

# KIC 008359671

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008359671-01	OBS	No	1.620492	132.997014	60.7	8.993	11.8	13.8	2.19	8691	1.74	20749.29
008359671-02	OBS	No	461.389569	502.262416	2011.6	30.322	16.7	16.3	2.19	8691	17.69	11.08
008359671-03	OBS	No	231.889579	284.166106	765.4	3.325	8.5	7.0	2.19	8691	8.55	27.72
008359671-04	OBS	No	10.555192	132.106334	268.7	1.447	7.8	7.7	2.19	8691	4.13	1705.73

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008359671-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT
008359671-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL_SKYE—LPP_DV—LPP_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
008359671-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL_TRACKER—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS
008359671-04	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT

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

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

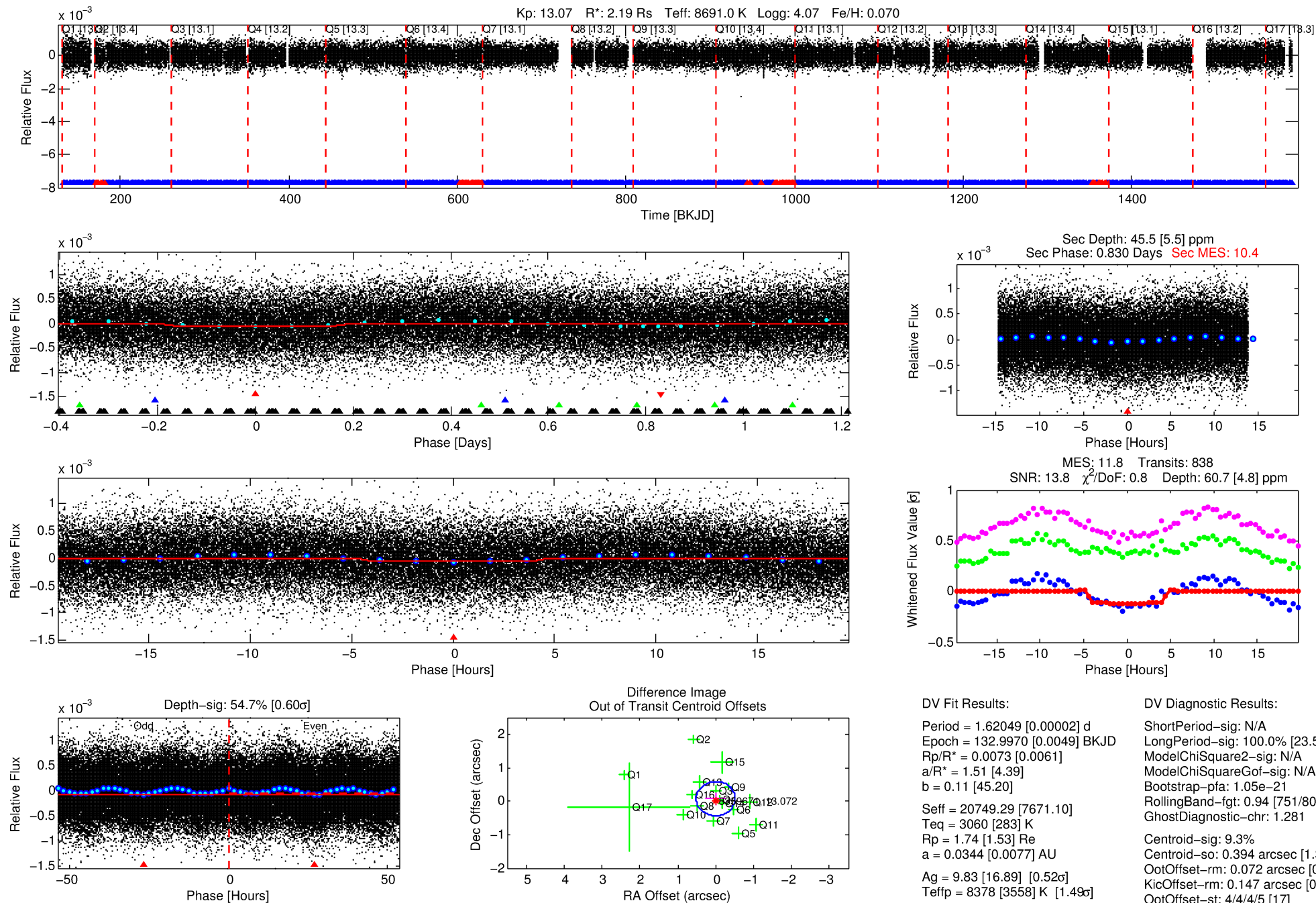
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 008359671-01

No Significant Match Found

# DV One-Page Summary

KIC: 8359671 Candidate: 1 of 4 Period: 1.620 d



## DV Fit Results:

Period = 1.62049 [0.00002] d  
Epoch = 132.9970 [0.0049] BKJD  
Rp/R\* = 0.0073 [0.0061]  
a/R\* = 1.51 [4.39]  
b = 0.11 [45.20]  
Seff = 20749.29 [7671.10]  
Teq = 3060 [283] K  
Rp = 1.74 [1.53] Re  
a = 0.0344 [0.0077] AU  
Ag = 9.83 [16.89] [0.52 $\sigma$ ]  
Teffp = 8378 [3558] K [1.49 $\sigma$ ]

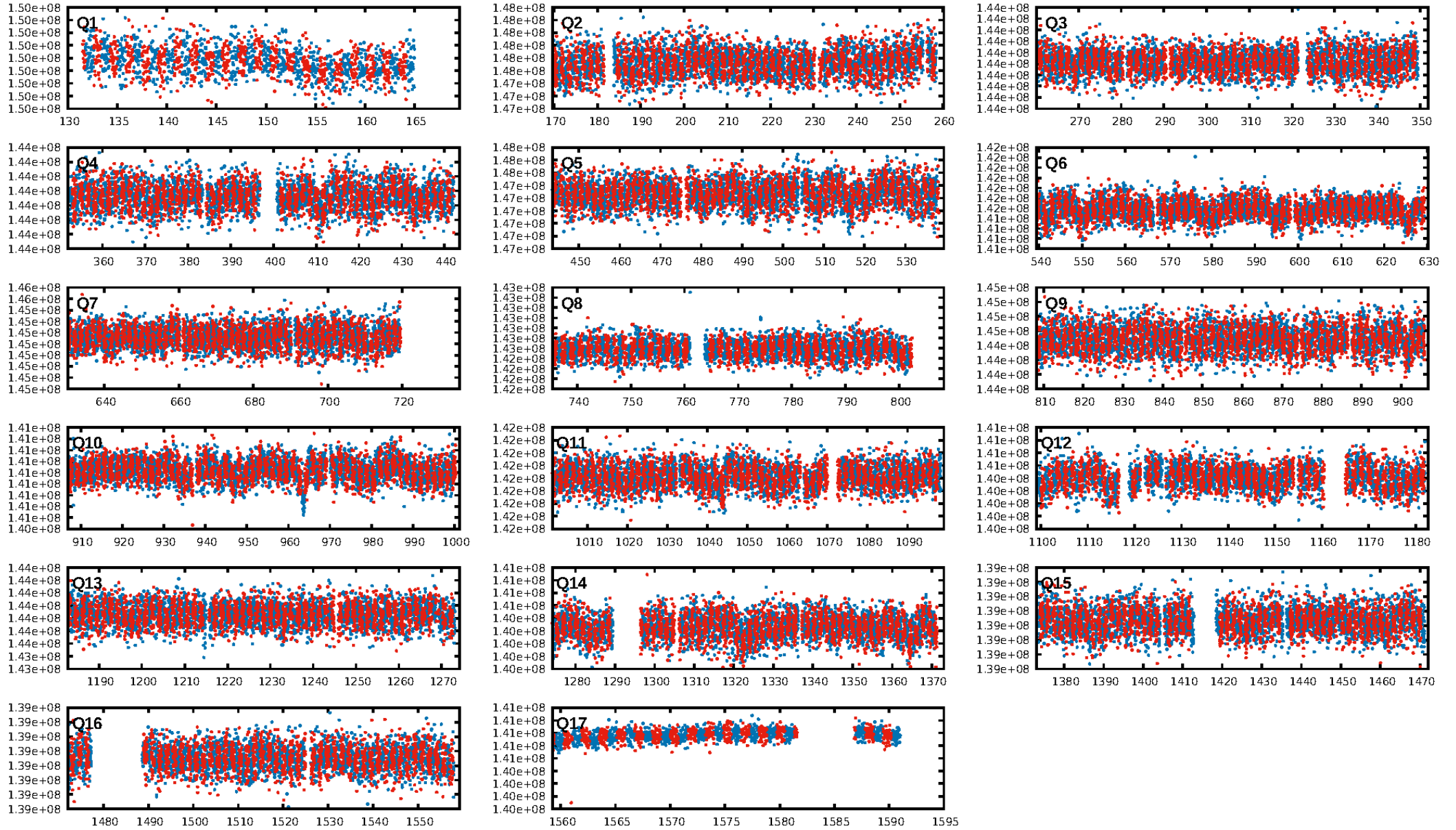
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [23.54 $\sigma$ ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 1.05e-21  
RollingBand-fgt: 0.94 [751/801]  
GhostDiagnostic-chr: 1.281  
Centroid-sig: 9.3%  
Centroid-so: 0.394 arcsec [1.36 $\sigma$ ]  
OotOffset-rm: 0.072 arcsec [0.42 $\sigma$ ]  
KicOffset-rm: 0.147 arcsec [0.85 $\sigma$ ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 0.94 [16/17]  
DiffImageOverlap-fno: 1.00 [17/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 09:31:24 Z

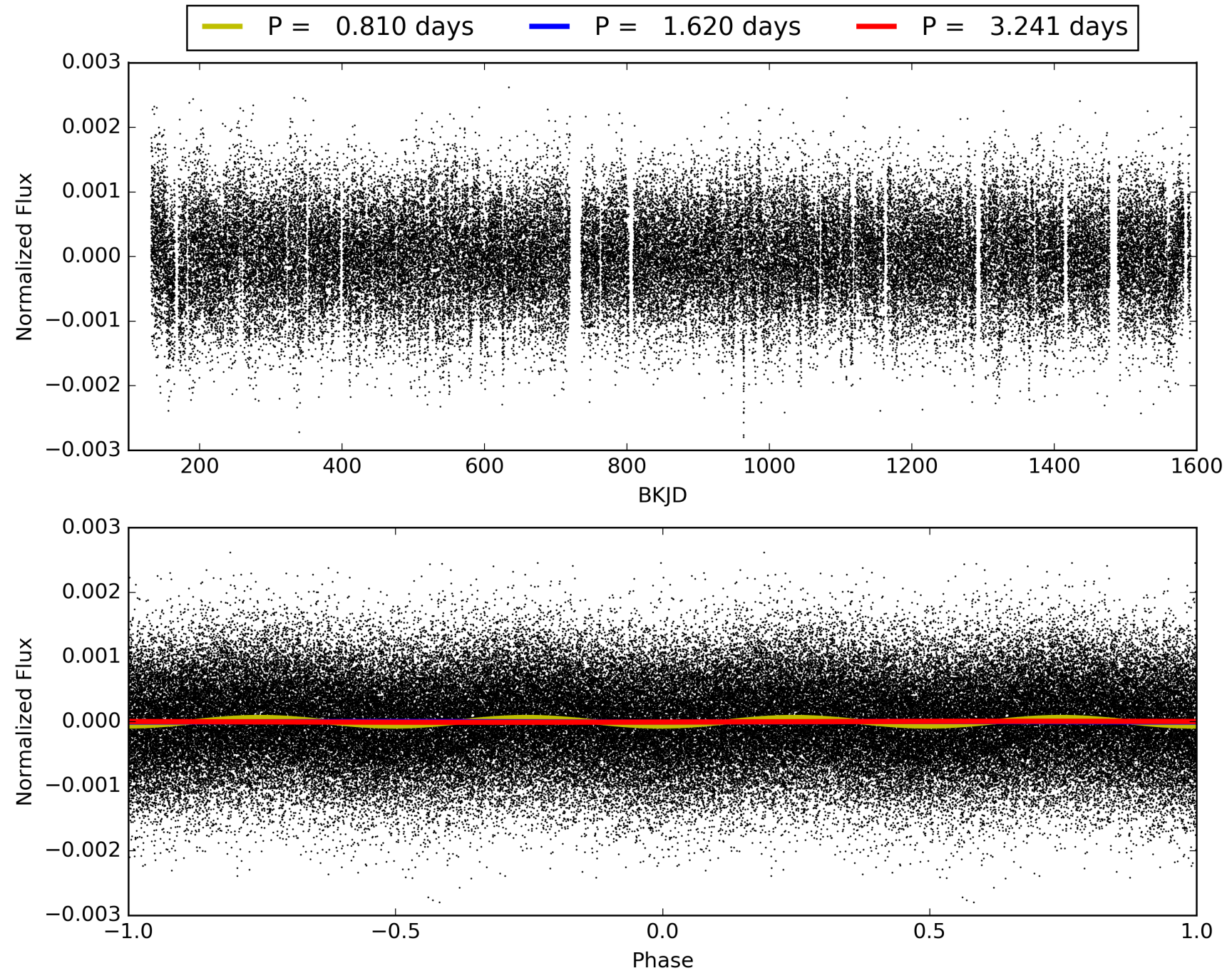
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 008359671-01, PDC Light Curves





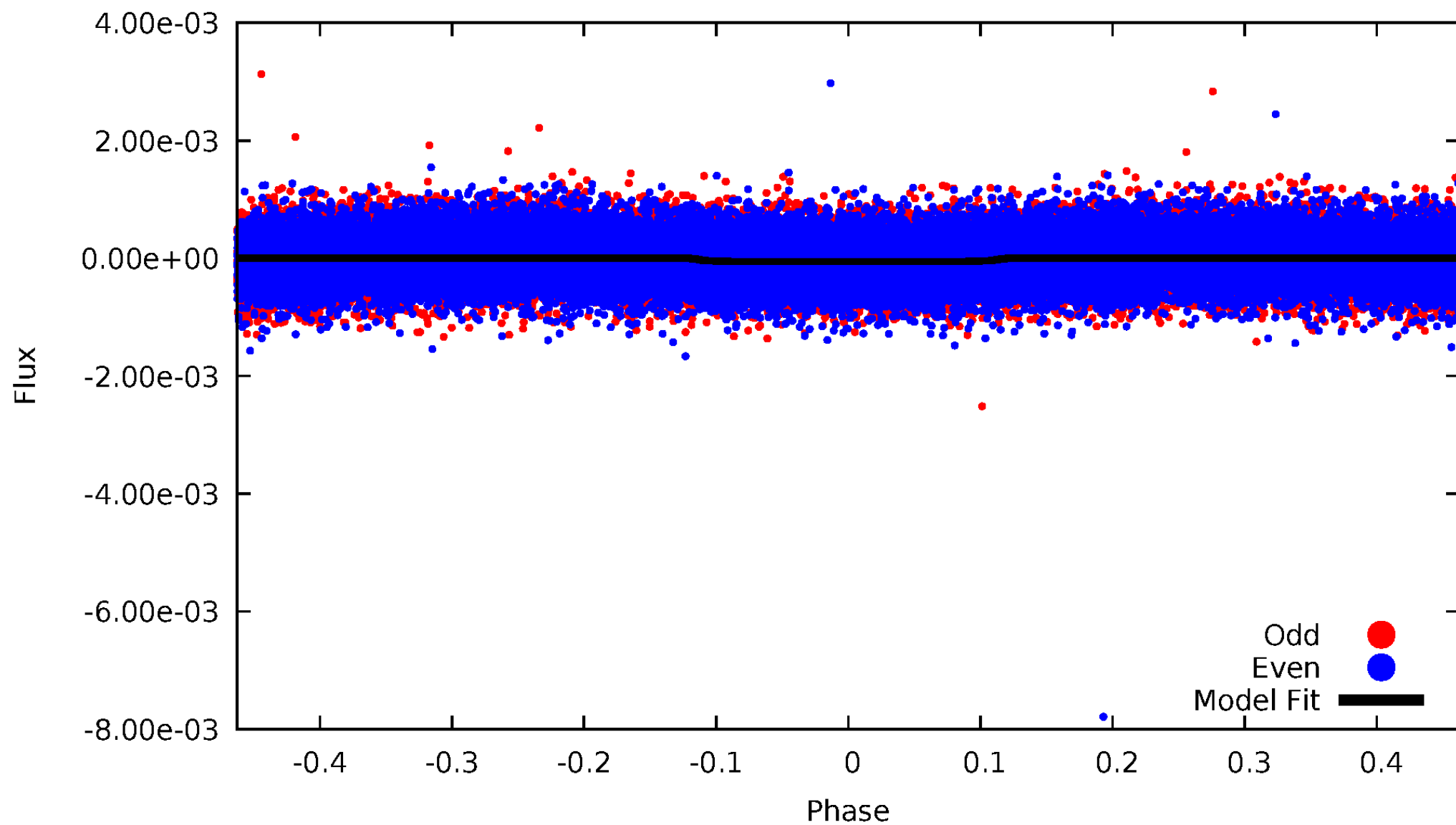
TCE 008359671-01





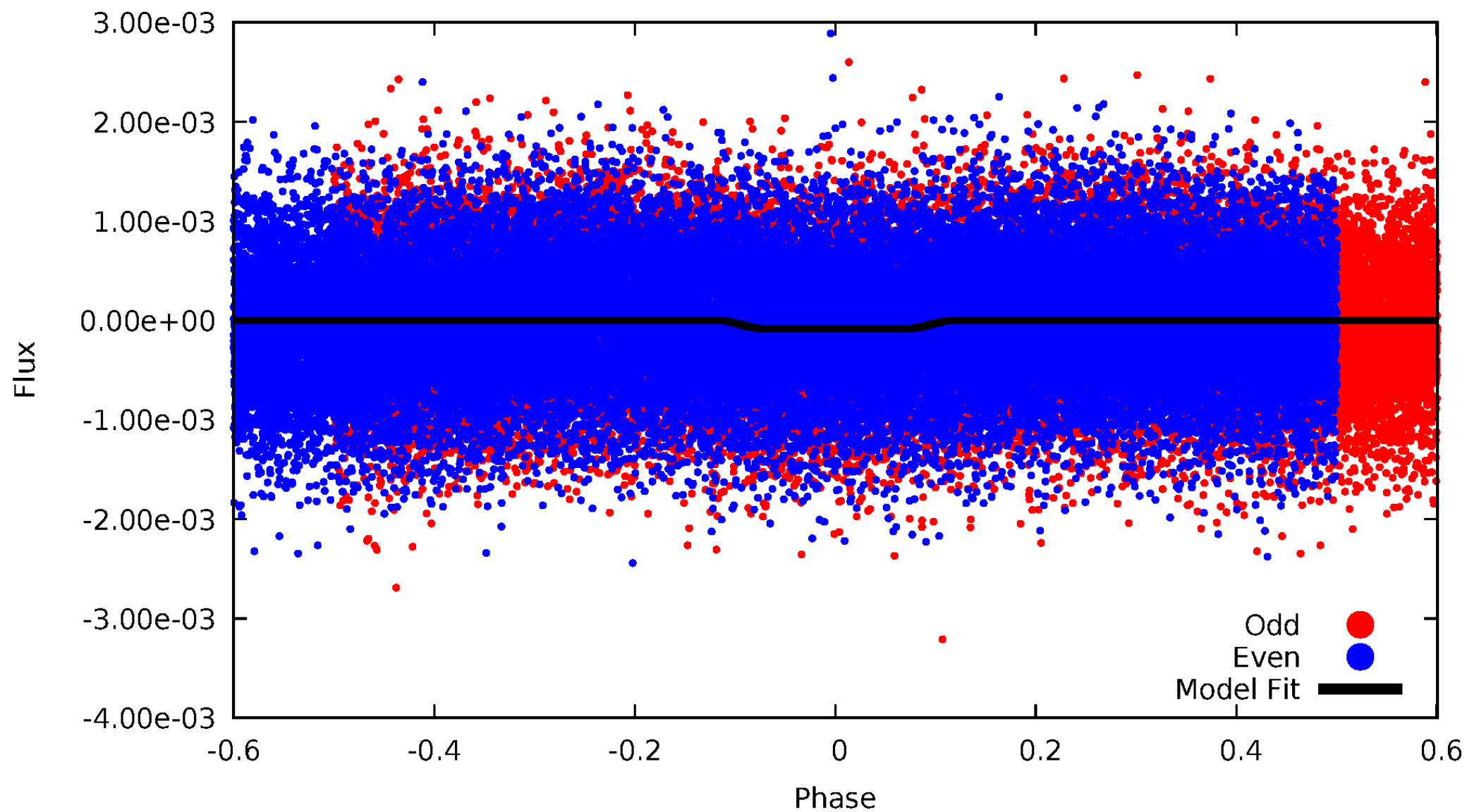
# DV Odd/Even

TCE 008359671-01

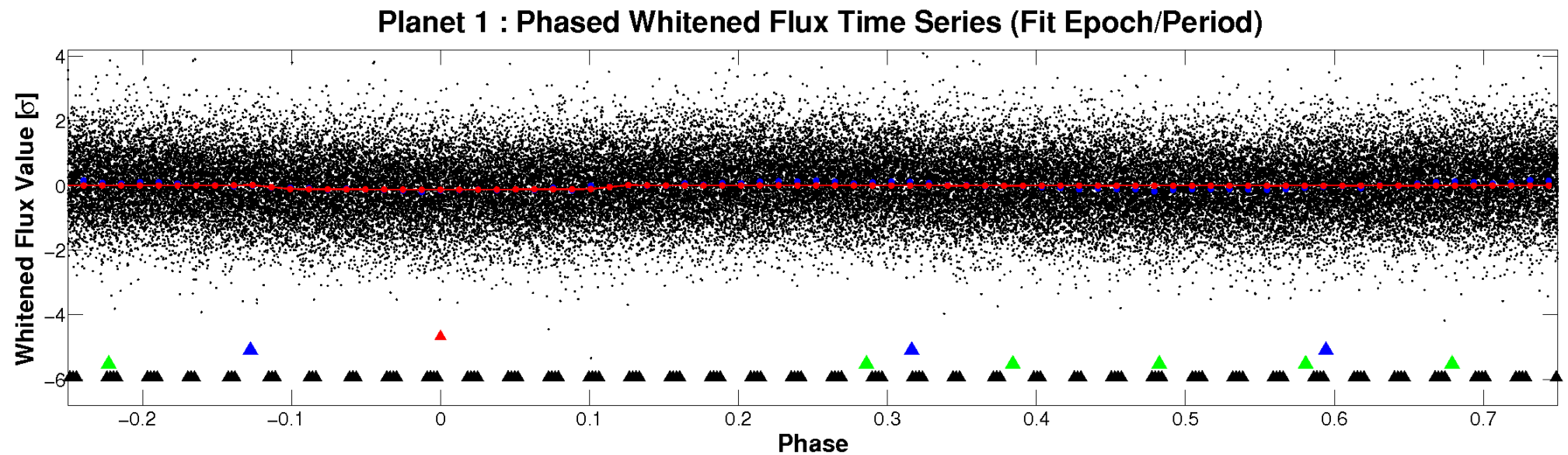
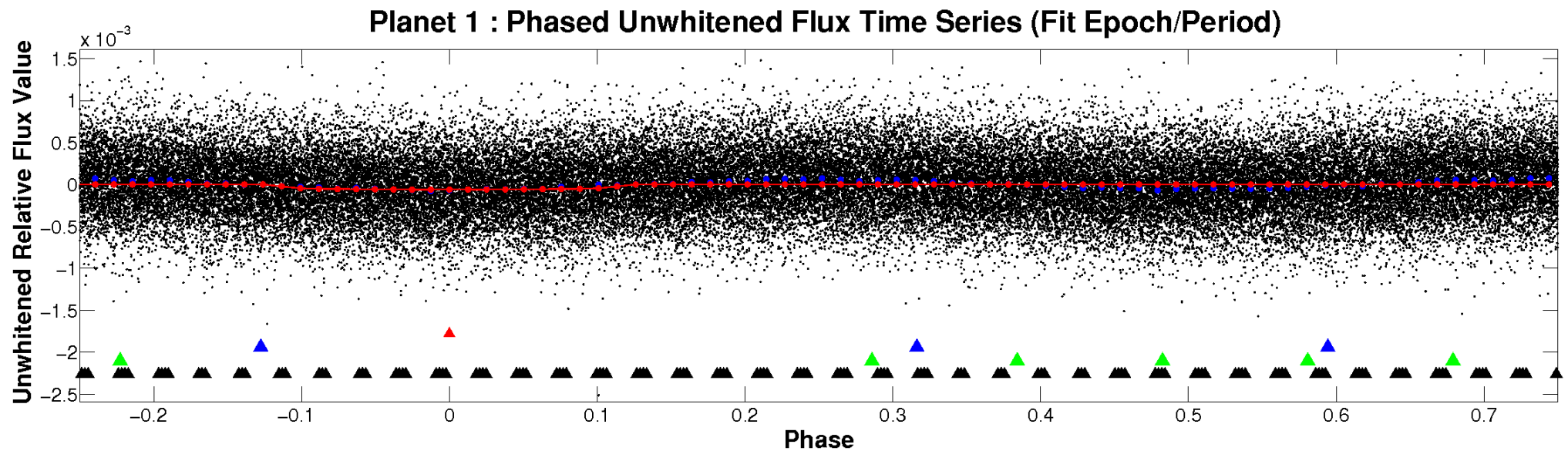


# ALT Odd/Even

TCE 008359671-01



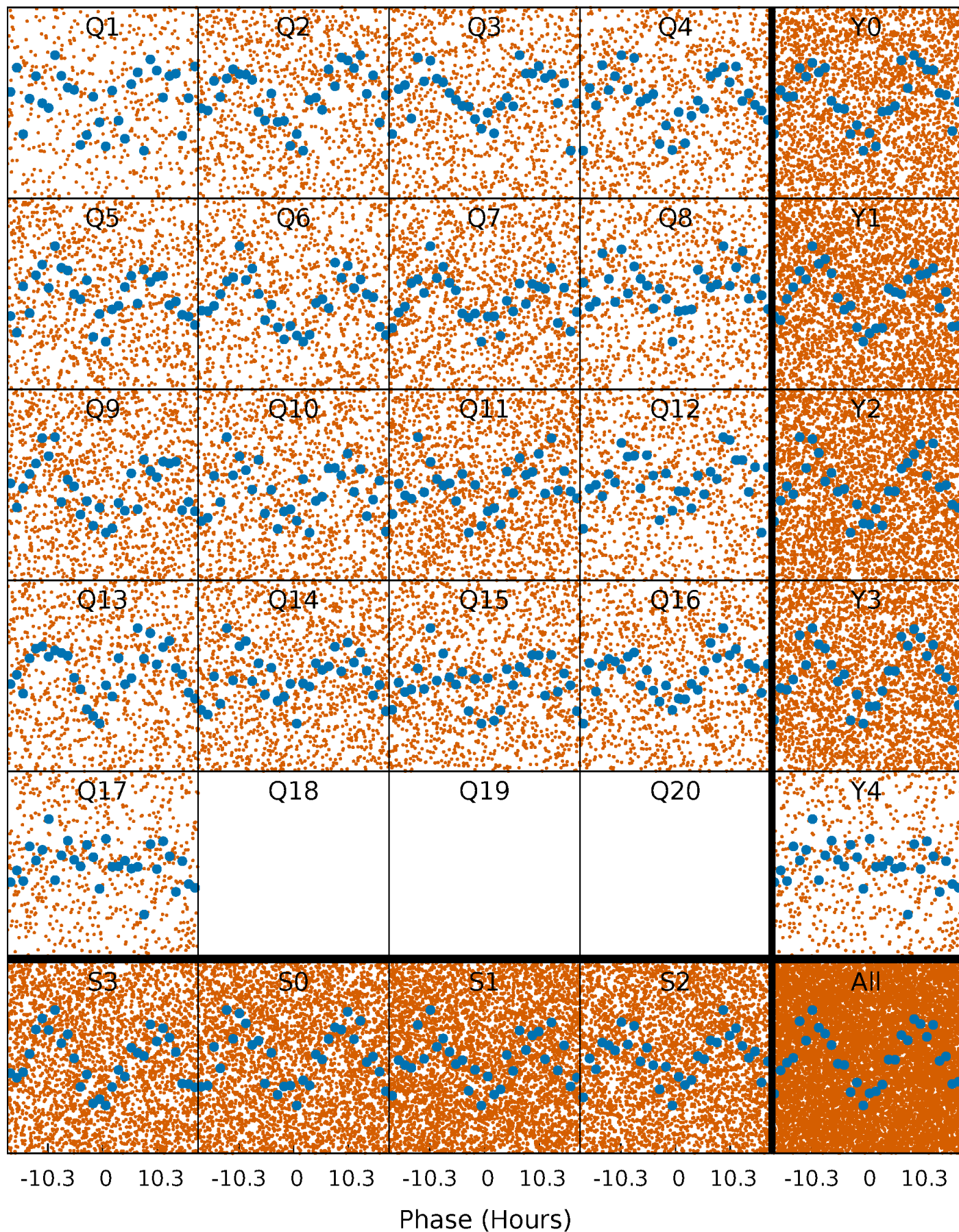
# Non-Whitened Vs. Whitened Light Curve





# PDC Quarter-Phased Transit Curves

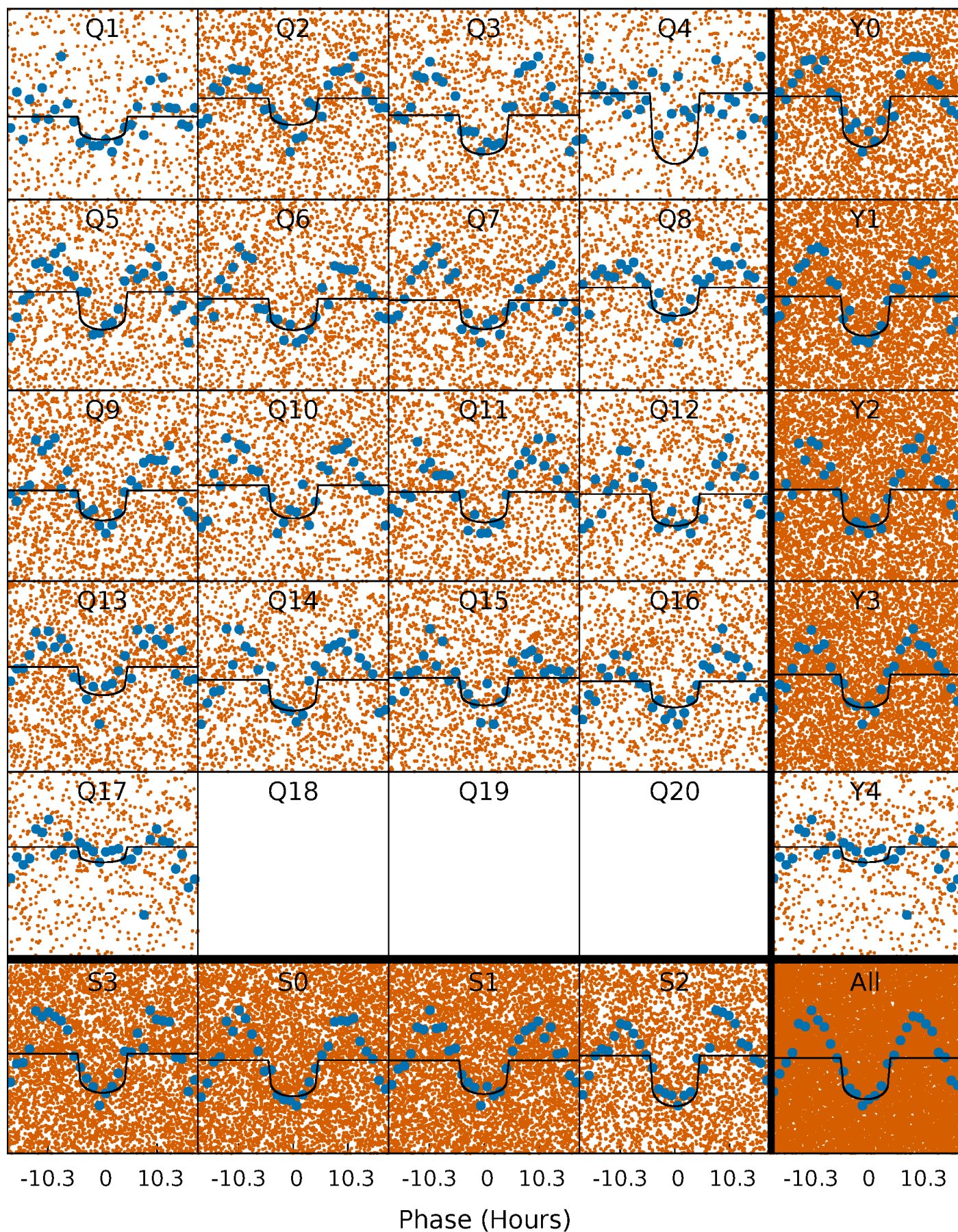
TCE 008359671-01 P= 1.620492 Days  $T_0=132.997014$  (BKJD)





# DV Quarter-Phased Transit Curves

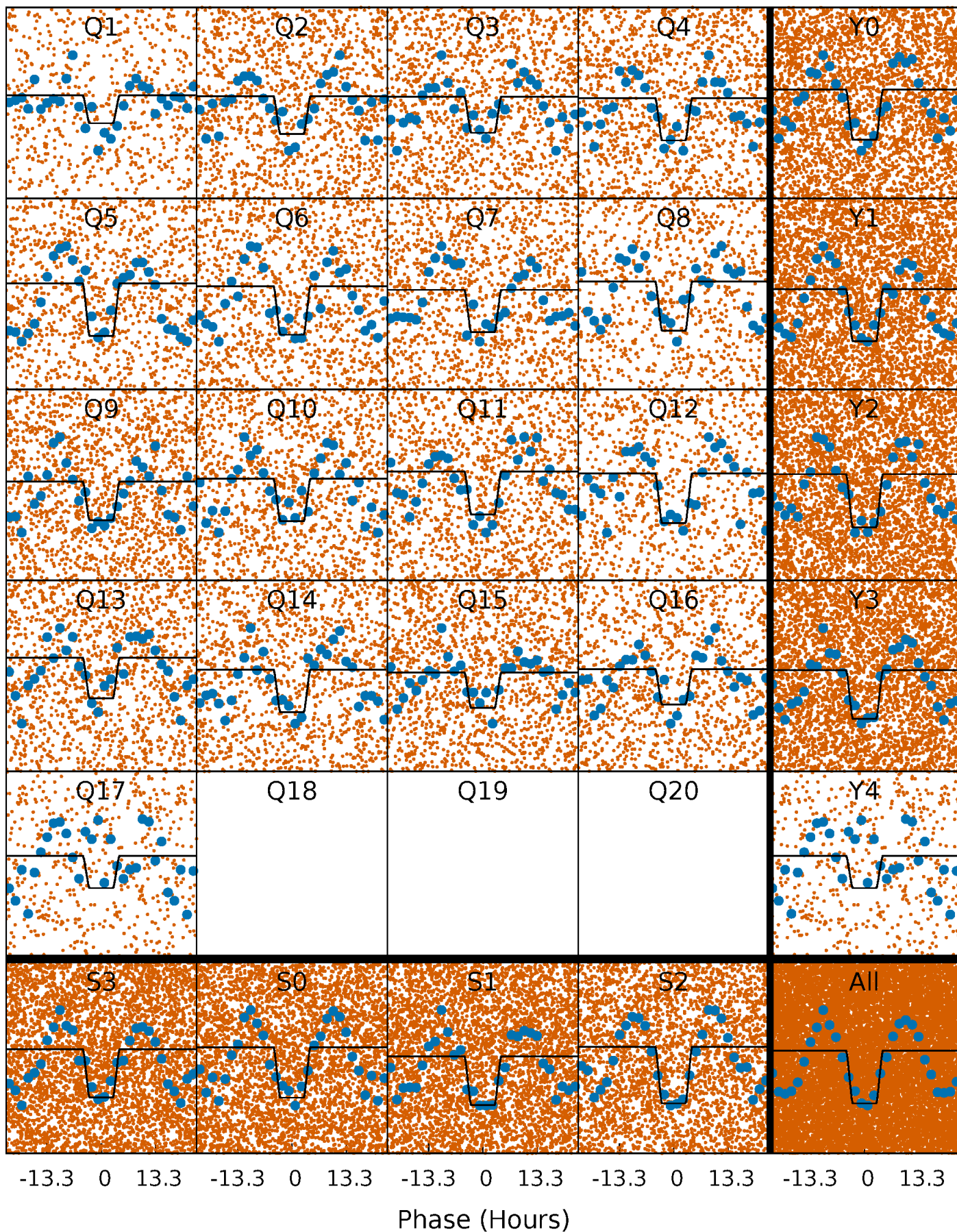
TCE 008359671-01 P= 1.620492 Days  $T_0=132.997014$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

TCE 008359671-01 P= 1.620472 Days  $T_0=132.997731$  (BKJD)

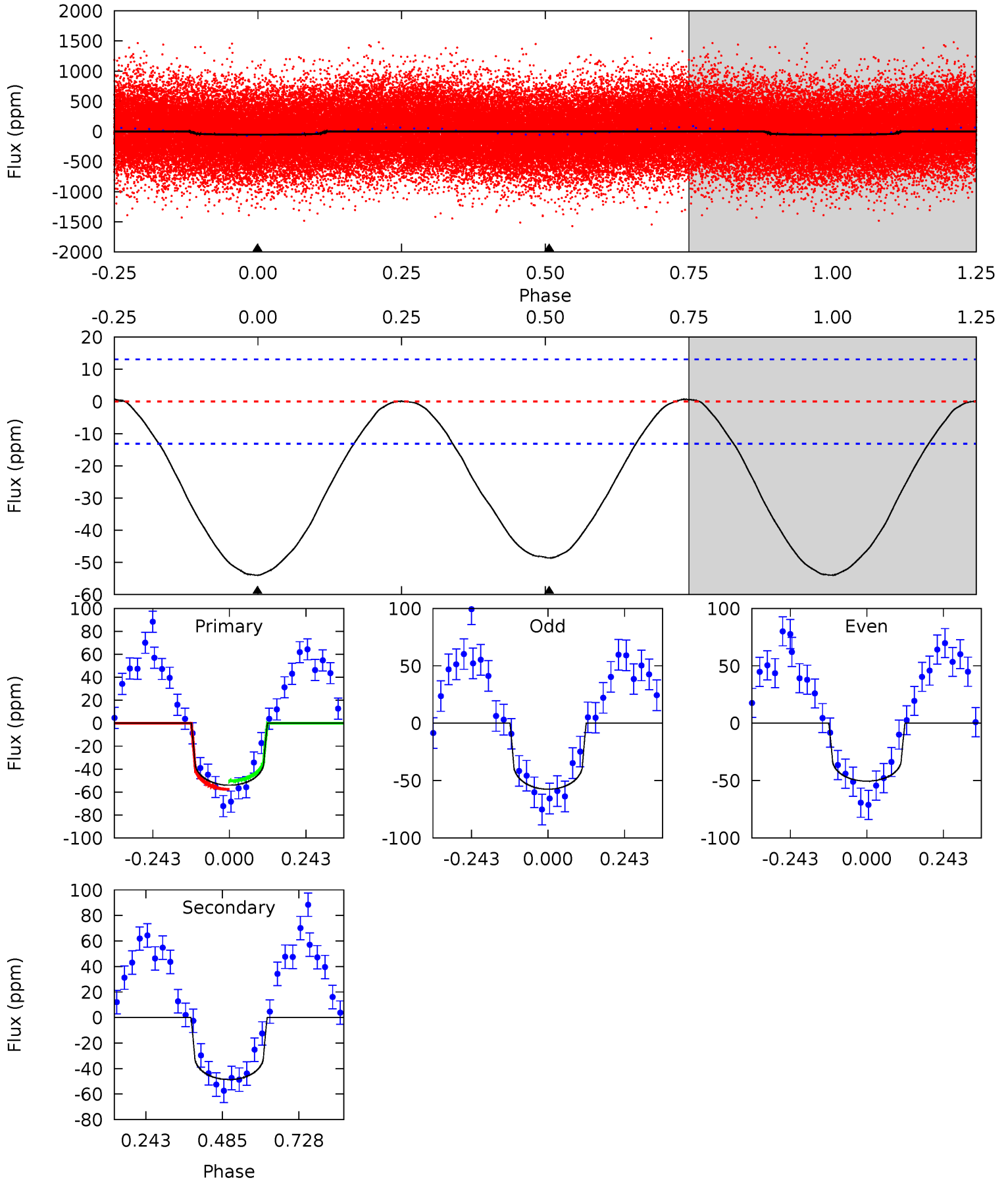




# DV Model-Shift Uniqueness Test

008359671-01, P = 1.620492 Days, E = 131.376522 Days

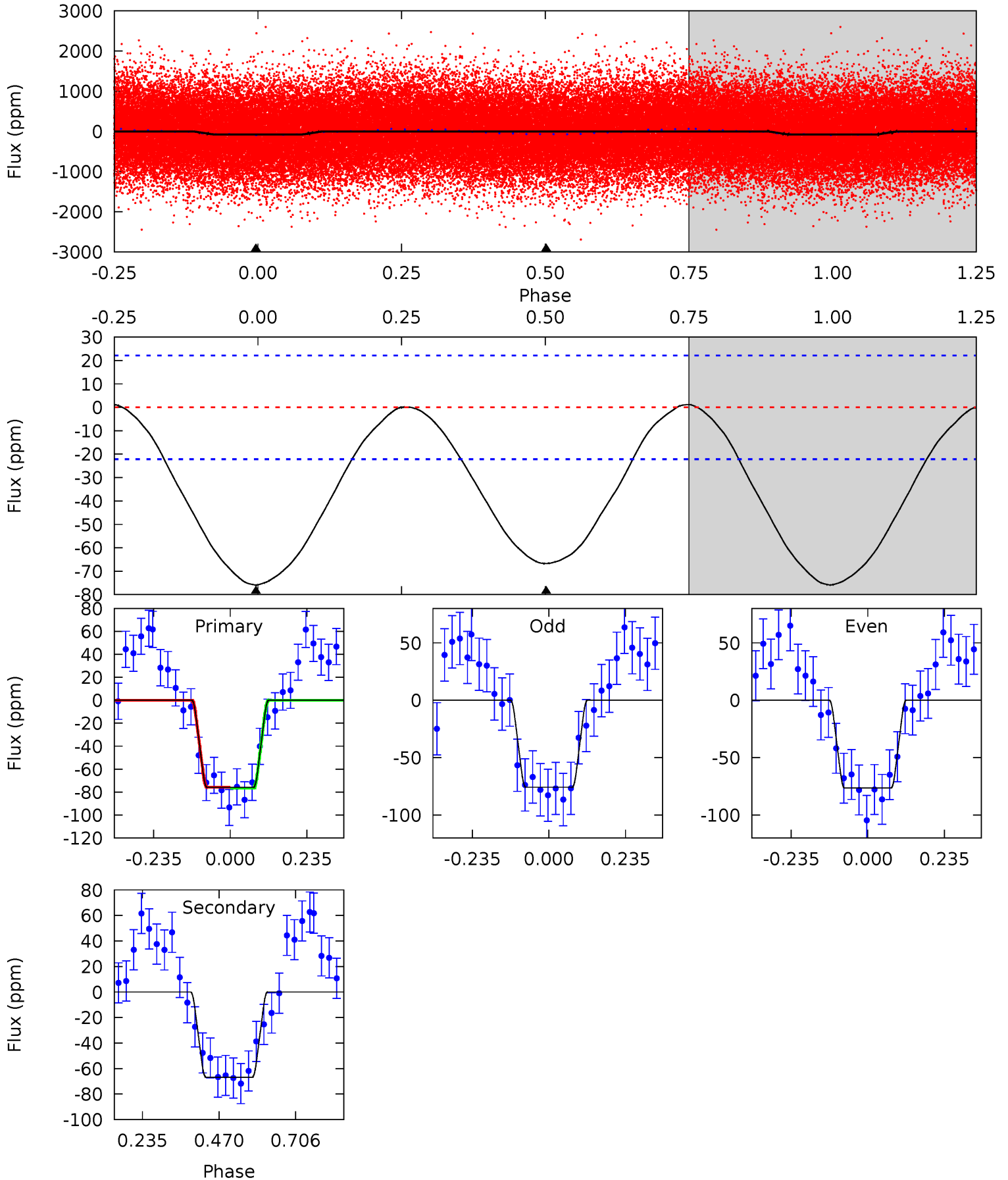
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
18.0	16.2	0	0	4.38	1.17	0.16	18.0	18.0	16.2	16.2	1.16	0.98	0.01	1.25



# Alt Model-Shift Uniqueness Test

008359671-01, P = 1.620472 Days, E = 131.377259 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
15.0	13.2	0	0	4.38	1.19	0.26	15.0	15.0	13.2	13.2	0.06	1.06	0.02	0.08



### Stellar Parameters For KIC 008359671

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$8691^{+239}_{-410}$	$4.072^{+0.171}_{-0.140}$	$0.070^{+0.250}_{-0.600}$	$2.193^{+0.482}_{-0.590}$	$2.069^{+0.341}_{-0.512}$	$0.276^{+0.258}_{-0.115}$
	+3%/-5%	+4%/-3%	+357%/-857%	+22%/-27%	+16%/-25%	+93%/-42%
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 008359671-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-49 \pm 3$	$1.90^{+1.46}_{-1.15}$	$4241^{+290}_{-319}$	$7747^{+8072}_{-2014}$	$8.496^{+46.797}_{-5.703}$
Alt.	$-67 \pm 5$	$2.21^{+1.48}_{-1.17}$	$4273^{+270}_{-313}$	$7820^{+5722}_{-1972}$	$8.841^{+28.432}_{-5.720}$

$T_{\text{max}}$  = Theoretical Maximum Planetary Temperature

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

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



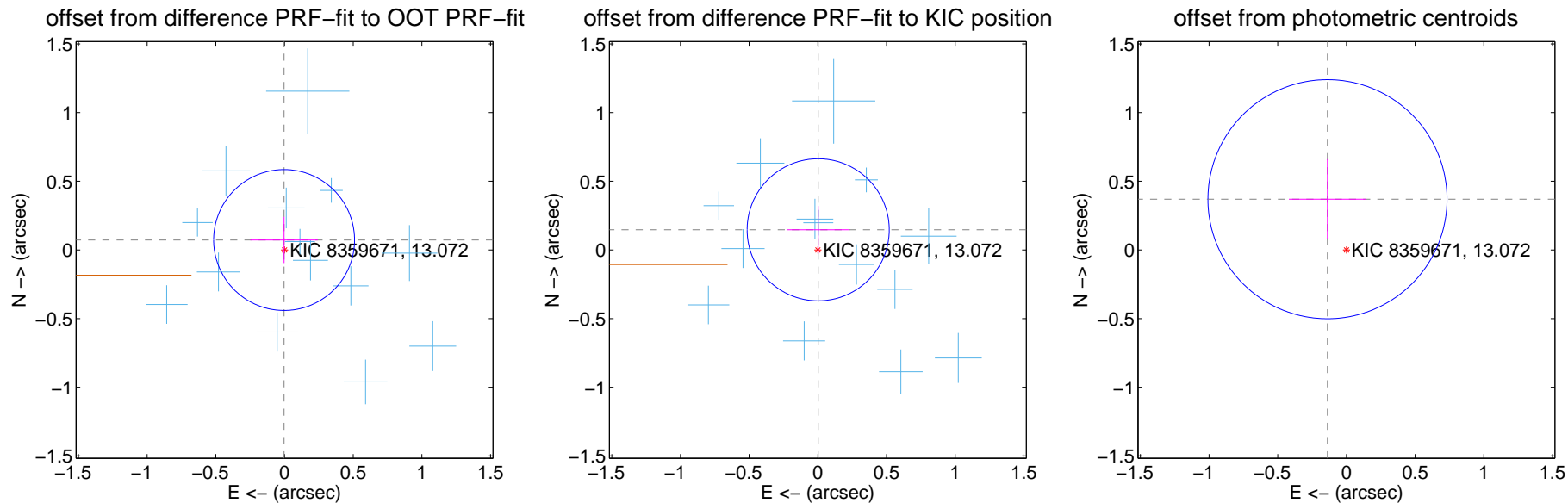
## DV Centroid Data

Supplemental centroid analysis for 008359671-01. Kepler magnitude: 13.07. Transit SNR 13.75

There are 16 quarters with good PRF difference image offsets

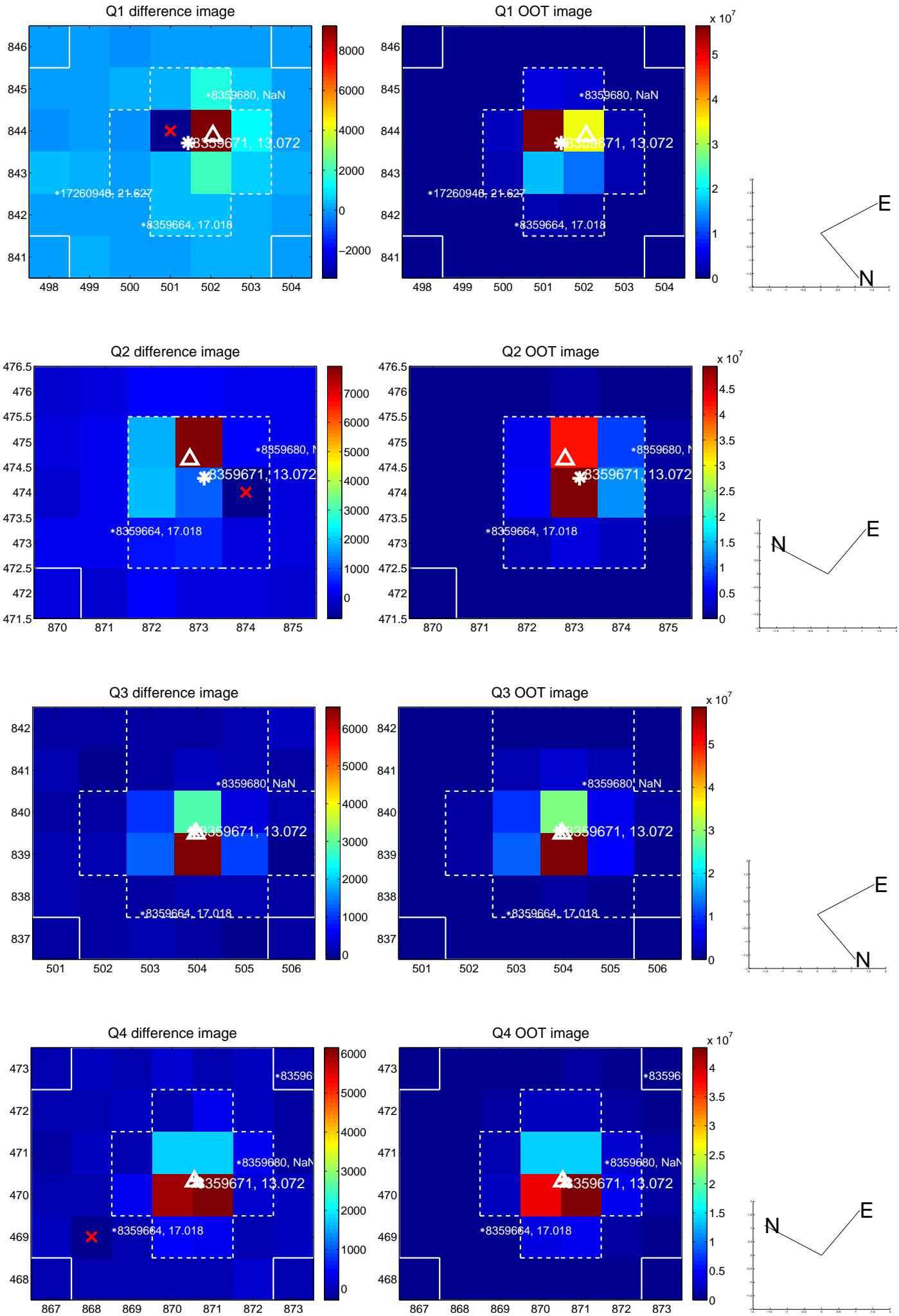
The direct PRF centroid is offset from the target star catalog position by about 0.08 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.072 \pm 0.171$	0.42	$0.003 \pm 0.245$	$0.072 \pm 0.169$
PRF-fit source offset from KIC position	$0.147 \pm 0.172$	0.85	$-0.002 \pm 0.229$	$0.147 \pm 0.173$
photometric centroid source offset	$0.39 \pm 0.29$	1.36	$0.14 \pm 0.28$	$0.37 \pm 0.29$

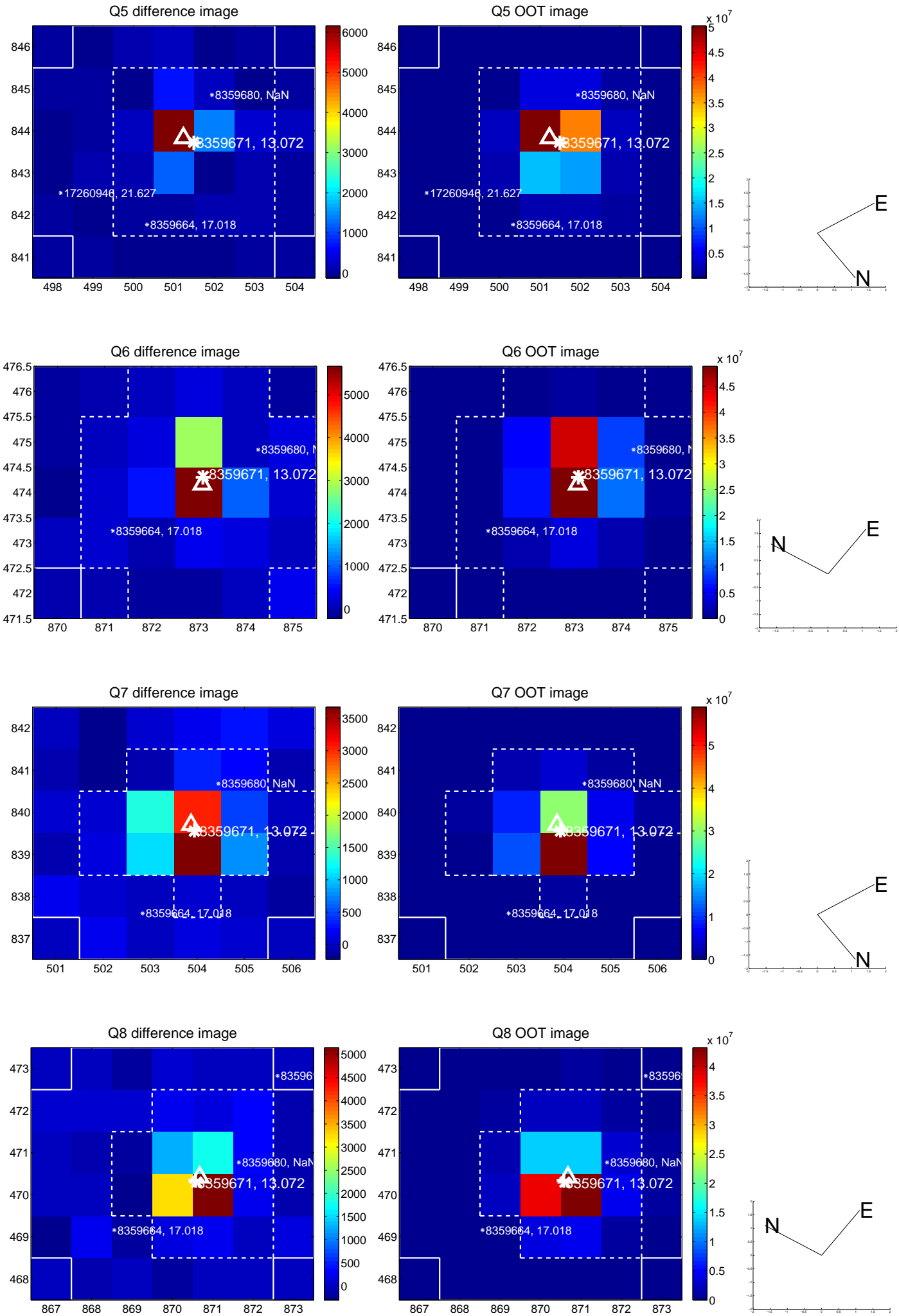


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets**; **Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

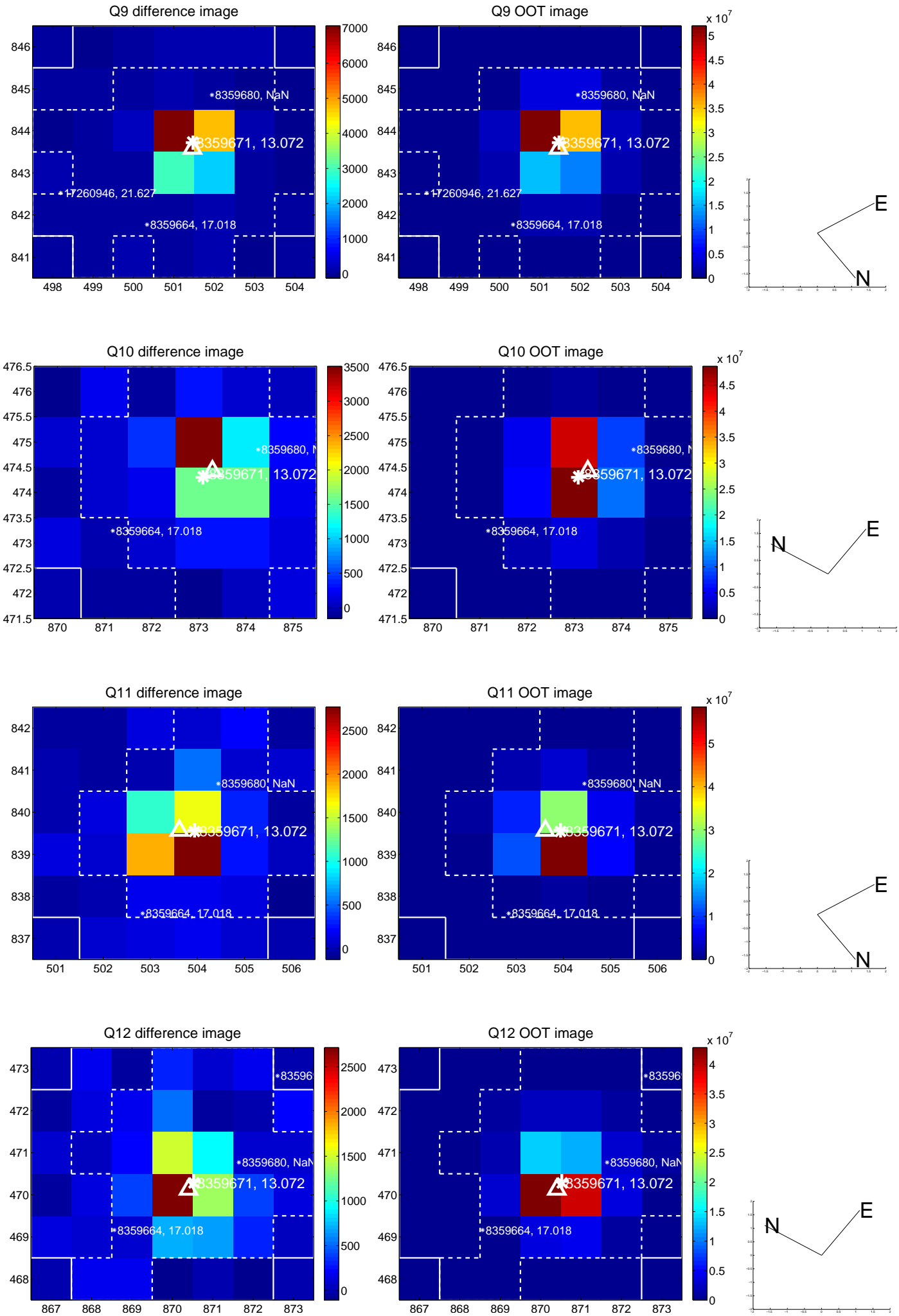


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

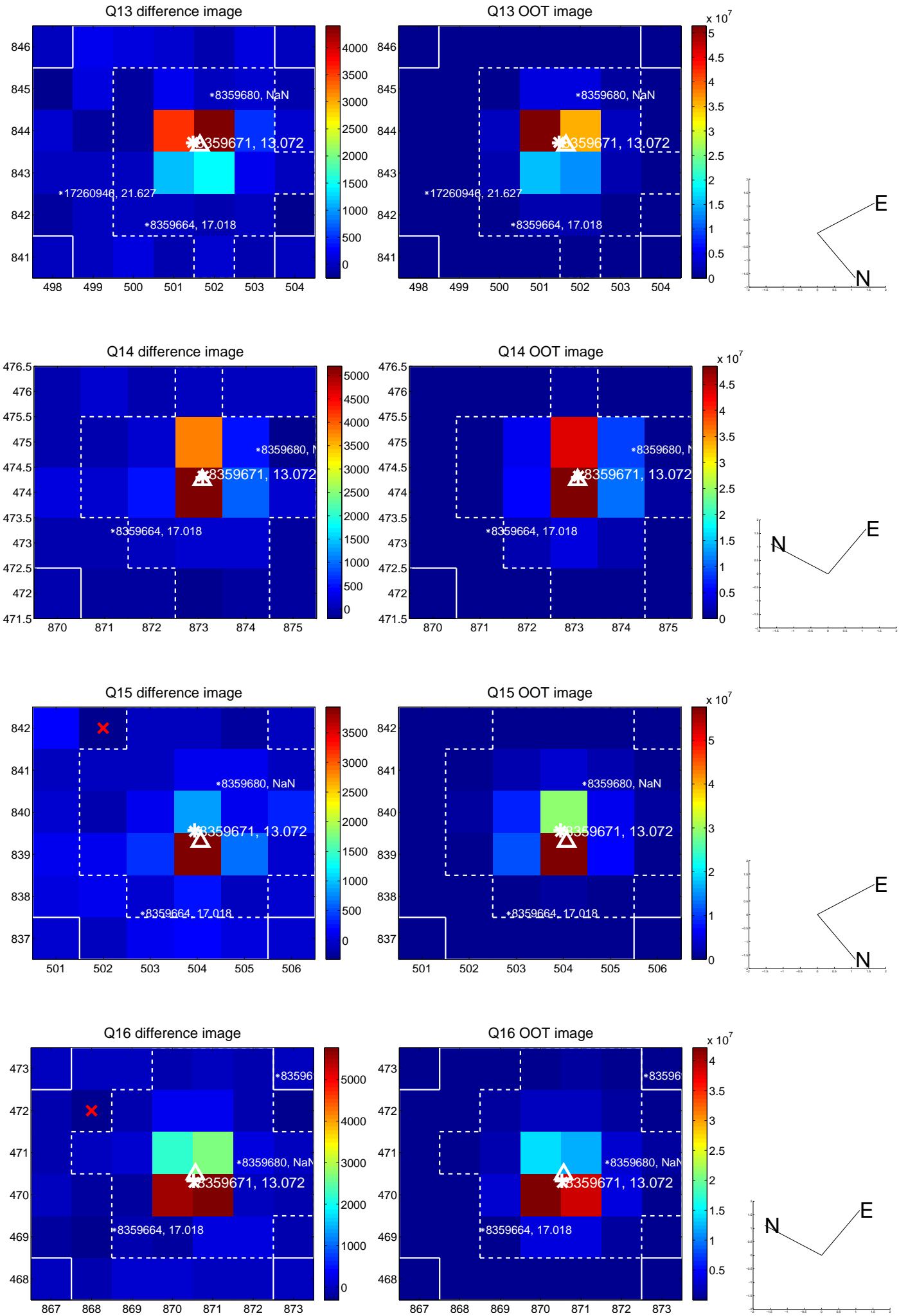




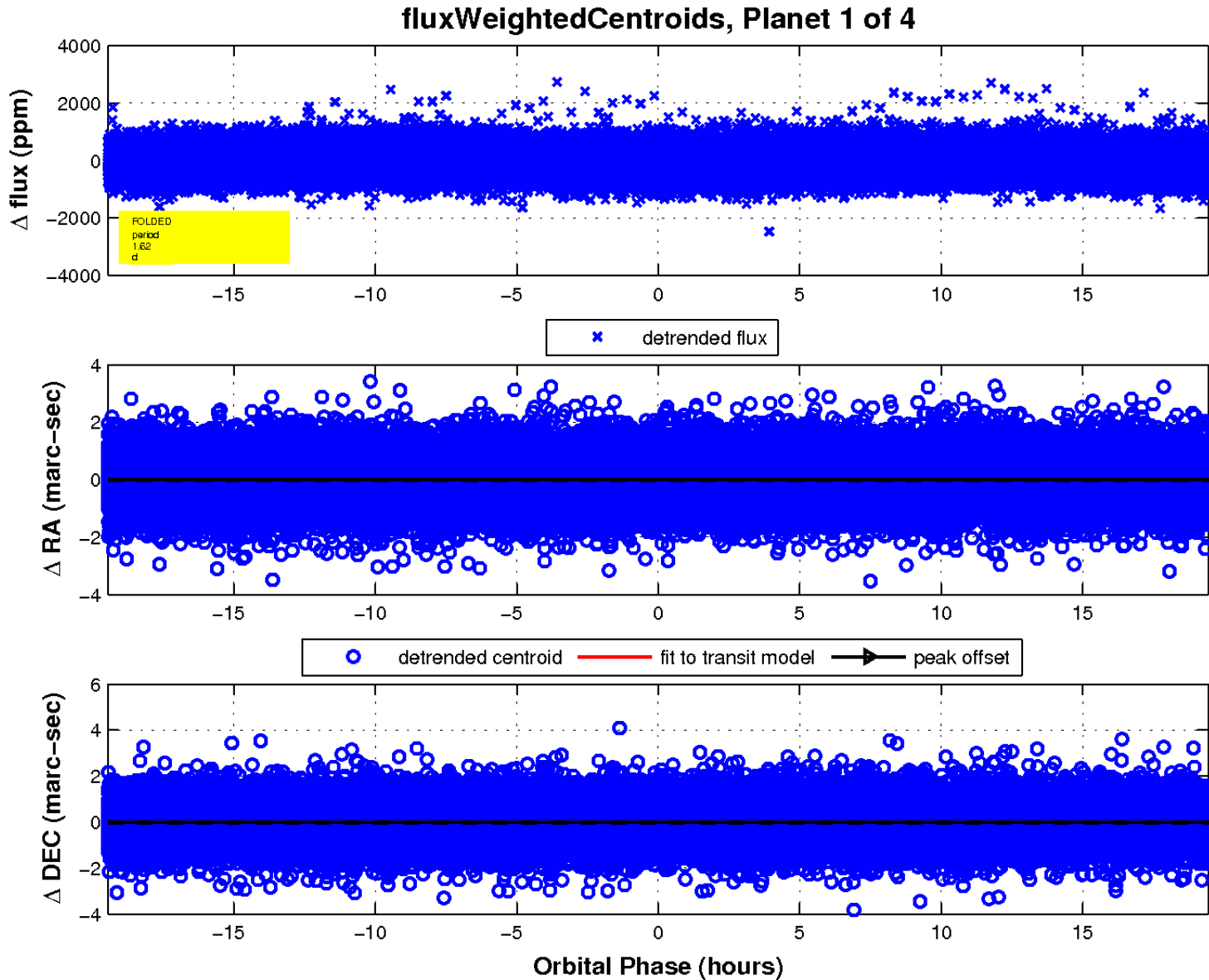
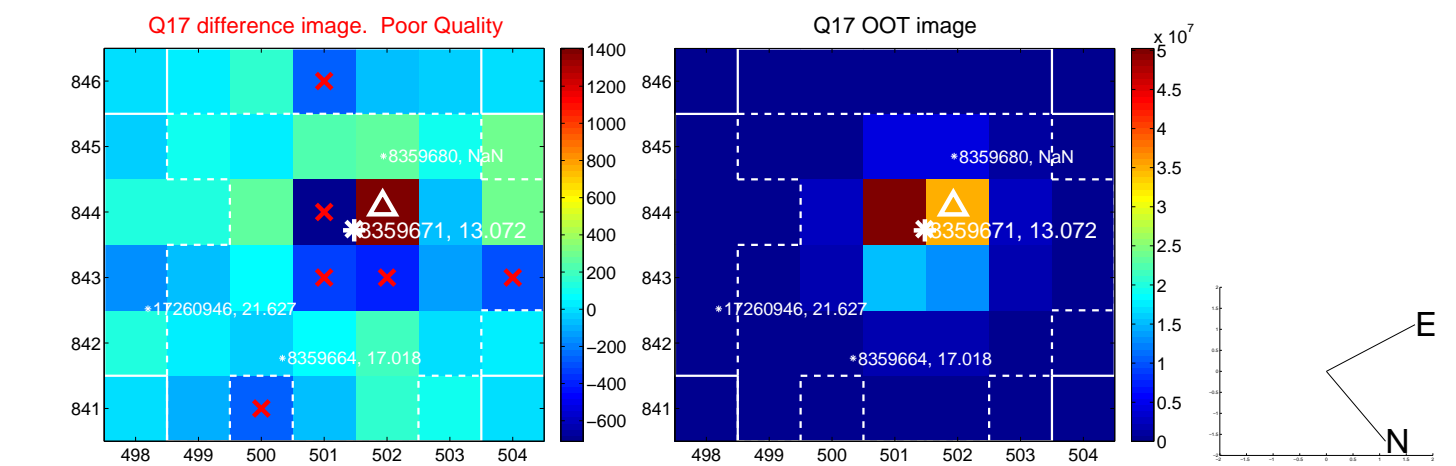
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



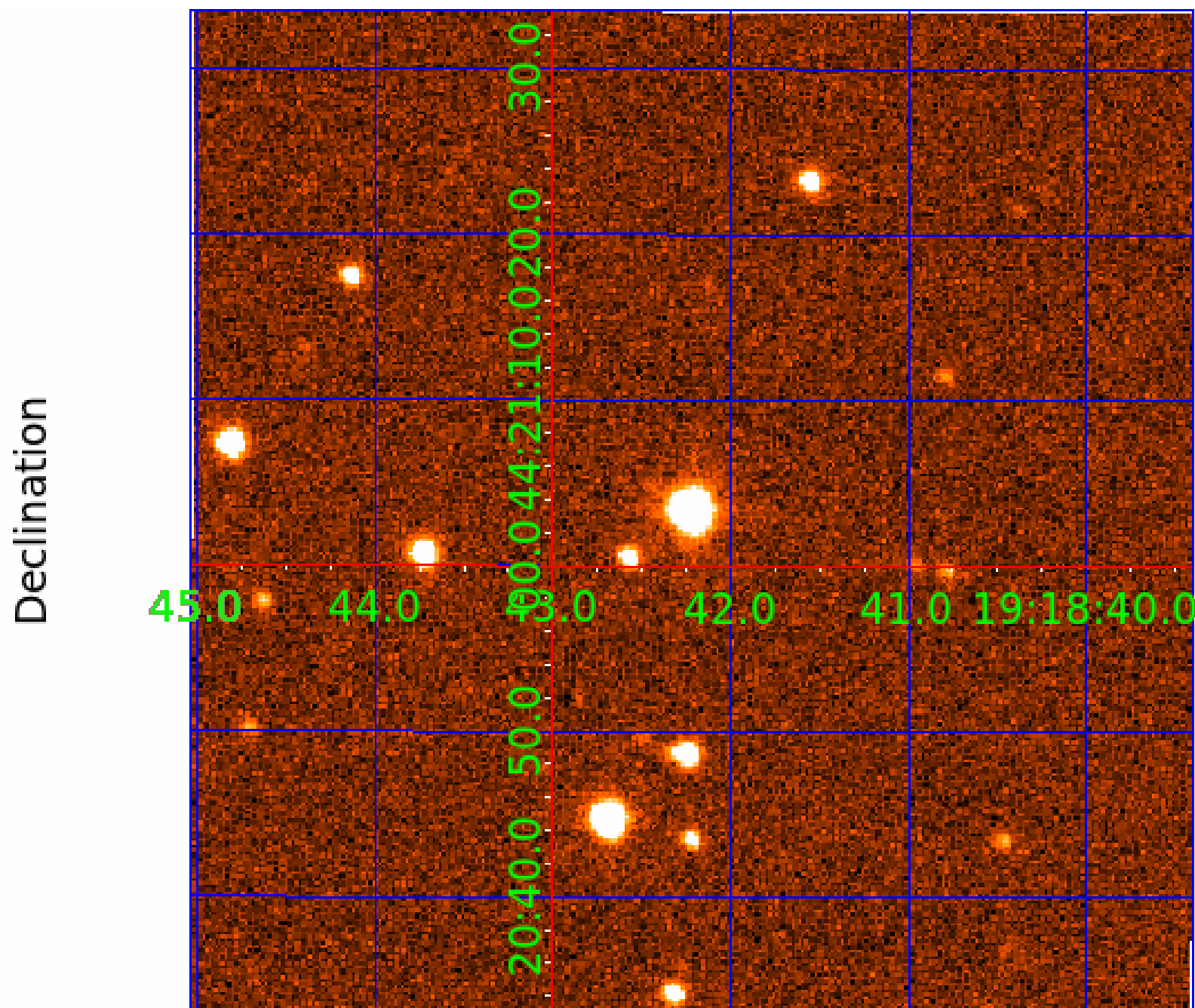
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



UKIRT Image



# KIC 008359671

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008359671-01	OBS	No	1.620492	132.997014	60.7	8.993	11.8	13.8	2.19	8691	1.74	20749.29
008359671-02	OBS	No	461.389569	502.262416	2011.6	30.322	16.7	16.3	2.19	8691	17.69	11.08
008359671-03	OBS	No	231.889579	284.166106	765.4	3.325	8.5	7.0	2.19	8691	8.55	27.72
008359671-04	OBS	No	10.555192	132.106334	268.7	1.447	7.8	7.7	2.19	8691	4.13	1705.73

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008359671-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT
008359671-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL_SKYE—LPP_DV—LPP_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
008359671-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL_TRACKER—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS
008359671-04	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT

**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](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

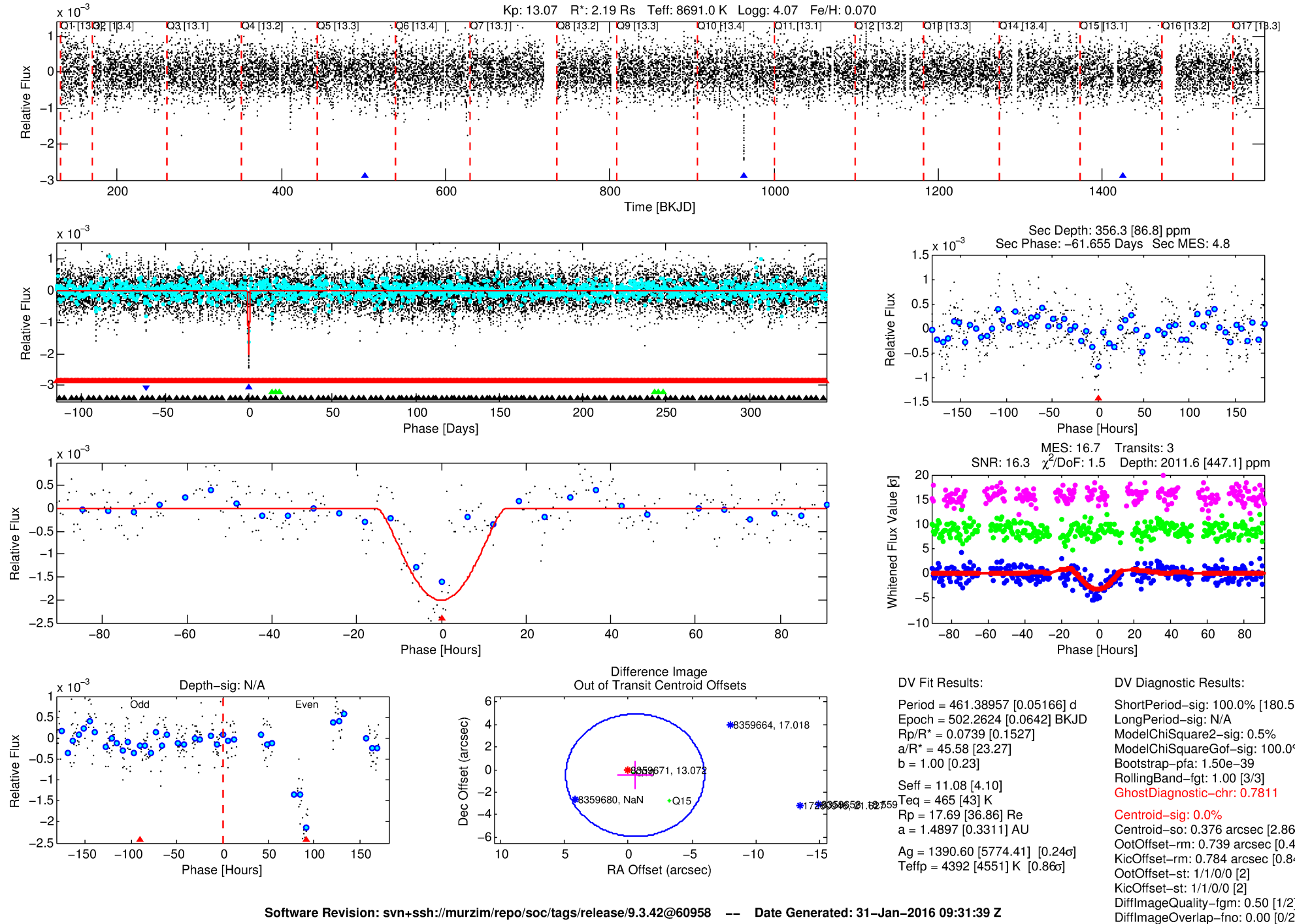
Ephemeris Match Information For 008359671-02

No Significant Match Found



# DV One-Page Summary

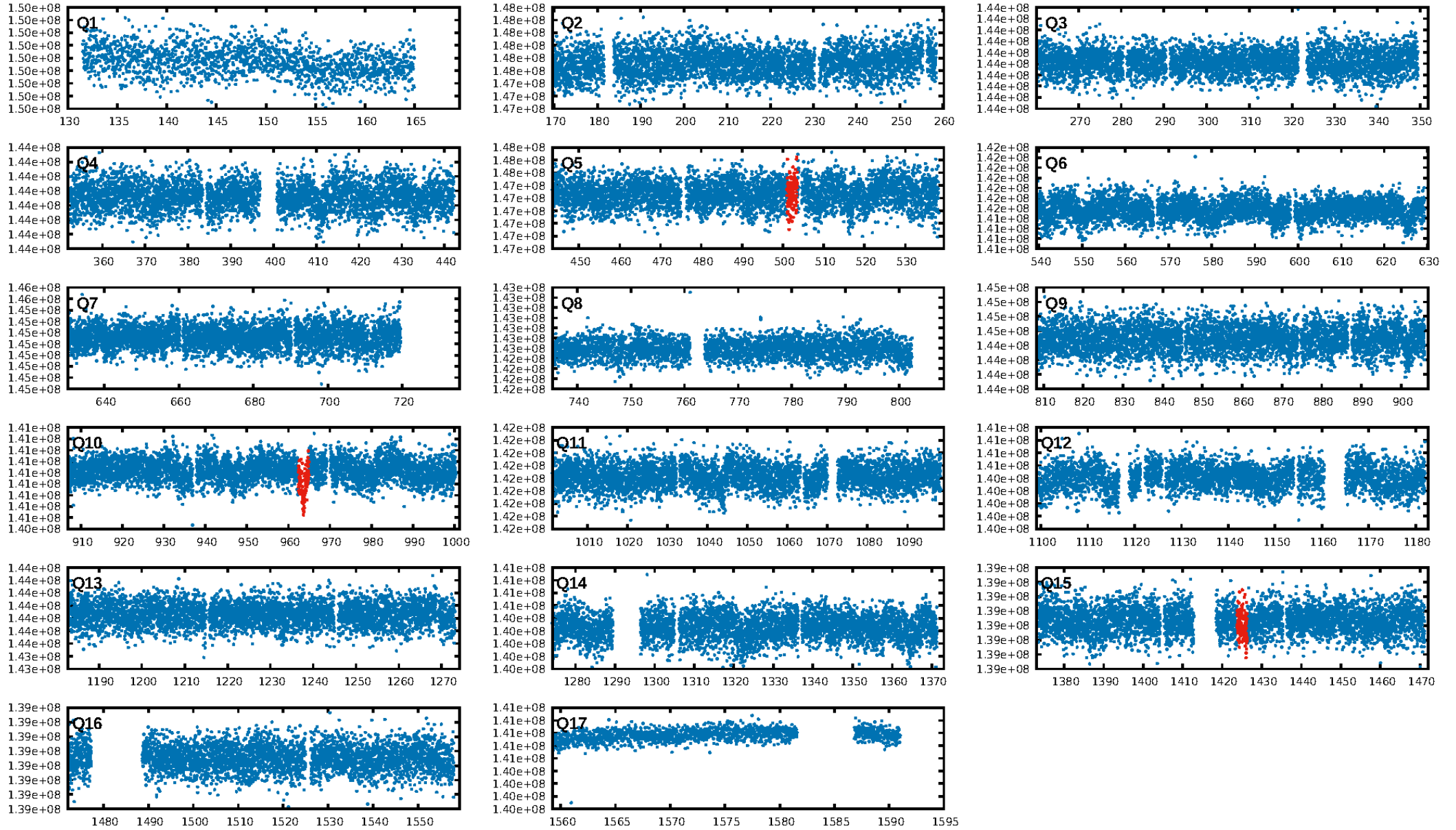
KIC: 8359671 Candidate: 2 of 4 Period: 461.390 d



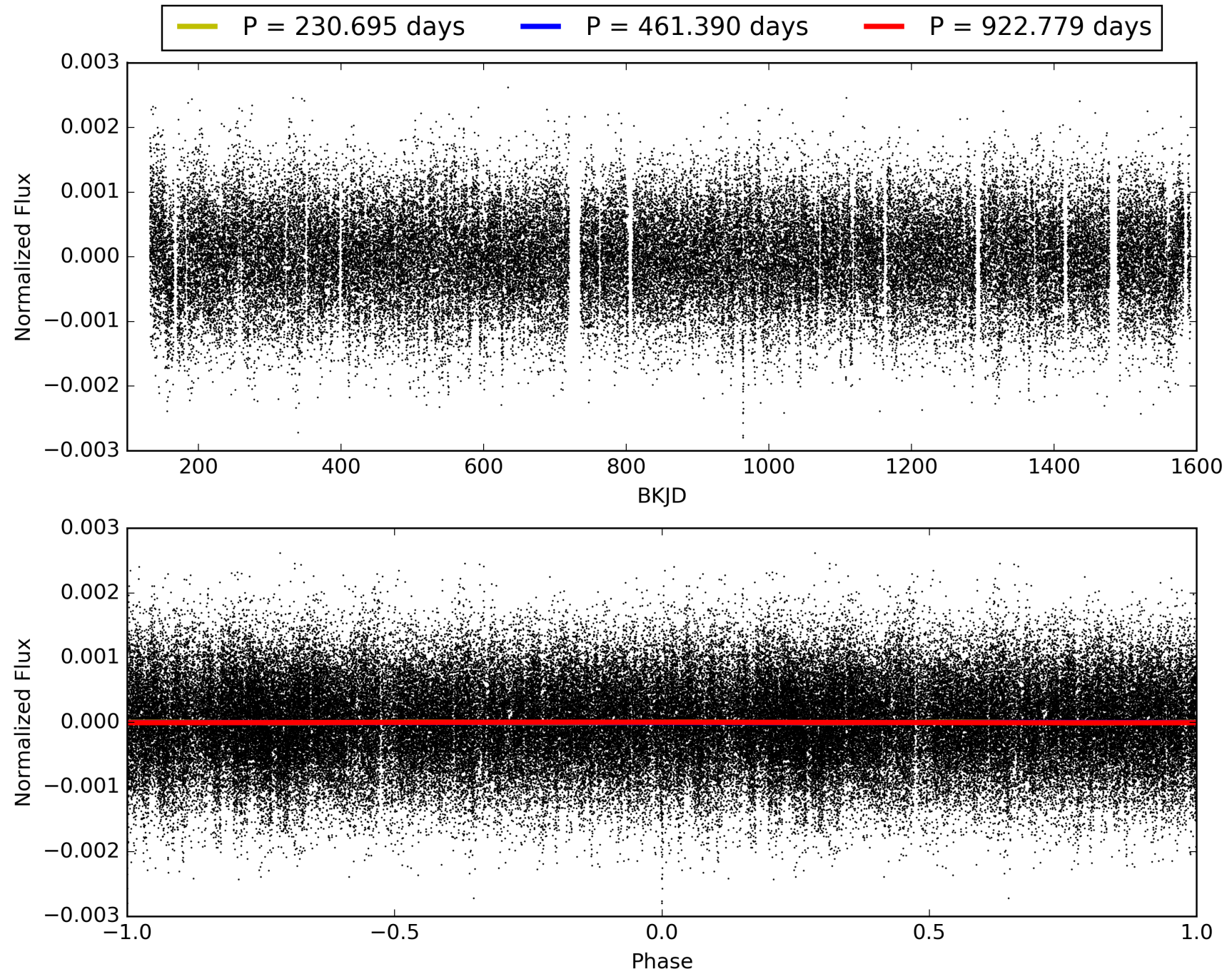
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 09:31:39 Z

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

# TCE 008359671-02, PDC Light Curves

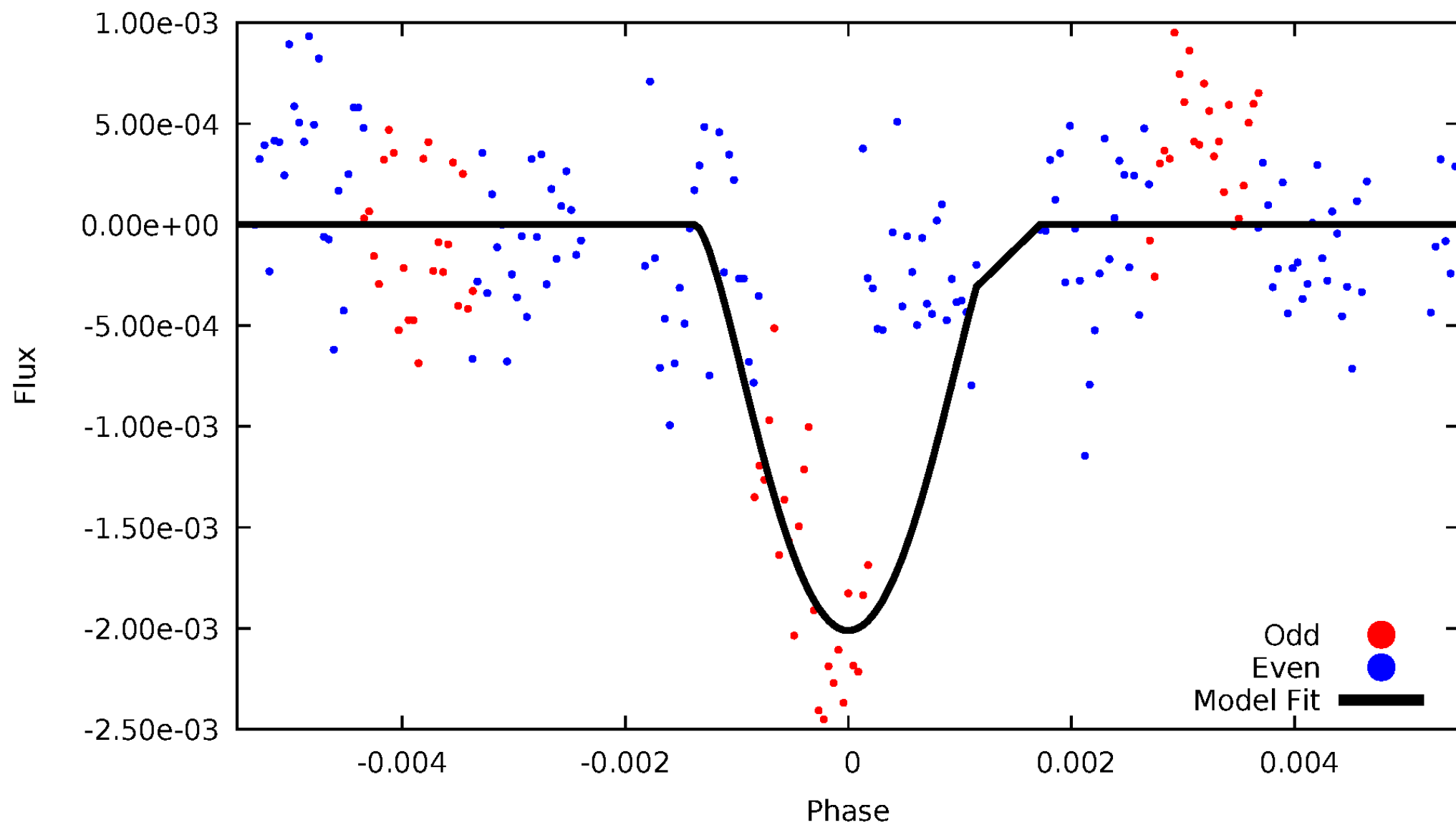


TCE 008359671-02



# DV Odd/Even

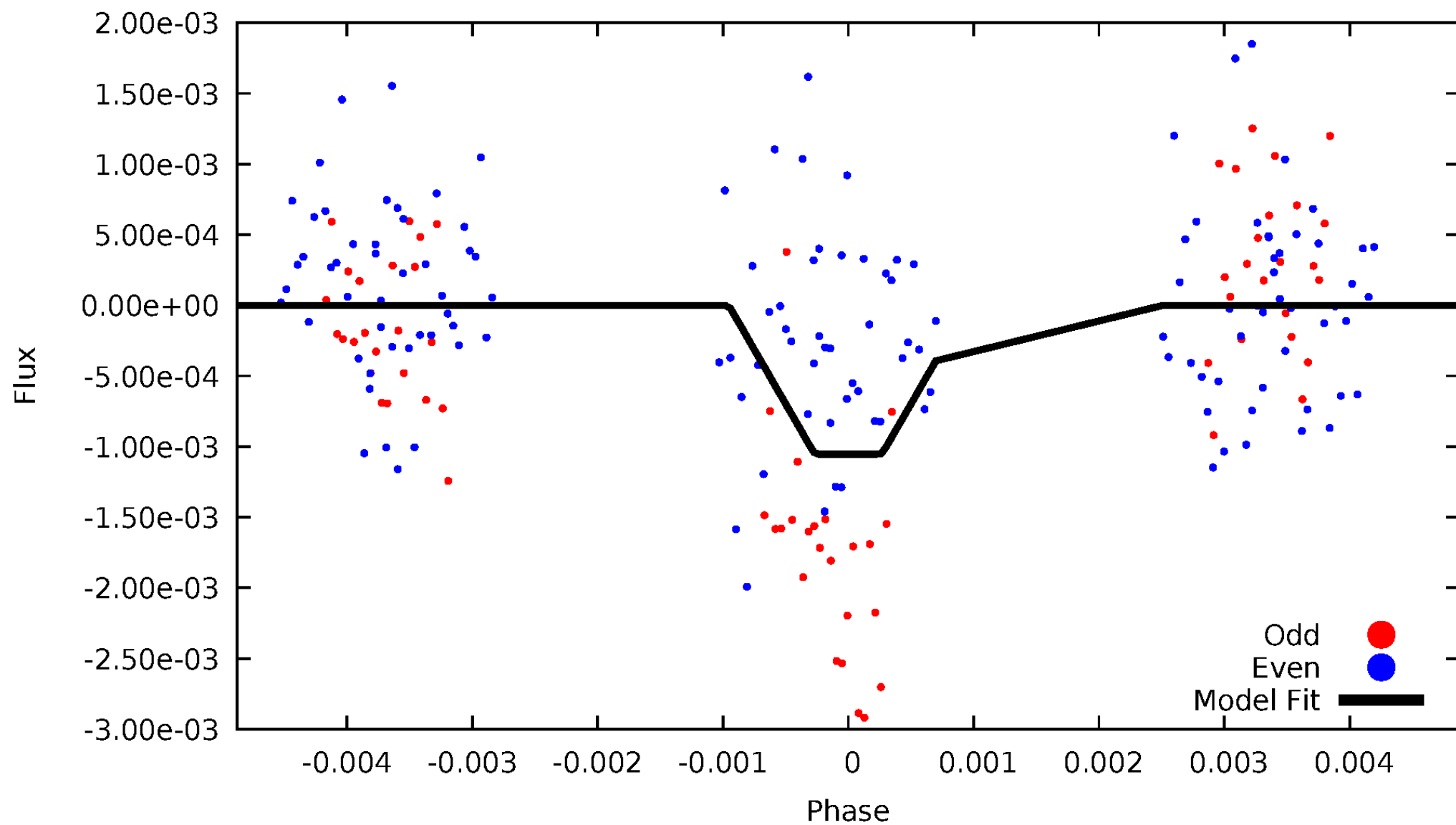
TCE 008359671-02





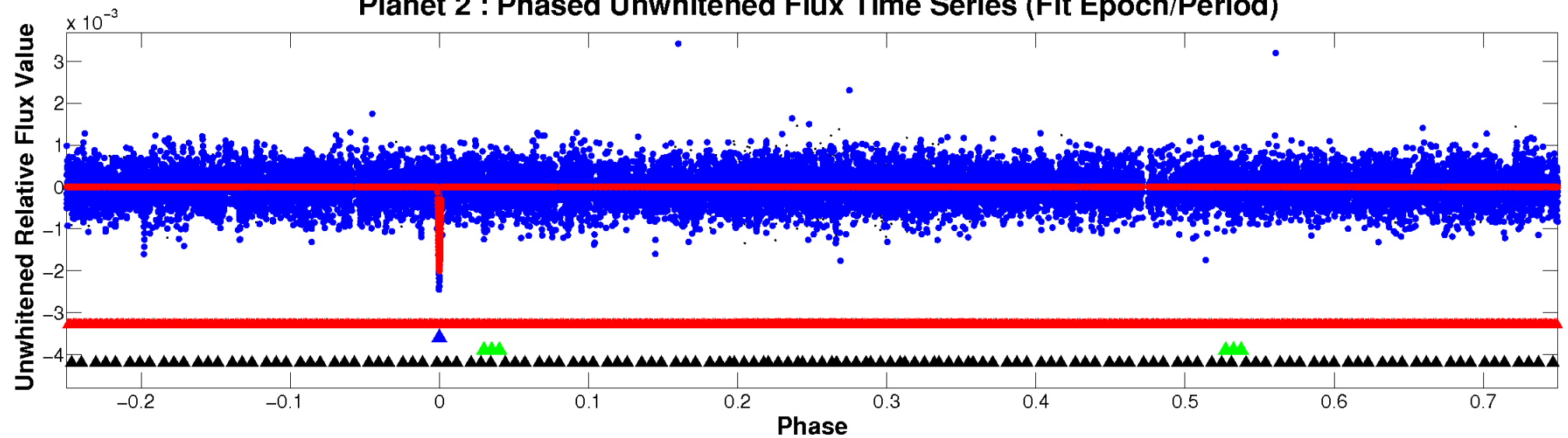
# ALT Odd/Even

TCE 008359671-02

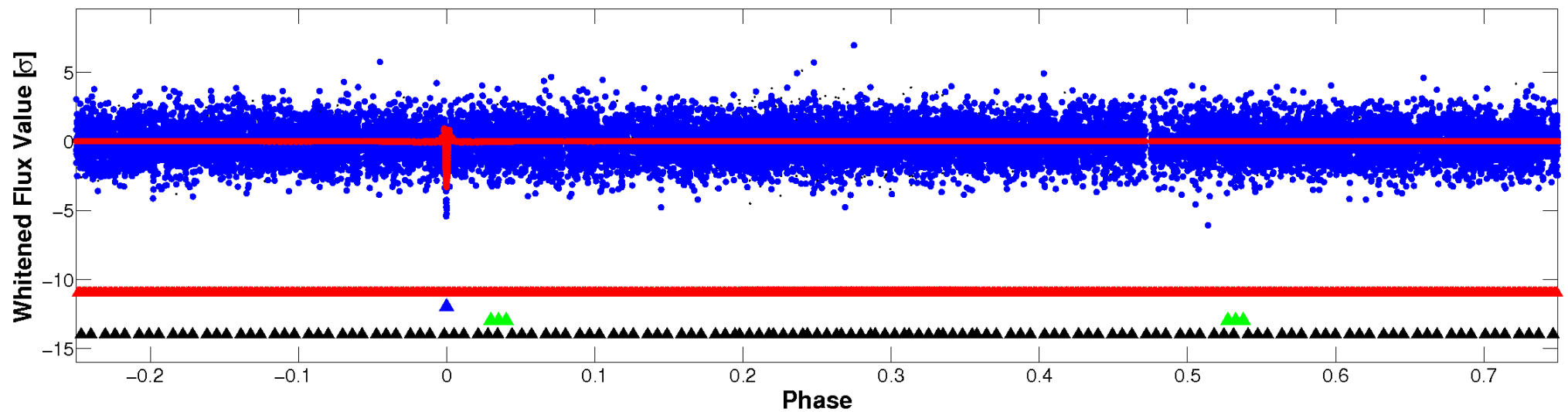


# Non-Whitened Vs. Whitened Light Curve

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

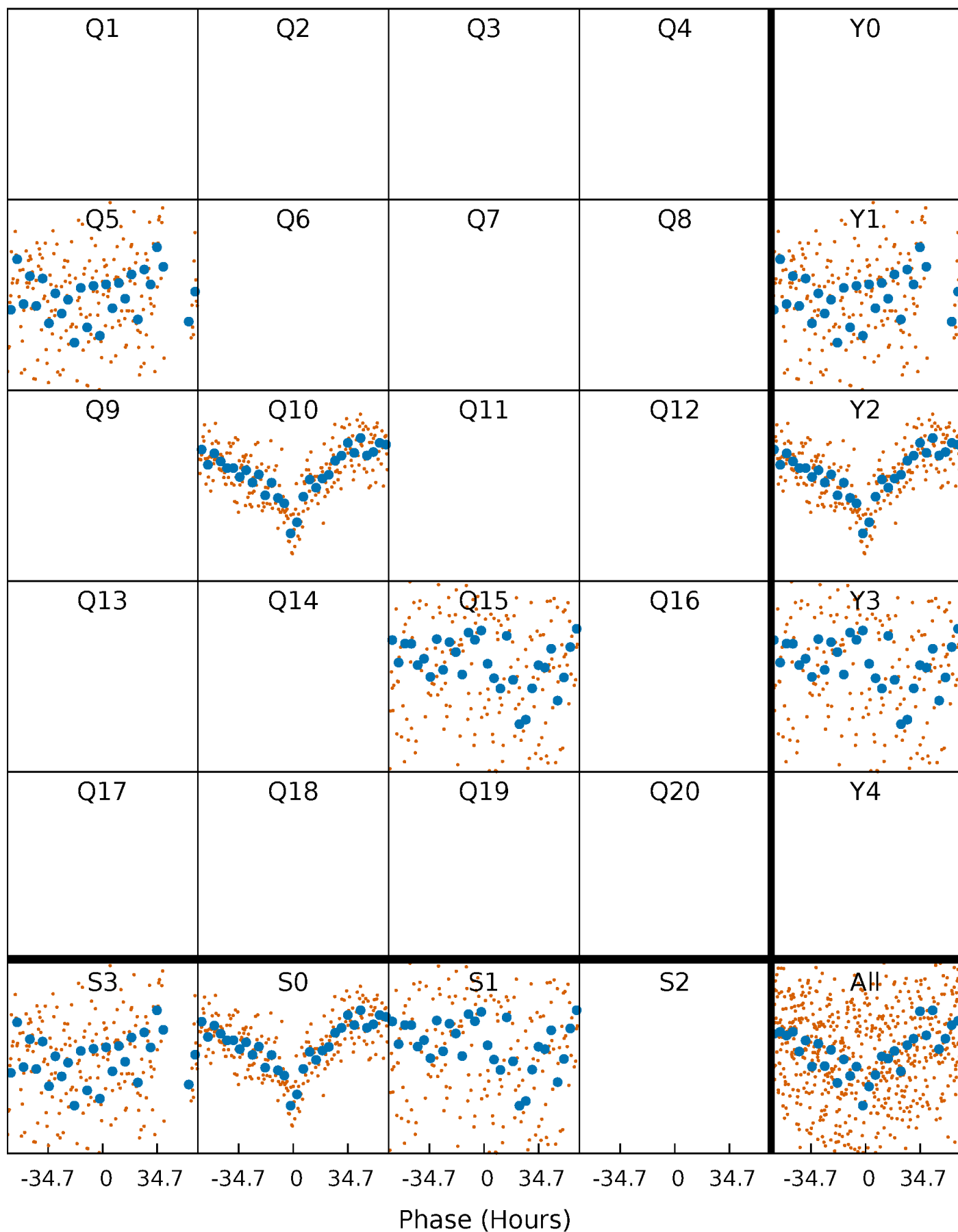


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



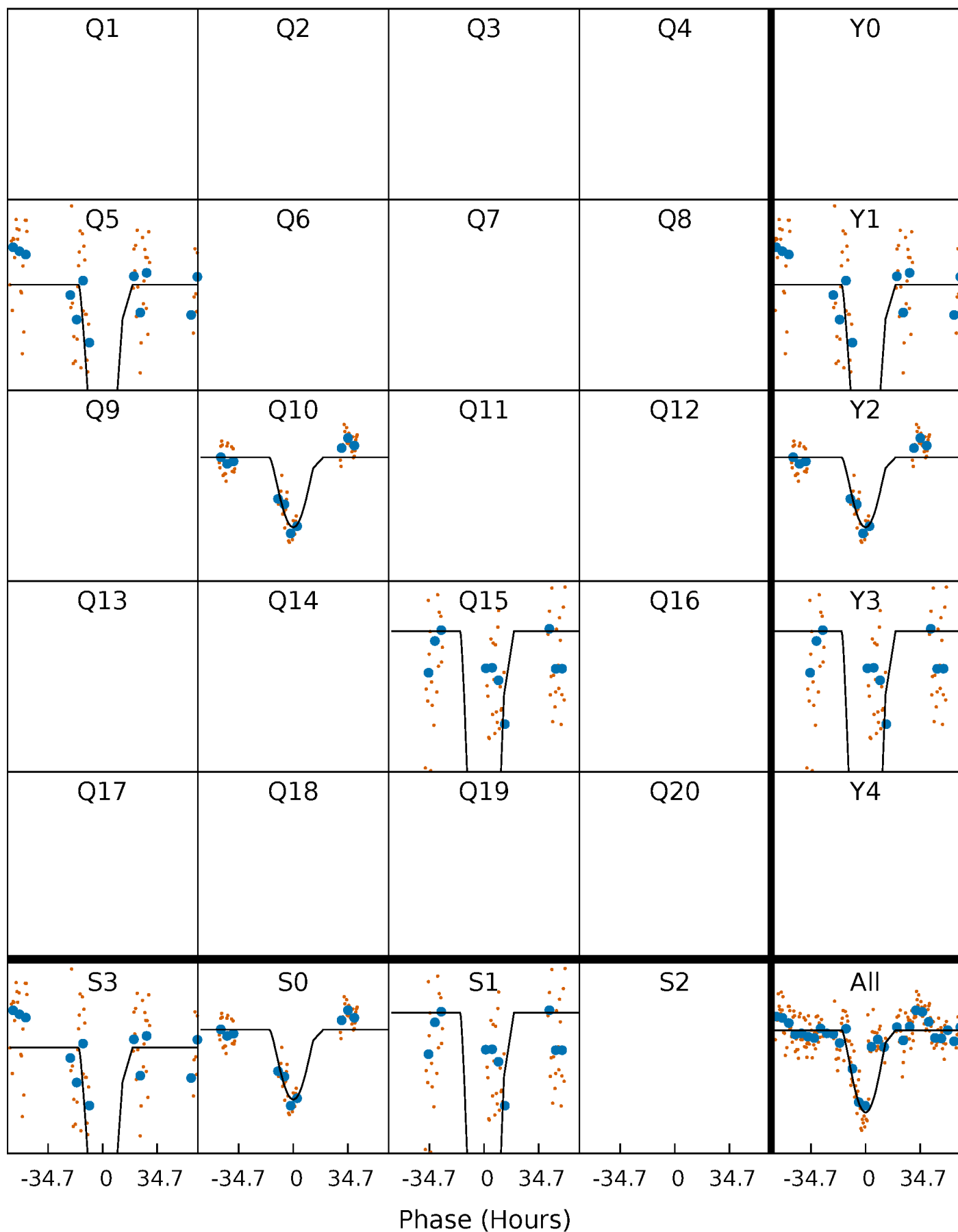
# PDC Quarter-Phased Transit Curves

TCE 008359671-02     $P=461.389569$  Days     $T_0=502.262416$  (BKJD)



# DV Quarter-Phased Transit Curves

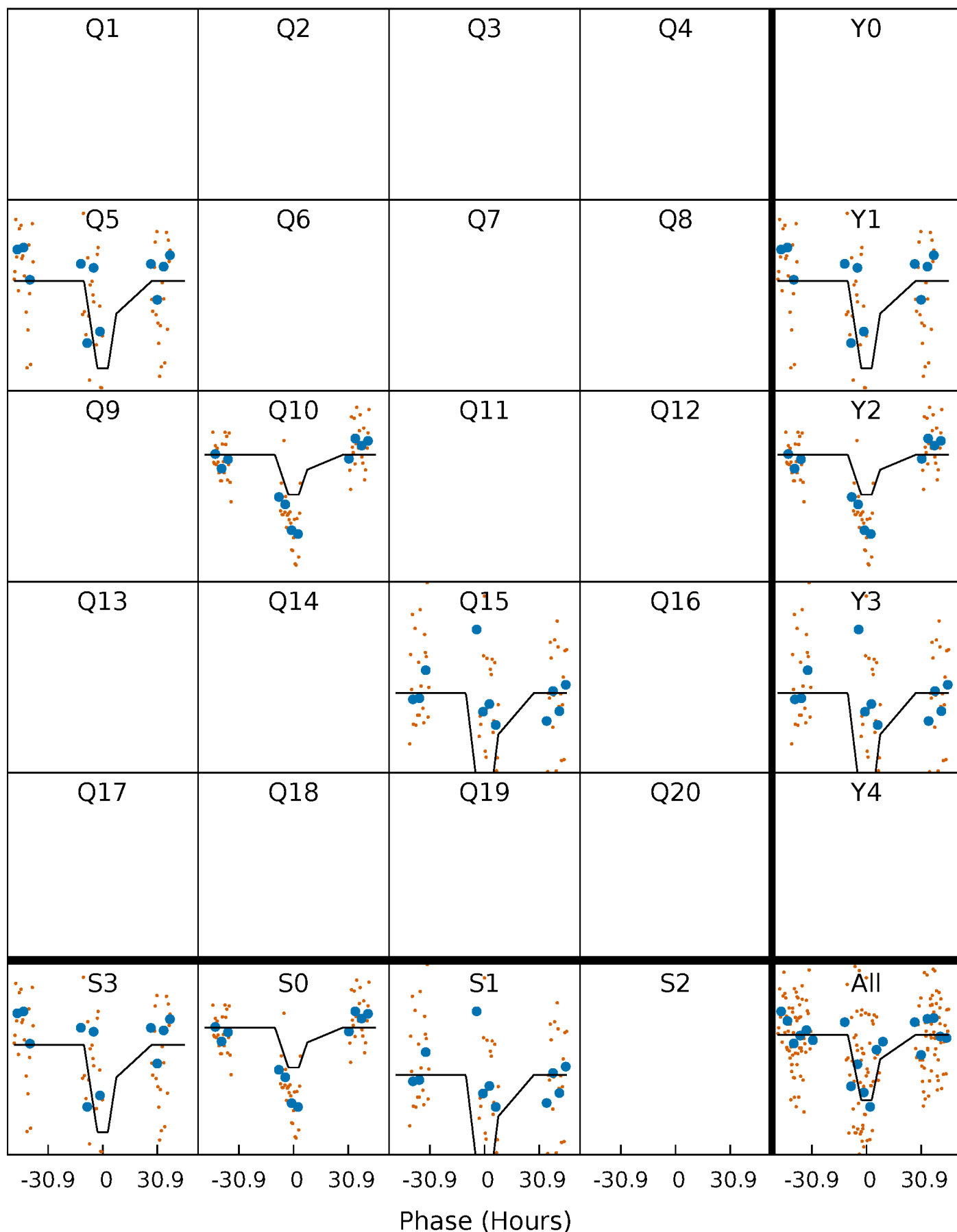
TCE 008359671-02   P=461.389569 Days    $T_0=502.262416$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

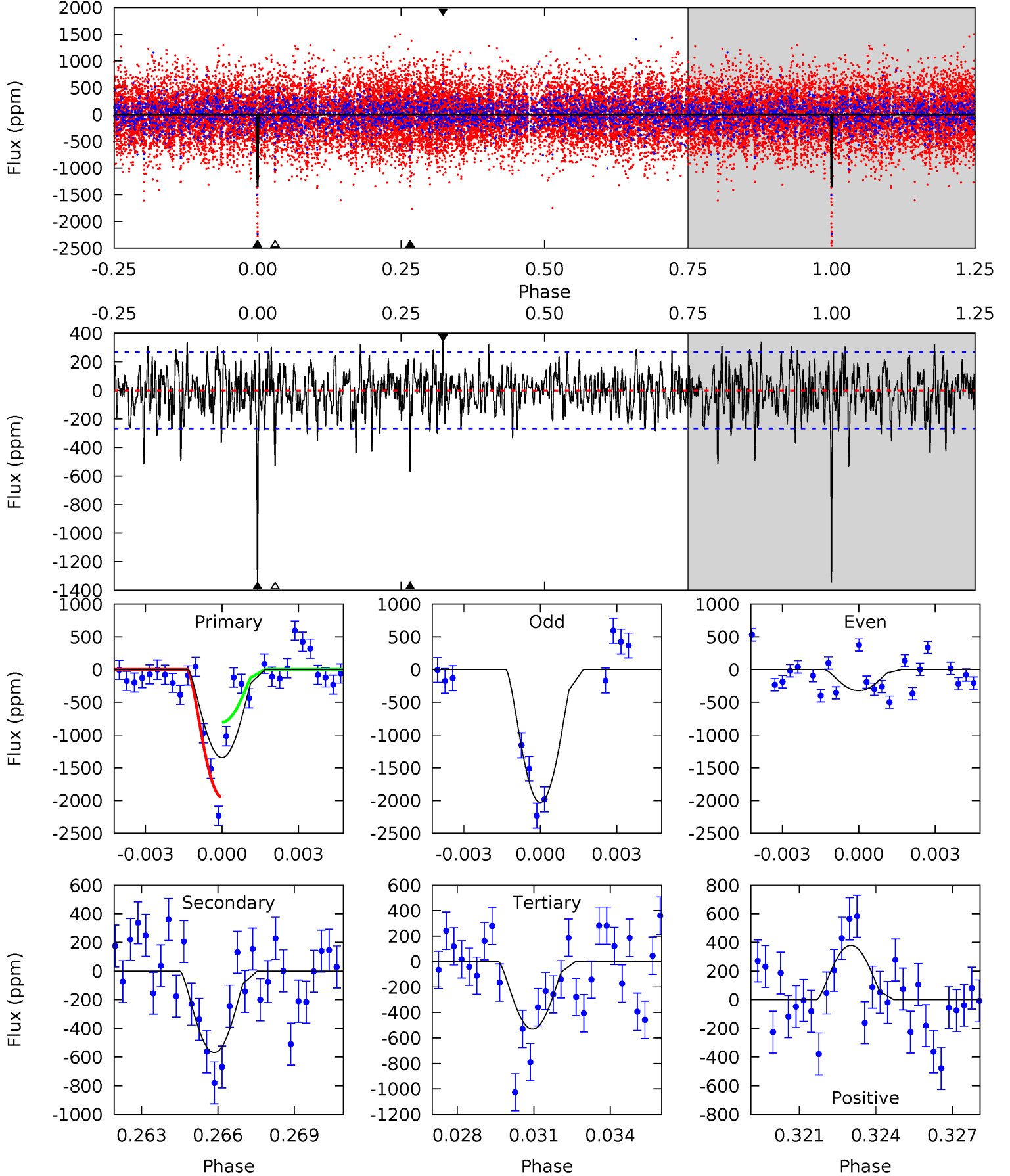
TCE 008359671-02 P=461.675855 Days  $T_0=501.897297$  (BKJD)



# DV Model-Shift Uniqueness Test

008359671-02, P = 461.389569 Days, E = 40.872847 Days

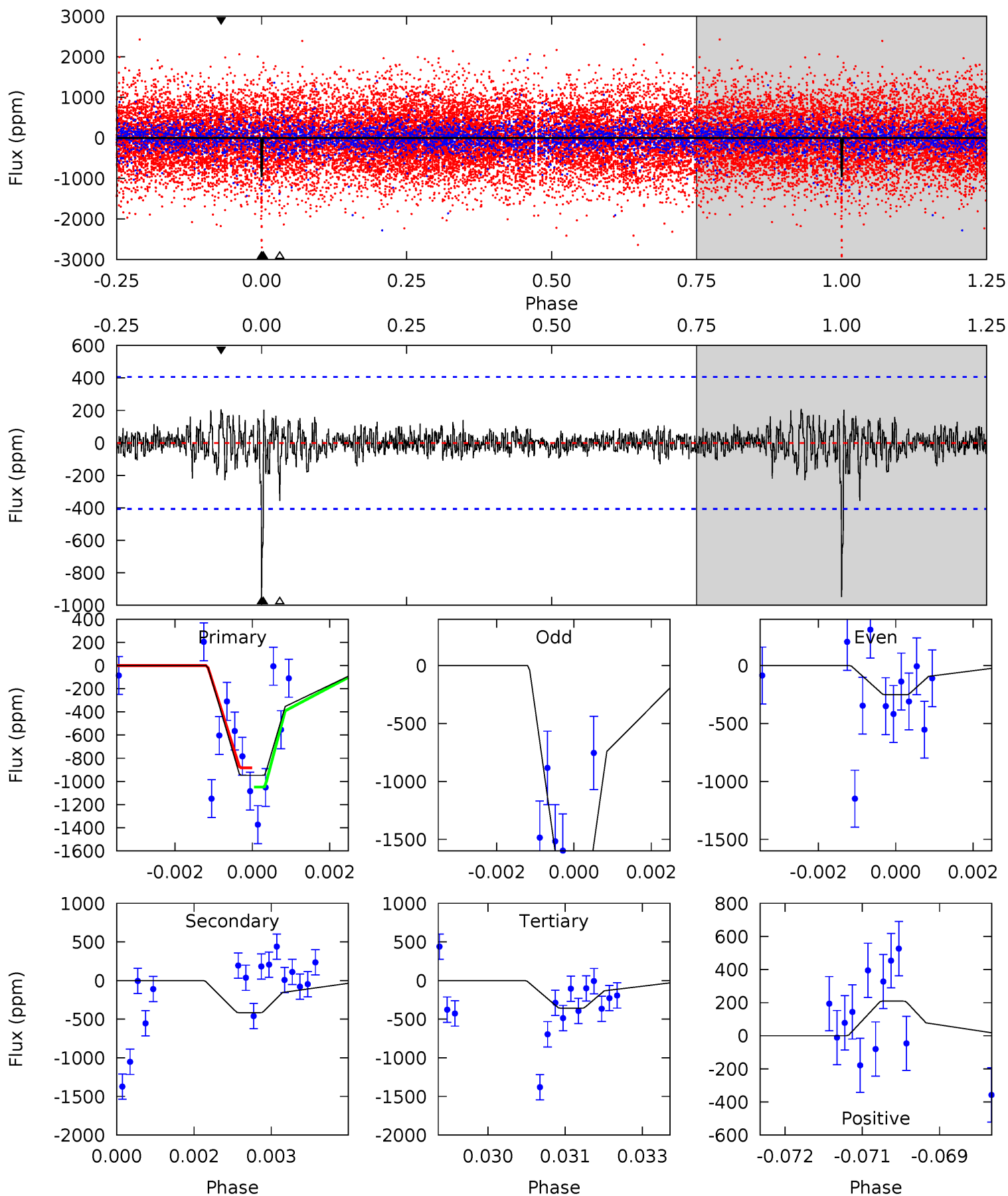
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
26.3	11.2	10.4	7.43	5.25	2.96	2.43	15.9	18.9	0.75	3.72	16.6	1.31	0.22	11.2



# Alt Model-Shift Uniqueness Test

008359671-02, P = 461.675855 Days, E = 40.221442 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
12.5	5.48	4.71	2.75	5.36	3.15	0.74	7.79	9.74	0.77	2.73	11.1	1.84	0.18	1.04



### Stellar Parameters For KIC 008359671

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$8691^{+239}_{-410}$	$4.072^{+0.171}_{-0.140}$	$0.070^{+0.250}_{-0.600}$	$2.193^{+0.482}_{-0.590}$	$2.069^{+0.341}_{-0.512}$	$0.276^{+0.258}_{-0.115}$
	+3%/-5%	+4%/-3%	+357%/-857%	+22%/-27%	+16%/-25%	+93%/-42%
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 008359671-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-569 \pm 51$	$32.61^{+31.27}_{-21.36}$	$646^{+44}_{-46}$	$3783^{+2146}_{-684}$	$638^{+4726}_{-460}$
Alt.	$-415 \pm 76$	$26.77^{+28.03}_{-17.69}$	$644^{+44}_{-45}$	$3822^{+2125}_{-740}$	$668^{+5508}_{-503}$

$T_{max}$  = 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  $A_{obs} \gg 1.0$



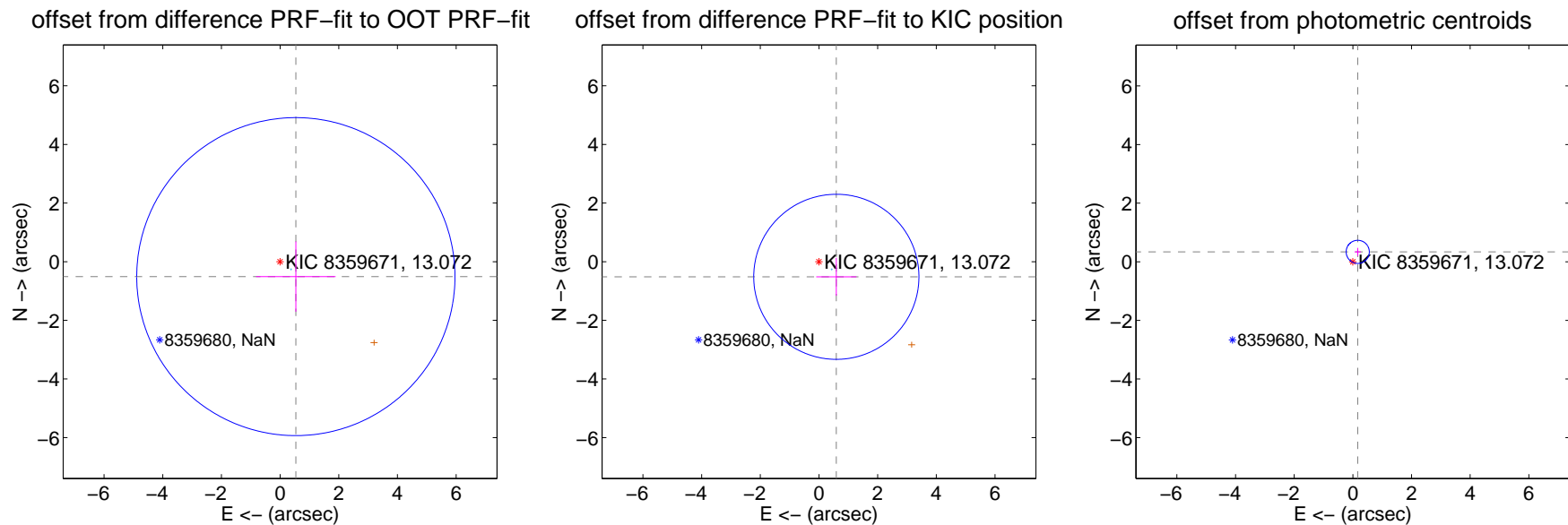
## DV Centroid Data

Supplemental centroid analysis for 008359671-02. Kepler magnitude: 13.07. Transit SNR 16.26

There are 1 quarters with good PRF difference image offsets

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

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.739 \pm 1.808$	0.41	$-0.537 \pm 1.356$	$-0.509 \pm 1.199$
PRF-fit source offset from KIC position	$0.784 \pm 0.938$	0.84	$-0.591 \pm 0.685$	$-0.516 \pm 0.646$
photometric centroid source offset	$0.38 \pm 0.13$	2.86	$-0.17 \pm 0.11$	$0.34 \pm 0.14$



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- $\sigma$  uncertainty. Blue circle: three- $\sigma$ . 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.

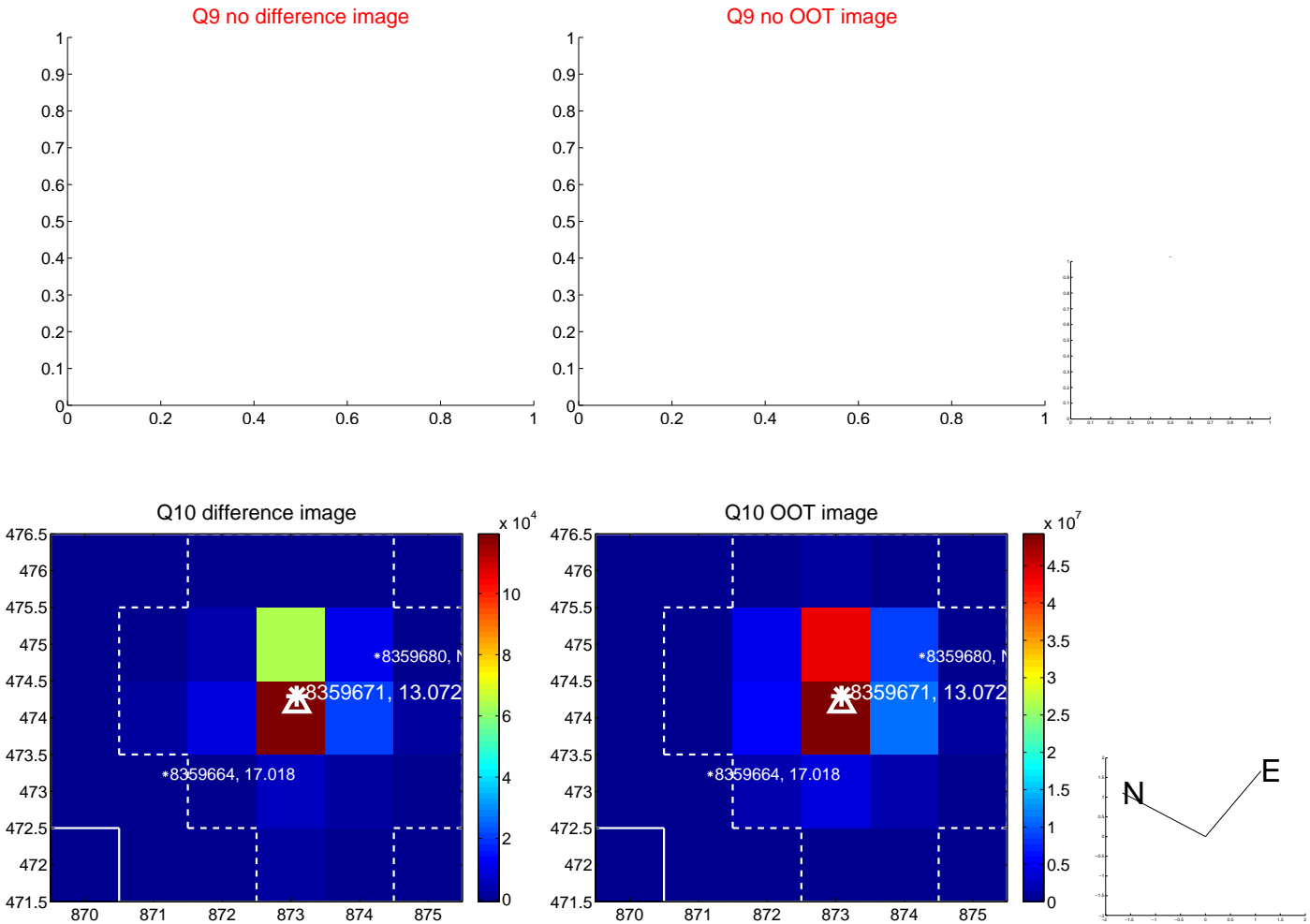
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



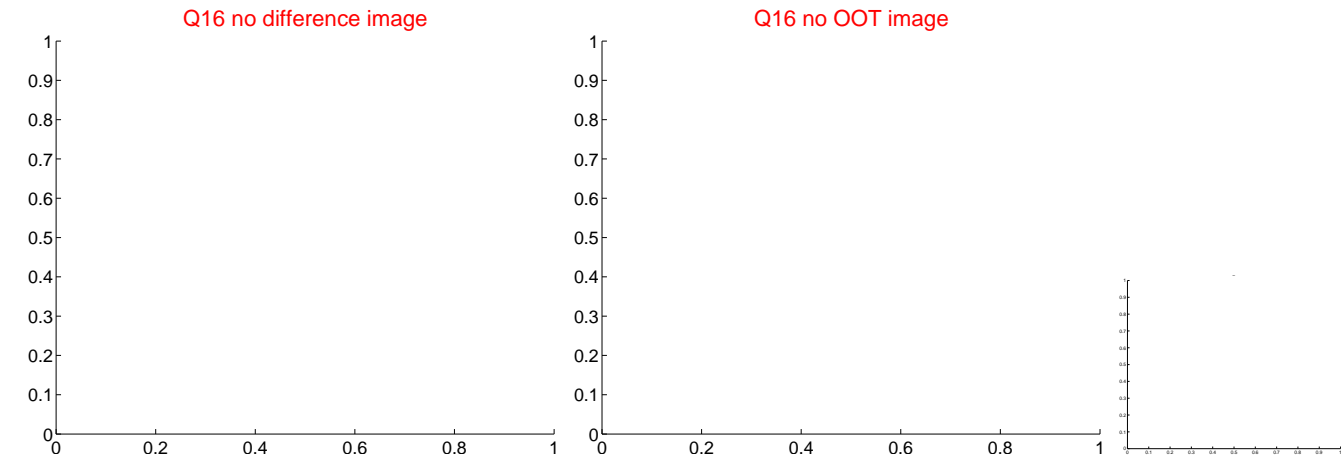
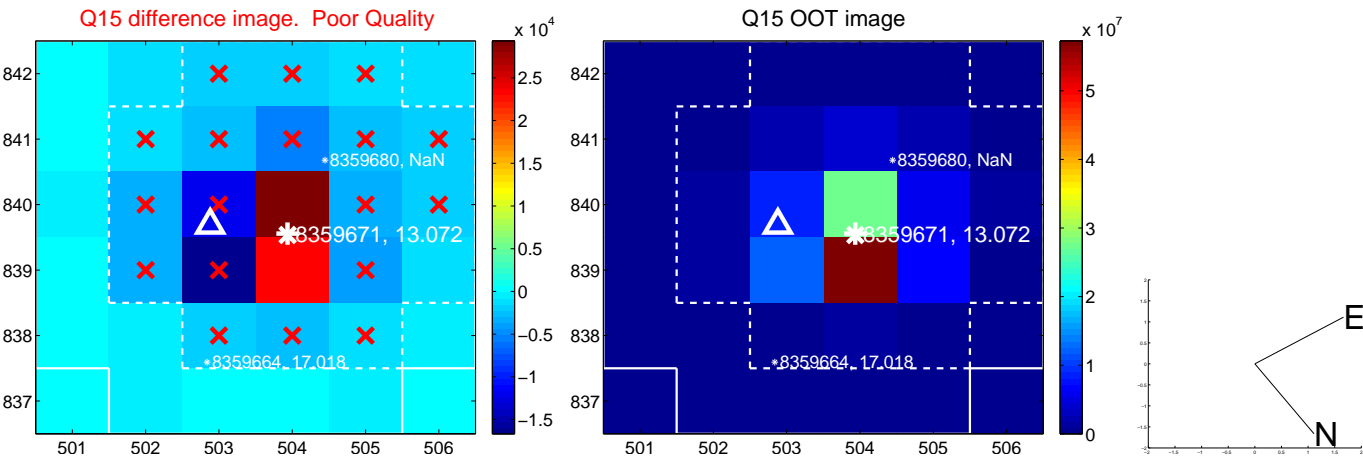
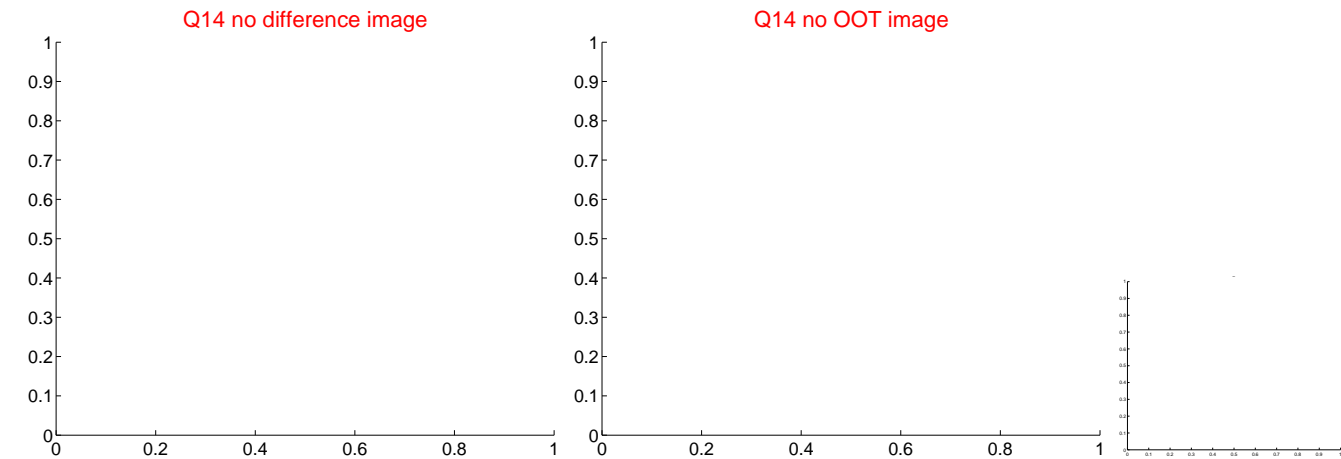
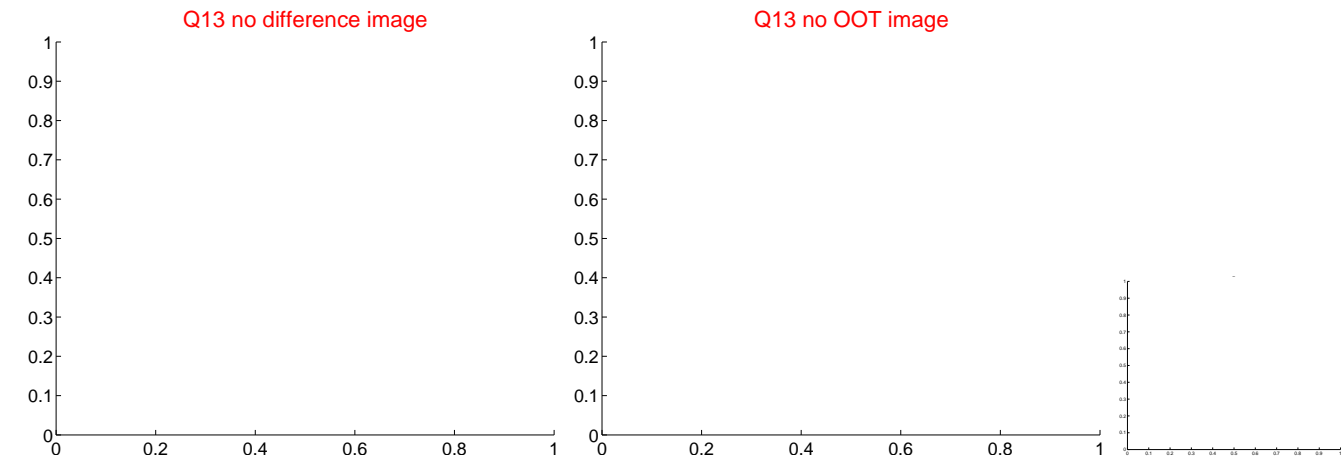
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

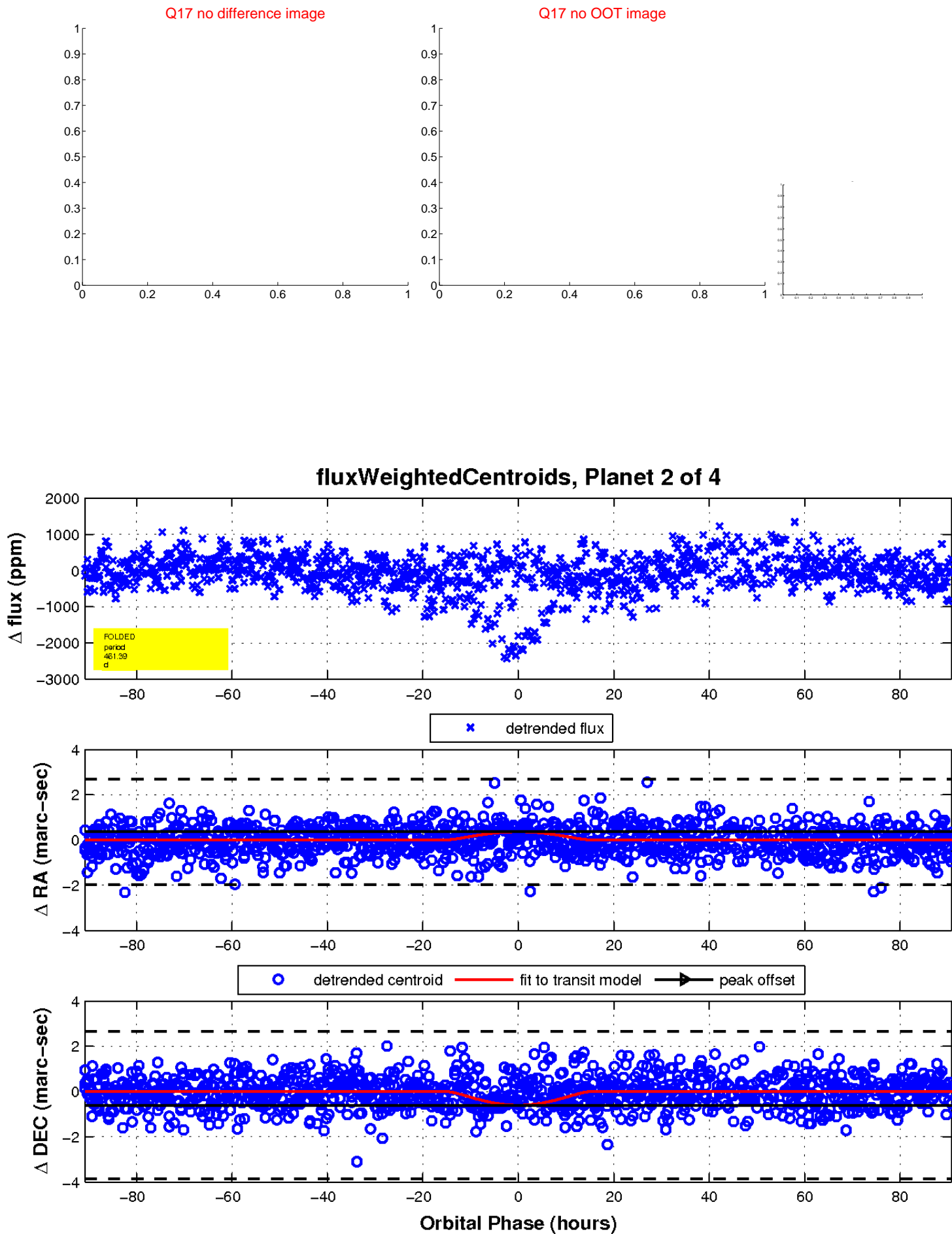


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.





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





# KIC 008359671

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008359671-01	OBS	No	1.620492	132.997014	60.7	8.993	11.8	13.8	2.19	8691	1.74	20749.29
008359671-02	OBS	No	461.389569	502.262416	2011.6	30.322	16.7	16.3	2.19	8691	17.69	11.08
008359671-03	OBS	No	231.889579	284.166106	765.4	3.325	8.5	7.0	2.19	8691	8.55	27.72
008359671-04	OBS	No	10.555192	132.106334	268.7	1.447	7.8	7.7	2.19	8691	4.13	1705.73

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008359671-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT
008359671-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL_SKYE—LPP_DV—LPP_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
008359671-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL_TRACKER—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS
008359671-04	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT

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

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

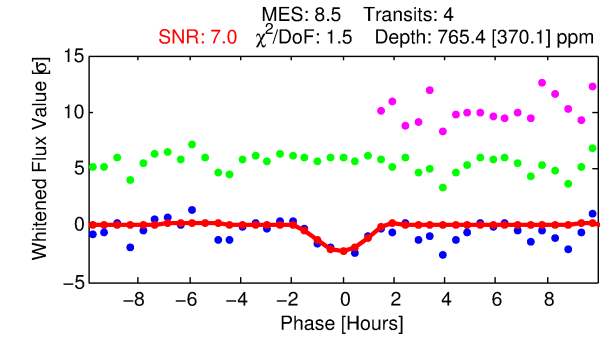
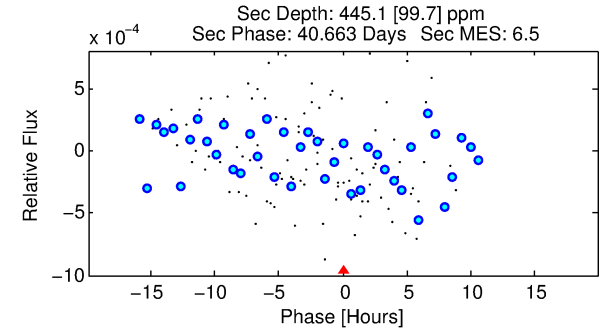
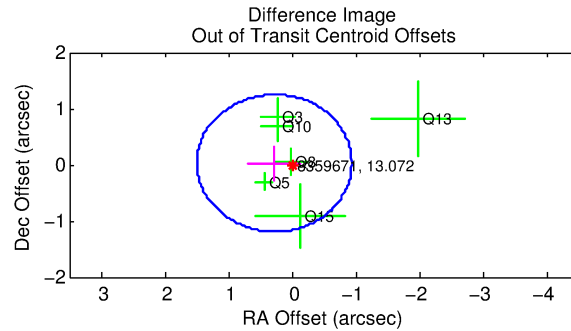
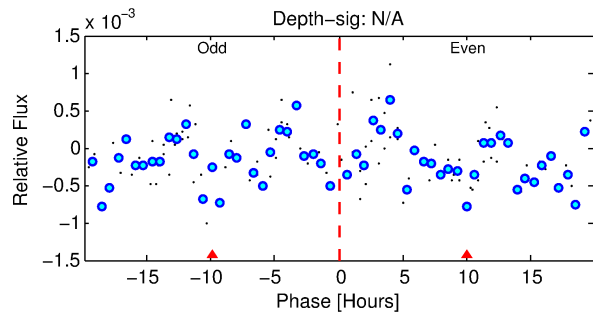
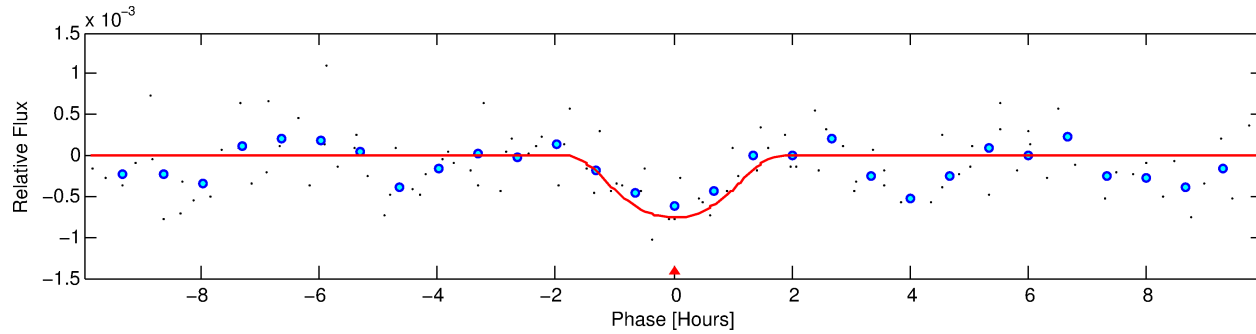
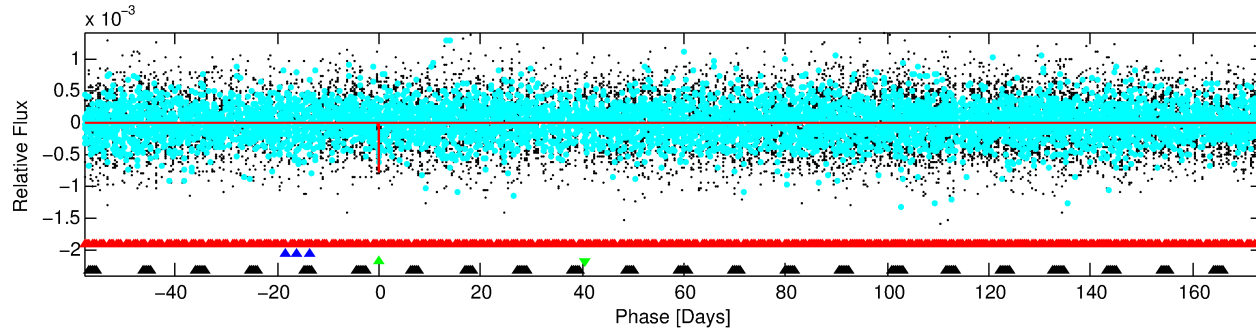
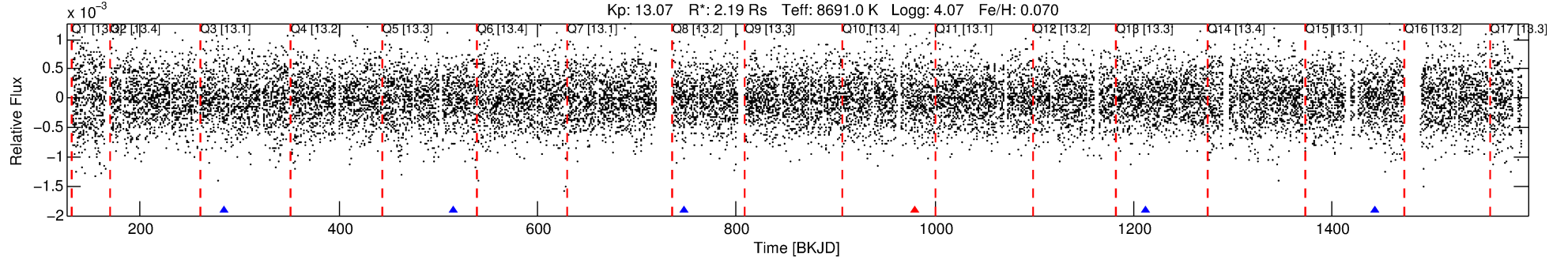
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 008359671-03

No Significant Match Found

# DV One-Page Summary

KIC: 8359671 Candidate: 3 of 4 Period: 231.890 d



## DV Fit Results:

Period = 231.88958 [0.00862] d  
Epoch = 284.1661 [0.0206] BKJD  
Rp/R\* = 0.0357 [0.0725]  
a/R\* = 178.12 [181.27]  
b = 0.98 [0.16]  
Seff = 27.72 [10.25]  
Teq = 585 [54] K  
Rp = 8.55 [17.51] Re  
a = 0.9417 [0.2093] AU  
Ag = 2970.68 [12119.05] [0.25σ]  
Teffp = 6679 [6798] K [0.90σ]

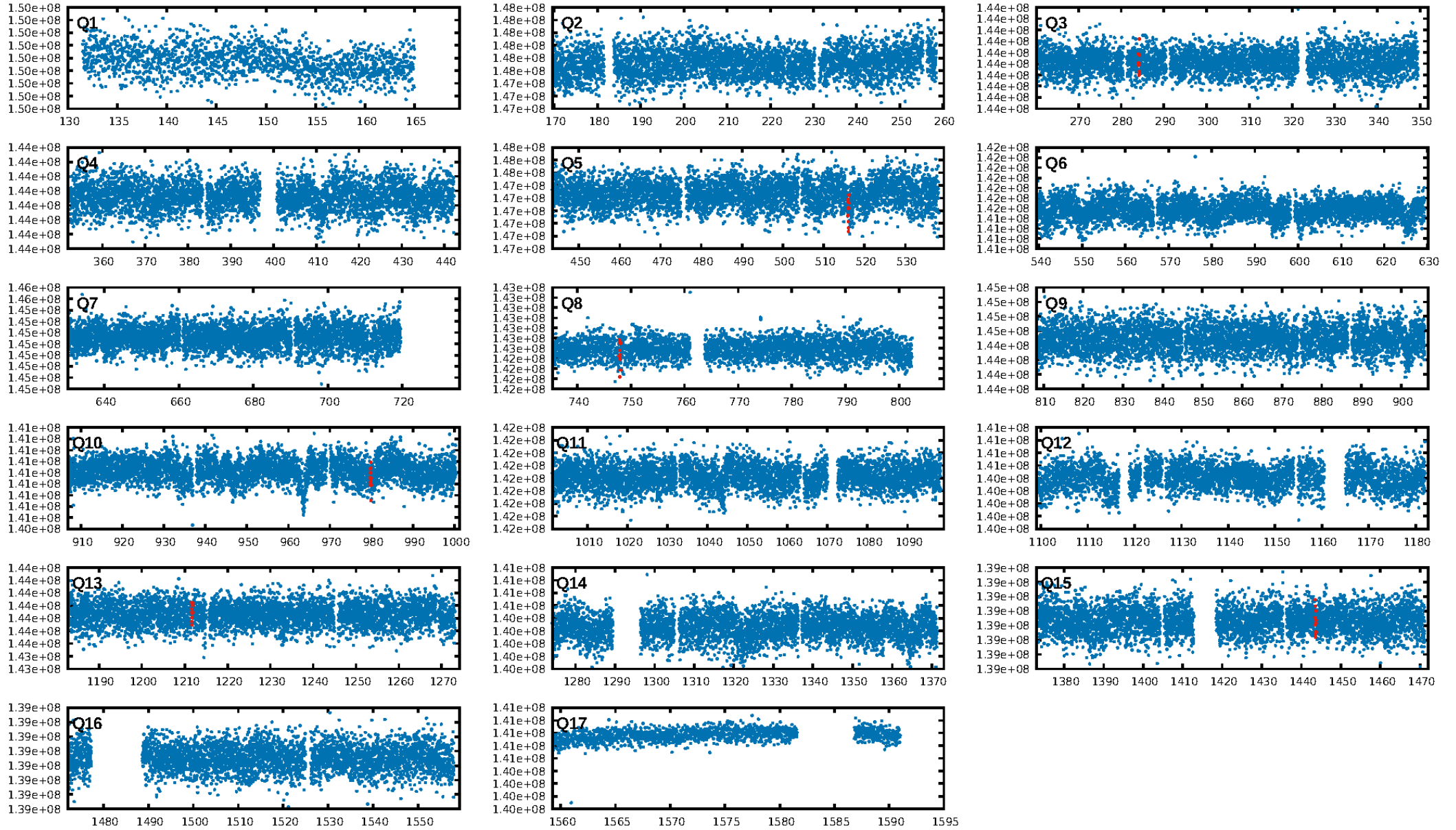
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [1464.75σ]  
LongPeriod-sig: 100.0% [180.57σ]  
ModelChiSquare2-sig: 15.0%  
ModelChiSquareGof-sig: 92.0%  
**Bootstrap-pfa: 8.76e-12**  
**RollingBand-fgt: 0.75 [3/4]**  
GhostDiagnostic-chr: -2.267  
Centroid-sig: 14.9%  
Centroid-so: 0.539 arcsec [0.98σ]  
OotOffset-rm: 0.277 arcsec [0.68σ]  
OotOffset-st: 1/2/1/2 [6]  
KicOffset-rm: 0.296 arcsec [0.96σ]  
KicOffset-st: 1/2/1/2 [6]  
DiffImageQuality-fgm: 1.00 [6/6]  
DiffImageOverlap-fno: 0.50 [3/6]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 09:31:44 Z

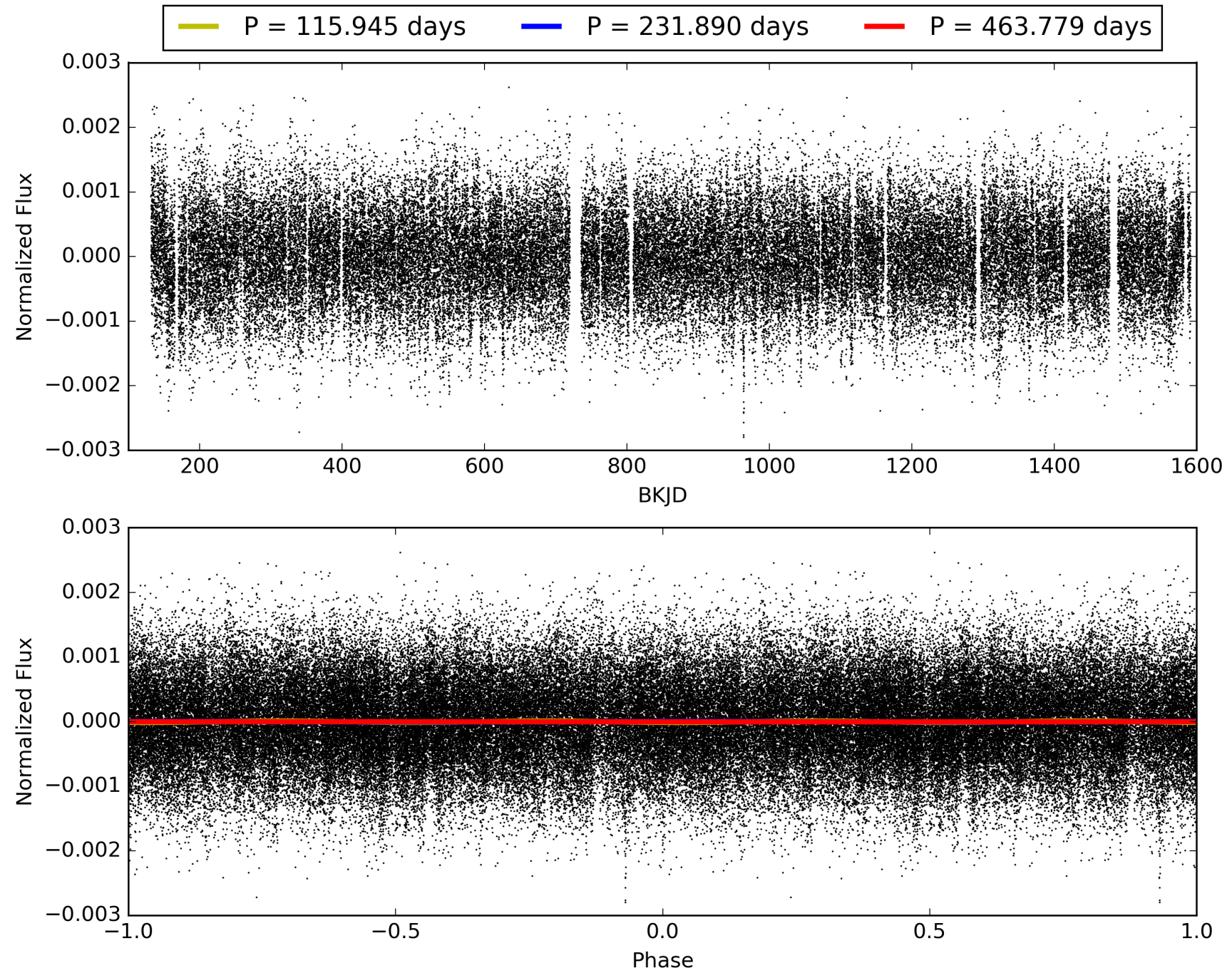
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 008359671-03, PDC Light Curves





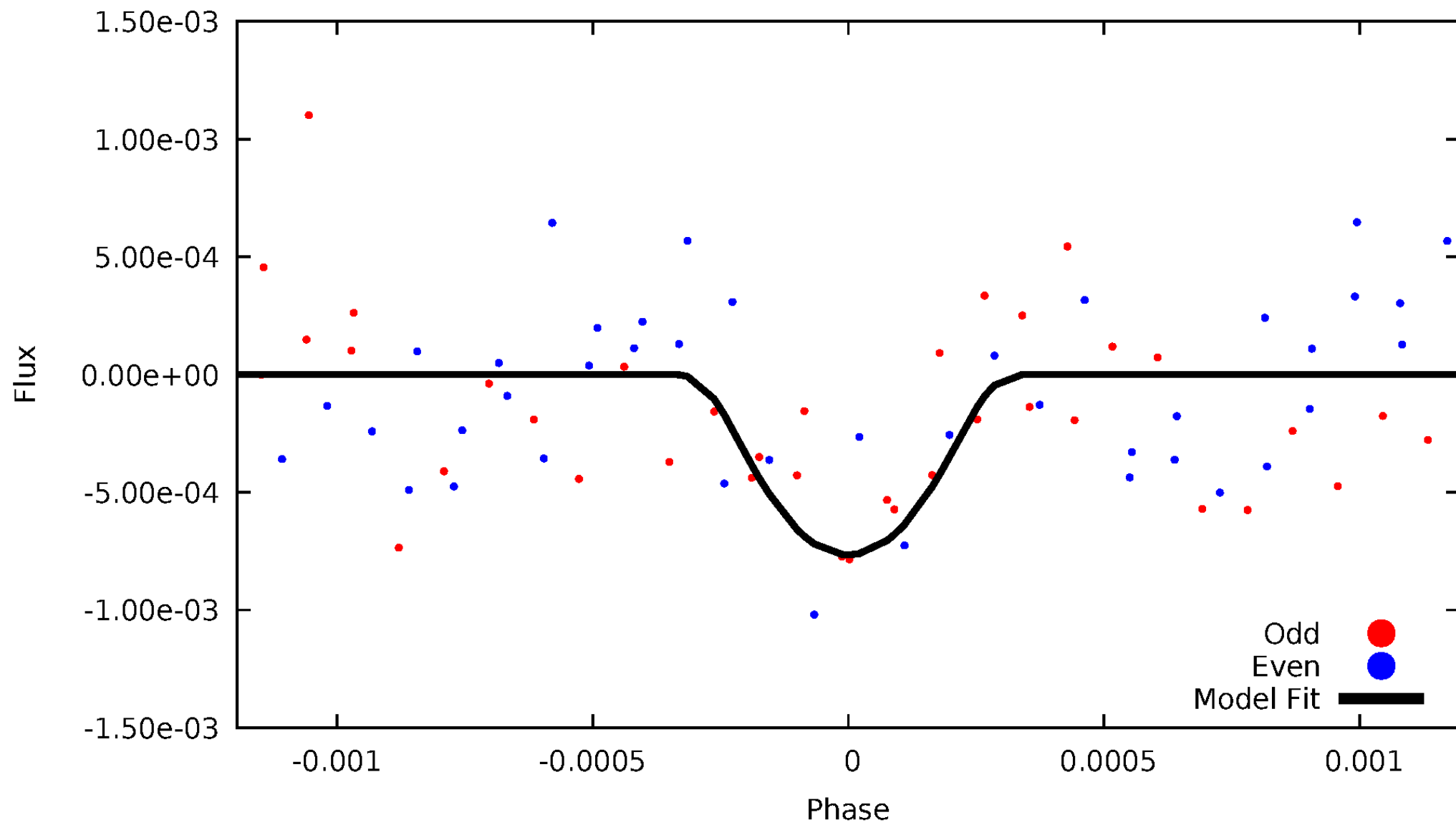
TCE 008359671-03





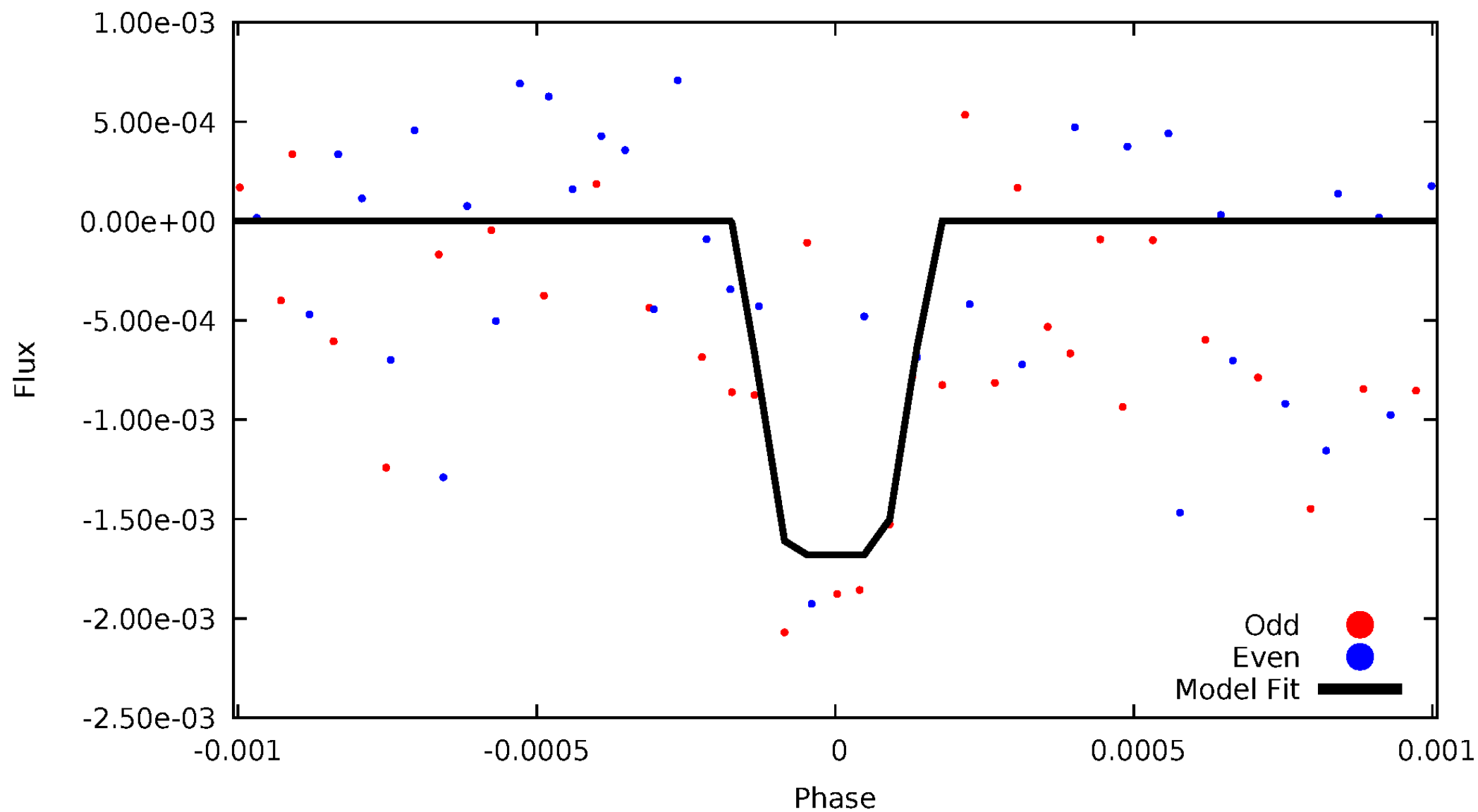
# DV Odd/Even

TCE 008359671-03



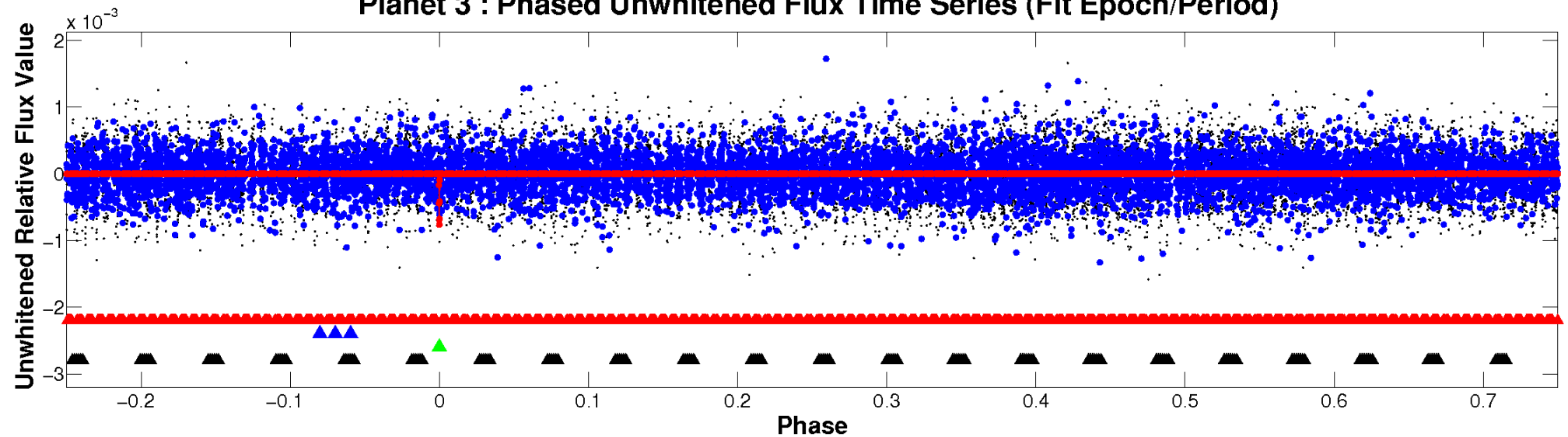
# ALT Odd/Even

TCE 008359671-03

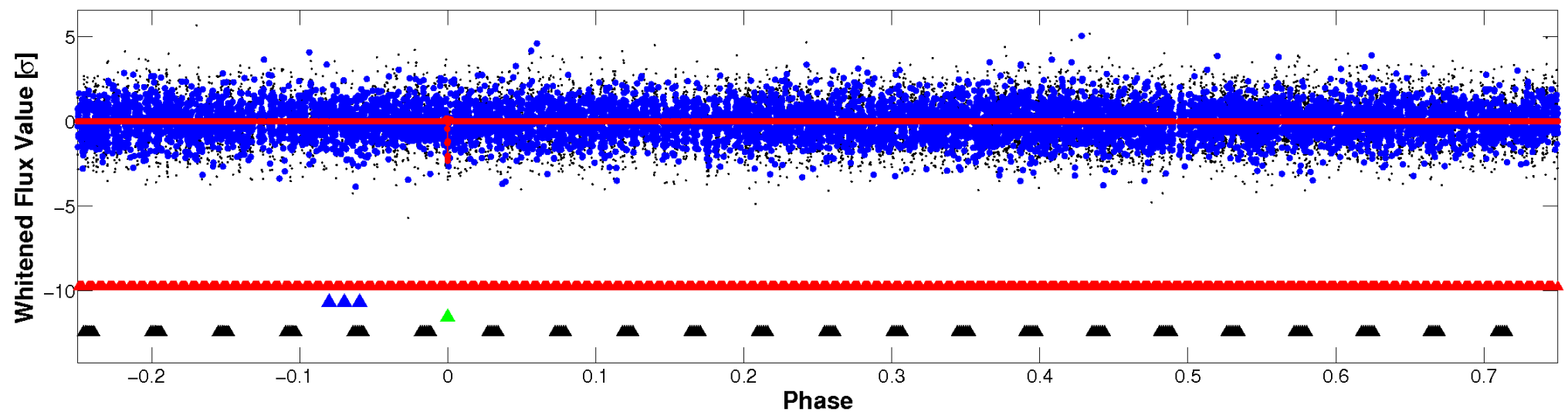


# Non-Whitened Vs. Whitened Light Curve

Planet 3 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

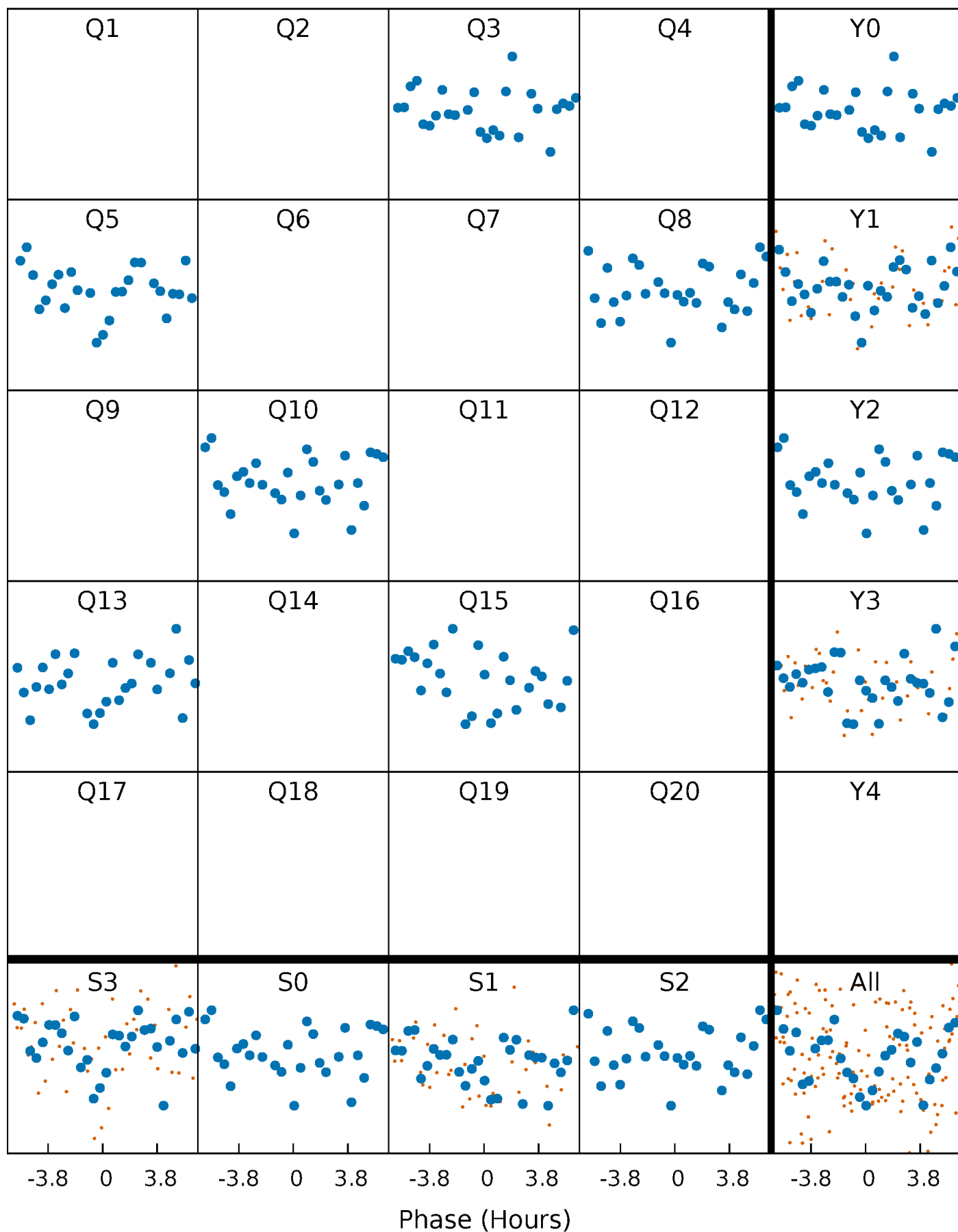


Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



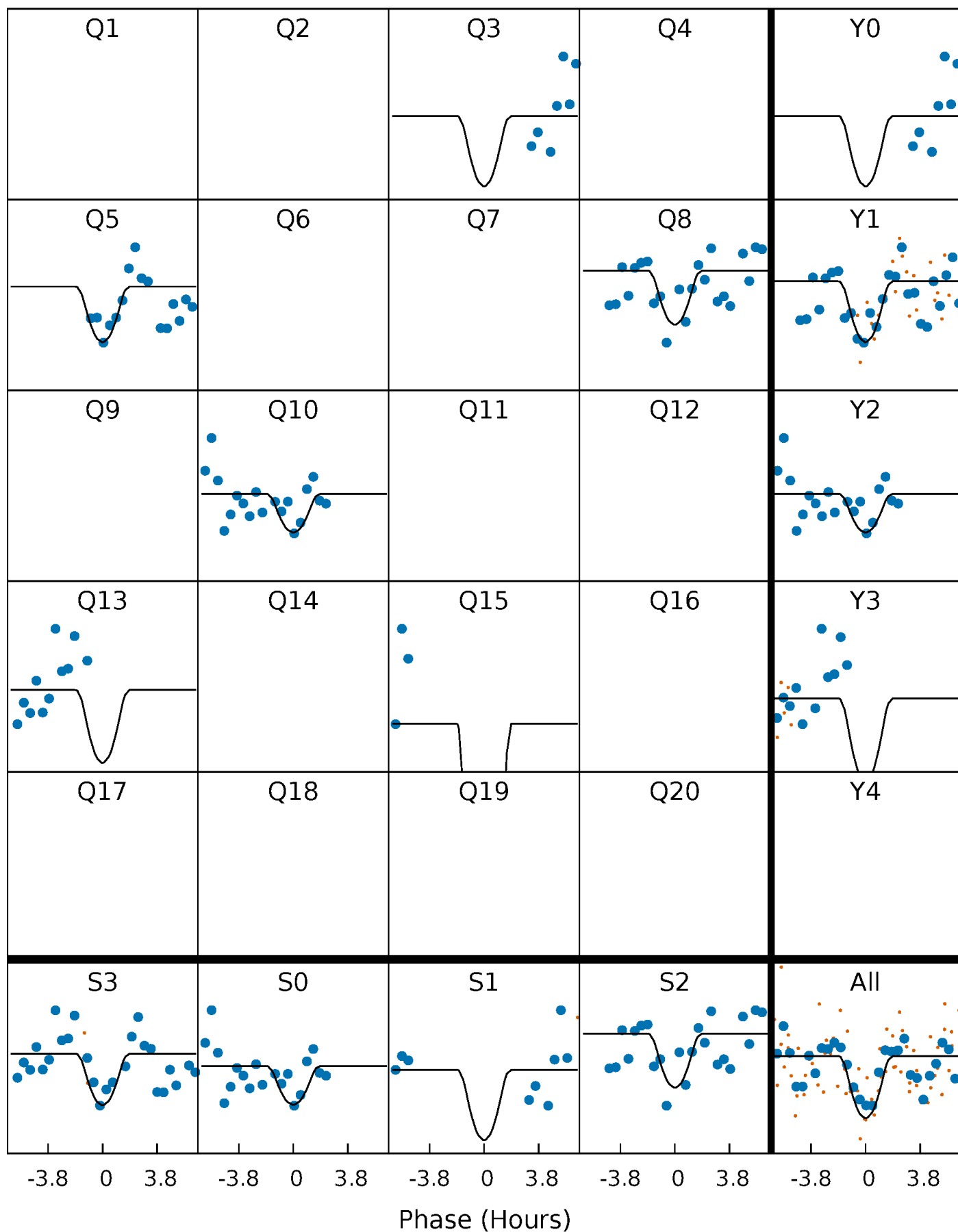
# PDC Quarter-Phased Transit Curves

TCE 008359671-03     $P=231.889579$  Days     $T_0=284.166106$  (BKJD)



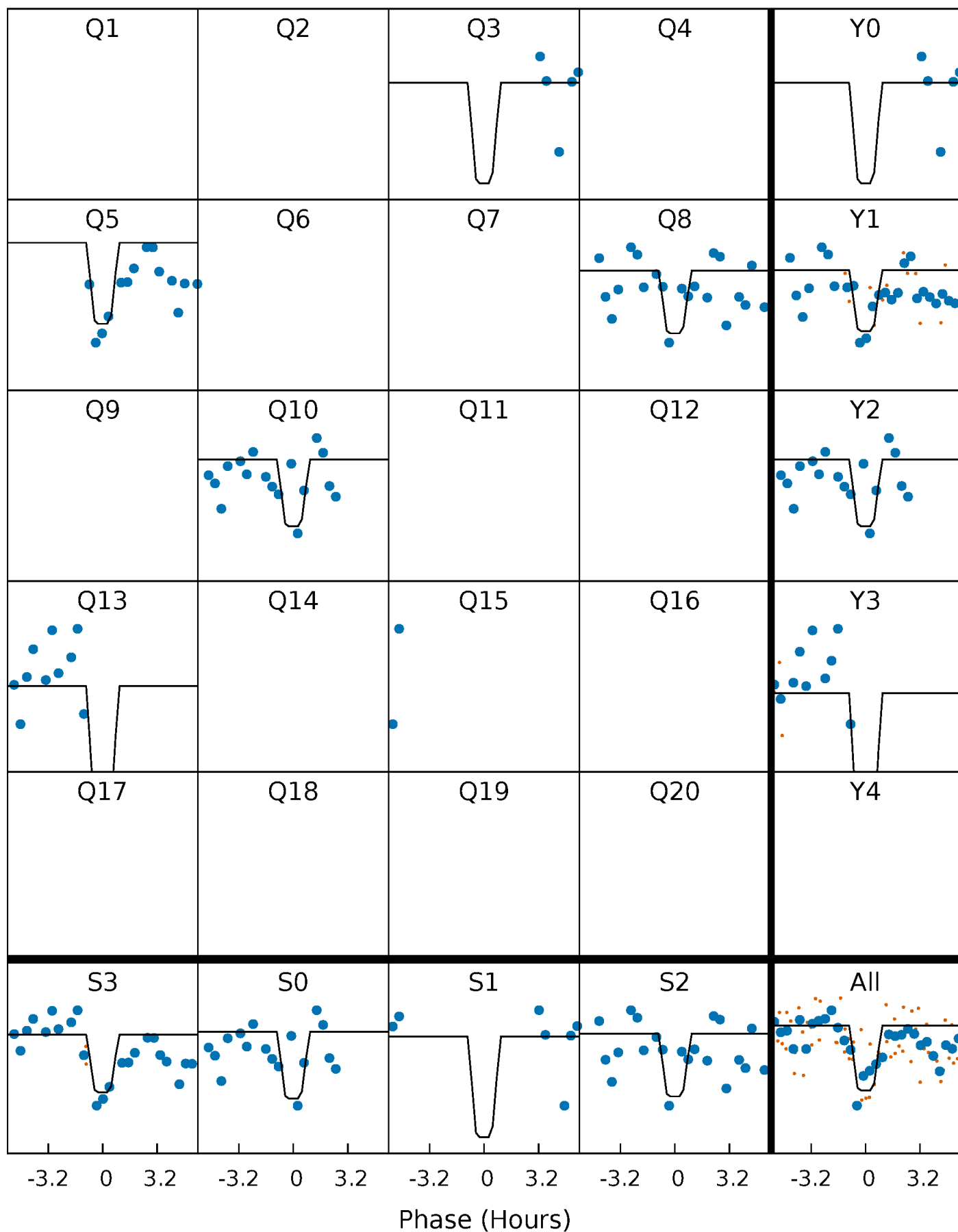
# DV Quarter-Phased Transit Curves

TCE 008359671-03     $P=231.889579$  Days     $T_0=284.166106$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 008359671-03     $P=231.886850$  Days     $T_0=284.165268$  (BKJD)

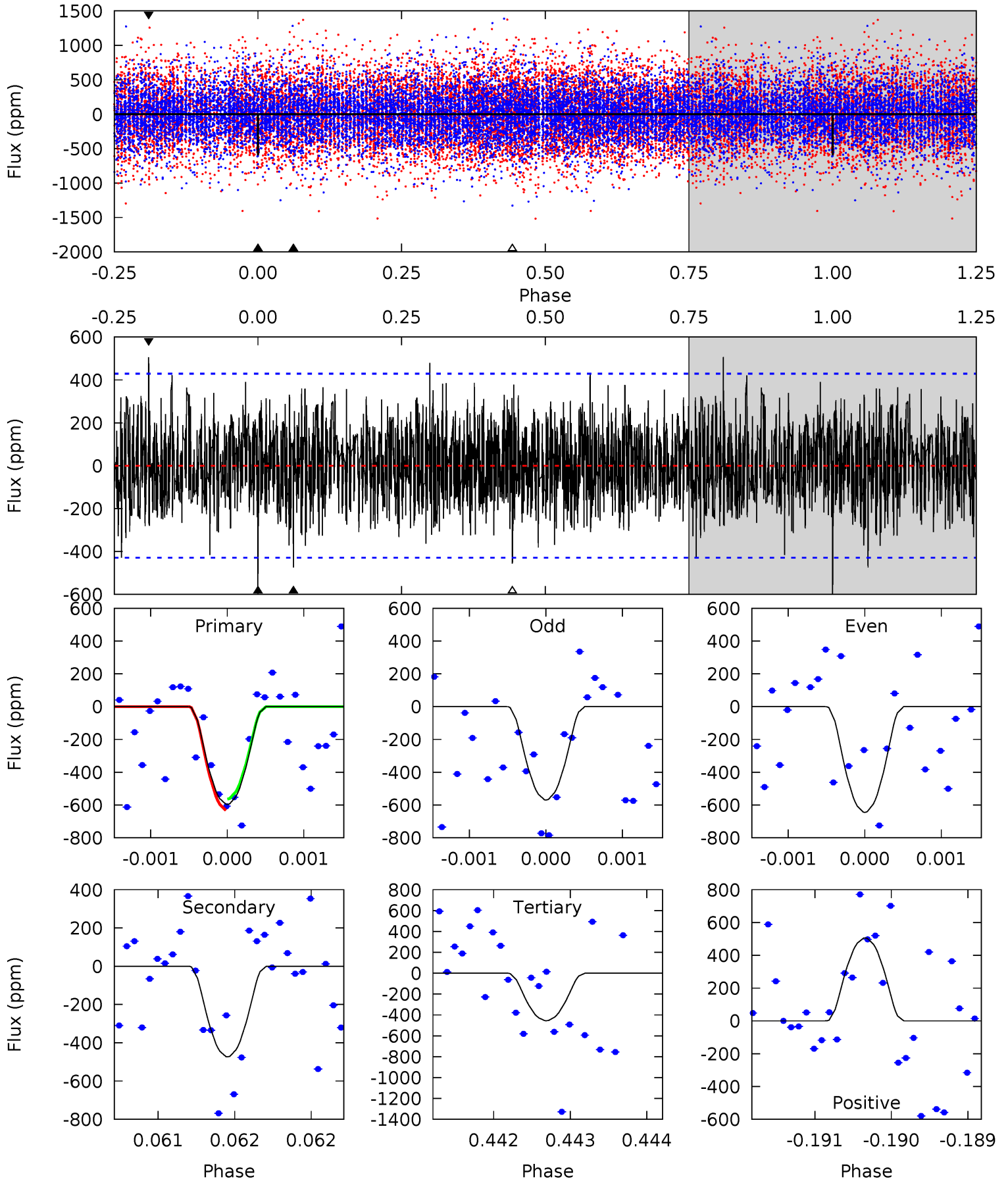




# DV Model-Shift Uniqueness Test

008359671-03, P = 231.889579 Days, E = 52.276527 Days

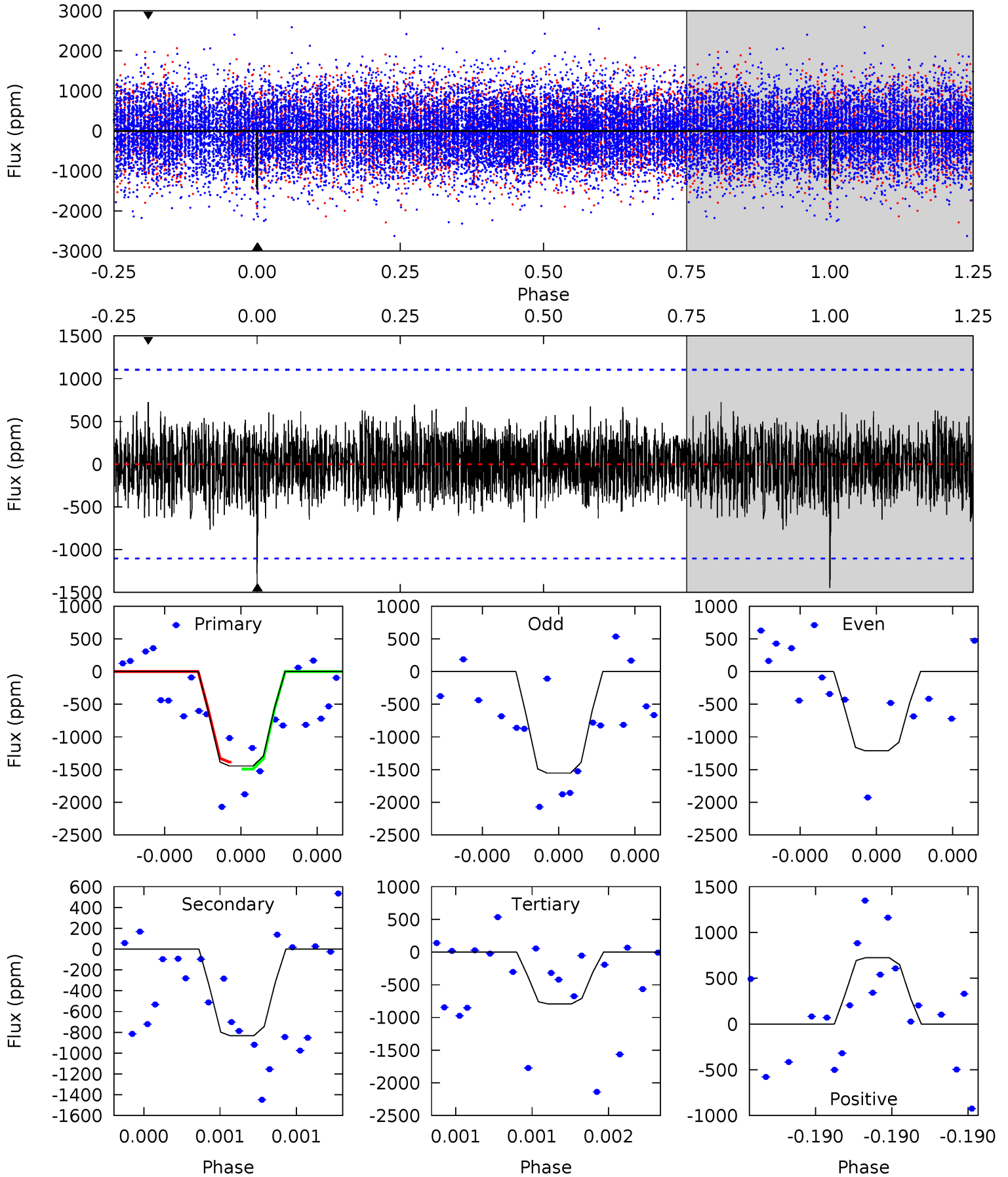
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
7.68	6.10	5.86	6.51	5.52	3.40	1.69	1.82	1.17	0.23	-0.41	0.48	0.34	0.46	0.44



# Alt Model-Shift Uniqueness Test

008359671-03, P = 231.886850 Days, E = 52.278418 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
7.40	4.27	4.06	3.71	5.66	3.61	1.06	3.33	3.69	0.21	0.56	0.89	1.17	0.33	0.27



### Stellar Parameters For KIC 008359671

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$8691^{+239}_{-410}$	$4.072^{+0.171}_{-0.140}$	$0.070^{+0.250}_{-0.600}$	$2.193^{+0.482}_{-0.590}$	$2.069^{+0.341}_{-0.512}$	$0.276^{+0.258}_{-0.115}$
	+3%/-5%	+4%/-3%	+357%/-857%	+22%/-27%	+16%/-25%	+93%/-42%
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 008359671-03 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-474 \pm 78$	$15.64^{+14.98}_{-10.53}$	$814^{+52}_{-59}$	$4898^{+3419}_{-1098}$	$934^{+7182}_{-686}$
Alt.	$-834 \pm 195$	$16.12^{+14.93}_{-10.36}$	$813^{+57}_{-58}$	$5378^{+4253}_{-1268}$	$1528^{+10396}_{-1128}$

$T_{max}$  = 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  $A_{obs} \gg 1.0$

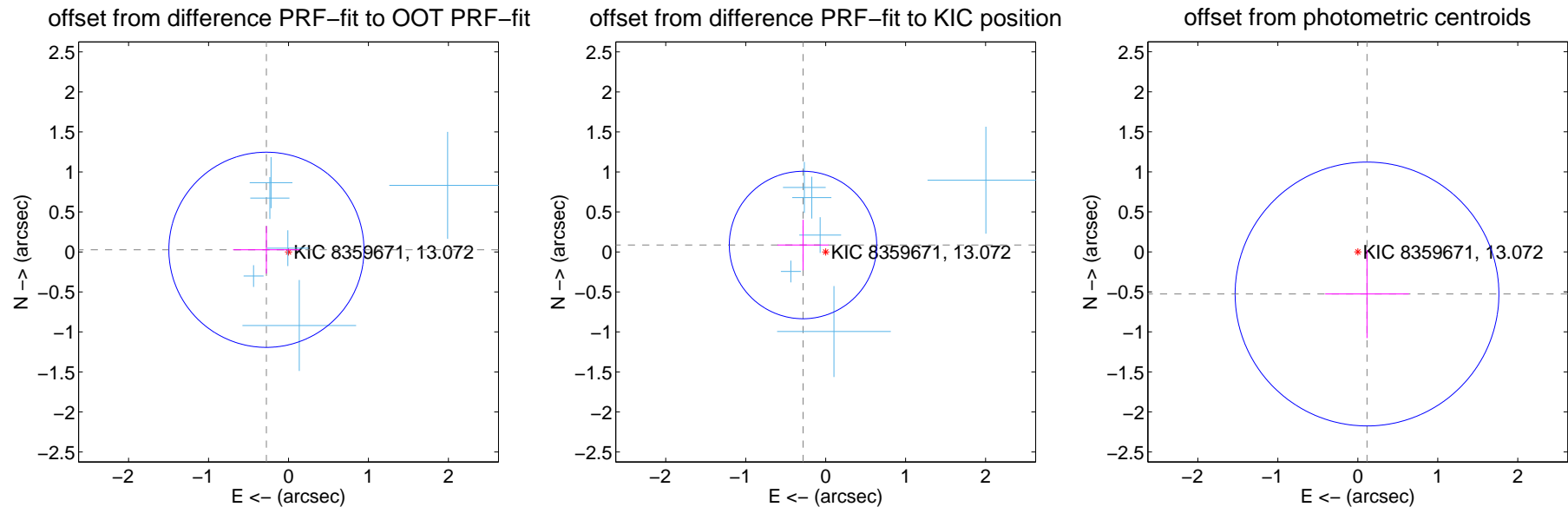
## DV Centroid Data

Supplemental centroid analysis for 008359671-03. Kepler magnitude: 13.07. Transit SNR 6.97

There are 6 quarters with good PRF difference image offsets

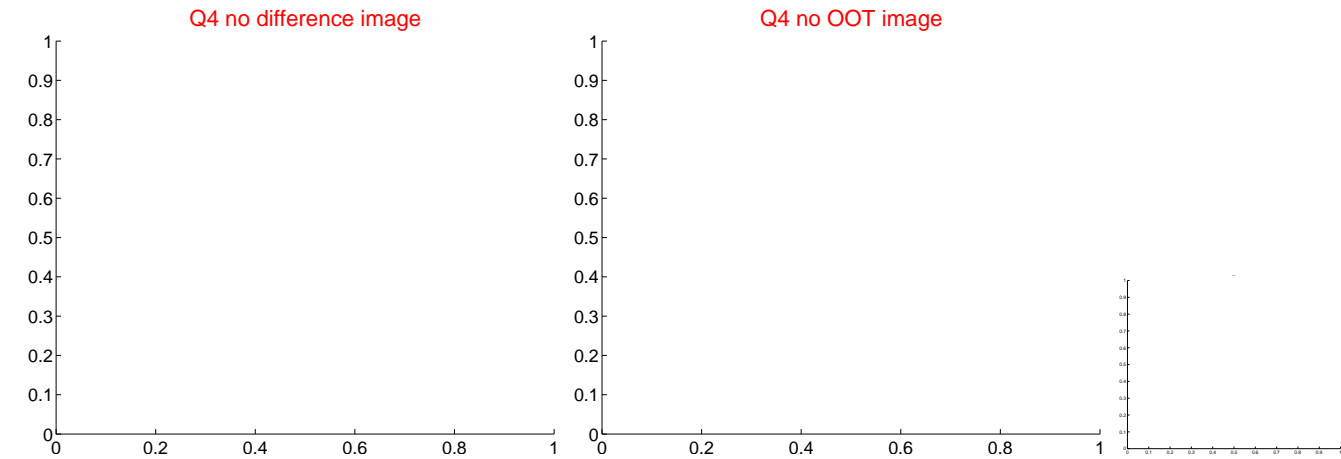
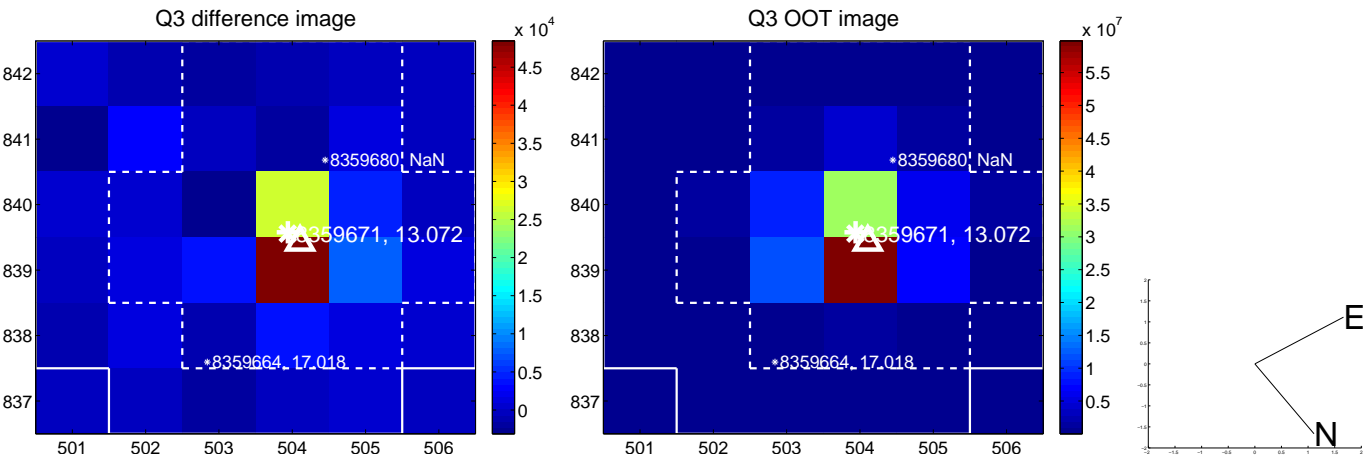
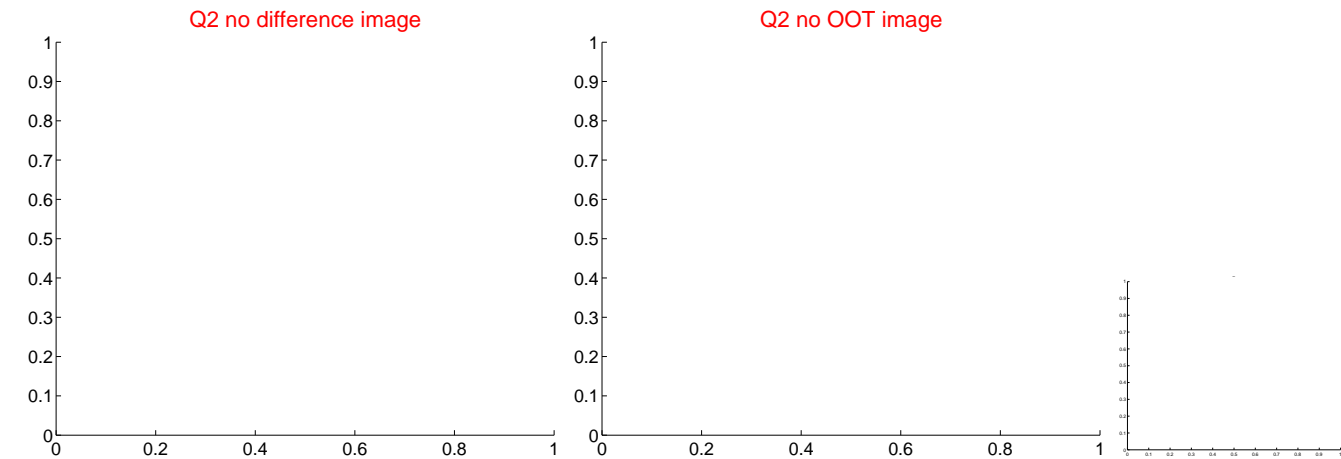
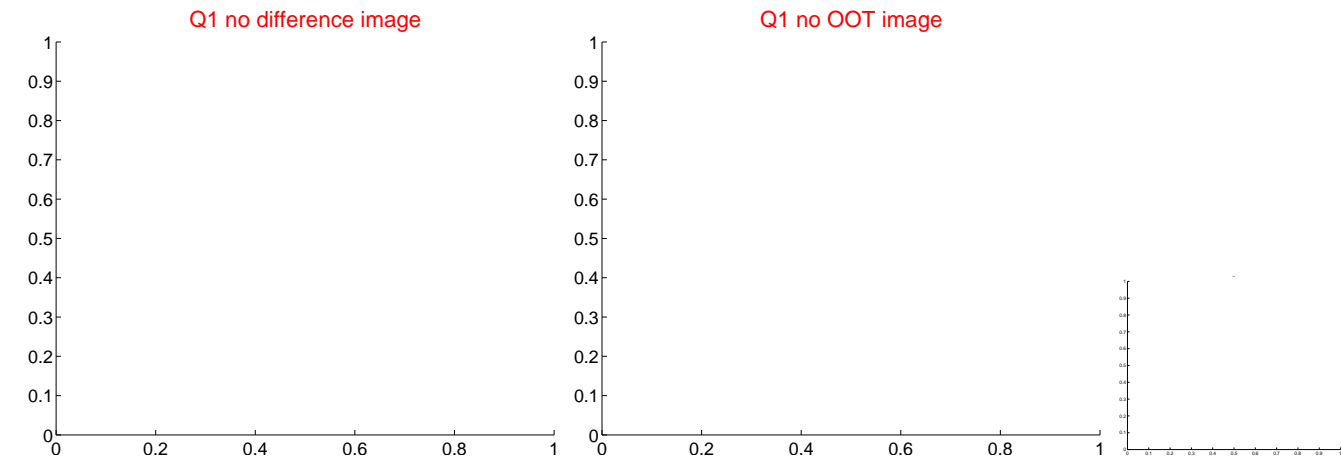
The direct PRF centroid is offset from the target star catalog position by about 0.08 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.277 \pm 0.407$	0.68	$0.276 \pm 0.417$	$0.027 \pm 0.296$
PRF-fit source offset from KIC position	$0.296 \pm 0.307$	0.96	$0.283 \pm 0.320$	$0.086 \pm 0.315$
photometric centroid source offset	$0.54 \pm 0.55$	0.98	$-0.12 \pm 0.52$	$-0.53 \pm 0.55$

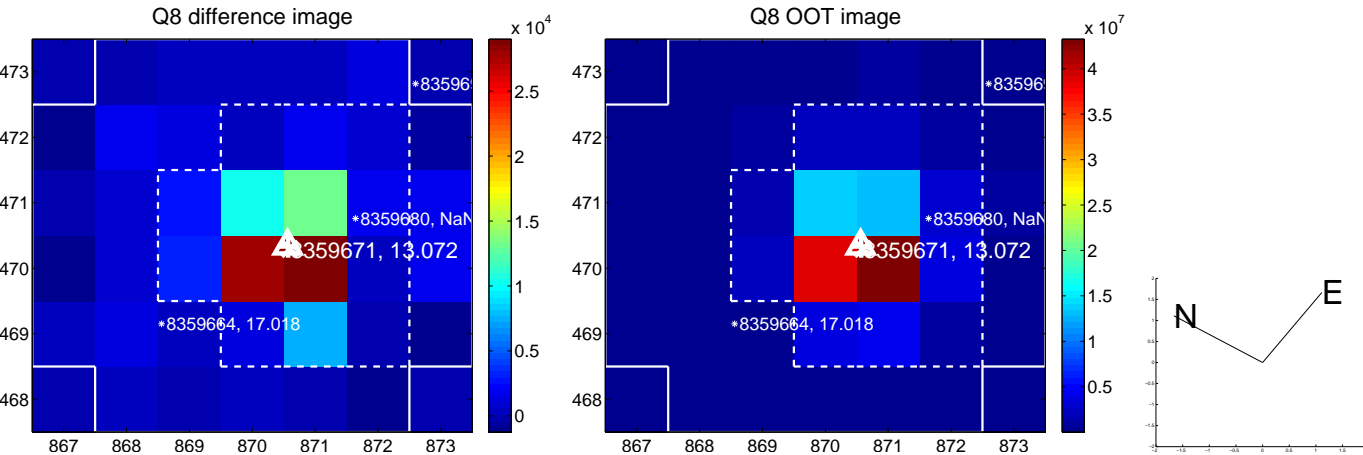
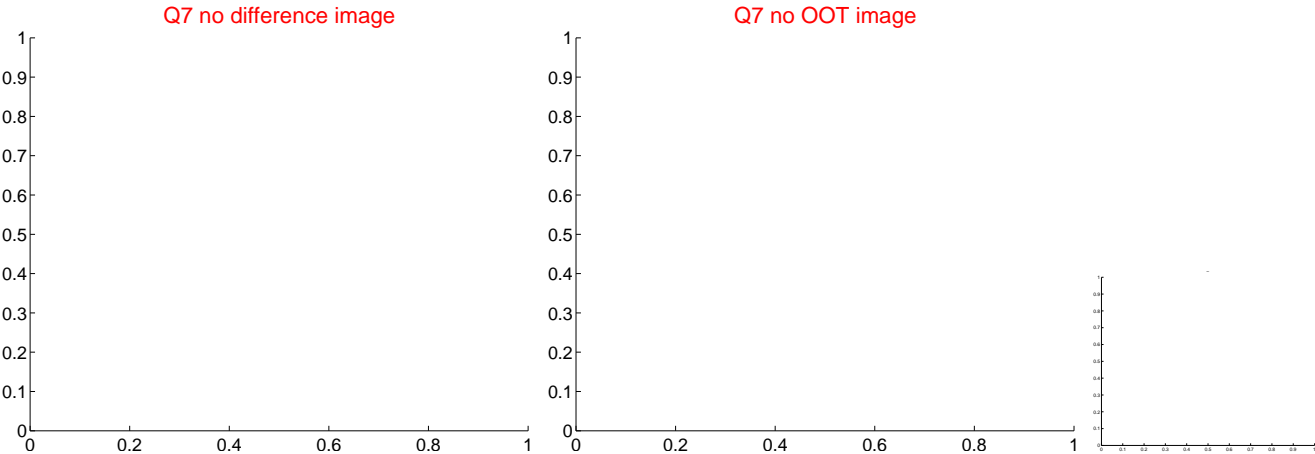
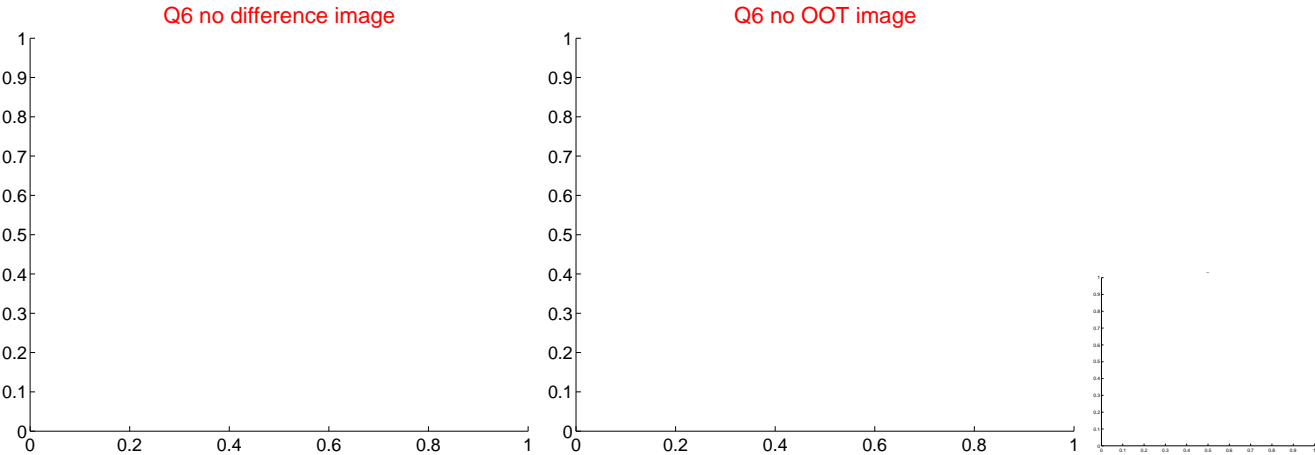
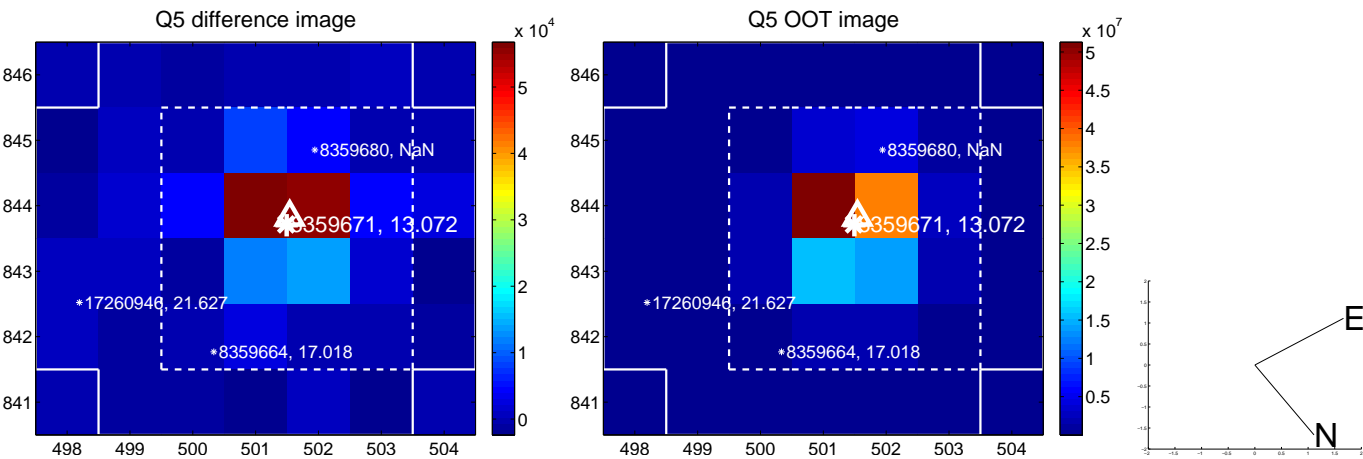


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

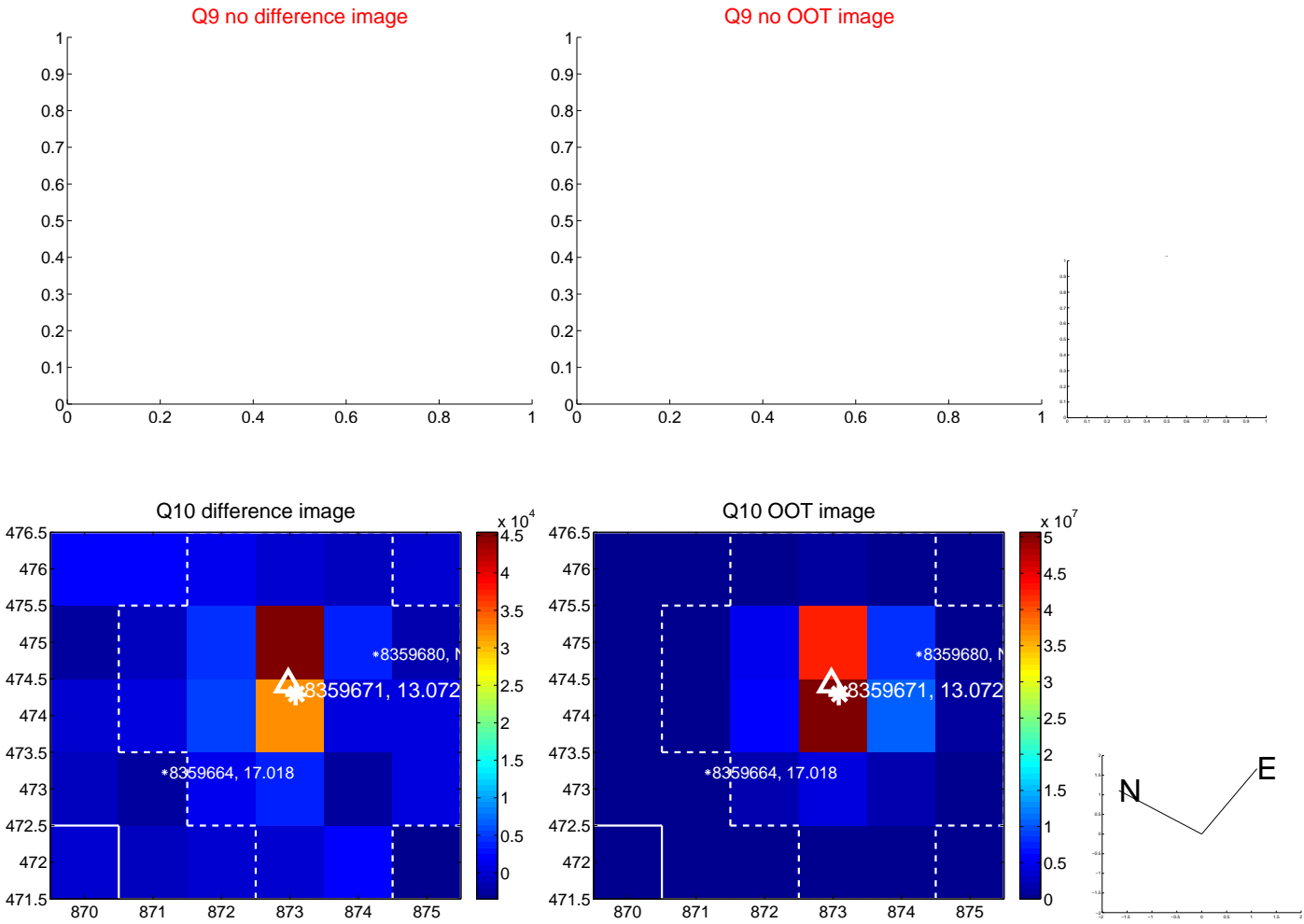


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

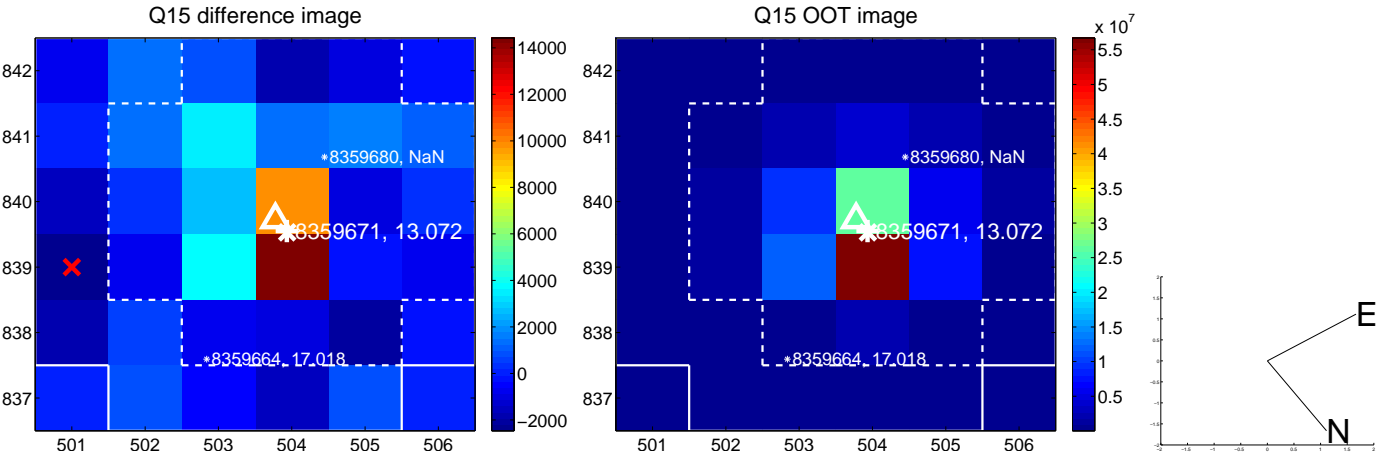
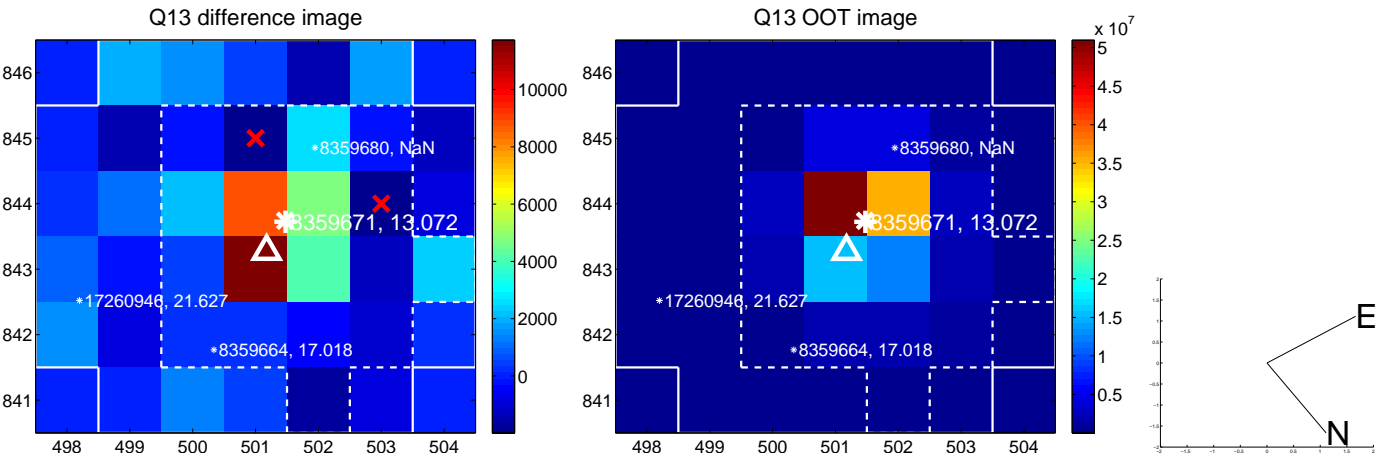




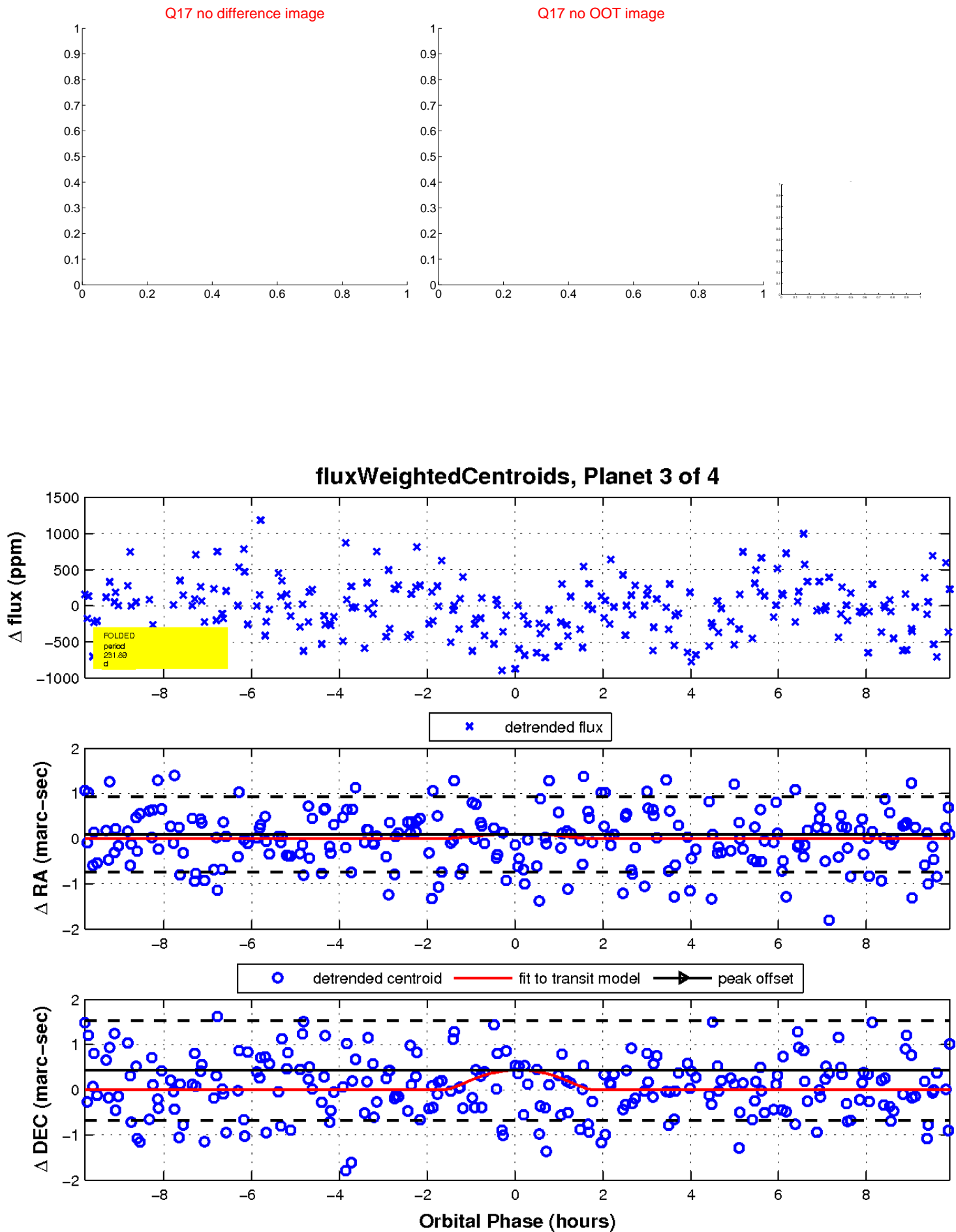
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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.





# KIC 008359671

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008359671-01	OBS	No	1.620492	132.997014	60.7	8.993	11.8	13.8	2.19	8691	1.74	20749.29
008359671-02	OBS	No	461.389569	502.262416	2011.6	30.322	16.7	16.3	2.19	8691	17.69	11.08
008359671-03	OBS	No	231.889579	284.166106	765.4	3.325	8.5	7.0	2.19	8691	8.55	27.72
008359671-04	OBS	No	10.555192	132.106334	268.7	1.447	7.8	7.7	2.19	8691	4.13	1705.73

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008359671-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT
008359671-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL_SKYE—LPP_DV—LPP_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
008359671-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL_TRACKER—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS
008359671-04	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT

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

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

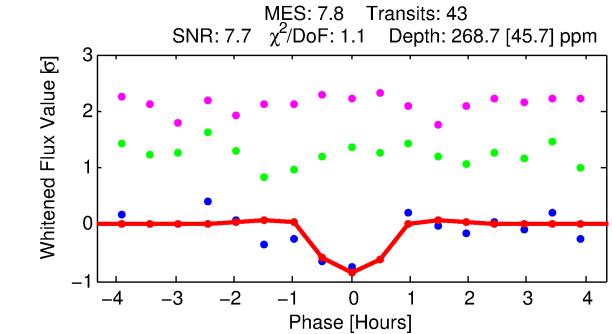
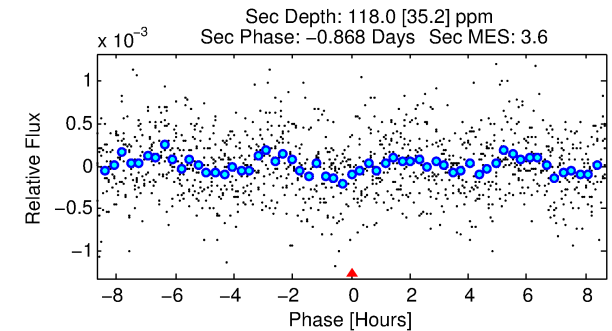
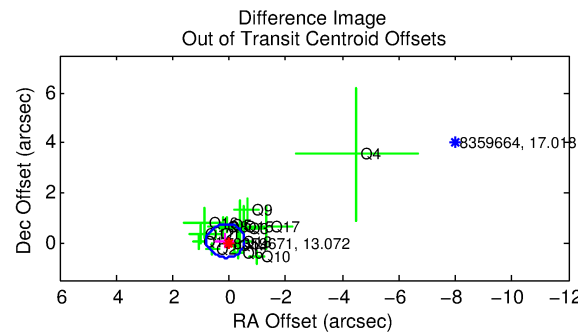
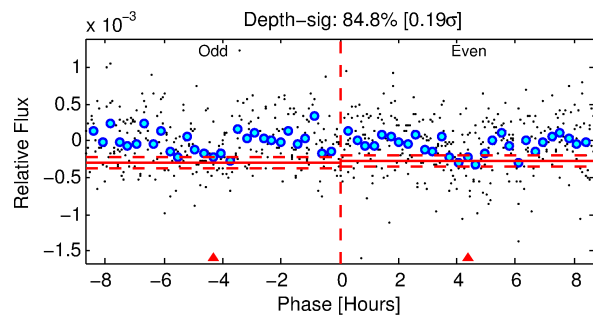
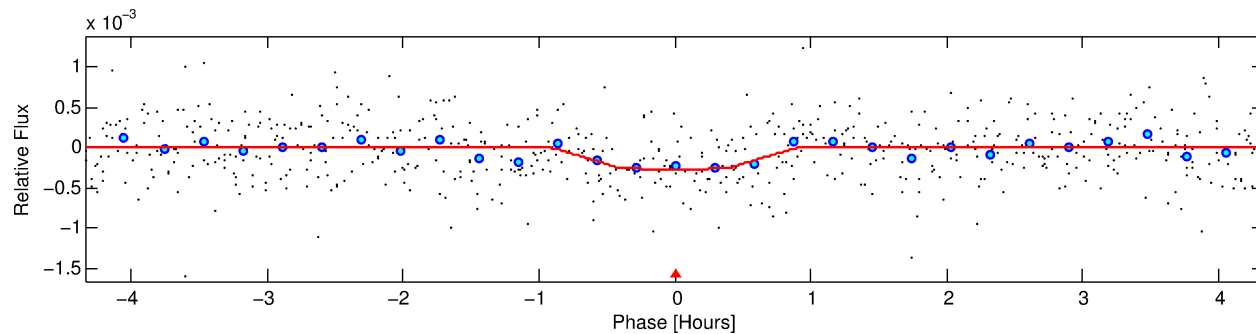
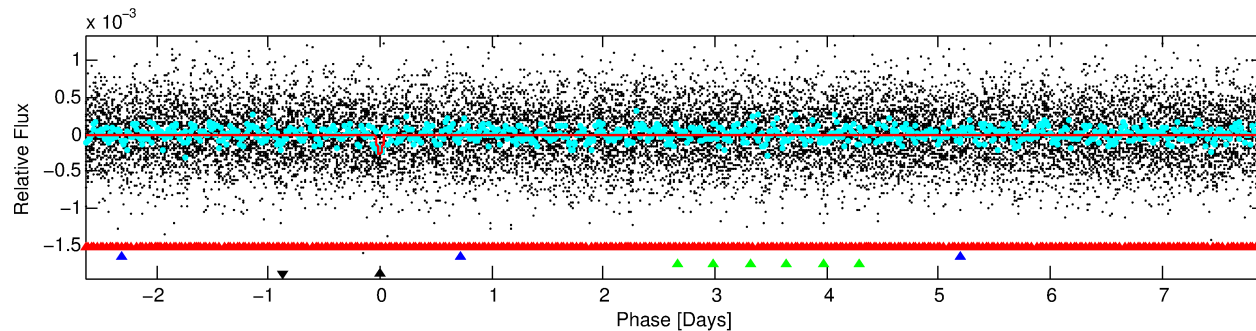
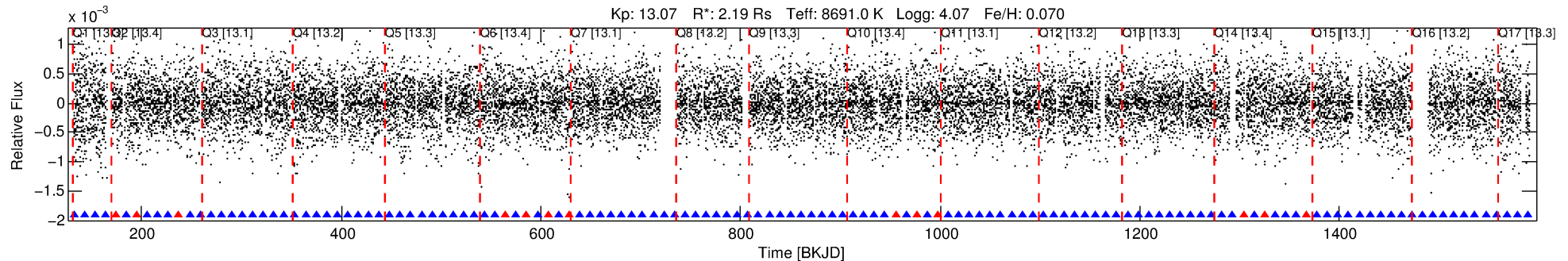
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 008359671-04

No Significant Match Found

# DV One-Page Summary

KIC: 8359671 Candidate: 4 of 4 Period: 10.555 d



## DV Fit Results:

Period = 10.55519 [0.00008] d  
Epoch = 132.1063 [0.0058] BKJD  
Rp/R\* = 0.0172 [0.0145]  
a/R\* = 28.15 [157.30]  
b = 0.88 [1.41]  
Seff = 1705.73 [630.62]  
Teq = 1639 [151] K  
Rp = 4.13 [3.65] Re  
a = 0.1201 [0.0267] AU  
Ag = 54.93 [95.55] [0.56σ]  
Teffp = 6898 [2967] K [1.77σ]

## DV Diagnostic Results:

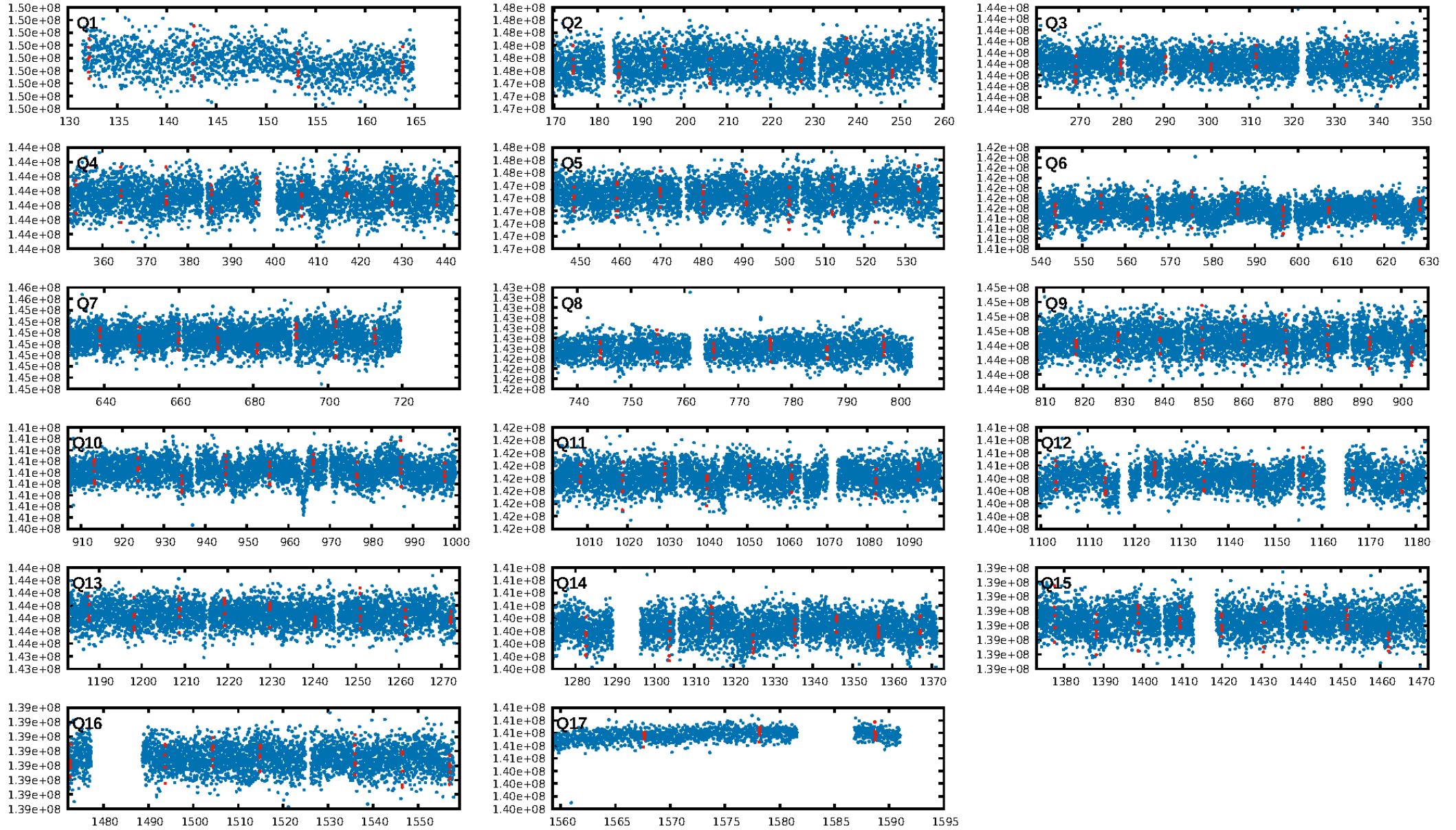
ShortPeriod-sig: 100.0% [23.54σ]  
LongPeriod-sig: 100.0% [1464.75σ]  
ModelChiSquare2-sig: 26.2%  
ModelChiSquareGof-sig: 100.0%  
**Bootstrap-pfa: 5.61e-10**  
**RollingBand-fgt: 0.68 [28/41]**  
GhostDiagnostic-chr: 10.24  
Centroid-sig: 0.5%  
Centroid-so: 0.835 arcsec [2.03σ]  
OotOffset-rm: 0.141 arcsec [0.63σ]  
OotOffset-st: 4/3/4/5 [16]  
KicOffset-rm: 0.117 arcsec [0.57σ]  
KicOffset-st: 4/3/4/5 [16]  
DiffImageQuality-fgm: 0.81 [13/16]  
DiffImageOverlap-fno: 1.00 [17/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 09:31:49 Z

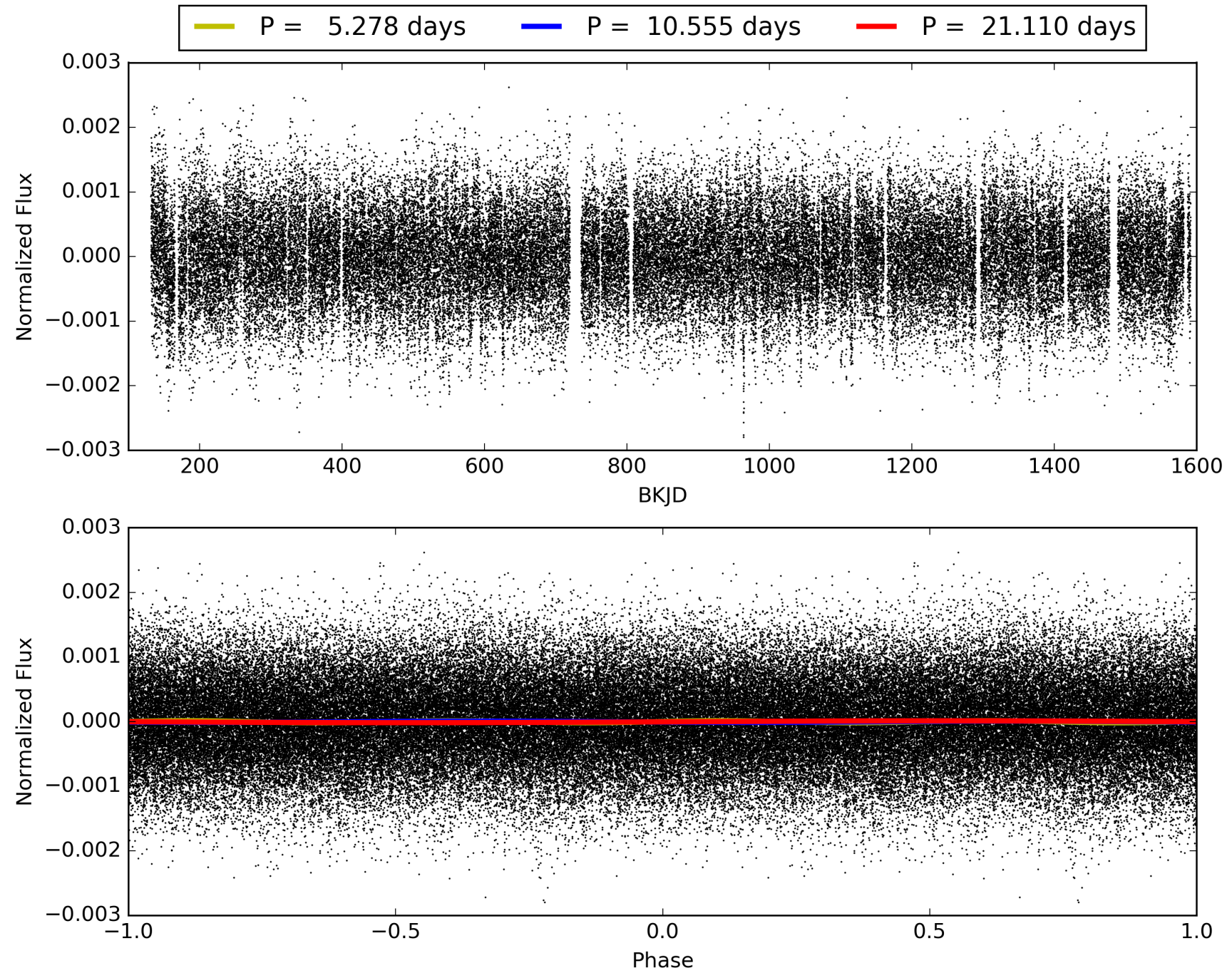
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center



# TCE 008359671-04, PDC Light Curves

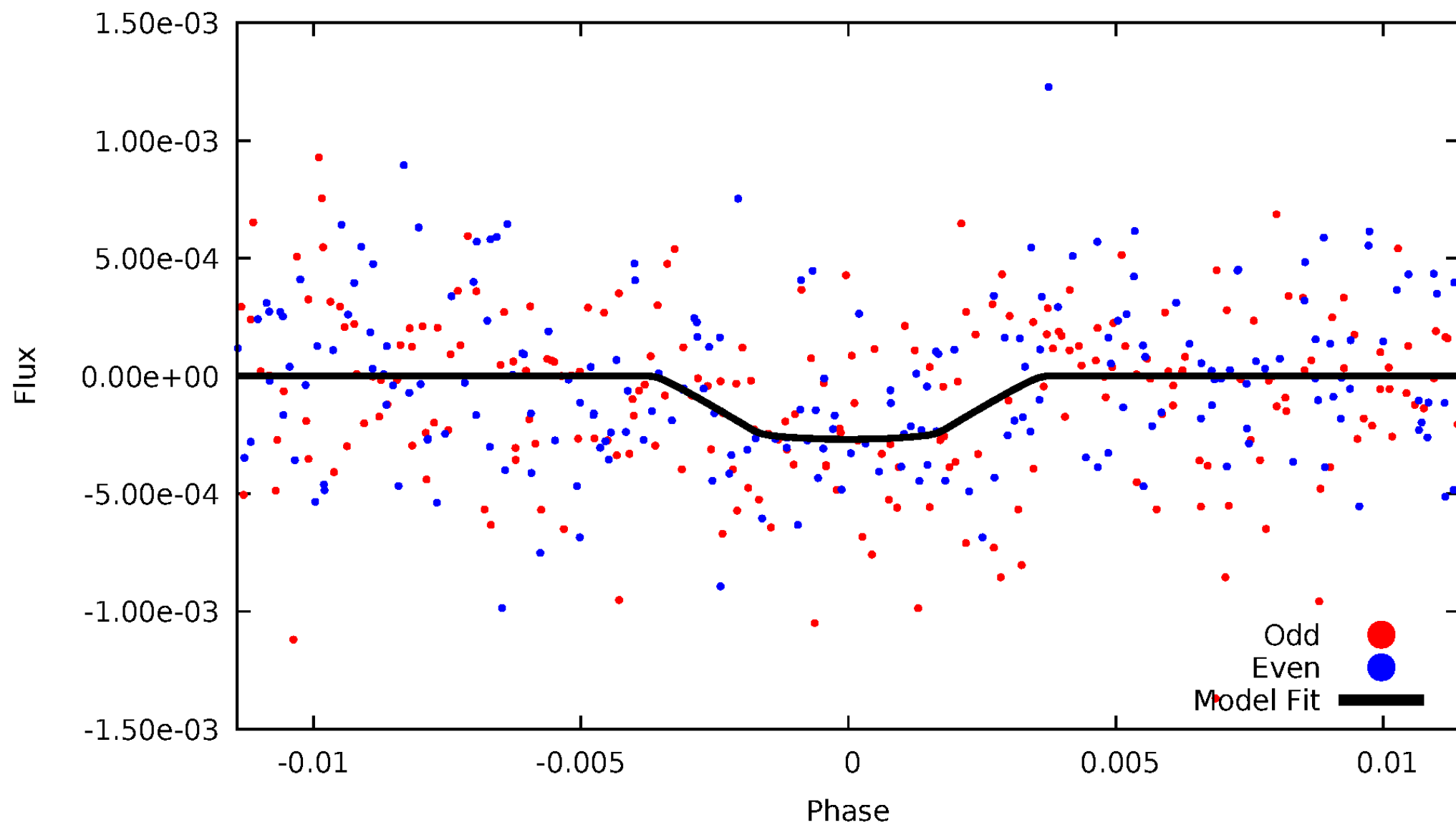


TCE 008359671-04



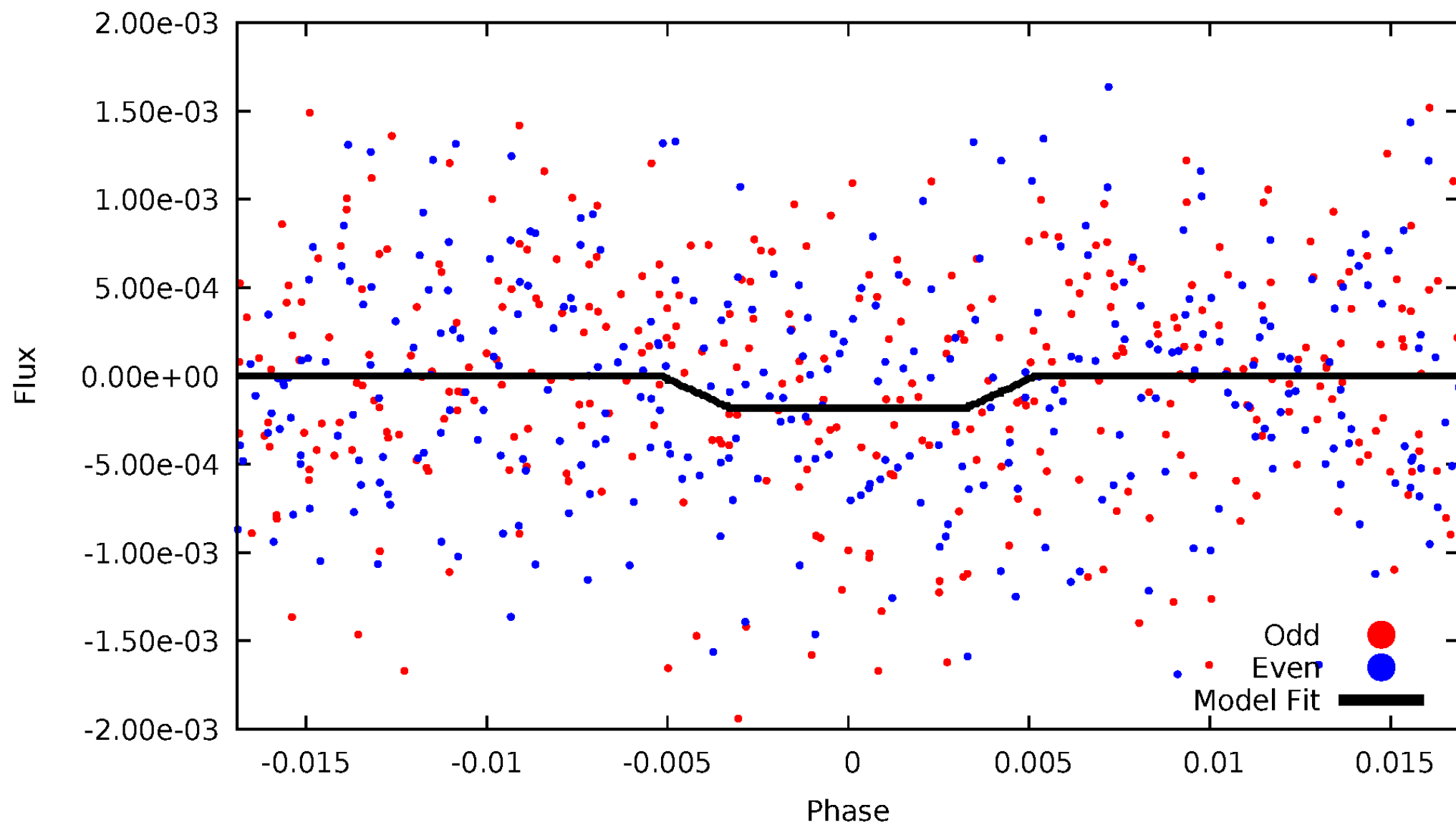
# DV Odd/Even

TCE 008359671-04



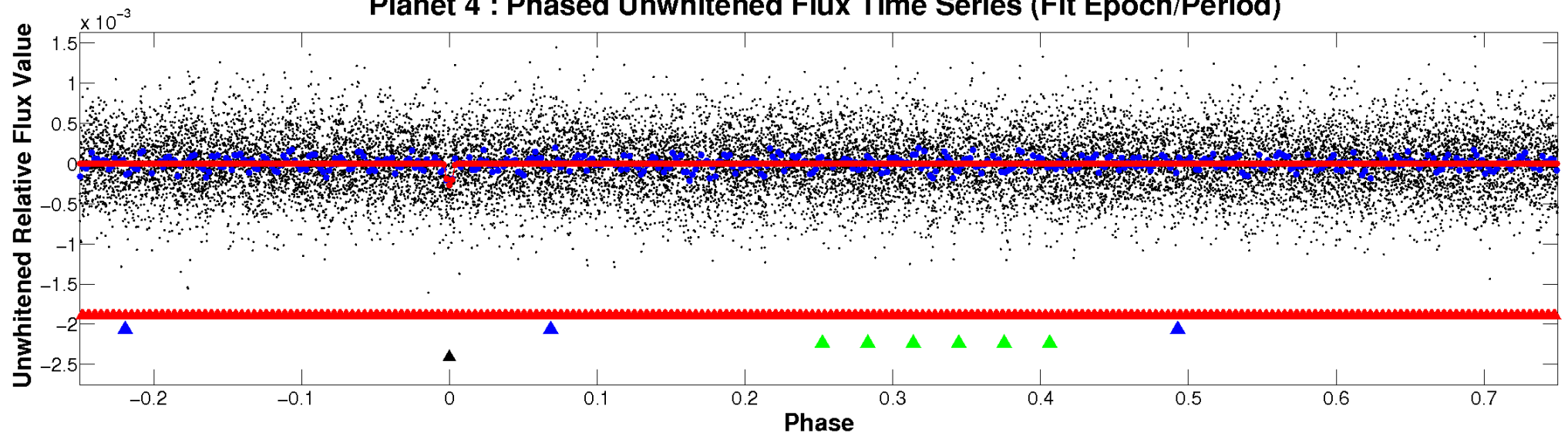
# ALT Odd/Even

TCE 008359671-04

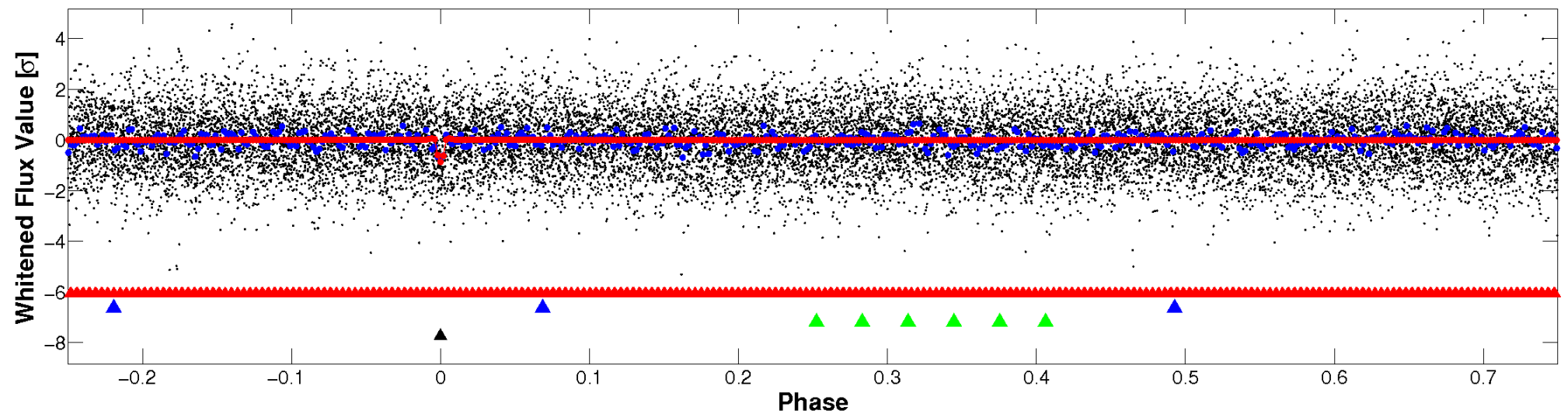


# Non-Whitened Vs. Whitened Light Curve

## Planet 4 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)



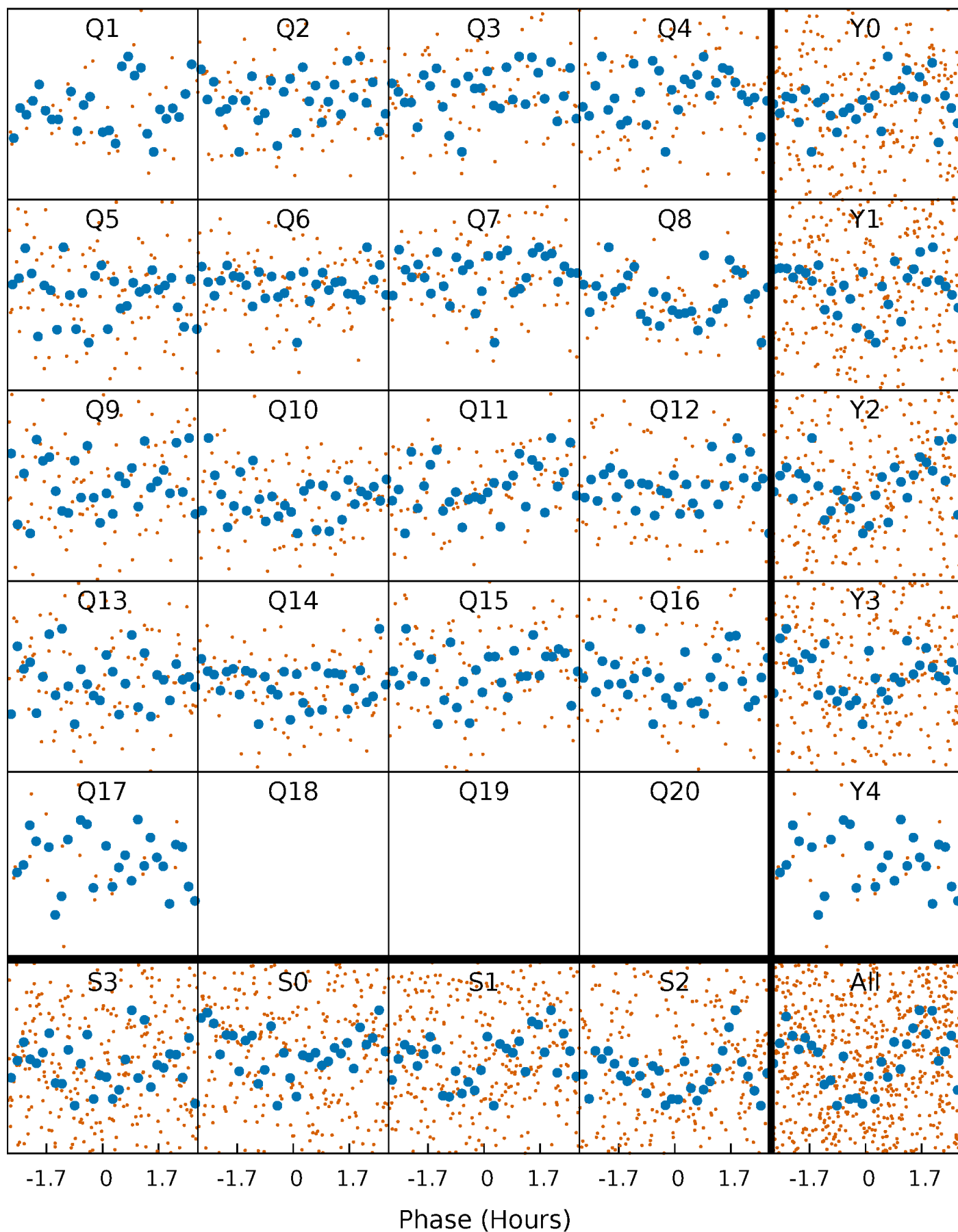
## Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)





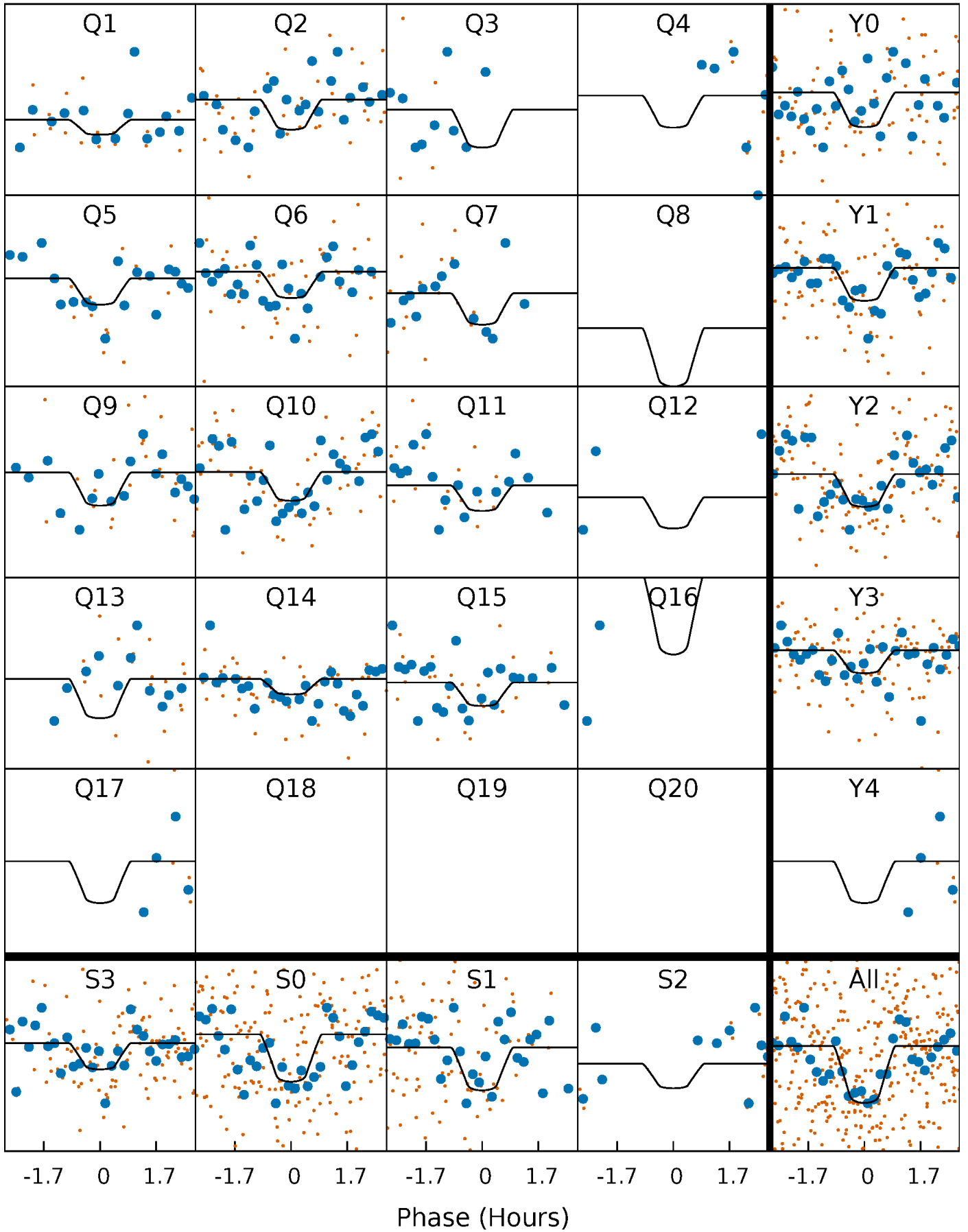
# PDC Quarter-Phased Transit Curves

TCE 008359671-04 P= 10.555192 Days  $T_0=132.106334$  (BKJD)



# DV Quarter-Phased Transit Curves

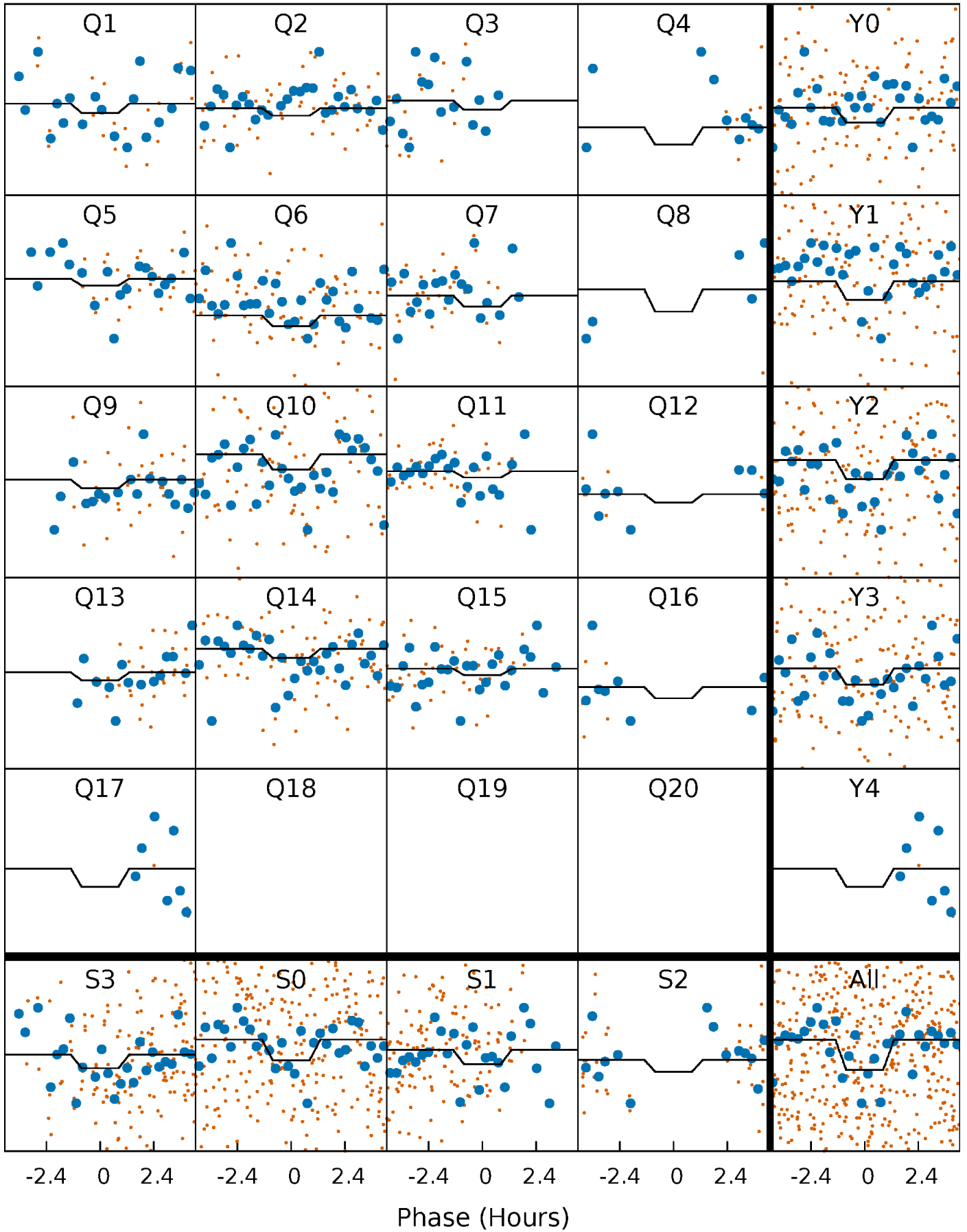
TCE 008359671-04 P= 10.555192 Days  $T_0=132.106334$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

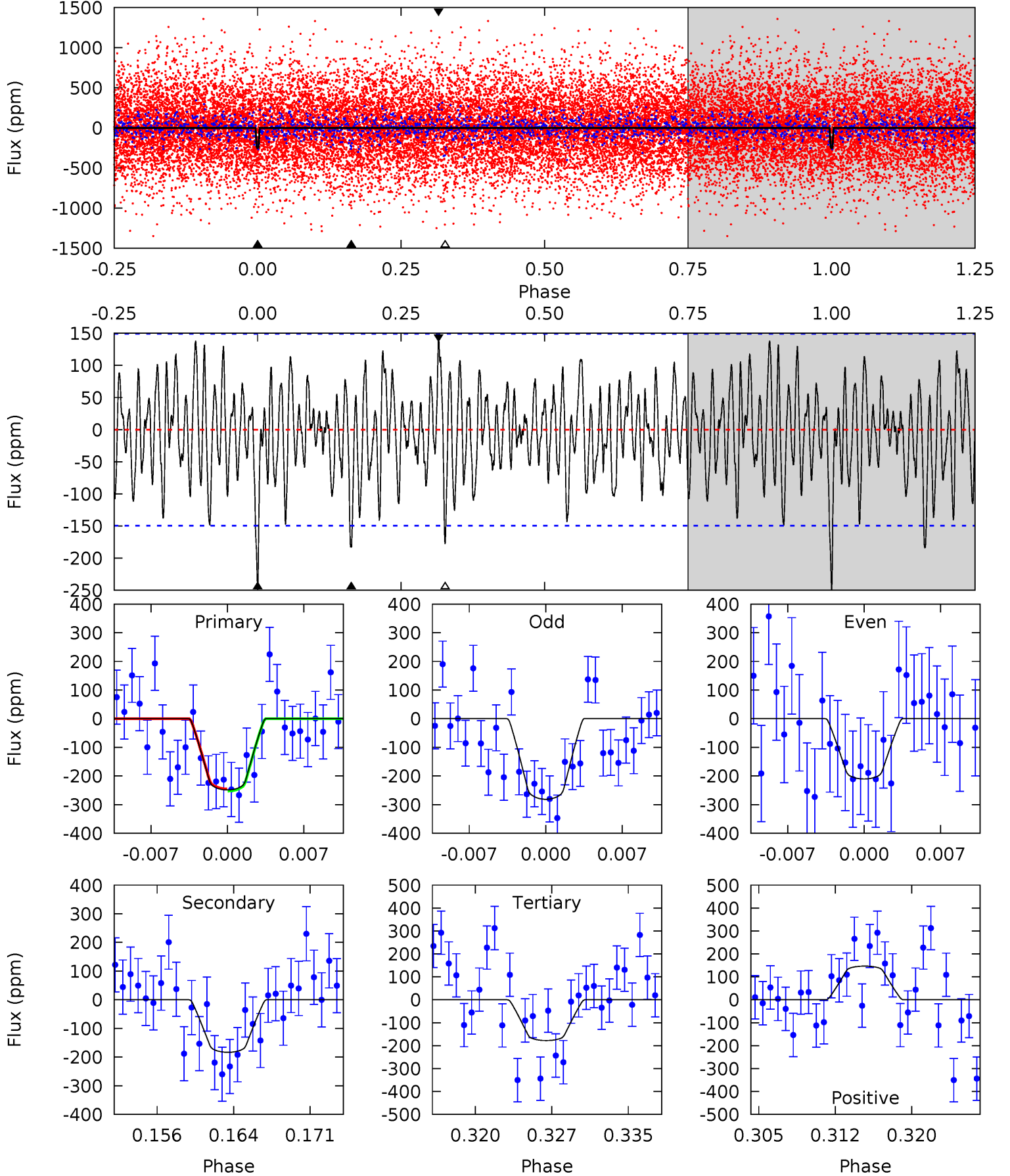
TCE 008359671-04 P= 10.555343 Days  $T_0=132.076576$  (BKJD)



# DV Model-Shift Uniqueness Test

008359671-04, P = 10.555192 Days, E = 121.551142 Days

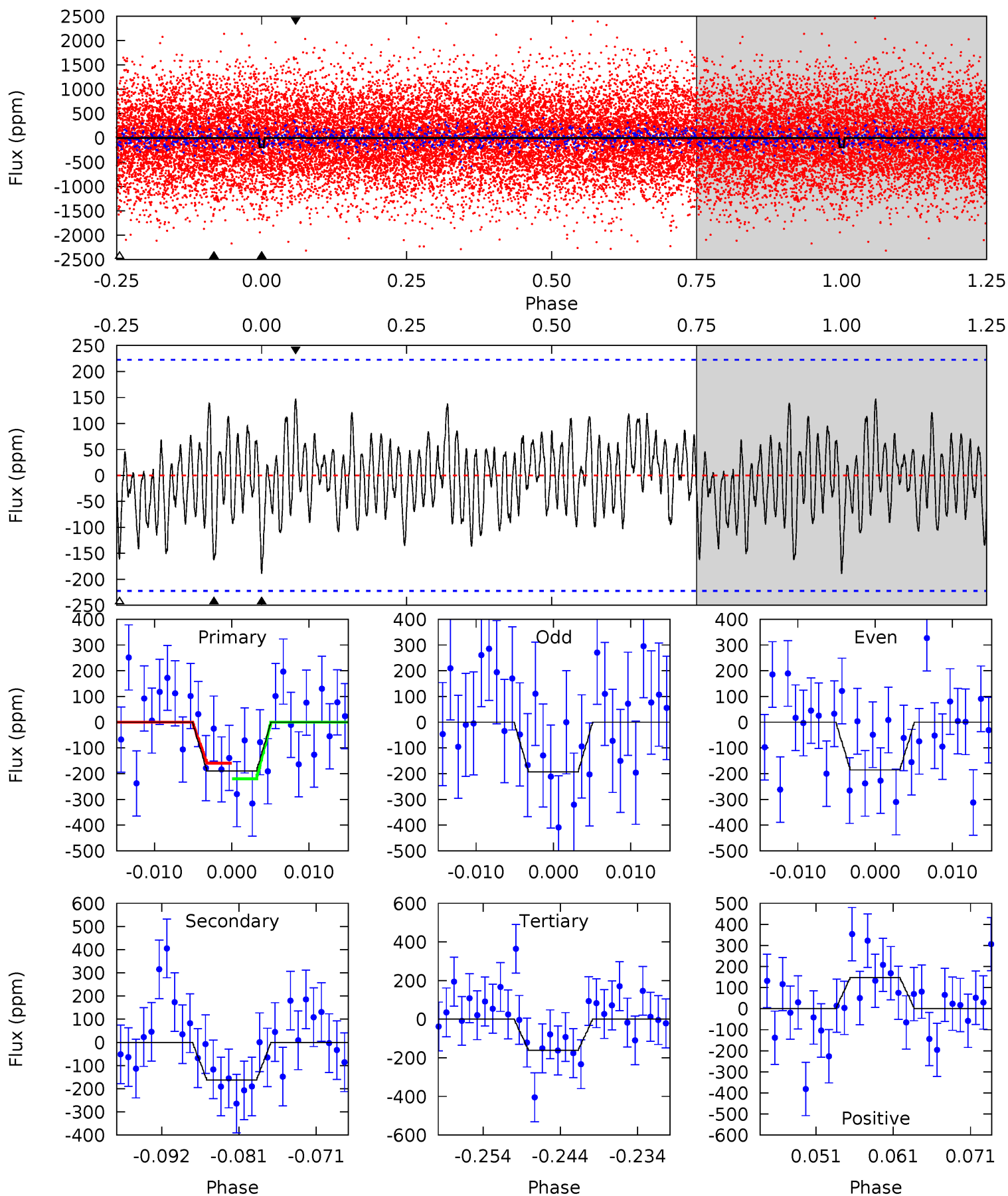
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.46	6.24	6.05	4.99	5.08	2.68	1.98	2.41	3.47	0.18	1.24	1.20	0.92	0.37	0.12



# Alt Model-Shift Uniqueness Test

008359671-04, P = 10.555343 Days, E = 121.521233 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
4.28	3.68	3.65	3.33	5.02	2.57	1.30	0.63	0.94	0.03	0.34	0.09	1.01	0.44	0.68



### Stellar Parameters For KIC 008359671

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$8691^{+239}_{-410}$	$4.072^{+0.171}_{-0.140}$	$0.070^{+0.250}_{-0.600}$	$2.193^{+0.482}_{-0.590}$	$2.069^{+0.341}_{-0.512}$	$0.276^{+0.258}_{-0.115}$
	+3%/-5%	+4%/-3%	+357%/-857%	+22%/-27%	+16%/-25%	+93%/-42%
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 008359671-04 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-183 \pm 29$	$4.46^{+3.59}_{-2.69}$	$2284^{+133}_{-158}$	$6980^{+6920}_{-1718}$	$69^{+373}_{-47}$
Alt.	$-163 \pm 44$	$4.03^{+3.18}_{-2.53}$	$2273^{+155}_{-152}$	$7107^{+7583}_{-1784}$	$75^{+450}_{-52}$

$T_{max}$  = 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  $A_{obs} \gg 1.0$

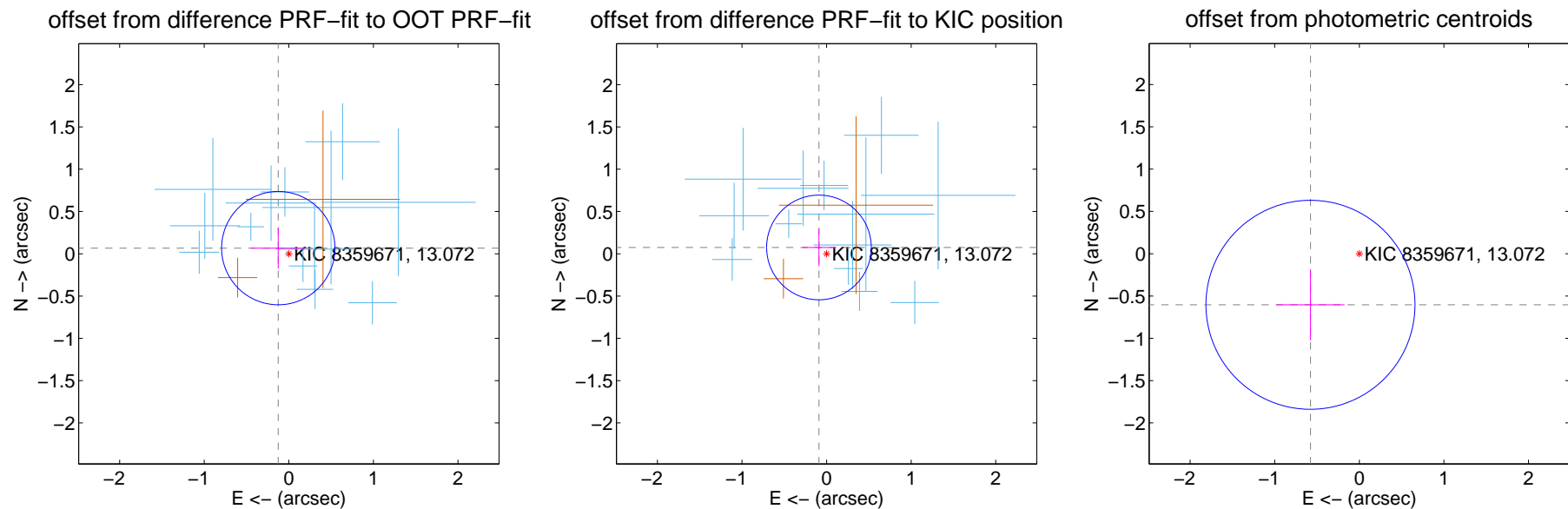
## DV Centroid Data

Supplemental centroid analysis for 008359671-04. Kepler magnitude: 13.07. Transit SNR 7.65

There are 13 quarters with good PRF difference image offsets

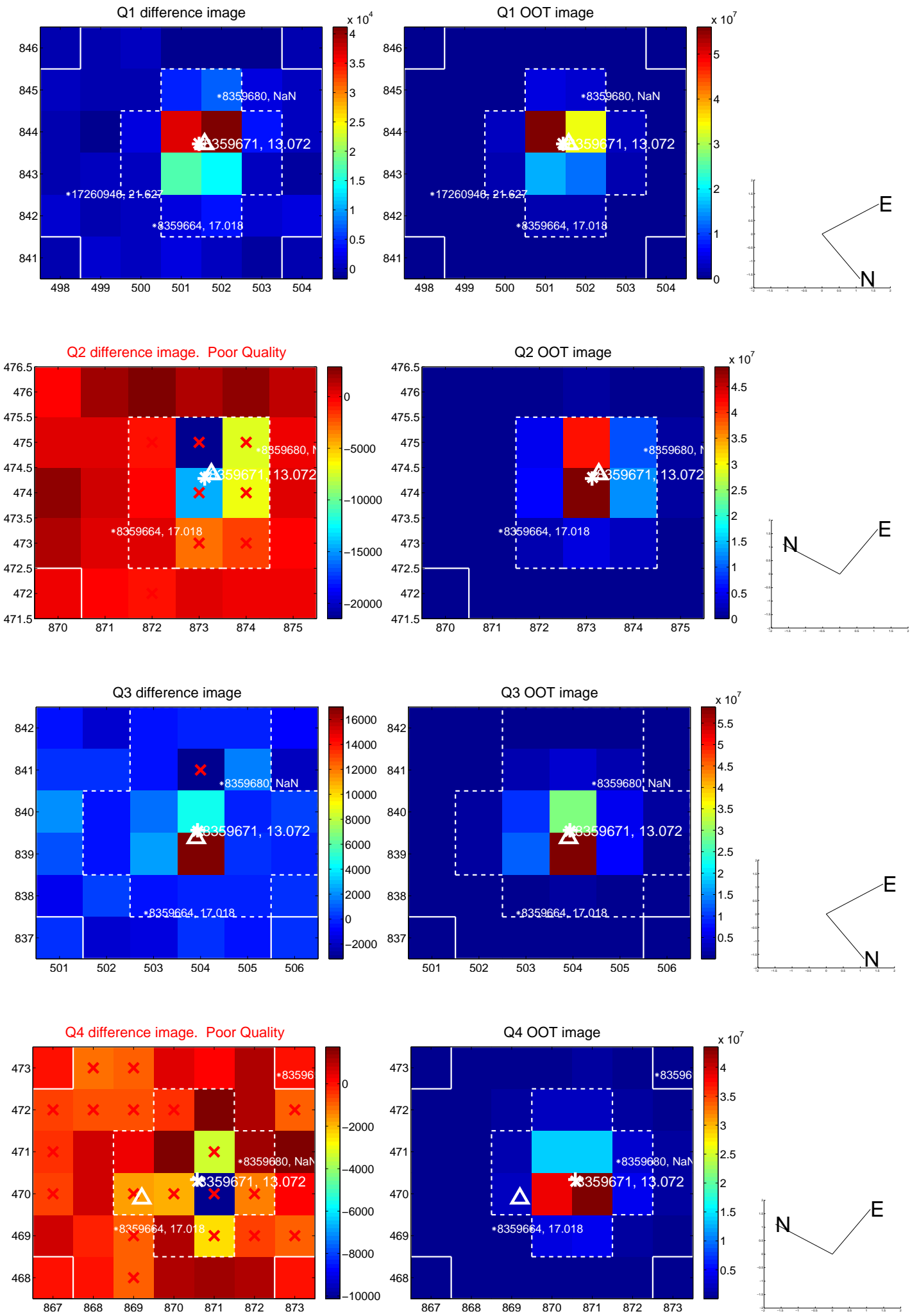
The direct PRF centroid is offset from the target star catalog position by about 0.08 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.141 \pm 0.223$	0.63	$0.125 \pm 0.328$	$0.067 \pm 0.243$
PRF-fit source offset from KIC position	$0.117 \pm 0.206$	0.57	$0.090 \pm 0.195$	$0.075 \pm 0.221$
photometric centroid source offset	$0.84 \pm 0.41$	2.03	$0.58 \pm 0.40$	$-0.60 \pm 0.42$

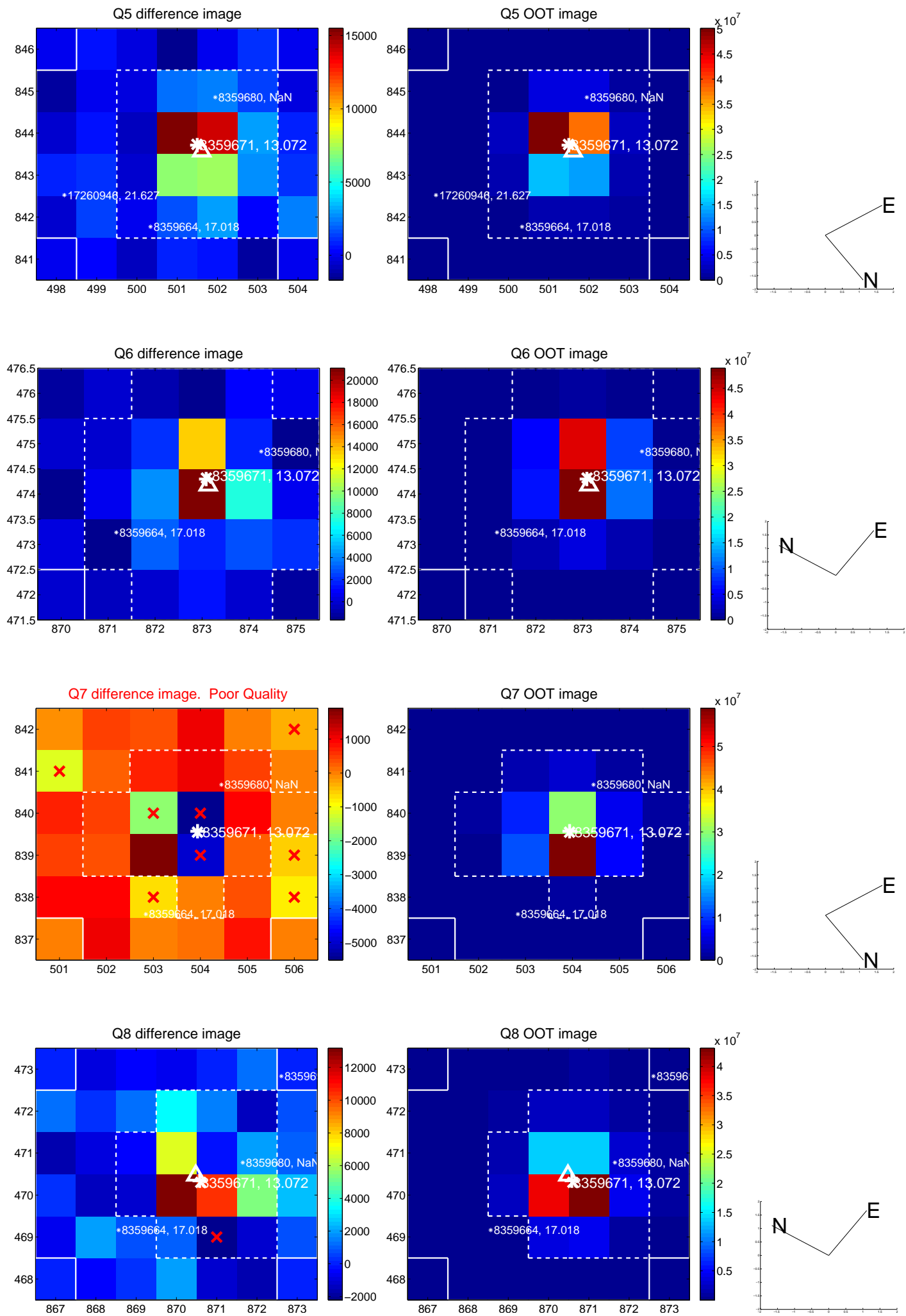


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

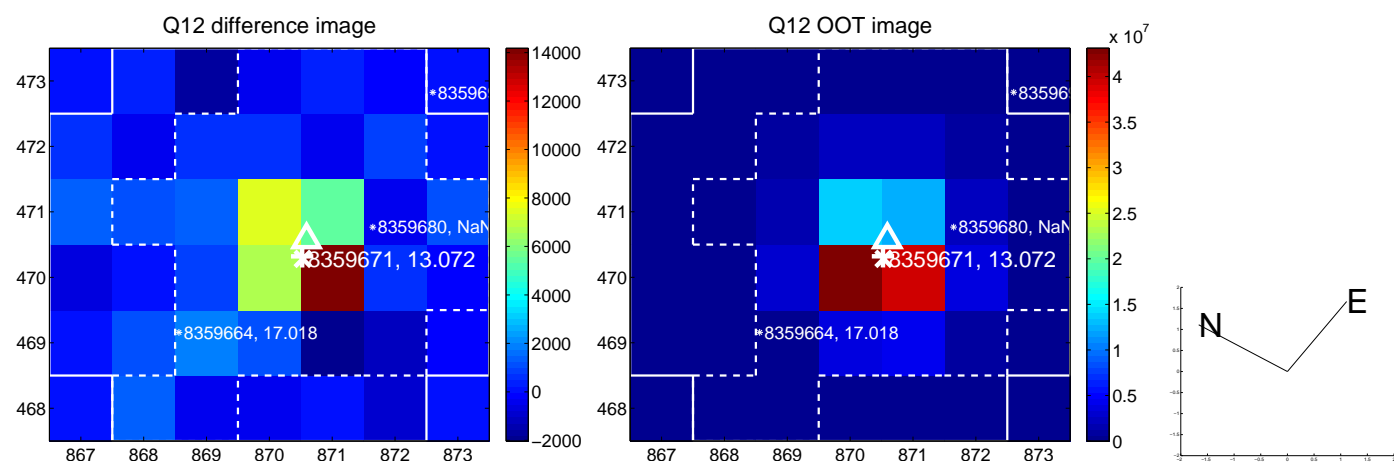
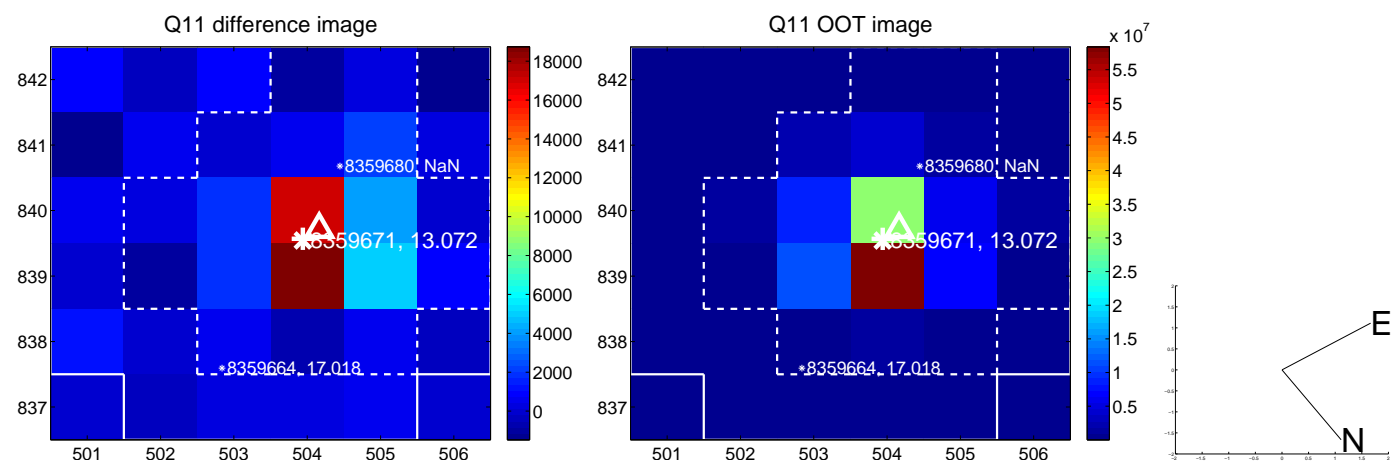
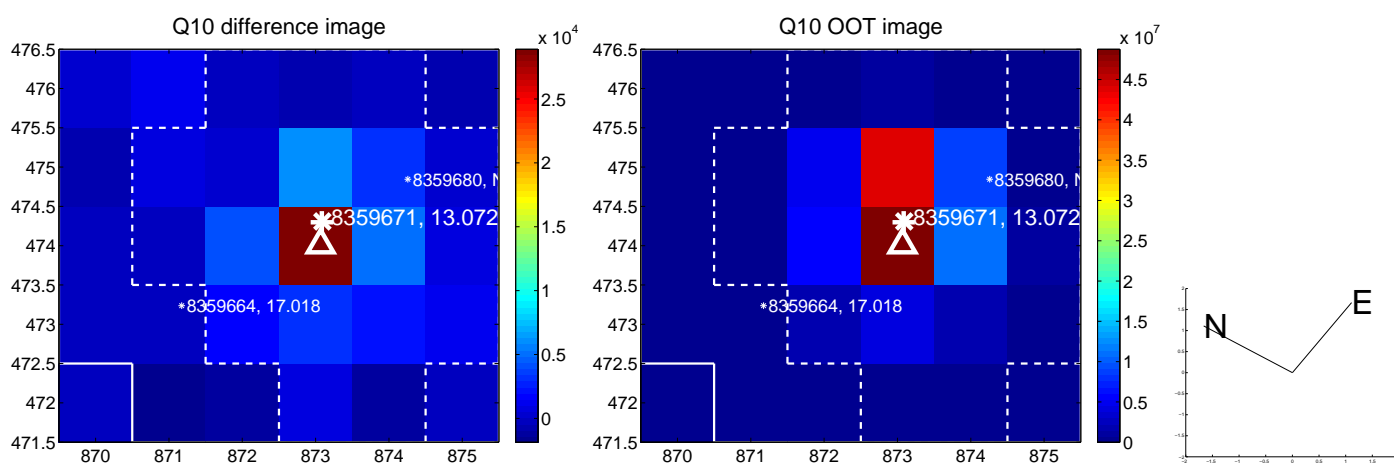
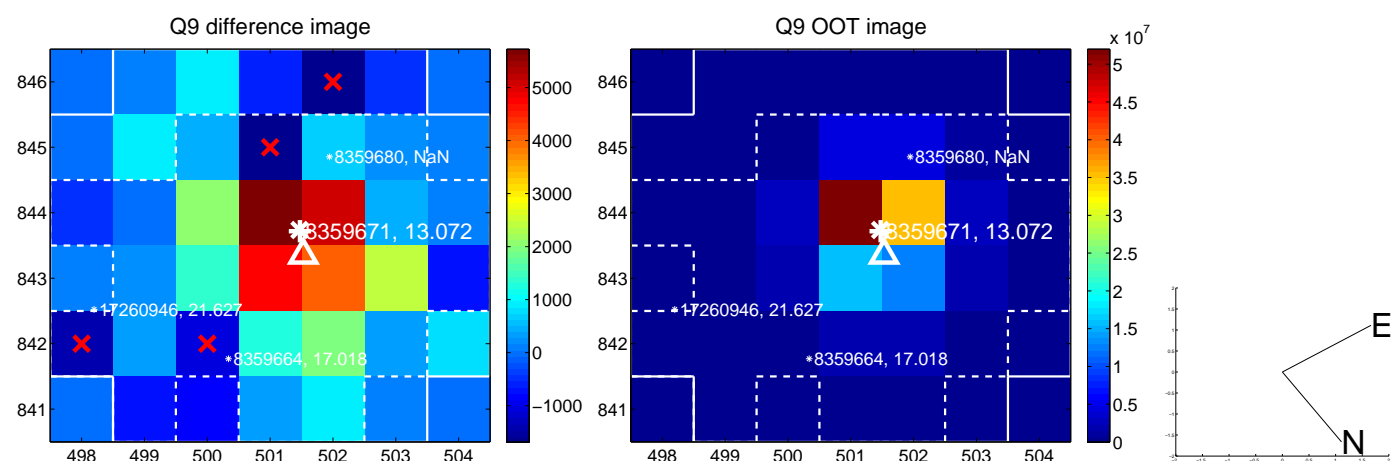


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

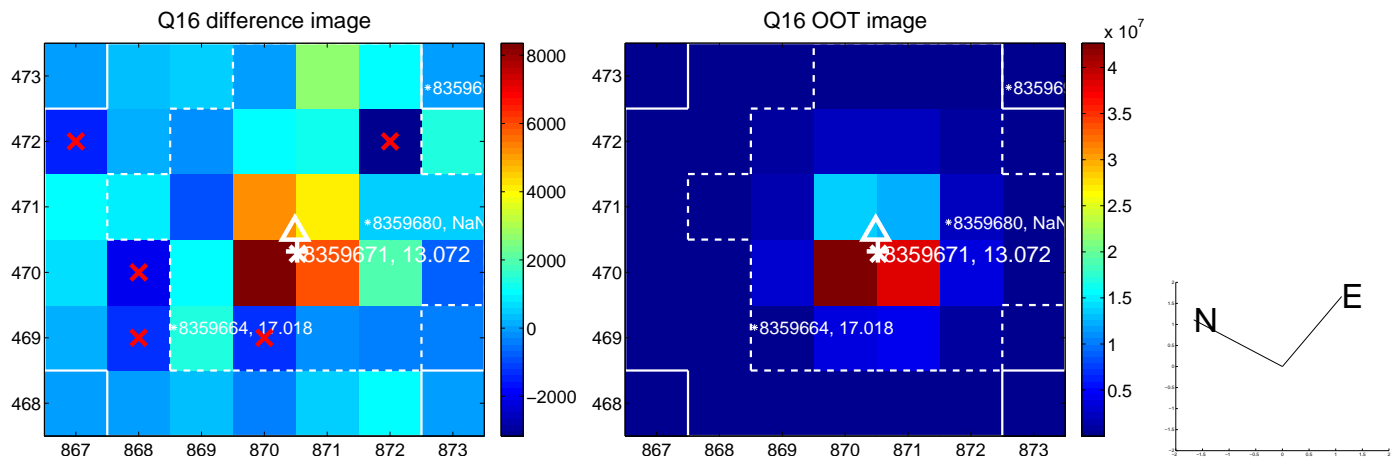
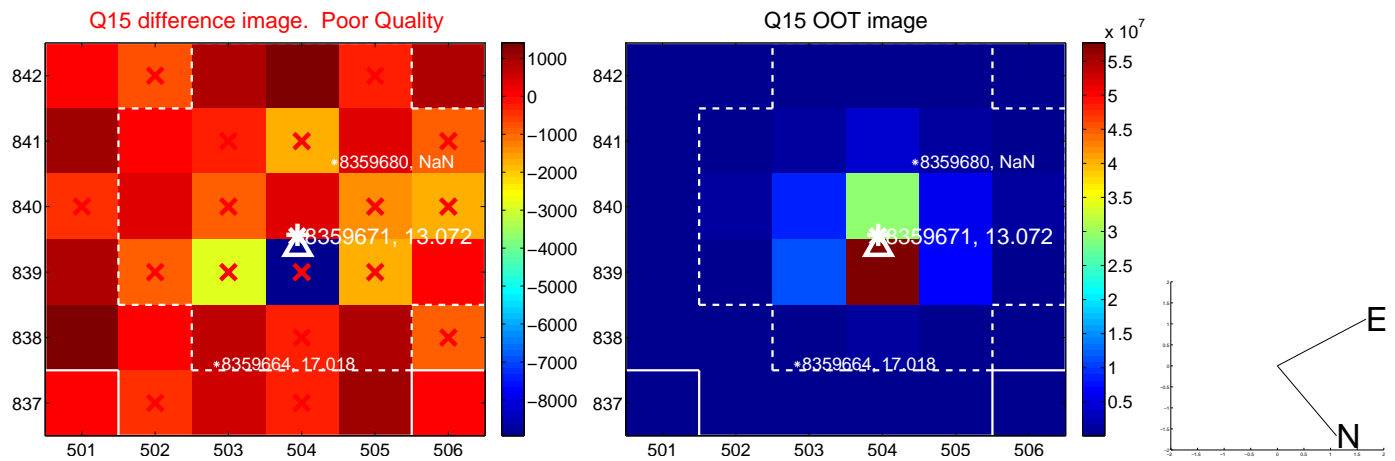
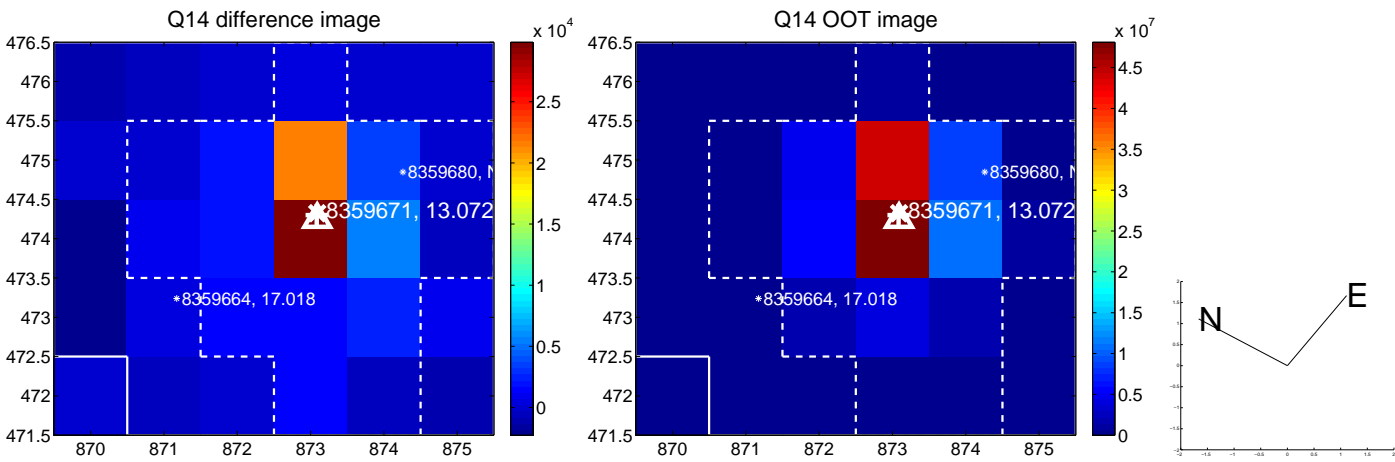
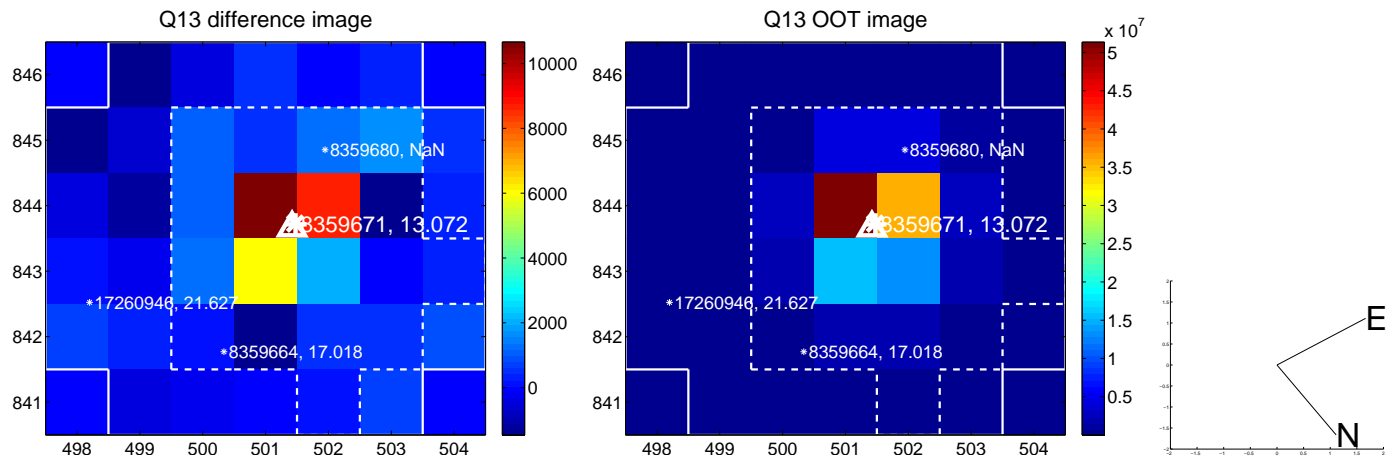




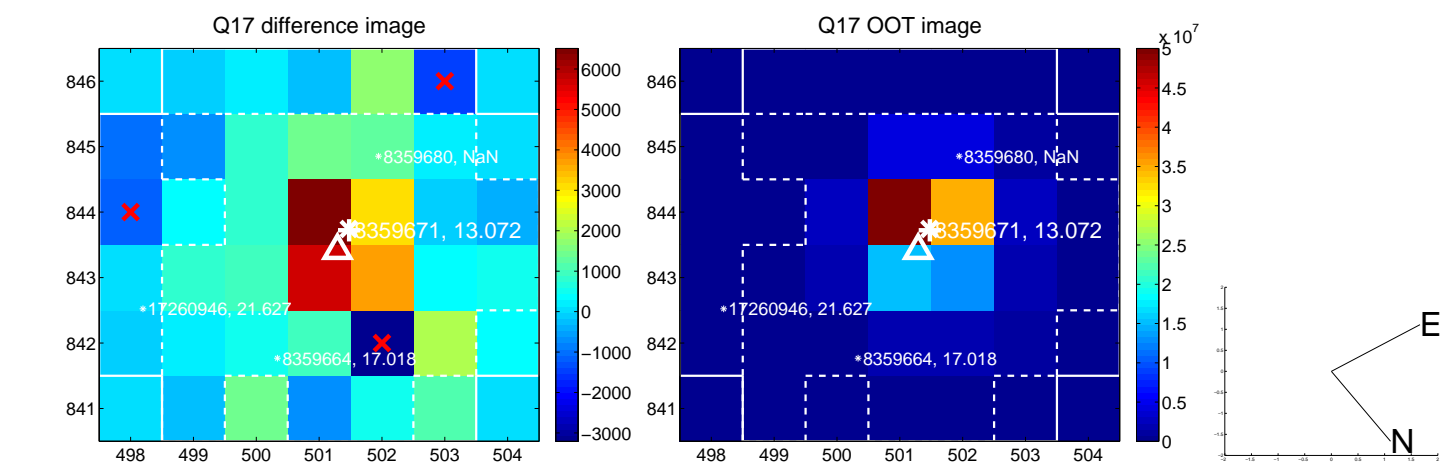
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



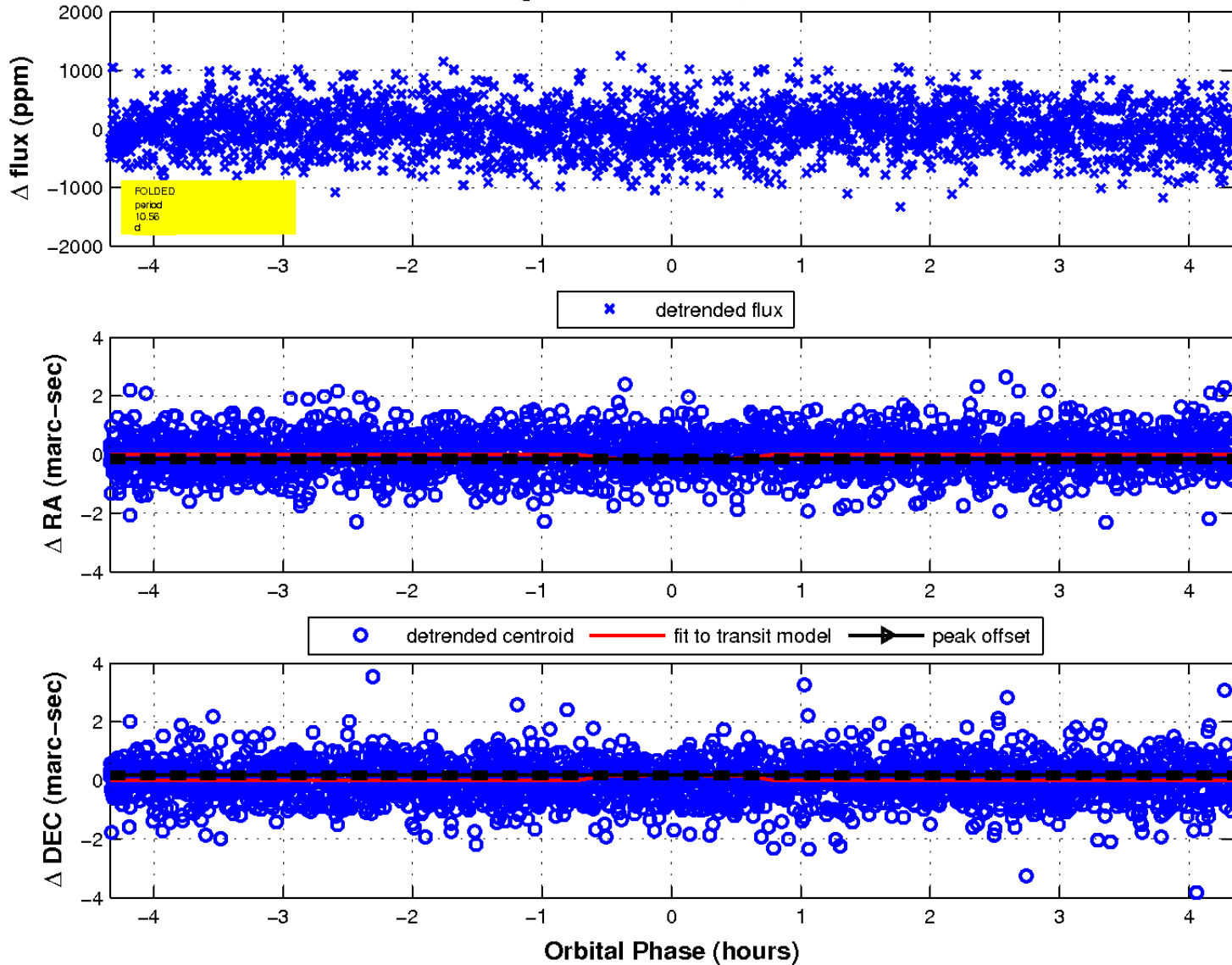
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



fluxWeightedCentroids, Planet 4 of 4



UKIRT Image

