

# KIC 008410368

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008410368-01	OBS	No	0.908115	132.270685	382.9	4.336	26.3	11.5	0.67	4805	1.28	839.07
008410368-02	OBS	No	0.907812	131.757869	8490.6	1.500	24.3	-1.0	0.67	4805	5.97	839.44

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008410368-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
008410368-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA—TRANS_GAPPED—LPP_DV—SAME_NTL_PERIOD—CENT_NOFITS

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

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

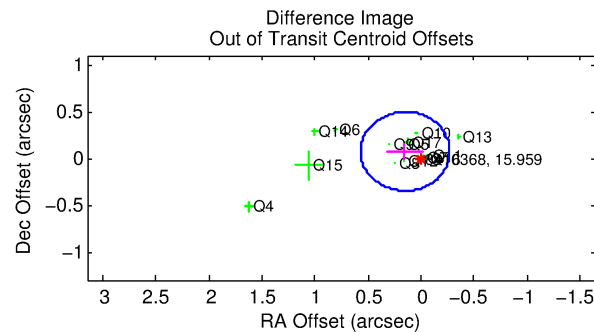
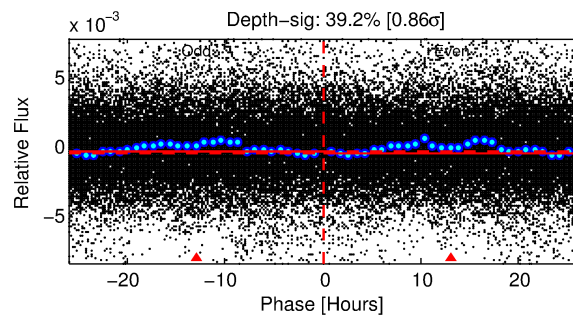
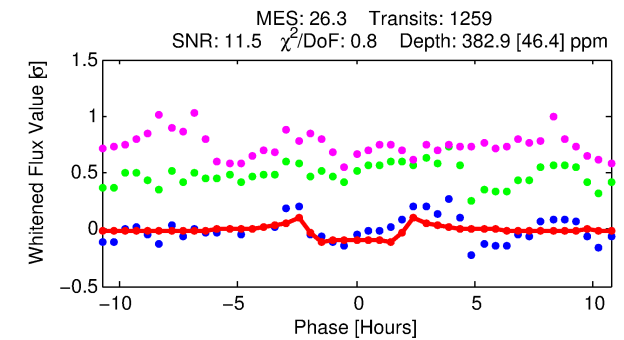
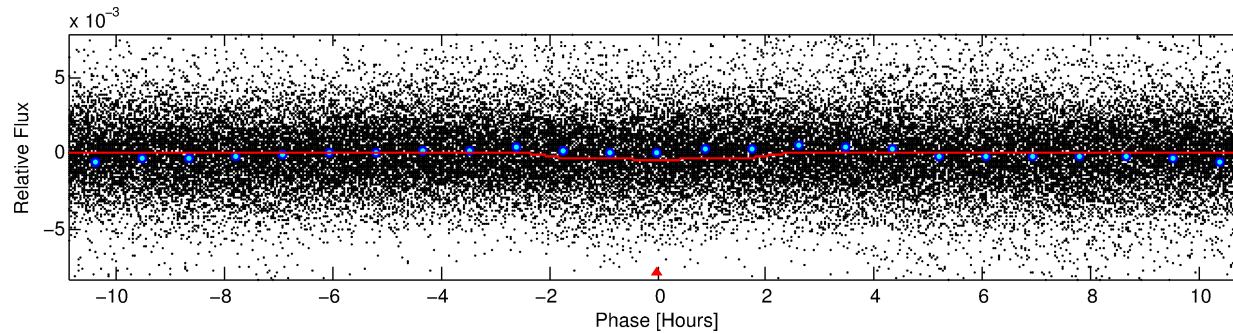
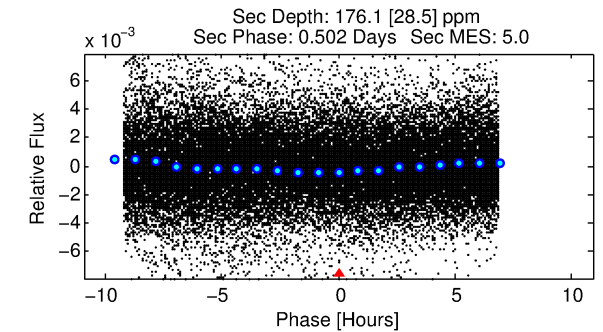
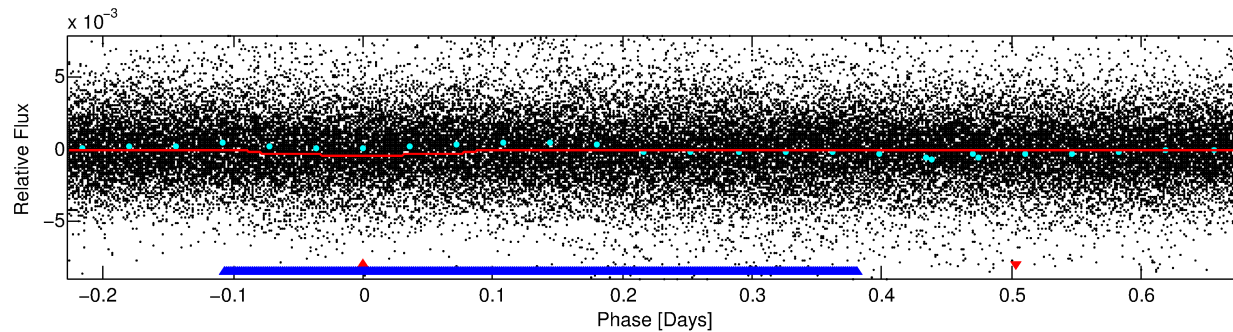
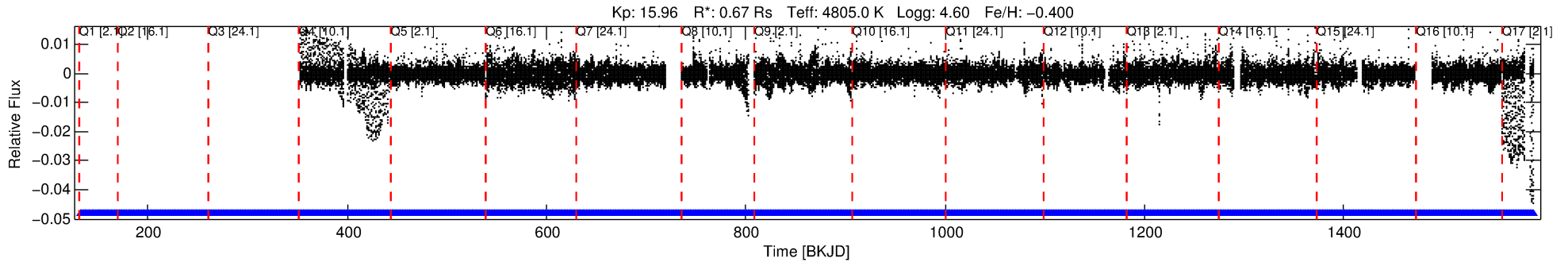
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 008410368-01

No Significant Match Found

# DV One-Page Summary

KIC: 8410368 Candidate: 1 of 2 Period: 0.908 d



## DV Fit Results:

Period = 0.90811 [0.00001] d  
Epoch = 132.2707 [0.0019] BKJD  
Rp/R\* = 0.0176 [0.0107]  
a/R\* = 1.69 [2.24]  
b = 0.30 [6.35]  
Seff = 839.07 [153.30]  
Teq = 1372 [63] K  
Rp = 1.28 [0.79] Re  
a = 0.0159 [0.0013] AU  
Ag = 15.02 [18.50] [0.76σ]  
Teffp = 4177 [1289] K [2.17σ]

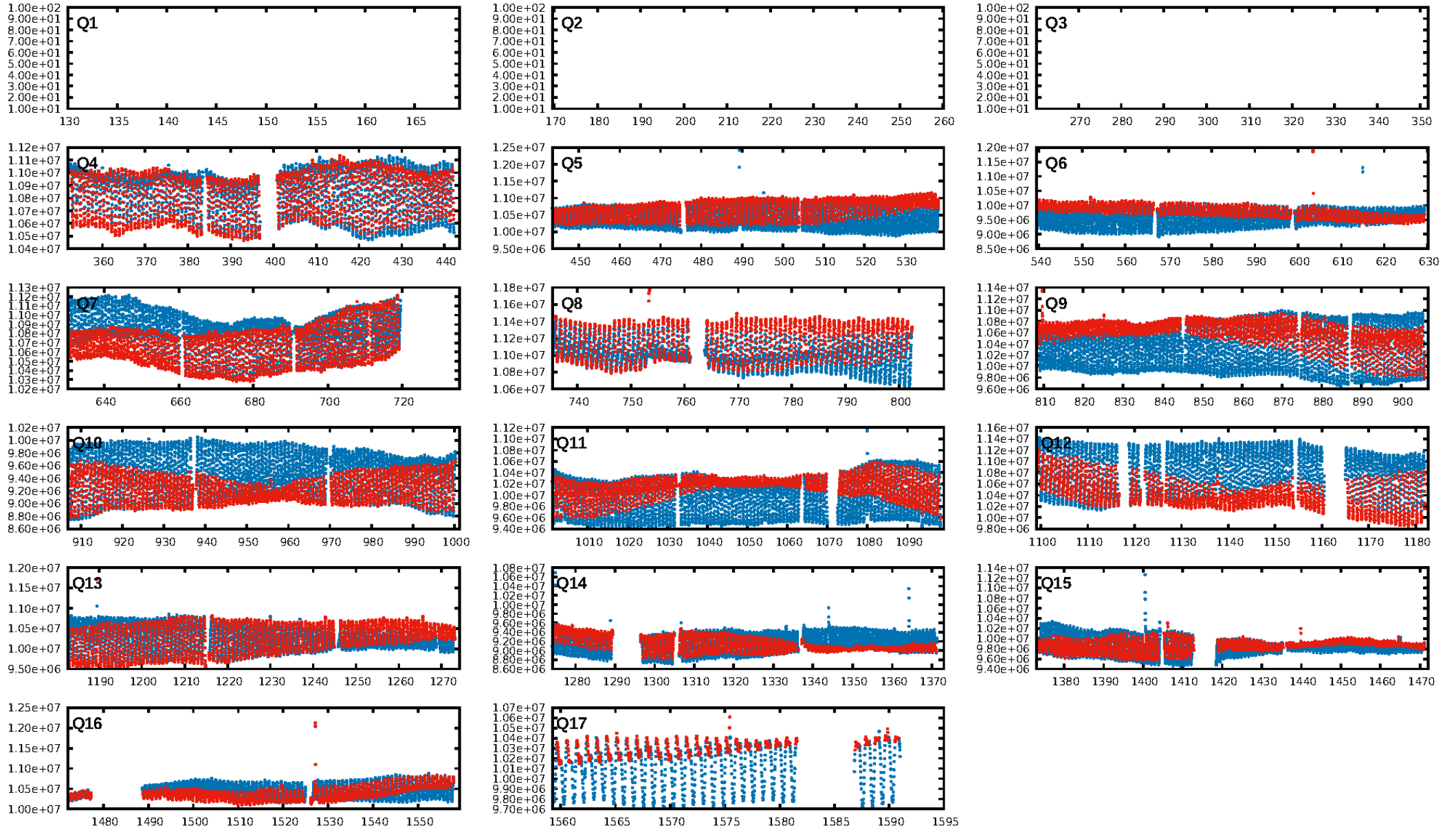
## DV Diagnostic Results:

ShortPeriod-sig: 0.1% [0.00σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [1229/1229]  
GhostDiagnostic-chr: 1.18  
Centroid-sig: 1.9%  
Centroid-so: 1.714 arcsec [4.29σ]  
OotOffset-rm: 0.168 arcsec [1.20σ]  
KicOffset-rm: 0.188 arcsec [1.32σ]  
OotOffset-st: 3/3/4/4 [14]  
KicOffset-st: 3/3/4/4 [14]  
DiffImageQuality-fgm: 0.29 [4/14]  
DiffImageOverlap-fno: 0.00 [0/14]

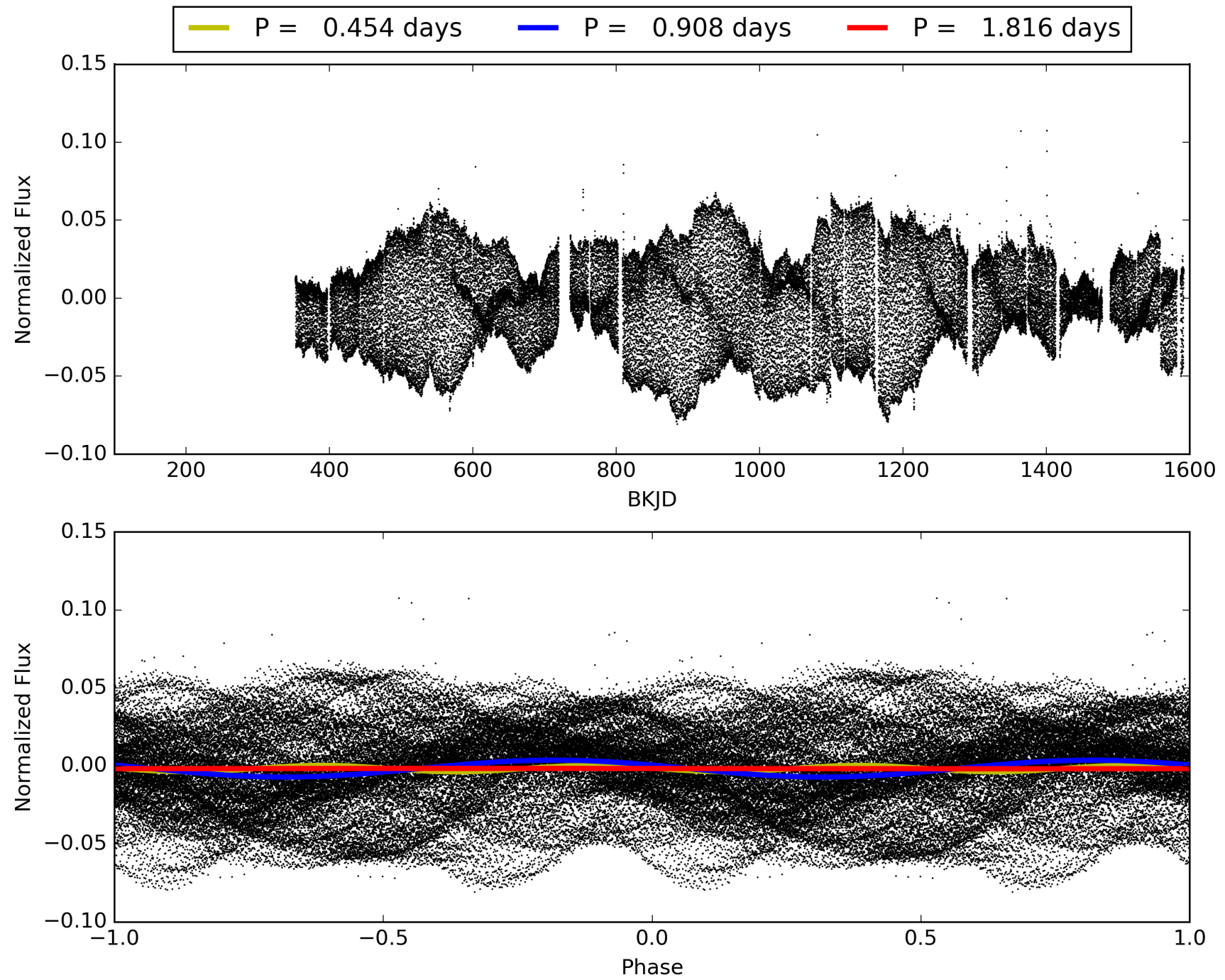
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 02-Feb-2016 08:20:45 Z

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

# TCE 008410368-01, PDC Light Curves

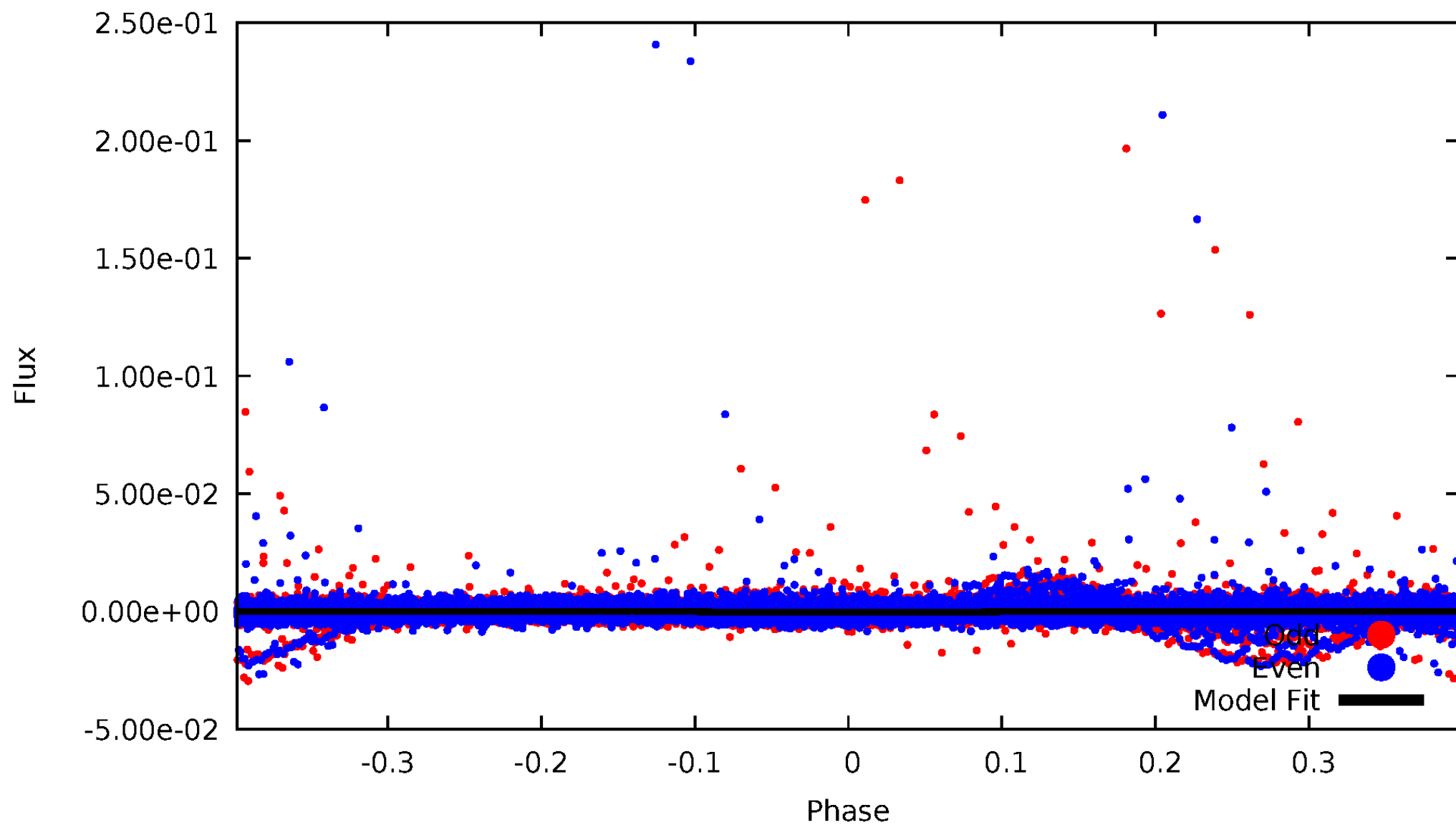


TCE 008410368-01



# DV Odd/Even

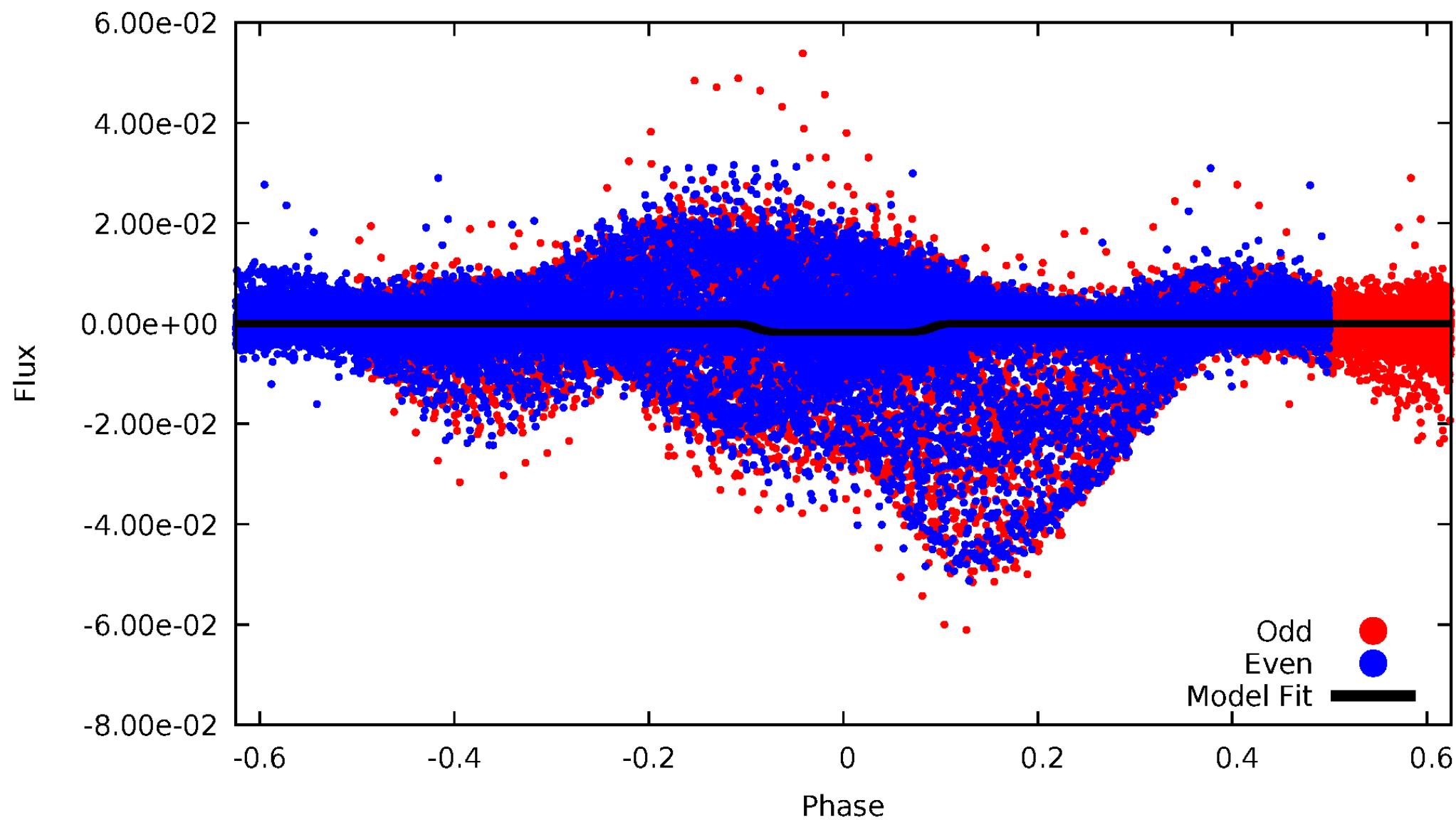
TCE 008410368-01





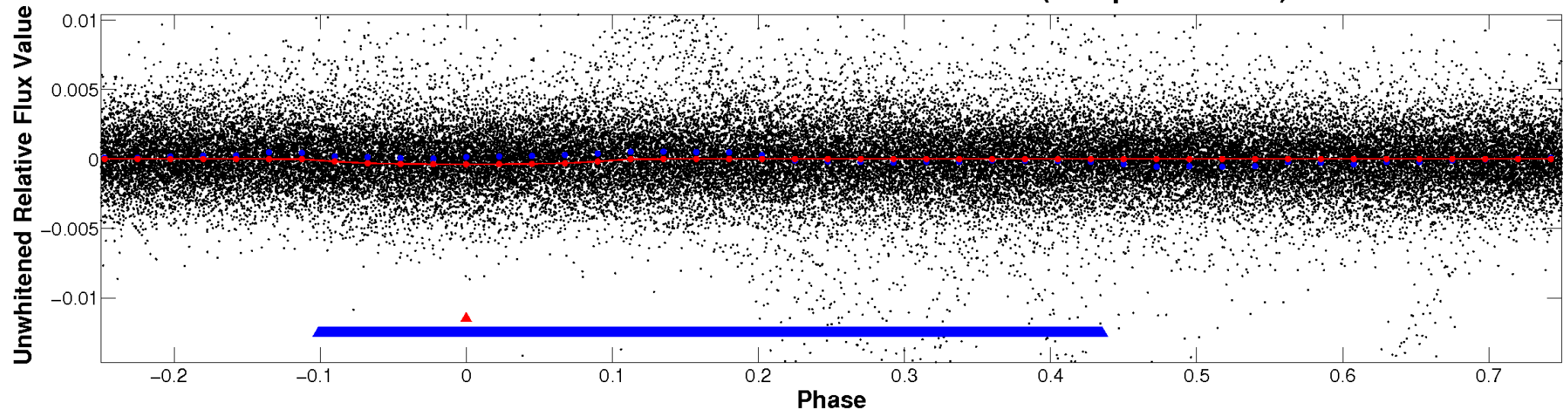
# ALT Odd/Even

TCE 008410368-01

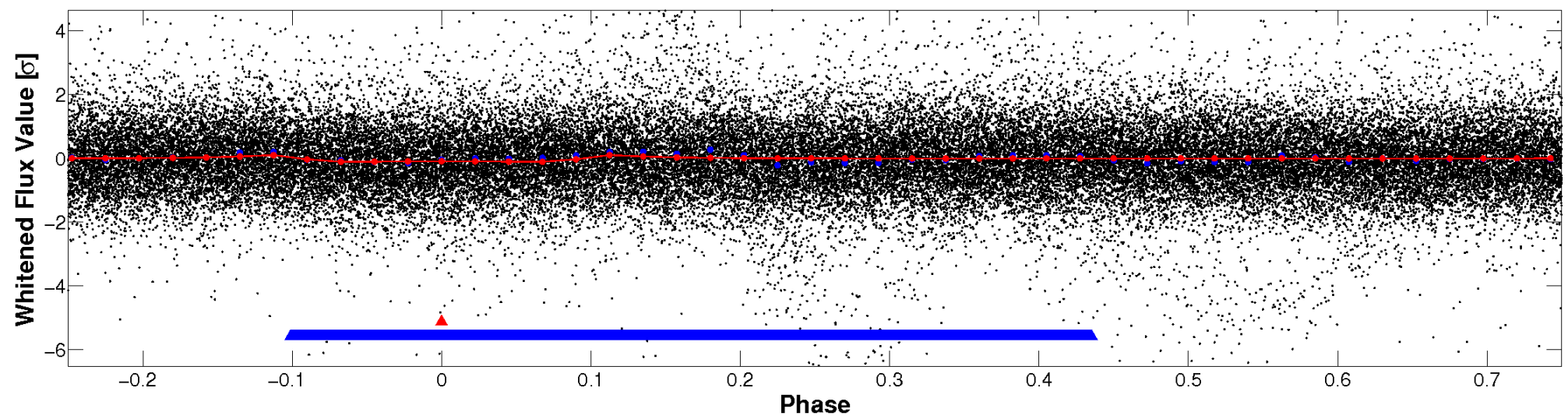


# Non-Whitened Vs. Whitened Light Curve

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

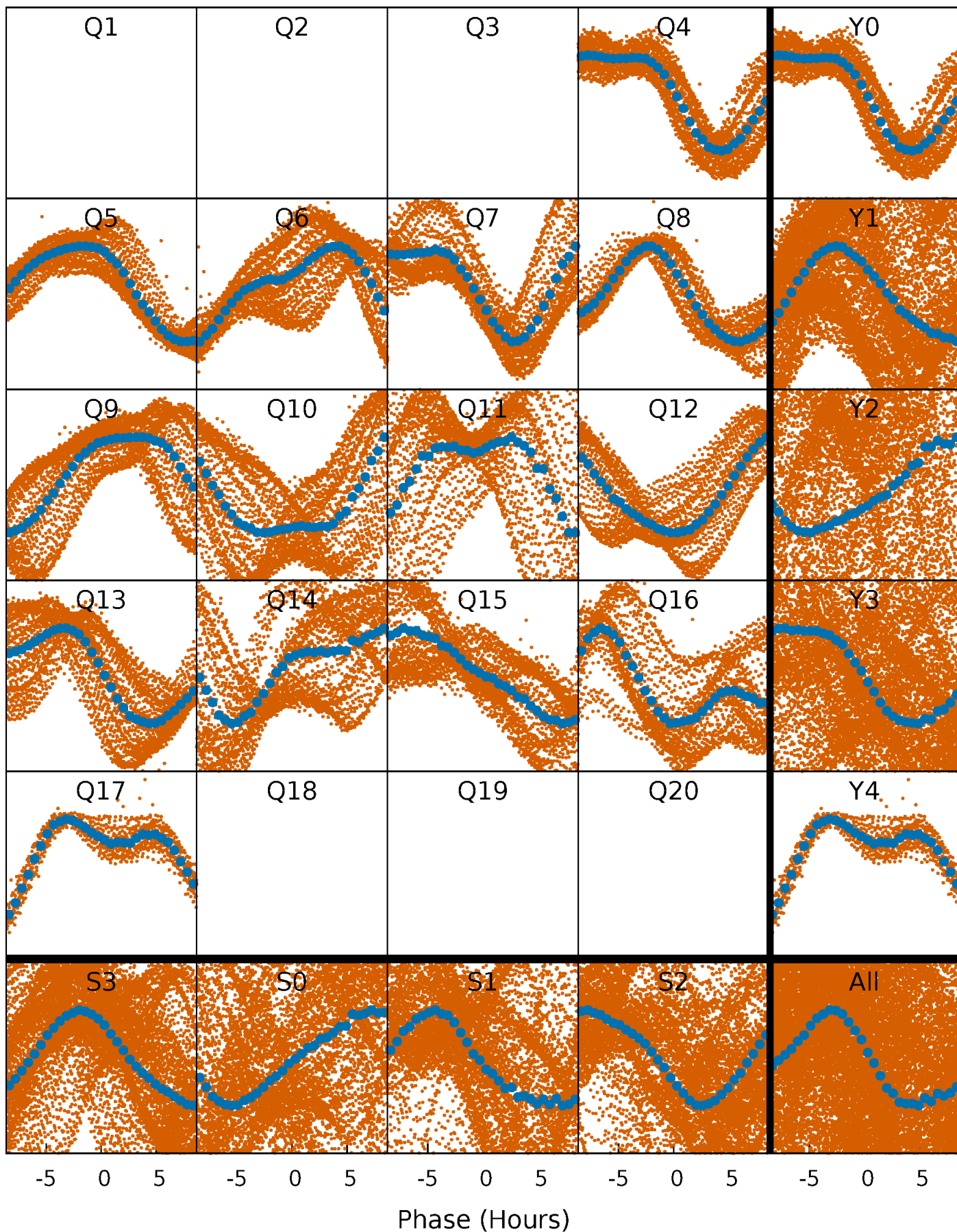


**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

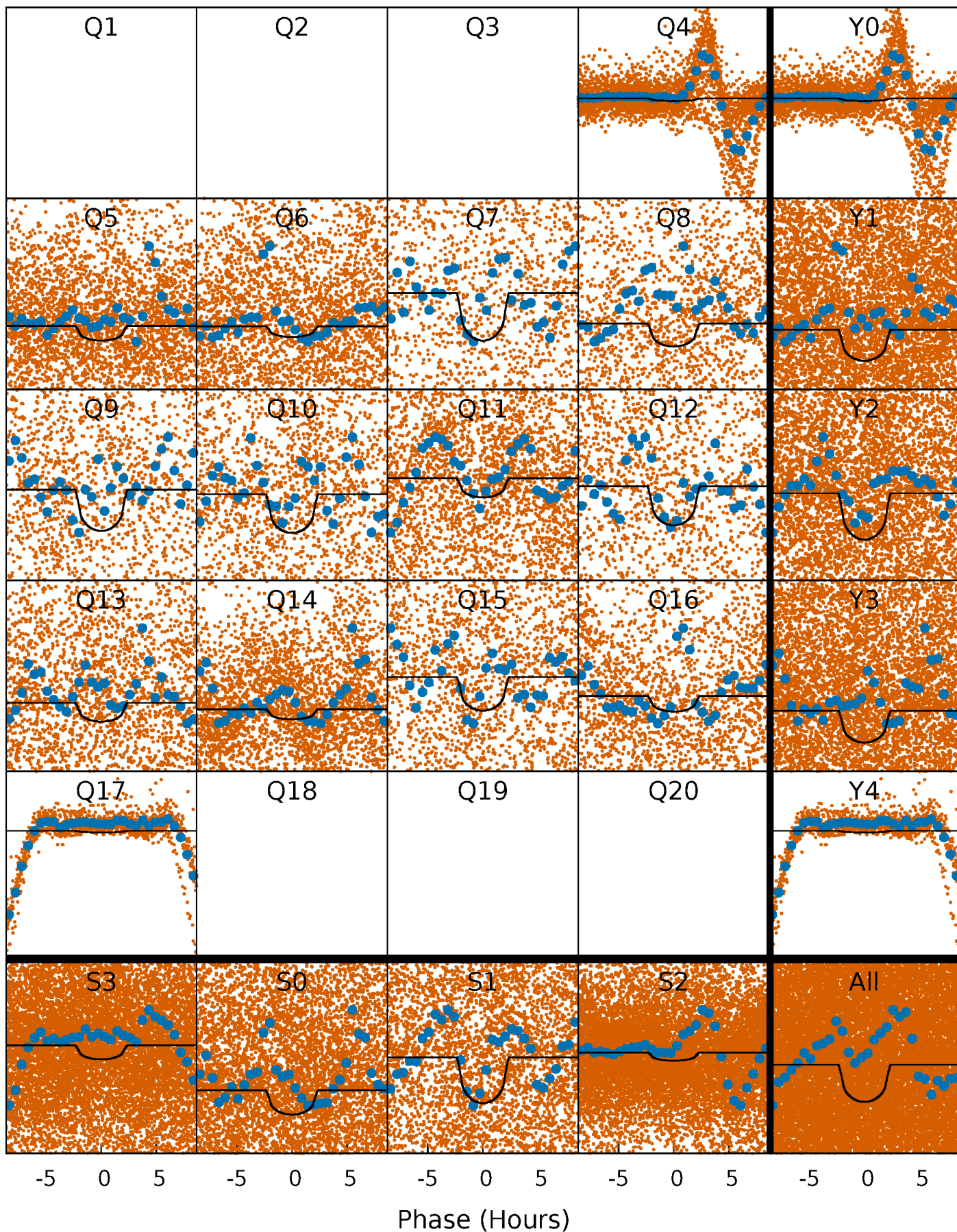
TCE 008410368-01   P= 0.908115 Days    $T_0=132.270685$  (BKJD)





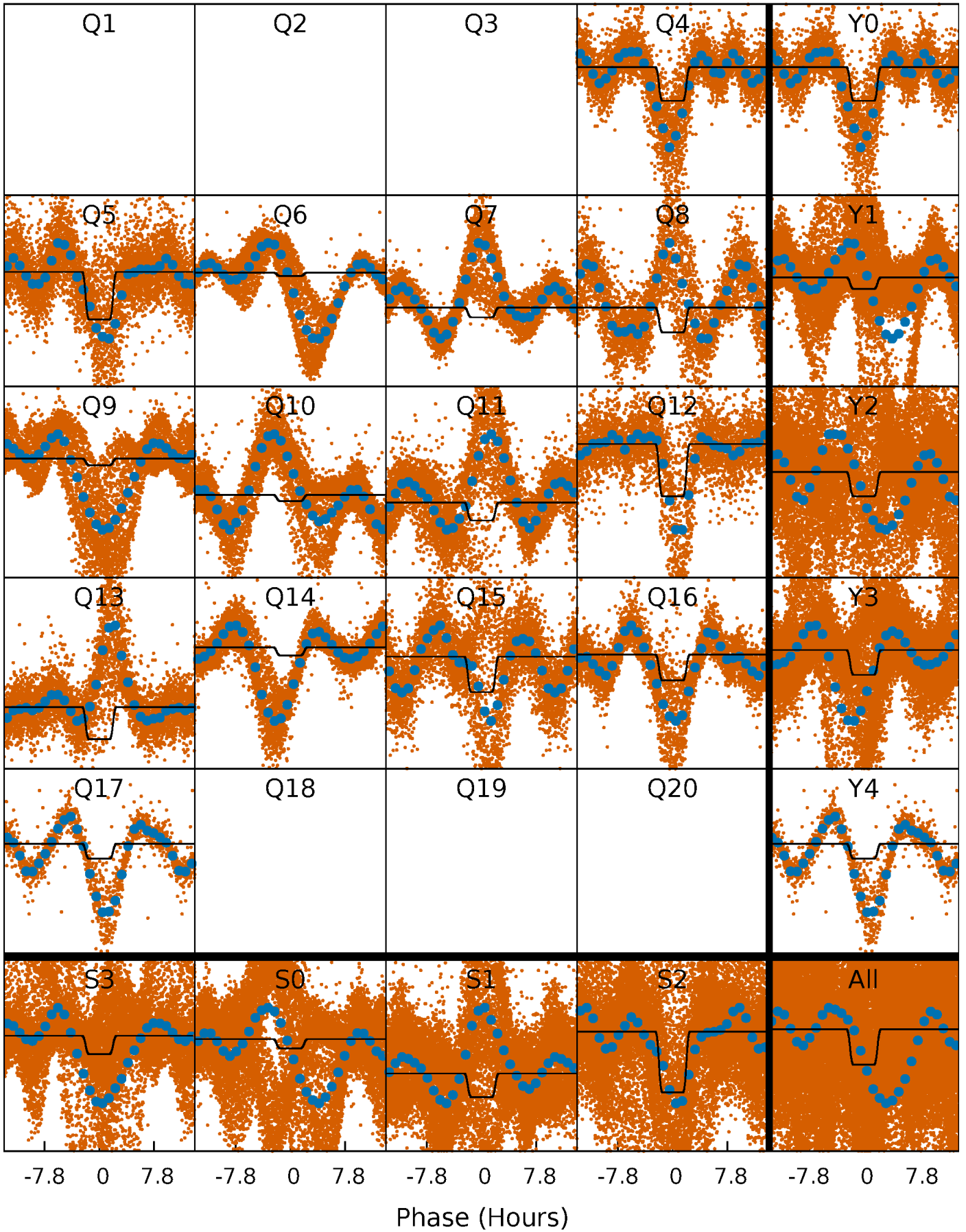
# DV Quarter-Phased Transit Curves

TCE 008410368-01 P= 0.908115 Days  $T_0=132.270685$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

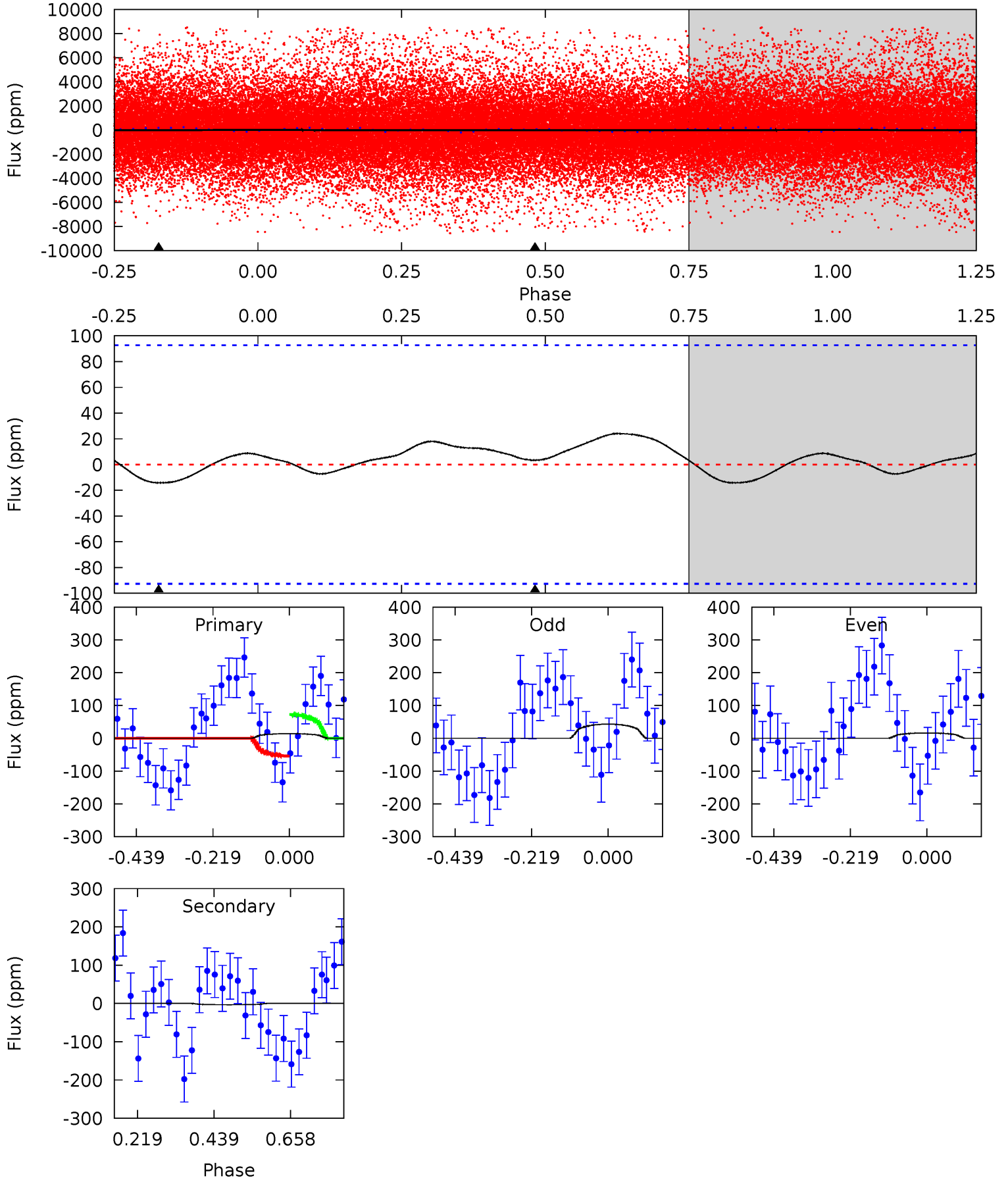
TCE 008410368-01 P= 0.908661 Days  $T_0=132.313394$  (BKJD)



# DV Model-Shift Uniqueness Test

008410368-01, P = 0.908115 Days, E = 132.270685 Days

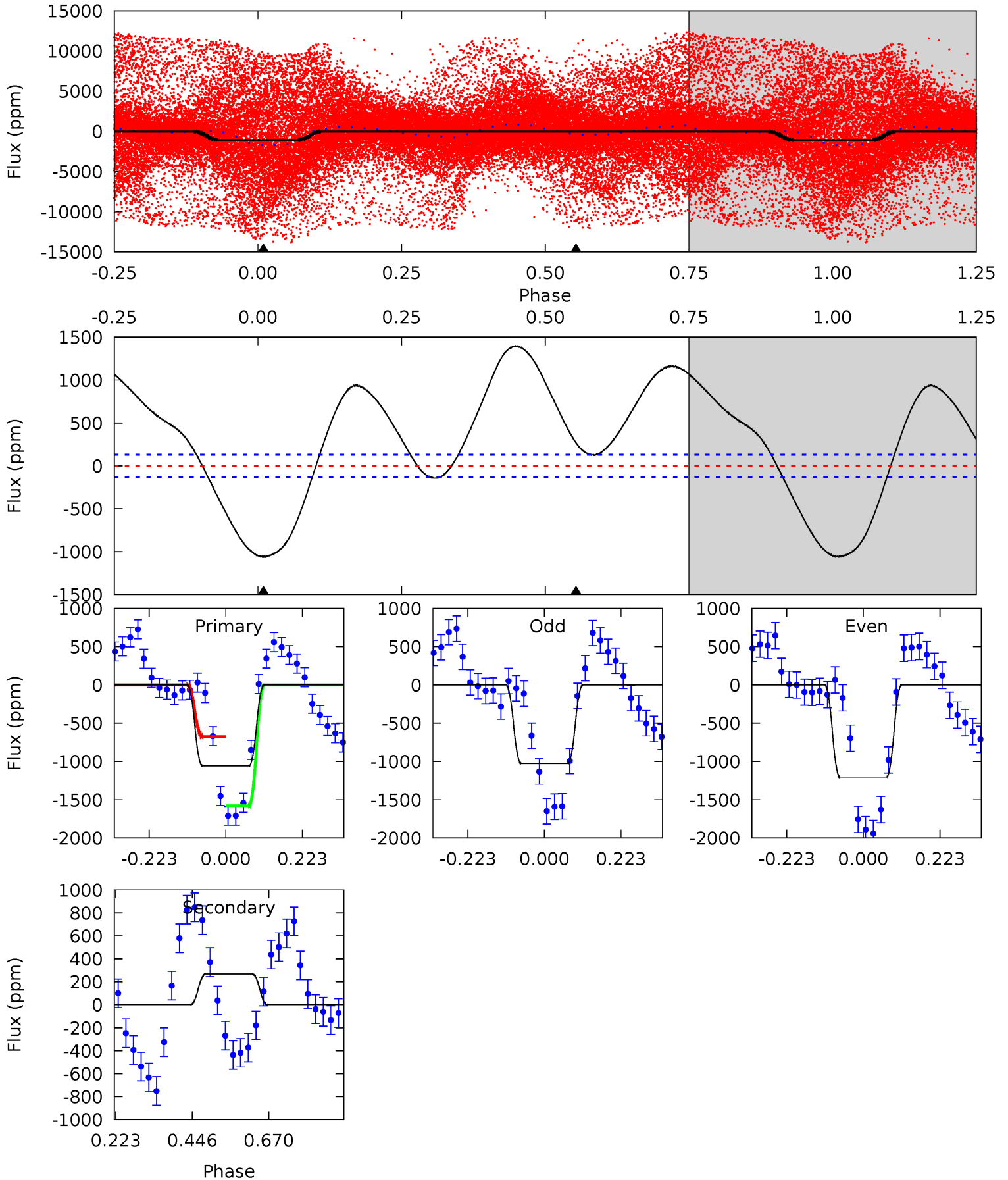
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0.67	-0.16	0	0	4.40	1.23	0.24	0.67	0.67	-0.16	-0.16	0.65	5.77	0.63	0.43



# Alt Model-Shift Uniqueness Test

008410368-01, P = 0.908661 Days, E = 132.313394 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
36.1	-9.15	0	0	4.39	1.22	10.3	36.1	36.1	-9.15	-9.15	3.01	0.88	0.57	12.9





### Stellar Parameters For KIC 008410368

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$4805^{+169}_{-169}$	$4.603^{+0.063}_{-0.032}$	$-0.400^{+0.350}_{-0.300}$	$0.666^{+0.059}_{-0.065}$	$0.649^{+0.078}_{-0.048}$	$3.092^{+0.866}_{-0.414}$
	+4%/-4%	+1%/-1%	+87%/-75%	+9%/-10%	+12%/-7%	+28%/-13%
Source	KIC0	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 008410368-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$3\pm 21$	$1.28^{+0.73}_{-0.68}$	$1907^{+73}_{-80}$	$-2558^{+5546}_{-794}$	$-0.203^{+2.199}_{-2.954}$
Alt.	$268\pm 29$	$3.00^{+0.80}_{-0.77}$	$1901^{+77}_{-74}$	$-3475^{+228}_{-359}$	$-4.216^{+1.619}_{-3.741}$

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



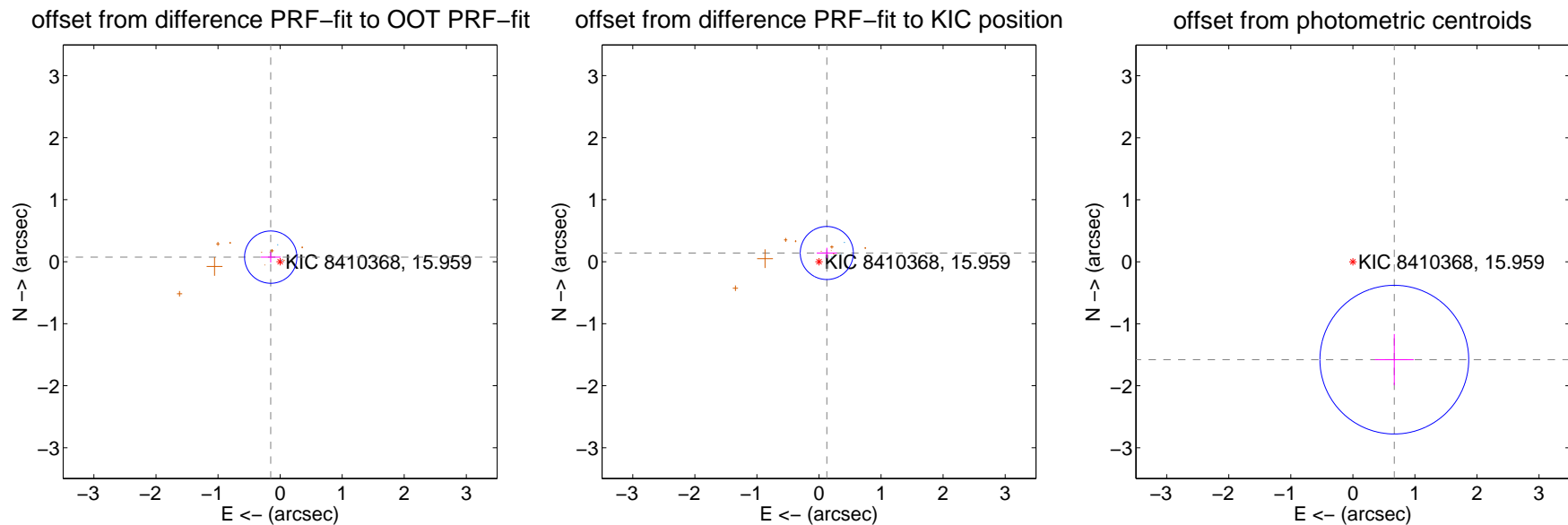
## DV Centroid Data

Supplemental centroid analysis for 008410368-01. Kepler magnitude: 15.96. Transit SNR 11.48

There are 4 quarters with good PRF difference image offsets

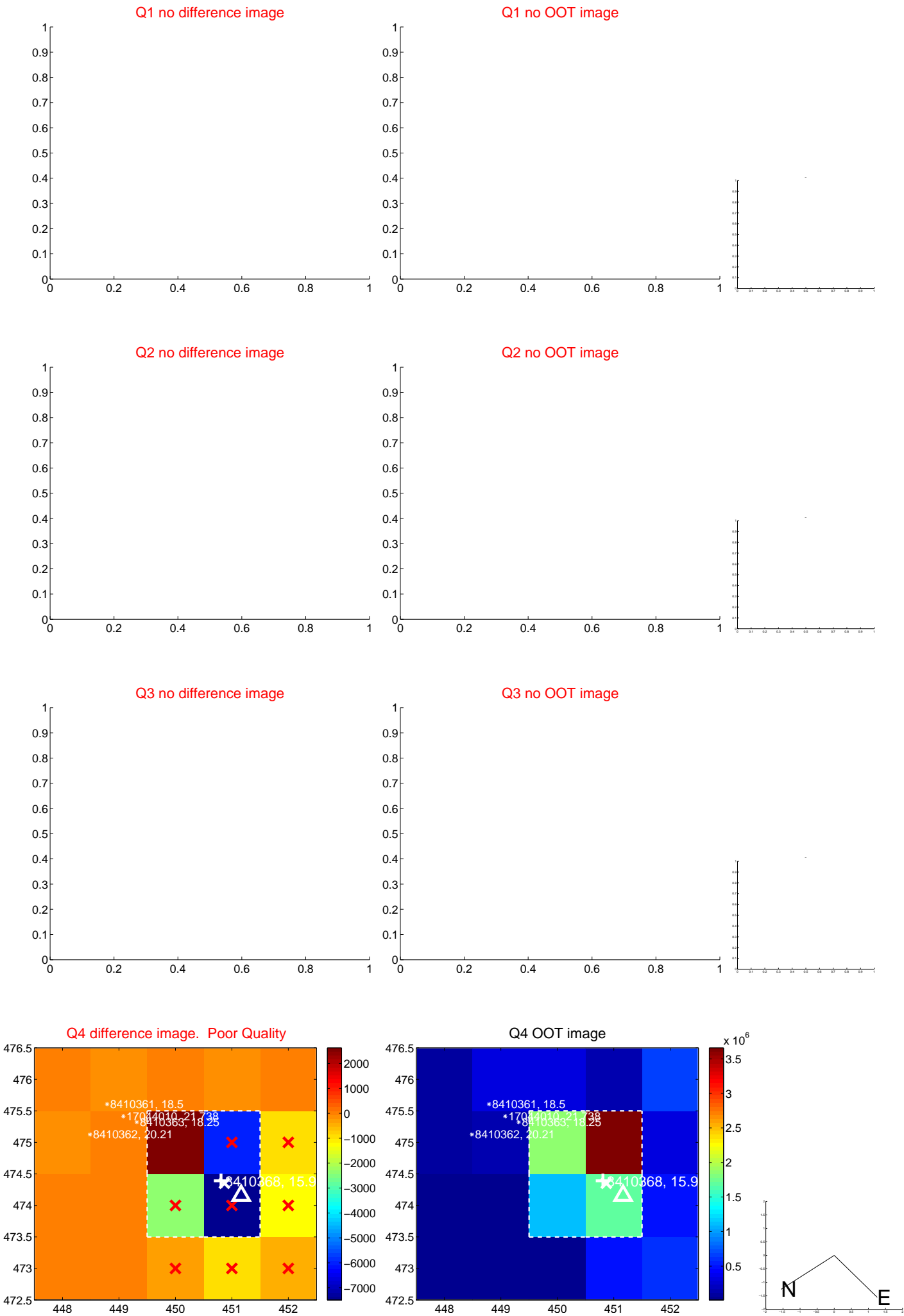
The direct PRF centroid is offset from the target star catalog position by about 0.34 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.168 \pm 0.141$	1.20	$0.151 \pm 0.160$	$0.073 \pm 0.085$
PRF-fit source offset from KIC position	$0.188 \pm 0.143$	1.32	$-0.126 \pm 0.162$	$0.140 \pm 0.084$
photometric centroid source offset	$1.71 \pm 0.40$	4.29	$-0.67 \pm 0.31$	$-1.58 \pm 0.41$

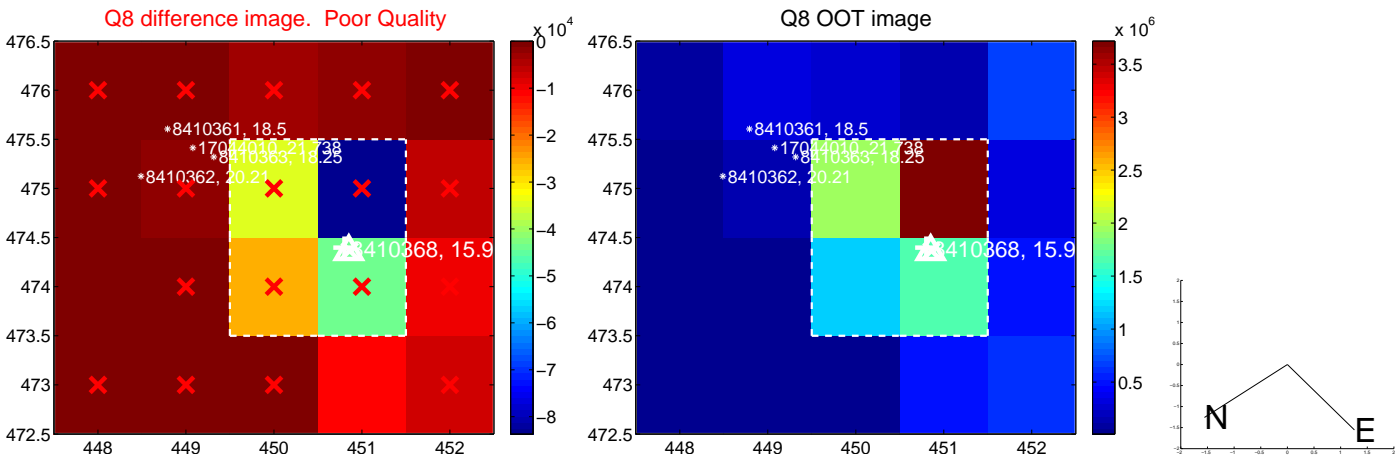
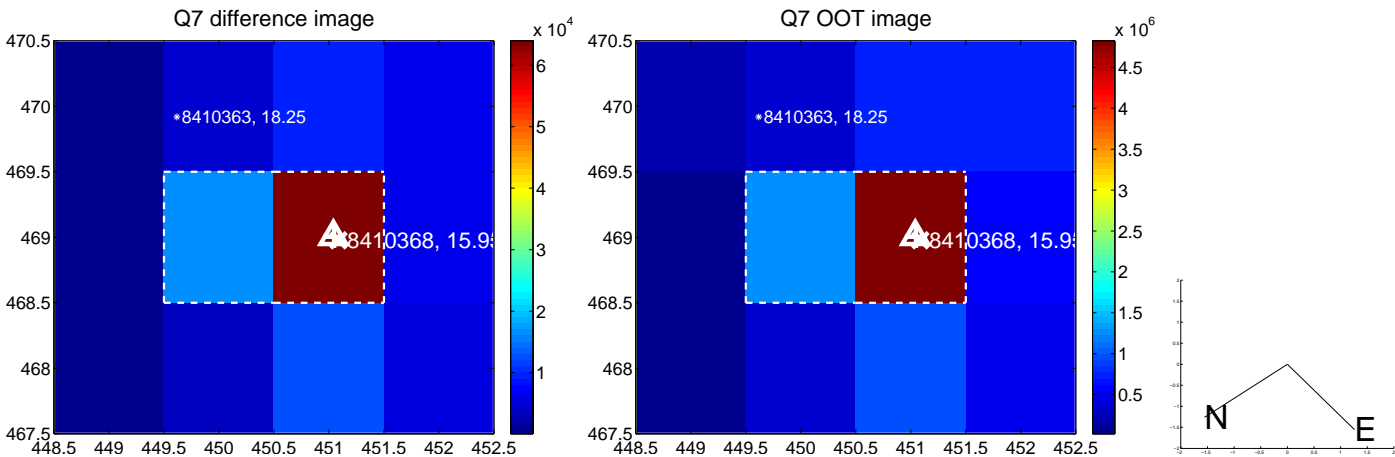
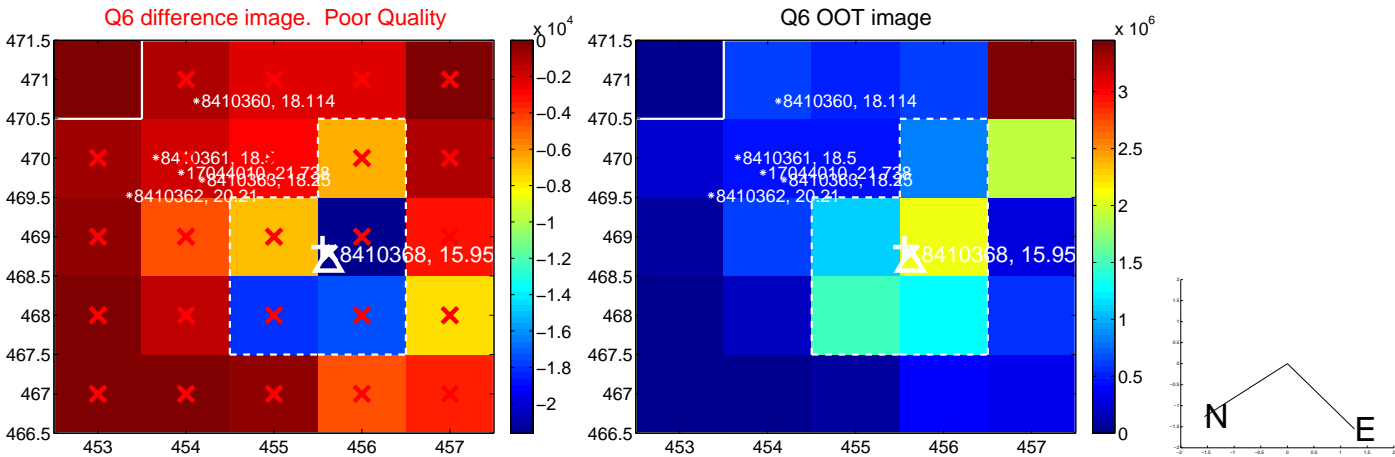
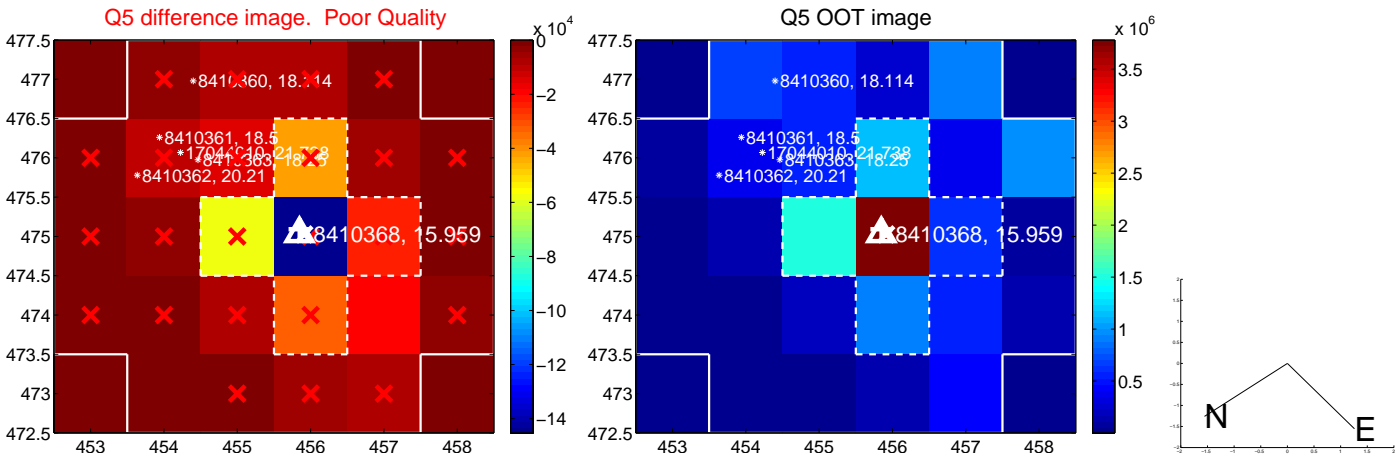


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

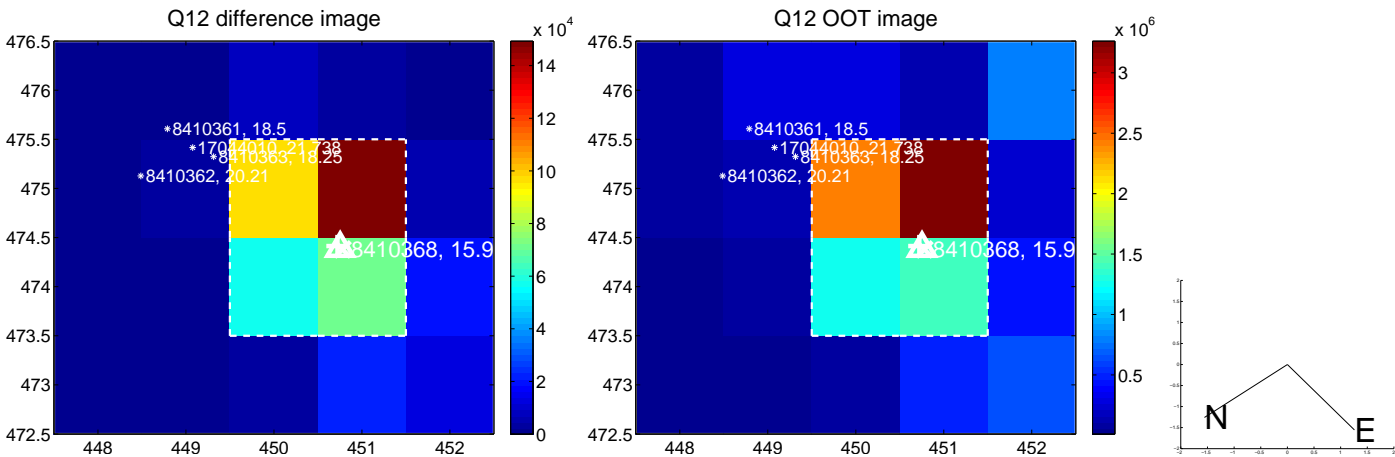
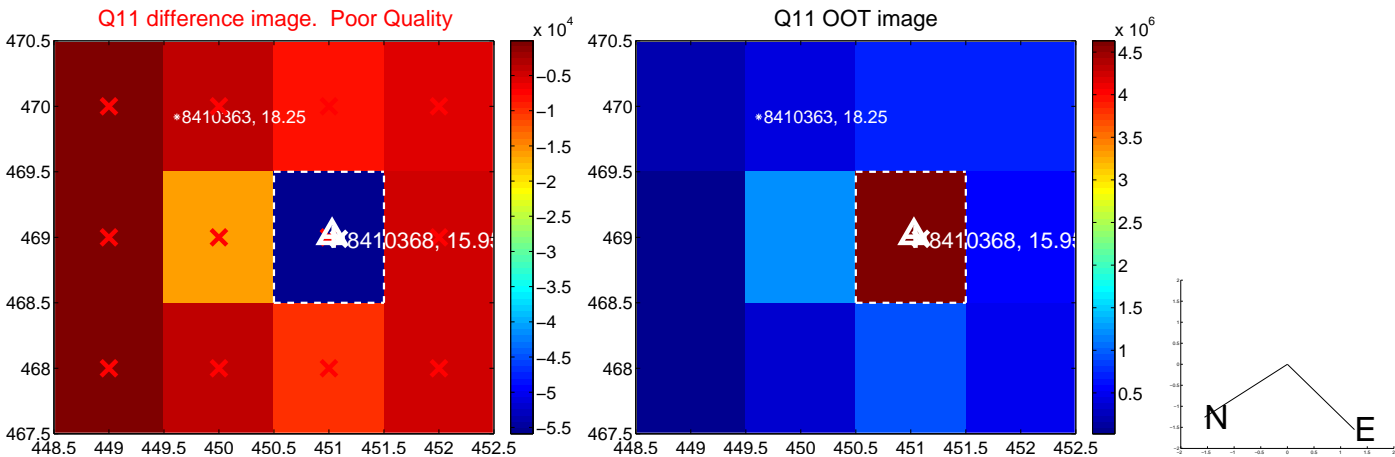
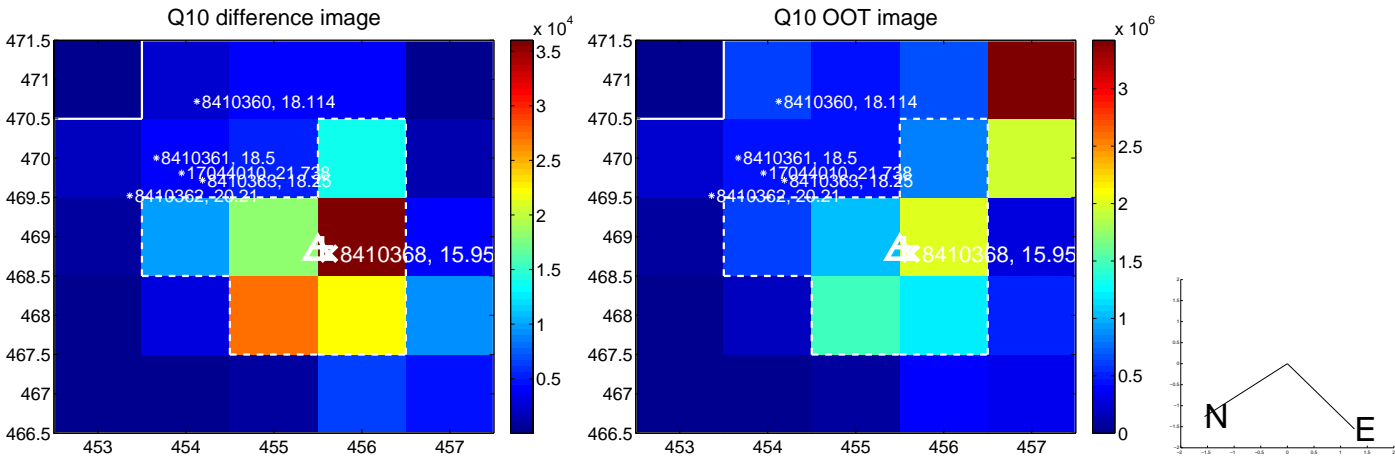
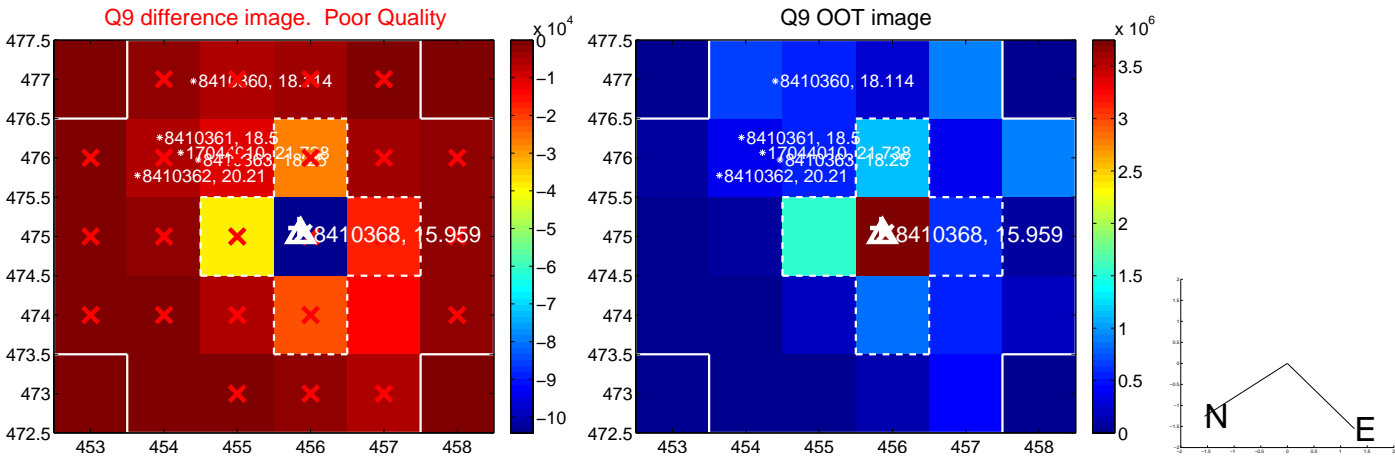
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



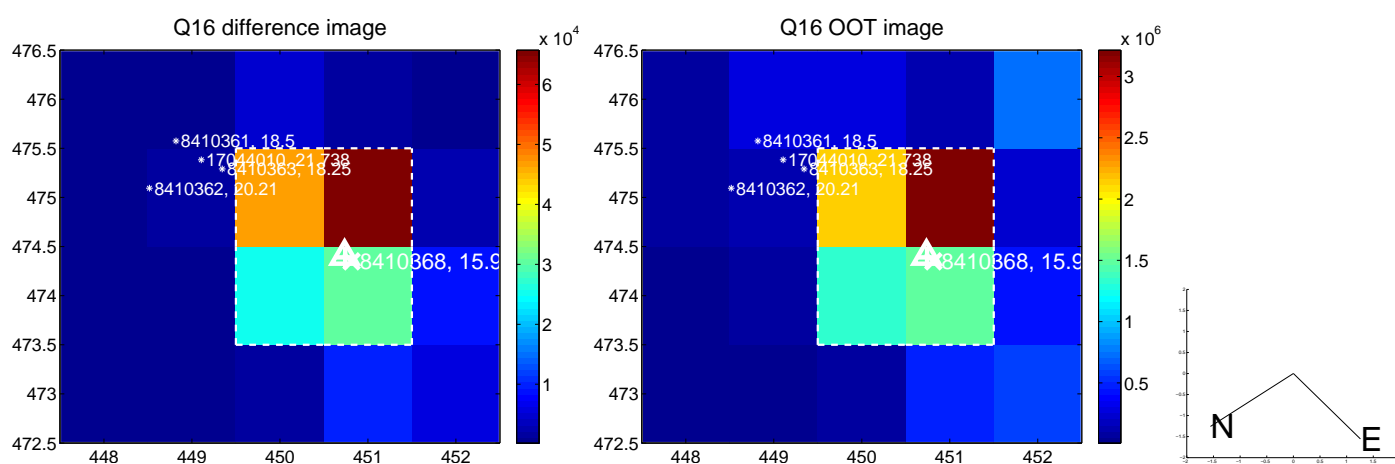
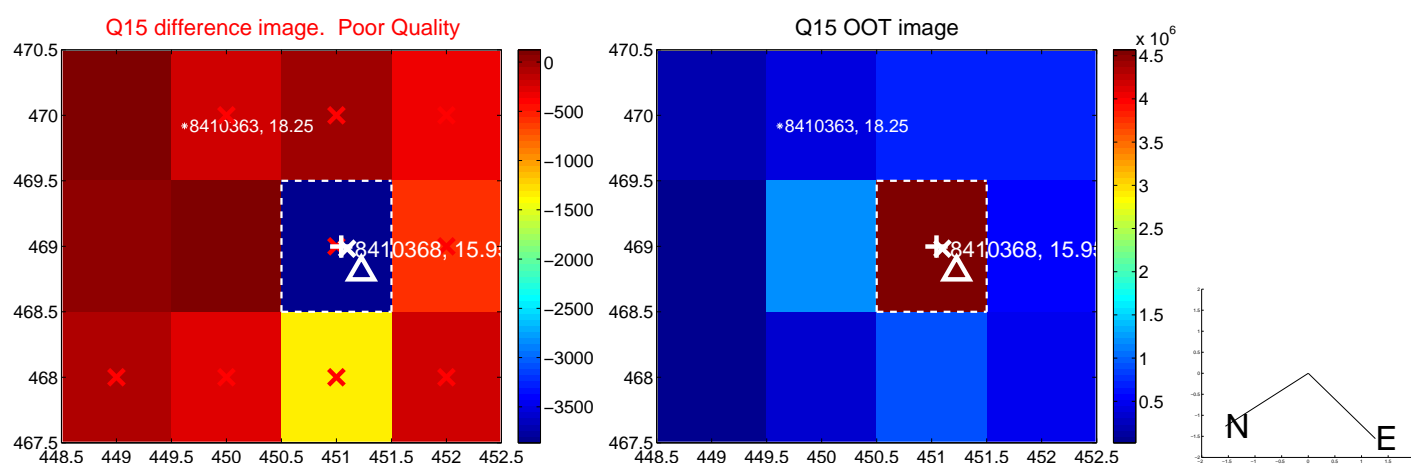
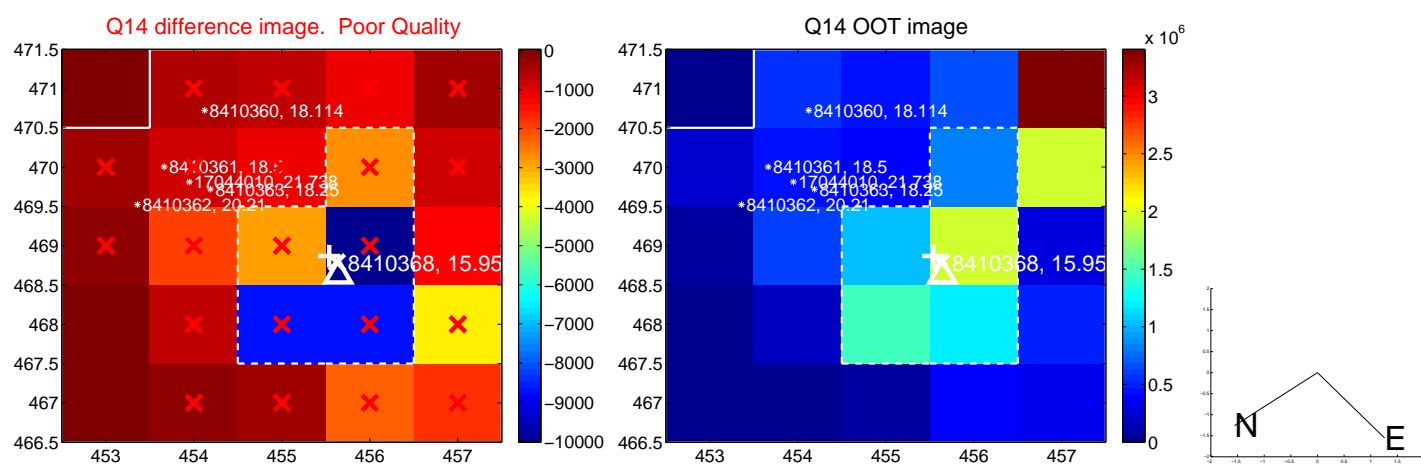
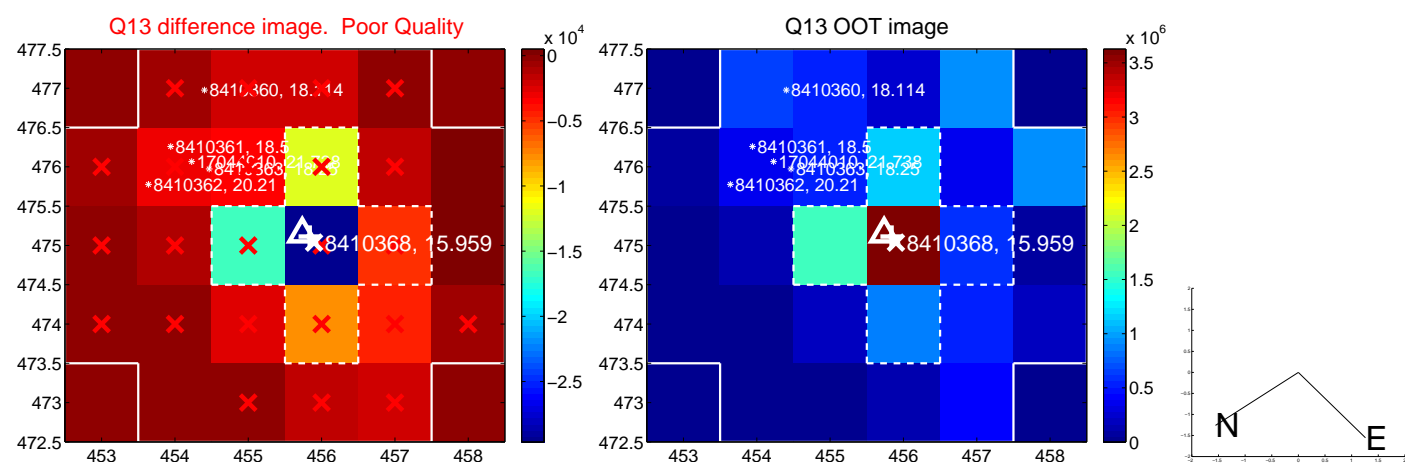
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

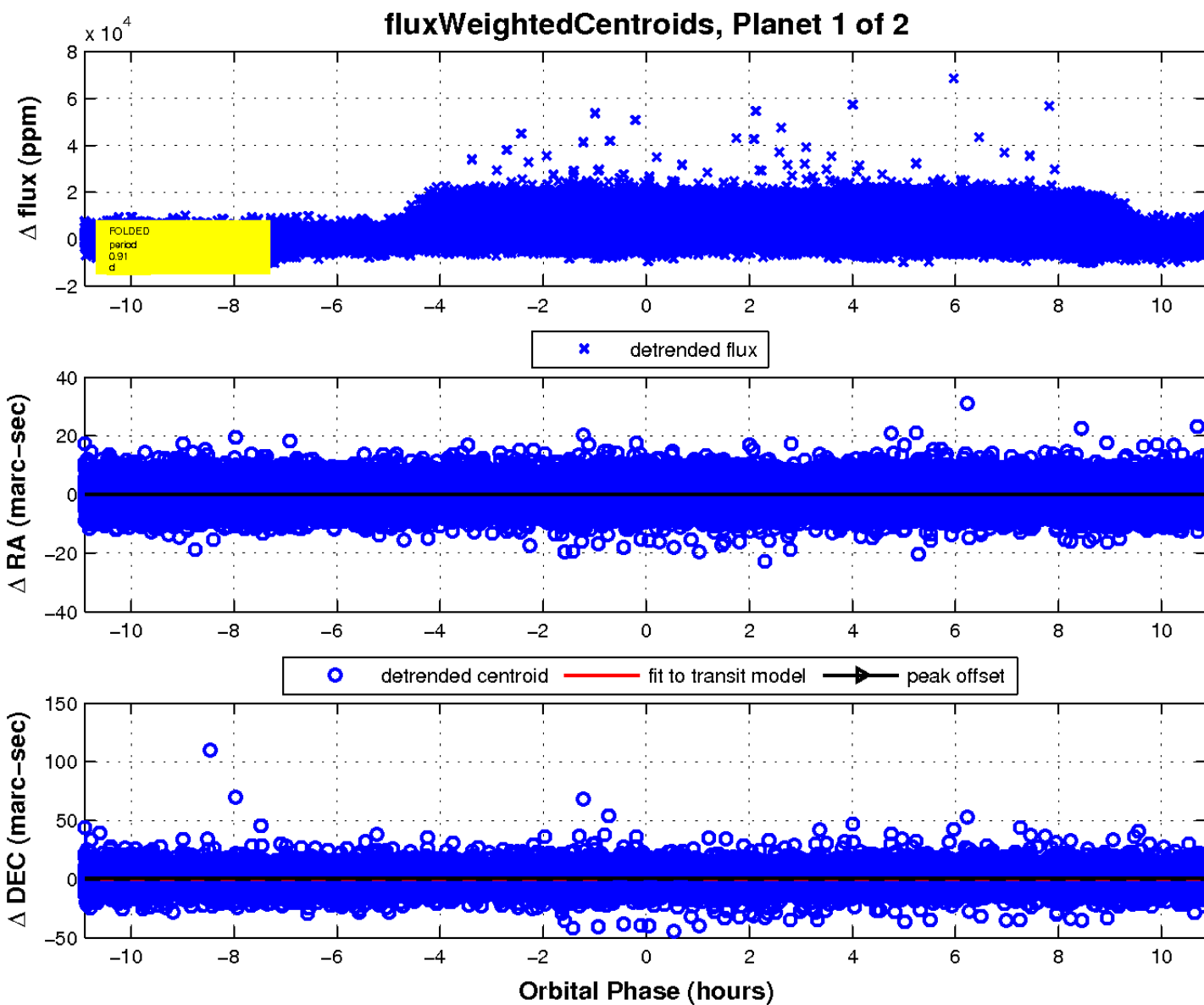
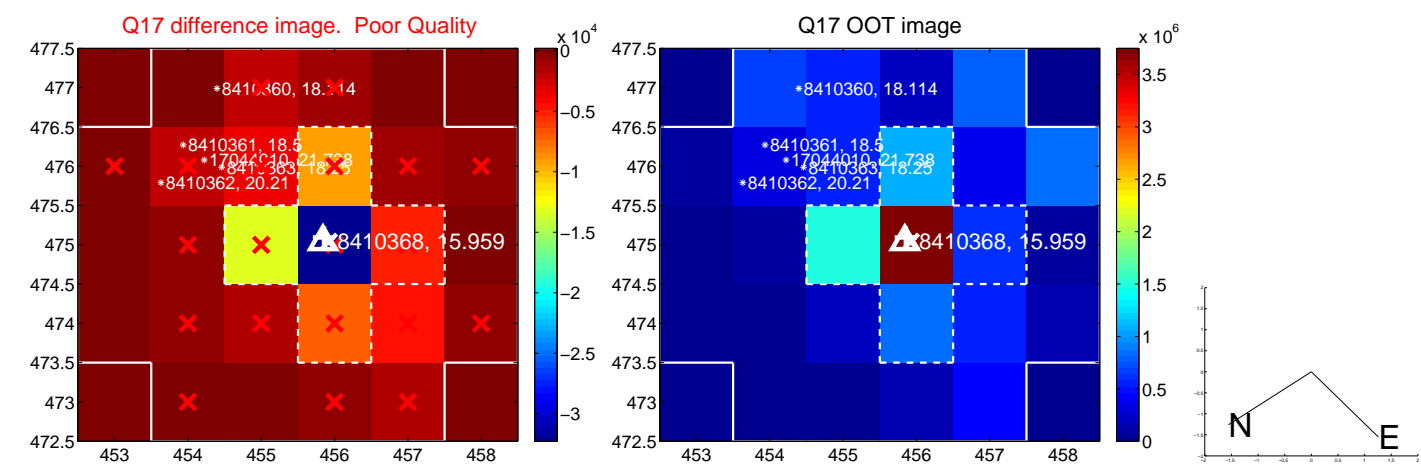


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



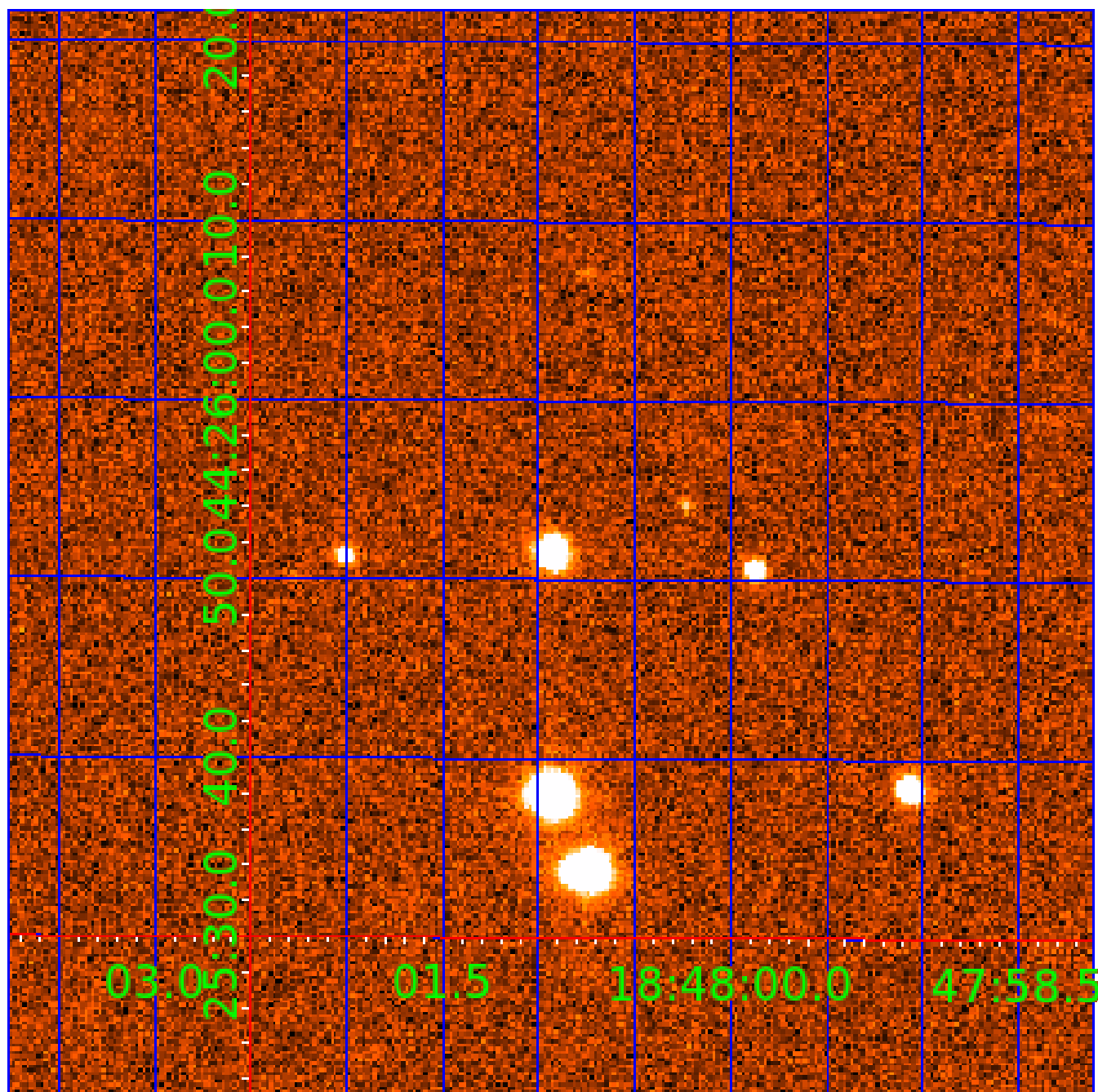


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 008410368

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008410368-01	OBS	No	0.908115	132.270685	382.9	4.336	26.3	11.5	0.67	4805	1.28	839.07
008410368-02	OBS	No	0.907812	131.757869	8490.6	1.500	24.3	-1.0	0.67	4805	5.97	839.44

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008410368-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
008410368-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA—TRANS_GAPPED—LPP_DV—SAME_NTL_PERIOD—CENT_NOFITS

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

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

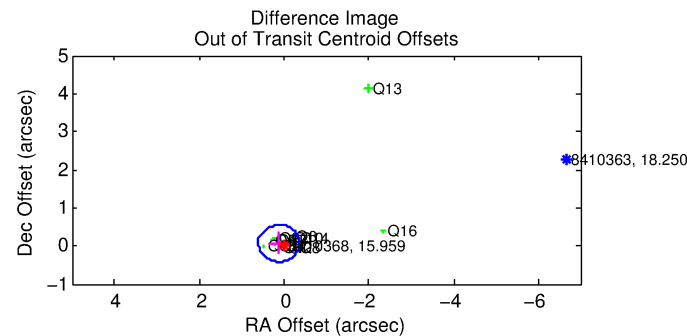
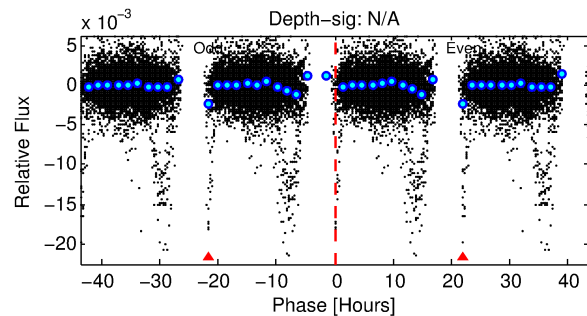
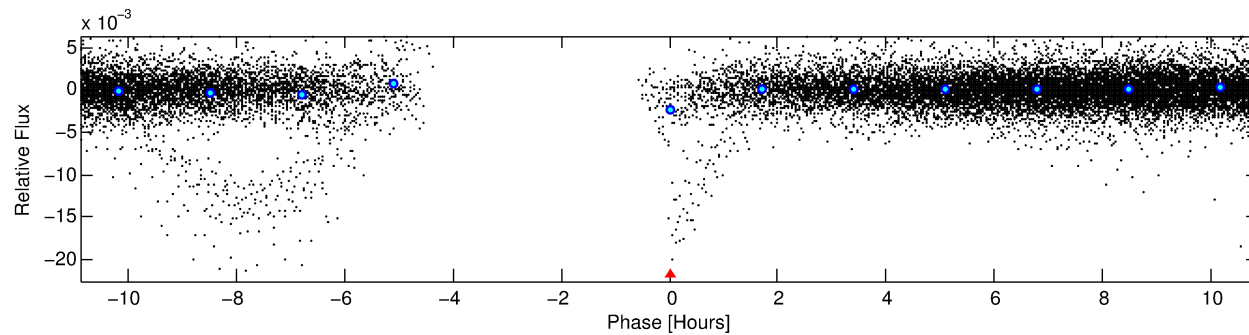
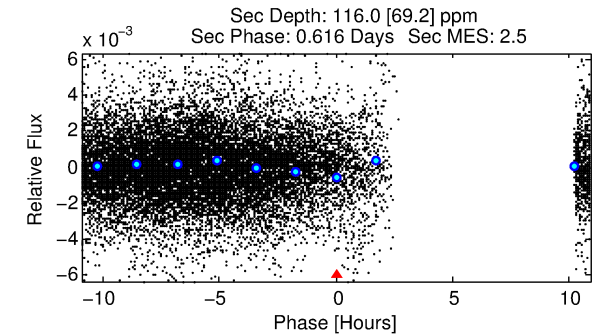
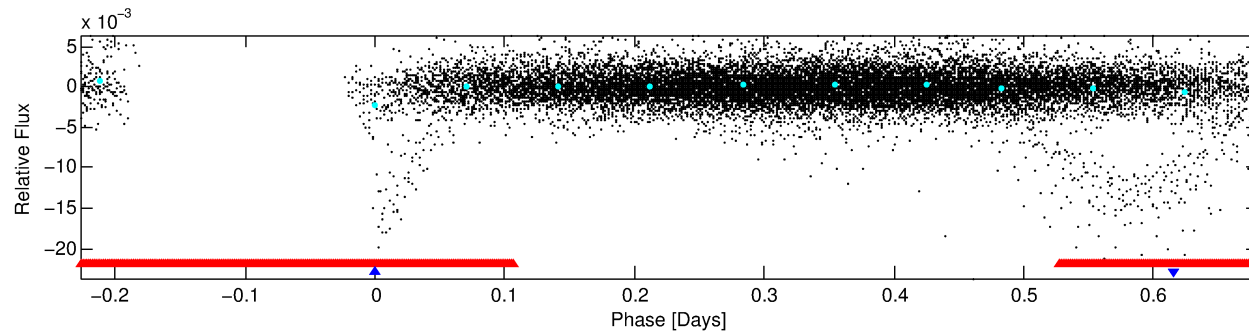
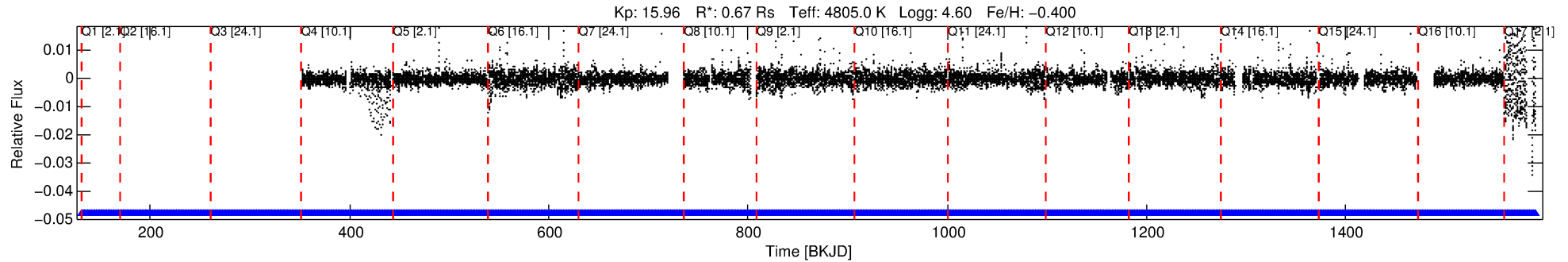
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 008410368-02

No Significant Match Found

# DV One-Page Summary

KIC: 8410368 Candidate: 2 of 2 Period: 0.908 d



## TPS TCE Results:

Period = 0.90781 d  
Epoch = 131.7579 BKJD

DV fit results are unavailable

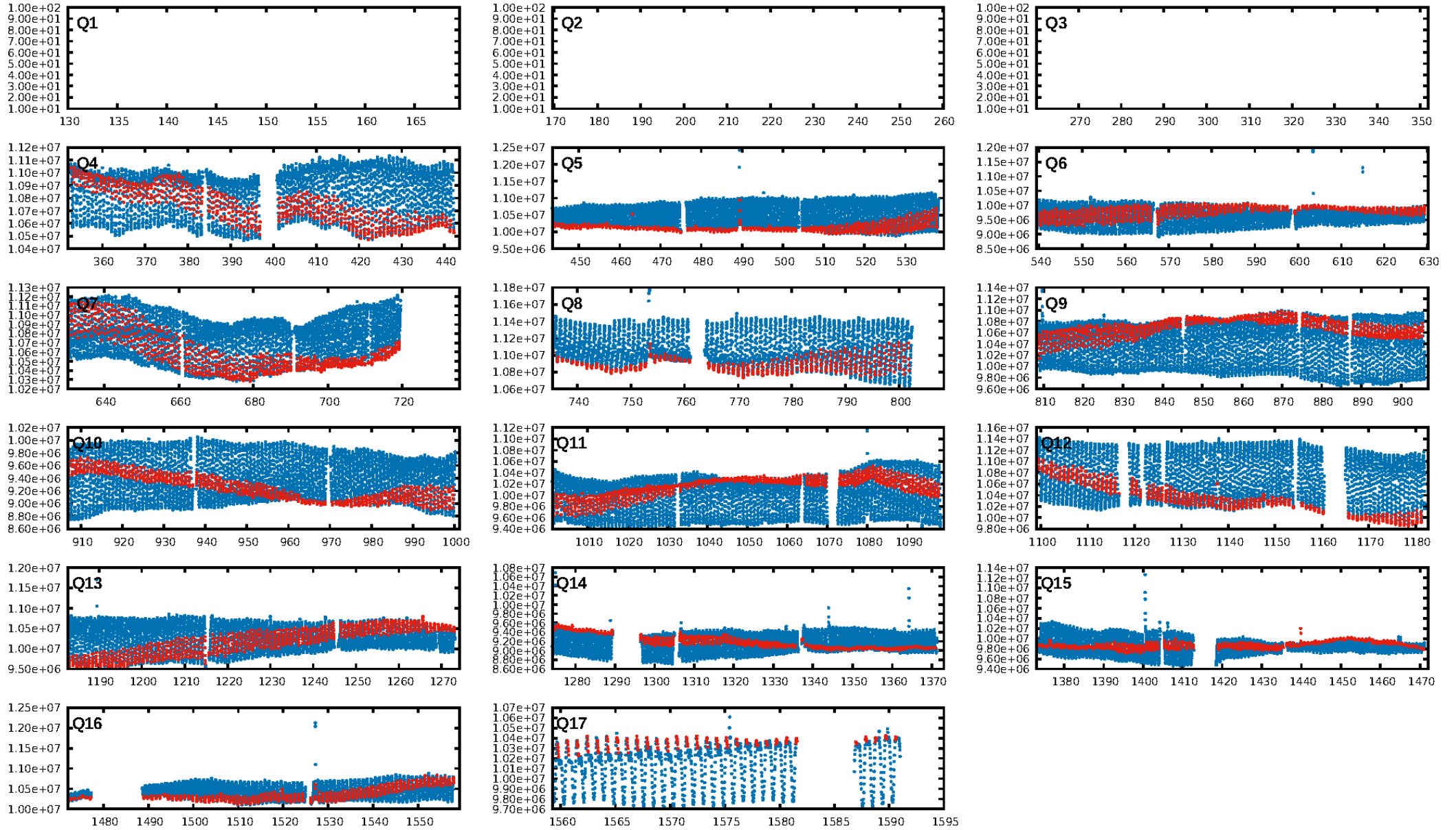
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 0.1% [0.00σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [626/626]  
GhostDiagnostic-chr: 2.171  
Centroid-sig: 44.3%  
Centroid-so: 1.241 arcsec [151.37σ]  
OotOffset-rm: 0.136 arcsec [0.84σ]  
KicOffset-rm: 0.206 arcsec [0.63σ]  
OotOffset-st: 3/3/4/4 [14]  
KicOffset-st: 3/3/4/4 [14]  
DiffImageQuality-fgm: 0.57 [8/14]  
DiffImageOverlap-fno: 0.00 [0/14]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 02-Feb-2016 08:20:58 Z

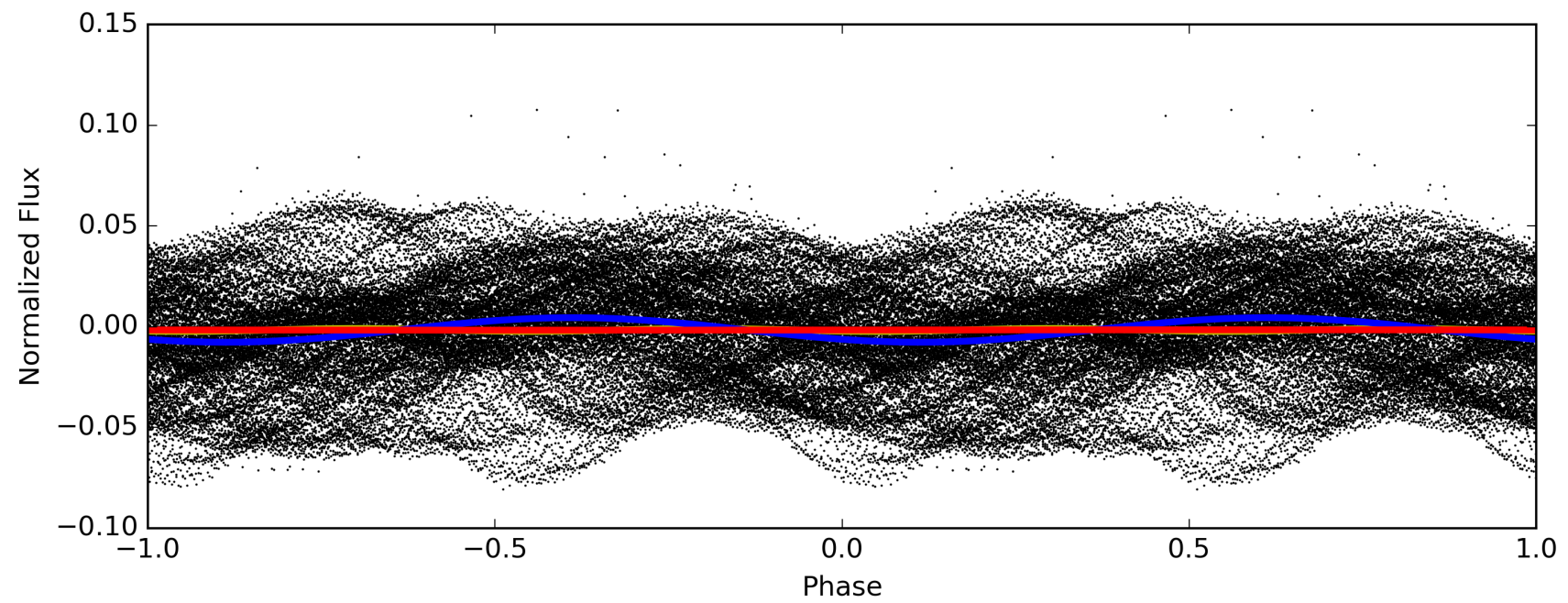
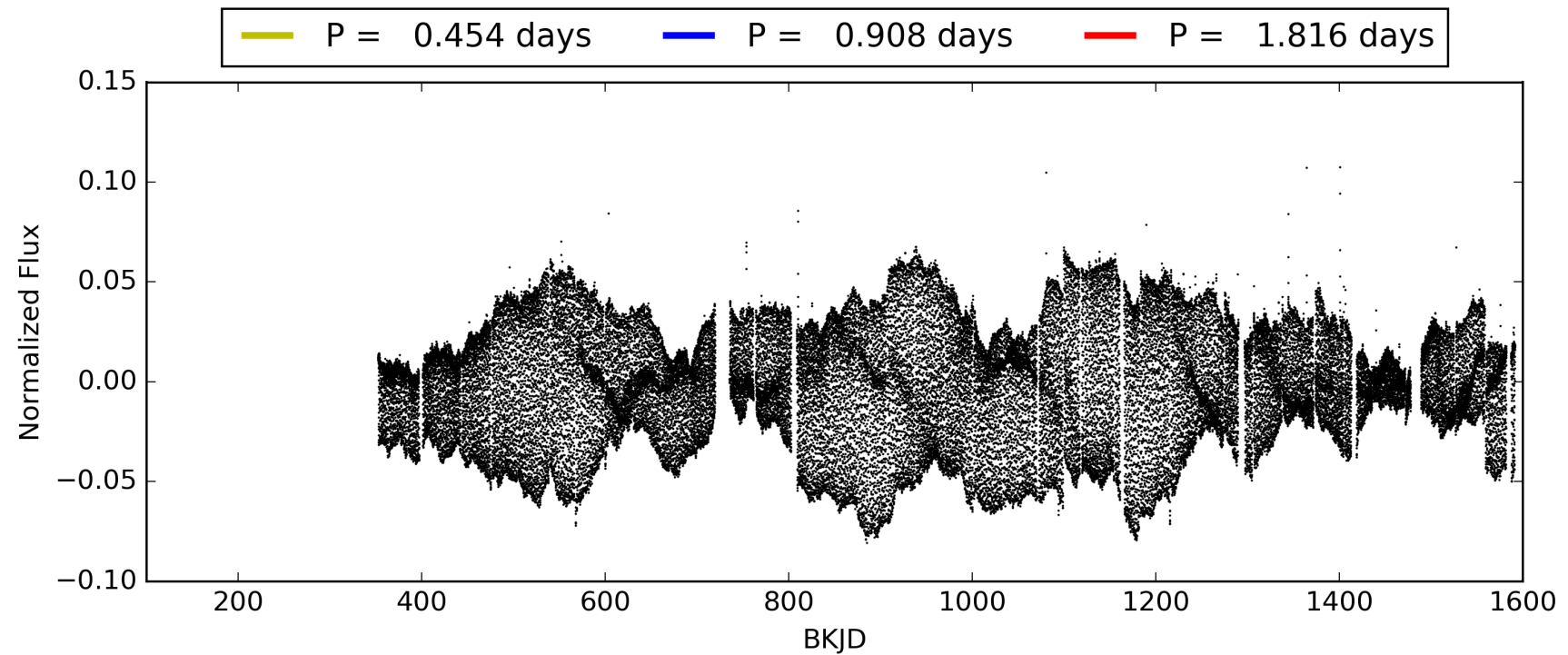
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 008410368-02, PDC Light Curves



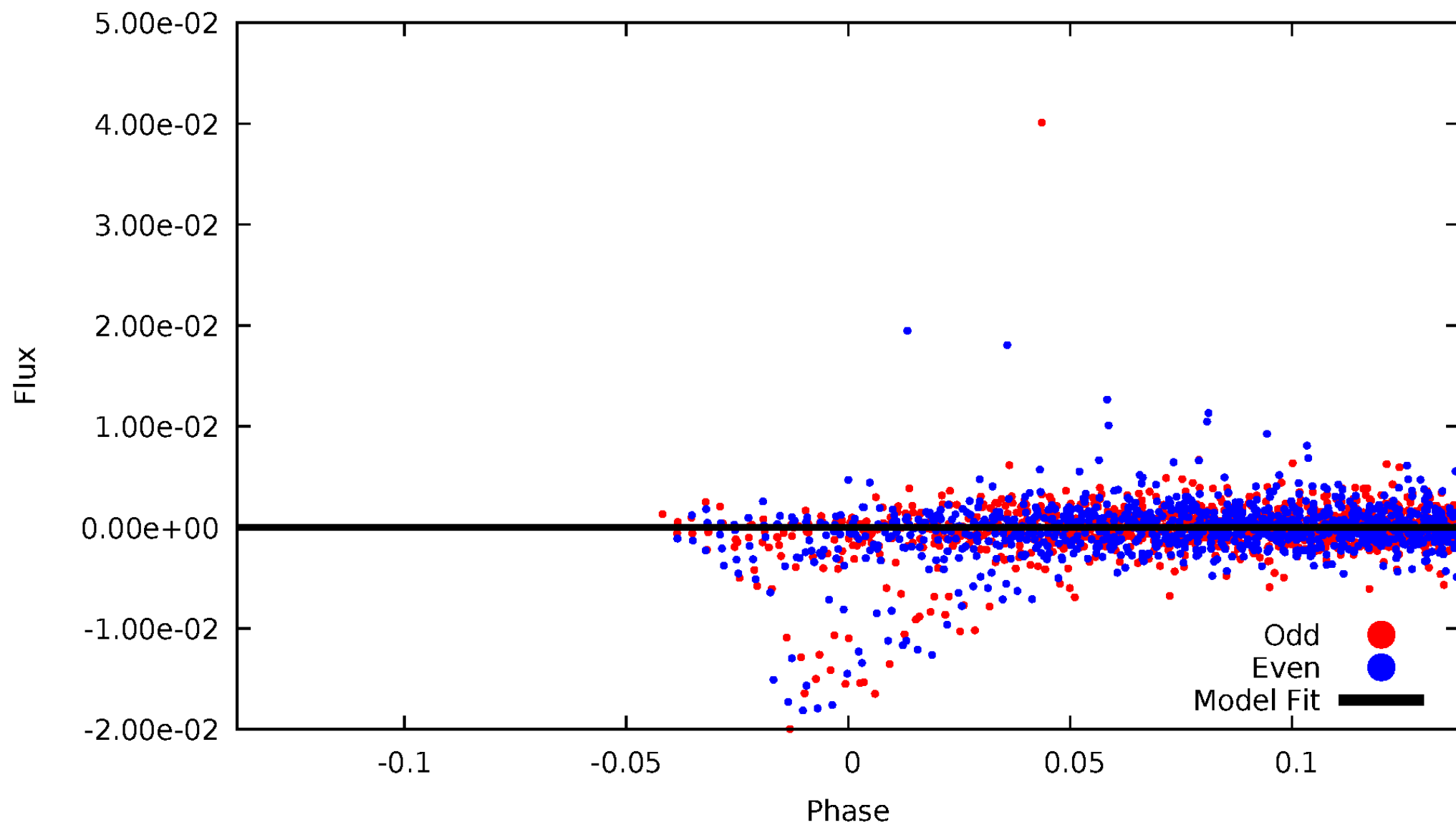


TCE 008410368-02



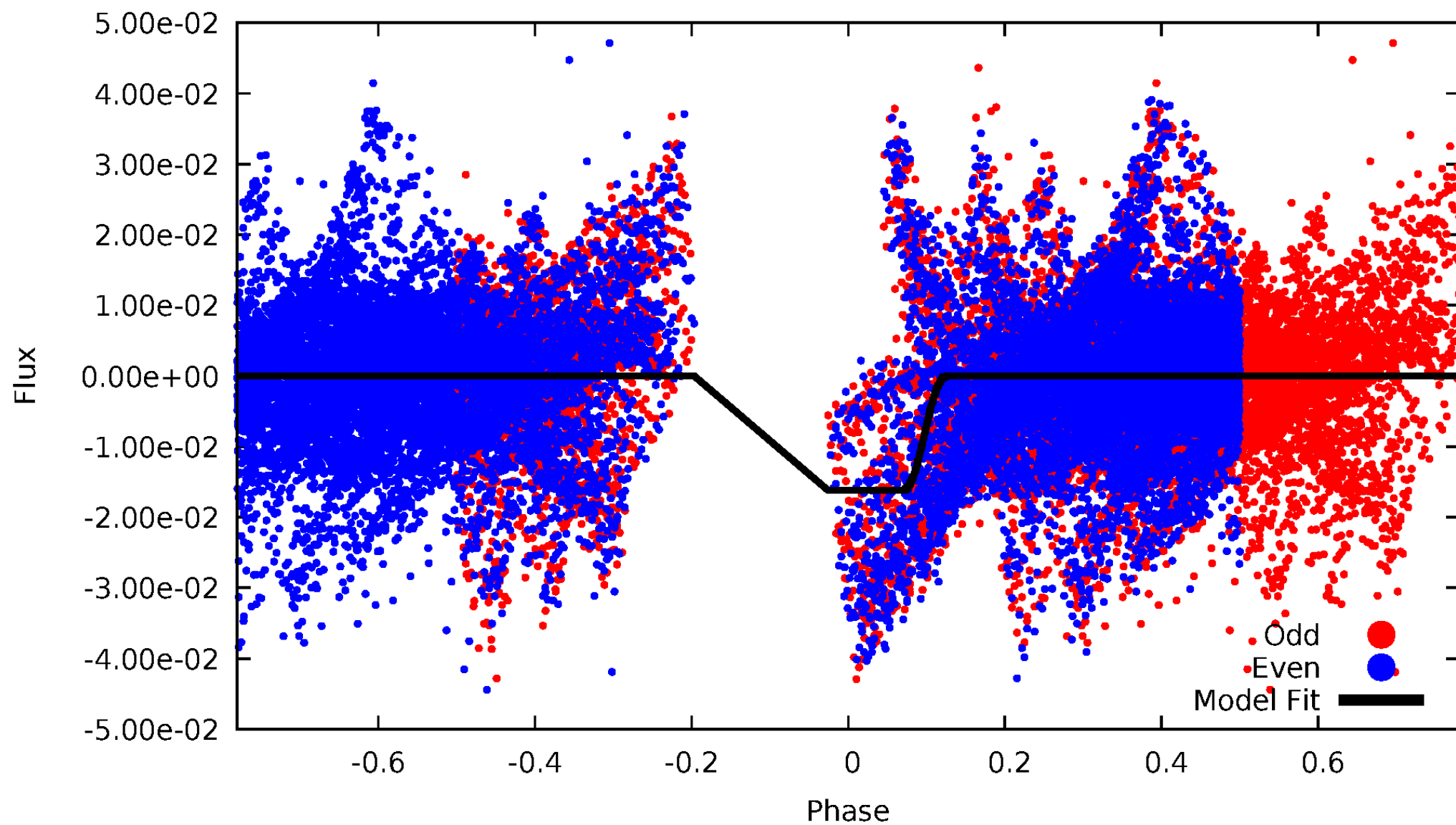
# DV Odd/Even

TCE 008410368-02



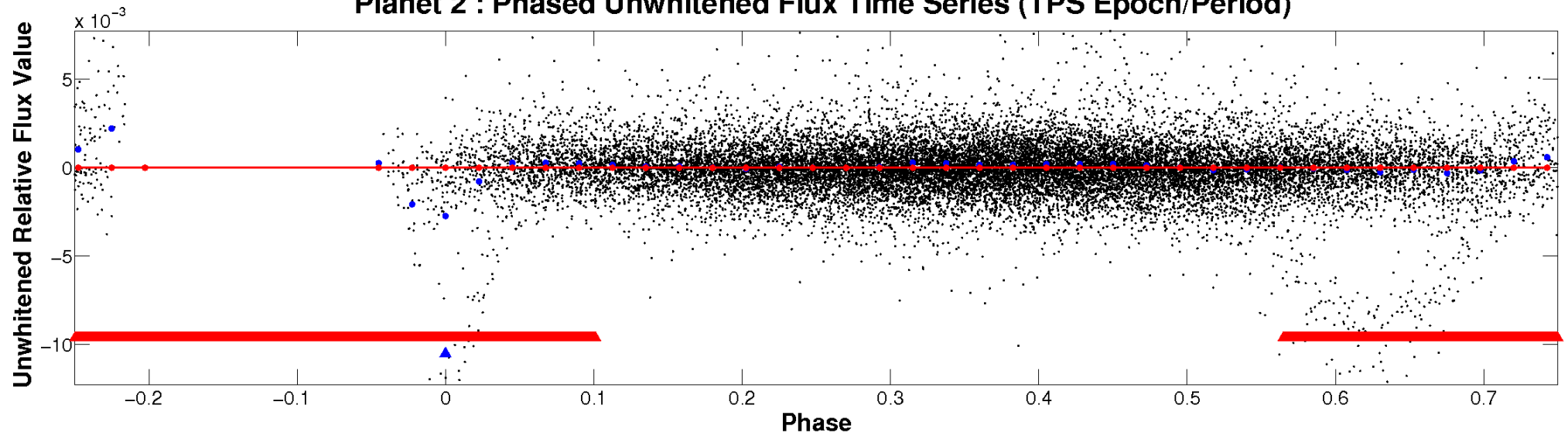
# ALT Odd/Even

TCE 008410368-02

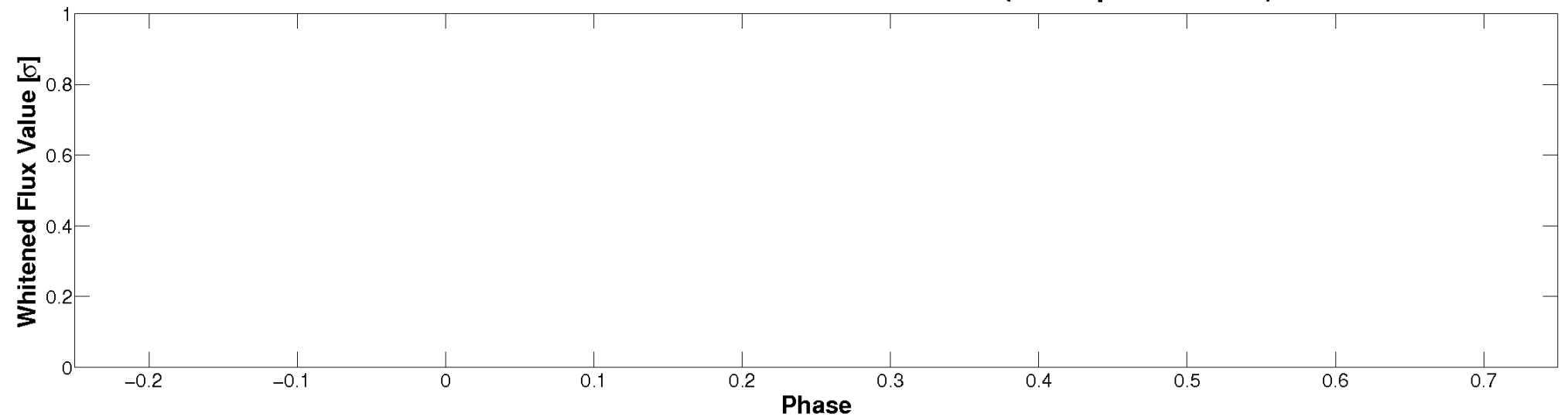


# Non-Whitened Vs. Whitened Light Curve

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

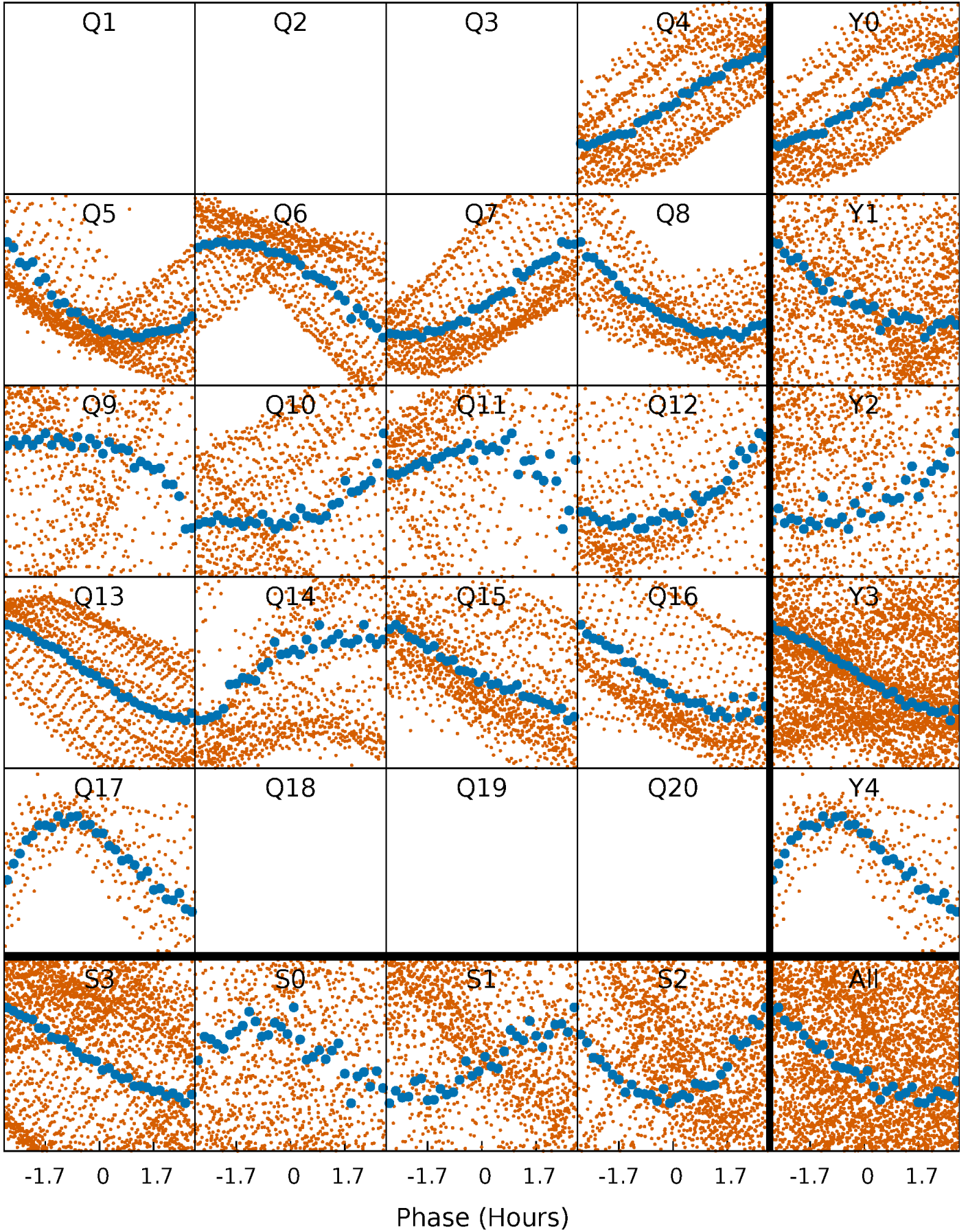


**Planet 2 : Phased Whitened Flux Time Series (TPS Epoch/Period)**



# PDC Quarter-Phased Transit Curves

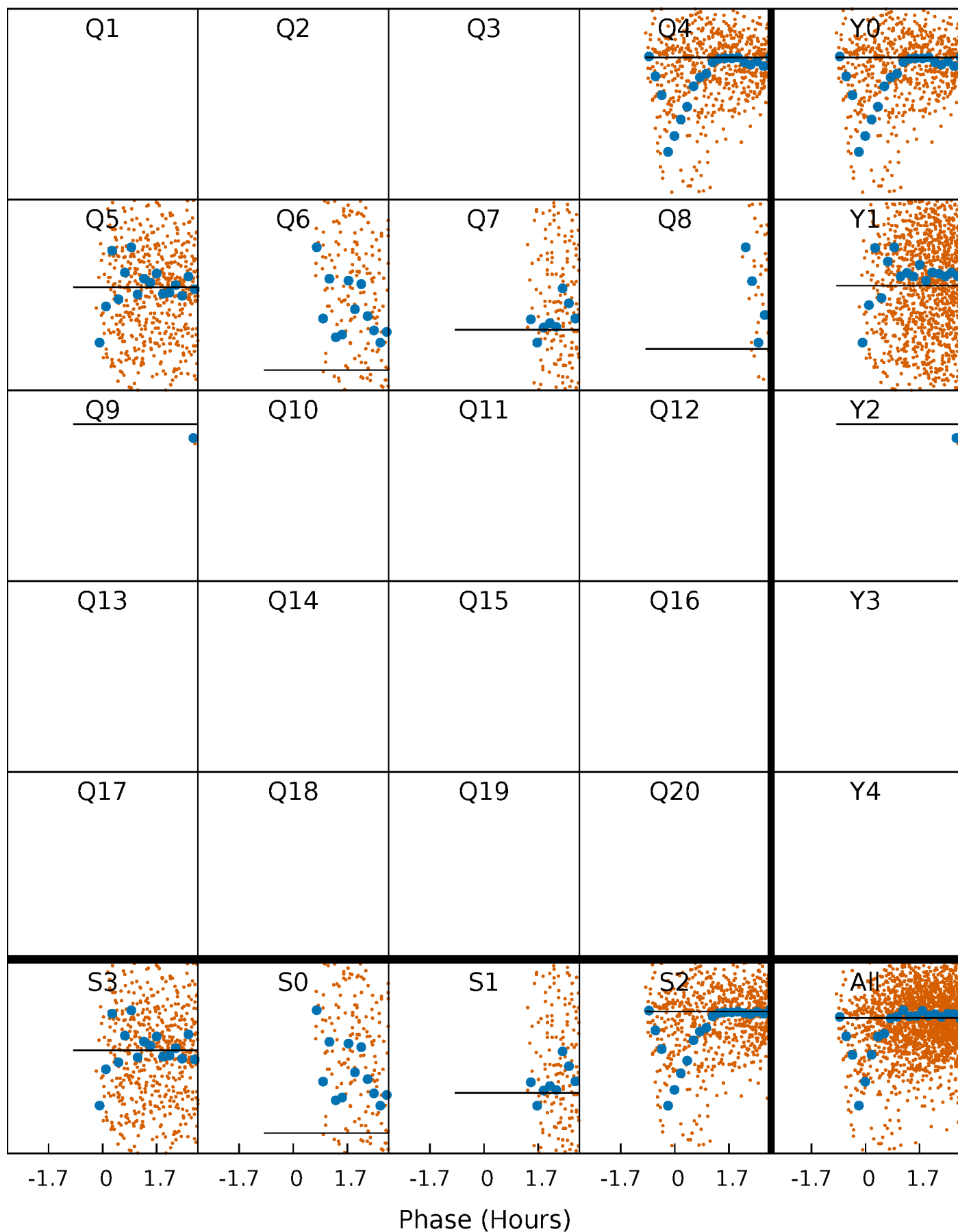
TCE 008410368-02     $P = 0.907812$  Days     $T_0 = 131.757869$  (BKJD)





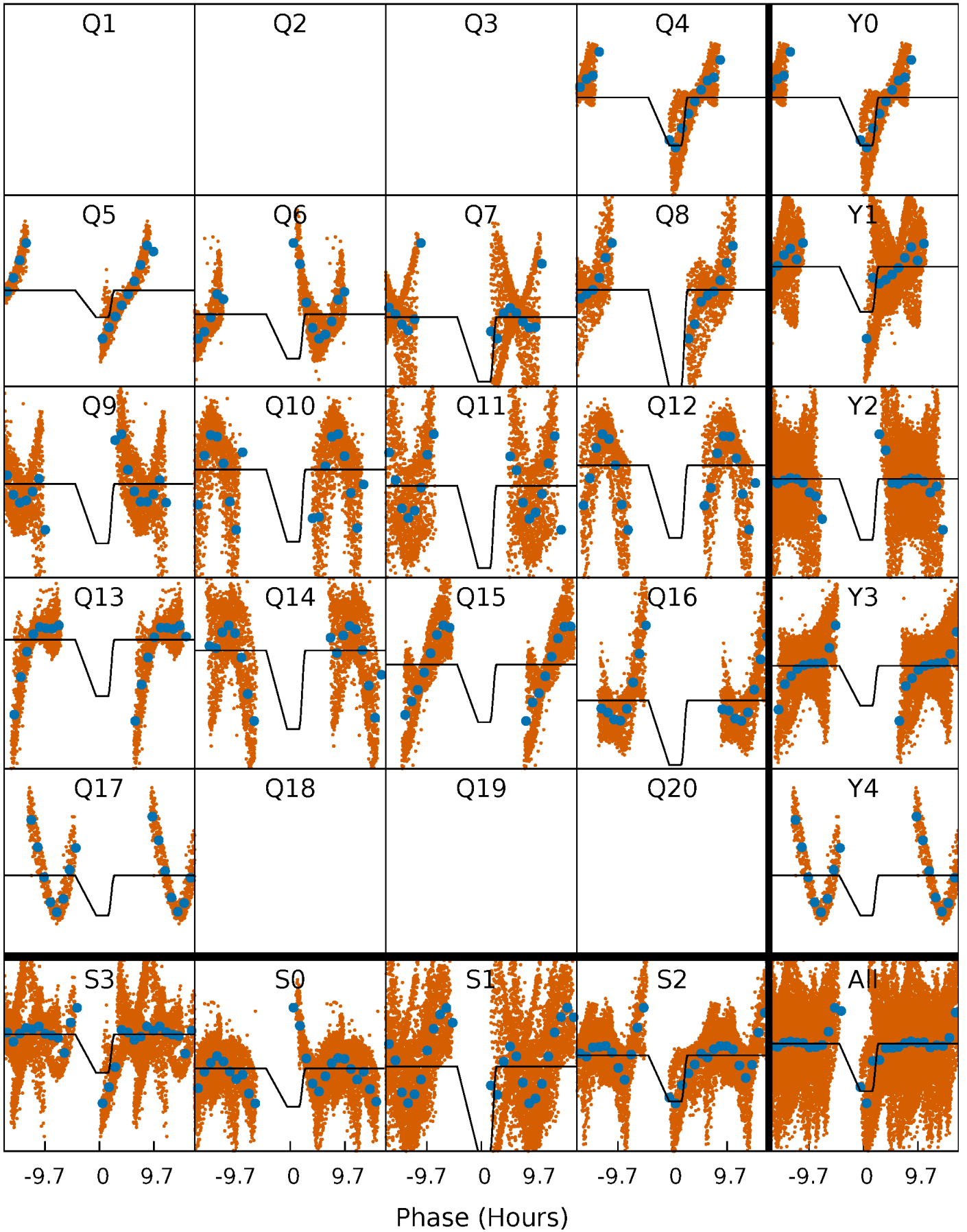
# DV Quarter-Phased Transit Curves

TCE 008410368-02   P= 0.907812 Days    $T_0=131.757869$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

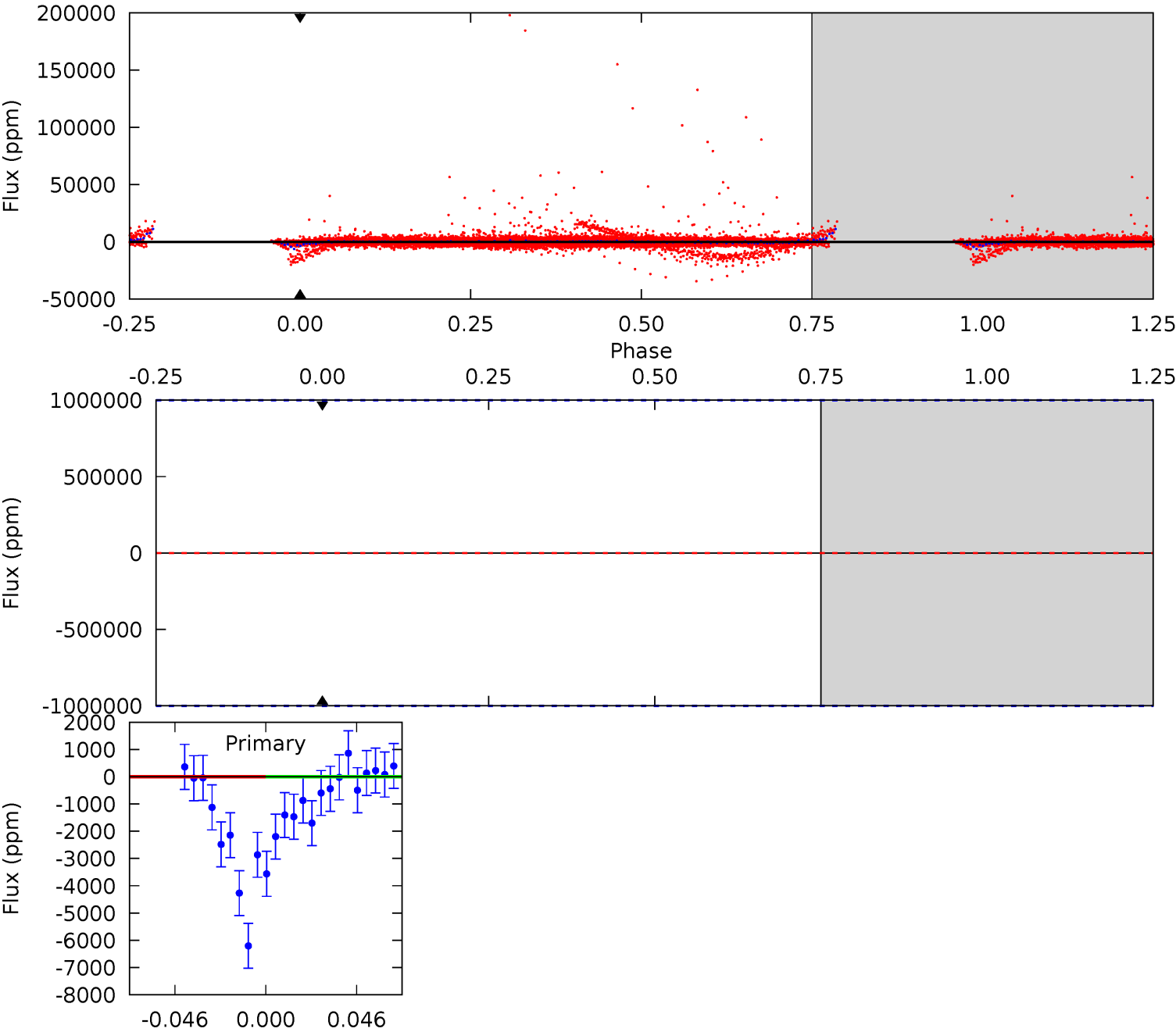
TCE 008410368-02   P= 0.907812 Days    $T_0=131.743328$  (BKJD)



# DV Model-Shift Uniqueness Test

008410368-02, P = 0.907812 Days, E = 131.757869 Days

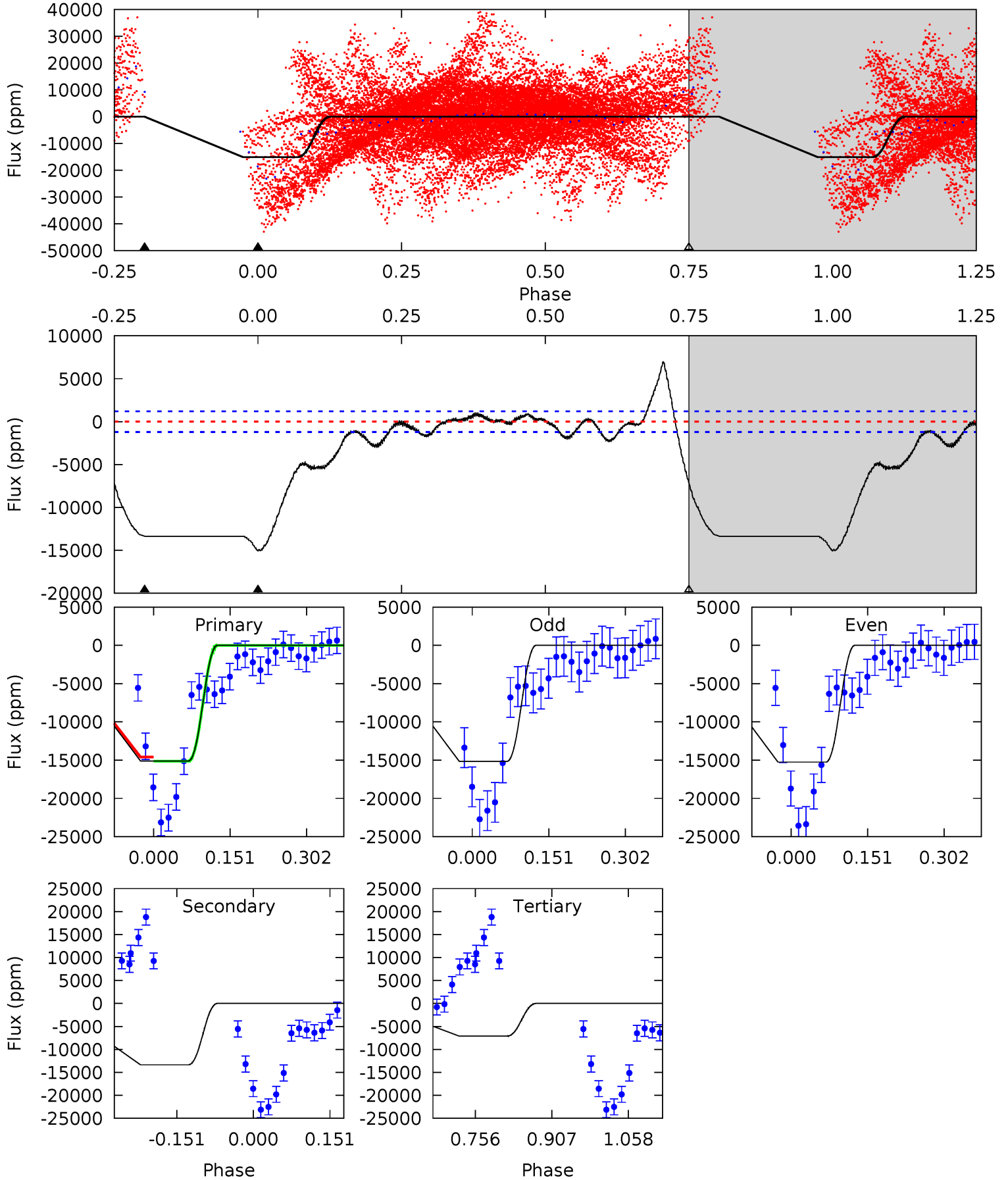
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0	0	0	0	1.00	1.00	1.00	0	0	0	0	0	0	0	0



# Alt Model-Shift Uniqueness Test

008410368-02, P = 0.907812 Days, E = 131.743328 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
56.2	49.7	26.5	0	4.48	1.44	4.58	29.7	56.2	23.2	49.7	0.21	0.56	0.32	0.40



### Stellar Parameters For KIC 008410368

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$4805^{+169}_{-169}$	$4.603^{+0.063}_{-0.032}$	$-0.400^{+0.350}_{-0.300}$	$0.666^{+0.059}_{-0.065}$	$0.649^{+0.078}_{-0.048}$	$3.092^{+0.866}_{-0.414}$
	+4%/-4%	+1%/-1%	+87%/-75%	+9%/-10%	+12%/-7%	+28%/-13%
Source	KIC0	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 008410368-02 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$0 \pm 1000000$	$7.84^{+6.64}_{-5.09}$	$1903^{+75}_{-77}$	$-2531^{+12387}_{-7130}$	$-0.213^{+389.567}_{-357.771}$
Alt.	$-13353 \pm 269$	$10.26^{+6.55}_{-5.93}$	$1905^{+76}_{-77}$	$4425^{+2131}_{-742}$	$18^{+83}_{-12}$

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

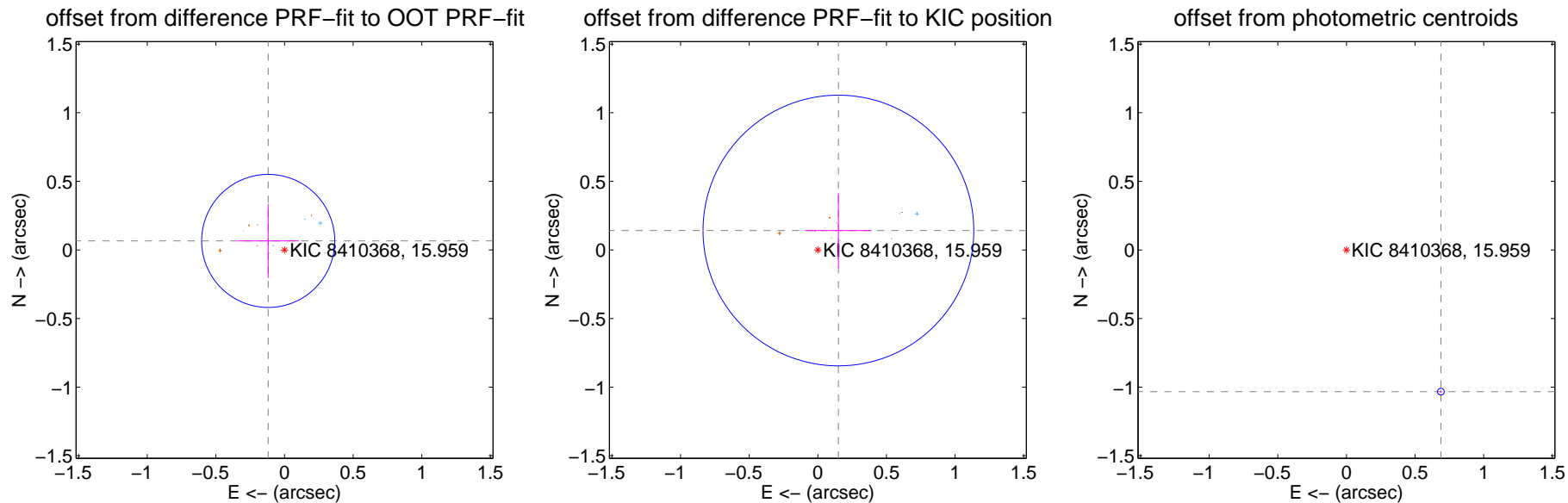
## DV Centroid Data

Supplemental centroid analysis for 008410368-02. Kepler magnitude: 15.96. Transit SNR -1.00

There are 8 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.35 arcsec

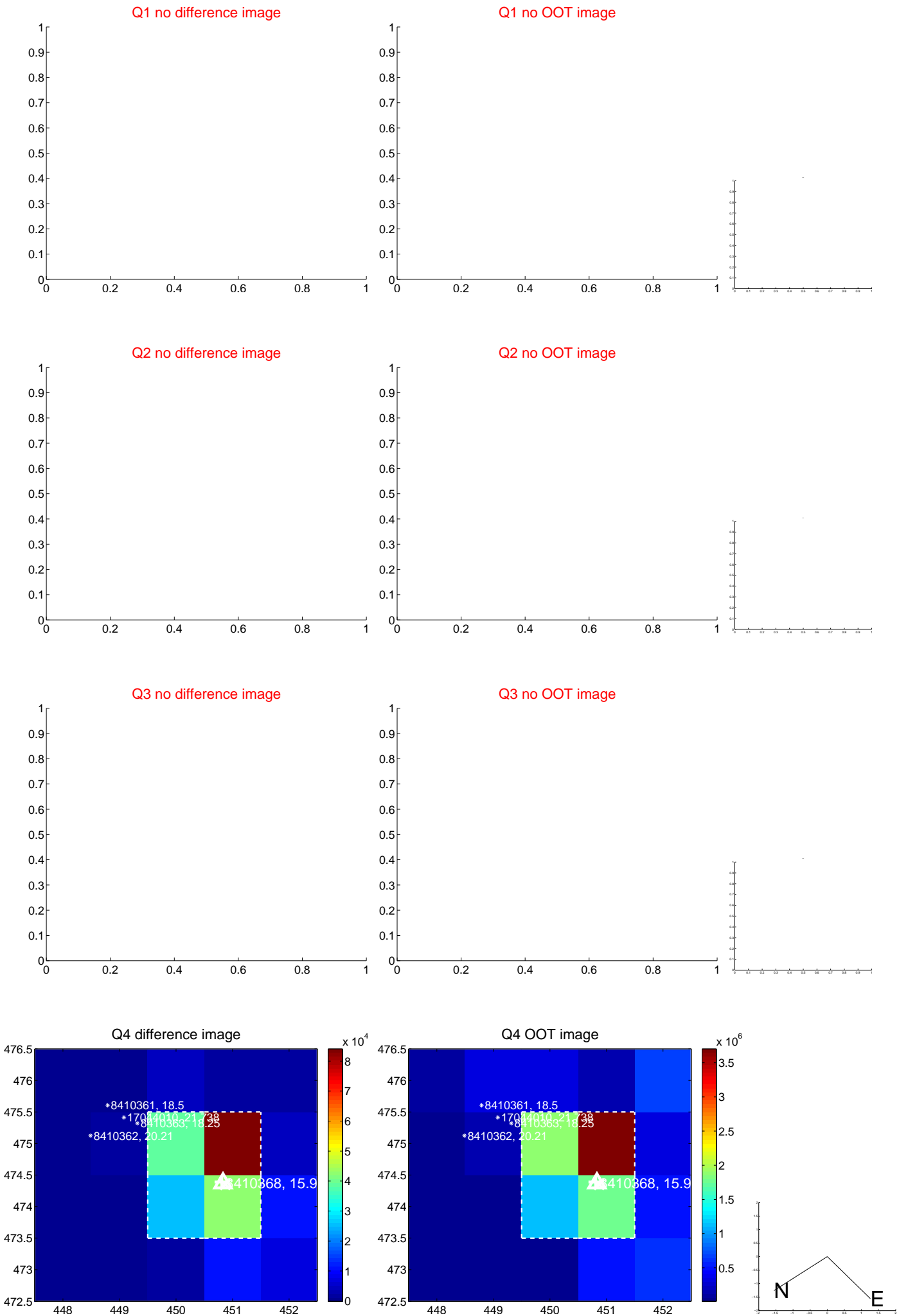
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.136 \pm 0.162$	0.84	$0.119 \pm 0.223$	$0.066 \pm 0.270$
PRF-fit source offset from KIC position	$0.206 \pm 0.329$	0.63	$-0.150 \pm 0.241$	$0.142 \pm 0.273$
photometric centroid source offset	$1.24 \pm 0.01$	151.37	$-0.69 \pm 0.01$	$-1.03 \pm 0.01$



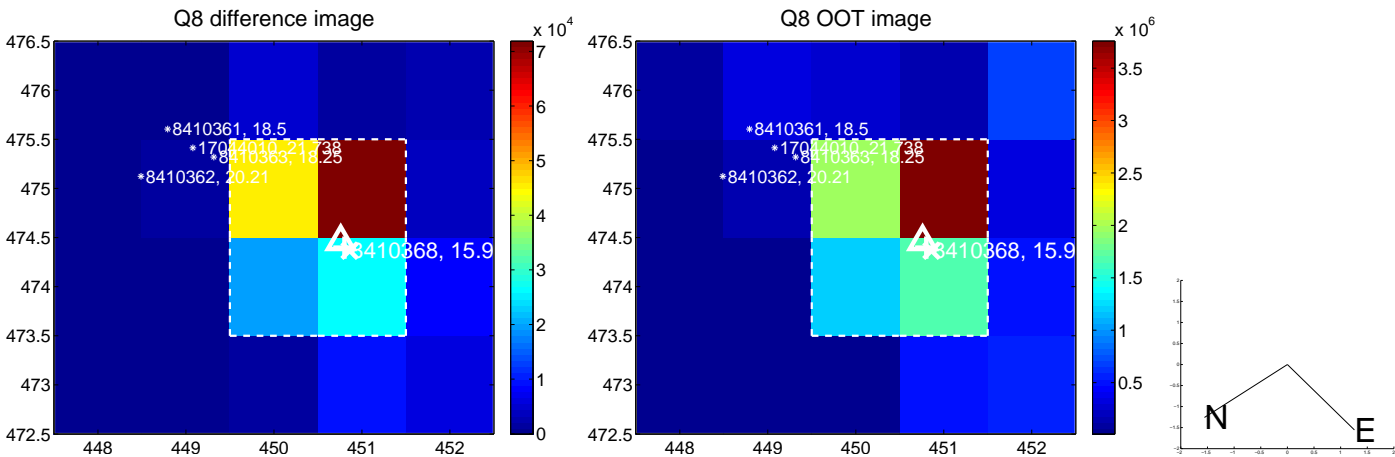
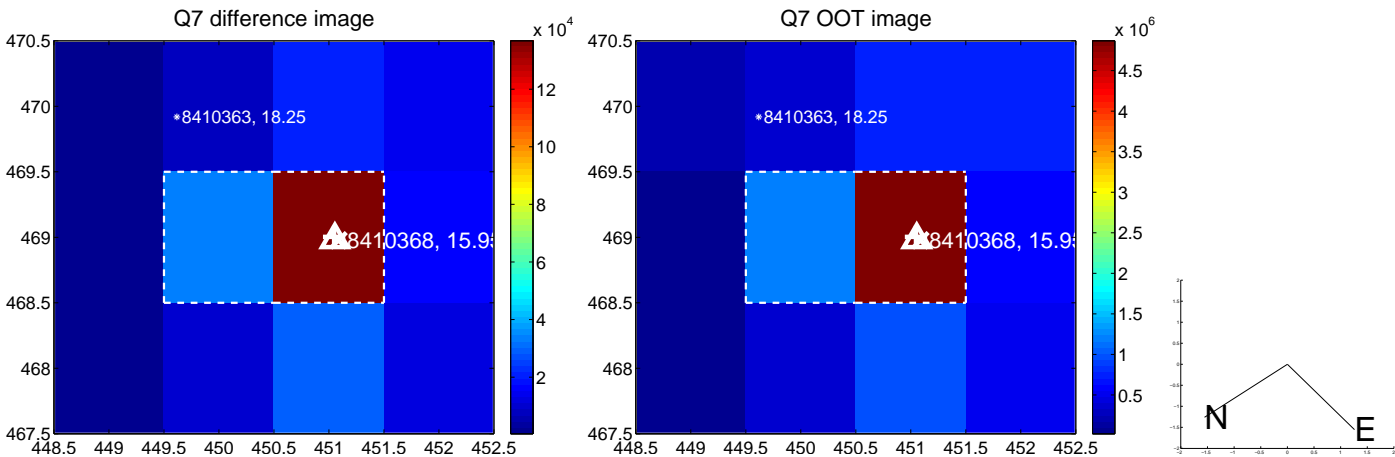
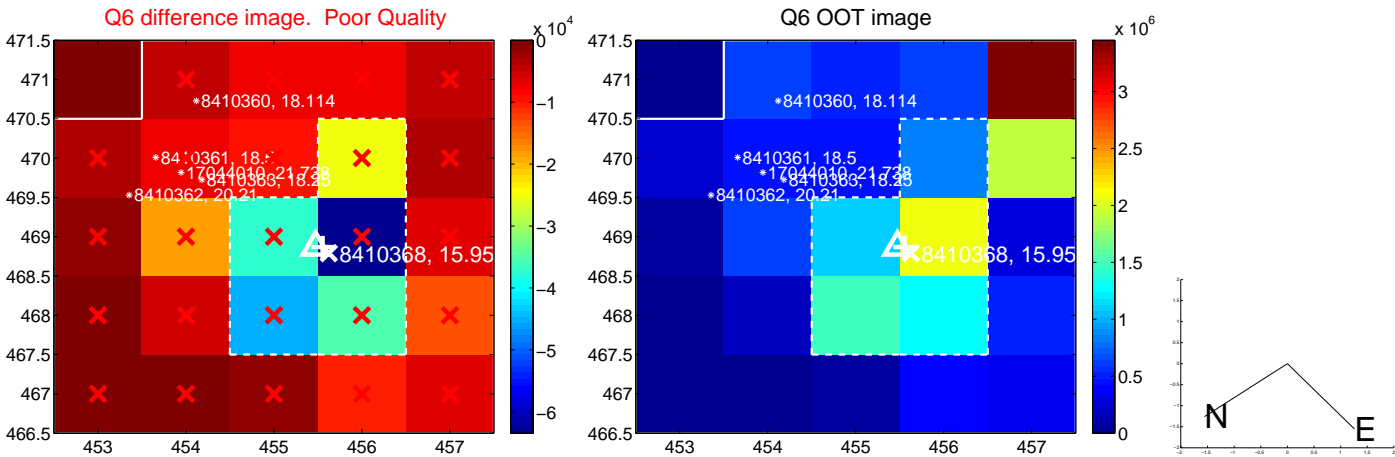
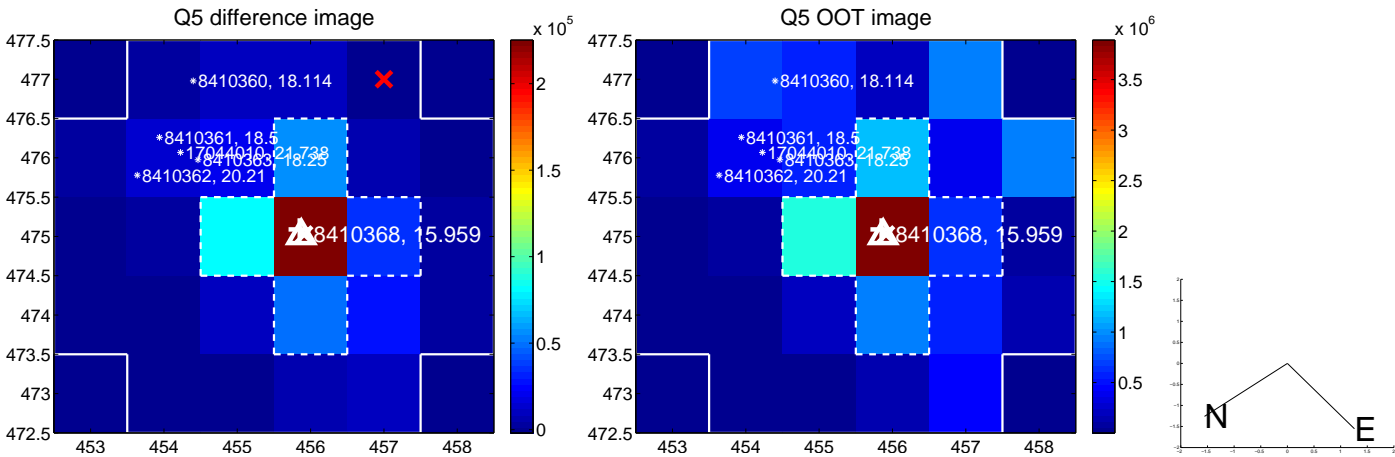
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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



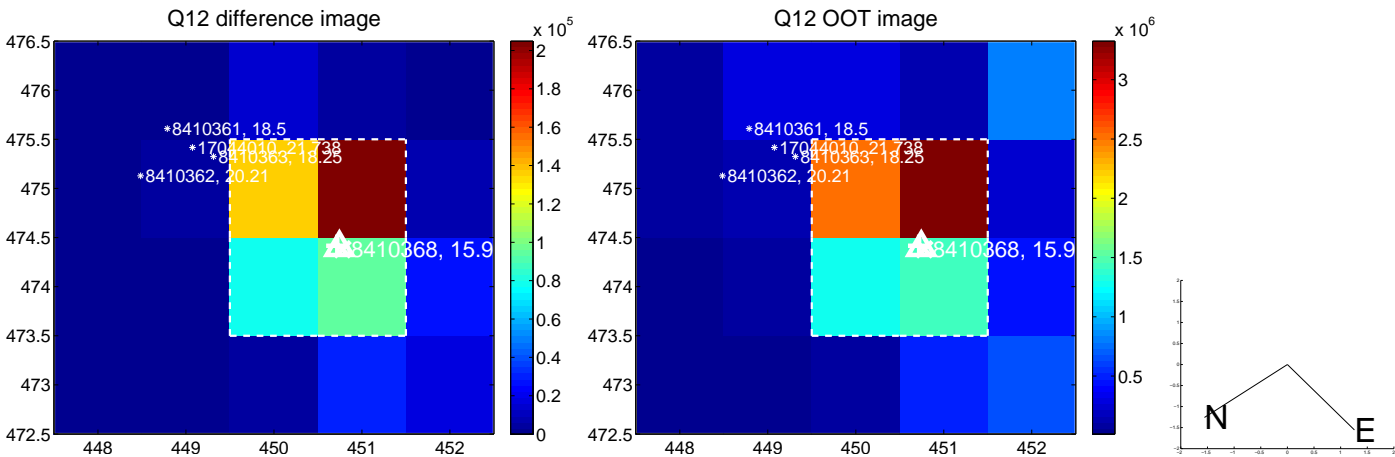
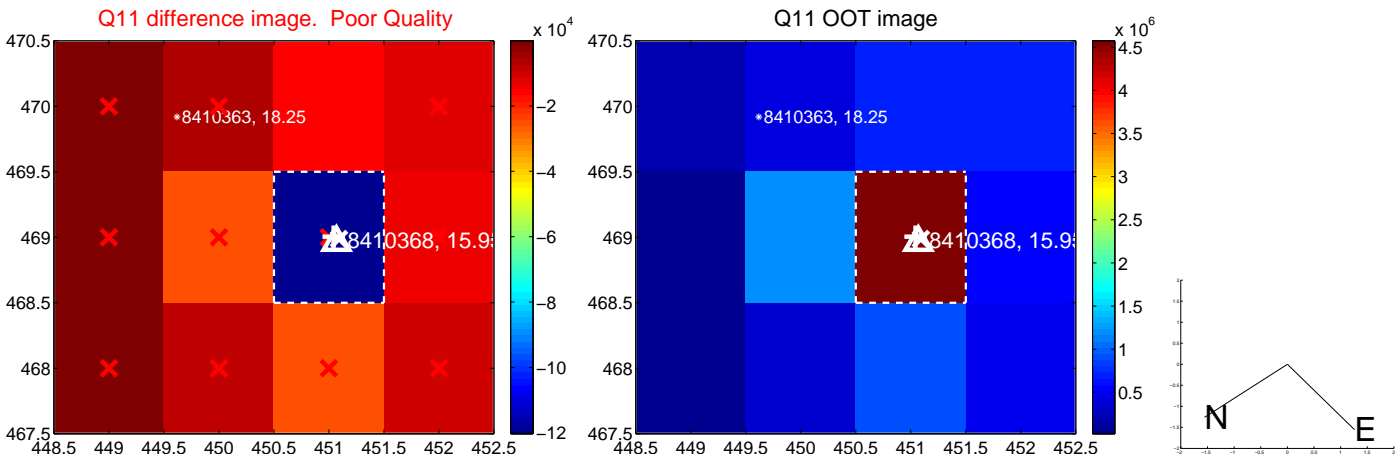
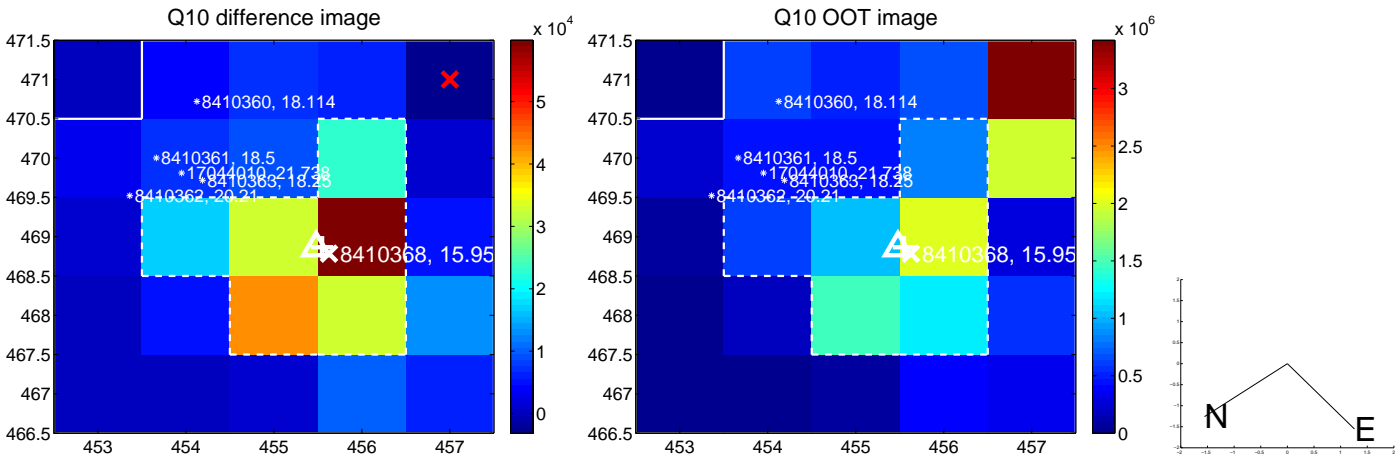
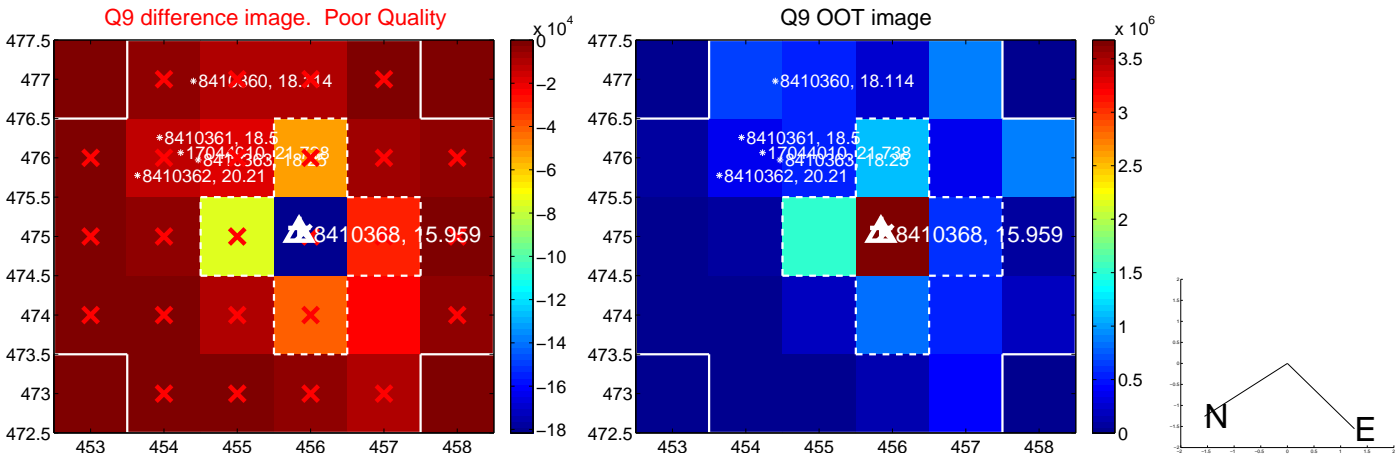
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



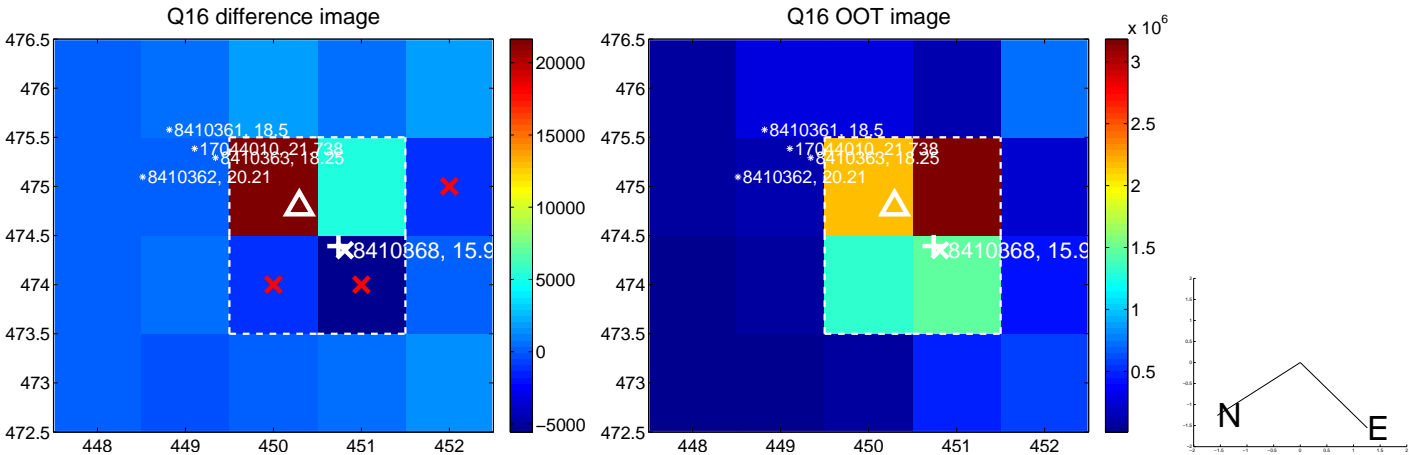
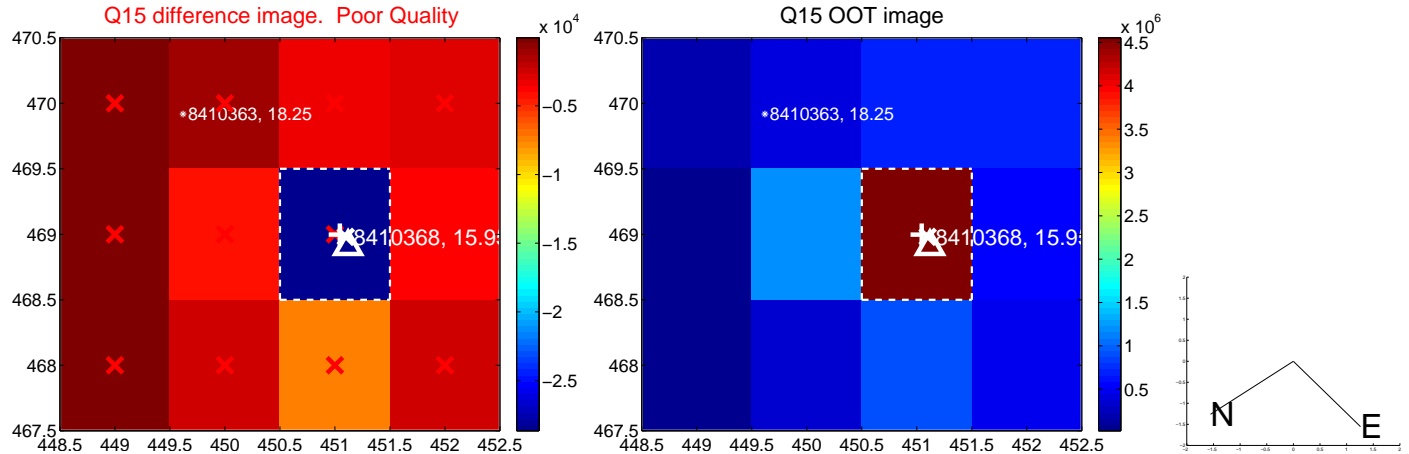
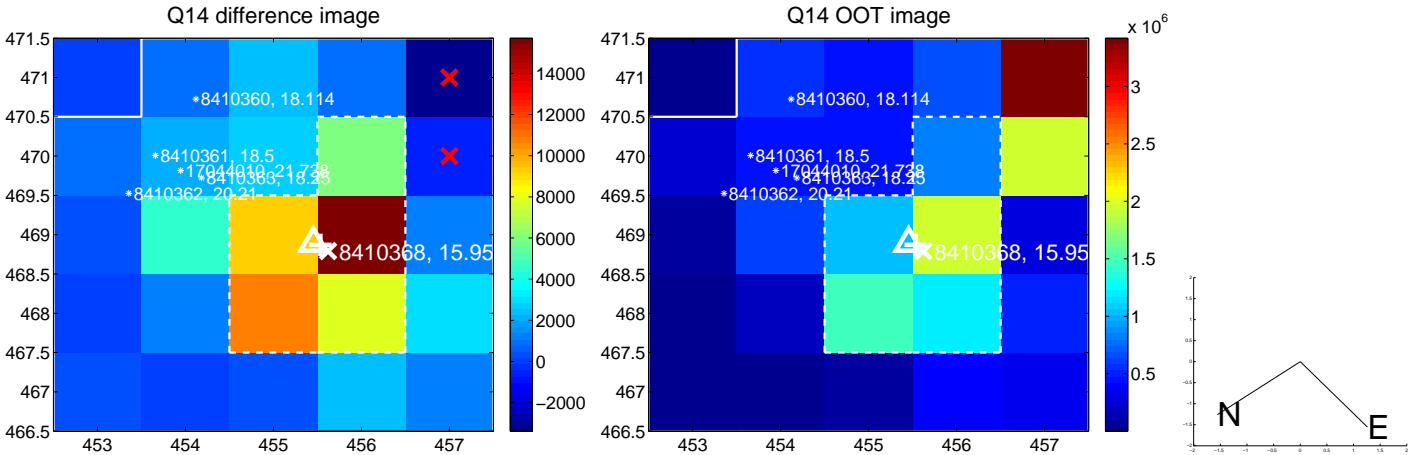
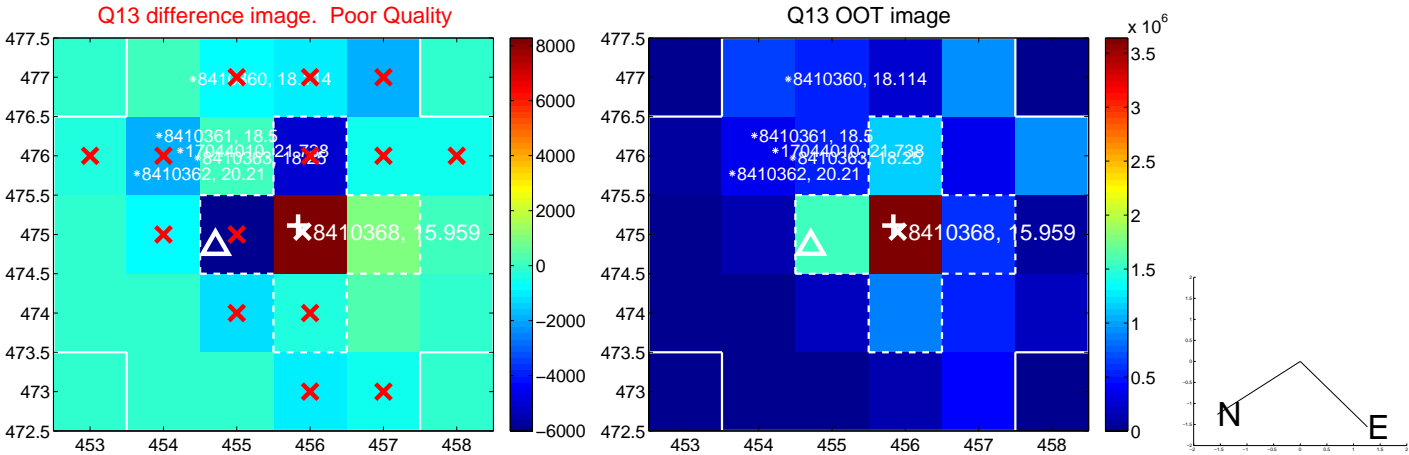
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



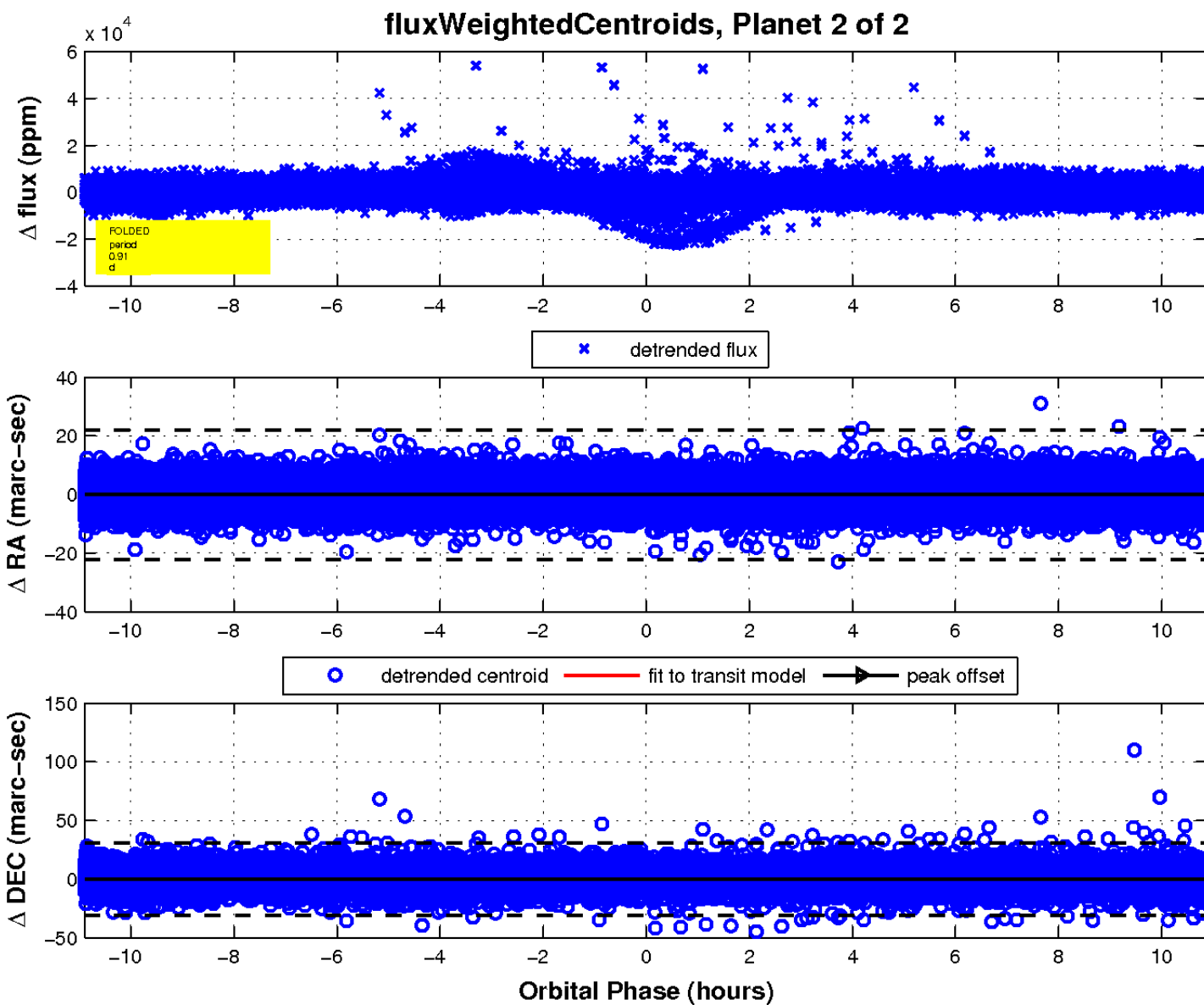
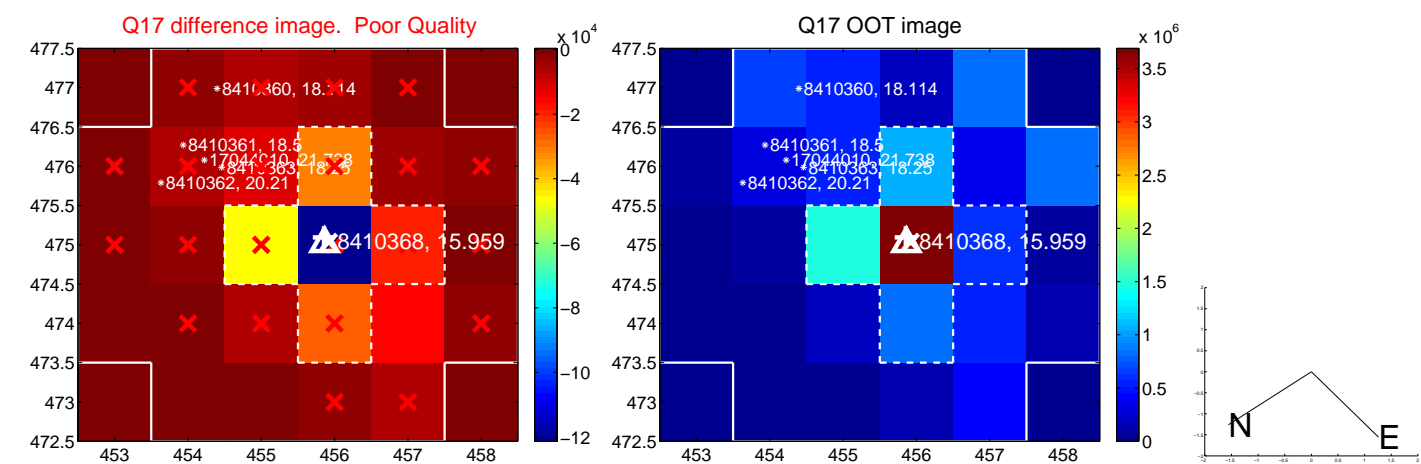
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

