

# KIC 005563080

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005563080-01	OBS	4220.01	0.785467	131.863513	113.7	1.153	14.9	18.8	0.87	5356	1.12	2319.70
005563080-02	OBS	No	0.785484	132.251976	114.5	1.347	8.6	20.7	0.87	5356	1.13	2319.63

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005563080-01	OBS	FP	0.00	0	1	1	0	MOD_SEC_ALT—HAS_SEC_TCE—CENT_RESOLVED_OFFSET
005563080-02	OBS	FP	0.00	1	1	1	0	IS_SEC_TCE—CENT_RESOLVED_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.

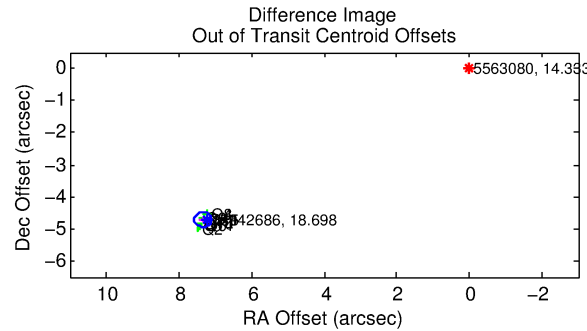
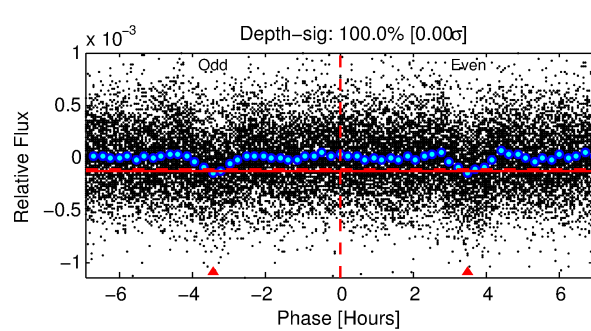
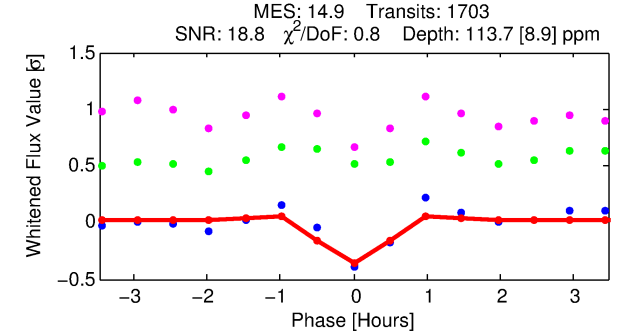
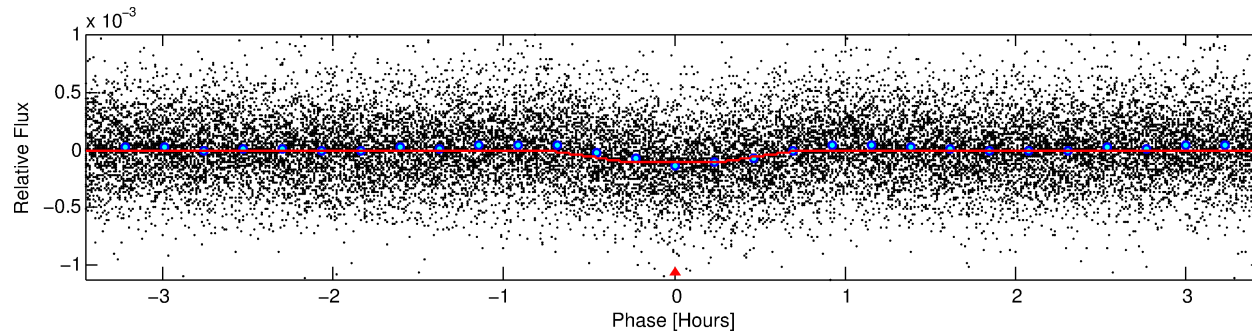
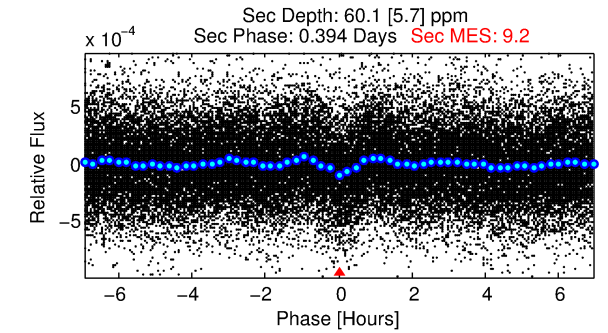
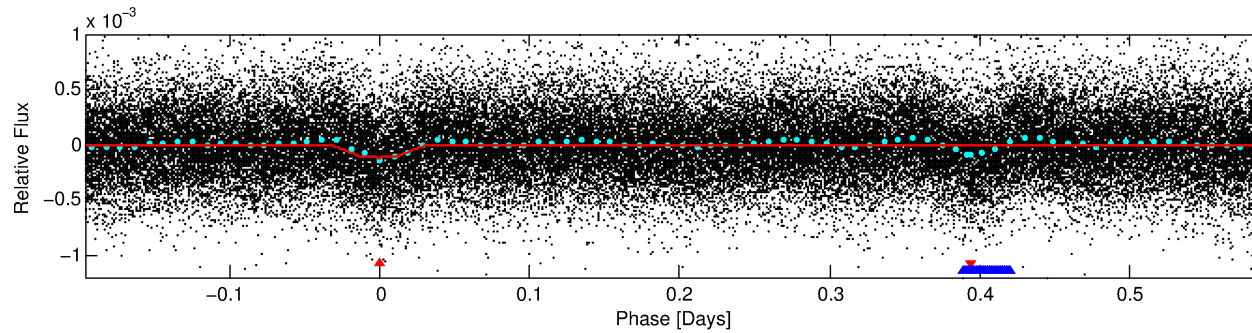
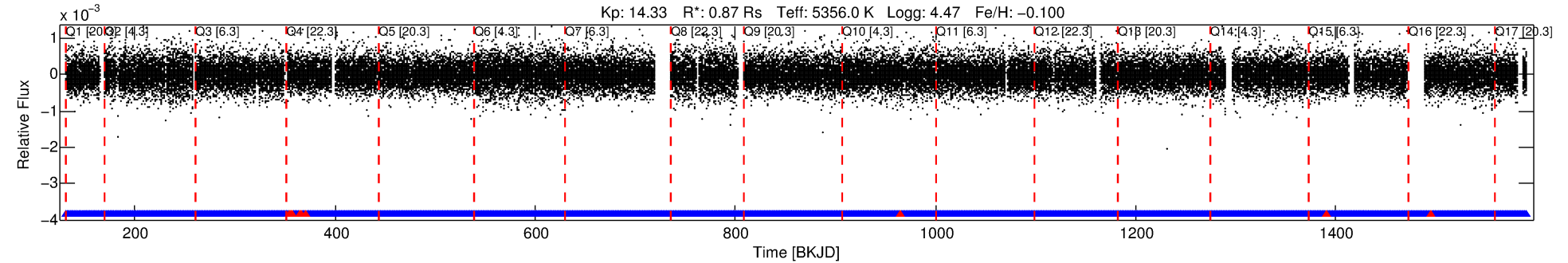
## Ephemeris Match Information For 005563080-01

No Significant Match Found

# DV One-Page Summary

KIC: 5563080 Candidate: 1 of 2 Period: 0.785 d  
KOI: K04220.01 Corr: 0.757

Kp: 14.33 R\*: 0.87 Rs Teff: 5356.0 K Logg: 4.47 Fe/H: -0.100



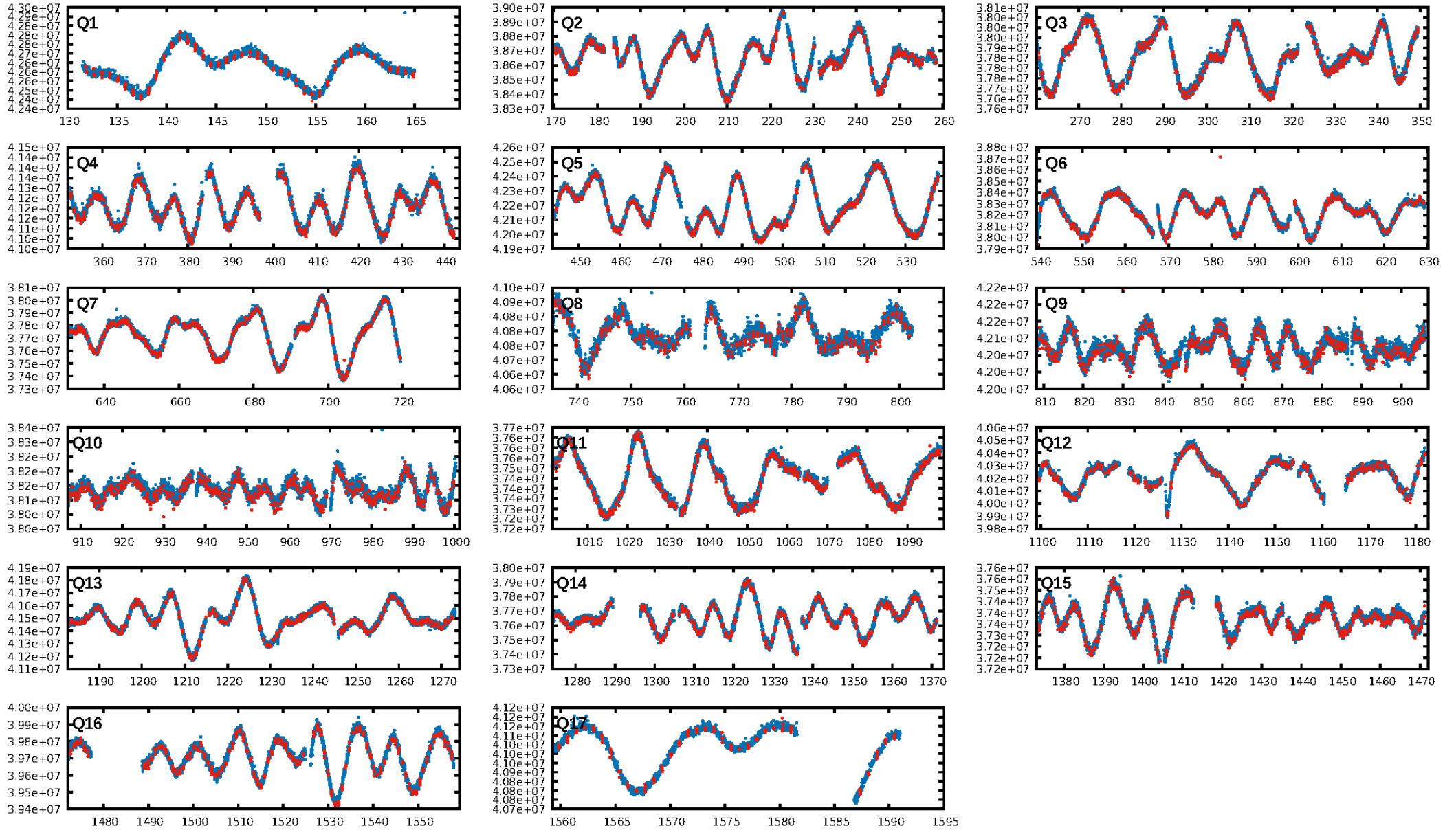
## DV Fit Results:

Period = 0.78547 [0.00001] d  
Epoch = 131.8635 [0.0009] BKJD  
Rp/R\* = 0.0118 [0.0059]  
a/R\* = 2.58 [4.74]  
b = 0.90 [0.47]  
Seff = 2319.70 [608.88]  
Teq = 1770 [116] K  
Rp = 1.12 [0.59] Re  
a = 0.0155 [0.0024] AU  
Ag = 6.31 [6.44] [0.82σ]  
Teffp = 4336 [1088] K [2.35σ]

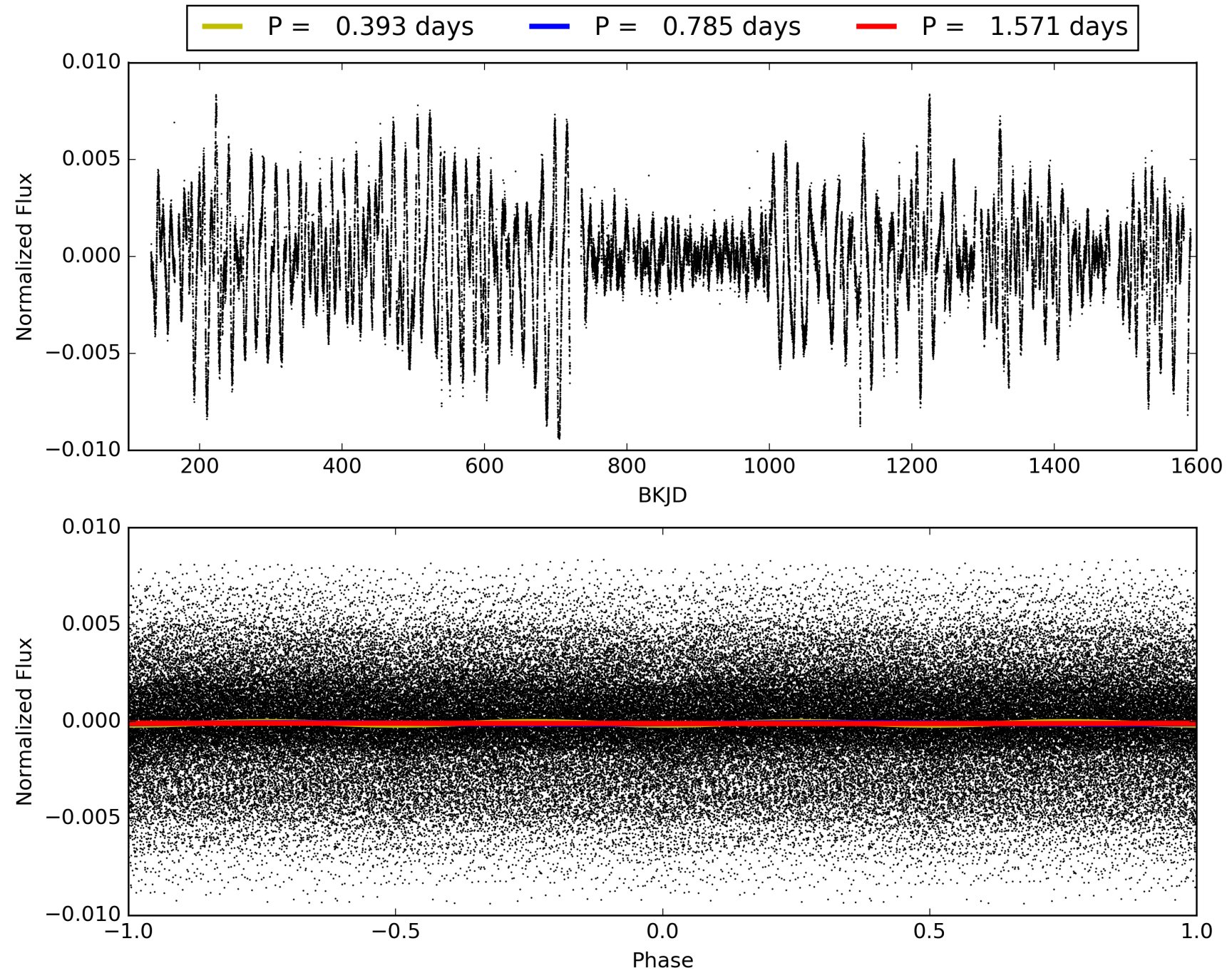
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 0.0% [0.00σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 6.36e-47  
RollingBand-fgt: 0.99 [1616/1627]  
GhostDiagnostic-chr: -0.6536  
Centroid-sig: N/A  
Centroid-so: 18.237 arcsec [25.25σ]  
OotOffset-rm: 8.724 arcsec [113.33σ]  
KicOffset-rm: 8.724 arcsec [105.99σ]  
OotOffset-st: 4/4/2/0 [10]  
KicOffset-st: 4/4/2/0 [10]  
DiffImageQuality-fgm: 1.00 [10/10]  
DiffImageOverlap-fno: 1.00 [17/17]

# TCE 005563080-01, PDC Light Curves

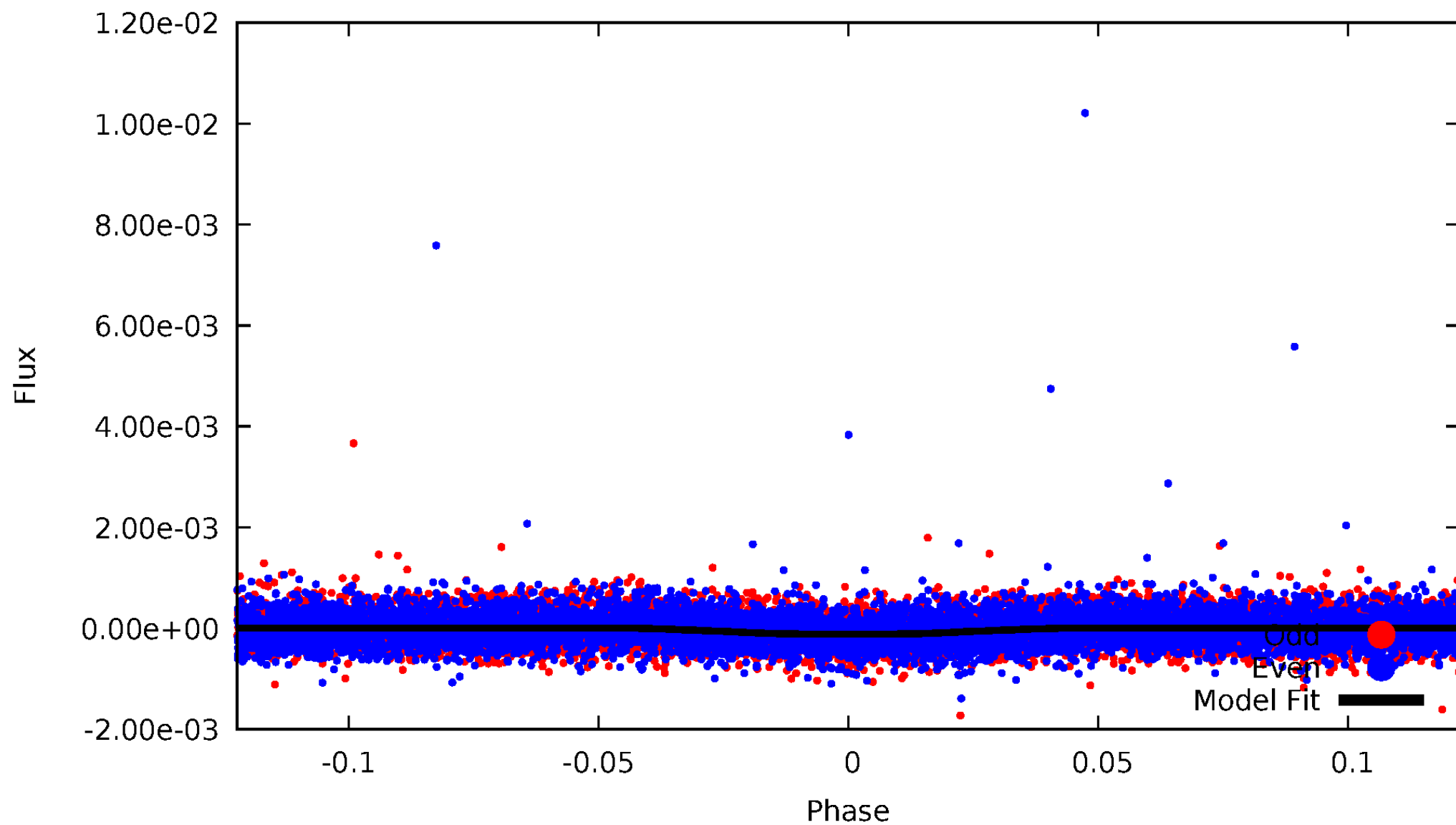


TCE 005563080-01



# DV Odd/Even

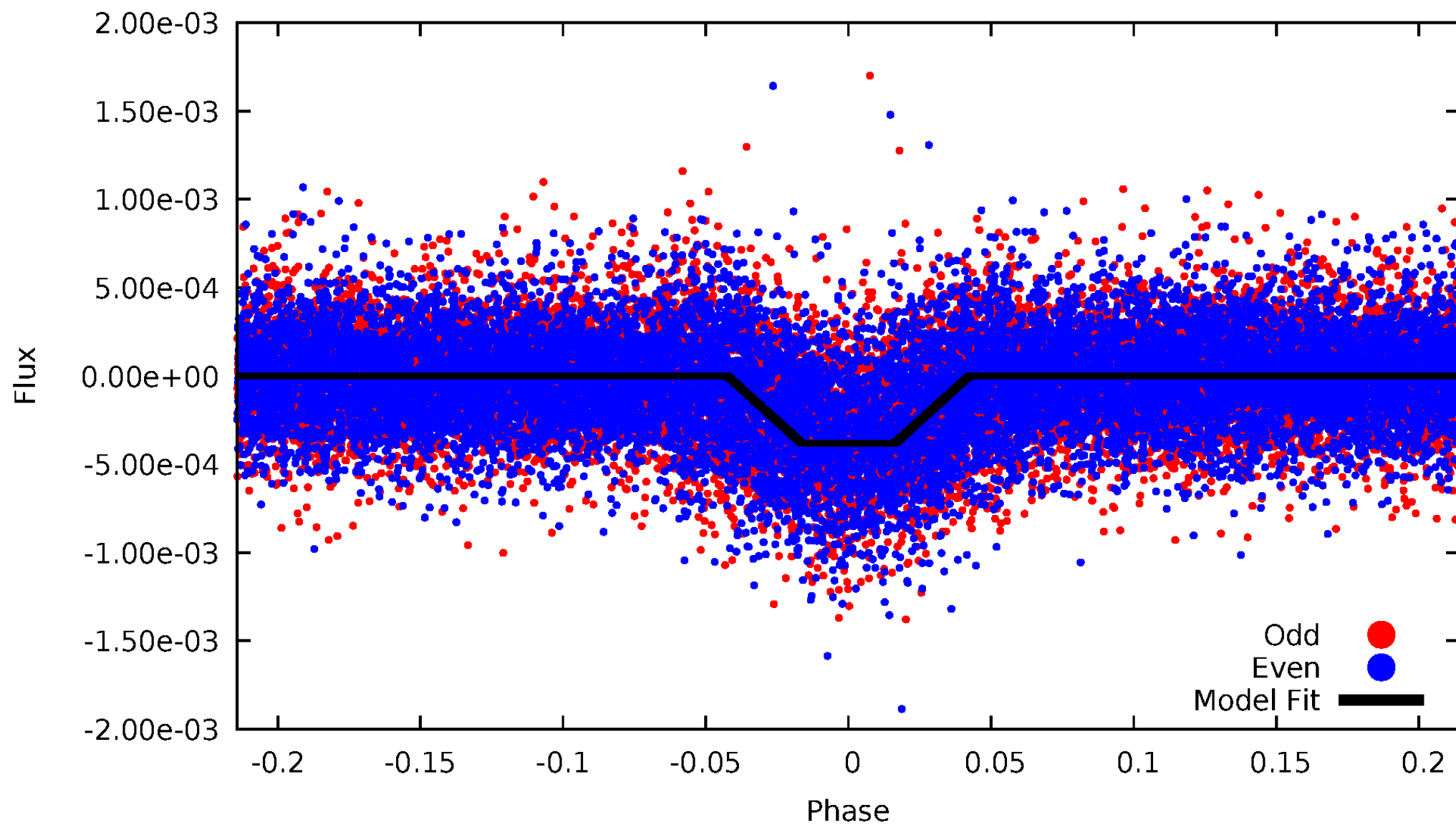
TCE 005563080-01





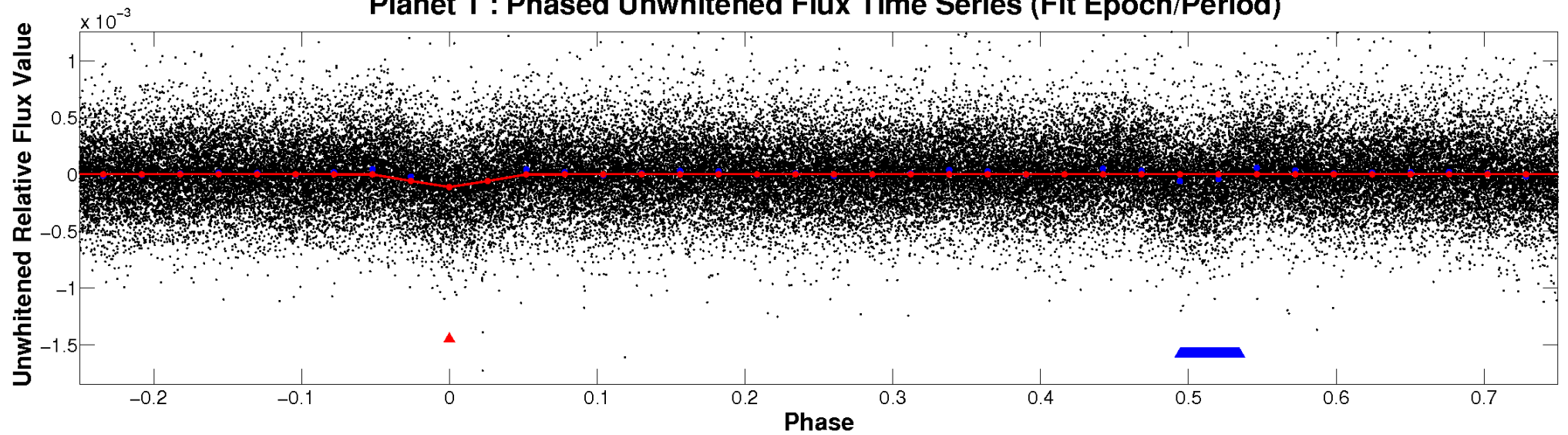
# ALT Odd/Even

TCE 005563080-01

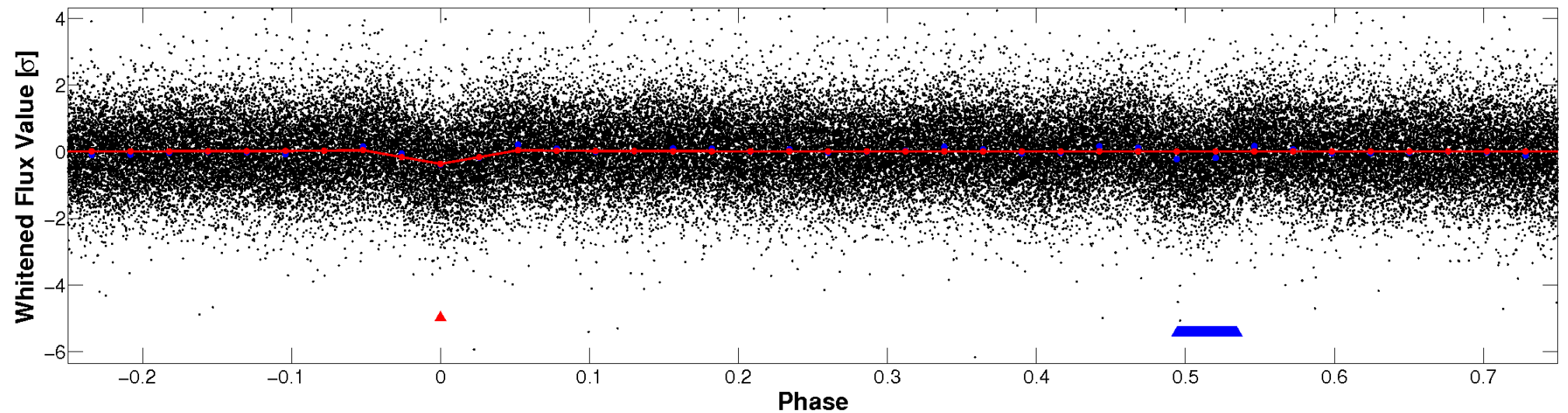


# Non-Whitened Vs. Whitened Light Curve

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

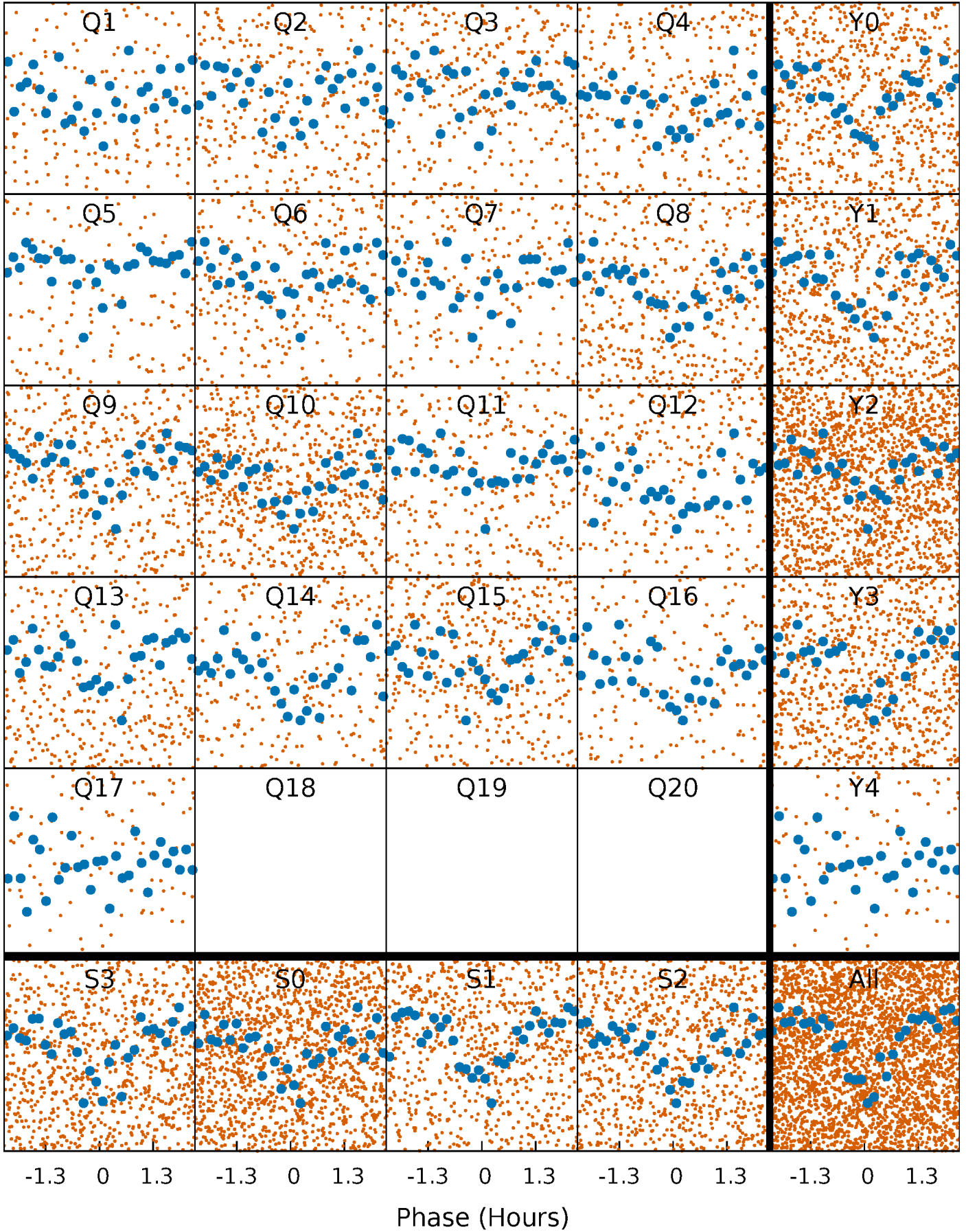


**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

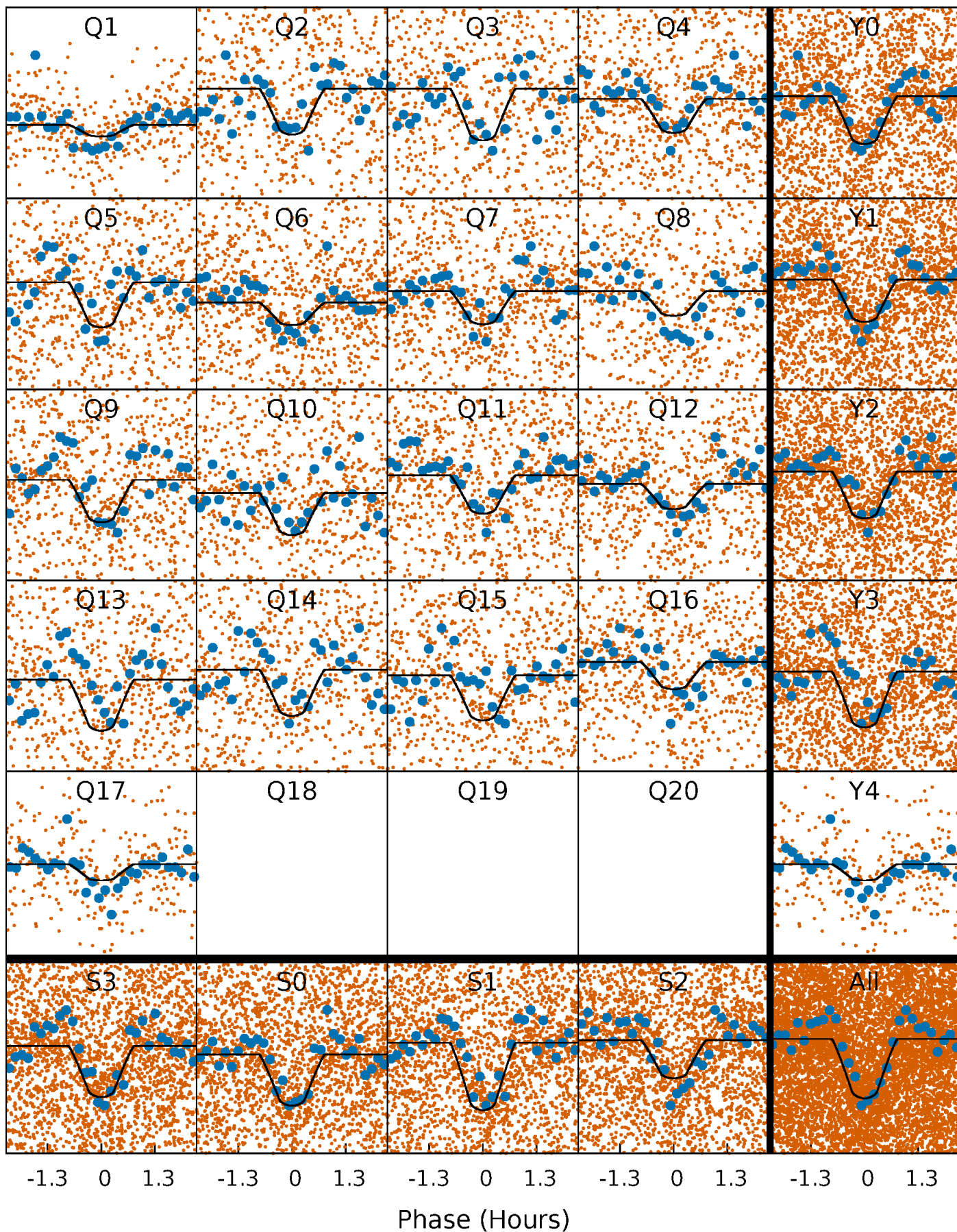
TCE 005563080-01 P= 0.785467 Days  $T_0=131.863513$  (BKJD)





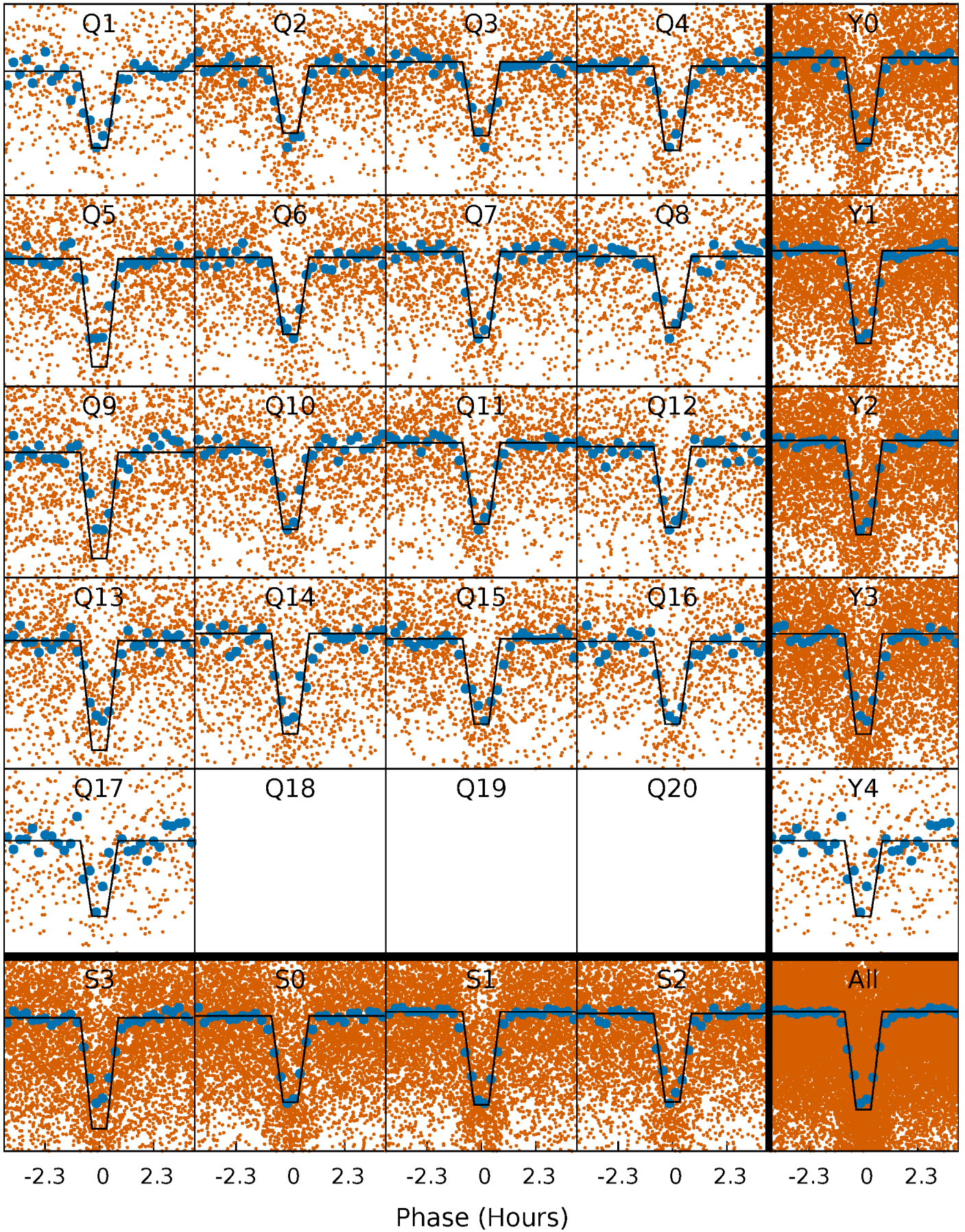
# DV Quarter-Phased Transit Curves

TCE 005563080-01   P= 0.785467 Days    $T_0=131.863513$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 005563080-01   P= 0.785474 Days    $T_0=131.860614$  (BKJD)

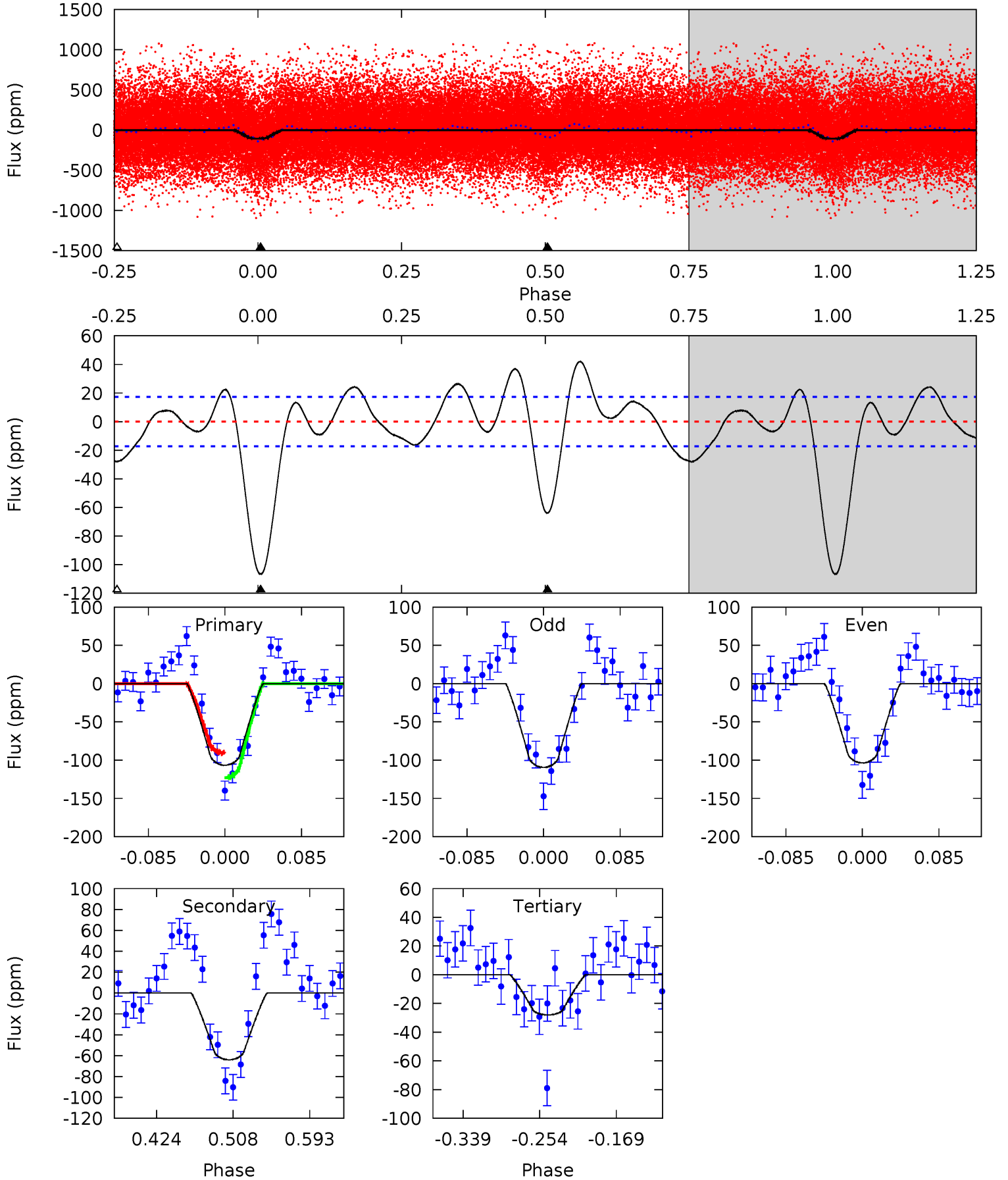




# DV Model-Shift Uniqueness Test

005563080-01, P = 0.785467 Days, E = 131.078046 Days

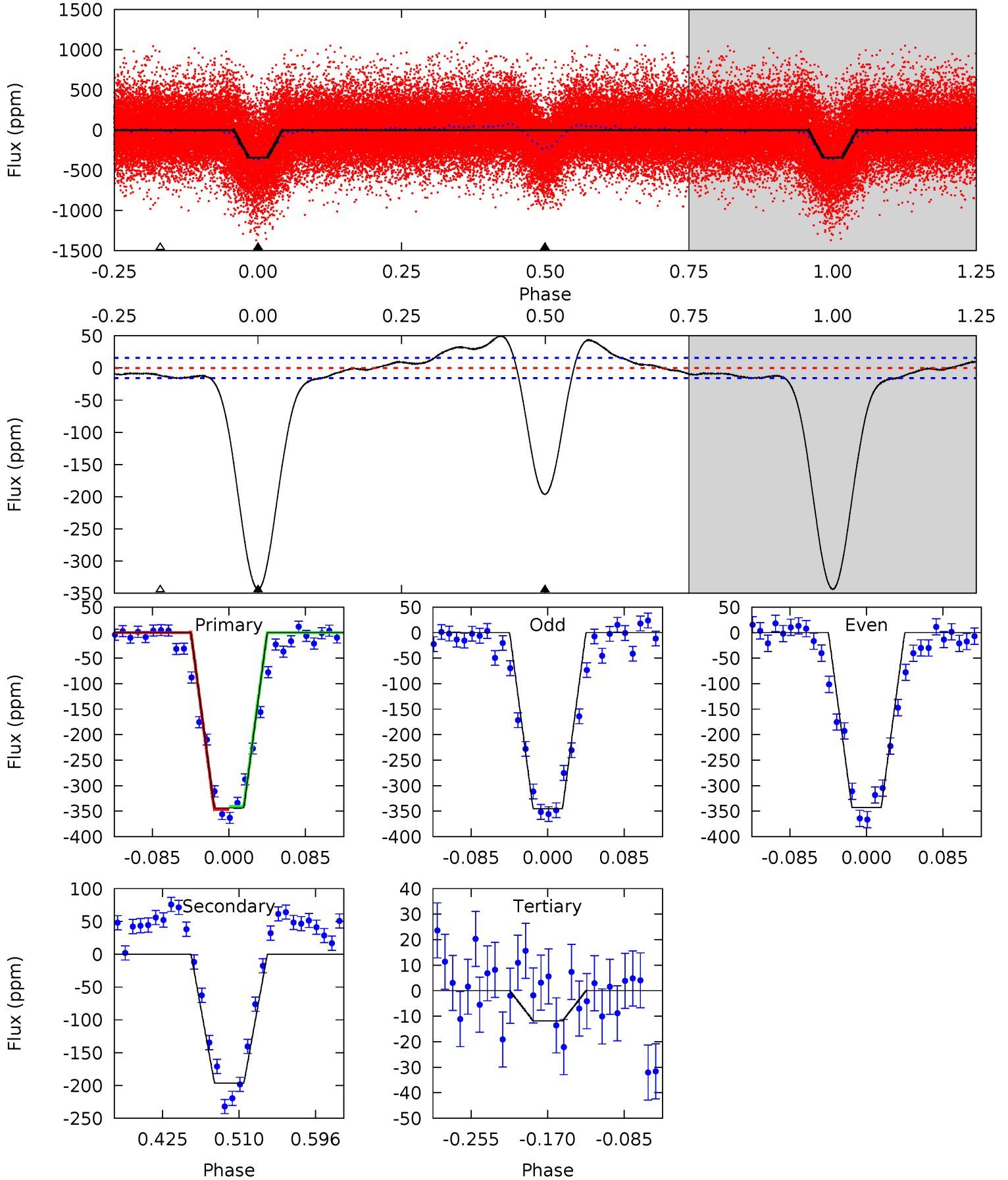
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
28.4	17.1	7.46	0	4.60	1.72	3.54	21.0	28.4	9.60	17.1	0.79	1.05	0.28	4.31



# Alt Model-Shift Uniqueness Test

005563080-01, P = 0.785474 Days, E = 131.075140 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
100.4	57.3	3.45	0	4.60	1.72	4.84	96.9	100.4	53.8	57.3	0.37	1.02	0.13	0.84



### Stellar Parameters For KIC 005563080

	$T_{\text{eff}}(K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5356^{+175}_{-159}$	$4.466^{+0.100}_{-0.125}$	$-0.100^{+0.300}_{-0.300}$	$0.871^{+0.160}_{-0.120}$	$0.810^{+0.113}_{-0.061}$	$1.725^{+0.715}_{-0.658}$
	+3%/-3%	+2%/-3%	+300%/-300%	+18%/-14%	+14%/-8%	+41%/-38%
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 005563080-01 / KOI 4220.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-64 \pm 4$	$1.13^{+0.55}_{-0.54}$	$2481^{+130}_{-121}$	$4520^{+1541}_{-628}$	$6.814^{+17.855}_{-3.834}$
Alt.	$-196 \pm 3$	$1.86^{+0.61}_{-0.60}$	$2487^{+131}_{-131}$	$4659^{+818}_{-494}$	$7.716^{+8.485}_{-3.298}$

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



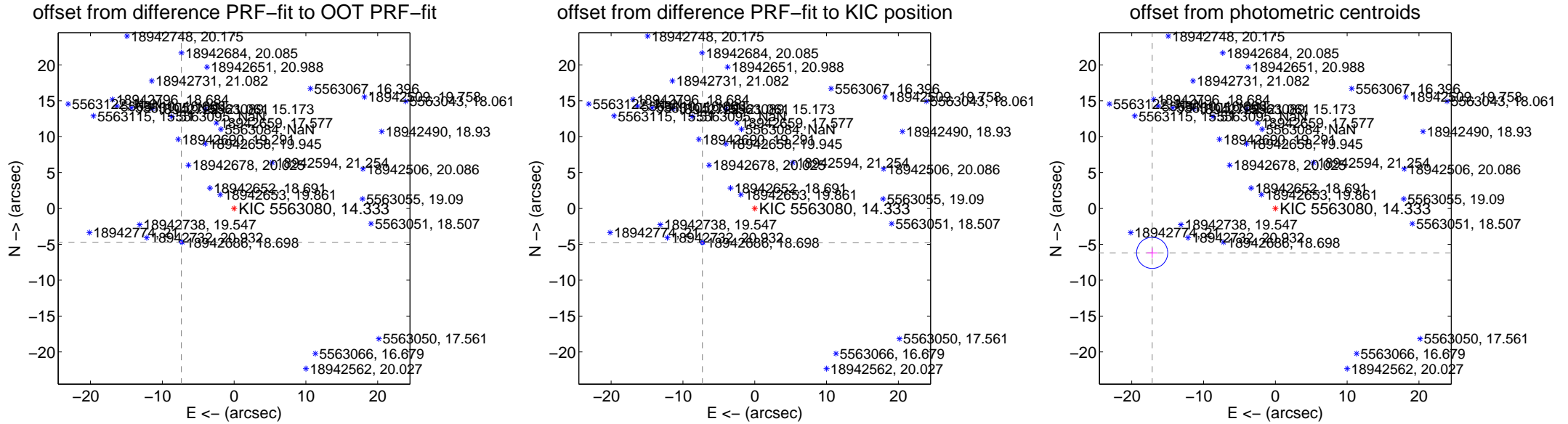
## DV Centroid Data

Supplemental centroid analysis for 005563080-01. Kepler magnitude: 14.33. Transit SNR 18.79

There are 10 quarters with good PRF difference image offsets

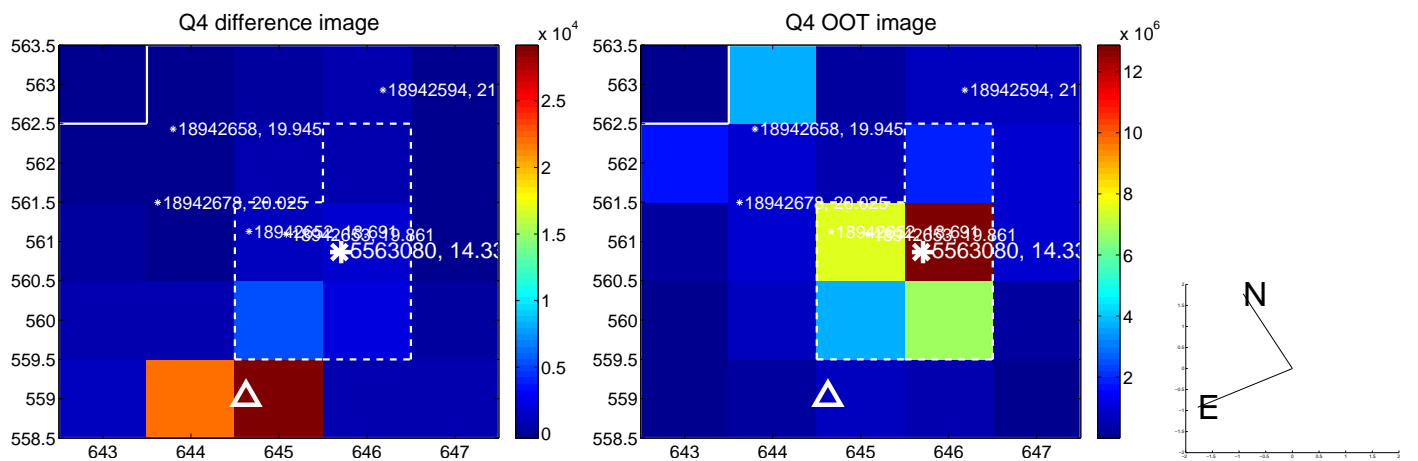
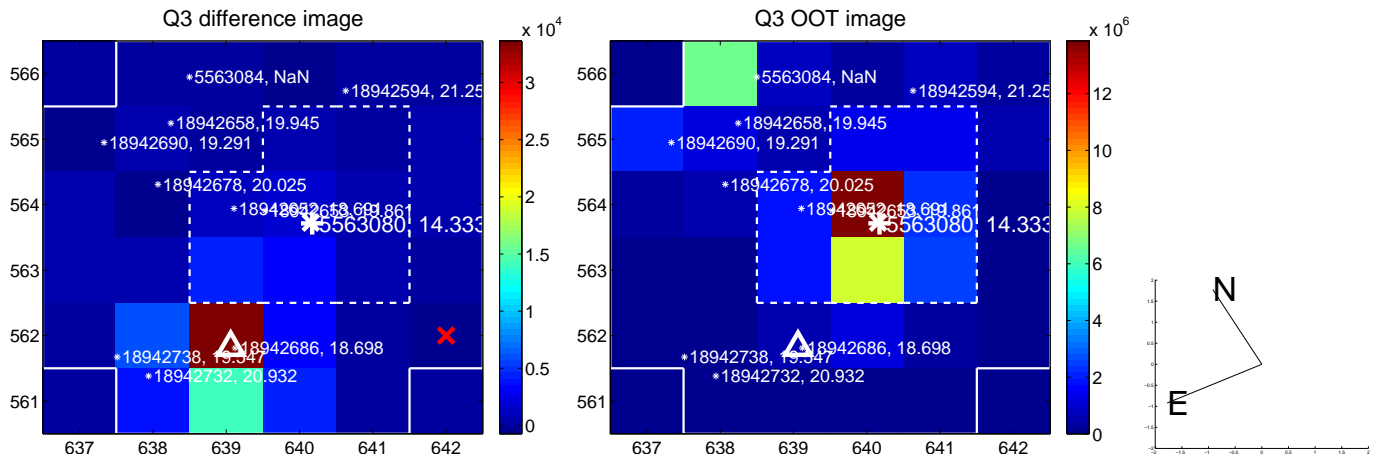
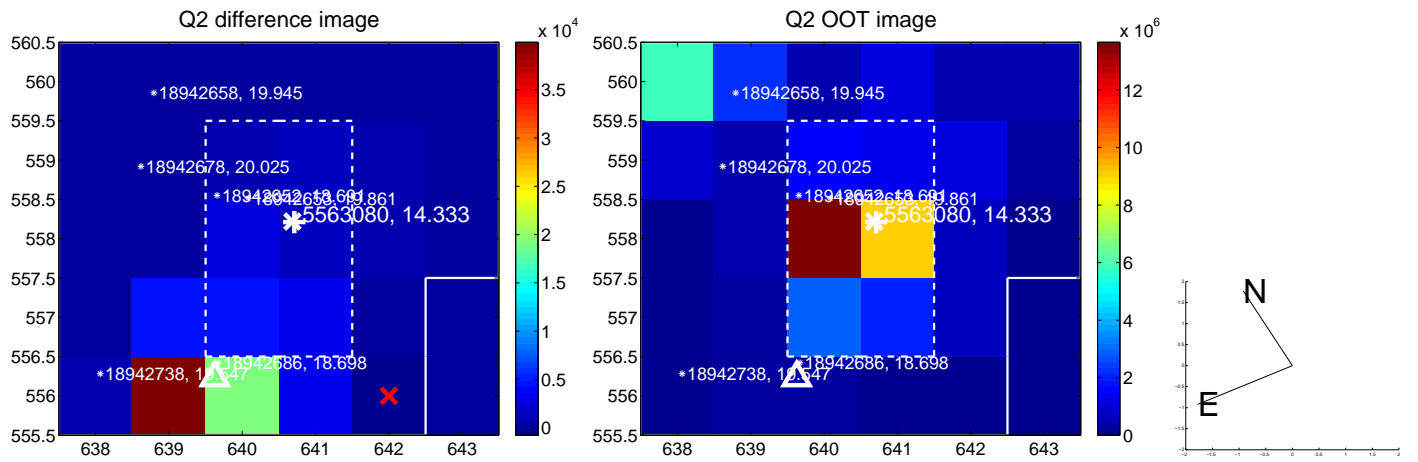
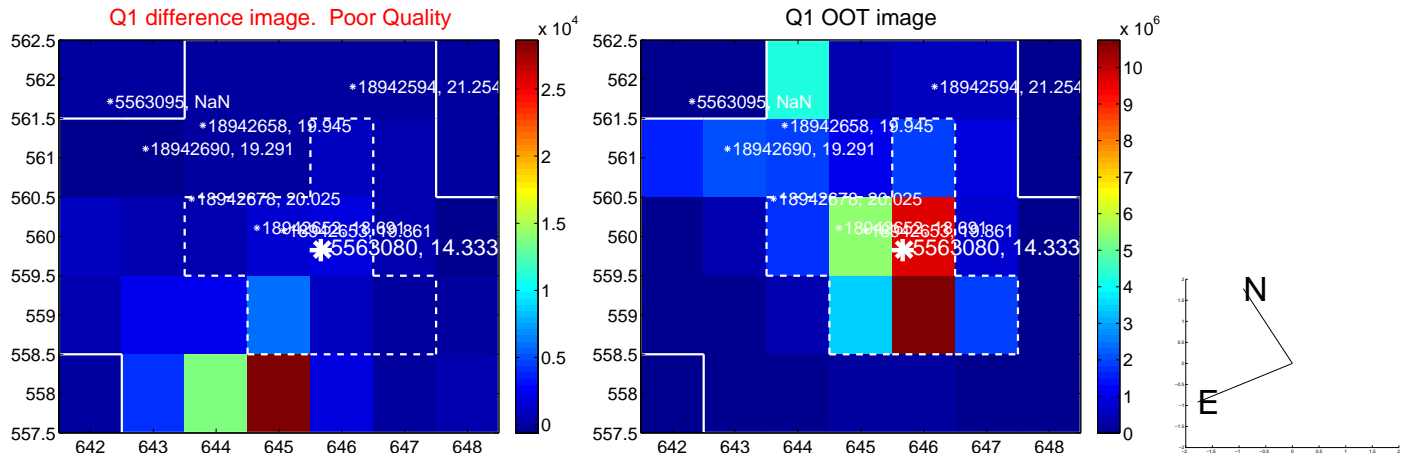
The direct PRF centroid is offset from the target star catalog position by about 0.11 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	8.724 $\pm$ 0.077	113.33	7.343 $\pm$ 0.071	-4.711 $\pm$ 0.077
PRF-fit source offset from KIC position	8.724 $\pm$ 0.082	105.99	7.289 $\pm$ 0.072	-4.793 $\pm$ 0.083
photometric centroid source offset	18.24 $\pm$ 0.72	25.25	17.16 $\pm$ 0.73	-6.19 $\pm$ 0.67

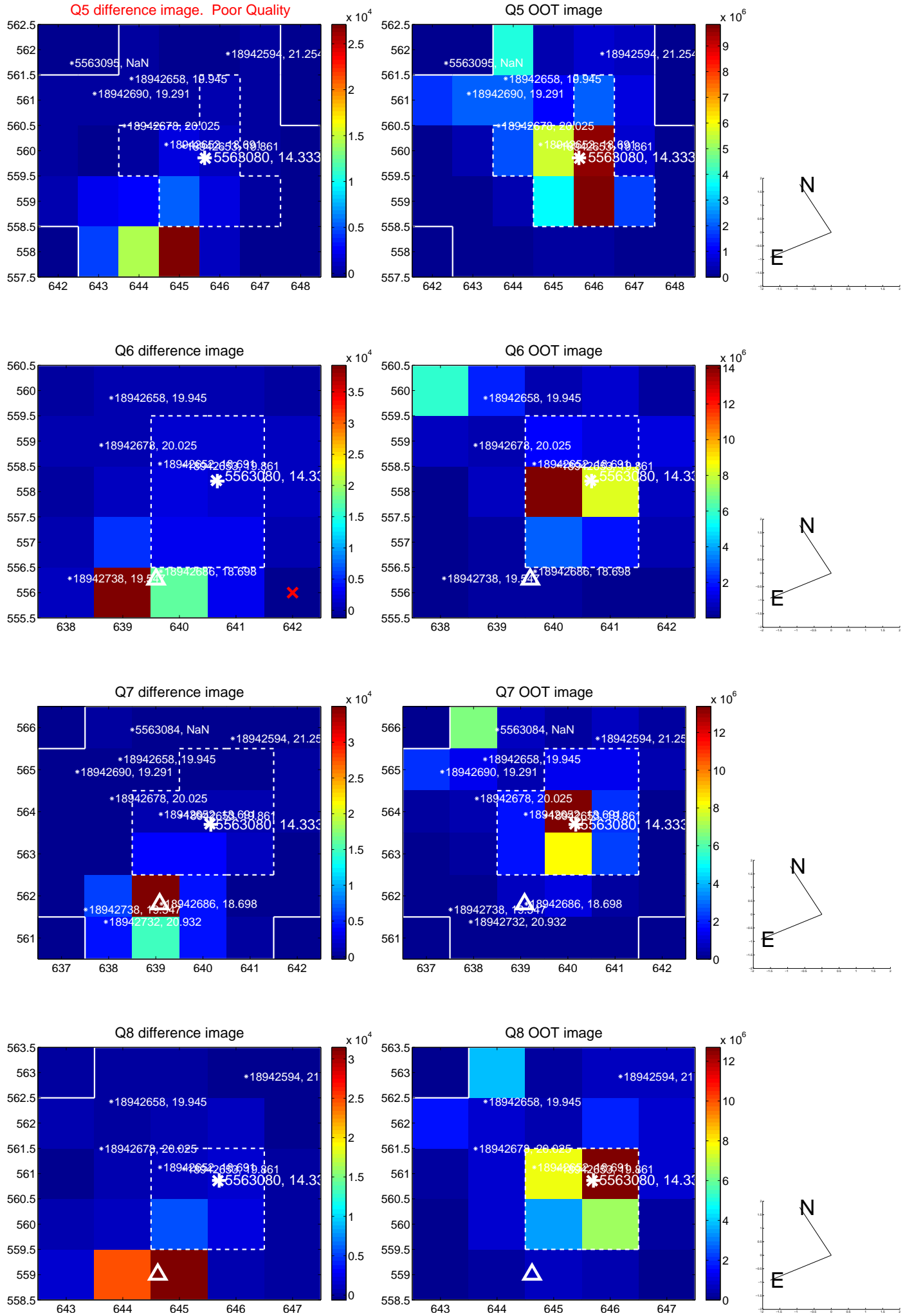


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

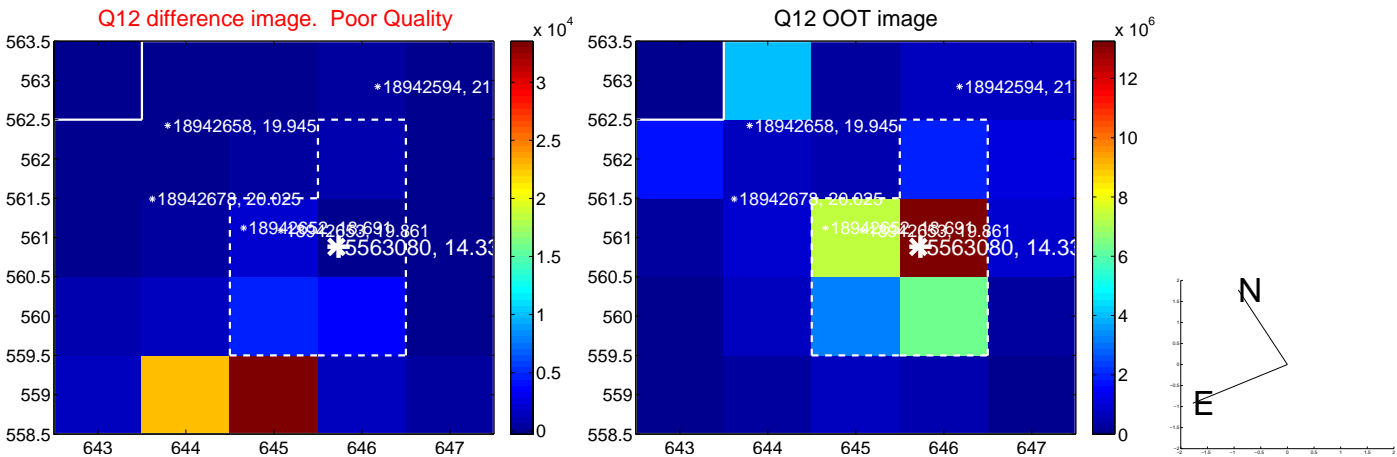
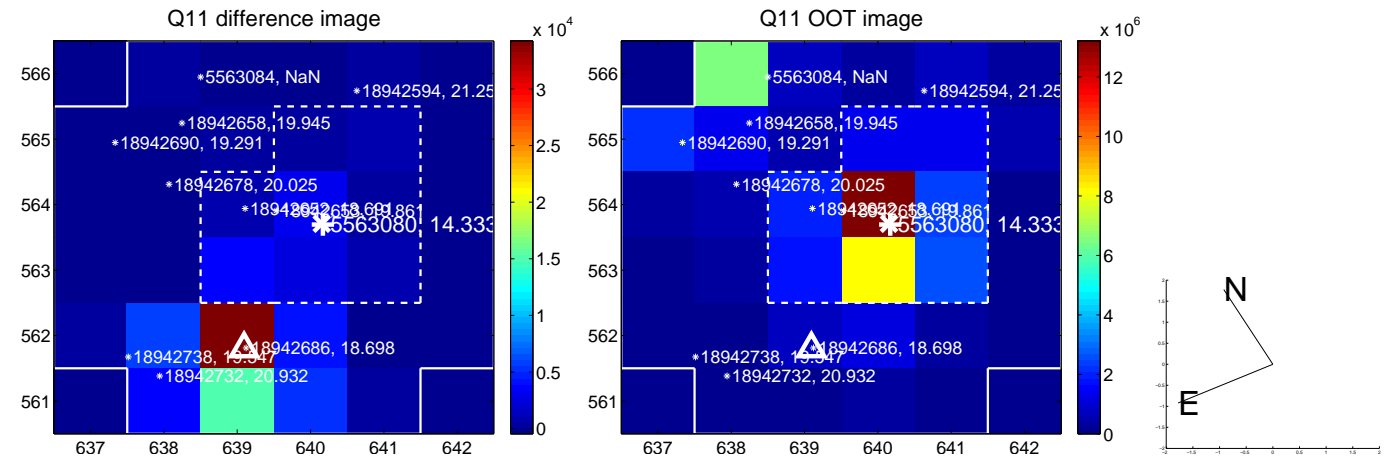
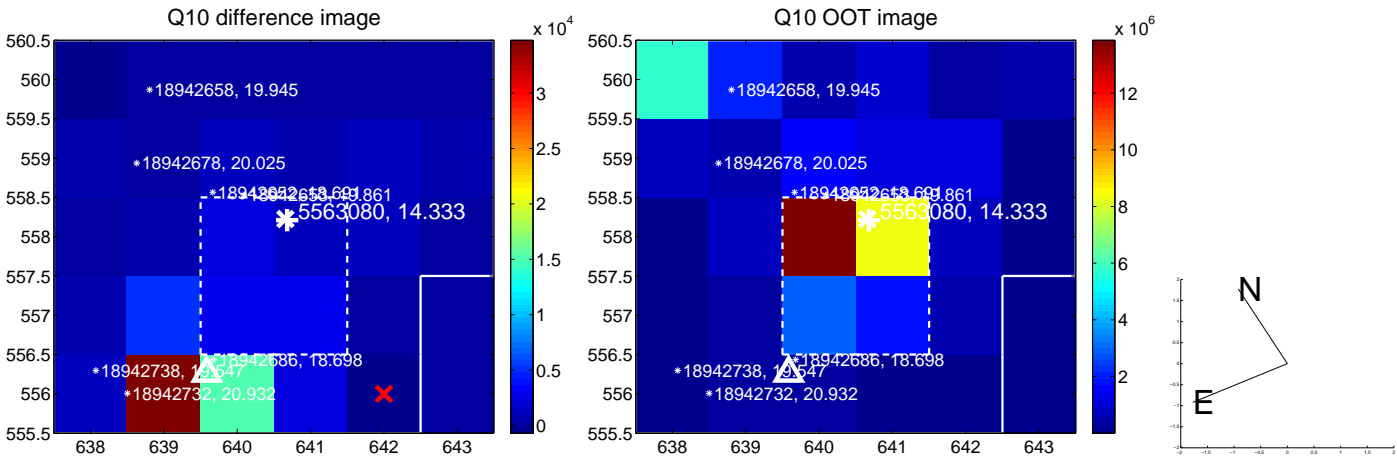
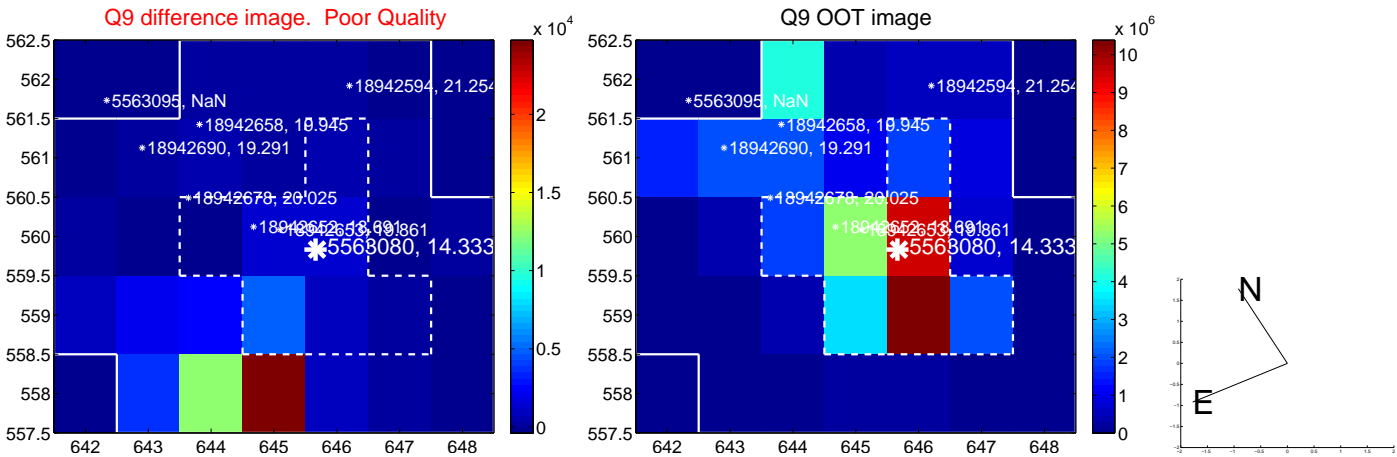
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



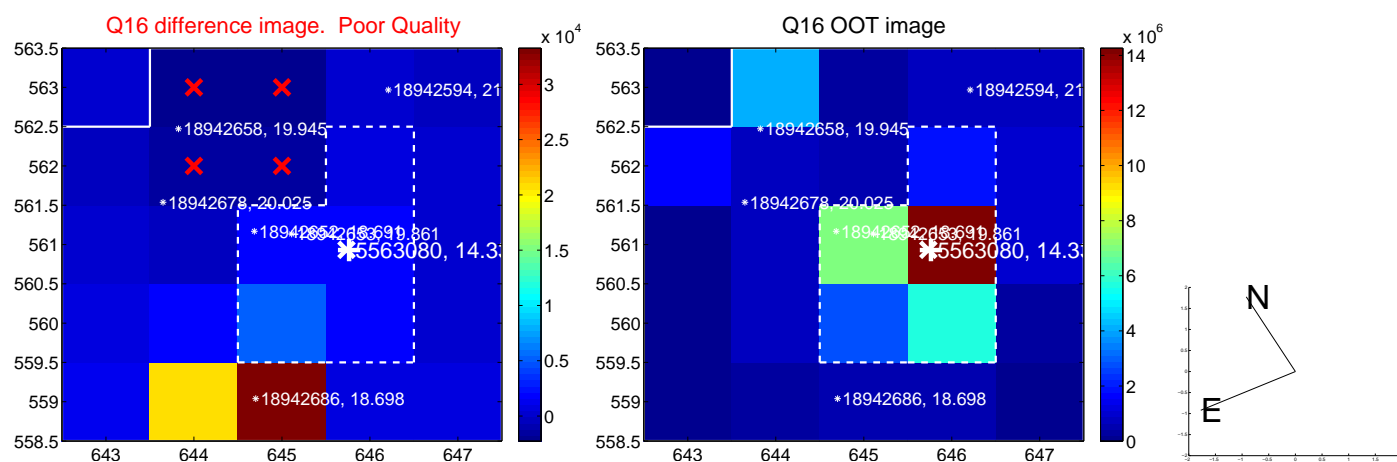
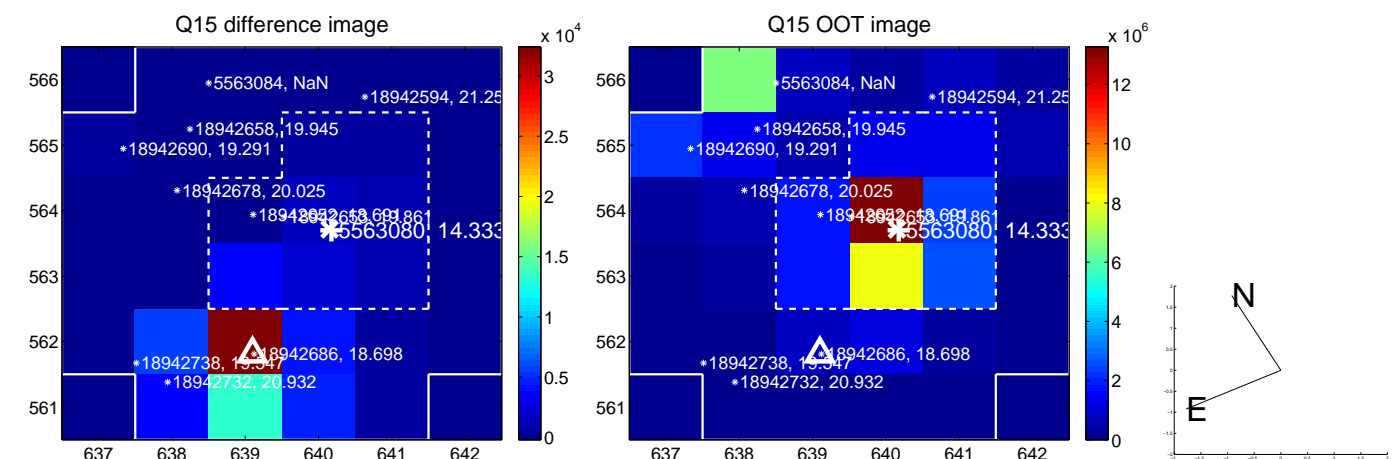
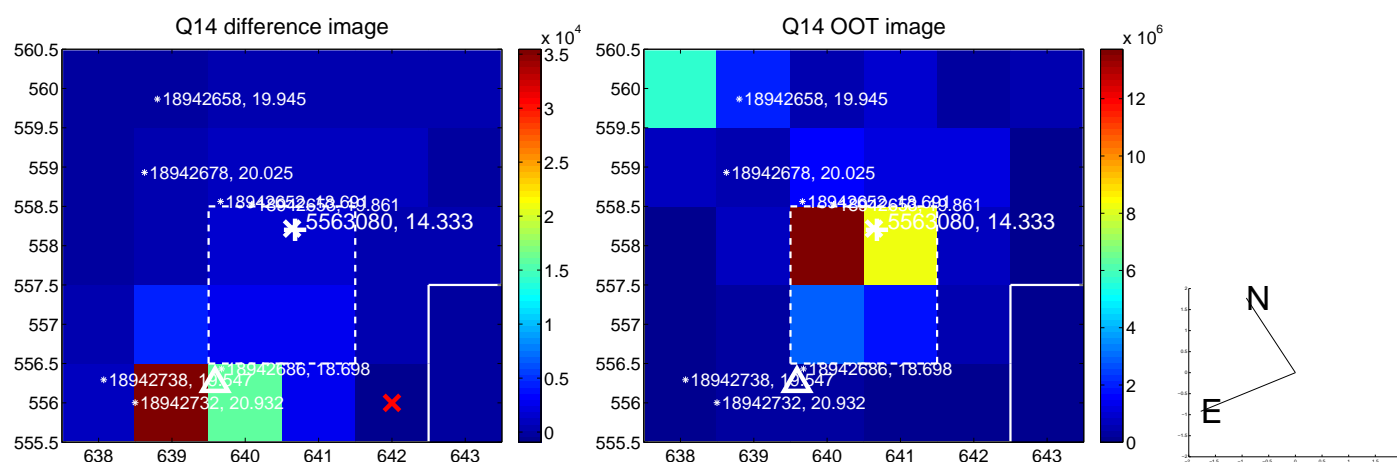
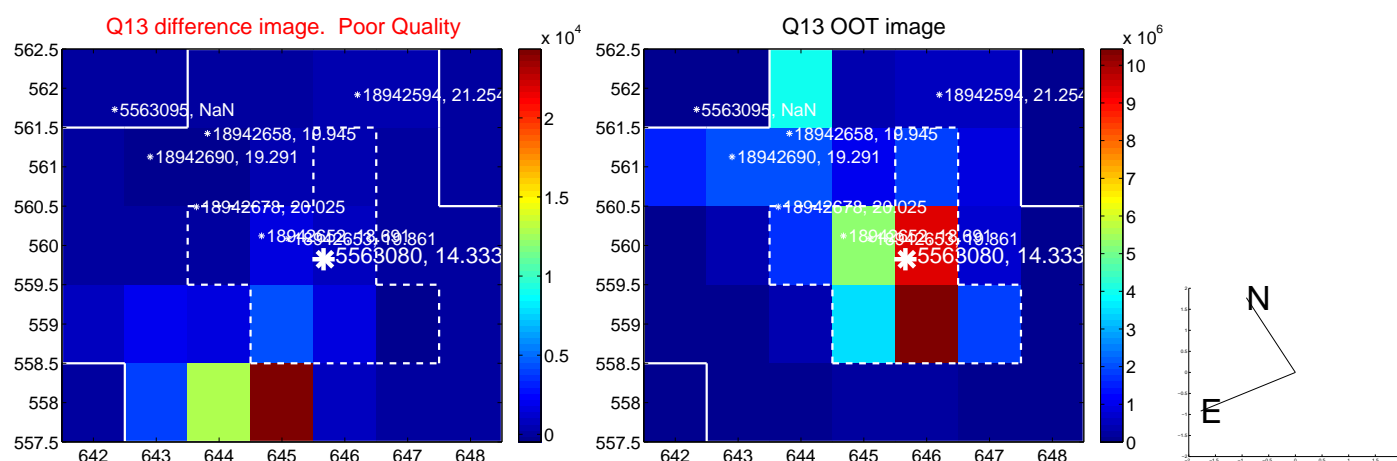
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

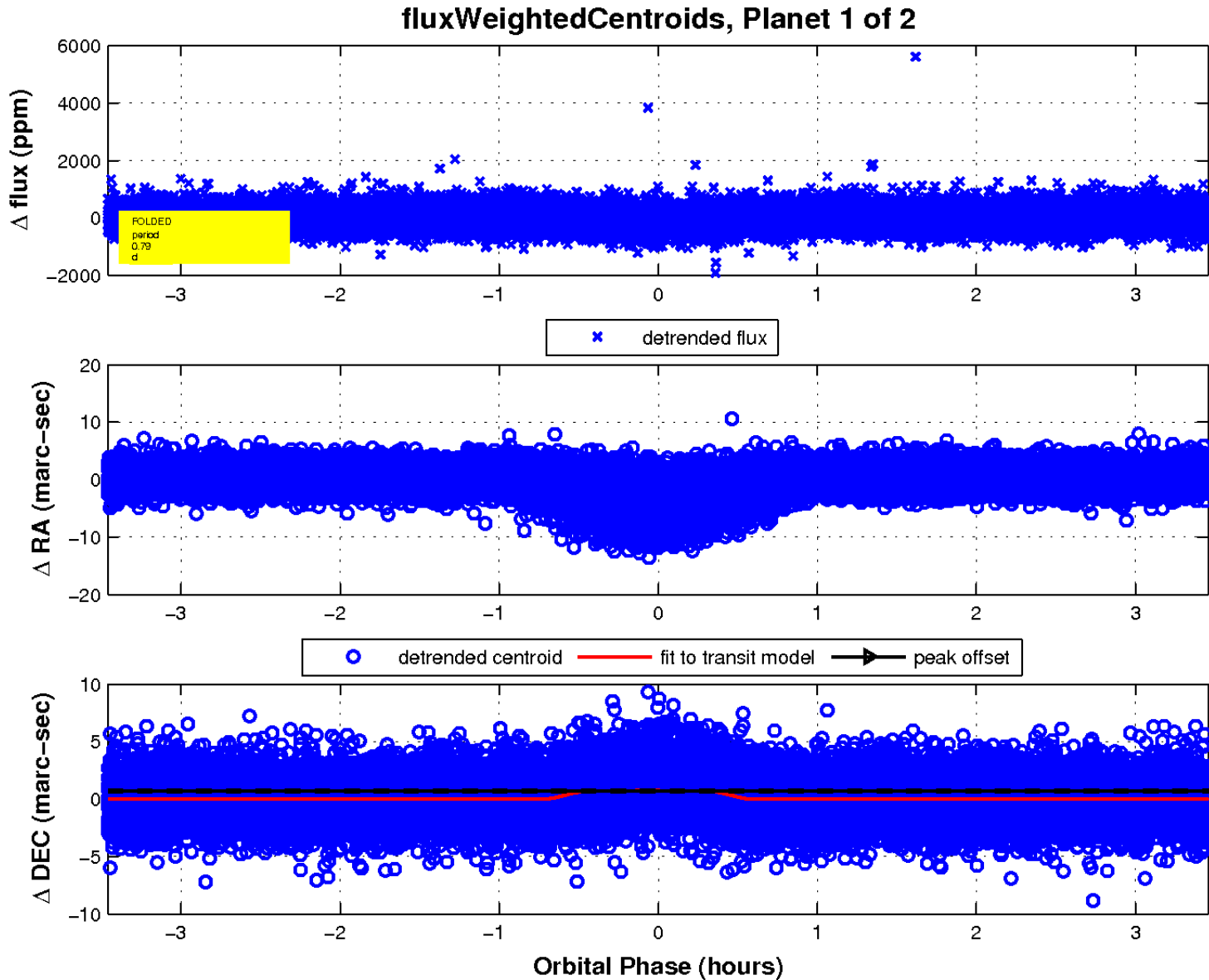
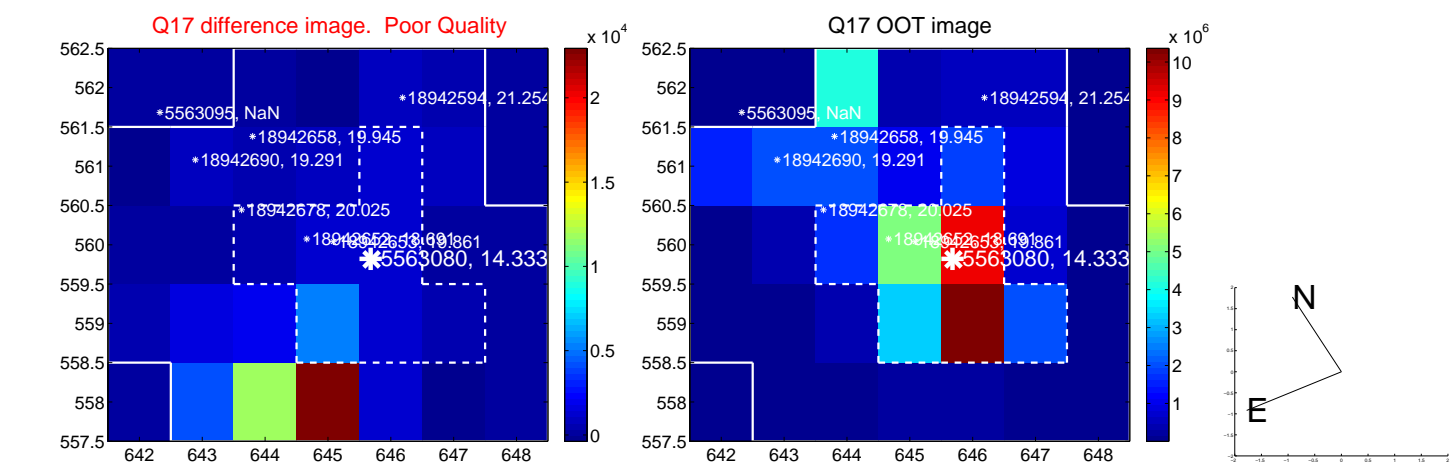


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



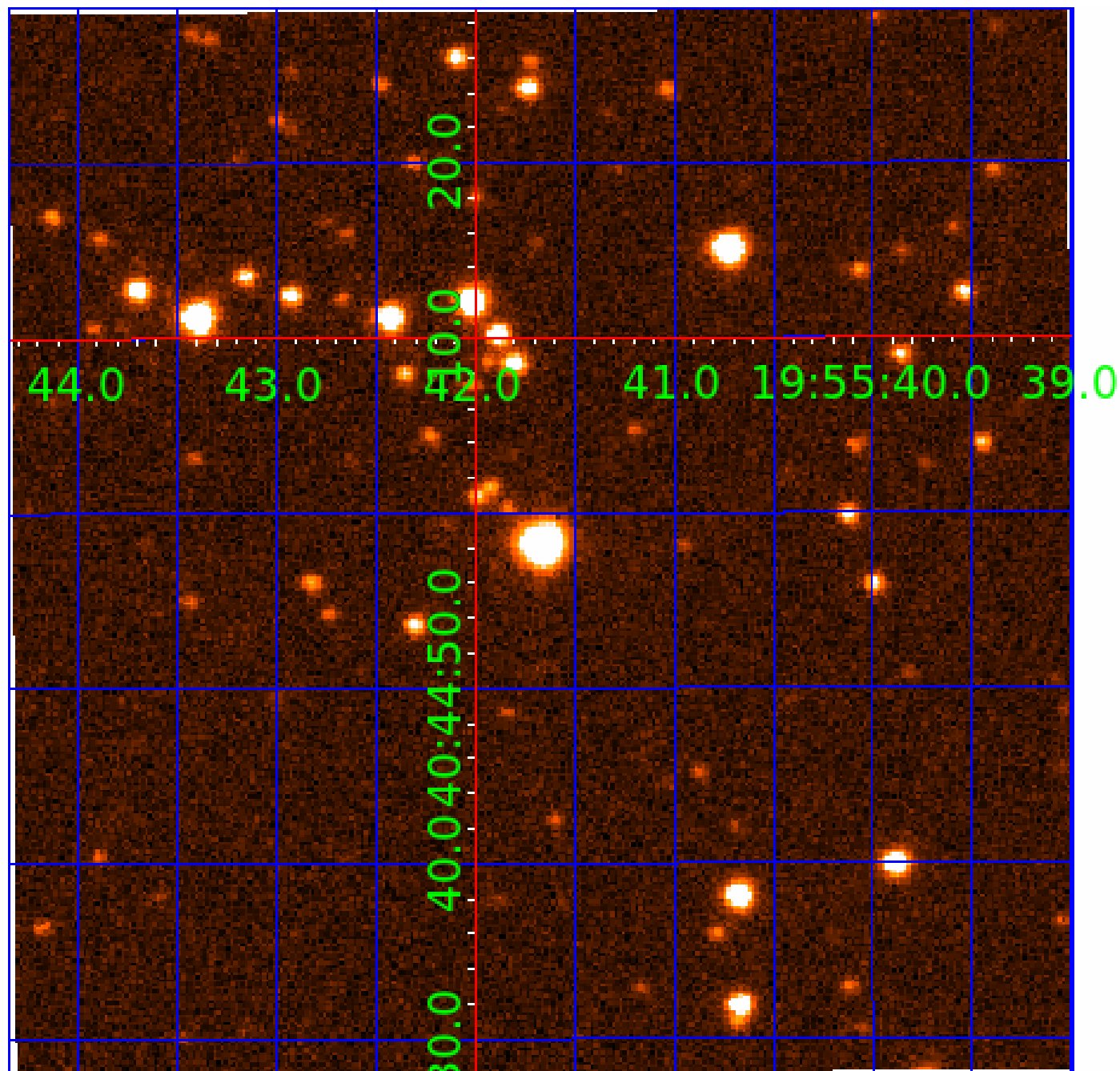


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 005563080

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005563080-01	OBS	4220.01	0.785467	131.863513	113.7	1.153	14.9	18.8	0.87	5356	1.12	2319.70
005563080-02	OBS	No	0.785484	132.251976	114.5	1.347	8.6	20.7	0.87	5356	1.13	2319.63

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005563080-01	OBS	FP	0.00	0	1	1	0	MOD_SEC_ALT—HAS_SEC_TCE—CENT_RESOLVED_OFFSET
005563080-02	OBS	FP	0.00	1	1	1	0	IS_SEC_TCE—CENT_RESOLVED_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.

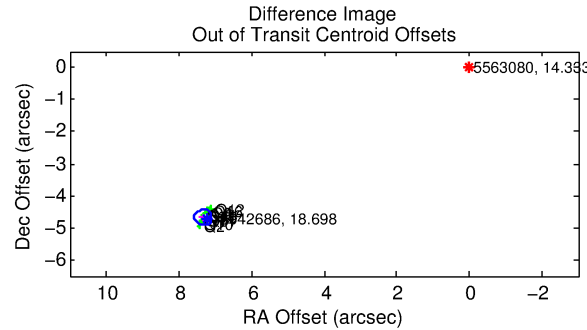
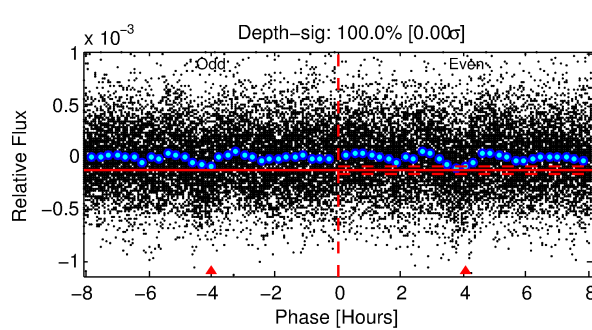
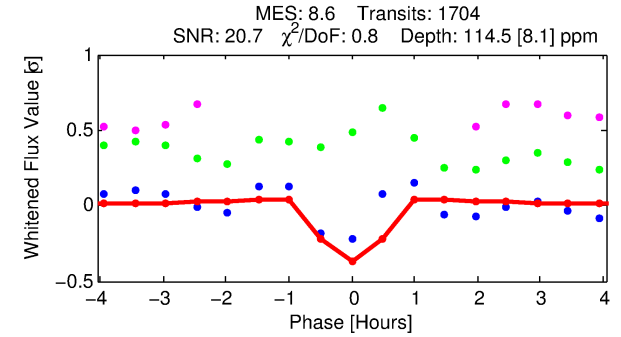
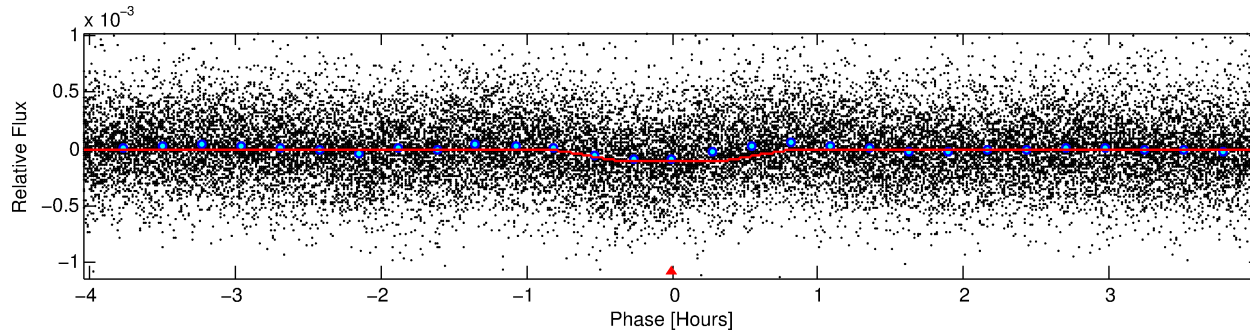
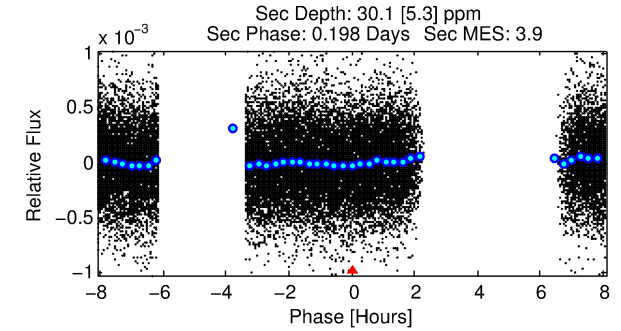
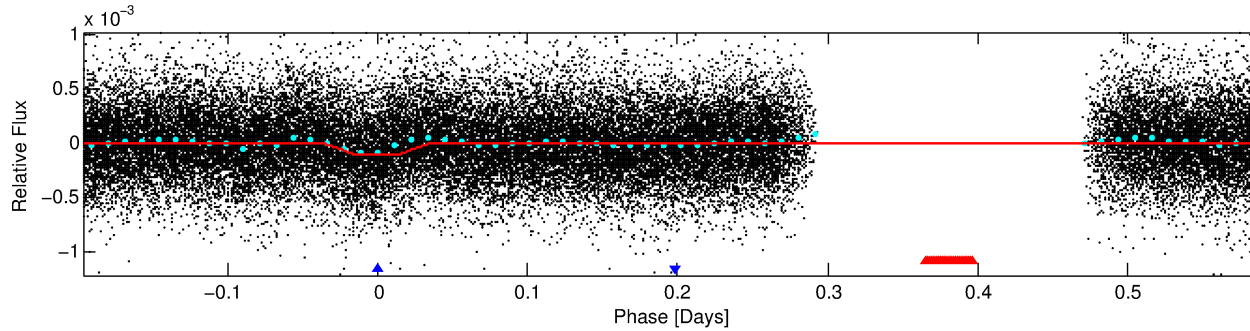
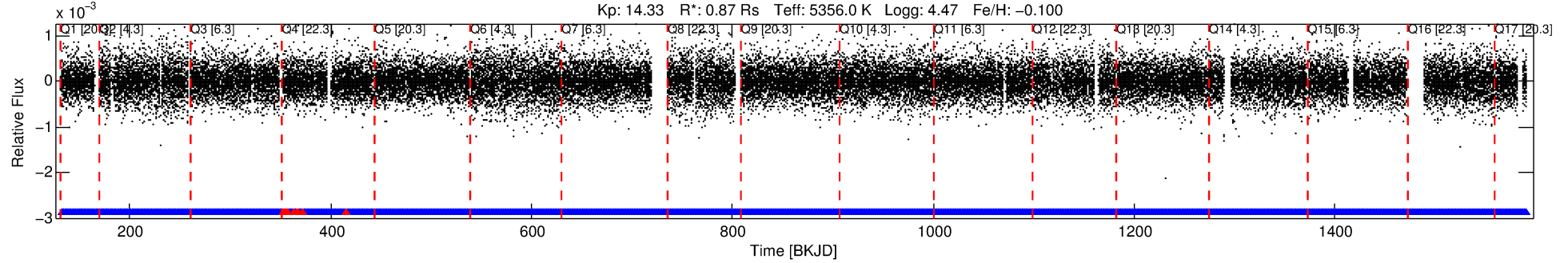
## Ephemeris Match Information For 005563080-02

No Significant Match Found

# DV One-Page Summary

KIC: 5563080 Candidate: 2 of 2 Period: 0.785 d  
KOI: K04220 Corr: No Ephemeris Match

Kp: 14.33 R\*: 0.87 Rs Teff: 5356.0 K Logg: 4.47 Fe/H: -0.100



## DV Fit Results:

Period = 0.78548 [0.00001] d  
Epoch = 132.2520 [0.0009] BKJD  
Rp/R\* = 0.0119 [0.0041]  
a/R\* = 2.22 [2.64]  
b = 0.91 [0.30]  
Seff = 2319.63 [608.86]  
Teq = 1770 [116] K  
Rp = 1.13 [0.44] Re  
a = 0.0155 [0.0024] AU  
Ag = 3.10 [2.29] [0.92σ]  
Teffp = 3631 [650] K [2.82σ]

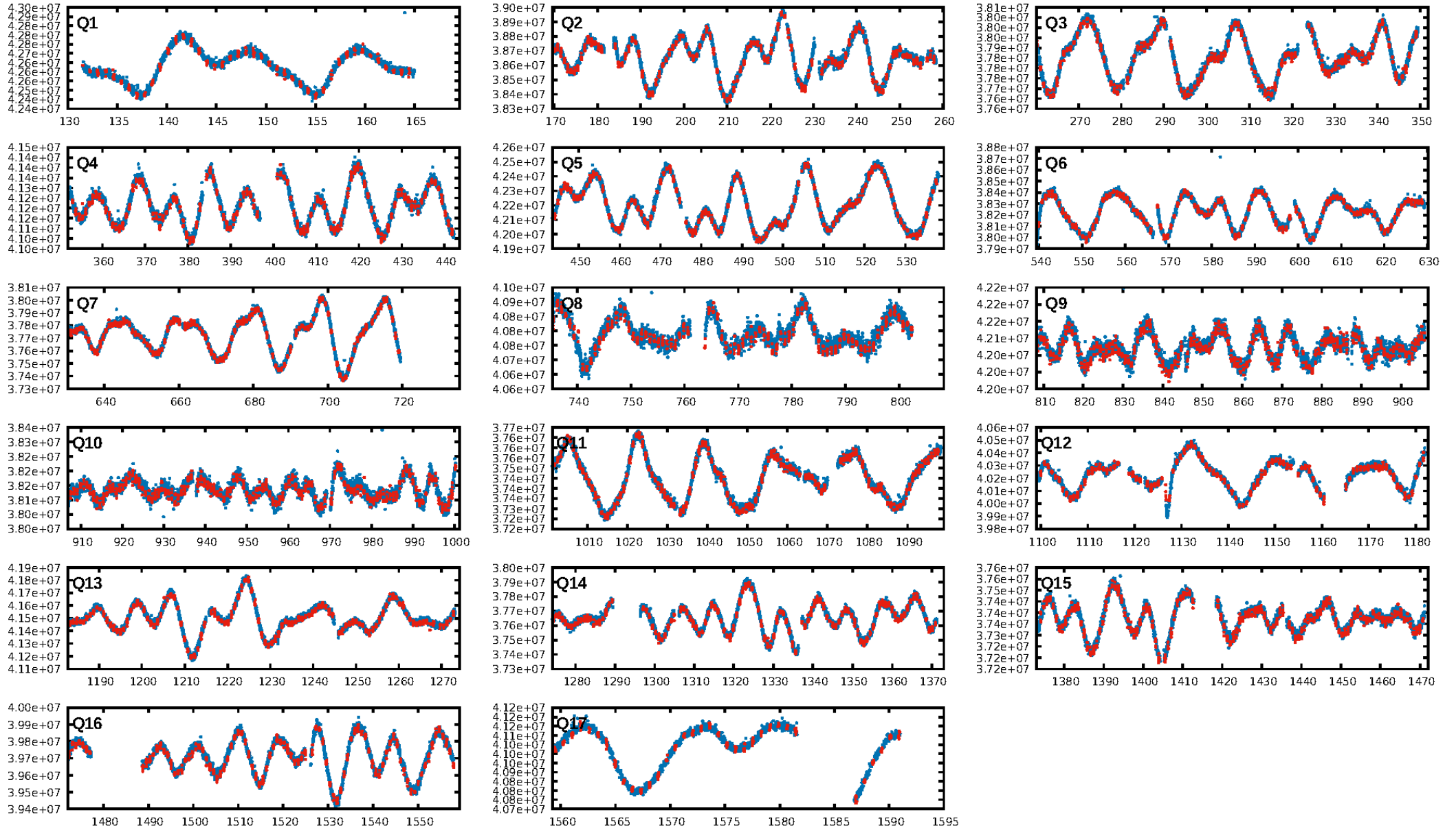
## DV Diagnostic Results:

ShortPeriod-sig: 0.0% [0.00σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 5.94e-18  
RollingBand-fgt: 0.99 [1618/1627]  
GhostDiagnostic-chr: -1.581  
Centroid-sig: N/A  
Centroid-so: 3.260 arcsec [4.90σ]  
OotOffset-rm: 8.696 arcsec [107.27σ]  
KicOffset-rm: 8.696 arcsec [103.82σ]  
OotOffset-st: 4/4/4/0 [12]  
KicOffset-st: 4/4/4/0 [12]  
DiffImageQuality-fgm: 1.00 [12/12]  
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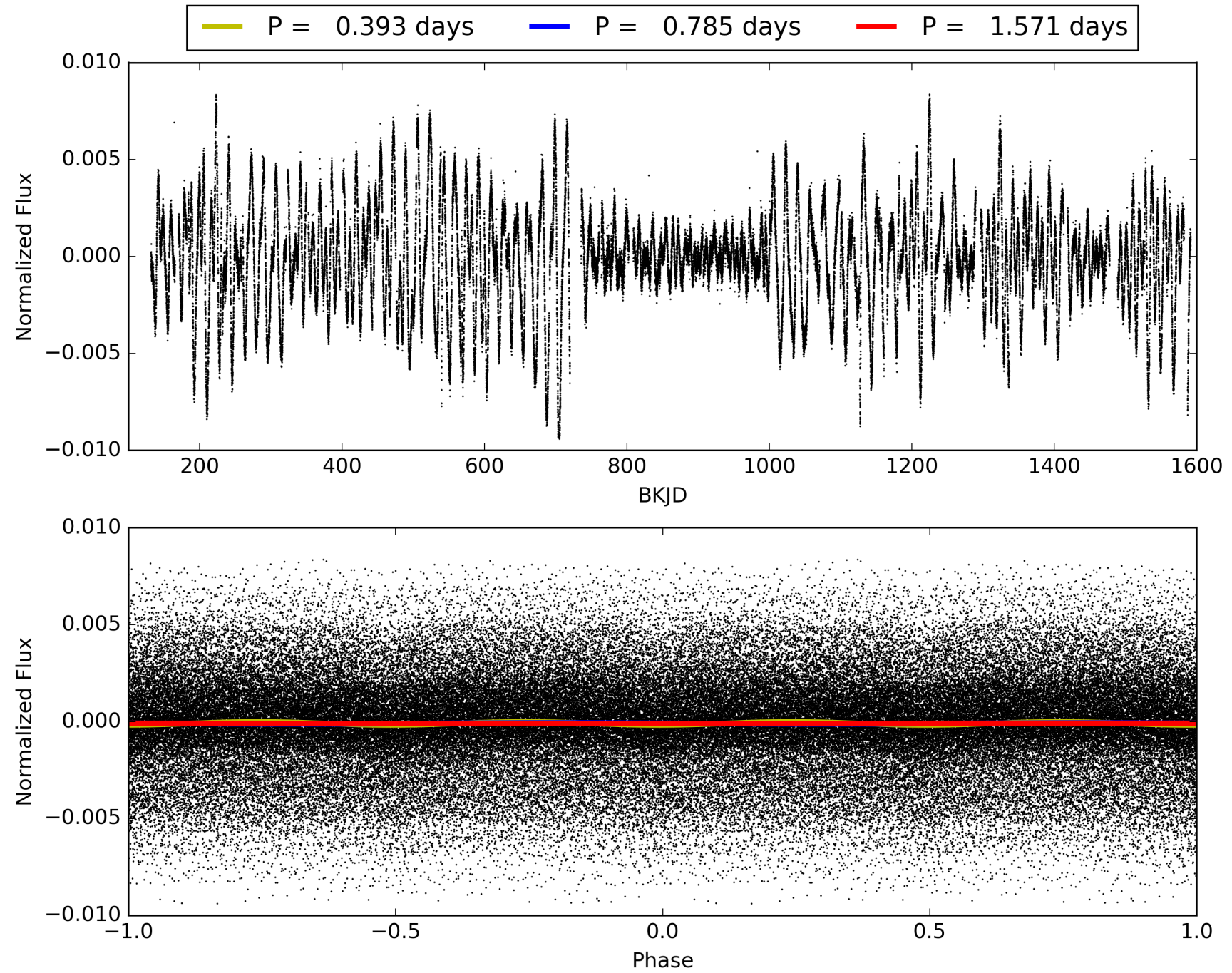
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 005563080-02, PDC Light Curves



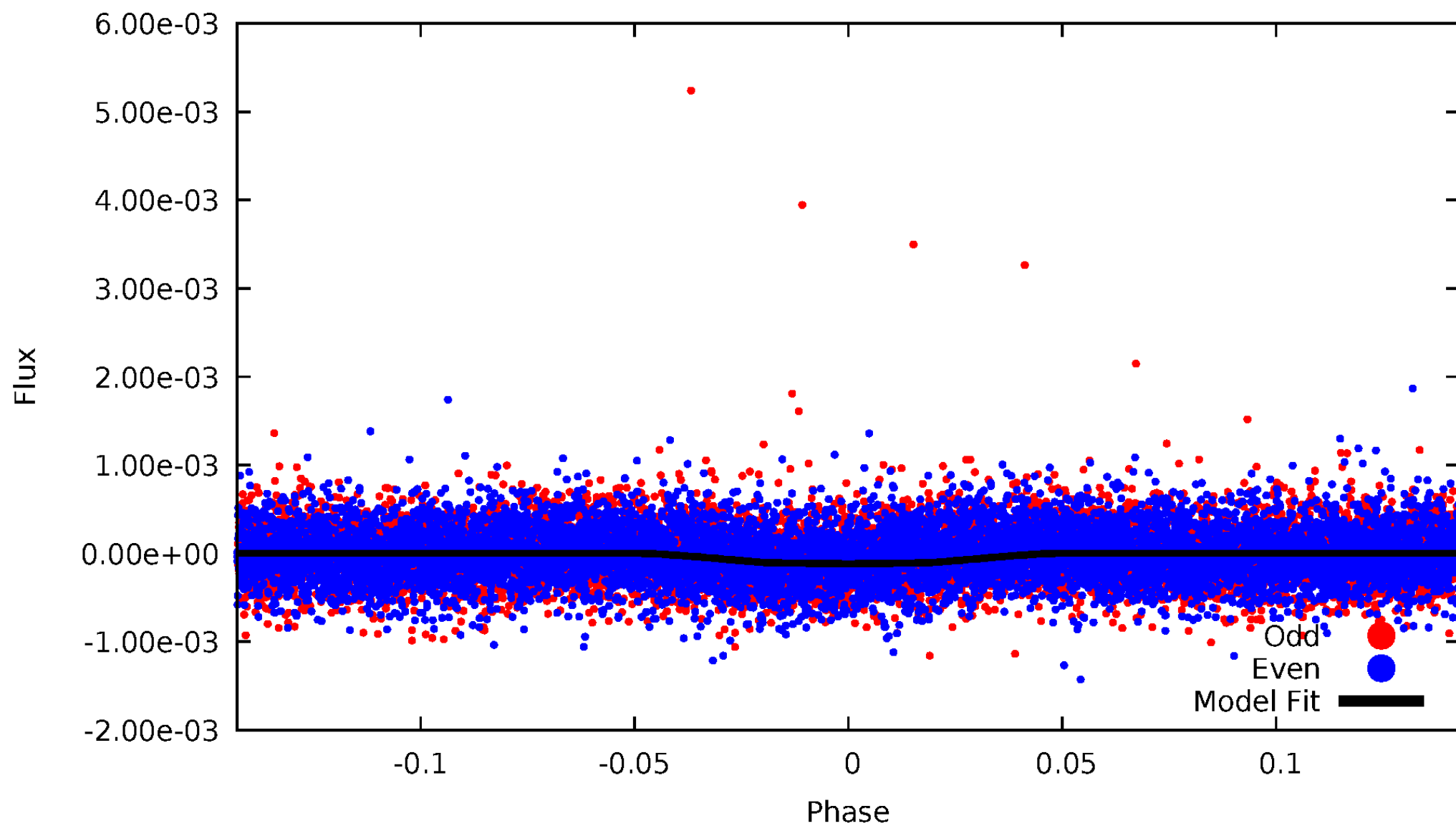


TCE 005563080-02



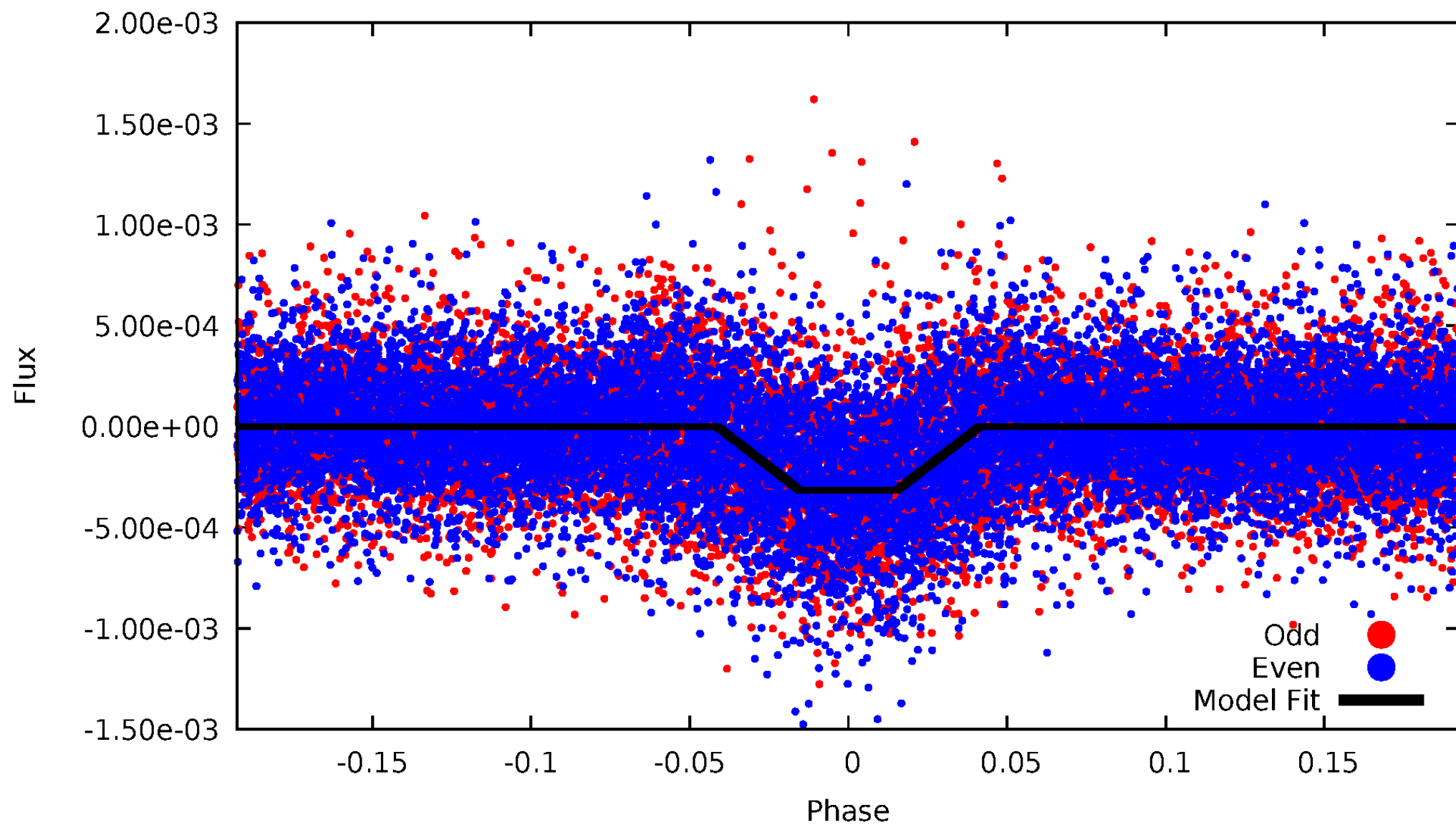
# DV Odd/Even

TCE 005563080-02



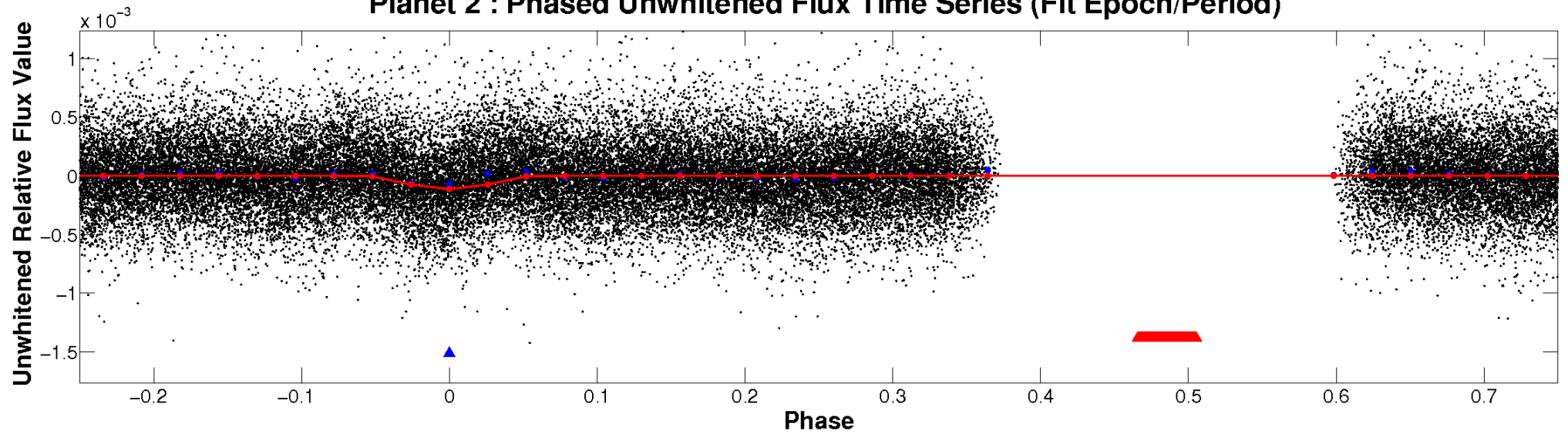
# ALT Odd/Even

TCE 005563080-02

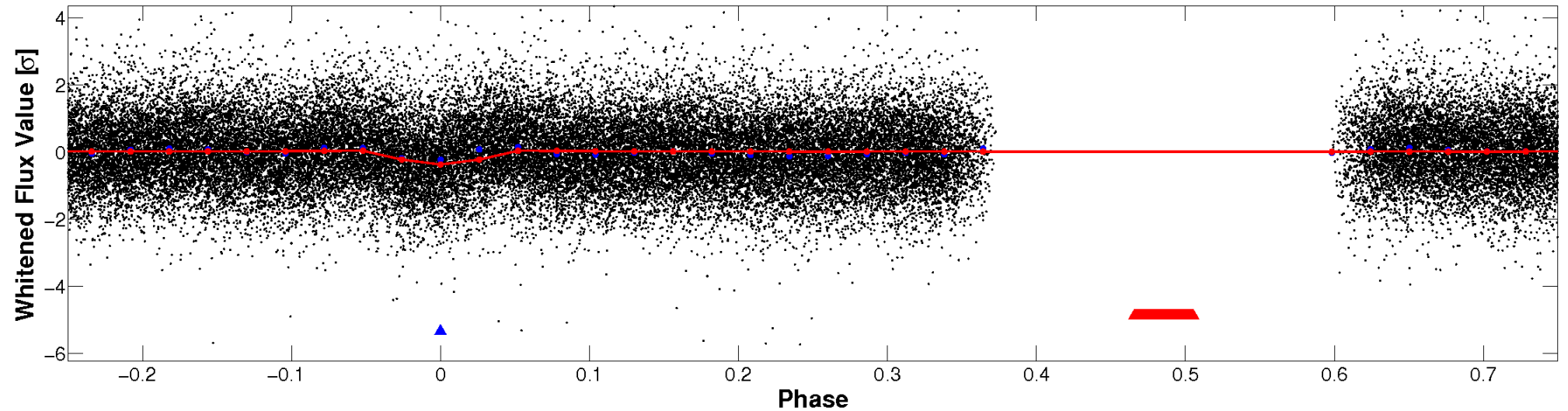


# Non-Whitened Vs. Whitened Light Curve

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



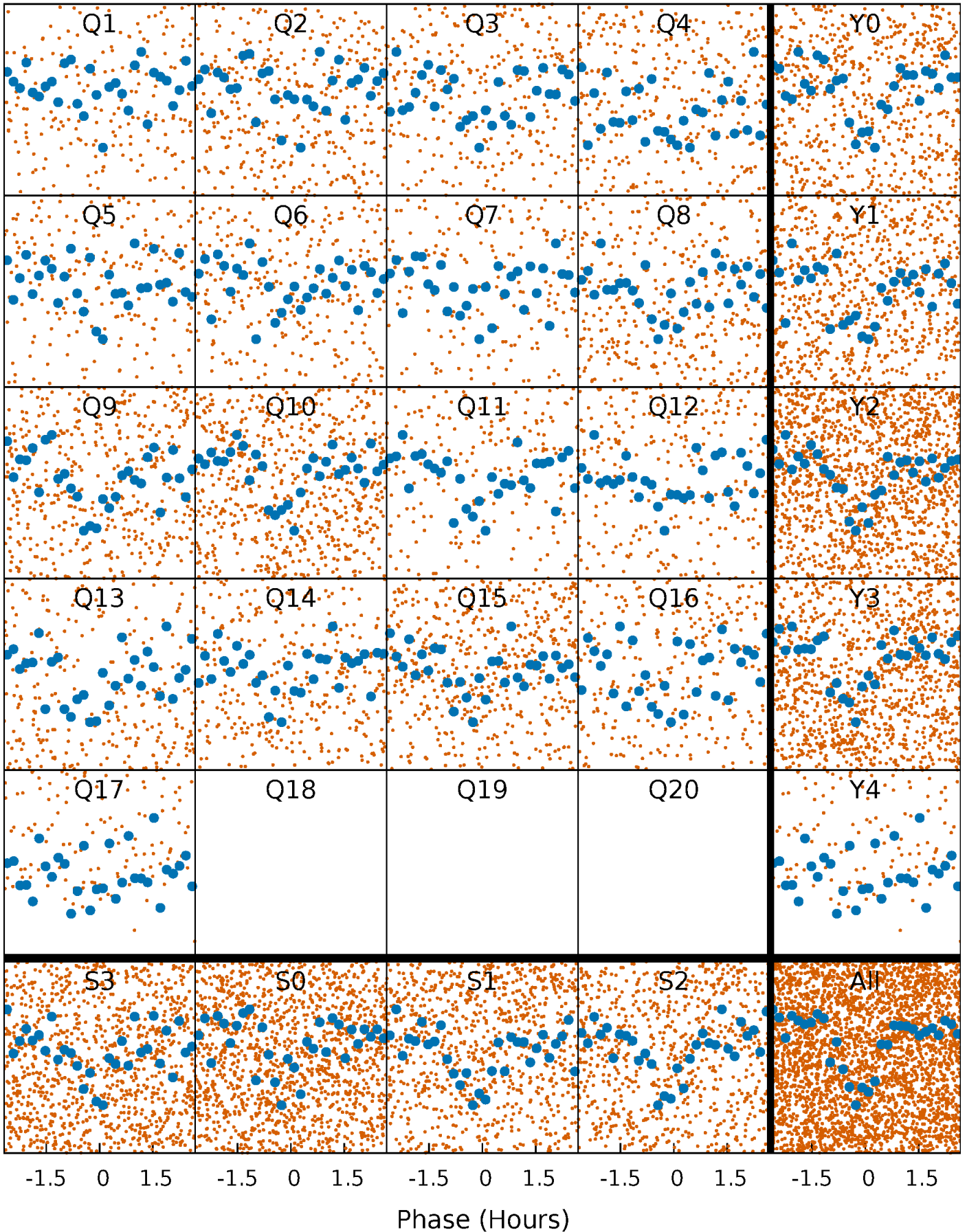
## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)





# PDC Quarter-Phased Transit Curves

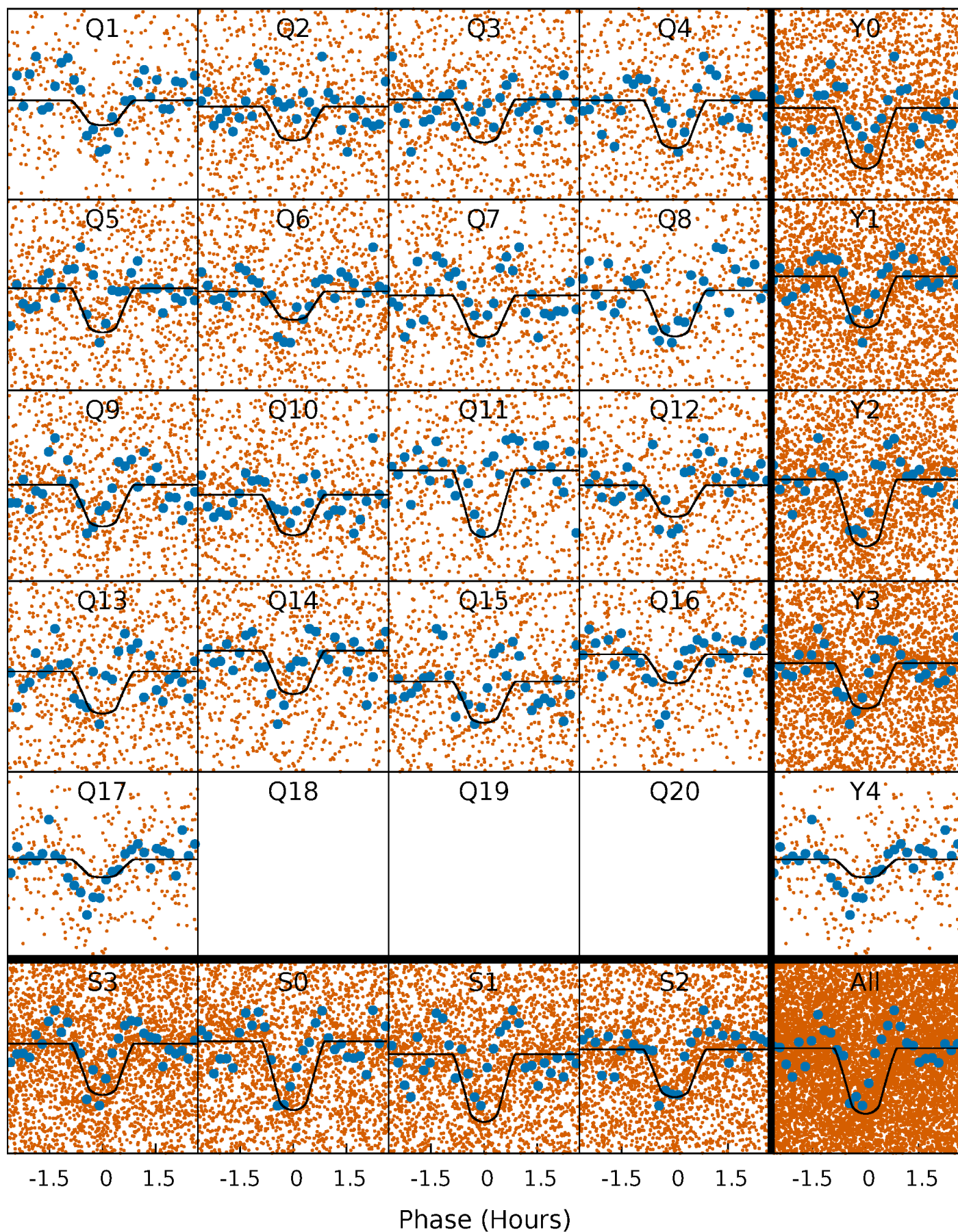
TCE 005563080-02     $P = 0.785484$  Days     $T_0 = 132.251976$  (BKJD)





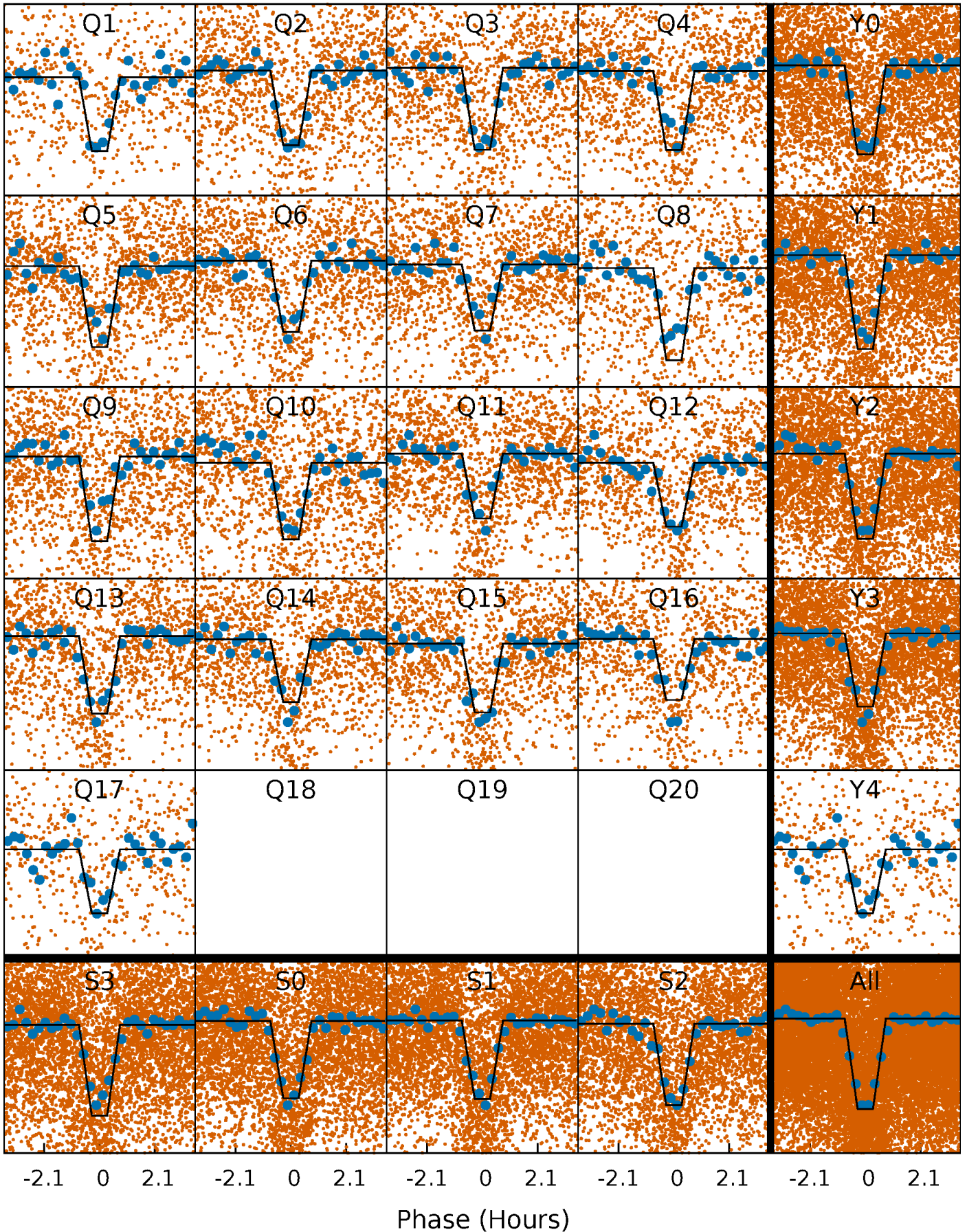
# DV Quarter-Phased Transit Curves

TCE 005563080-02   P= 0.785484 Days    $T_0=132.251976$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 005563080-02     $P = 0.785474$  Days     $T_0 = 132.252945$  (BKJD)

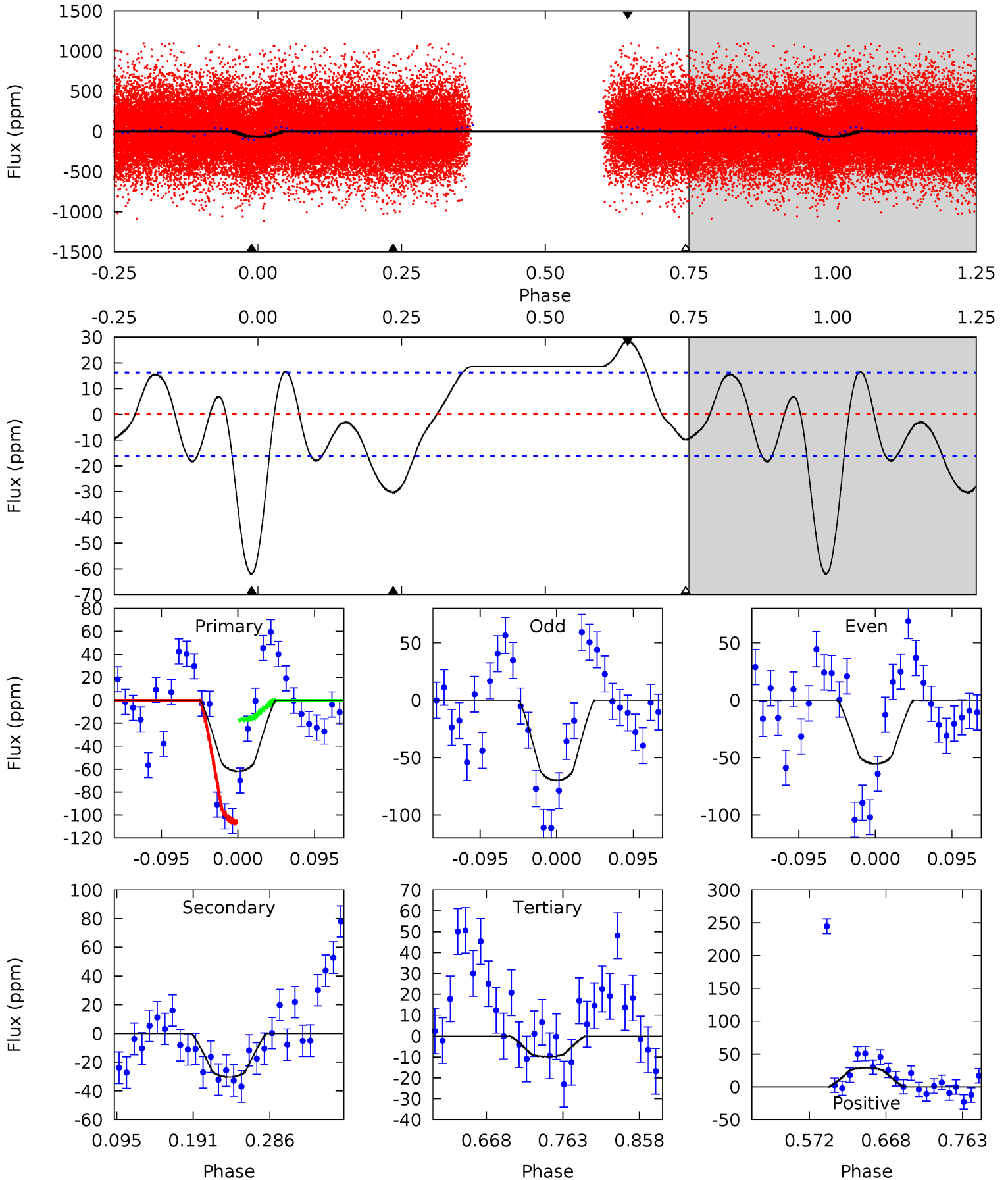




# DV Model-Shift Uniqueness Test

005563080-02, P = 0.785484 Days, E = 131.466492 Days

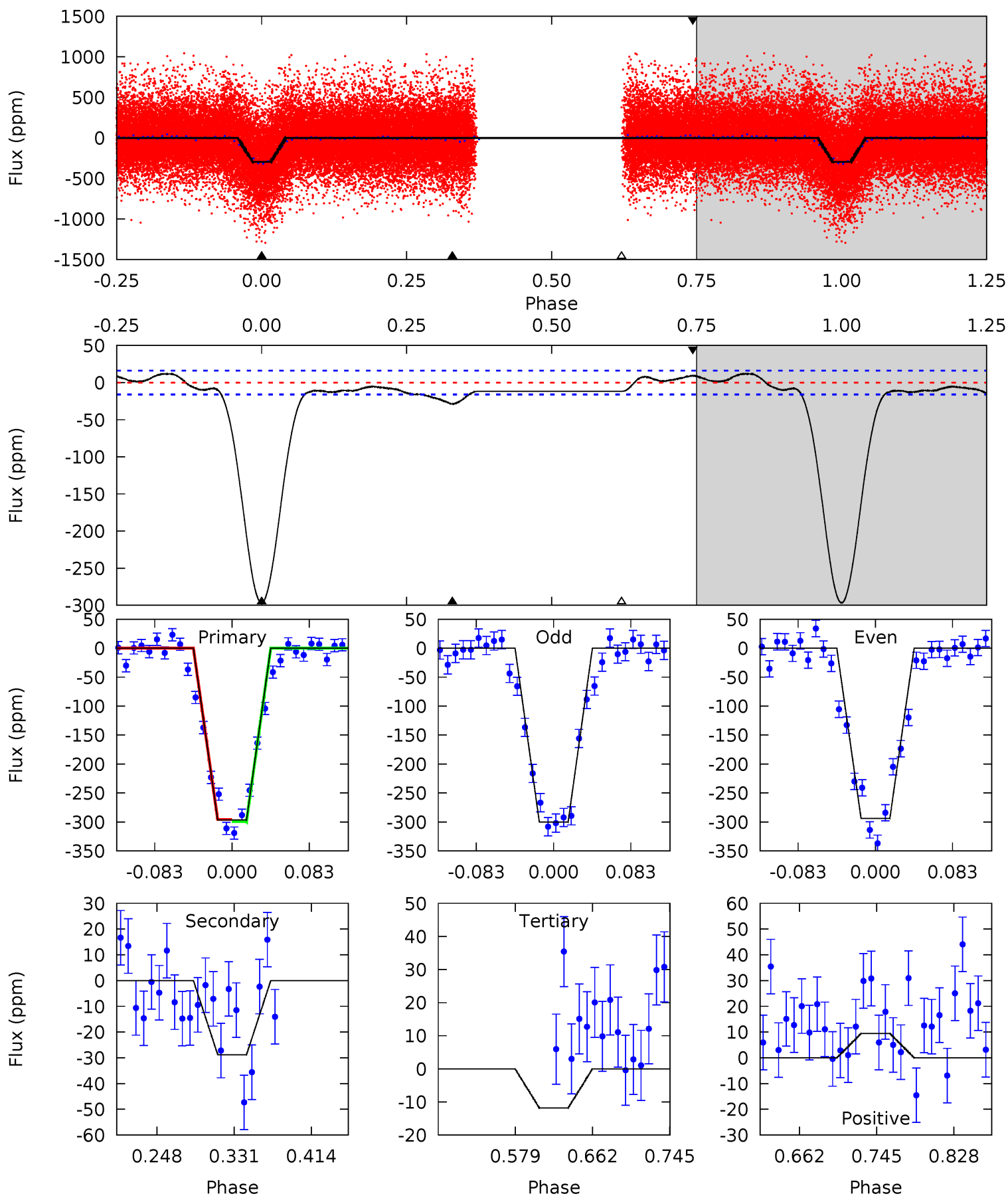
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
17.4	8.52	2.77	8.07	4.57	1.67	3.95	14.6	9.32	5.75	0.45	2.03	0.92	0.32	12.7



# Alt Model-Shift Uniqueness Test

005563080-02, P = 0.785474 Days, E = 131.467471 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
84.7	8.23	3.38	2.70	4.60	1.73	2.28	81.3	82.0	4.85	5.53	0.87	1.02	0.04	0.55



### Stellar Parameters For KIC 005563080

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5356^{+175}_{-159}$	$4.466^{+0.100}_{-0.125}$	$-0.100^{+0.300}_{-0.300}$	$0.871^{+0.160}_{-0.120}$	$0.810^{+0.113}_{-0.061}$	$1.725^{+0.715}_{-0.658}$
	+3%/-3%	+2%/-3%	+300%/-300%	+18%/-14%	+14%/-8%	+41%/-38%
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 005563080-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-30 \pm 4$	$1.12^{+0.41}_{-0.36}$	$2479^{+135}_{-116}$	$3914^{+659}_{-455}$	$3.203^{+4.053}_{-1.536}$
Alt.	$-29 \pm 4$	$1.72^{+0.44}_{-0.42}$	$2483^{+148}_{-119}$	$3285^{+363}_{-292}$	$1.283^{+1.015}_{-0.471}$

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



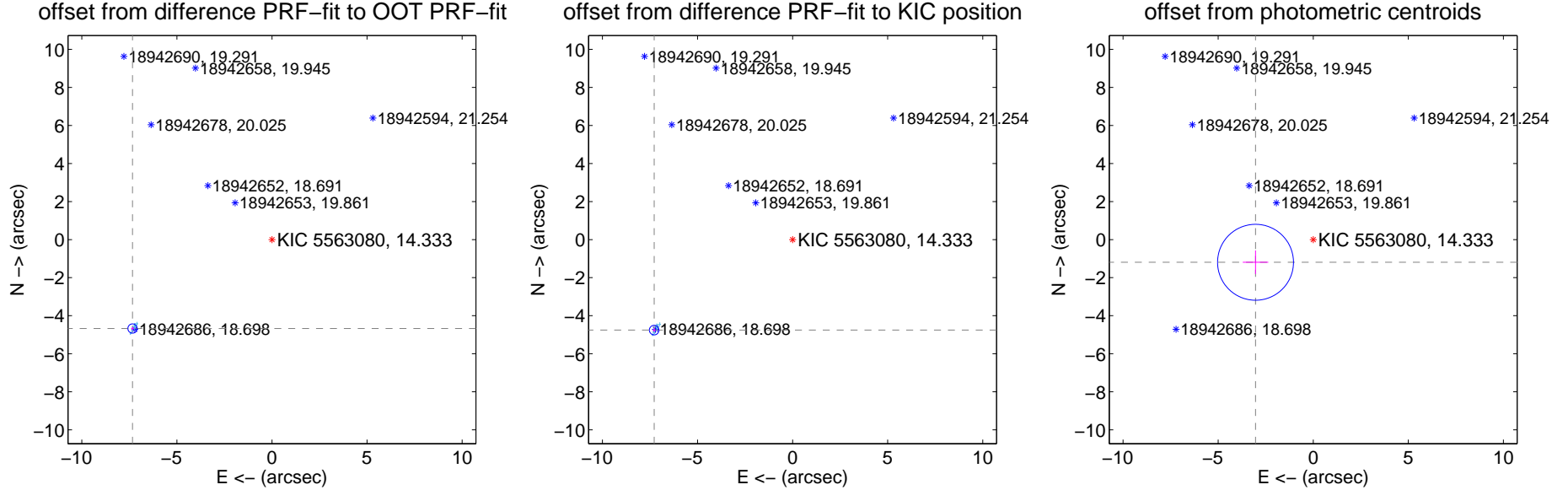
## DV Centroid Data

Supplemental centroid analysis for 005563080-02. Kepler magnitude: 14.33. Transit SNR 20.67

There are 12 quarters with good PRF difference image offsets

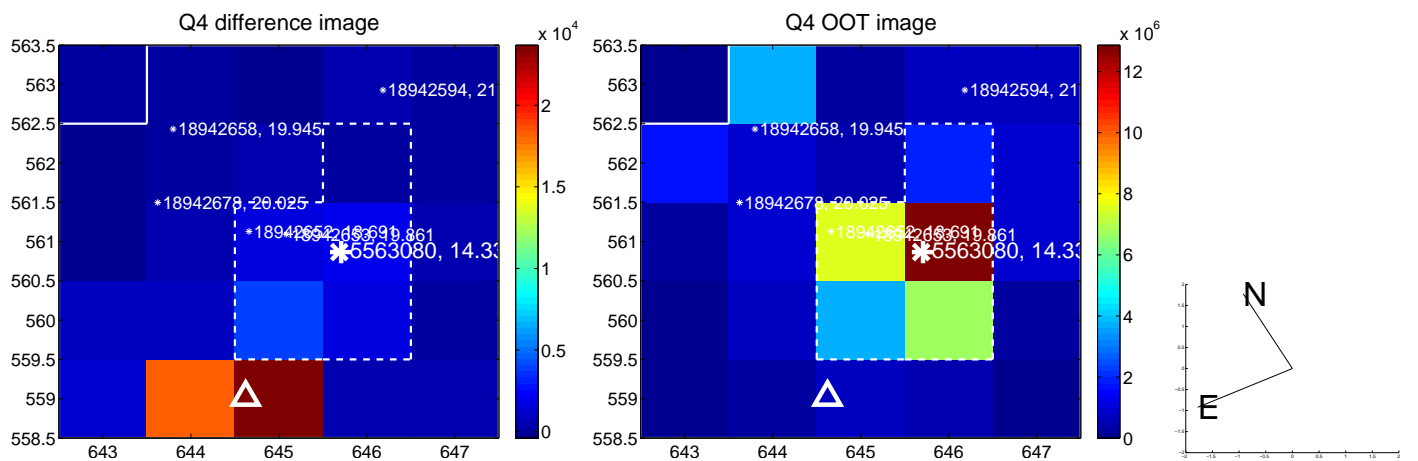
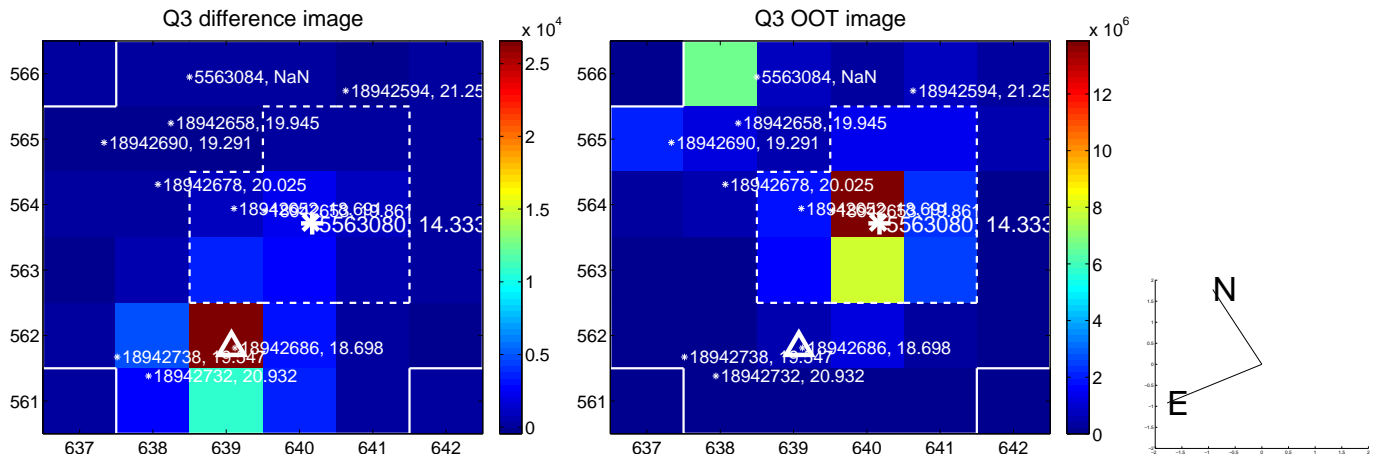
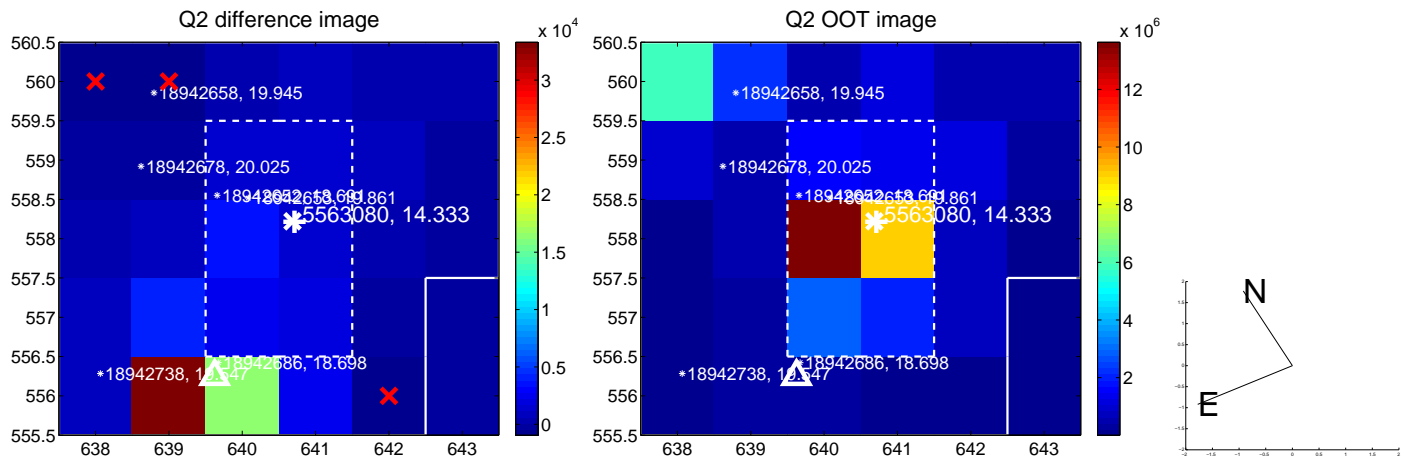
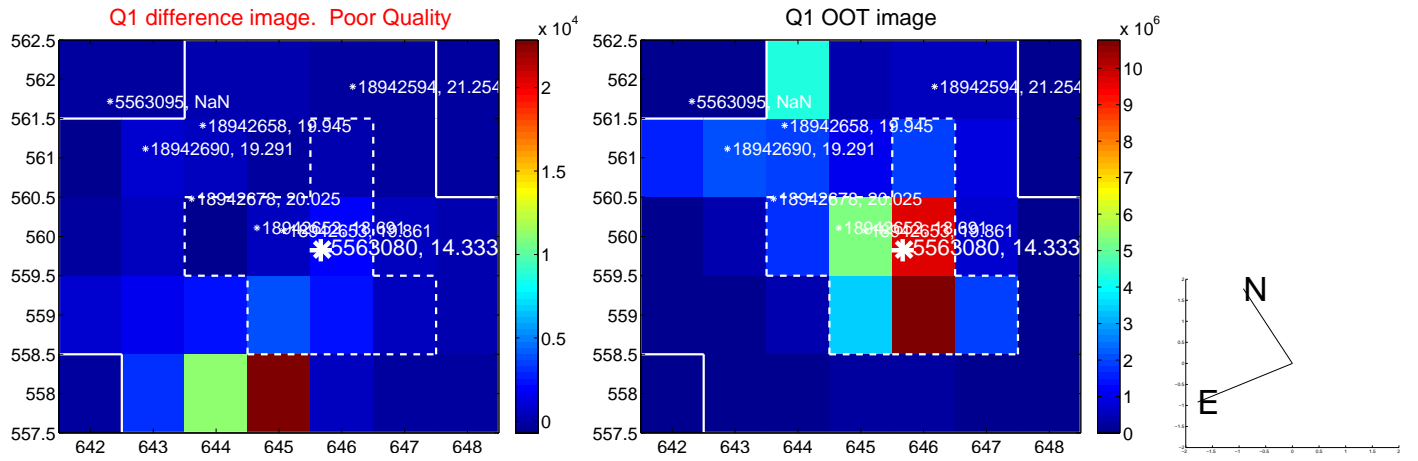
The direct PRF centroid is offset from the target star catalog position by about 0.12 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	8.696 $\pm$ 0.081	107.27	7.333 $\pm$ 0.072	-4.674 $\pm$ 0.080
PRF-fit source offset from KIC position	8.696 $\pm$ 0.084	103.82	7.279 $\pm$ 0.074	-4.757 $\pm$ 0.081
photometric centroid source offset	3.26 $\pm$ 0.67	4.90	3.03 $\pm$ 0.67	-1.19 $\pm$ 0.62

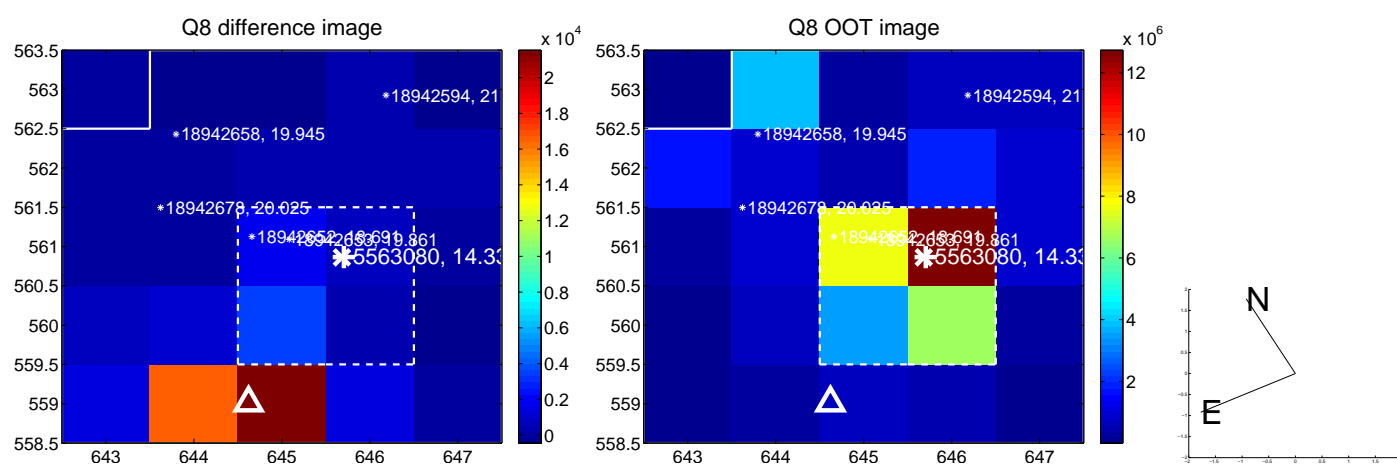
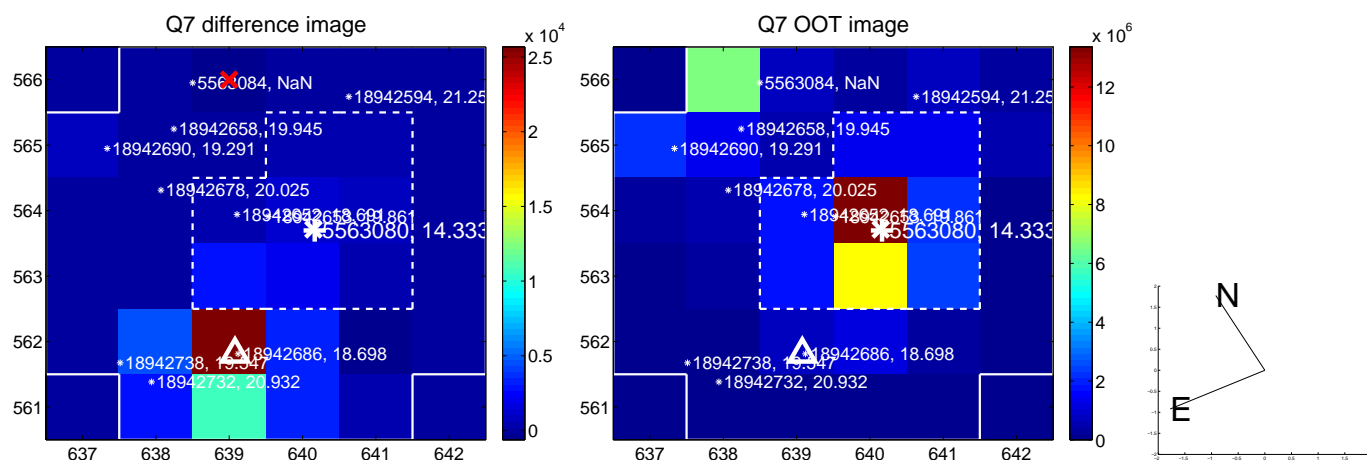
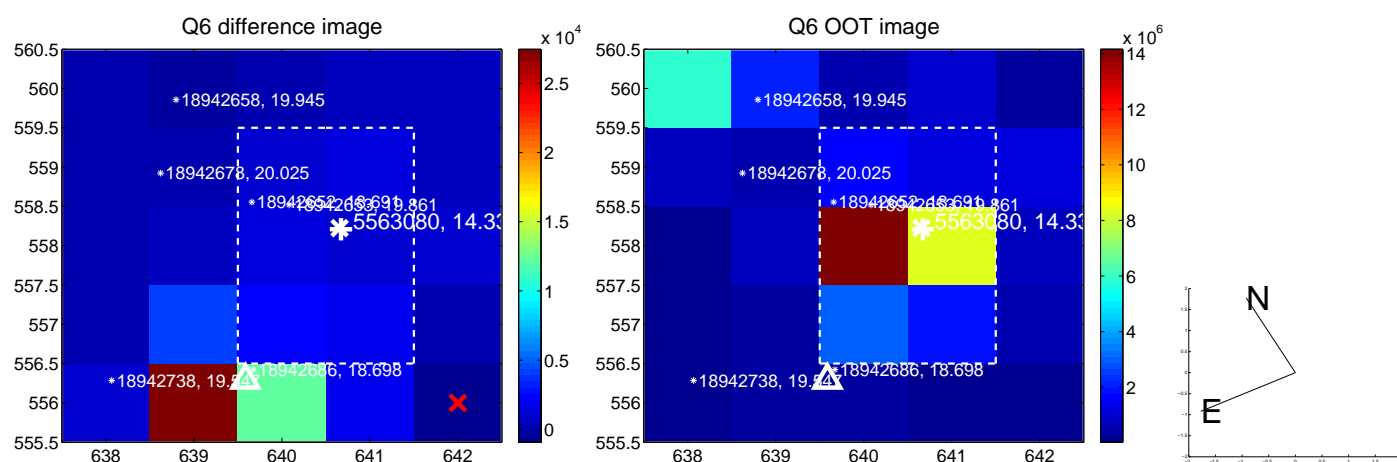
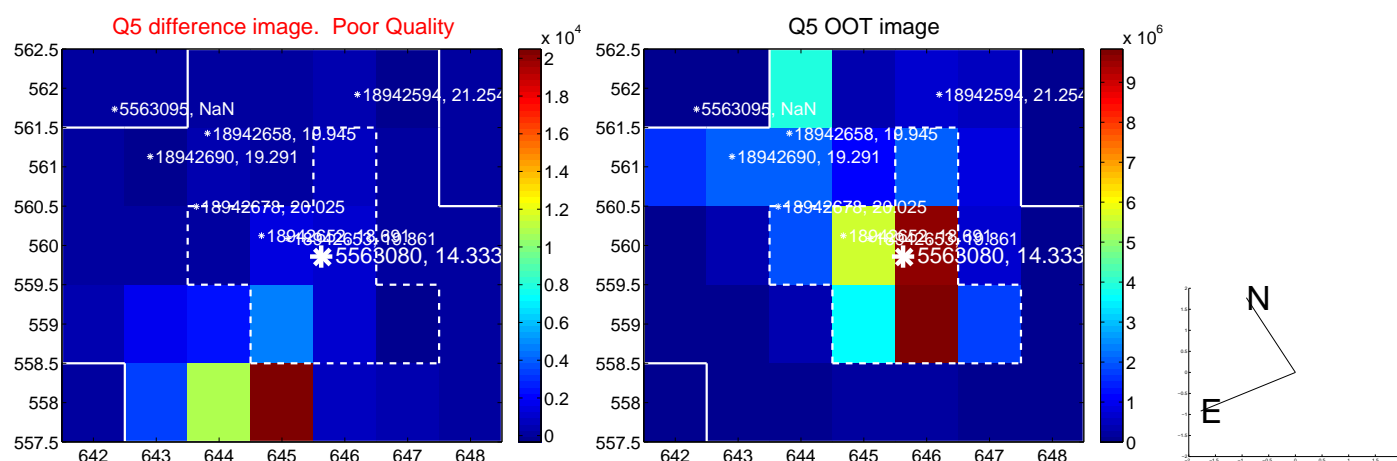


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

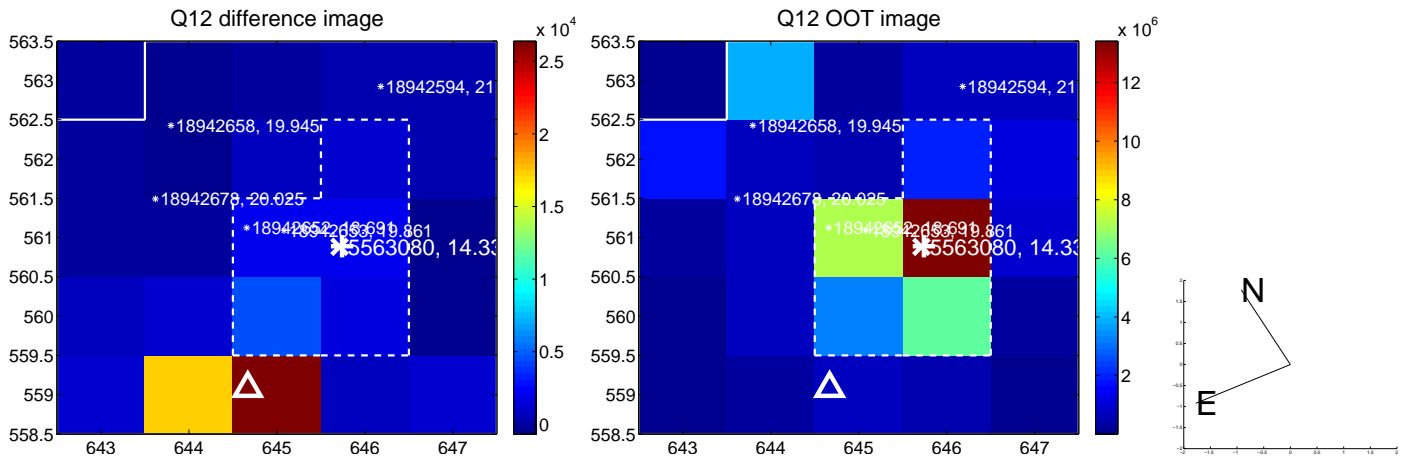
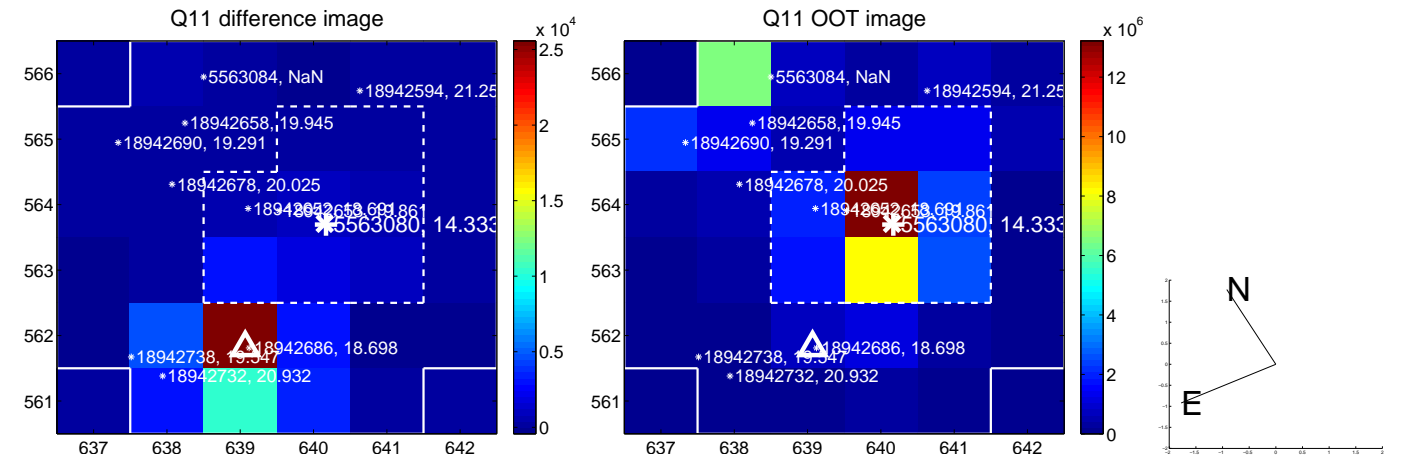
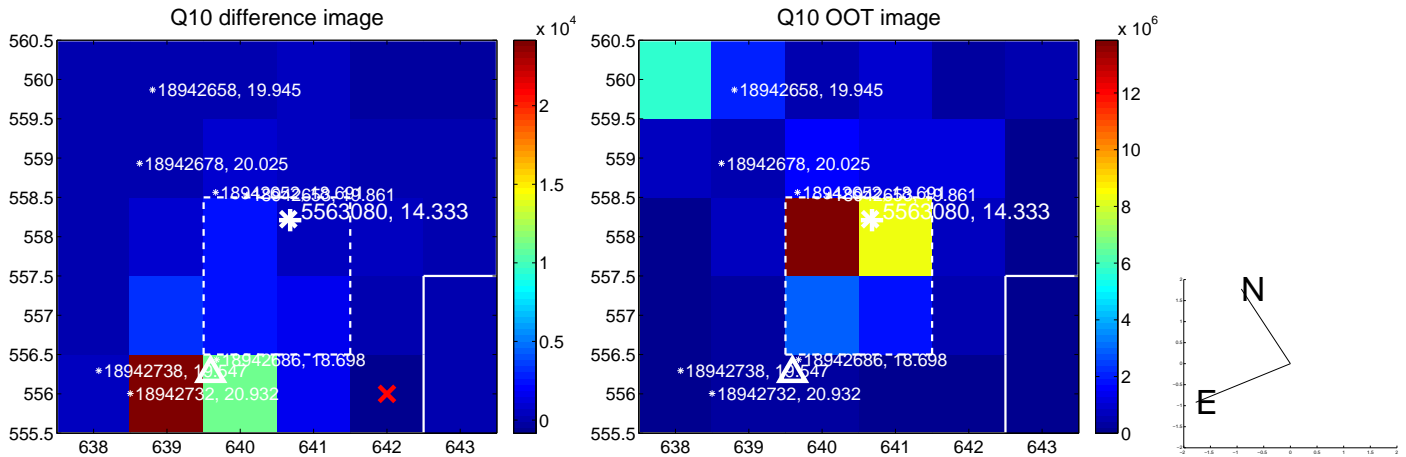
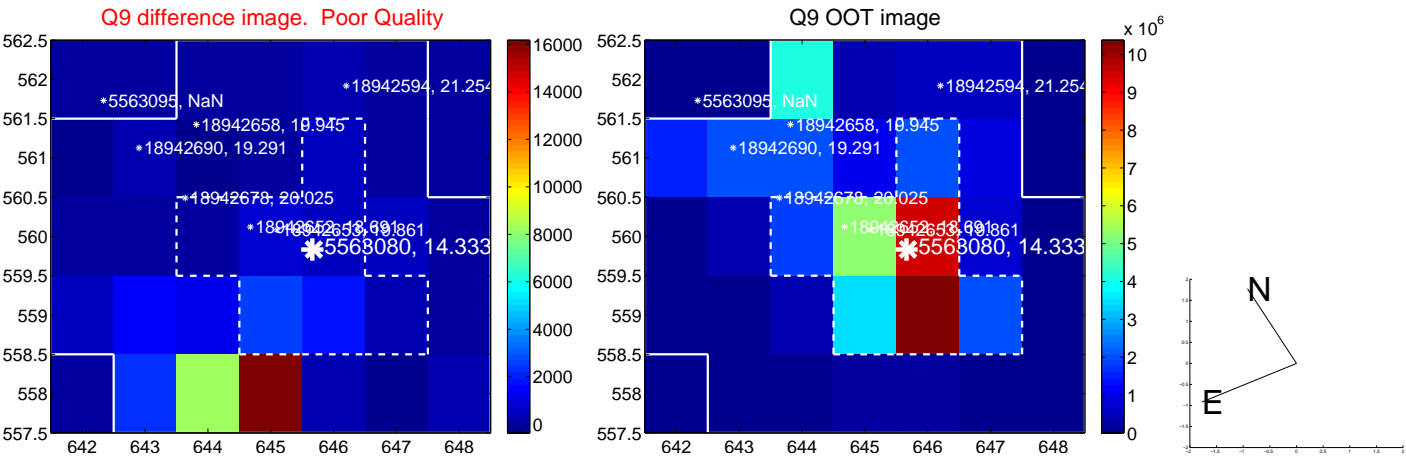
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



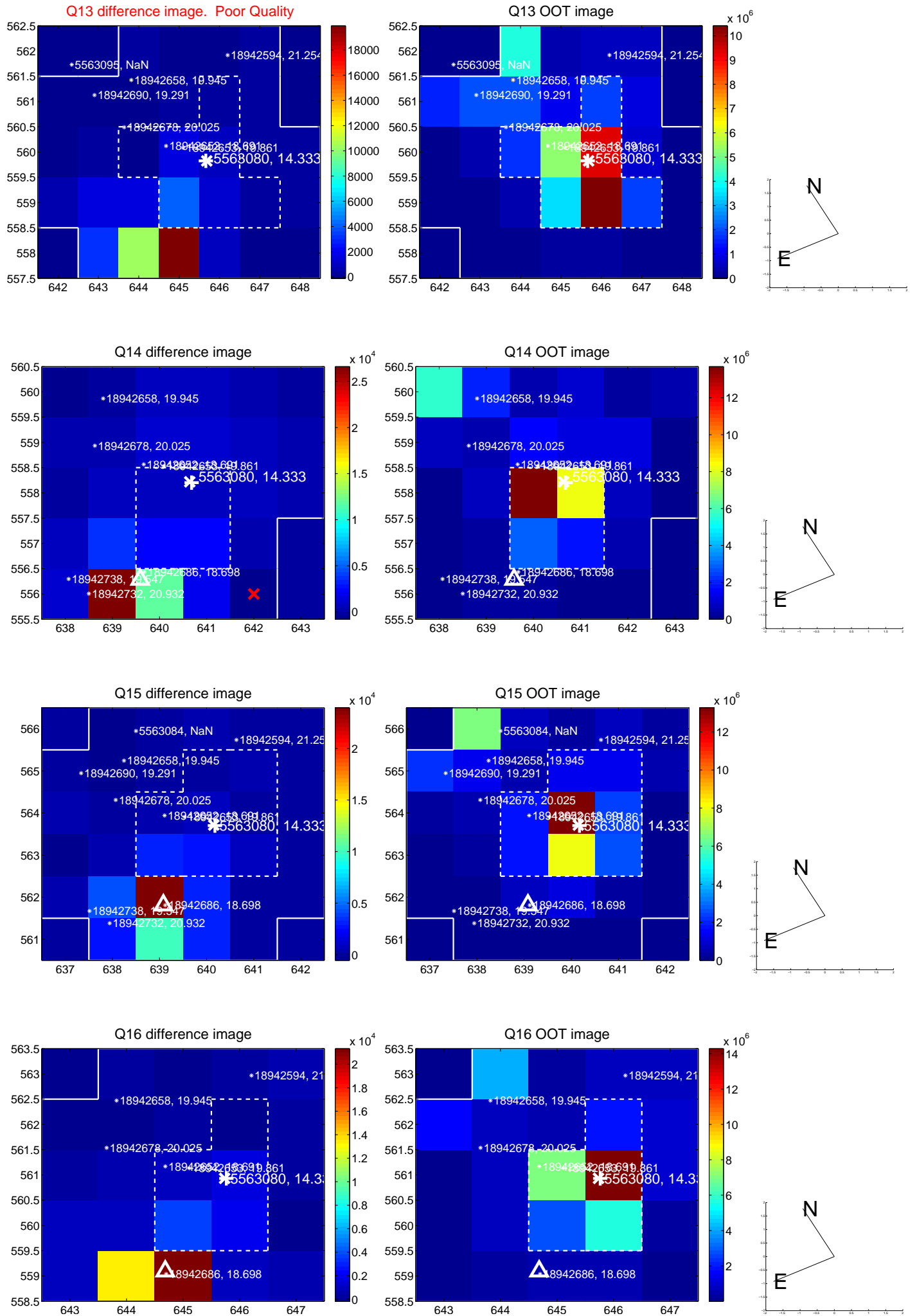
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

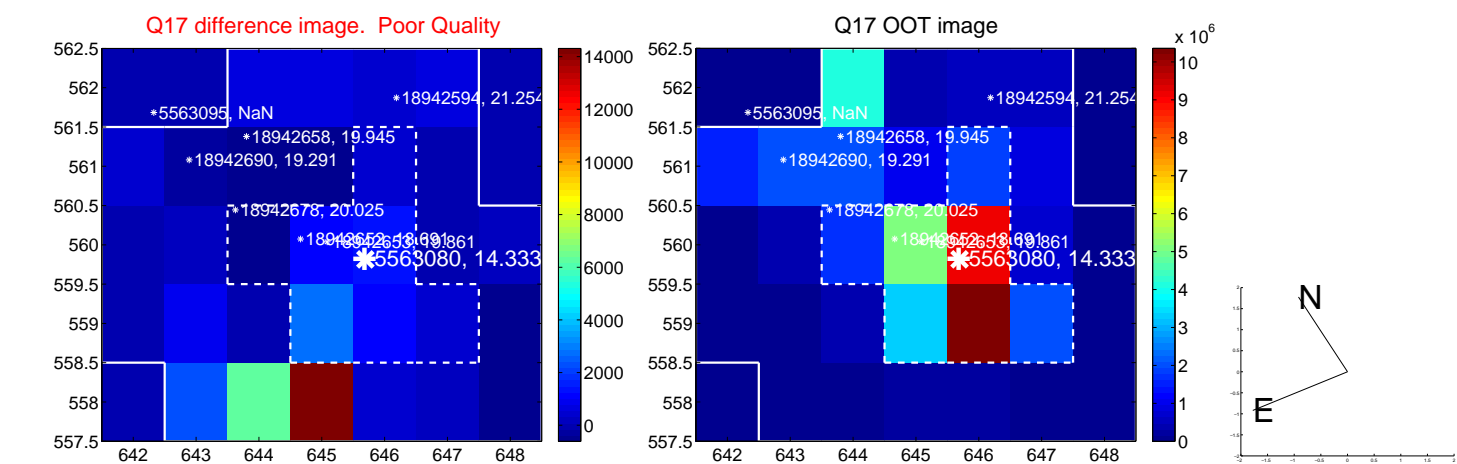


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

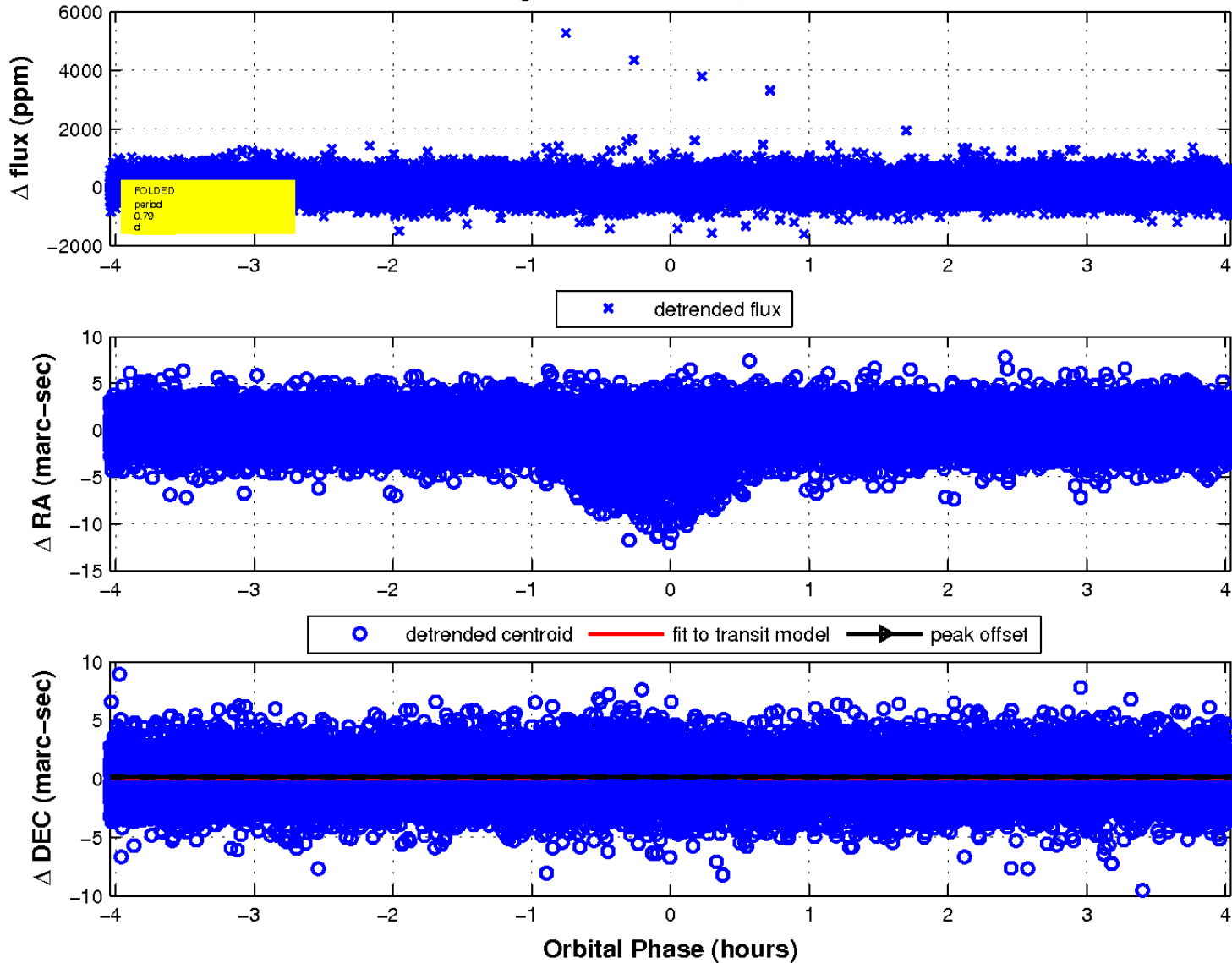




white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



fluxWeightedCentroids, Planet 2 of 2



UKIRT Image

Declination

