

# KIC 002310993

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
002310993-01	OBS	4938.01	55.187829	147.599762	439.8	7.792	8.7	8.6	1.08	6306	2.47	18.82

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
002310993-01	OBS	PC	1.00	0	0	0	0	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 002310993-01

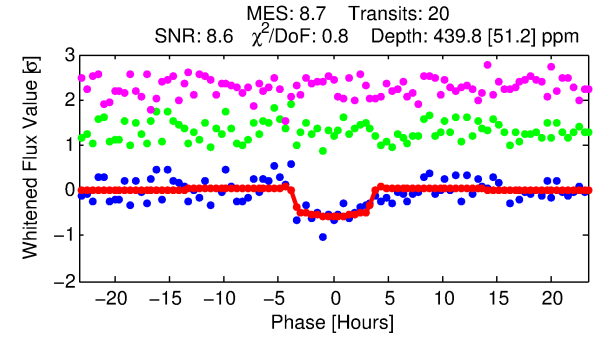
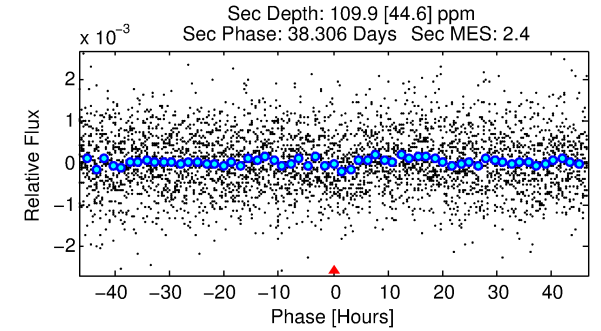
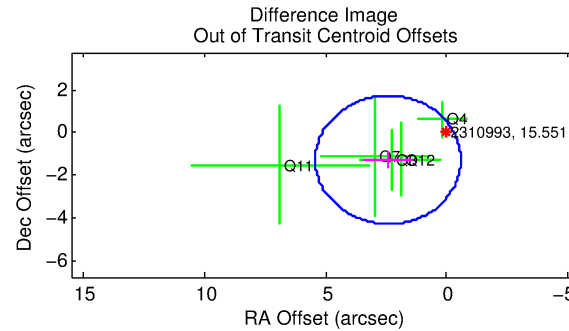
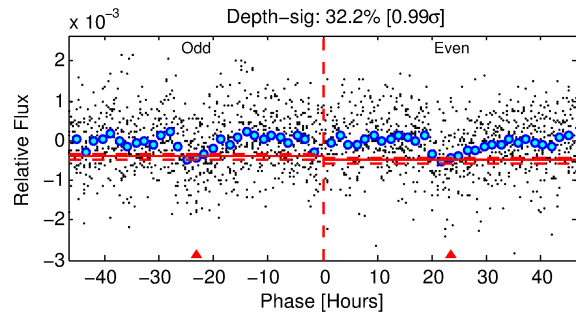
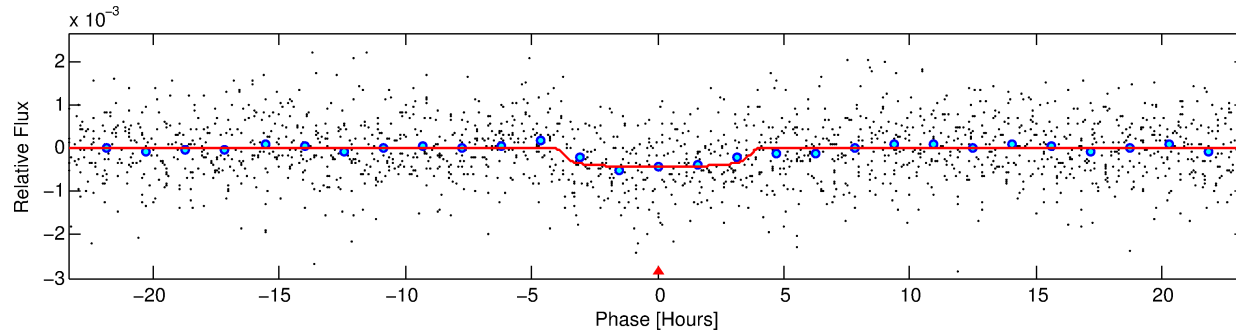
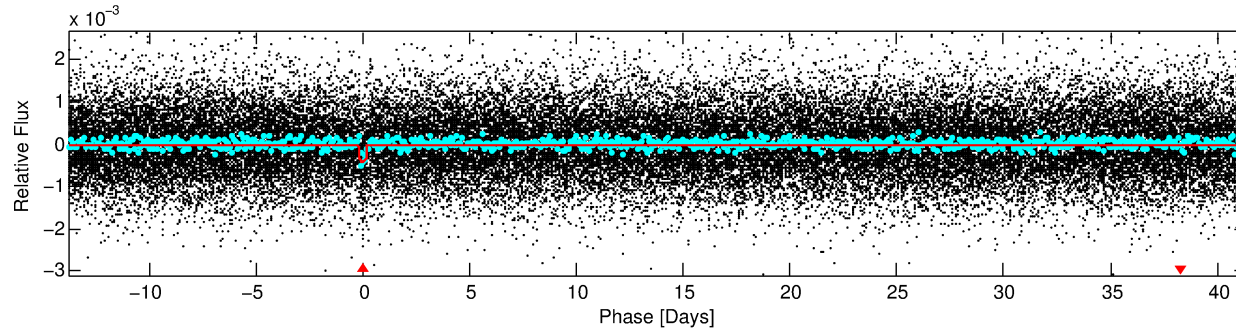
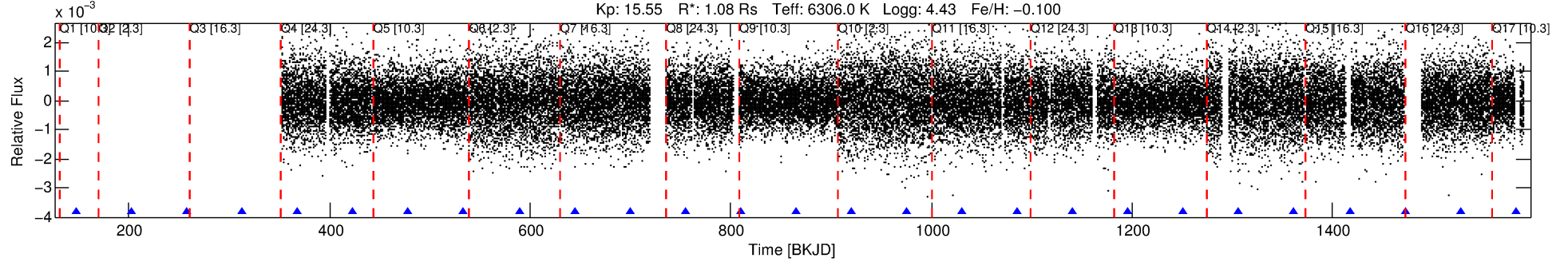
No Significant Match Found

# DV One-Page Summary

KIC: 2310993 Candidate: 1 of 1 Period: 55.188 d

KOI: K04938.01 Corr: 0.913

Kp: 15.55 R\*: 1.08 Rs Teff: 6306.0 K Logg: 4.43 Fe/H: -0.100



## DV Fit Results:

Period = 55.18783 [0.00126] d  
Epoch = 147.5998 [0.0189] BKJD  
Rp/R\* = 0.0210 [0.0090]  
a/R\* = 36.14 [80.32]  
b = 0.77 [1.17]  
Seff = 18.82 [7.82]  
Teq = 531 [55] K  
Rp = 2.47 [1.31] Re  
a = 0.2952 [0.0773] AU  
Ag = 864.95 [884.65] [0.98σ]  
Teff = 4453 [1073] K [3.65σ]

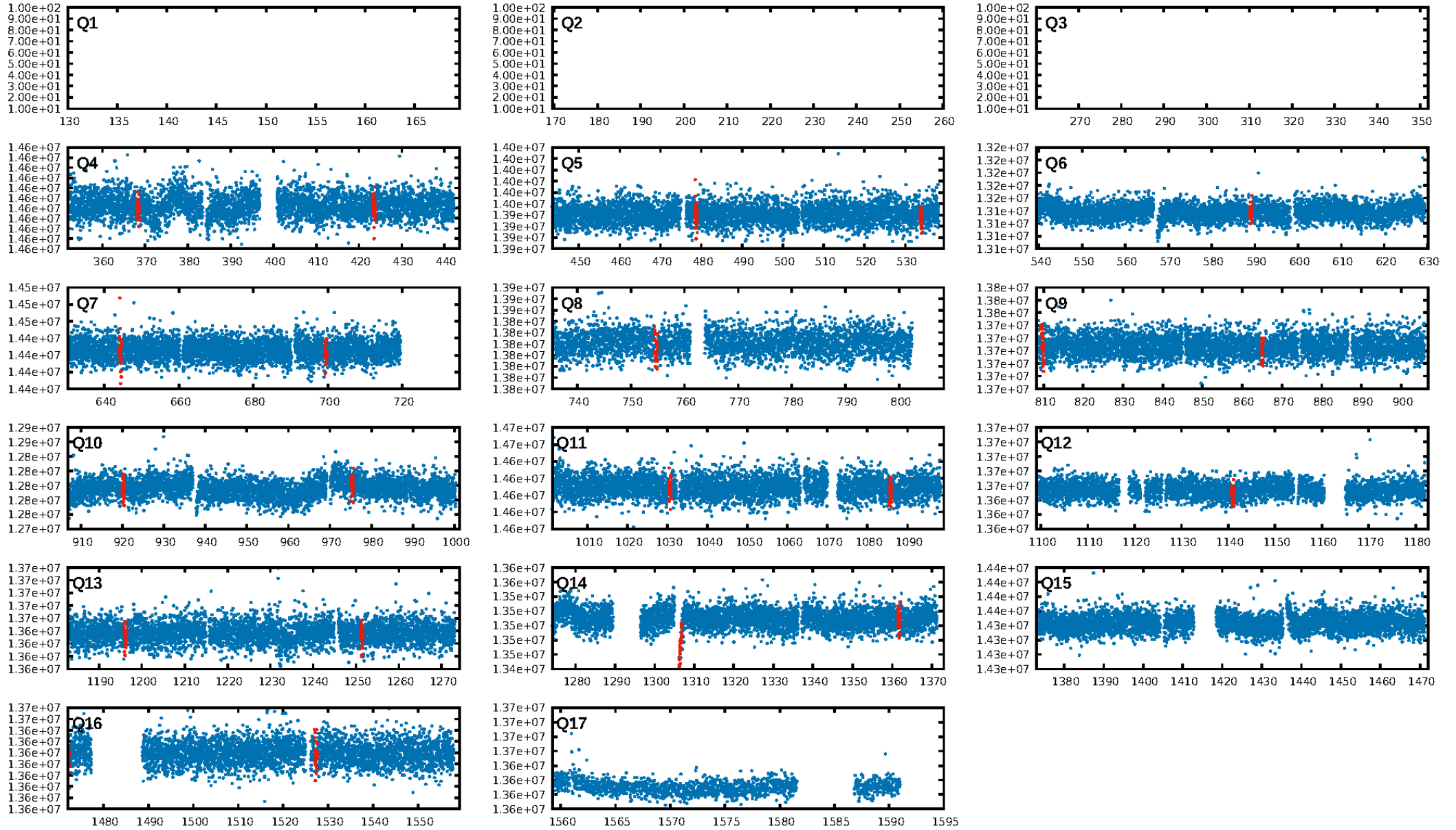
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 89.6%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 4.45e-17  
RollingBand-fgt: 1.00 [20/20]  
GhostDiagnostic-chr: -1.223  
Centroid-sig: 1.7%  
**Centroid-so: 2.739 arcsec [3.41σ]**  
OotOffset-rm: 2.739 arcsec [2.74σ]  
KicOffset-rm: 0.969 arcsec [1.16σ]  
OotOffset-st: 0/2/3/0 [5]  
KicOffset-st: 1/2/3/0 [6]  
DiffImageQuality-fgm: 0.50 [3/6]  
DiffImageOverlap-fno: 1.00 [11/11]

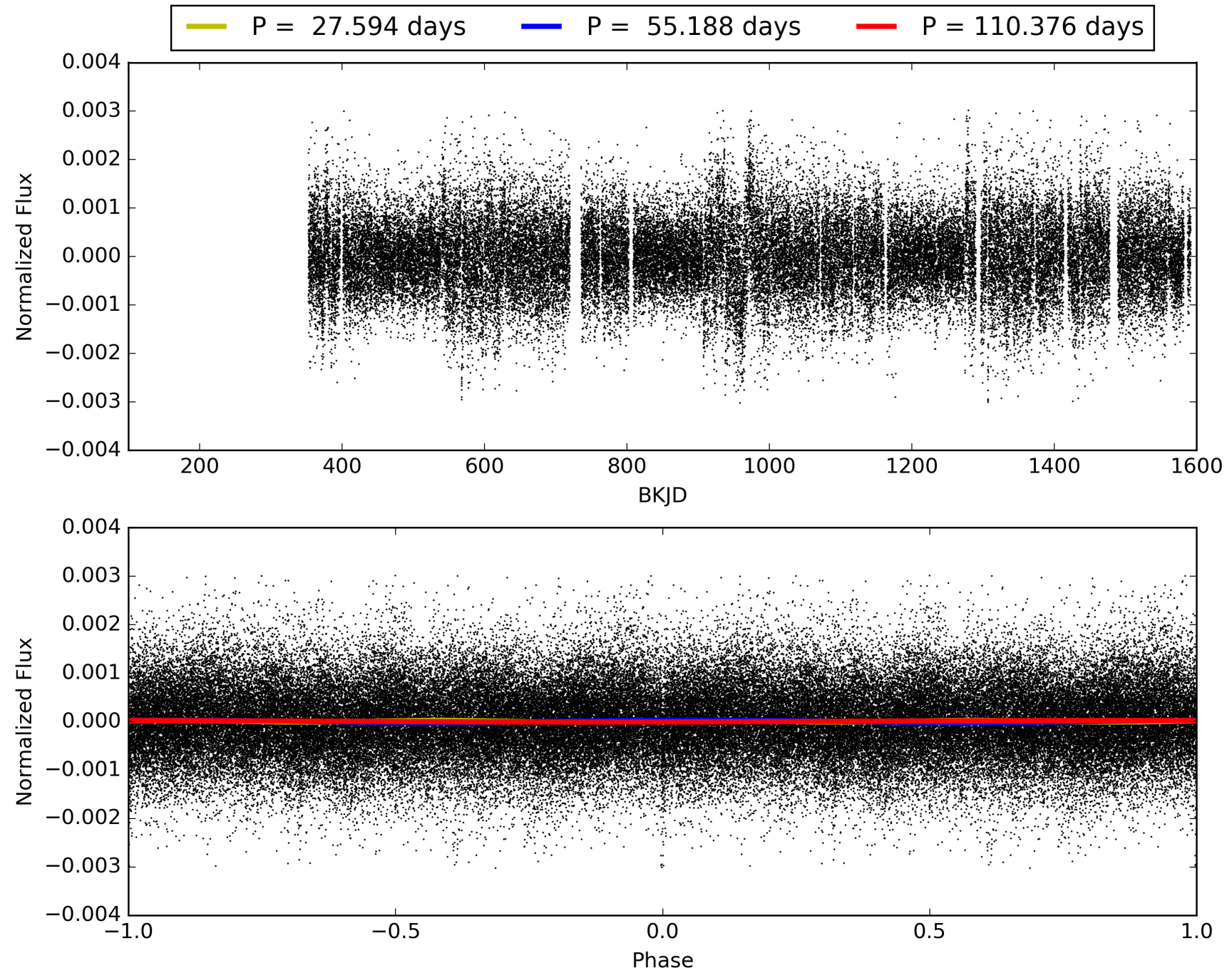
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 19:53:04 Z

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

# TCE 002310993-01, PDC Light Curves

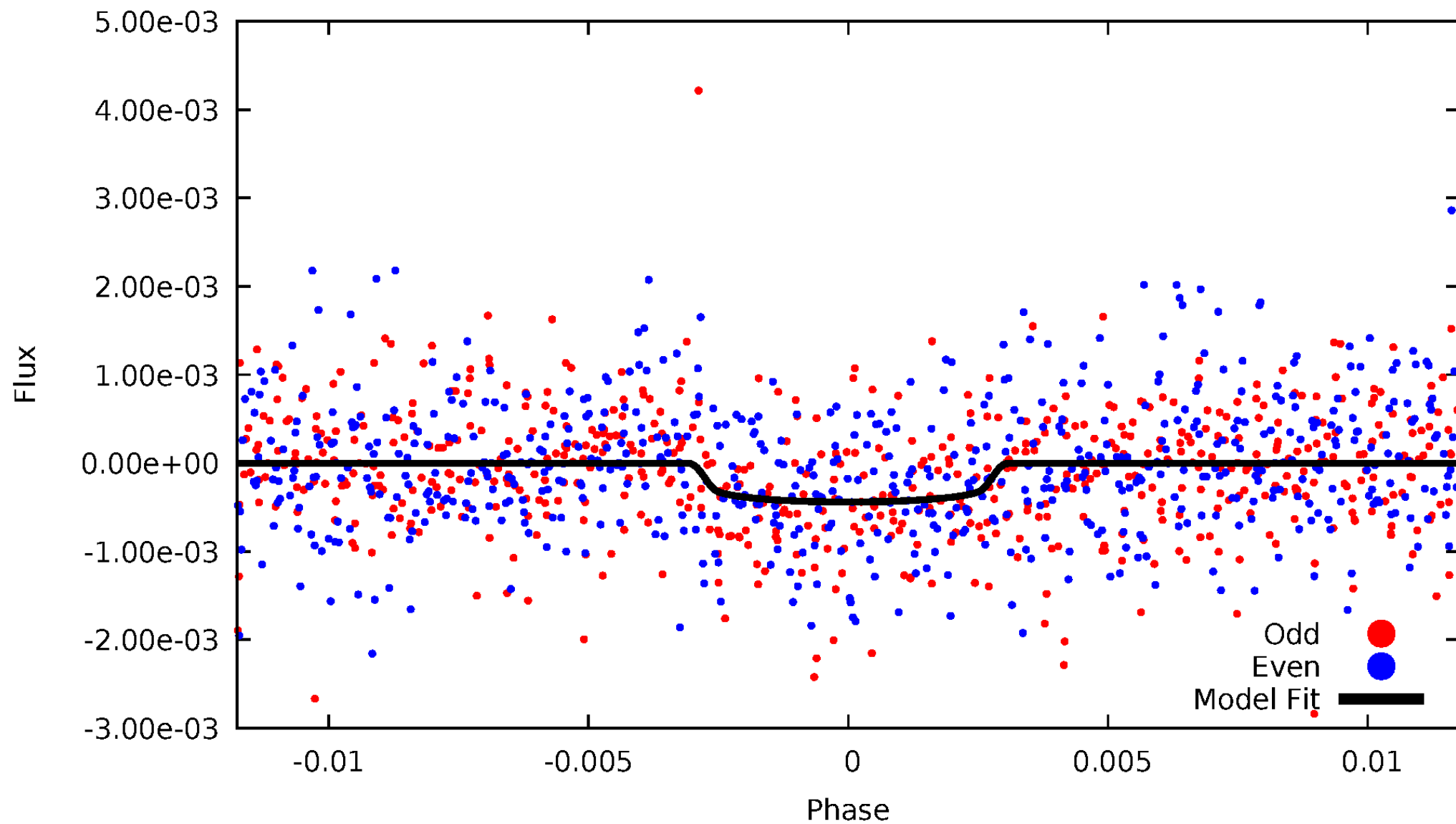


TCE 002310993-01



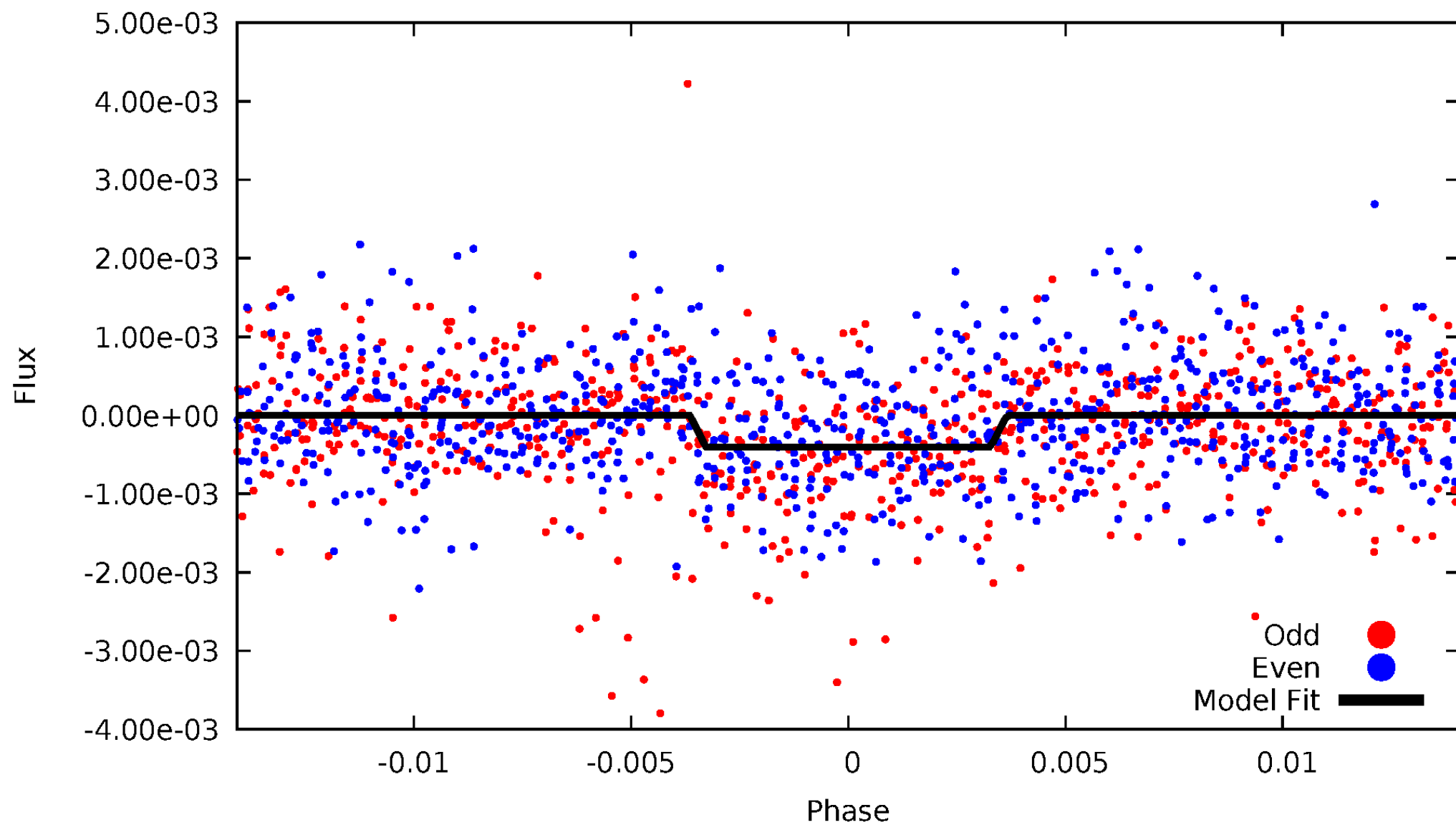
# DV Odd/Even

TCE 002310993-01



# ALT Odd/Even

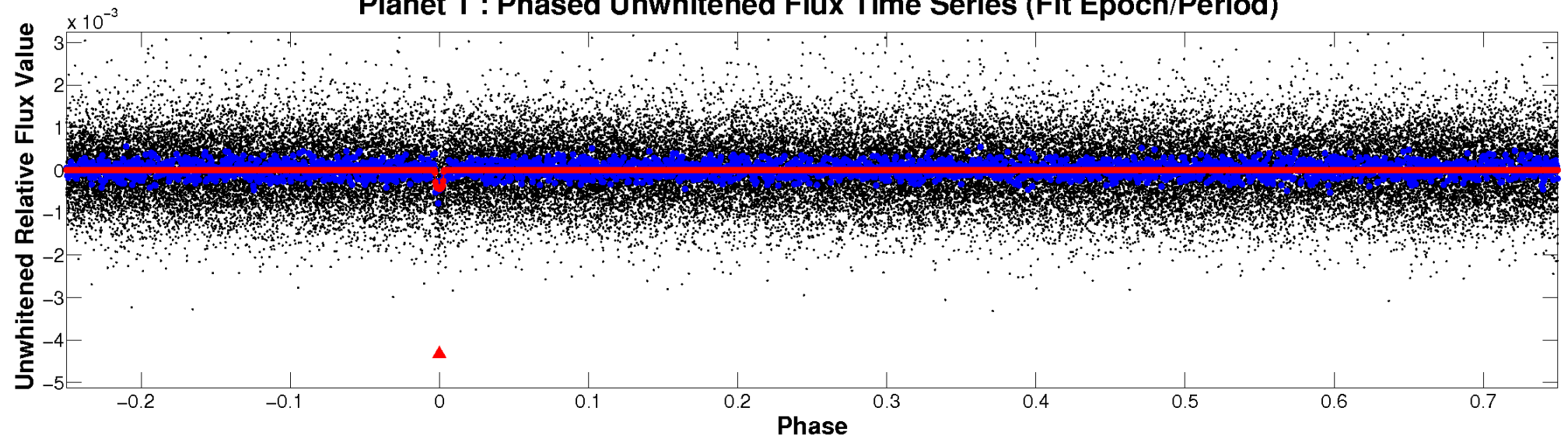
TCE 002310993-01



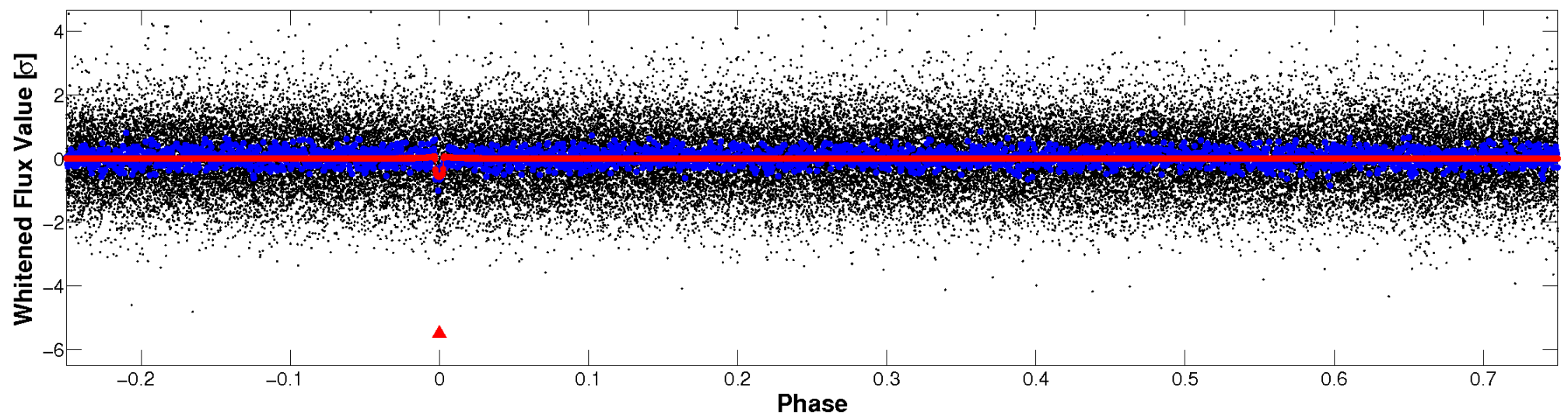


# Non-Whitened Vs. Whitened Light Curve

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

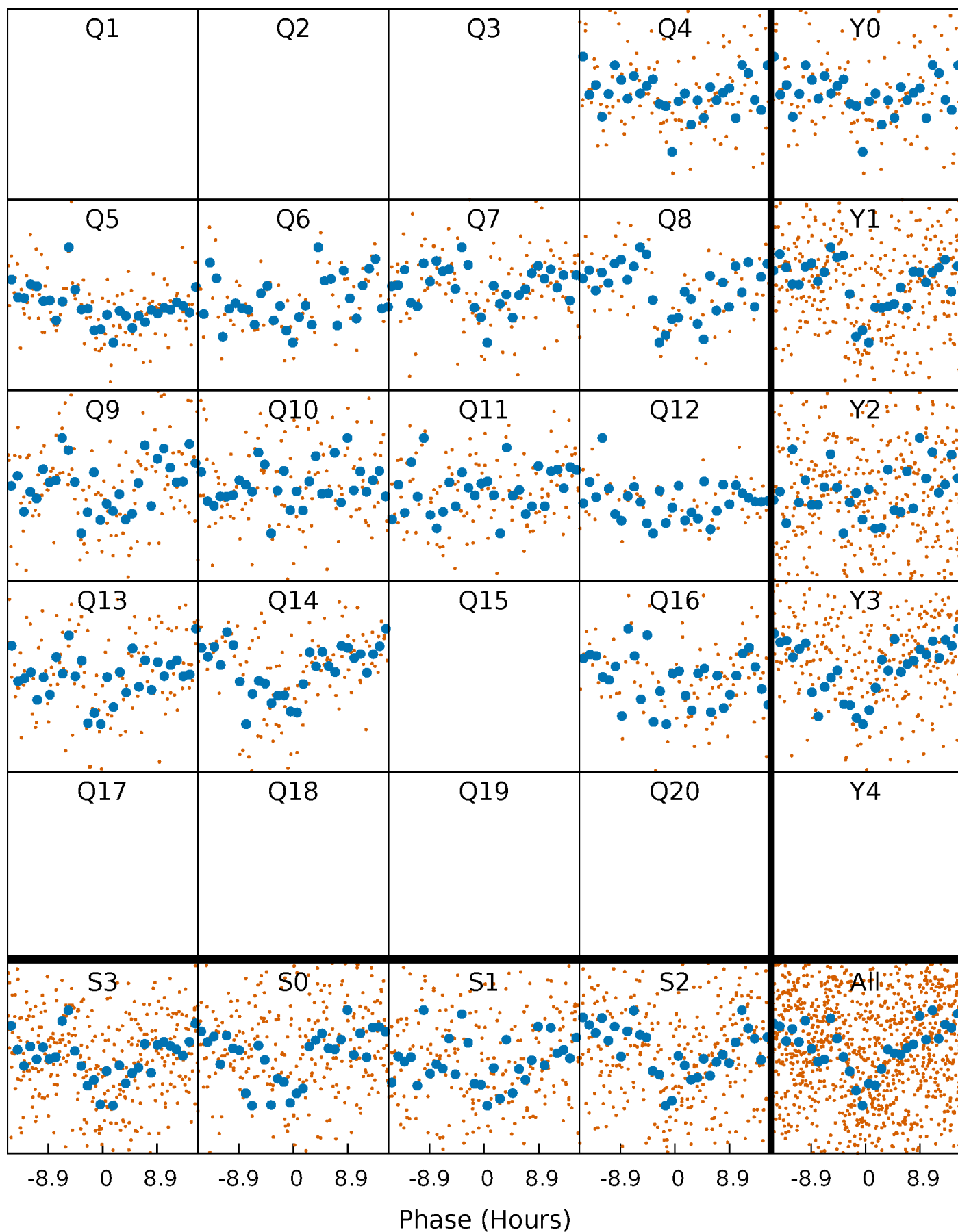


**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

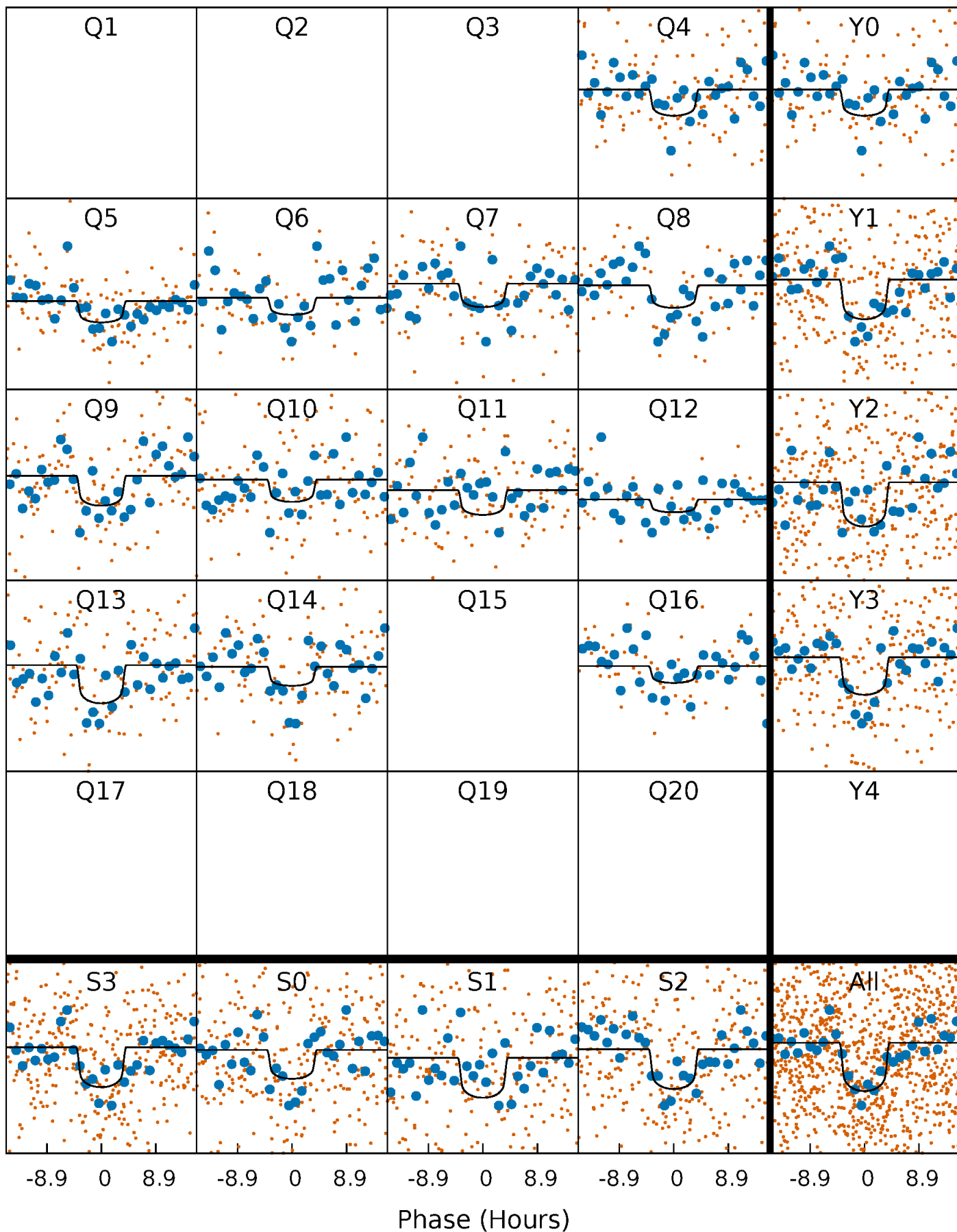
TCE 002310993-01 P= 55.187829 Days  $T_0=147.599762$  (BKJD)





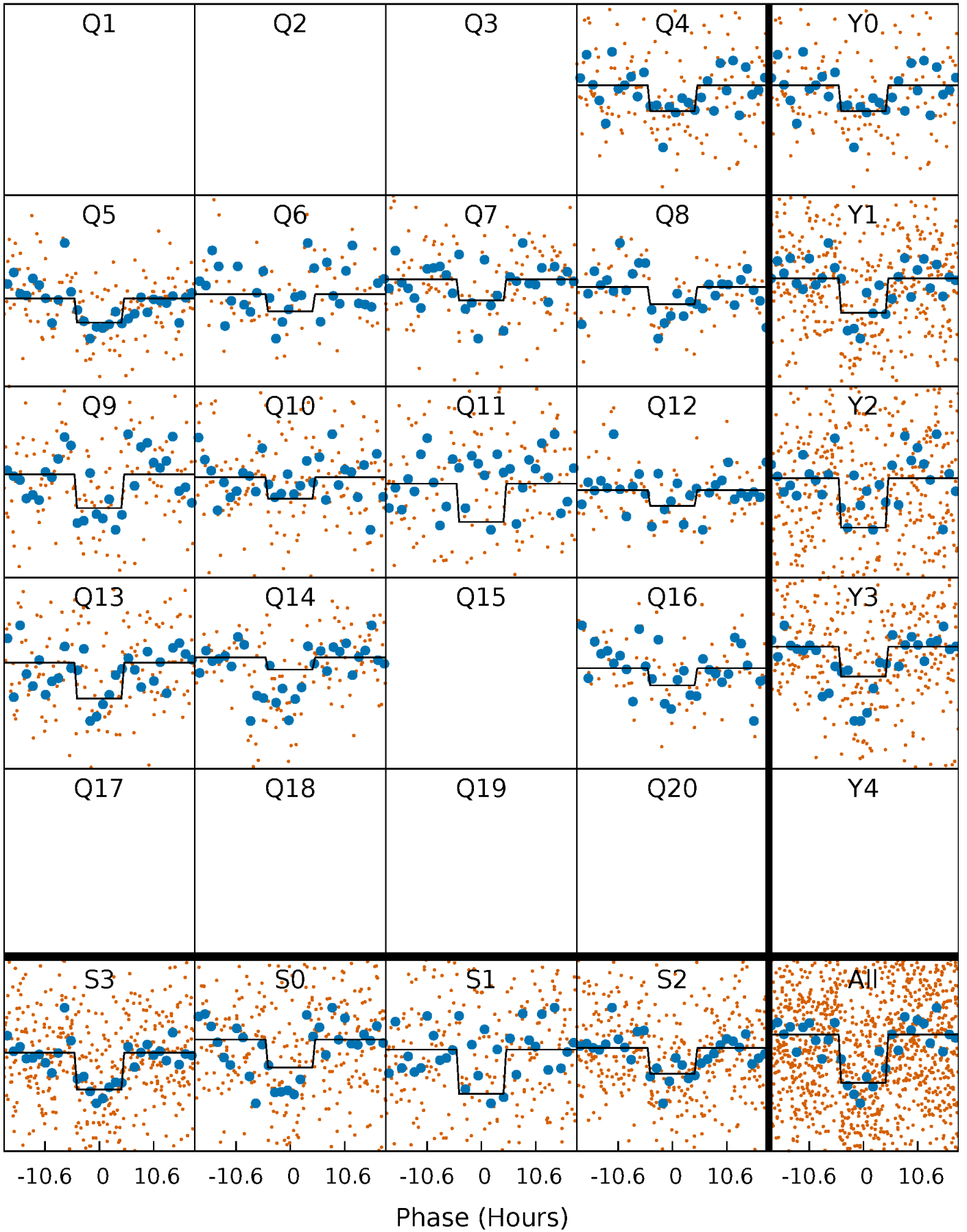
# DV Quarter-Phased Transit Curves

TCE 002310993-01 P= 55.187829 Days  $T_0=147.599762$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

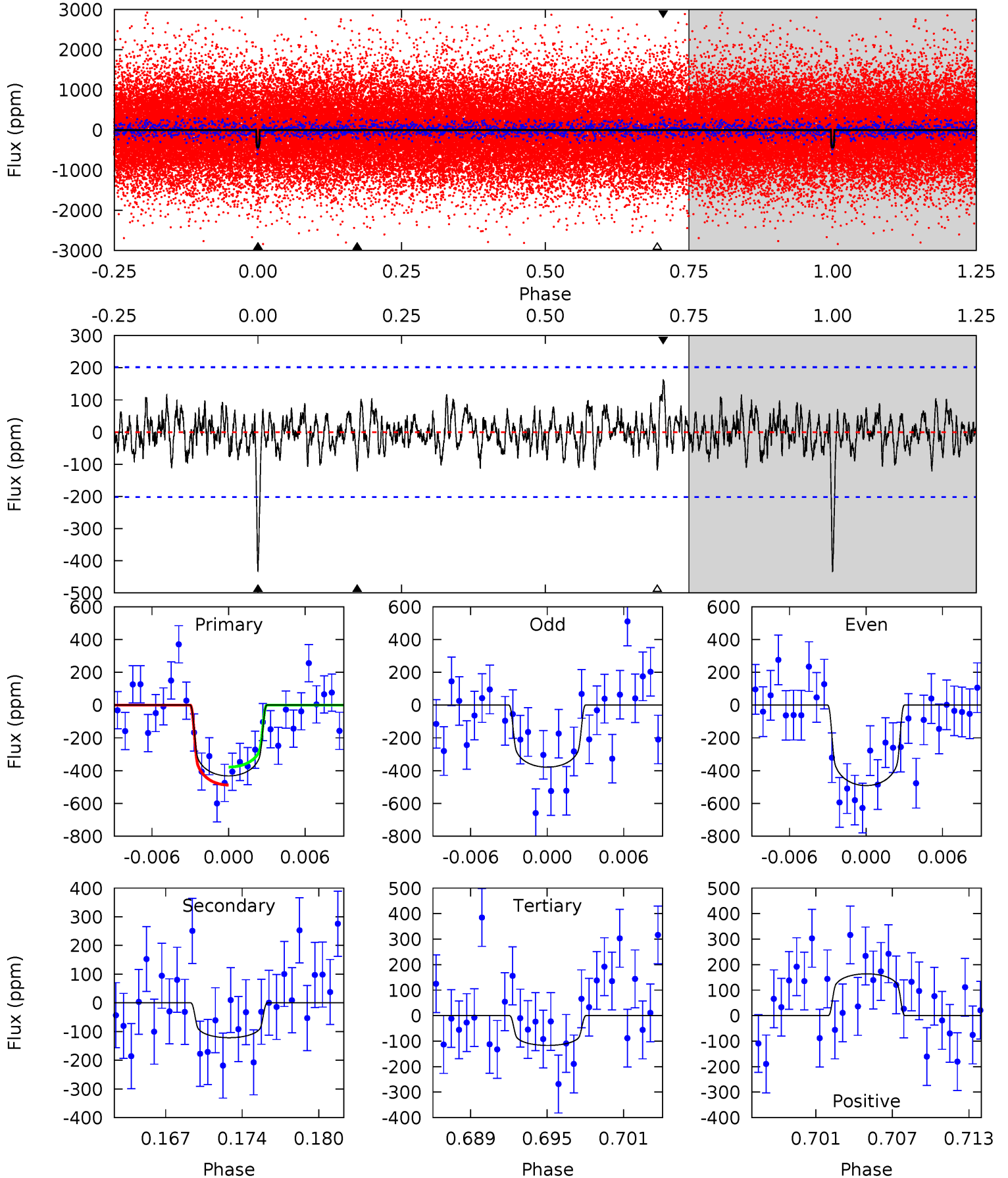
TCE 002310993-01 P= 55.182267 Days  $T_0=147.694734$  (BKJD)



# DV Model-Shift Uniqueness Test

002310993-01, P = 55.187829 Days, E = 147.599762 Days

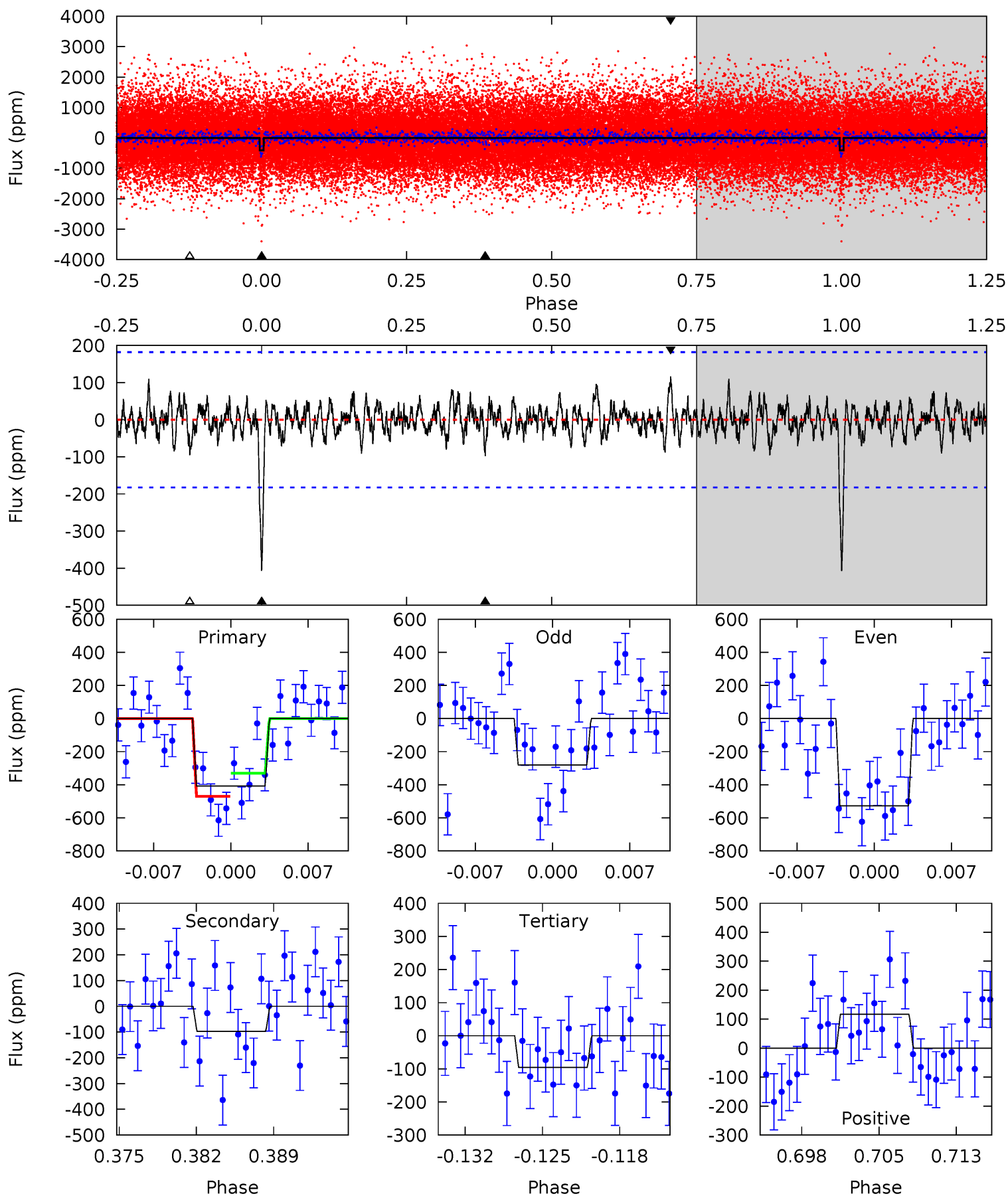
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
11.0	3.08	2.96	4.16	5.12	2.74	1.10	8.00	6.81	0.12	-1.08	1.43	1.00	0.27	1.39



# Alt Model-Shift Uniqueness Test

002310993-01, P = 55.182267 Days, E = 147.694734 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
11.4	2.72	2.67	3.26	5.09	2.68	0.90	8.70	8.11	0.05	-0.54	3.45	1.02	0.22	1.95



### Stellar Parameters For KIC 002310993

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6306^{+174}_{-261}$	$4.426^{+0.065}_{-0.208}$	$-0.100^{+0.250}_{-0.300}$	$1.076^{+0.335}_{-0.134}$	$1.126^{+0.157}_{-0.157}$	$1.272^{+0.435}_{-0.629}$
	+3%/-4%	+1%/-5%	+250%/-300%	+31%/-12%	+14%/-14%	+34%/-49%
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 002310993-01 / KOI 4938.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-121 \pm 39$	$2.52^{+1.25}_{-1.08}$	$753^{+61}_{-40}$	$4708^{+1339}_{-717}$	$876^{+1783}_{-518}$
Alt.	$-98 \pm 36$	$2.50^{+1.16}_{-1.04}$	$753^{+54}_{-38}$	$4503^{+1279}_{-669}$	$704^{+1488}_{-419}$

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

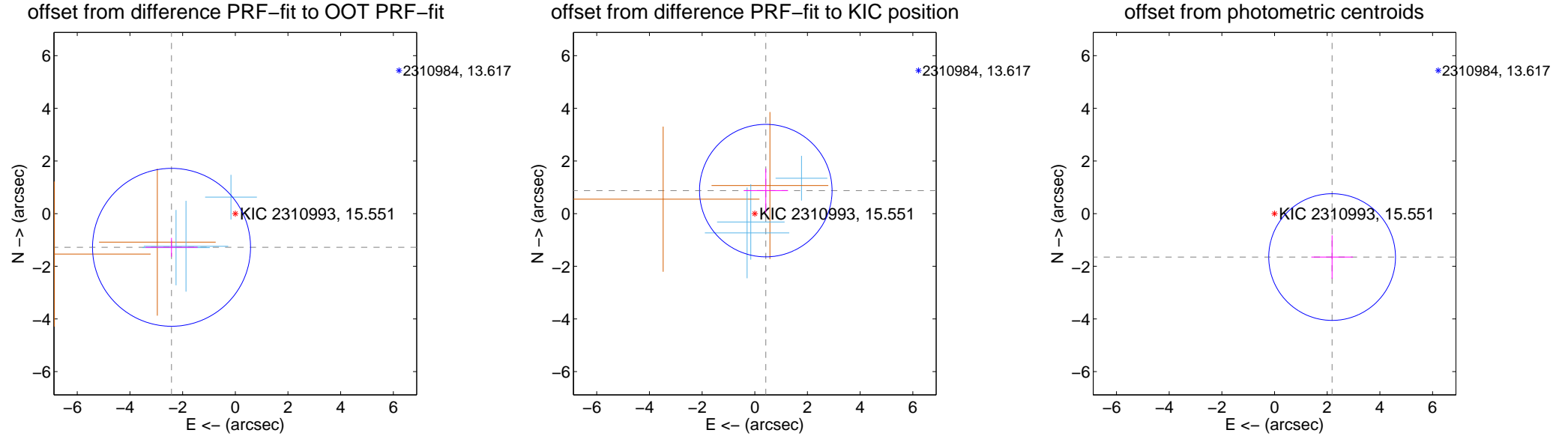
## DV Centroid Data

Supplemental centroid analysis for 002310993-01. Kepler magnitude: 15.55. Transit SNR 8.61

There are 3 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 1.66 arcsec

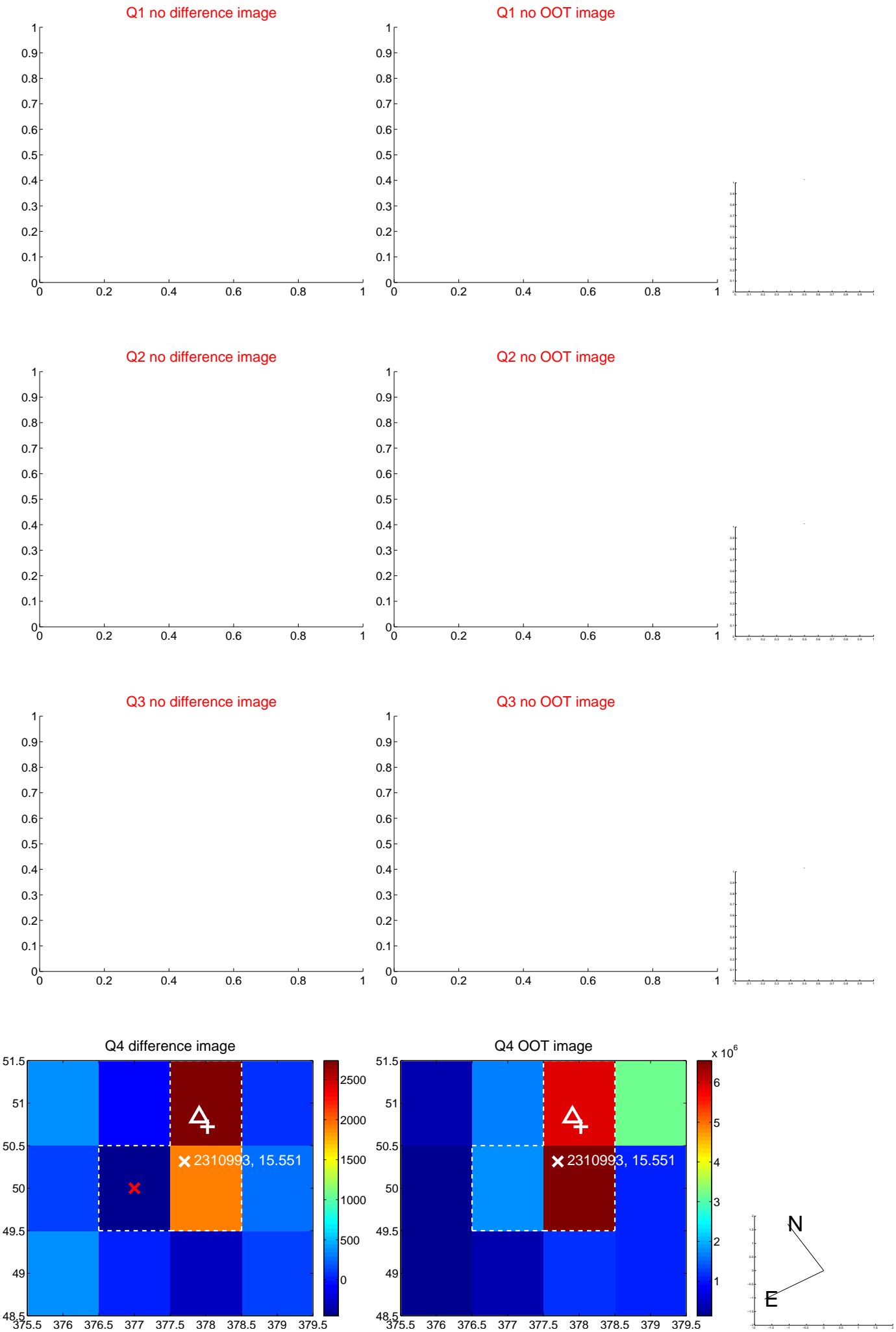
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$2.739 \pm 1.000$	2.74	$2.421 \pm 0.993$	$-1.280 \pm 0.358$
PRF-fit source offset from KIC position	$0.969 \pm 0.839$	1.16	$-0.418 \pm 0.841$	$0.875 \pm 0.838$
photometric centroid source offset	$2.74 \pm 0.80$	3.41	$-2.19 \pm 0.79$	$-1.65 \pm 0.82$



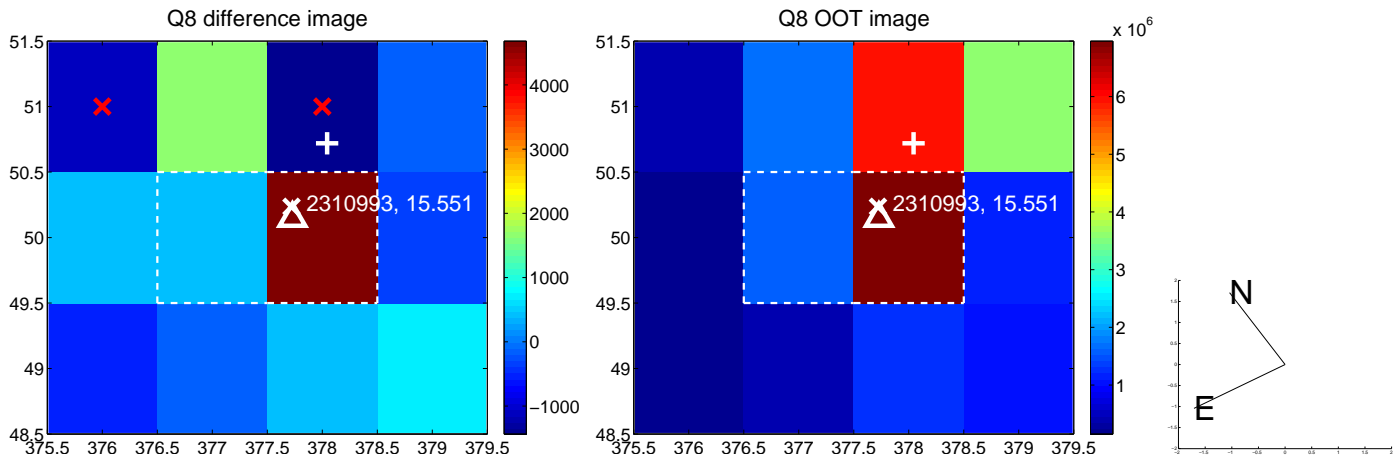
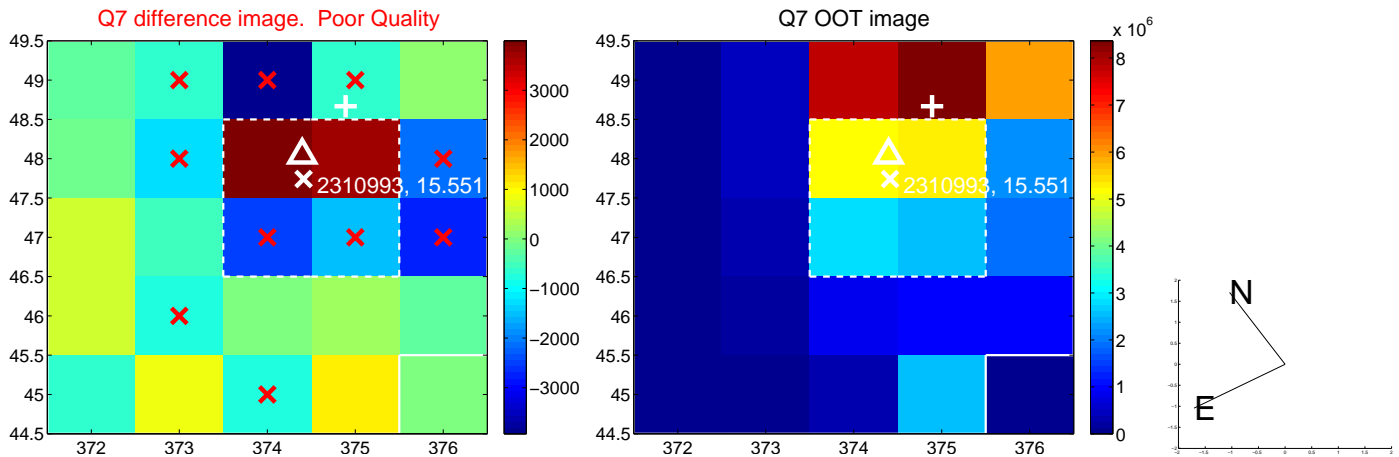
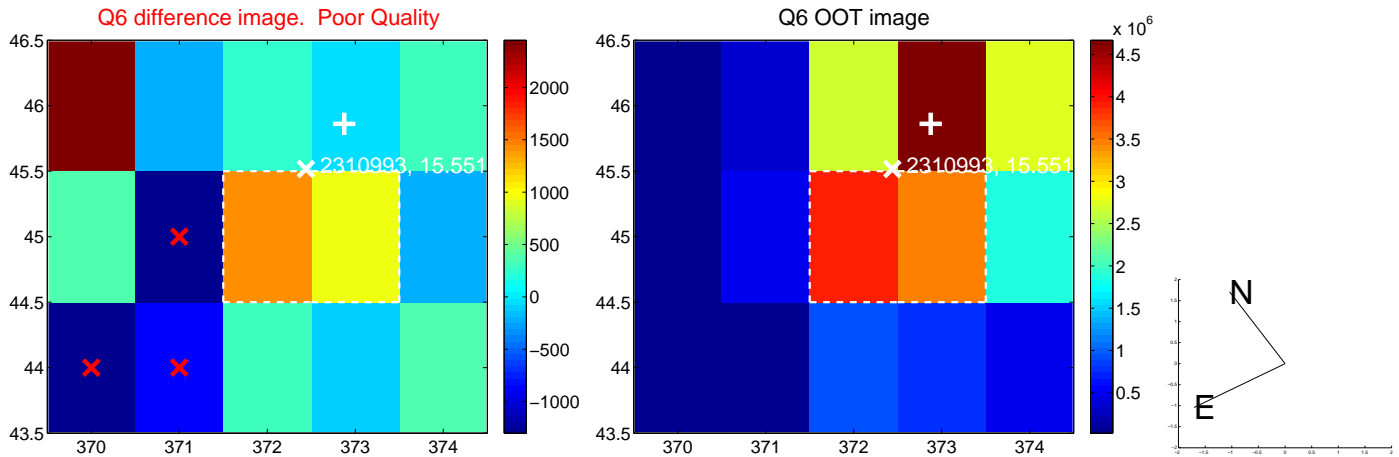
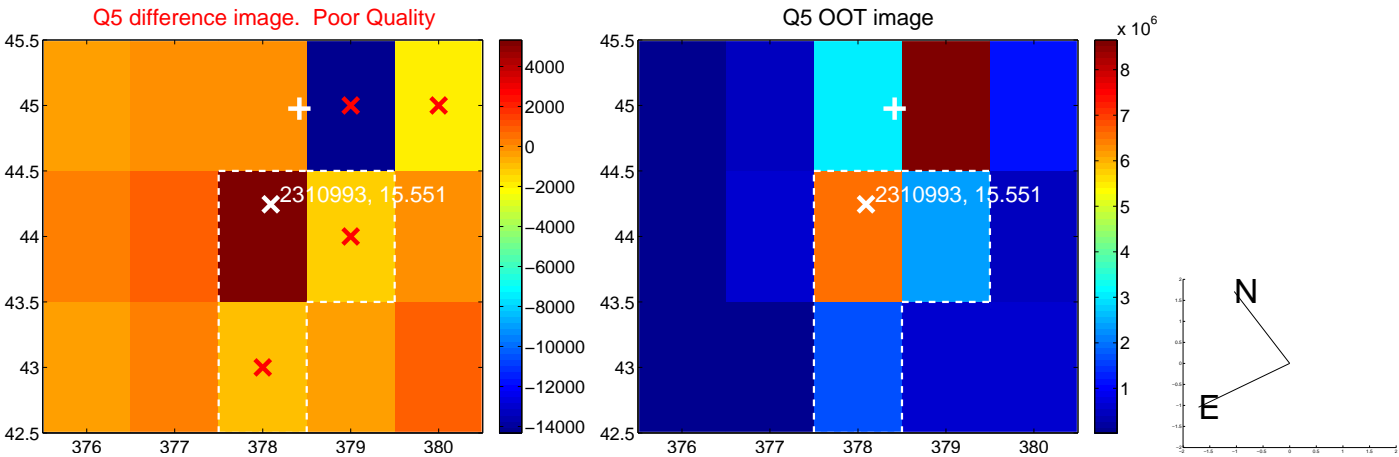
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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



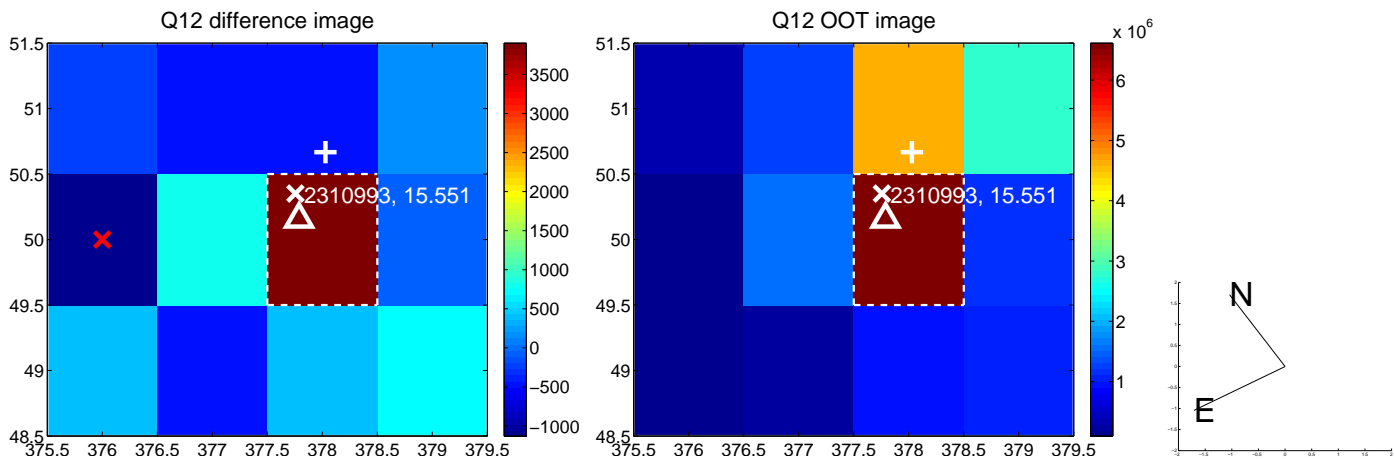
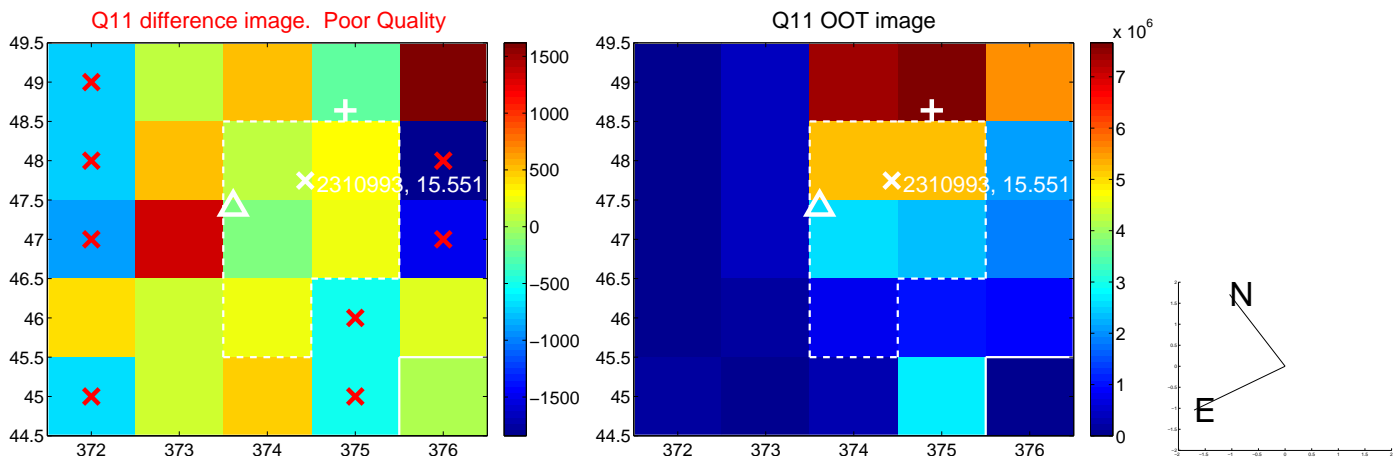
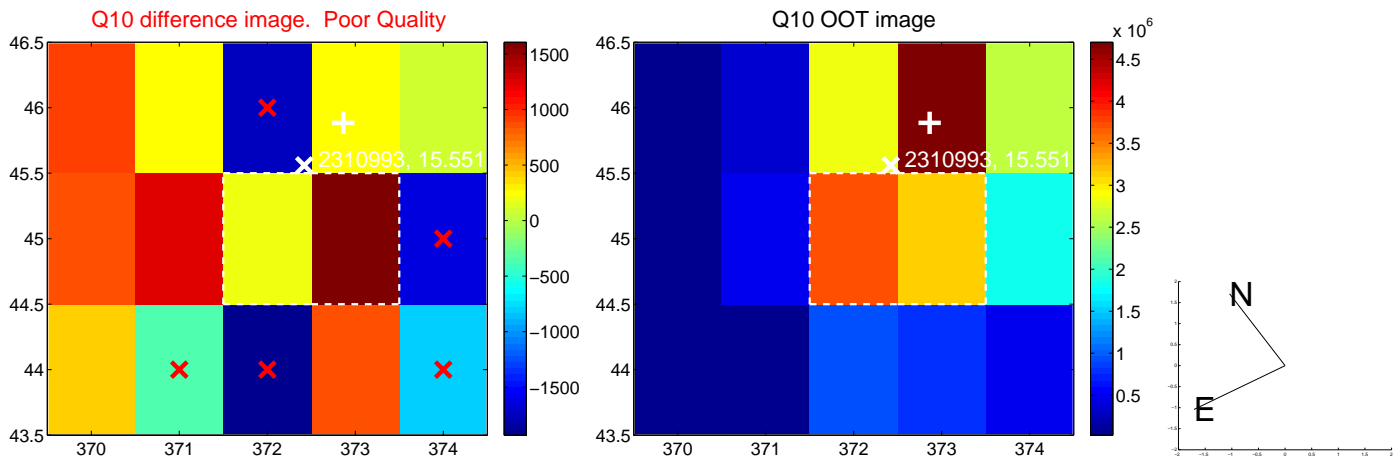
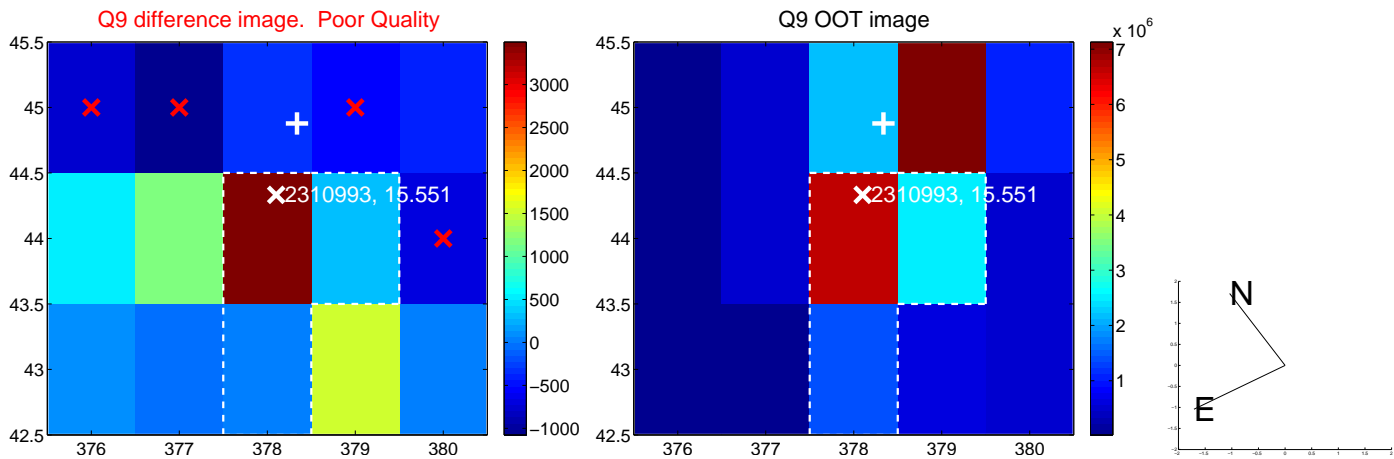
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



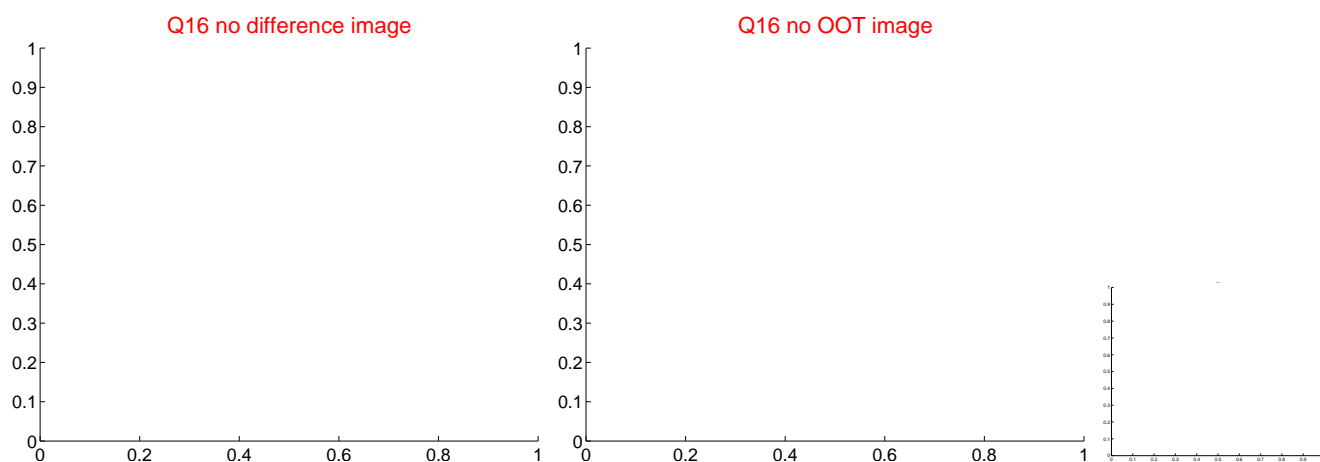
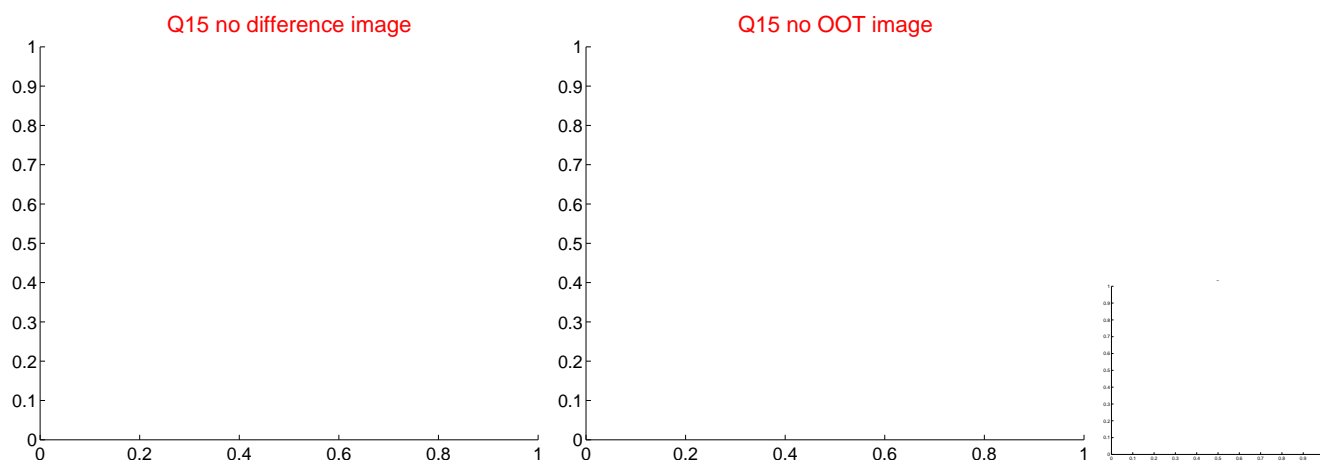
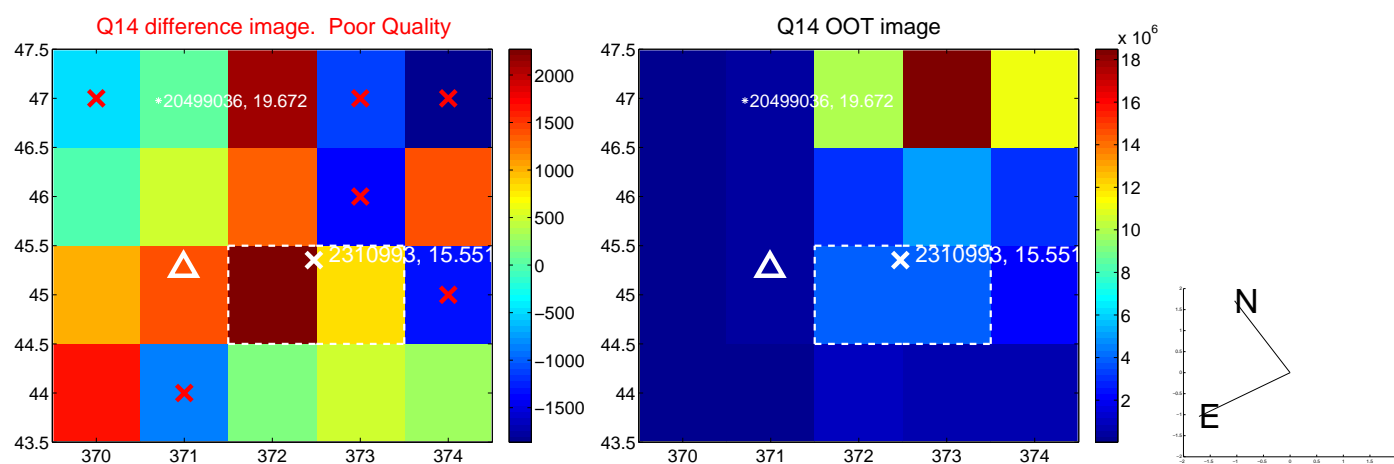
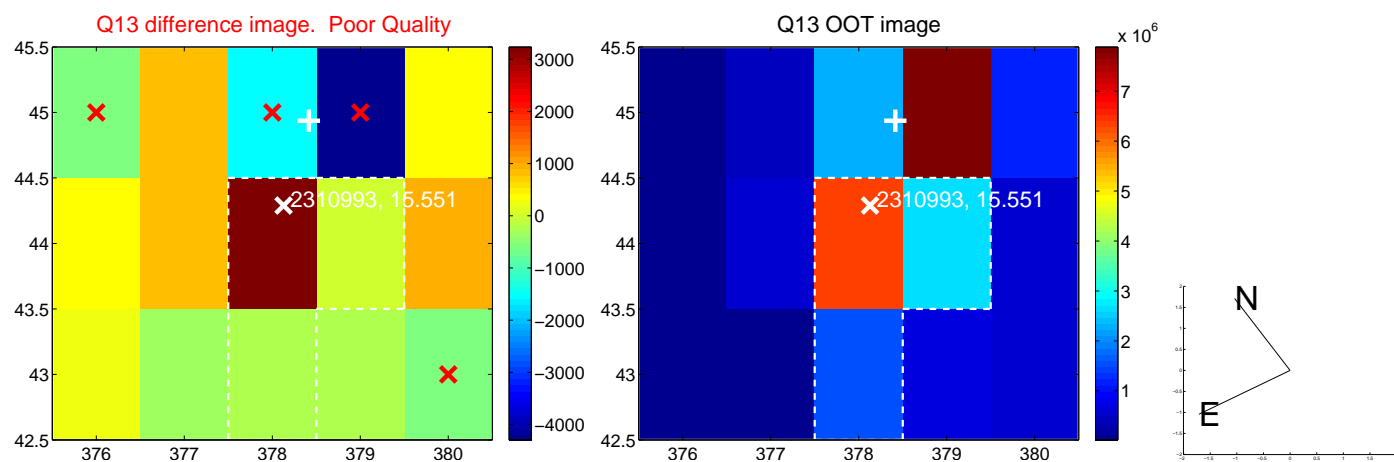
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



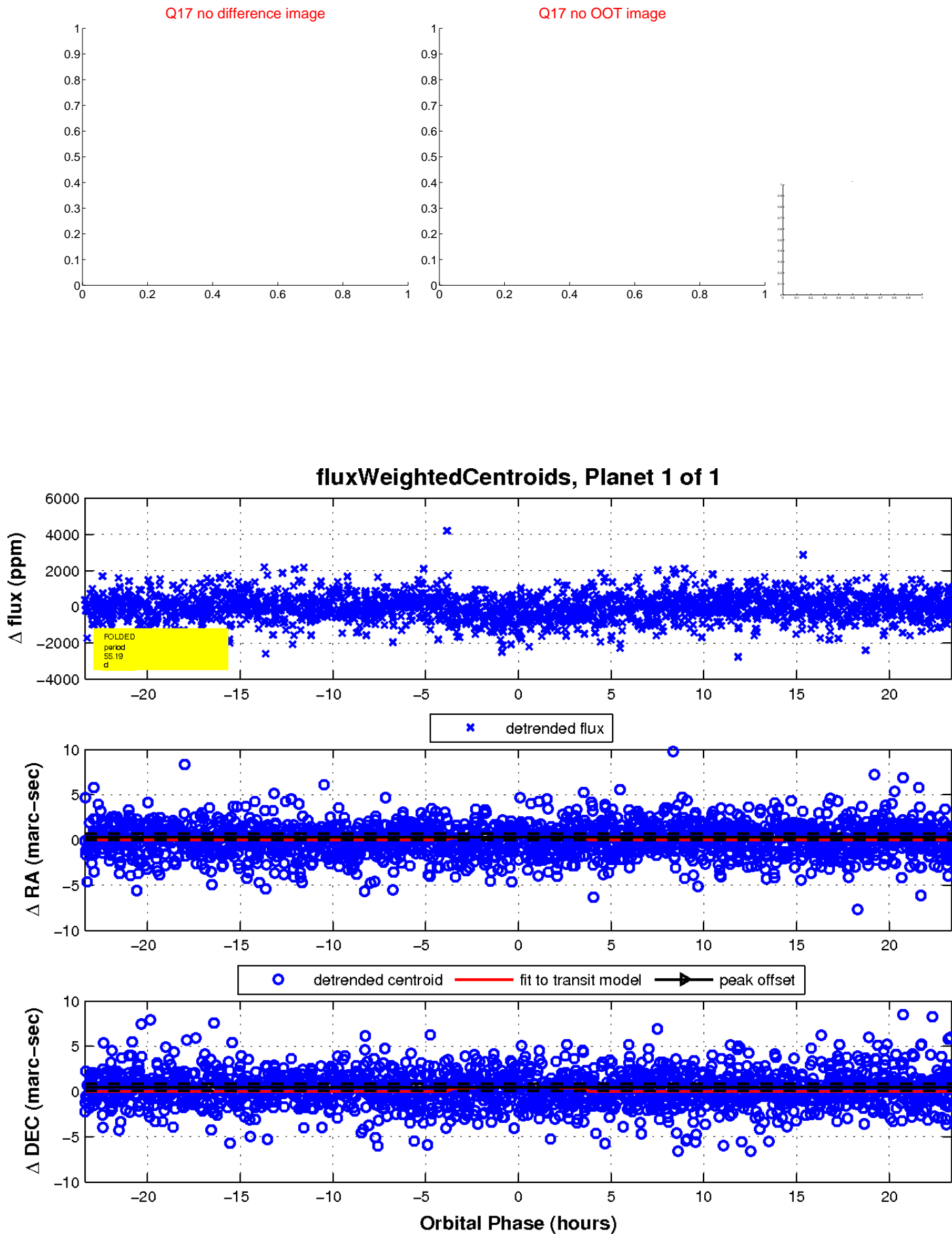
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

