

# KIC 009851943

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009851943-01	OBS	4001.01	1.081923	132.618460	162.0	4.634	19.4	23.8	0.72	4938	0.89	820.83

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009851943-01	OBS	FP	0.00	0	1	1	1	MOD_SEC_DV—CENT_RESOLVED_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 009851943-01

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	$\sigma_P$	$\sigma_T$
009851943-01	9851943	009851944-pri	9851944	1:2	33.2	-4	7	11.25	15.25	1280.90	Direct-PRF	0	4.64	2.42

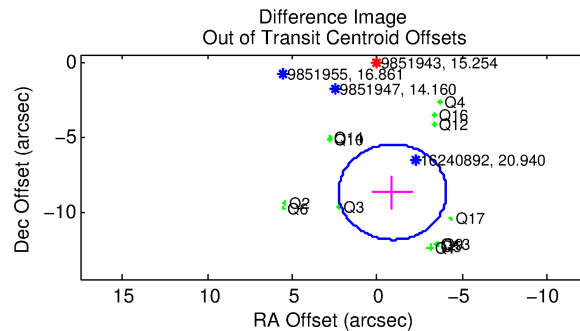
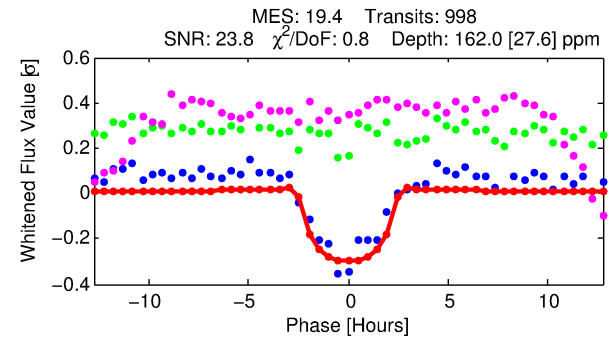
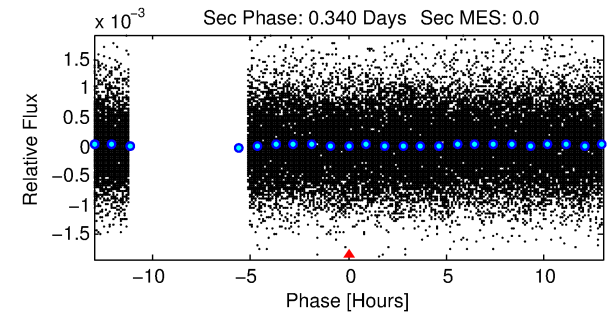
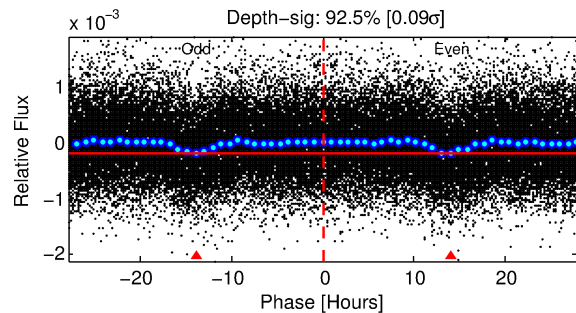
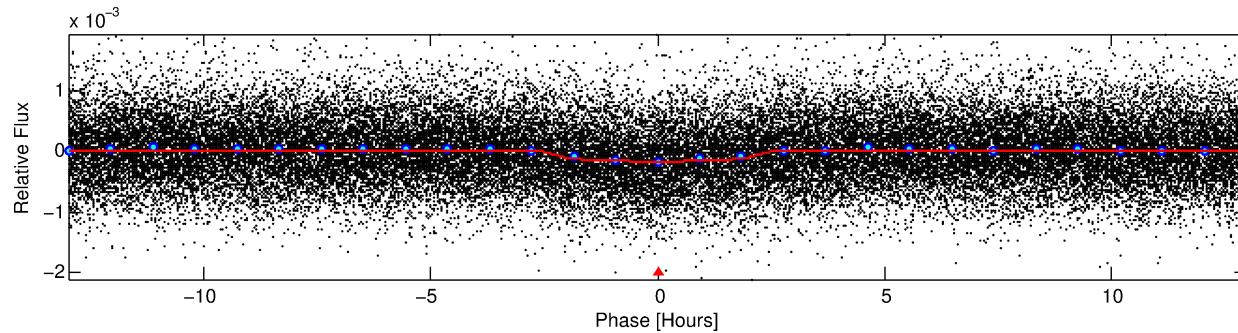
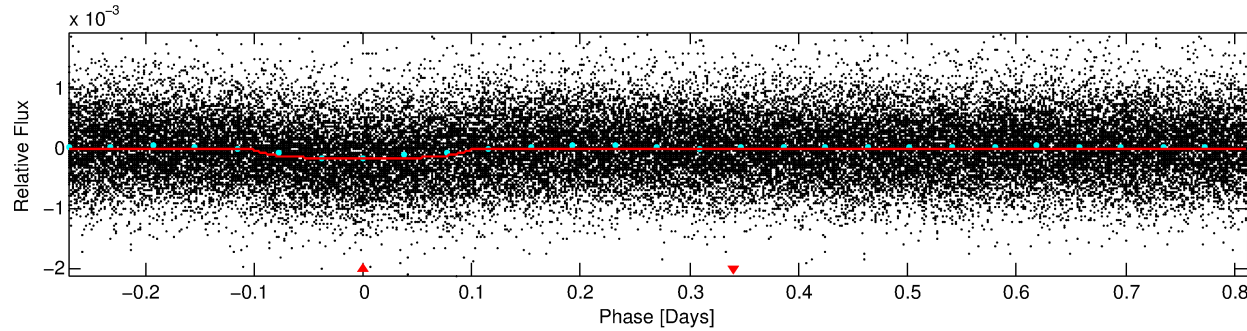
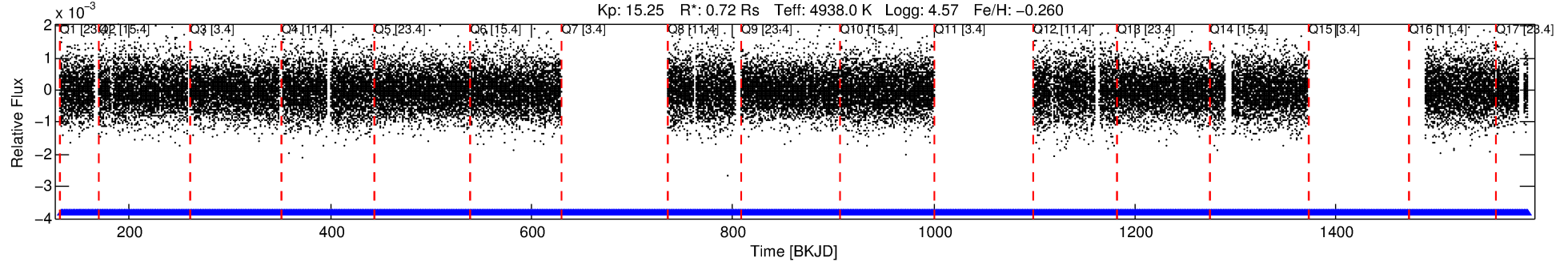
**Notes:**  $P_1:P_2$  is the period ratio. Dist is the distance in arcseconds.  $\Delta$ Row and  $\Delta$ Col are the number of pixels apart in row and column.  $m_2$  and  $m_1$  are the magnitudes of the parent and child.  $D_2/D_1$  is the parent's transit depth divided by the child's.  $\sigma_P$  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: 9851943 Candidate: 1 of 1 Period: 1.082 d

KOI: K04001.01 Corr: 0.949

Kp: 15.25 R\*: 0.72 Rs Teff: 4938.0 K Logg: 4.57 Fe/H: -0.260



## DV Fit Results:

Period = 1.08192 [0.00001] d  
Epoch = 132.6185 [0.0024] BKJD  
Rp/R\* = 0.0113 [0.0092]  
a/R\* = 1.90 [3.84]  
b = 0.02 [172.29]  
Seff = 820.83 [138.41]  
Teq = 1365 [58] K  
Rp = 0.88 [0.73] Re  
a = 0.0183 [0.0015] AU  
Ag = N/A  
Teffp = N/A

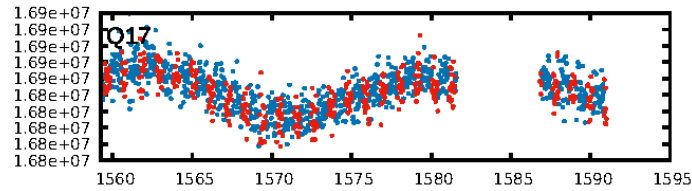
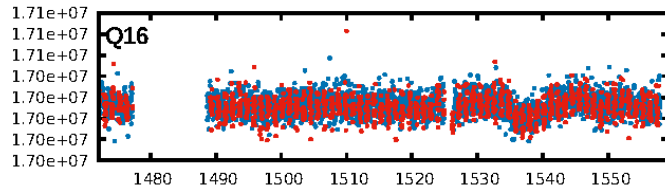
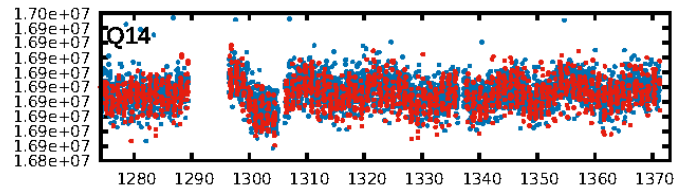
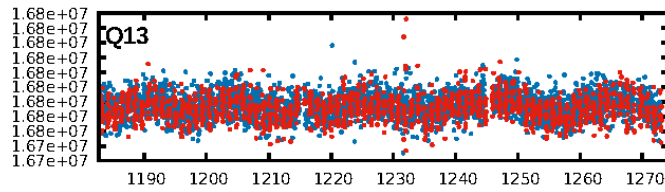
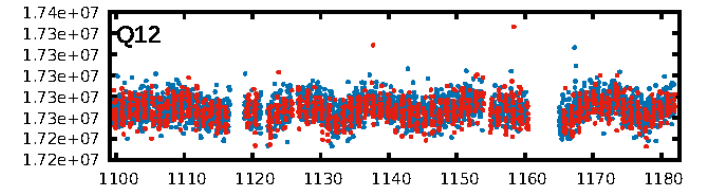
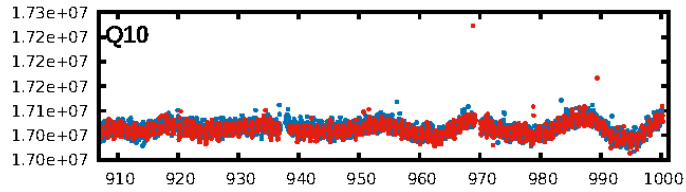
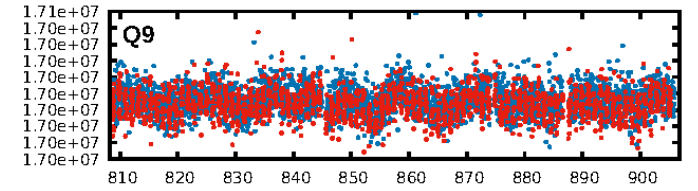
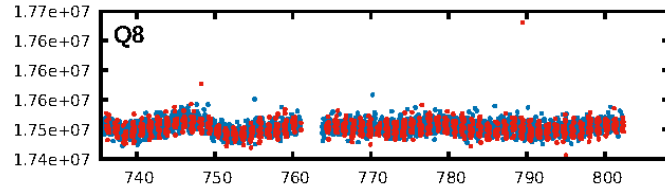
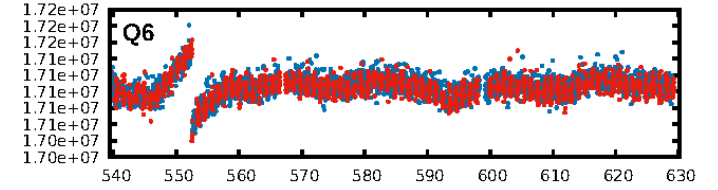
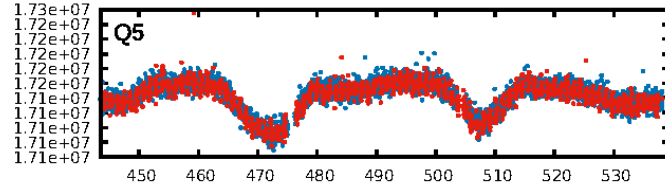
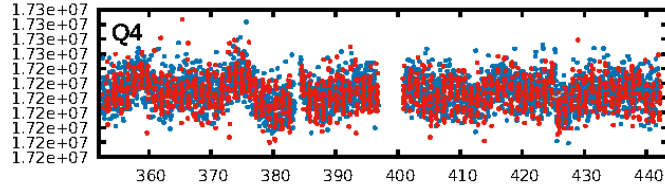
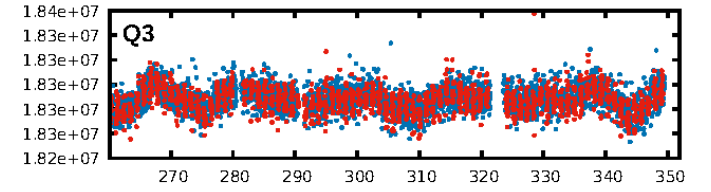
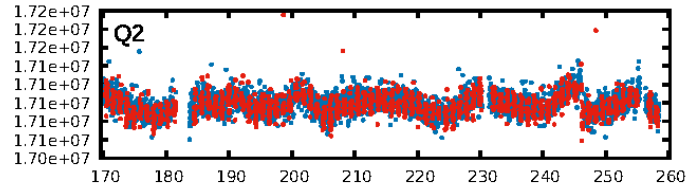
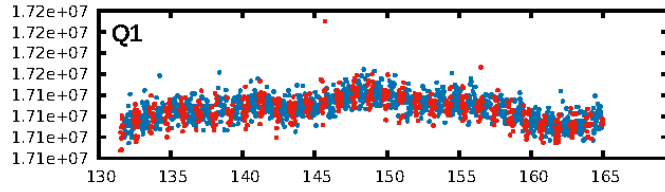
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 5.73e-73  
RollingBand-fgt: 1.00 [941/941]  
GhostDiagnostic-chr: -0.2256  
Centroid-sig: 0.0%  
Centroid-so: 3.957 arcsec [7.37σ]  
OotOffset-rm: 8.742 arcsec [8.23σ]  
KicOffset-rm: 8.607 arcsec [8.19σ]  
OotOffset-st: 4/1/3/5 [13]  
KicOffset-st: 4/1/3/5 [13]  
DiffImageQuality-fgm: 0.46 [6/13]  
DiffImageOverlap-fno: 1.00 [14/14]

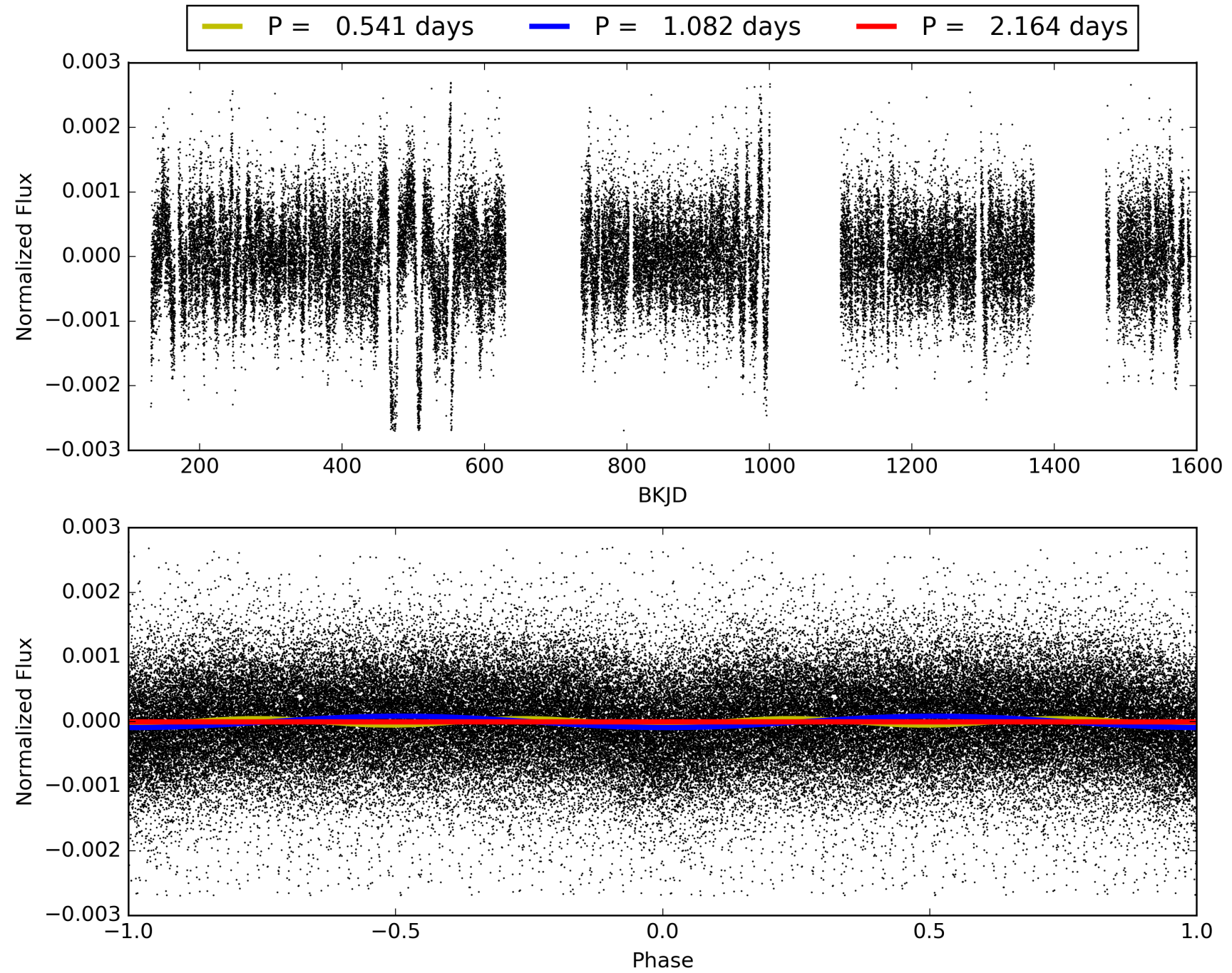
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 14:36:36 Z

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

# TCE 009851943-01, PDC Light Curves

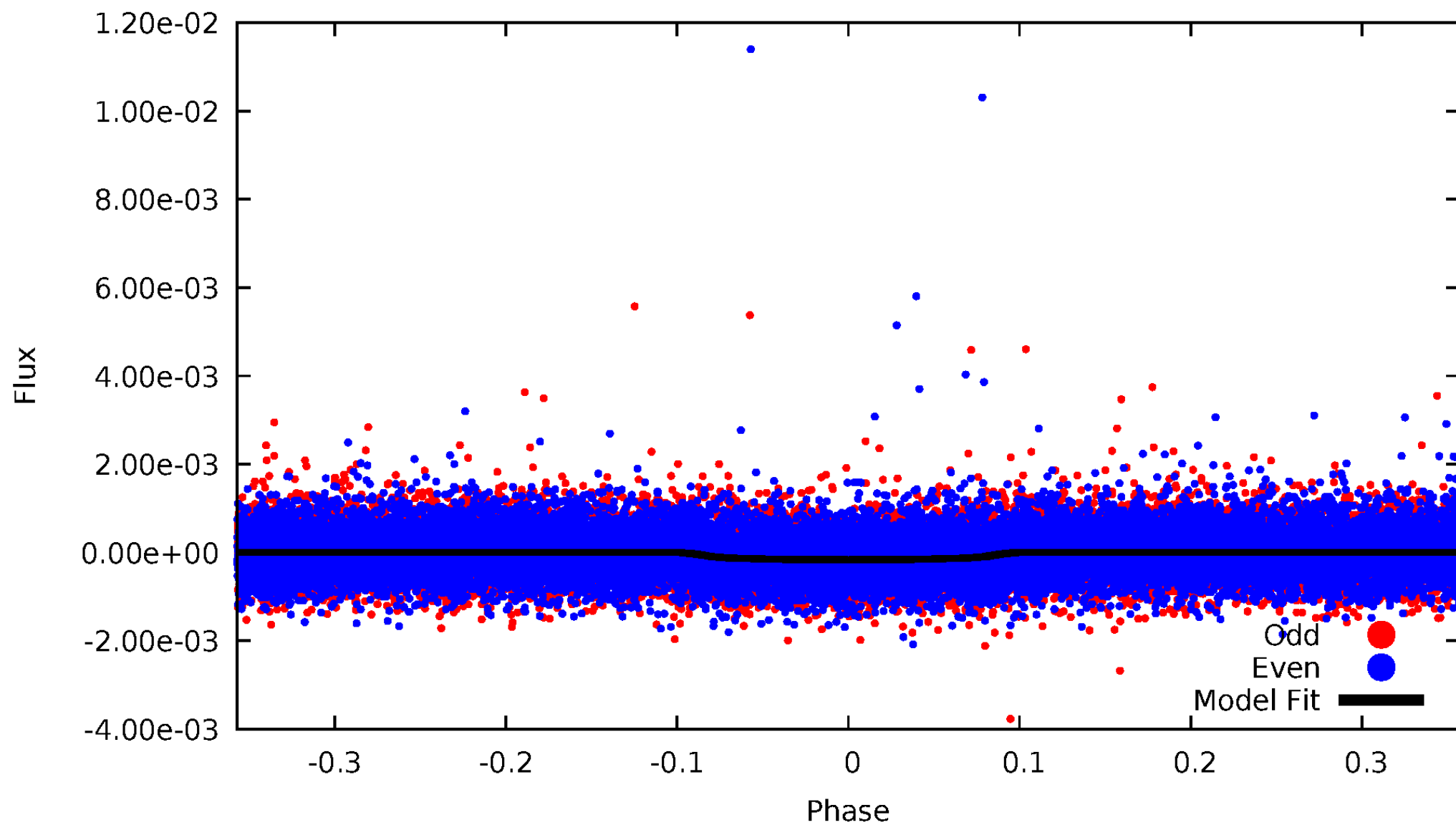


TCE 009851943-01



# DV Odd/Even

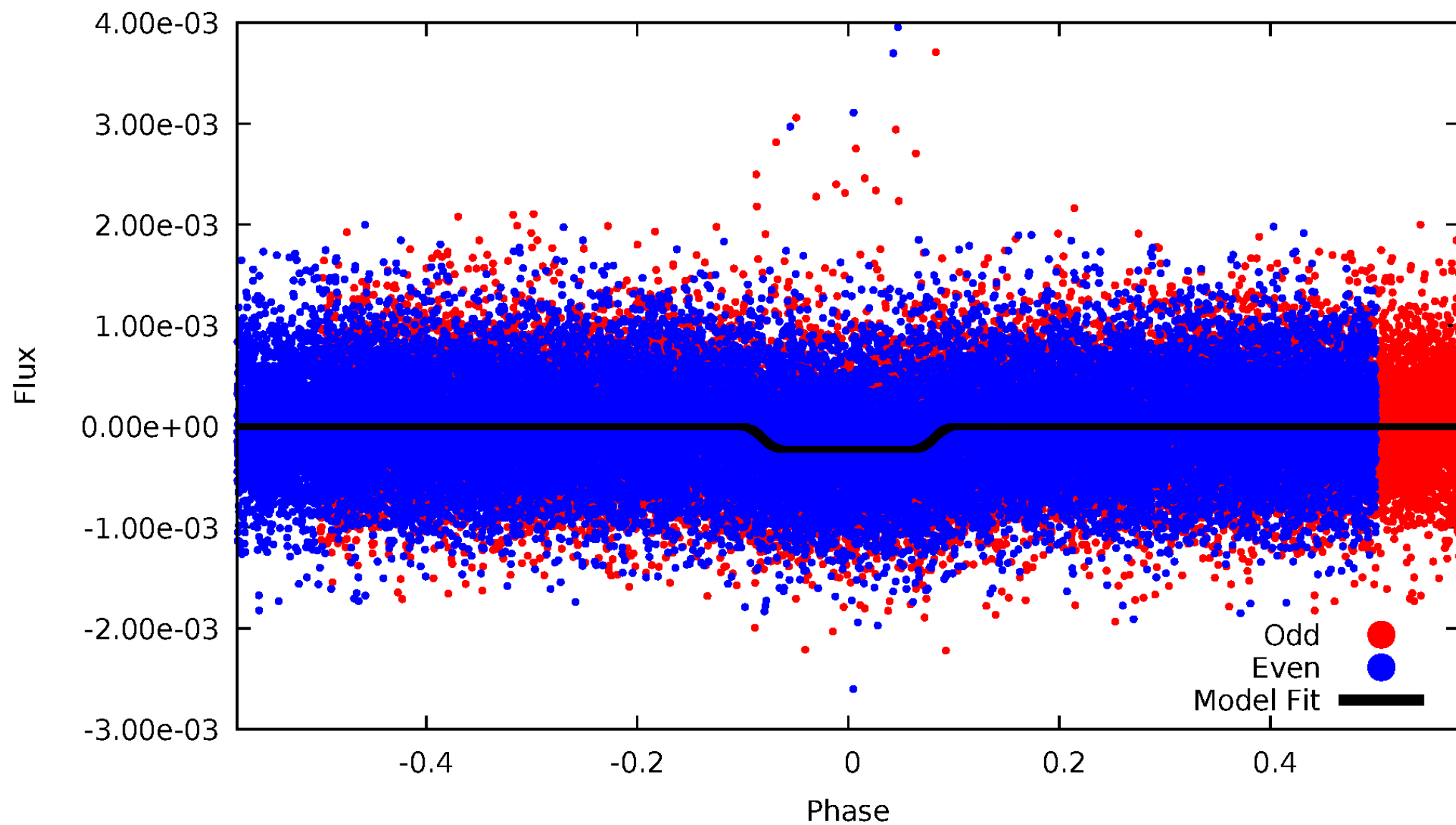
TCE 009851943-01





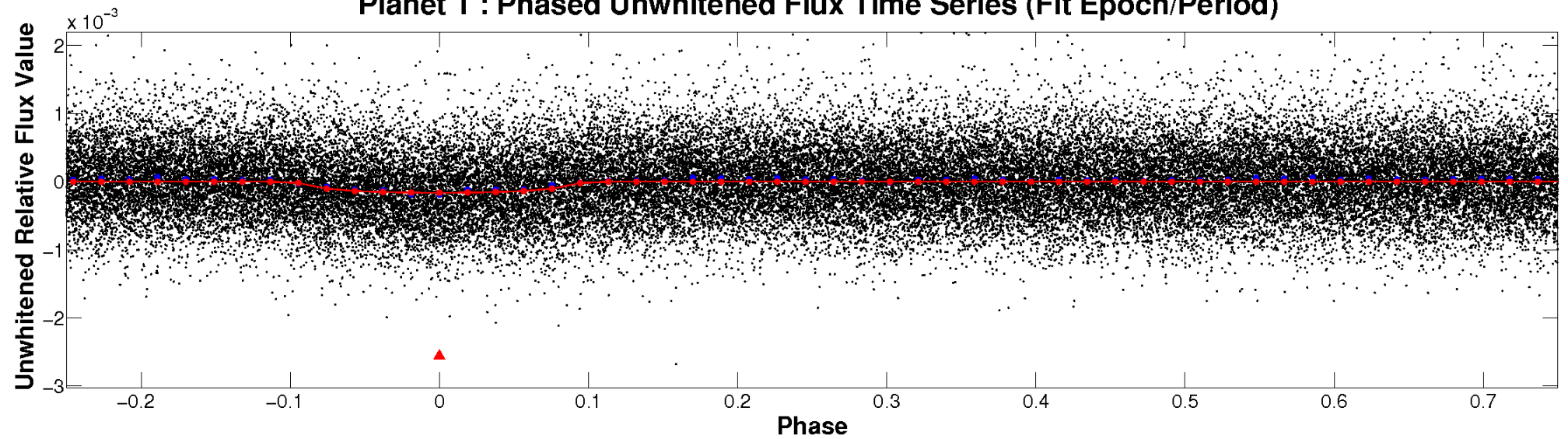
# ALT Odd/Even

TCE 009851943-01

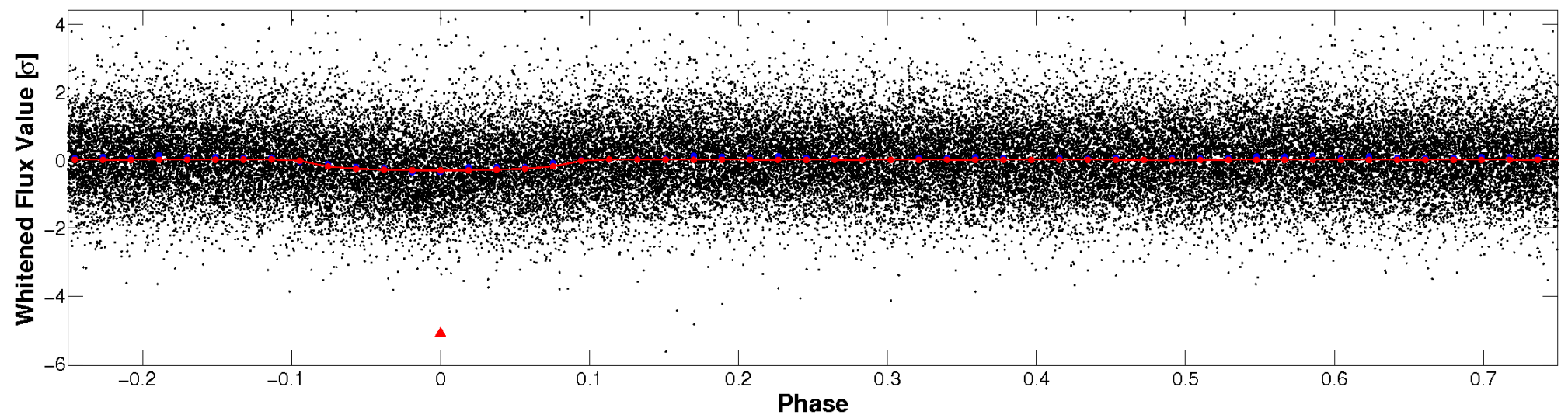


# Non-Whitened Vs. Whitened Light Curve

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

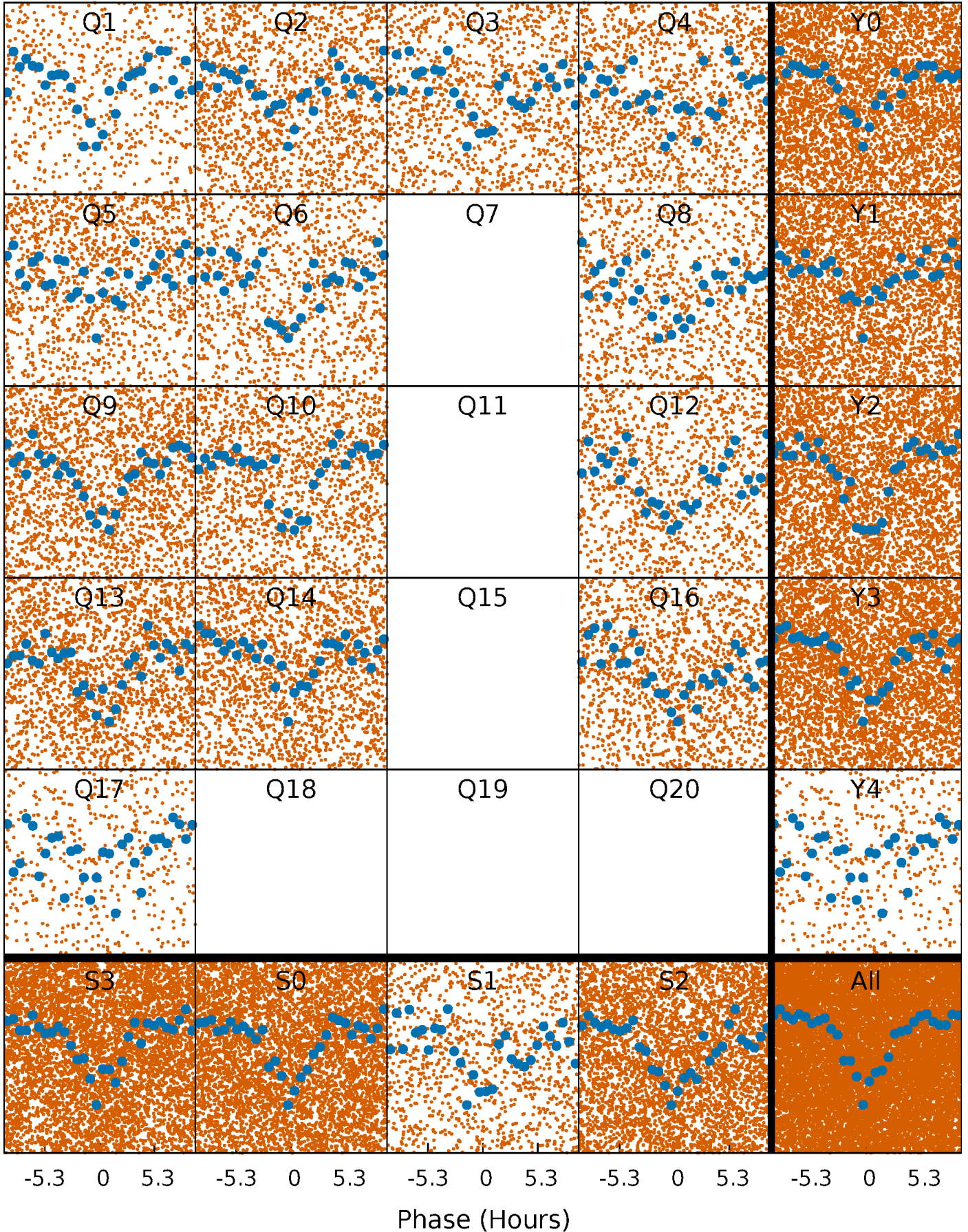


**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

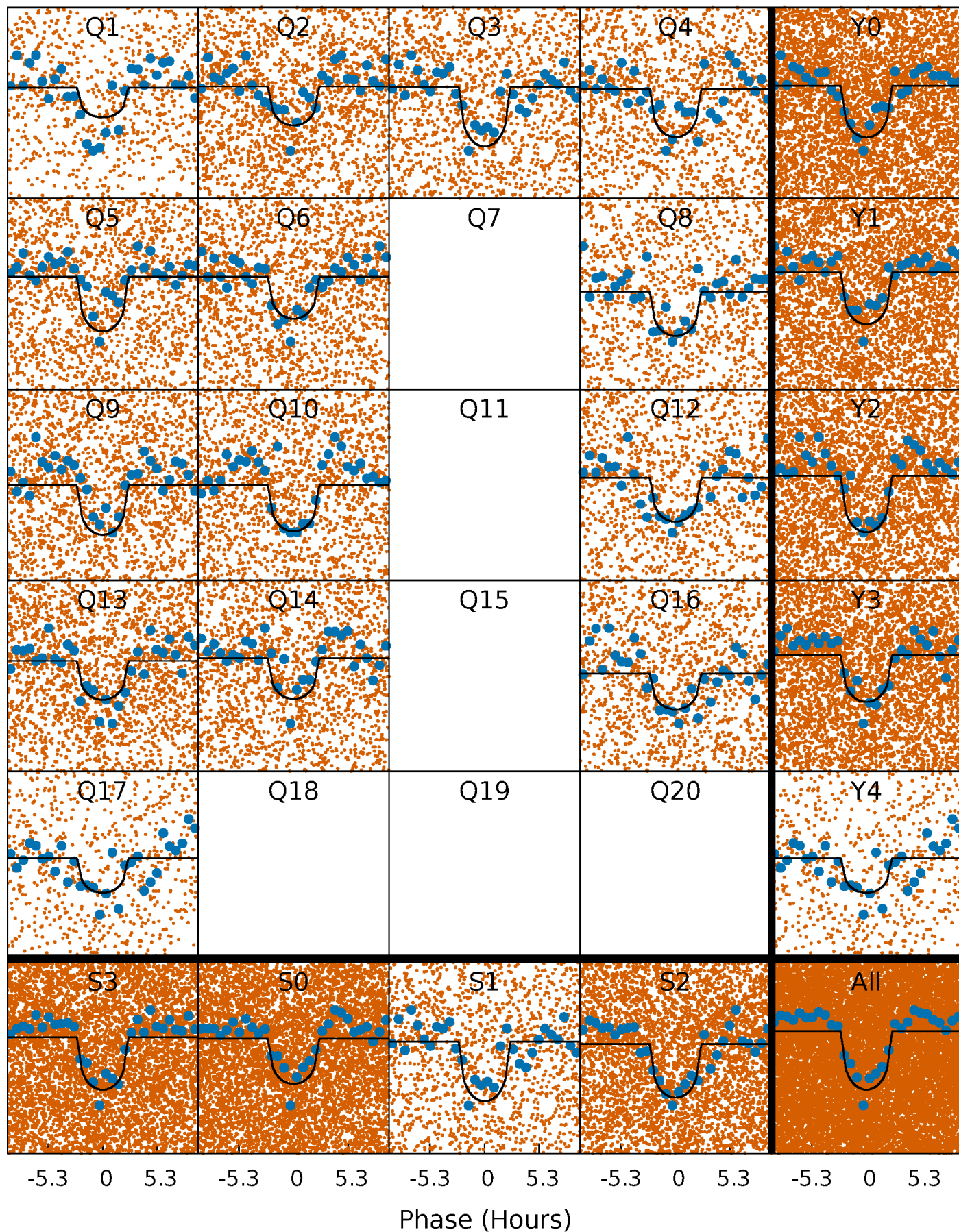
TCE 009851943-01 P= 1.081923 Days  $T_0=132.618460$  (BKJD)





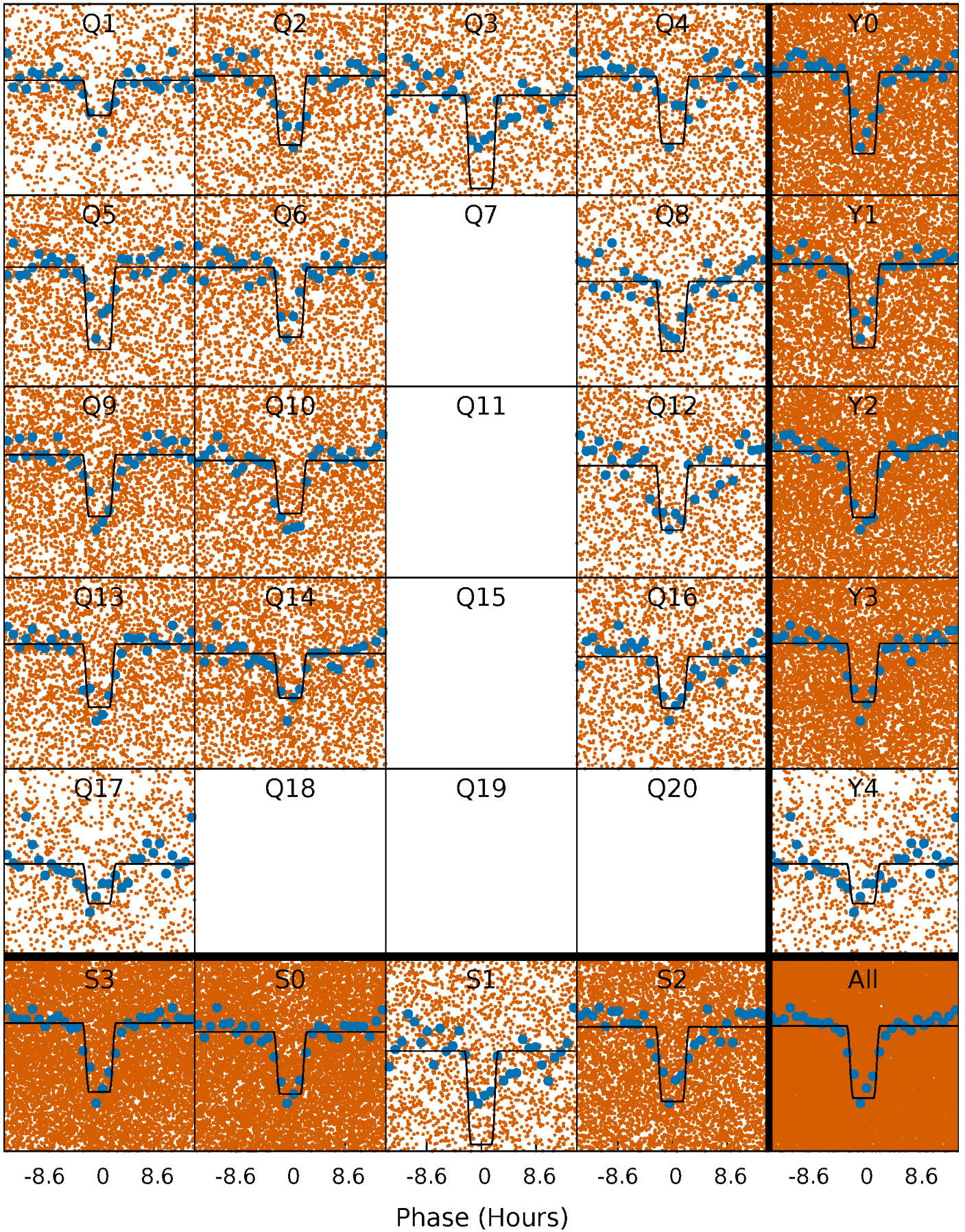
# DV Quarter-Phased Transit Curves

TCE 009851943-01 P= 1.081923 Days  $T_0=132.618460$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 009851943-01 P= 1.081958 Days  $T_0=132.597276$  (BKJD)

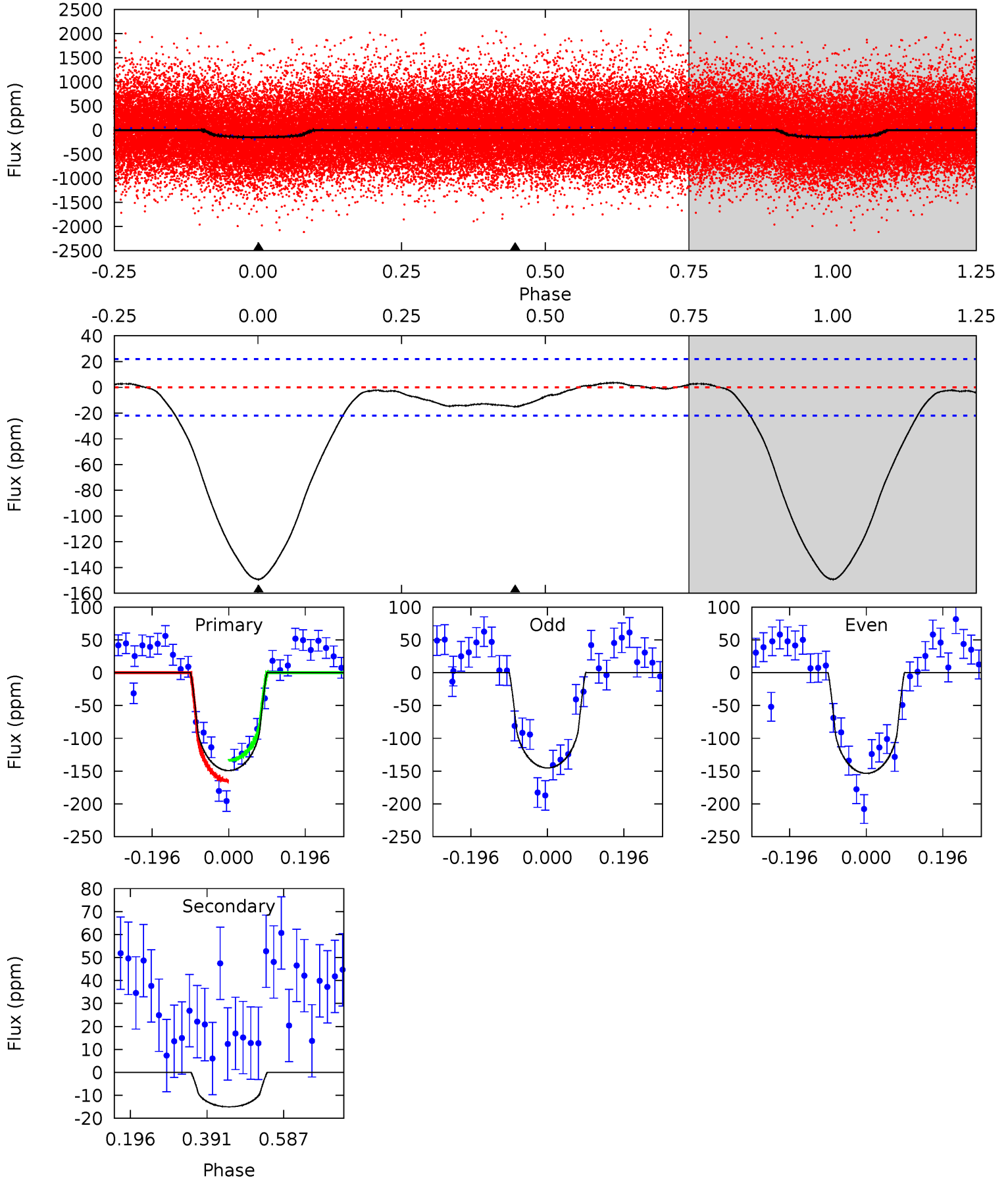




# DV Model-Shift Uniqueness Test

009851943-01, P = 1.081923 Days, E = 130.454614 Days

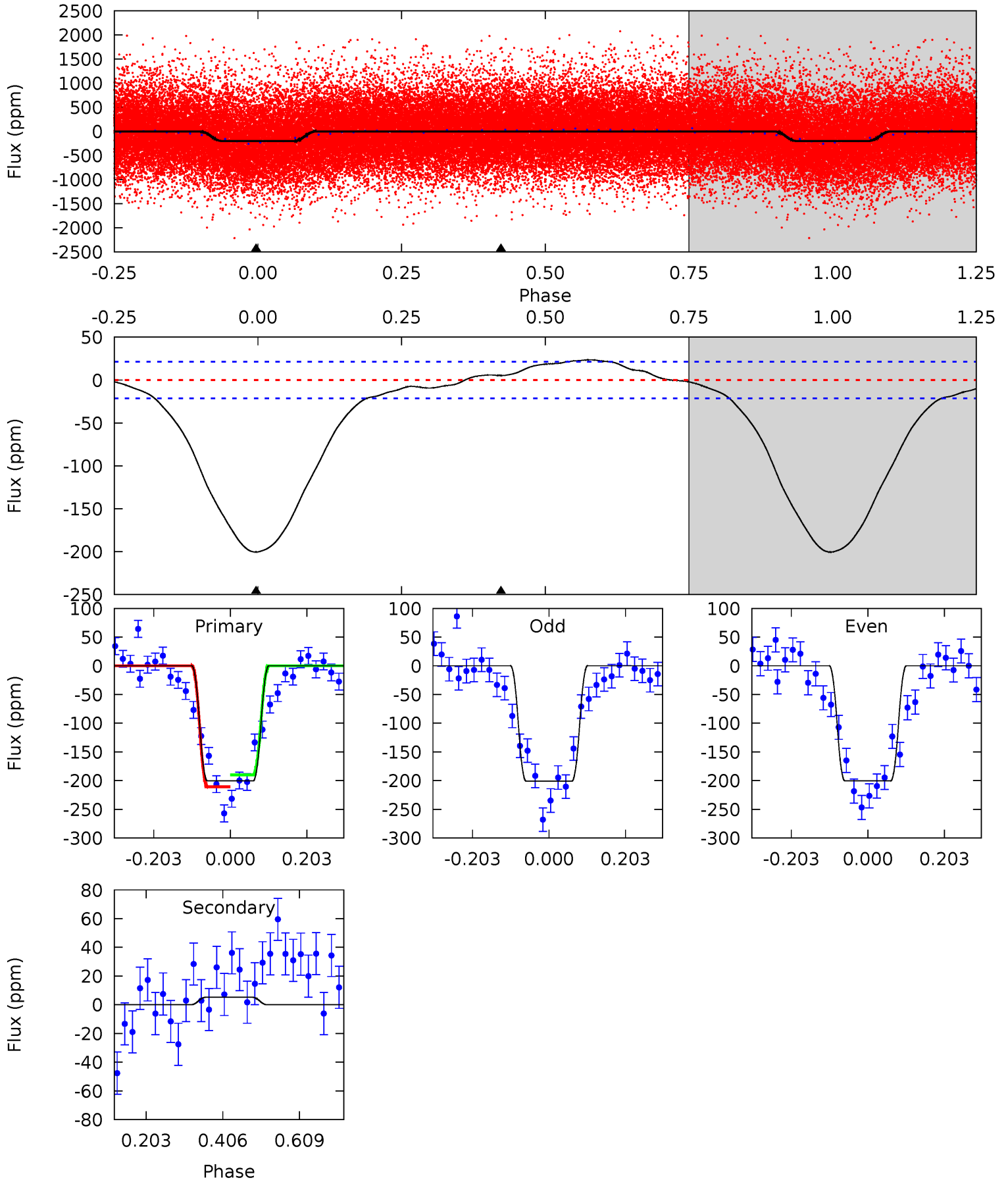
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
30.0	3.02	0	0	4.42	1.29	0.40	30.0	30.0	3.02	3.02	0.83	0.92	0.02	3.16



# Alt Model-Shift Uniqueness Test

009851943-01, P = 1.081958 Days, E = 130.433360 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
41.4	-1.08	0	0	4.41	1.27	2.05	41.4	41.4	-1.08	-1.08	0.04	0.94	0.11	2.15





### Stellar Parameters For KIC 009851943

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$4938^{+148}_{-133}$	$4.569^{+0.065}_{-0.040}$	$-0.260^{+0.300}_{-0.300}$	$0.718^{+0.062}_{-0.069}$	$0.697^{+0.088}_{-0.054}$	$2.652^{+0.754}_{-0.408}$
	+3%/-3%	+1%/-1%	+115%/-115%	+9%/-10%	+13%/-8%	+28%/-15%
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 009851943-01 / KOI 4001.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-15 \pm 5$	$0.96^{+0.65}_{-0.56}$	$1900^{+70}_{-72}$	$3224^{+1153}_{-598}$	$2.968^{+13.630}_{-2.057}$
Alt.	$5 \pm 5$	$1.28^{+0.68}_{-0.66}$	$1900^{+64}_{-72}$	$-2757^{+303}_{-546}$	$-0.566^{+0.522}_{-2.228}$

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

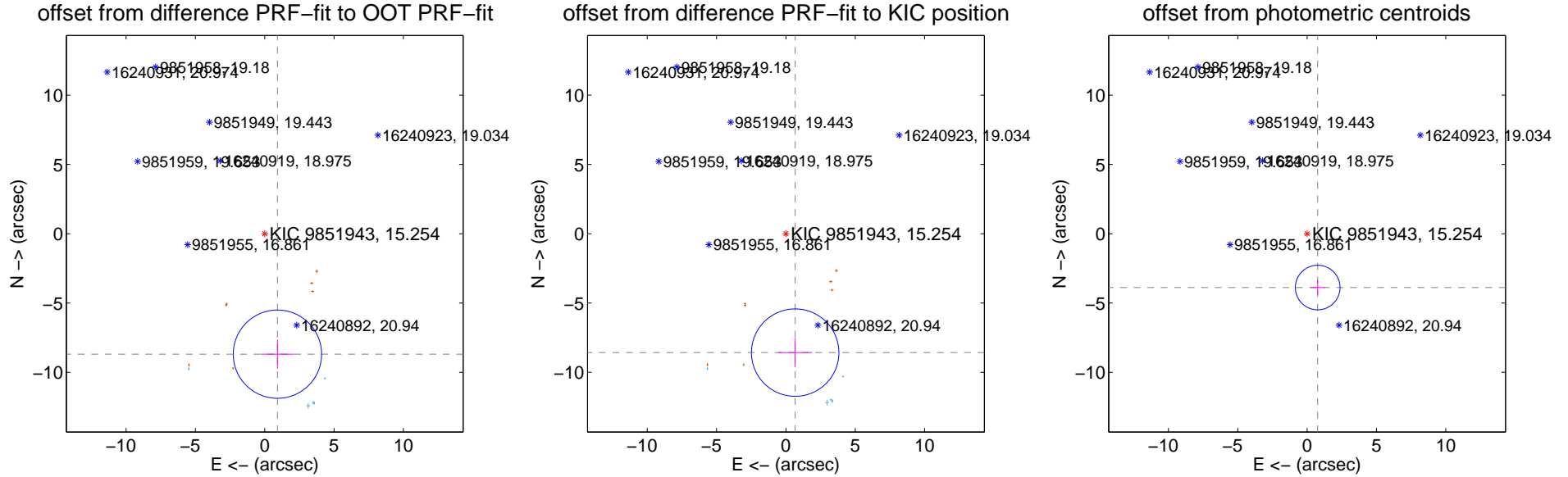
## DV Centroid Data

Supplemental centroid analysis for 009851943-01. Kepler magnitude: 15.25. Transit SNR 23.81

There are 6 quarters with good PRF difference image offsets

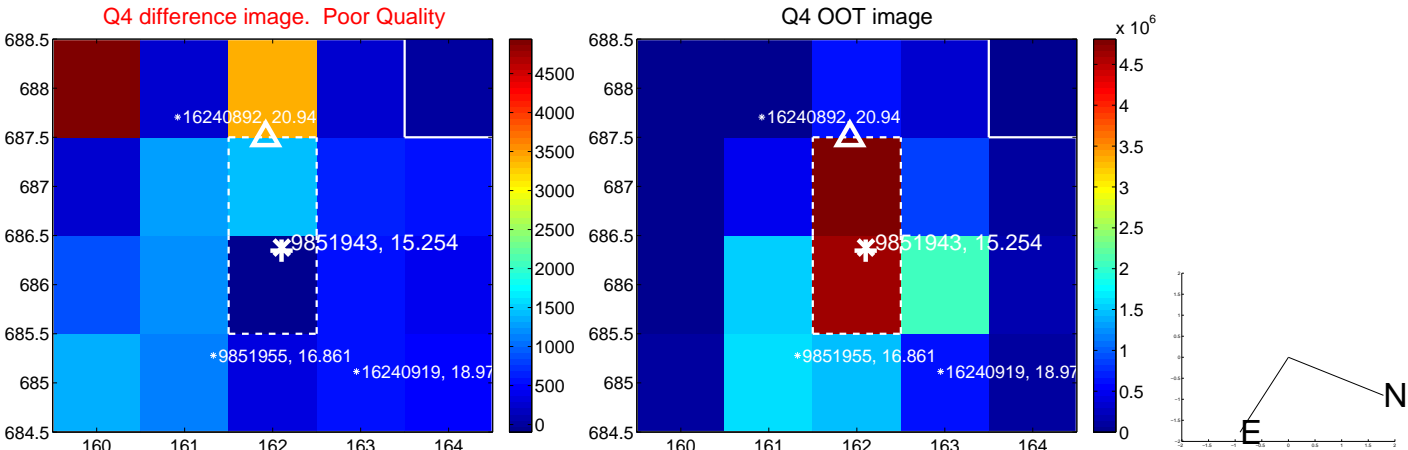
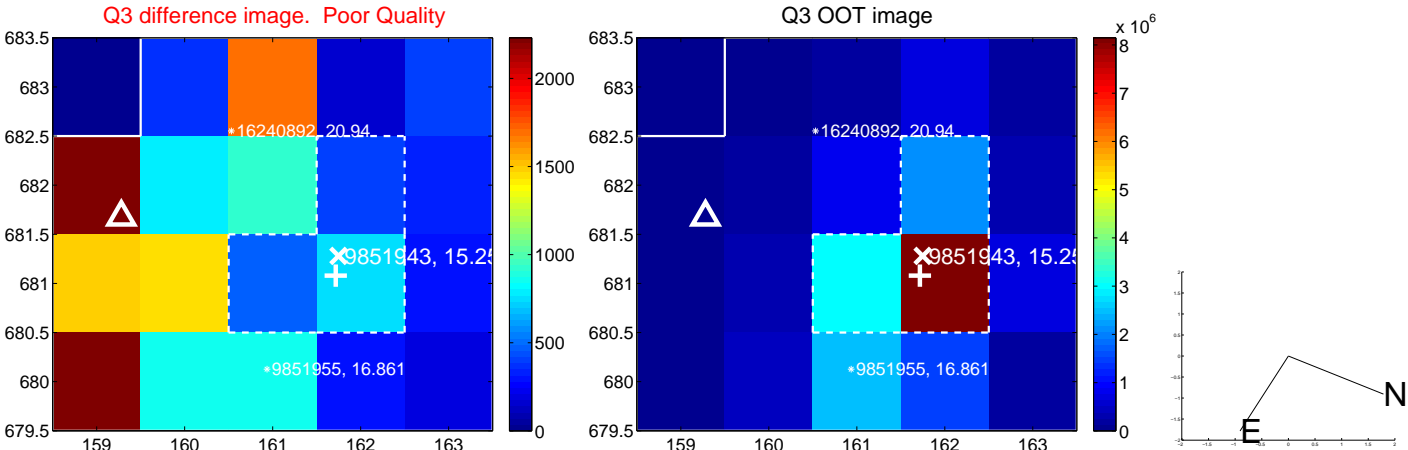
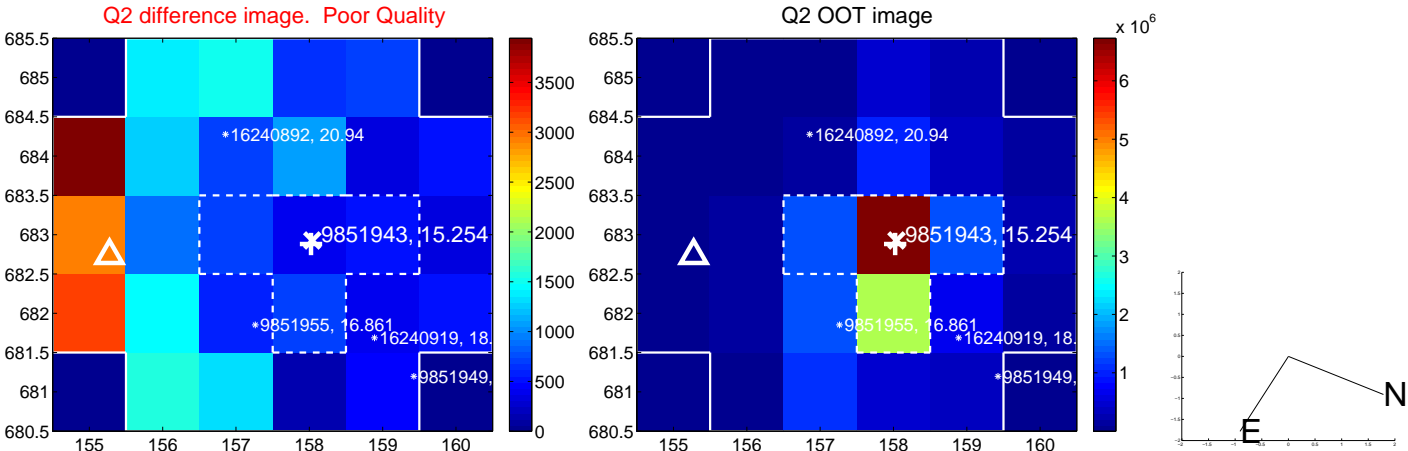
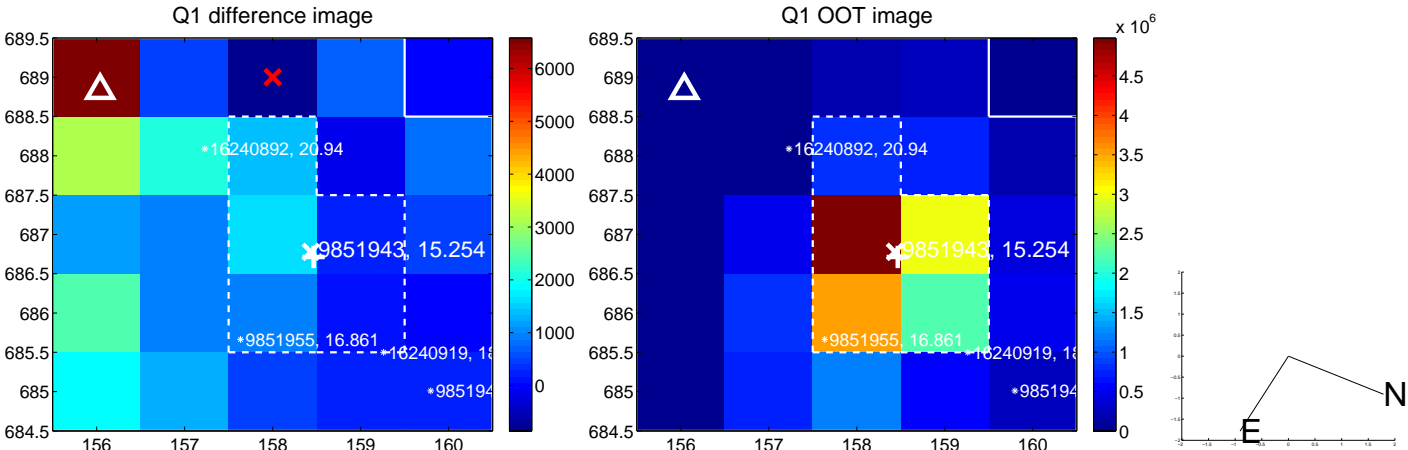
The direct PRF centroid is offset from the target star catalog position by about 0.27 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$8.742 \pm 1.062$	8.23	$-0.917 \pm 1.193$	$-8.693 \pm 1.060$
PRF-fit source offset from KIC position	$8.607 \pm 1.051$	8.19	$-0.667 \pm 1.218$	$-8.581 \pm 1.050$
photometric centroid source offset	$3.96 \pm 0.54$	7.37	$-0.76 \pm 0.52$	$-3.88 \pm 0.54$

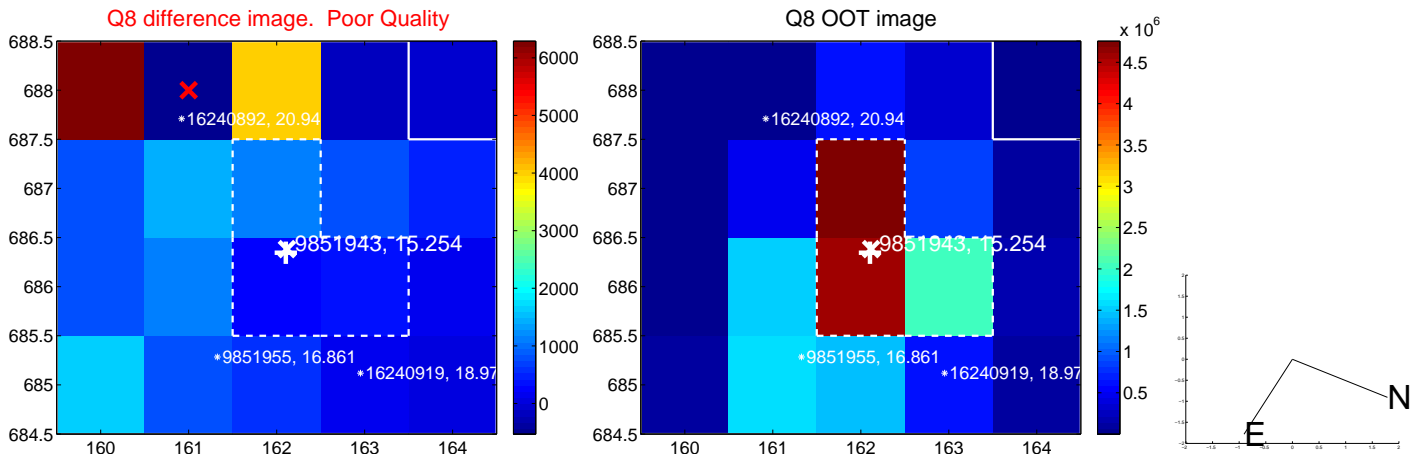
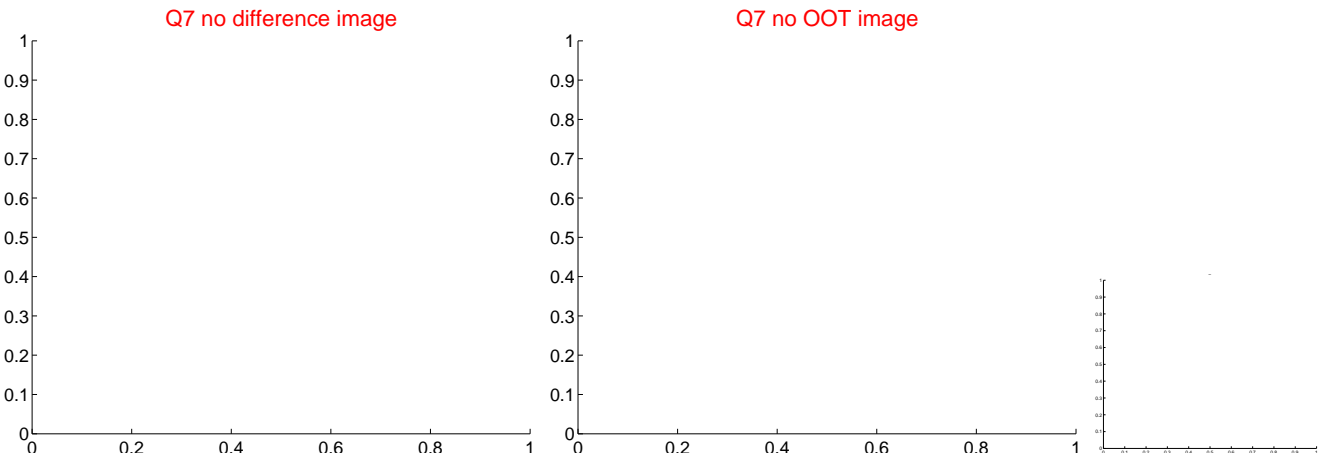
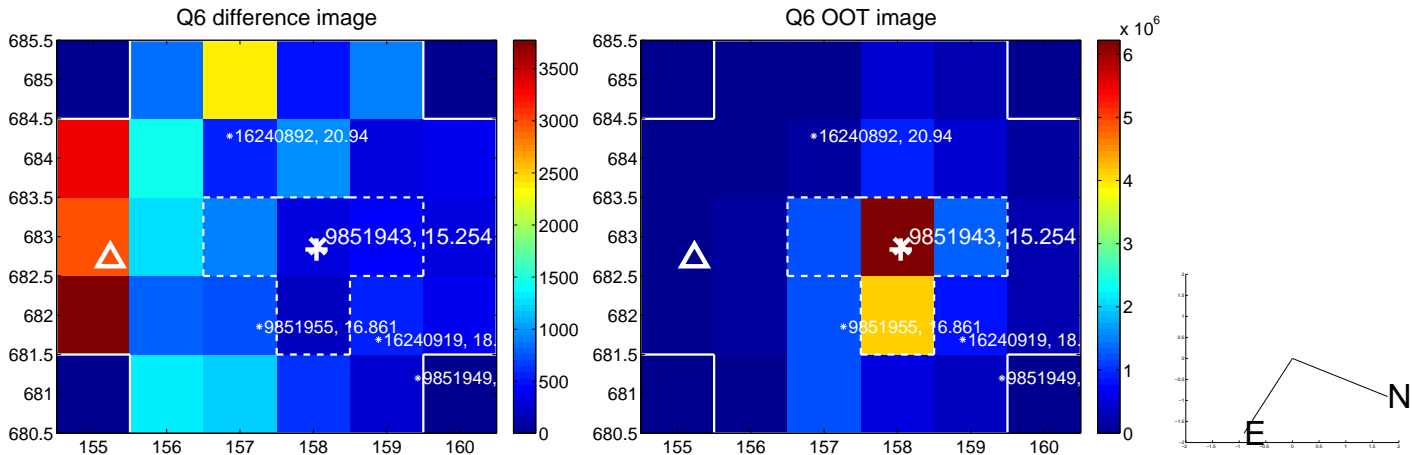
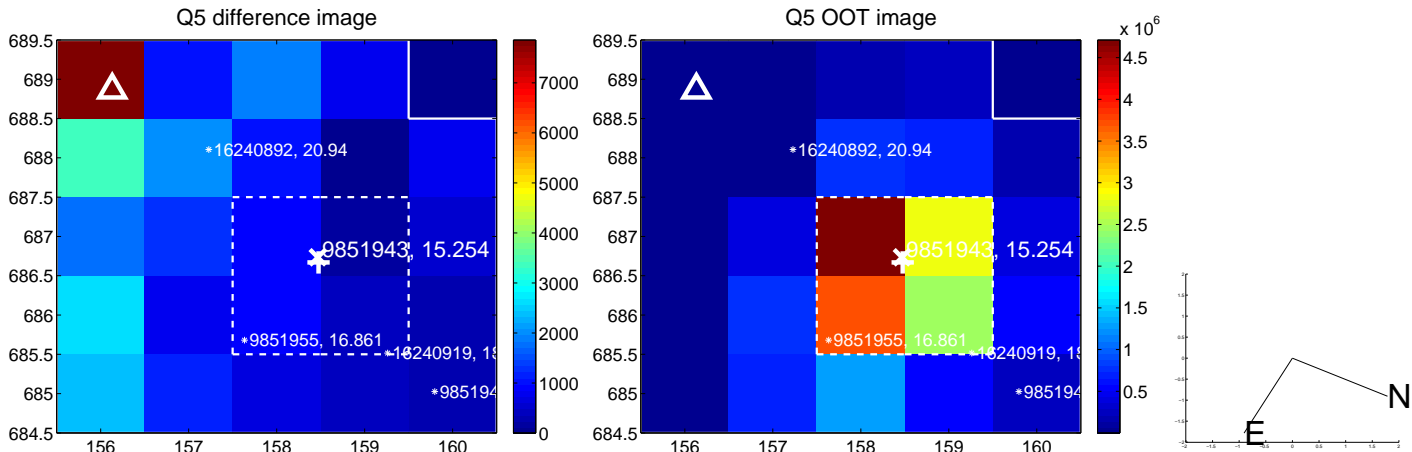


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

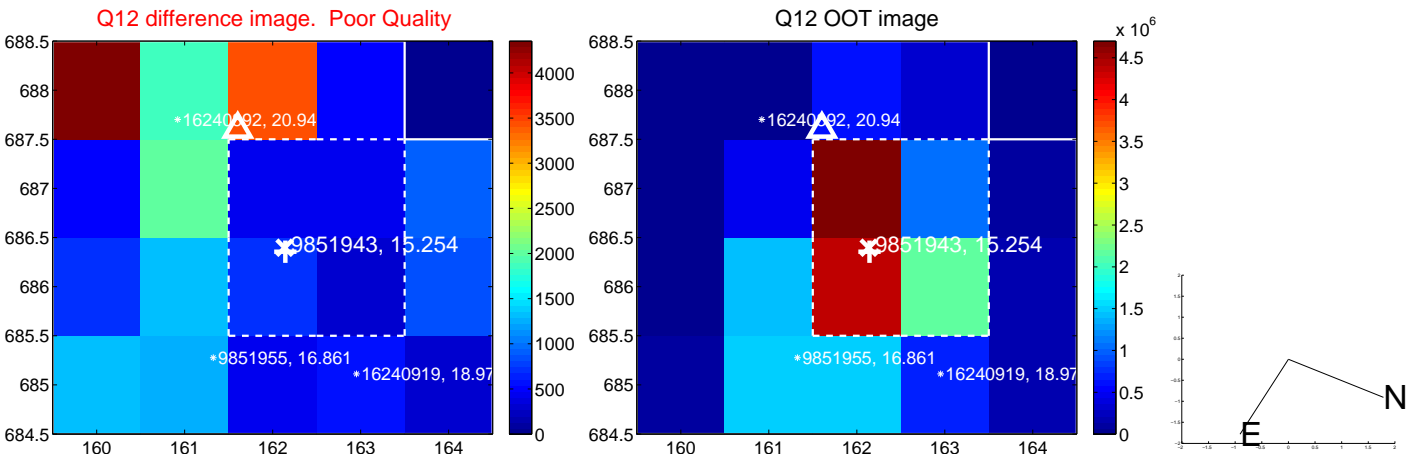
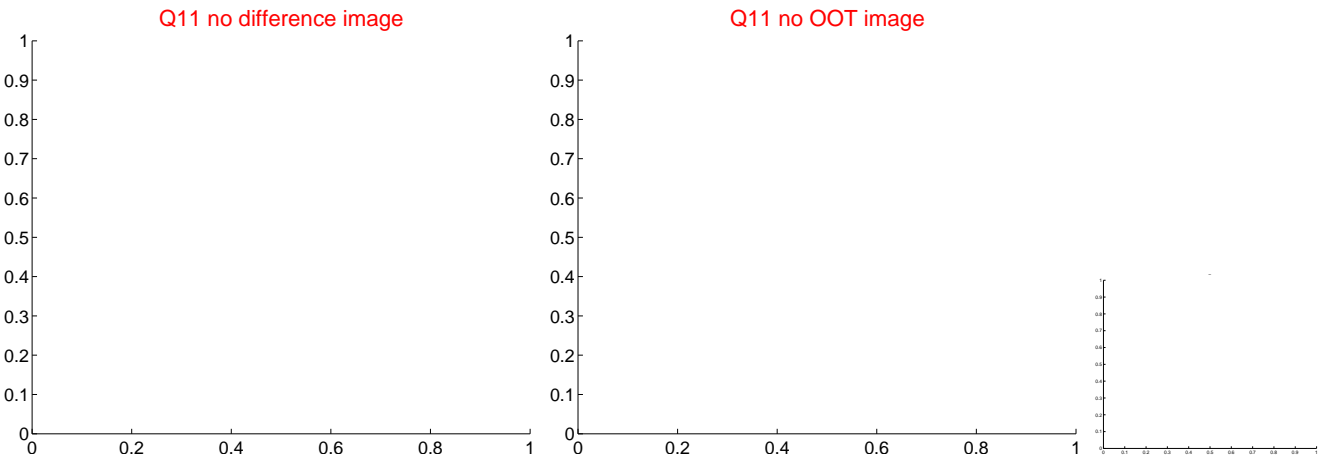
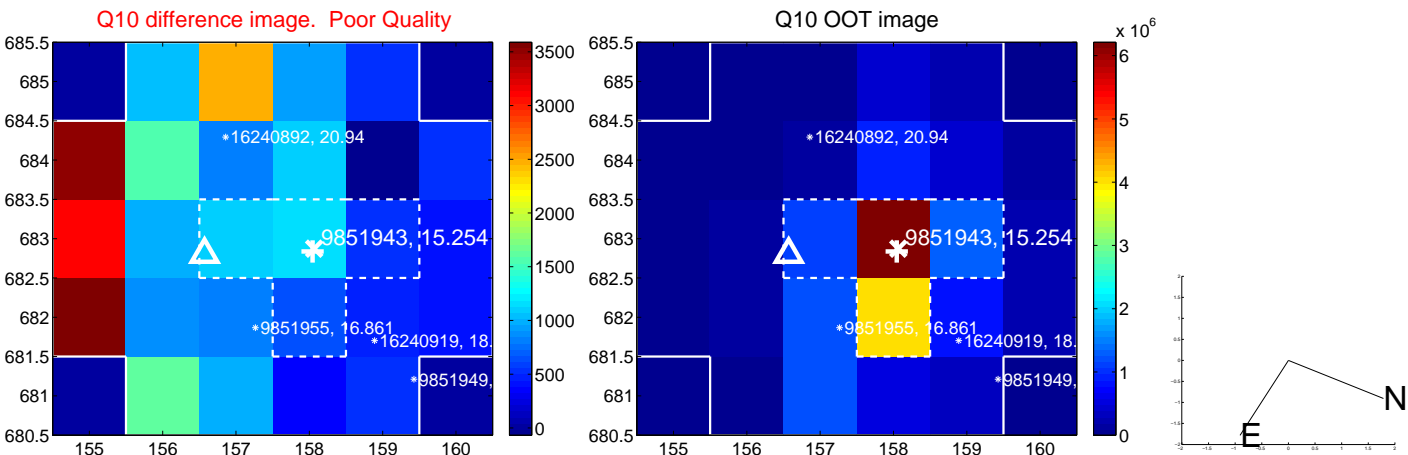
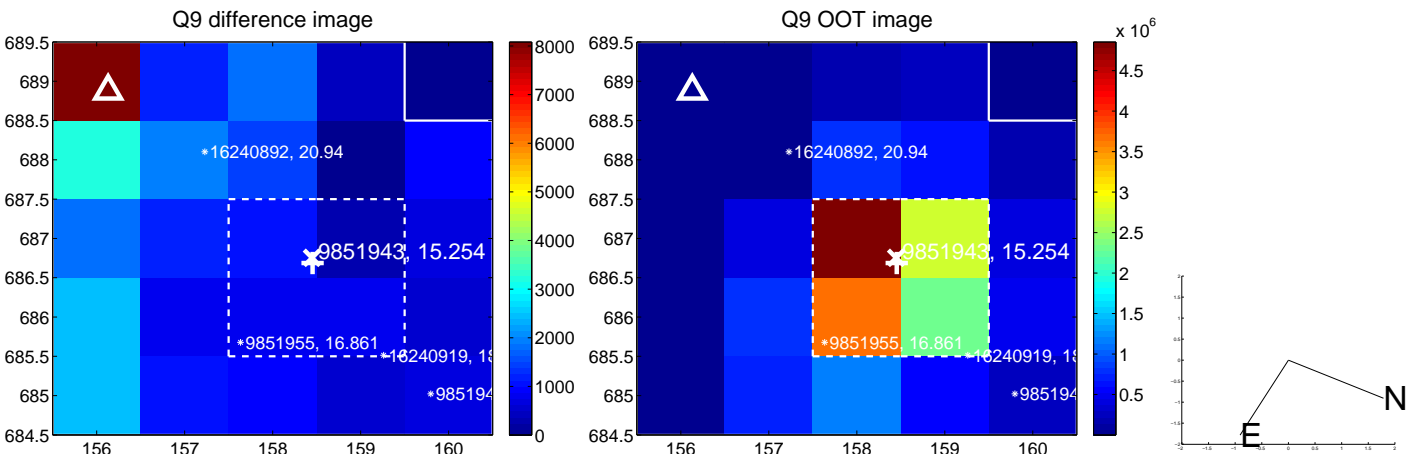


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

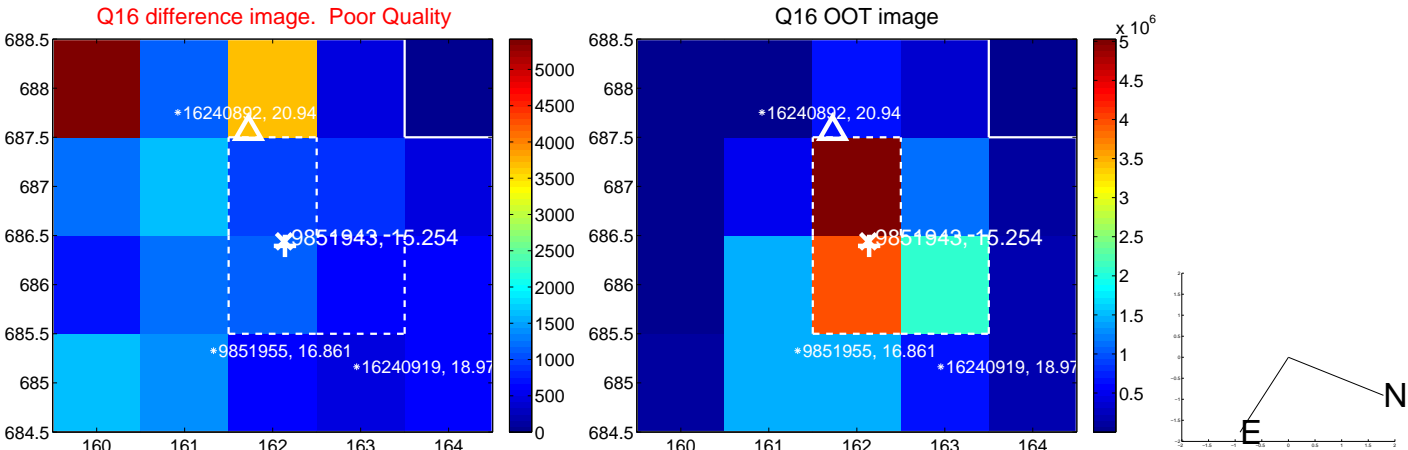
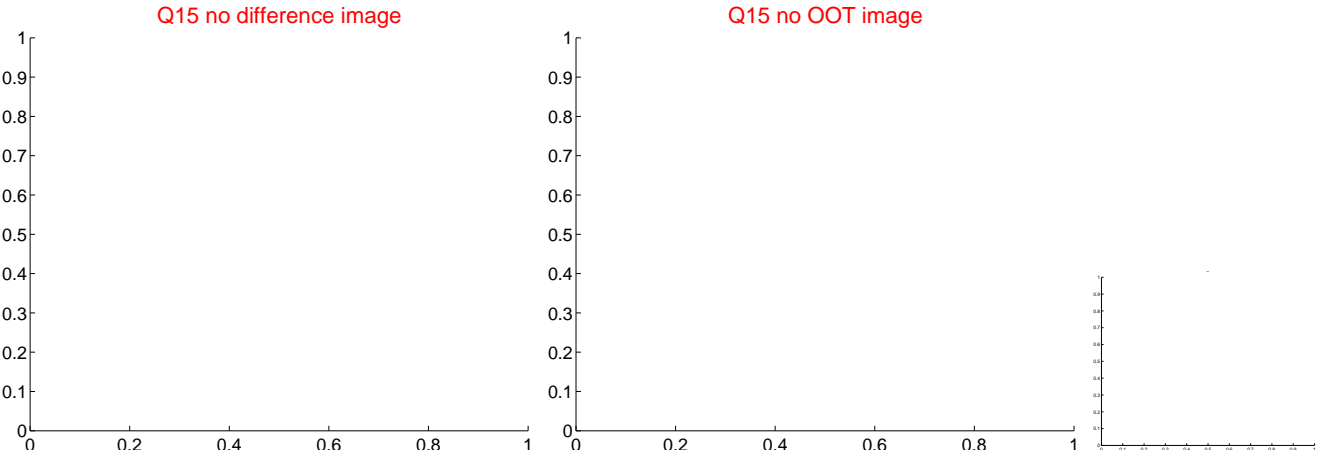
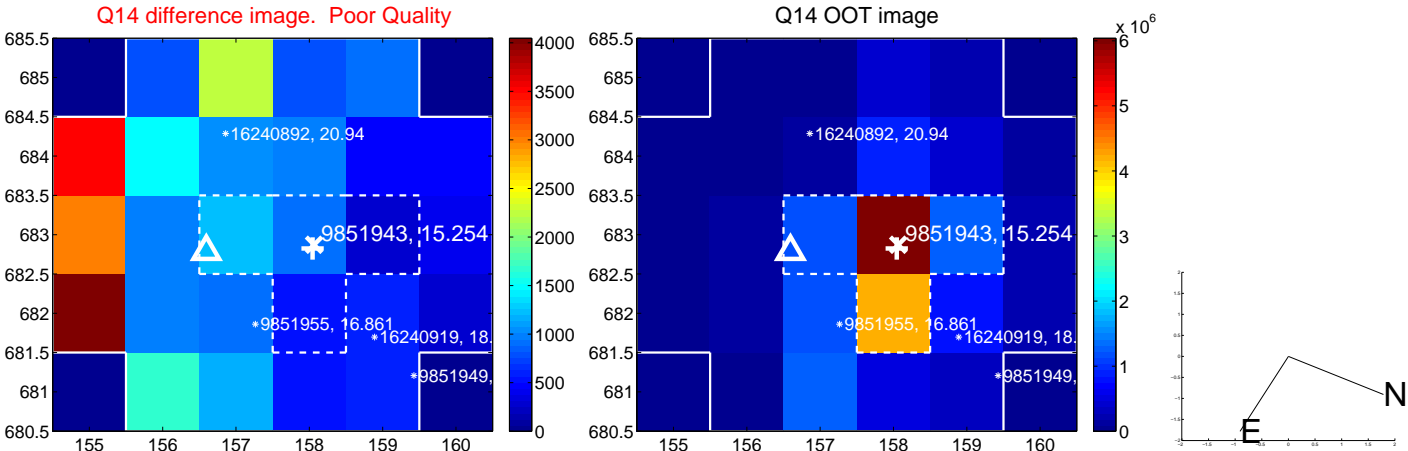
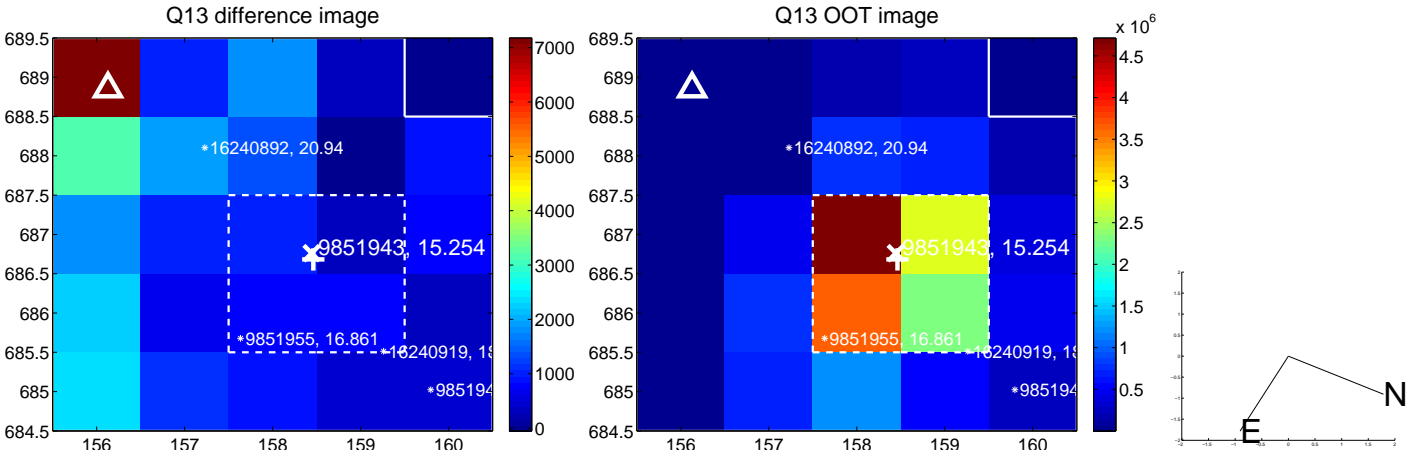




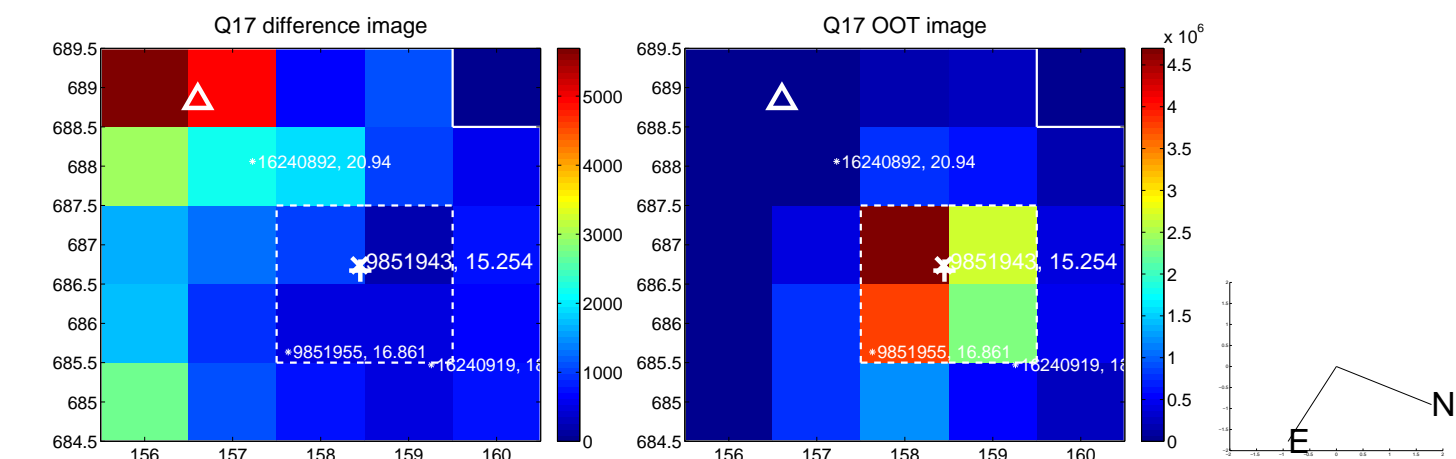
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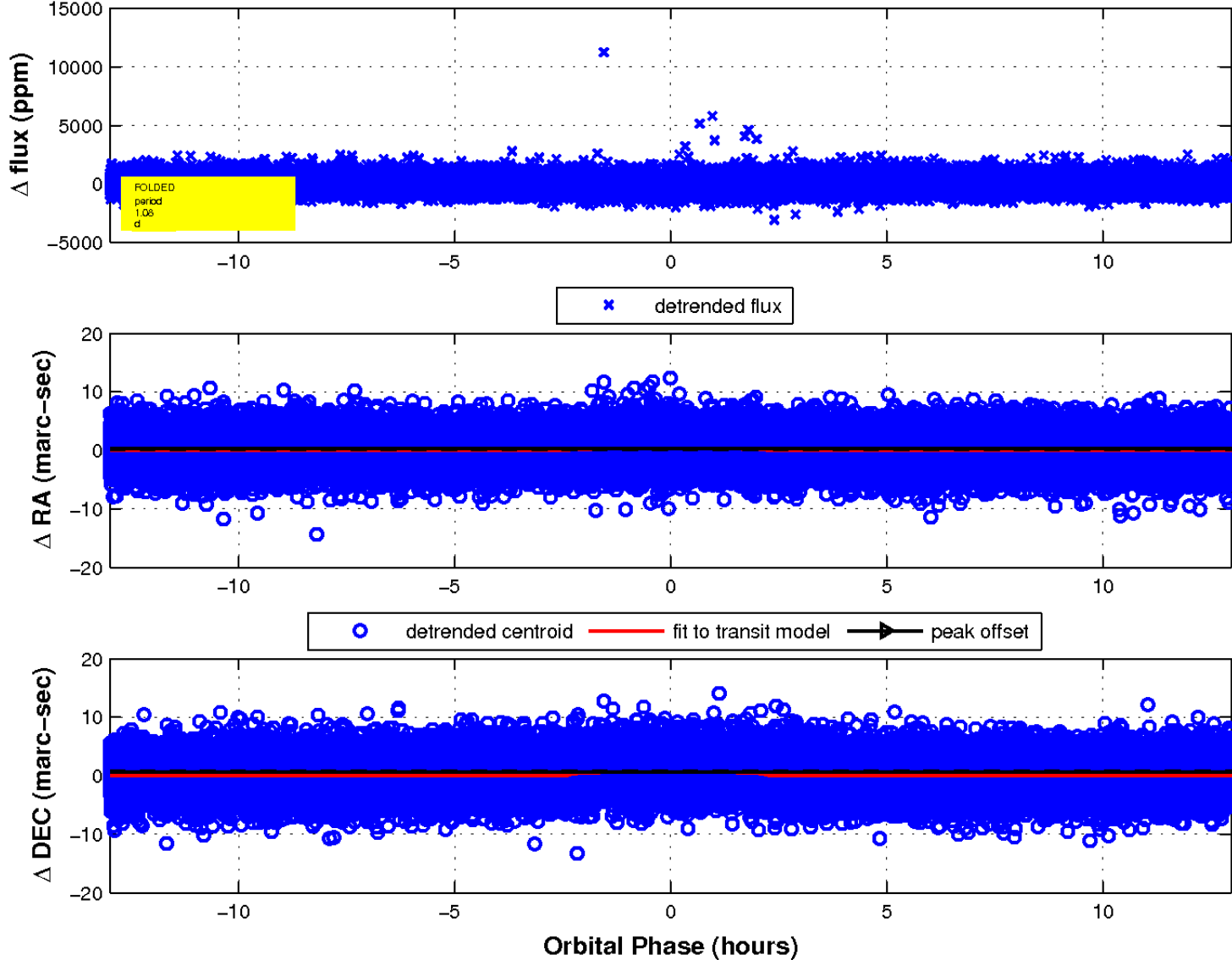
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



fluxWeightedCentroids, Planet 1 of 1



# UKIRT Image

Declination

