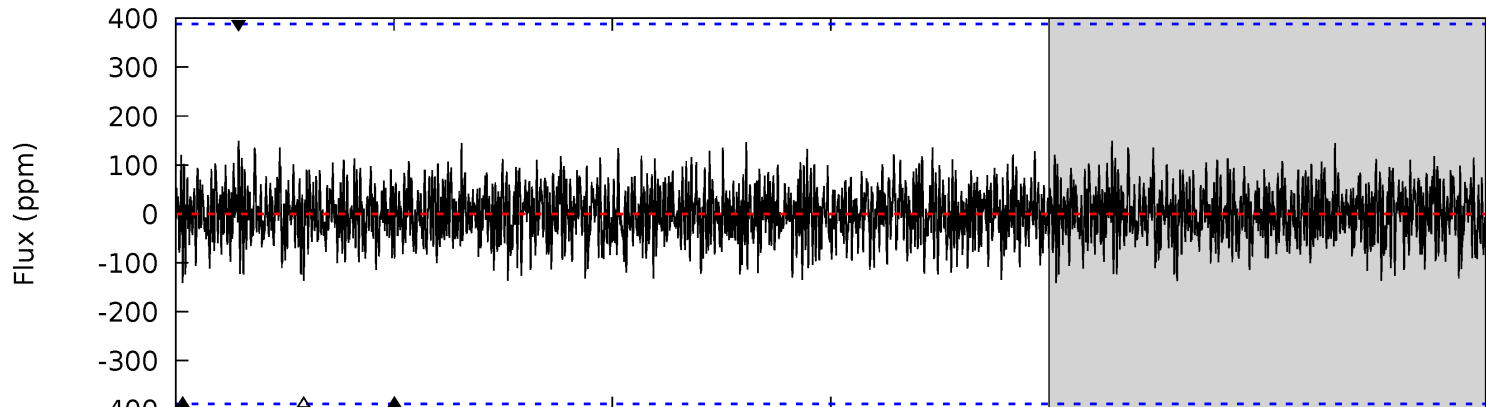
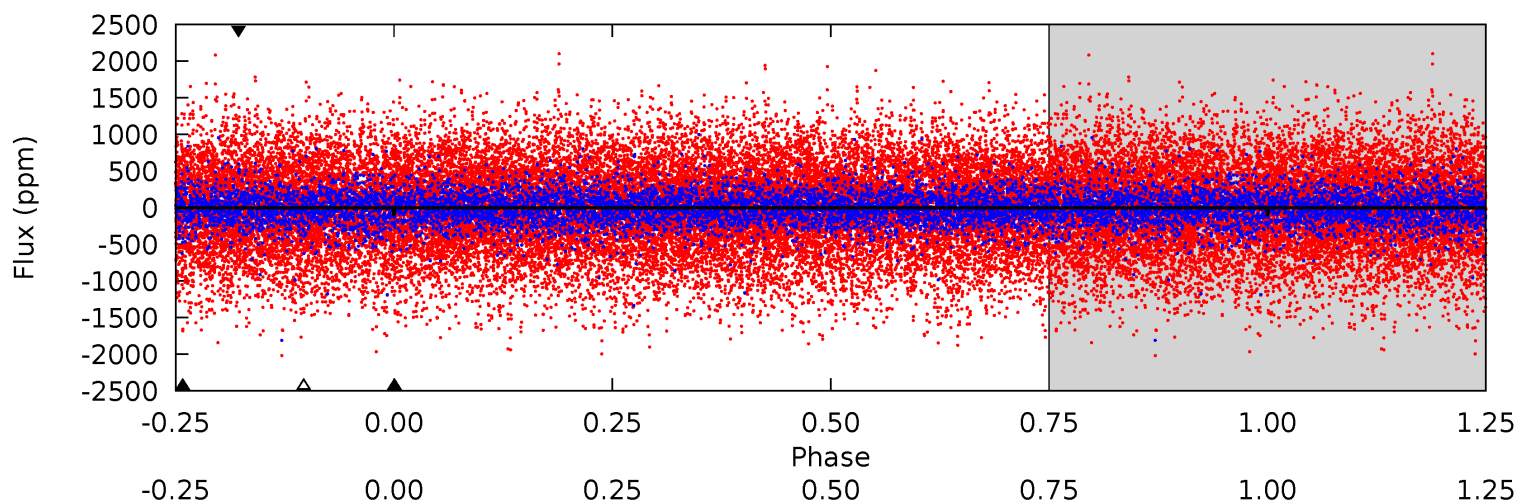
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
12.2	7.42	7.29	6.92	5.35	3.12	2.05	4.95	5.32	0.13	0.51	2.74	0.84	0.36	2.78



Alt Model-Shift Uniqueness Test

008978630-02, P = 101.948138 Days, E = 95.569469 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
1.26	1.95	1.89	2.06	5.36	3.14	0.66	-0.63	-0.79	0.06	-0.11	0.38	0.63	0.51	1.21



Stellar Parameters For KIC 008978630

	$T_{\text{eff}} (K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	7097^{+193}_{-236}	$3.904^{+0.382}_{-0.127}$	$-0.580^{+0.250}_{-0.300}$	$2.182^{+0.503}_{-0.935}$	$1.394^{+0.193}_{-0.289}$	$0.189^{+0.632}_{-0.074}$
	+3%/-3%	+10%/-3%	+43%/-52%	+23%/-43%	+14%/-21%	+334%/-39%
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 008978630-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-115 ± 16	$16.33^{+16.15}_{-11.12}$	916^{+71}_{-95}	3251^{+1587}_{-563}	54^{+465}_{-41}
Alt.	-141 ± 72	$14.82^{+15.11}_{-10.79}$	922^{+64}_{-105}	3389^{+1953}_{-682}	72^{+786}_{-58}

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

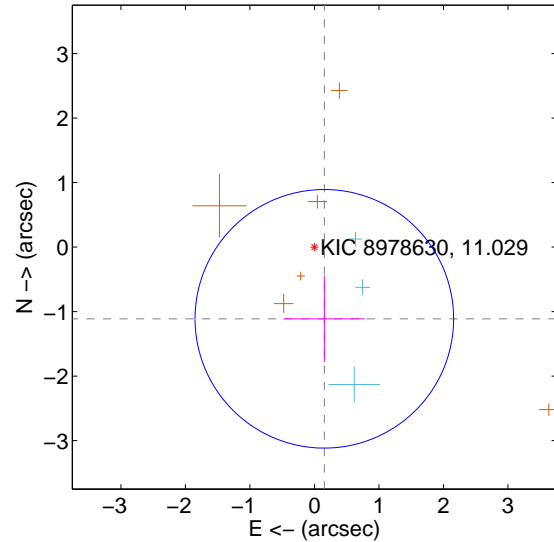
Supplemental centroid analysis for 008978630-02. **Kepler magnitude: 11.03.** Transit SNR 8.56

There are 4 quarters with good PRF difference image offsets

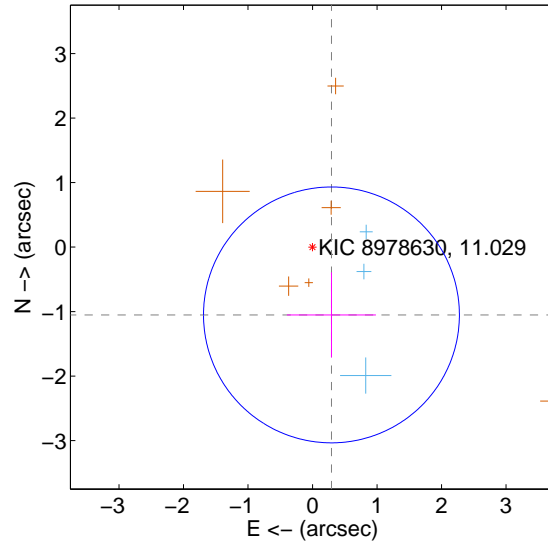
The direct PRF centroid is offset from the target star catalog position by about 0.26 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	1.122 ± 0.668	1.68	-0.153 ± 0.626	-1.112 ± 0.671
PRF-fit source offset from KIC position	1.092 ± 0.661	1.65	-0.293 ± 0.690	-1.052 ± 0.659
photometric centroid source offset	1.17 ± 0.65	1.81	-0.91 ± 0.71	0.74 ± 0.54

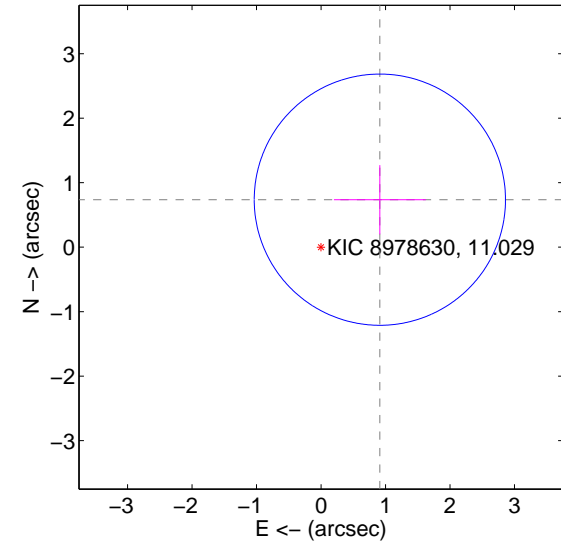
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position



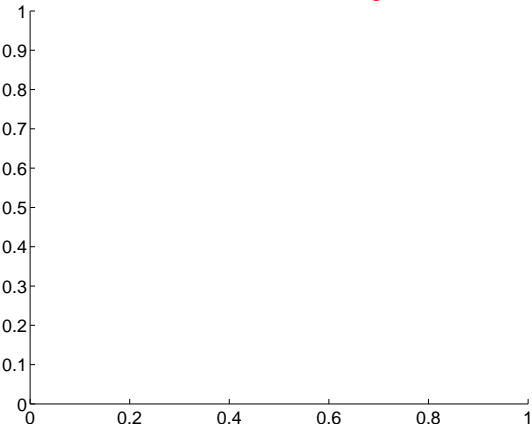
offset from photometric centroids



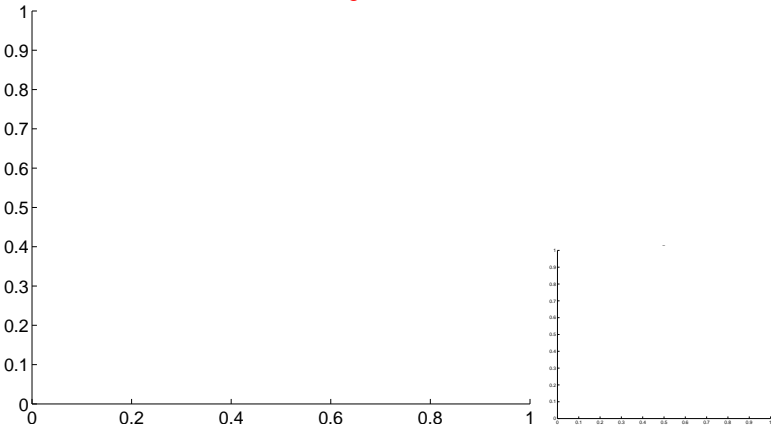
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

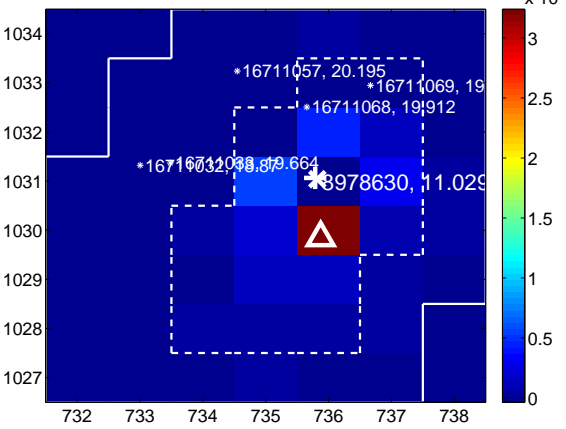
Q1 no difference image



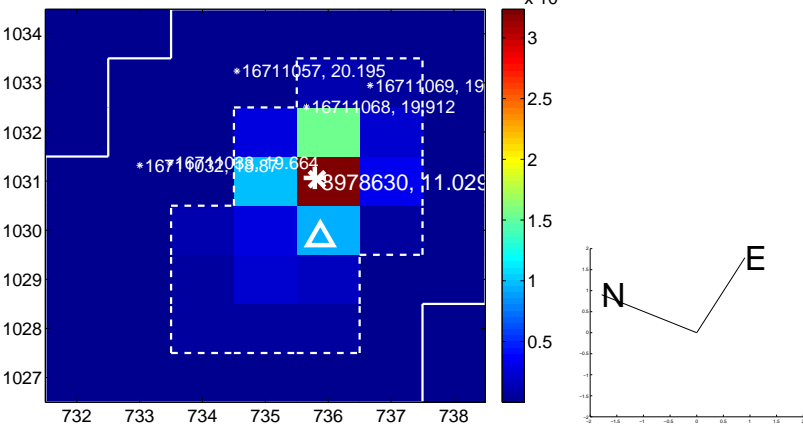
Q1 no OOT image



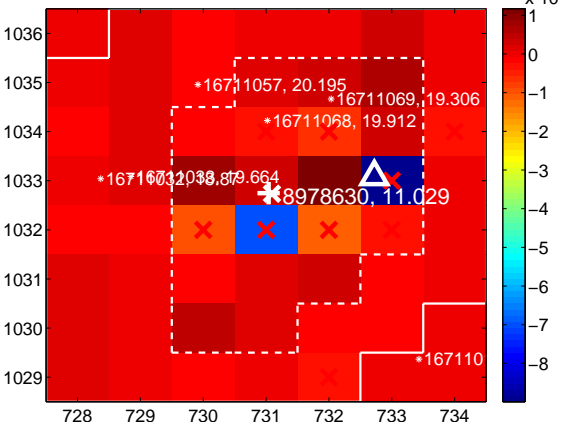
Q2 difference image



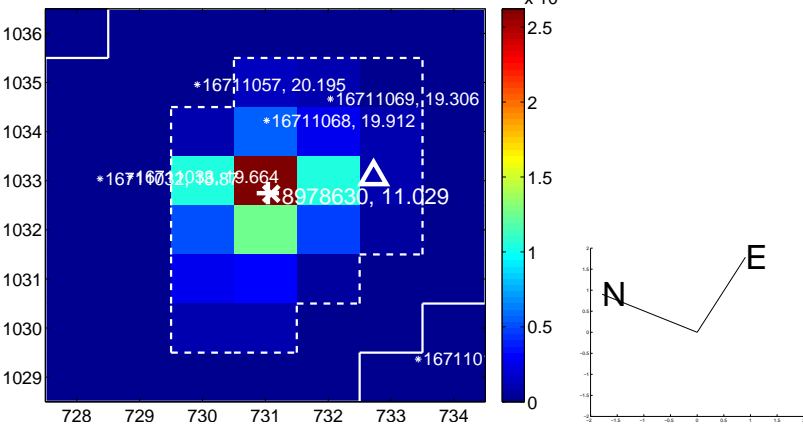
Q2 OOT image



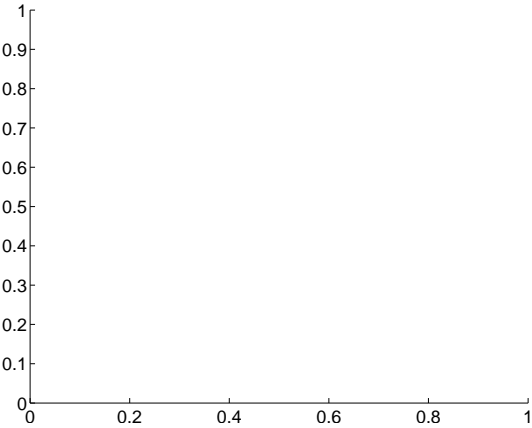
Q3 difference image. Poor Quality



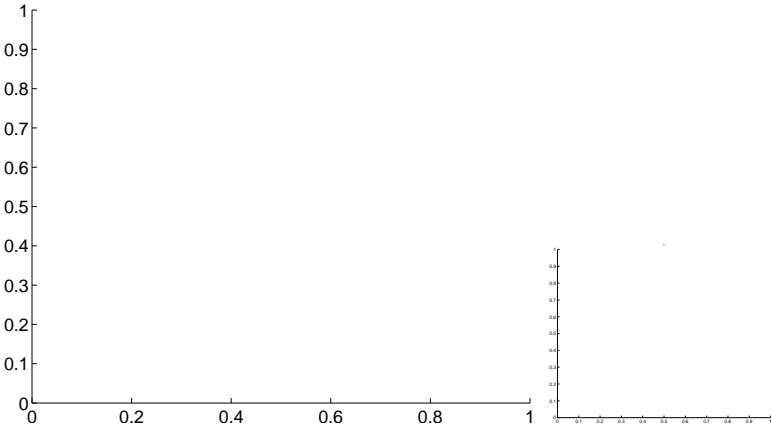
Q3 OOT image



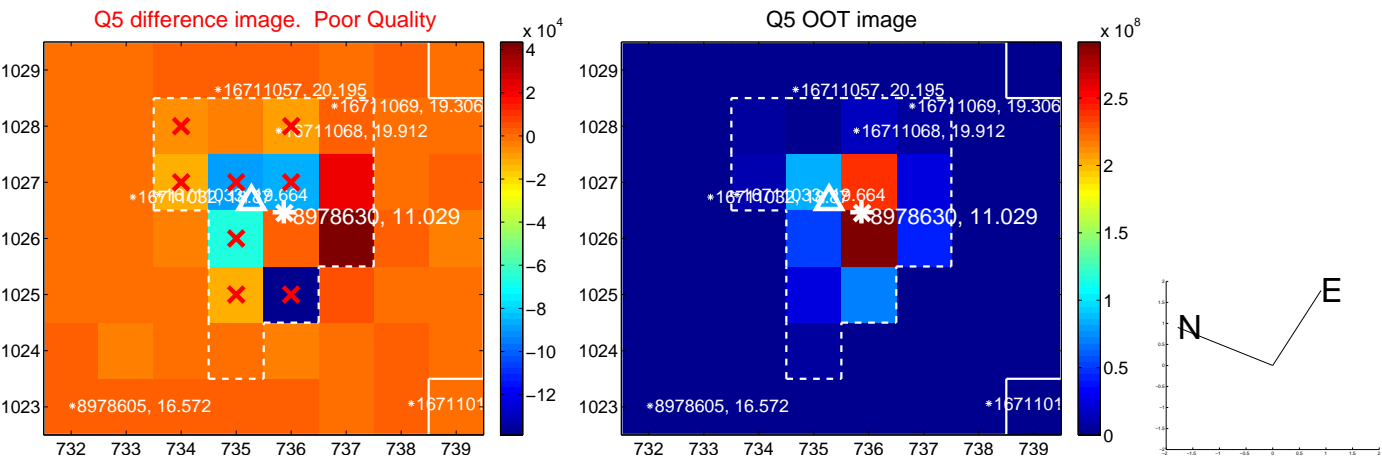
Q4 no difference image



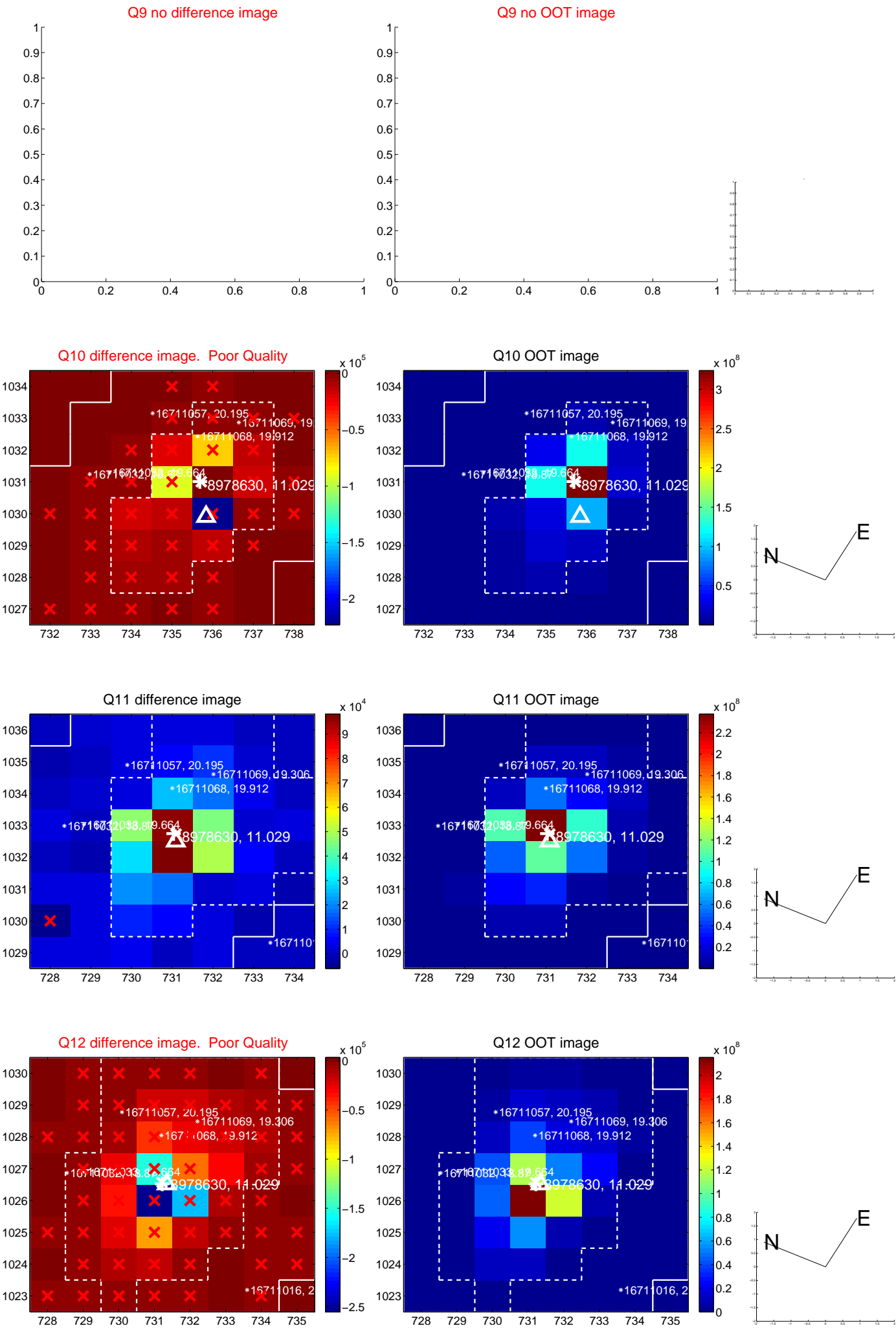
Q4 no OOT image



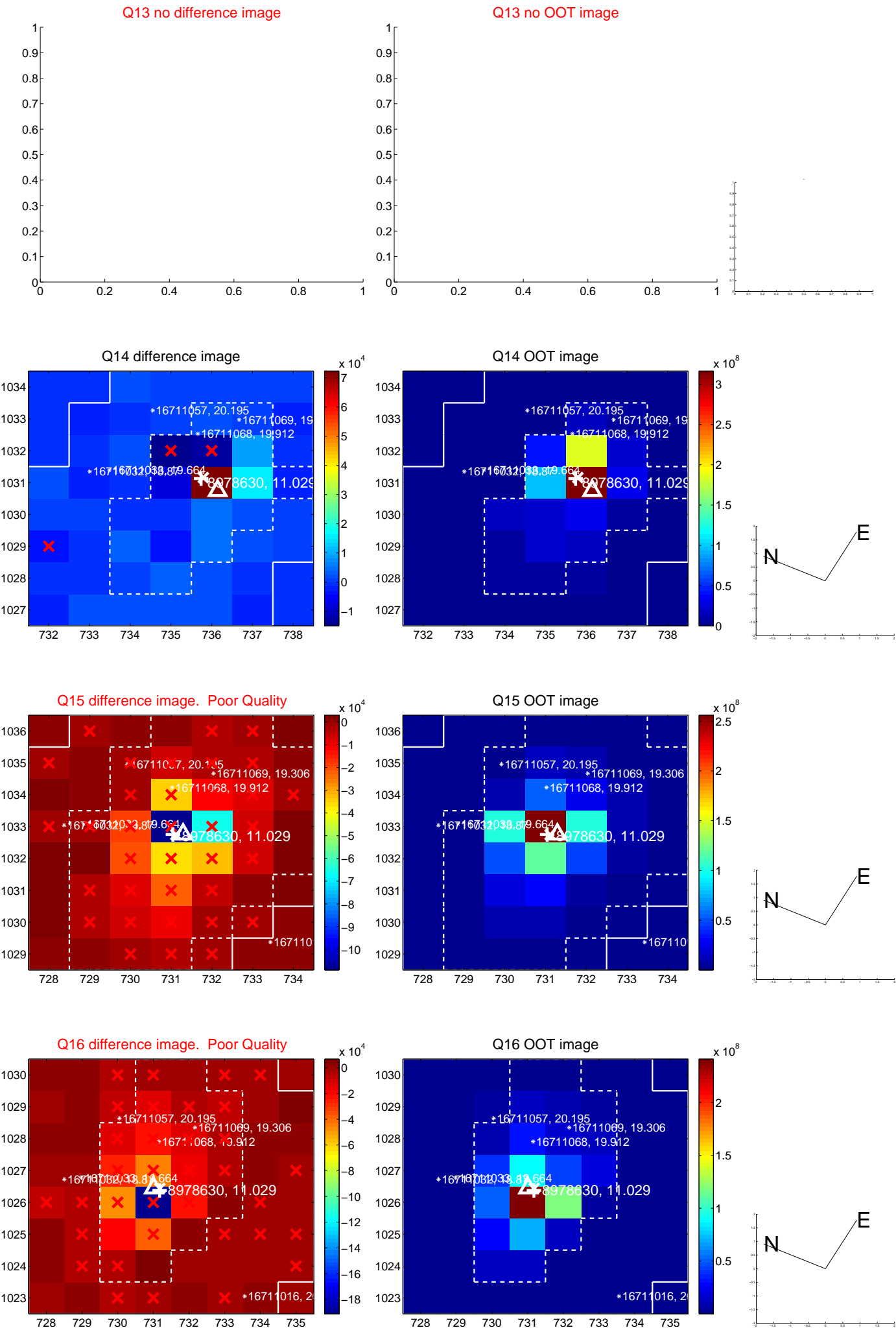
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



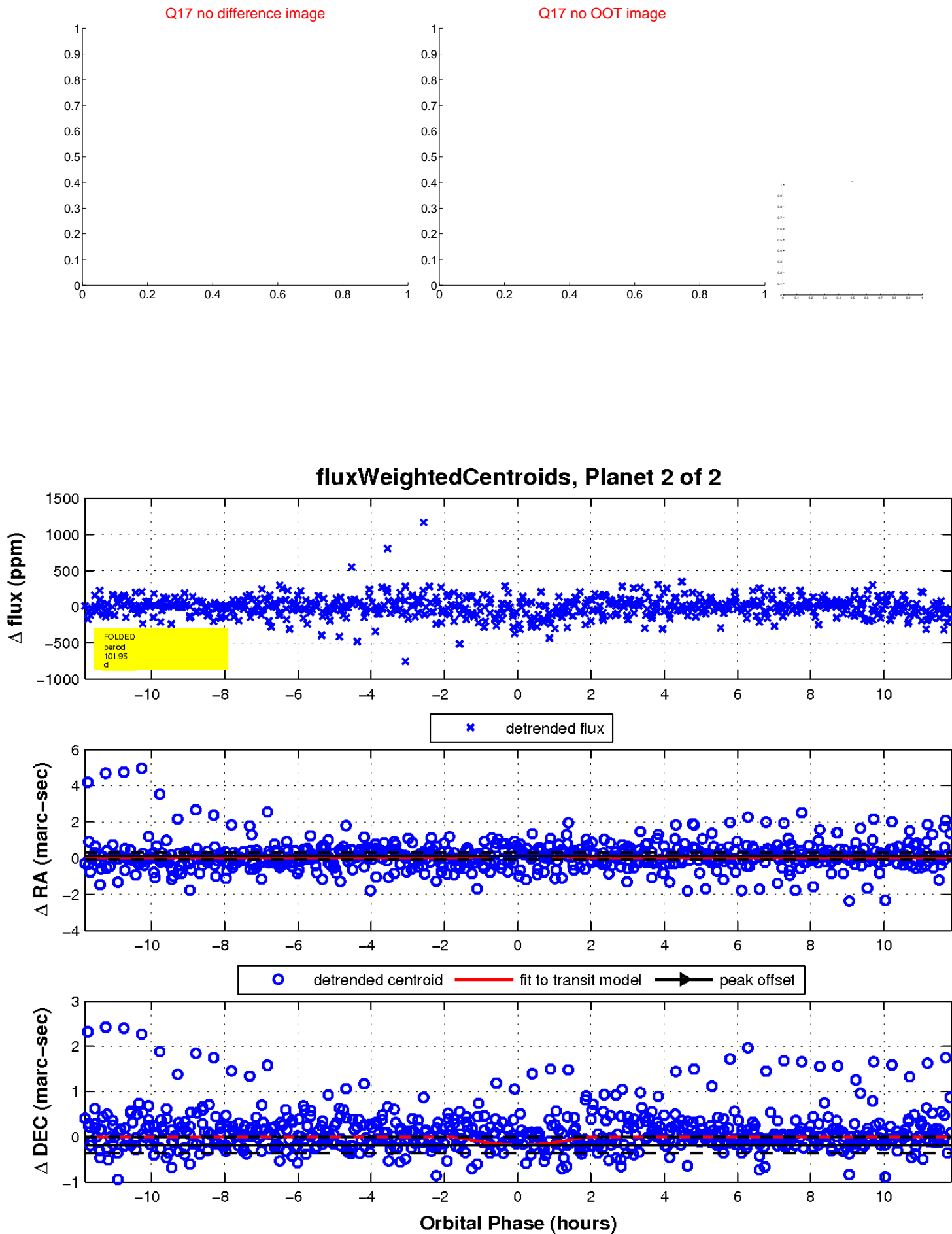
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

