

# KIC 006587280

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
006587280-01	OBS	0857.01	5.715426	134.871521	910.9	2.666	48.6	54.2	0.83	5237	2.90	123.35
006587280-02	OBS	0857.02	20.026187	146.910237	435.9	1.415	9.3	11.4	0.83	5237	2.03	23.18

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
006587280-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
006587280-02	OBS	PC	0.99	0	0	0	0	NO_COMMENT

**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.

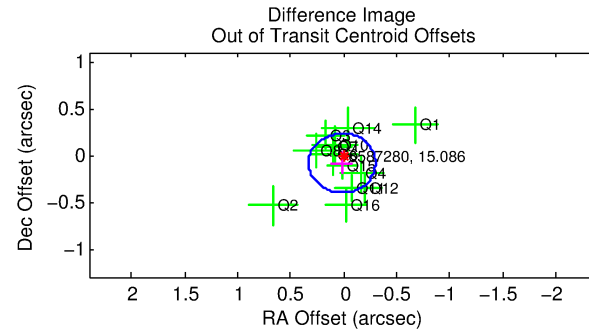
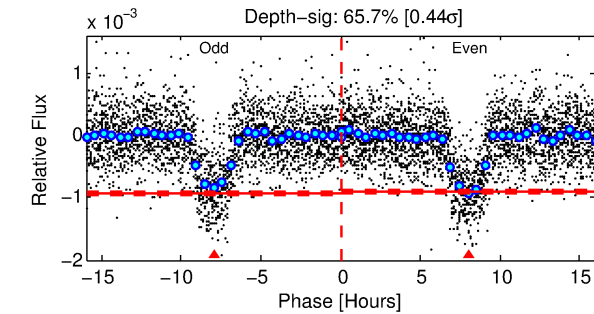
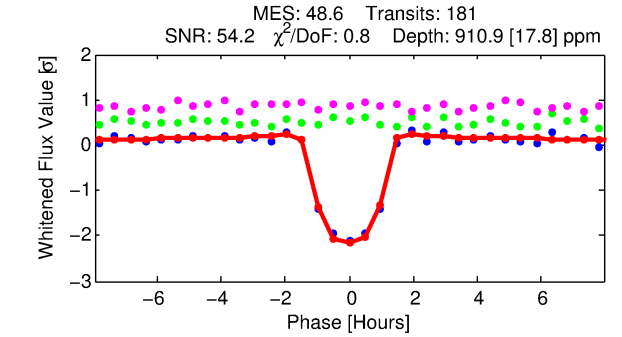
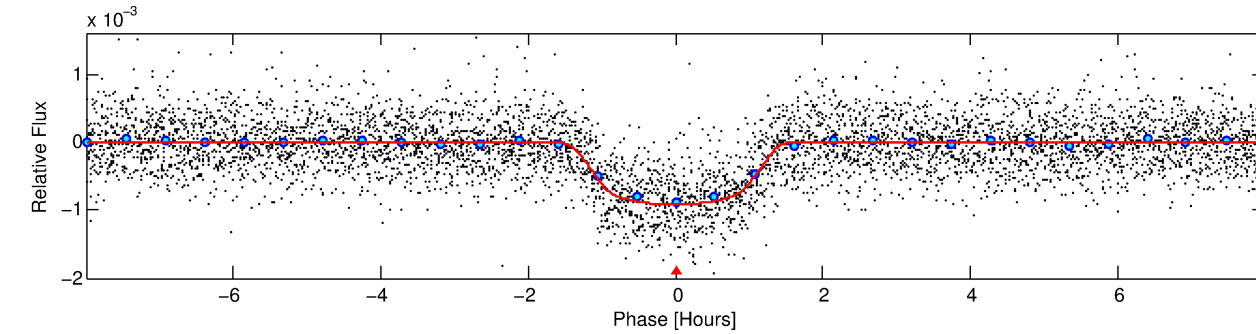
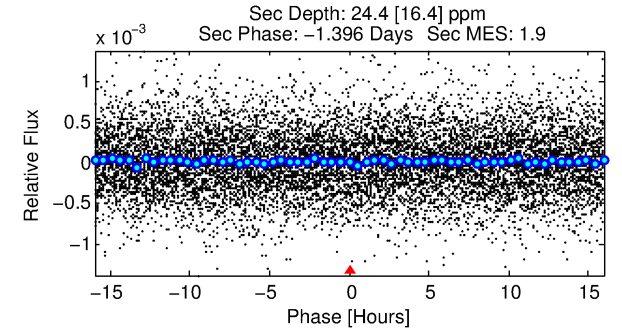
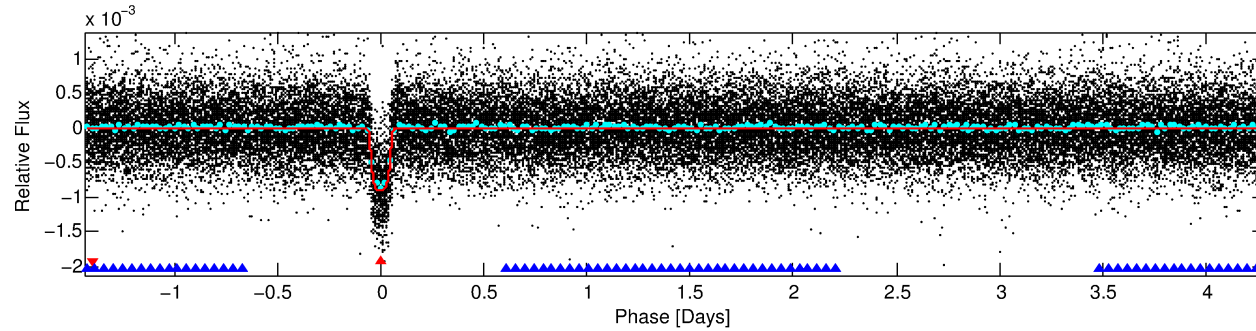
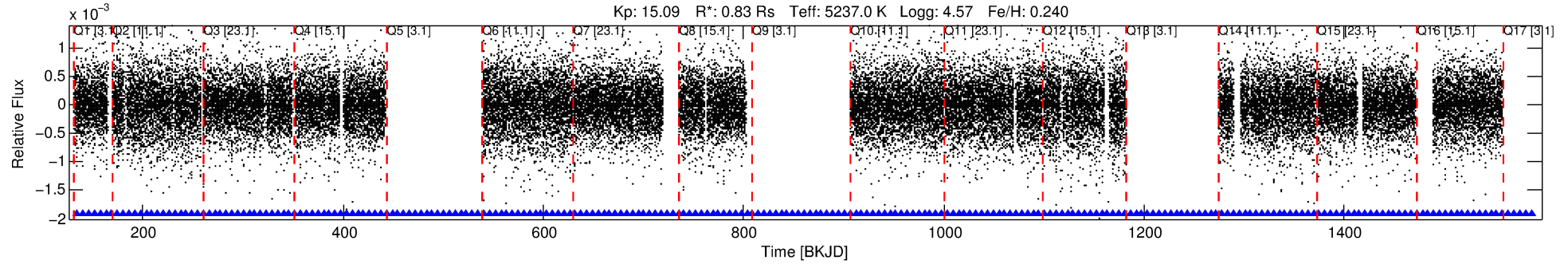
## Ephemeris Match Information For 006587280-01

No Significant Match Found

# DV One-Page Summary

KIC: 6587280 Candidate: 1 of 2 Period: 5.715 d  
KOI: K00857.01 Name: Kepler-243b Corr: 0.973

Kp: 15.09 R\*: 0.83 Rs Teff: 5237.0 K Logg: 4.57 Fe/H: 0.240



## DV Fit Results:

Period = 5.71543 [0.00001] d  
Epoch = 134.8715 [0.0008] BKJD  
Rp/R\* = 0.0322 [0.0030]  
a/R\* = 9.47 [3.25]  
b = 0.86 [0.11]  
Seff = 123.35 [28.65]  
Teff = 850 [49] K  
Rp = 2.90 [0.51] Re  
a = 0.0611 [0.0081] AU  
Ag = 5.93 [4.30] [1.15σ]  
Teffp = 2050 [362] K [3.28σ]

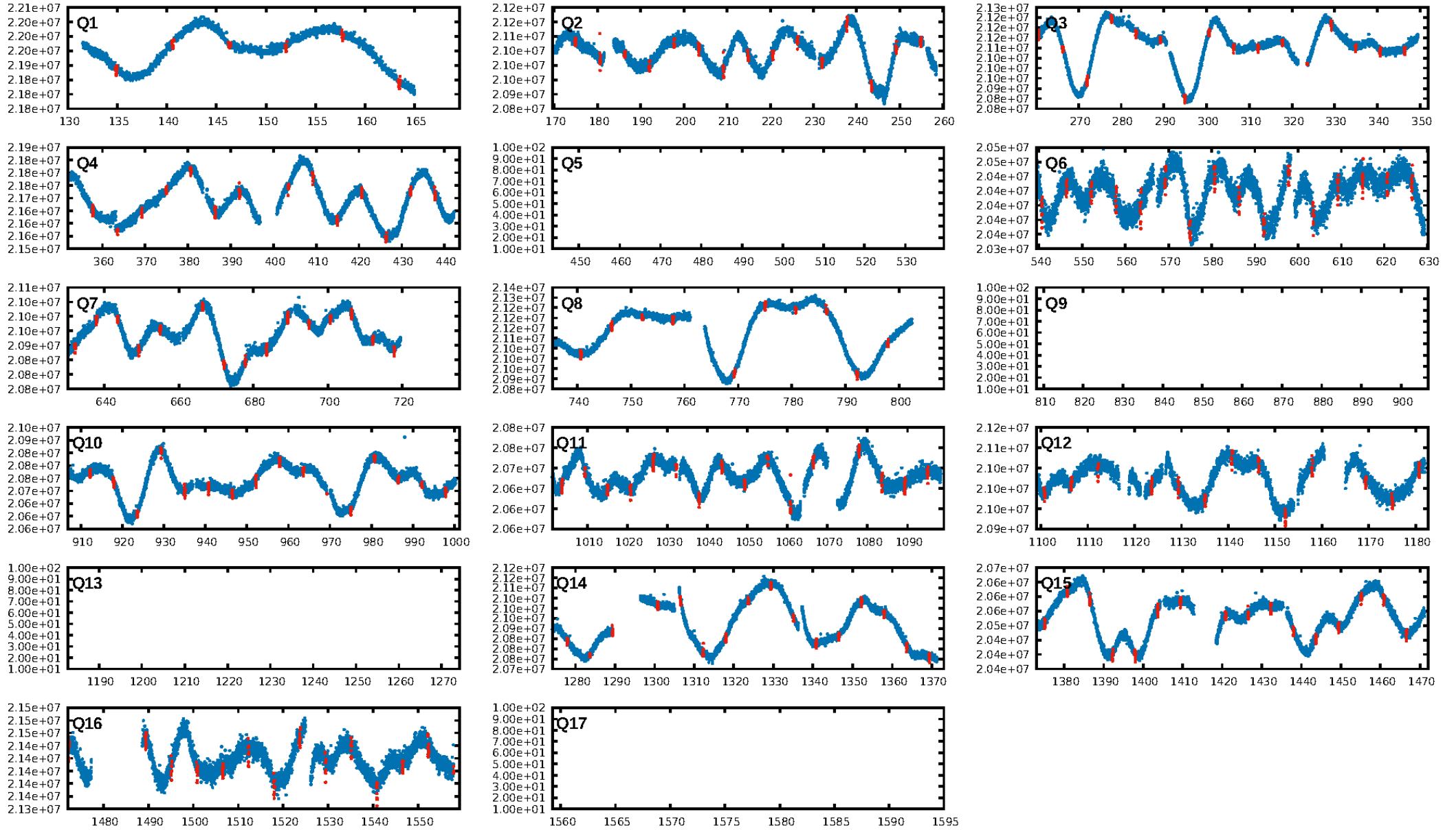
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [113.82σ]  
ModelChiSquare2-sig: 100.0%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 0.00e+00  
RollingBand-fgt: 1.00 [175/175]  
GhostDiagnostic-chr: 5.001  
Centroid-sig: 30.9%  
Centroid-so: 0.324 arcsec [1.51σ]  
OotOffset-rm: 0.085 arcsec [0.80σ]  
KicOffset-rm: 0.056 arcsec [0.49σ]  
OotOffset-st: 4/4/4/1 [13]  
KicOffset-st: 4/4/4/1 [13]  
DiffImageQuality-fgm: 1.00 [13/13]  
DiffImageOverlap-fno: 1.00 [13/13]

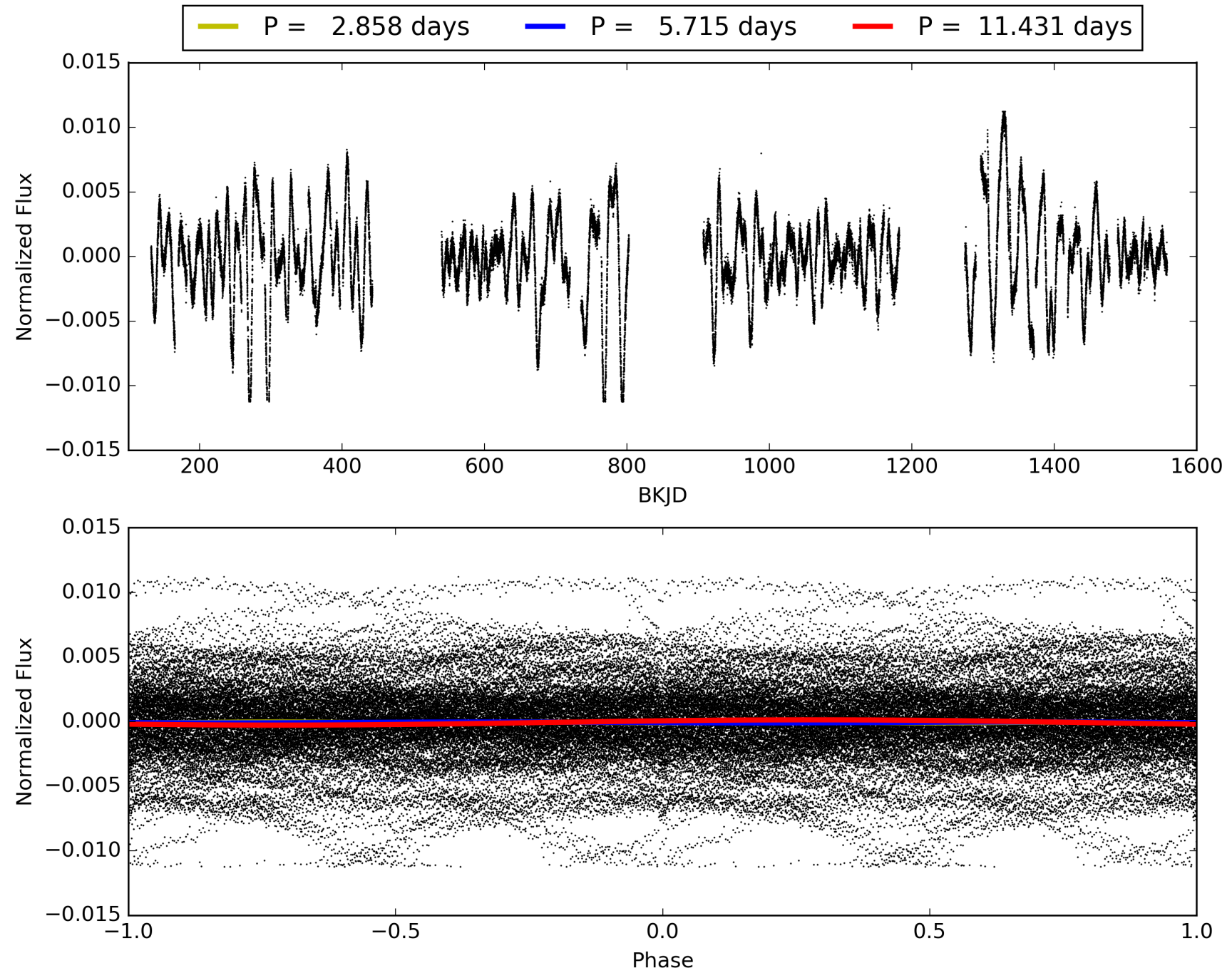
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 05:25:17 Z

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

# TCE 006587280-01, PDC Light Curves

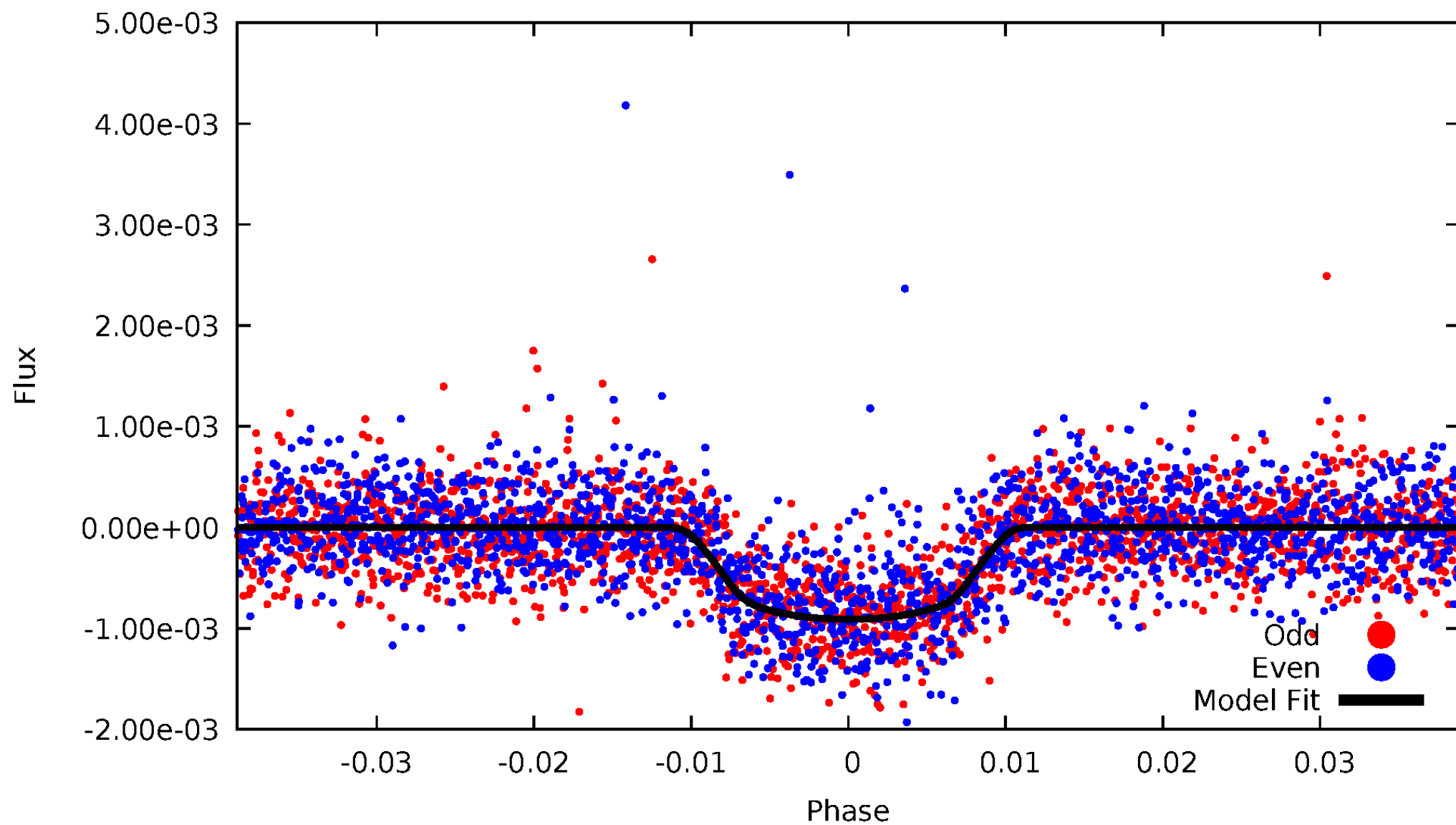


TCE 006587280-01



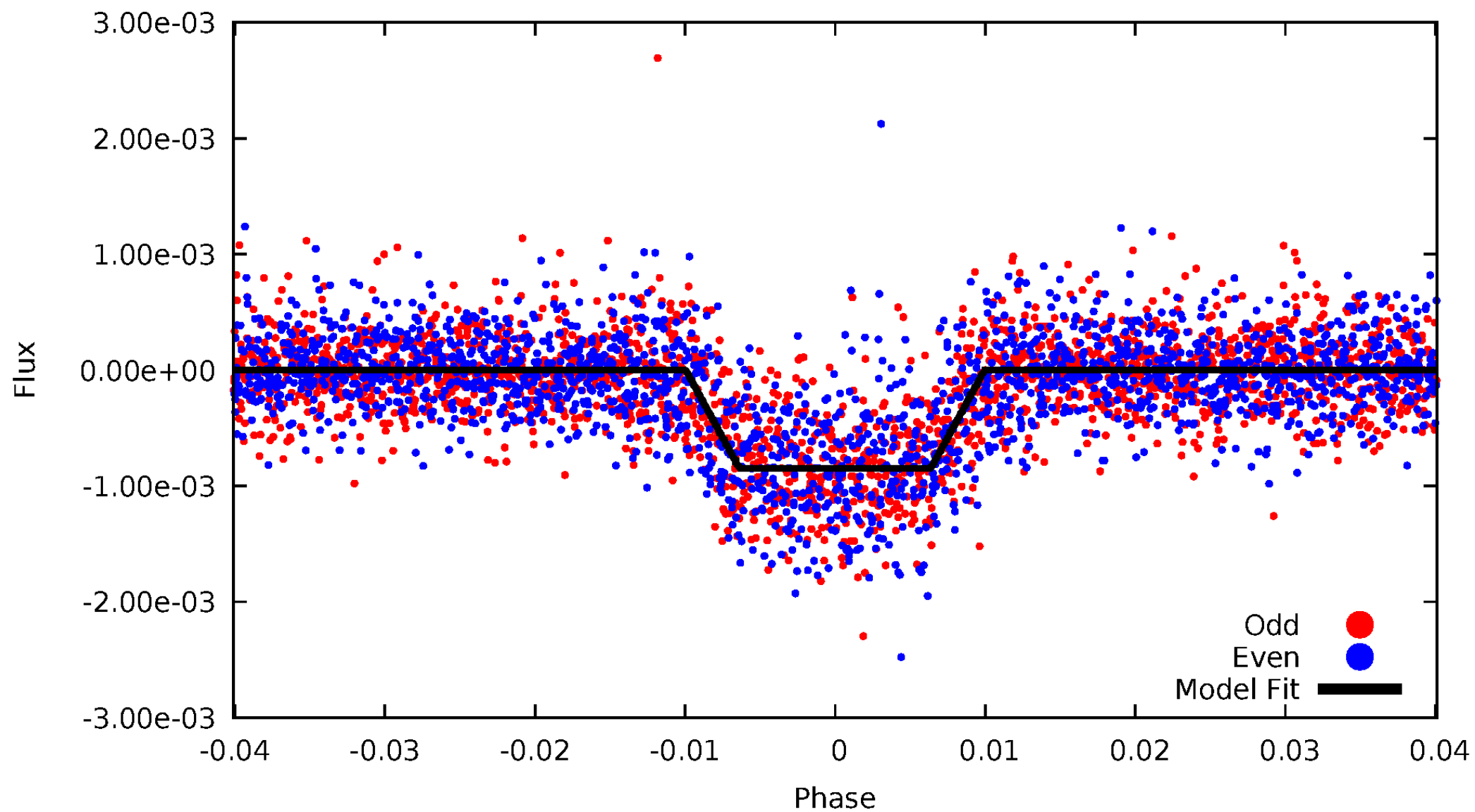
# DV Odd/Even

TCE 006587280-01



# ALT Odd/Even

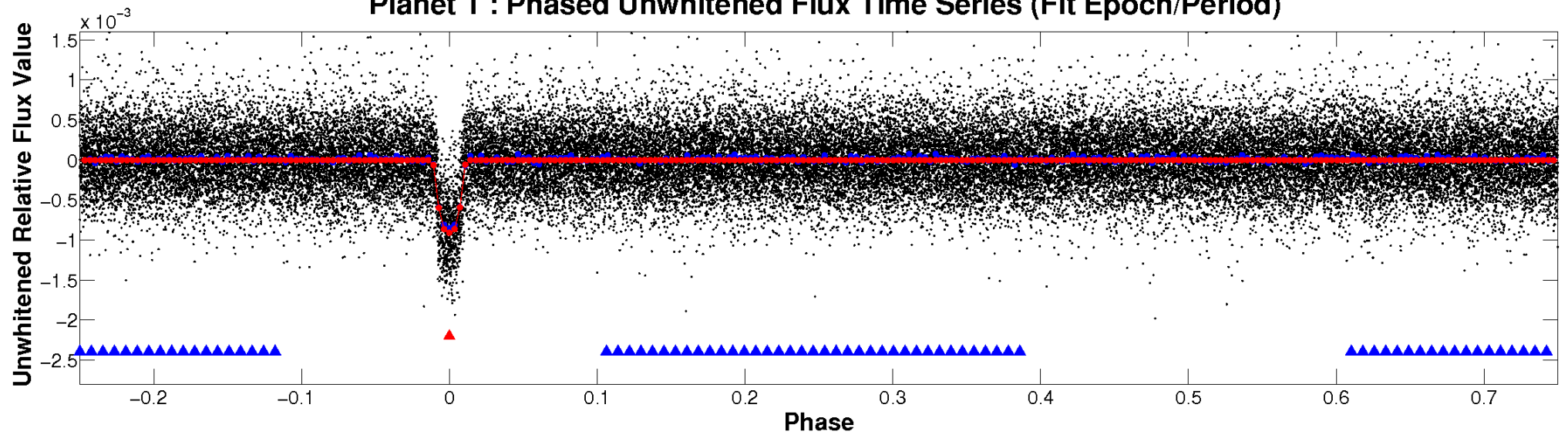
TCE 006587280-01



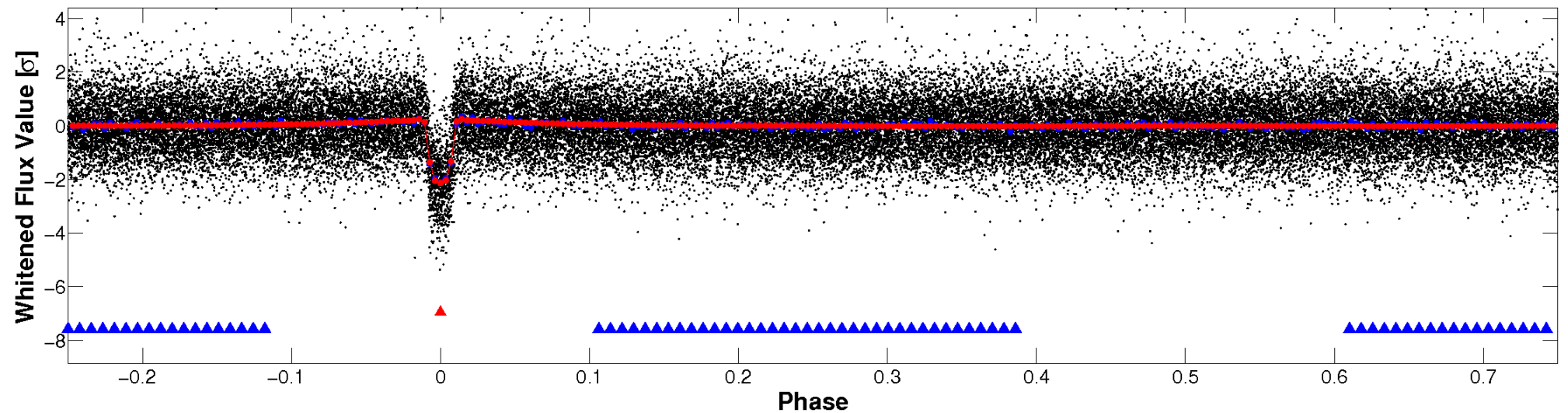


# Non-Whitened Vs. Whitened Light Curve

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

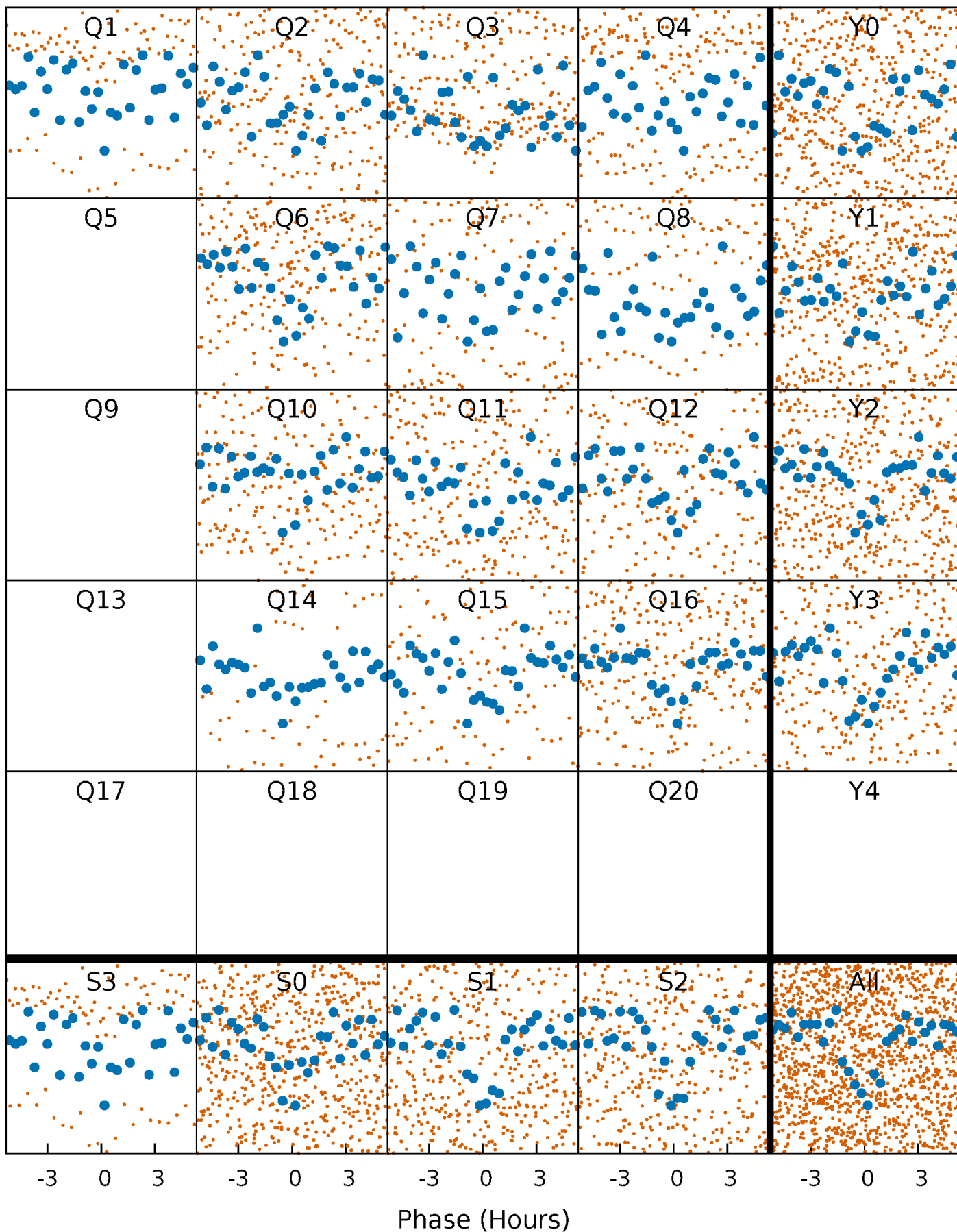


**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

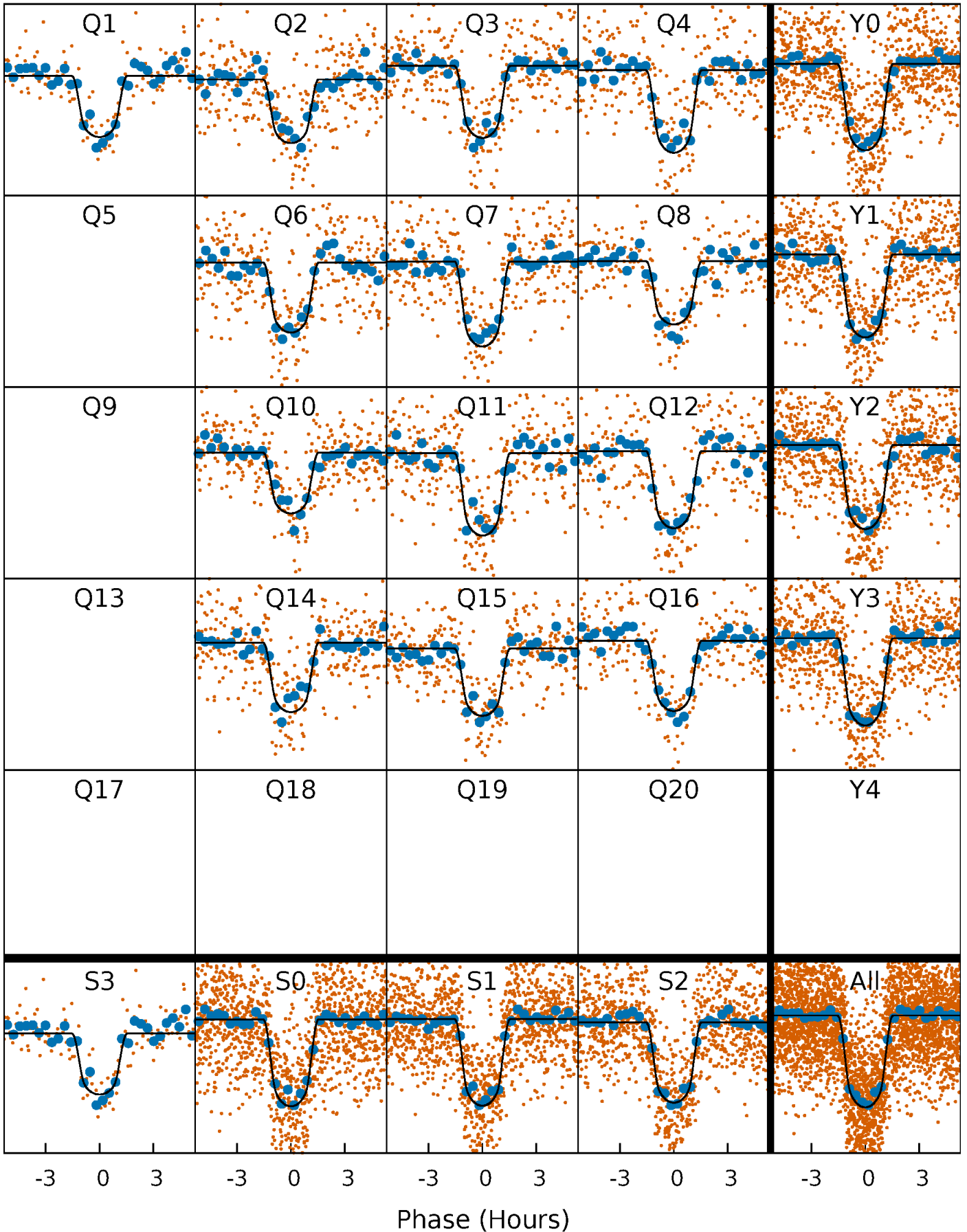
TCE 006587280-01 P= 5.715426 Days  $T_0=134.871521$  (BKJD)





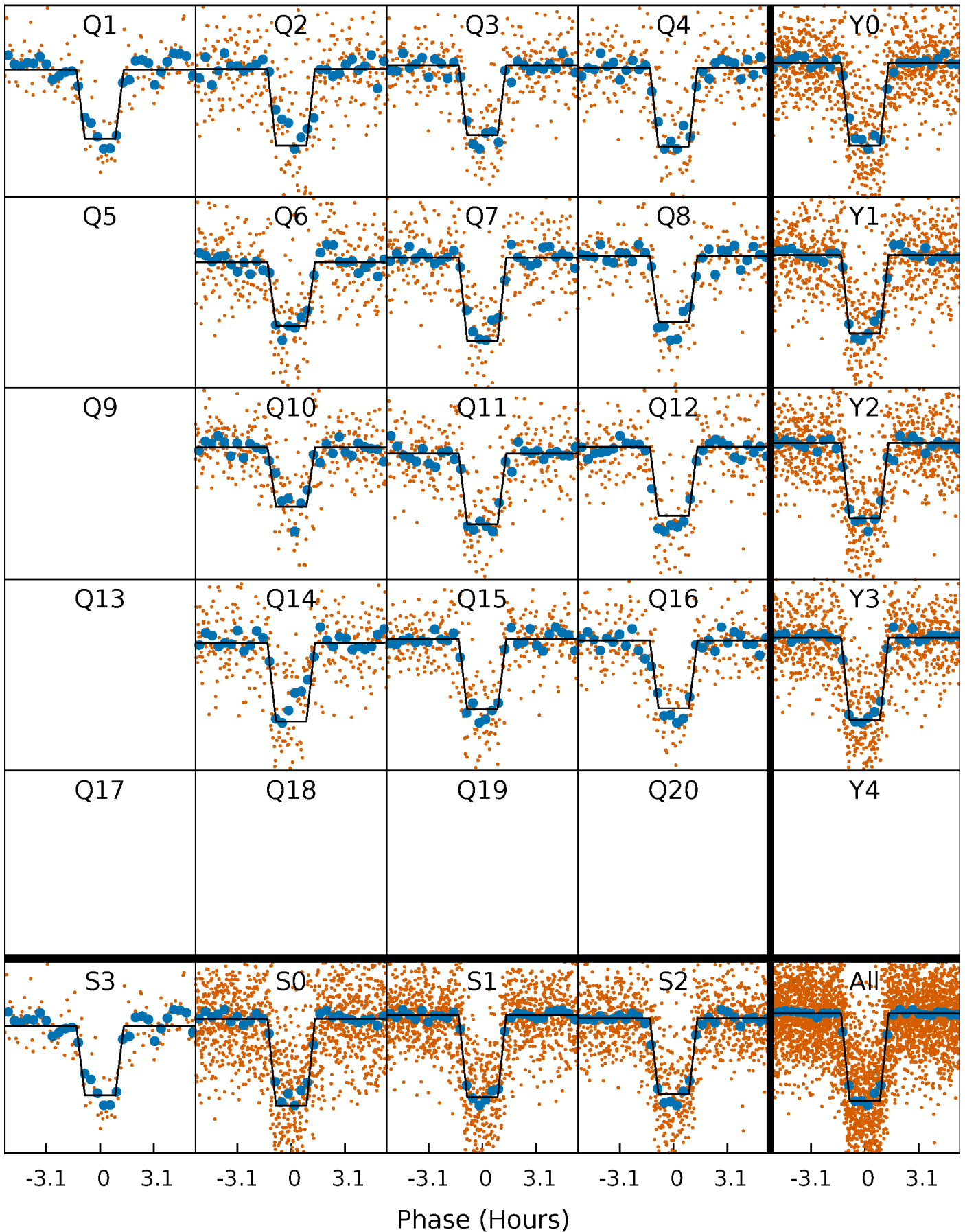
# DV Quarter-Phased Transit Curves

TCE 006587280-01 P= 5.715426 Days  $T_0=134.871521$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

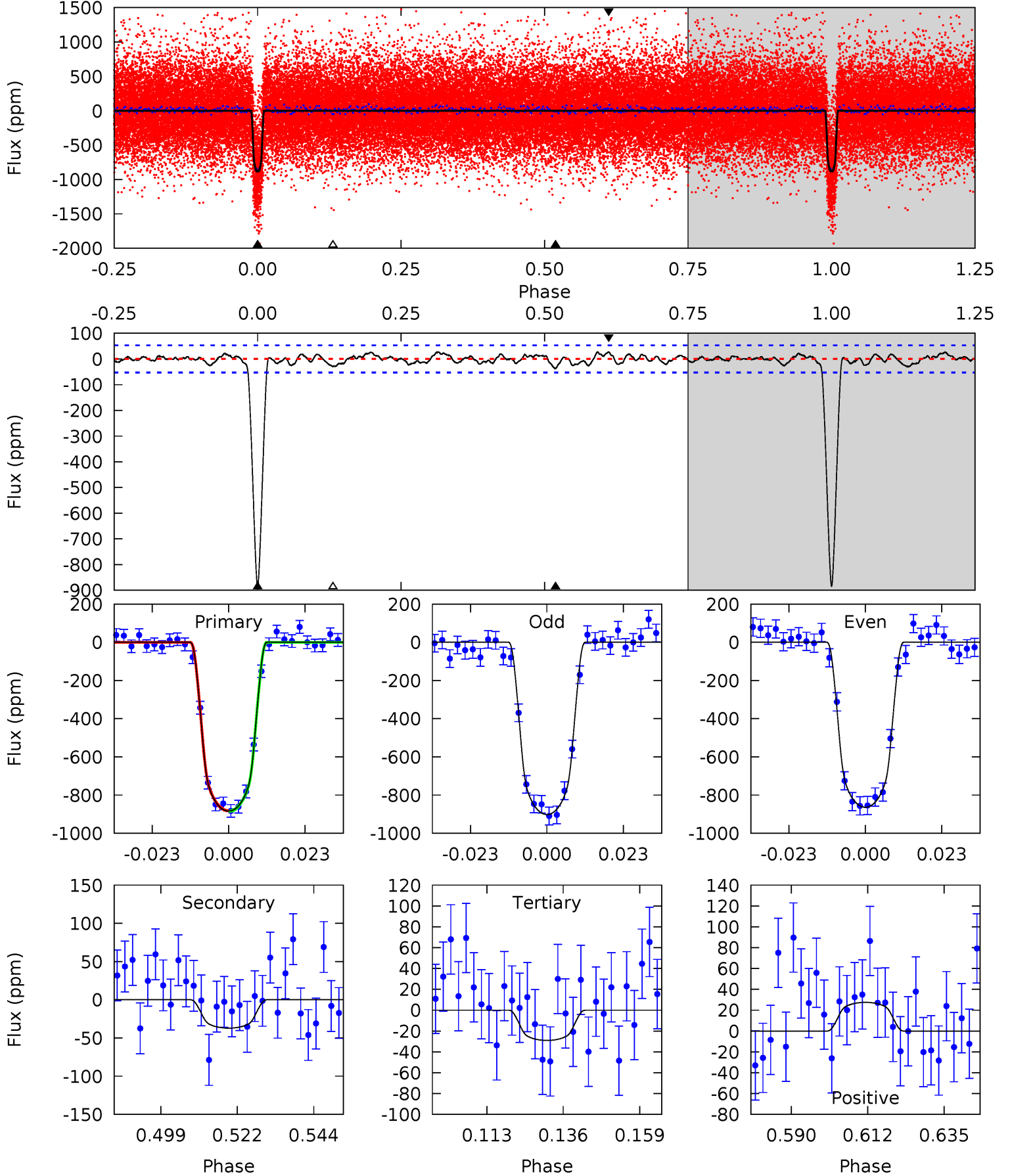
TCE 006587280-01 P= 5.715462 Days  $T_0=134.867288$  (BKJD)



# DV Model-Shift Uniqueness Test

006587280-01, P = 5.715426 Days, E = 129.156095 Days

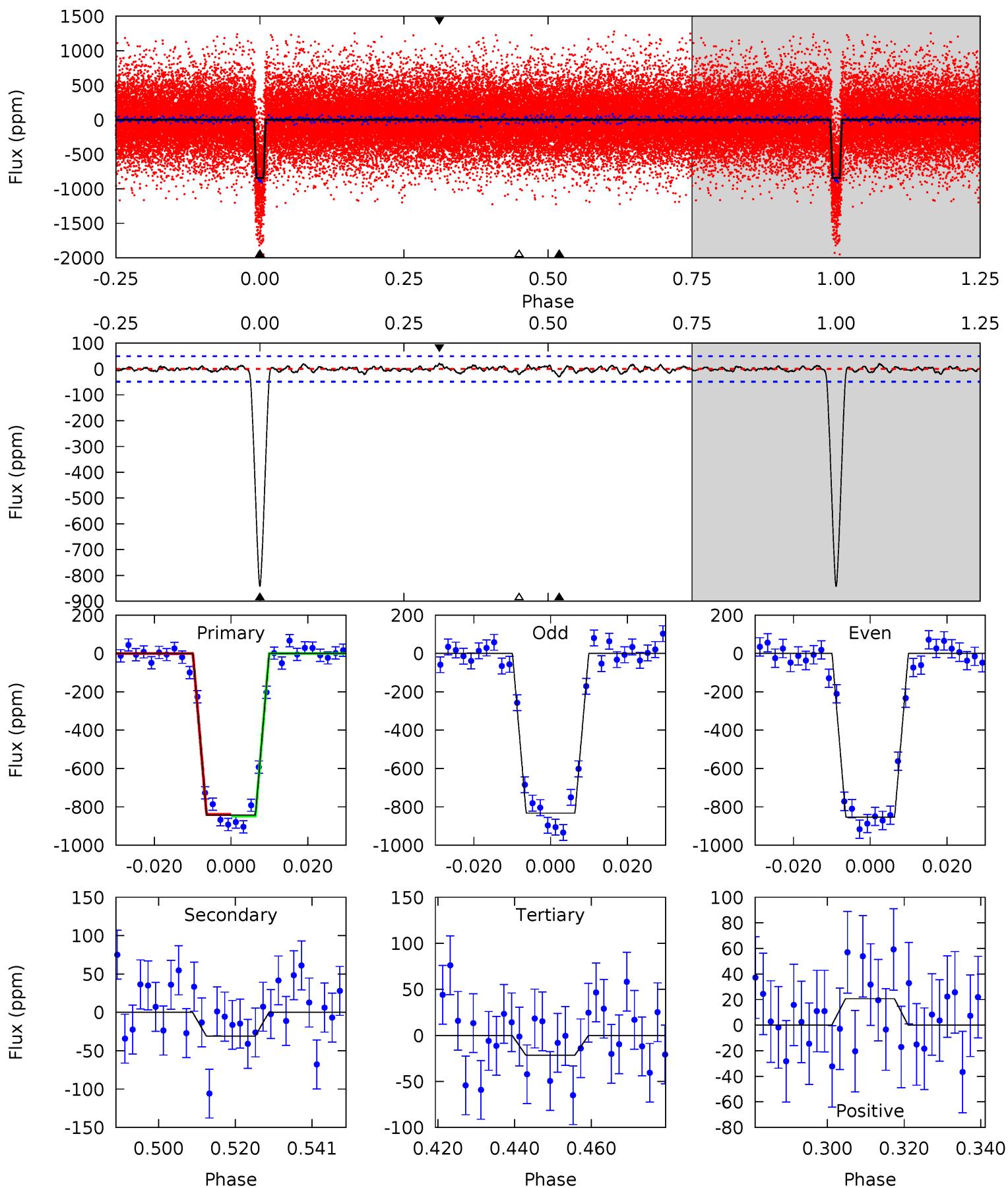
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
81.6	3.43	2.68	2.54	4.87	2.28	1.15	78.9	79.0	0.75	0.89	1.76	0.97	0.03	0.14



# Alt Model-Shift Uniqueness Test

006587280-01, P = 5.715462 Days, E = 129.151826 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
83.3	3.05	2.14	2.05	4.89	2.33	0.74	81.1	81.2	0.91	1.00	1.01	0.98	0.02	0.44



### Stellar Parameters For KIC 006587280

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5237^{+157}_{-157}$	$4.572^{+0.028}_{-0.112}$	$0.240^{+0.200}_{-0.300}$	$0.826^{+0.124}_{-0.057}$	$0.927^{+0.047}_{-0.095}$	$2.315^{+0.325}_{-0.753}$
	+3%/-3%	+1%/-2%	+83%/-125%	+15%/-7%	+5%/-10%	+14%/-33%
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 006587280-01 / KOI 0857.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-37 \pm 11$	$2.95^{+0.34}_{-0.34}$	$1203^{+55}_{-46}$	$2927^{+147}_{-168}$	$8.286^{+3.594}_{-2.684}$
Alt.	$-31 \pm 10$	$2.68^{+0.35}_{-0.31}$	$1205^{+52}_{-44}$	$2938^{+172}_{-168}$	$8.466^{+4.374}_{-2.743}$

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

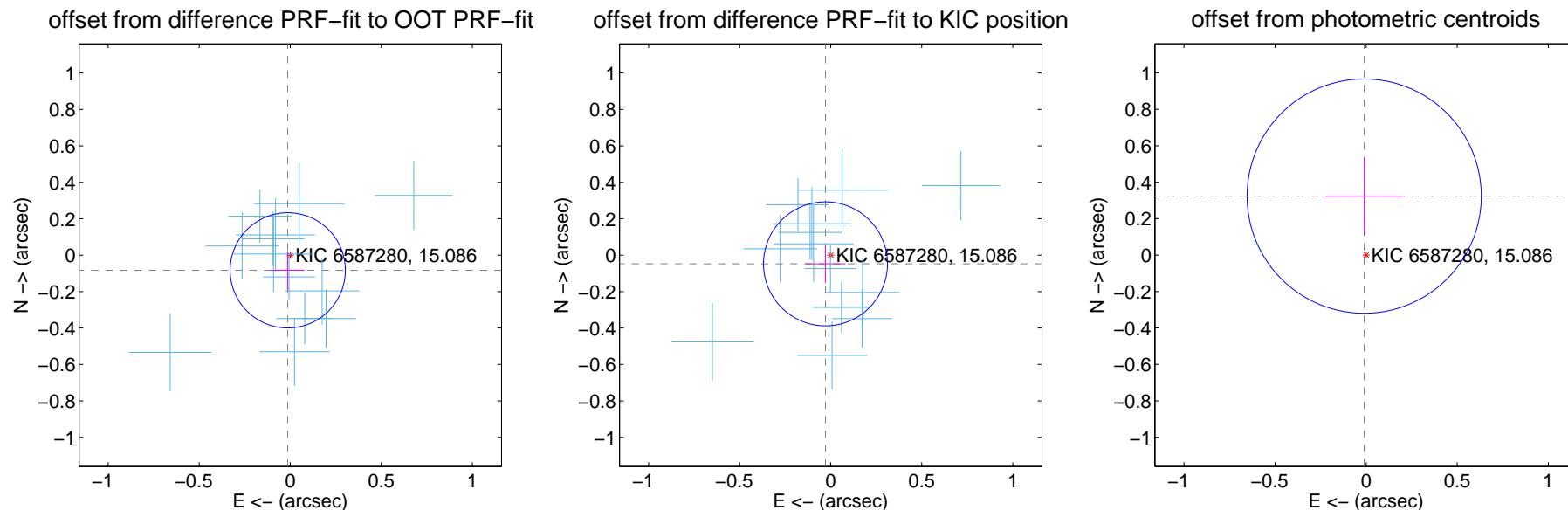
## DV Centroid Data

Supplemental centroid analysis for 006587280-01. Kepler magnitude: 15.09. Transit SNR 54.24

There are 13 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.03 arcsec

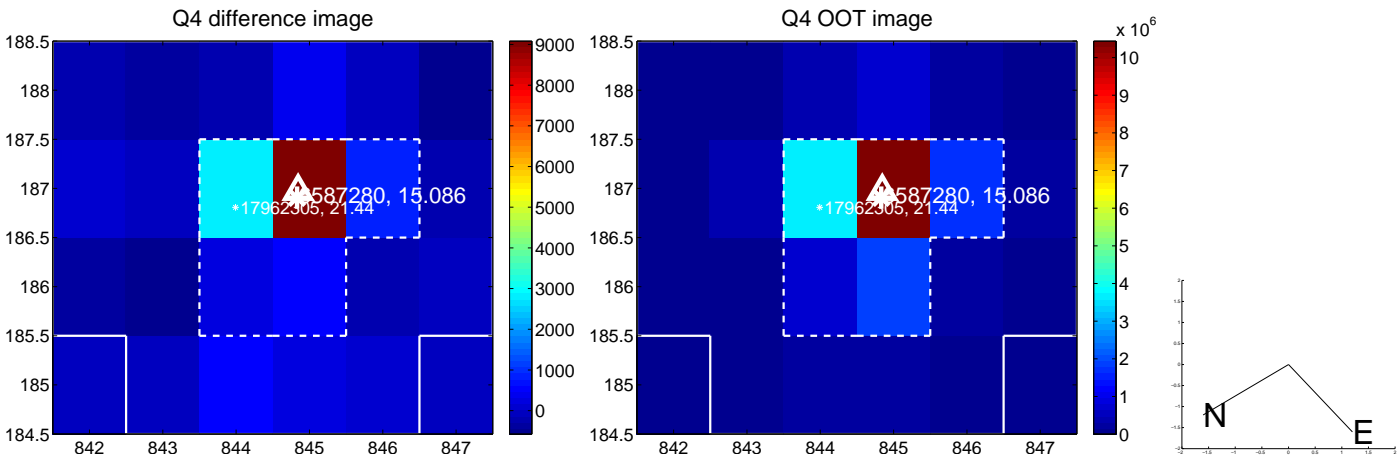
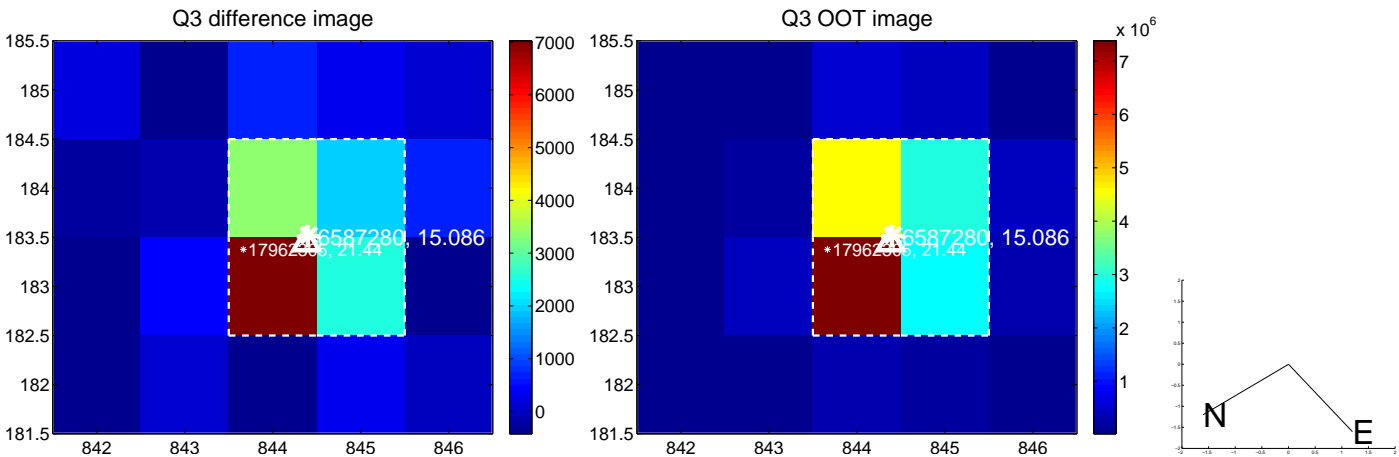
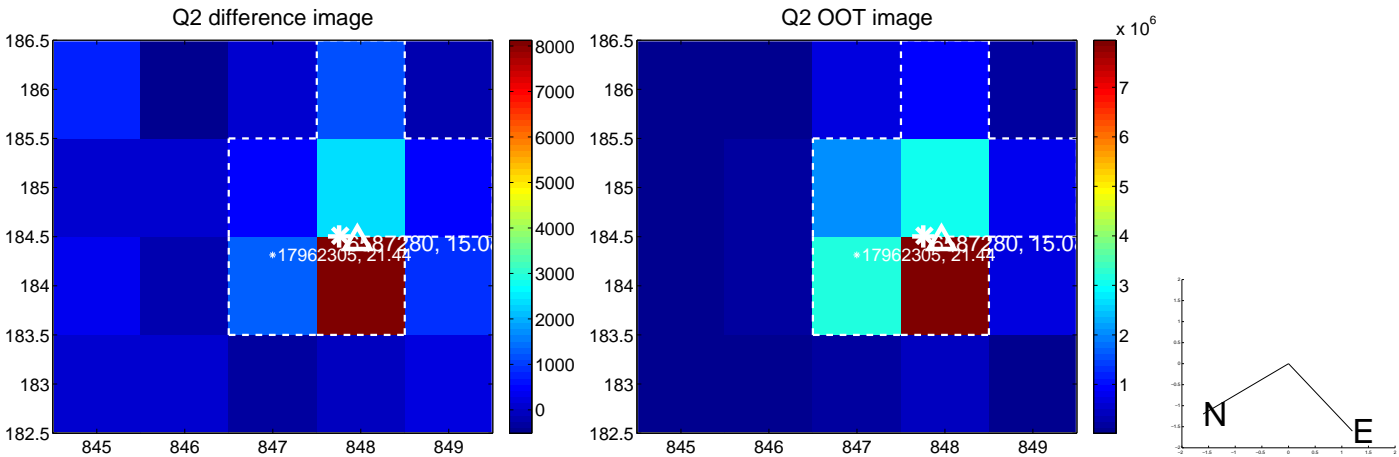
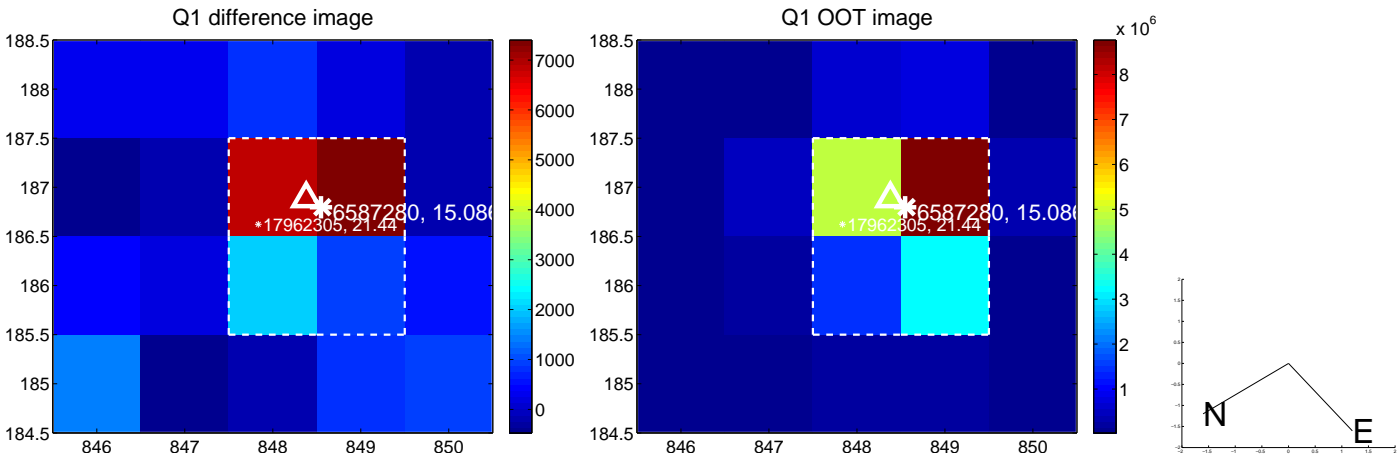
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.085 \pm 0.105$	0.80	$0.014 \pm 0.092$	$-0.083 \pm 0.106$
PRF-fit source offset from KIC position	$0.056 \pm 0.113$	0.49	$0.029 \pm 0.110$	$-0.048 \pm 0.104$
photometric centroid source offset	$0.32 \pm 0.21$	1.51	$0.01 \pm 0.21$	$0.32 \pm 0.21$



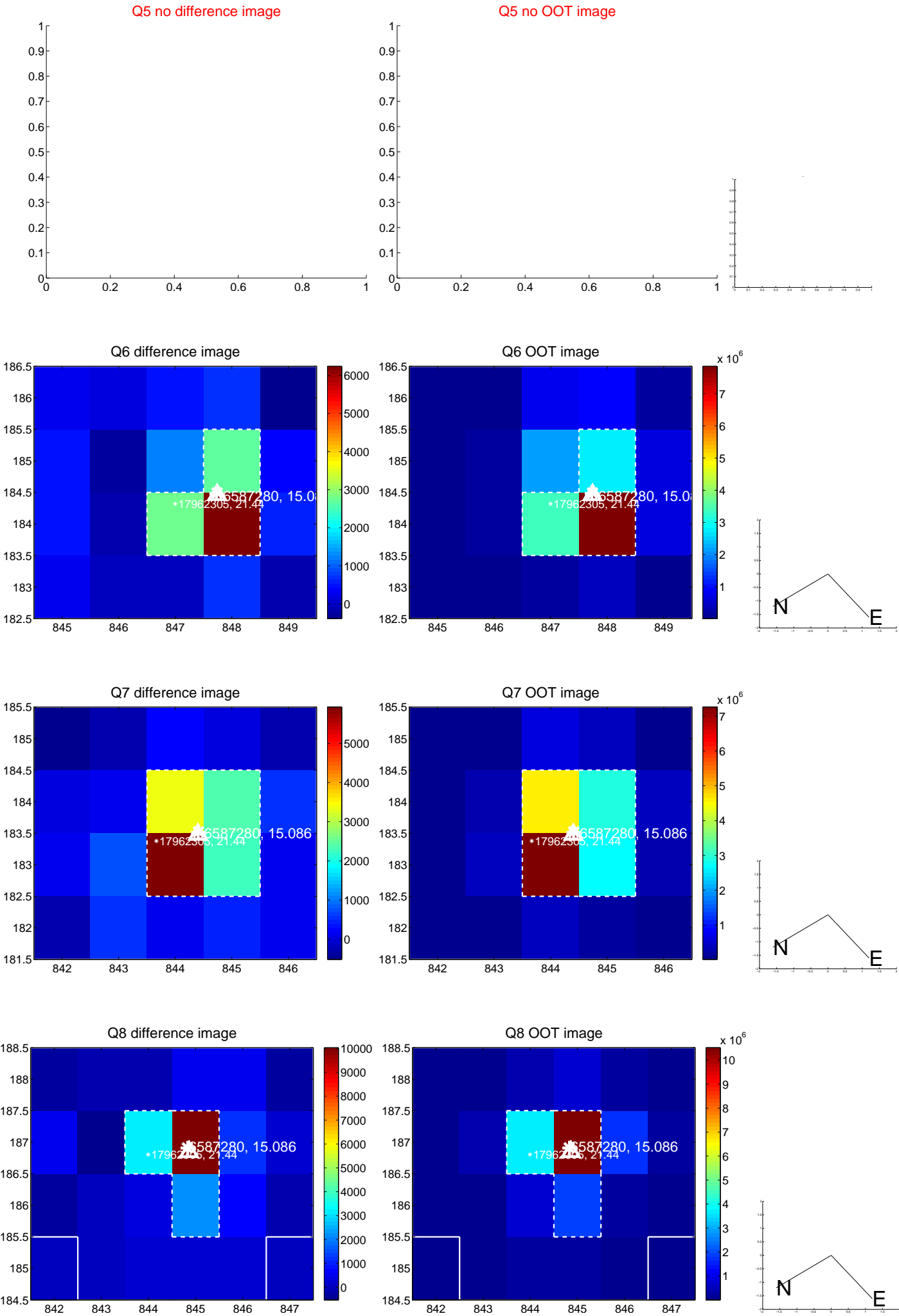
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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



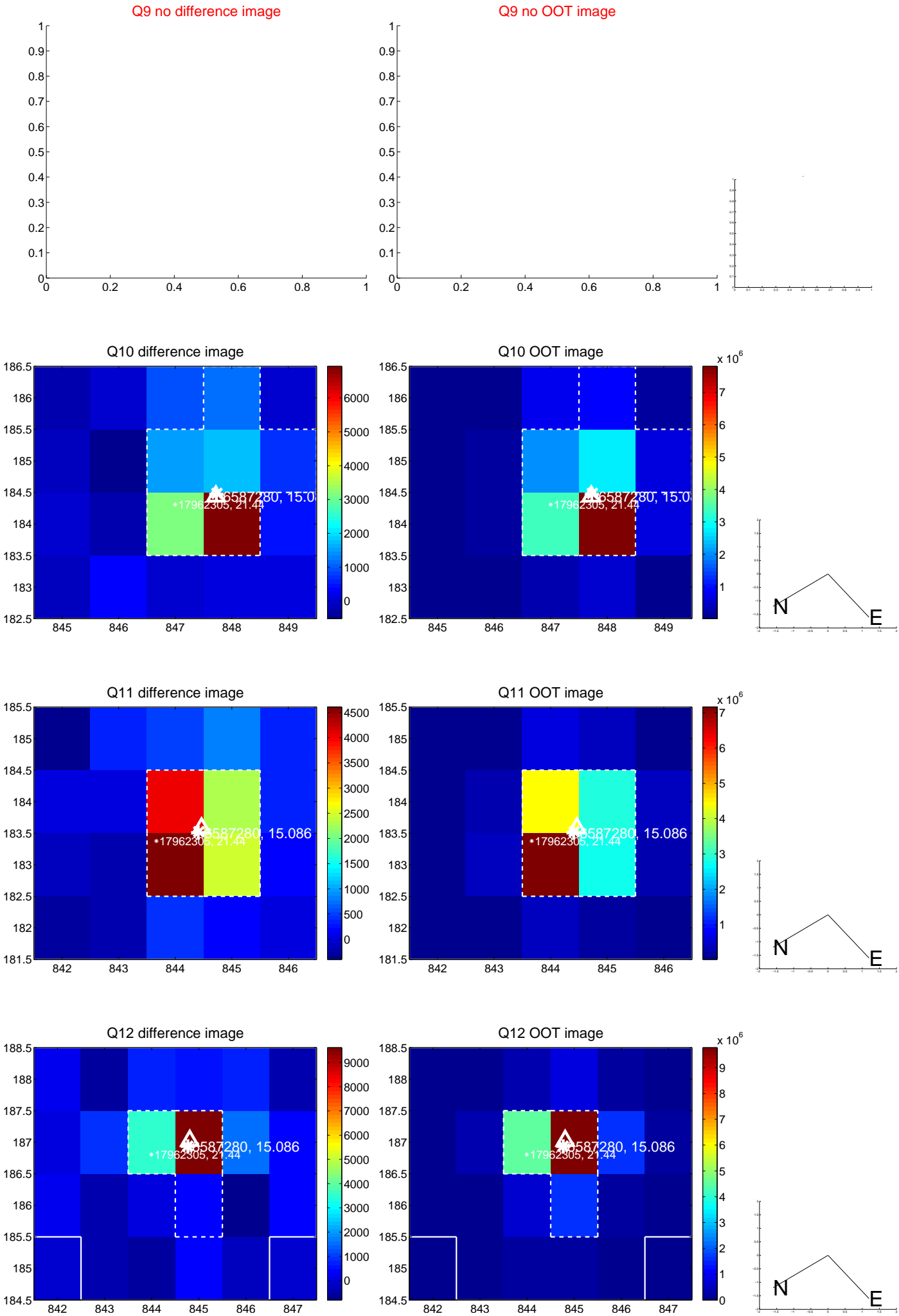
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



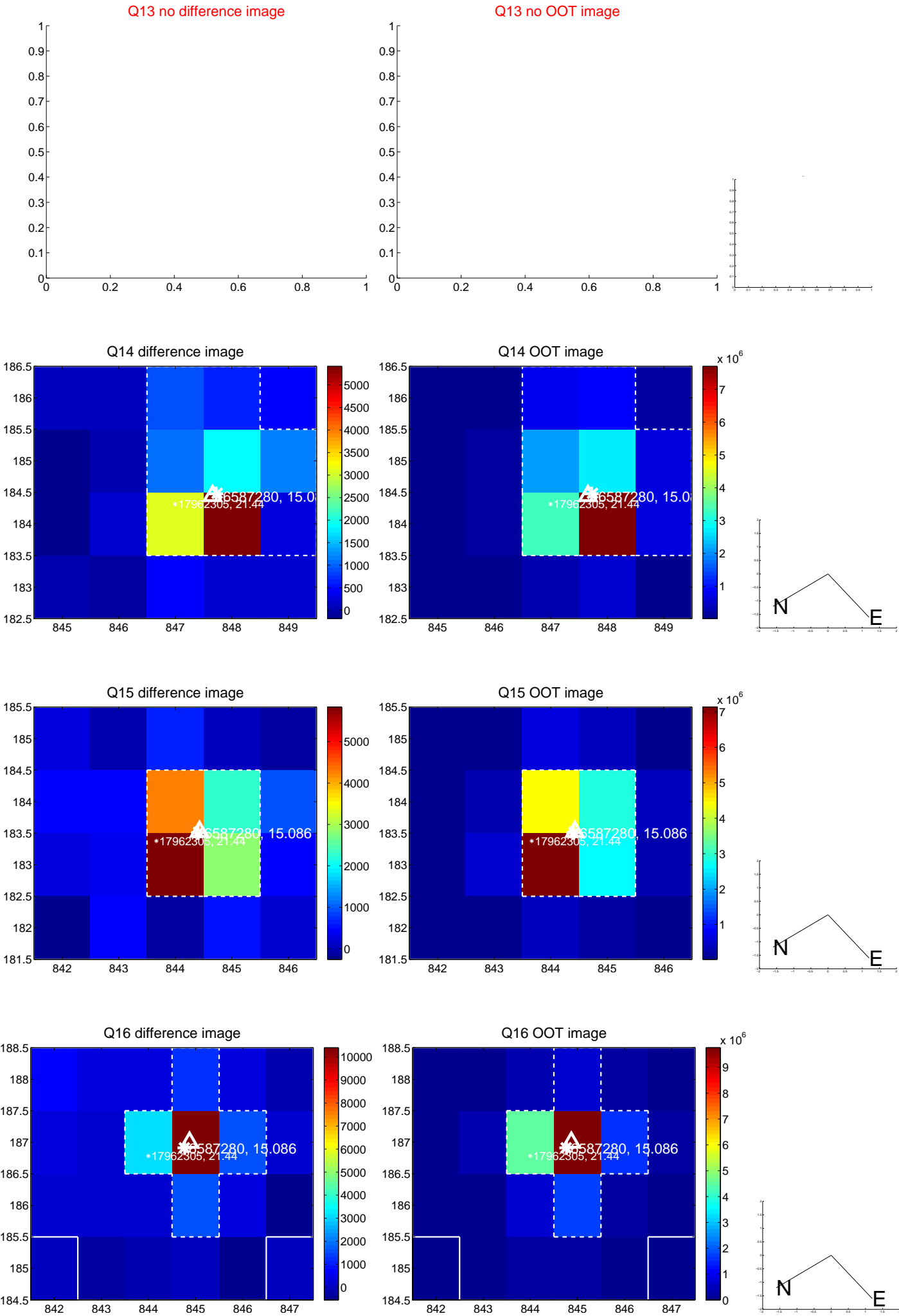
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



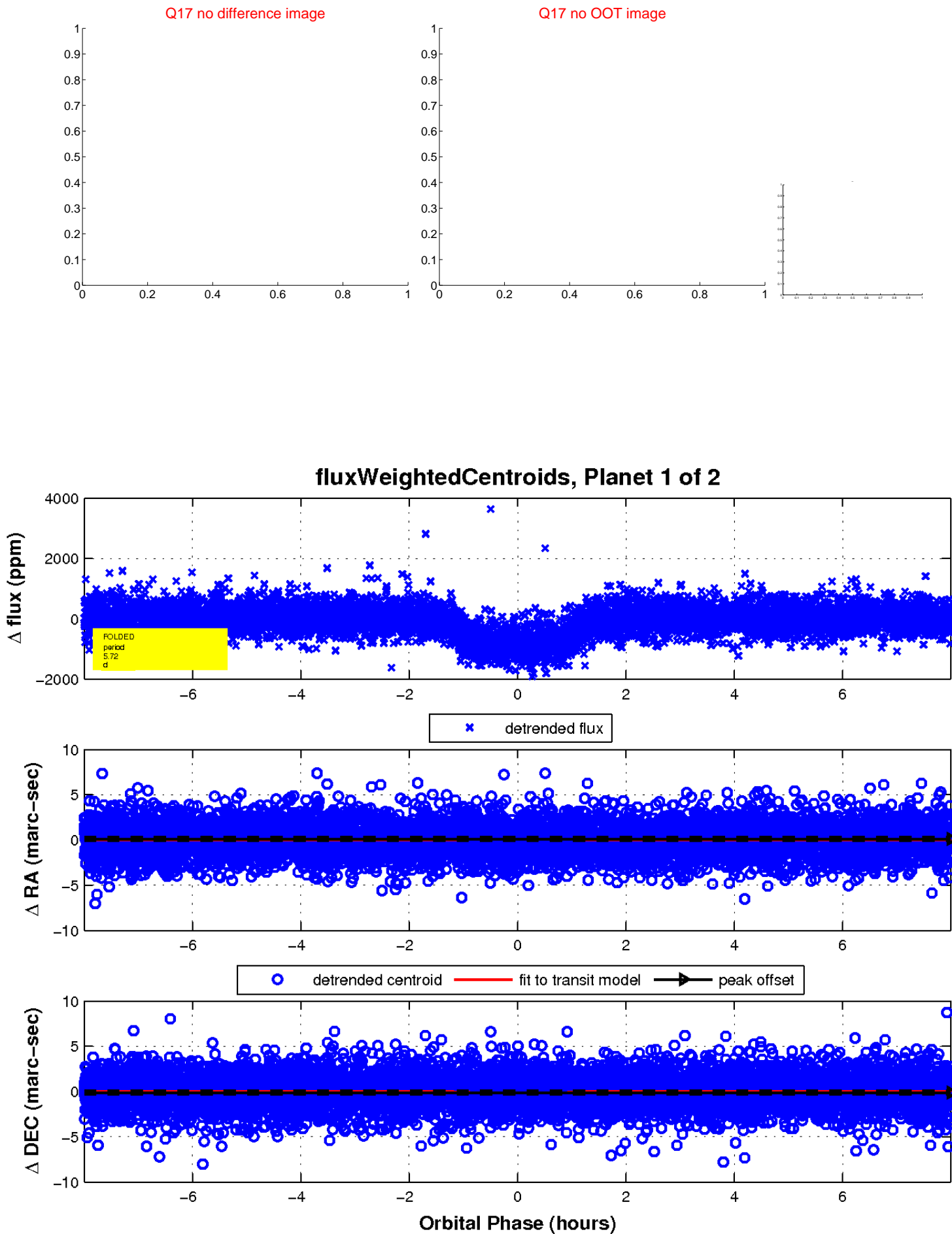
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

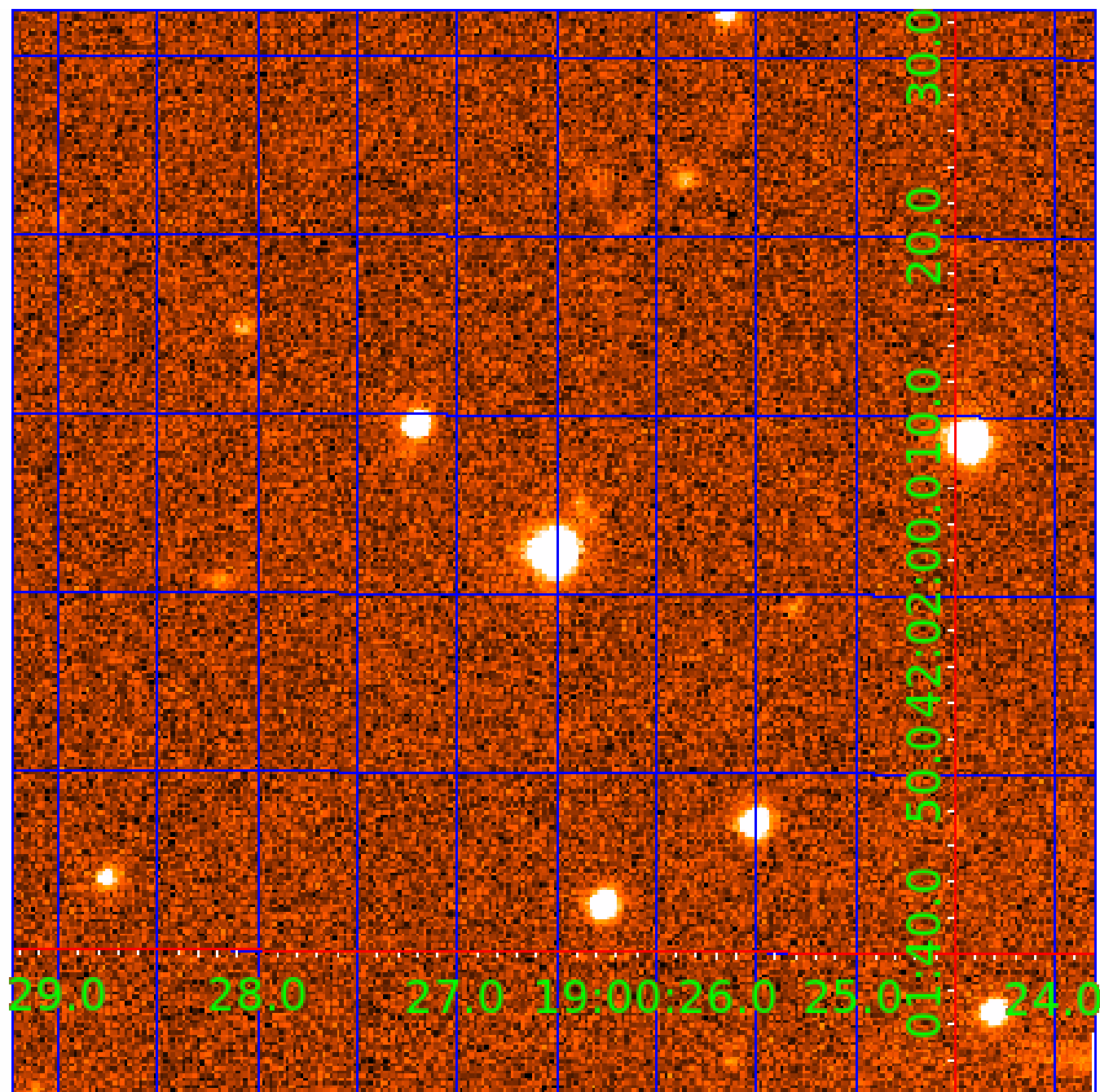


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination





# KIC 006587280

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
006587280-01	OBS	0857.01	5.715426	134.871521	910.9	2.666	48.6	54.2	0.83	5237	2.90	123.35
006587280-02	OBS	0857.02	20.026187	146.910237	435.9	1.415	9.3	11.4	0.83	5237	2.03	23.18

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
006587280-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
006587280-02	OBS	PC	0.99	0	0	0	0	NO_COMMENT

**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.

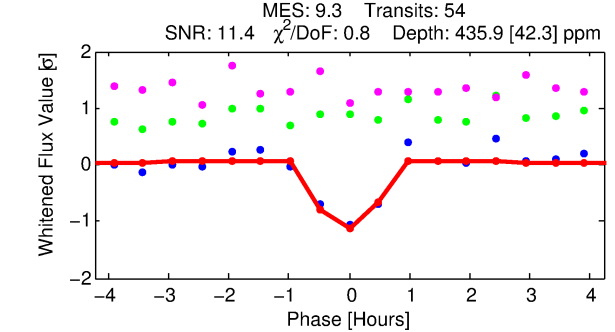
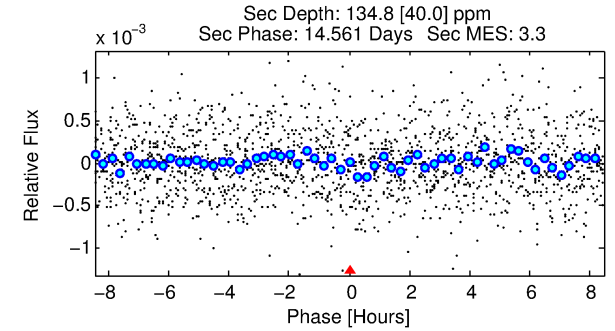
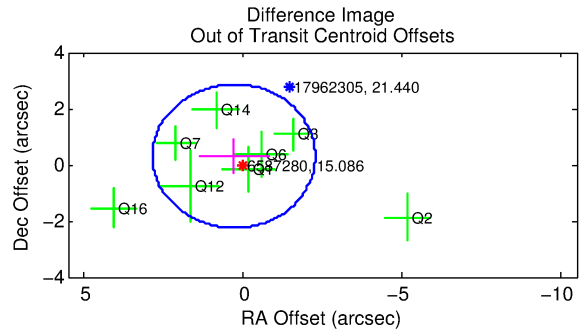
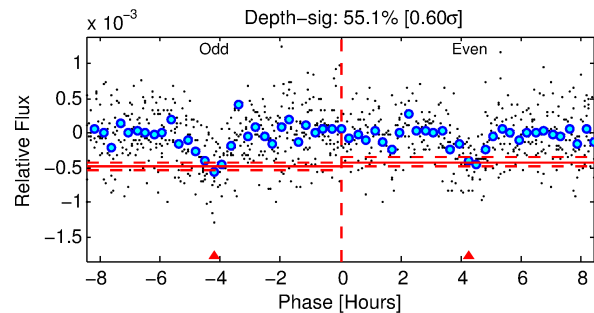
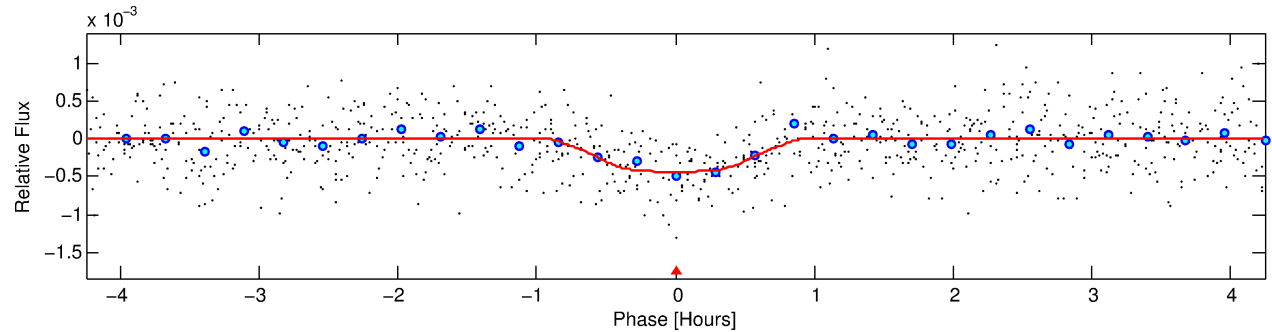
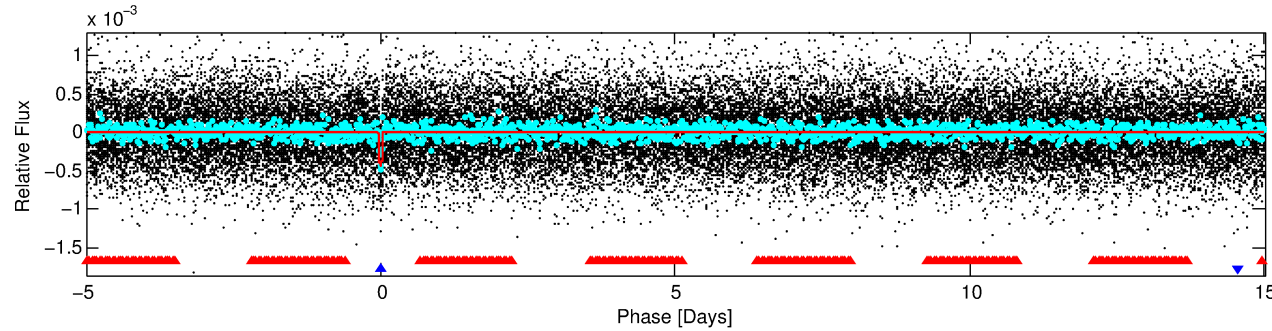
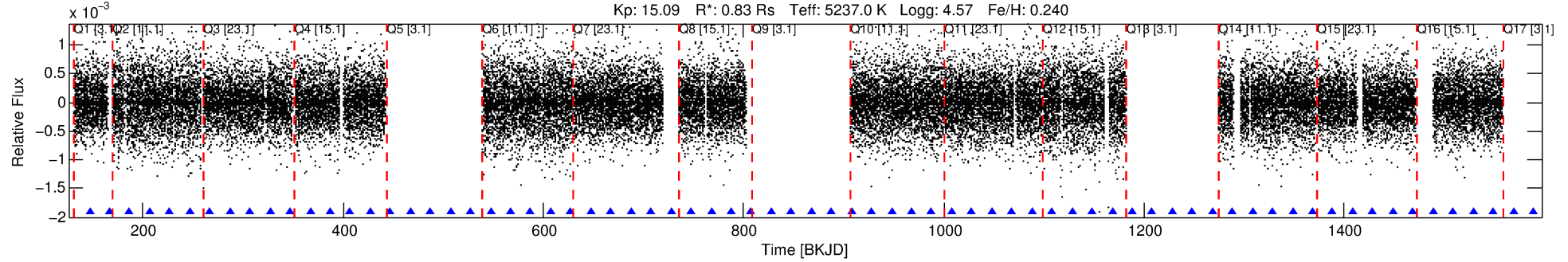
## Ephemeris Match Information For 006587280-02

No Significant Match Found

# DV One-Page Summary

KIC: 6587280 Candidate: 2 of 2 Period: 20.026 d  
KOI: K00857.02 Name: Kepler-243c Corr: 0.910

Kp: 15.09 R\*: 0.83 Rs Teff: 5237.0 K Logg: 4.57 Fe/H: 0.240



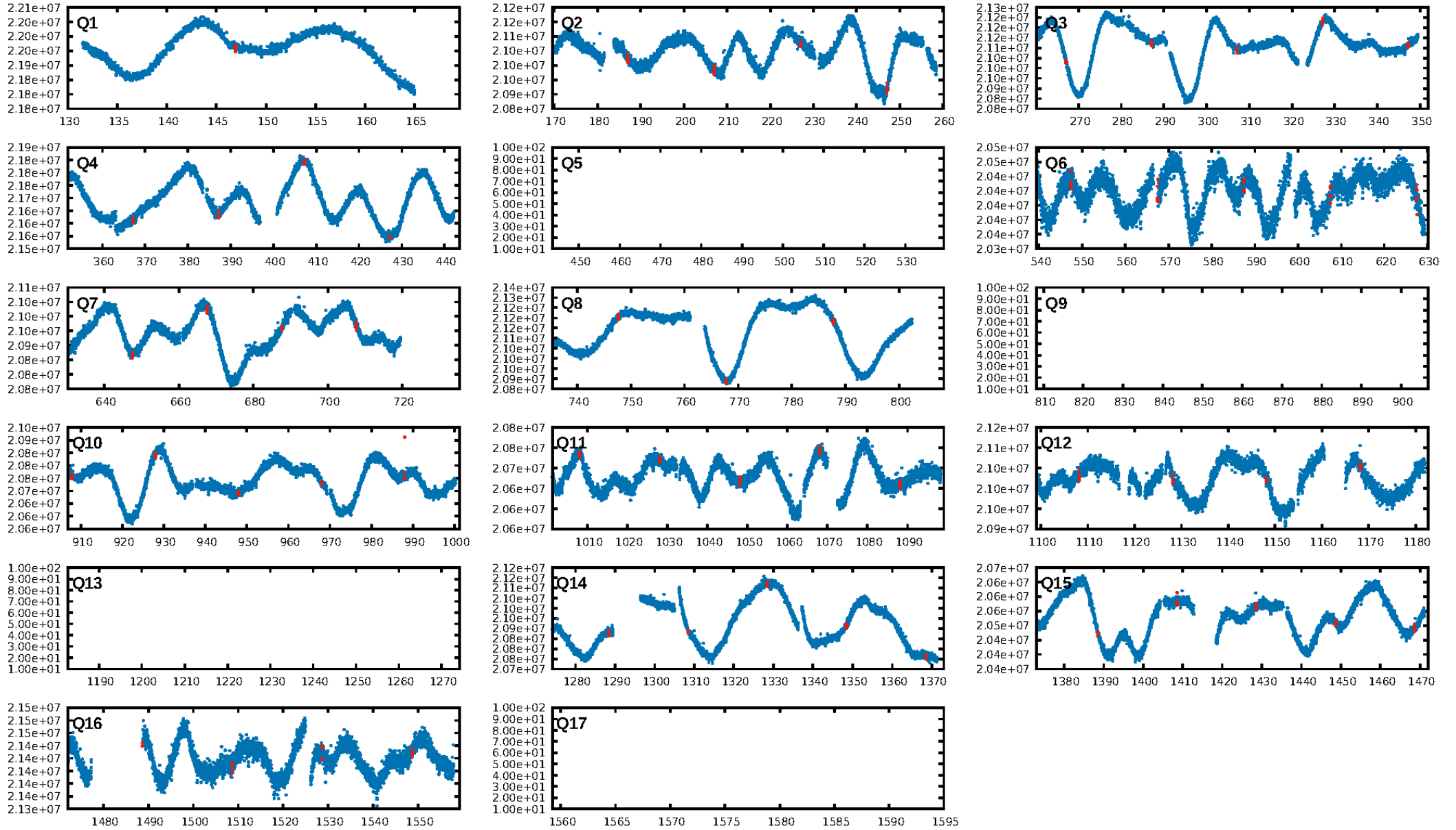
## DV Fit Results:

Period = 20.02619 [0.00008] d  
Epoch = 146.9102 [0.0031] BKJD  
Rp/R\* = 0.0226 [0.0301]  
a/R\* = 58.64 [304.57]  
b = 0.87 [1.54]  
Seff = 23.18 [5.38]  
Teff = 559 [32] K  
Rp = 2.03 [2.73] Re  
a = 0.1408 [0.0186] AU  
Ag = 355.34 [956.03] [0.37σ]  
Teffp = 3756 [2522] K [1.27σ]

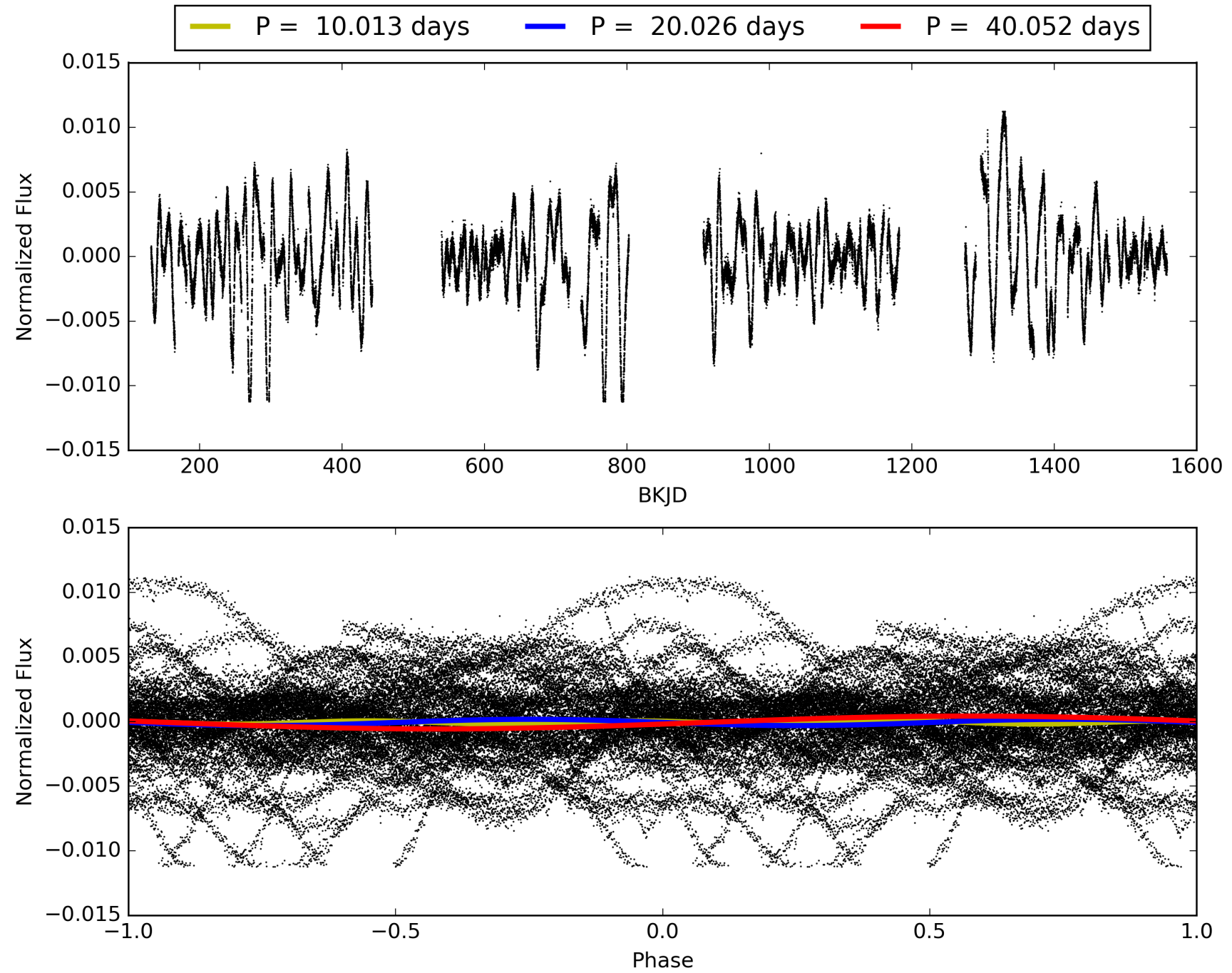
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [113.82σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 96.2%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 1.95e-20  
RollingBand-fgt: 1.00 [53/53]  
GhostDiagnostic-chr: 13.56  
Centroid-sig: 17.5%  
Centroid-so: 0.972 arcsec [0.85σ]  
OotOffset-rm: 0.414 arcsec [0.49σ]  
KicOffset-rm: 0.447 arcsec [0.54σ]  
OotOffset-st: 3/2/2/1 [8]  
KicOffset-st: 3/2/2/1 [8]  
DiffImageQuality-fgm: 0.50 [4/8]  
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# TCE 006587280-02, PDC Light Curves

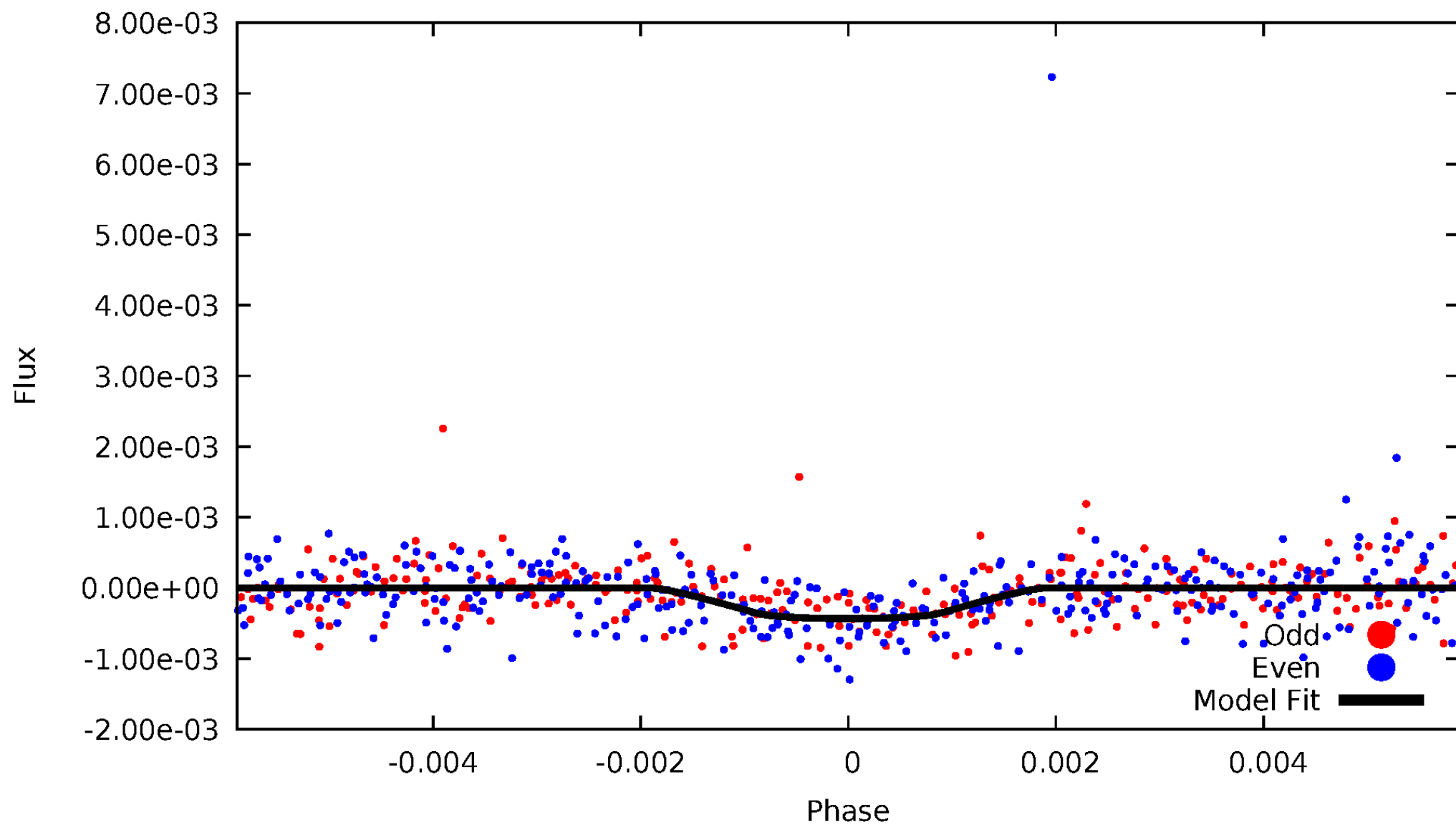


TCE 006587280-02



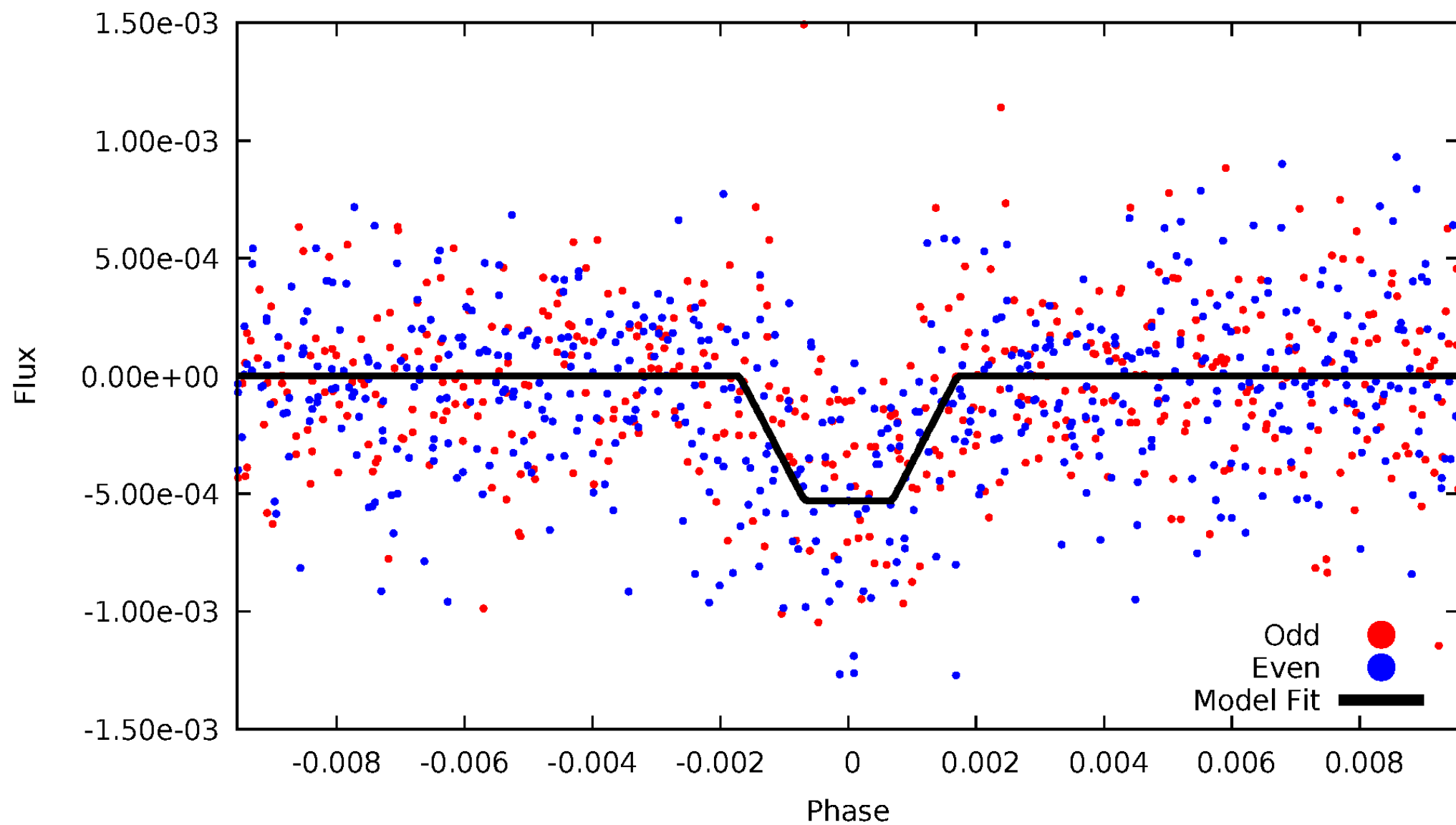
# DV Odd/Even

TCE 006587280-02



# ALT Odd/Even

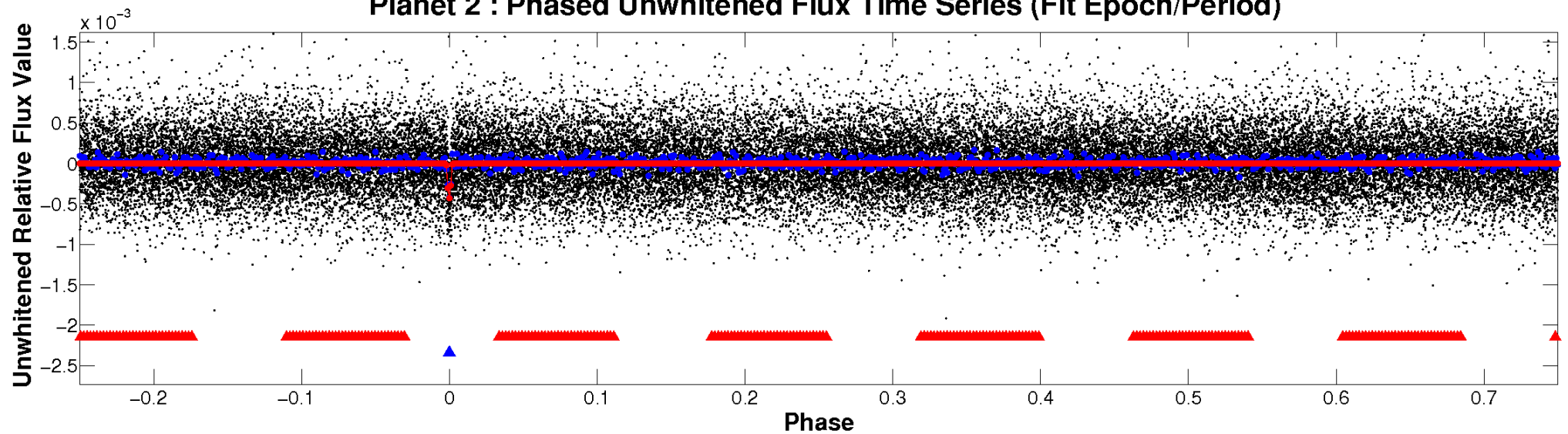
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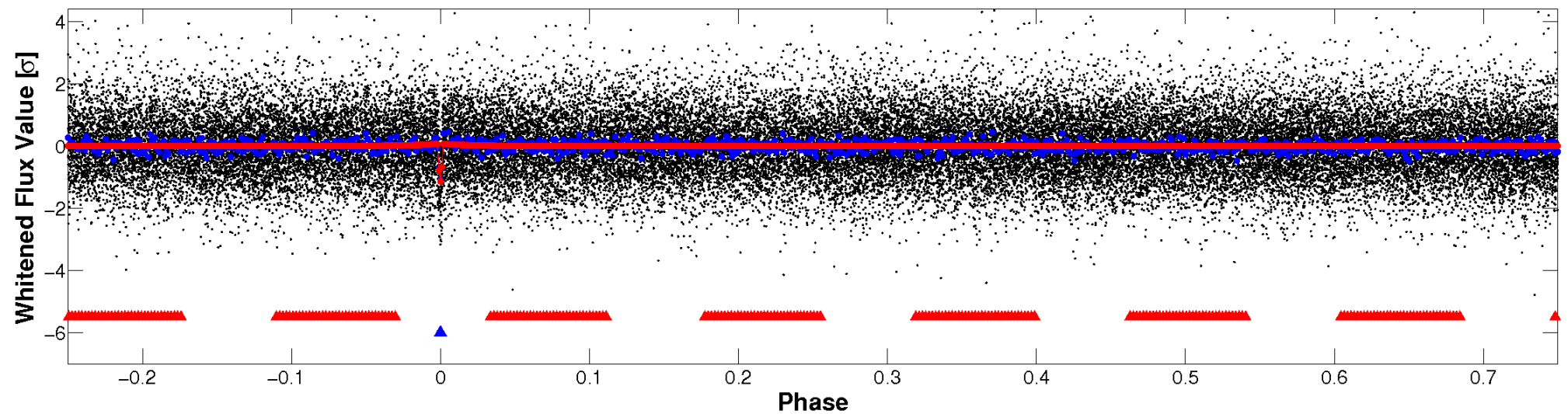


# Non-Whitened Vs. Whitened Light Curve

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

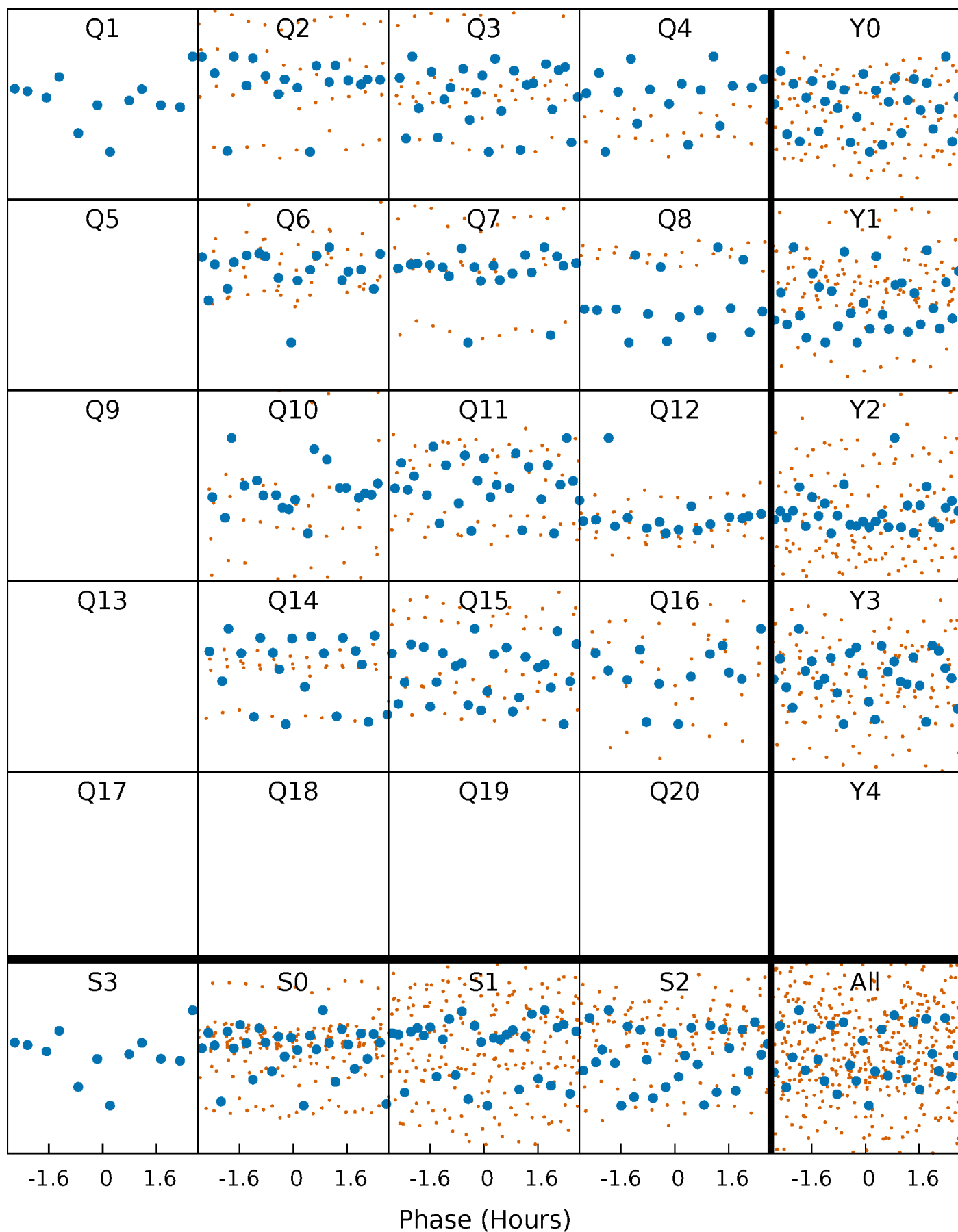


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



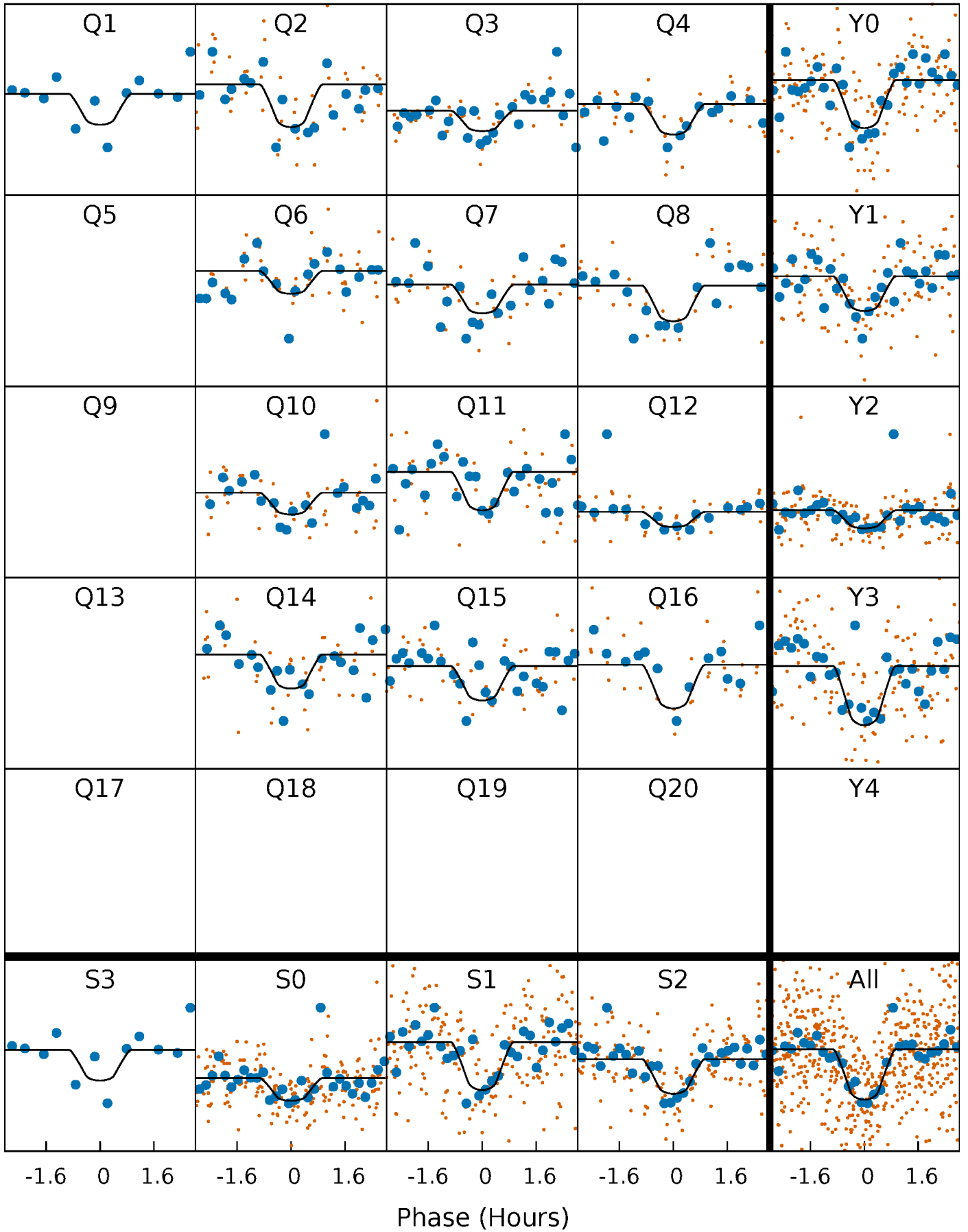
# PDC Quarter-Phased Transit Curves

TCE 006587280-02   P= 20.026187 Days    $T_0=146.910237$  (BKJD)



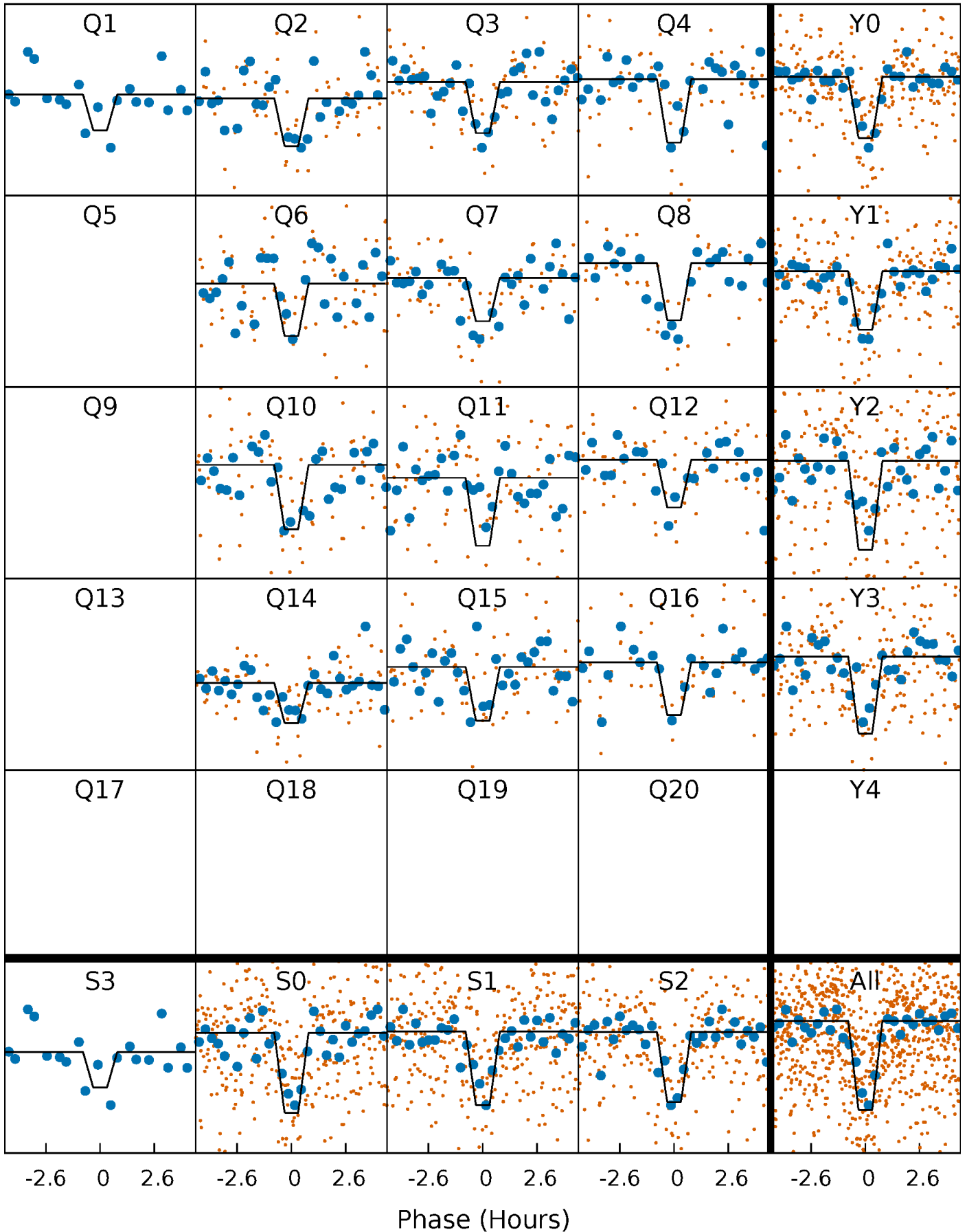
# DV Quarter-Phased Transit Curves

TCE 006587280-02   P= 20.026187 Days    $T_0=146.910237$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

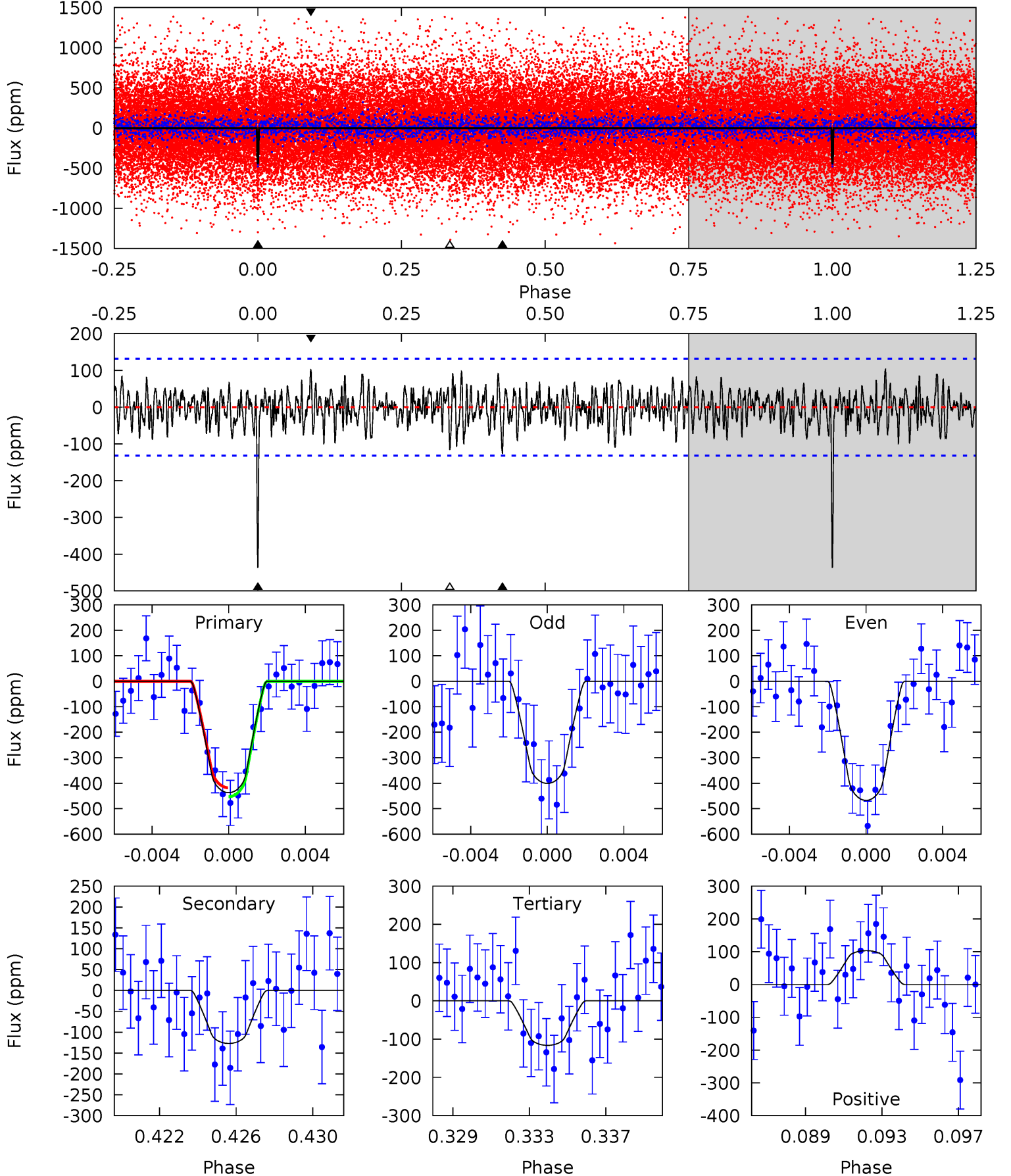
TCE 006587280-02     $P = 20.026337$  Days     $T_0 = 146.905170$  (BKJD)



# DV Model-Shift Uniqueness Test

006587280-02, P = 20.026187 Days, E = 126.884050 Days

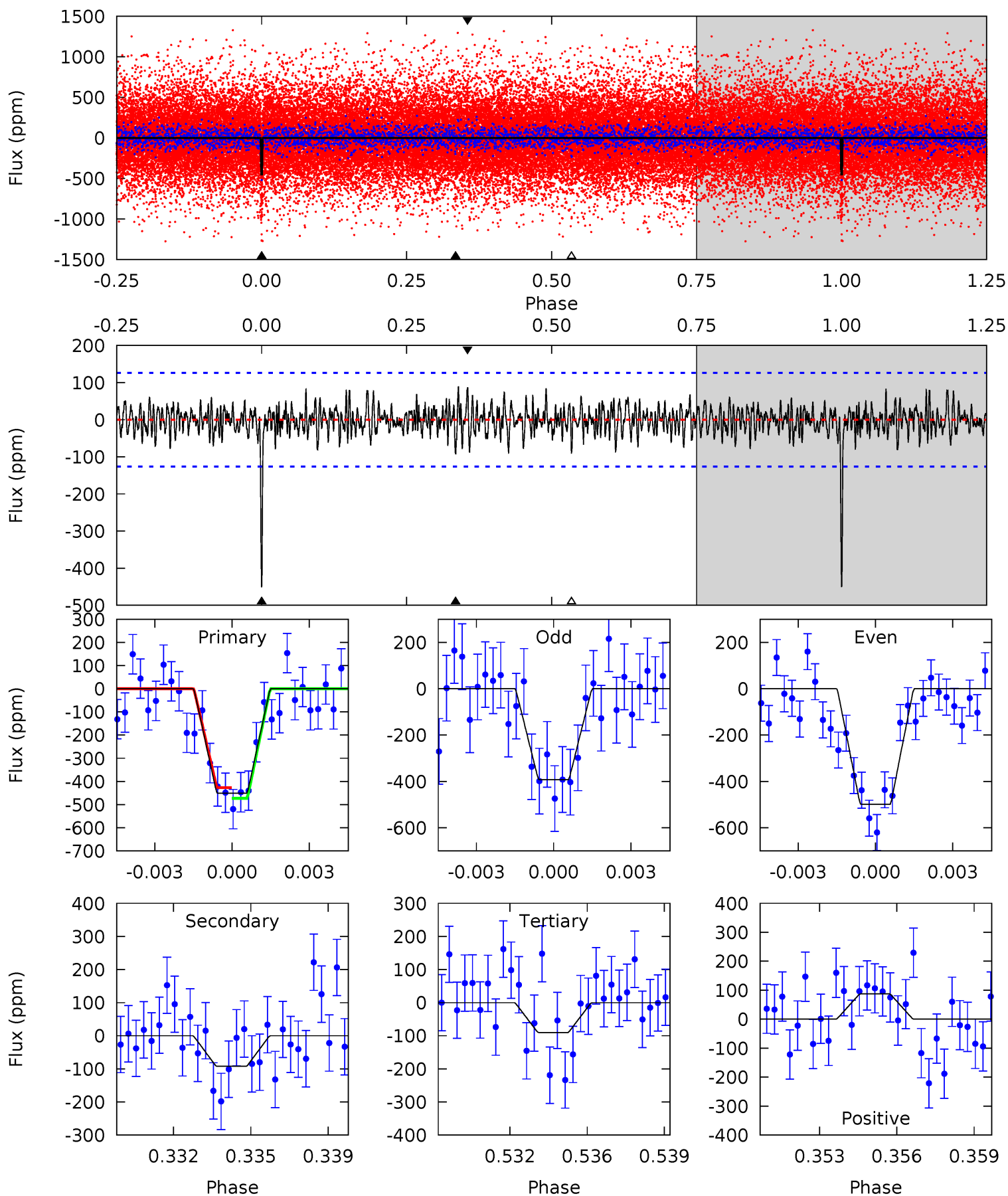
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
17.2	5.01	4.58	4.07	5.21	2.89	1.45	12.6	13.2	0.42	0.94	1.31	0.99	0.19	0.69



# Alt Model-Shift Uniqueness Test

006587280-02,  $P = 20.026337$  Days,  $E = 126.878833$  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
18.7	3.82	3.74	3.60	5.23	2.92	1.22	14.9	15.1	0.09	0.22	2.20	0.98	0.16	0.96



### Stellar Parameters For KIC 006587280

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5237^{+157}_{-157}$	$4.572^{+0.028}_{-0.112}$	$0.240^{+0.200}_{-0.300}$	$0.826^{+0.124}_{-0.057}$	$0.927^{+0.047}_{-0.095}$	$2.315^{+0.325}_{-0.753}$
	+3%/-3%	+1%/-2%	+83%/-125%	+15%/-7%	+5%/-10%	+14%/-33%
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 006587280-02 / KOI 0857.02

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-127 \pm 25$	$2.86^{+2.31}_{-1.85}$	$794^{+33}_{-28}$	$3598^{+1718}_{-623}$	$171^{+1186}_{-121}$
Alt.	$-92 \pm 24$	$2.87^{+2.56}_{-1.87}$	$793^{+34}_{-30}$	$3380^{+1649}_{-581}$	$119^{+906}_{-86}$

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



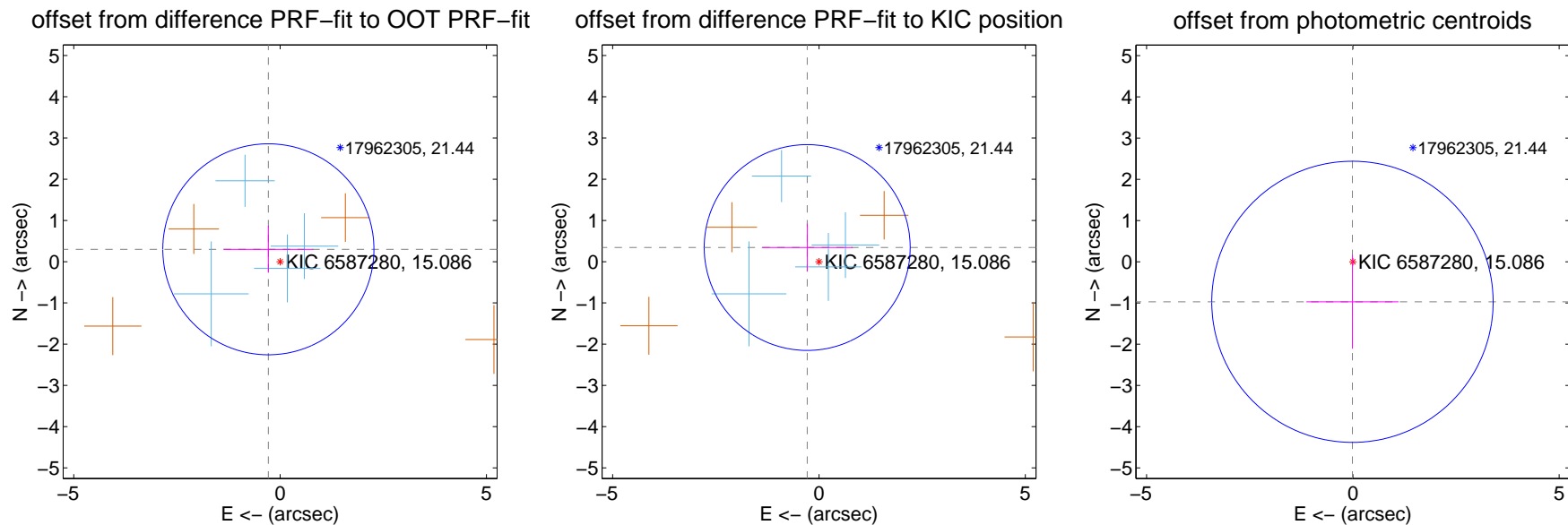
## DV Centroid Data

Supplemental centroid analysis for 006587280-02. Kepler magnitude: 15.09. Transit SNR 11.41

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

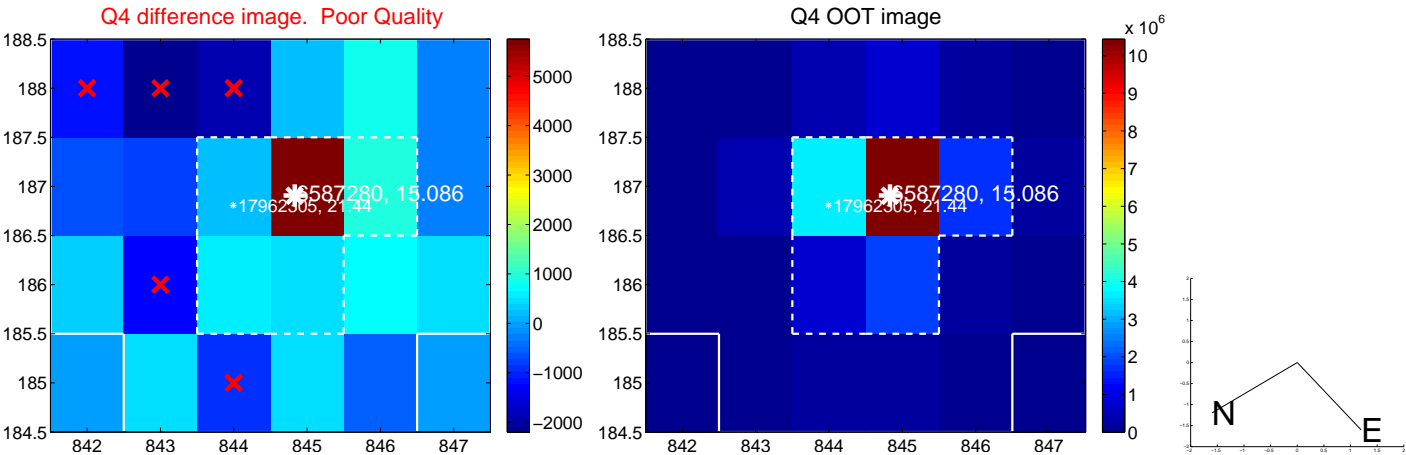
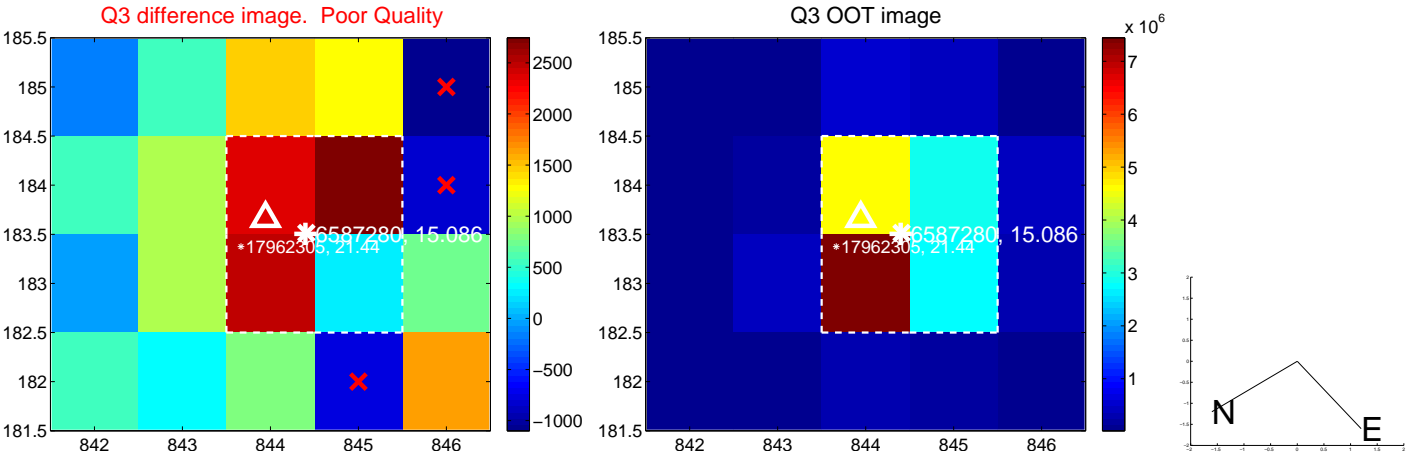
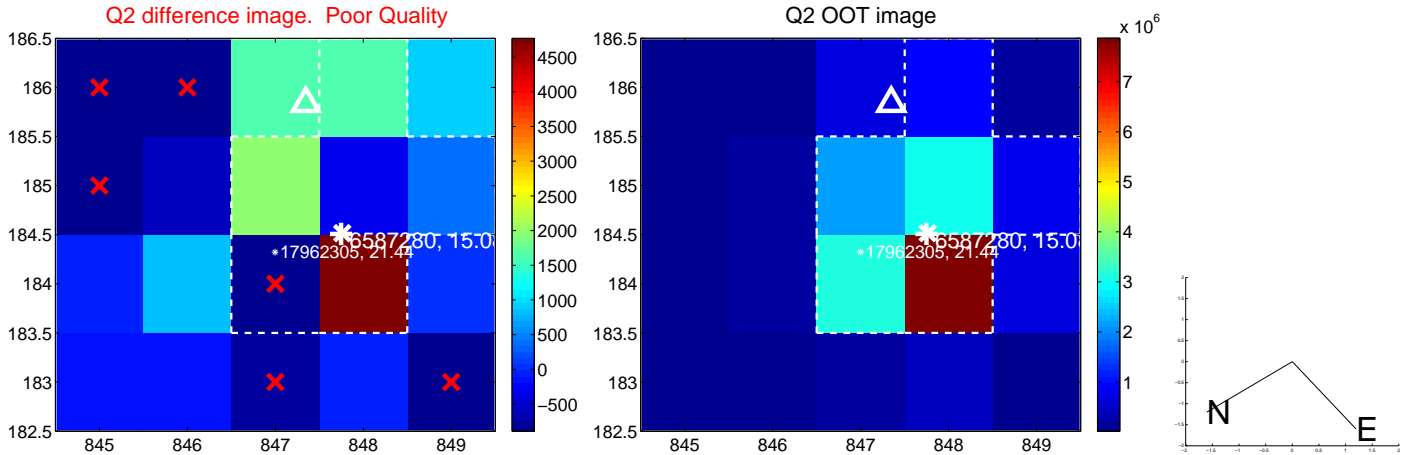
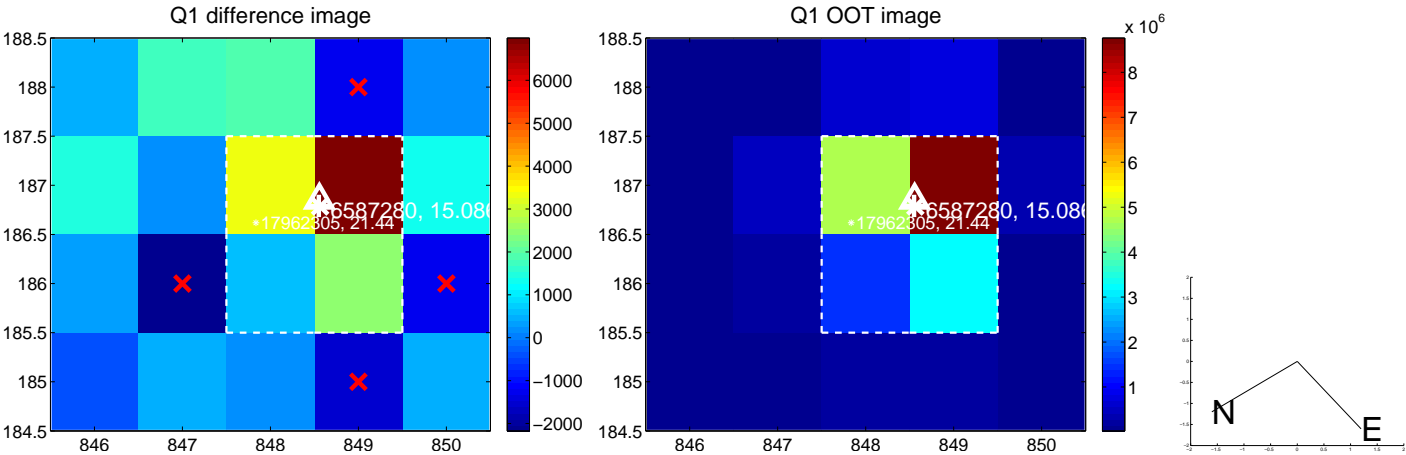
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.414 \pm 0.853$	0.49	$0.284 \pm 1.086$	$0.301 \pm 0.568$
PRF-fit source offset from KIC position	$0.447 \pm 0.832$	0.54	$0.285 \pm 1.100$	$0.344 \pm 0.579$
photometric centroid source offset	$0.97 \pm 1.14$	0.85	$0.01 \pm 1.12$	$-0.97 \pm 1.14$



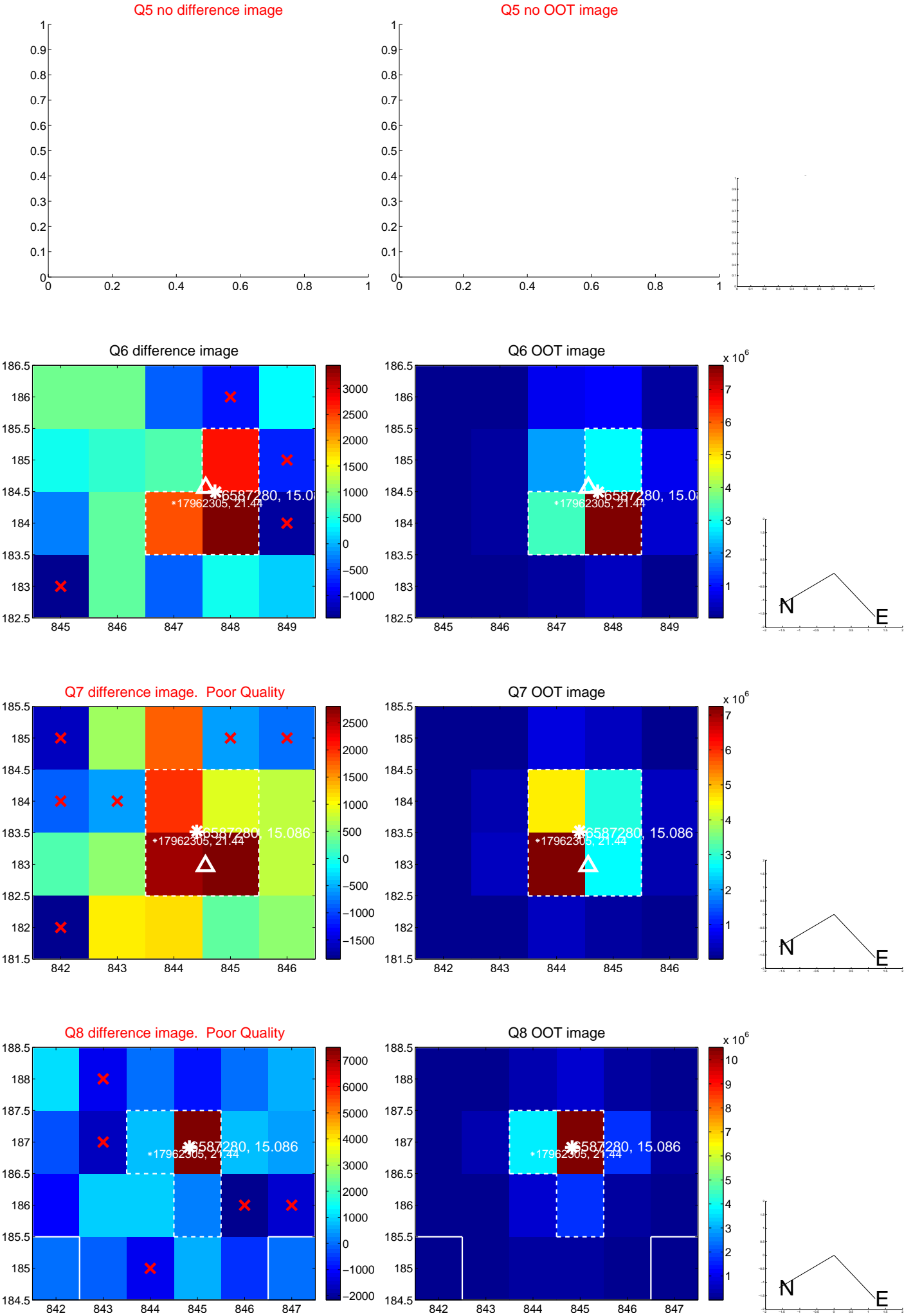
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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



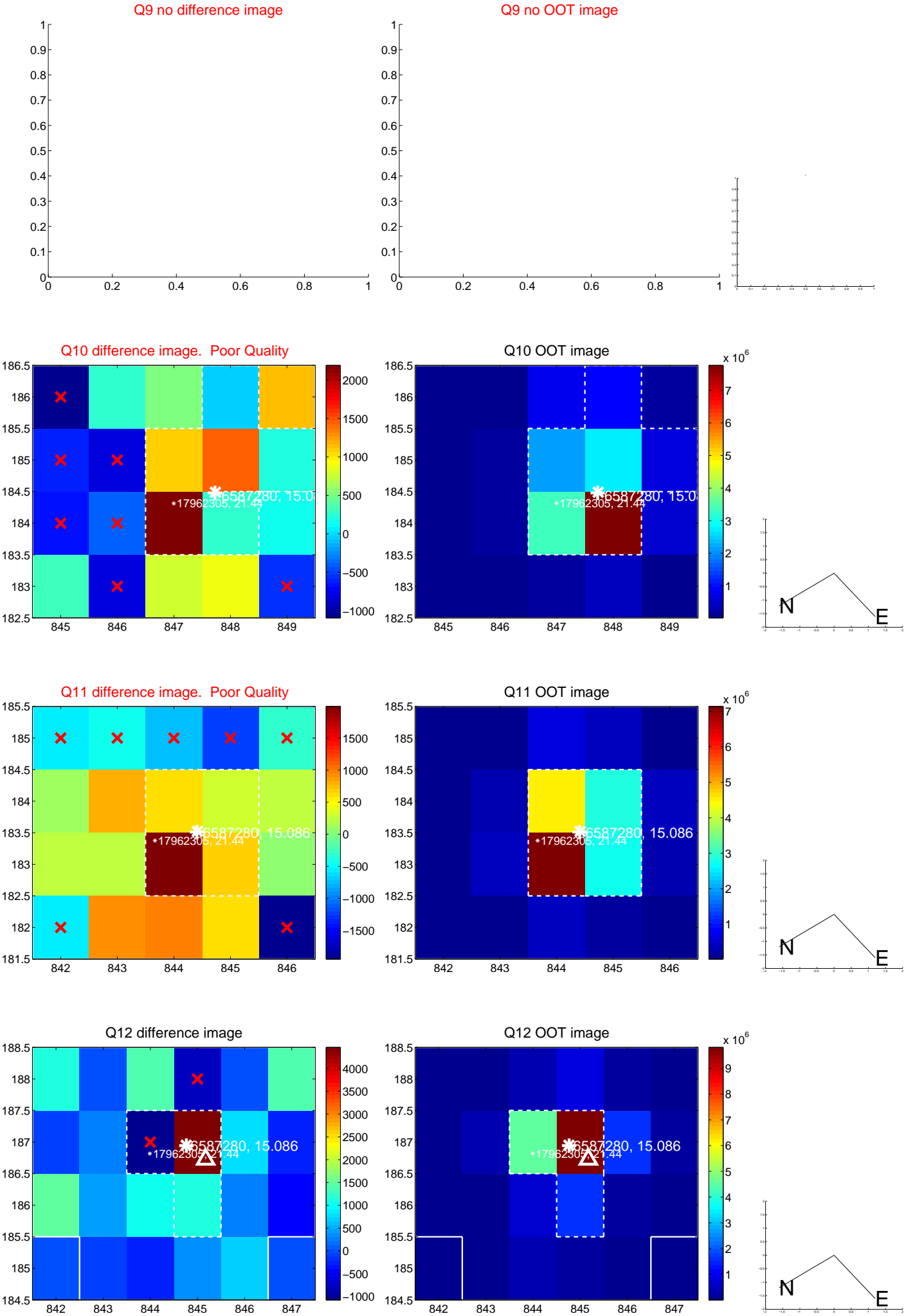
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



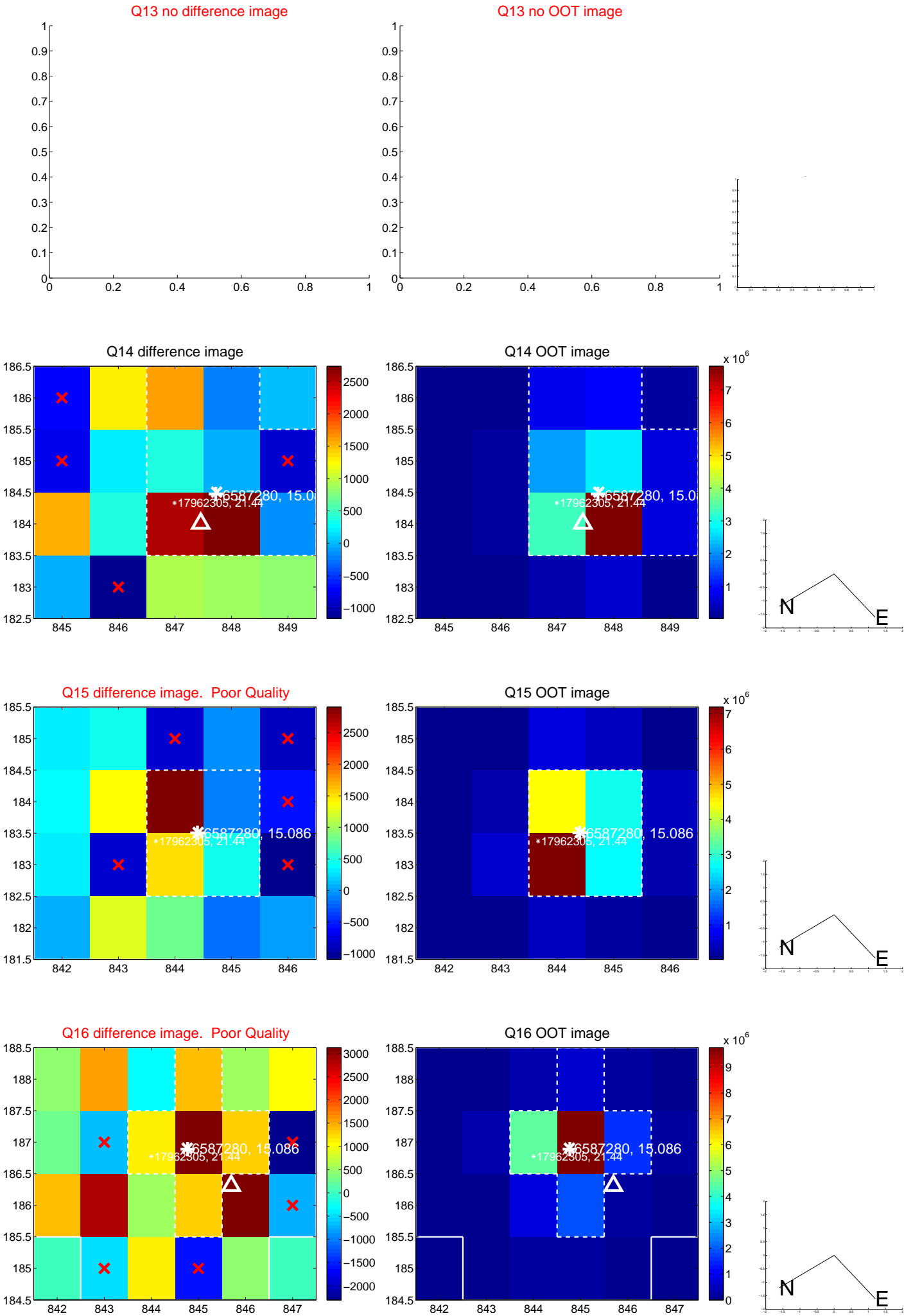
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



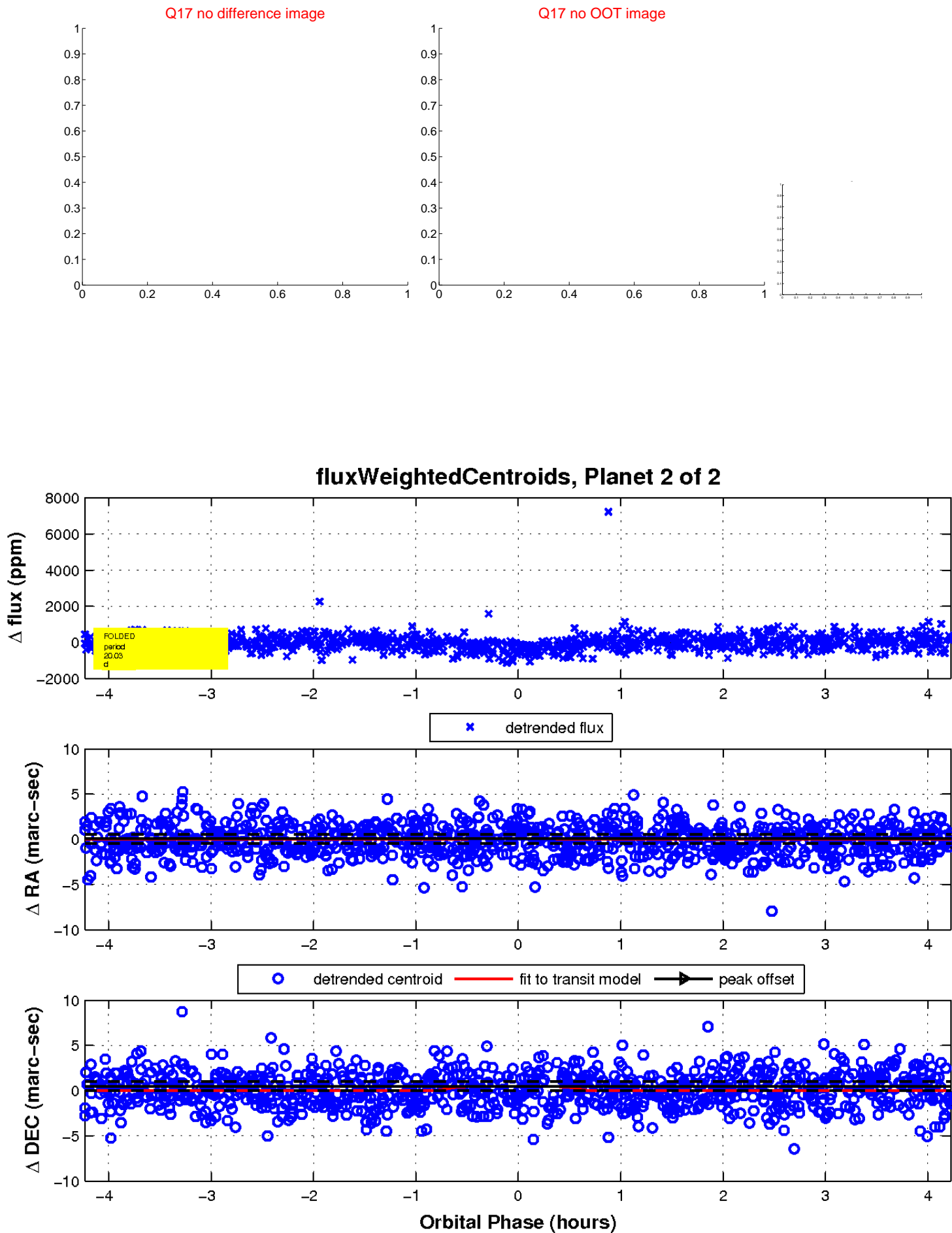
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

