

# KIC 008760767

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008760767-01	OBS	No	0.750214	131.736012	17.7	3.031	8.7	9.8	3.01	7099	1.48	54702.39
008760767-02	OBS	No	242.382889	340.454362	101.3	12.000	7.5	-1.0	3.01	7099	3.05	24.68
008760767-03	OBS	No	119.455500	135.968667	228.1	2.145	7.2	7.6	3.01	7099	5.13	63.38
008760767-04	OBS	No	239.972169	220.181556	193.0	6.806	8.1	7.6	3.01	7099	4.91	25.01

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008760767-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
008760767-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL_SKYE—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_NOFITS
008760767-03	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_ALT—MOD_POS_ALT—CENT_UNRESOLVED_OFFSET
008760767-04	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_UNRESOLVED_OFFSET—HALO_GHOST

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

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

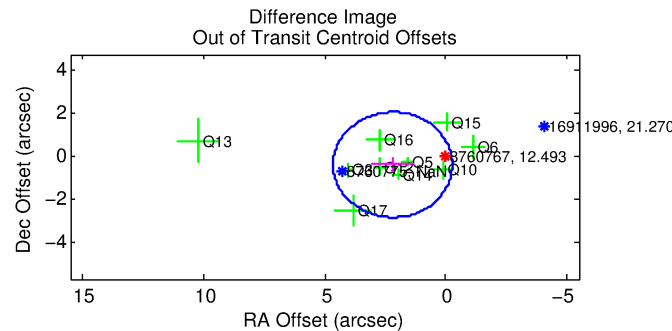
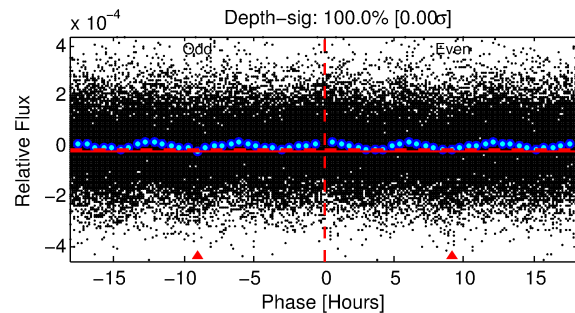
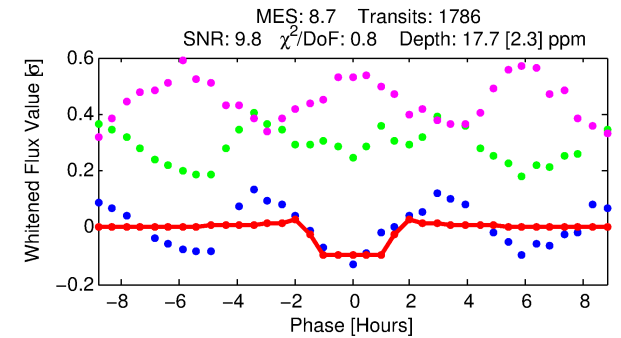
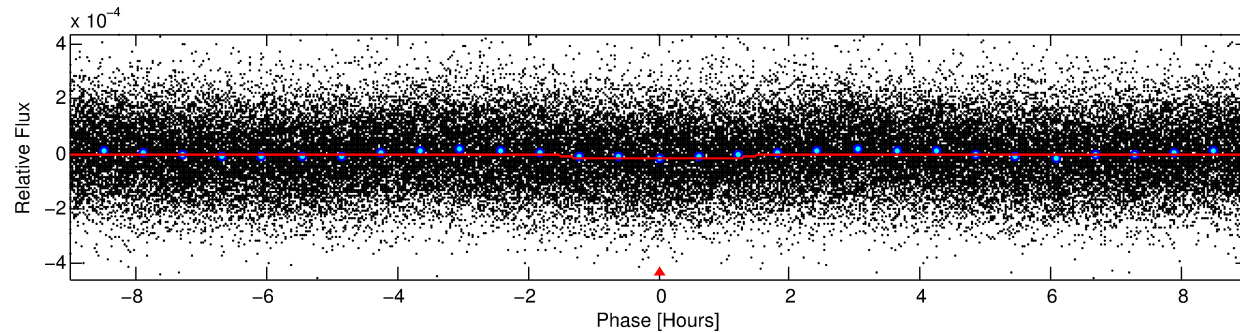
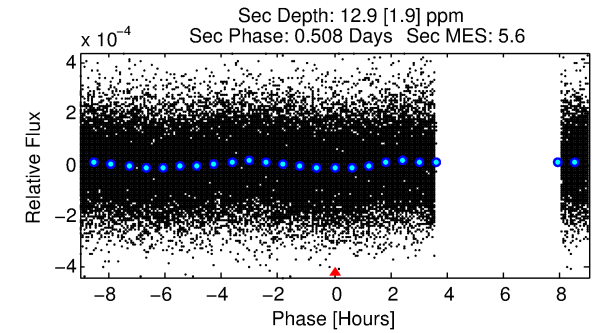
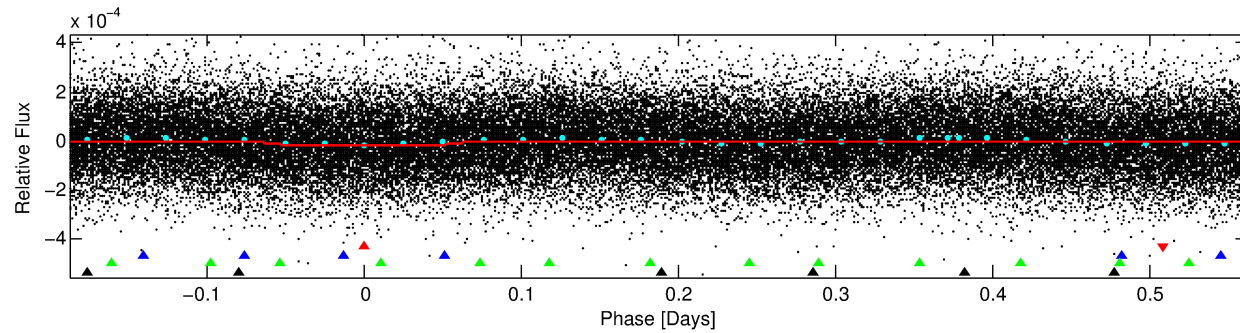
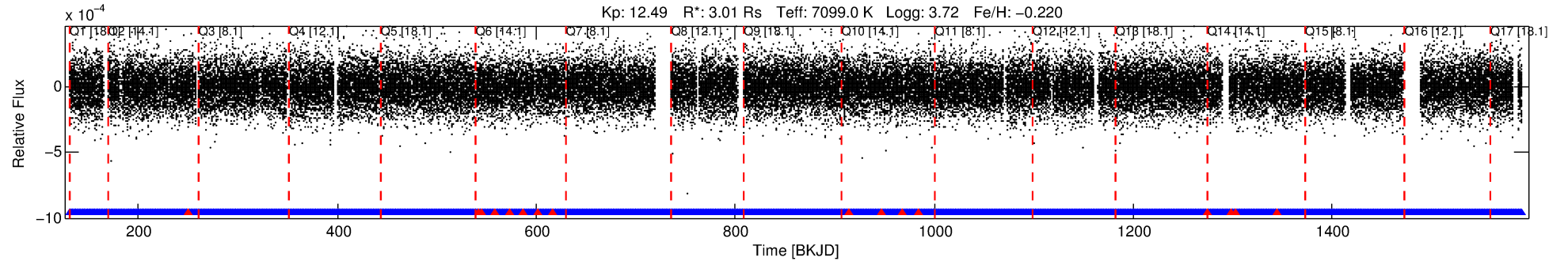
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 008760767-01

No Significant Match Found

# DV One-Page Summary

KIC: 8760767 Candidate: 1 of 4 Period: 0.750 d



## DV Fit Results:

Period = 0.75021 [0.00001] d  
Epoch = 131.7360 [0.0026] BKJD  
Rp/R\* = 0.0045 [0.0011]  
a/R\* = 1.26 [0.68]  
b = 0.90 [0.31]  
Seff = 54702.39 [29223.85]  
Teq = 3900 [521] K  
Rp = 1.48 [0.66] Re  
a = 0.0194 [0.0065] AU  
Ag = 1.22 [0.90] [0.25σ]  
Teffp = 6340 [853] K [2.44σ]

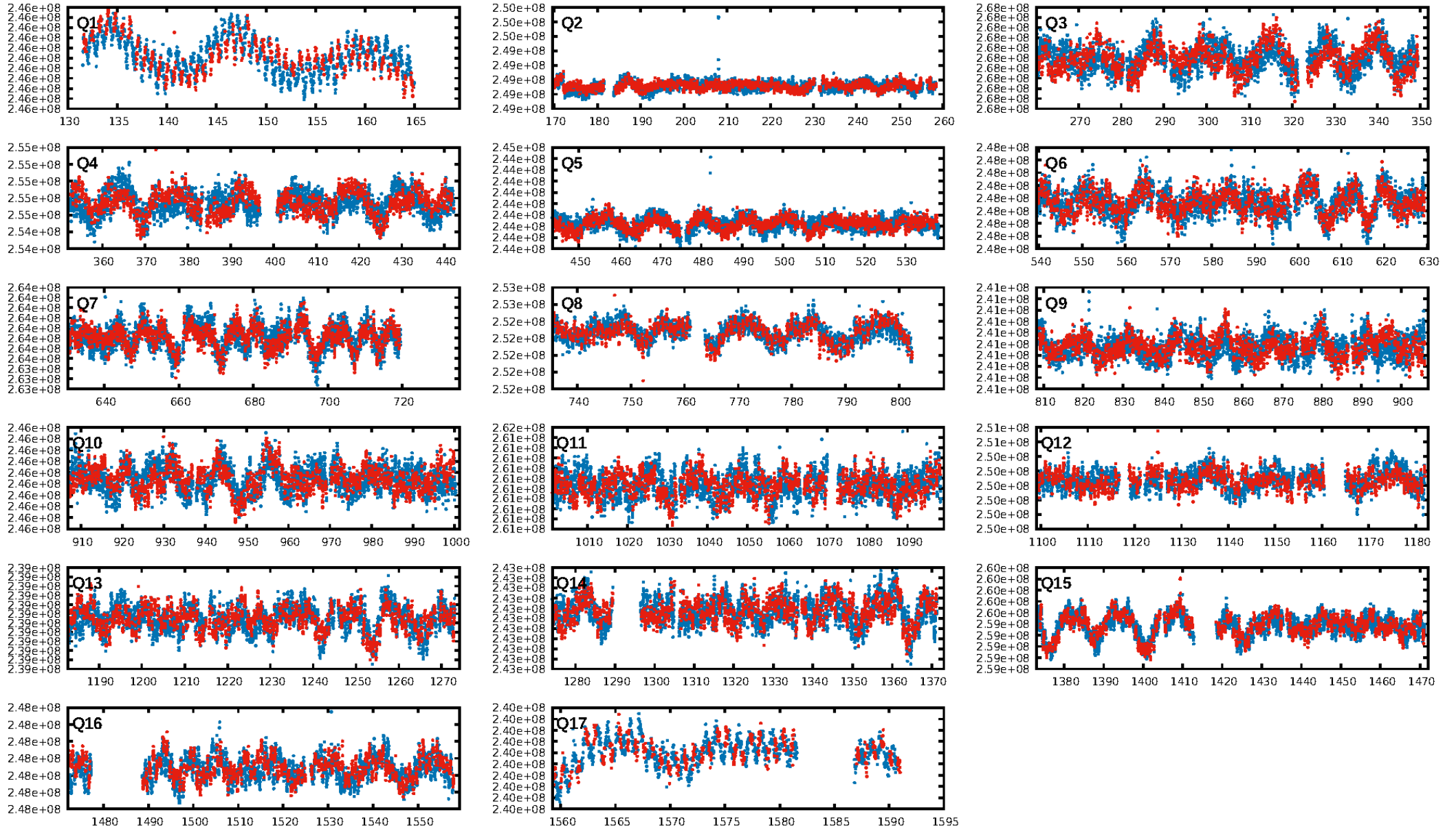
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [767.26σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 4.70e-16  
RollingBand-fgt: 0.99 [1689/1705]  
GhostDiagnostic-chr: -6.087  
Centroid-sig: 79.0%  
Centroid-so: 0.290 arcsec [0.42σ]  
OotOffset-rm: 2.231 arcsec [2.72σ]  
OotOffset-st: 3/2/2/3 [10]  
KicOffset-rm: 2.152 arcsec [2.33σ]  
KicOffset-st: 3/2/2/3 [10]  
DiffImageQuality-fgm: 0.70 [7/10]  
DiffImageOverlap-fno: 1.00 [17/17]

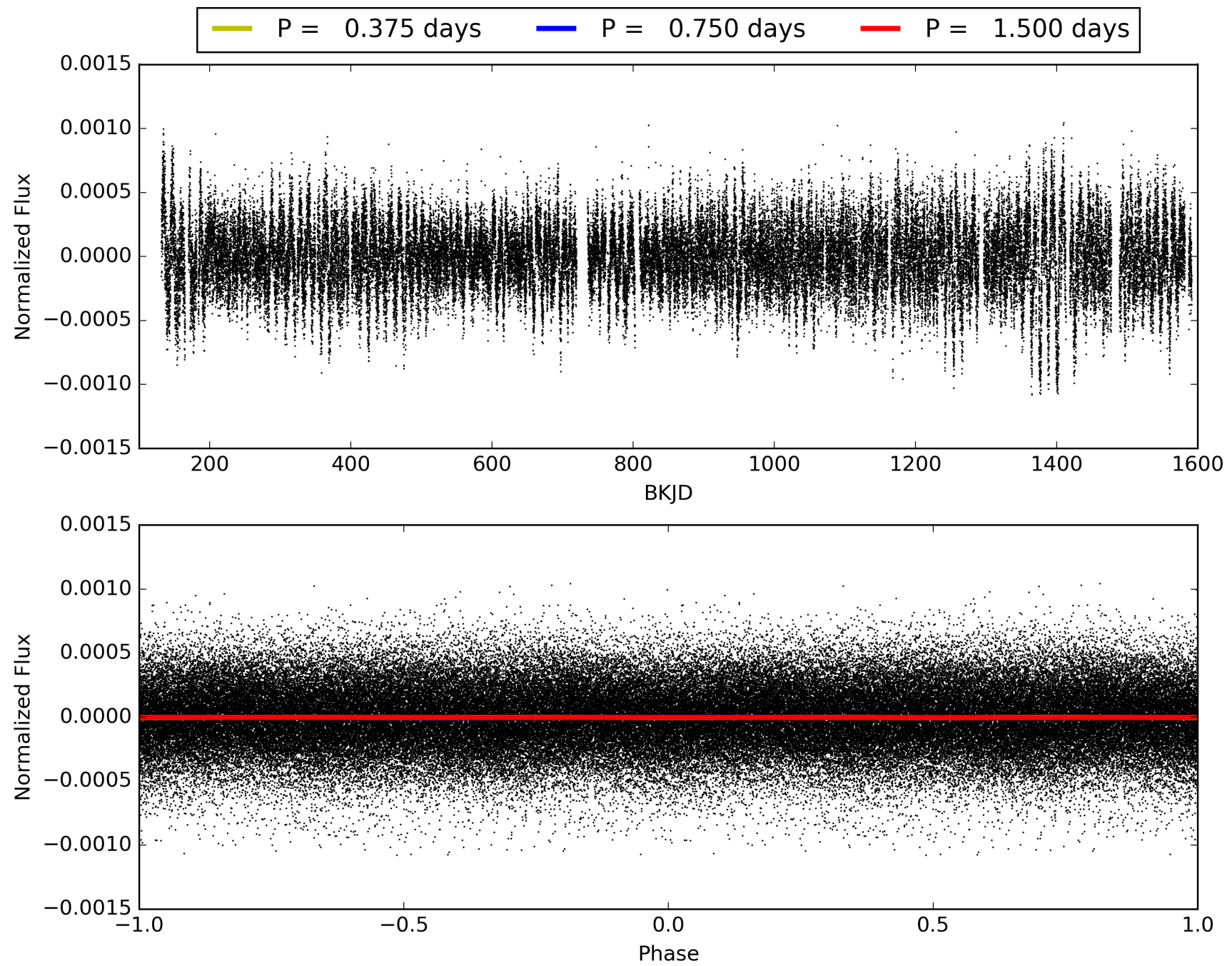
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 01:17:26 Z

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

# TCE 008760767-01, PDC Light Curves



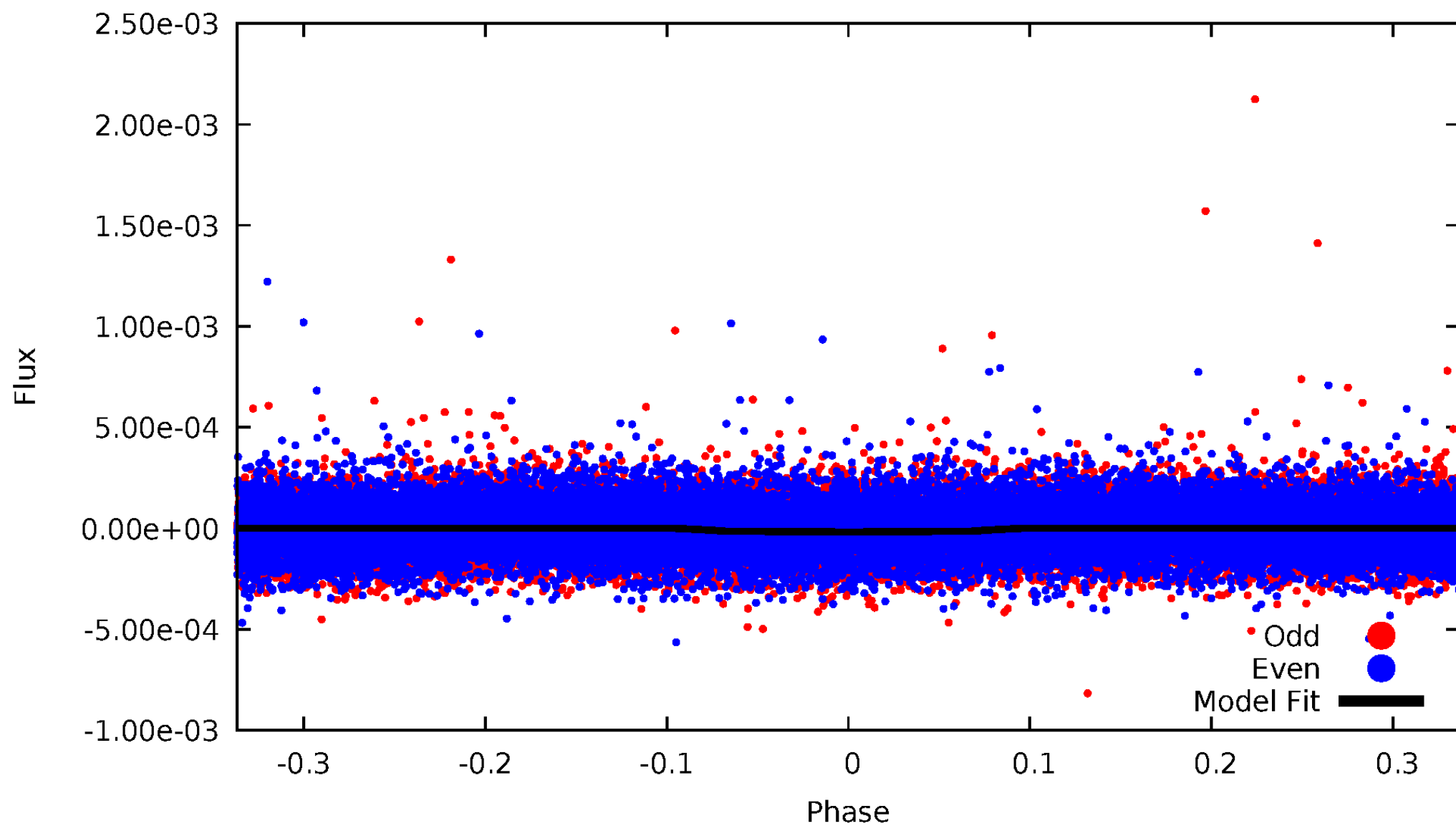
TCE 008760767-01





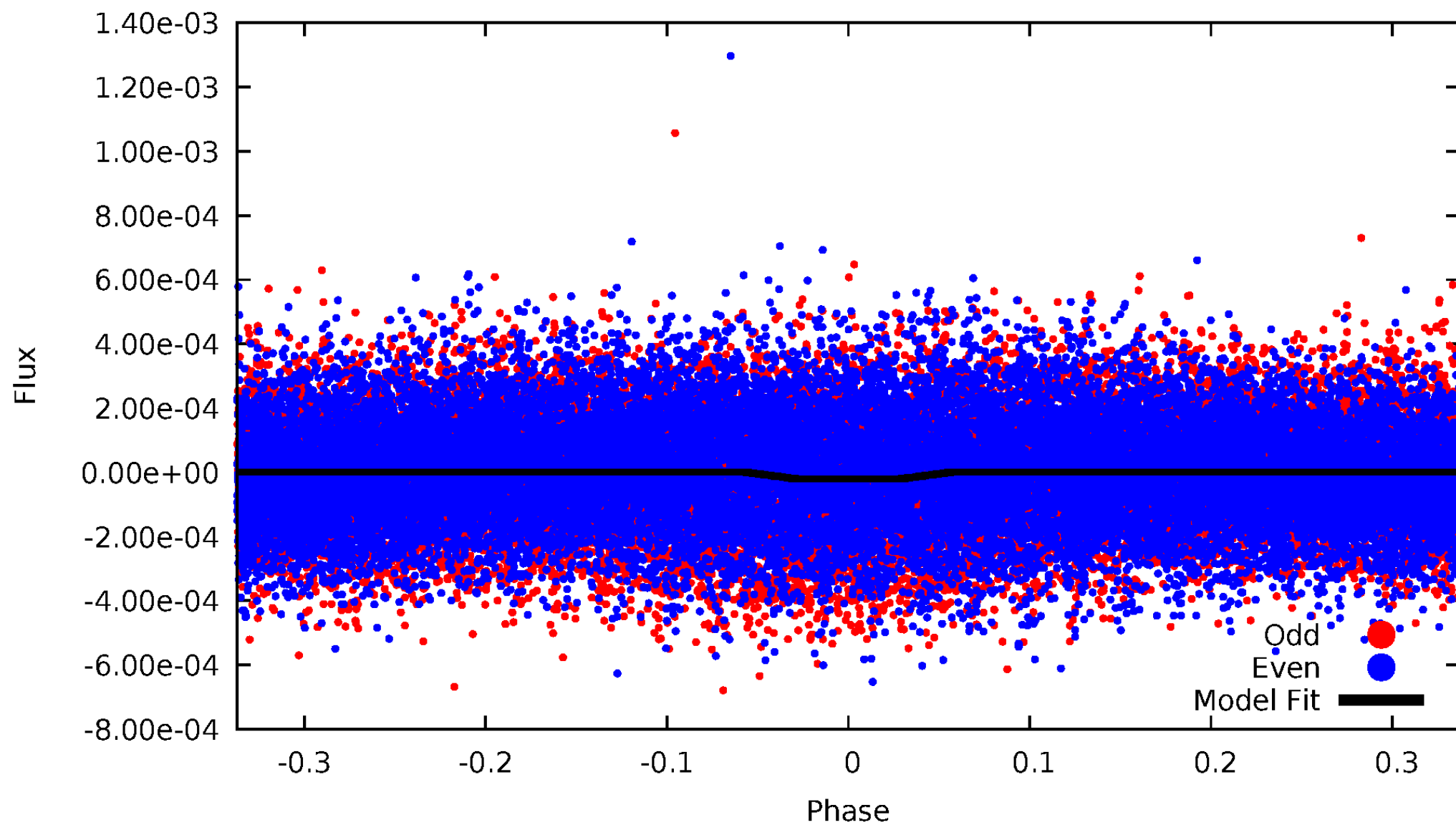
# DV Odd/Even

TCE 008760767-01

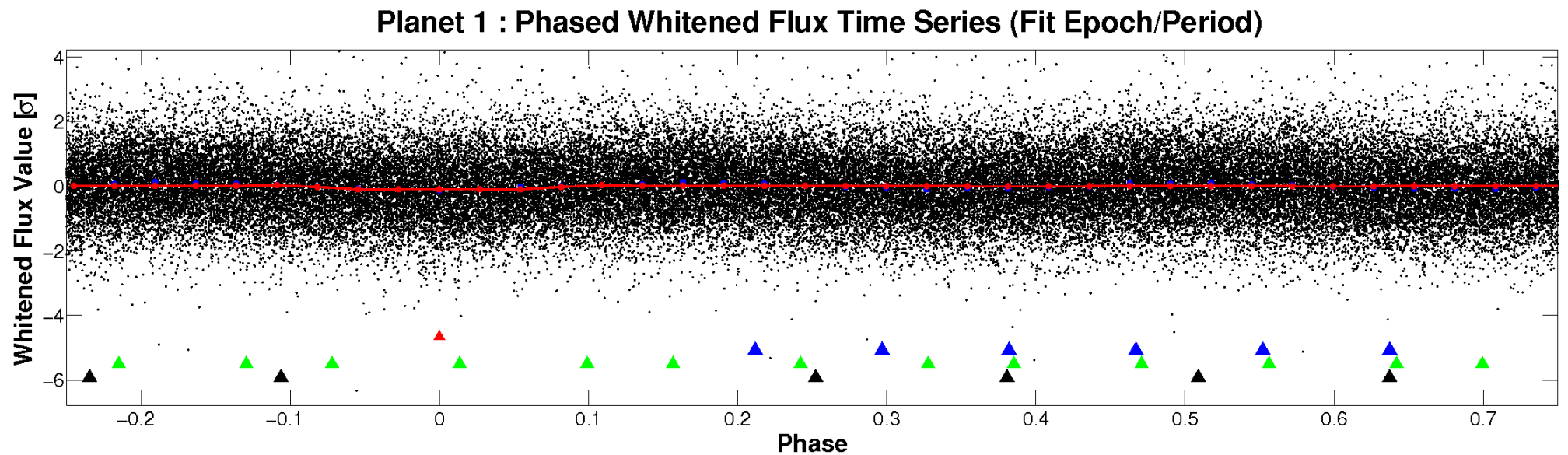
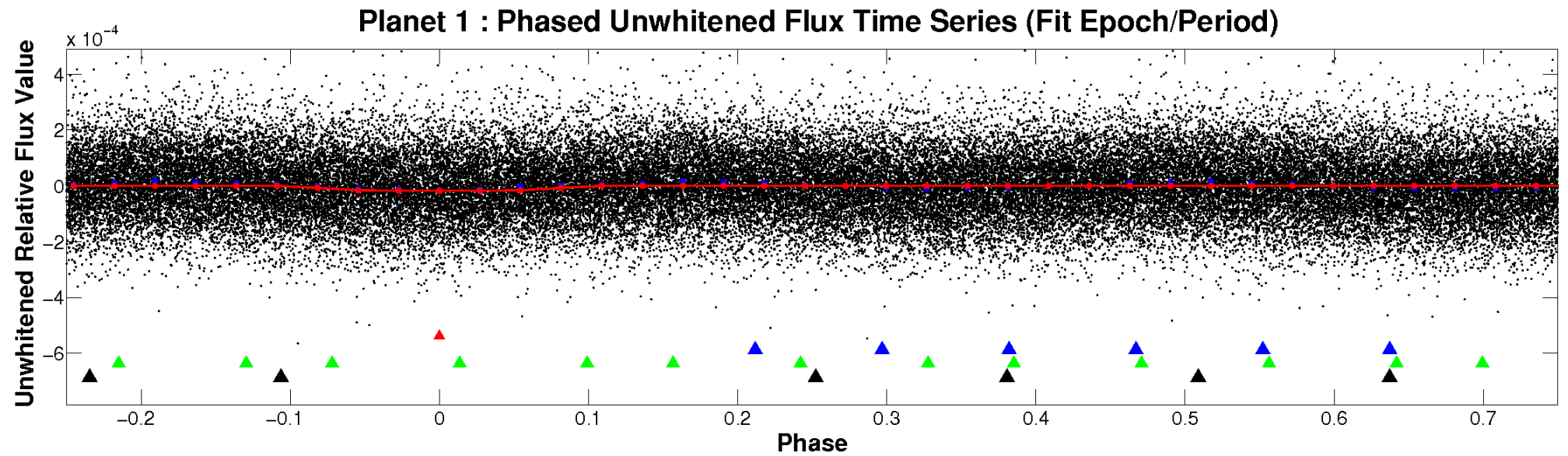


# ALT Odd/Even

TCE 008760767-01

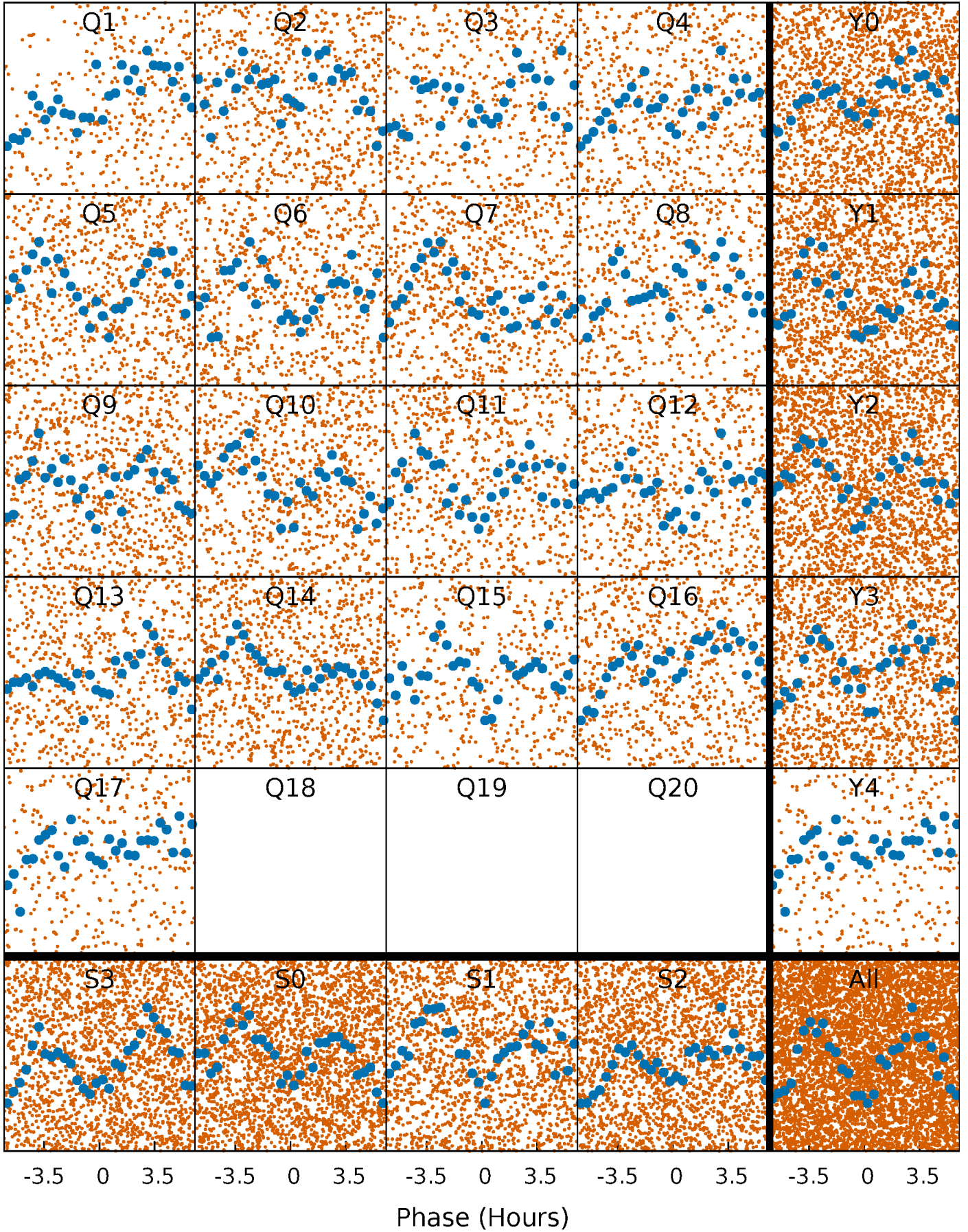


# Non-Whitened Vs. Whitened Light Curve



# PDC Quarter-Phased Transit Curves

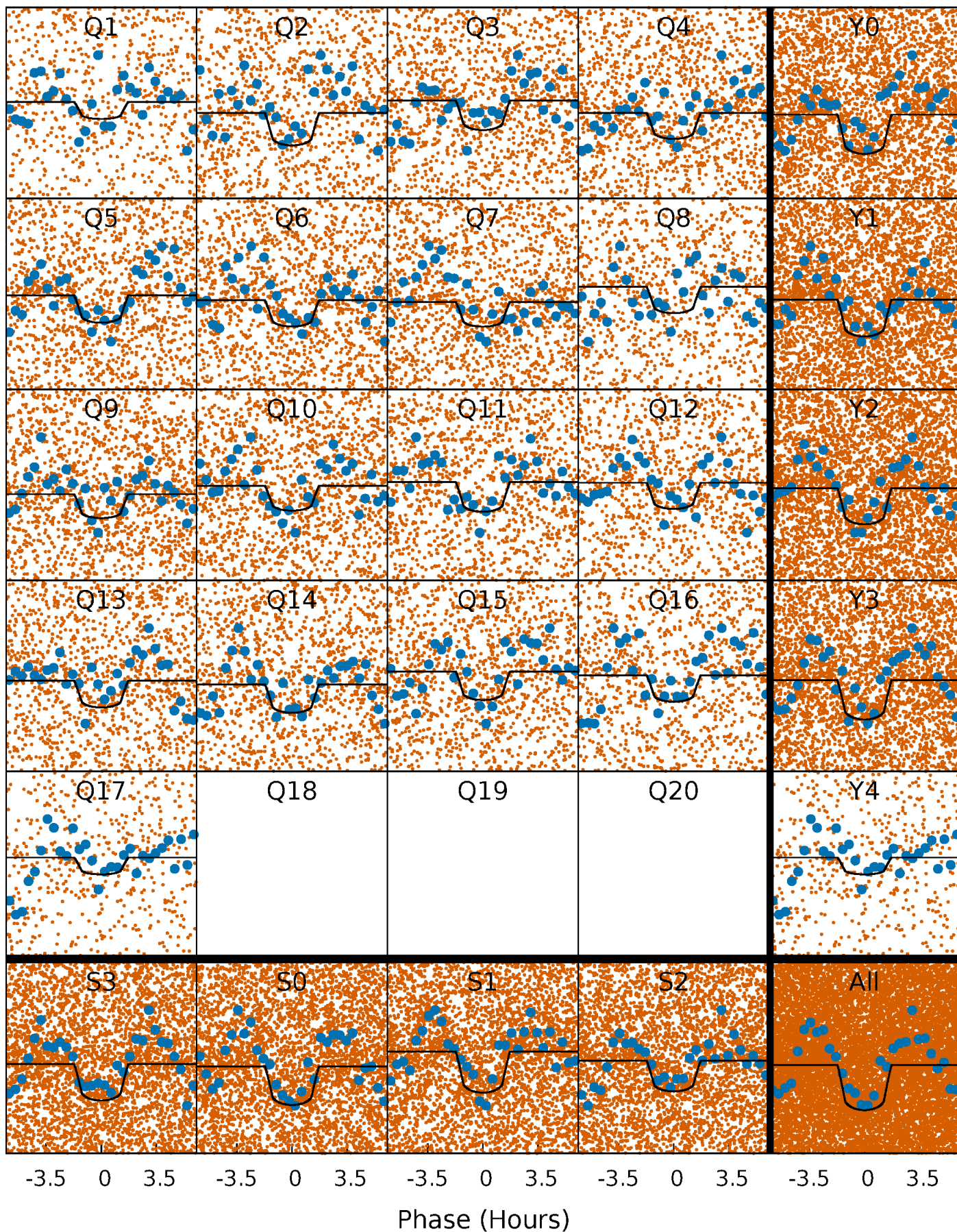
TCE 008760767-01   P= 0.750214 Days    $T_0=131.736012$  (BKJD)





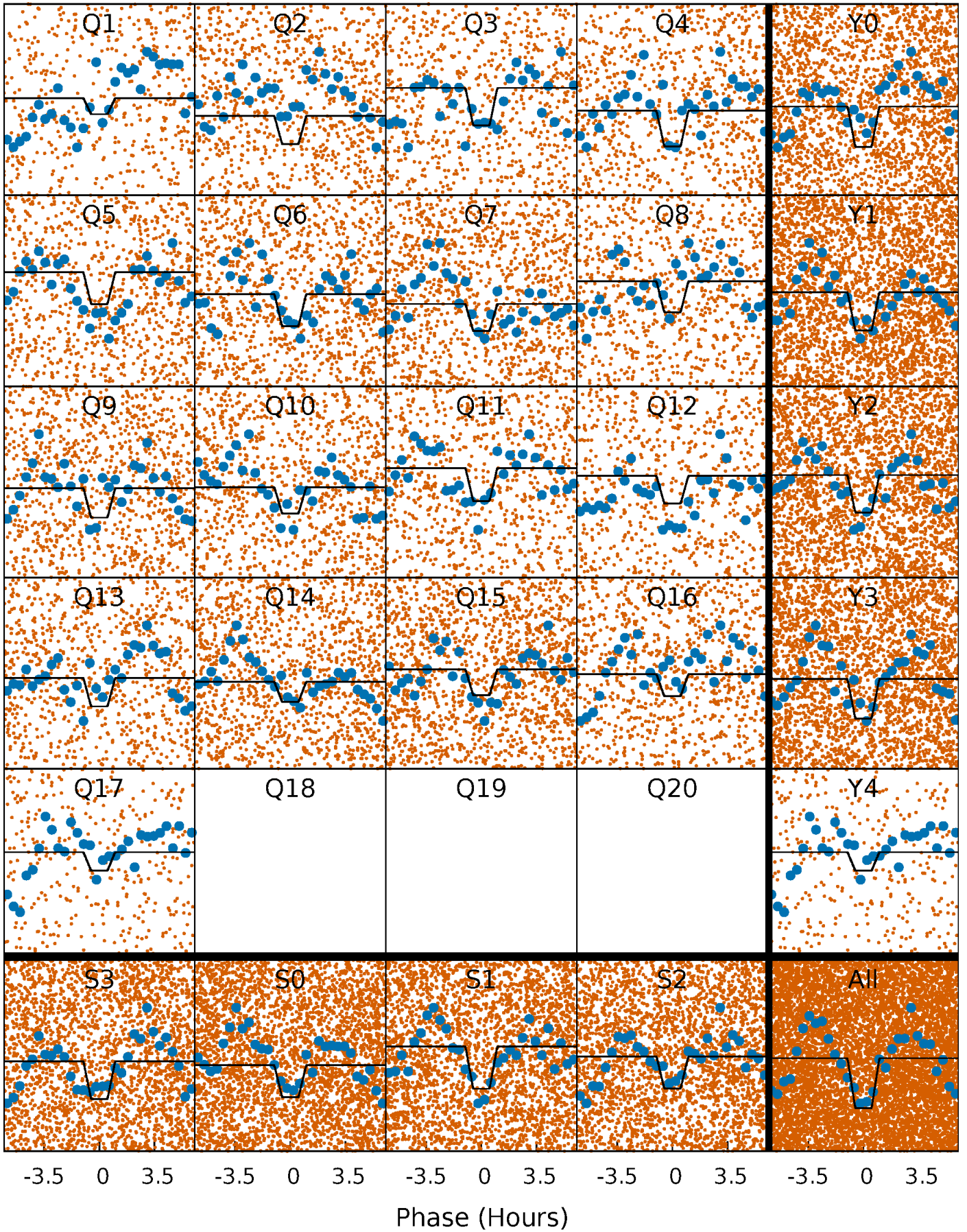
# DV Quarter-Phased Transit Curves

TCE 008760767-01   P= 0.750214 Days    $T_0=131.736012$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 008760767-01 P= 0.750214 Days  $T_0=131.736012$  (BKJD)

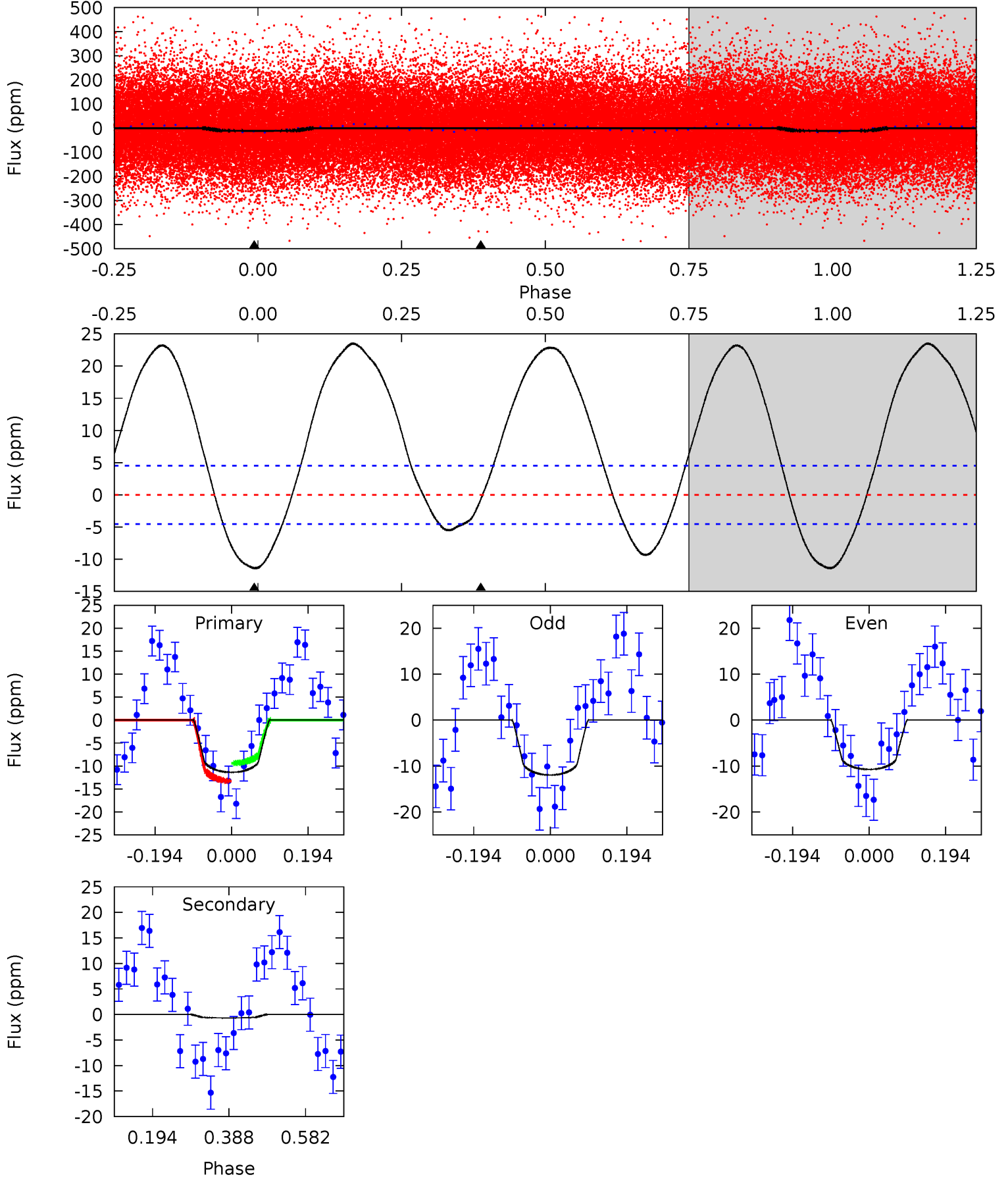




# DV Model-Shift Uniqueness Test

008760767-01, P = 0.750214 Days, E = 130.985798 Days

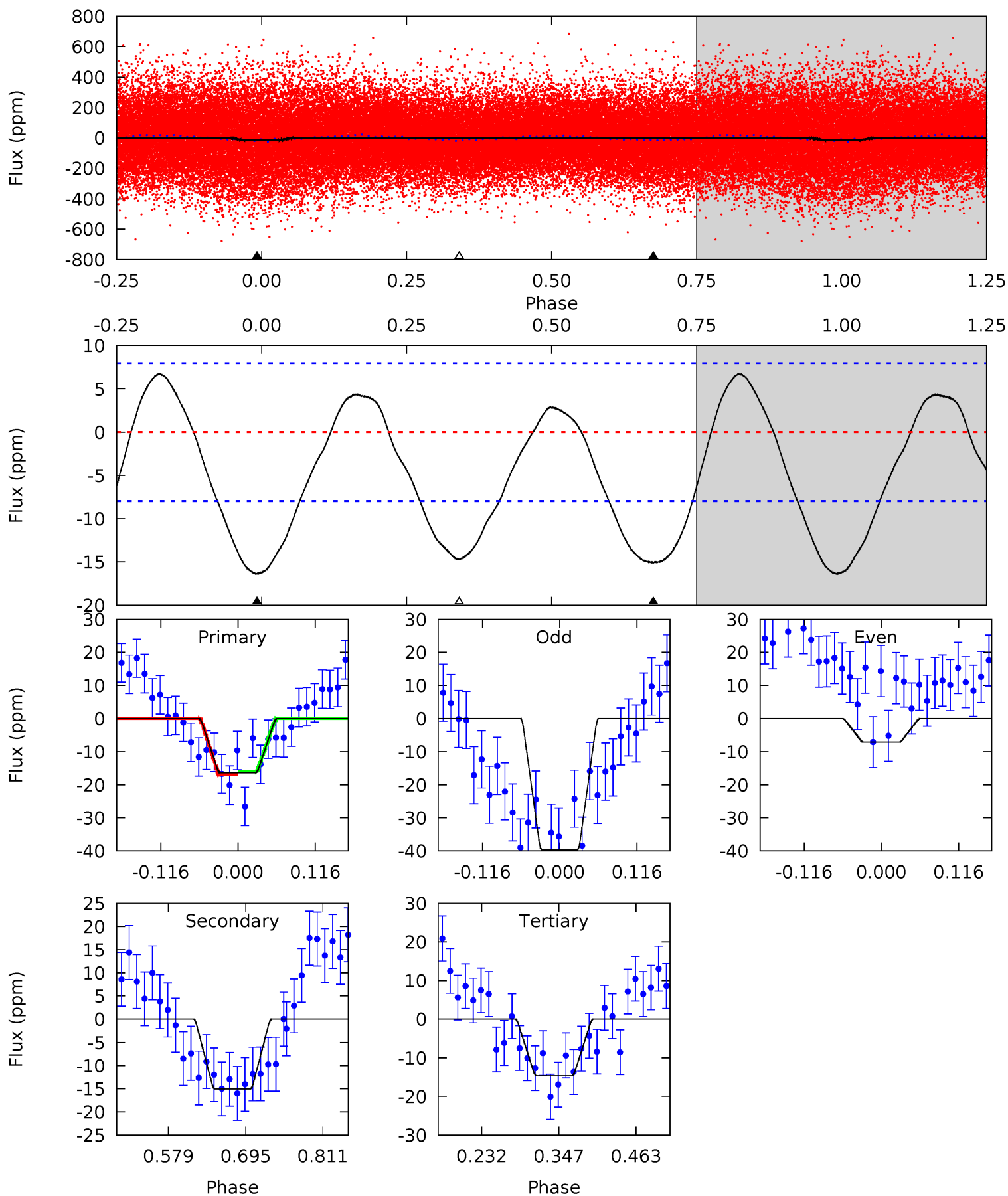
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
11.1	0.66	0	0	4.42	1.30	8.89	11.1	11.1	0.66	0.66	0.60	0.72	0.67	1.92



# Alt Model-Shift Uniqueness Test

008760767-01, P = 0.750214 Days, E = 130.985798 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
9.31	8.57	8.36	0	4.53	1.57	3.77	0.96	9.31	0.21	8.57	9.15	1.63	0.29	0.28





### Stellar Parameters For KIC 008760767

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$7099^{+191}_{-234}$	$3.720^{+0.296}_{-0.074}$	$-0.220^{+0.250}_{-0.300}$	$3.012^{+0.374}_{-1.121}$	$1.736^{+0.154}_{-0.359}$	$0.090^{+0.175}_{-0.023}$
	+3%/-3%	+8%/-2%	+114%/-136%	+12%/-37%	+9%/-21%	+196%/-25%
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 008760767-01 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-1\pm1$	$1.35^{+0.42}_{-0.36}$	$5327^{+301}_{-467}$	$-4241^{+772}_{-421}$	$0.076^{+0.148}_{-0.104}$
Alt.	$-15\pm2$	$1.40^{+0.40}_{-0.41}$	$5345^{+295}_{-462}$	$6156^{+1354}_{-850}$	$1.574^{+1.569}_{-0.590}$

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

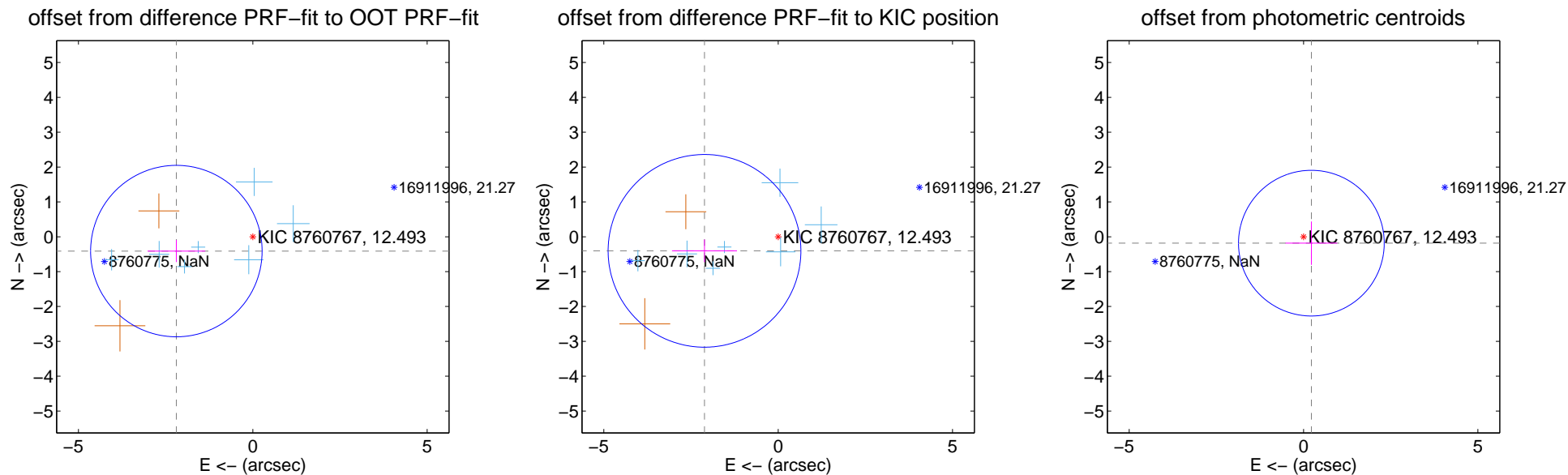
## DV Centroid Data

Supplemental centroid analysis for 008760767-01. Kepler magnitude: 12.49. Transit SNR 9.76

There are 7 quarters with good PRF difference image offsets

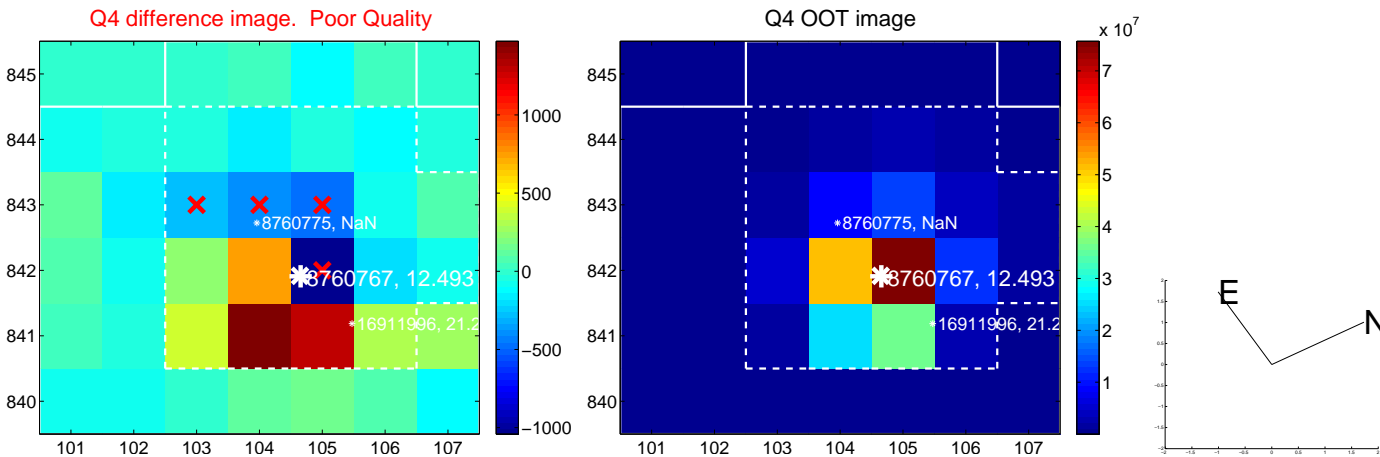
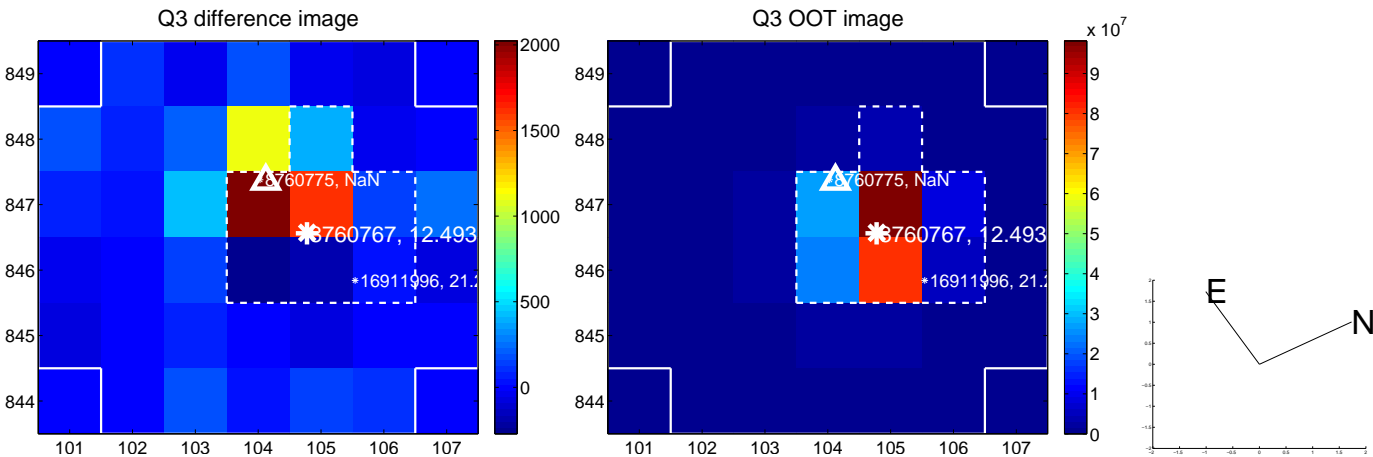
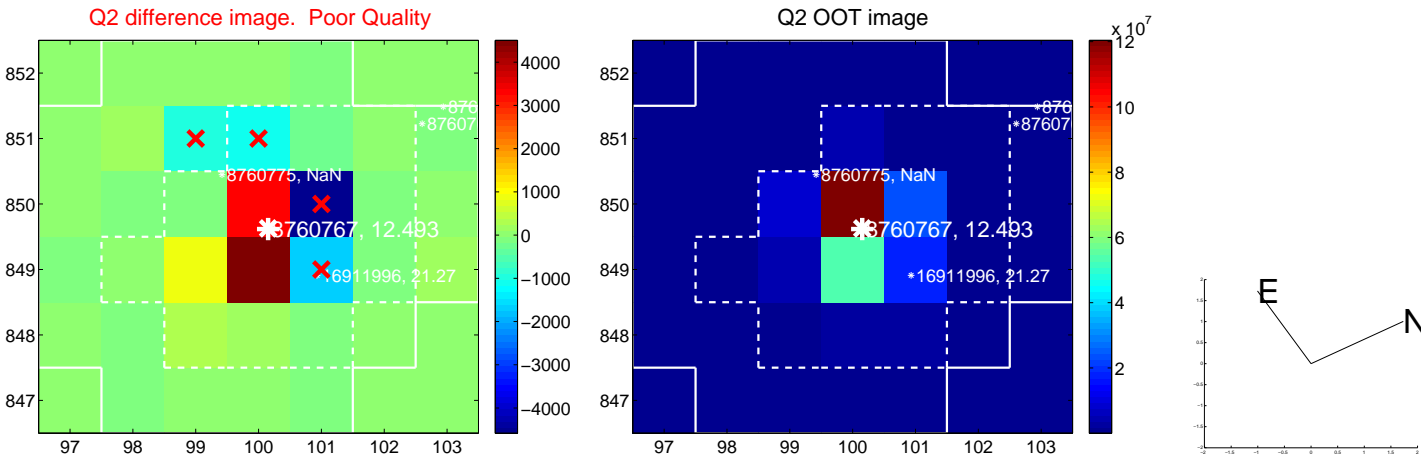
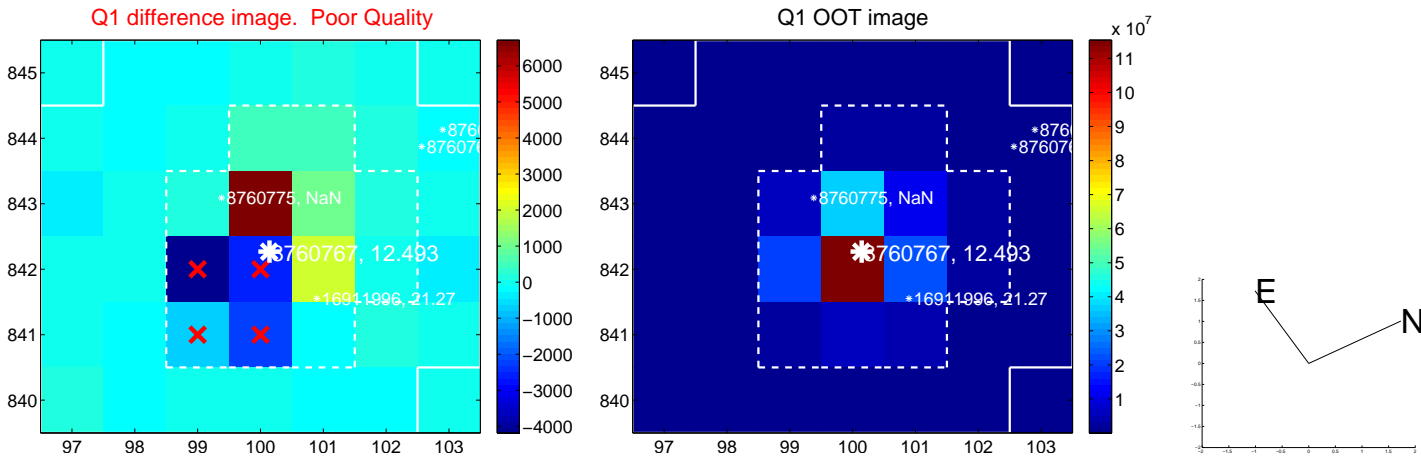
The direct PRF centroid is offset from the target star catalog position by about 0.06 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$2.231 \pm 0.820$	2.72	$2.193 \pm 0.827$	$-0.410 \pm 0.316$
PRF-fit source offset from KIC position	$2.152 \pm 0.922$	2.33	$2.113 \pm 0.932$	$-0.404 \pm 0.325$
photometric centroid source offset	$0.29 \pm 0.70$	0.42	$-0.22 \pm 0.74$	$-0.18 \pm 0.62$

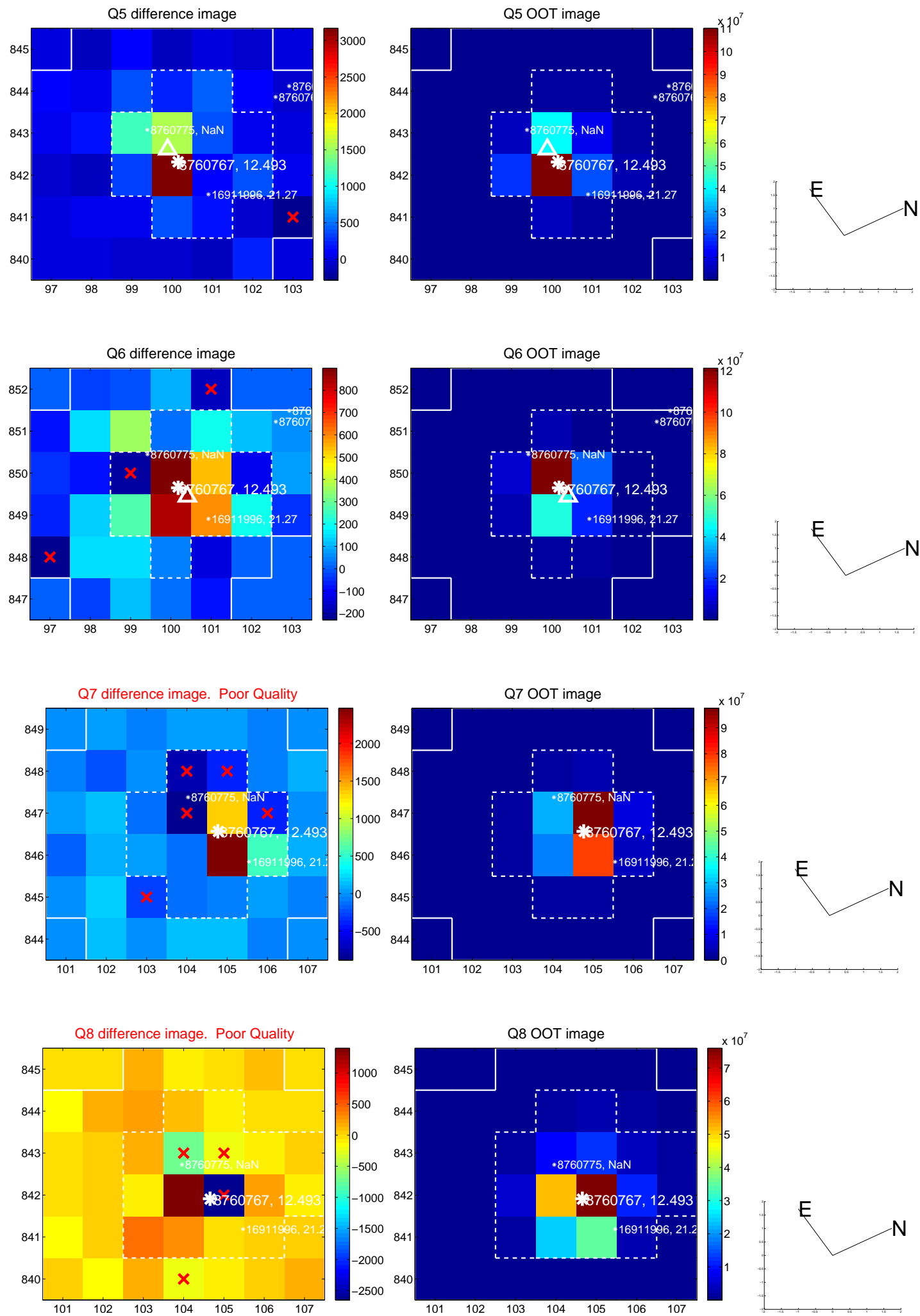


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

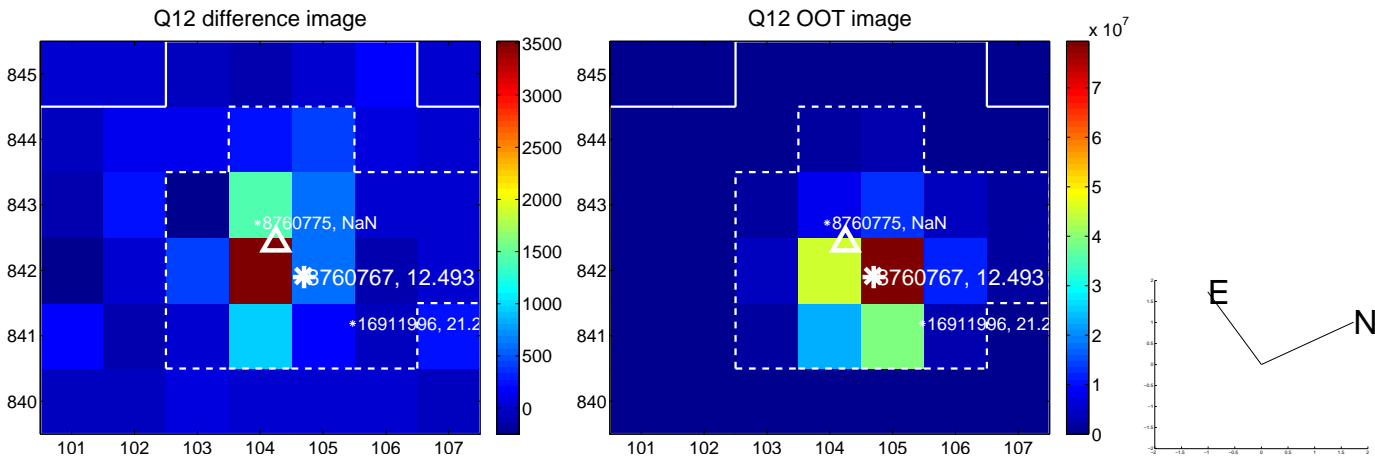
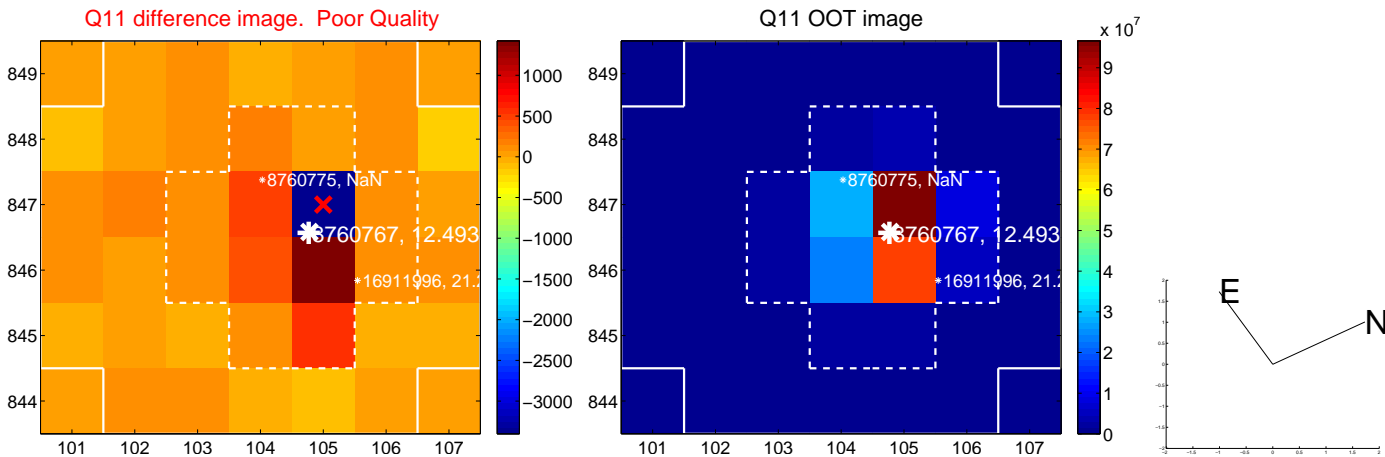
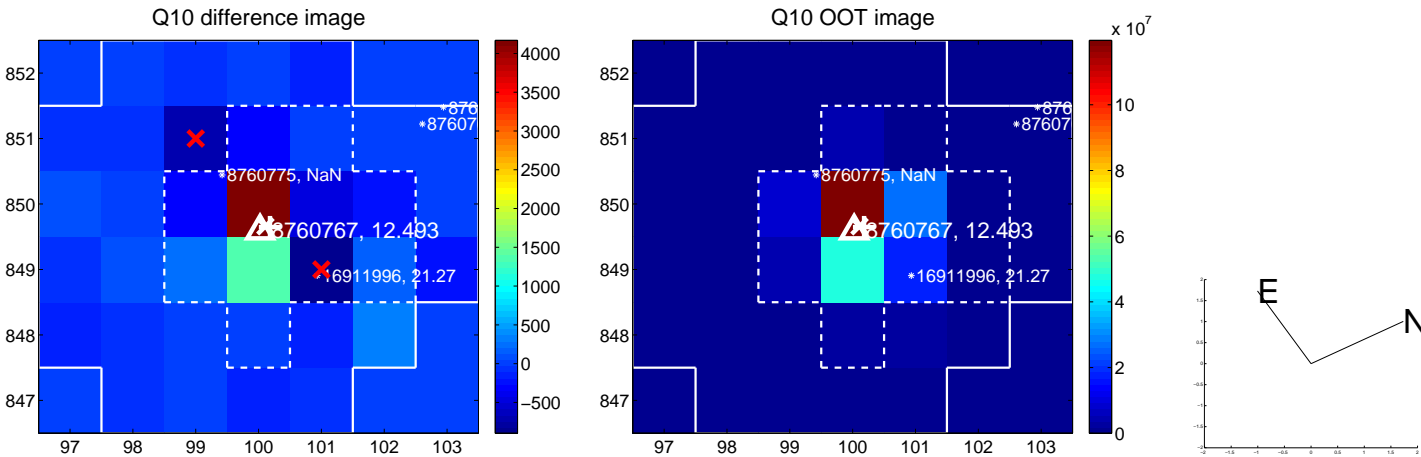
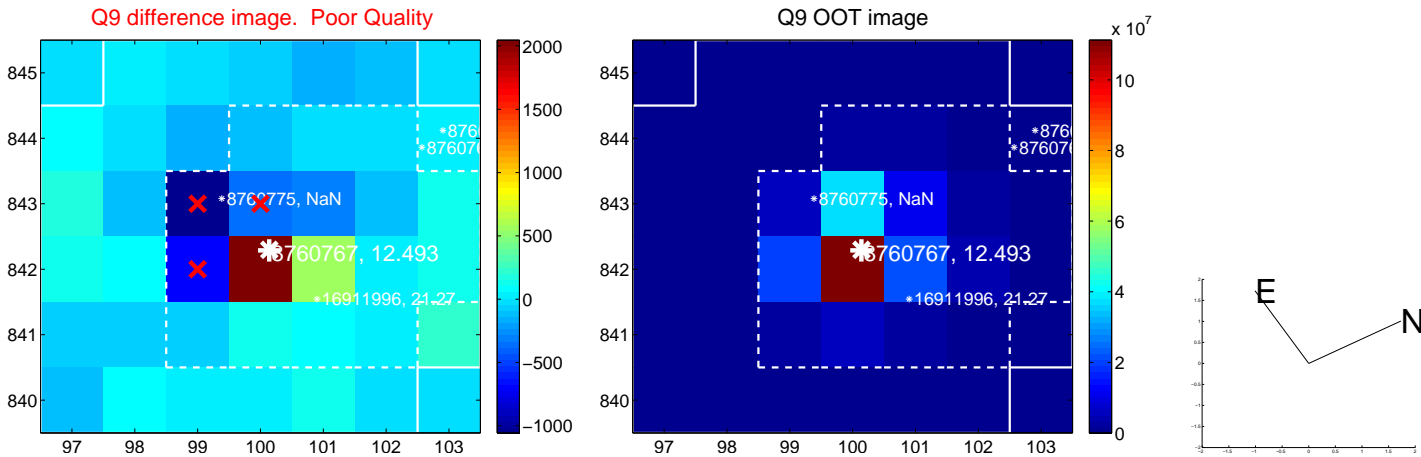


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

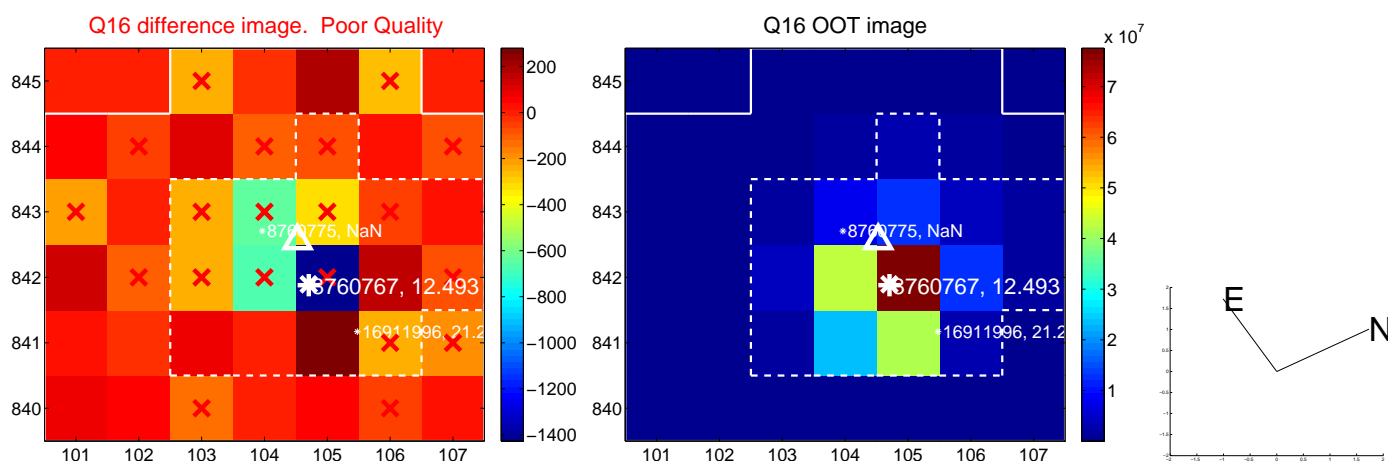
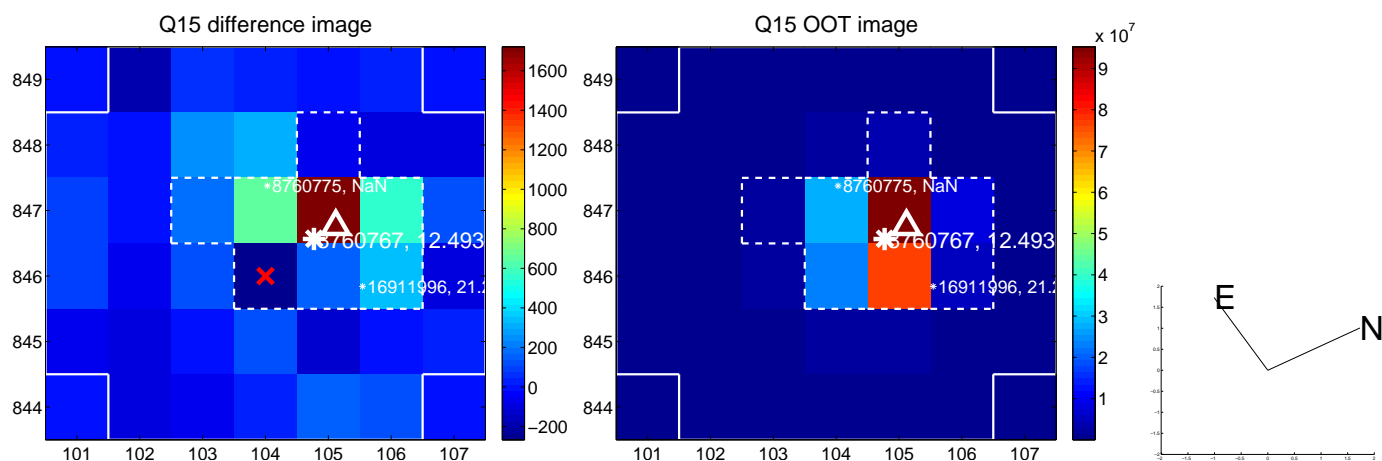
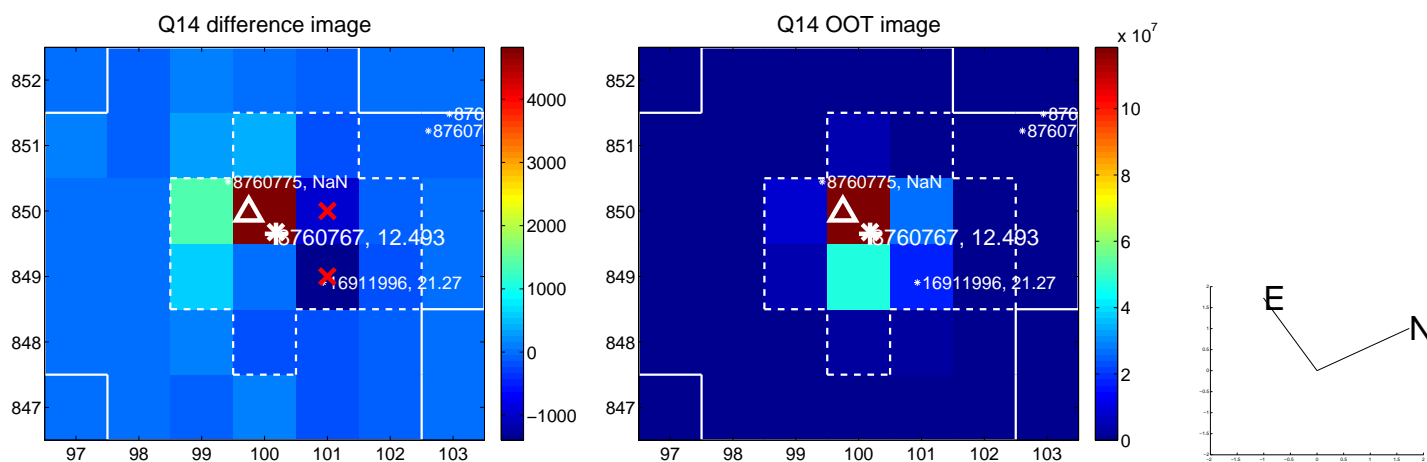
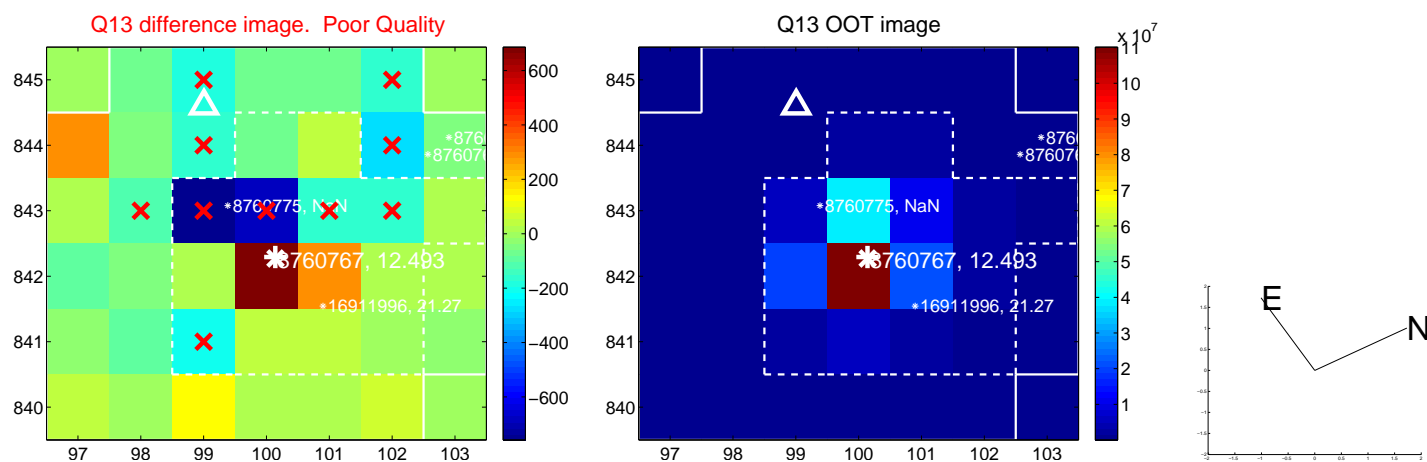




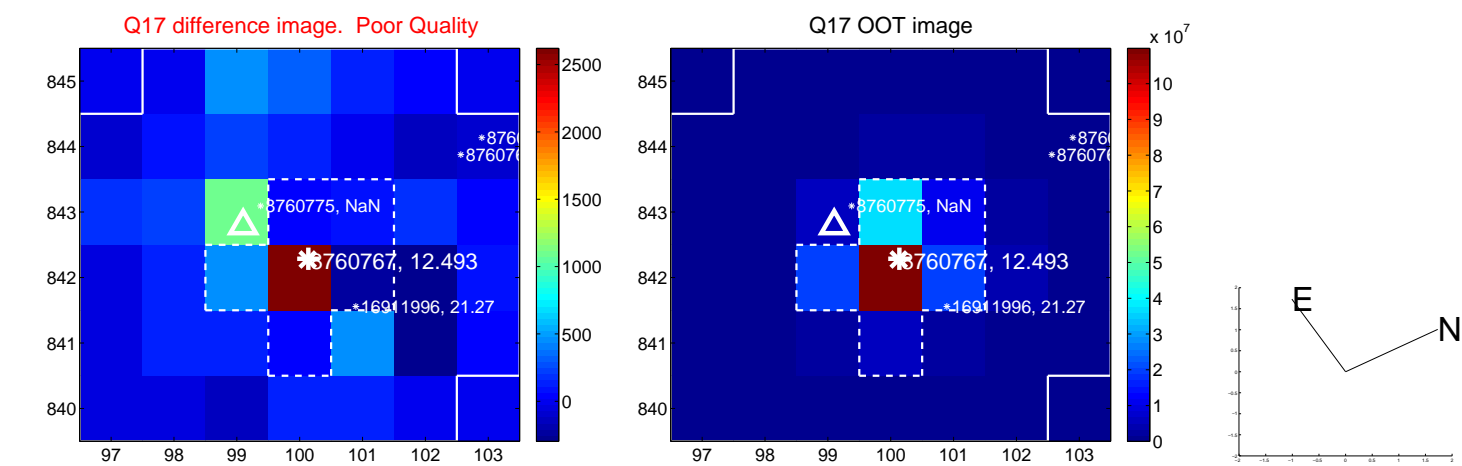
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



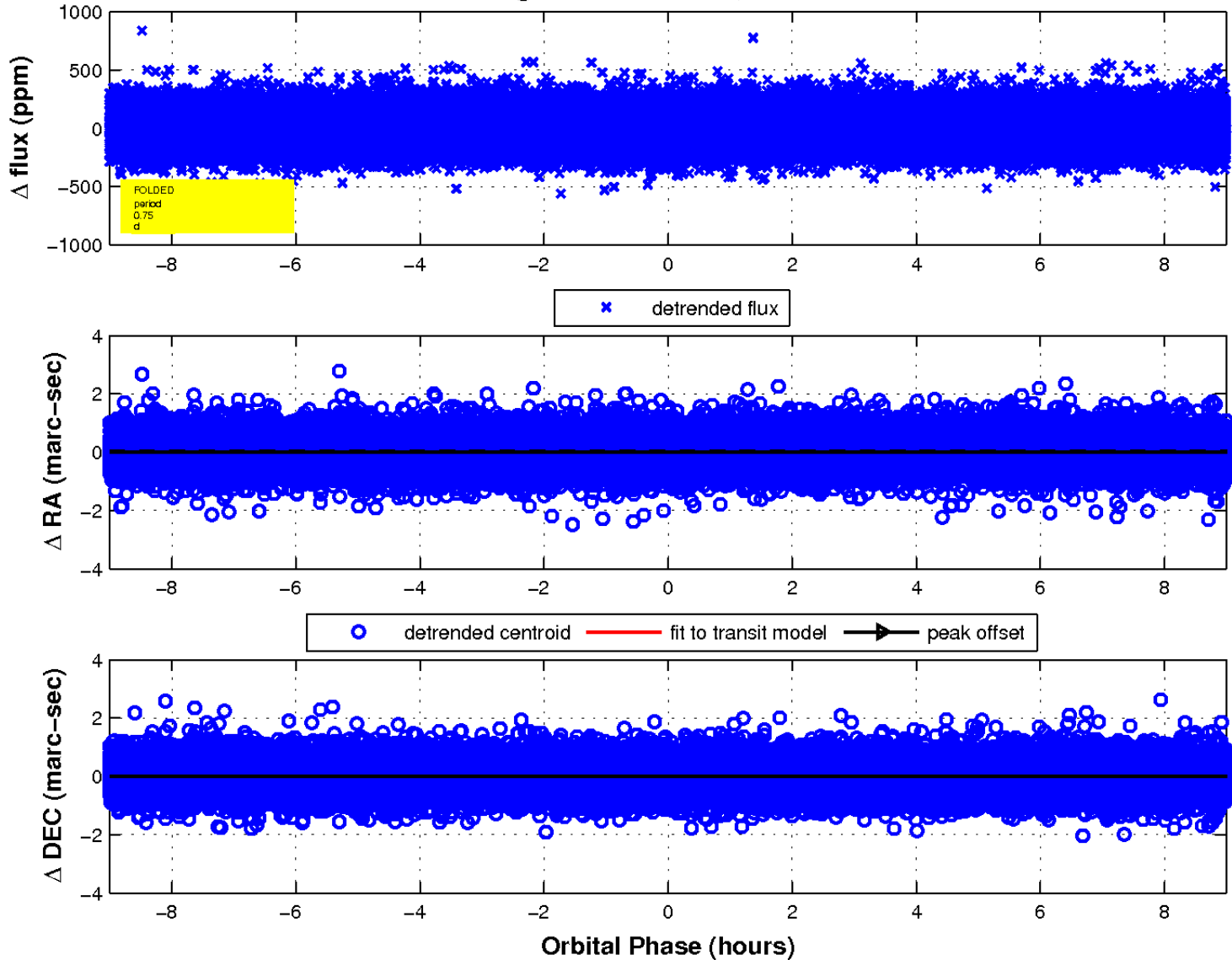
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

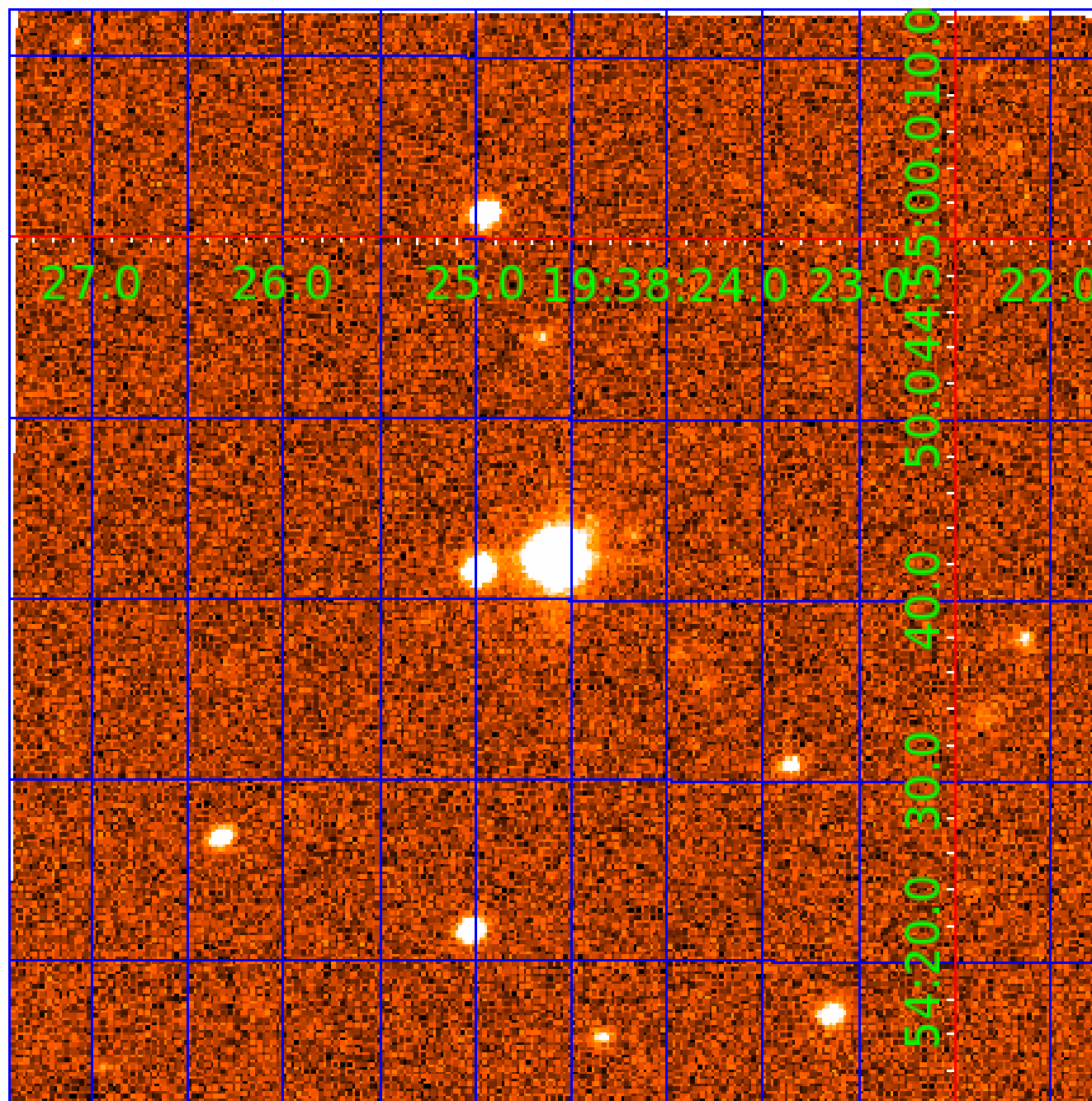


fluxWeightedCentroids, Planet 1 of 4



UKIRT Image

Declination





# KIC 008760767

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008760767-01	OBS	No	0.750214	131.736012	17.7	3.031	8.7	9.8	3.01	7099	1.48	54702.39
008760767-02	OBS	No	242.382889	340.454362	101.3	12.000	7.5	-1.0	3.01	7099	3.05	24.68
008760767-03	OBS	No	119.455500	135.968667	228.1	2.145	7.2	7.6	3.01	7099	5.13	63.38
008760767-04	OBS	No	239.972169	220.181556	193.0	6.806	8.1	7.6	3.01	7099	4.91	25.01

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008760767-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
008760767-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL_SKYE—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_NOFITS
008760767-03	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_ALT—MOD_POS_ALT—CENT_UNRESOLVED_OFFSET
008760767-04	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_UNRESOLVED_OFFSET—HALO_GHOST

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

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

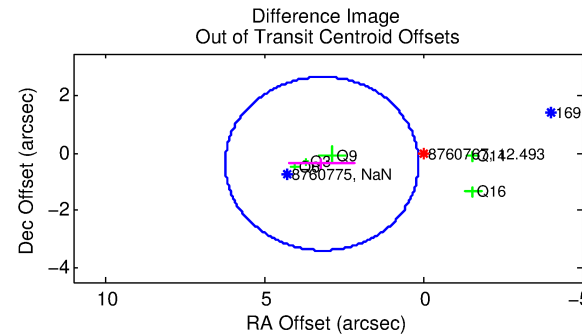
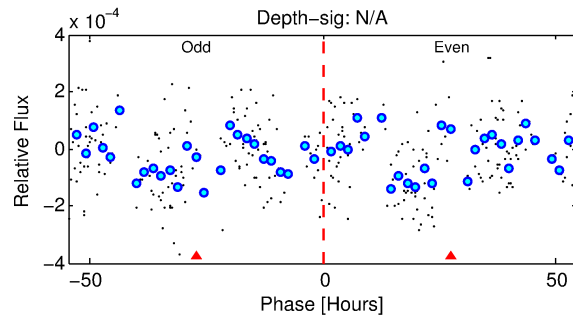
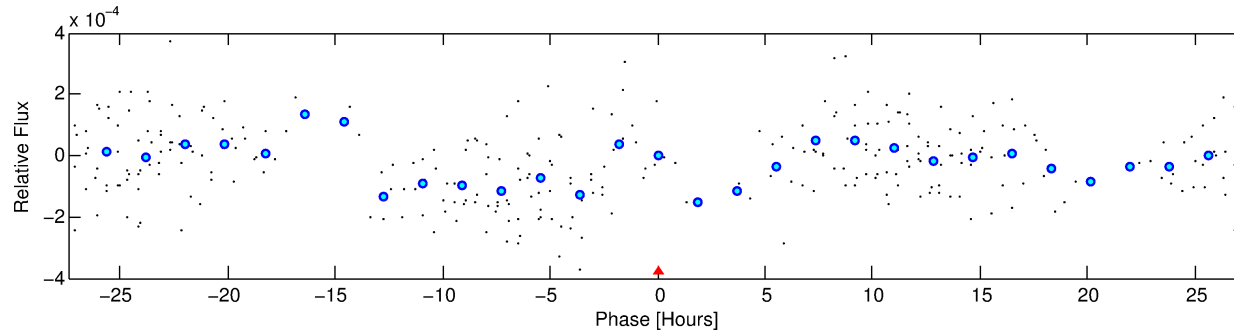
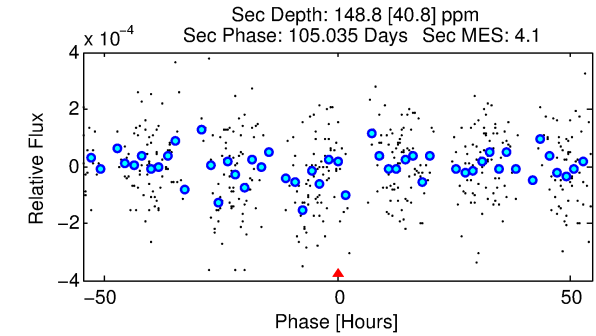
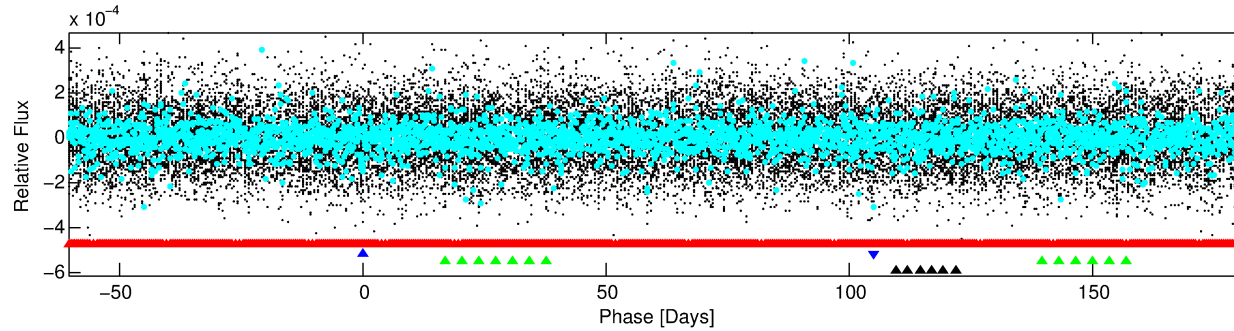
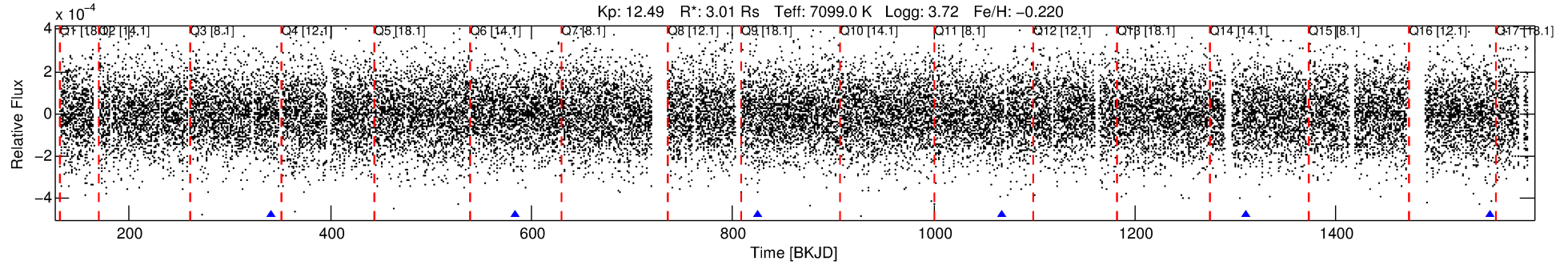
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 008760767-02

No Significant Match Found

# DV One-Page Summary

KIC: 8760767 Candidate: 2 of 4 Period: 242.383 d



## TPS TCE Results:

Period = 242.38289 d  
Epoch = 340.4544 BKJD

DV fit results are unavailable

## DV Diagnostic Results:

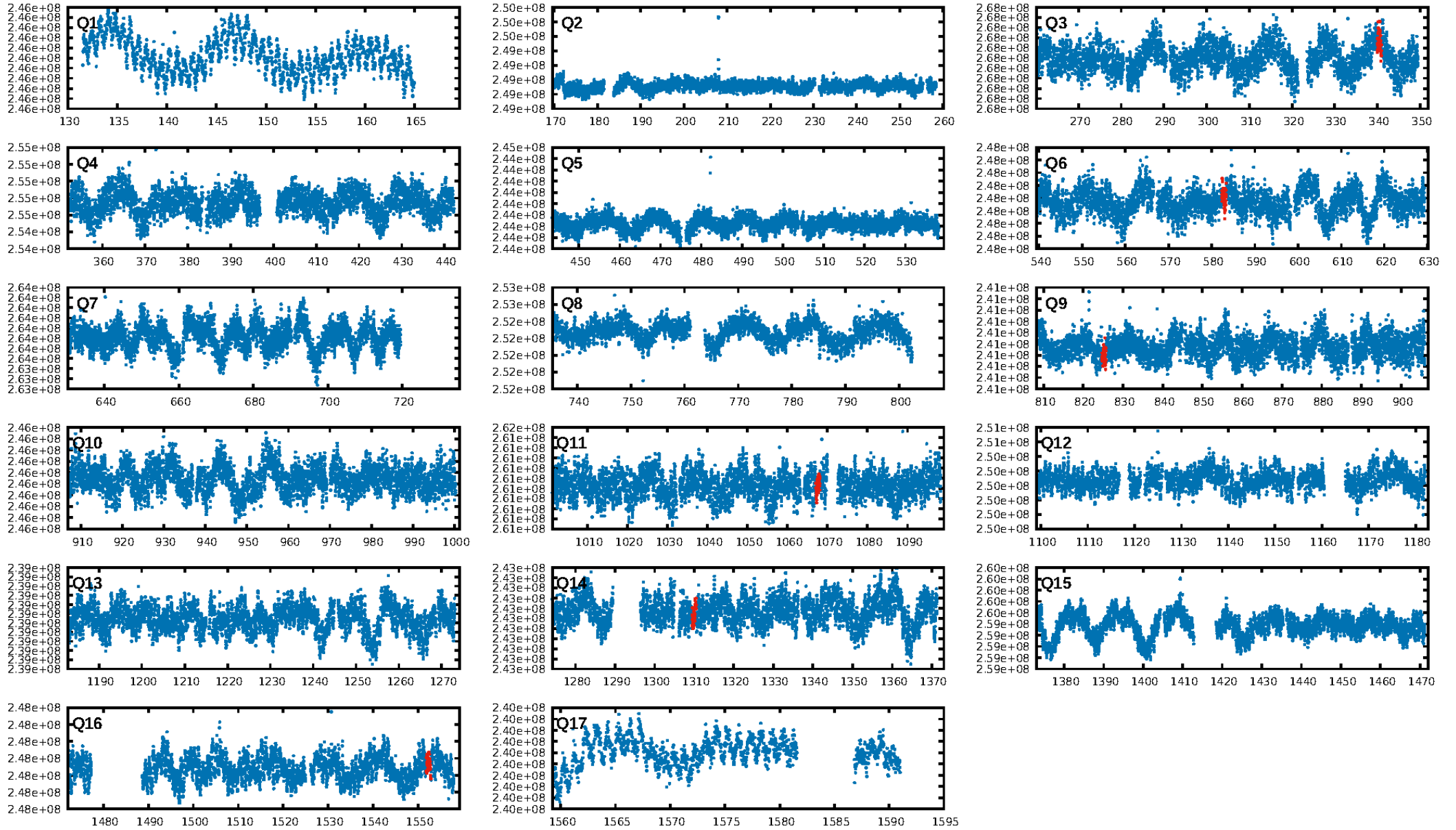
ShortPeriod-sig: 100.0% [4.19σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 7.81e-12  
RollingBand-fgt: 1.00 [5/5]  
GhostDiagnostic-chr: -7.931

Centroid-sig: 13.1%  
Centroid-so: 0.700 arcsec [1.17σ]  
OotOffset-rm: 3.196 arcsec [3.16σ]  
KicOffset-rm: 3.153 arcsec [2.83σ]  
OotOffset-st: 2/1/1/1 [5]  
KicOffset-st: 2/1/1/1 [5]  
DiffImageQuality-fgm: 0.60 [3/5]  
DiffImageOverlap-fno: 0.00 [0/6]

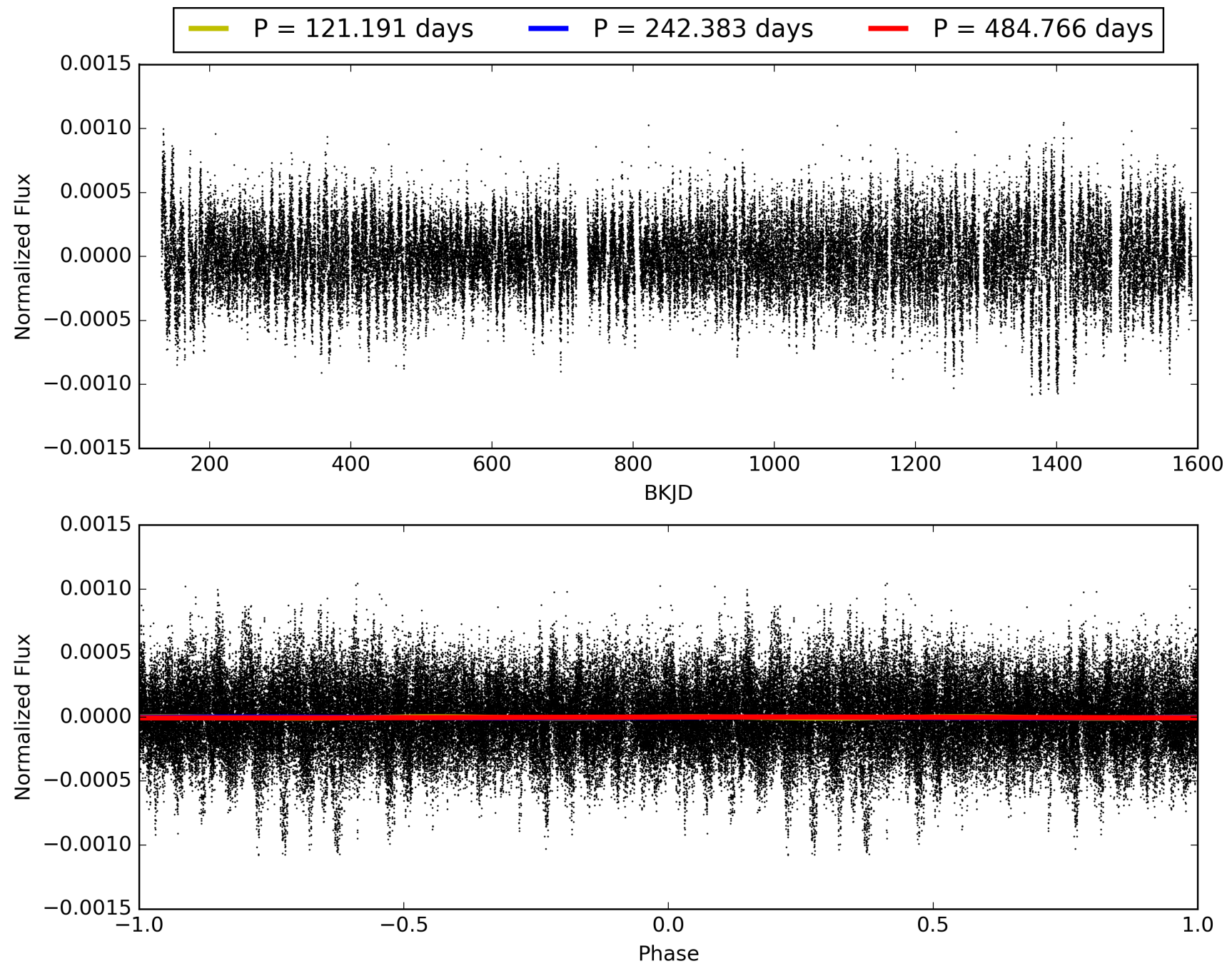
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 01:17:37 Z

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

# TCE 008760767-02, PDC Light Curves

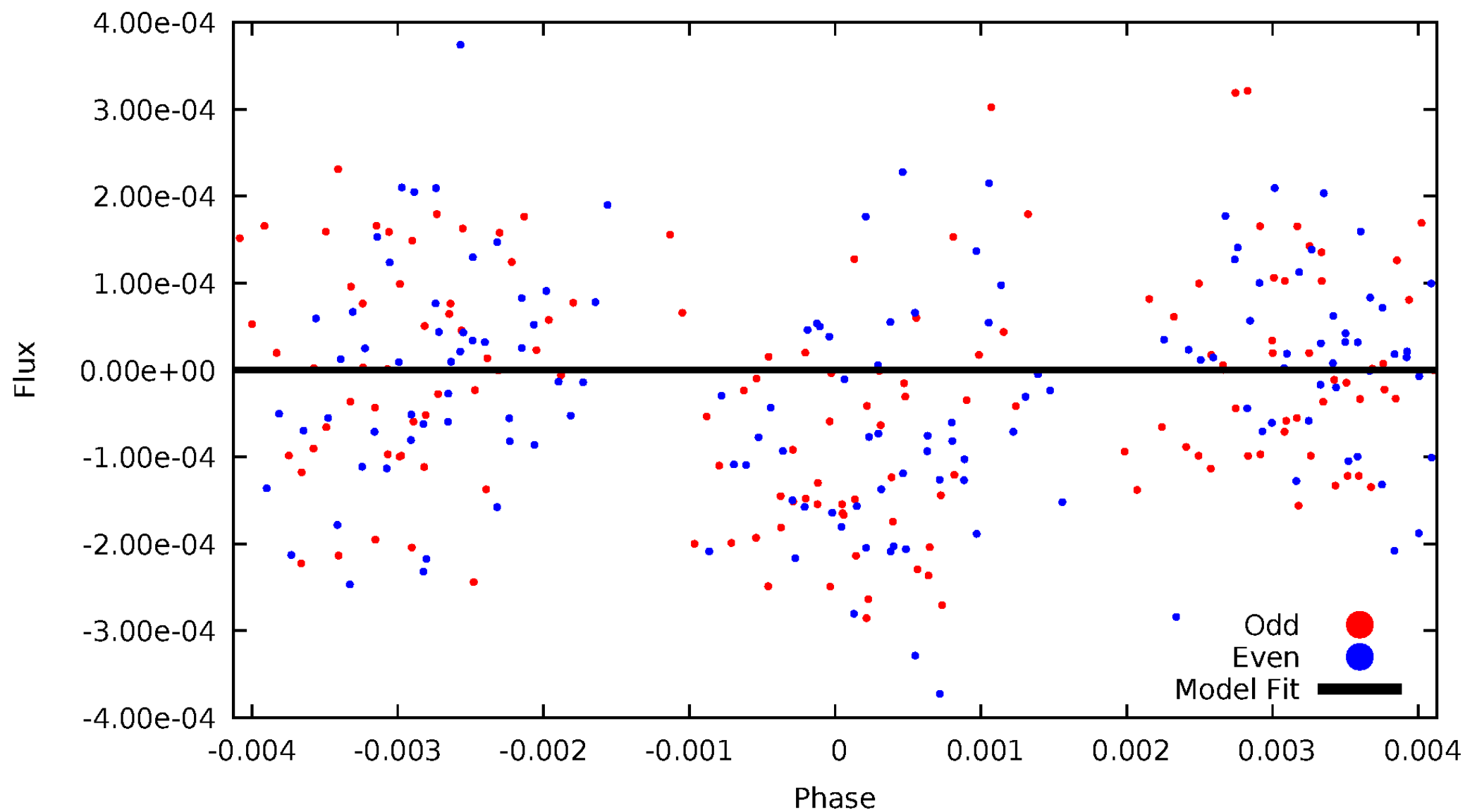


TCE 008760767-02



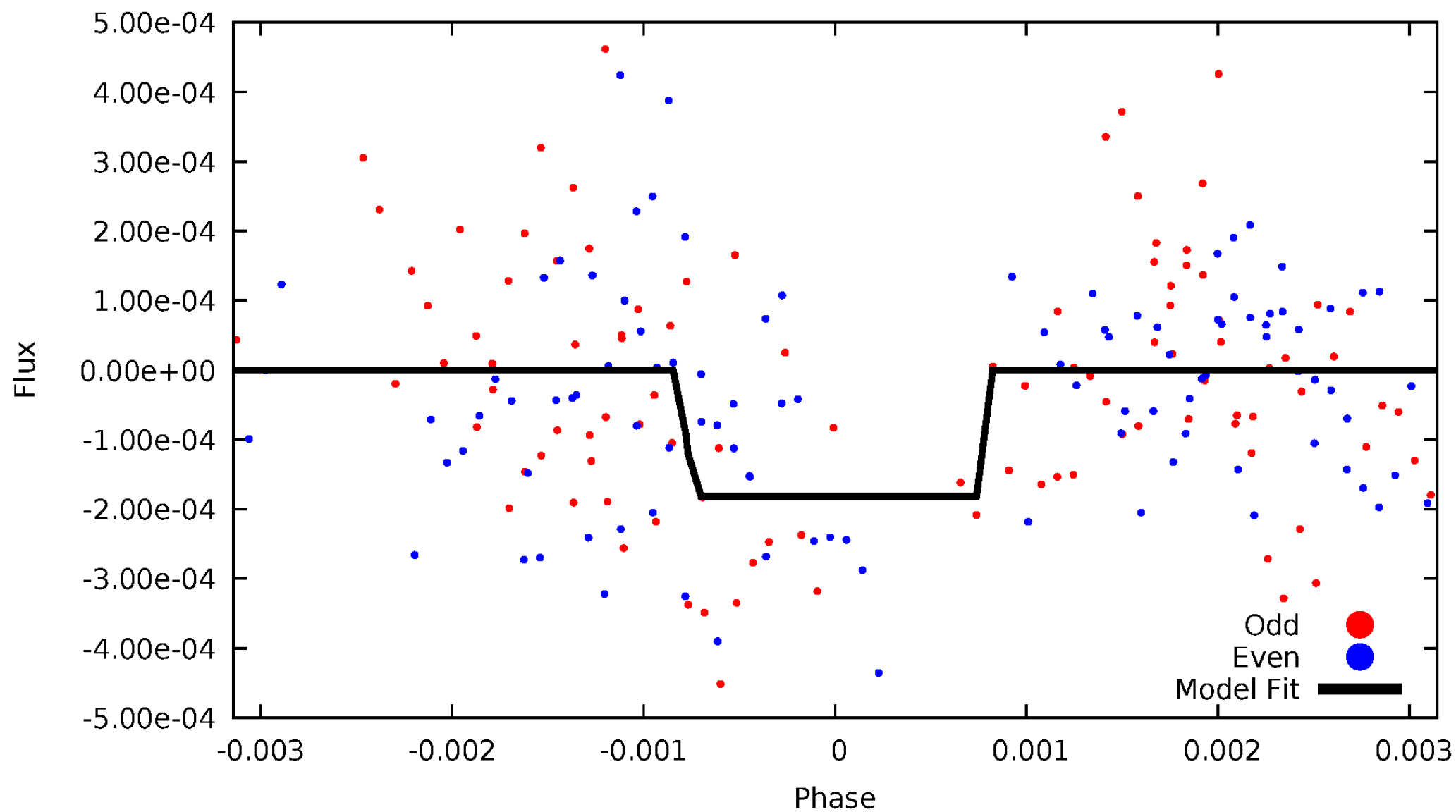
DV Odd/Even

TCE 008760767-02



# ALT Odd/Even

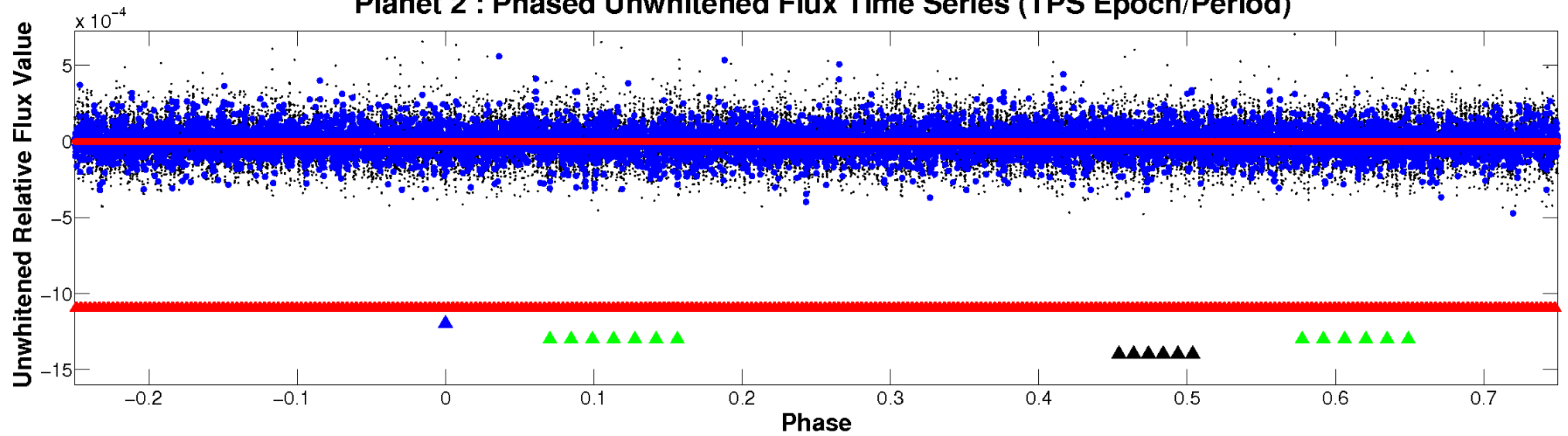
TCE 008760767-02



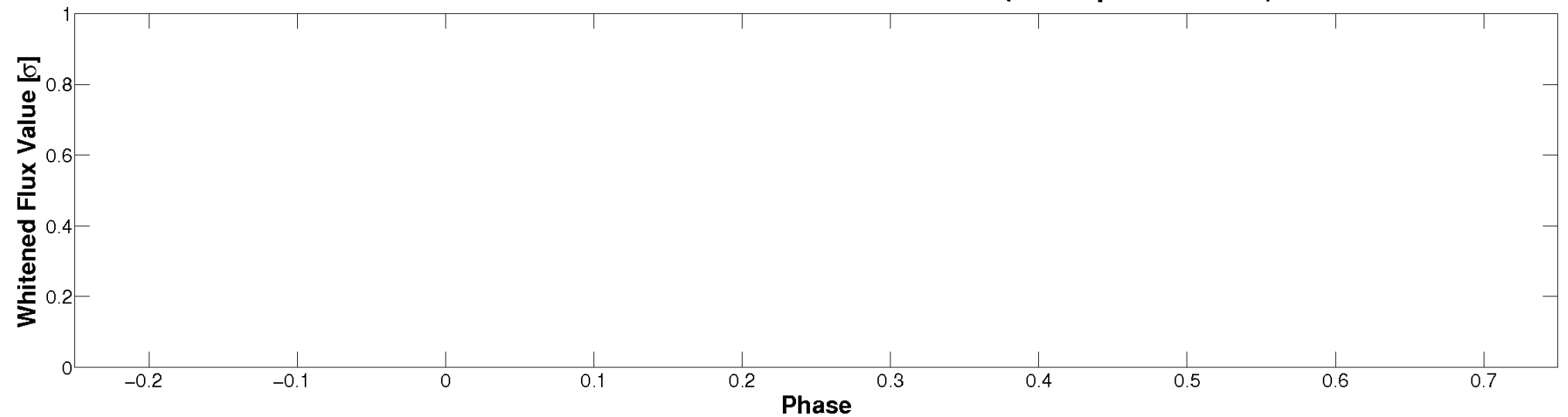


# Non-Whitened Vs. Whitened Light Curve

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

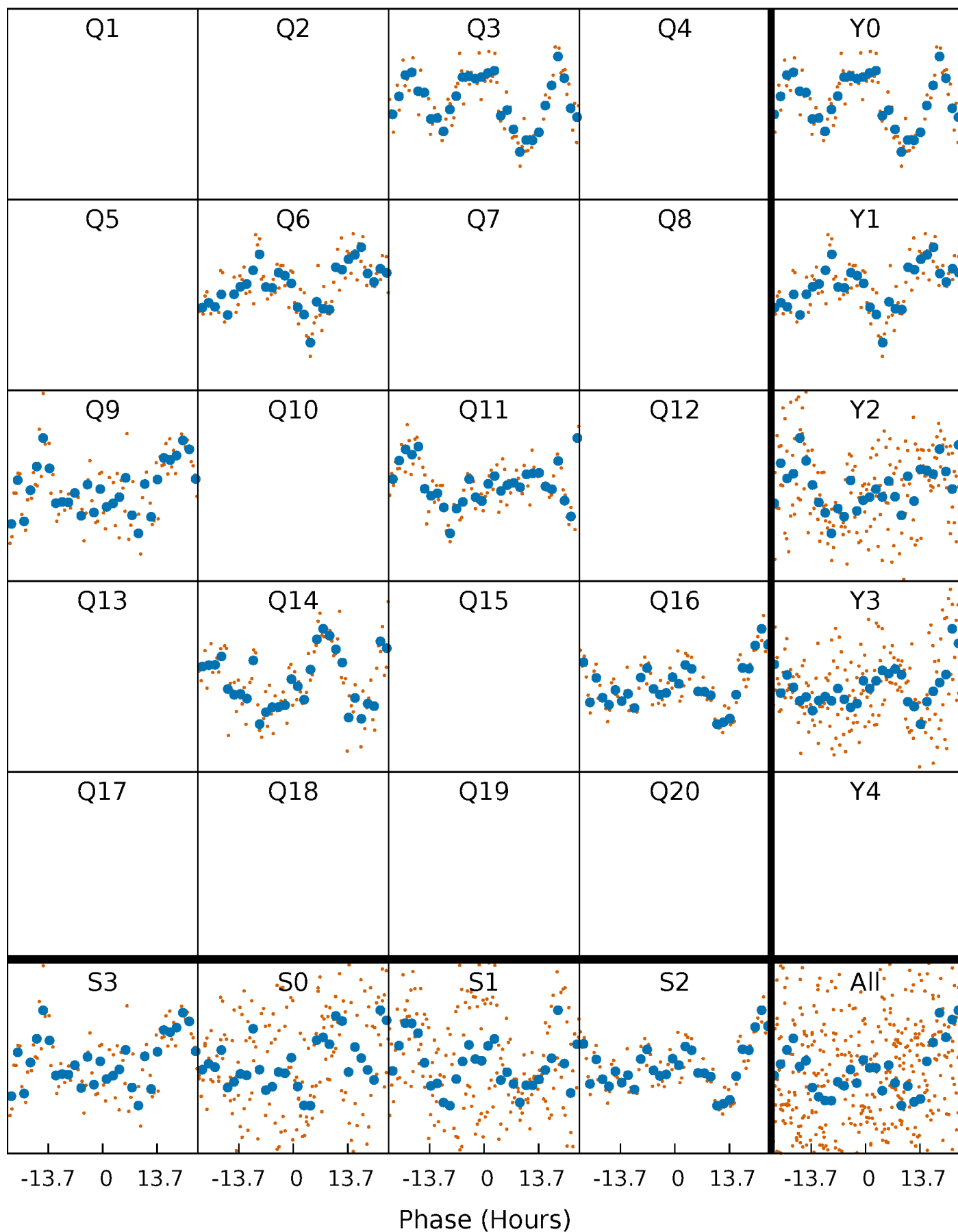


**Planet 2 : Phased Whitened Flux Time Series (TPS Epoch/Period)**



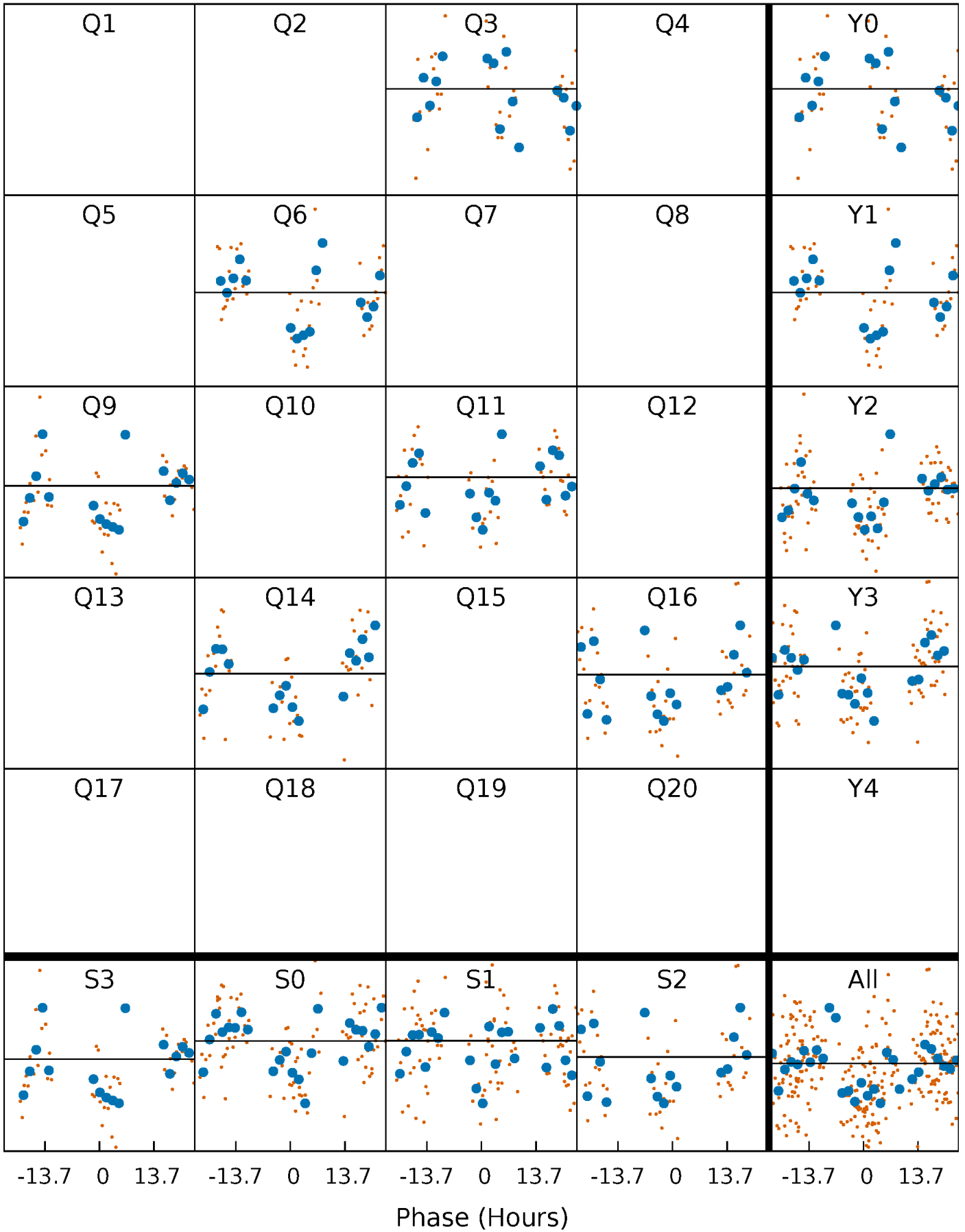
# PDC Quarter-Phased Transit Curves

TCE 008760767-02     $P=242.382889$  Days     $T_0=340.454362$  (BKJD)



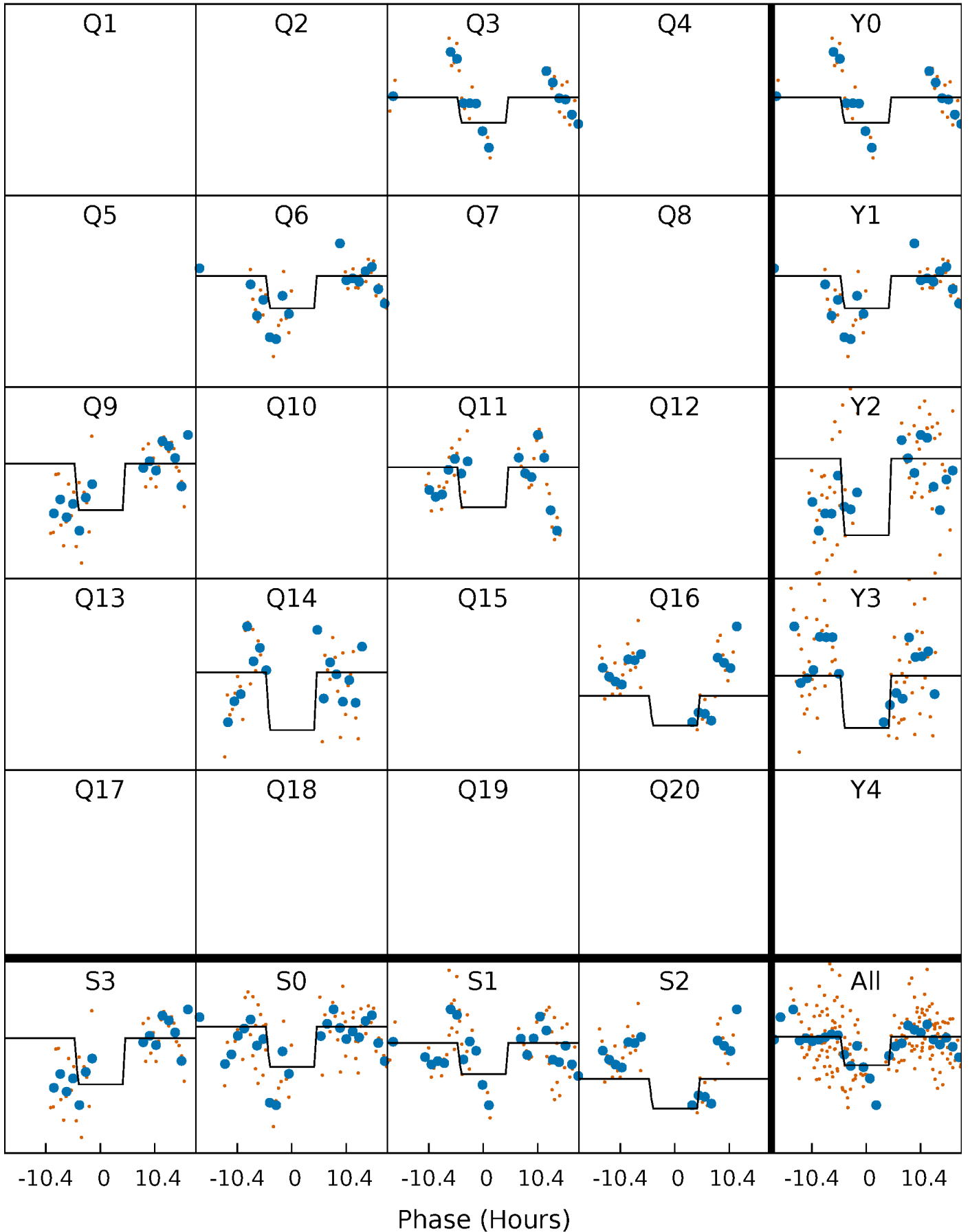
# DV Quarter-Phased Transit Curves

TCE 008760767-02     $P=242.382889$  Days     $T_0=340.454362$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

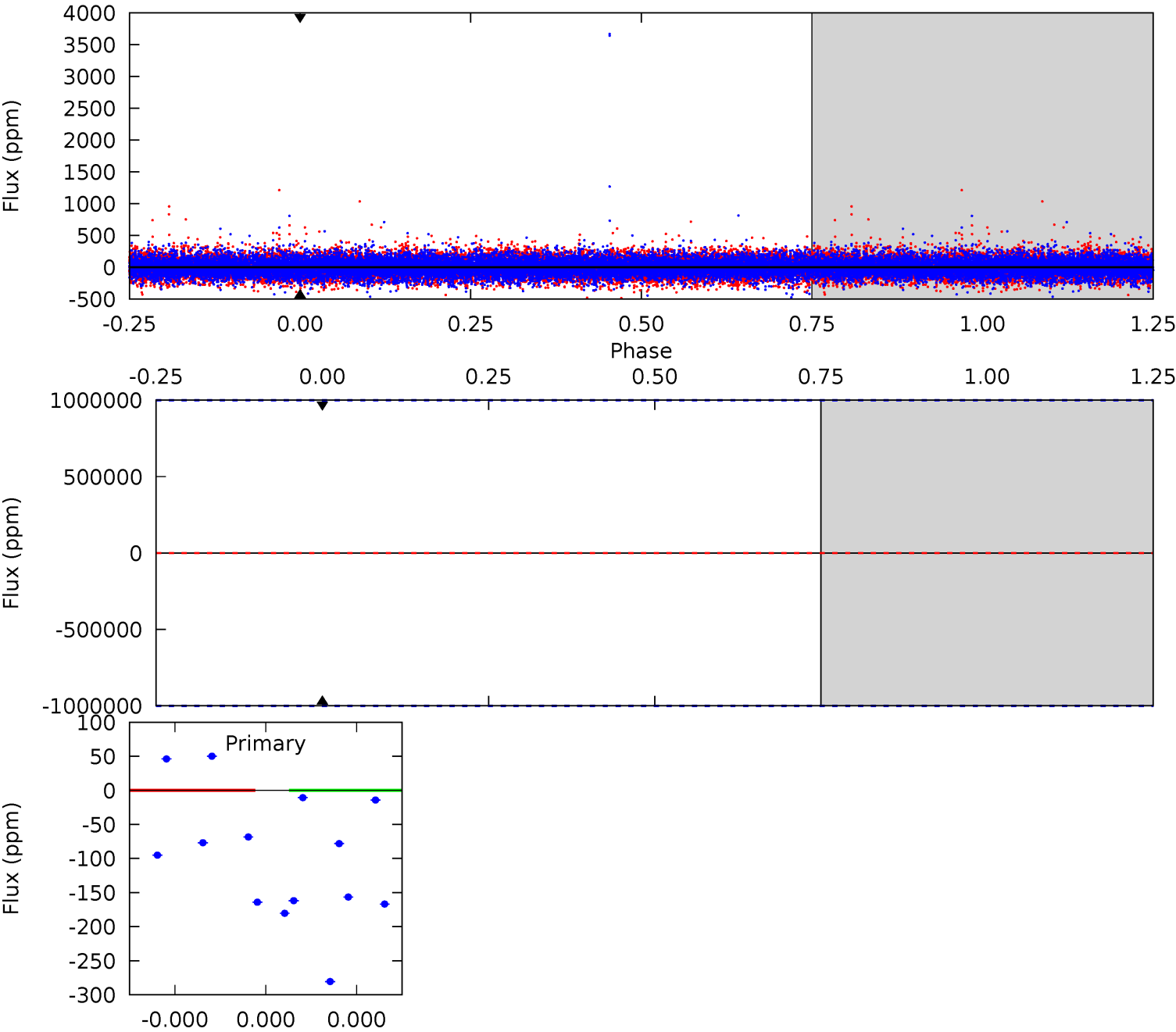
TCE 008760767-02 P=242.382889 Days  $T_0=340.777377$  (BKJD)



# DV Model-Shift Uniqueness Test

008760767-02, P = 242.382889 Days, E = 98.071473 Days

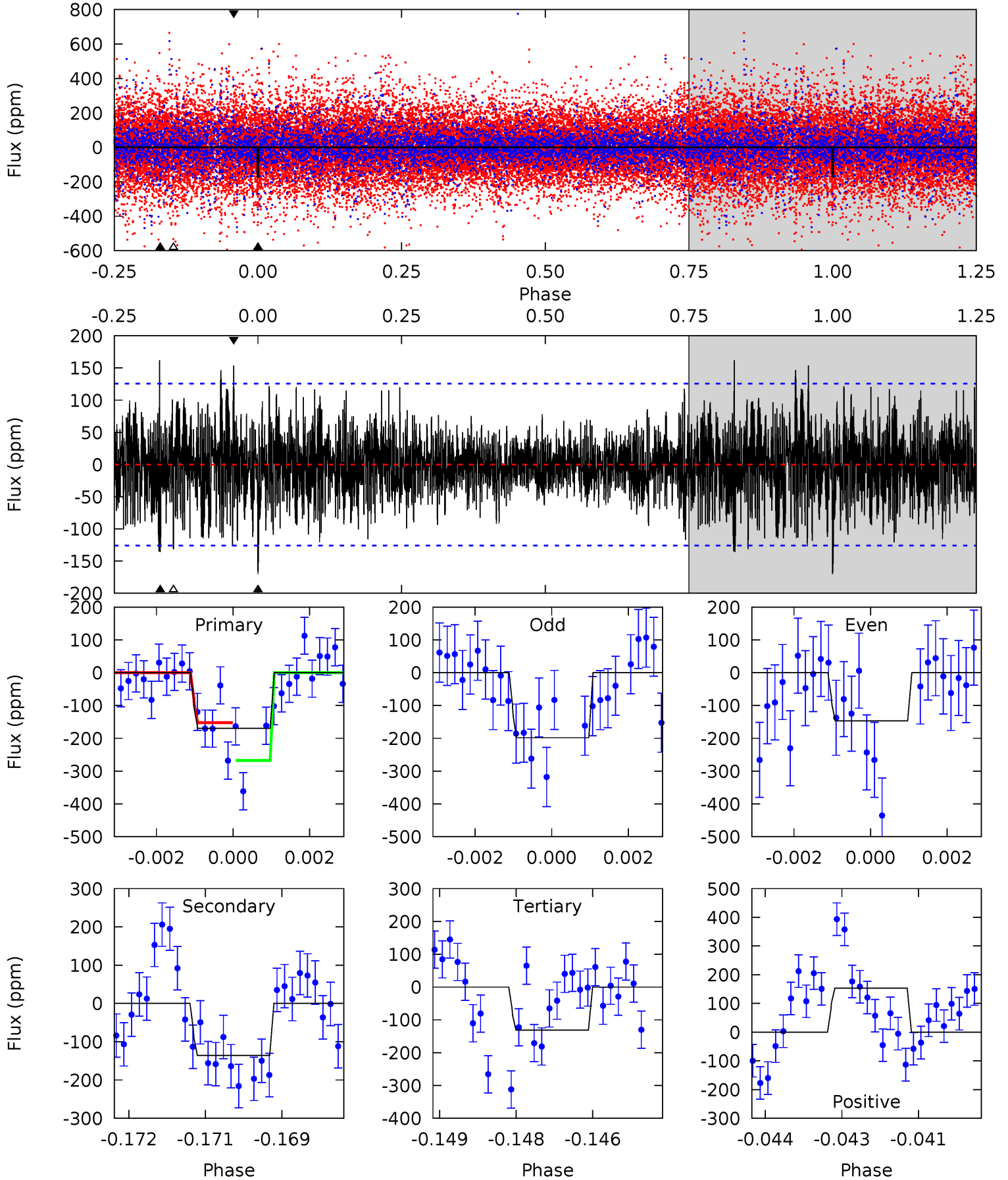
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0	0	0	0	1.00	1.00	1.00	0	0	0	0	0	0	0	0



# Alt Model-Shift Uniqueness Test

008760767-02,  $P = 242.382889$  Days,  $E = 98.394488$  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
7.26	5.81	5.62	6.56	5.38	3.17	1.62	1.64	0.70	0.18	-0.76	1.09	0.92	0.49	1.60





### Stellar Parameters For KIC 008760767

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$7099^{+191}_{-234}$	$3.720^{+0.296}_{-0.074}$	$-0.220^{+0.250}_{-0.300}$	$3.012^{+0.374}_{-1.121}$	$1.736^{+0.154}_{-0.359}$	$0.090^{+0.175}_{-0.023}$
	+3%/-3%	+8%/-2%	+114%/-136%	+12%/-37%	+9%/-21%	+196%/-25%
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 008760767-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$0 \pm 1000000$	$21.04^{+23.71}_{-14.03}$	$777^{+44}_{-66}$	$-5007^{+48278}_{-27124}$	$-1235.604^{+236932.302}_{-135254.495}$
Alt.	$-136 \pm 23$	$21.34^{+23.89}_{-15.22}$	$776^{+44}_{-66}$	$3358^{+1893}_{-630}$	$136^{+1459}_{-107}$

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

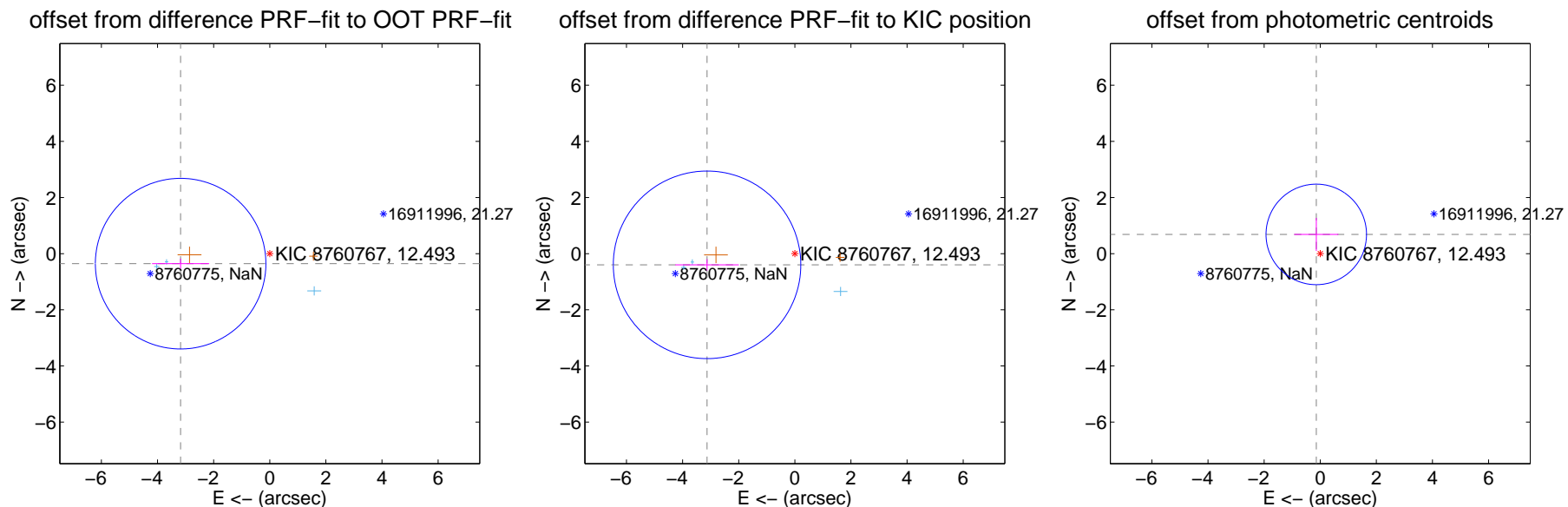
## DV Centroid Data

Supplemental centroid analysis for 008760767-02. Kepler magnitude: 12.49. Transit SNR -1.00

There are 3 quarters with good PRF difference image offsets

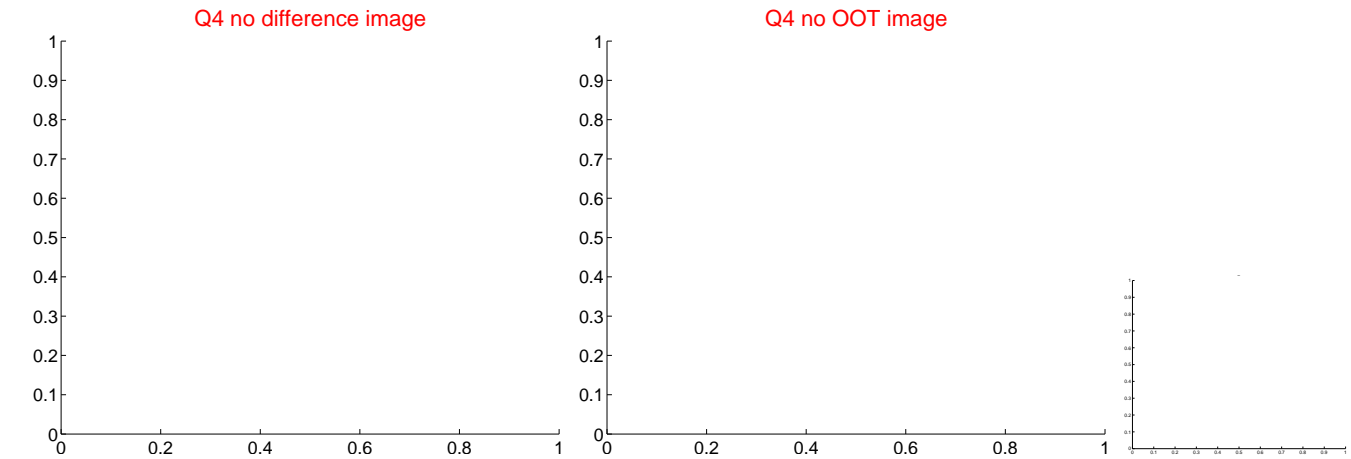
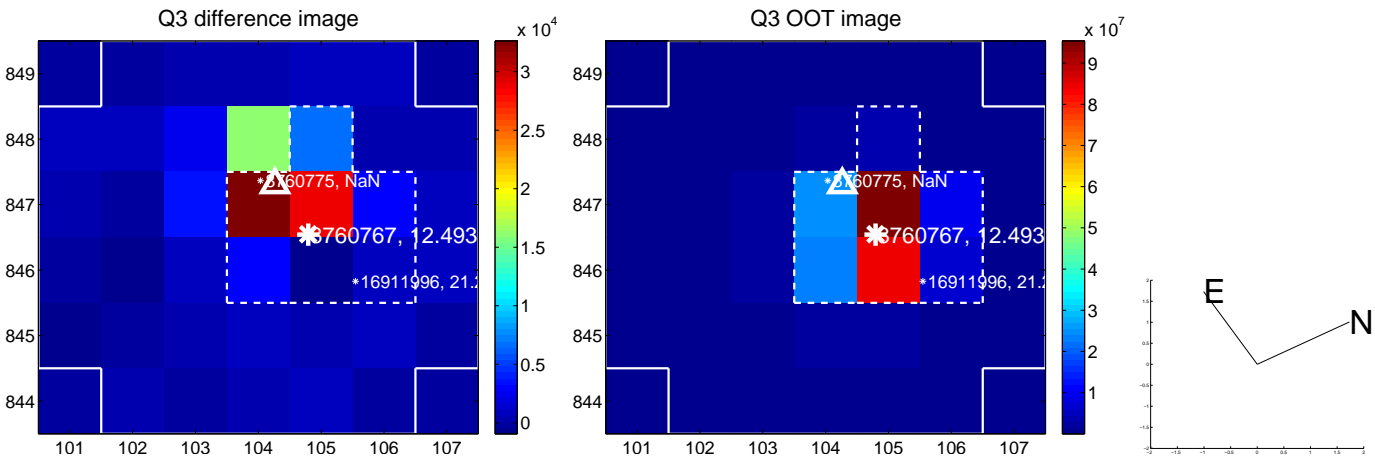
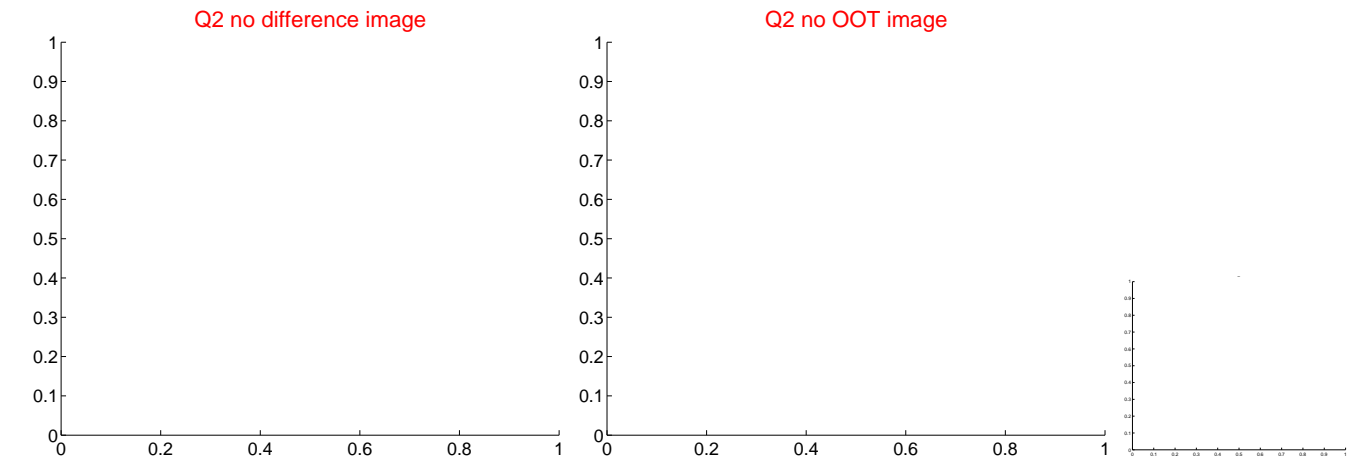
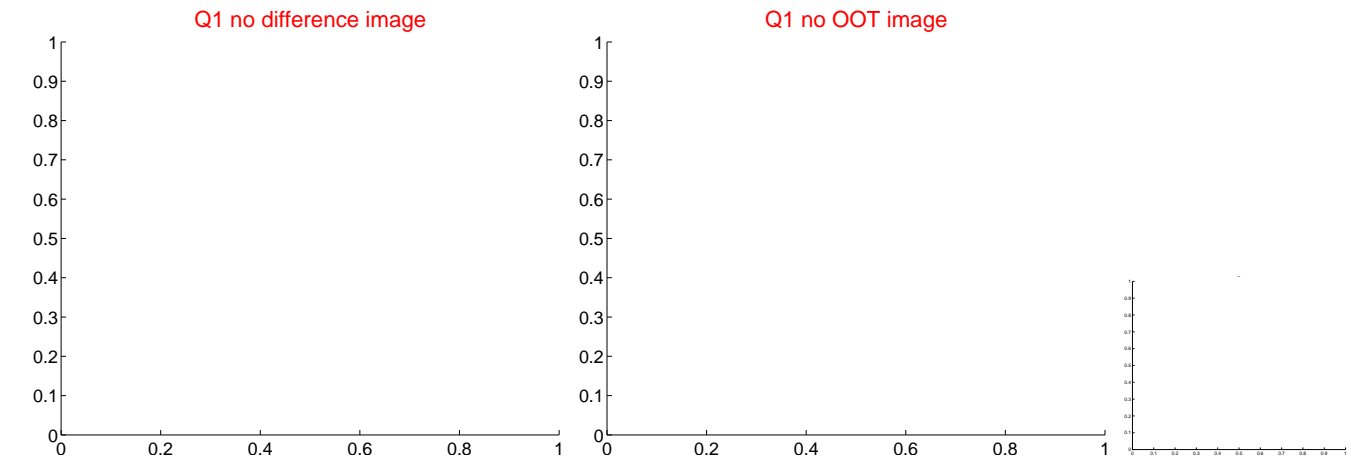
The direct PRF centroid is offset from the target star catalog position by about 0.05 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$3.196 \pm 1.013$	<b>3.16</b>	$3.177 \pm 1.019$	$-0.356 \pm 0.179$
PRF-fit source offset from KIC position	$3.153 \pm 1.114$	2.83	$3.128 \pm 1.133$	$-0.398 \pm 0.202$
photometric centroid source offset	$0.70 \pm 0.60$	1.17	$0.14 \pm 0.79$	$0.69 \pm 0.59$

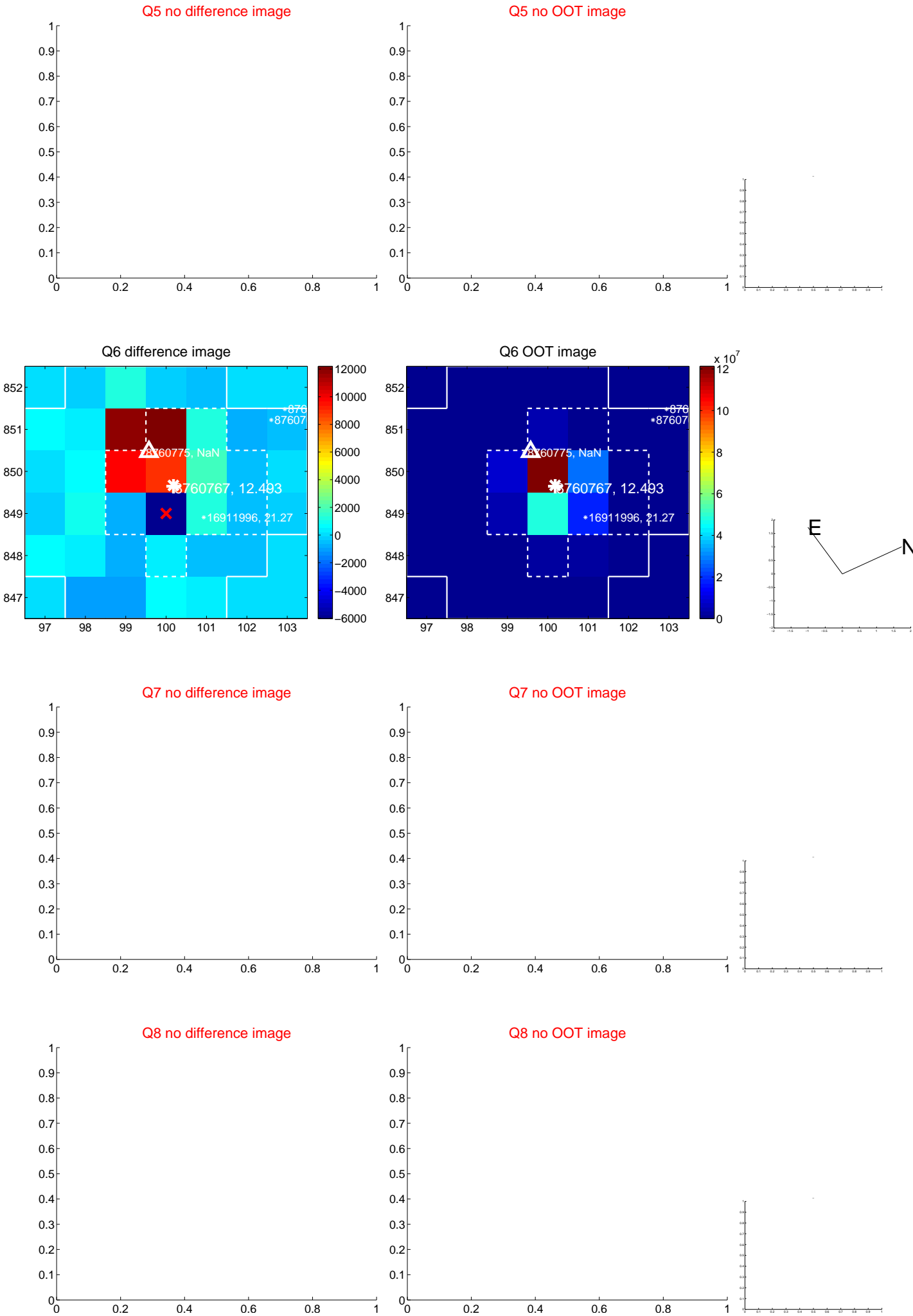


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

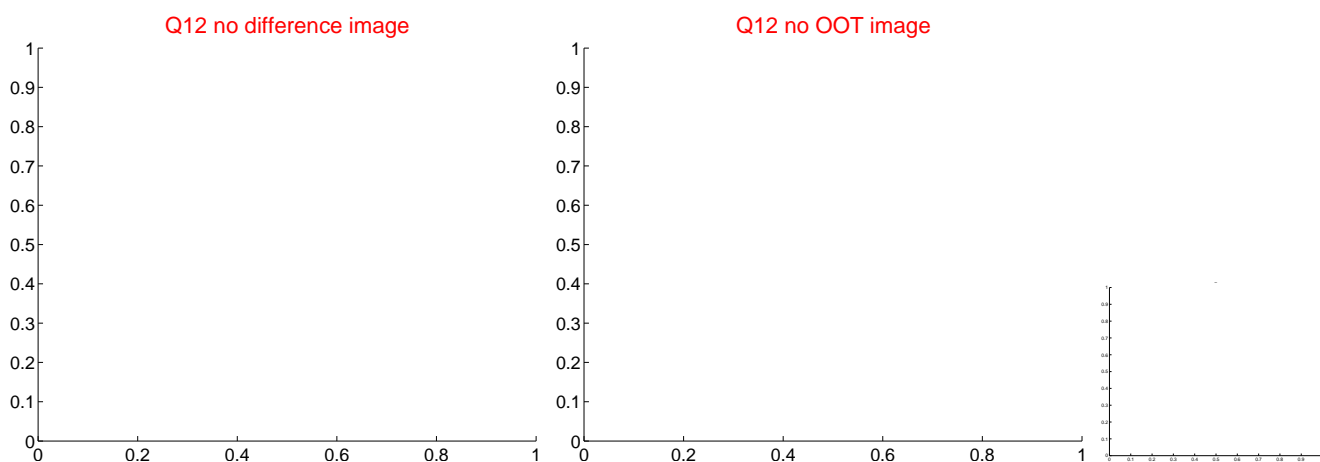
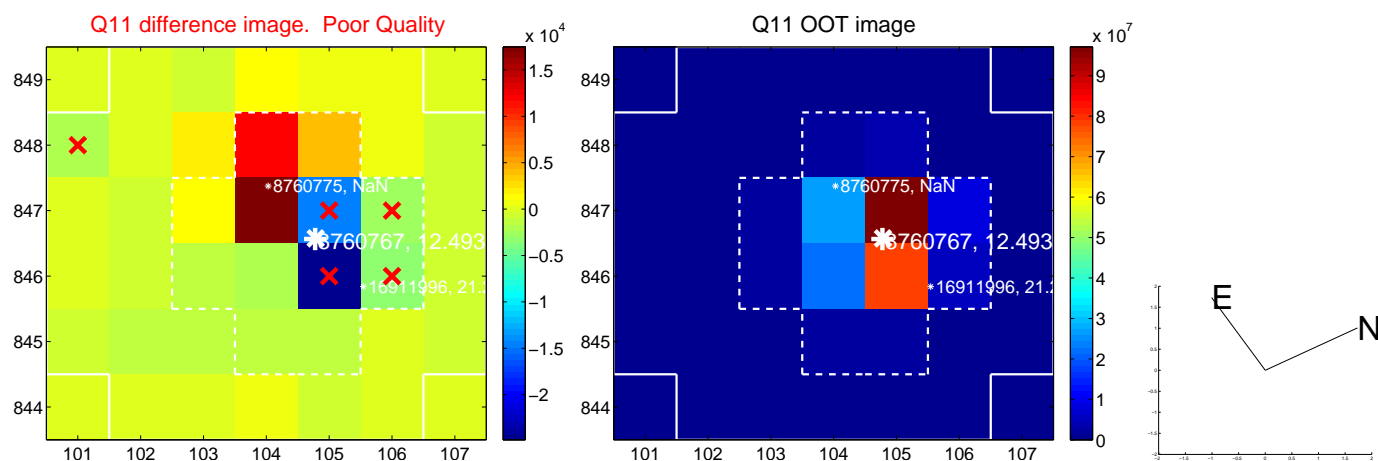
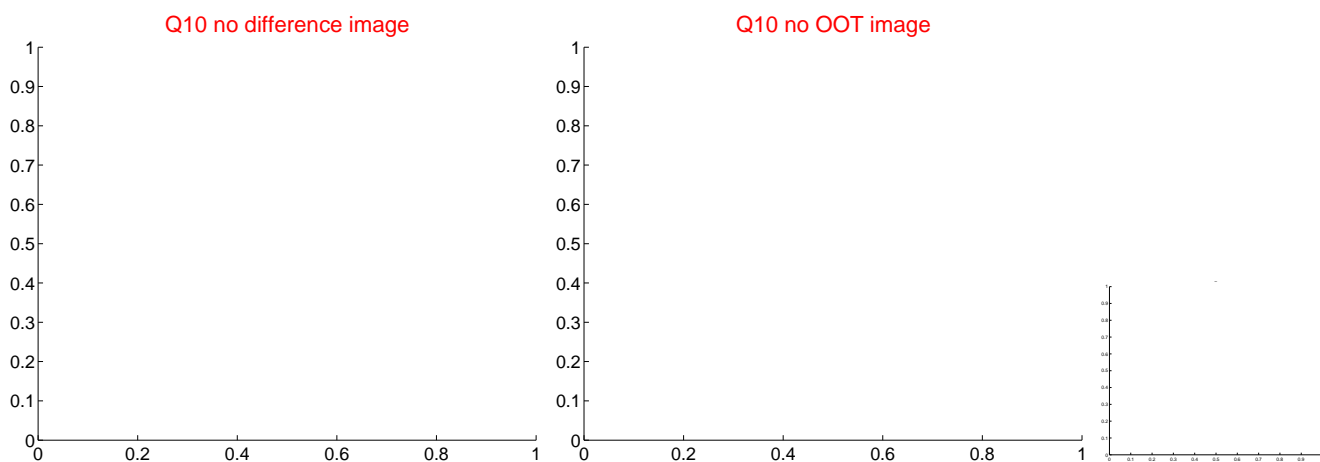
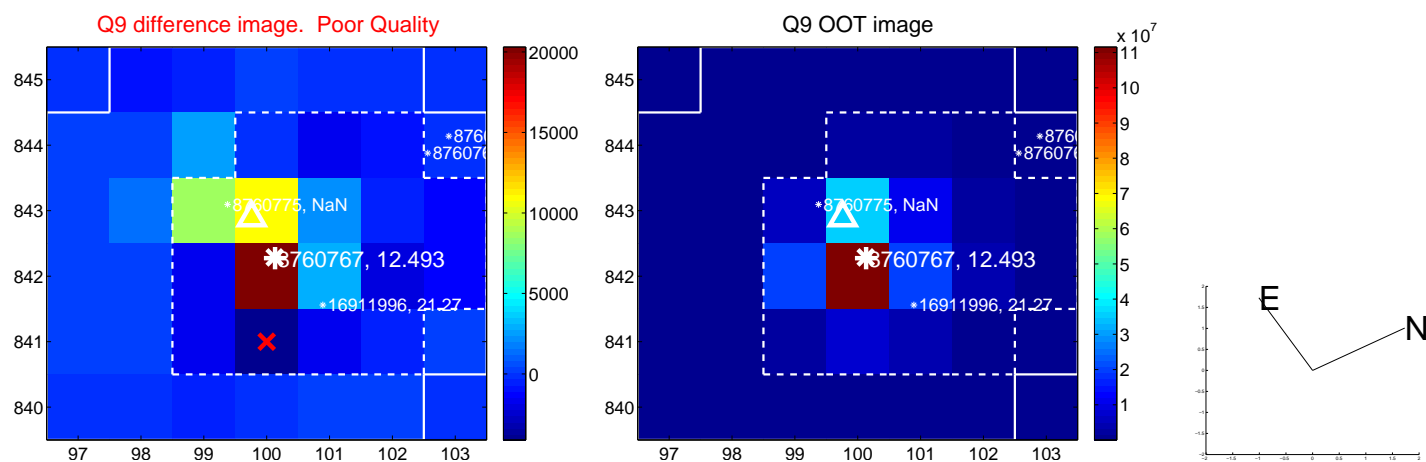
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



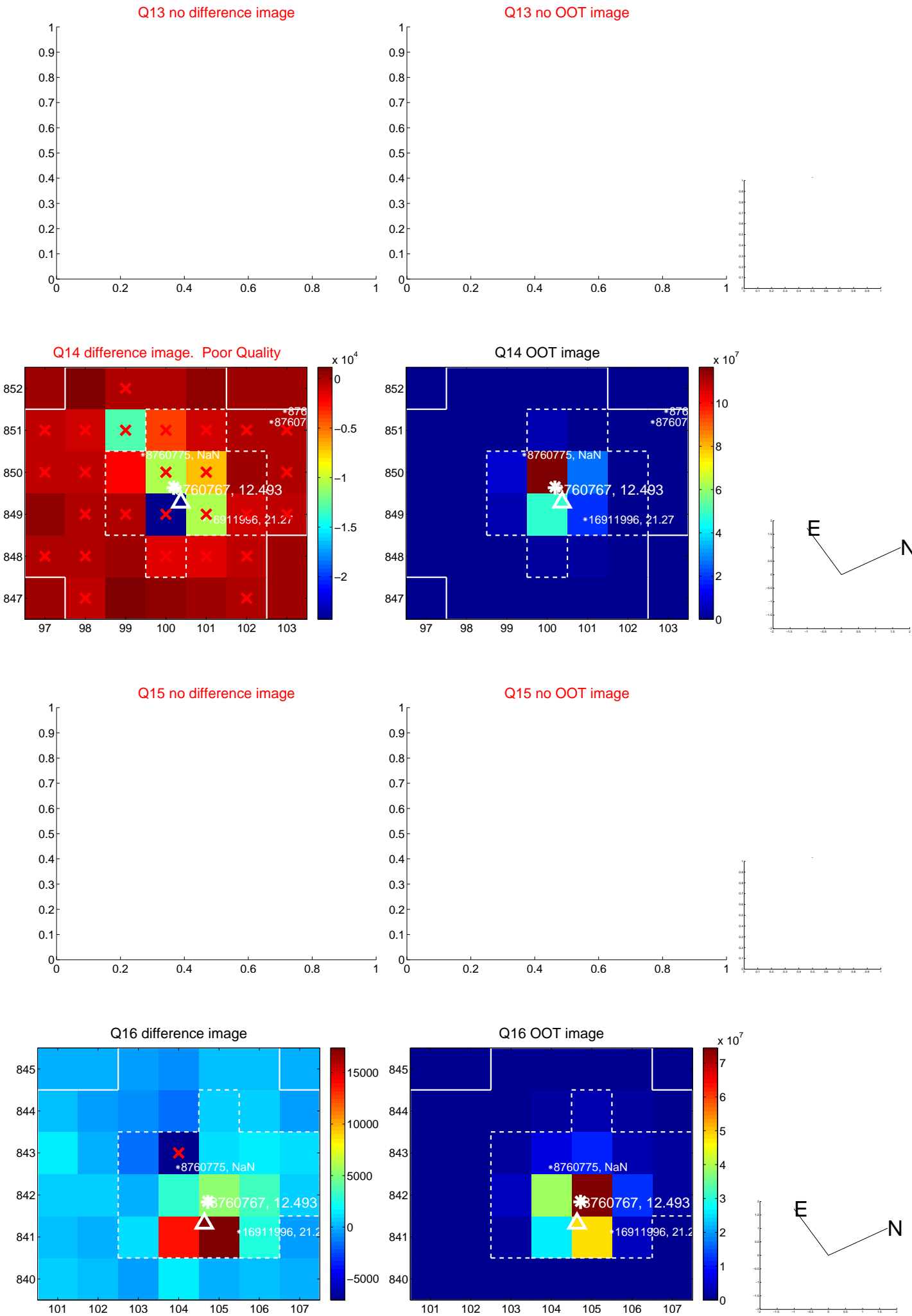
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

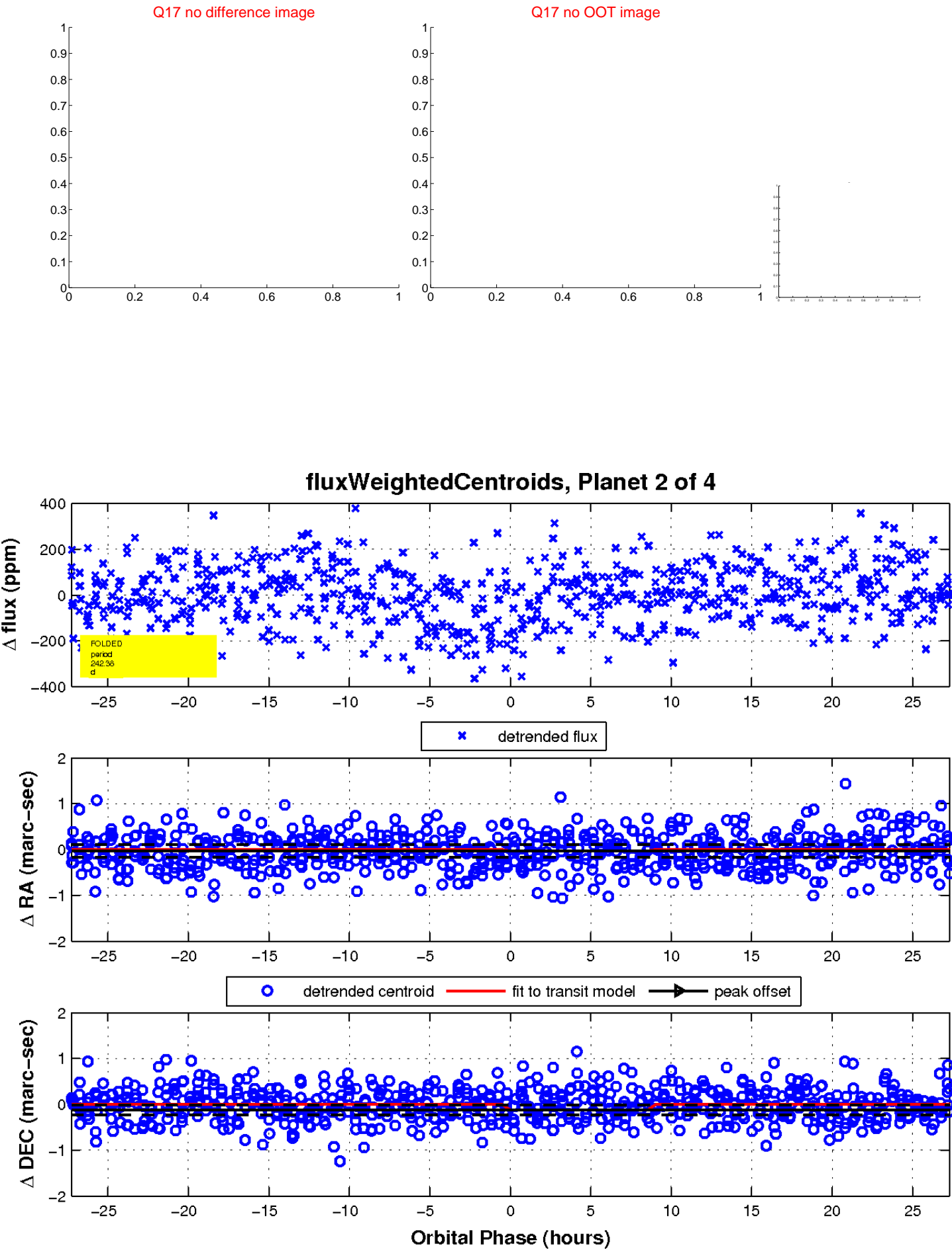


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



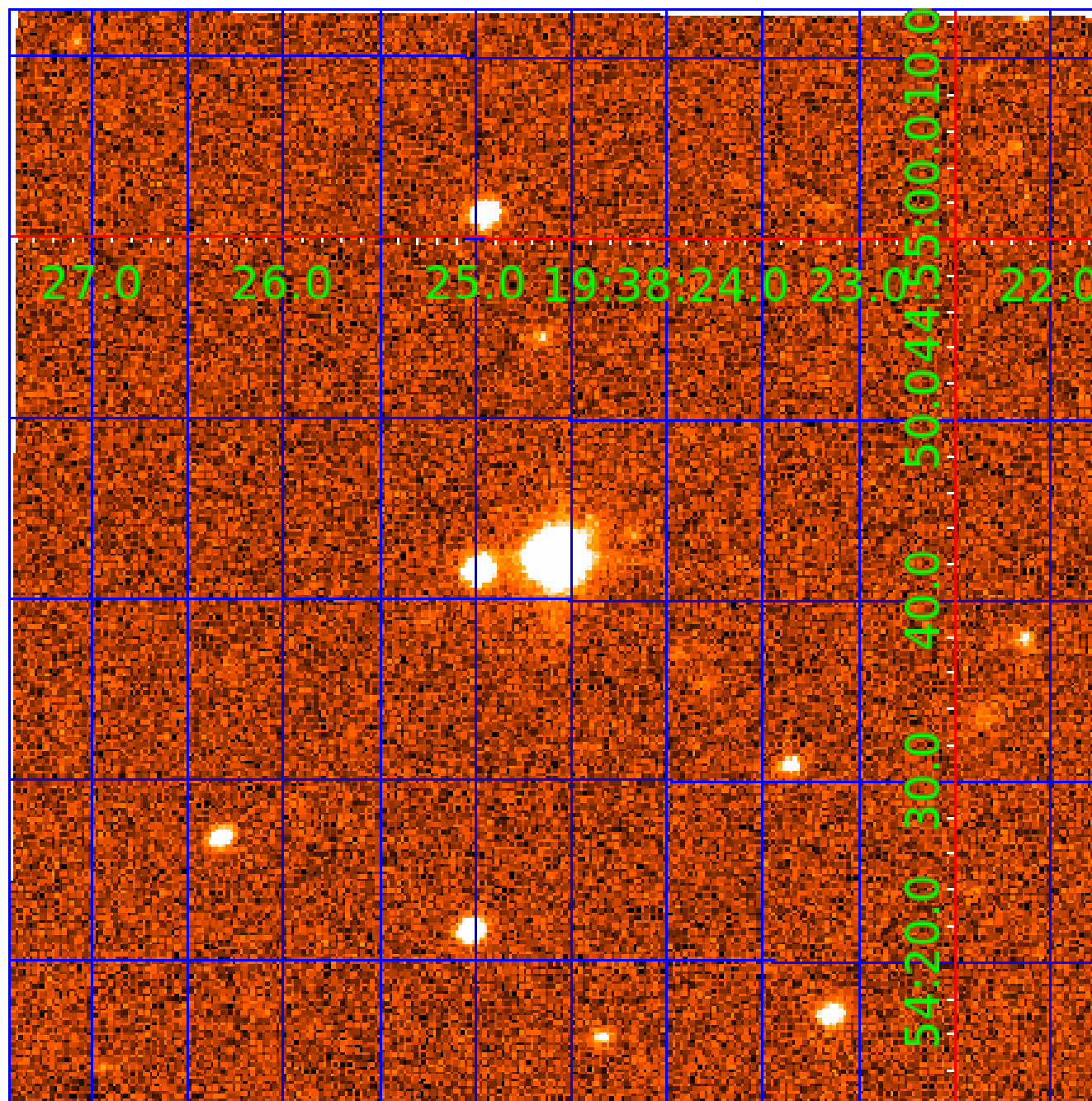


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 008760767

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008760767-01	OBS	No	0.750214	131.736012	17.7	3.031	8.7	9.8	3.01	7099	1.48	54702.39
008760767-02	OBS	No	242.382889	340.454362	101.3	12.000	7.5	-1.0	3.01	7099	3.05	24.68
008760767-03	OBS	No	119.455500	135.968667	228.1	2.145	7.2	7.6	3.01	7099	5.13	63.38
008760767-04	OBS	No	239.972169	220.181556	193.0	6.806	8.1	7.6	3.01	7099	4.91	25.01

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008760767-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
008760767-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL_SKYE—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_NOFITS
008760767-03	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_ALT—MOD_POS_ALT—CENT_UNRESOLVED_OFFSET
008760767-04	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_UNRESOLVED_OFFSET—HALO_GHOST

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

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

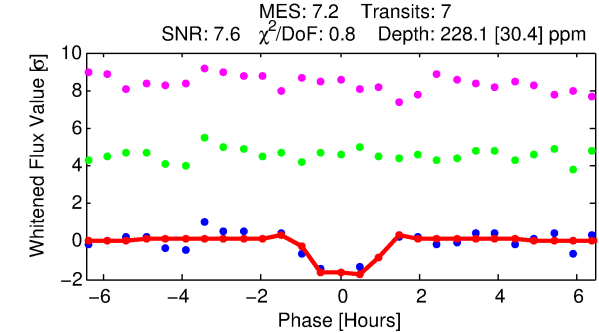
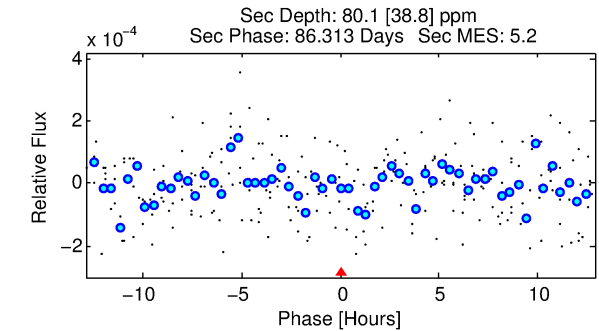
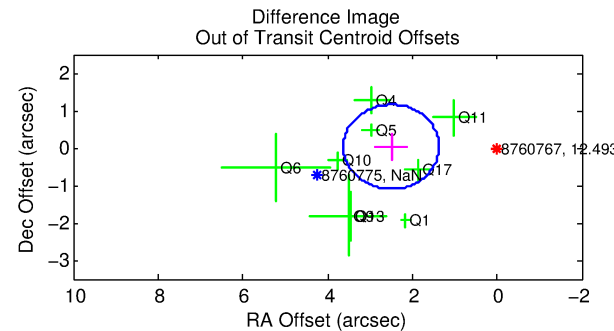
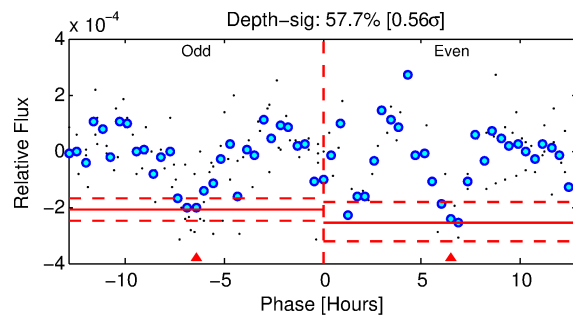
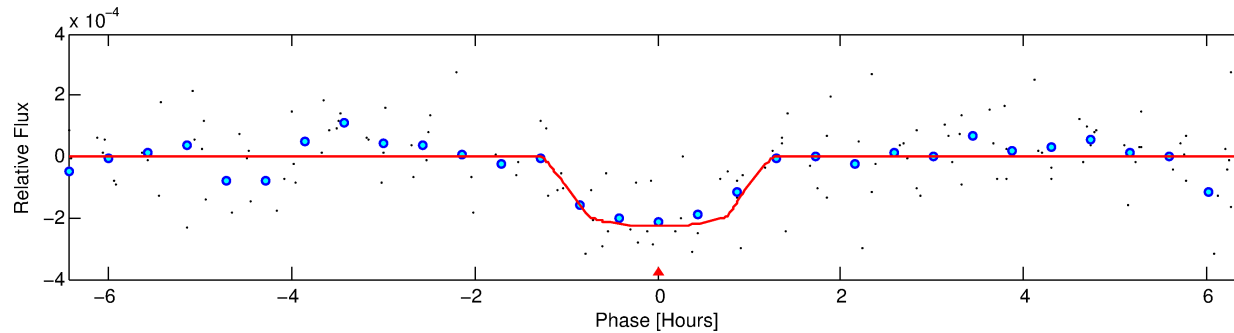
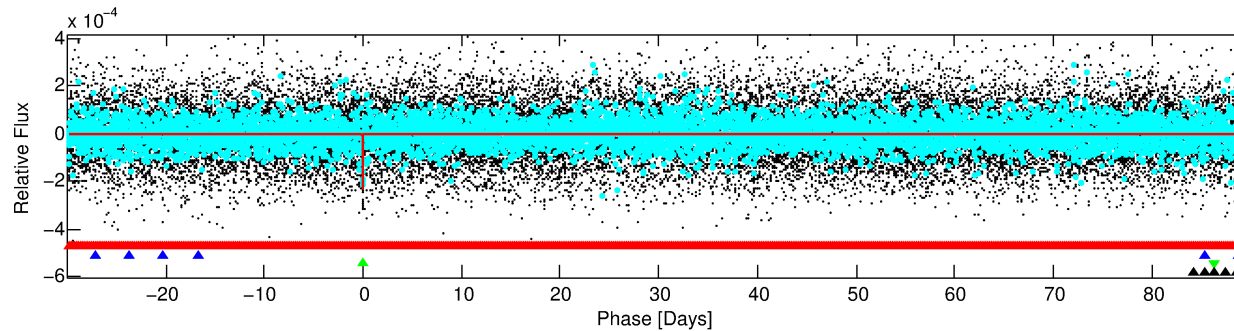
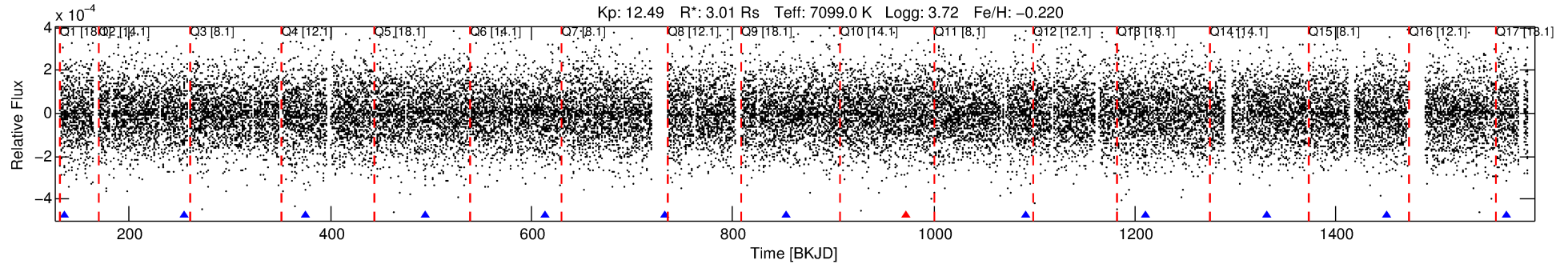
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 008760767-03

No Significant Match Found

# DV One-Page Summary

KIC: 8760767 Candidate: 3 of 4 Period: 119.455 d



## DV Fit Results:

Period = 119.45550 [0.00072] d  
Epoch = 135.9687 [0.0045] BKJD  
Rp/R\* = 0.0156 [0.0115]  
a/R\* = 241.01 [981.65]  
b = 0.84 [1.43]  
Seff = 63.38 [33.86]  
Teff = 719 [96] K  
Rp = 5.13 [4.24] Re  
a = 0.5707 [0.1920] AU  
Ag = 544.87 [890.63] [0.61 $\sigma$ ]  
Teffp = 5374 [2091] K [2.22 $\sigma$ ]

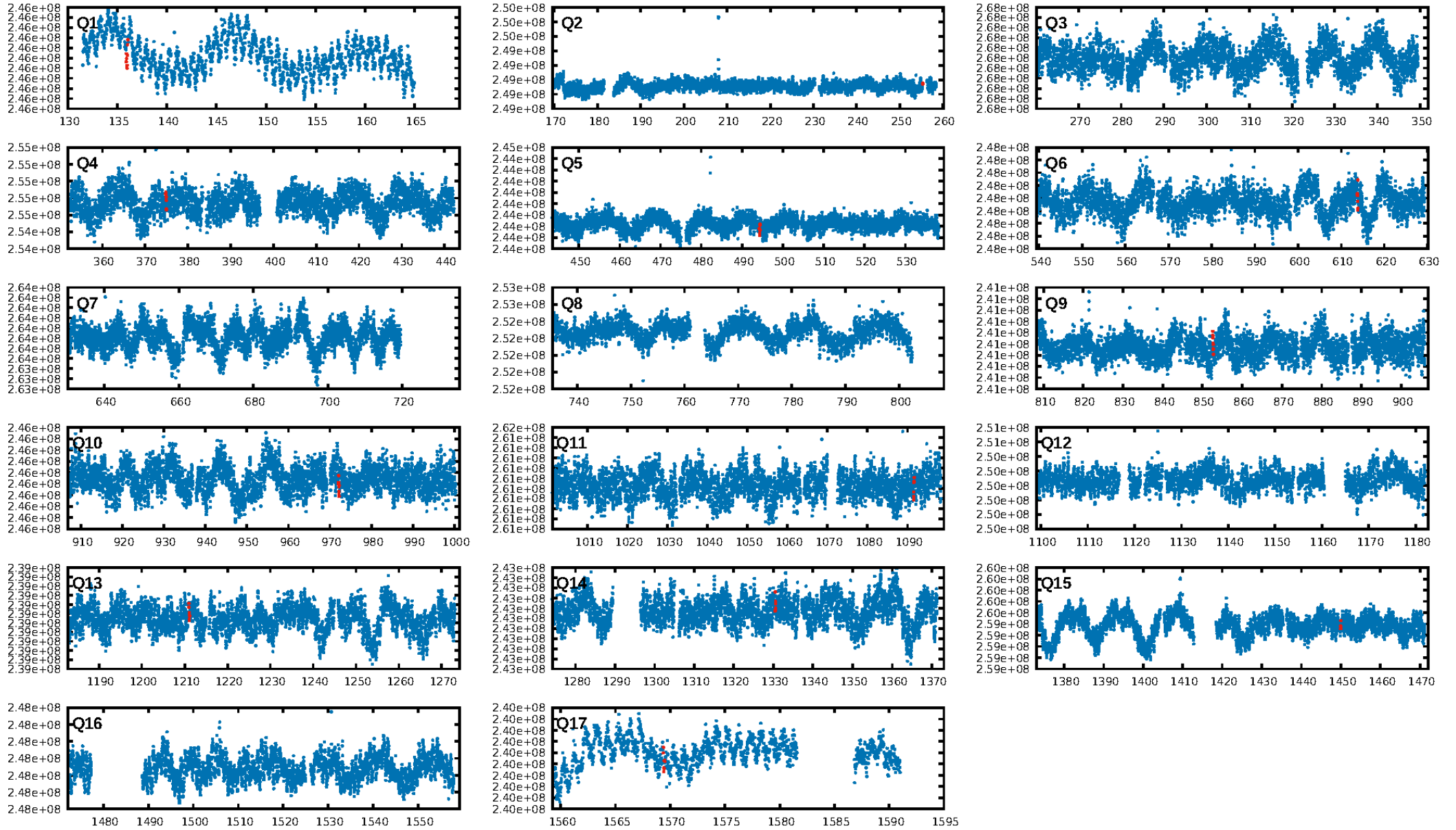
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [767.26 $\sigma$ ]  
LongPeriod-sig: 100.0% [405.31 $\sigma$ ]  
ModelChiSquare2-sig: 67.8%  
ModelChiSquareGof-sig: 100.0%  
**Bootstrap-pfa: 7.62e-10**  
RollingBand-fgt: 0.80 [4/5]  
GhostDiagnostic-chr: 1.7  
Centroid-sig: 8.8%  
Centroid-so: 1.080 arcsec [1.39 $\sigma$ ]  
**OotOffset-rm: 2.500 arcsec [6.65 $\sigma$ ]**  
**KicOffset-rm: 2.478 arcsec [7.05 $\sigma$ ]**  
OotOffset-st: 2/1/1/5 [9]  
KicOffset-st: 2/1/1/5 [9]  
DiffImageQuality-fgm: 0.56 [5/9]  
DiffImageOverlap-fno: 0.09 [1/11]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 01:17:44 Z

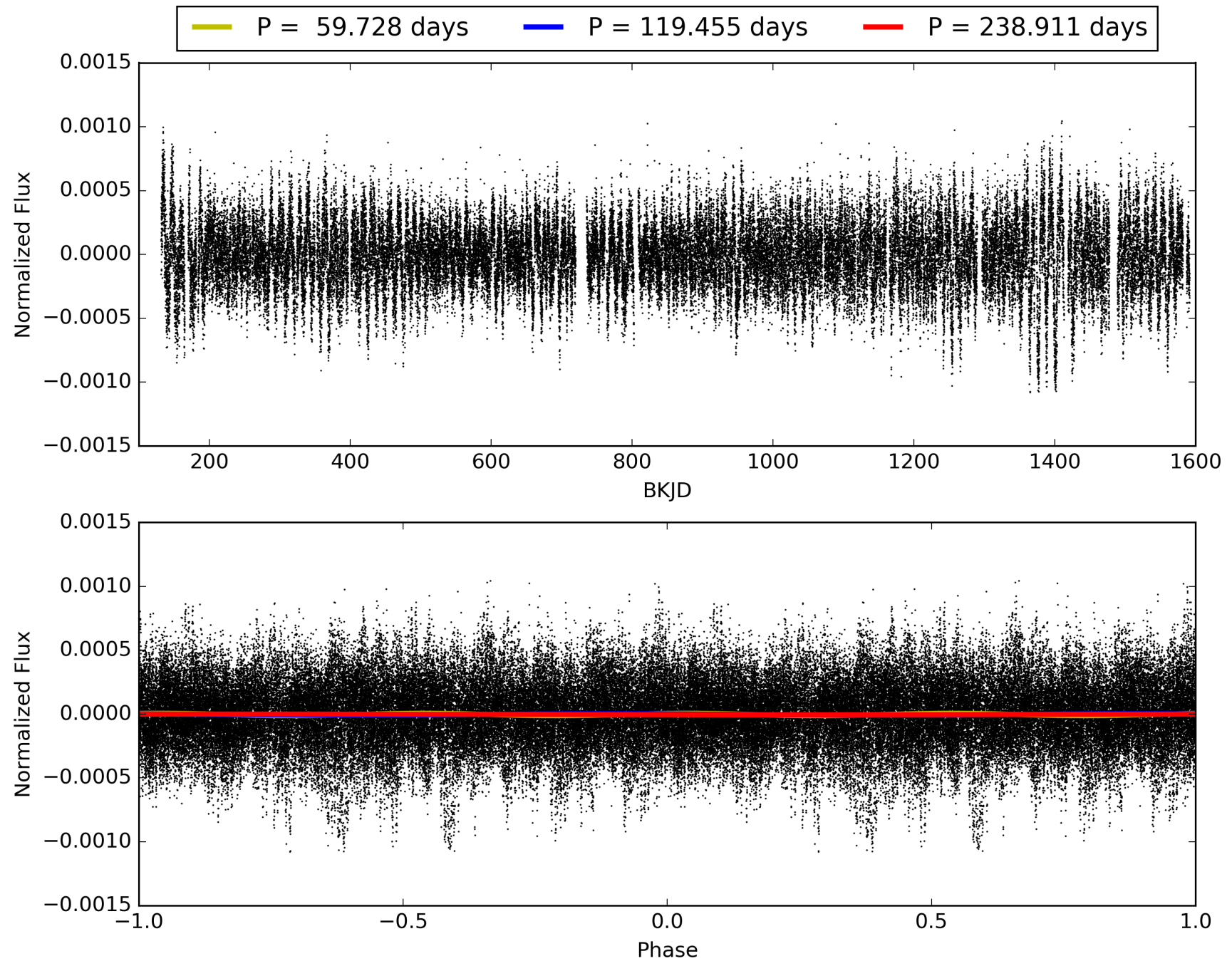
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 008760767-03, PDC Light Curves



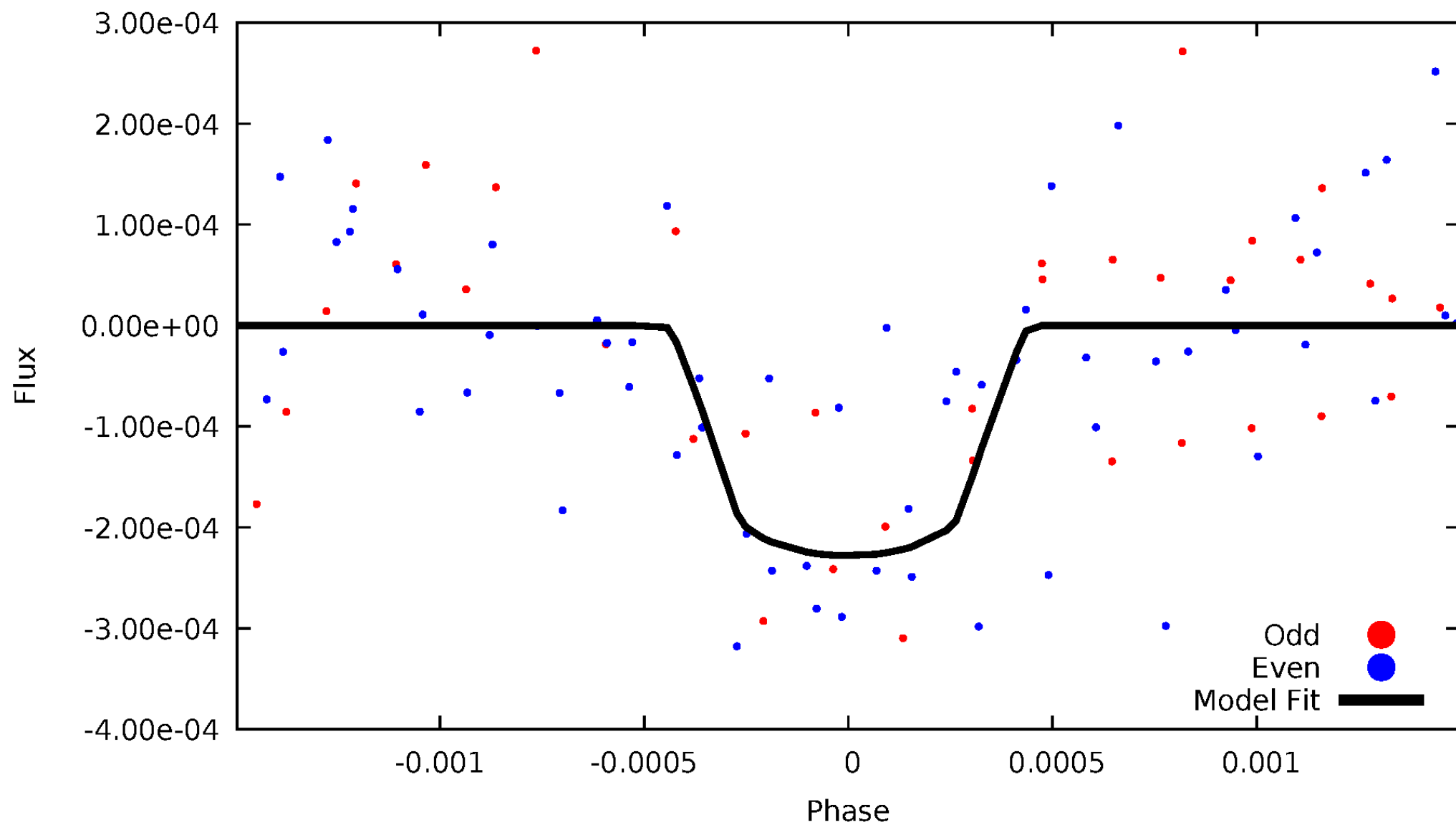


# TCE 008760767-03



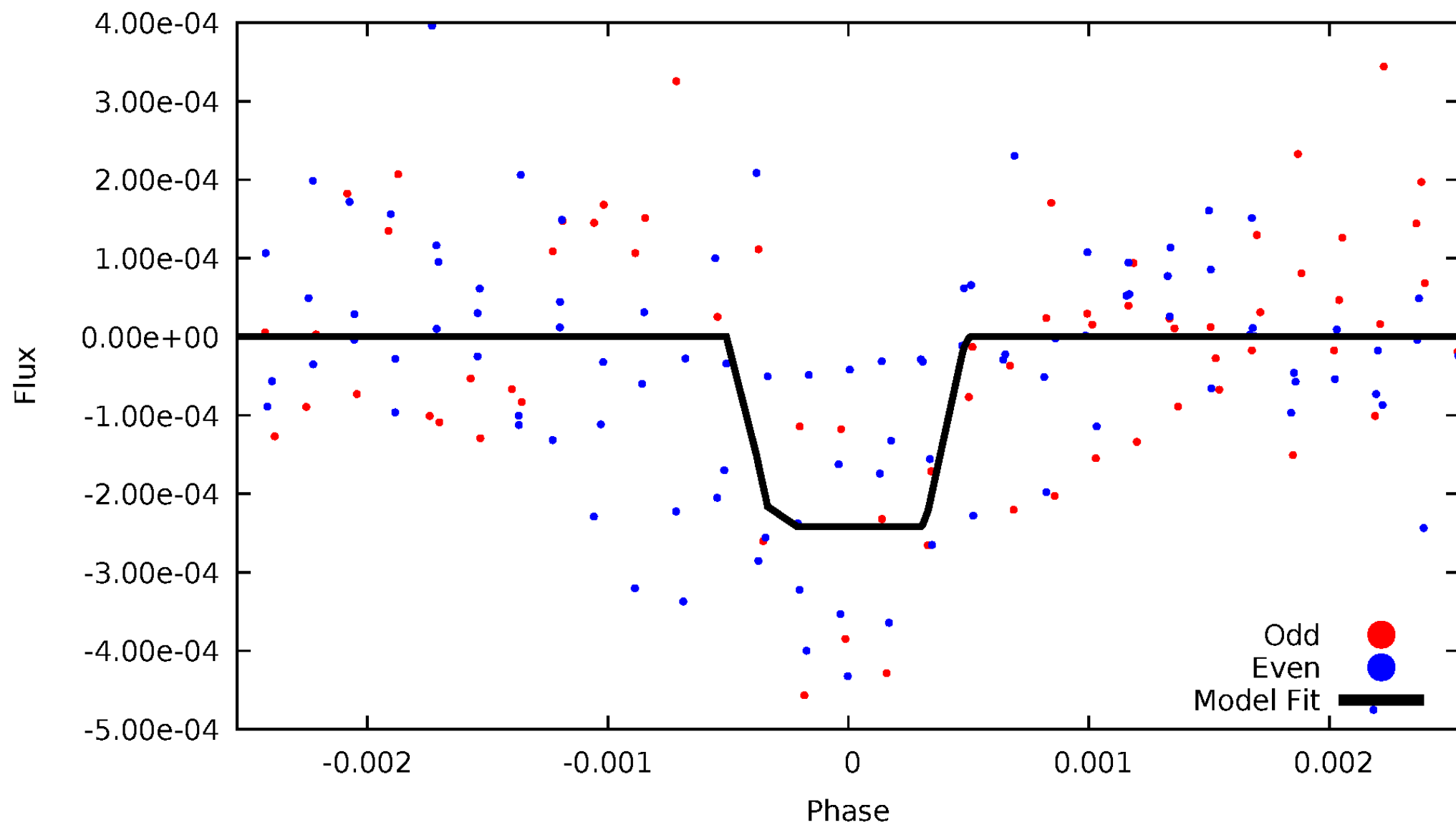
# DV Odd/Even

TCE 008760767-03

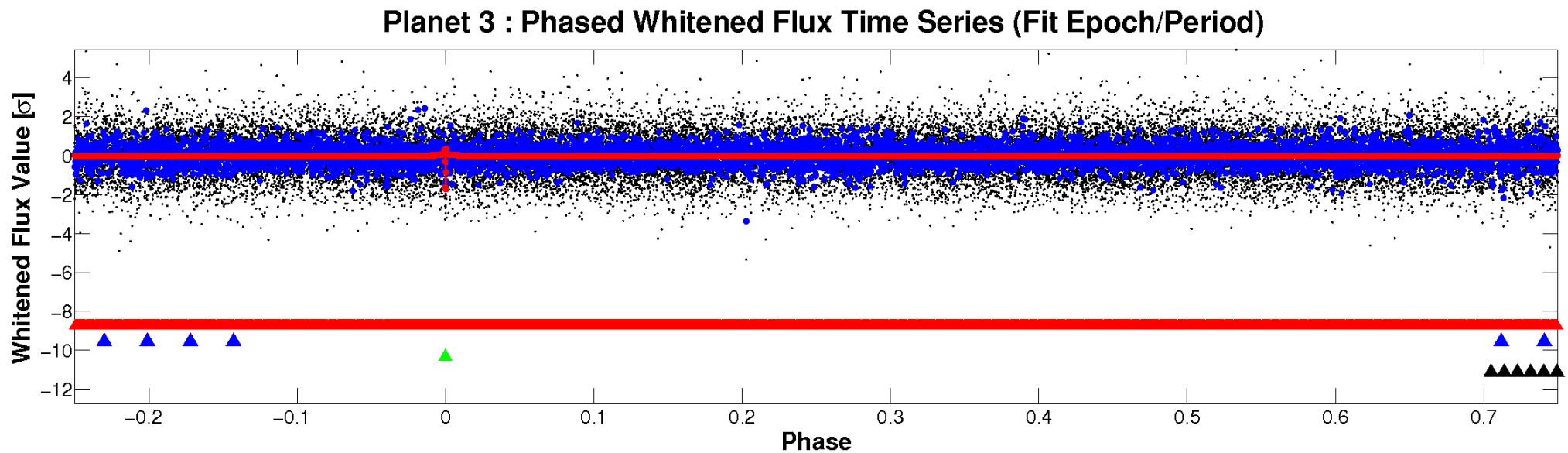
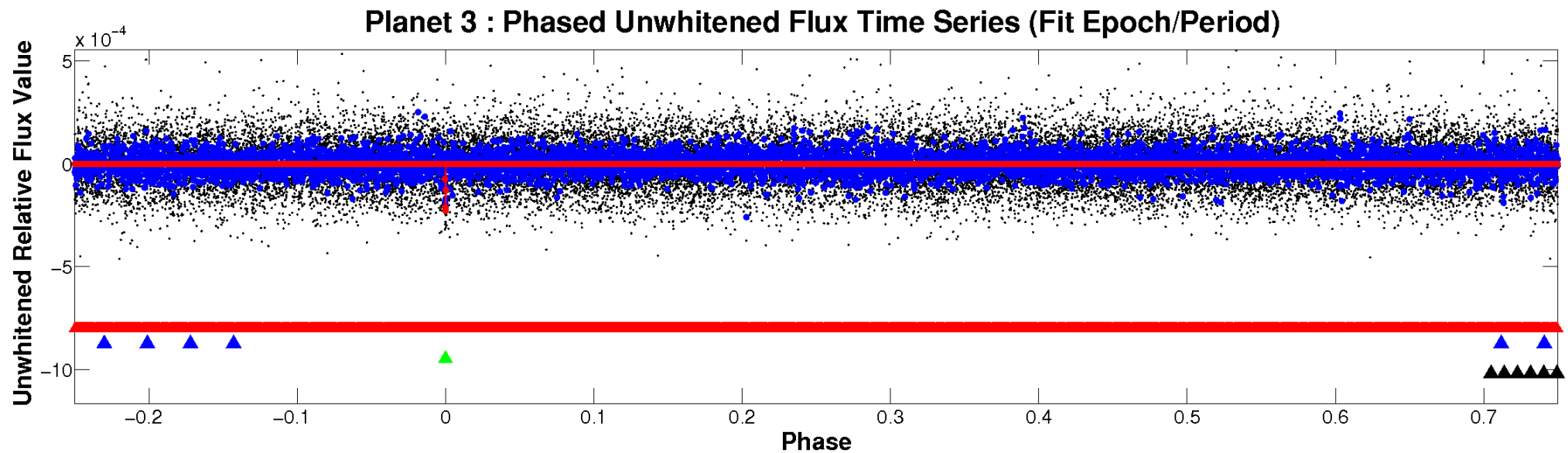


# ALT Odd/Even

TCE 008760767-03

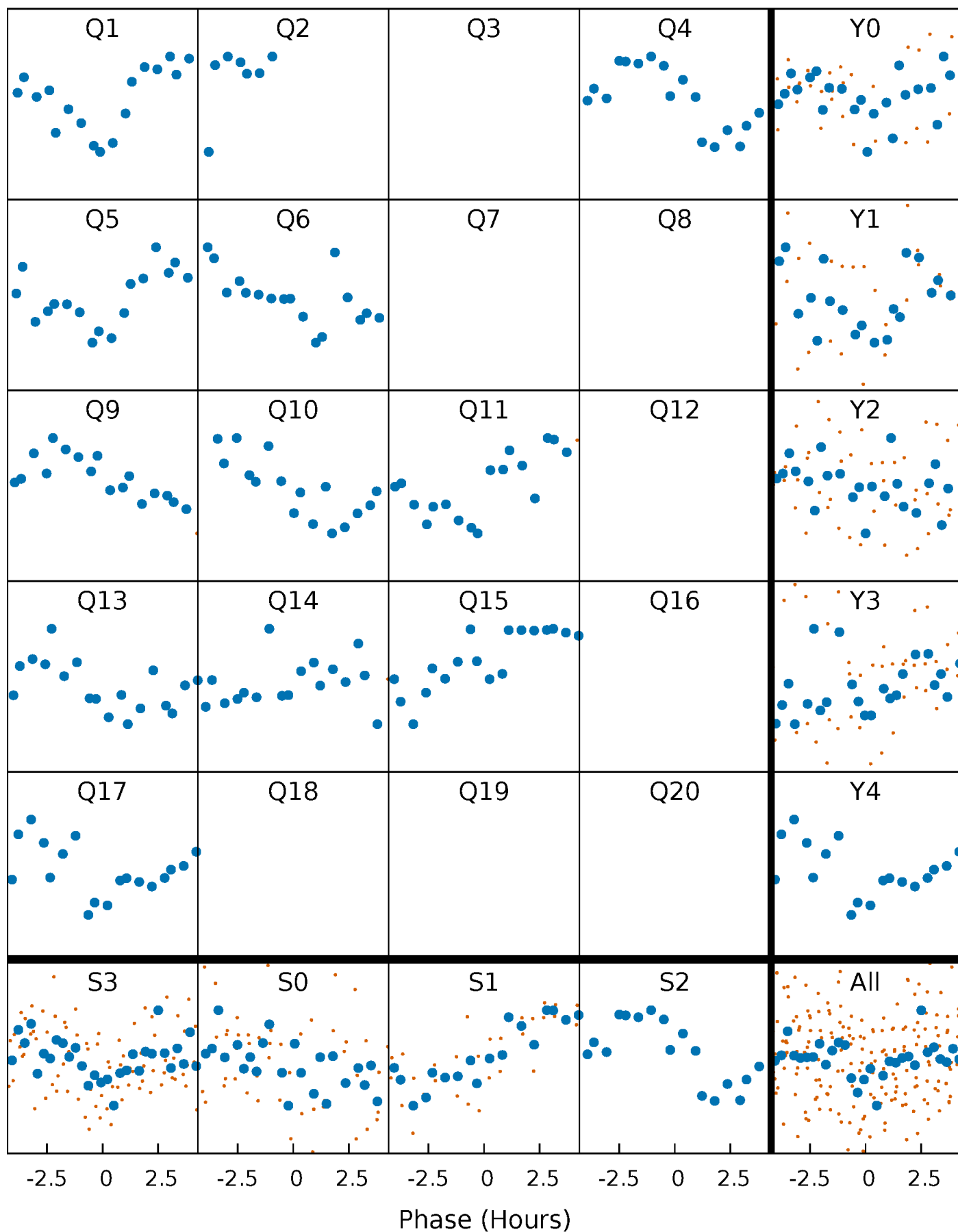


# Non-Whitened Vs. Whitened Light Curve



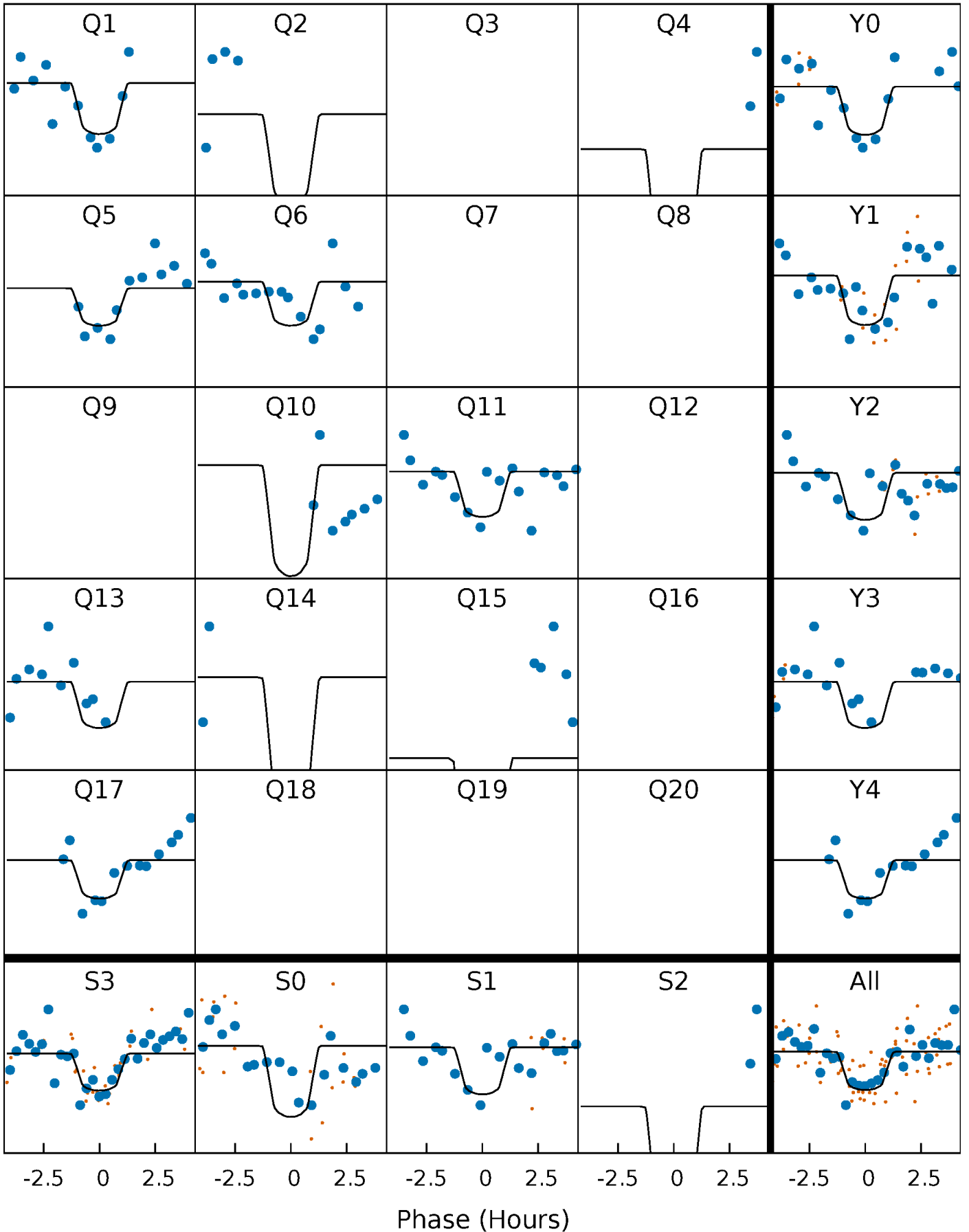
# PDC Quarter-Phased Transit Curves

TCE 008760767-03 P=119.455500 Days  $T_0=135.968667$  (BKJD)



# DV Quarter-Phased Transit Curves

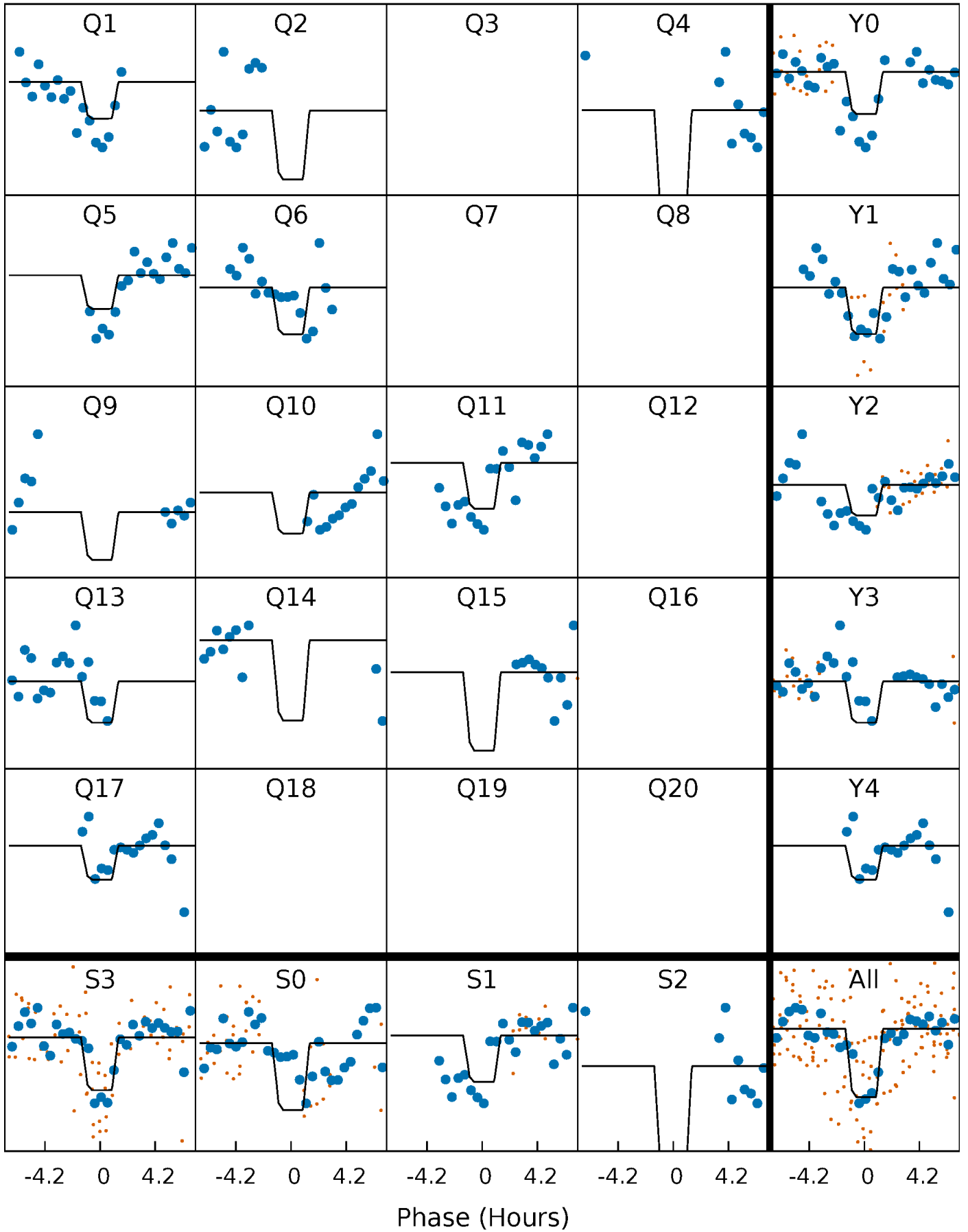
TCE 008760767-03 P=119.455500 Days  $T_0=135.968667$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

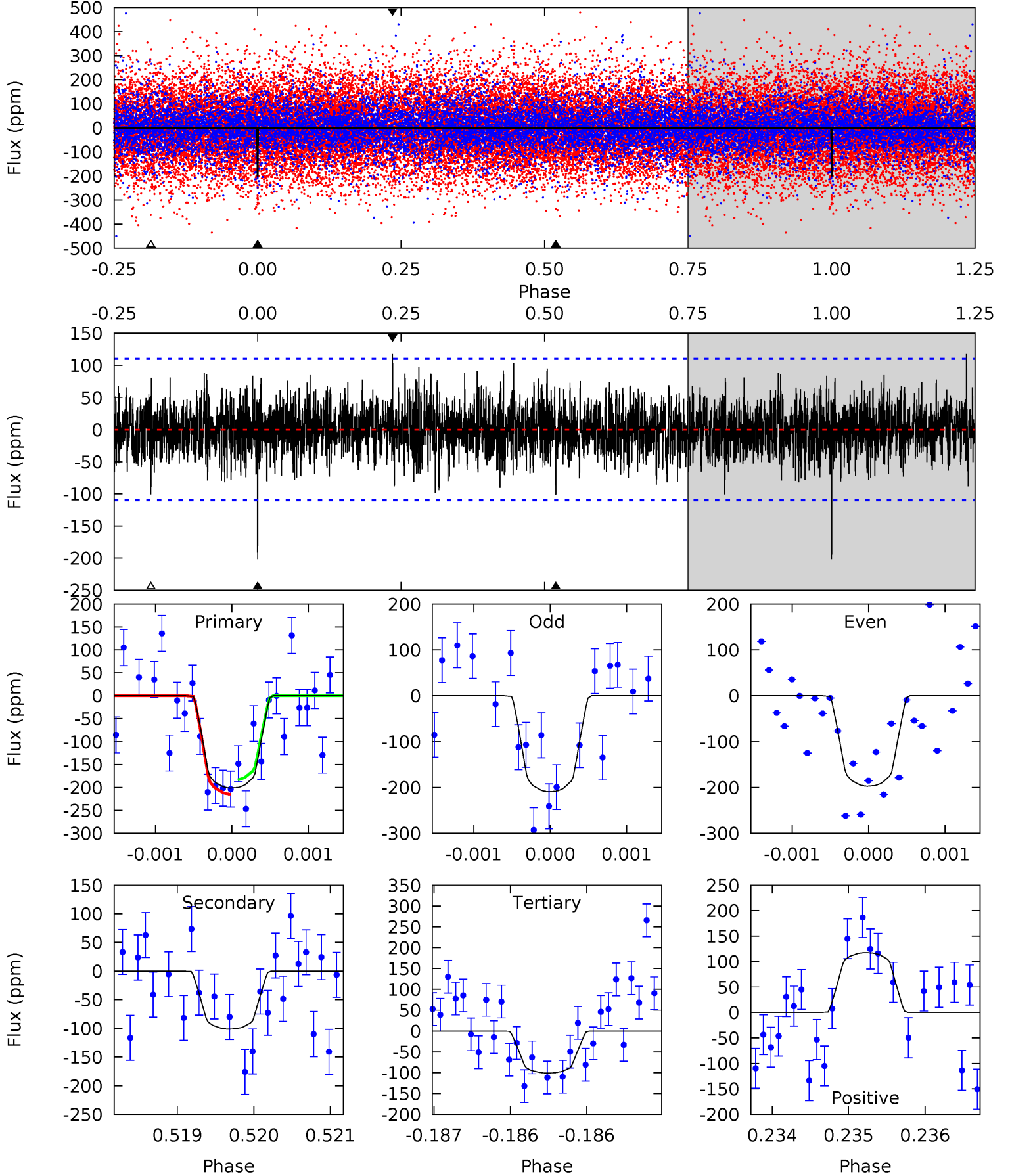
TCE 008760767-03 P=119.455015 Days  $T_0=135.967096$  (BKJD)



# DV Model-Shift Uniqueness Test

008760767-03,  $P = 119.455500$  Days,  $E = 16.513167$  Days

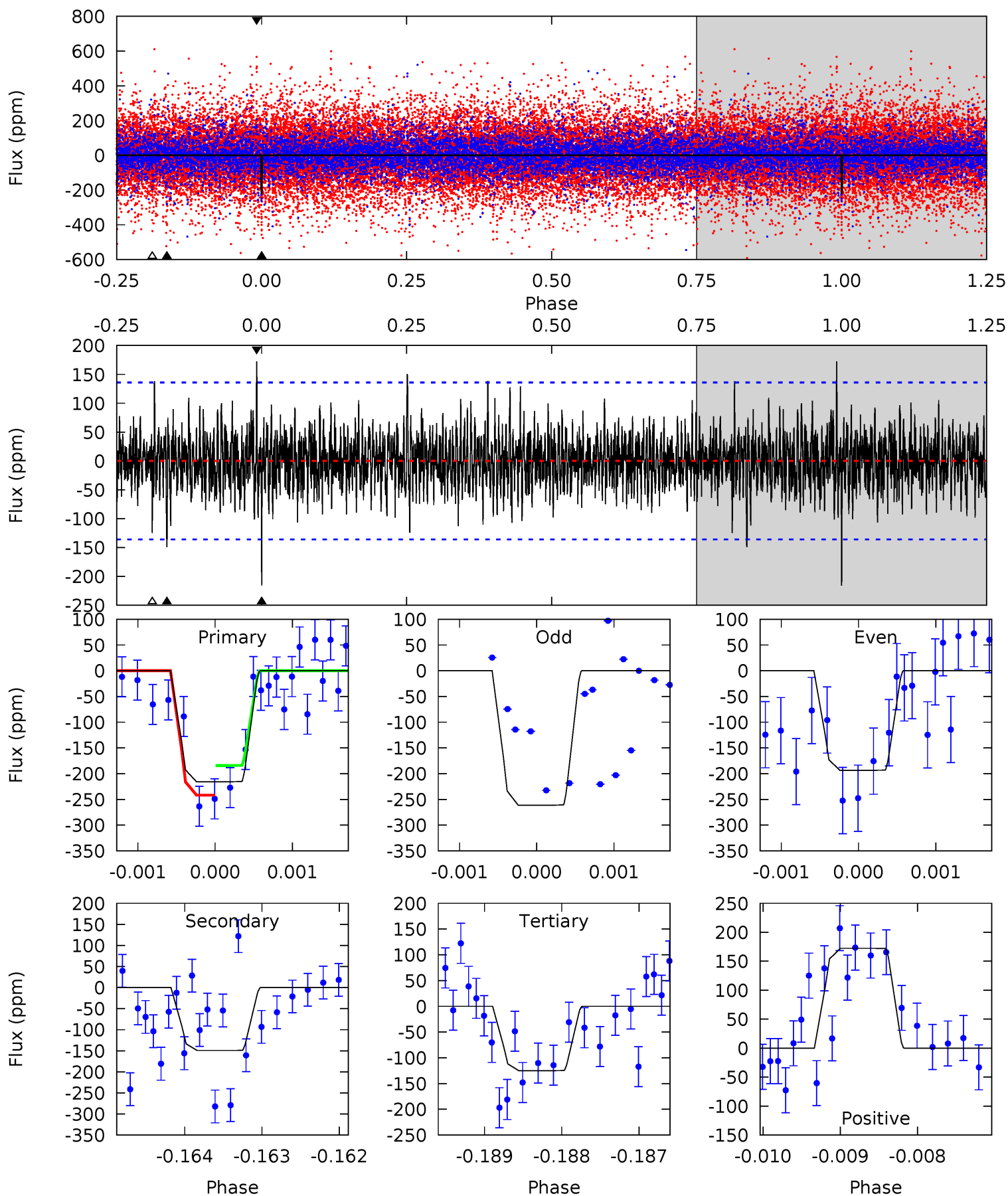
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
10.0	5.03	5.02	5.84	5.47	3.33	1.46	5.00	4.18	0.02	-0.81	0.29	1.04	0.37	0.78



# Alt Model-Shift Uniqueness Test

008760767-03, P = 119.455015 Days, E = 16.512081 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
8.68	6.01	5.03	6.93	5.47	3.33	1.48	3.65	1.75	0.98	-0.92	1.28	1.32	0.44	1.16



### Stellar Parameters For KIC 008760767

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$7099^{+191}_{-234}$	$3.720^{+0.296}_{-0.074}$	$-0.220^{+0.250}_{-0.300}$	$3.012^{+0.374}_{-1.121}$	$1.736^{+0.154}_{-0.359}$	$0.090^{+0.175}_{-0.023}$
	+3%/-3%	+8%/-2%	+114%/-136%	+12%/-37%	+9%/-21%	+196%/-25%
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 008760767-03 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-101 \pm 20$	$5.30^{+3.18}_{-3.12}$	$983^{+54}_{-89}$	$5382^{+3516}_{-979}$	$656^{+3326}_{-420}$
Alt.	$-149 \pm 25$	$5.20^{+3.28}_{-2.88}$	$983^{+58}_{-78}$	$5944^{+3250}_{-1196}$	$950^{+3888}_{-593}$

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

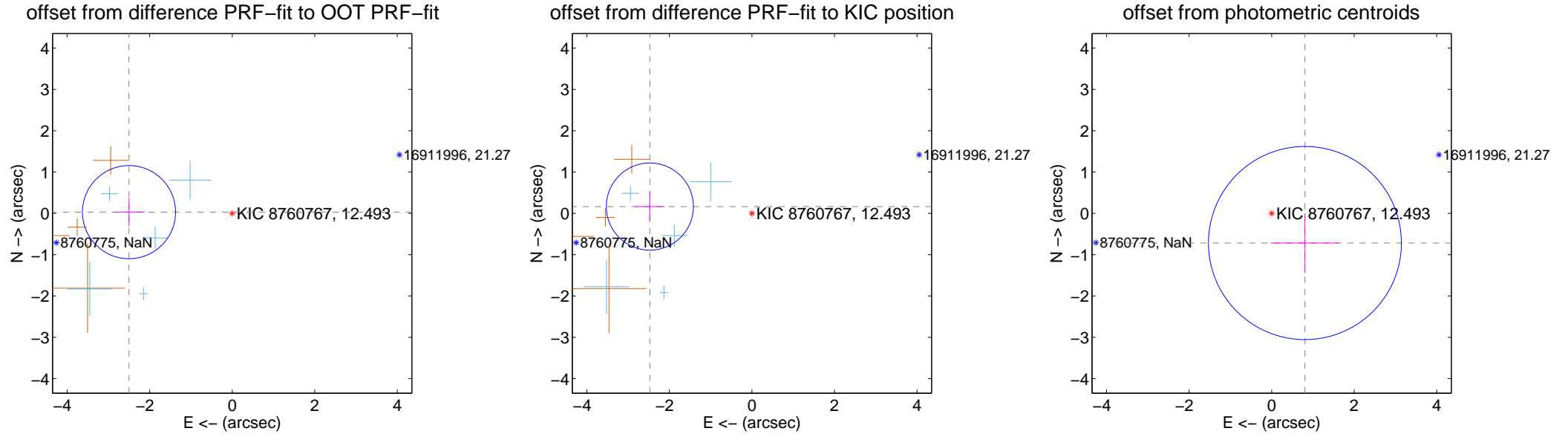
## DV Centroid Data

Supplemental centroid analysis for 008760767-03. Kepler magnitude: 12.49. Transit SNR 7.57

There are 5 quarters with good PRF difference image offsets

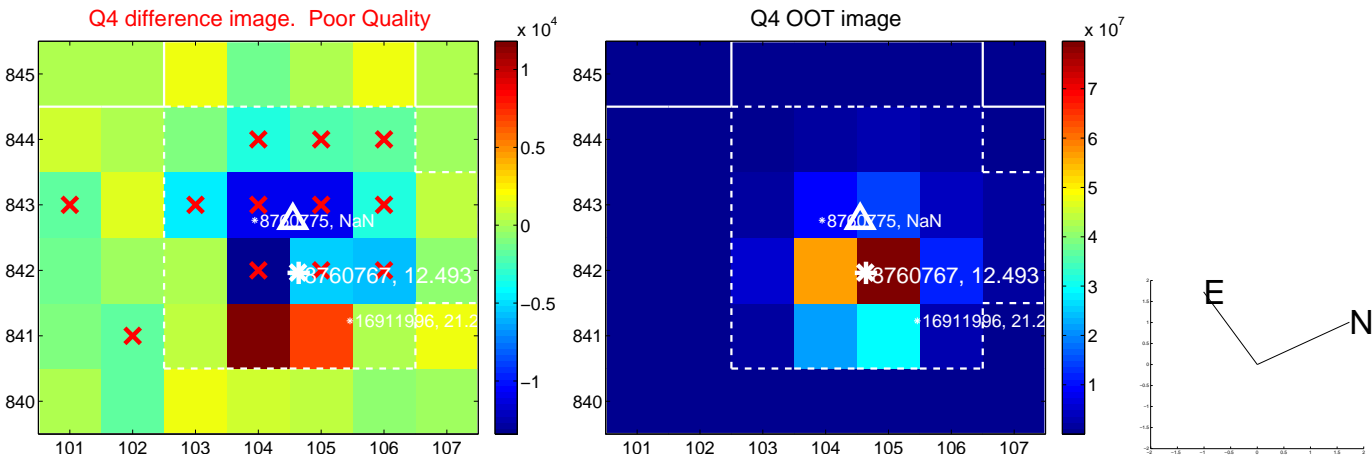
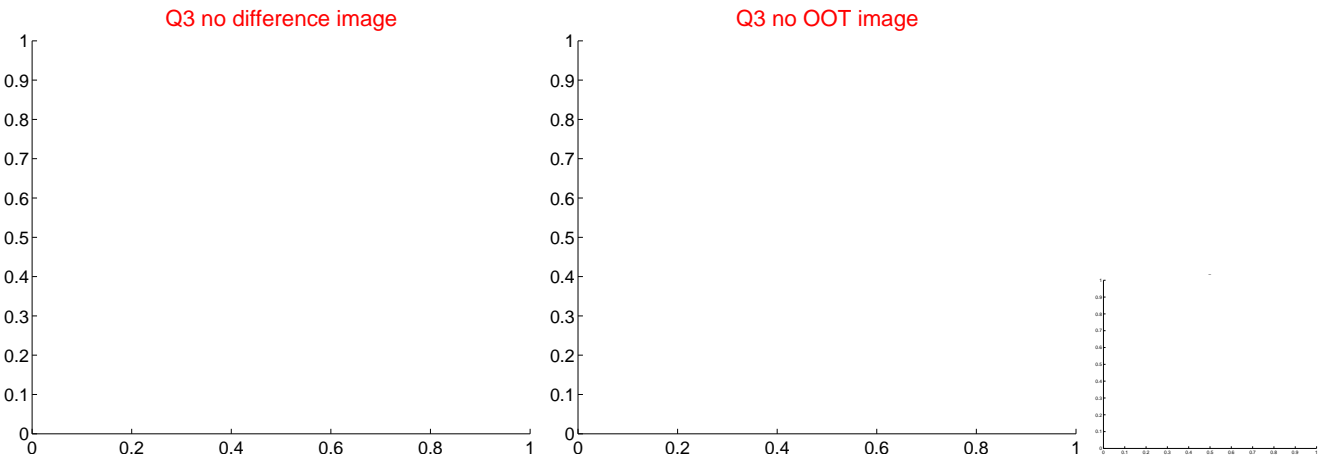
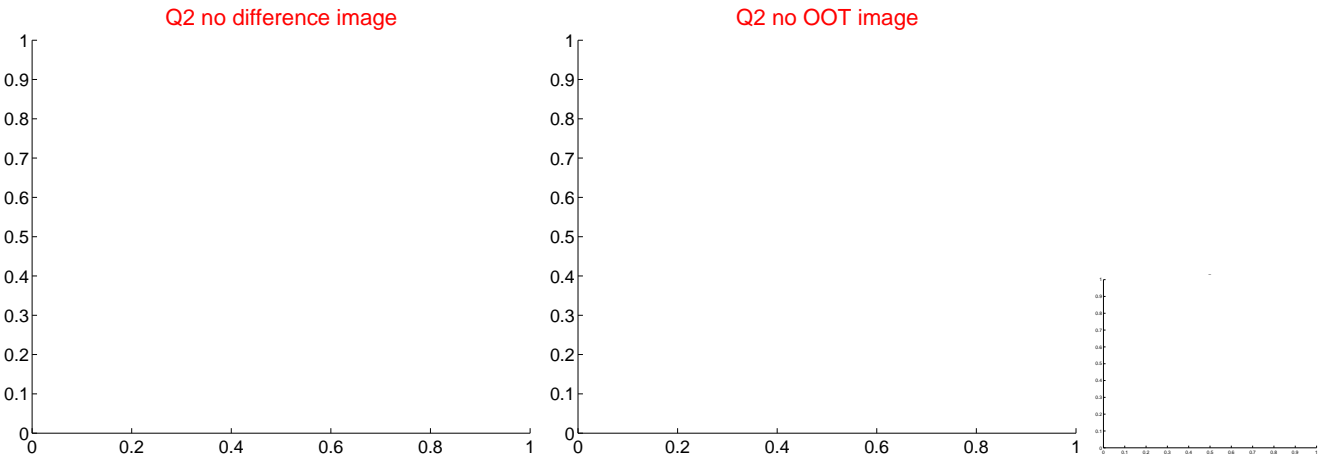
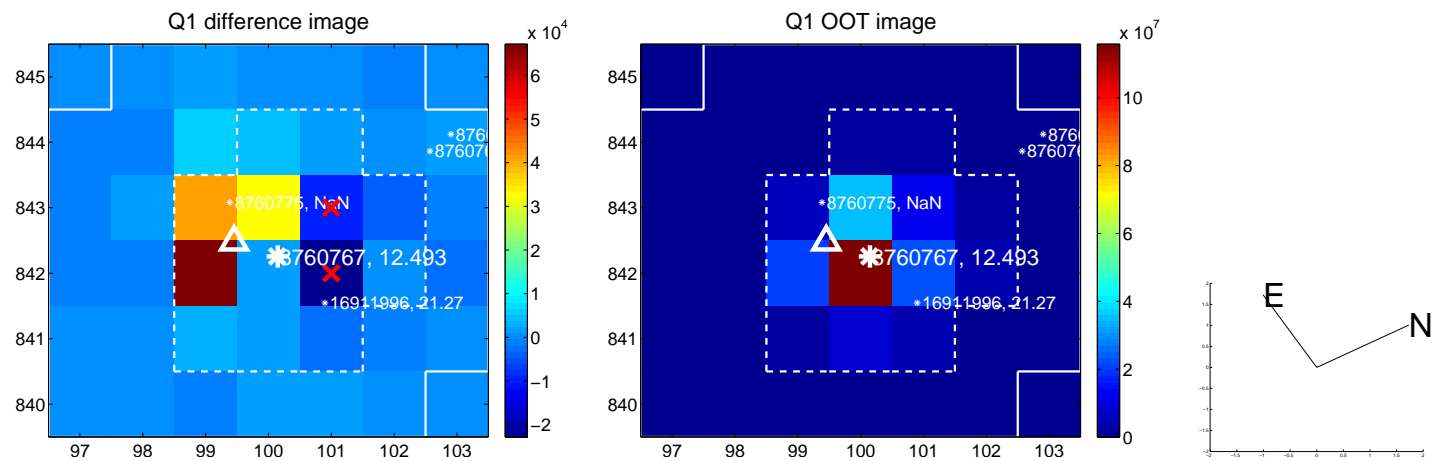
The direct PRF centroid is offset from the target star catalog position by about 0.06 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	<b><math>2.500 \pm 0.376</math></b>	<b>6.65</b>	$2.500 \pm 0.377$	$0.030 \pm 0.345$
PRF-fit source offset from KIC position	<b><math>2.478 \pm 0.352</math></b>	<b>7.05</b>	$2.472 \pm 0.357$	$0.164 \pm 0.359$
photometric centroid source offset	$1.08 \pm 0.78$	1.39	$-0.81 \pm 0.82$	$-0.72 \pm 0.72$

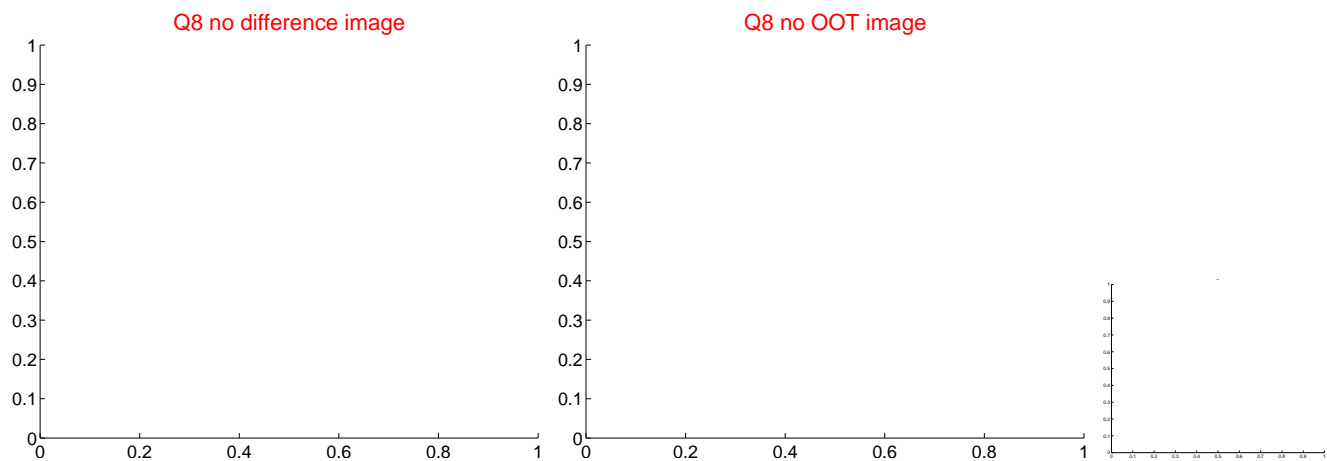
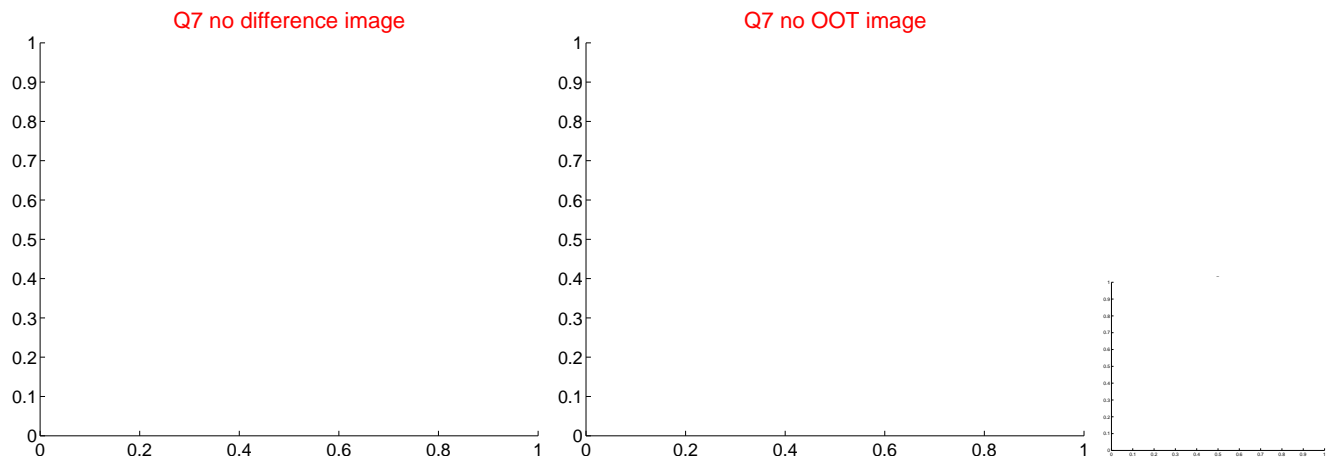
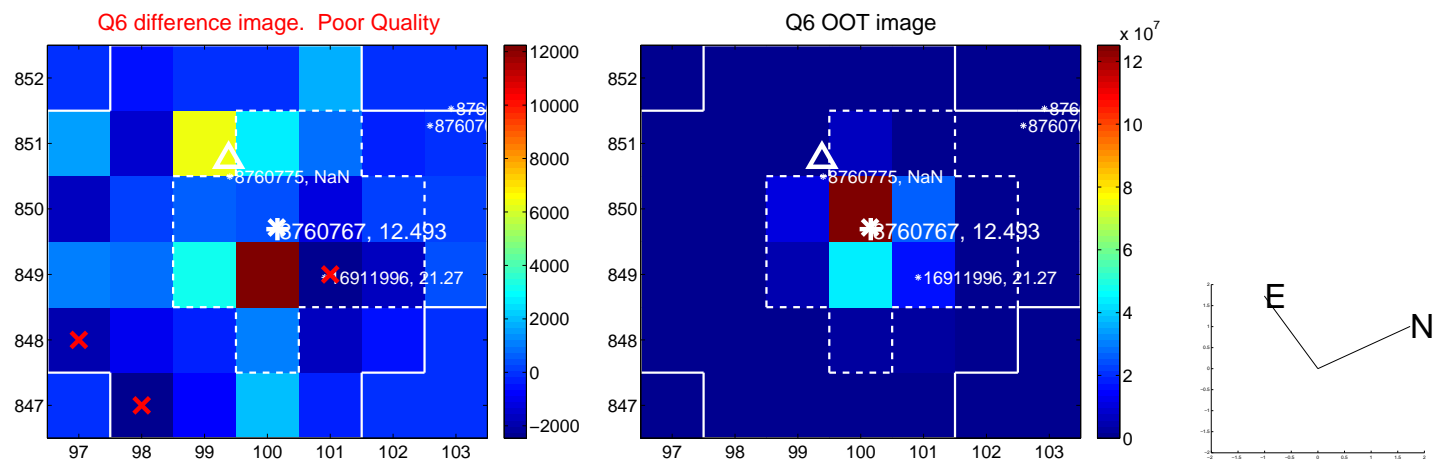
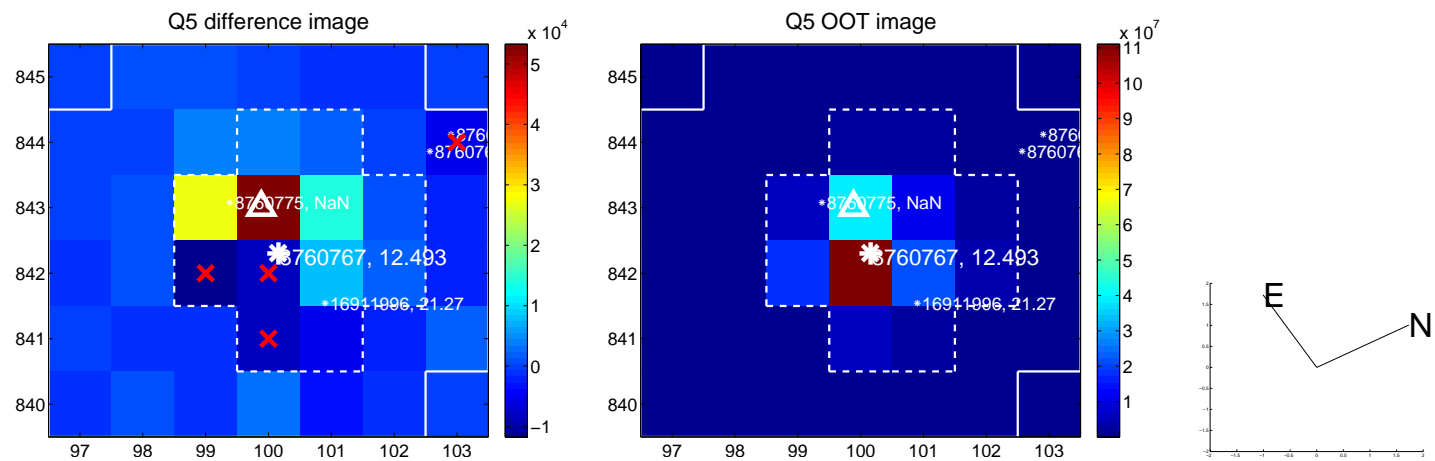


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

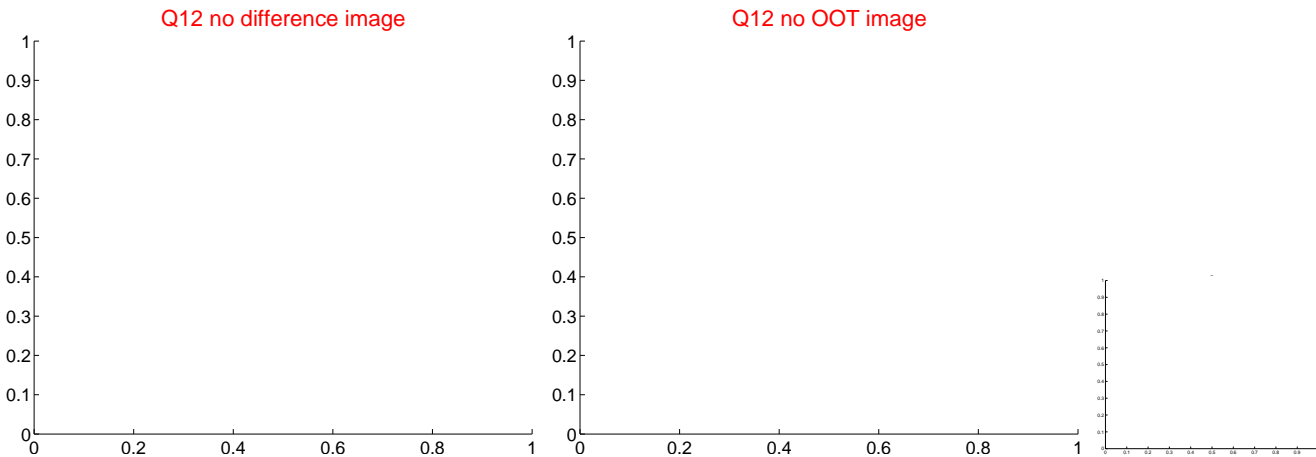
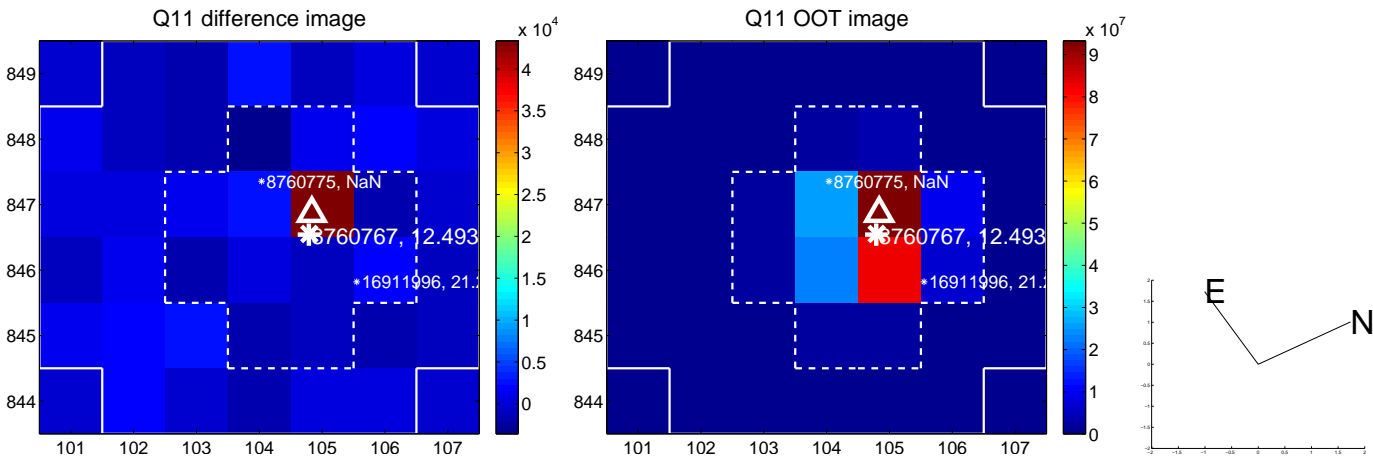
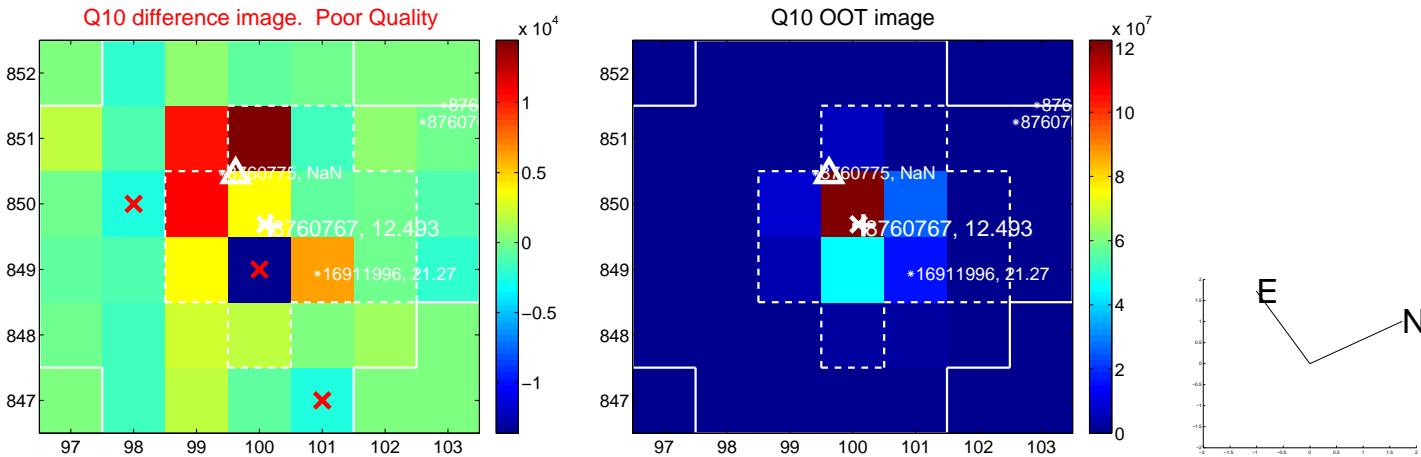
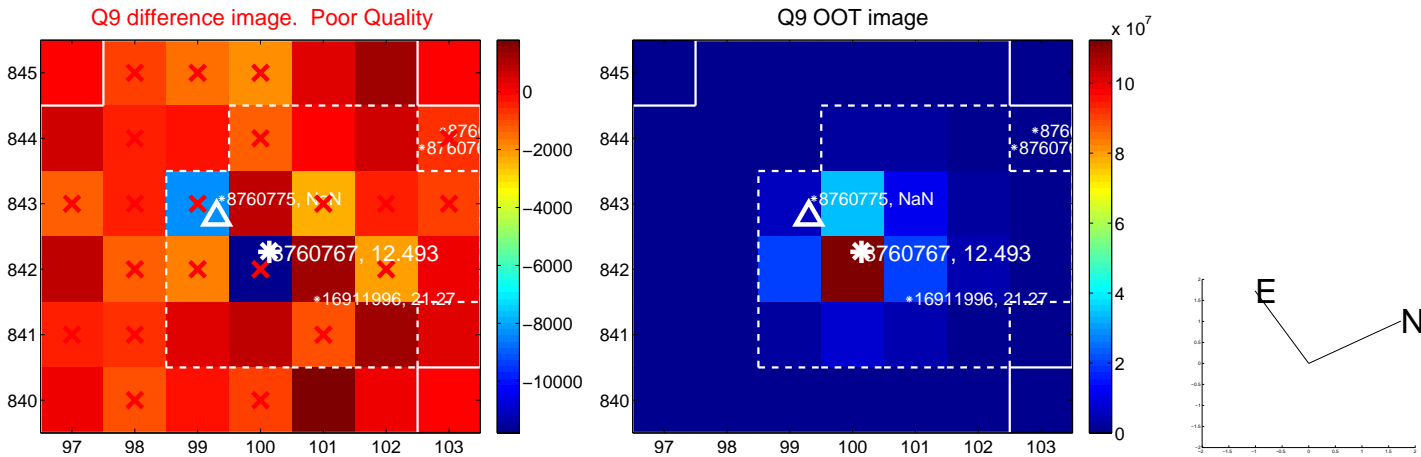


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

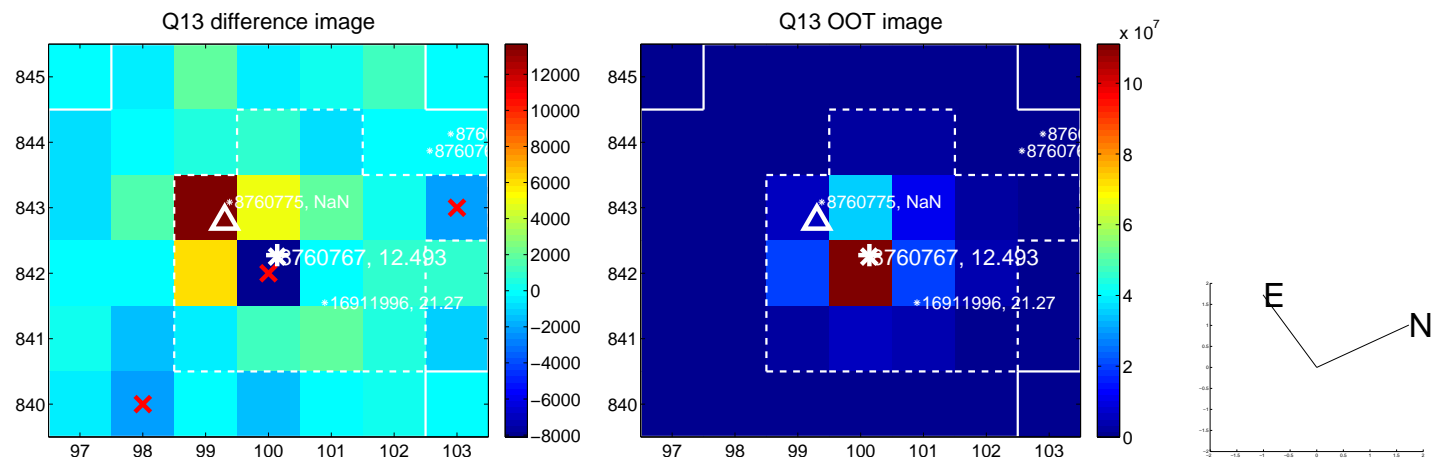




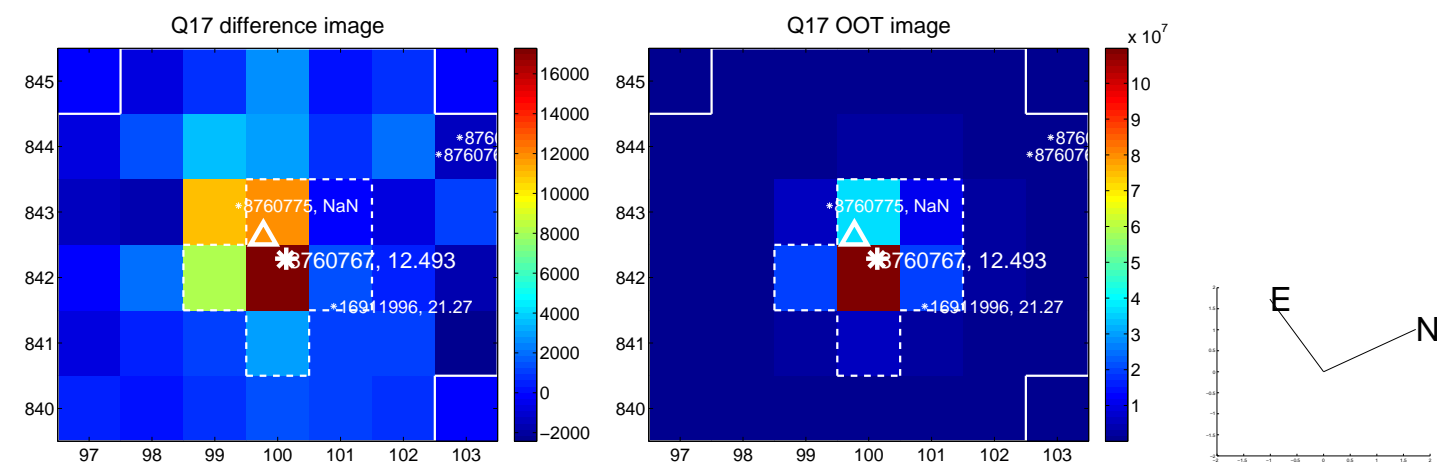
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



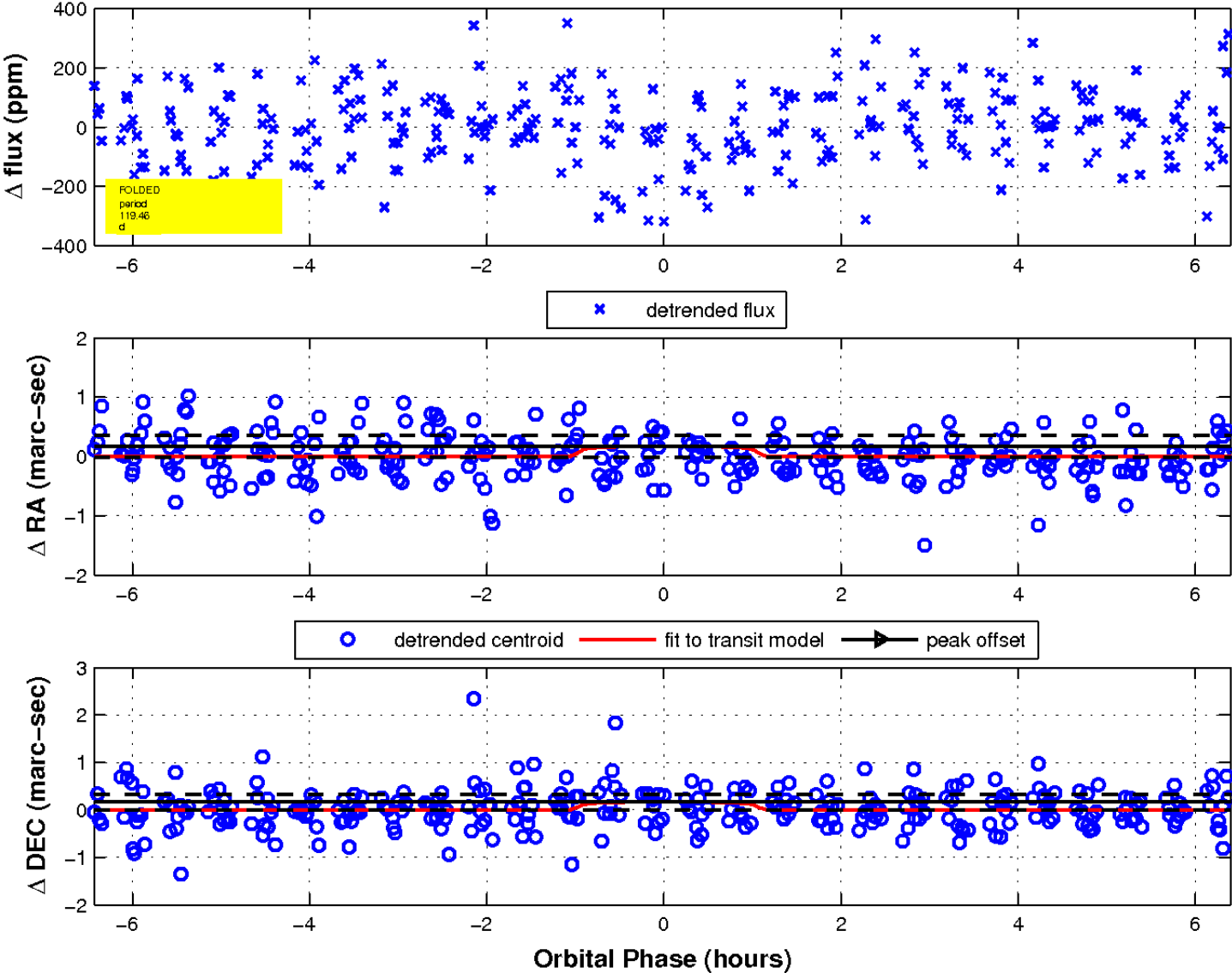
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

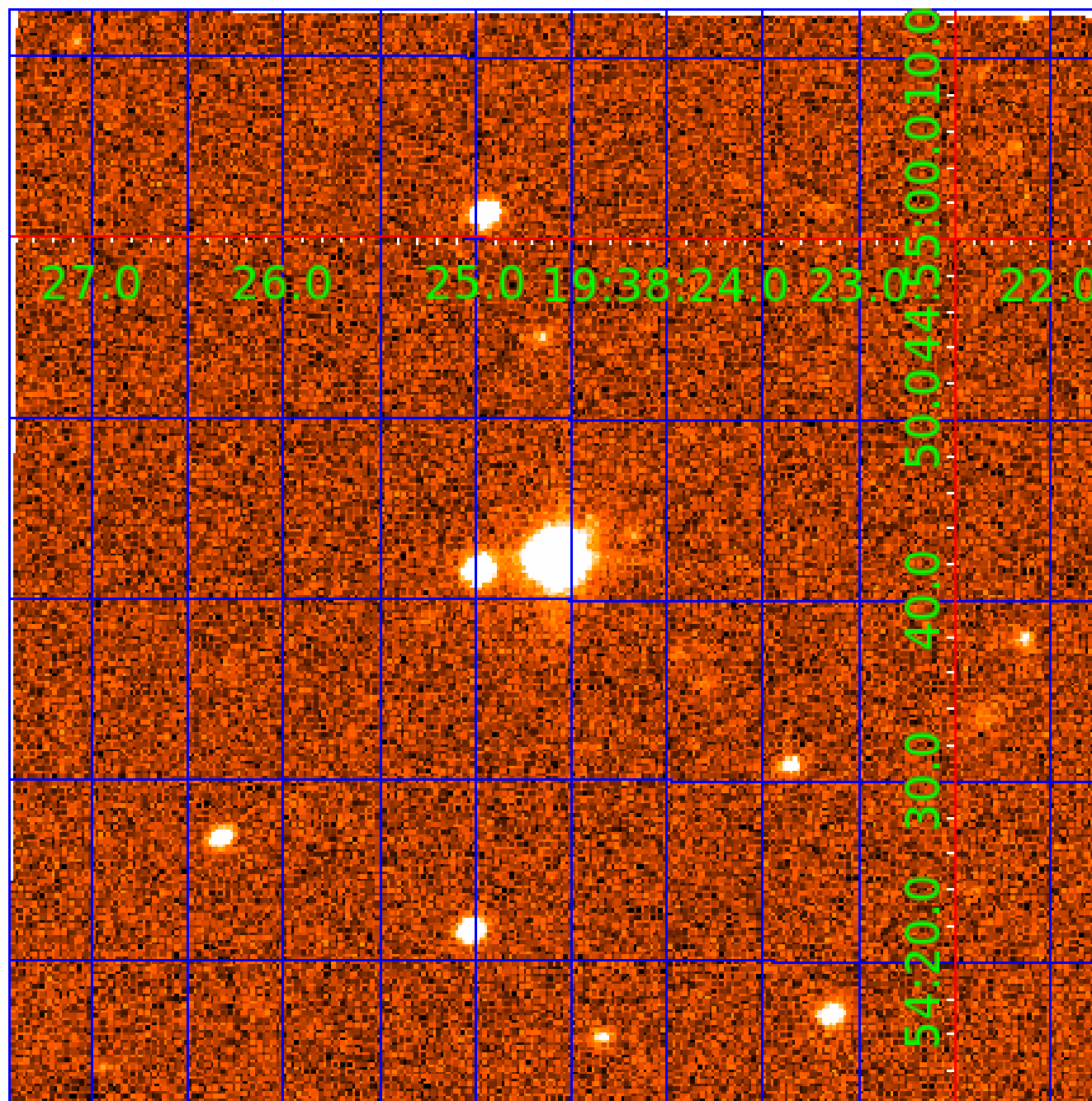


fluxWeightedCentroids, Planet 3 of 4



UKIRT Image

Declination



# KIC 008760767

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008760767-01	OBS	No	0.750214	131.736012	17.7	3.031	8.7	9.8	3.01	7099	1.48	54702.39
008760767-02	OBS	No	242.382889	340.454362	101.3	12.000	7.5	-1.0	3.01	7099	3.05	24.68
008760767-03	OBS	No	119.455500	135.968667	228.1	2.145	7.2	7.6	3.01	7099	5.13	63.38
008760767-04	OBS	No	239.972169	220.181556	193.0	6.806	8.1	7.6	3.01	7099	4.91	25.01

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008760767-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
008760767-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL_SKYE—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_NOFITS
008760767-03	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_ALT—MOD_POS_ALT—CENT_UNRESOLVED_OFFSET
008760767-04	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_UNRESOLVED_OFFSET—HALO_GHOST

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

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

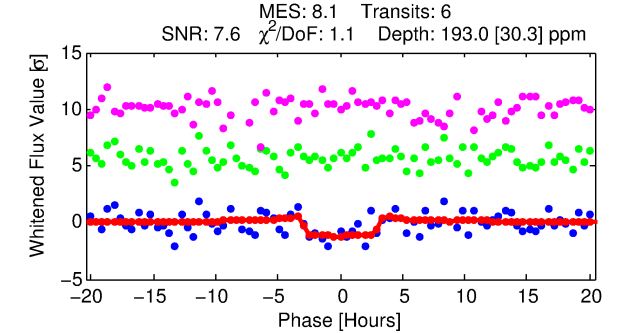
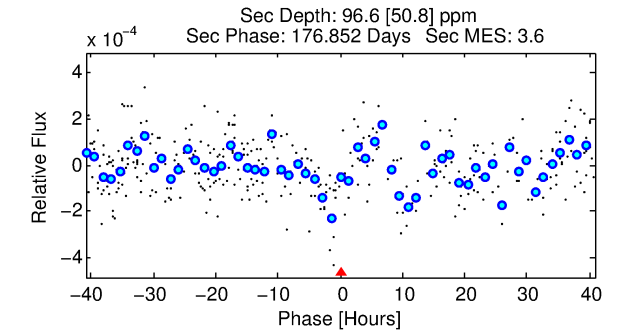
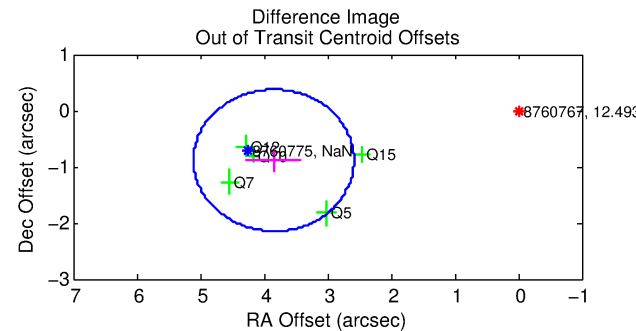
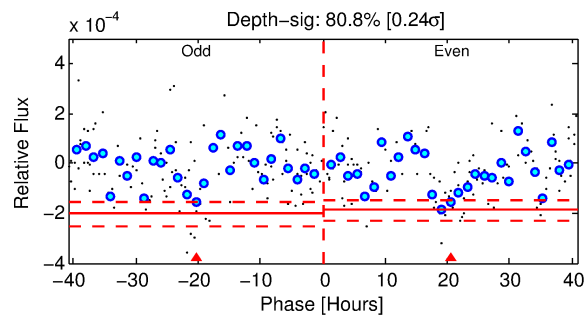
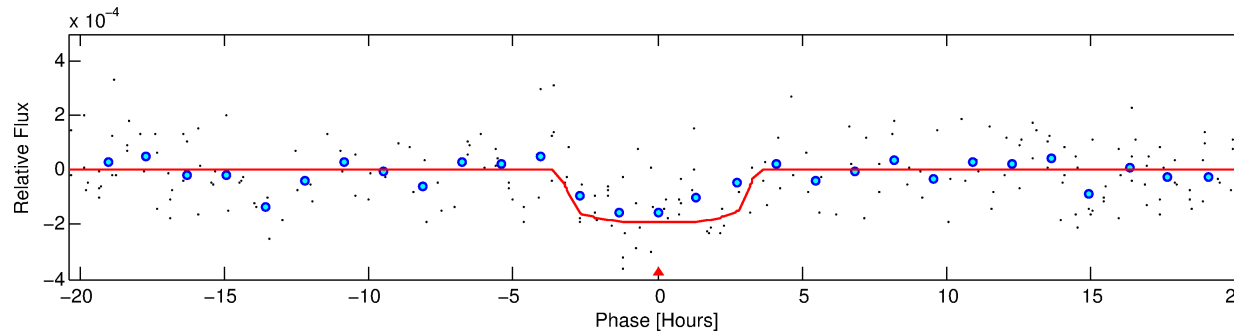
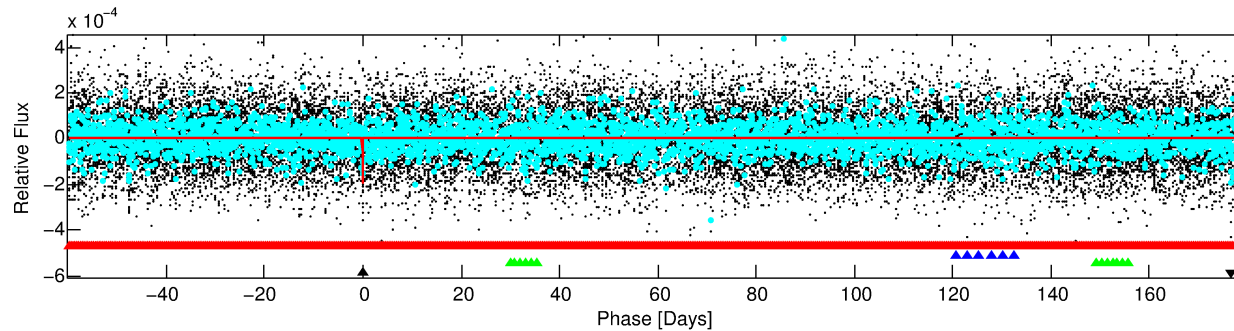
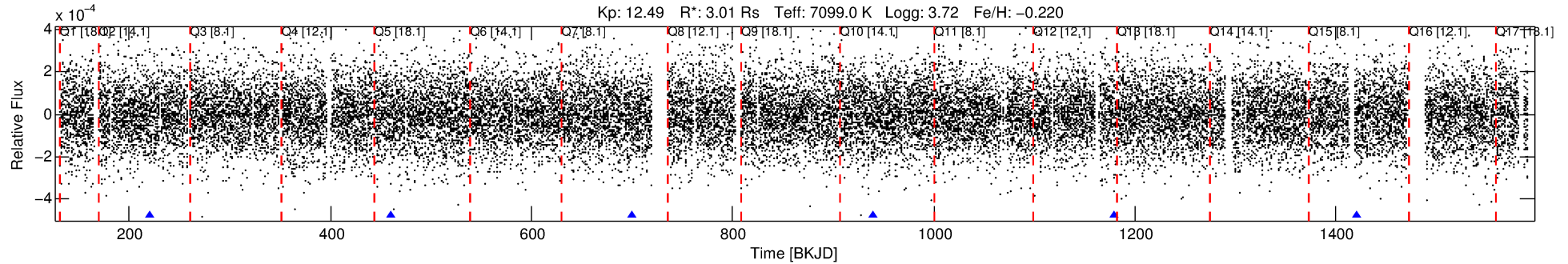
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 008760767-04

No Significant Match Found

# DV One-Page Summary

KIC: 8760767 Candidate: 4 of 4 Period: 239.972 d



## DV Fit Results:

Period = 239.97217 [0.00870] d  
Epoch = 220.1816 [0.0233] BKJD  
Rp/R\* = 0.0149 [0.0045]  
a/R\* = 123.78 [202.27]  
b = 0.90 [0.34]  
Seff = 25.01 [13.36]  
Teq = 570 [76] K  
Rp = 4.91 [2.35] Re  
a = 0.9086 [0.3057] AU  
Ag = 1819.61 [1735.80] [1.05σ]  
Teffp = 5758 [1169] K [4.43σ]

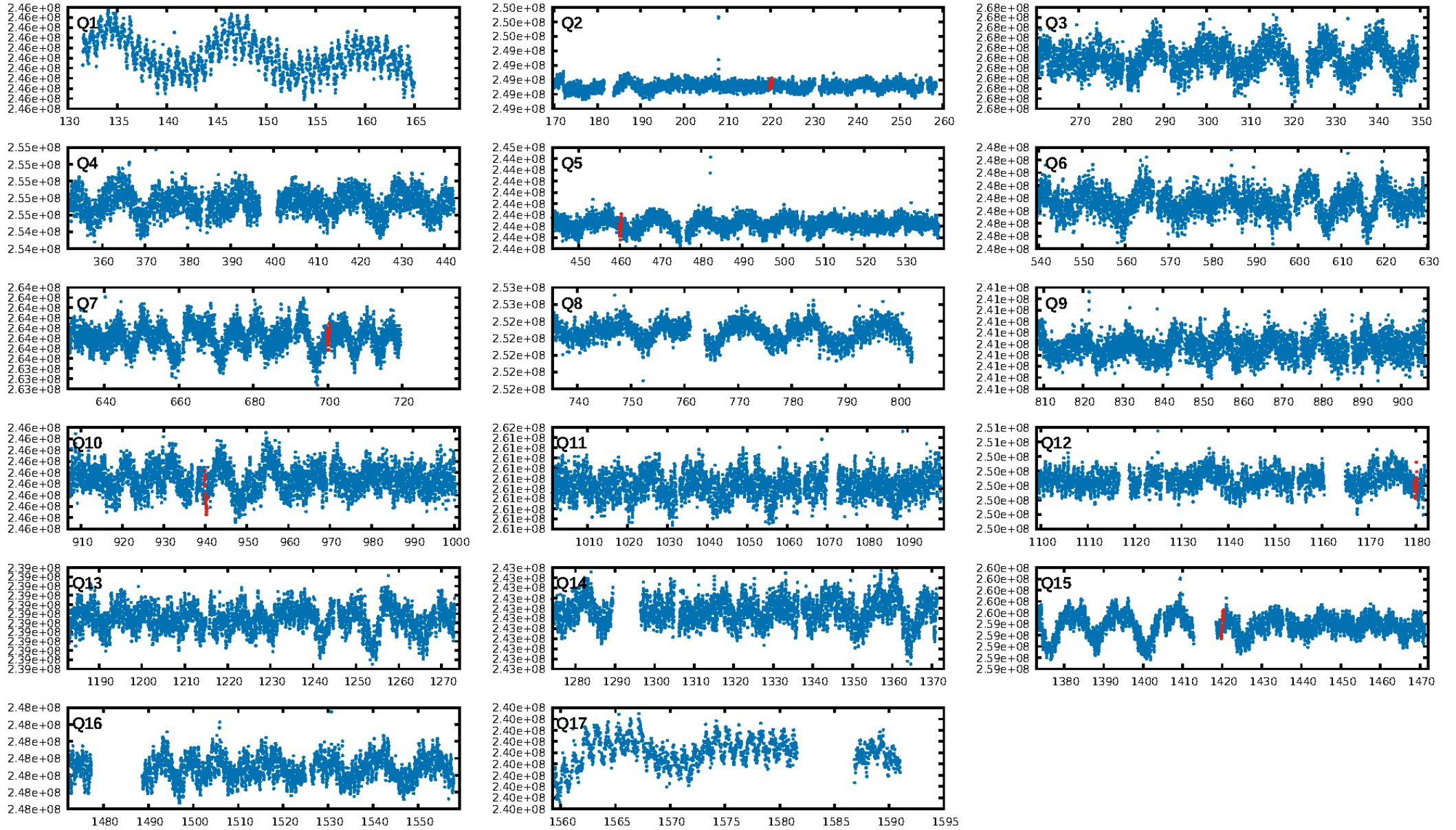
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [405.31σ]  
LongPeriod-sig: 100.0% [4.19σ]  
ModelChiSquare2-sig: 97.9%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 3.77e-12  
RollingBand-fgt: 1.00 [6/6]  
GhostDiagnostic-chr: 0.09121  
Centroid-sig: 57.7%  
Centroid-so: 0.682 arcsec [0.75σ]  
OotOffset-rm: 3.947 arcsec [9.38σ]  
KicOffset-rm: 3.844 arcsec [9.24σ]  
OotOffset-st: 1/2/1/1 [5]  
KicOffset-st: 1/2/1/1 [5]  
DiffImageQuality-fgm: 0.40 [2/5]  
DiffImageOverlap-fno: 0.00 [0/6]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 01:17:50 Z

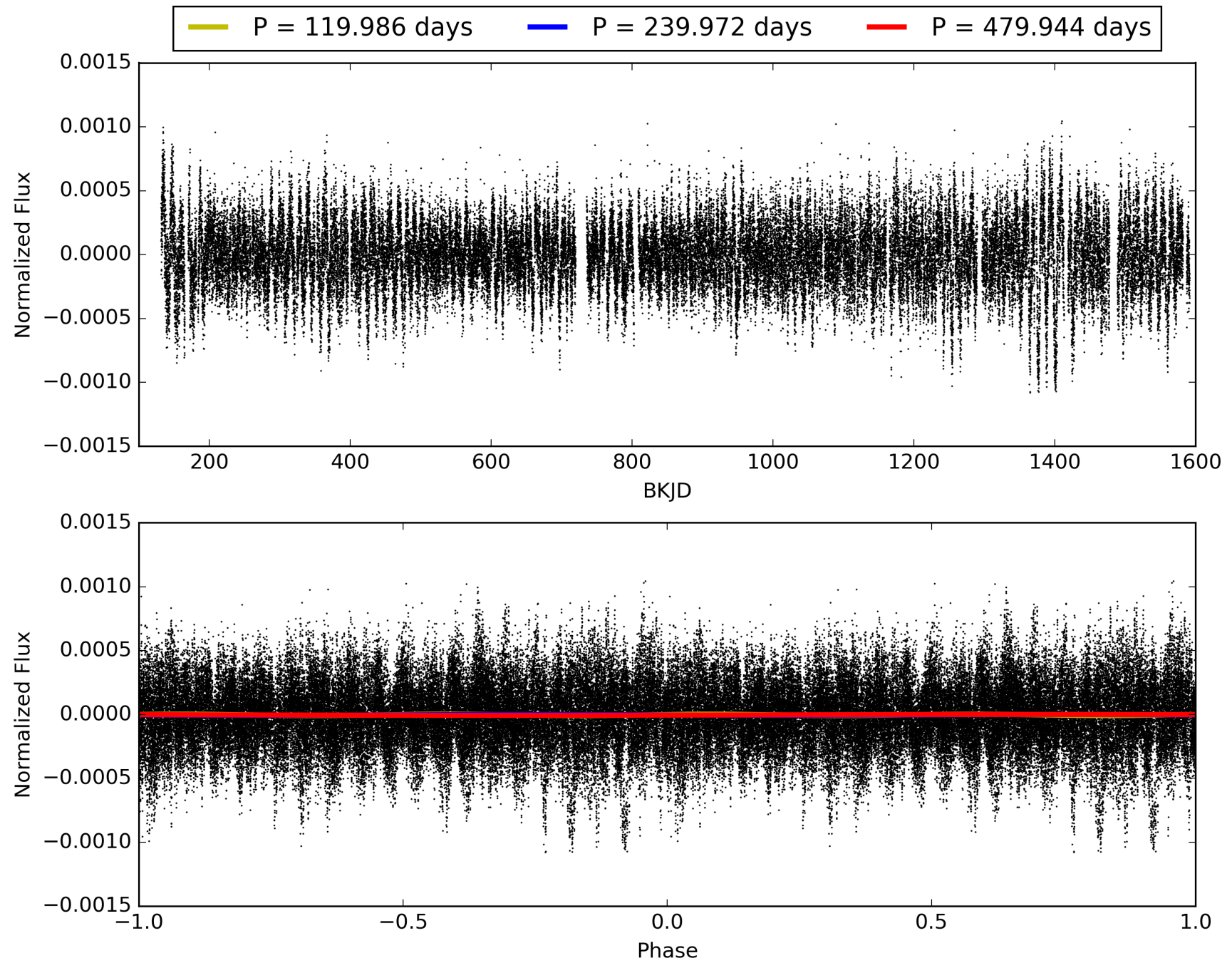
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 008760767-04, PDC Light Curves



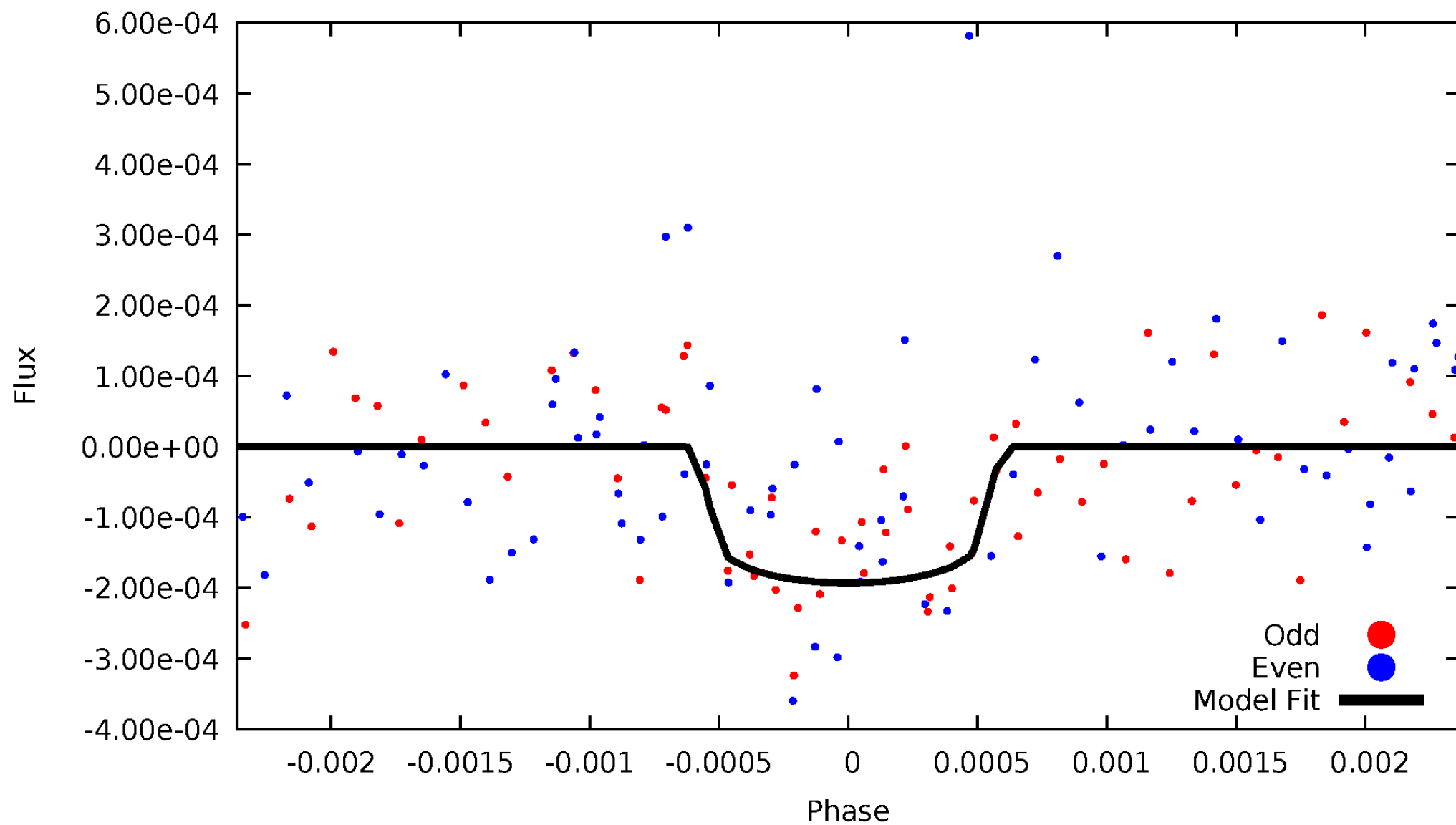


TCE 008760767-04



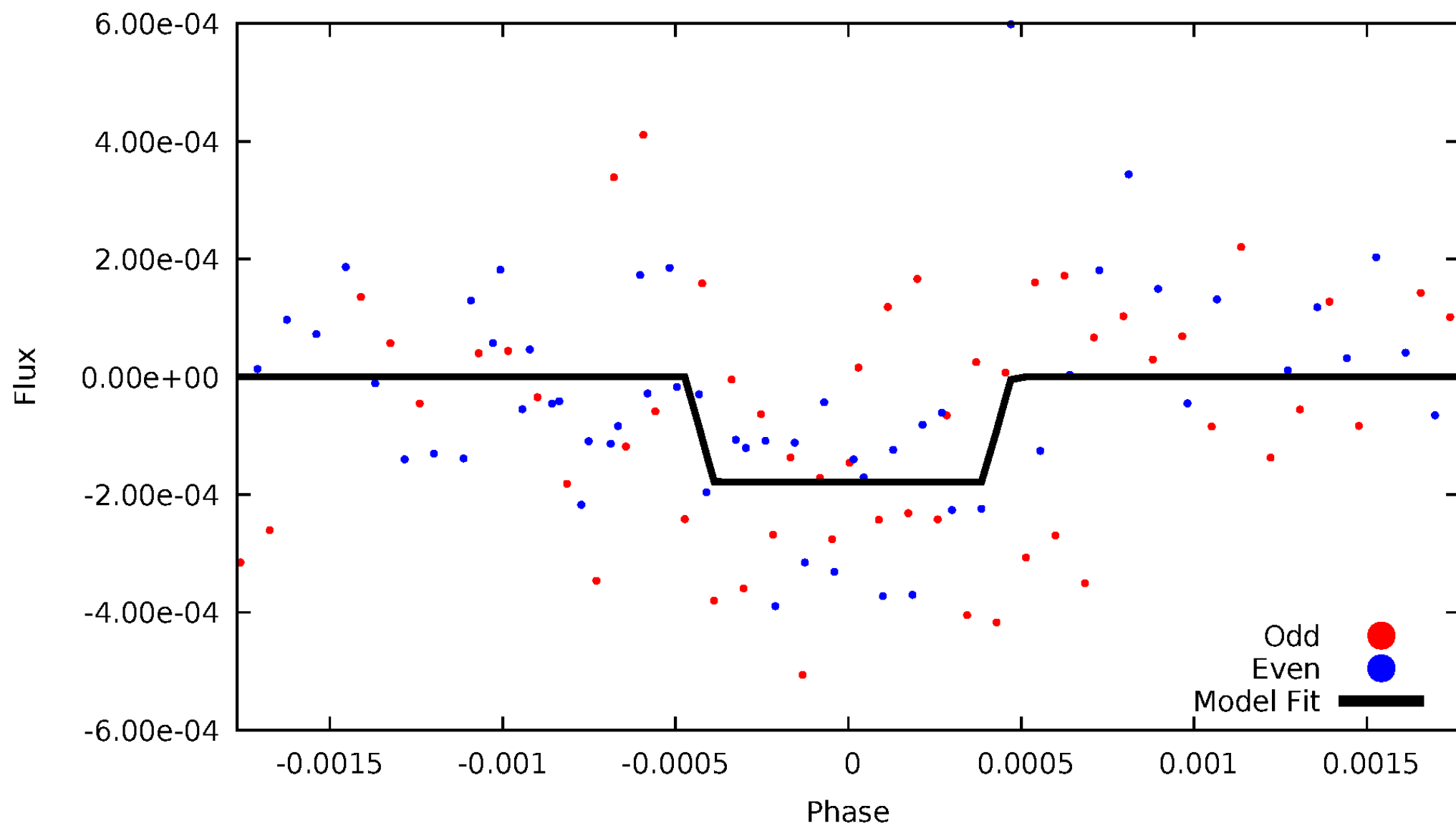
# DV Odd/Even

TCE 008760767-04



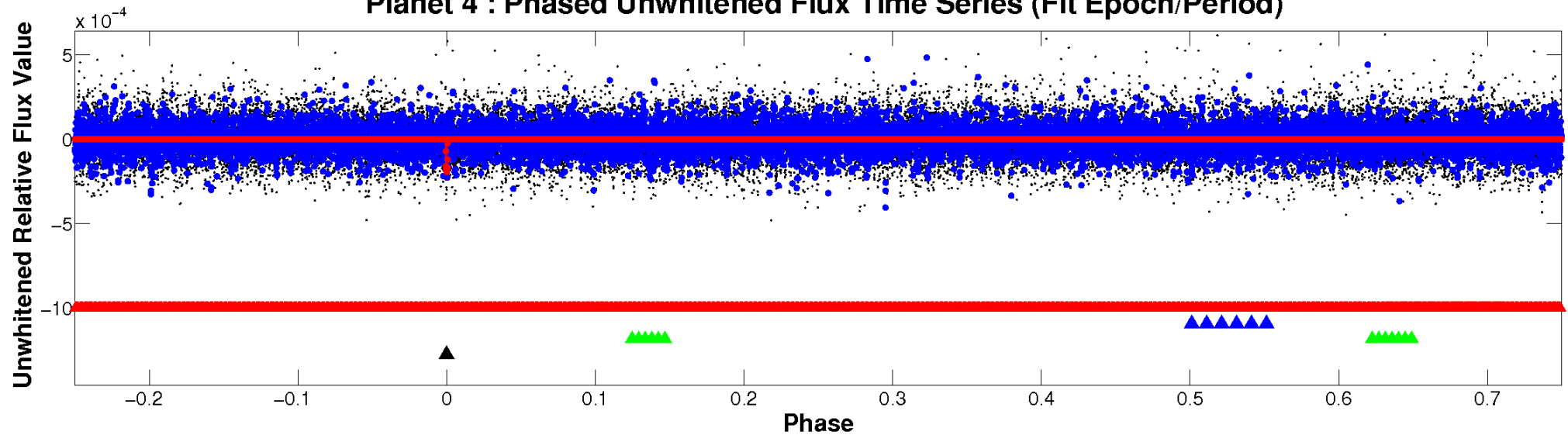
# ALT Odd/Even

TCE 008760767-04

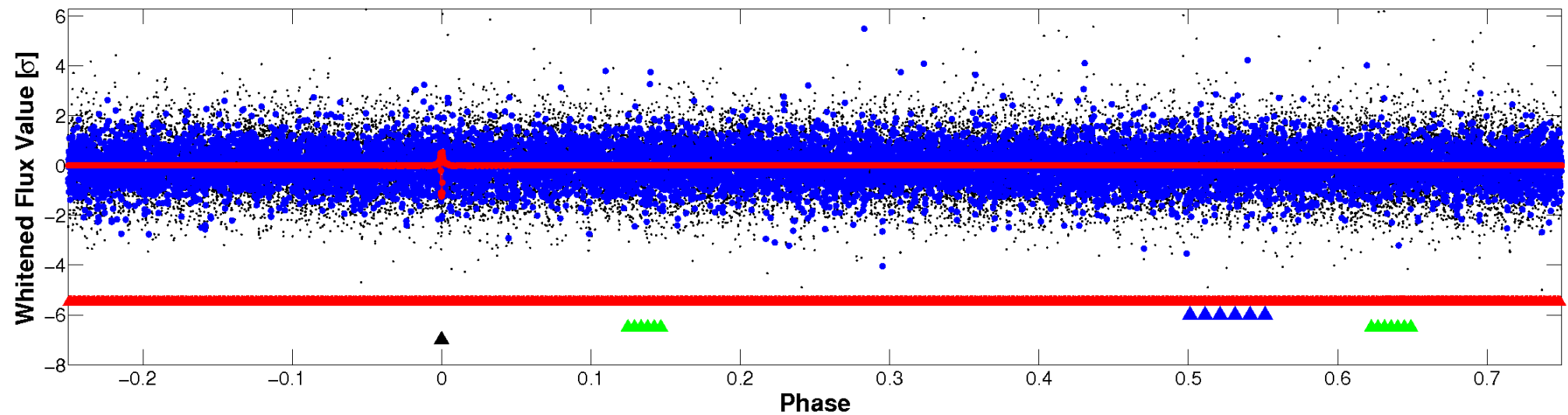


# Non-Whitened Vs. Whitened Light Curve

## Planet 4 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

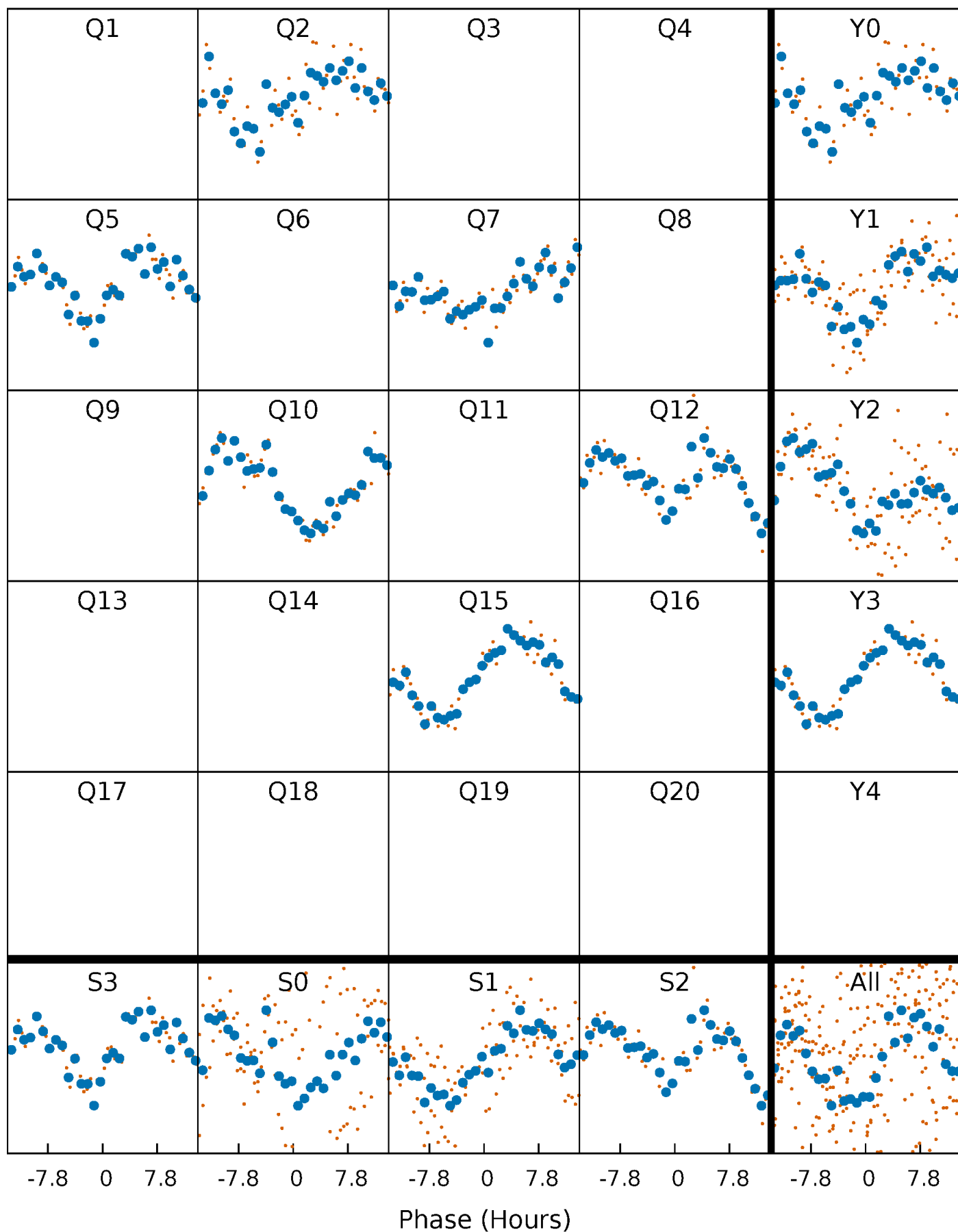


## Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



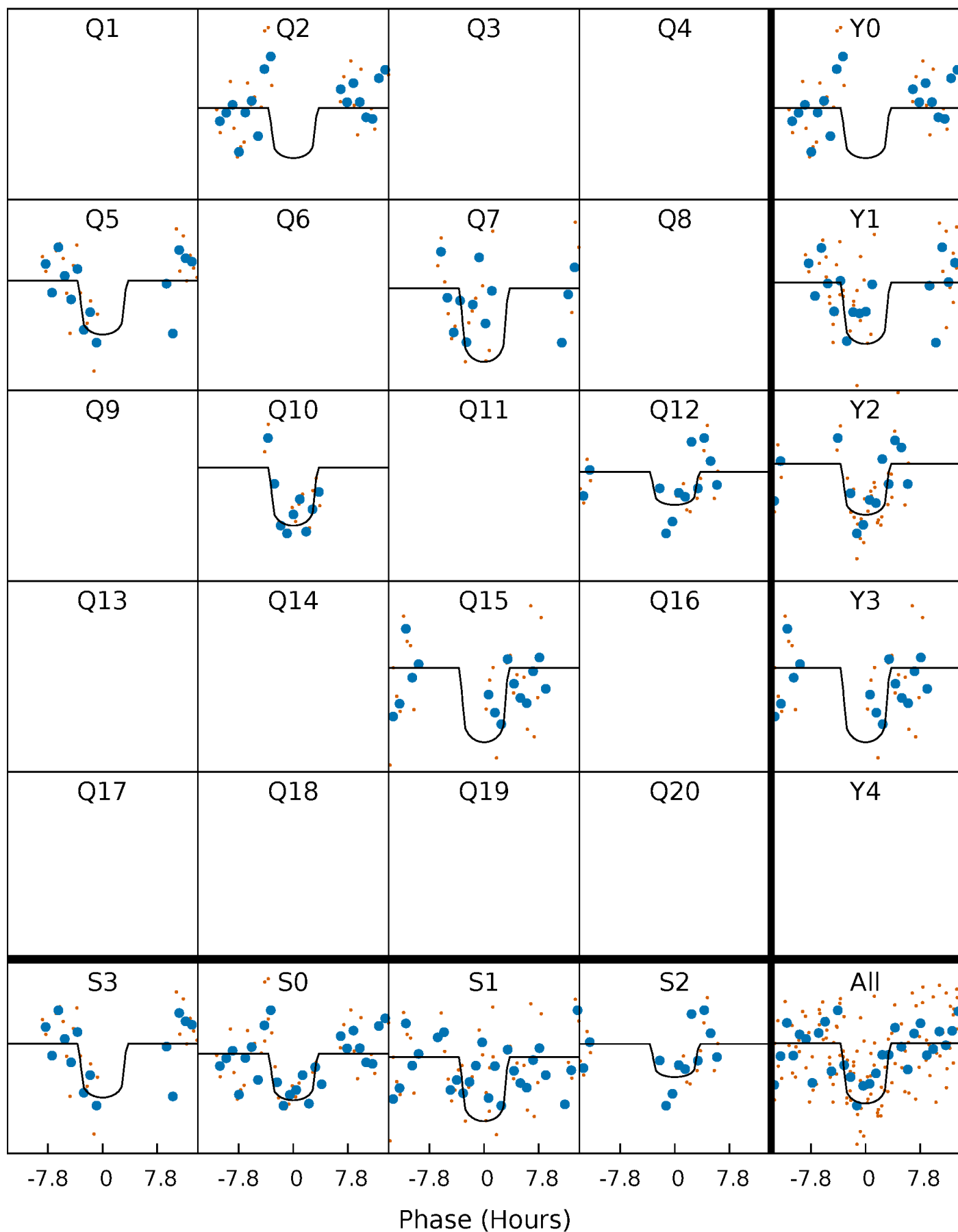
# PDC Quarter-Phased Transit Curves

TCE 008760767-04     $P=239.972169$  Days     $T_0=220.181556$  (BKJD)



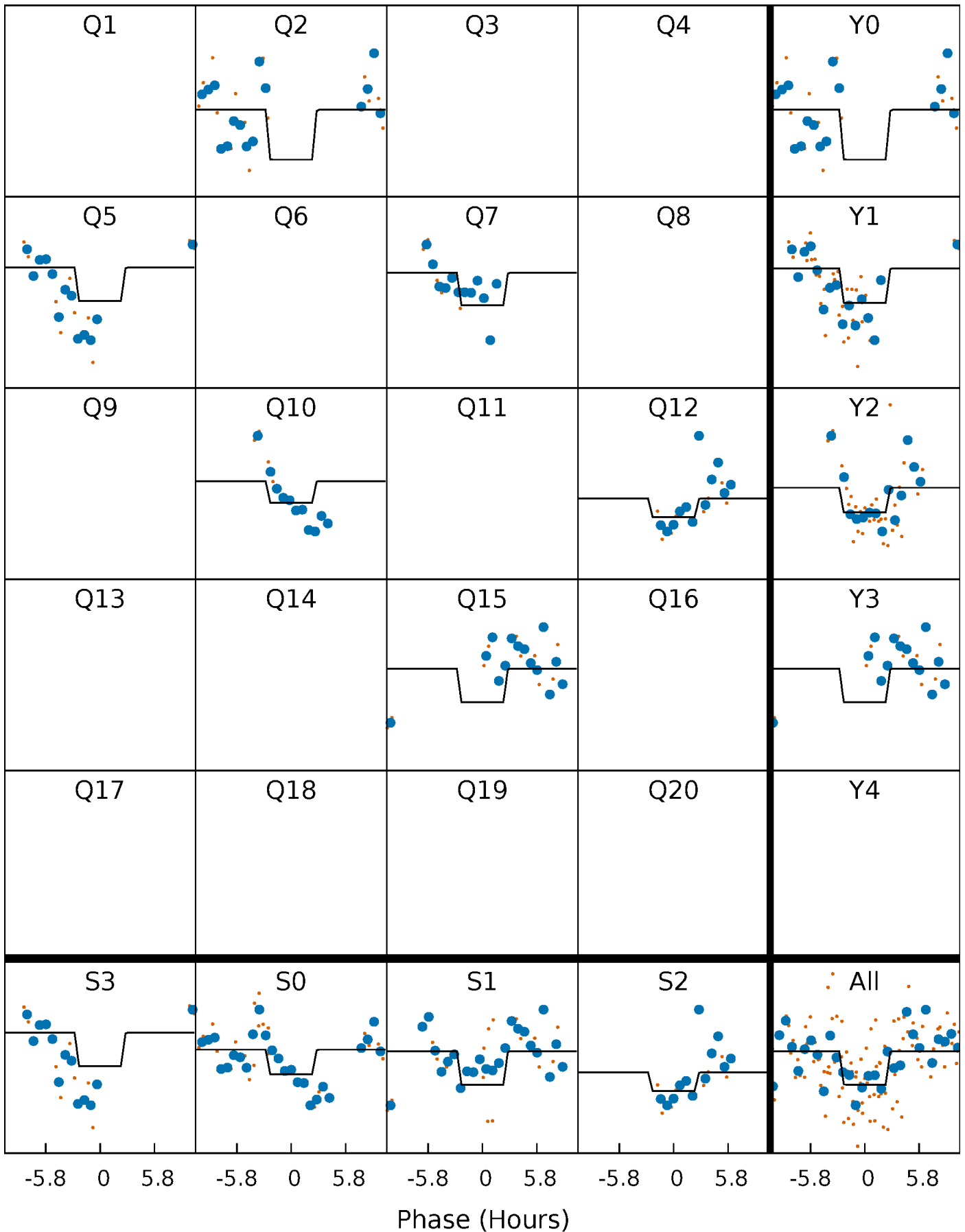
# DV Quarter-Phased Transit Curves

TCE 008760767-04 P=239.972169 Days  $T_0=220.181556$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 008760767-04 P=239.978217 Days  $T_0=220.156689$  (BKJD)

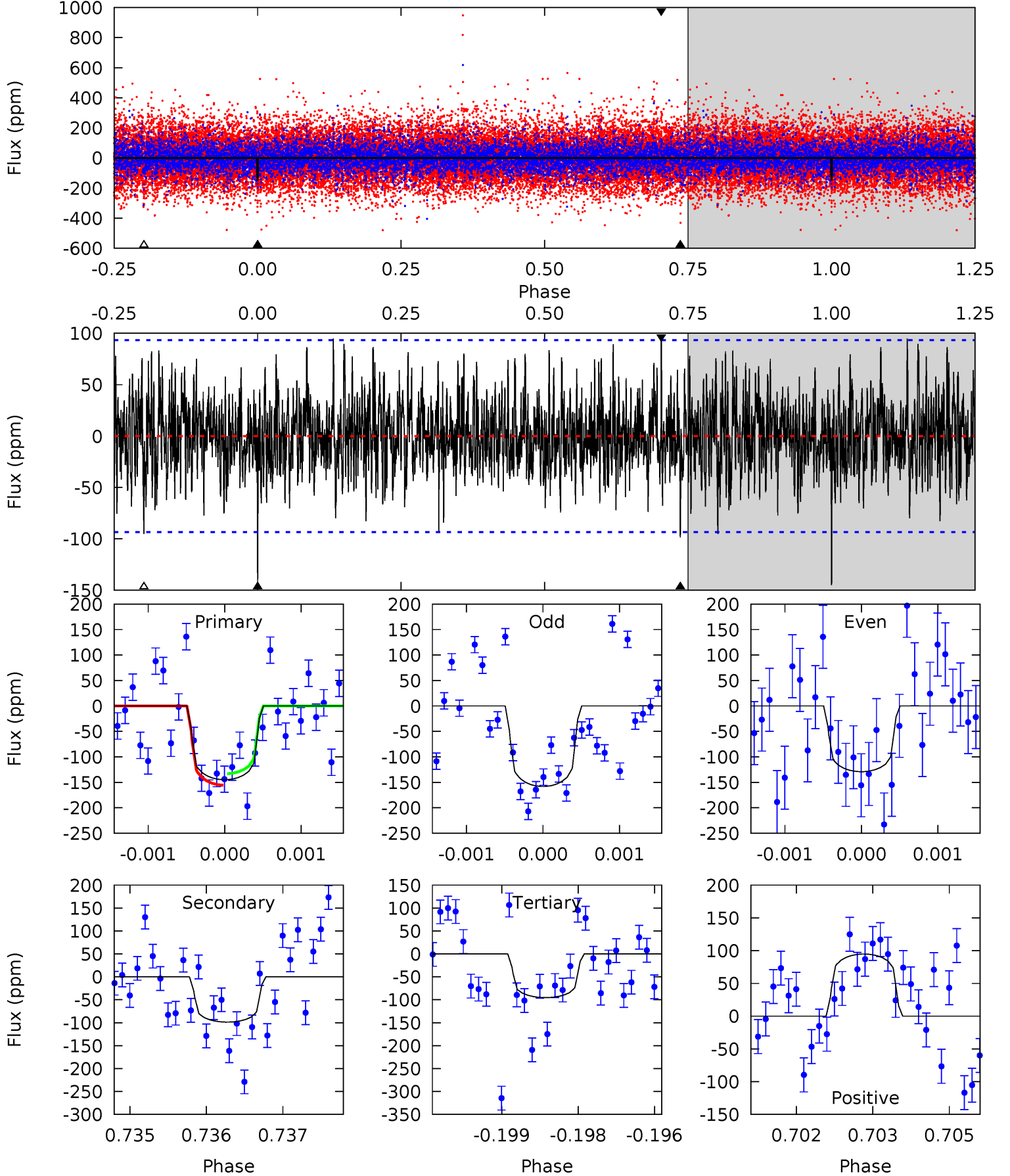




# DV Model-Shift Uniqueness Test

008760767-04,  $P = 239.972169$  Days,  $E = 220.181556$  Days

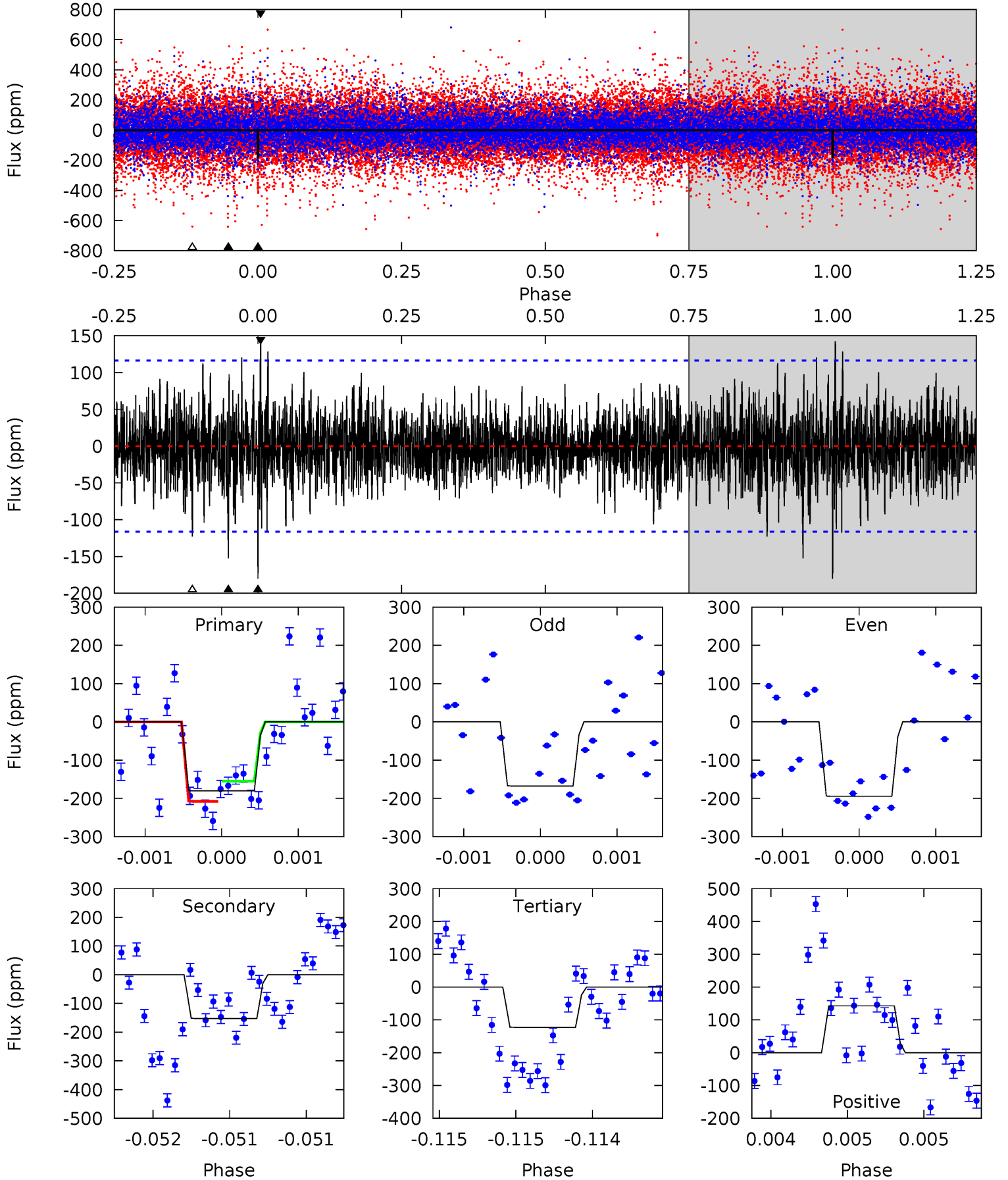
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.39	5.72	5.52	5.49	5.41	3.23	1.66	2.87	2.90	0.20	0.23	0.83	0.60	0.40	0.65



# Alt Model-Shift Uniqueness Test

008760767-04, P = 239.978217 Days, E = 220.156689 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
8.48	7.16	5.77	6.71	5.47	3.32	1.53	2.71	1.77	1.39	0.45	0.63	0.96	0.44	1.24



### Stellar Parameters For KIC 008760767

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$7099^{+191}_{-234}$	$3.720^{+0.296}_{-0.074}$	$-0.220^{+0.250}_{-0.300}$	$3.012^{+0.374}_{-1.121}$	$1.736^{+0.154}_{-0.359}$	$0.090^{+0.175}_{-0.023}$
	+3%/-3%	+8%/-2%	+114%/-136%	+12%/-37%	+9%/-21%	+196%/-25%
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 008760767-04 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	-99±17	$4.57^{+1.63}_{-1.61}$	$780^{+45}_{-61}$	$5759^{+1281}_{-689}$	$2155^{+2833}_{-1005}$
Alt.	-152±21	$4.05^{+1.63}_{-1.46}$	$776^{+48}_{-68}$	$6756^{+1904}_{-1016}$	$4246^{+5625}_{-2149}$

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

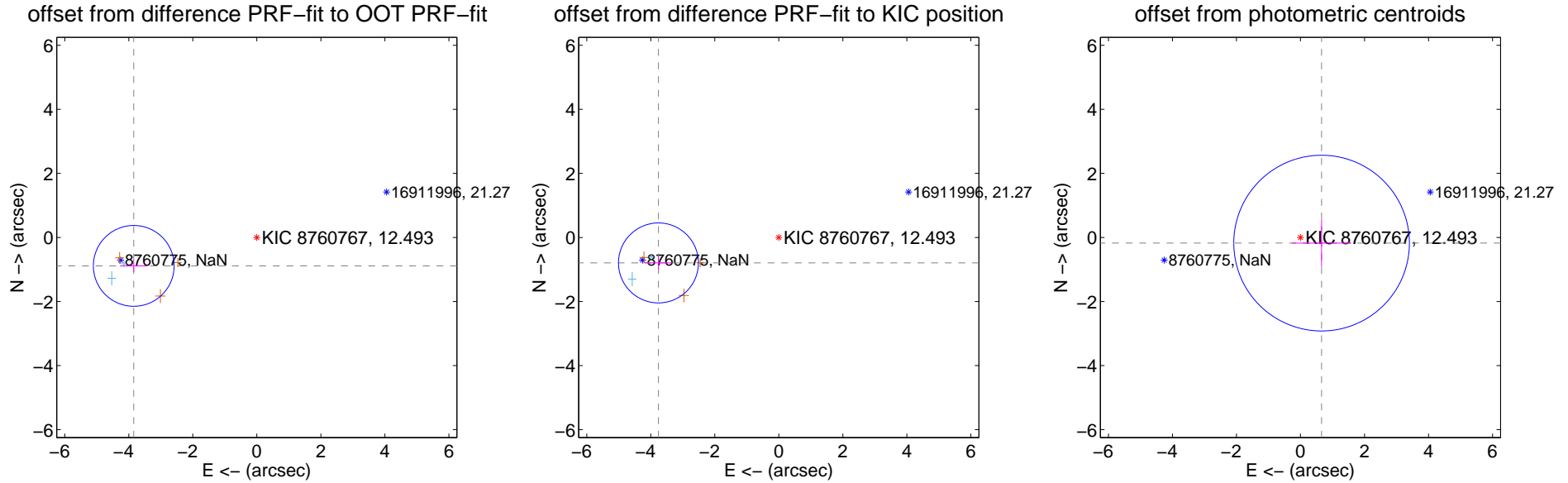
## DV Centroid Data

Supplemental centroid analysis for 008760767-04. Kepler magnitude: 12.49. Transit SNR 7.61

There are 2 quarters with good PRF difference image offsets

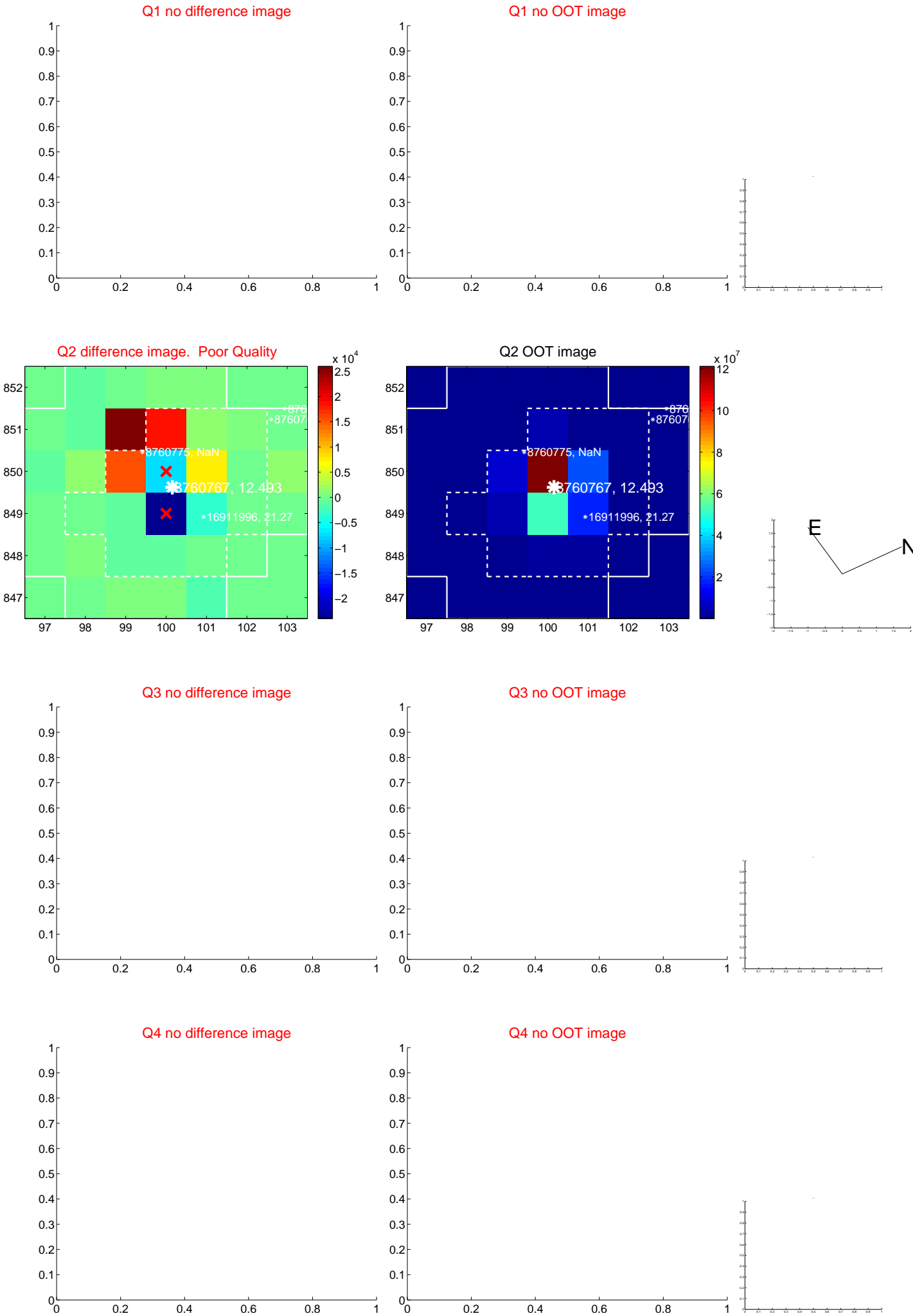
The direct PRF centroid is offset from the target star catalog position by about 0.01 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$3.947 \pm 0.421$	9.38	$3.845 \pm 0.429$	$-0.888 \pm 0.185$
PRF-fit source offset from KIC position	$3.844 \pm 0.416$	9.24	$3.761 \pm 0.423$	$-0.796 \pm 0.209$
photometric centroid source offset	$0.68 \pm 0.91$	0.75	$-0.66 \pm 0.93$	$-0.18 \pm 0.74$

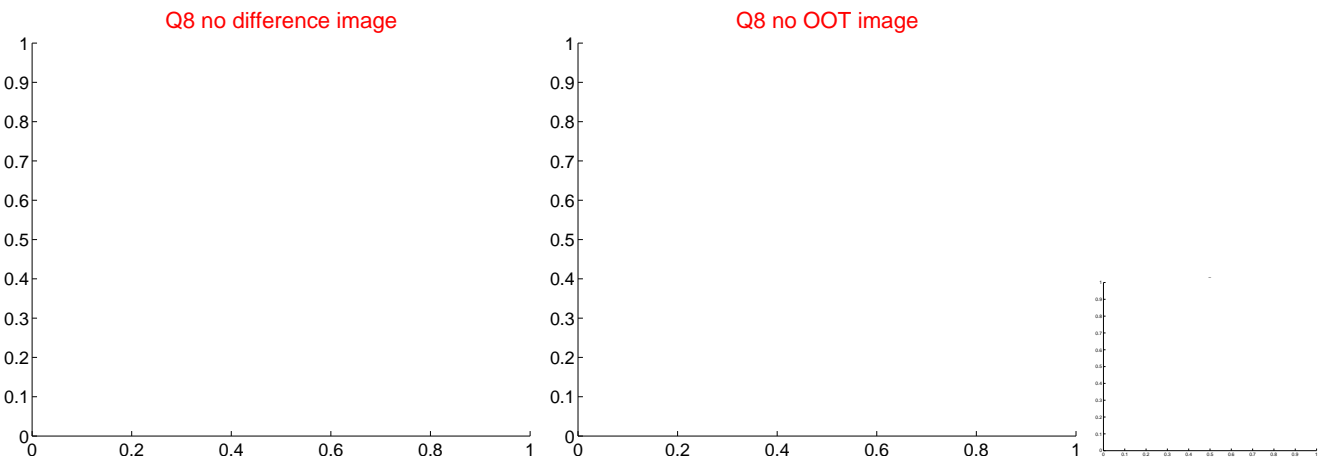
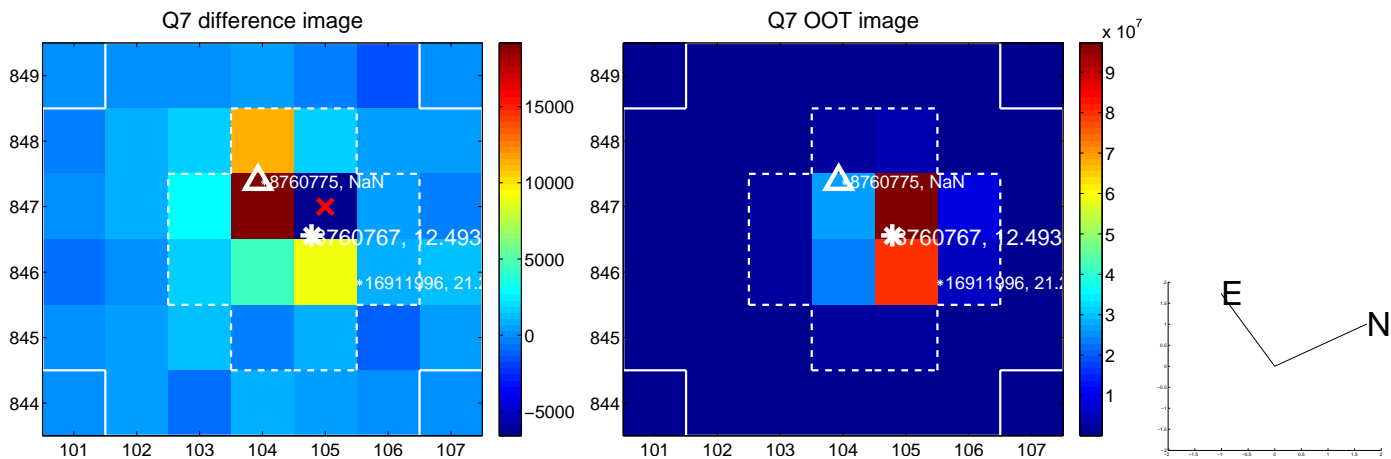
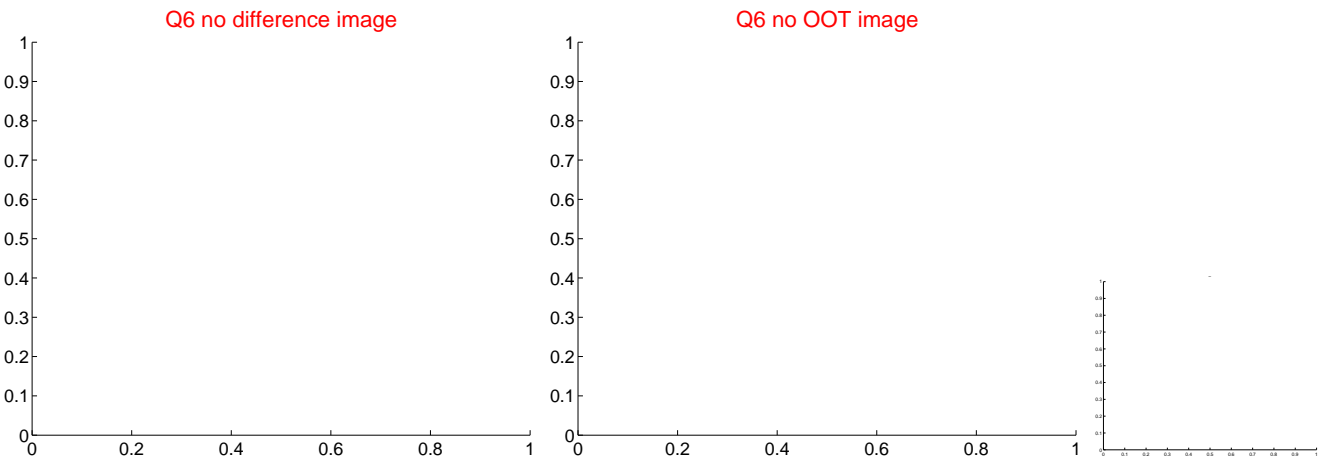
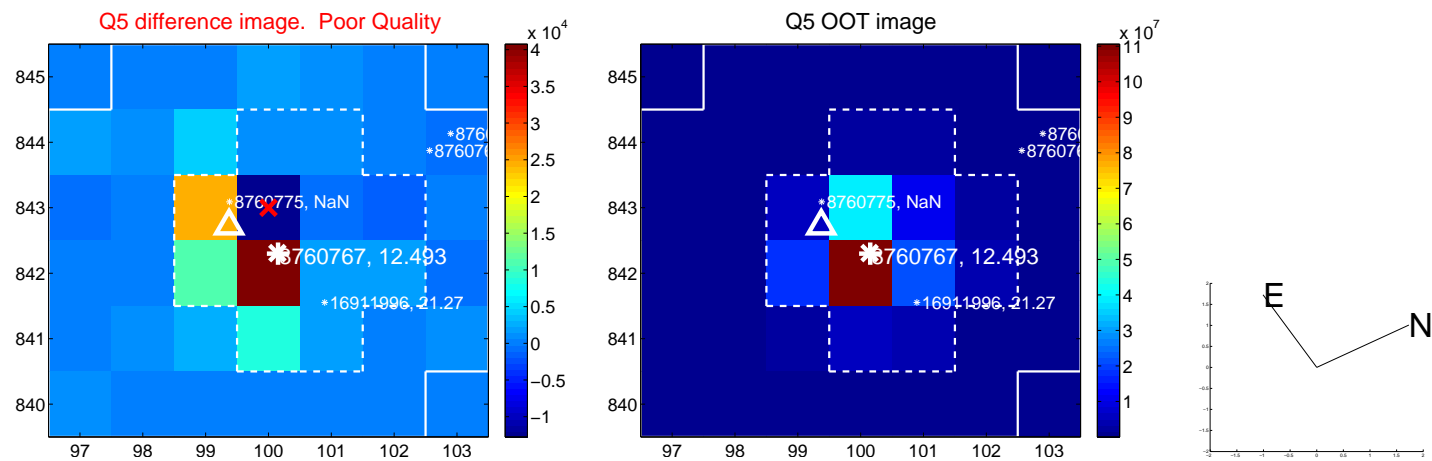


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

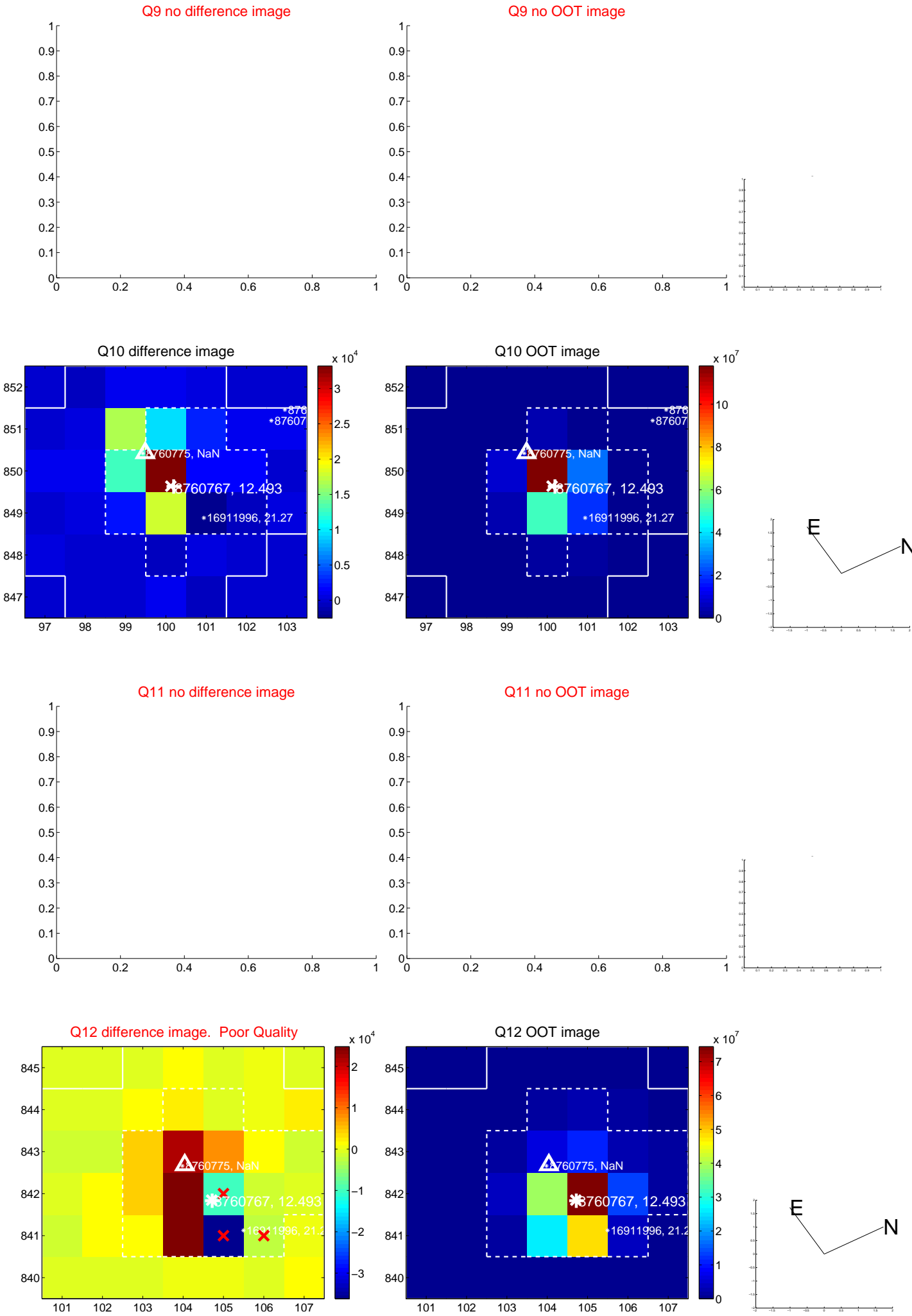
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

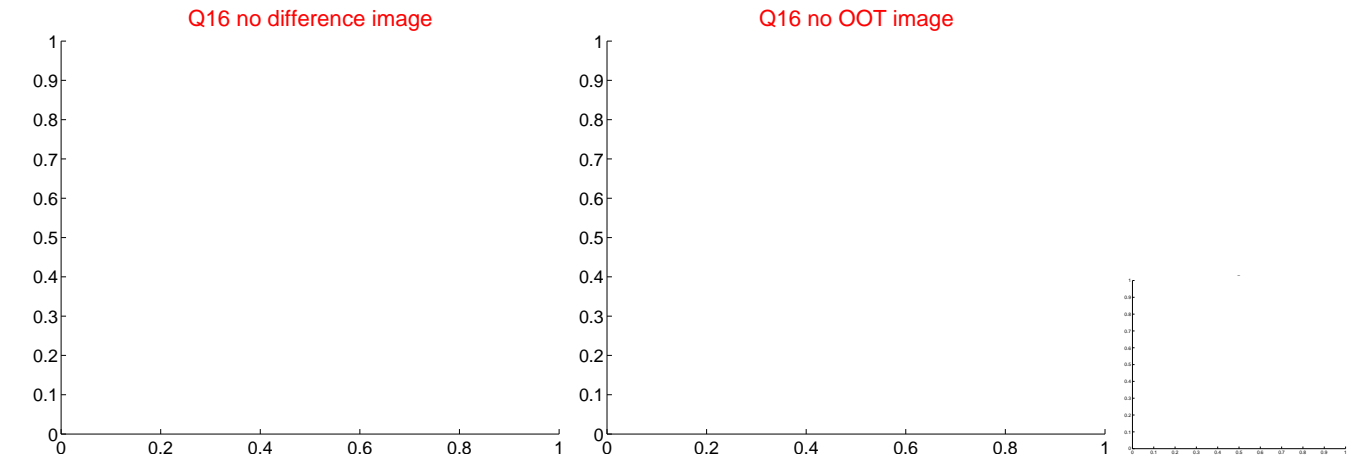
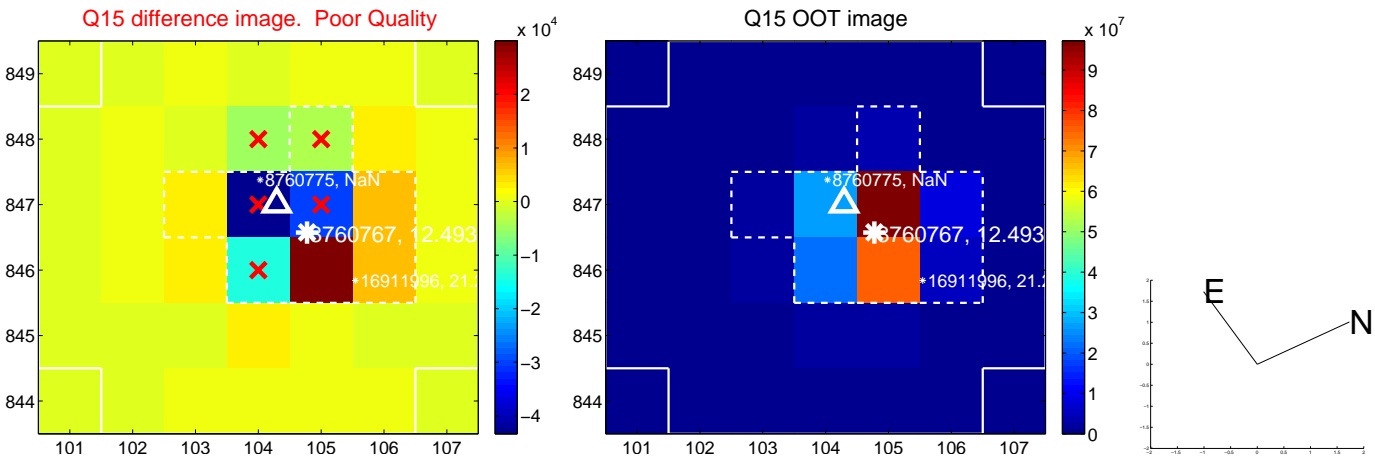
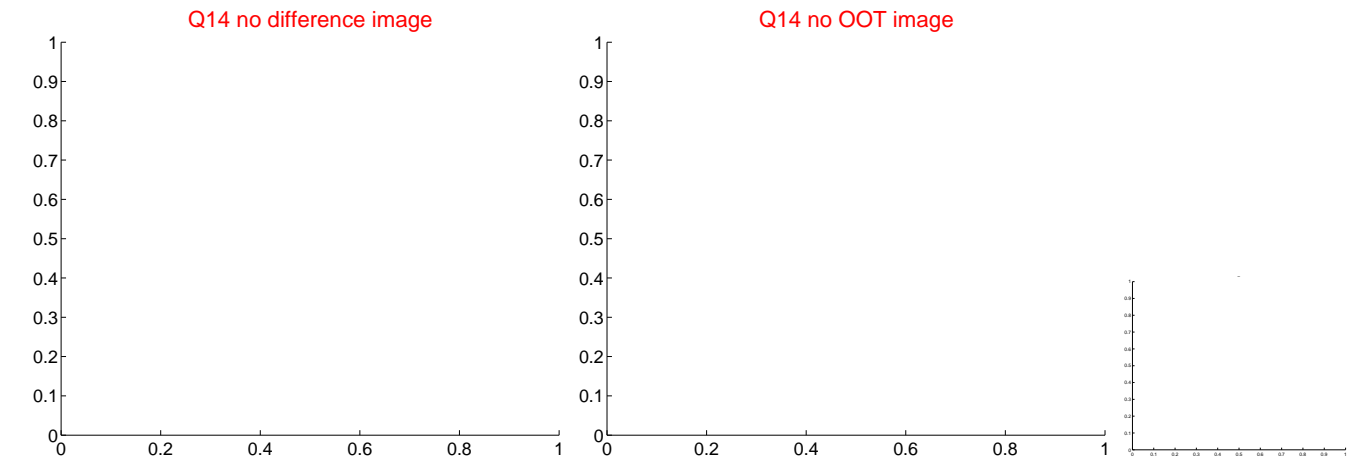
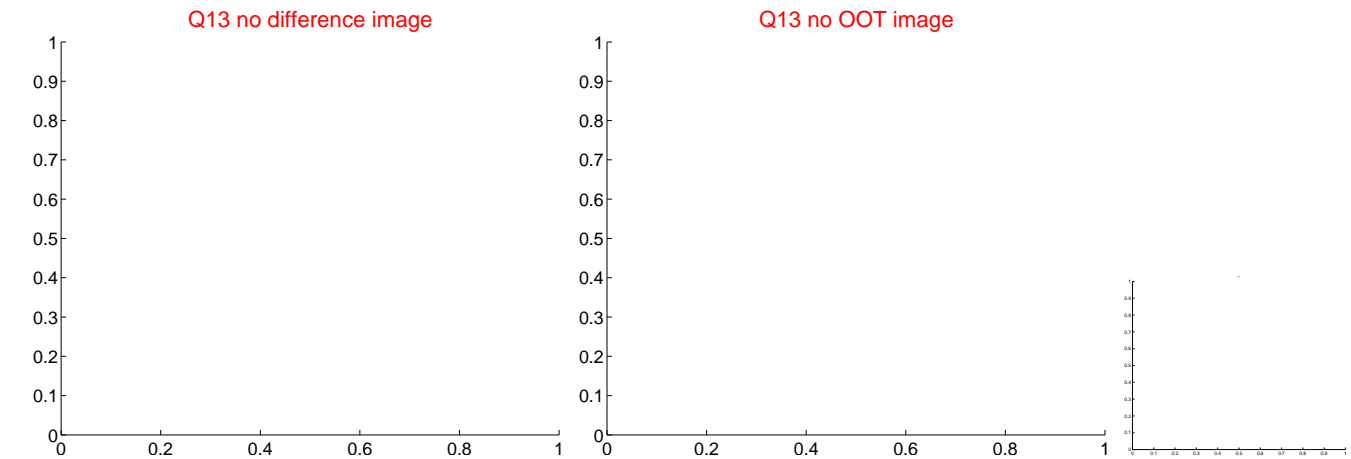


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

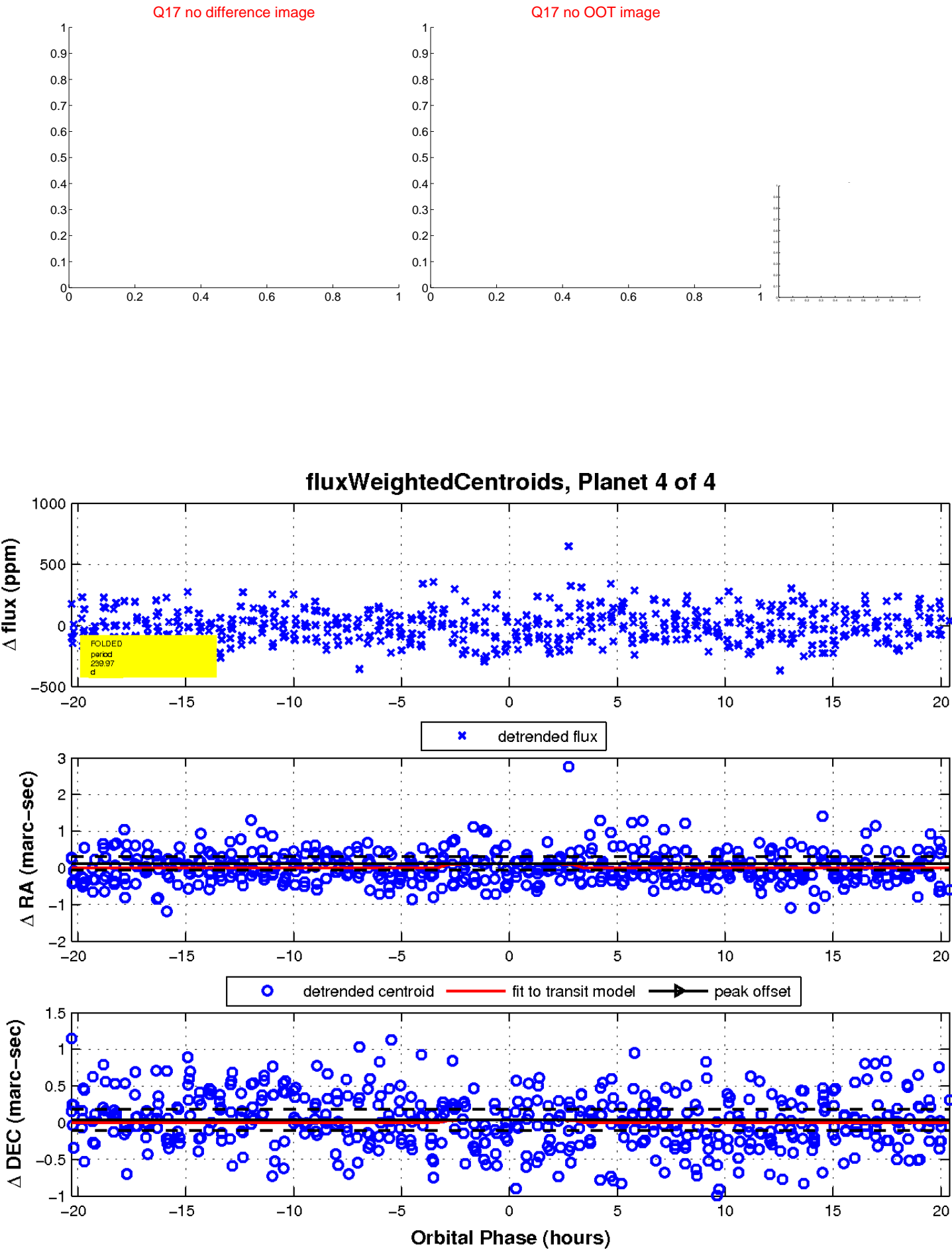




white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



UKIRT Image

Declination

