

# KIC 007684873

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
007684873-01	OBS	0014.01	2.947364	133.216067	403.2	1.943	318.8	297.5	2.23	8090	5.79	7909.80
007684873-02	OBS	No	2.947372	131.766650	79.9	1.666	58.0	68.1	2.23	8090	2.41	7909.77

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
007684873-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_DV—MOD_SEC_ALT—HAS_SEC_TCE—CENT_SATURATED
007684873-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE—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](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 007684873-01

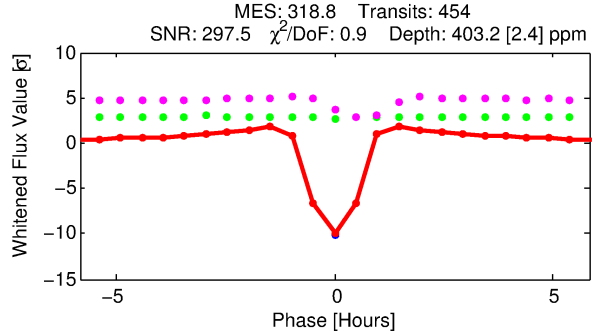
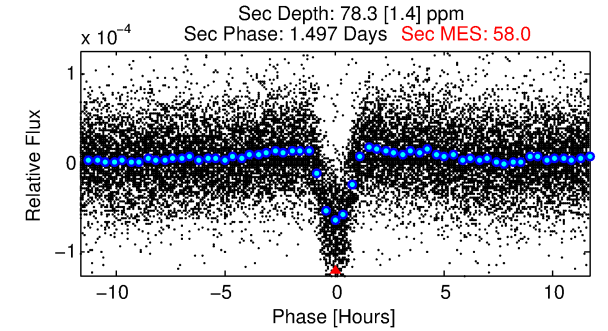
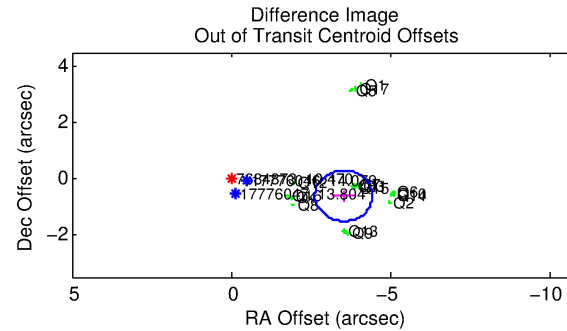
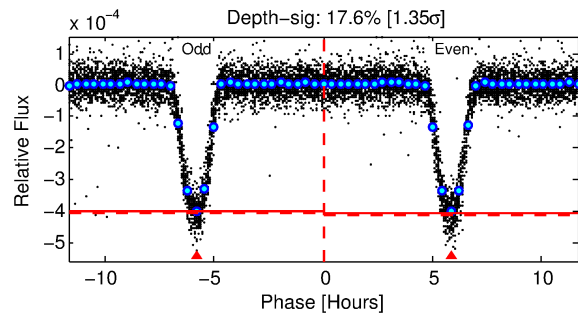
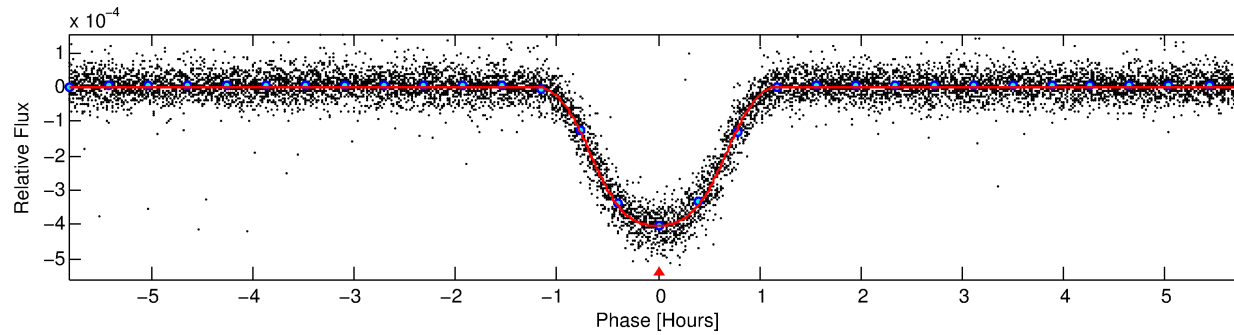
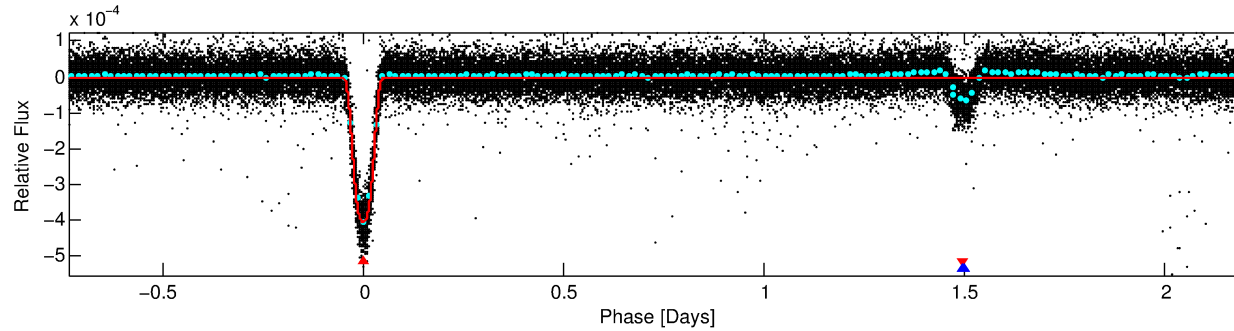
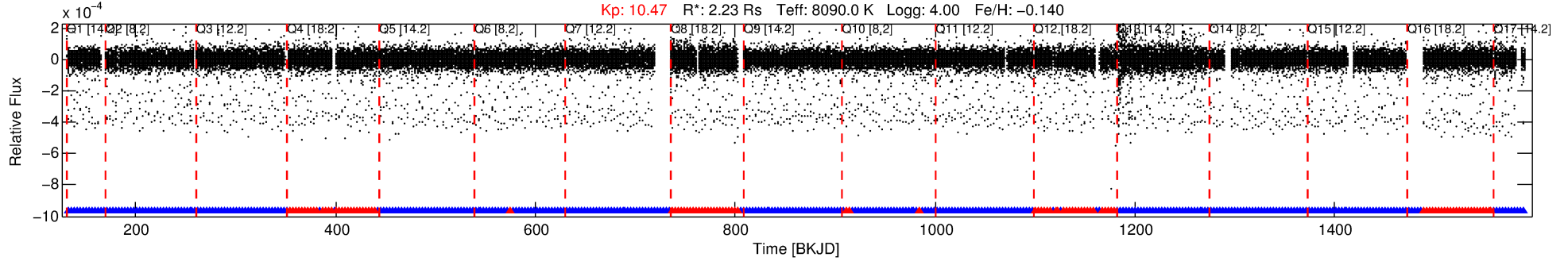
No Significant Match Found

# DV One-Page Summary

KIC: 7684873 Candidate: 1 of 2 Period: 2.947 d

KOI: K00014.01 Corr: 0.928

Kp: 10.47 R\*: 2.23 Rs Teff: 8090.0 K Logg: 4.00 Fe/H: -0.140



## DV Fit Results:

Period = 2.94736 [0.00000] d  
Epoch = 133.2161 [0.0001] BKJD  
Rp/R\* = 0.0238 [0.0001]  
a/R\* = 3.81 [0.04]  
b = 0.97 [0.00]  
Seff = 7909.80 [3070.61]  
Teq = 2405 [233] K  
Rp = 5.79 [1.51] Re  
a = 0.0492 [0.0113] AU  
Ag = 3.11 [1.09] [1.93σ]  
Teff = 4935 [209] K [8.08σ]

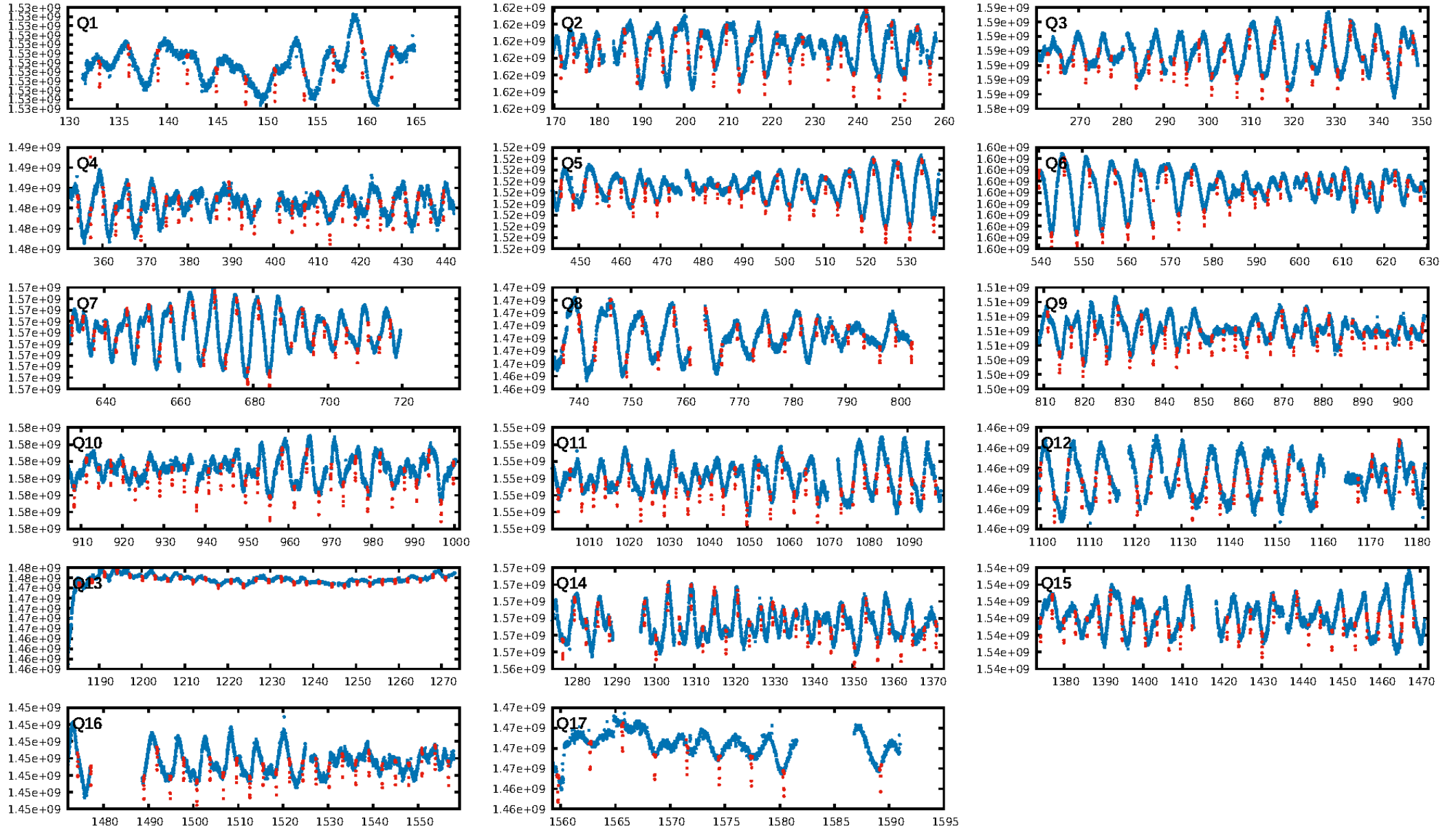
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 0.0% [0.00σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 0.00e+00  
RollingBand-fgt: 0.76 [331/434]  
GhostDiagnostic-chr: 8.603  
Centroid-sig: 0.0%  
Centroid-so: 1.385 arcsec [31.39σ]  
OotOffset-rm: 3.590 arcsec [11.92σ]  
KicOffset-rm: 3.480 arcsec [19.05σ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 0.29 [5/17]  
DiffImageOverlap-fno: 1.00 [17/17]

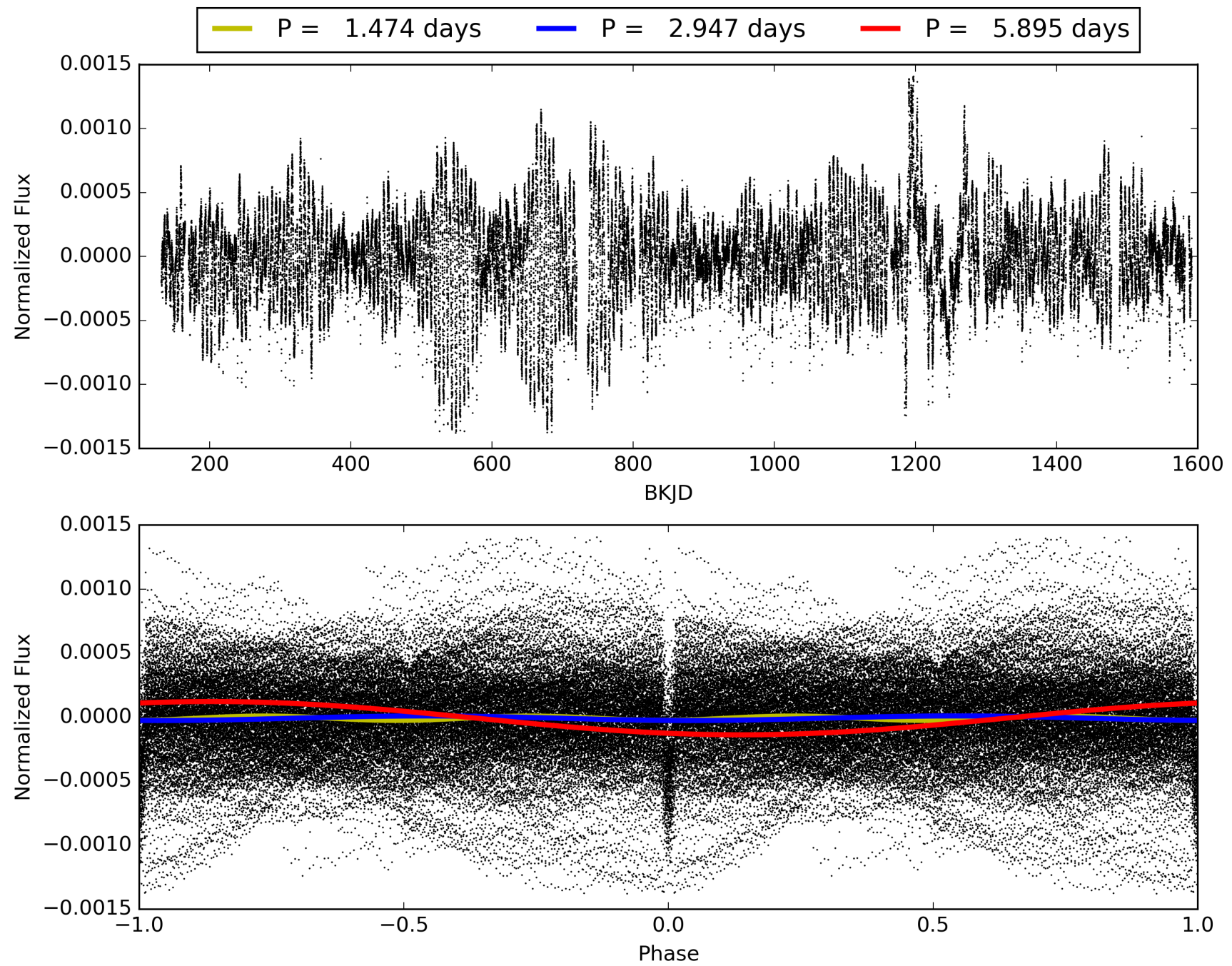
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 20:11:06 Z

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

# TCE 007684873-01, PDC Light Curves

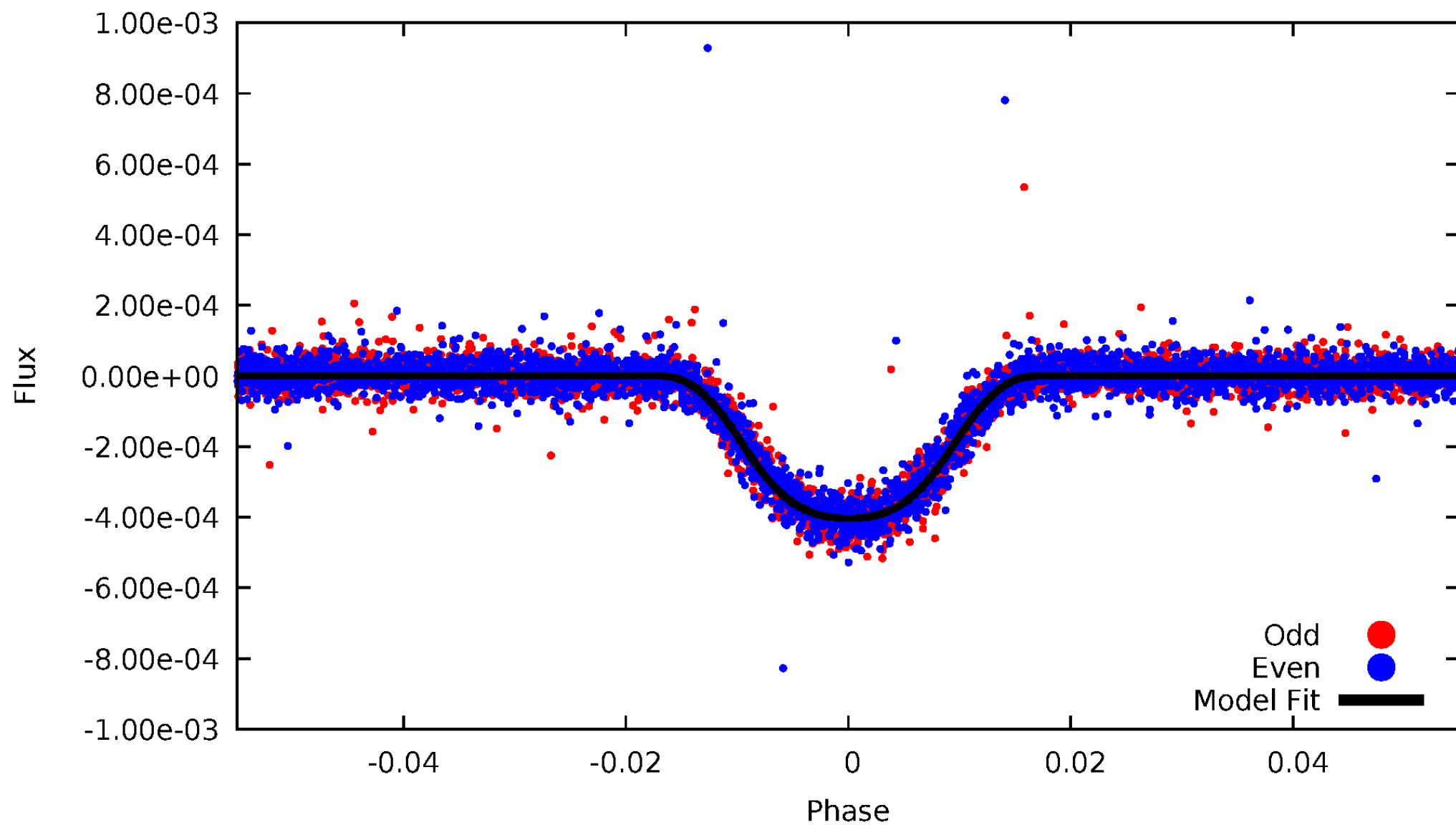


TCE 007684873-01



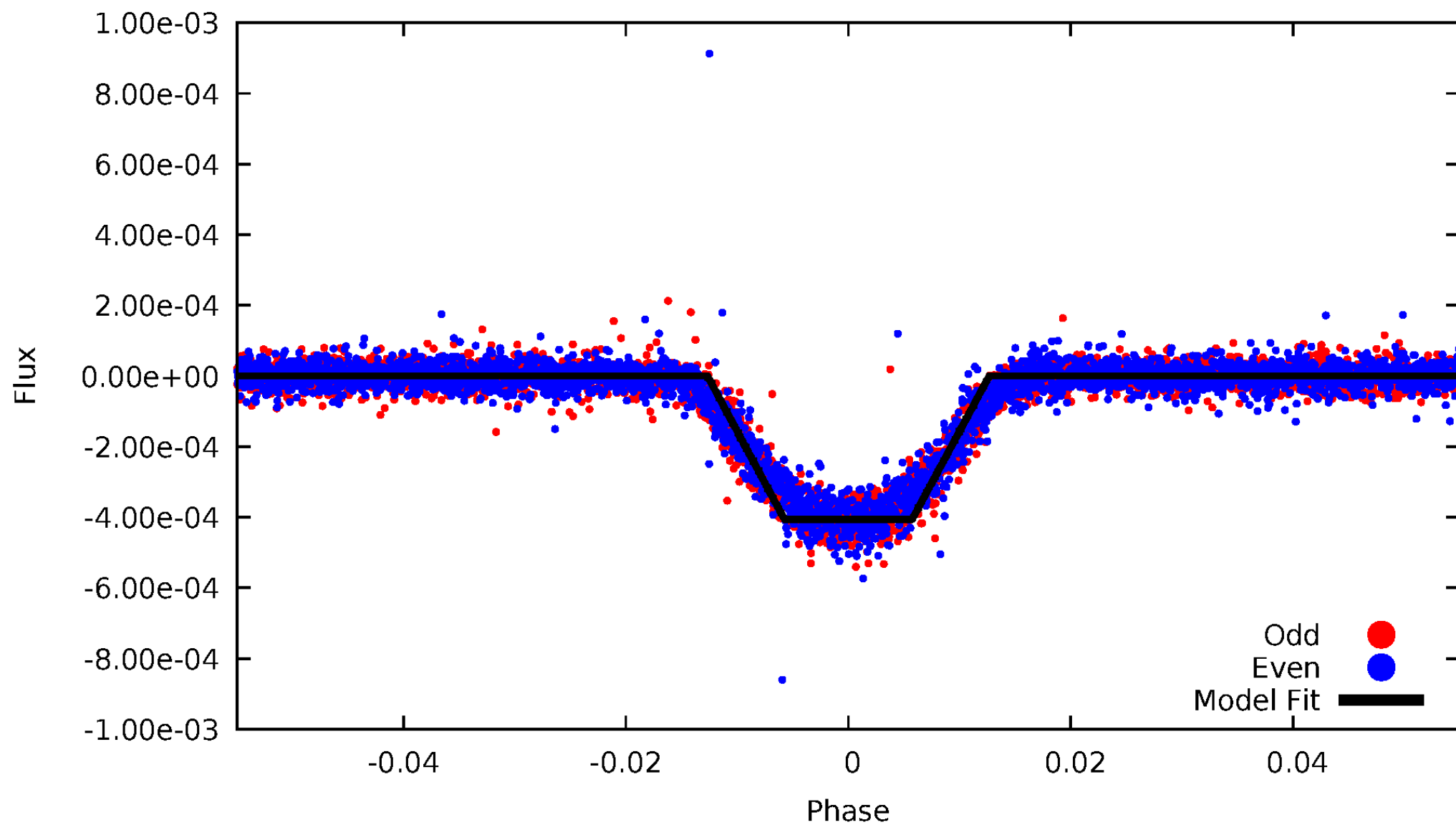
# DV Odd/Even

TCE 007684873-01



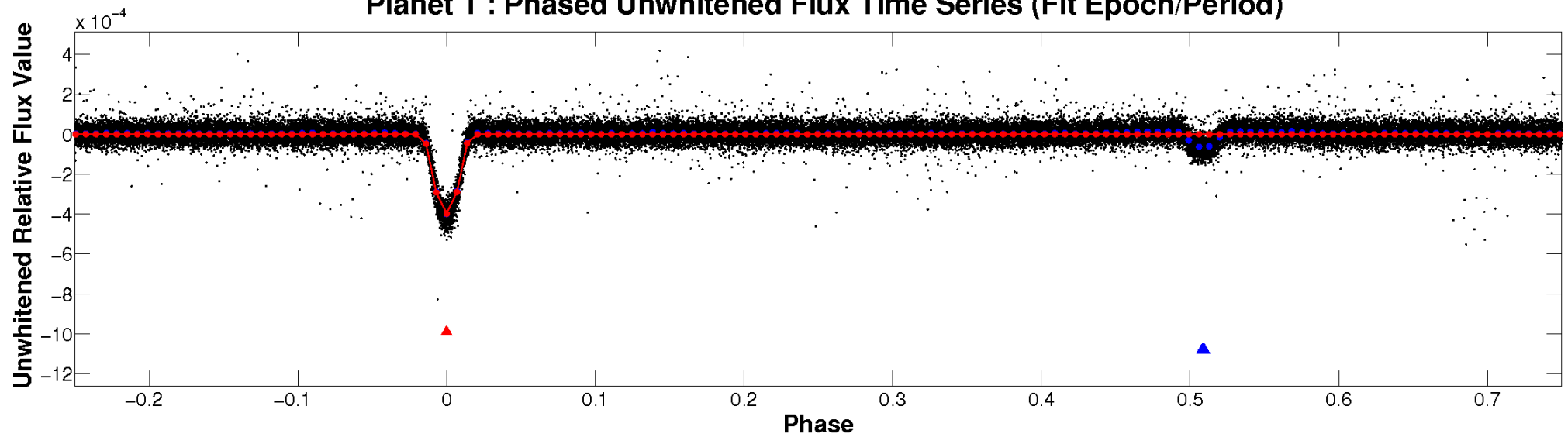
# ALT Odd/Even

TCE 007684873-01

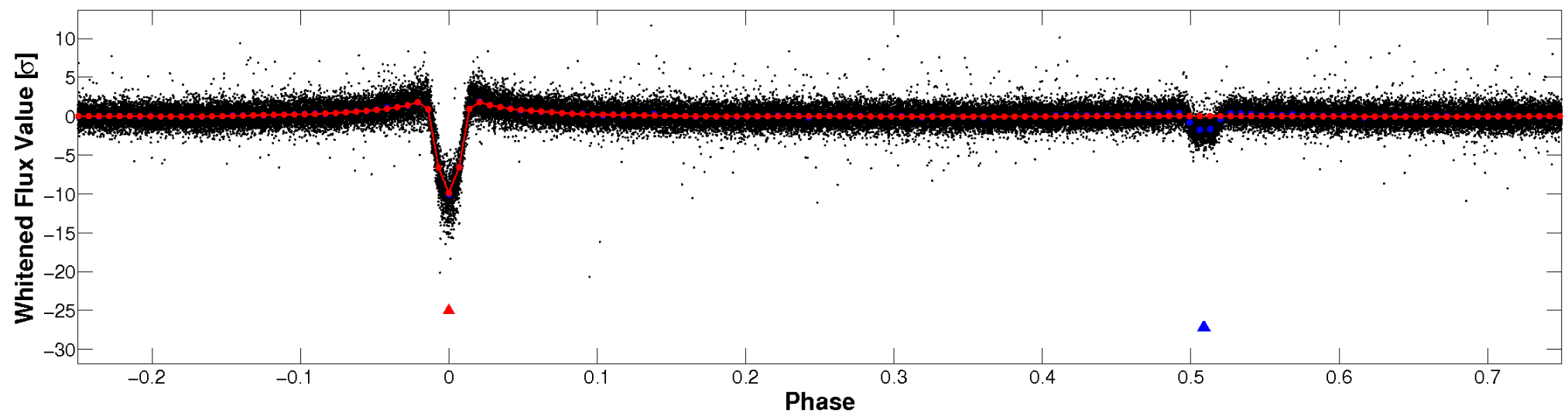


# Non-Whitened Vs. Whitened Light Curve

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



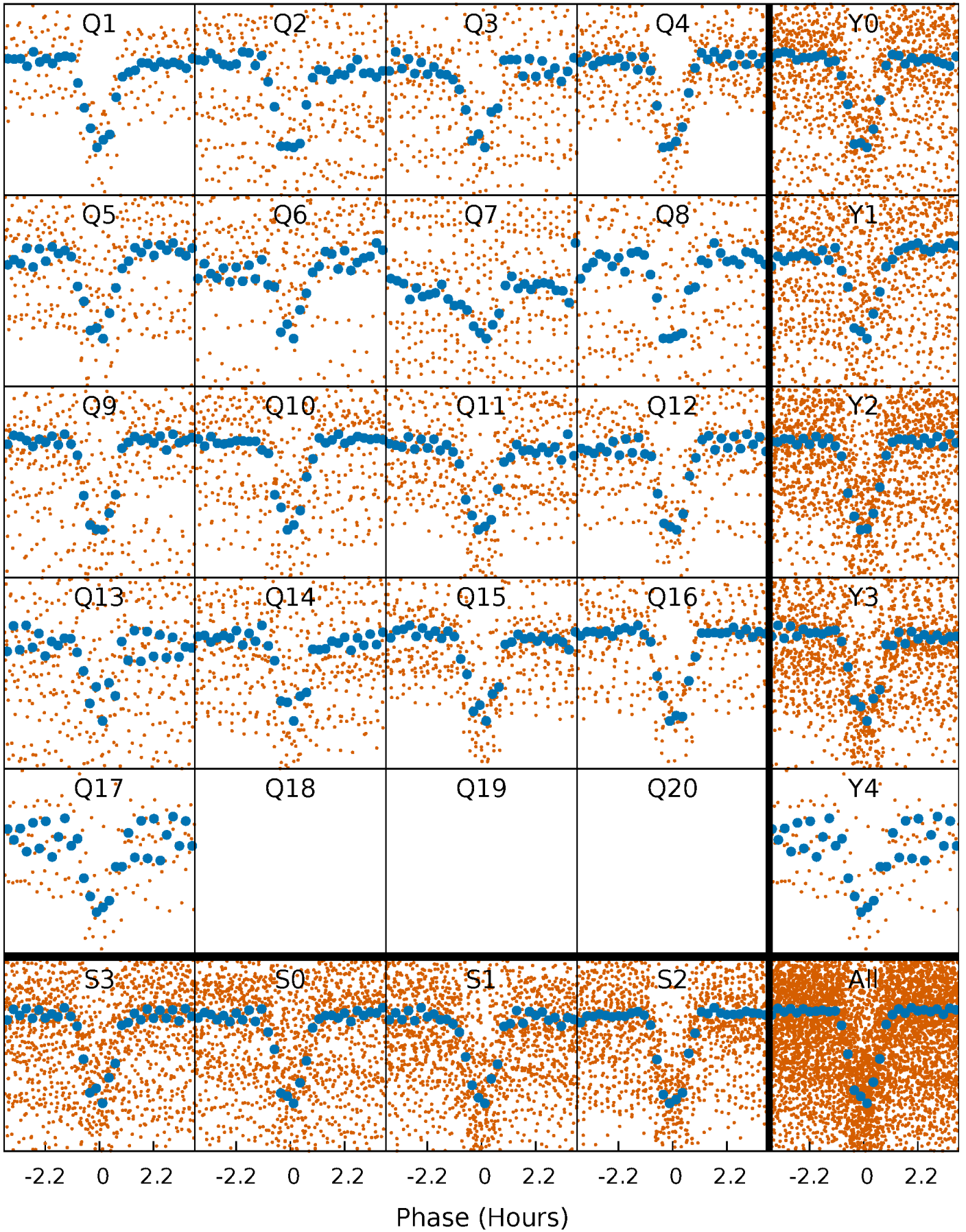
**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**





# PDC Quarter-Phased Transit Curves

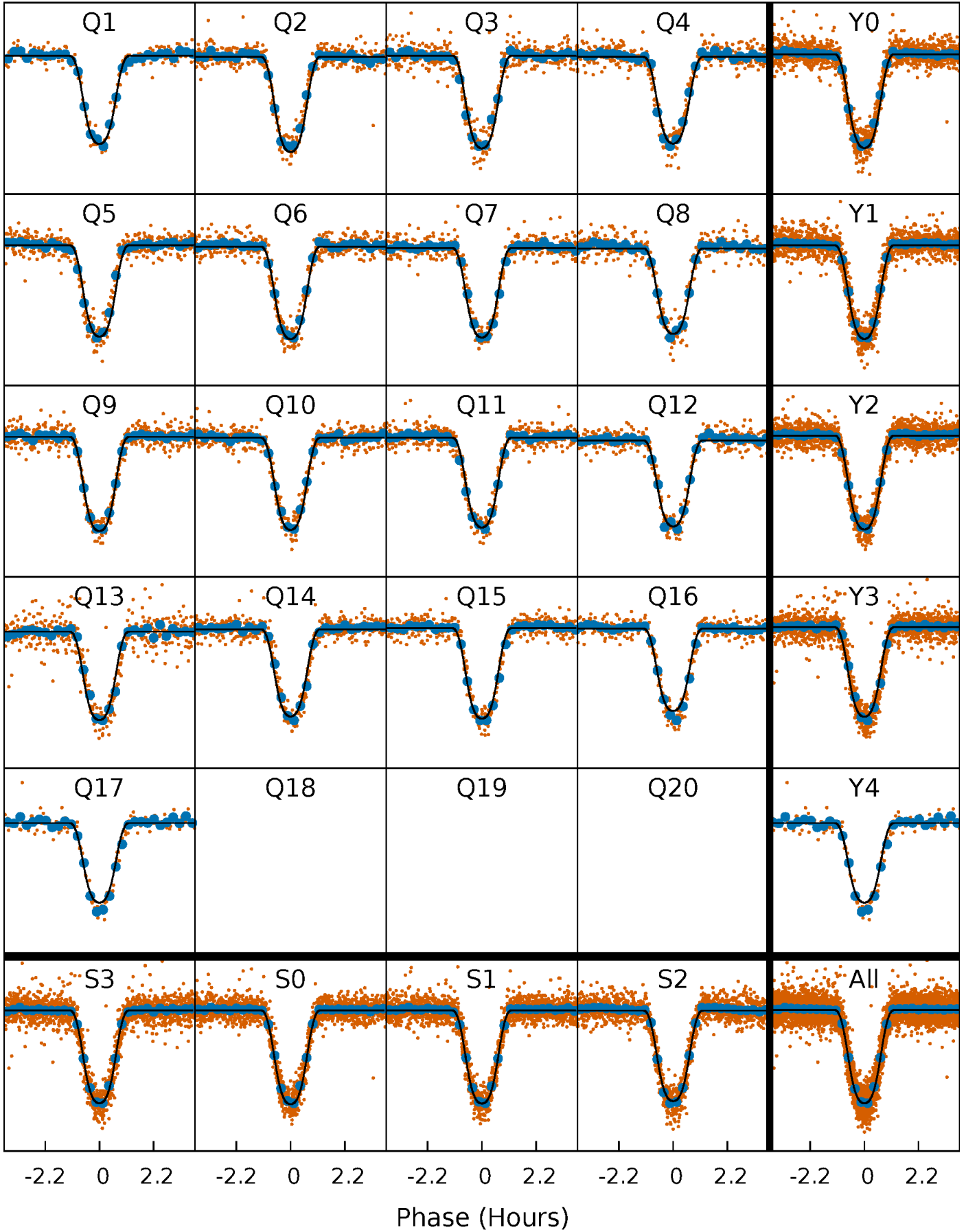
TCE 007684873-01 P= 2.947364 Days  $T_0=133.216067$  (BKJD)





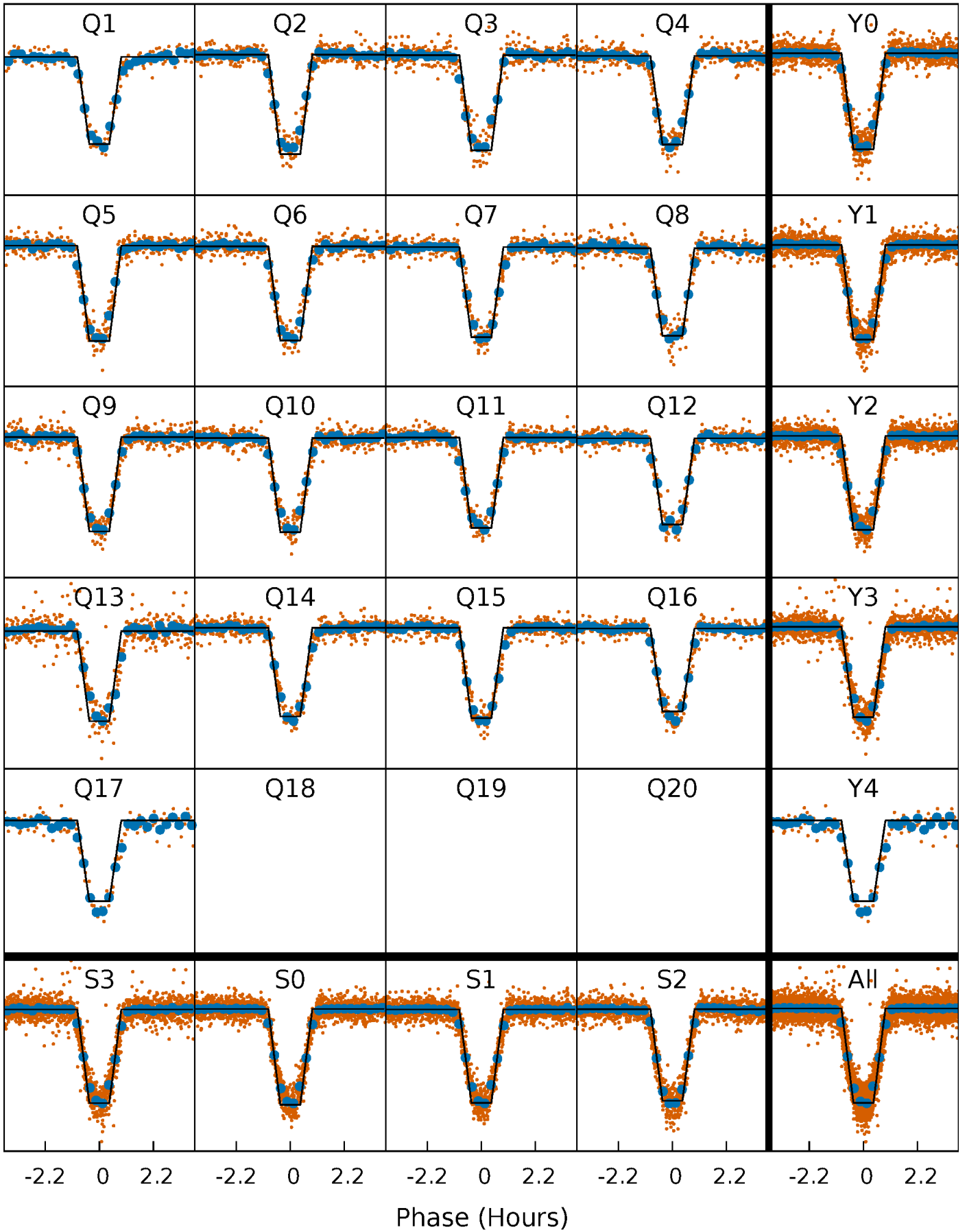
# DV Quarter-Phased Transit Curves

TCE 007684873-01   P= 2.947364 Days    $T_0=133.216067$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

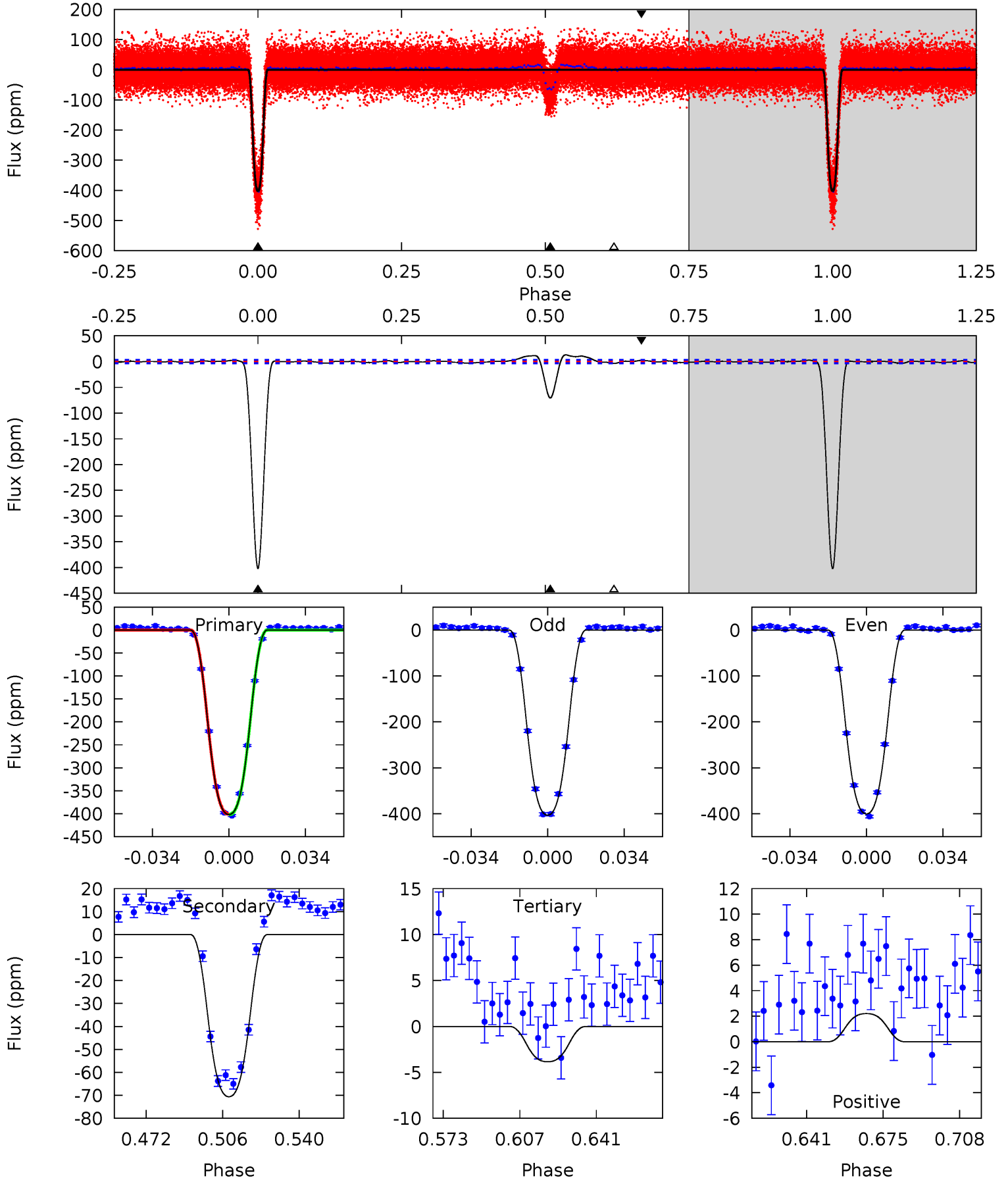
TCE 007684873-01 P= 2.947366 Days  $T_0=133.215515$  (BKJD)



# DV Model-Shift Uniqueness Test

007684873-01, P = 2.947364 Days, E = 130.268703 Days

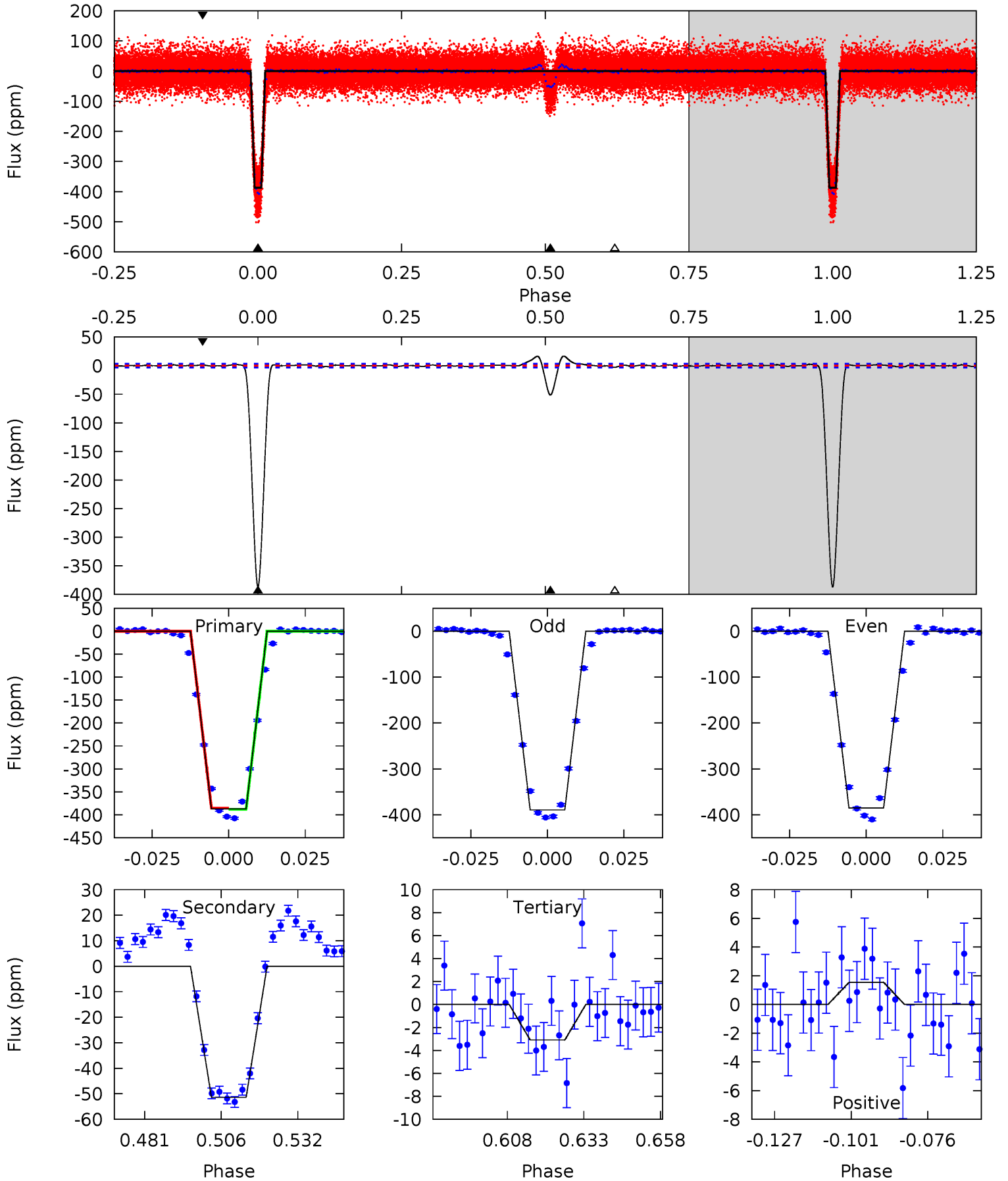
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
568.9	100.0	5.44	3.12	4.79	2.12	3.91	563.4	565.7	94.5	96.8	1.96	1.00	0.03	0.83



# Alt Model-Shift Uniqueness Test

007684873-01, P = 2.947366 Days, E = 130.268149 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
540.3	71.8	4.31	2.15	4.85	2.24	3.02	536.0	538.2	67.5	69.7	2.84	1.00	0.04	1.88



### Stellar Parameters For KIC 007684873

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$8090^{+226}_{-340}$	$4.002^{+0.198}_{-0.132}$	$-0.140^{+0.250}_{-0.300}$	$2.234^{+0.476}_{-0.581}$	$1.828^{+0.144}_{-0.312}$	$0.231^{+0.257}_{-0.090}$
	+3%/-4%	+5%/-3%	+179%/-214%	+21%/-26%	+8%/-17%	+111%/-39%
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 007684873-01 / KOI 0014.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-71 \pm 1$	$5.70^{+0.70}_{-0.75}$	$3323^{+218}_{-244}$	$4697^{+87}_{-131}$	$2.873^{+0.828}_{-0.568}$
Alt.	$-51 \pm 1$	$4.85^{+0.58}_{-0.74}$	$3322^{+216}_{-251}$	$4697^{+100}_{-136}$	$2.887^{+0.983}_{-0.570}$

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

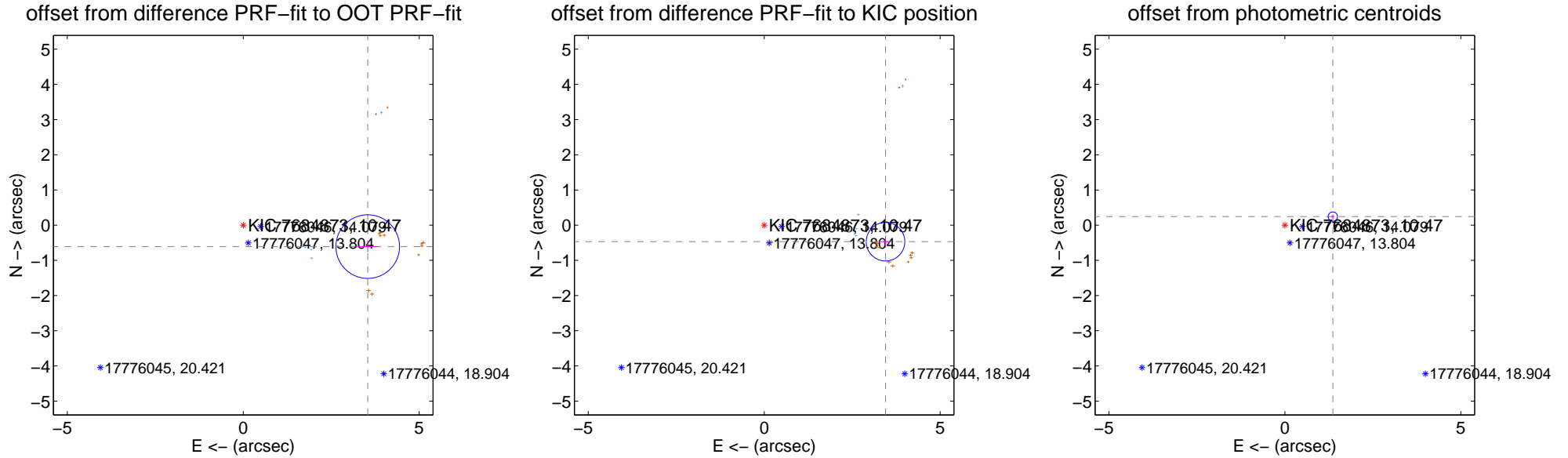
## DV Centroid Data

Supplemental centroid analysis for 007684873-01. **Kepler magnitude: 10.47.** Transit SNR 297.50

There are 5 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.75 arcsec

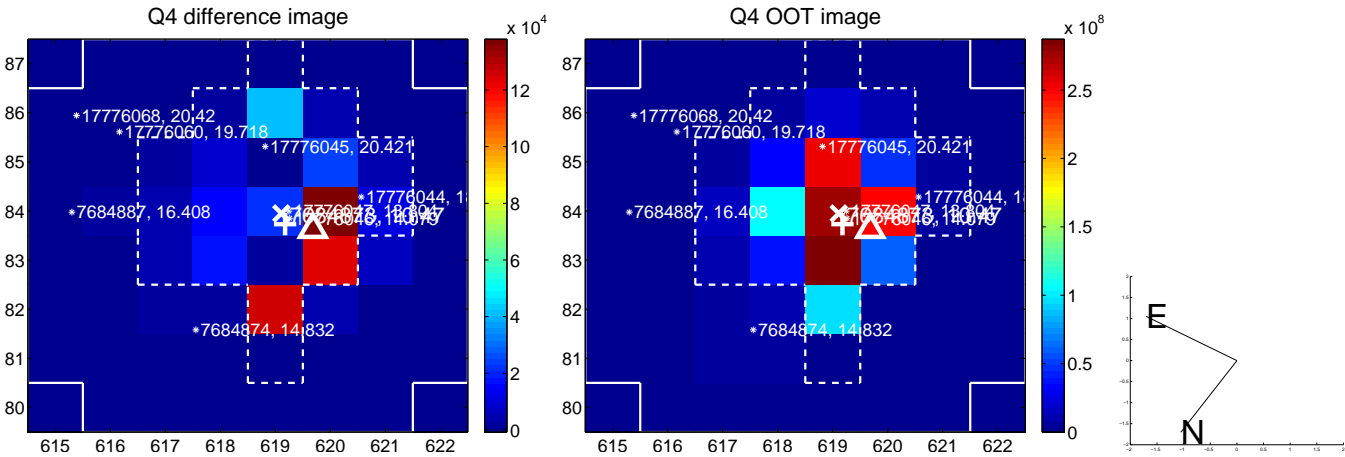
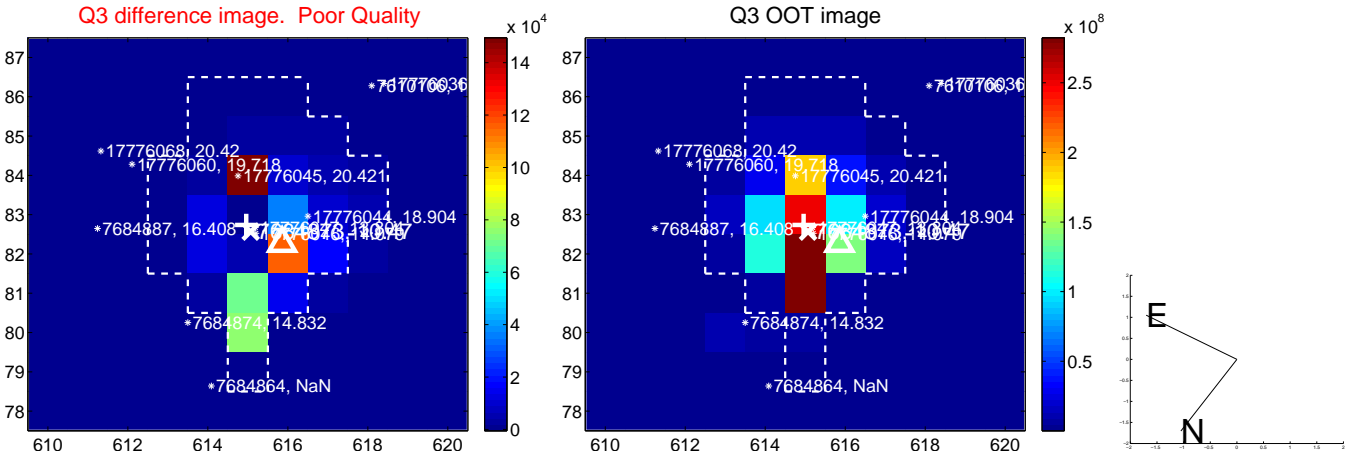
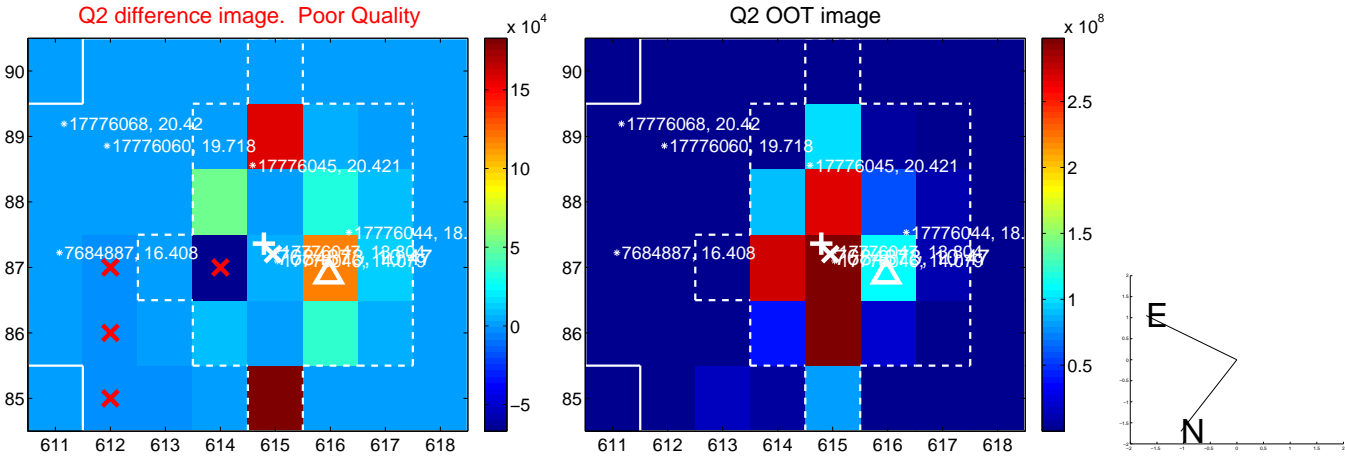
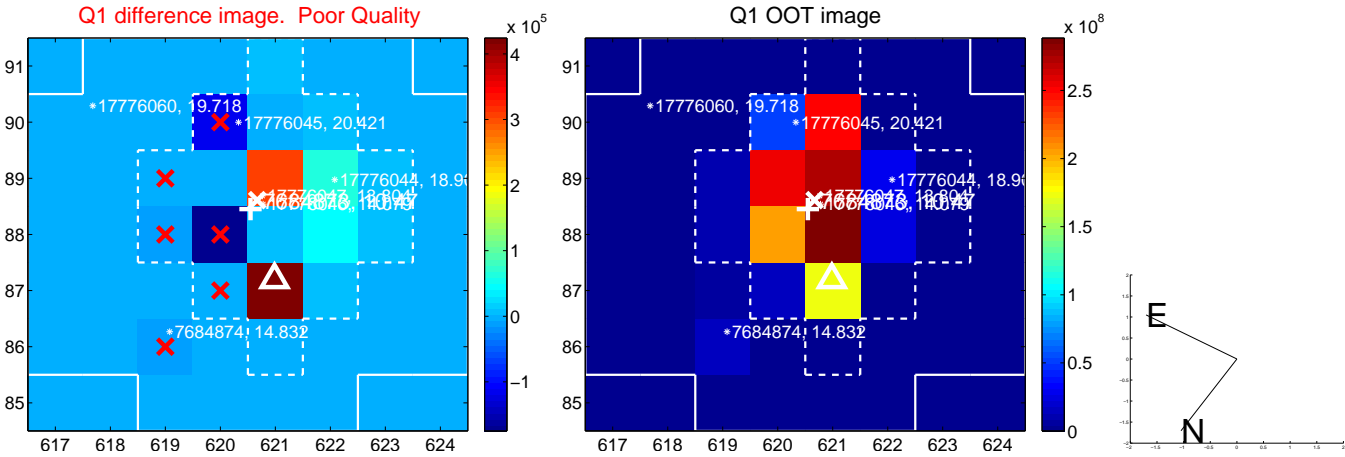
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	<b><math>3.590 \pm 0.301</math></b>	<b>11.92</b>	$-3.538 \pm 0.304$	$-0.609 \pm 0.160$
PRF-fit source offset from KIC position	<b><math>3.480 \pm 0.183</math></b>	<b>19.05</b>	$-3.448 \pm 0.183$	$-0.469 \pm 0.167$
photometric centroid source offset	<b><math>1.38 \pm 0.04</math></b>	<b>31.39</b>	$-1.36 \pm 0.04$	$0.24 \pm 0.05$



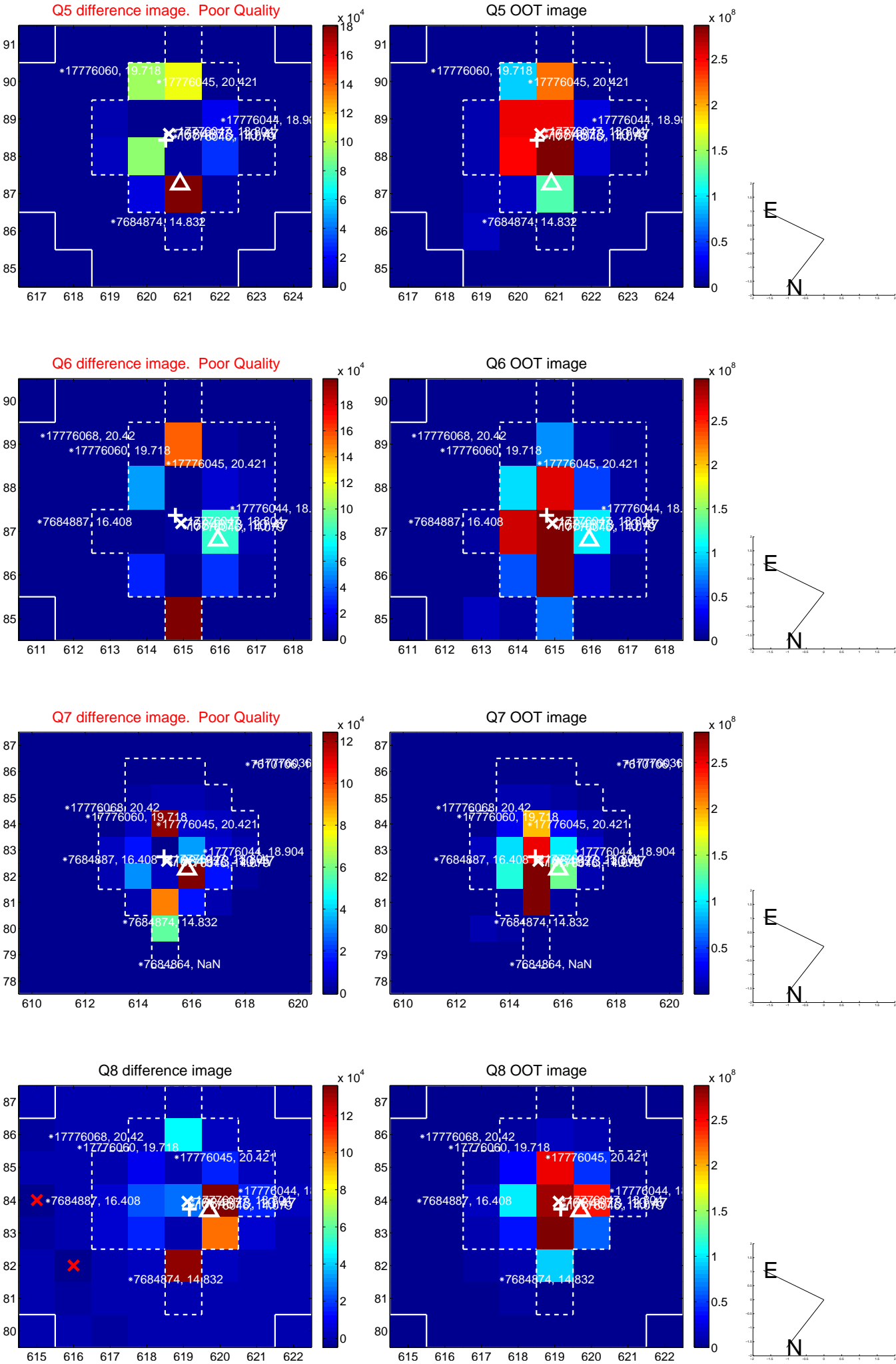
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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



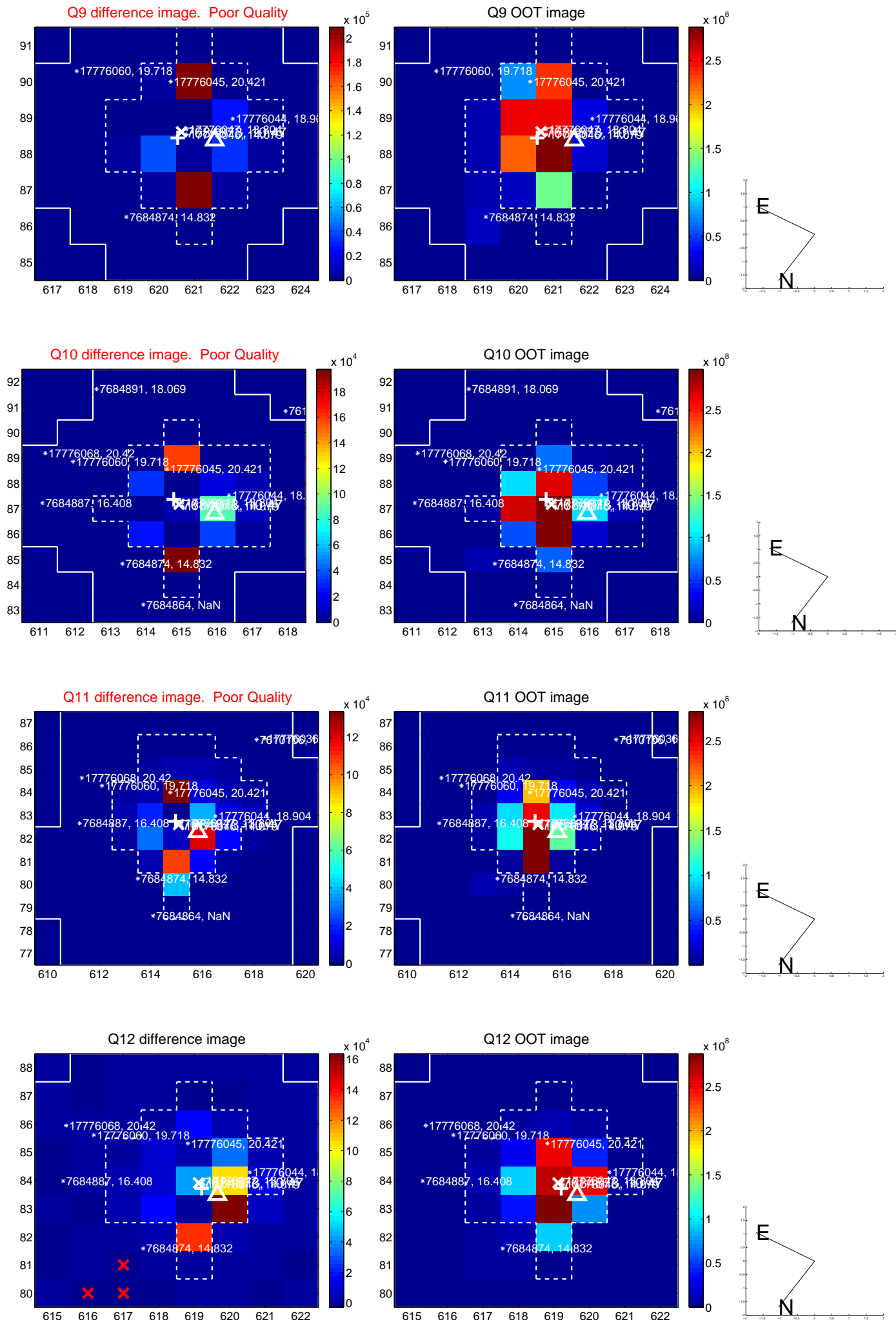
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



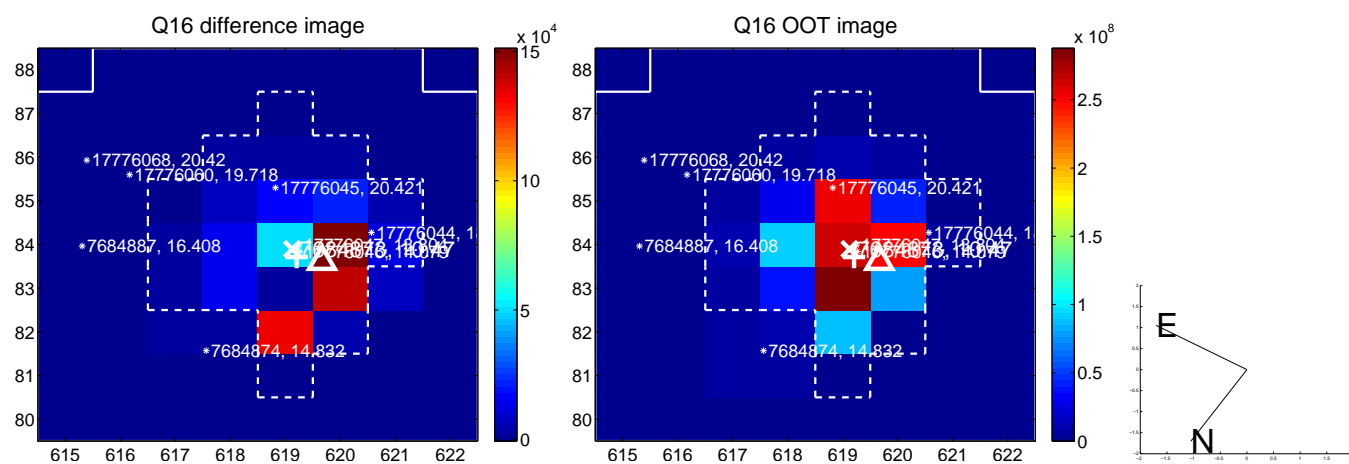
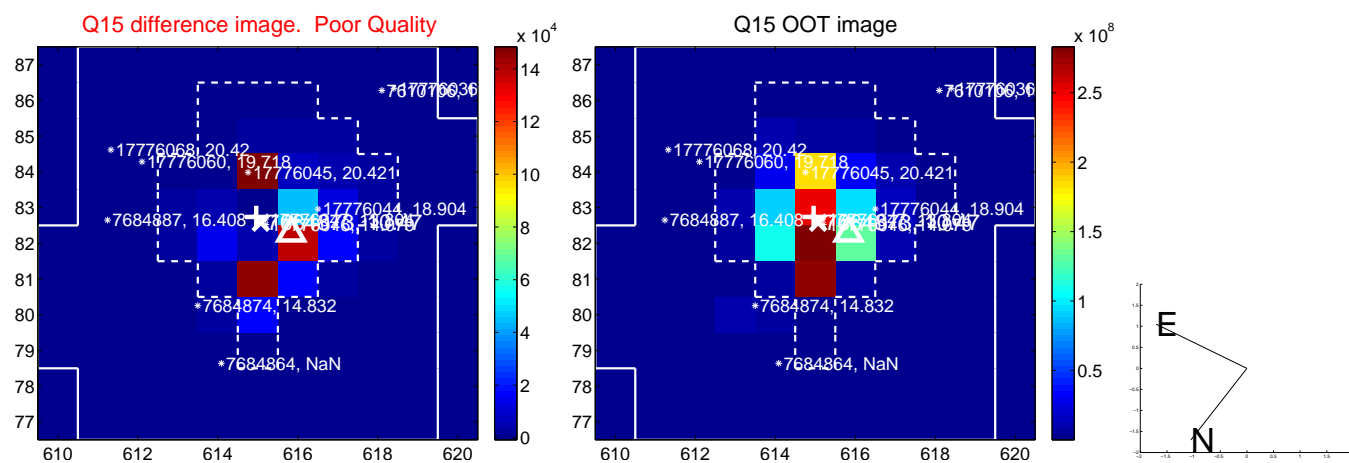
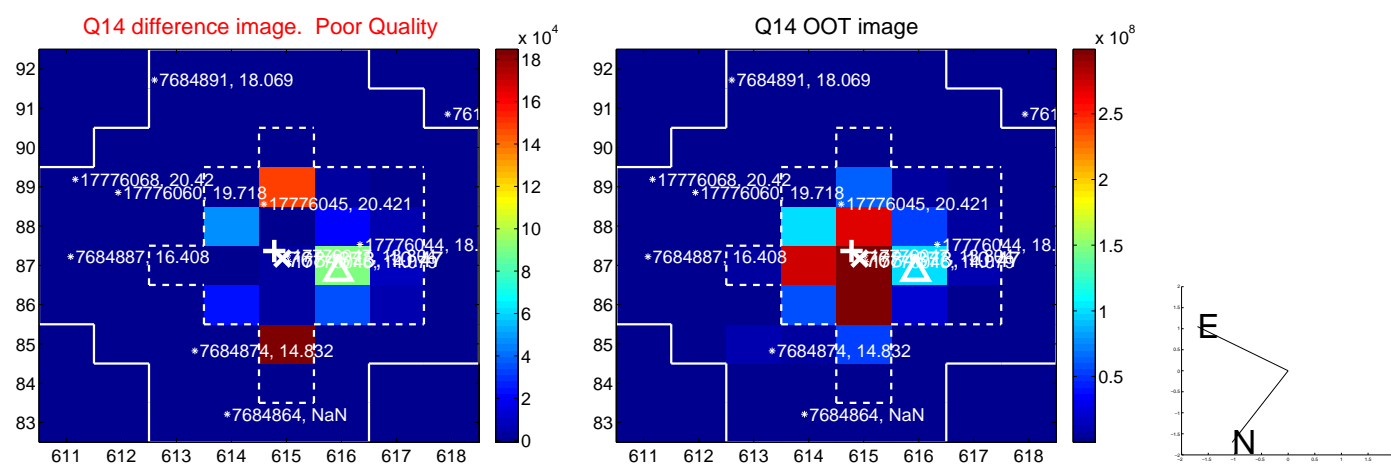
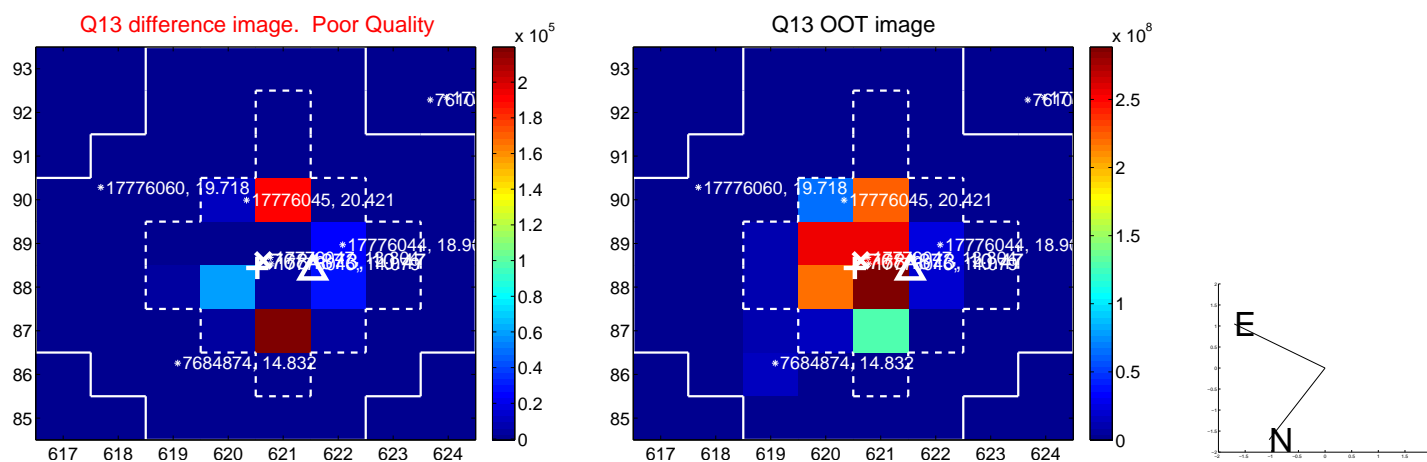
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



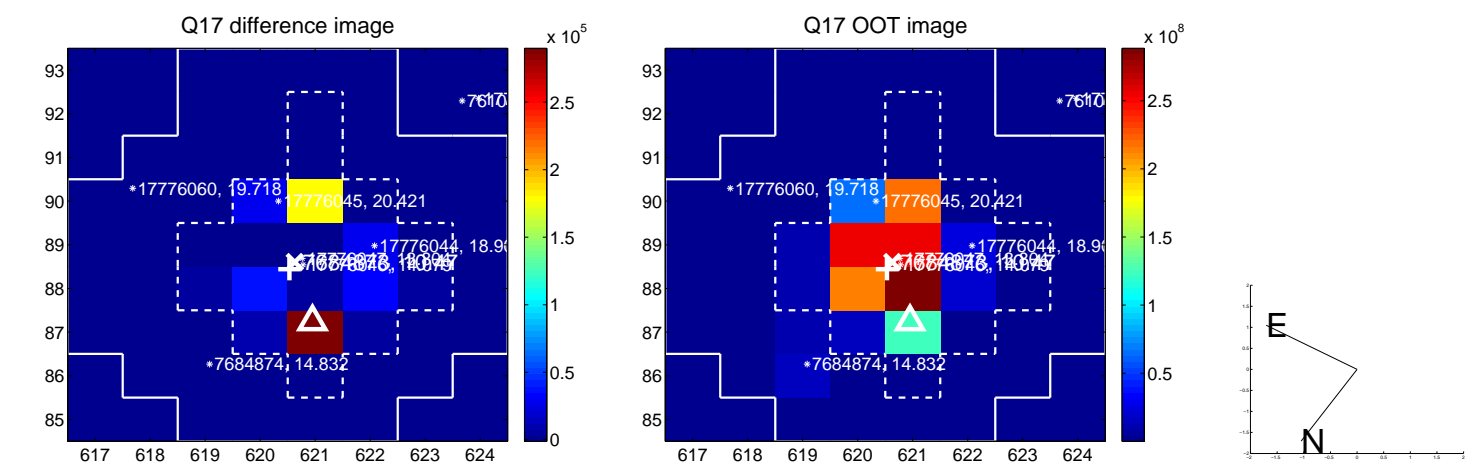
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



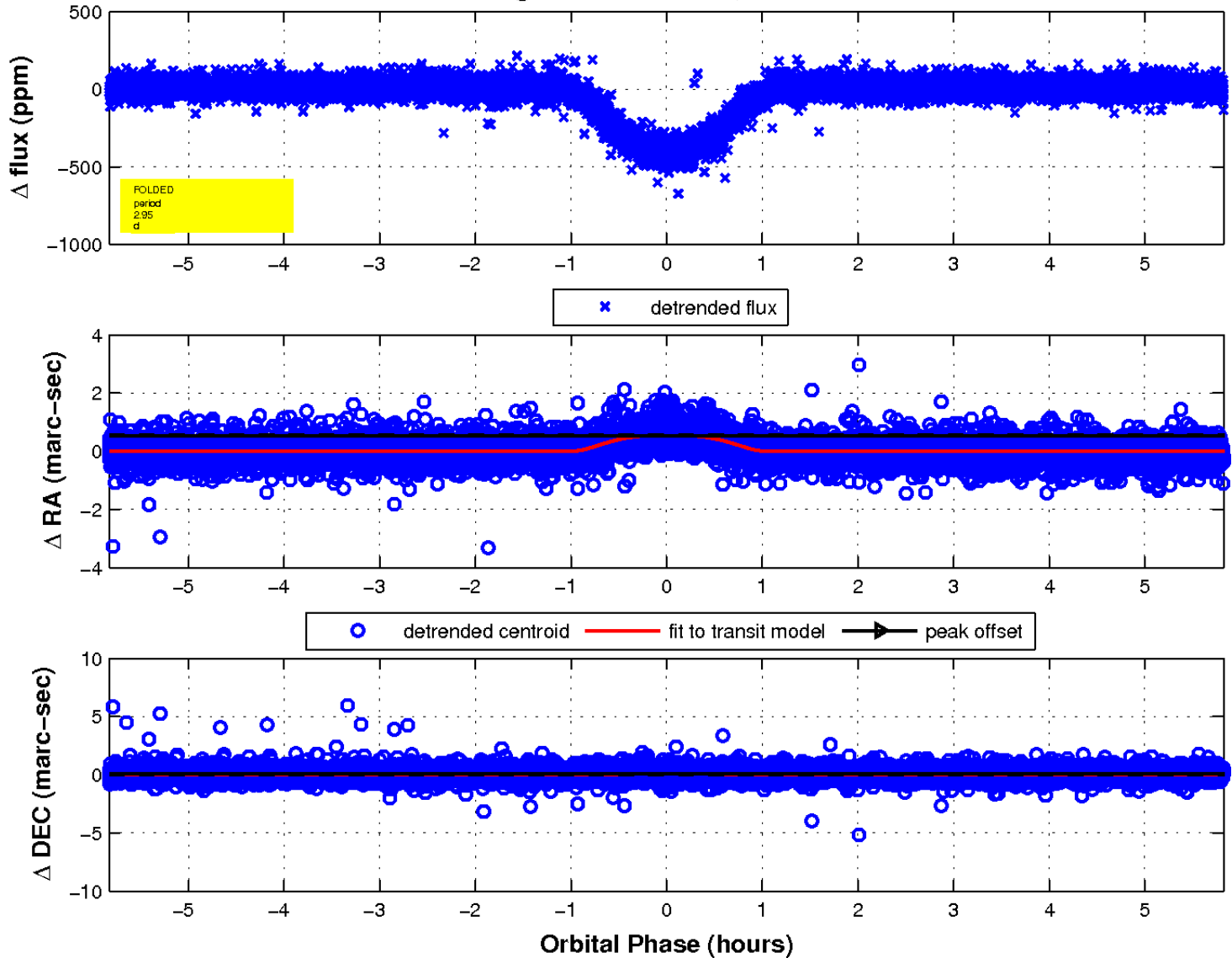
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

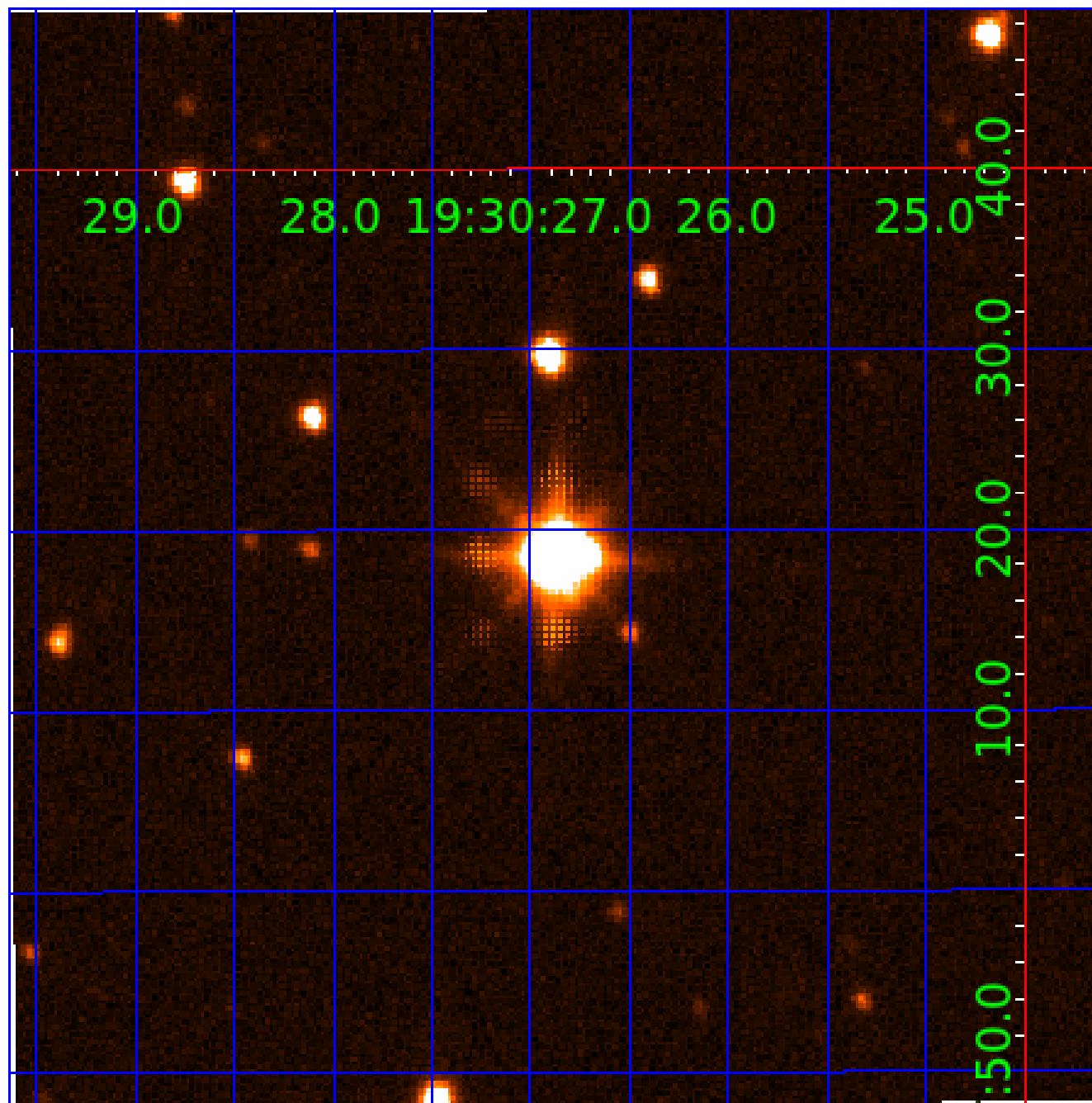


fluxWeightedCentroids, Planet 1 of 2



UKIRT Image

Declination





# KIC 007684873

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
007684873-01	OBS	0014.01	2.947364	133.216067	403.2	1.943	318.8	297.5	2.23	8090	5.79	7909.80
007684873-02	OBS	No	2.947372	131.766650	79.9	1.666	58.0	68.1	2.23	8090	2.41	7909.77

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
007684873-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_DV—MOD_SEC_ALT—HAS_SEC_TCE—CENT_SATURATED
007684873-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE—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](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

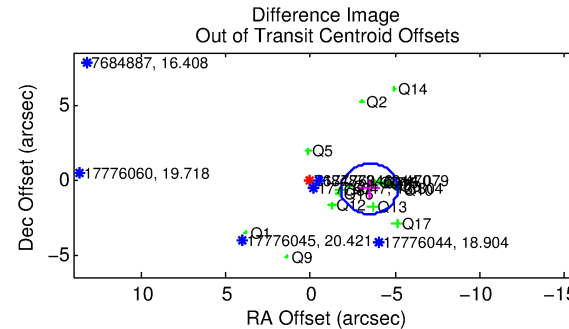
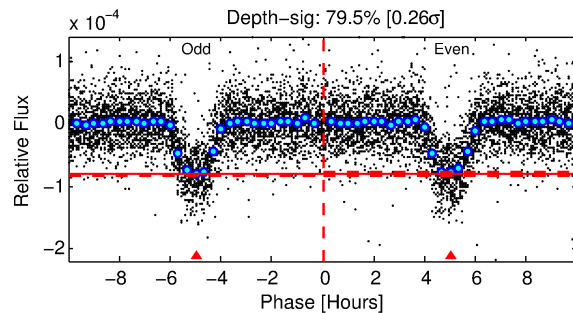
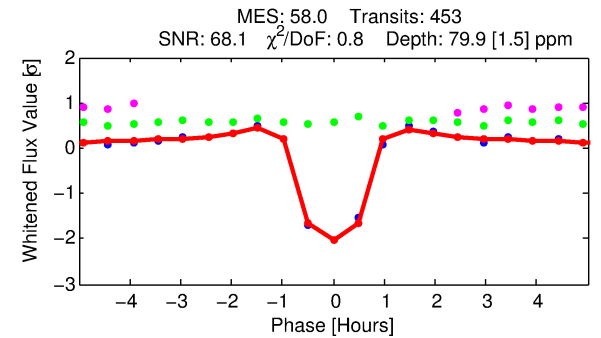
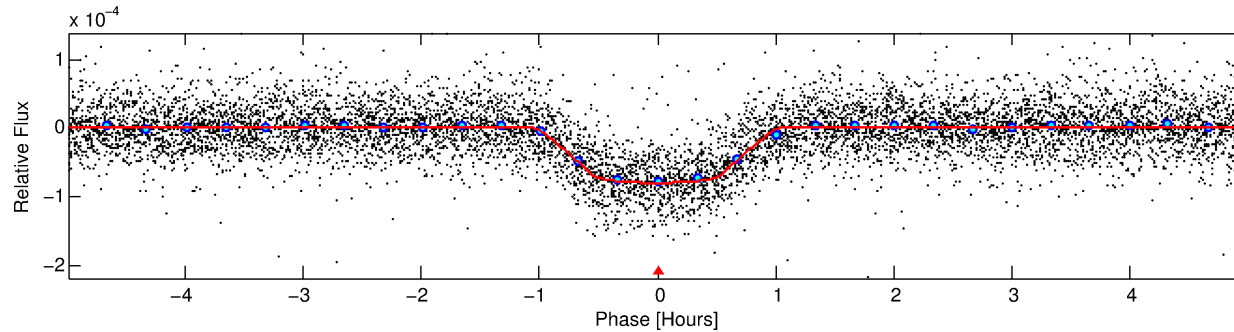
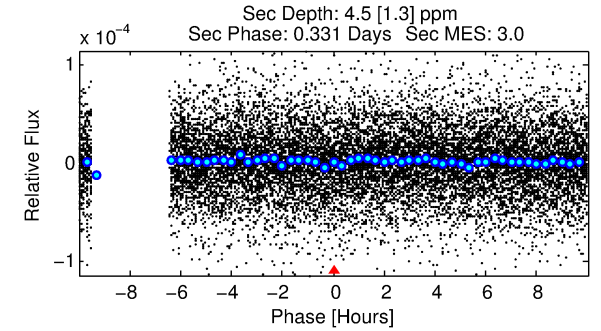
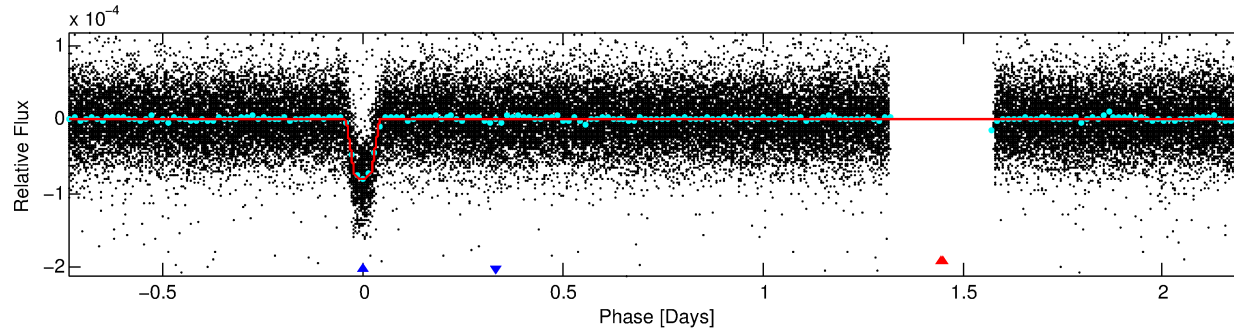
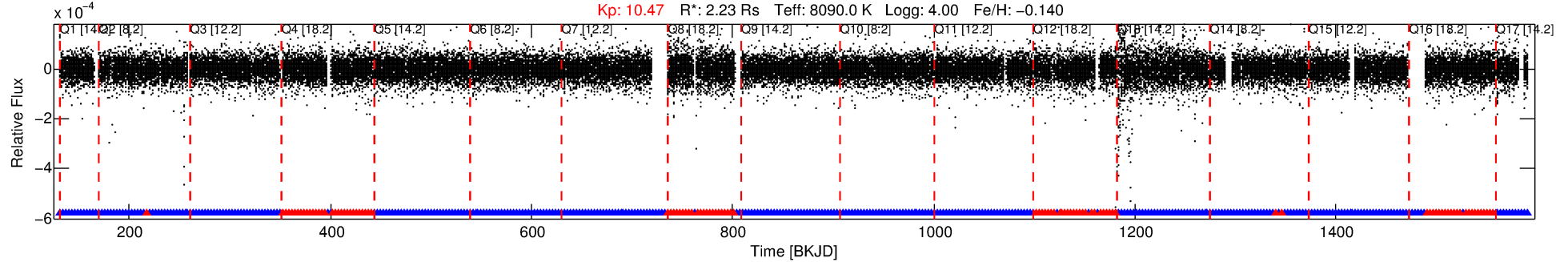
## Ephemeris Match Information For 007684873-02

No Significant Match Found

# DV One-Page Summary

KIC: 7684873 Candidate: 2 of 2 Period: 2.947 d  
KOI: K00014 Corr: No Ephemeris Match

Kp: 10.47 R\*: 2.23 Rs Teff: 8090.0 K Logg: 4.00 Fe/H: -0.140



## DV Fit Results:

Period = 2.94737 [0.00000] d  
Epoch = 131.7666 [0.0004] BKJD  
Rp/R\* = 0.0099 [0.0006]  
a/R\* = 5.26 [1.95]  
b = 0.93 [0.05]  
Seff = 7909.77 [3070.60]  
Teq = 2405 [233] K  
Rp = 2.41 [0.64] Re  
a = 0.0492 [0.0113] AU  
Ag = 1.02 [0.48] [0.05σ]  
Teff = 3741 [328] K [3.32σ]

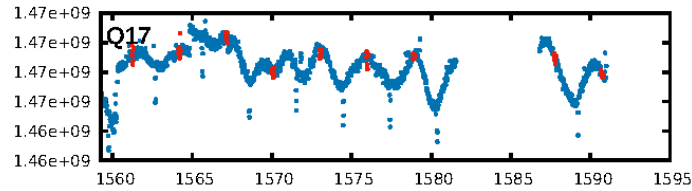
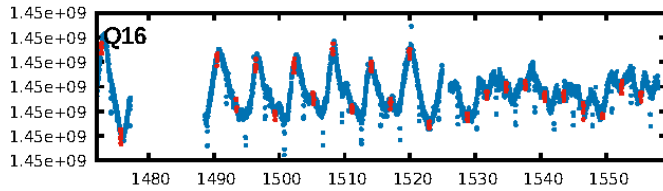
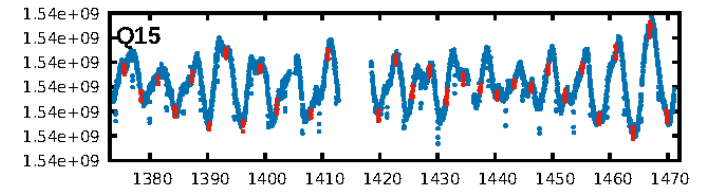
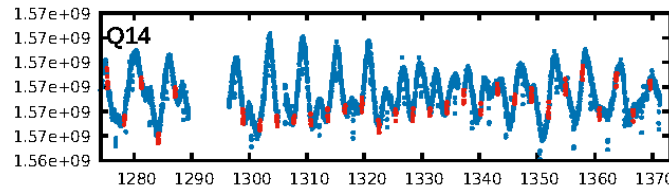
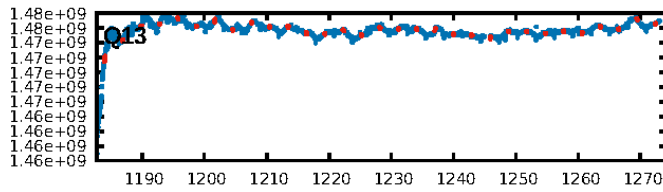
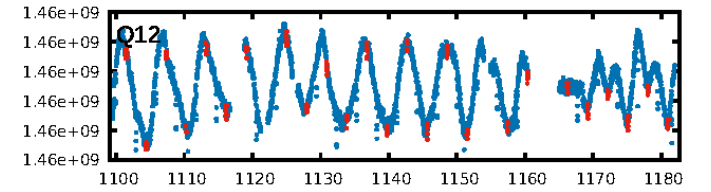
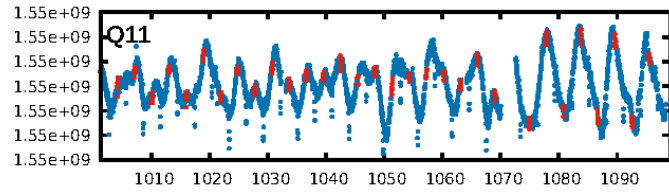
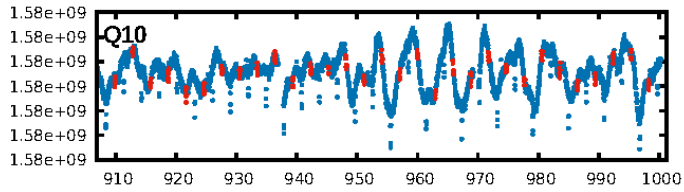
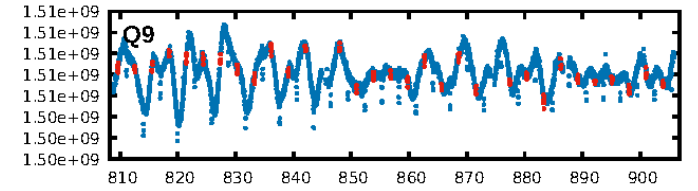
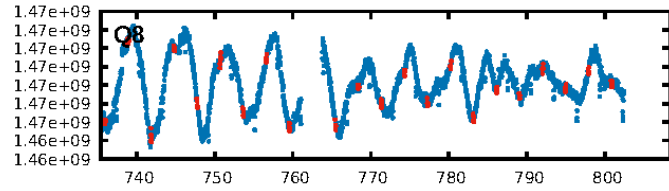
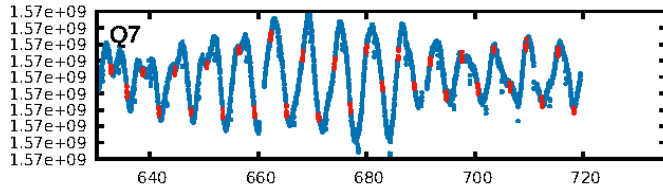
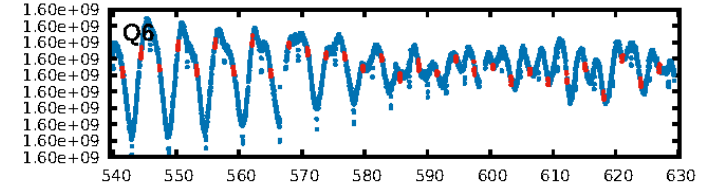
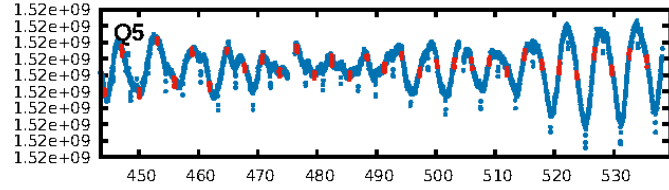
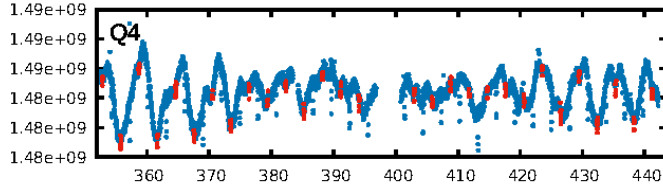
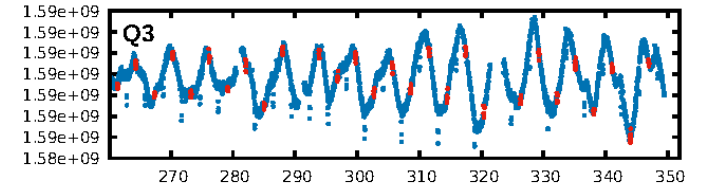
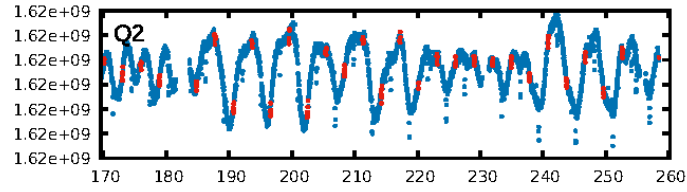
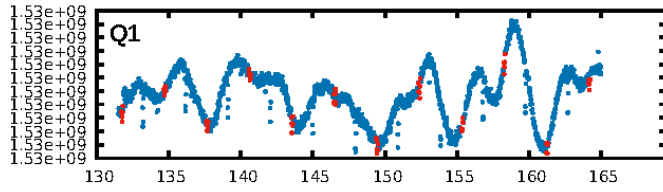
## DV Diagnostic Results:

ShortPeriod-sig: 0.0% [0.00σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 0.00e+00  
RollingBand-fgt: 0.77 [331/432]  
GhostDiagnostic-chr: 4.71  
Centroid-sig: 0.0%  
Centroid-so: 1.288 arcsec [6.48σ]  
OotOffset-rm: 3.521 arcsec [6.32σ]  
KicOffset-rm: 3.164 arcsec [5.97σ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 0.18 [3/17]  
DiffImageOverlap-fno: 1.00 [17/17]

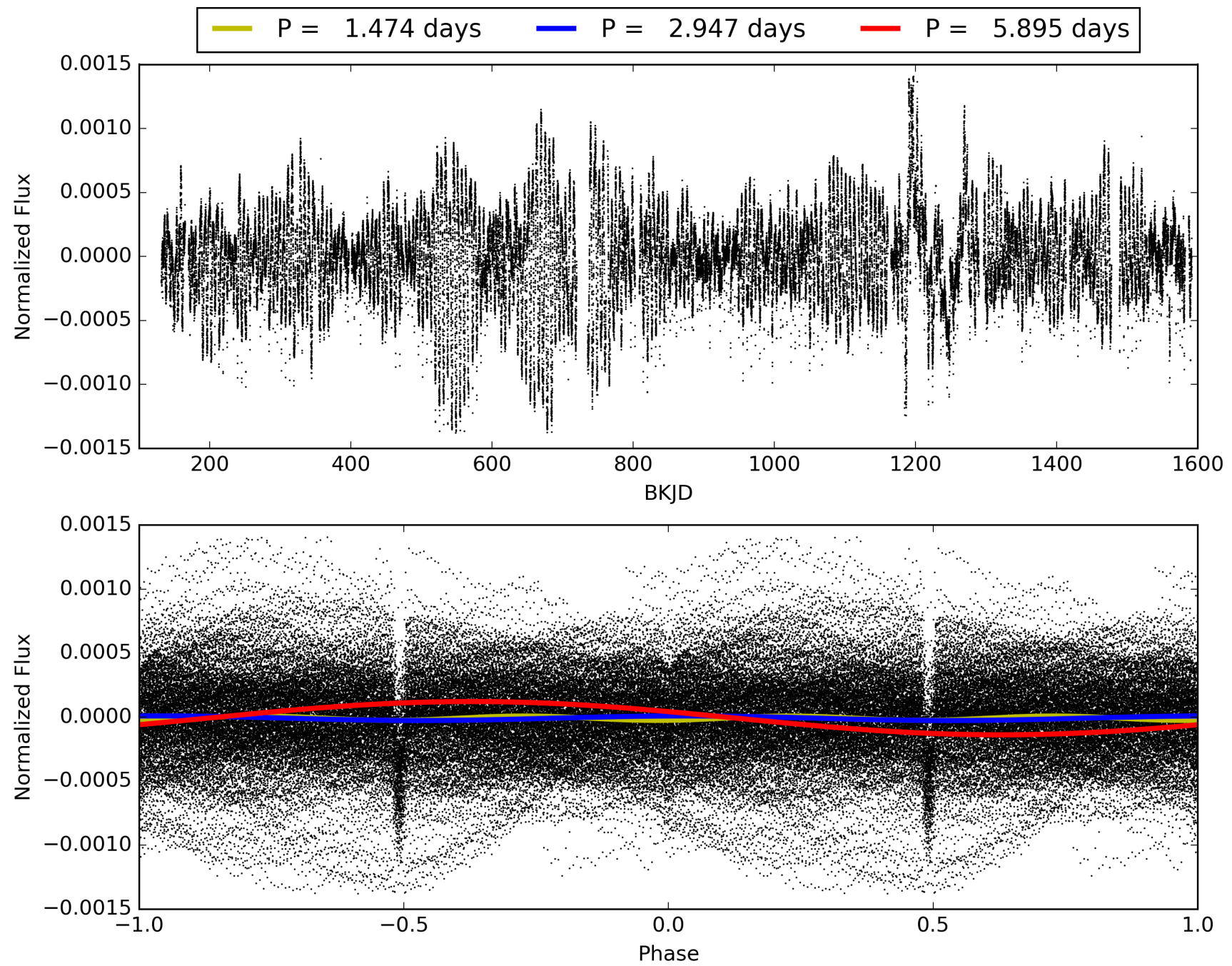
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 20:11:14 Z

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

# TCE 007684873-02, PDC Light Curves

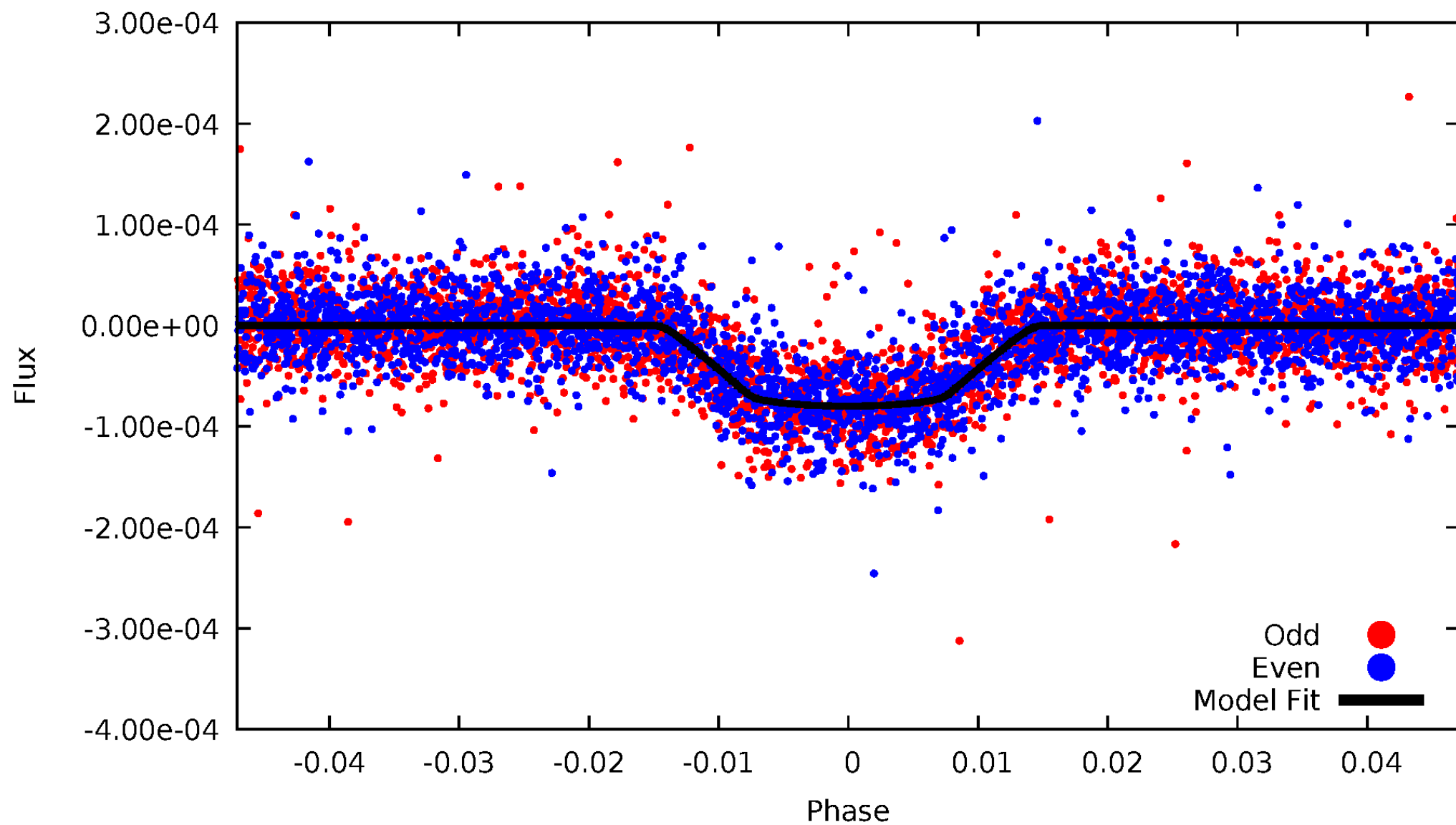


TCE 007684873-02



# DV Odd/Even

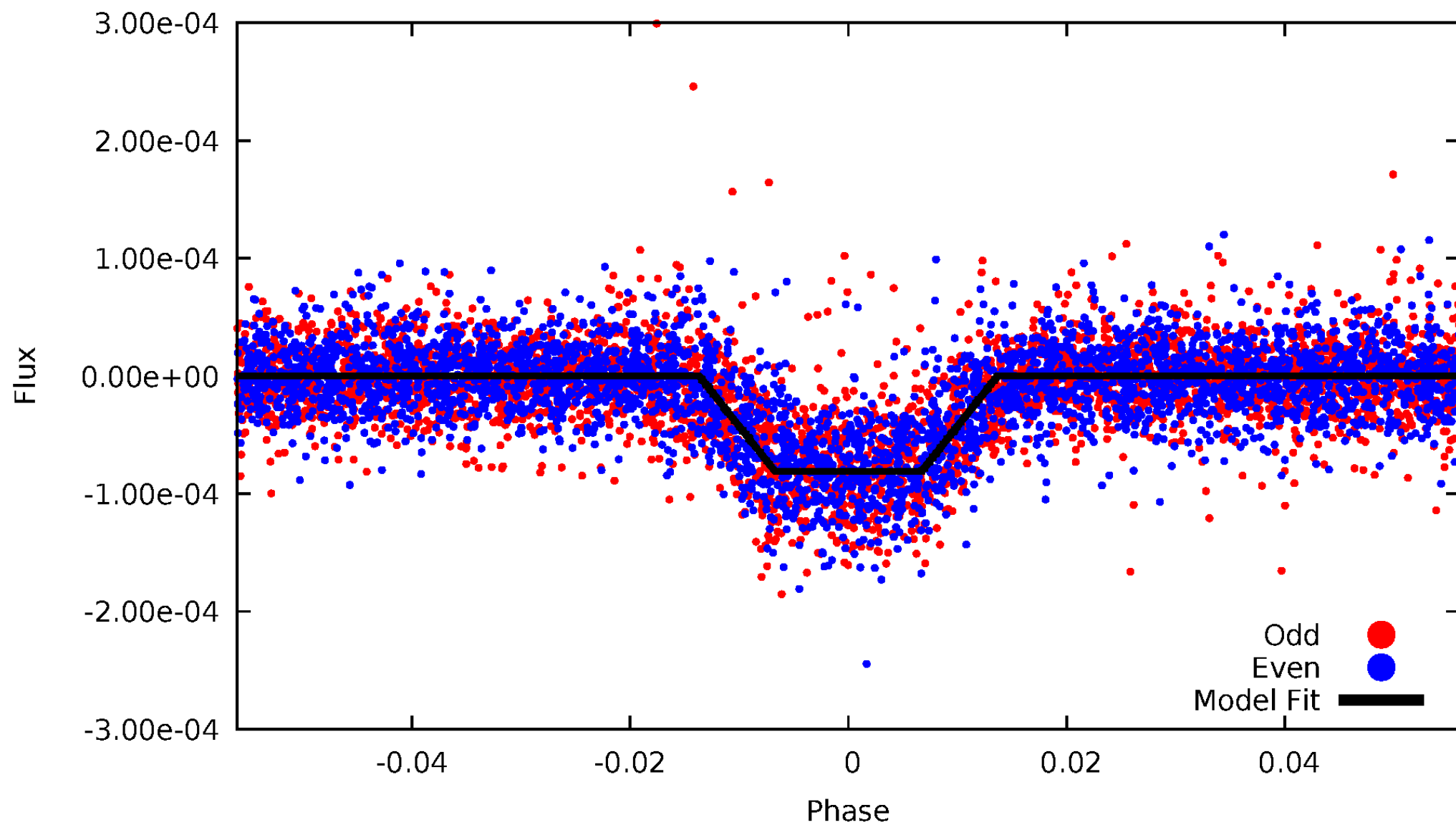
TCE 007684873-02





# ALT Odd/Even

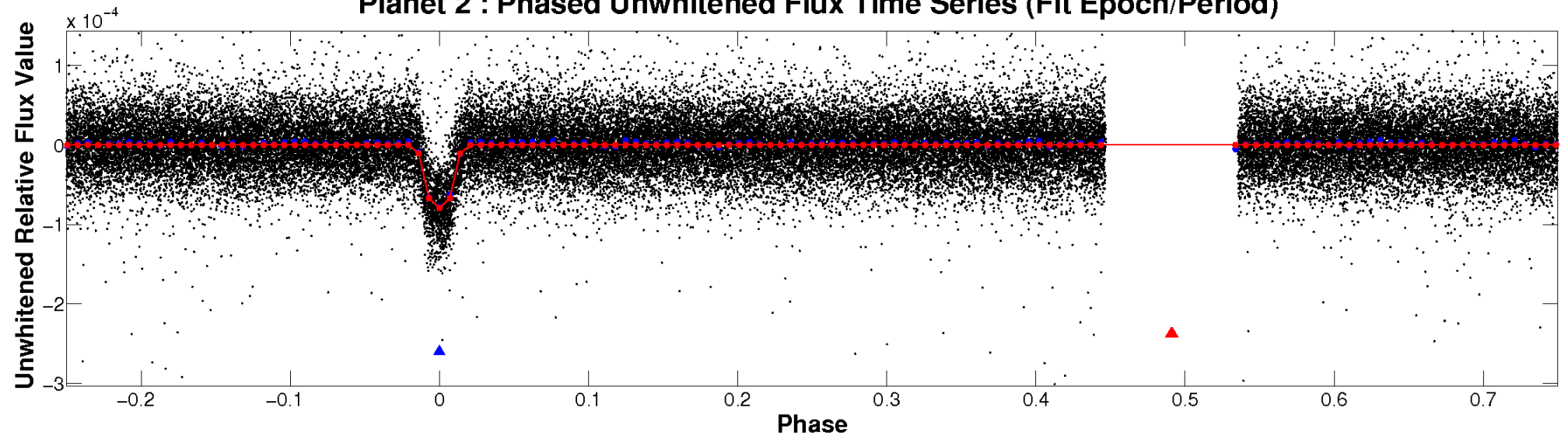
TCE 007684873-02



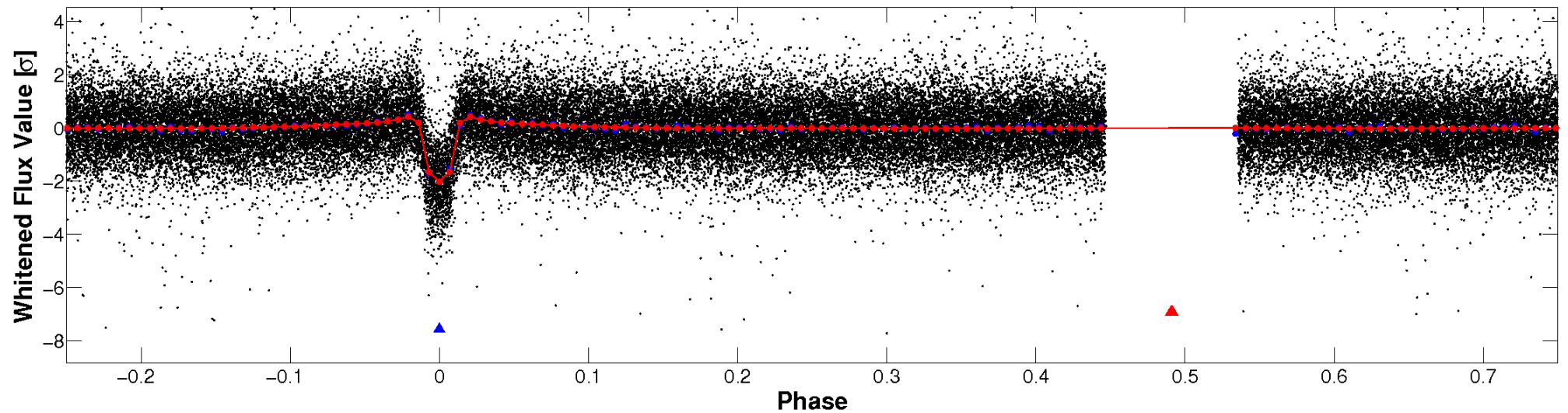


# Non-Whitened Vs. Whitened Light Curve

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

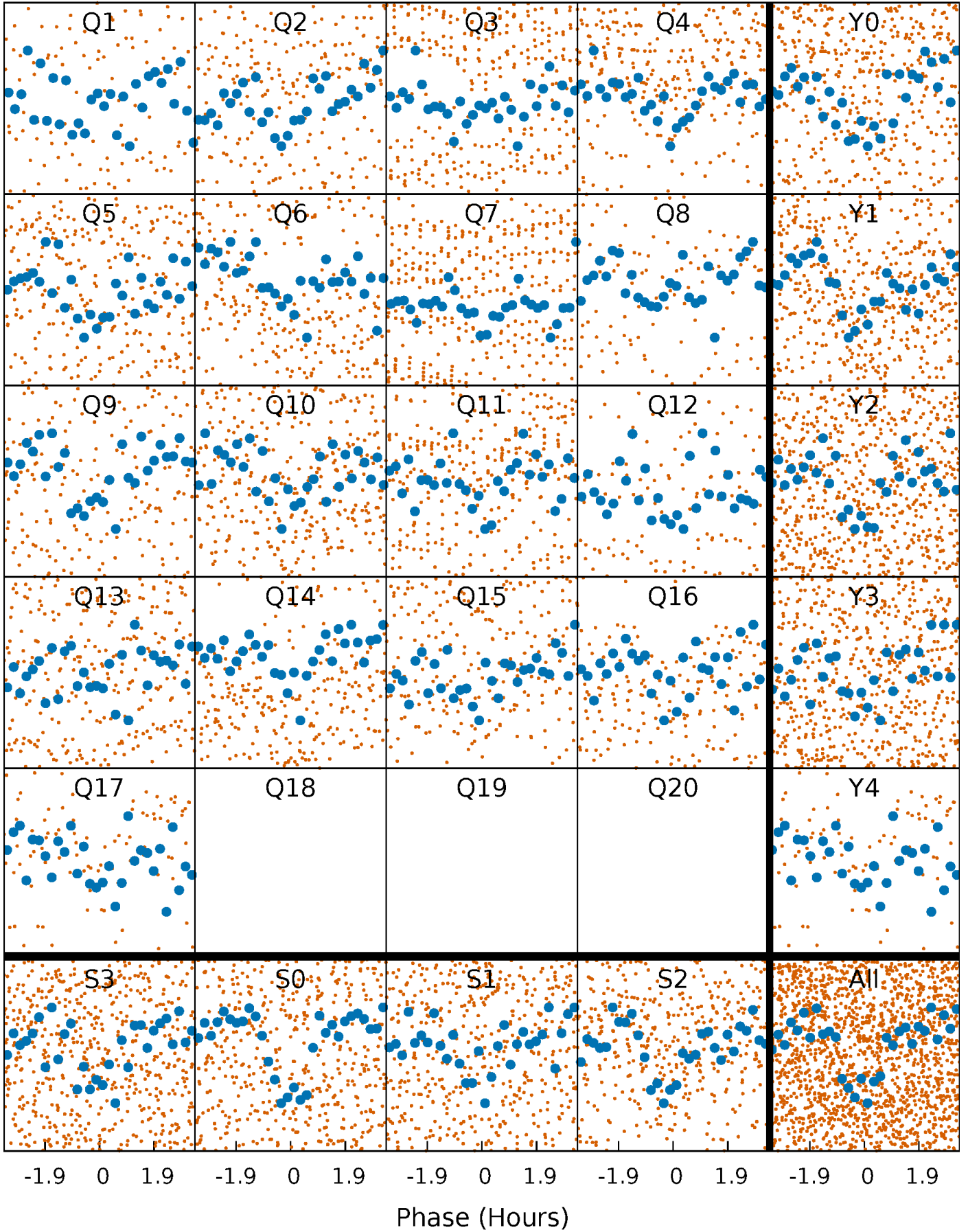


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



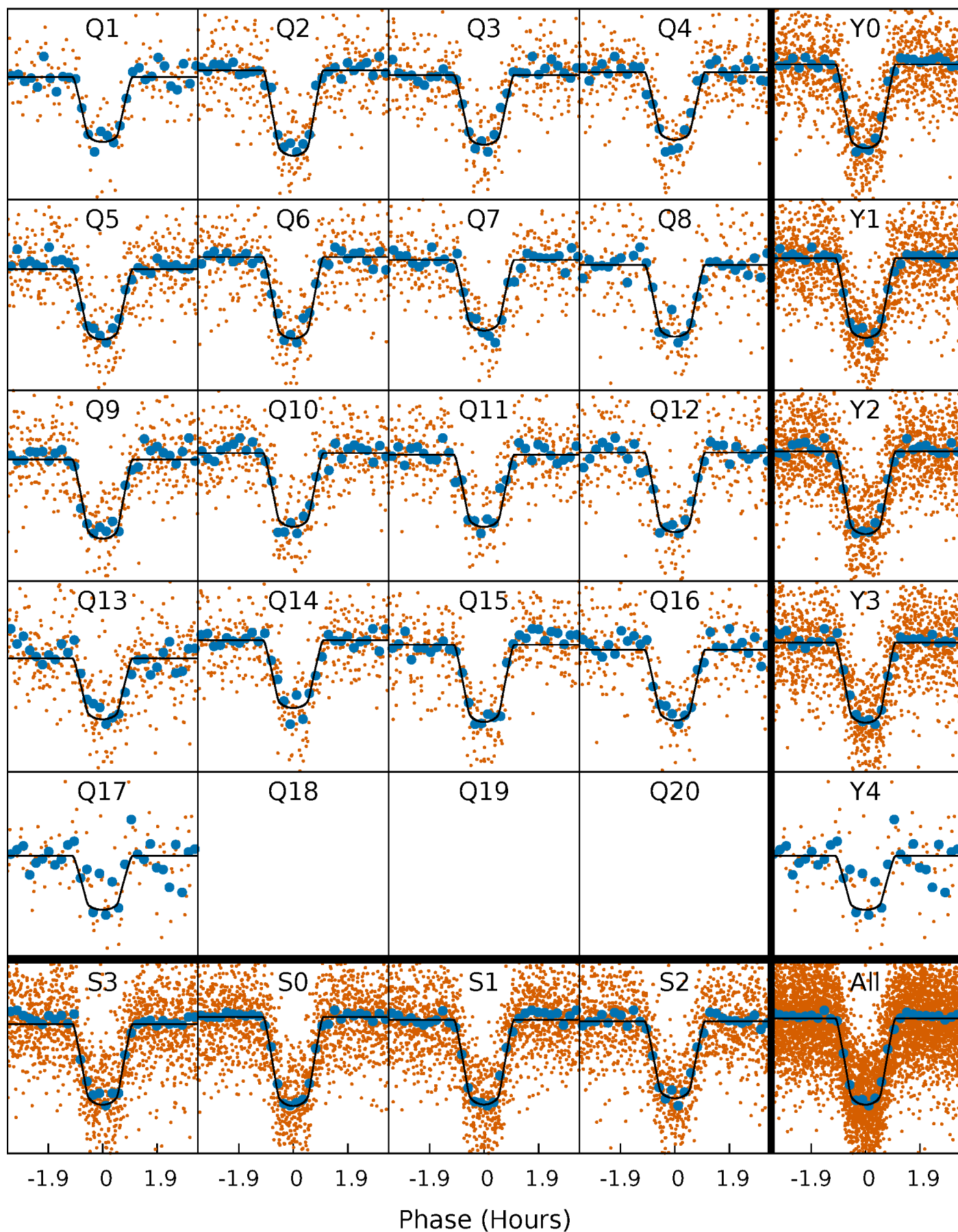
# PDC Quarter-Phased Transit Curves

TCE 007684873-02   P= 2.947372 Days    $T_0=131.766650$  (BKJD)



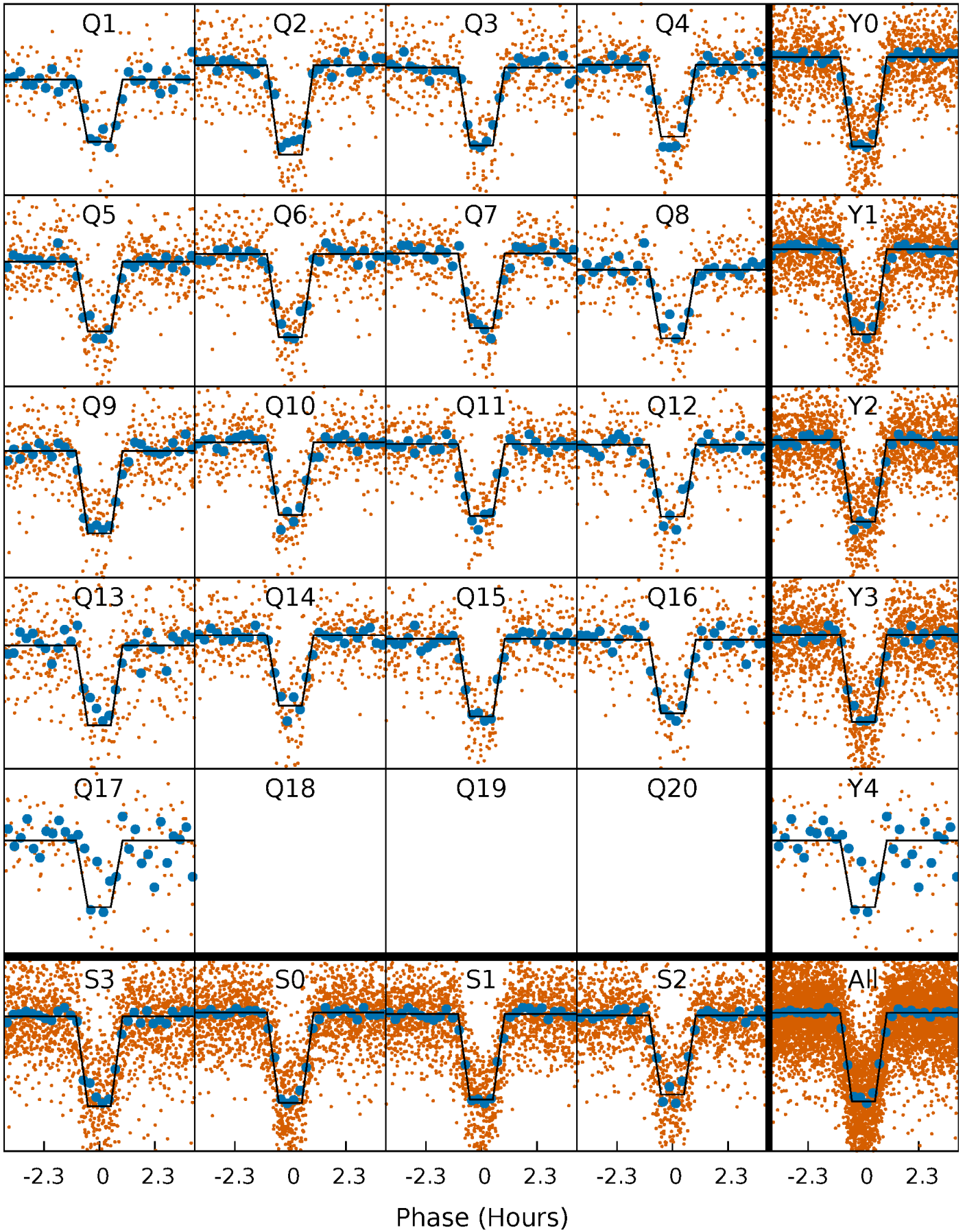
# DV Quarter-Phased Transit Curves

TCE 007684873-02 P= 2.947372 Days  $T_0=131.766650$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 007684873-02 P= 2.947381 Days  $T_0=131.764098$  (BKJD)

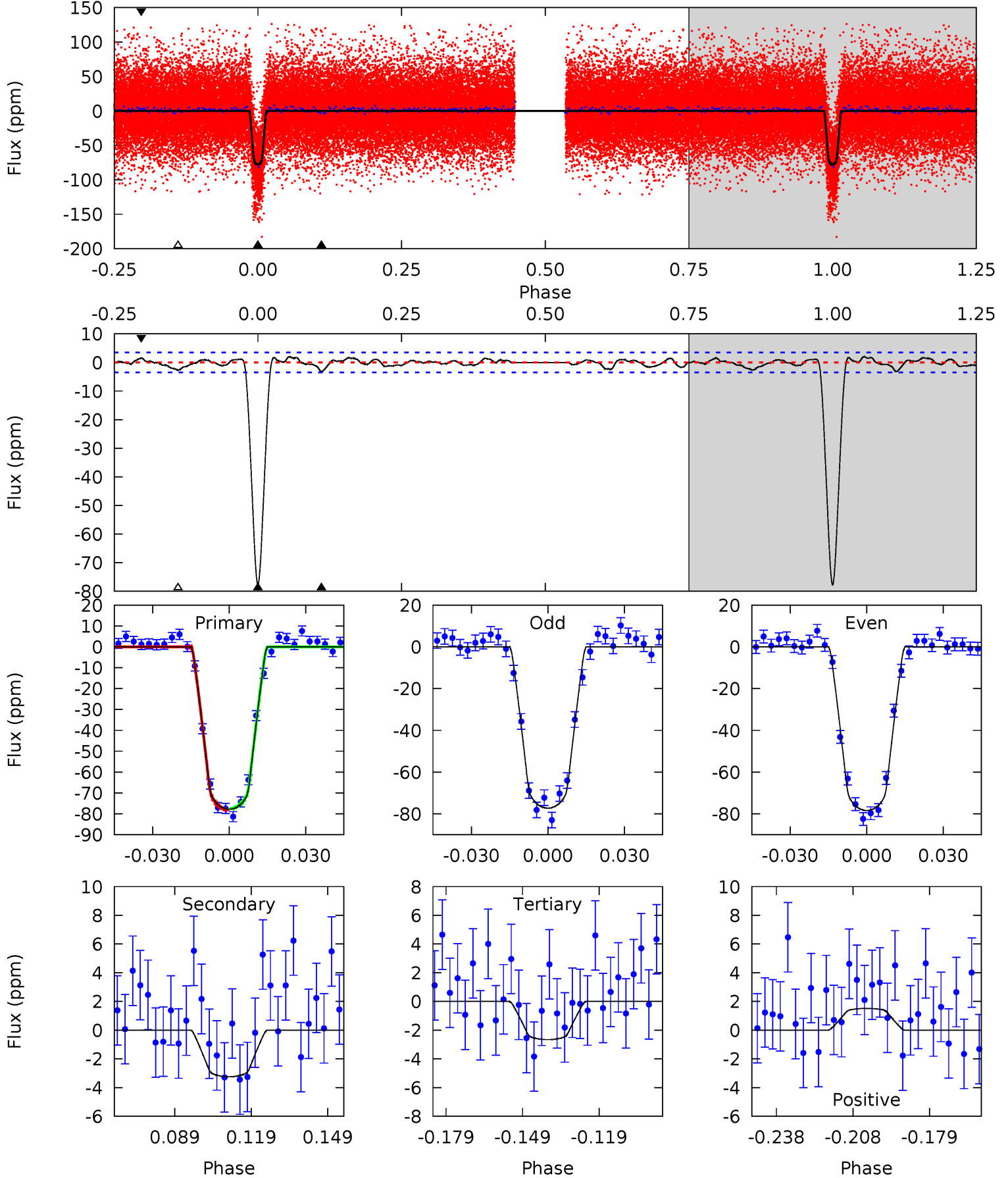




# DV Model-Shift Uniqueness Test

007684873-02, P = 2.947372 Days, E = 128.819278 Days

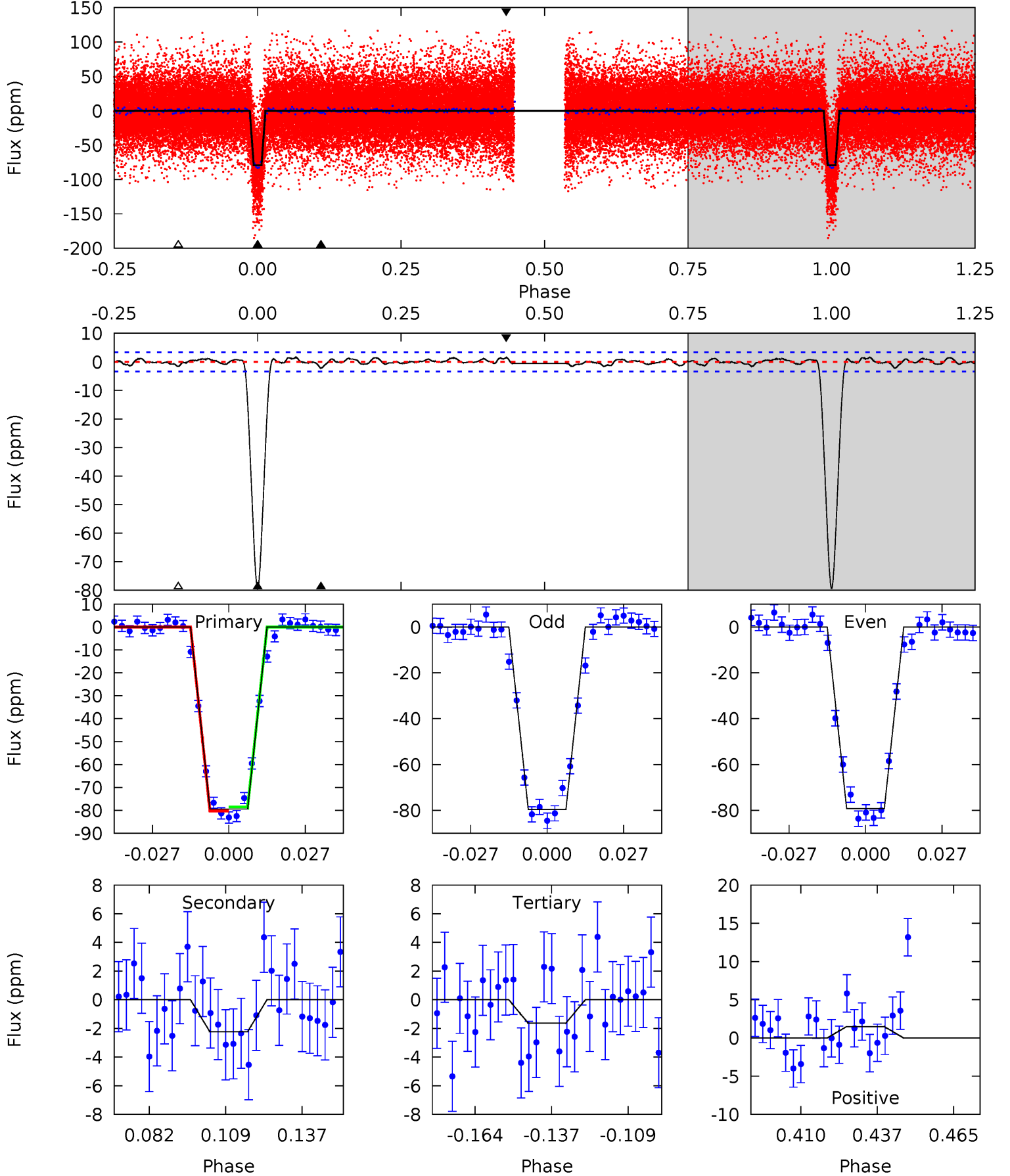
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
106.7	4.45	3.64	2.08	4.81	2.17	1.30	103.0	104.6	0.80	2.37	0.77	0.99	0.03	0.41



# Alt Model-Shift Uniqueness Test

007684873-02, P = 2.947381 Days, E = 128.816717 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
113.8	3.20	2.34	2.14	4.83	2.21	1.01	111.4	111.6	0.86	1.06	0.26	0.99	0.02	1.29





### Stellar Parameters For KIC 007684873

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$8090^{+226}_{-340}$	$4.002^{+0.198}_{-0.132}$	$-0.140^{+0.250}_{-0.300}$	$2.234^{+0.476}_{-0.581}$	$1.828^{+0.144}_{-0.312}$	$0.231^{+0.257}_{-0.090}$
	+3%/-4%	+5%/-3%	+179%/-214%	+21%/-26%	+8%/-17%	+111%/-39%
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 007684873-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-3 \pm 1$	$2.35^{+0.34}_{-0.33}$	$3326^{+212}_{-257}$	$3434^{+226}_{-286}$	$0.769^{+0.295}_{-0.243}$
Alt.	$-2 \pm 1$	$2.16^{+0.31}_{-0.33}$	$3325^{+232}_{-227}$	$3270^{+277}_{-464}$	$0.624^{+0.294}_{-0.225}$

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

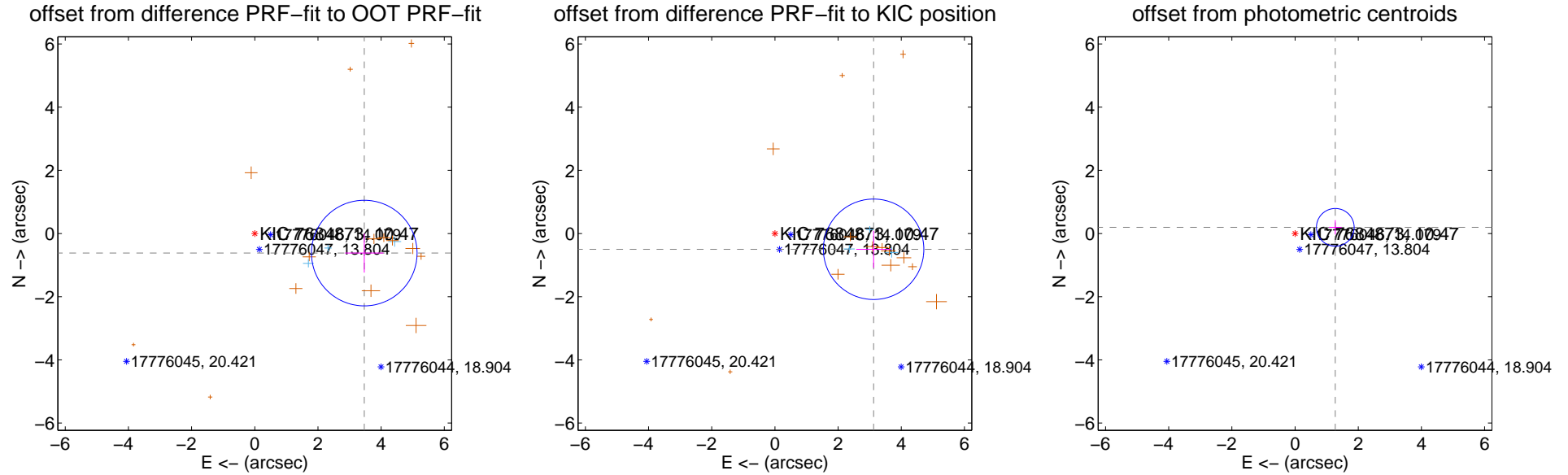
## DV Centroid Data

Supplemental centroid analysis for 007684873-02. **Kepler magnitude: 10.47.** Transit SNR 68.07

**There are 3 quarters with good PRF difference image offsets**

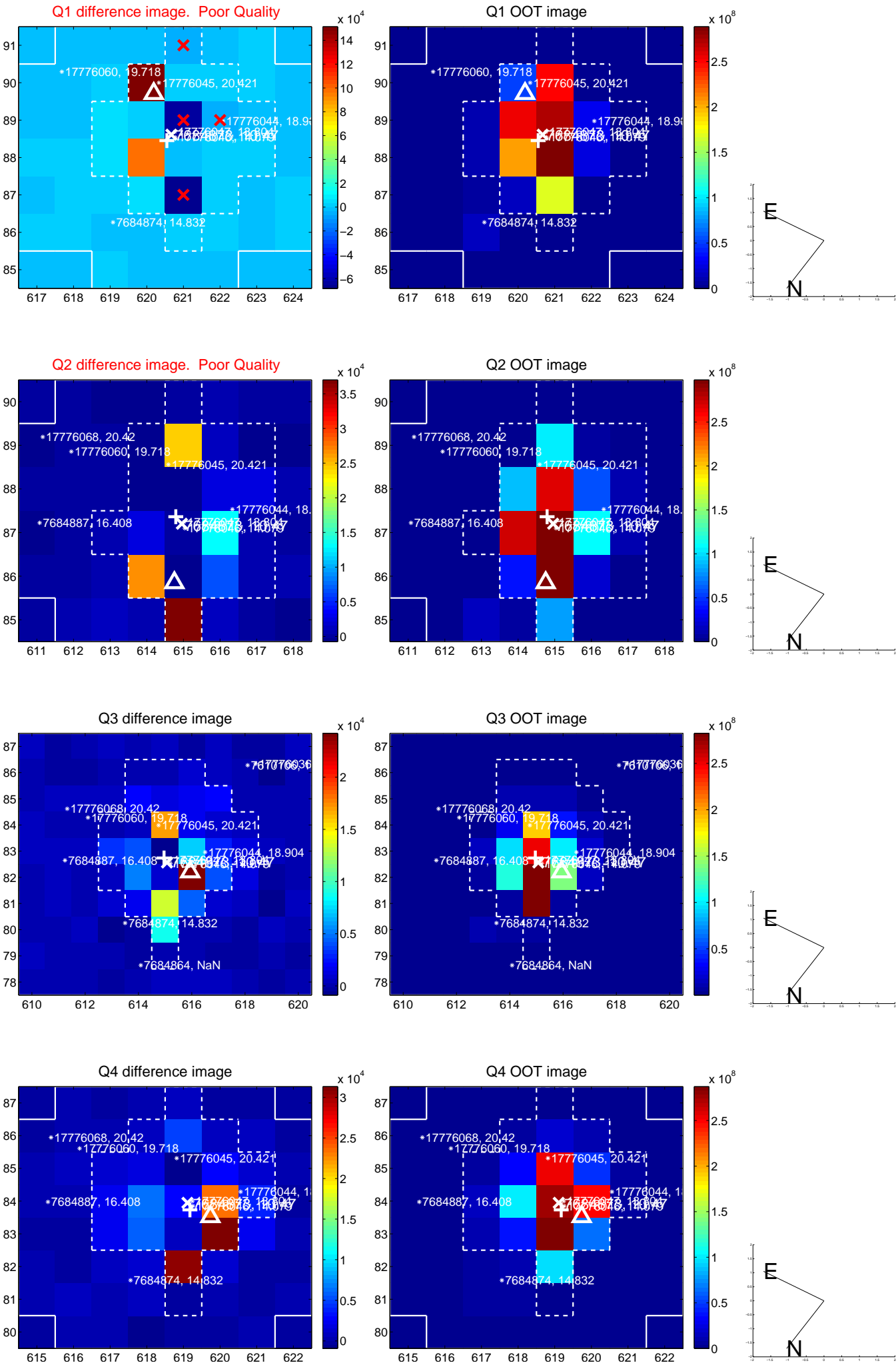
The direct PRF centroid is offset from the target star catalog position by about 0.75 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	<b><math>3.521 \pm 0.557</math></b>	<b>6.32</b>	$-3.466 \pm 0.608$	$-0.619 \pm 0.617$
PRF-fit source offset from KIC position	<b><math>3.164 \pm 0.530</math></b>	<b>5.97</b>	$-3.124 \pm 0.548$	$-0.499 \pm 0.587$
photometric centroid source offset	<b><math>1.29 \pm 0.20</math></b>	<b>6.48</b>	$-1.27 \pm 0.20$	$0.20 \pm 0.23$

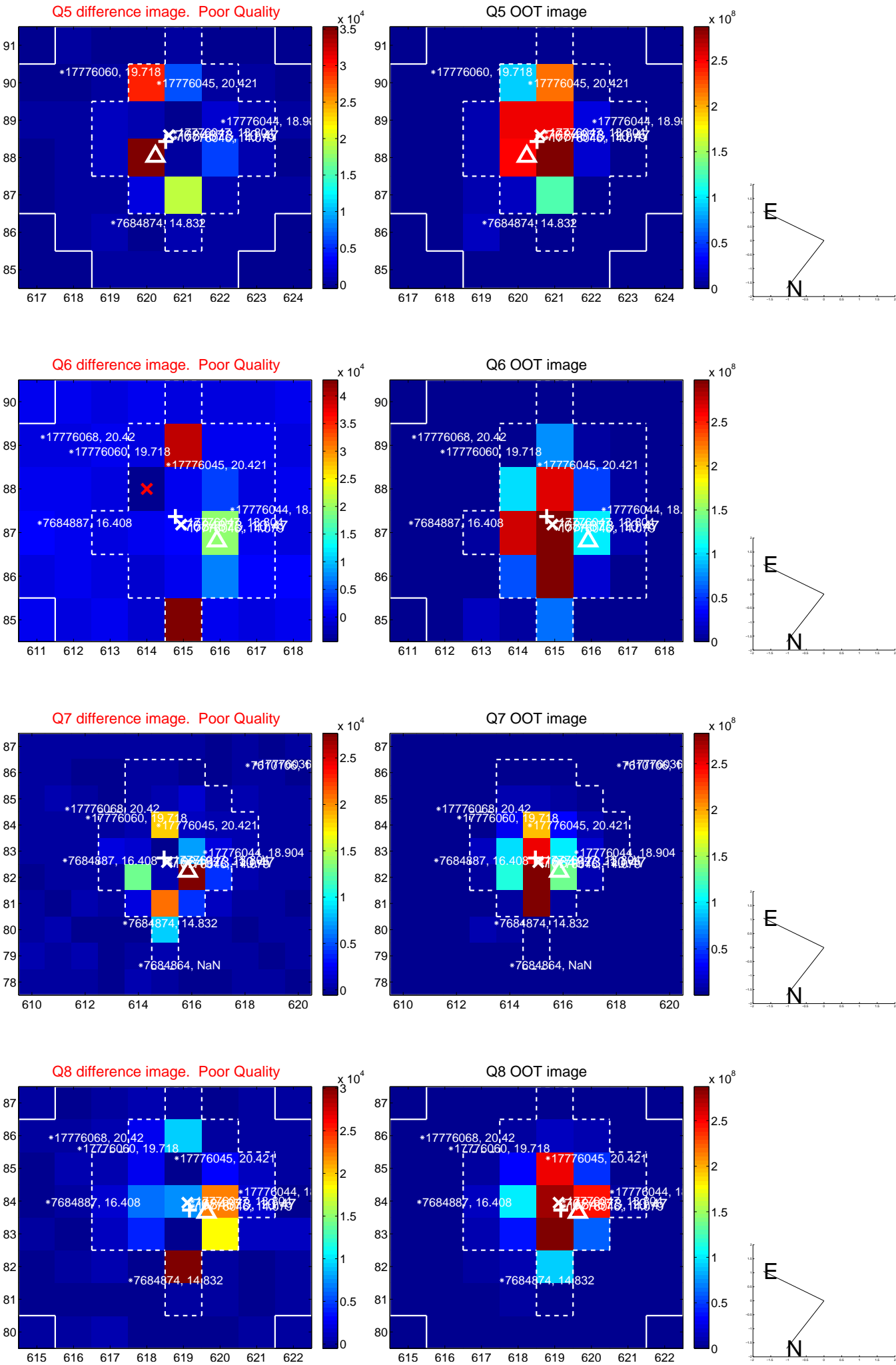


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

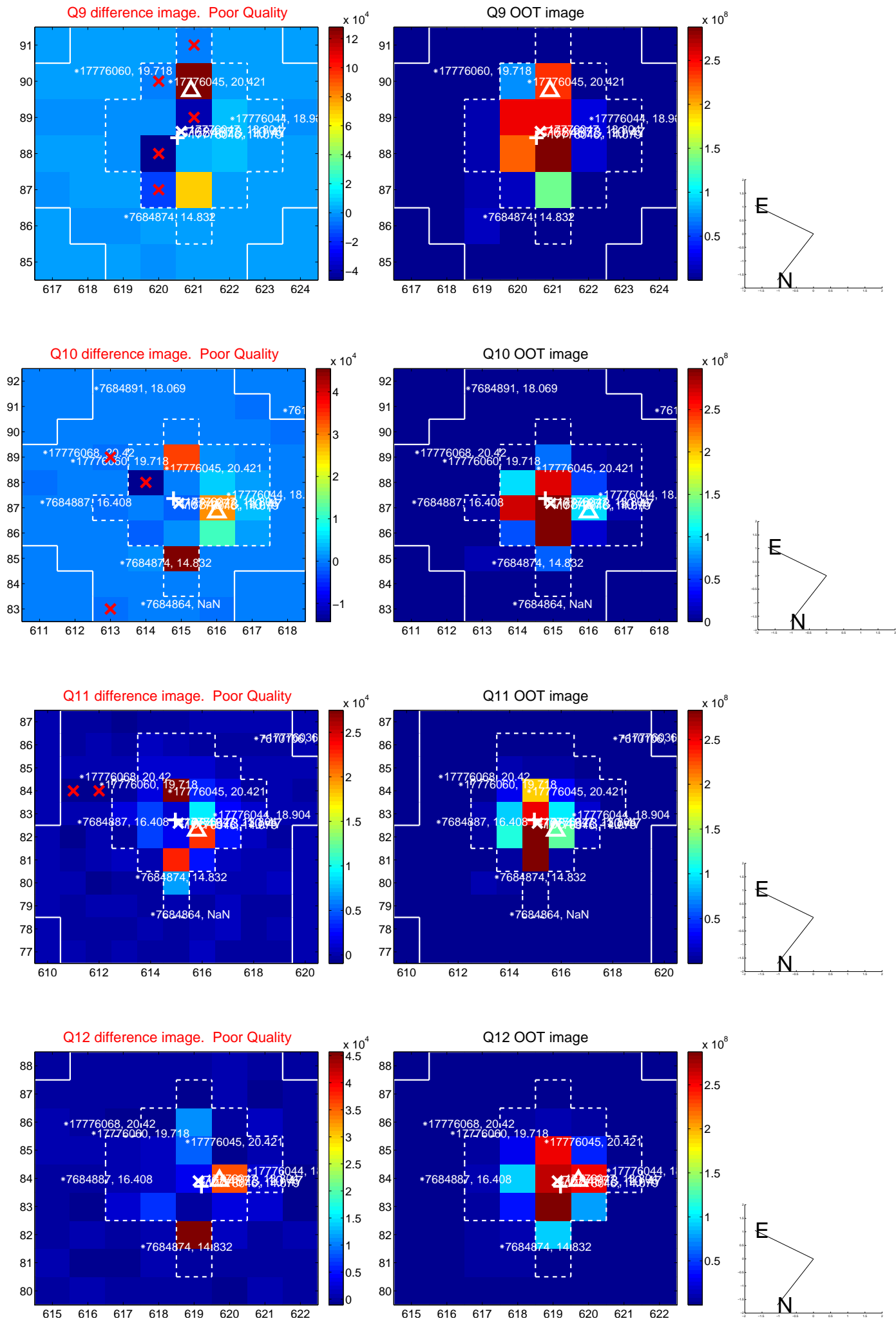
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



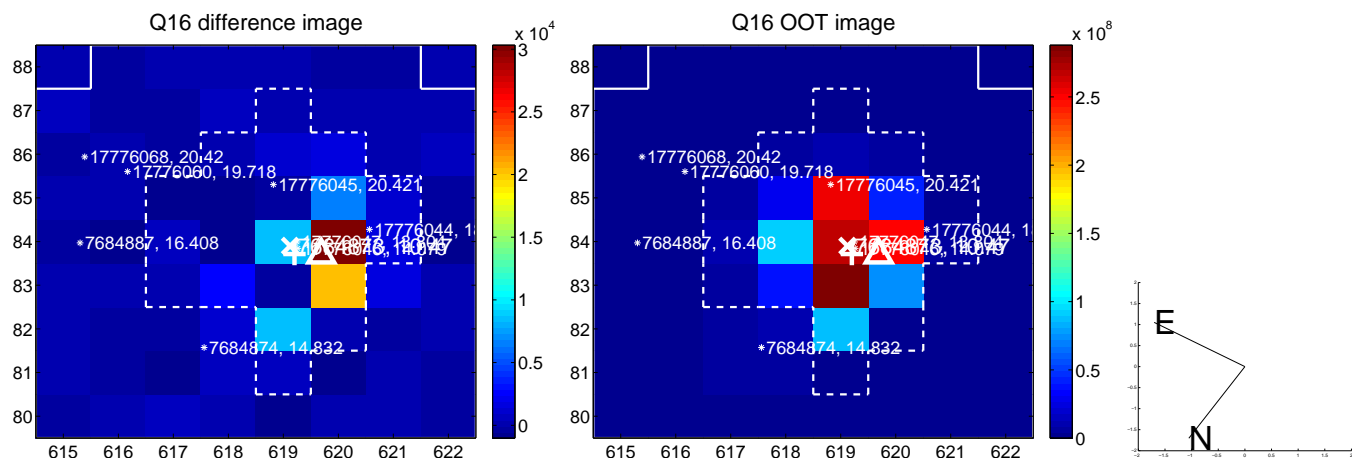
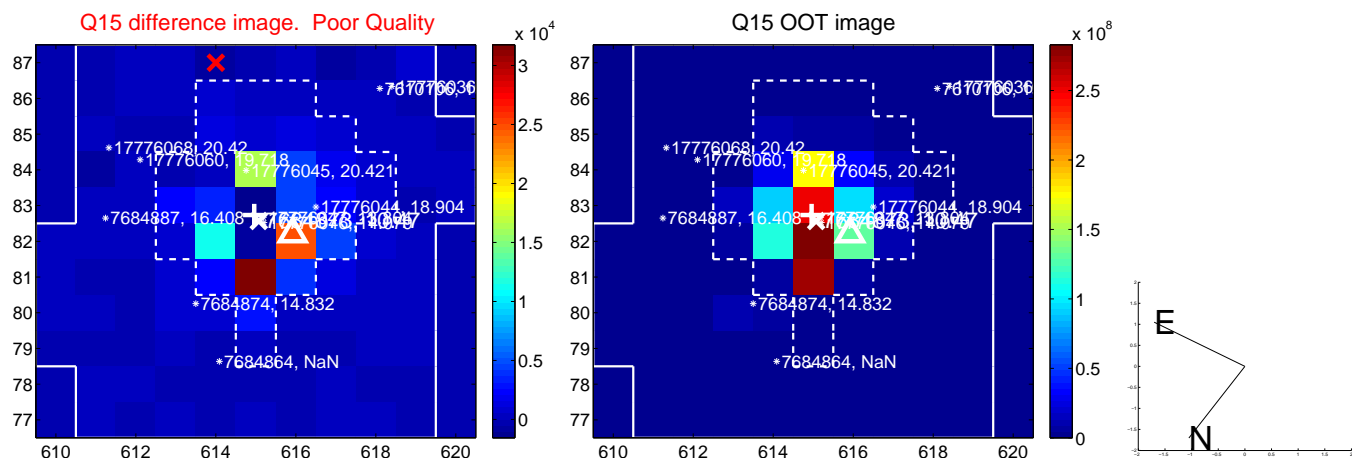
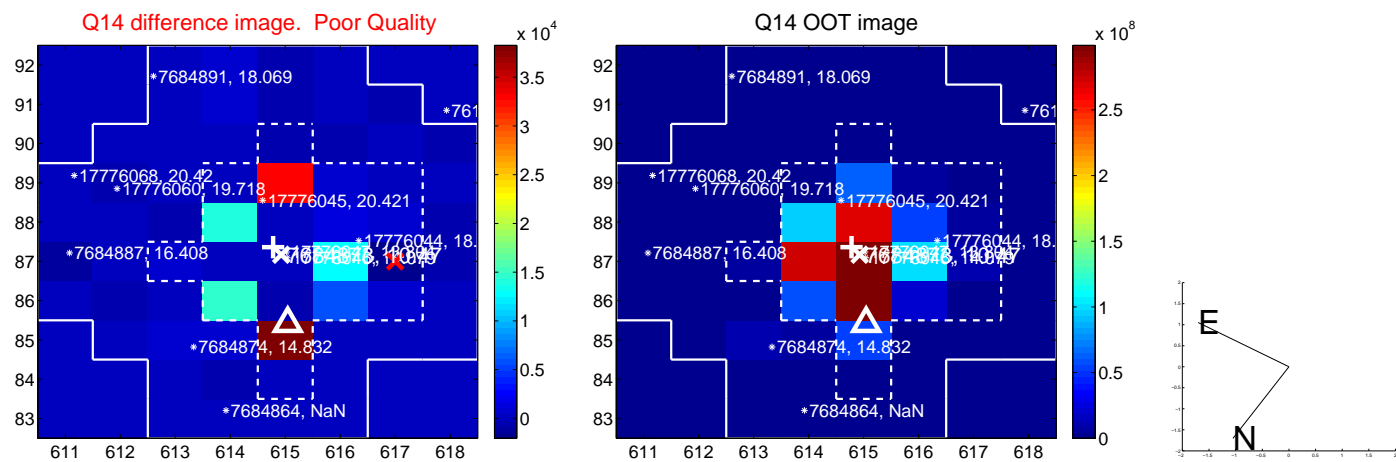
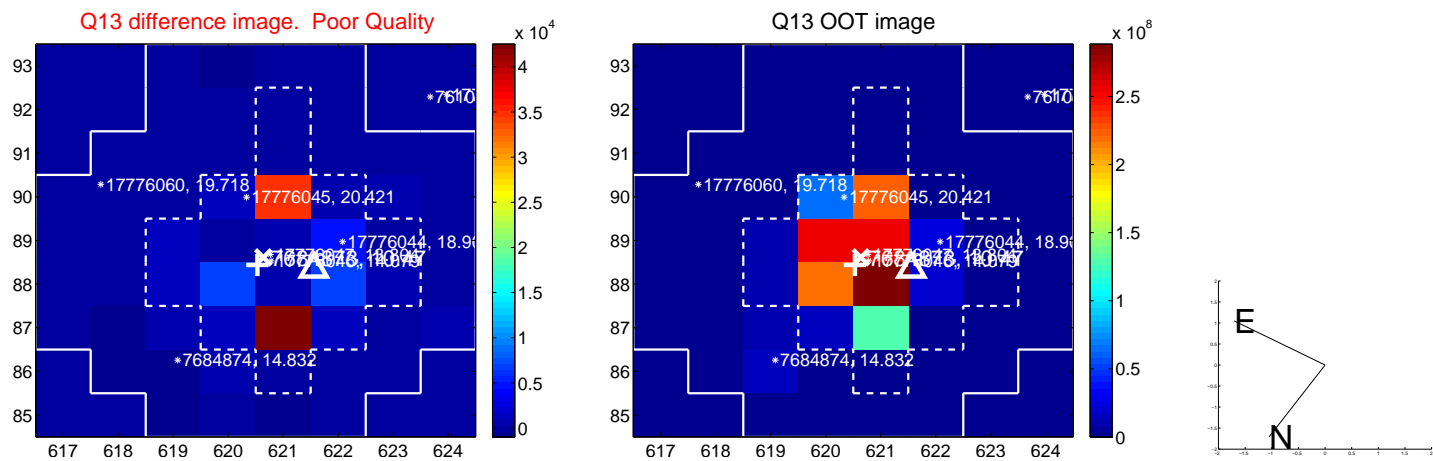
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



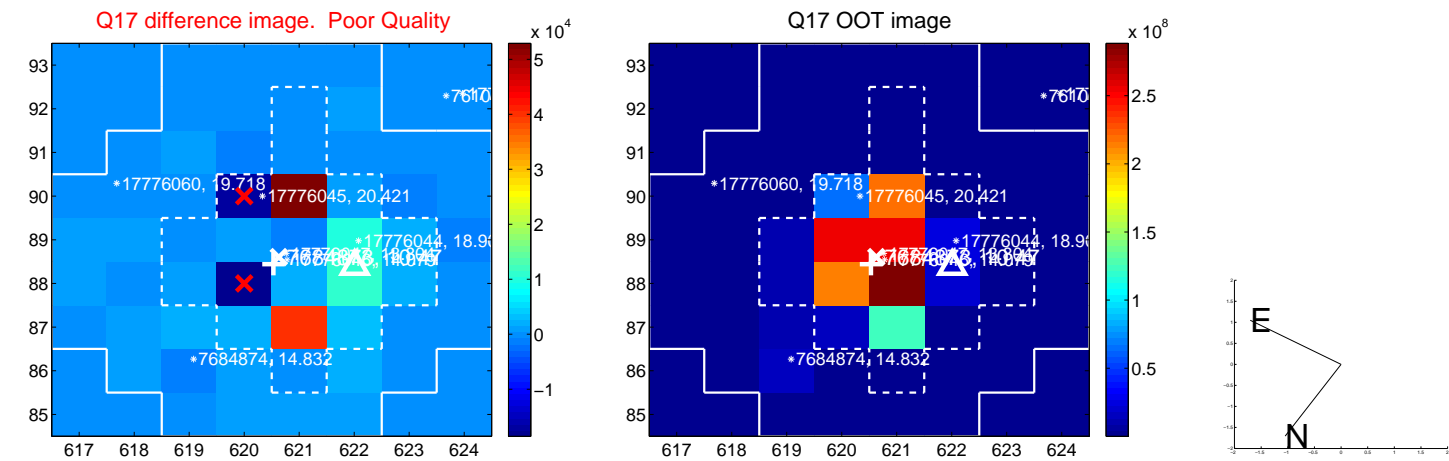
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



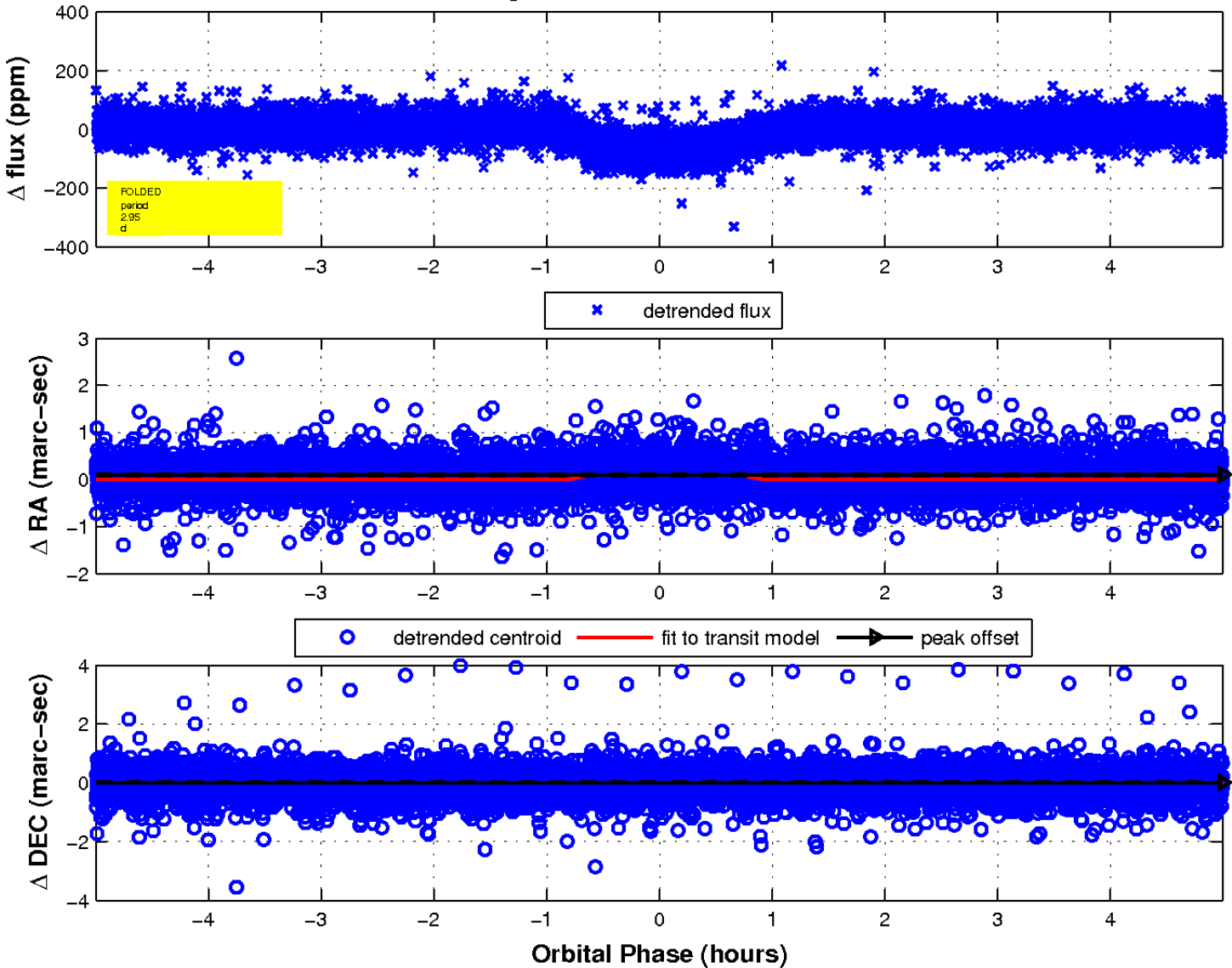
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



fluxWeightedCentroids, Planet 2 of 2





UKIRT Image

Declination

