

# KIC 012164998

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
012164998-01	OBS	No	484.452160	488.399693	338.2	29.982	7.6	7.4	0.98	6004	1.87	0.73

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
012164998-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—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.

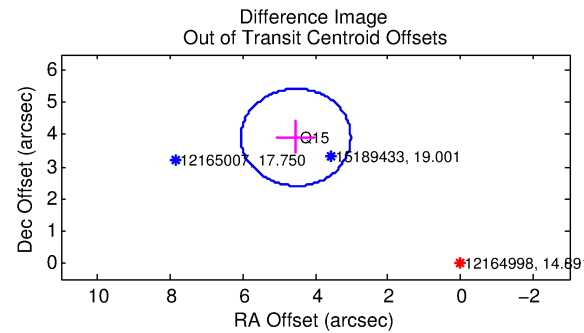
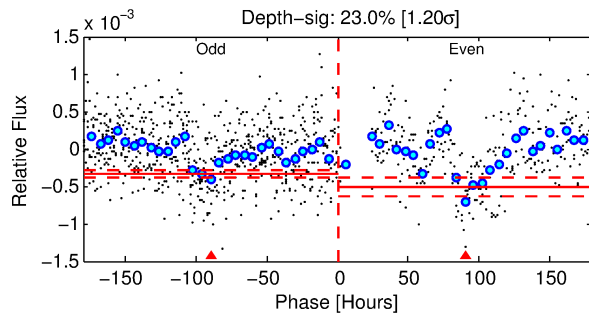
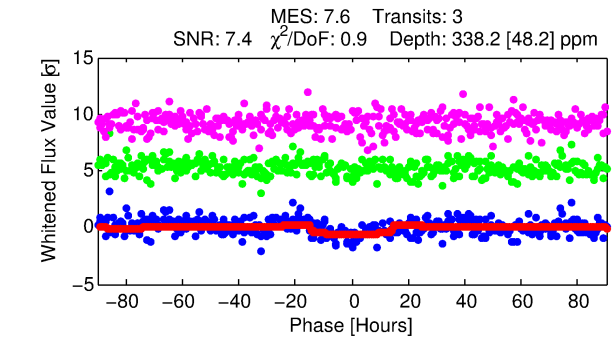
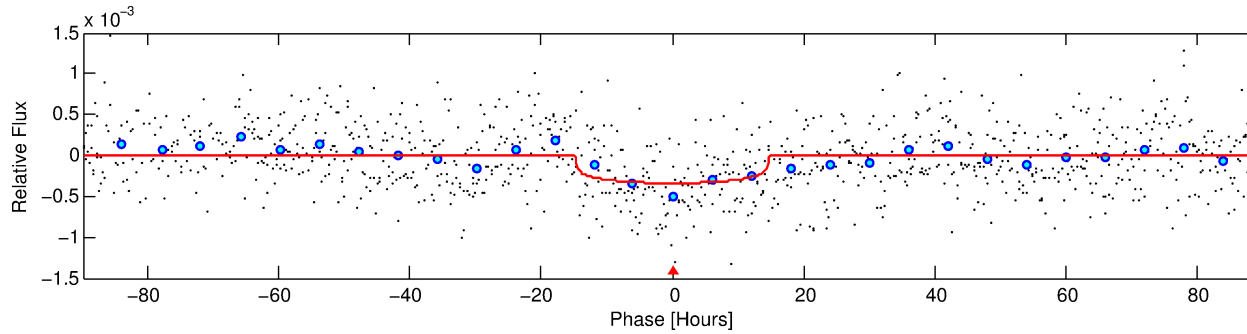
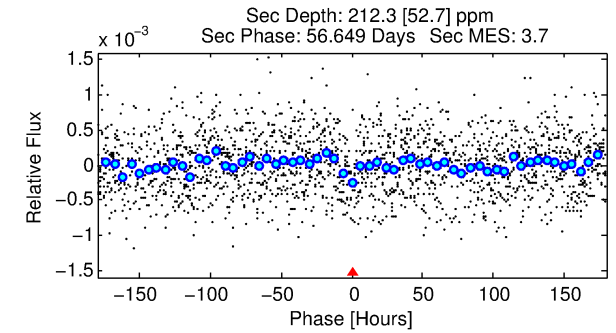
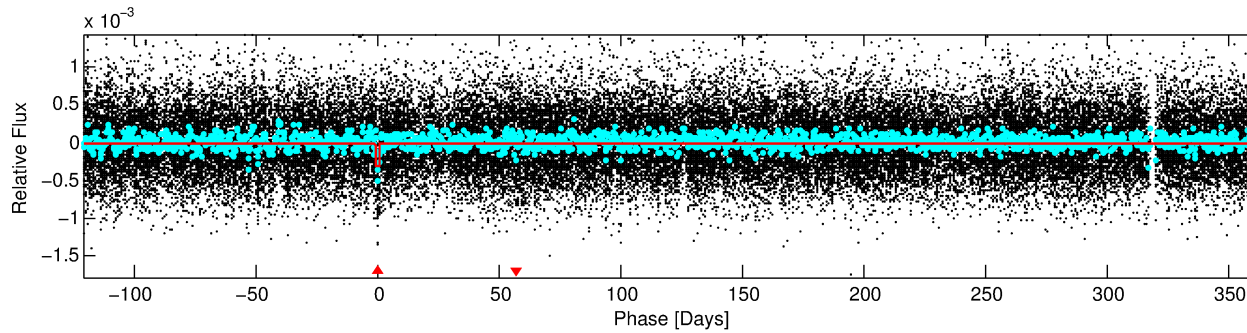
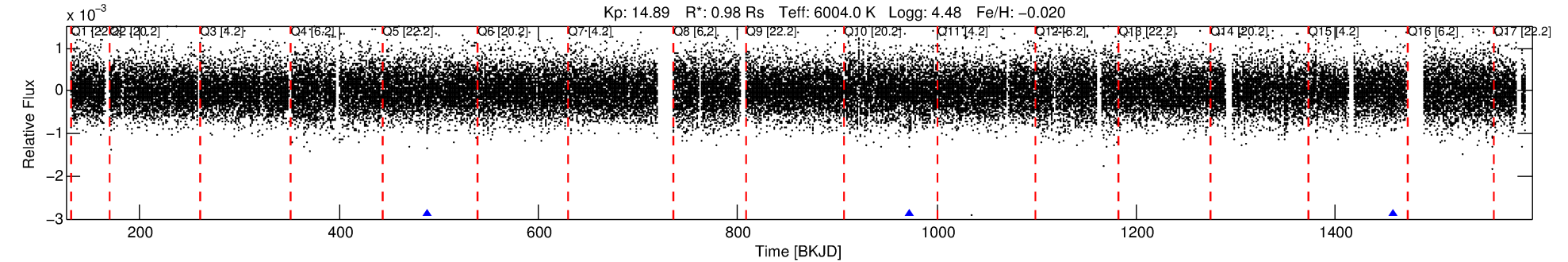
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 012164998-01

No Significant Match Found

# DV One-Page Summary

KIC: 12164998 Candidate: 1 of 1 Period: 484.452 d



## DV Fit Results:

Period = 484.45216 [0.02549] d  
Epoch = 488.3997 [0.0330] BKJD  
Rp/R\* = 0.0176 [0.0060]  
a/R\* = 101.99 [159.51]  
b = 0.59 [1.72]  
Seff = 0.73 [0.30]  
Teq = 236 [24] K  
Rp = 1.87 [0.86] Re  
a = 1.2316 [0.3210] AU  
Ag = 50587.32 [41500.49] [1.22σ]  
Teffp = 5470 [1013] K [5.17σ]

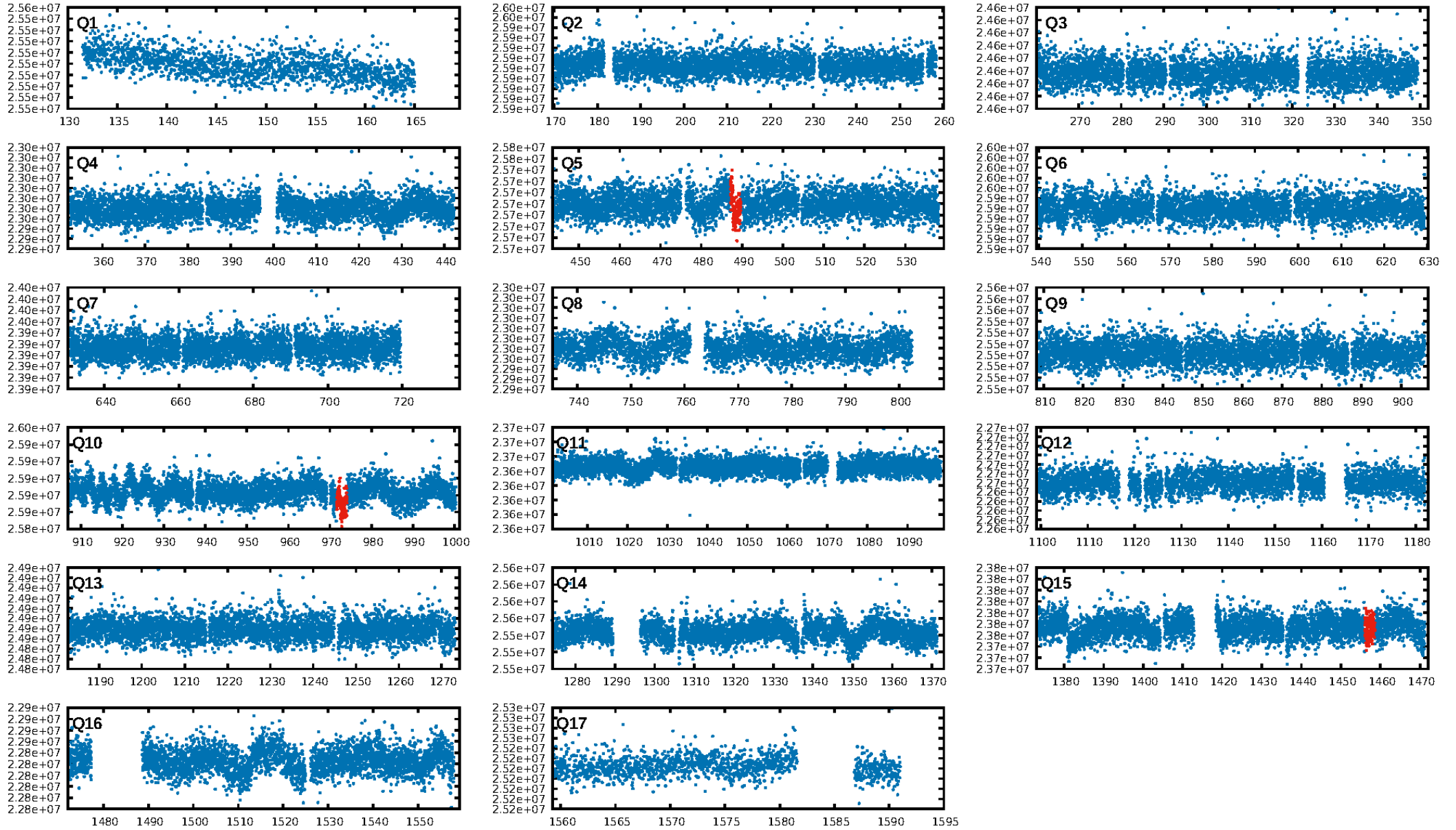
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 7.6%  
ModelChiSquareGof-sig: 100.0%  
**Bootstrap-pfa: 7.76e-10**  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: 15.74  
Centroid-sig: 44.4%  
Centroid-so: 1.825 arcsec [1.26σ]  
**OotOffset-rm: 5.987 arcsec [11.88σ]**  
**KicOffset-rm: 5.837 arcsec [11.57σ]**  
OotOffset-st: 0/1/0/0 [1]  
KicOffset-st: 0/1/0/0 [1]  
DiffImageQuality-fgm: 1.00 [1/1]  
DiffImageOverlap-fno: 1.00 [2/2]

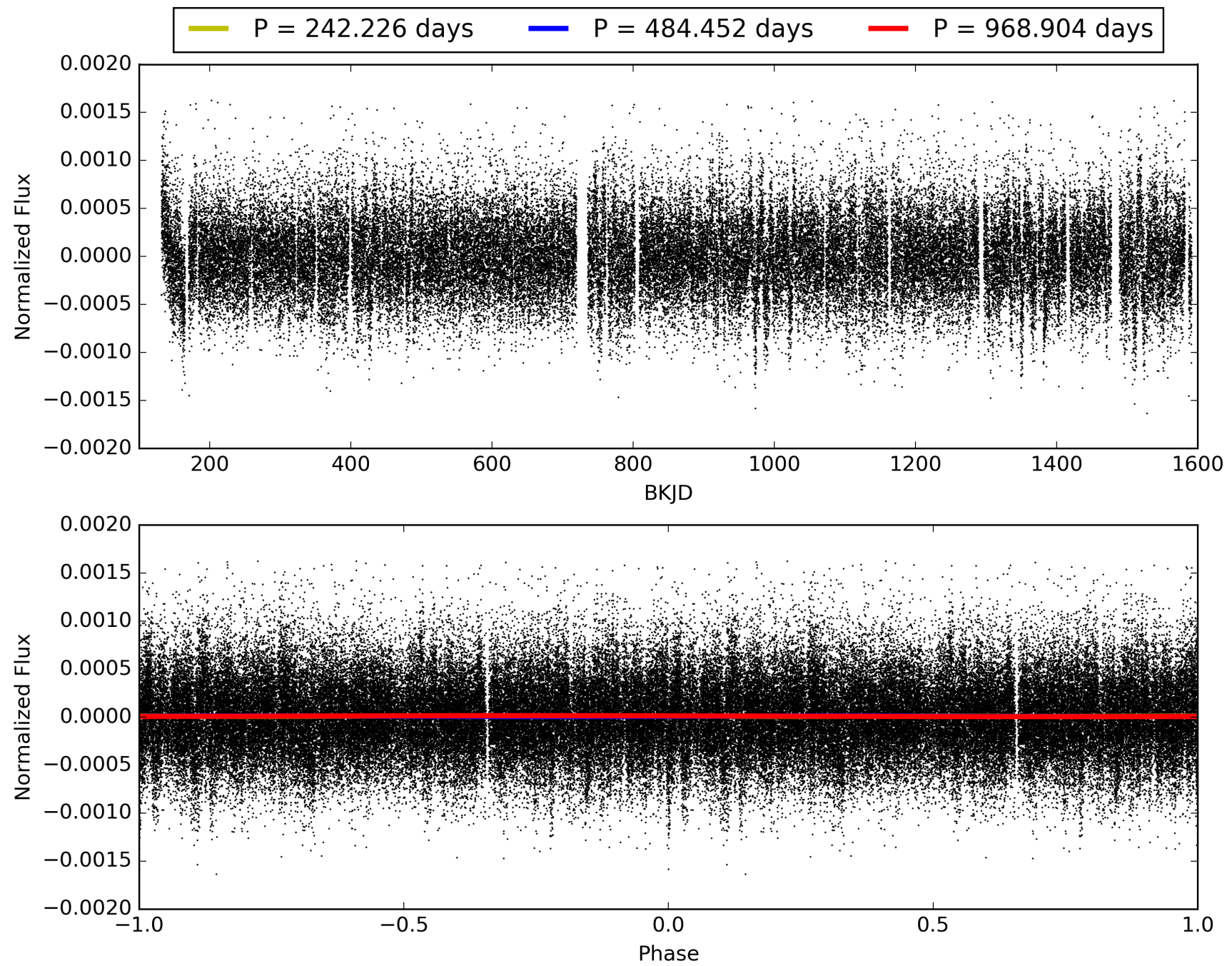
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 28-Jan-2016 20:48:31 Z

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

# TCE 012164998-01, PDC Light Curves

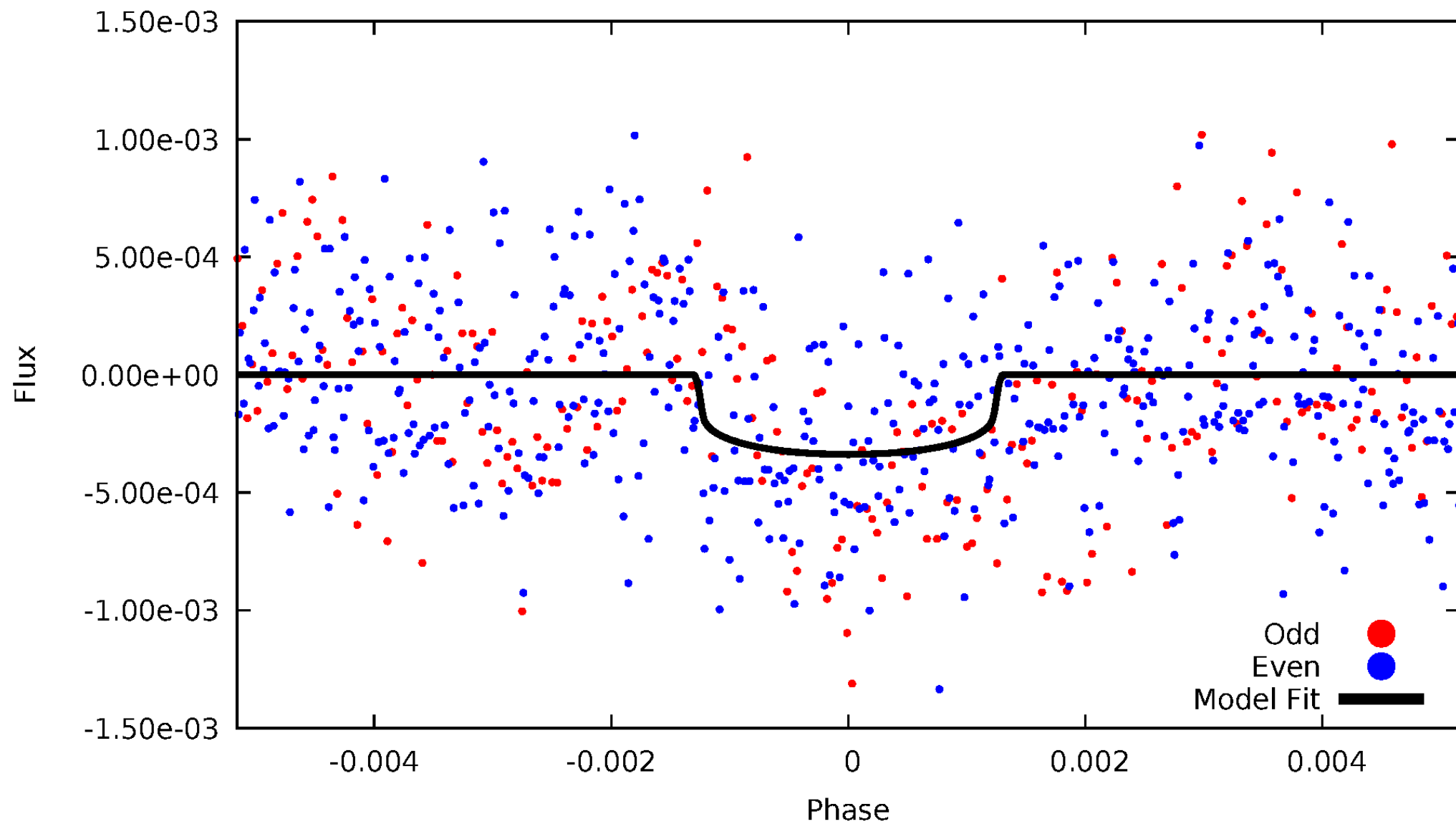


TCE 012164998-01



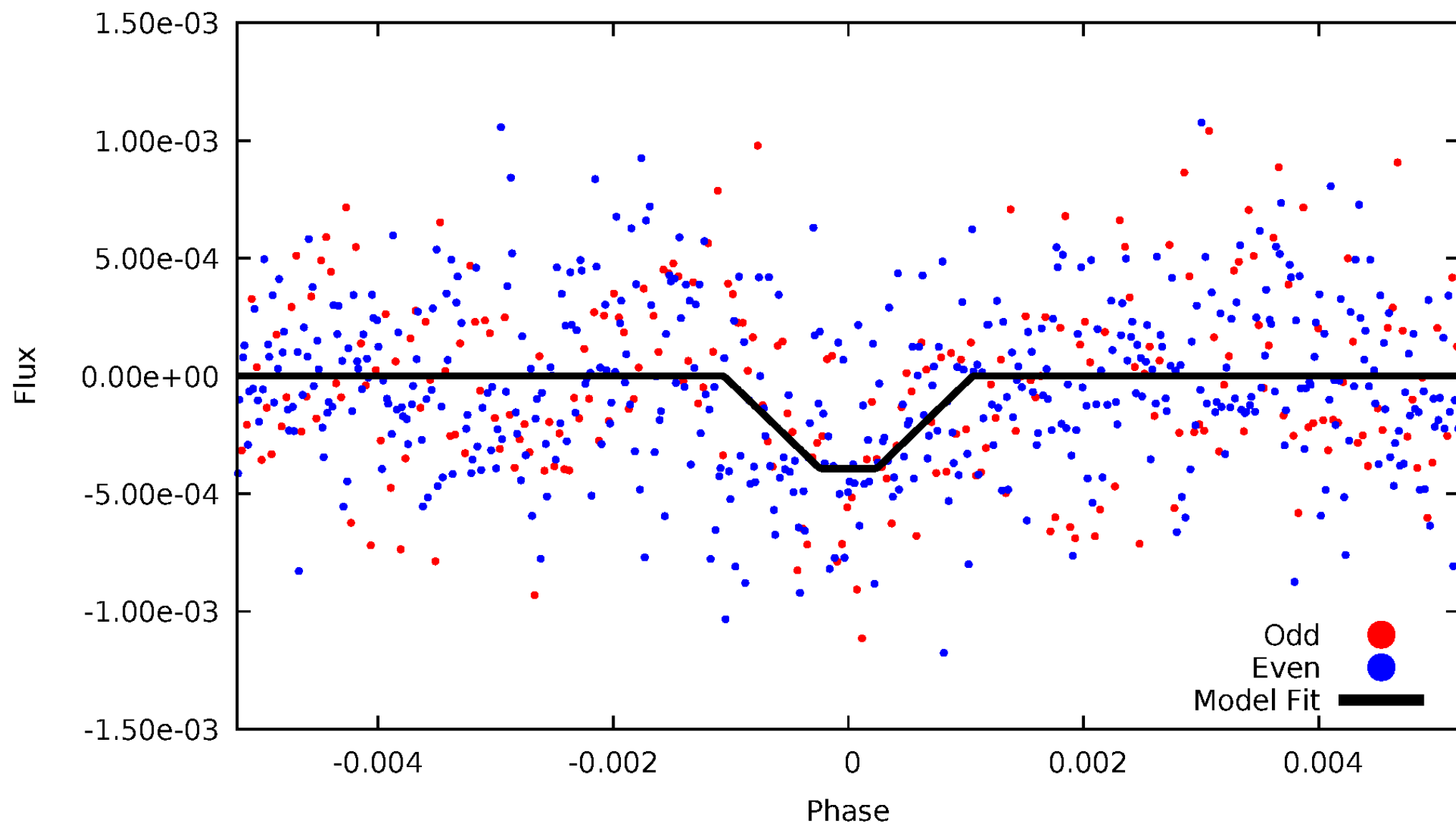
# DV Odd/Even

TCE 012164998-01



# ALT Odd/Even

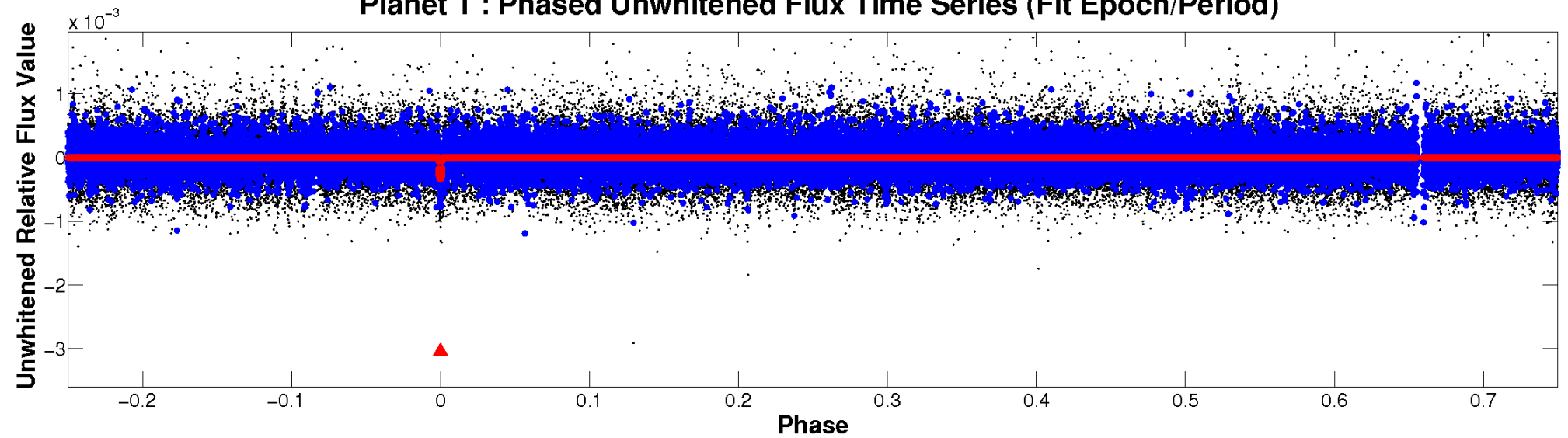
TCE 012164998-01



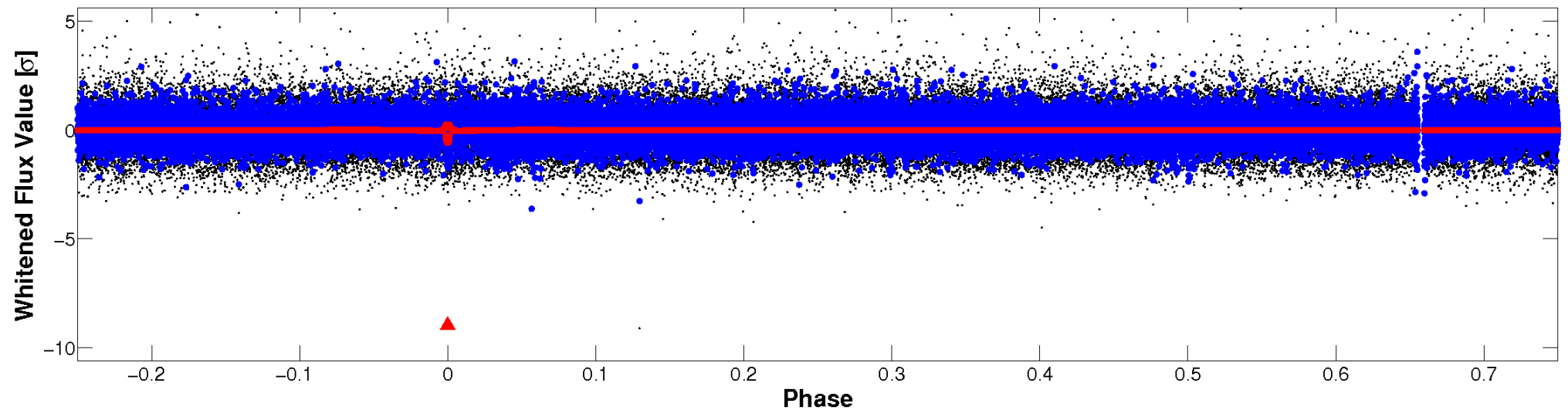


# Non-Whitened Vs. Whitened Light Curve

**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

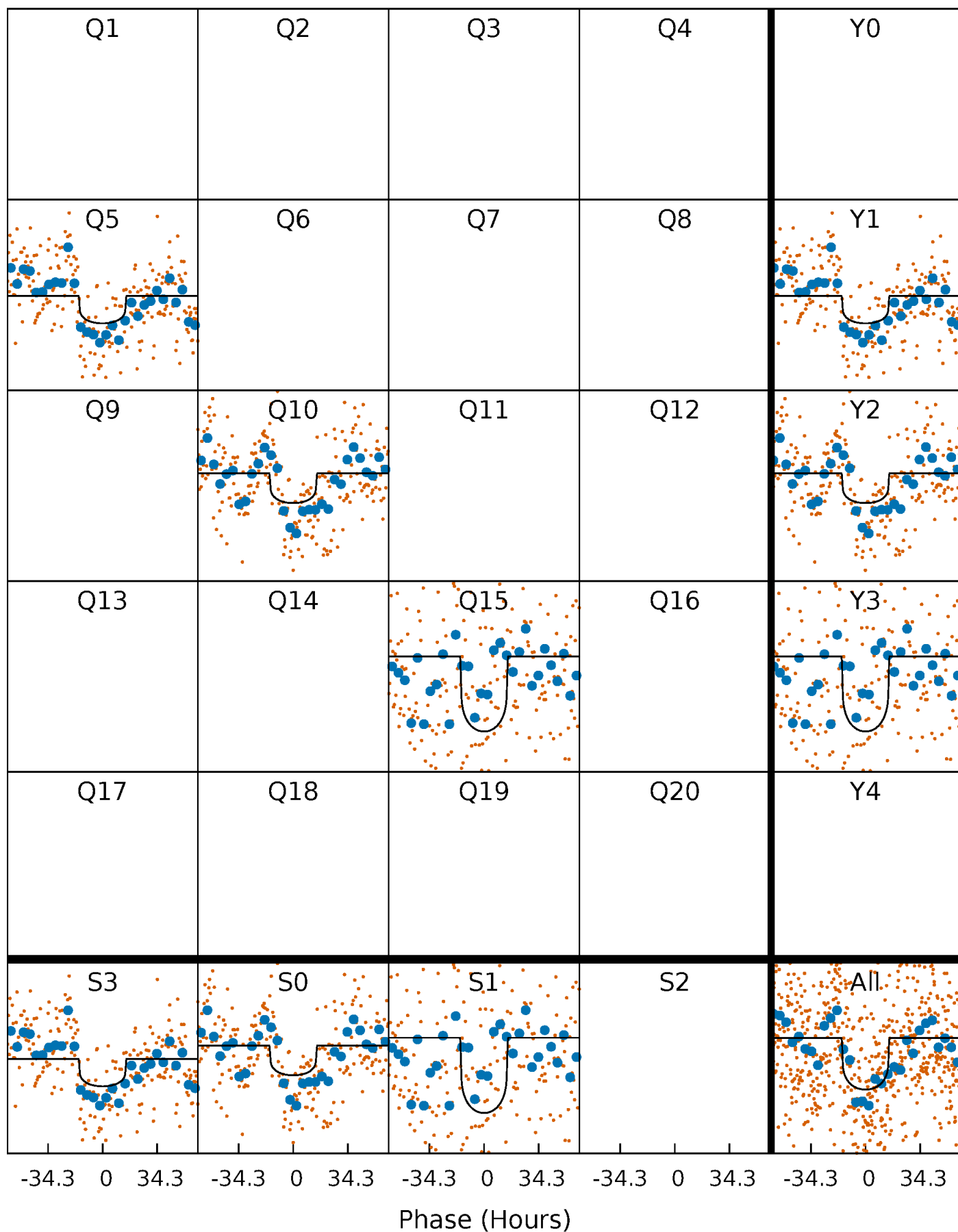
TCE 012164998-01     $P=484.452160$  Days     $T_0=488.399693$  (BKJD)





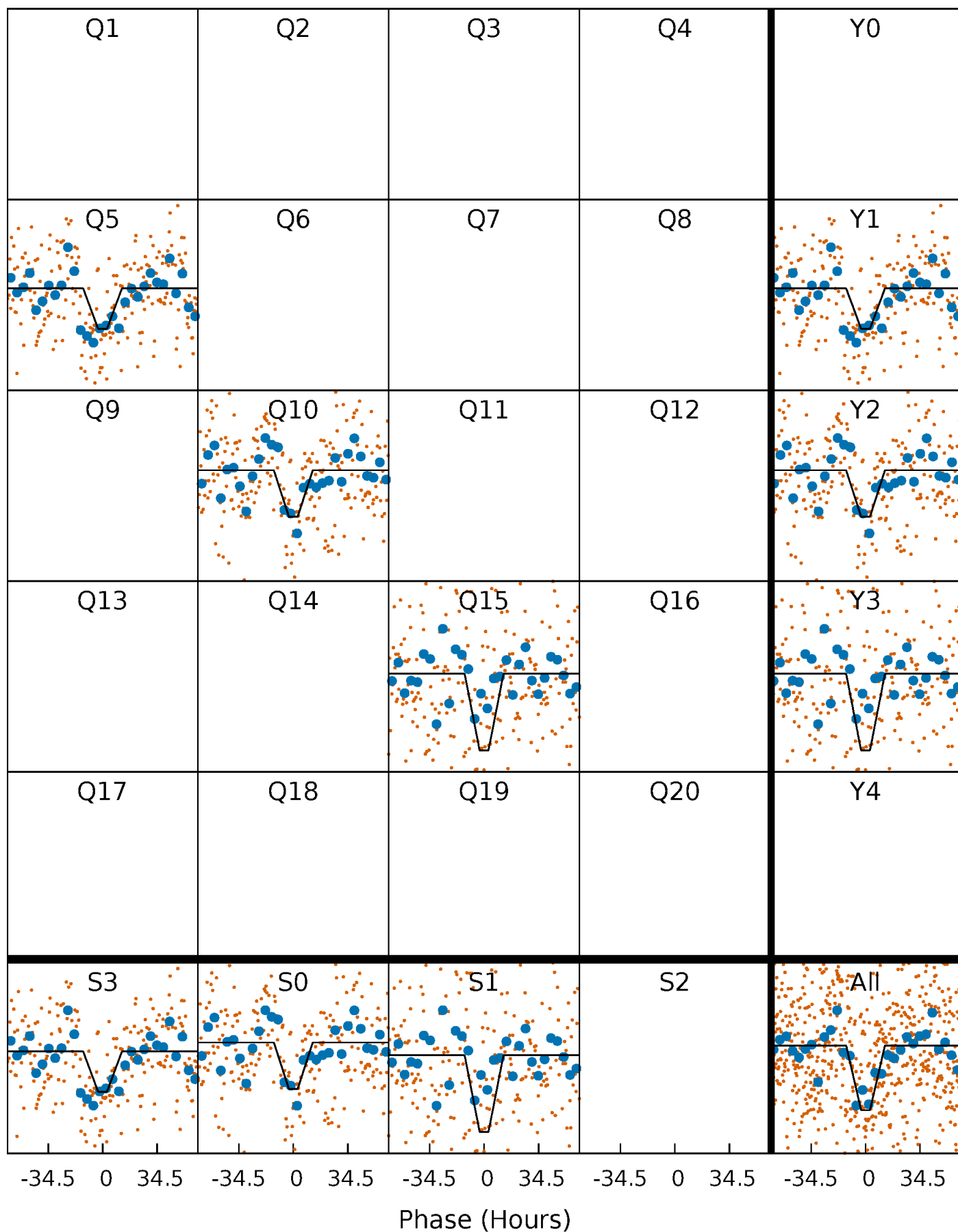
# DV Quarter-Phased Transit Curves

TCE 012164998-01 P=484.452160 Days  $T_0=488.399693$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

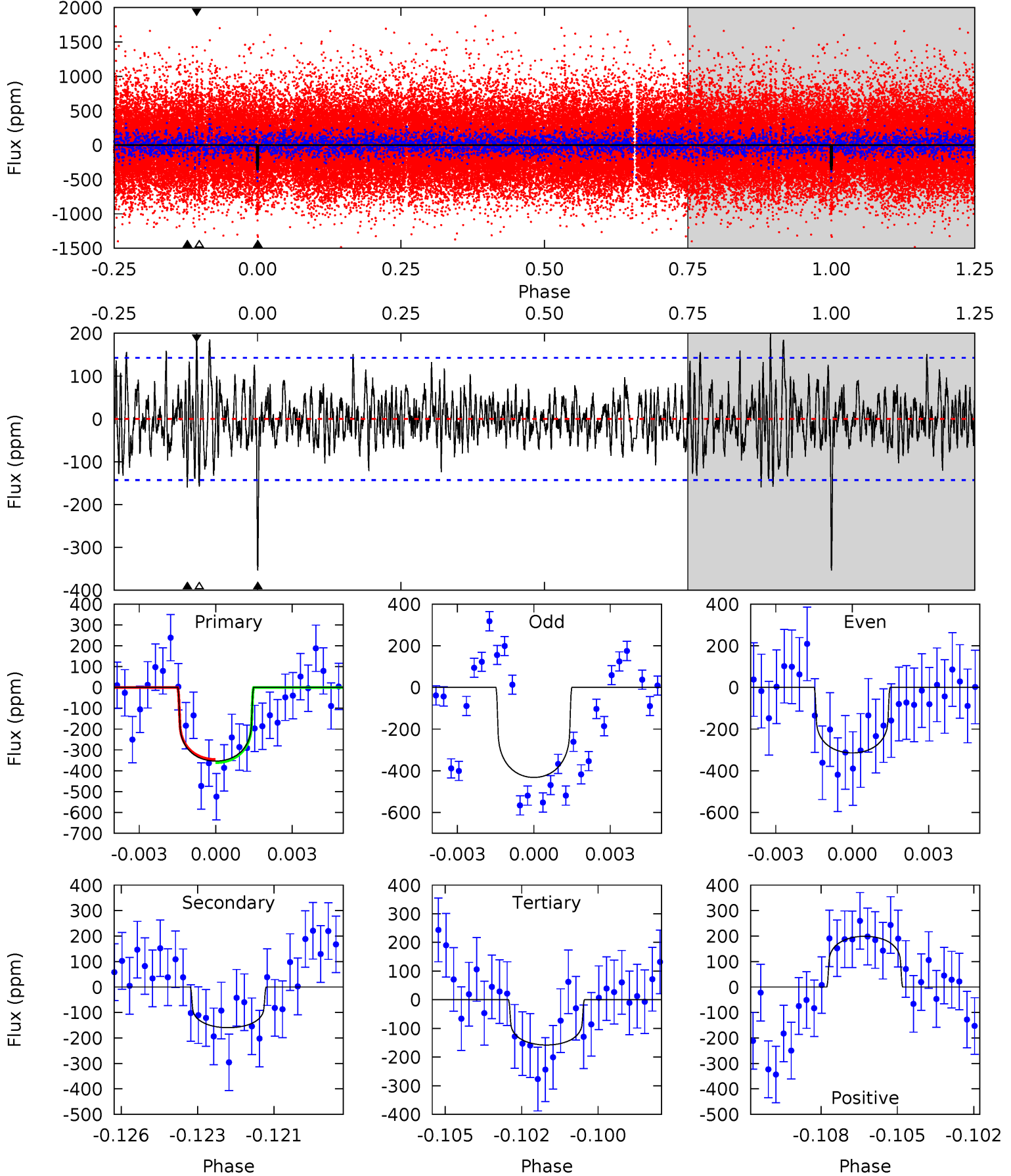
TCE 012164998-01 P=484.432029 Days  $T_0=488.379295$  (BKJD)



# DV Model-Shift Uniqueness Test

012164998-01, P = 484.452160 Days, E = 3.947533 Days

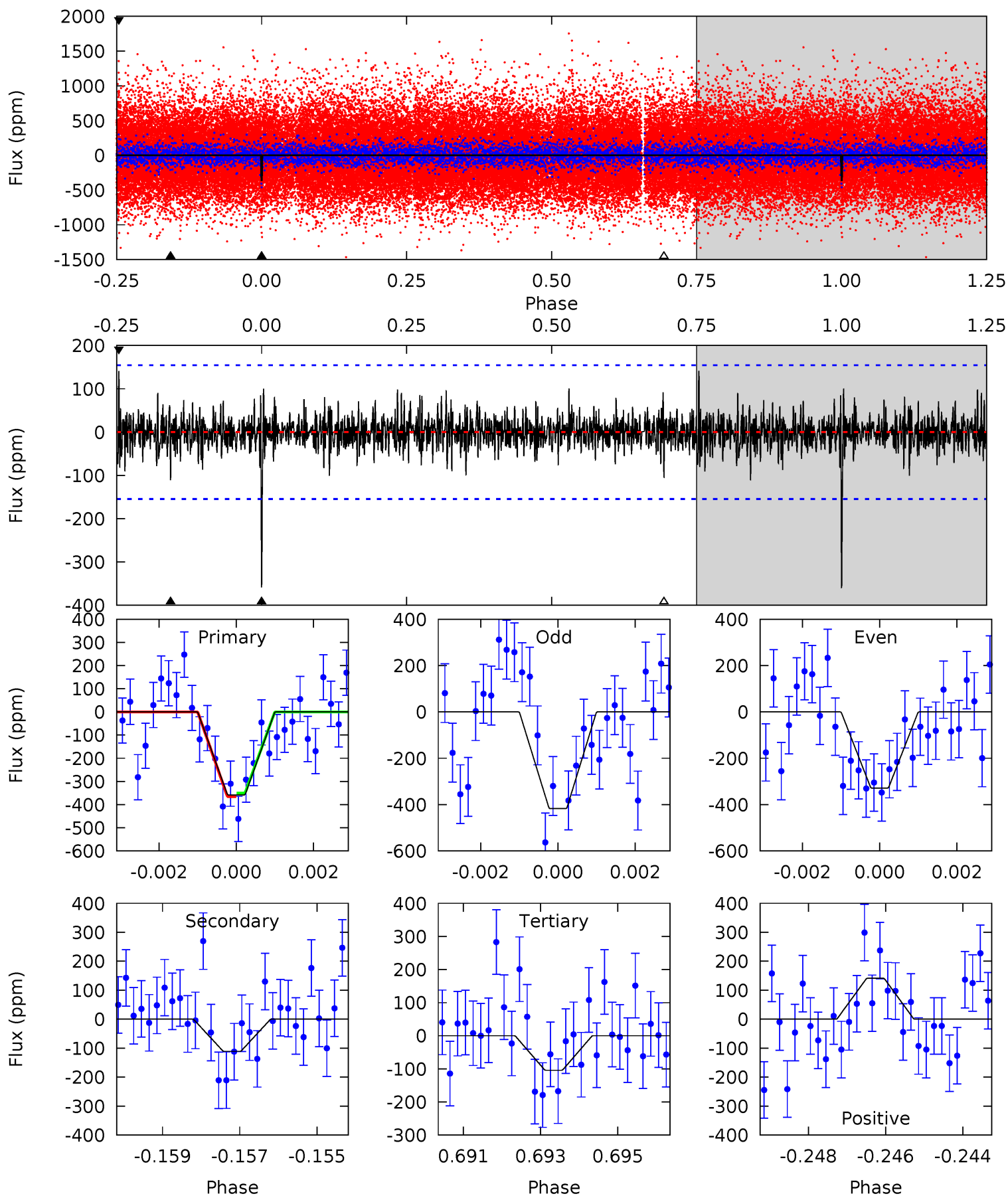
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
13.1	5.90	5.84	7.36	5.28	3.01	1.70	7.23	5.71	0.06	-1.46	2.04	0.82	0.36	0.27



# Alt Model-Shift Uniqueness Test

012164998-01, P = 484.432029 Days, E = 3.947266 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
12.3	3.82	3.58	4.85	5.32	3.07	0.99	8.74	7.48	0.24	-1.03	1.43	0.86	0.28	0.27



### Stellar Parameters For KIC 012164998

	$T_{\text{eff}}(K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6004^{+190}_{-211}$	$4.484^{+0.052}_{-0.208}$	$-0.020^{+0.250}_{-0.300}$	$0.977^{+0.302}_{-0.101}$	$1.061^{+0.134}_{-0.147}$	$1.603^{+0.429}_{-0.808}$
	+3%/-4%	+1%/-5%	+1250%/-1500%	+31%/-10%	+13%/-14%	+27%/-50%
Source	PHO1	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 012164998-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-160 \pm 27$	$1.97^{+0.77}_{-0.66}$	$337^{+24}_{-17}$	$5159^{+1054}_{-648}$	$32936^{+43857}_{-15943}$
Alt.	$-111 \pm 29$	$2.25^{+0.76}_{-0.74}$	$338^{+25}_{-17}$	$4520^{+819}_{-516}$	$18110^{+21799}_{-9193}$

$T_{\text{max}}$  = 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

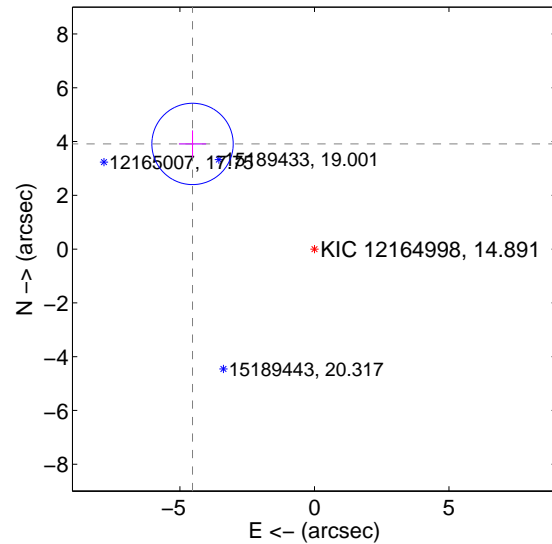
Supplemental centroid analysis for 012164998-01. Kepler magnitude: 14.89. Transit SNR 7.40

There are 1 quarters with good PRF difference image offsets

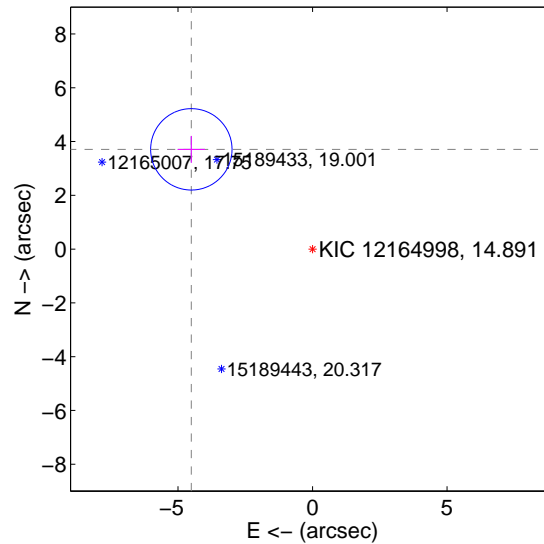
The direct PRF centroid is offset from the target star catalog position by about 0.20 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$5.987 \pm 0.504$	11.88	$4.533 \pm 0.508$	$3.911 \pm 0.499$
PRF-fit source offset from KIC position	$5.837 \pm 0.504$	11.57	$4.507 \pm 0.508$	$3.709 \pm 0.499$
photometric centroid source offset	$1.82 \pm 1.44$	1.26	$1.82 \pm 1.44$	$-0.13 \pm 1.57$

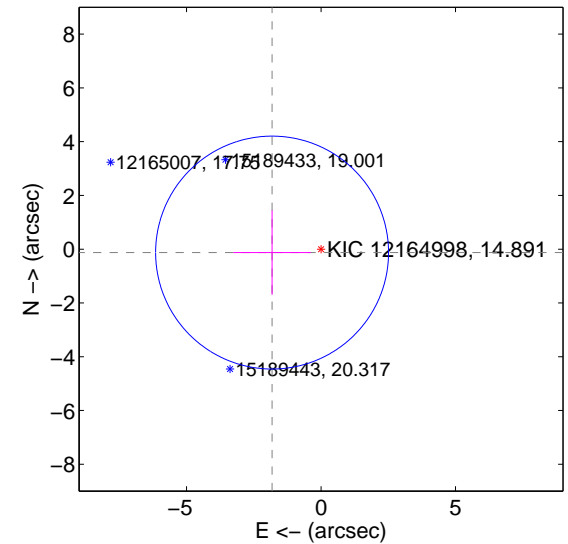
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position



offset from photometric centroids



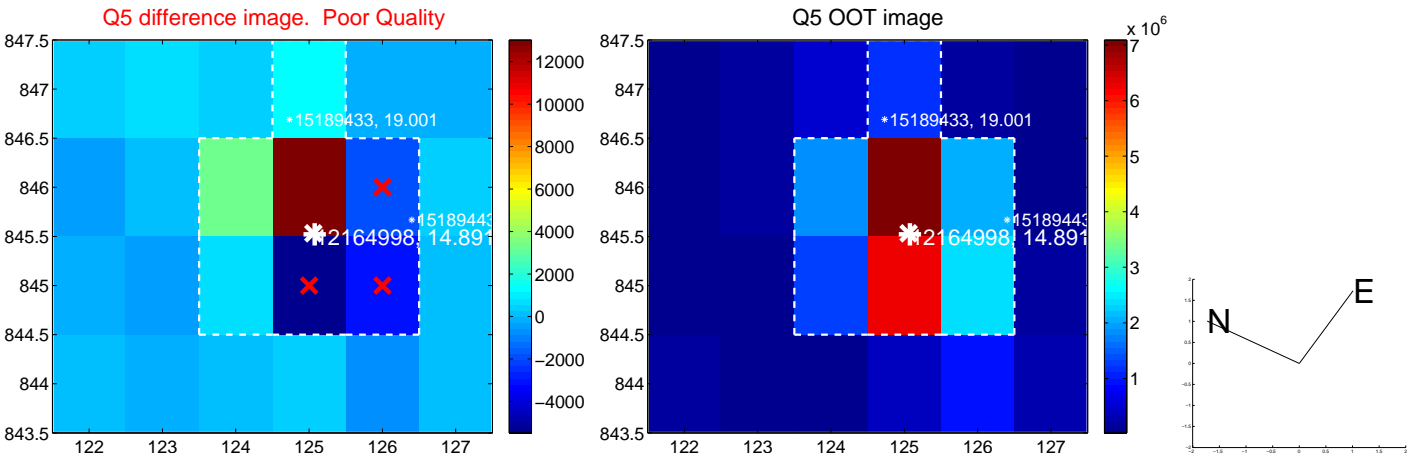
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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



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

Q13 no difference image



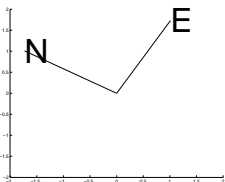
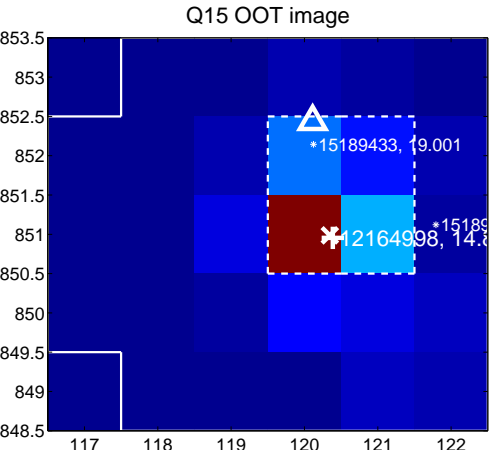
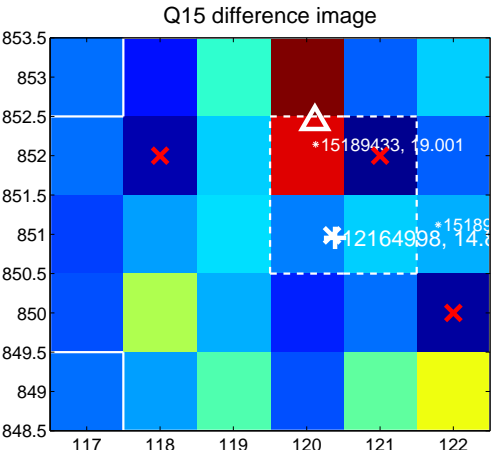
Q13 no OOT image



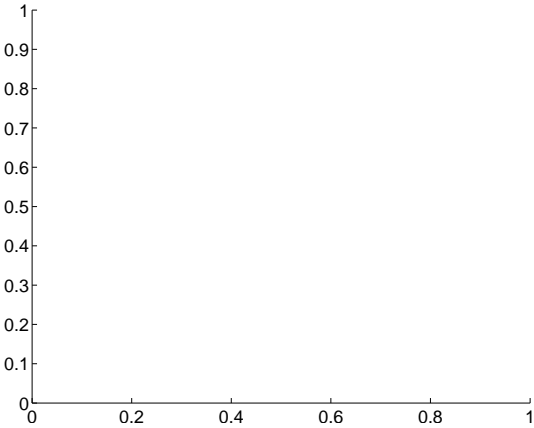
Q14 no difference image



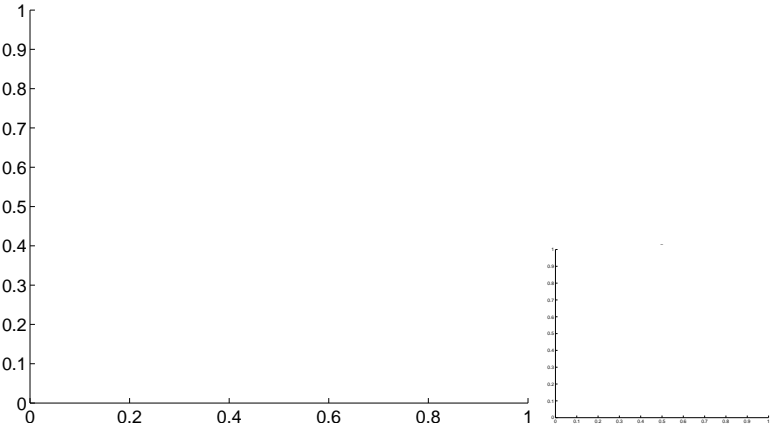
Q14 no OOT image



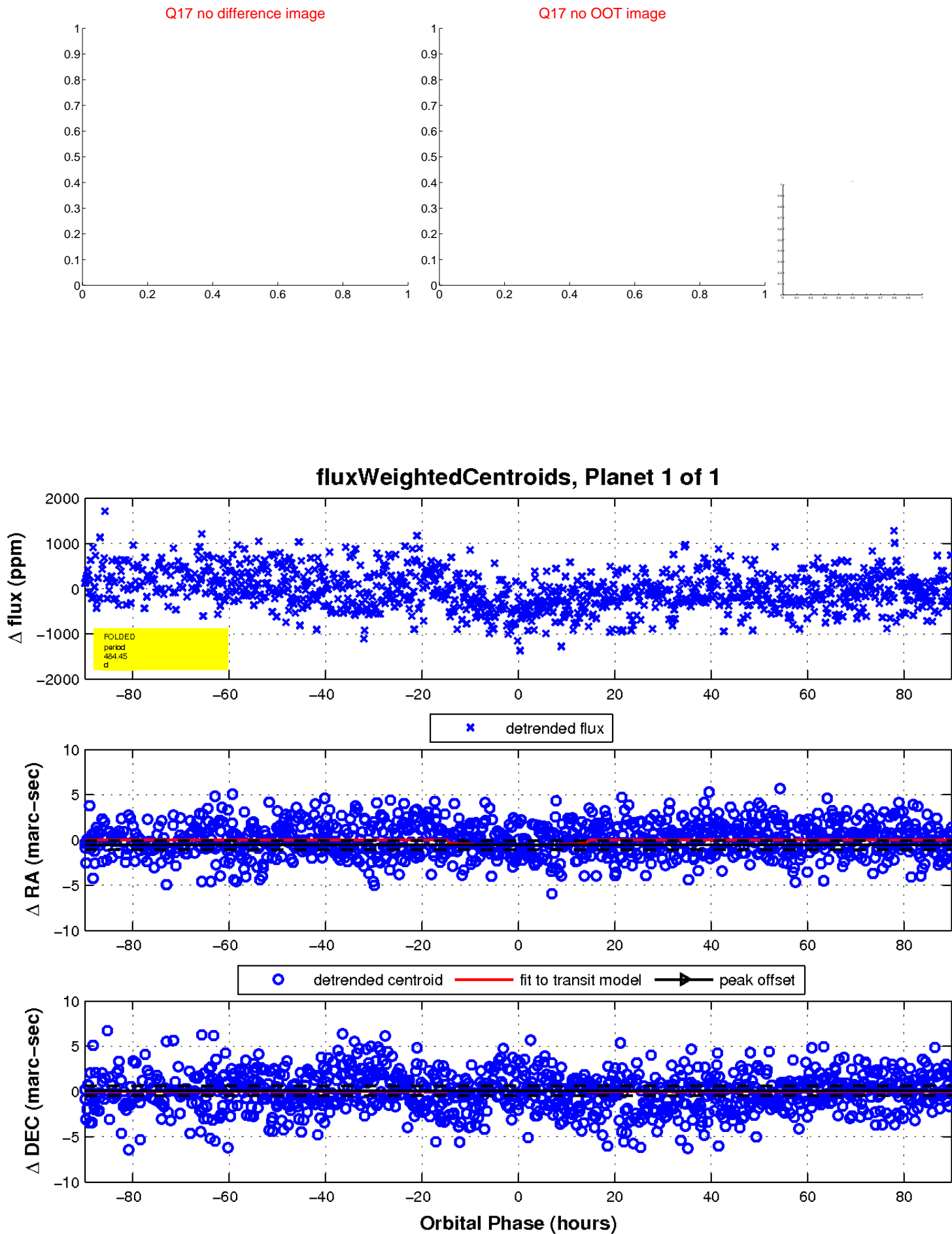
Q16 no difference image



Q16 no OOT image



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



UKIRT Image

Declination

