

# KIC 003865595

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
003865595-01	OBS	3938.01	5.591856	132.879552	239.4	1.738	25.1	27.9	58.33	3915	114.71	0.00
003865595-02	OBS	No	5.591834	135.673762	69.0	1.683	7.6	8.3	58.33	3915	50.77	0.00

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
003865595-01	OBS	FP	0.00	0	1	1	0	PLANET_IN_STAR—HAS_SEC_TCE—CENT_UNRESOLVED_OFFSET
003865595-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE

**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.

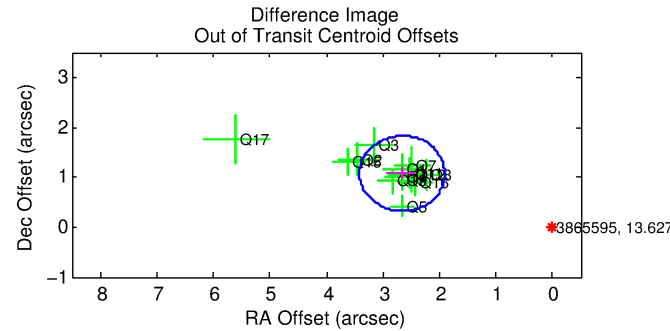
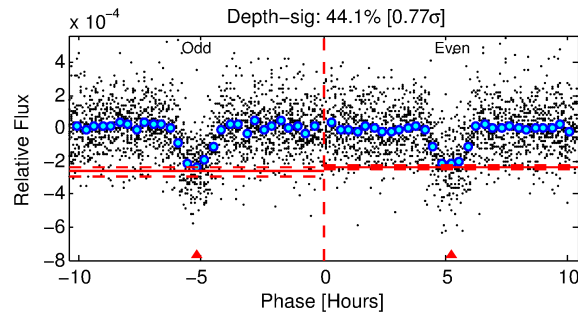
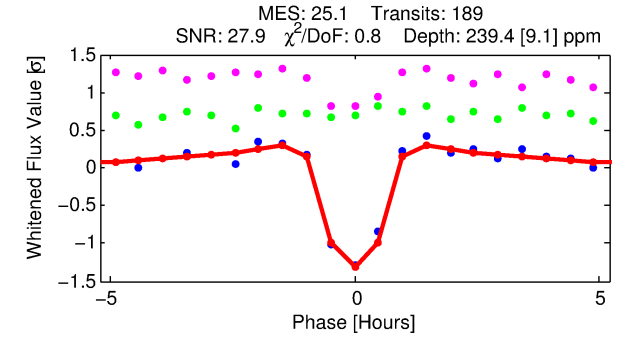
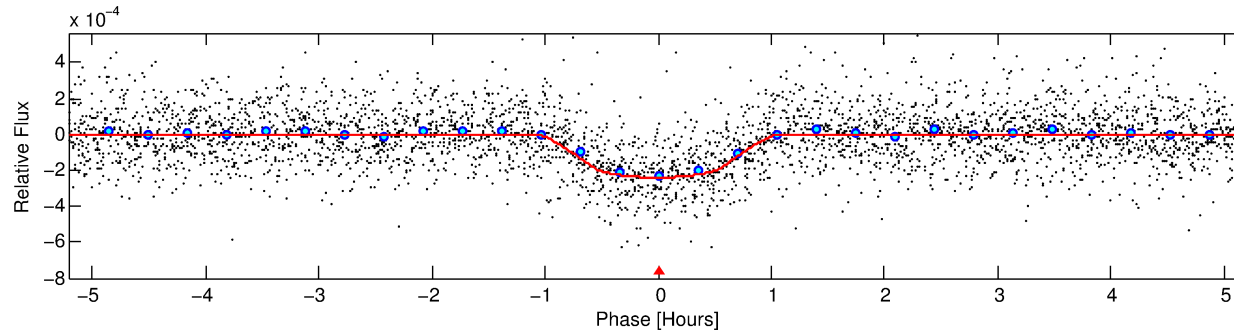
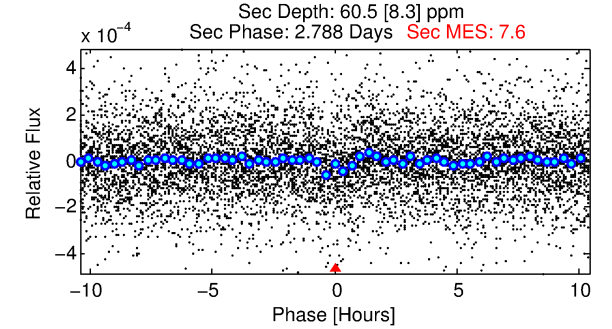
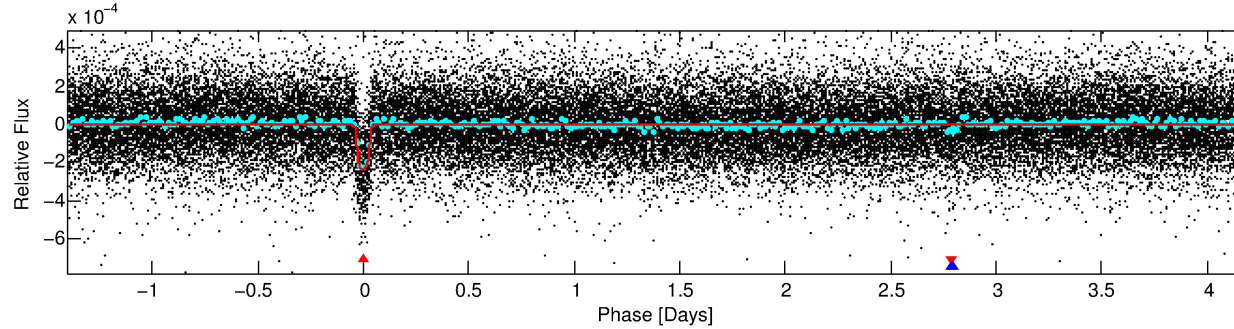
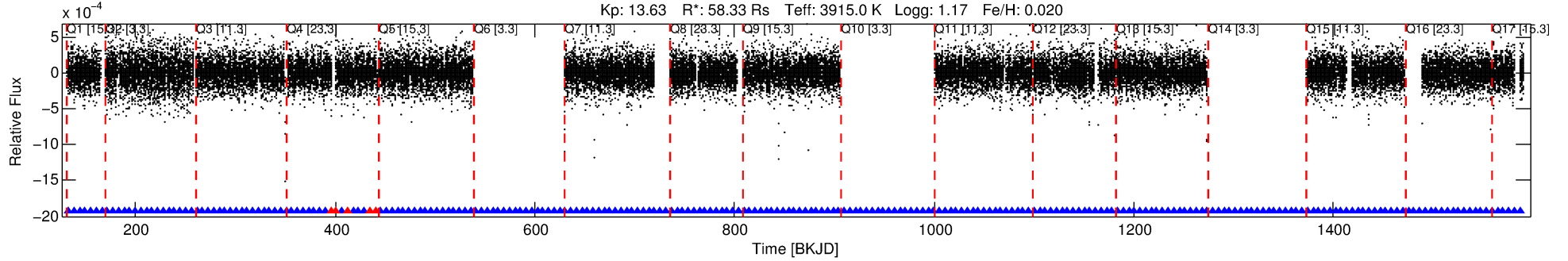
## Ephemeris Match Information For 003865595-01

No Significant Match Found

# DV One-Page Summary

KIC: 3865595 Candidate: 1 of 2 Period: 5.592 d

KOI: K03938.01 Corr: 0.967



## DV Fit Results:

Period = 5.59186 [0.00001] d  
Epoch = 132.8796 [0.0011] BKJD  
Rp/R\* = 0.0180 [0.0070]  
a/R\* = 11.73 [14.46]  
b = 0.90 [0.27]  
Seff = N/A  
Teq = N/A  
Rp = 114.71 [51.09] Re  
a = N/A  
Ag = N/A  
Teffp = N/A

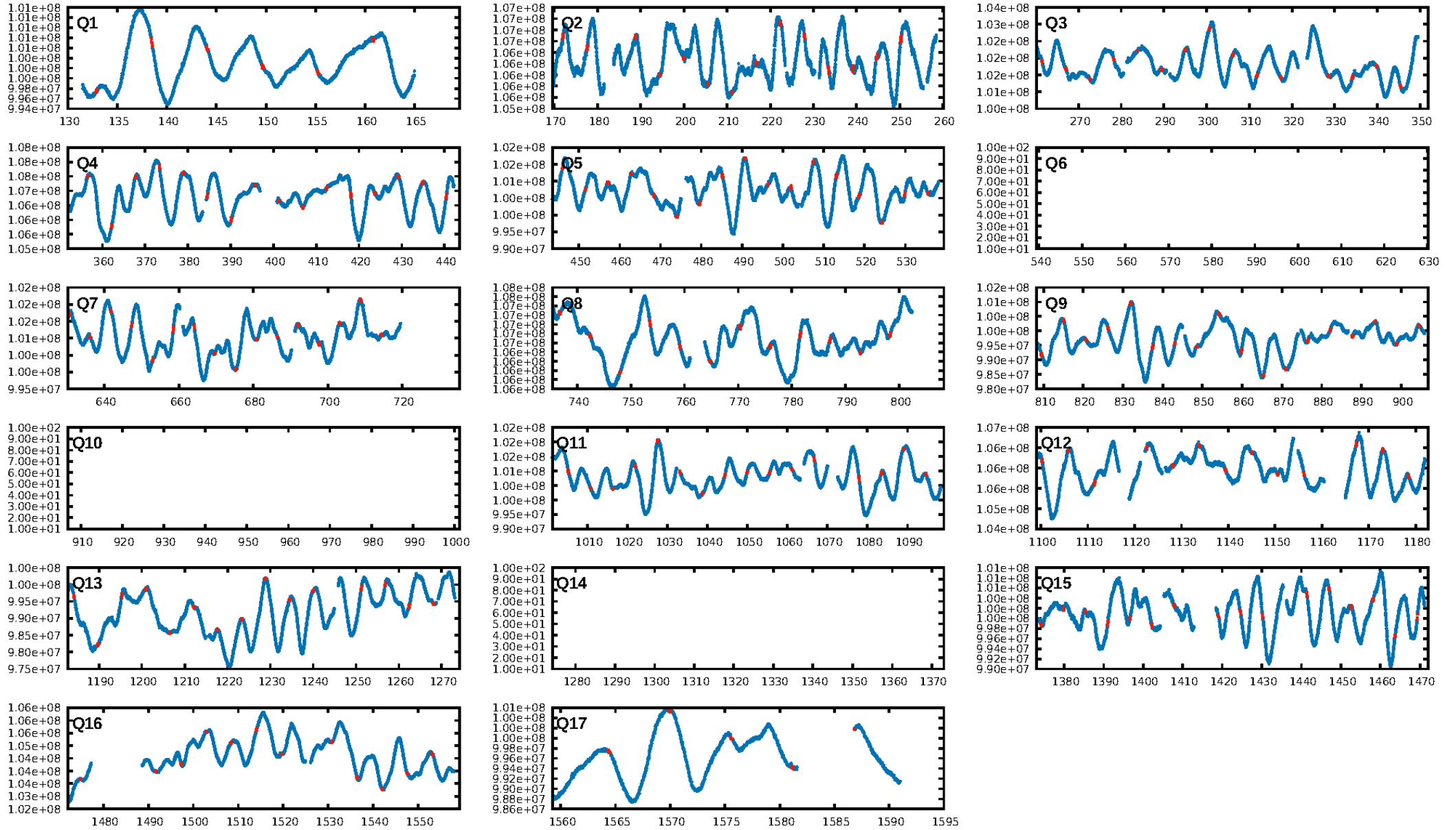
## DV Diagnostic Results:

**ShortPeriod-sig: 0.0% [0.00σ]**  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 100.0%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 2.69e-132  
RollingBand-fgt: 0.97 [174/179]  
GhostDiagnostic-chr: 1.424  
**Centroid-sig: 0.0%**  
Centroid-so: 2.242 arcsec [5.00σ]  
OotOffset-rm: 2.870 arcsec [11.41σ]  
KicOffset-rm: 2.942 arcsec [12.00σ]  
OotOffset-st: 1/4/4/5 [14]  
KicOffset-st: 1/4/4/5 [14]  
DiffImageQuality-fgm: 0.93 [13/14]  
DiffImageOverlap-fno: 1.00 [14/14]

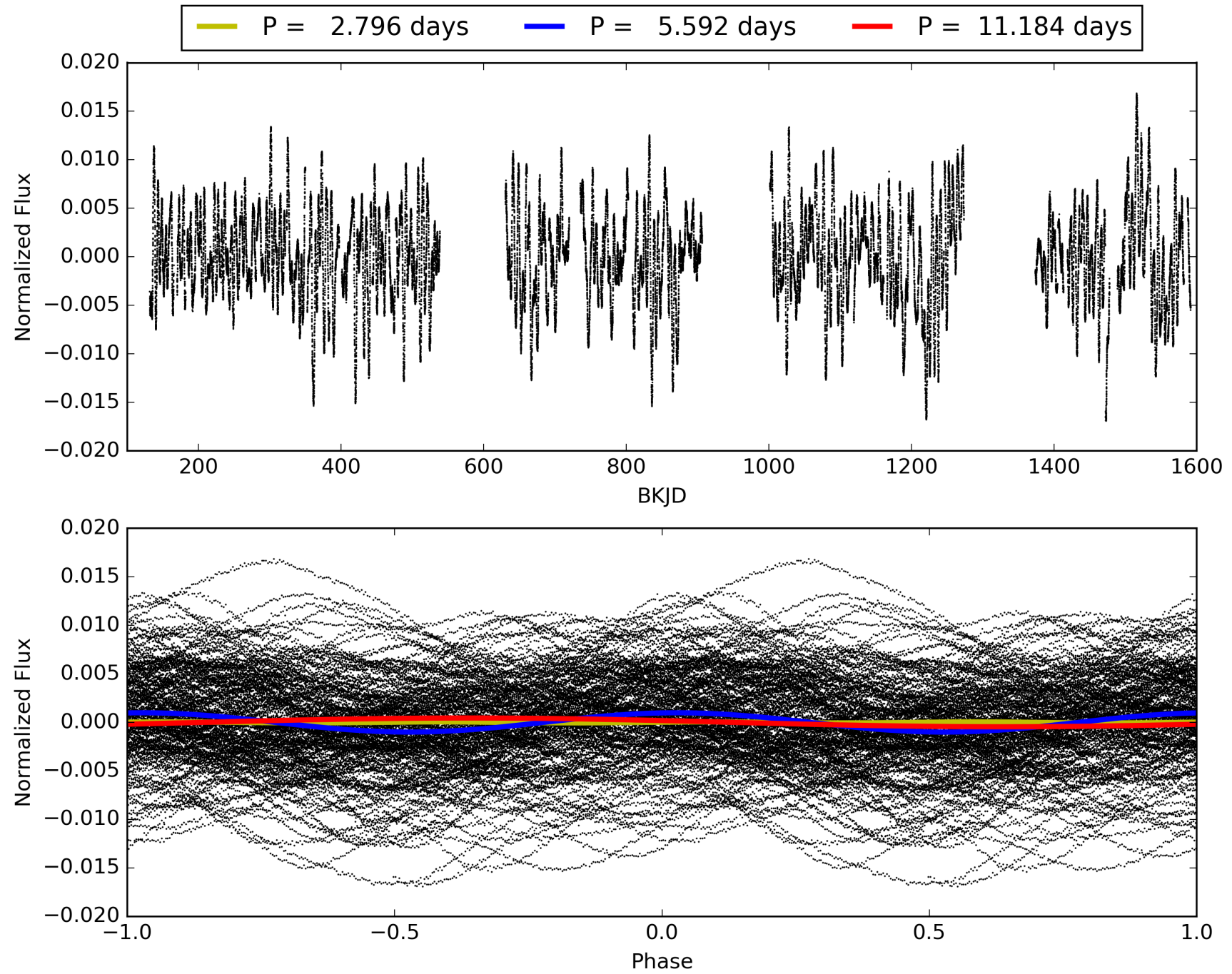
Software Revision: svn-ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 02:18:09 Z

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

# TCE 003865595-01, PDC Light Curves

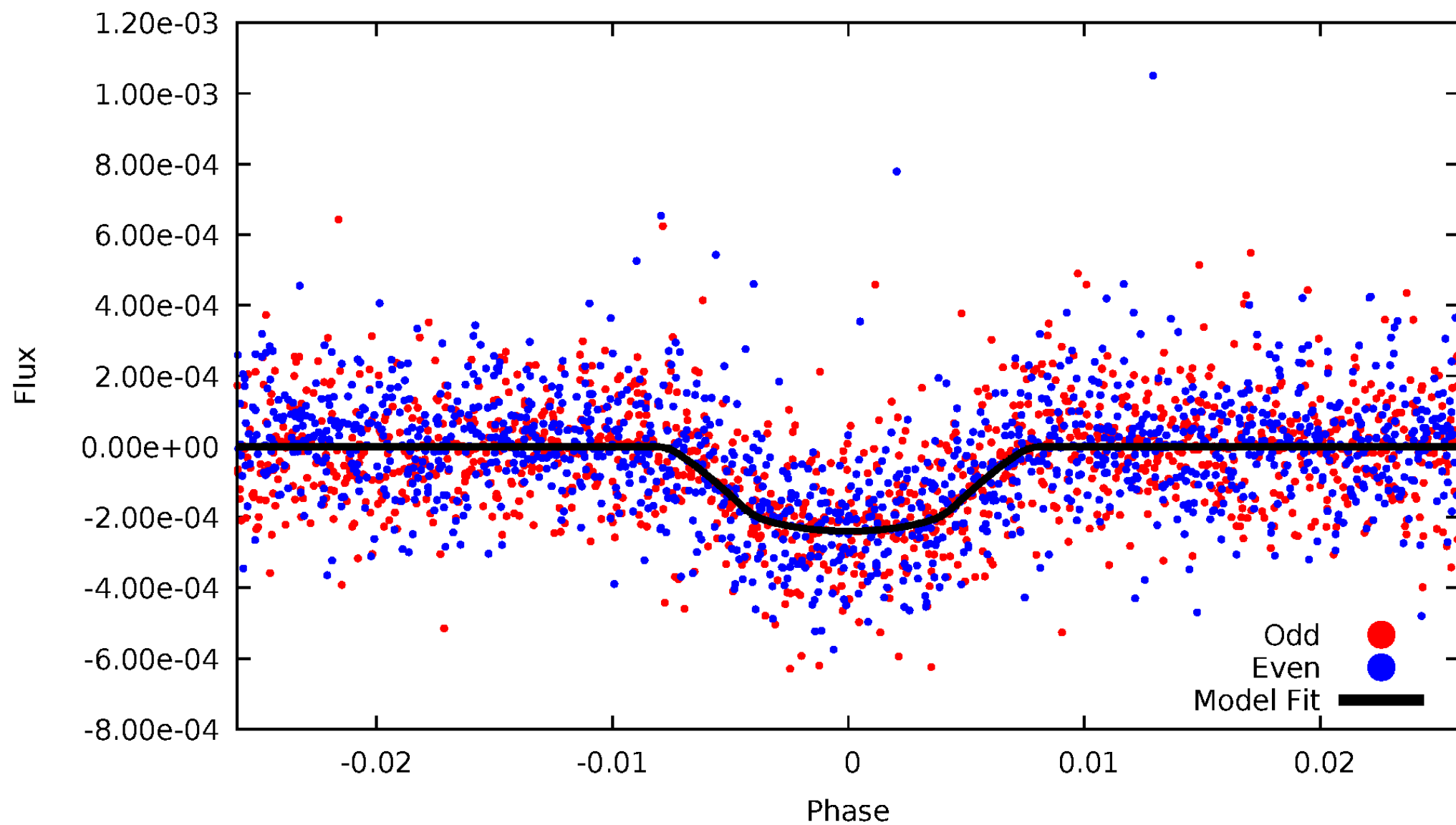


TCE 003865595-01



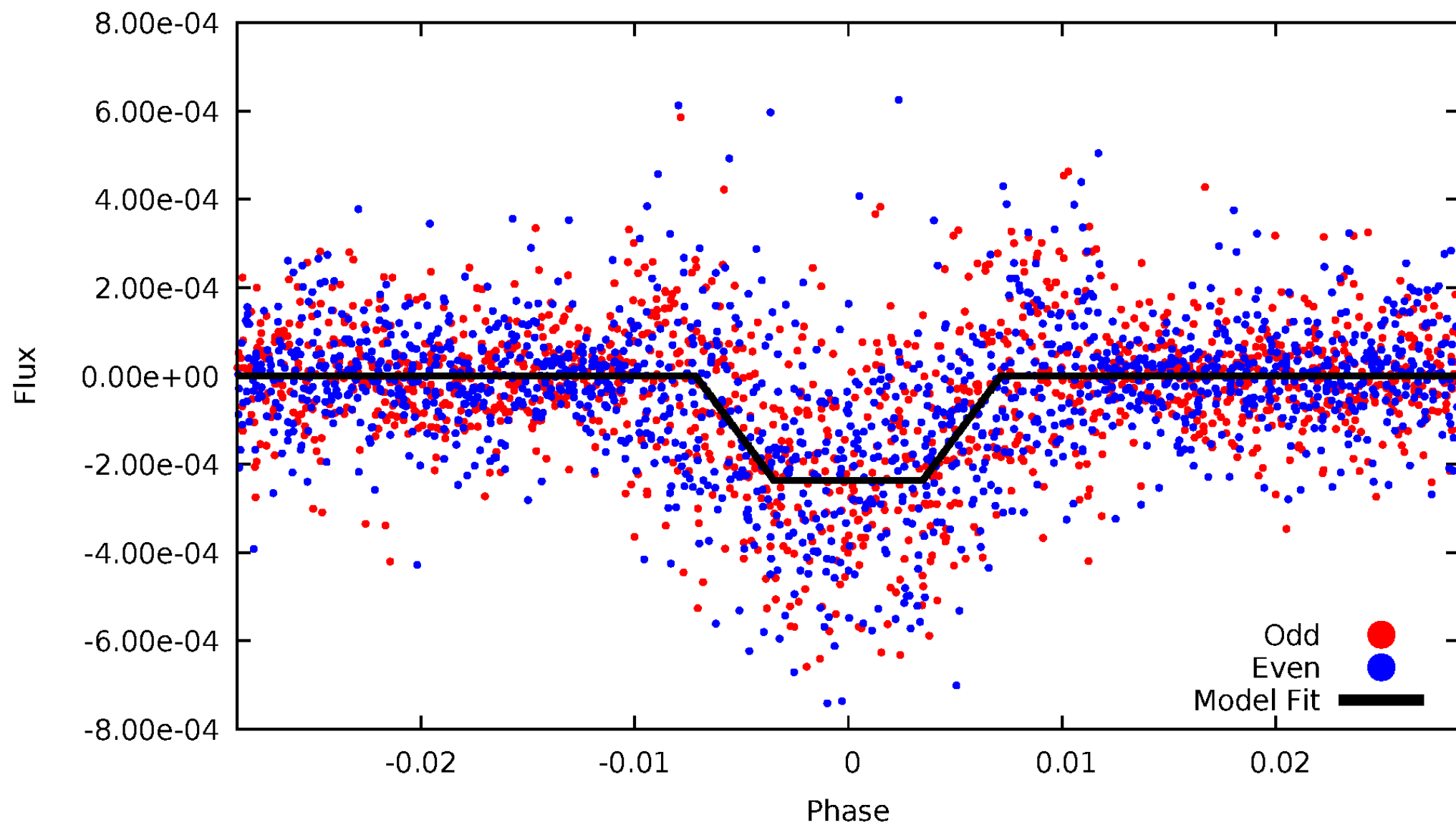
# DV Odd/Even

TCE 003865595-01



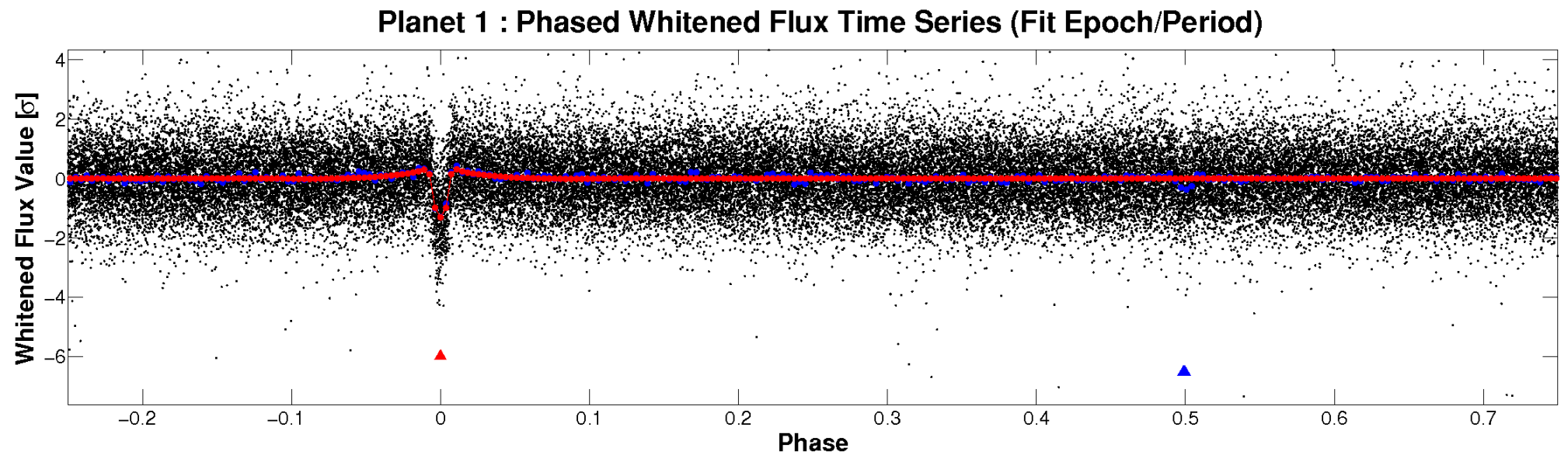
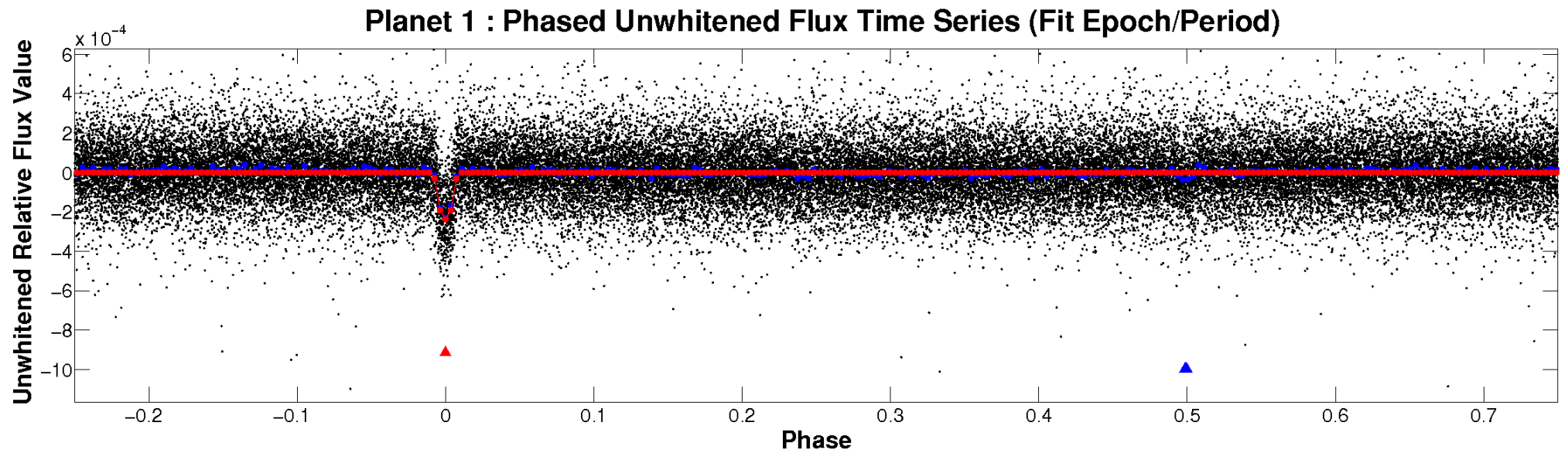
# ALT Odd/Even

TCE 003865595-01



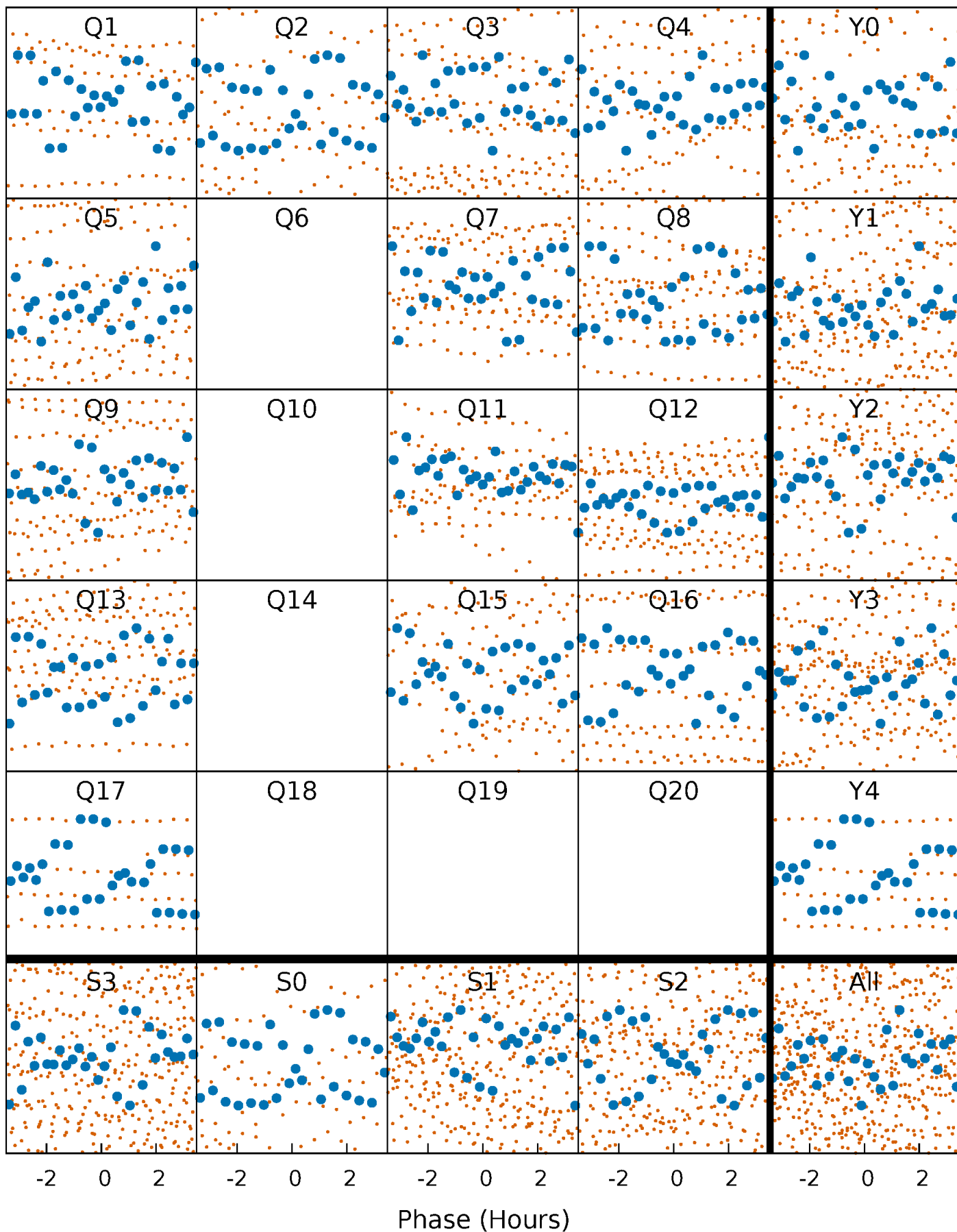


# Non-Whitened Vs. Whitened Light Curve



# PDC Quarter-Phased Transit Curves

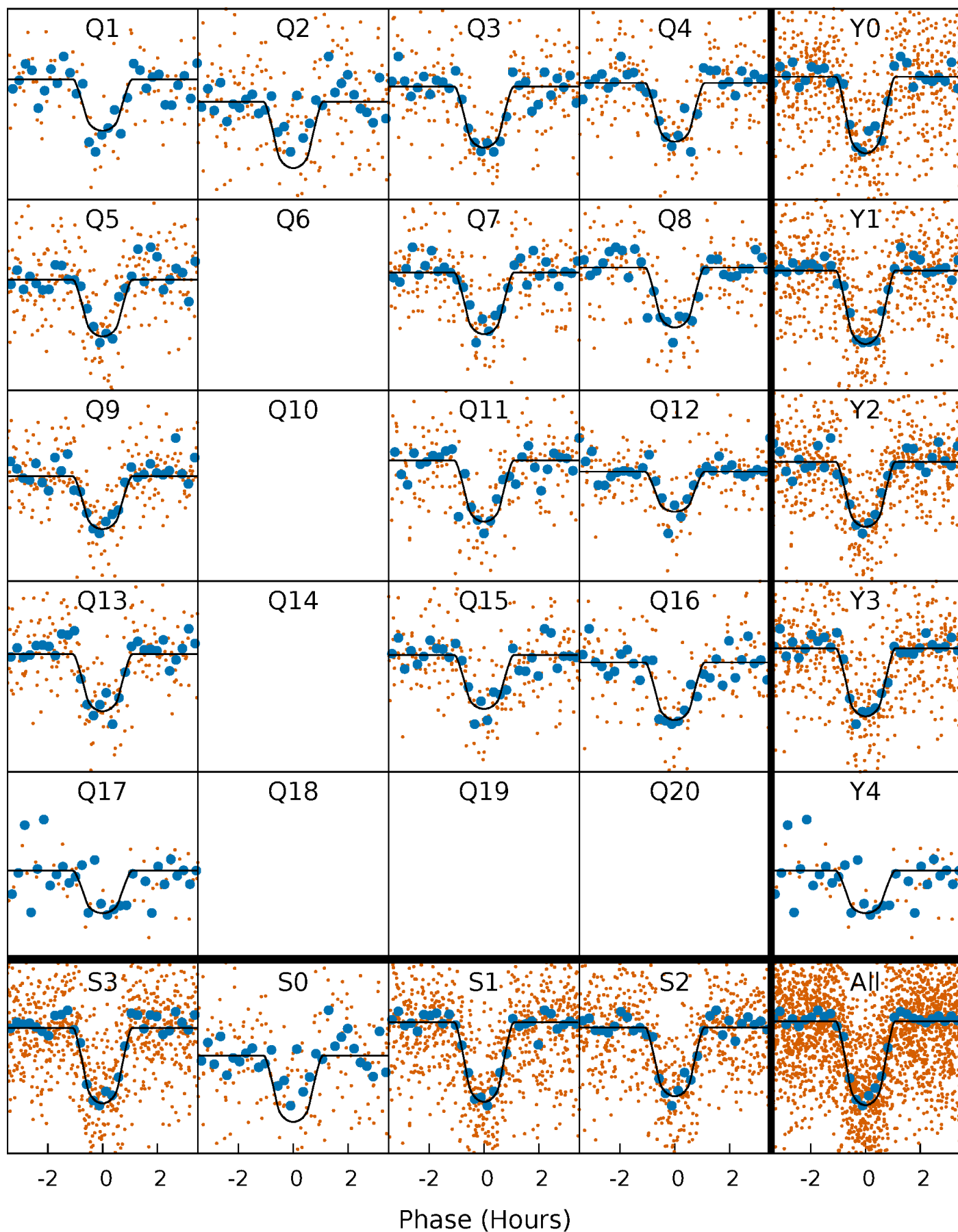
TCE 003865595-01 P= 5.591856 Days  $T_0=132.879552$  (BKJD)





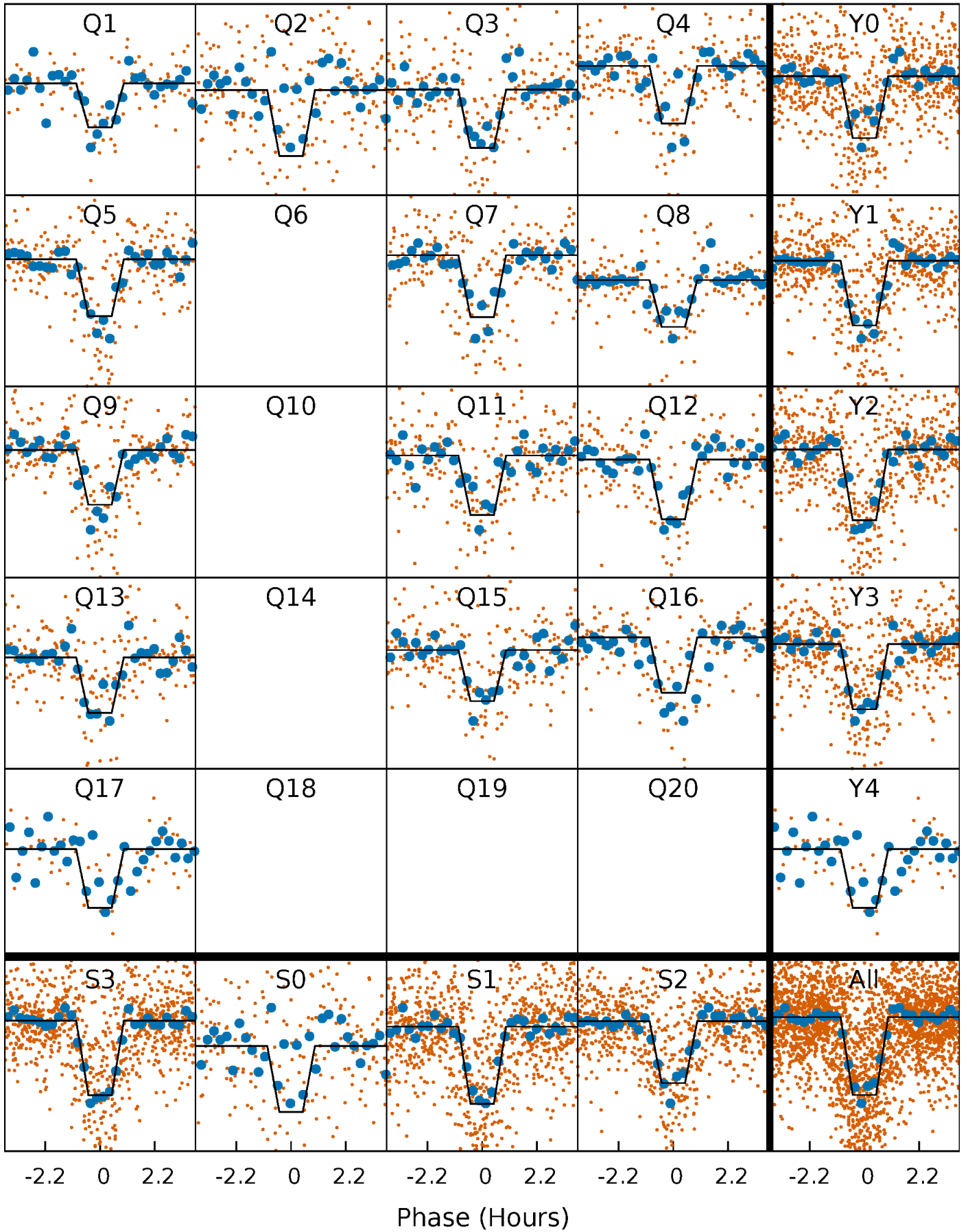
# DV Quarter-Phased Transit Curves

TCE 003865595-01 P= 5.591856 Days  $T_0=132.879552$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

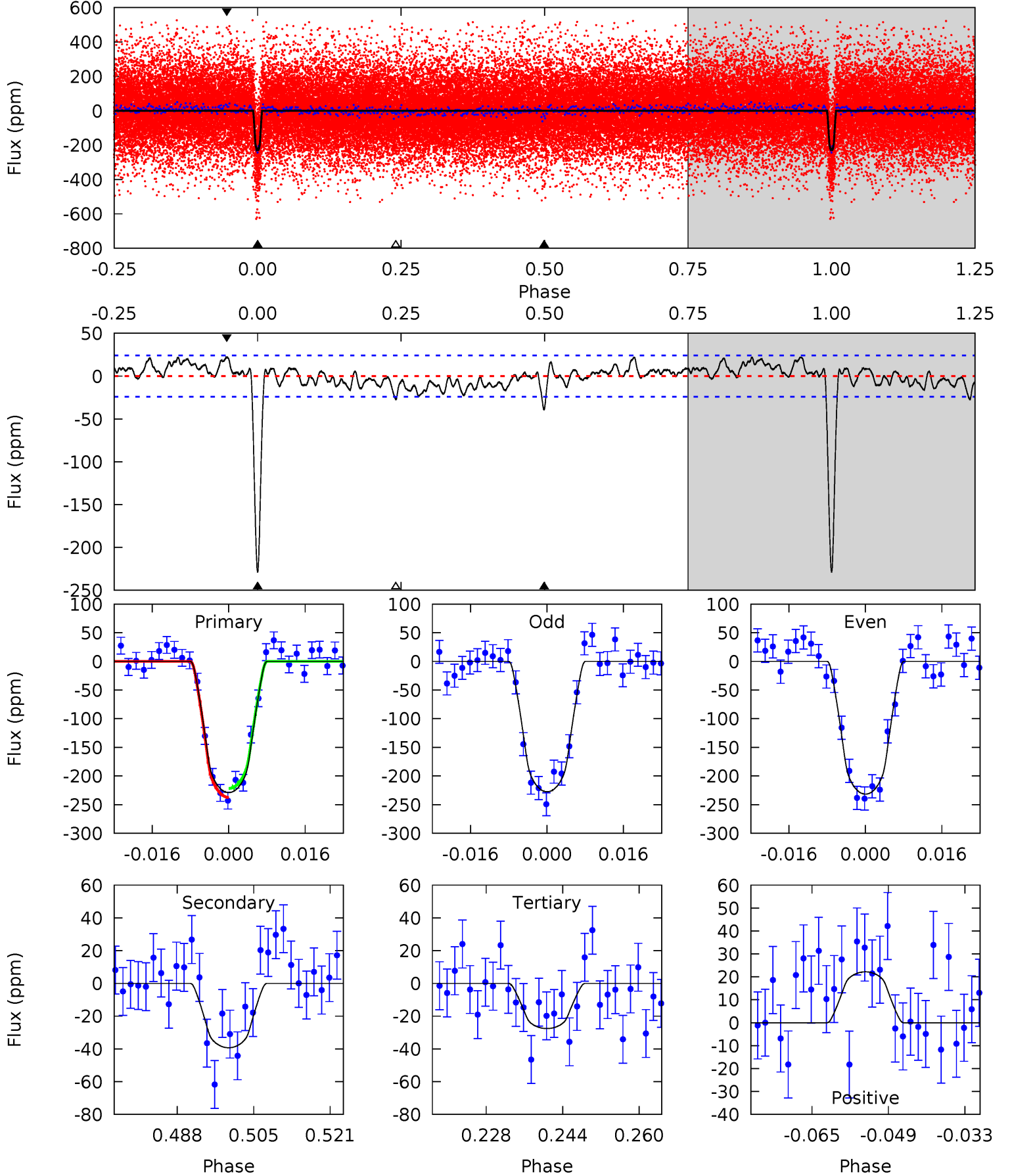
TCE 003865595-01 P= 5.591867 Days  $T_0=132.877394$  (BKJD)



# DV Model-Shift Uniqueness Test

003865595-01, P = 5.591856 Days, E = 127.287696 Days

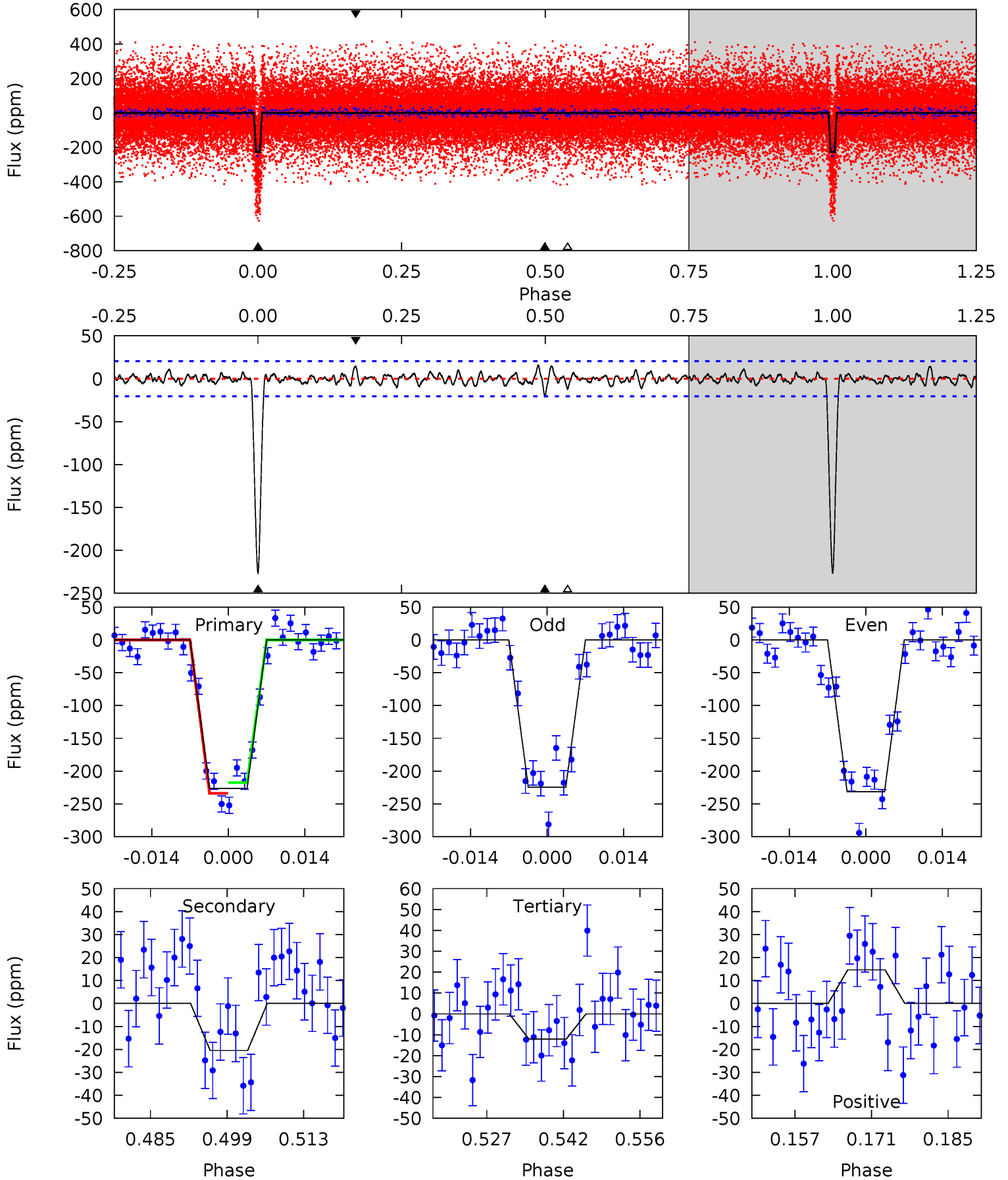
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
46.8	8.03	5.64	4.53	4.93	2.40	2.03	41.1	42.2	2.39	3.50	0.42	0.97	0.09	1.60



# Alt Model-Shift Uniqueness Test

003865595-01, P = 5.591867 Days, E = 127.285527 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
54.8	4.96	2.91	3.53	4.96	2.45	0.99	51.9	51.2	2.05	1.43	0.82	1.02	0.07	1.97



### Stellar Parameters For KIC 003865595

	$T_{\text{eff}}(K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$3915^{+78}_{-107}$	$1.173^{+0.030}_{-0.027}$	$0.020^{+0.200}_{-0.250}$	$58.325^{+2.800}_{-12.598}$	$1.846^{+1.266}_{-0.724}$	$0.000^{+0.000}_{-0.000}$
	+2%/-3%	+3%/-2%	+1000%/-1250%	+5%/-22%	+69%/-39%	+32%/-8%
Source	PHO54	AST54	PHO54	DSEP		

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

### Secondary Eclipse Parameters for KIC 003865595-01 / KOI 3938.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-39 \pm 5$	$108.54^{+49.06}_{-44.47}$	$6661^{+179}_{-224}$	$-4981^{+212}_{-166}$	$0.010^{+0.019}_{-0.005}$
Alt.	$-20 \pm 4$	$95.64^{+43.90}_{-46.06}$	$6655^{+196}_{-223}$	$-4988^{+218}_{-177}$	$0.007^{+0.016}_{-0.004}$

$T_{\text{max}}$  = 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

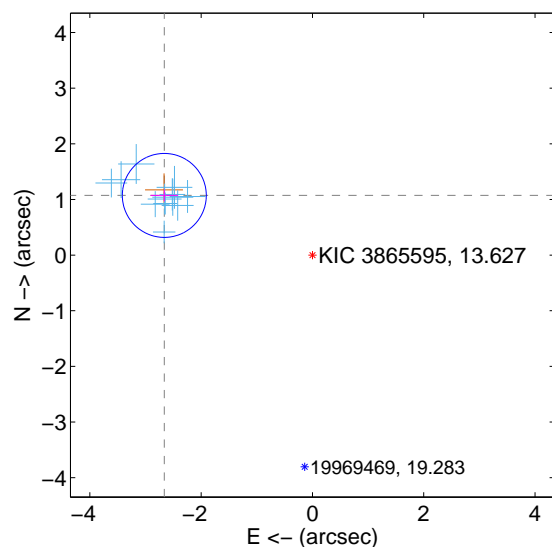
Supplemental centroid analysis for 003865595-01. Kepler magnitude: 13.63. Transit SNR 27.88

There are 13 quarters with good PRF difference image offsets

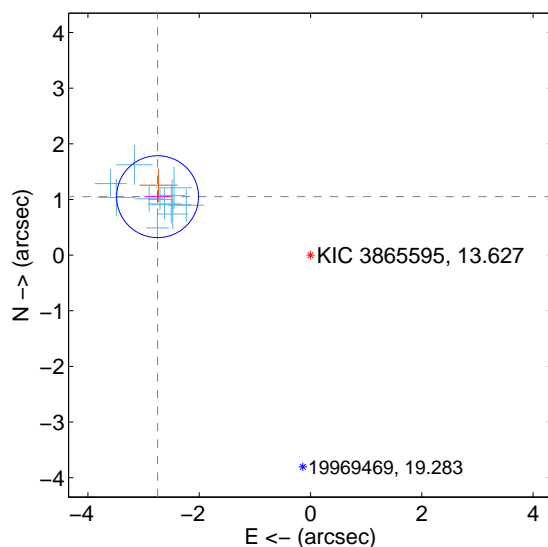
The direct PRF centroid is offset from the target star catalog position by about 0.09 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$2.870 \pm 0.251$	11.41	$2.662 \pm 0.247$	$1.073 \pm 0.107$
PRF-fit source offset from KIC position	$2.942 \pm 0.245$	12.00	$2.748 \pm 0.236$	$1.050 \pm 0.114$
photometric centroid source offset	$2.24 \pm 0.45$	5.00	$2.21 \pm 0.45$	$0.36 \pm 0.45$

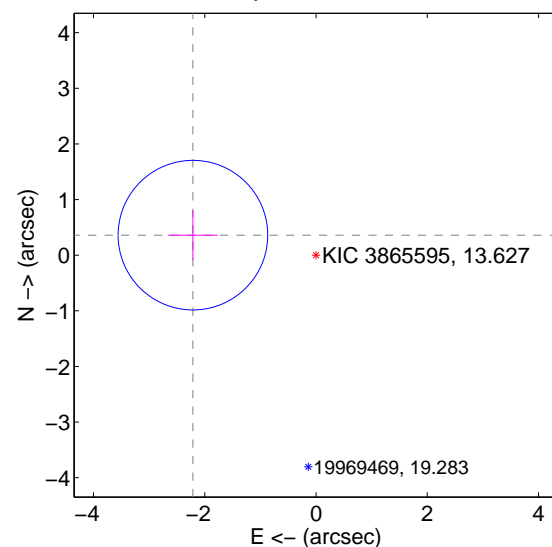
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position



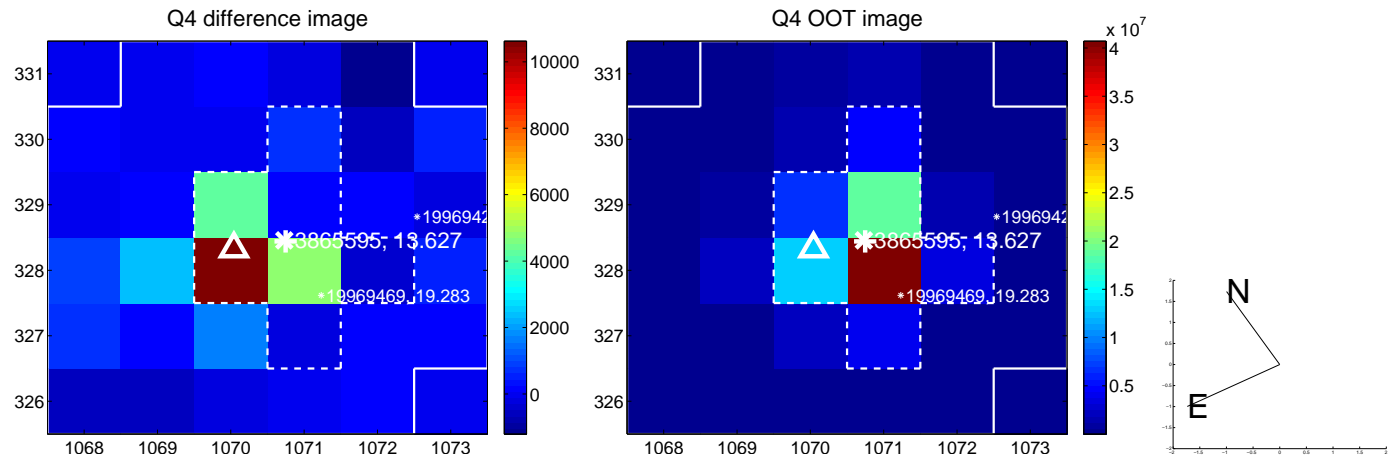
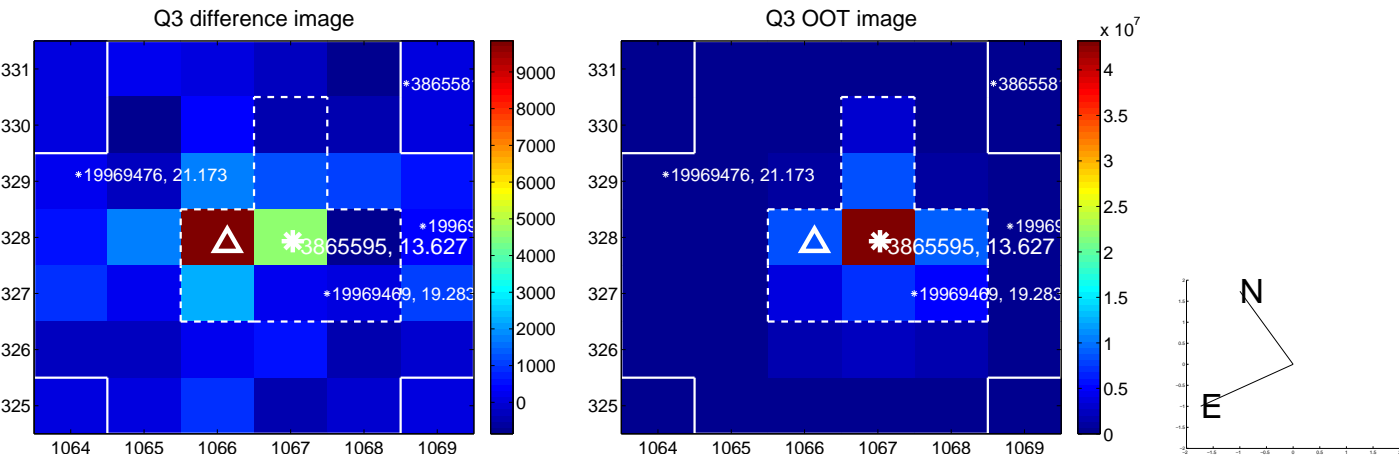
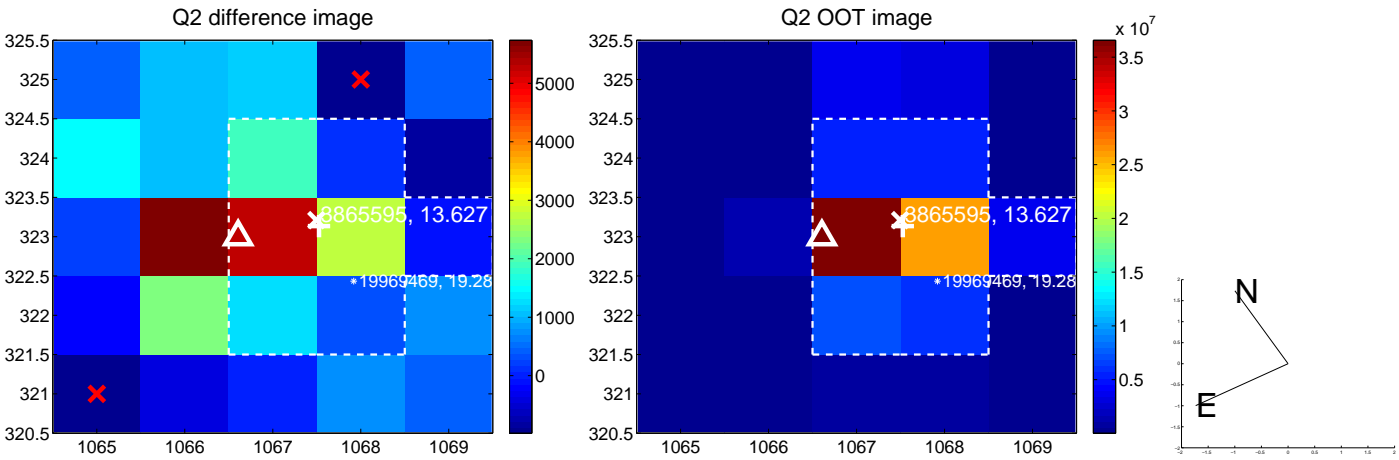
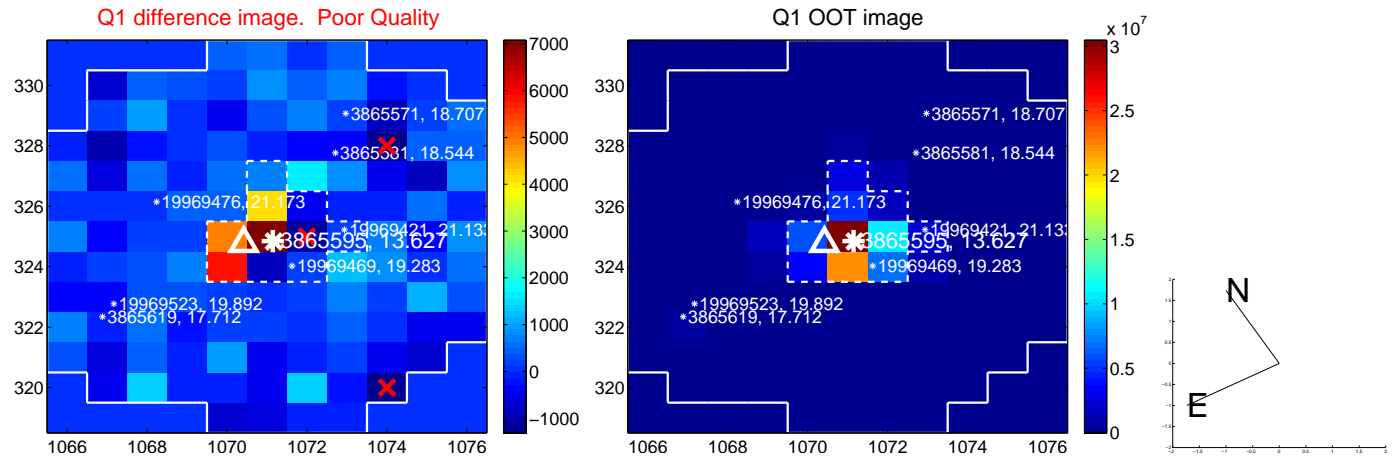
offset from photometric centroids



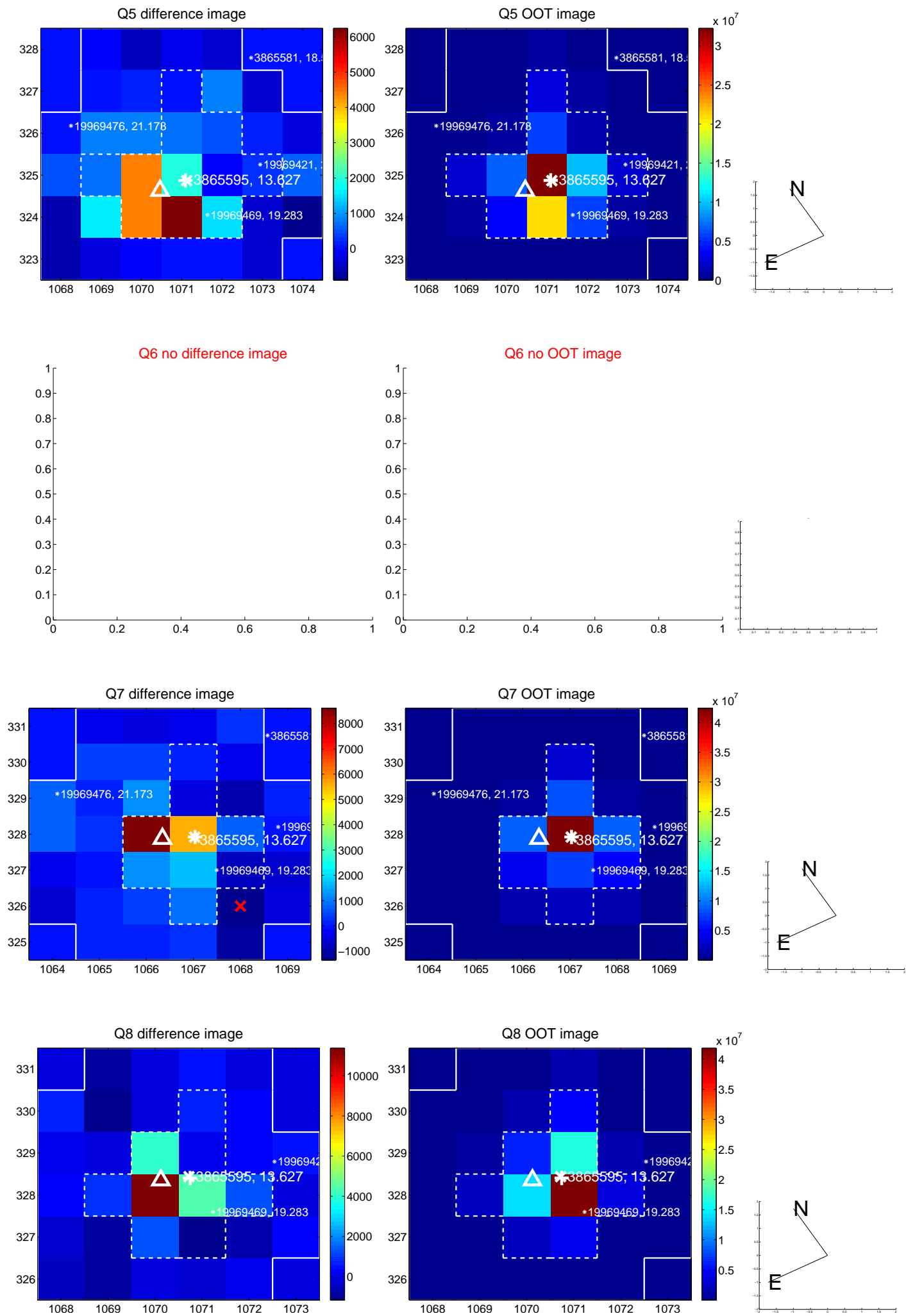
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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



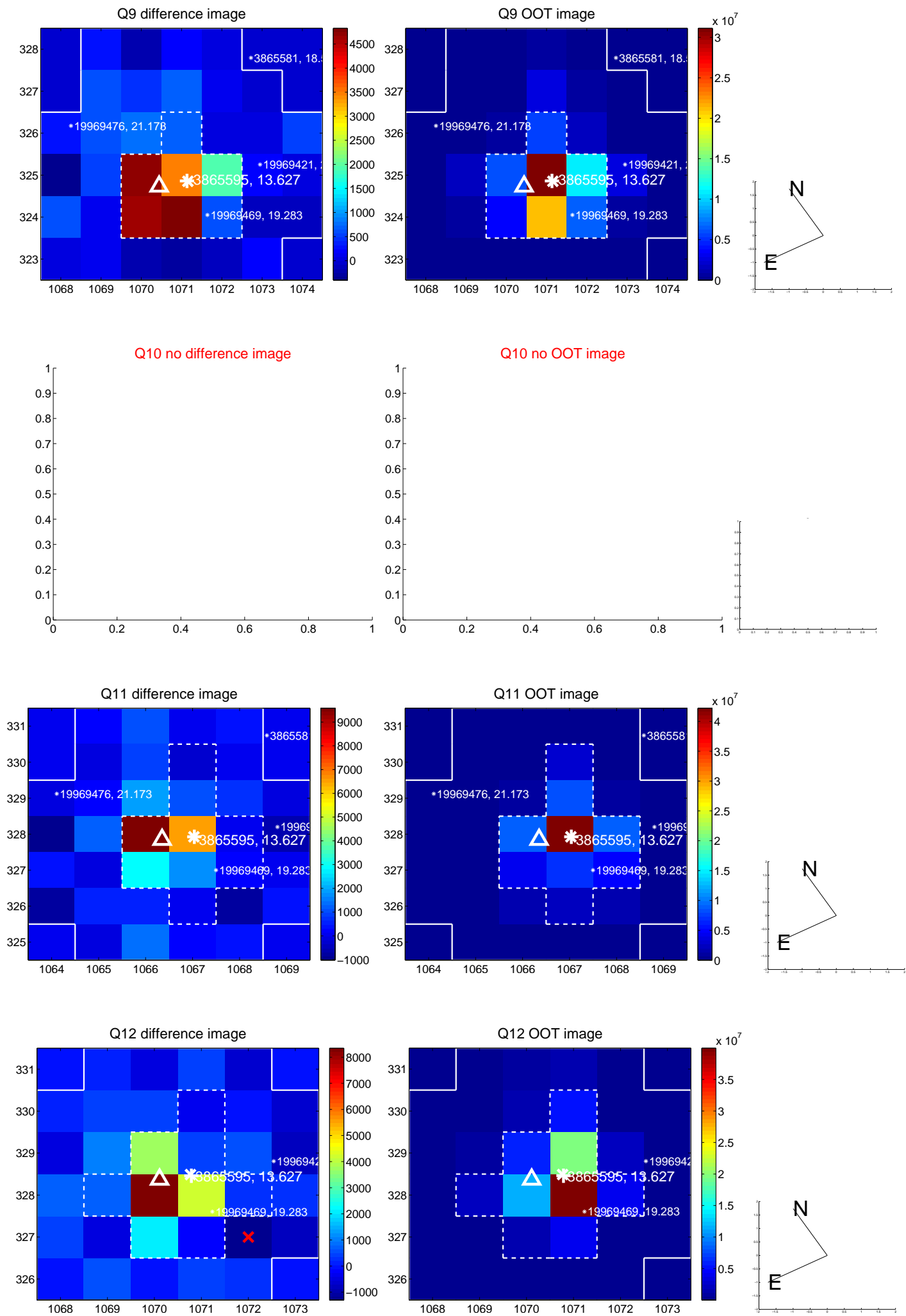
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



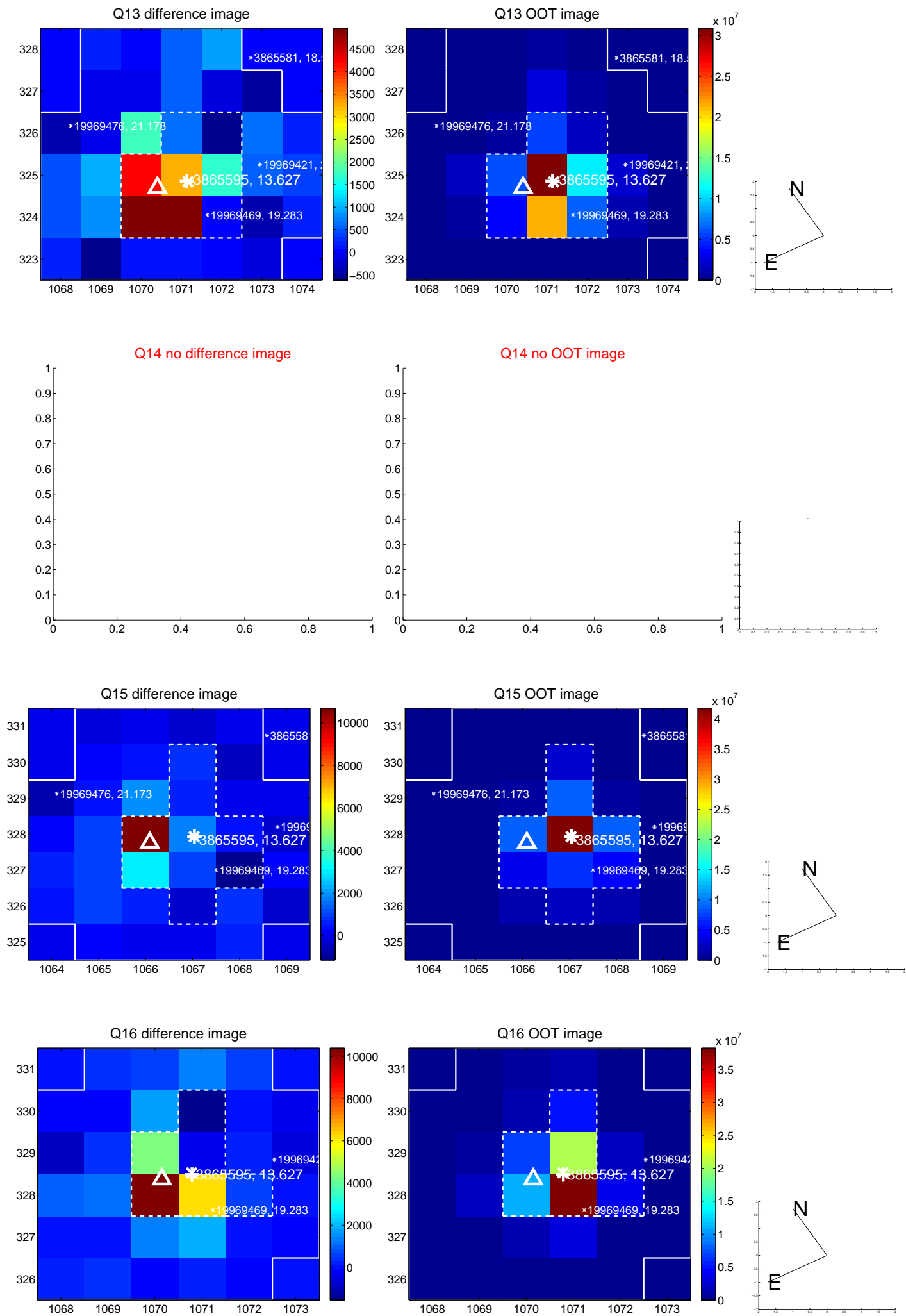
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



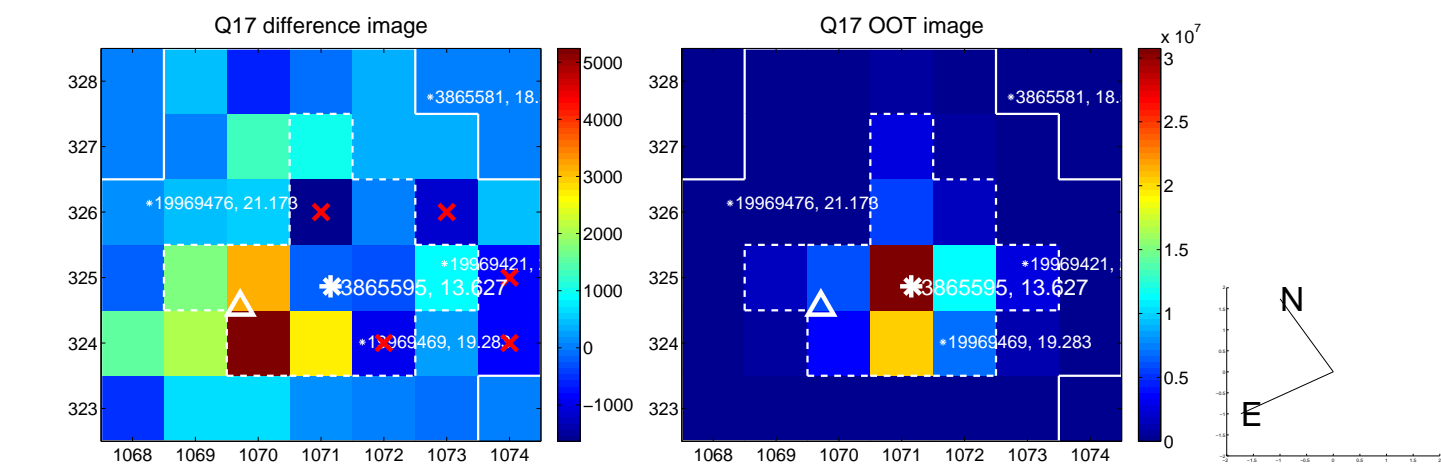
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



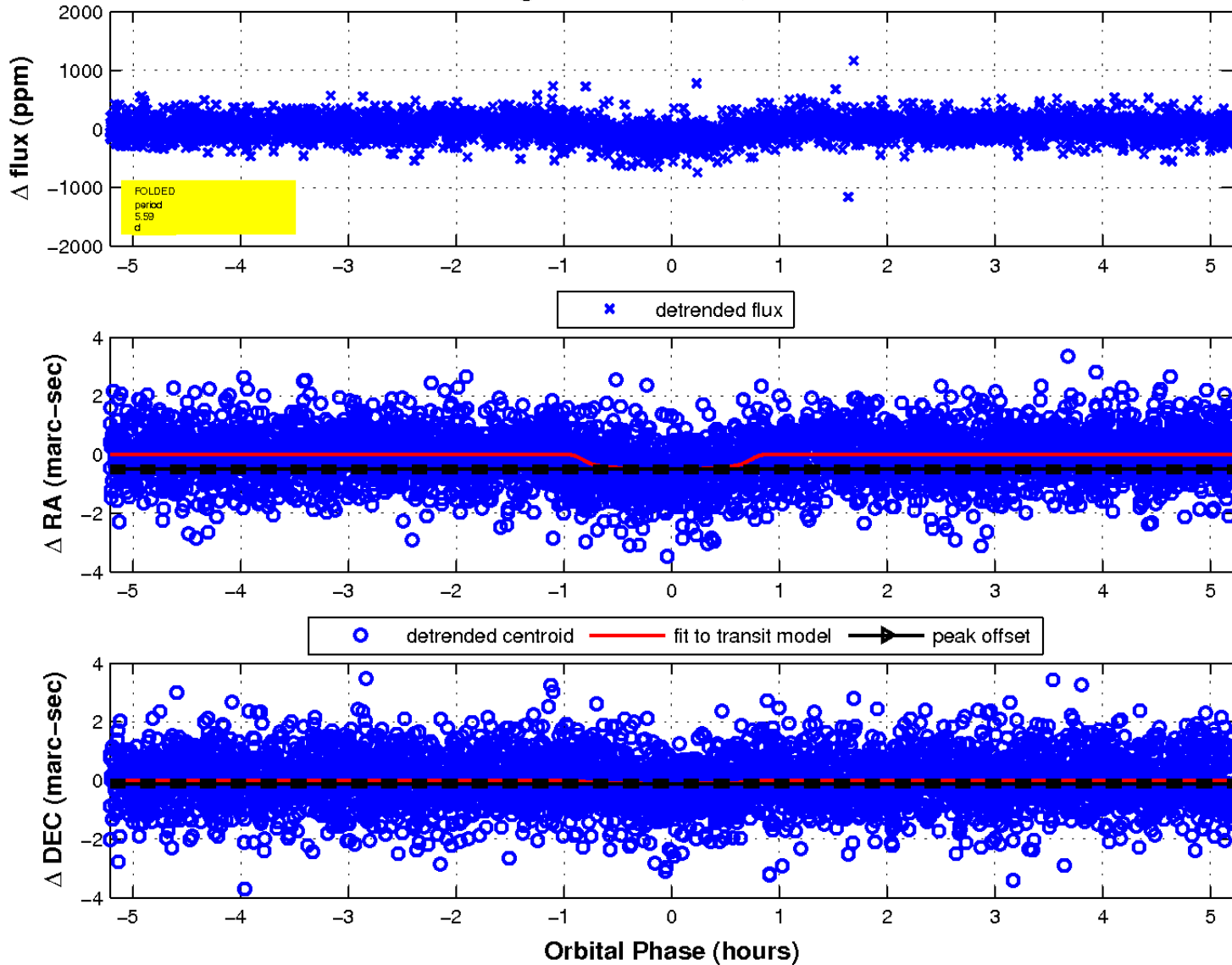
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

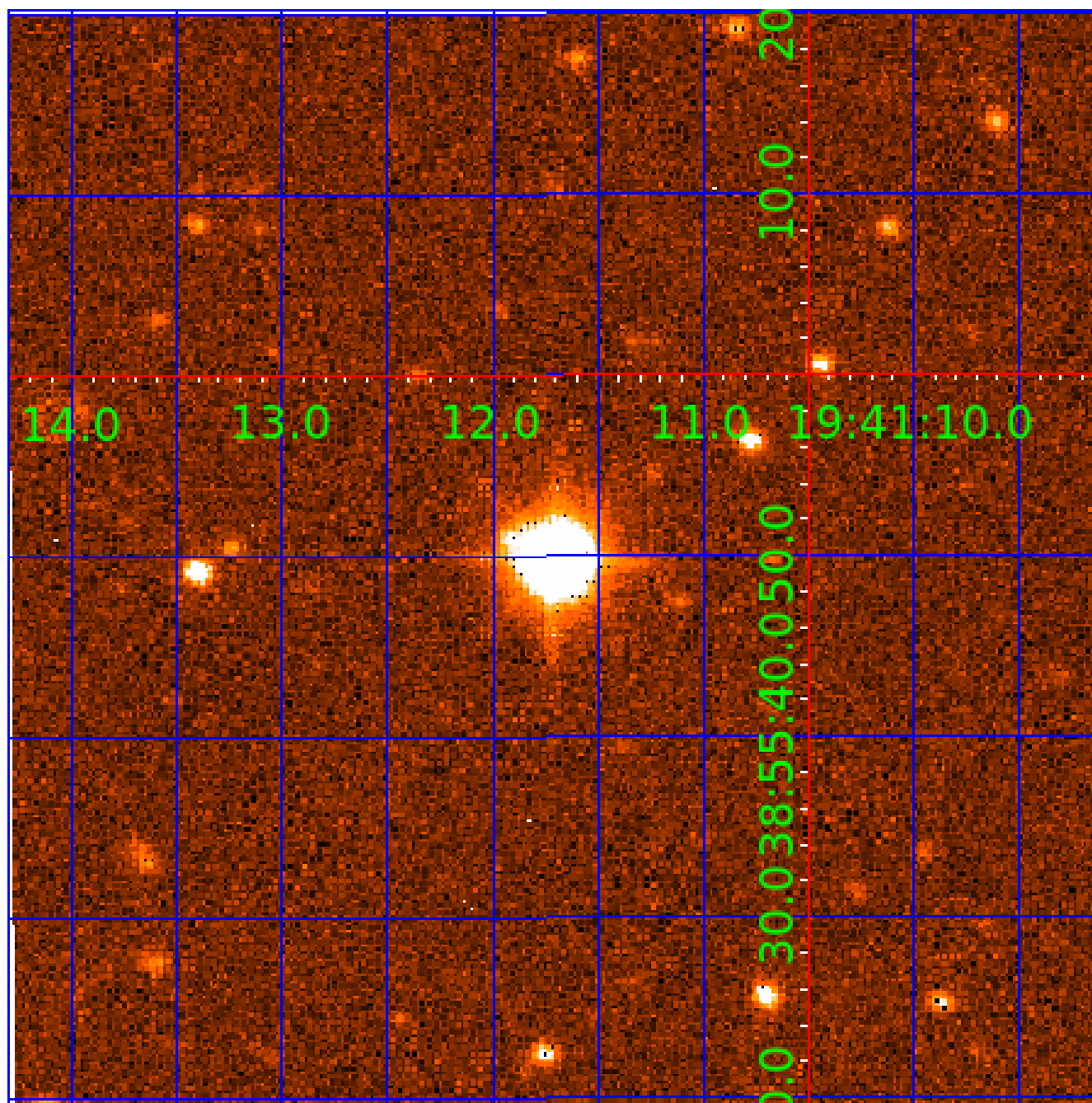


fluxWeightedCentroids, Planet 1 of 2



UKIRT Image

Declination





# KIC 003865595

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
003865595-01	OBS	3938.01	5.591856	132.879552	239.4	1.738	25.1	27.9	58.33	3915	114.71	0.00
003865595-02	OBS	No	5.591834	135.673762	69.0	1.683	7.6	8.3	58.33	3915	50.77	0.00

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
003865595-01	OBS	FP	0.00	0	1	1	0	PLANET_IN_STAR—HAS_SEC_TCE—CENT_UNRESOLVED_OFFSET
003865595-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE

**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 003865595-02

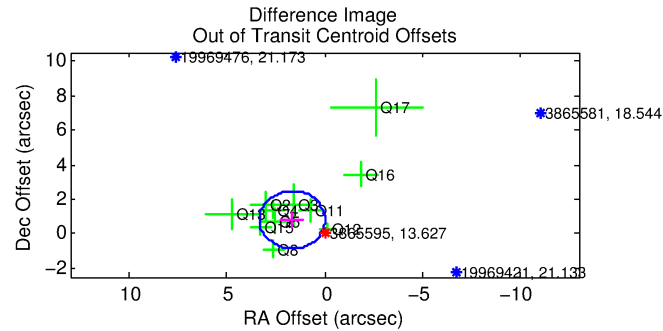
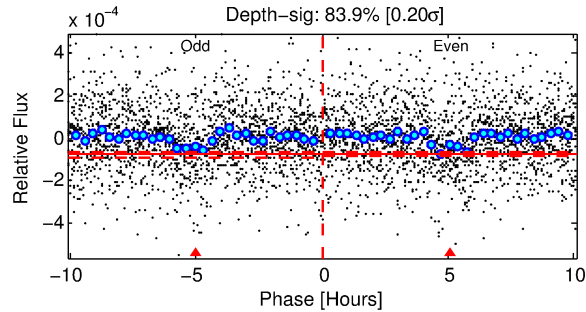
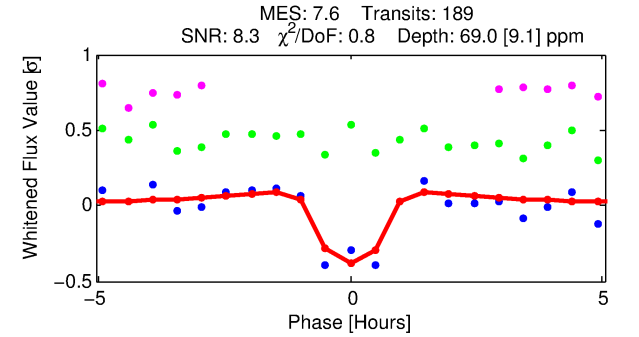
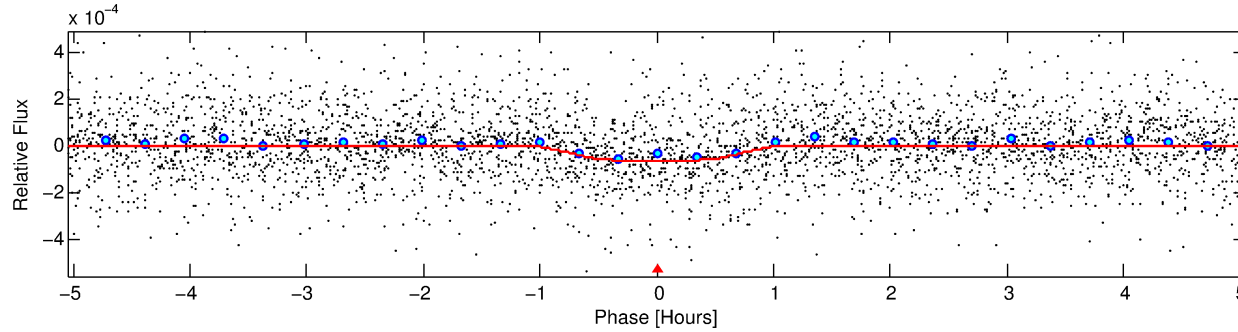
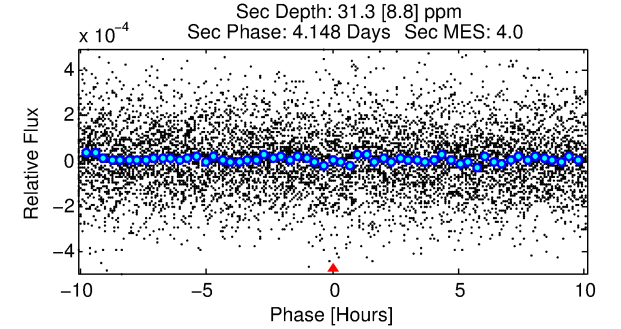
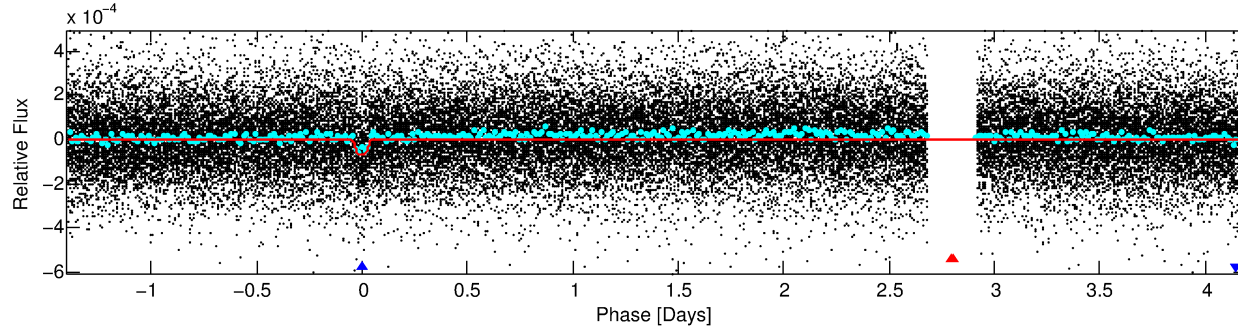
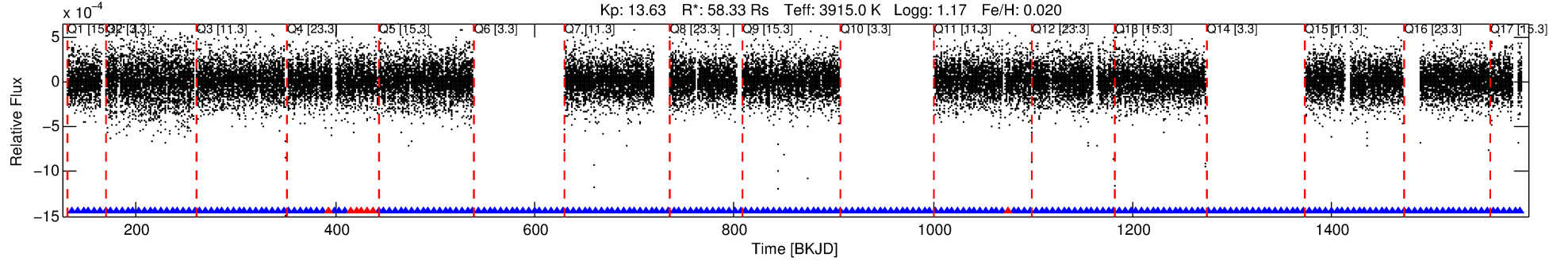
No Significant Match Found

# DV One-Page Summary

KIC: 3865595 Candidate: 2 of 2 Period: 5.592 d

KOI: K03938 Corr: No Ephemeris Match

Kp: 13.63 R\*: 58.33 Rs Teff: 3915.0 K Logg: 1.17 Fe/H: 0.020



## DV Fit Results:

Period = 5.59183 [0.00003] d  
Epoch = 135.6738 [0.0040] BKJD  
Rp/R\* = 0.0080 [0.0066]  
a/R\* = 19.56 [40.61]  
b = 0.65 [1.92]  
Seff = N/A  
Teq = N/A  
Rp = 50.77 [43.22] Re  
a = N/A  
Ag = N/A  
Teffp = N/A

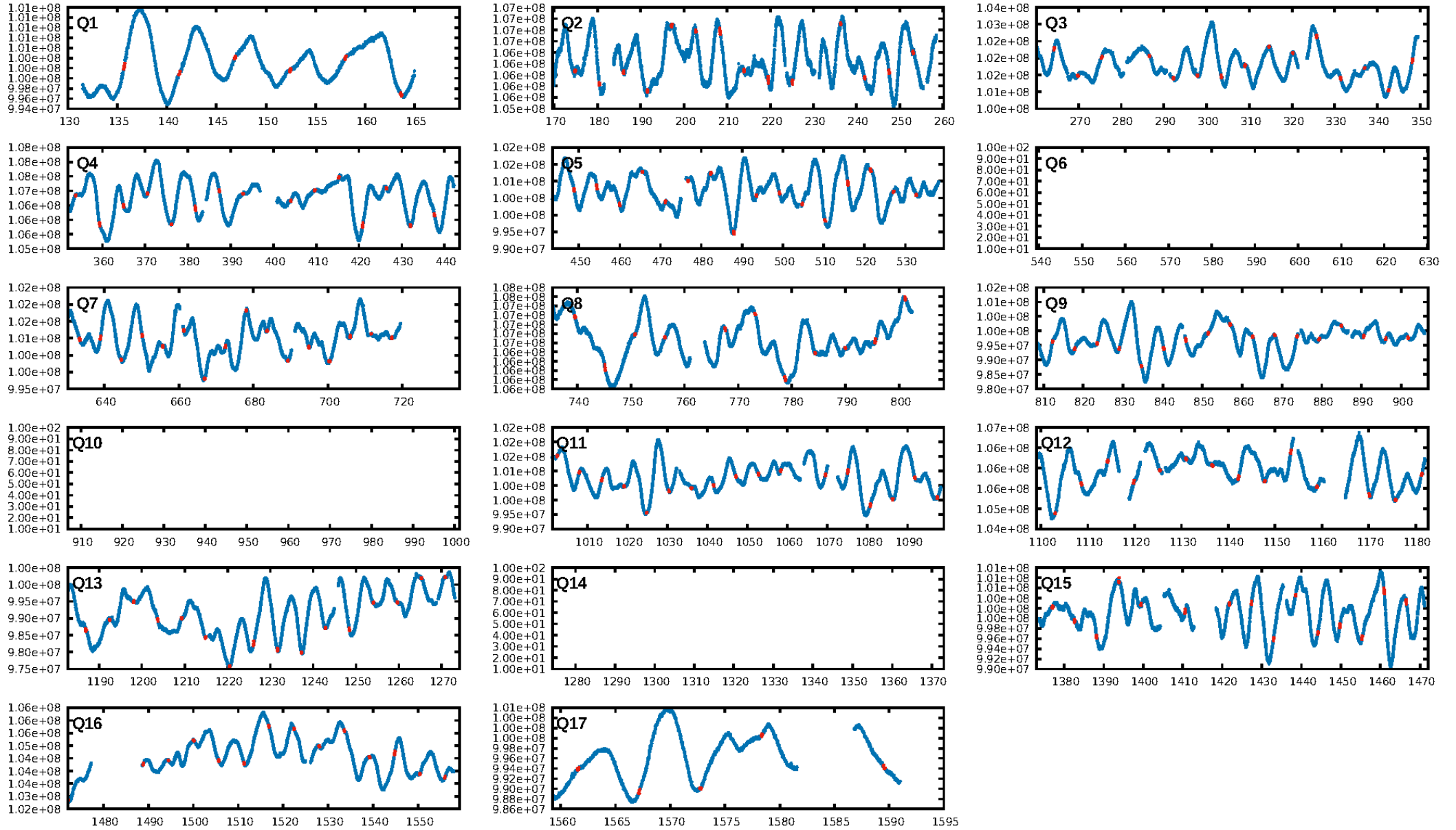
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 0.0% [0.00σ]  
ModelChiSquare2-sig: 100.0%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 6.50e-14  
RollingBand-fgt: 0.96 [171/178]  
GhostDiagnostic-chr: 1.672  
Centroid-sig: 0.0%  
Centroid-so: 4.578 arcsec [2.94σ]  
OotOffset-rm: 1.845 arcsec [3.32σ]  
KicOffset-rm: 1.837 arcsec [3.25σ]  
OotOffset-st: 1/3/4/3 [11]  
KicOffset-st: 1/3/4/3 [11]  
DiffImageQuality-fgm: 0.64 [7/11]  
DiffImageOverlap-fno: 1.00 [14/14]

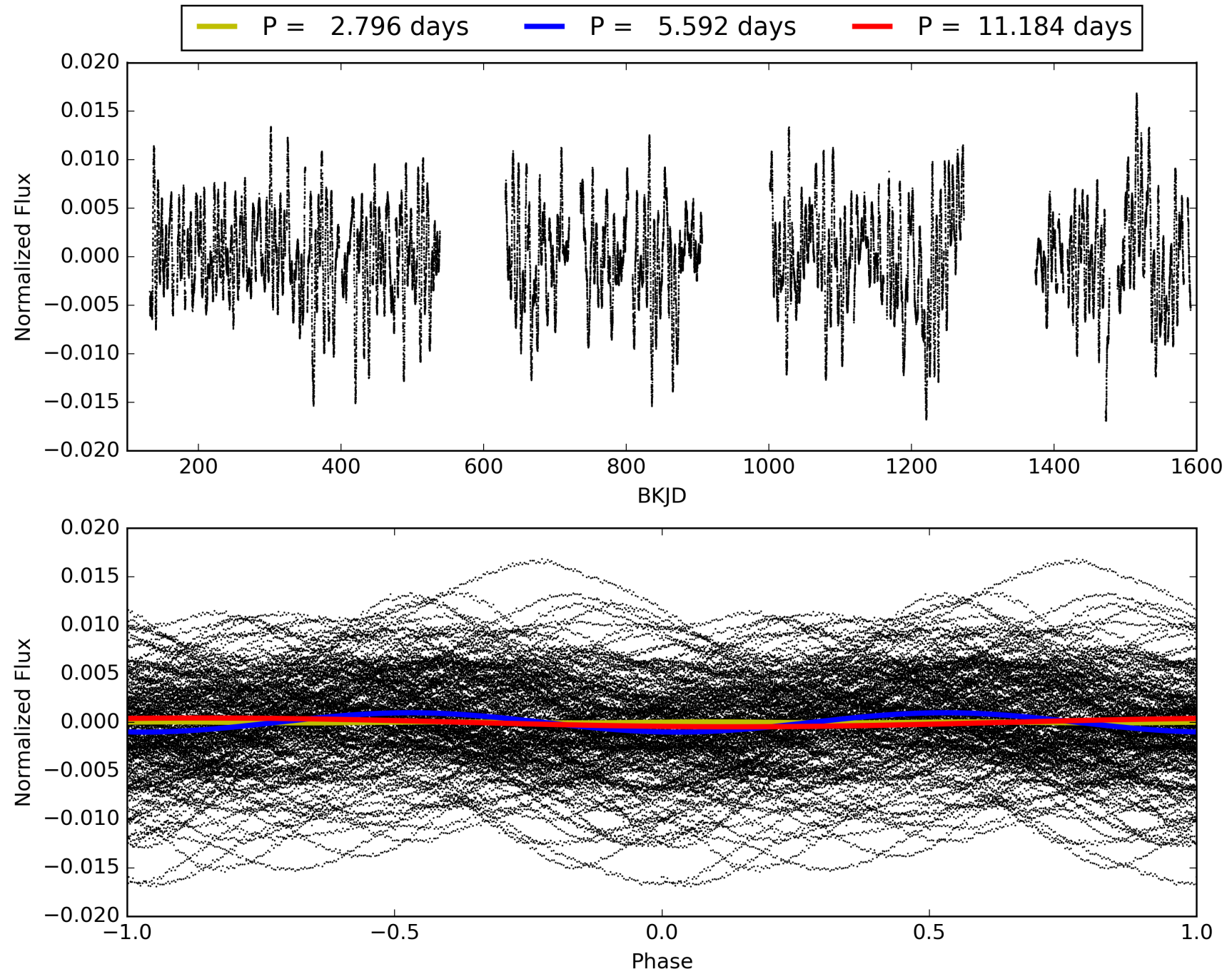
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 02:18:15 Z

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

# TCE 003865595-02, PDC Light Curves

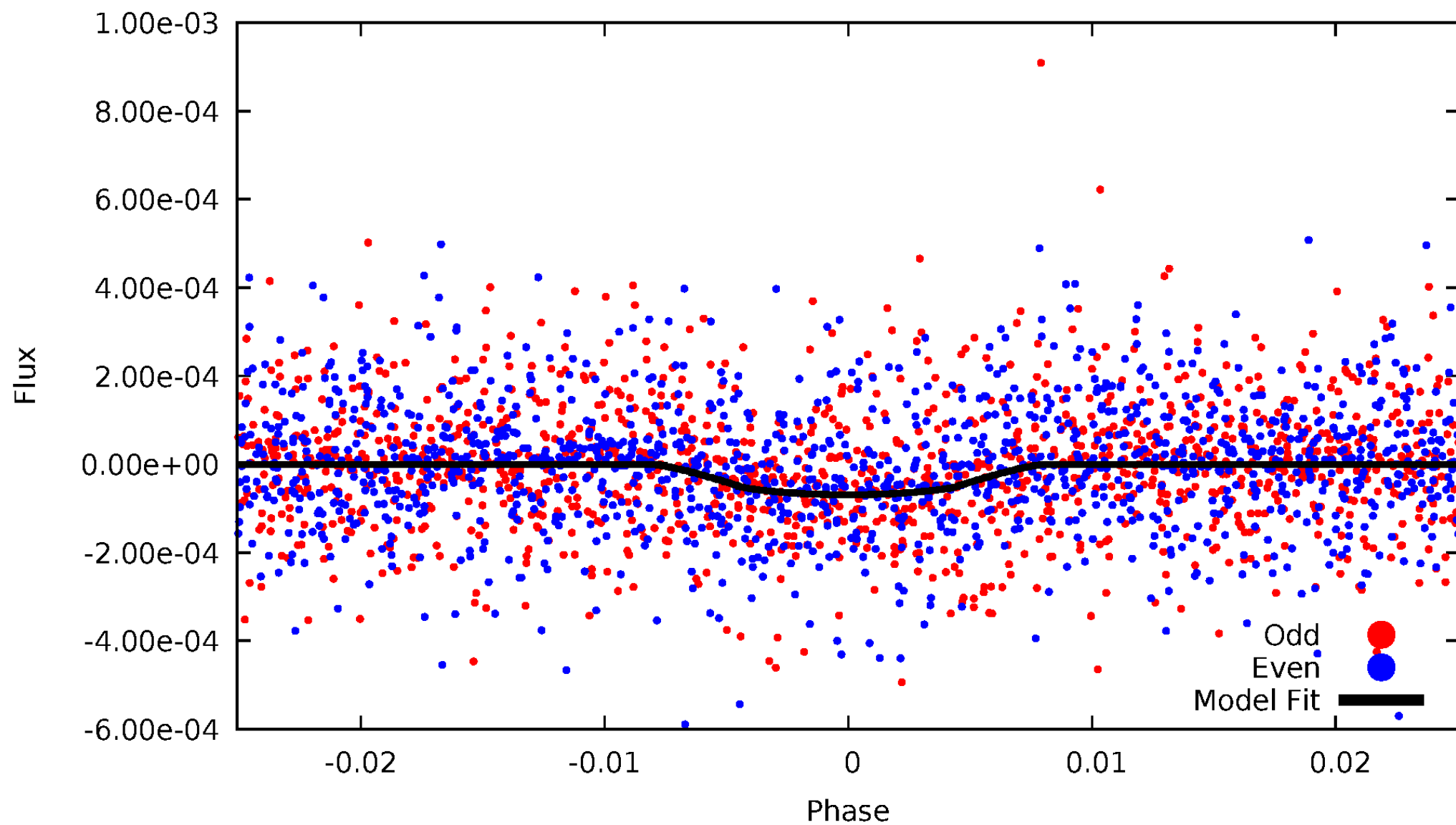


TCE 003865595-02



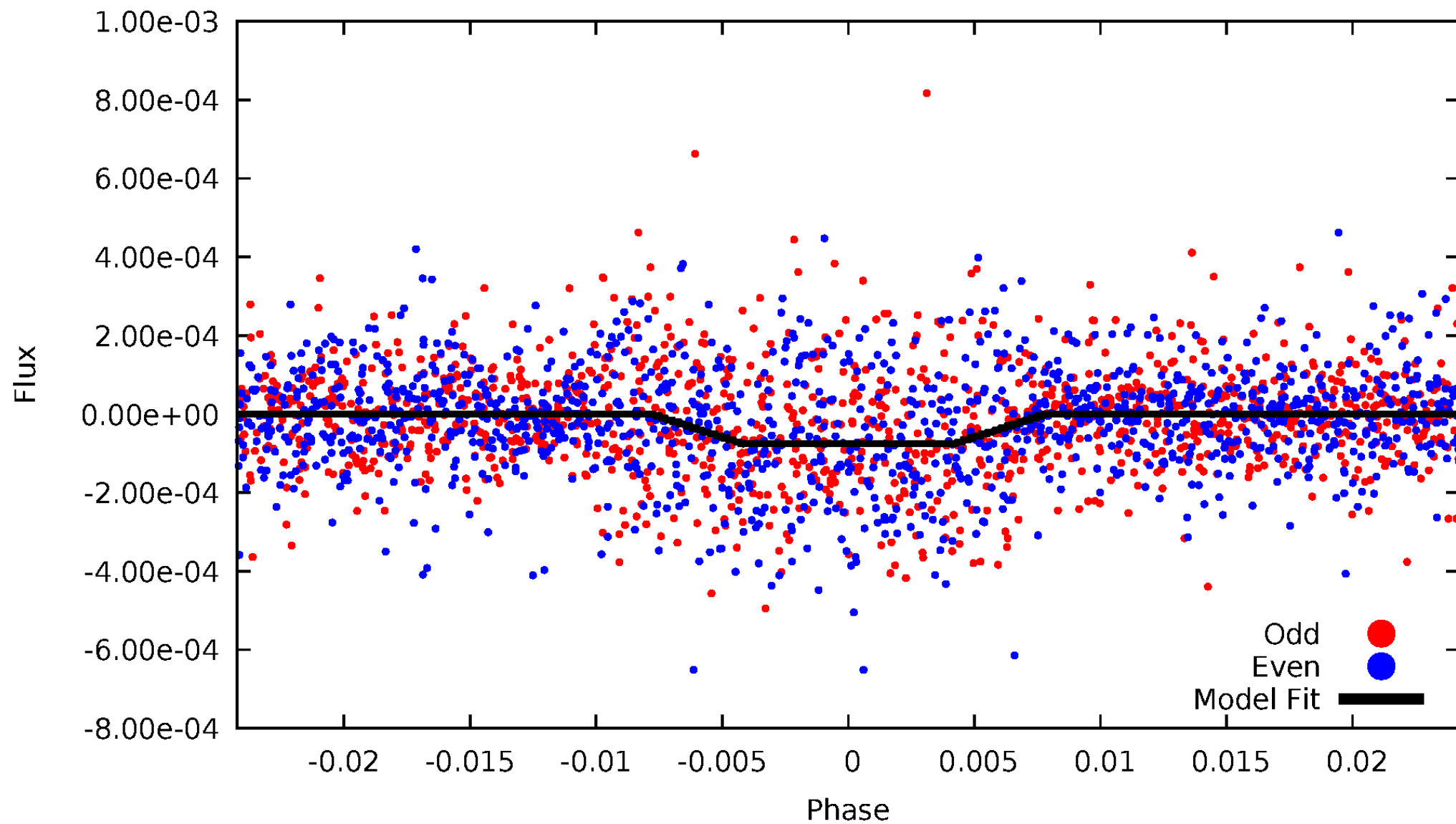
# DV Odd/Even

TCE 00386595-02



# ALT Odd/Even

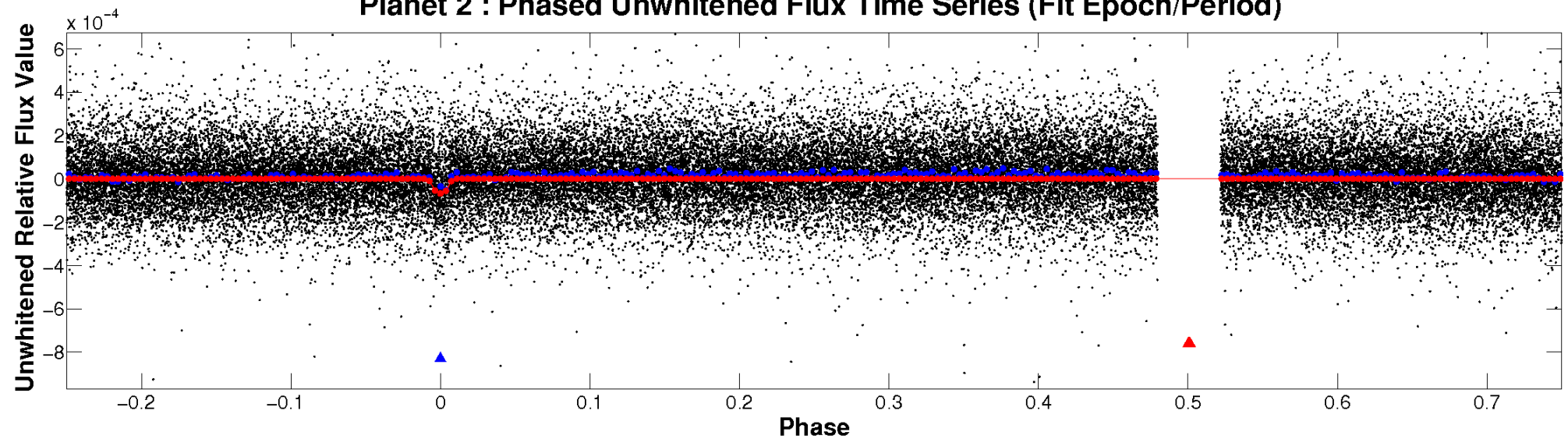
TCE 003865595-02



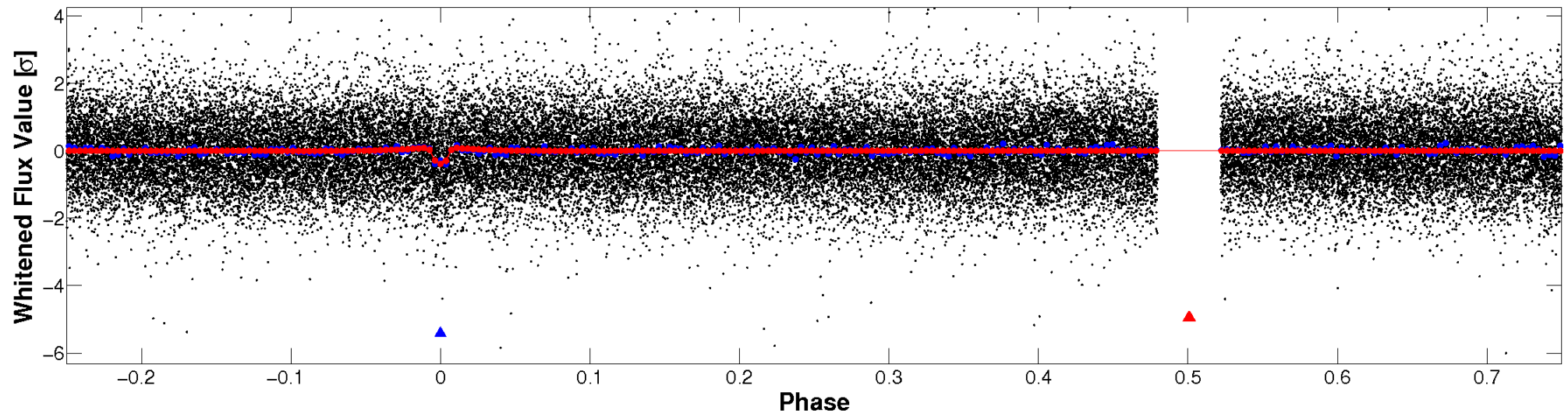


# Non-Whitened Vs. Whitened Light Curve

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

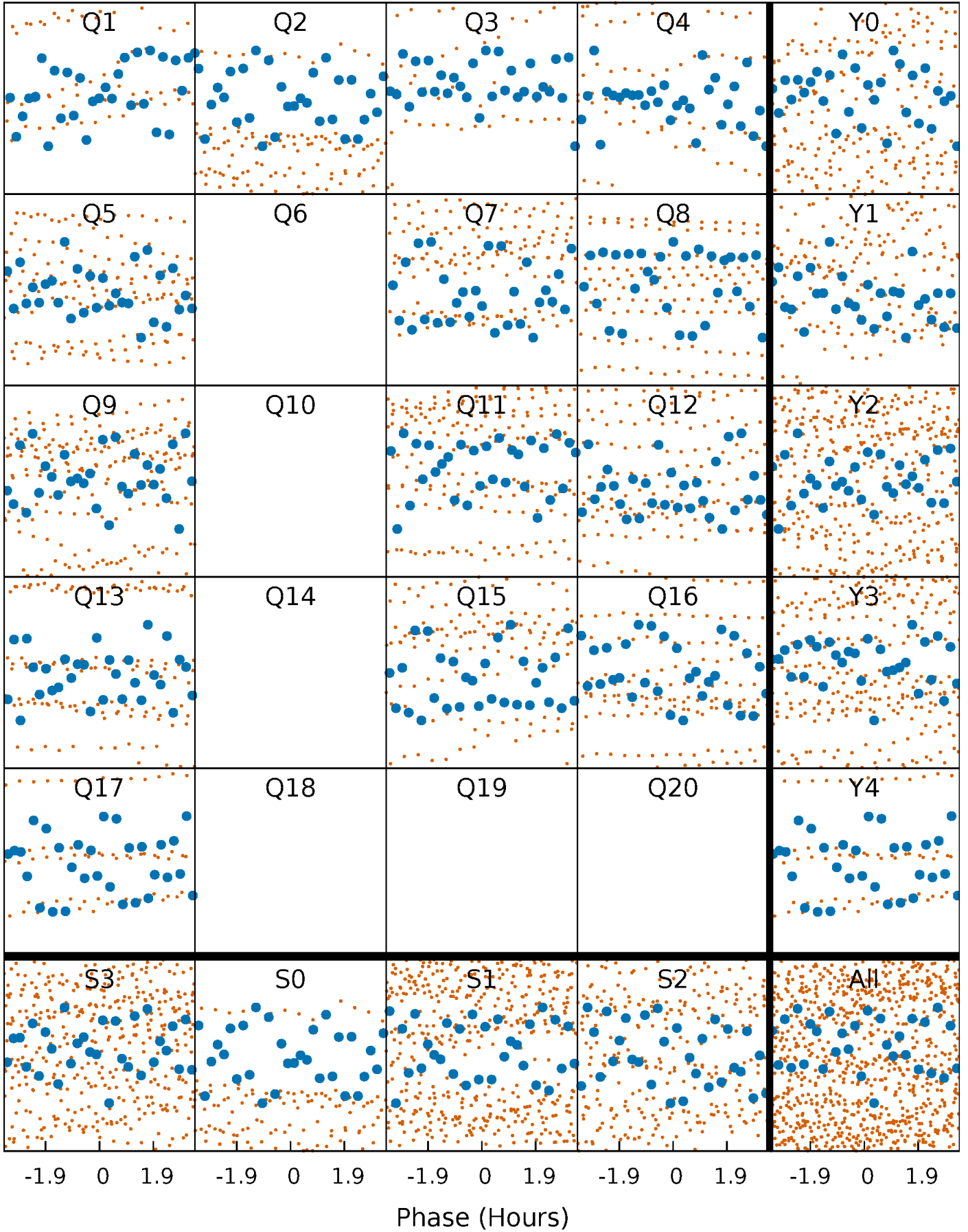


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



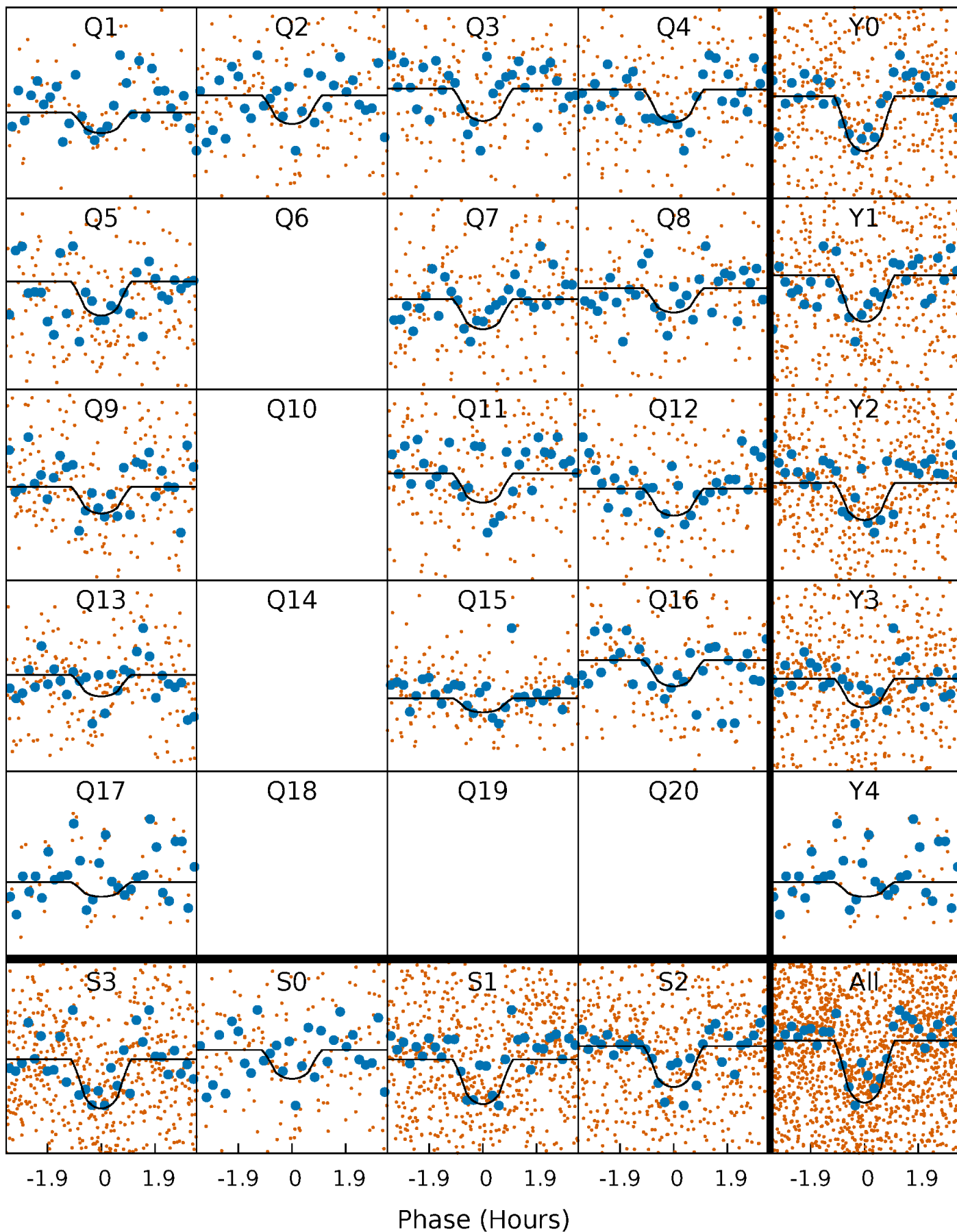
# PDC Quarter-Phased Transit Curves

TCE 003865595-02   P= 5.591834 Days    $T_0=135.673762$  (BKJD)



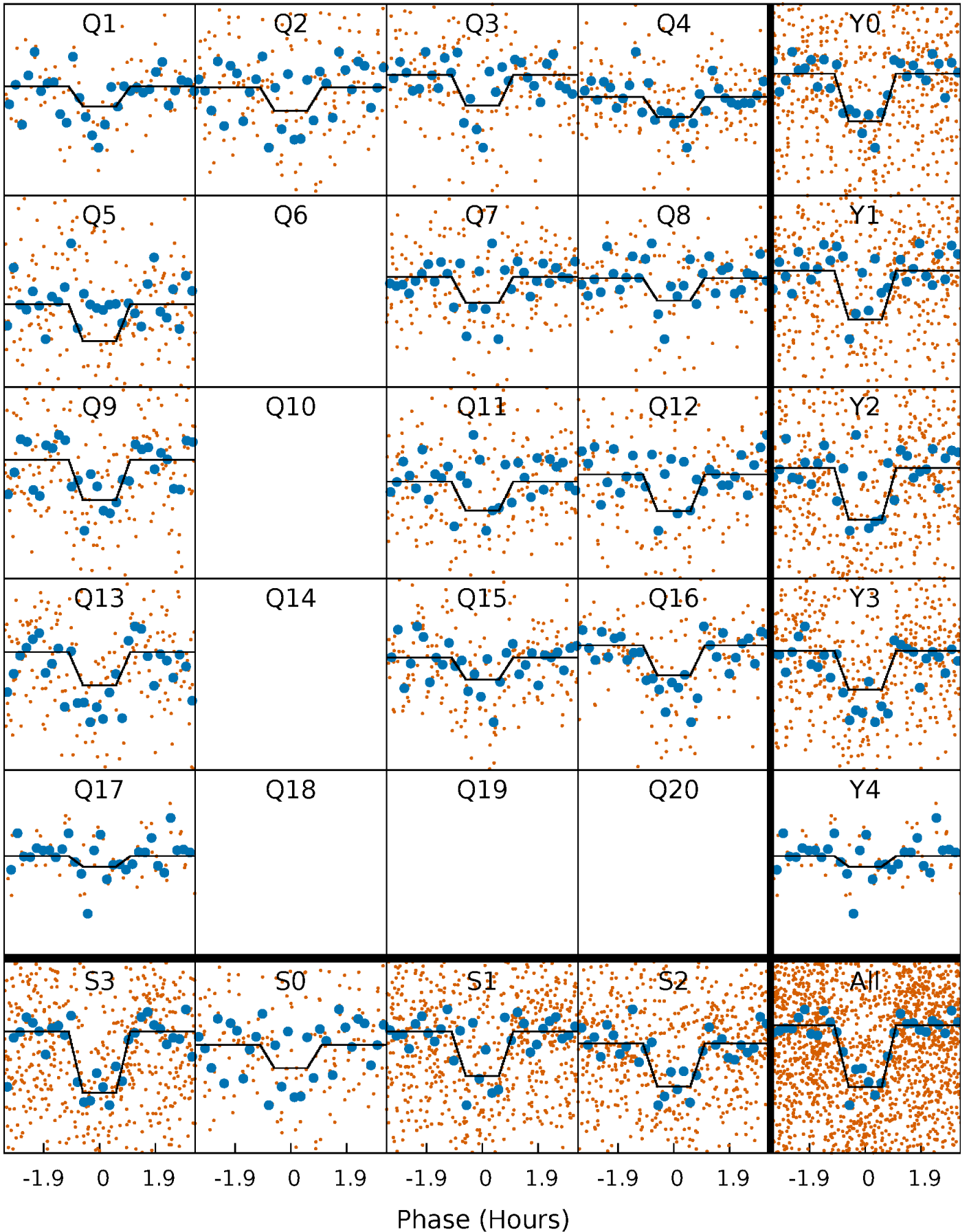
# DV Quarter-Phased Transit Curves

TCE 003865595-02   P= 5.591834 Days    $T_0=135.673762$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

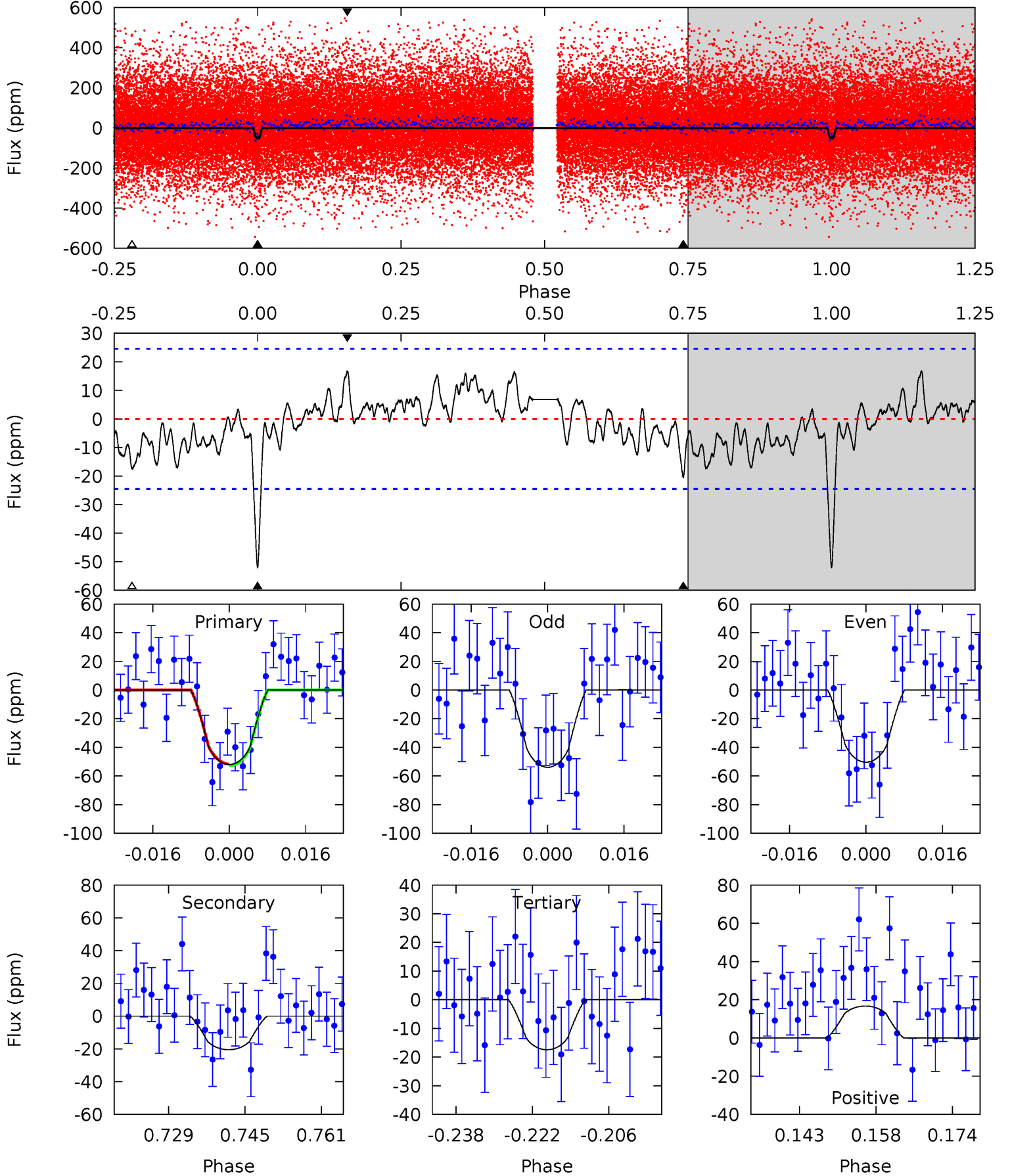
TCE 003865595-02 P= 5.591873 Days  $T_0=135.670345$  (BKJD)



# DV Model-Shift Uniqueness Test

003865595-02, P = 5.591834 Days, E = 130.081928 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
10.5	4.12	3.51	3.36	4.94	2.41	1.50	6.95	7.10	0.61	0.76	0.36	0.81	0.24	0.11

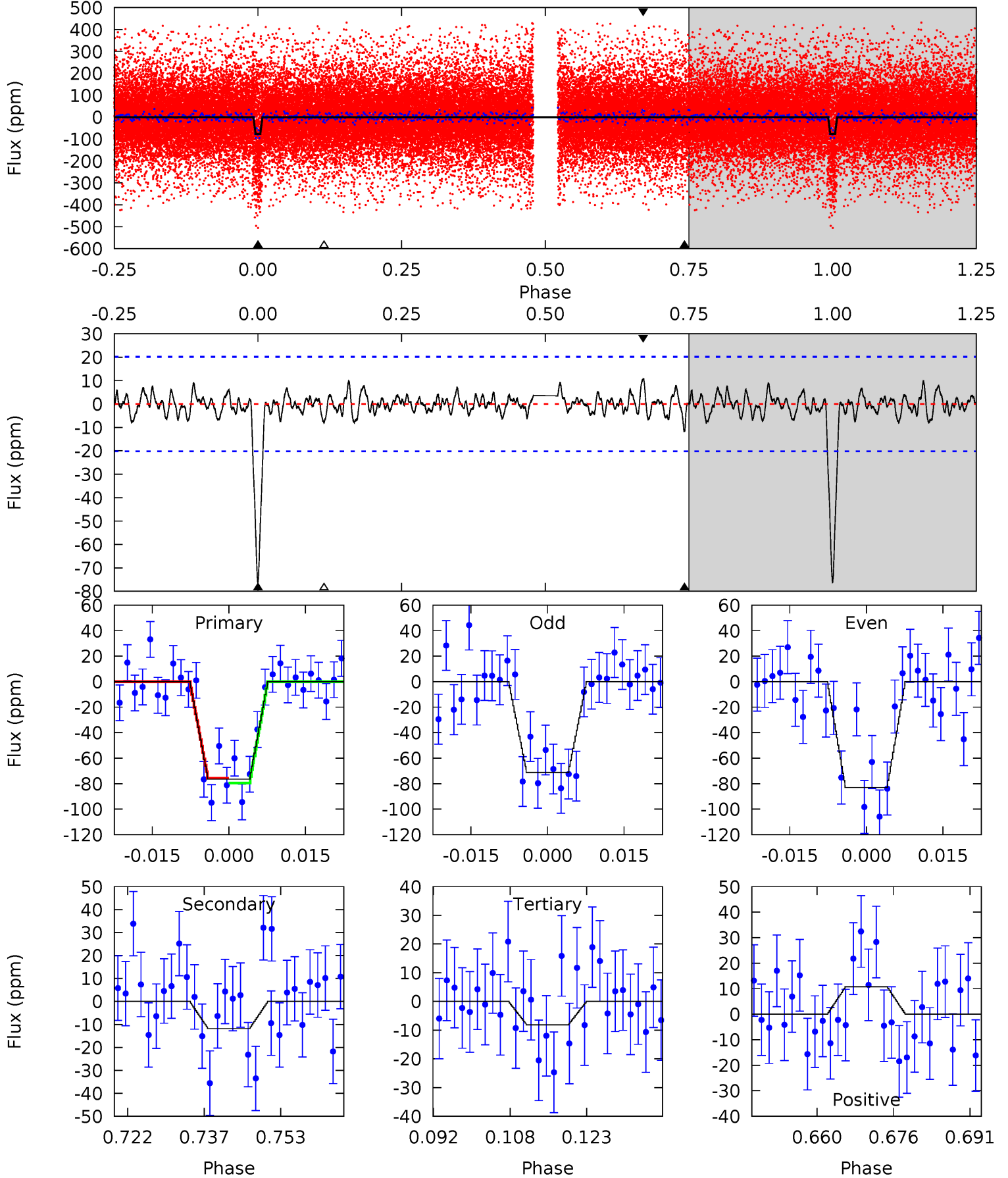




# Alt Model-Shift Uniqueness Test

003865595-02, P = 5.591873 Days, E = 130.078472 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
18.7	2.89	1.99	2.63	4.94	2.42	0.82	16.7	16.1	0.90	0.27	1.44	0.95	0.12	0.47





### Stellar Parameters For KIC 003865595

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$3915^{+78}_{-107}$	$1.173^{+0.030}_{-0.027}$	$0.020^{+0.200}_{-0.250}$	$58.325^{+2.800}_{-12.598}$	$1.846^{+1.266}_{-0.724}$	$0.000^{+0.000}_{-0.000}$
	+2%/-3%	+3%/-2%	+1000%/-1250%	+5%/-22%	+69%/-39%	+32%/-8%
Source	PHO54	AST54	PHO54	DSEP		

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

### Secondary Eclipse Parameters for KIC 003865595-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-20 \pm 5$	$53.11^{+41.24}_{-31.25}$	$6635^{+213}_{-199}$	$-4890^{+453}_{-213}$	$0.021^{+0.095}_{-0.014}$
Alt.	$-12 \pm 4$	$56.87^{+39.18}_{-32.69}$	$6653^{+185}_{-231}$	$-4960^{+292}_{-172}$	$0.011^{+0.050}_{-0.008}$

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

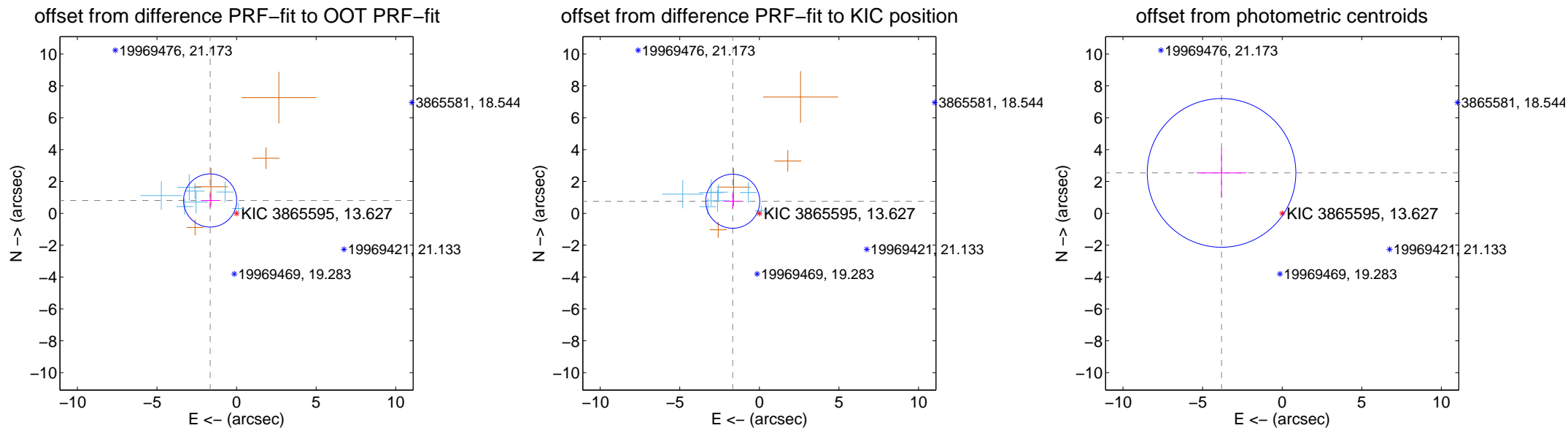
## DV Centroid Data

Supplemental centroid analysis for 003865595-02. Kepler magnitude: 13.63. Transit SNR 8.27

There are 7 quarters with good PRF difference image offsets

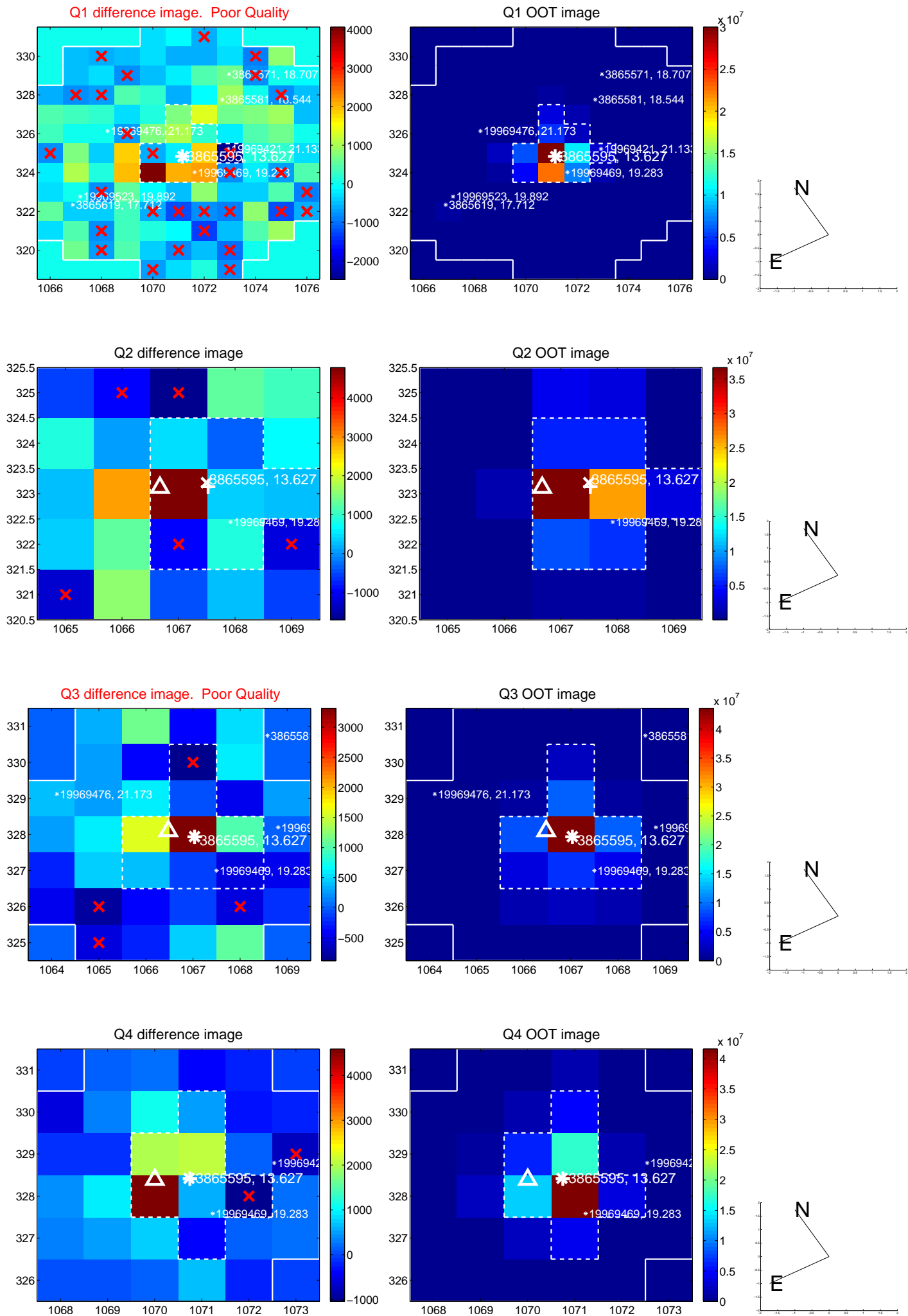
The direct PRF centroid is offset from the target star catalog position by about 0.08 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	<b><math>1.845 \pm 0.556</math></b>	<b>3.32</b>	$1.659 \pm 0.580$	$0.808 \pm 0.445$
PRF-fit source offset from KIC position	<b><math>1.837 \pm 0.566</math></b>	<b>3.25</b>	$1.673 \pm 0.584$	$0.759 \pm 0.469$
photometric centroid source offset	$4.58 \pm 1.56$	2.94	$3.81 \pm 1.56$	$2.54 \pm 1.55$

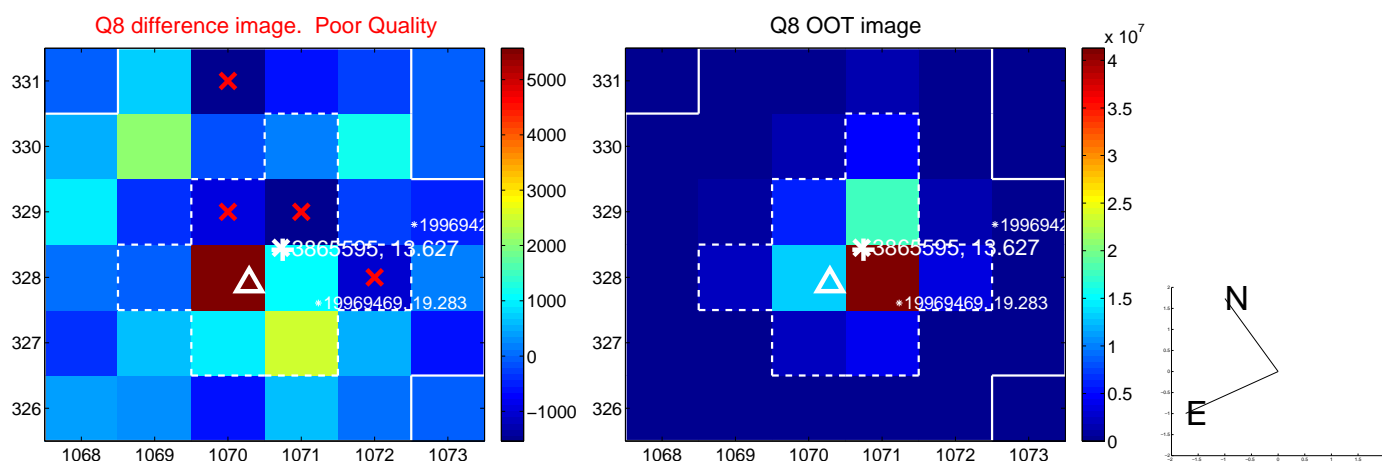
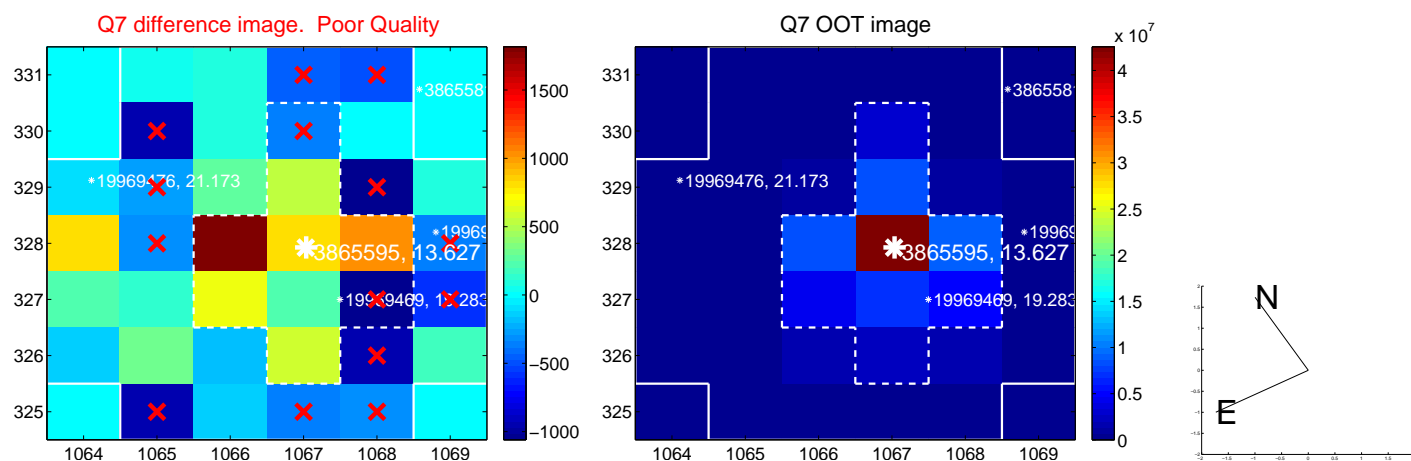
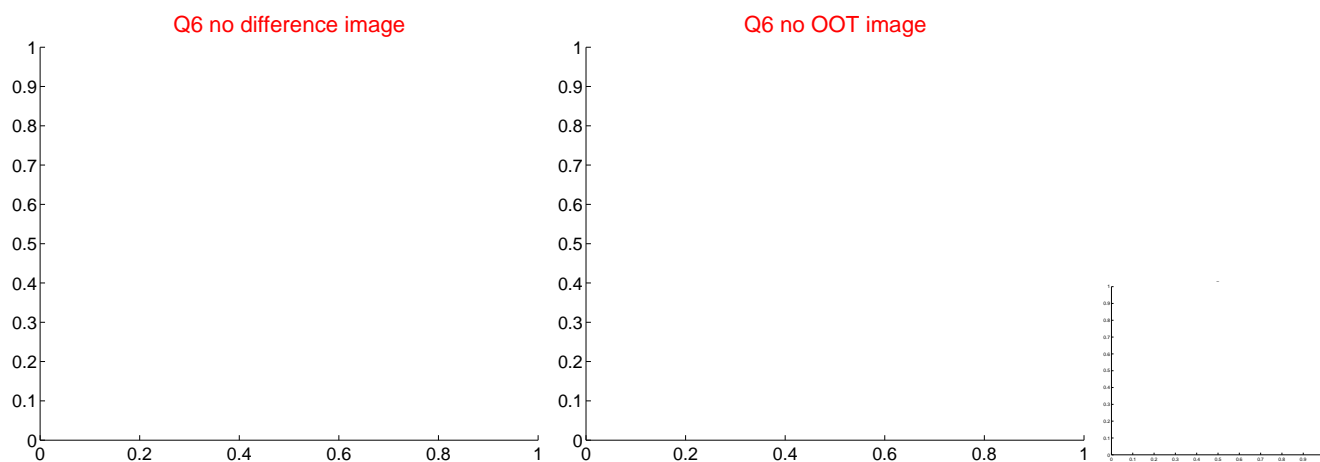
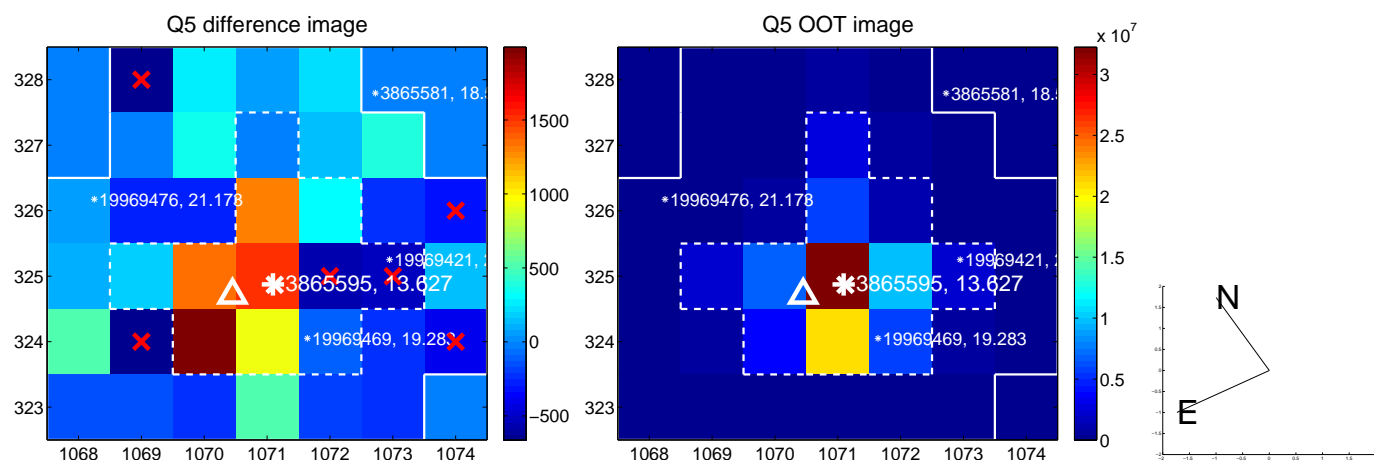


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets**; **Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

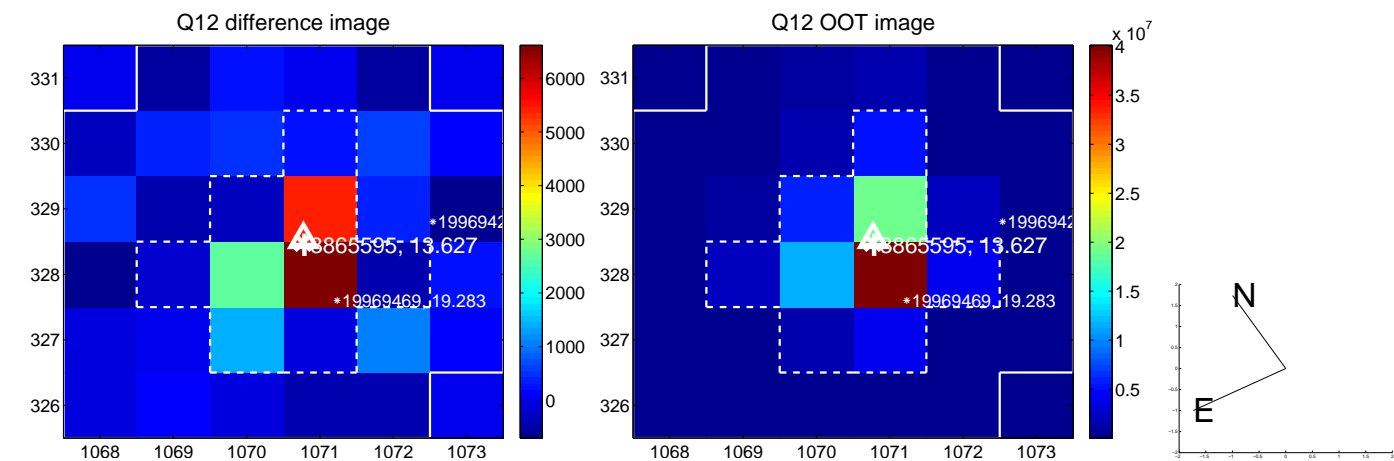
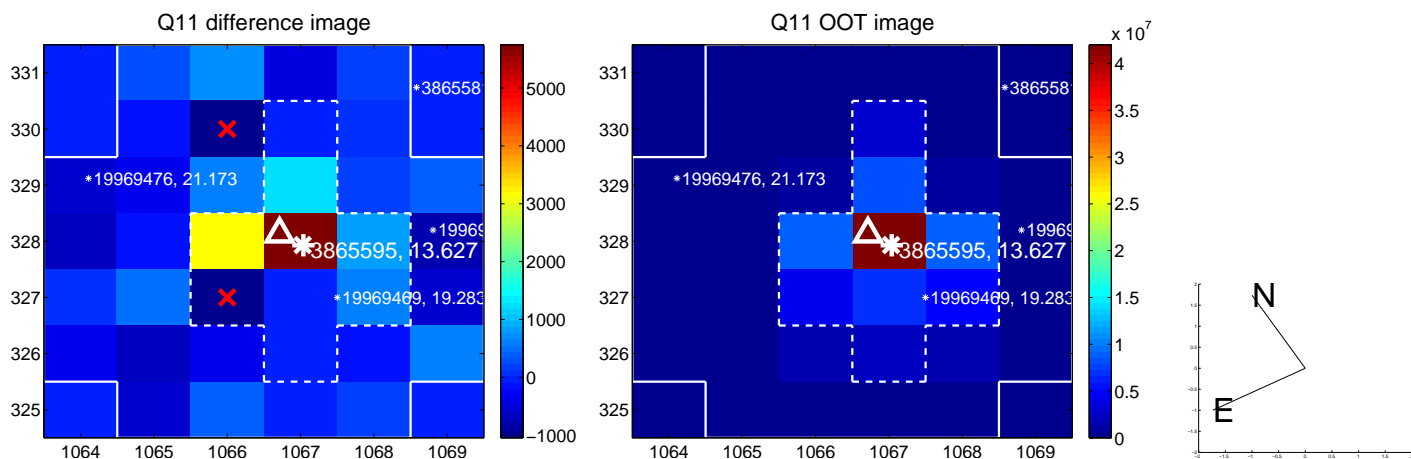
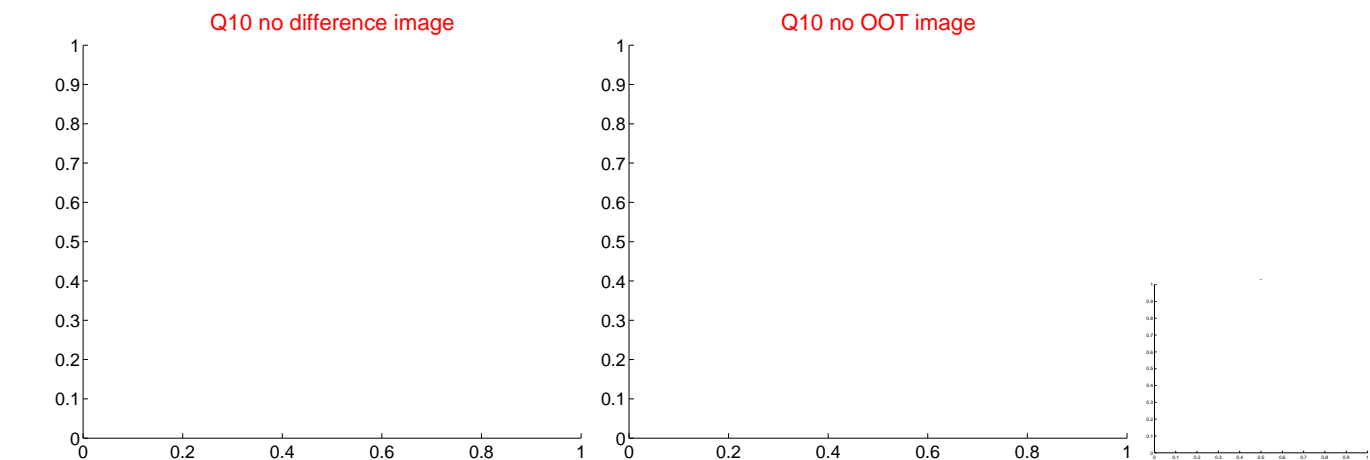
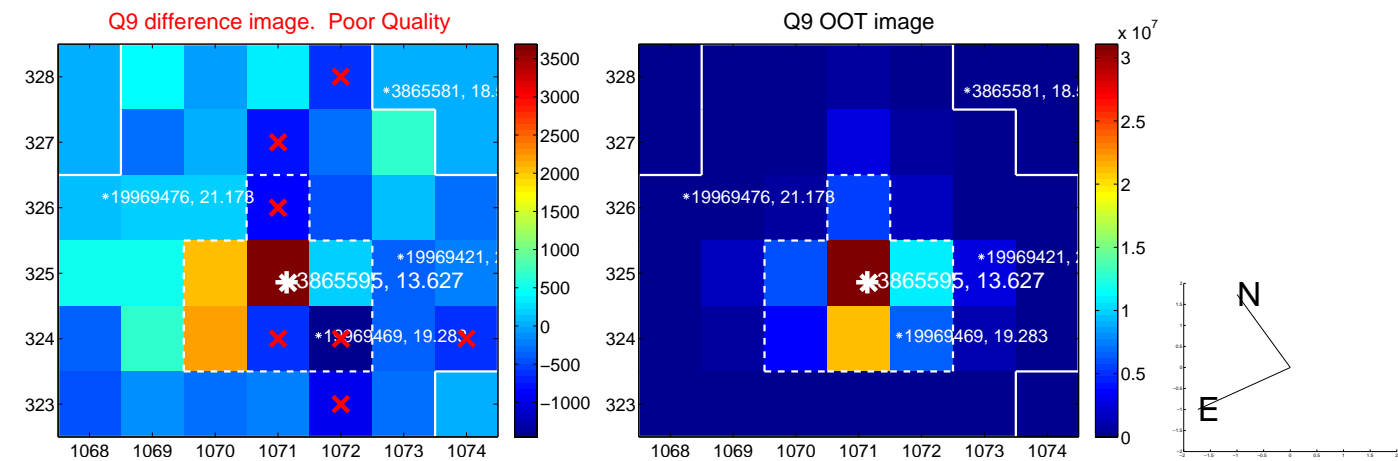
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



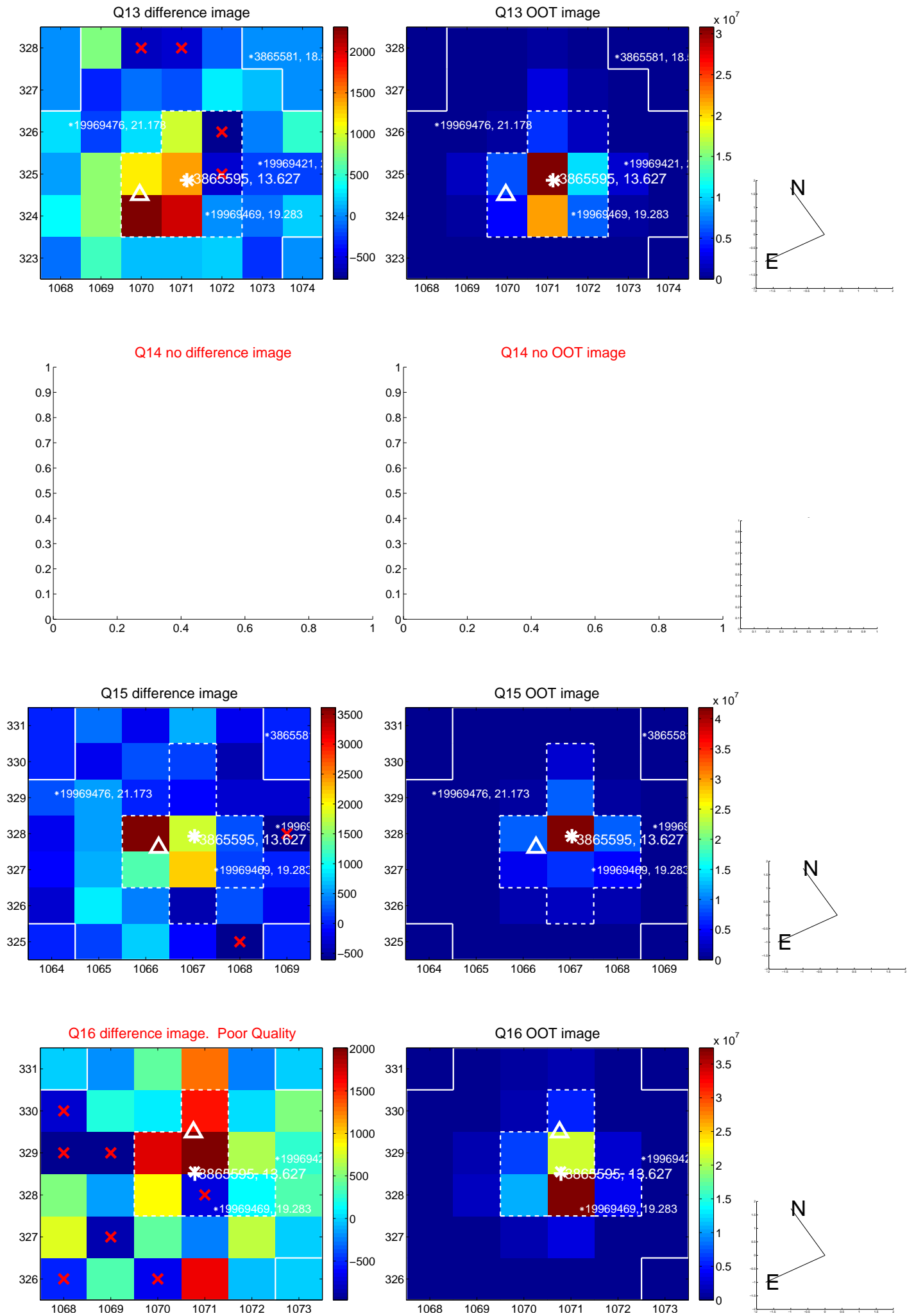
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



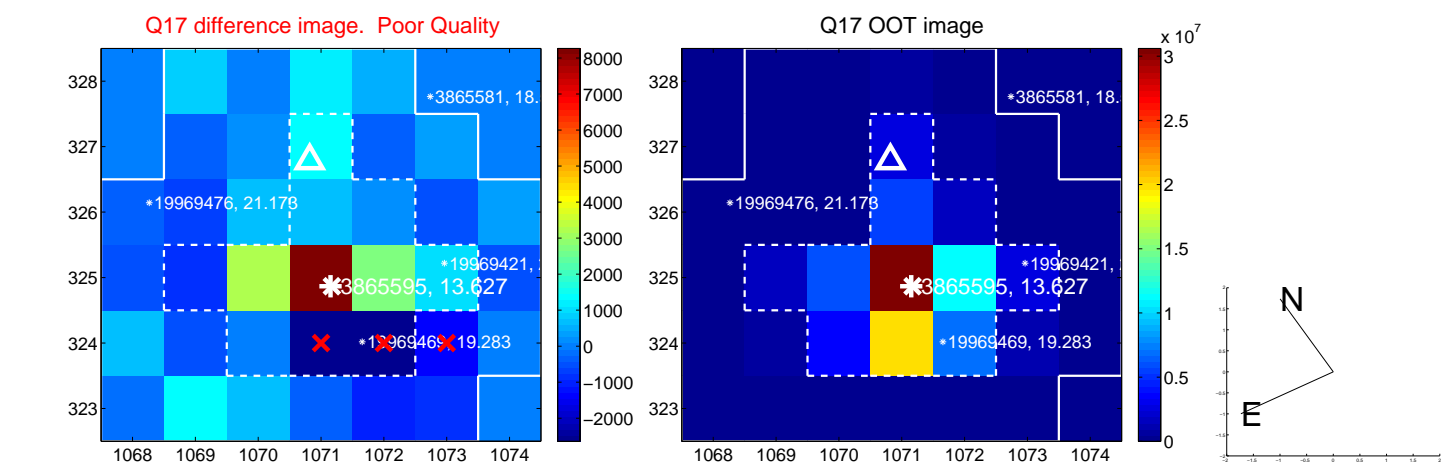
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



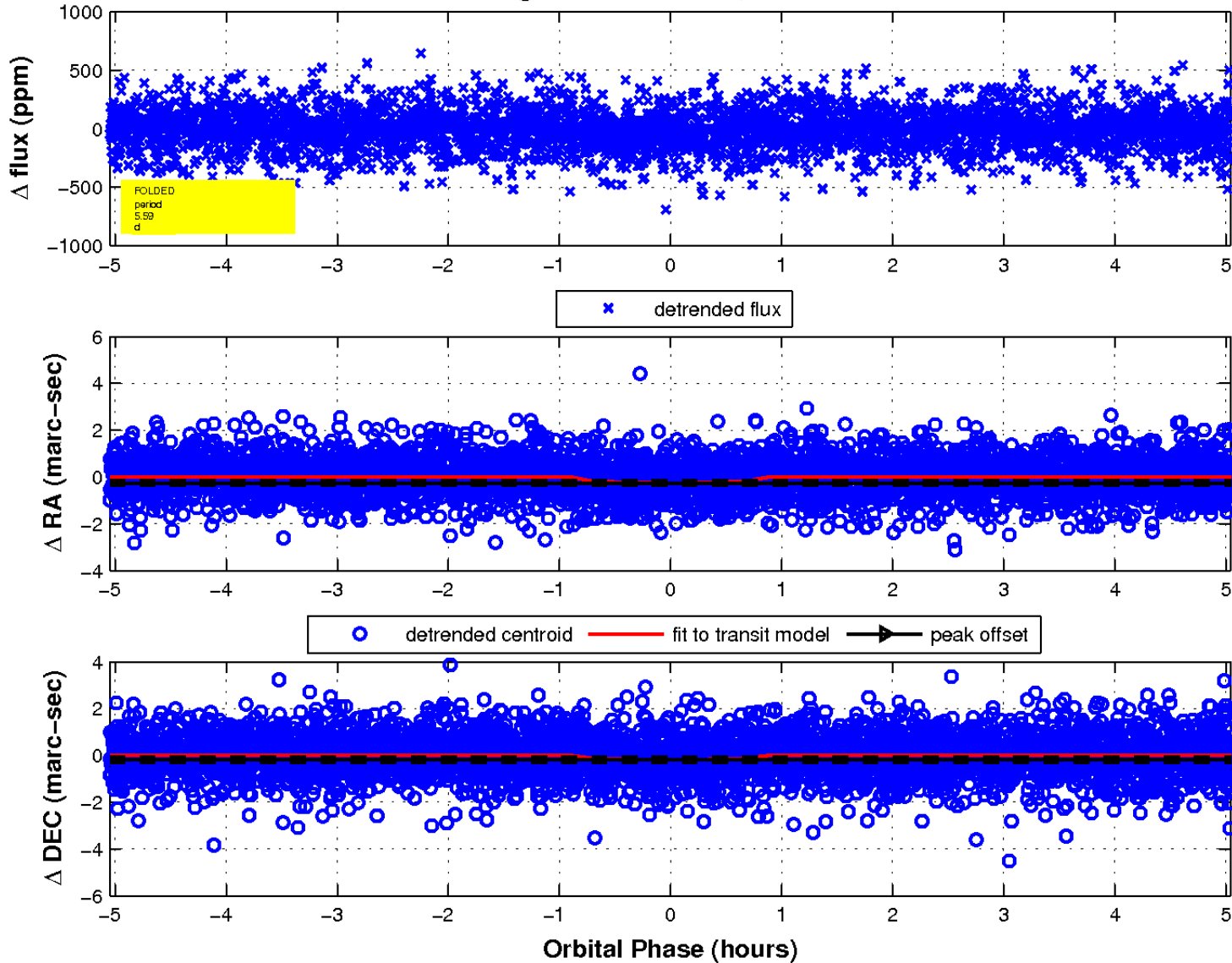
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



fluxWeightedCentroids, Planet 2 of 2





UKIRT Image

Declination

