

# KIC 002438070

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
002438070-01	OBS	0363.01	2.442938	132.012892	619.9	4.058	108.8	94.6	1.43	5657	6.18	1501.44

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
002438070-01	OBS	FP	0.00	0	1	1	1	MOD_ODDEVEN_DV—MOD_ODDEVEN_ALT—CENT_UNRESOLVED_OFFSET—HALO_GHOST—EPHEM_MATCH

**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 002438070-01

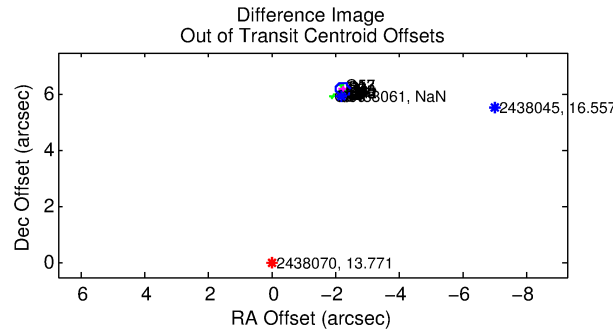
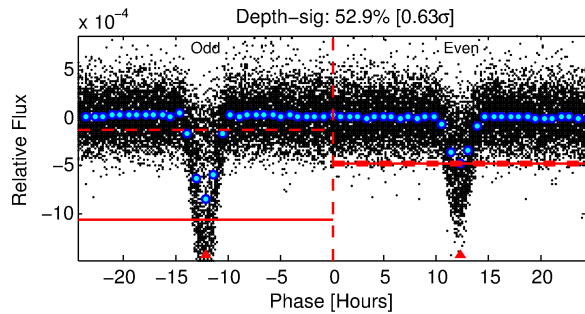
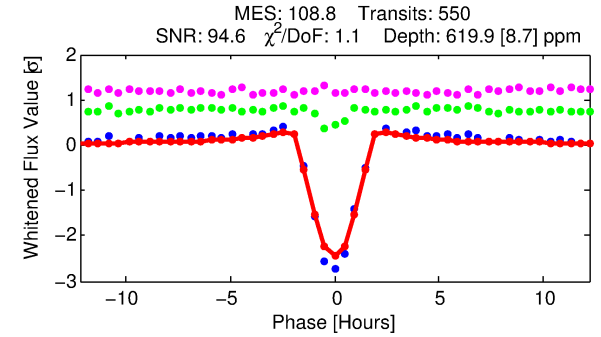
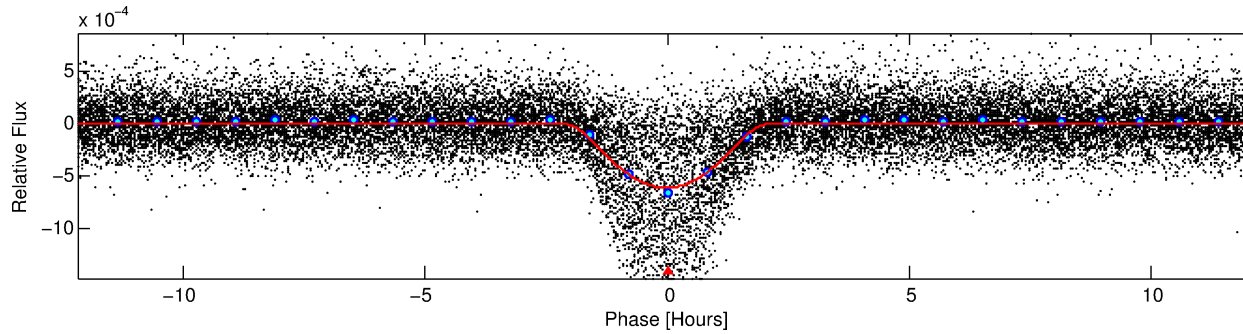
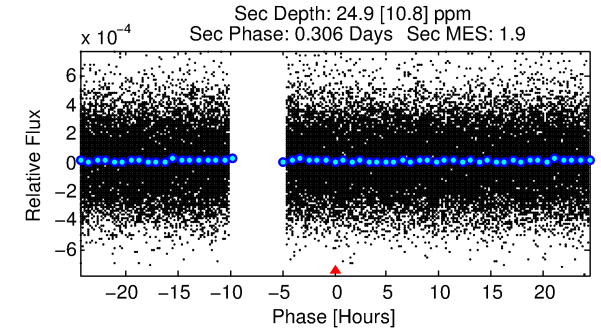
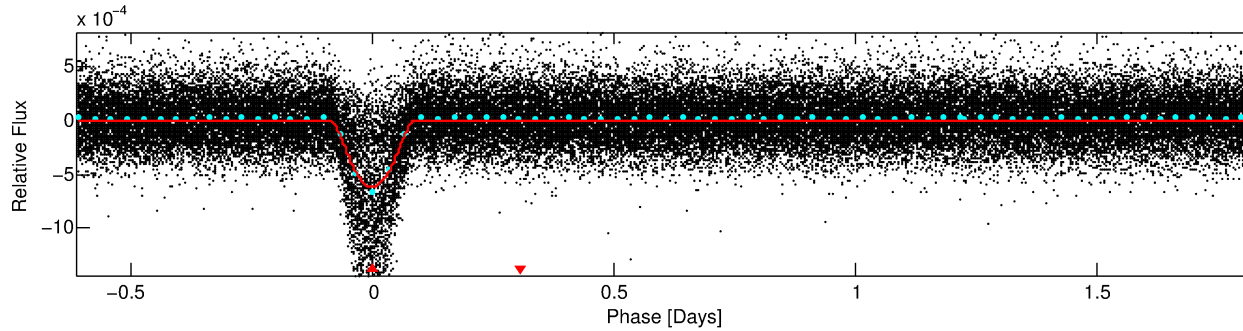
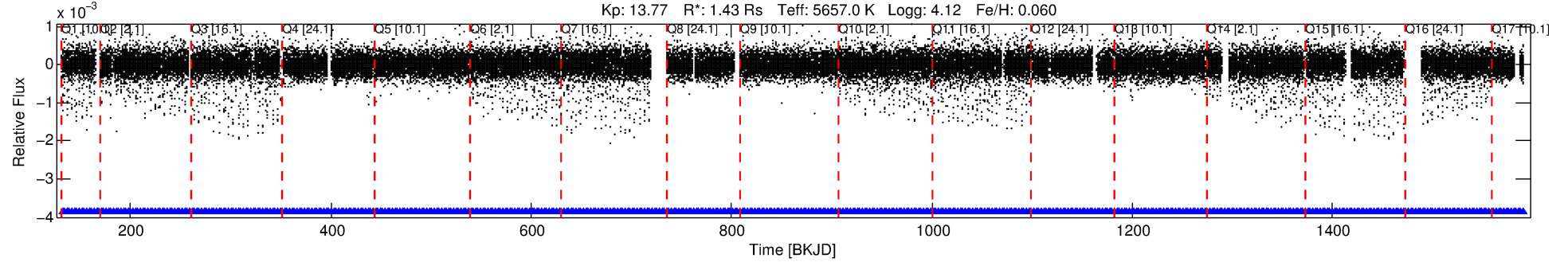
TCE (1)	KIC	Parent (2)	Parent KIC	$P_1:P_2$	Dist ( $''$ )	$\Delta$ Row	$\Delta$ Col	$m_2$	$m_1$	$D_2/D_1$	Mechanism	Flag	$\sigma_P$	$\sigma_T$
002438070-01	2438070	6270.01	2438061	1:1	6.3	2	0	0.00	13.77	60.79	Direct-PRF	0	0.09	0.07

**Notes:**  $P_1:P_2$  is the period ratio. Dist is the distance in arcseconds.  $\Delta$ Row and  $\Delta$ Col are the number of pixels apart in row and column.  $m_2$  and  $m_1$  are the magnitudes of the parent and child.  $D_2/D_1$  is the parent's transit depth divided by the child's.  $\sigma_P$  and  $\sigma_T$  are the significance of the match in period and epoch. For a match to be considered significant  $\sigma_P < 5.0$  and  $\sigma_T < 5.0$ . Matches which have  $\sigma_P$  and  $\sigma_T$  very close to this cutoff should receive extra scrutiny, especially if the period ratio is very large.

# DV One-Page Summary

KIC: 2438070 Candidate: 1 of 1 Period: 2.443 d

KOI: K00363.01 Corr: 0.994



## DV Fit Results:

Period = 2.44294 [0.00000] d  
Epoch = 132.0129 [0.0007] BKJD  
Rp/R\* = 0.0396 [0.0087]  
a/R\* = 1.77 [0.08]  
b = 0.99 [0.01]  
Seff = 1501.44 [865.40]  
Teq = 1587 [229] K  
Rp = 6.18 [2.51] Re  
a = 0.0353 [0.0121] AU  
Ag = 0.45 [0.37] [-1.47σ]  
Teffp = 2008 [316] K [1.08σ]

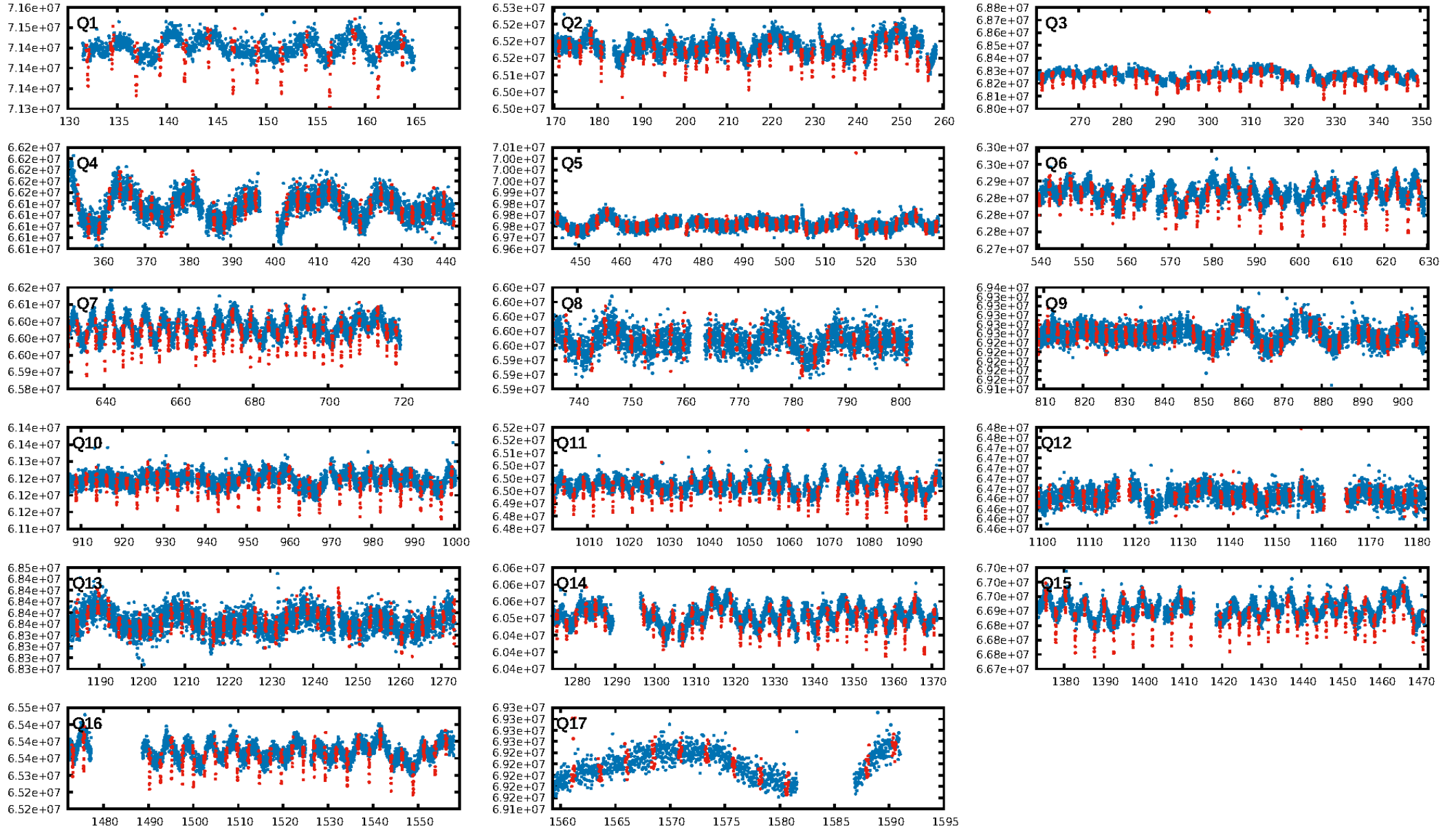
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 0.00e+00  
RollingBand-fgt: 1.00 [525/525]  
GhostDiagnostic-chr: 0.006175  
Centroid-sig: 0.0%  
Centroid-so: 6.346 arcsec [53.55σ]  
OotOffset-rm: 6.568 arcsec [83.86σ]  
KicOffset-rm: 6.449 arcsec [86.93σ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 1.00 [17/17]  
DiffImageOverlap-fno: 1.00 [17/17]

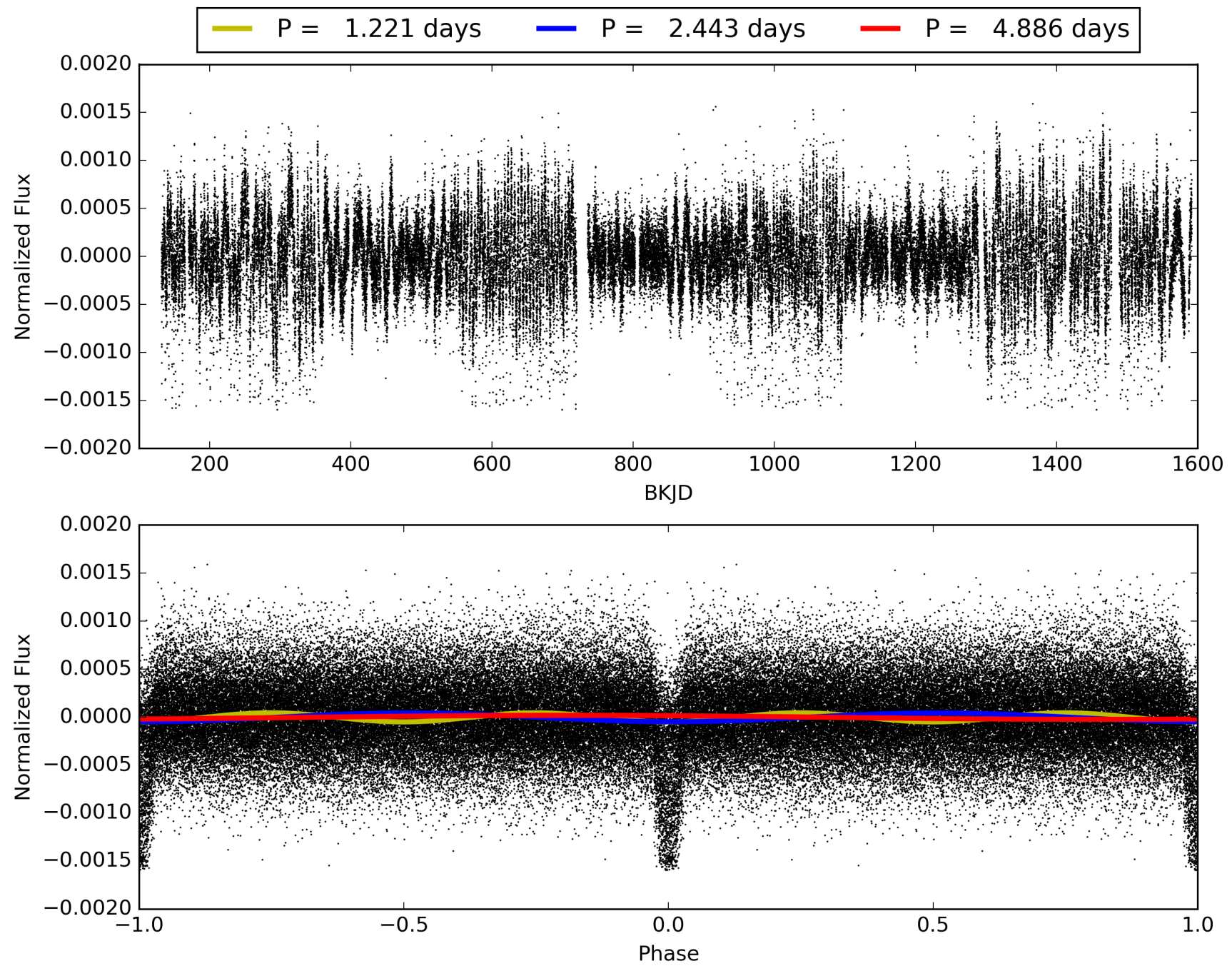
Software Revision: svn-ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 01:29:56 Z

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

# TCE 002438070-01, PDC Light Curves

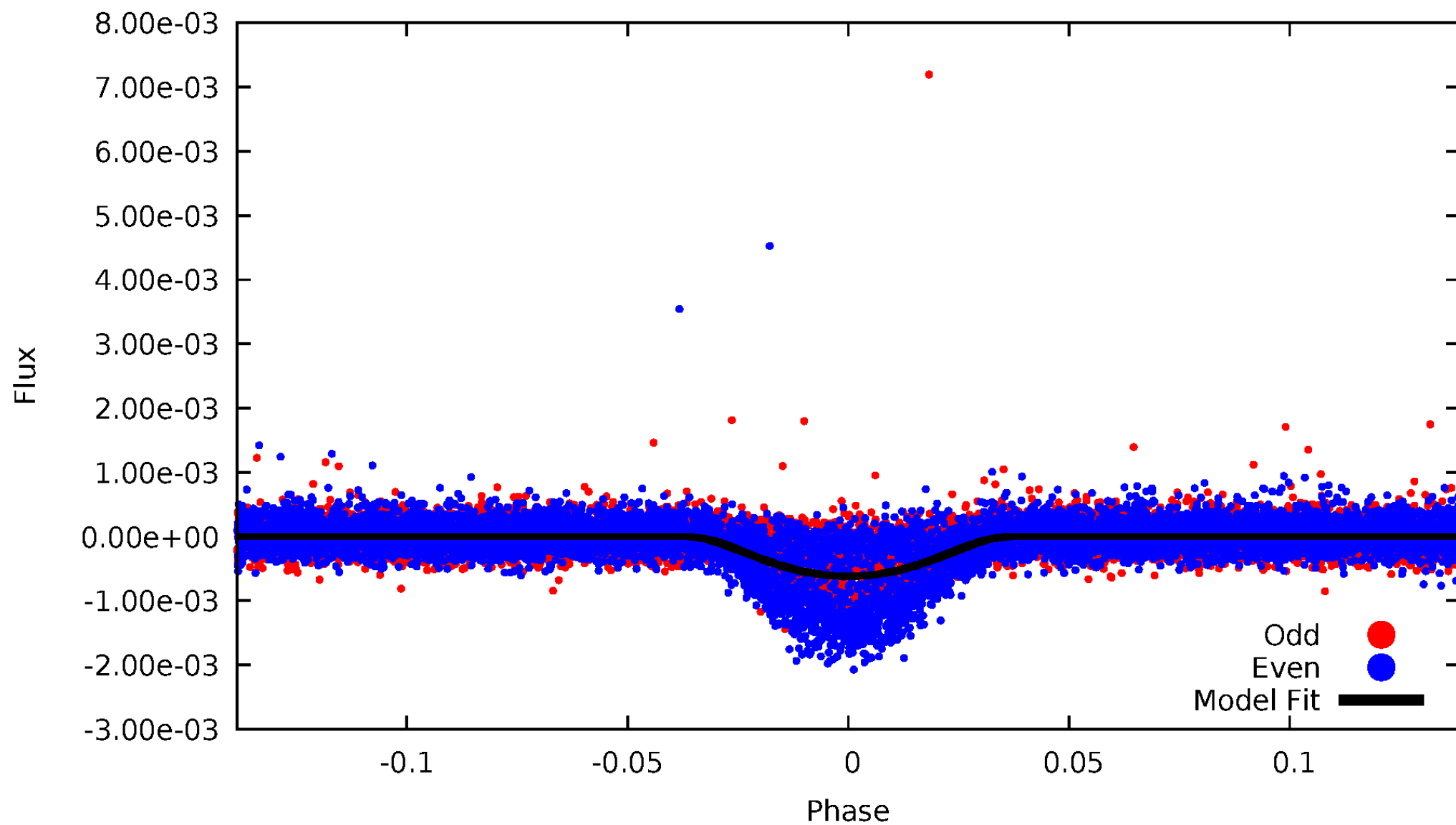


TCE 002438070-01



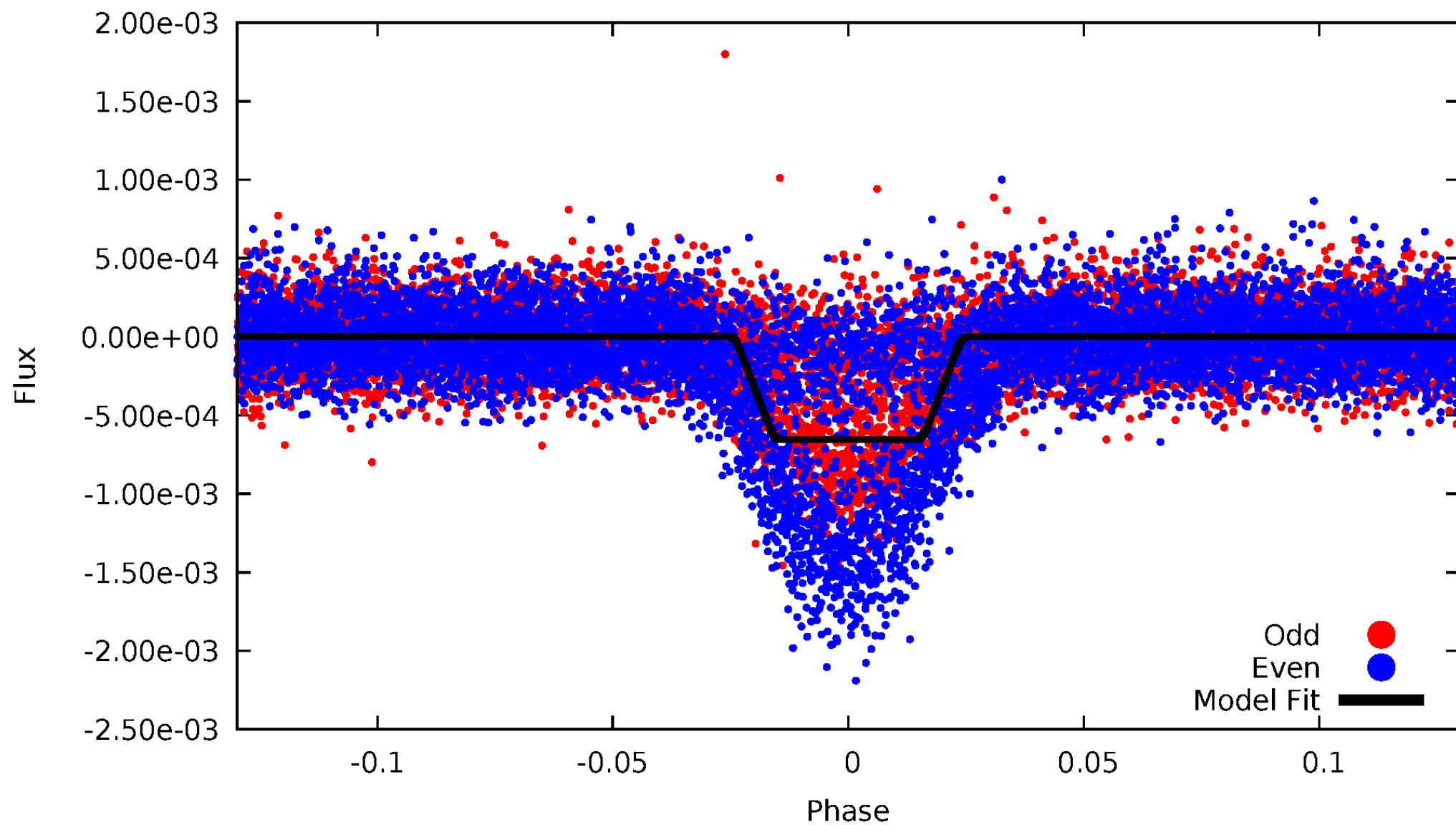
# DV Odd/Even

TCE 002438070-01



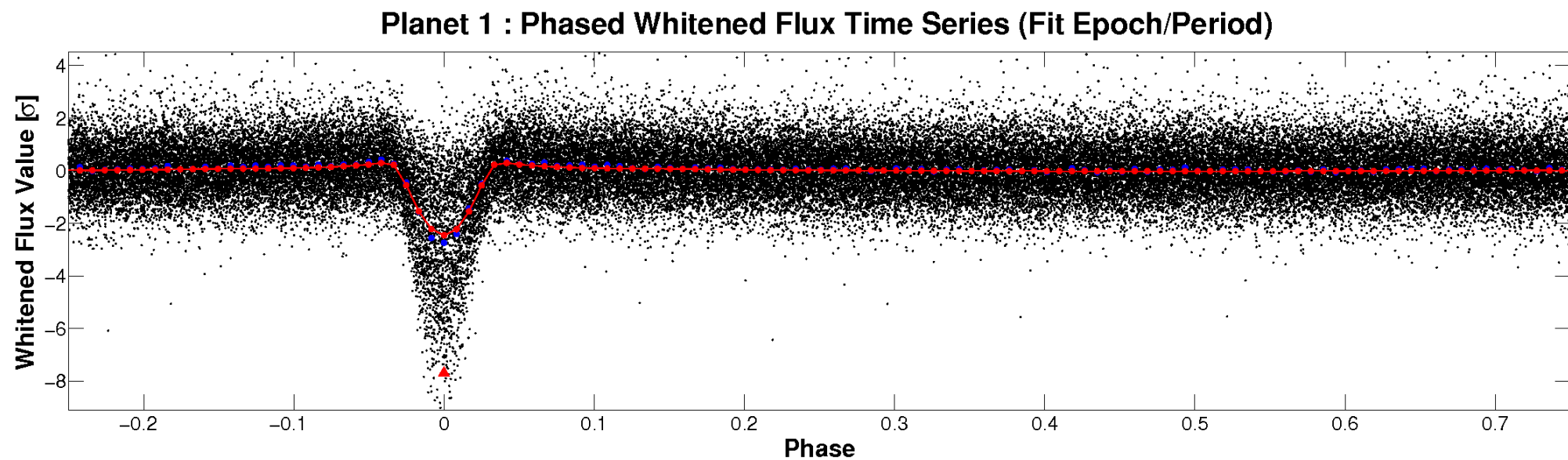
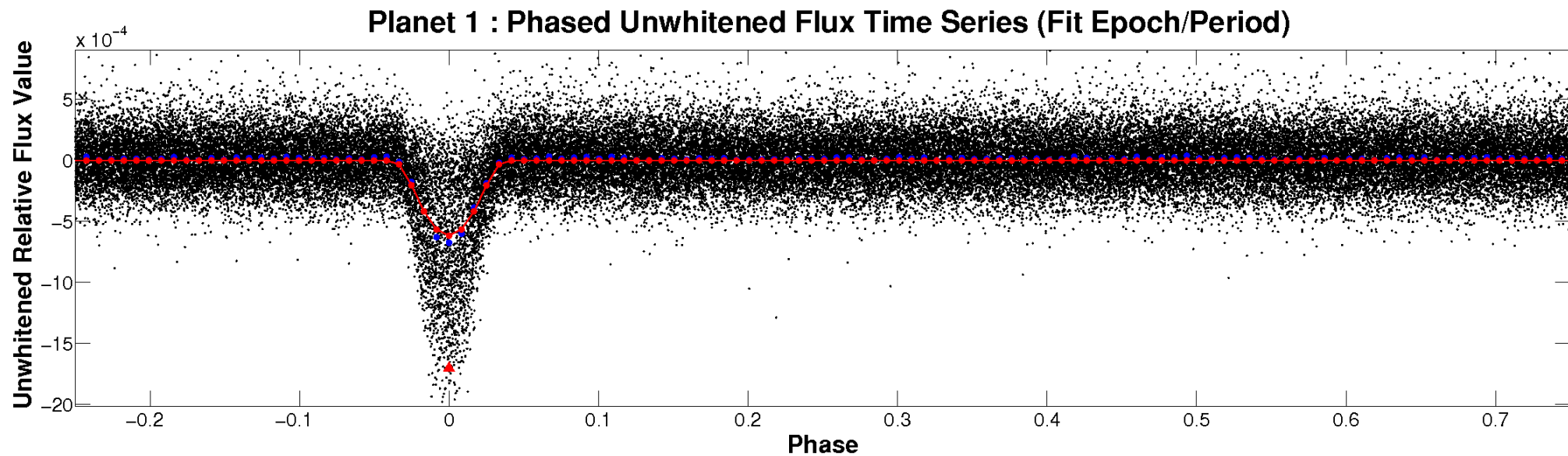
# ALT Odd/Even

TCE 002438070-01



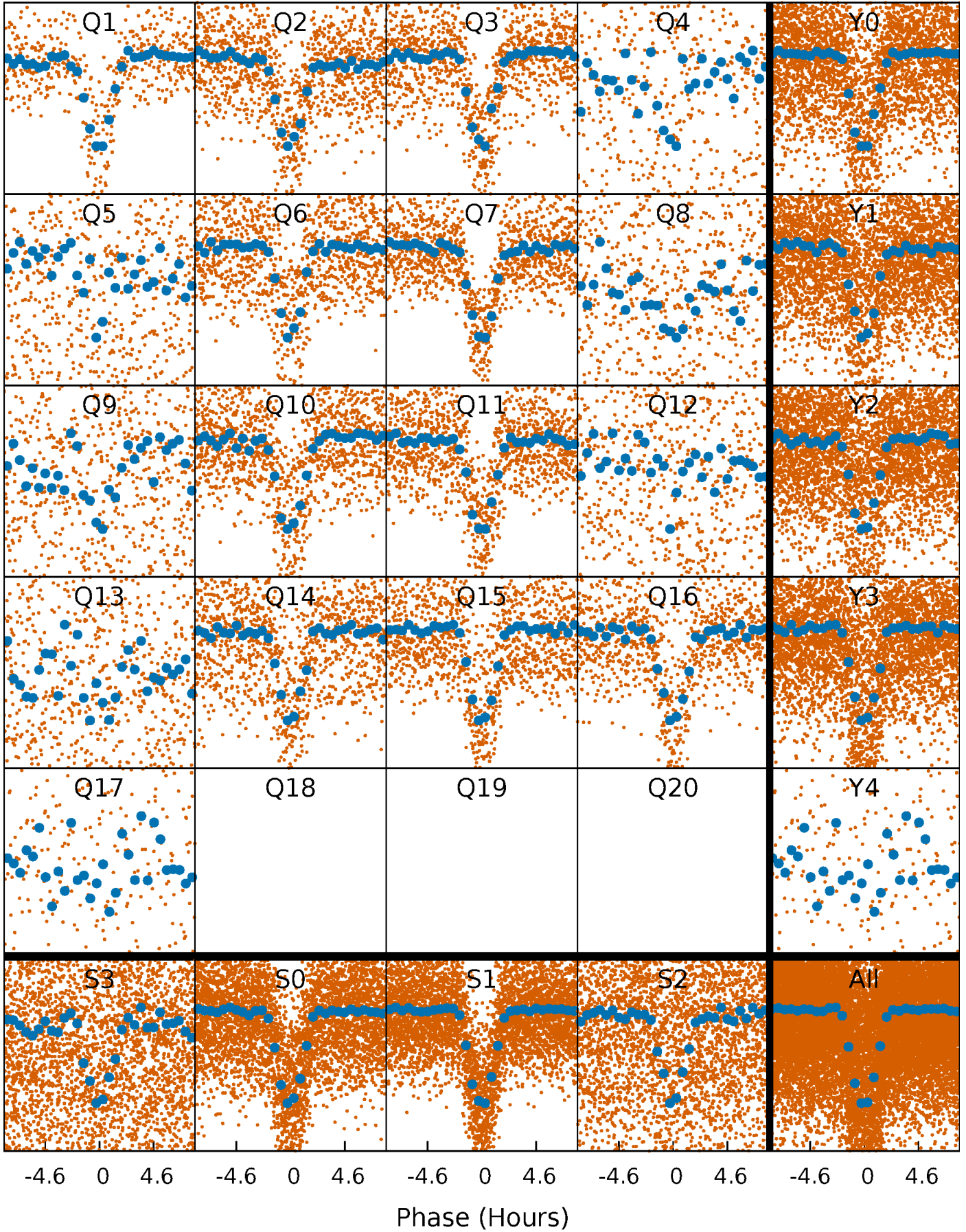


# Non-Whitened Vs. Whitened Light Curve



# PDC Quarter-Phased Transit Curves

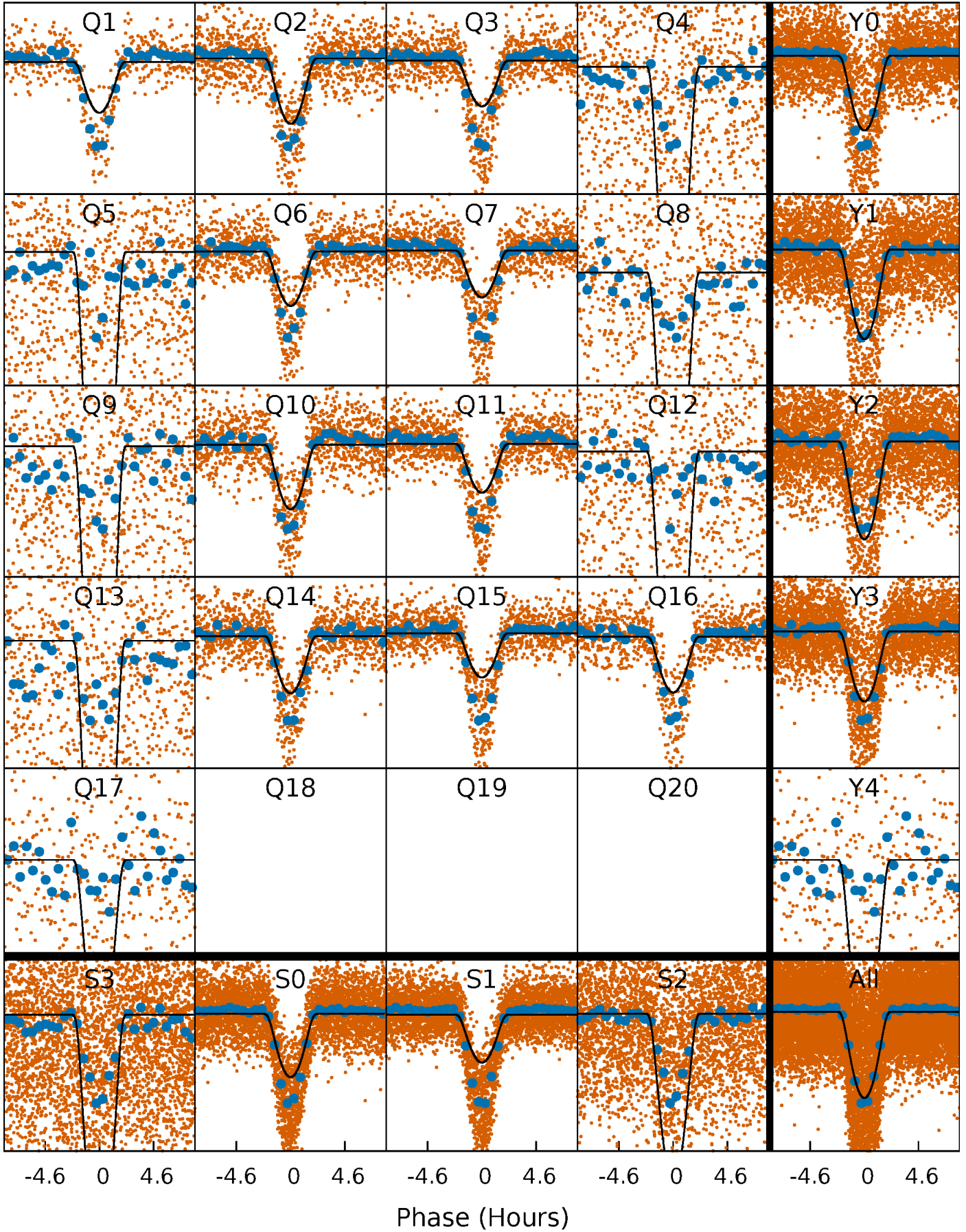
TCE 002438070-01 P= 2.442938 Days  $T_0=132.012892$  (BKJD)





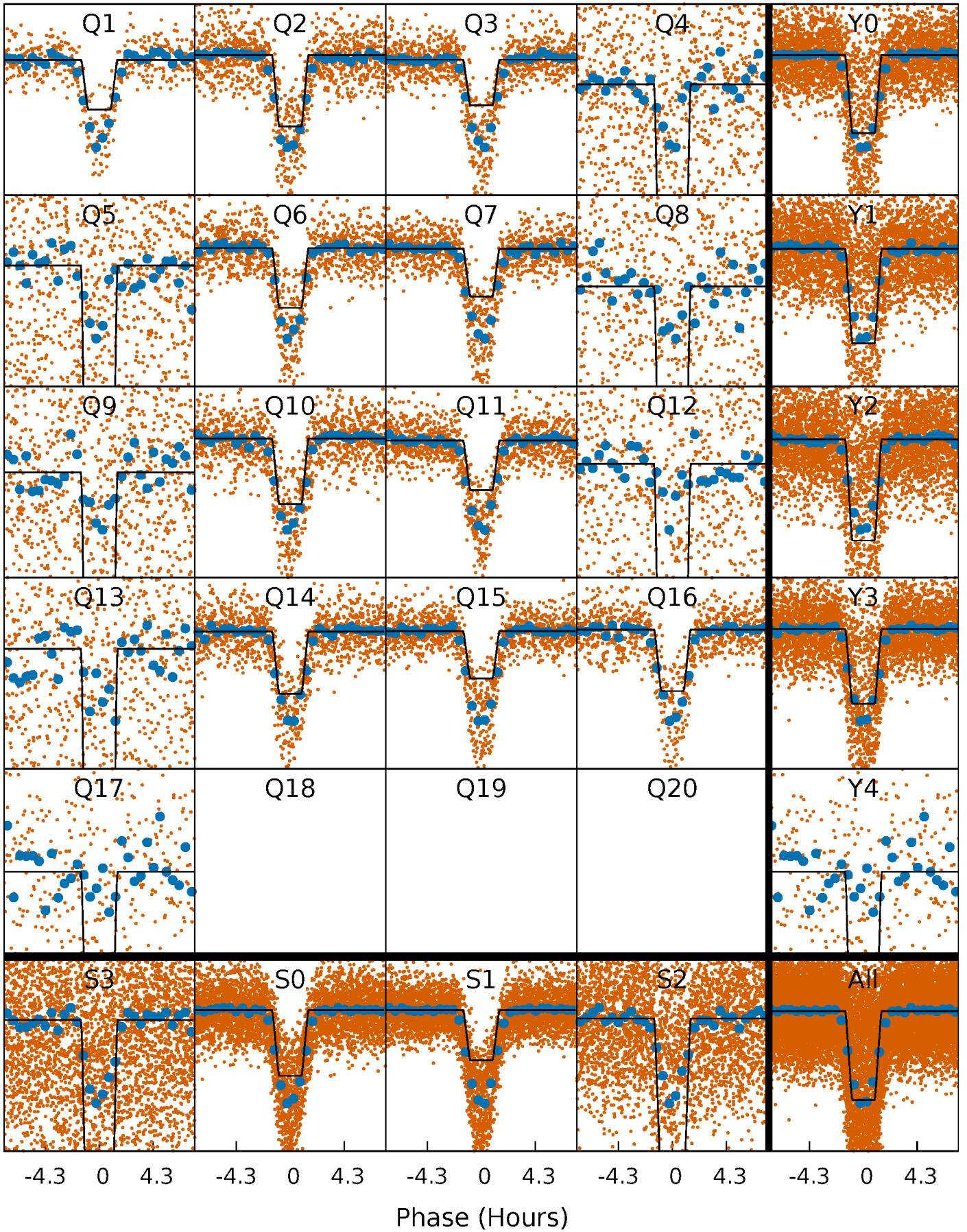
# DV Quarter-Phased Transit Curves

TCE 002438070-01   P= 2.442938 Days    $T_0=132.012892$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

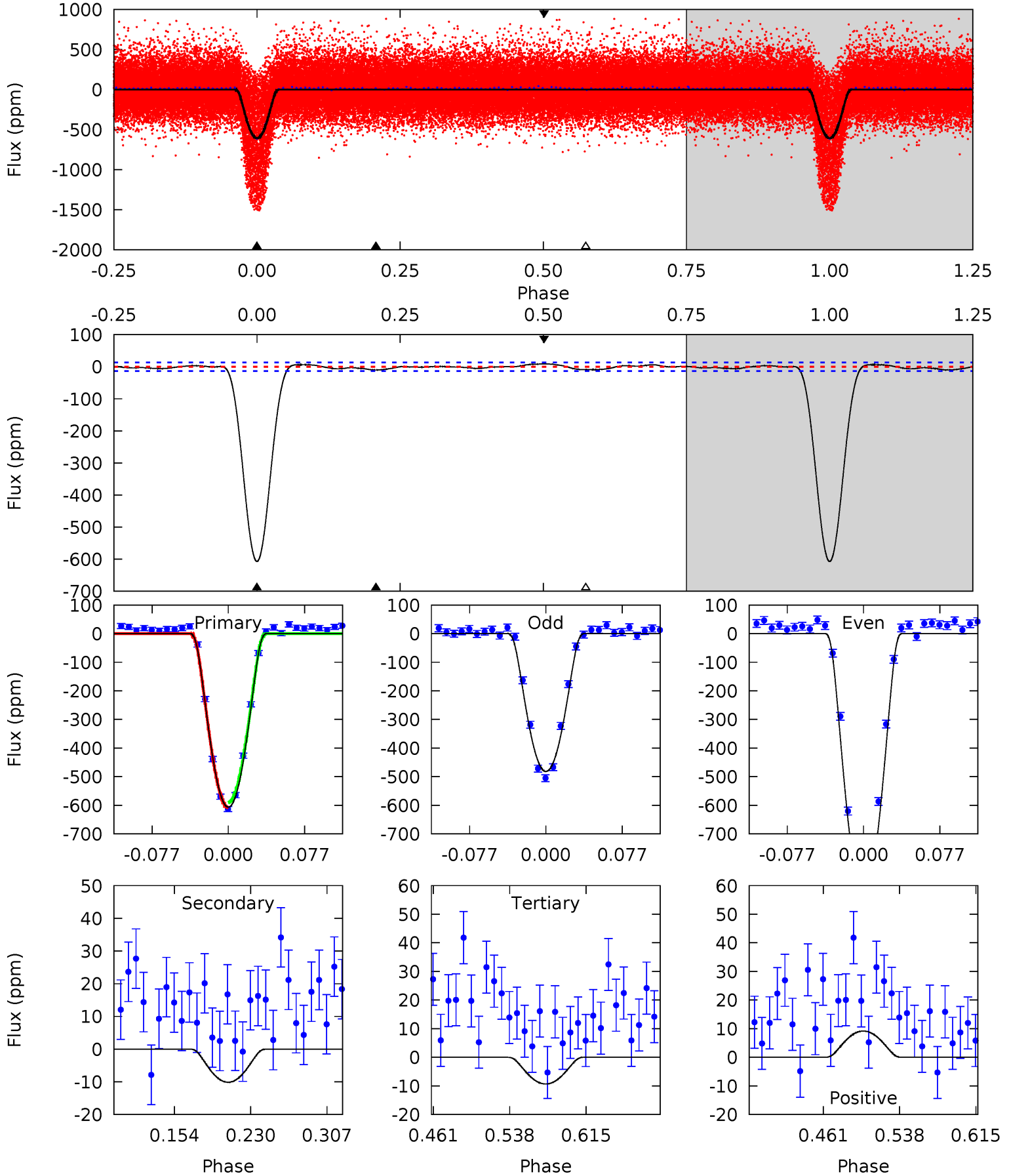
TCE 002438070-01 P= 2.442941 Days  $T_0=132.011515$  (BKJD)



# DV Model-Shift Uniqueness Test

002438070-01, P = 2.442938 Days, E = 129.569954 Days

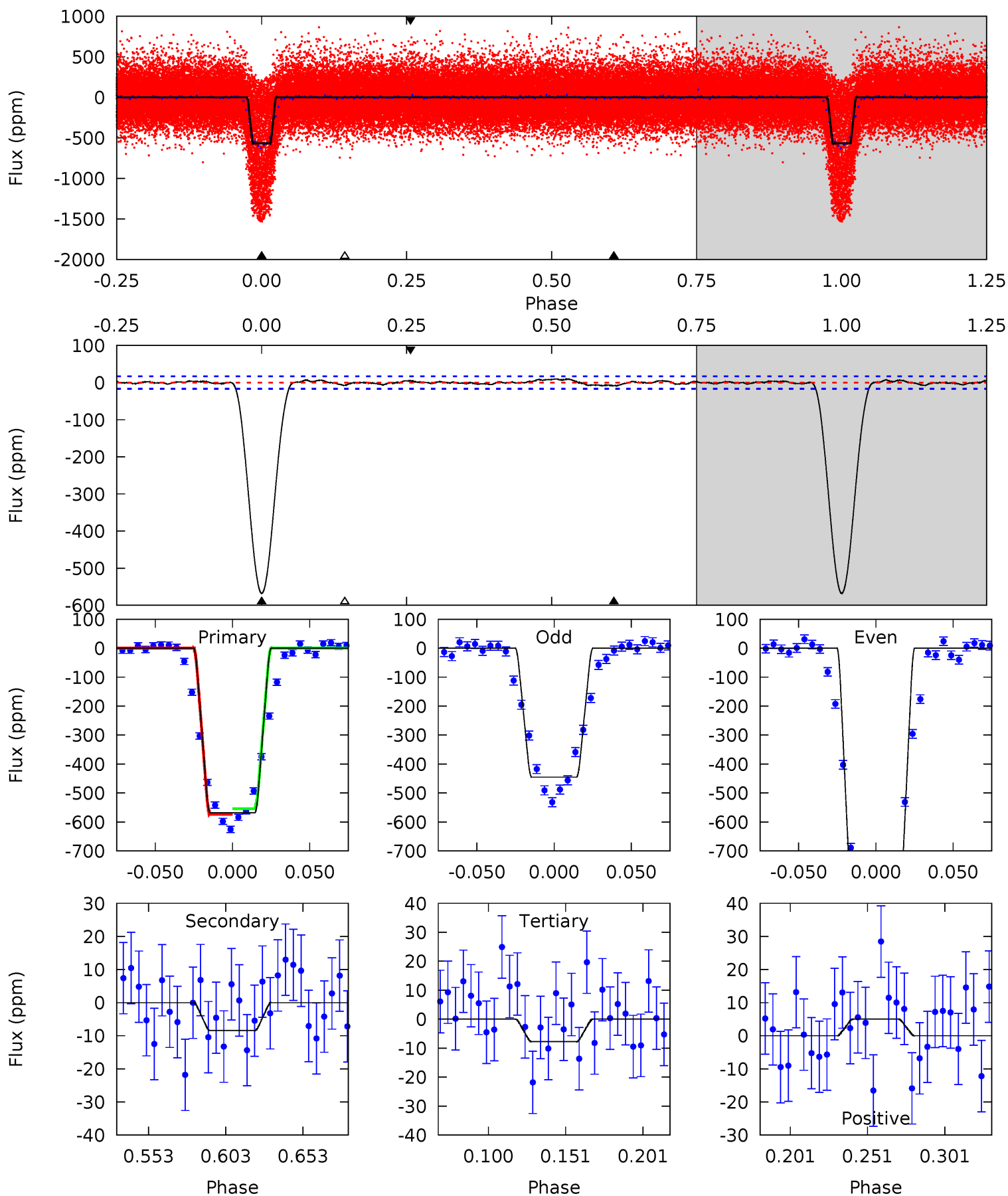
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
207.3	3.46	3.19	3.14	4.62	1.77	1.49	204.1	204.2	0.27	0.33	73.7	0.99	0.01	3.12



# Alt Model-Shift Uniqueness Test

002438070-01, P = 2.442941 Days, E = 129.568574 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
158.0	2.34	2.16	1.40	4.71	1.96	0.95	155.8	156.6	0.19	0.94	68.5	0.95	0.02	2.75



### Stellar Parameters For KIC 002438070

	$T_{\text{eff}}(K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5657^{+169}_{-152}$	$4.121^{+0.336}_{-0.144}$	$0.060^{+0.250}_{-0.250}$	$1.428^{+0.366}_{-0.488}$	$0.983^{+0.115}_{-0.103}$	$0.475^{+1.086}_{-0.187}$
	+3%/-3%	+8%/-3%	+417%/-417%	+26%/-34%	+12%/-10%	+228%/-39%
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 002438070-01 / KOI 0363.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-10 \pm 3$	$5.89^{+1.74}_{-1.52}$	$2191^{+164}_{-220}$	$-2274^{+4433}_{-236}$	$0.199^{+0.179}_{-0.091}$
Alt.	$-8 \pm 4$	$3.79^{+1.44}_{-1.44}$	$2173^{+176}_{-187}$	$2214^{+678}_{-4571}$	$0.377^{+0.749}_{-0.204}$

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



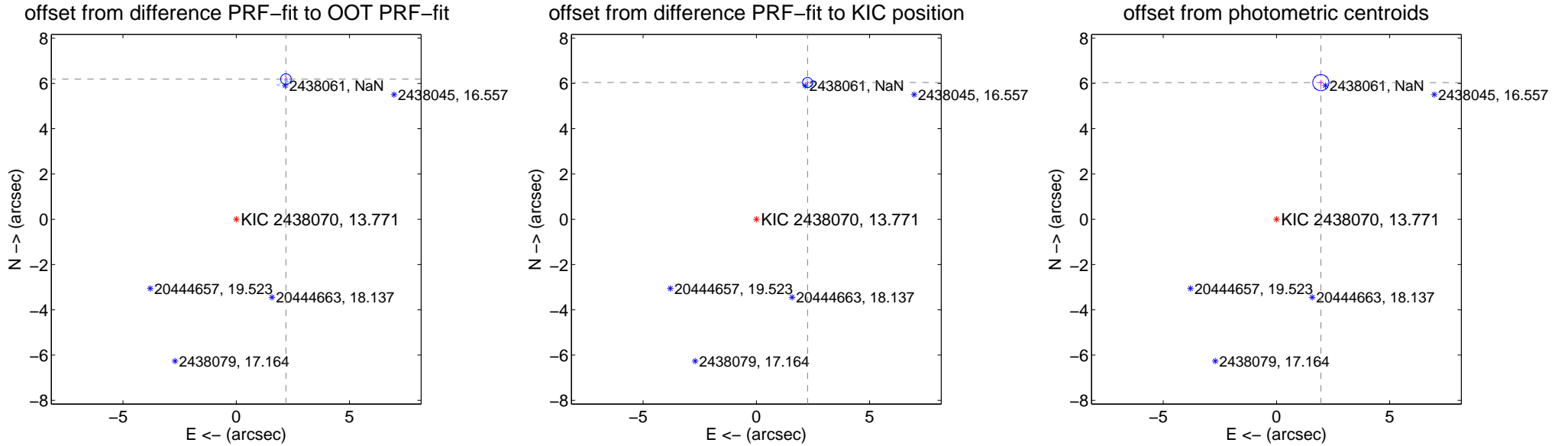
## DV Centroid Data

Supplemental centroid analysis for 002438070-01. Kepler magnitude: 13.77. Transit SNR 94.58

There are 17 quarters with good PRF difference image offsets

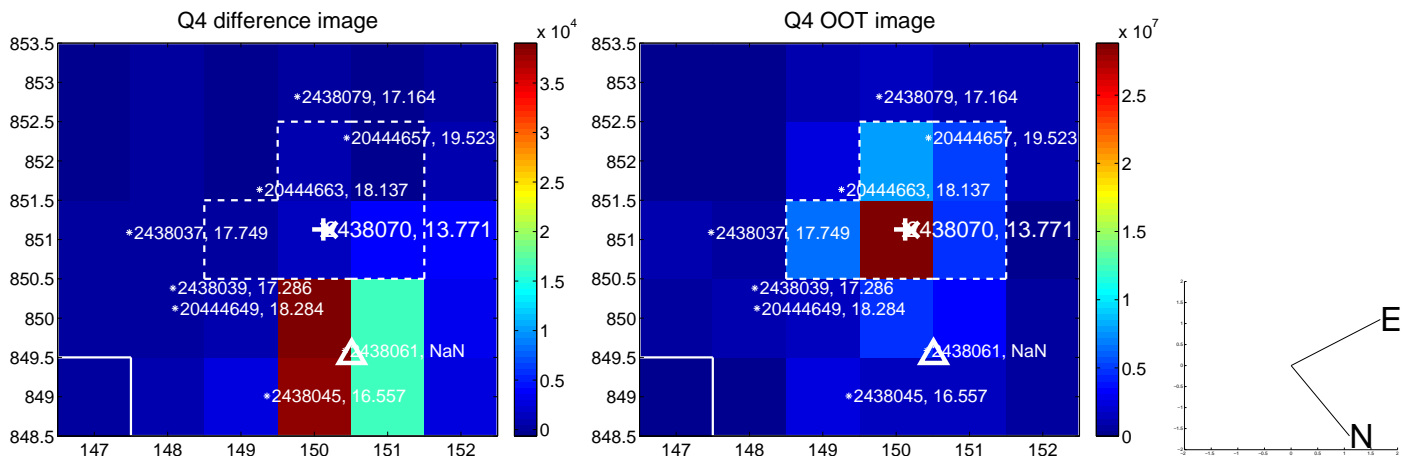
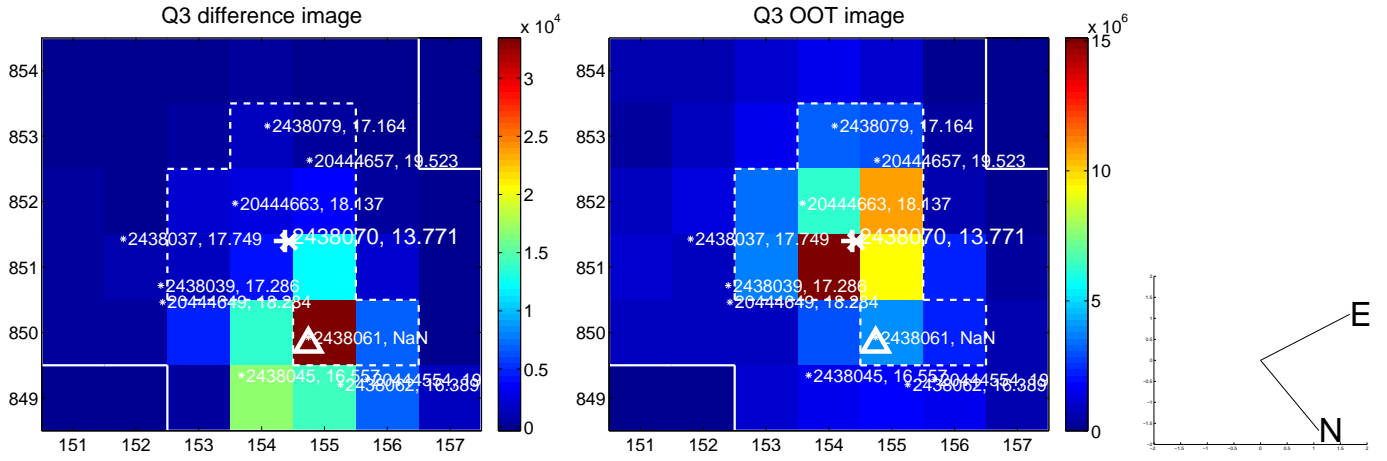
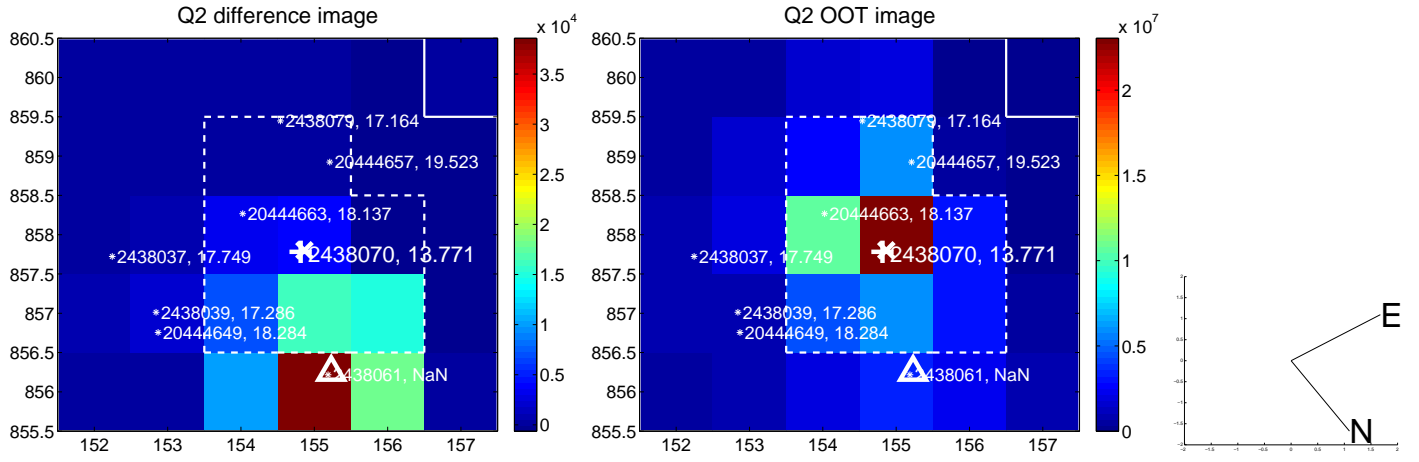
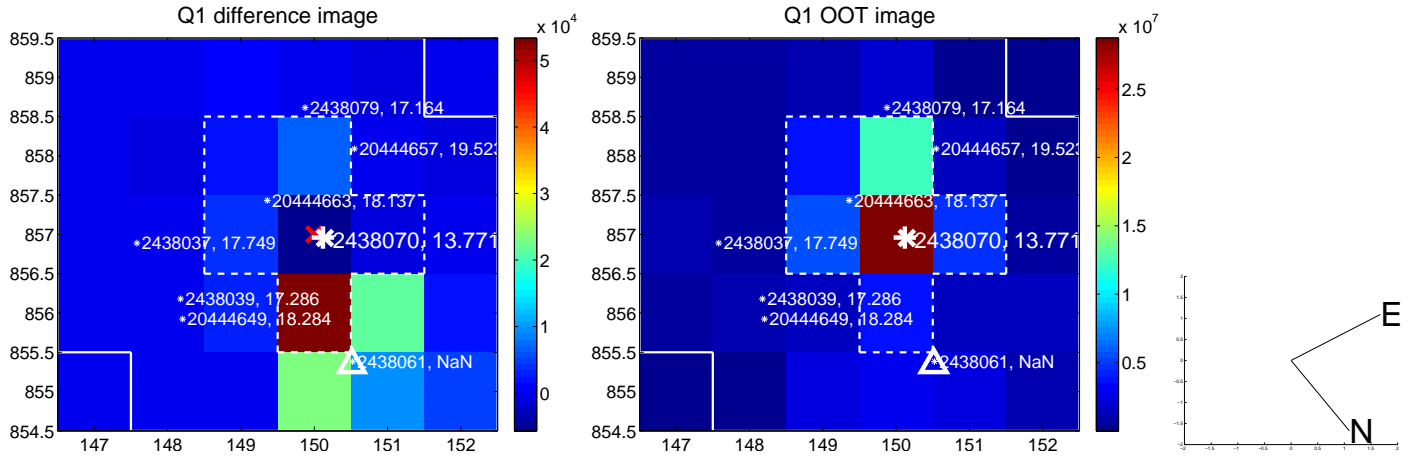
The direct PRF centroid is offset from the target star catalog position by about 0.12 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	<b>6.568 <math>\pm</math> 0.078</b>	<b>83.86</b>	-2.194 $\pm$ 0.076	6.191 $\pm$ 0.075
PRF-fit source offset from KIC position	<b>6.449 <math>\pm</math> 0.074</b>	<b>86.93</b>	-2.261 $\pm$ 0.072	6.040 $\pm$ 0.075
photometric centroid source offset	<b>6.35 <math>\pm</math> 0.12</b>	<b>53.55</b>	-1.96 $\pm$ 0.10	6.04 $\pm$ 0.12

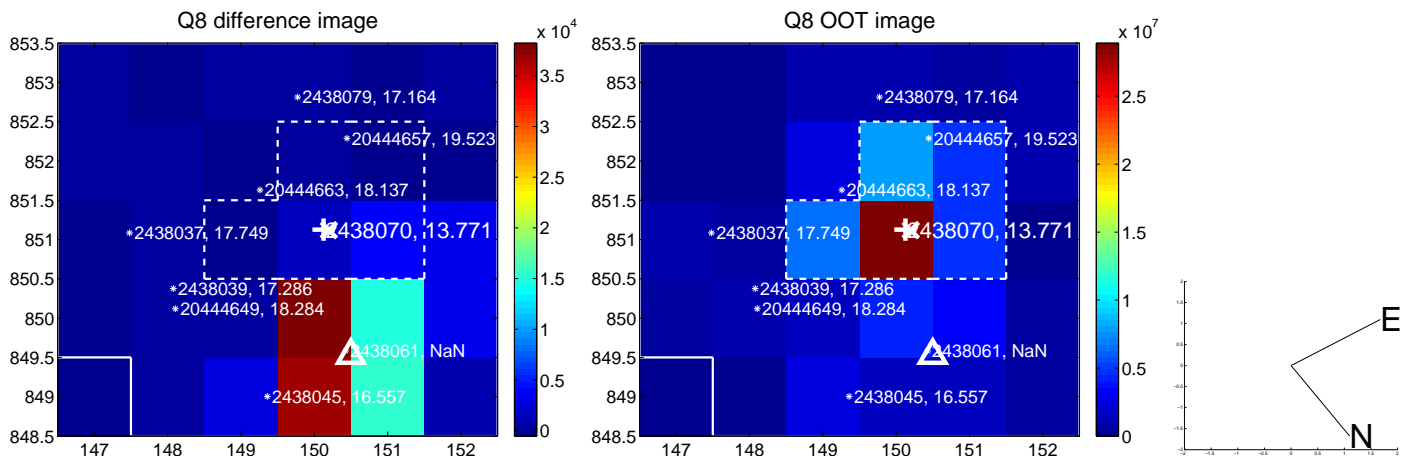
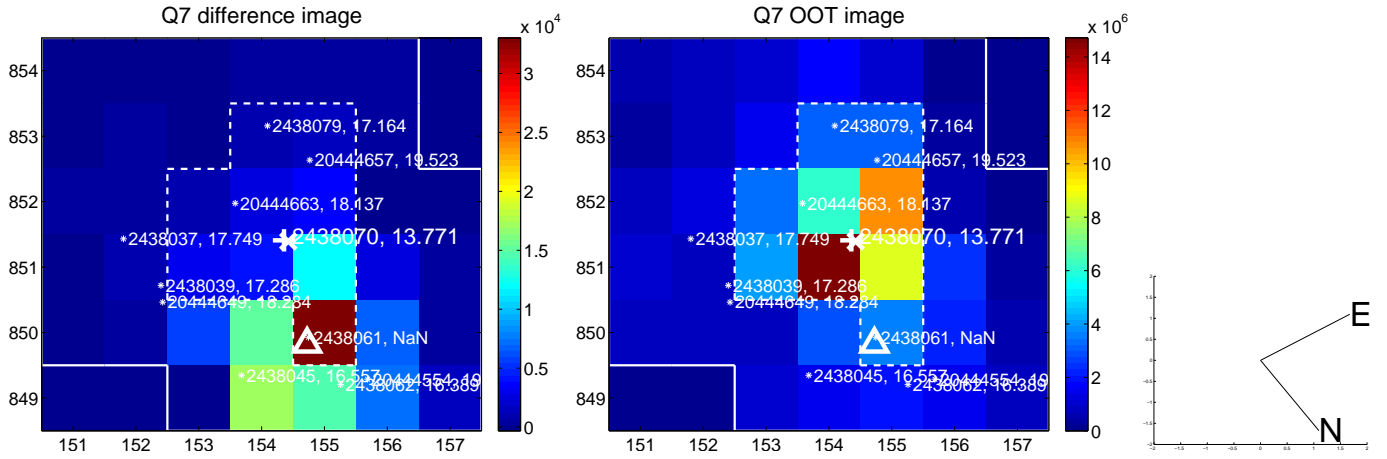
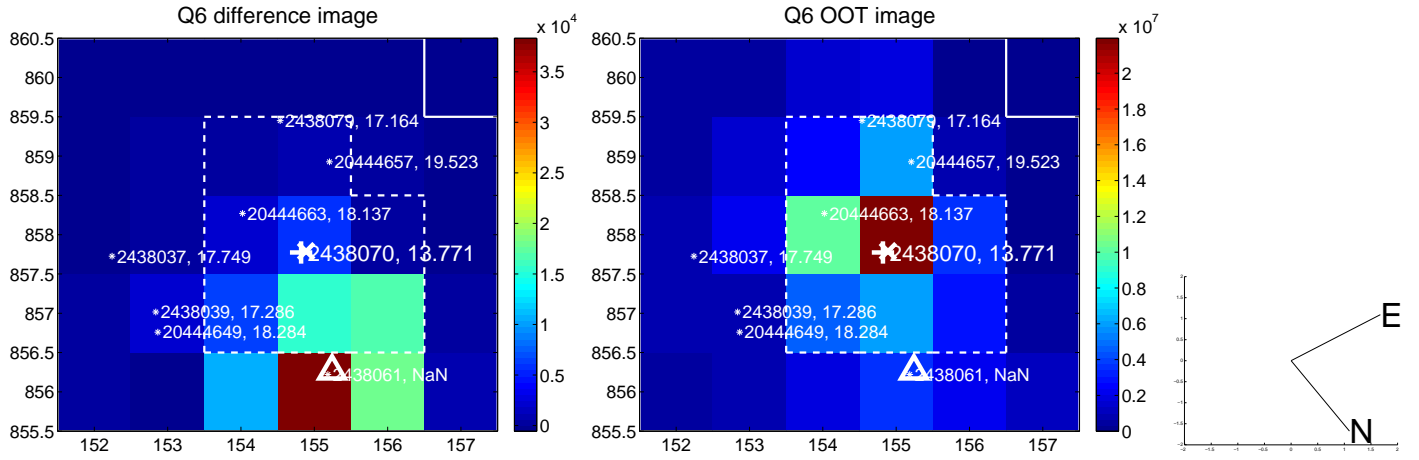
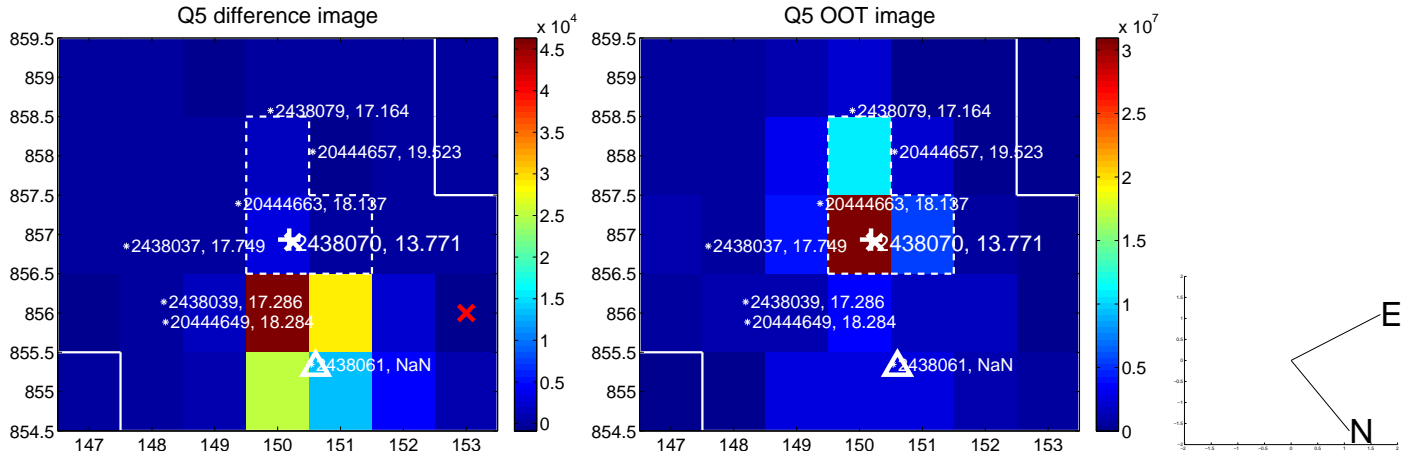


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets**; **Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

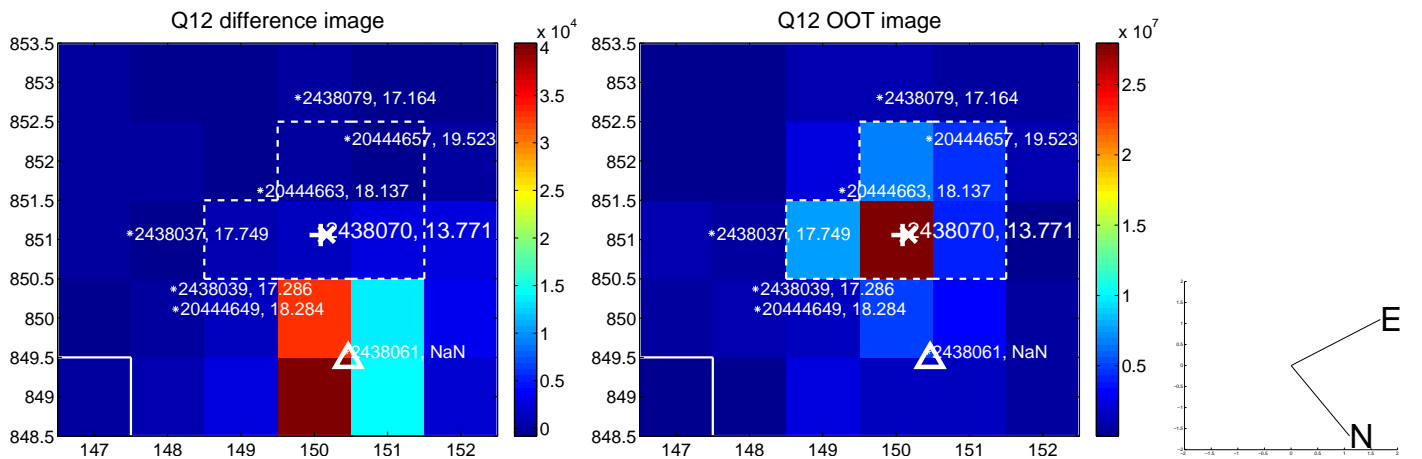
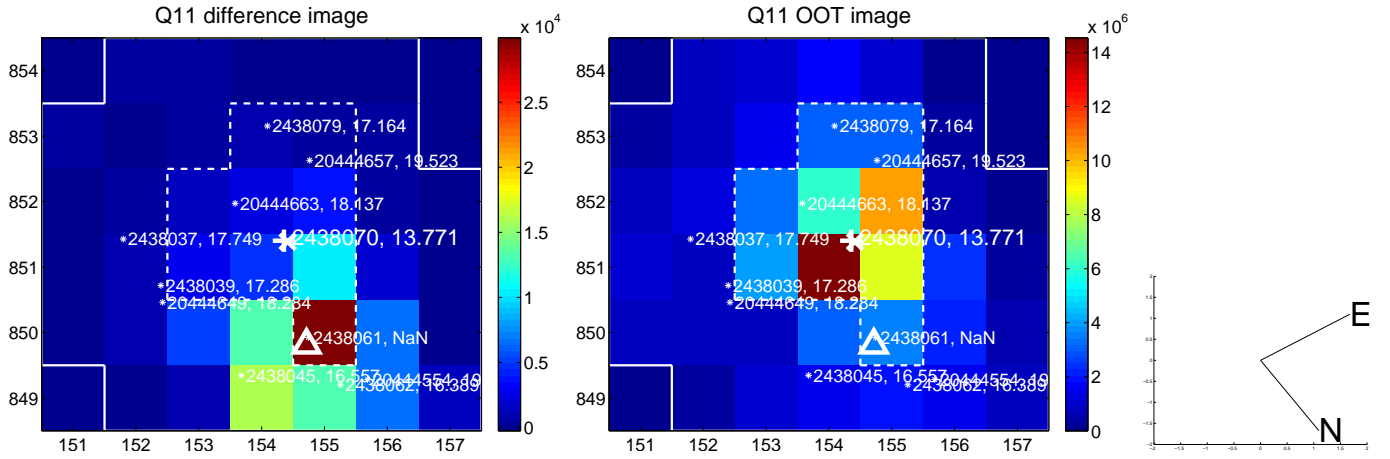
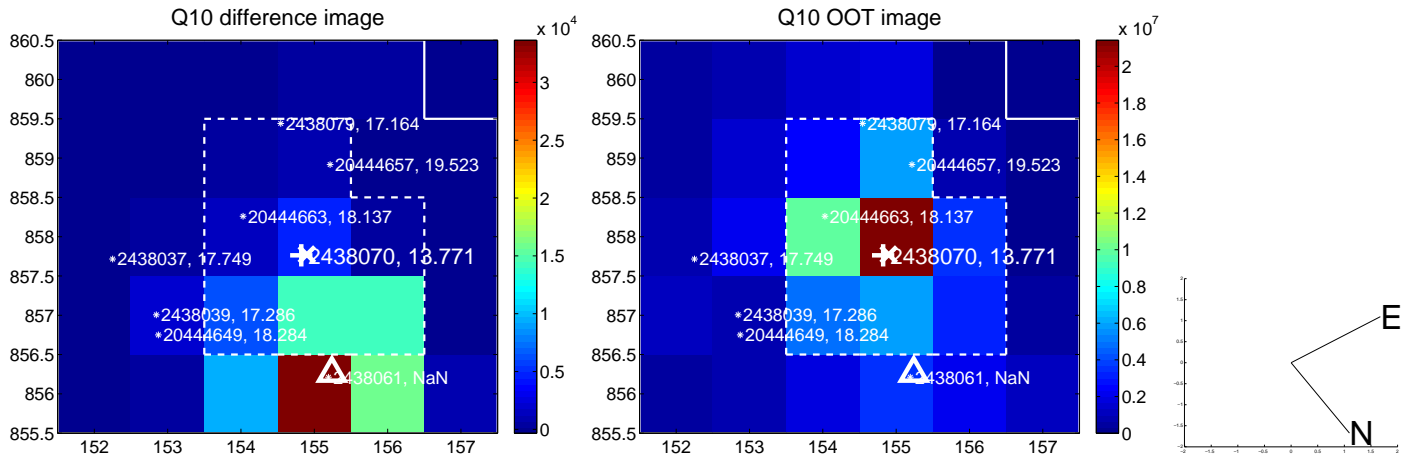
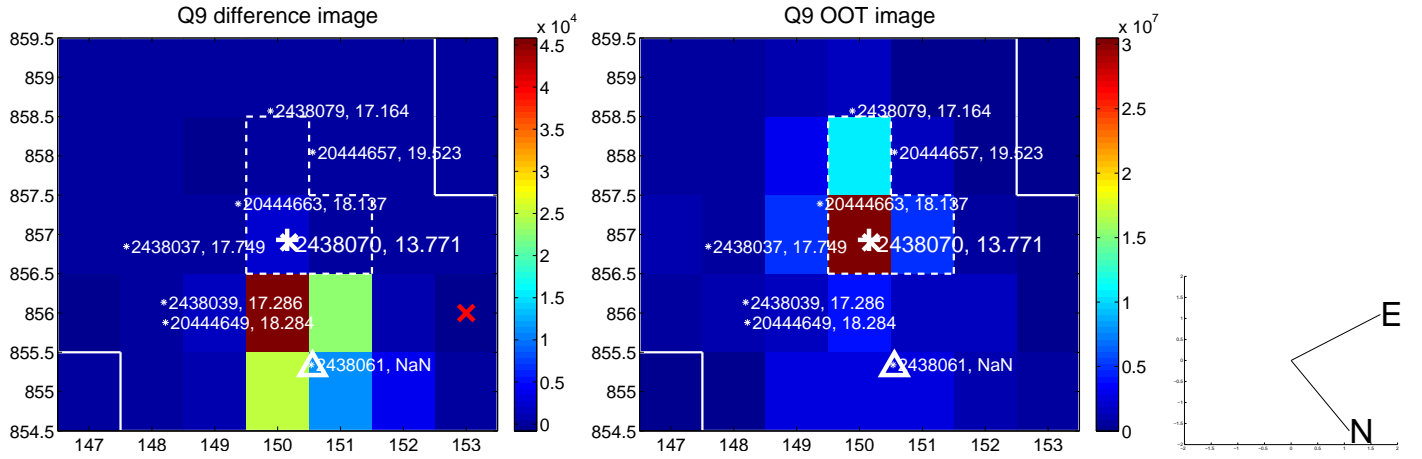
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



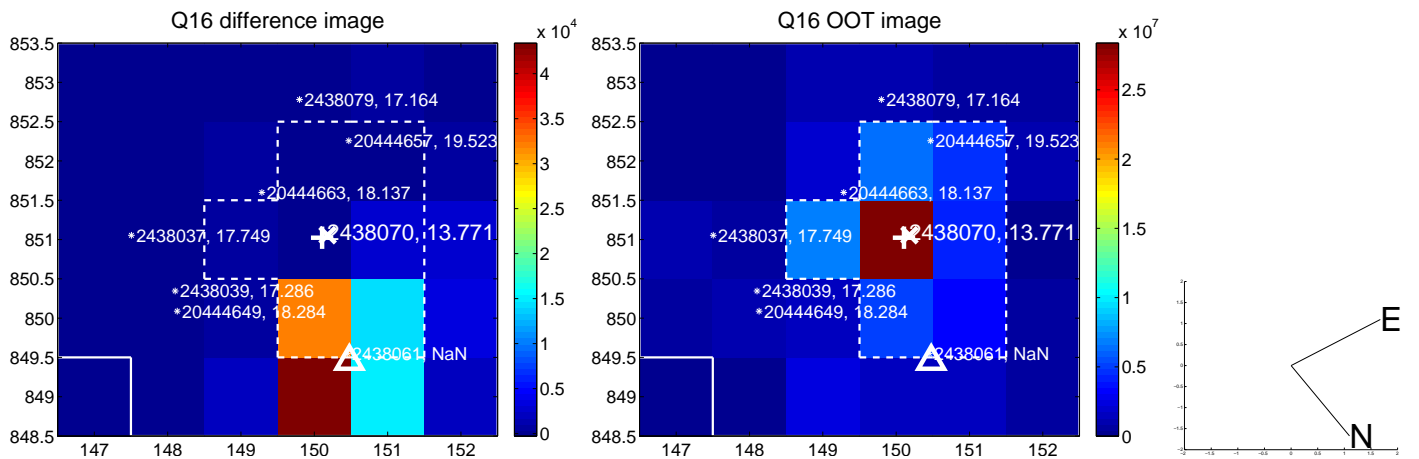
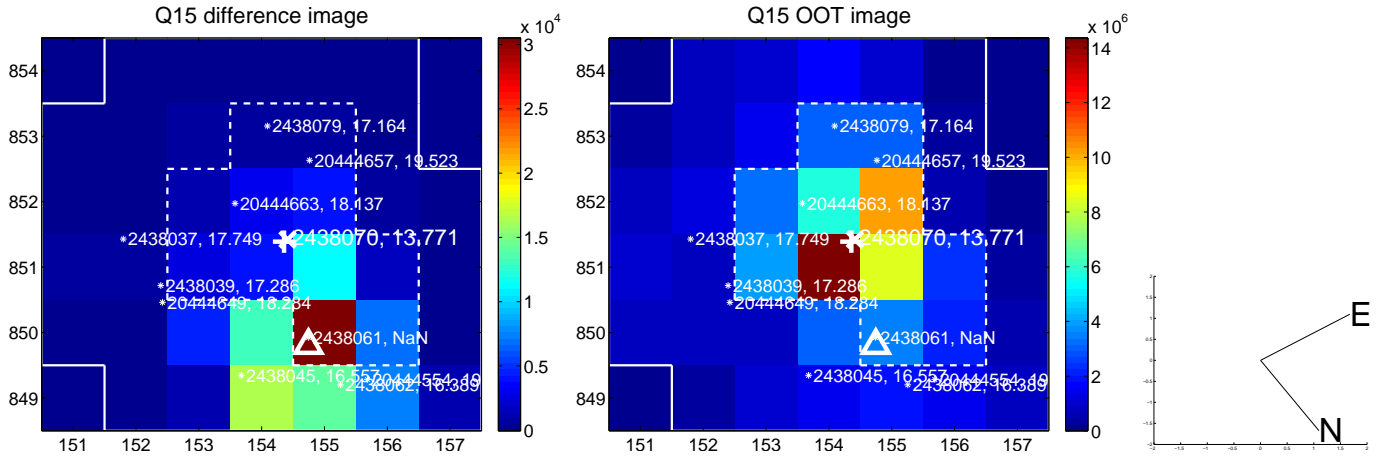
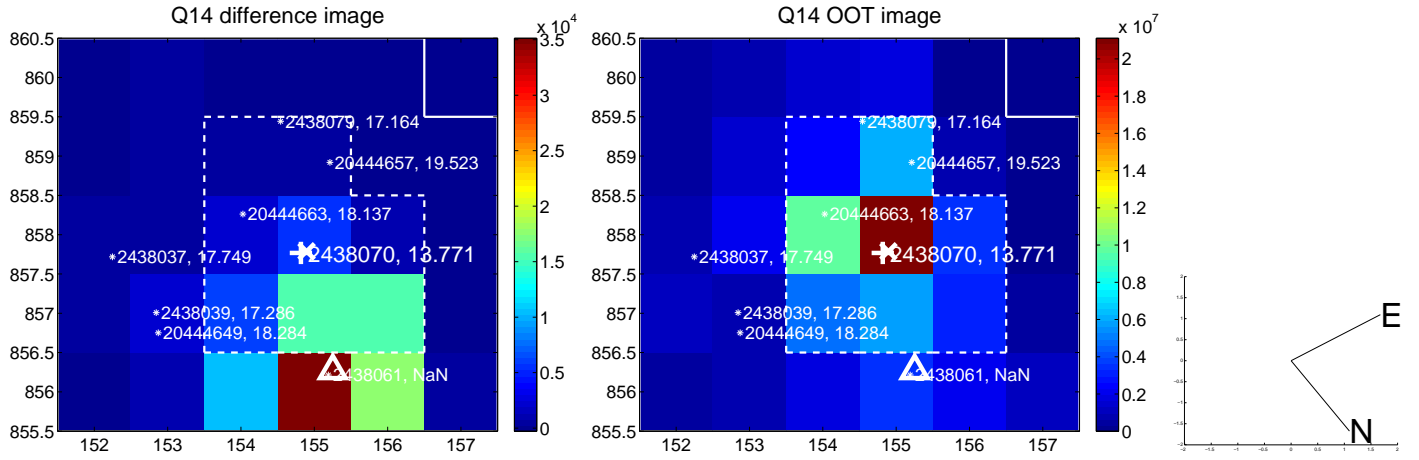
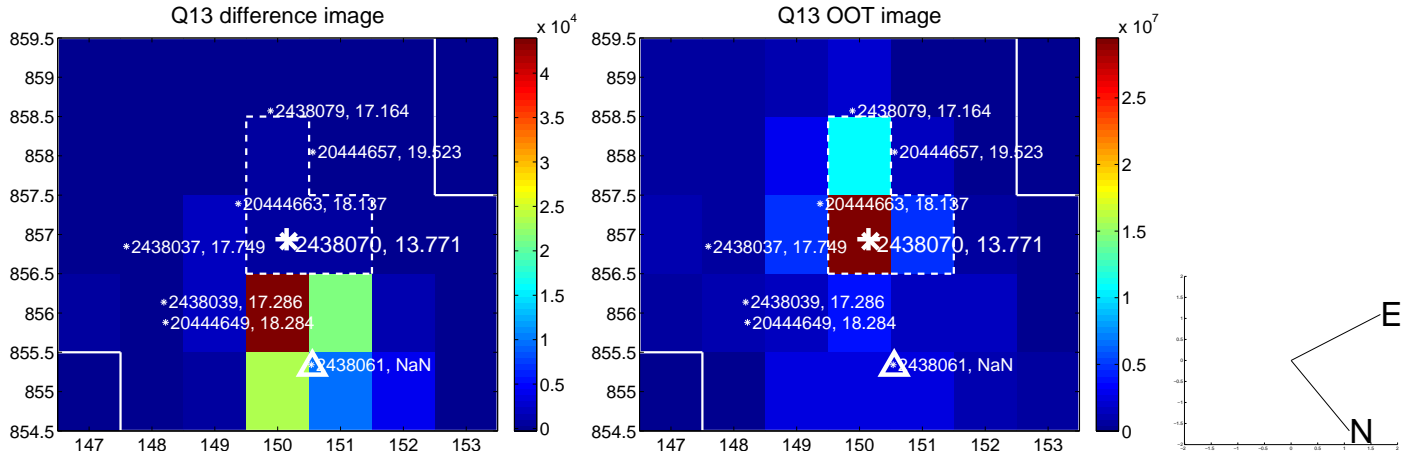
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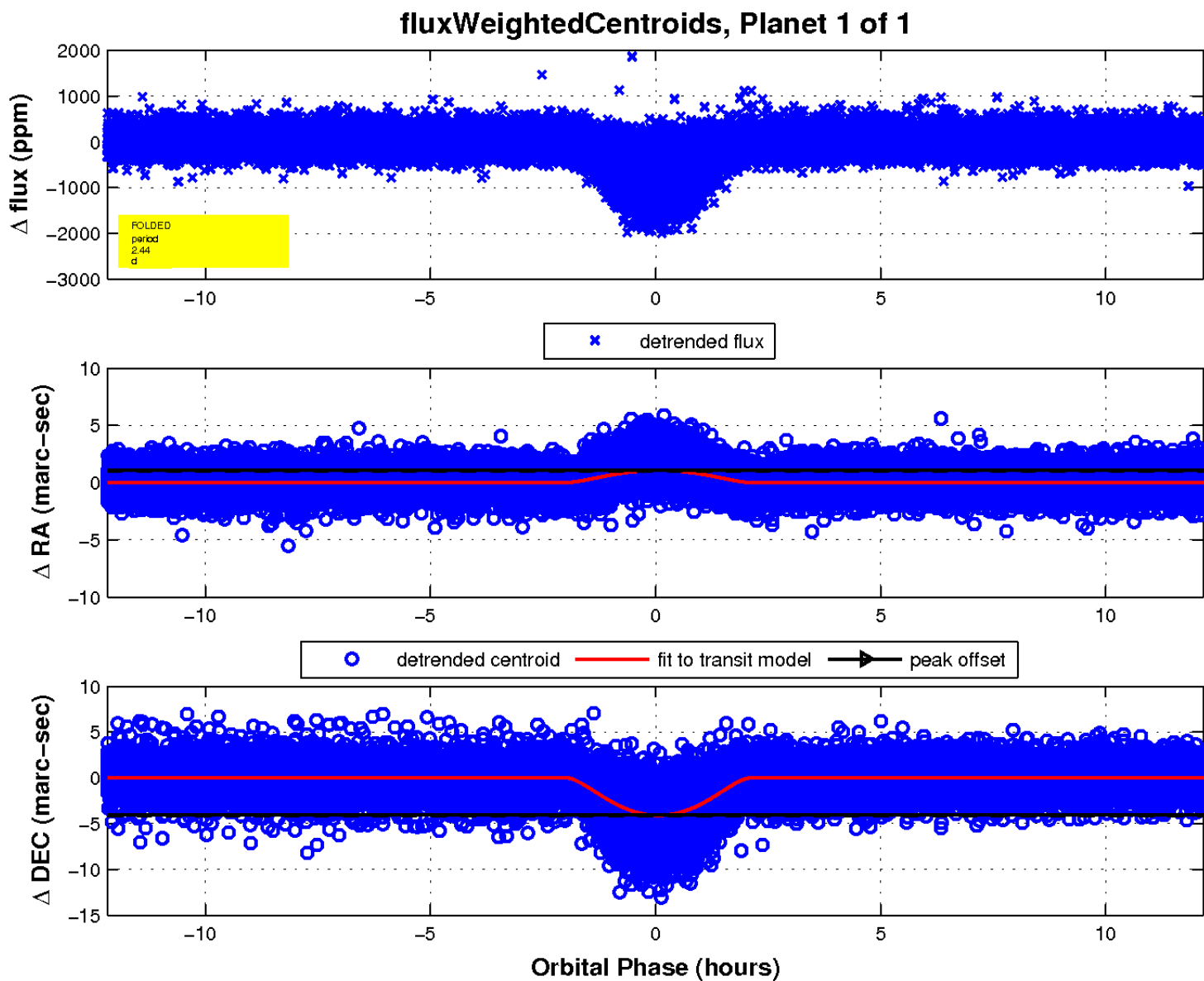
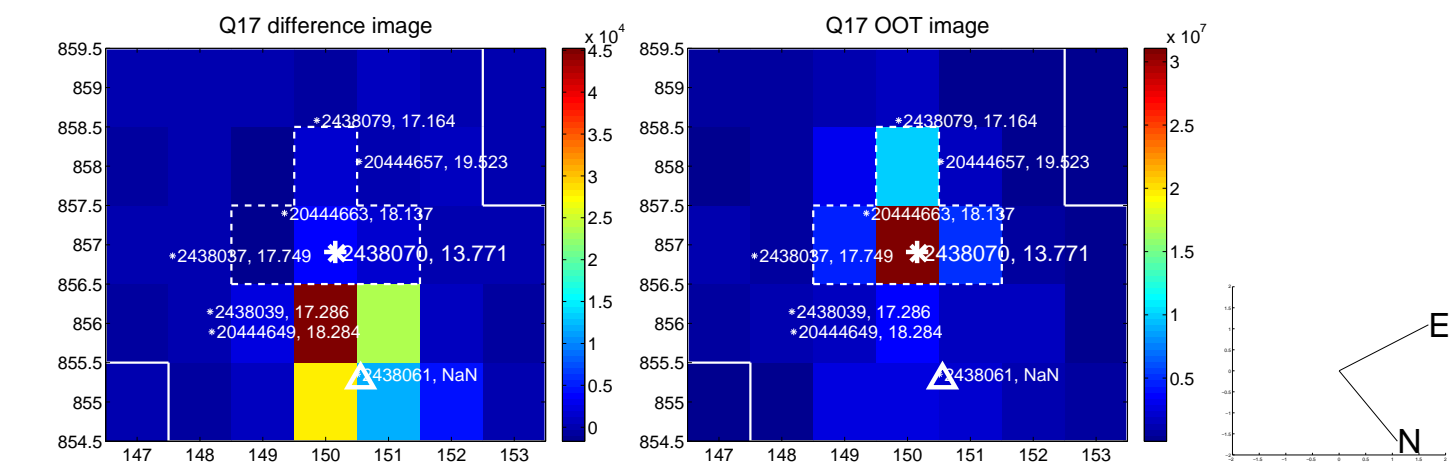


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.





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



UKIRT Image

Declination

