

# KIC 009710998

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009710998-01	OBS	No	389.458426	429.597339	1081.3	19.925	11.7	12.7	0.62	4377	1.96	0.16

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009710998-01	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.

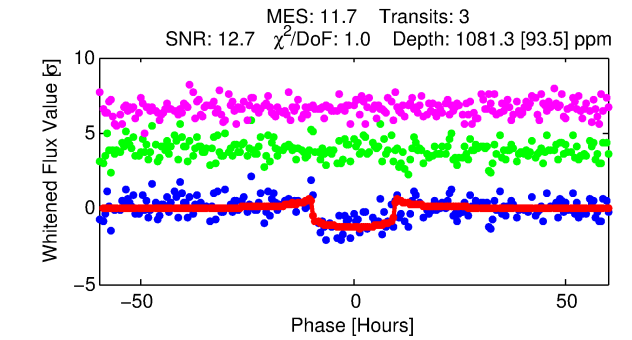
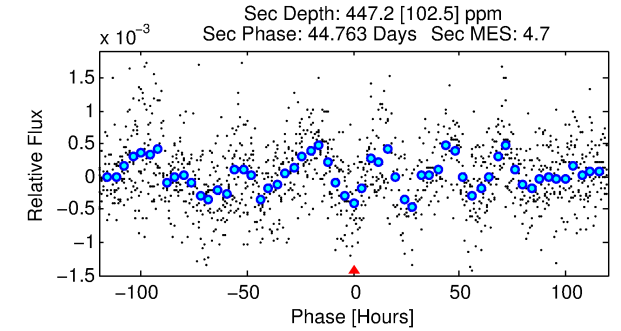
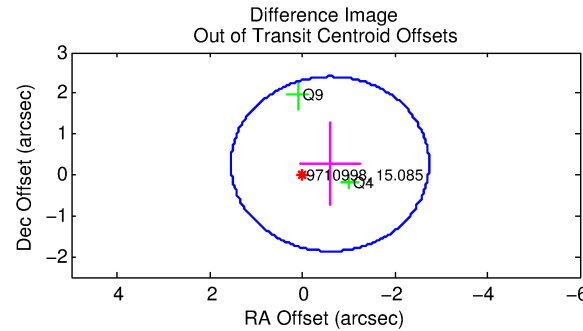
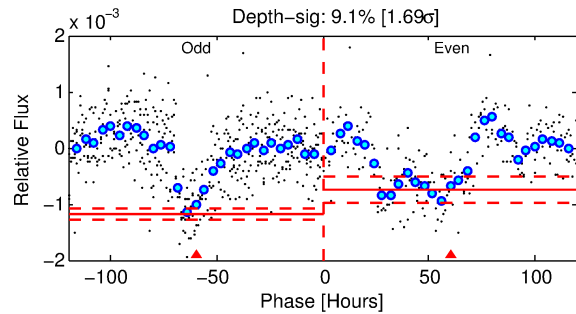
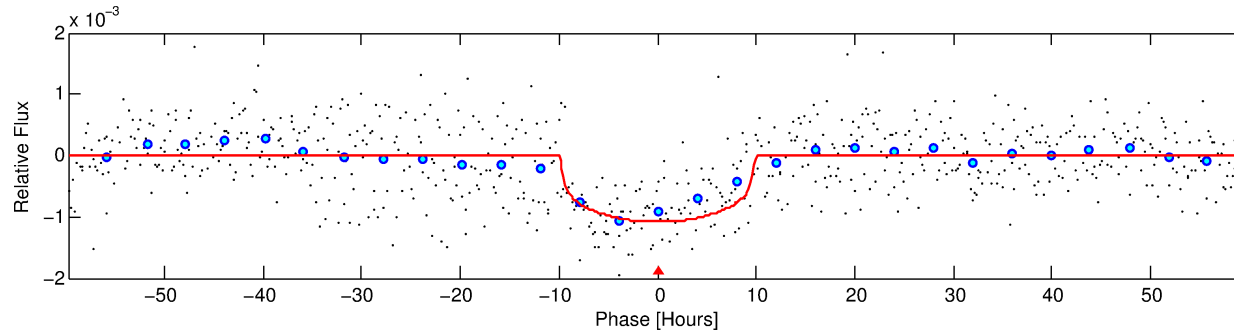
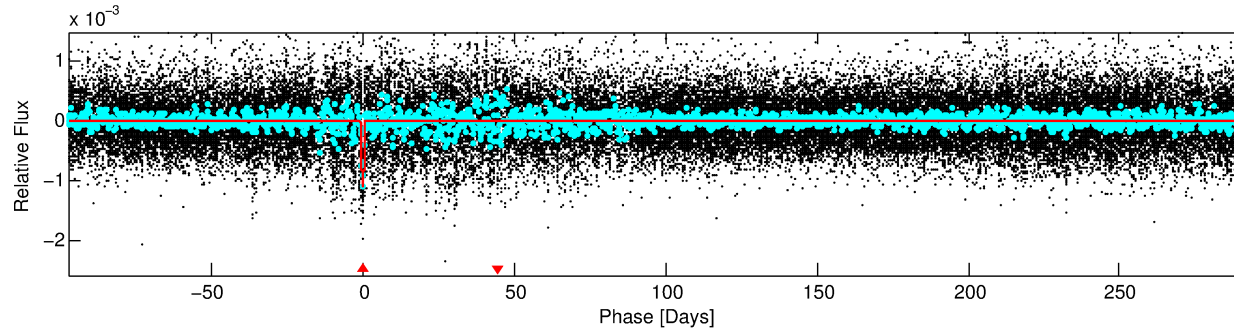
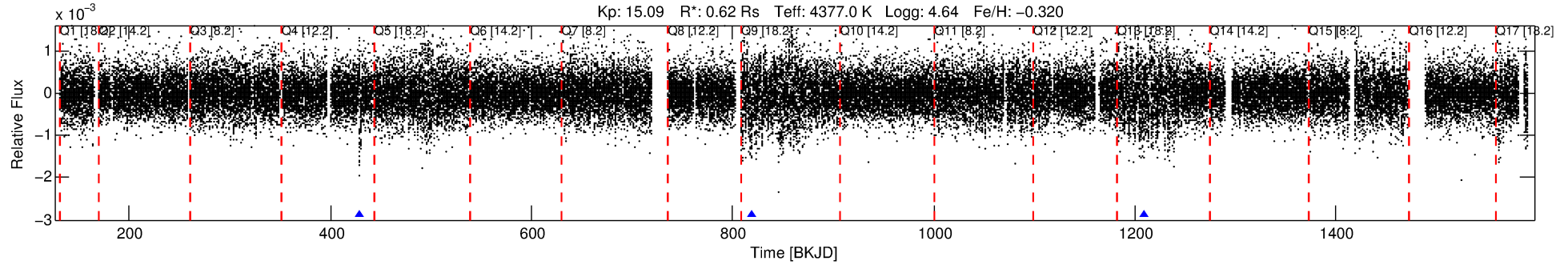
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 009710998-01

No Significant Match Found

# DV One-Page Summary

KIC: 9710998 Candidate: 1 of 1 Period: 389.458 d



## DV Fit Results:

Period = 389.45843 [0.01245] d  
Epoch = 429.5973 [0.0118] BKJD  
Rp/R\* = 0.0290 [0.0129]  
a/R\* = 153.65 [219.70]  
b = 0.01 [220.78]  
Seff = 0.16 [0.02]  
Teq = 161 [6] K  
Rp = 1.95 [0.88] Re  
a = 0.8835 [0.0629] AU  
Ag = 50261.04 [46304.77] [1.09 $\sigma$ ]  
Teffp = 3736 [863] K [4.14 $\sigma$ ]

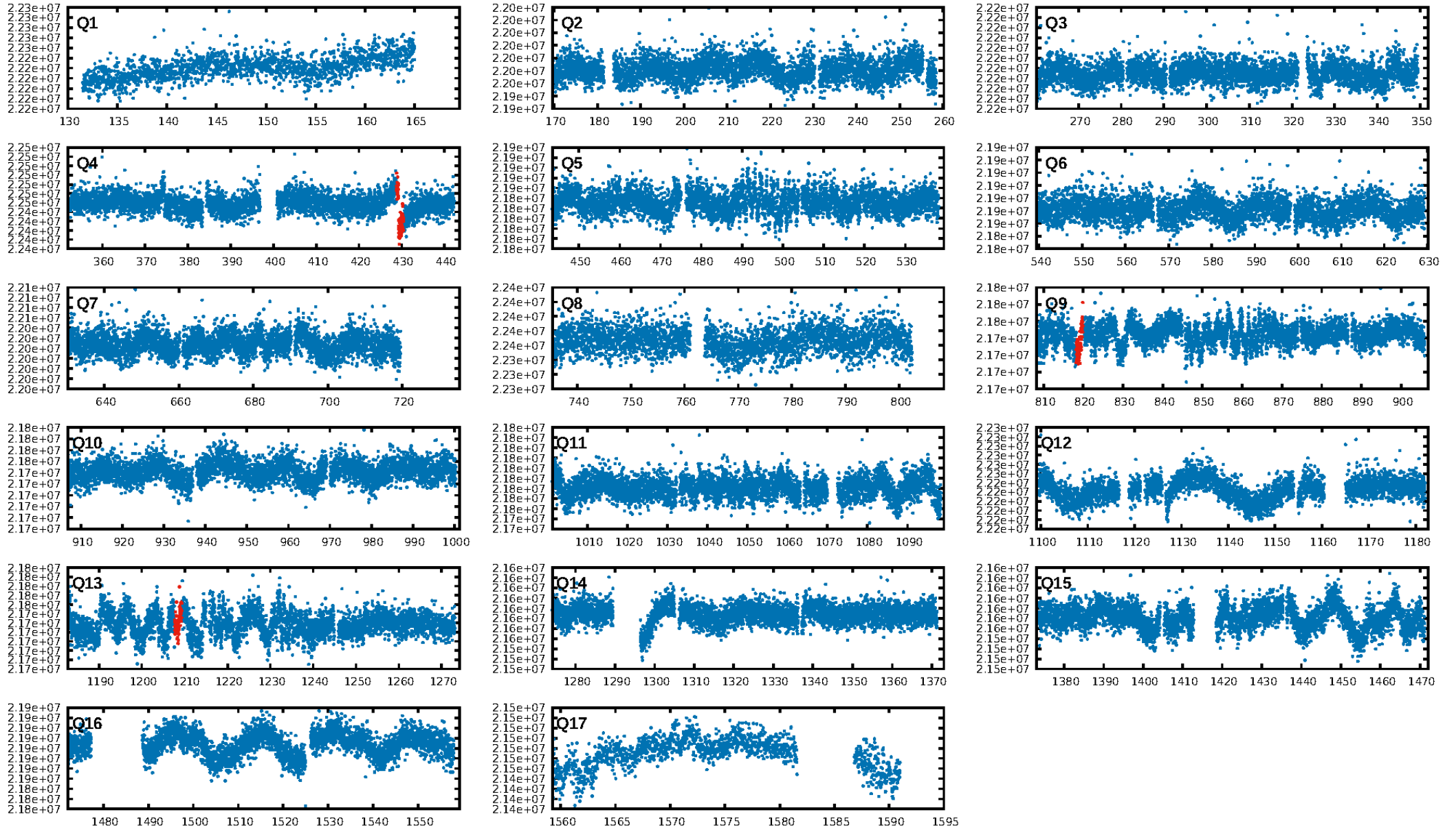
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 1.1%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 1.41e-15  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: 8.201  
Centroid-sig: 66.5%  
Centroid-so: 0.955 arcsec [1.12 $\sigma$ ]  
OotOffset-rm: 0.654 arcsec [0.92 $\sigma$ ]  
OotOffset-st: 0/0/1/1 [2]  
KicOffset-rm: 1.010 arcsec [1.43 $\sigma$ ]  
KicOffset-st: 0/0/1/1 [2]  
DiffImageQuality-fgm: 1.00 [2/2]  
DiffImageOverlap-fno: 1.00 [3/3]

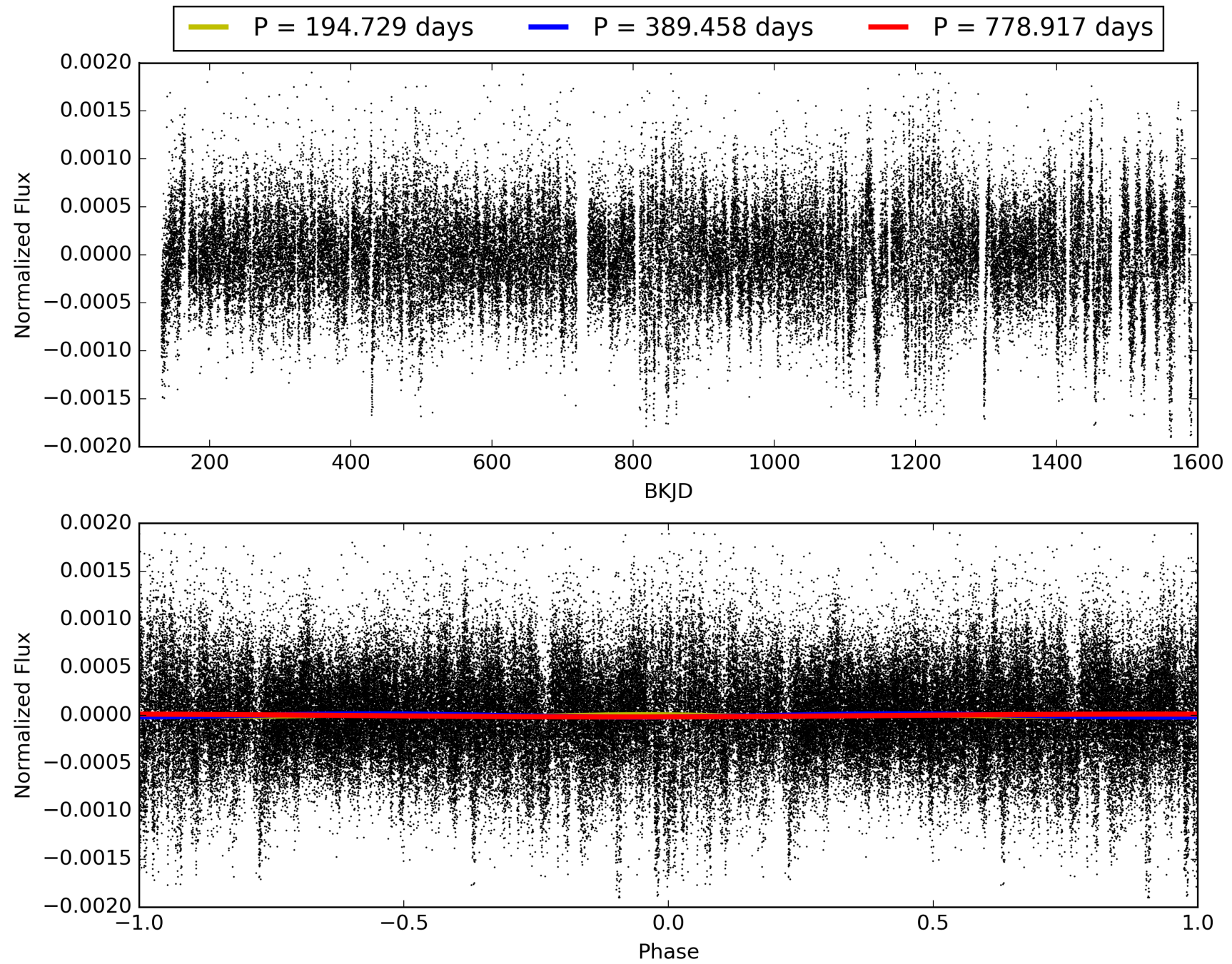
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 14:23:22 Z

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

# TCE 009710998-01, PDC Light Curves

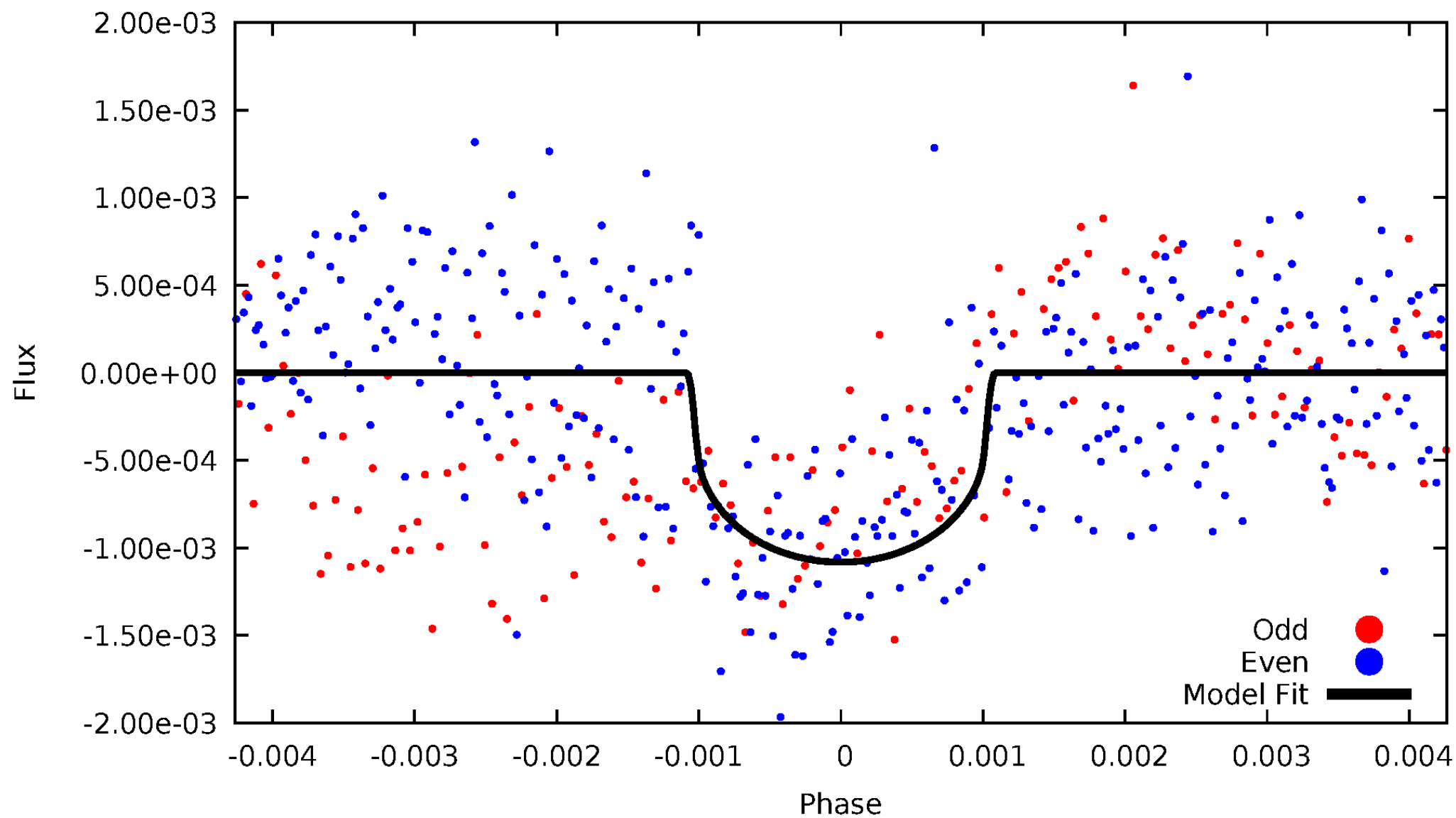


TCE 009710998-01



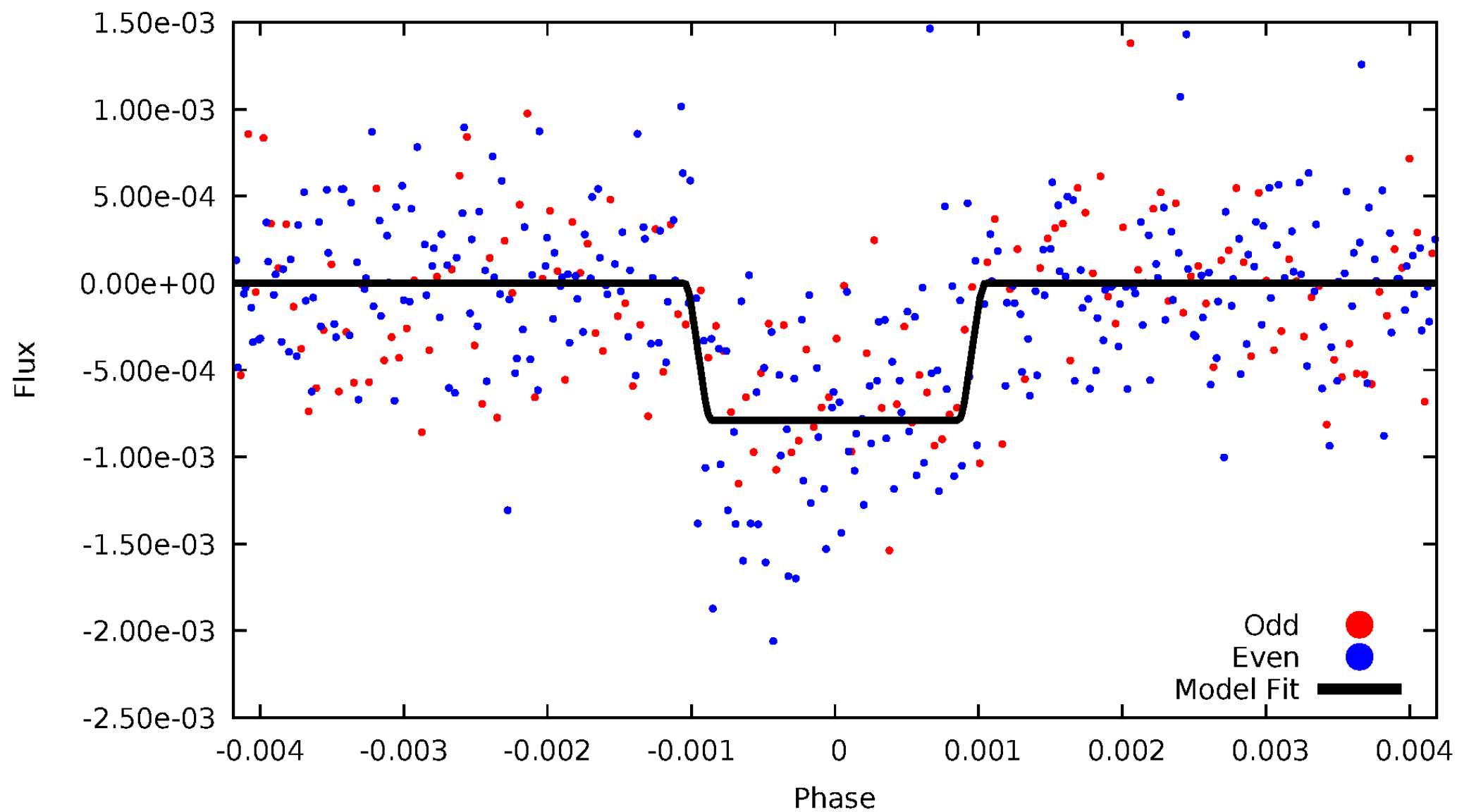
# DV Odd/Even

TCE 009710998-01



# ALT Odd/Even

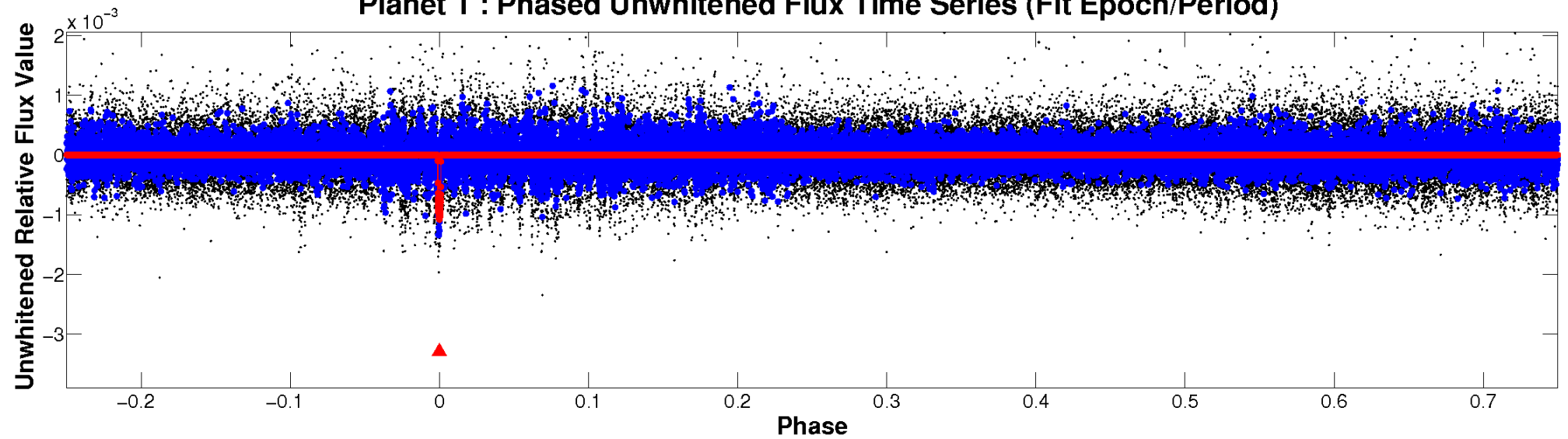
TCE 009710998-01



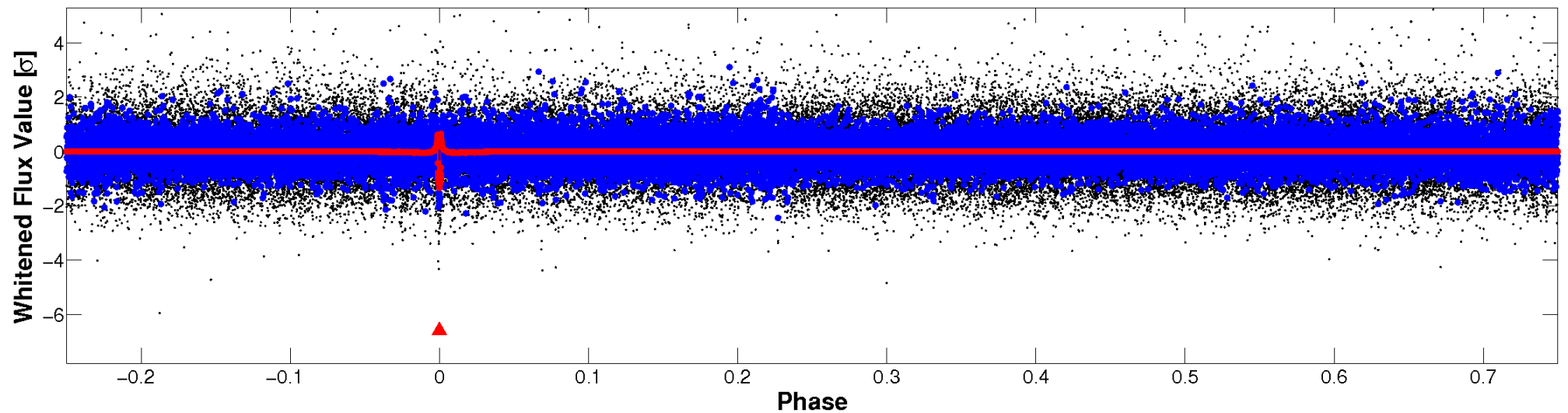


# Non-Whitened Vs. Whitened Light Curve

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

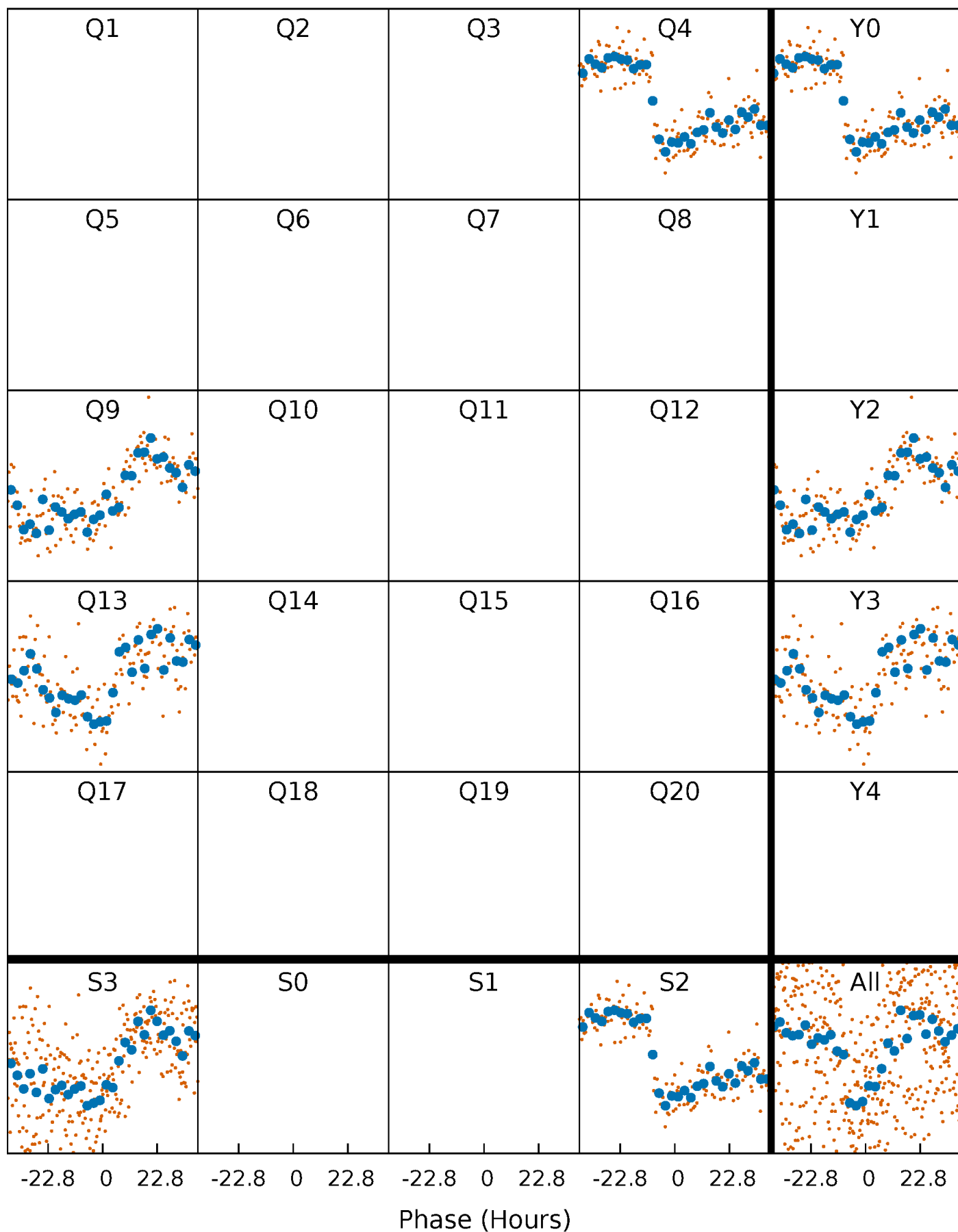


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

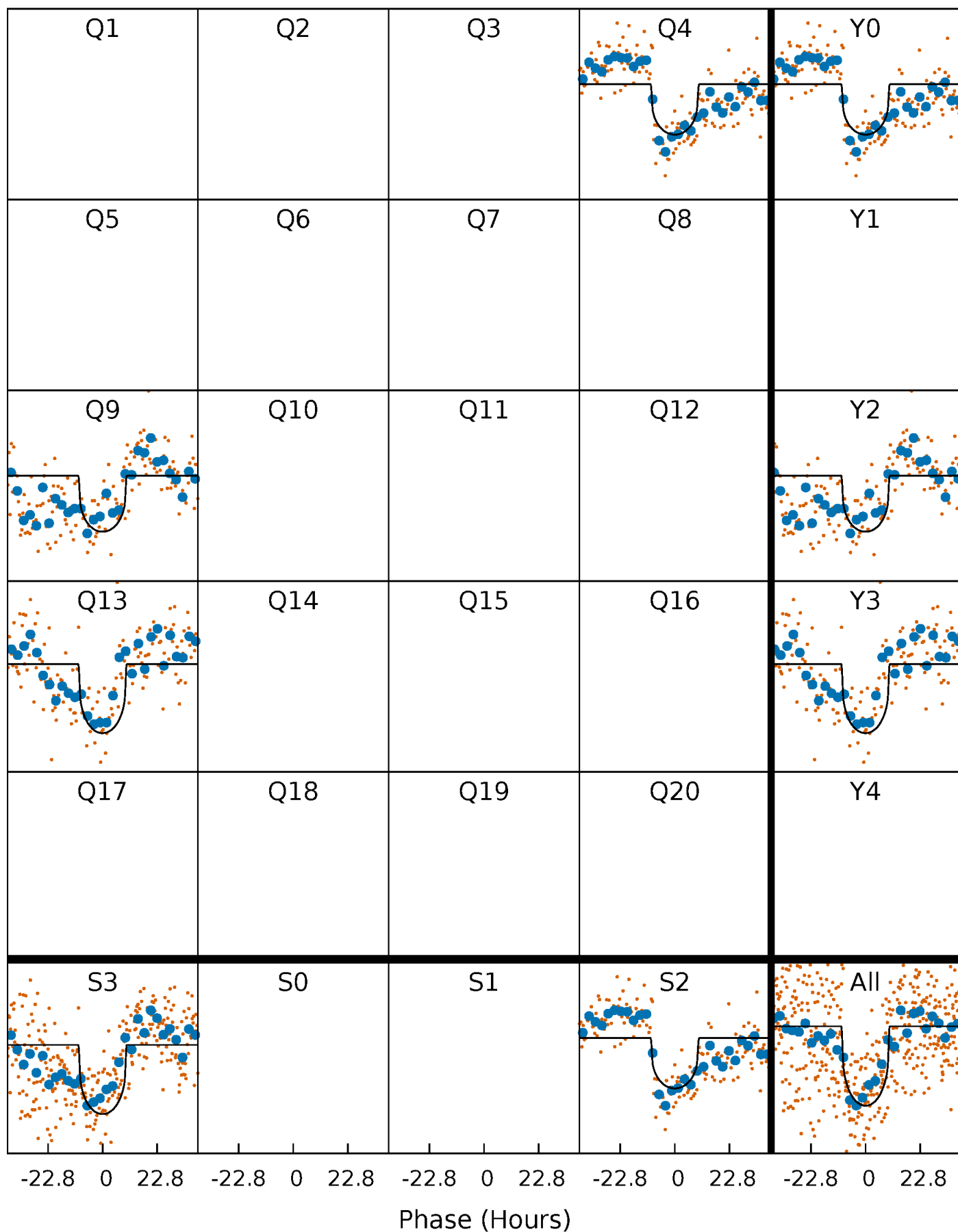
TCE 009710998-01   P=389.458426 Days    $T_0=429.597339$  (BKJD)





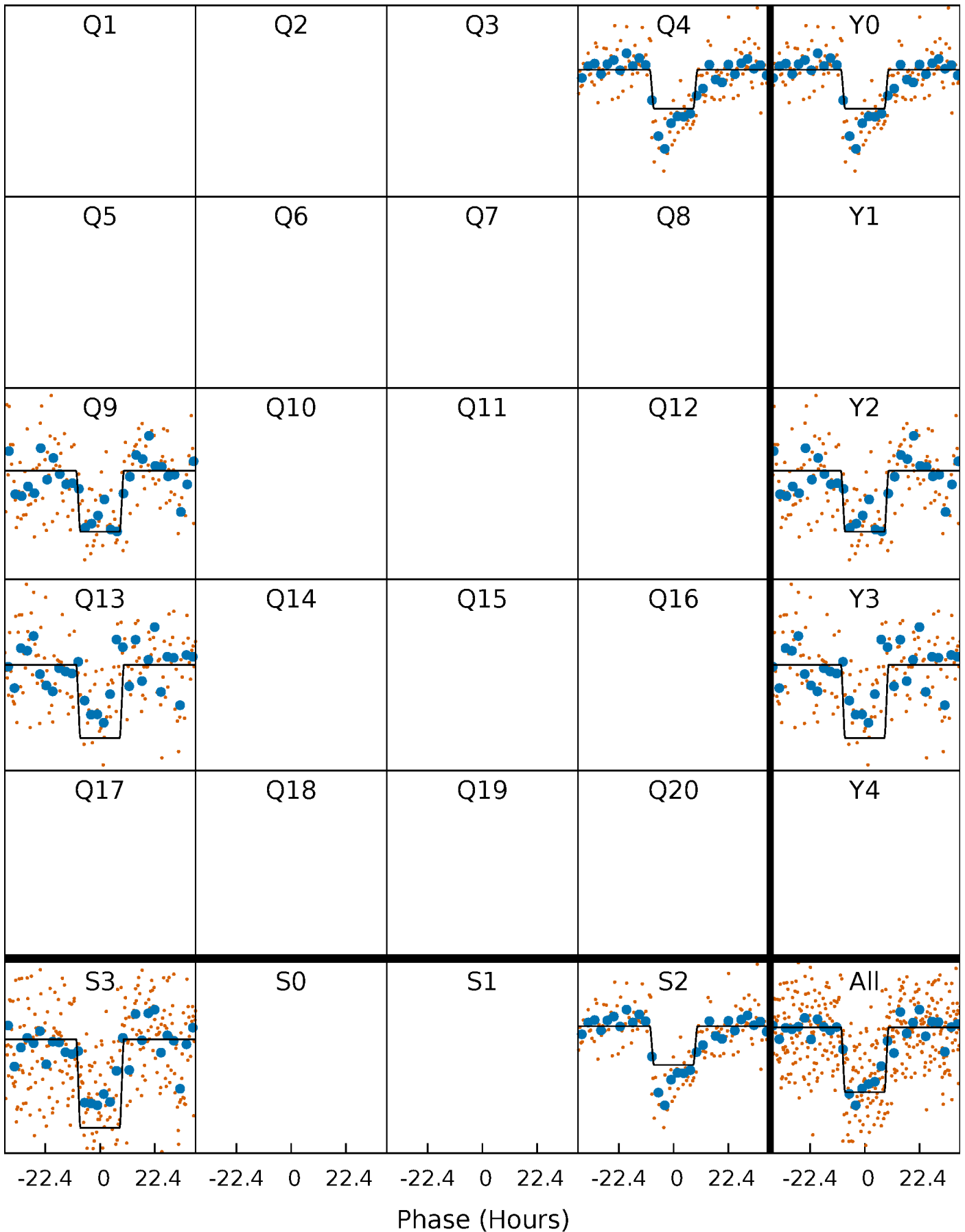
# DV Quarter-Phased Transit Curves

TCE 009710998-01     $P=389.458426$  Days     $T_0=429.597339$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

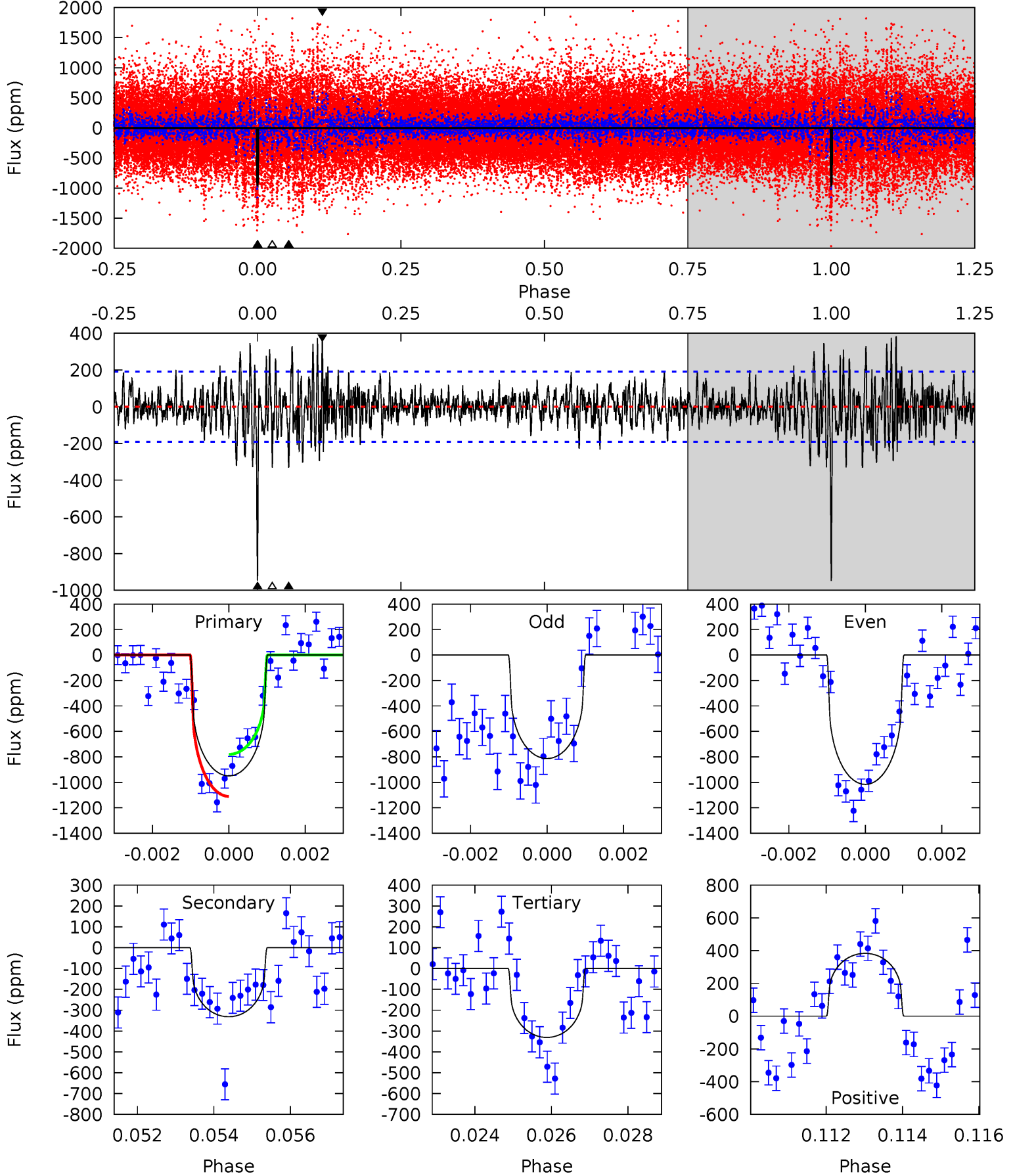
TCE 009710998-01     $P=389.456842$  Days     $T_0=429.598843$  (BKJD)



# DV Model-Shift Uniqueness Test

009710998-01,  $P = 389.458426$  Days,  $E = 40.138913$  Days

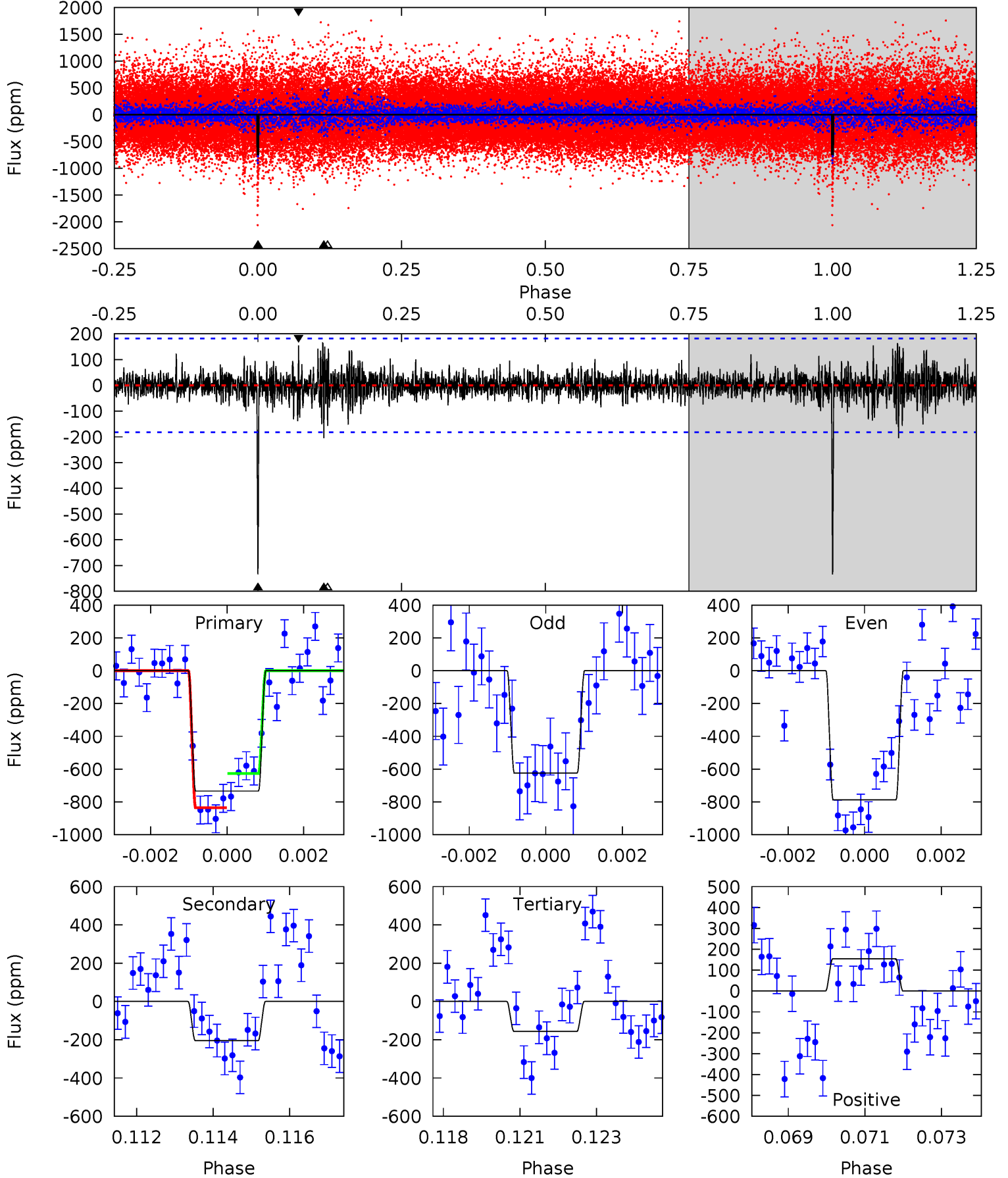
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
26.4	9.21	9.19	10.7	5.31	3.07	2.23	17.2	15.7	0.02	-1.44	2.67	1.14	0.29	4.58



# Alt Model-Shift Uniqueness Test

009710998-01,  $P = 389.456842$  Days,  $E = 40.142001$  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
21.5	5.99	4.59	4.52	5.32	3.08	0.94	16.9	16.9	1.40	1.47	2.26	1.14	0.18	3.04



### Stellar Parameters For KIC 009710998

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$4377^{+131}_{-131}$	$4.640^{+0.049}_{-0.025}$	$-0.320^{+0.300}_{-0.300}$	$0.617^{+0.045}_{-0.056}$	$0.606^{+0.070}_{-0.047}$	$3.639^{+0.839}_{-0.415}$
	$+3\%/-3\%$	$+1\%/-1\%$	$+94\%/-94\%$	$+7\%/-9\%$	$+12\%/-8\%$	$+23\%/-11\%$
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 009710998-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-332 \pm 36$	$1.95^{+0.88}_{-0.82}$	$224^{+8}_{-7}$	$3689^{+858}_{-402}$	$37815^{+75614}_{-20015}$
Alt.	$-205 \pm 34$	$1.89^{+0.92}_{-0.78}$	$224^{+8}_{-8}$	$3452^{+712}_{-394}$	$24364^{+45869}_{-13505}$

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

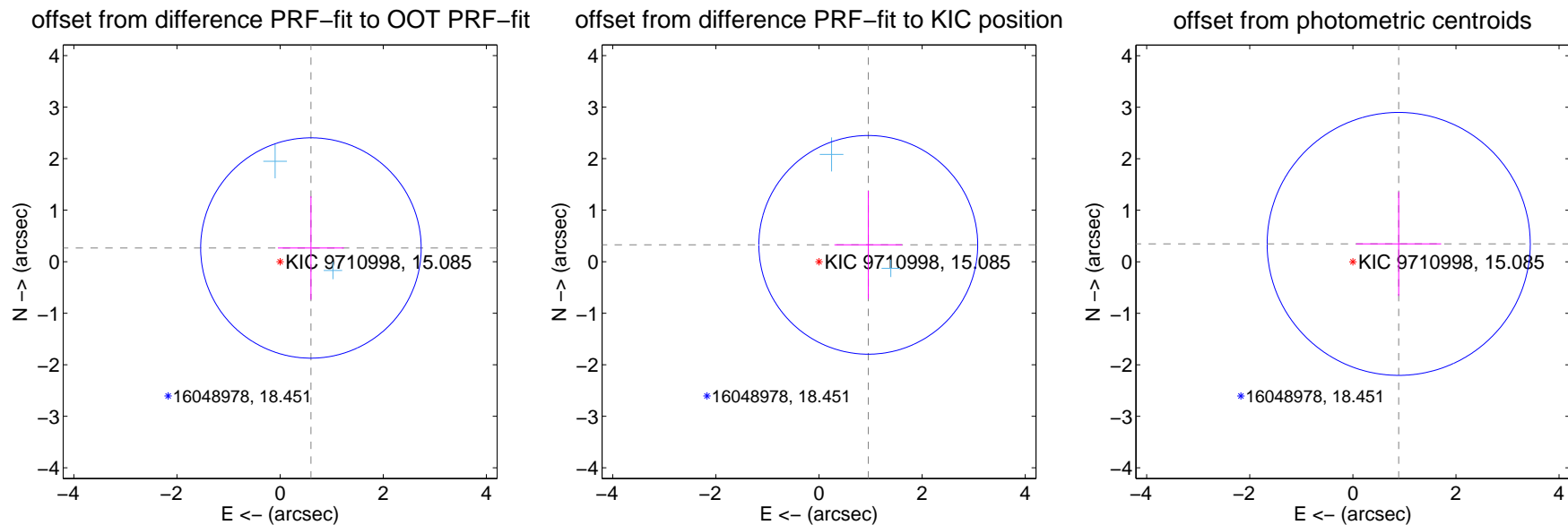
## DV Centroid Data

Supplemental centroid analysis for 009710998-01. Kepler magnitude: 15.09. Transit SNR 12.68

There are 2 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.37 arcsec

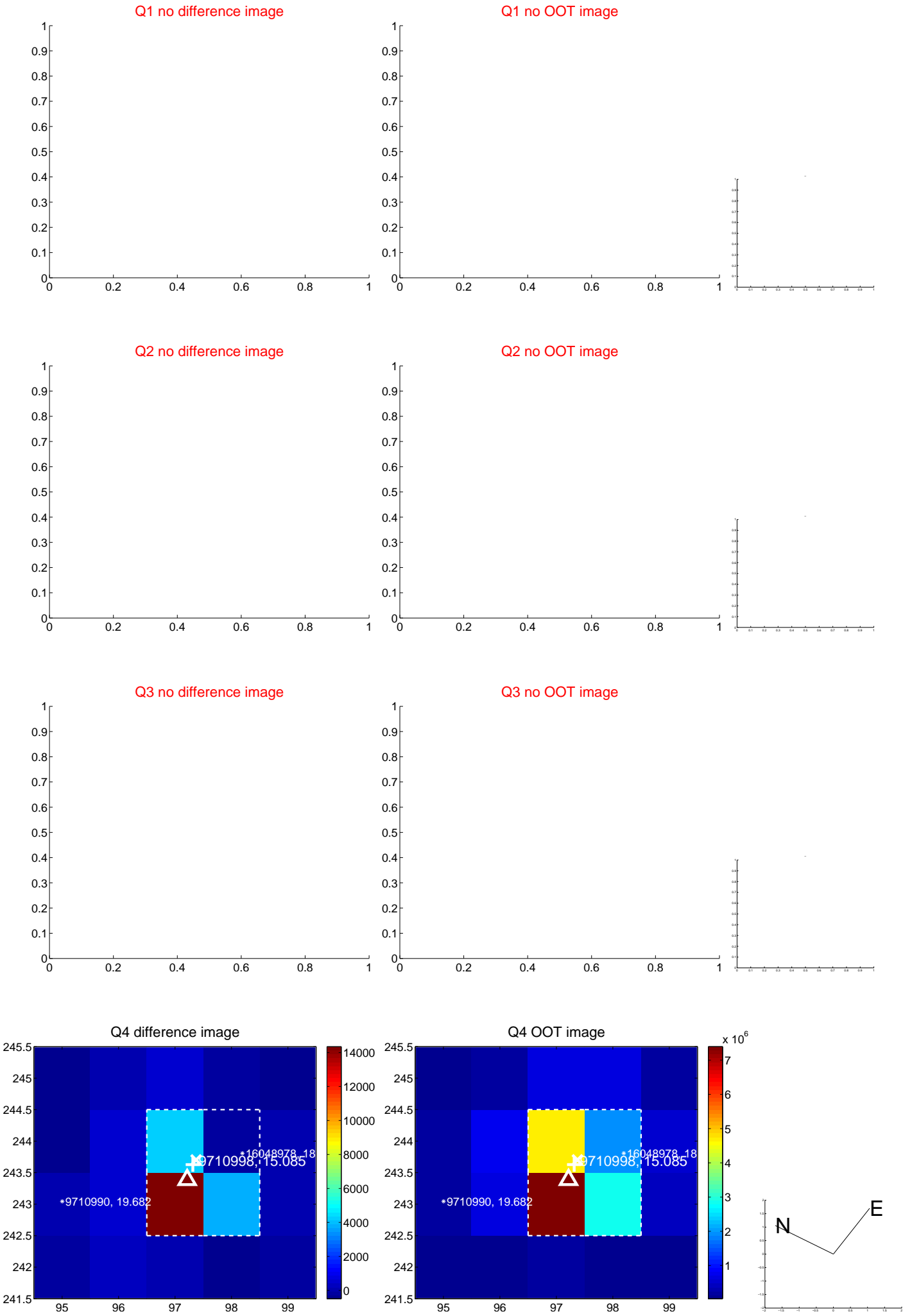
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.654 \pm 0.713$	0.92	$-0.598 \pm 0.640$	$0.266 \pm 1.004$
PRF-fit source offset from KIC position	$1.010 \pm 0.708$	1.43	$-0.956 \pm 0.656$	$0.327 \pm 1.048$
photometric centroid source offset	$0.95 \pm 0.85$	1.12	$-0.89 \pm 0.82$	$0.35 \pm 1.01$



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.



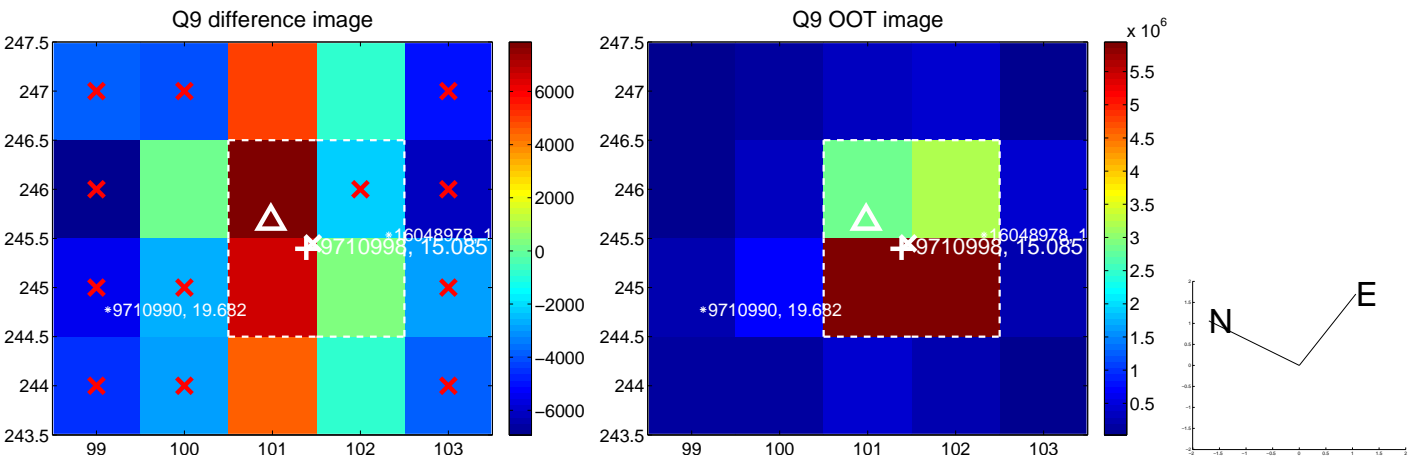
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



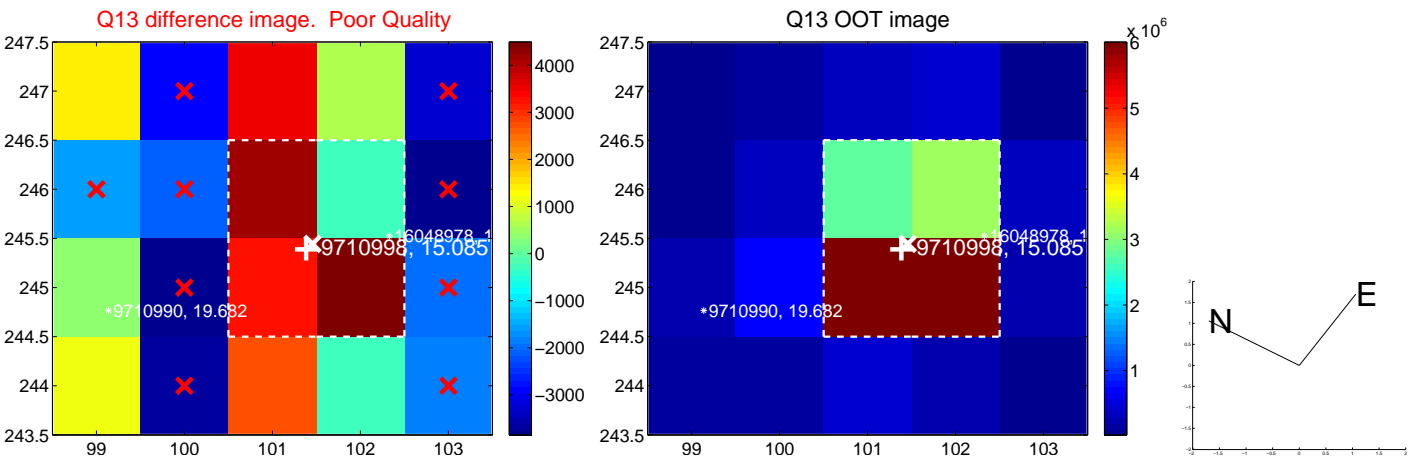
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



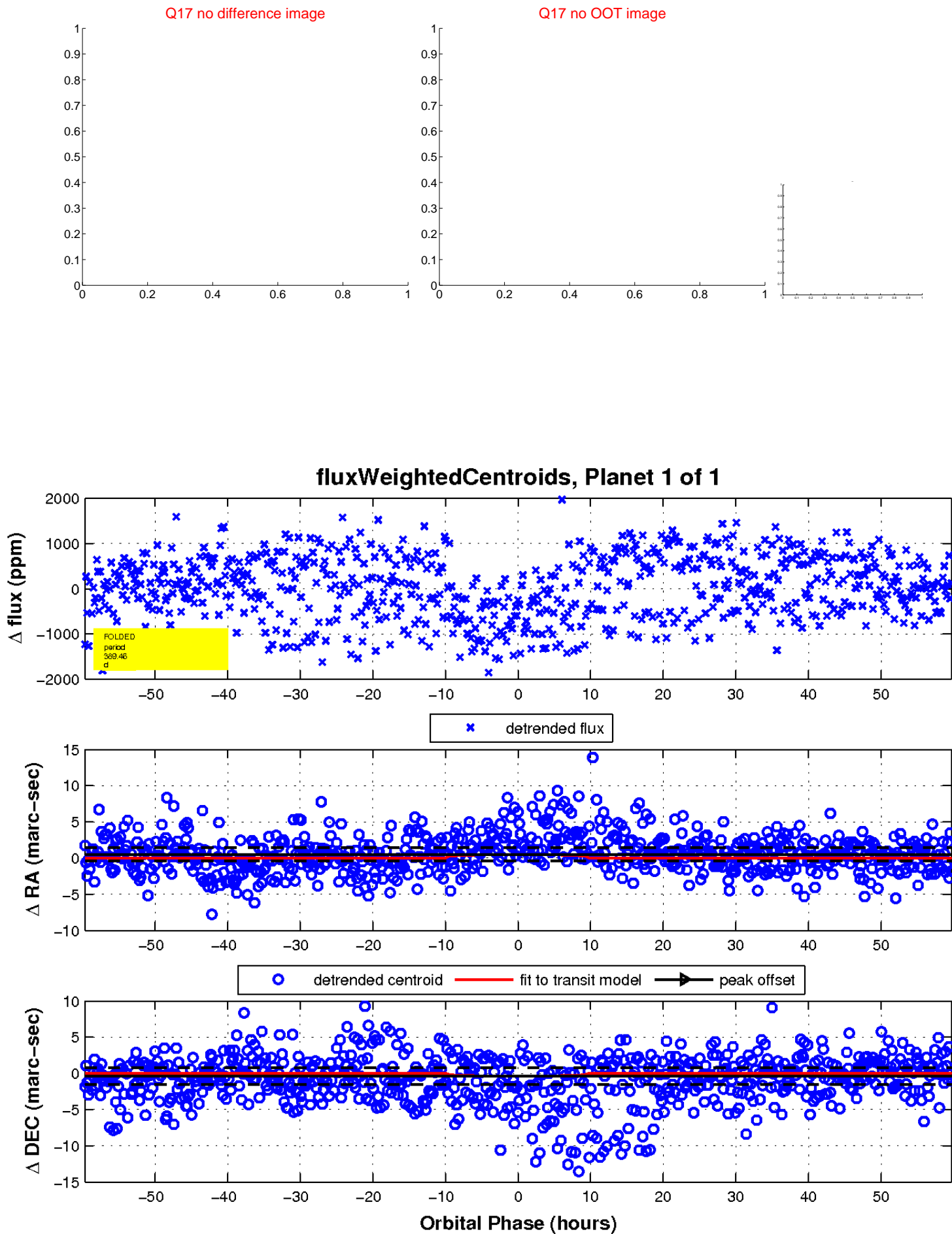
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

Declination

