

# KIC 009406936

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009406936-01	OBS	No	304.156510	183.452630	255.6	23.053	7.4	7.7	0.84	5865	1.67	1.05

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009406936-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_SKYE—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_FEW_DIFFS

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

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

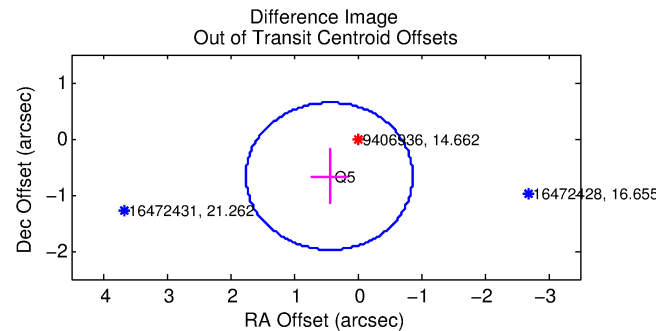
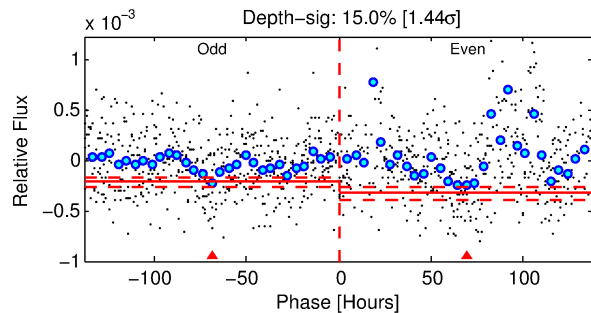
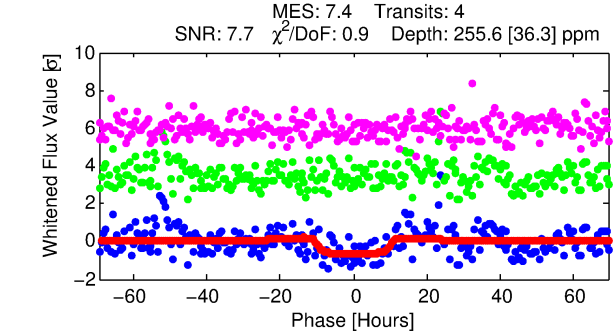
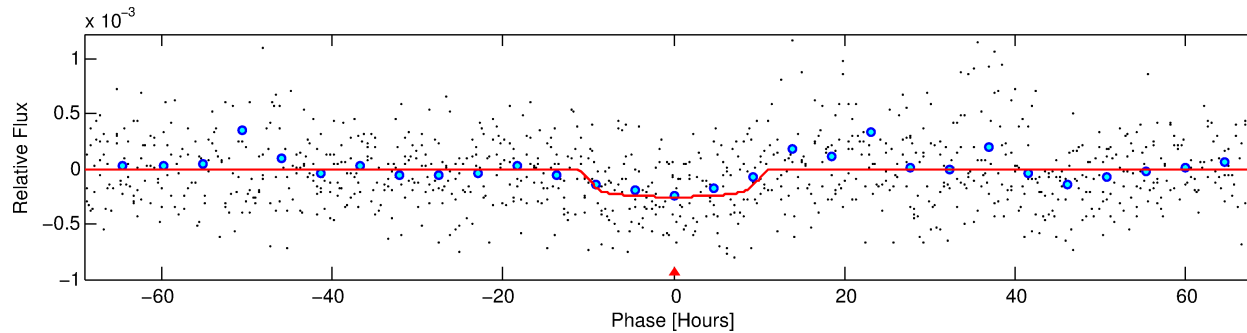
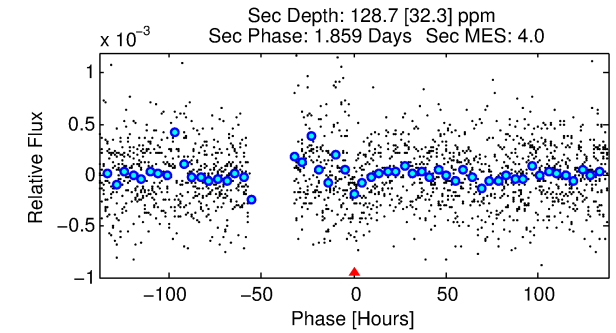
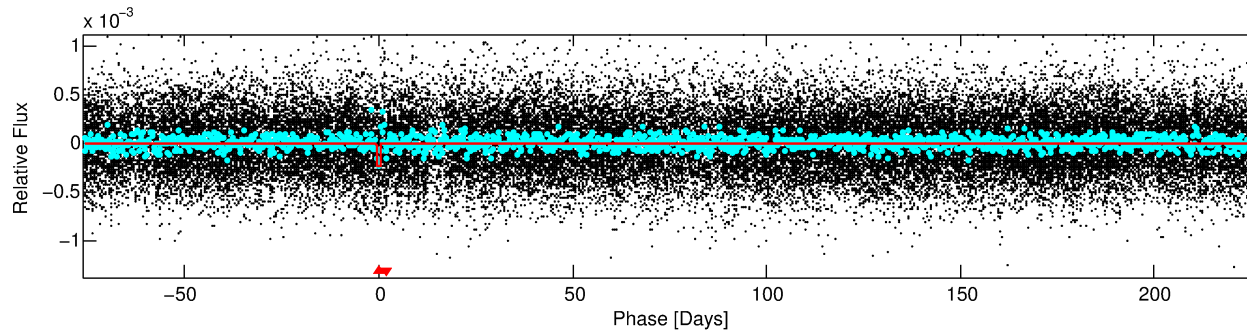
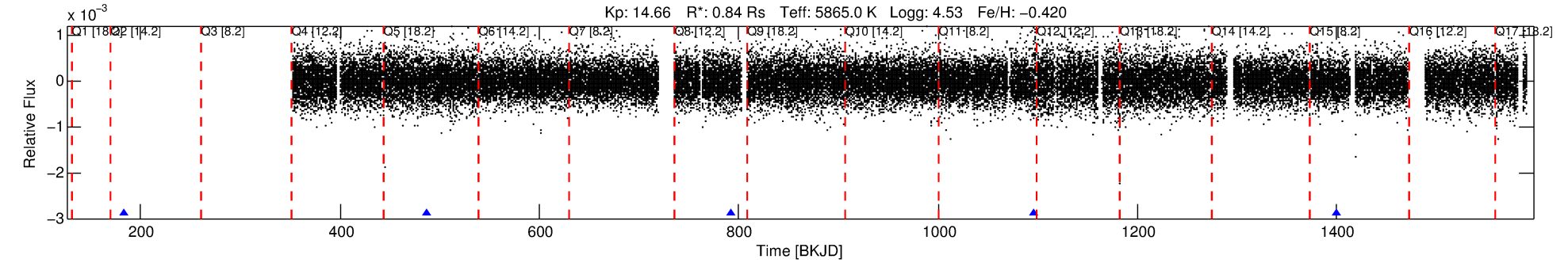
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 009406936-01

No Significant Match Found

# DV One-Page Summary

KIC: 9406936 Candidate: 1 of 1 Period: 304.157 d



## DV Fit Results:

Period = 304.15651 [0.02416] d  
Epoch = 183.4526 [0.0709] BKJD  
Rp/R\* = 0.0181 [0.0022]  
a/R\* = 38.97 [19.09]  
b = 0.94 [0.06]  
Seff = 1.05 [0.38]  
Teq = 258 [23] K  
Rp = 1.67 [0.51] Re  
a = 0.8465 [0.1967] AU  
Ag = 18276.92 [8860.14] [2.06σ]  
Teffp = 4639 [436] K [10.04σ]

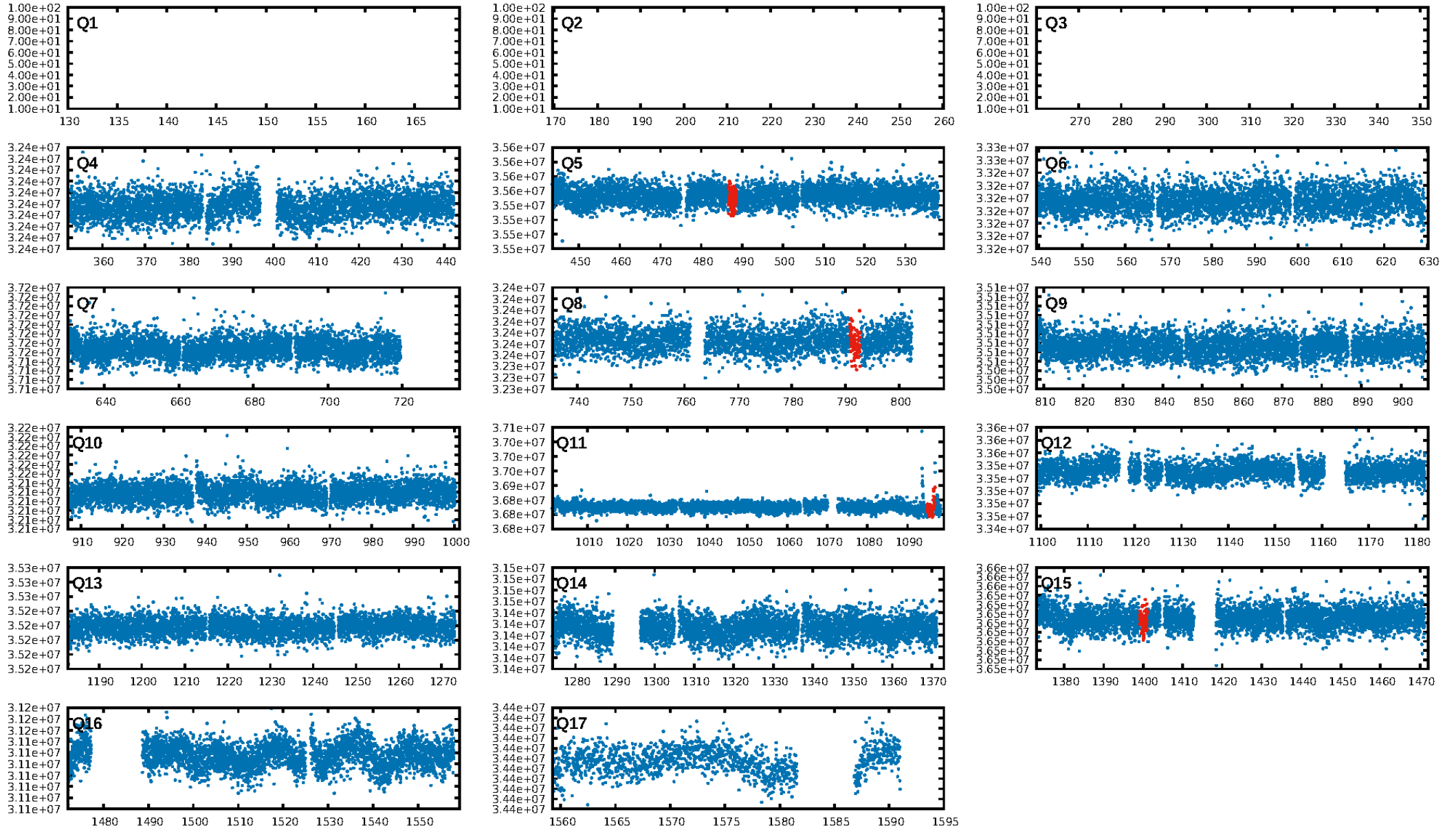
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 29.5%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 1.65e-13  
RollingBand-fgt: 1.00 [4/4]  
GhostDiagnostic-chr: -1.596  
Centroid-sig: 1.1%  
Centroid-so: 2.262 arcsec [2.00σ]  
OotOffset-rm: 0.802 arcsec [1.84σ]  
OotOffset-st: 0/0/0/1 [1]  
KicOffset-rm: 4.379 arcsec [14.59σ]  
KicOffset-st: 0/0/0/1 [1]  
DiffImageQuality-fgm: 1.00 [1/1]  
DiffImageOverlap-fno: 1.00 [3/3]

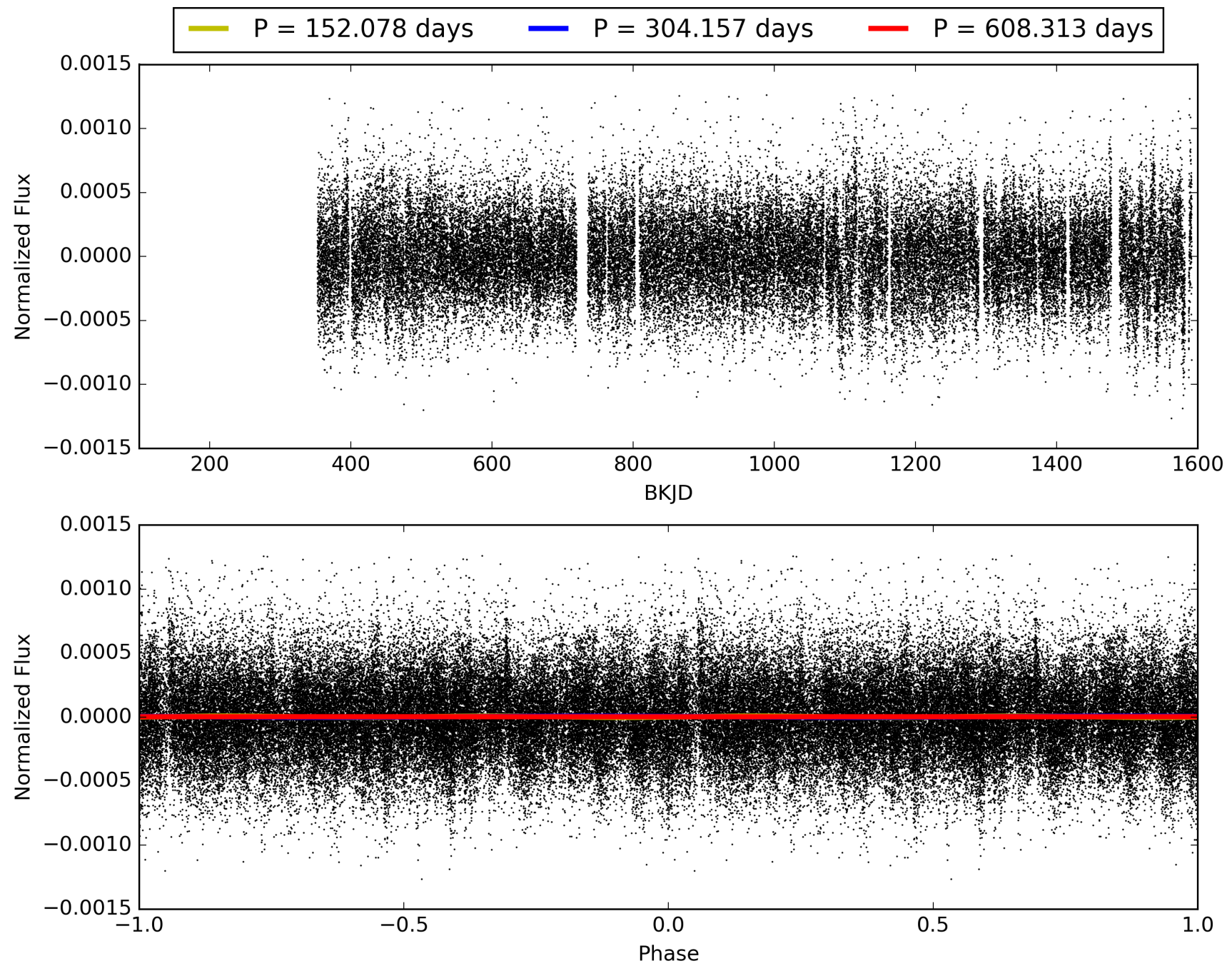
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 12:13:34 Z

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

# TCE 009406936-01, PDC Light Curves

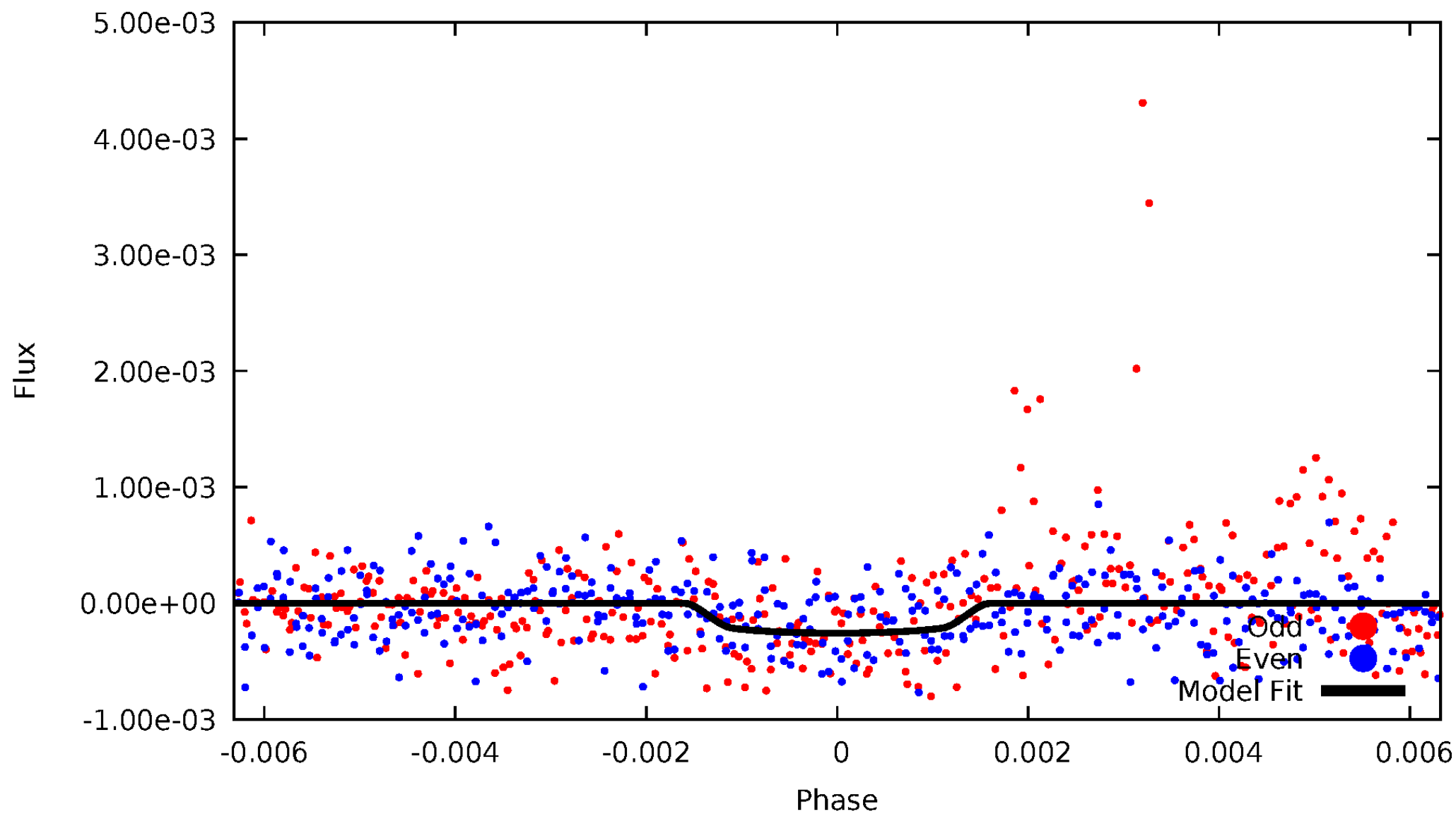


TCE 009406936-01



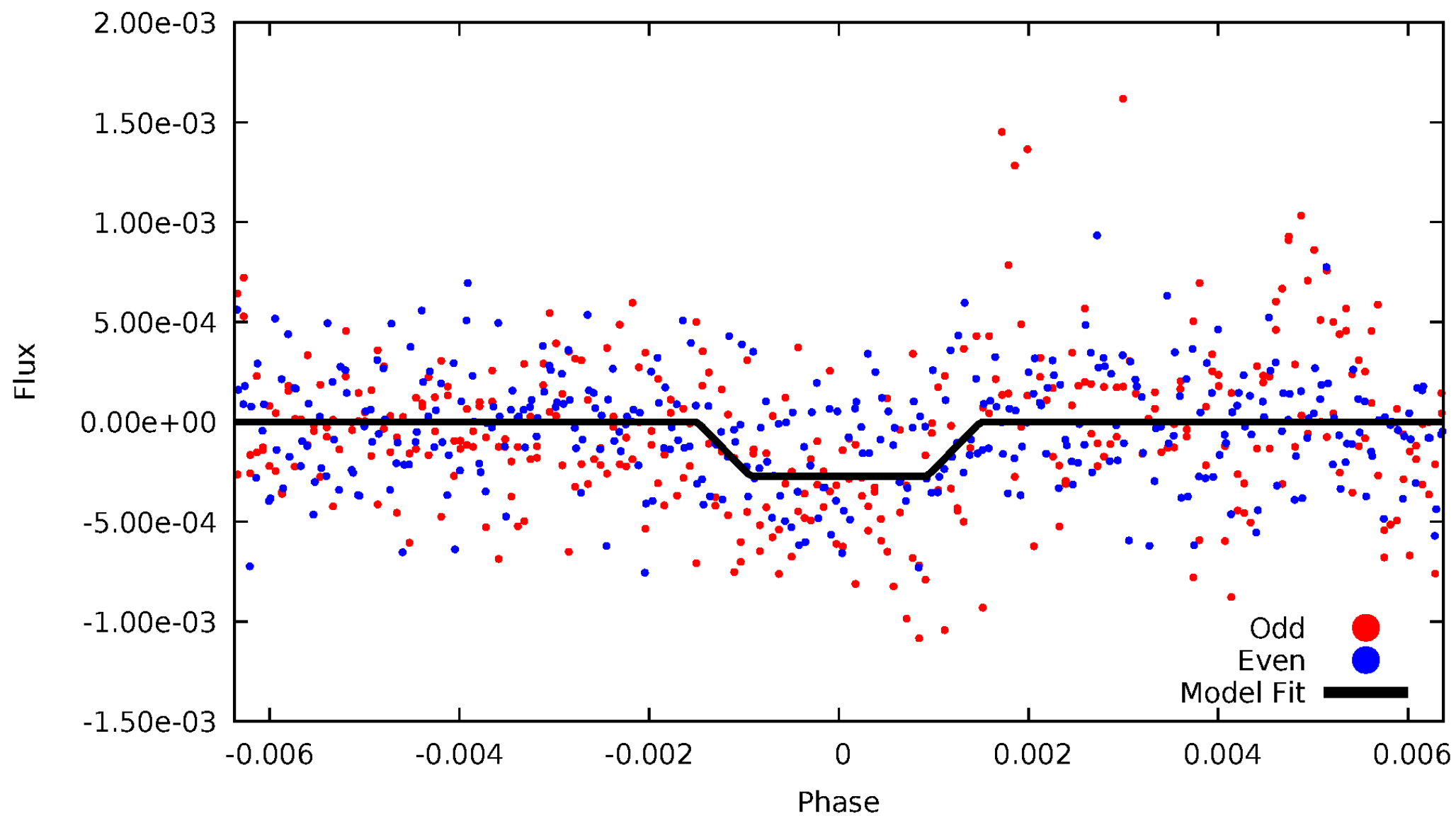
# DV Odd/Even

TCE 009406936-01



# ALT Odd/Even

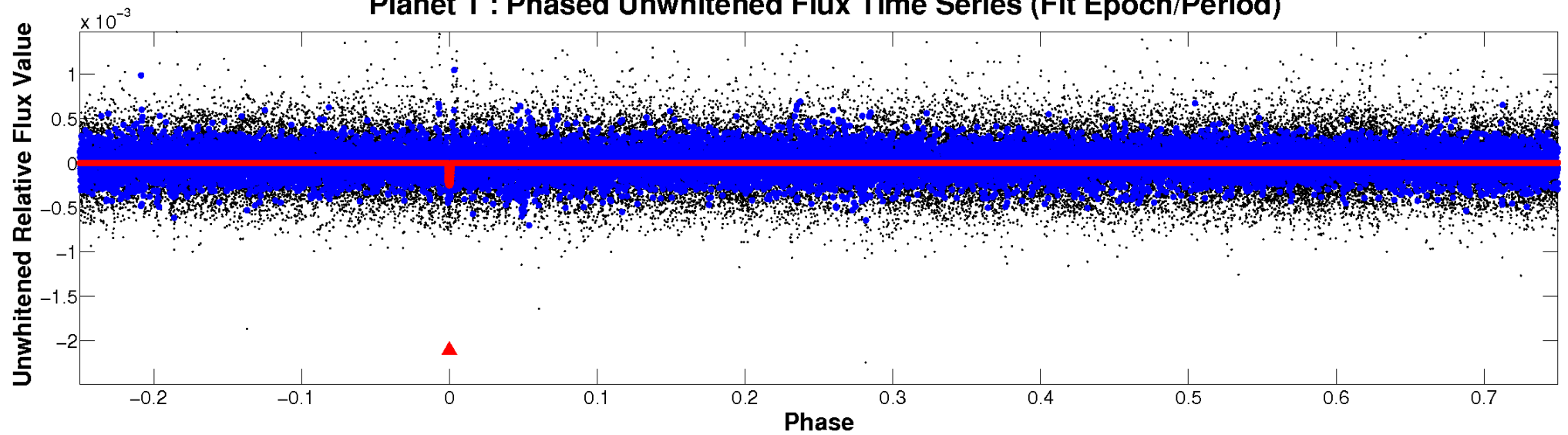
TCE 009406936-01



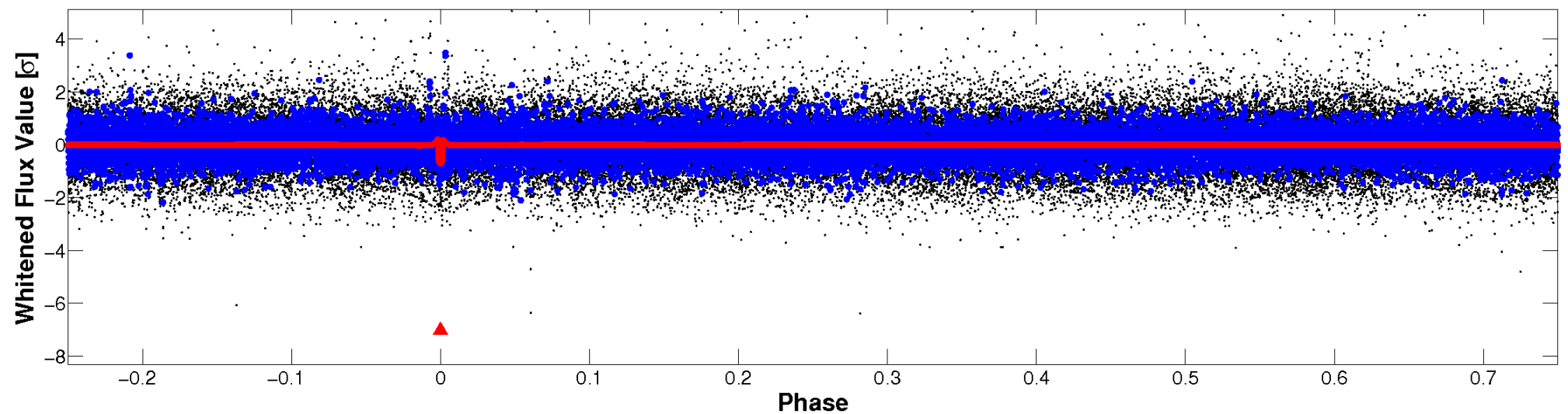


# Non-Whitened Vs. Whitened Light Curve

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

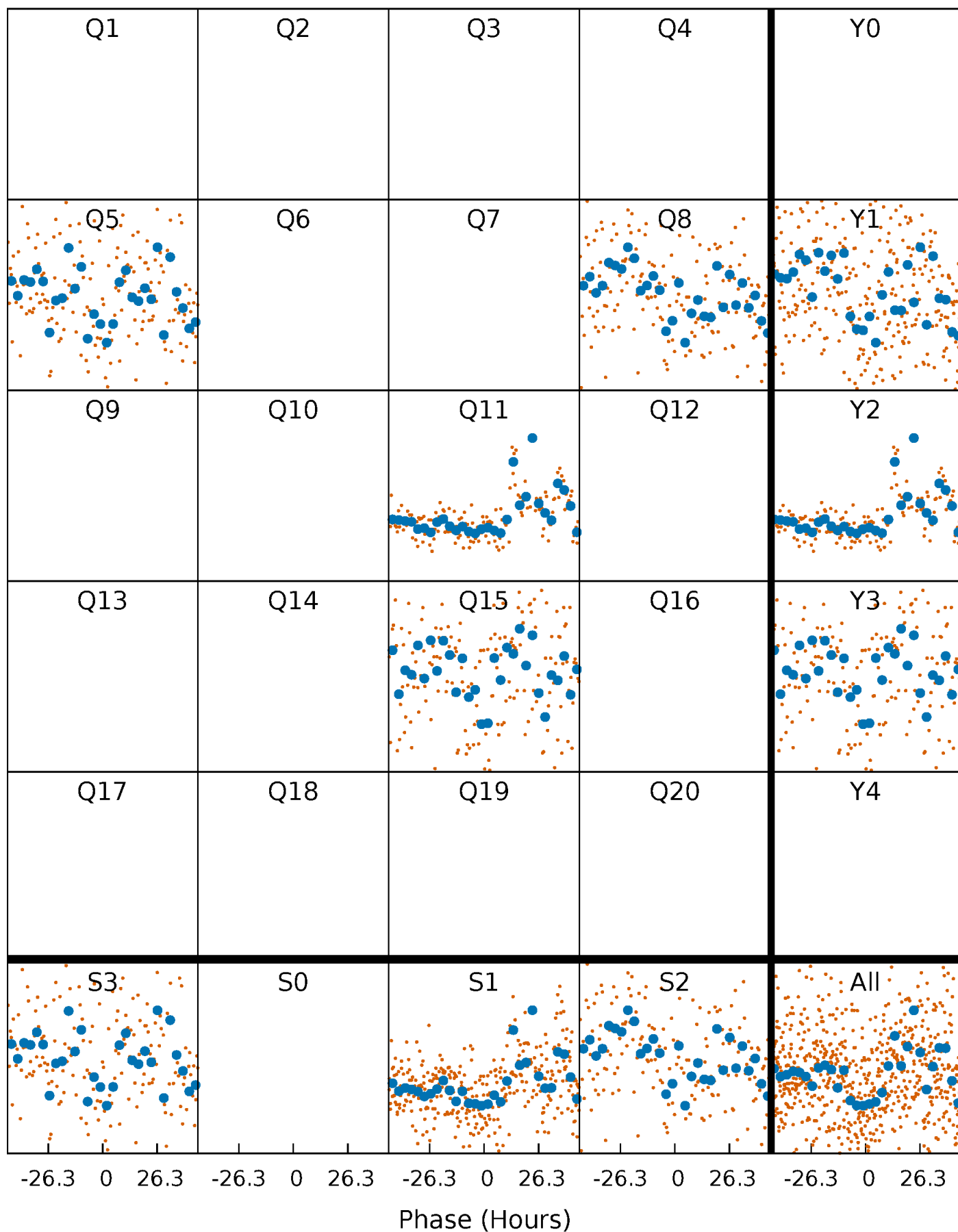


**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

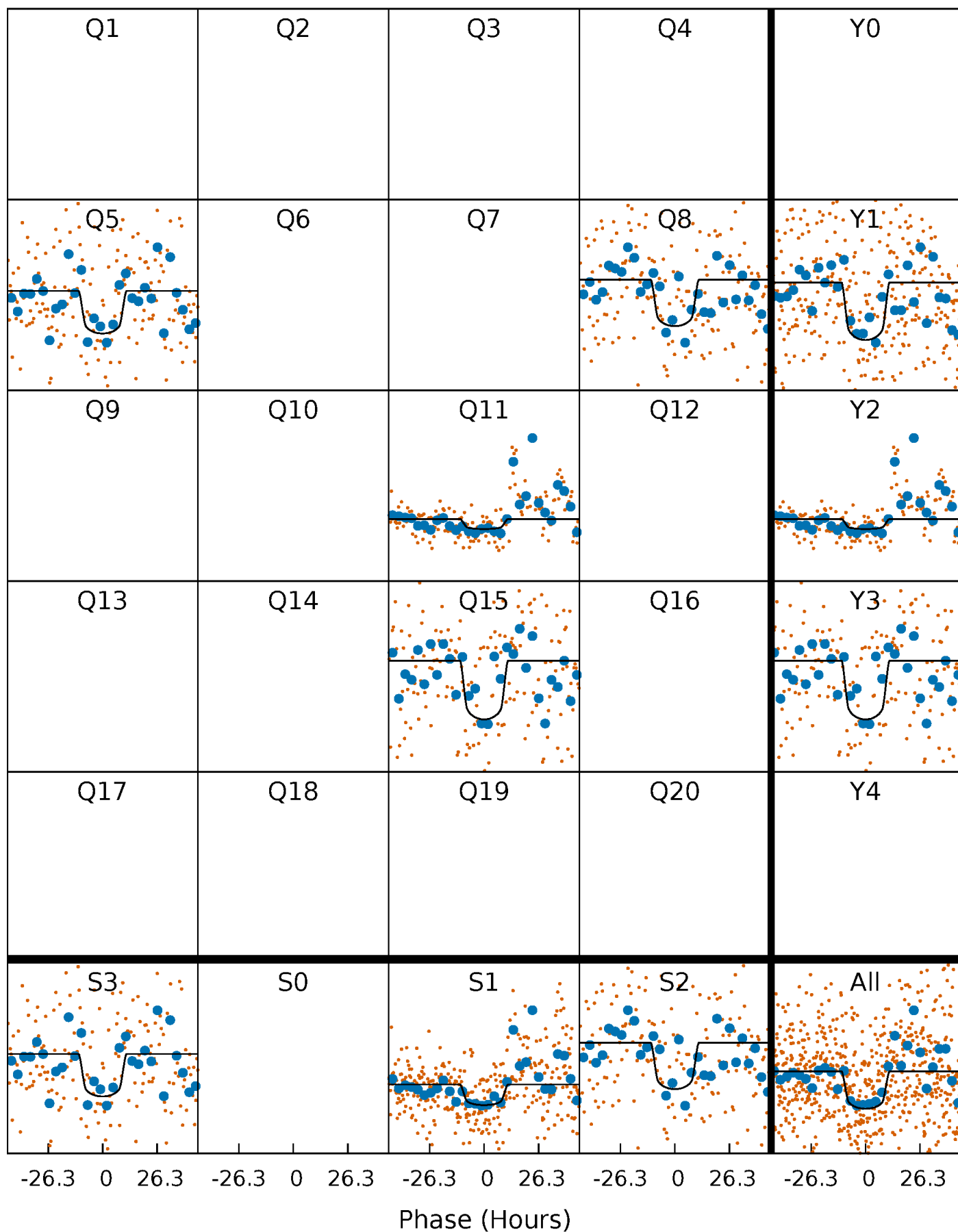
TCE 009406936-01 P=304.156510 Days  $T_0=183.452630$  (BKJD)





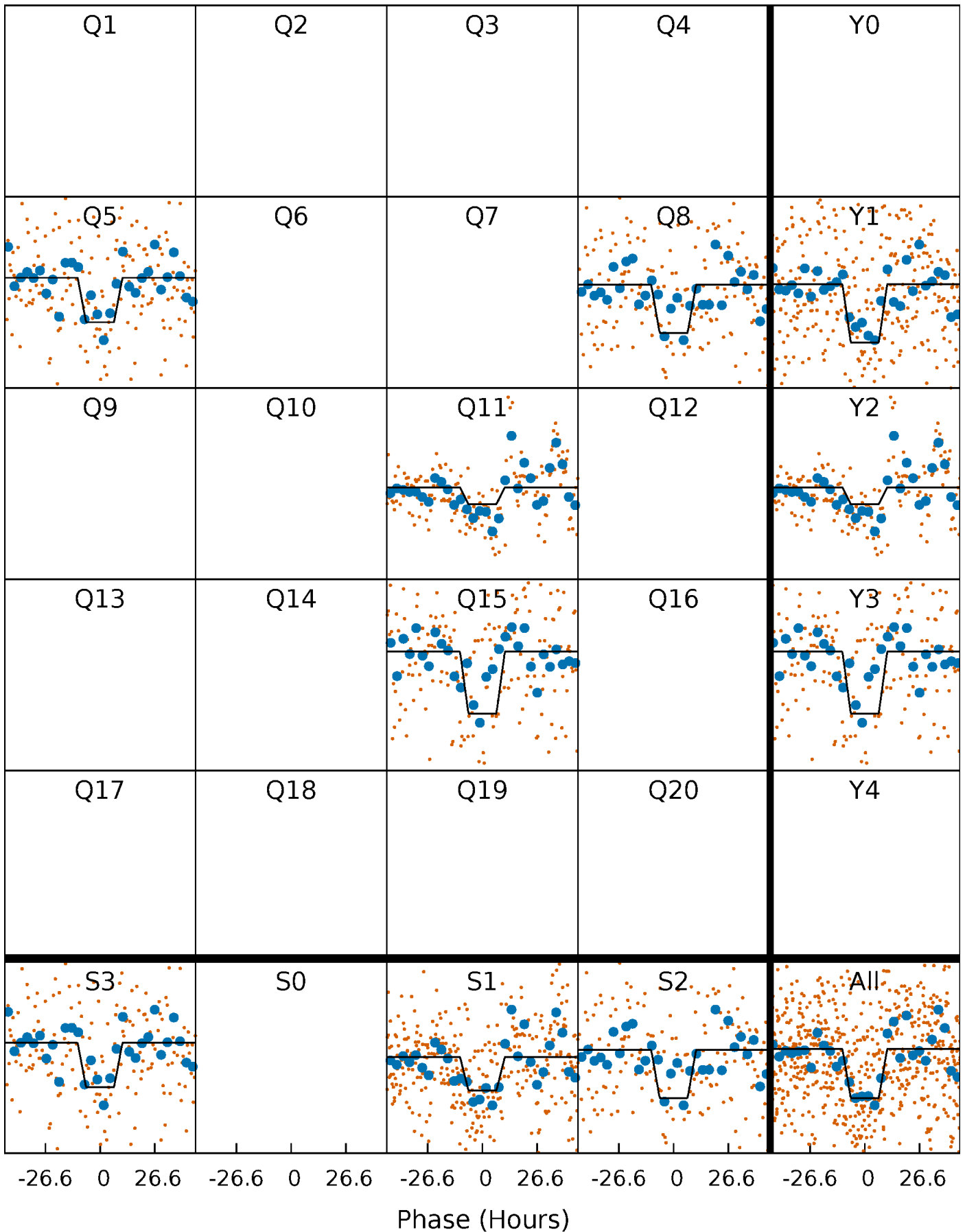
# DV Quarter-Phased Transit Curves

TCE 009406936-01     $P=304.156510$  Days     $T_0=183.452630$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

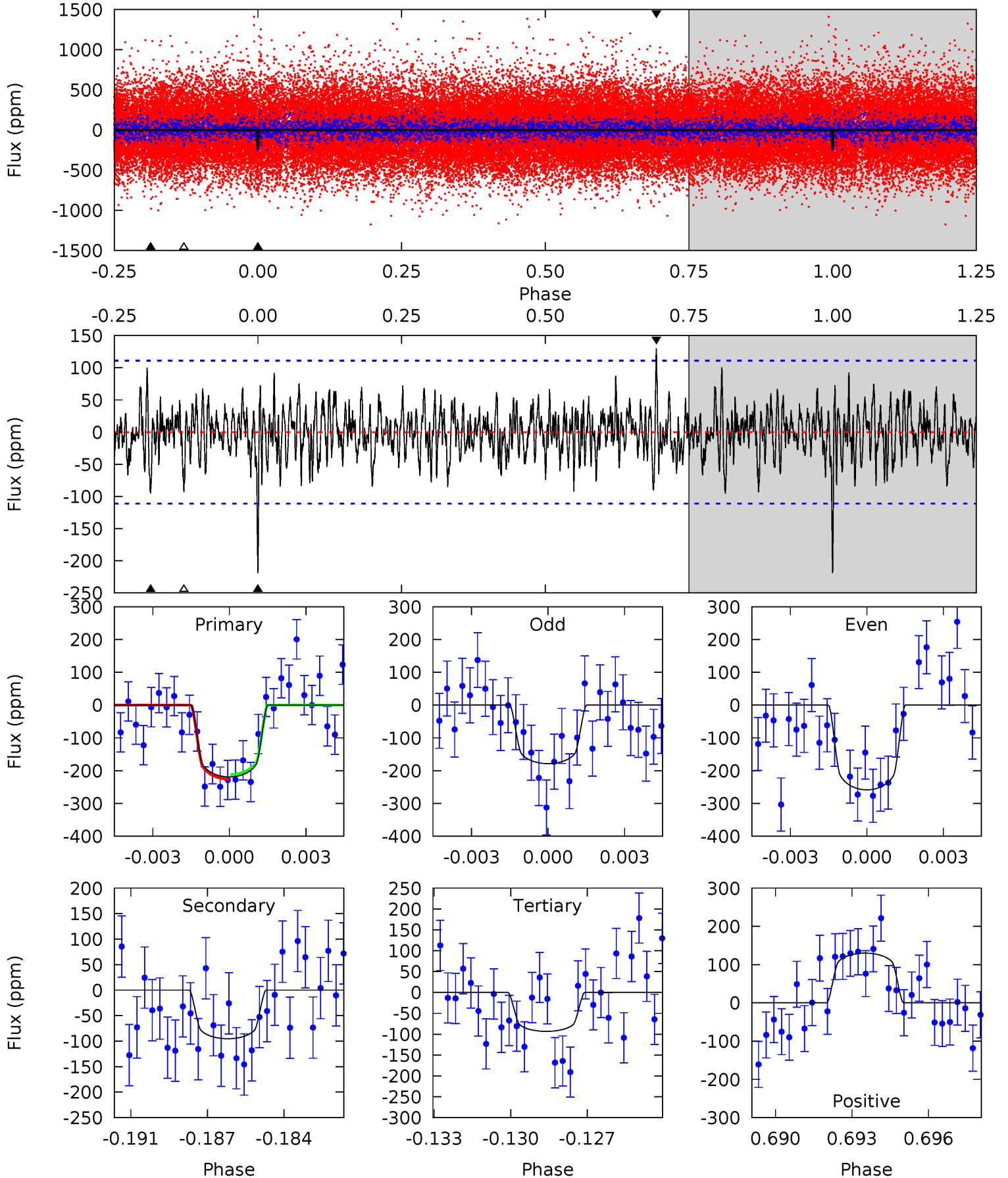
TCE 009406936-01 P=304.194408 Days  $T_0=183.380581$  (BKJD)



# DV Model-Shift Uniqueness Test

009406936-01, P = 304.156510 Days, E = 183.452630 Days

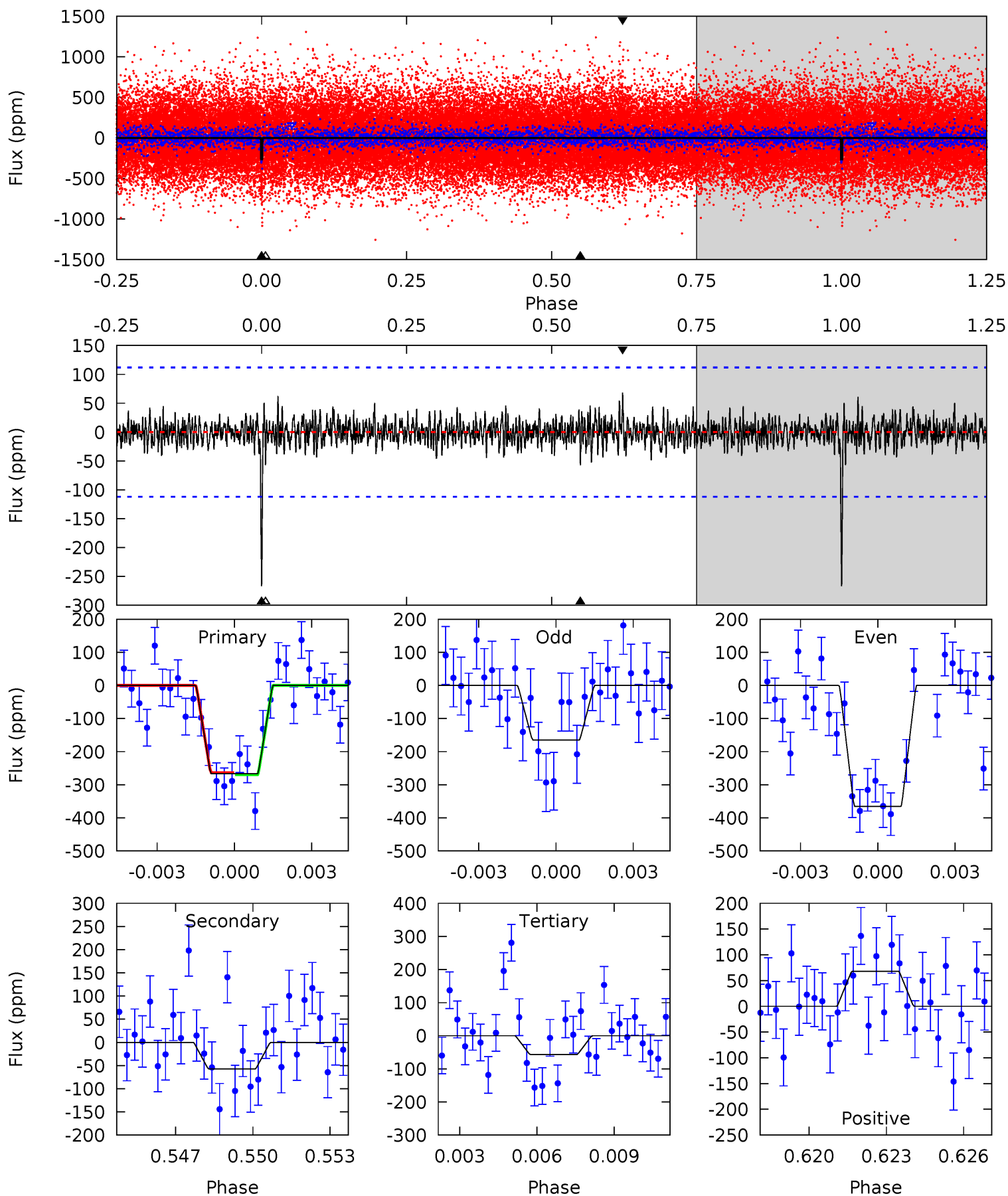
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
10.3	4.50	4.40	6.14	5.24	2.95	1.46	5.94	4.21	0.09	-1.64	1.88	1.12	0.37	0.32



# Alt Model-Shift Uniqueness Test

009406936-01, P = 304.194408 Days, E = 183.380581 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	2.69	2.67	3.19	5.25	2.97	0.78	9.84	9.32	0.02	-0.50	4.71	1.29	0.20	0.14



### Stellar Parameters For KIC 009406936

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5865^{+175}_{-193}$	$4.529^{+0.060}_{-0.180}$	$-0.420^{+0.300}_{-0.300}$	$0.842^{+0.236}_{-0.094}$	$0.875^{+0.109}_{-0.089}$	$2.062^{+0.621}_{-0.995}$
	+3%/-3%	+1%/-4%	+71%/-71%	+28%/-11%	+12%/-10%	+30%/-48%
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 009406936-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-95 \pm 21$	$1.76^{+0.33}_{-0.26}$	$367^{+25}_{-18}$	$4461^{+333}_{-312}$	$12071^{+5629}_{-4236}$
Alt.	$-57 \pm 21$	$1.59^{+0.26}_{-0.25}$	$367^{+24}_{-17}$	$4217^{+363}_{-373}$	$8881^{+5332}_{-3713}$

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

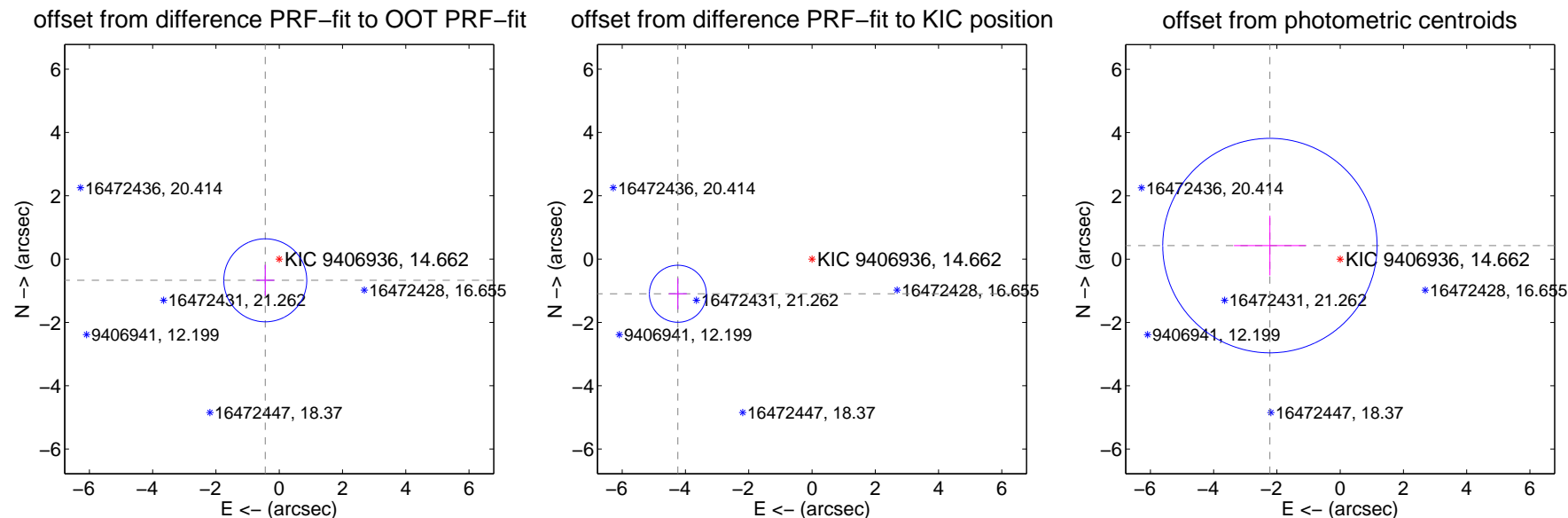
## DV Centroid Data

Supplemental centroid analysis for 009406936-01. Kepler magnitude: 14.66. Transit SNR 7.69

There are 1 quarters with good PRF difference image offsets

The OOT PRF centroid is offset from the target star catalog position by about 3.82 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	$0.802 \pm 0.437$	1.84	$0.440 \pm 0.283$	$-0.670 \pm 0.489$
PRF-fit source offset from KIC position	<b><math>4.379 \pm 0.300</math></b>	<b>14.59</b>	$4.240 \pm 0.283$	$-1.095 \pm 0.489$
photometric centroid source offset	$2.26 \pm 1.13$	2.00	$2.22 \pm 1.14$	$0.43 \pm 0.94$



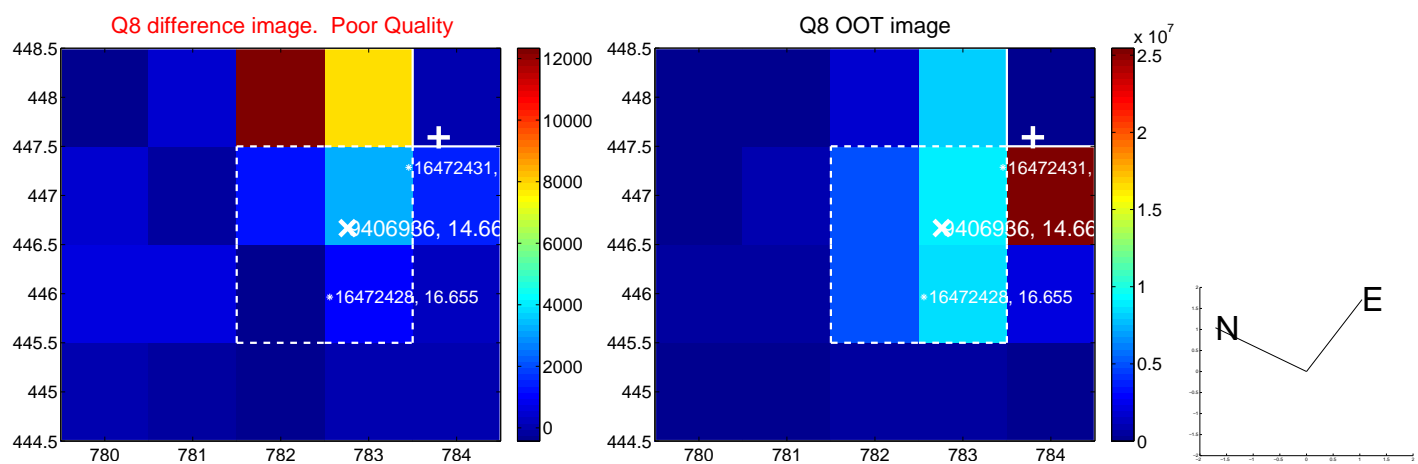
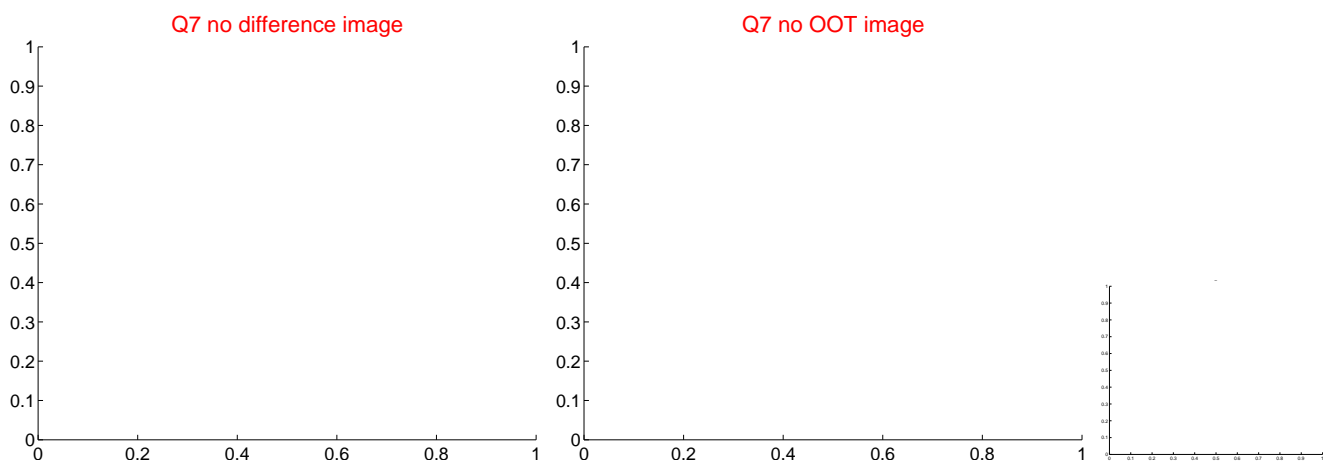
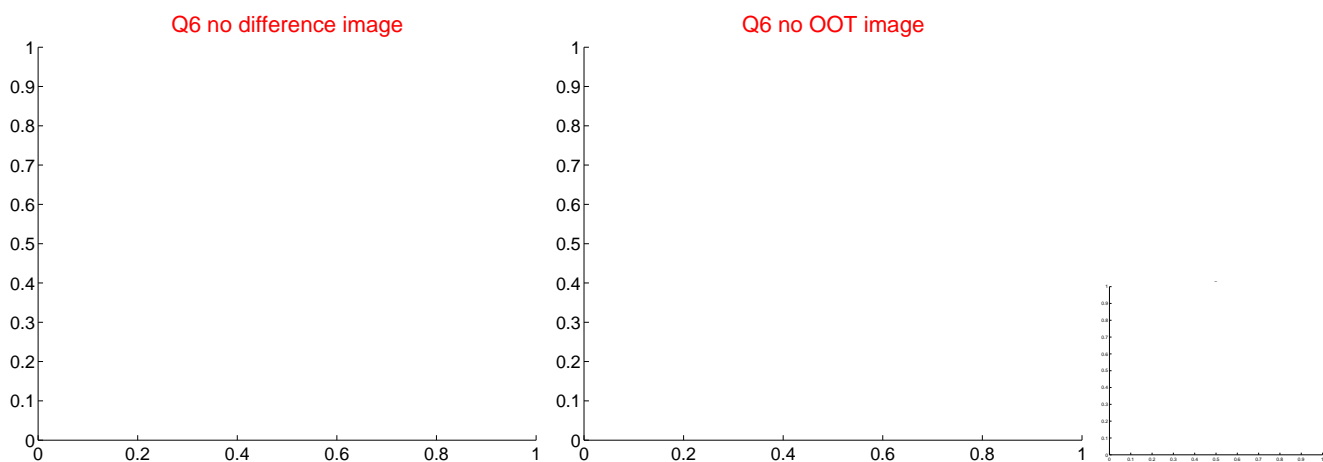
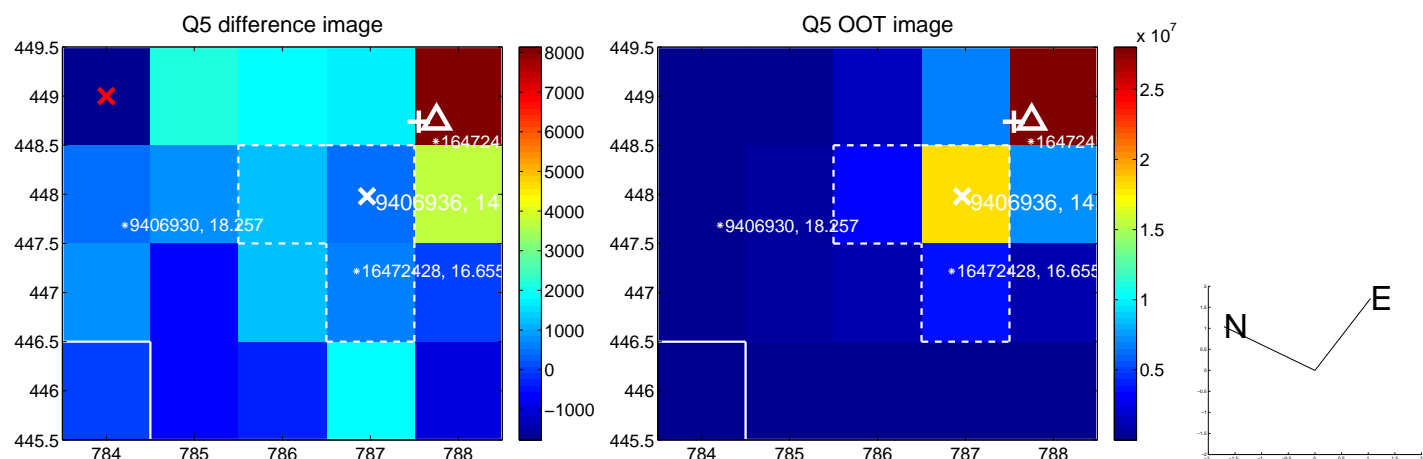
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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





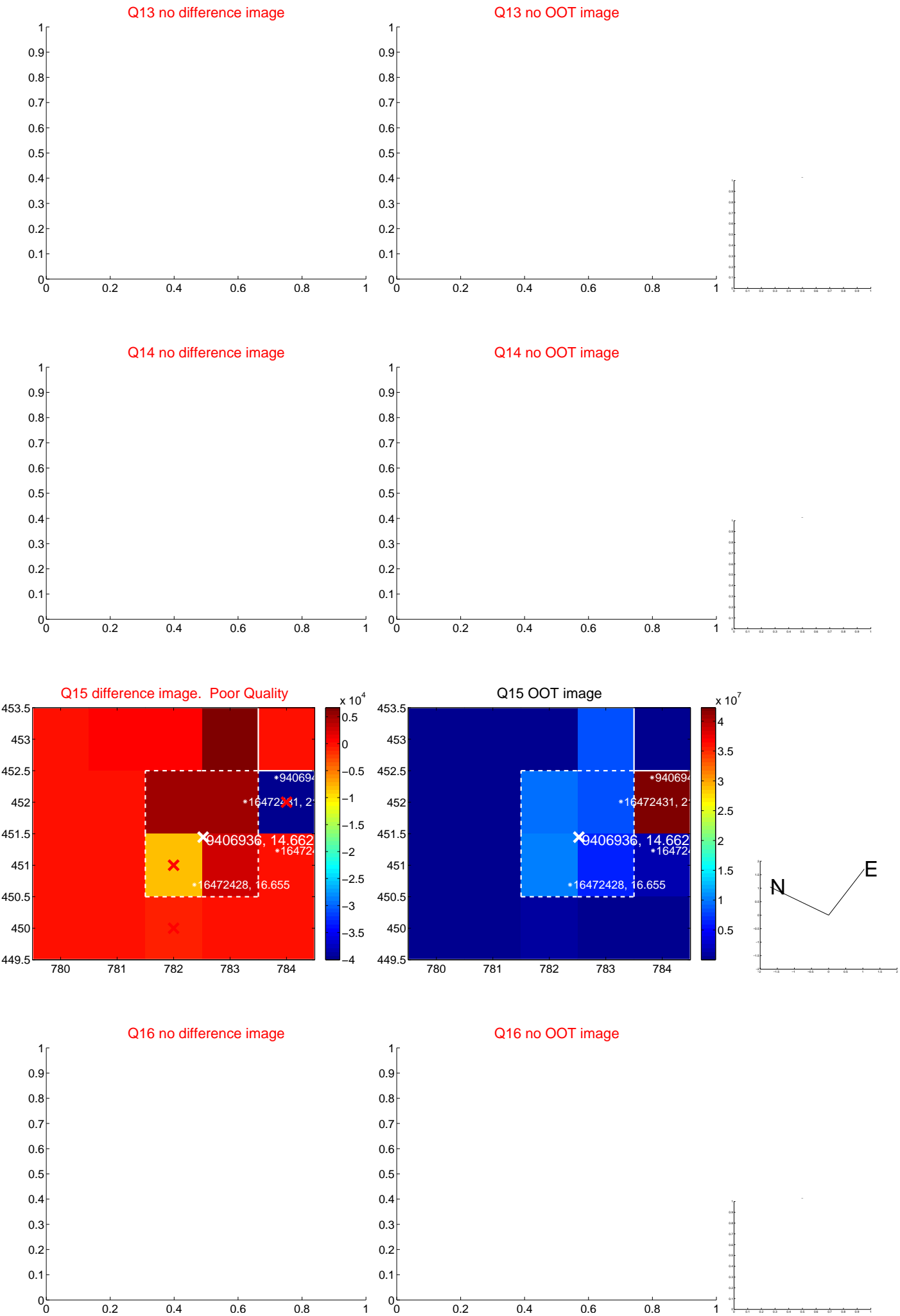
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



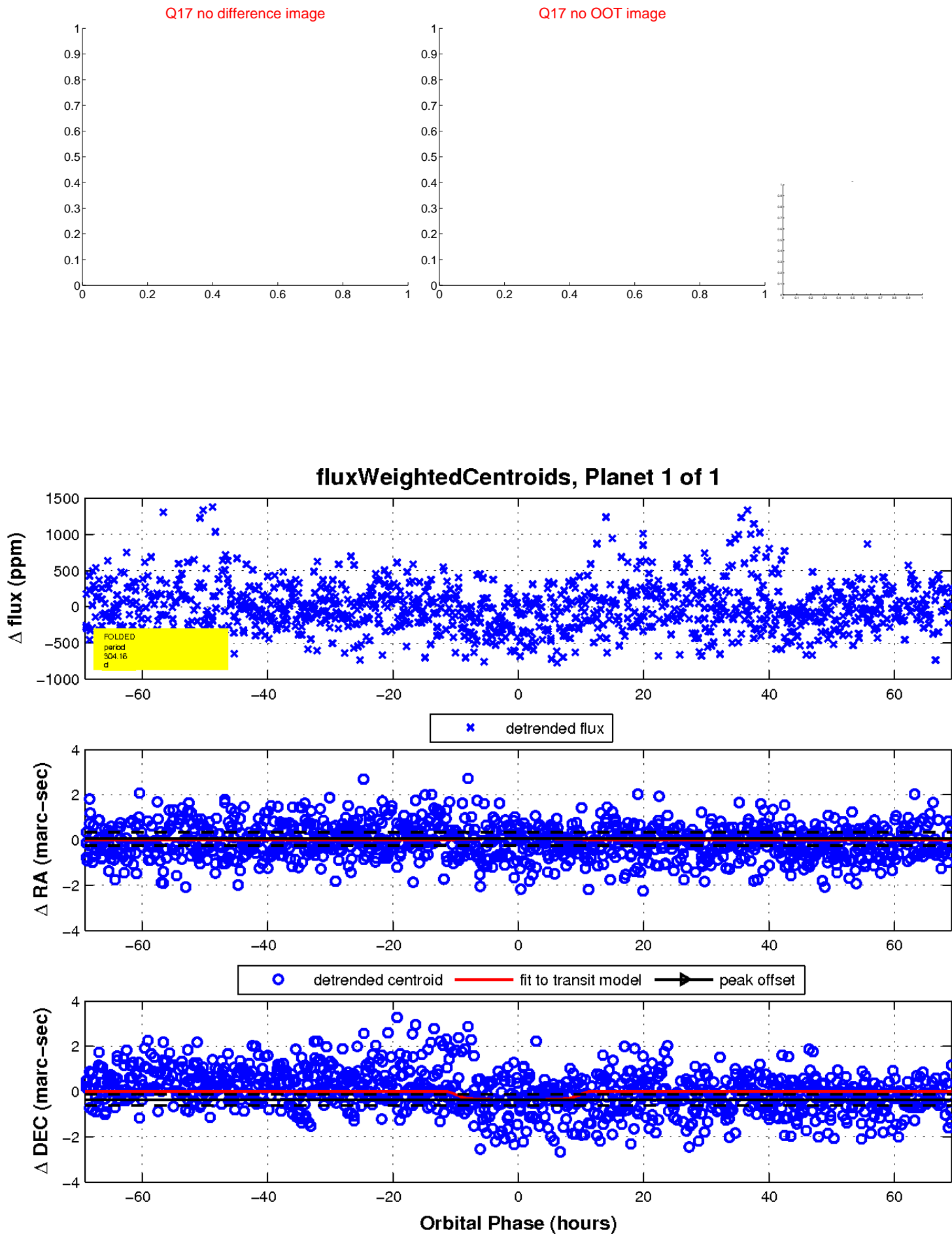
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.



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



UKIRT Image

