

# KIC 004913858

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
004913858-01	OBS	No	2.290546	133.177970	59.2	14.477	14.9	20.1	0.89	5926	0.70	763.20
004913858-02	OBS	No	74.519612	133.066460	512.3	2.189	8.5	8.1	0.89	5926	2.22	7.35

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004913858-01	OBS	FP	0.00	1	0	1	0	LPP_DV—CENT_UNRESOLVED_OFFSET
004913858-02	OBS	FP	0.00	1	0	1	0	TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_MEAS—HALO_GHOST

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

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

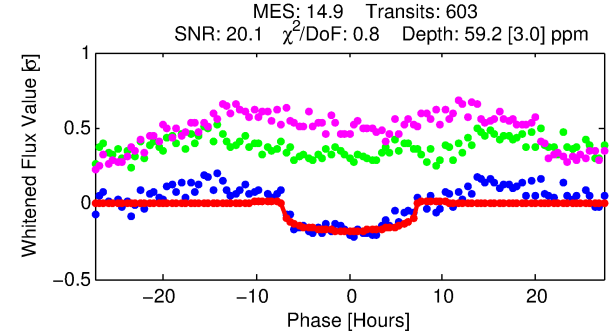
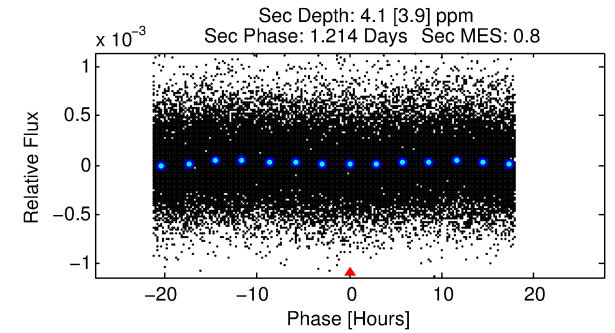
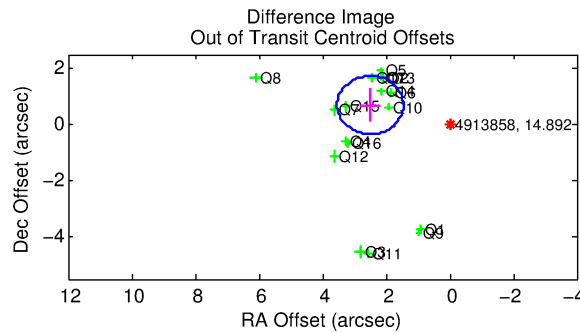
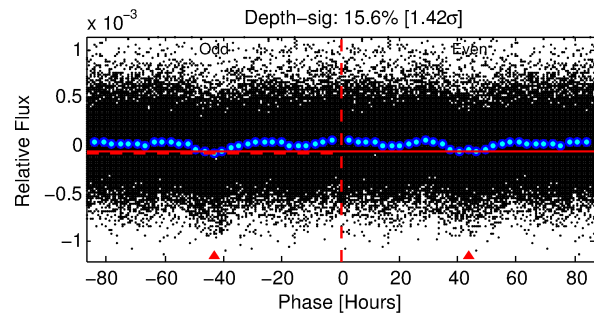
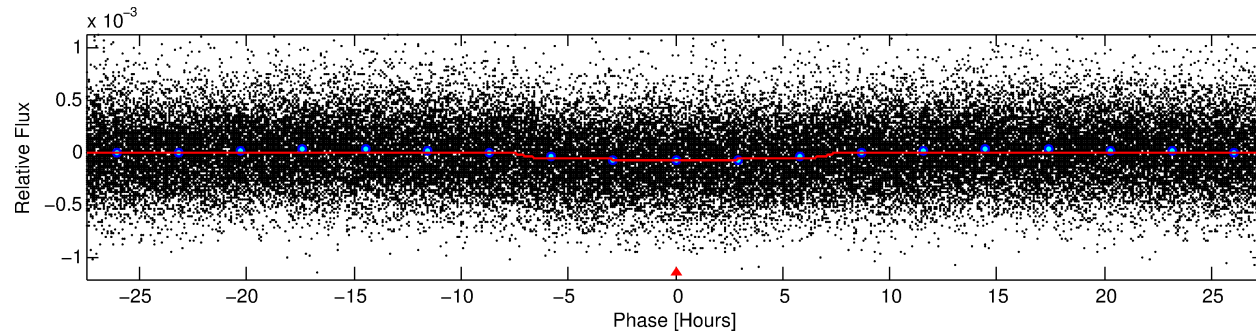
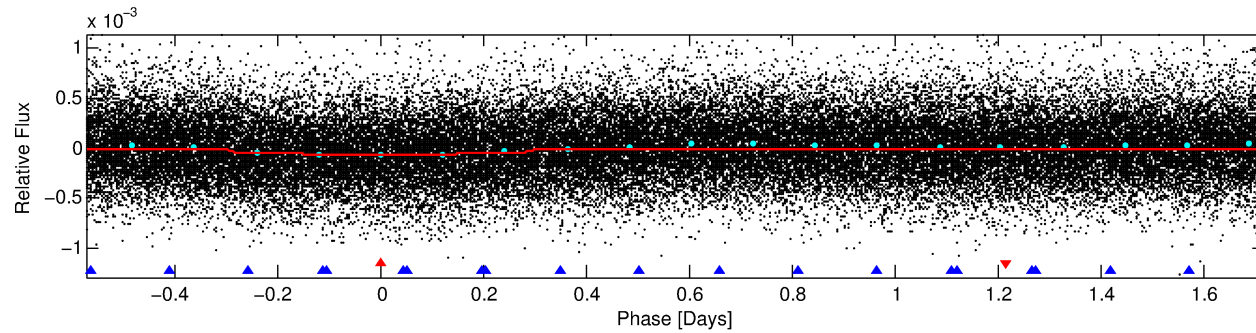
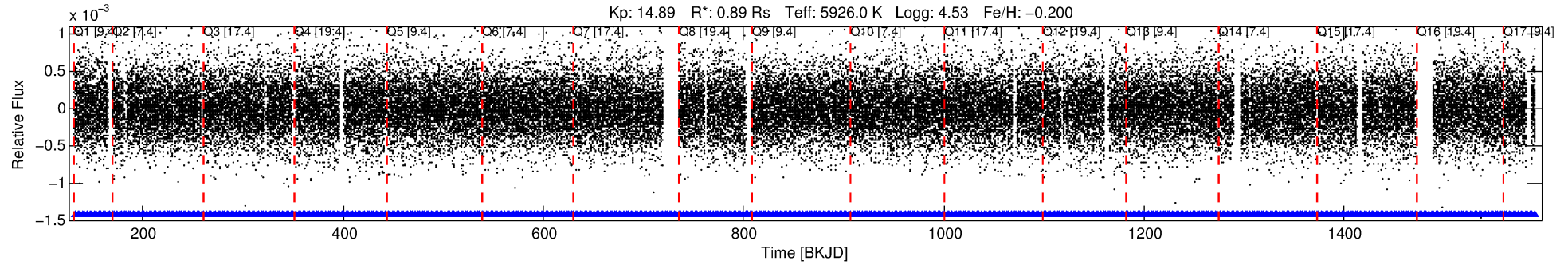
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 004913858-01

No Significant Match Found

# DV One-Page Summary

KIC: 4913858 Candidate: 1 of 2 Period: 2.291 d



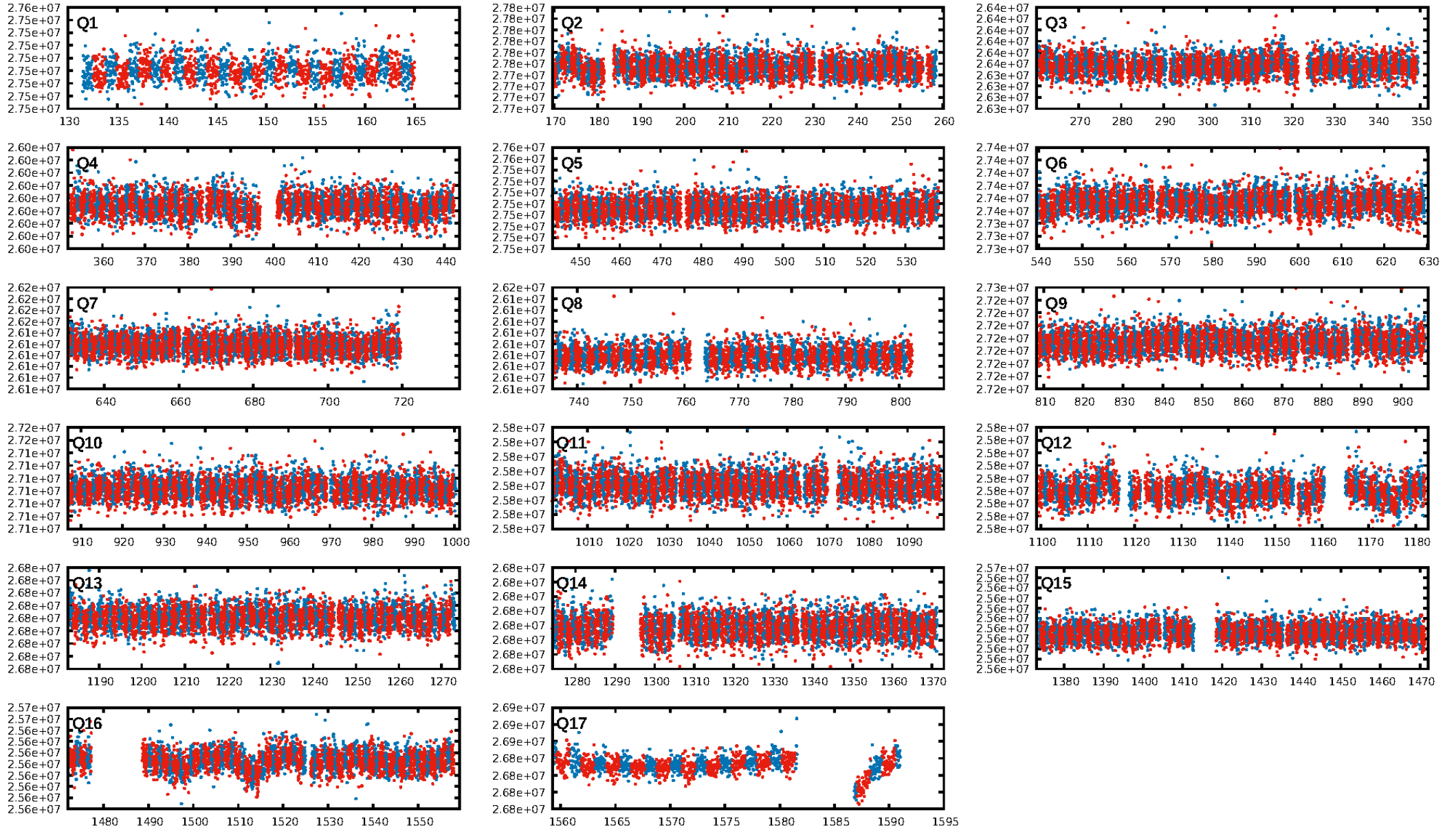
## DV Fit Results:

Period = 2.29055 [0.00002] d  
Epoch = 133.1780 [0.0065] BKJD  
Rp/R\* = 0.0073 [0.0038]  
a/R\* = 1.28 [1.23]  
b = 0.54 [3.37]  
Seff = 763.20 [295.97]  
Teq = 1340 [130] K  
Rp = 0.70 [0.42] Re  
a = 0.0337 [0.0084] AU  
Ag = 5.17 [7.61] [0.55 $\sigma$ ]  
Teffp = 3124 [1117] K [1.59 $\sigma$ ]

## DV Diagnostic Results:

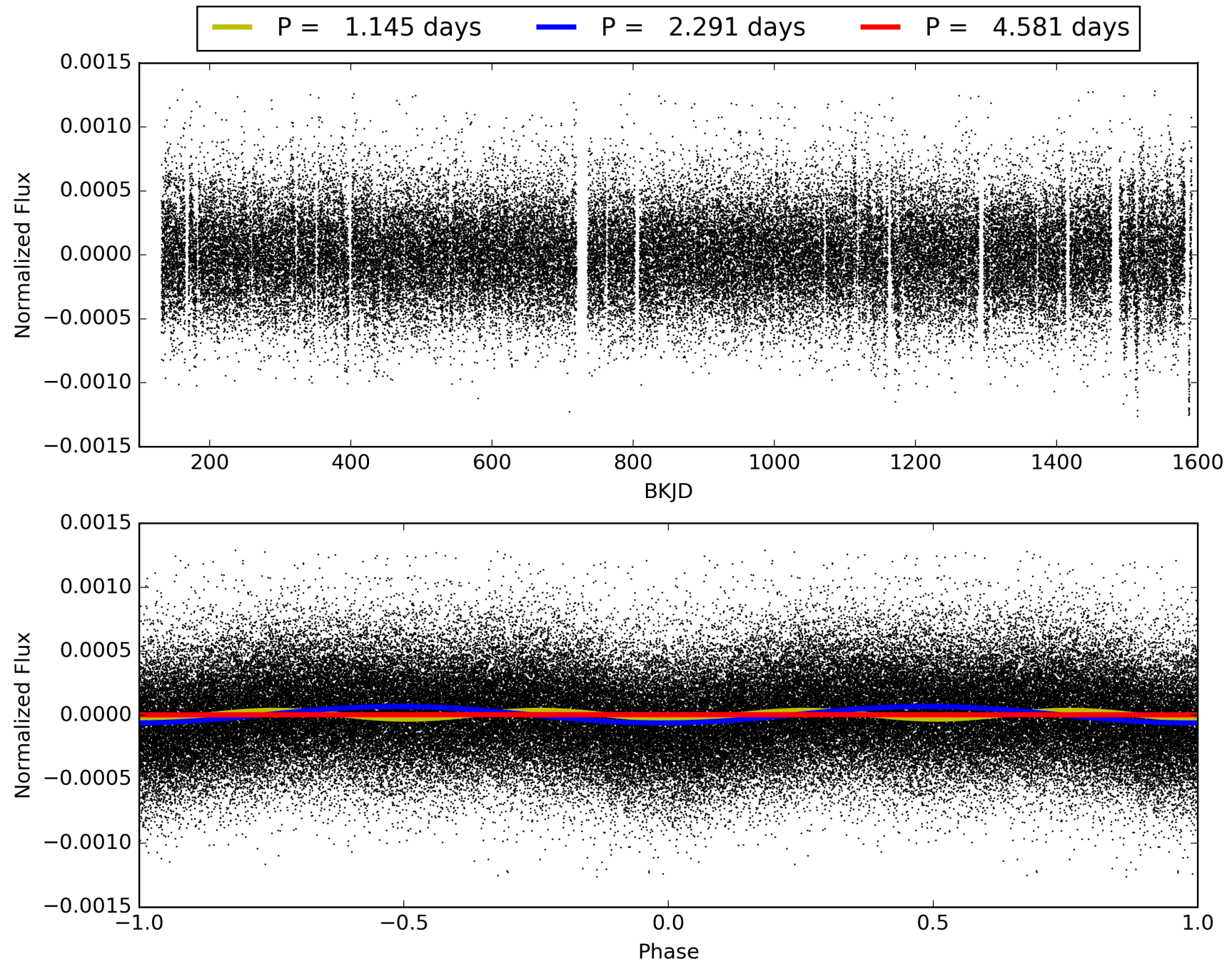
ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [118.40 $\sigma$ ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 4.75e-31  
RollingBand-fgt: 1.00 [576/576]  
GhostDiagnostic-chr: 0.7703  
Centroid-sig: 0.0%  
Centroid-so: 6.631 arcsec [10.20 $\sigma$ ]  
OotOffset-rm: 2.596 arcsec [7.49 $\sigma$ ]  
KicOffset-rm: 2.549 arcsec [6.80 $\sigma$ ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 0.24 [4/17]  
DiffImageOverlap-fno: 1.00 [17/17]

# TCE 004913858-01, PDC Light Curves



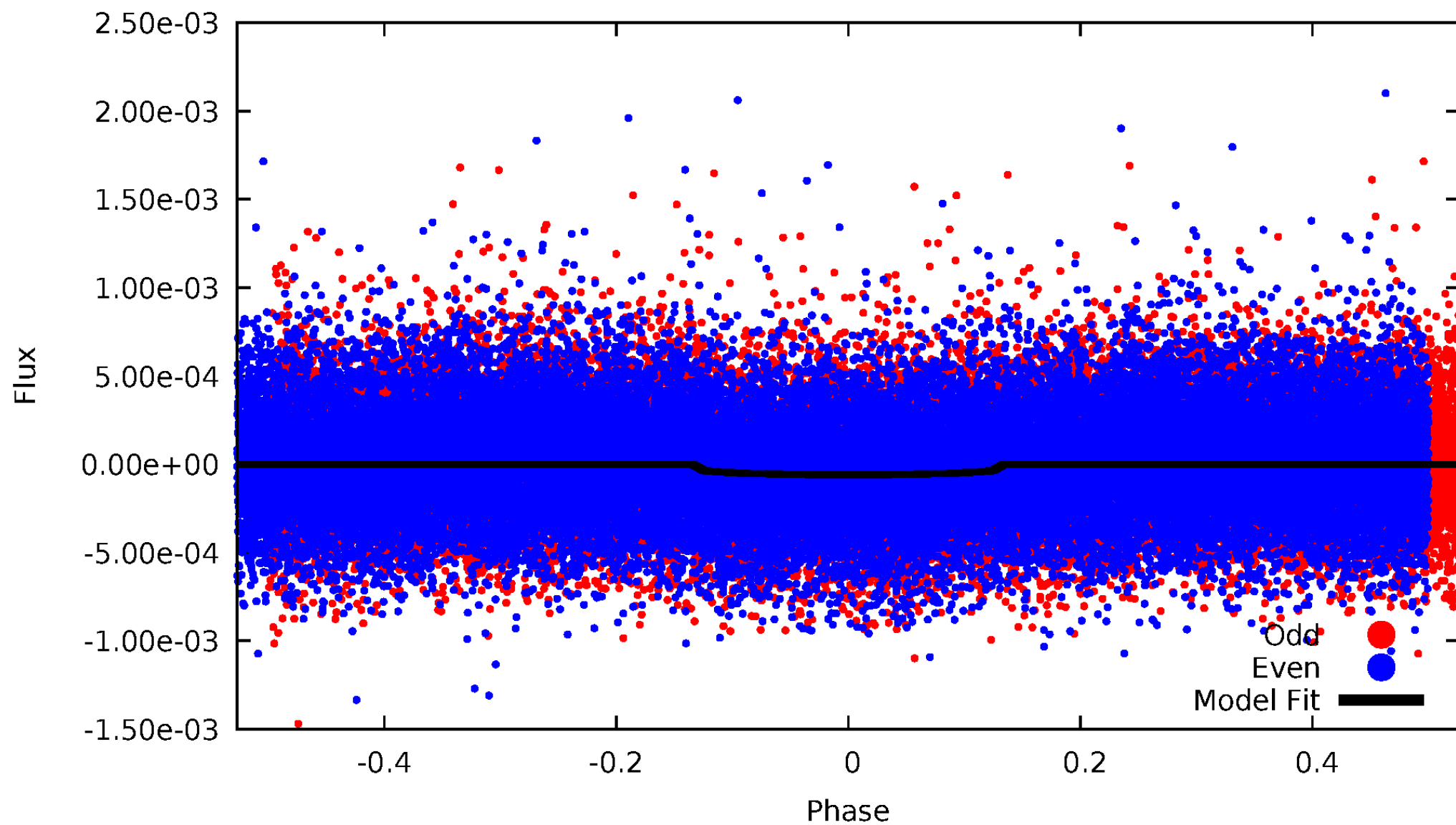


TCE 004913858-01



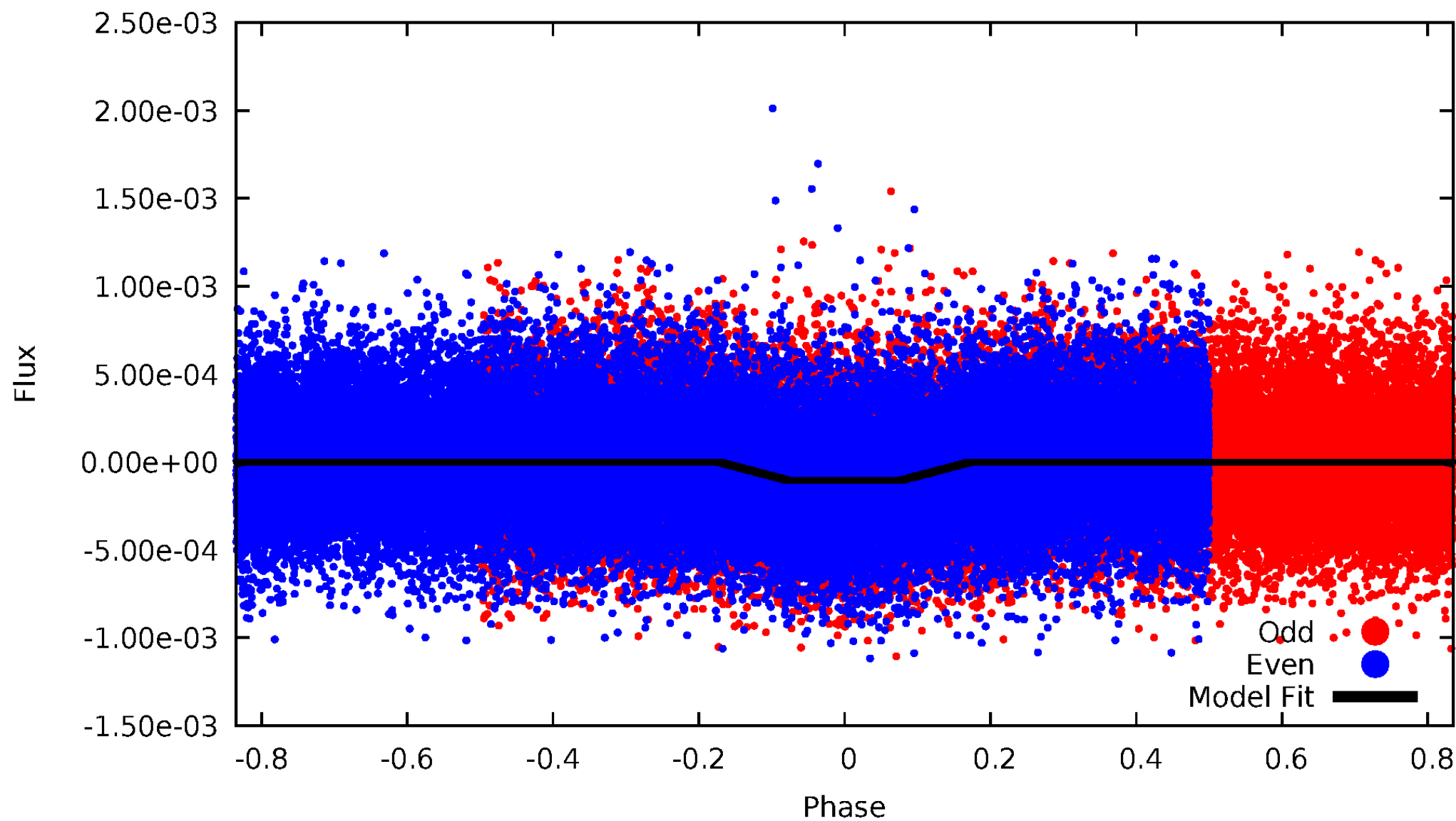
# DV Odd/Even

TCE 004913858-01

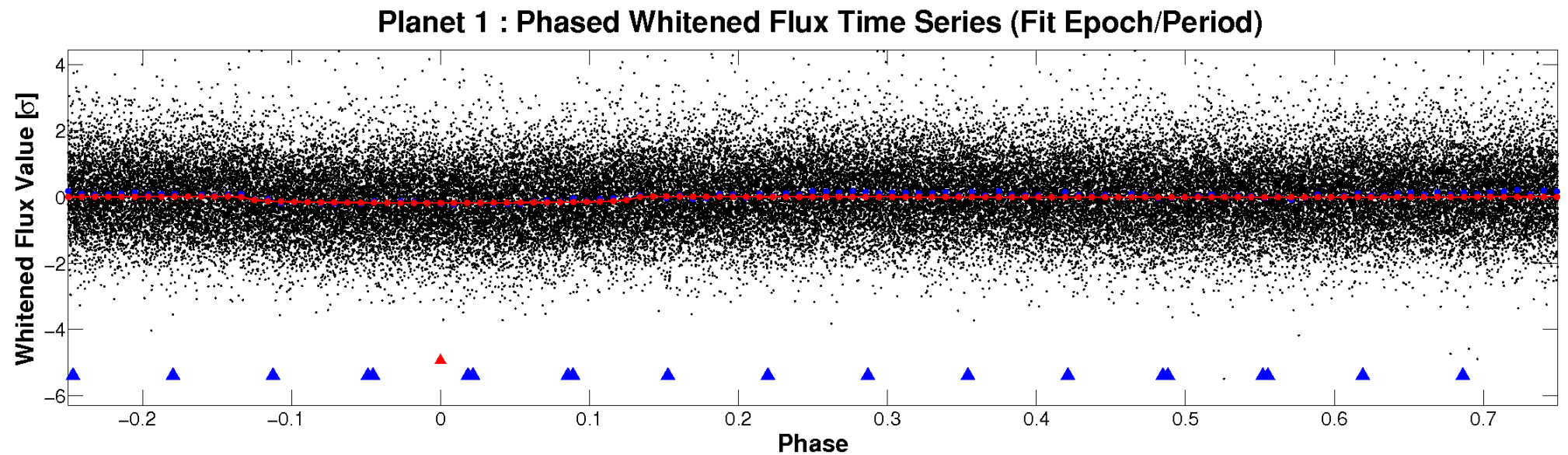
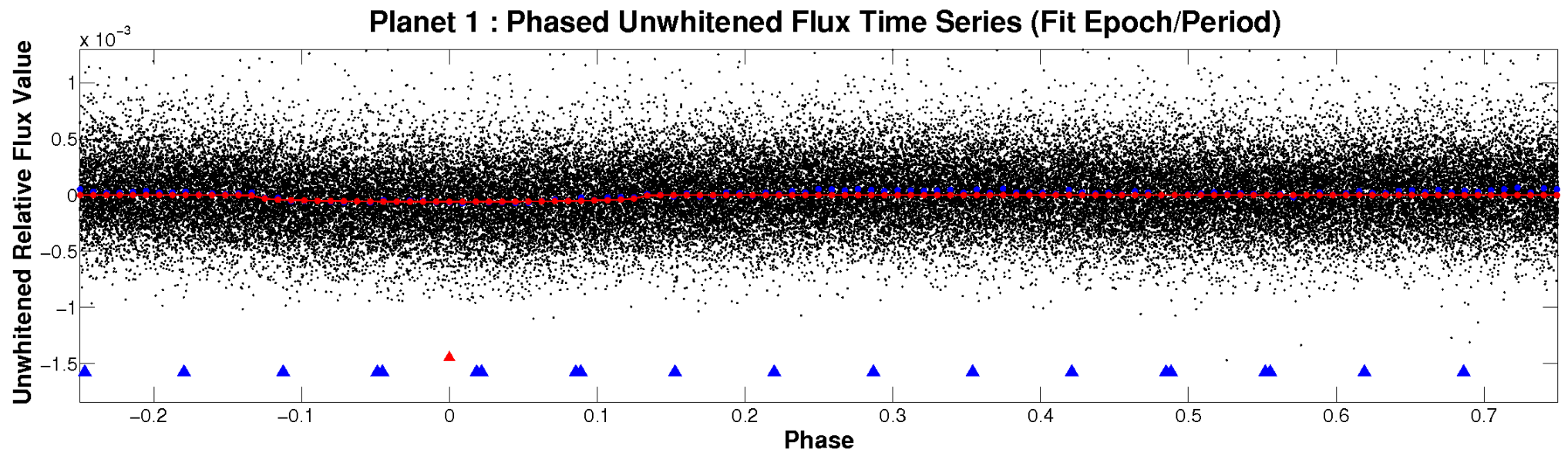


# ALT Odd/Even

TCE 004913858-01



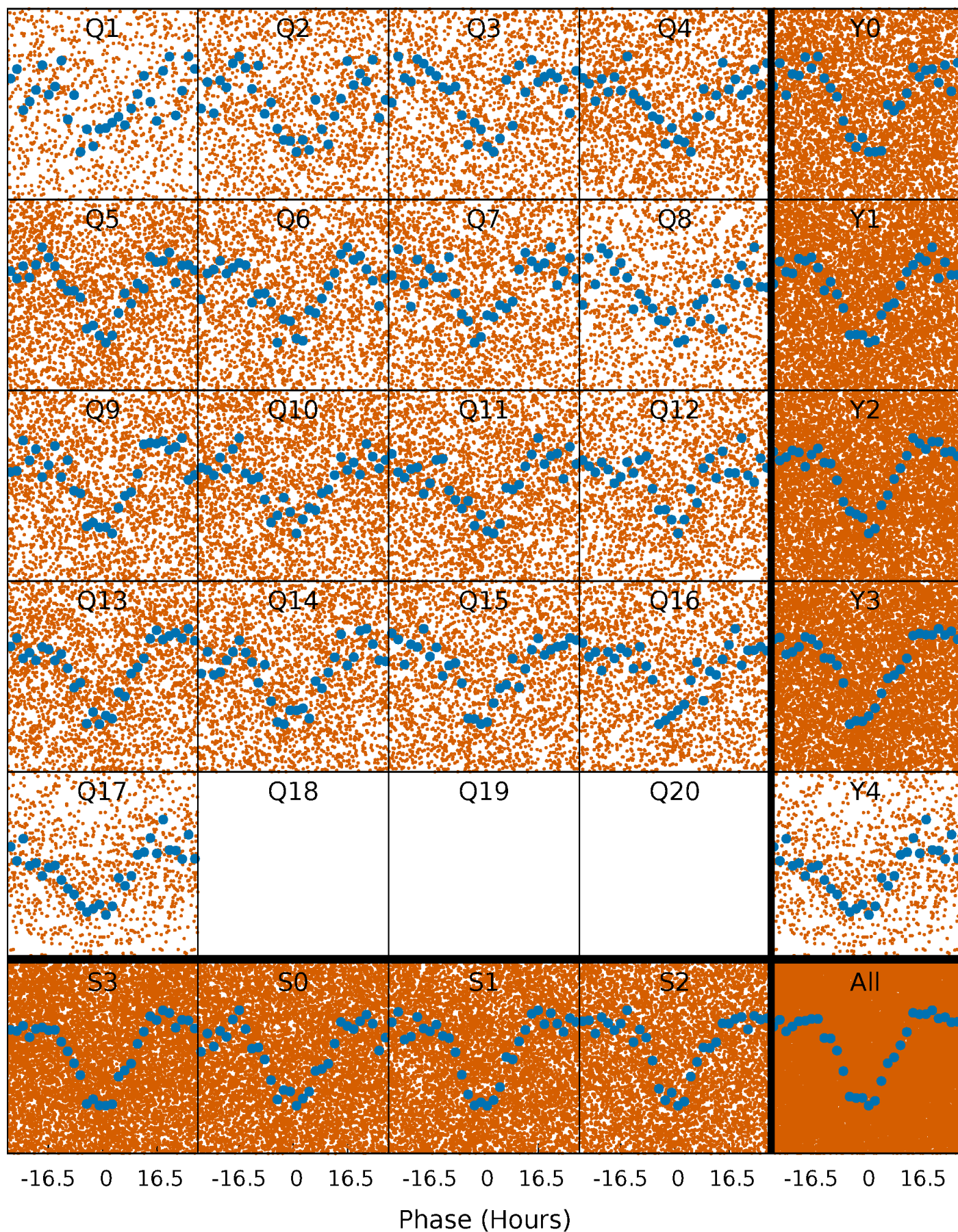
# Non-Whitened Vs. Whitened Light Curve





# PDC Quarter-Phased Transit Curves

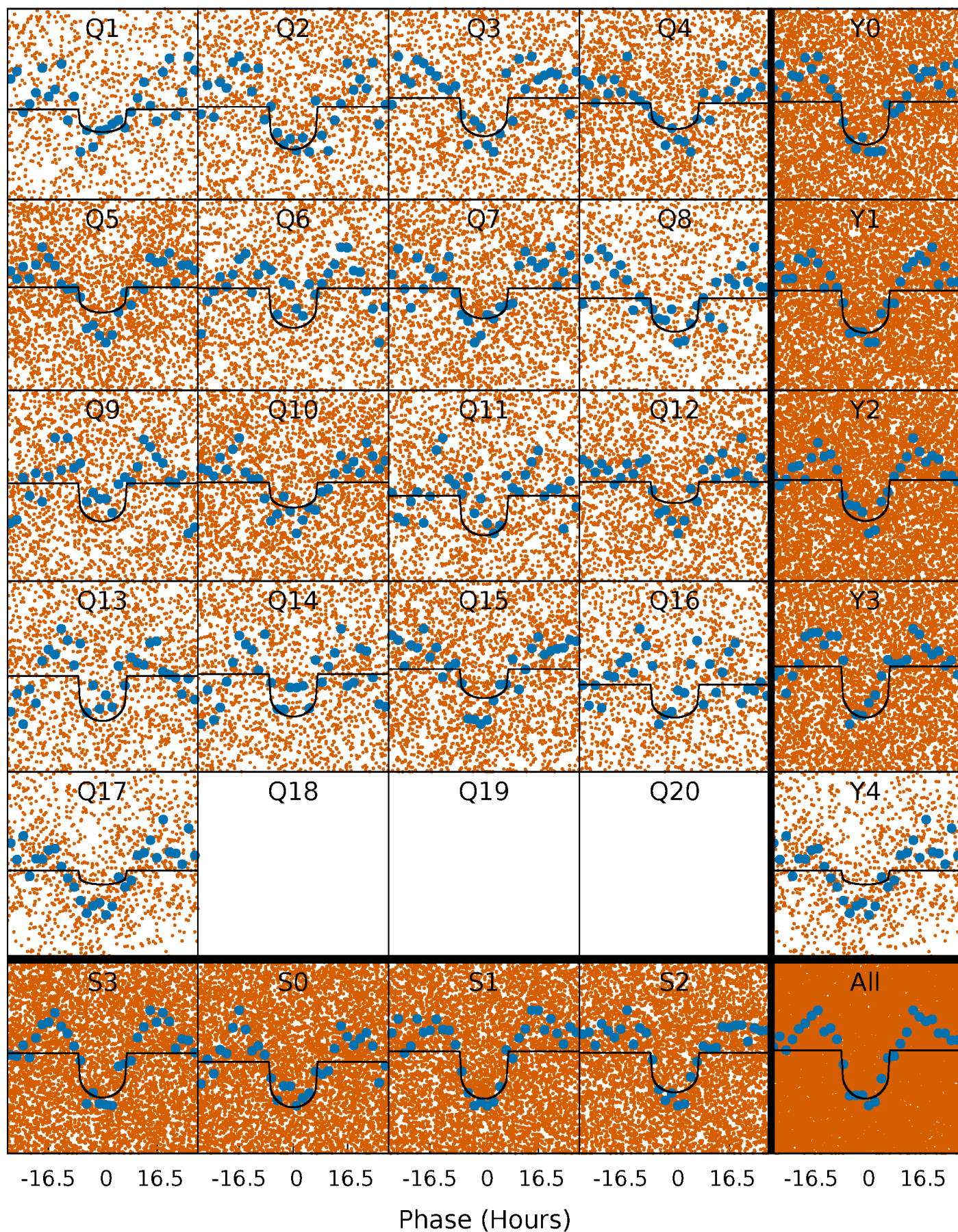
TCE 004913858-01 P= 2.290546 Days  $T_0=133.177969$  (BKJD)





# DV Quarter-Phased Transit Curves

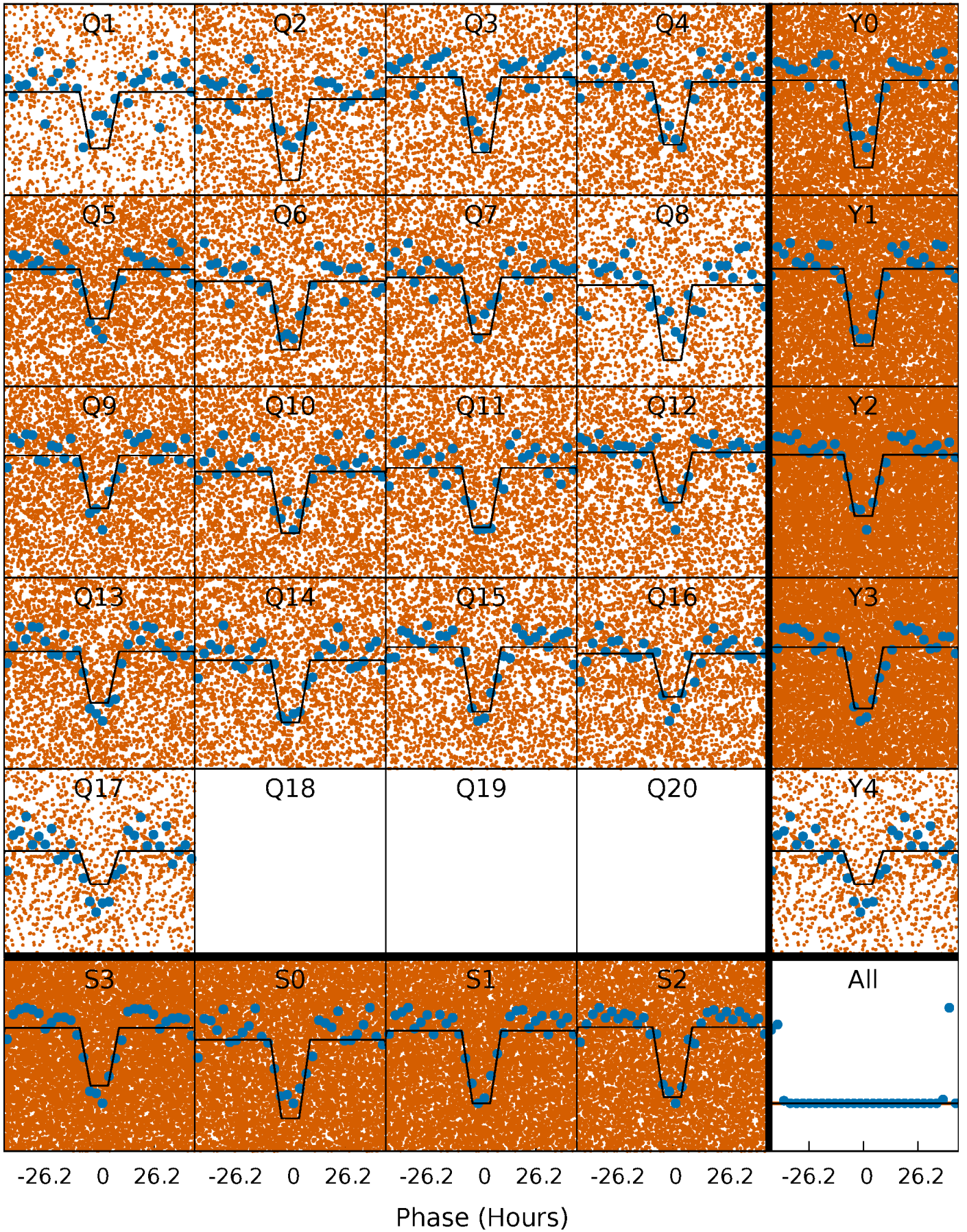
TCE 004913858-01 P= 2.290546 Days  $T_0=133.177969$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

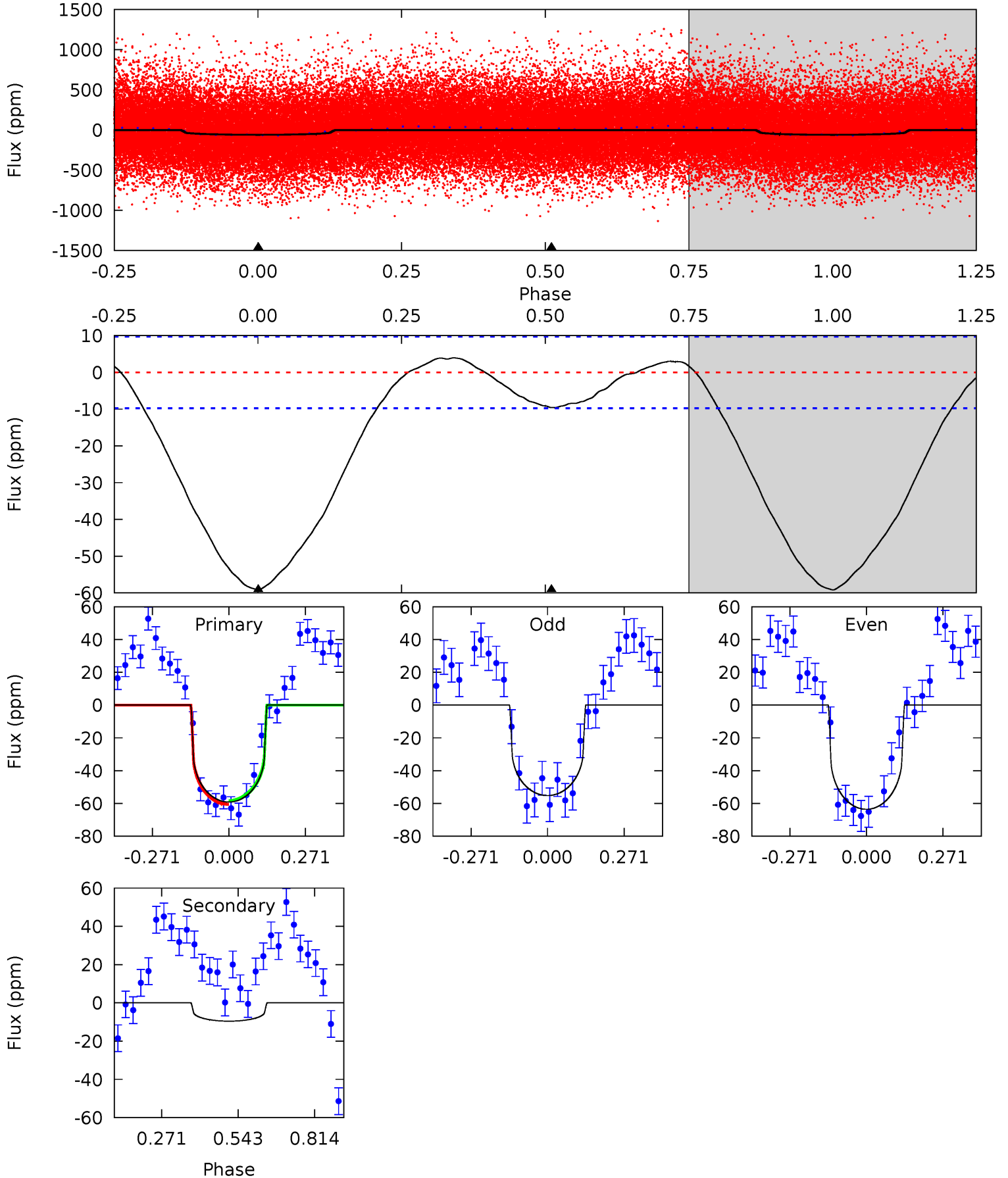
TCE 004913858-01 P= 2.290334 Days  $T_0=133.241873$  (BKJD)



# DV Model-Shift Uniqueness Test

004913858-01, P = 2.290546 Days, E = 130.887423 Days

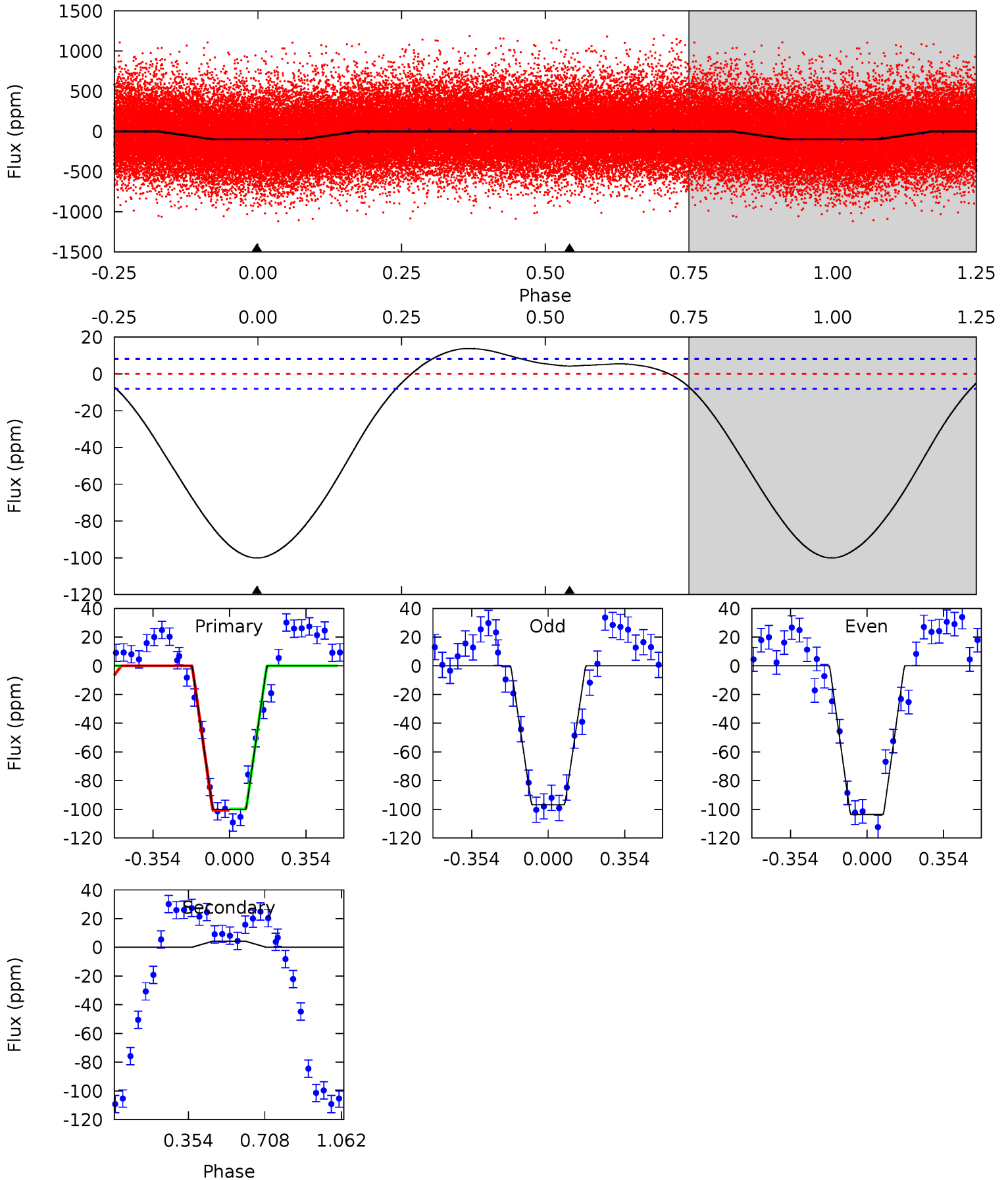
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
26.4	4.27	0	0	4.35	1.10	1.00	26.4	26.4	4.27	4.27	1.88	1.02	0.06	0.50



# Alt Model-Shift Uniqueness Test

004913858-01, P = 2.290334 Days, E = 130.951539 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
52.8	-2.23	0	0	4.29	0.93	4.07	52.8	52.8	-2.23	-2.23	1.80	1.06	0.12	0.26





### Stellar Parameters For KIC 004913858

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5926^{+160}_{-178}$	$4.532^{+0.048}_{-0.204}$	$-0.200^{+0.300}_{-0.300}$	$0.887^{+0.259}_{-0.086}$	$0.978^{+0.119}_{-0.131}$	$1.971^{+0.384}_{-0.999}$
	+3%/-3%	+1%/-5%	+150%/-150%	+29%/-10%	+12%/-13%	+19%/-51%
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 004913858-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-10 \pm 2$	$0.75^{+0.41}_{-0.36}$	$1917^{+141}_{-86}$	$4083^{+1266}_{-595}$	$11^{+28}_{-7}$
Alt.	$4 \pm 2$	$1.01^{+0.42}_{-0.37}$	$1907^{+139}_{-87}$	$-3295^{+344}_{-514}$	$-2.447^{+1.516}_{-3.707}$

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

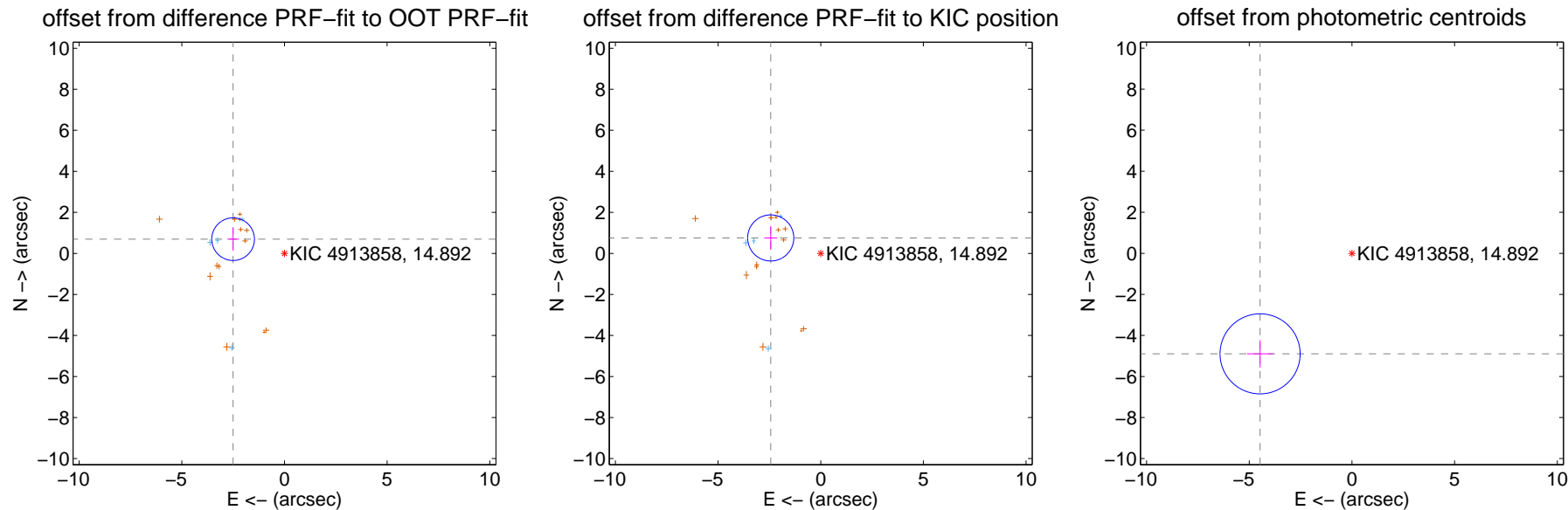
## DV Centroid Data

Supplemental centroid analysis for 004913858-01. Kepler magnitude: 14.89. Transit SNR 20.10

There are 4 quarters with good PRF difference image offsets

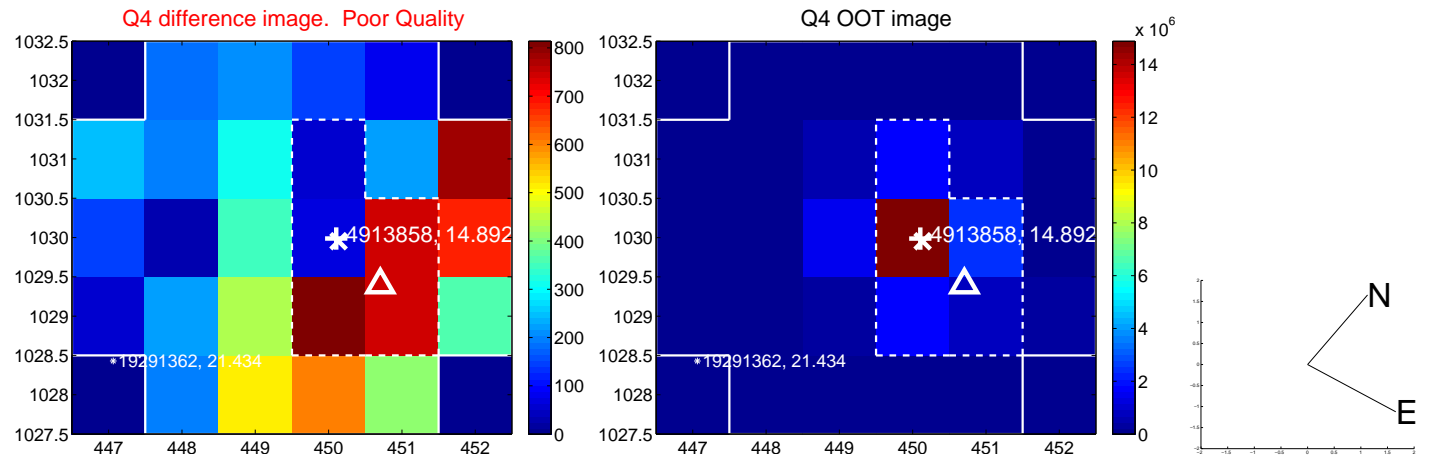
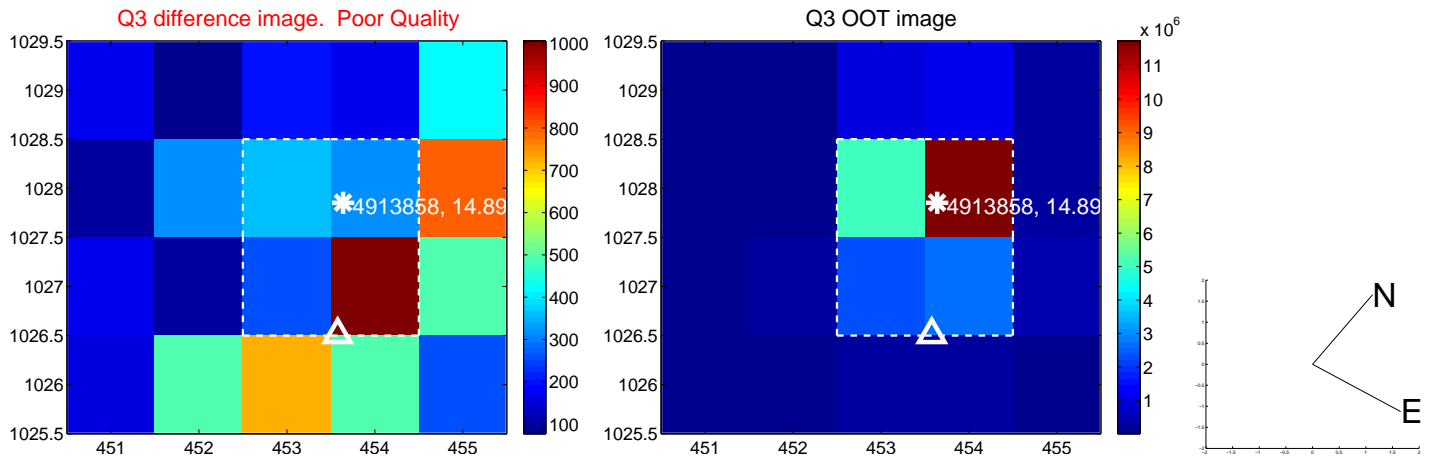
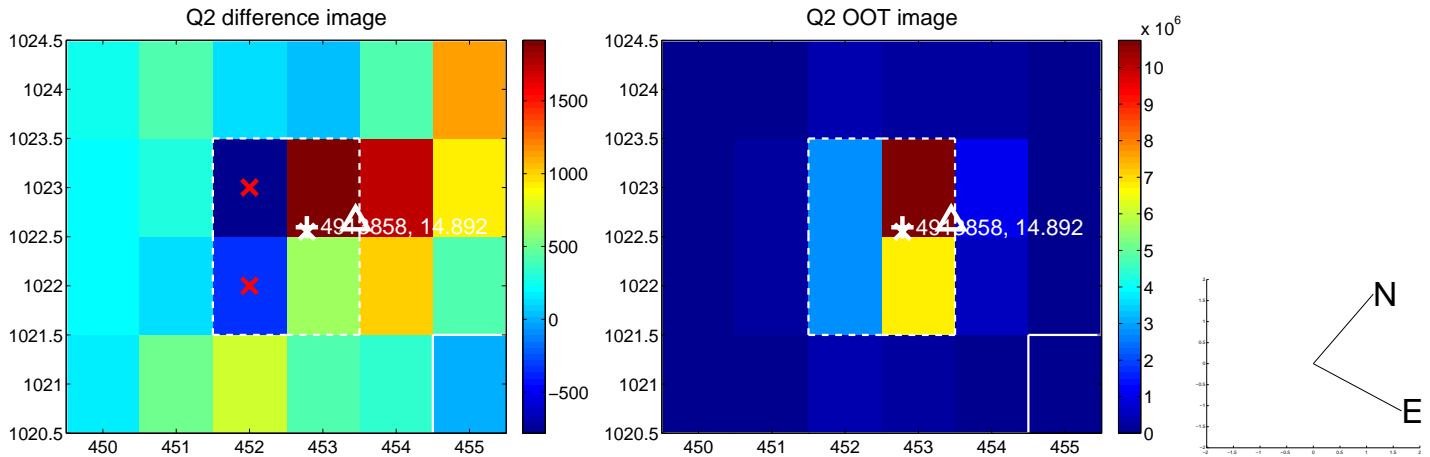
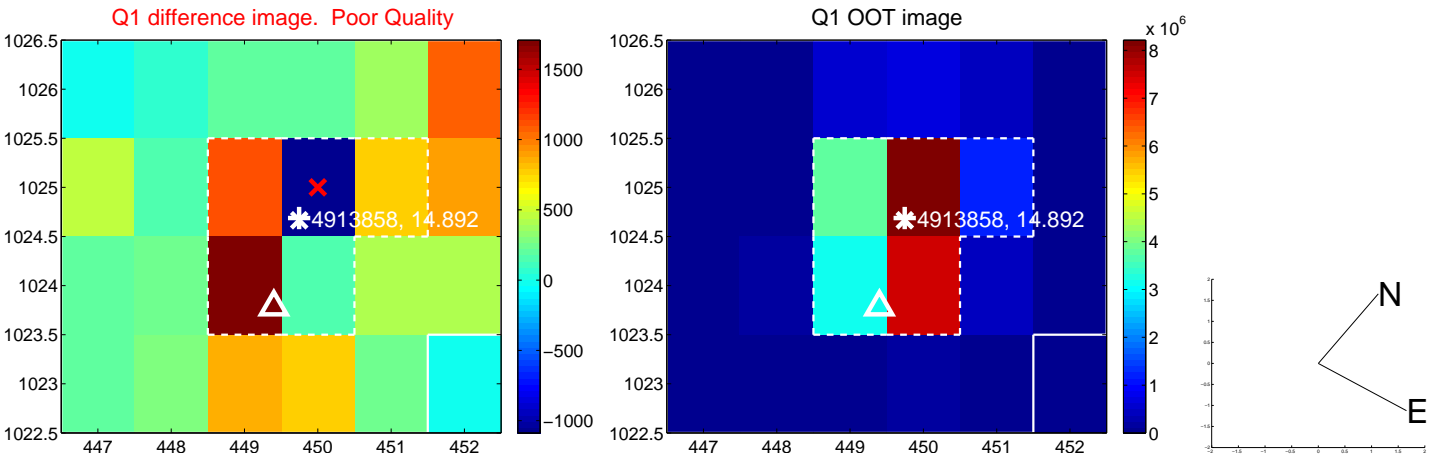
The direct PRF centroid is offset from the target star catalog position by about 0.07 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	<b><math>2.596 \pm 0.346</math></b>	<b>7.49</b>	$2.501 \pm 0.282$	$0.694 \pm 0.558$
PRF-fit source offset from KIC position	<b><math>2.549 \pm 0.375</math></b>	<b>6.80</b>	$2.435 \pm 0.317$	$0.754 \pm 0.580$
photometric centroid source offset	<b><math>6.63 \pm 0.65</math></b>	<b>10.20</b>	$4.47 \pm 0.63$	$-4.90 \pm 0.67$

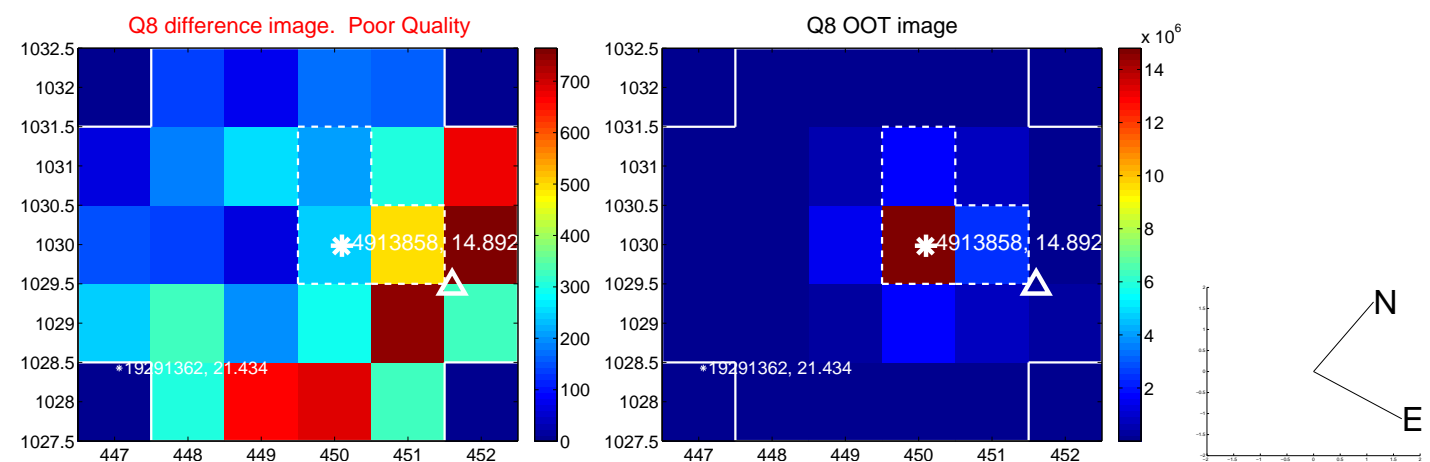
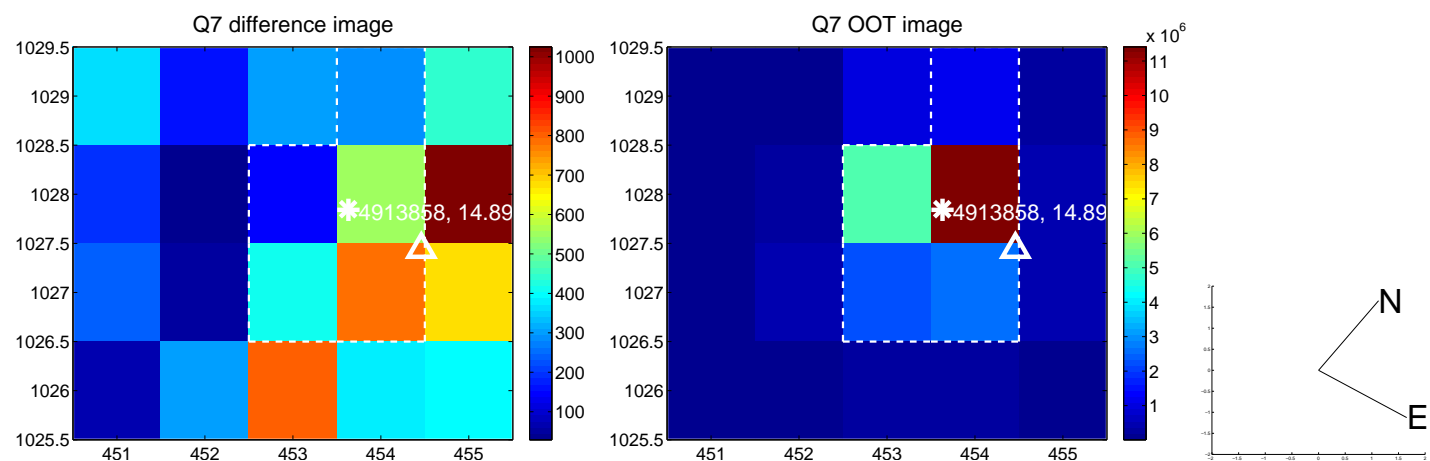
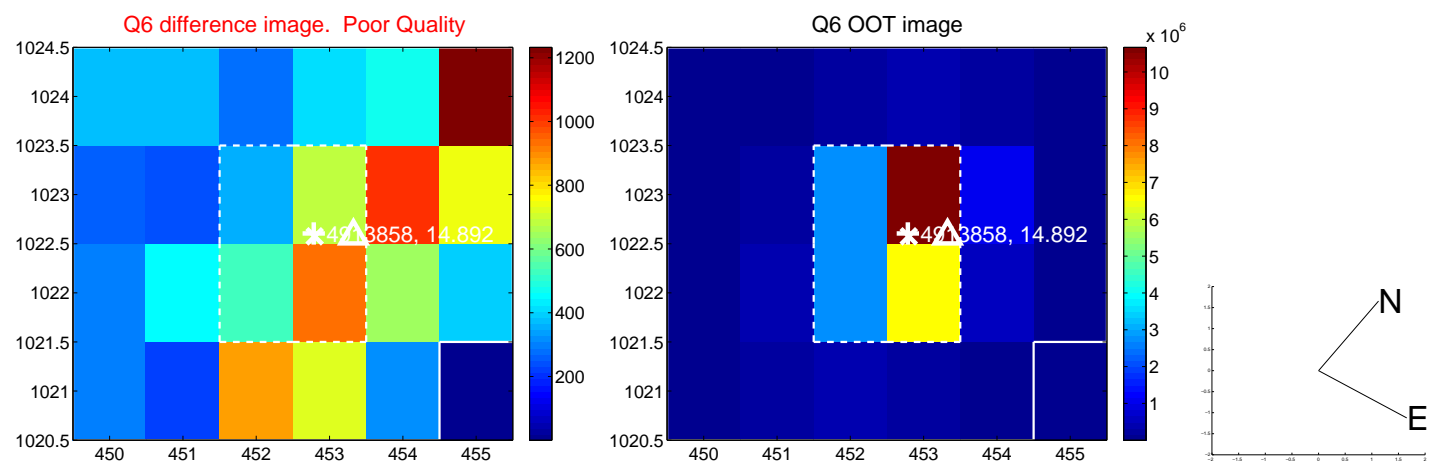
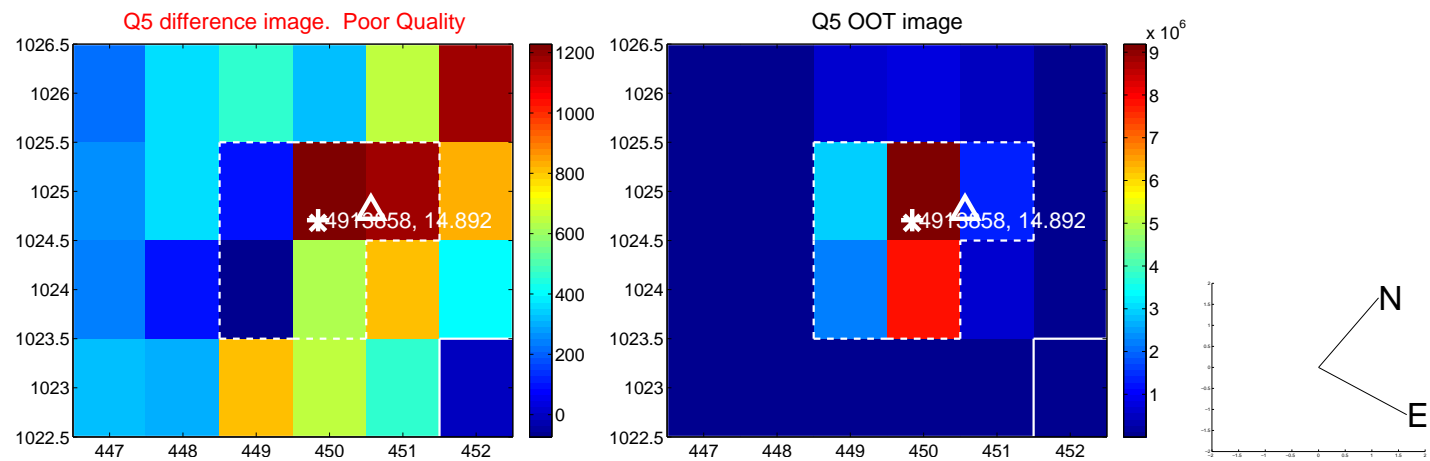


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets**; **Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

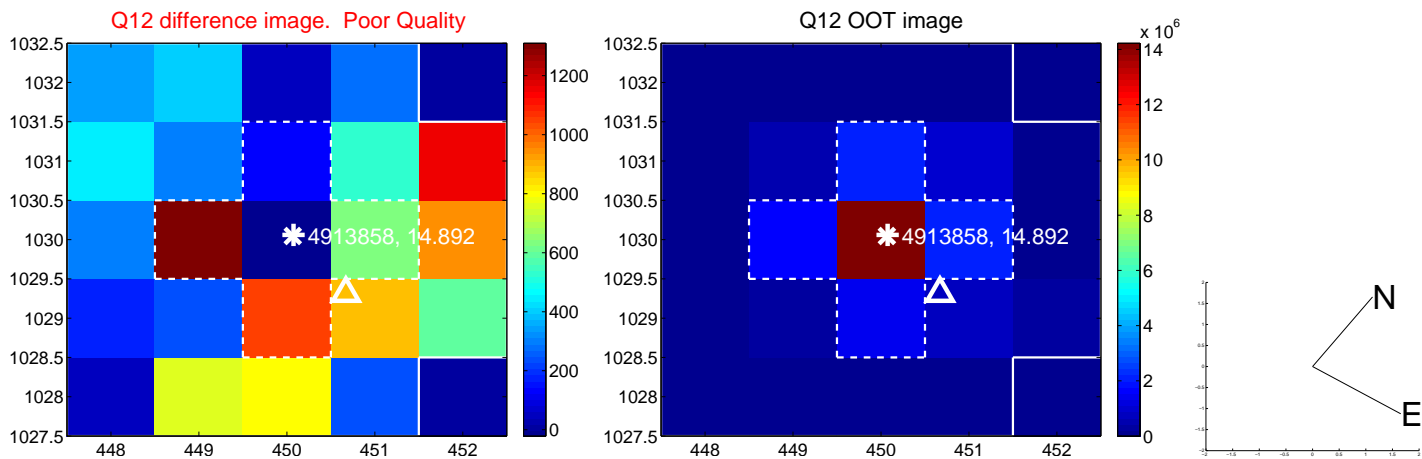
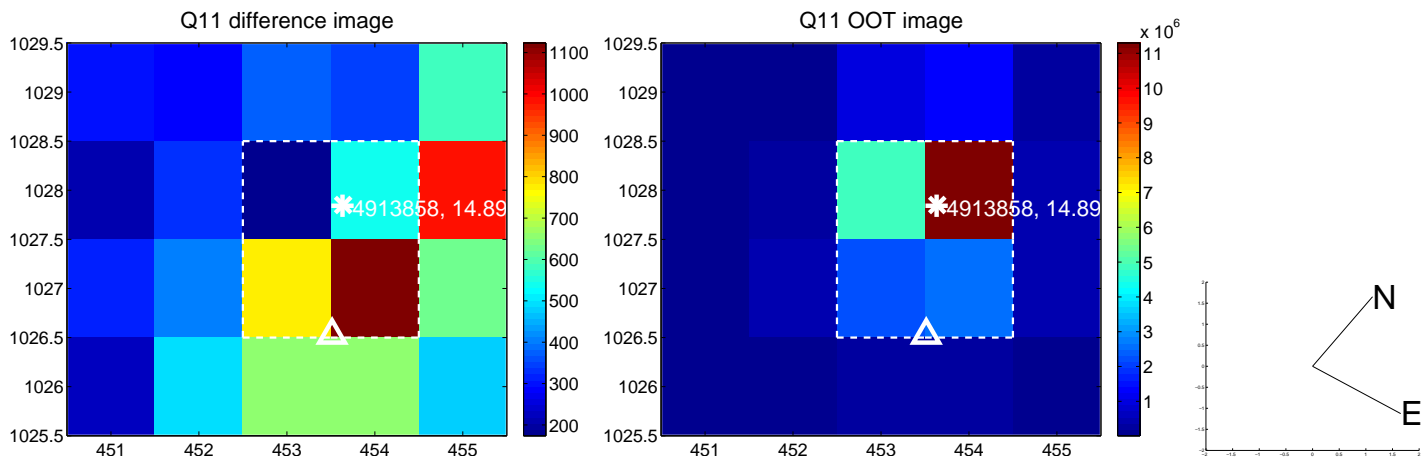
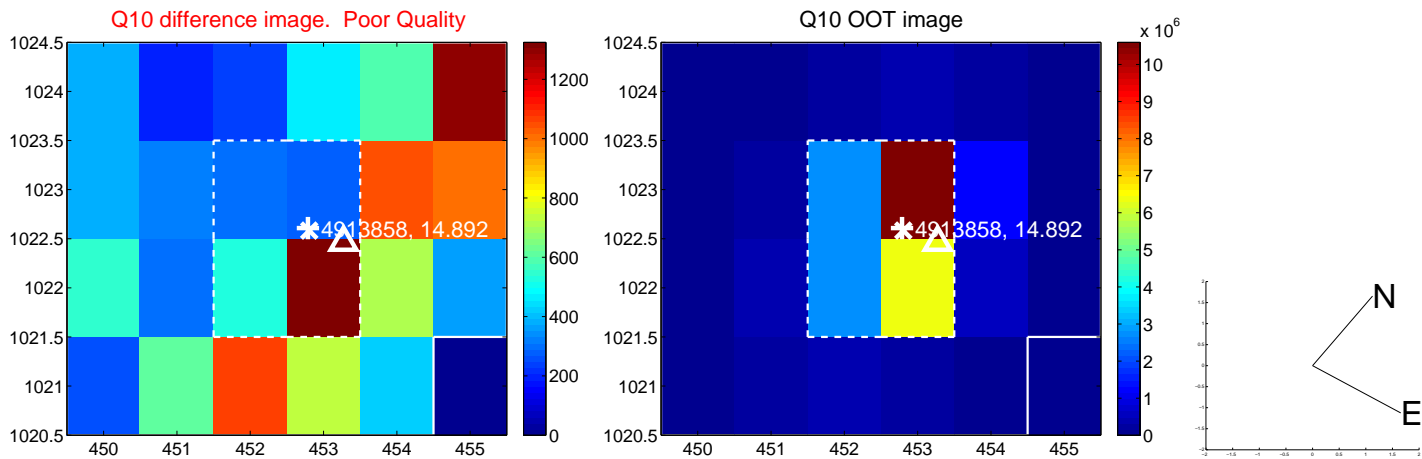
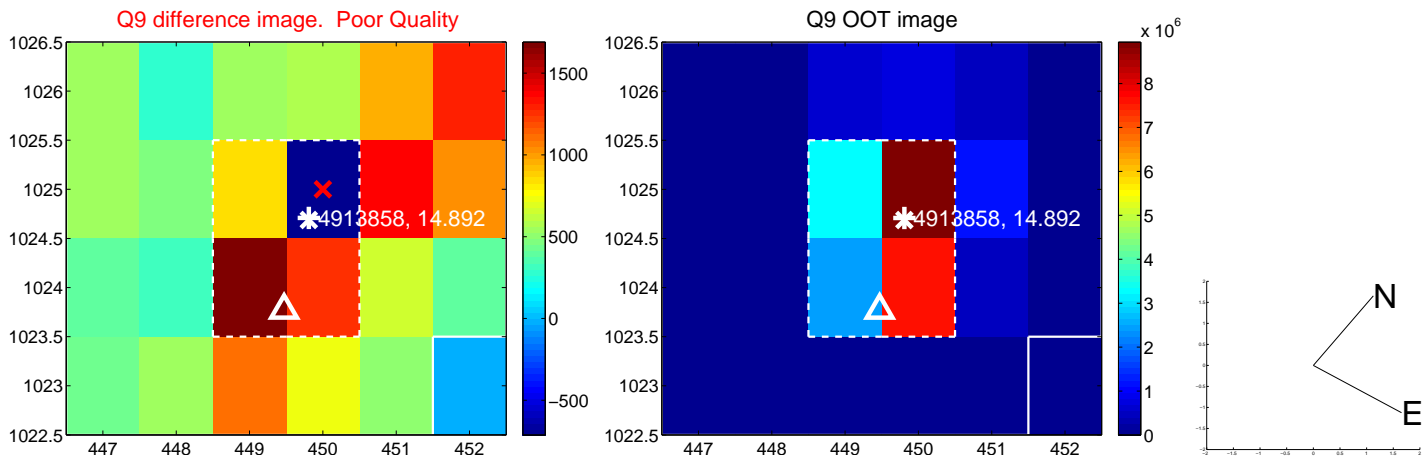


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

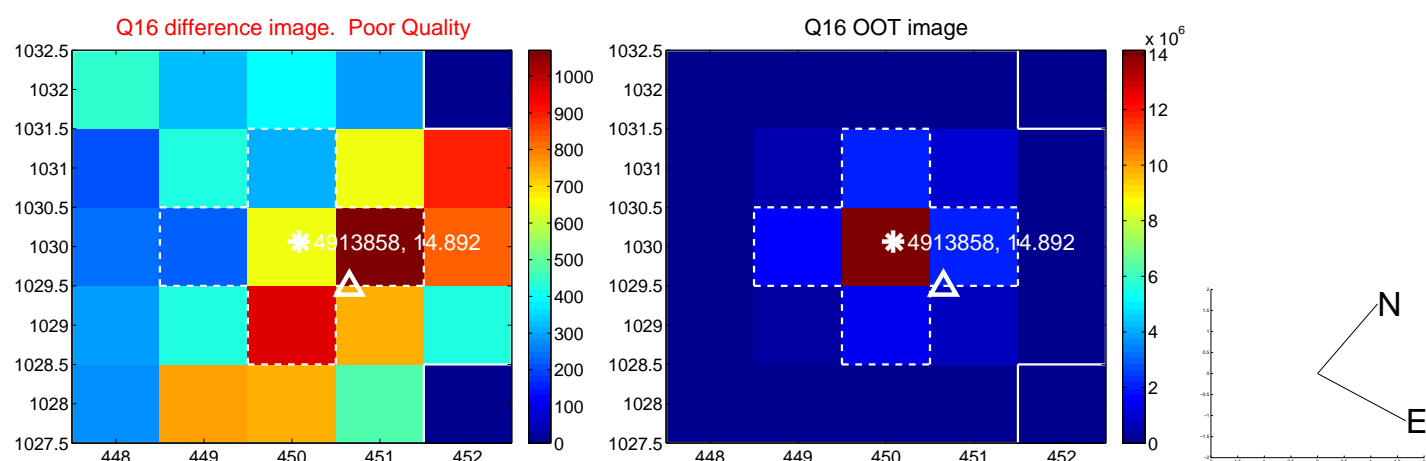
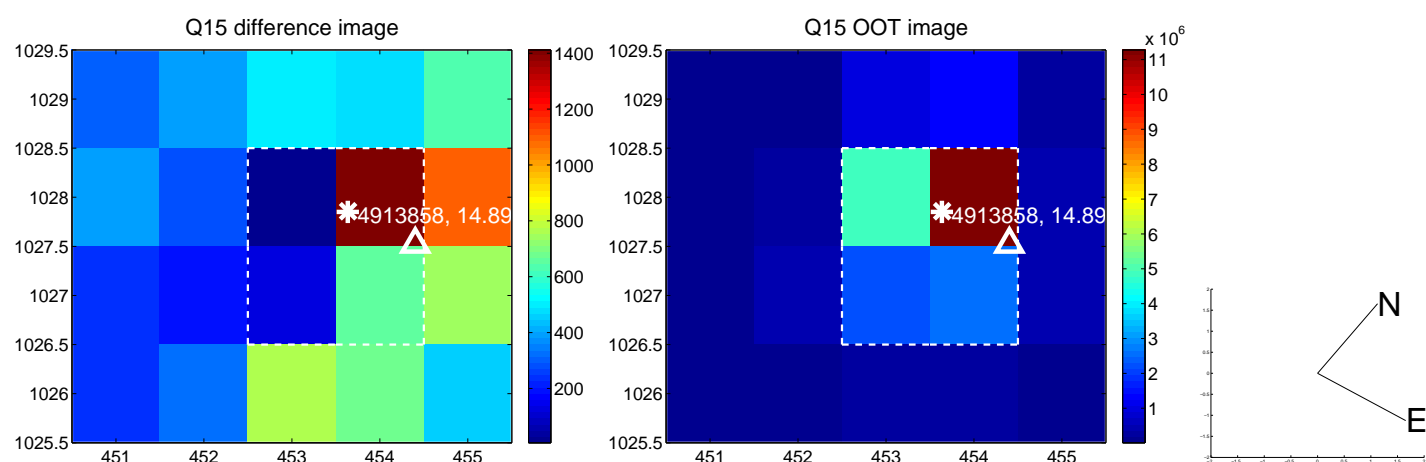
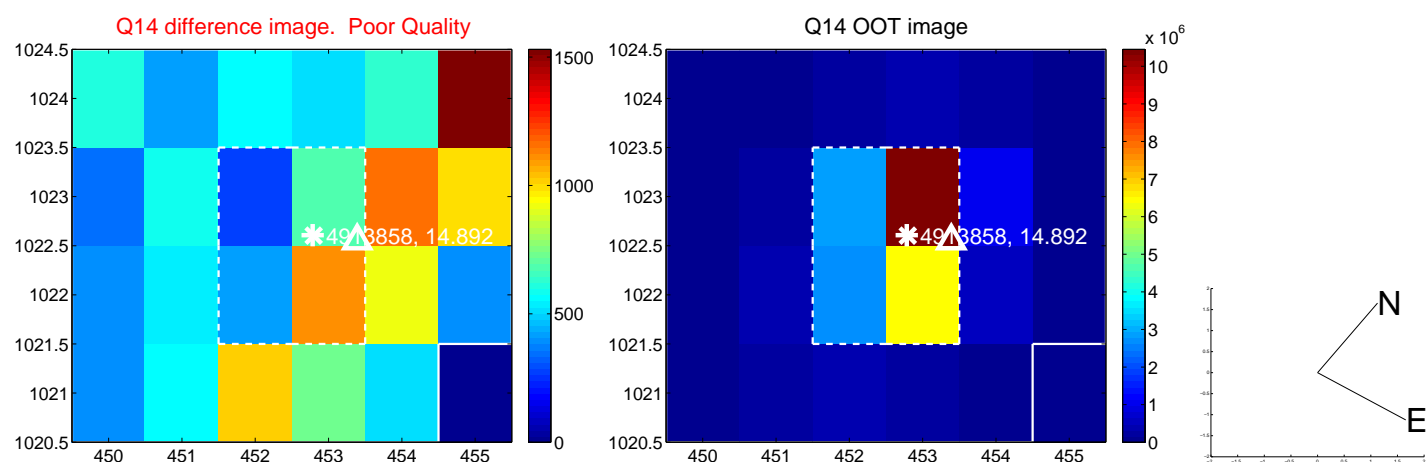
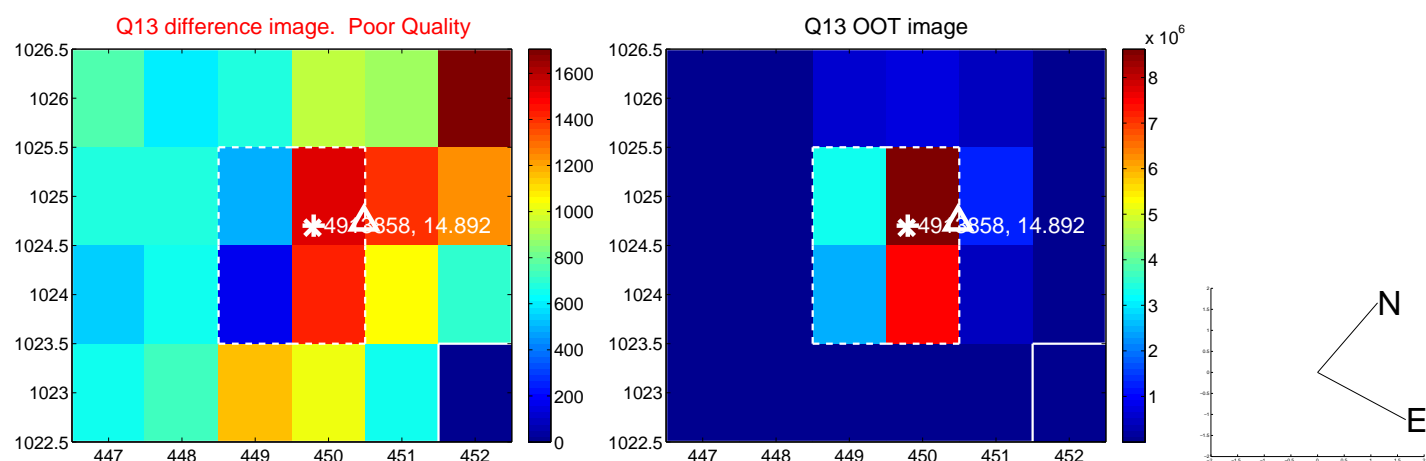




white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



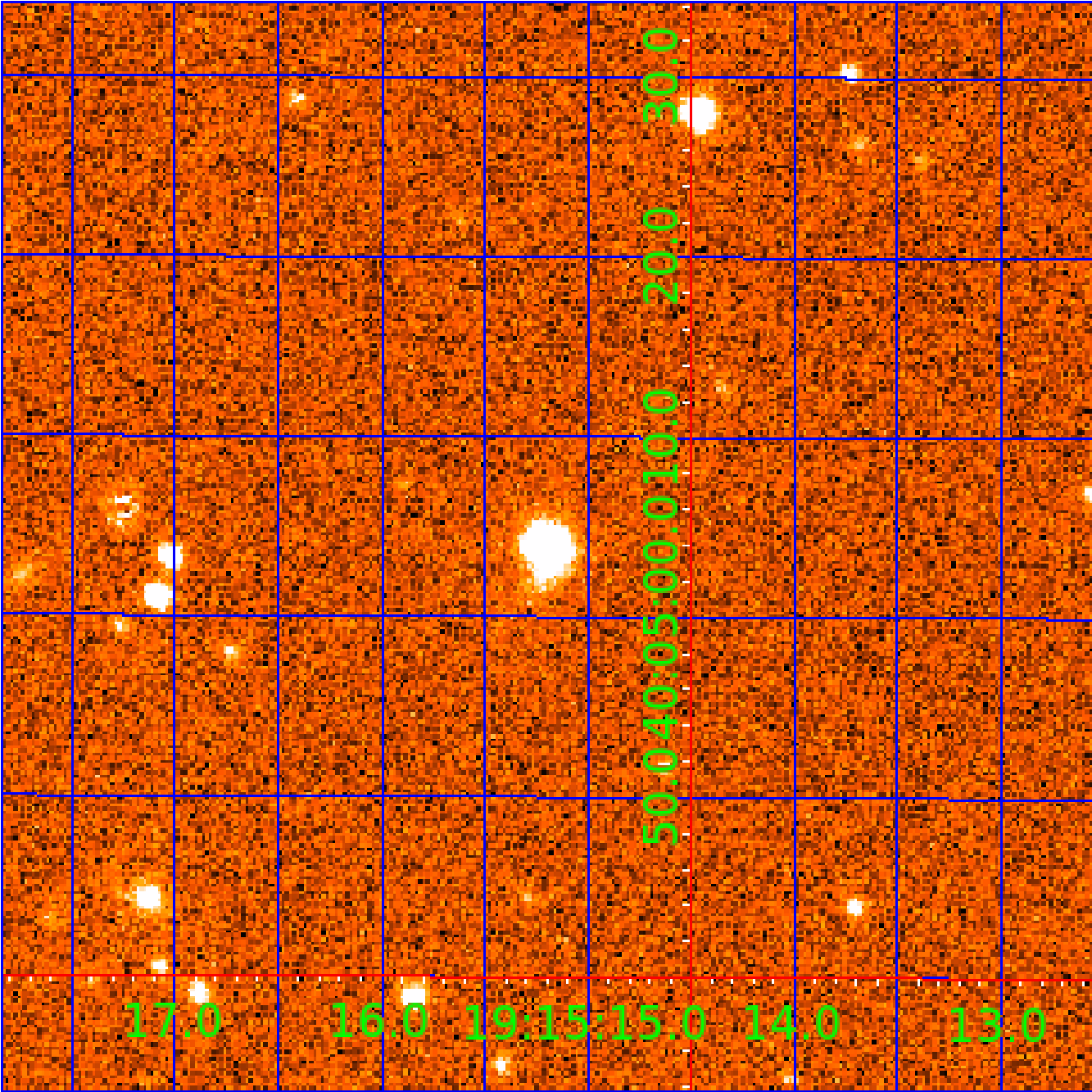
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.





UKIRT Image

Declination





# KIC 004913858

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
004913858-01	OBS	No	2.290546	133.177970	59.2	14.477	14.9	20.1	0.89	5926	0.70	763.20
004913858-02	OBS	No	74.519612	133.066460	512.3	2.189	8.5	8.1	0.89	5926	2.22	7.35

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004913858-01	OBS	FP	0.00	1	0	1	0	LPP_DV—CENT_UNRESOLVED_OFFSET
004913858-02	OBS	FP	0.00	1	0	1	0	TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_MEAS—HALO_GHOST

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

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

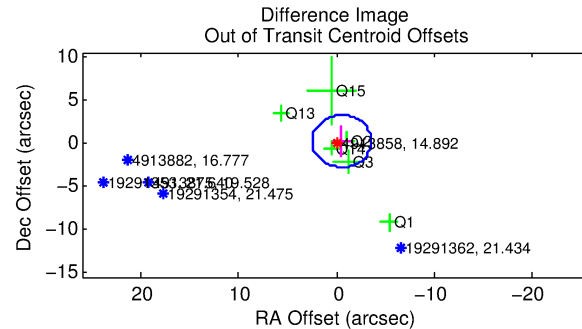
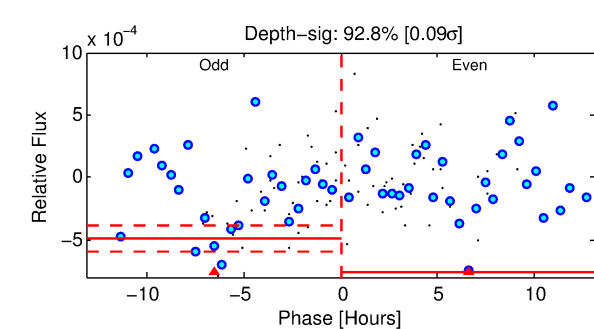
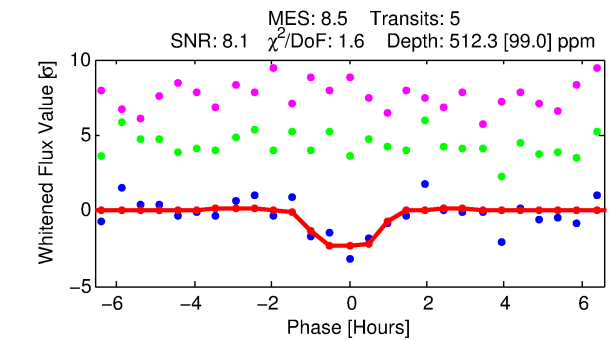
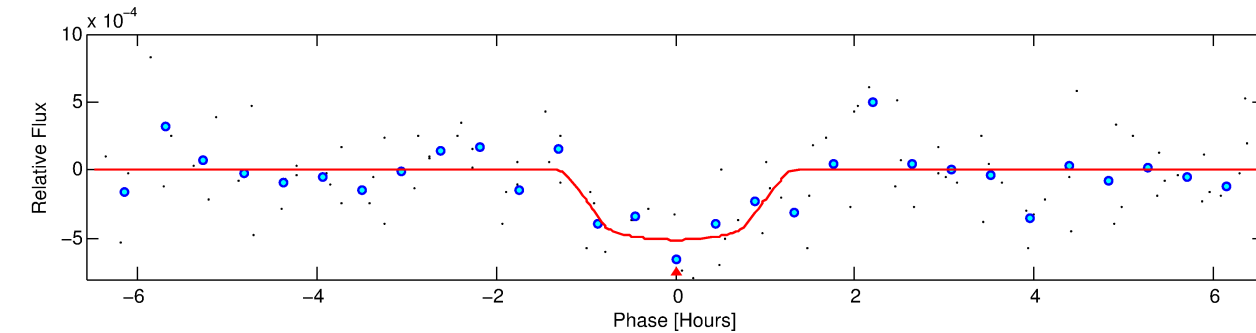
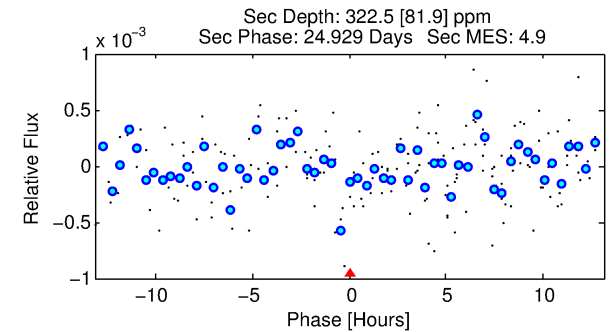
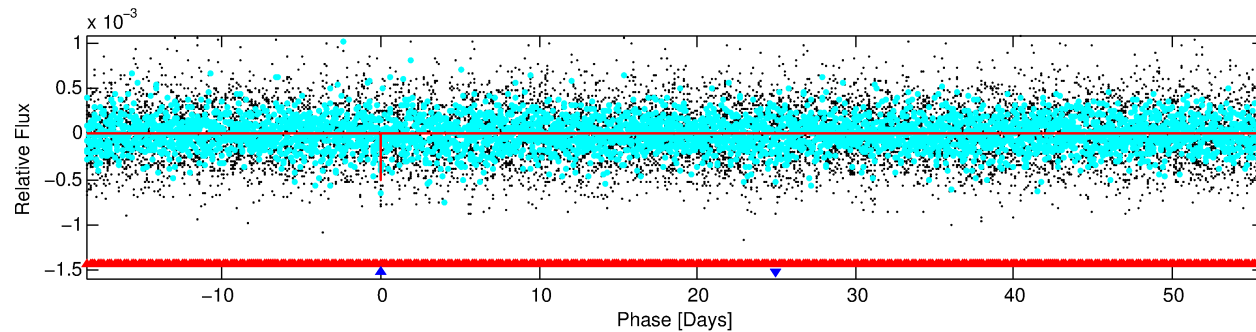
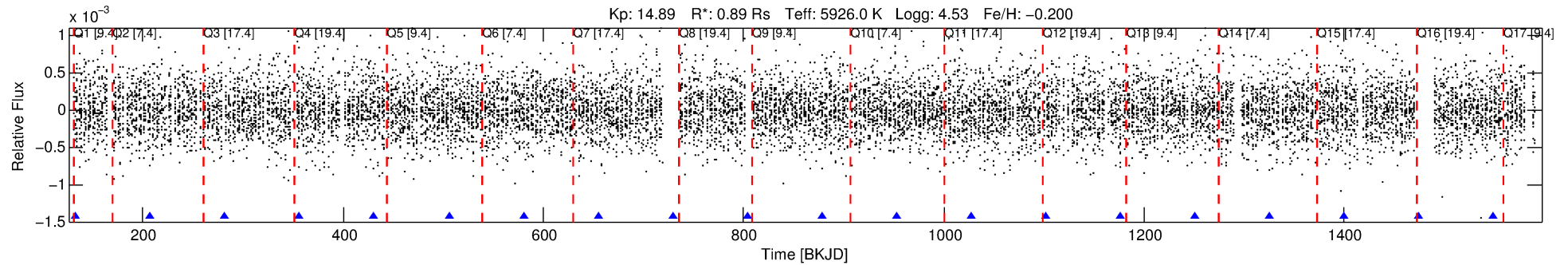
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 004913858-02

No Significant Match Found

# DV One-Page Summary

KIC: 4913858 Candidate: 2 of 2 Period: 74.520 d



## DV Fit Results:

Period = 74.51961 [0.00076] d  
Epoch = 133.0665 [0.0072] BKJD  
Rp/R\* = 0.0229 [0.0579]  
a/R\* = 168.03 [2010.94]  
b = 0.79 [5.73]  
Seff = 7.35 [2.85]  
Teq = 420 [41] K  
Rp = 2.22 [5.64] Re  
a = 0.3439 [0.0859] AU  
Ag = 4256.51 [21559.17] [0.20 $\sigma$ ]  
Teffp = 5243 [6623] K [0.73 $\sigma$ ]

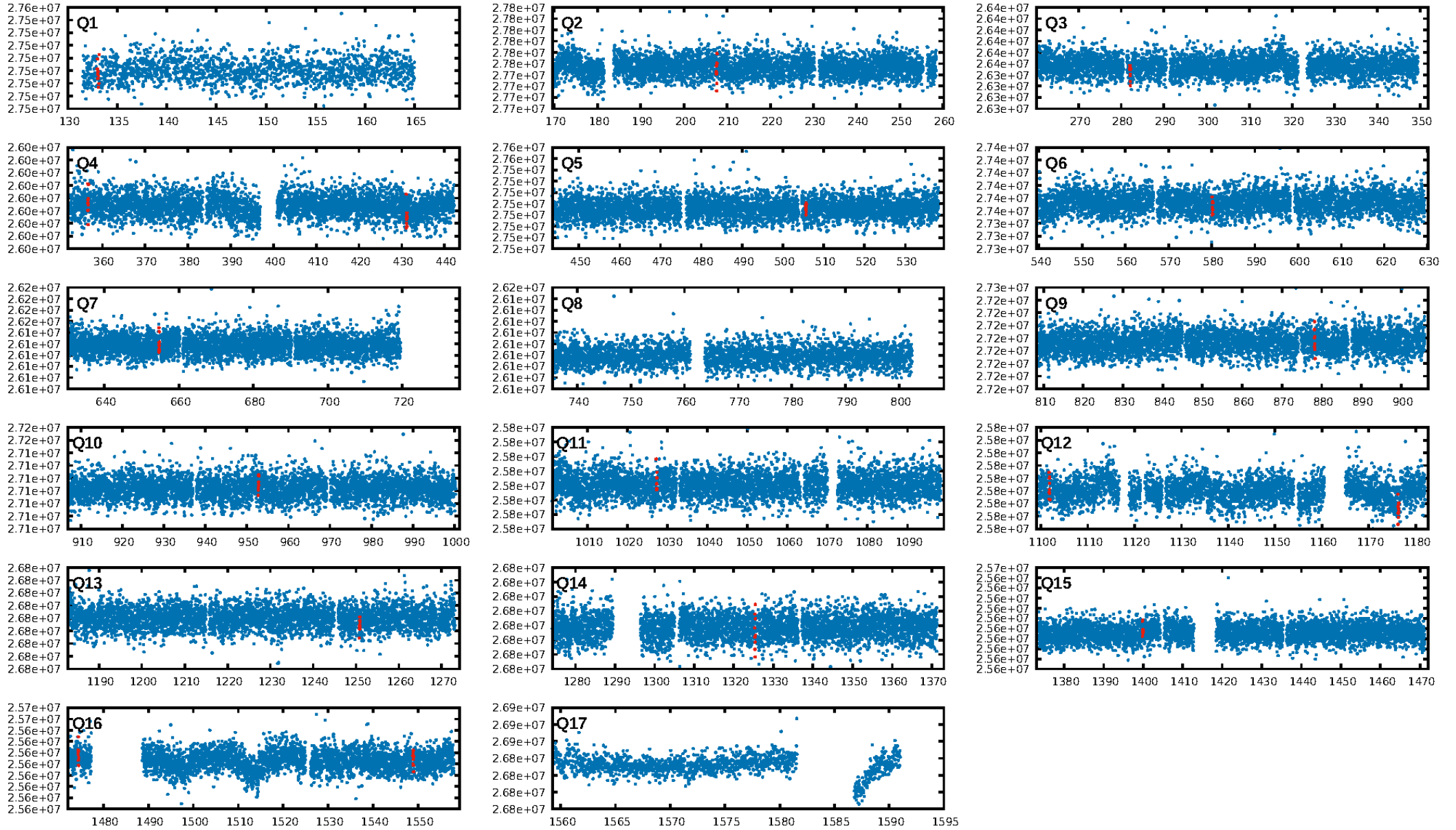
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [118.40 $\sigma$ ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 39.2%  
ModelChiSquareGof-sig: 85.8%  
**Bootstrap-pfa: 6.65e-09**  
RollingBand-fgt: 1.00 [5/5]  
**GhostDiagnostic-chr: 0.1346**  
Centroid-sig: 0.2%  
Centroid-so: 2.580 arcsec [2.35 $\sigma$ ]  
OotOffset-rm: 0.574 arcsec [0.57 $\sigma$ ]  
KicOffset-rm: 0.718 arcsec [0.72 $\sigma$ ]  
OotOffset-st: 2/2/0/2 [6]  
KicOffset-st: 2/2/0/2 [6]  
DiffImageQuality-fgm: 0.33 [2/6]  
DiffImageOverlap-fno: 0.46 [6/13]

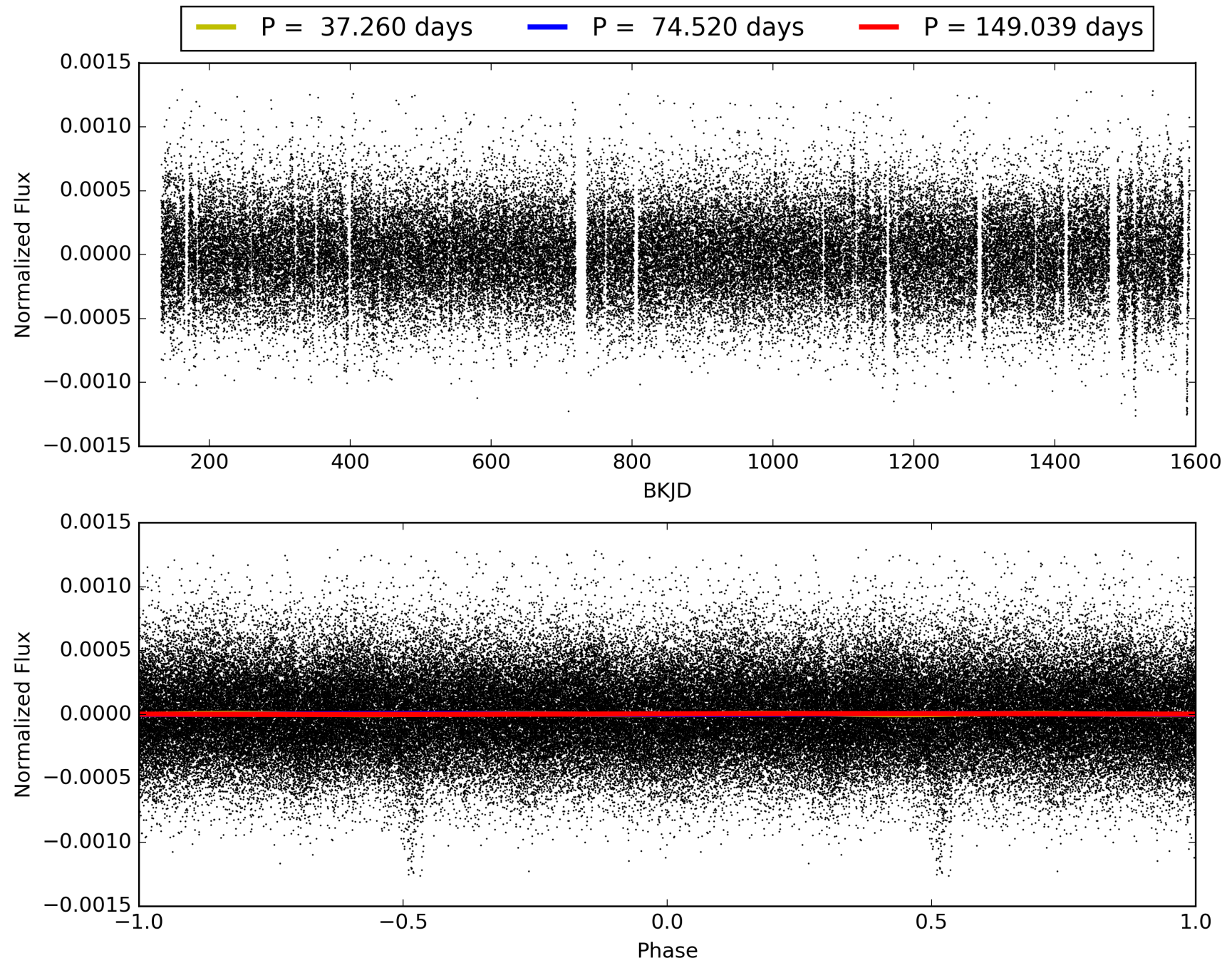
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 22:48:55 Z

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

# TCE 004913858-02, PDC Light Curves

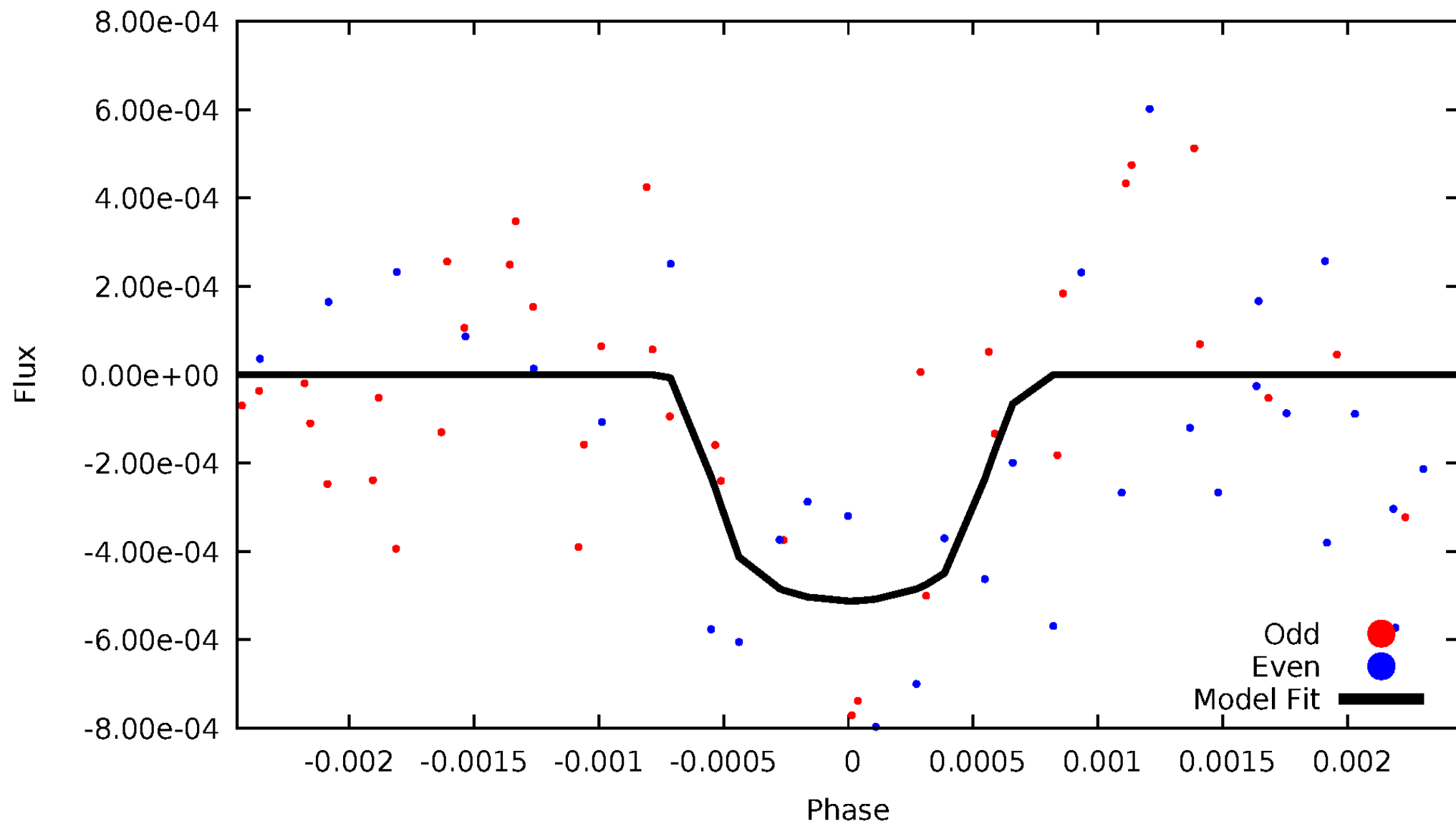


# TCE 004913858-02



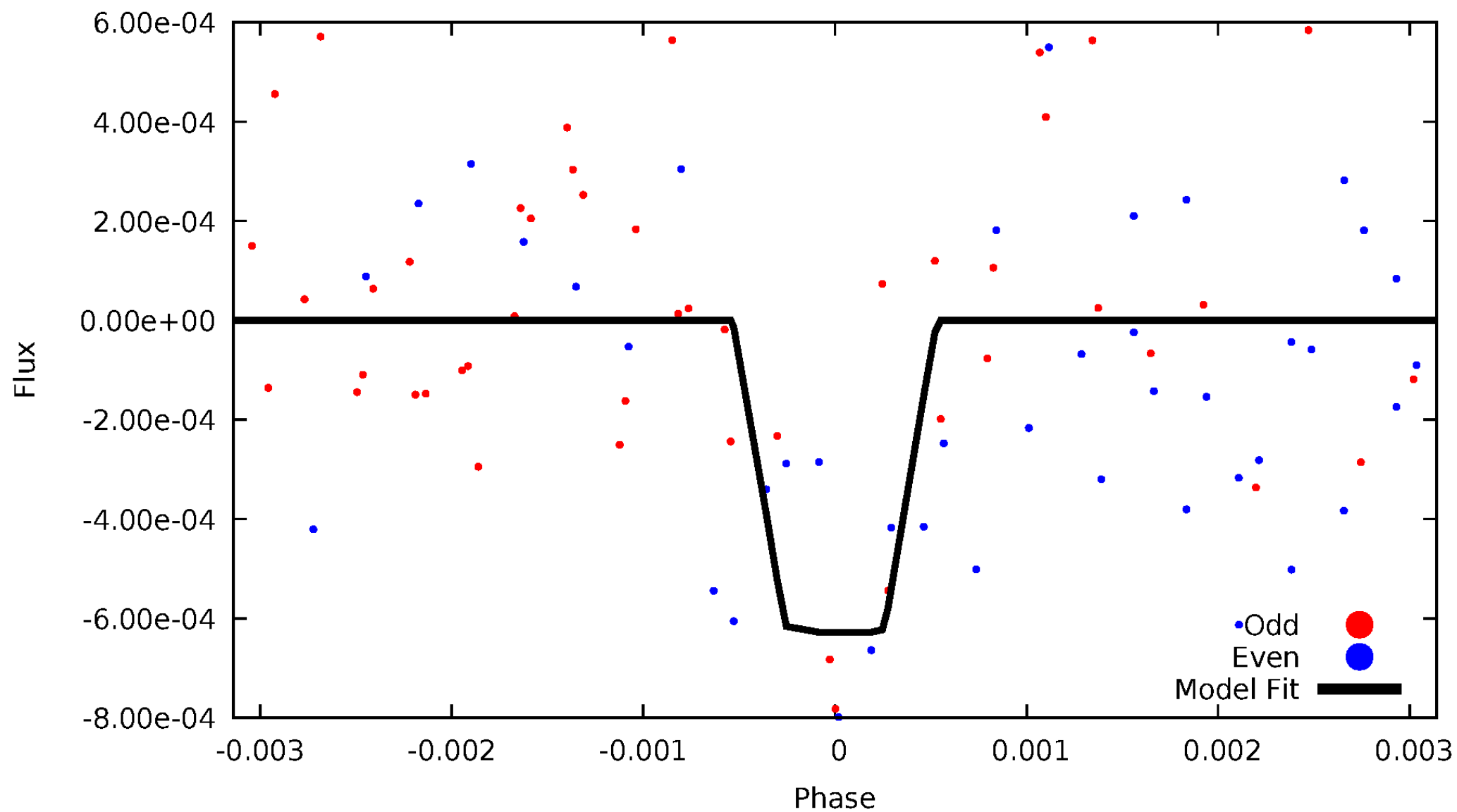
# DV Odd/Even

TCE 004913858-02



# ALT Odd/Even

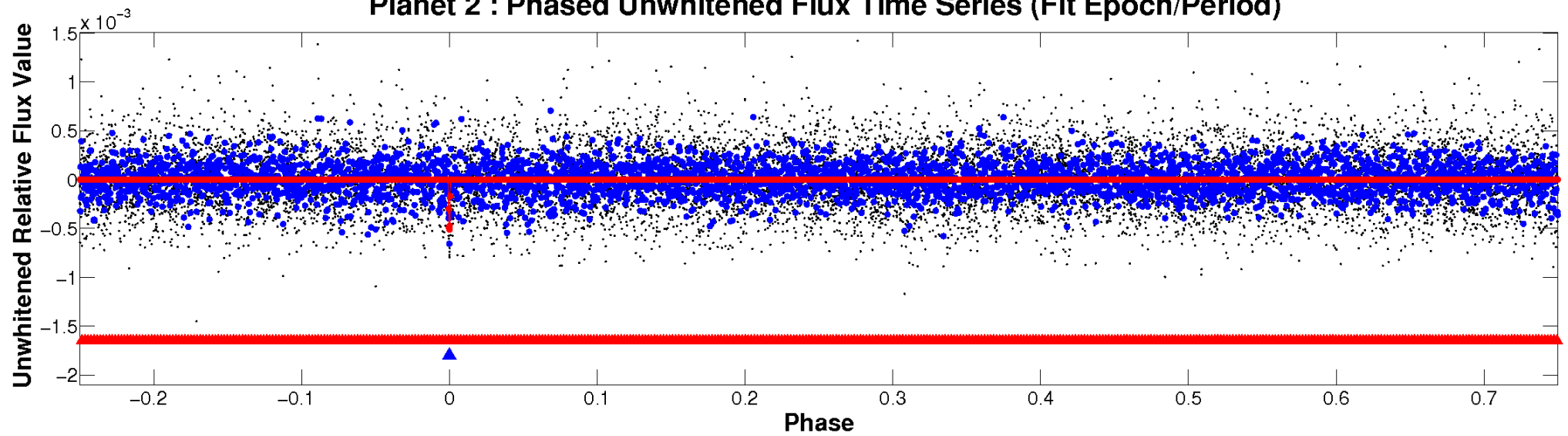
TCE 004913858-02



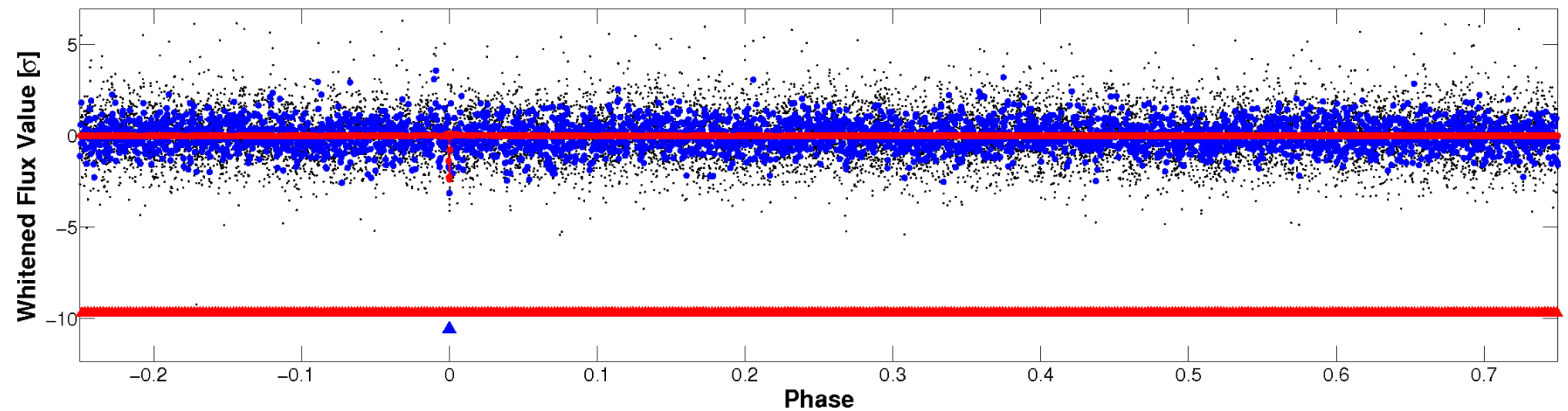


# Non-Whitened Vs. Whitened Light Curve

**Planet 2 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)**

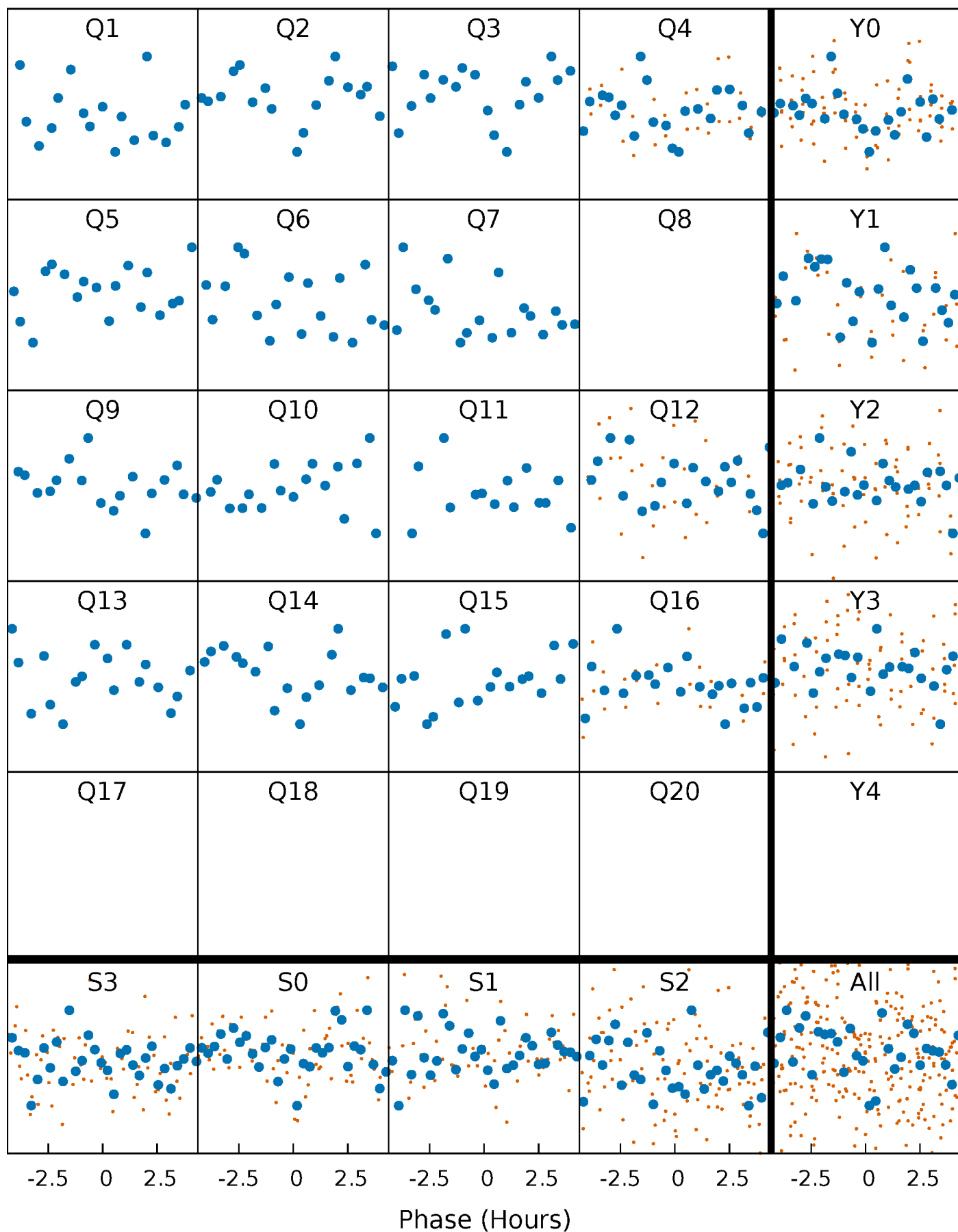


**Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



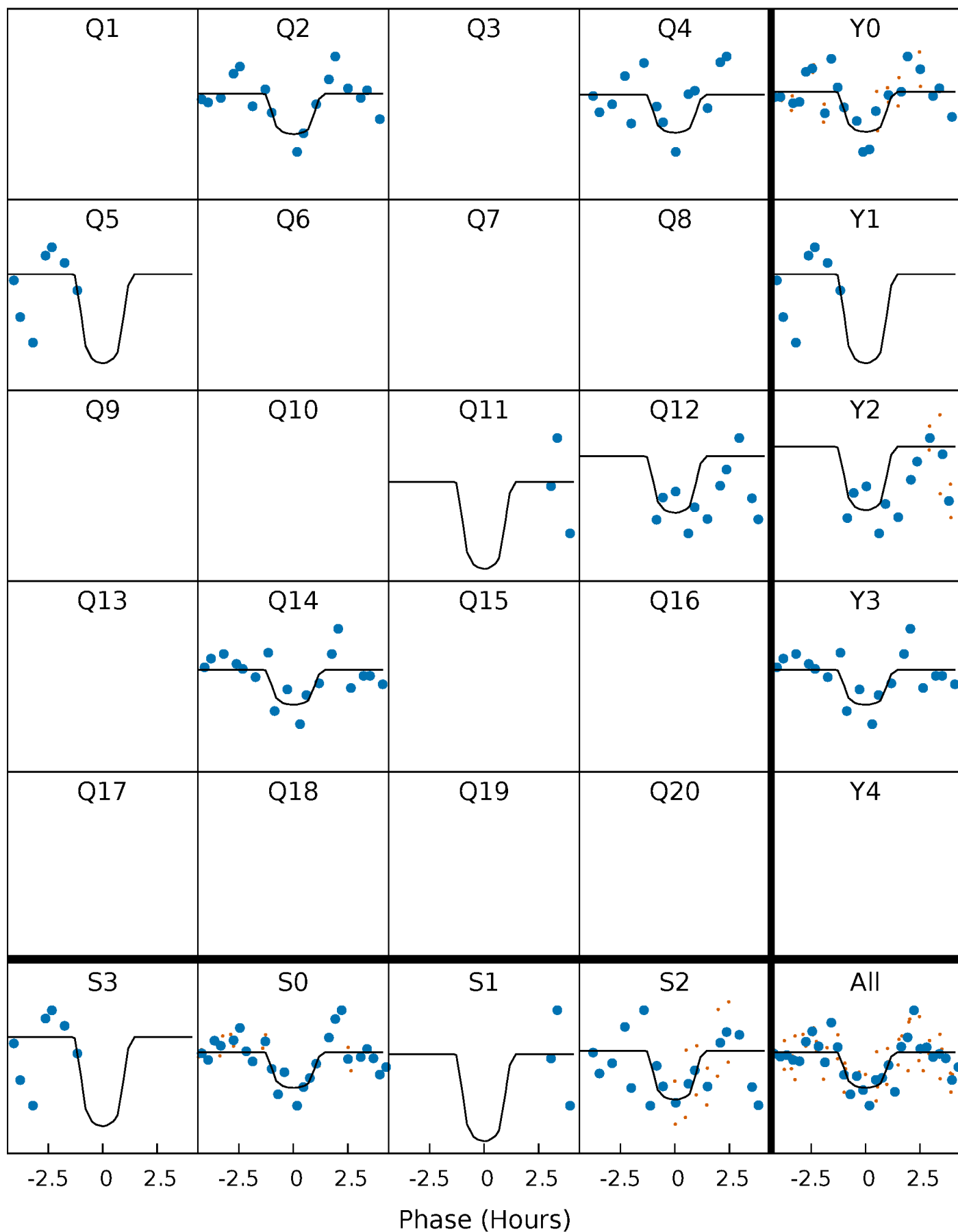
# PDC Quarter-Phased Transit Curves

TCE 004913858-02   P= 74.519612 Days    $T_0=133.066460$  (BKJD)



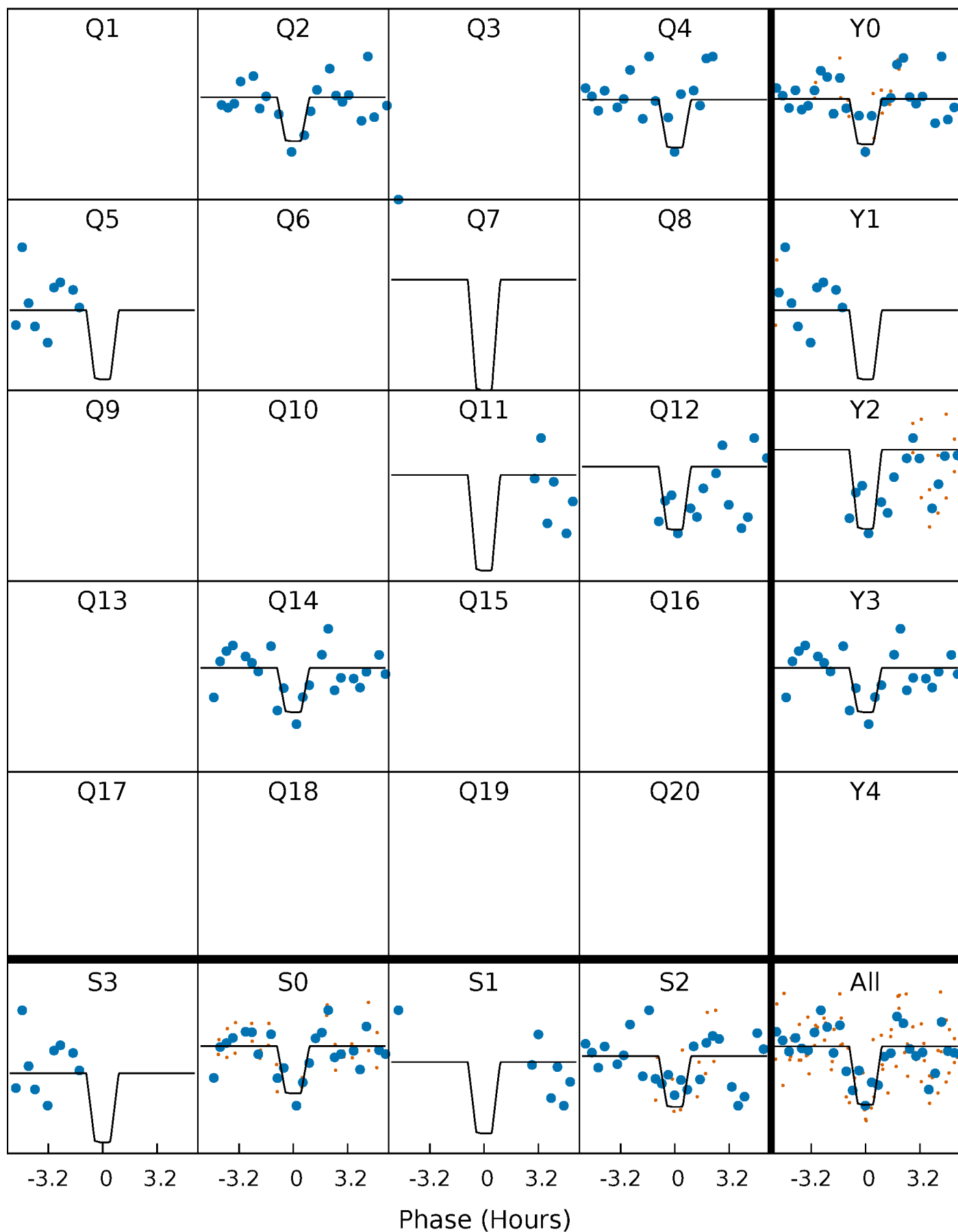
# DV Quarter-Phased Transit Curves

TCE 004913858-02 P= 74.519612 Days  $T_0=133.066460$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

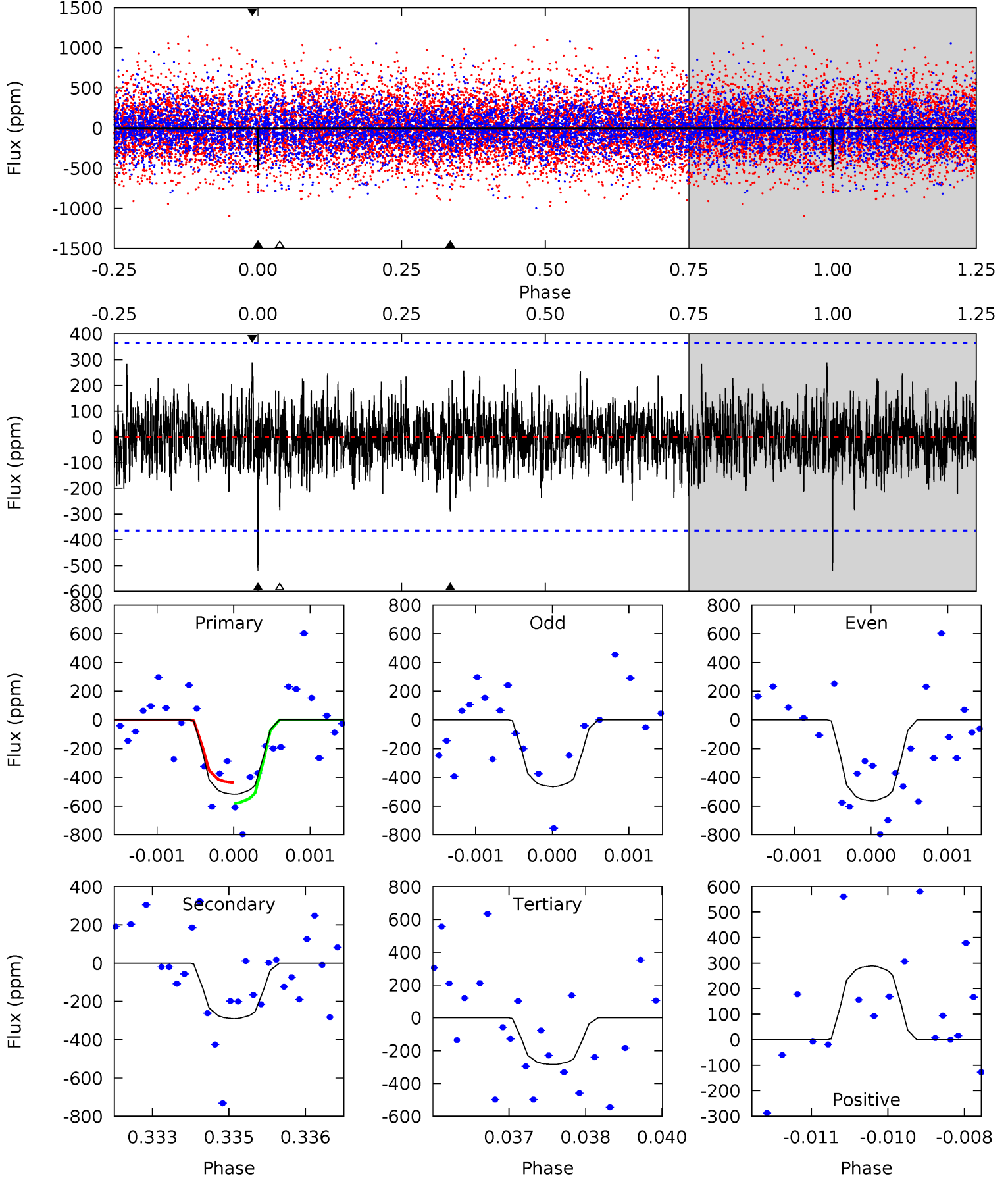
TCE 004913858-02 P= 74.519893 Days  $T_0=133.068729$  (BKJD)



# DV Model-Shift Uniqueness Test

004913858-02, P = 74.519612 Days, E = 58.546848 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
7.68	4.30	4.21	4.28	5.39	3.20	1.19	3.47	3.40	0.08	0.01	0.73	0.93	0.36	1.06

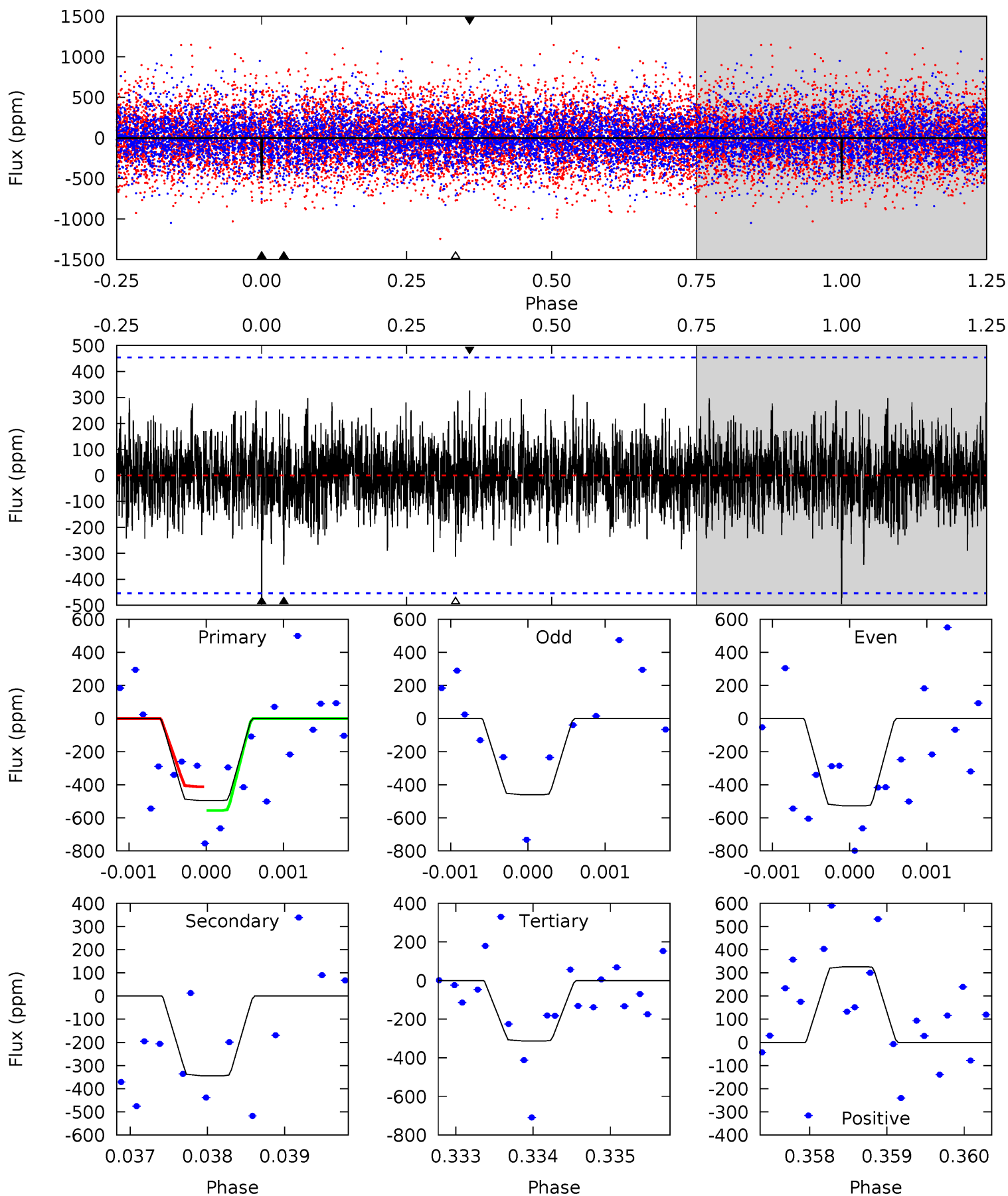




# Alt Model-Shift Uniqueness Test

004913858-02, P = 74.519893 Days, E = 58.548836 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
5.97	4.14	3.76	3.93	5.47	3.32	1.10	2.21	2.04	0.38	0.21	0.41	0.97	0.40	0.81



### Stellar Parameters For KIC 004913858

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5926^{+160}_{-178}$	$4.532^{+0.048}_{-0.204}$	$-0.200^{+0.300}_{-0.300}$	$0.887^{+0.259}_{-0.086}$	$0.978^{+0.119}_{-0.131}$	$1.971^{+0.384}_{-0.999}$
	+3%/-3%	+1%/-5%	+150%/-150%	+29%/-10%	+12%/-13%	+19%/-51%
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 004913858-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-290 \pm 68$	$4.83^{+4.98}_{-3.37}$	$600^{+40}_{-26}$	$3876^{+2655}_{-769}$	$762^{+7561}_{-576}$
Alt.	$-344 \pm 83$	$4.92^{+4.90}_{-3.43}$	$598^{+43}_{-29}$	$3974^{+2523}_{-803}$	$901^{+8149}_{-675}$

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

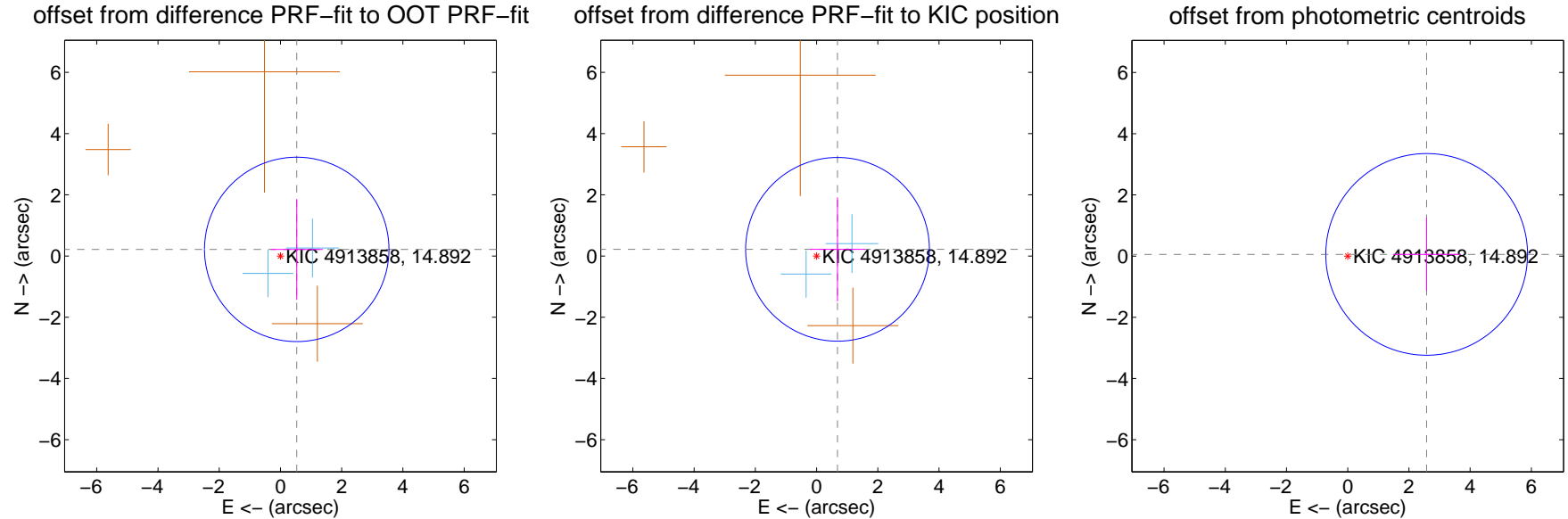
## DV Centroid Data

Supplemental centroid analysis for 004913858-02. Kepler magnitude: 14.89. Transit SNR 8.05

There are 2 quarters with good PRF difference image offsets

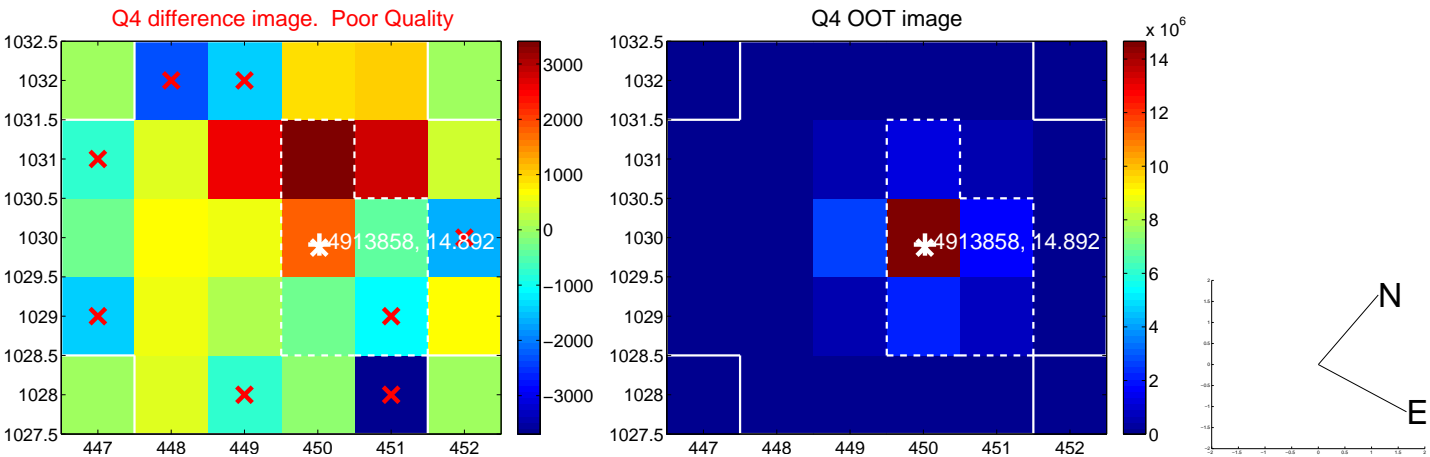
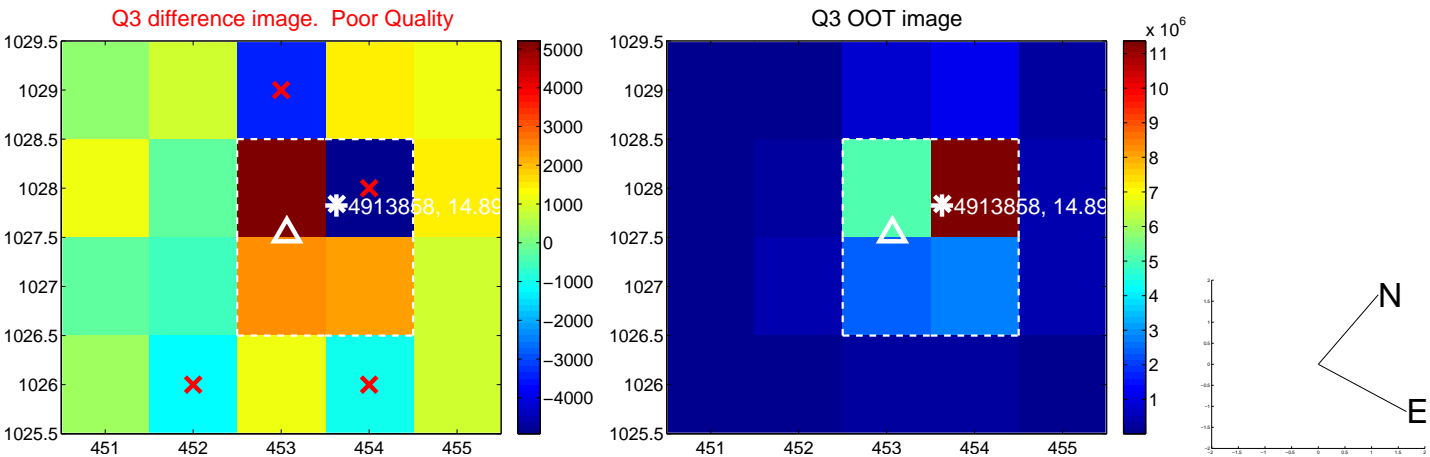
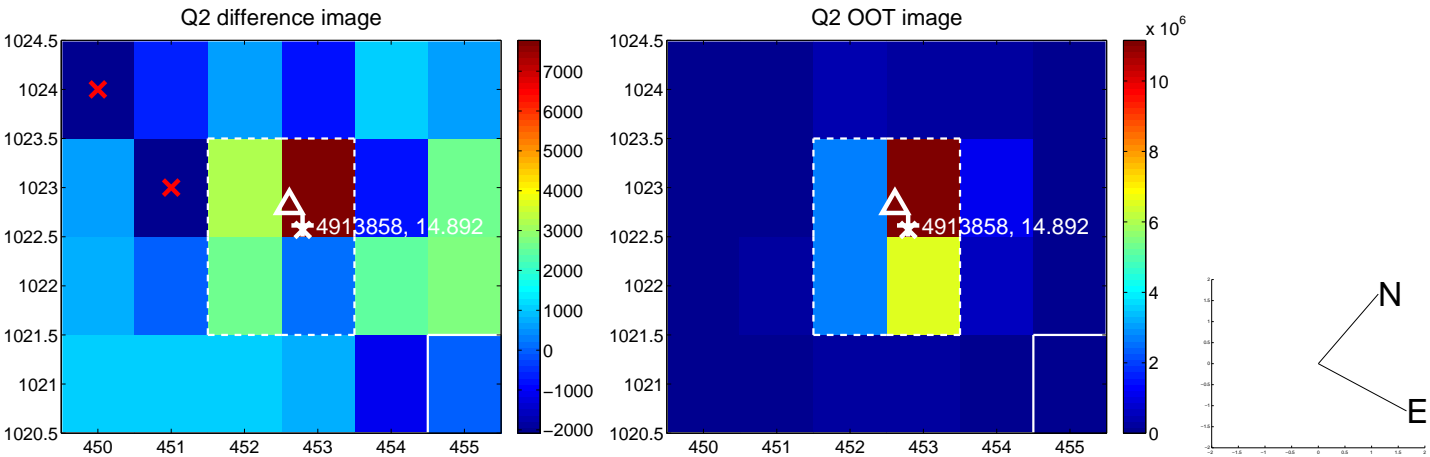
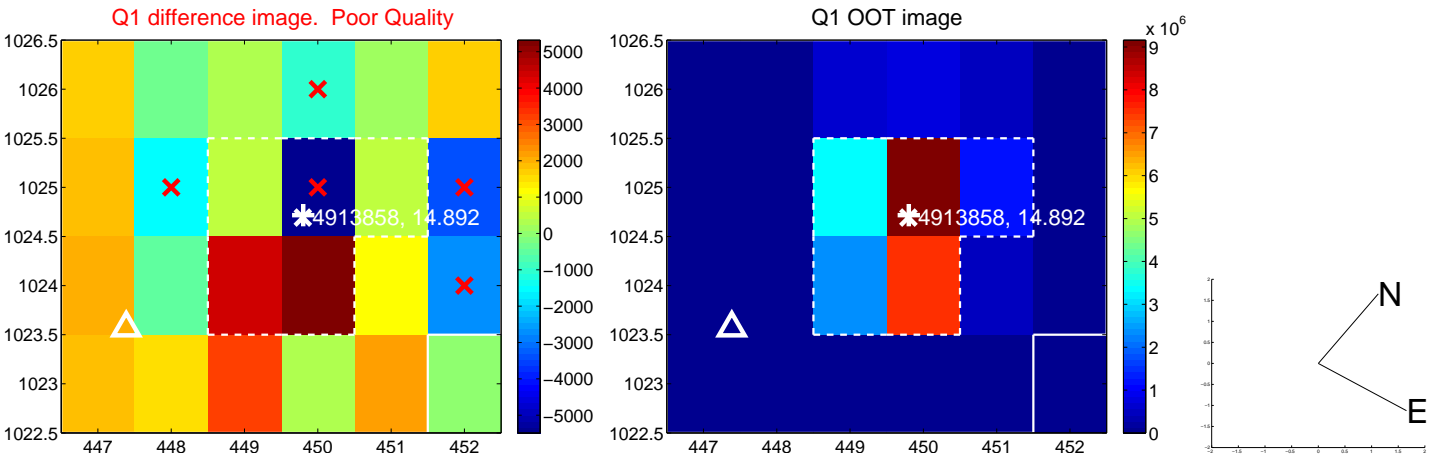
The direct PRF centroid is offset from the target star catalog position by about 0.11 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.574 \pm 1.004$	0.57	$-0.532 \pm 0.852$	$0.216 \pm 1.648$
PRF-fit source offset from KIC position	$0.718 \pm 1.000$	0.72	$-0.684 \pm 0.899$	$0.218 \pm 1.700$
photometric centroid source offset	$2.58 \pm 1.10$	2.35	$-2.58 \pm 1.10$	$0.06 \pm 1.20$



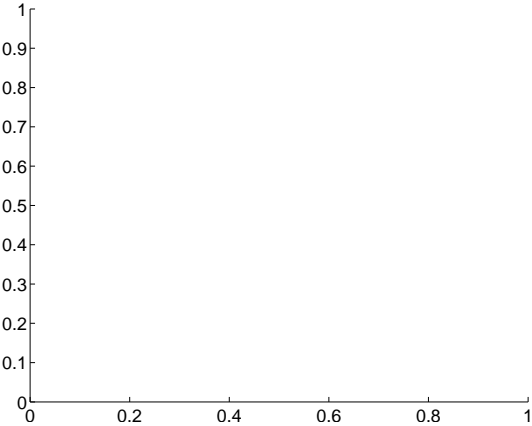
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

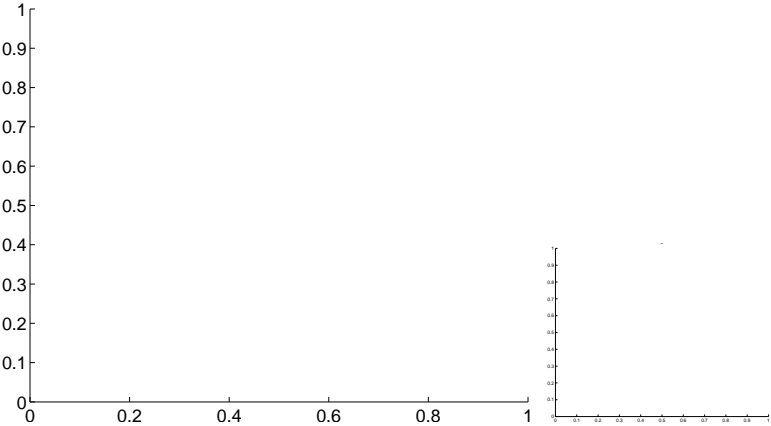


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

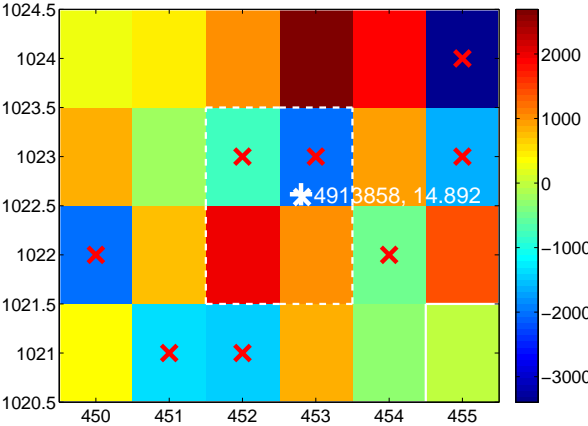
Q5 no difference image



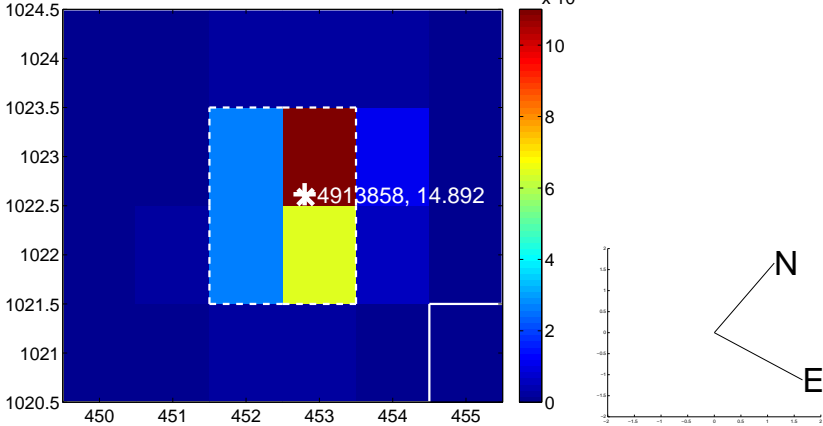
Q5 no OOT image



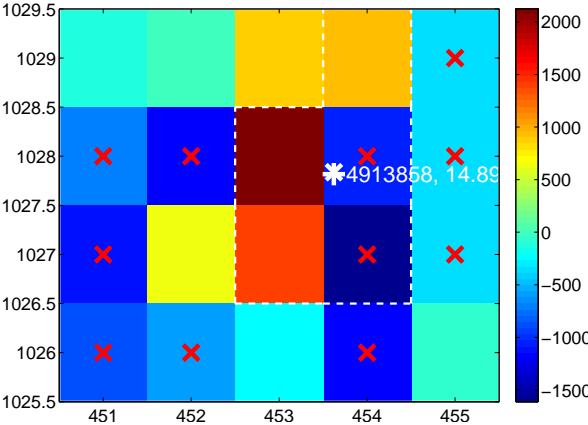
Q6 difference image. Poor Quality



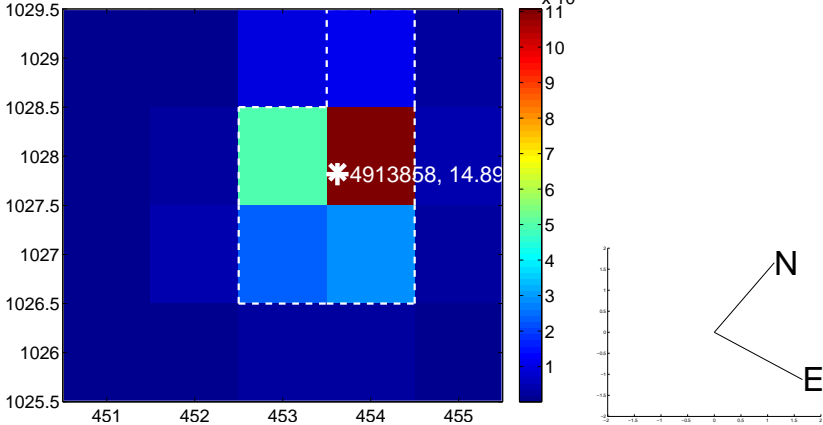
Q6 OOT image



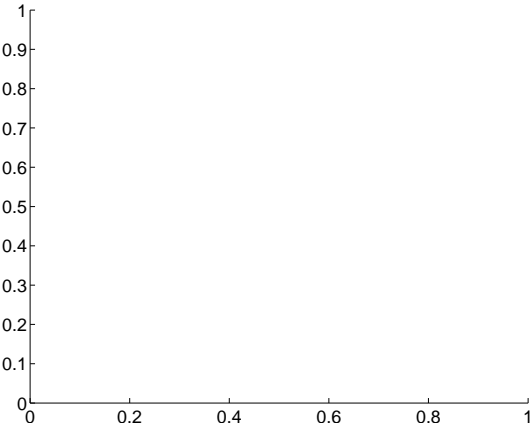
Q7 difference image. Poor Quality



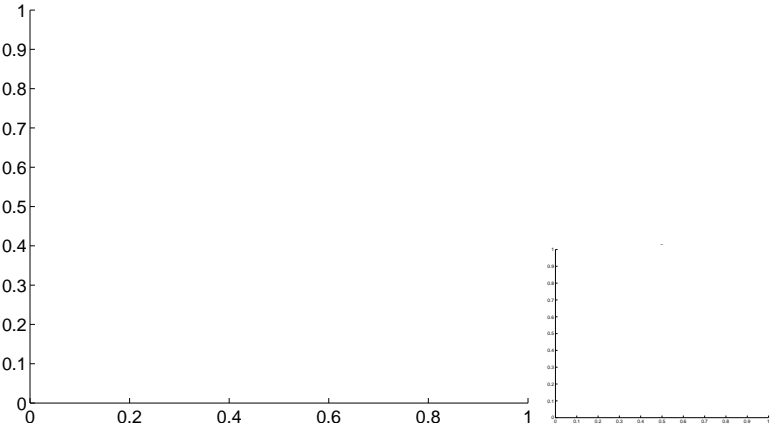
Q7 OOT image



Q8 no difference image

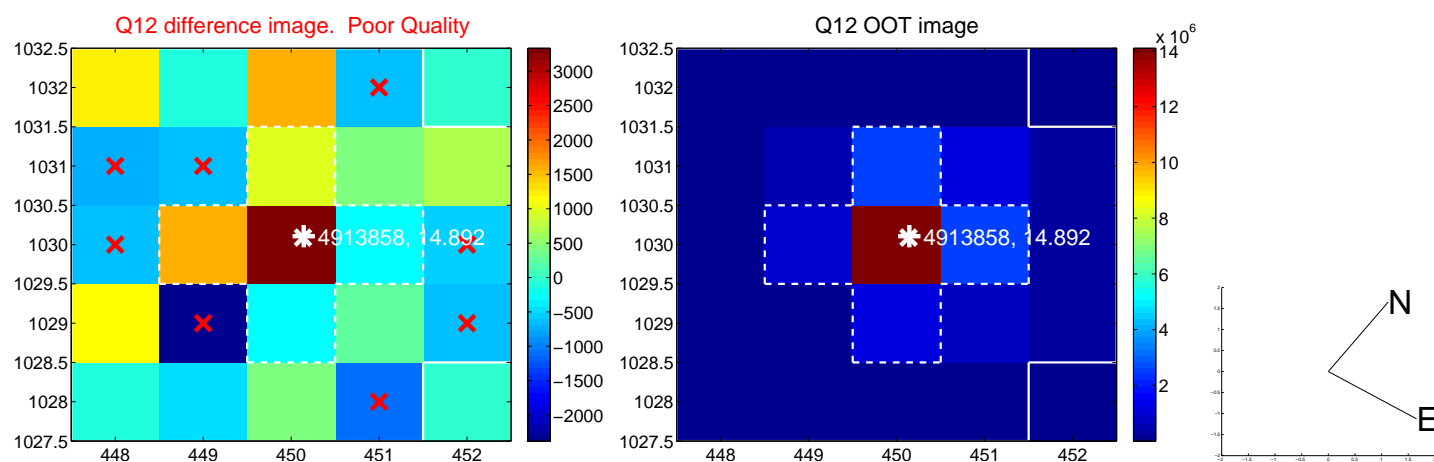
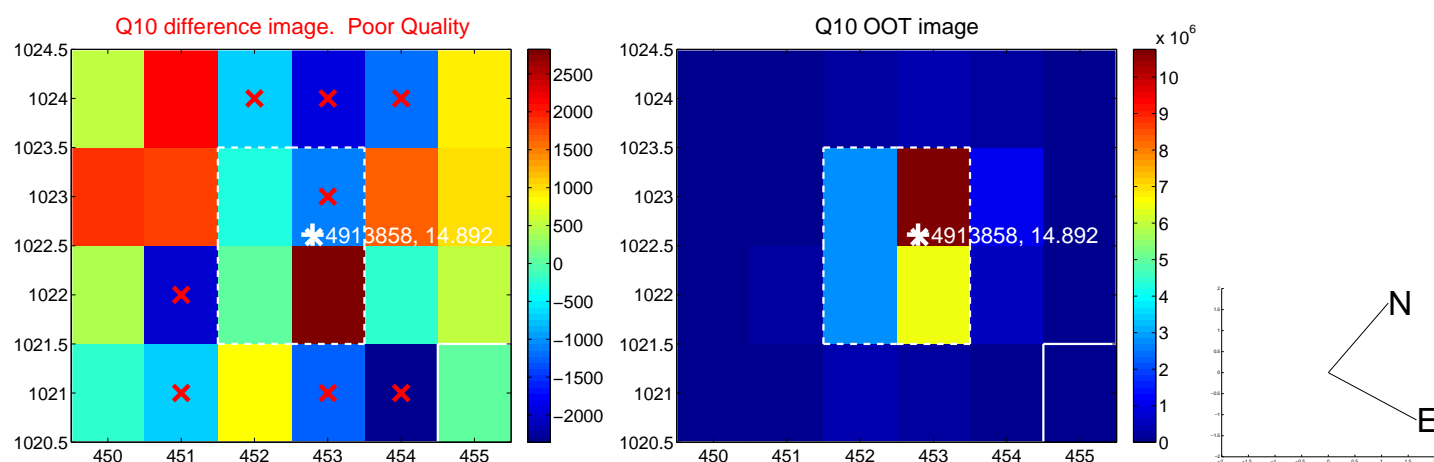
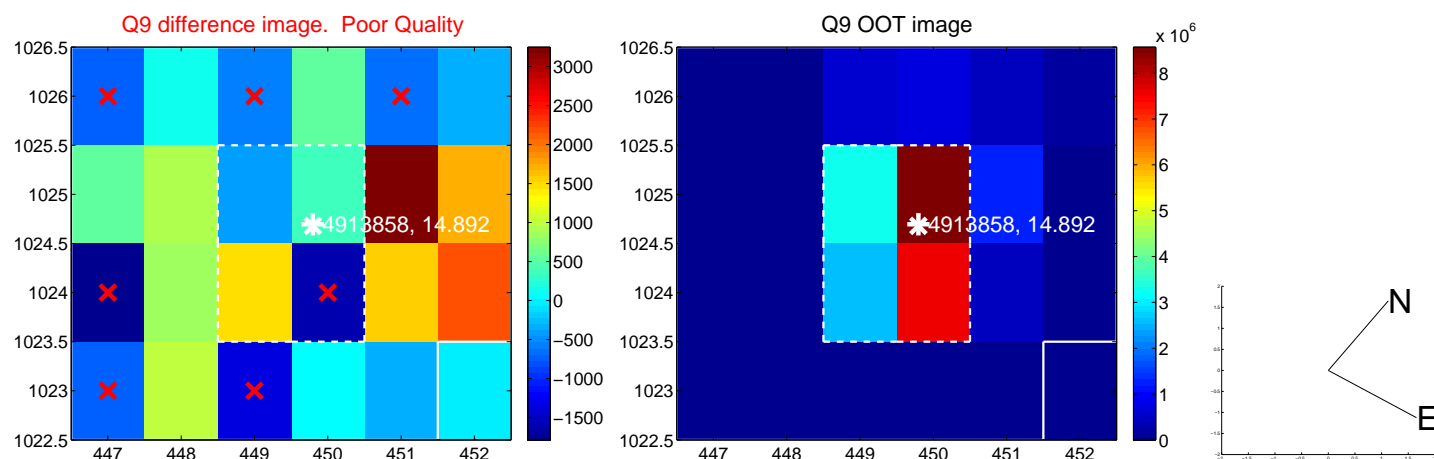


Q8 no OOT image

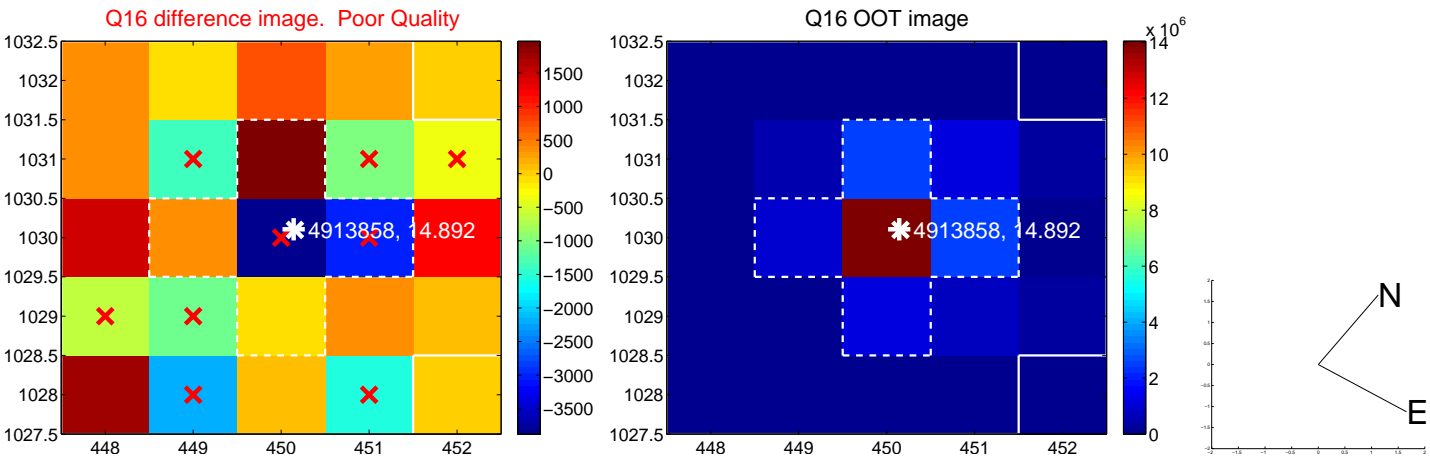
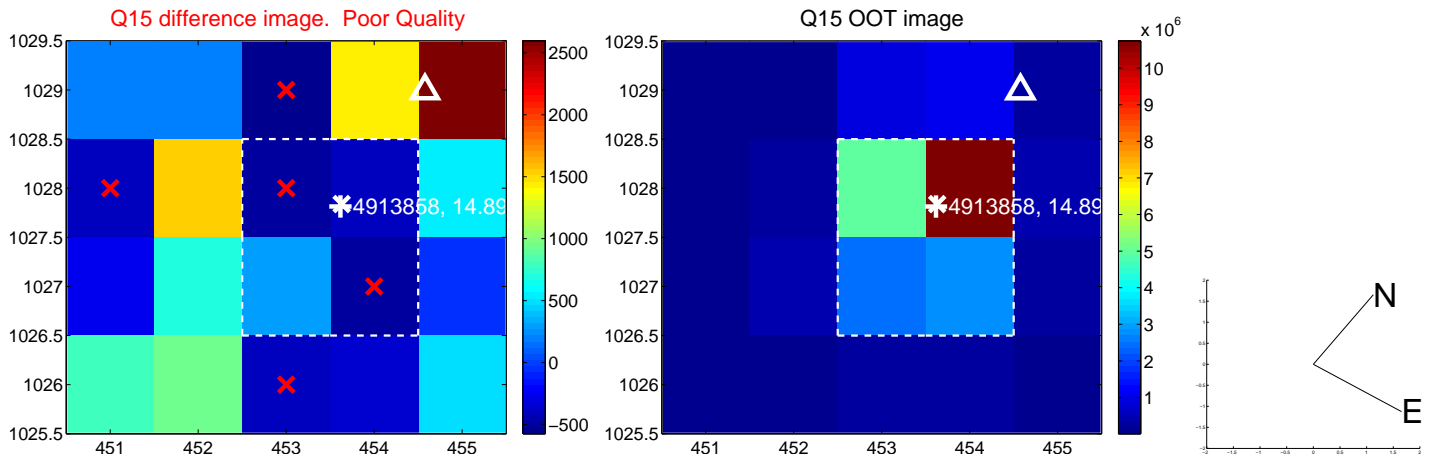
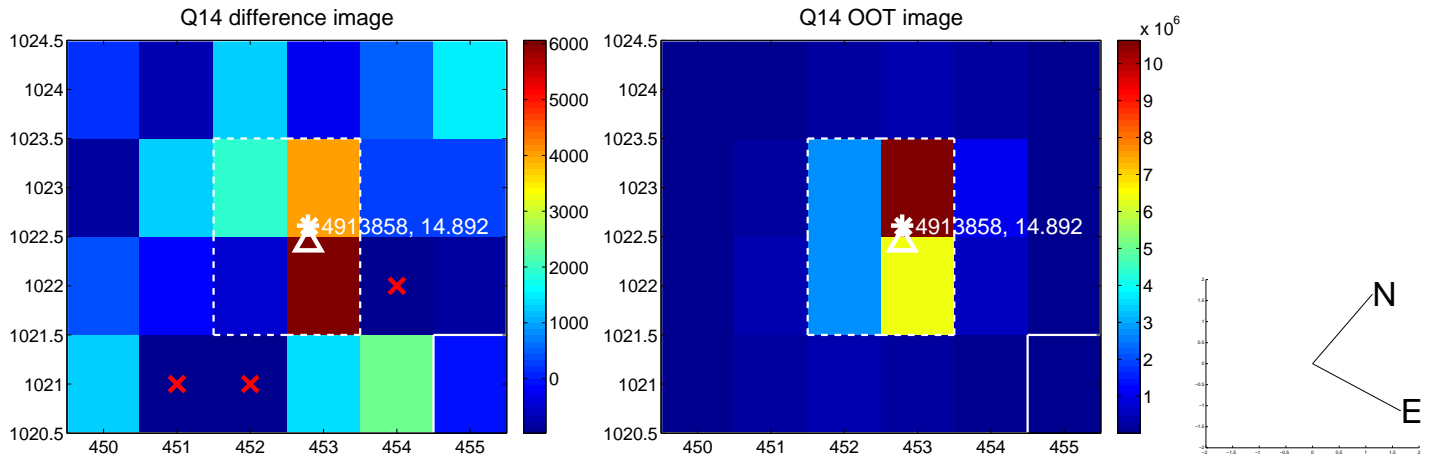
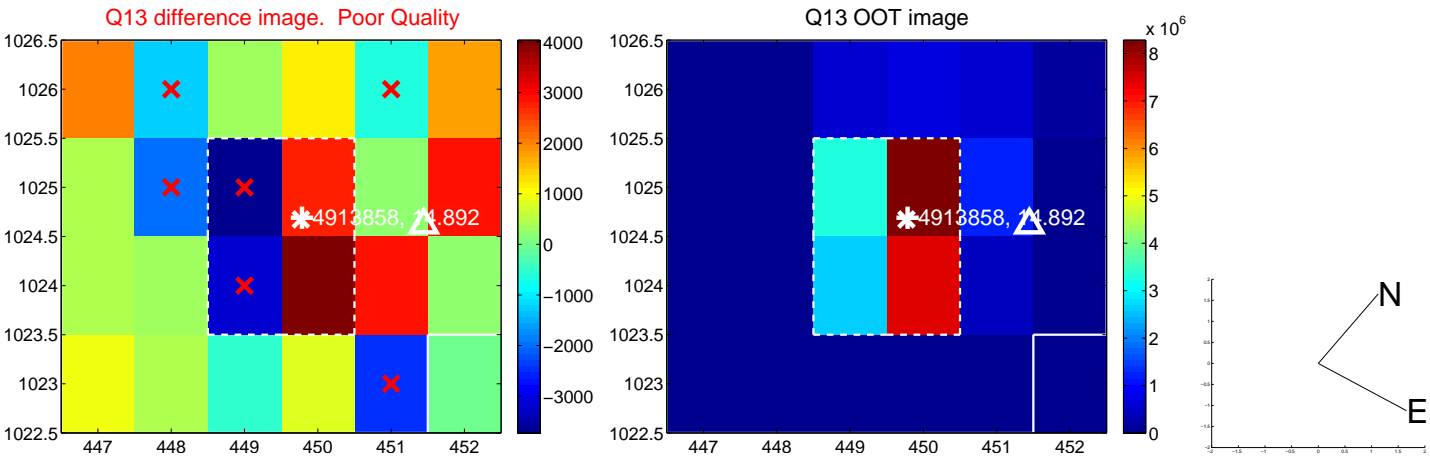




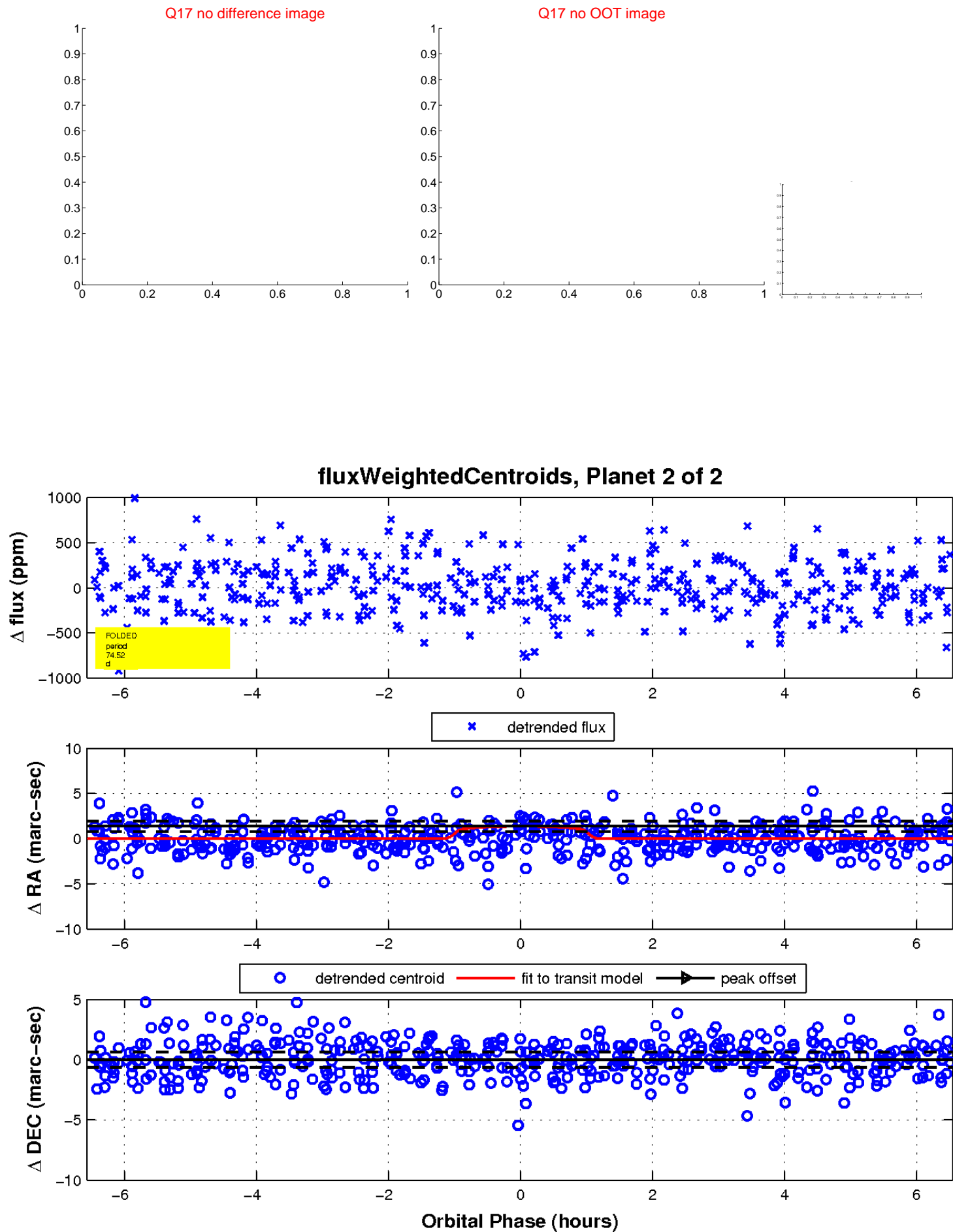
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

