

# KIC 005478083

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005478083-01	OBS	3738.01	15.852317	142.524069	473777.7	5.246	550.2	399.4	1.00	5780	121.03	65.54
005478083-02	OBS	No	110.969571	231.290244	13266.0	4.274	7.8	8.6	1.00	5780	13.63	4.89

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005478083-01	OBS	FP	0.00	0	1	1	0	MOD_SEC_DV—MOD_ODDEVEN_DV—MOD_ODDEVEN_ALT—DEEP_V_SHAPED—HAS_SEC_TCE—SEASONAL_DEPTH_DV—SEASONAL_DEPTH_ALT—CENT_RESOLVED_OFFSET—HALO_GHOST
005478083-02	OBS	FP	0.00	1	1	1	0	IS_SEC_TCE—CENT_RESOLVED_OFFSET

**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 005478083-01

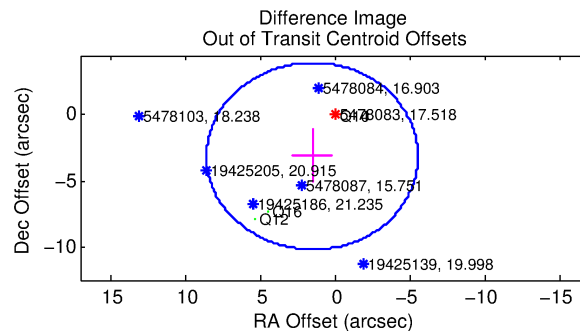
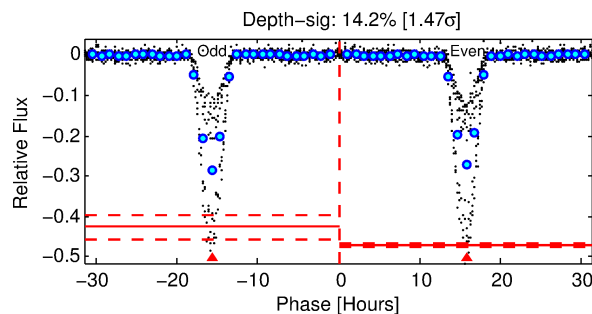
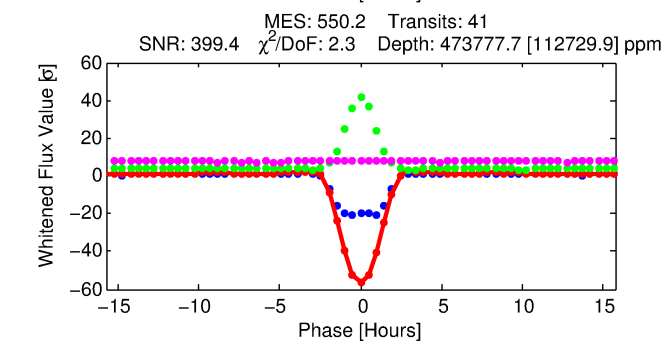
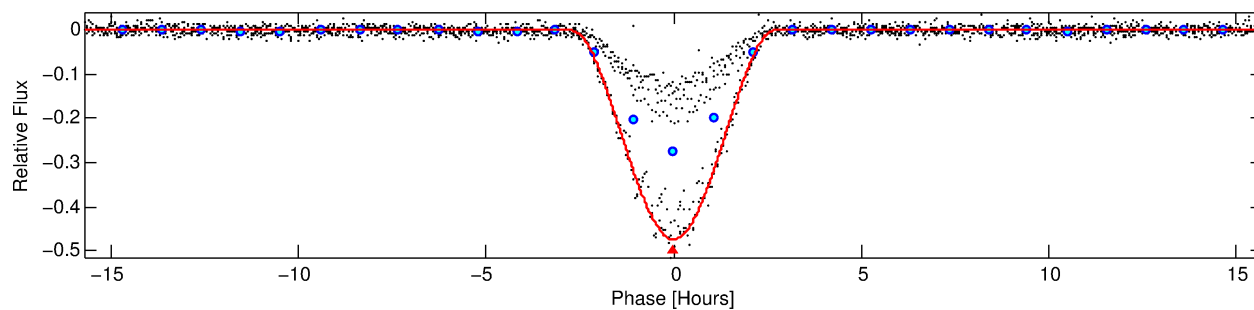
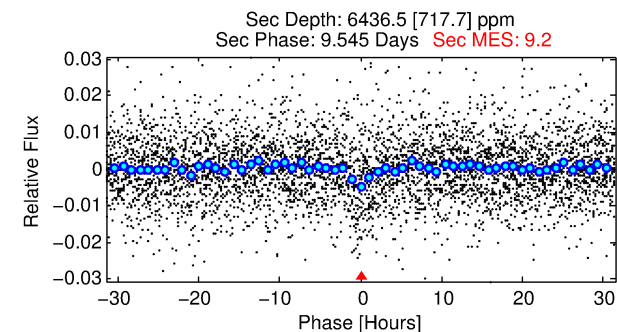
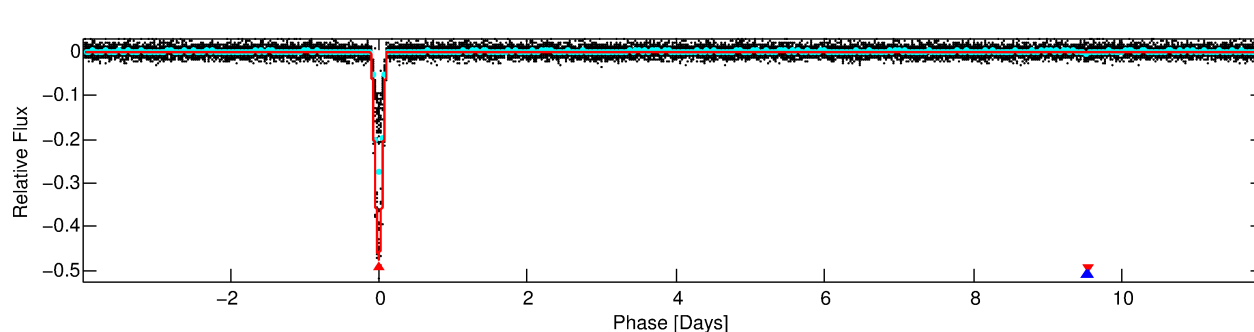
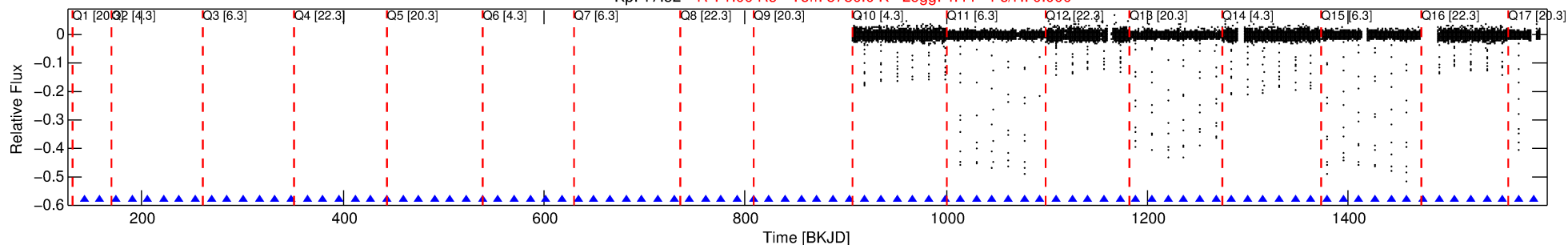
No Significant Match Found

# DV One-Page Summary

KIC: 5478083 Candidate: 1 of 2 Period: 15.852 d

KOI: K03738.01 Corr: 0.958

Kp: 17.52 R\*: 1.00 Rs Teff: 5780.0 K Logg: 4.44 Fe/H: 0.000



## DV Fit Results:

Period = 15.85232 [0.00001] d  
Epoch = 142.5241 [0.0010] BKJD  
Rp/R\* = 1.1091 [0.0794]  
a/R\* = 42.90 [1.18]  
b = 1.00 [0.08]  
Seff = 65.54 [0.00]  
Teq = 726 [0] K  
Rp = 121.03 [8.66] Re  
a = 0.1235 [0.0000] AU  
Ag = 3.69 [0.67] [4.02σ]  
Teffp = 1555 [71] K [11.76σ]

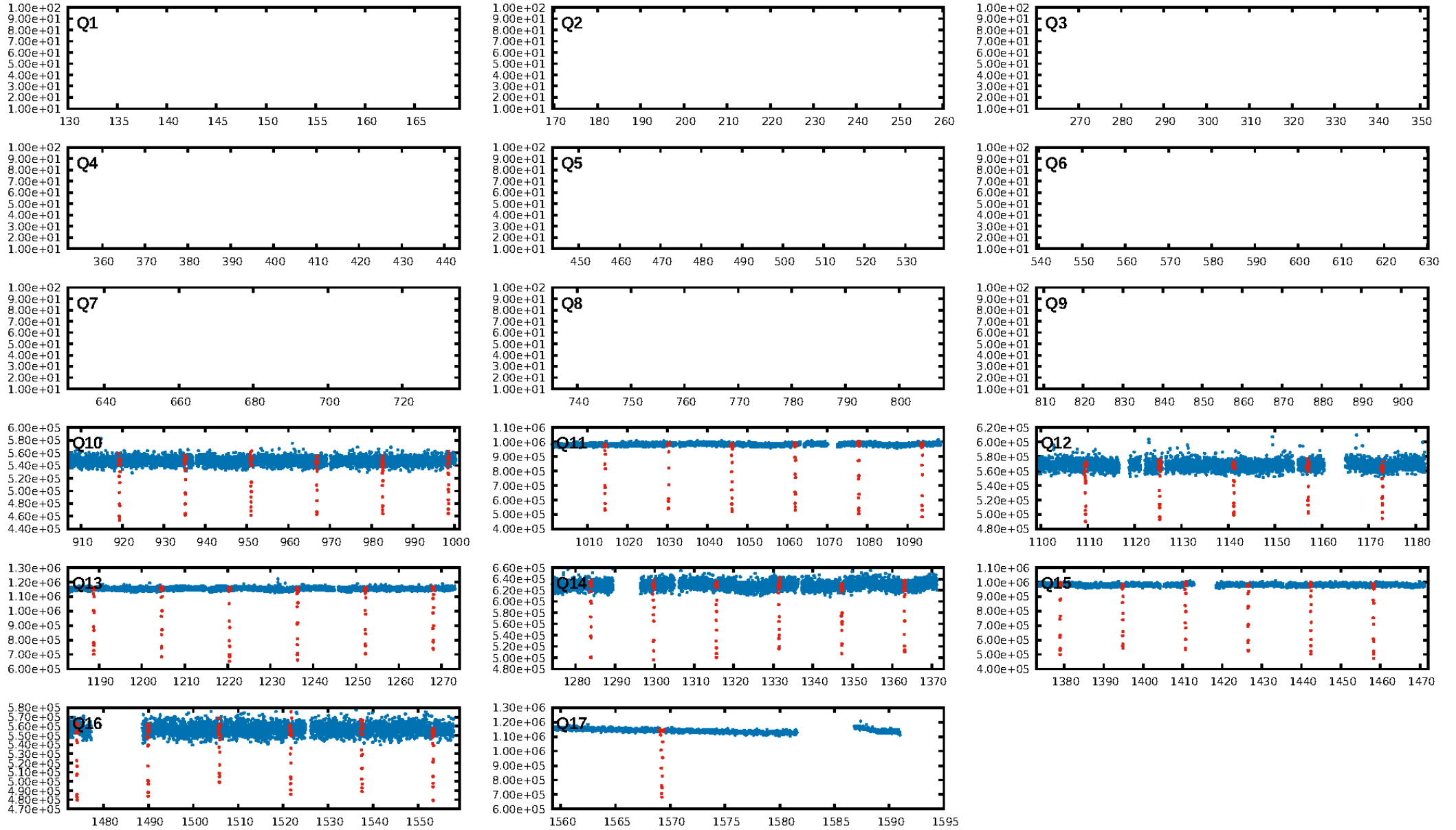
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [337.38σ]  
ModelChiSquare2-sig: 0.0%  
ModelChiSquareGof-sig: 88.7%  
Bootstrap-pfa: 0.00e+00  
RollingBand-fgt: 1.00 [40/40]  
GhostDiagnostic-chr: -0.099  
Centroid-sig: 0.0%  
Centroid-so: 2.369 arcsec [1262.96σ]  
OotOffset-rm: 3.470 arcsec [1.47σ]  
OotOffset-st: 2/0/2/0 [4]  
KicOffset-rm: 5.908 arcsec [84.66σ]  
KicOffset-st: 2/2/2/2 [8]  
DiffImageQuality-fgm: 1.00 [8/8]  
DiffImageOverlap-fno: 1.00 [8/8]

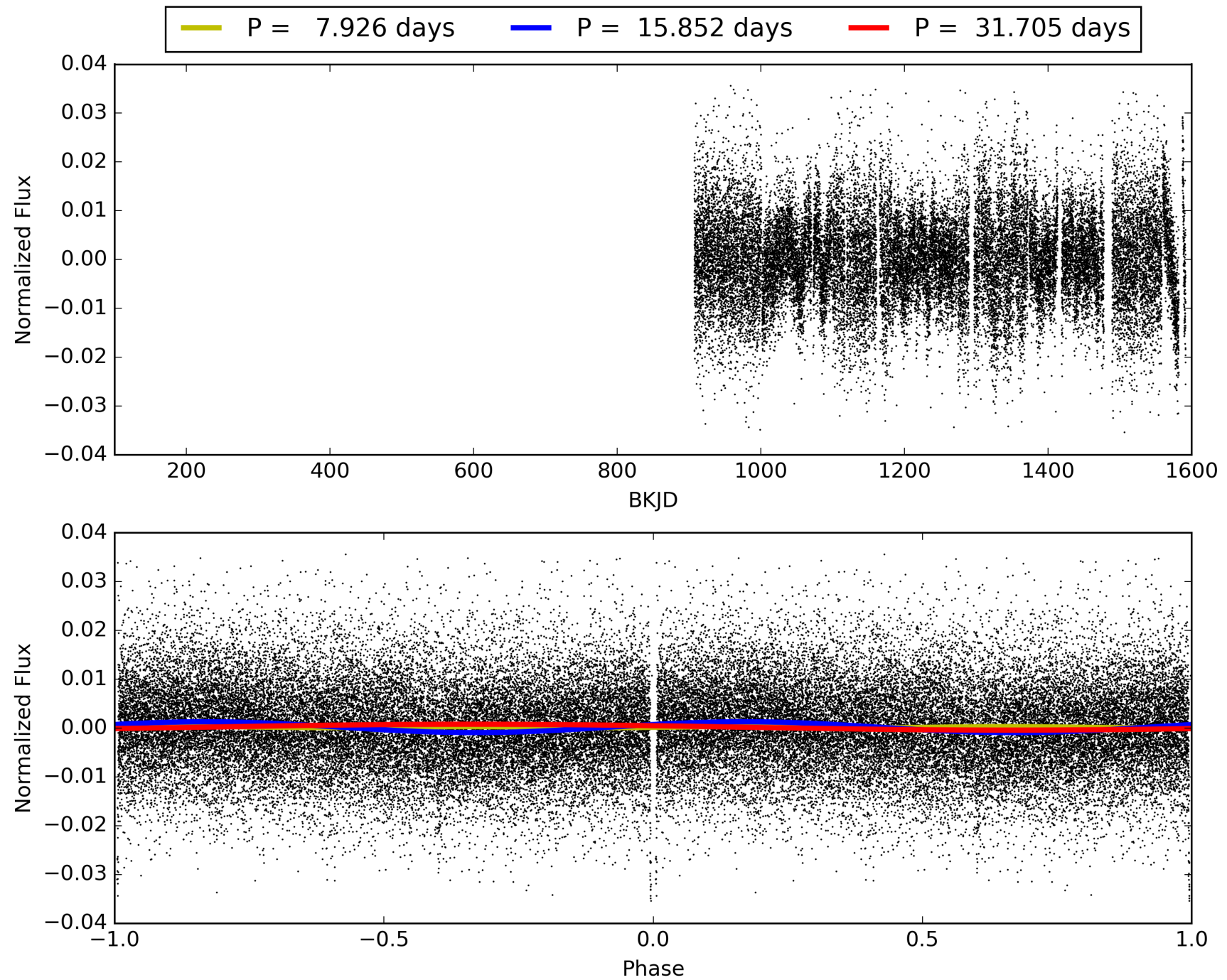
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 15:51:03 Z

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

# TCE 005478083-01, PDC Light Curves

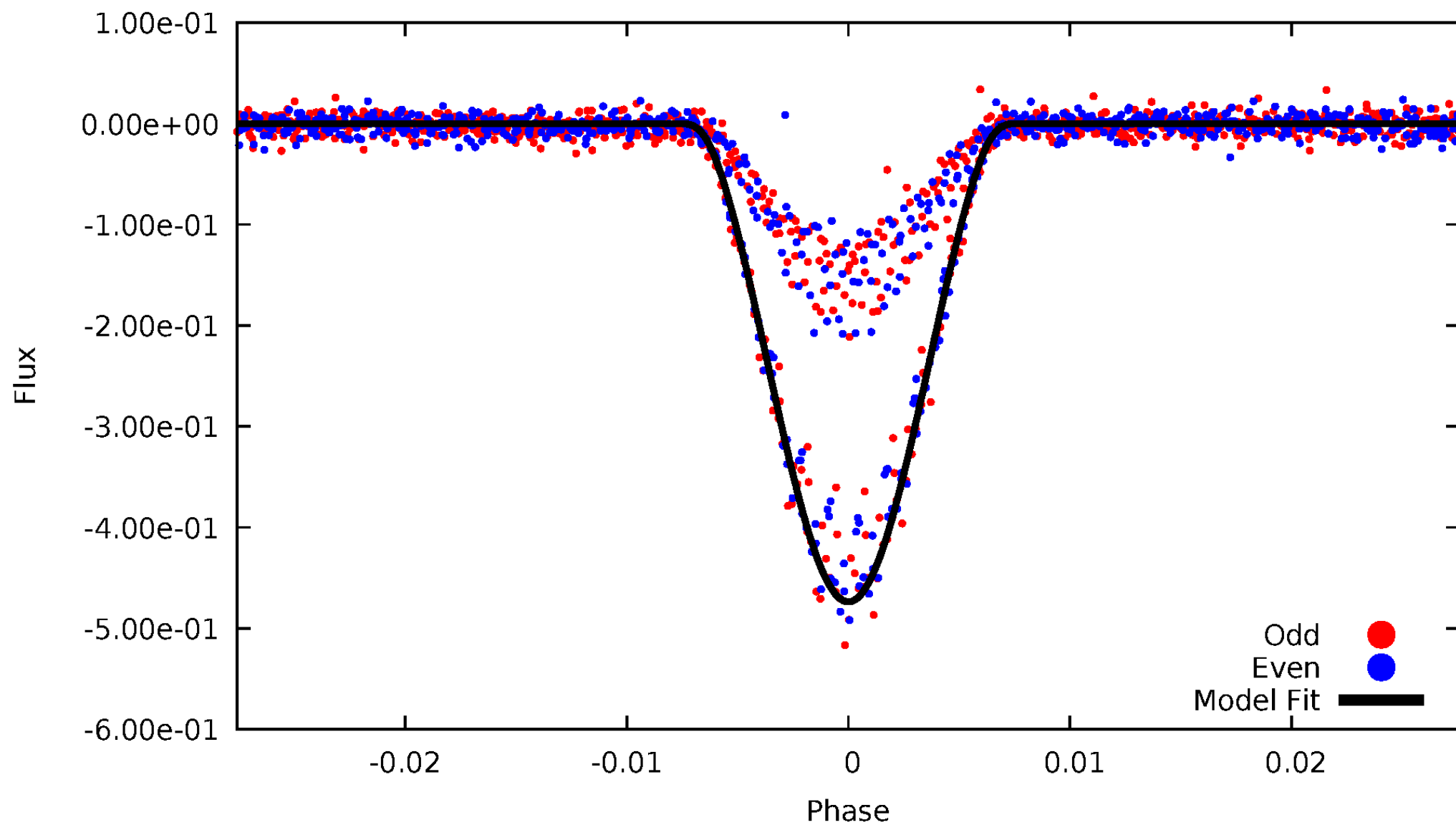


TCE 005478083-01



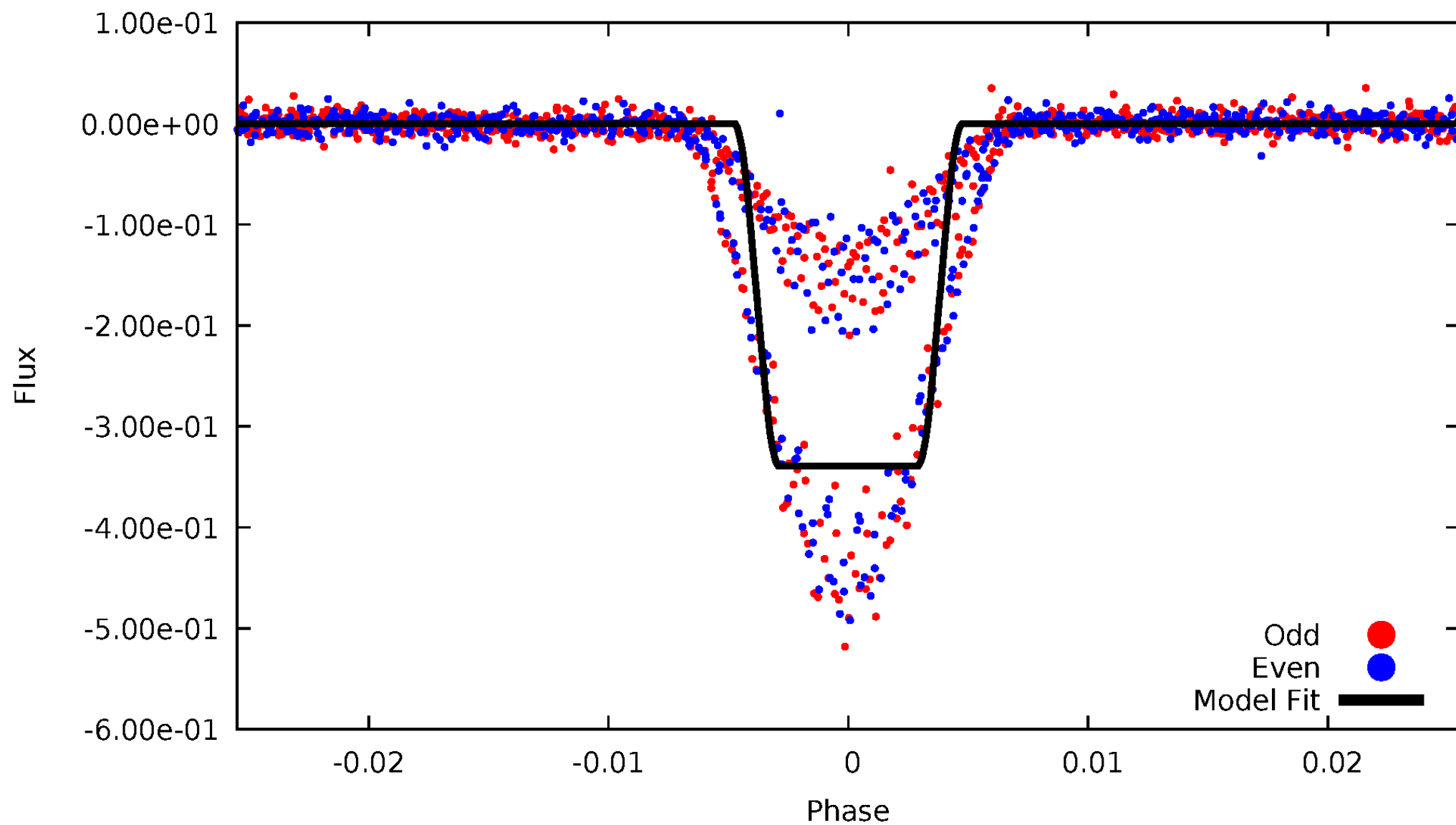
# DV Odd/Even

TCE 005478083-01



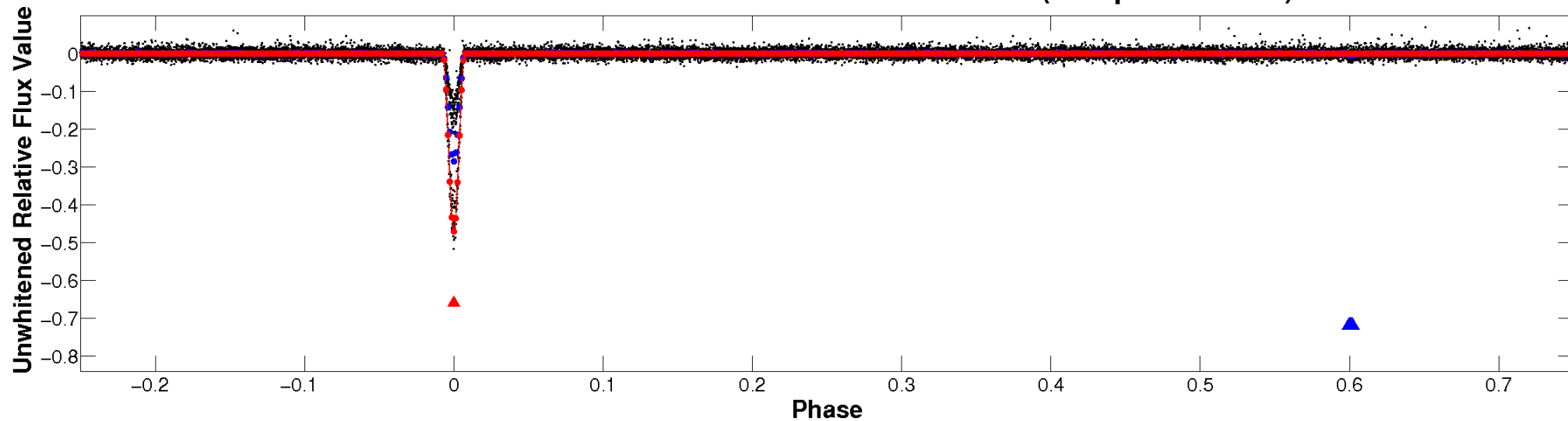
# ALT Odd/Even

TCE 005478083-01

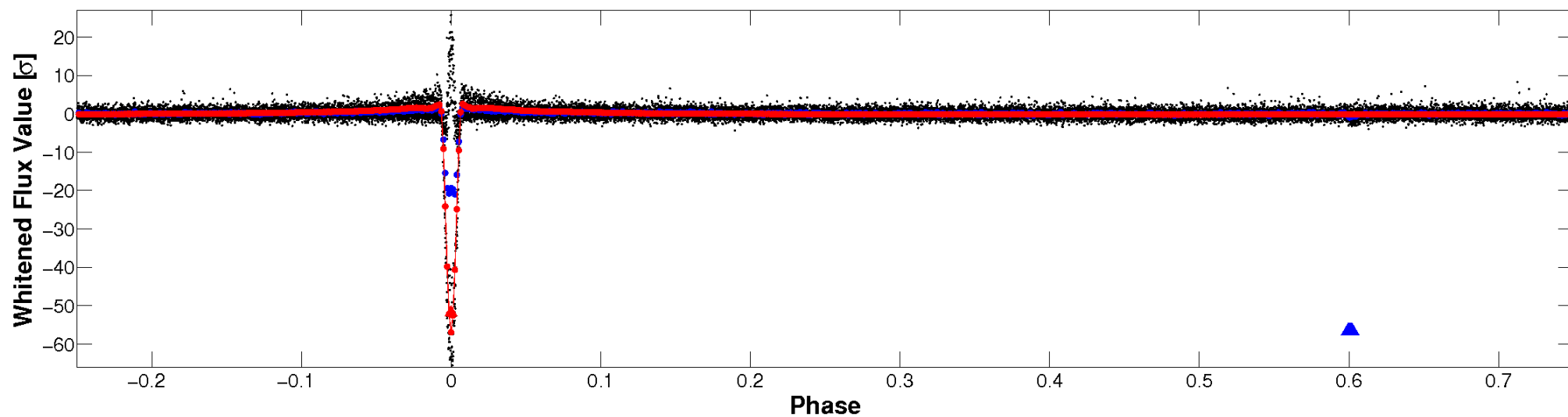


# Non-Whitened Vs. Whitened Light Curve

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

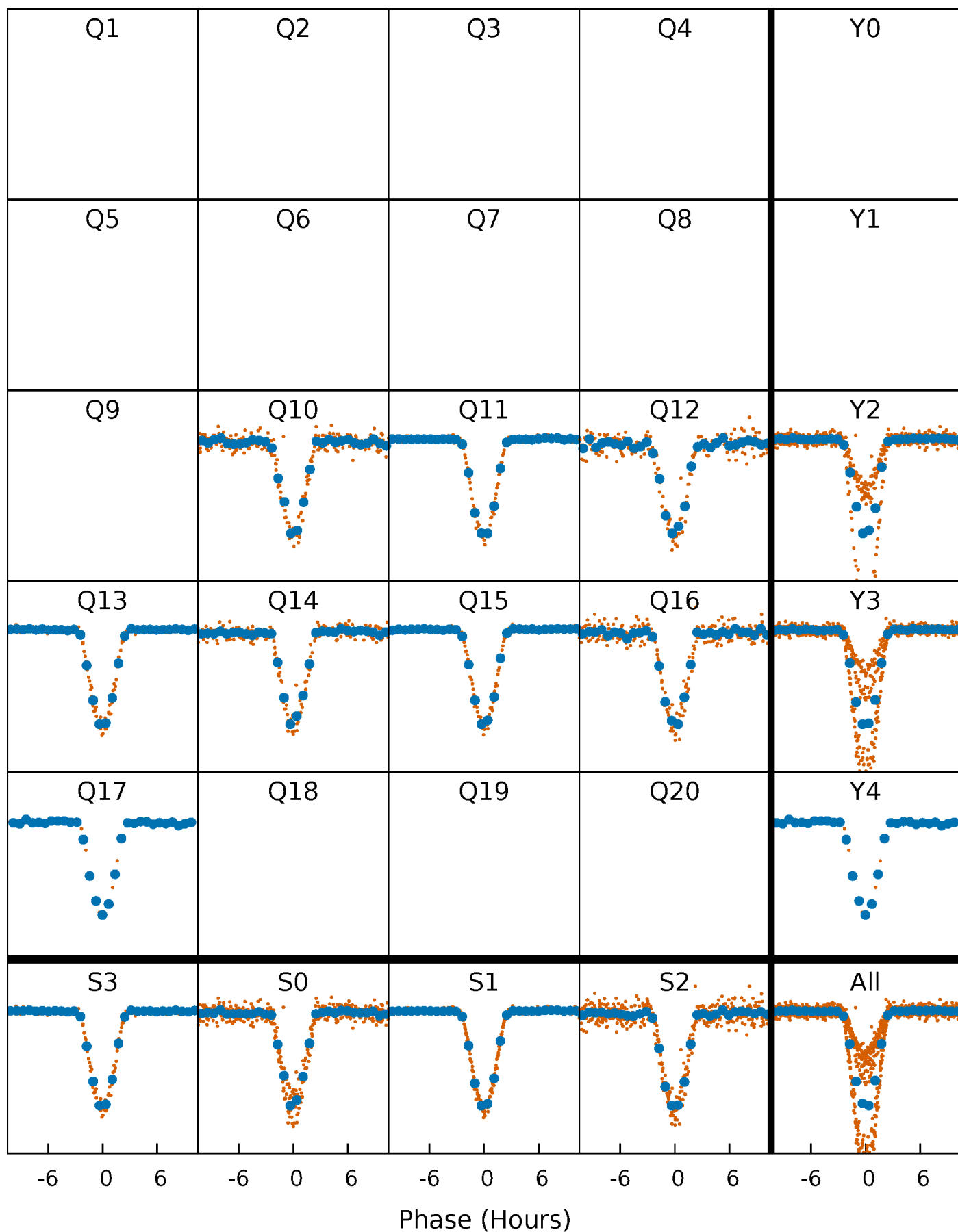


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

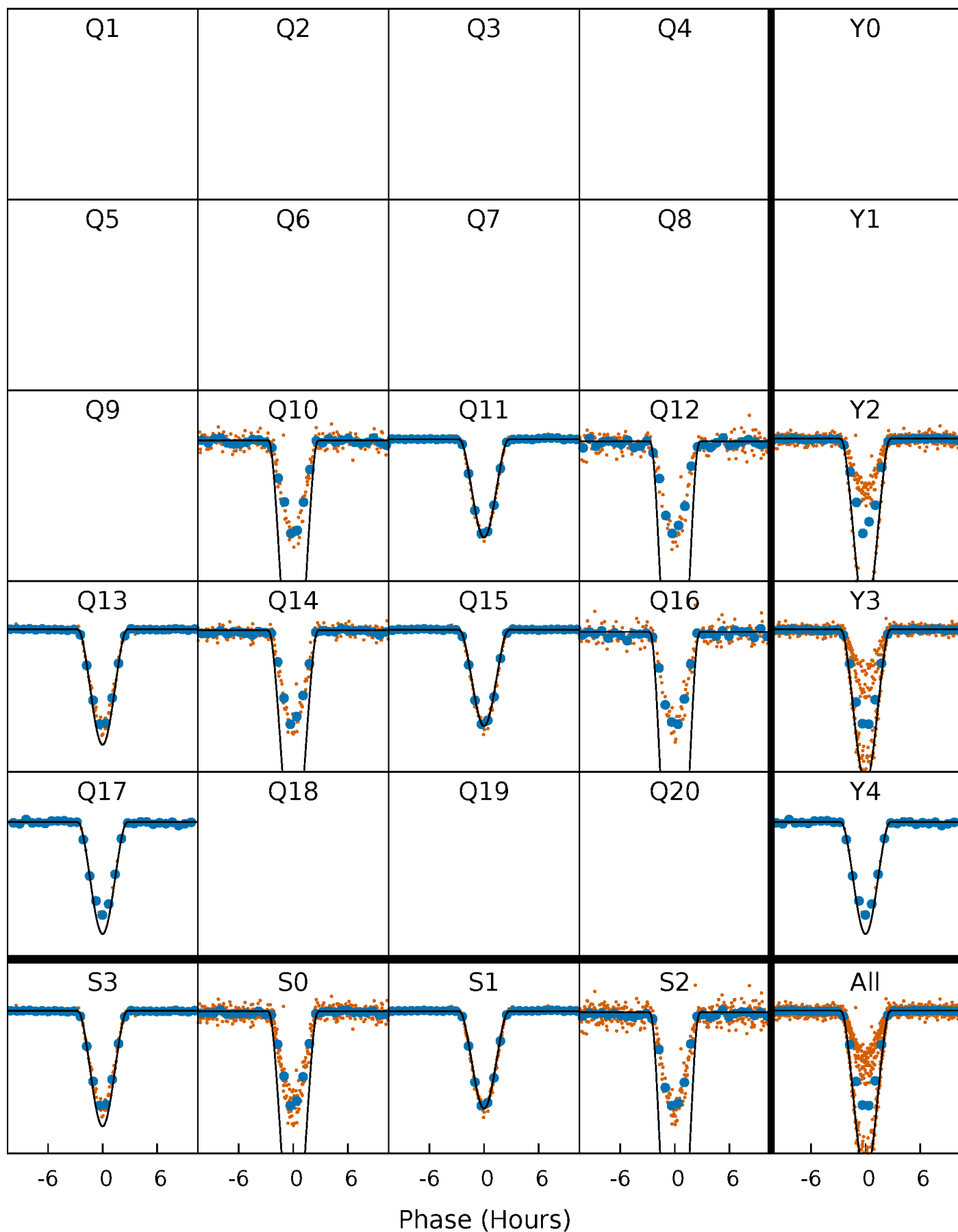
TCE 005478083-01 P= 15.852317 Days  $T_0=142.524069$  (BKJD)





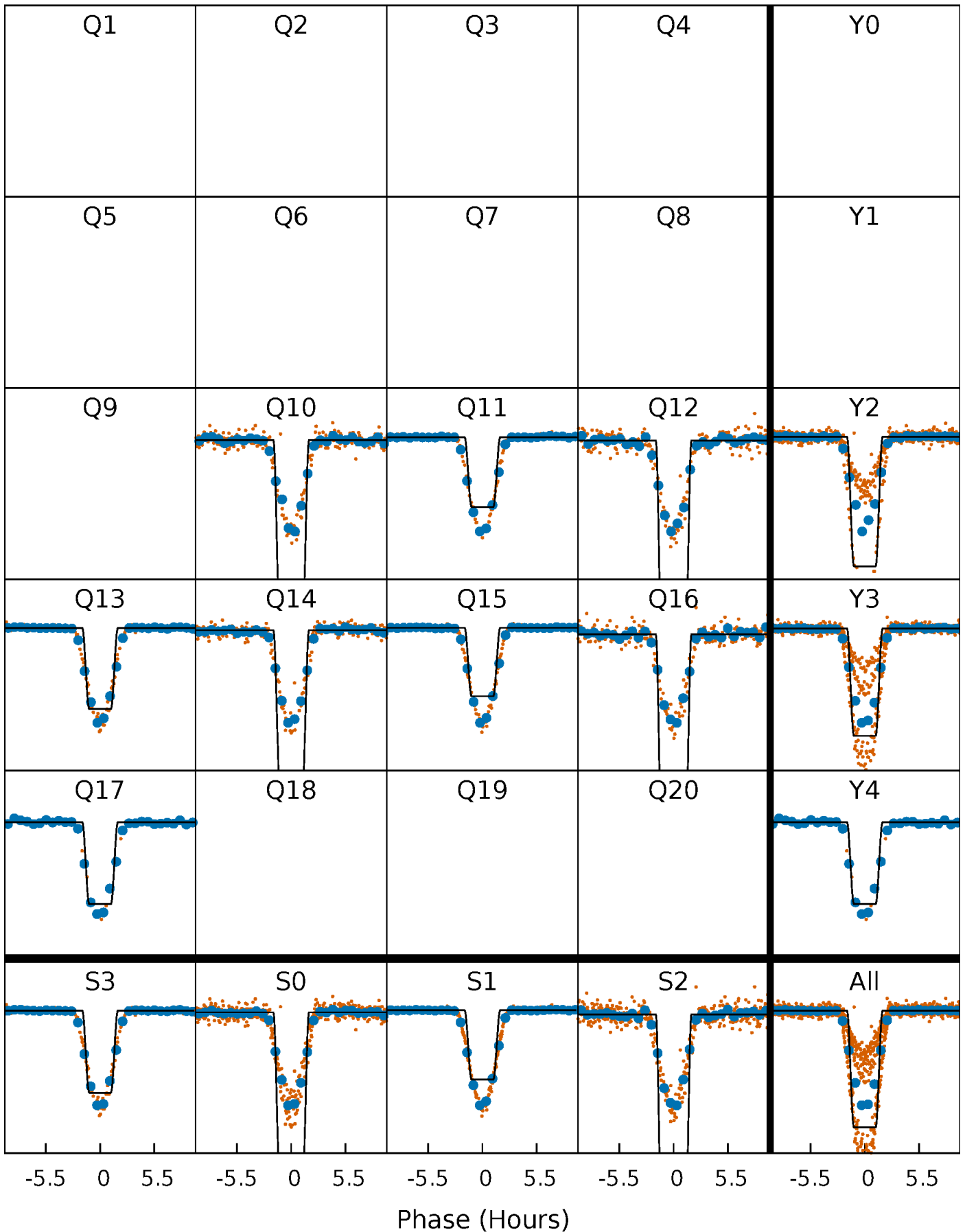
# DV Quarter-Phased Transit Curves

TCE 005478083-01 P= 15.852317 Days  $T_0=142.524069$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

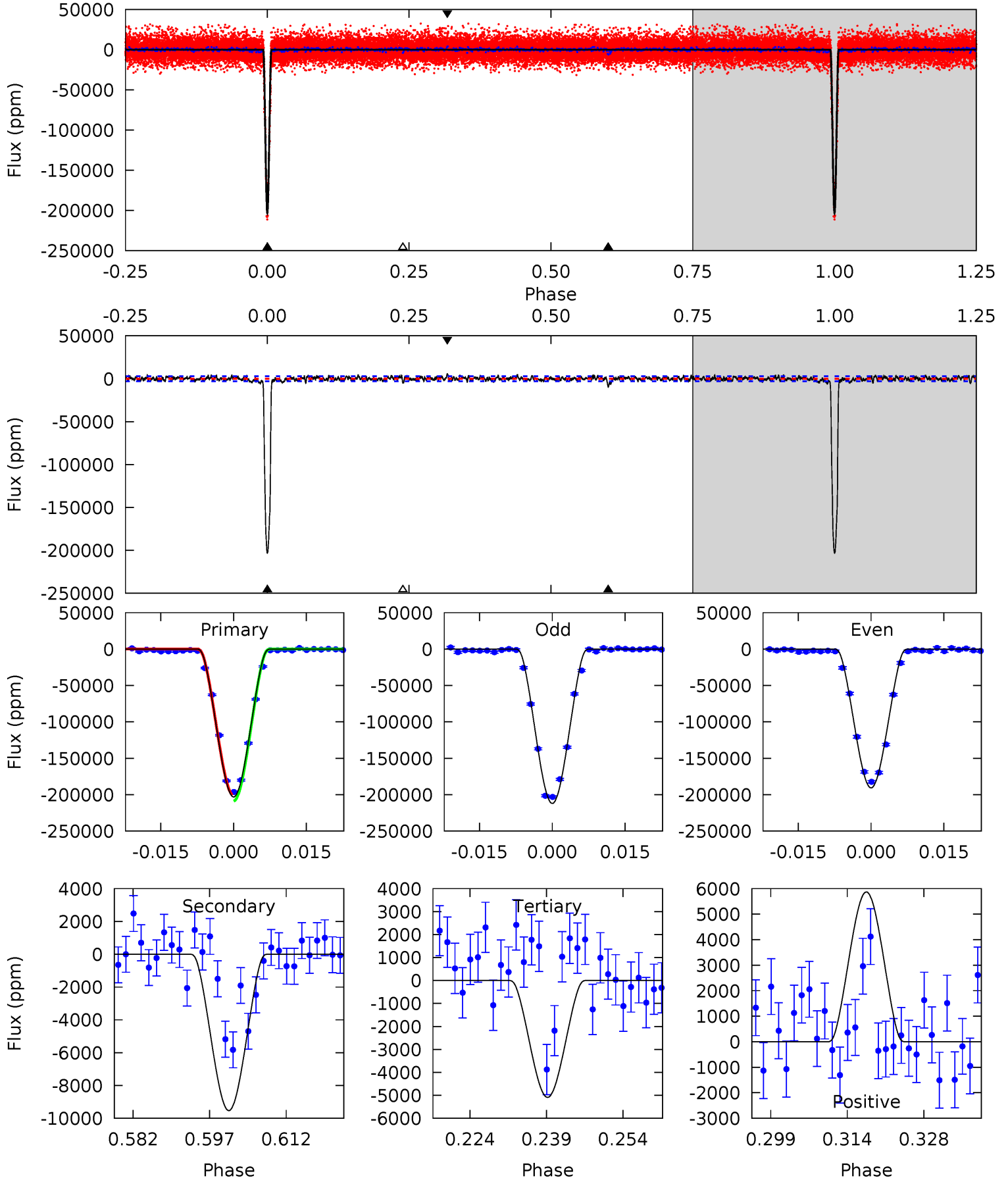
TCE 005478083-01 P= 15.852306 Days  $T_0=142.524773$  (BKJD)



# DV Model-Shift Uniqueness Test

005478083-01, P = 15.852317 Days, E = 142.524069 Days

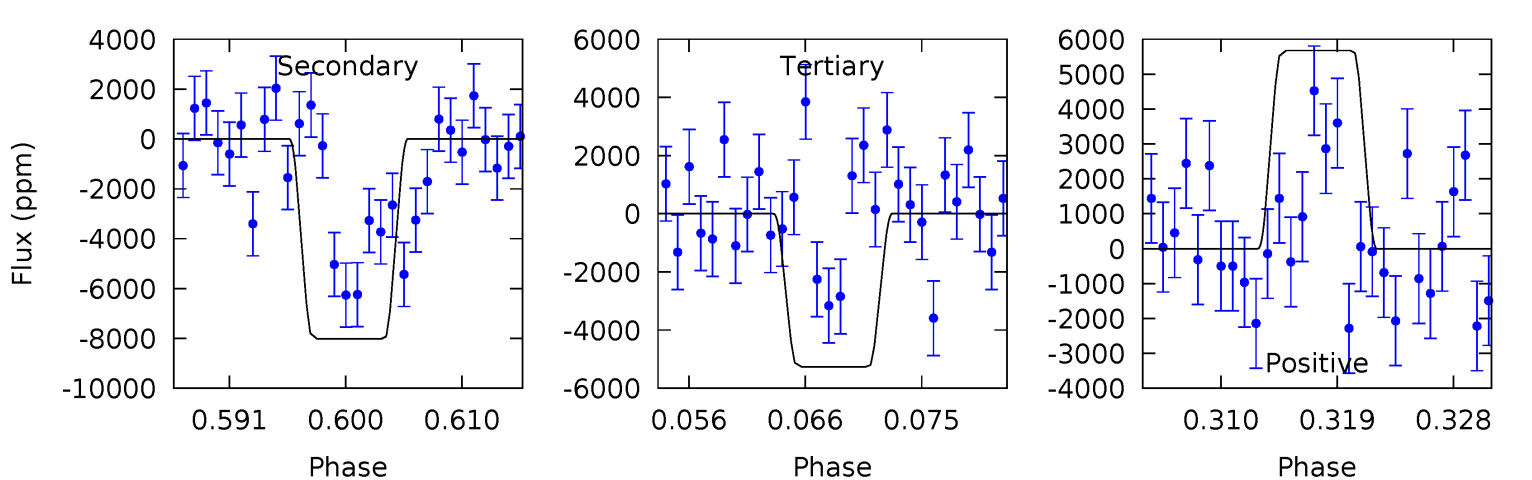
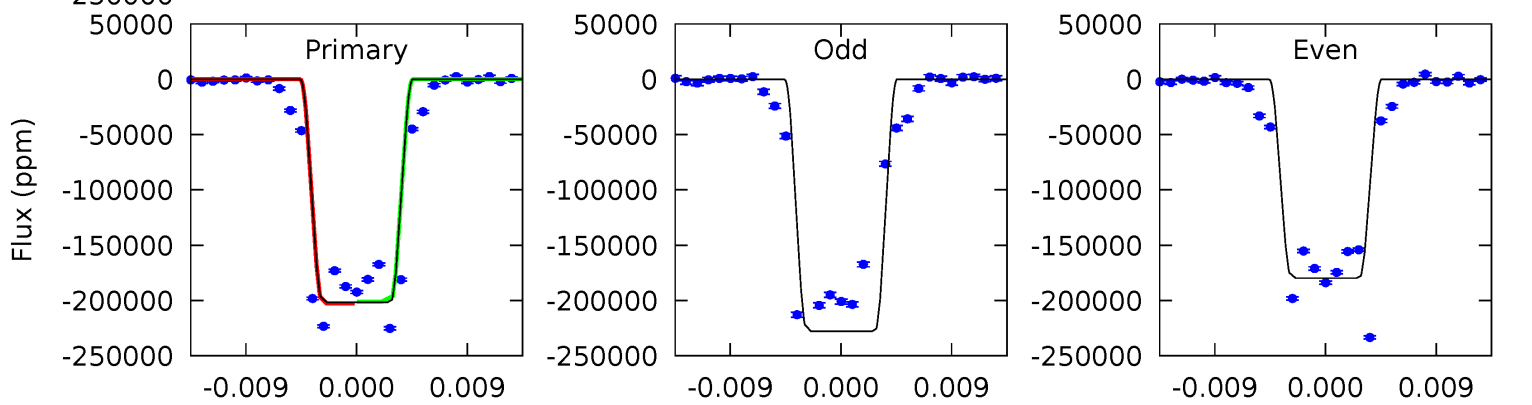
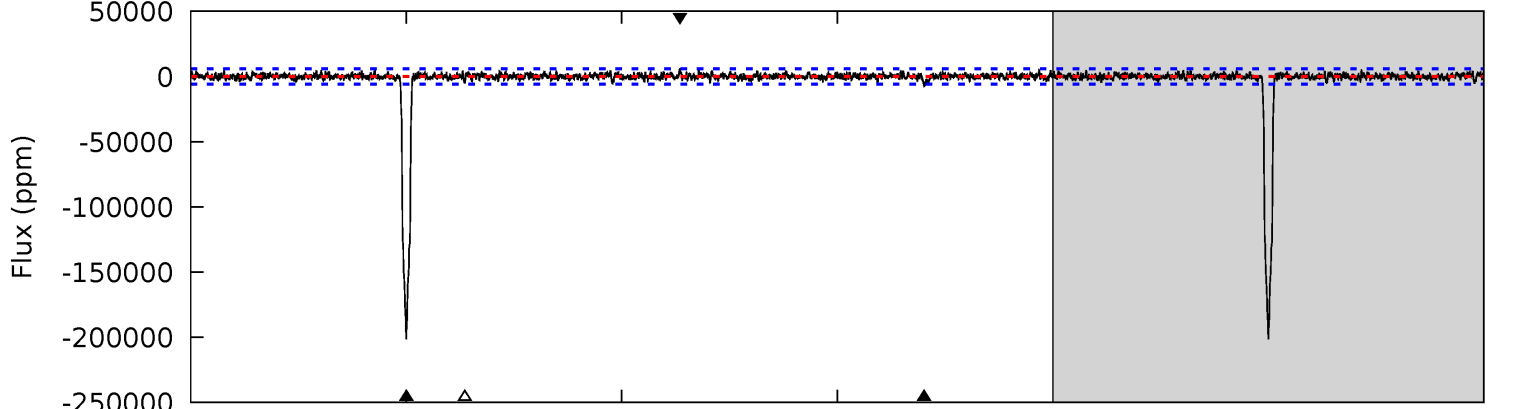
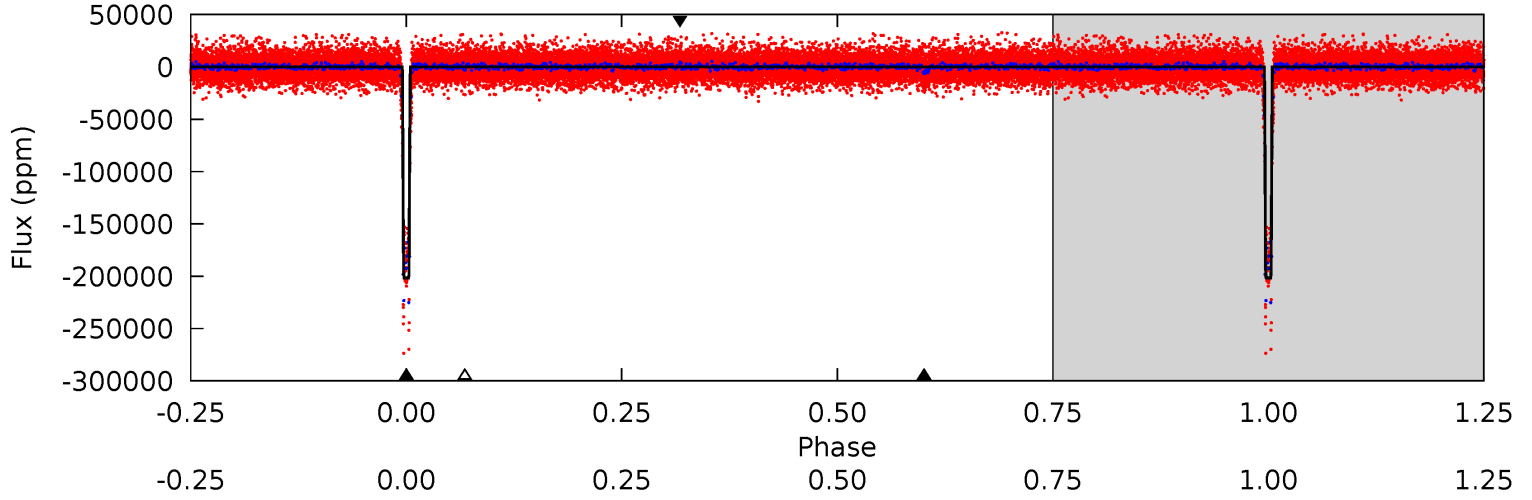
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
345.9	16.2	8.67	10.00	4.95	2.43	2.65	337.2	335.9	7.57	6.24	18.2	1.42	0.03	0



# Alt Model-Shift Uniqueness Test

005478083-01, P = 15.852306 Days, E = 142.524773 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
171.1	6.81	4.47	4.82	5.04	2.60	1.23	166.6	166.3	2.34	1.99	21.1	1.40	0.03	0



### Stellar Parameters For KIC 005478083

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5780^{+1}_{-1}$	$4.438^{+1.000}_{-1.000}$	$0.000^{+1.000}_{-1.000}$	$1.000^{+1.000}_{-1.000}$	$-1.000^{+1.000}_{-1.000}$	$-1.000^{+1.000}_{-1.000}$
	+0%/-0%	+23%/-23%	+inf%/-inf%	+100%/-100%	+100%/-100%	+100%/-100%
Source	Solar	Solar	Solar	Solar		

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

### Secondary Eclipse Parameters for KIC 005478083-01 / KOI 3738.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-9536 \pm 587$	$121.39^{+12.50}_{-12.33}$	$1014^{+47}_{-45}$	$2538^{+66}_{-66}$	$5.491^{+1.257}_{-0.959}$
Alt.	$-8023 \pm 1178$	$62.70^{+10.03}_{-8.77}$	$1013^{+52}_{-46}$	$2951^{+156}_{-134}$	$17^{+7}_{-5}$

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

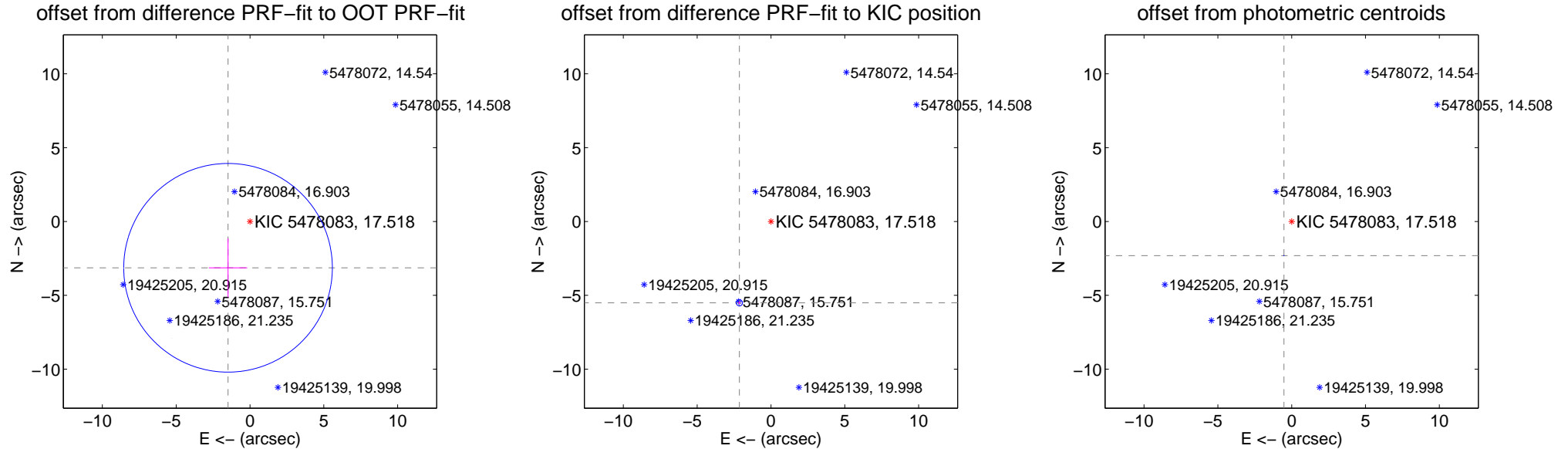
## DV Centroid Data

Supplemental centroid analysis for 005478083-01. Kepler magnitude: 17.52. Transit SNR 399.35

There are 8 quarters with good PRF difference image offsets

The OOT PRF centroid is offset from the target star catalog position by about 2.99 arcsec so the offset from difference PRF-fit to OOT-fit may be invalid.

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$3.470 \pm 2.355$	1.47	$1.487 \pm 1.299$	$-3.136 \pm 1.992$
PRF-fit source offset from KIC position	$5.908 \pm 0.070$	84.66	$2.139 \pm 0.076$	$-5.507 \pm 0.069$
photometric centroid source offset	$2.37 \pm 0.00$	1262.96	$0.52 \pm 0.00$	$-2.31 \pm 0.00$



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.

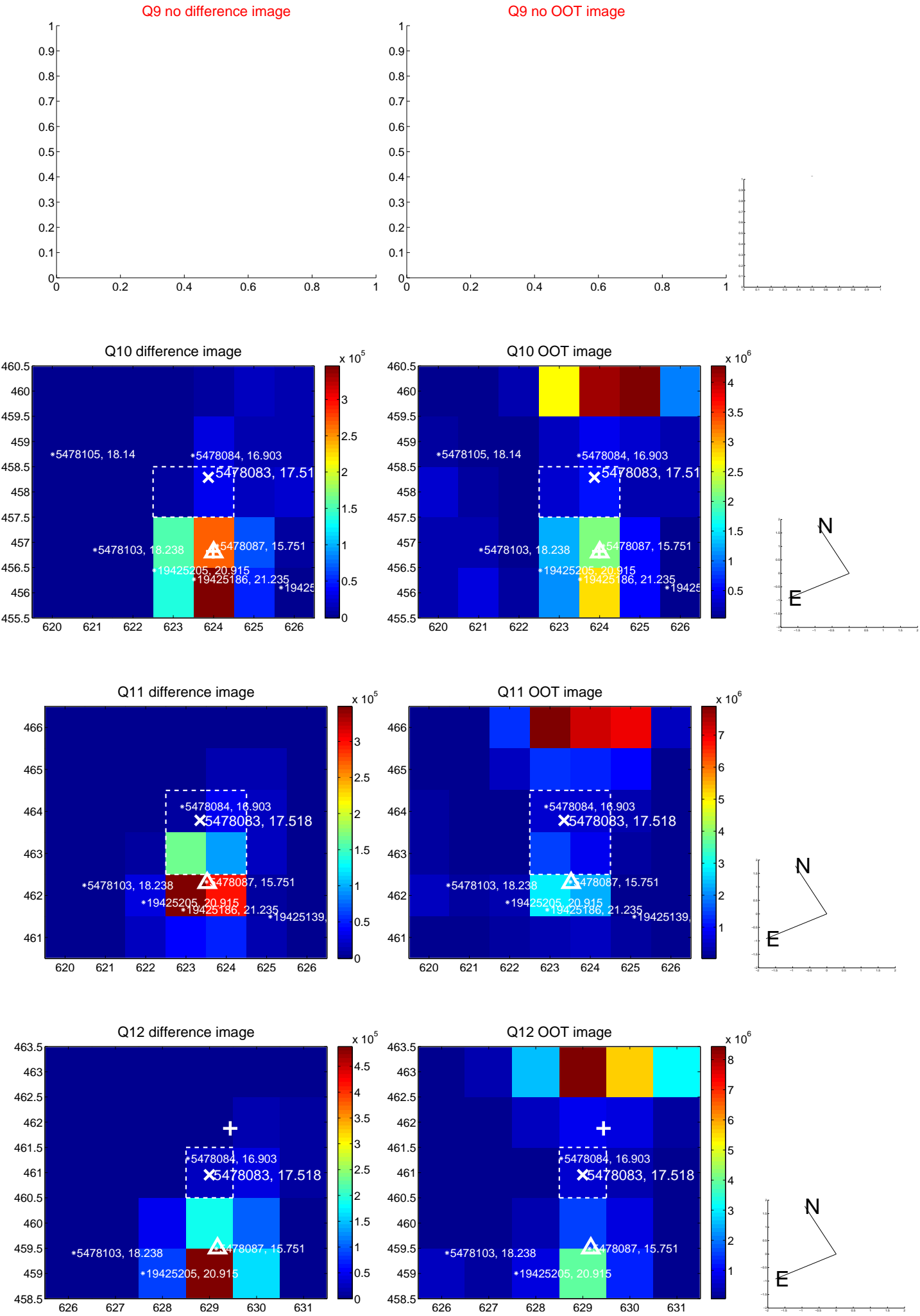


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

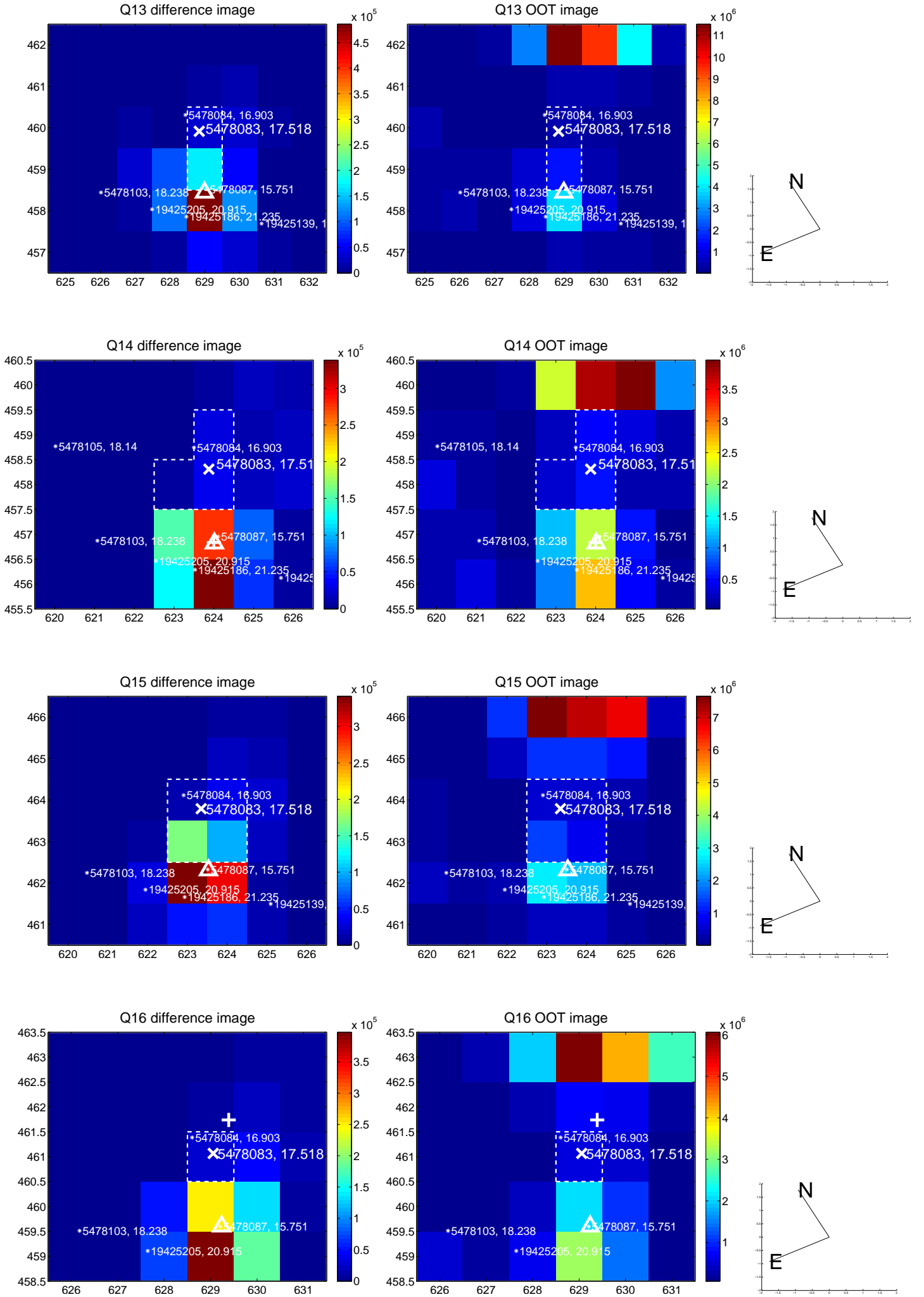




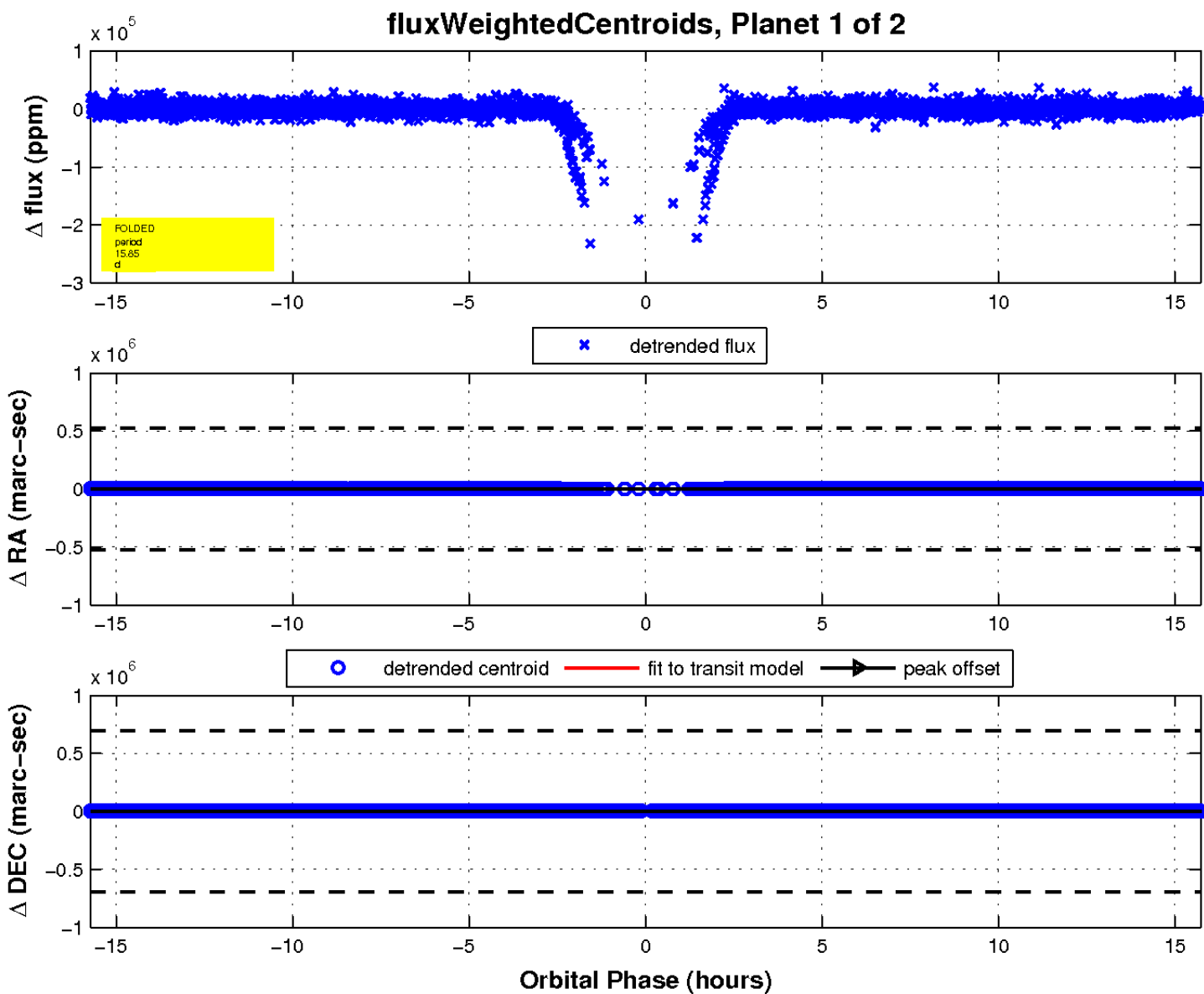
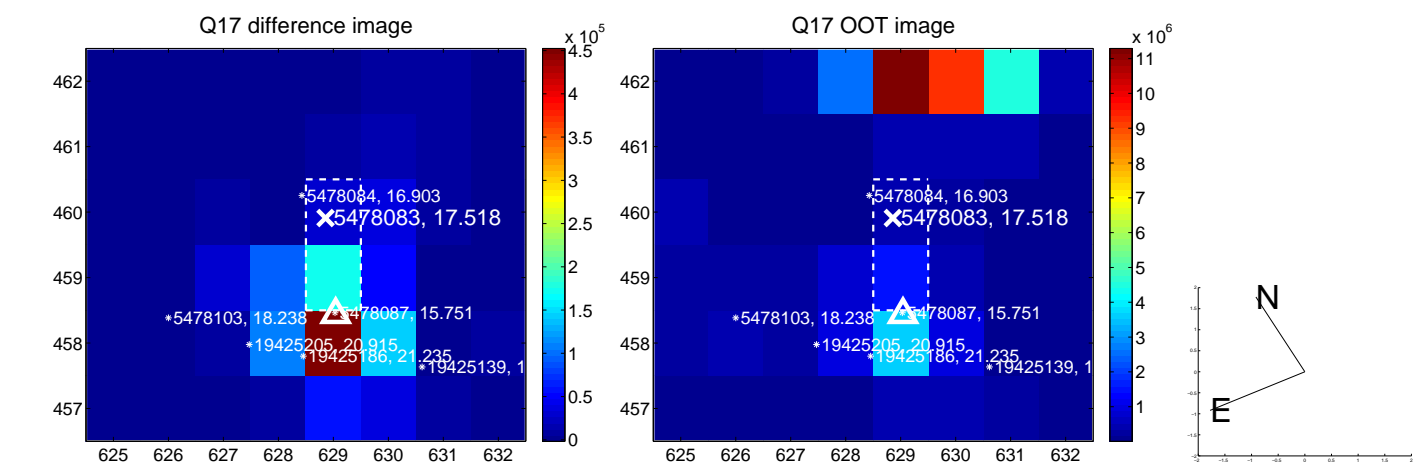
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

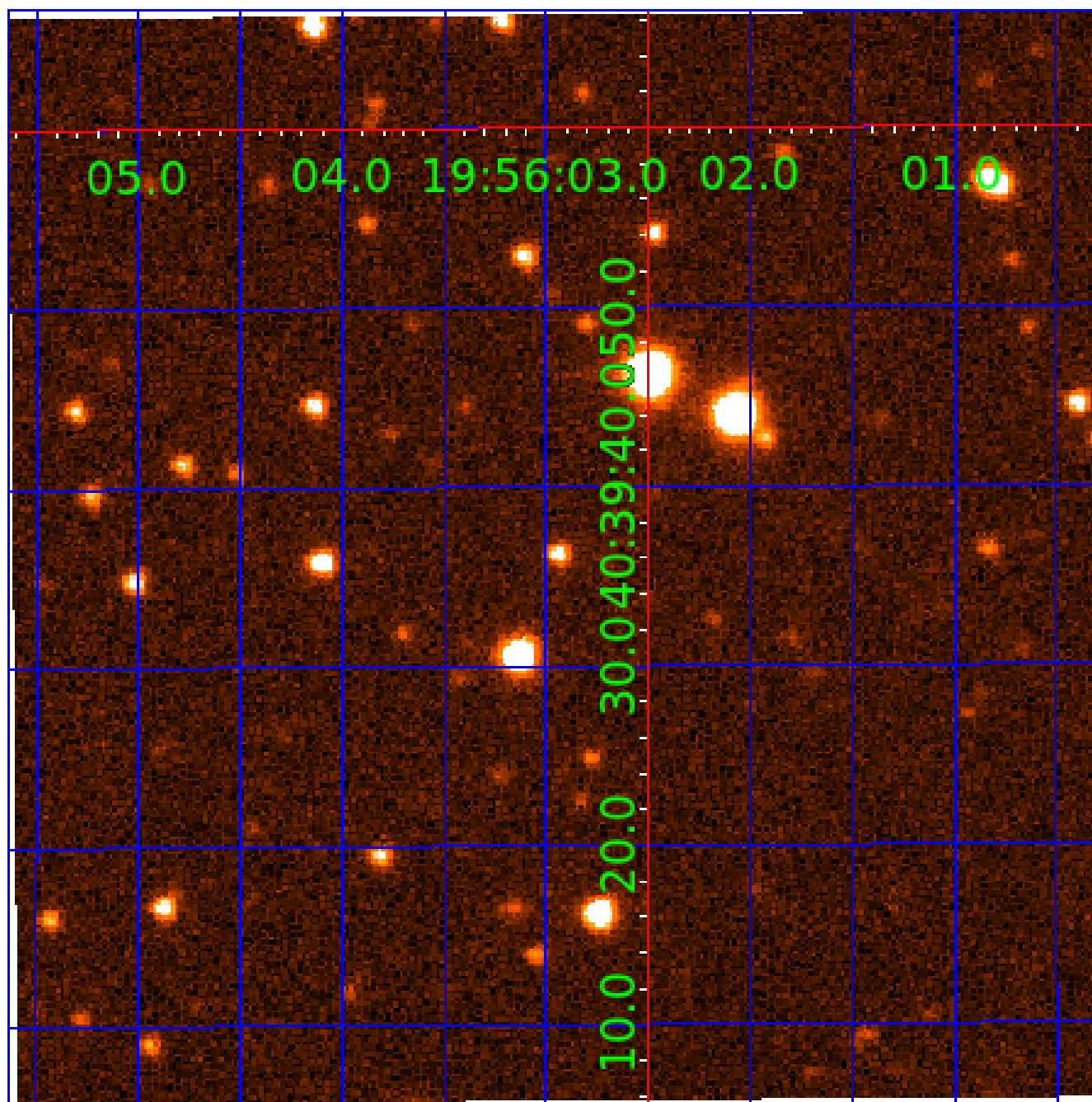


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 005478083

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005478083-01	OBS	3738.01	15.852317	142.524069	473777.7	5.246	550.2	399.4	1.00	5780	121.03	65.54
005478083-02	OBS	No	110.969571	231.290244	13266.0	4.274	7.8	8.6	1.00	5780	13.63	4.89

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005478083-01	OBS	FP	0.00	0	1	1	0	MOD_SEC_DV—MOD_ODDEVEN_DV—MOD_ODDEVEN_ALT—DEEP_V_SHAPED—HAS_SEC_TCE—SEASONAL_DEPTH_DV—SEASONAL_DEPTH_ALT—CENT_RESOLVED_OFFSET—HALO_GHOST
005478083-02	OBS	FP	0.00	1	1	1	0	IS_SEC_TCE—CENT_RESOLVED_OFFSET

**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 005478083-02

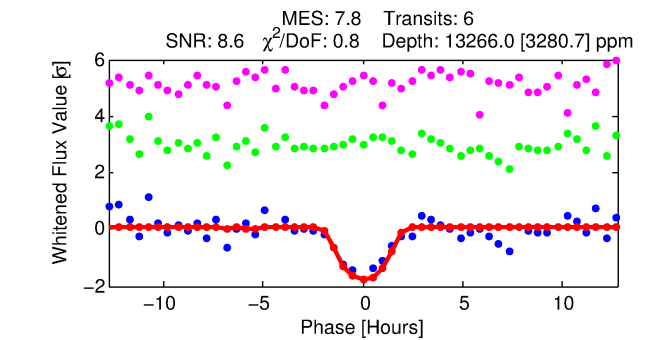
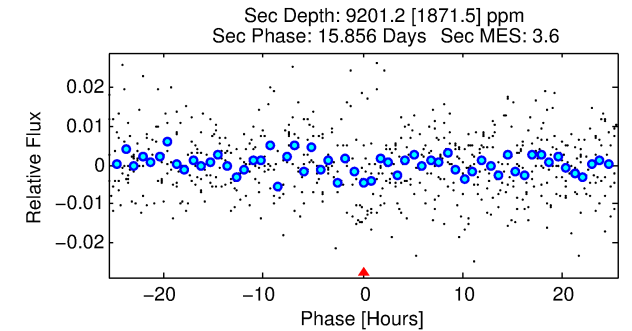
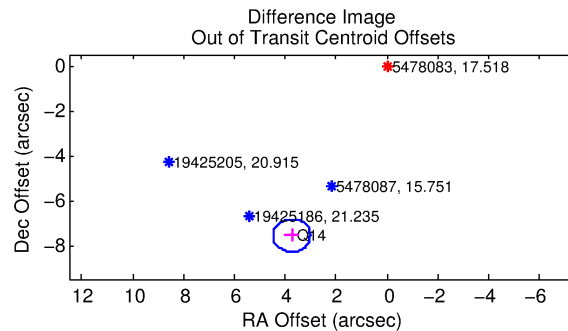
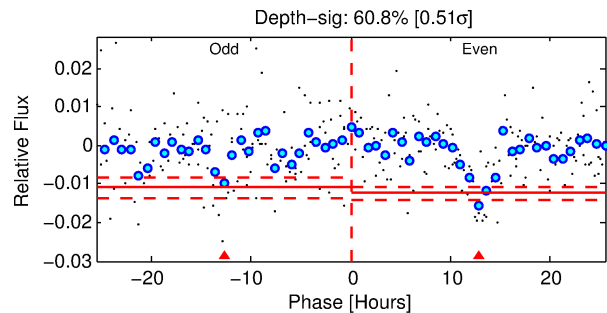
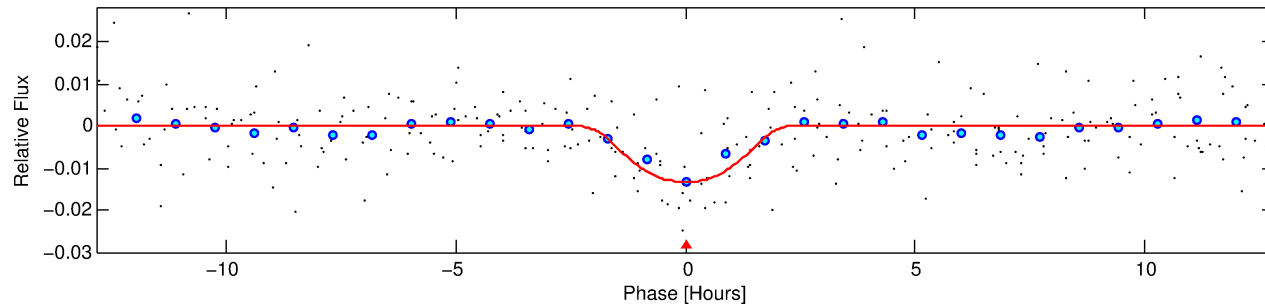
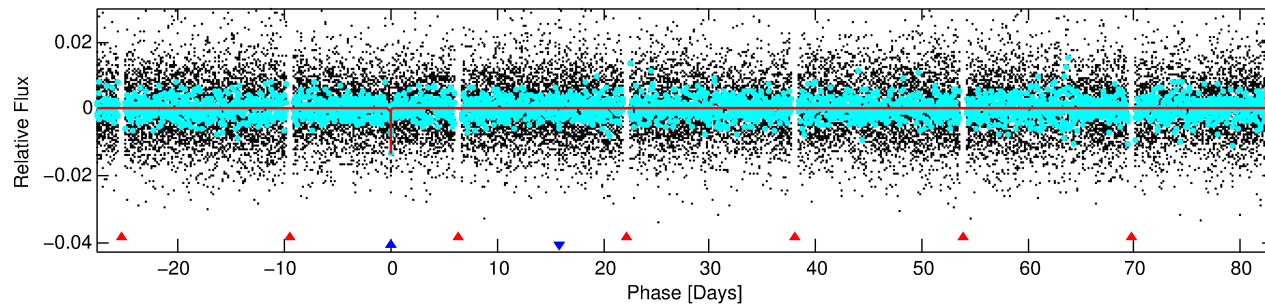
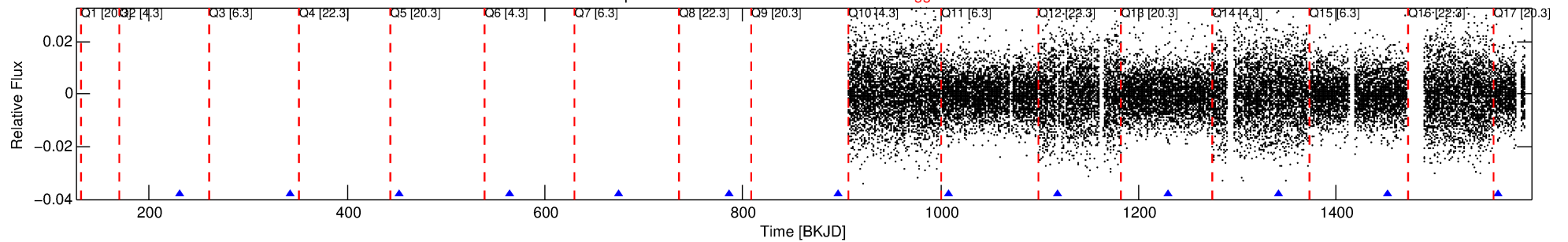
No Significant Match Found

# DV One-Page Summary

KIC: 5478083 Candidate: 2 of 2 Period: 110.970 d

KOI: K03738 Corr: No Ephemeris Match

Kp: 17.52 R\*: 1.00 Rs Teff: 5780.0 K Logg: 4.44 Fe/H: 0.000



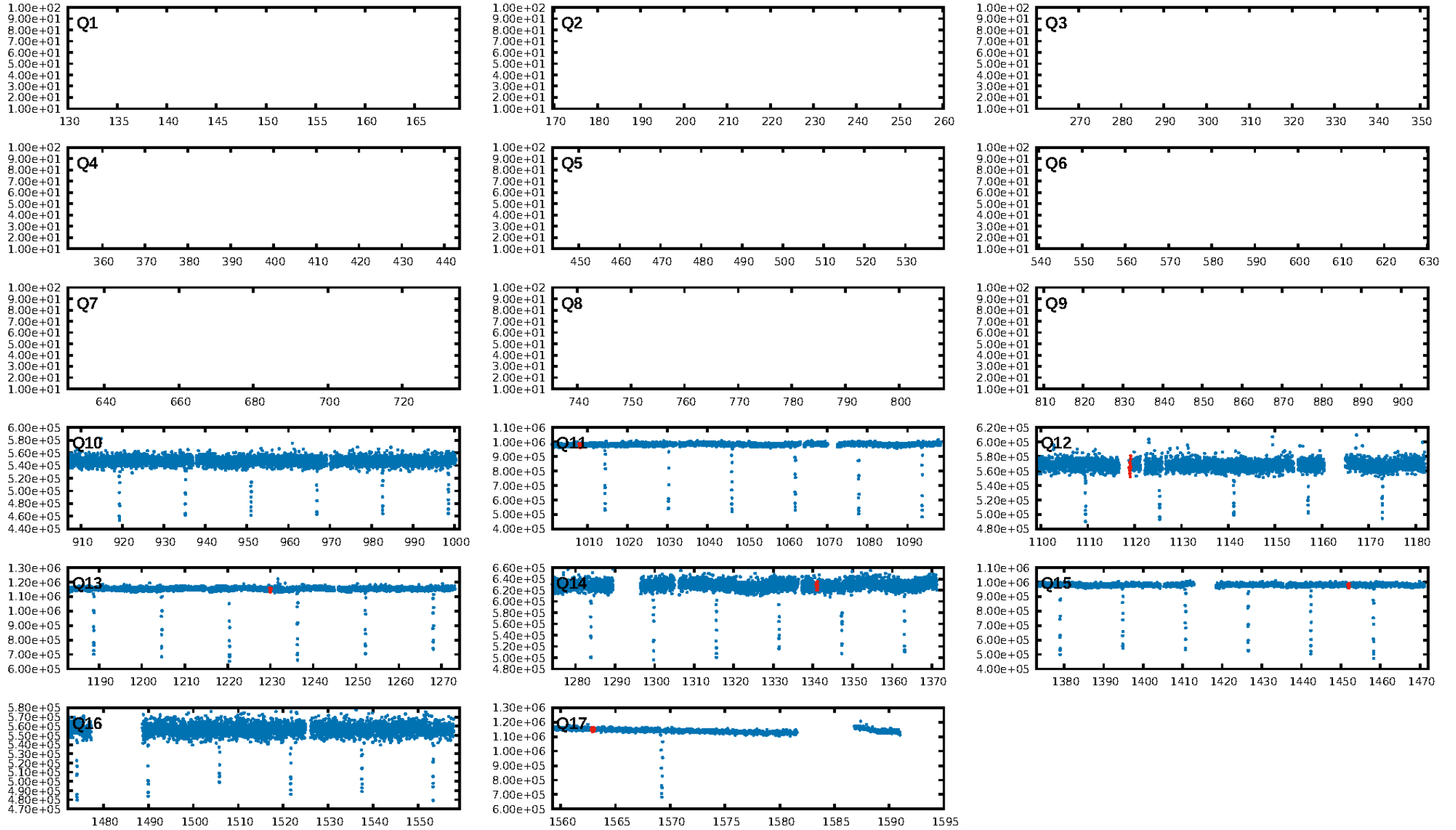
## DV Fit Results:

Period = 110.96957 [0.00329] d  
Epoch = 231.2902 [0.0327] BKJD  
Rp/R\* = 0.1249 [0.0349]  
a/R\* = 139.89 [40.32]  
b = 0.88 [0.13]  
Seff = 4.89 [0.00]  
Teq = 379 [0] K  
Rp = 13.63 [3.81] Re  
a = 0.4520 [0.0000] AU  
Ag = 5565.98 [3312.37] [1.68σ]  
Teffp = 5065 [754] K [6.22σ]

## DV Diagnostic Results:

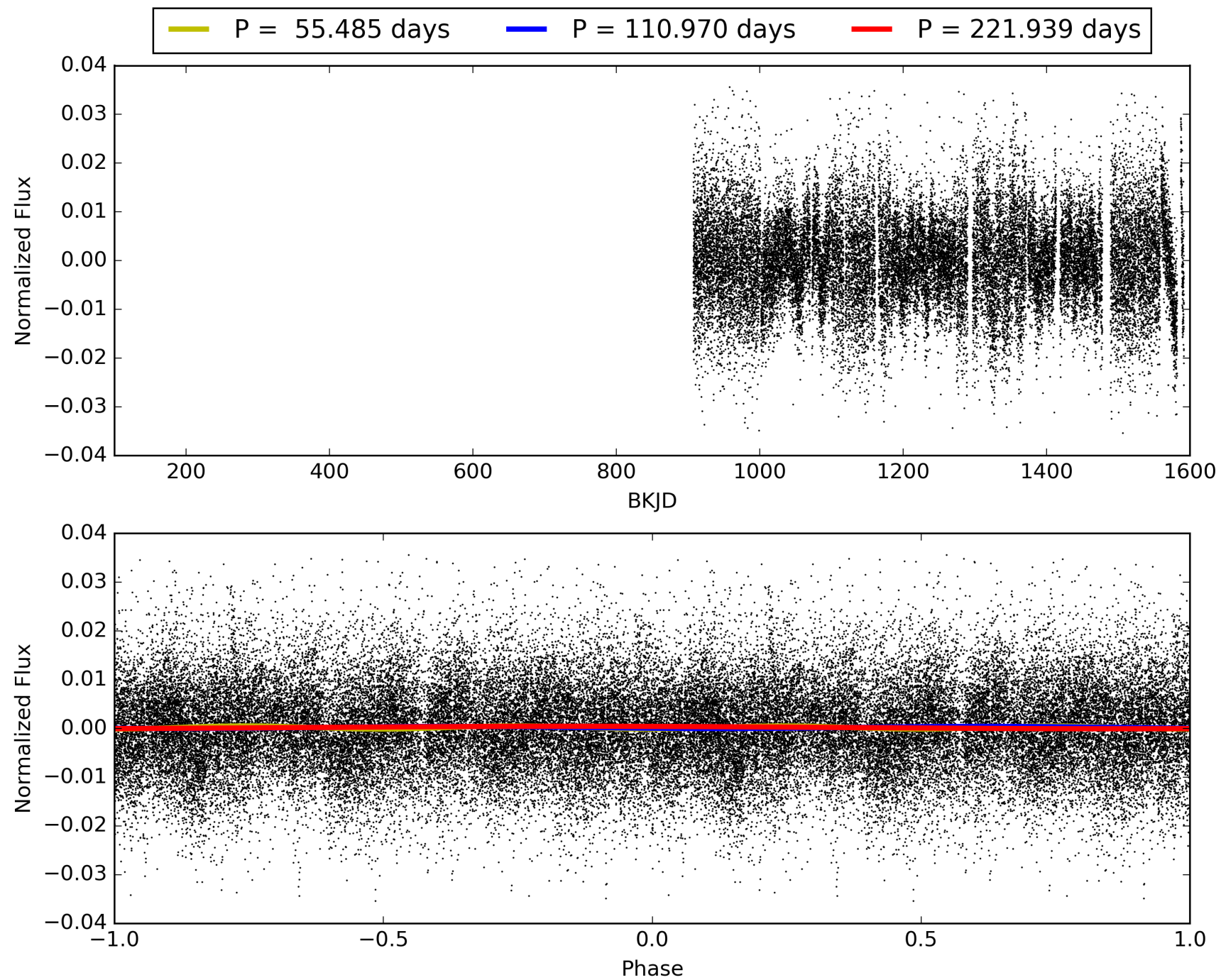
ShortPeriod-sig: 100.0% [337.38σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 25.9%  
ModelChiSquareGof-sig: 97.8%  
**Bootstrap-pfa: 1.31e-12**  
RollingBand-fgt: 1.00 [5/5]  
**GhostDiagnostic-chr: 0.2912**  
Centroid-sig: 2.0%  
Centroid-so: 2.048 arcsec [14.27σ]  
OotOffset-rm: 8.446 arcsec [34.53σ]  
KicOffset-rm: 5.495 arcsec [17.87σ]  
OotOffset-st: 1/0/0/0 [1]  
KicOffset-st: 1/1/0/2 [4]  
DiffImageQuality-fgm: 0.75 [3/4]  
DiffImageOverlap-fno: 1.00 [4/4]

# TCE 005478083-02, PDC Light Curves





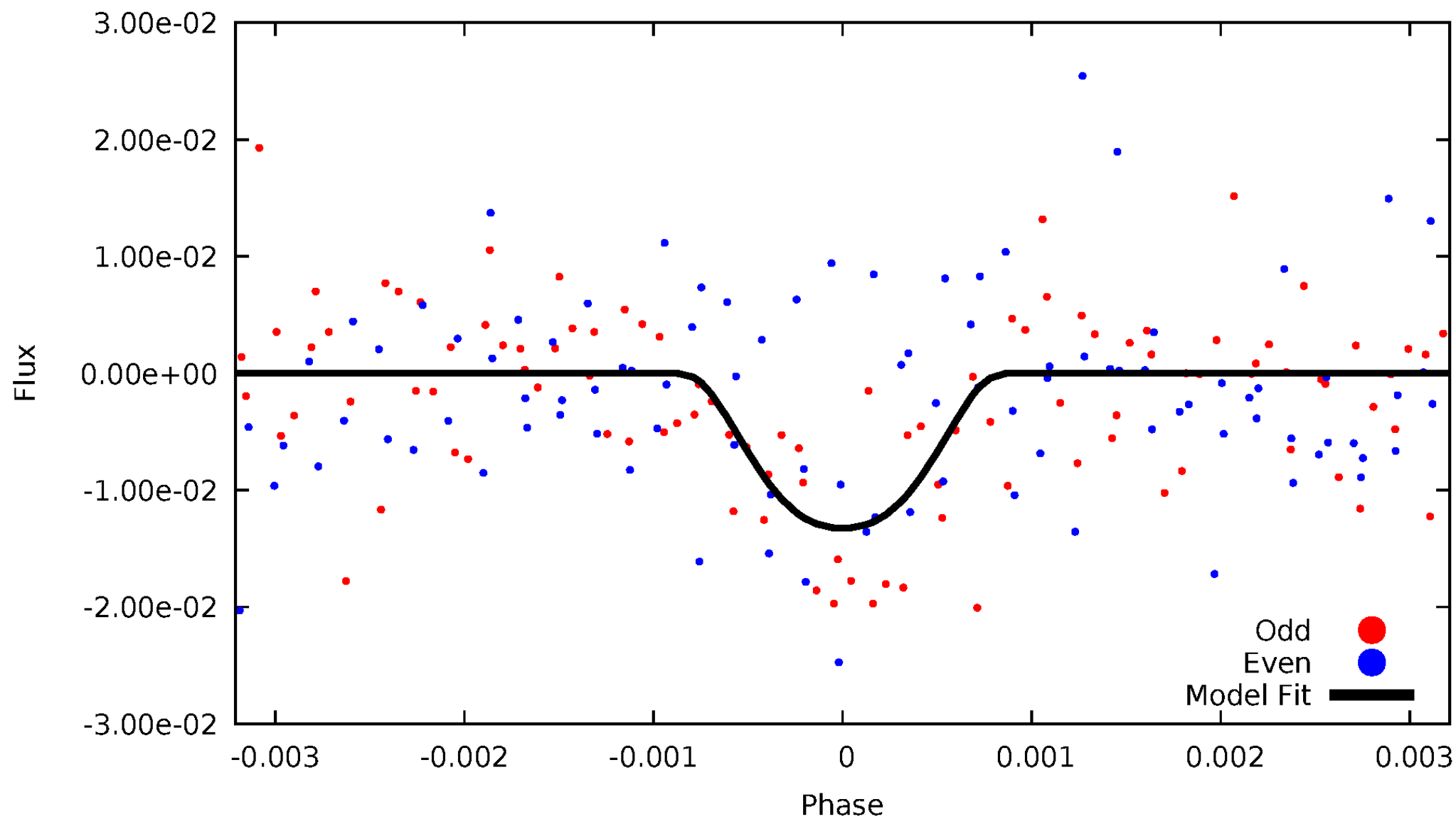
# TCE 005478083-02





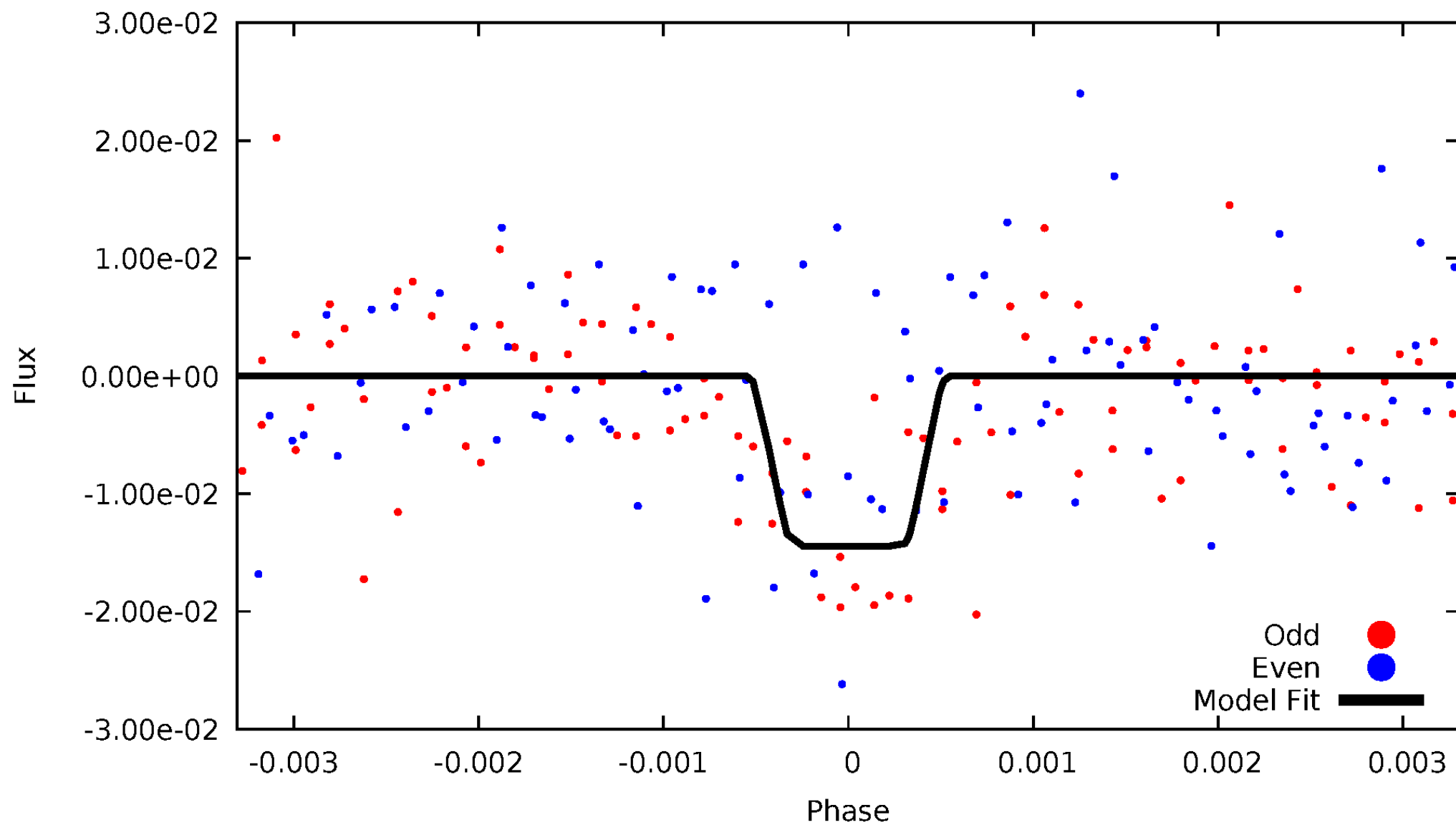
# DV Odd/Even

TCE 005478083-02



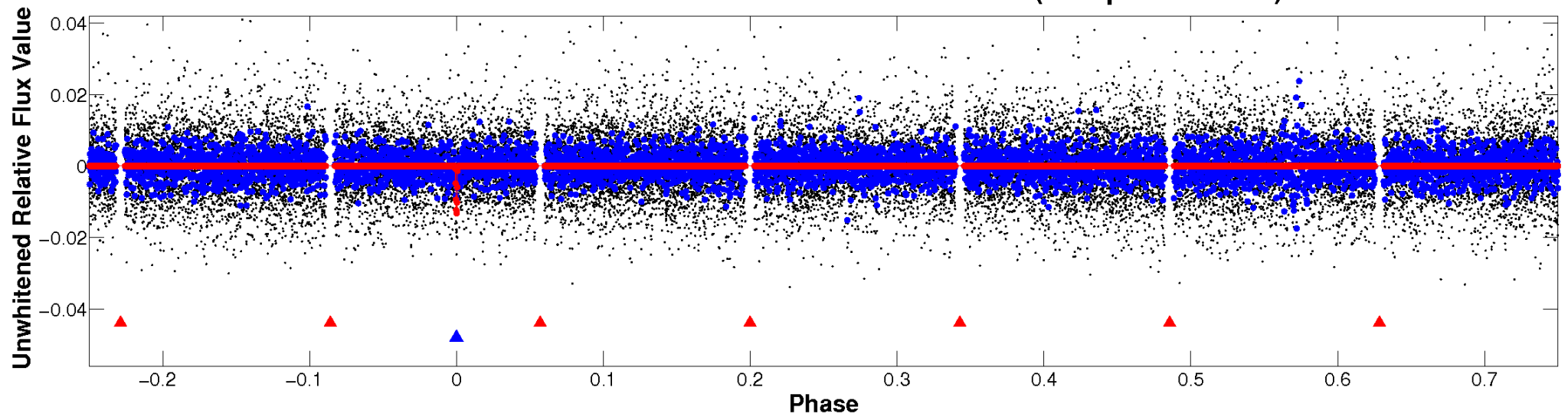
# ALT Odd/Even

TCE 005478083-02

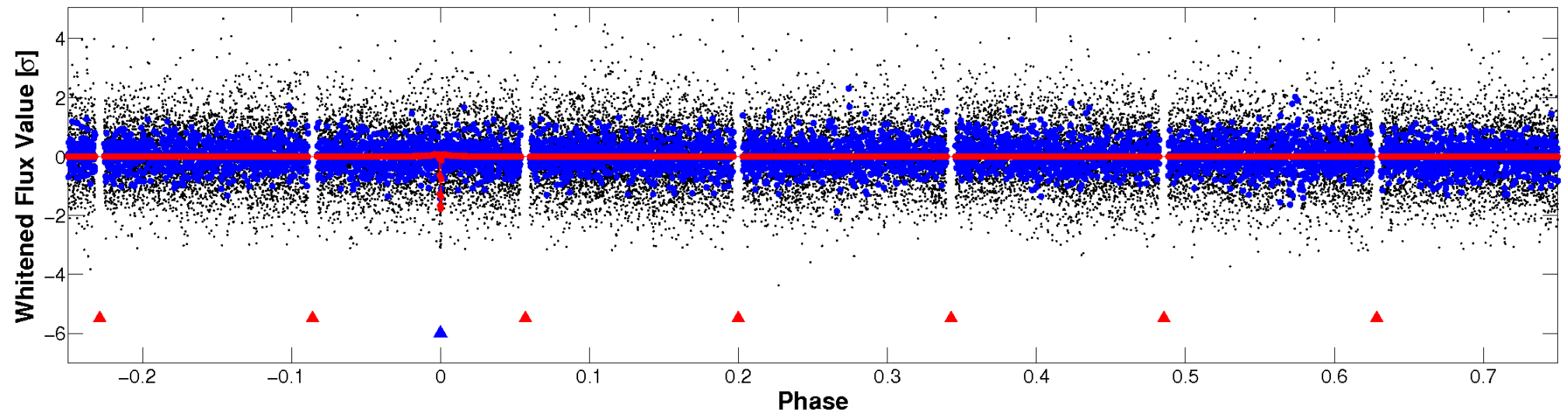


# Non-Whitened Vs. Whitened Light Curve

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

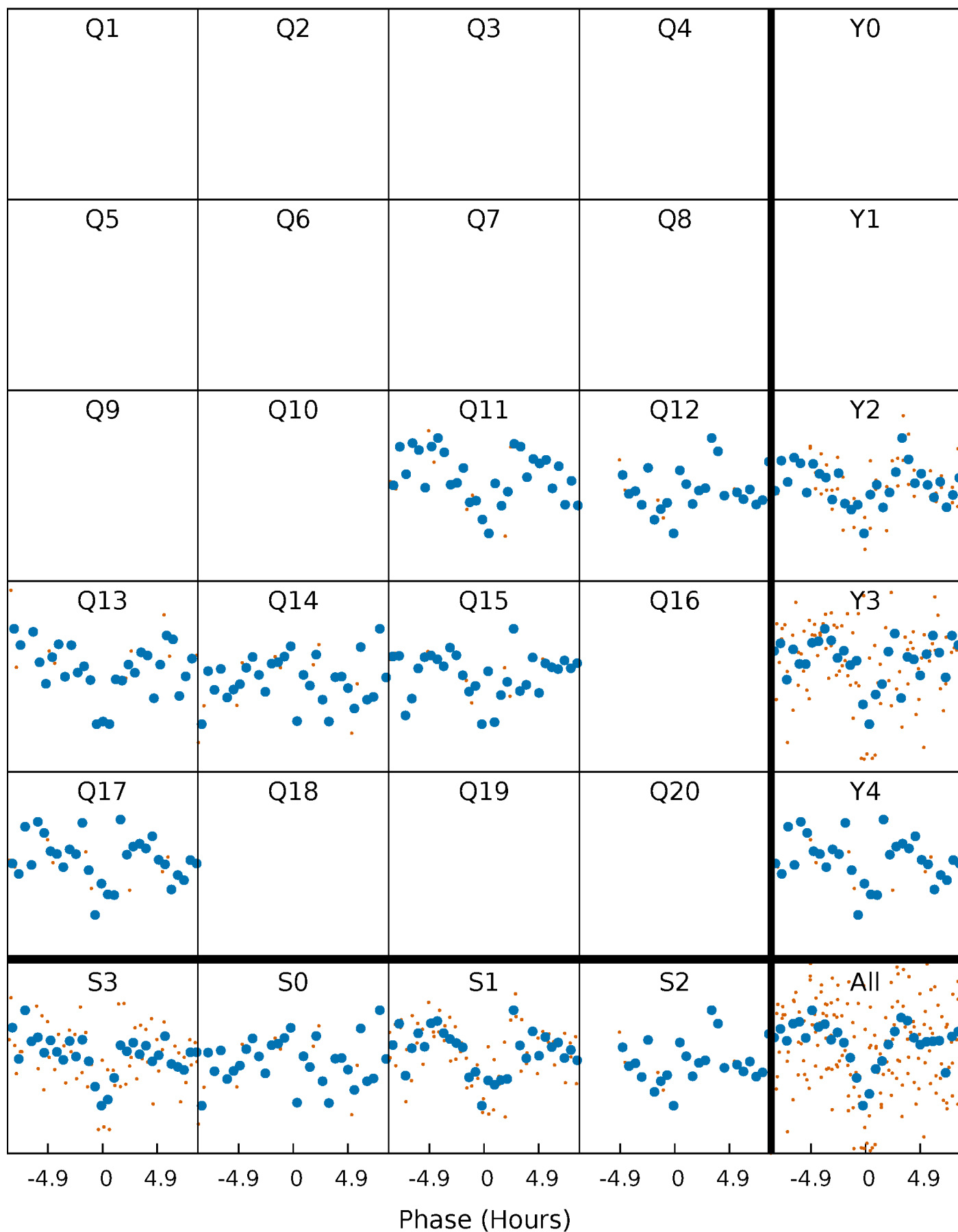


**Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



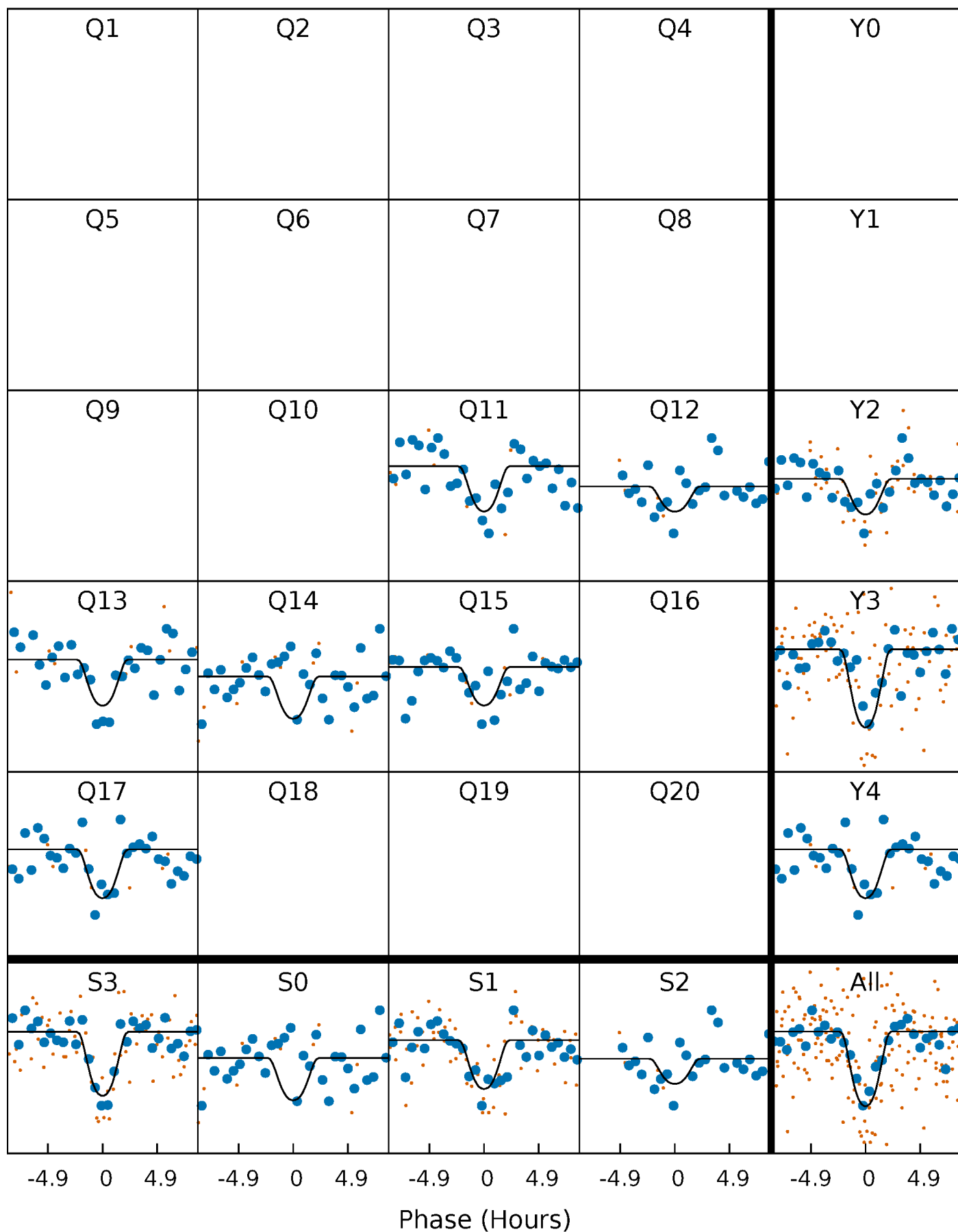
# PDC Quarter-Phased Transit Curves

TCE 005478083-02 P=110.969571 Days  $T_0=231.290244$  (BKJD)



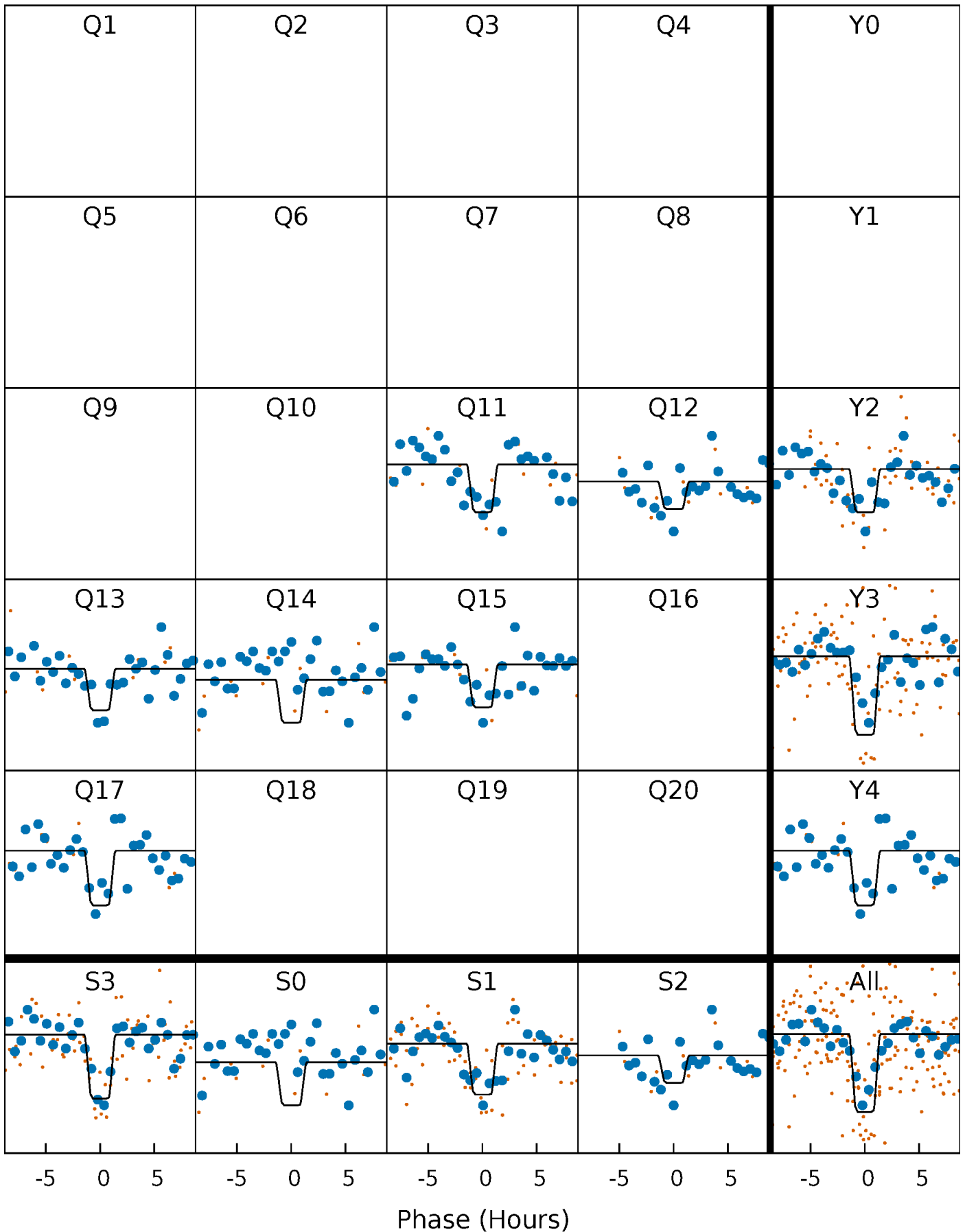
# DV Quarter-Phased Transit Curves

TCE 005478083-02 P=110.969571 Days  $T_0=231.290244$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

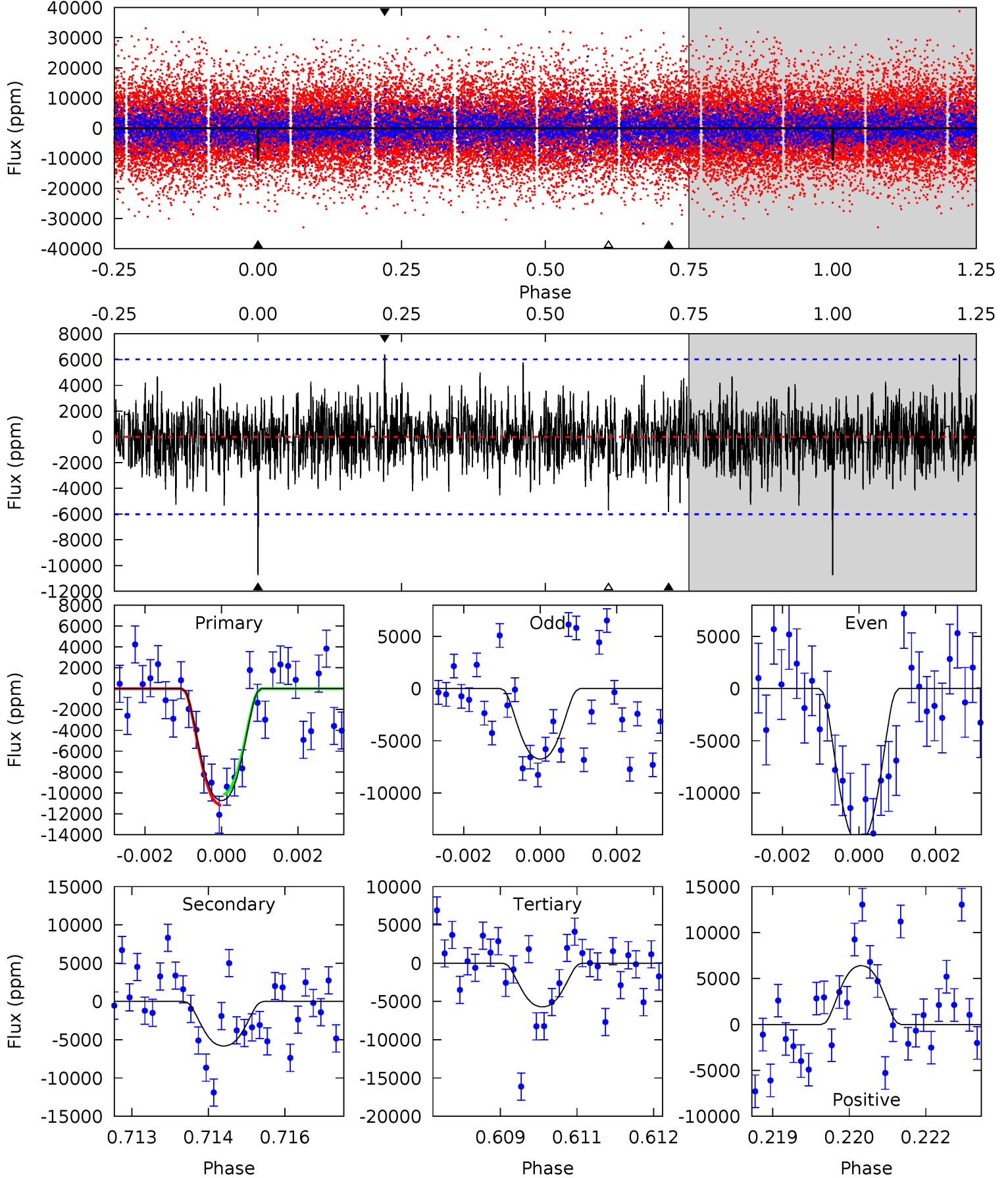
TCE 005478083-02 P=110.968917 Days  $T_0=231.297047$  (BKJD)



# DV Model-Shift Uniqueness Test

005478083-02, P = 110.969571 Days, E = 231.290244 Days

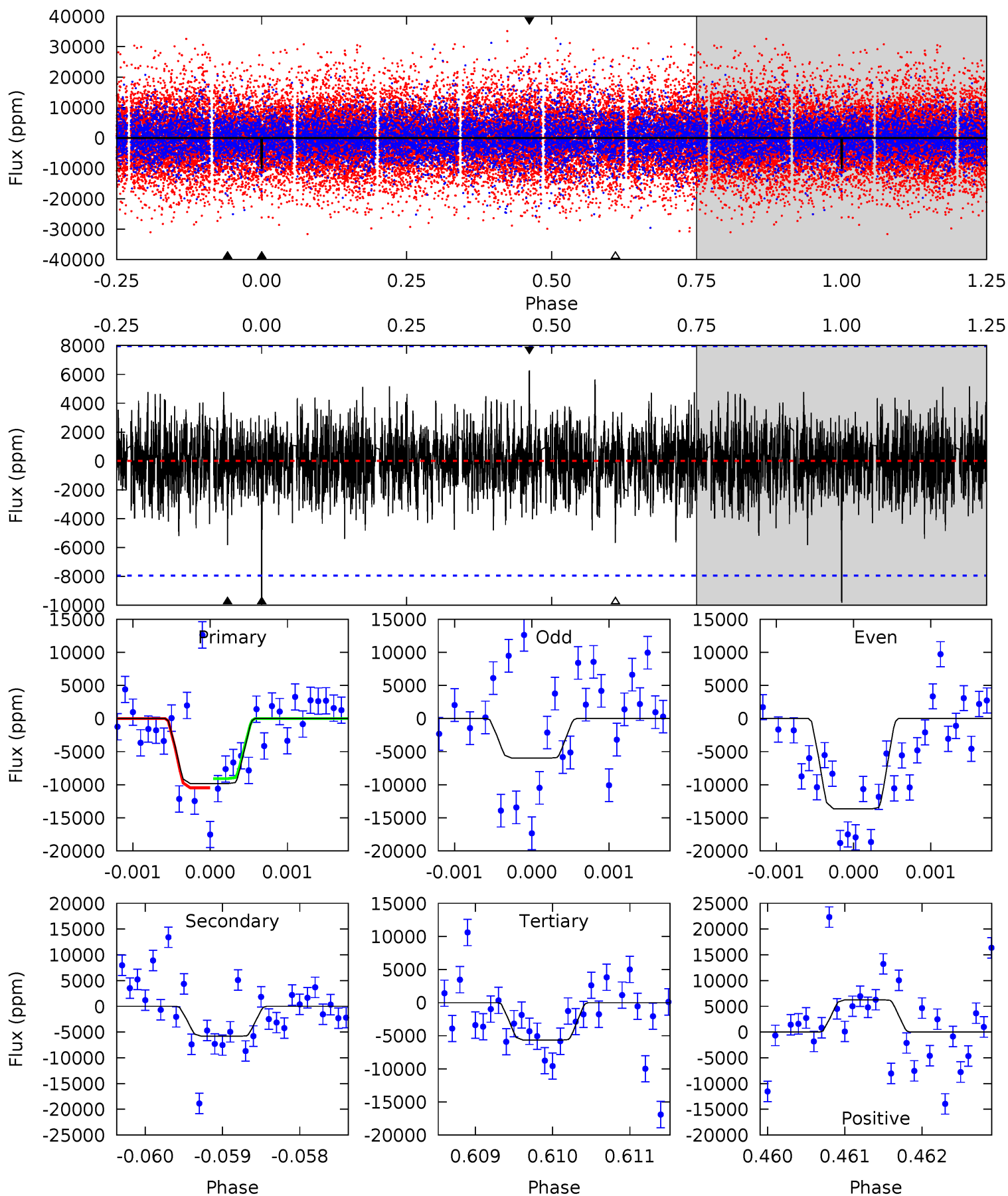
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
9.57	5.19	5.08	5.71	5.36	3.14	1.39	4.49	3.87	0.10	-0.52	3.56	0.85	0.37	0.45



# Alt Model-Shift Uniqueness Test

005478083-02, P = 110.968917 Days, E = 231.297047 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
6.76	4.00	3.89	4.31	5.46	3.31	1.08	2.86	2.45	0.11	-0.31	2.63	0.77	0.39	0.48





### Stellar Parameters For KIC 005478083

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5780^{+1}_{-1}$	$4.438^{+1.000}_{-1.000}$	$0.000^{+1.000}_{-1.000}$	$1.000^{+1.000}_{-1.000}$	$-1.000^{+1.000}_{-1.000}$	$-1.000^{+1.000}_{-1.000}$
	+0%/-0%	+23%/-23%	+inf%/-inf%	+100%/-100%	+100%/-100%	+100%/-100%
Source	Solar	Solar	Solar	Solar		

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

### Secondary Eclipse Parameters for KIC 005478083-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-5820 \pm 1122$	$13.67^{+3.95}_{-3.92}$	$531^{+26}_{-25}$	$4663^{+778}_{-503}$	$3489^{+3710}_{-1549}$
Alt.	$-5819 \pm 1455$	$13.28^{+4.03}_{-3.95}$	$531^{+25}_{-26}$	$4699^{+784}_{-484}$	$3685^{+3797}_{-1610}$

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

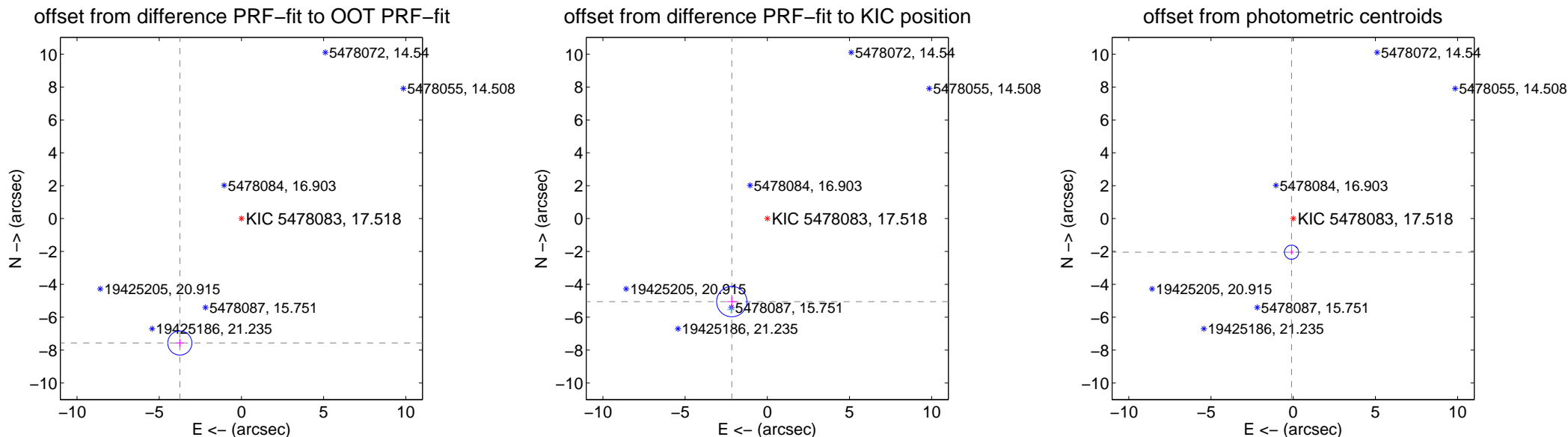
## DV Centroid Data

Supplemental centroid analysis for 005478083-02. Kepler magnitude: 17.52. Transit SNR 8.61

There are 3 quarters with good PRF difference image offsets

The OOT PRF centroid is offset from the target star catalog position by about 2.54 arcsec so the offset from difference PRF-fit to OOT-fit may be invalid.

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$8.446 \pm 0.245$	<b>34.53</b>	$3.747 \pm 0.247$	$-7.569 \pm 0.244$
PRF-fit source offset from KIC position	$5.495 \pm 0.307$	<b>17.87</b>	$2.162 \pm 0.301$	$-5.052 \pm 0.309$
photometric centroid source offset	$2.05 \pm 0.14$	<b>14.27</b>	$0.10 \pm 0.13$	$-2.05 \pm 0.14$



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.



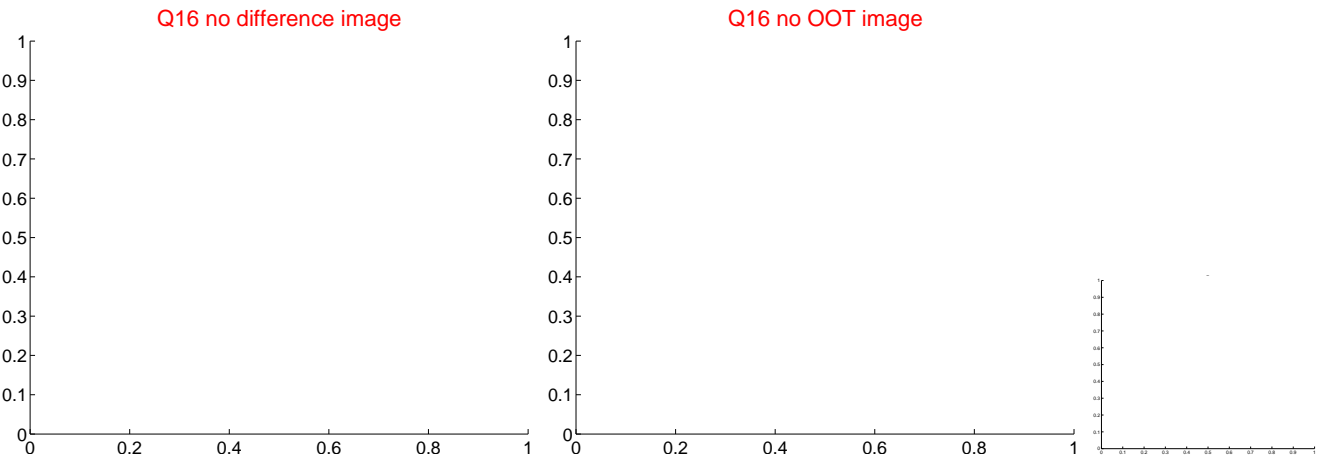
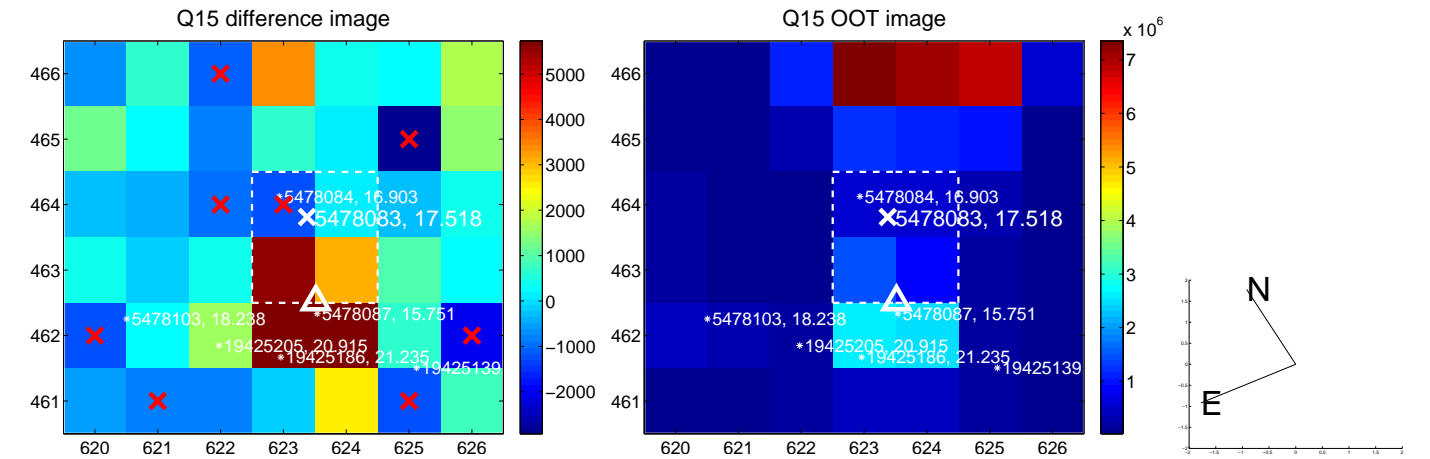
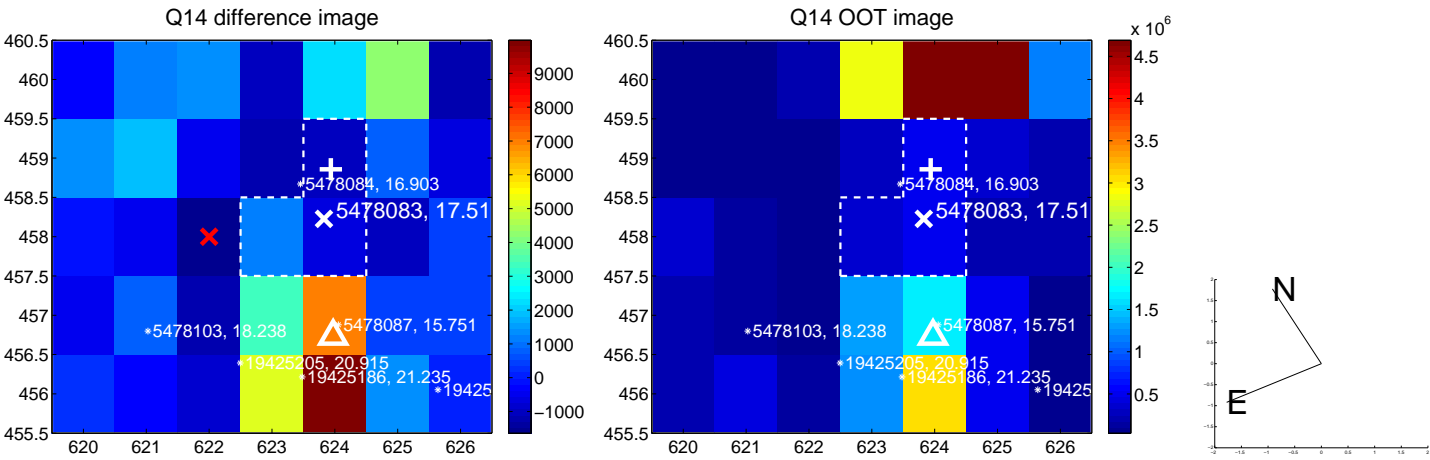
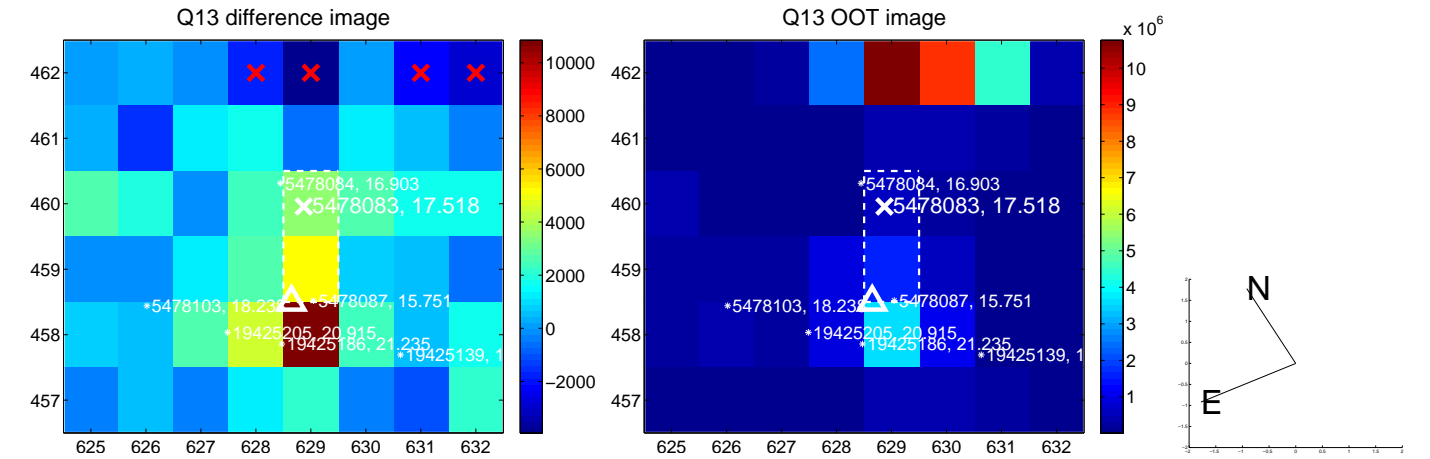
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



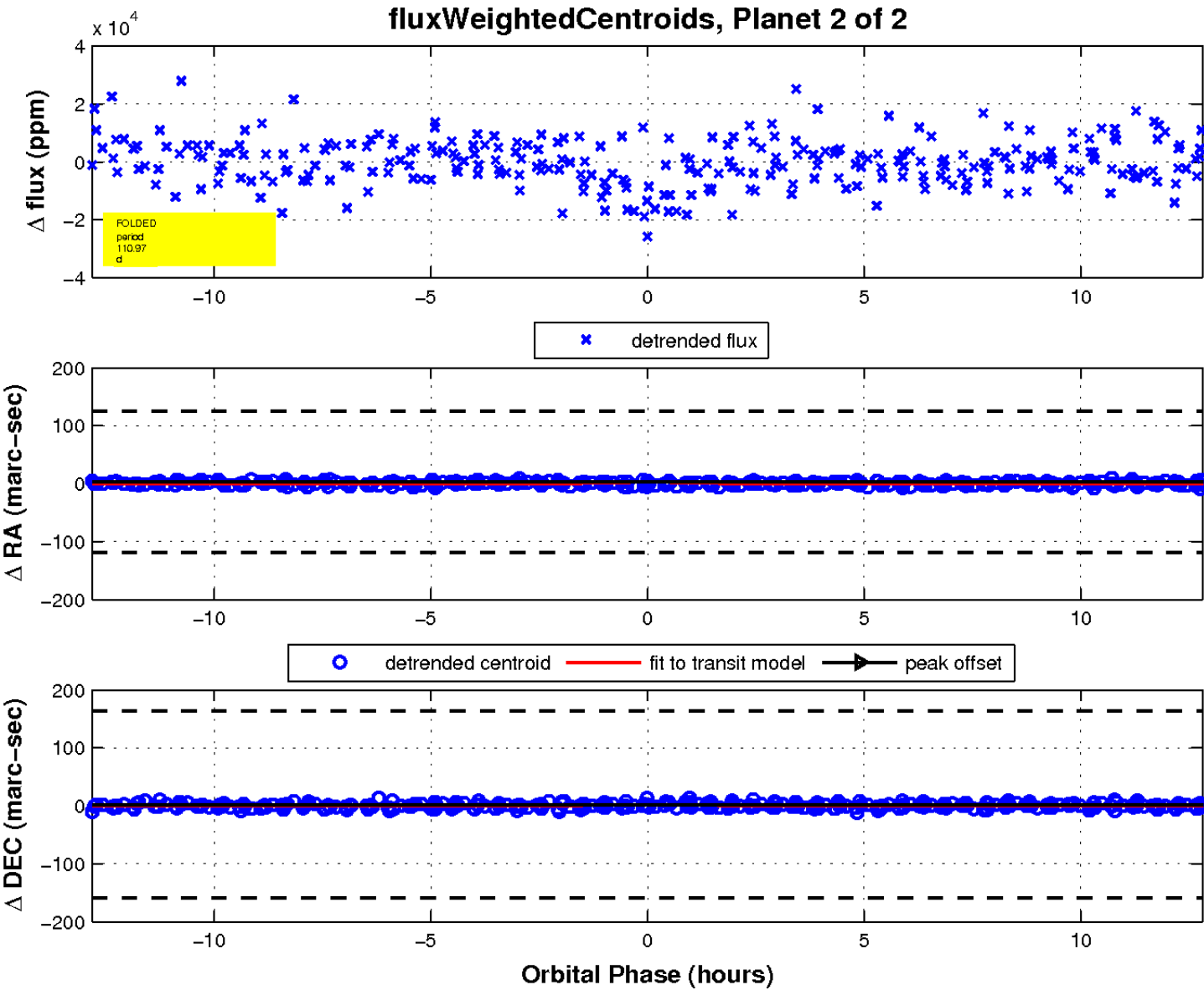
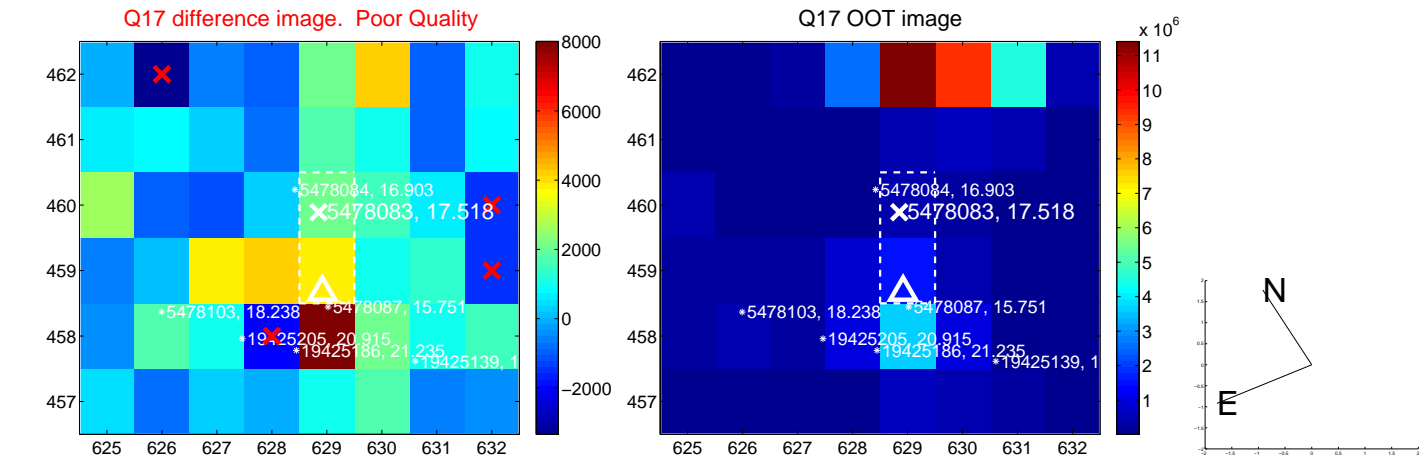
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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.



UKIRT Image

Declination

