

# KIC 002438406

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
002438406-01	OBS	4941.01	262.713824	134.359565	1649.3	7.869	7.4	7.4	0.99	5398	4.06	1.29

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
002438406-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_SKYE—MOD_NONUNIQ_ALT—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.

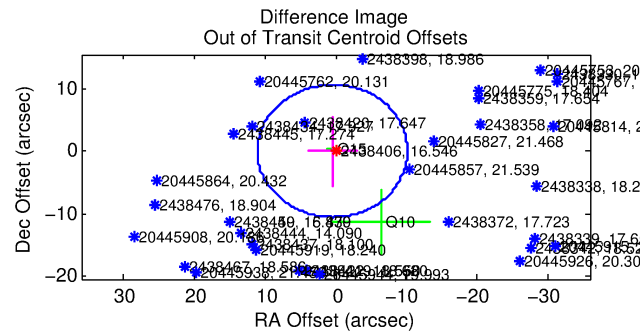
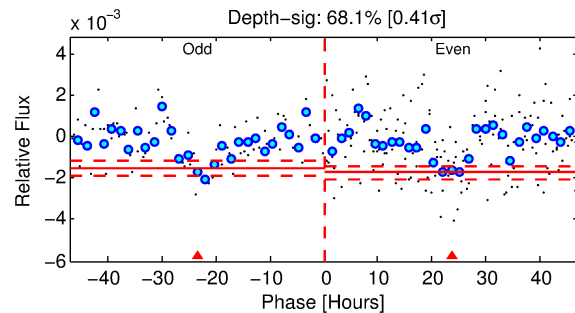
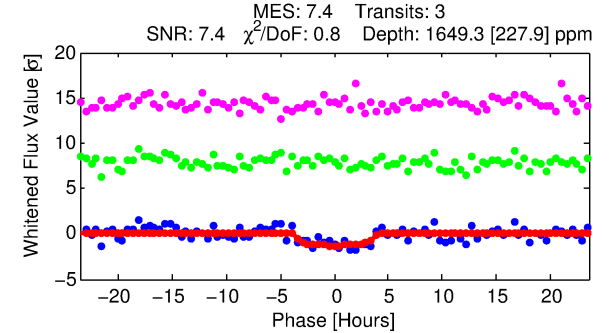
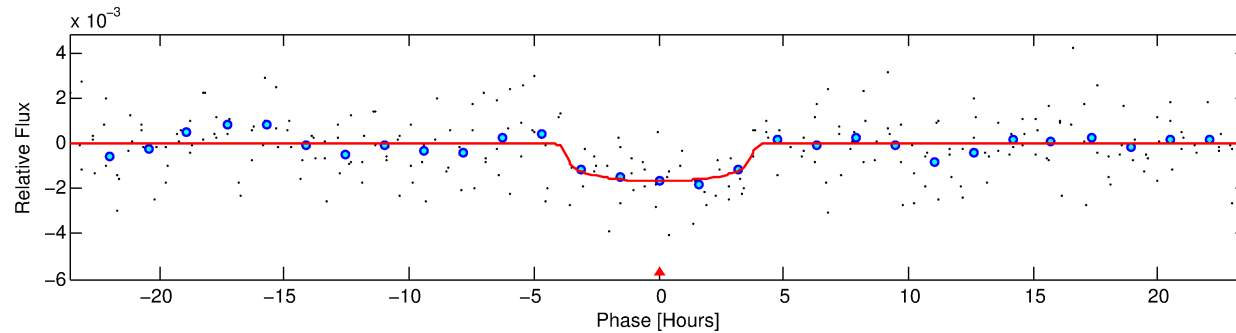
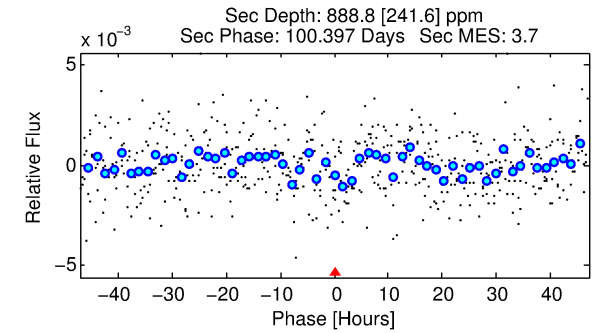
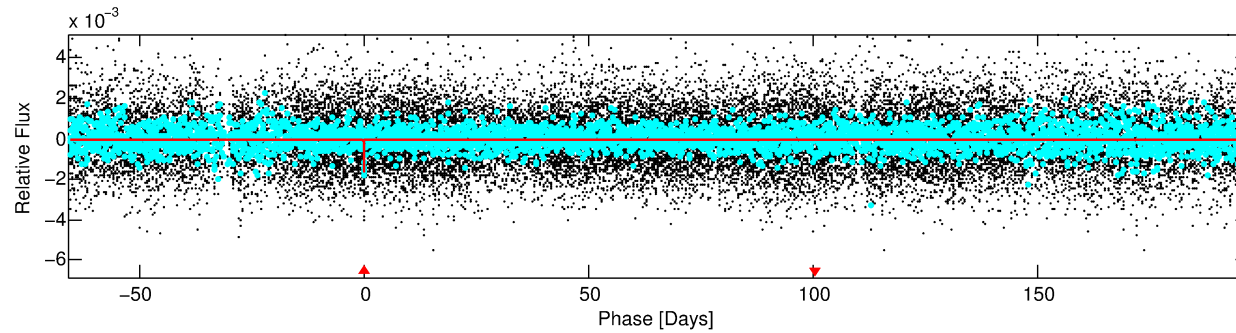
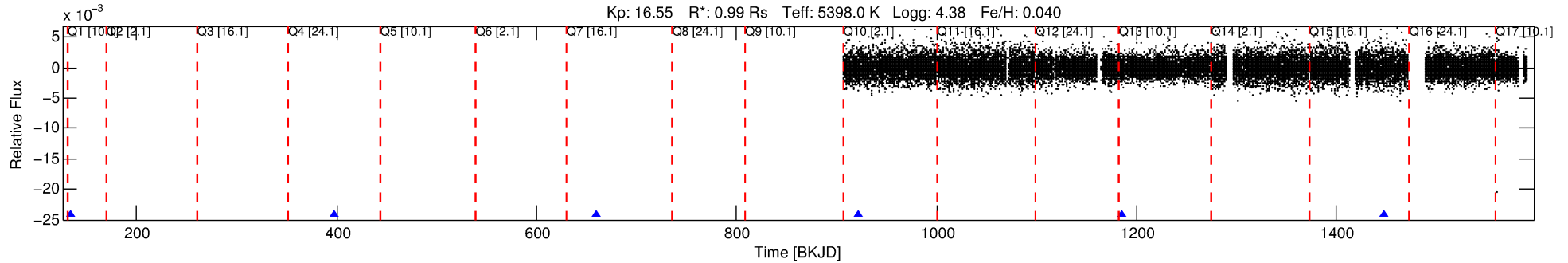
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 002438406-01

No Significant Match Found

# DV One-Page Summary

KIC: 2438406 Candidate: 1 of 1 Period: 262.714 d  
KOI: K04941.01 Corr: 0.974



## DV Fit Results:

Period = 262.71382 [0.01399] d  
Epoch = 134.3596 [0.0563] BKJD  
Rp/R\* = 0.0376 [0.0609]  
a/R\* = 236.64 [1473.28]  
b = 0.46 [10.63]  
Seff = 1.29 [0.51]  
Teq = 272 [27] K  
Rp = 4.06 [6.68] Re  
a = 0.7599 [0.1885] AU  
Ag = 17152.06 [56200.69] [0.31σ]  
Teffp = 4809 [3918] K [1.16σ]

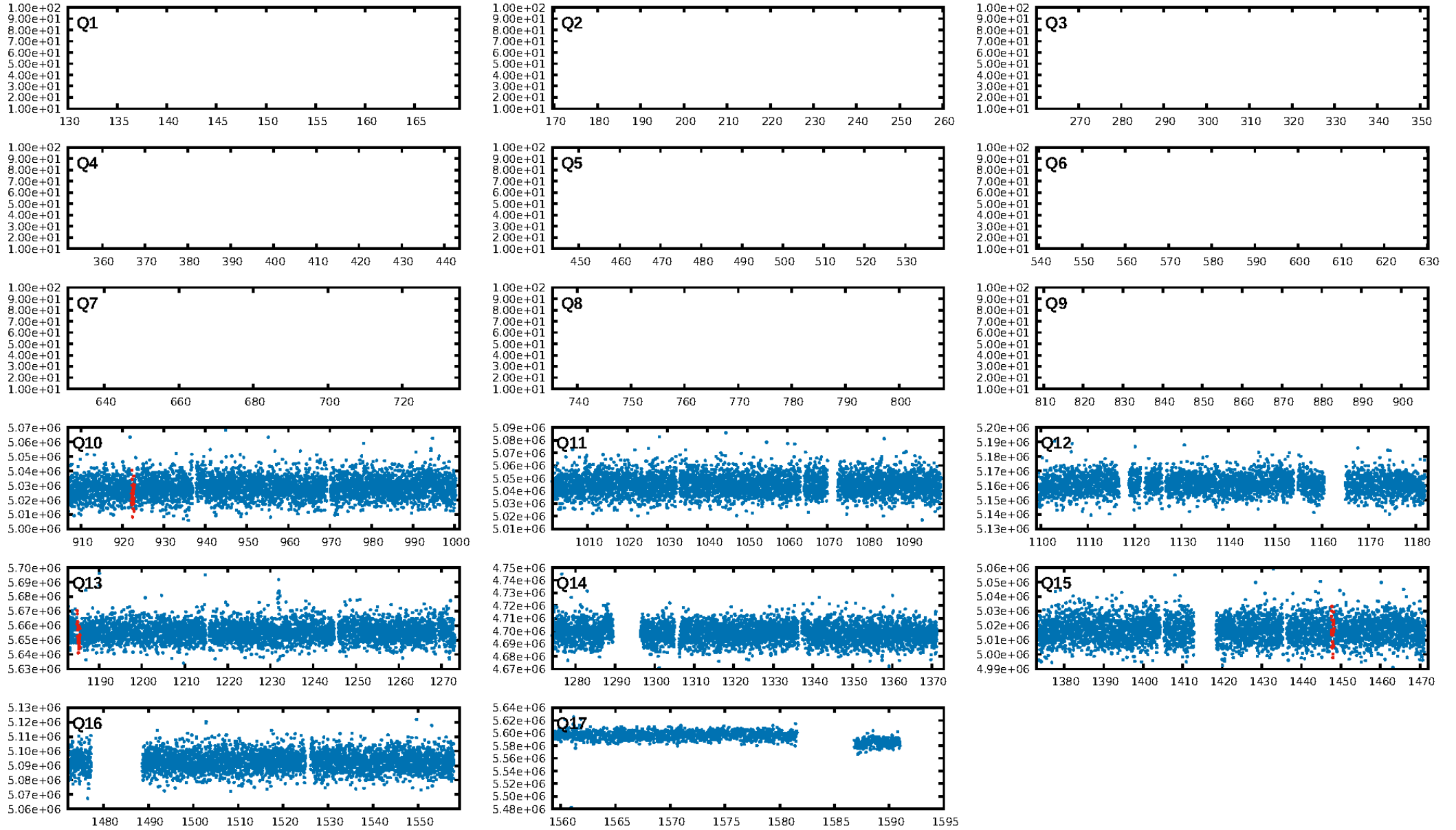
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 59.5%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 4.93e-13  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: -96.73  
Centroid-sig: 74.4%  
Centroid-so: 0.878 arcsec [0.49σ]  
OotOffset-rm: 0.449 arcsec [0.13σ]  
OotOffset-st: 1/1/0/0 [2]  
KicOffset-rm: 1.200 arcsec [0.21σ]  
KicOffset-st: 1/1/0/0 [2]  
DiffImageQuality-fgm: 0.50 [1/2]  
DiffImageOverlap-fno: 1.00 [2/2]

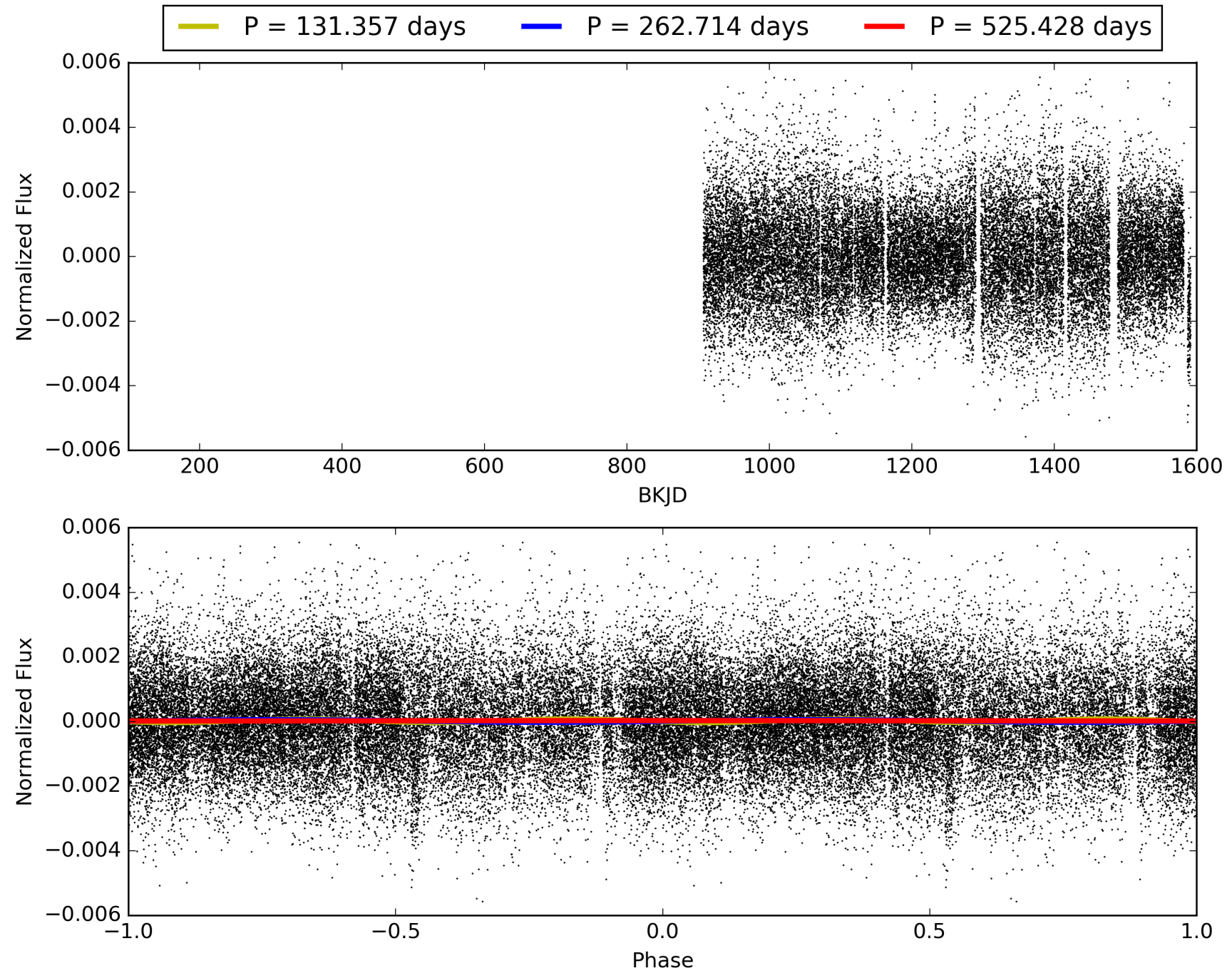
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 12:01:27 Z

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

# TCE 002438406-01, PDC Light Curves

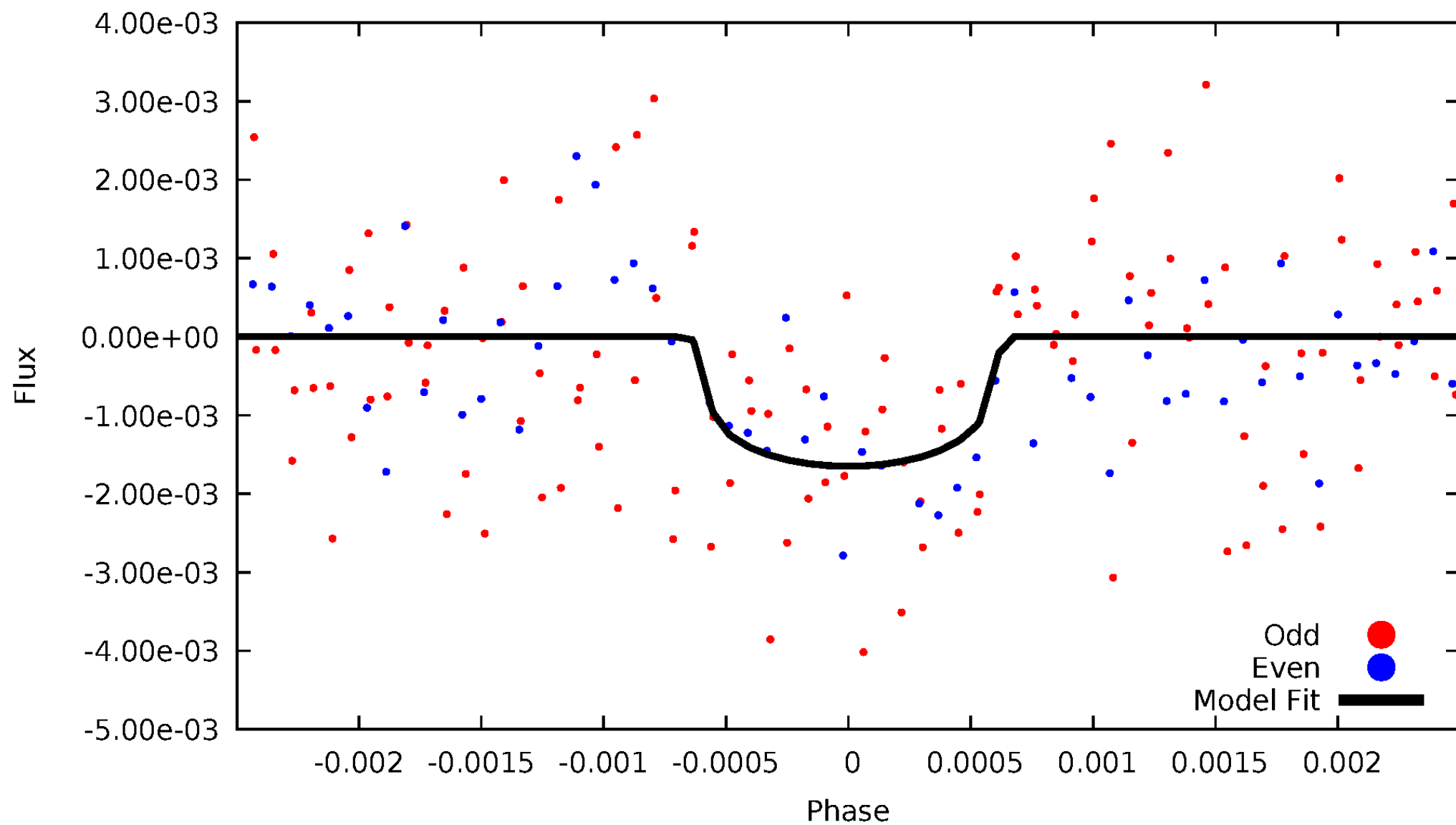


TCE 002438406-01



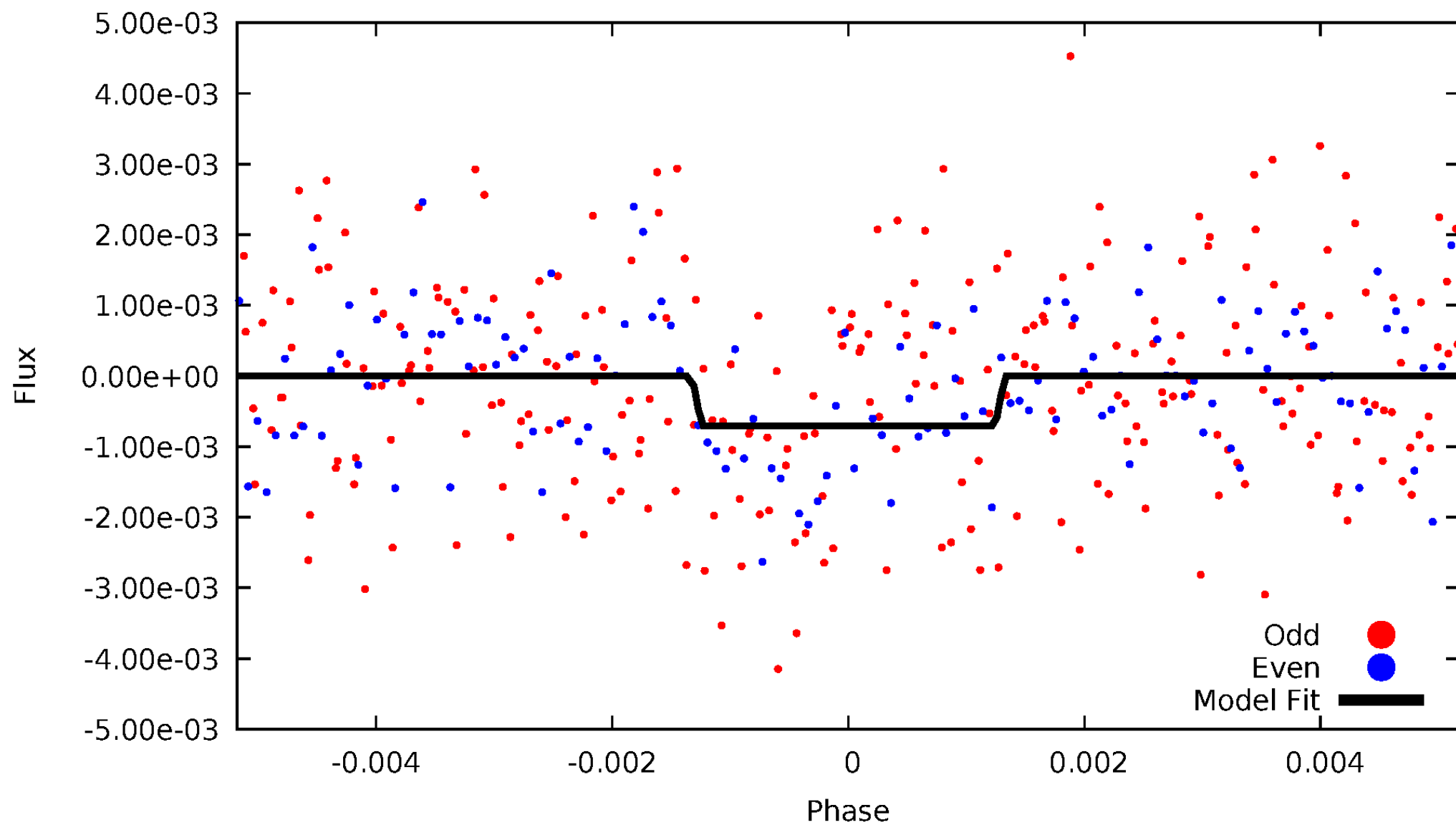
# DV Odd/Even

TCE 002438406-01



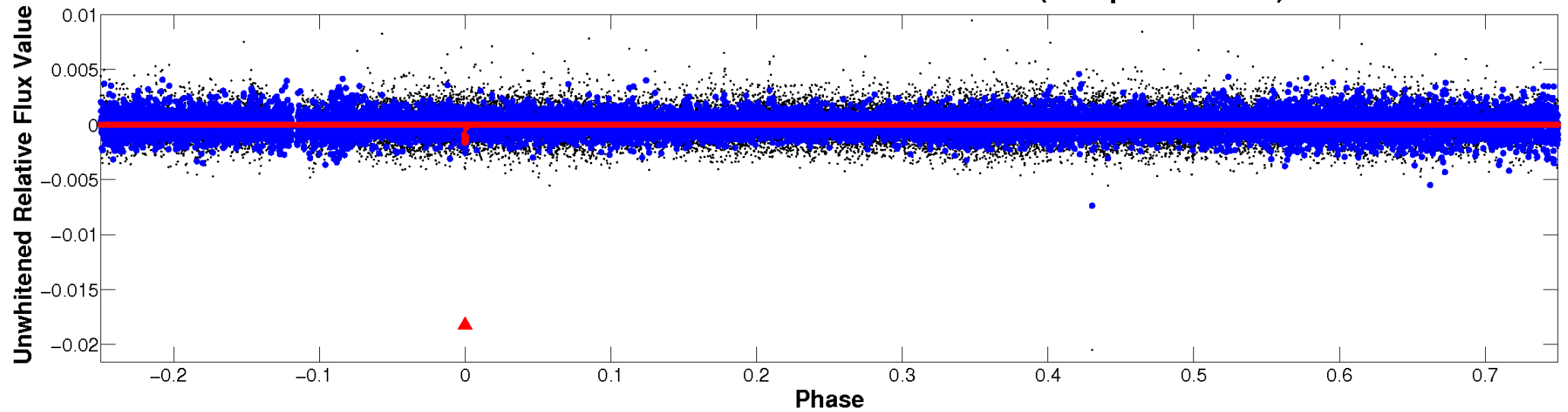
# ALT Odd/Even

TCE 002438406-01

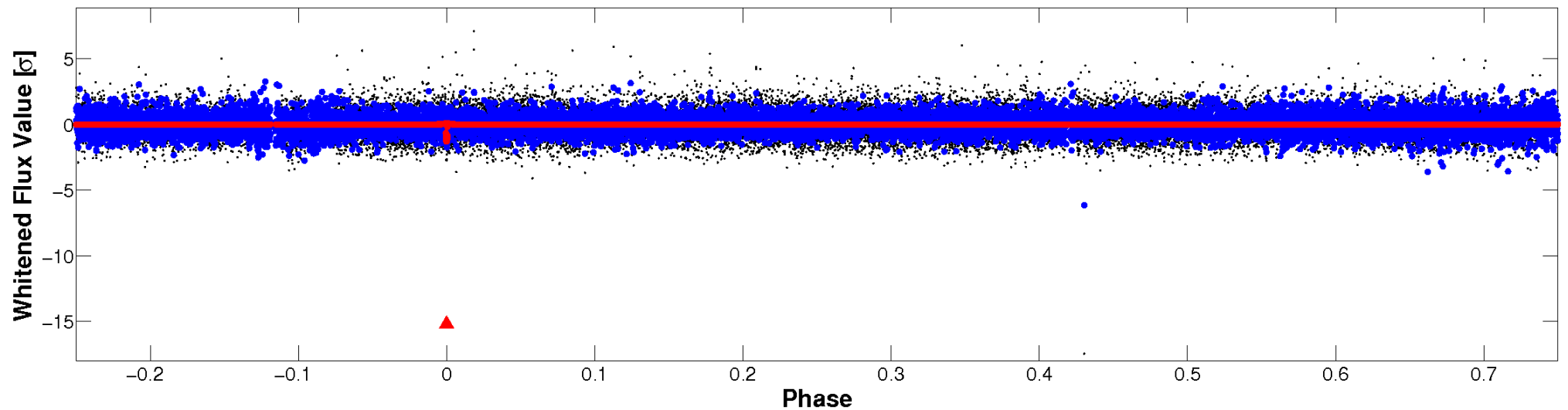


# Non-Whitened Vs. Whitened Light Curve

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

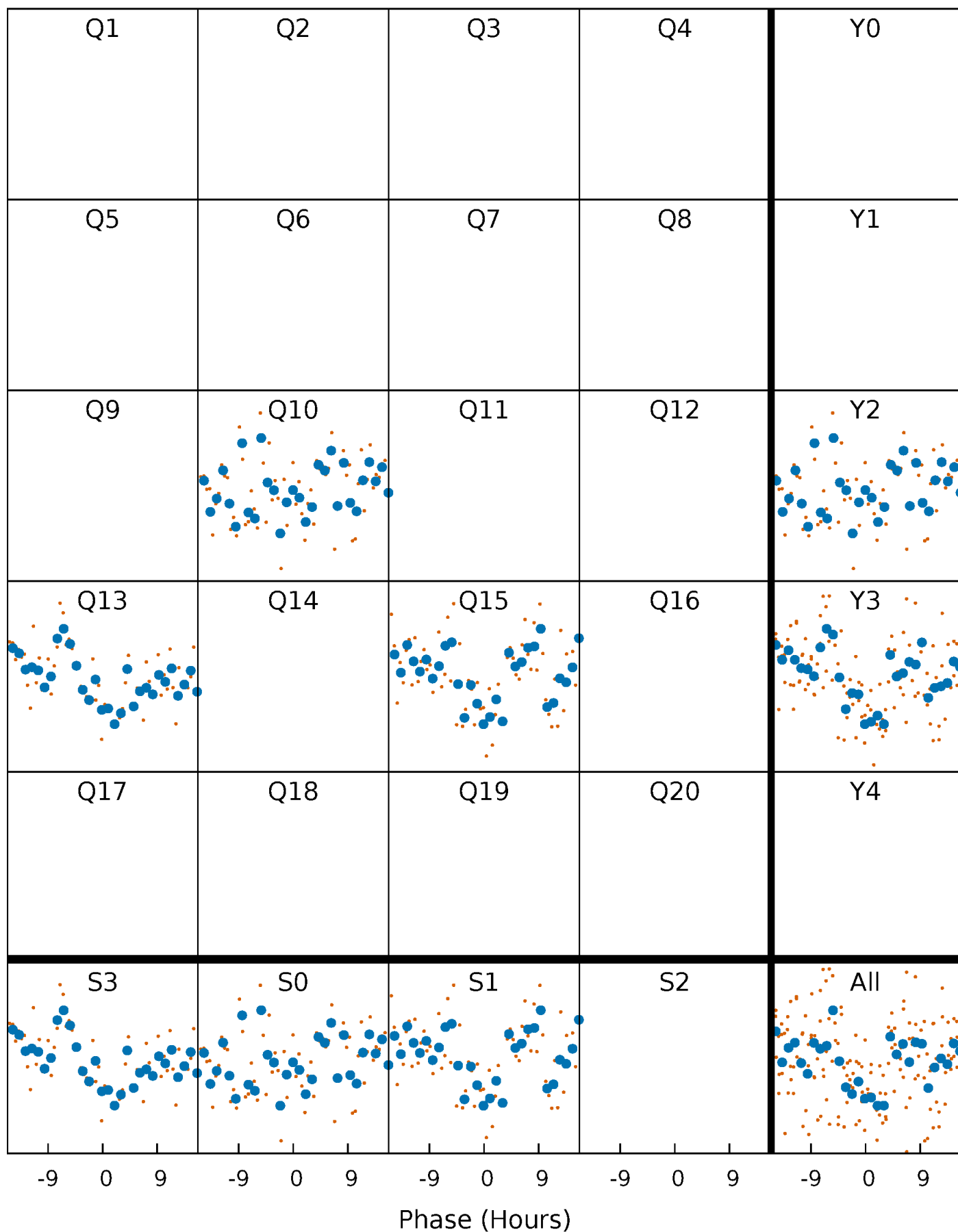


**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

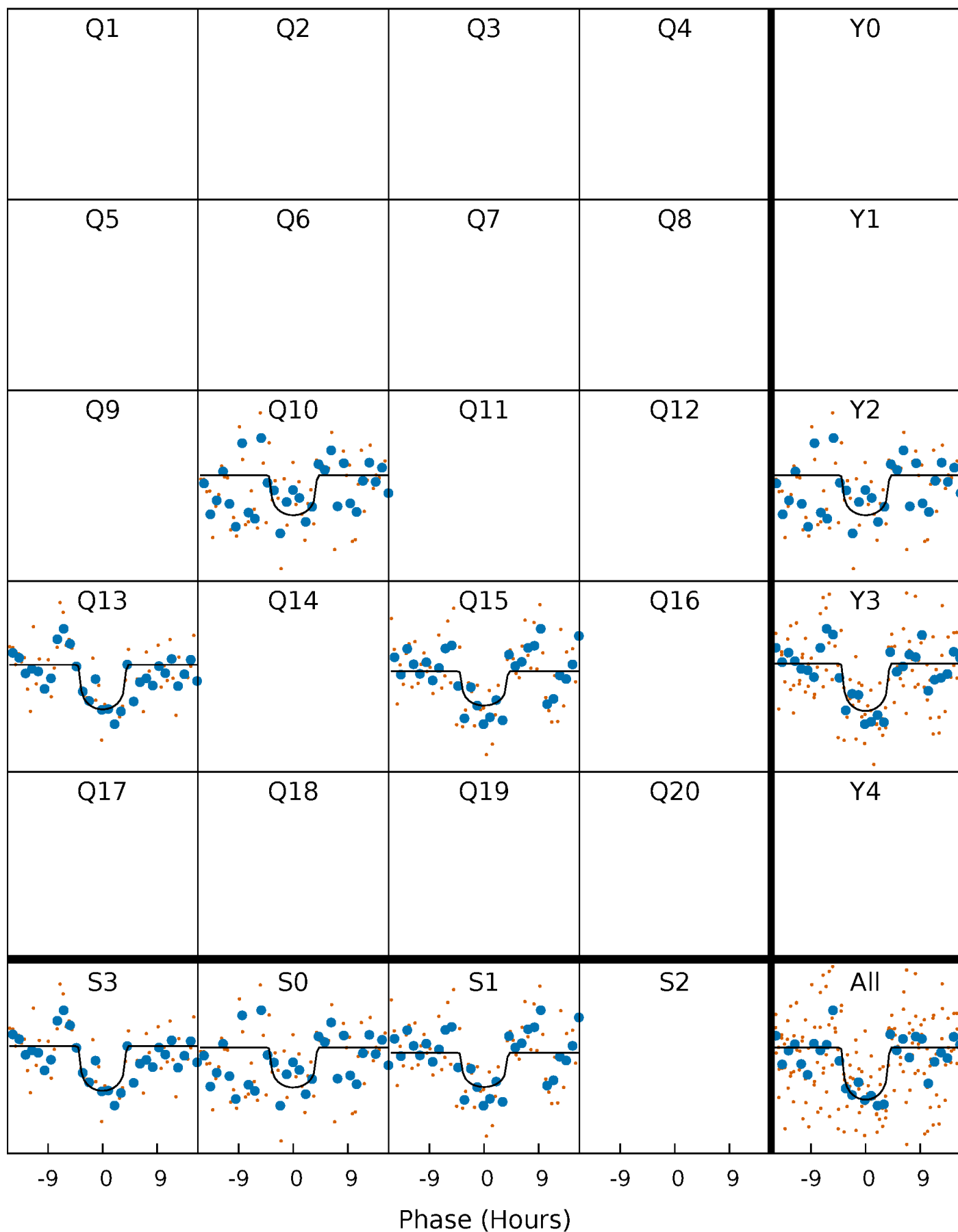
TCE 002438406-01 P=262.713824 Days  $T_0=134.359565$  (BKJD)





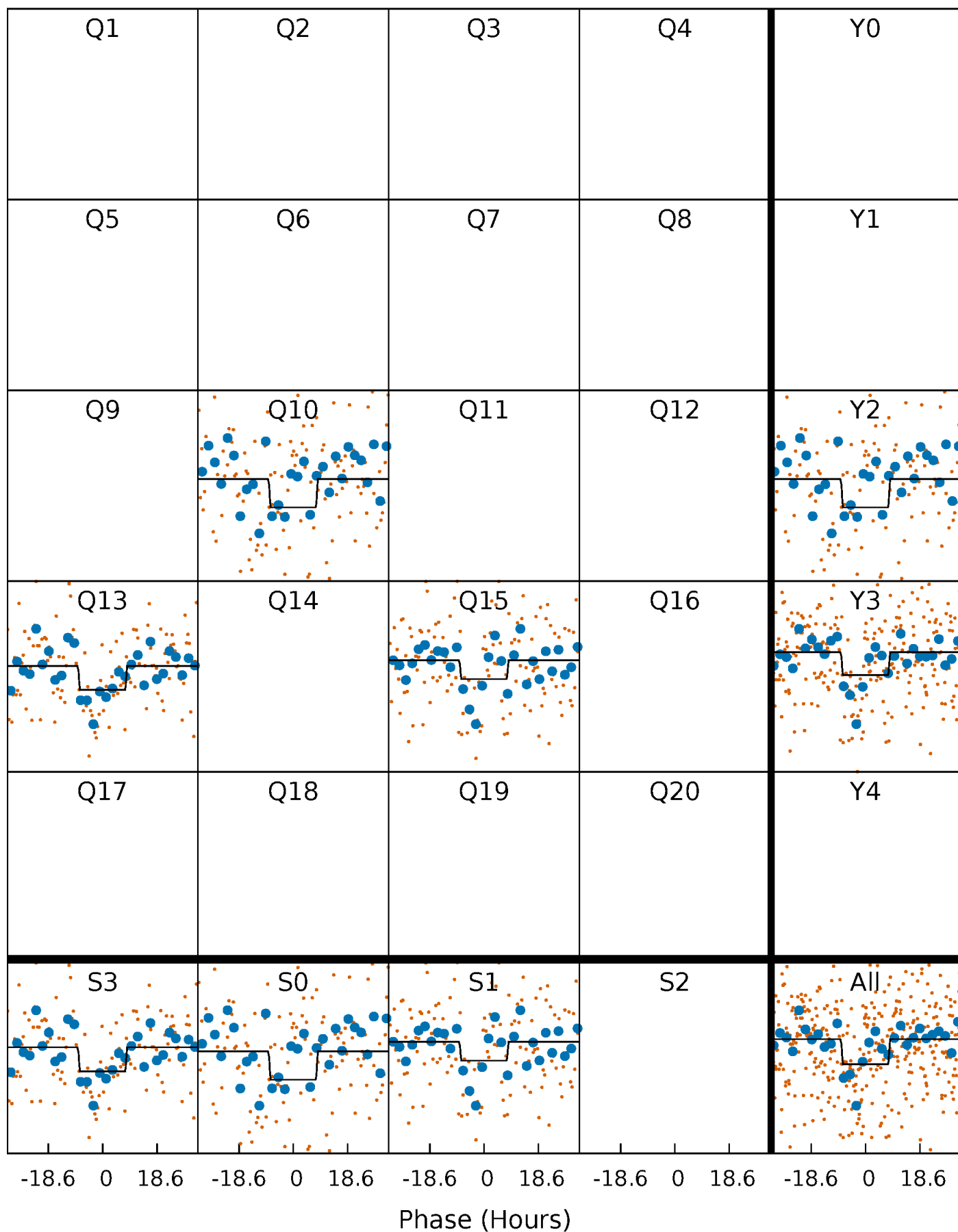
# DV Quarter-Phased Transit Curves

TCE 002438406-01 P=262.713824 Days  $T_0=134.359565$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

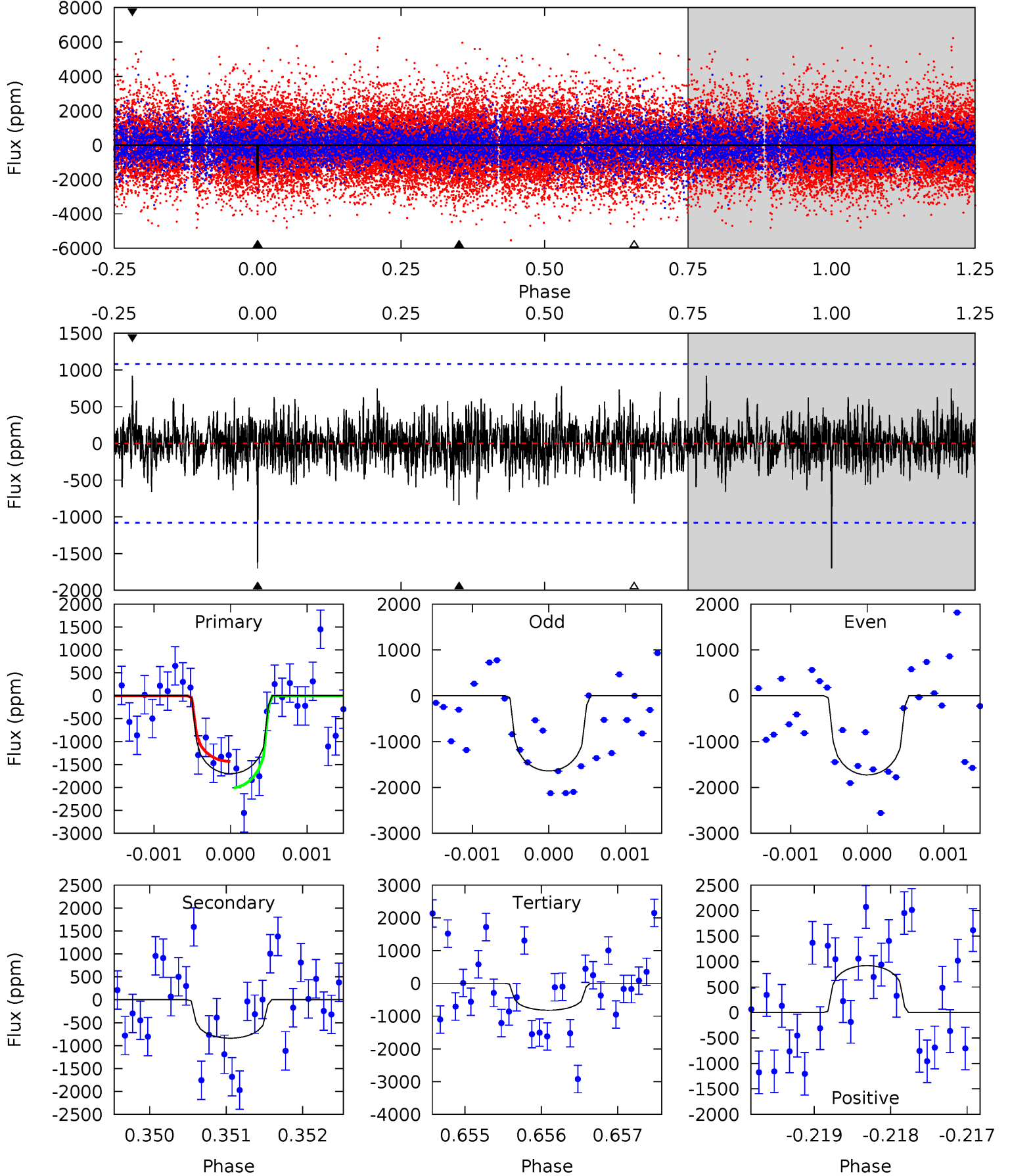
TCE 002438406-01 P=262.700658 Days  $T_0=134.597636$  (BKJD)



# DV Model-Shift Uniqueness Test

002438406-01, P = 262.713824 Days, E = 134.359565 Days

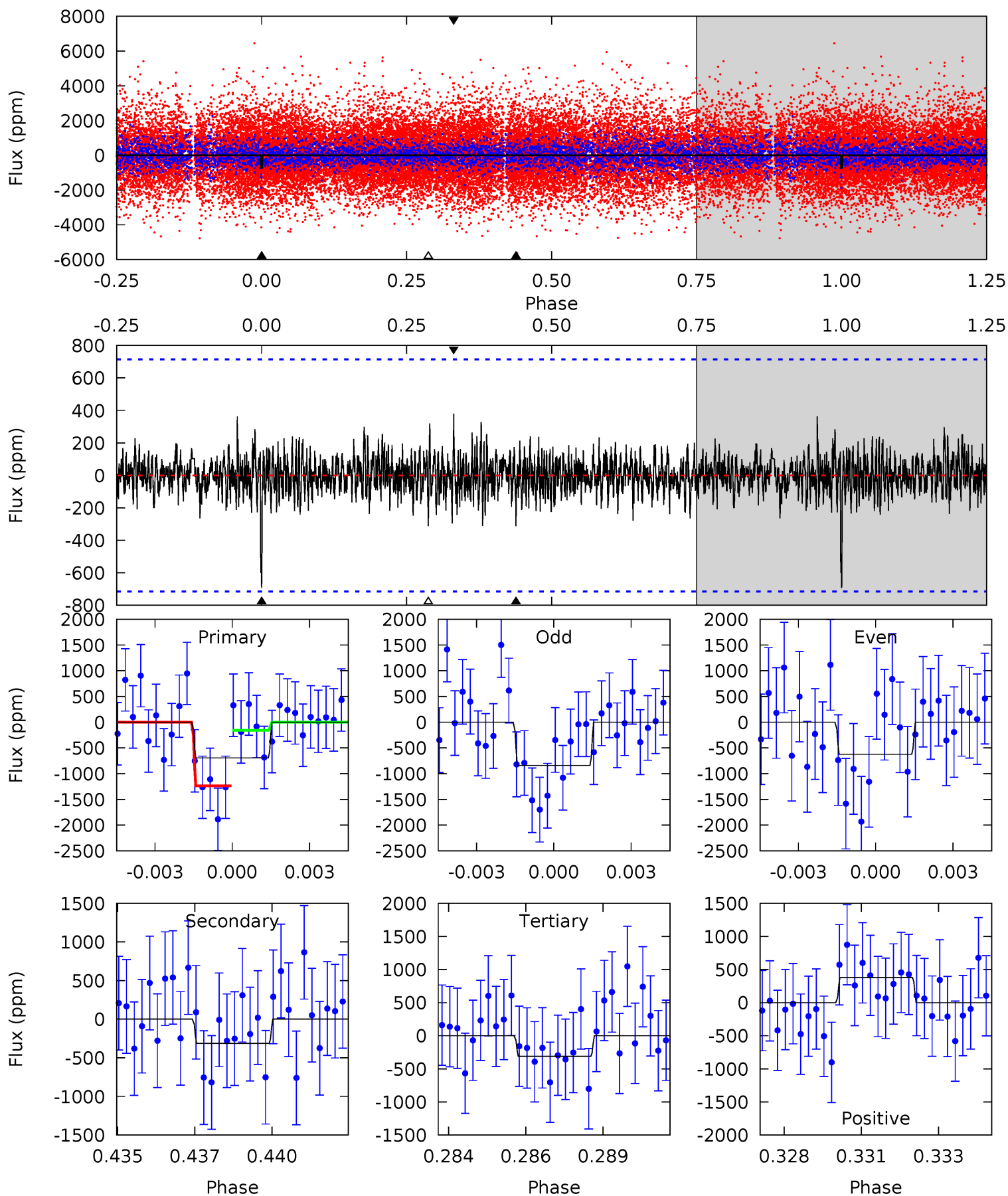
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.52	4.20	4.11	4.62	5.41	3.23	1.09	4.41	3.91	0.09	-0.41	0.21	1.04	0.35	1.44



# Alt Model-Shift Uniqueness Test

002438406-01, P = 262.700658 Days, E = 134.597636 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
5.12	2.31	2.30	2.80	5.28	3.01	0.67	2.81	2.32	0.01	-0.49	0.77	0.83	0.35	3.98



### Stellar Parameters For KIC 002438406

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5398^{+187}_{-168}$	$4.375^{+0.171}_{-0.209}$	$0.040^{+0.250}_{-0.250}$	$0.990^{+0.281}_{-0.164}$	$0.847^{+0.117}_{-0.063}$	$1.231^{+0.971}_{-0.620}$
	+3%/-3%	+4%/-5%	+625%/-625%	+28%/-17%	+14%/-7%	+79%/-50%
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 002438406-01 / KOI 4941.01

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-838 \pm 199$	$6.79^{+5.80}_{-4.62}$	$382^{+32}_{-25}$	$4027^{+2526}_{-777}$	$6003^{+48605}_{-4393}$
Alt.	$-313 \pm 135$	$5.38^{+5.90}_{-3.66}$	$380^{+32}_{-24}$	$3589^{+1851}_{-721}$	$3193^{+25093}_{-2556}$

$T_{max}$  = 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

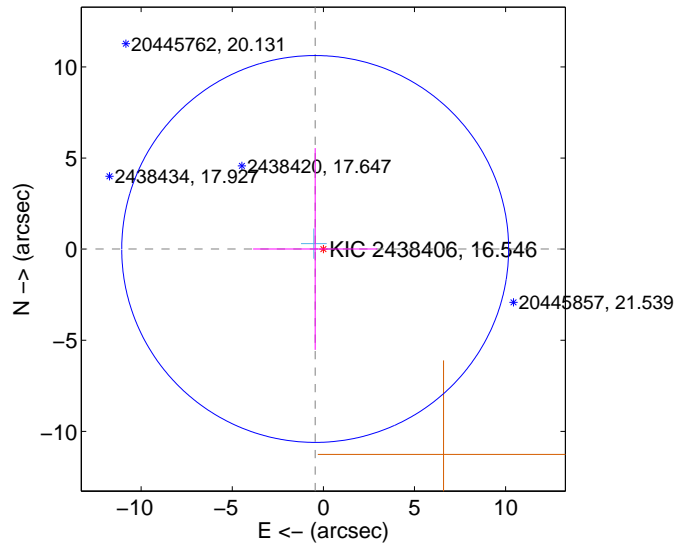
Supplemental centroid analysis for 002438406-01. Kepler magnitude: 16.55. Transit SNR 7.42

There are 1 quarters with good PRF difference image offsets

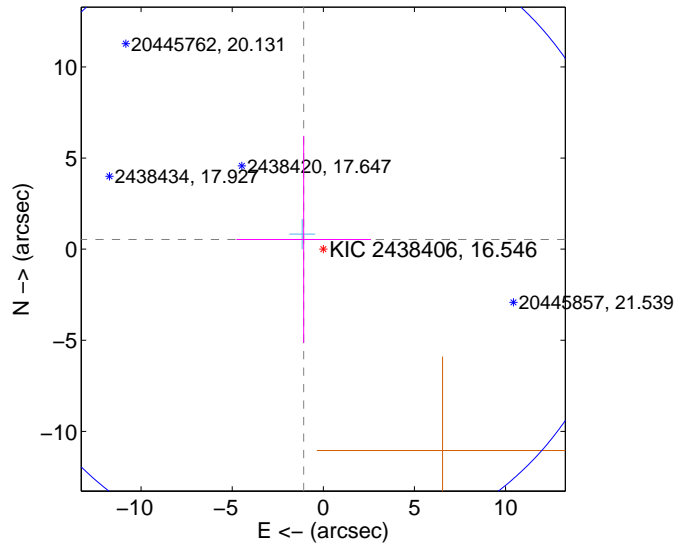
The direct PRF centroid is offset from the target star catalog position by about 0.82 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.449 \pm 3.537$	0.13	$0.449 \pm 3.406$	$0.011 \pm 5.534$
PRF-fit source offset from KIC position	$1.200 \pm 5.817$	0.21	$1.077 \pm 3.687$	$0.530 \pm 5.686$
photometric centroid source offset	$0.88 \pm 1.80$	0.49	$-0.60 \pm 1.77$	$-0.64 \pm 1.84$

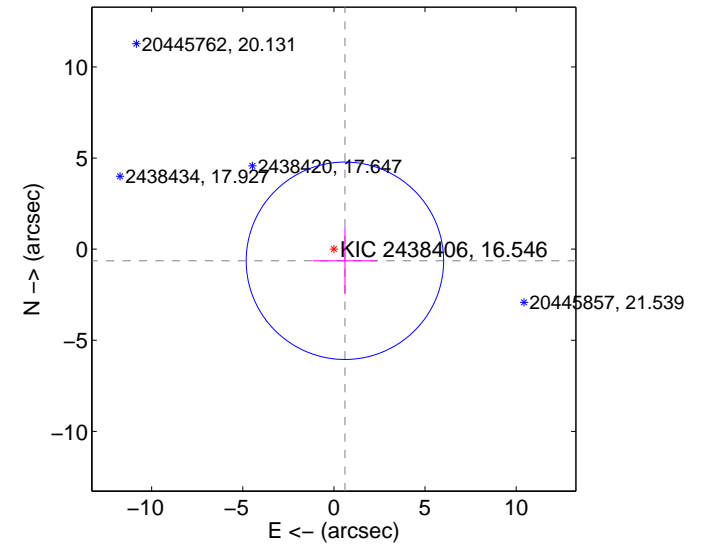
offset from difference PRF-fit to OOT PRF-fit



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.

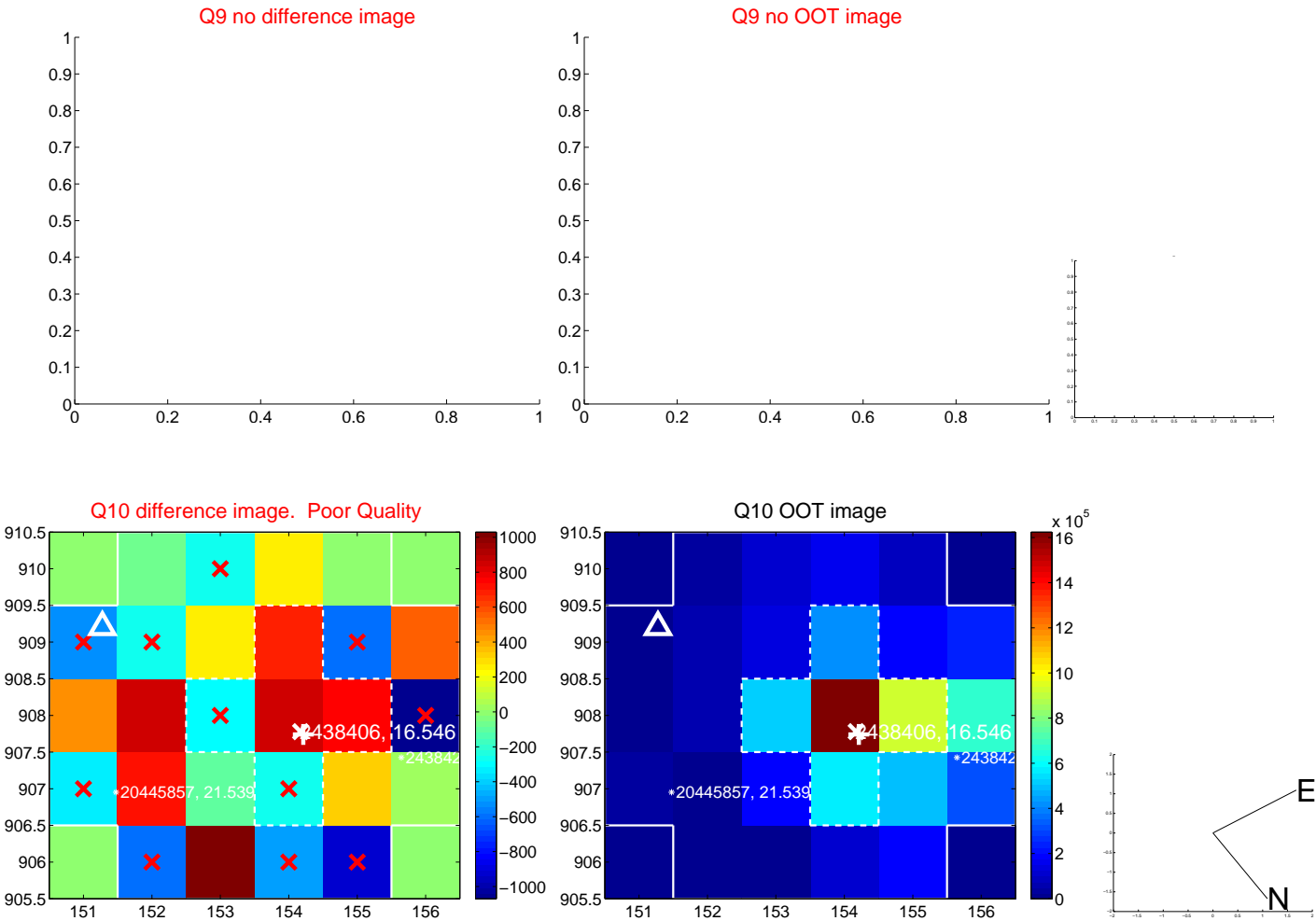


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

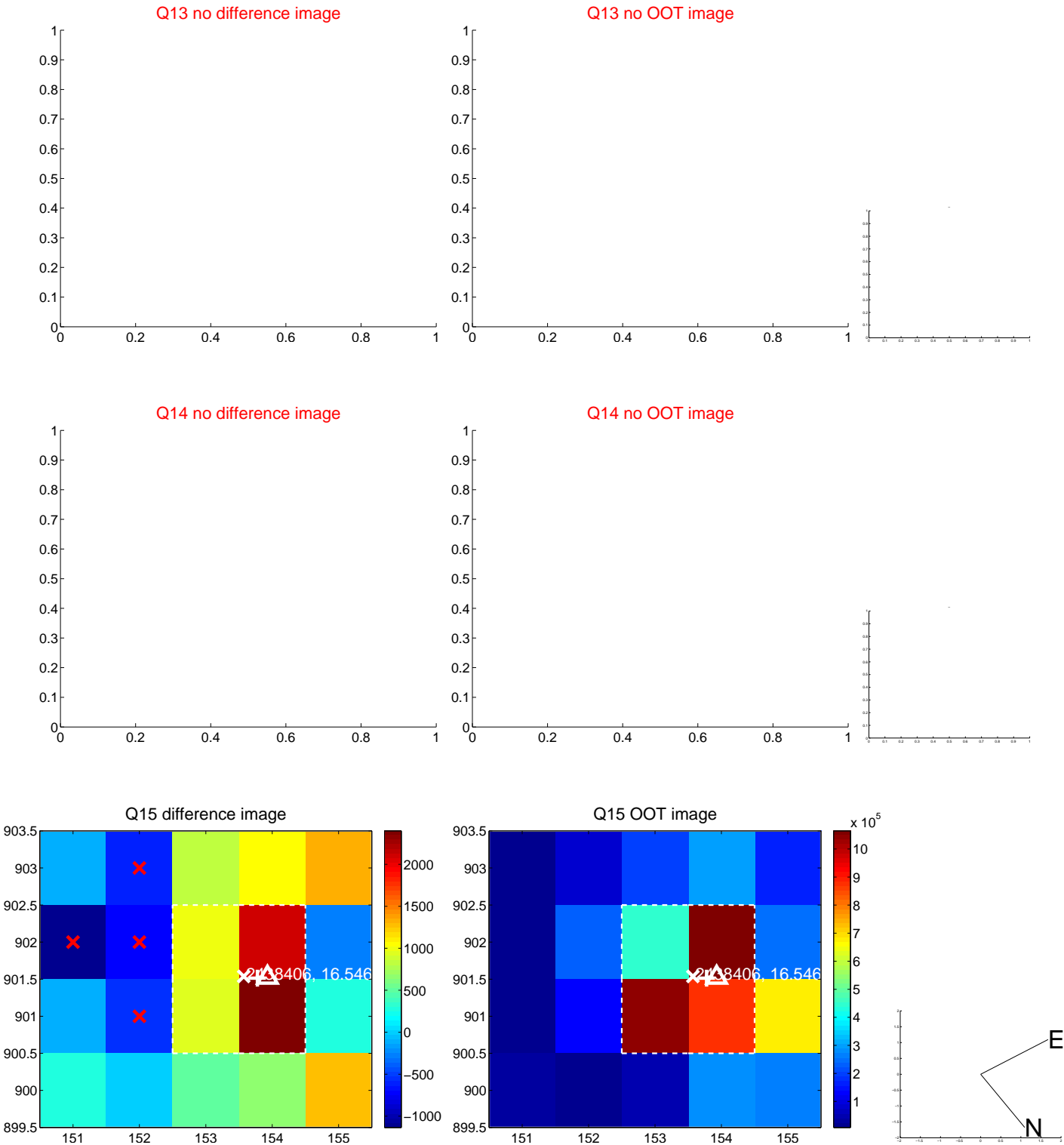




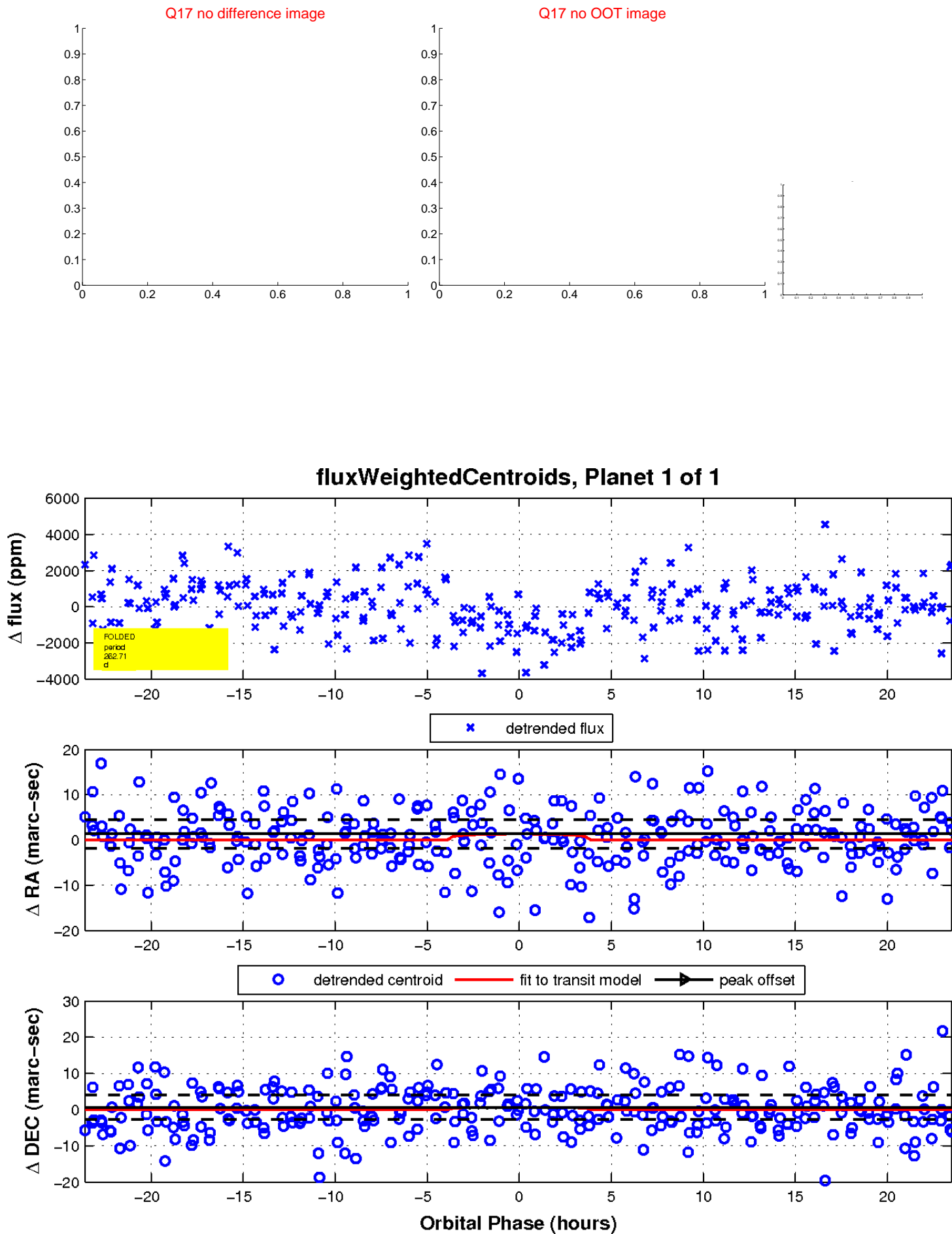
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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.



UKIRT Image

Declination

