

# KIC 008700558

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008700558-01	OBS	No	4.791813	133.013385	134.6	1.902	43.8	50.0	1.10	6499	1.50	577.21
008700558-02	OBS	0320.01	4.791809	135.180269	105.2	2.165	36.8	40.9	1.10	6499	1.33	577.21

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008700558-01	OBS	FP	0.00	1	0	1	0	LPP_DV—CENT_UNRESOLVED_OFFSET
008700558-02	OBS	FP	0.00	1	0	1	0	SAME_NTL_PERIOD—CENT_UNRESOLVED_OFFSET

**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.

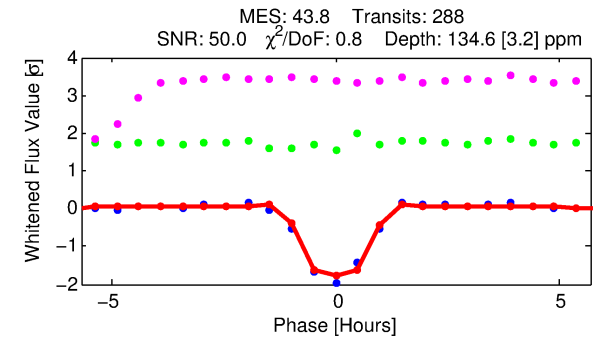
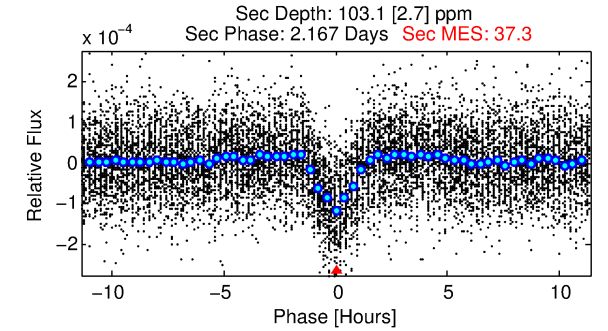
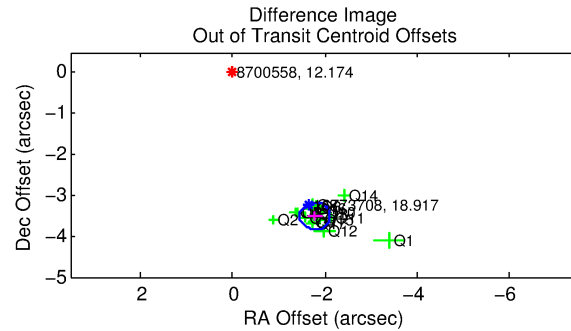
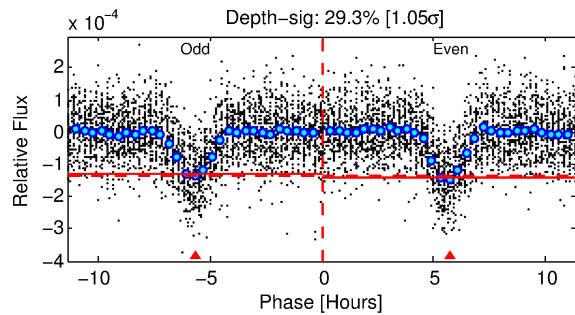
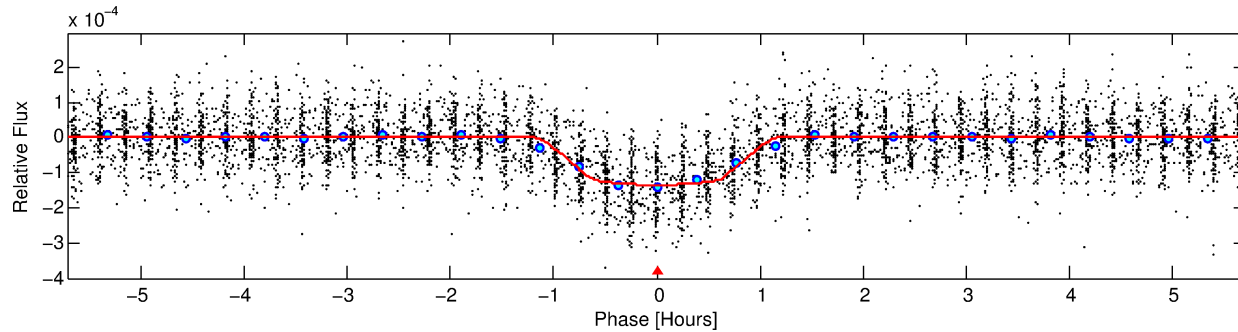
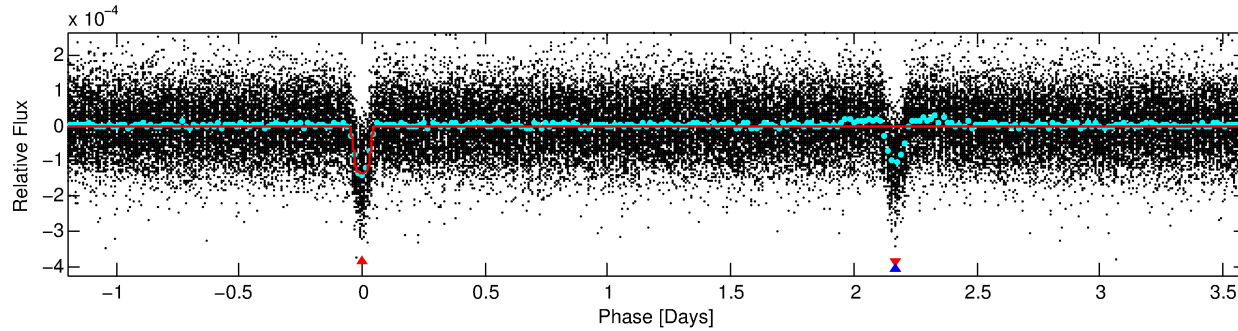
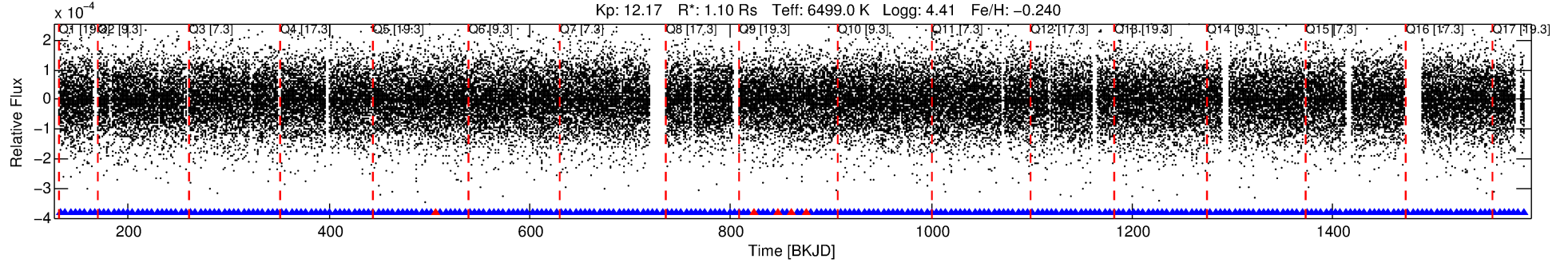
## Ephemeris Match Information For 008700558-01

No Significant Match Found

# DV One-Page Summary

KIC: 8700558 Candidate: 1 of 2 Period: 4.792 d  
KOI: K00320 Corr: No Ephemeris Match

Kp: 12.17 R\*: 1.10 Rs Teff: 6499.0 K Logg: 4.41 Fe/H: -0.240



## DV Fit Results:

Period = 4.79181 [0.00000] d  
Epoch = 133.0134 [0.0007] BKJD  
Rp/R\* = 0.0124 [0.0018]  
a/R\* = 8.97 [7.58]  
b = 0.90 [0.18]  
Seff = 577.21 [176.49]  
Teq = 1250 [96] K  
Rp = 1.50 [0.41] Re  
a = 0.0580 [0.0112] AU  
Ag = 85.22 [34.76] [2.42σ]  
Teff = 5871 [468] K [9.67σ]

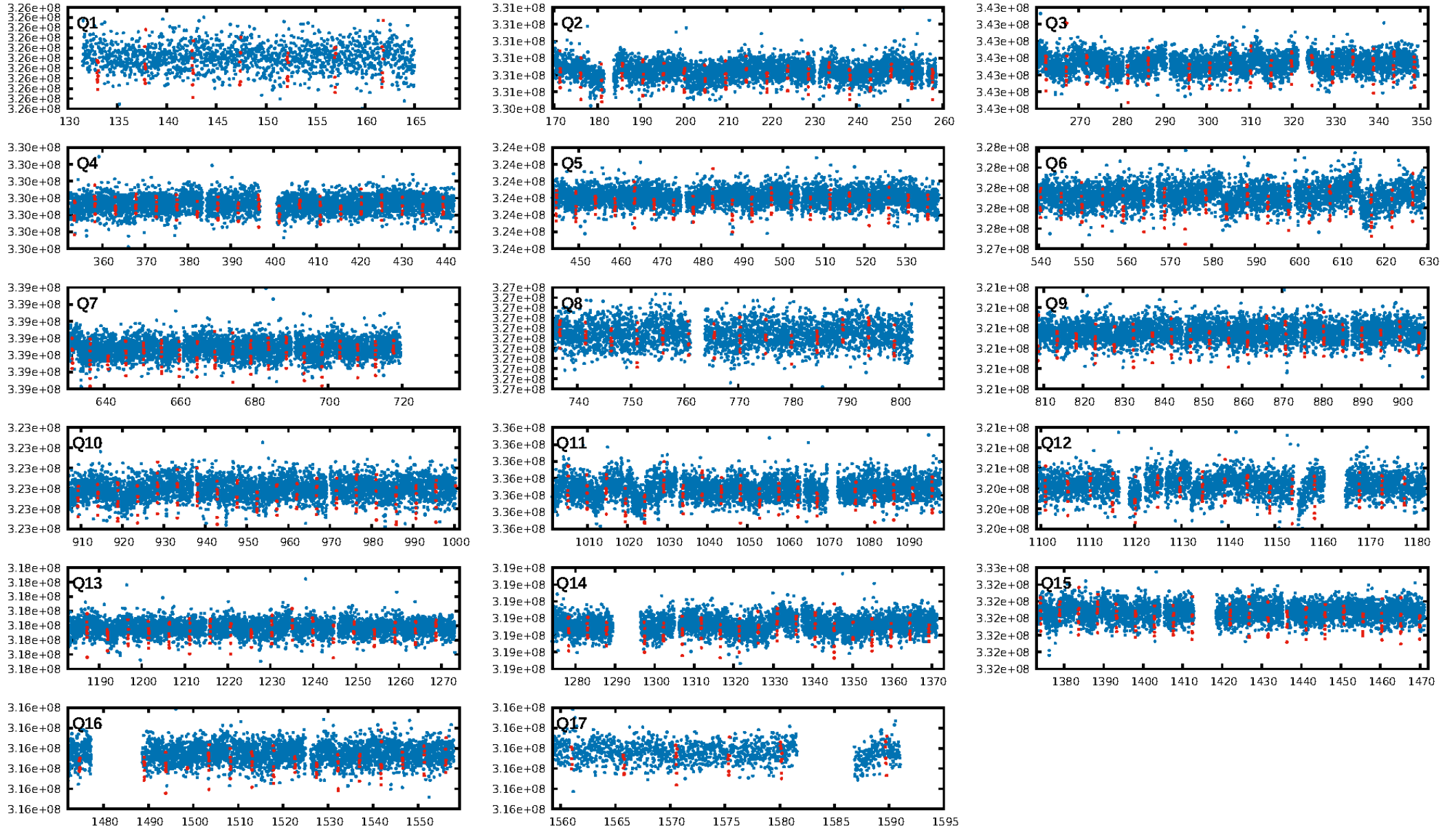
## DV Diagnostic Results:

ShortPeriod-sig: 0.0% [0.00σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGoF-sig: N/A  
Bootstrap-pfa: 0.00e+00  
RollingBand-fgt: 0.98 [270/275]  
GhostDiagnostic-chr: 2.533  
Centroid-sig: 0.0%  
Centroid-so: 3.659 arcsec [19.37σ]  
OotOffset-rm: 3.936 arcsec [35.87σ]  
KicOffset-rm: 3.818 arcsec [32.11σ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 0.94 [16/17]  
DiffImageOverlap-fno: 1.00 [17/17]

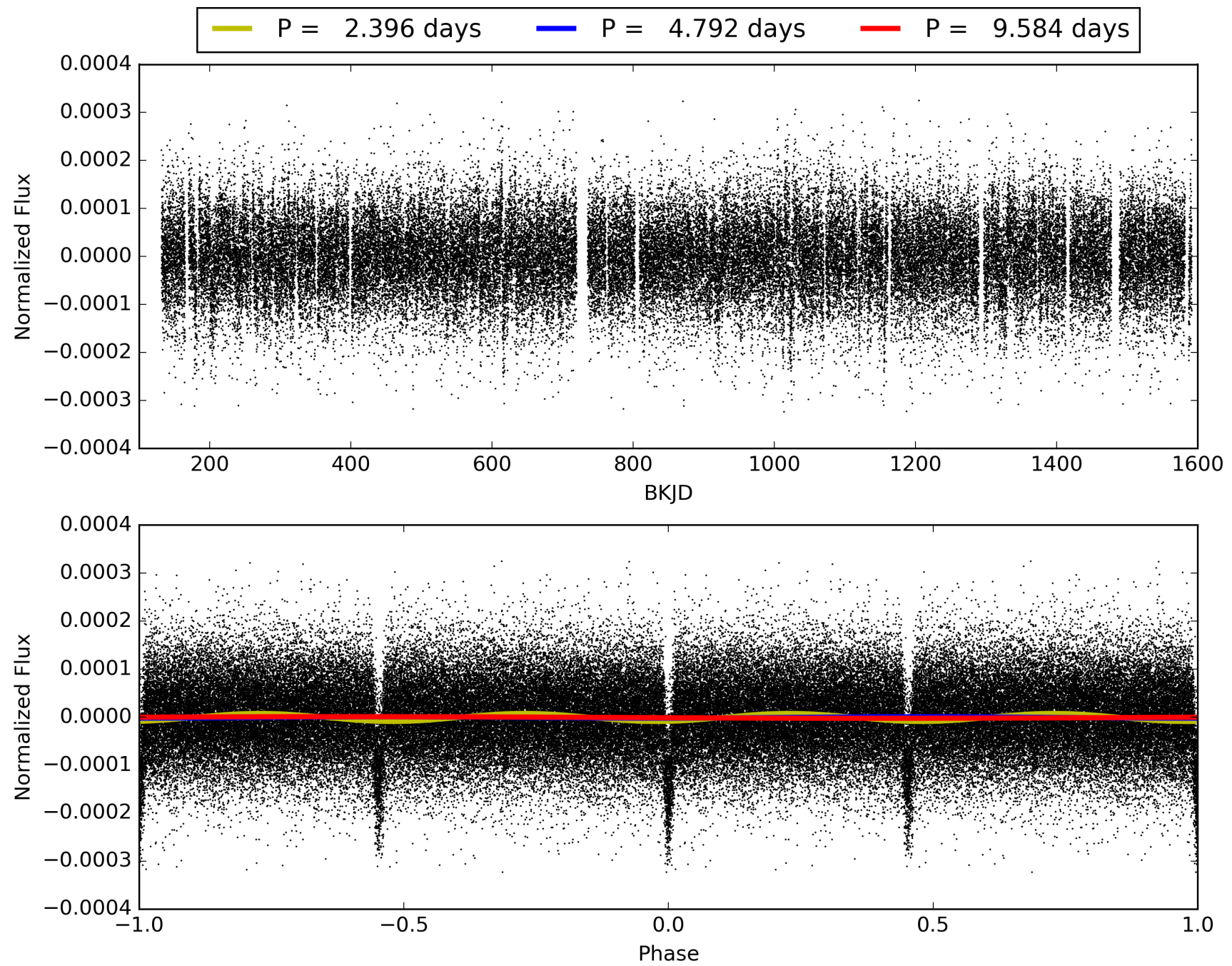
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This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 008700558-01, PDC Light Curves



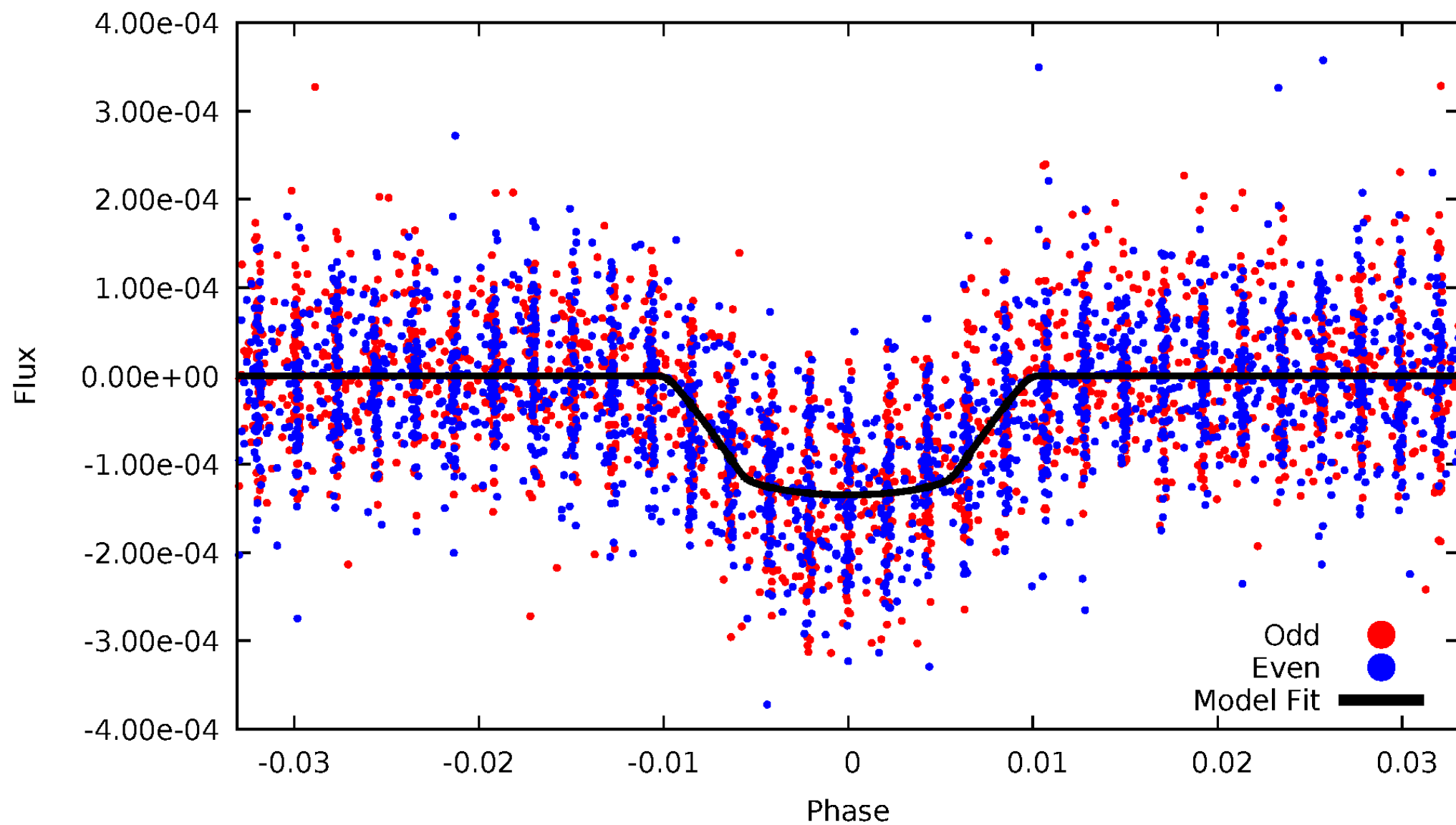
TCE 008700558-01





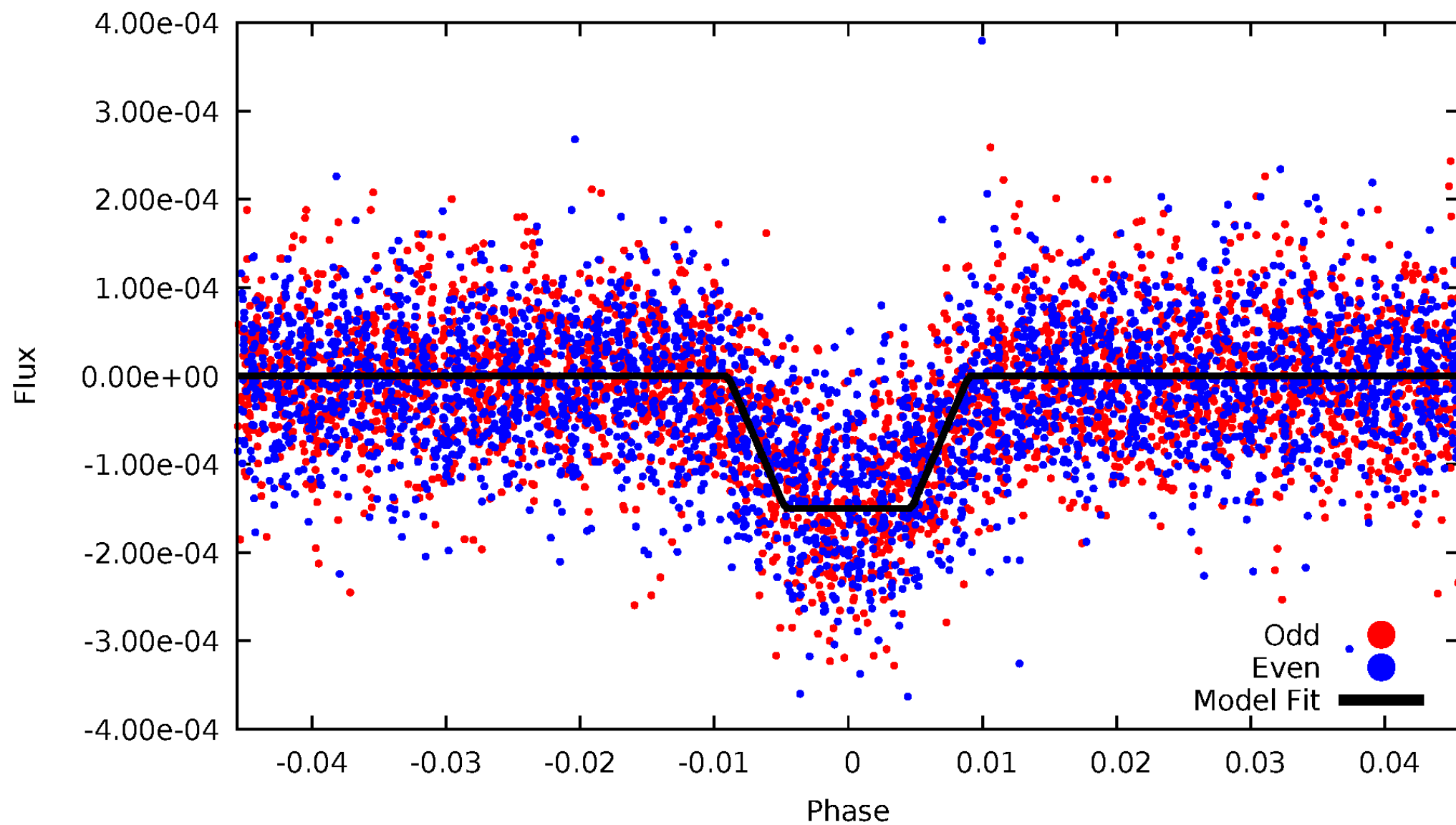
DV Odd/Even

TCE 008700558-01



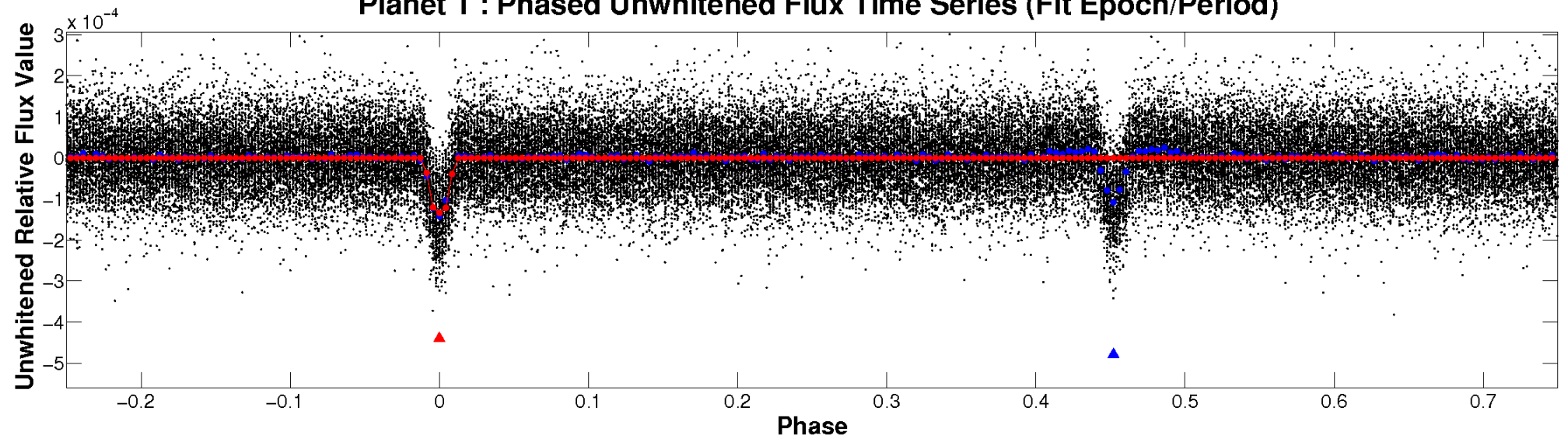
# ALT Odd/Even

TCE 008700558-01

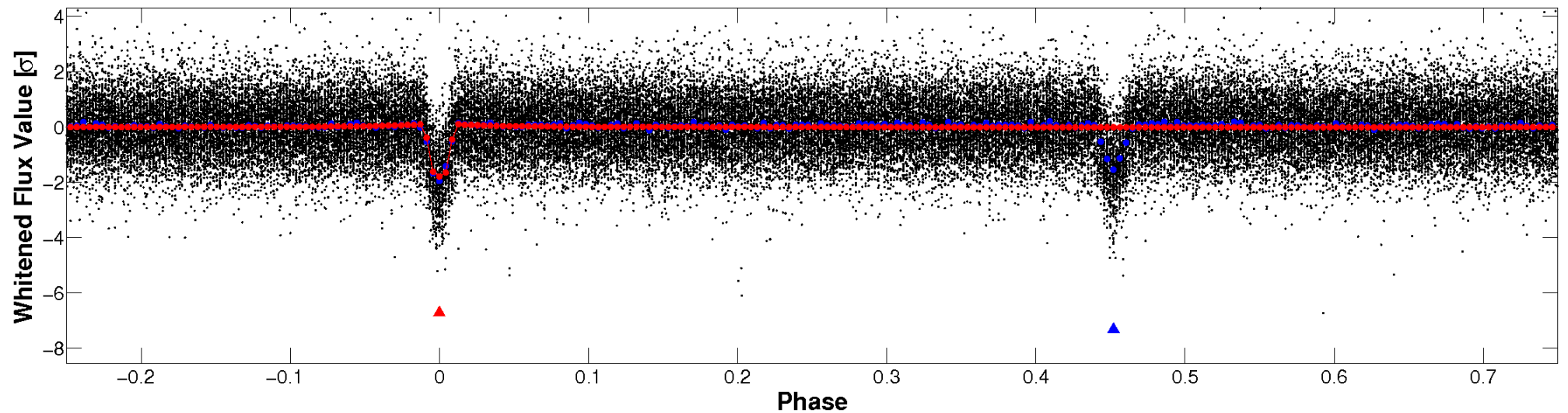


# Non-Whitened Vs. Whitened Light Curve

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

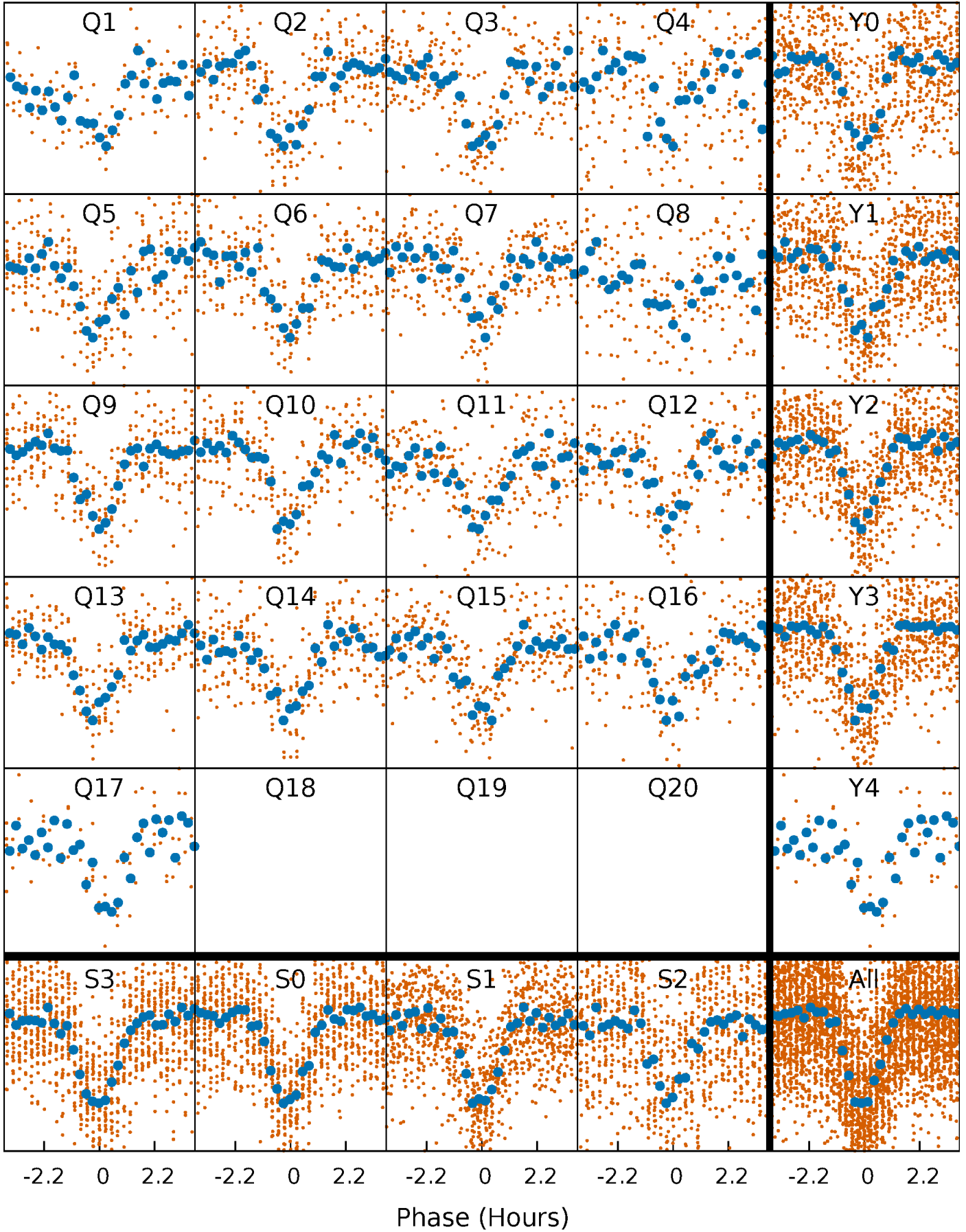


**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

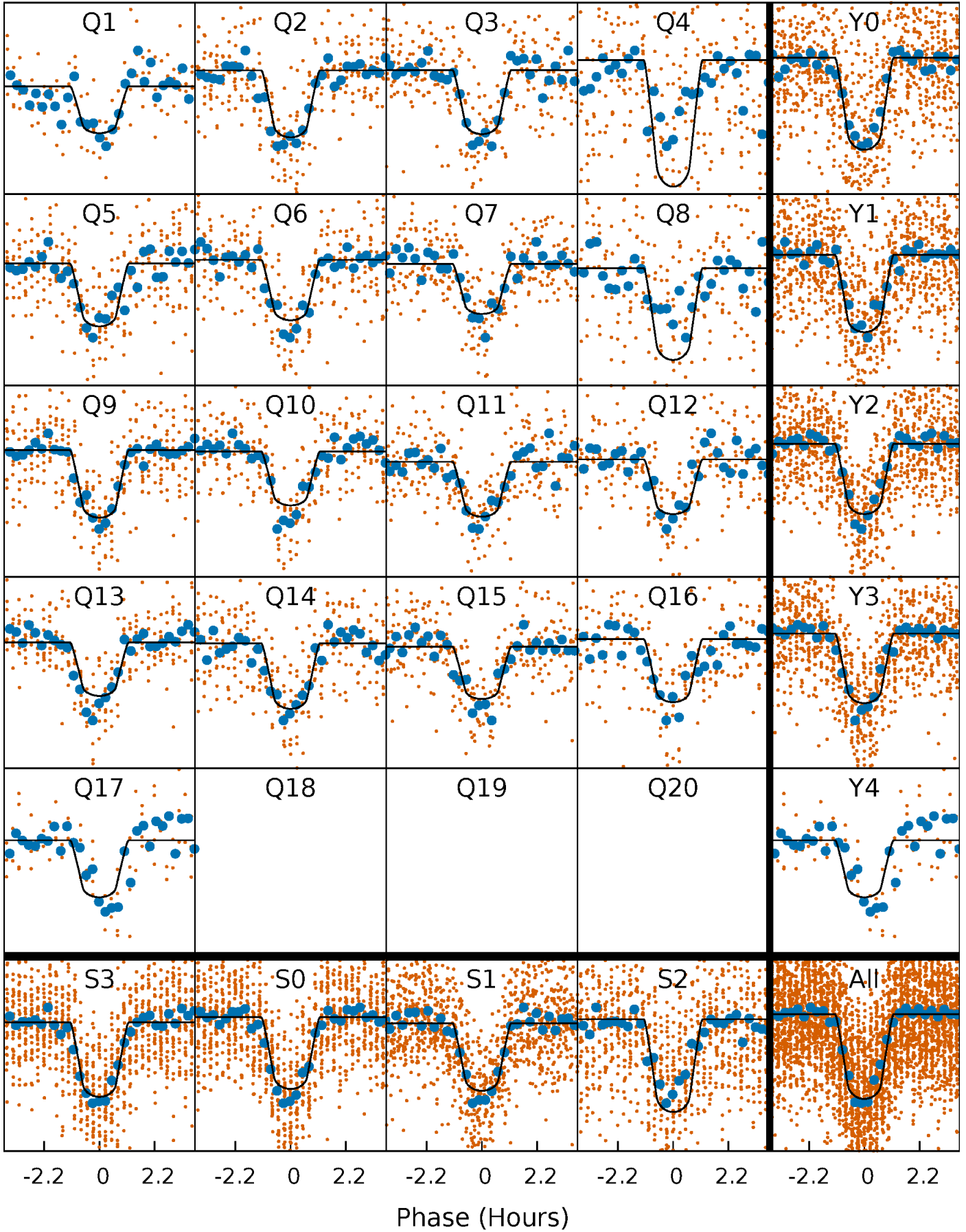
TCE 008700558-01 P= 4.791813 Days  $T_0=133.013385$  (BKJD)





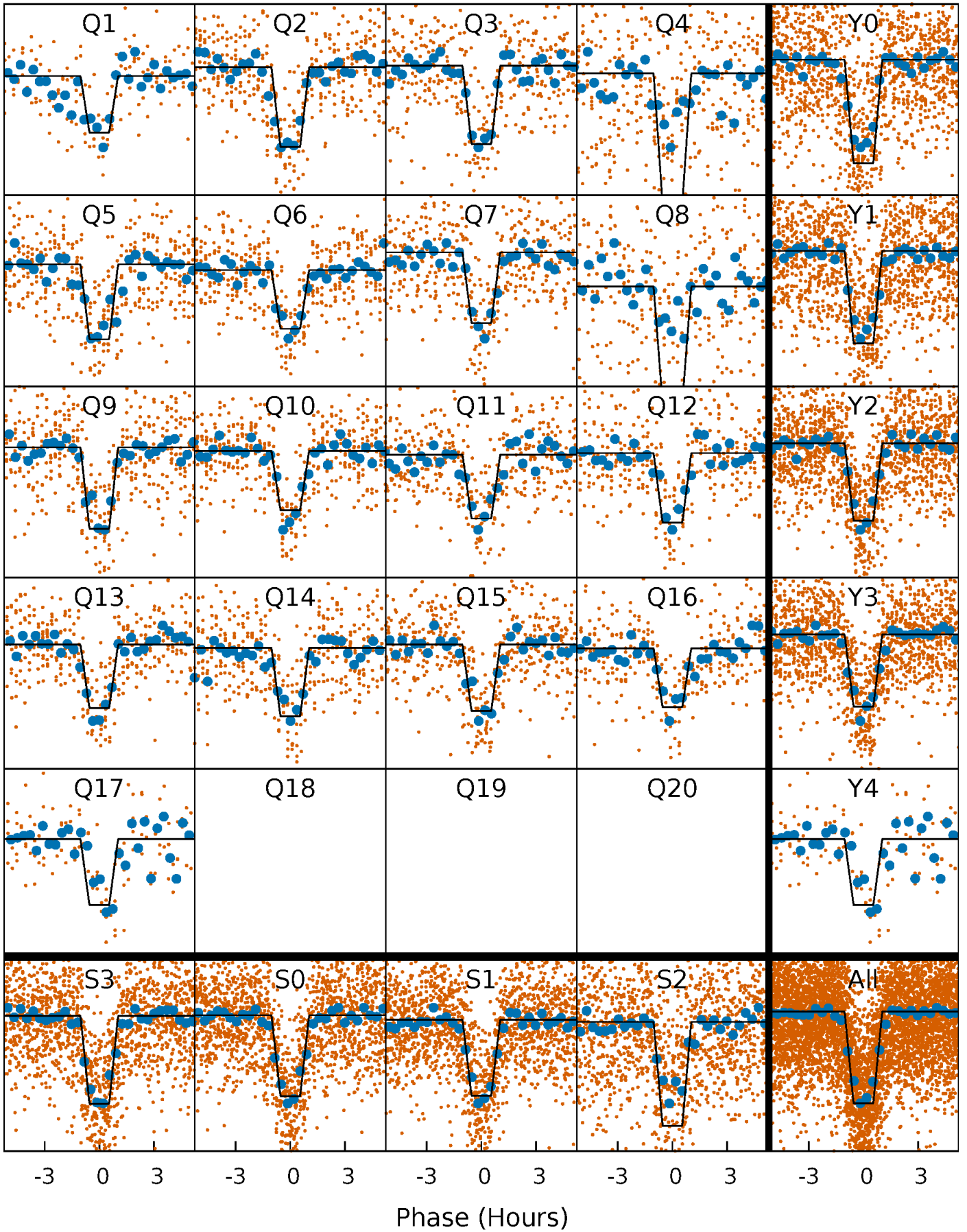
# DV Quarter-Phased Transit Curves

TCE 008700558-01 P= 4.791813 Days  $T_0=133.013385$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

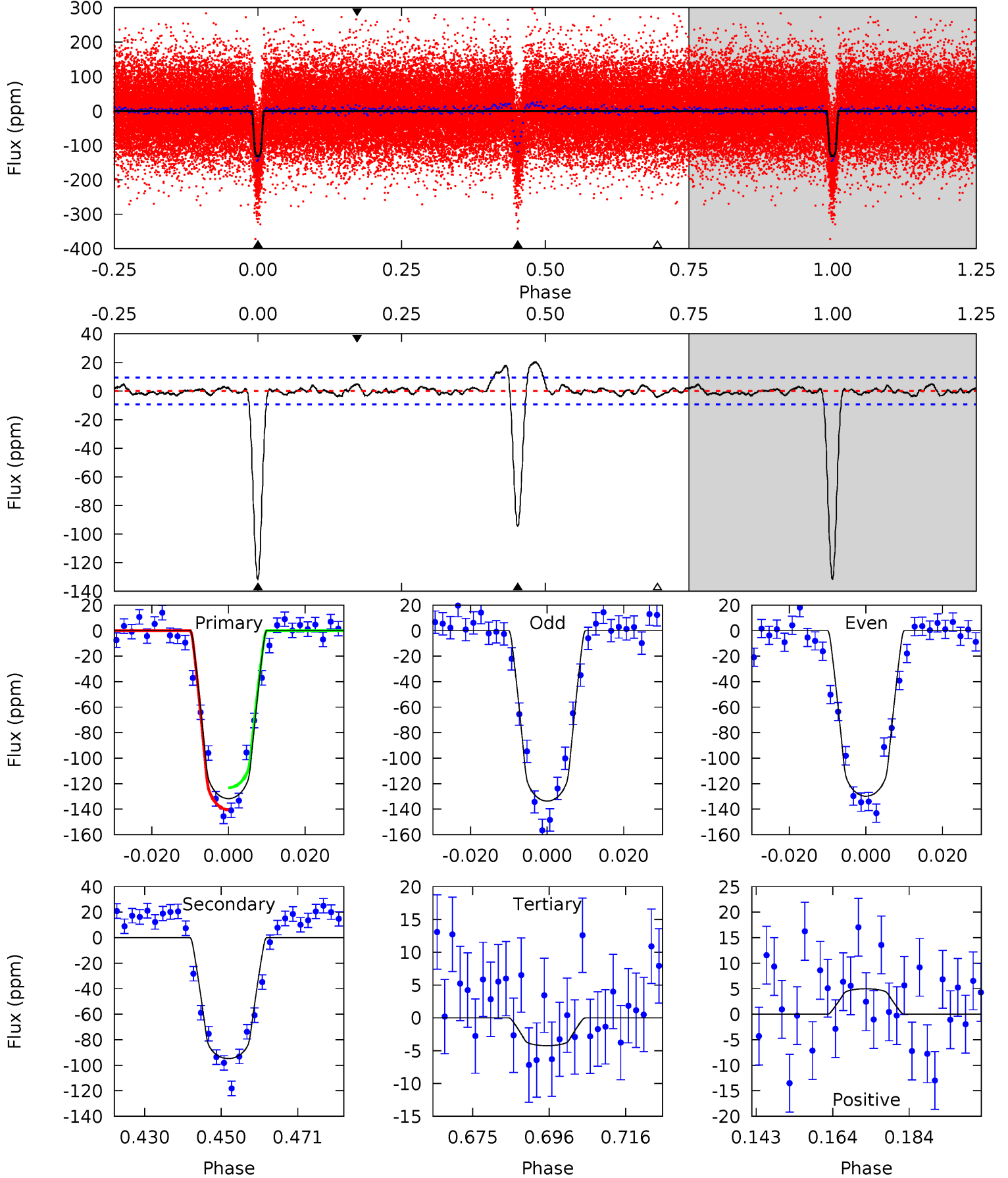
TCE 008700558-01 P= 4.791784 Days  $T_0=133.015836$  (BKJD)



# DV Model-Shift Uniqueness Test

008700558-01, P = 4.791813 Days, E = 128.221572 Days

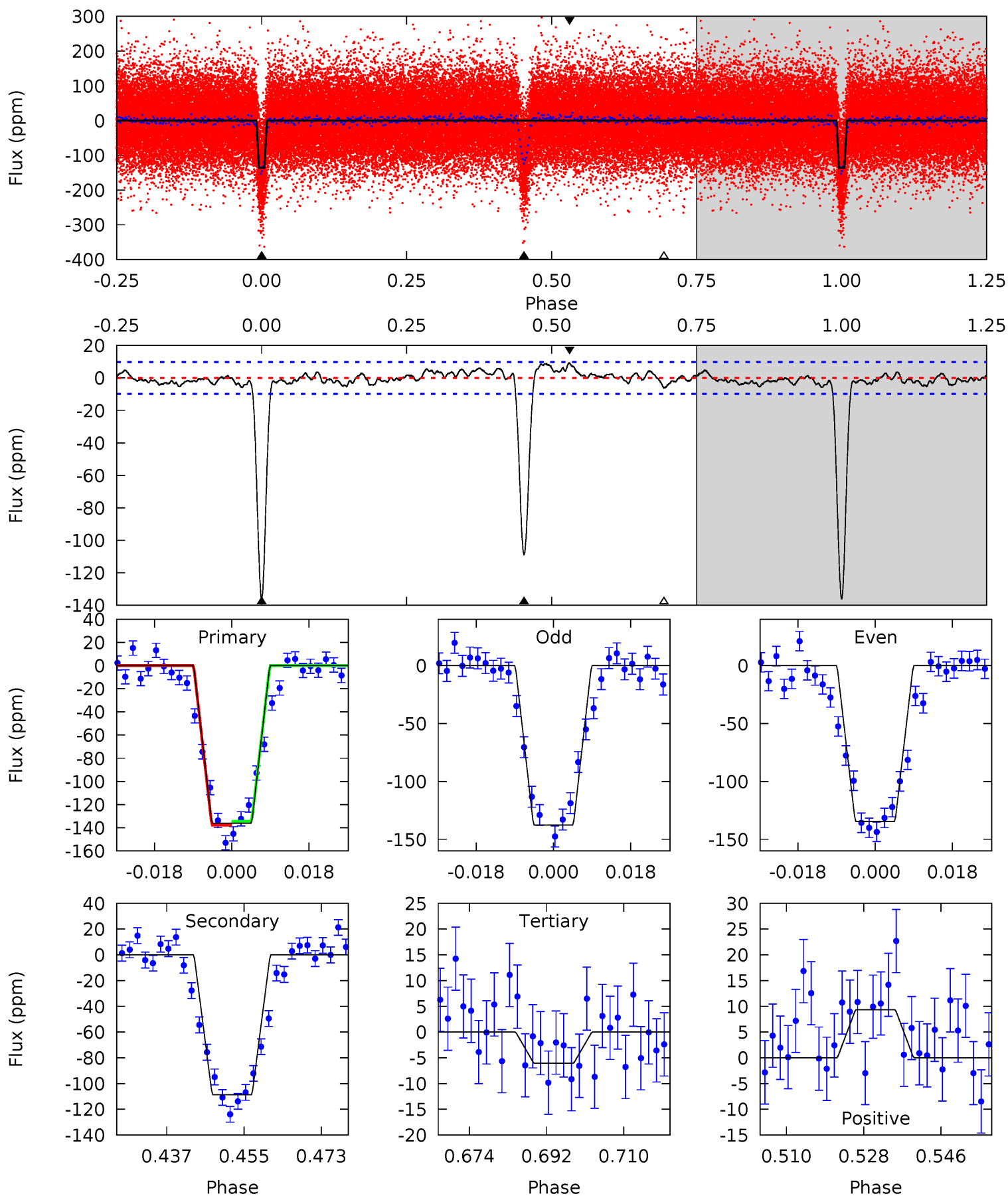
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
68.9	49.6	2.22	2.61	4.89	2.32	2.08	66.7	66.3	47.4	47.0	1.00	1.01	0.13	4.45



# Alt Model-Shift Uniqueness Test

008700558-01, P = 4.791784 Days, E = 128.224052 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
68.0	54.3	3.03	4.67	4.91	2.36	1.55	65.0	63.3	51.3	49.7	0.75	0.99	0.06	0.87



### Stellar Parameters For KIC 008700558

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6499^{+146}_{-195}$	$4.408^{+0.055}_{-0.154}$	$-0.240^{+0.250}_{-0.300}$	$1.103^{+0.252}_{-0.126}$	$1.135^{+0.129}_{-0.144}$	$1.192^{+0.332}_{-0.524}$
	+2%/-3%	+1%/-3%	+104%/-125%	+23%/-11%	+11%/-13%	+28%/-44%
Source	PHO1	FLK73	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 008700558-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-95 \pm 2$	$1.53^{+0.30}_{-0.22}$	$1772^{+98}_{-83}$	$5750^{+451}_{-392}$	$74^{+28}_{-21}$
Alt.	$-109 \pm 2$	$1.51^{+0.32}_{-0.23}$	$1771^{+96}_{-76}$	$5973^{+504}_{-412}$	$87^{+35}_{-26}$

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



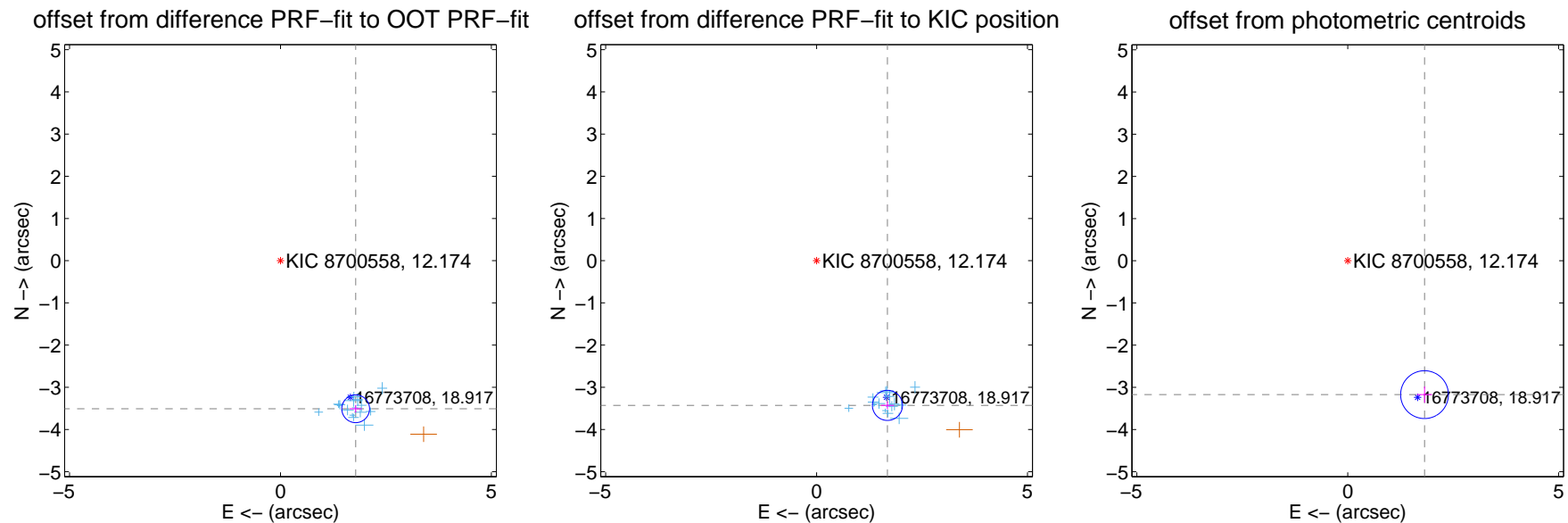
## DV Centroid Data

Supplemental centroid analysis for 008700558-01. Kepler magnitude: 12.17. Transit SNR 49.95

There are 16 quarters with good PRF difference image offsets

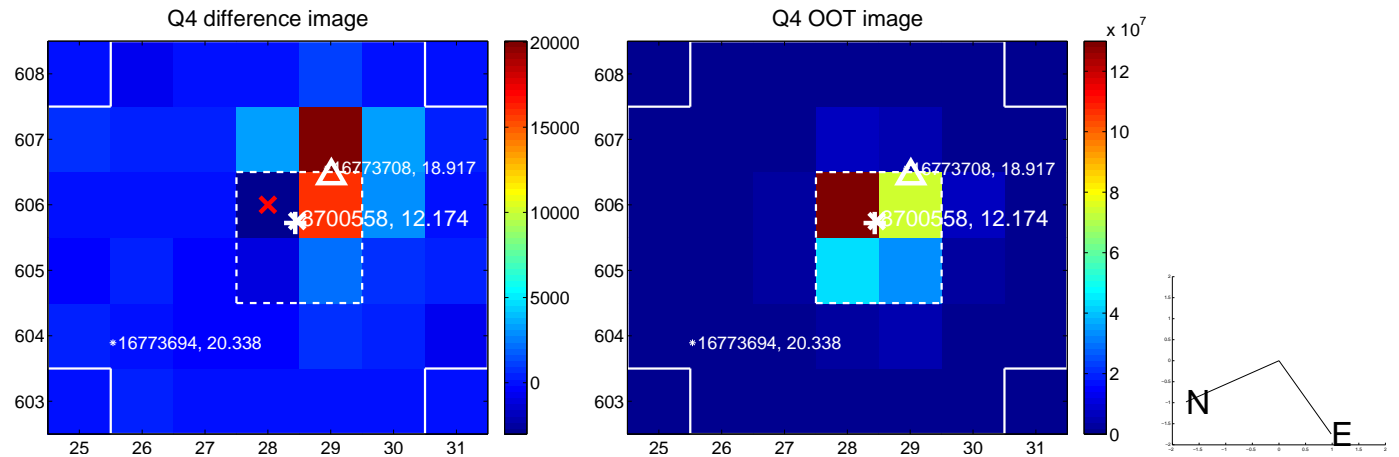
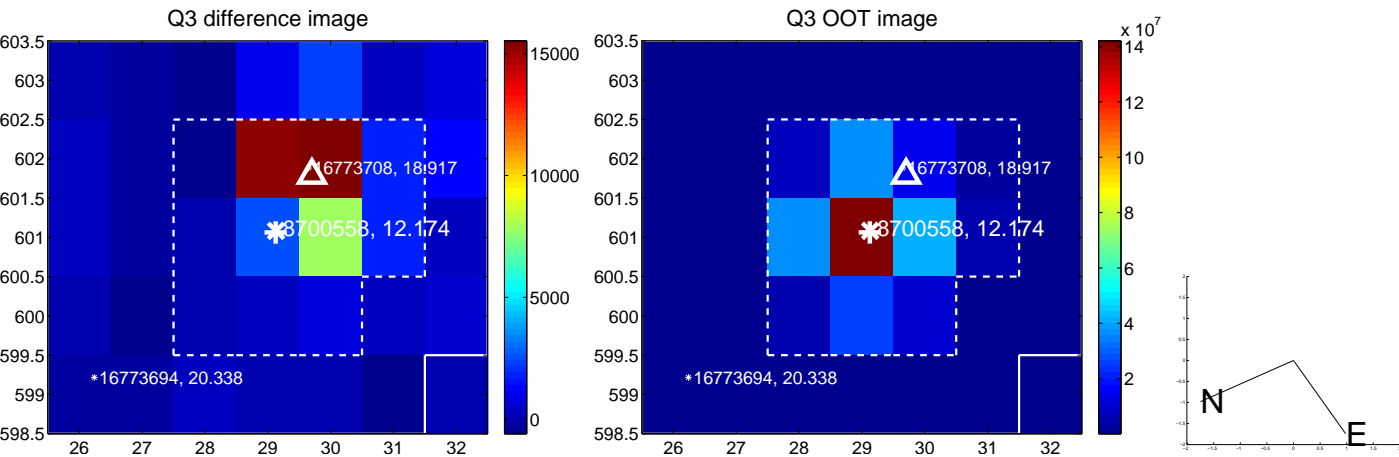
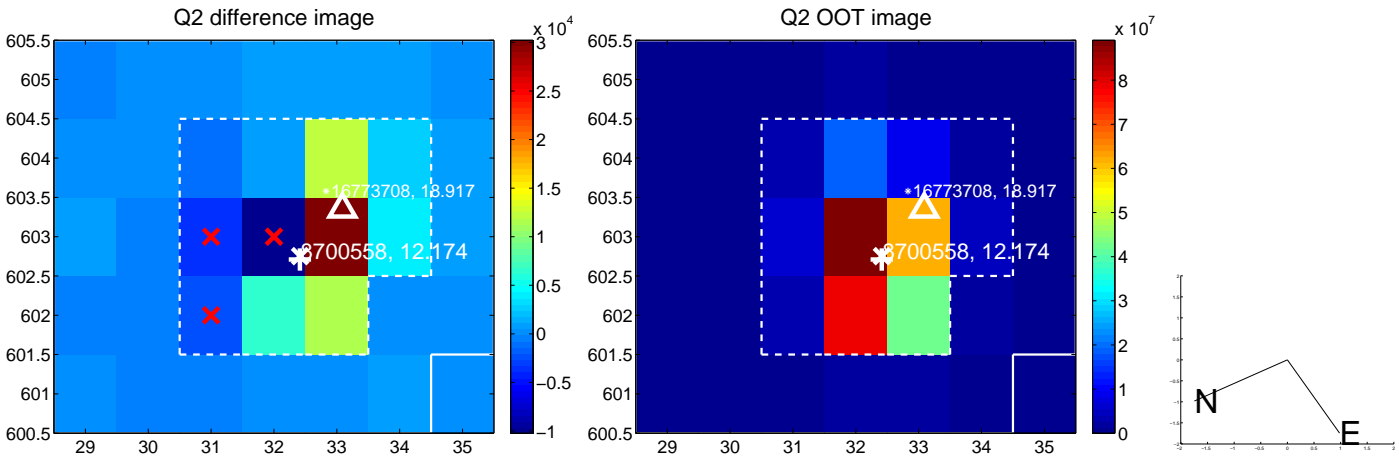
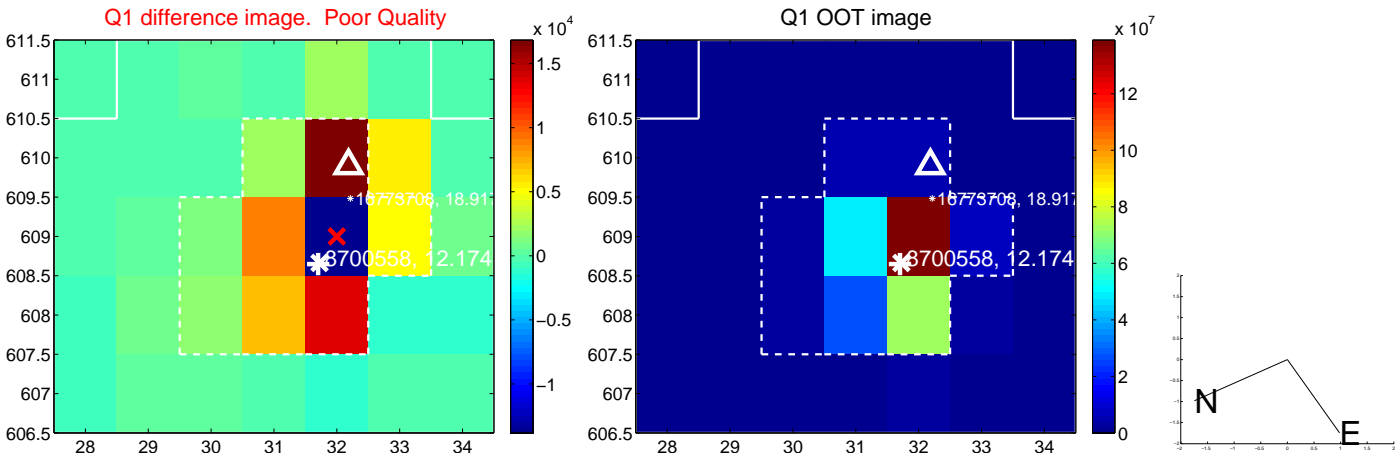
The direct PRF centroid is offset from the target star catalog position by about 0.11 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$3.936 \pm 0.110$	35.87	$-1.783 \pm 0.145$	$-3.509 \pm 0.090$
PRF-fit source offset from KIC position	$3.818 \pm 0.119$	32.11	$-1.681 \pm 0.154$	$-3.429 \pm 0.091$
photometric centroid source offset	$3.66 \pm 0.19$	19.37	$-1.82 \pm 0.18$	$-3.17 \pm 0.19$

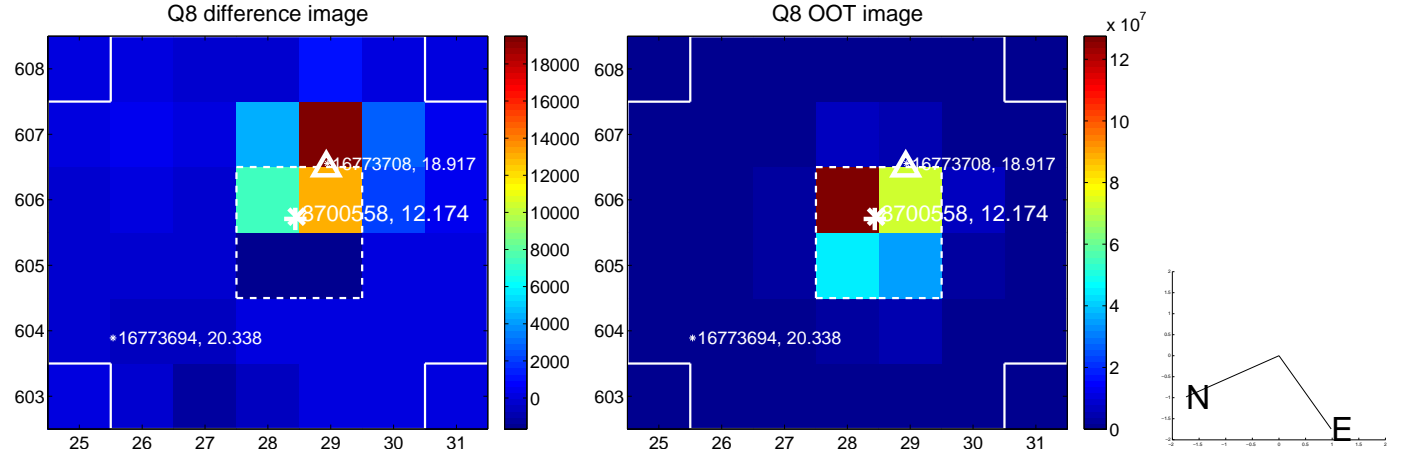
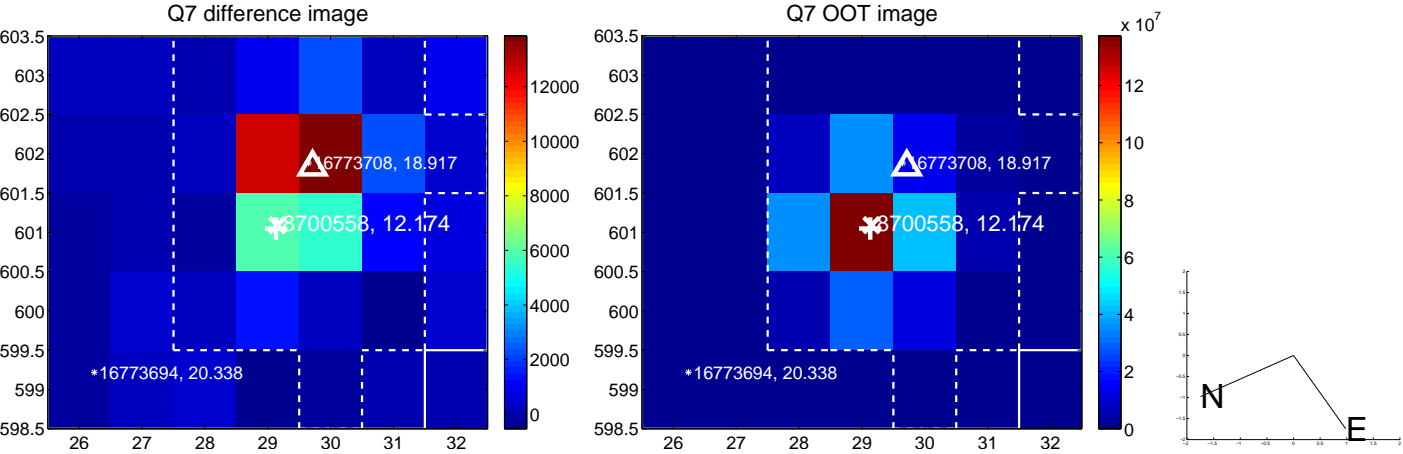
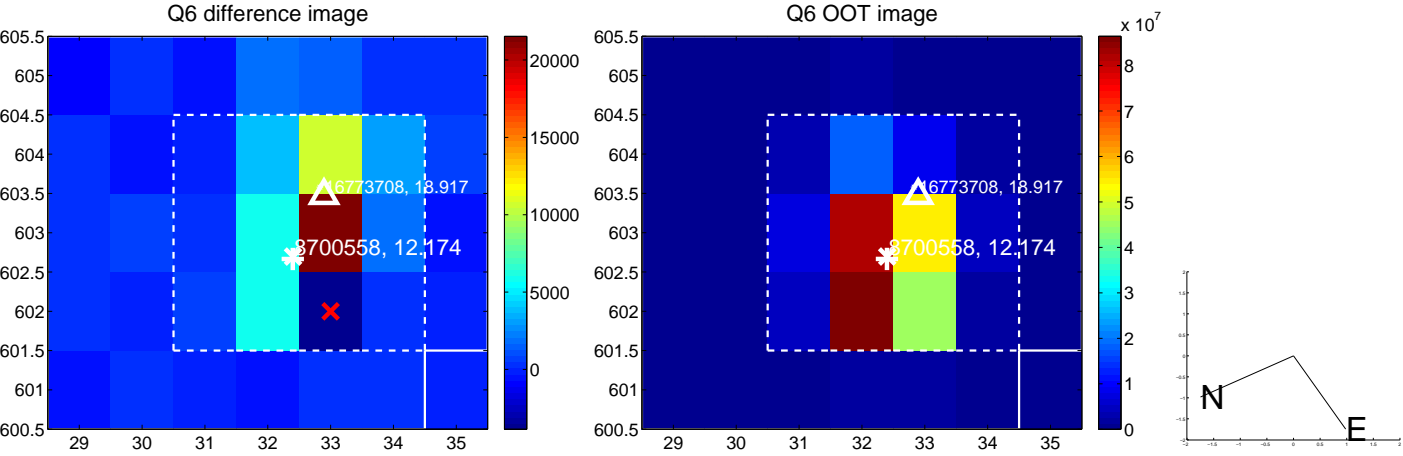
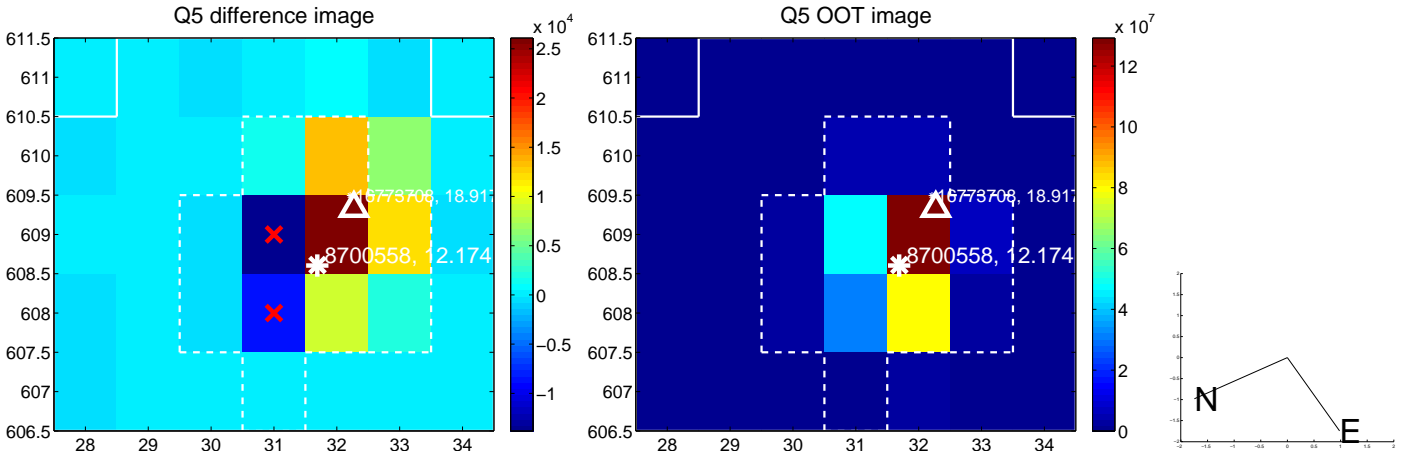


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

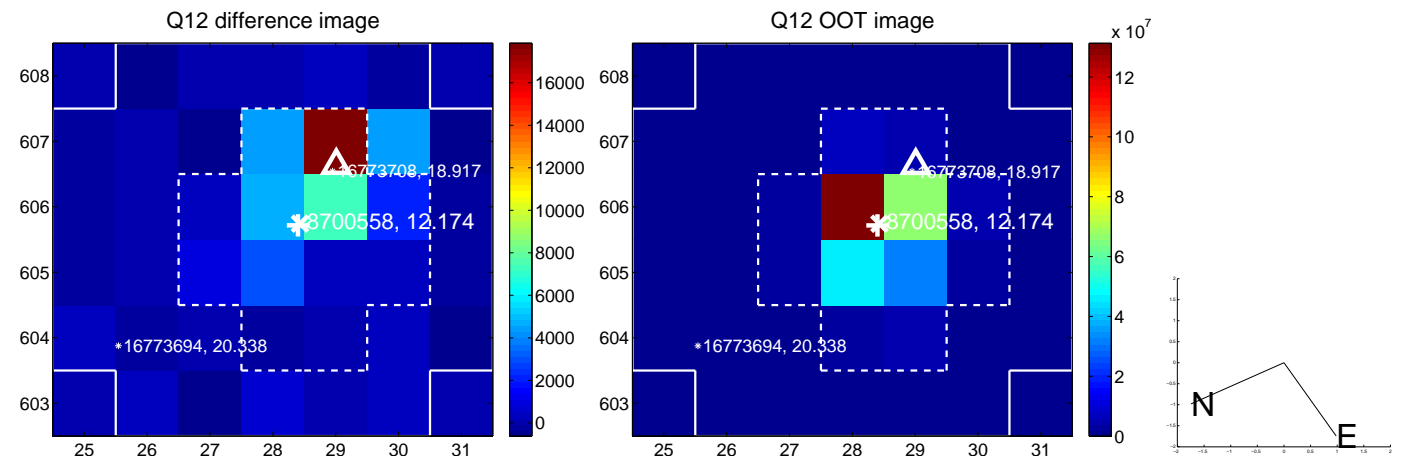
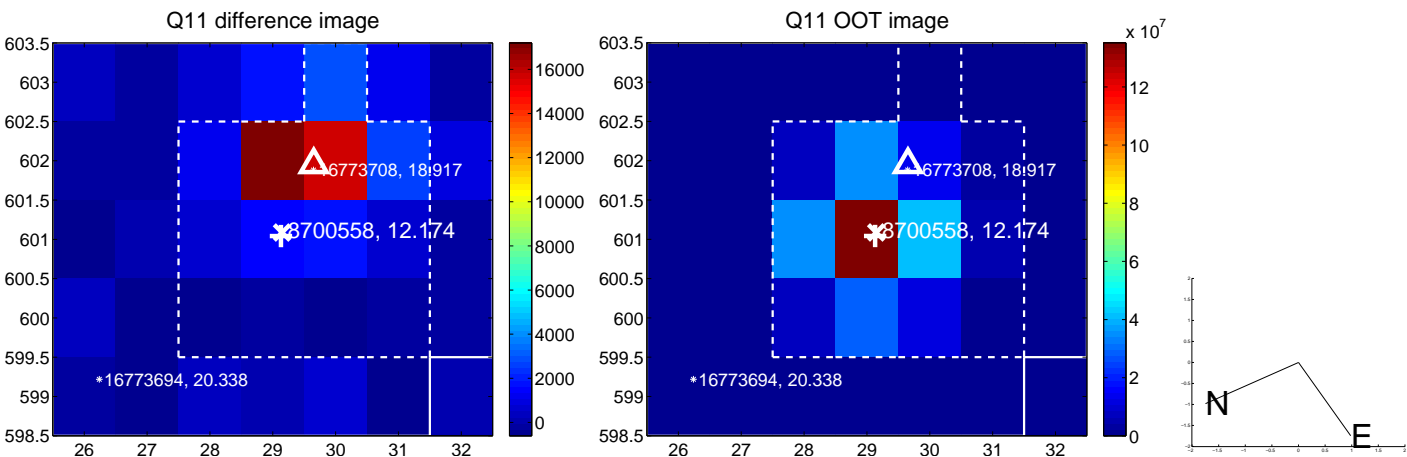
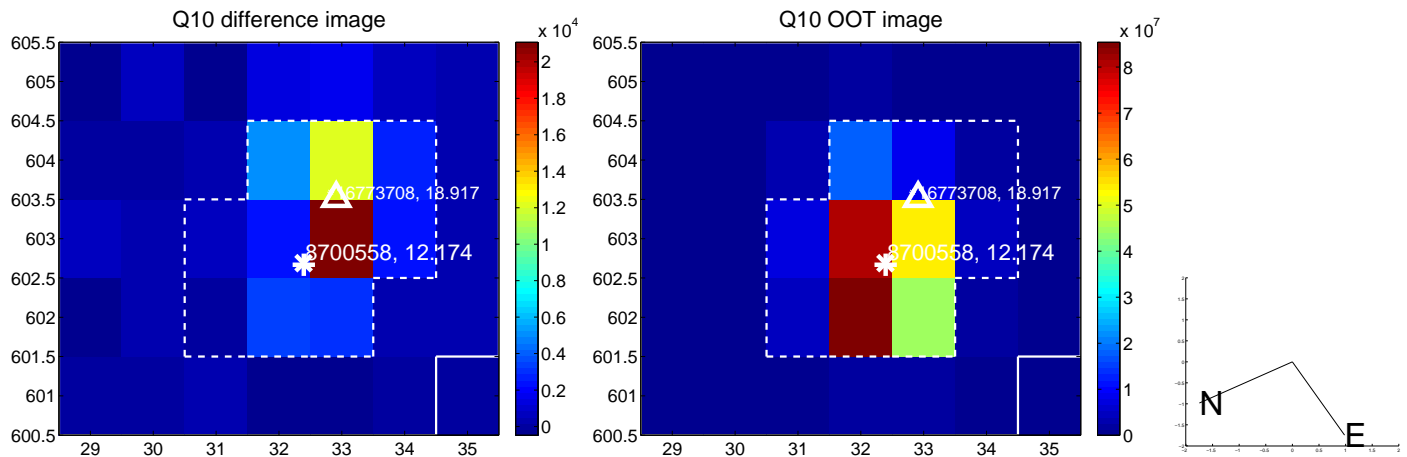
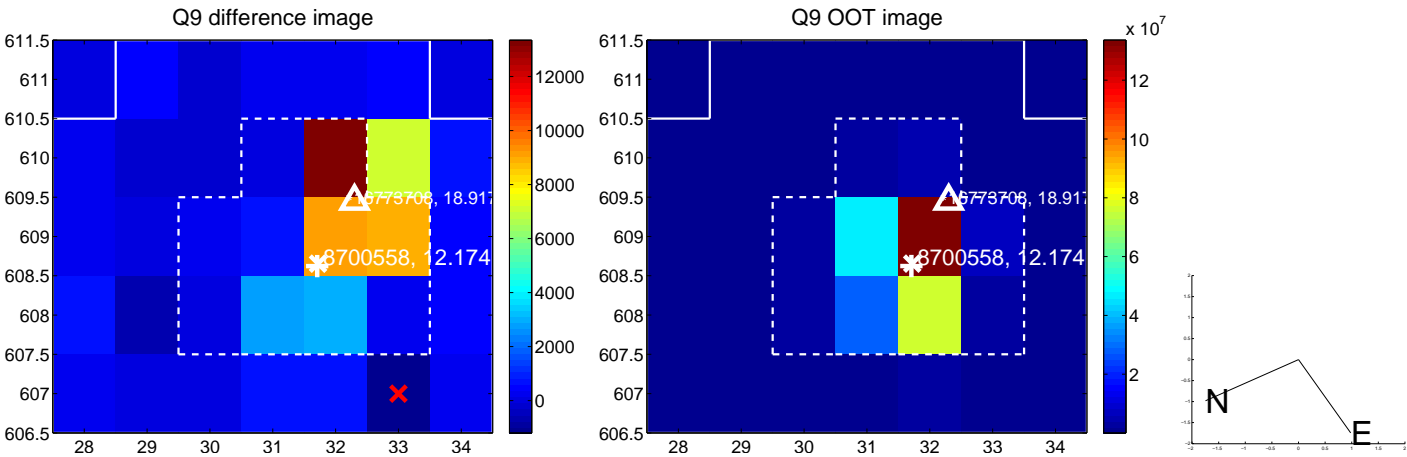
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



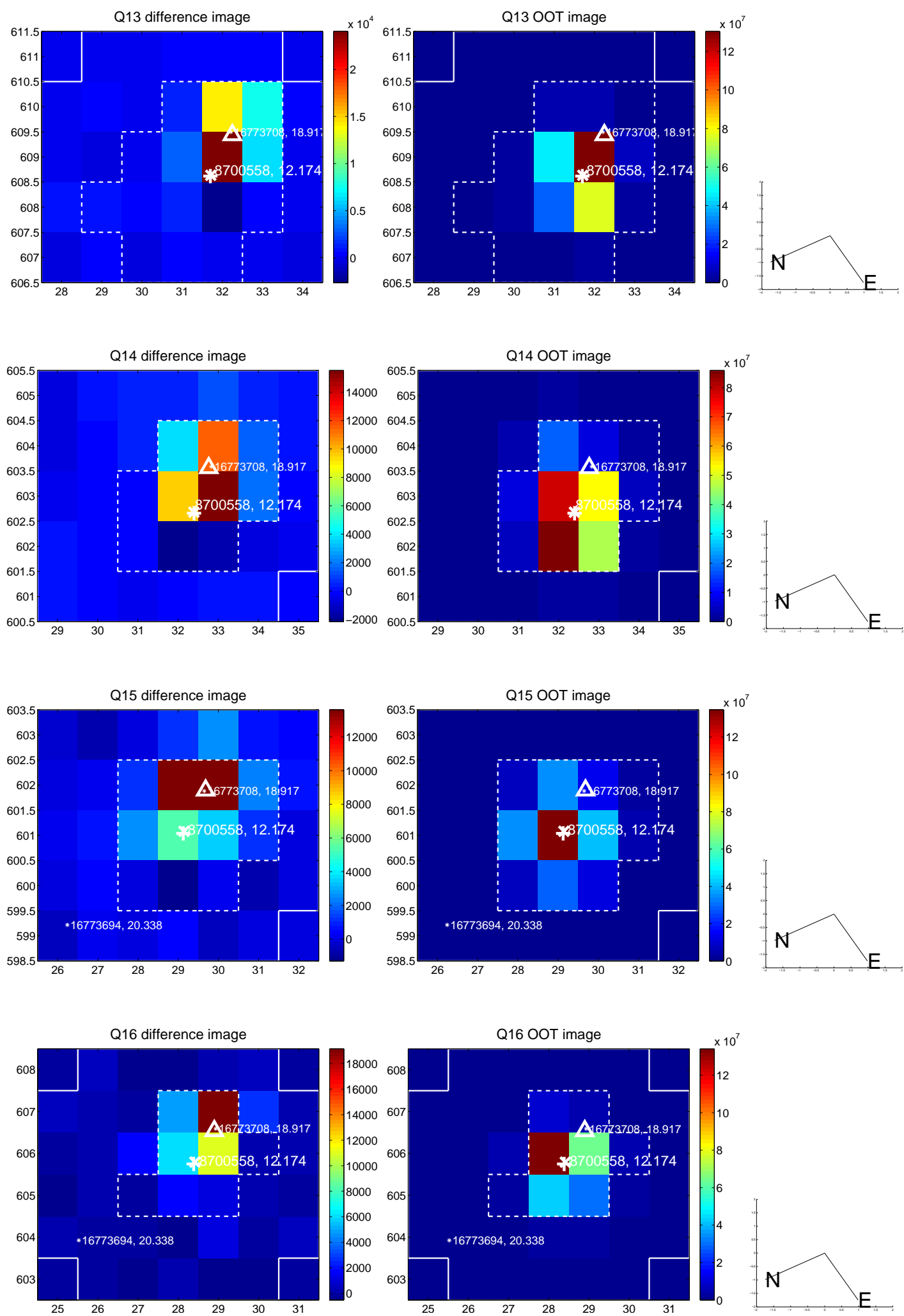
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

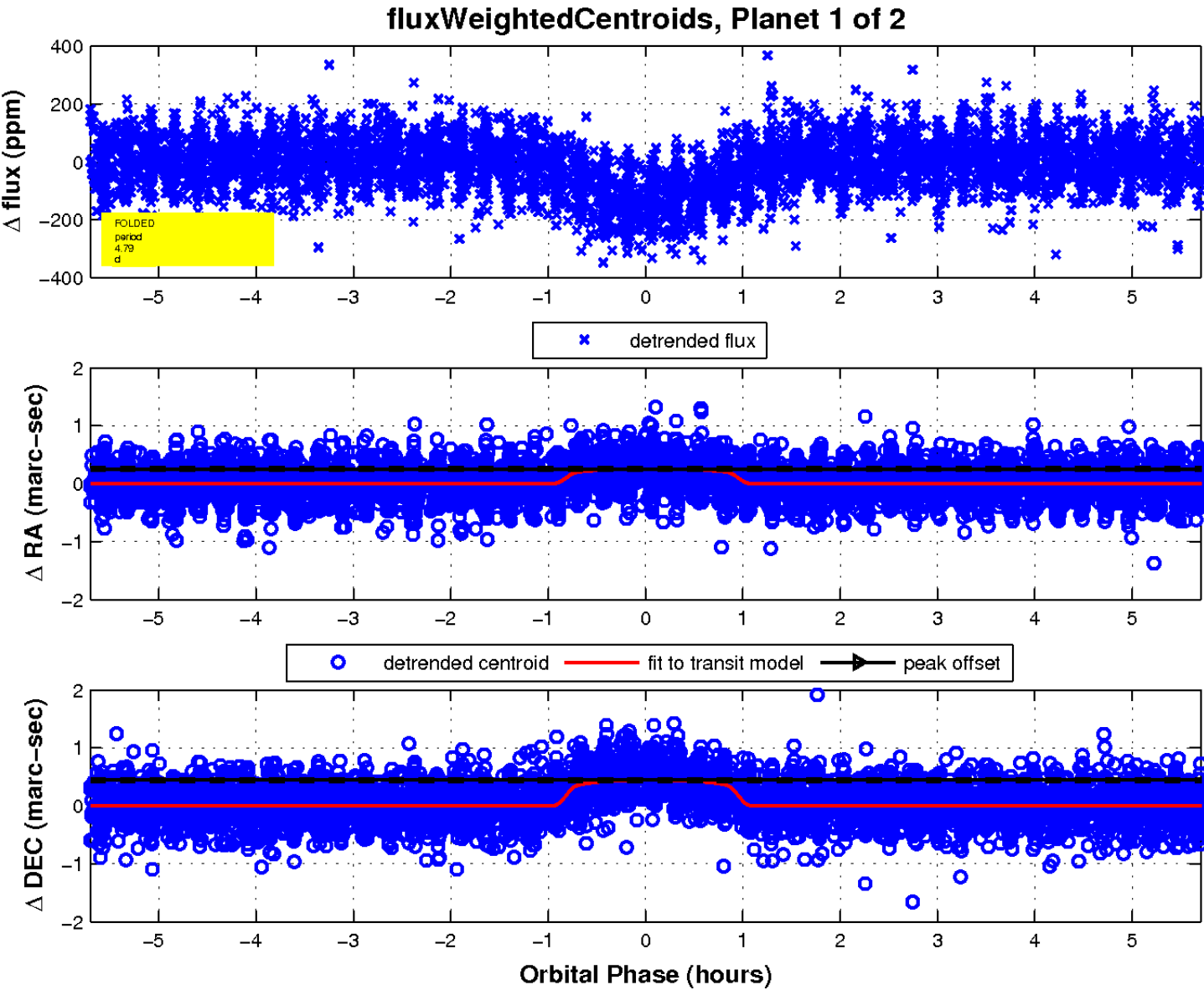
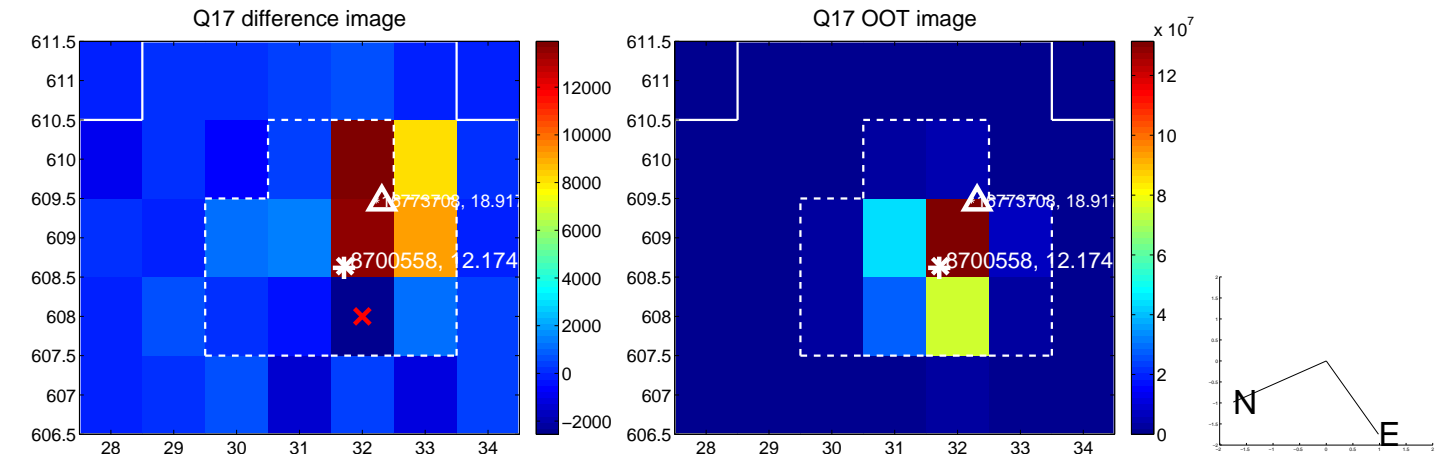


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

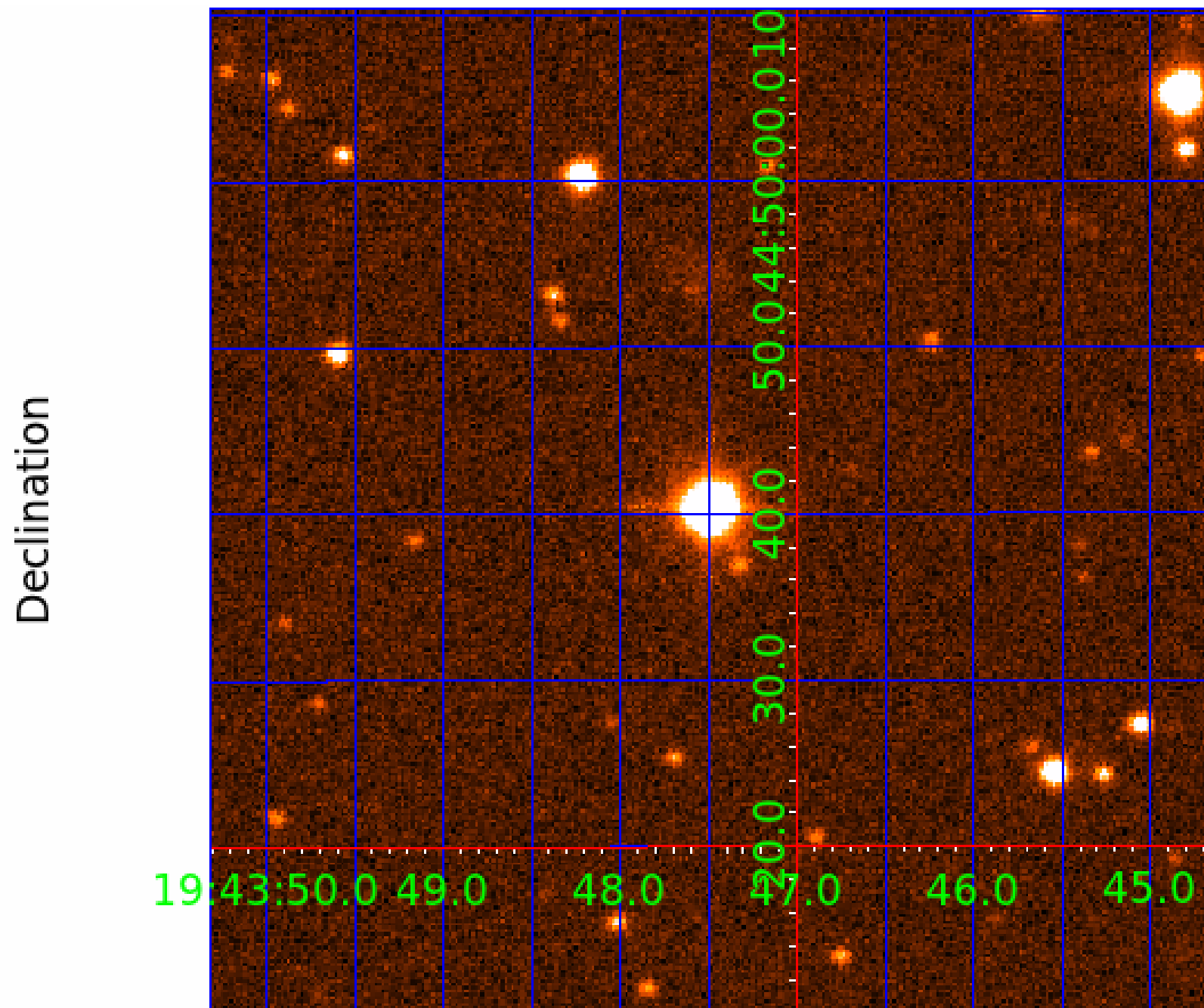




white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image



# KIC 008700558

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008700558-01	OBS	No	4.791813	133.013385	134.6	1.902	43.8	50.0	1.10	6499	1.50	577.21
008700558-02	OBS	0320.01	4.791809	135.180269	105.2	2.165	36.8	40.9	1.10	6499	1.33	577.21

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008700558-01	OBS	FP	0.00	1	0	1	0	LPP_DV—CENT_UNRESOLVED_OFFSET
008700558-02	OBS	FP	0.00	1	0	1	0	SAME_NTL_PERIOD—CENT_UNRESOLVED_OFFSET

**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.

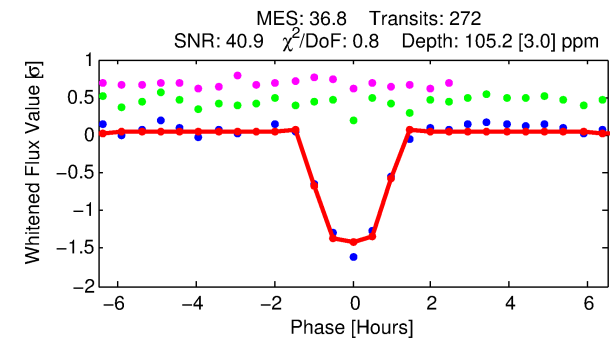
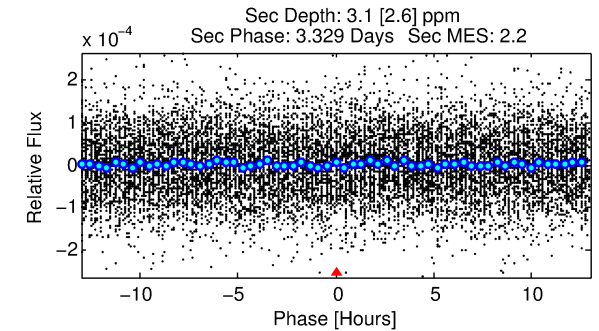
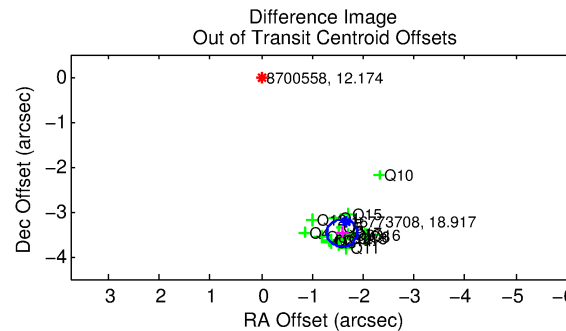
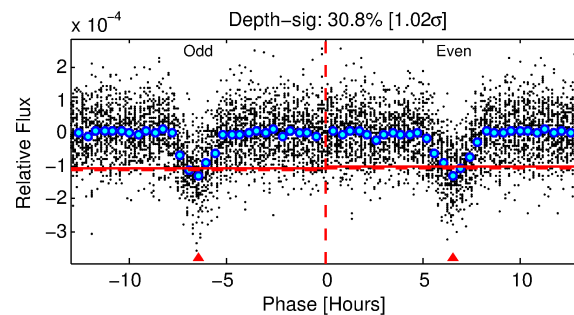
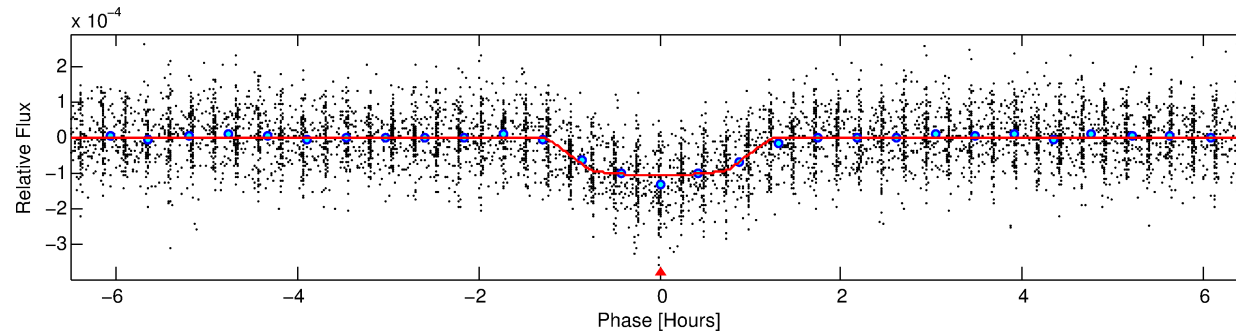
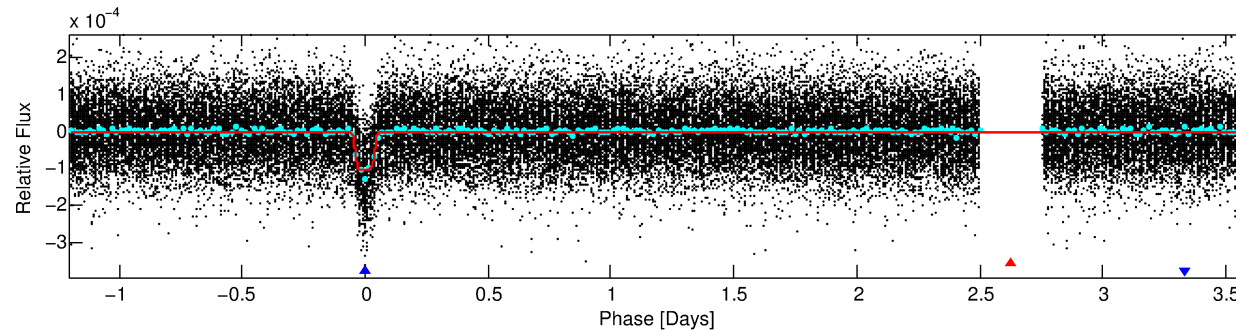
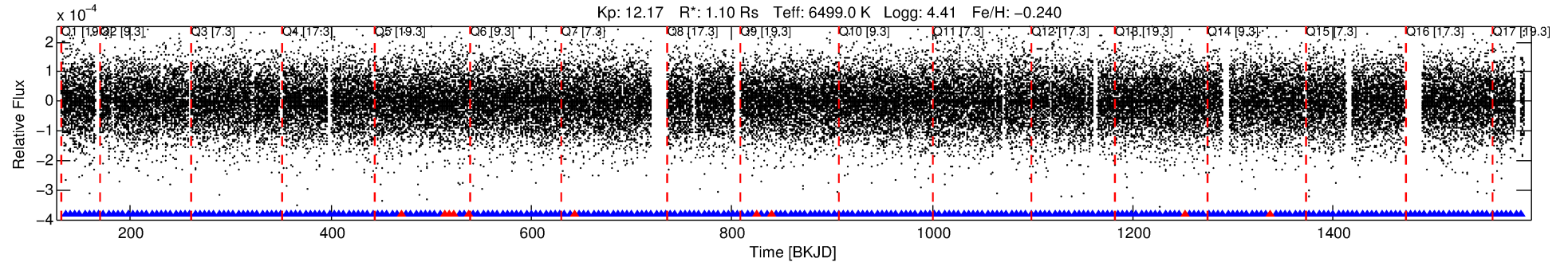
## Ephemeris Match Information For 008700558-02

No Significant Match Found

# DV One-Page Summary

KIC: 8700558 Candidate: 2 of 2 Period: 4.792 d  
KOI: K00320.01 Corr: 0.855

Kp: 12.17 R\*: 1.10 Rs Teff: 6499.0 K Logg: 4.41 Fe/H: -0.240



## DV Fit Results:

Period = 4.79181 [0.00001] d  
Epoch = 135.1803 [0.0010] BKJD  
Rp/R\* = 0.0110 [0.0015]  
a/R\* = 7.68 [5.76]  
b = 0.91 [0.16]  
Seff = 577.21 [176.49]  
Teq = 1250 [96] K  
Rp = 1.33 [0.35] Re  
a = 0.0580 [0.0112] AU  
Ag = 3.26 [2.99] [0.76σ]  
Teff = 2596 [572] K [2.32σ]

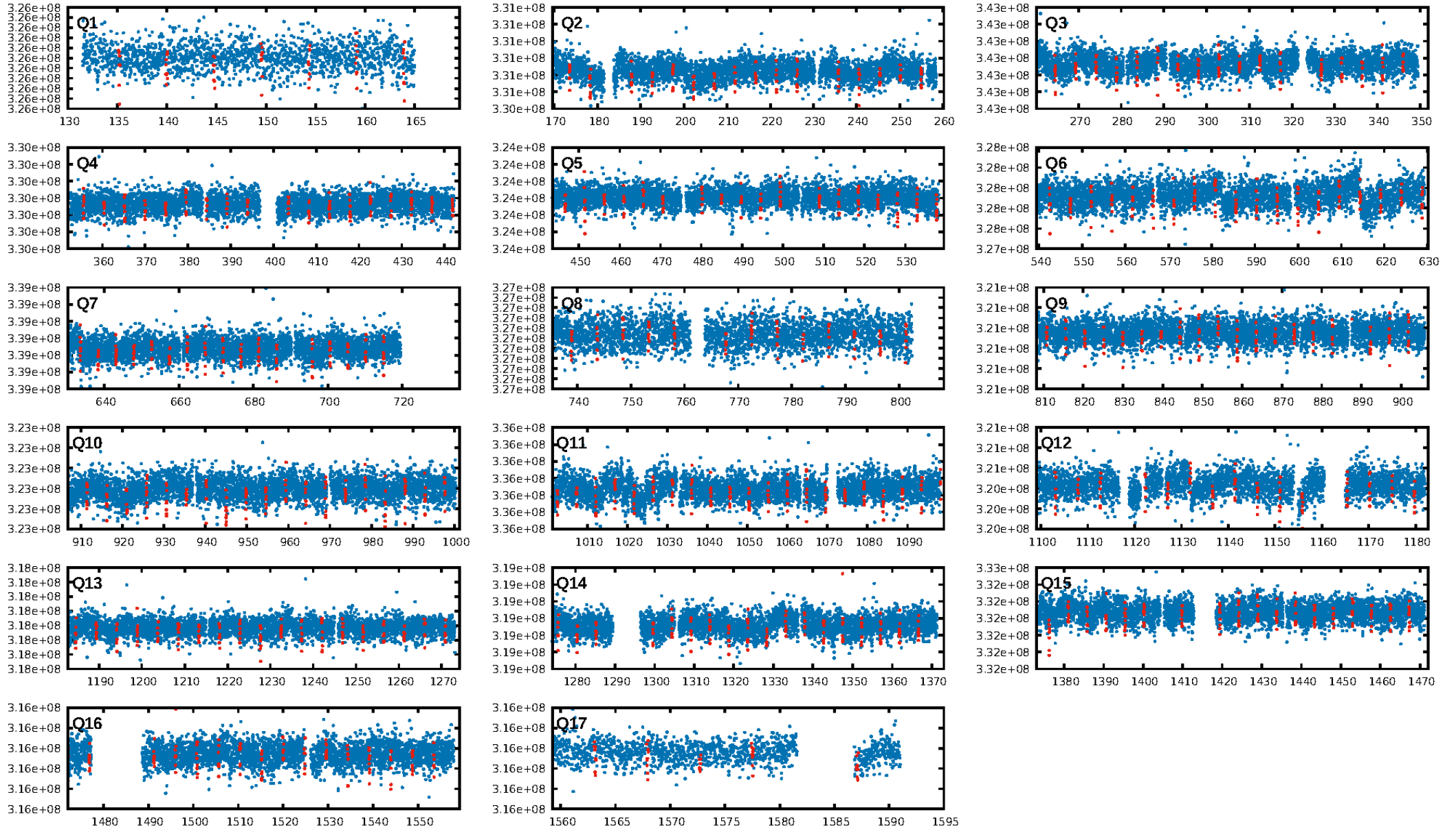
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 0.0% [0.00σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 8.27e-285  
RollingBand-fgt: 0.96 [250/260]  
GhostDiagnostic-chr: 1.73  
Centroid-sig: 0.0%  
Centroid-so: 4.256 arcsec [18.22σ]  
OotOffset-rm: 3.818 arcsec [37.82σ]  
KicOffset-rm: 3.711 arcsec [37.46σ]  
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: 30-Jan-2016 22:00:01 Z

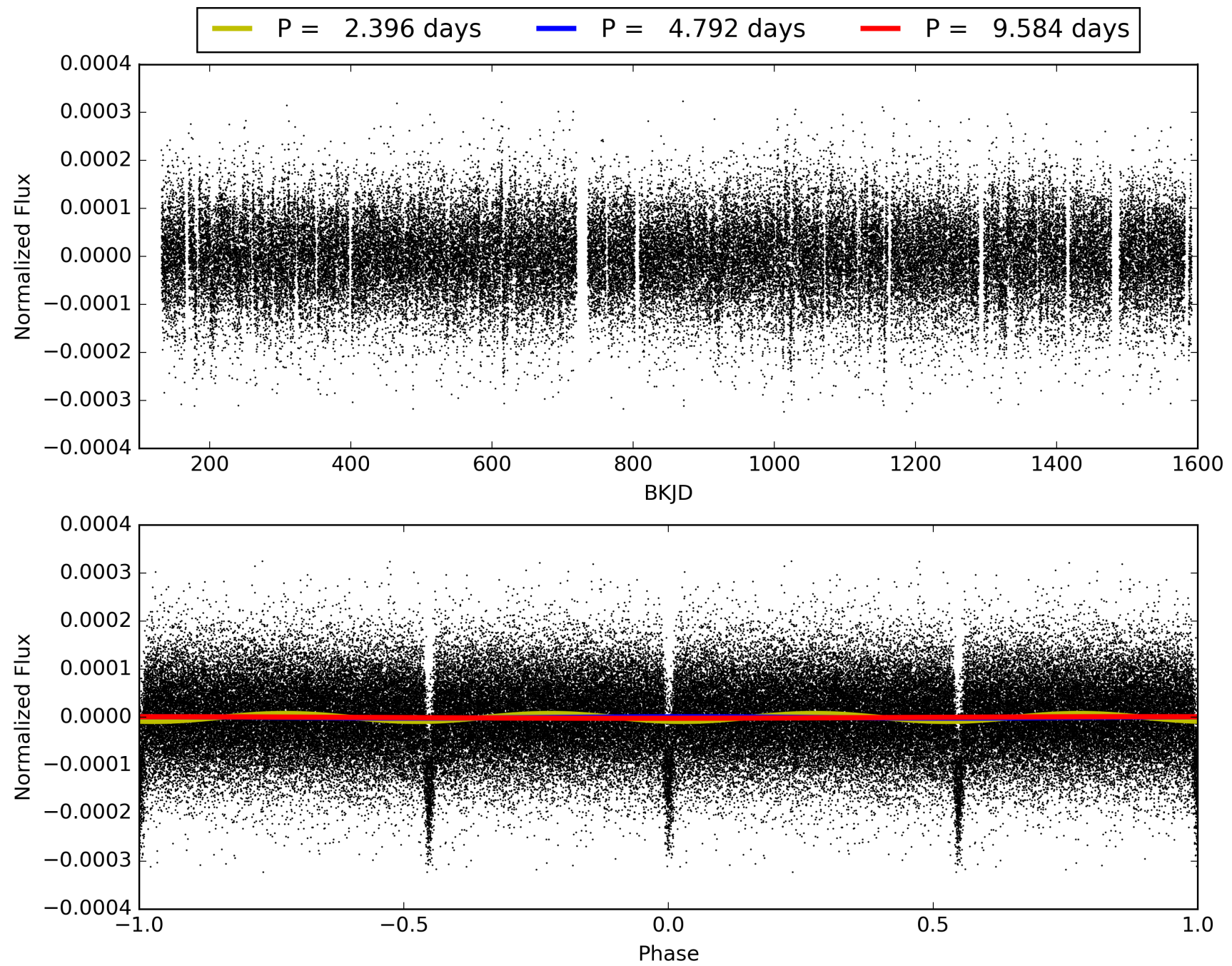
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 008700558-02, PDC Light Curves



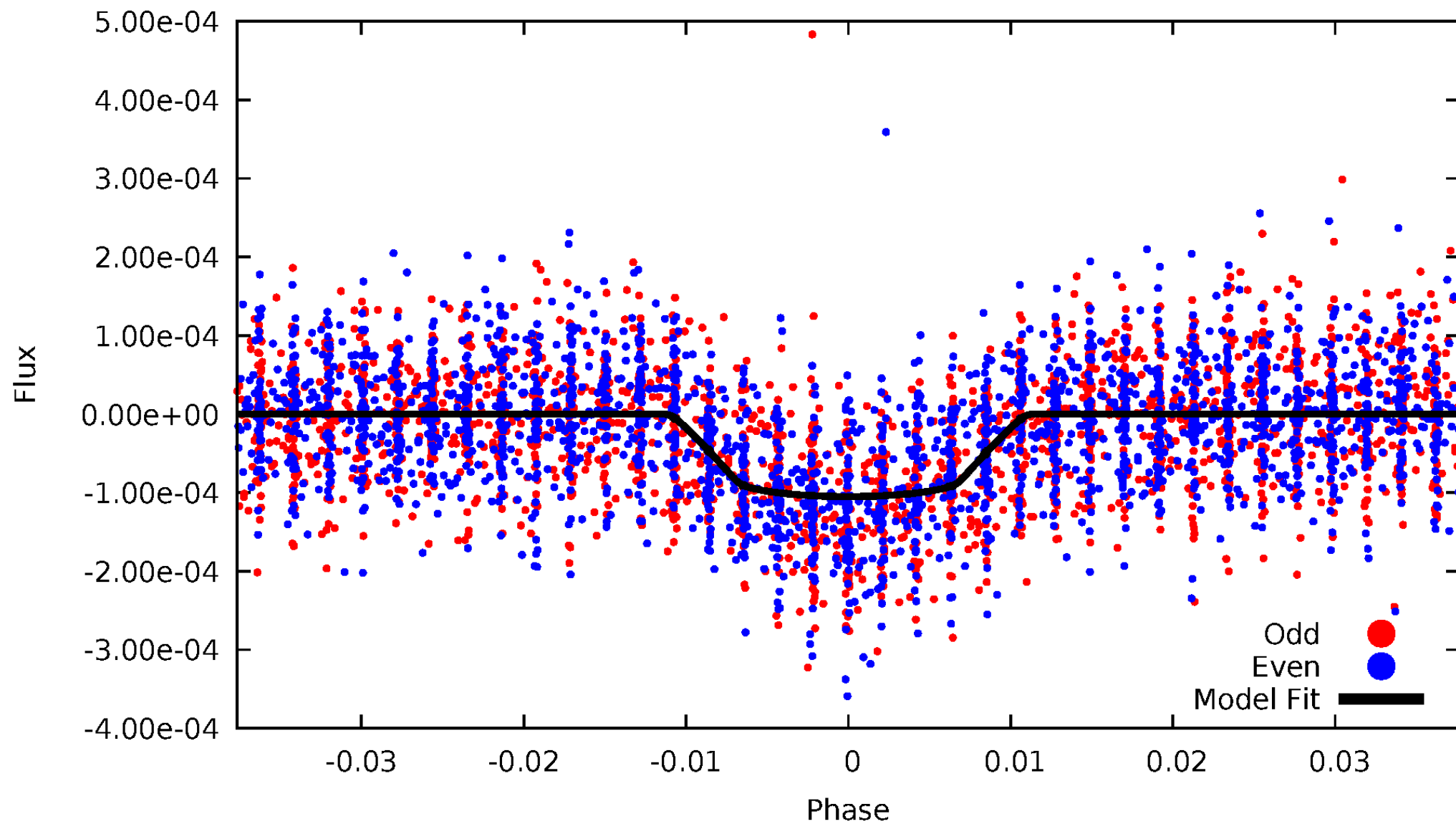


TCE 008700558-02



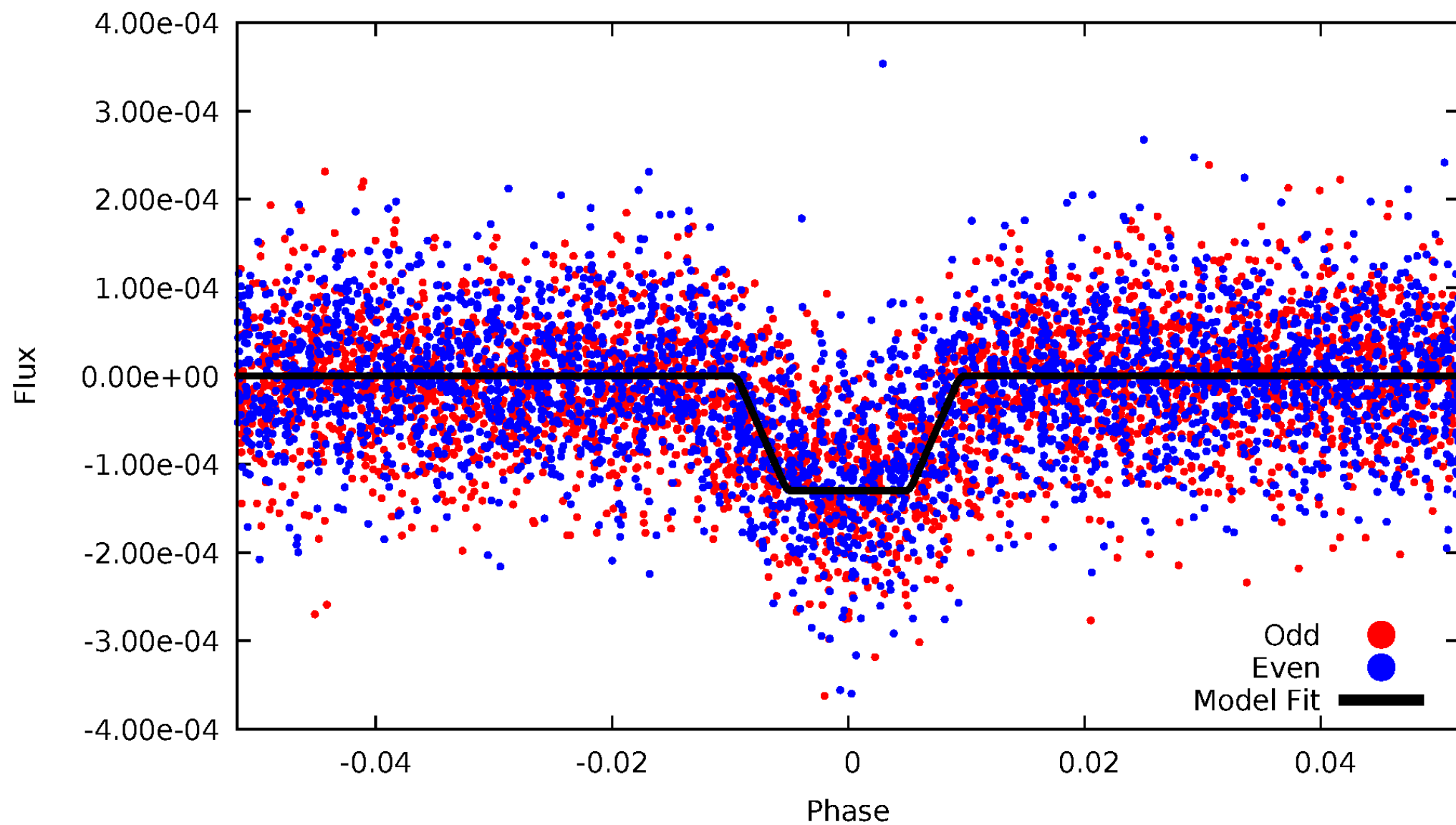
# DV Odd/Even

TCE 008700558-02



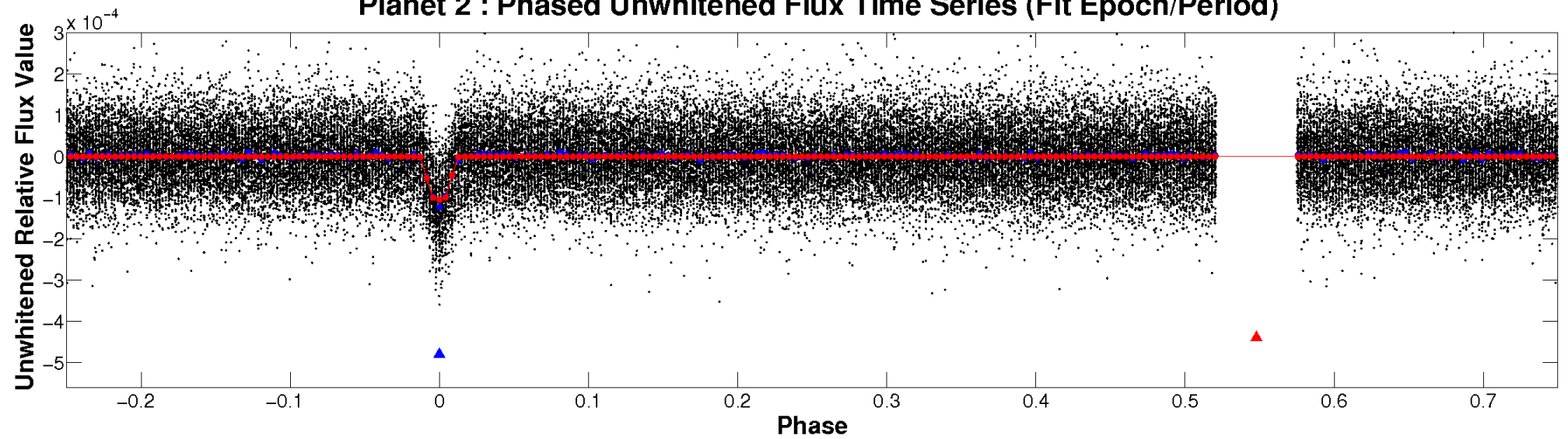
# ALT Odd/Even

TCE 008700558-02

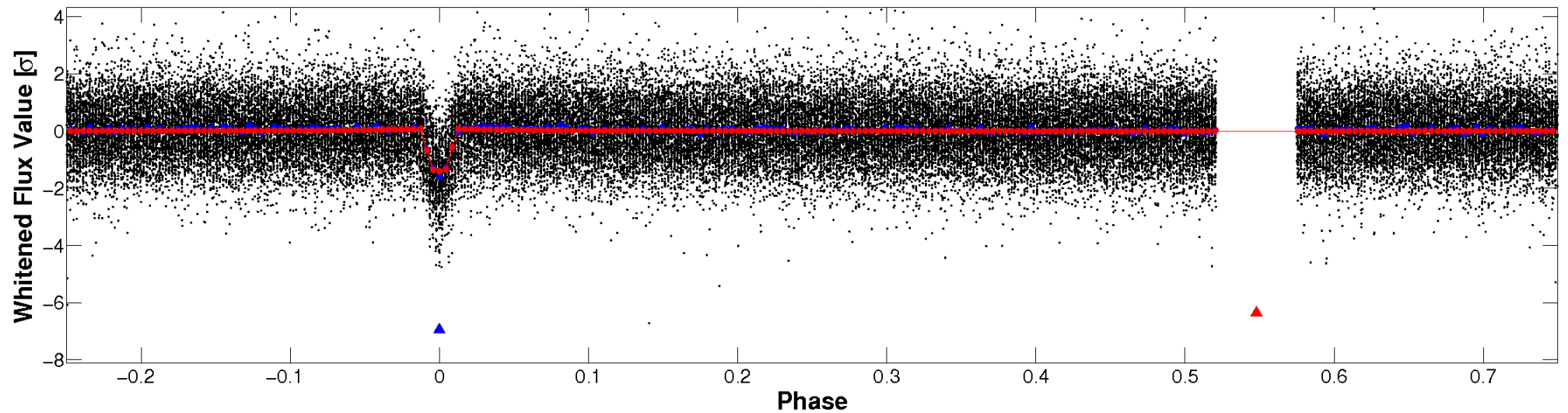


# Non-Whitened Vs. Whitened Light Curve

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



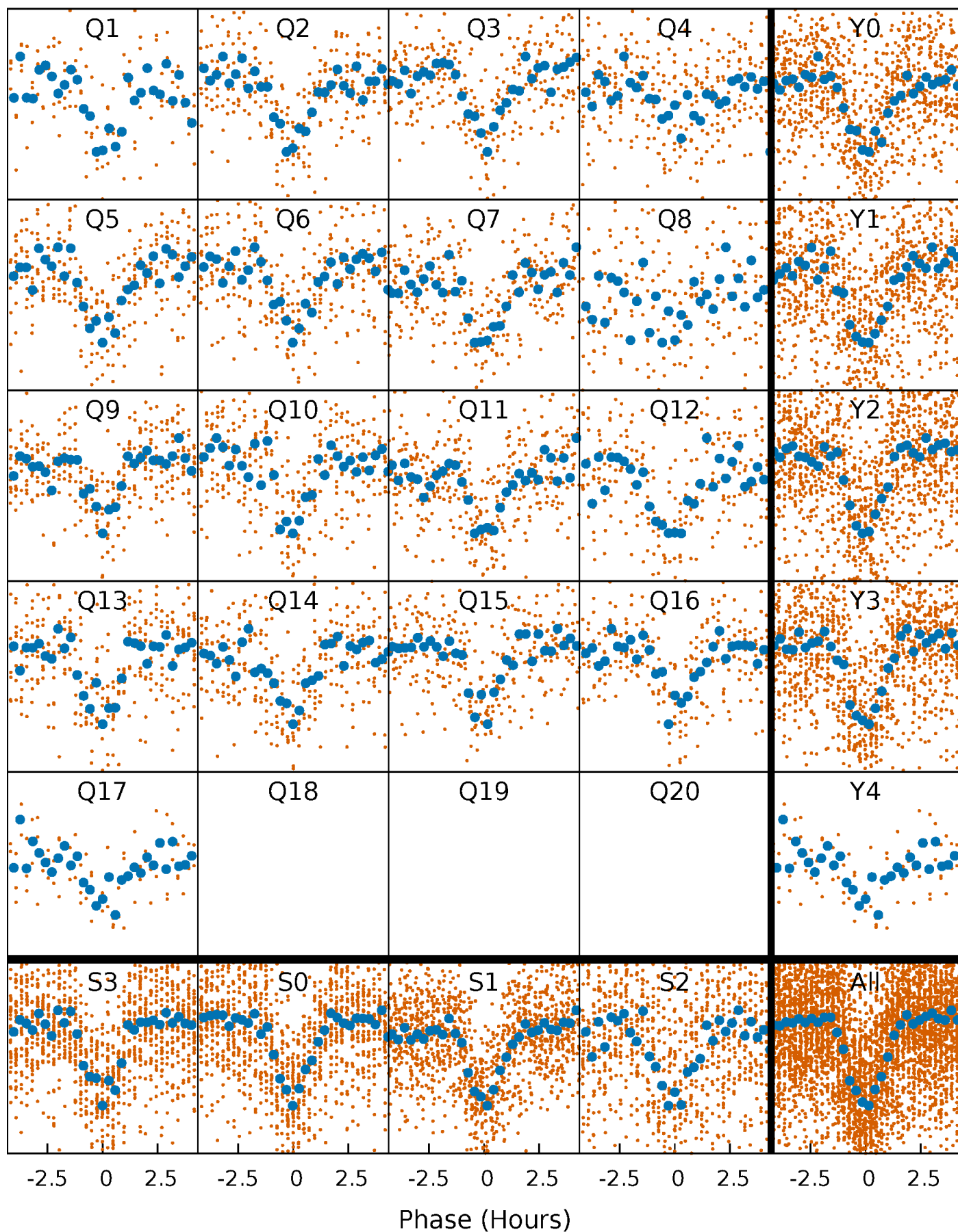
## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)





# PDC Quarter-Phased Transit Curves

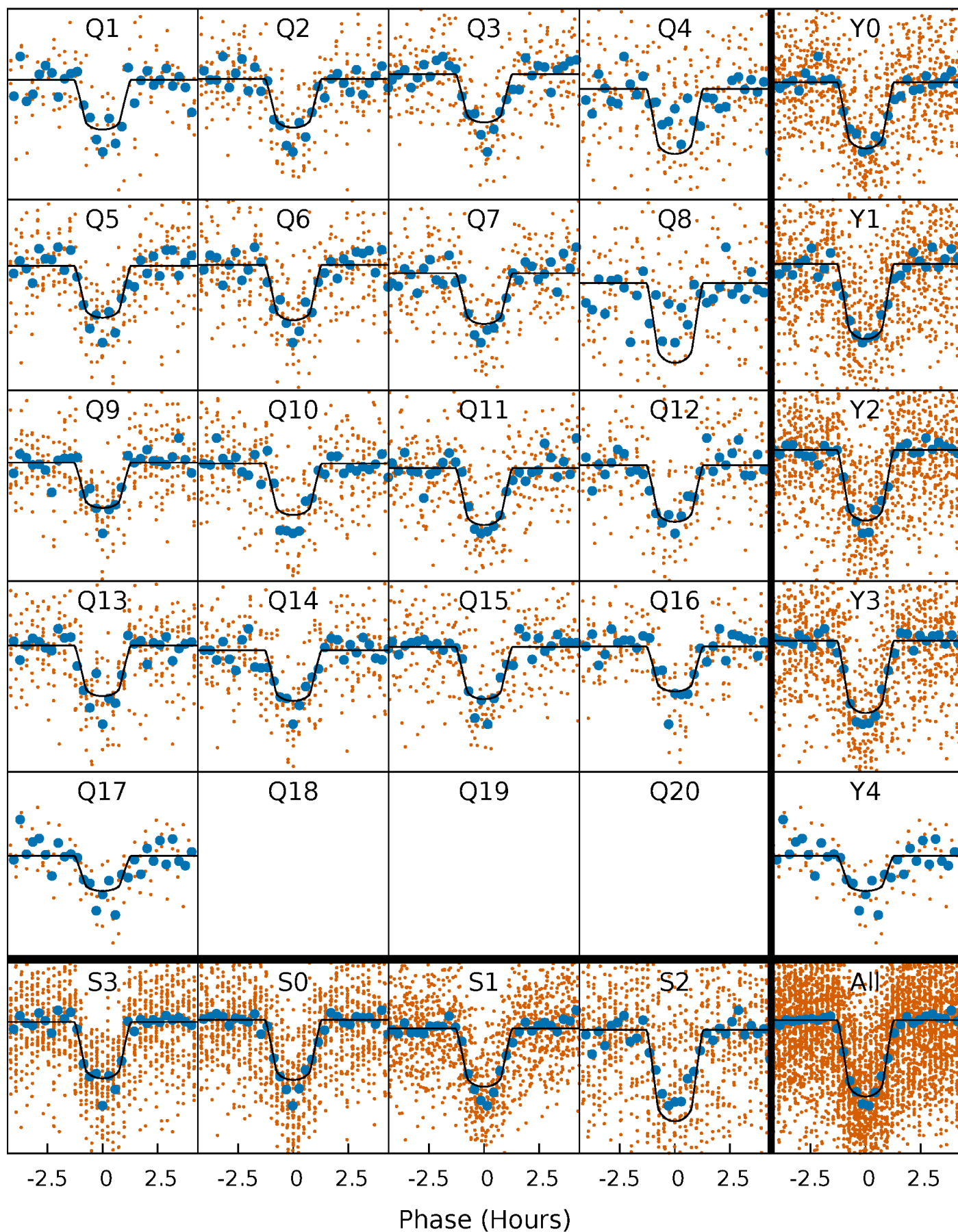
TCE 008700558-02   P= 4.791809 Days    $T_0=135.180269$  (BKJD)





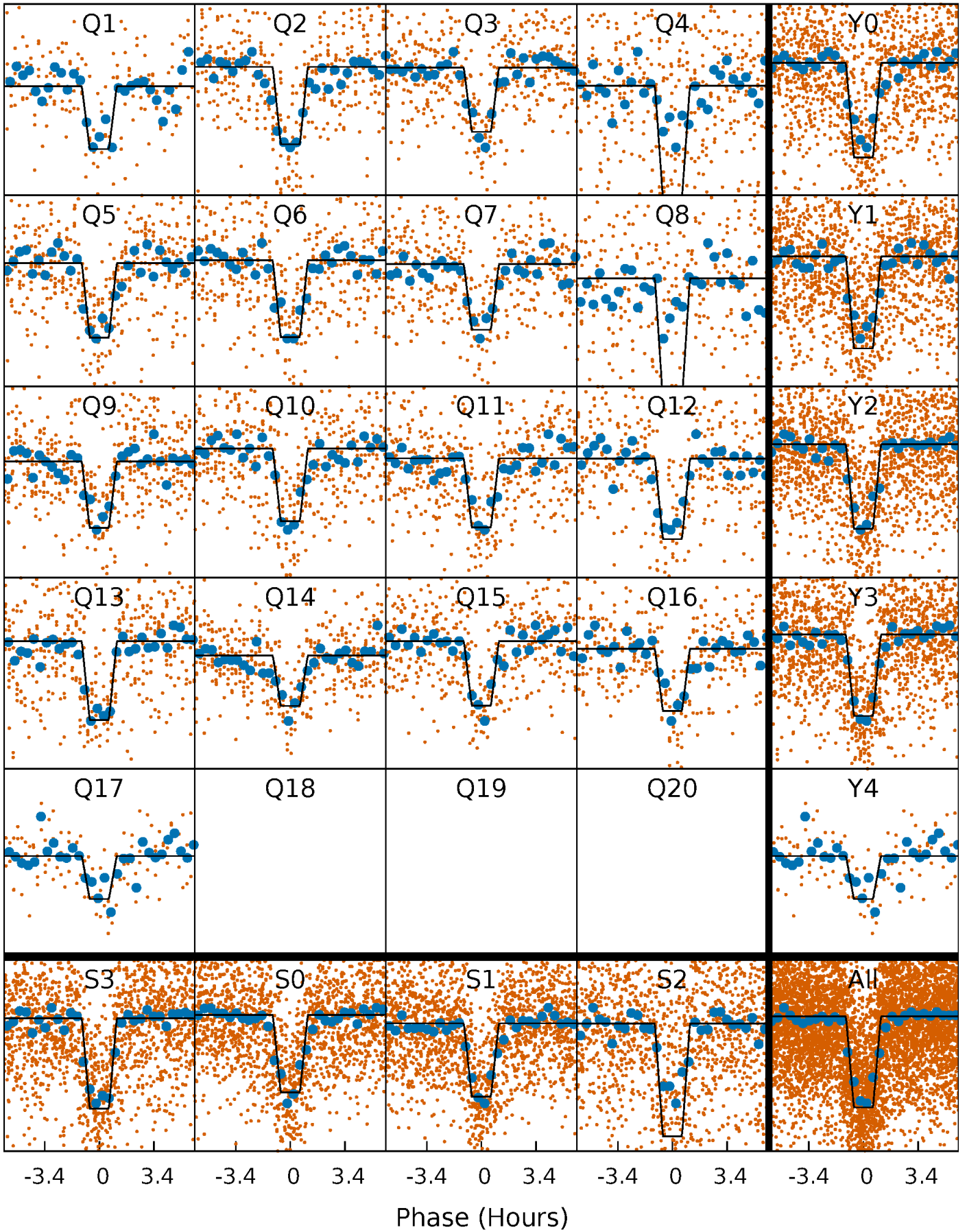
# DV Quarter-Phased Transit Curves

TCE 008700558-02 P= 4.791809 Days  $T_0=135.180269$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

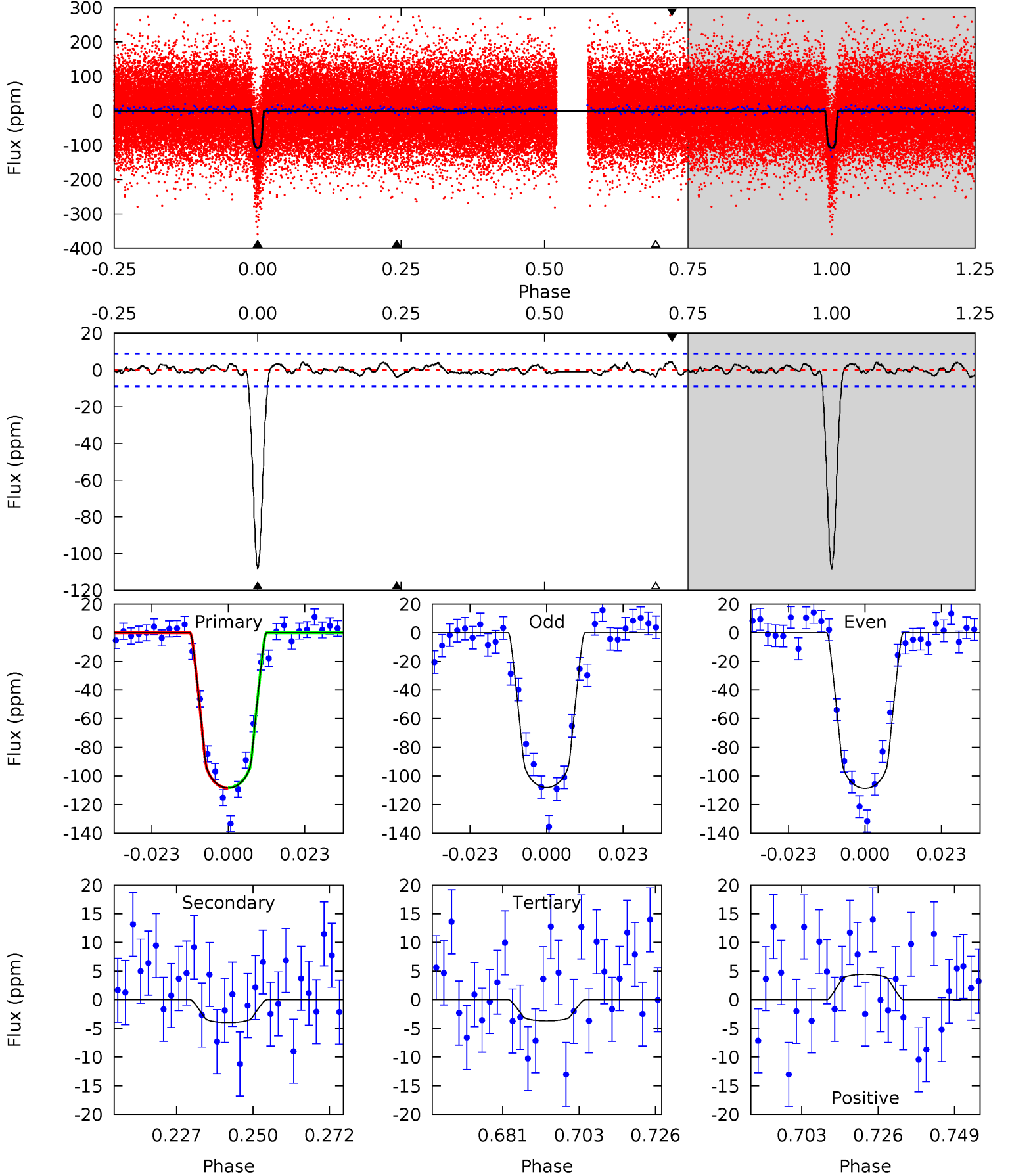
TCE 008700558-02     $P = 4.791784$  Days     $T_0 = 135.184422$  (BKJD)



# DV Model-Shift Uniqueness Test

008700558-02, P = 4.791809 Days, E = 130.388460 Days

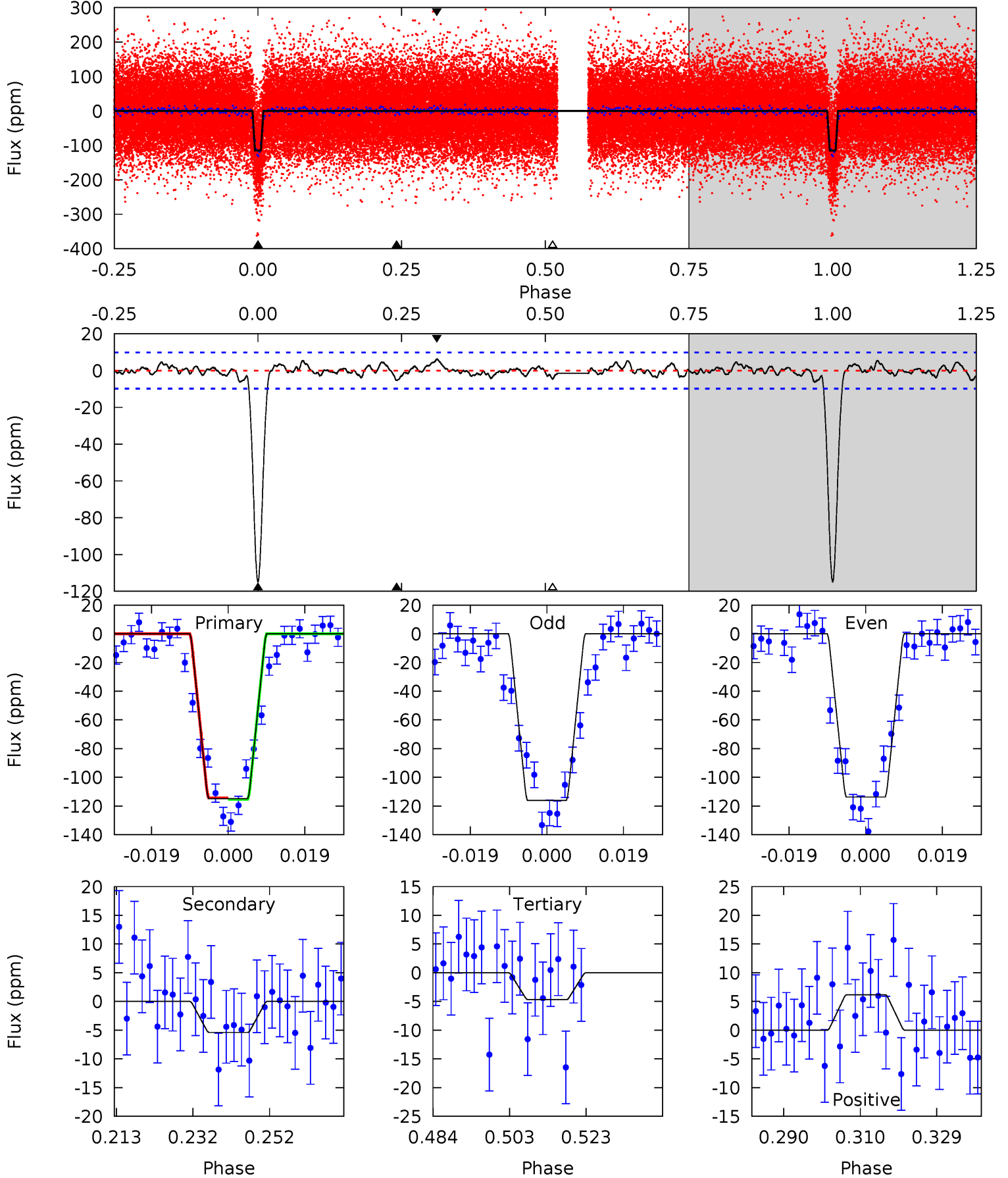
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
59.4	2.19	2.02	2.44	4.87	2.28	0.96	57.4	57.0	0.17	-0.25	0.18	0.97	0.04	0.12



# Alt Model-Shift Uniqueness Test

008700558-02, P = 4.791784 Days, E = 130.392638 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
57.1	2.69	2.33	3.07	4.90	2.34	1.06	54.8	54.1	0.36	-0.38	0.60	0.97	0.05	0.24



### Stellar Parameters For KIC 008700558

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6499^{+146}_{-195}$	$4.408^{+0.055}_{-0.154}$	$-0.240^{+0.250}_{-0.300}$	$1.103^{+0.252}_{-0.126}$	$1.135^{+0.129}_{-0.144}$	$1.192^{+0.332}_{-0.524}$
	+2%/-3%	+1%/-3%	+104%/-125%	+23%/-11%	+11%/-13%	+28%/-44%
Source	PHO1	FLK73	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 008700558-02 / KOI 0320.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-4 \pm 2$	$1.37^{+0.27}_{-0.21}$	$1772^{+100}_{-80}$	$3241^{+270}_{-341}$	$3.682^{+2.440}_{-1.921}$
Alt.	$-5 \pm 2$	$1.43^{+0.26}_{-0.21}$	$1773^{+102}_{-72}$	$3381^{+270}_{-273}$	$4.739^{+2.835}_{-1.992}$

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

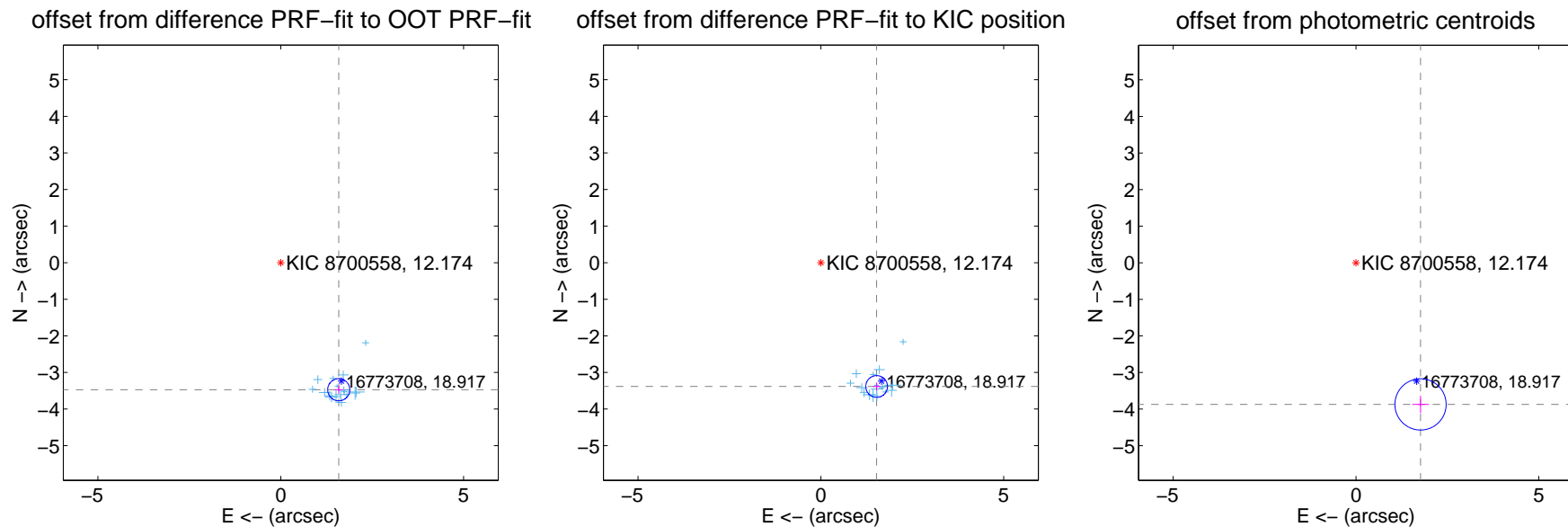
## DV Centroid Data

Supplemental centroid analysis for 008700558-02. Kepler magnitude: 12.17. Transit SNR 40.86

There are 17 quarters with good PRF difference image offsets

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

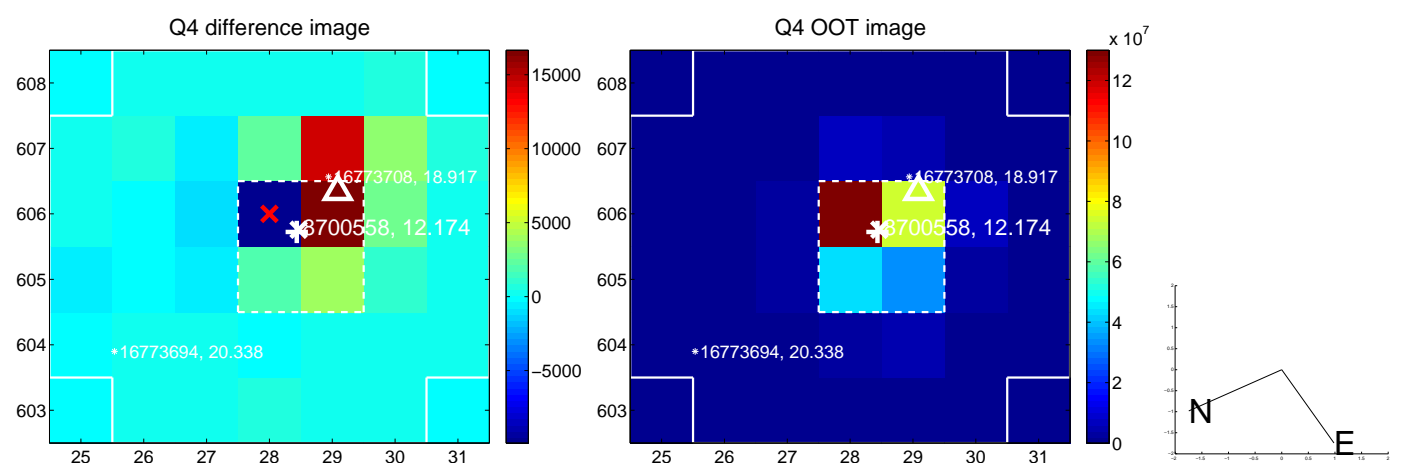
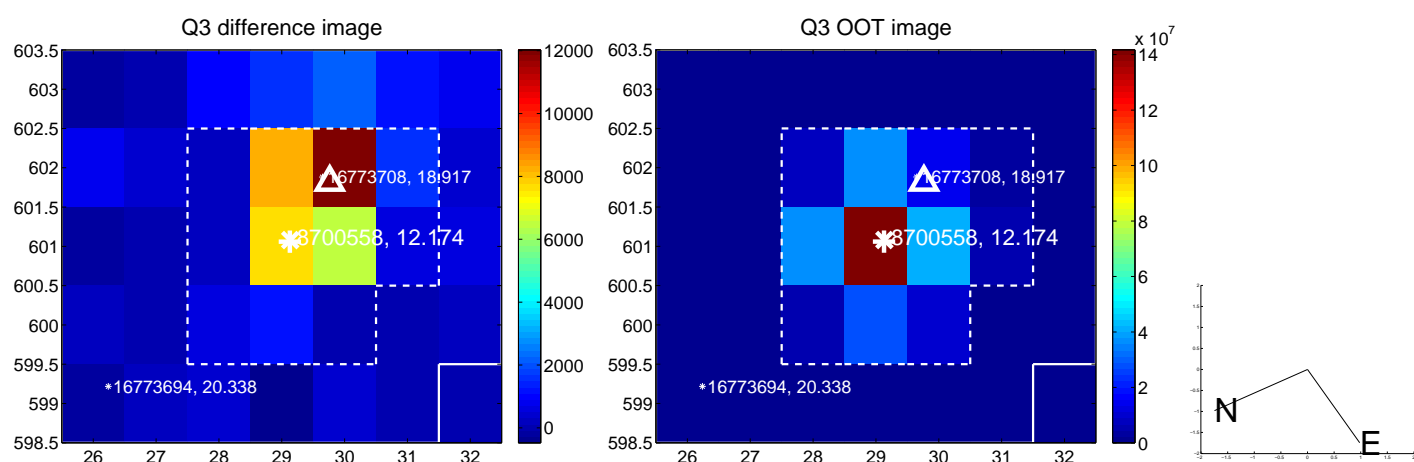
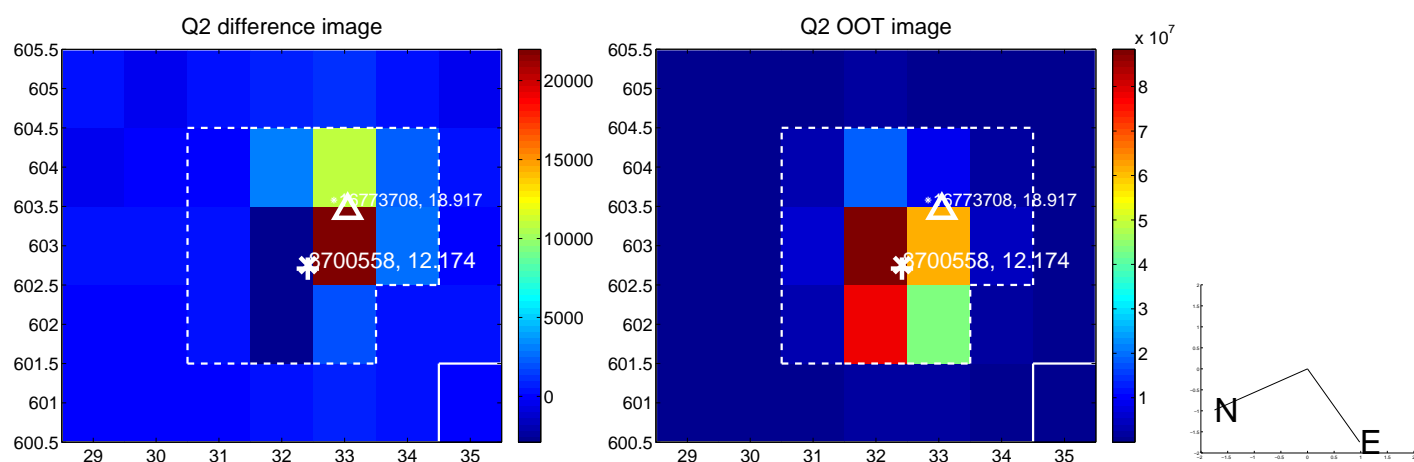
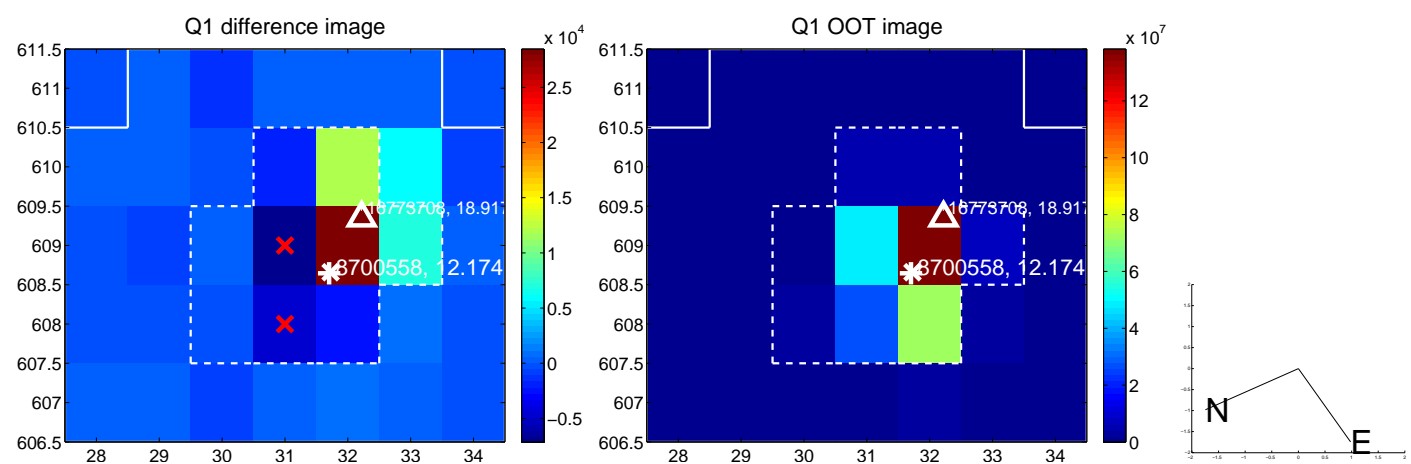
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$3.818 \pm 0.101$	37.82	$-1.586 \pm 0.113$	$-3.472 \pm 0.110$
PRF-fit source offset from KIC position	$3.711 \pm 0.099$	37.46	$-1.525 \pm 0.109$	$-3.382 \pm 0.107$
photometric centroid source offset	$4.26 \pm 0.23$	18.22	$-1.77 \pm 0.22$	$-3.87 \pm 0.24$



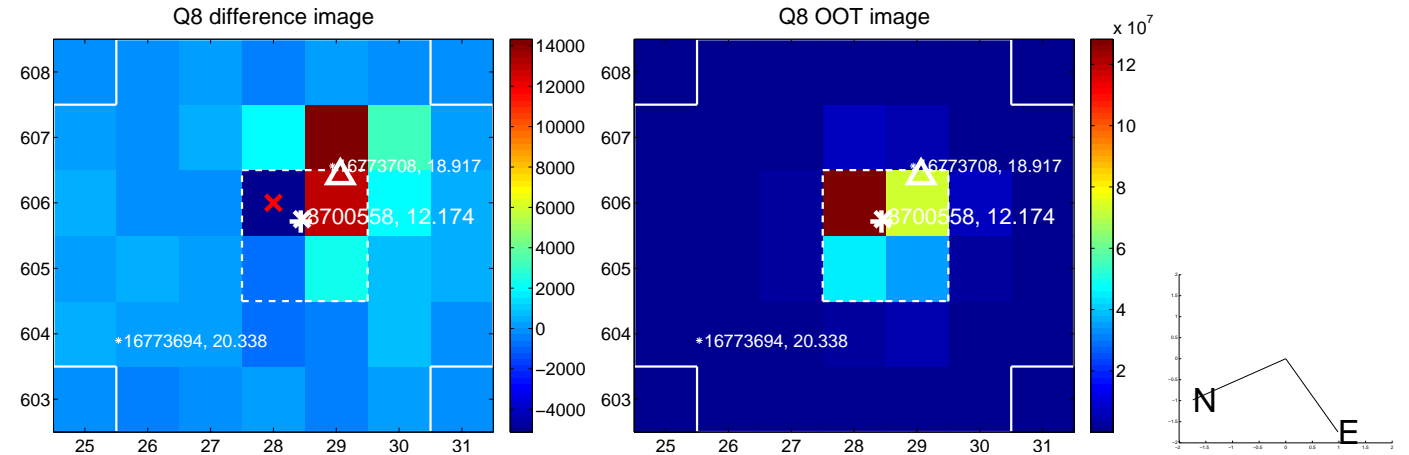
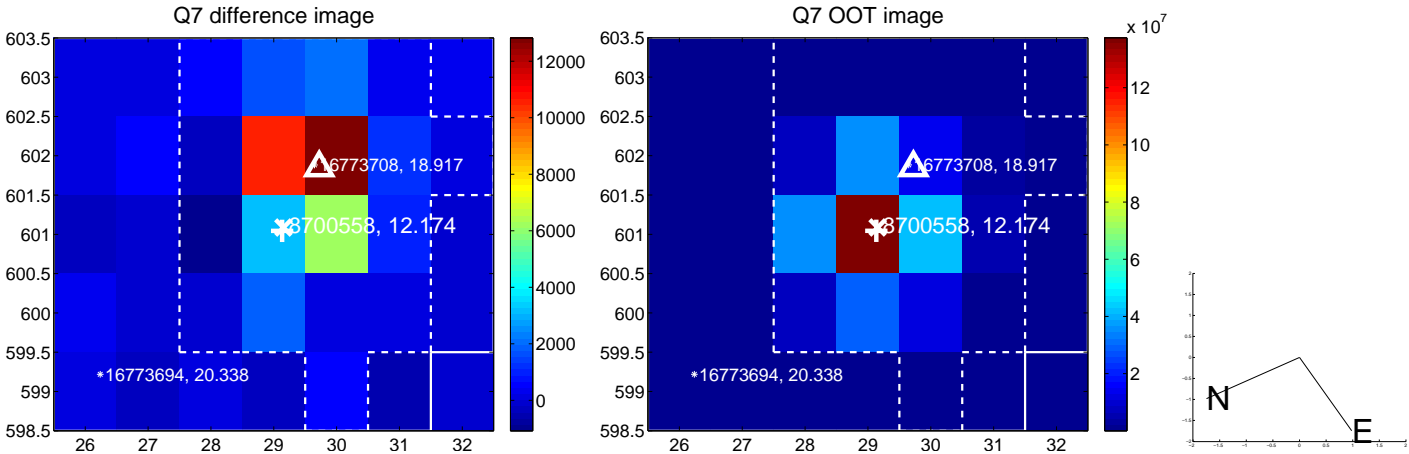
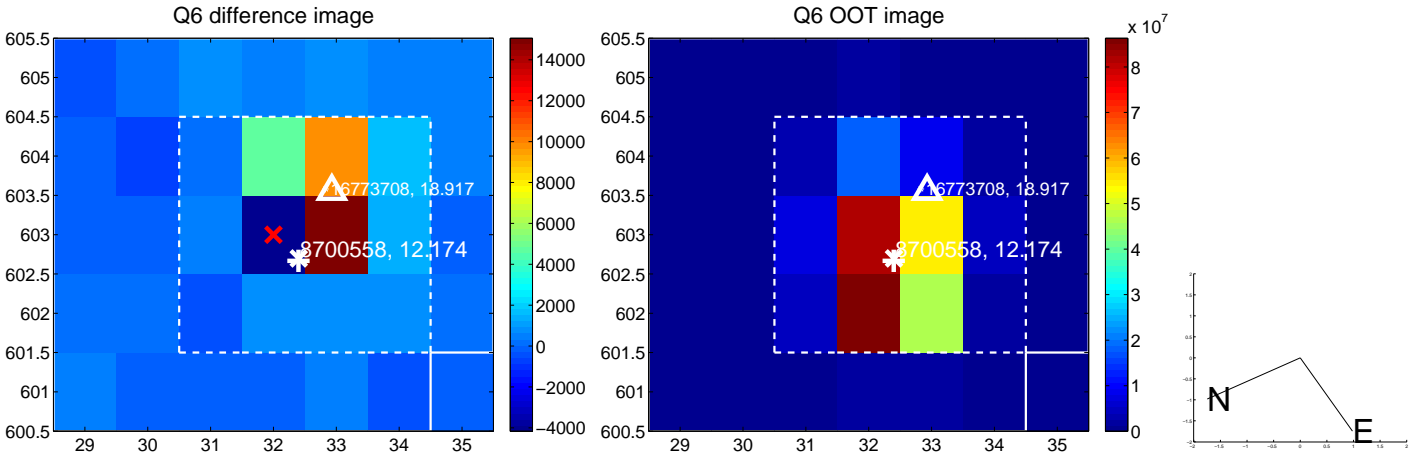
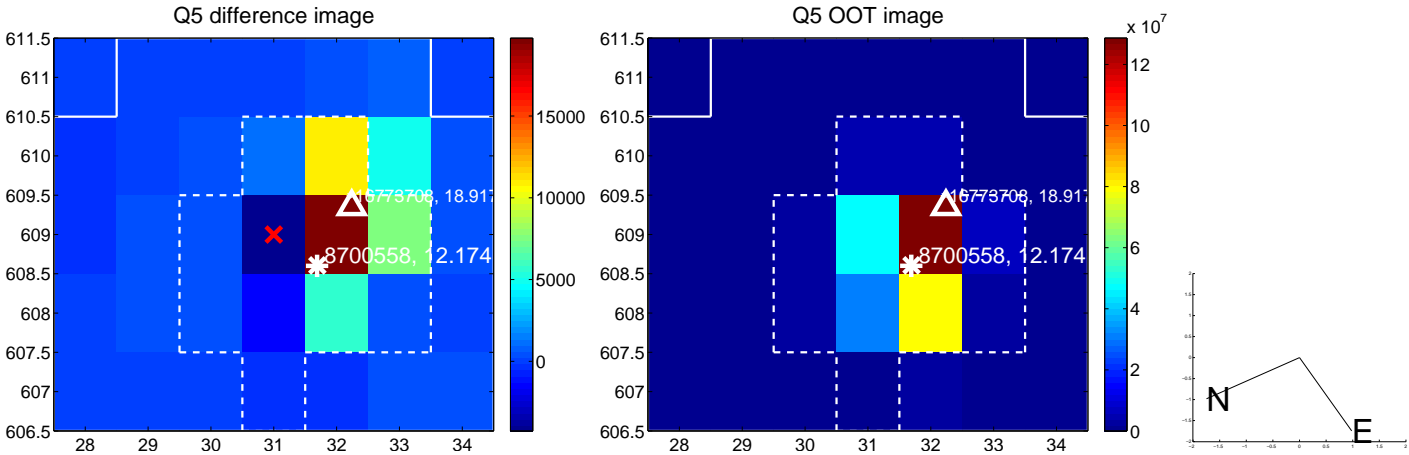
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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



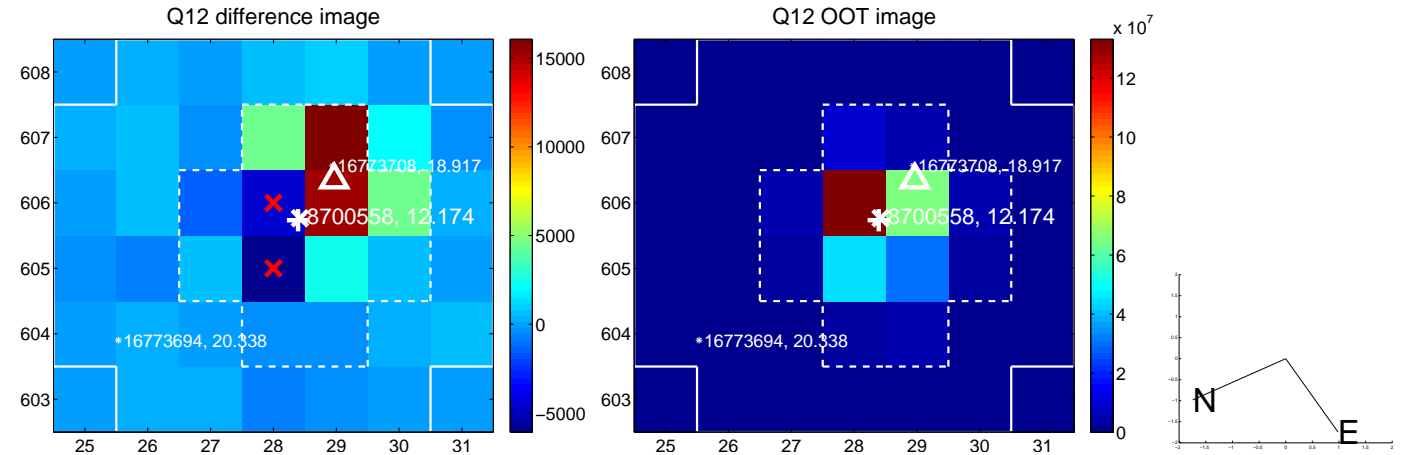
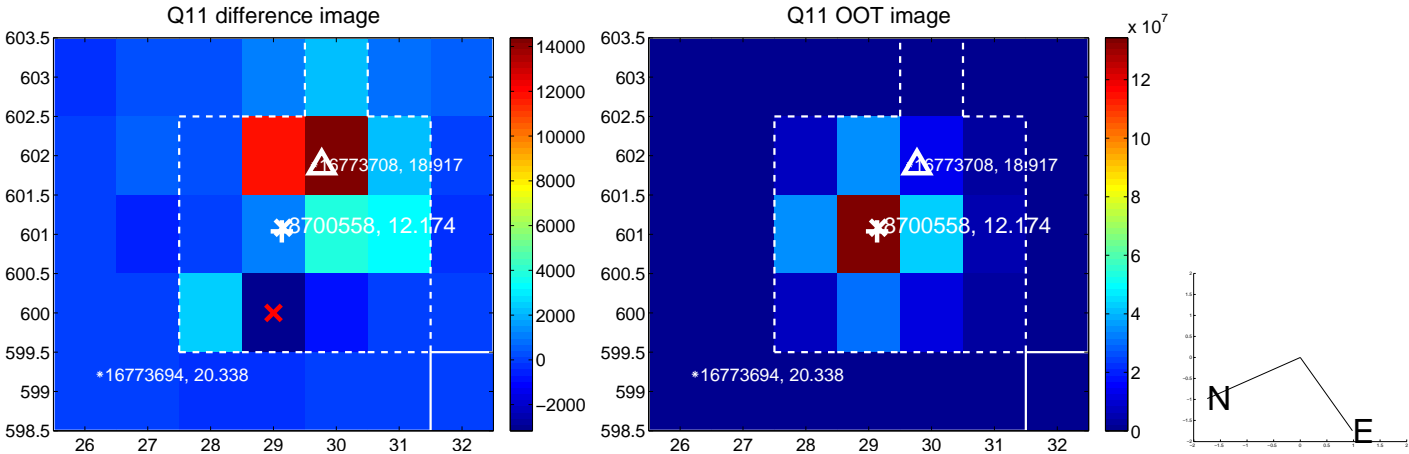
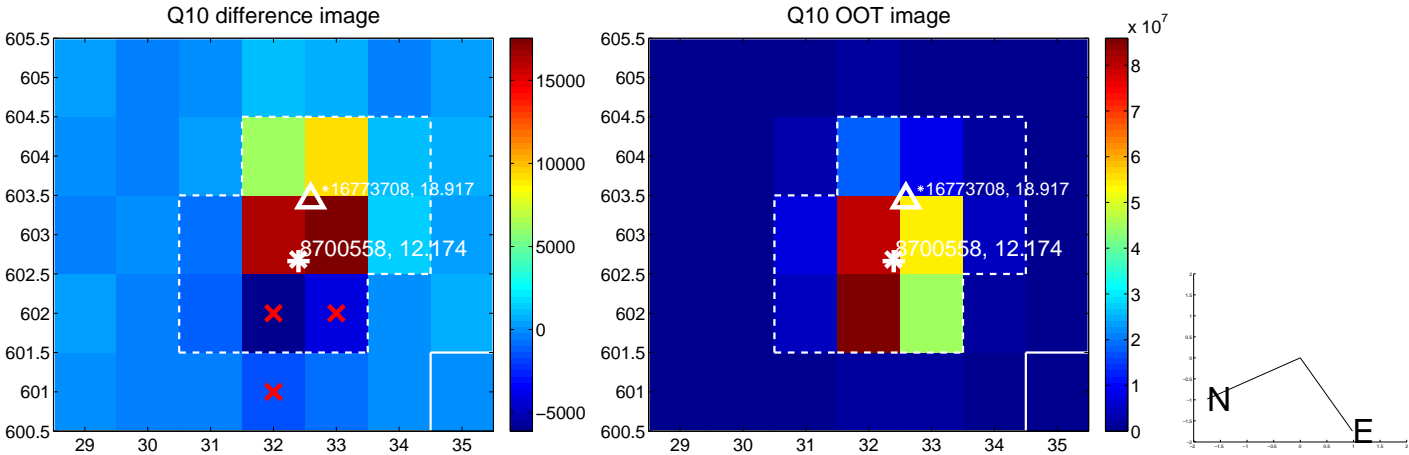
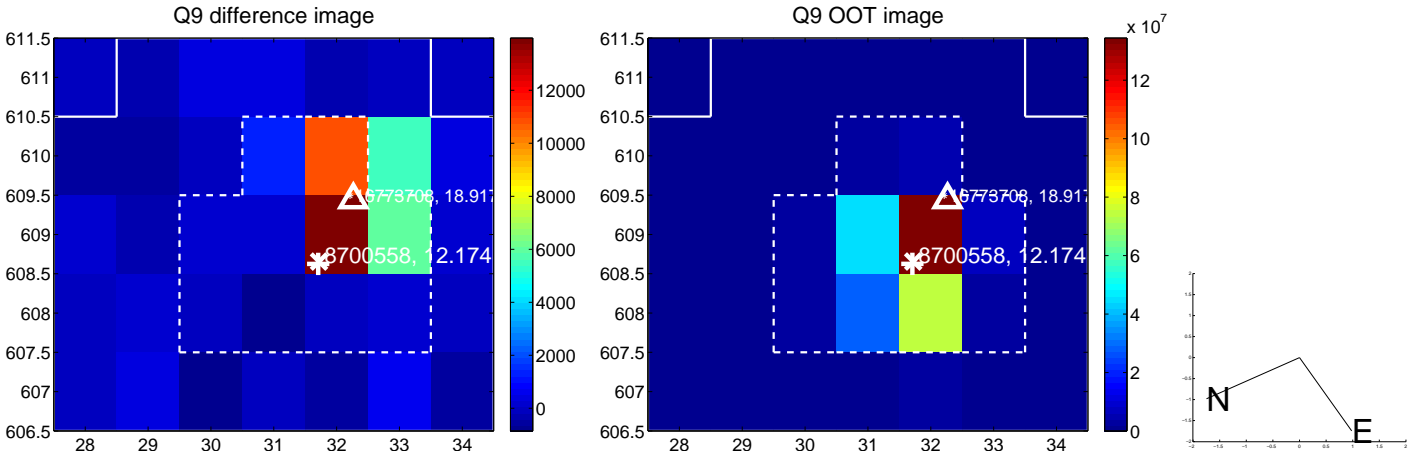
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



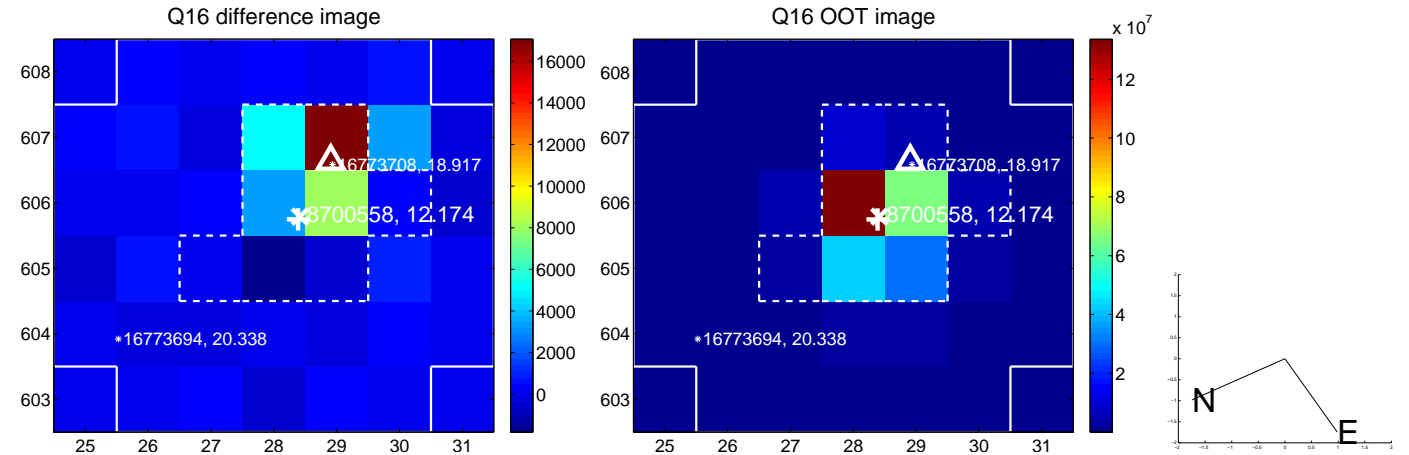
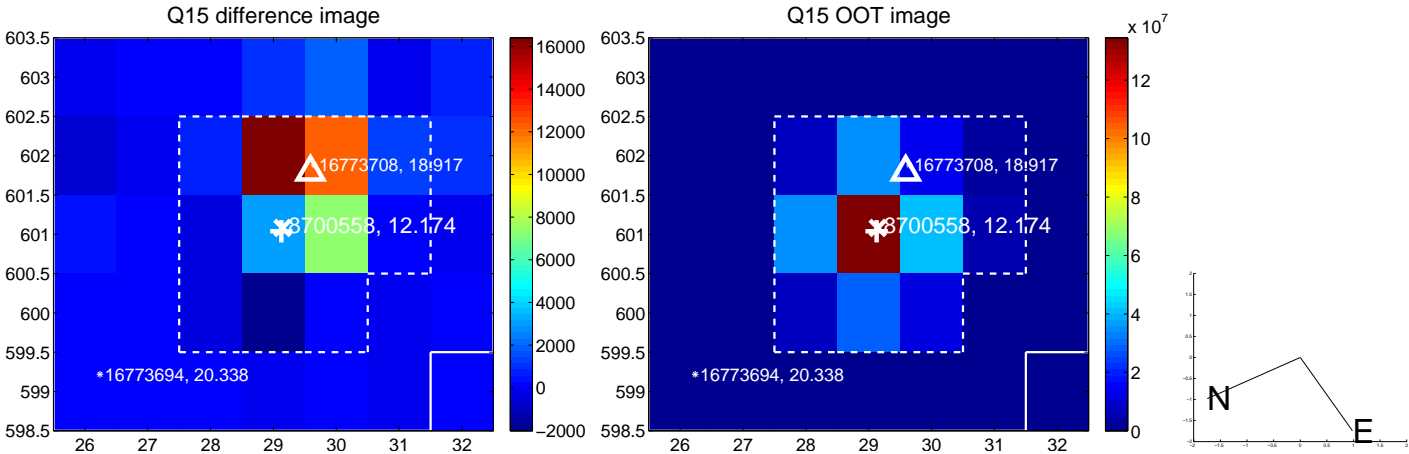
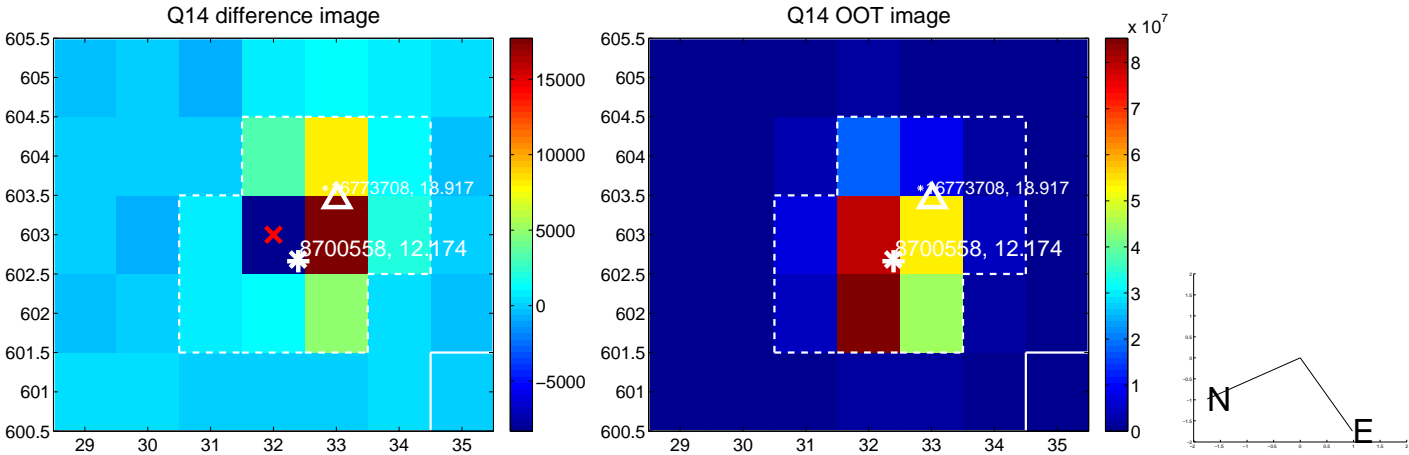
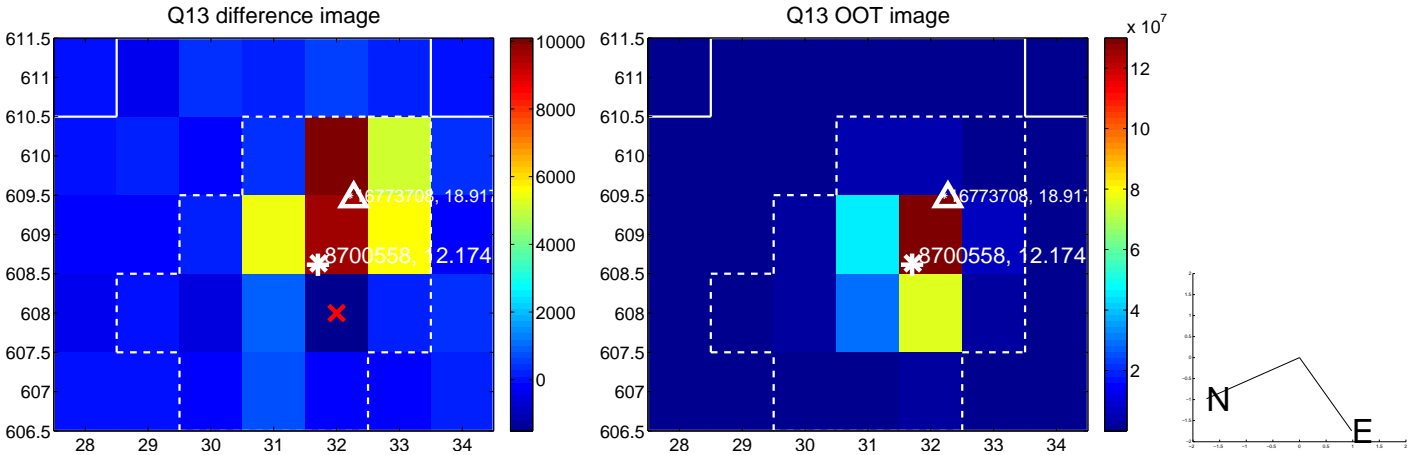
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



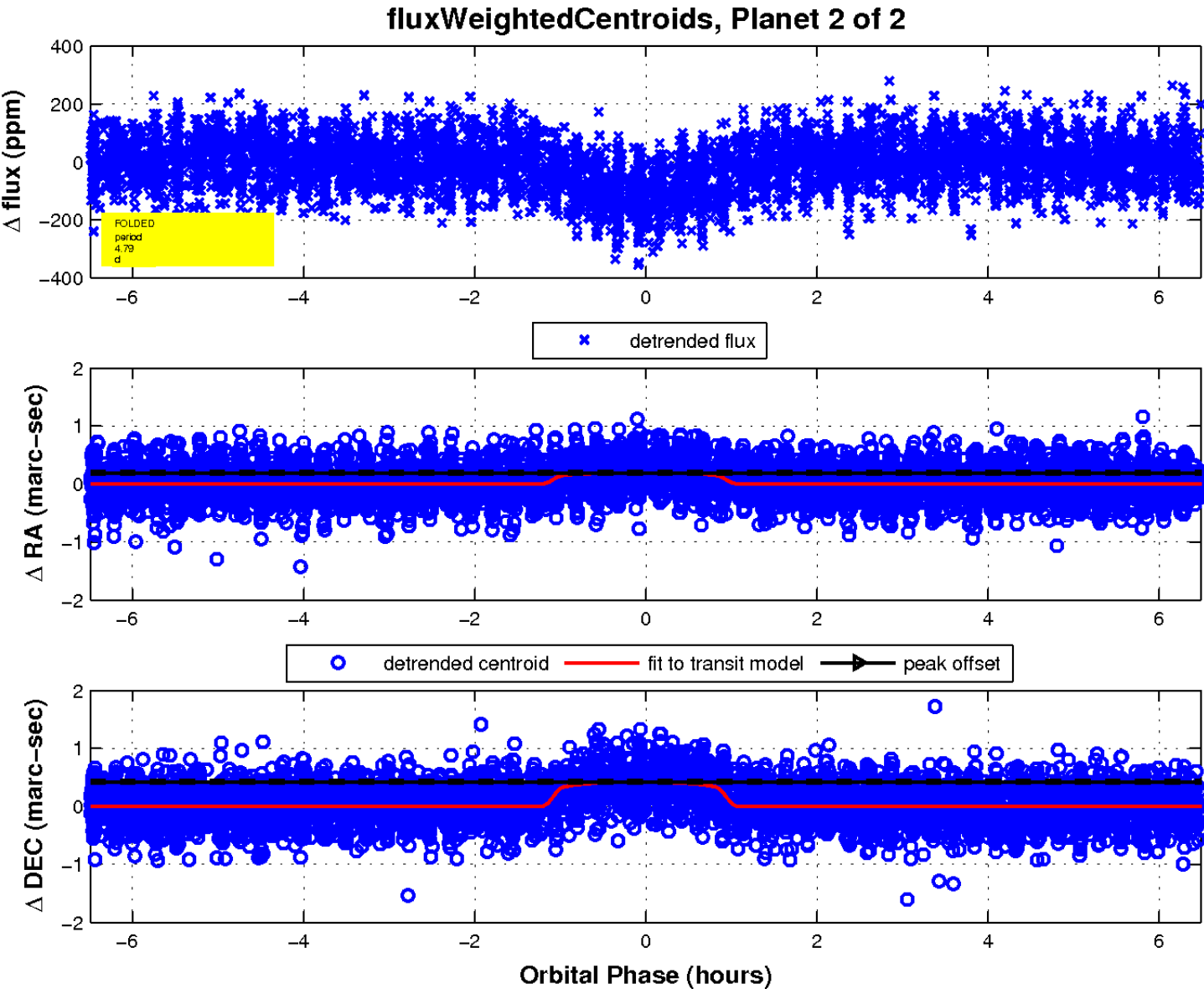
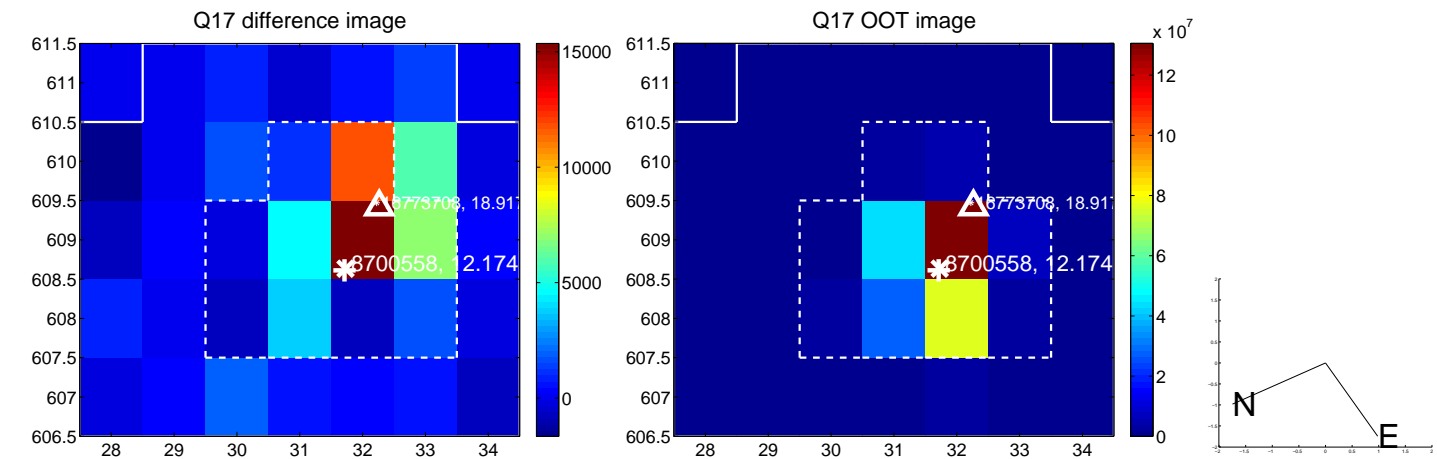
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

