

# KIC 009936080

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009936080-01	OBS	4431.01	19.564993	136.283582	64.6	4.299	10.8	12.5	1.24	6180	1.20	92.89

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009936080-01	OBS	PC	1.00	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.

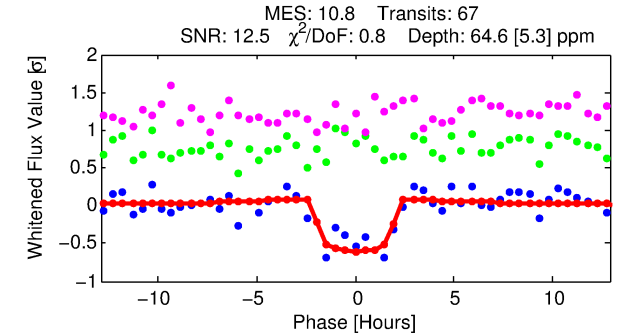
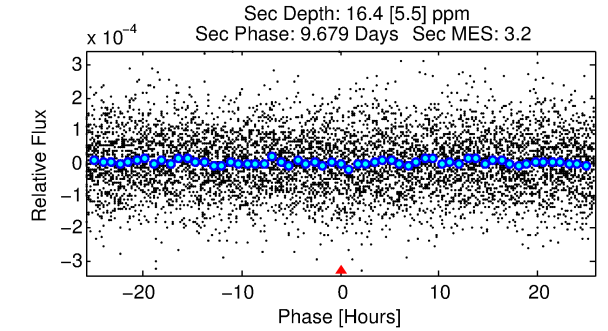
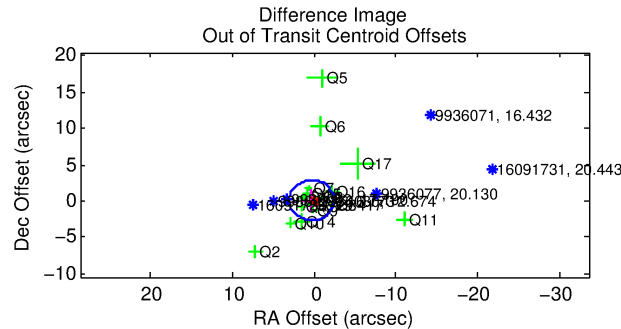
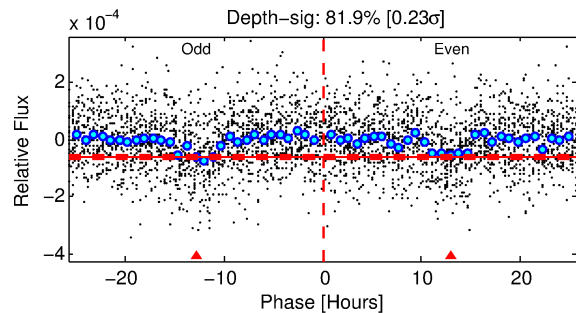
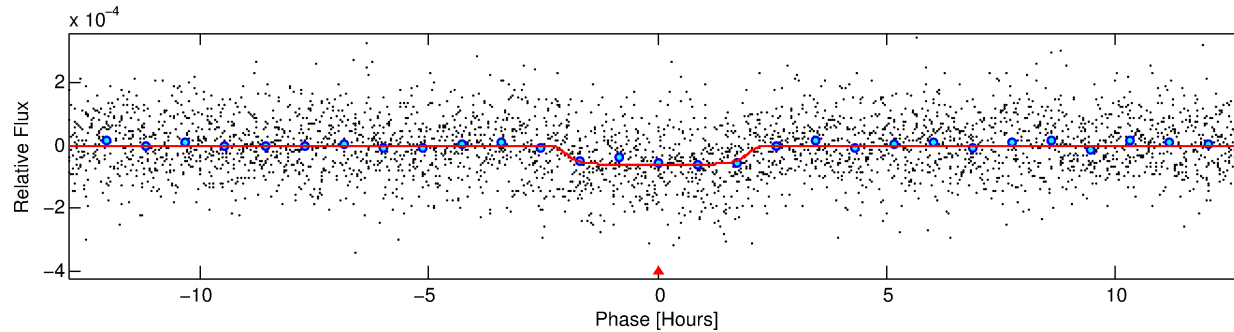
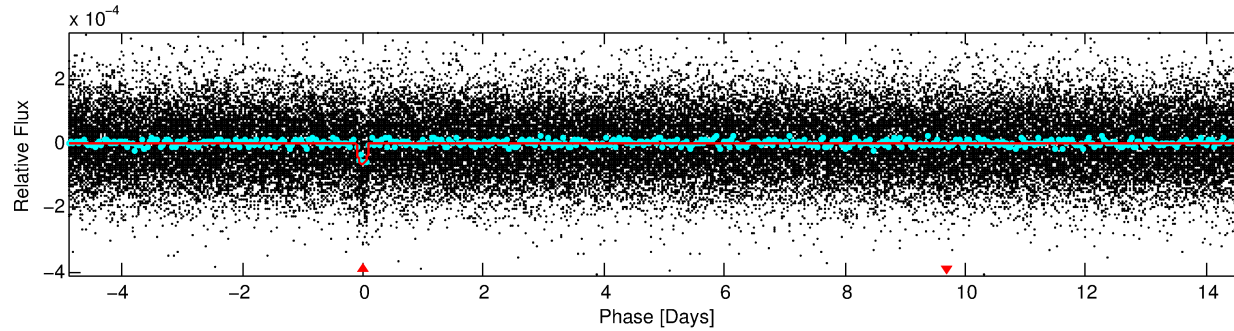
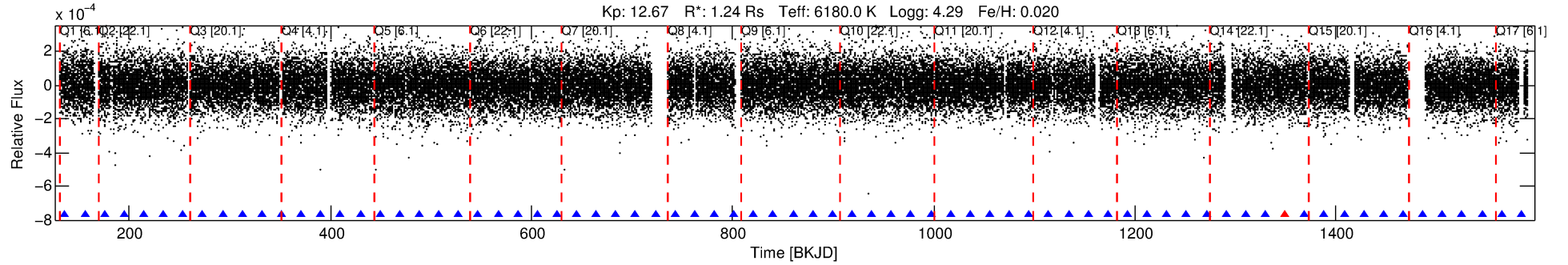
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 009936080-01

No Significant Match Found

# DV One-Page Summary

KIC: 9936080 Candidate: 1 of 1 Period: 19.565 d  
KOI: K04431.01 Corr: 0.965



## DV Fit Results:

Period = 19.56499 [0.00016] d  
Epoch = 136.2836 [0.0067] BKJD  
Rp/R\* = 0.0089 [0.0024]  
a/R\* = 13.89 [19.81]  
b = 0.93 [0.22]  
Seff = 92.89 [23.35]  
Teq = 792 [50] K  
Rp = 1.20 [0.39] Re  
a = 0.1465 [0.0230] AU  
Ag = 133.94 [90.50] [1.47 $\sigma$ ]  
Teff = 4164 [665] K [5.05 $\sigma$ ]

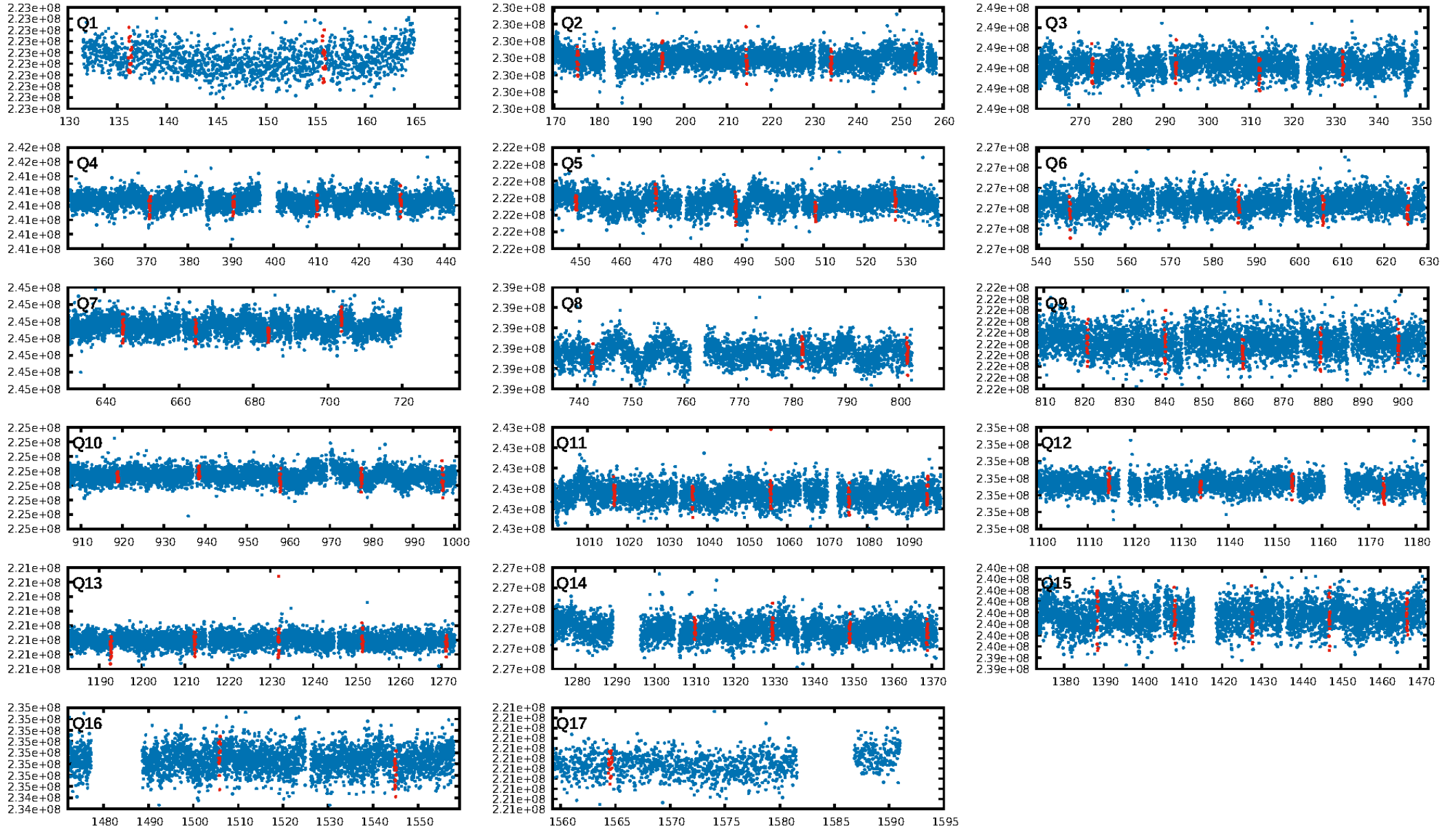
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 99.2%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 1.67e-26  
RollingBand-fgt: 0.98 [63/64]  
GhostDiagnostic-chr: 1.001  
Centroid-sig: 6.6%  
Centroid-so: 1.639 arcsec [1.91 $\sigma$ ]  
OotOffset-rm: 0.297 arcsec [0.32 $\sigma$ ]  
KicOffset-rm: 0.165 arcsec [0.16 $\sigma$ ]  
OotOffset-st: 4/4/4/4 [16]  
KicOffset-st: 4/4/4/4 [16]  
DiffImageQuality-fgm: 0.62 [10/16]  
DiffImageOverlap-fno: 1.00 [17/17]

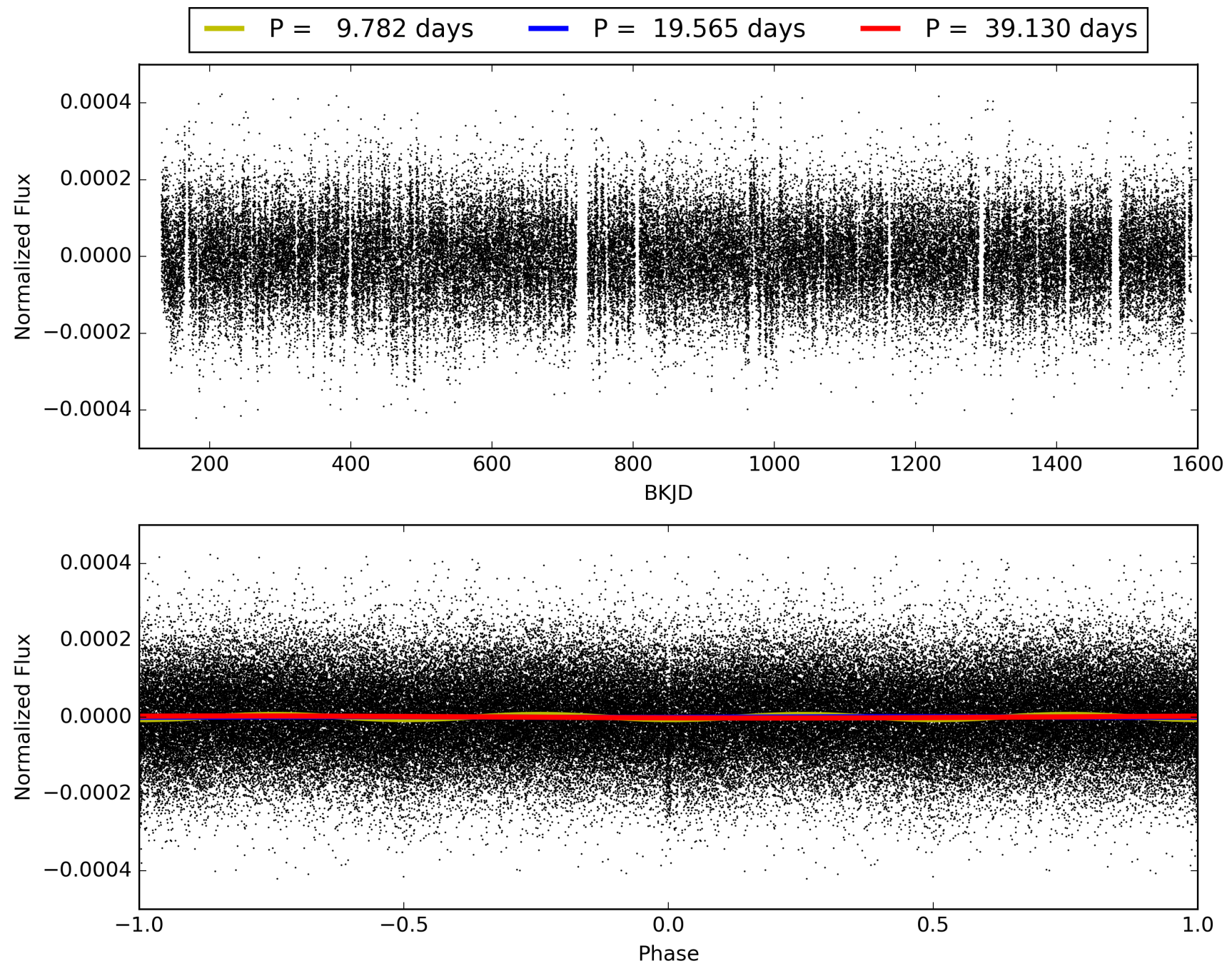
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 28-Jan-2016 20:00:37 Z

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

# TCE 009936080-01, PDC Light Curves

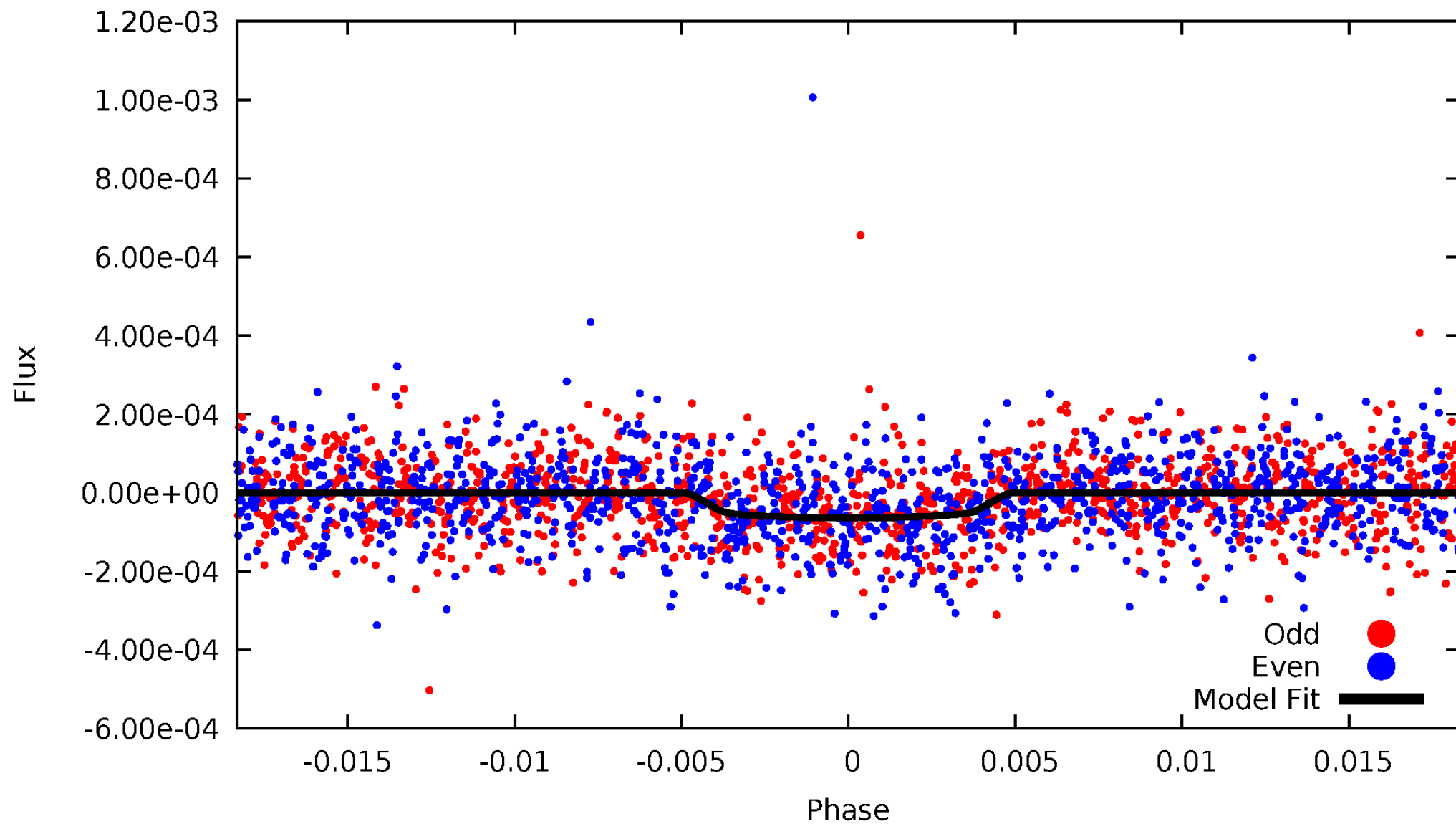


TCE 009936080-01



# DV Odd/Even

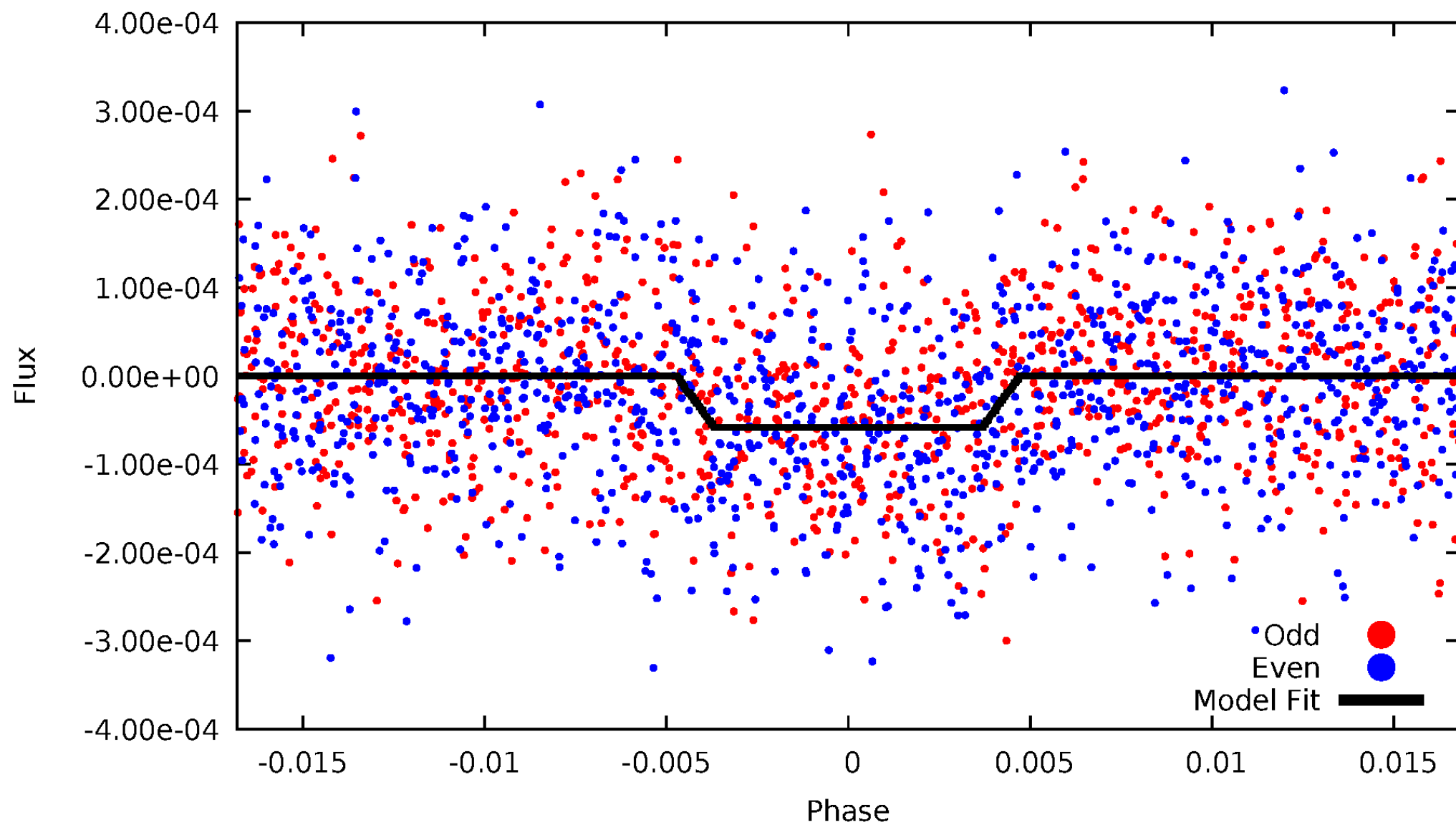
TCE 009936080-01



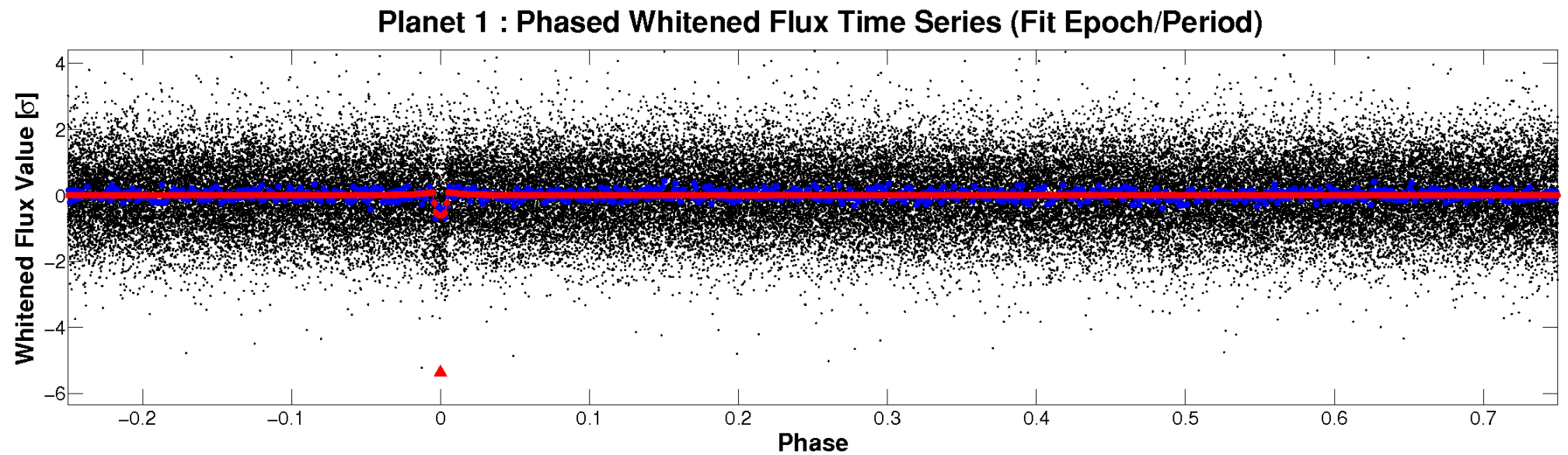
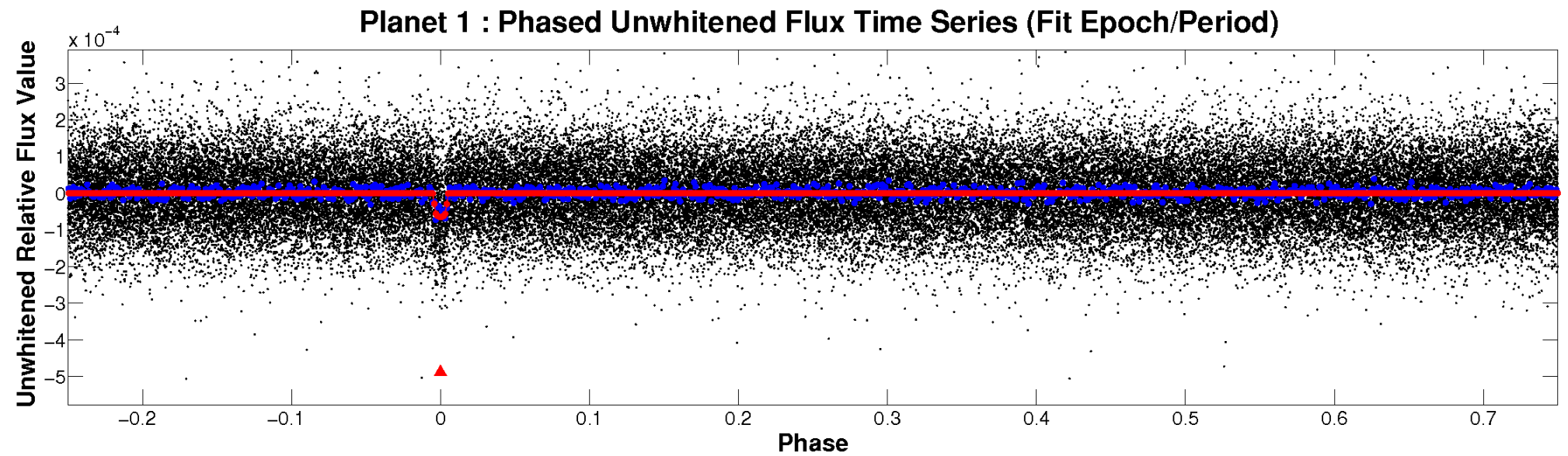


# ALT Odd/Even

TCE 009936080-01

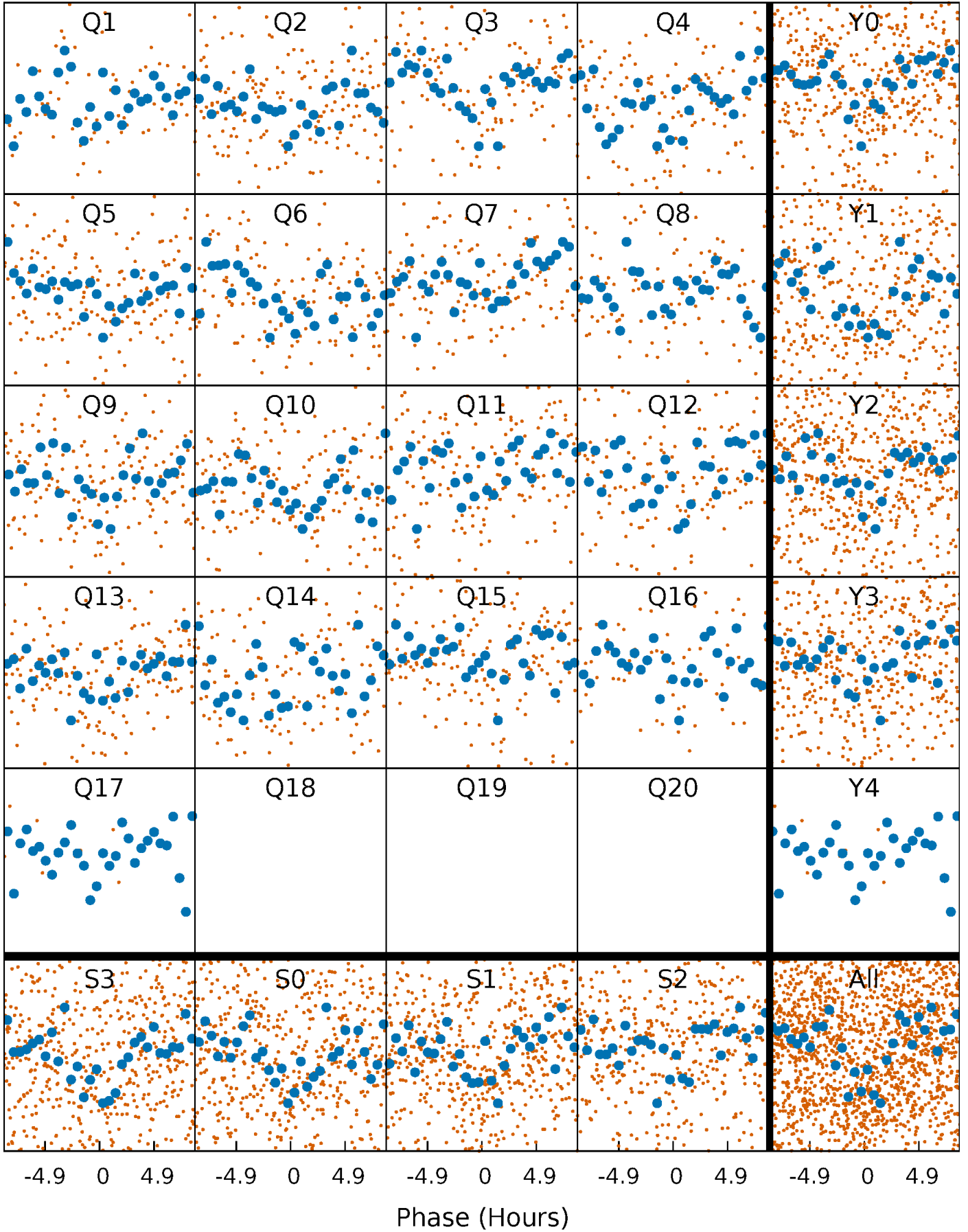


# Non-Whitened Vs. Whitened Light Curve



# PDC Quarter-Phased Transit Curves

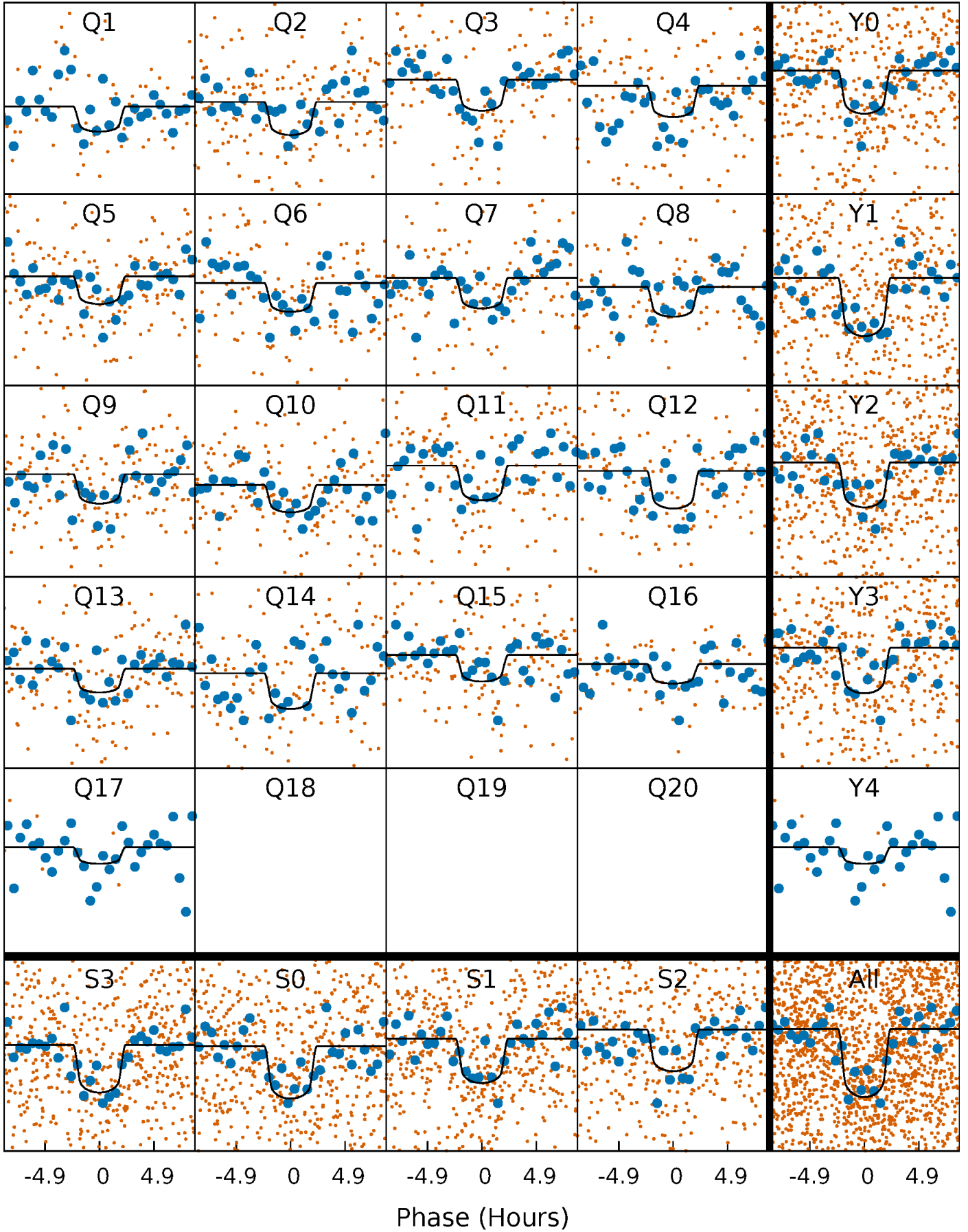
TCE 009936080-01   P= 19.564993 Days    $T_0=136.283582$  (BKJD)





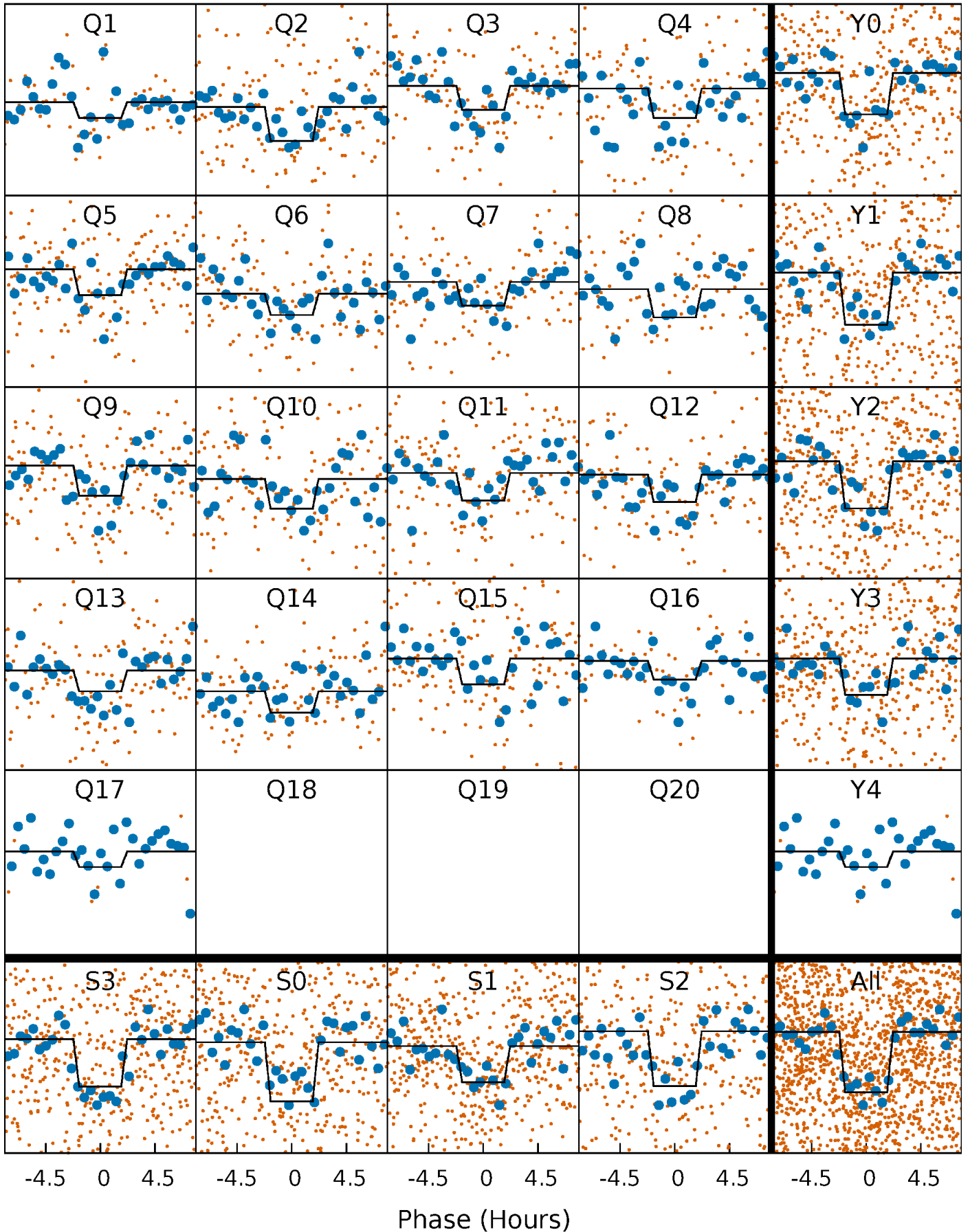
# DV Quarter-Phased Transit Curves

TCE 009936080-01 P= 19.564993 Days  $T_0=136.283582$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

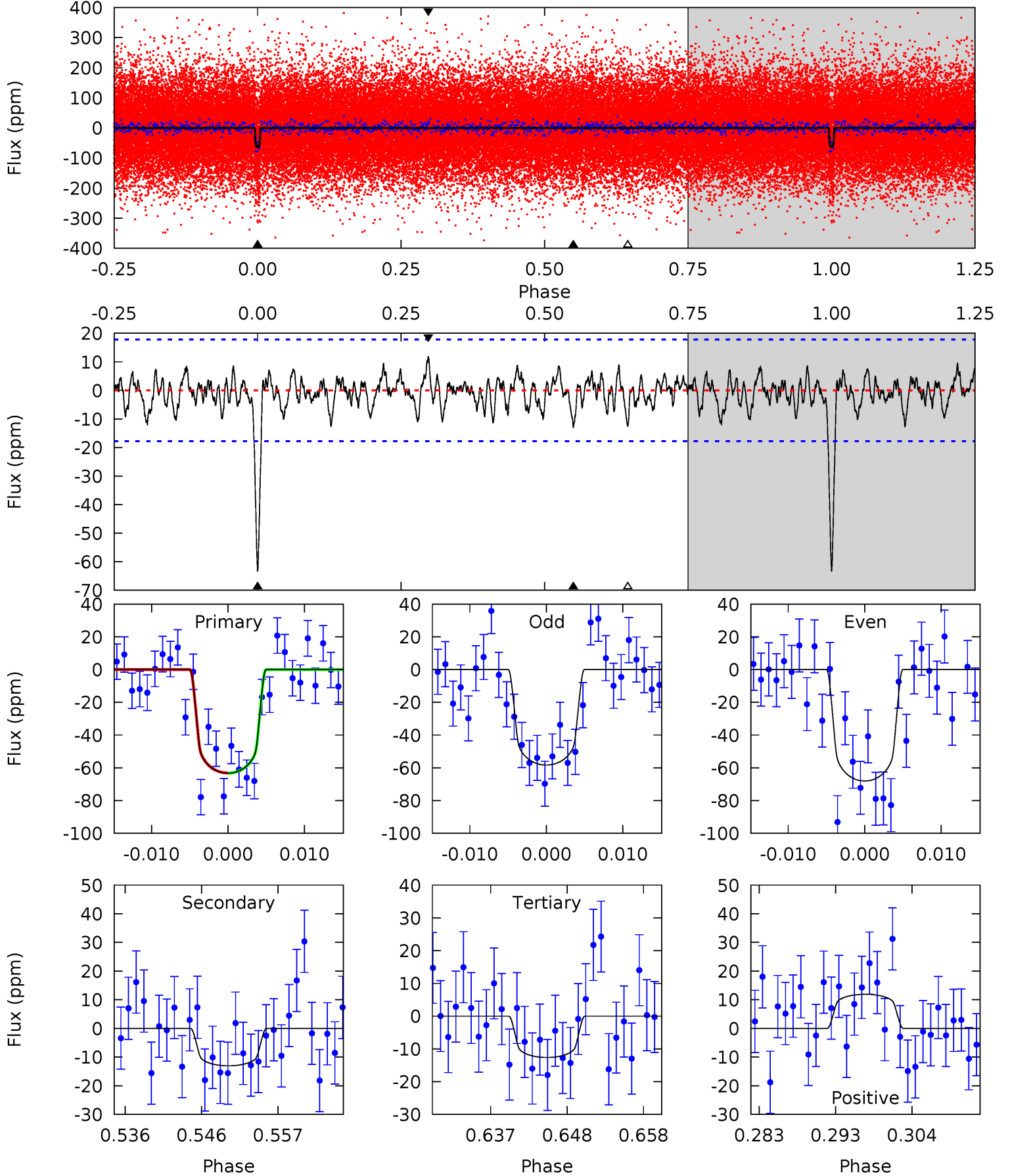
TCE 009936080-01 P= 19.564951 Days  $T_0=136.286264$  (BKJD)



# DV Model-Shift Uniqueness Test

009936080-01,  $P = 19.564993$  Days,  $E = 116.718589$  Days

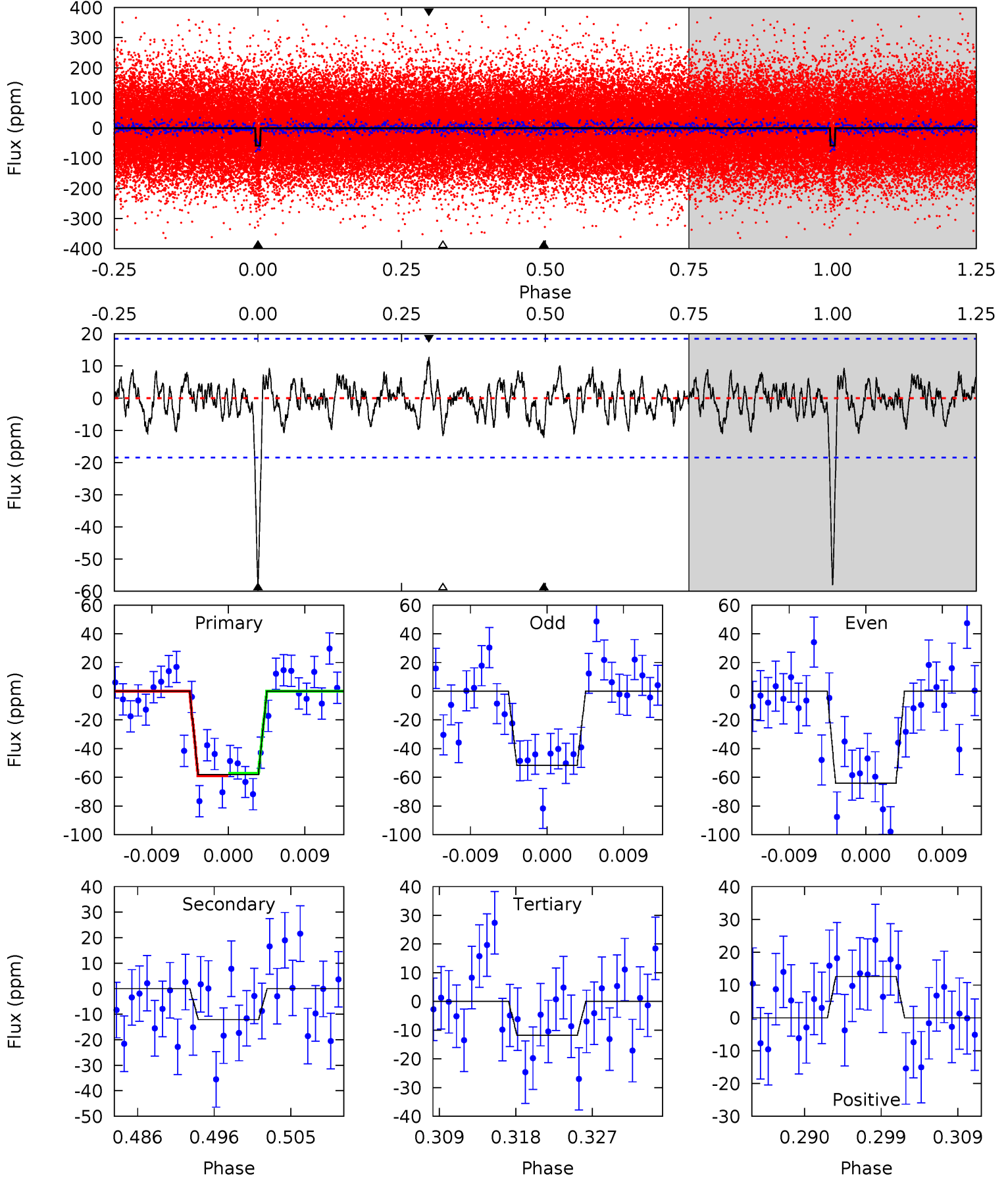
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
17.9	3.68	3.56	3.36	5.02	2.57	1.20	14.3	14.5	0.12	0.32	1.37	0.96	0.16	0.02



# Alt Model-Shift Uniqueness Test

009936080-01, P = 19.564951 Days, E = 116.721313 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
15.8	3.31	3.21	3.44	5.04	2.60	1.15	12.6	12.4	0.10	-0.13	1.70	1.09	0.18	0.23



### Stellar Parameters For KIC 009936080

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6180^{+111}_{-135}$	$4.294^{+0.099}_{-0.132}$	$0.020^{+0.150}_{-0.150}$	$1.235^{+0.223}_{-0.149}$	$1.090^{+0.113}_{-0.066}$	$0.816^{+0.327}_{-0.304}$
	+2%/-2%	+2%/-3%	+750%/-750%	+18%/-12%	+10%/-6%	+40%/-37%
Source	SPE59	SPE59	SPE59	DSEP		

KIC = Kepler Input Catalog; PHO = Photometry; SPE = Spectroscopy; AST = Asteroseismology  
 TRA = Transits; DESP = Dartmouth Models; MULT = Multiple Models

### Secondary Eclipse Parameters for KIC 009936080-01 / KOI 4431.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-13 \pm 4$	$1.21^{+0.38}_{-0.34}$	$1111^{+53}_{-46}$	$4178^{+623}_{-398}$	$104^{+109}_{-50}$
Alt.	$-12 \pm 4$	$1.04^{+0.34}_{-0.35}$	$1109^{+55}_{-46}$	$4368^{+822}_{-484}$	$127^{+188}_{-62}$

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



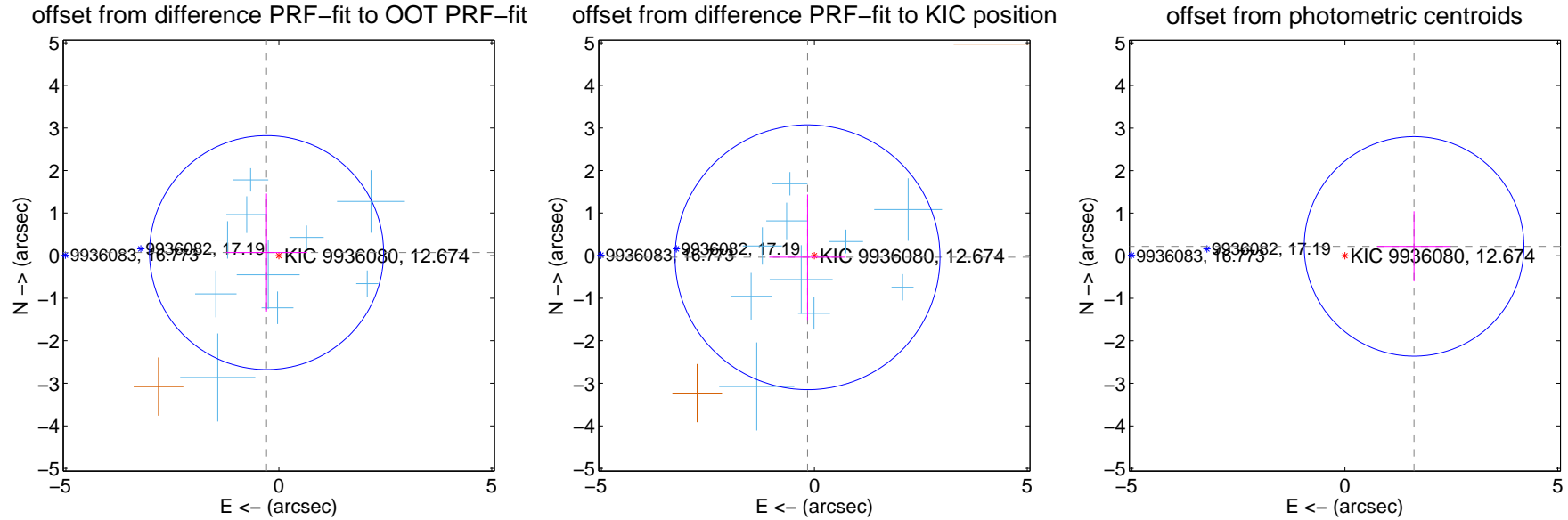
## DV Centroid Data

Supplemental centroid analysis for 009936080-01. Kepler magnitude: 12.67. Transit SNR 12.46

There are 10 quarters with good PRF difference image offsets

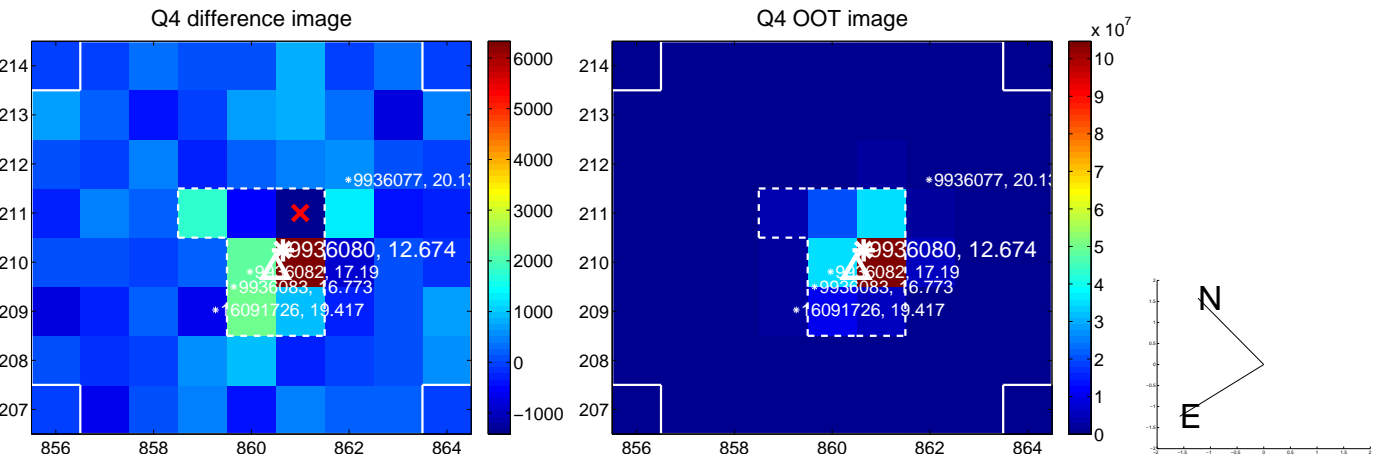
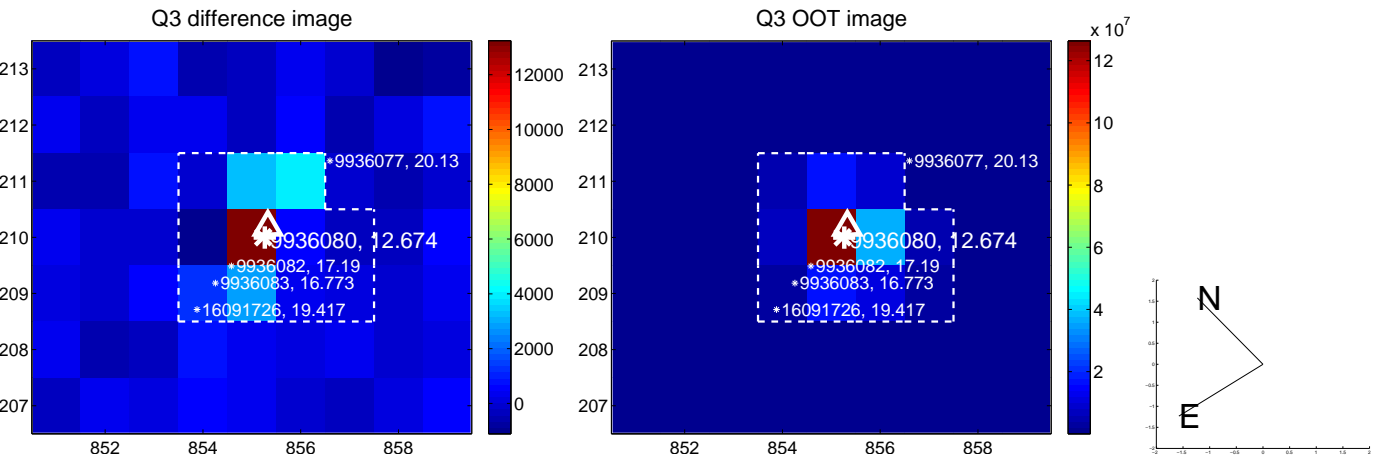
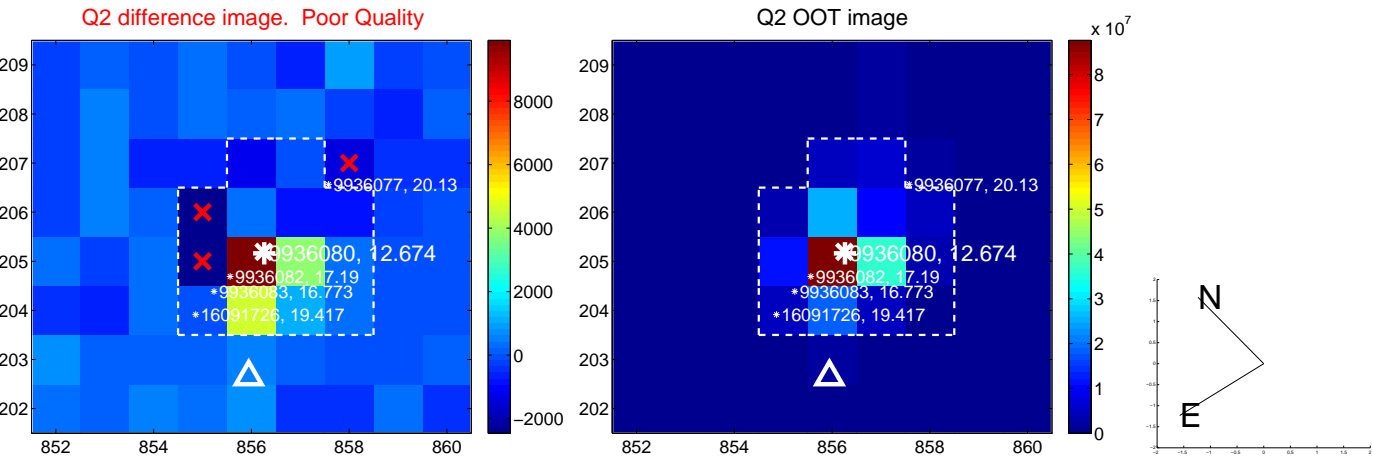
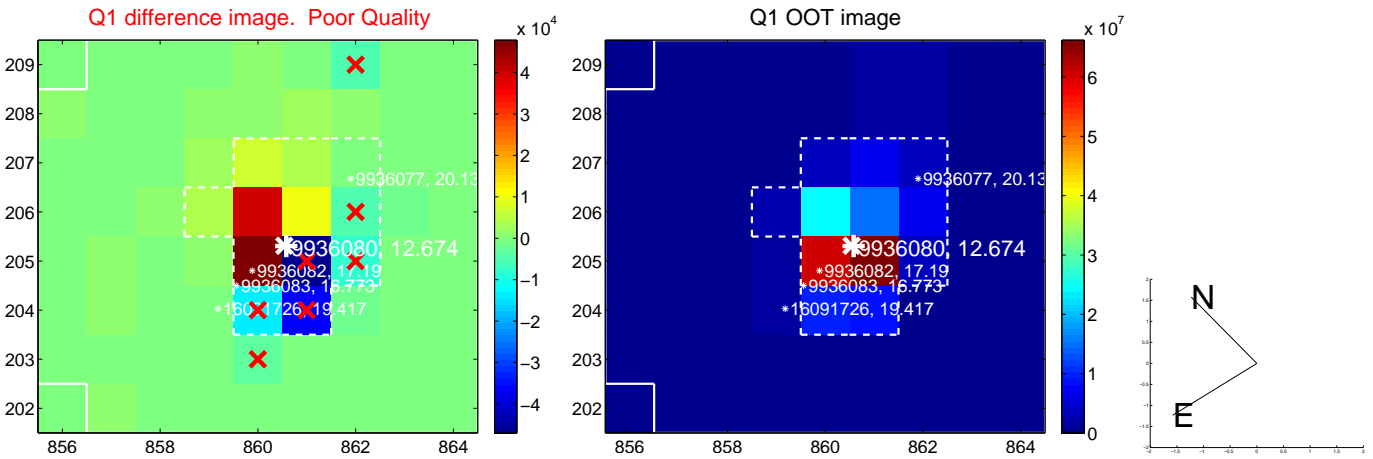
The direct PRF centroid is offset from the target star catalog position by about 0.17 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.297 \pm 0.916$	0.32	$0.288 \pm 0.953$	$0.072 \pm 1.387$
PRF-fit source offset from KIC position	$0.165 \pm 1.037$	0.16	$0.160 \pm 0.898$	$-0.038 \pm 1.475$
photometric centroid source offset	$1.64 \pm 0.86$	1.91	$-1.62 \pm 0.86$	$0.22 \pm 0.82$

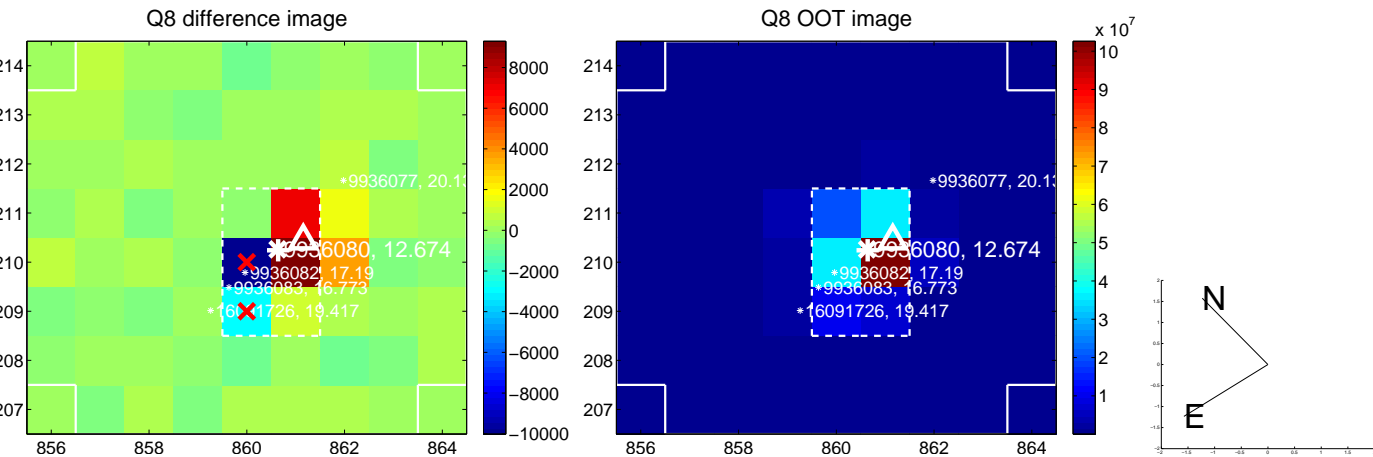
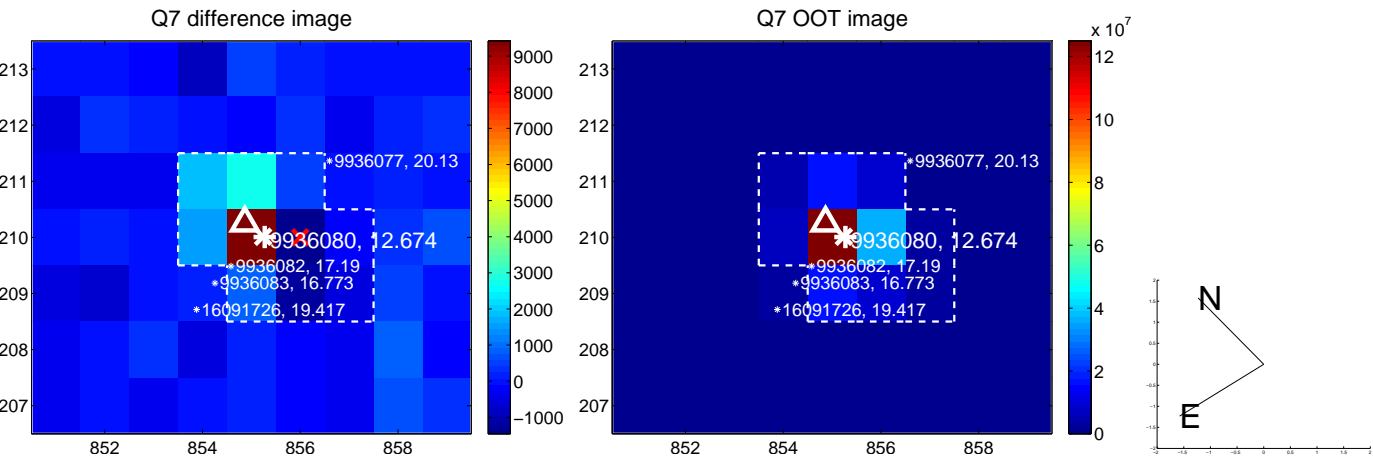
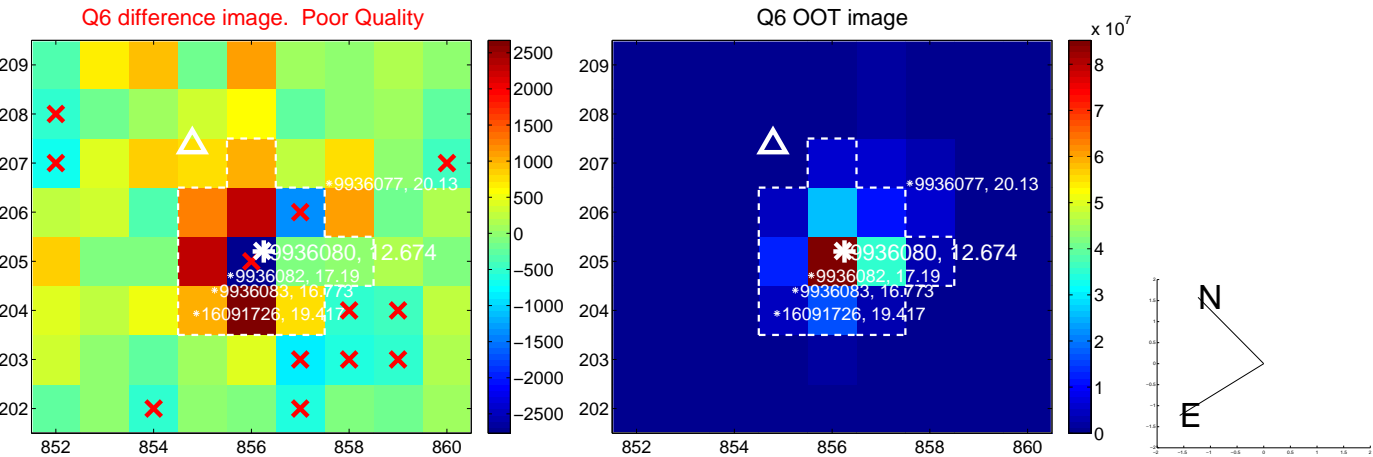
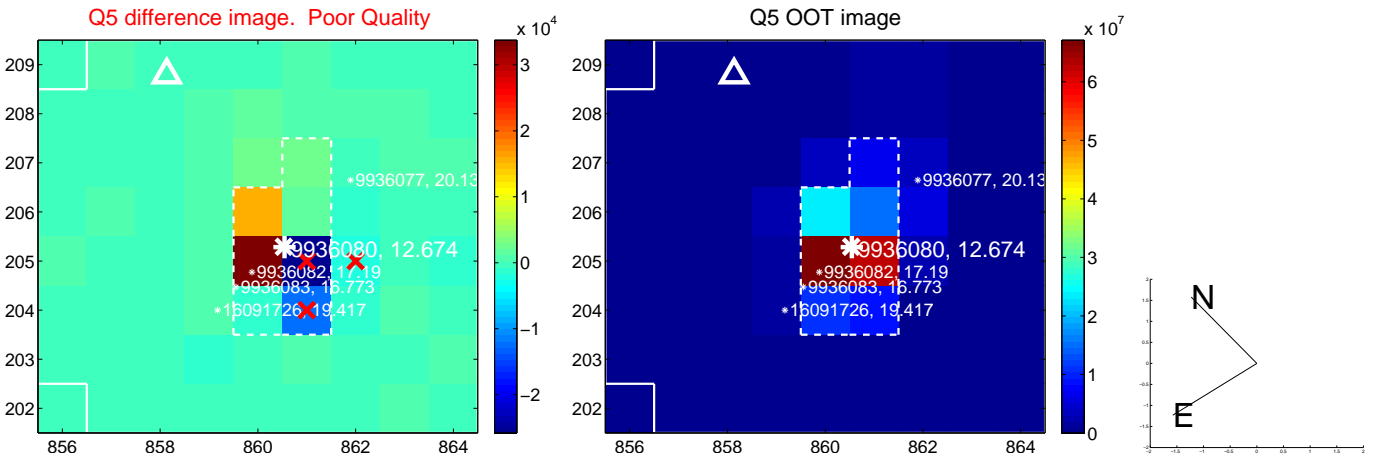


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets**; **Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

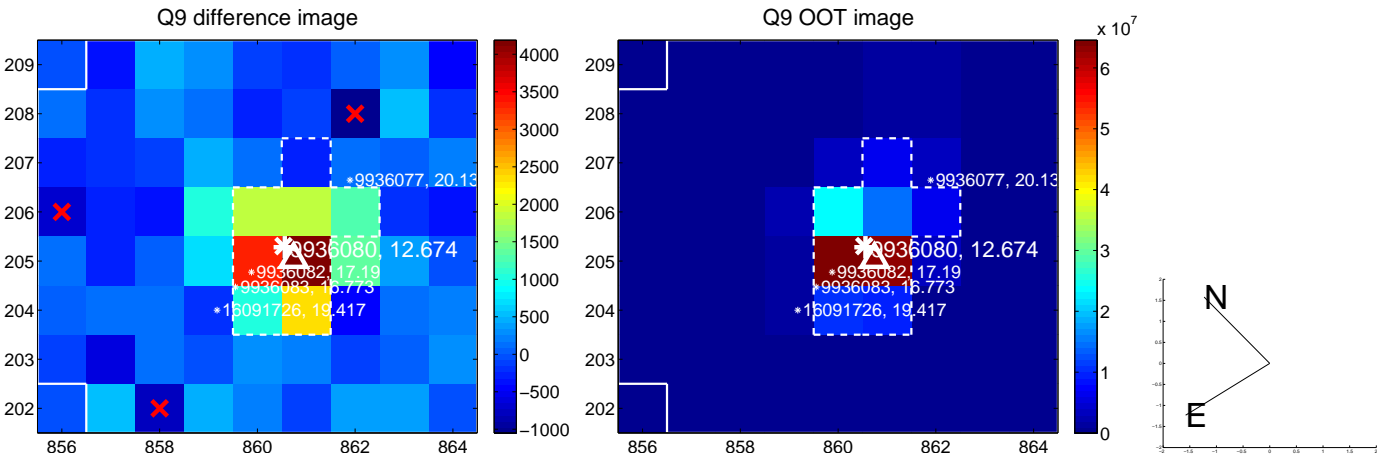
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



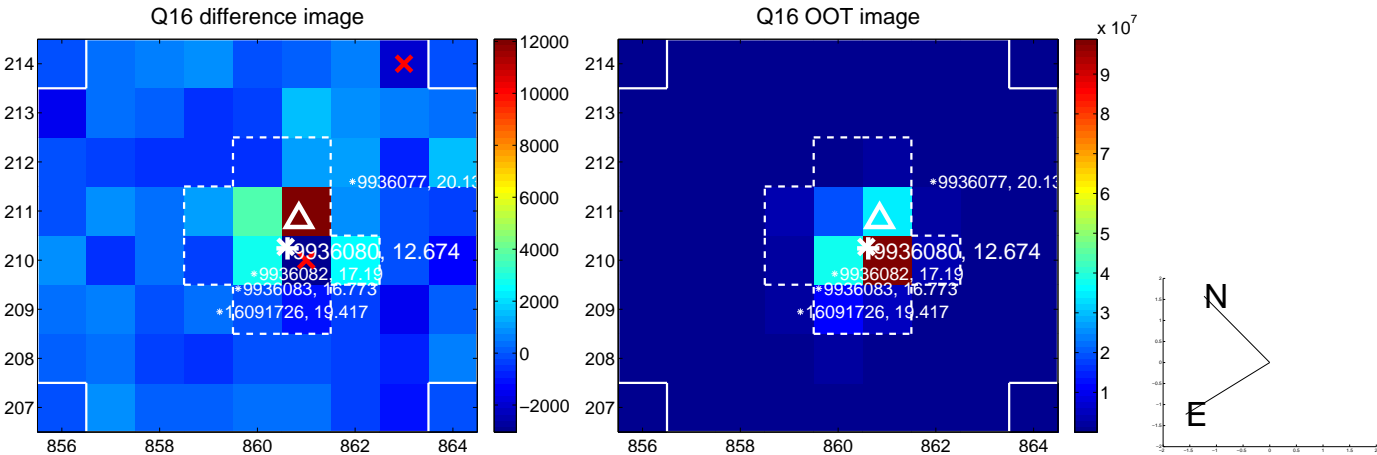
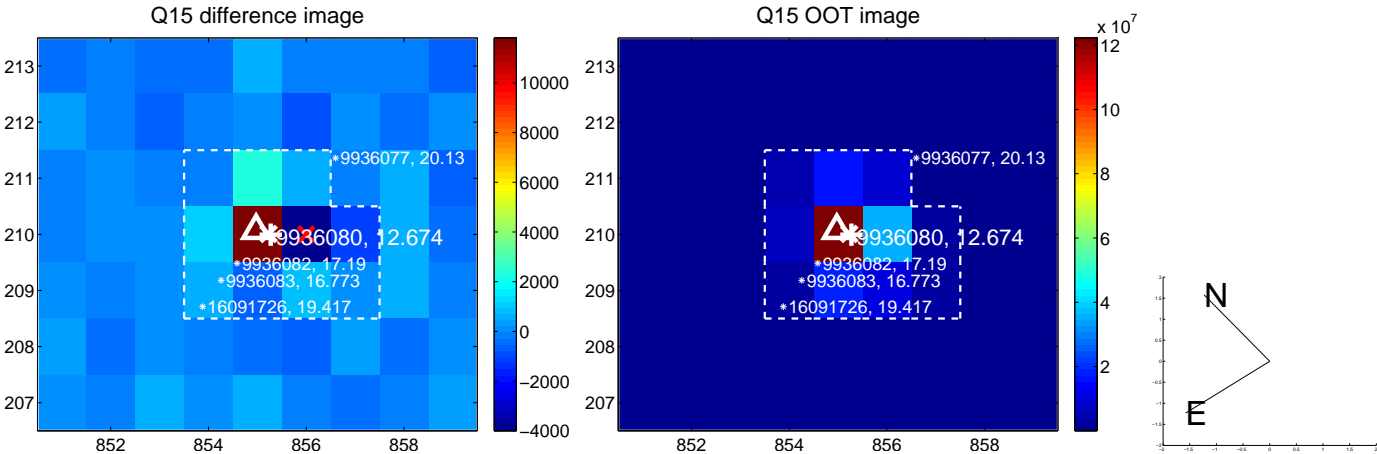
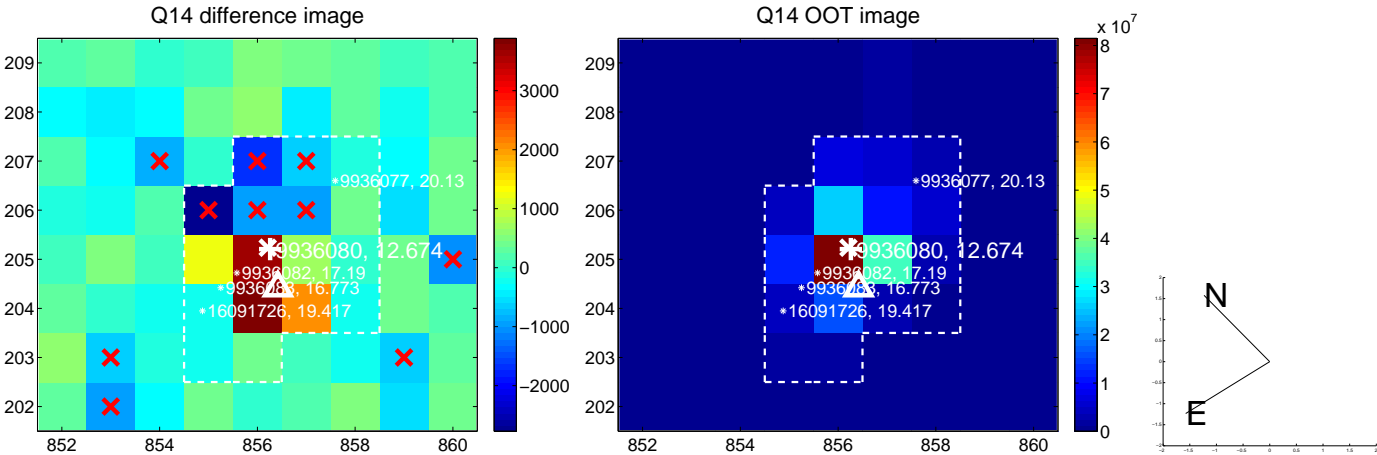
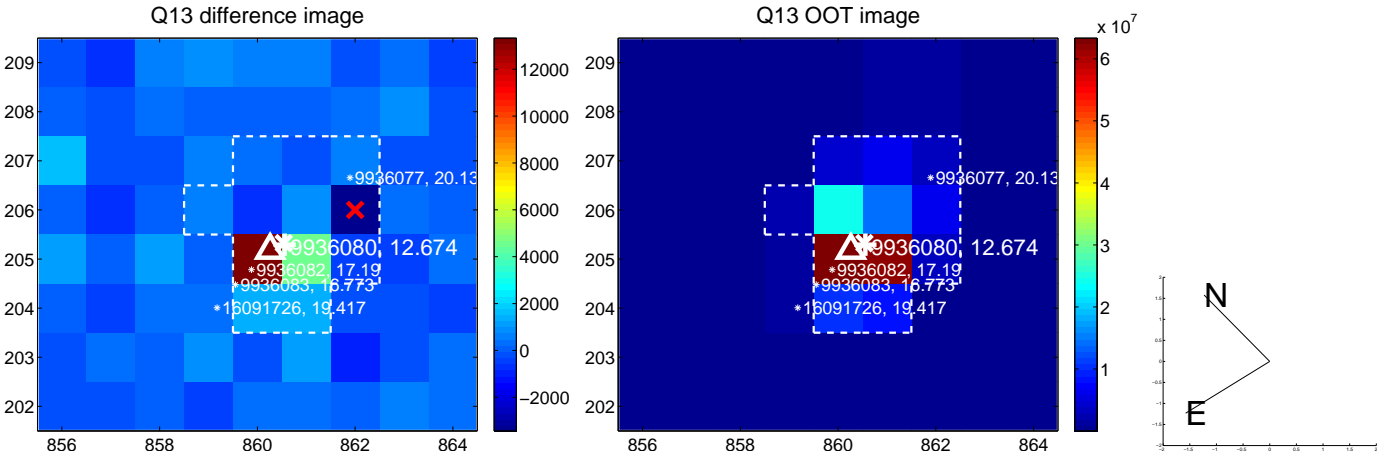
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

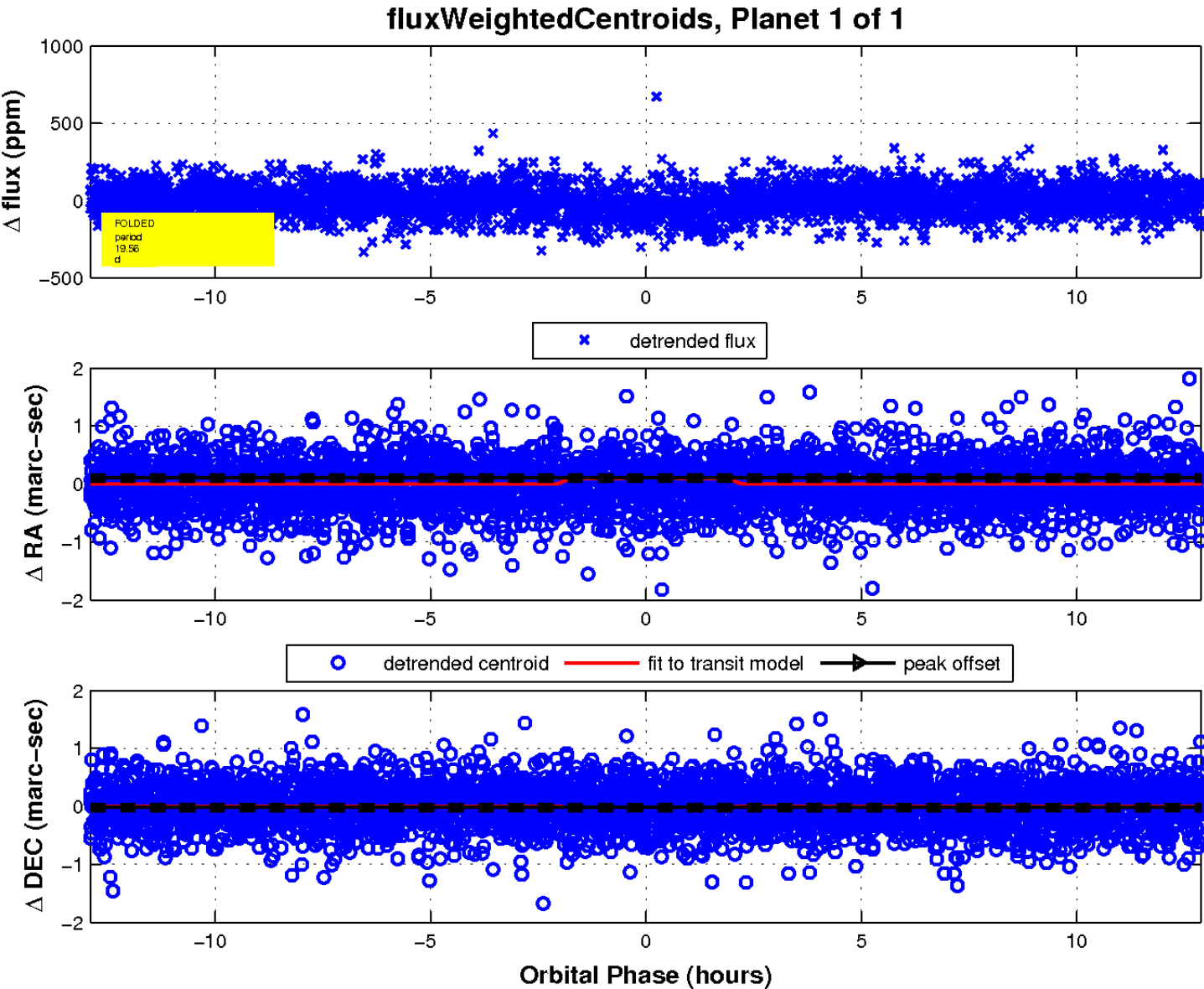
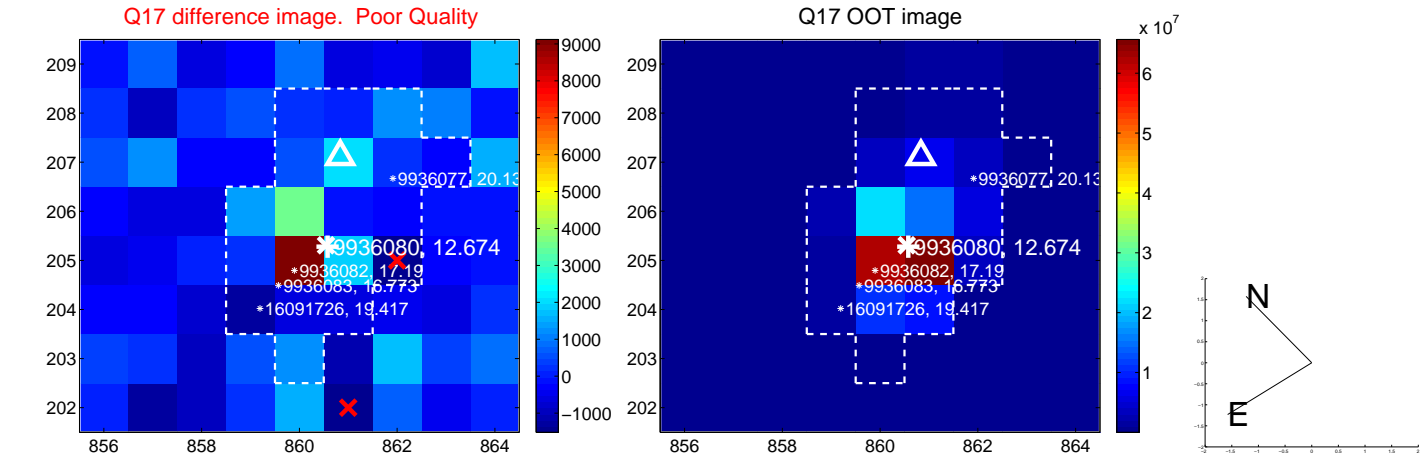


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.





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



UKIRT Image

Declination

