

# KIC 005856571

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005856571-01	OBS	1839.01	9.590733	132.679716	543.7	3.773	40.5	42.0	1.67	5476	4.70	330.07
005856571-02	OBS	1839.02	80.411060	171.290329	541.6	3.145	12.9	14.2	1.67	5476	4.41	19.38

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005856571-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
005856571-02	OBS	PC	0.98	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.

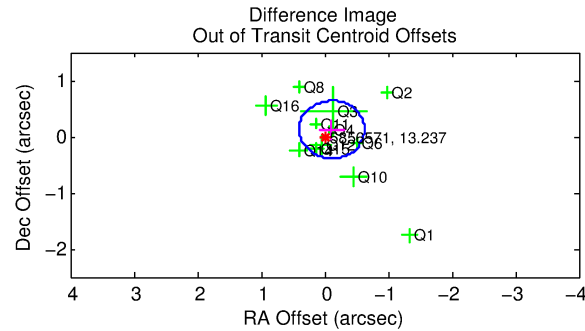
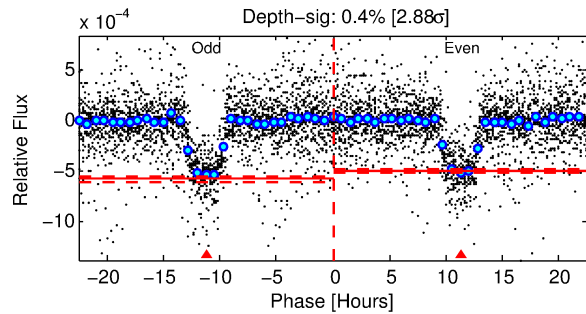
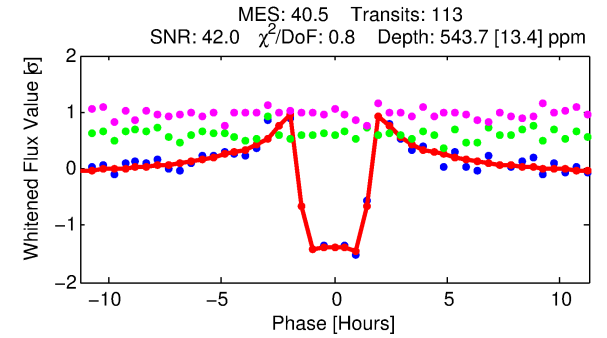
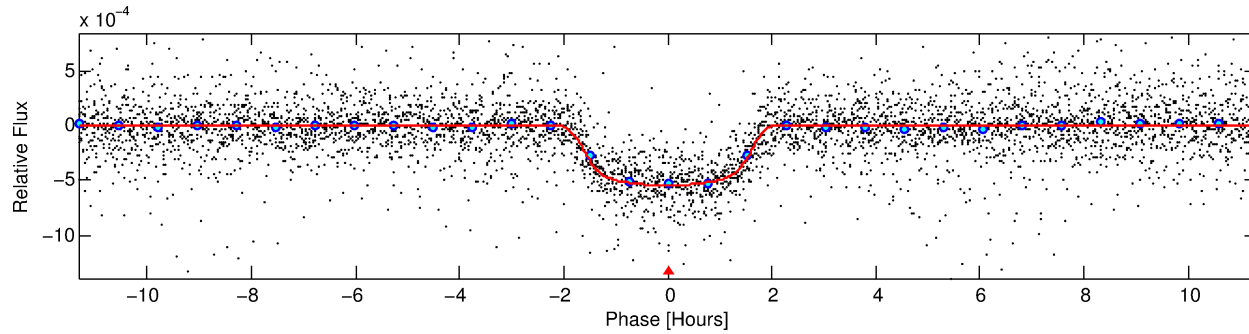
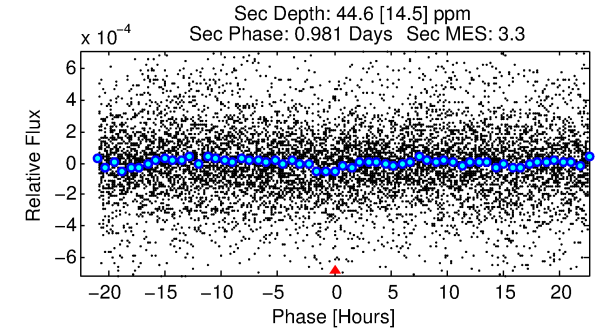
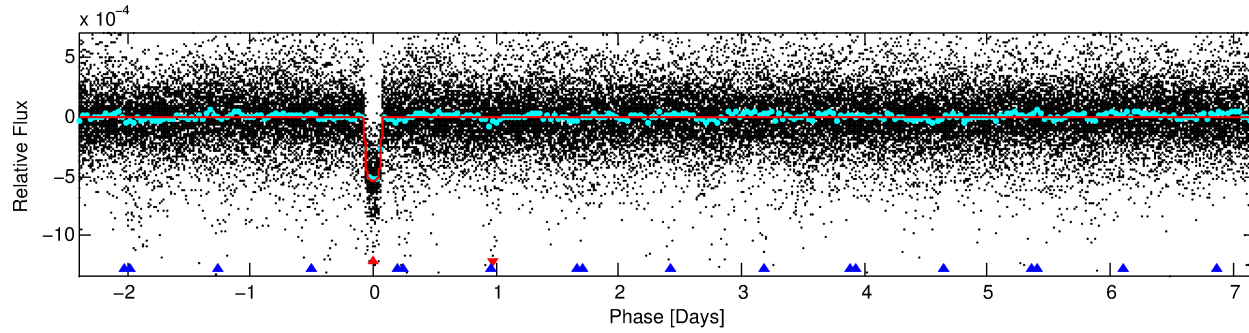
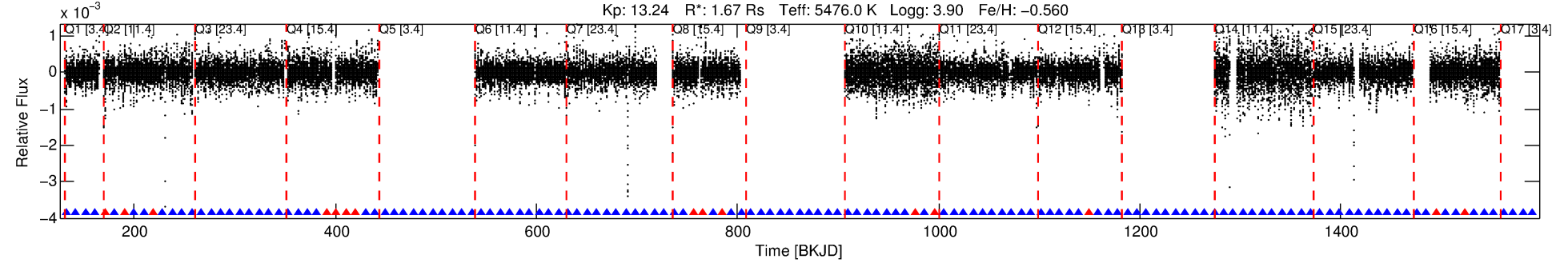
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 005856571-01

No Significant Match Found

# DV One-Page Summary

KIC: 5856571 Candidate: 1 of 2 Period: 9.591 d  
KOI: K01839.01 Corr: 0.961



## DV Fit Results:

Period = 9.59073 [0.00001] d  
Epoch = 132.6797 [0.0011] BKJD  
Rp/R\* = 0.0257 [0.0008]  
a/R\* = 9.17 [1.02]  
b = 0.91 [0.02]  
Seff = 330.07 [376.12]  
Teq = 1087 [310] K  
Rp = 4.70 [2.73] Re  
a = 0.0827 [0.0544] AU  
Ag = 7.59 [8.95] [0.74σ]  
Teffp = 2790 [247] K [4.30σ]

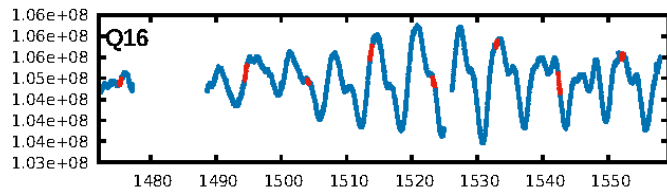
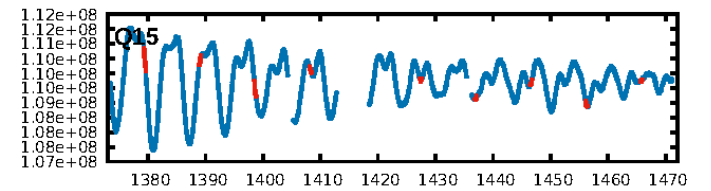
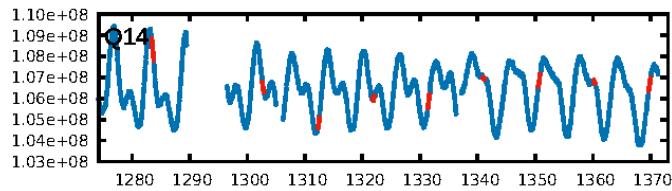
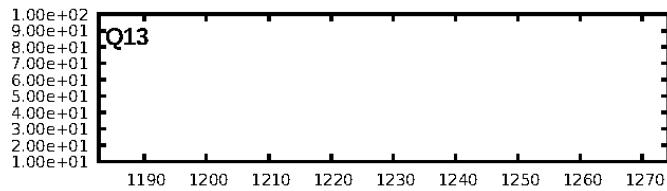
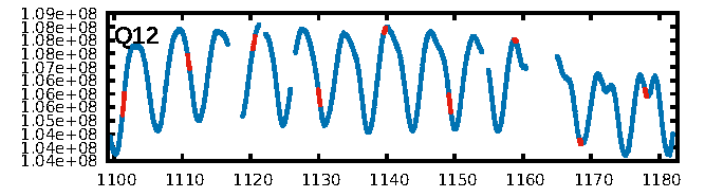
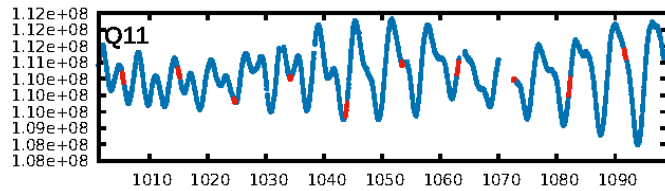
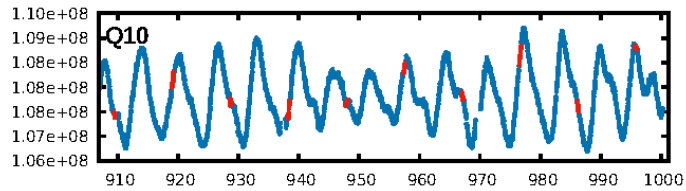
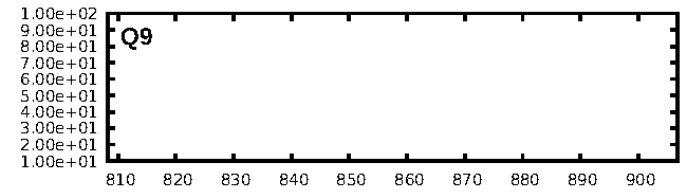
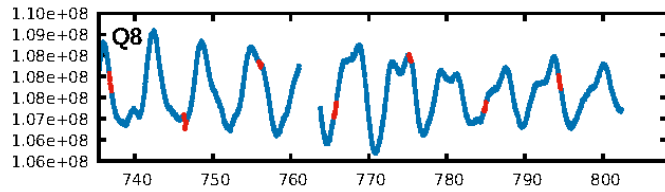
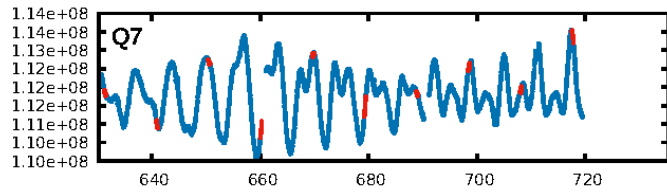
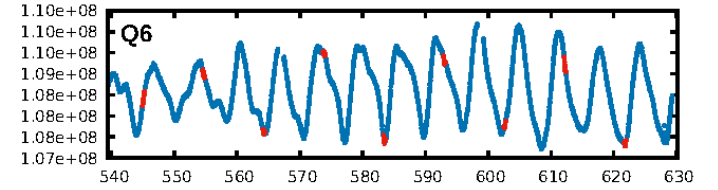
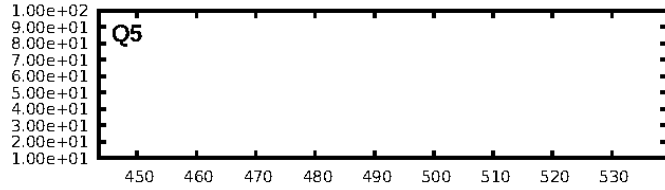
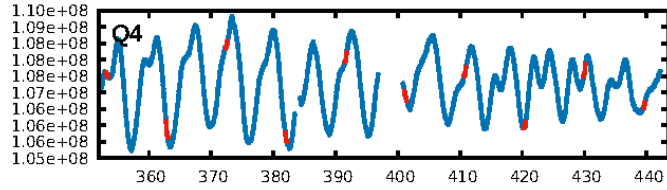
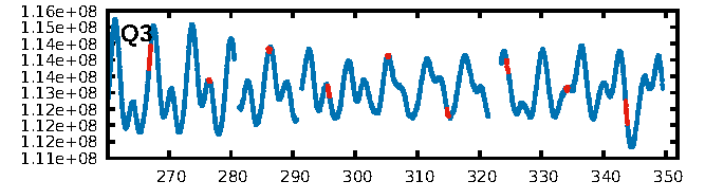
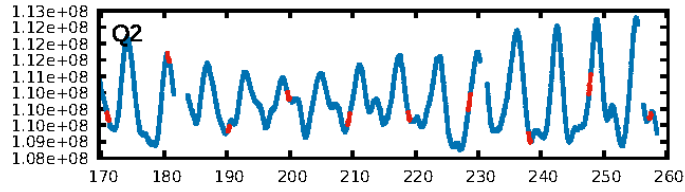
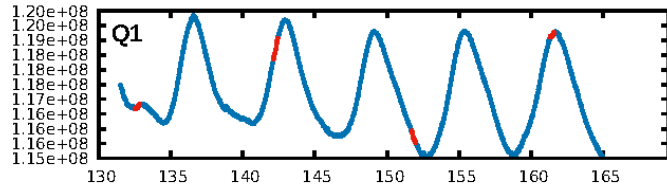
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [346.03σ]  
ModelChiSquare2-sig: 100.0%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 1.39e-297  
RollingBand-fgt: 0.86 [94/109]  
GhostDiagnostic-chr: 1.876  
Centroid-sig: N/A  
Centroid-so: 0.234 arcsec [1.55σ]  
OotOffset-rm: 0.167 arcsec [0.97σ]  
KicOffset-rm: 0.086 arcsec [0.47σ]  
OotOffset-st: 4/3/4/1 [12]  
KicOffset-st: 4/3/4/1 [12]  
DiffImageQuality-fgm: 1.00 [12/12]  
DiffImageOverlap-fno: 1.00 [13/13]

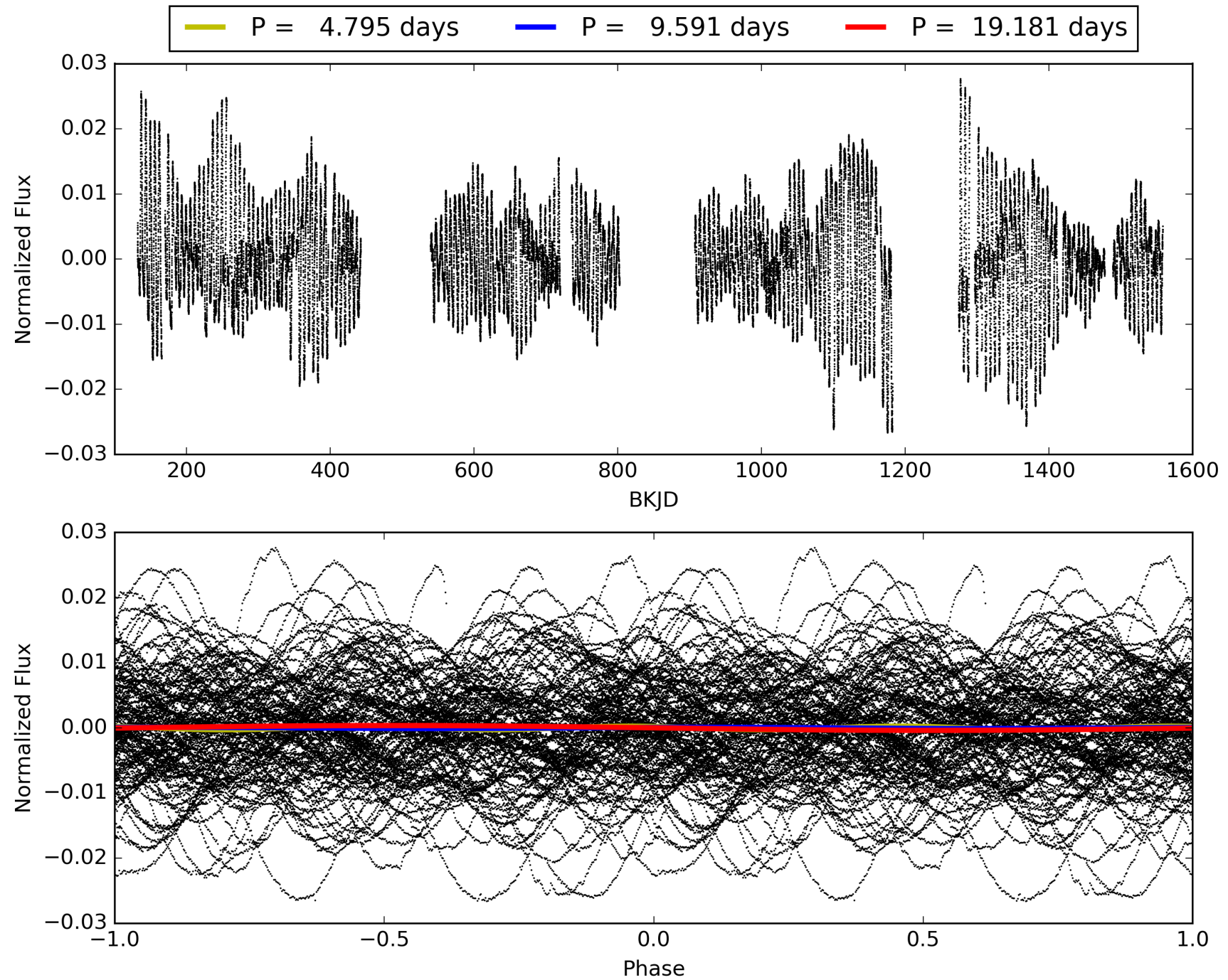
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This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 005856571-01, PDC Light Curves

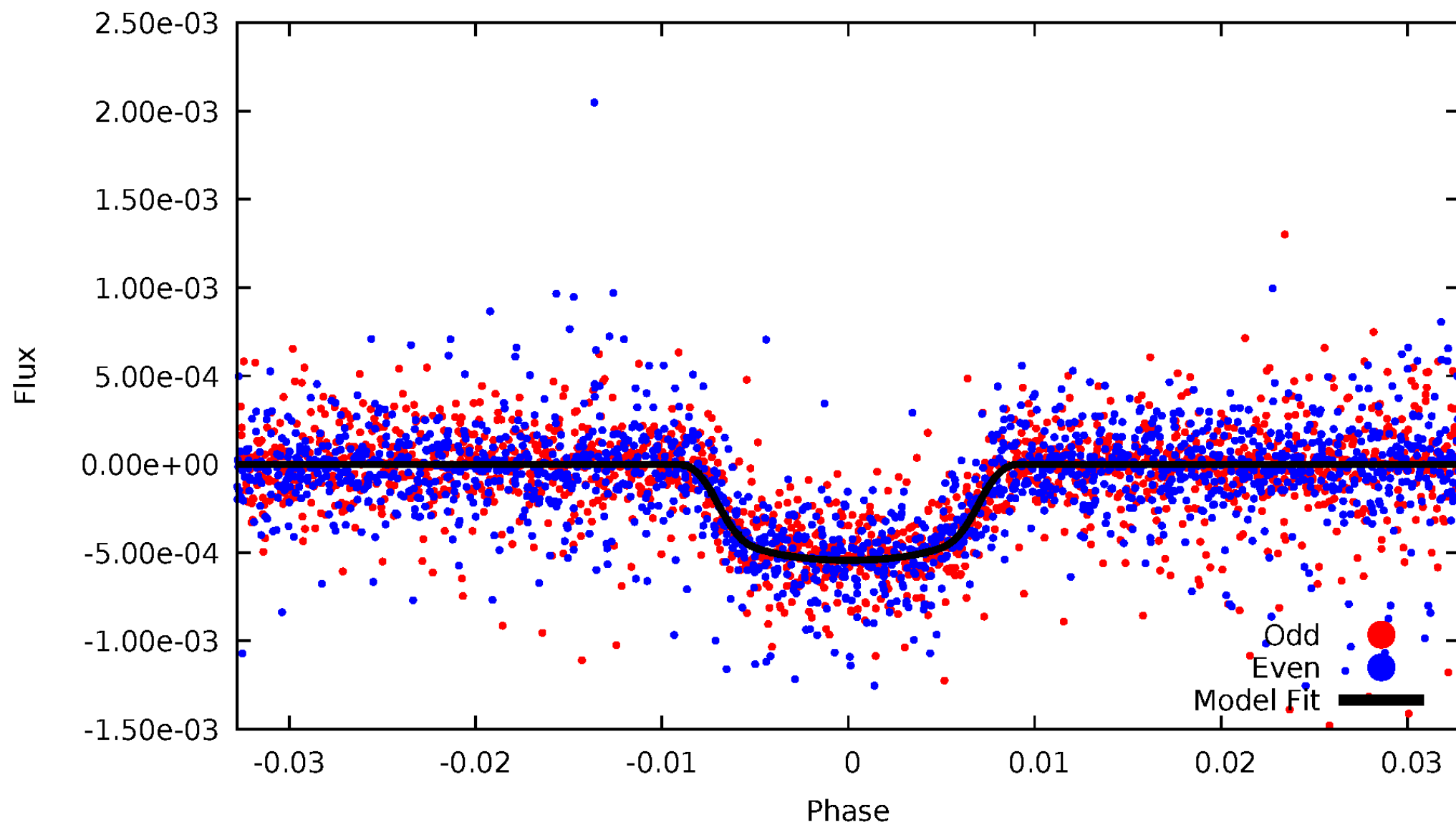


TCE 005856571-01



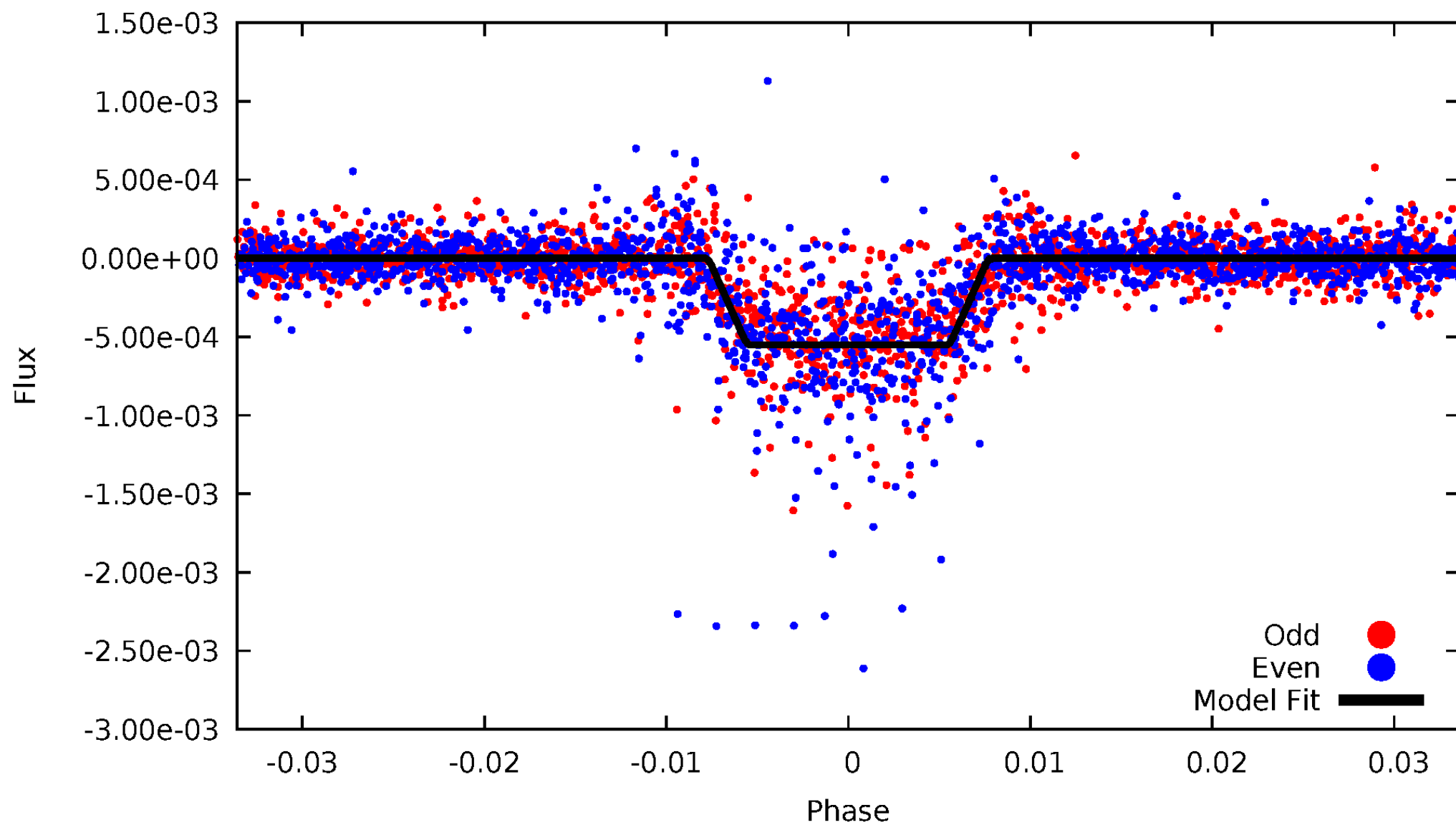
# DV Odd/Even

TCE 005856571-01



# ALT Odd/Even

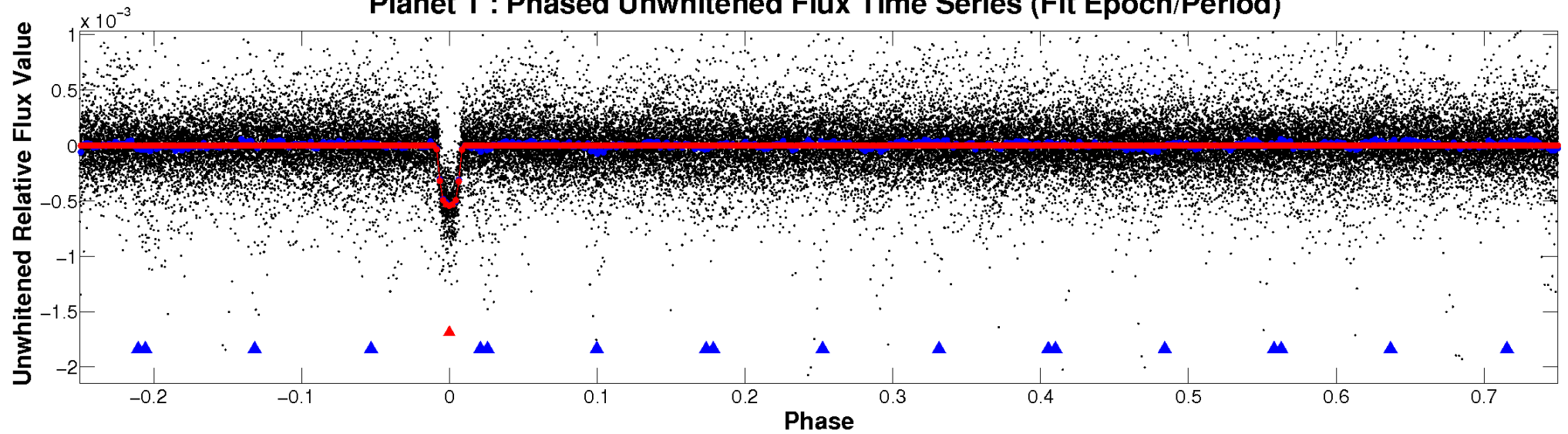
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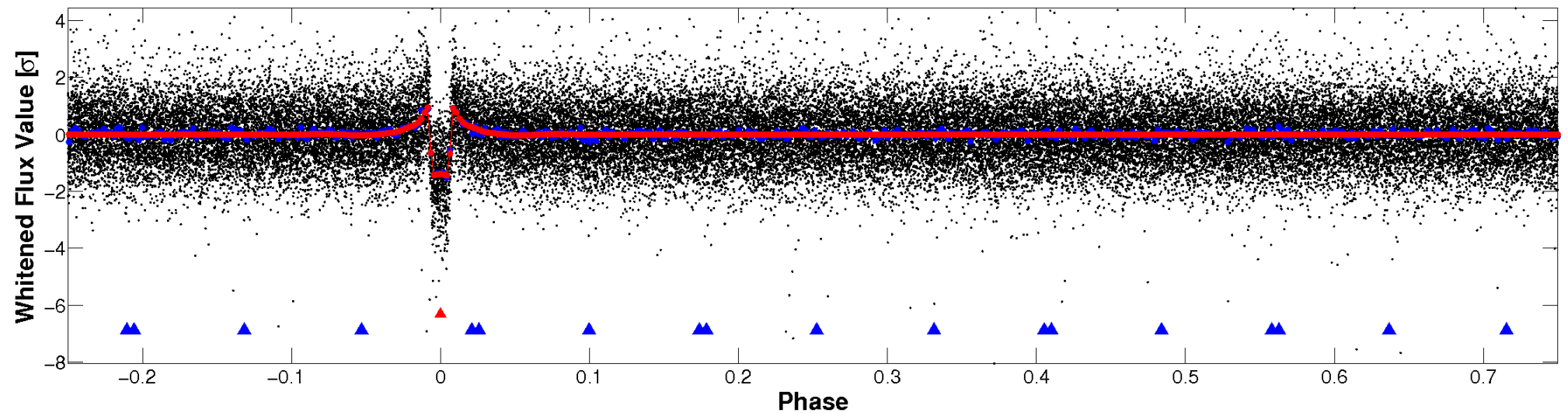


# Non-Whitened Vs. Whitened Light Curve

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

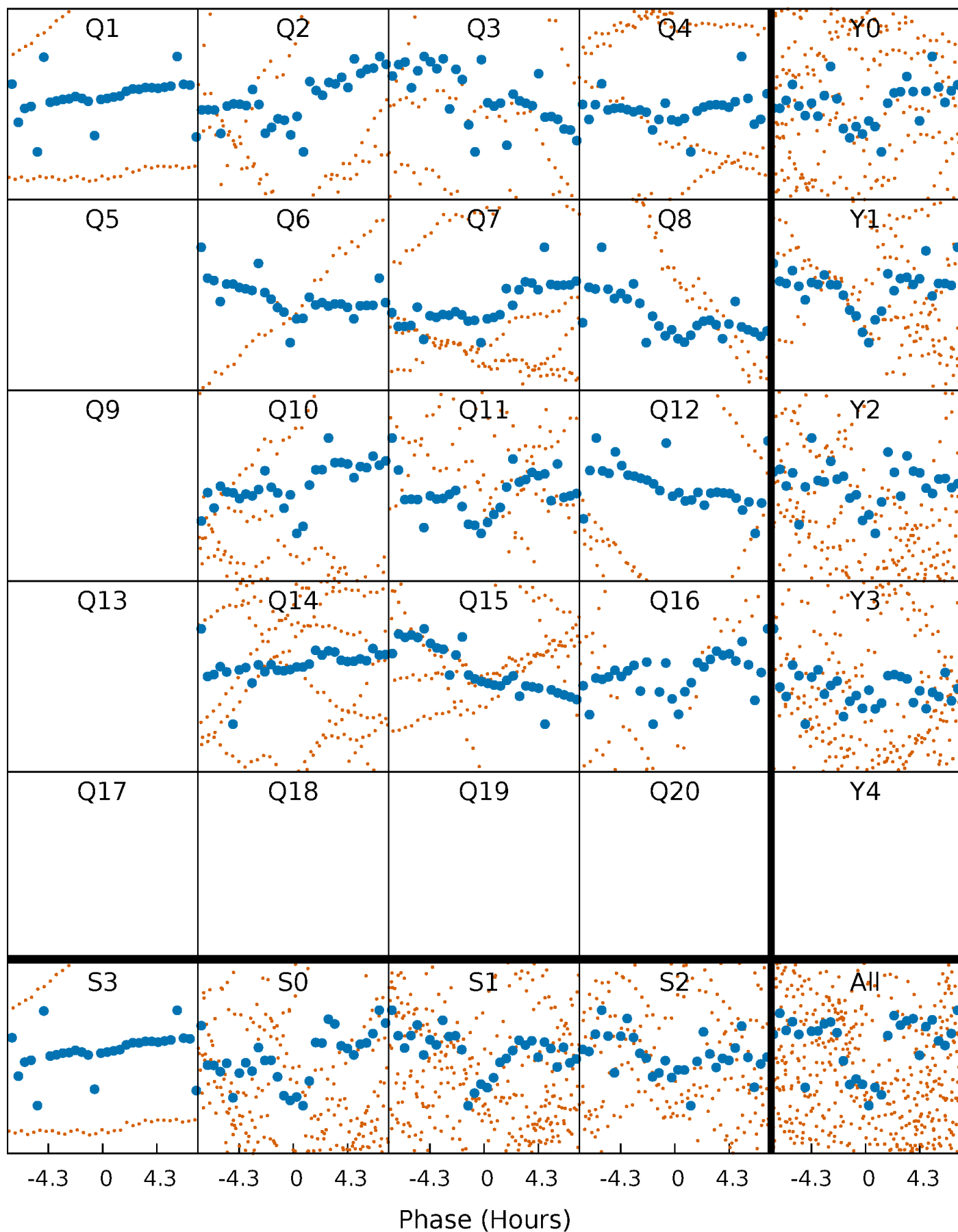


**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

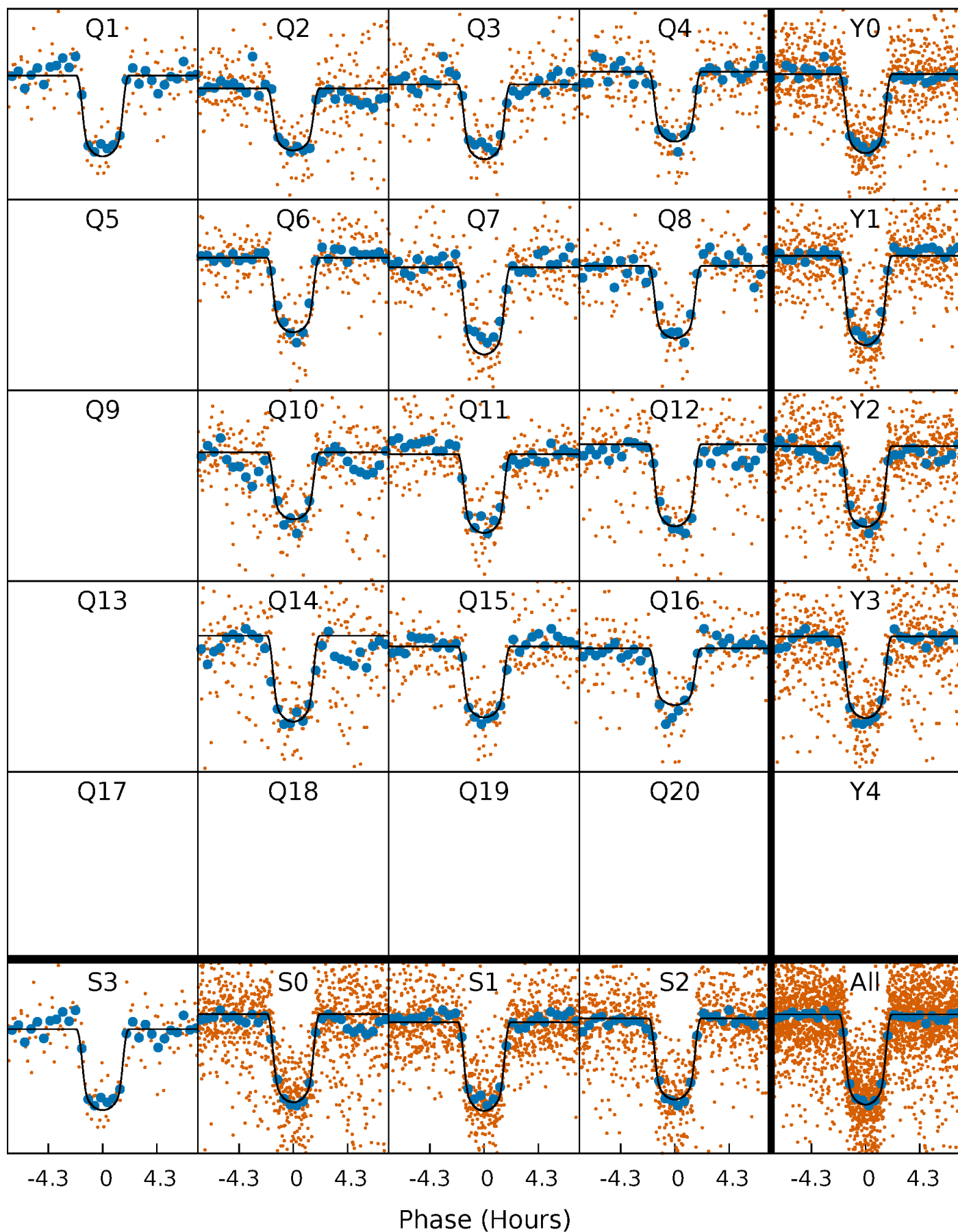
TCE 005856571-01 P= 9.590733 Days  $T_0=132.679716$  (BKJD)





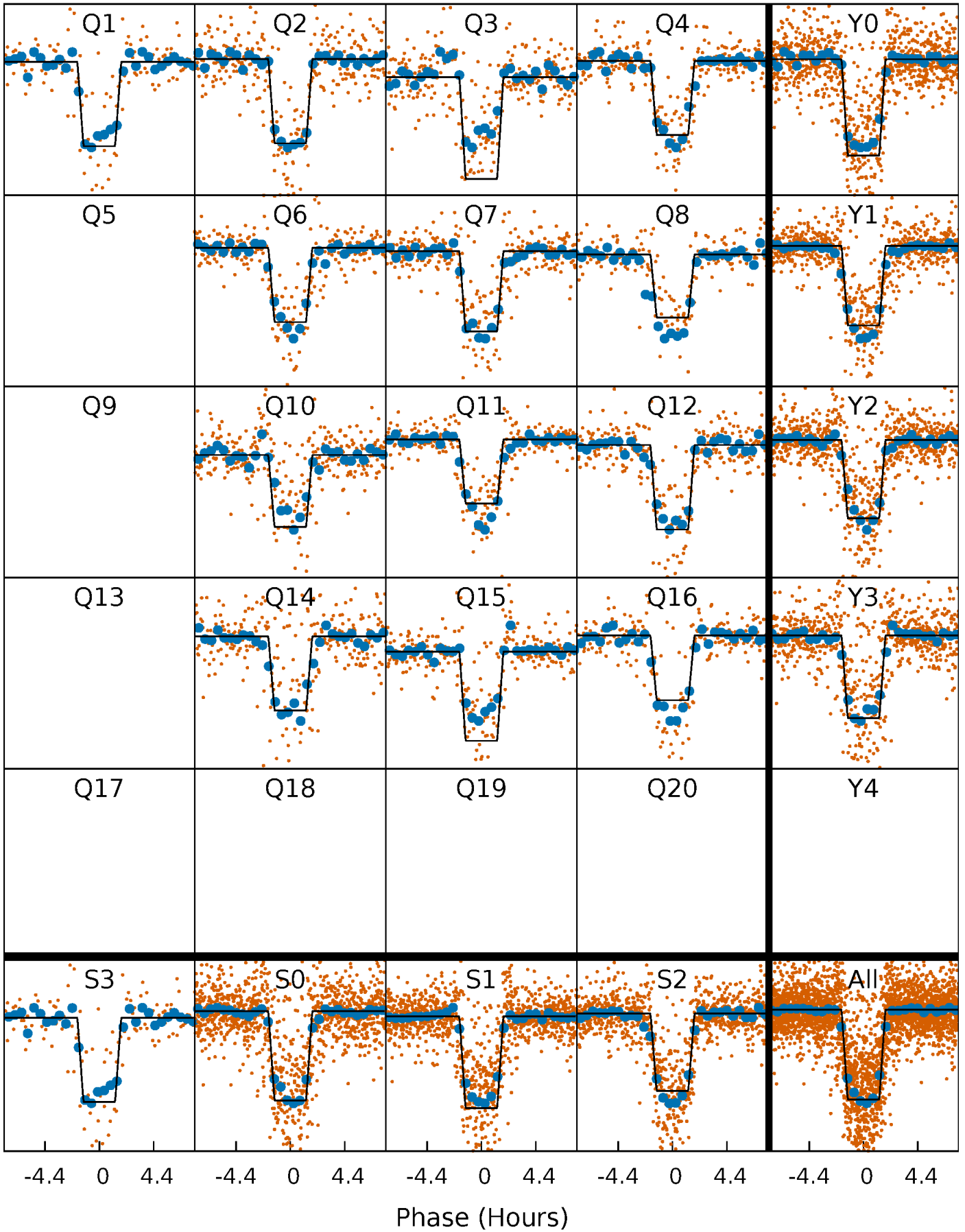
# DV Quarter-Phased Transit Curves

TCE 005856571-01 P= 9.590733 Days  $T_0=132.679716$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

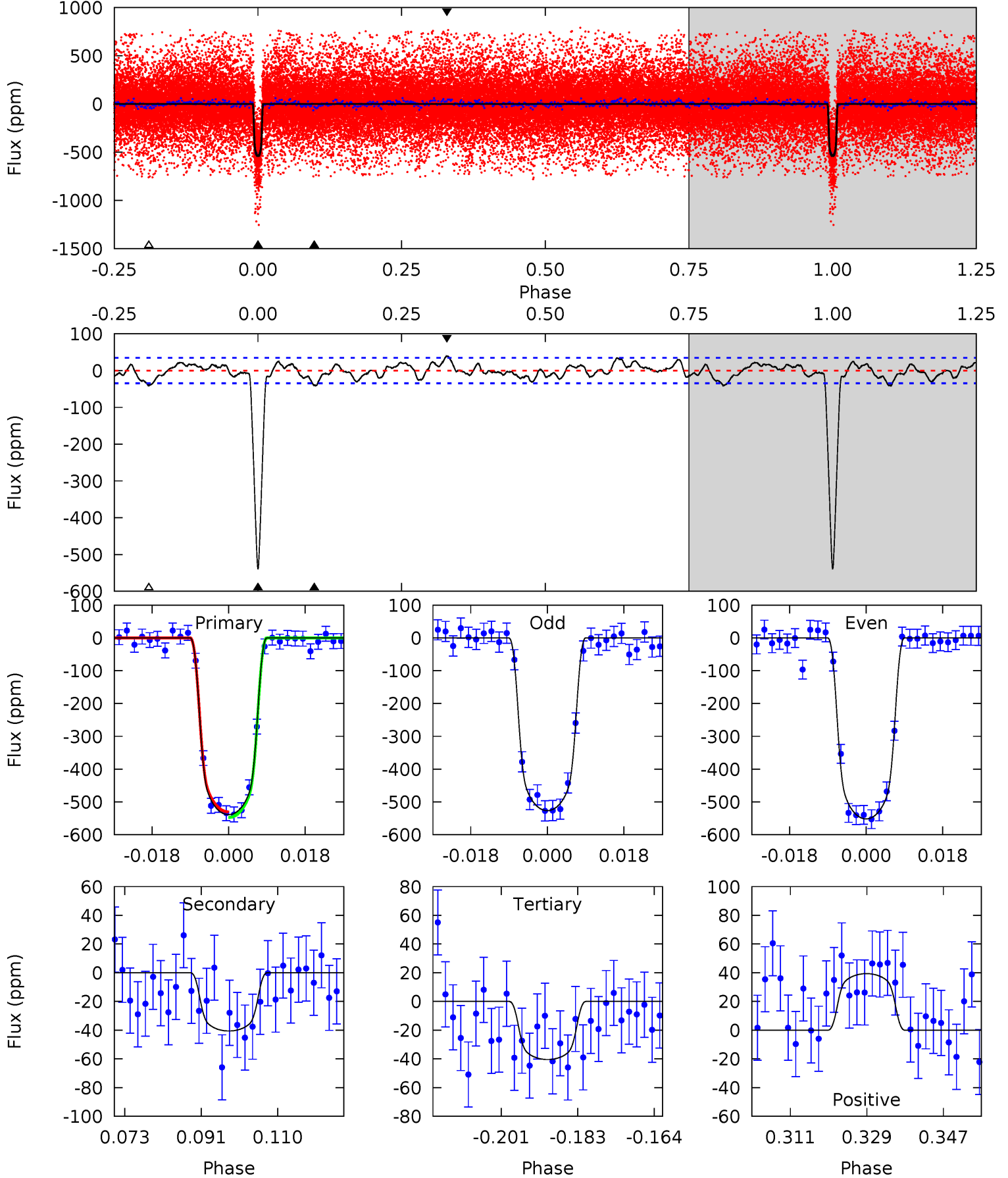
TCE 005856571-01 P= 9.590725 Days  $T_0=132.680589$  (BKJD)



# DV Model-Shift Uniqueness Test

005856571-01, P = 9.590733 Days, E = 123.088983 Days

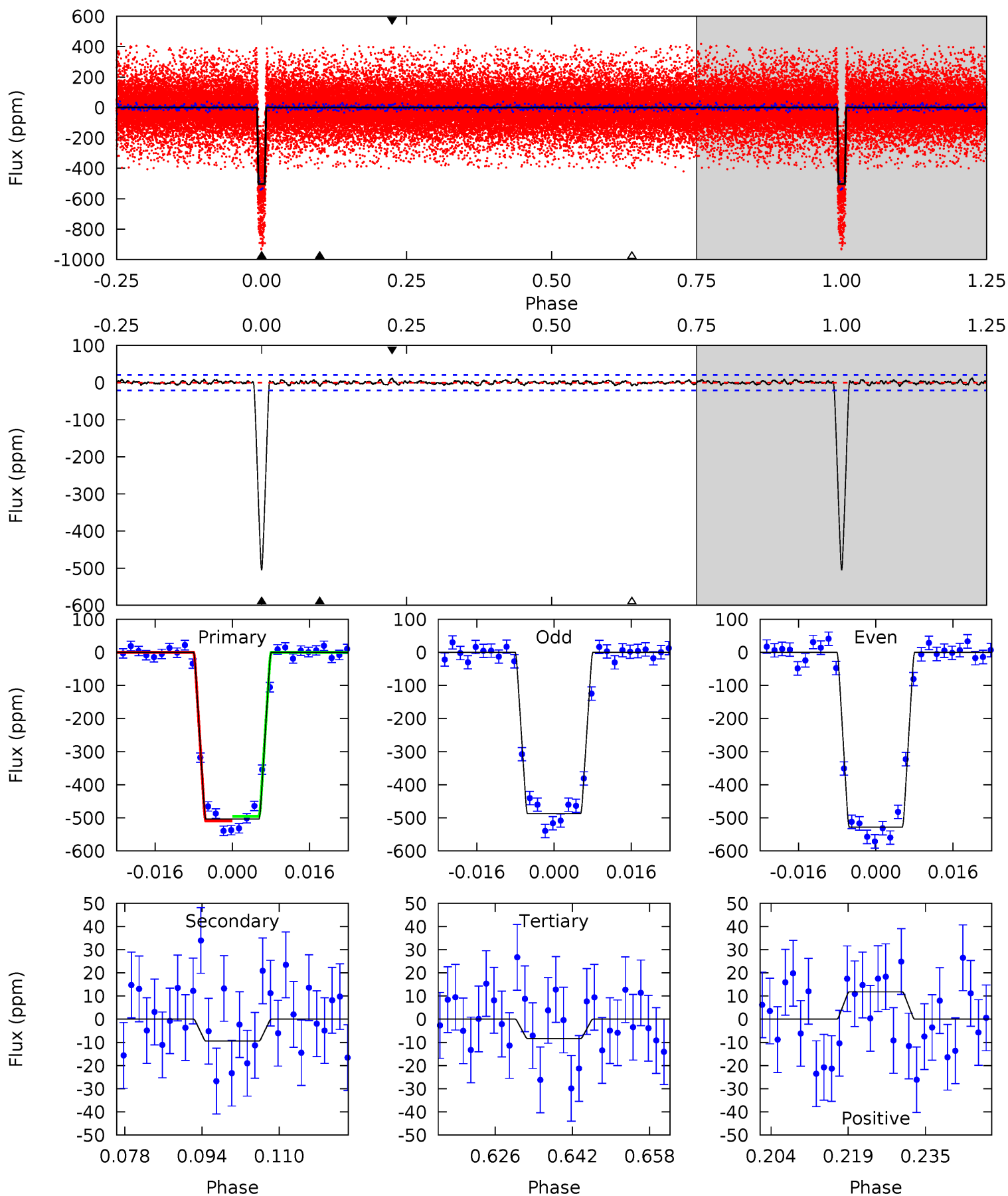
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
76.3	5.75	5.73	5.58	4.91	2.36	2.13	70.6	70.8	0.02	0.17	1.81	0.99	0.07	1.22



# Alt Model-Shift Uniqueness Test

005856571-01, P = 9.590725 Days, E = 123.089864 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
118.9	2.22	1.98	2.78	4.94	2.42	0.77	116.9	116.1	0.25	-0.56	4.76	1.06	0.02	1.72



### Stellar Parameters For KIC 005856571

	$T_{\text{eff}} (K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5476^{+179}_{-146}$	$3.904^{+0.693}_{-0.297}$	$-0.560^{+0.350}_{-0.250}$	$1.673^{+0.971}_{-0.971}$	$0.819^{+0.122}_{-0.100}$	$0.246^{+2.259}_{-0.173}$
	+3%/-3%	+18%/-8%	+62%/-45%	+58%/-58%	+15%/-12%	+918%/-70%
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 005856571-01 / KOI 1839.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-41 \pm 7$	$4.52^{+1.29}_{-1.39}$	$1483^{+207}_{-252}$	$3256^{+102}_{-112}$	$7.448^{+8.973}_{-3.237}$
Alt.	$-9 \pm 4$	$4.14^{+1.24}_{-1.27}$	$1489^{+211}_{-236}$	$2686^{+164}_{-263}$	$2.053^{+2.801}_{-1.142}$

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

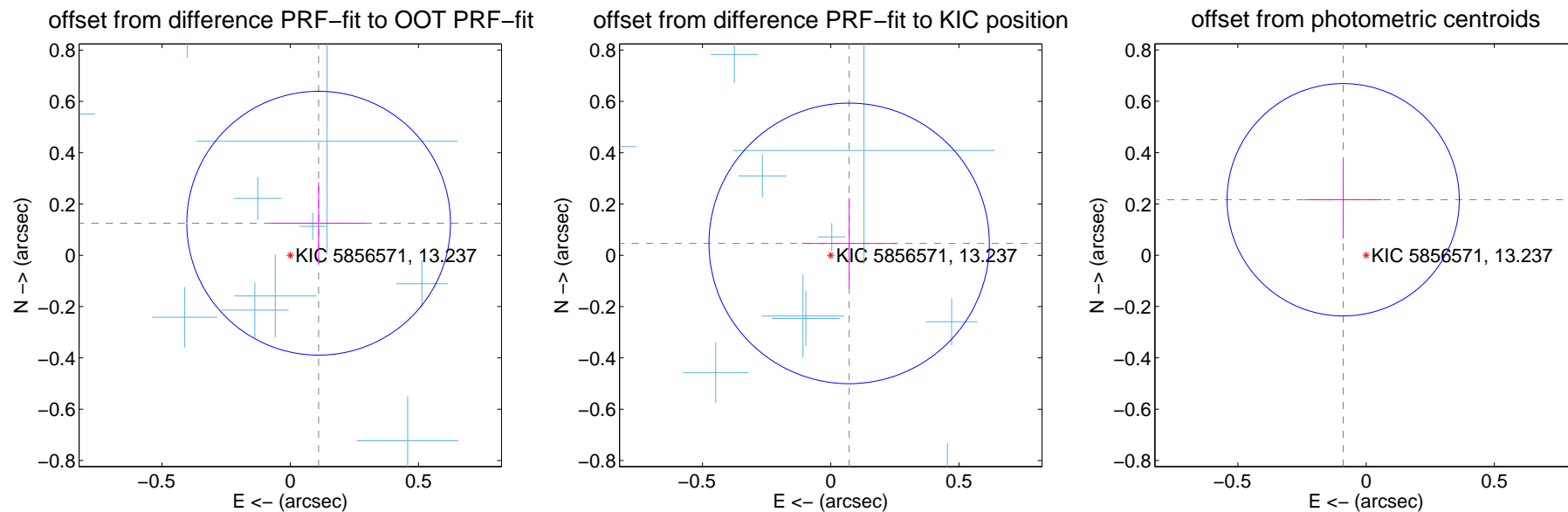
## DV Centroid Data

Supplemental centroid analysis for 005856571-01. Kepler magnitude: 13.24. Transit SNR 41.95

There are 12 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.13 arcsec

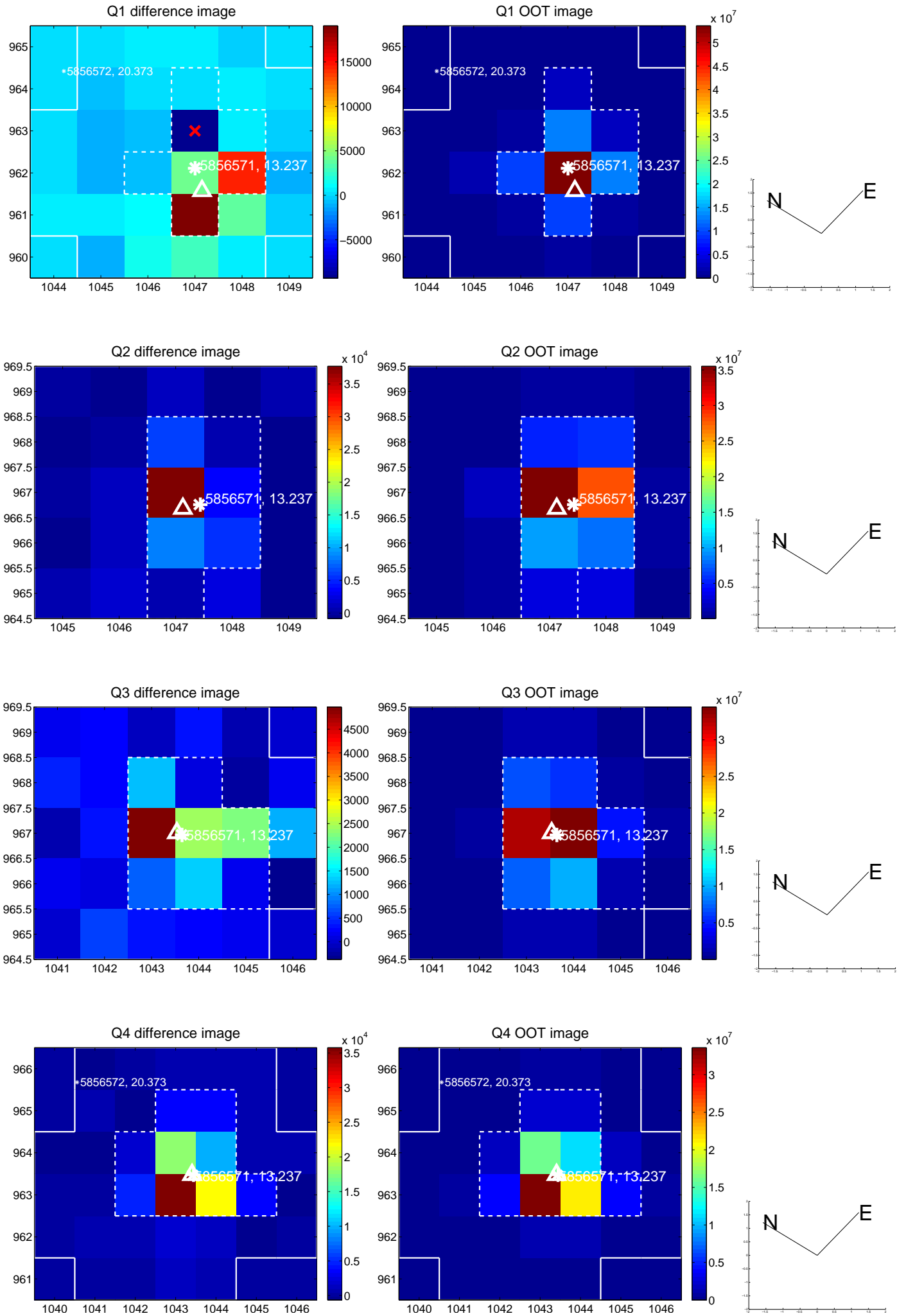
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.167 \pm 0.171$	0.97	$-0.111 \pm 0.186$	$0.125 \pm 0.159$
PRF-fit source offset from KIC position	$0.086 \pm 0.182$	0.47	$-0.072 \pm 0.184$	$0.046 \pm 0.177$
photometric centroid source offset	$0.23 \pm 0.15$	1.55	$0.09 \pm 0.15$	$0.22 \pm 0.15$



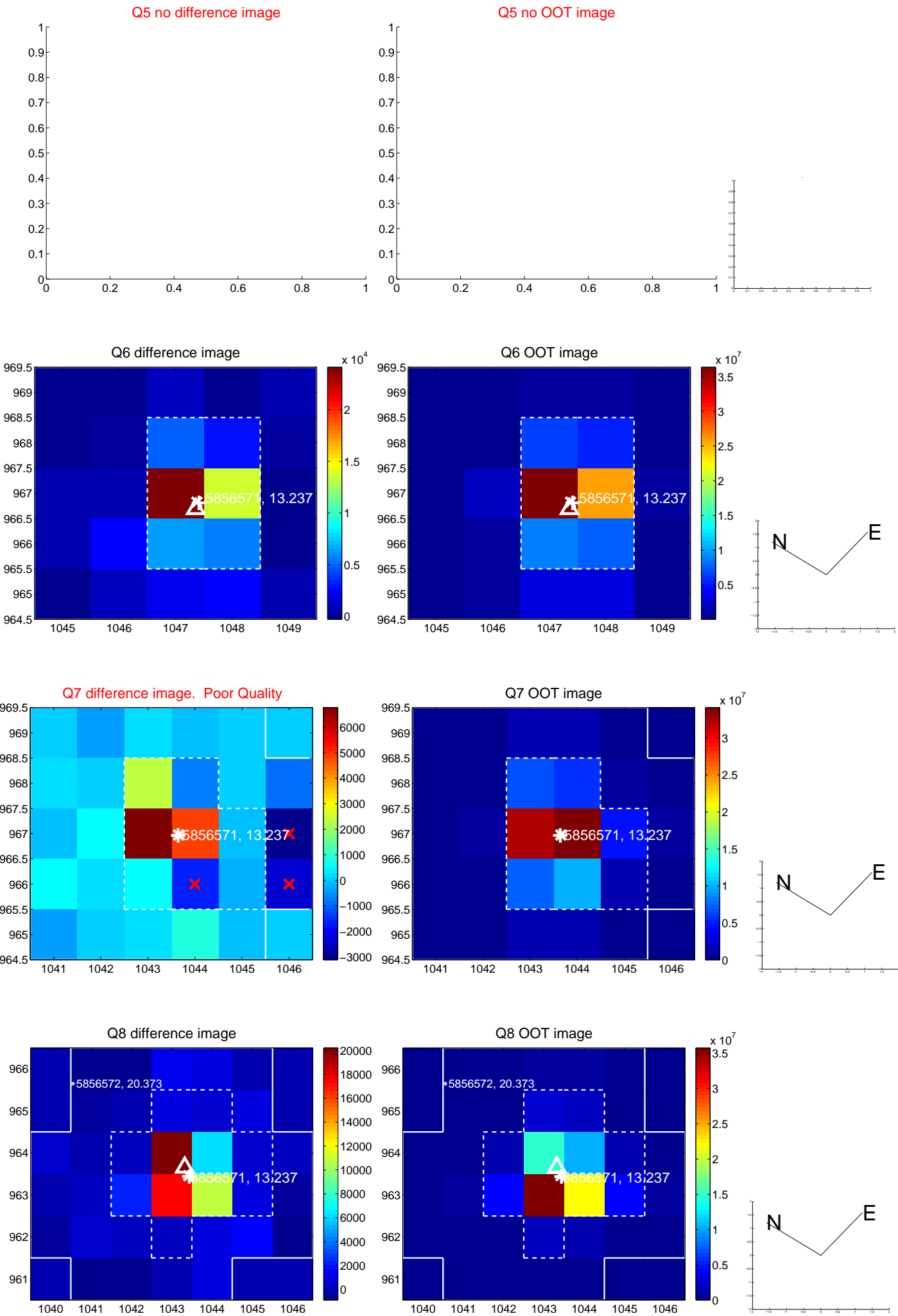
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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



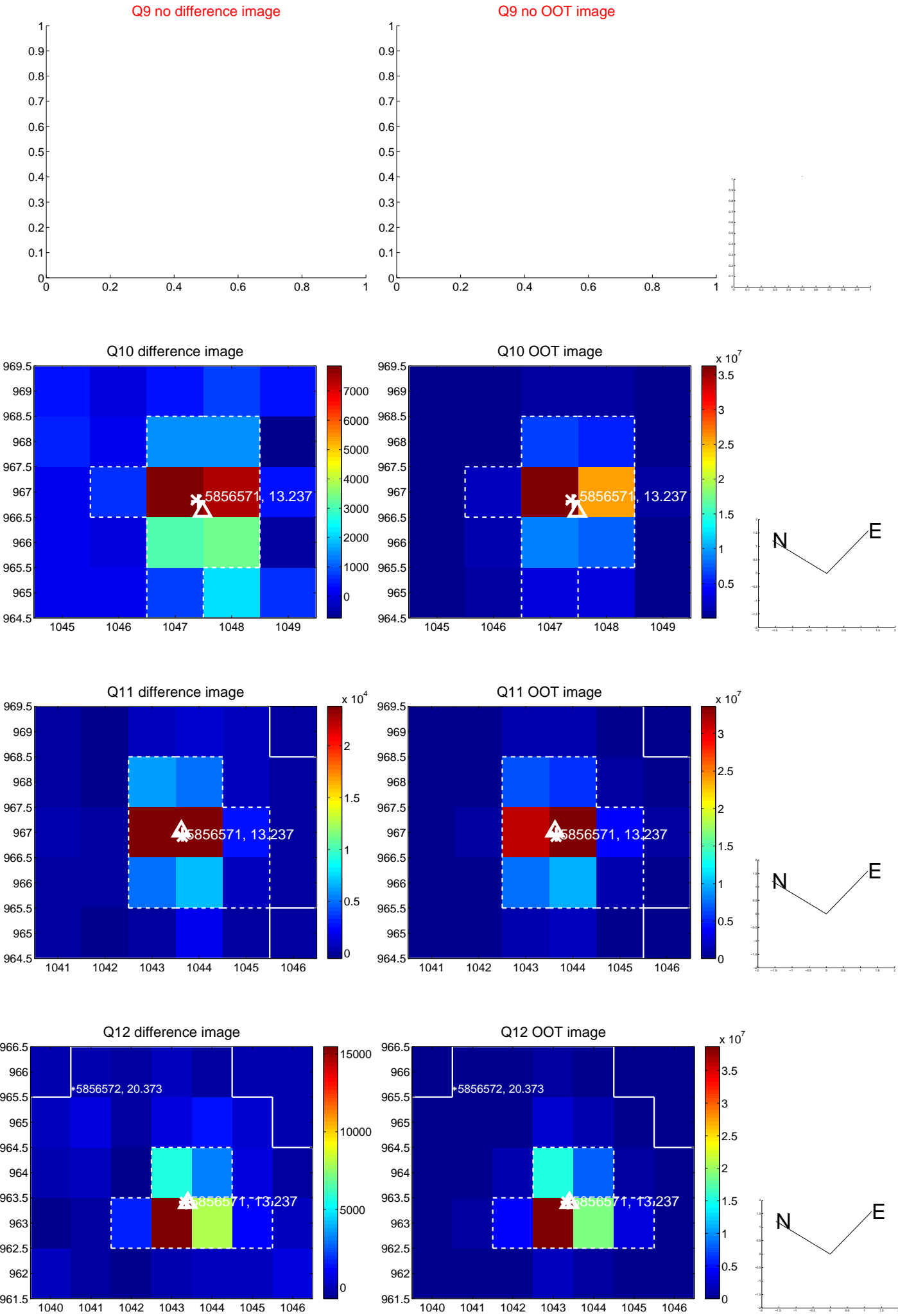
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



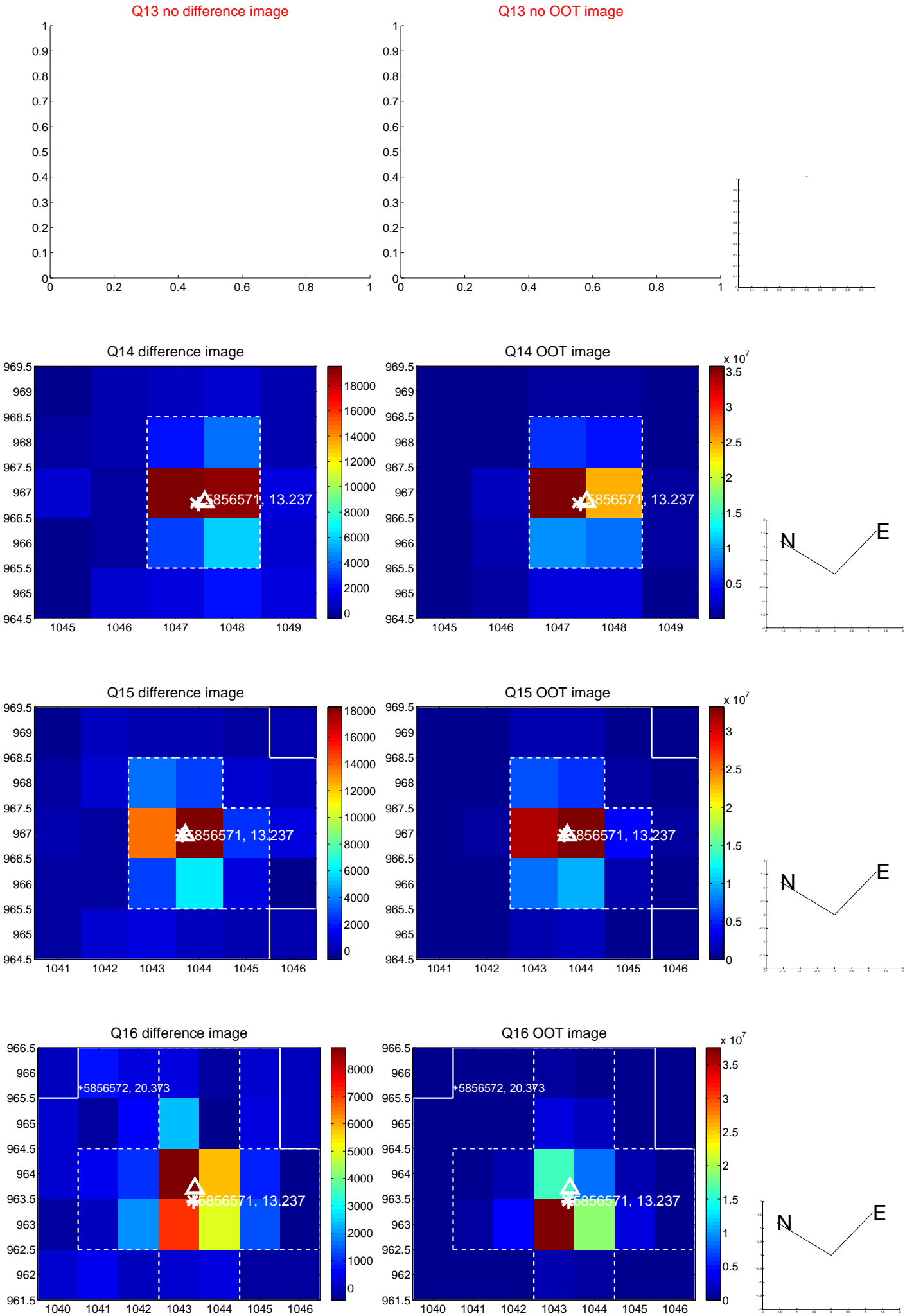
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



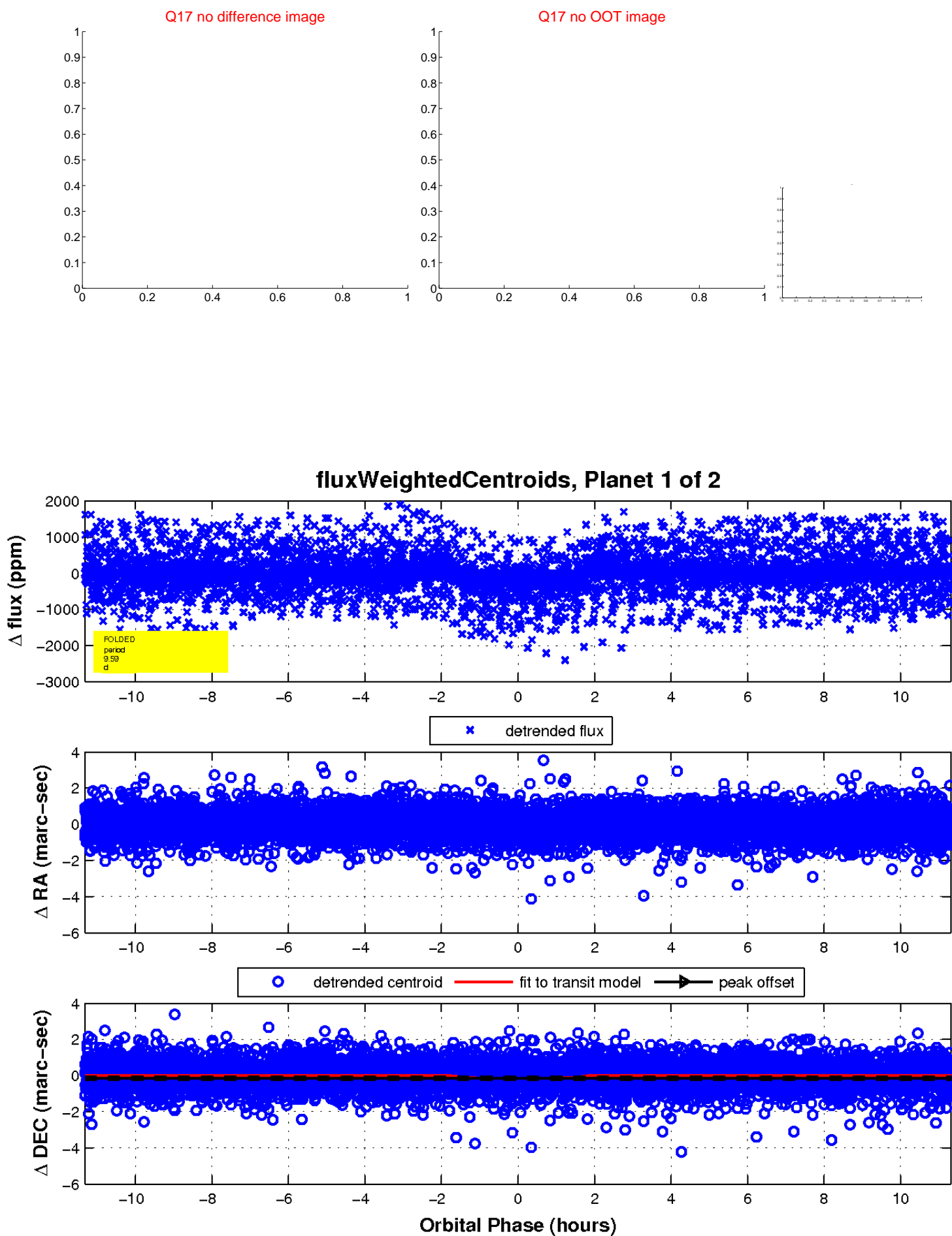
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

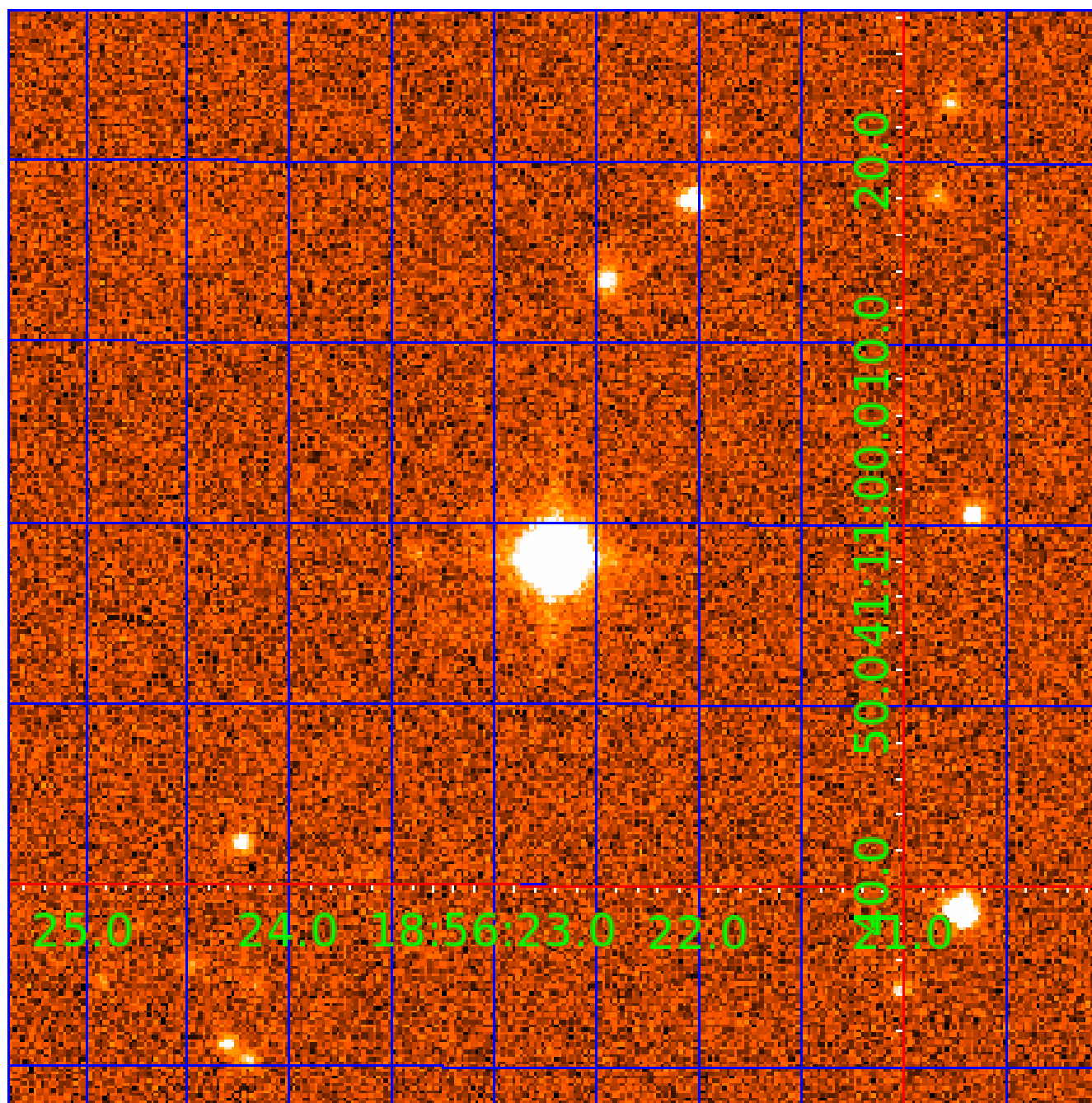


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



# UKIRT Image

Declination





# KIC 005856571

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005856571-01	OBS	1839.01	9.590733	132.679716	543.7	3.773	40.5	42.0	1.67	5476	4.70	330.07
005856571-02	OBS	1839.02	80.411060	171.290329	541.6	3.145	12.9	14.2	1.67	5476	4.41	19.38

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005856571-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
005856571-02	OBS	PC	0.98	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.

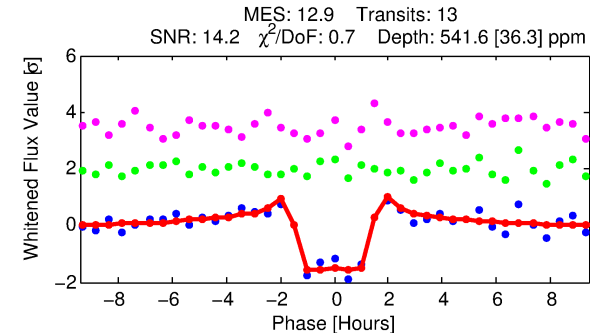
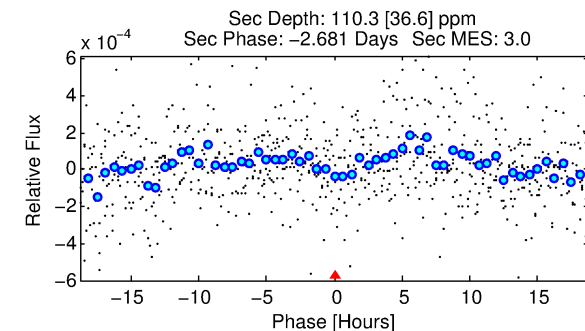
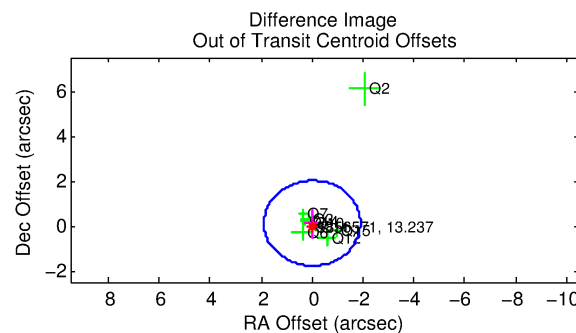
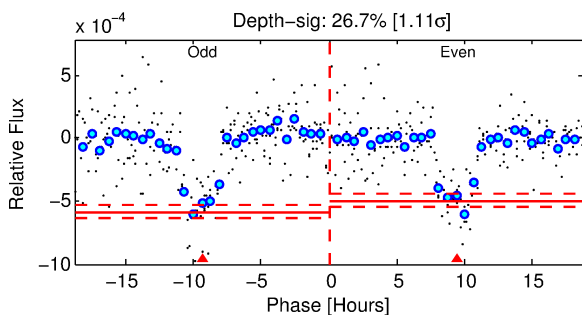
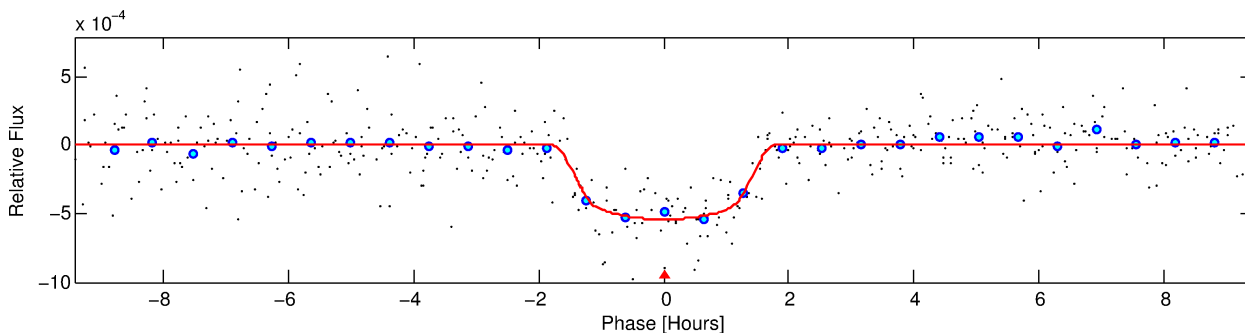
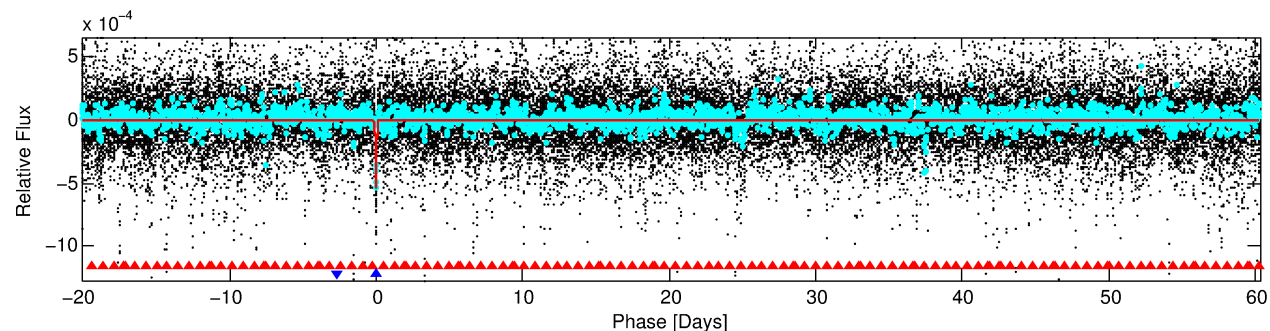
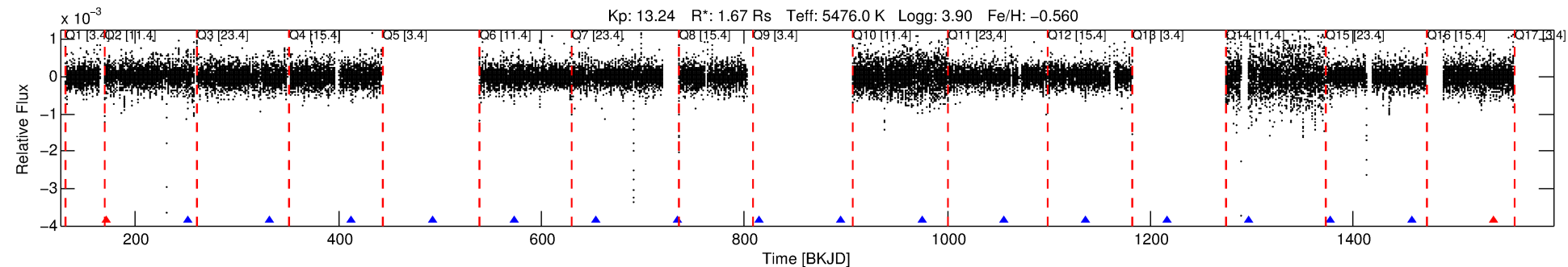
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 005856571-02

No Significant Match Found

# DV One-Page Summary

KIC: 5856571 Candidate: 2 of 2 Period: 80.411 d  
KOI: K01839.02 Corr: 0.984



## DV Fit Results:

Period = 80.41106 [0.00027] d  
Epoch = 171.2903 [0.0030] BKJD  
Rp/R\* = 0.0241 [0.0063]  
a/R\* = 115.97 [134.11]  
b = 0.83 [0.43]  
Seff = 19.38 [22.08]  
Teq = 535 [152] K  
Rp = 4.40 [2.80] Re  
a = 0.3411 [0.2244] AU  
Ag = 363.96 [469.44] [0.77σ]  
Teffp = 3613 [571] K [5.21σ]

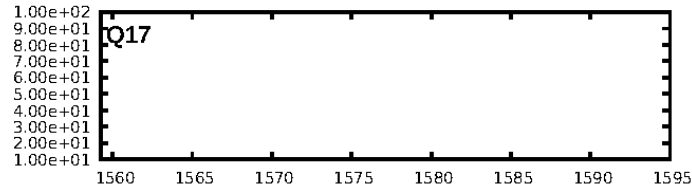
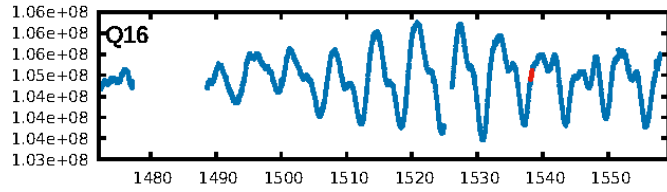
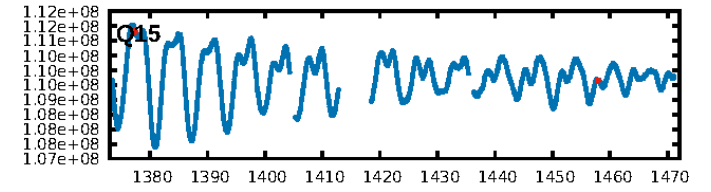
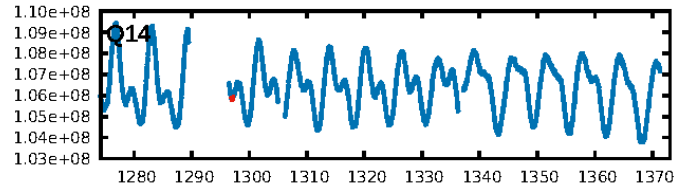
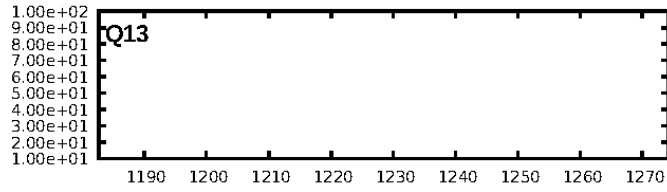
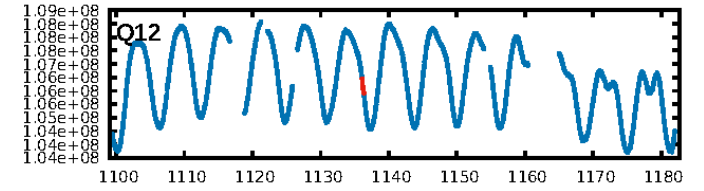
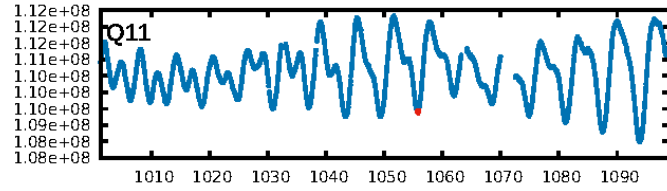
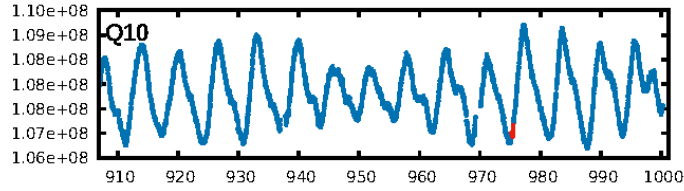
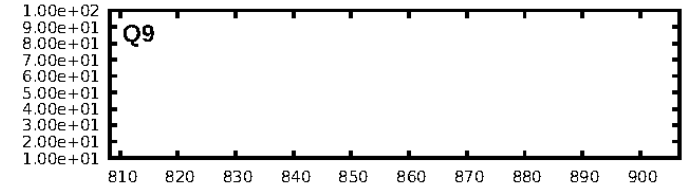
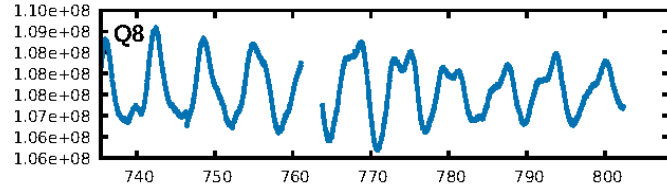
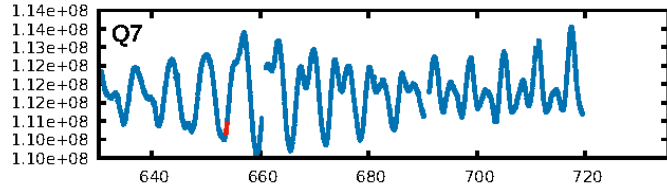
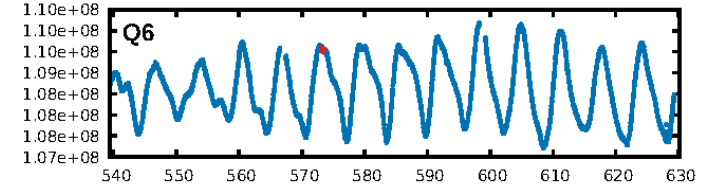
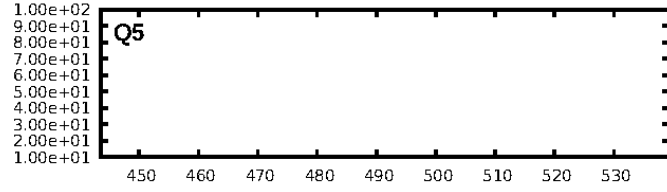
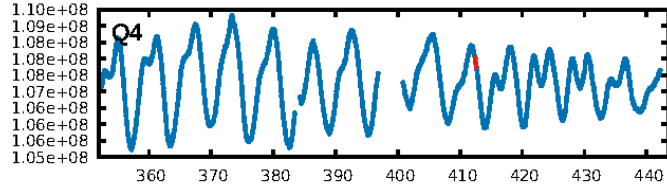
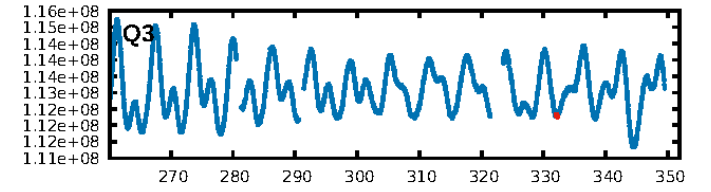
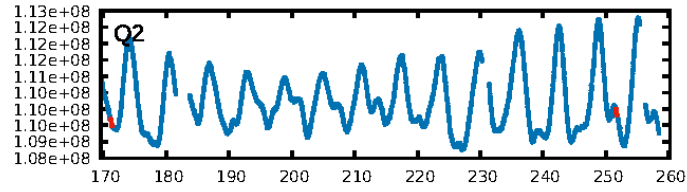
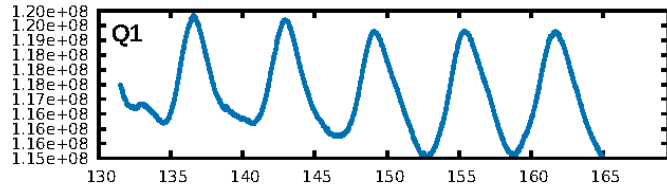
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [346.03σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 85.5%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 1.29e-24  
RollingBand-fgt: 0.85 [11/13]  
GhostDiagnostic-chr: 3.648  
Centroid-sig: N/A  
Centroid-so: 1.009 arcsec [2.21σ]  
OotOffset-rm: 0.113 arcsec [0.18σ]  
KicOffset-rm: 0.066 arcsec [0.18σ]  
OotOffset-st: 4/4/1/0 [9]  
KicOffset-st: 4/4/1/0 [9]  
DiffImageQuality-fgm: 0.89 [8/9]  
DiffImageOverlap-fno: 1.00 [11/11]

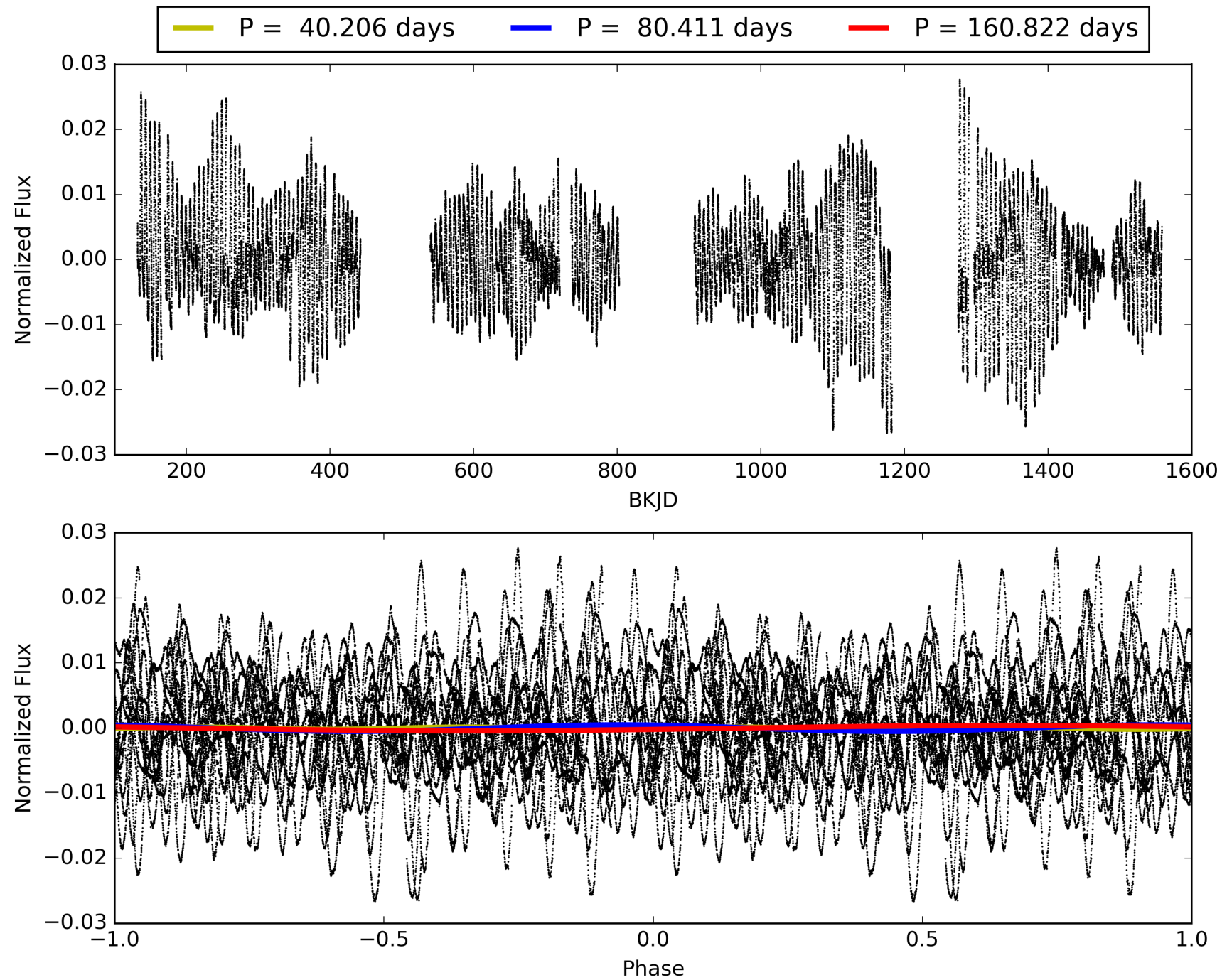
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 06:01:41 Z

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

# TCE 005856571-02, PDC Light Curves

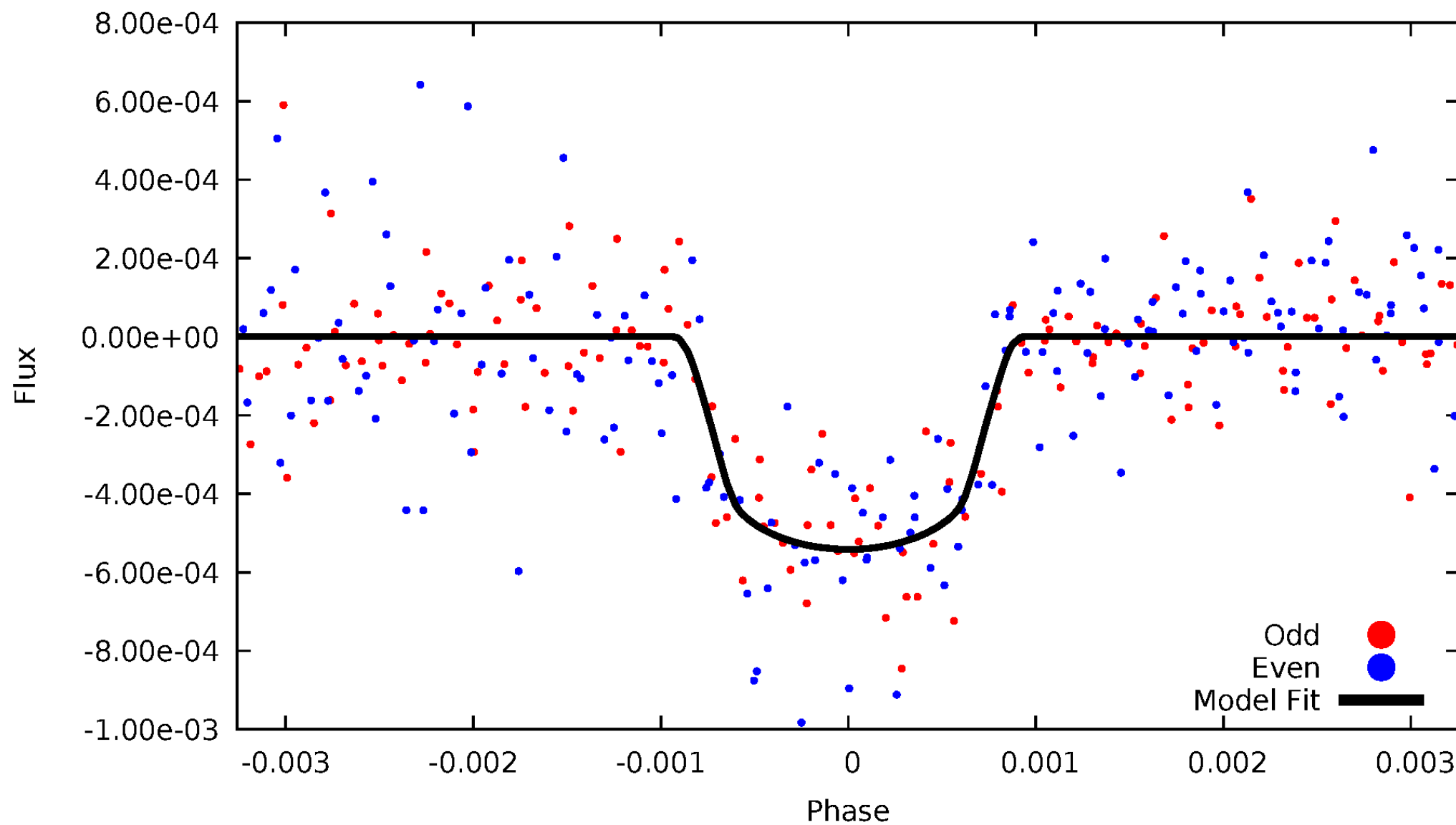


# TCE 005856571-02



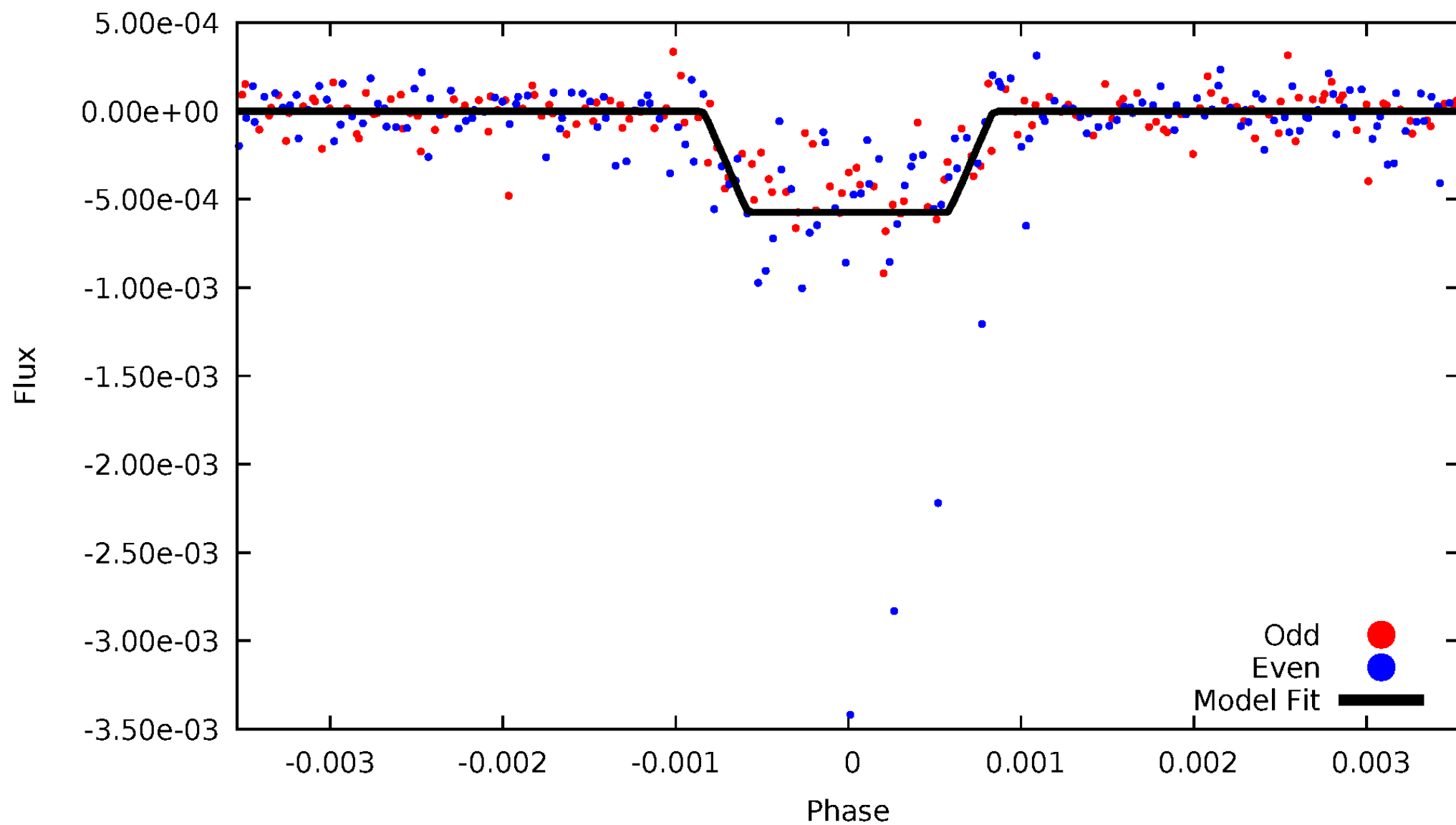
# DV Odd/Even

TCE 005856571-02



# ALT Odd/Even

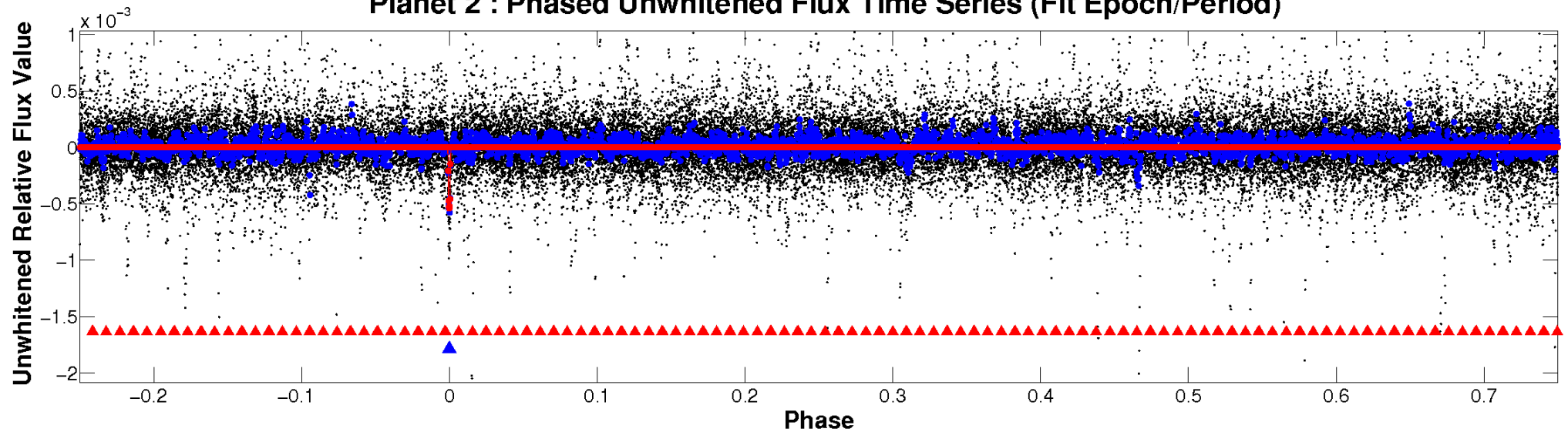
TCE 005856571-02



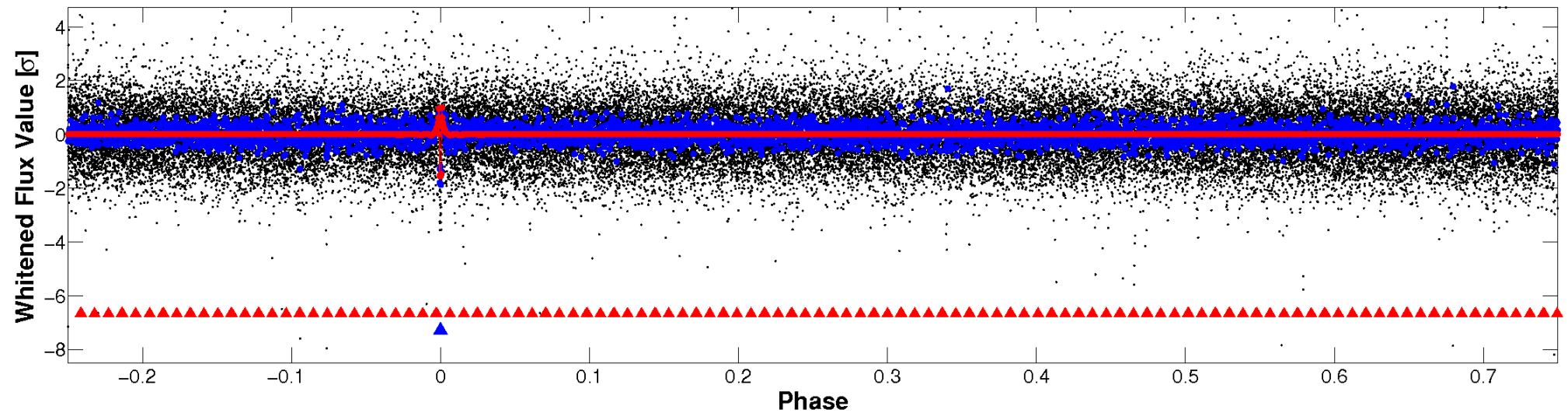


# Non-Whitened Vs. Whitened Light Curve

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

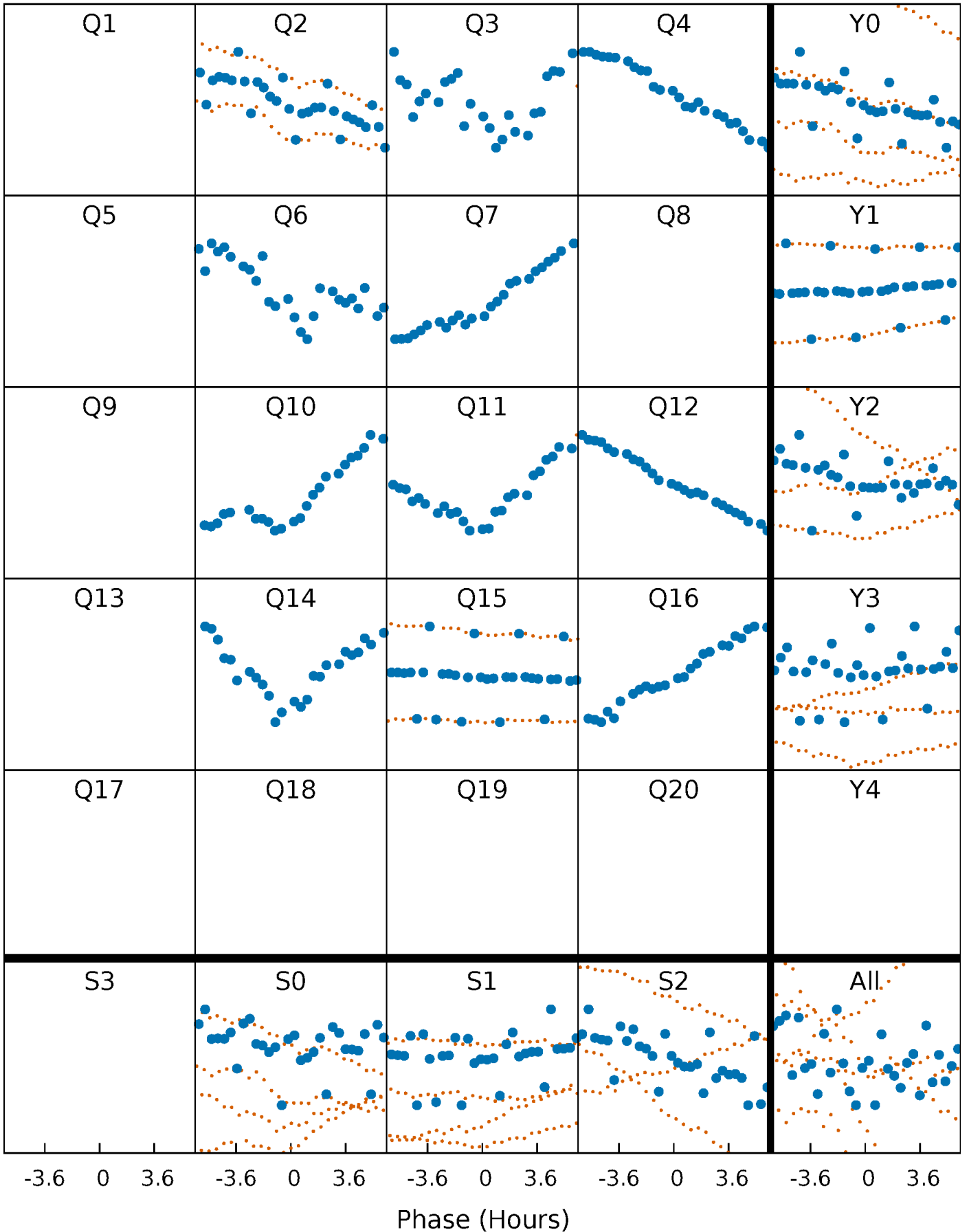


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



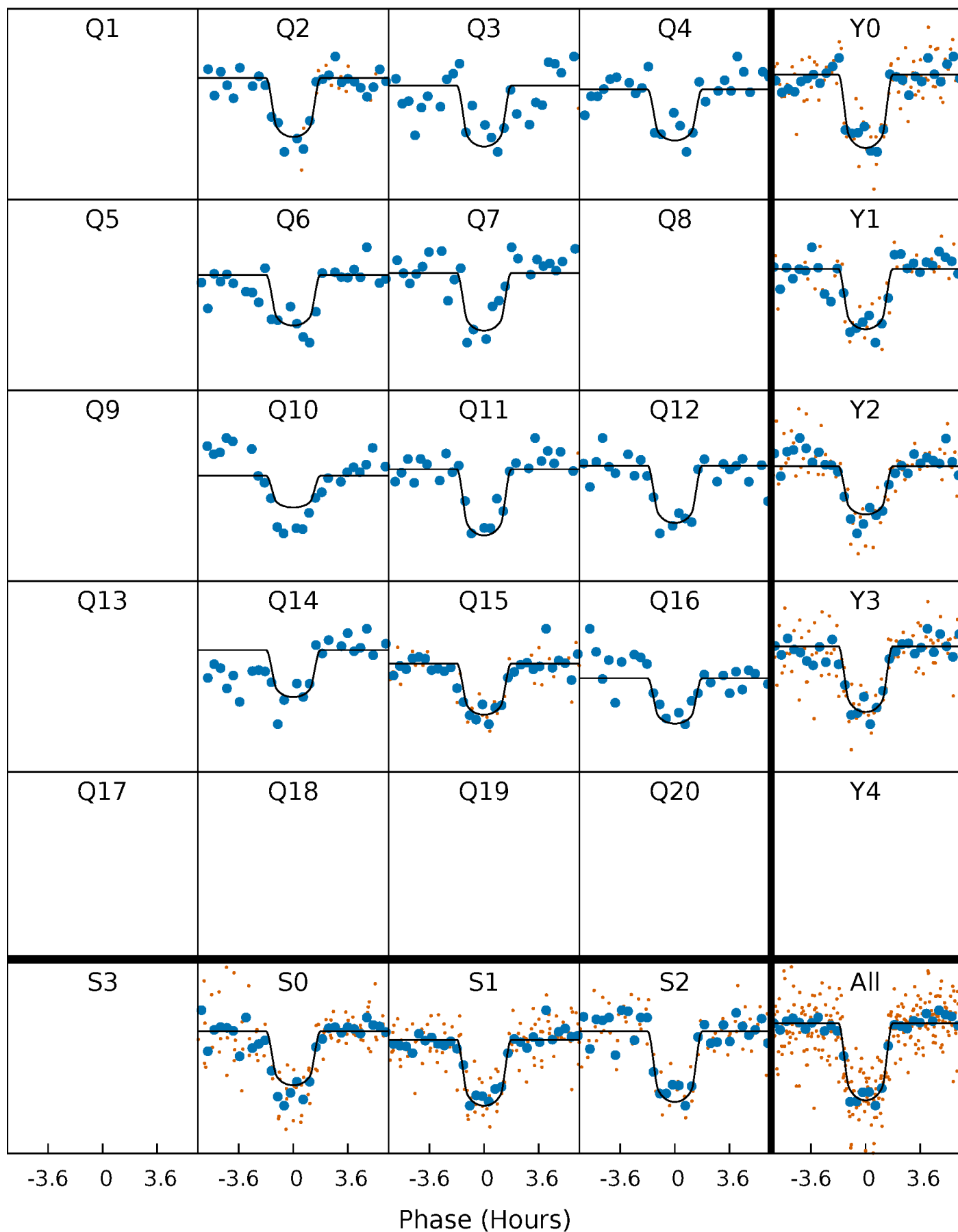
# PDC Quarter-Phased Transit Curves

TCE 005856571-02 P= 80.411060 Days  $T_0=171.290329$  (BKJD)



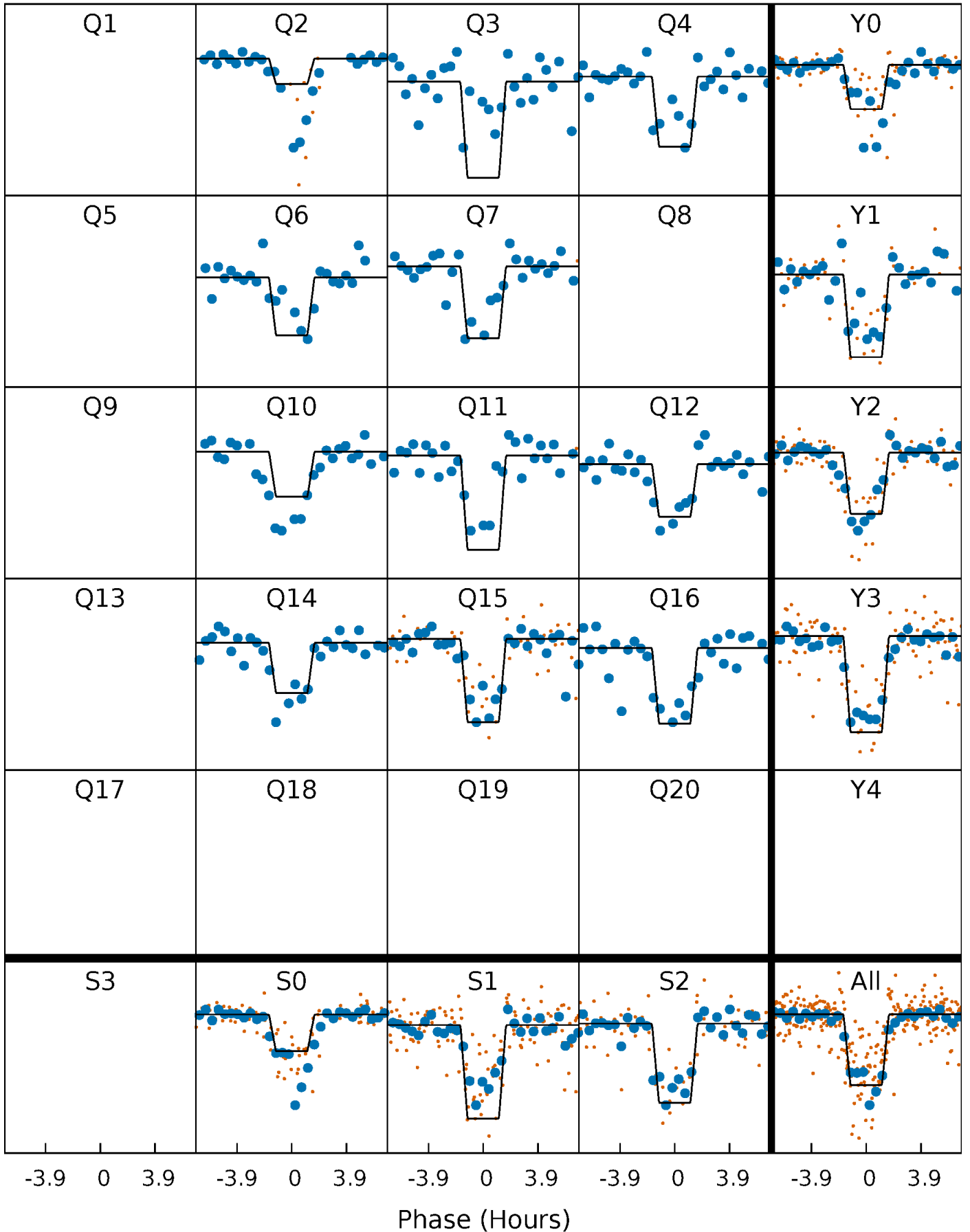
# DV Quarter-Phased Transit Curves

TCE 005856571-02   P= 80.411060 Days    $T_0=171.290329$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

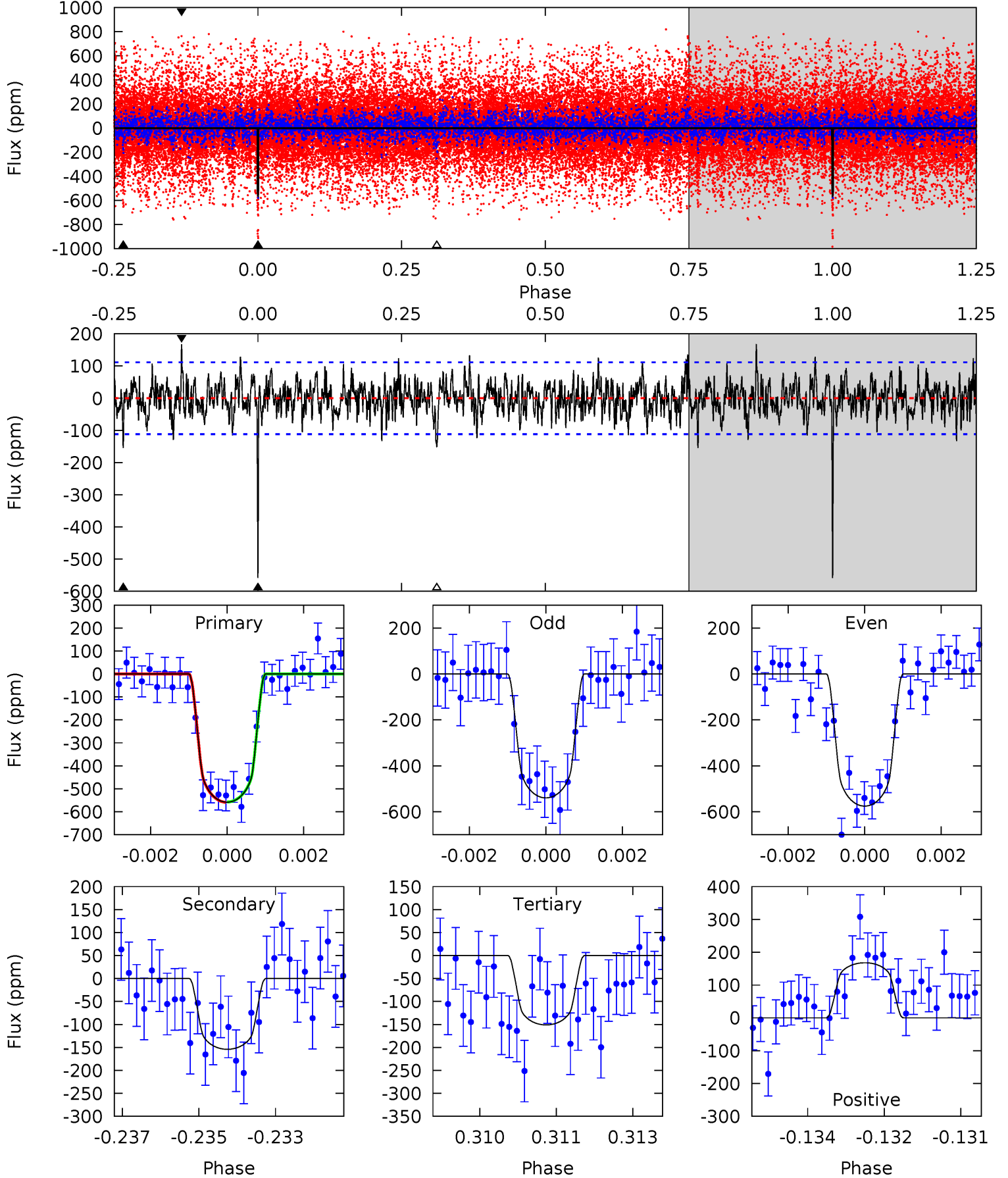
TCE 005856571-02 P= 80.410498 Days  $T_0=171.297435$  (BKJD)



# DV Model-Shift Uniqueness Test

005856571-02, P = 80.411060 Days, E = 90.879269 Days

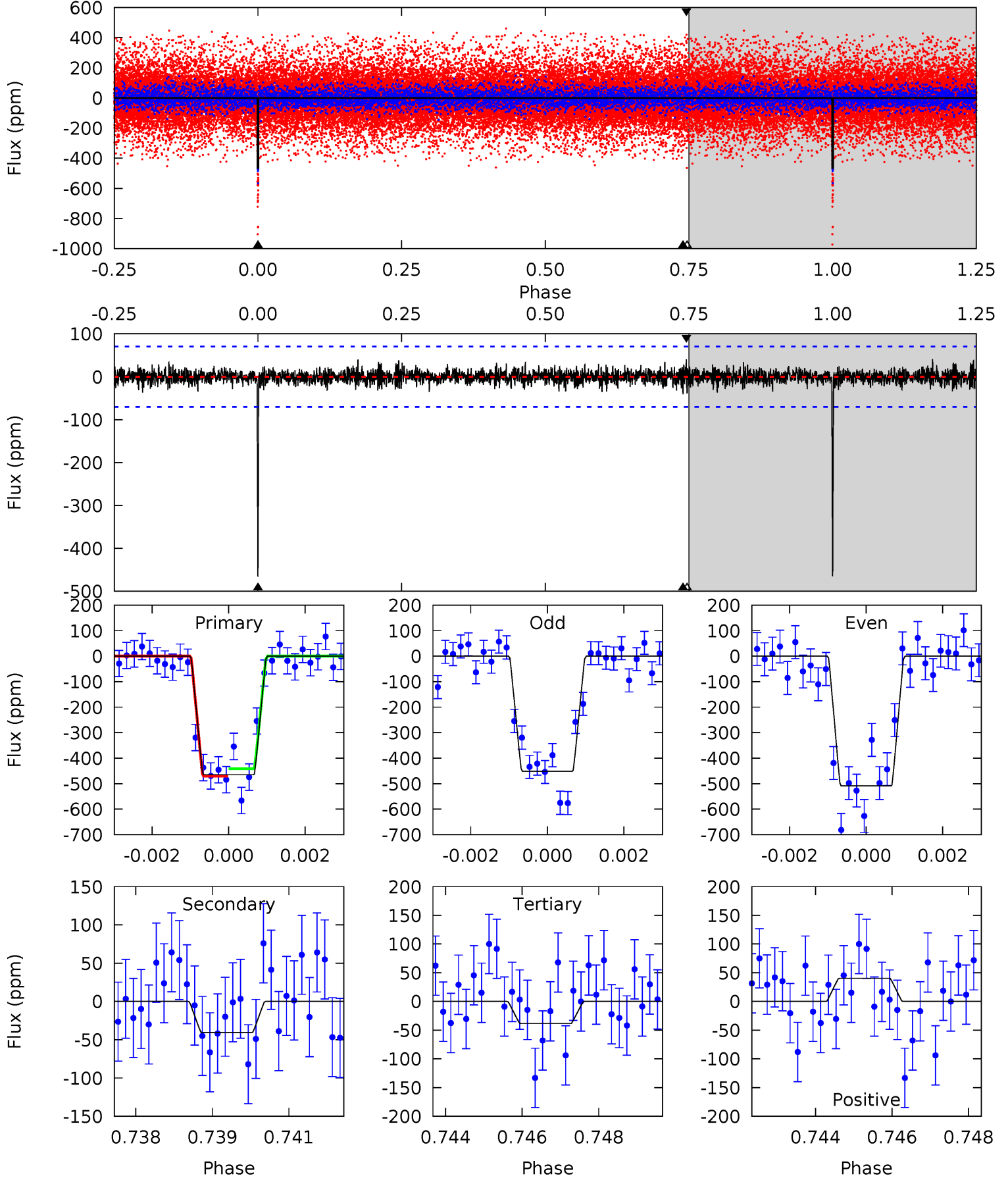
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
26.7	7.37	7.22	8.03	5.34	3.11	2.01	19.5	18.7	0.15	-0.66	0.86	1.06	0.23	0.04



# Alt Model-Shift Uniqueness Test

005856571-02, P = 80.410498 Days, E = 90.886937 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
35.3	3.08	2.92	3.06	5.35	3.14	0.80	32.4	32.2	0.16	0.02	2.21	1.42	0.08	1.10





### Stellar Parameters For KIC 005856571

	$T_{\text{eff}} (K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5476^{+179}_{-146}$	$3.904^{+0.693}_{-0.297}$	$-0.560^{+0.350}_{-0.250}$	$1.673^{+0.971}_{-0.971}$	$0.819^{+0.122}_{-0.100}$	$0.246^{+2.259}_{-0.173}$
	+3%/-3%	+18%/-8%	+62%/-45%	+58%/-58%	+15%/-12%	+918%/-70%
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 005856571-02 / KOI 1839.02

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-154 \pm 21$	$4.09^{+1.98}_{-1.54}$	$736^{+109}_{-120}$	$4185^{+522}_{-351}$	$592^{+970}_{-326}$
Alt.	$-41 \pm 13$	$3.99^{+2.07}_{-1.52}$	$729^{+113}_{-117}$	$3353^{+393}_{-299}$	$157^{+269}_{-94}$

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

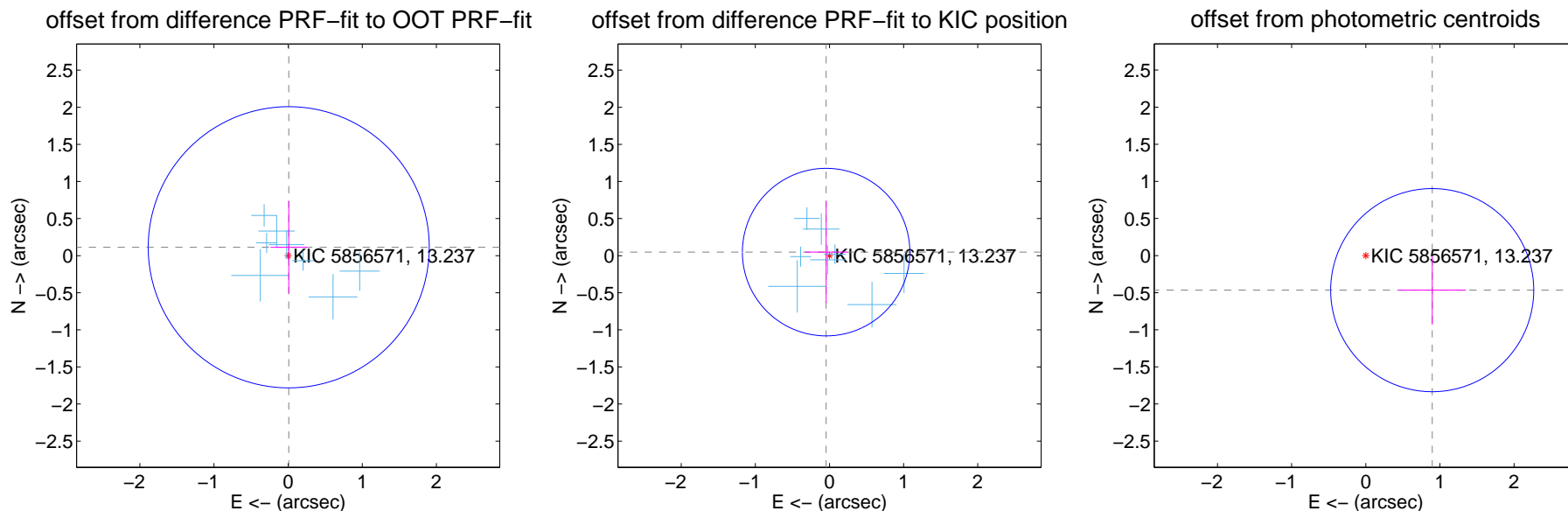
## DV Centroid Data

Supplemental centroid analysis for 005856571-02. Kepler magnitude: 13.24. Transit SNR 14.18

There are 8 quarters with good PRF difference image offsets

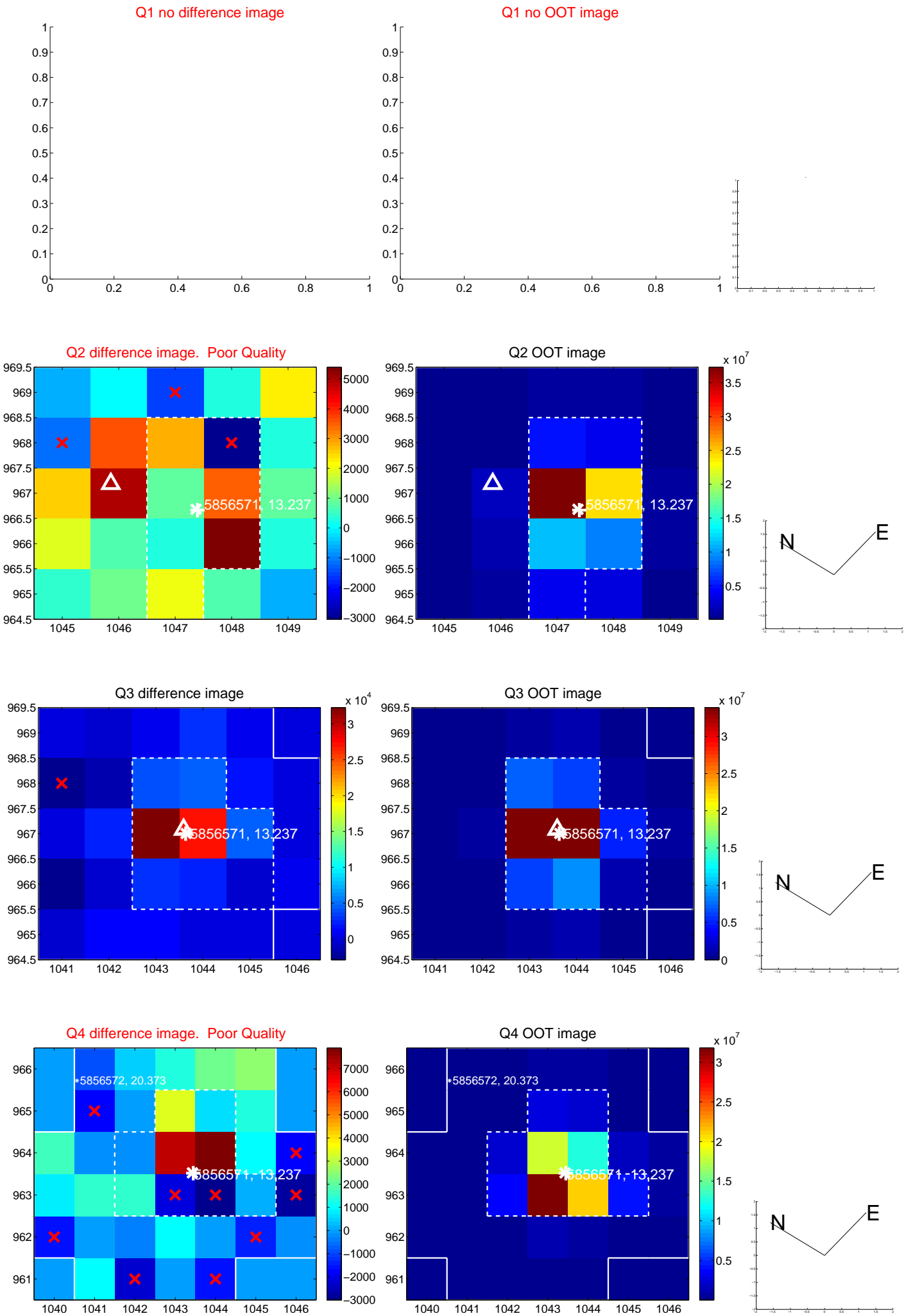
The direct PRF centroid is offset from the target star catalog position by about 0.05 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.113 \pm 0.632$	0.18	$-0.008 \pm 0.246$	$0.113 \pm 0.621$
PRF-fit source offset from KIC position	$0.066 \pm 0.376$	0.18	$0.046 \pm 0.286$	$0.048 \pm 0.687$
photometric centroid source offset	$1.01 \pm 0.46$	2.21	$-0.90 \pm 0.45$	$-0.47 \pm 0.47$



Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three- $\sigma$ . Red \*: target star. Blue \*: Other stars. Text next to a star gives its KIC ID and kepmag. KIC IDs > 15,000,000 are from the UKIRT catalog.

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

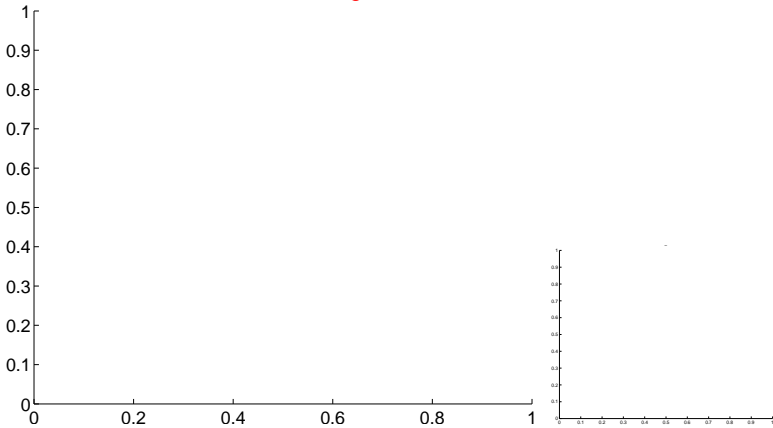


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

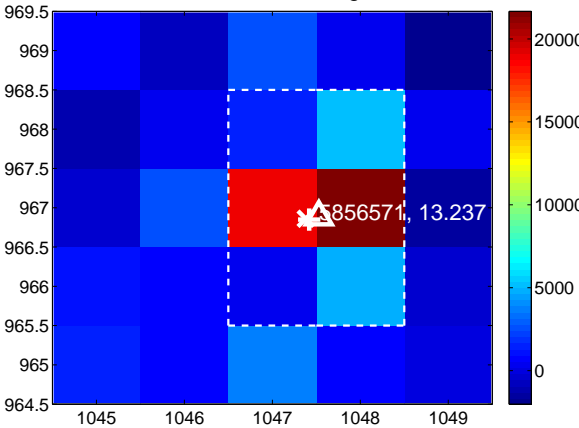
Q5 no difference image



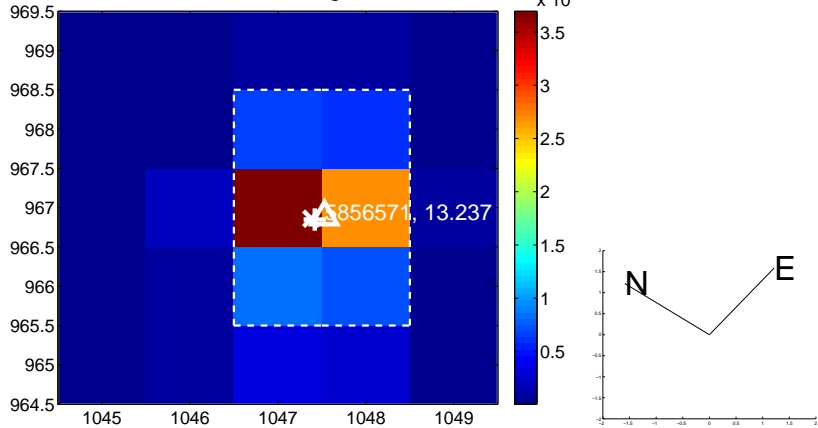
Q5 no OOT image



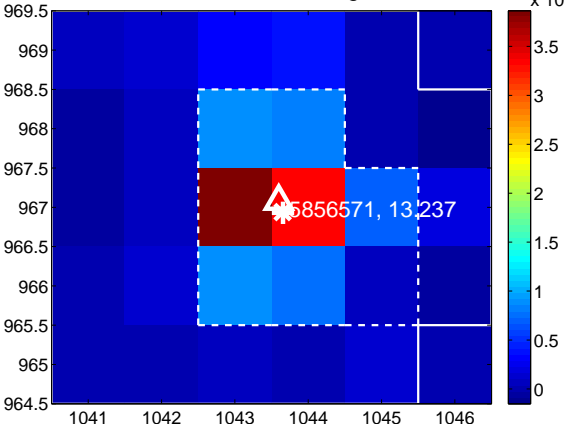
Q6 difference image



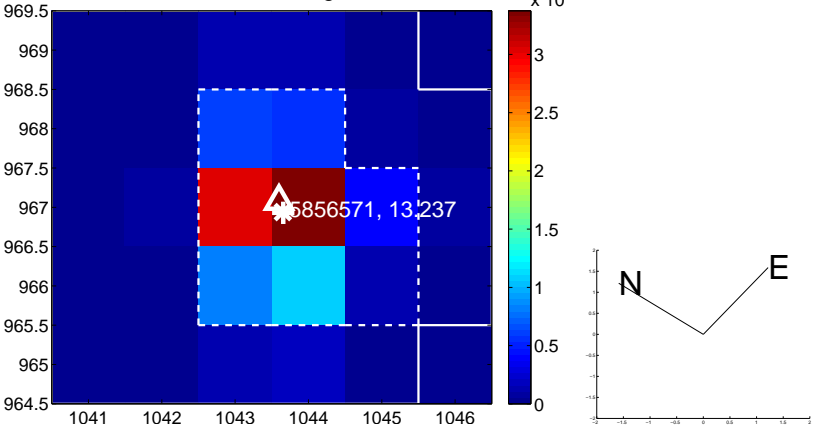
Q6 OOT image



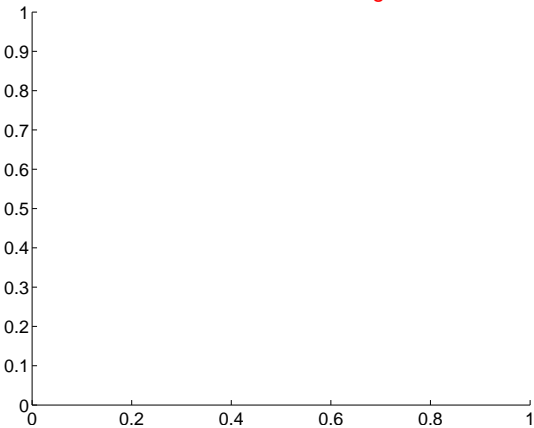
Q7 difference image



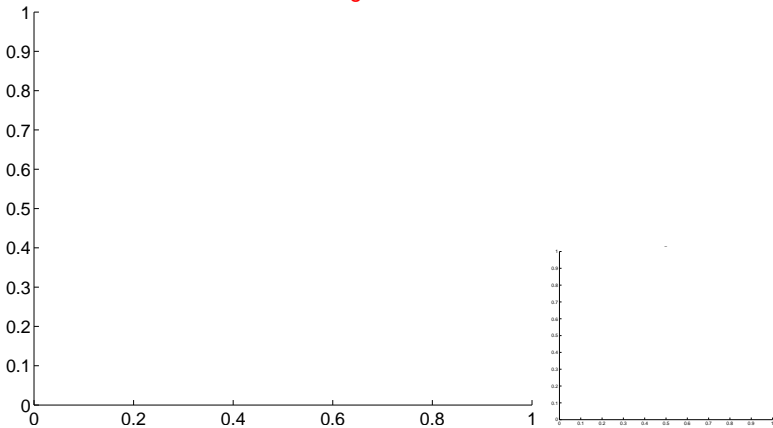
Q7 OOT image



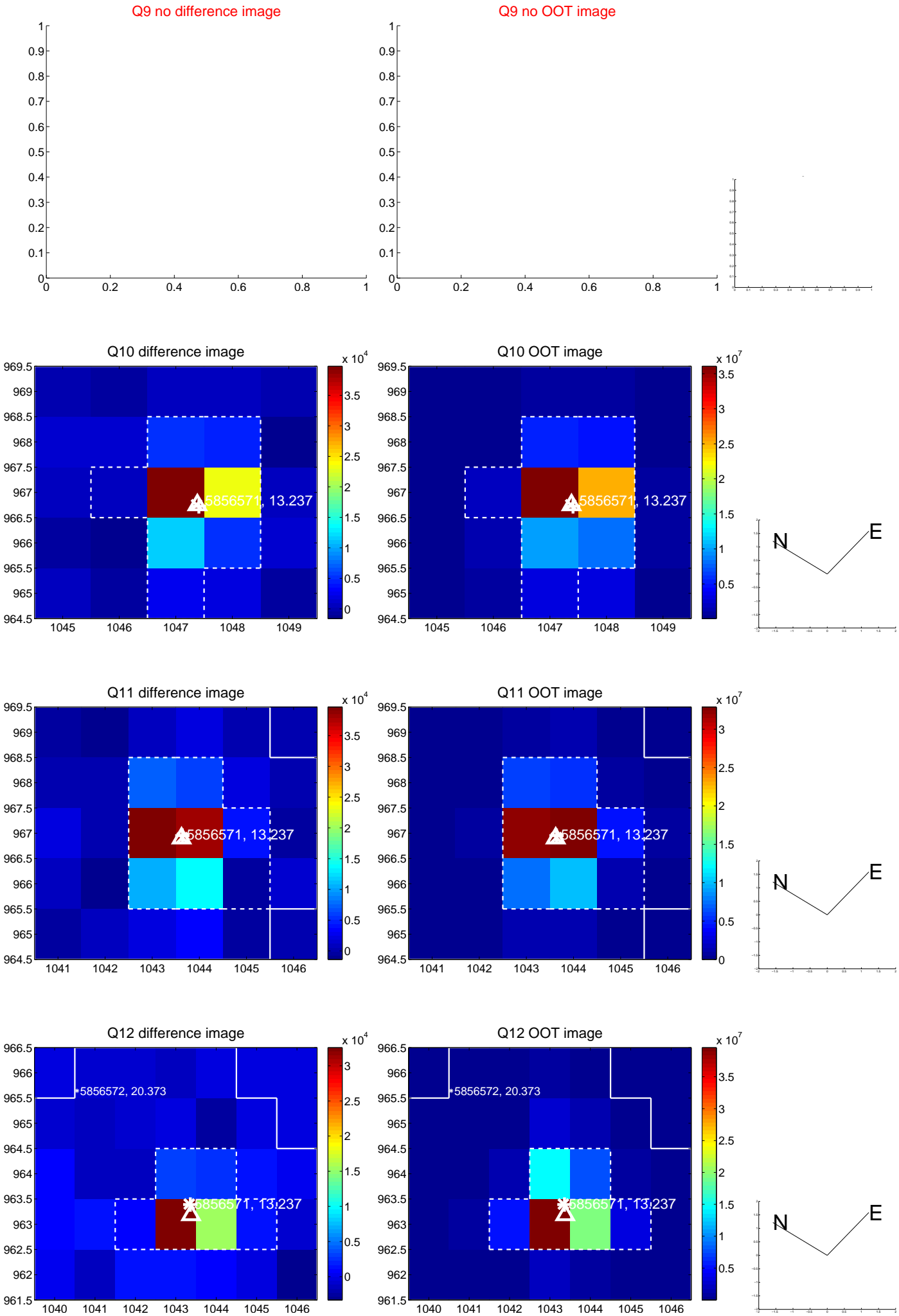
Q8 no difference image



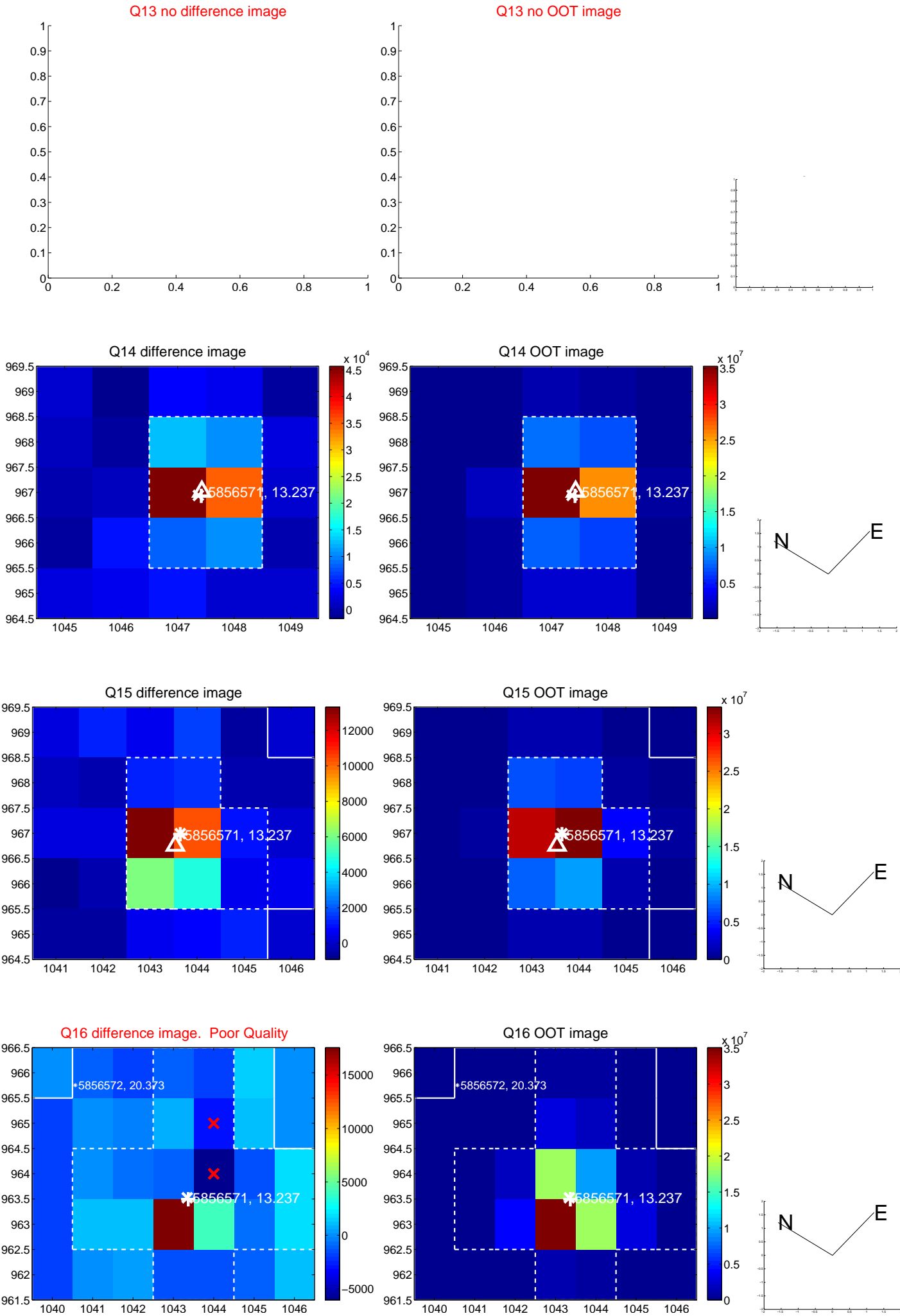
Q8 no OOT image



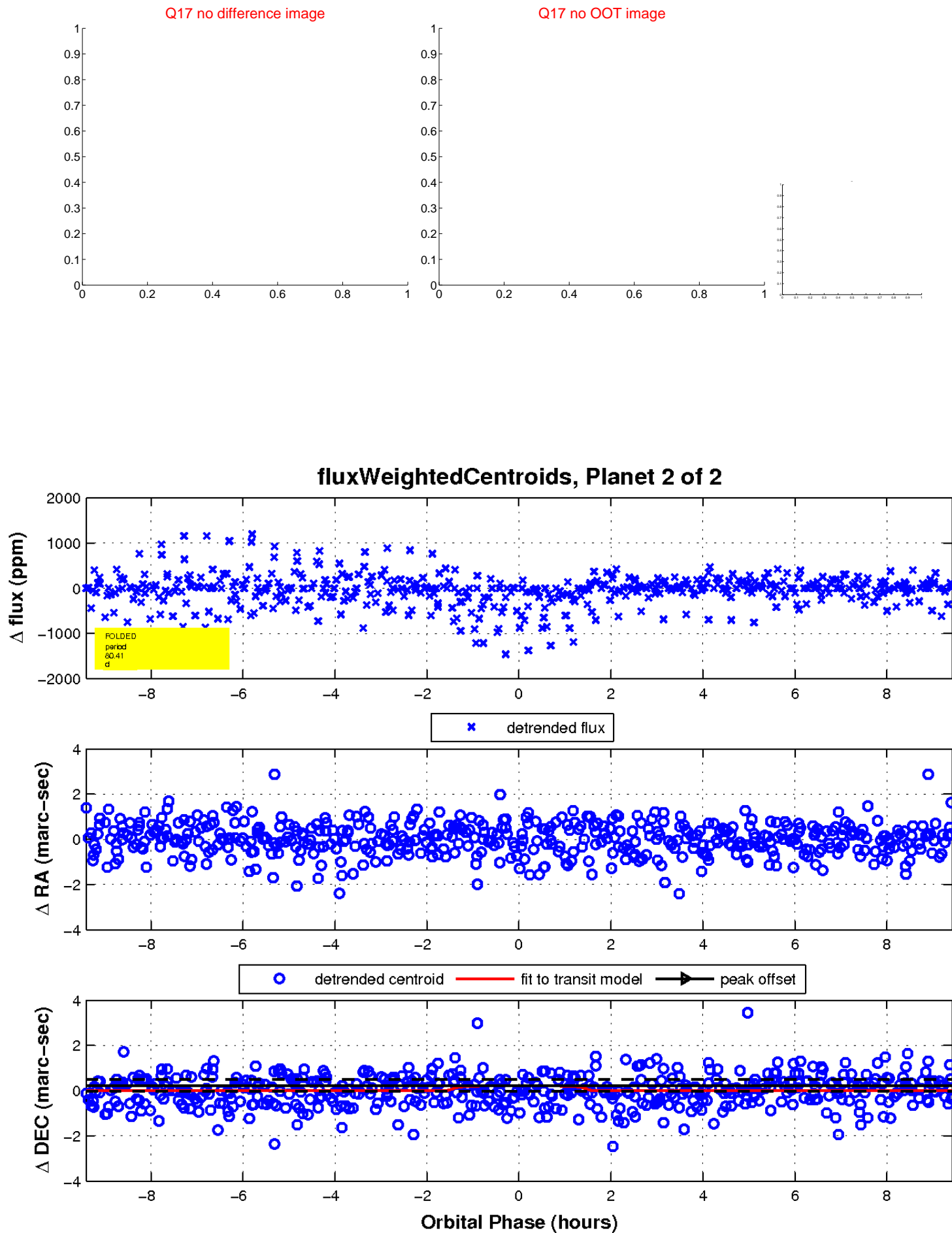
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



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





# UKIRT Image

Declination

