

# KIC 009873004

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009873004-01	OBS	7970.01	1.985119	132.036806	191.4	1.766	8.3	9.2	0.84	5581	1.21	674.94

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009873004-01	OBS	PC	0.96	0	0	0	0	NO_COMMENT

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

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

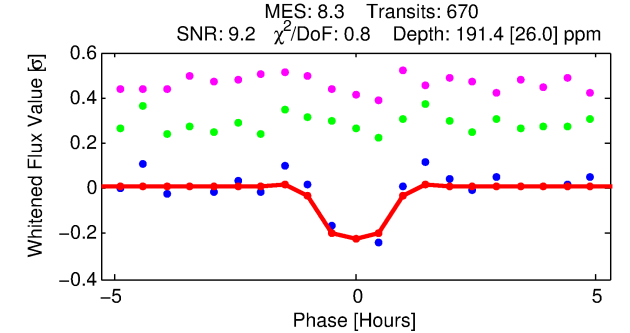
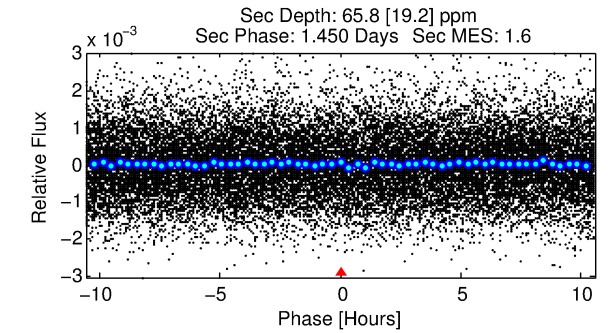
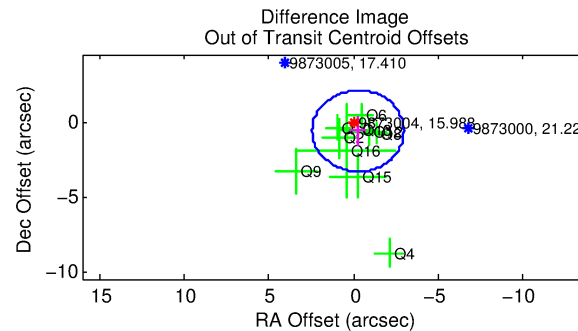
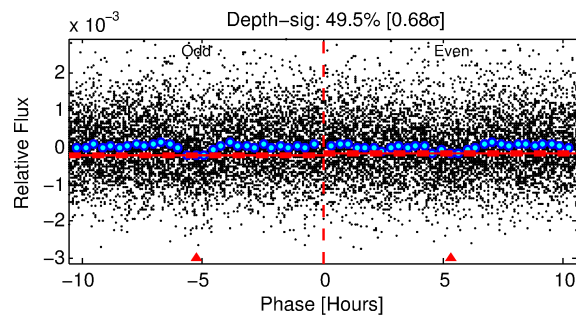
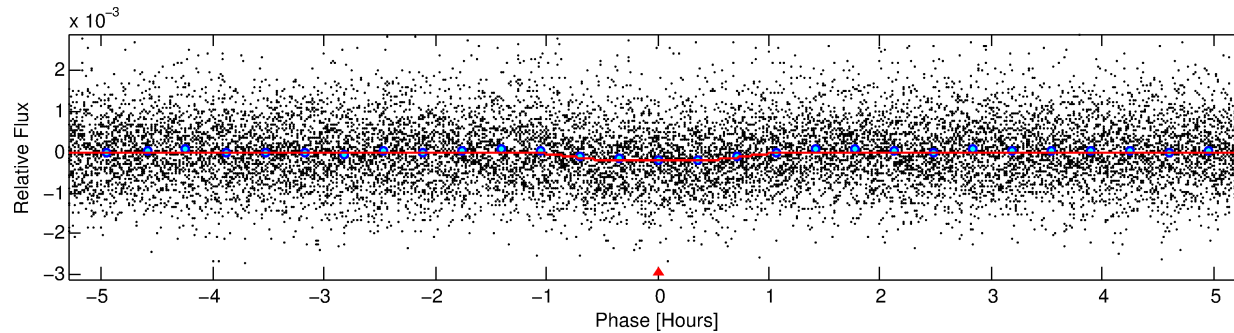
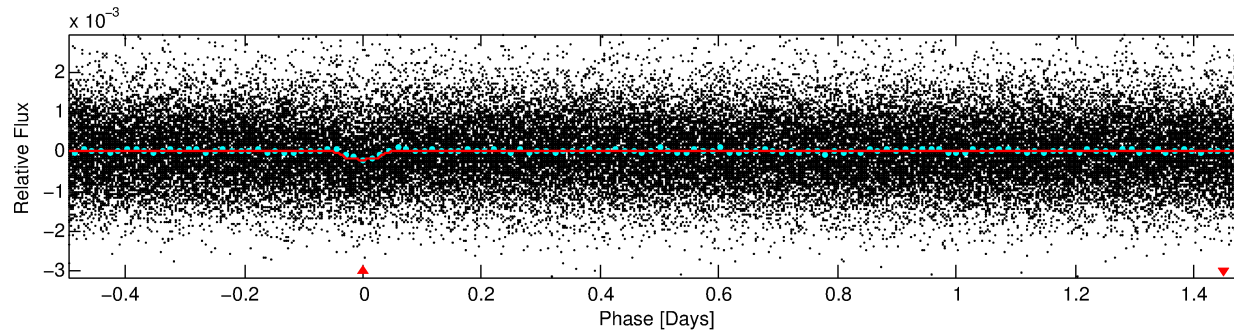
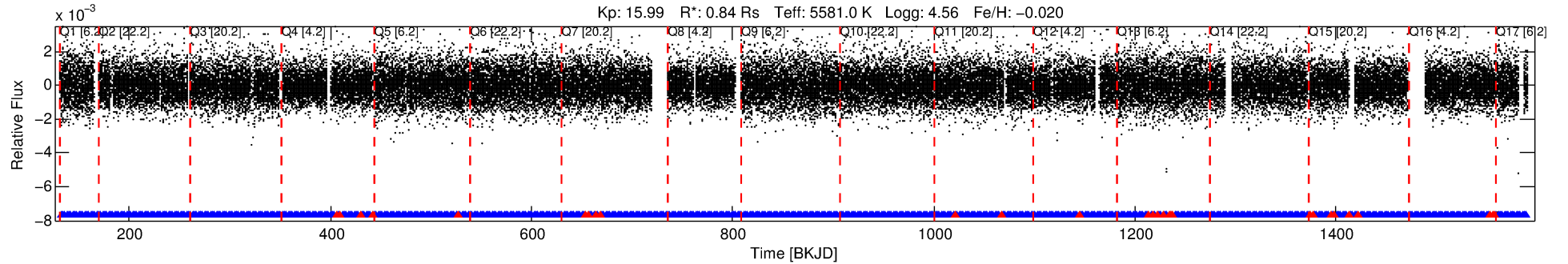
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 009873004-01

No Significant Match Found

# DV One-Page Summary

KIC: 9873004 Candidate: 1 of 1 Period: 1.985 d



## DV Fit Results:

Period = 1.98512 [0.00001] d  
Epoch = 132.0368 [0.0030] BKJD  
Rp/R\* = 0.0131 [0.0112]  
a/R\* = 7.35 [25.31]  
b = 0.55 [4.52]  
Seff = 674.94 [203.96]  
Teff = 1300 [98] K  
Rp = 1.20 [1.06] Re  
a = 0.0303 [0.0057] AU  
Ag = 22.94 [40.27] [0.54 $\sigma$ ]  
Teffp = 4398 [1910] K [1.62 $\sigma$ ]

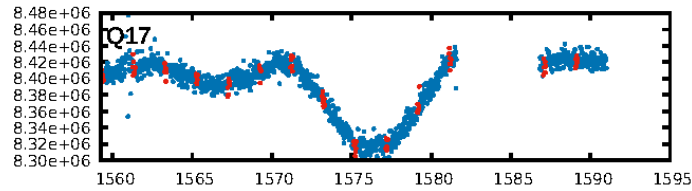
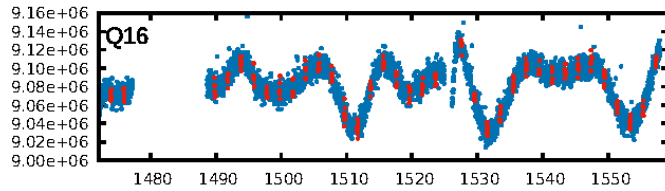
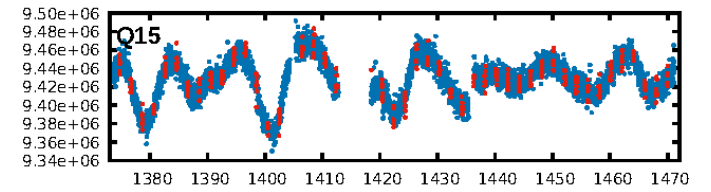
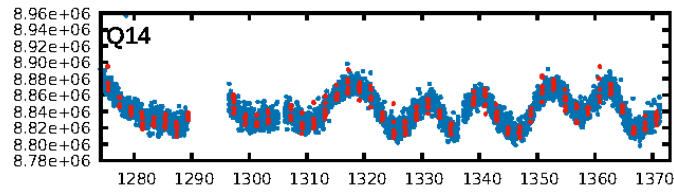
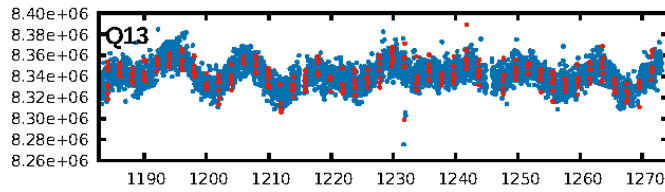
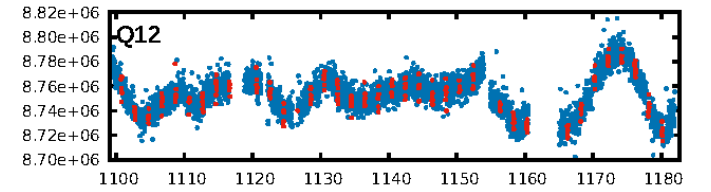
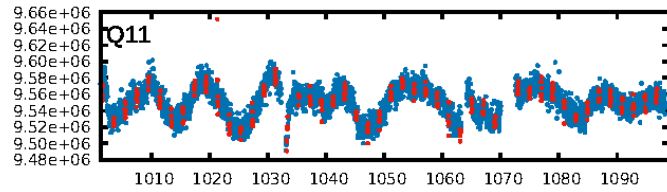
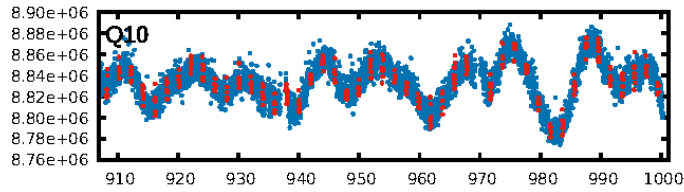
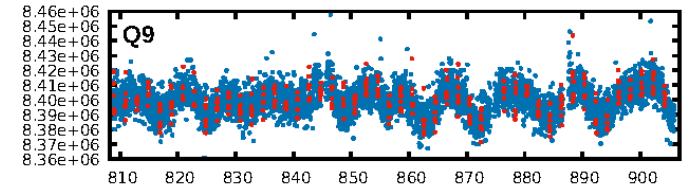
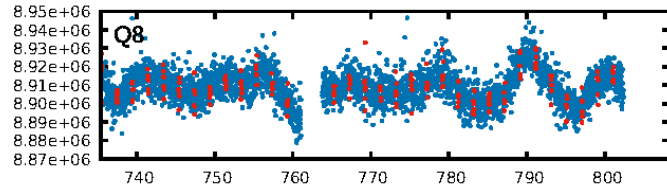
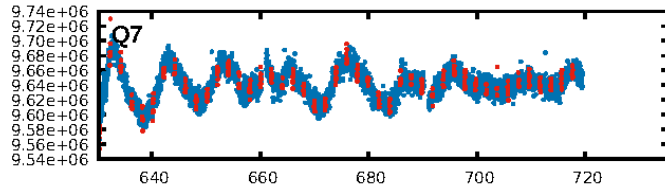
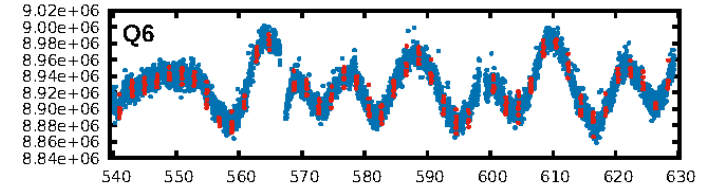
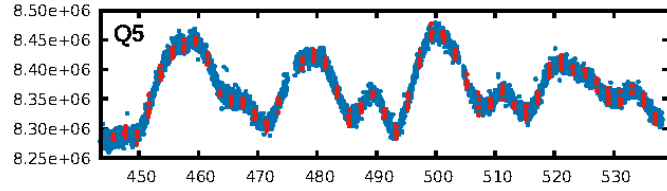
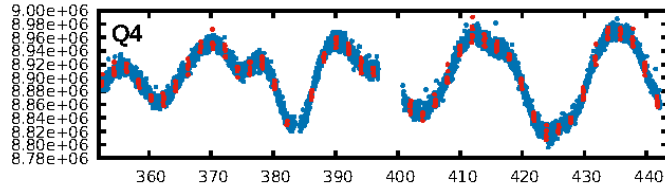
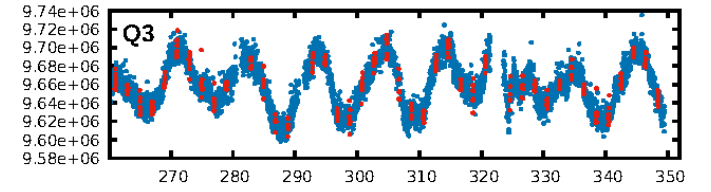
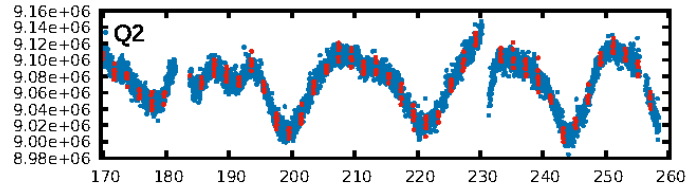
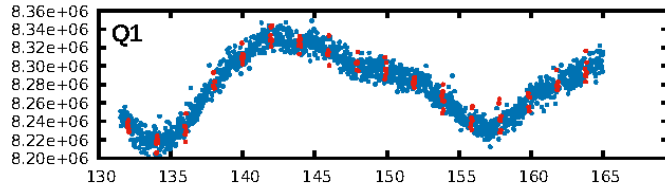
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 1.16e-16  
RollingBand-fgt: 0.96 [611/639]  
GhostDiagnostic-chr: 3.378  
Centroid-sig: 0.1%  
Centroid-so: 2.823 arcsec [1.98 $\sigma$ ]  
OotOffset-rm: 0.672 arcsec [0.75 $\sigma$ ]  
KicOffset-rm: 0.688 arcsec [0.89 $\sigma$ ]  
OotOffset-st: 3/1/4/2 [10]  
KicOffset-st: 3/1/4/2 [10]  
DiffImageQuality-fgm: 0.30 [3/10]  
DiffImageOverlap-fno: 1.00 [17/17]

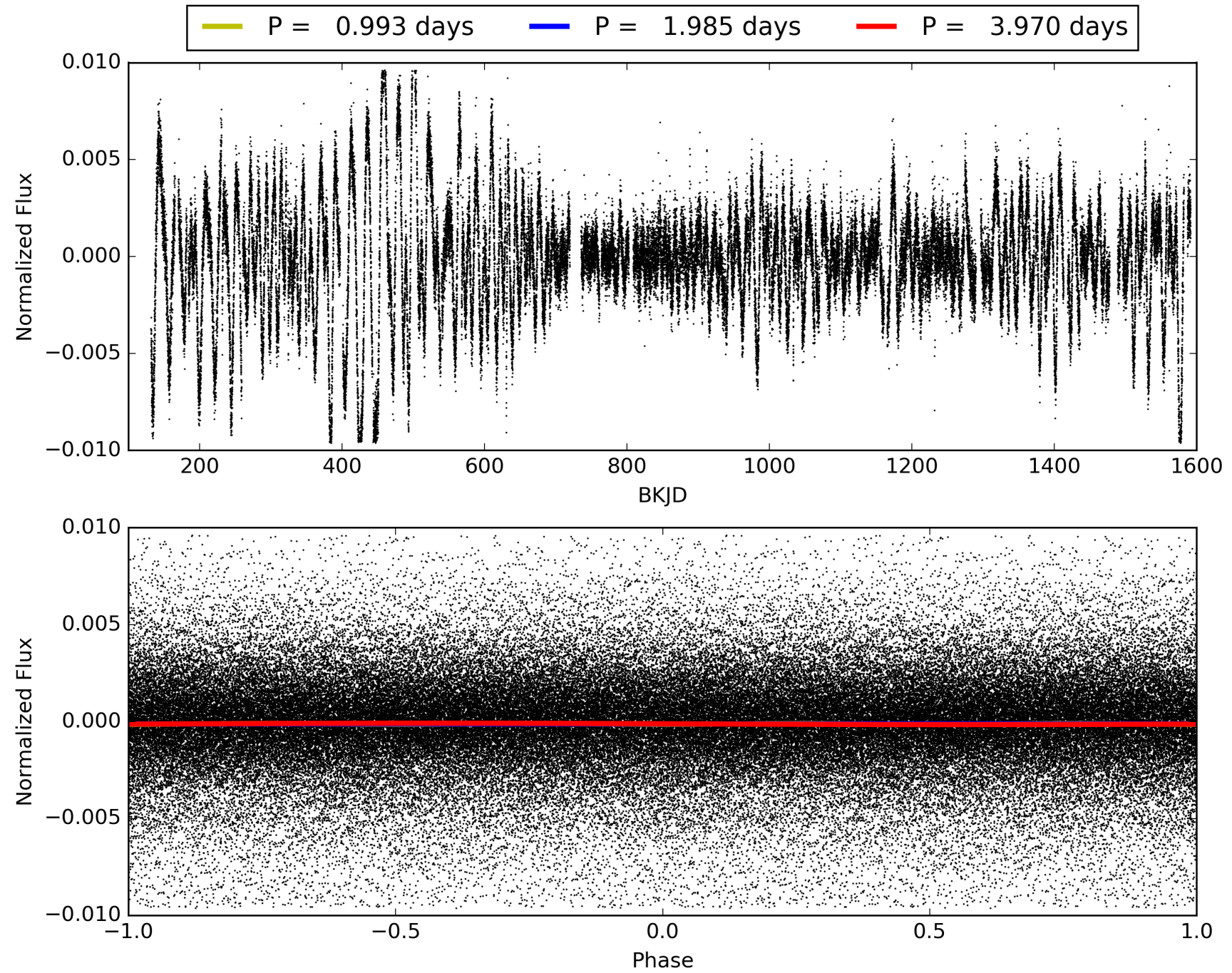
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 28-Jan-2016 23:21:00 Z

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

# TCE 009873004-01, PDC Light Curves



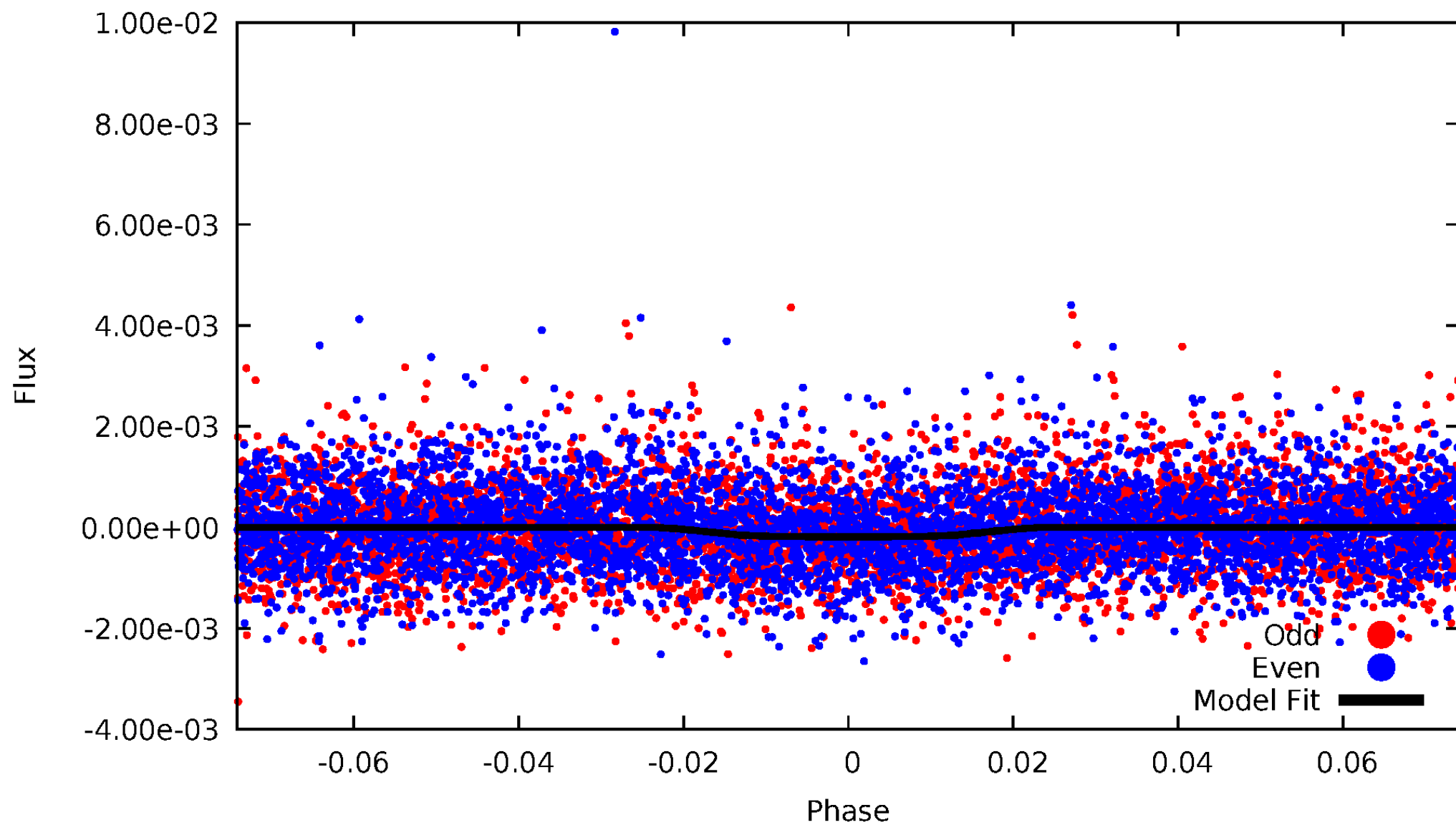
TCE 009873004-01





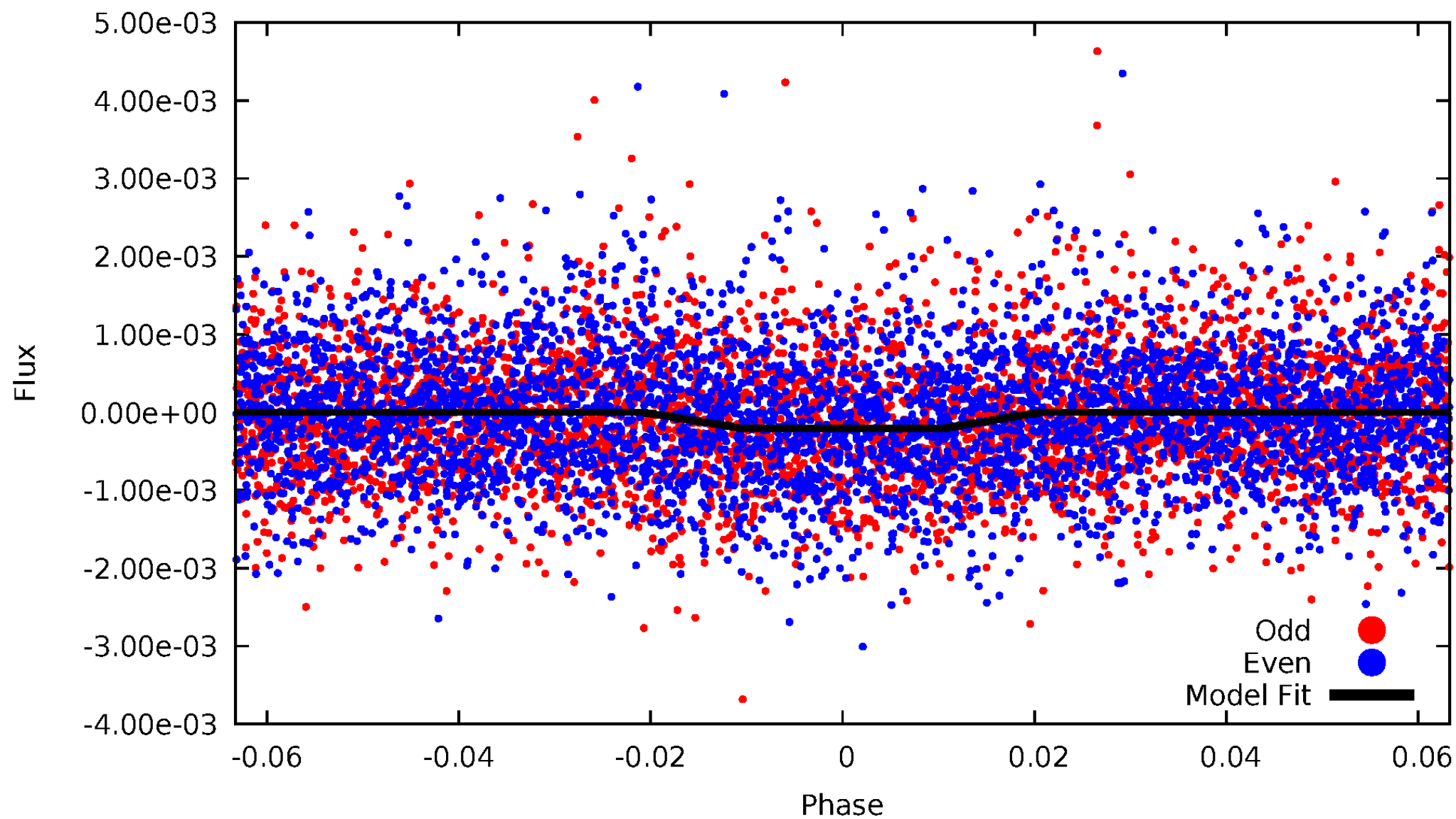
# DV Odd/Even

TCE 009873004-01



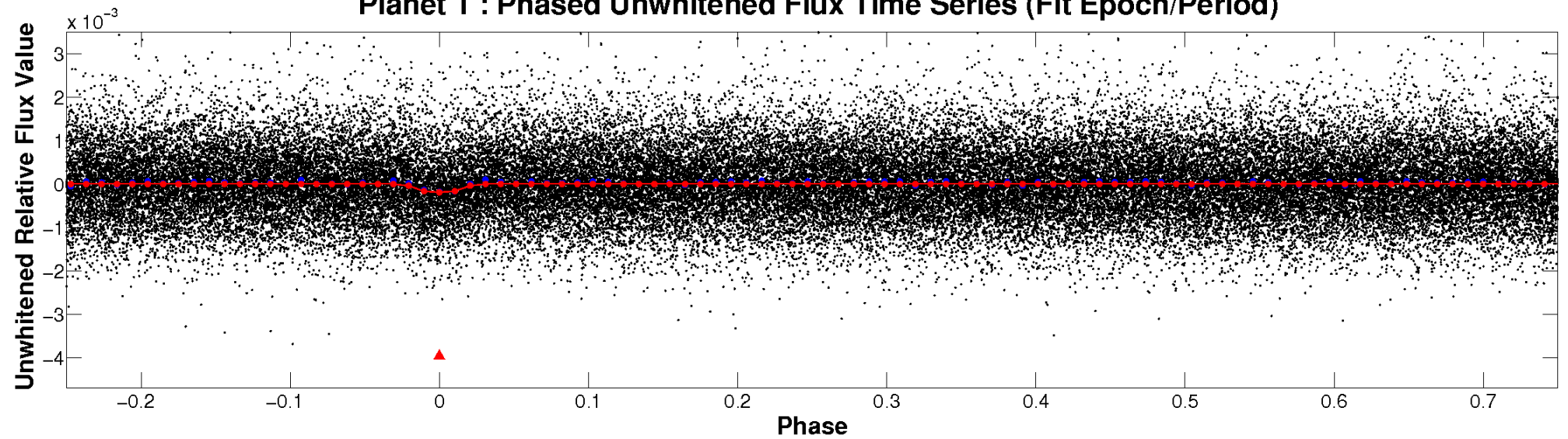
# ALT Odd/Even

TCE 009873004-01

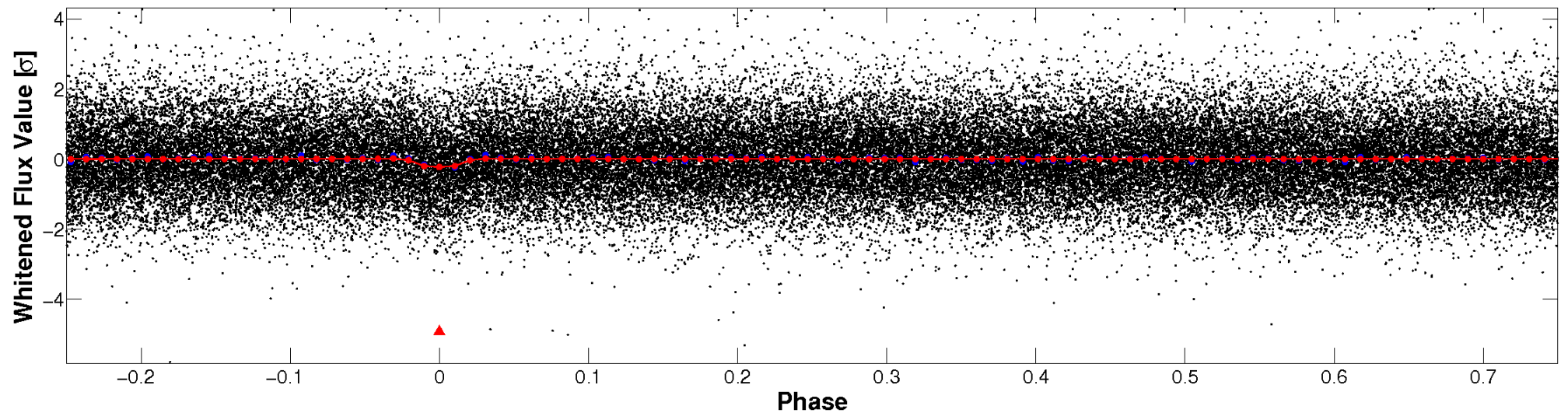


# Non-Whitened Vs. Whitened Light Curve

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

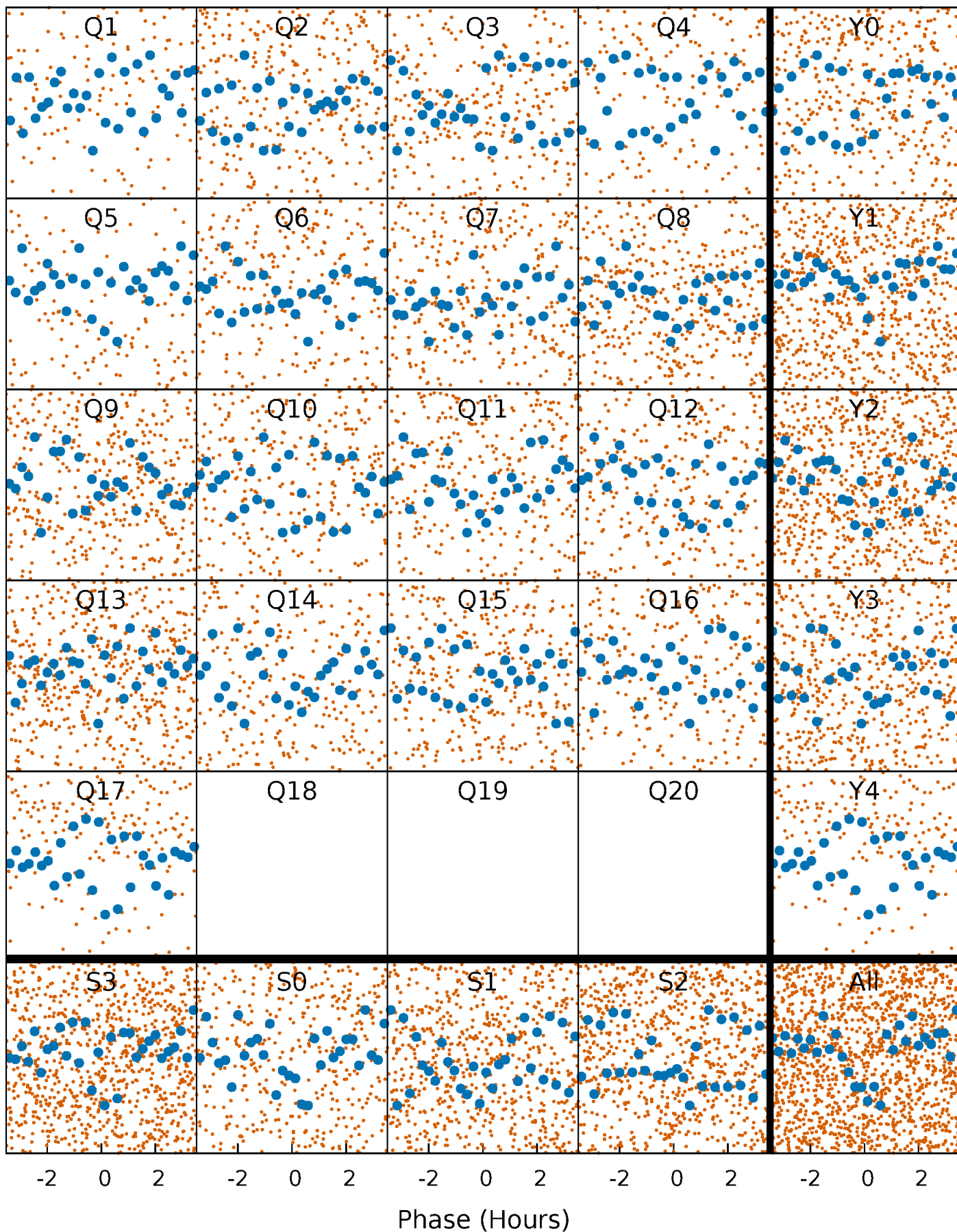


**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

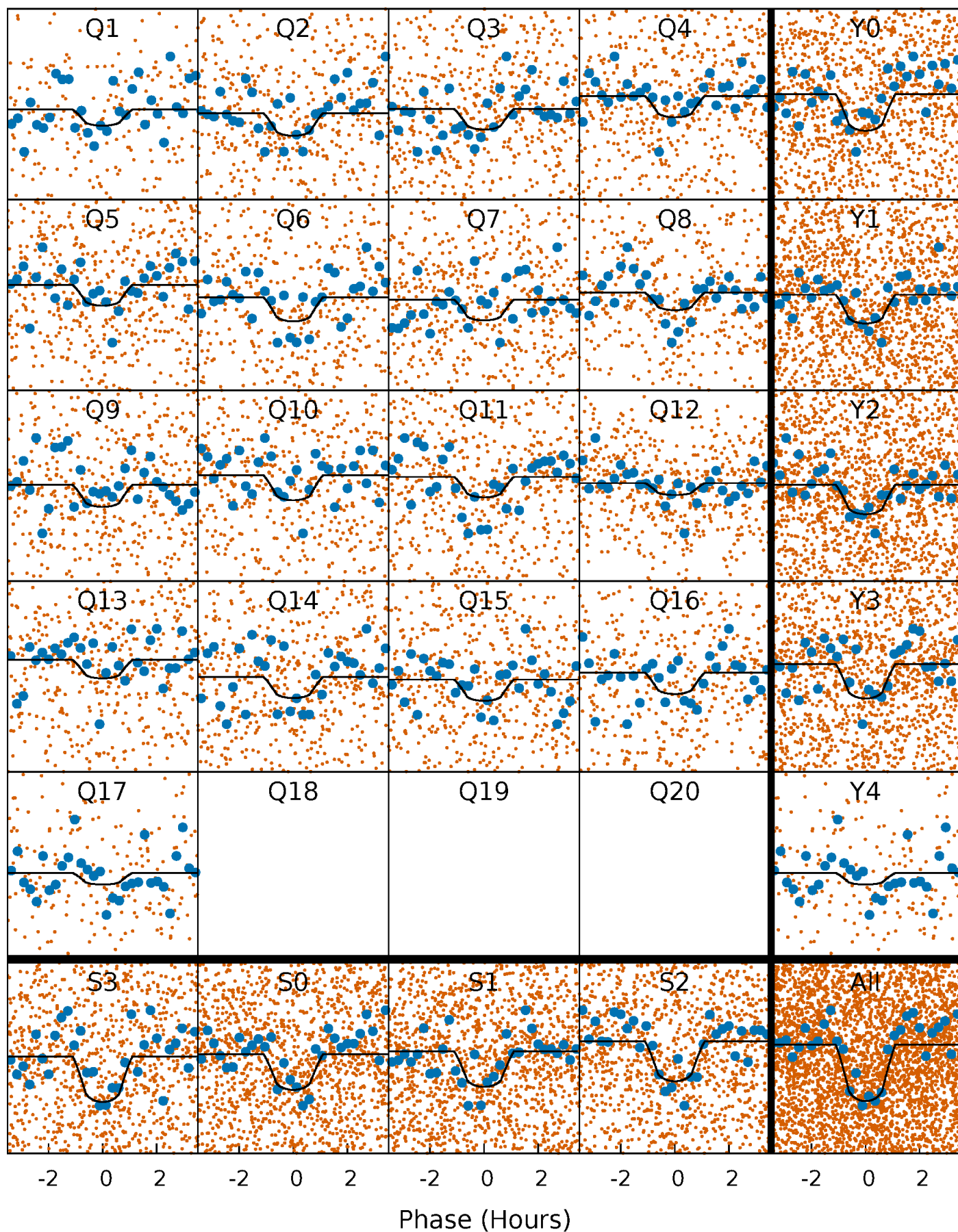
TCE 009873004-01 P= 1.985119 Days  $T_0=132.036806$  (BKJD)





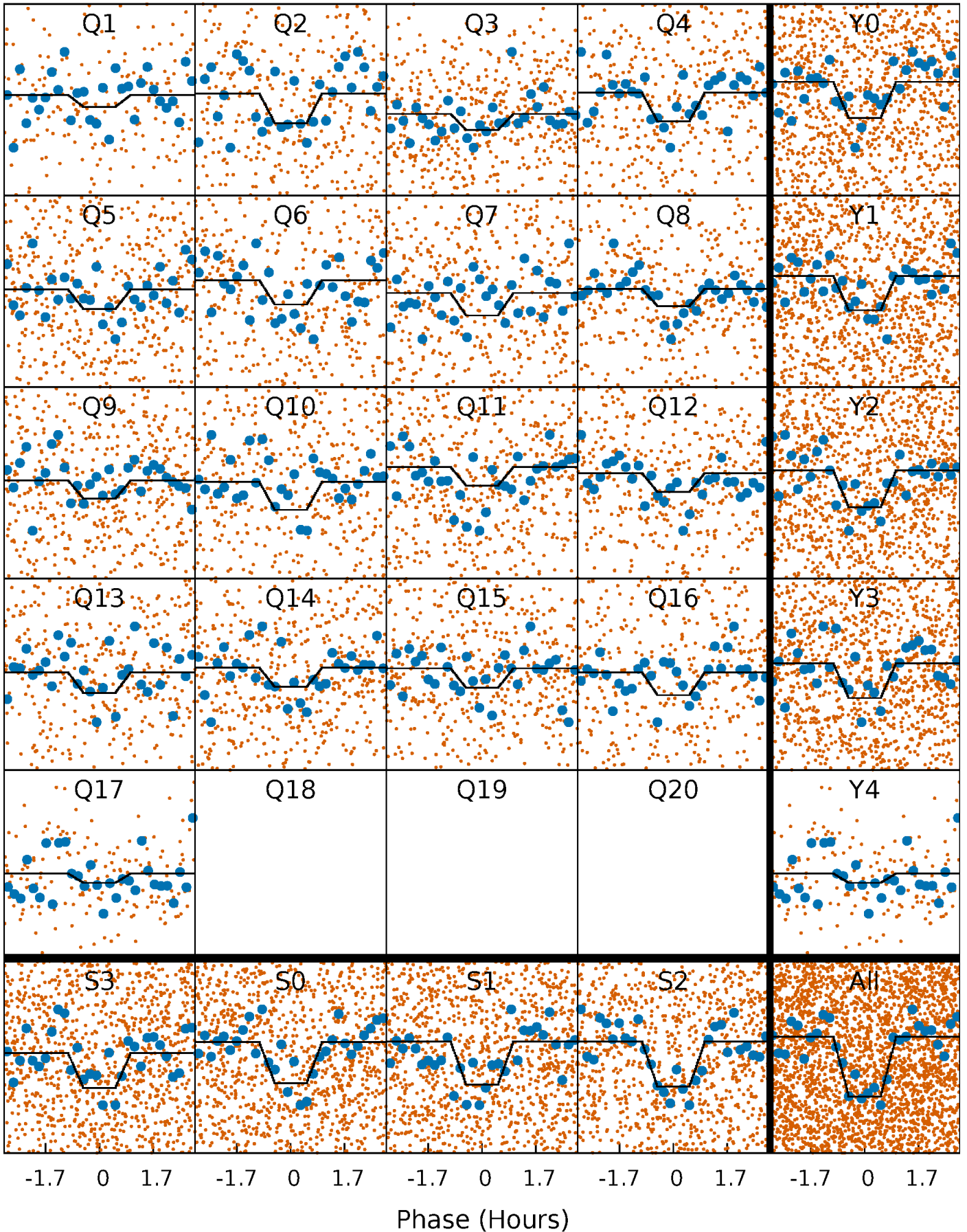
# DV Quarter-Phased Transit Curves

TCE 009873004-01 P= 1.985119 Days  $T_0=132.036806$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

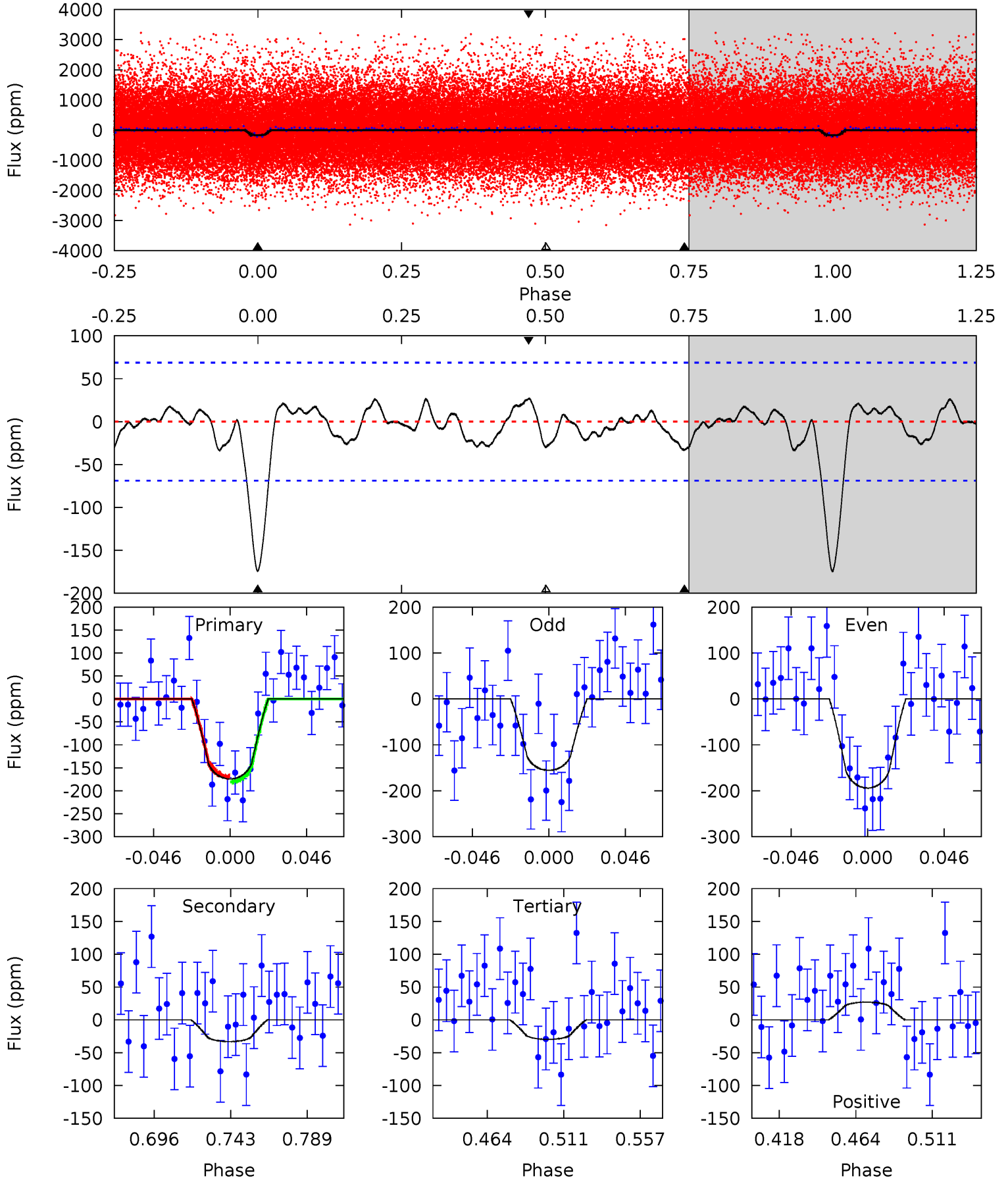
TCE 009873004-01 P= 1.985137 Days  $T_0=132.027886$  (BKJD)



# DV Model-Shift Uniqueness Test

009873004-01, P = 1.985119 Days, E = 130.051687 Days

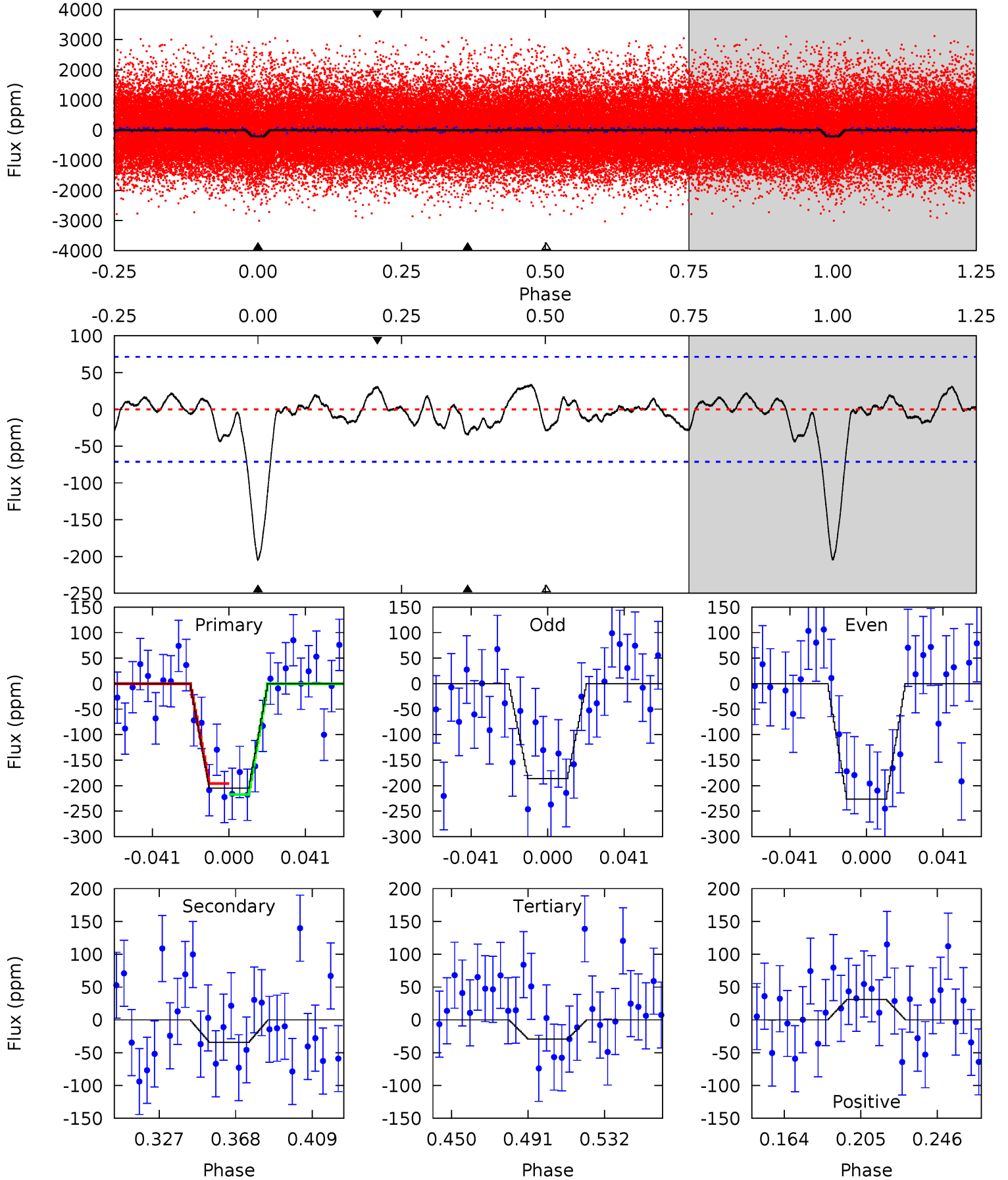
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
12.0	2.27	2.04	1.85	4.72	1.99	0.99	9.92	10.1	0.23	0.42	1.33	0.91	0.13	0.38



# Alt Model-Shift Uniqueness Test

009873004-01, P = 1.985137 Days, E = 130.042749 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
13.6	2.27	1.95	2.07	4.75	2.04	1.01	11.7	11.6	0.32	0.21	1.34	0.94	0.14	0.72





### Stellar Parameters For KIC 009873004

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5581^{+149}_{-166}$	$4.559^{+0.036}_{-0.153}$	$-0.020^{+0.250}_{-0.300}$	$0.845^{+0.188}_{-0.075}$	$0.946^{+0.083}_{-0.111}$	$2.204^{+0.434}_{-0.922}$
	+3%/-3%	+1%/-3%	+1250%/-1500%	+22%/-9%	+9%/-12%	+20%/-42%
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 009873004-01 / KOI 7970.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-33 \pm 15$	$1.42^{+1.06}_{-0.90}$	$1851^{+96}_{-80}$	$3797^{+1876}_{-718}$	$7.861^{+49.992}_{-5.536}$
Alt.	$-34 \pm 15$	$1.50^{+1.04}_{-0.85}$	$1852^{+97}_{-79}$	$3702^{+1545}_{-638}$	$7.303^{+37.577}_{-5.145}$

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

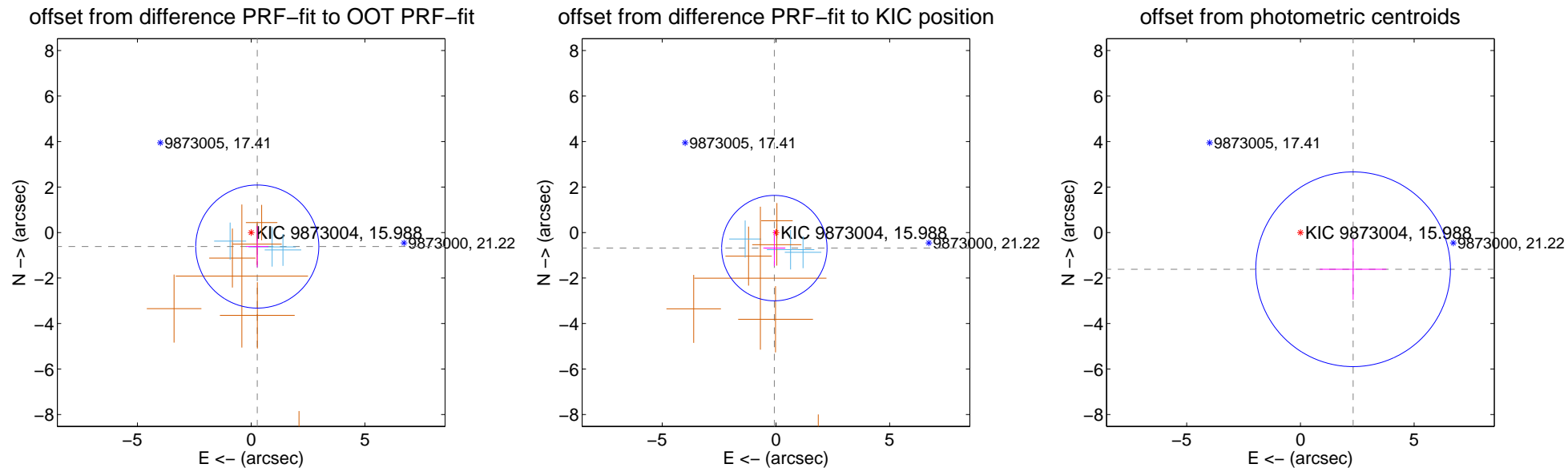
## DV Centroid Data

Supplemental centroid analysis for 009873004-01. Kepler magnitude: 15.99. Transit SNR 9.21

There are 3 quarters with good PRF difference image offsets

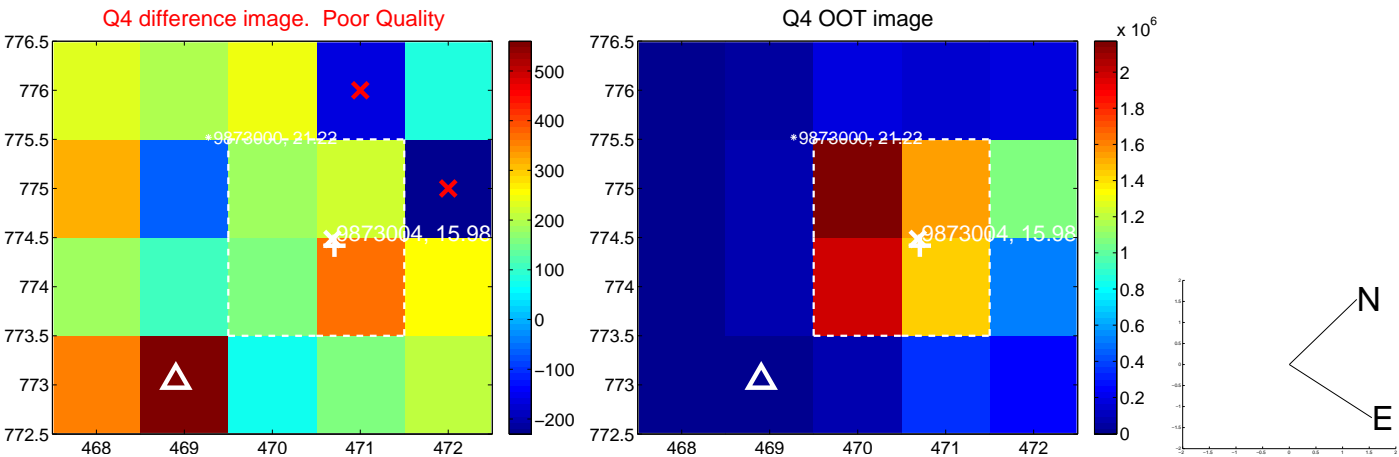
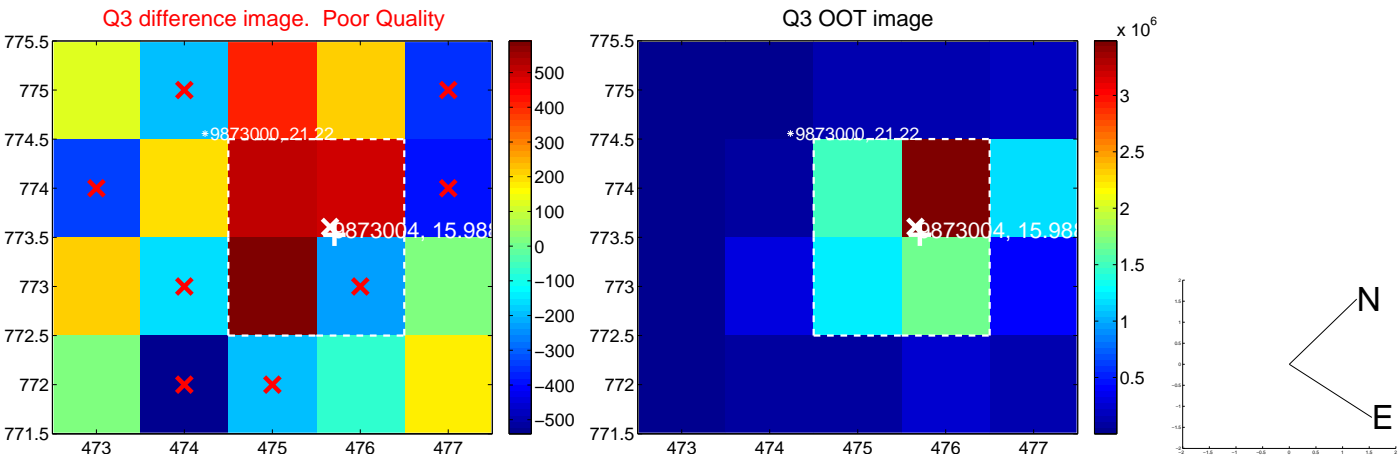
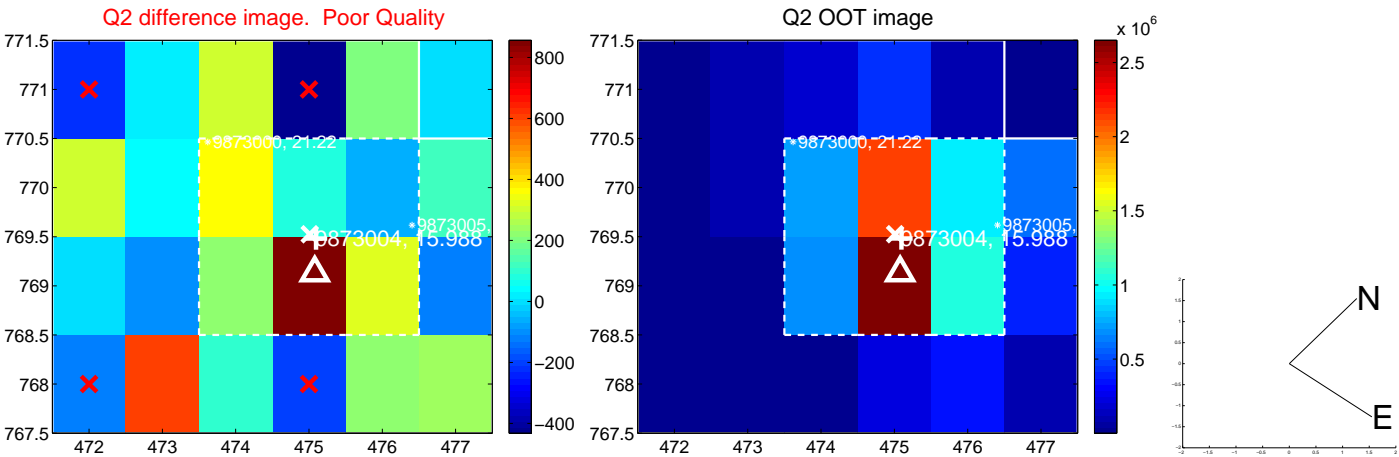
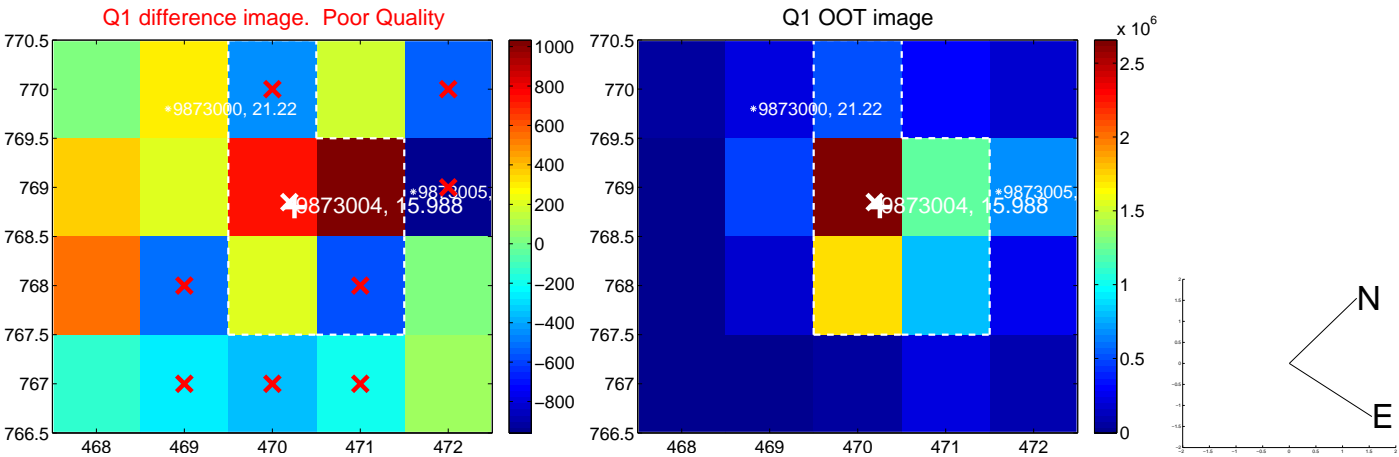
The direct PRF centroid is offset from the target star catalog position by about 0.29 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.672 \pm 0.902$	0.75	$-0.269 \pm 0.483$	$-0.616 \pm 0.907$
PRF-fit source offset from KIC position	$0.688 \pm 0.772$	0.89	$0.070 \pm 0.484$	$-0.684 \pm 0.789$
photometric centroid source offset	$2.82 \pm 1.43$	1.98	$-2.32 \pm 1.47$	$-1.61 \pm 1.34$

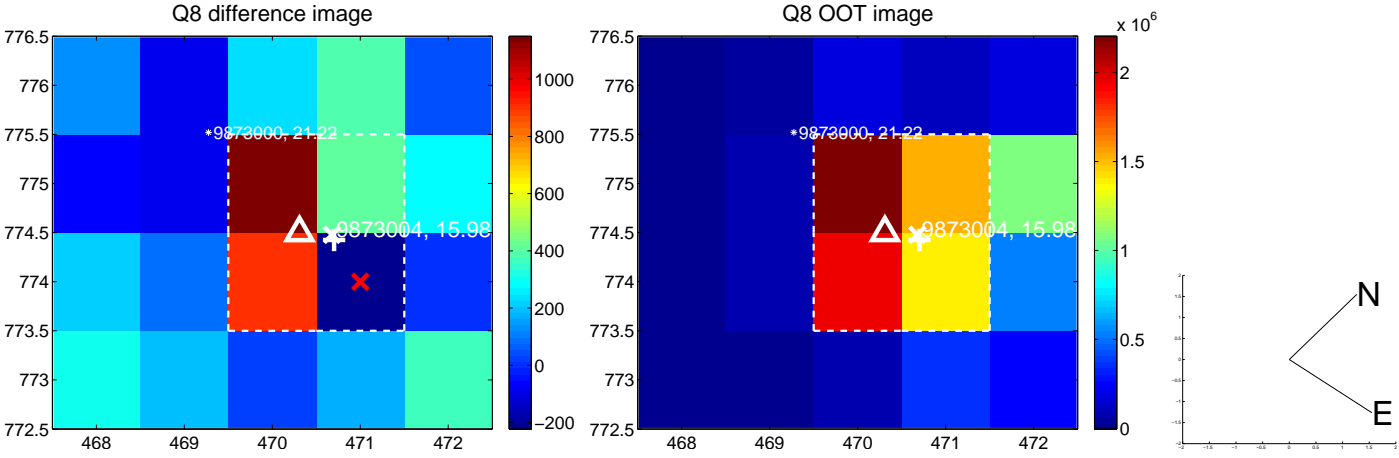
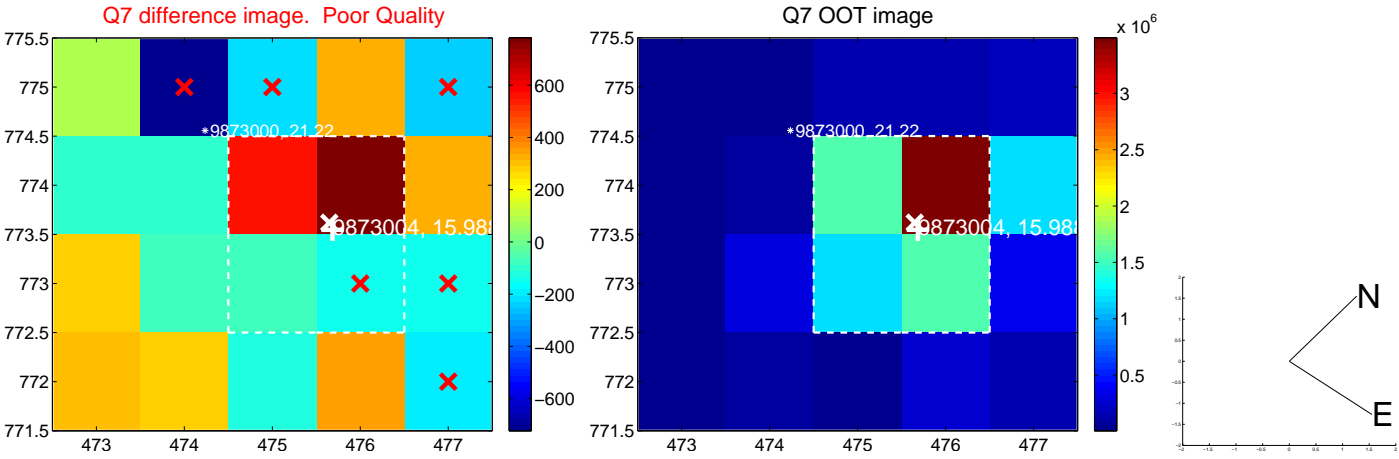
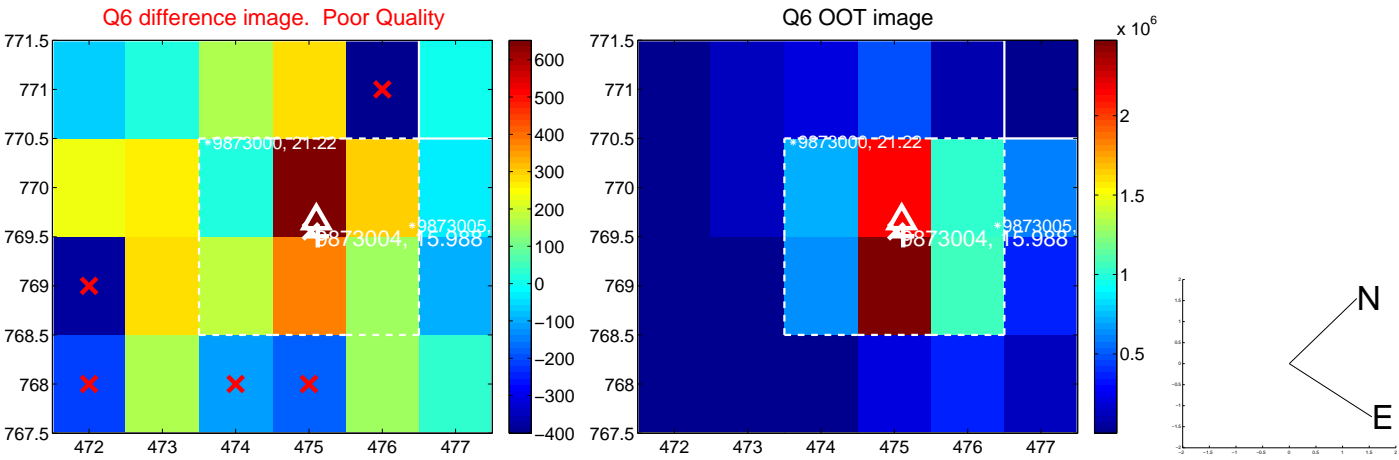
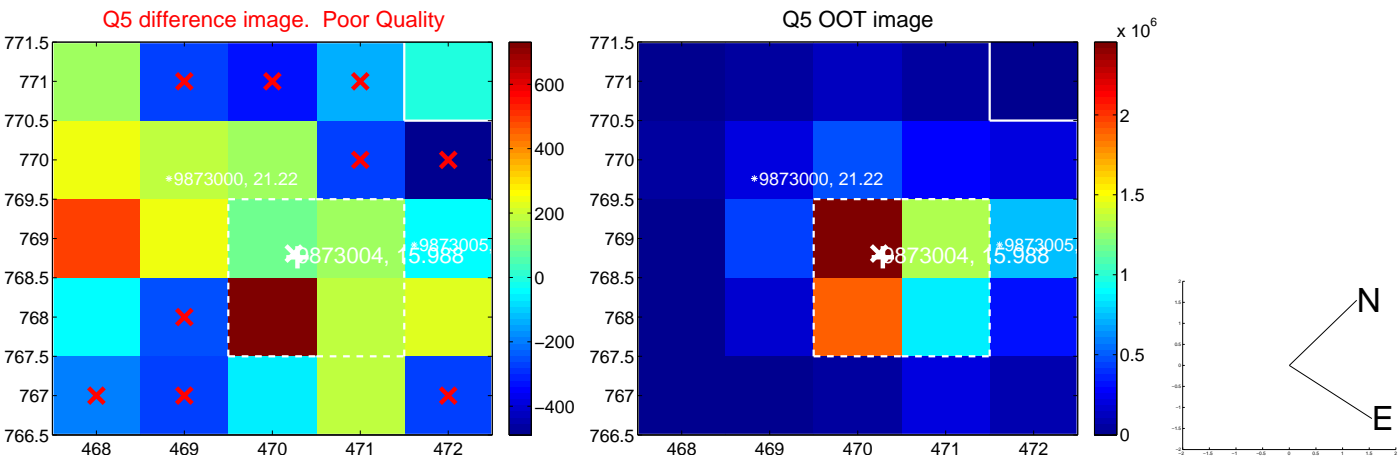


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

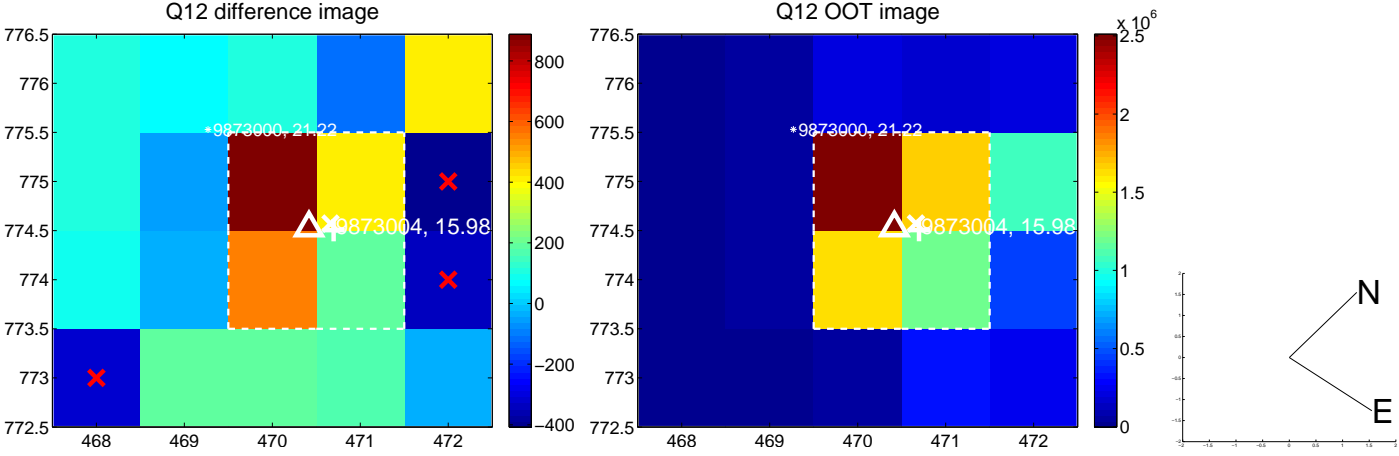
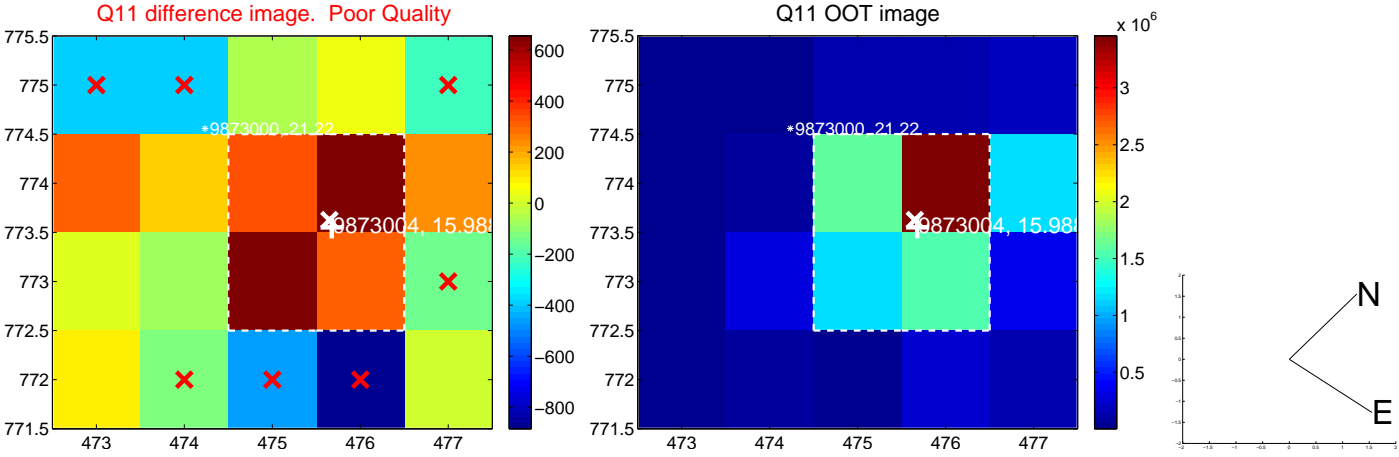
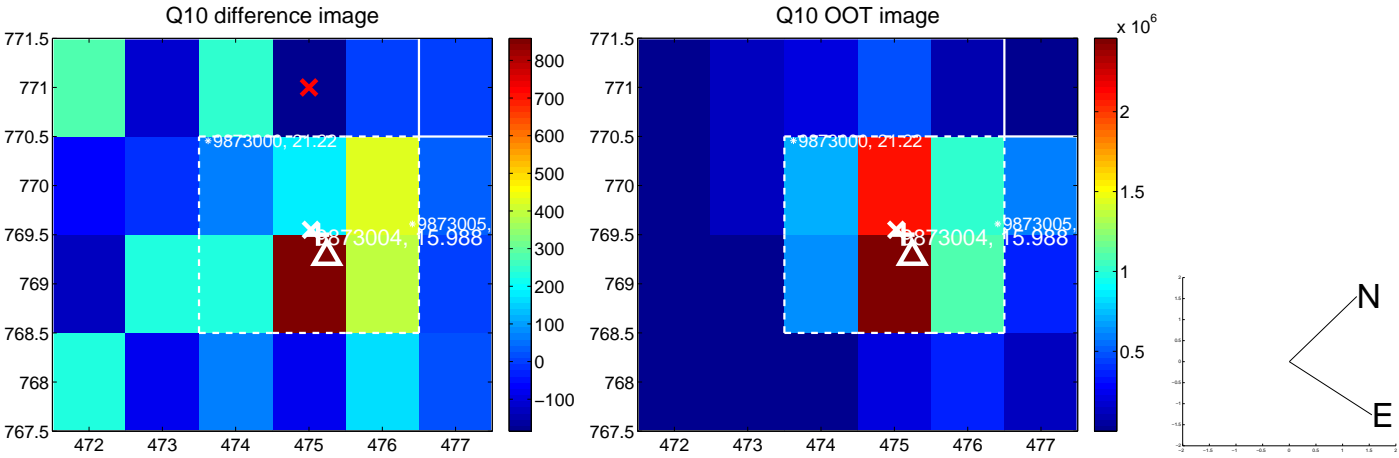
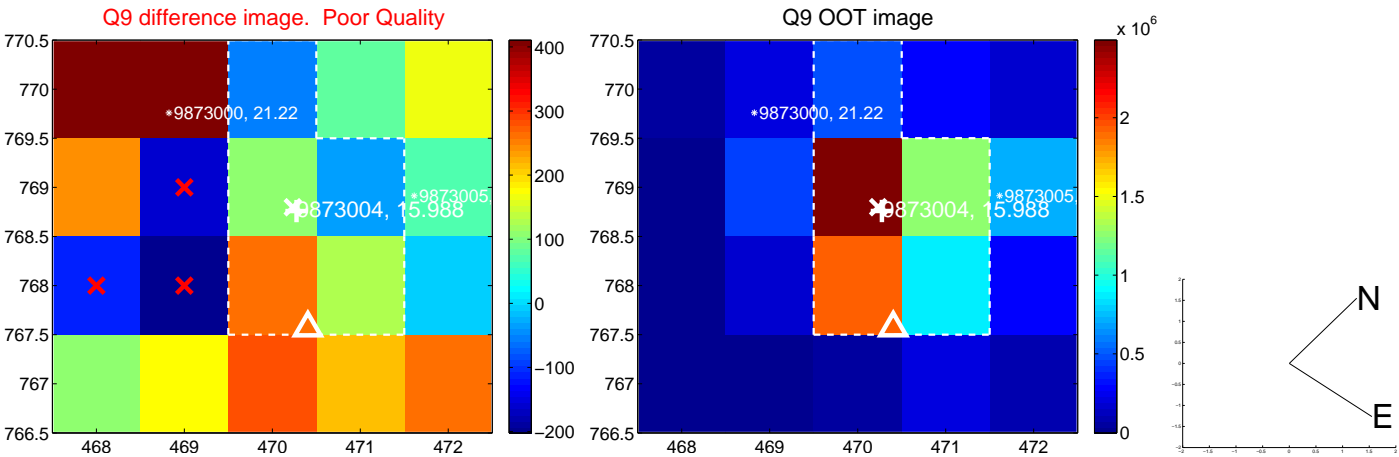


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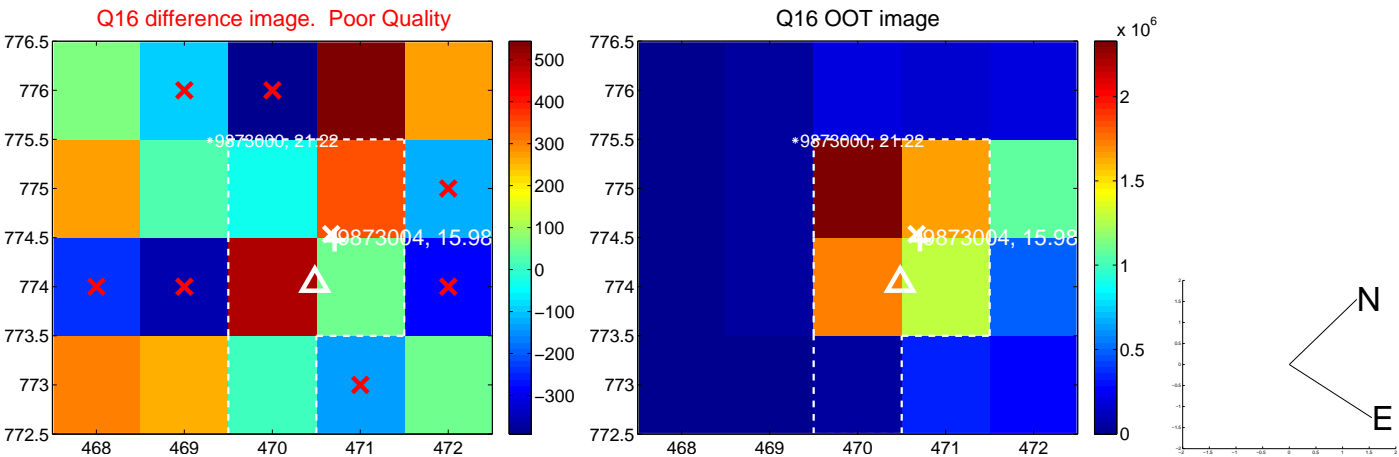
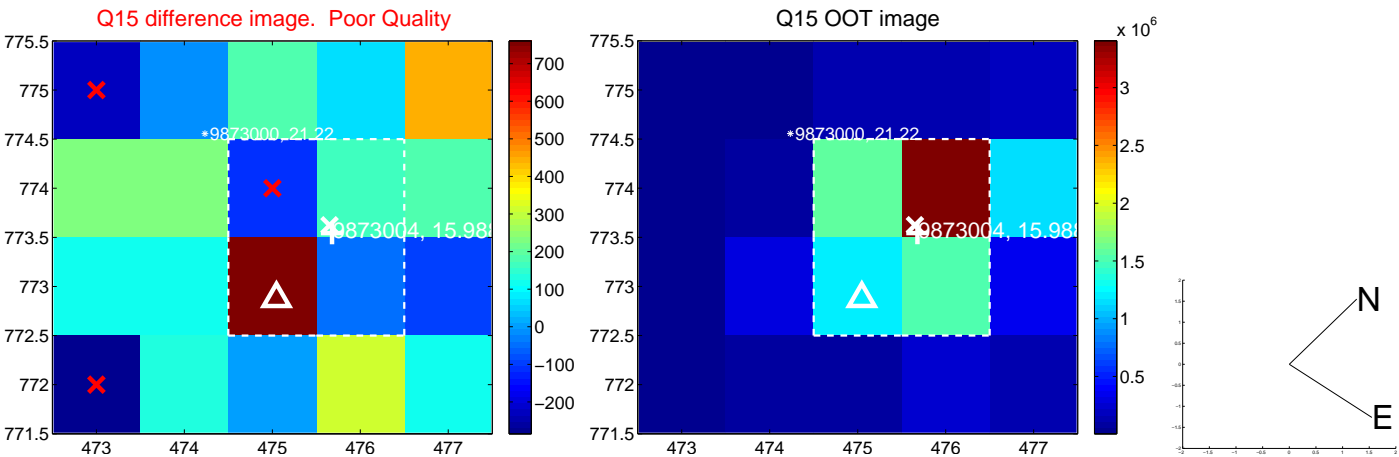
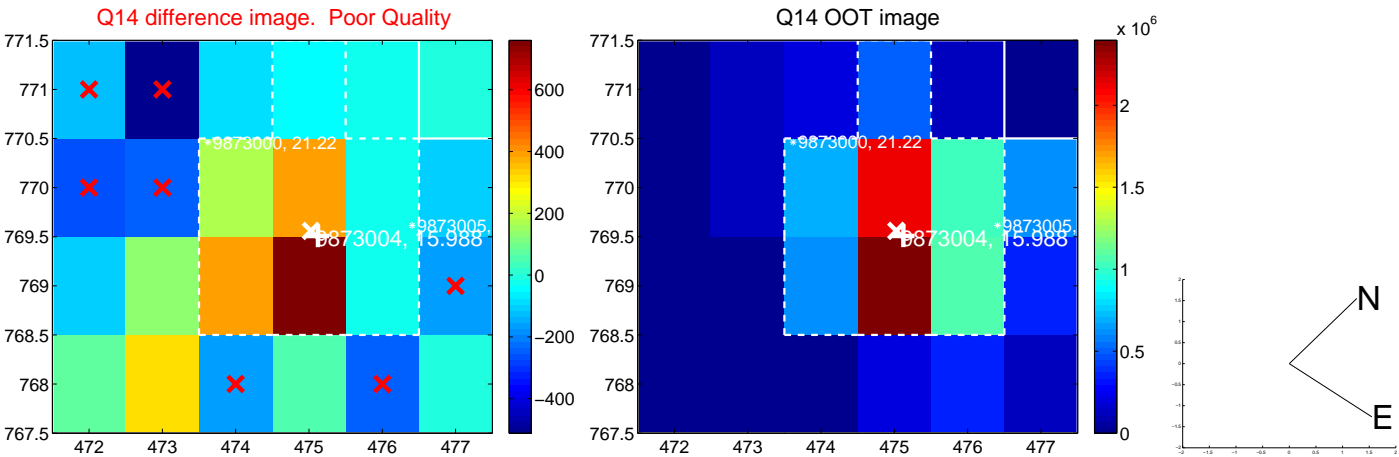
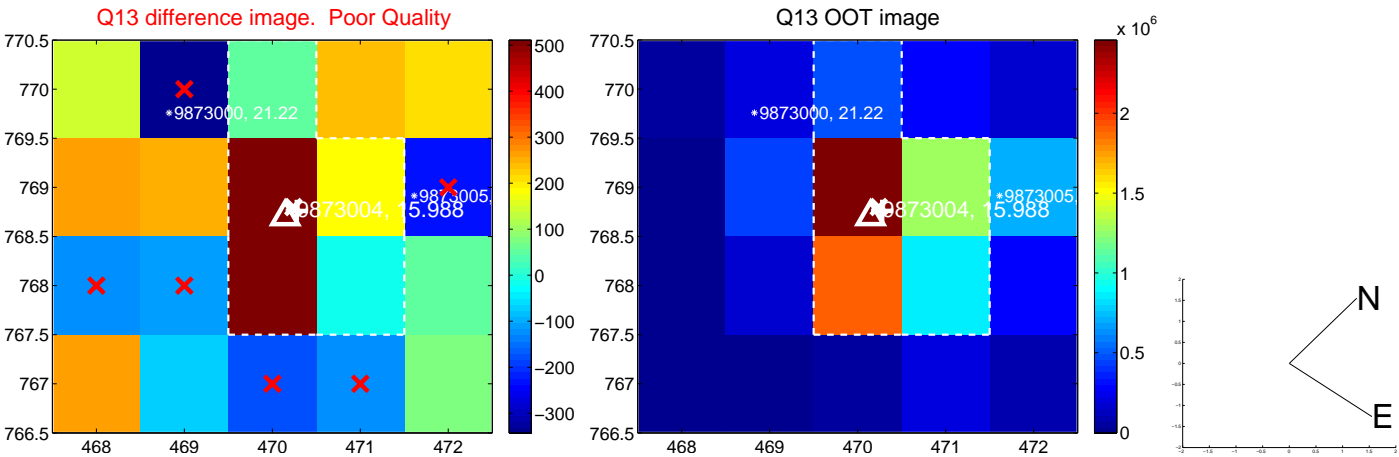




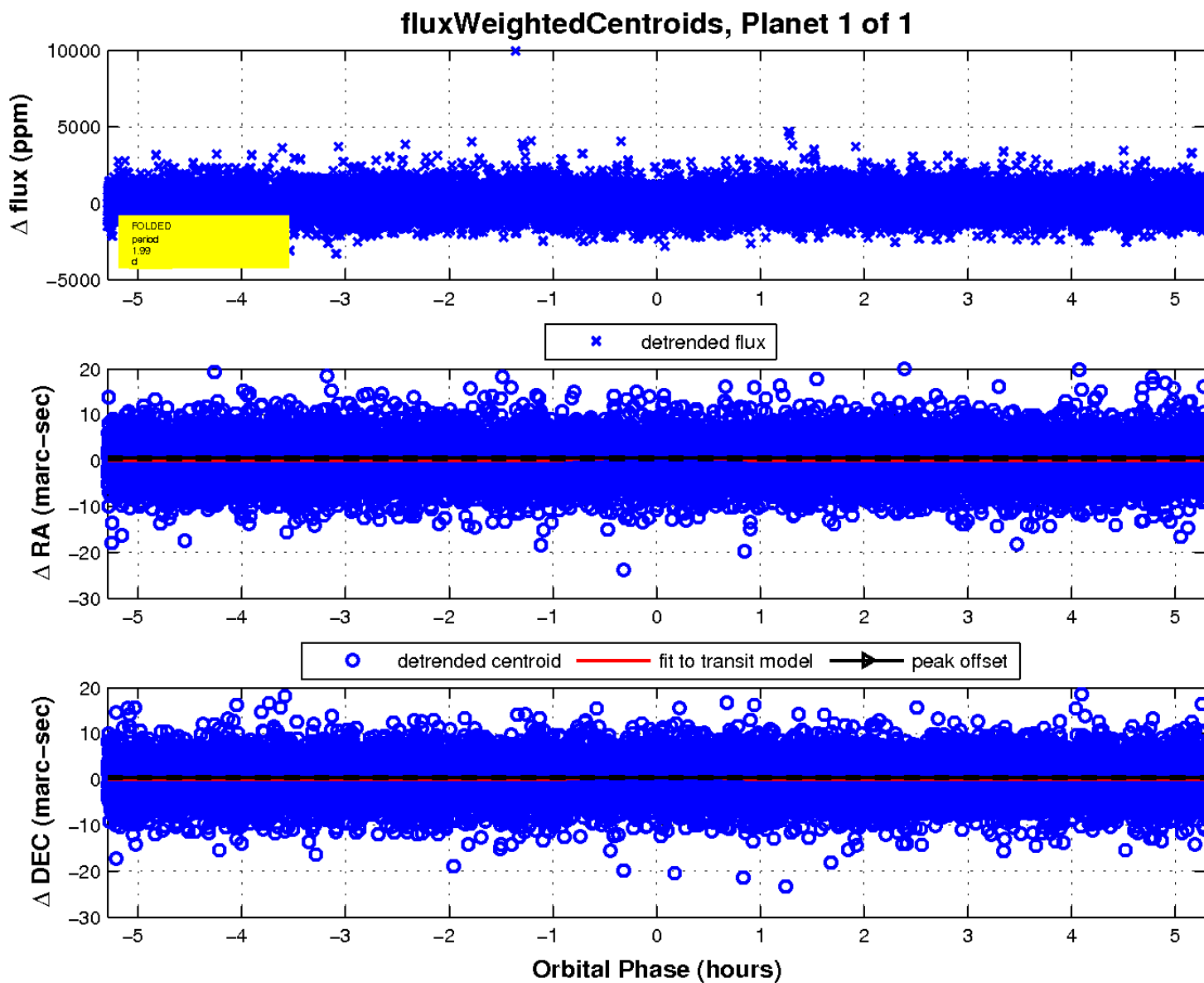
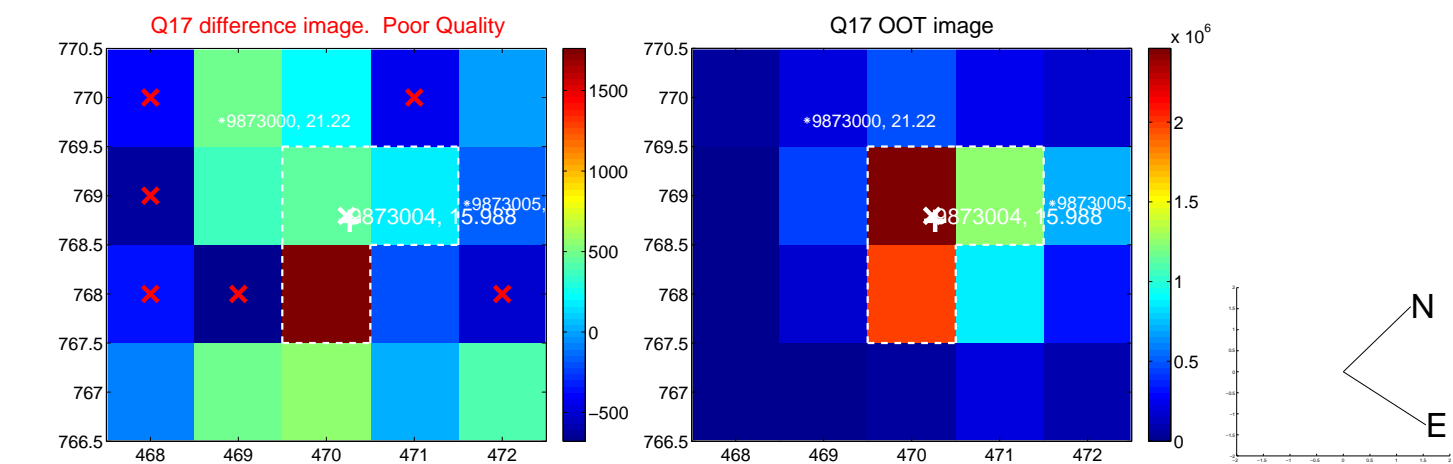
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white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



UKIRT Image

Declination

