

# KIC 007732458

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
007732458-01	OBS	No	0.915654	132.335911	13.9	3.910	9.3	11.2	3.57	7766	1.56	75883.07
007732458-02	OBS	No	8.928126	135.610152	45.7	2.836	9.0	9.9	3.57	7766	2.94	3642.84
007732458-03	OBS	No	129.604704	197.331896	123.5	7.515	7.6	7.7	3.57	7766	4.46	102.87
007732458-04	OBS	No	110.790226	240.064641	99.6	2.857	7.8	7.8	3.57	7766	4.04	126.80

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
007732458-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED
007732458-02	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED
007732458-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED
007732458-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED

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

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

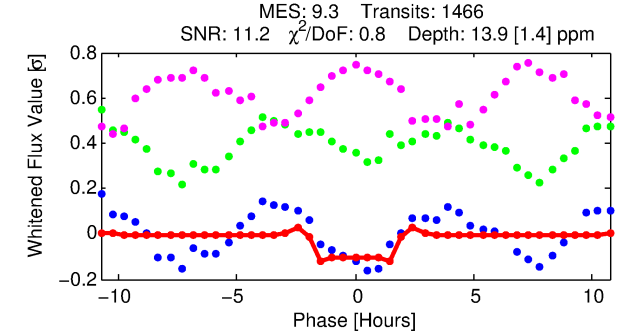
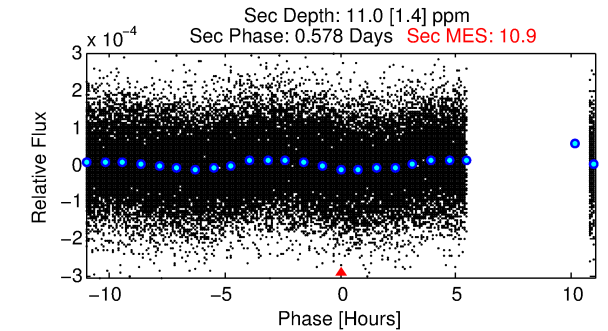
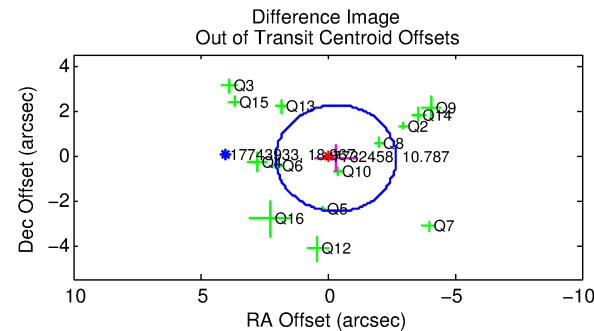
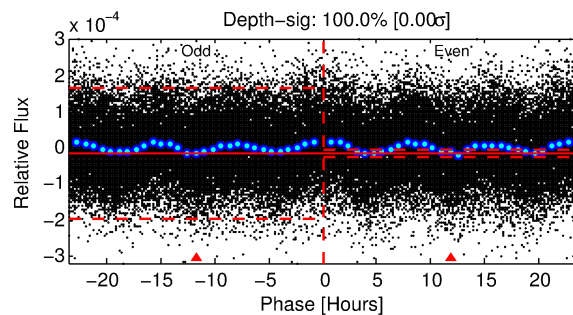
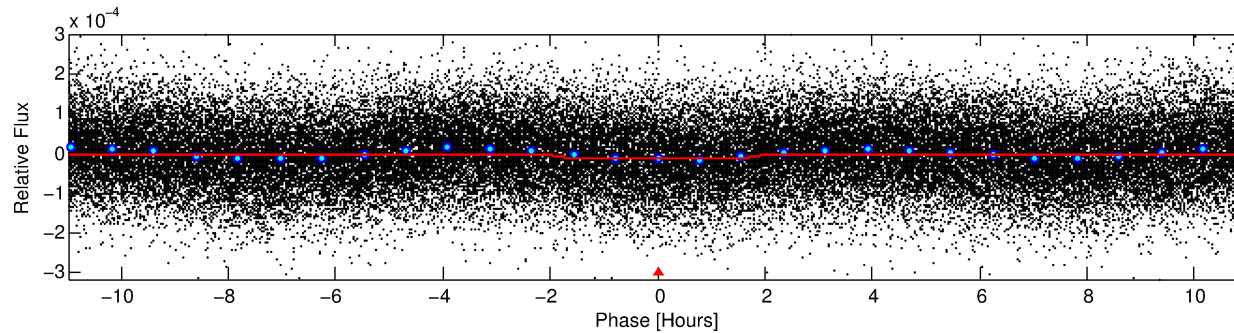
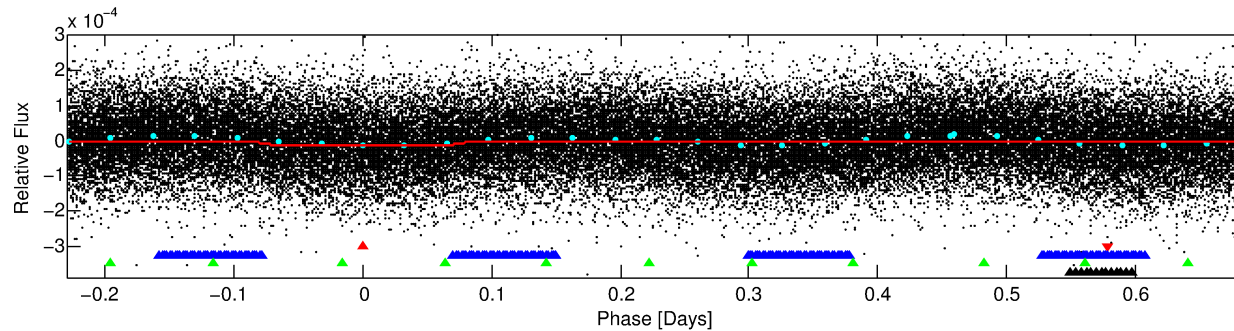
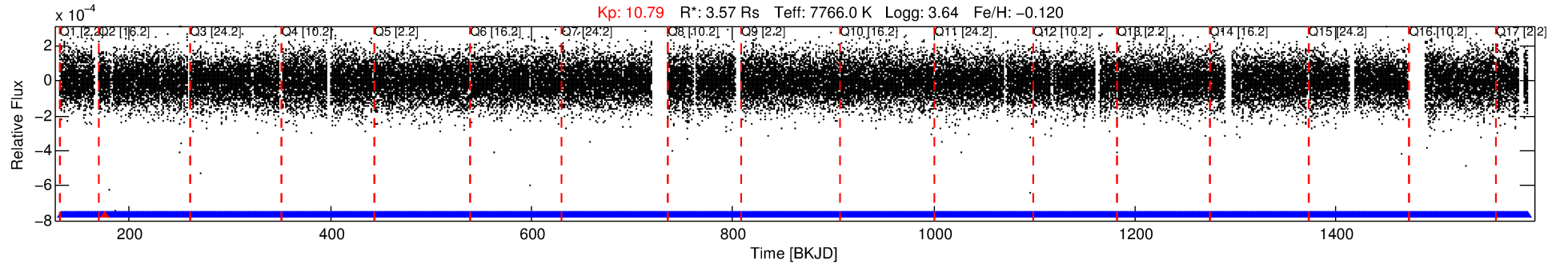
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 007732458-01

No Significant Match Found

# DV One-Page Summary

KIC: 7732458 Candidate: 1 of 4 Period: 0.916 d



## DV Fit Results:

Period = 0.91565 [0.00001] d  
Epoch = 132.3359 [0.0023] BKJD  
 $R_p/R^* = 0.0040$  [0.0006]  
 $a/R^* = 1.23$  [0.40]  
 $b = 0.90$  [0.20]  
 $\text{Seff} = 75883.08$  [64179.16]  
 $T_{\text{eq}} = 4232$  [895] K  
 $R_p = 1.56$  [0.83]  $R_e$   
 $a = 0.0234$  [0.0119] AU  
 $A_g = 1.37$  [1.24] [0.30 $\sigma$ ]  
 $T_{\text{eff}} = 7083$  [685] K [2.53 $\sigma$ ]

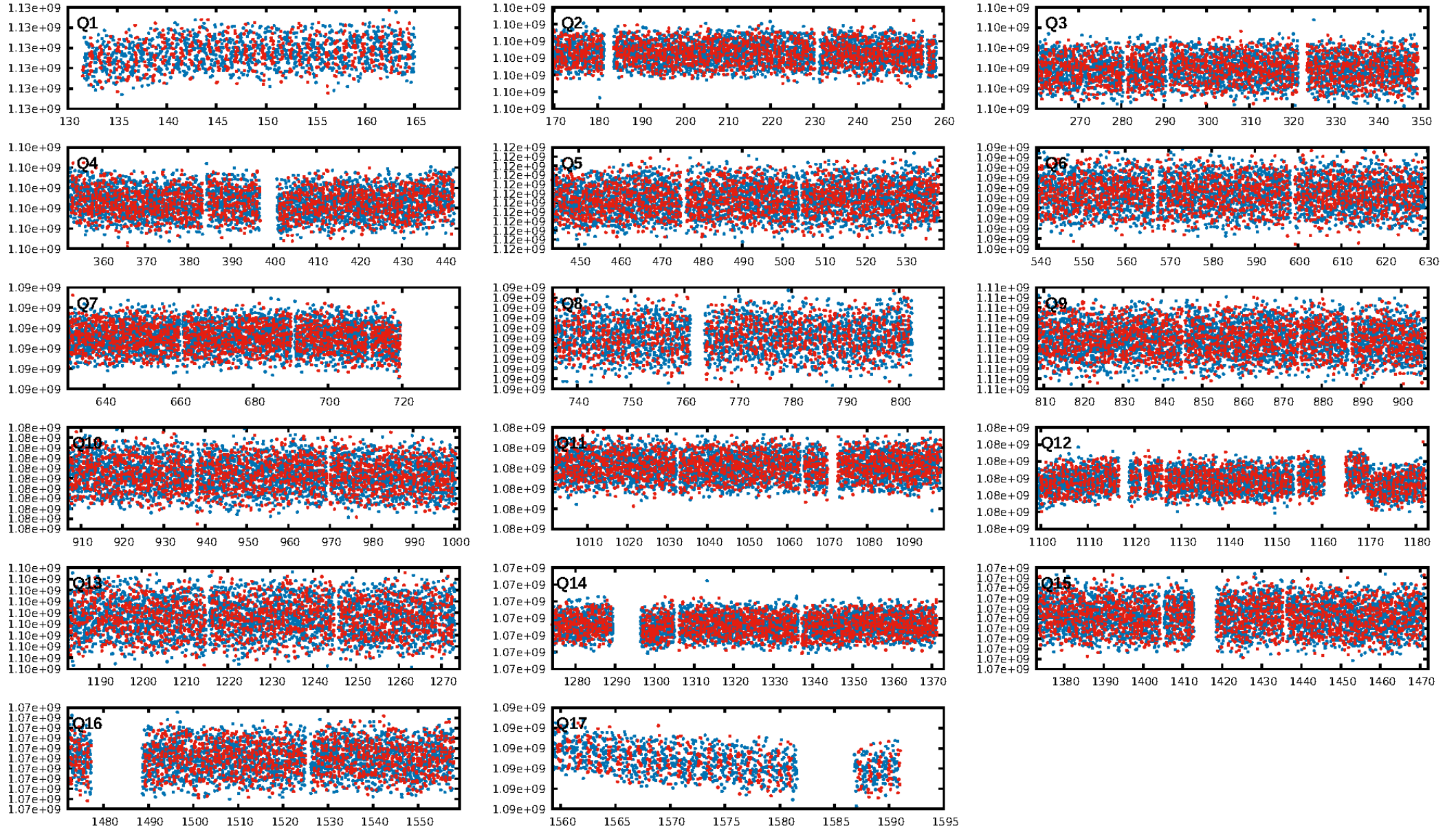
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [39.81 $\sigma$ ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 3.57e-14  
RollingBand-fgt: 1.00 [1400/1401]  
GhostDiagnostic-chr: 5.282  
Centroid-sig: 30.3%  
Centroid-so: 1.141 arcsec [1.30 $\sigma$ ]  
OotOffset-rm: 0.351 arcsec [0.44 $\sigma$ ]  
KicOffset-rm: 0.282 arcsec [0.45 $\sigma$ ]  
OotOffset-st: 4/3/4/3 [14]  
KicOffset-st: 4/3/4/3 [14]  
DiffImageQuality-fgm: 0.43 [6/14]  
DiffImageOverlap-fno: 1.00 [17/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 02-Feb-2016 03:18:10 Z

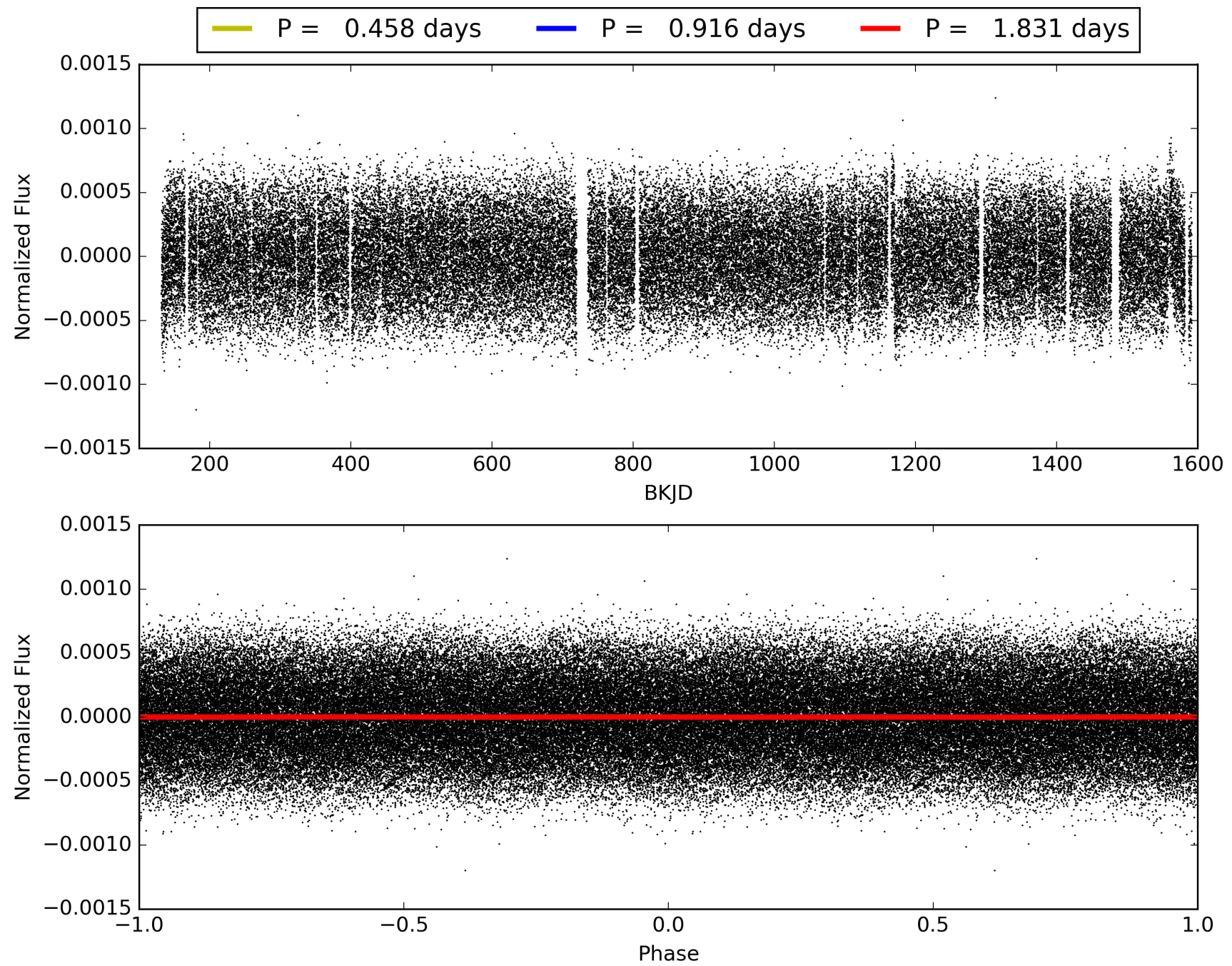
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 007732458-01, PDC Light Curves





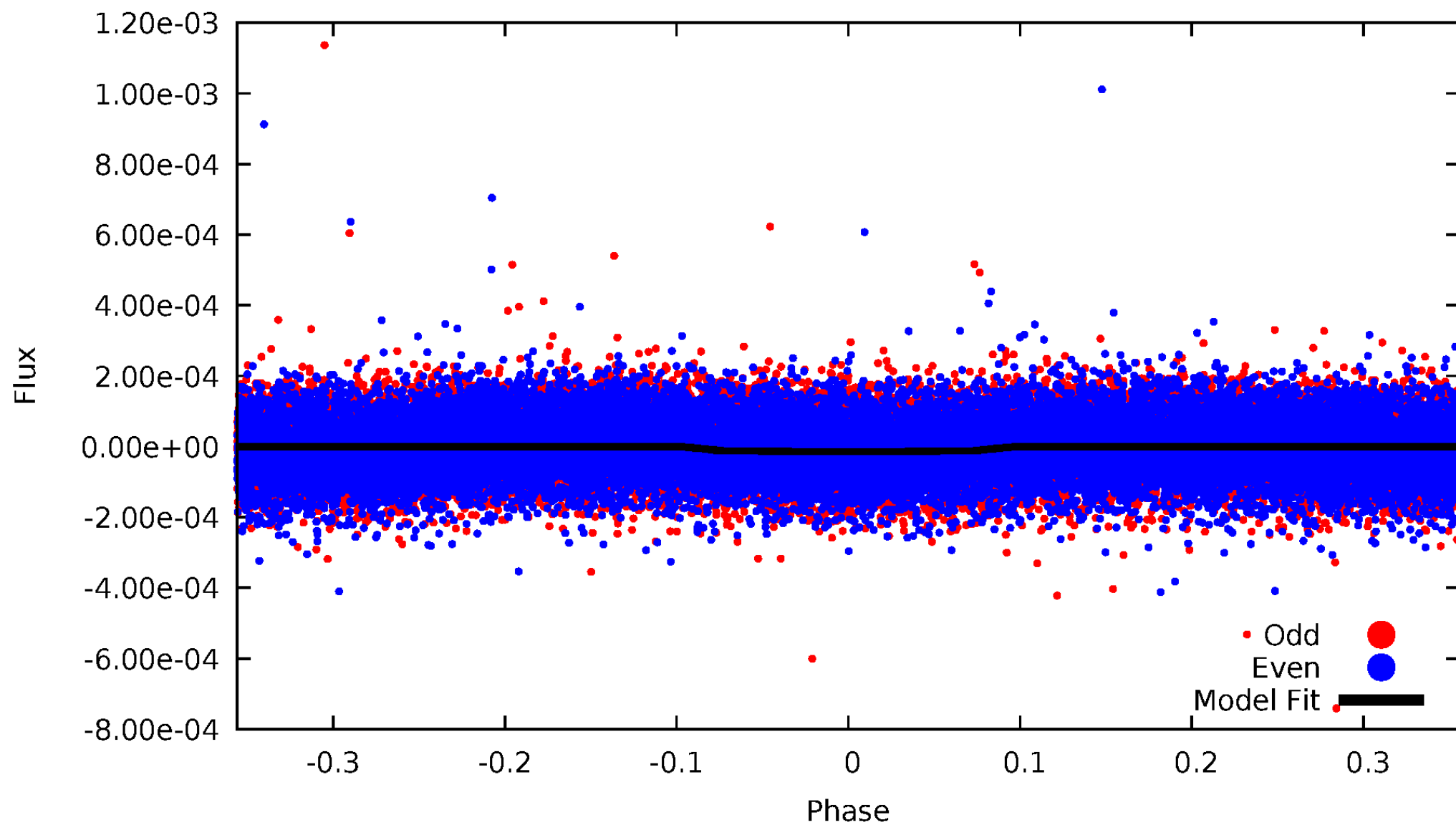
TCE 007732458-01





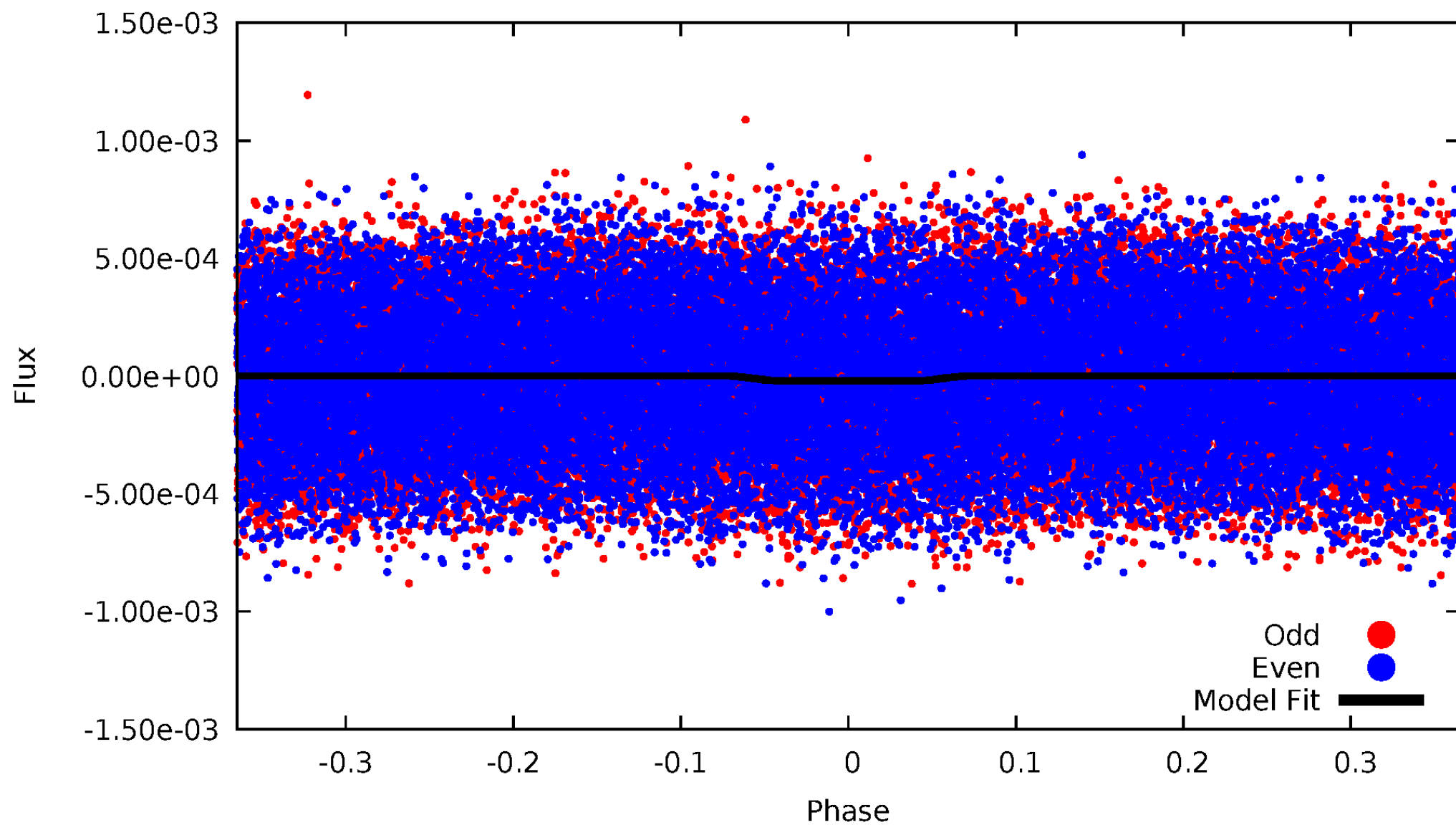
# DV Odd/Even

TCE 007732458-01



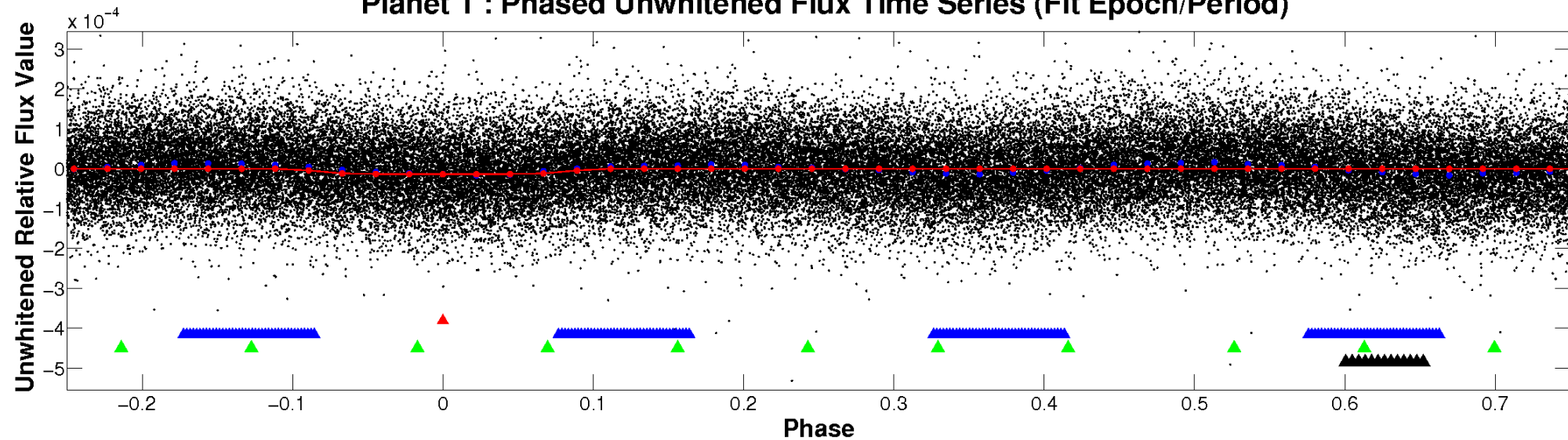
# ALT Odd/Even

TCE 007732458-01

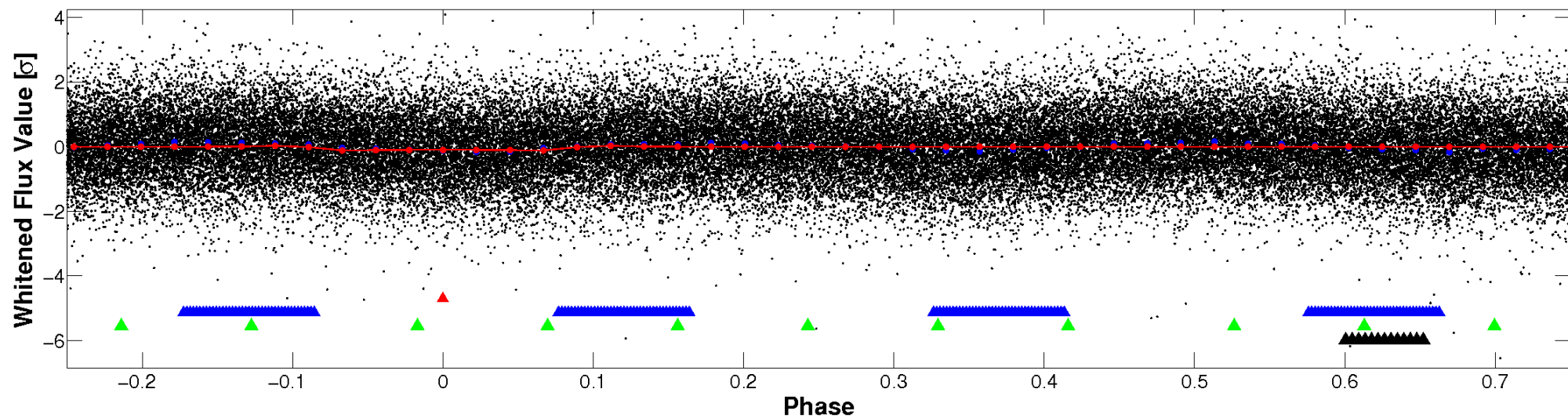


# Non-Whitened Vs. Whitened Light Curve

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



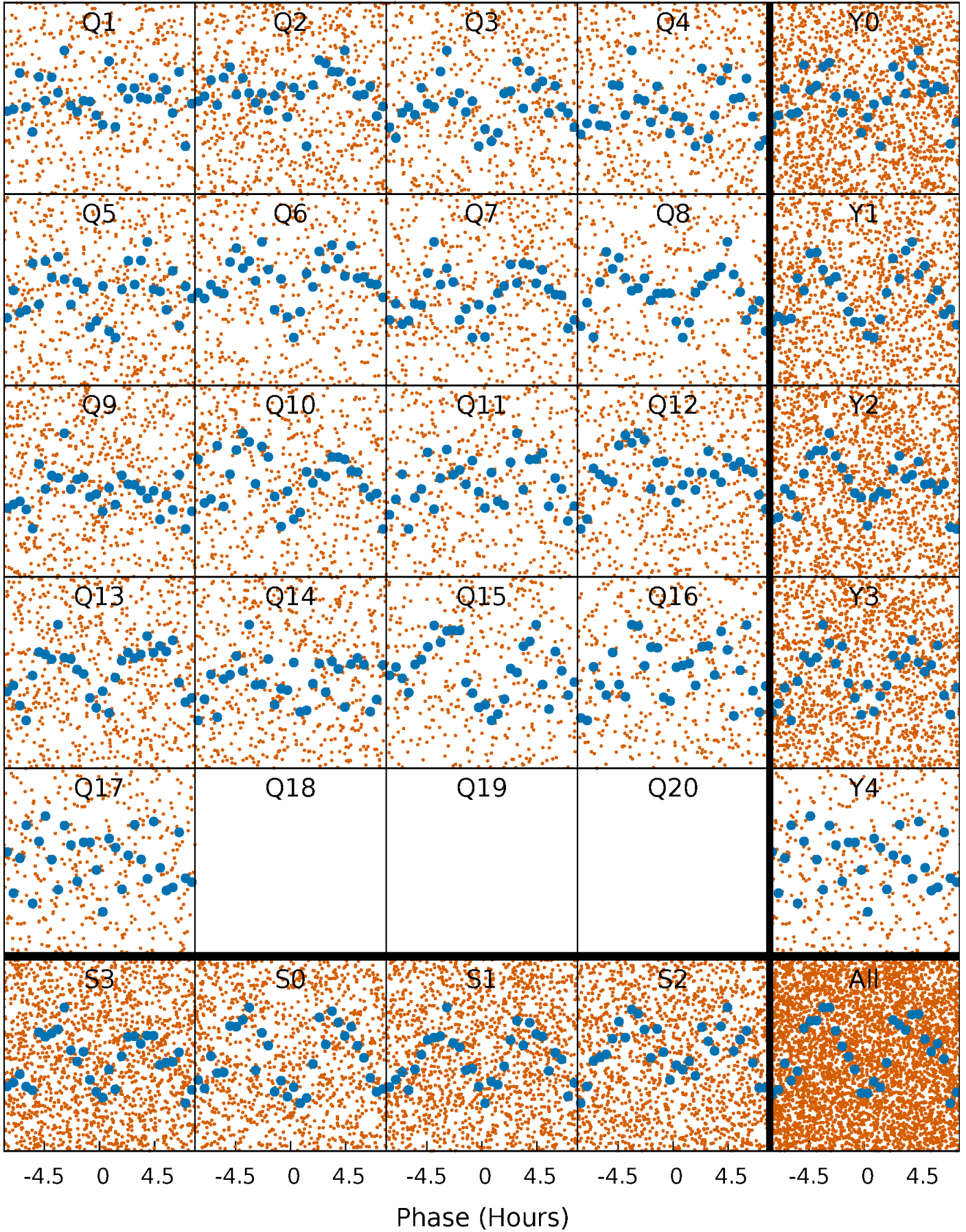
## Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)





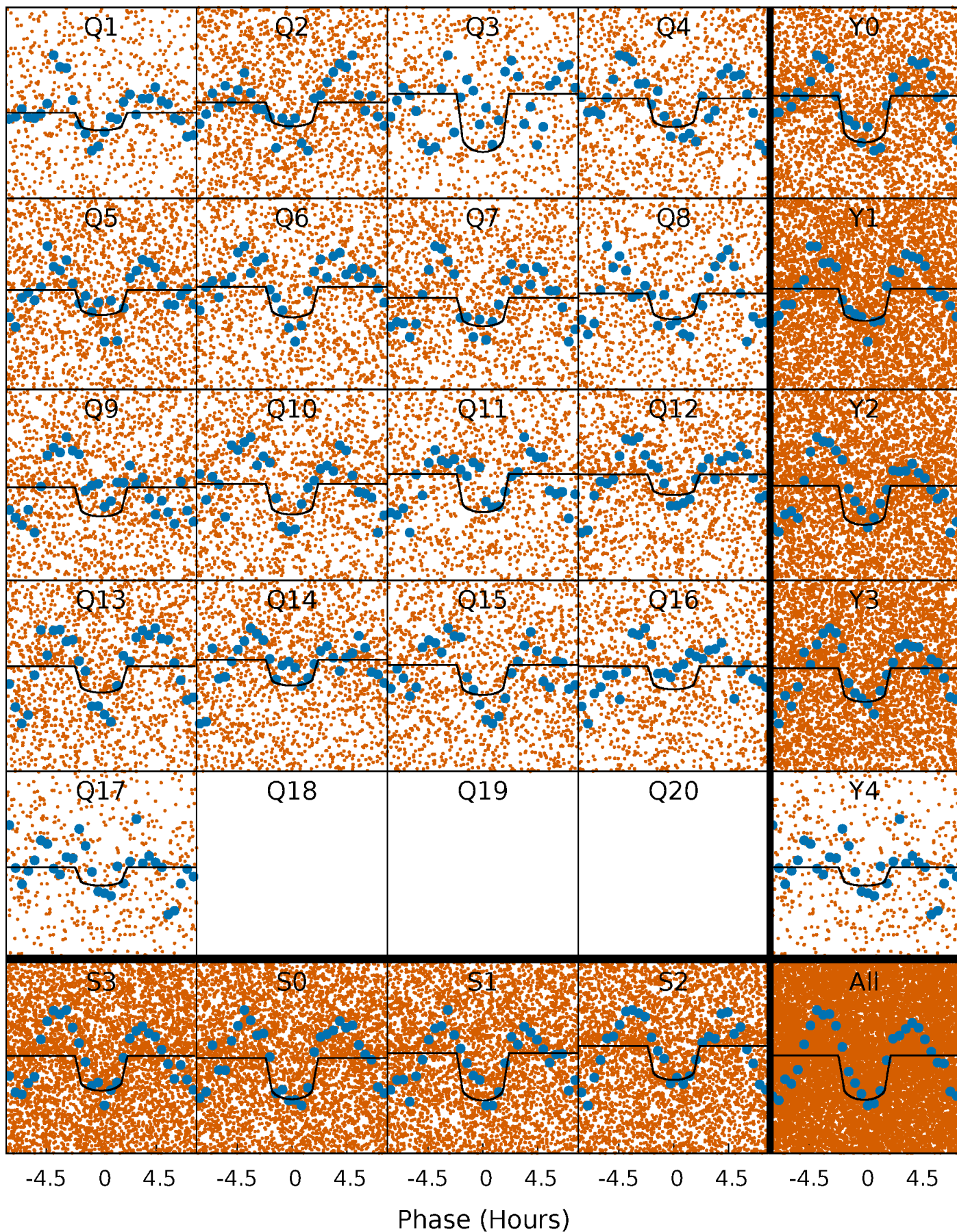
# PDC Quarter-Phased Transit Curves

TCE 007732458-01 P= 0.915654 Days  $T_0=132.335911$  (BKJD)



# DV Quarter-Phased Transit Curves

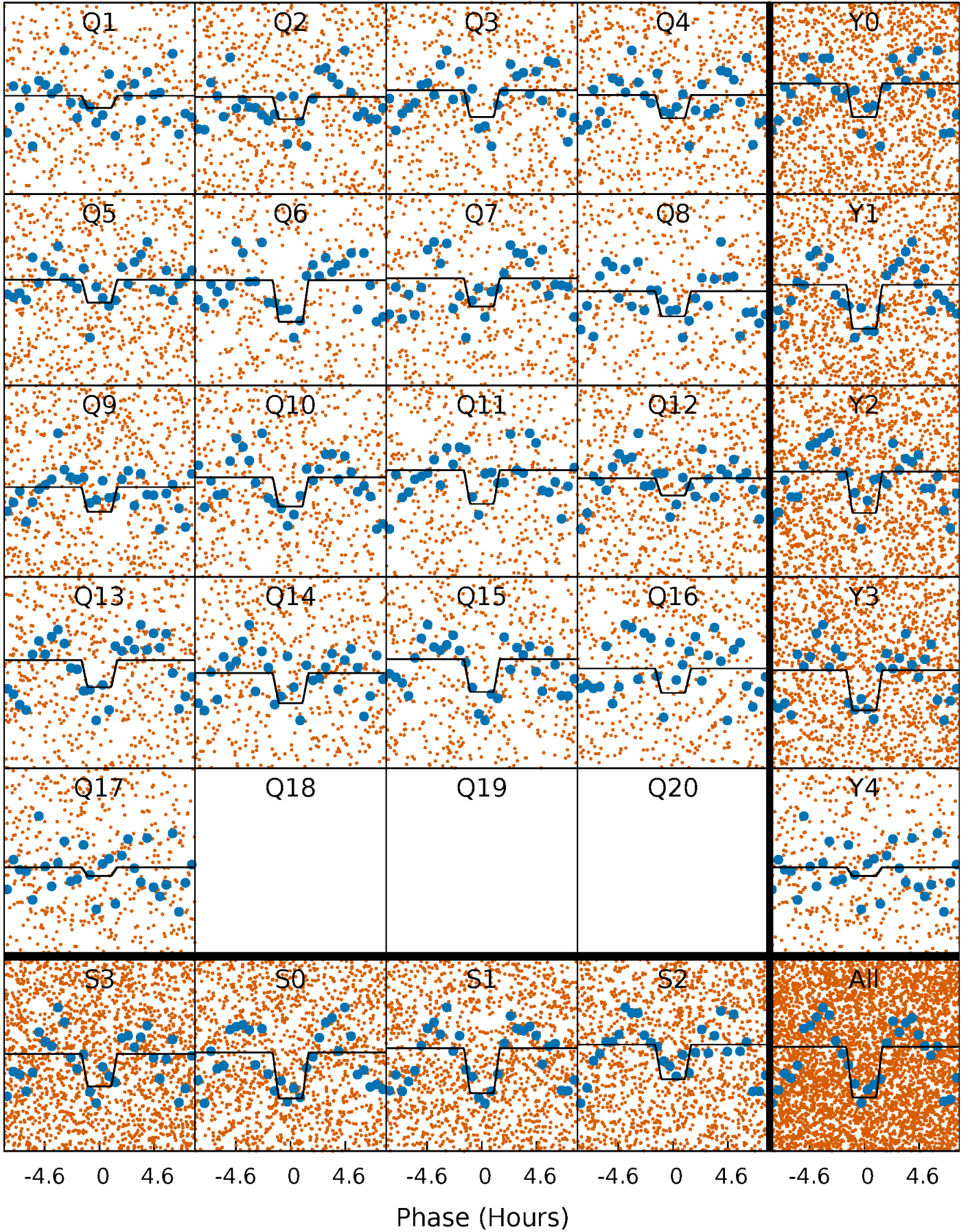
TCE 007732458-01   P= 0.915654 Days    $T_0=132.335911$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

TCE 007732458-01 P= 0.915666 Days  $T_0=132.337197$  (BKJD)

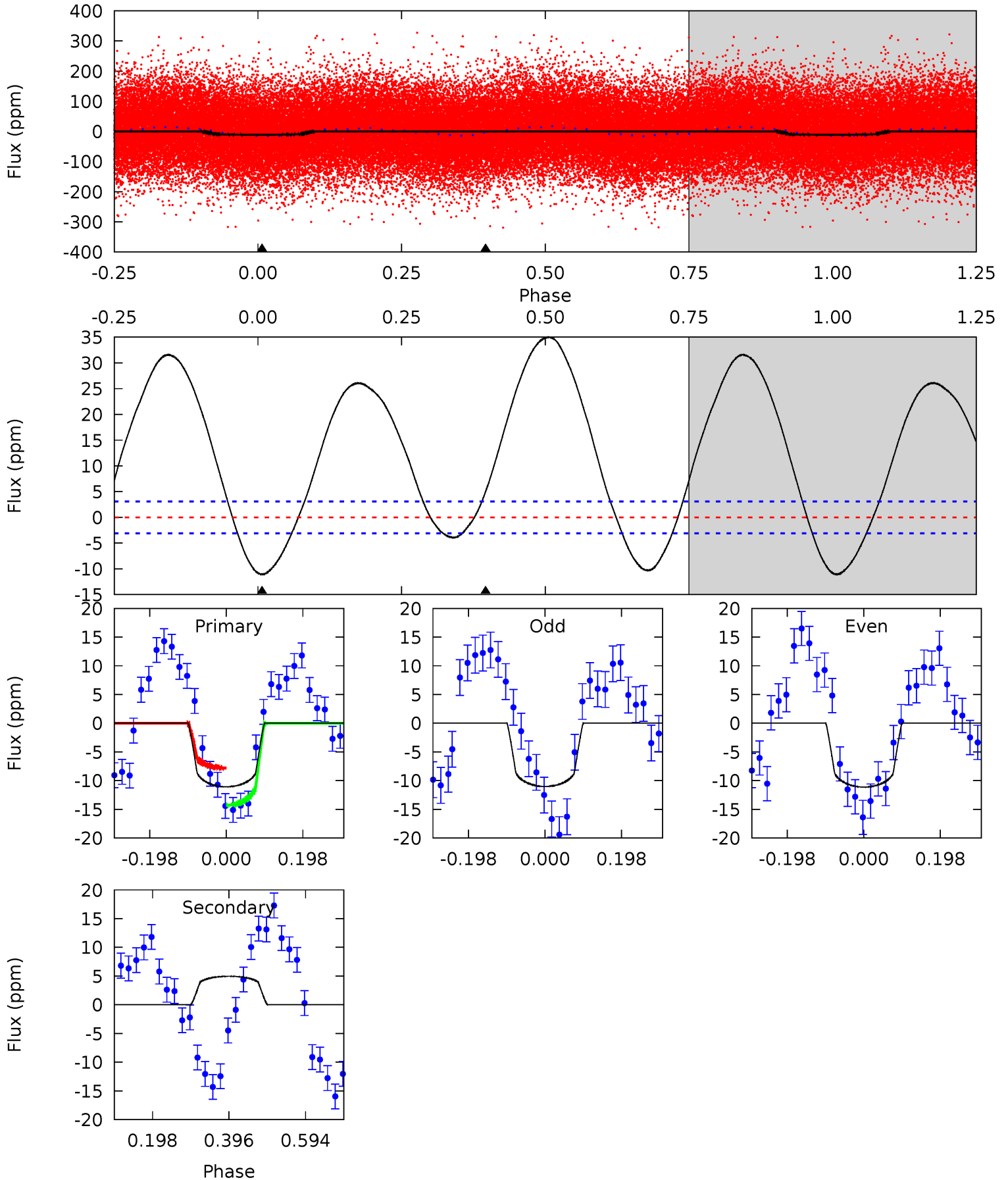




# DV Model-Shift Uniqueness Test

007732458-01, P = 0.915654 Days, E = 131.420257 Days

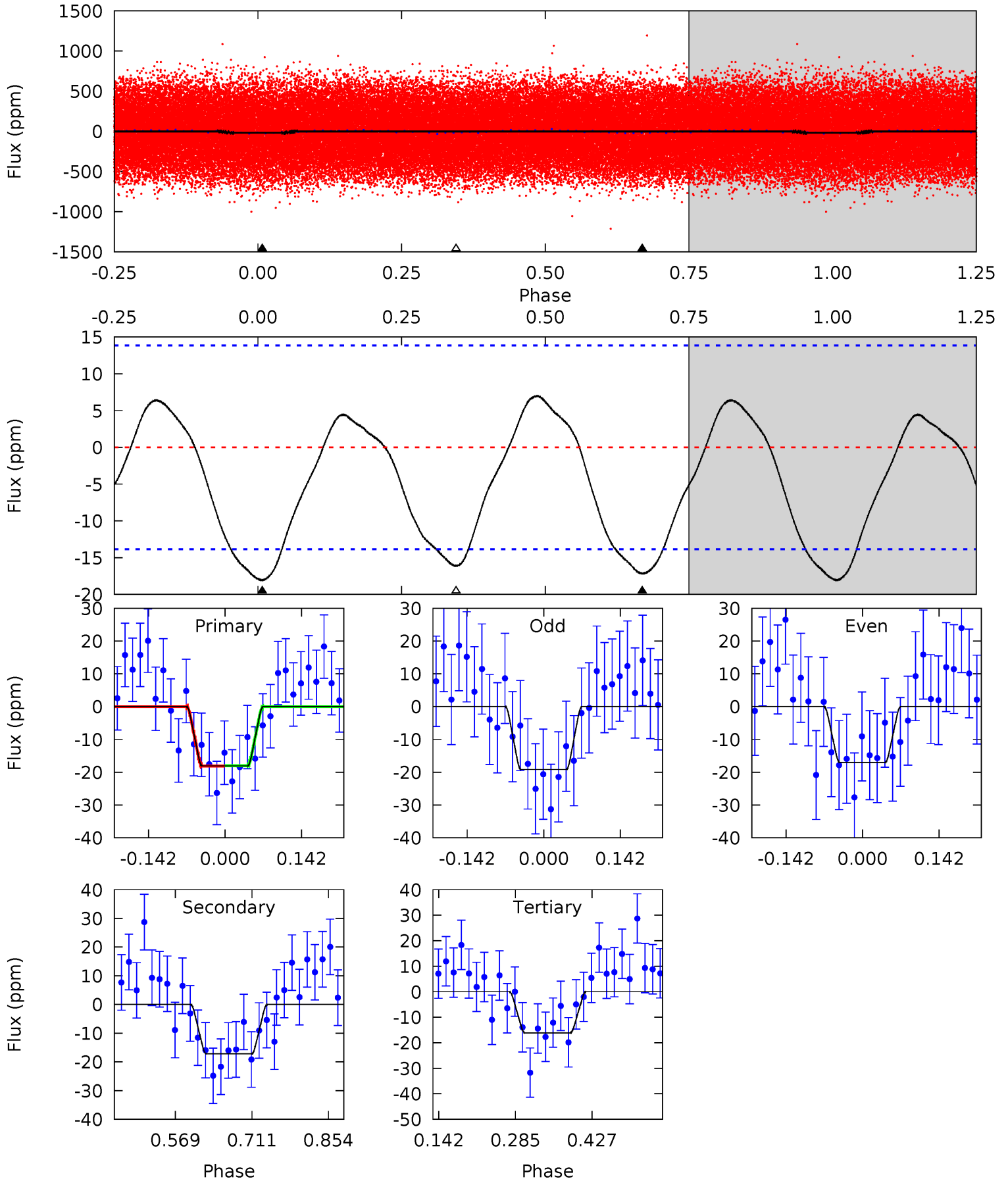
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
15.9	-7.11	0	0	4.42	1.29	15.7	15.9	15.9	-7.11	-7.11	0.08	0.92	0.76	4.66



# Alt Model-Shift Uniqueness Test

007732458-01, P = 0.915666 Days, E = 131.421531 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
5.85	5.56	5.22	0	4.49	1.47	2.52	0.63	5.85	0.34	5.56	0.35	0.76	0.28	0.02



### Stellar Parameters For KIC 007732458

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$7766^{+216}_{-324}$	$3.642^{+0.493}_{-0.087}$	$-0.120^{+0.200}_{-0.350}$	$3.574^{+0.605}_{-1.816}$	$2.039^{+0.301}_{-0.559}$	$0.063^{+0.315}_{-0.019}$
	+3%/-4%	+14%/-2%	+167%/-292%	+17%/-51%	+15%/-27%	+501%/-29%
Source	KIC0	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 007732458-01 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$5 \pm 1$	$1.42^{+0.34}_{-0.41}$	$5686^{+423}_{-710}$	$-6181^{+415}_{-520}$	$-0.745^{+0.262}_{-0.668}$
Alt.	$-17 \pm 3$	$1.60^{+0.40}_{-0.46}$	$5678^{+437}_{-710}$	$7061^{+916}_{-799}$	$2.070^{+1.626}_{-0.773}$

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



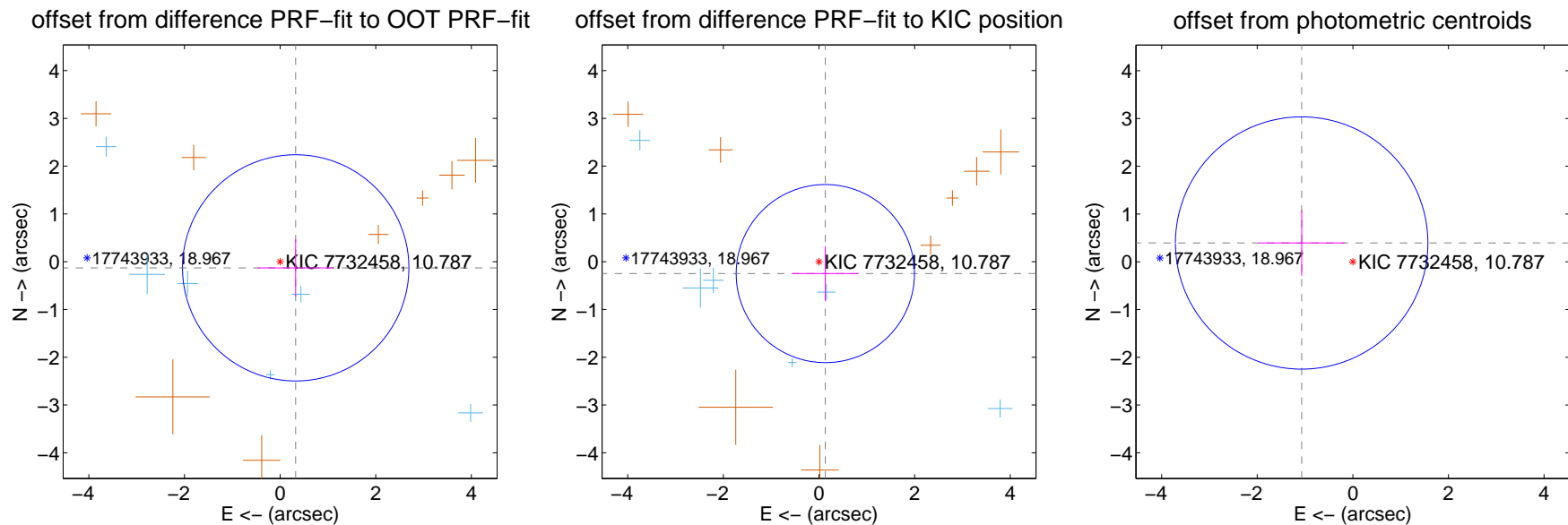
## DV Centroid Data

Supplemental centroid analysis for 007732458-01. **Kepler magnitude: 10.79.** Transit SNR 11.19

There are 6 quarters with good PRF difference image offsets

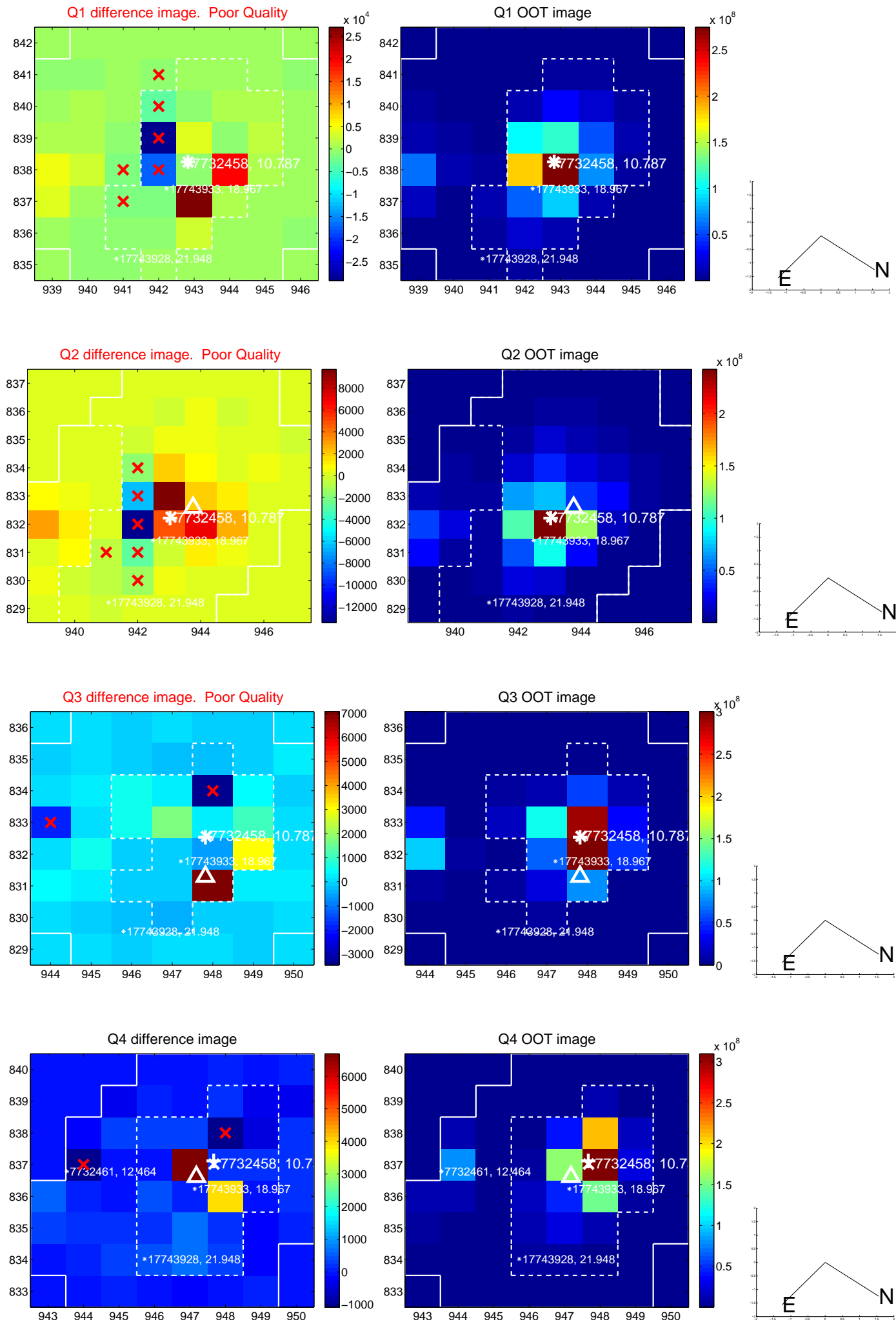
The direct PRF centroid is offset from the target star catalog position by about 0.55 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.351 \pm 0.789$	0.44	$-0.326 \pm 0.791$	$-0.129 \pm 0.596$
PRF-fit source offset from KIC position	$0.282 \pm 0.621$	0.45	$-0.133 \pm 0.695$	$-0.249 \pm 0.574$
photometric centroid source offset	$1.14 \pm 0.88$	1.30	$1.07 \pm 0.90$	$0.39 \pm 0.69$

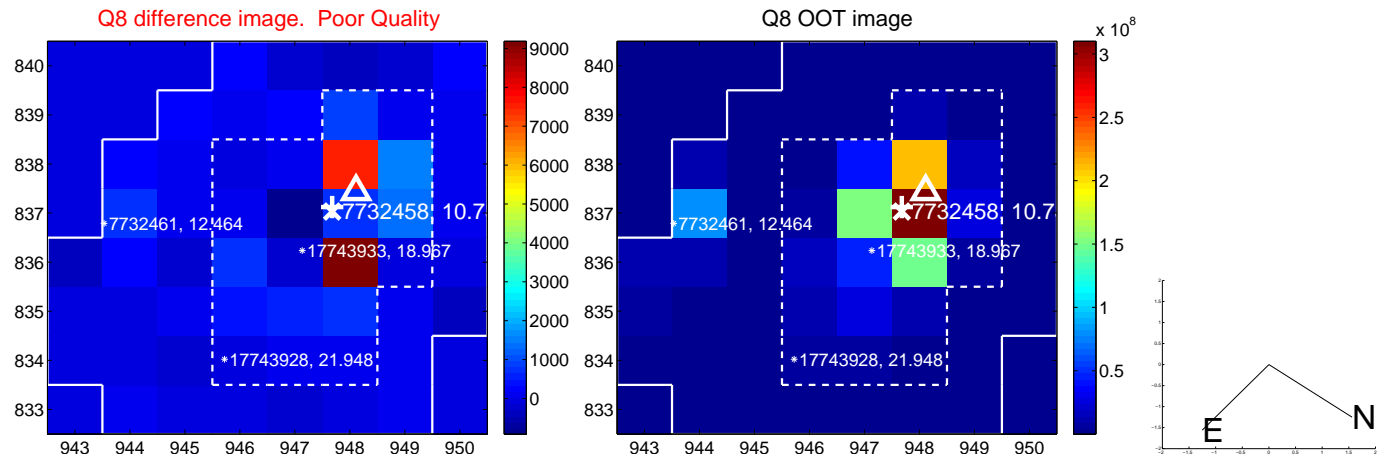
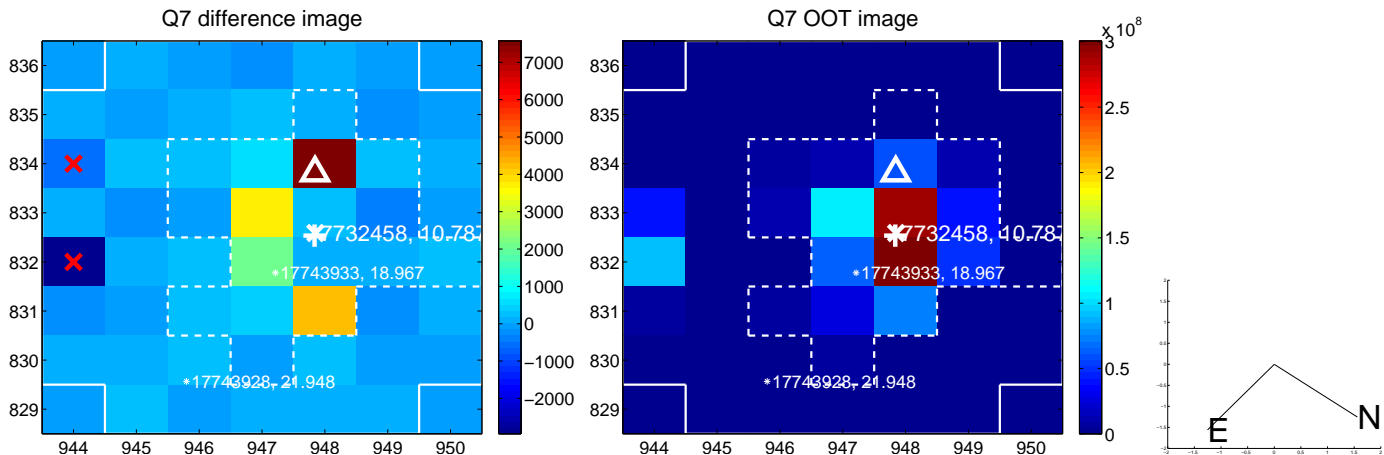
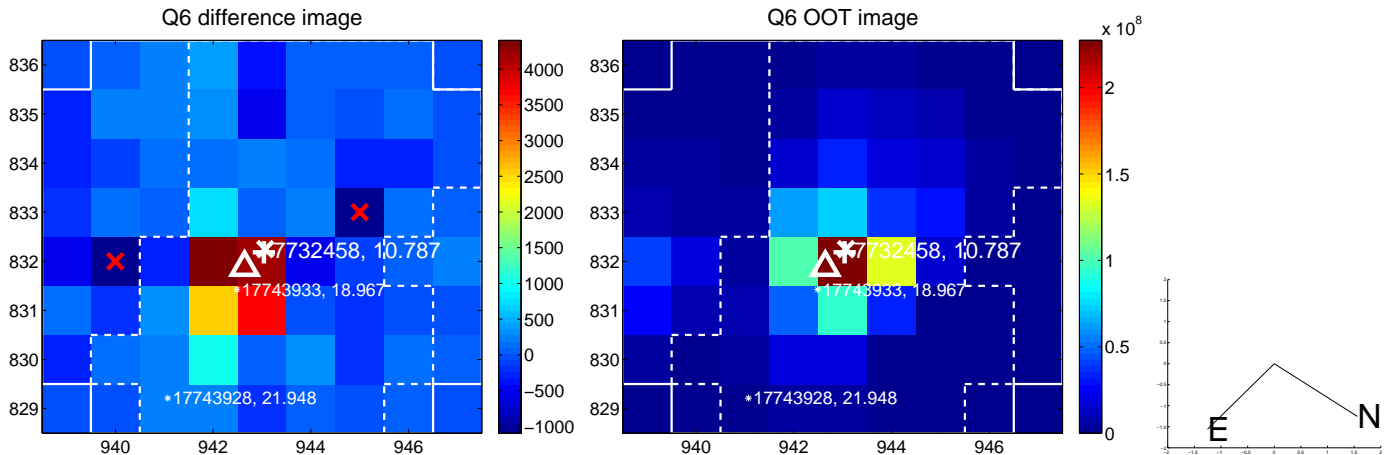
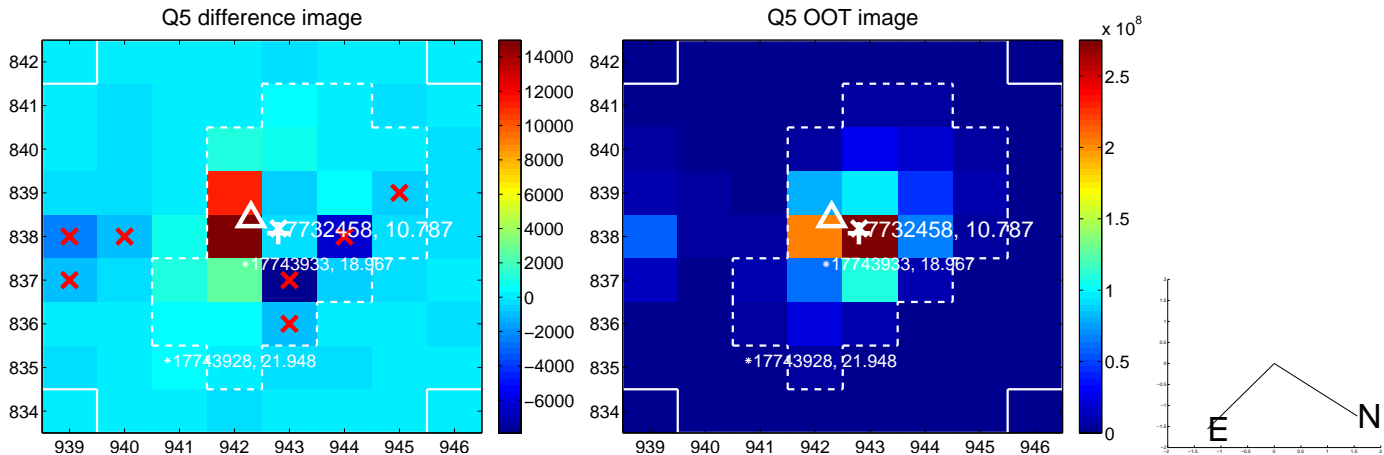


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

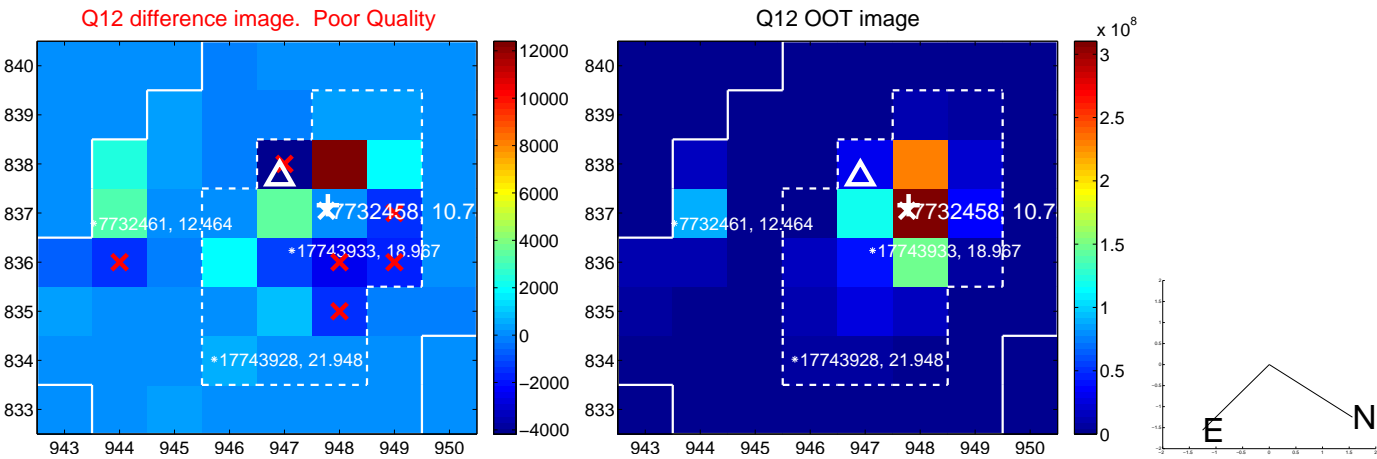
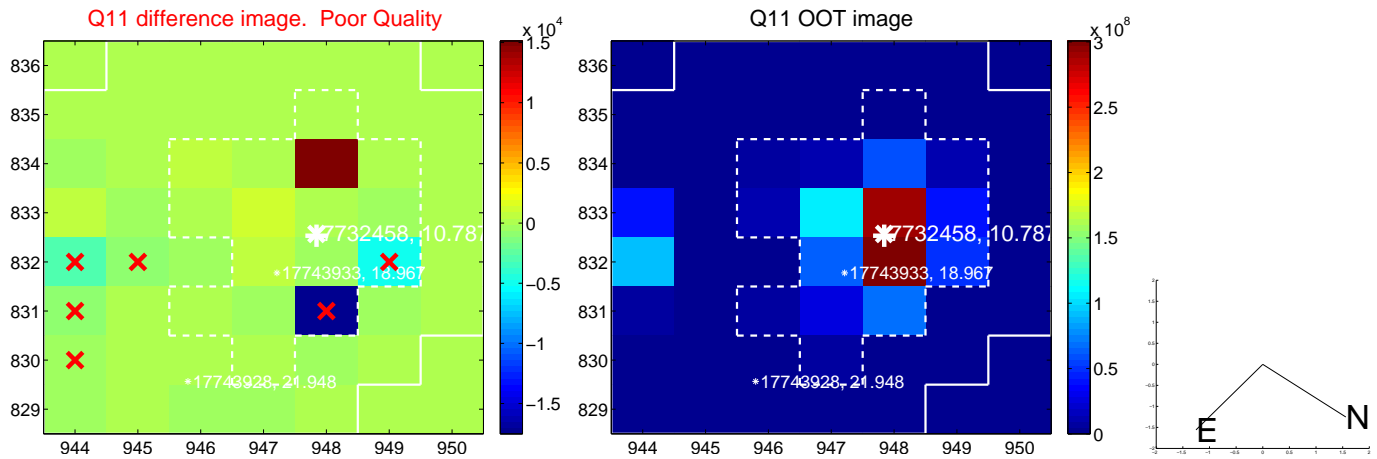
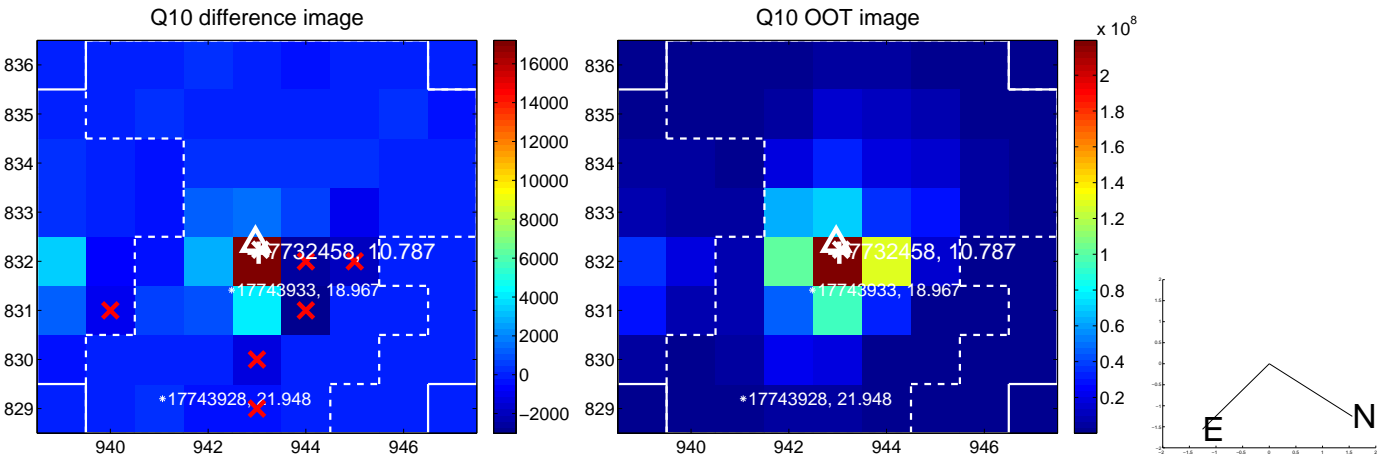
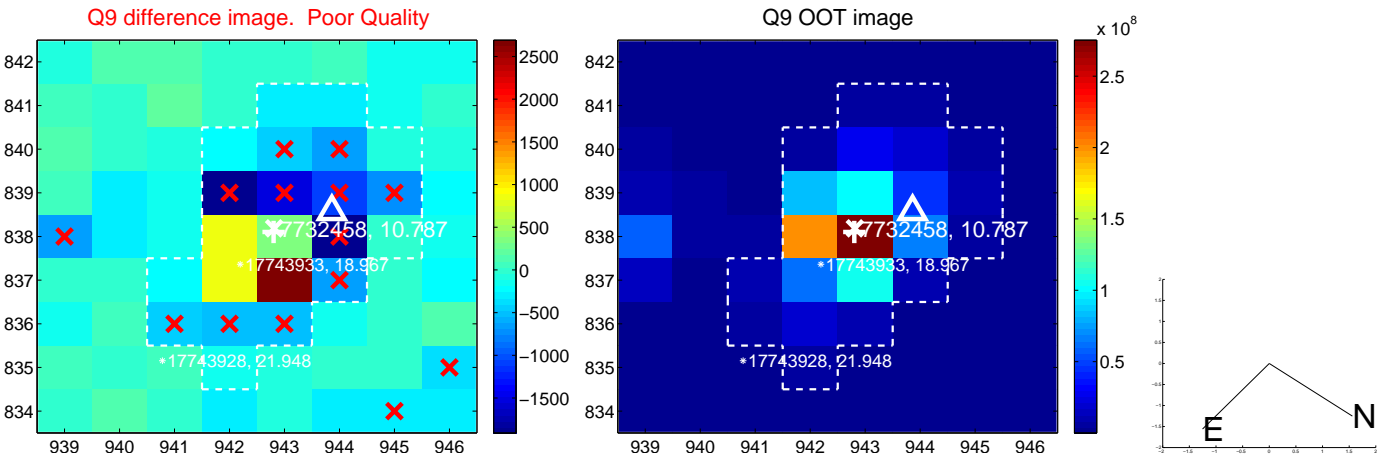


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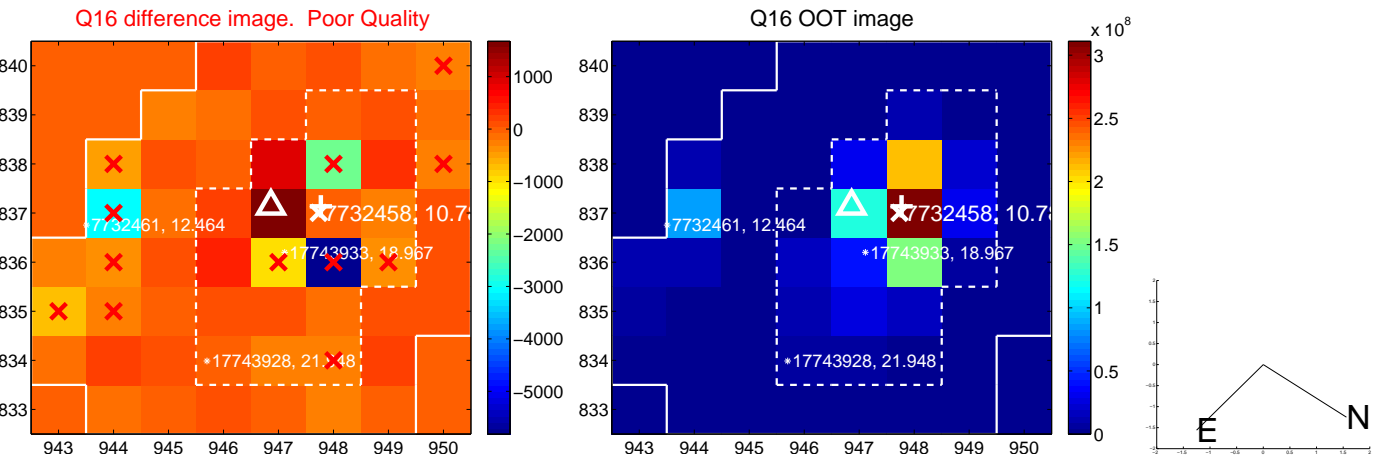
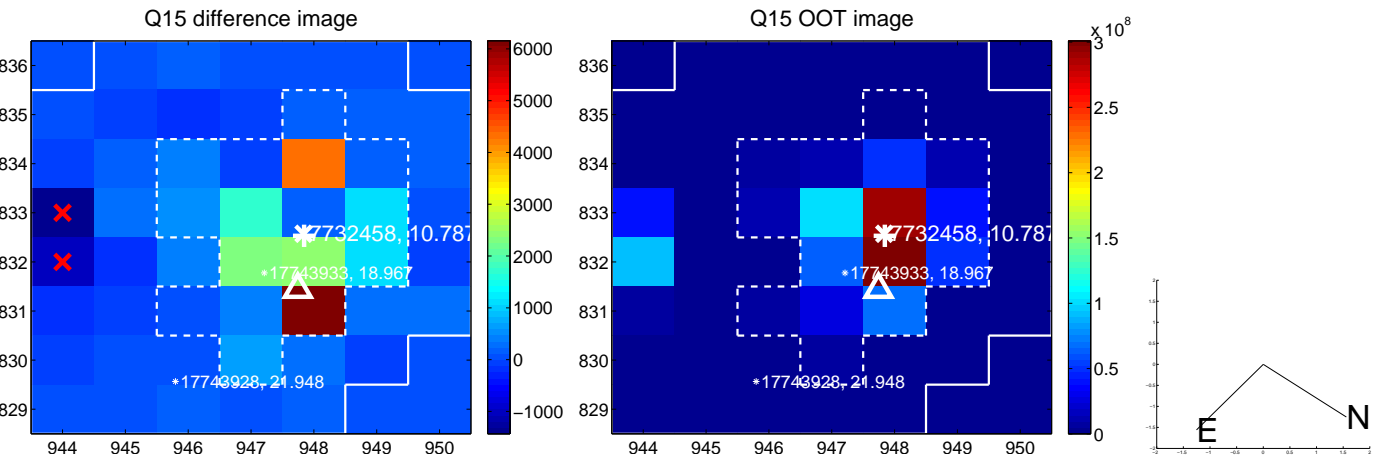
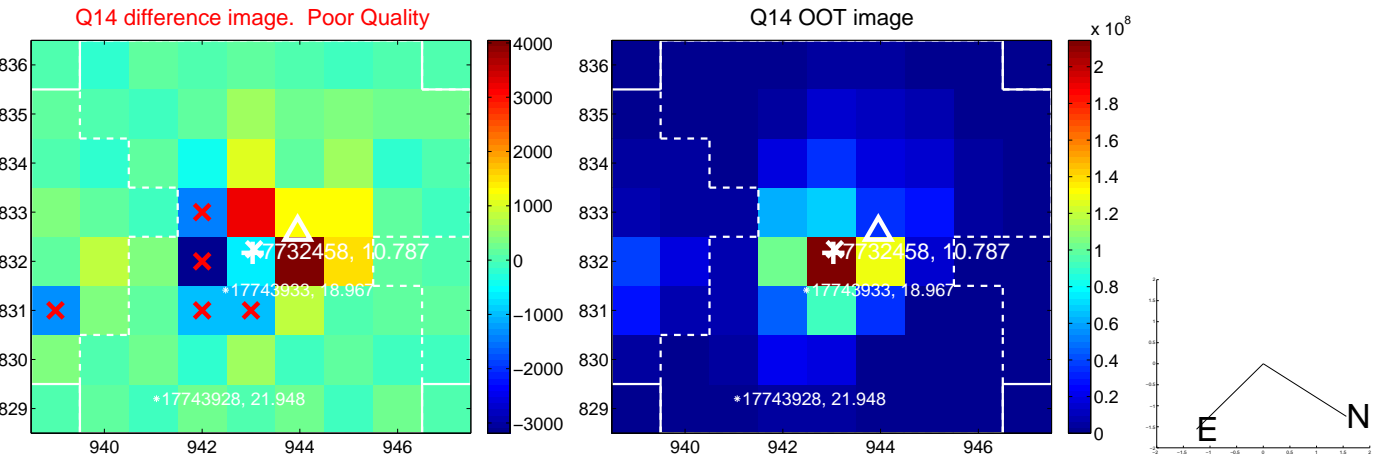
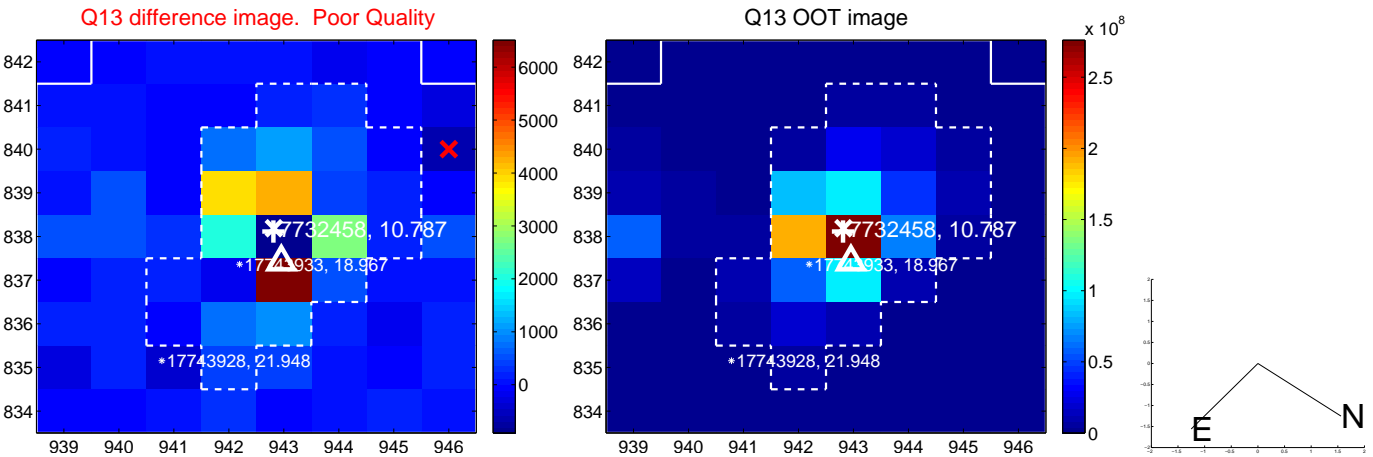




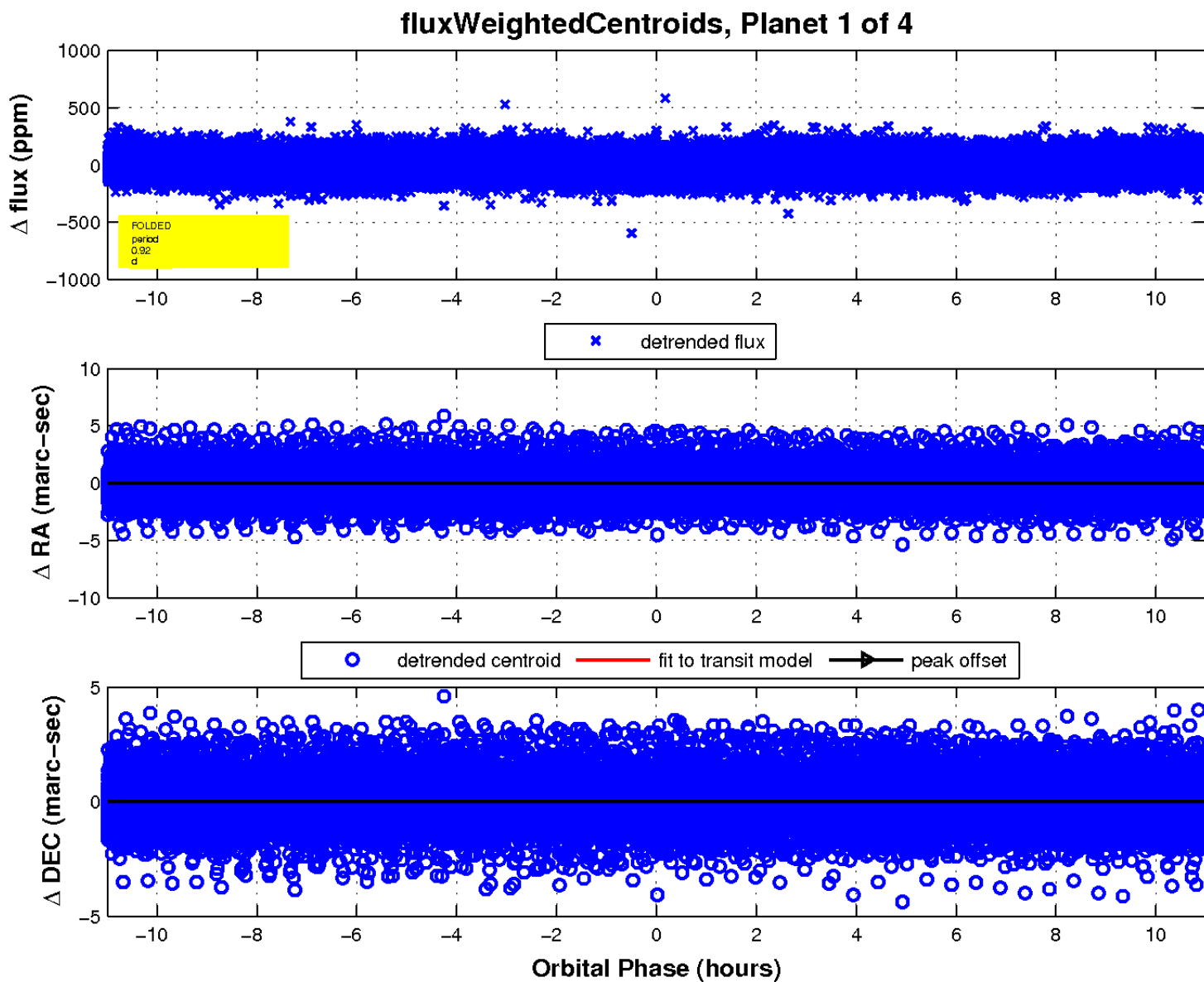
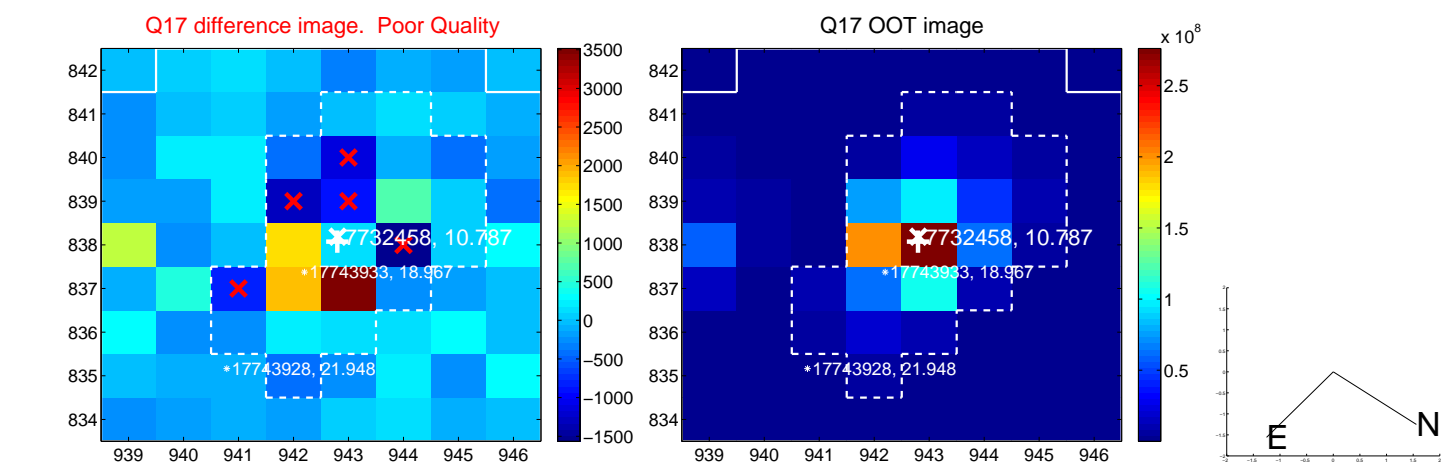
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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.



Declination

# KIC 007732458

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
007732458-01	OBS	No	0.915654	132.335911	13.9	3.910	9.3	11.2	3.57	7766	1.56	75883.07
007732458-02	OBS	No	8.928126	135.610152	45.7	2.836	9.0	9.9	3.57	7766	2.94	3642.84
007732458-03	OBS	No	129.604704	197.331896	123.5	7.515	7.6	7.7	3.57	7766	4.46	102.87
007732458-04	OBS	No	110.790226	240.064641	99.6	2.857	7.8	7.8	3.57	7766	4.04	126.80

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
007732458-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED
007732458-02	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED
007732458-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED
007732458-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED

**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.

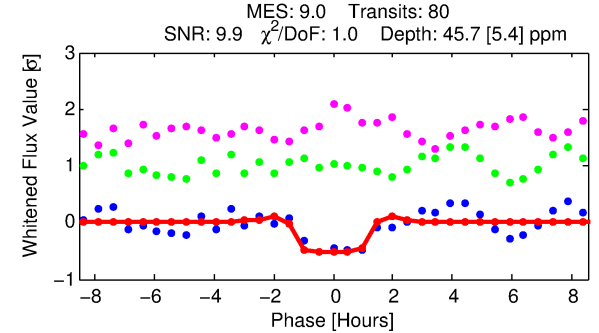
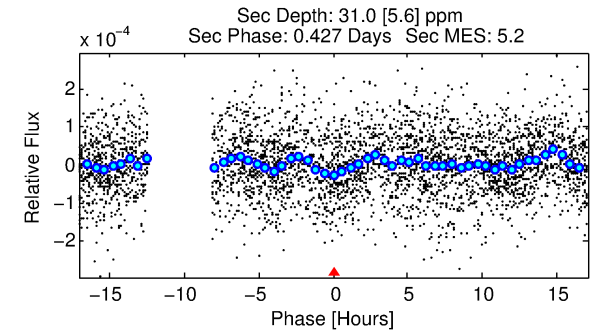
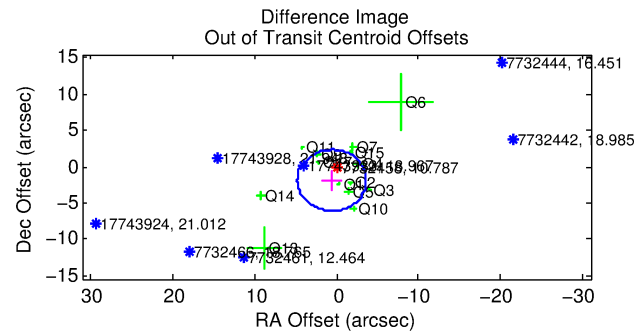
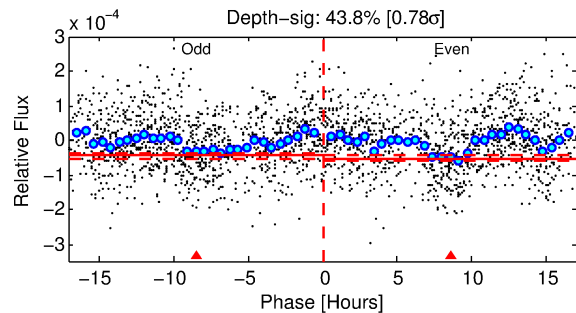
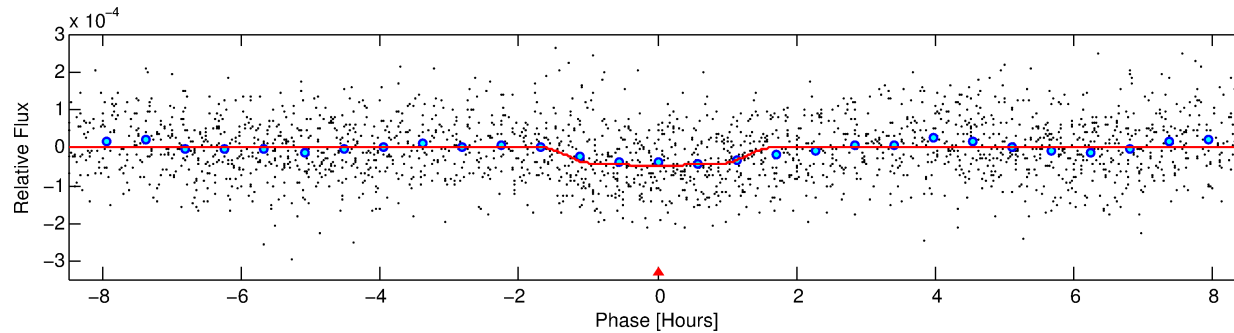
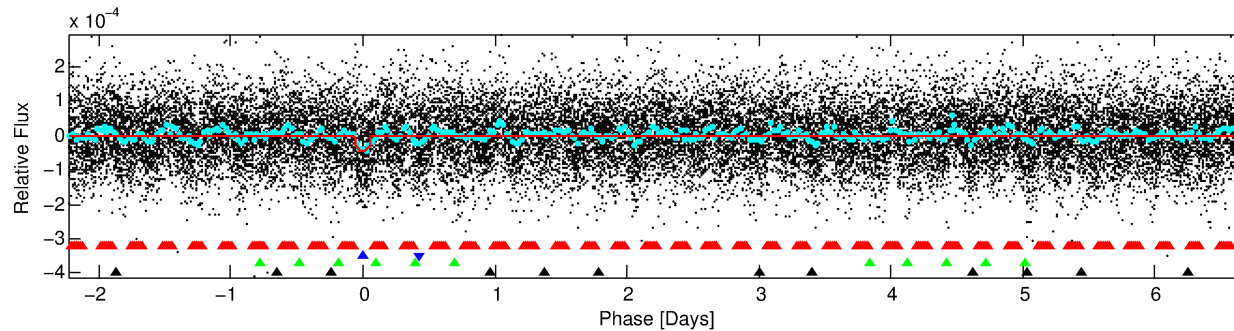
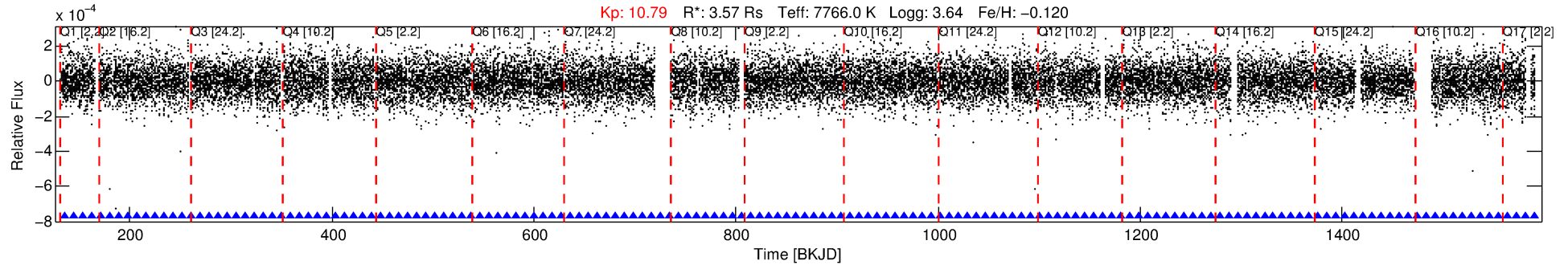
Ephemeris Match Information For 007732458-02

No Significant Match Found



# DV One-Page Summary

KIC: 7732458 Candidate: 2 of 4 Period: 8.928 d



## DV Fit Results:

Period = 8.92813 [0.00006] d  
Epoch = 135.6102 [0.0051] BKJD  
Rp/R\* = 0.0075 [0.0022]  
a/R\* = 8.60 [15.24]  
b = 0.94 [0.21]  
Seff = 3642.84 [3080.98]  
Teq = 1981 [419] K  
Rp = 2.94 [1.72] Re  
a = 0.1069 [0.0543] AU  
Ag = 22.54 [23.09] [0.93 $\sigma$ ]  
Teffp = 6674 [1042] K [4.18 $\sigma$ ]

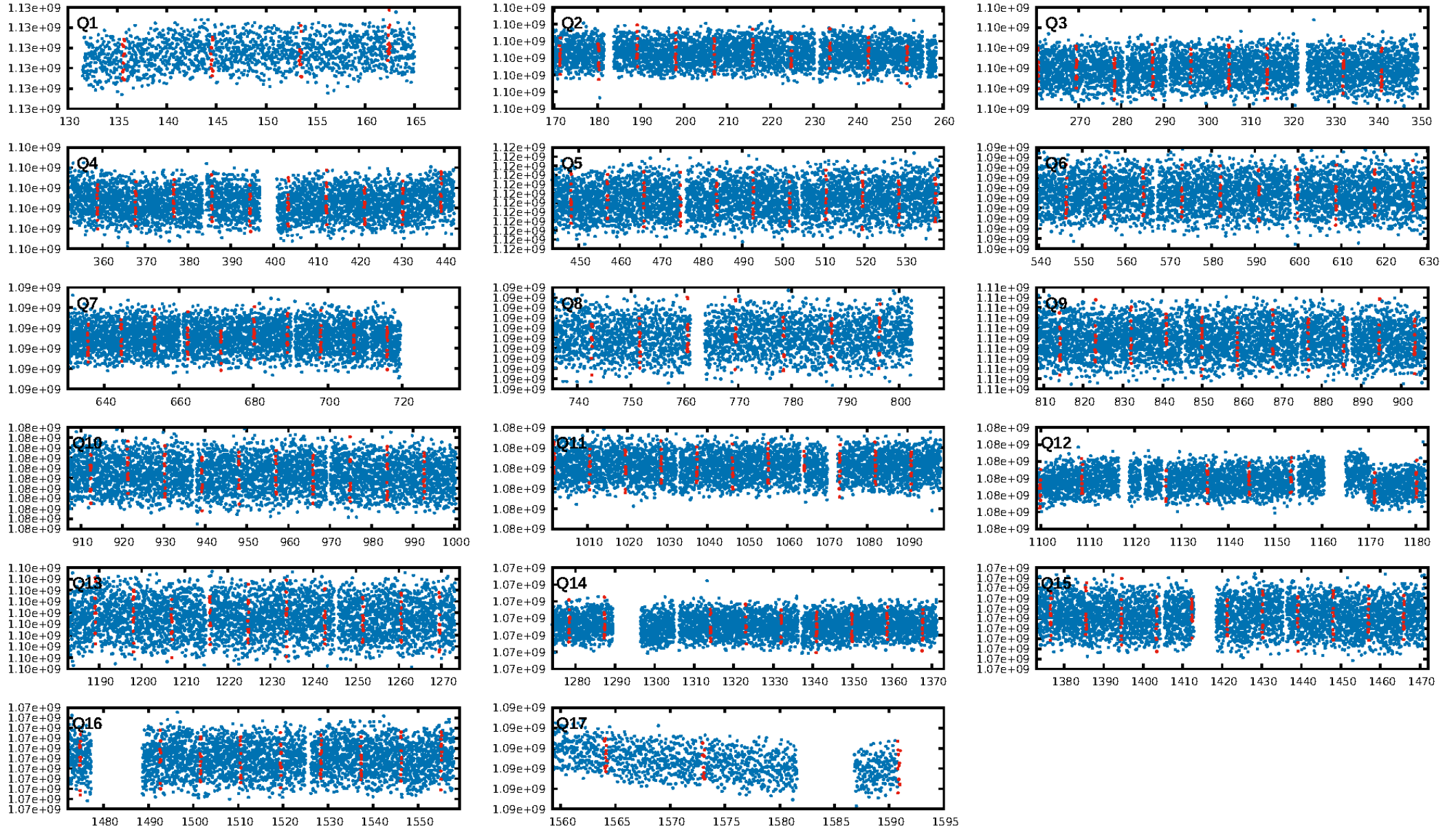
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [39.81 $\sigma$ ]  
LongPeriod-sig: 100.0% [607.30 $\sigma$ ]  
ModelChiSquare2-sig: 19.4%  
ModelChiSquareGof-sig: 100.0%  
**Bootstrap-pfa: 2.18e-12**  
RollingBand-fgt: 1.00 [76/76]  
**GhostDiagnostic-chr: 0.6169**  
Centroid-sig: 27.9%  
Centroid-so: 0.610 arcsec [0.66 $\sigma$ ]  
OotOffset-rm: 1.967 arcsec [1.40 $\sigma$ ]  
OotOffset-st: 4/4/1/5 [14]  
KicOffset-rm: 1.974 arcsec [1.29 $\sigma$ ]  
KicOffset-st: 4/4/1/5 [14]  
DiffImageQuality-fgm: 0.29 [4/14]  
DiffImageOverlap-fno: 0.06 [1/17]

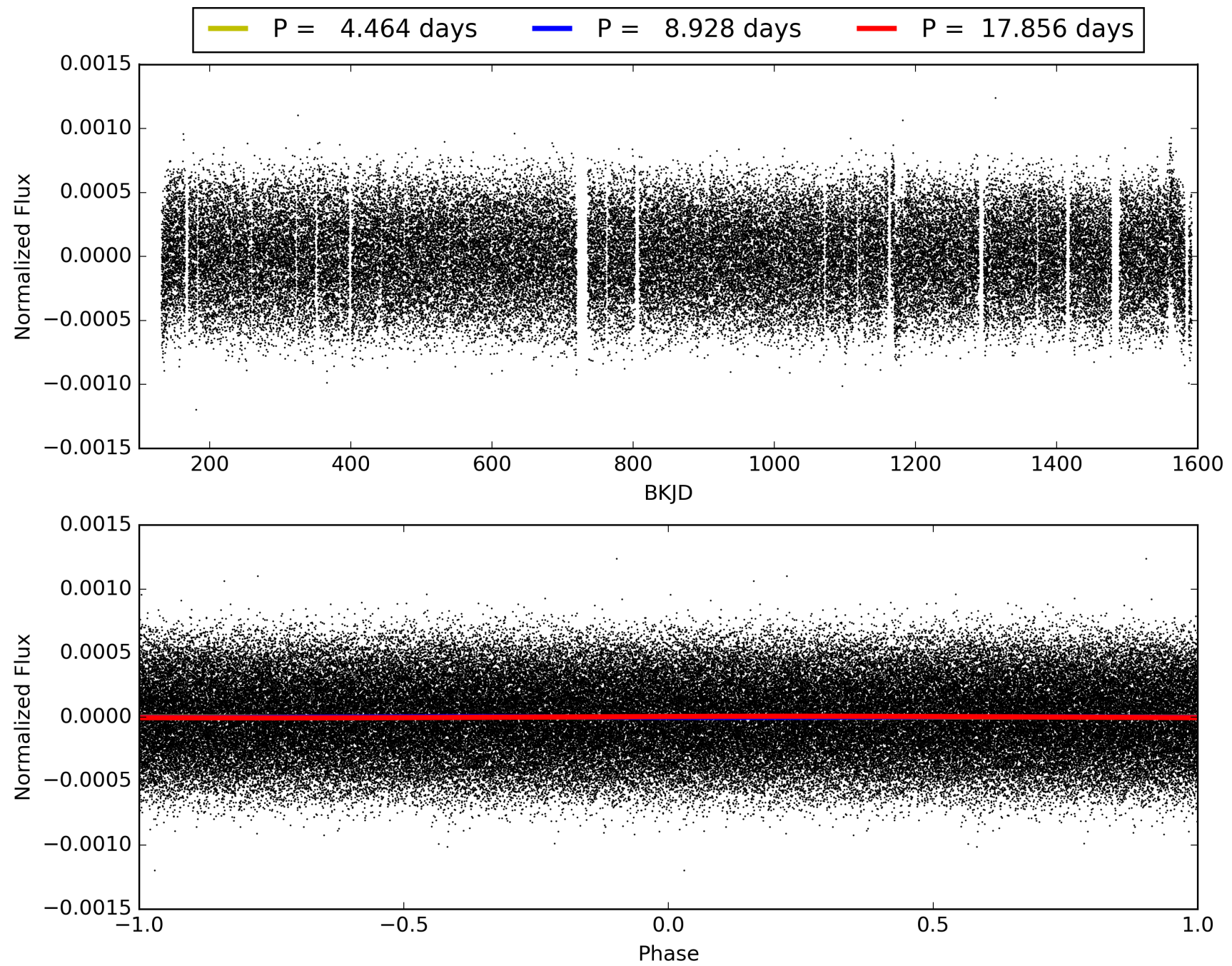
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 02-Feb-2016 03:18:20 Z

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

# TCE 007732458-02, PDC Light Curves

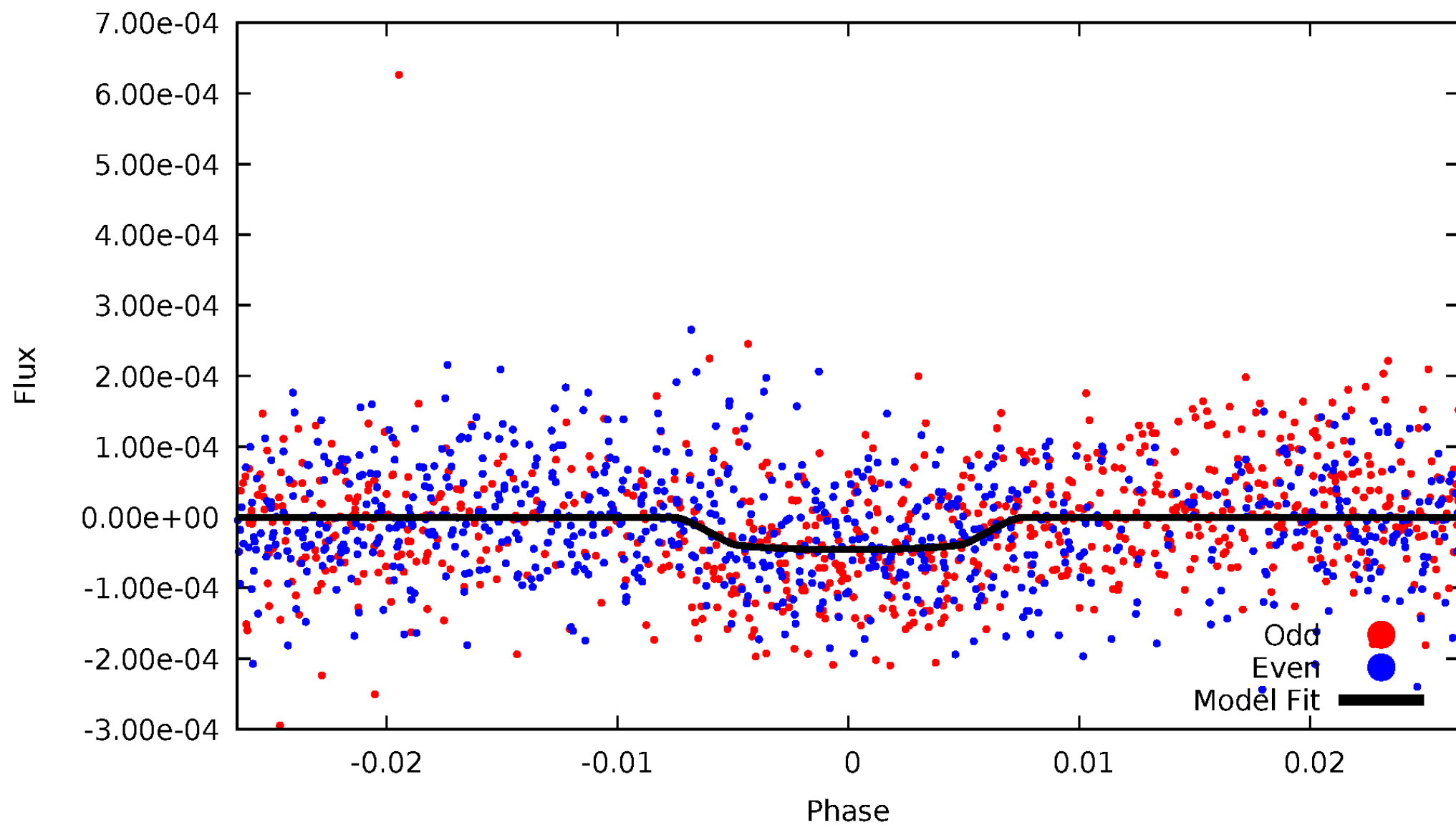


TCE 007732458-02



# DV Odd/Even

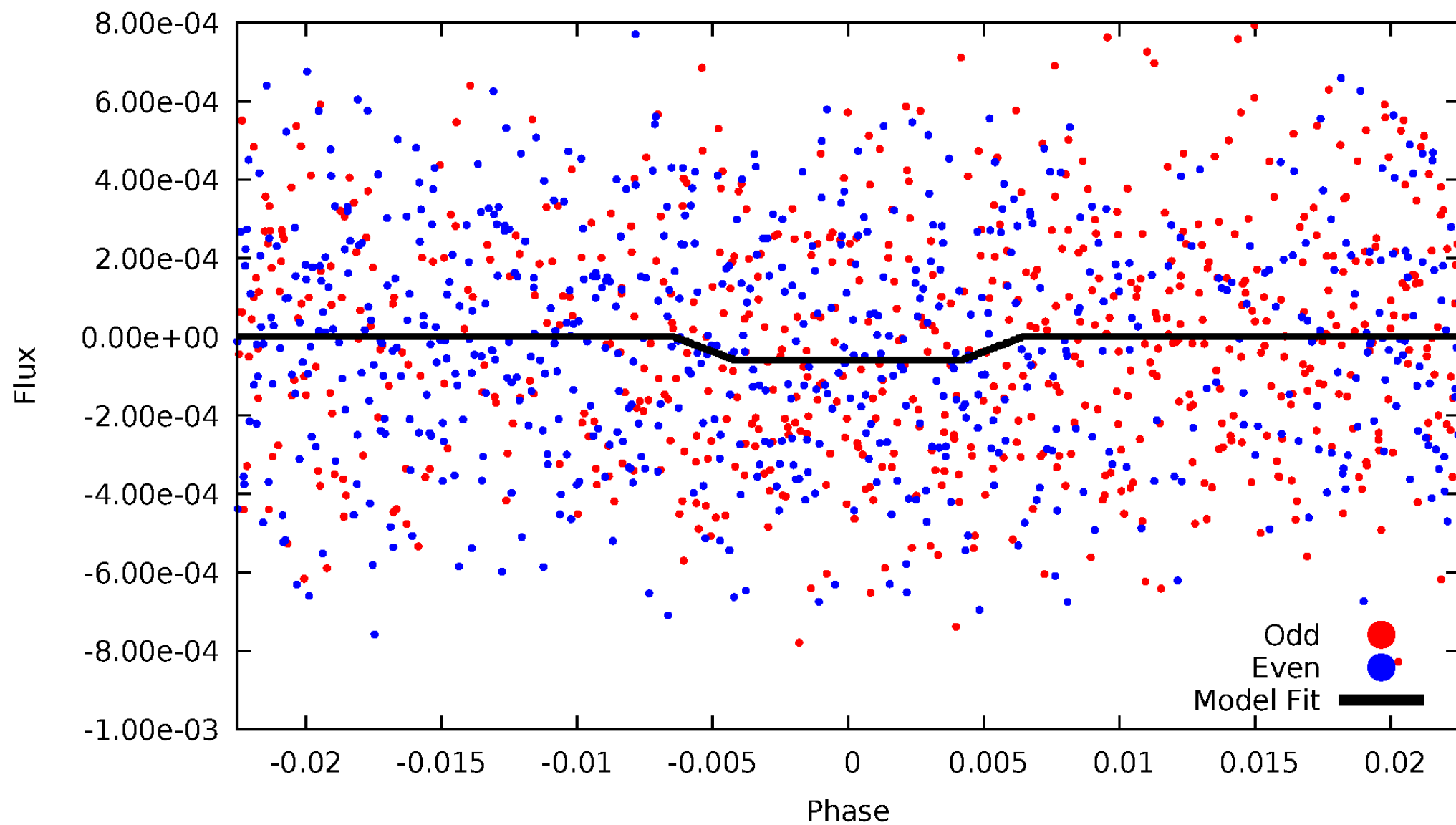
TCE 007732458-02





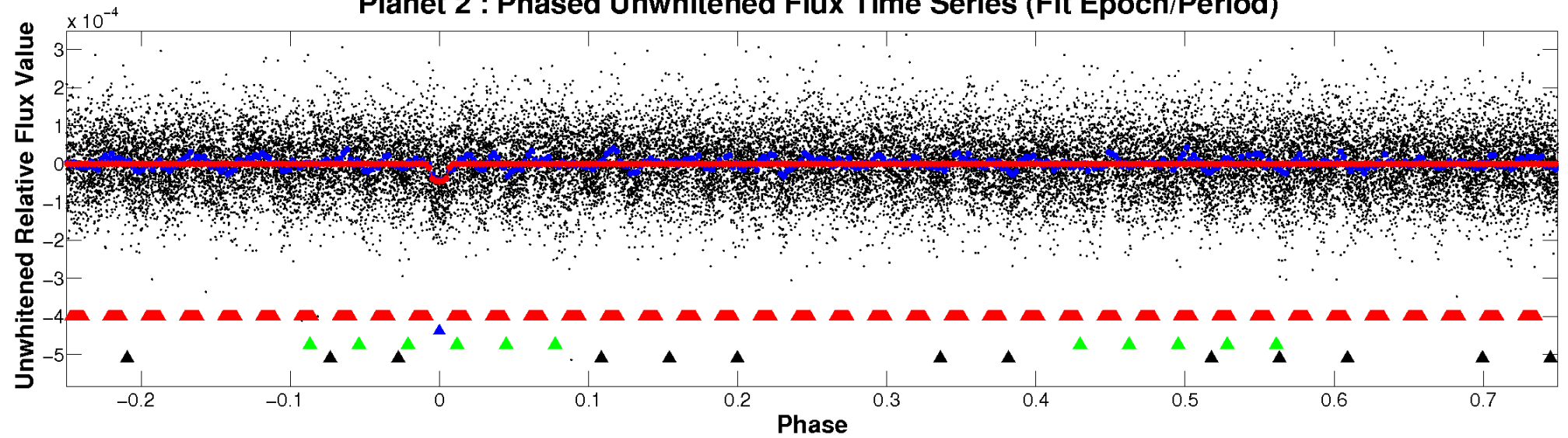
# ALT Odd/Even

TCE 007732458-02

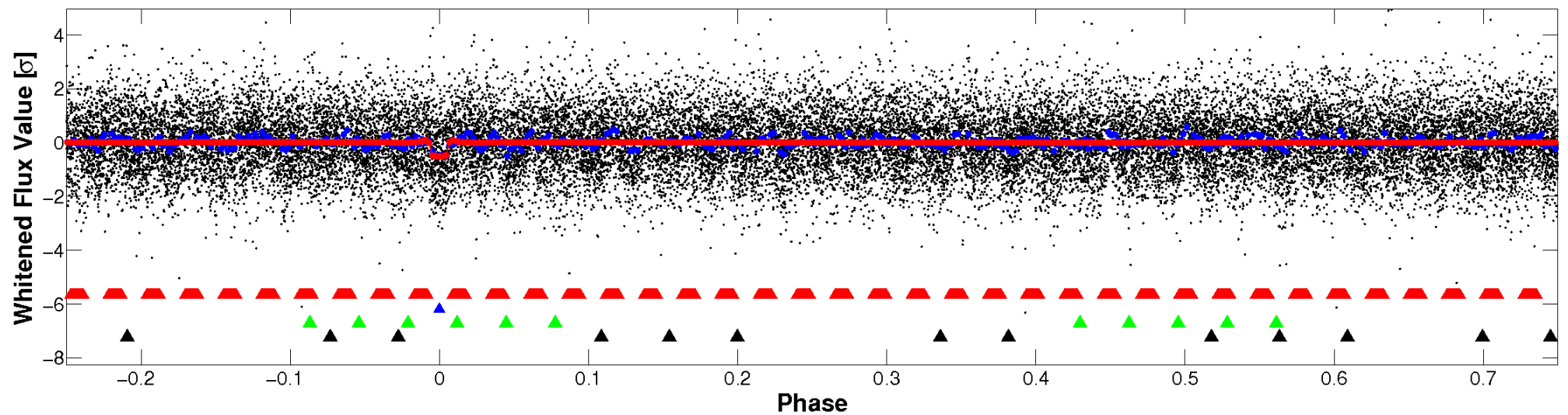


# Non-Whitened Vs. Whitened Light Curve

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



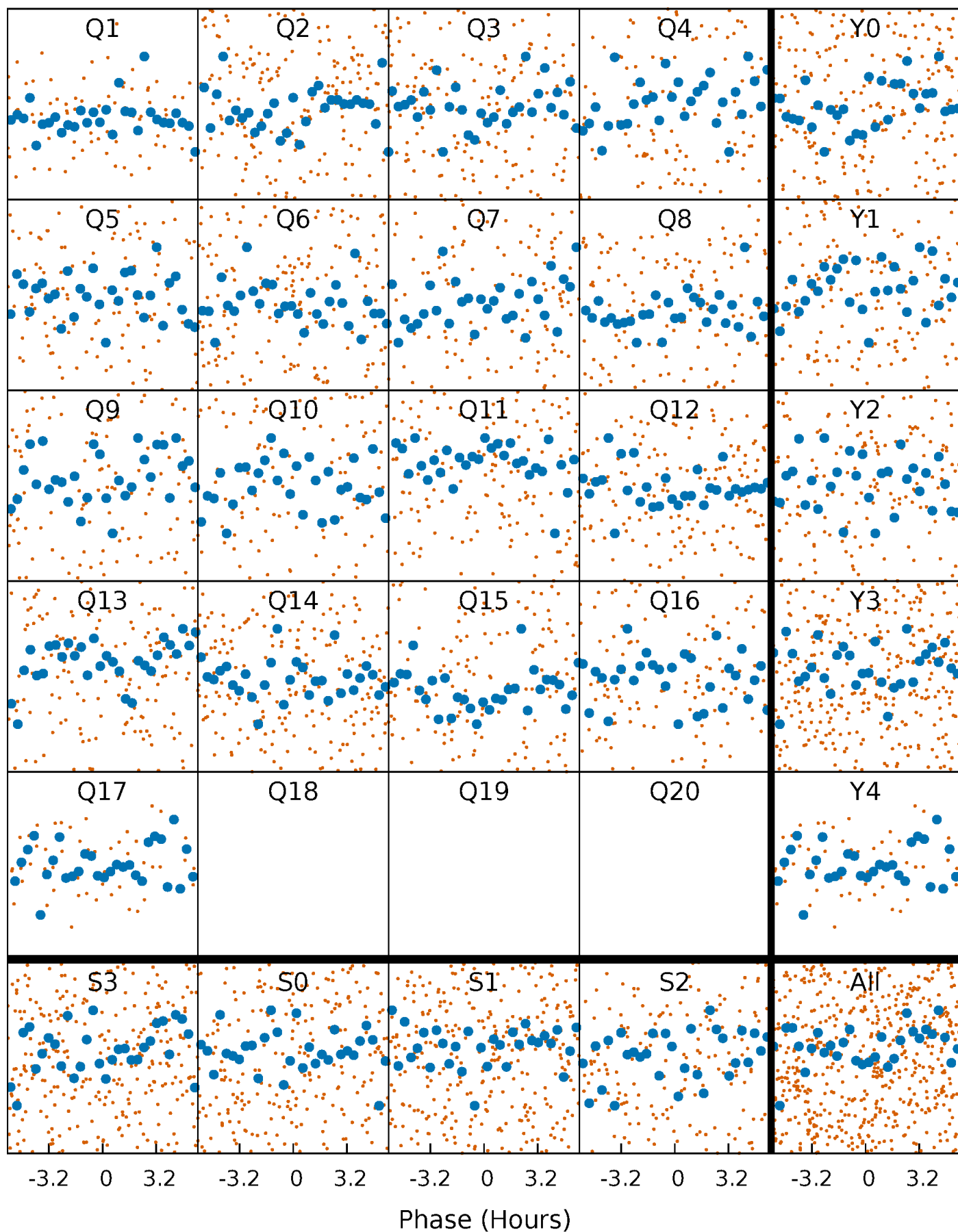
## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)





# PDC Quarter-Phased Transit Curves

TCE 007732458-02 P= 8.928127 Days  $T_0=135.610152$  (BKJD)



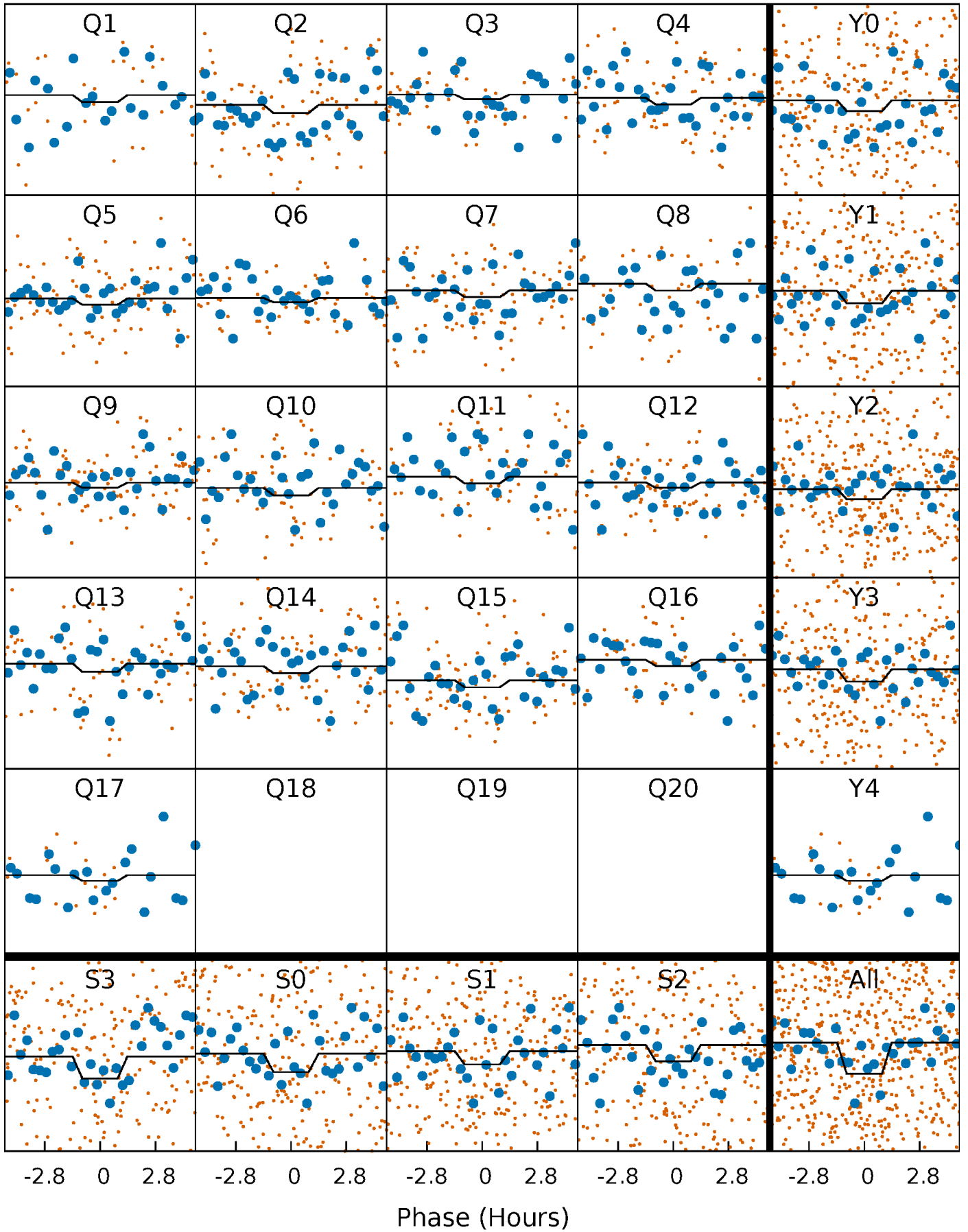
# DV Quarter-Phased Transit Curves

TCE 007732458-02   P= 8.928127 Days    $T_0=135.610152$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

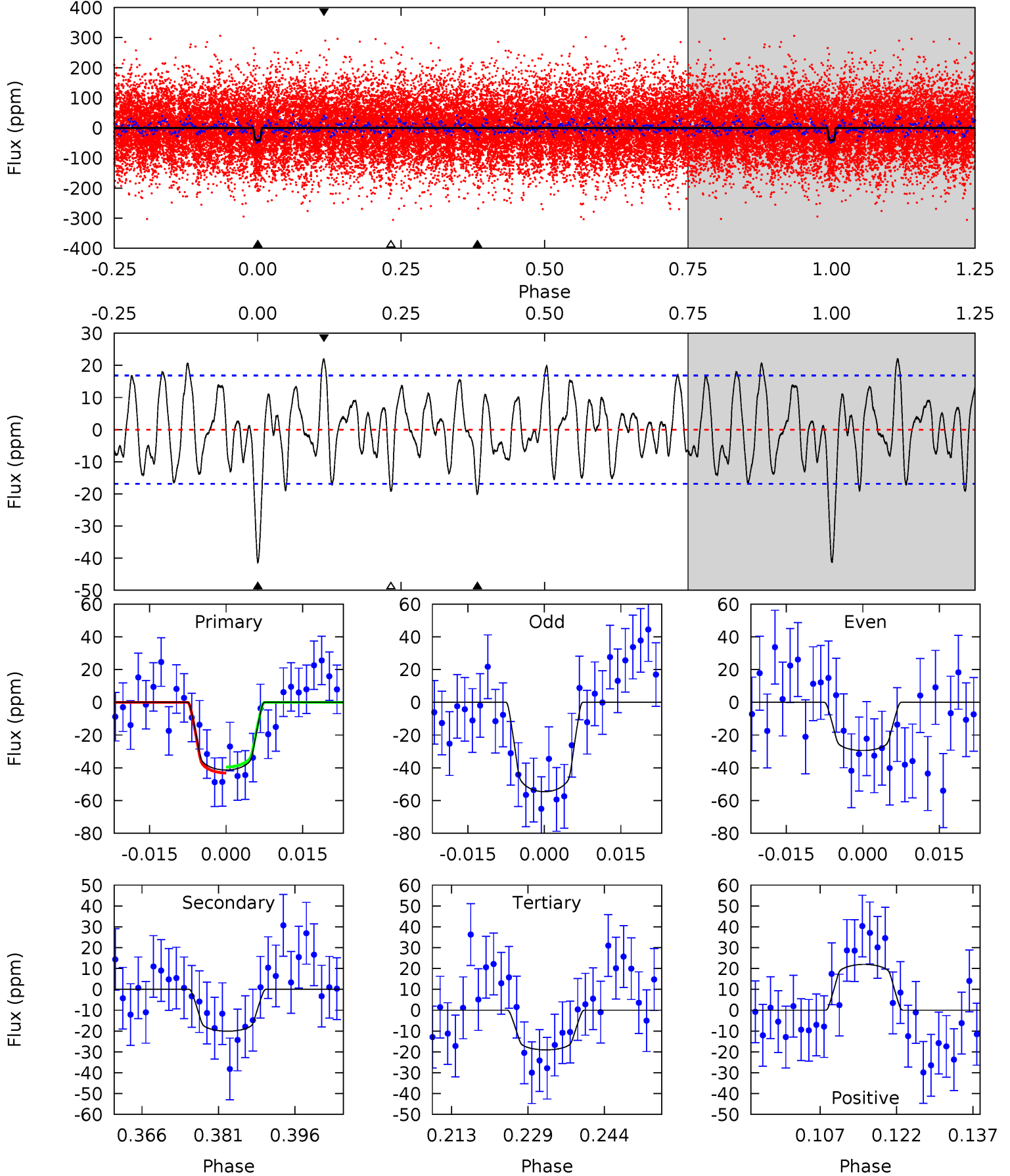
TCE 007732458-02 P= 8.928179 Days  $T_0=135.612733$  (BKJD)



# DV Model-Shift Uniqueness Test

007732458-02, P = 8.928127 Days, E = 126.682025 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
12.1	5.89	5.59	6.44	4.94	2.43	2.48	6.55	5.70	0.30	-0.55	3.71	0.92	0.35	0.53

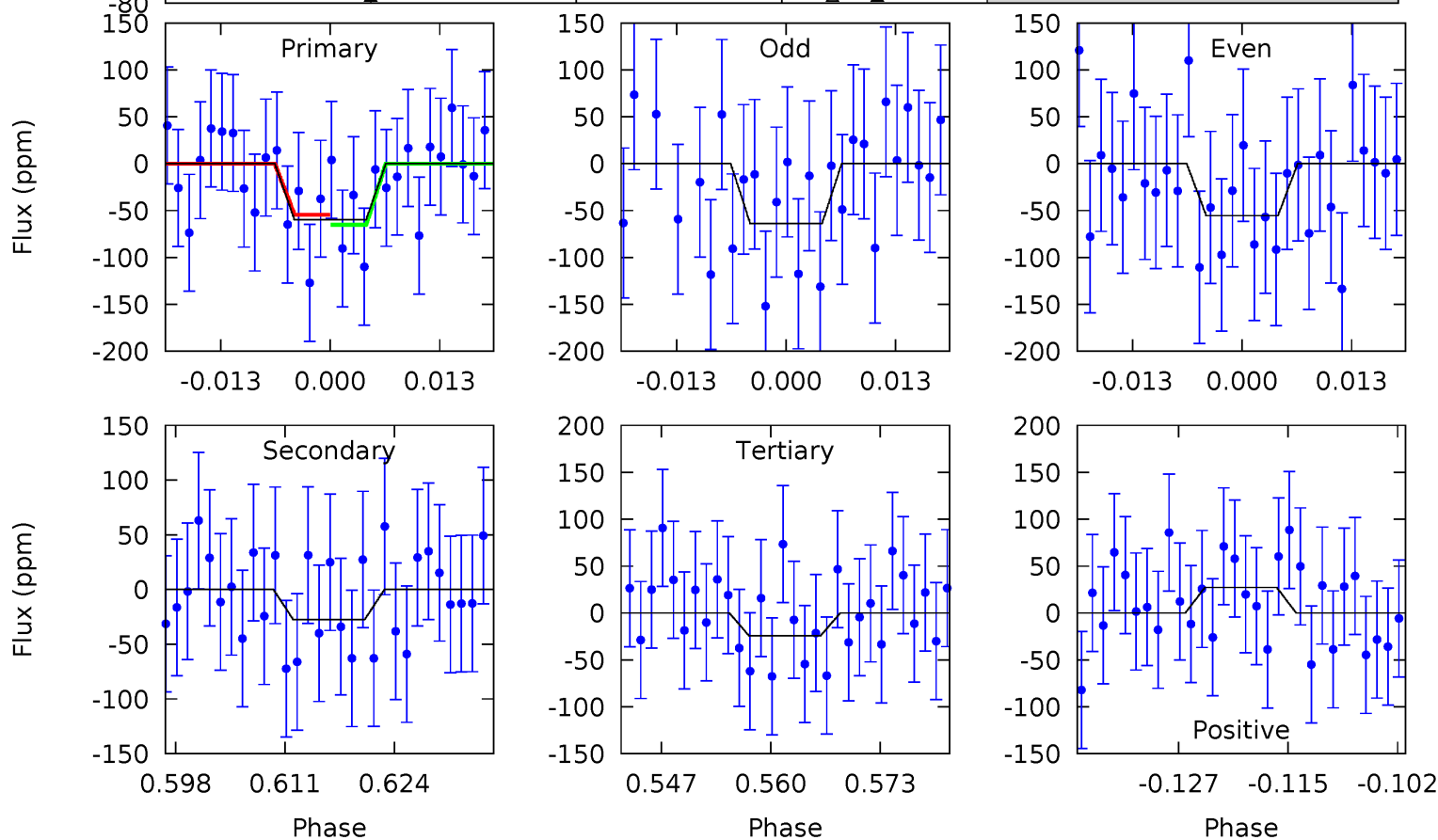
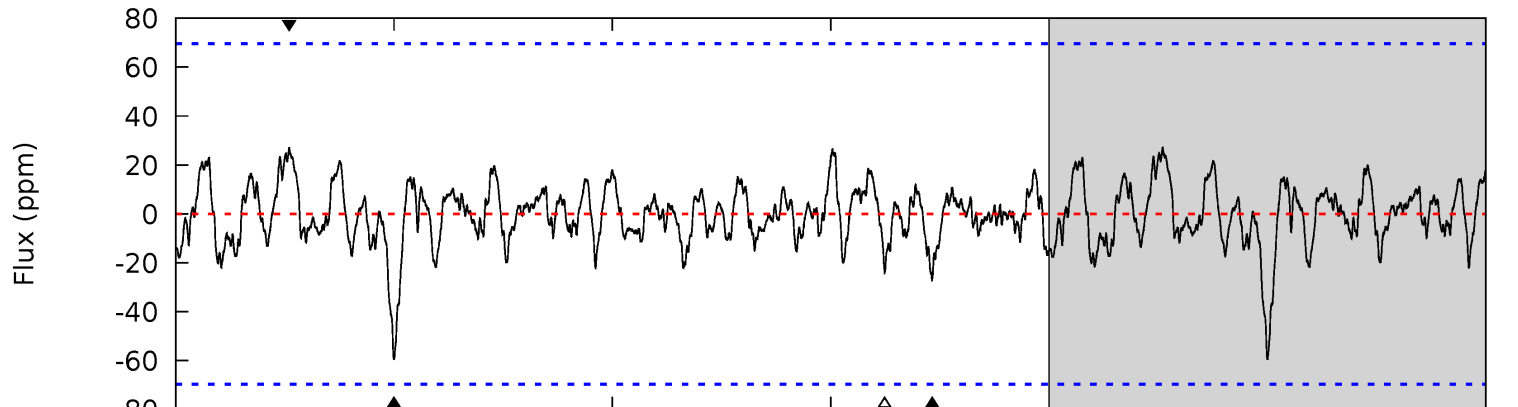
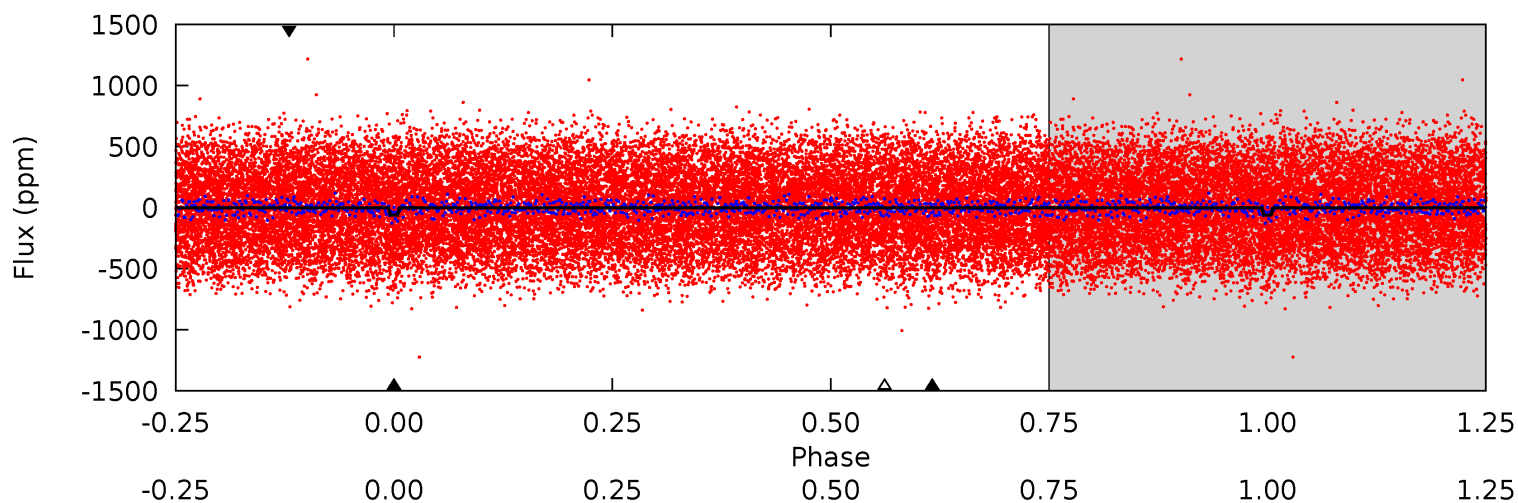




# Alt Model-Shift Uniqueness Test

007732458-02, P = 8.928179 Days, E = 126.684554 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
4.28	1.95	1.73	1.95	4.98	2.49	0.69	2.54	2.33	0.22	0.00	0.31	0.93	0.31	0.39



### Stellar Parameters For KIC 007732458

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$7766^{+216}_{-324}$	$3.642^{+0.493}_{-0.087}$	$-0.120^{+0.200}_{-0.350}$	$3.574^{+0.605}_{-1.816}$	$2.039^{+0.301}_{-0.559}$	$0.063^{+0.315}_{-0.019}$
	+3%/-4%	+14%/-2%	+167%/-292%	+17%/-51%	+15%/-27%	+501%/-29%
Source	KIC0	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 007732458-02 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-20 \pm 3$	$2.71^{+1.08}_{-1.07}$	$2665^{+207}_{-321}$	$5722^{+1178}_{-634}$	$17^{+24}_{-8}$
Alt.	$-27 \pm 14$	$2.70^{+1.02}_{-0.93}$	$2652^{+228}_{-323}$	$6089^{+1448}_{-1198}$	$22^{+33}_{-14}$

$T_{max}$  = 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

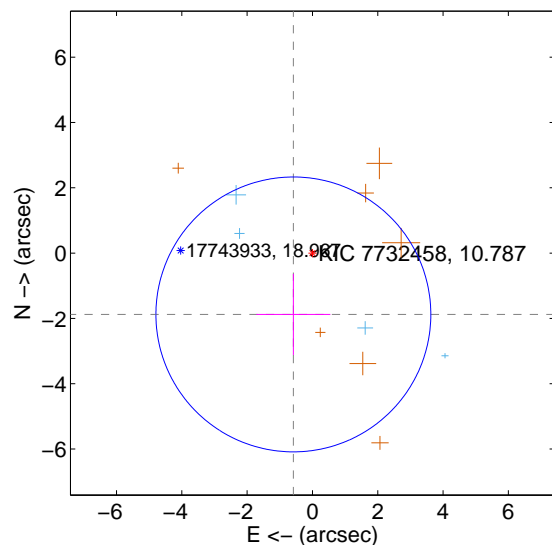
Supplemental centroid analysis for 007732458-02. **Kepler magnitude: 10.79.** Transit SNR 9.87

There are 4 quarters with good PRF difference image offsets

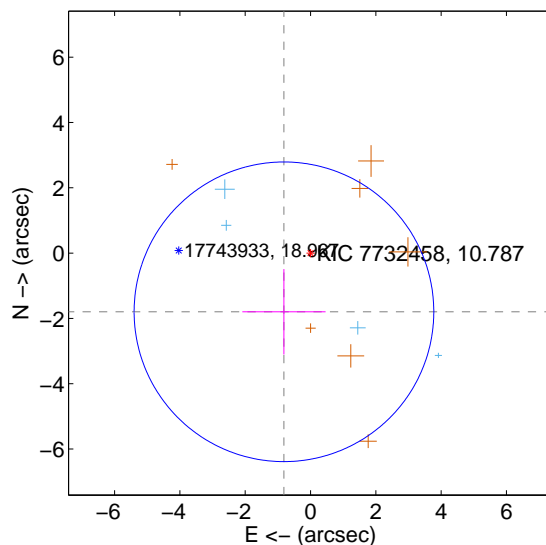
The direct PRF centroid is offset from the target star catalog position by about 0.43 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.967 \pm 1.403$	1.40	$0.584 \pm 1.133$	$-1.879 \pm 1.241$
PRF-fit source offset from KIC position	$1.974 \pm 1.530$	1.29	$0.814 \pm 1.274$	$-1.798 \pm 1.309$
photometric centroid source offset	$0.61 \pm 0.93$	0.66	$-0.57 \pm 0.95$	$0.22 \pm 0.74$

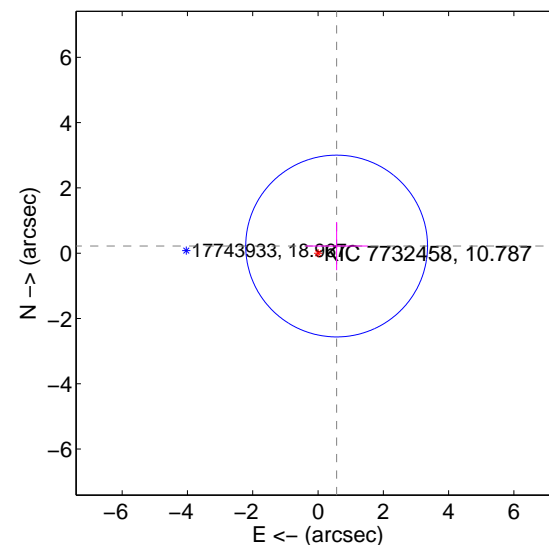
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

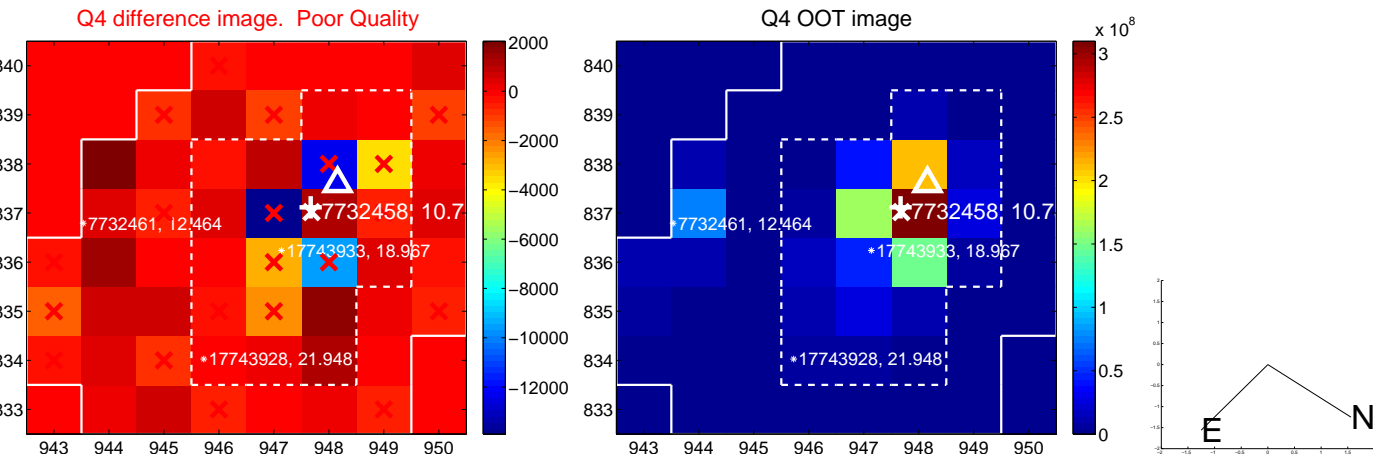
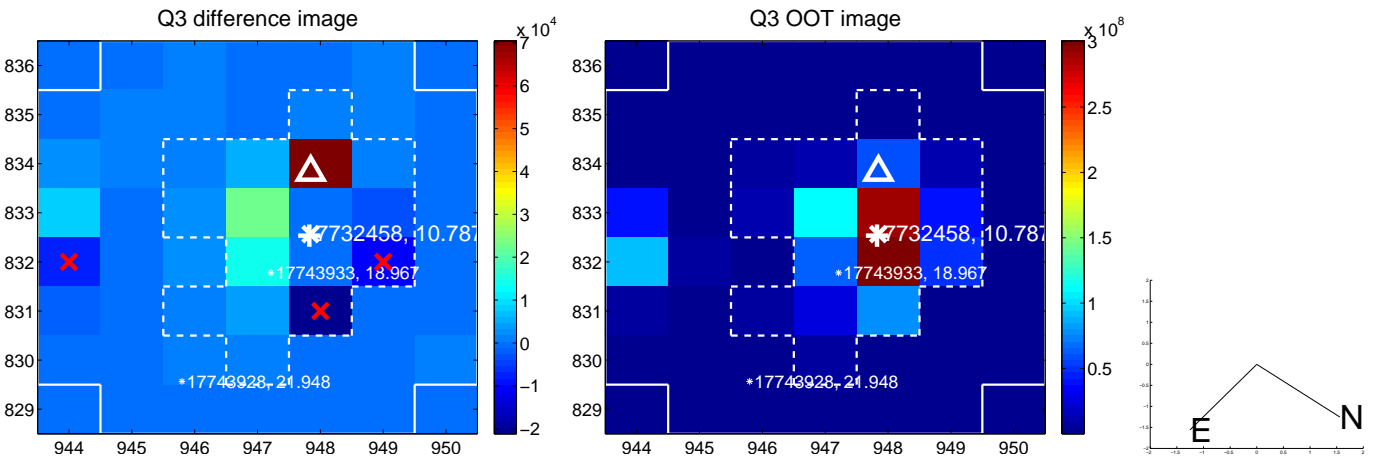
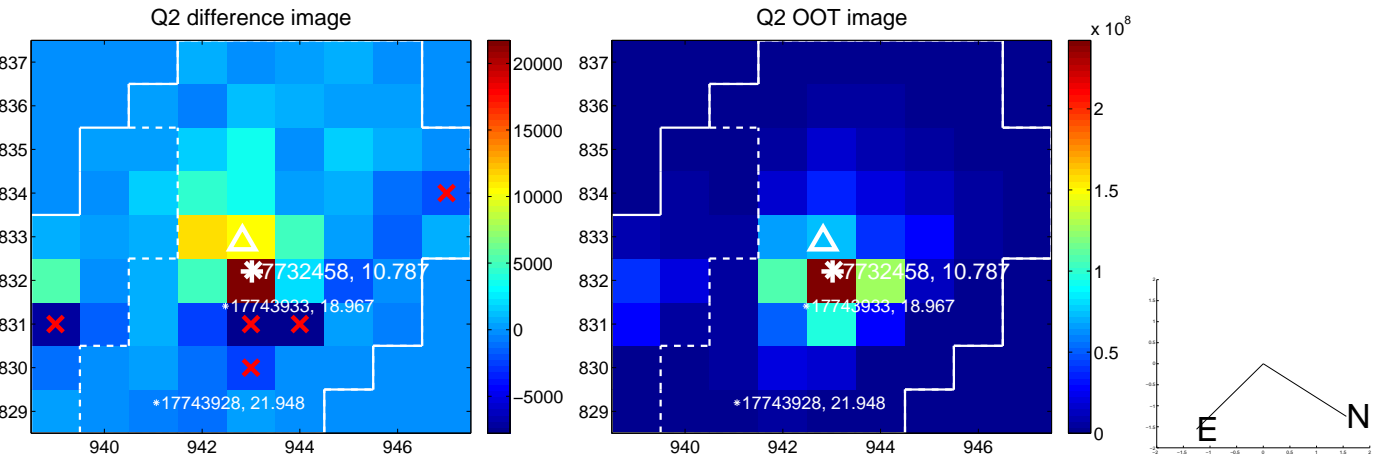
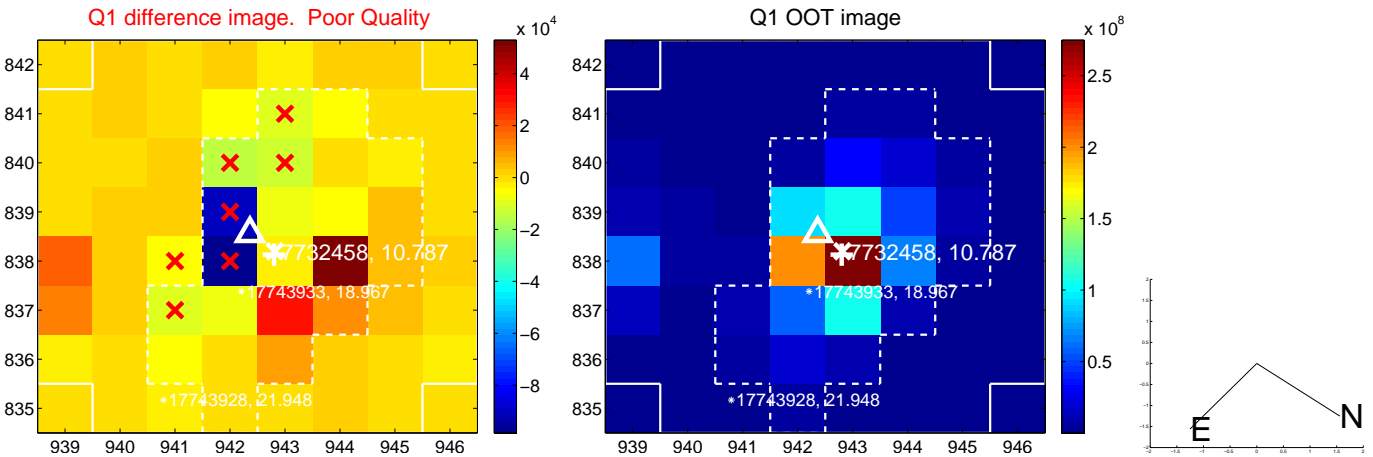


offset from photometric centroids



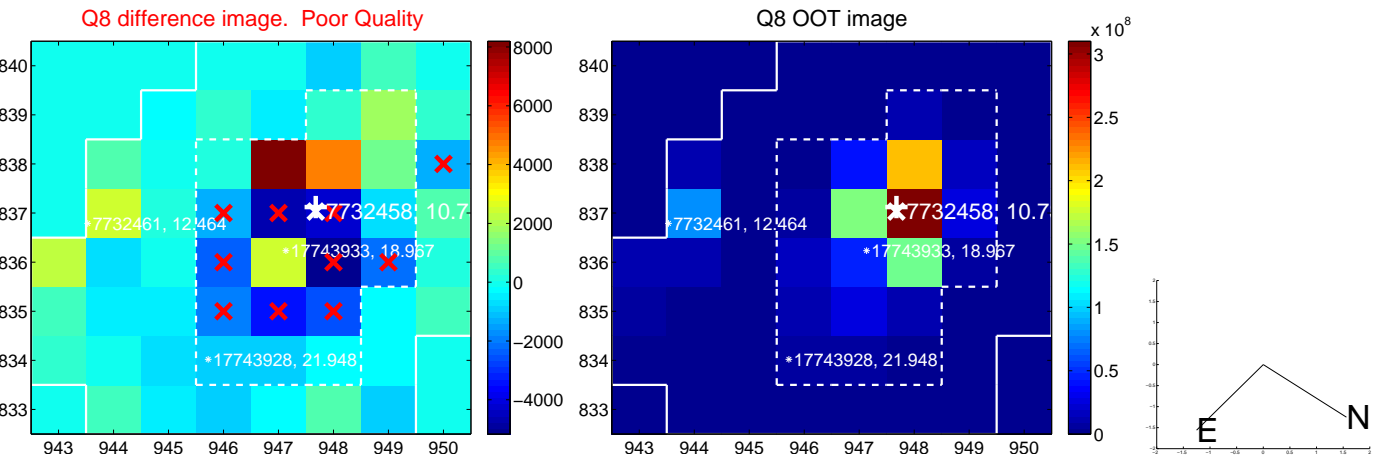
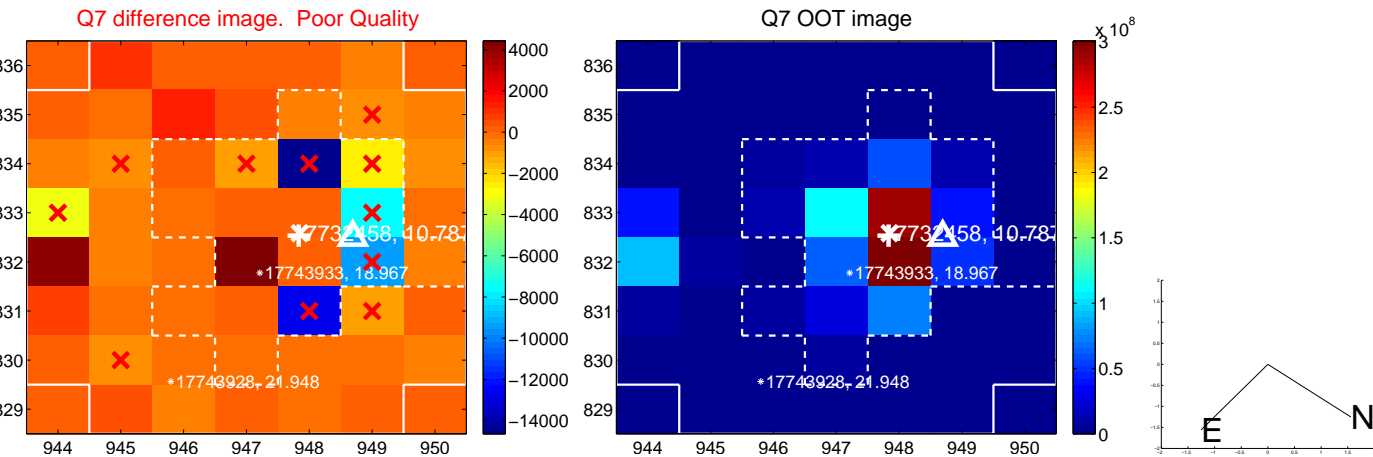
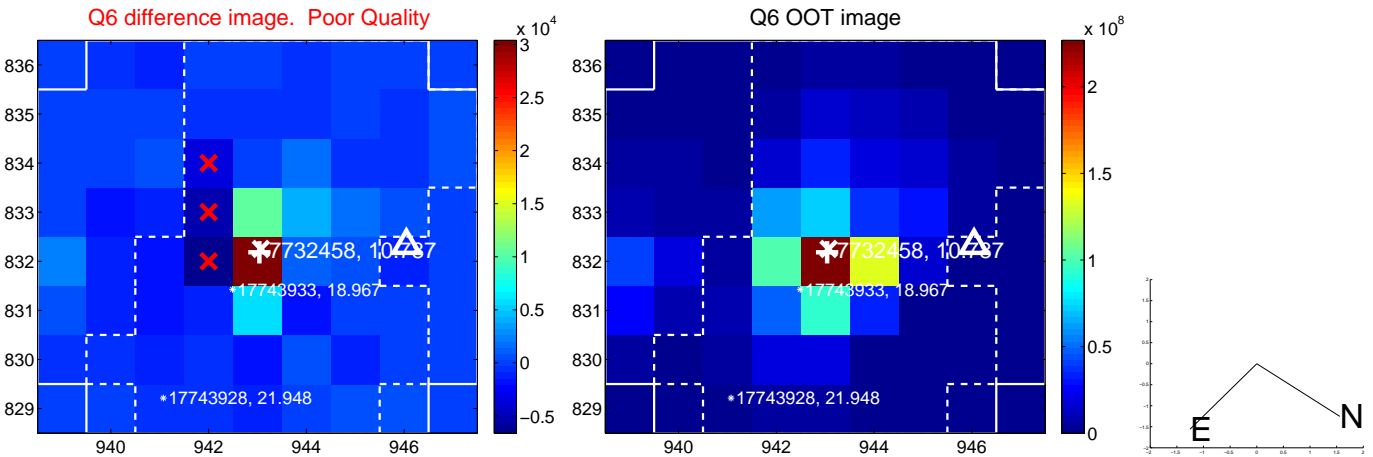
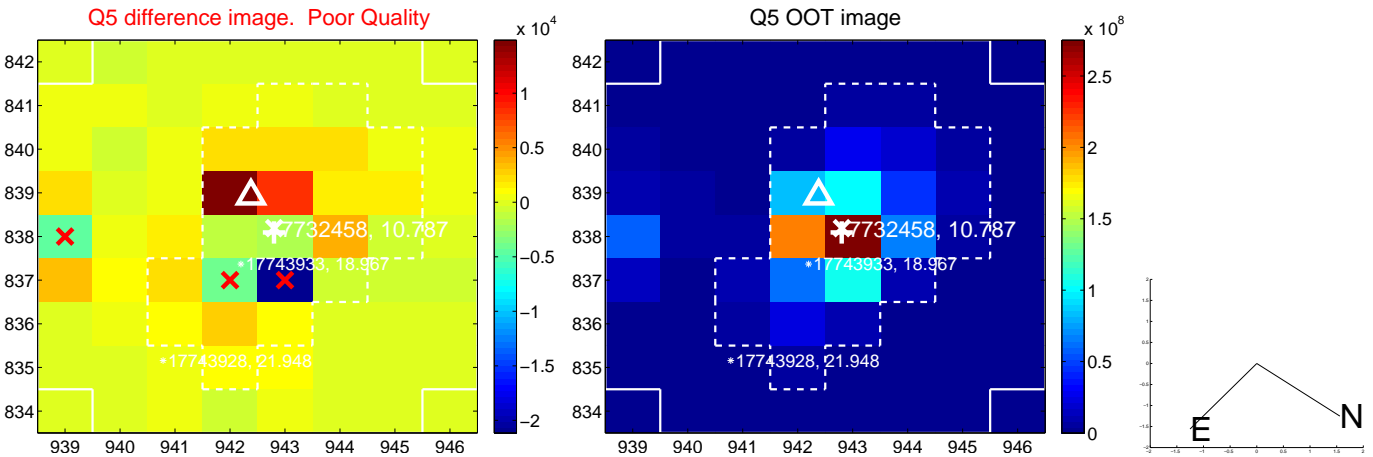
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

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

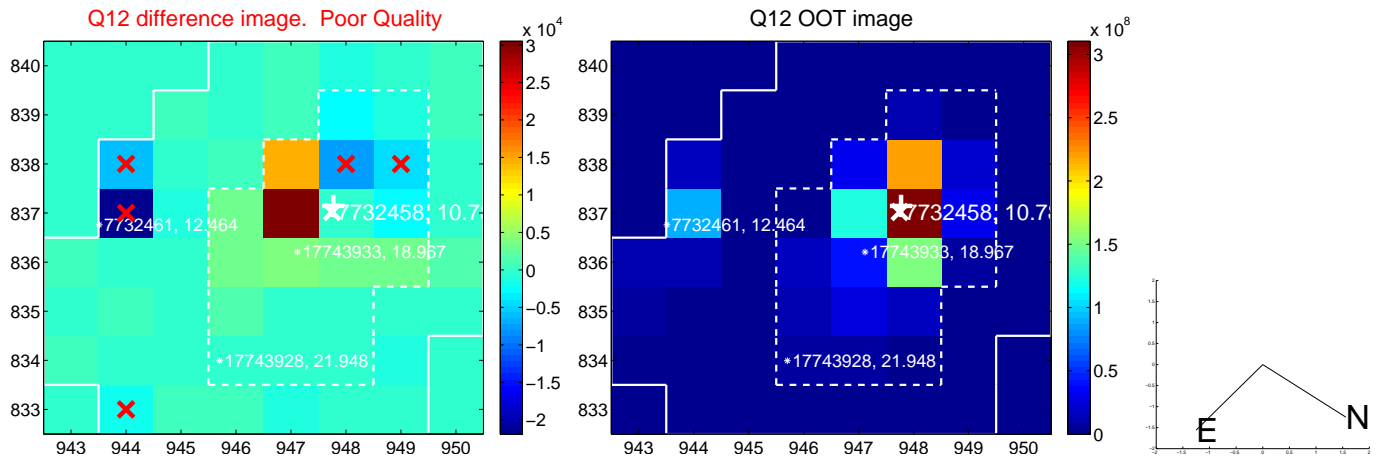
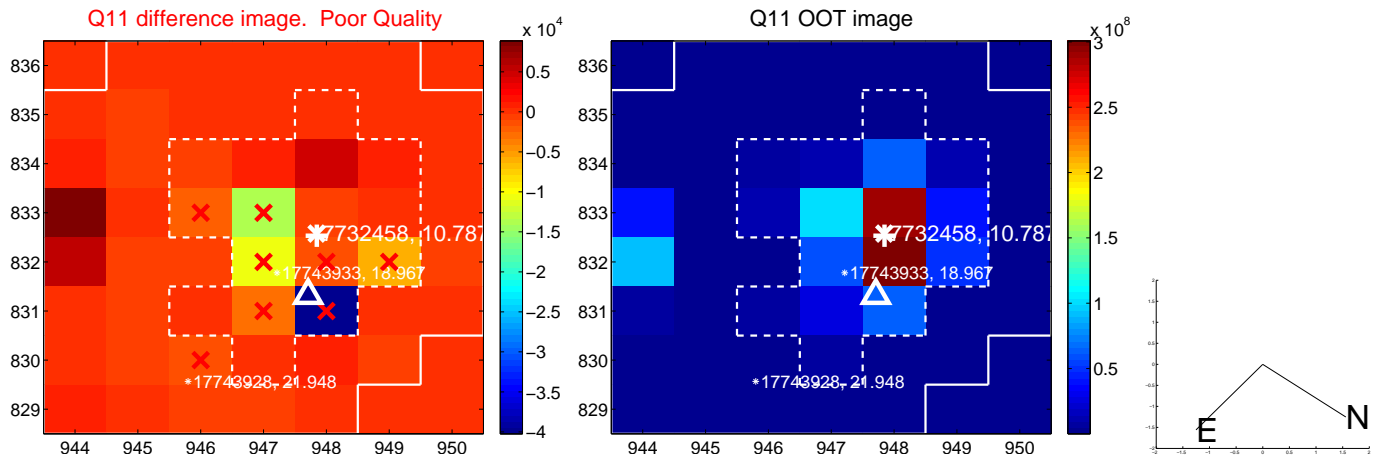
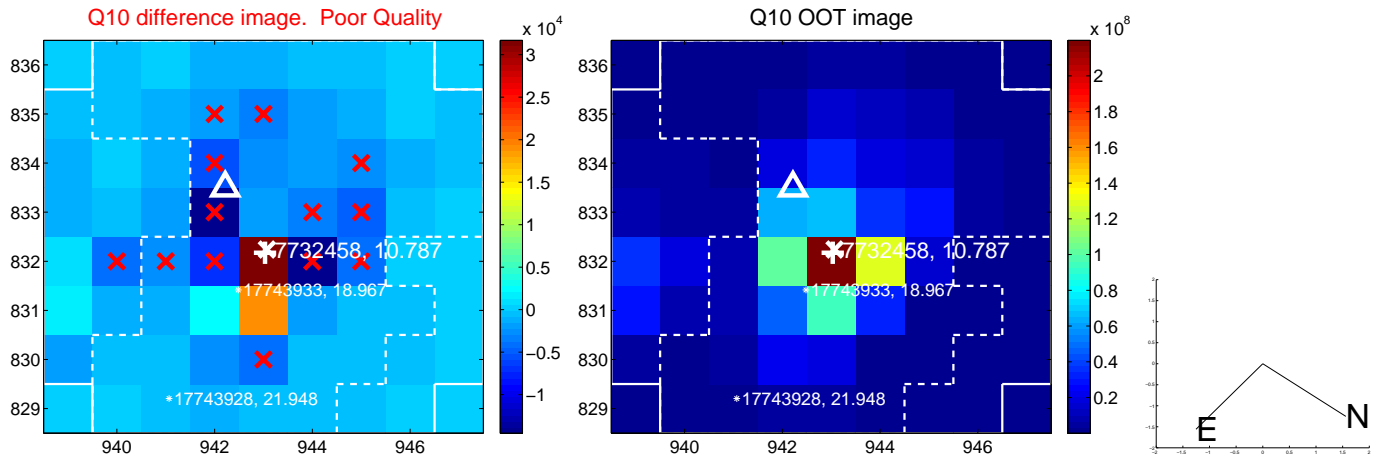
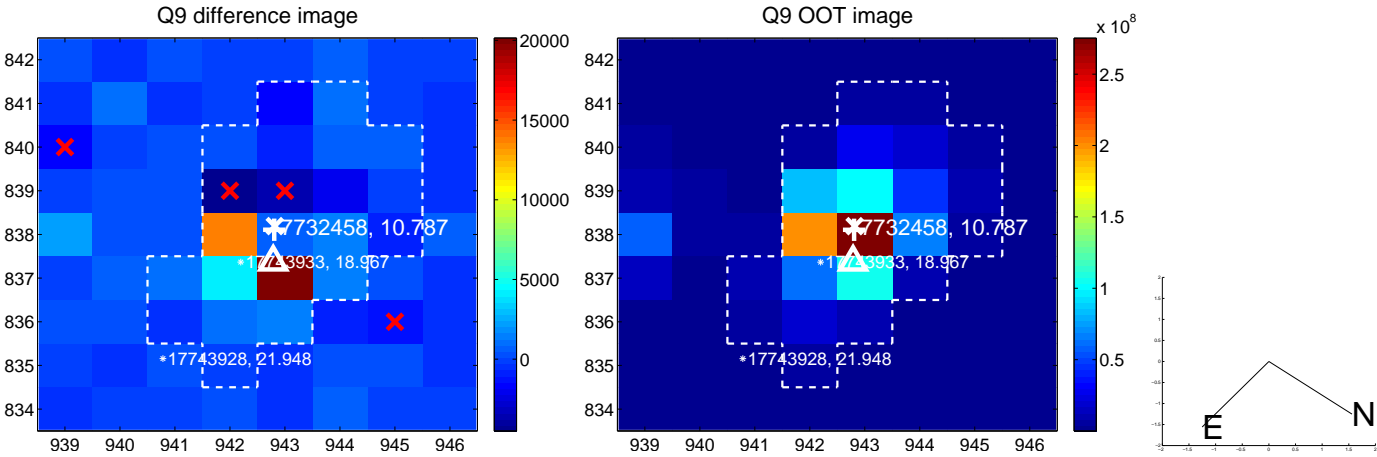




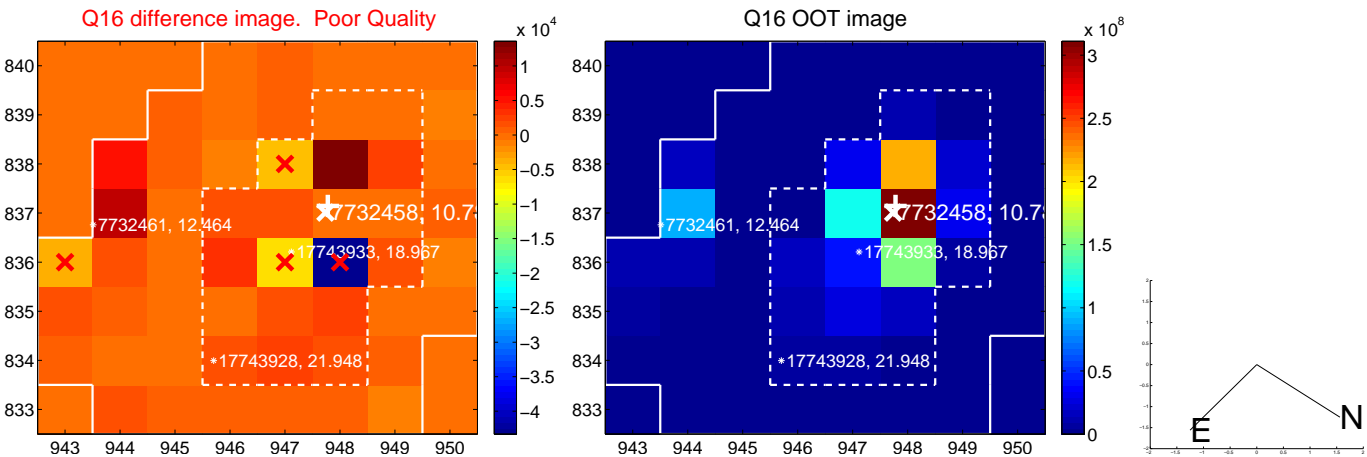
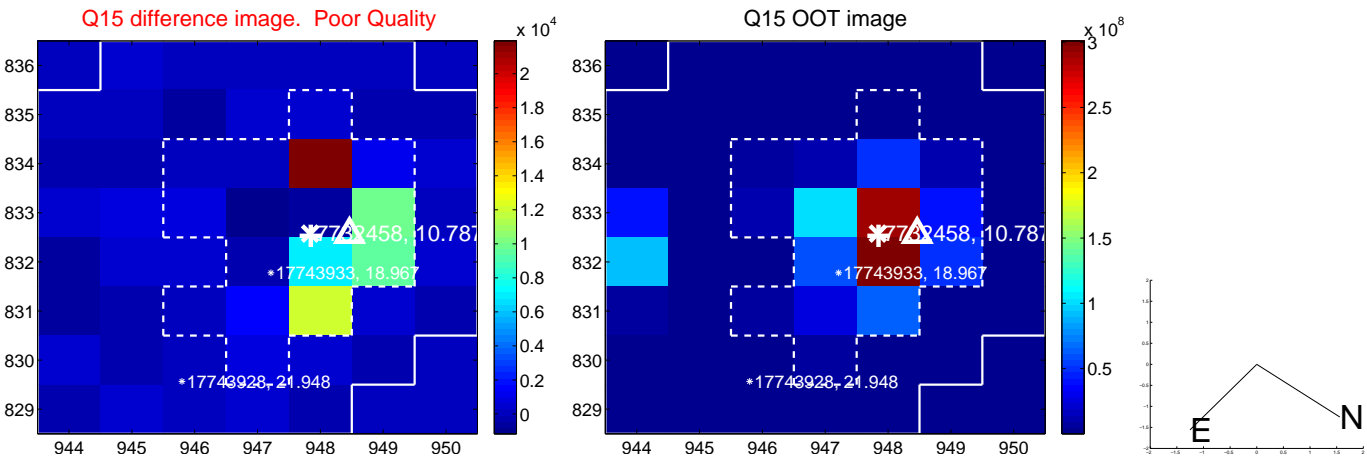
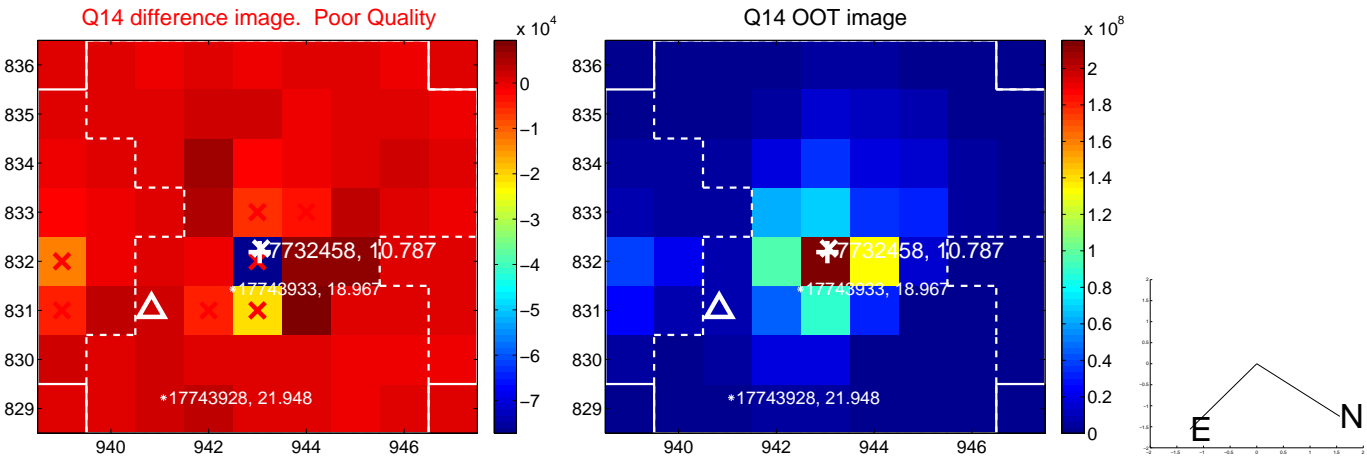
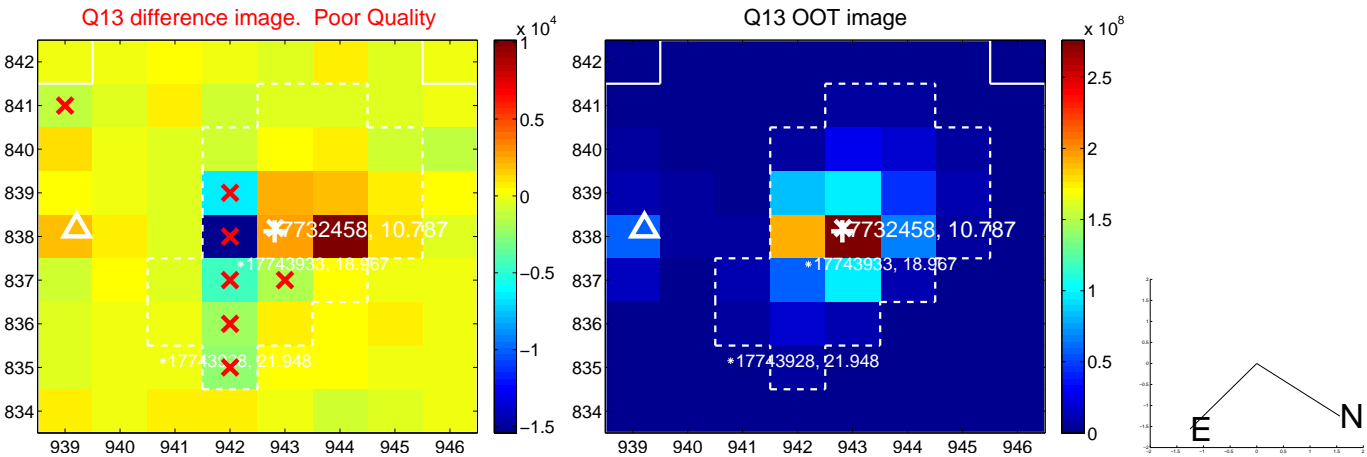
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



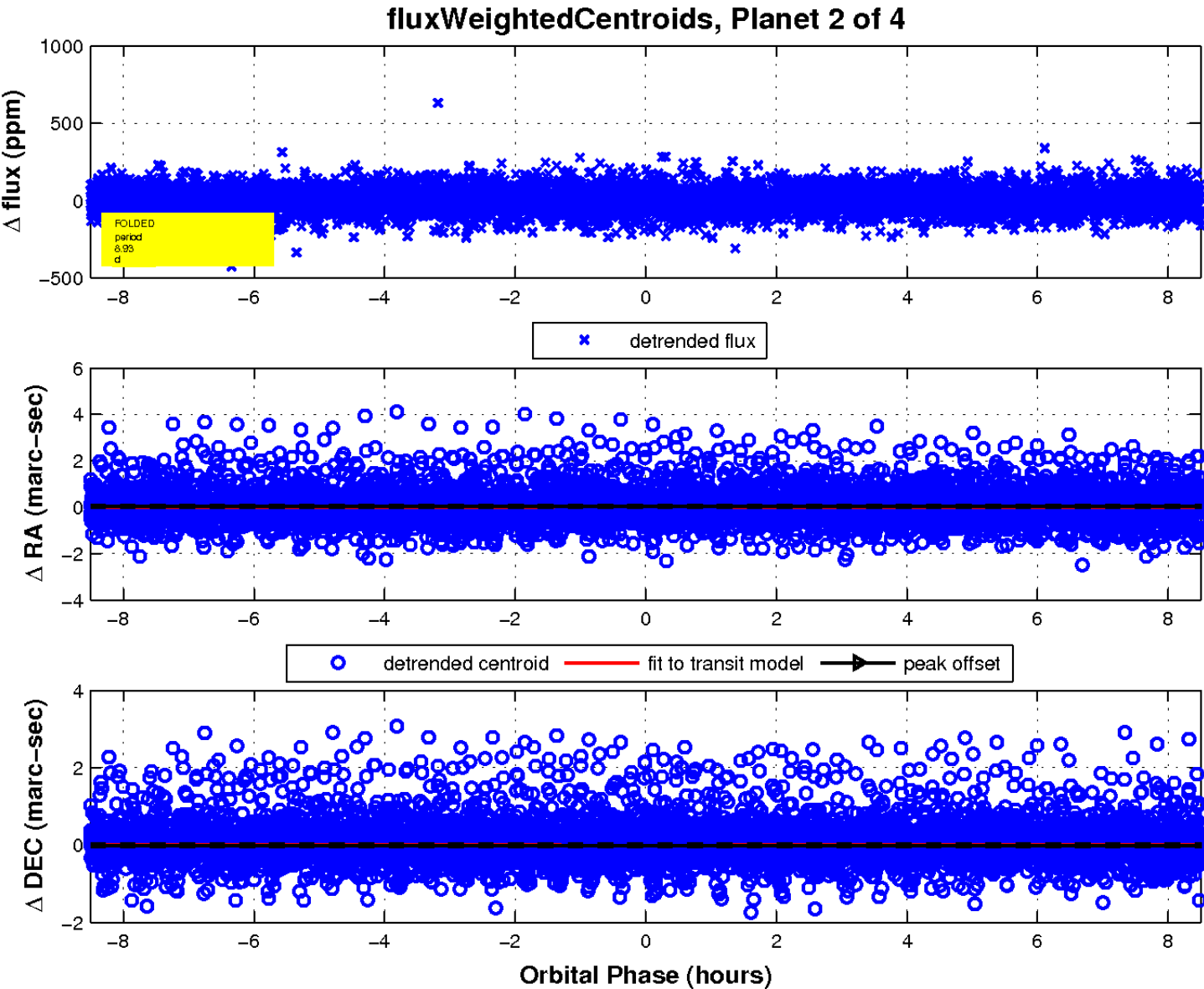
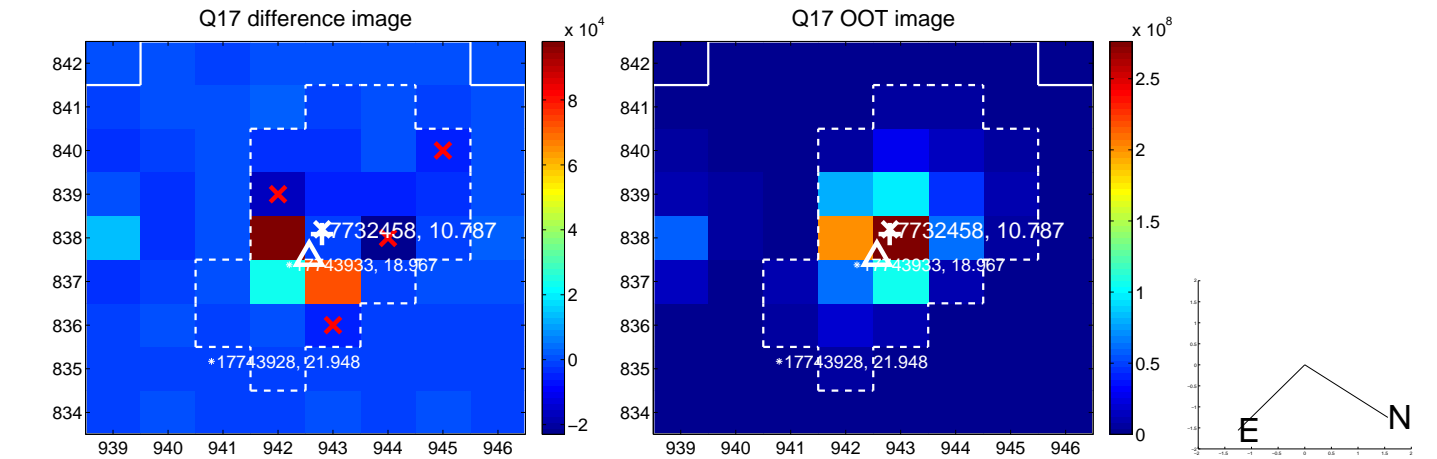
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



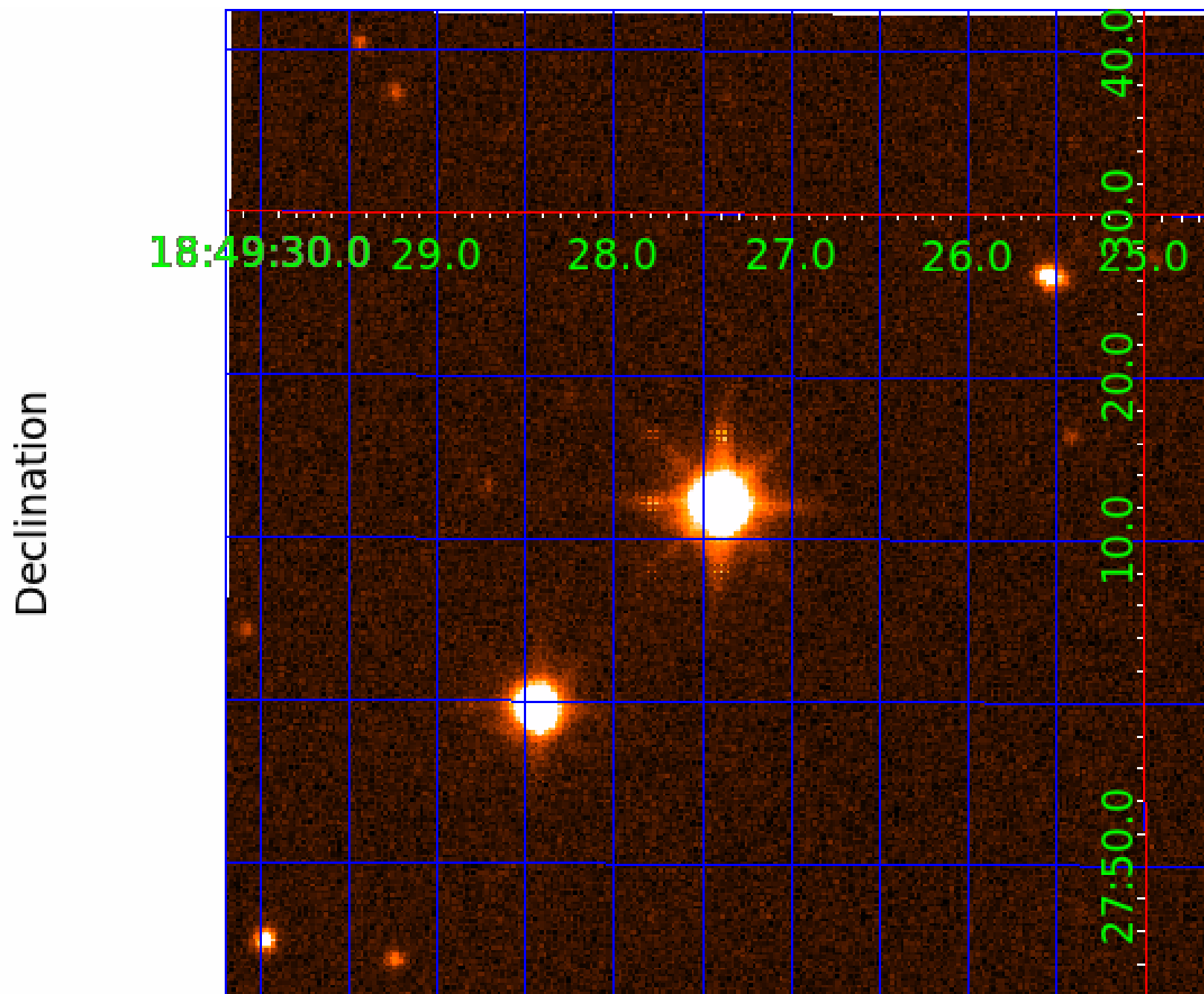
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



UKIRT Image





# KIC 007732458

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
007732458-01	OBS	No	0.915654	132.335911	13.9	3.910	9.3	11.2	3.57	7766	1.56	75883.07
007732458-02	OBS	No	8.928126	135.610152	45.7	2.836	9.0	9.9	3.57	7766	2.94	3642.84
007732458-03	OBS	No	129.604704	197.331896	123.5	7.515	7.6	7.7	3.57	7766	4.46	102.87
007732458-04	OBS	No	110.790226	240.064641	99.6	2.857	7.8	7.8	3.57	7766	4.04	126.80

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
007732458-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED
007732458-02	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED
007732458-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED
007732458-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED

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

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

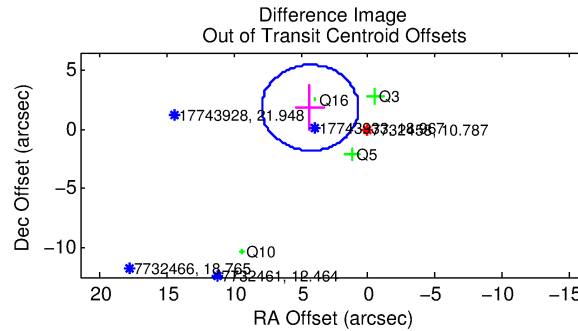
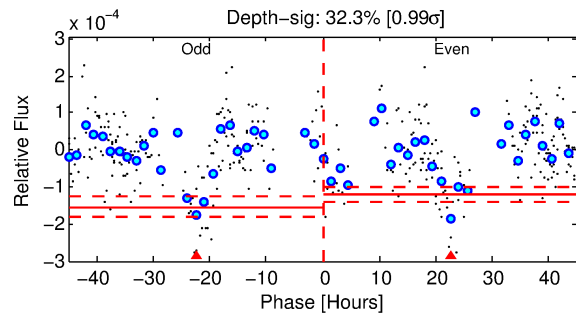
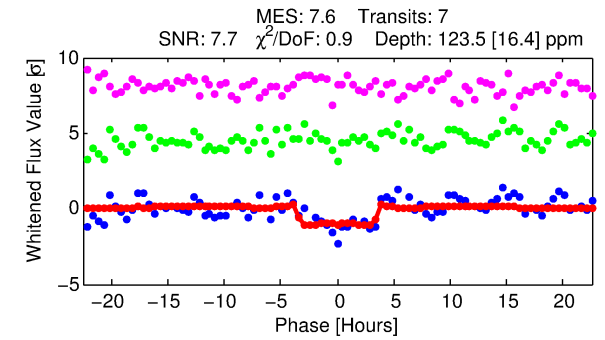
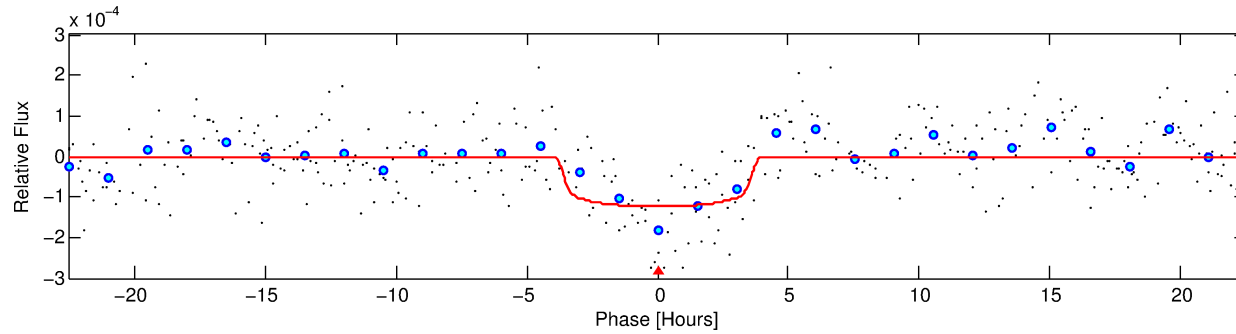
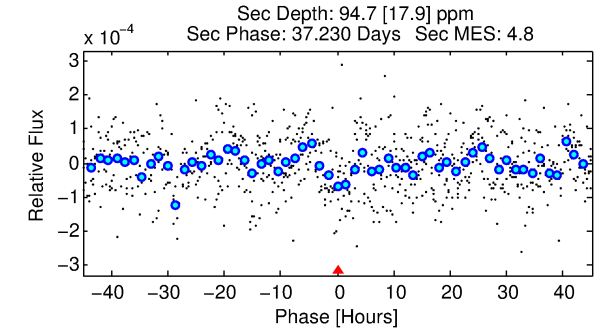
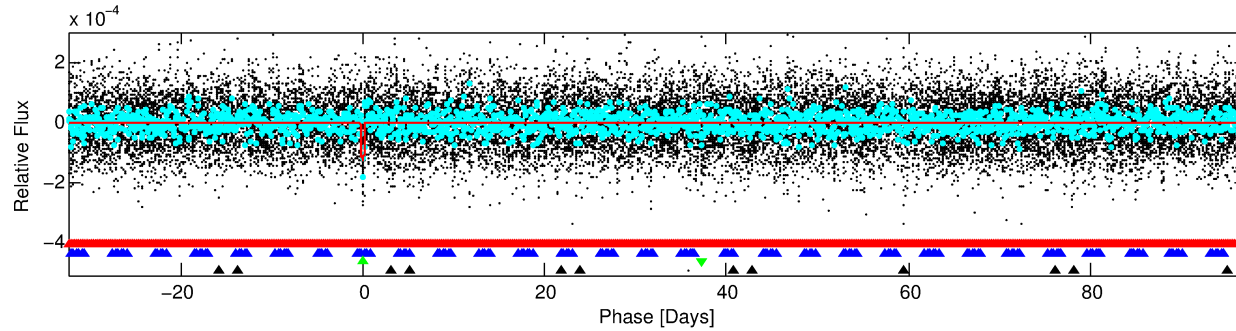
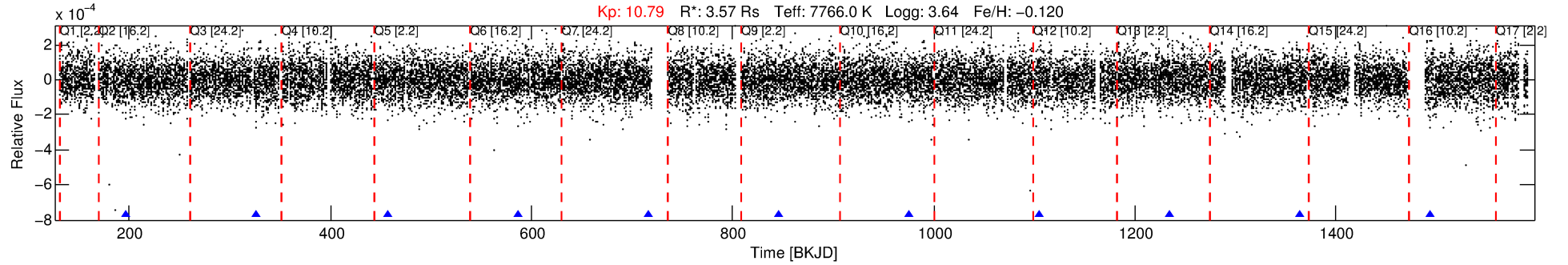
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 007732458-03

No Significant Match Found

# DV One-Page Summary

KIC: 7732458 Candidate: 3 of 4 Period: 129.605 d



## DV Fit Results:

Period = 129.60470 [0.00180] d  
Epoch = 197.3319 [0.0120] BKJD  
Rp/R\* = 0.0114 [0.0059]  
a/R\* = 73.83 [225.88]  
b = 0.84 [1.06]  
Seff = 102.87 [87.00]  
Teq = 812 [172] K  
Rp = 4.46 [3.23] Re  
a = 0.6361 [0.3231] AU  
Ag = 1057.58 [1410.33] [0.75σ]  
Teffp = 7160 [1893] K [3.34σ]

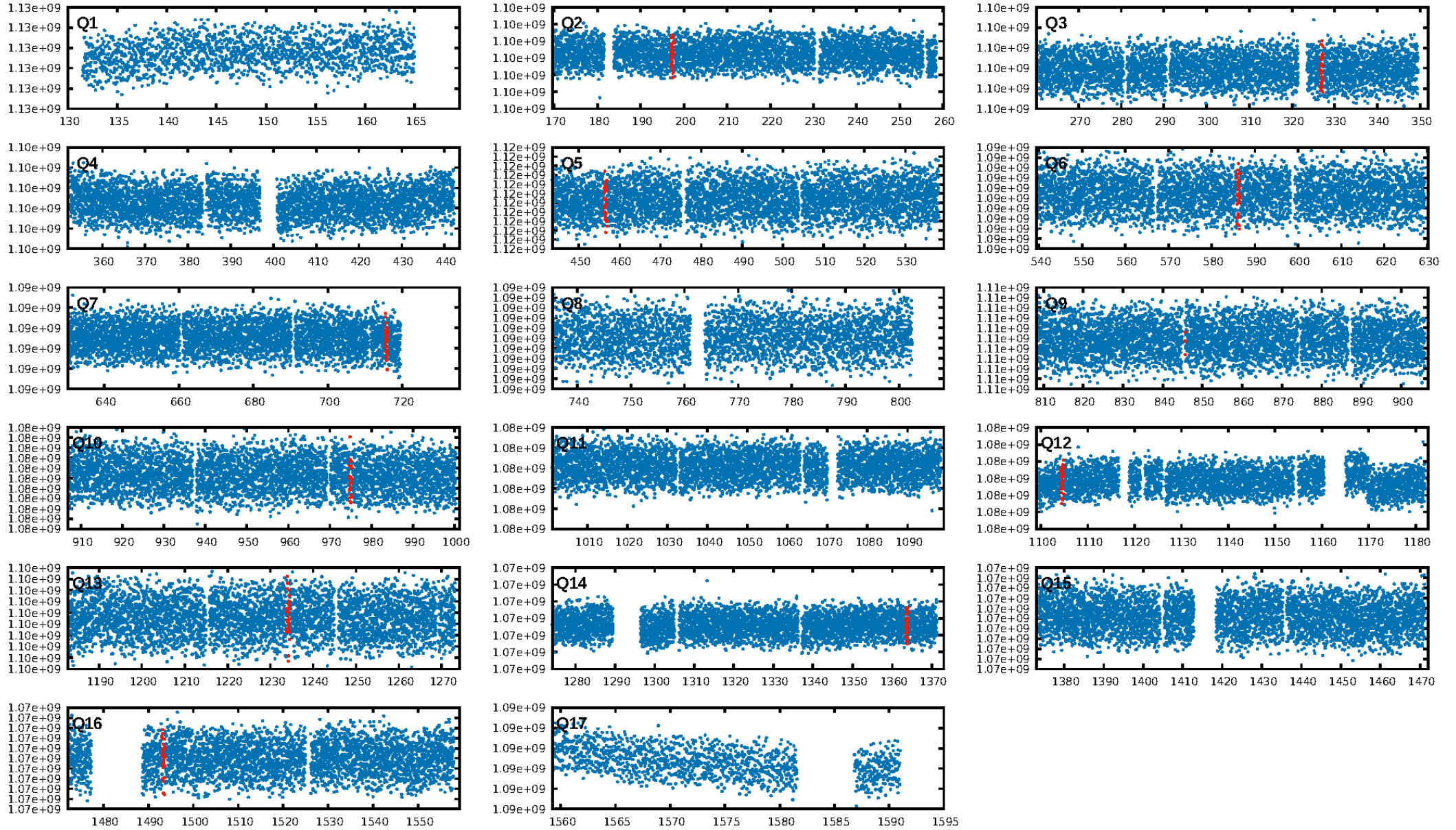
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [56.16σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 45.0%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 1.61e-09  
RollingBand-fgt: 1.00 [7/7]  
GhostDiagnostic-chr: -1.738  
Centroid-sig: 9.5%  
Centroid-so: 1.078 arcsec [1.05σ]  
OotOffset-rm: 4.691 arcsec [3.89σ]  
KicOffset-rm: 4.350 arcsec [3.38σ]  
OotOffset-st: 1/1/1/1 [4]  
KicOffset-st: 1/1/1/1 [4]  
DiffImageQuality-fgm: 0.25 [1/4]  
DiffImageOverlap-fno: 0.00 [0/9]

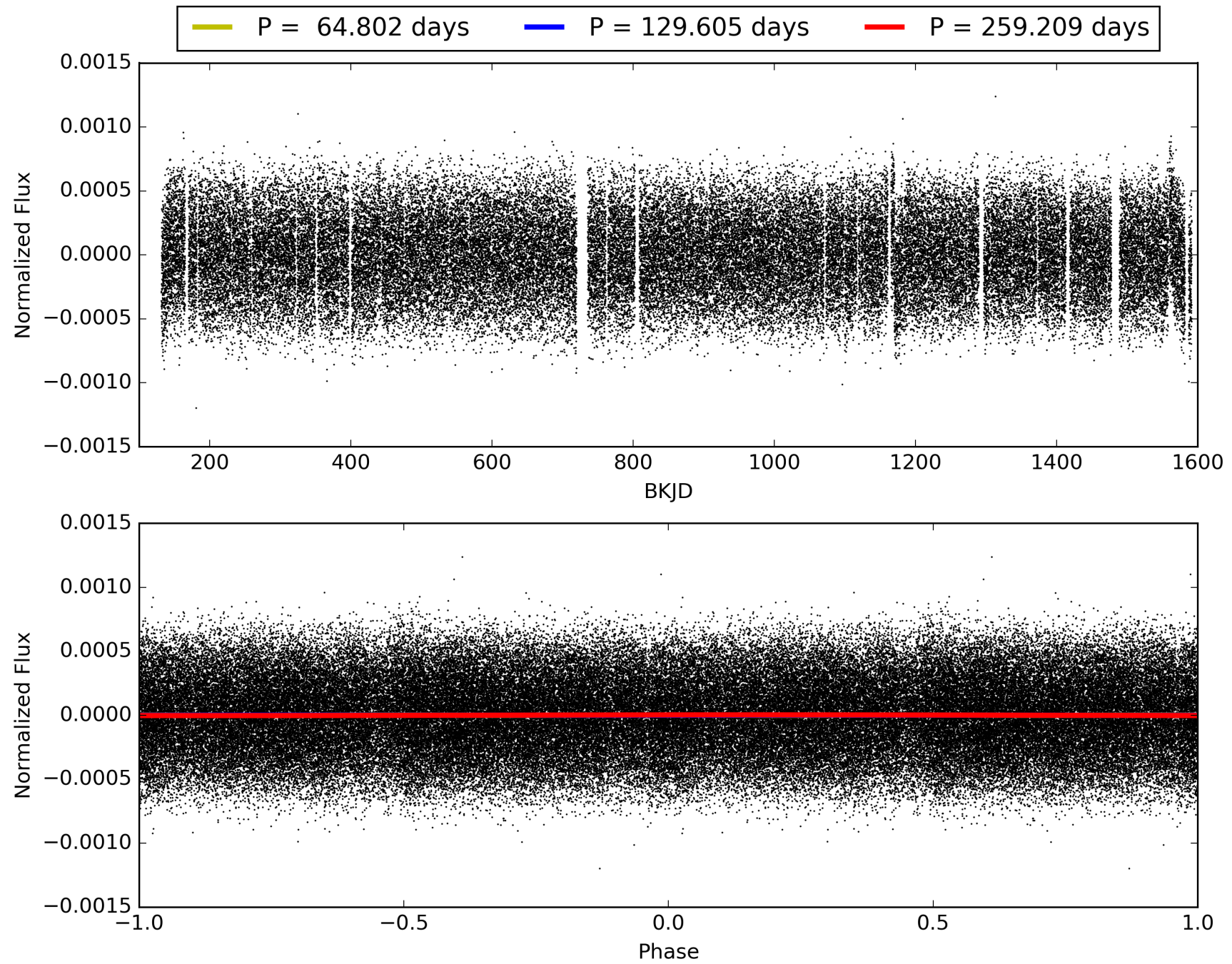
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 02-Feb-2016 03:18:26 Z

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

# TCE 007732458-03, PDC Light Curves

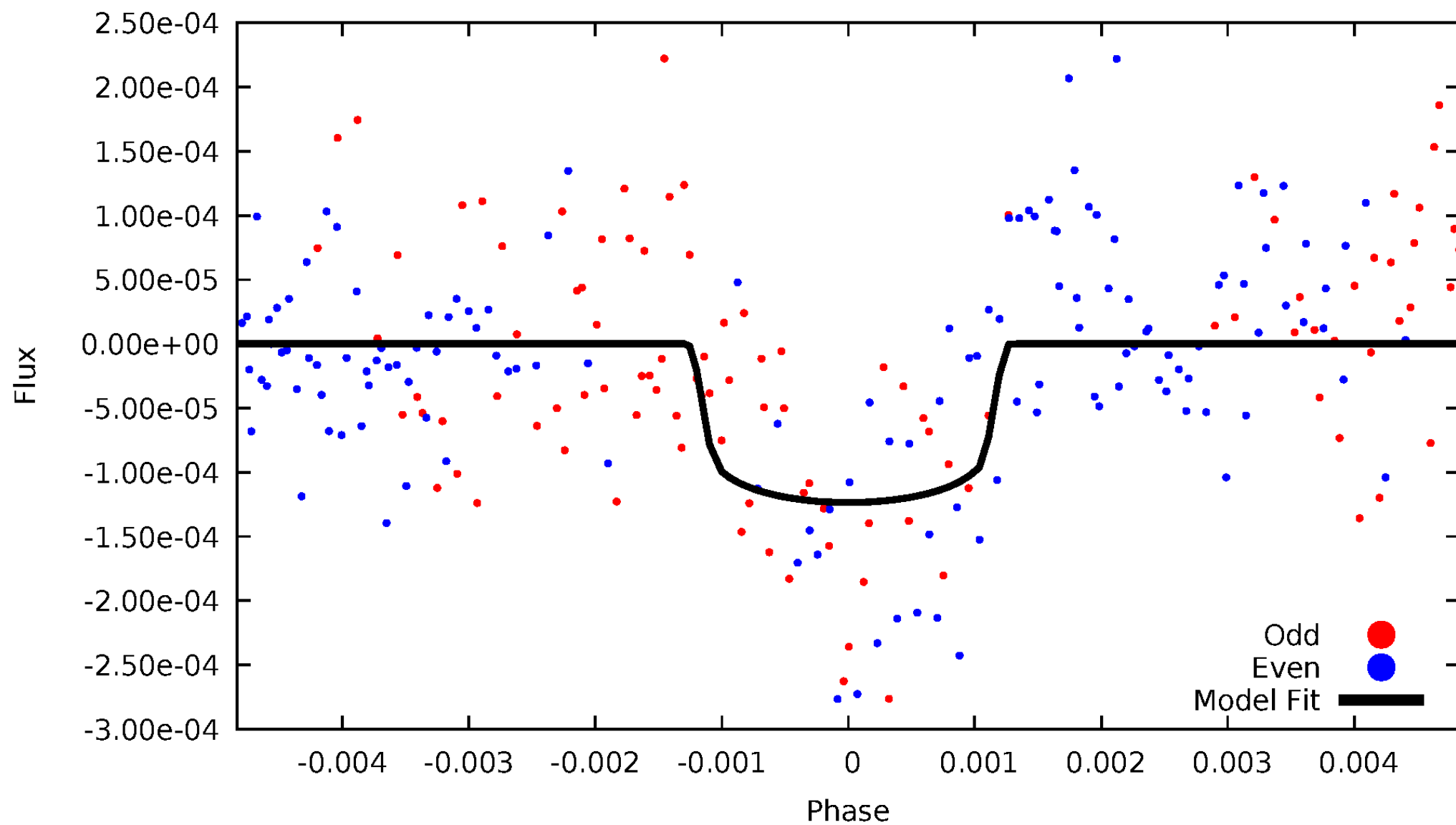


TCE 007732458-03



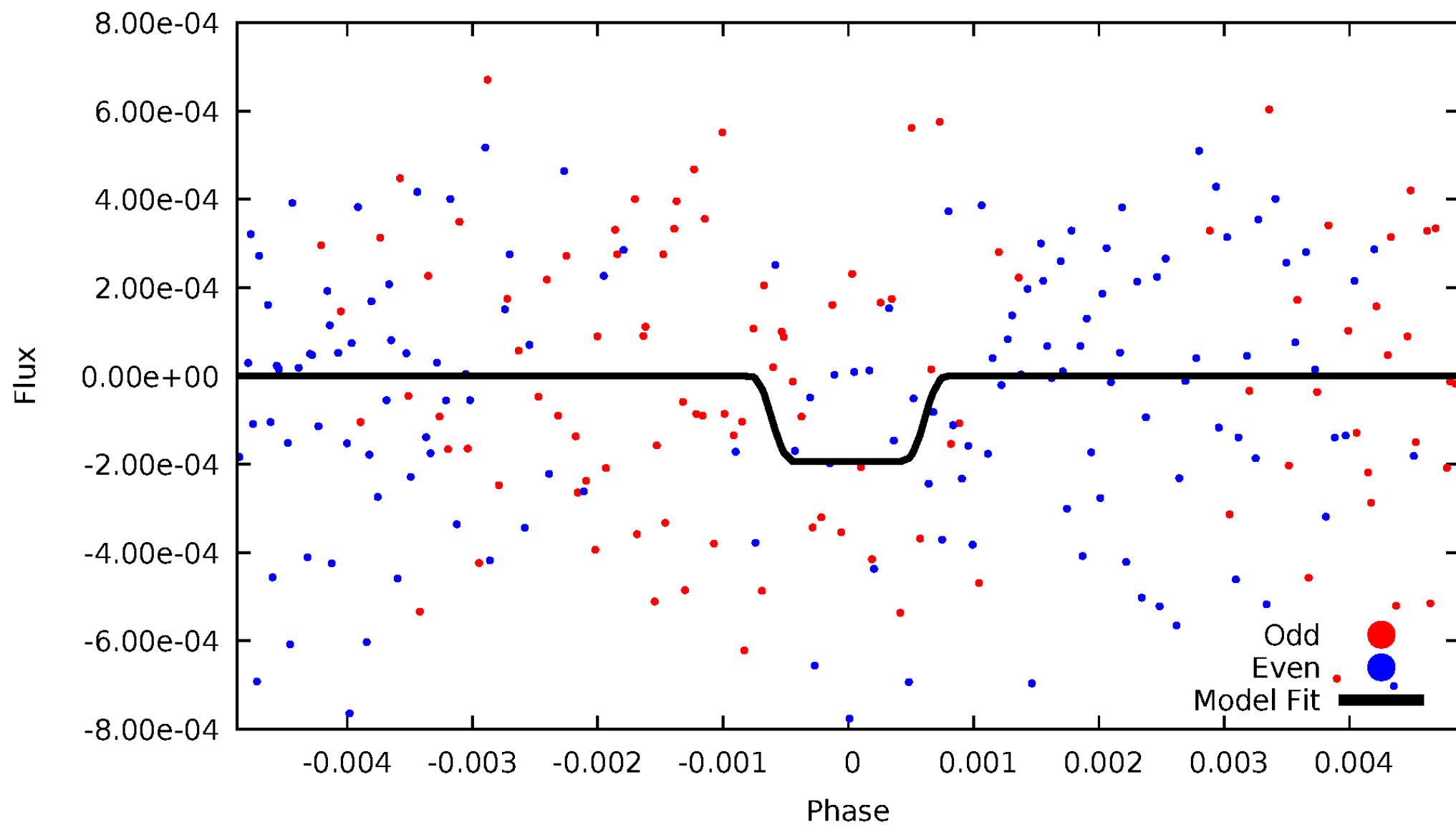
# DV Odd/Even

TCE 007732458-03



# ALT Odd/Even

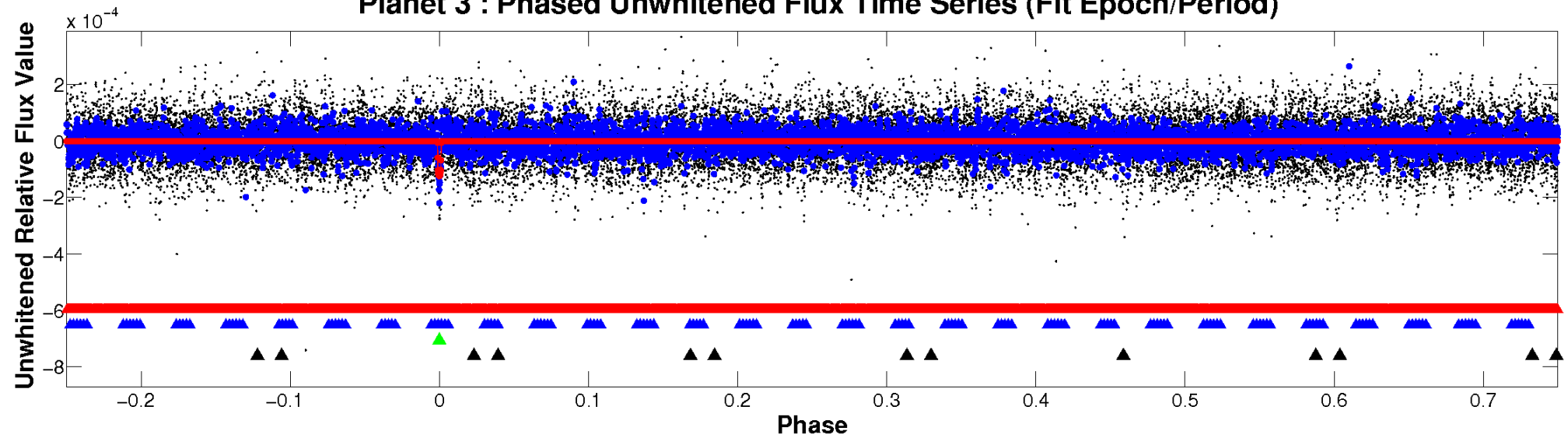
TCE 007732458-03



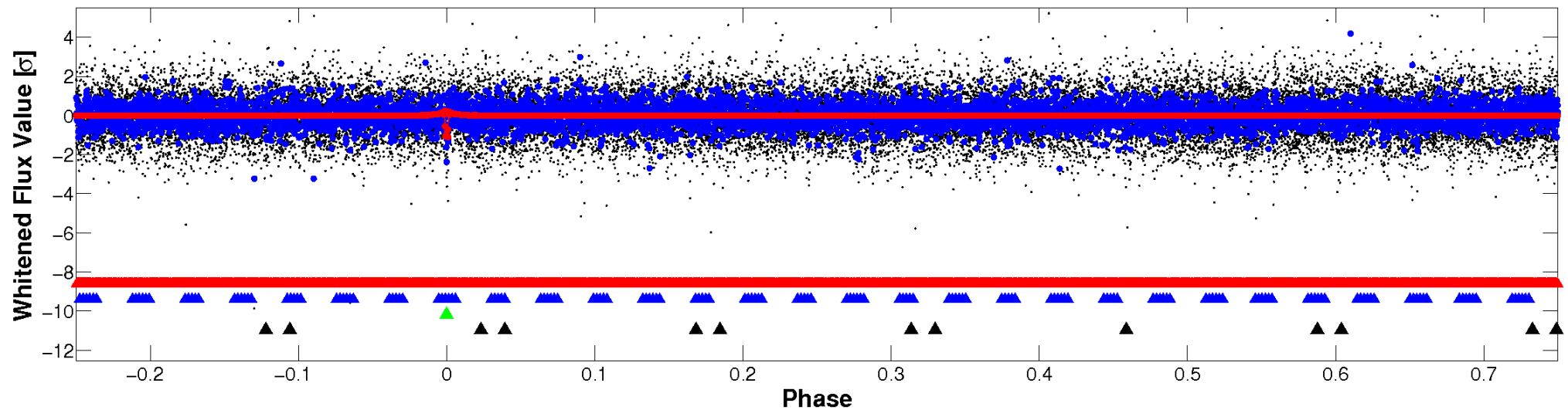


# Non-Whitened Vs. Whitened Light Curve

Planet 3 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

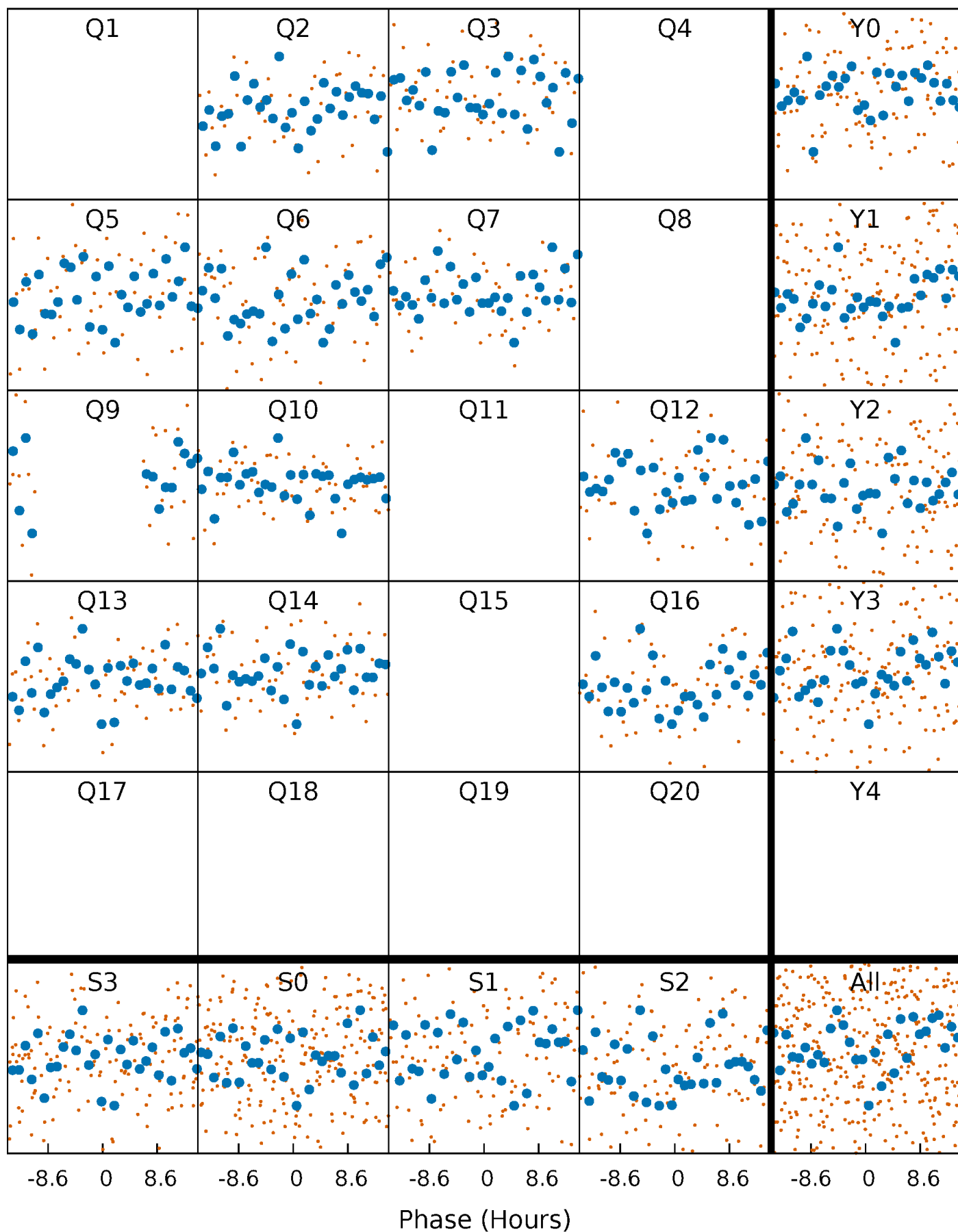


Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



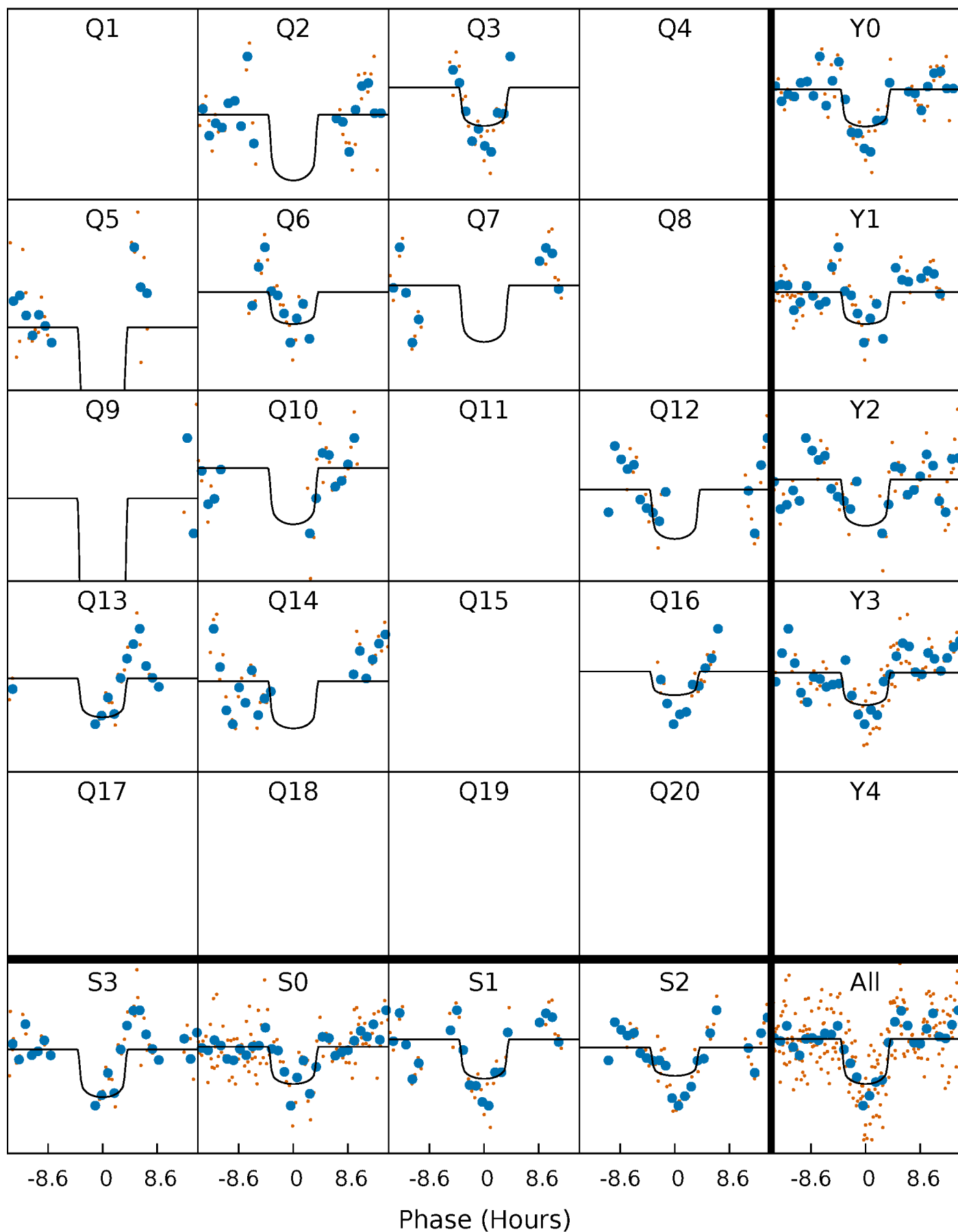
# PDC Quarter-Phased Transit Curves

TCE 007732458-03 P=129.604704 Days  $T_0=197.331896$  (BKJD)



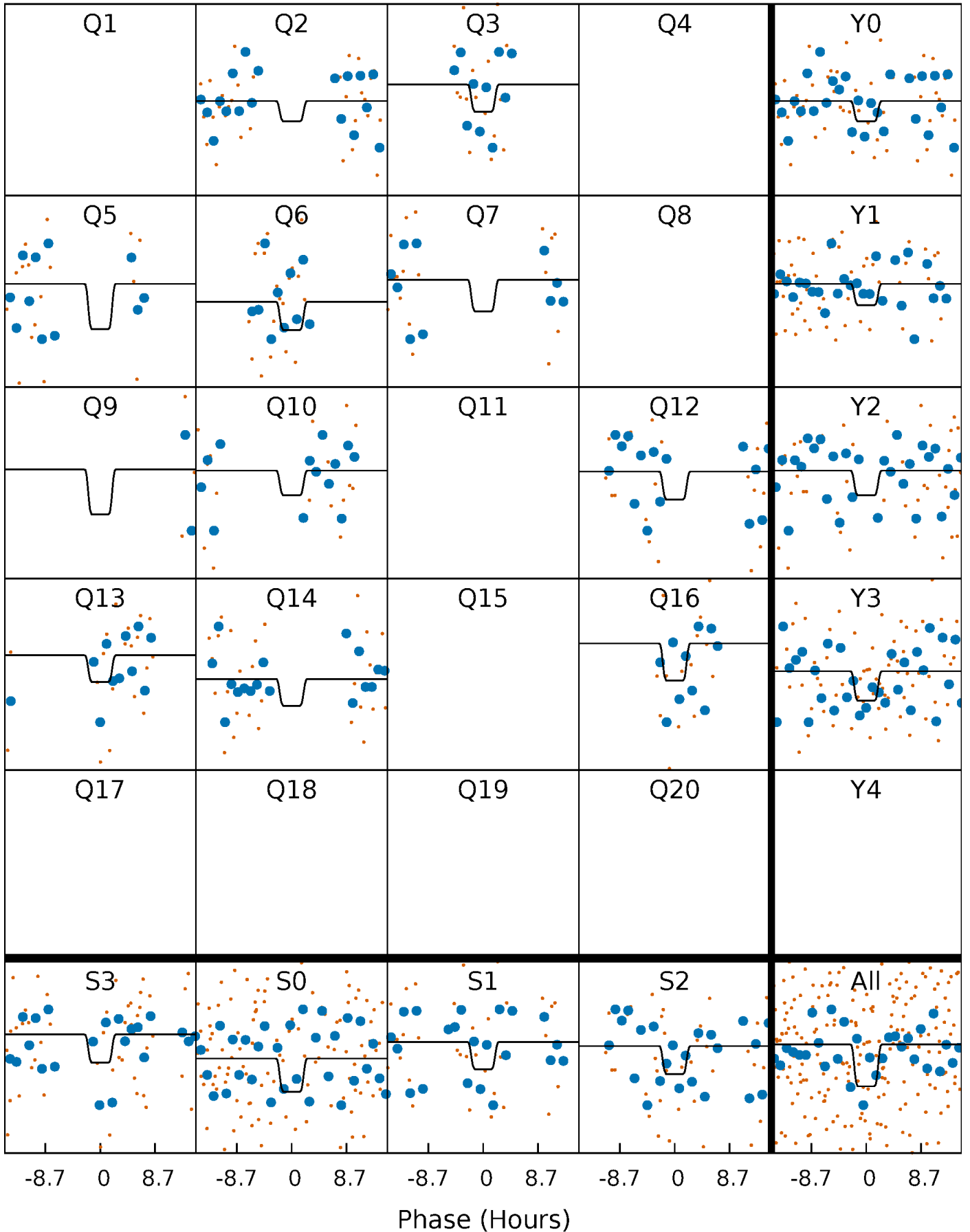
# DV Quarter-Phased Transit Curves

TCE 007732458-03 P=129.604704 Days  $T_0=197.331896$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

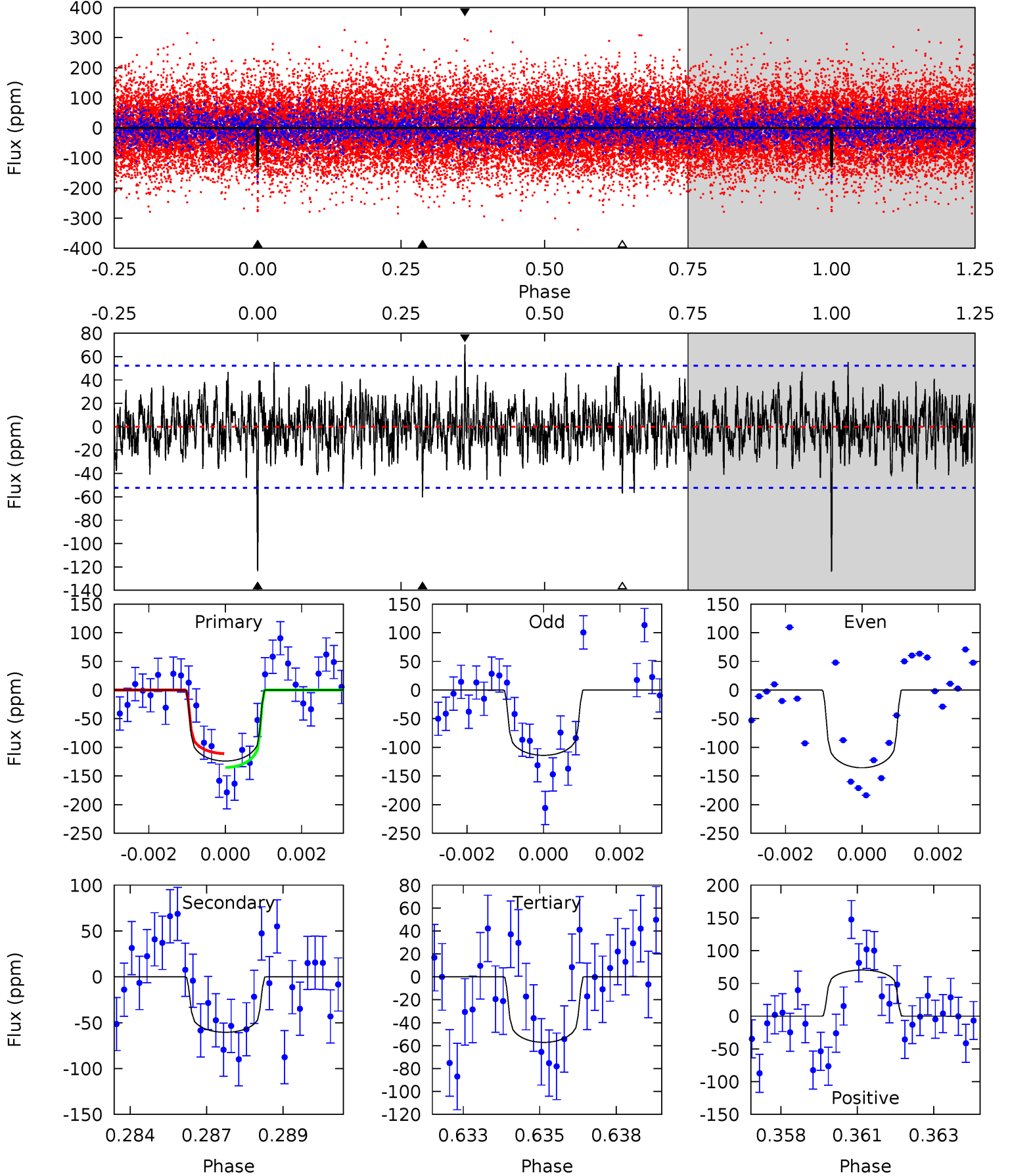
TCE 007732458-03 P=129.606410 Days  $T_0=197.318132$  (BKJD)



# DV Model-Shift Uniqueness Test

007732458-03, P = 129.604704 Days, E = 67.727192 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
12.5	6.12	5.79	7.12	5.29	3.03	1.67	6.75	5.41	0.33	-1.00	1.09	1.01	0.36	1.22

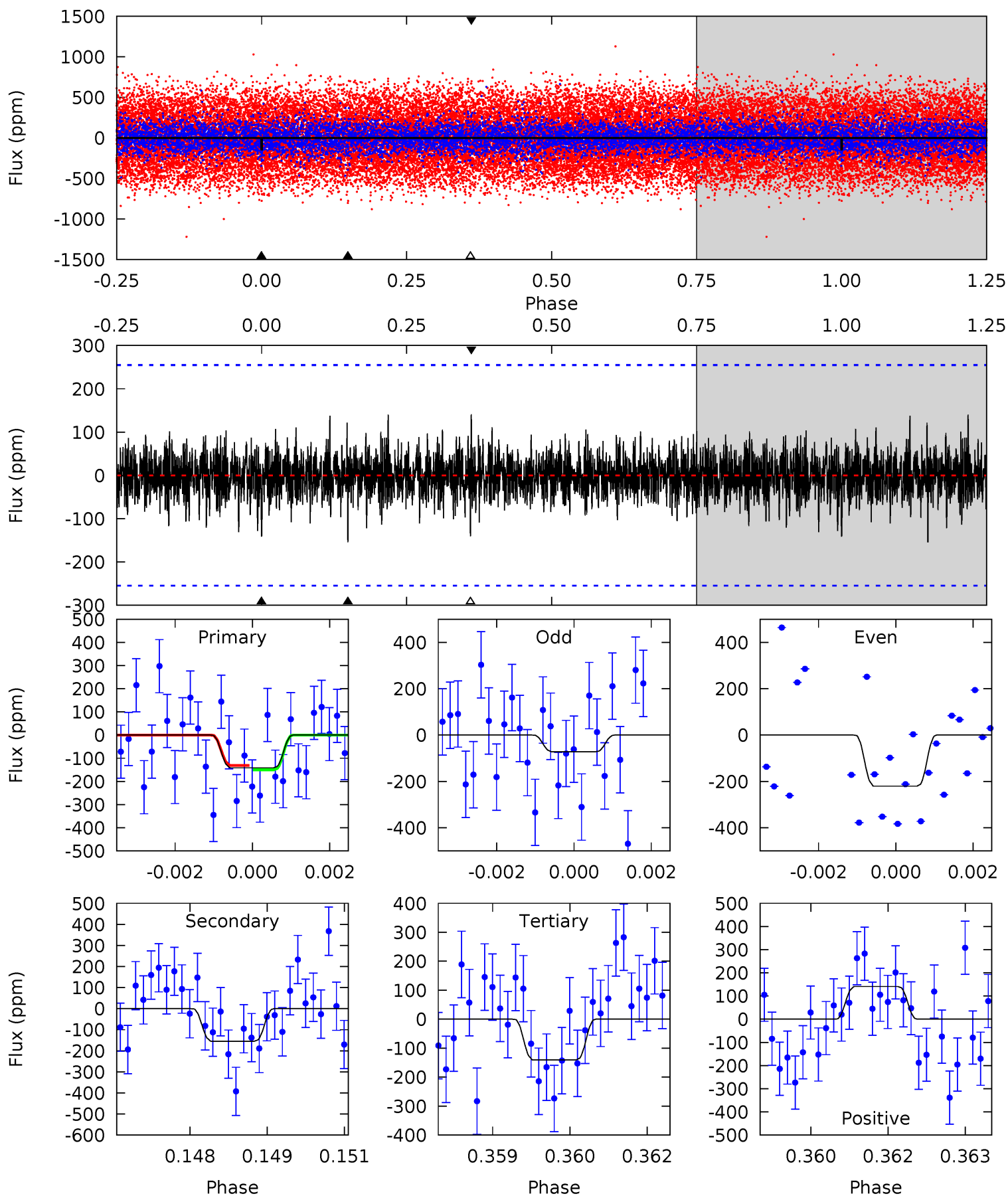




# Alt Model-Shift Uniqueness Test

007732458-03, P = 129.606410 Days, E = 67.711722 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
2.98	3.26	2.96	2.98	5.38	3.17	0.82	0.02	0.00	0.30	0.28	1.56	0.52	0.48	0.20



### Stellar Parameters For KIC 007732458

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$7766^{+216}_{-324}$	$3.642^{+0.493}_{-0.087}$	$-0.120^{+0.200}_{-0.350}$	$3.574^{+0.605}_{-1.816}$	$2.039^{+0.301}_{-0.559}$	$0.063^{+0.315}_{-0.019}$
	+3%/-4%	+14%/-2%	+167%/-292%	+17%/-51%	+15%/-27%	+501%/-29%
Source	KIC0	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 007732458-03 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-60 \pm 10$	$3.96^{+2.41}_{-1.92}$	$1094^{+83}_{-149}$	$6148^{+2861}_{-1058}$	$852^{+2489}_{-519}$
Alt.	$-154 \pm 47$	$4.86^{+2.60}_{-2.13}$	$1101^{+72}_{-127}$	$7194^{+2765}_{-1388}$	$1371^{+3165}_{-816}$

$T_{\text{max}}$  = 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

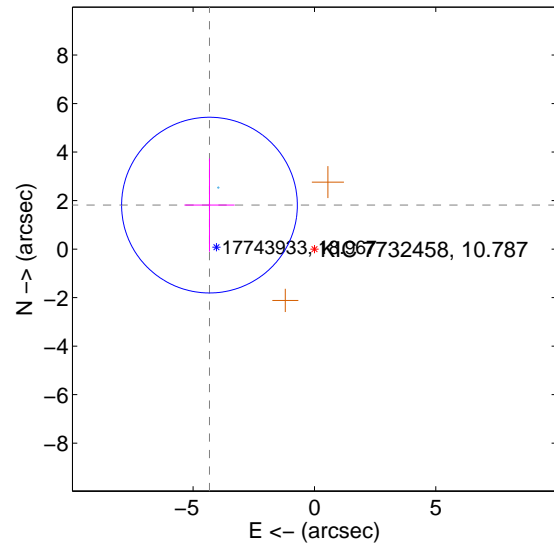
Supplemental centroid analysis for 007732458-03. **Kepler magnitude: 10.79.** Transit SNR 7.71

**There are 1 quarters with good PRF difference image offsets**

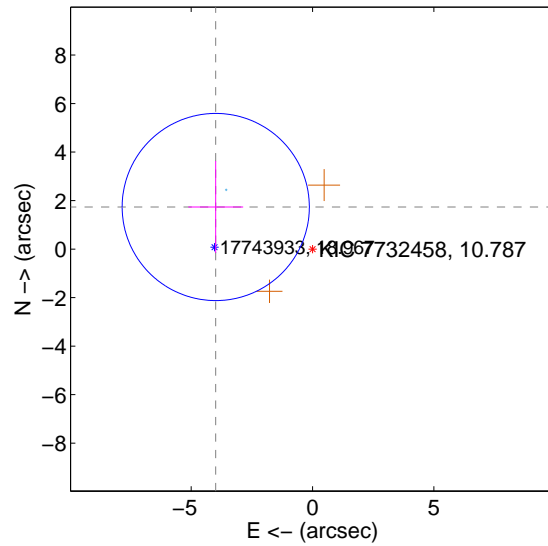
The direct PRF centroid is offset from the target star catalog position by about 0.41 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	<b><math>4.691 \pm 1.207</math></b>	<b>3.89</b>	$4.327 \pm 1.032$	$1.813 \pm 1.921$
PRF-fit source offset from KIC position	<b><math>4.350 \pm 1.286</math></b>	<b>3.38</b>	$3.989 \pm 1.133$	$1.735 \pm 1.899$
photometric centroid source offset	$1.08 \pm 1.03$	1.05	$-0.13 \pm 1.36$	$1.07 \pm 1.02$

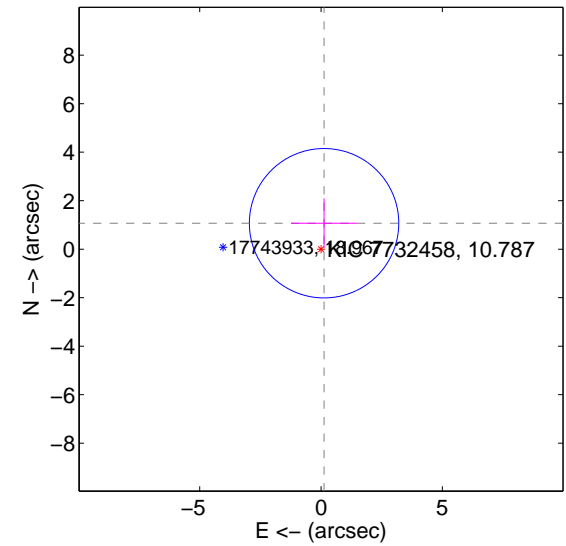
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position



offset from photometric centroids



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.

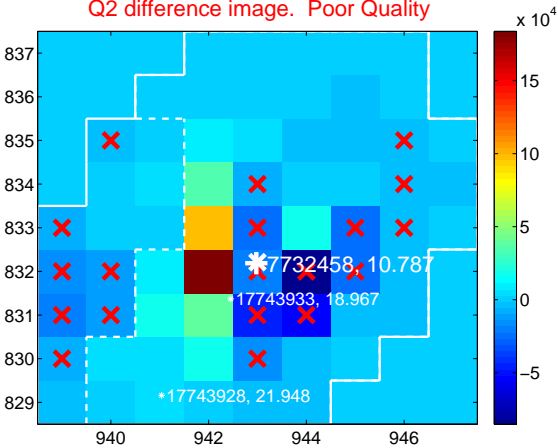
Q1 no difference image



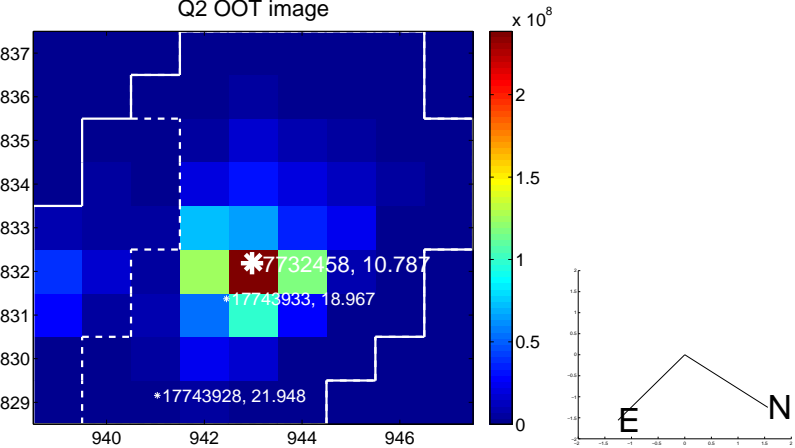
Q1 no OOT image



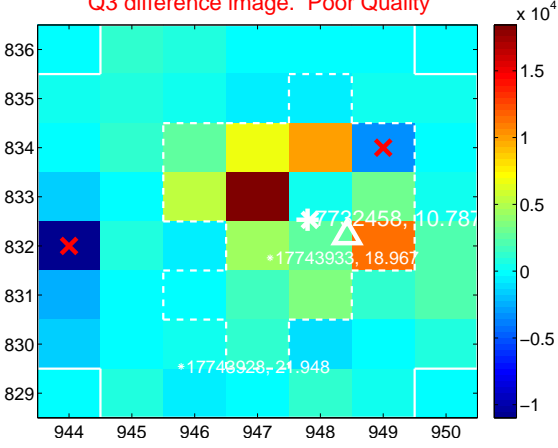
Q2 difference image. Poor Quality



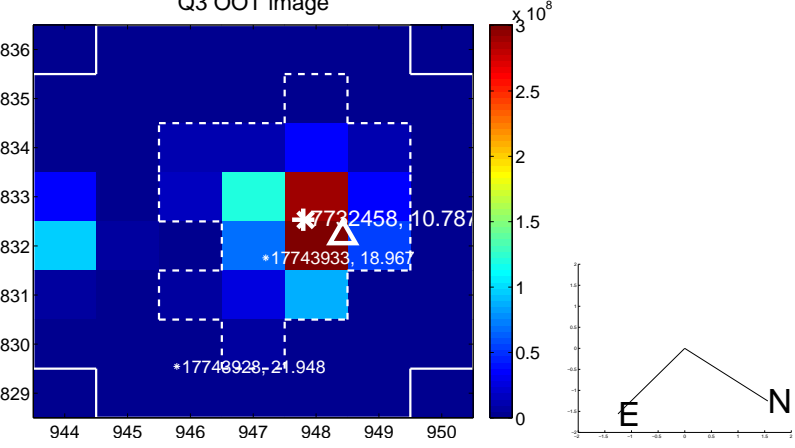
Q2 OOT image



Q3 difference image. Poor Quality



Q3 OOT image



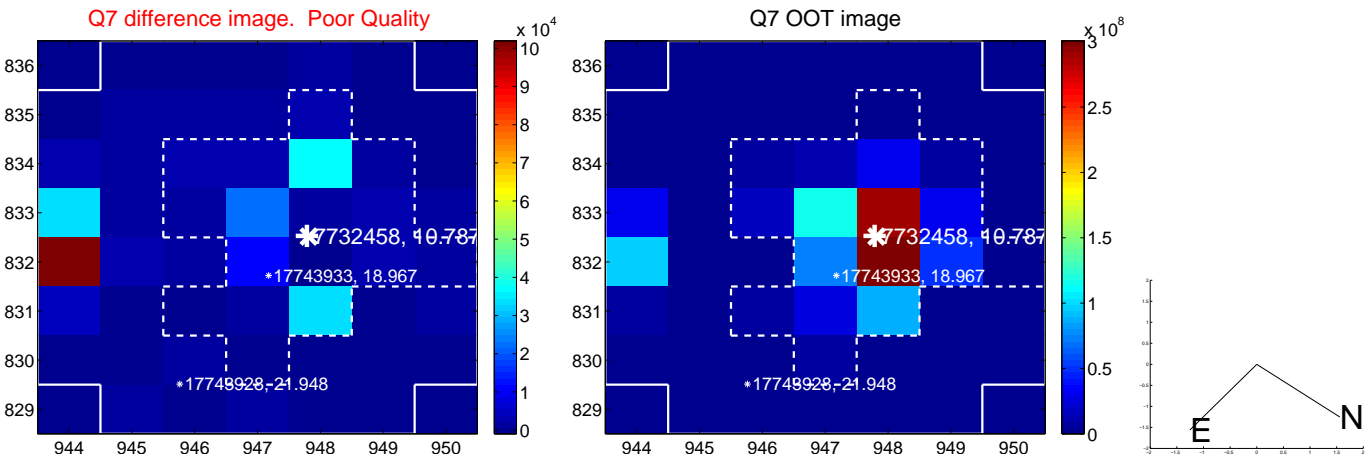
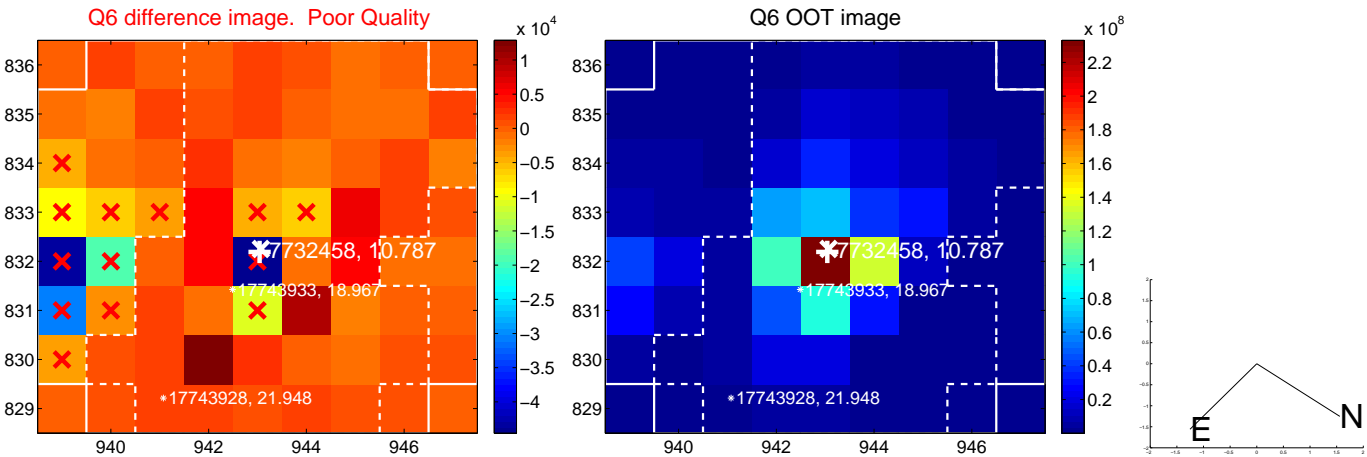
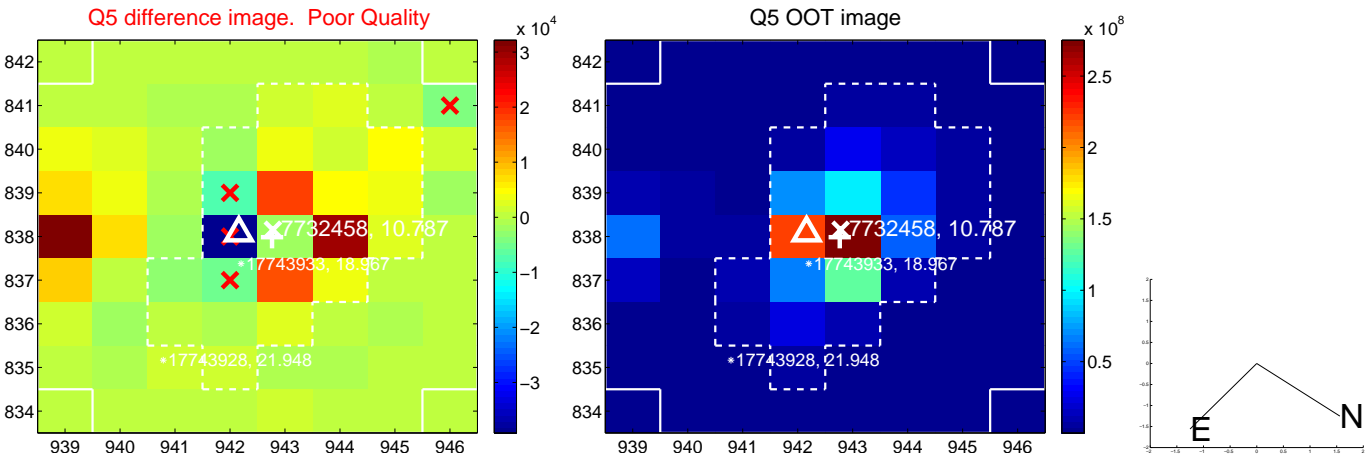
Q4 no difference image



Q4 no OOT image

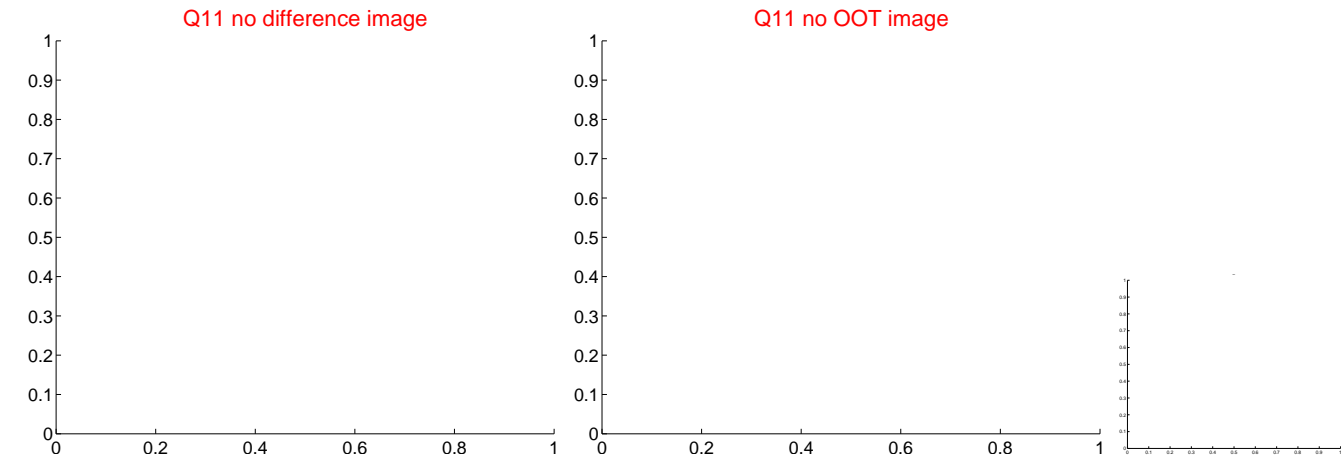
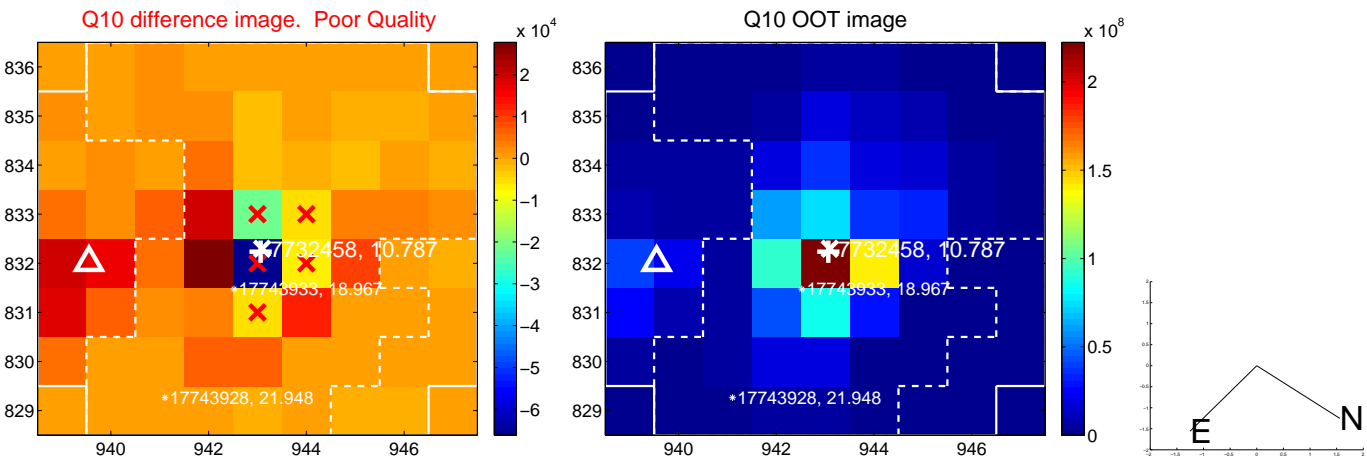


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

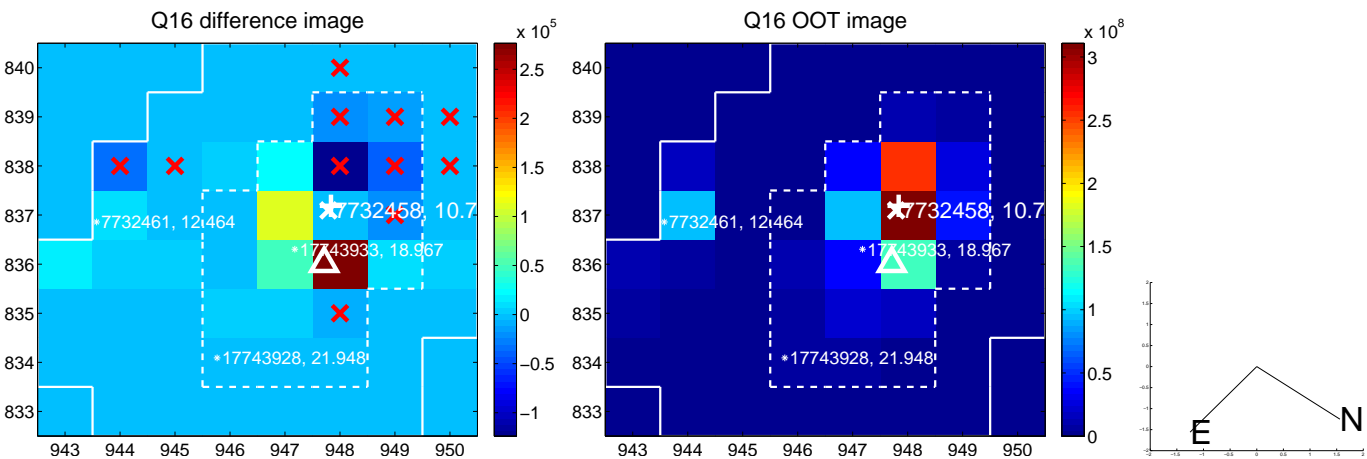
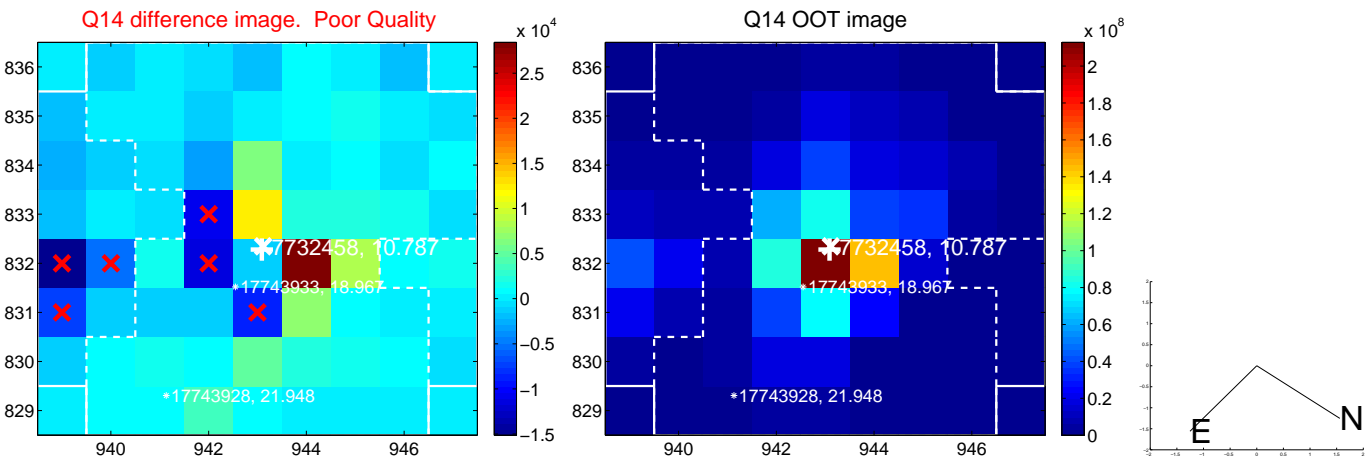
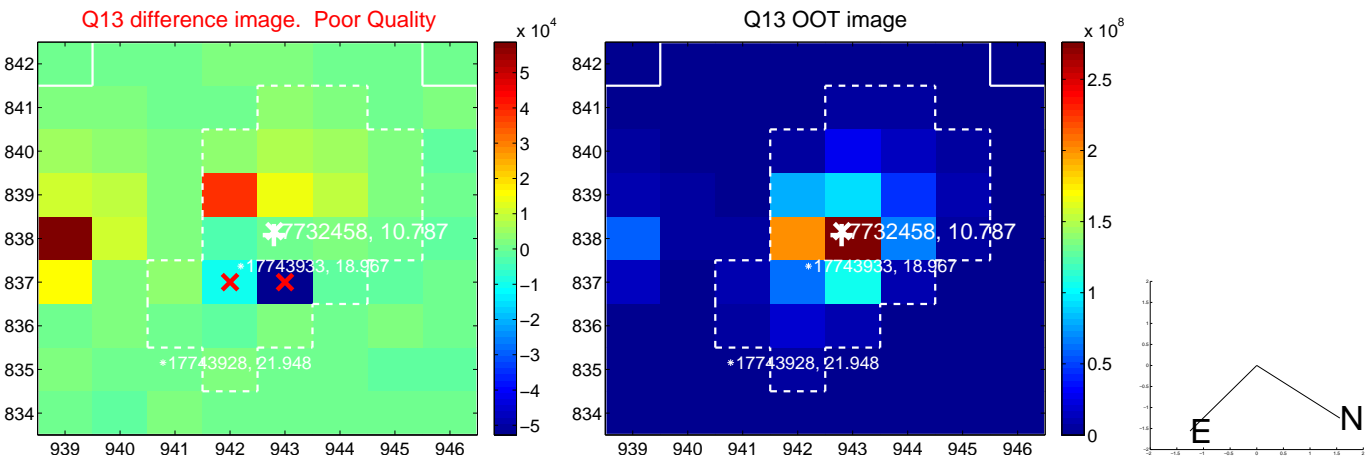




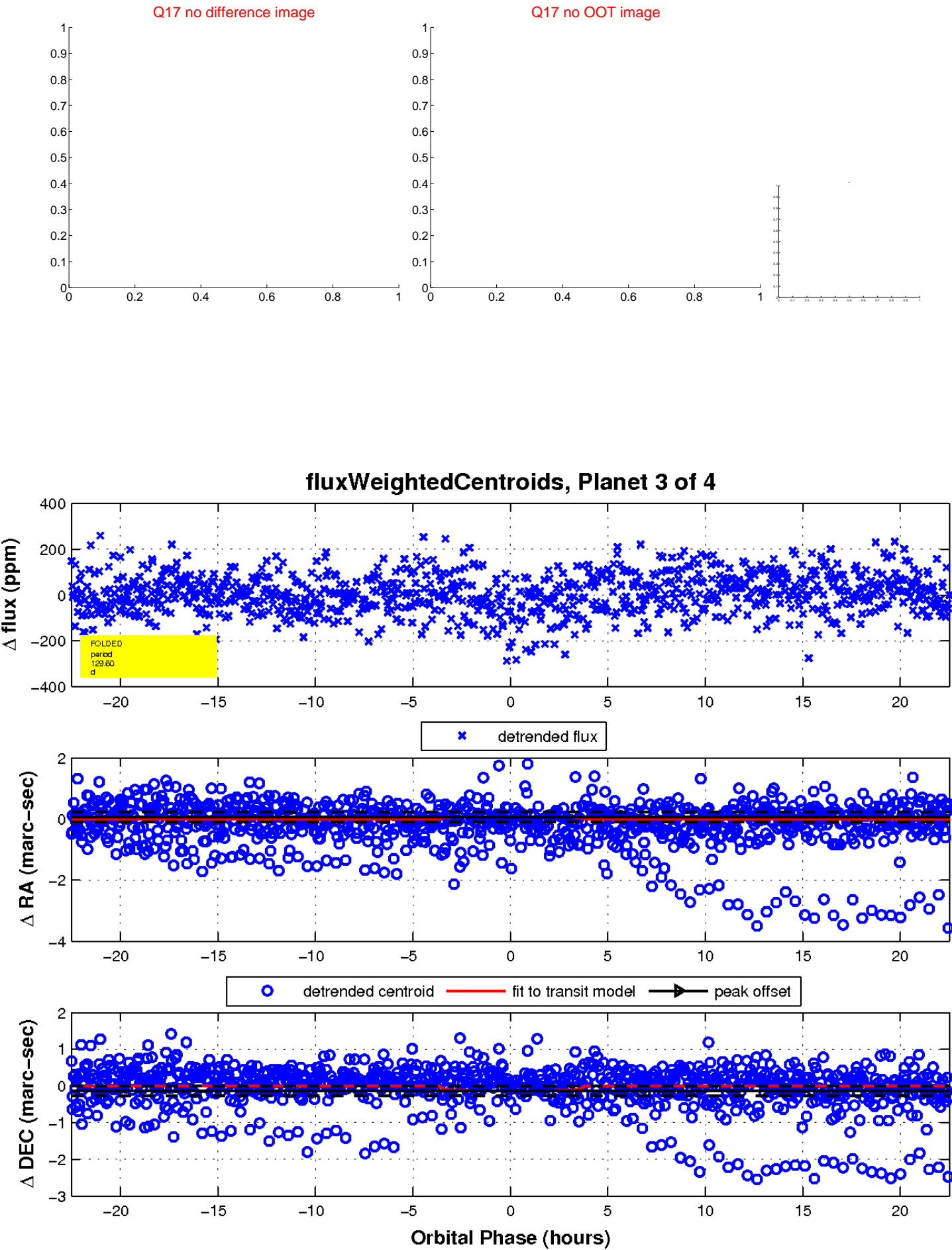
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



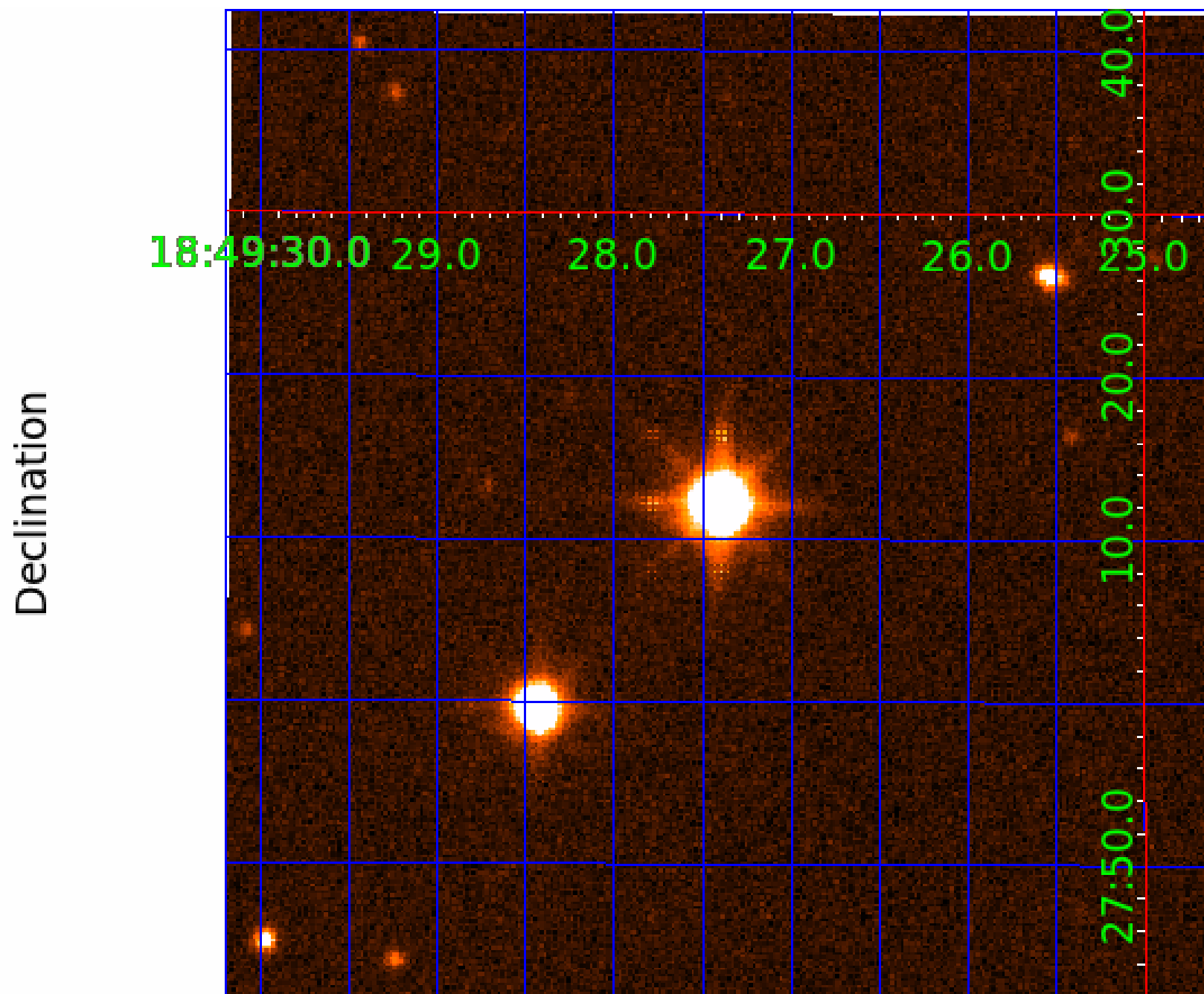
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



UKIRT Image



# KIC 007732458

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
007732458-01	OBS	No	0.915654	132.335911	13.9	3.910	9.3	11.2	3.57	7766	1.56	75883.07
007732458-02	OBS	No	8.928126	135.610152	45.7	2.836	9.0	9.9	3.57	7766	2.94	3642.84
007732458-03	OBS	No	129.604704	197.331896	123.5	7.515	7.6	7.7	3.57	7766	4.46	102.87
007732458-04	OBS	No	110.790226	240.064641	99.6	2.857	7.8	7.8	3.57	7766	4.04	126.80

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
007732458-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED
007732458-02	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED
007732458-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED
007732458-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED

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

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

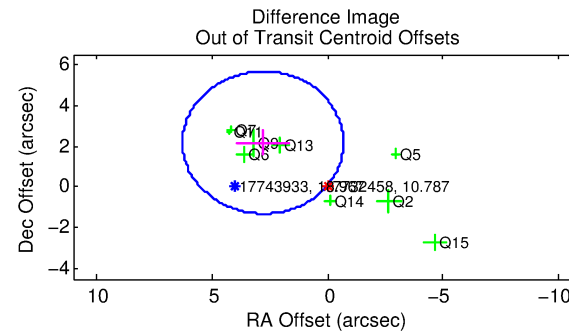
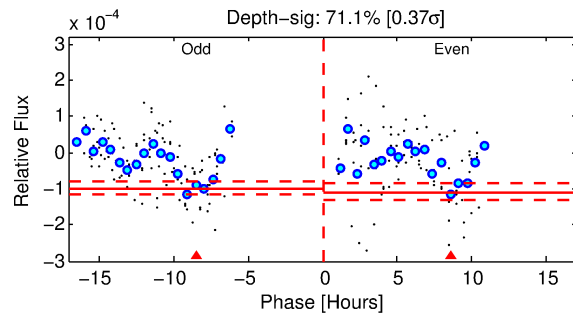
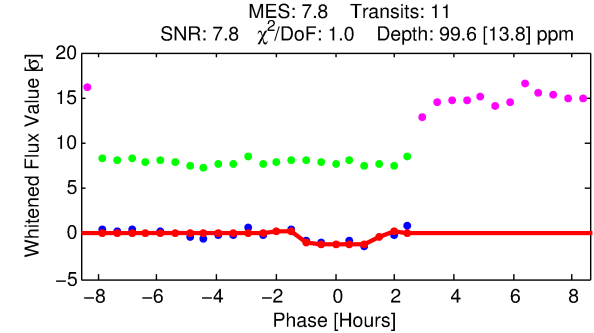
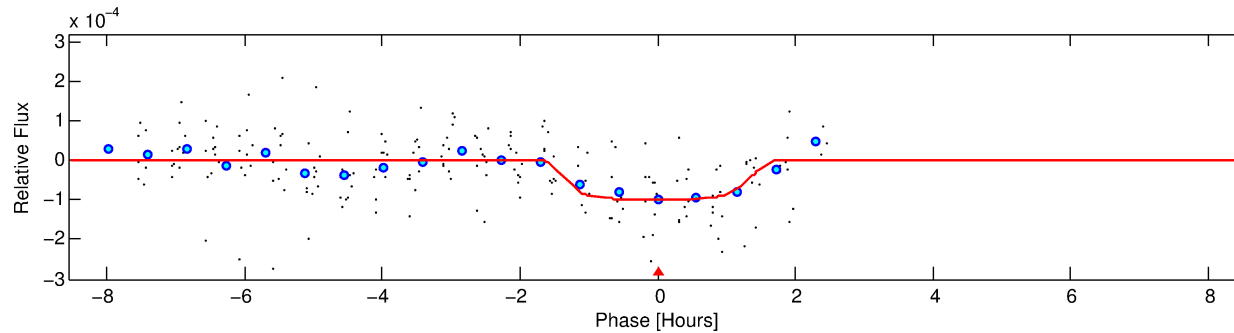
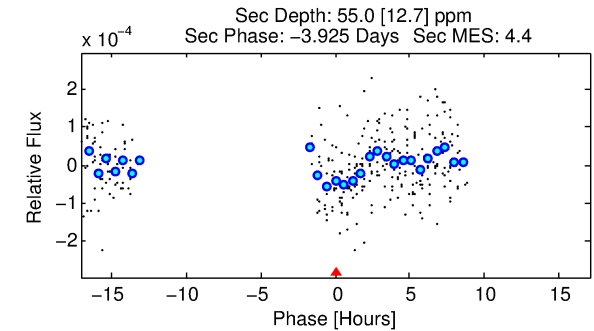
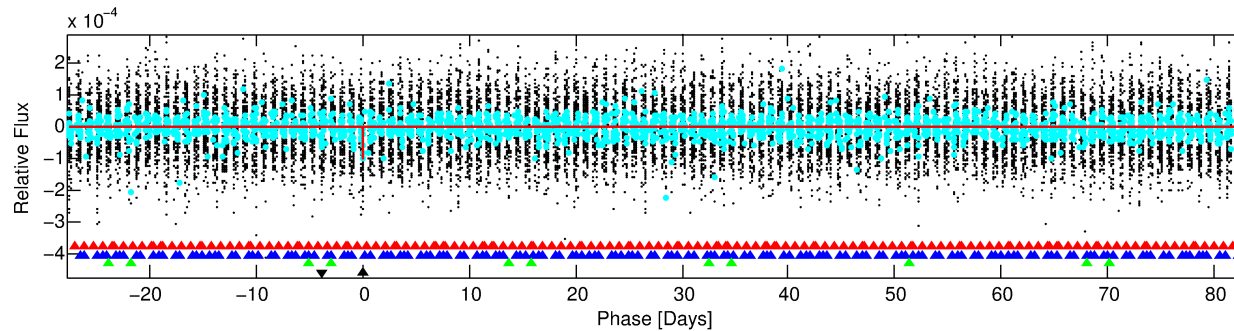
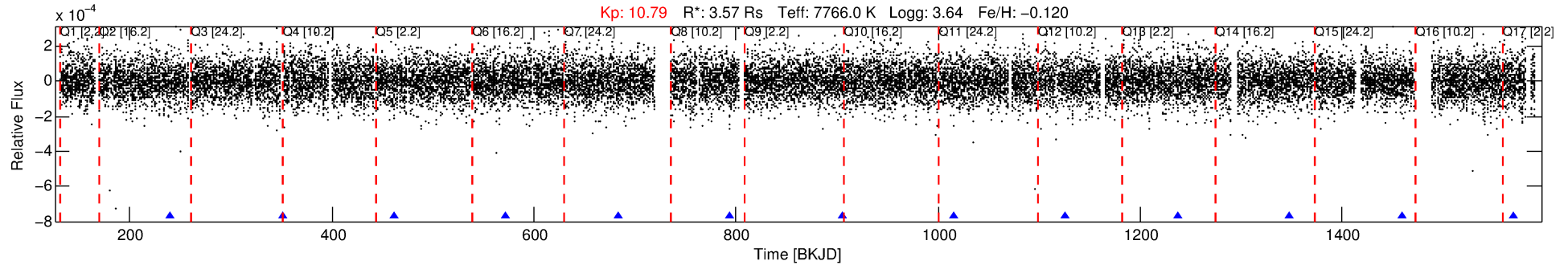
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 007732458-04

No Significant Match Found

# DV One-Page Summary

KIC: 7732458 Candidate: 4 of 4 Period: 110.790 d



## DV Fit Results:

Period = 110.79023 [0.00097] d  
Epoch = 240.0646 [0.0070] BKJD  
Rp/R\* = 0.0104 [0.0067]  
a/R\* = 159.92 [610.24]  
b = 0.85 [1.22]  
Seff = 126.80 [107.24]  
Teq = 856 [181] K  
Rp = 4.04 [3.31] Re  
a = 0.5730 [0.2910] AU  
Ag = 609.53 [943.19] [0.65σ]  
Teffp = 6573 [2165] K [2.63σ]

## DV Diagnostic Results:

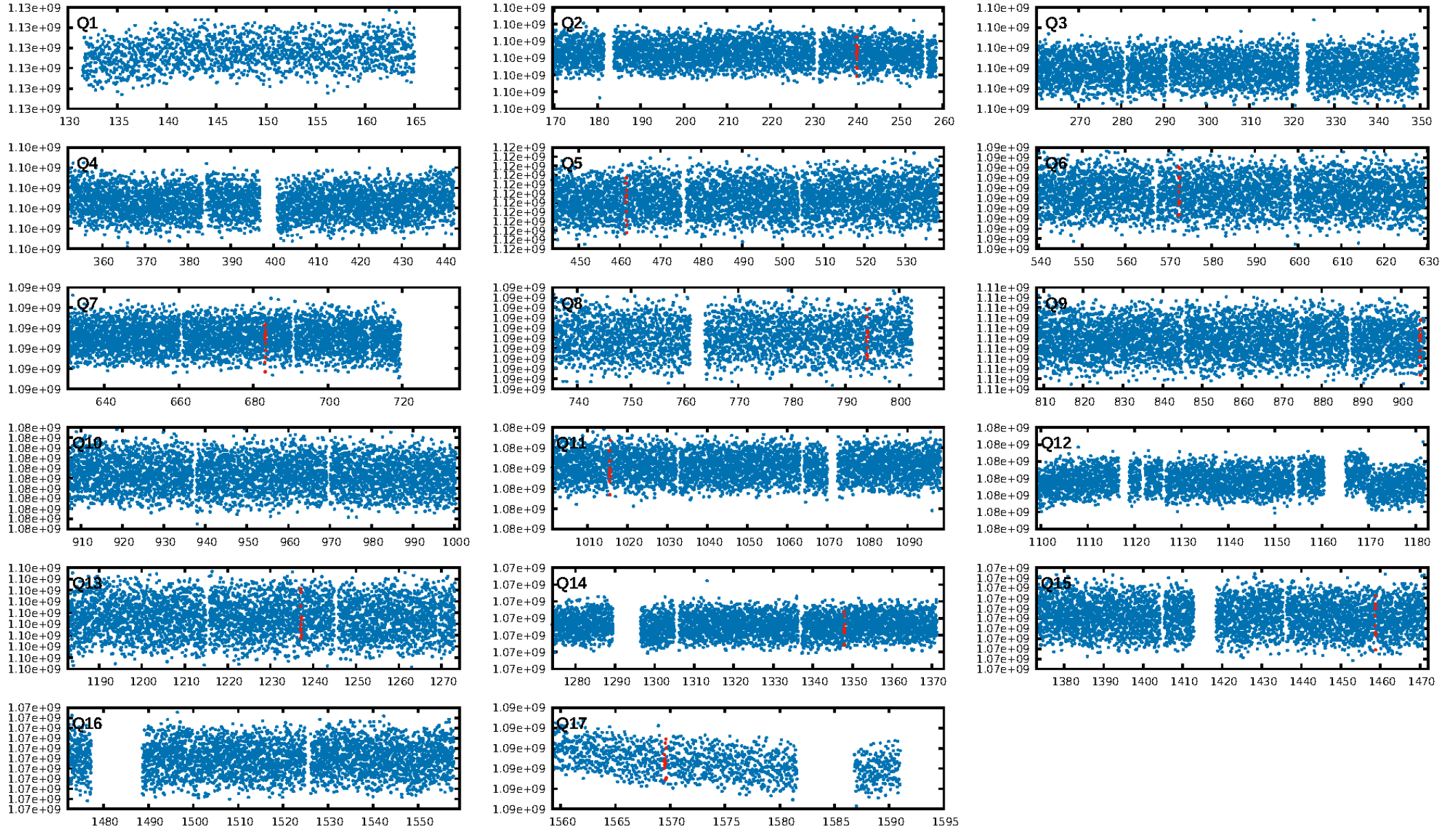
ShortPeriod-sig: 100.0% [607.30σ]  
LongPeriod-sig: 100.0% [56.16σ]  
ModelChiSquare2-sig: 72.7%  
ModelChiSquareGof-sig: 99.9%  
**Bootstrap-pfa: 1.34e-09**  
RollingBand-fgt: 1.00 [10/10]  
GhostDiagnostic-chr: 7.923  
Centroid-sig: 38.5%  
Centroid-so: 1.018 arcsec [0.64σ]  
**OotOffset-rm: 3.536 arcsec [3.05σ]**  
**KicOffset-rm: 3.950 arcsec [3.02σ]**  
OotOffset-st: 3/3/0/3 [9]  
KicOffset-st: 3/3/0/3 [9]  
DiffImageQuality-fgm: 0.44 [4/9]  
DiffImageOverlap-fno: 0.00 [0/11]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 02-Feb-2016 03:18:32 Z

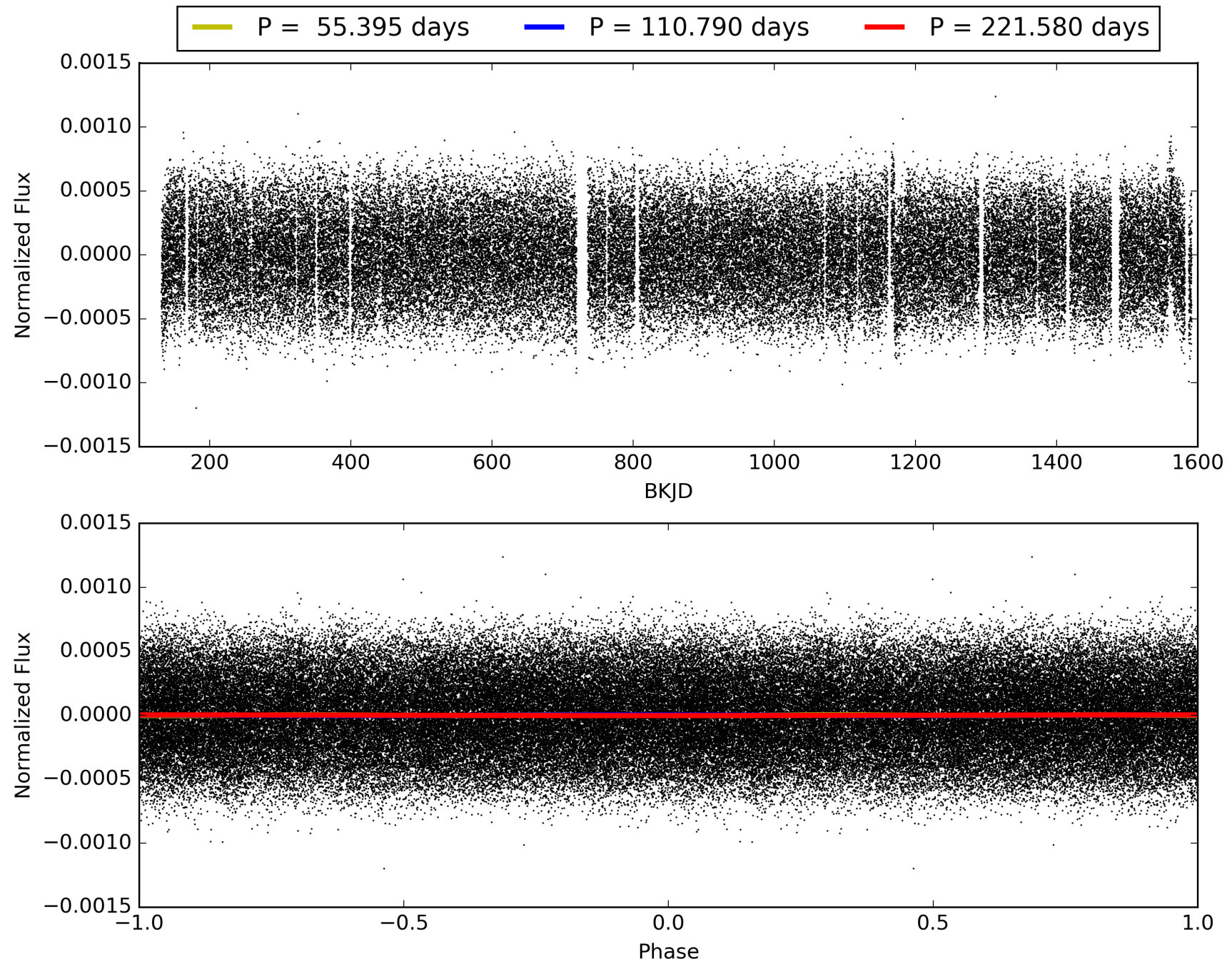
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center



# TCE 007732458-04, PDC Light Curves

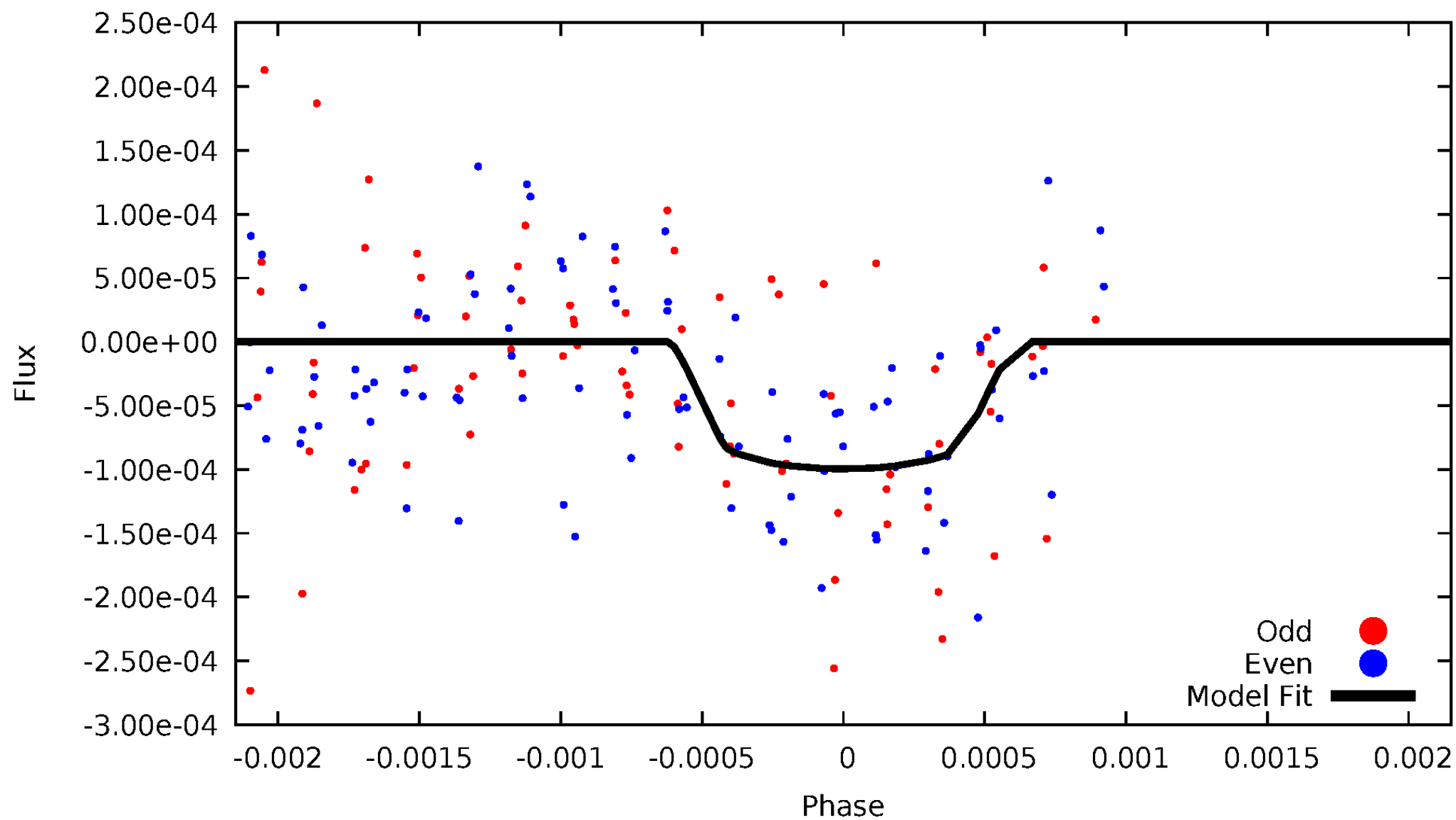


TCE 007732458-04



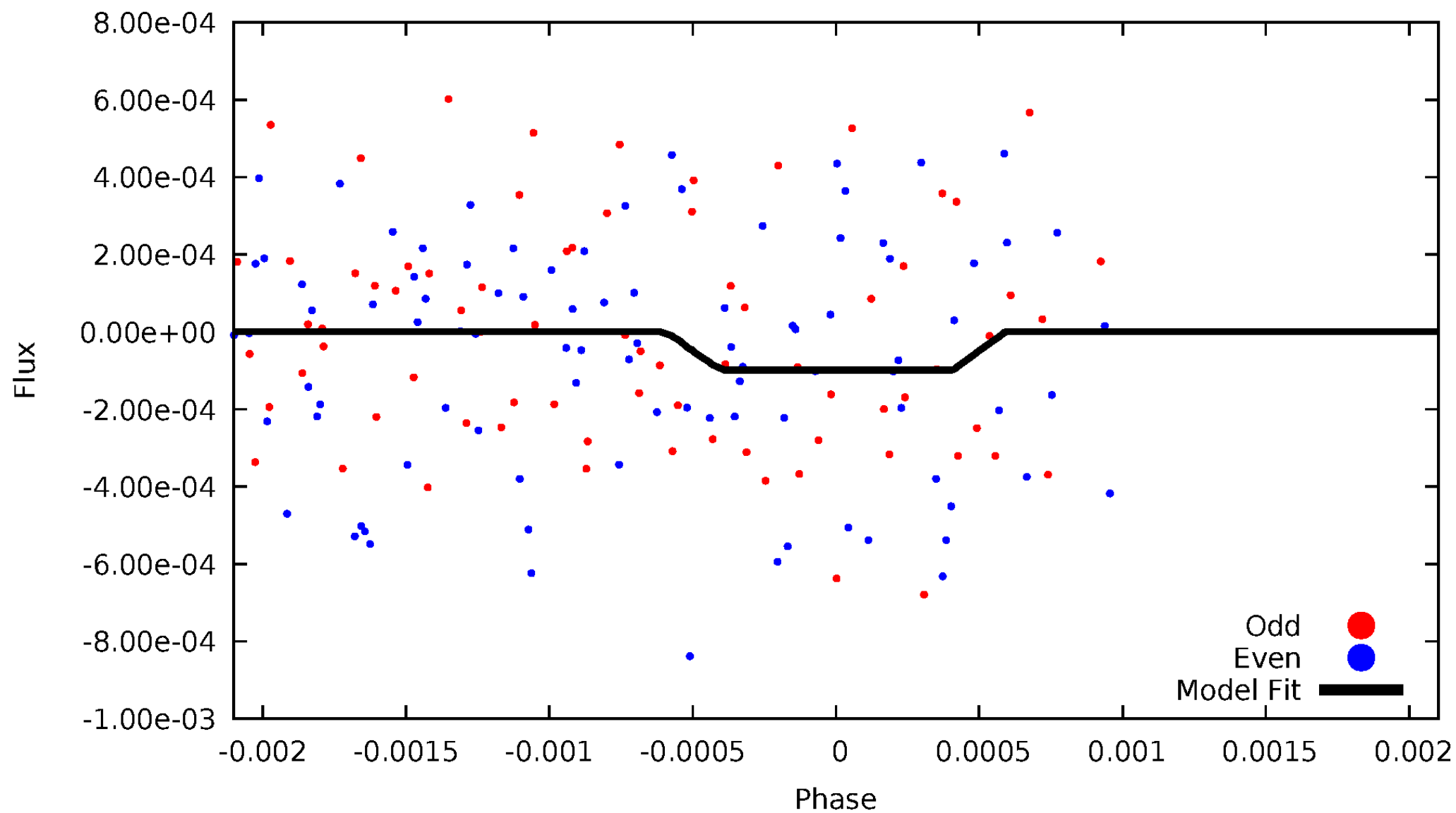
# DV Odd/Even

TCE 007732458-04



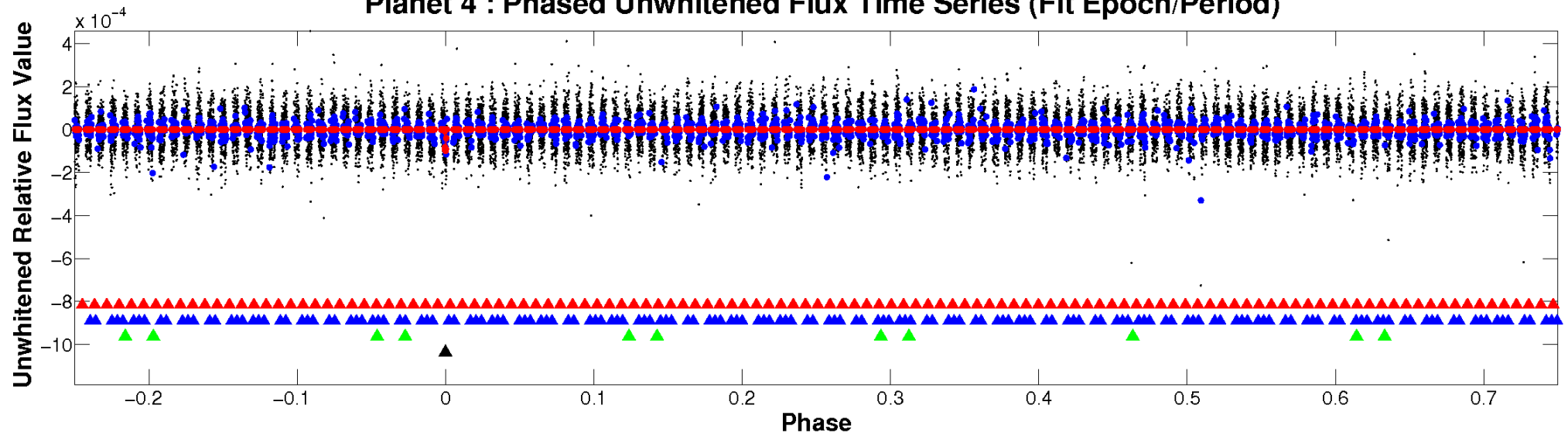
# ALT Odd/Even

TCE 007732458-04

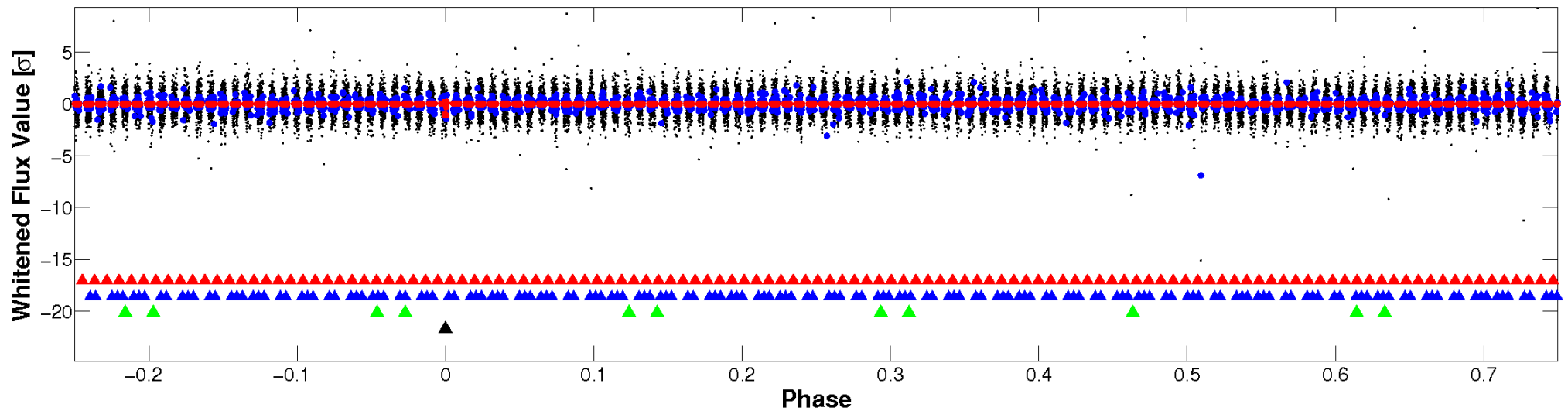


# Non-Whitened Vs. Whitened Light Curve

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

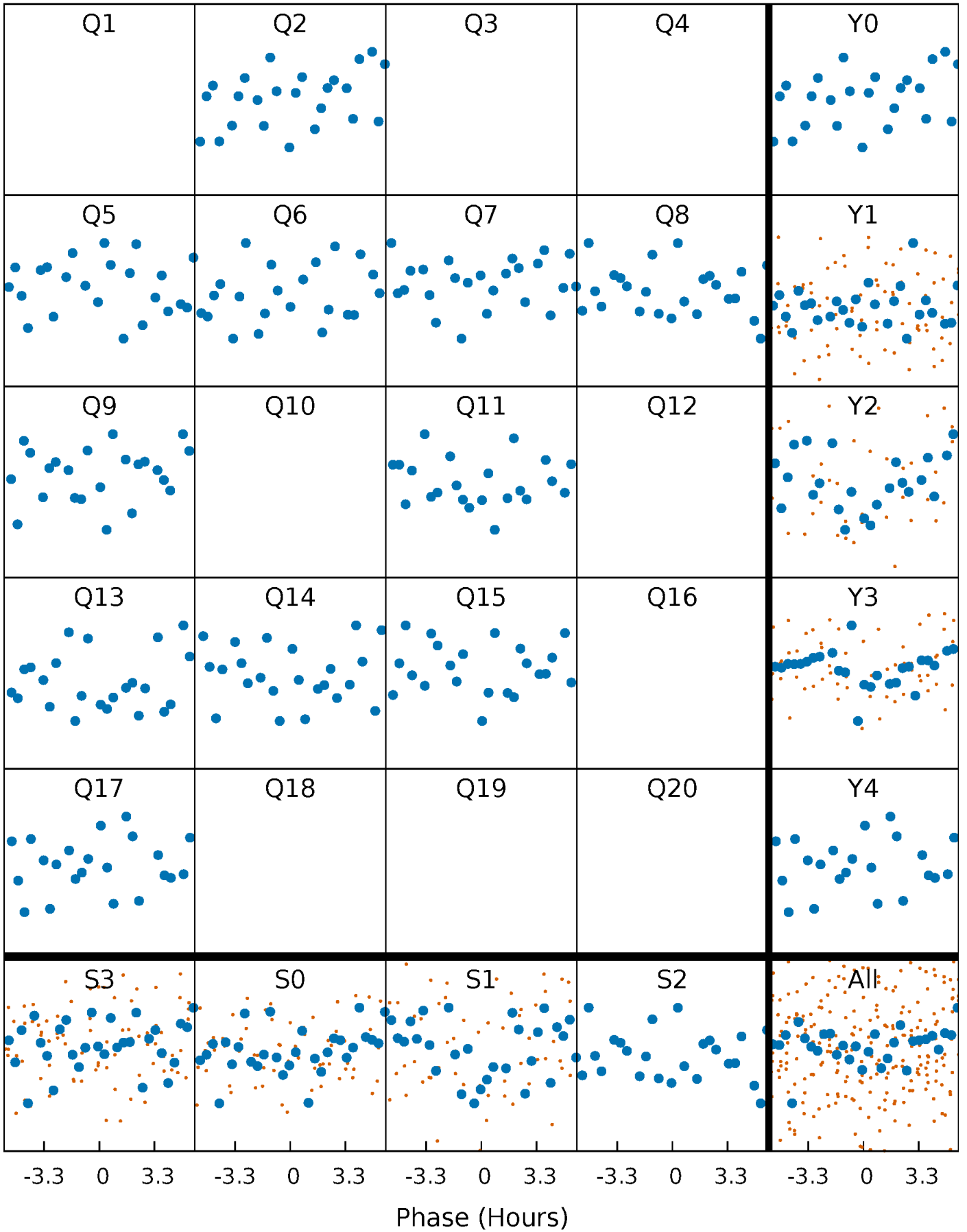


## Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

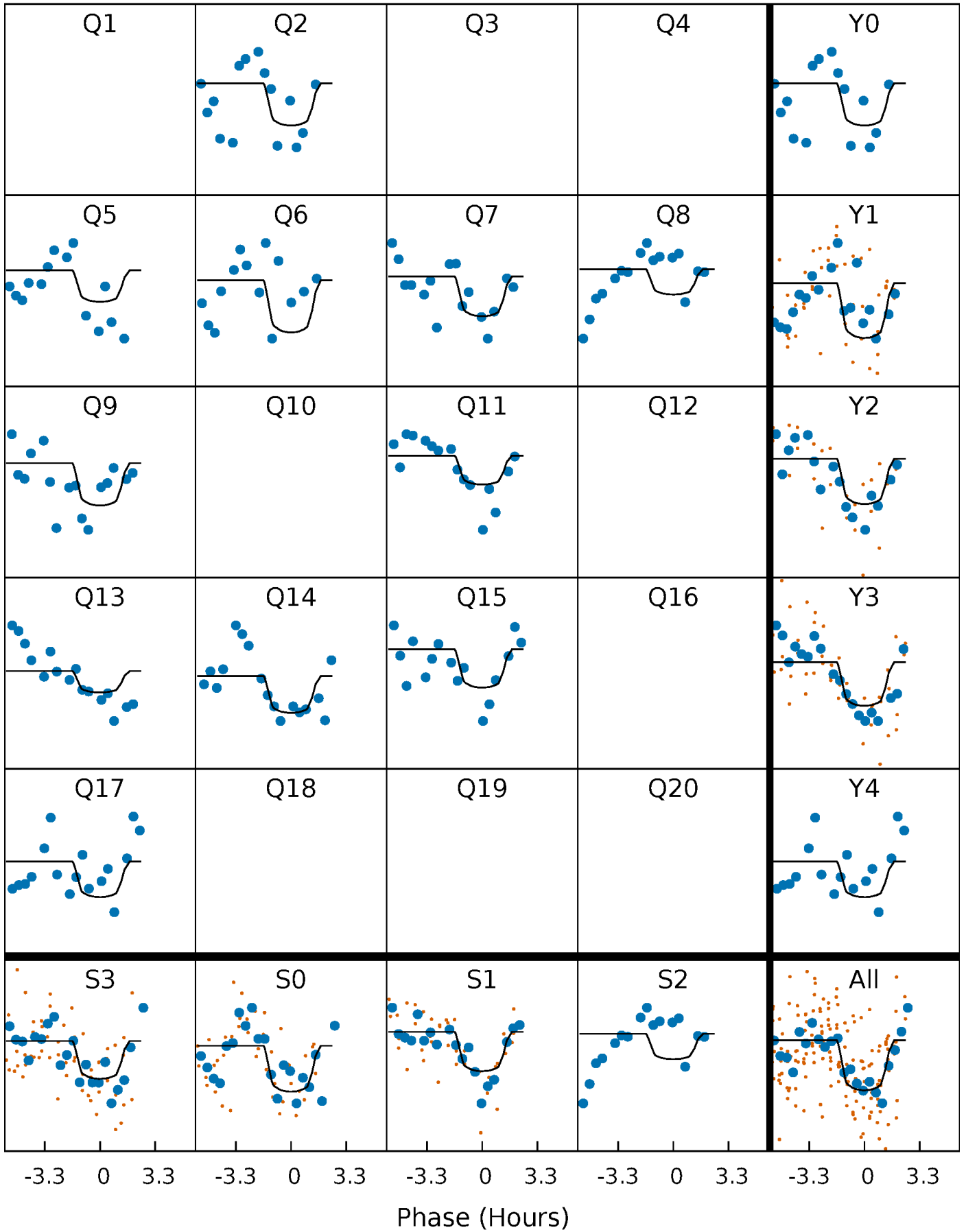
TCE 007732458-04   P=110.790226 Days    $T_0=240.064641$  (BKJD)





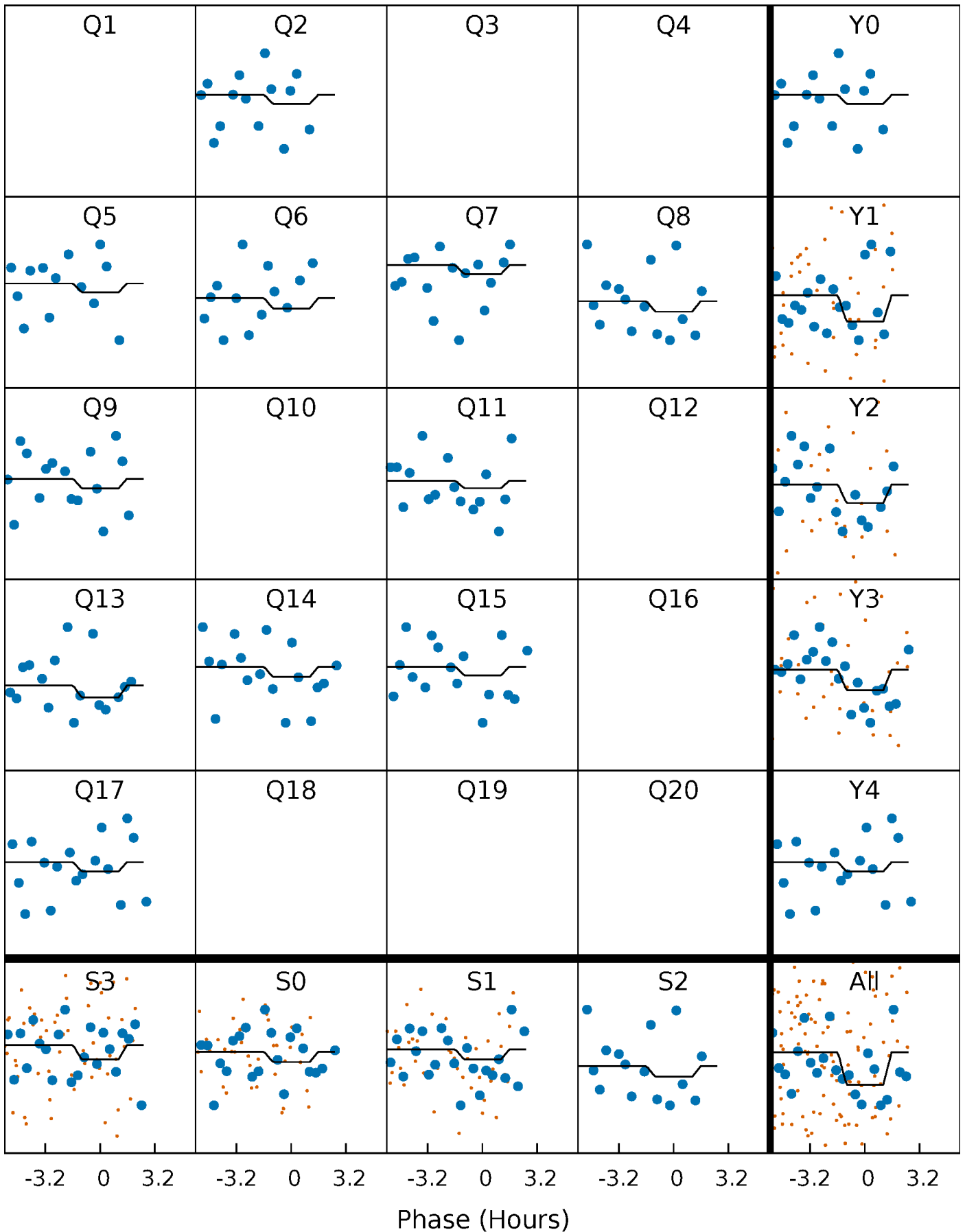
# DV Quarter-Phased Transit Curves

TCE 007732458-04 P=110.790226 Days  $T_0=240.064641$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

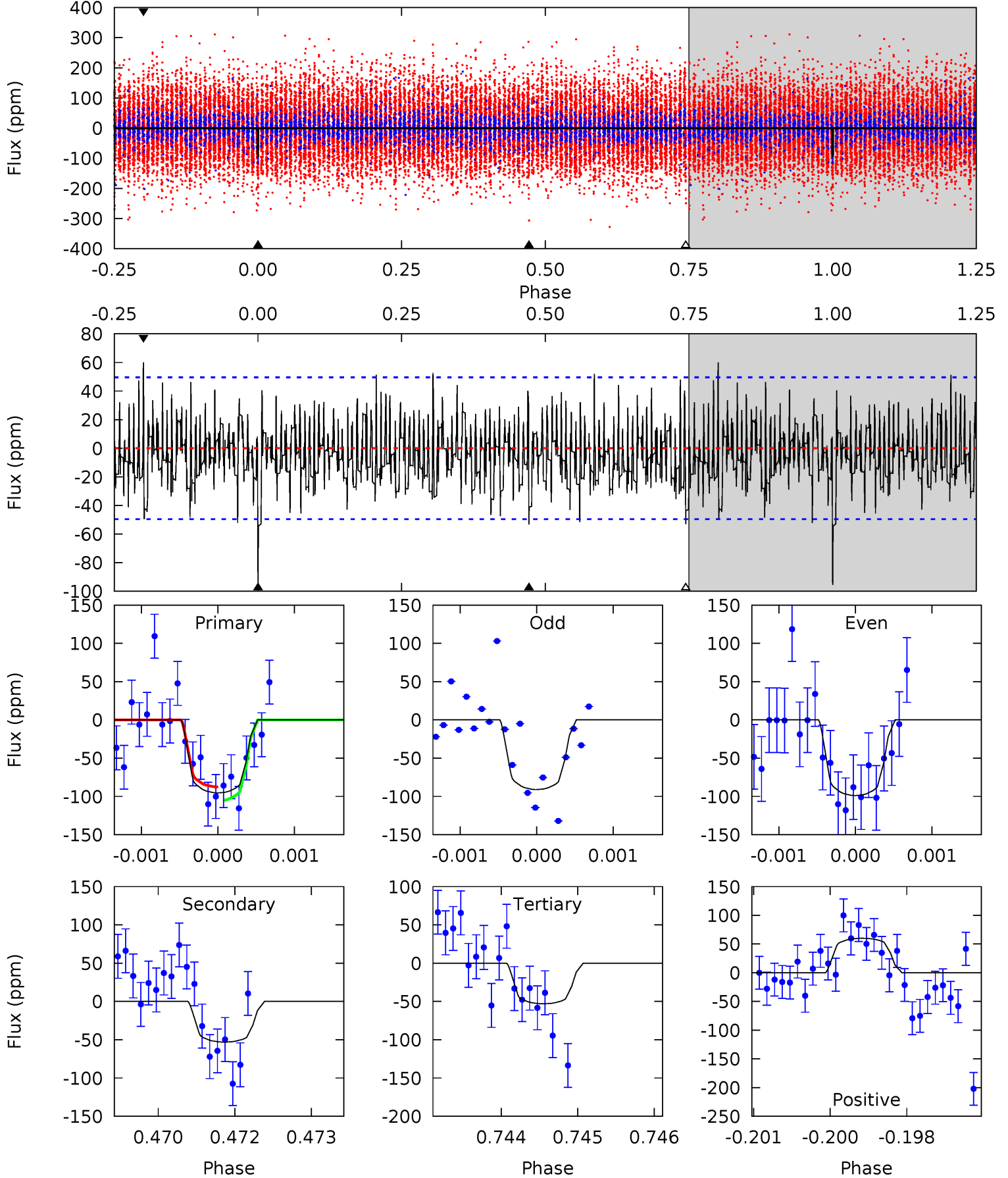
TCE 007732458-04 P=110.788560 Days  $T_0=240.079509$  (BKJD)



# DV Model-Shift Uniqueness Test

007732458-04, P = 110.790226 Days, E = 129.274415 Days

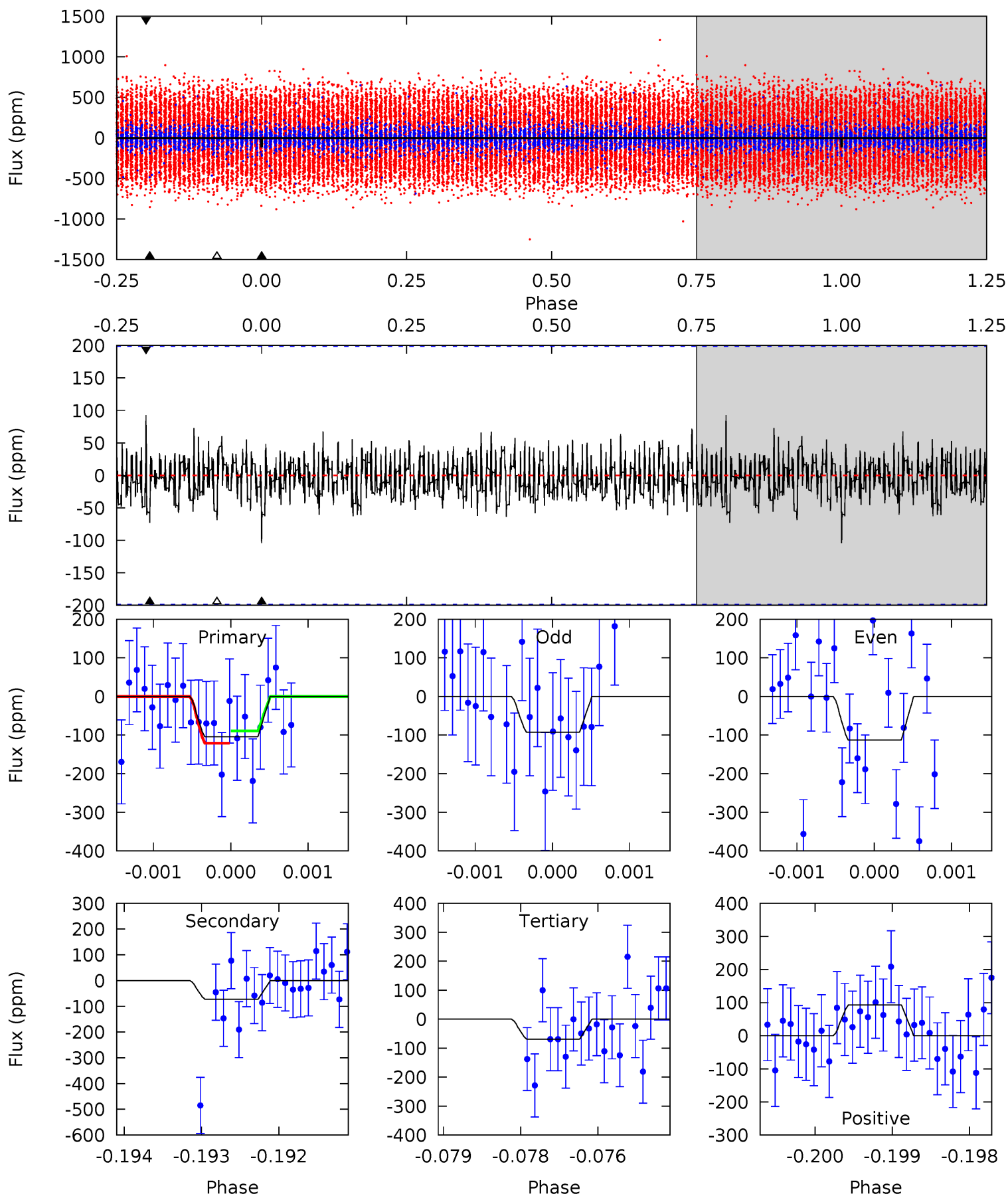
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
10.4	5.79	5.78	6.54	5.41	3.22	1.94	4.62	3.86	0.01	-0.76	0.43	0.97	0.39	0.95



# Alt Model-Shift Uniqueness Test

007732458-04, P = 110.788560 Days, E = 129.290949 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
2.84	1.98	1.87	2.52	5.43	3.25	0.62	0.96	0.31	0.11	-0.54	0.27	1.26	0.47	0.43



### Stellar Parameters For KIC 007732458

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$7766^{+216}_{-324}$	$3.642^{+0.493}_{-0.087}$	$-0.120^{+0.200}_{-0.350}$	$3.574^{+0.605}_{-1.816}$	$2.039^{+0.301}_{-0.559}$	$0.063^{+0.315}_{-0.019}$
	+3%/-4%	+14%/-2%	+167%/-292%	+17%/-51%	+15%/-27%	+501%/-29%
Source	KIC0	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 007732458-04 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-53 \pm 9$	$3.60^{+2.61}_{-2.05}$	$1147^{+86}_{-143}$	$6258^{+4186}_{-1276}$	$700^{+3088}_{-460}$
Alt.	$-73 \pm 37$	$3.56^{+2.39}_{-2.05}$	$1147^{+87}_{-143}$	$6776^{+4903}_{-1716}$	$978^{+4565}_{-705}$

$T_{max}$  = 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

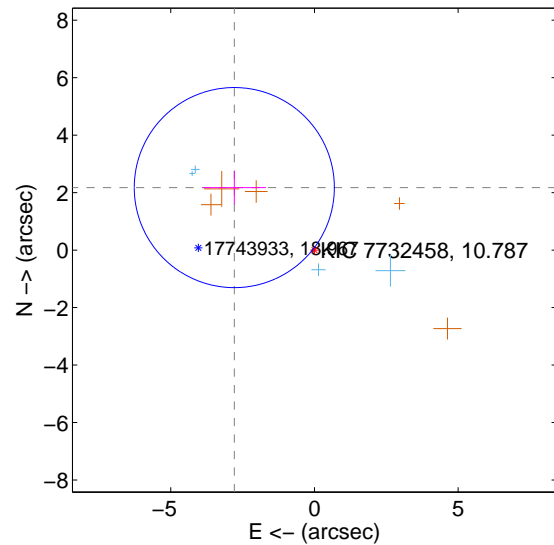
Supplemental centroid analysis for 007732458-04. **Kepler magnitude: 10.79.** Transit SNR 7.80

There are 4 quarters with good PRF difference image offsets

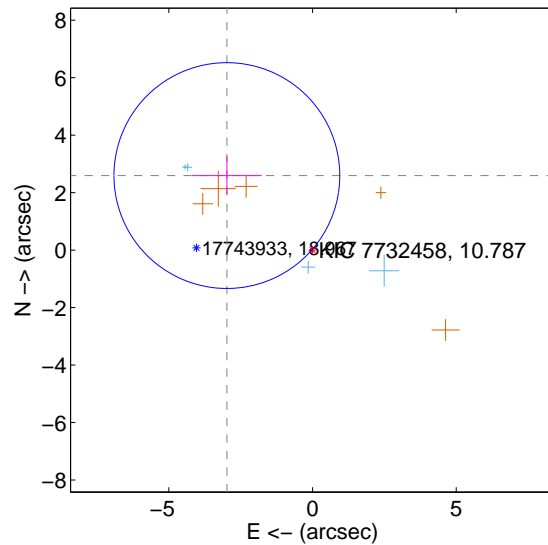
The direct PRF centroid is offset from the target star catalog position by about 0.05 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	<b><math>3.536 \pm 1.160</math></b>	<b>3.05</b>	$2.788 \pm 1.099$	$2.175 \pm 0.583$
PRF-fit source offset from KIC position	<b><math>3.950 \pm 1.309</math></b>	<b>3.02</b>	$2.980 \pm 1.213$	$2.593 \pm 0.659$
photometric centroid source offset	$1.02 \pm 1.59$	0.64	$-1.00 \pm 1.61$	$-0.19 \pm 1.21$

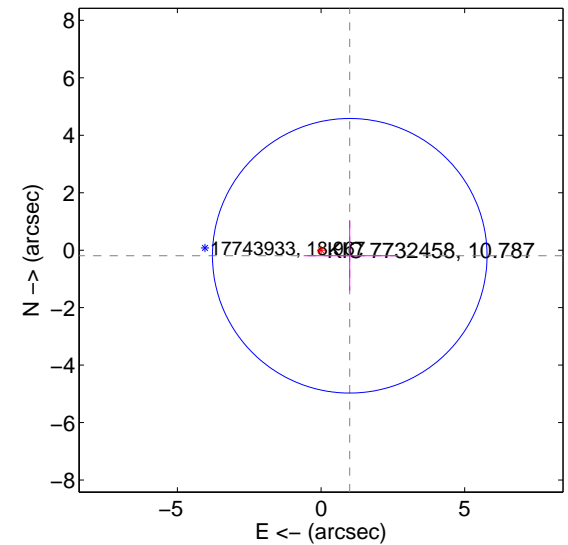
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position



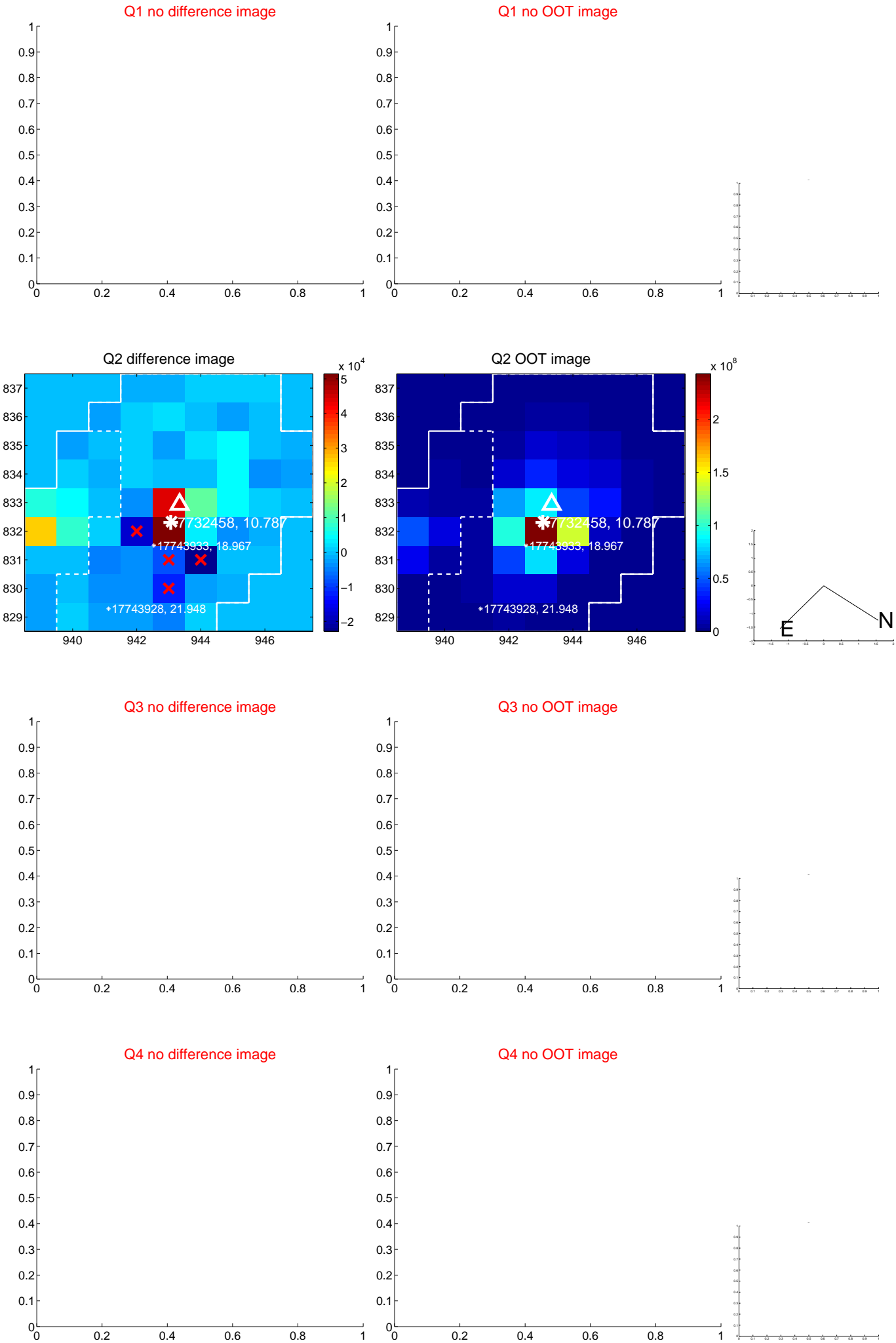
offset from photometric centroids



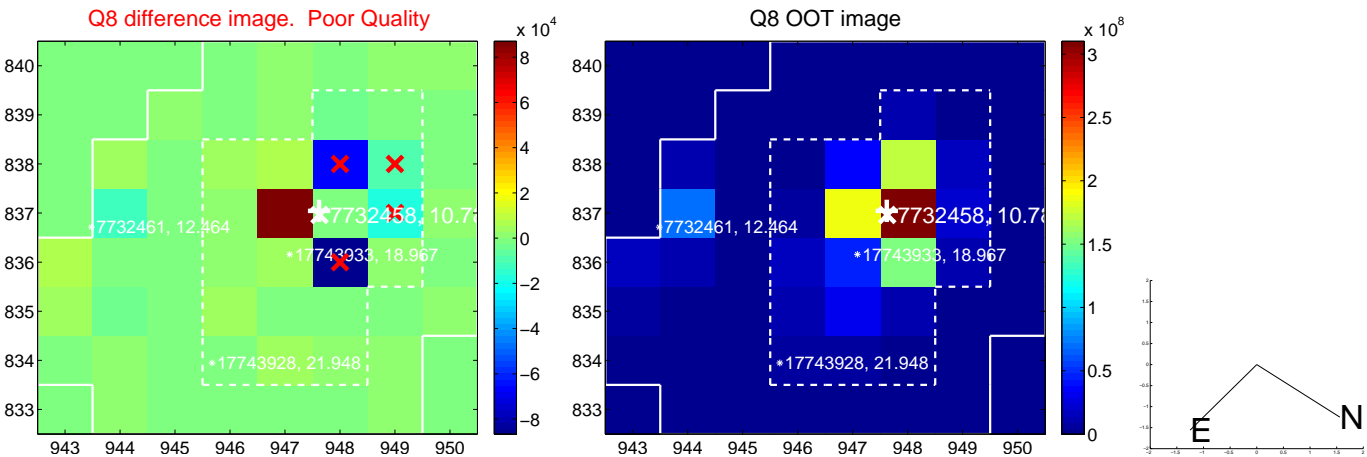
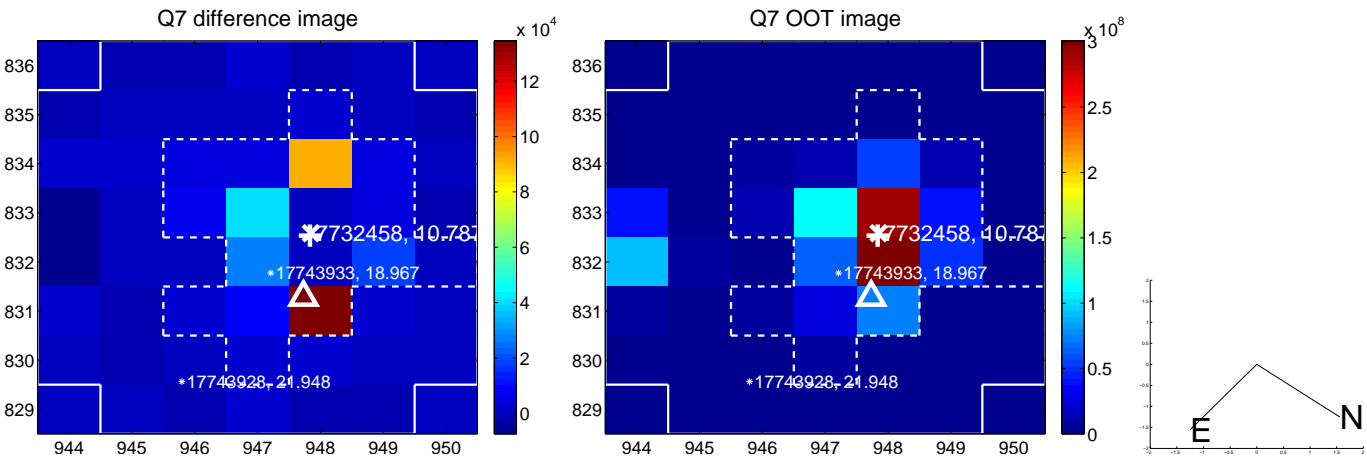
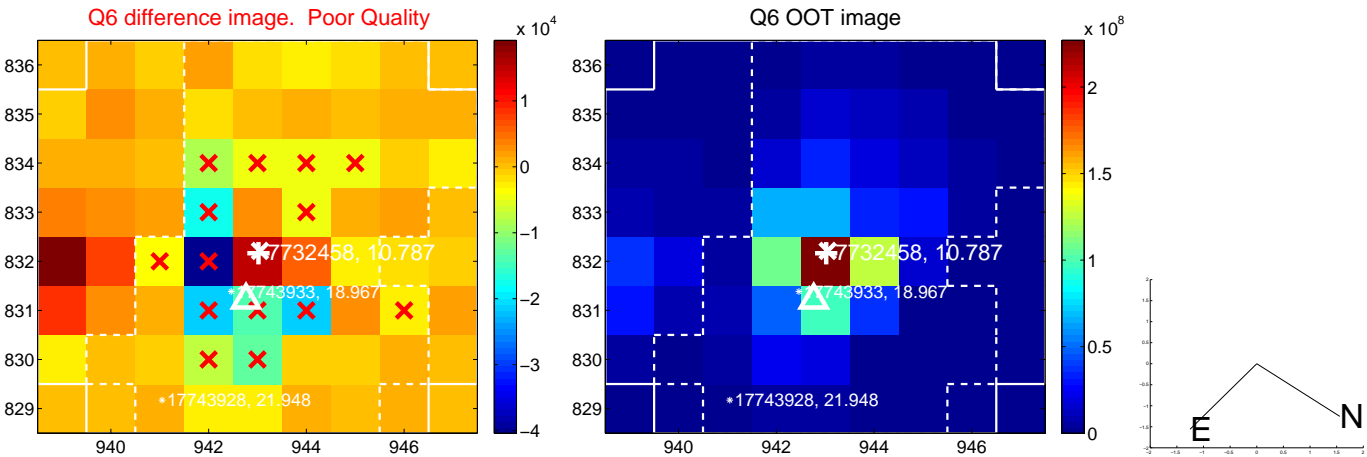
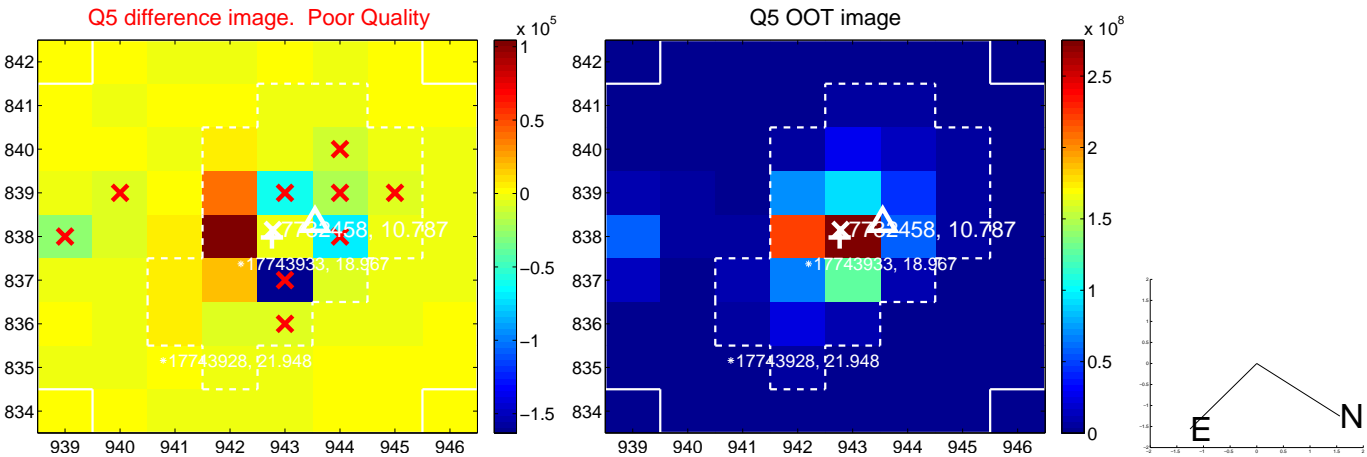
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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



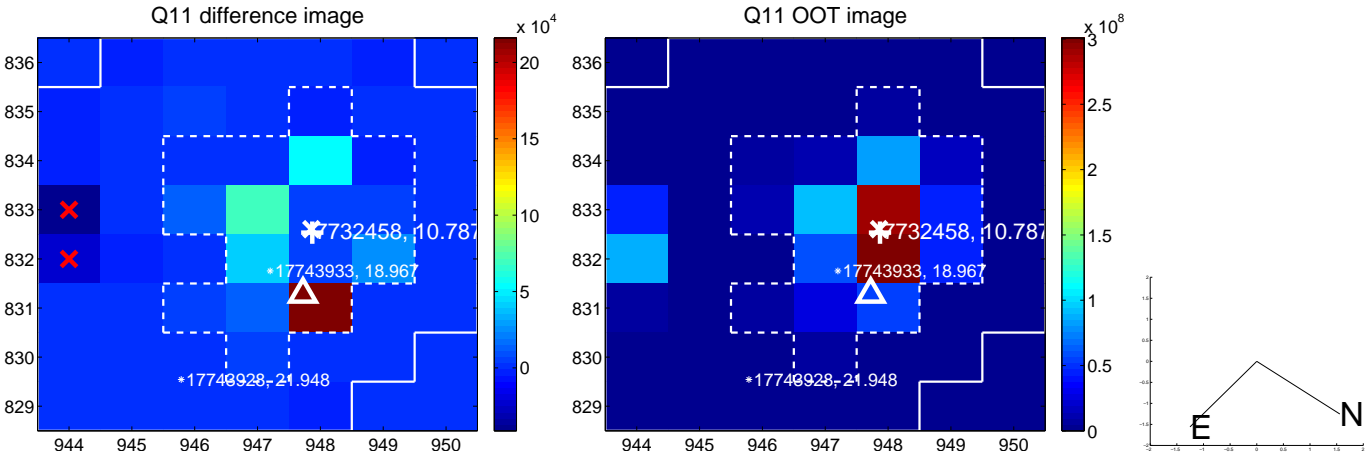
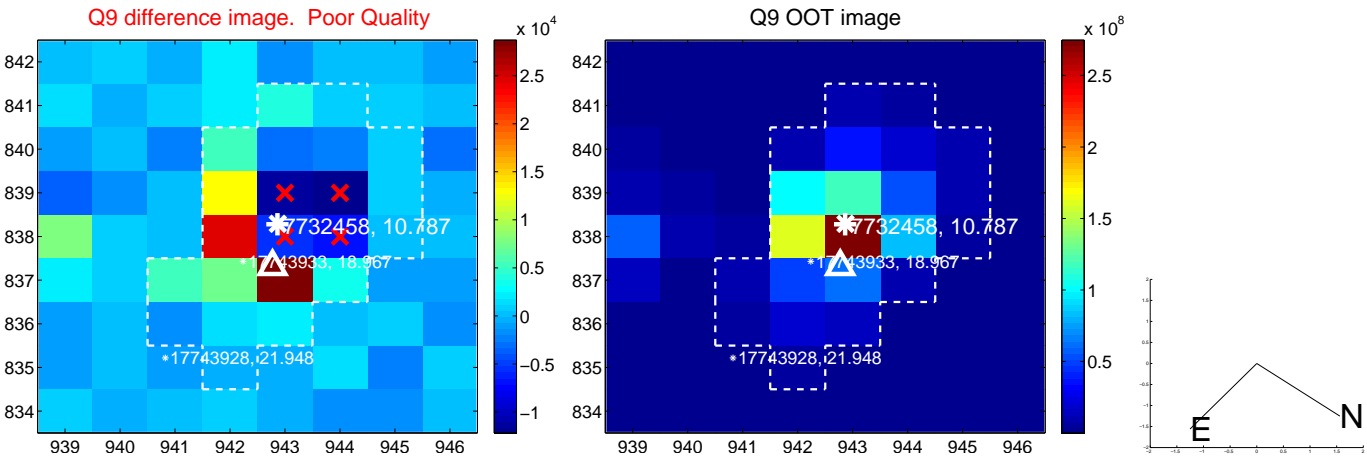
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



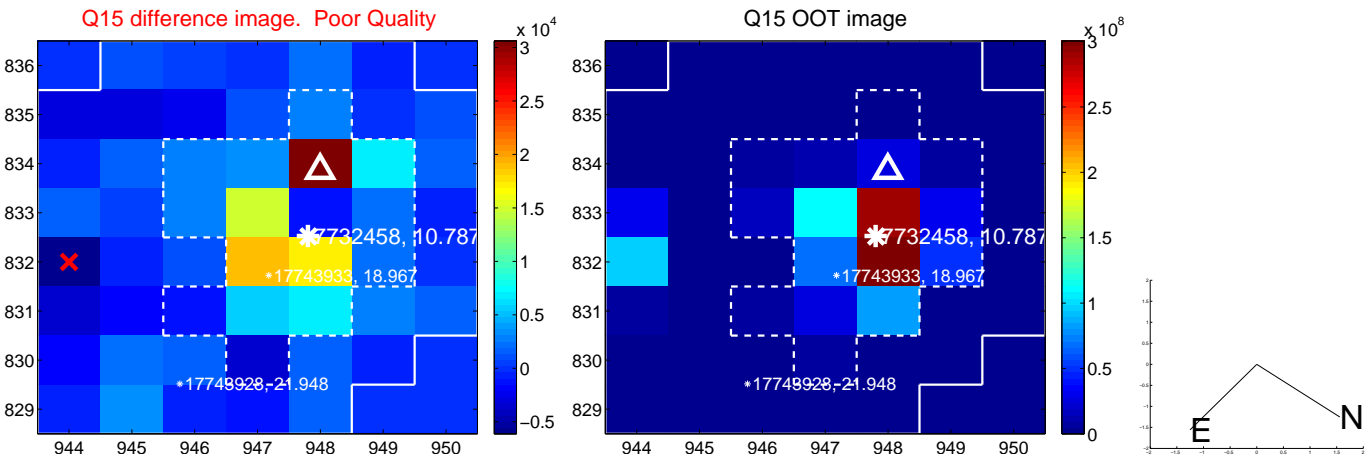
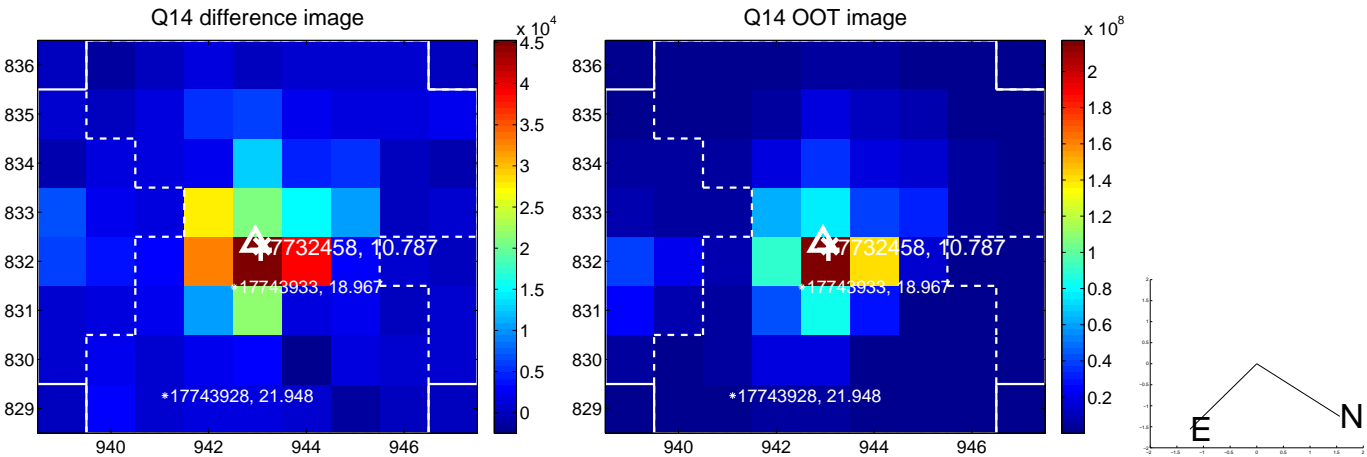
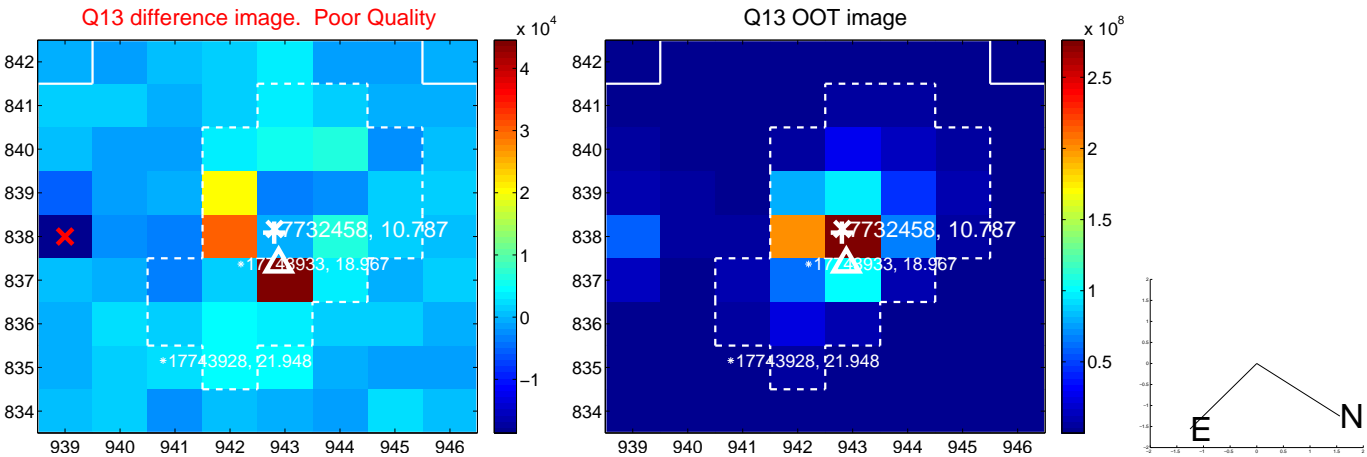
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



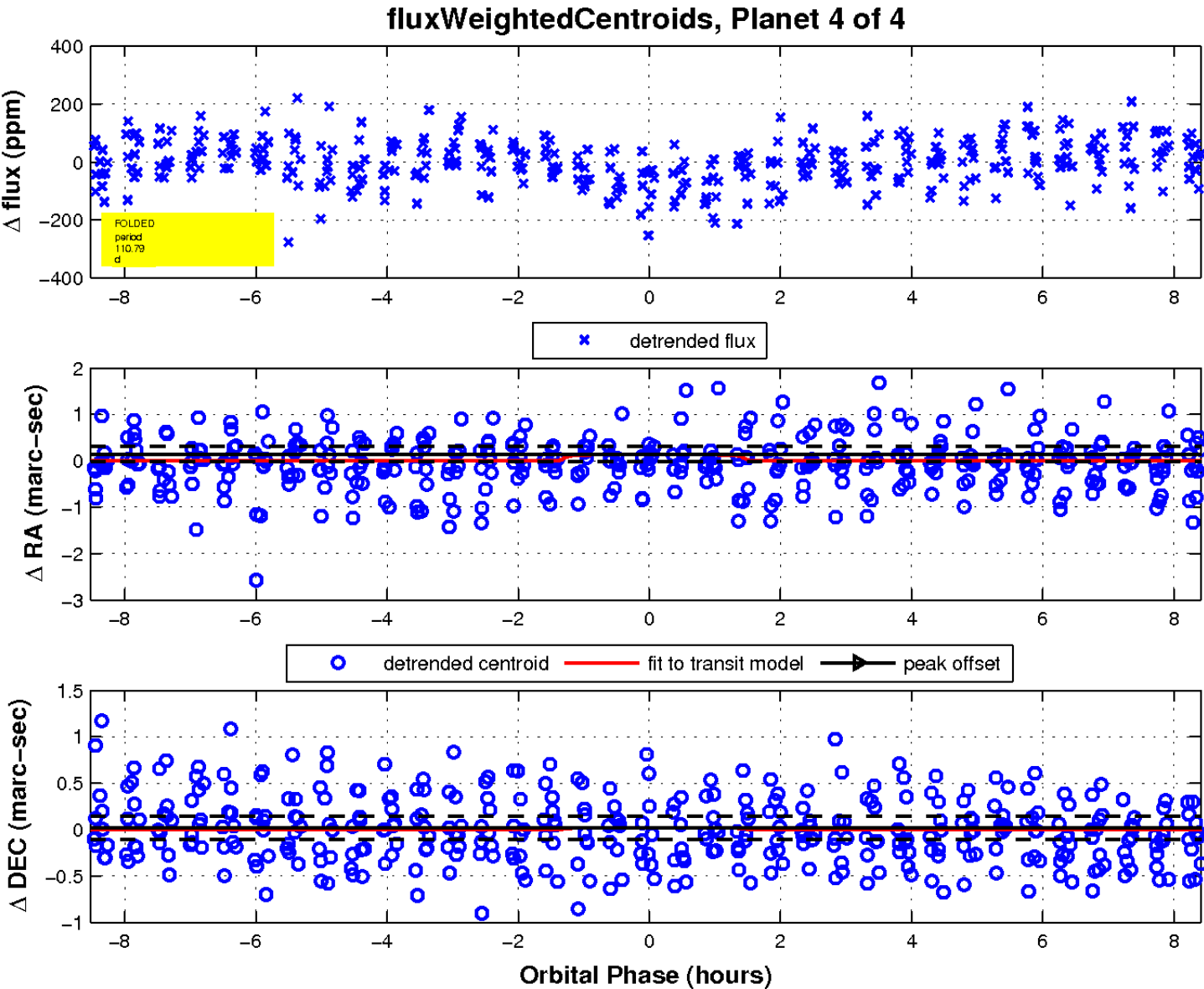
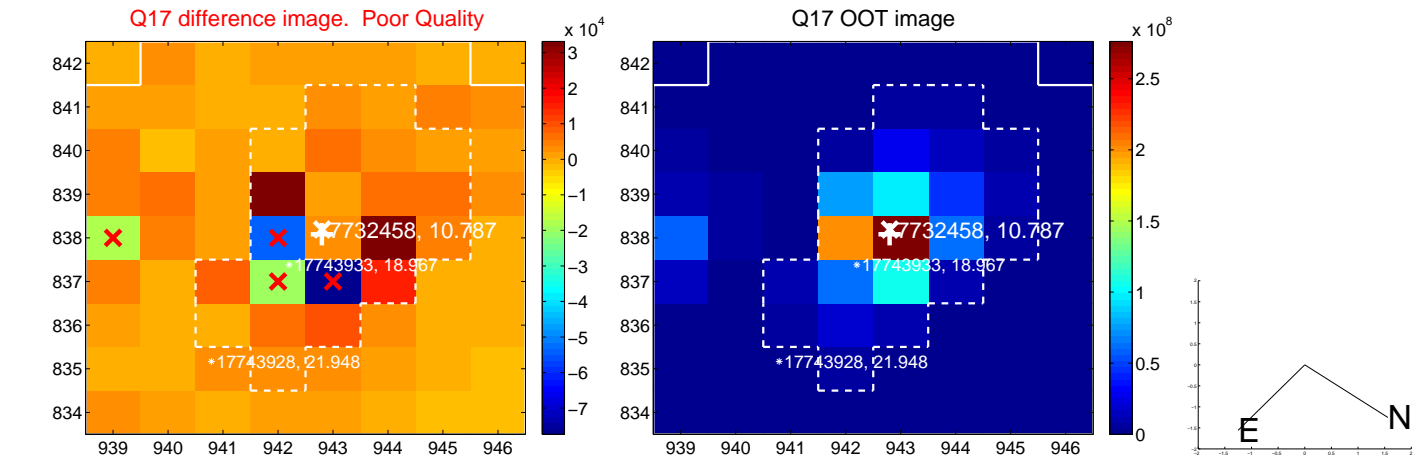
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

