

# KIC 003855001

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
003855001-01	OBS	No	1.709750	132.779883	137.9	6.726	9.5	7.7	1.54	7149	1.84	5261.16
003855001-02	OBS	No	0.623876	131.556527	182.6	1.880	8.9	10.4	1.54	7149	2.42	20177.16
003855001-03	OBS	No	77.567808	167.991944	2249.2	4.011	7.8	8.9	1.54	7149	7.70	32.52
003855001-04	OBS	No	21.743285	132.579449	1123.1	3.847	8.0	7.7	1.54	7149	7.13	177.24

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
003855001-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
003855001-02	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
003855001-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_ALT—MOD_POS_ALT
003855001-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA—TRANS_GAPPED—MOD_NONUNIQ_ALT

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

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

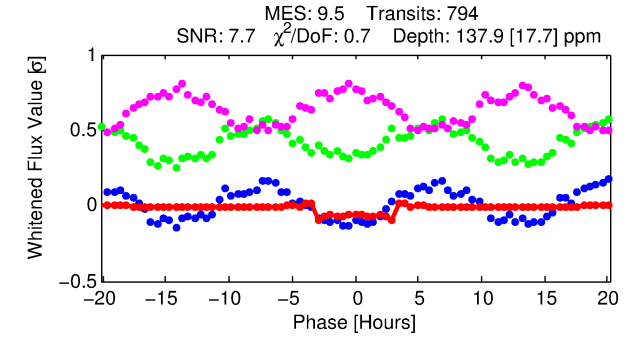
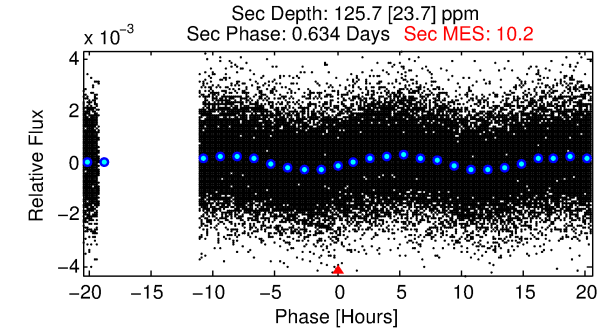
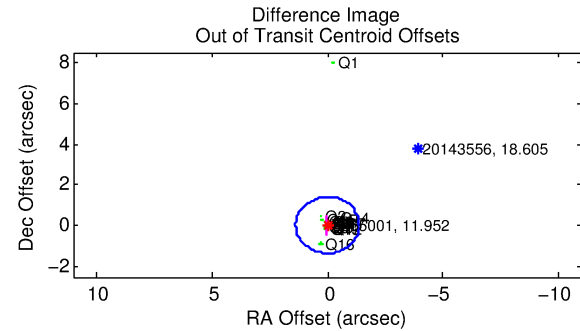
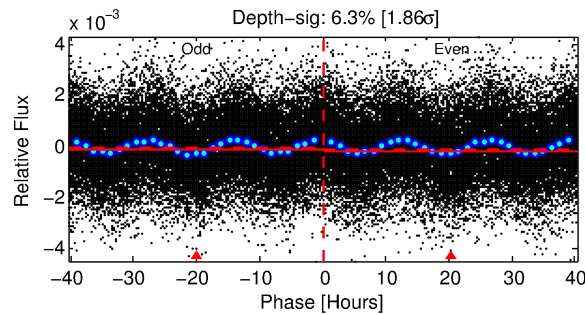
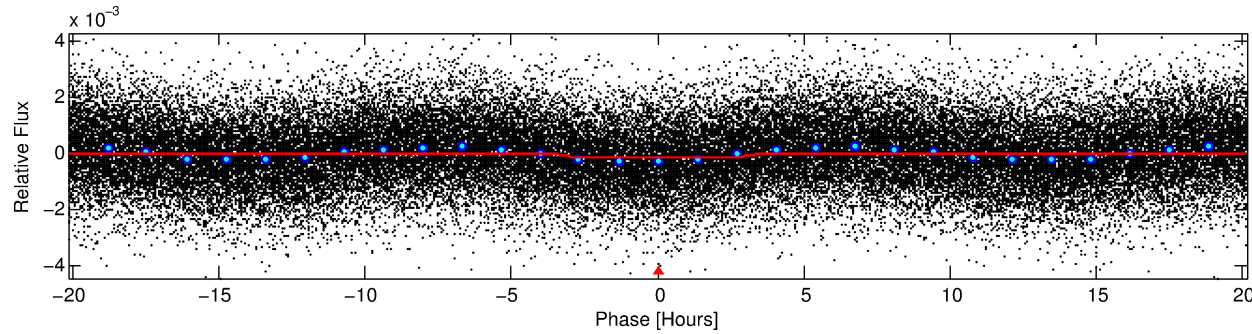
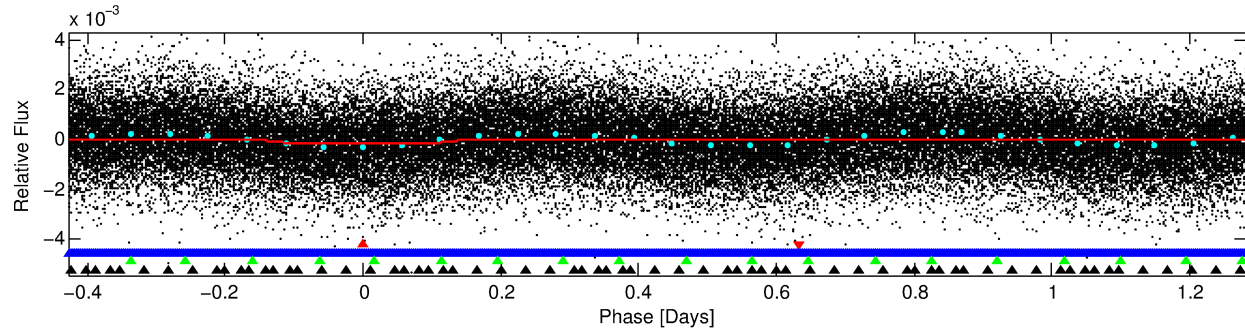
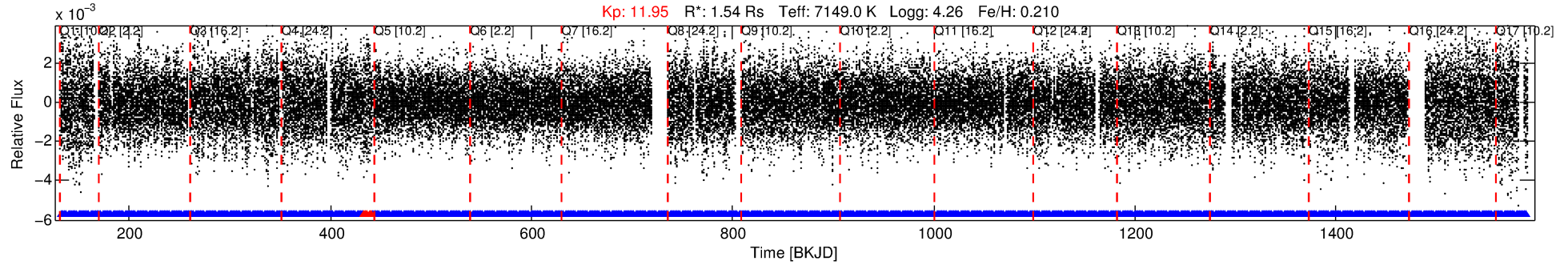
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 003855001-01

No Significant Match Found

# DV One-Page Summary

KIC: 3855001 Candidate: 1 of 4 Period: 1.710 d



## DV Fit Results:

Period = 1.70975 [0.00002] d  
Epoch = 132.7799 [0.0026] BKJD  
Rp/R\* = 0.0110 [0.0064]  
a/R\* = 1.99 [5.10]  
b = 0.28 [11.14]  
Seff = 5261.16 [2458.12]  
Teq = 2172 [254] K  
Rp = 1.84 [1.28] Re  
a = 0.0324 [0.0100] AU  
Ag = 21.50 [27.09] [0.76 $\sigma$ ]  
Teffp = 7230 [2159] K [2.33 $\sigma$ ]

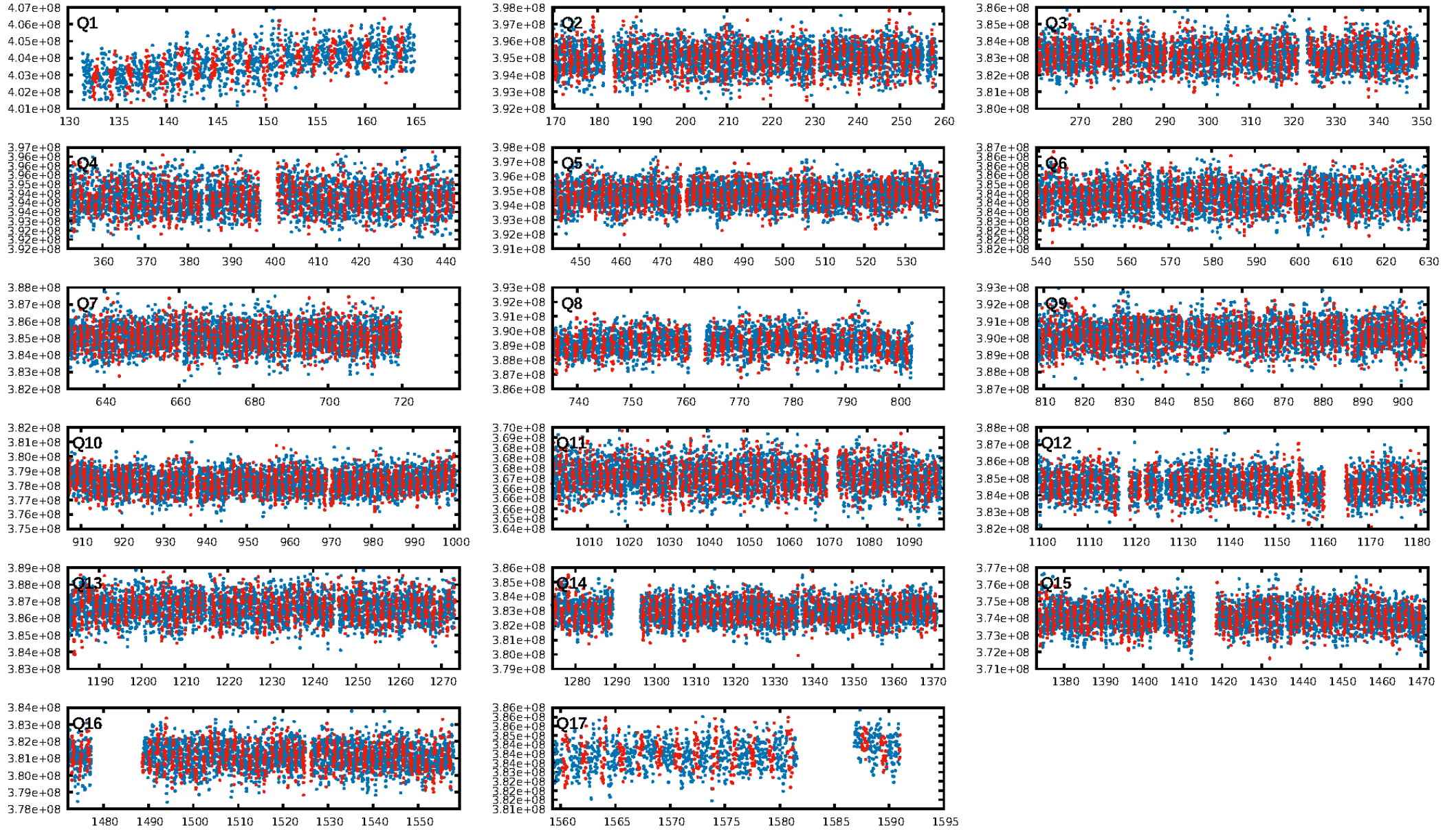
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [3.73 $\sigma$ ]  
LongPeriod-sig: 100.0% [62.05 $\sigma$ ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 2.58e-15  
RollingBand-fgt: 0.99 [755/760]  
GhostDiagnostic-chr: 1.427  
Centroid-sig: N/A  
Centroid-so: N/A  
OotOffset-rm: 0.039 arcsec [0.09 $\sigma$ ]  
KicOffset-rm: 0.163 arcsec [0.62 $\sigma$ ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 0.94 [16/17]  
DiffImageOverlap-fno: 0.00 [0/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 23:38:03 Z

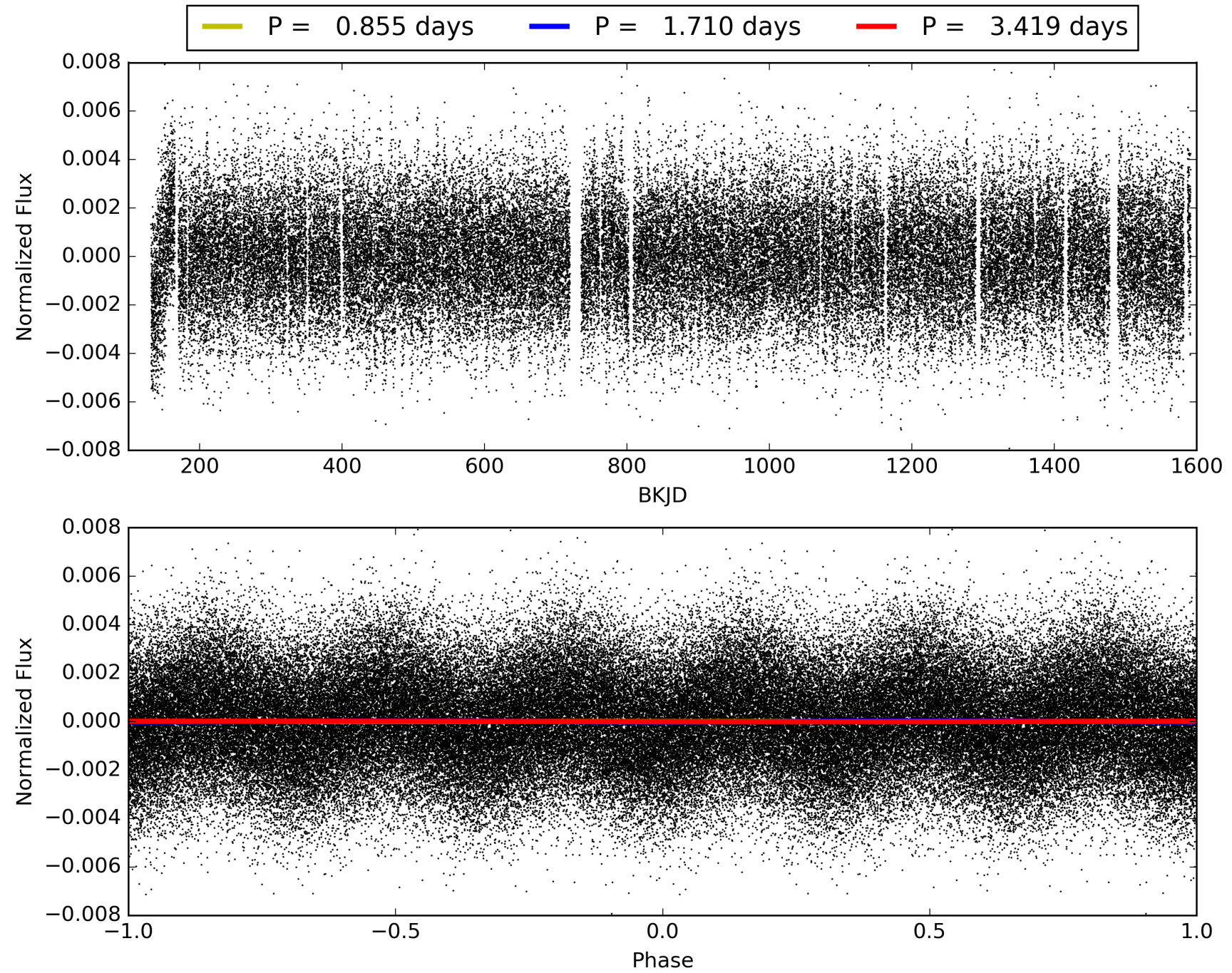
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 003855001-01, PDC Light Curves





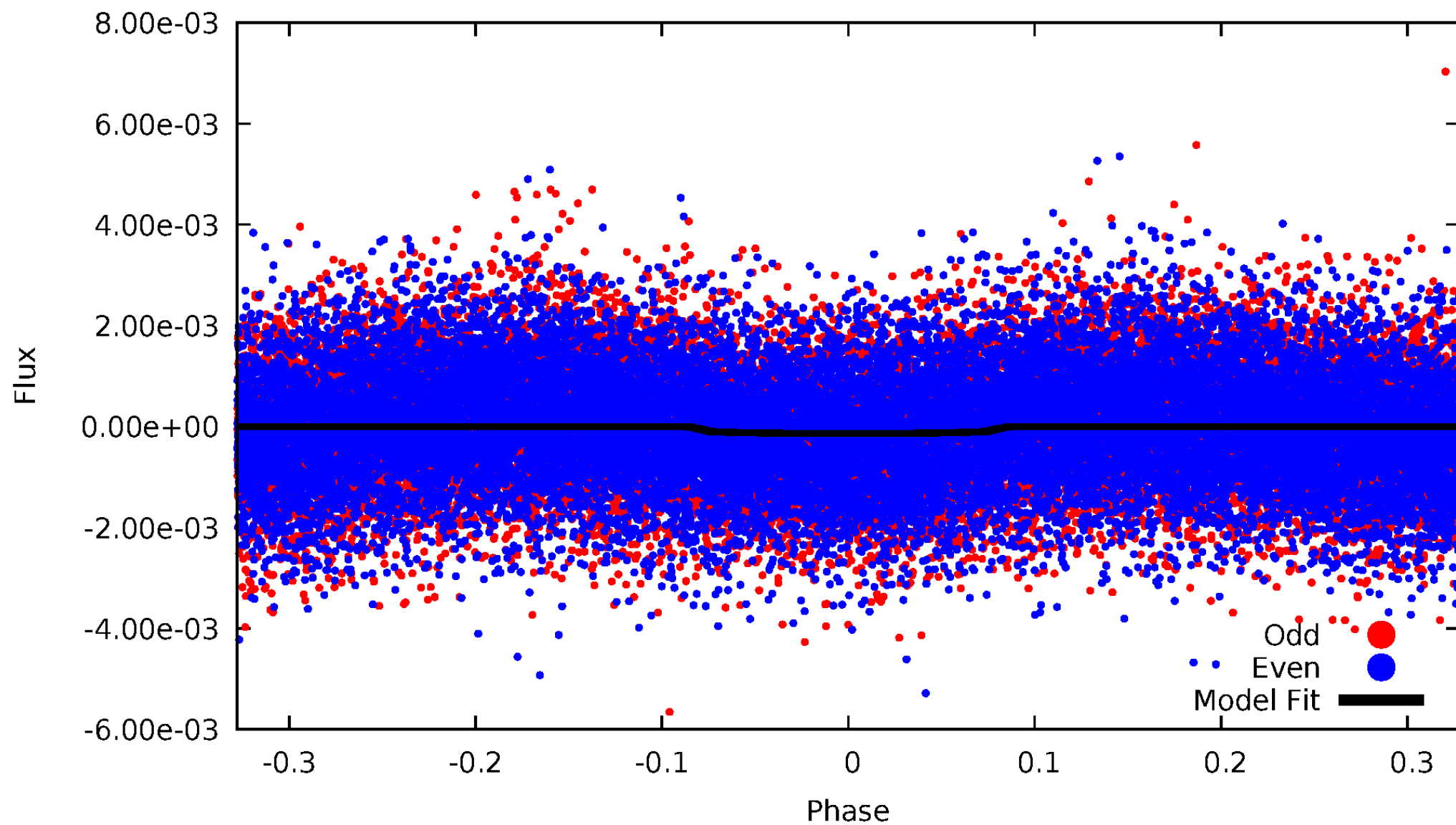
TCE 003855001-01





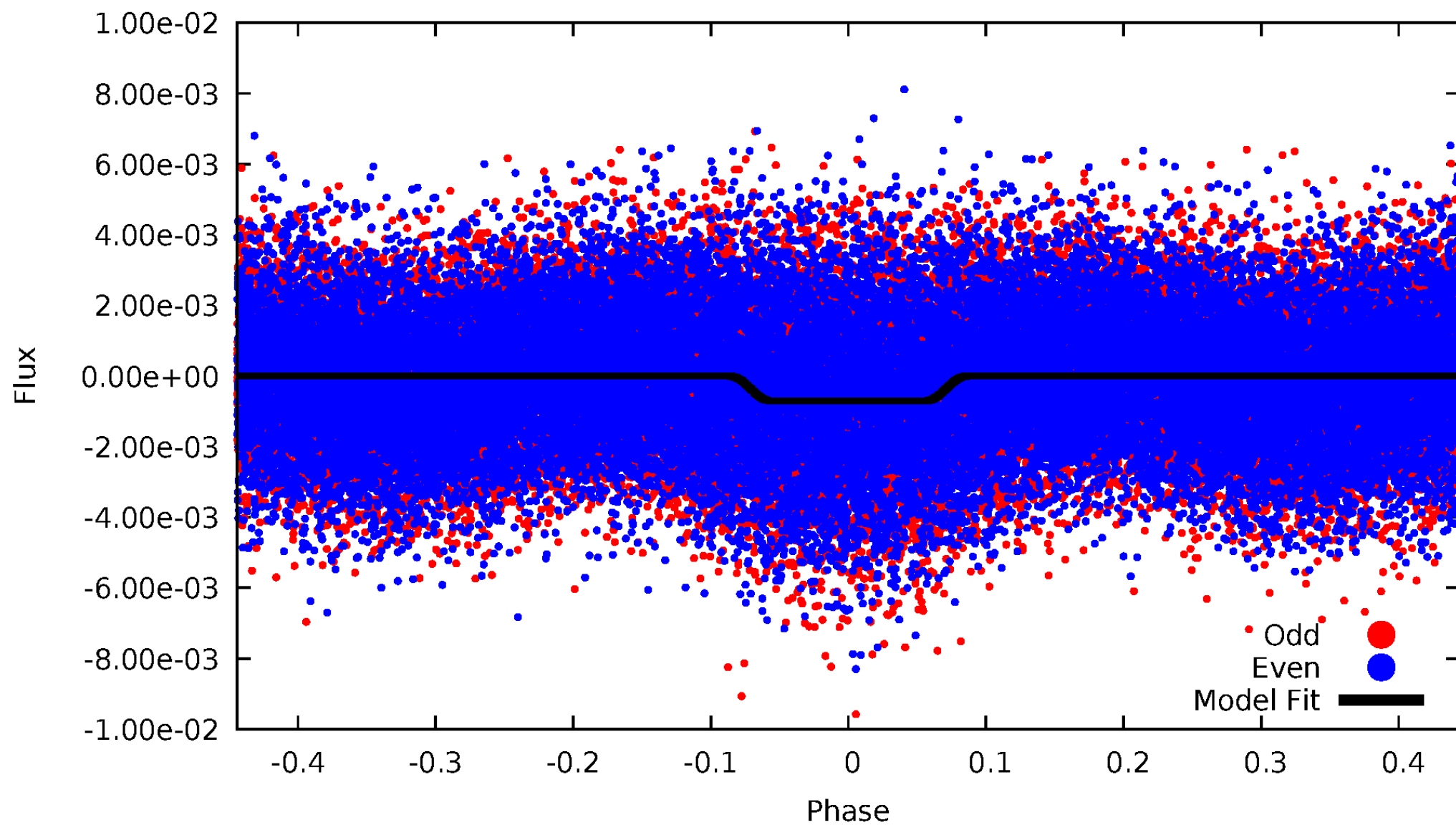
# DV Odd/Even

TCE 003855001-01



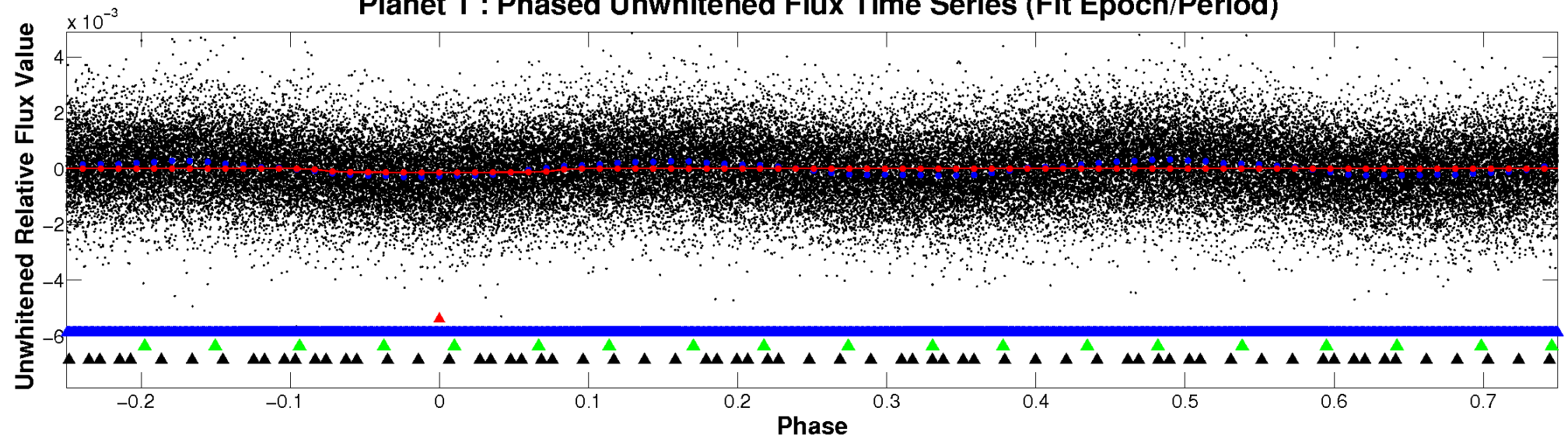
# ALT Odd/Even

TCE 003855001-01

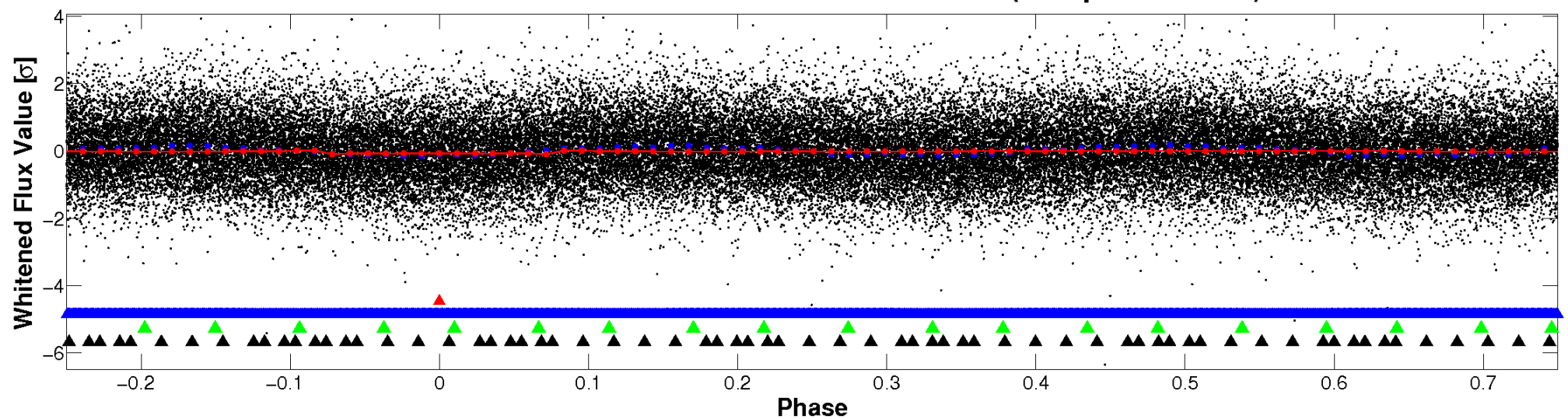


# Non-Whitened Vs. Whitened Light Curve

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



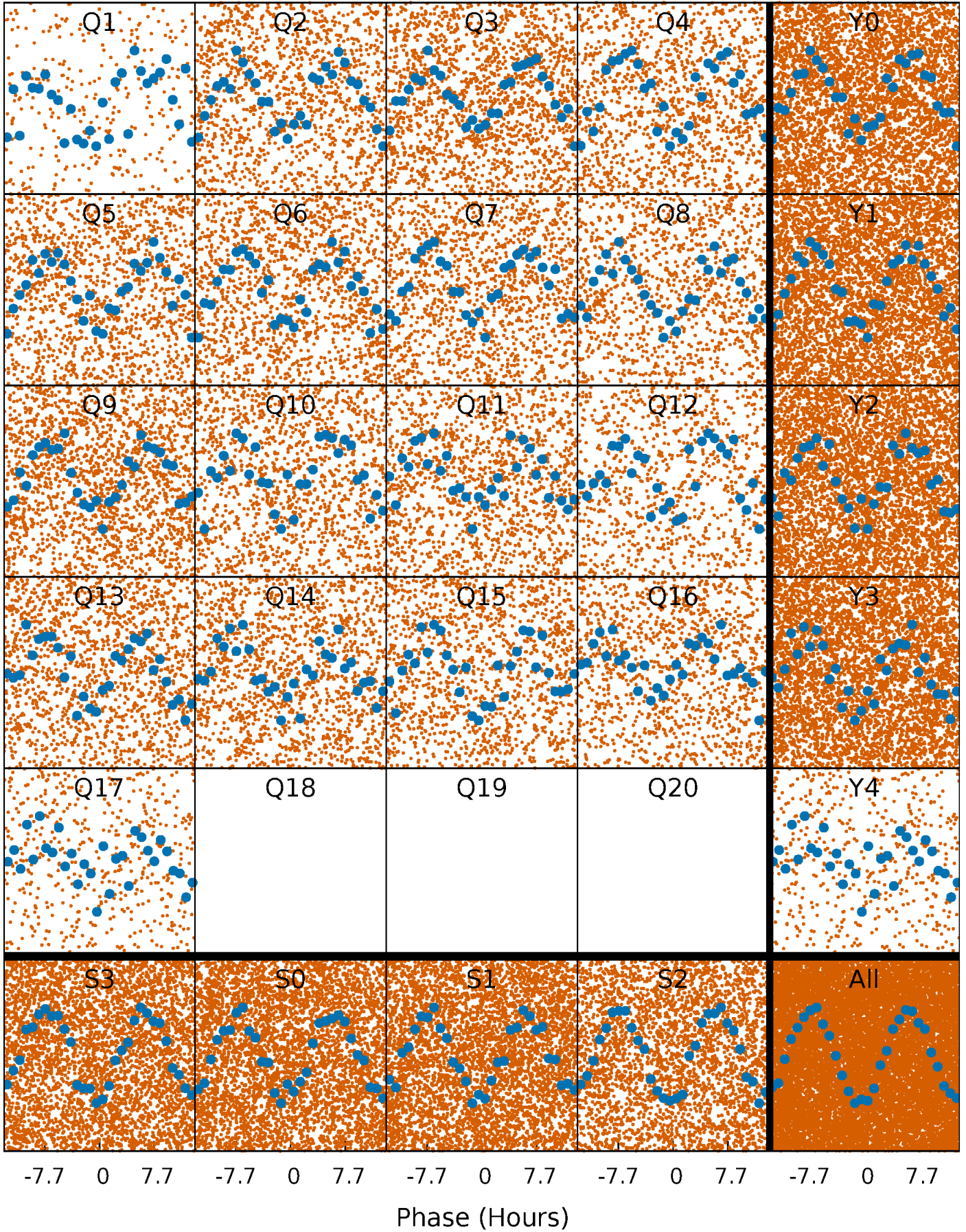
Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)





# PDC Quarter-Phased Transit Curves

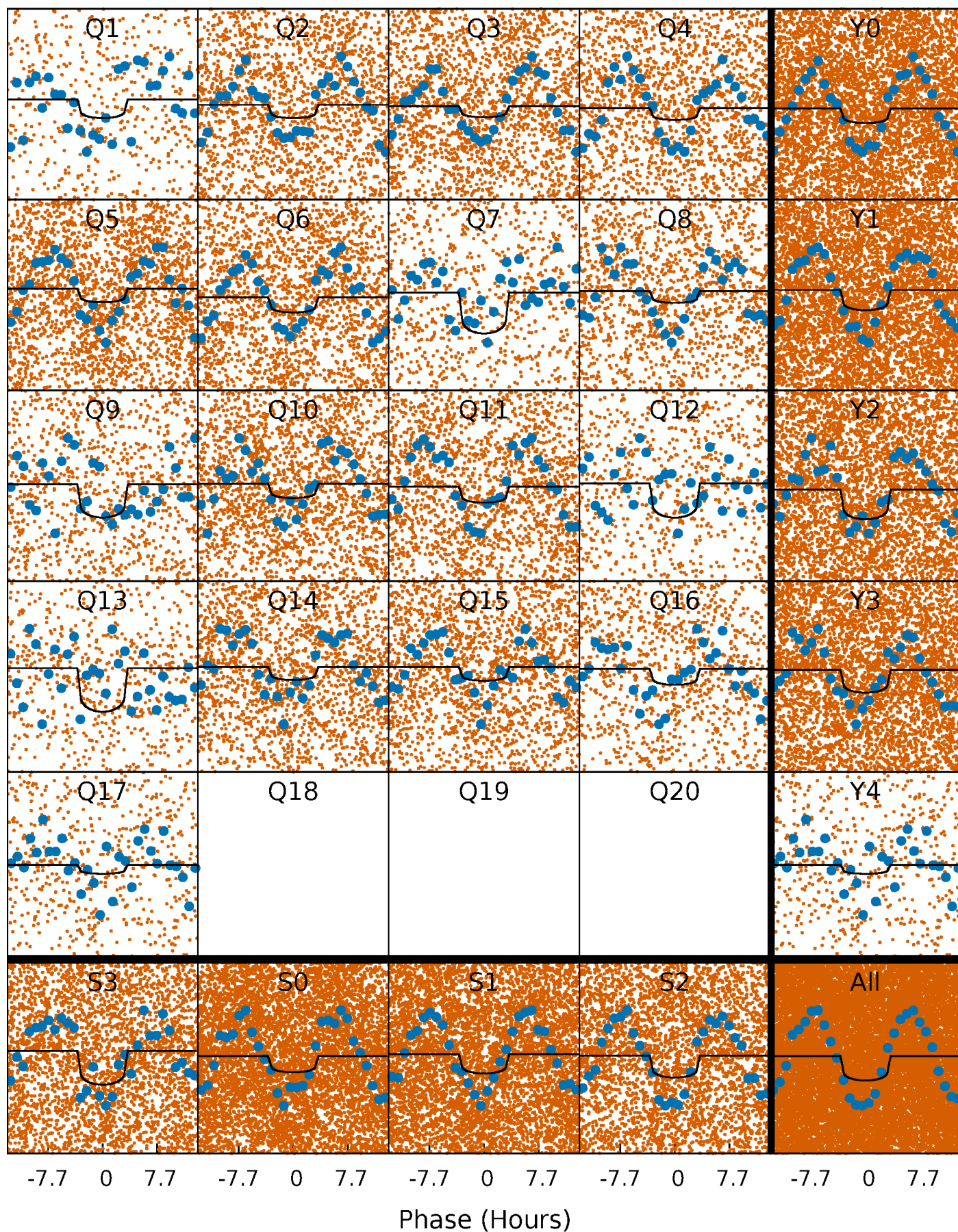
TCE 003855001-01 P= 1.709750 Days  $T_0=132.779883$  (BKJD)





# DV Quarter-Phased Transit Curves

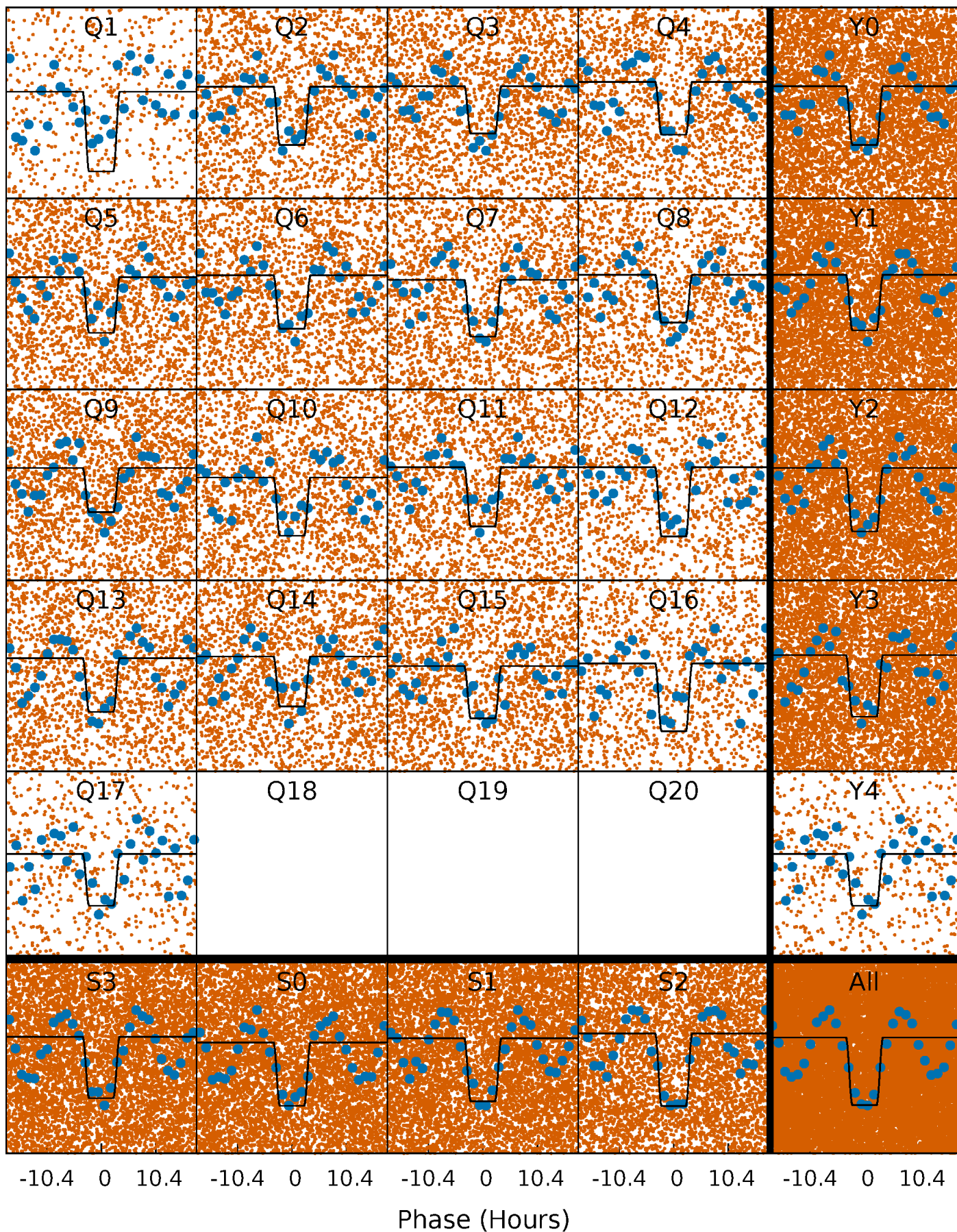
TCE 003855001-01 P= 1.709750 Days  $T_0=132.779883$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

TCE 003855001-01   P= 1.709728 Days    $T_0=132.764080$  (BKJD)

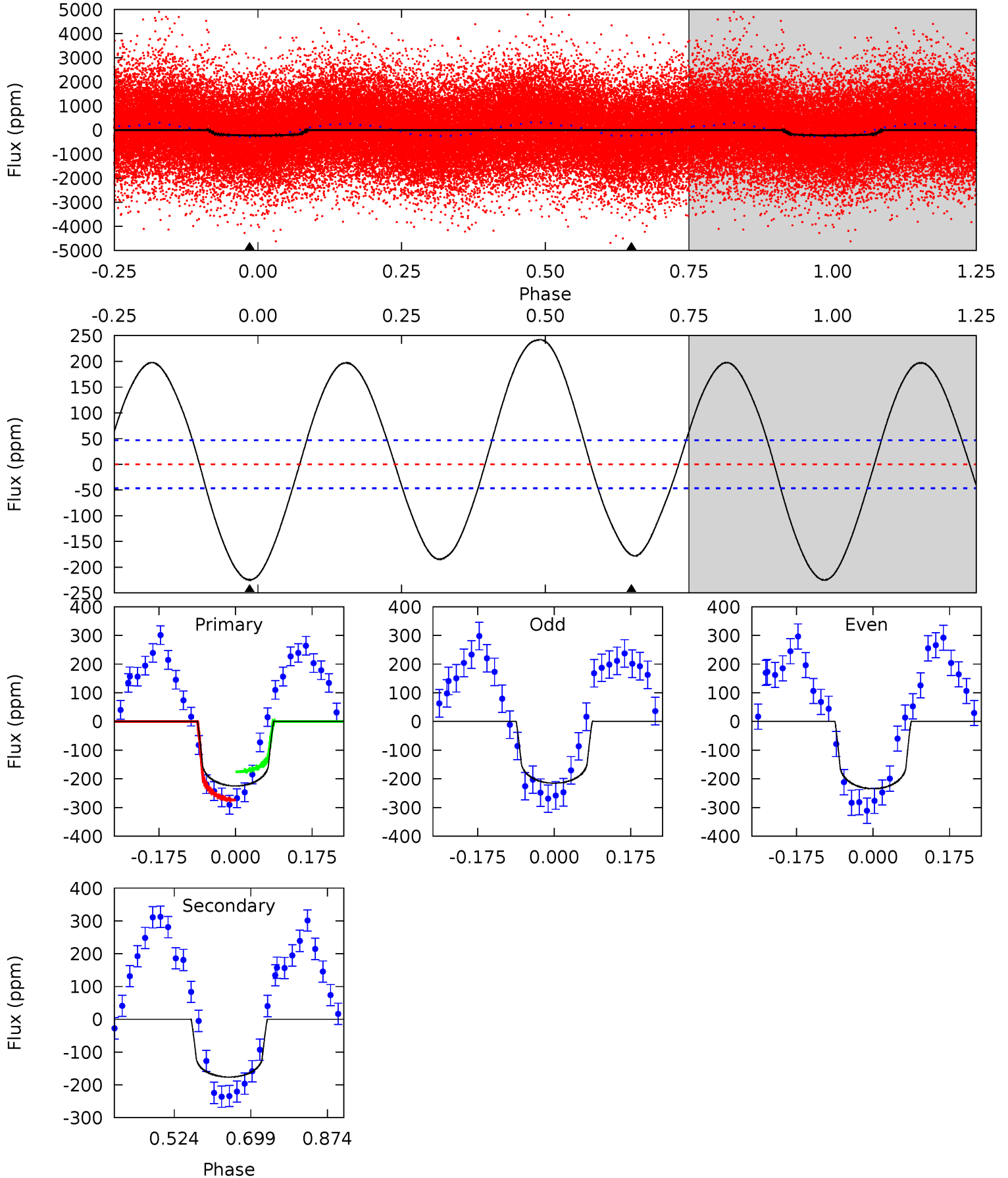




# DV Model-Shift Uniqueness Test

003855001-01, P = 1.709750 Days, E = 131.070133 Days

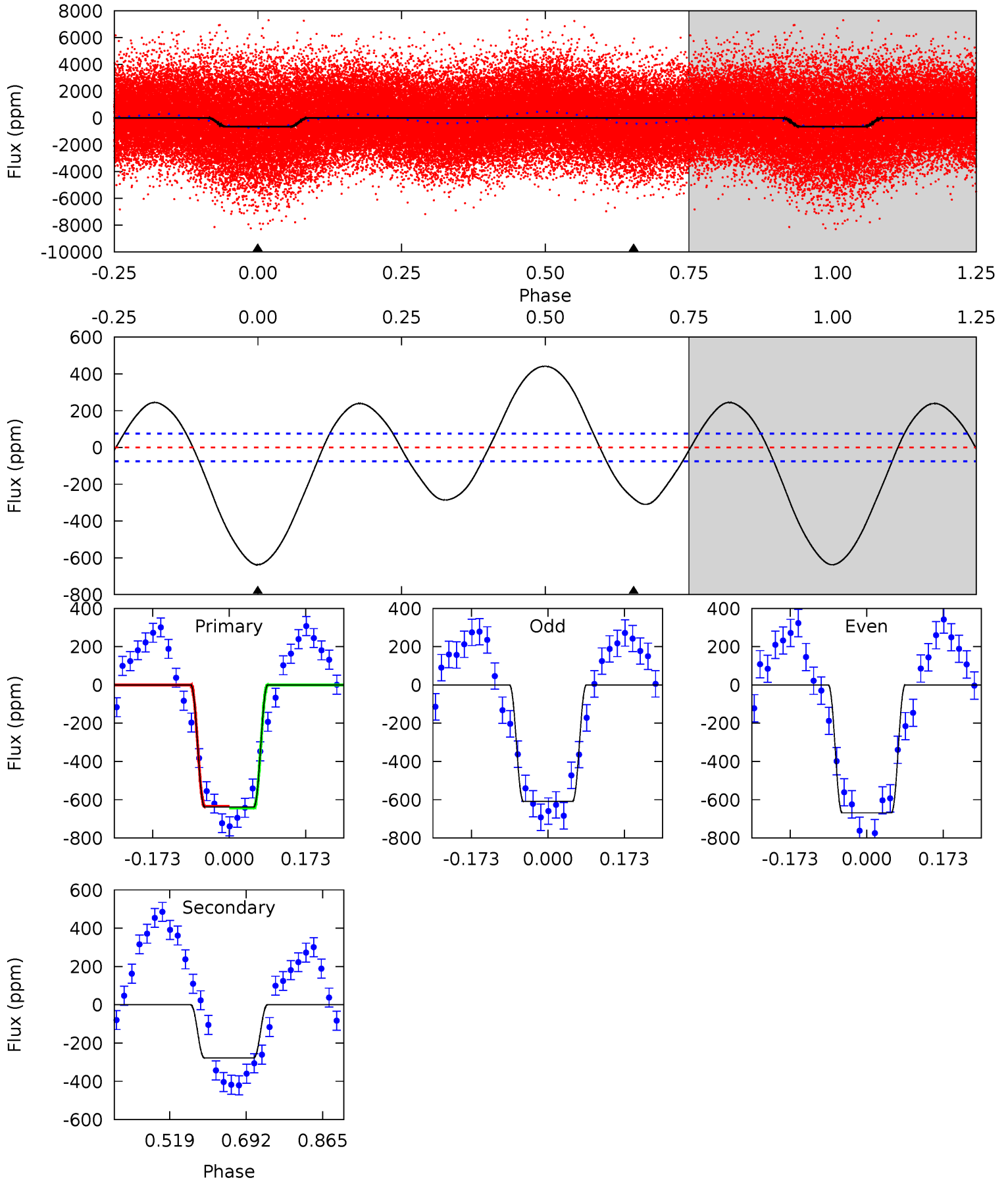
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
21.4	16.8	0	0	4.45	1.36	13.1	21.4	21.4	16.8	16.8	0.91	1.09	0.52	4.75



# Alt Model-Shift Uniqueness Test

003855001-01, P = 1.709728 Days, E = 131.054352 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
37.7	16.4	0	0	4.45	1.36	12.8	37.7	37.7	16.4	16.4	1.76	1.04	0.41	0.29



### Stellar Parameters For KIC 003855001

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$7149^{+175}_{-300}$	$4.256^{+0.058}_{-0.232}$	$0.210^{+0.150}_{-0.400}$	$1.537^{+0.580}_{-0.193}$	$1.556^{+0.211}_{-0.211}$	$0.603^{+0.195}_{-0.342}$
	+2%/-4%	+1%/-5%	+71%/-190%	+38%/-13%	+14%/-14%	+32%/-57%
Source	PHO1	KIC0	KIC0	DSEP		

KIC = Kepler Input Catalog; PHO = Photometry; SPE = Spectroscopy; AST = Asteroseismology  
 TRA = Transits; DESP = Dartmouth Models; MULT = Multiple Models

### Secondary Eclipse Parameters for KIC 003855001-01 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-176 \pm 11$	$2.00^{+1.10}_{-1.06}$	$3082^{+260}_{-161}$	$7837^{+5367}_{-1727}$	$24^{+86}_{-14}$
Alt.	$-278 \pm 17$	$4.78^{+1.43}_{-1.22}$	$3096^{+257}_{-188}$	$5484^{+867}_{-513}$	$6.985^{+5.405}_{-2.773}$

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



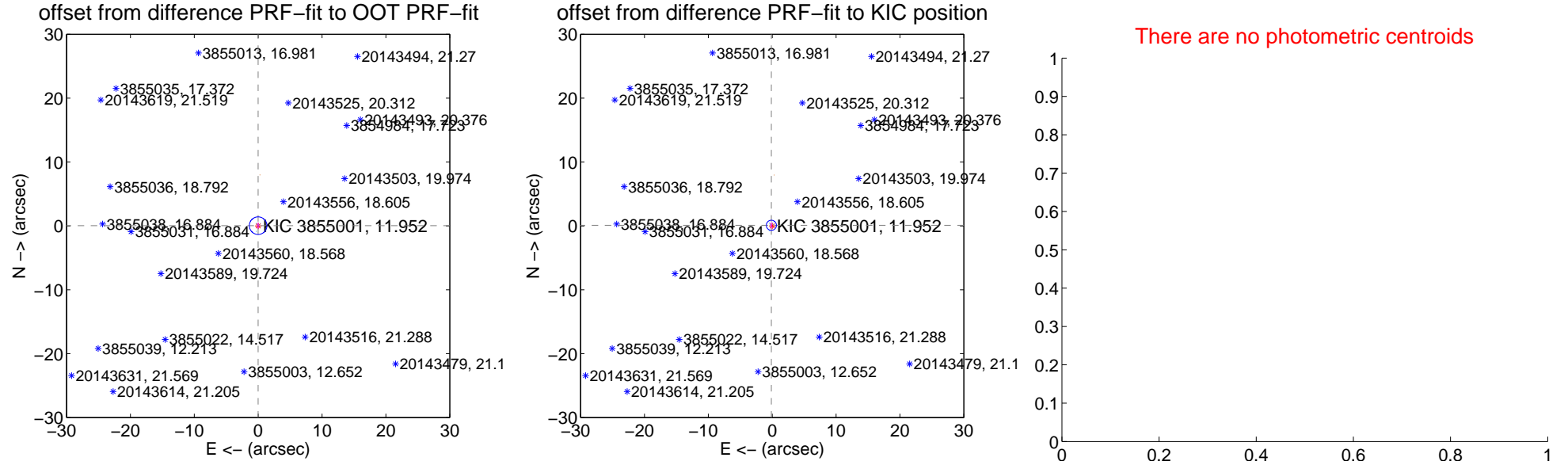
## DV Centroid Data

Supplemental centroid analysis for 003855001-01. **Kepler magnitude: 11.95.** Transit SNR 7.71

There are 16 quarters with good PRF difference image offsets

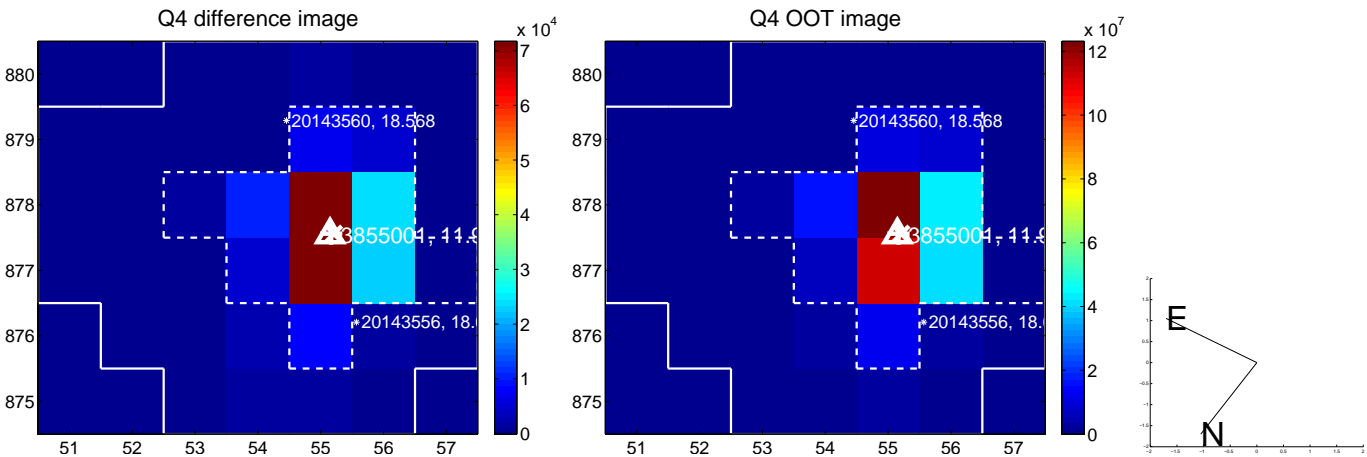
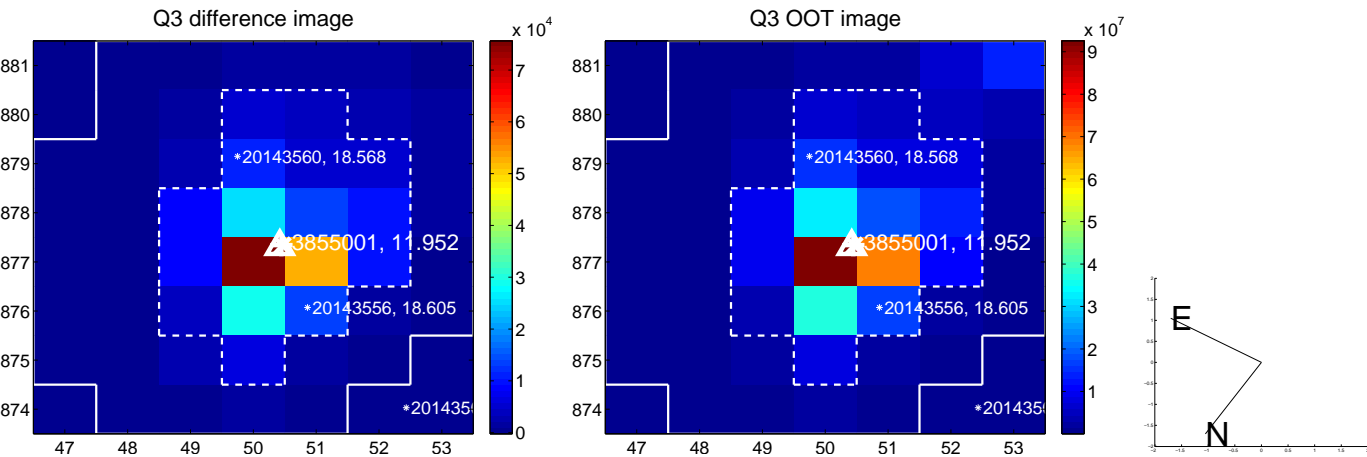
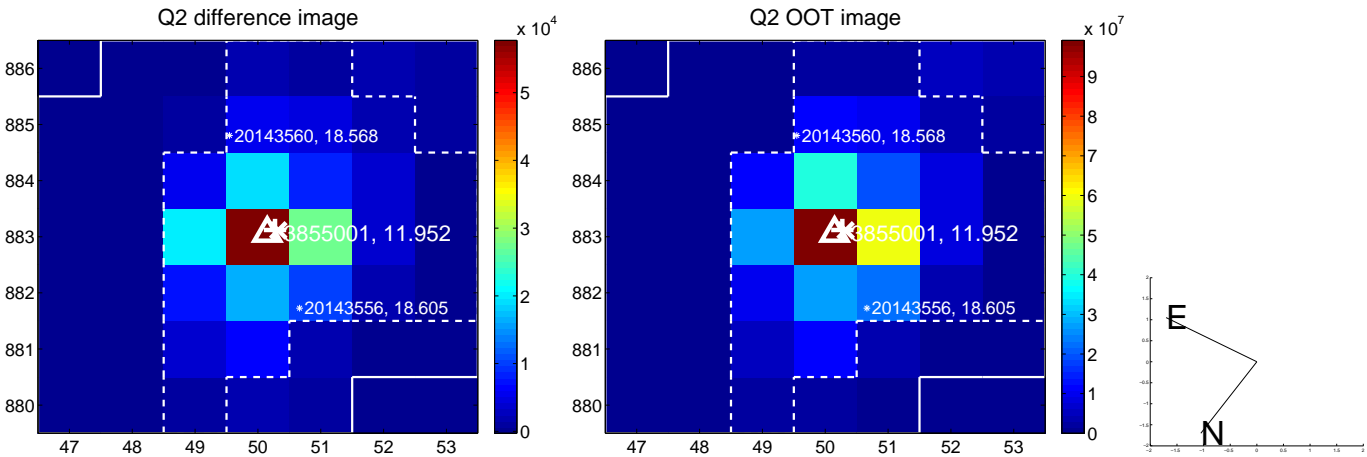
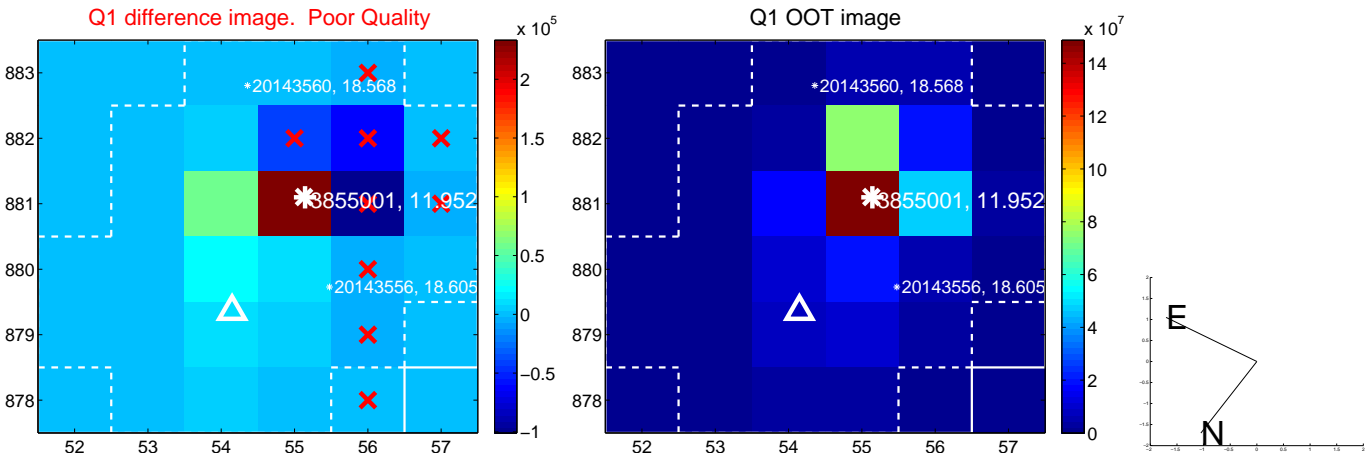
The direct PRF centroid is offset from the target star catalog position by about 0.09 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.039 \pm 0.458$	0.09	$0.007 \pm 0.078$	$0.039 \pm 0.468$
PRF-fit source offset from KIC position	$0.163 \pm 0.263$	0.62	$0.131 \pm 0.087$	$0.096 \pm 0.476$
photometric centroid source offset	—	—	—	—

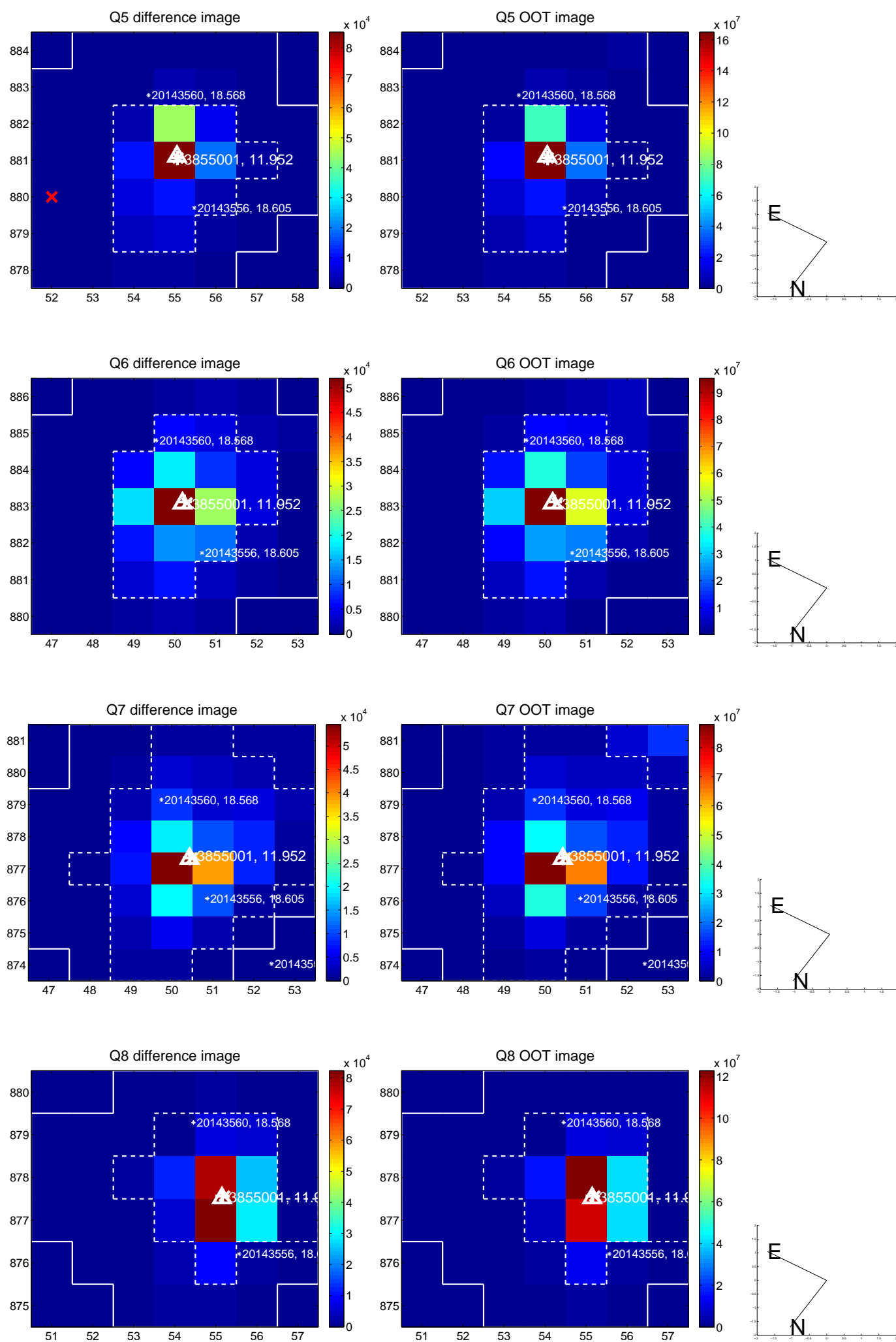


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

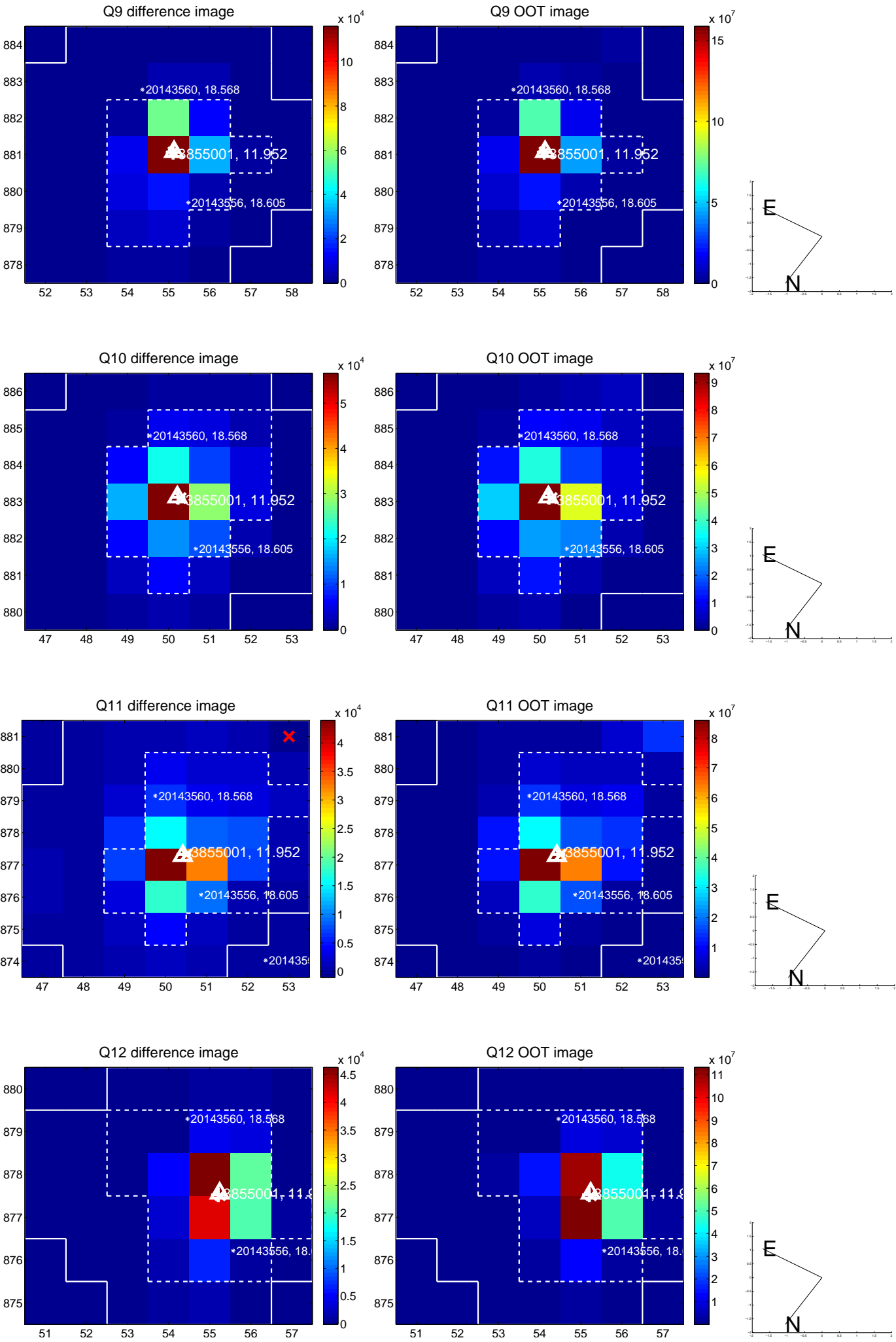


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

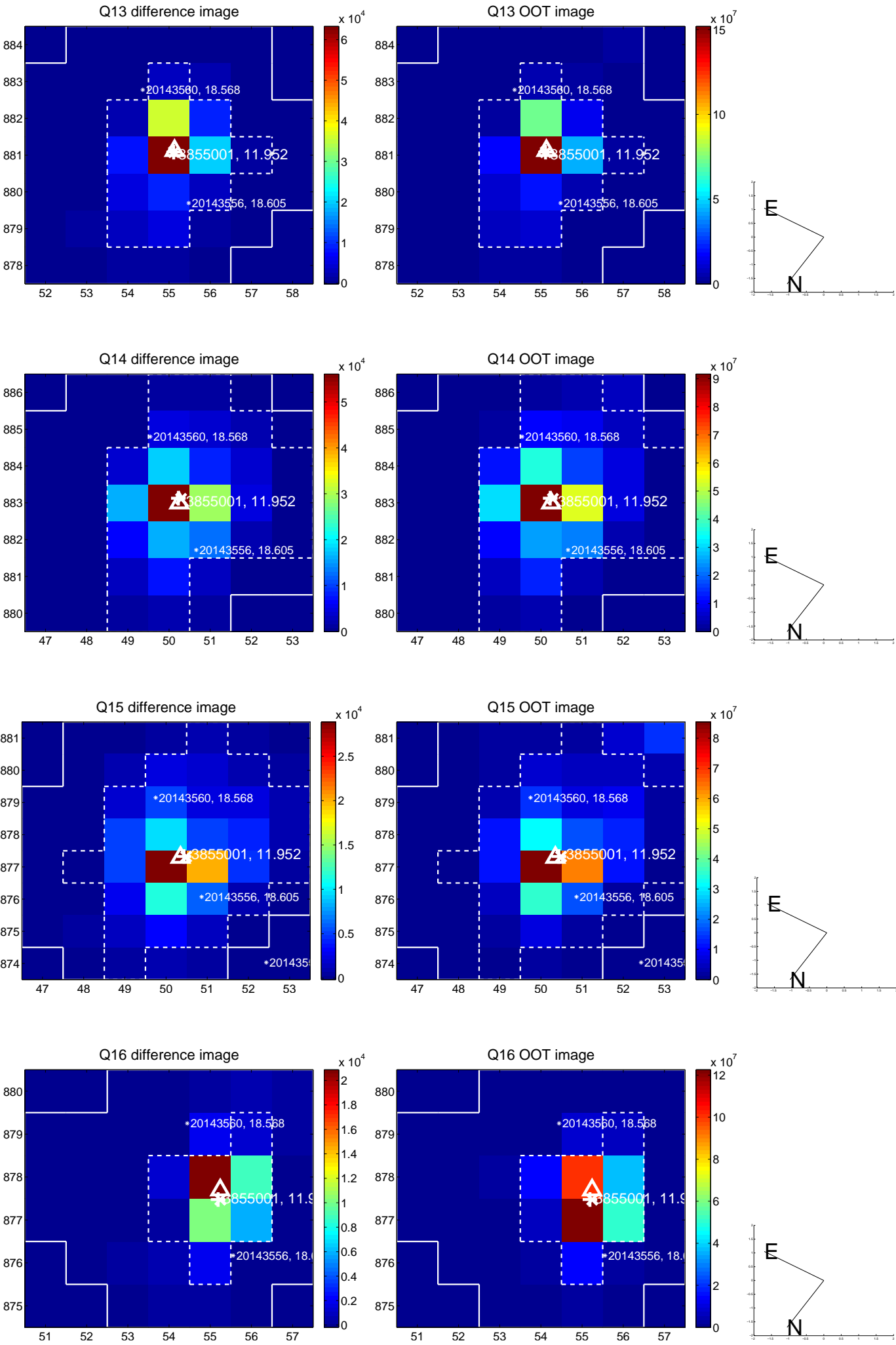




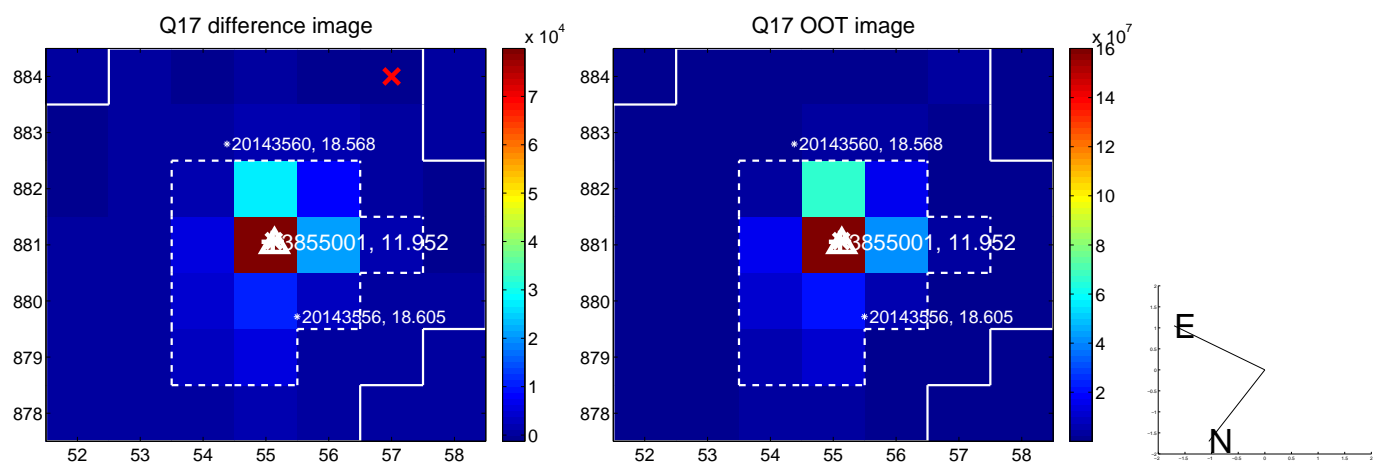
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



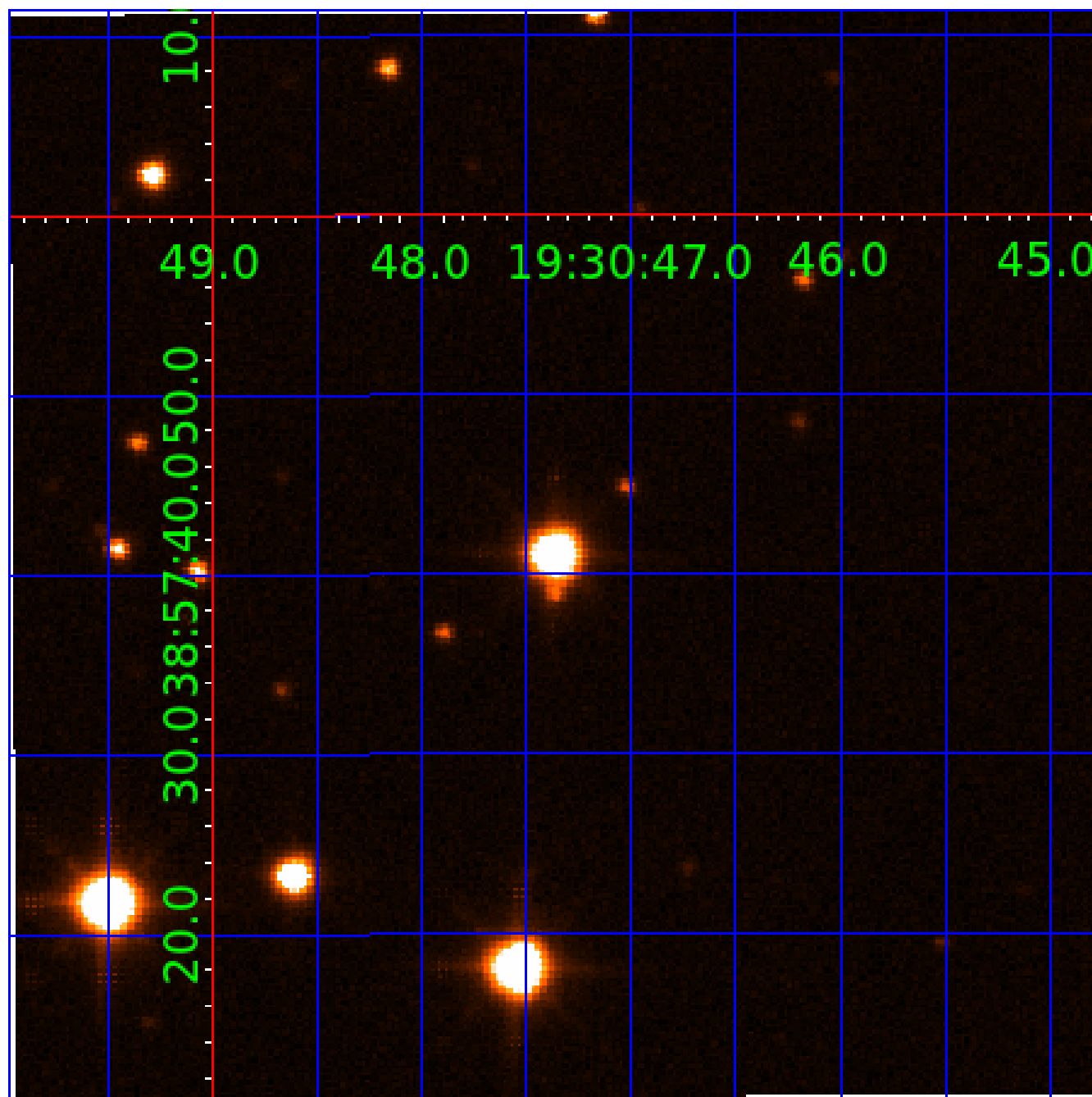
folded centroid time series figure for this object.





UKIRT Image

Declination



# KIC 003855001

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
003855001-01	OBS	No	1.709750	132.779883	137.9	6.726	9.5	7.7	1.54	7149	1.84	5261.16
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003855001-03	OBS	No	77.567808	167.991944	2249.2	4.011	7.8	8.9	1.54	7149	7.70	32.52
003855001-04	OBS	No	21.743285	132.579449	1123.1	3.847	8.0	7.7	1.54	7149	7.13	177.24

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
003855001-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
003855001-02	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
003855001-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_ALT—MOD_POS_ALT
003855001-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA—TRANS_GAPPED—MOD_NONUNIQ_ALT

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

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

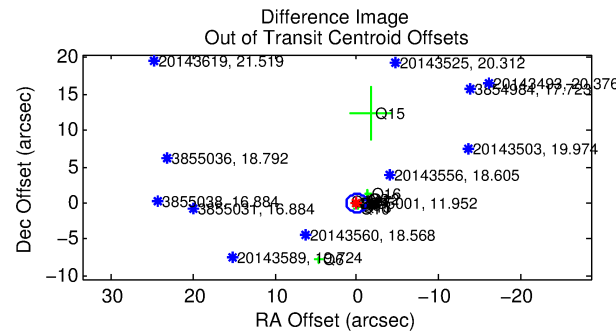
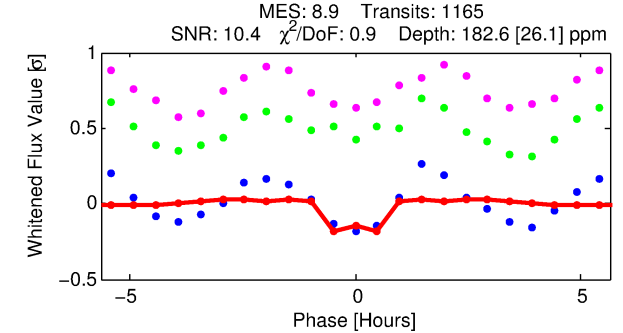
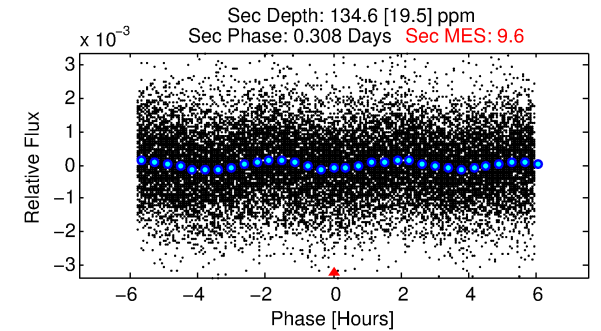
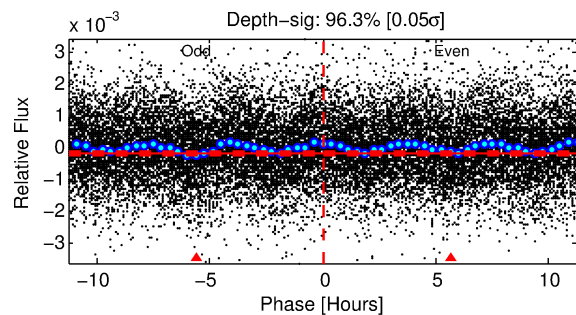
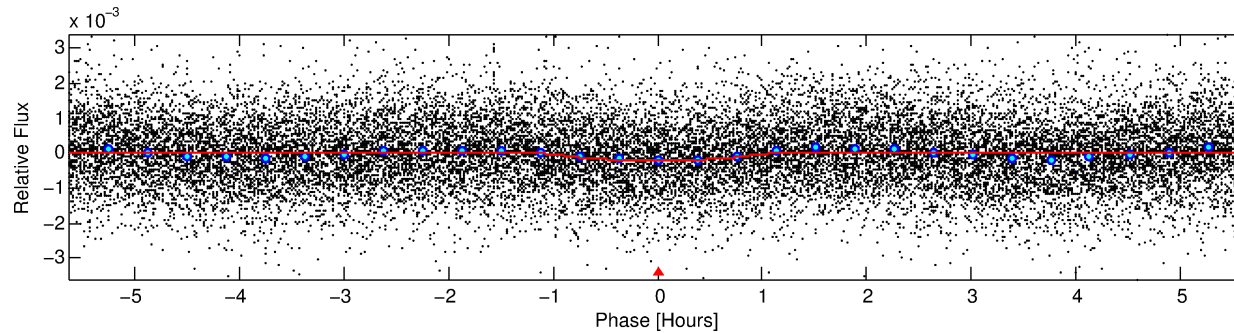
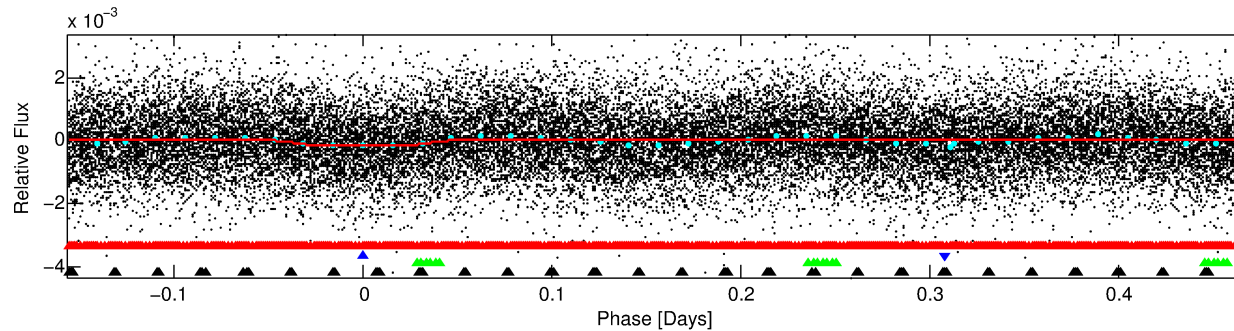
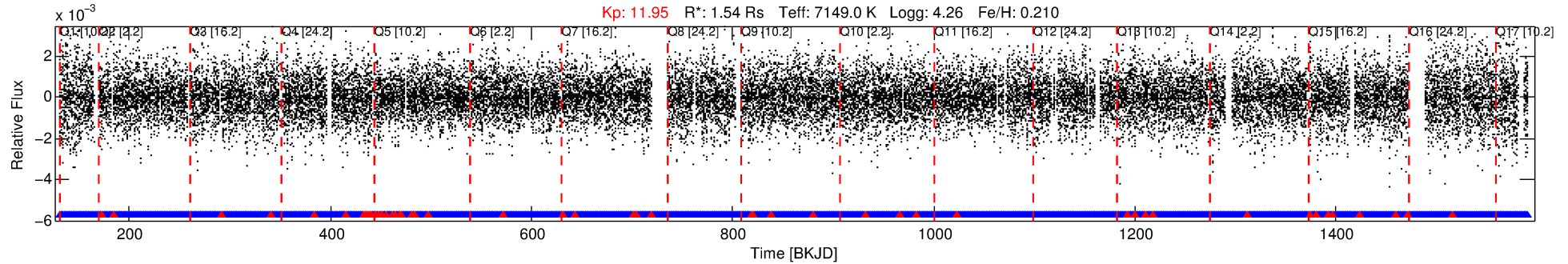
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 003855001-02

No Significant Match Found

# DV One-Page Summary

KIC: 3855001 Candidate: 2 of 4 Period: 0.624 d



## DV Fit Results:

Period = 0.62388 [0.00001] d  
Epoch = 131.5565 [0.0015] BKJD  
Rp/R\* = 0.0144 [0.0037]  
a/R\* = 1.50 [1.23]  
b = 0.90 [0.30]  
Seff = 20177.16 [9427.18]  
Teq = 3039 [355] K  
Rp = 2.42 [1.10] Re  
a = 0.0166 [0.0051] AU  
Ag = 3.46 [2.37] [1.04 $\sigma$ ]  
Teffp = 6408 [889] K [3.52 $\sigma$ ]

## DV Diagnostic Results:

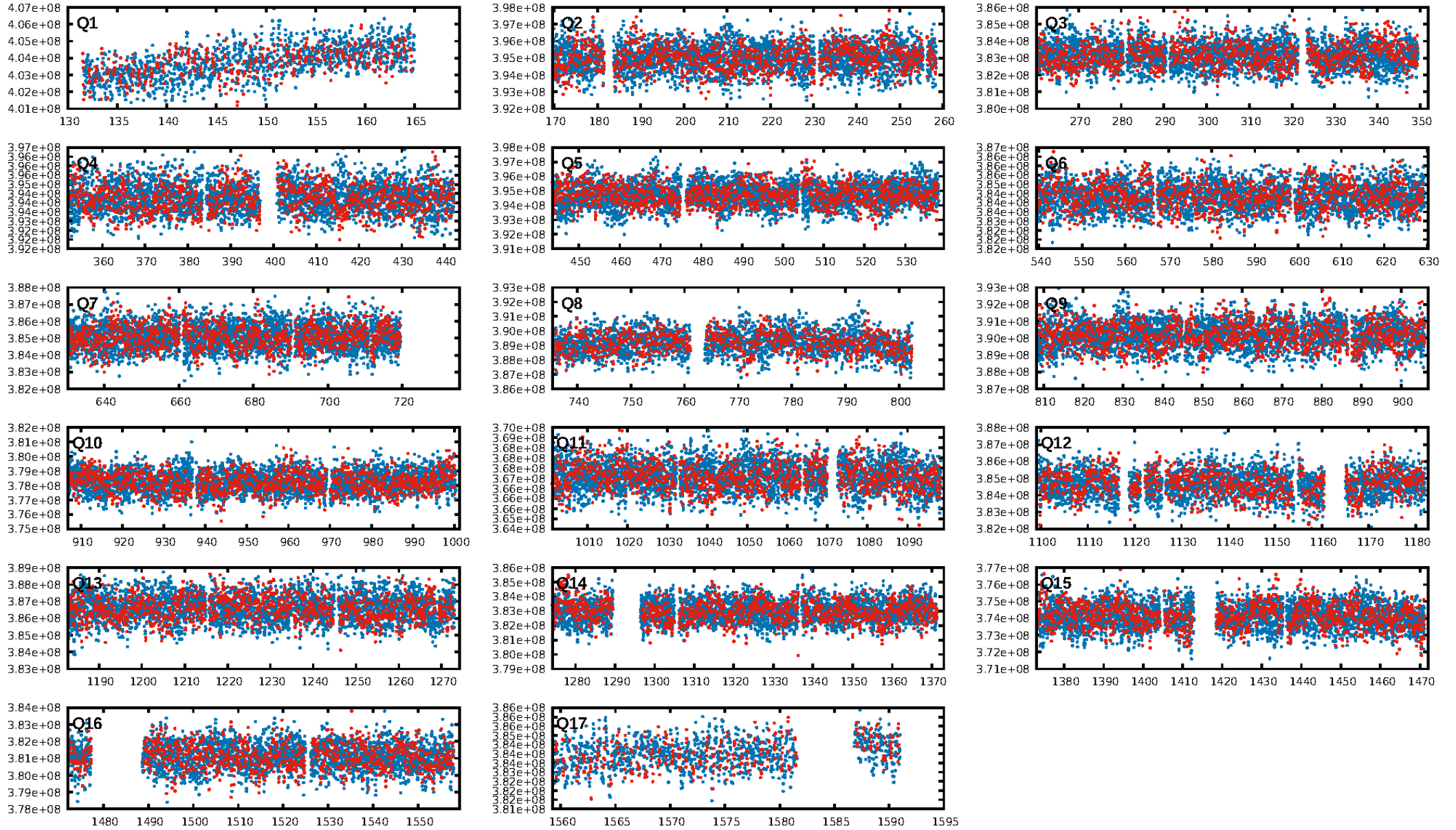
ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [3.73 $\sigma$ ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 1.41e-13  
RollingBand-fgt: 0.95 [1058/1111]  
GhostDiagnostic-chr: 1.48  
Centroid-sig: N/A  
Centroid-so: N/A  
OotOffset-rm: 0.097 arcsec [0.23 $\sigma$ ]  
KicOffset-rm: 0.223 arcsec [0.93 $\sigma$ ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 0.82 [14/17]  
DiffImageOverlap-fno: 1.00 [17/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 23:38:15 Z

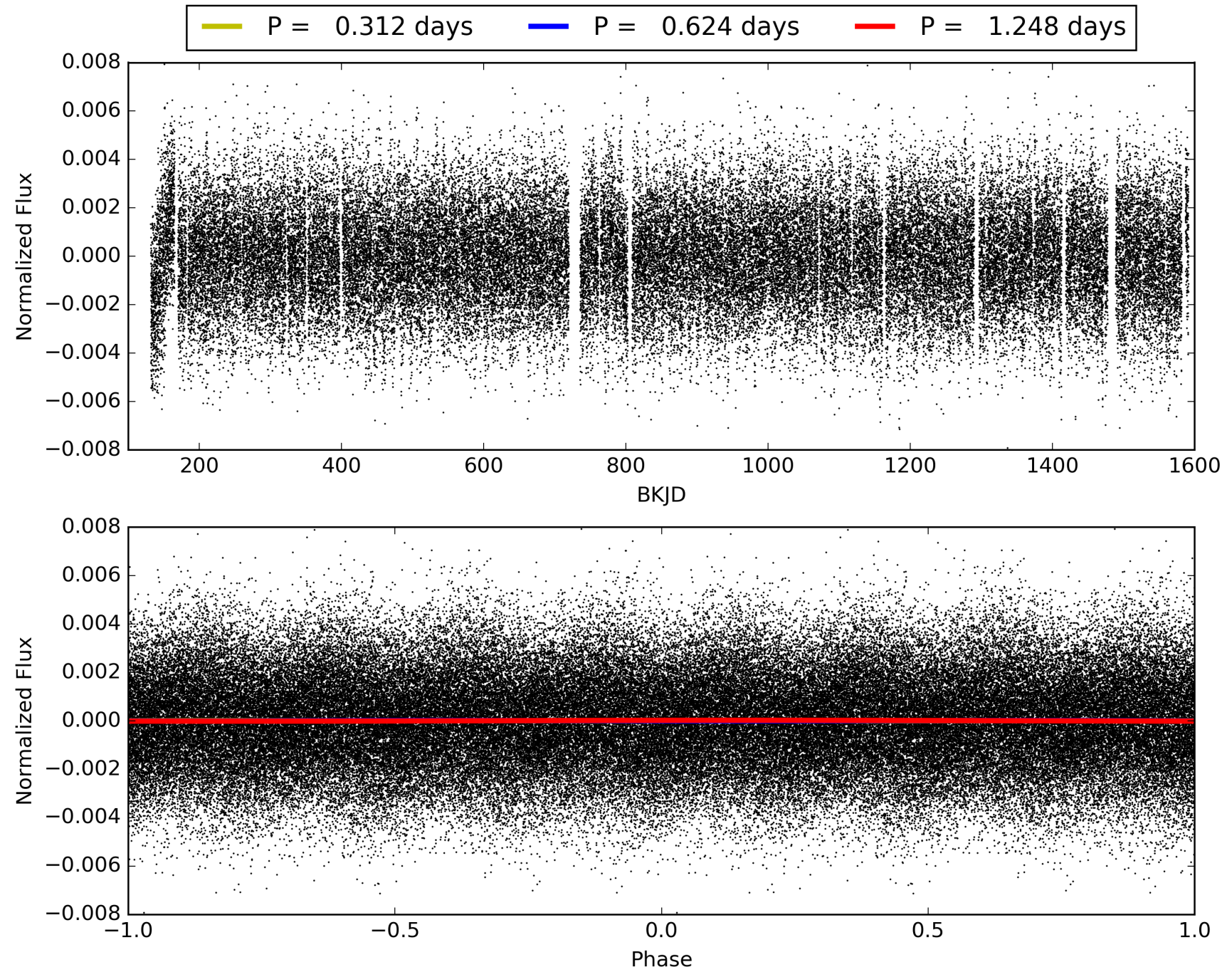
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center



# TCE 003855001-02, PDC Light Curves

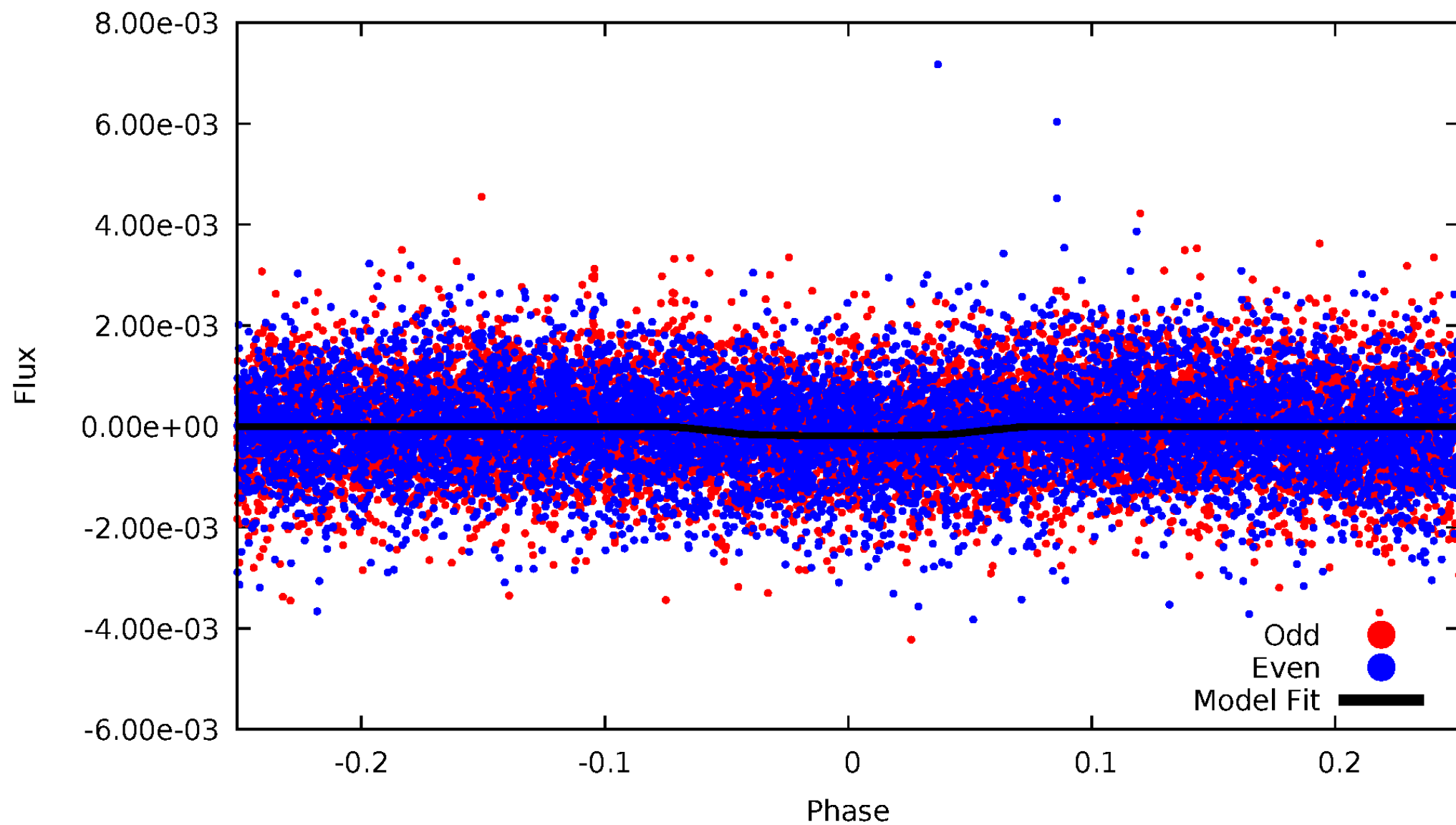


# TCE 003855001-02



# DV Odd/Even

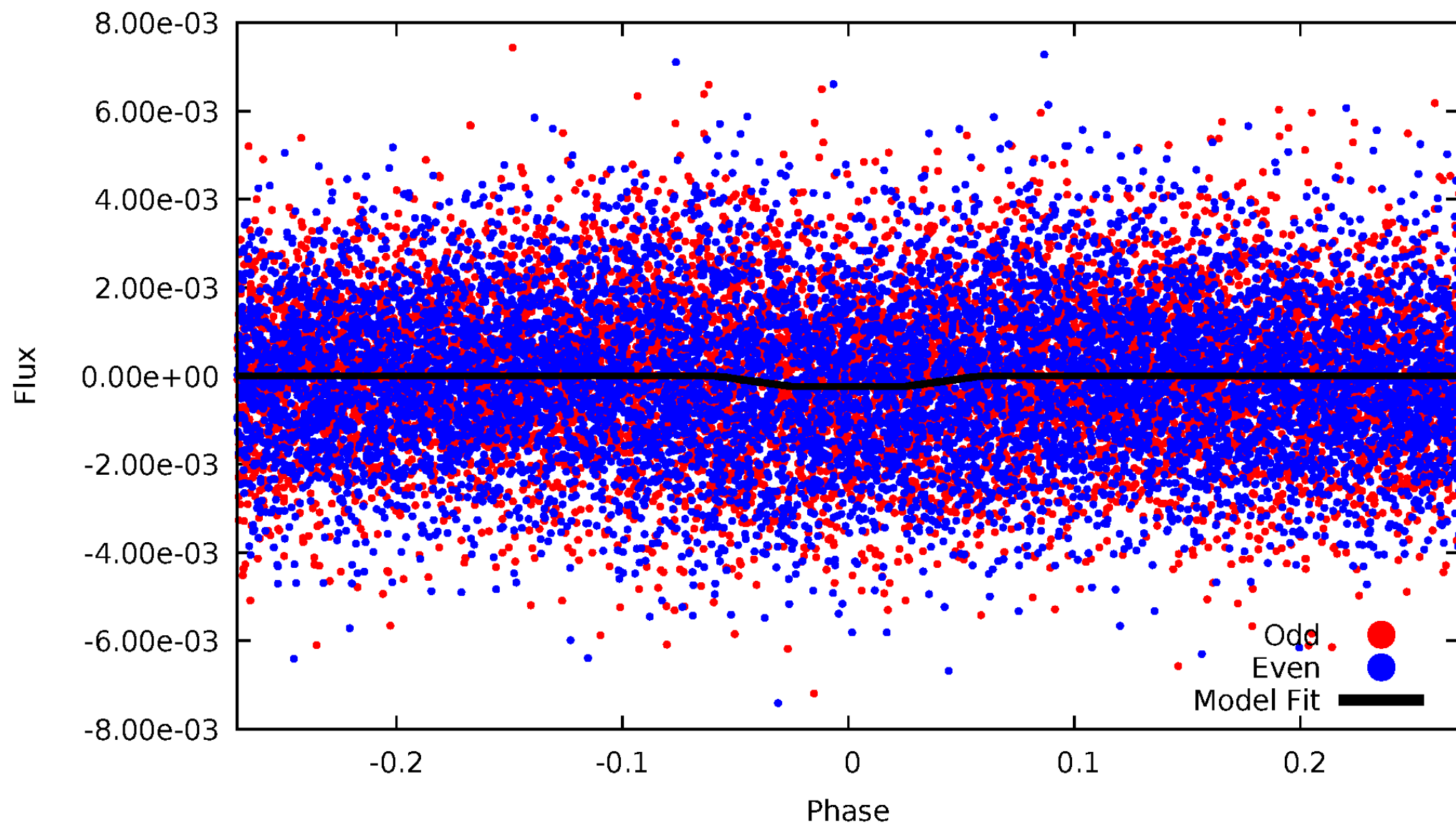
TCE 003855001-02





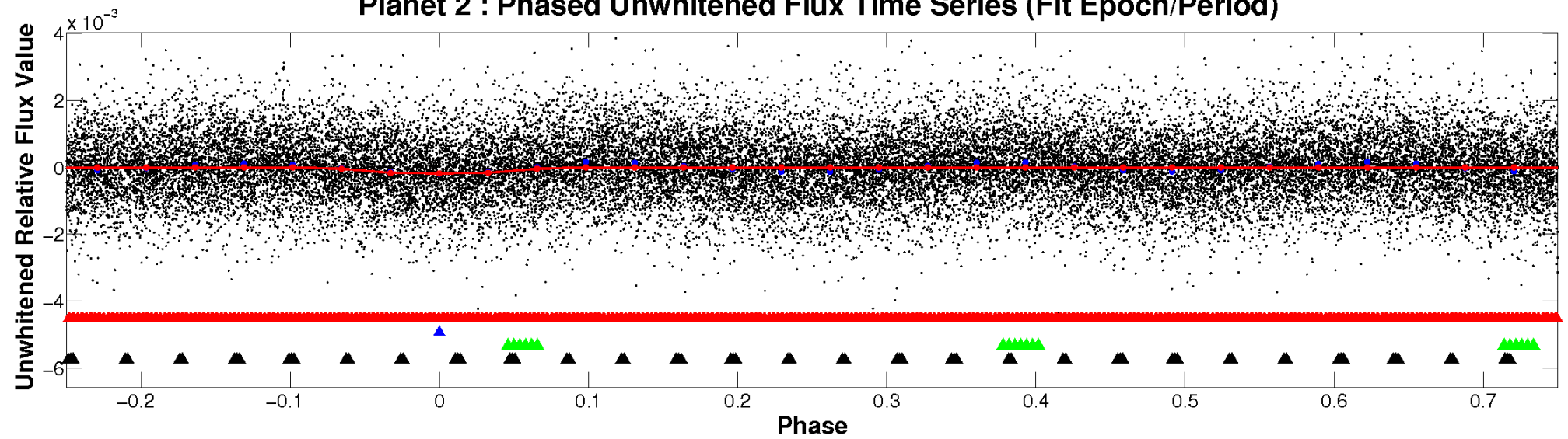
# ALT Odd/Even

TCE 003855001-02

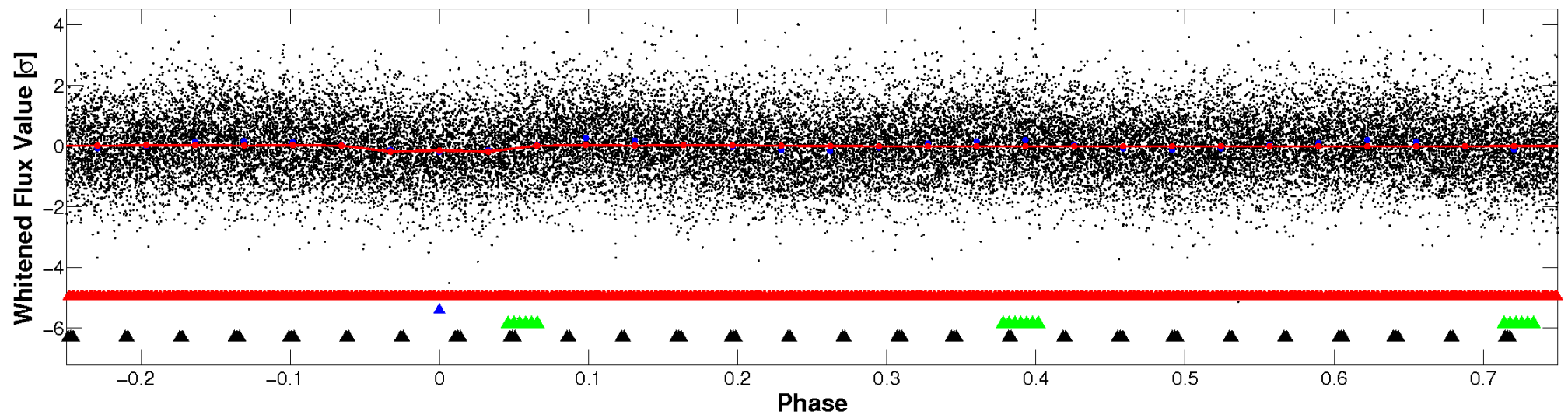


# Non-Whitened Vs. Whitened Light Curve

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

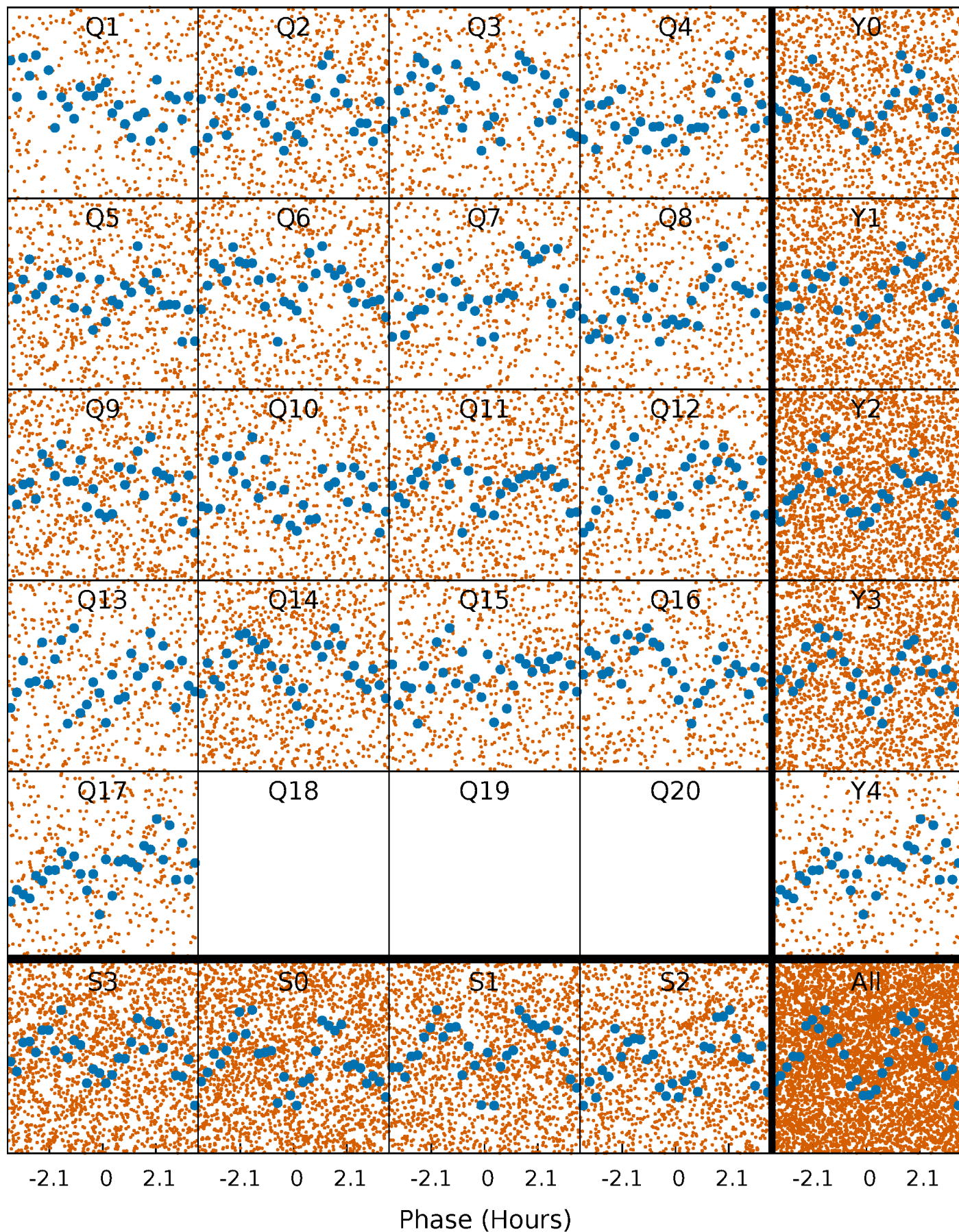


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

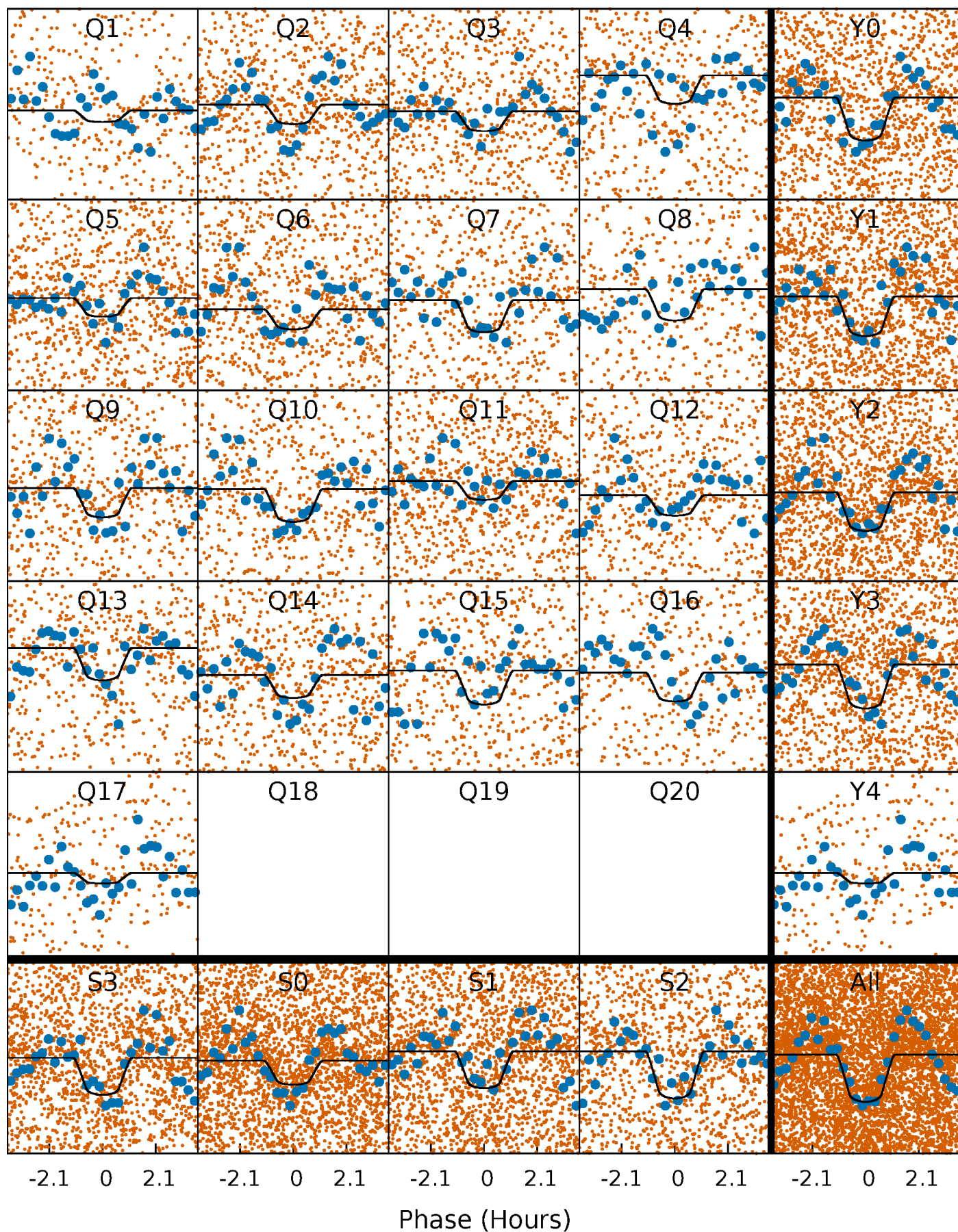
TCE 003855001-02     $P = 0.623876$  Days     $T_0 = 131.556527$  (BKJD)





# DV Quarter-Phased Transit Curves

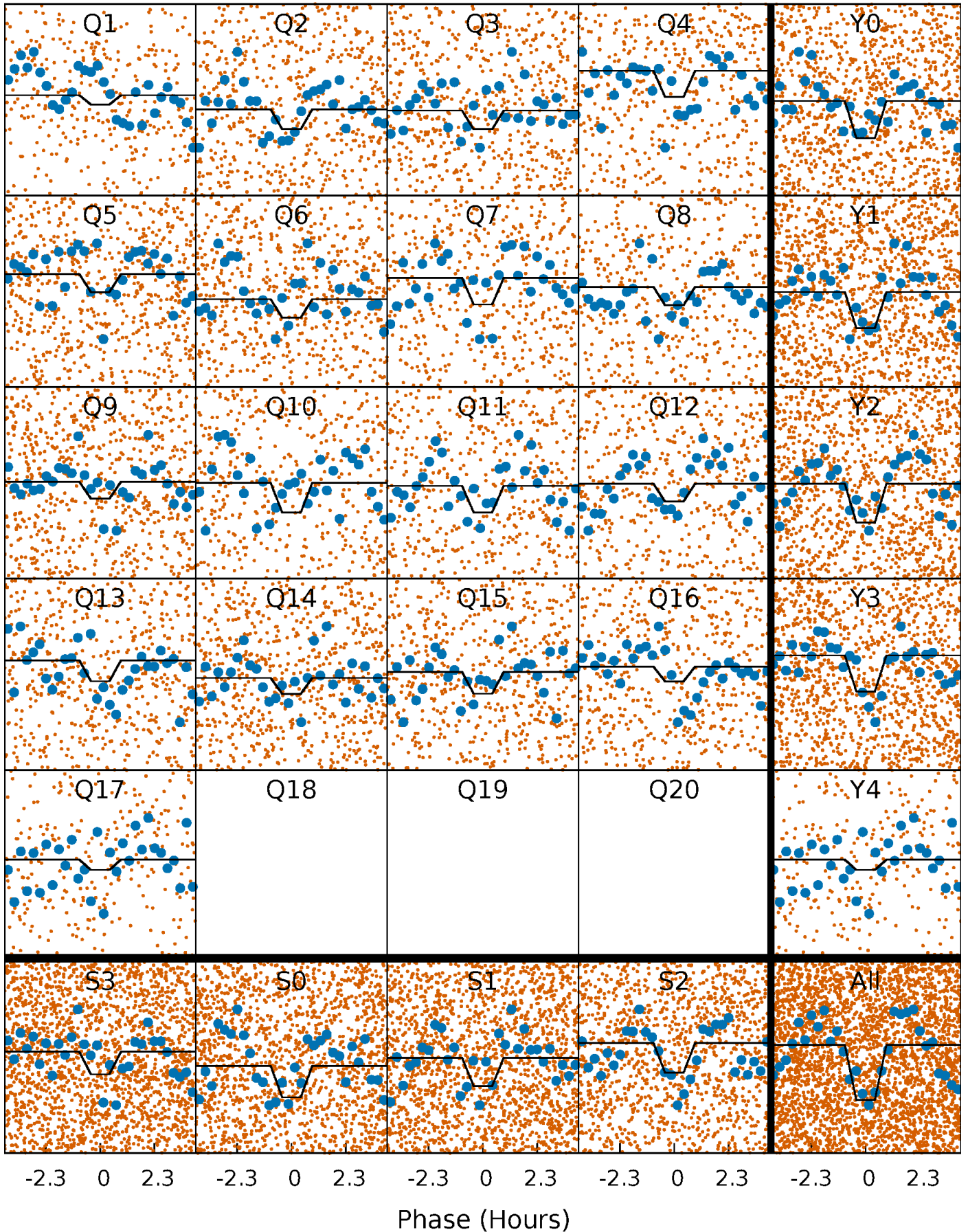
TCE 003855001-02 P= 0.623876 Days  $T_0=131.556527$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

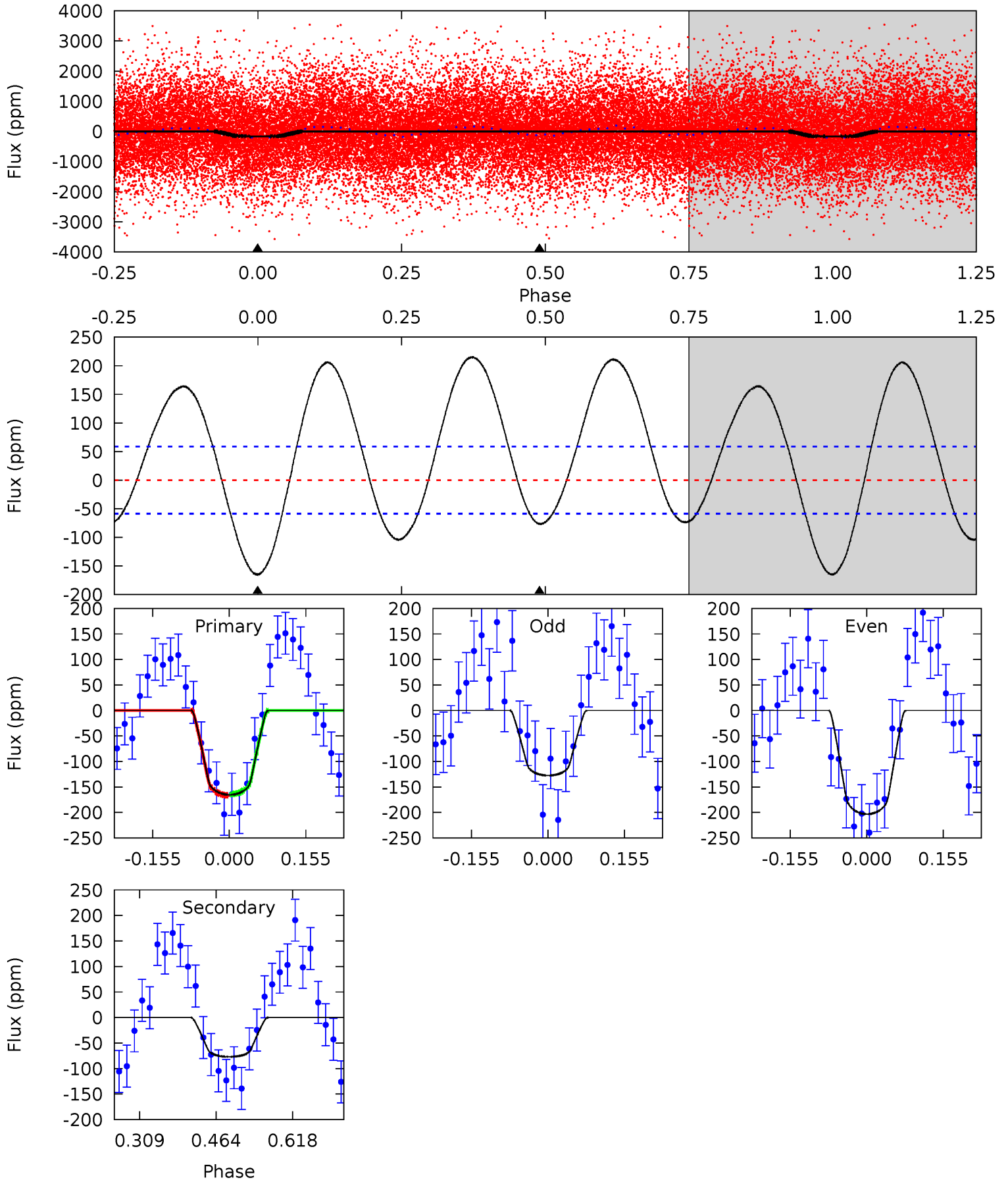
TCE 003855001-02     $P = 0.623879$  Days     $T_0 = 131.555065$  (BKJD)



# DV Model-Shift Uniqueness Test

003855001-02, P = 0.623876 Days, E = 130.932651 Days

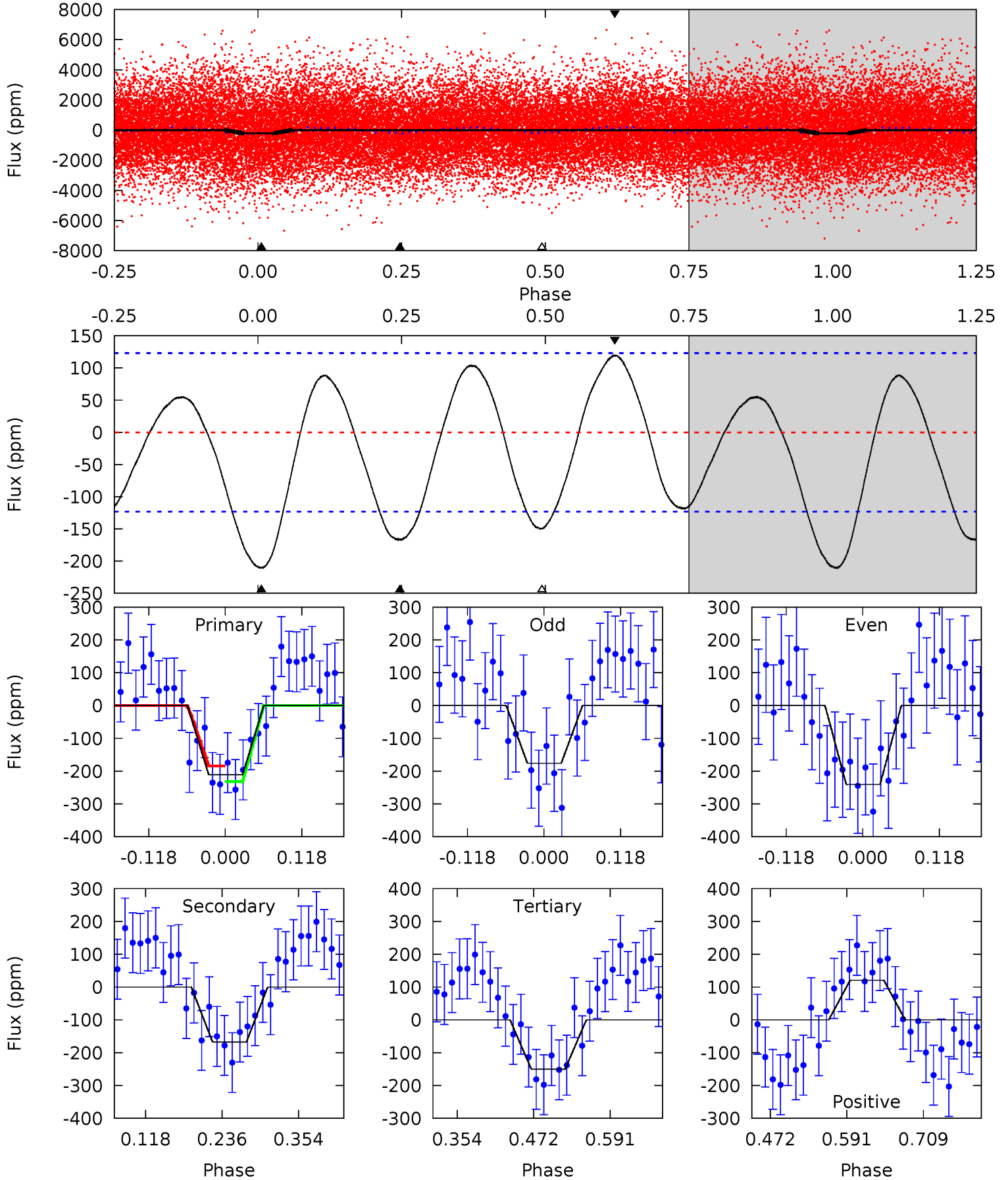
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
12.6	5.86	0	0	4.47	1.42	6.20	12.6	12.6	5.86	5.86	2.89	1.06	0.57	0.09



# Alt Model-Shift Uniqueness Test

003855001-02, P = 0.623879 Days, E = 130.931186 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
7.78	6.16	5.52	4.43	4.53	1.56	3.07	2.26	3.35	0.64	1.73	1.19	0.94	0.36	0.86



### Stellar Parameters For KIC 003855001

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$7149^{+175}_{-300}$	$4.256^{+0.058}_{-0.232}$	$0.210^{+0.150}_{-0.400}$	$1.537^{+0.580}_{-0.193}$	$1.556^{+0.211}_{-0.211}$	$0.603^{+0.195}_{-0.342}$
	+2%/-4%	+1%/-5%	+71%/-190%	+38%/-13%	+14%/-14%	+32%/-57%
Source	PHO1	KIC0	KIC0	DSEP		

KIC = Kepler Input Catalog; PHO = Photometry; SPE = Spectroscopy; AST = Asteroseismology  
 TRA = Transits; DESP = Dartmouth Models; MULT = Multiple Models

### Secondary Eclipse Parameters for KIC 003855001-02 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-77 \pm 13$	$2.53^{+0.91}_{-0.68}$	$4331^{+364}_{-246}$	$5281^{+878}_{-703}$	$1.774^{+1.468}_{-0.816}$
Alt.	$-167 \pm 27$	$2.74^{+0.81}_{-0.74}$	$4355^{+355}_{-253}$	$6296^{+1162}_{-745}$	$3.270^{+2.955}_{-1.317}$

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



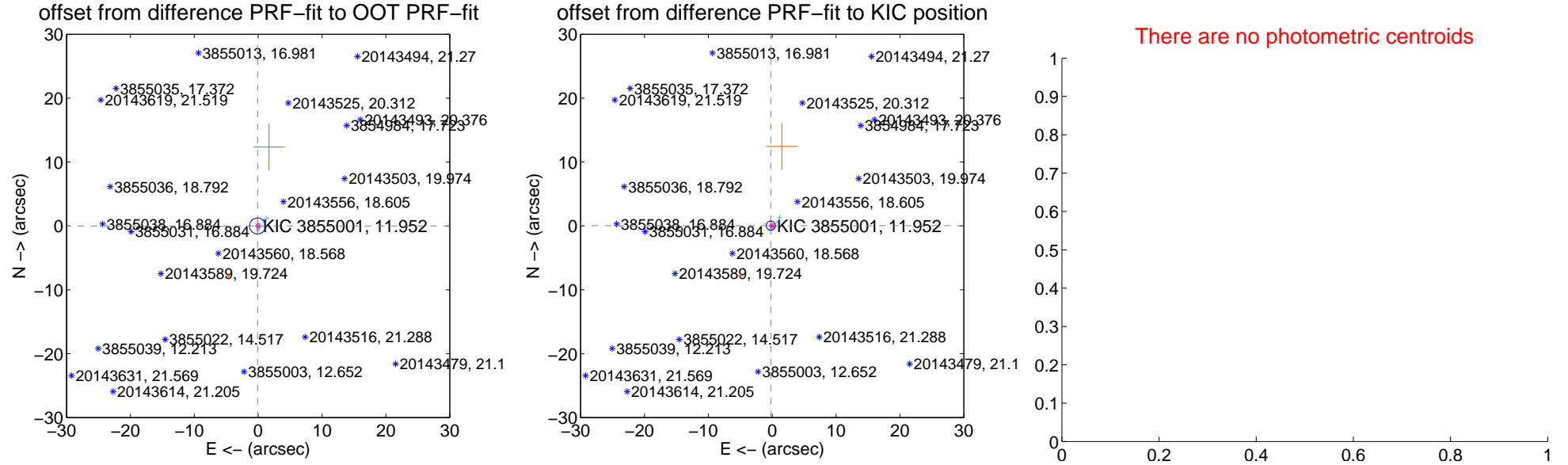
## DV Centroid Data

Supplemental centroid analysis for 003855001-02. **Kepler magnitude: 11.95.** Transit SNR 10.44

There are 14 quarters with good PRF difference image offsets

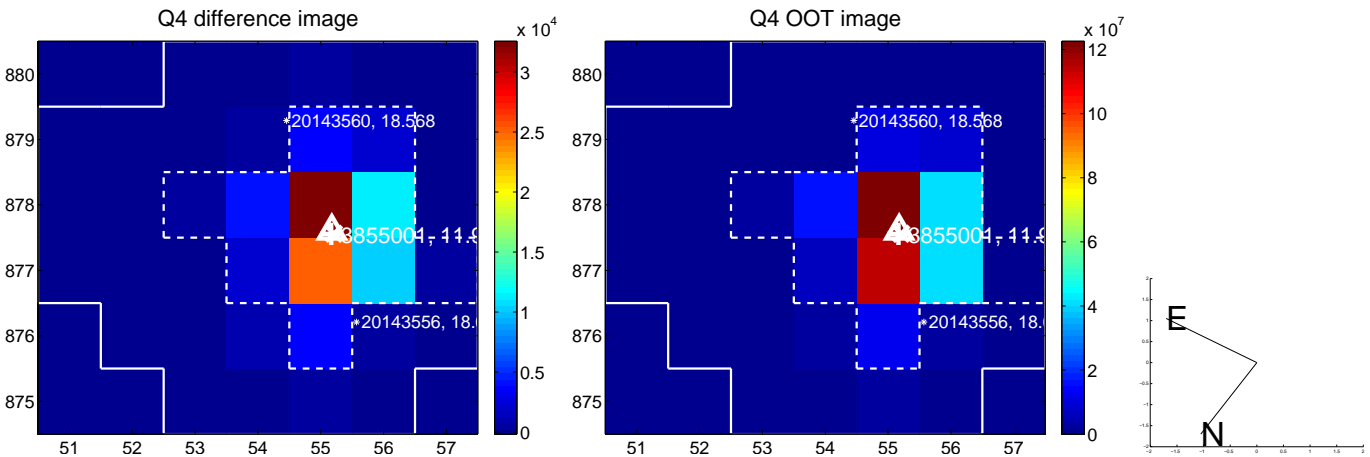
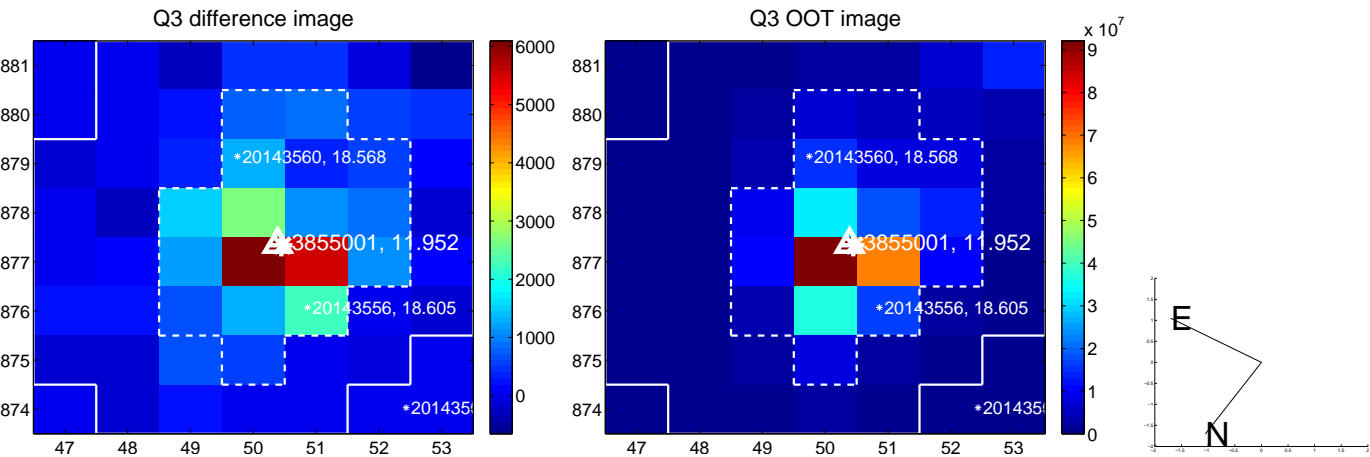
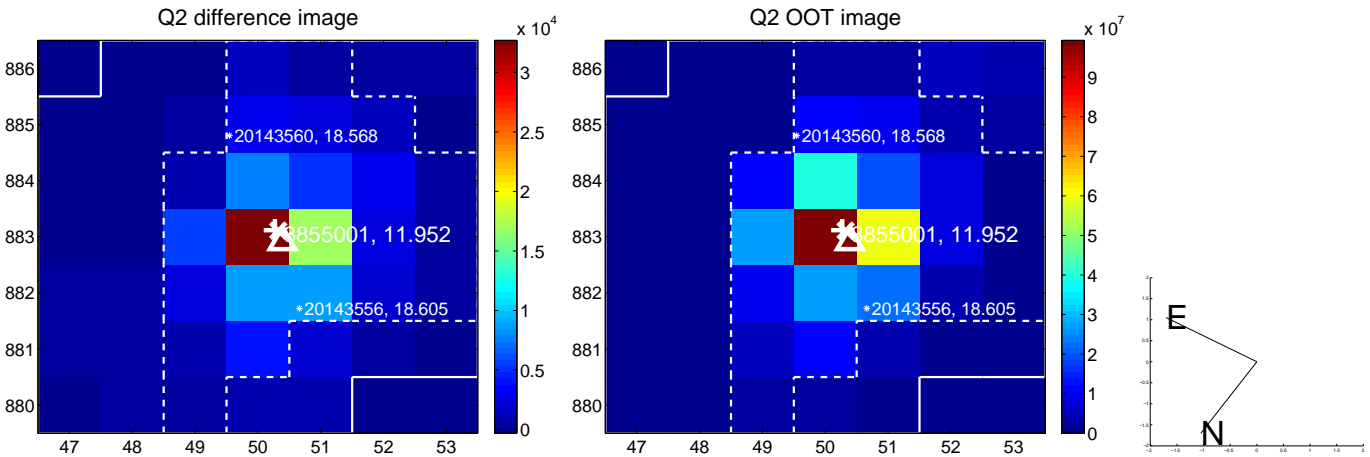
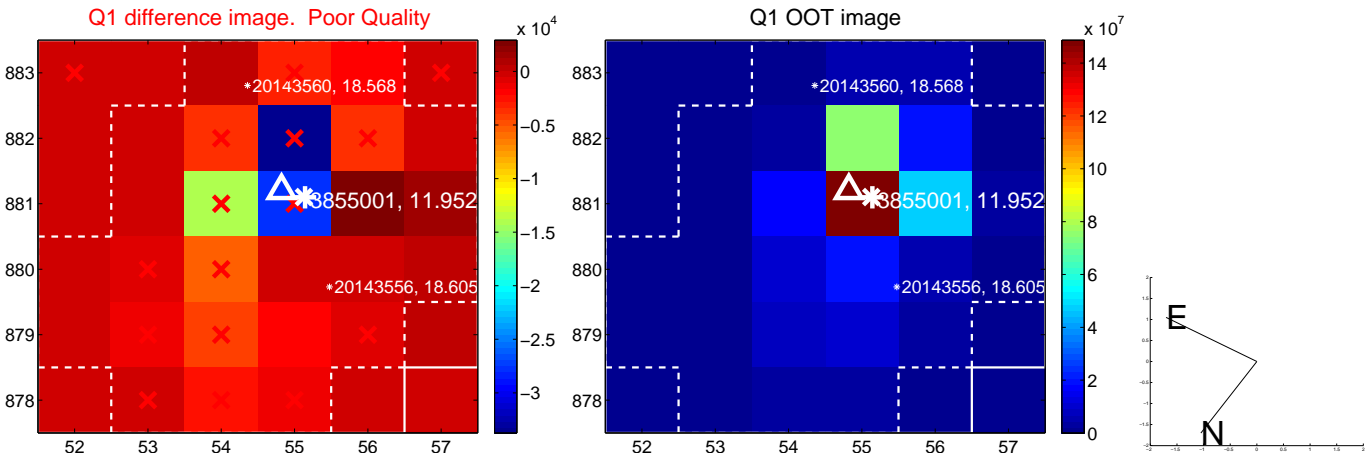
The direct PRF centroid is offset from the target star catalog position by about 0.09 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.097 \pm 0.417$	0.23	$0.096 \pm 0.319$	$-0.014 \pm 0.856$
PRF-fit source offset from KIC position	$0.223 \pm 0.239$	0.93	$0.219 \pm 0.336$	$0.040 \pm 0.880$
photometric centroid source offset	—	—	—	—

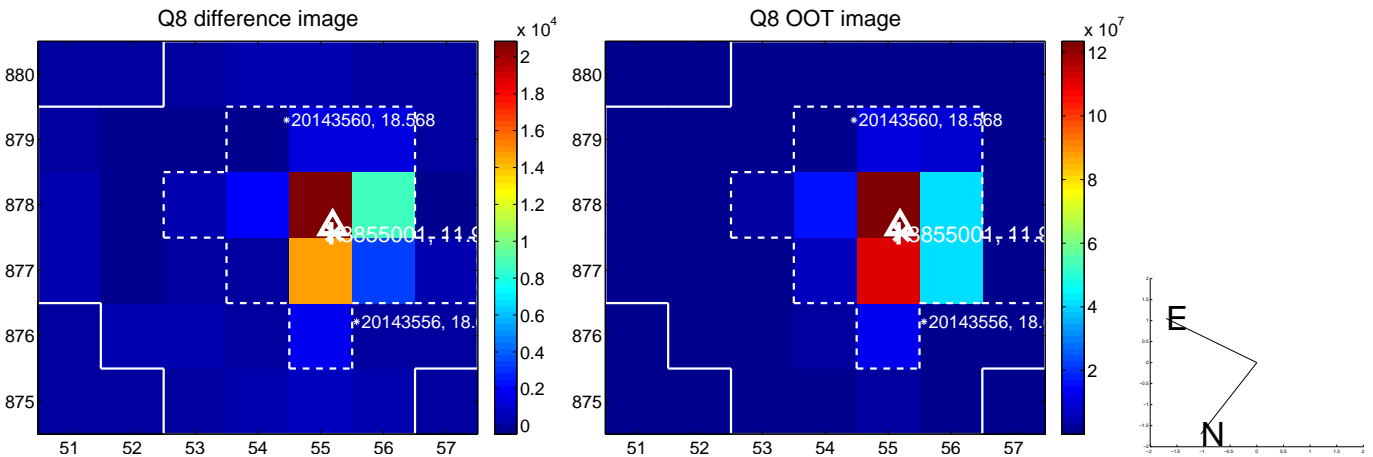
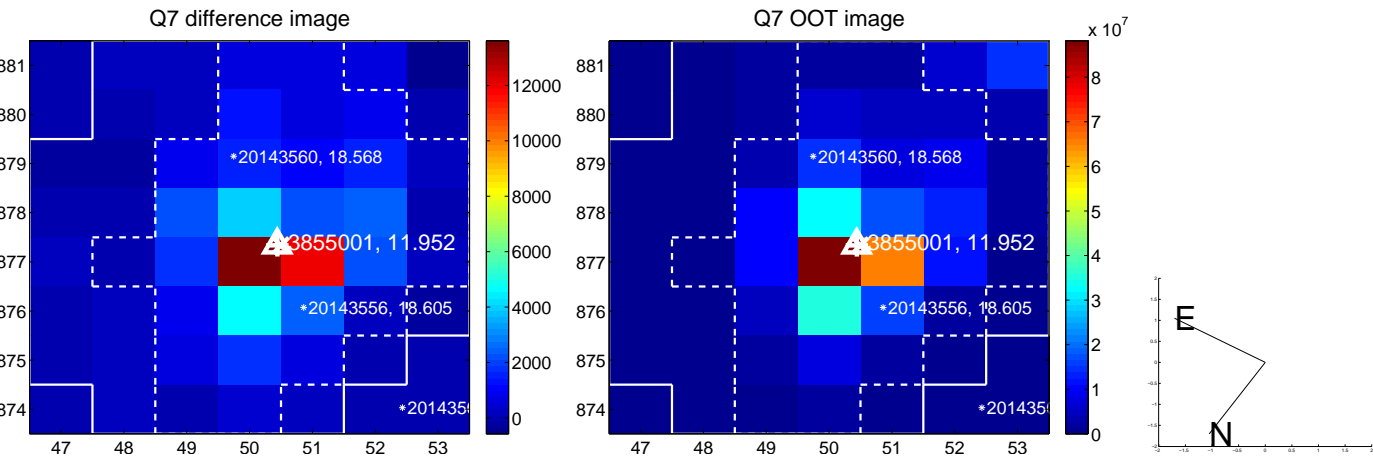
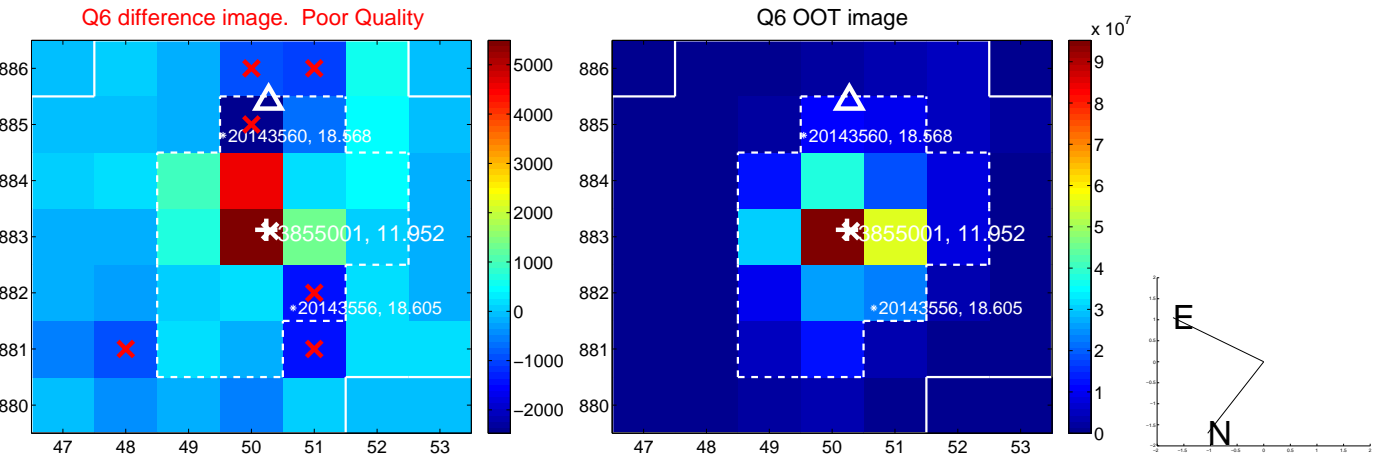
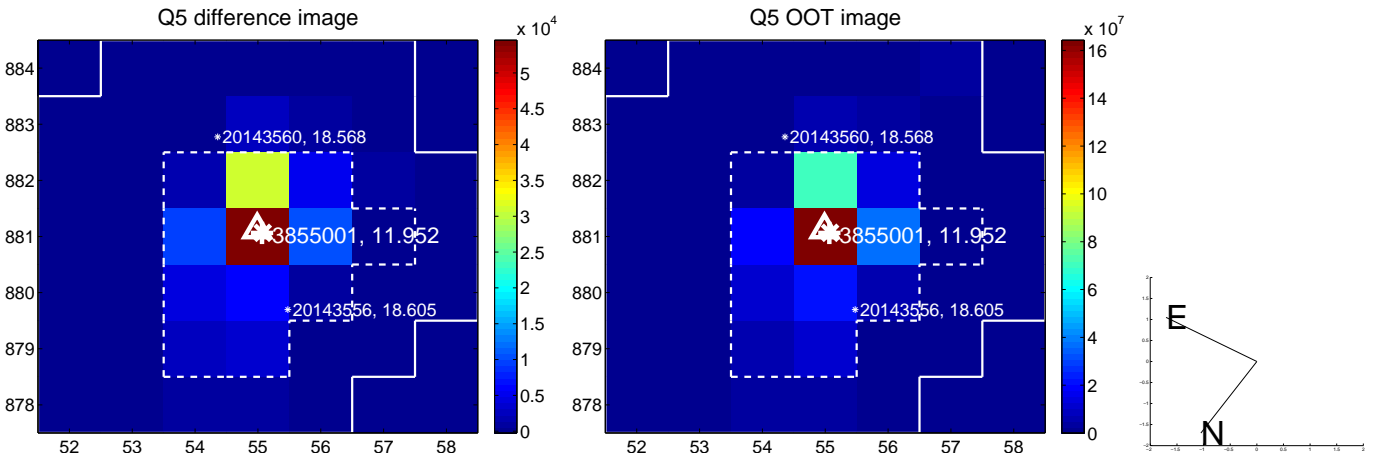


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

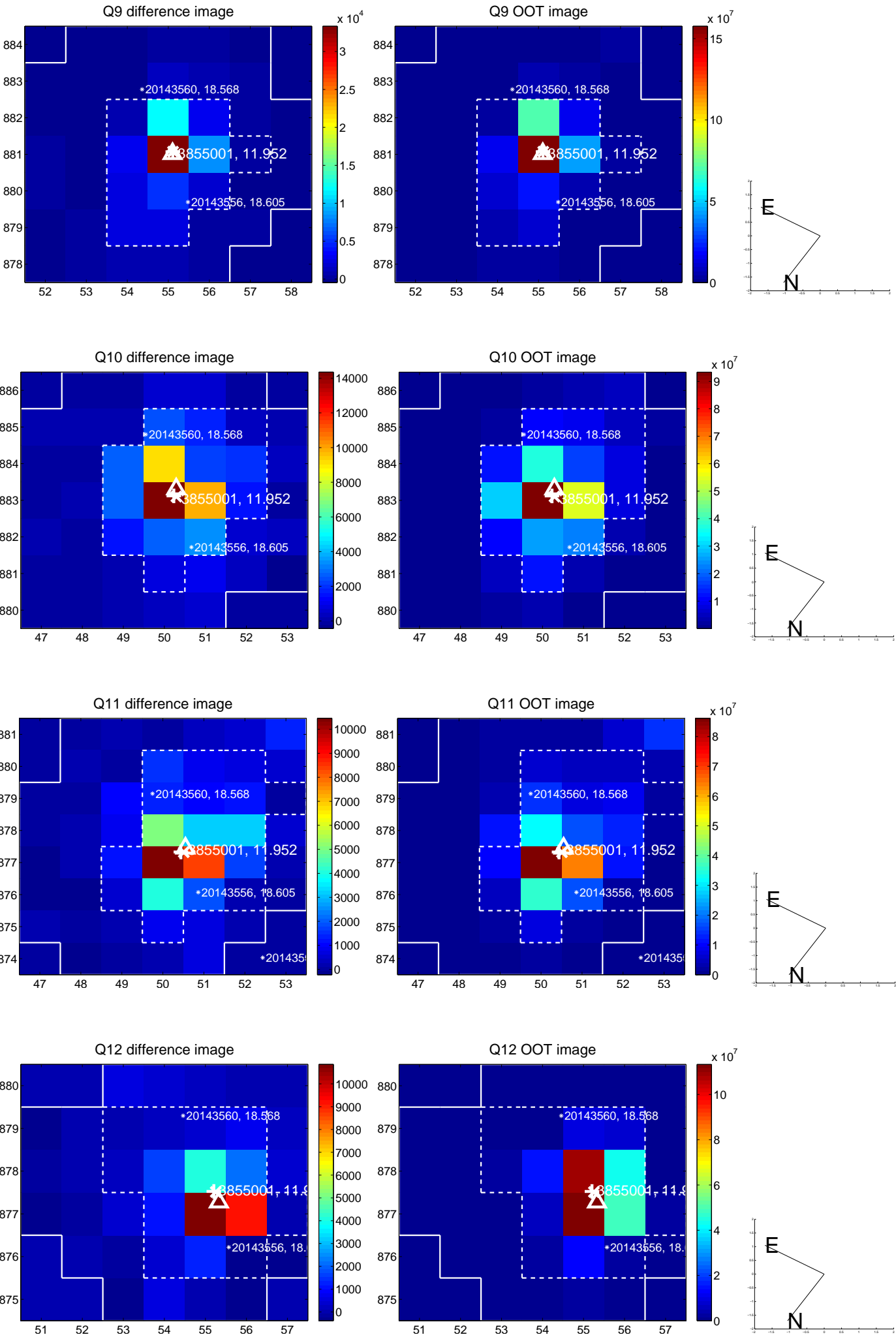
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

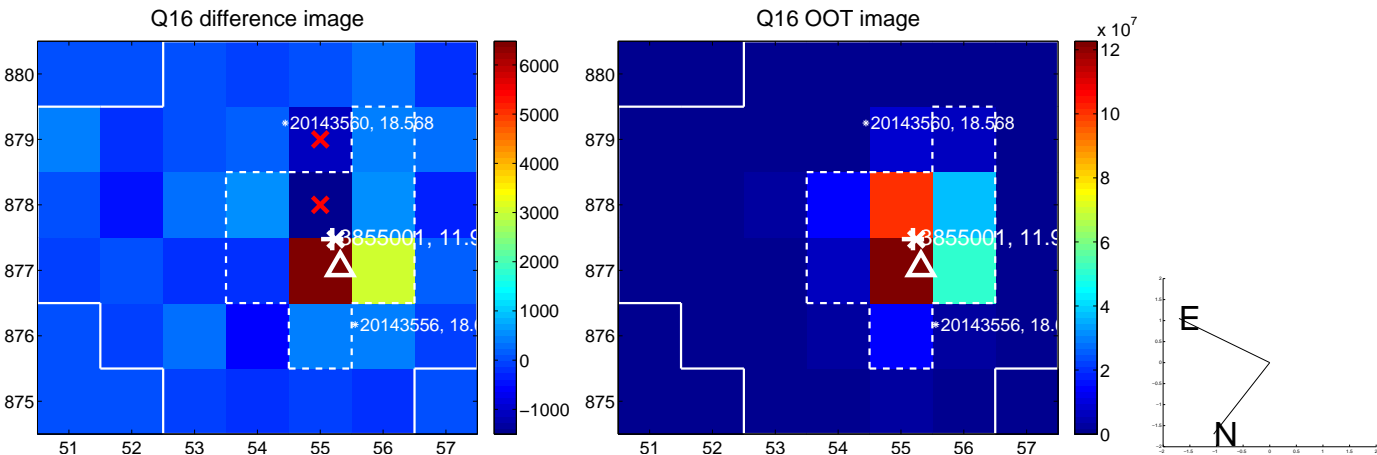
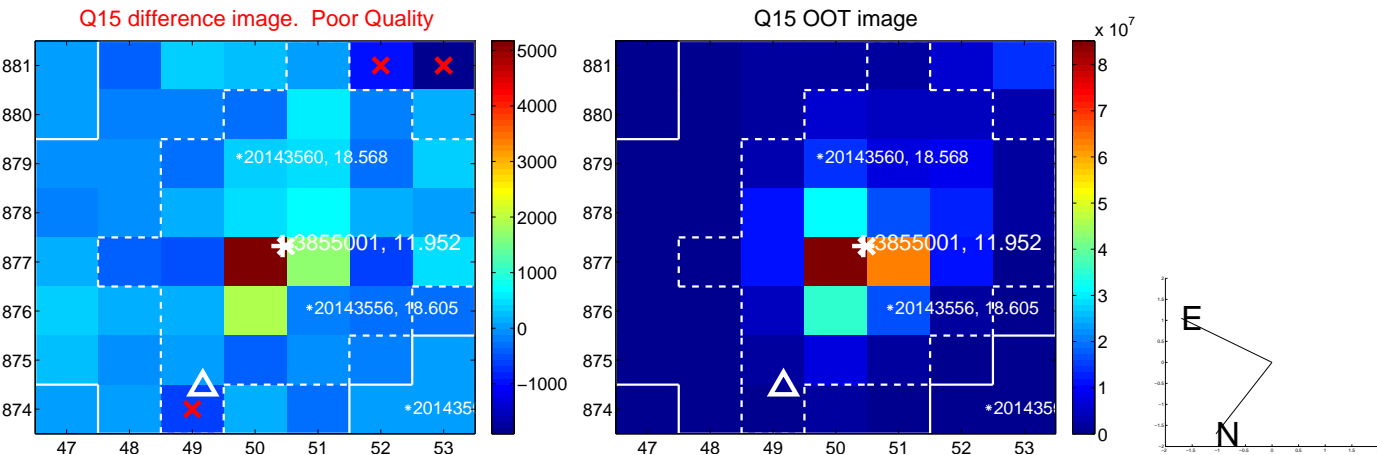
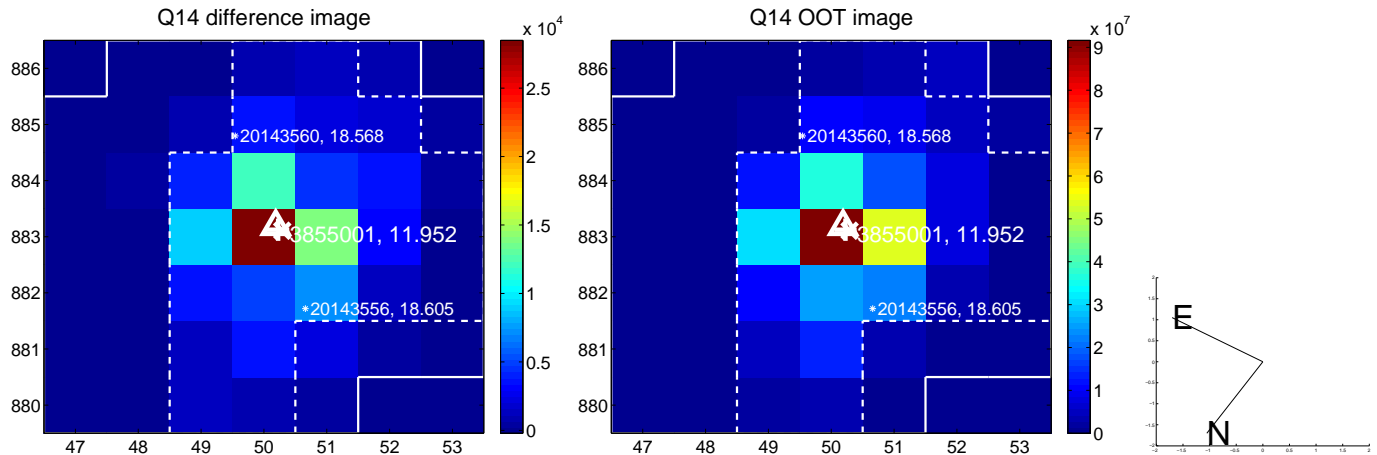
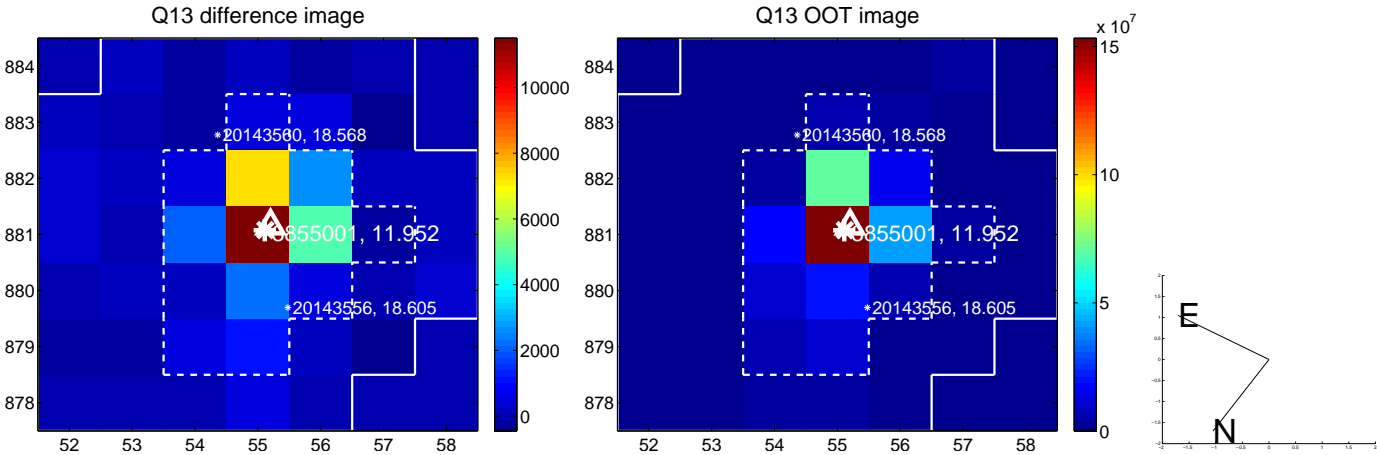


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

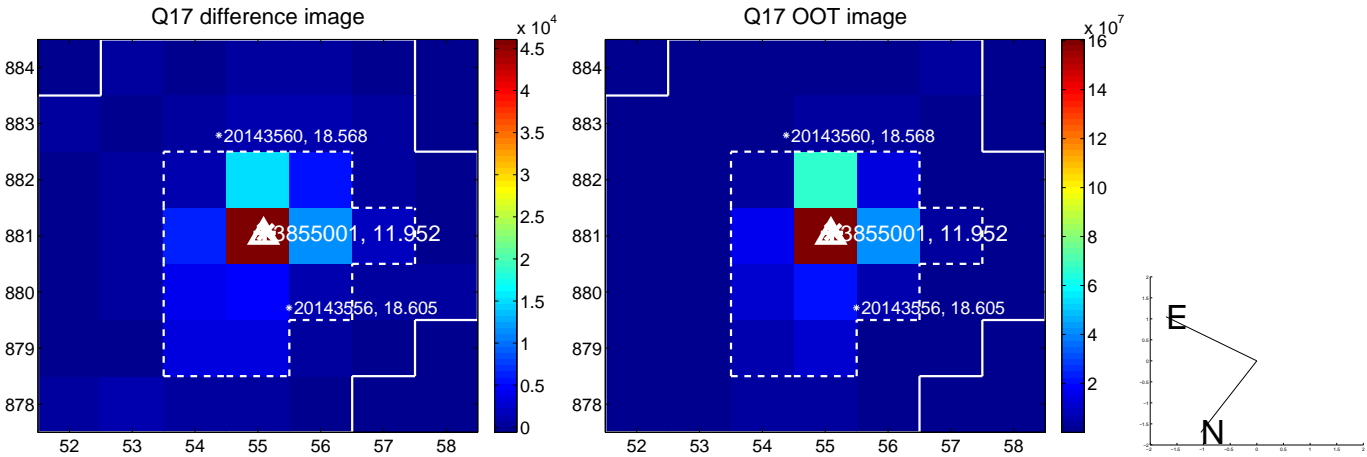




white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



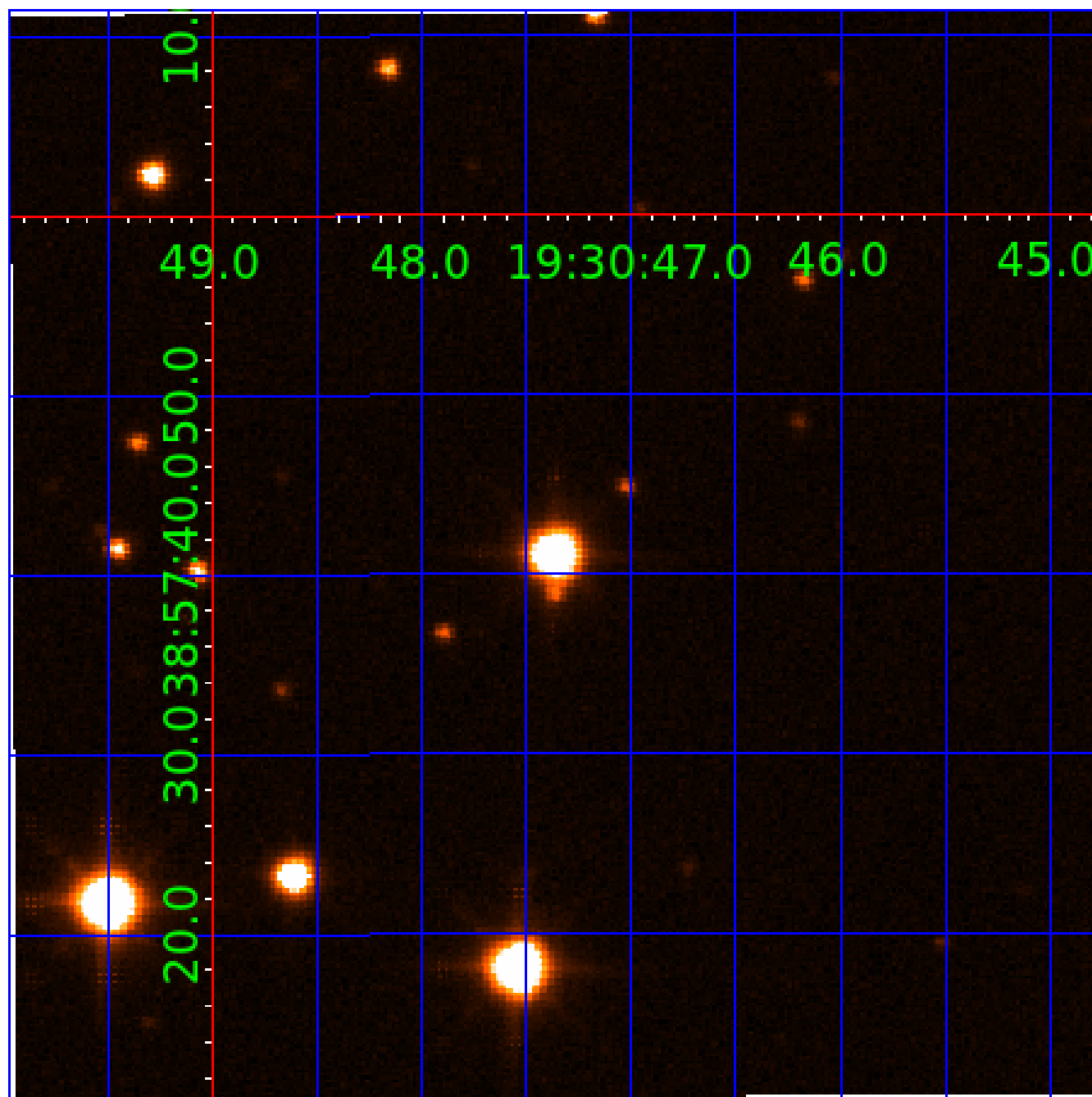
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



folded centroid time series figure for this object.

UKIRT Image

Declination



# KIC 003855001

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
003855001-01	OBS	No	1.709750	132.779883	137.9	6.726	9.5	7.7	1.54	7149	1.84	5261.16
003855001-02	OBS	No	0.623876	131.556527	182.6	1.880	8.9	10.4	1.54	7149	2.42	20177.16
003855001-03	OBS	No	77.567808	167.991944	2249.2	4.011	7.8	8.9	1.54	7149	7.70	32.52
003855001-04	OBS	No	21.743285	132.579449	1123.1	3.847	8.0	7.7	1.54	7149	7.13	177.24

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
003855001-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
003855001-02	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
003855001-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_ALT—MOD_POS_ALT
003855001-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA—TRANS_GAPPED—MOD_NONUNIQ_ALT

**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.

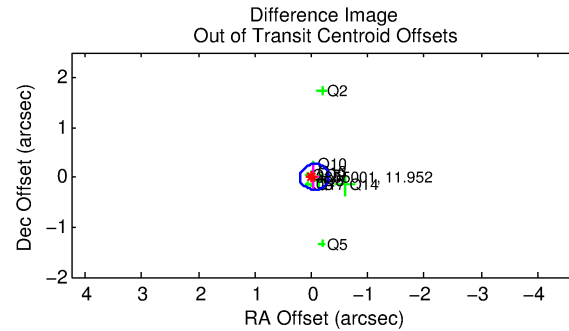
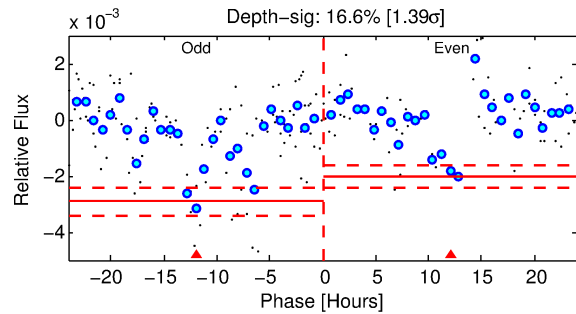
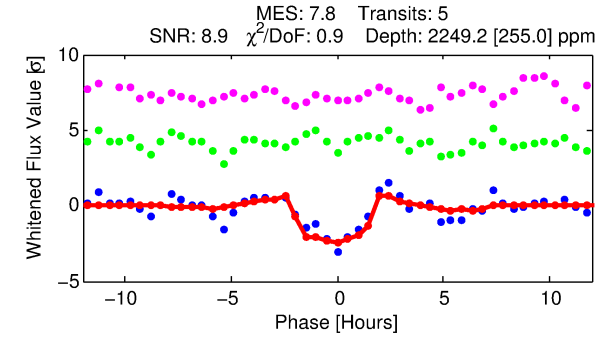
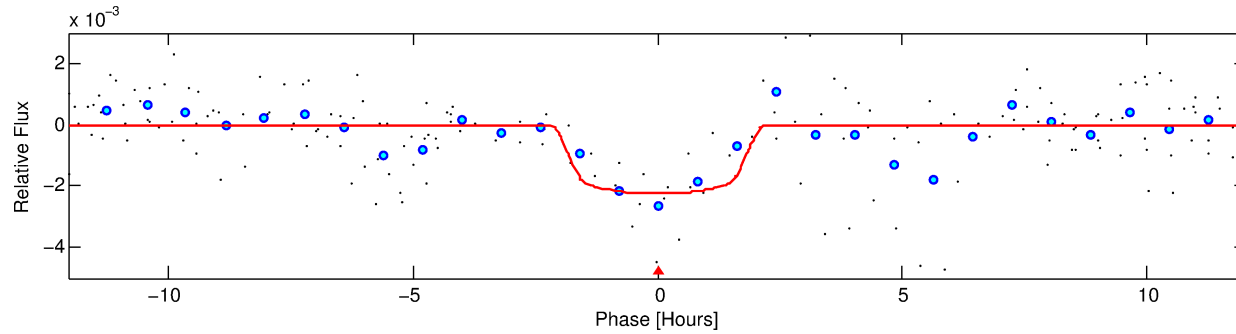
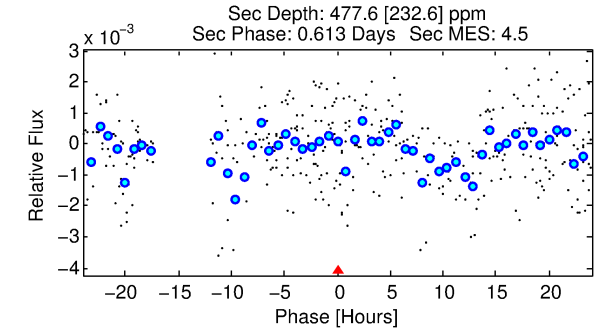
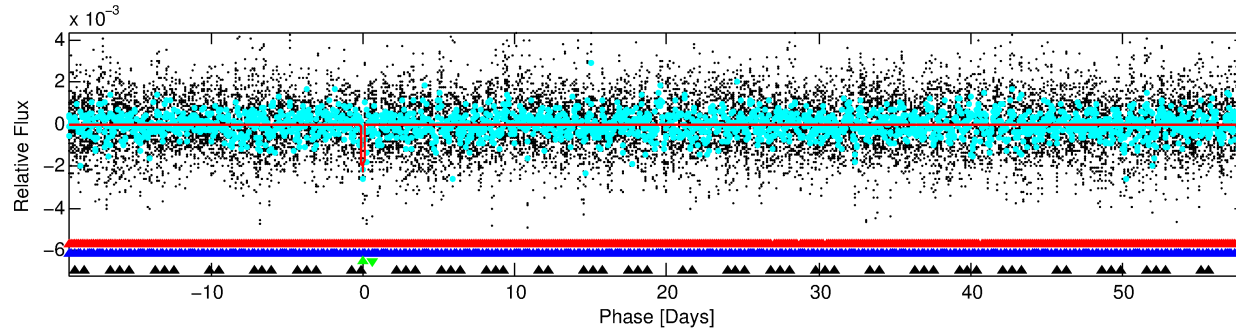
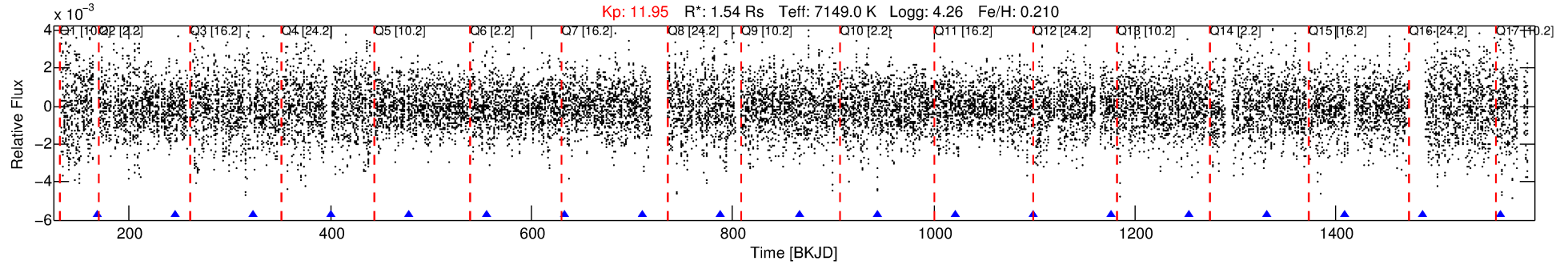
Ephemeris Match Information For 003855001-03

No Significant Match Found



# DV One-Page Summary

KIC: 3855001 Candidate: 3 of 4 Period: 77.568 d



## DV Fit Results:

Period = 77.56781 [0.00119] d  
Epoch = 167.9919 [0.0178] BKJD  
Rp/R\* = 0.0459 [0.0337]  
a/R\* = 123.24 [531.35]  
b = 0.63 [4.15]  
Seff = 32.51 [15.19]  
Teq = 609 [71] K  
Rp = 7.70 [6.36] Re  
a = 0.4124 [0.1271] AU  
Ag = 752.76 [1209.85] [0.62σ]  
Teffp = 4931 [1918] K [2.25σ]

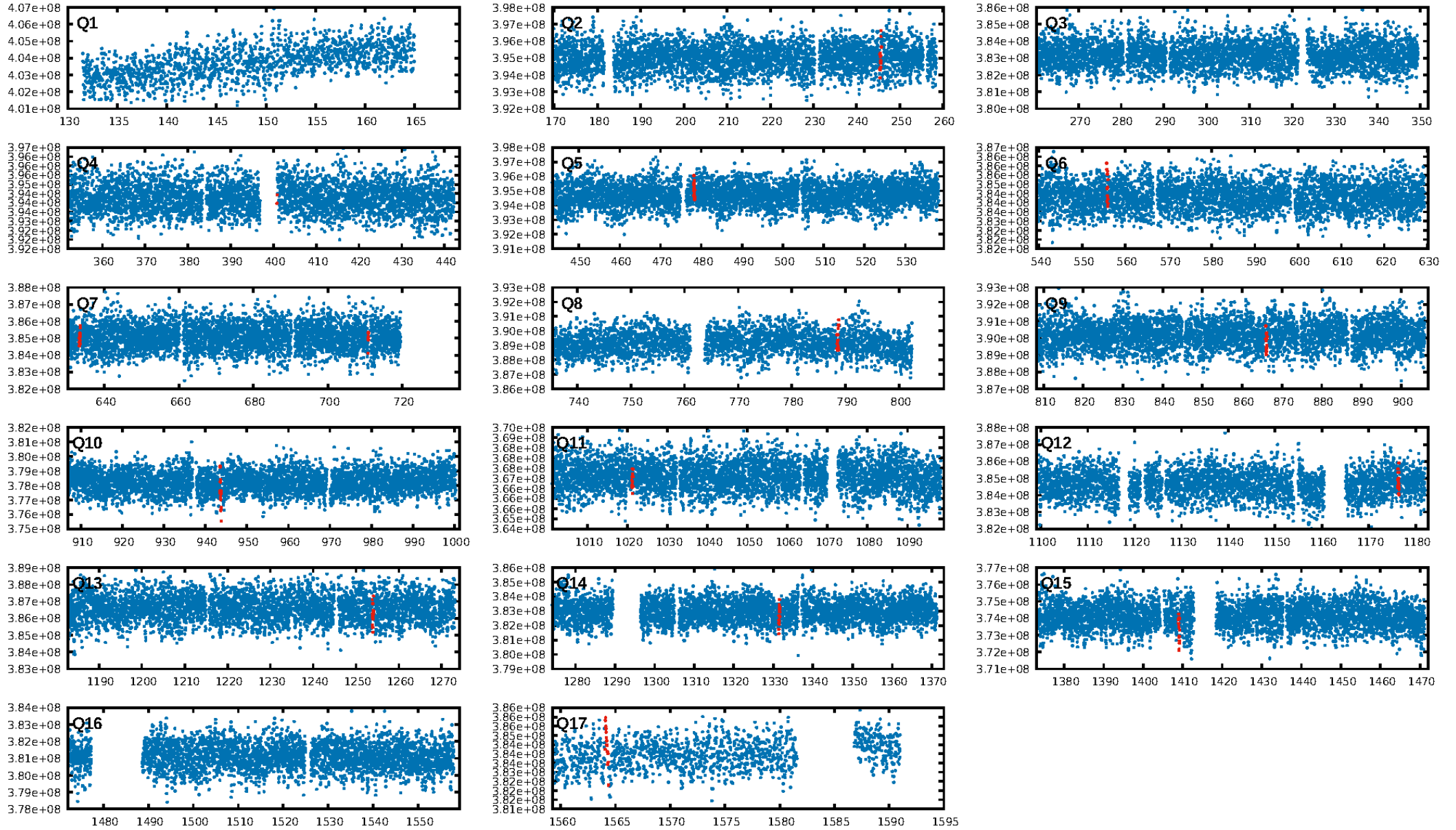
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [241.06σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 24.1%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 4.17e-12  
RollingBand-fgt: 1.00 [4/4]  
GhostDiagnostic-chr: 1.358  
Centroid-sig: N/A  
Centroid-so: N/A  
OotOffset-rm: 0.048 arcsec [0.56σ]  
KicOffset-rm: 0.039 arcsec [0.20σ]  
OotOffset-st: 4/1/1/4 [10]  
KicOffset-st: 4/1/1/4 [10]  
DiffImageQuality-fgm: 0.50 [5/10]  
DiffImageOverlap-fno: 0.00 [0/11]

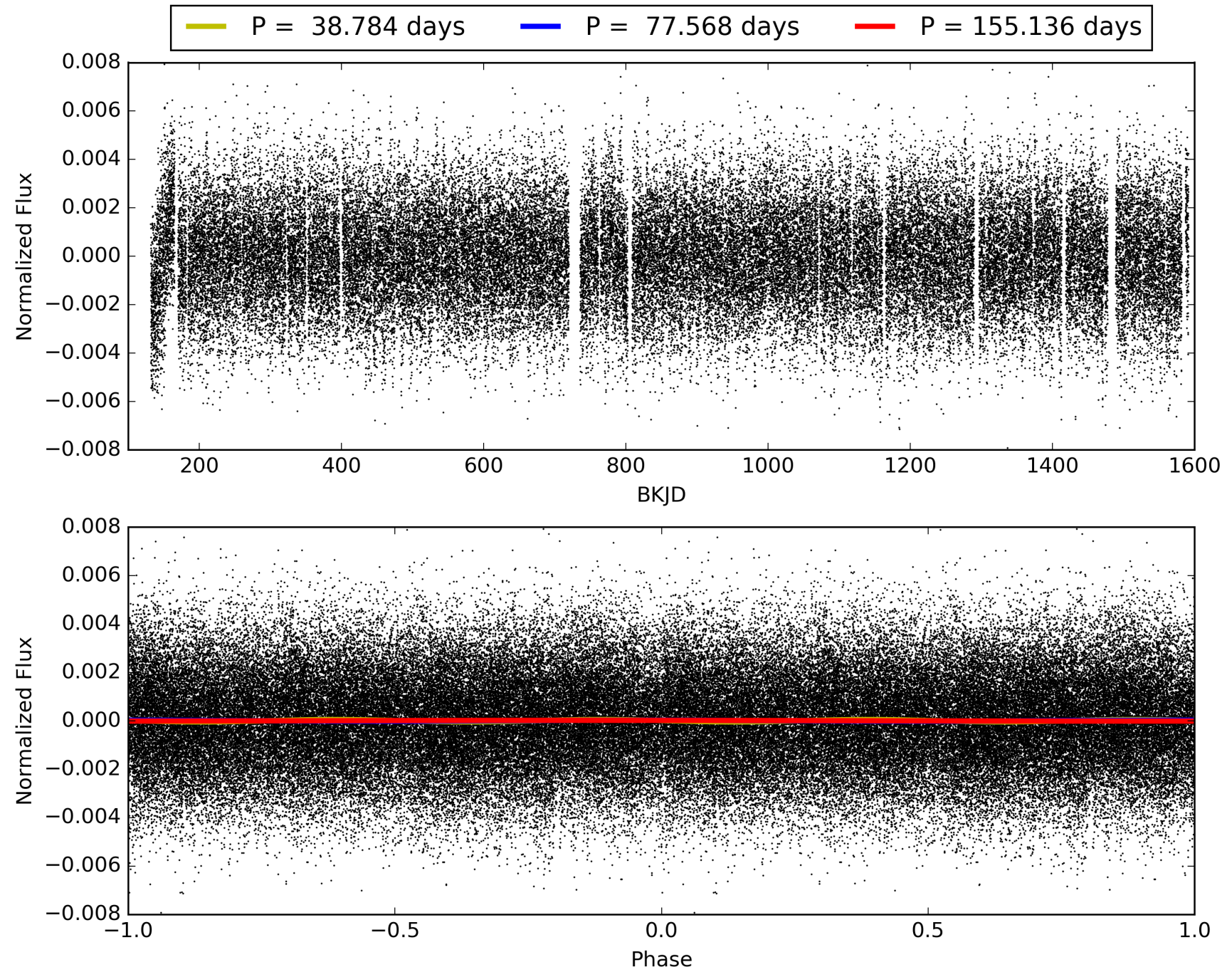
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 23:38:23 Z

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

# TCE 003855001-03, PDC Light Curves

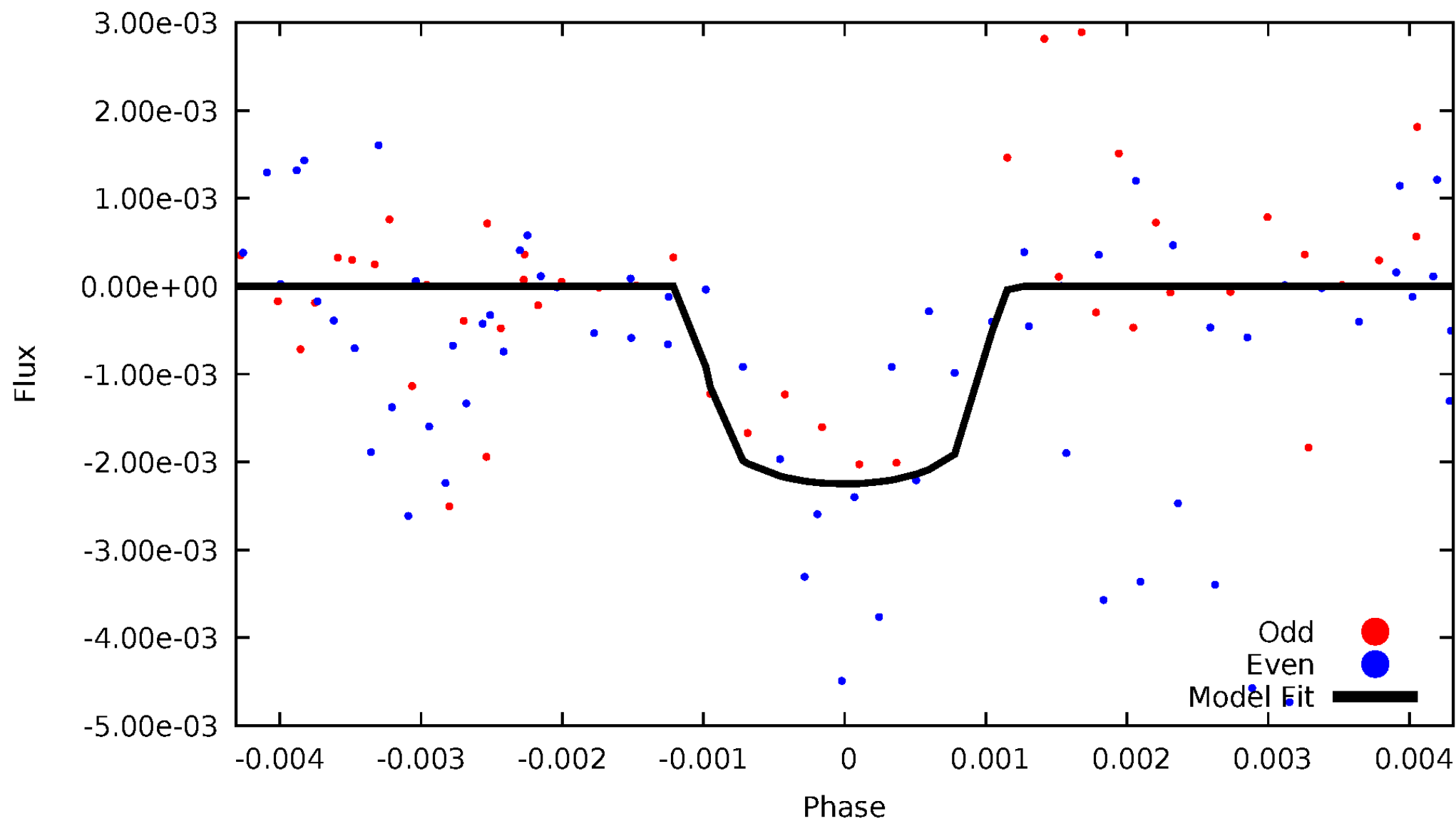


# TCE 003855001-03



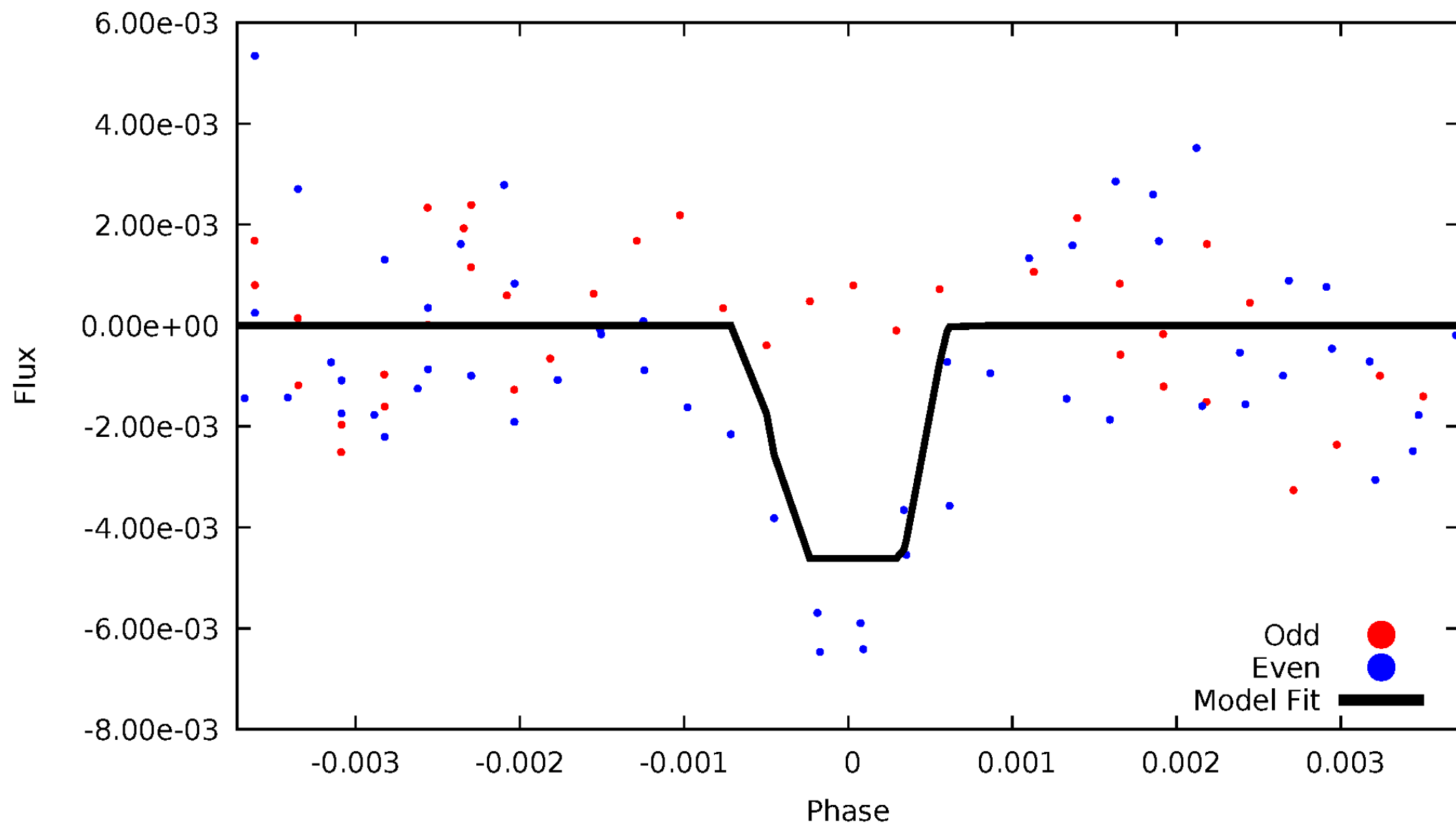
# DV Odd/Even

TCE 003855001-03



# ALT Odd/Even

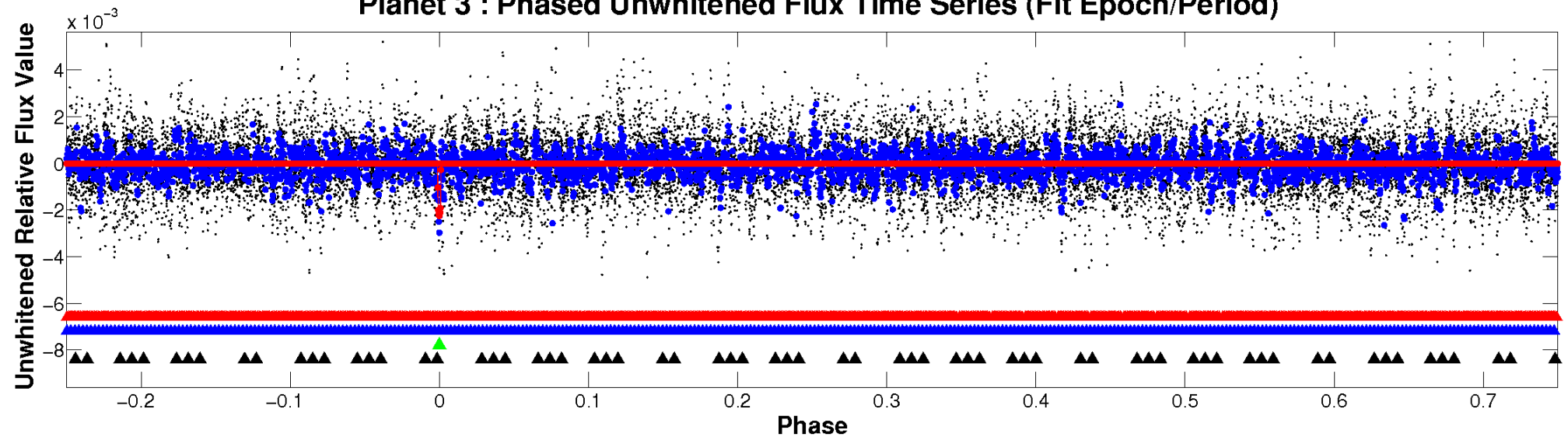
TCE 003855001-03



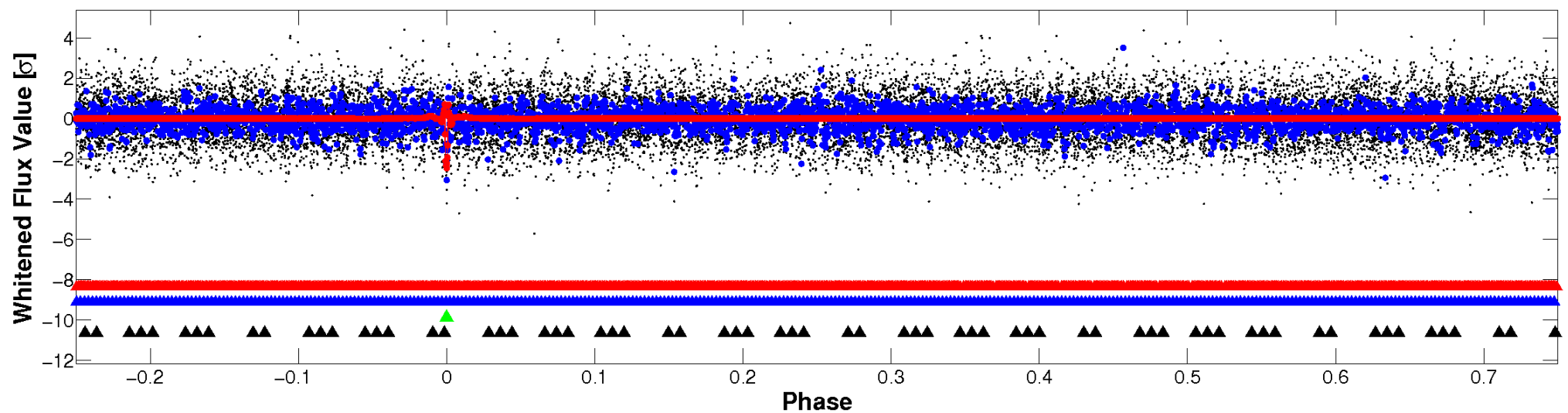


# Non-Whitened Vs. Whitened Light Curve

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

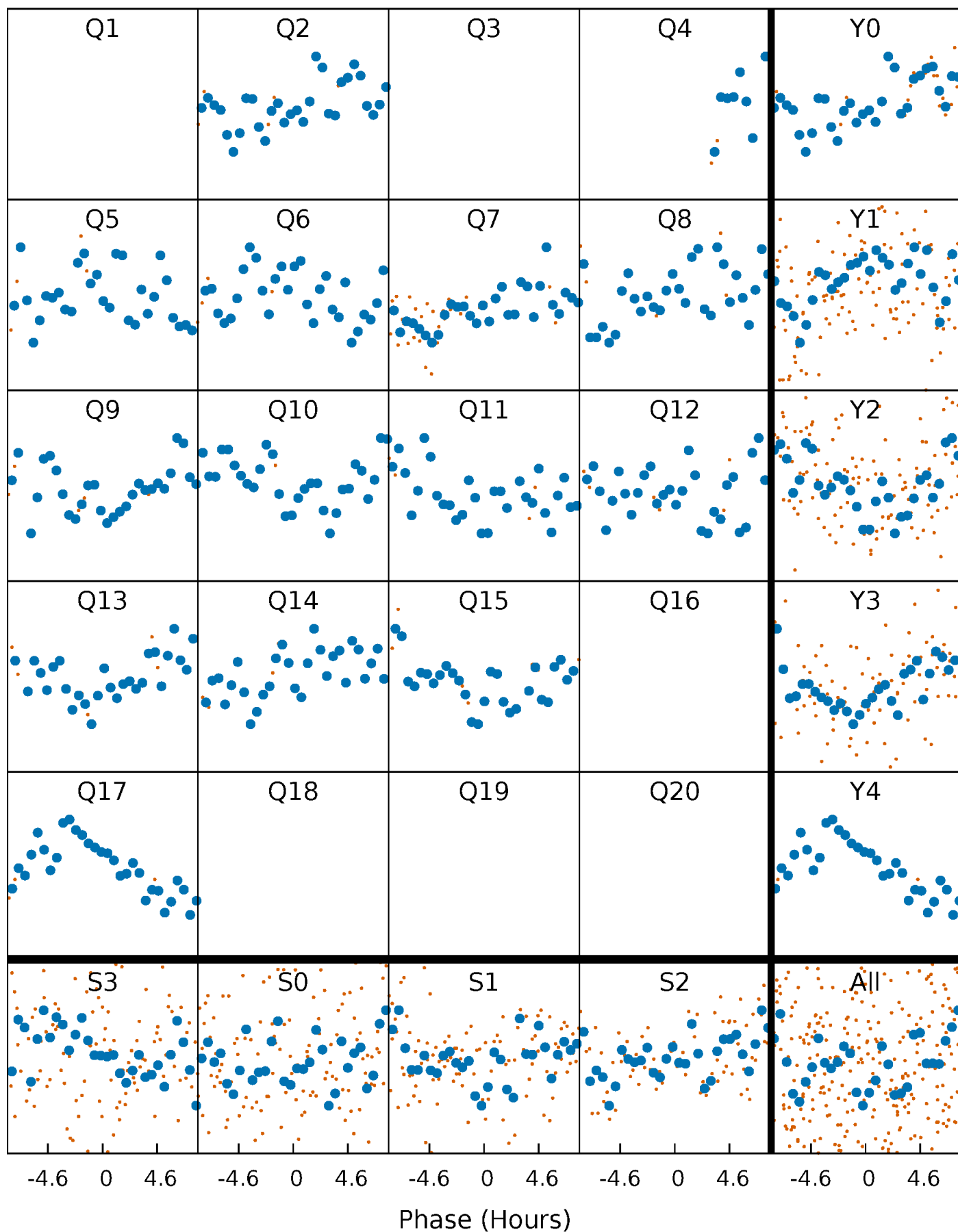


Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



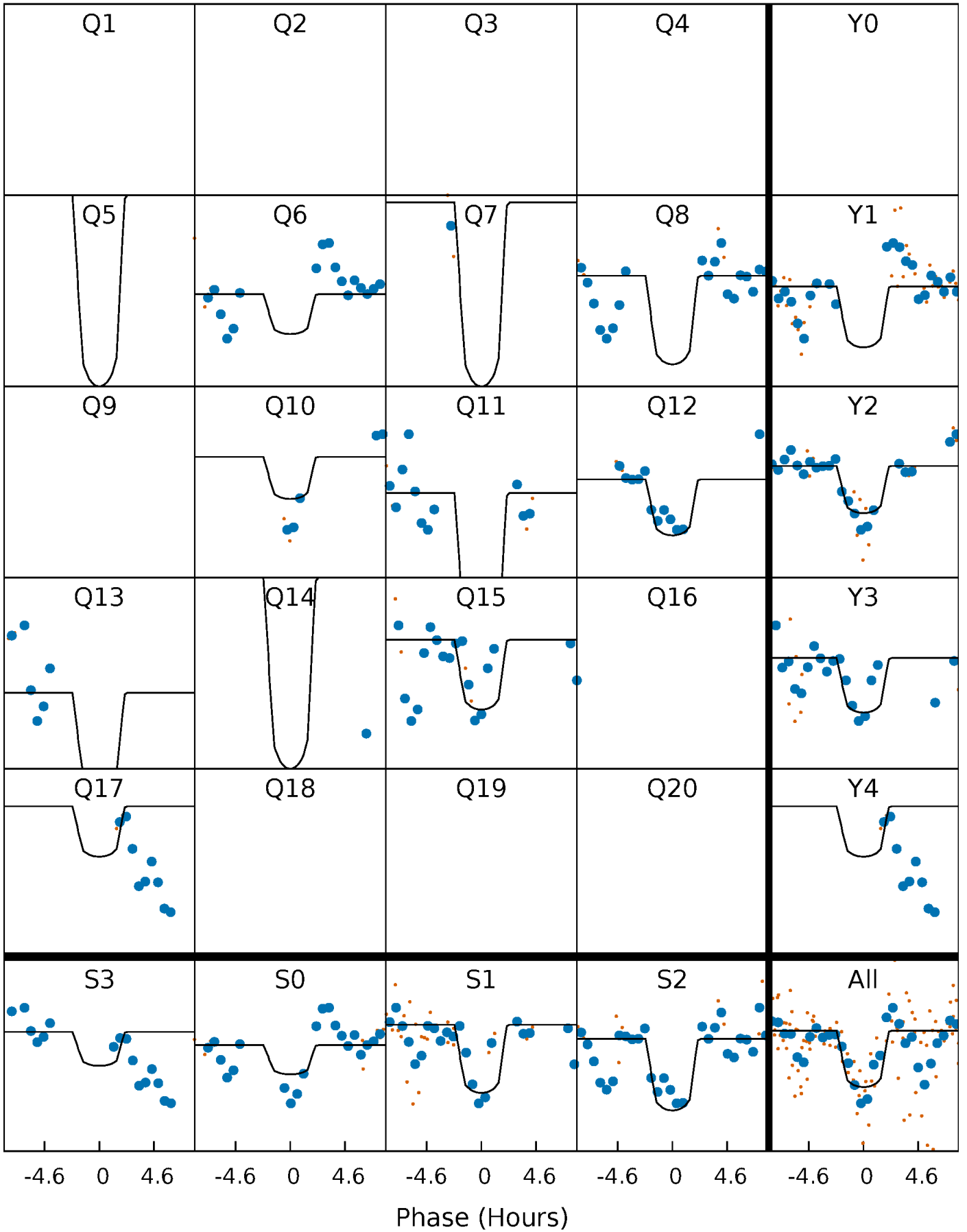
# PDC Quarter-Phased Transit Curves

TCE 003855001-03     $P = 77.567808$  Days     $T_0 = 167.991944$  (BKJD)



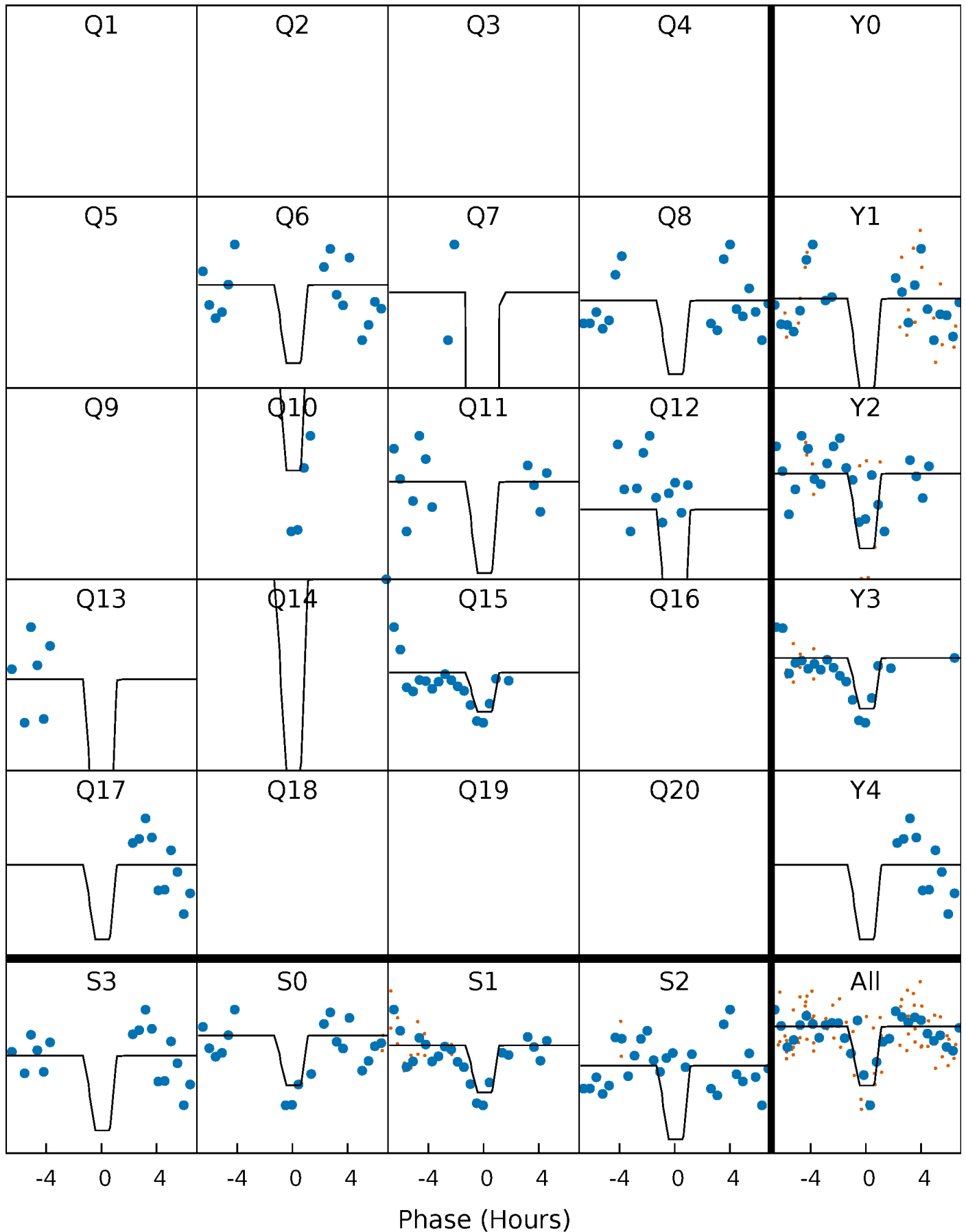
# DV Quarter-Phased Transit Curves

TCE 003855001-03 P= 77.567808 Days  $T_0=167.991944$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

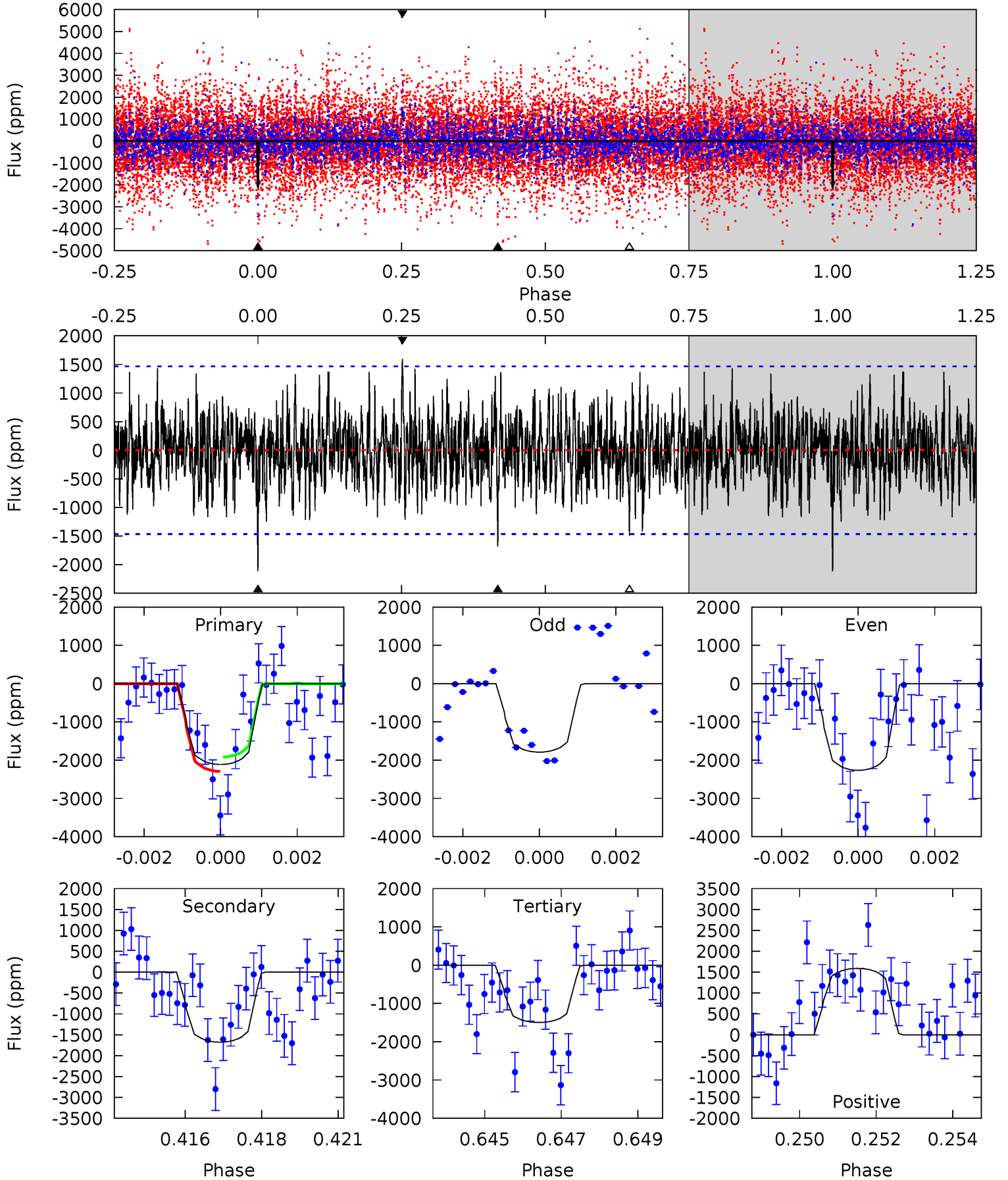
TCE 003855001-03 P= 77.565760 Days  $T_0=168.003930$  (BKJD)



# DV Model-Shift Uniqueness Test

003855001-03, P = 77.567808 Days, E = 90.424136 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
7.67	6.09	5.43	5.77	5.31	3.07	1.61	2.24	1.90	0.66	0.32	0.82	1.20	0.43	0.68

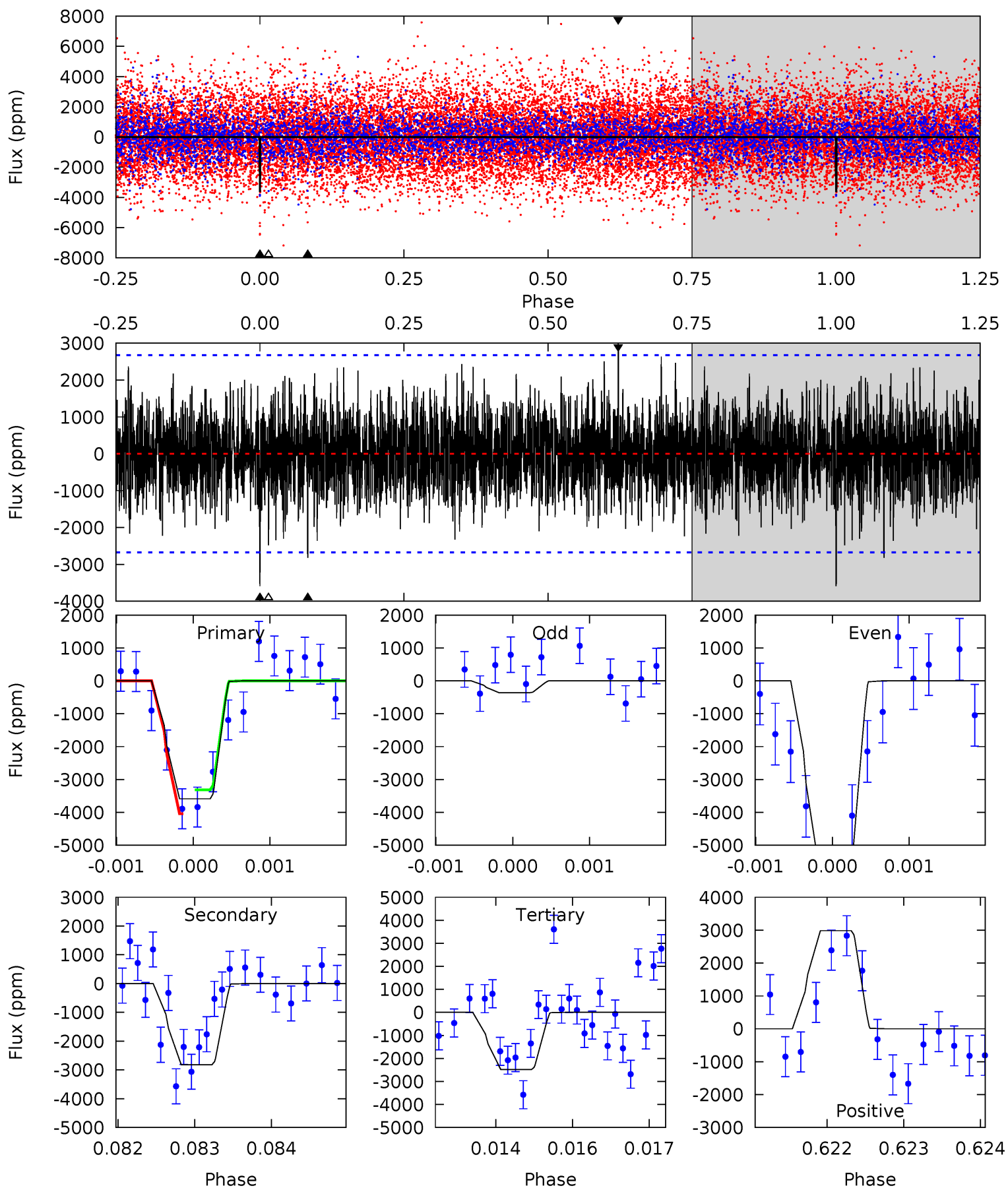




# Alt Model-Shift Uniqueness Test

003855001-03, P = 77.565760 Days, E = 90.438170 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
7.24	5.69	5.01	6.03	5.40	3.21	1.54	2.23	1.22	0.68	-0.33	5.05	0.69	0.45	0.63



### Stellar Parameters For KIC 003855001

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$7149^{+175}_{-300}$	$4.256^{+0.058}_{-0.232}$	$0.210^{+0.150}_{-0.400}$	$1.537^{+0.580}_{-0.193}$	$1.556^{+0.211}_{-0.211}$	$0.603^{+0.195}_{-0.342}$
	+2%/-4%	+1%/-5%	+71%/-190%	+38%/-13%	+14%/-14%	+32%/-57%
Source	PHO1	KIC0	KIC0	DSEP		

KIC = Kepler Input Catalog; PHO = Photometry; SPE = Spectroscopy; AST = Asteroseismology  
 TRA = Transits; DESP = Dartmouth Models; MULT = Multiple Models

### Secondary Eclipse Parameters for KIC 003855001-03 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-1678 \pm 276$	$8.57^{+6.16}_{-5.03}$	$866^{+66}_{-44}$	$6431^{+4727}_{-1415}$	$2054^{+9648}_{-1353}$
Alt.	$-2820 \pm 495$	$12.42^{+6.94}_{-6.00}$	$866^{+72}_{-49}$	$6131^{+2897}_{-1129}$	$1644^{+4702}_{-970}$

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

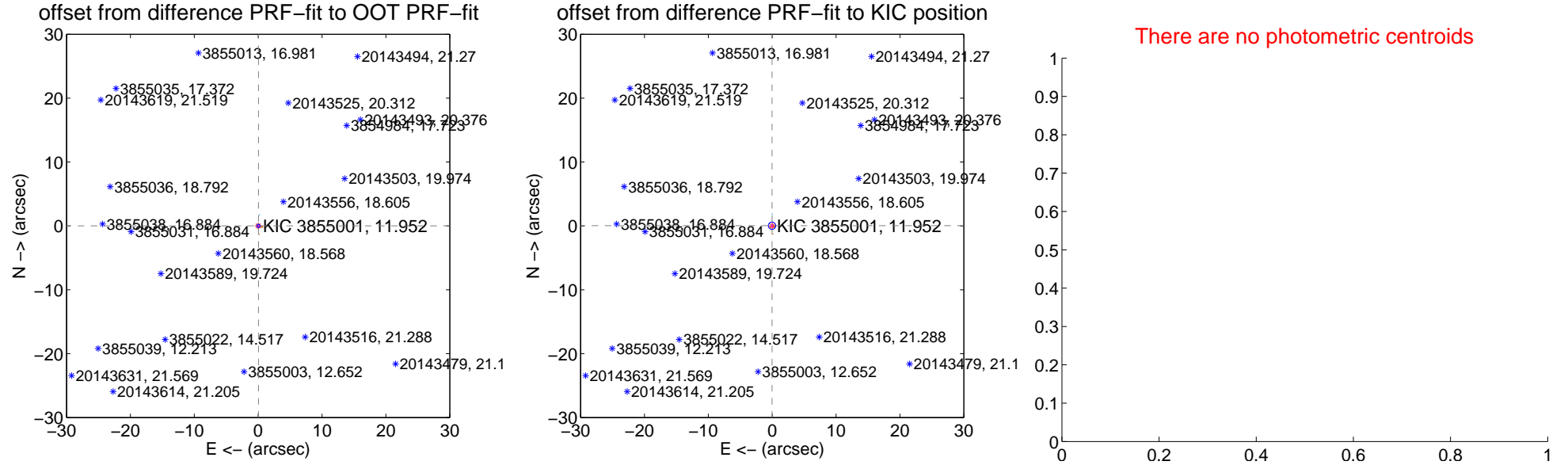
## DV Centroid Data

Supplemental centroid analysis for 003855001-03. **Kepler magnitude: 11.95.** Transit SNR 8.92

There are 5 quarters with good PRF difference image offsets

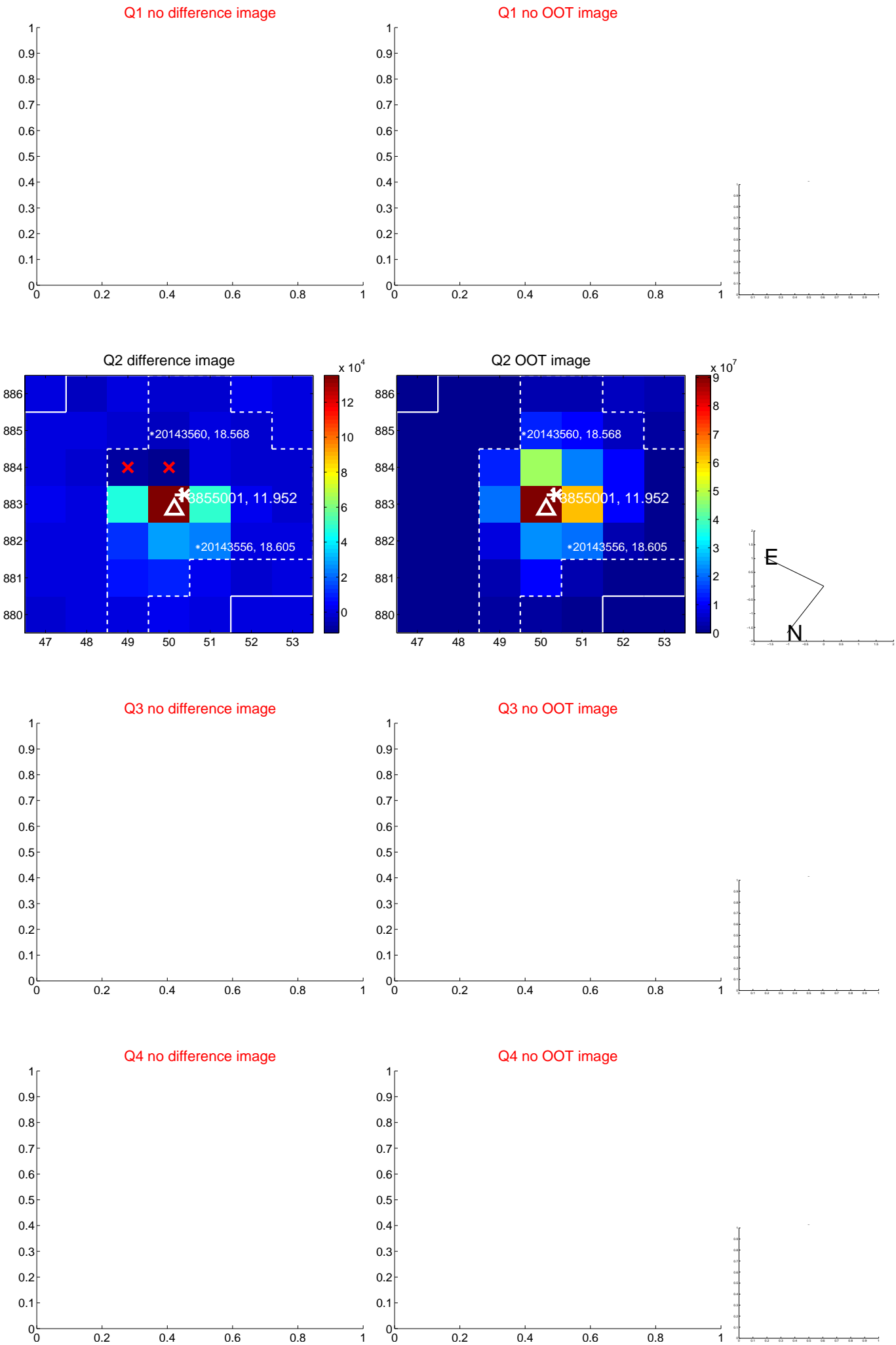
The direct PRF centroid is offset from the target star catalog position by about 0.09 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.048 \pm 0.086$	0.56	$-0.048 \pm 0.085$	$0.002 \pm 0.249$
PRF-fit source offset from KIC position	$0.039 \pm 0.192$	0.20	$0.026 \pm 0.094$	$0.029 \pm 0.246$
photometric centroid source offset	—	—	—	—

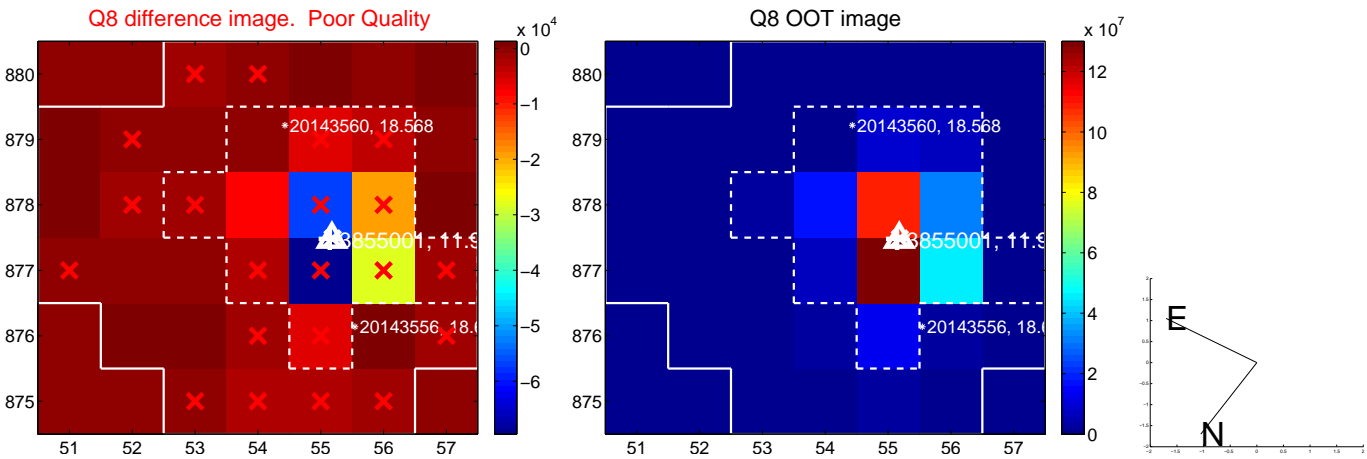
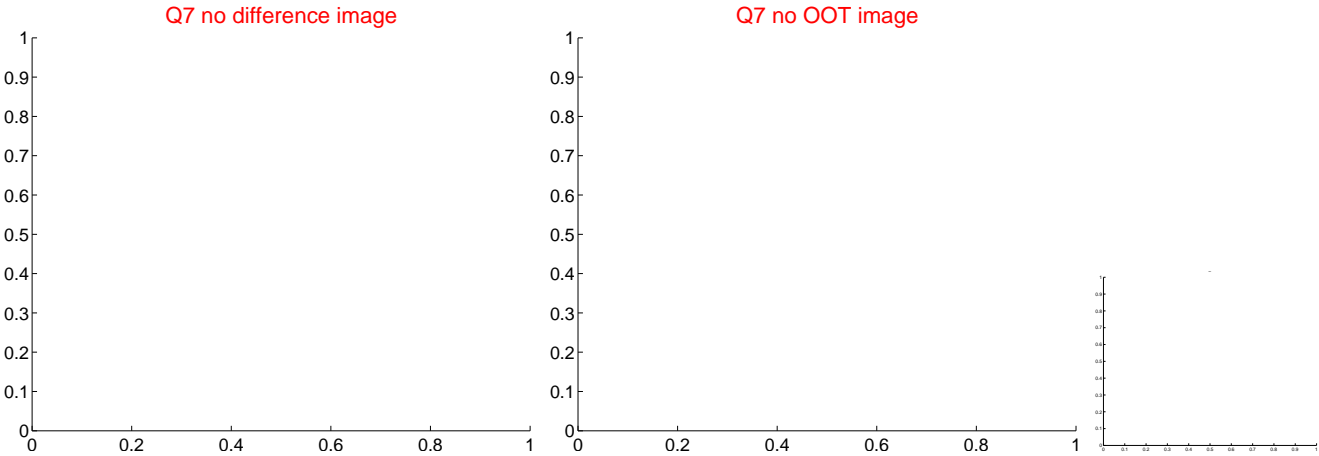
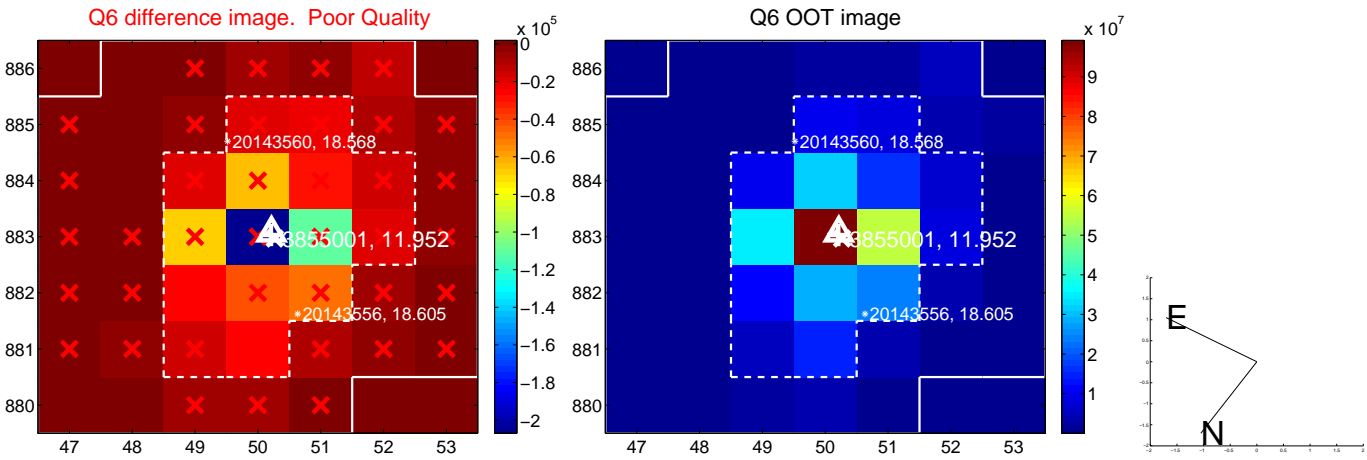
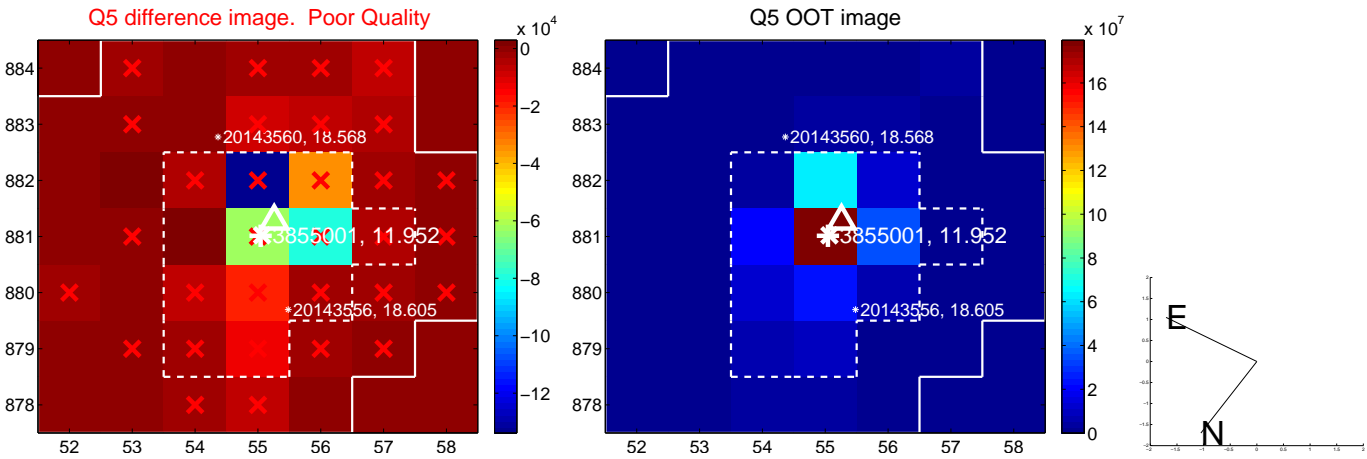


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

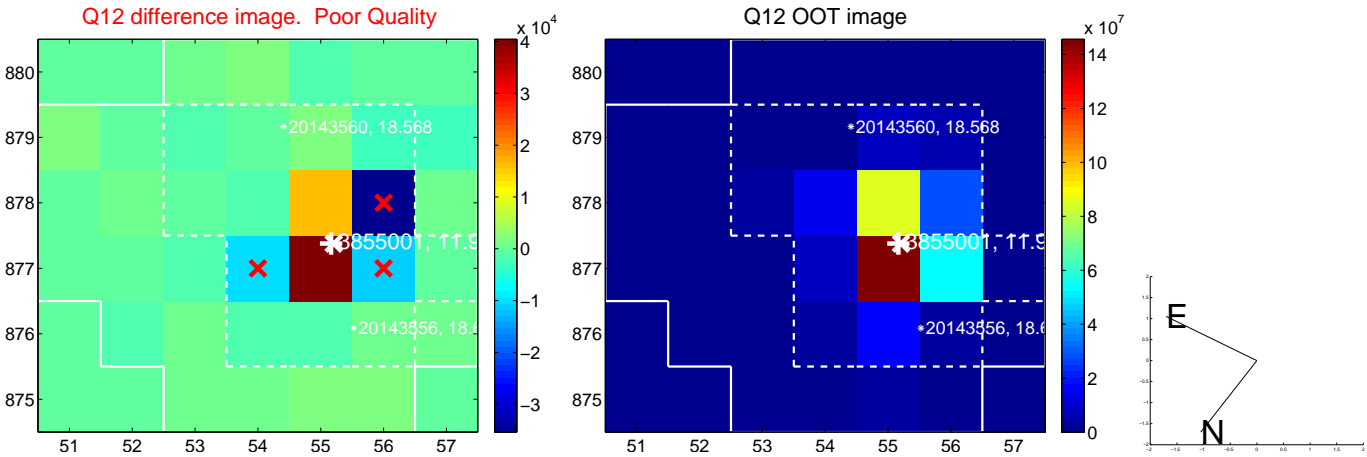
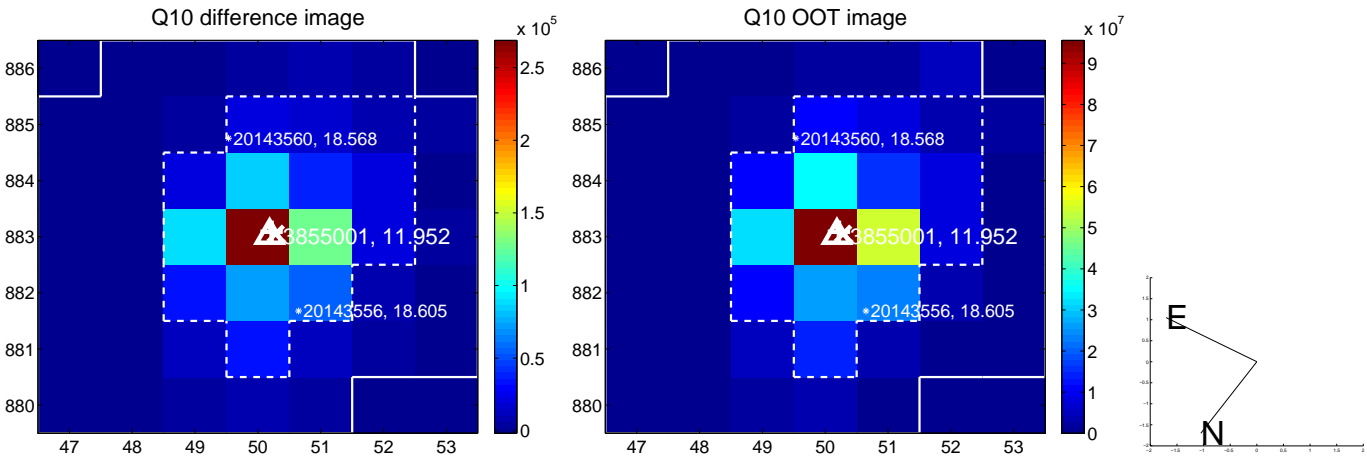
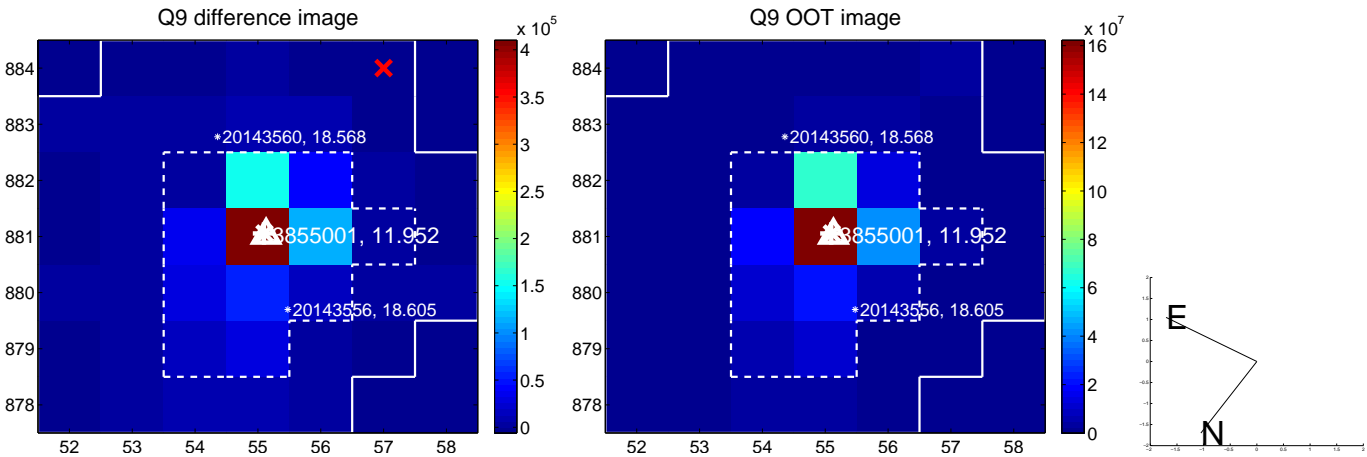


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

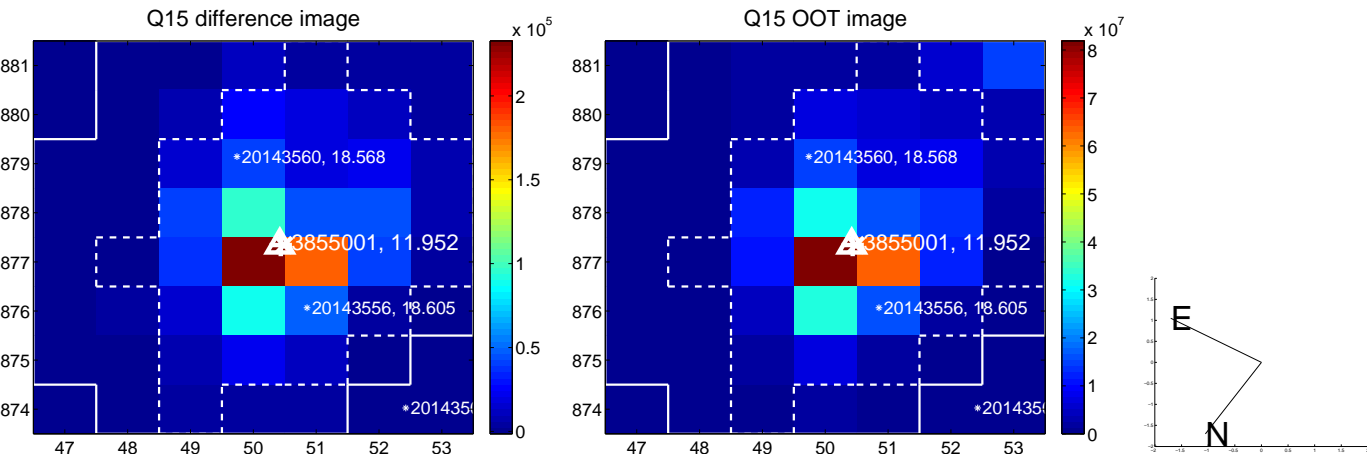
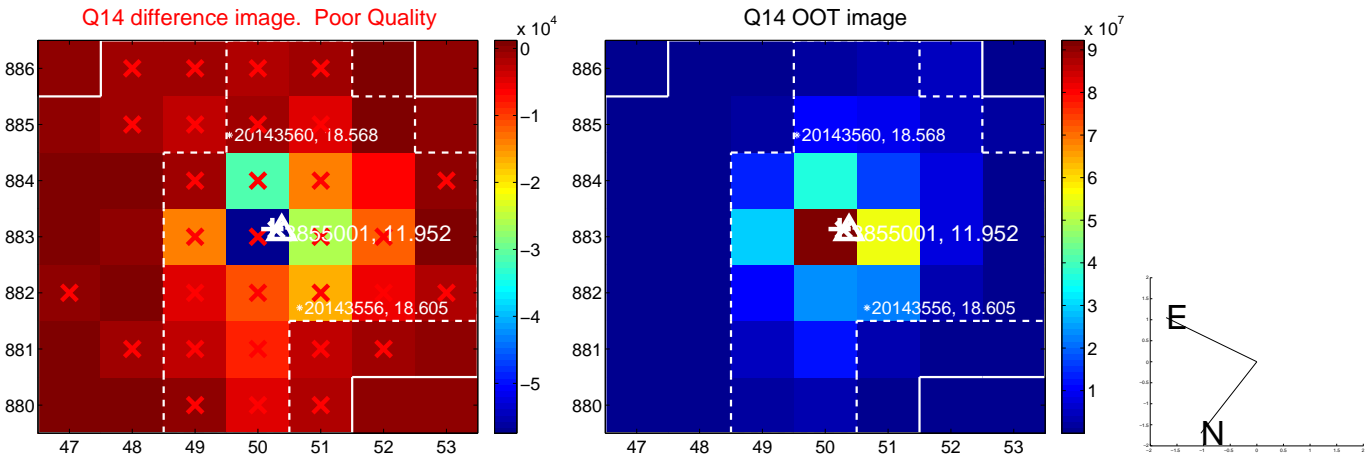
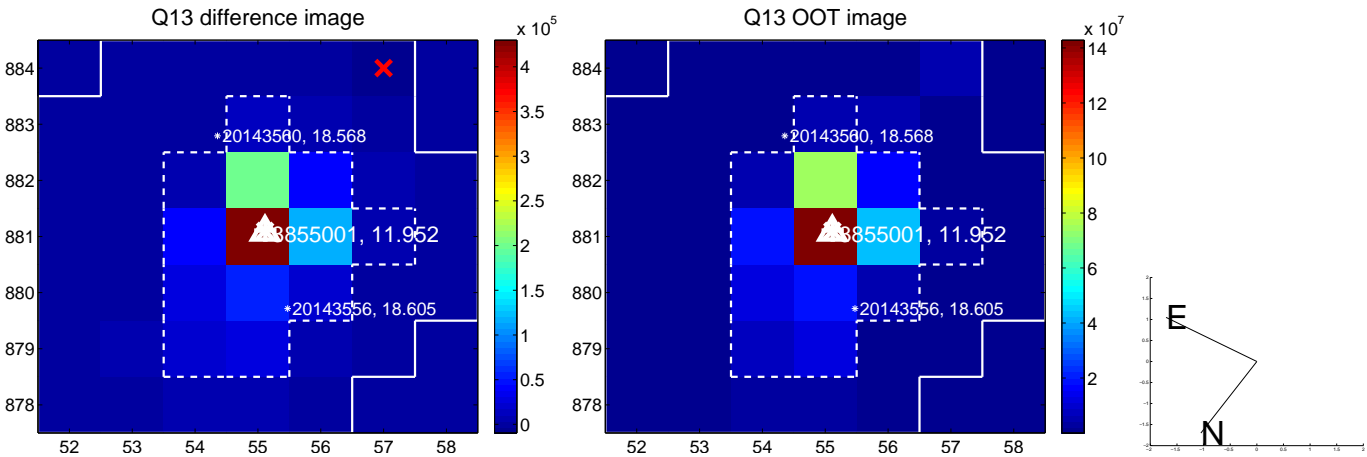




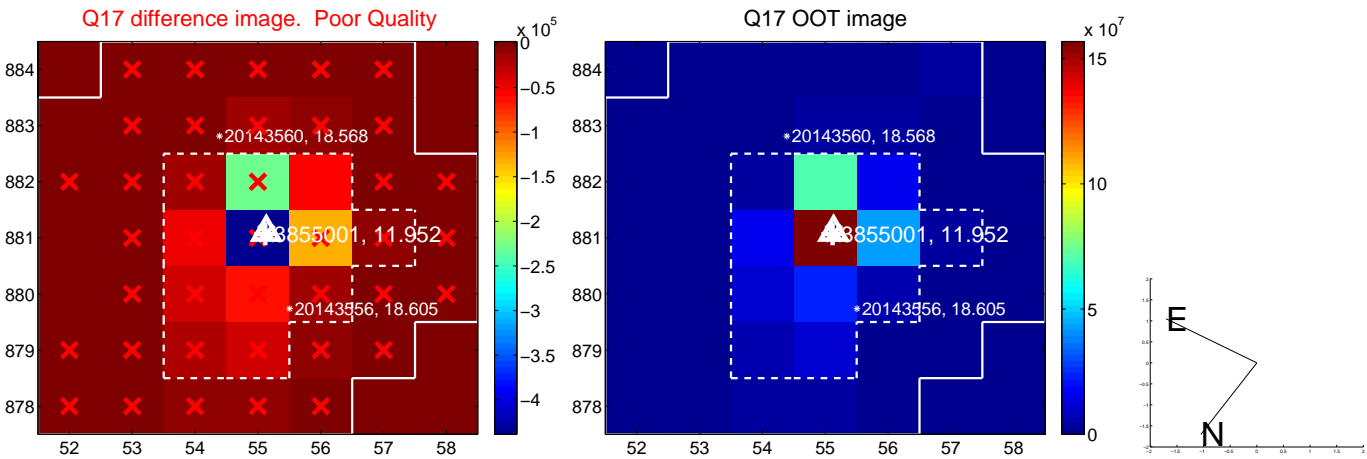
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



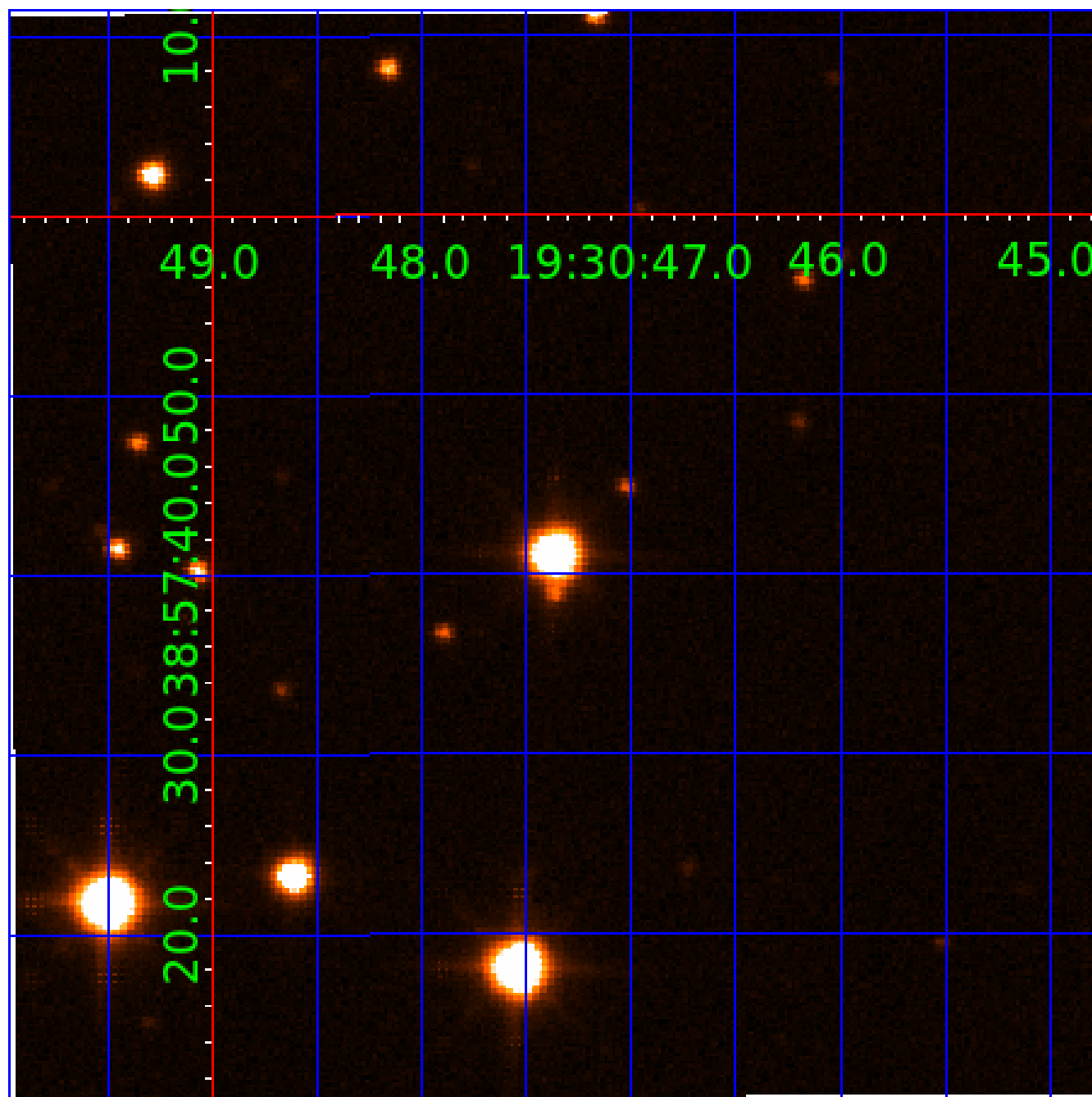
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



folded centroid time series figure for this object.

UKIRT Image

Declination



# KIC 003855001

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
003855001-01	OBS	No	1.709750	132.779883	137.9	6.726	9.5	7.7	1.54	7149	1.84	5261.16
003855001-02	OBS	No	0.623876	131.556527	182.6	1.880	8.9	10.4	1.54	7149	2.42	20177.16
003855001-03	OBS	No	77.567808	167.991944	2249.2	4.011	7.8	8.9	1.54	7149	7.70	32.52
003855001-04	OBS	No	21.743285	132.579449	1123.1	3.847	8.0	7.7	1.54	7149	7.13	177.24

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
003855001-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
003855001-02	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
003855001-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_ALT—MOD_POS_ALT
003855001-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA—TRANS_GAPPED—MOD_NONUNIQ_ALT

**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.

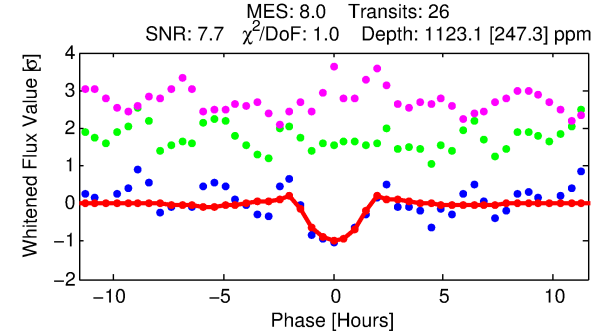
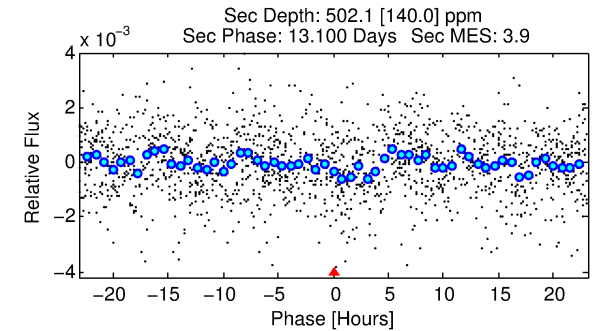
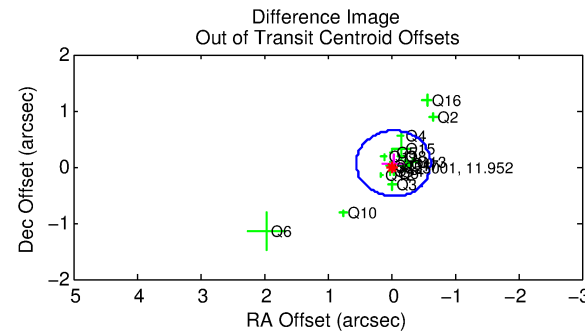
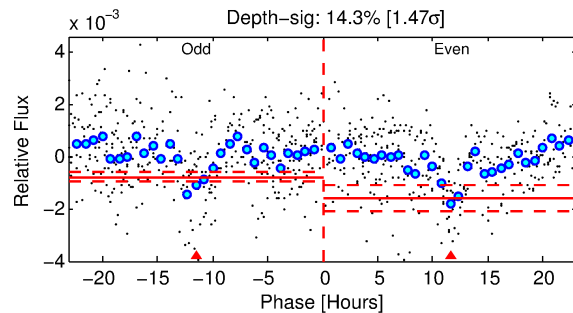
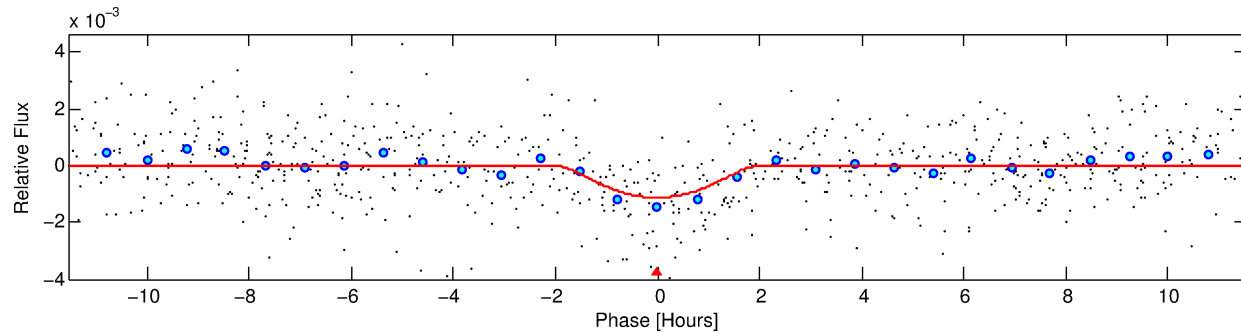
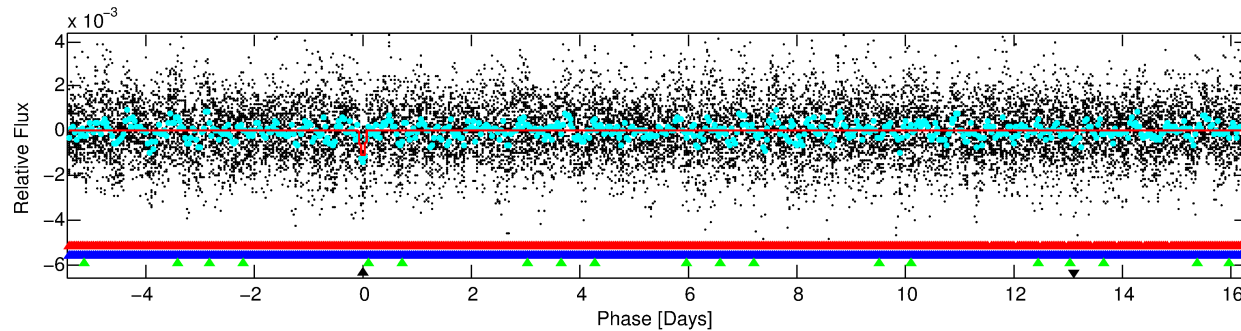
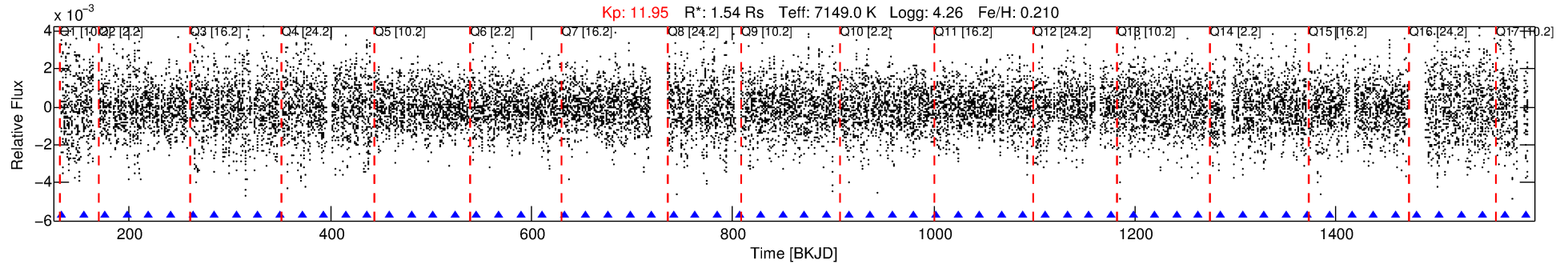
Ephemeris Match Information For 003855001-04

No Significant Match Found



# DV One-Page Summary

KIC: 3855001 Candidate: 4 of 4 Period: 21.743 d



## DV Fit Results:

Period = 21.74328 [0.00032] d  
Epoch = 132.5794 [0.0104] BKJD  
 $R_p/R^* = 0.0425$  [0.0303]  
 $a/R^* = 16.08$  [5.64]  
 $b = 0.97$  [0.07]  
 $\text{Seff} = 177.24$  [82.81]  
 $T_{\text{eq}} = 930$  [109] K  
 $R_p = 7.13$  [5.74]  $R_{\text{e}}$   
 $a = 0.1766$  [0.0544] AU  
 $A_g = 169.60$  [257.03] [0.66 $\sigma$ ]  
 $T_{\text{eff}} = 5191$  [1896] K [2.24 $\sigma$ ]

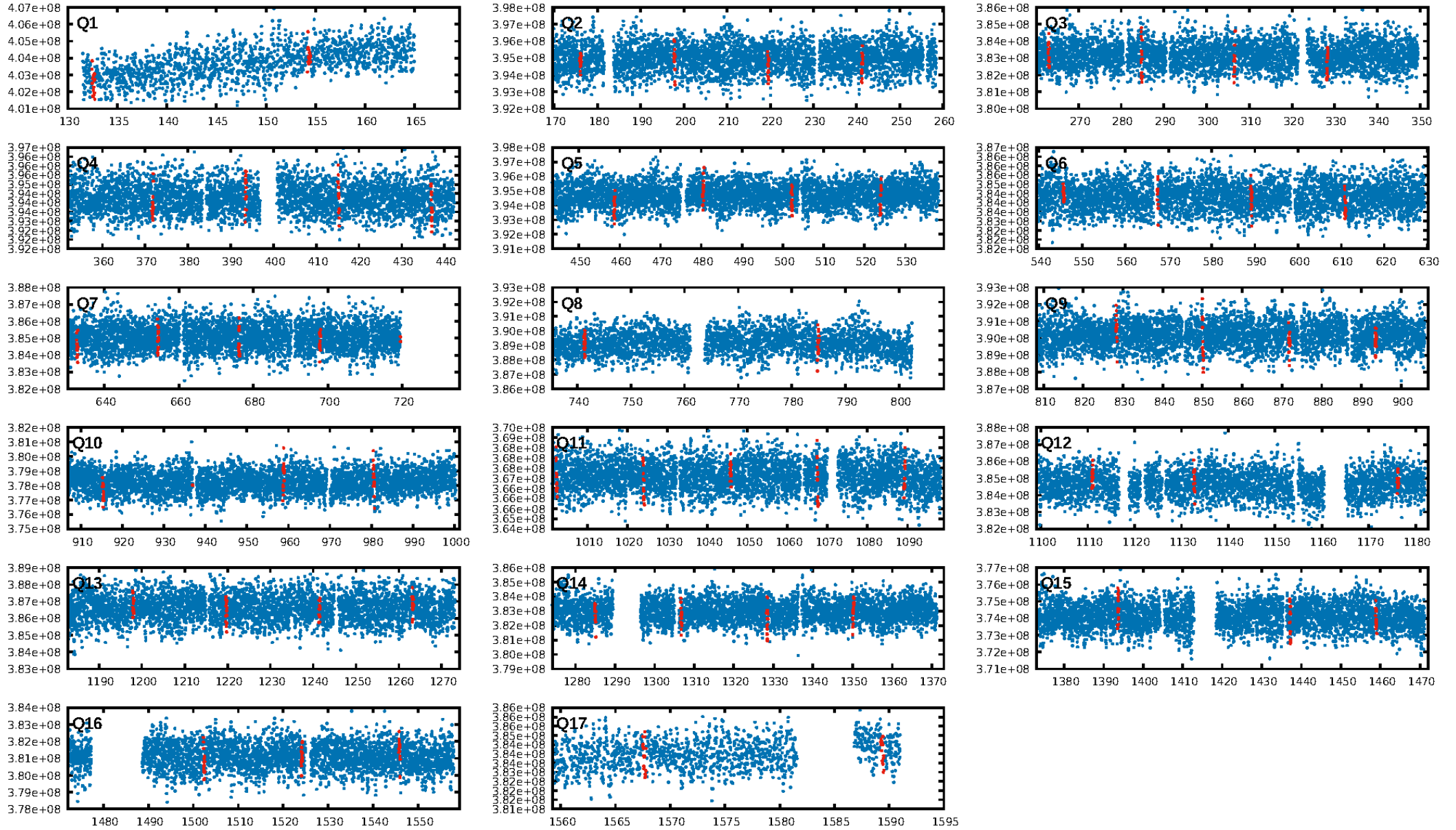
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [62.05 $\sigma$ ]  
LongPeriod-sig: 100.0% [241.06 $\sigma$ ]  
ModelChiSquare2-sig: 54.1%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 9.04e-13  
RollingBand-fgt: 1.00 [25/25]  
GhostDiagnostic-chr: 1.451  
Centroid-sig: N/A  
Centroid-so: N/A  
OotOffset-rm: 0.067 arcsec [0.35 $\sigma$ ]  
KicOffset-rm: 0.155 arcsec [1.42 $\sigma$ ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 0.82 [14/17]  
DiffImageOverlap-fno: 0.00 [0/17]

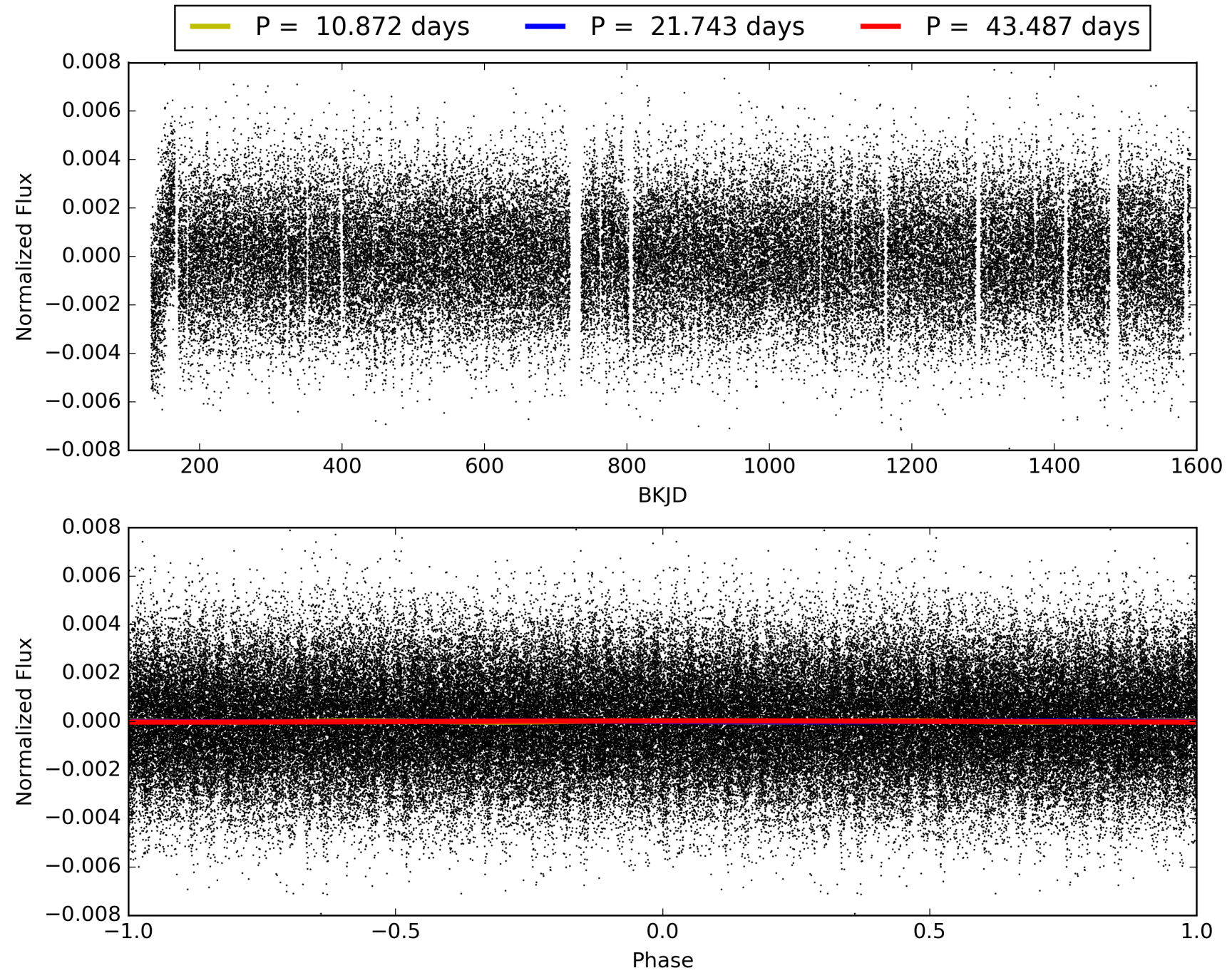
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 23:38:27 Z

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

# TCE 003855001-04, PDC Light Curves

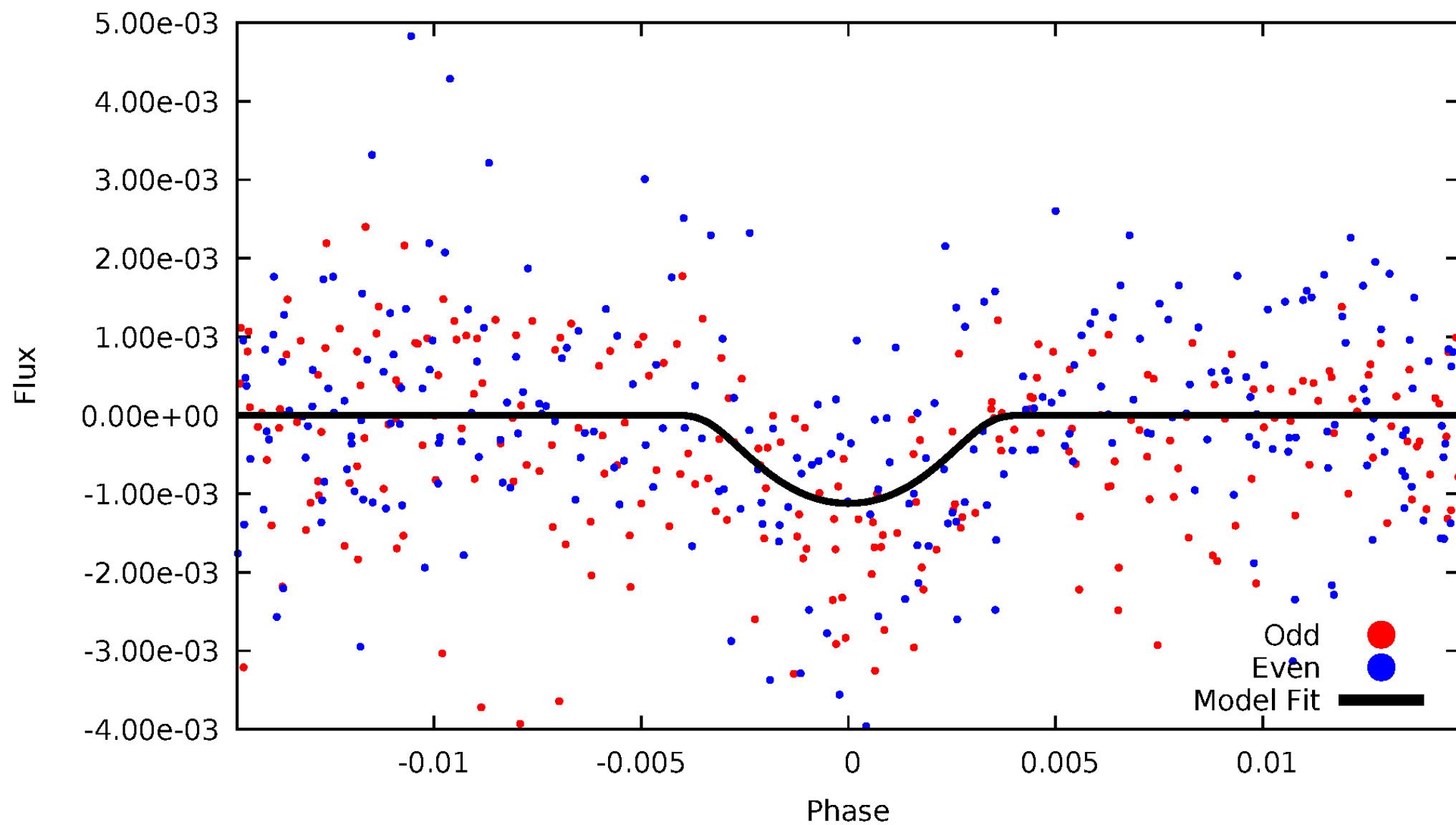


TCE 003855001-04



# DV Odd/Even

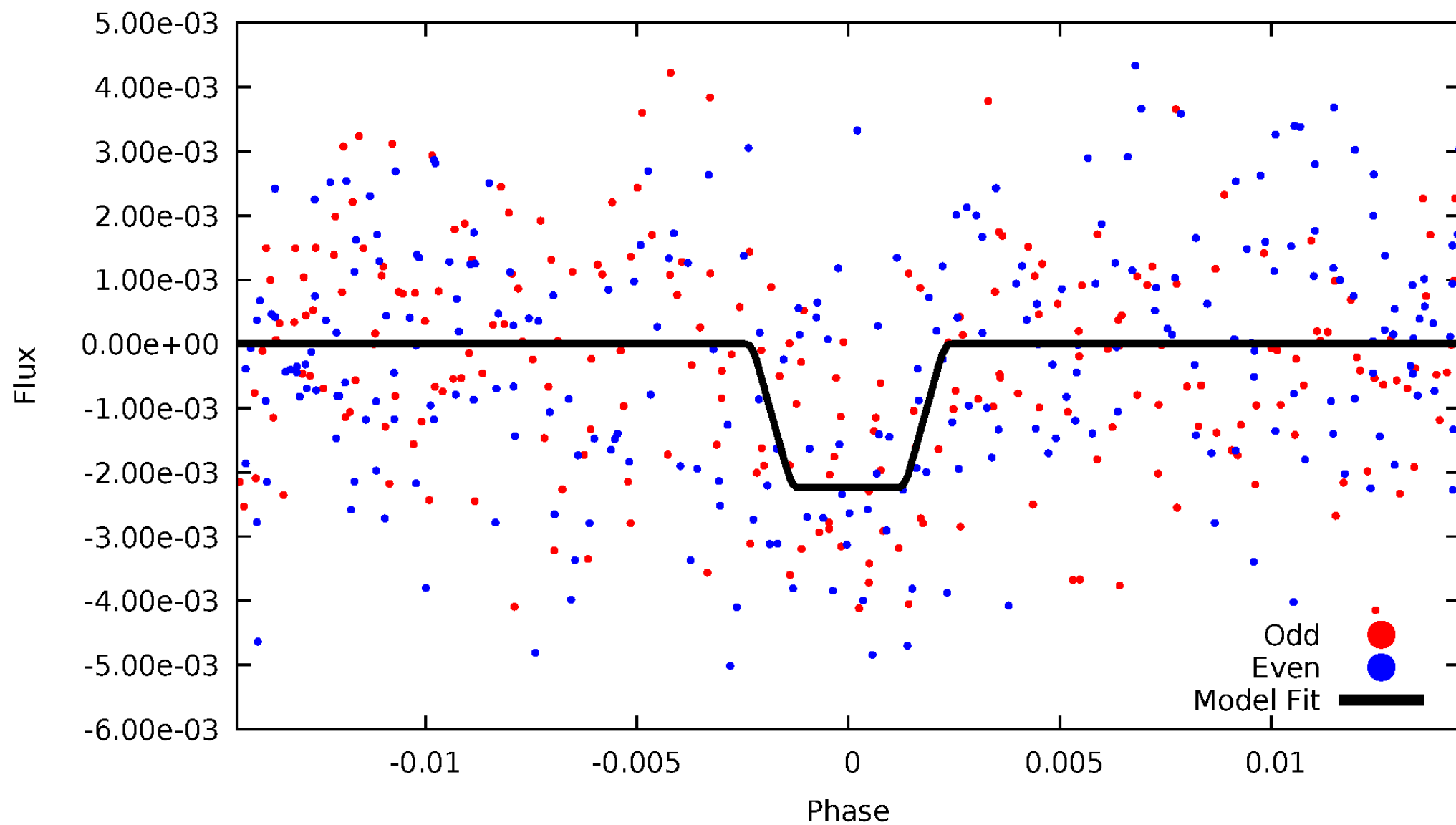
TCE 003855001-04





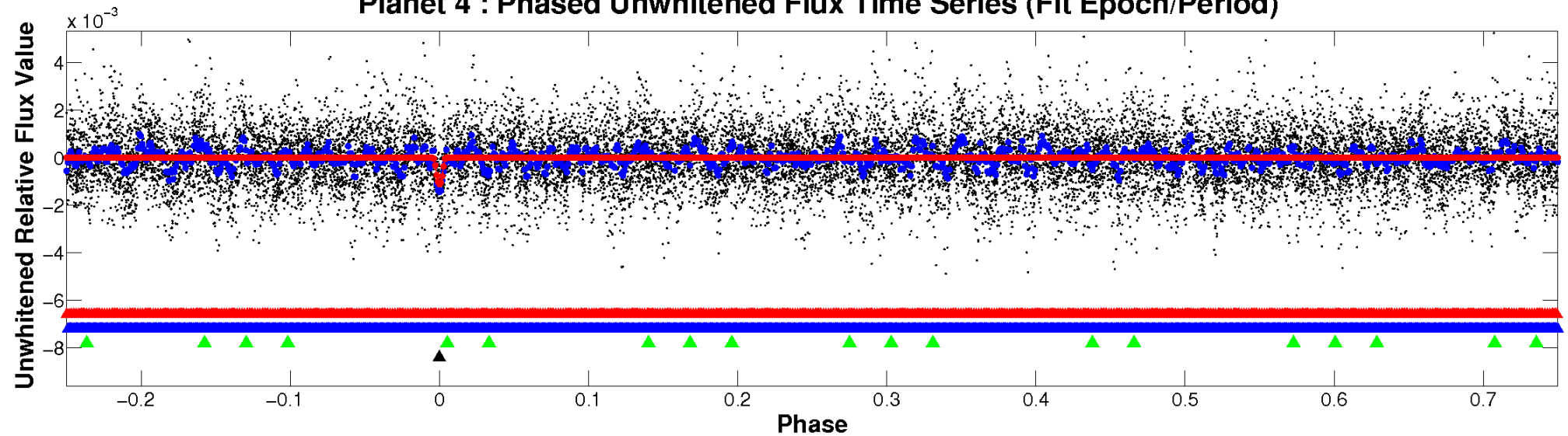
# ALT Odd/Even

TCE 003855001-04

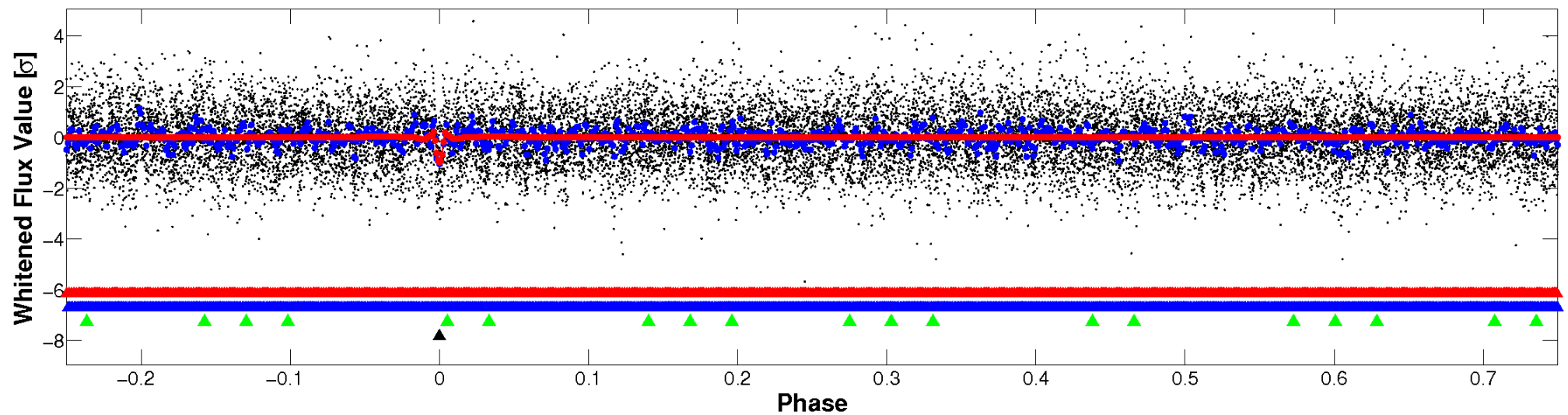


# Non-Whitened Vs. Whitened Light Curve

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



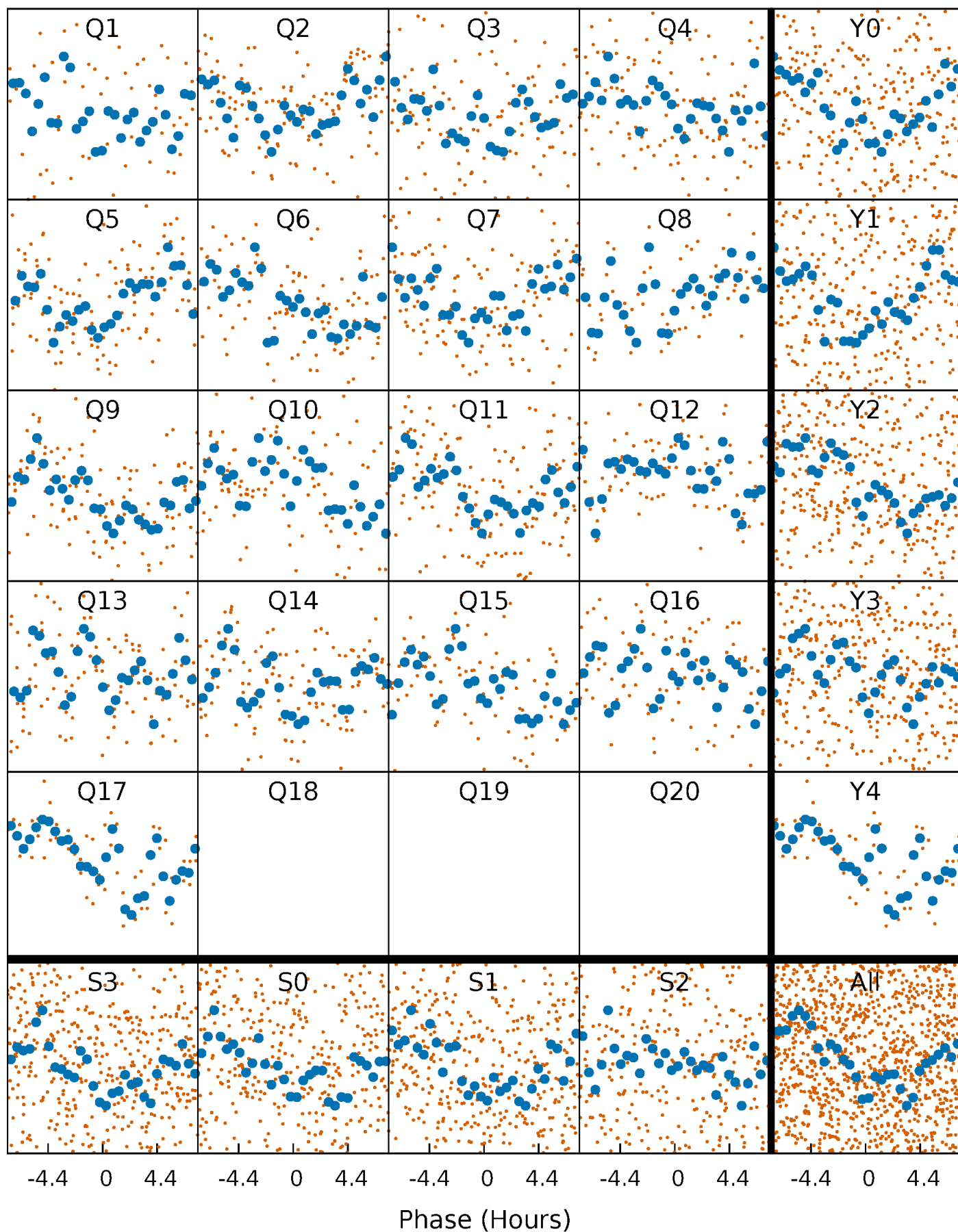
## Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)





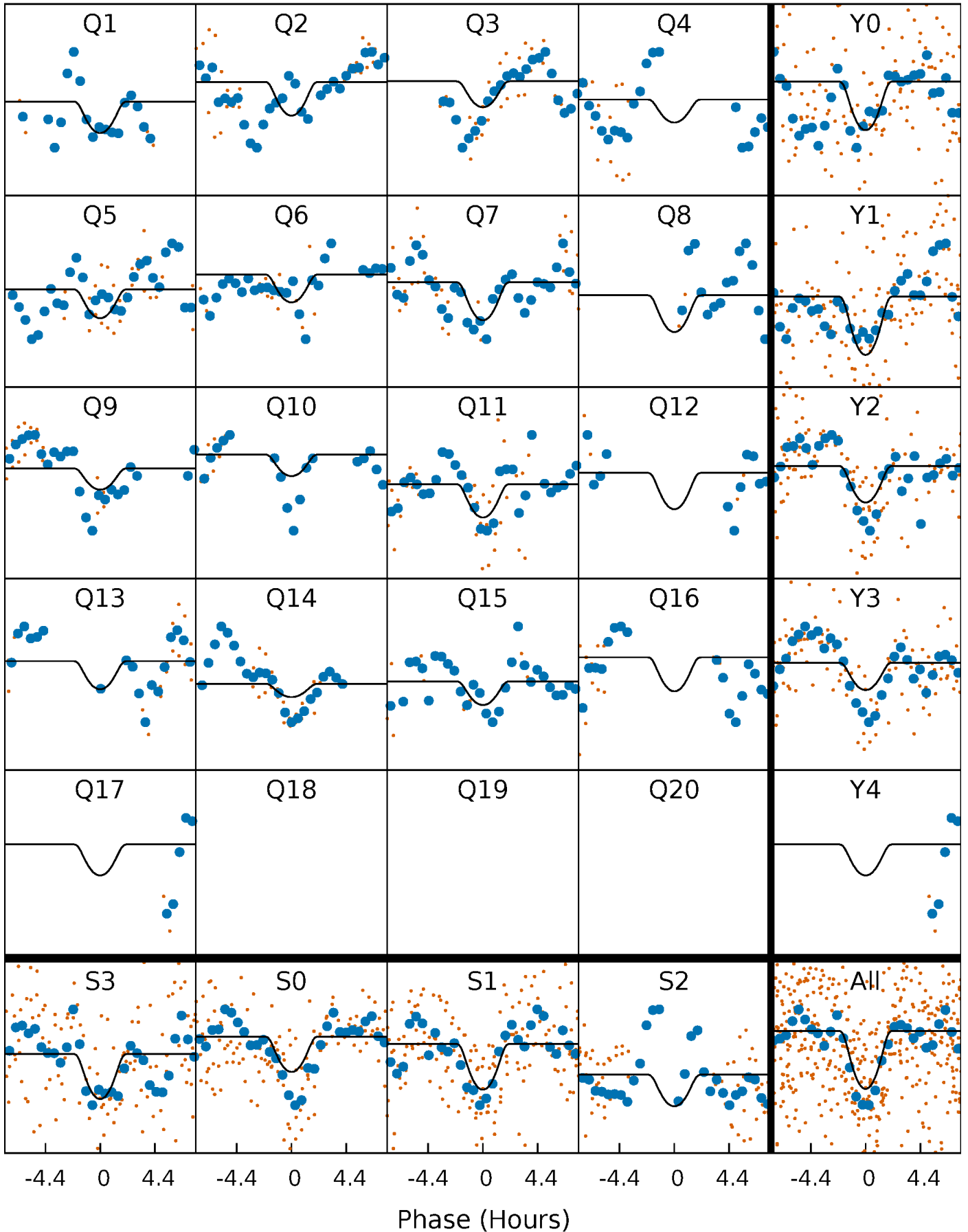
# PDC Quarter-Phased Transit Curves

TCE 003855001-04 P= 21.743285 Days  $T_0=132.579449$  (BKJD)



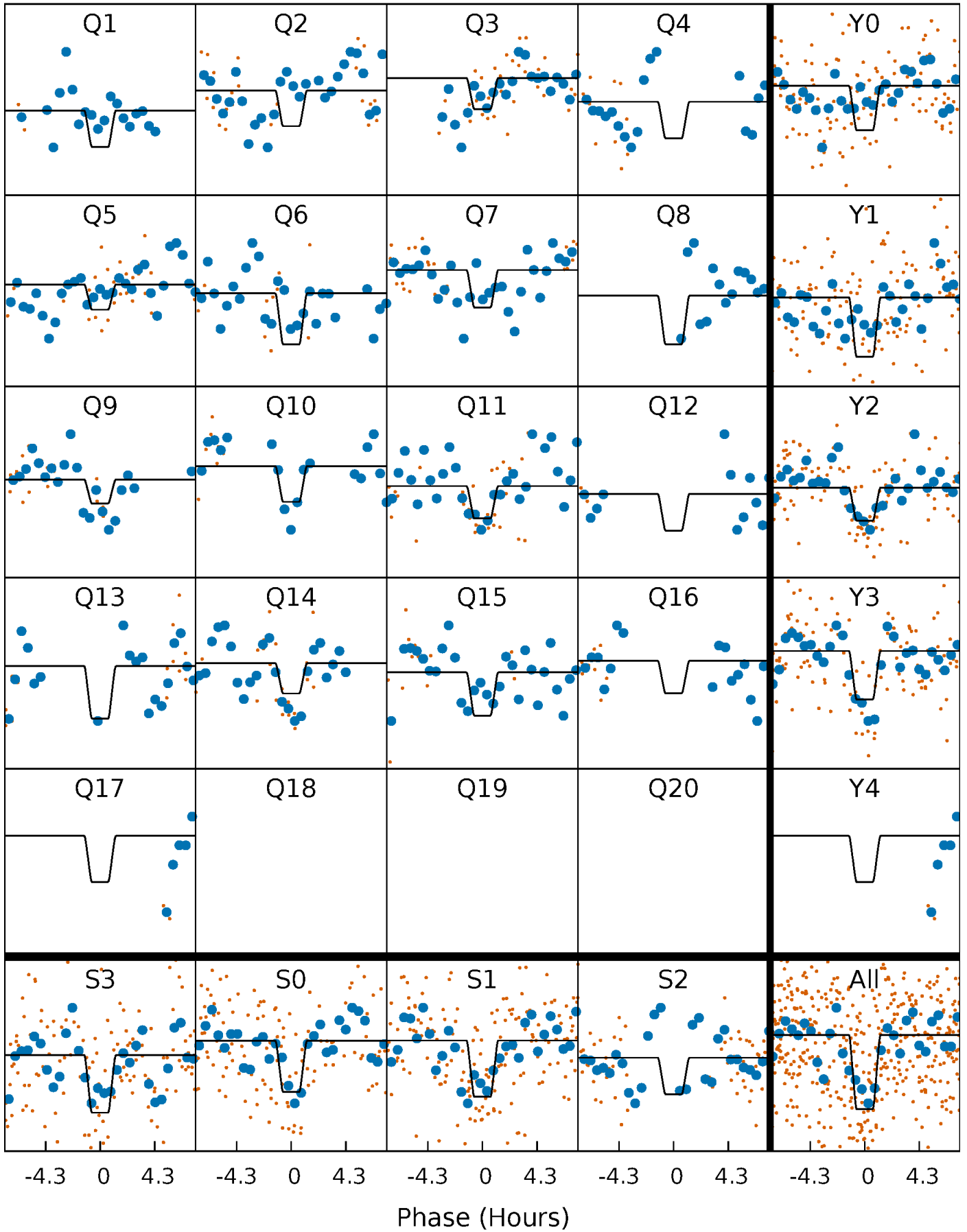
# DV Quarter-Phased Transit Curves

TCE 003855001-04 P= 21.743285 Days  $T_0=132.579449$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

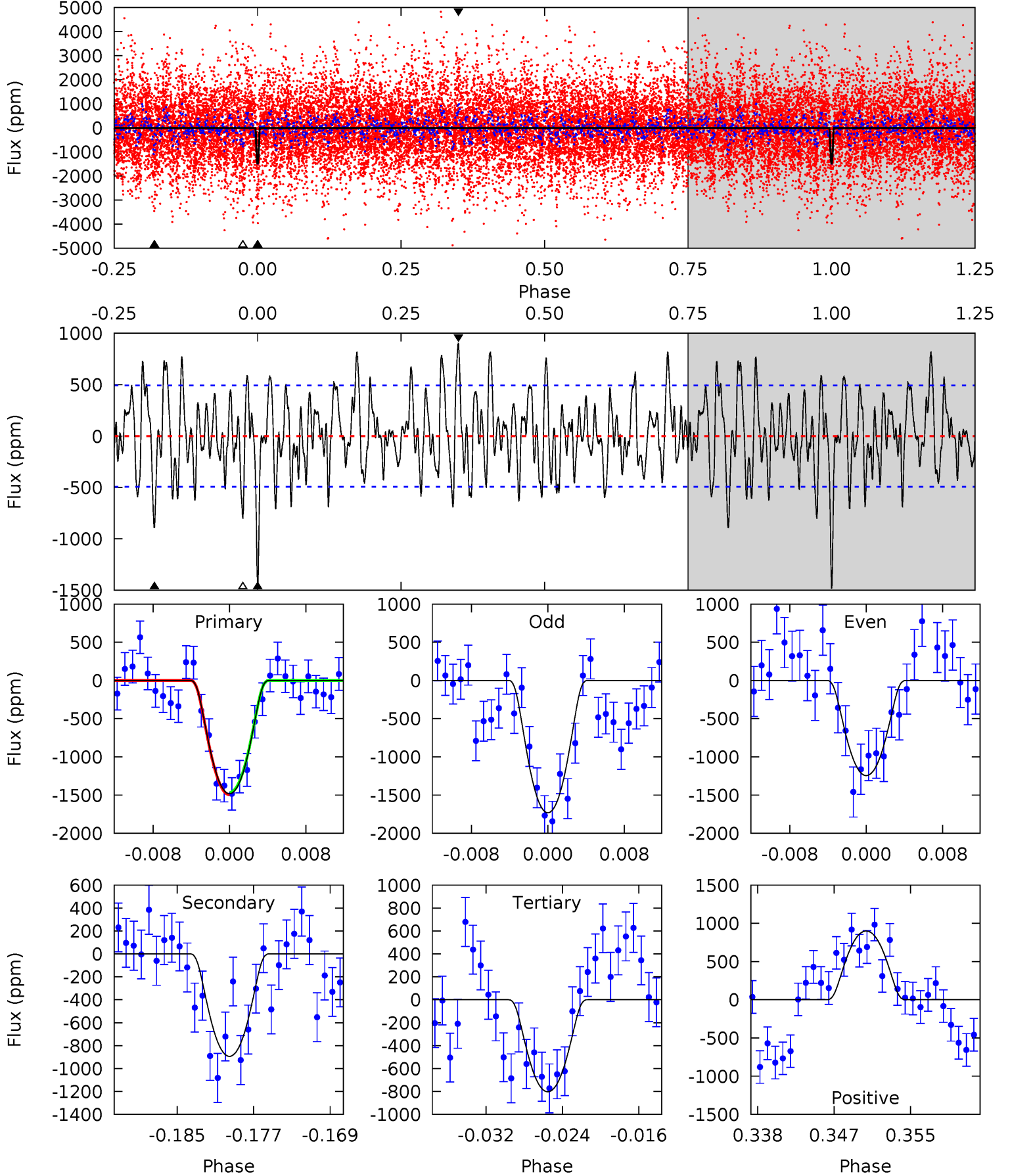
TCE 003855001-04 P= 21.743374 Days  $T_0=132.577936$  (BKJD)



# DV Model-Shift Uniqueness Test

003855001-04, P = 21.743285 Days, E = 110.836164 Days

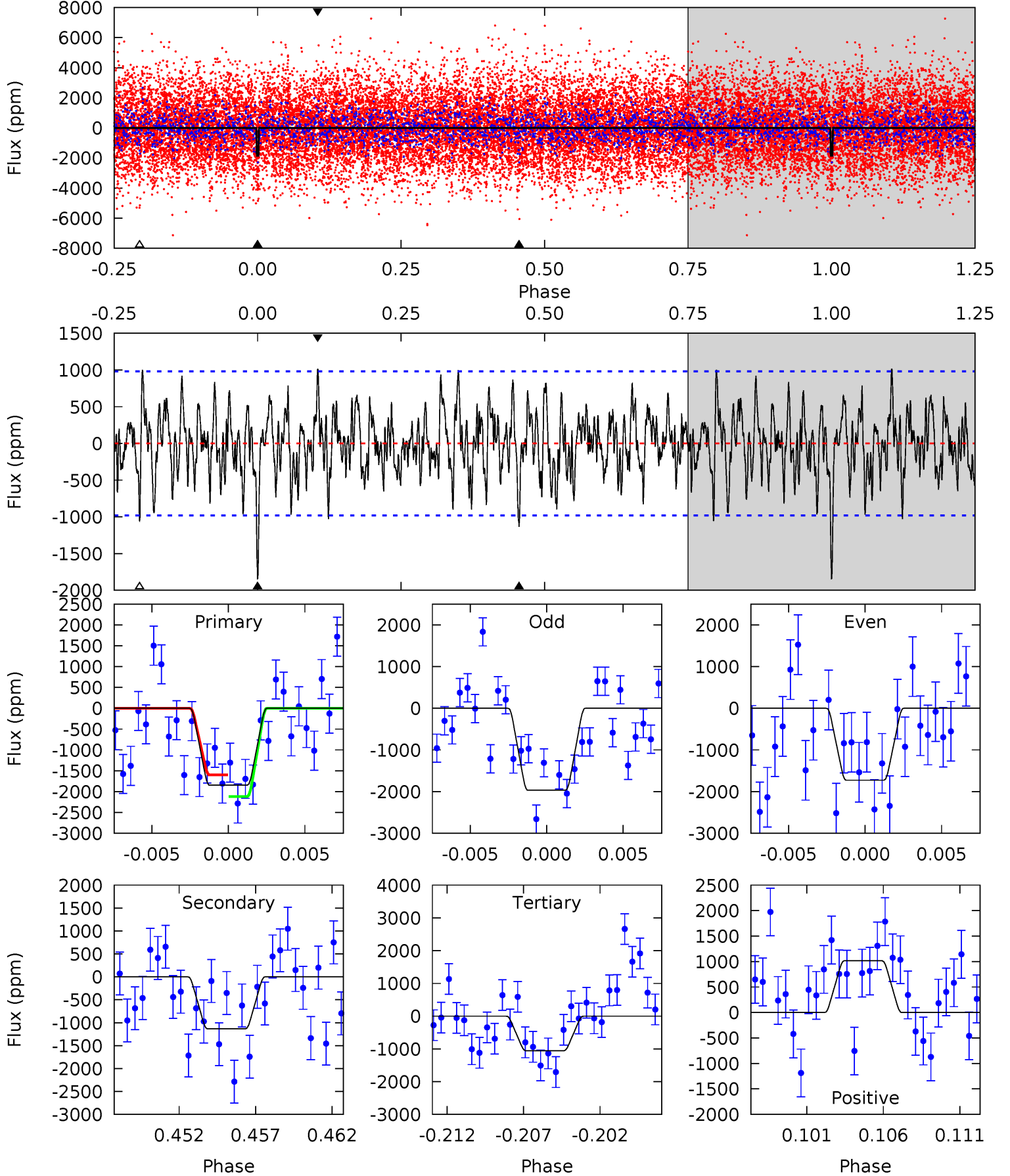
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
15.2	9.19	8.25	9.25	5.07	2.65	3.23	6.99	5.99	0.94	-0.06	2.51	0.66	0.38	0.16



# Alt Model-Shift Uniqueness Test

003855001-04, P = 21.743374 Days, E = 110.834562 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
9.71	5.96	5.56	5.33	5.16	2.82	1.90	4.15	4.37	0.40	0.63	0.63	0.90	0.35	1.36



### Stellar Parameters For KIC 003855001

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$7149^{+175}_{-300}$	$4.256^{+0.058}_{-0.232}$	$0.210^{+0.150}_{-0.400}$	$1.537^{+0.580}_{-0.193}$	$1.556^{+0.211}_{-0.211}$	$0.603^{+0.195}_{-0.342}$
	+2%/-4%	+1%/-5%	+71%/-190%	+38%/-13%	+14%/-14%	+32%/-57%
Source	PHO1	KIC0	KIC0	DSEP		

KIC = Kepler Input Catalog; PHO = Photometry; SPE = Spectroscopy; AST = Asteroseismology  
 TRA = Transits; DESP = Dartmouth Models; MULT = Multiple Models

### Secondary Eclipse Parameters for KIC 003855001-04 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-894 \pm 97$	$7.92^{+5.43}_{-4.68}$	$1326^{+112}_{-76}$	$5753^{+3729}_{-1170}$	$237^{+1195}_{-153}$
Alt.	$-1134 \pm 190$	$8.84^{+5.72}_{-4.91}$	$1326^{+122}_{-73}$	$5766^{+3338}_{-1061}$	$249^{+947}_{-160}$

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



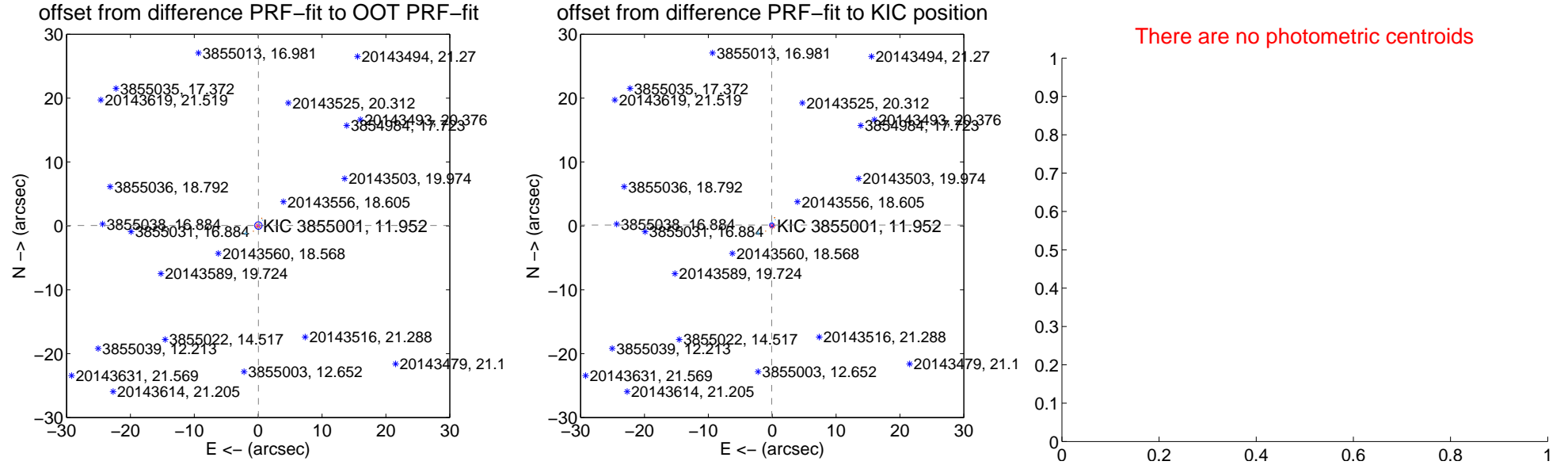
## DV Centroid Data

Supplemental centroid analysis for 003855001-04. **Kepler magnitude: 11.95.** Transit SNR 7.71

There are 14 quarters with good PRF difference image offsets

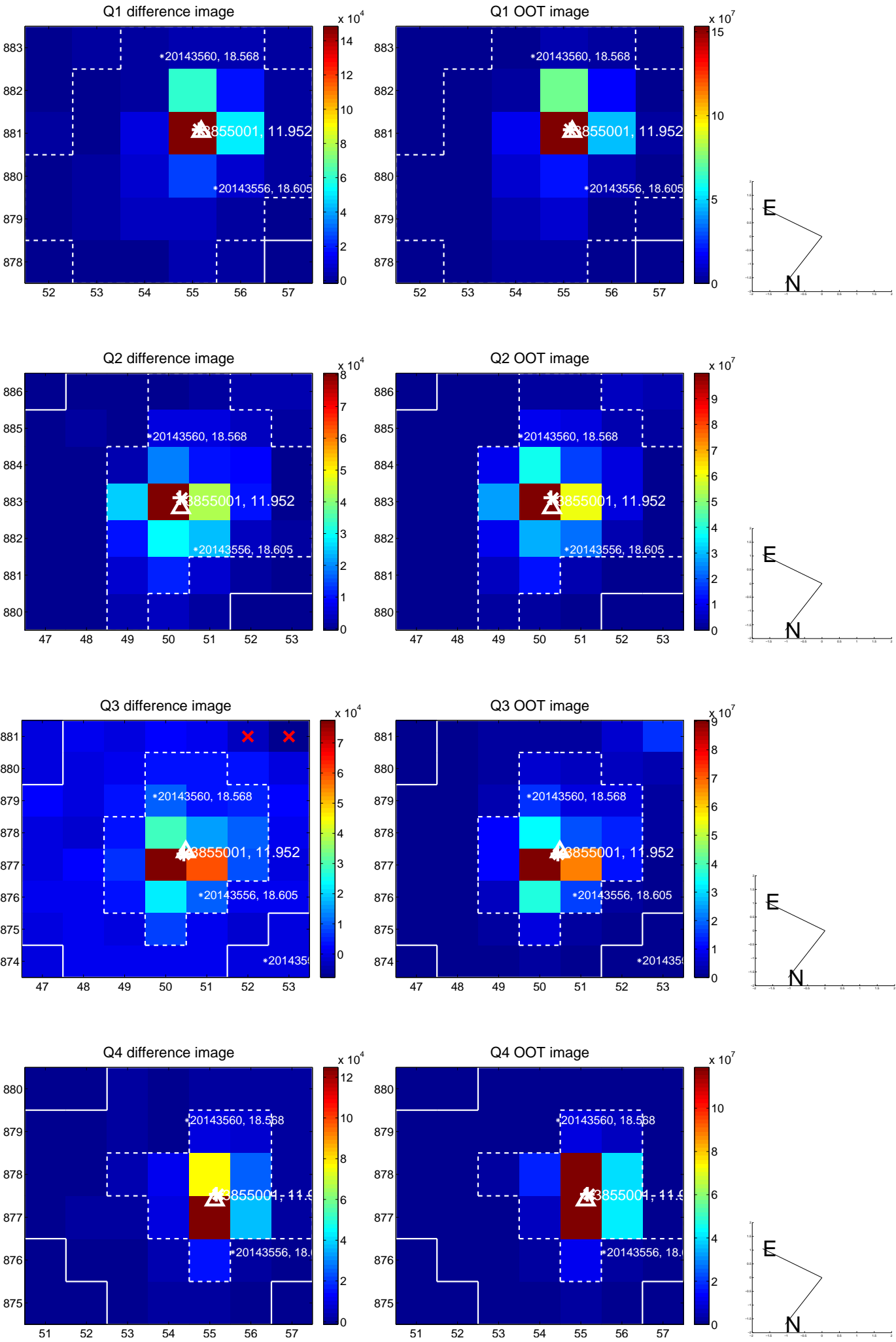
The direct PRF centroid is offset from the target star catalog position by about 0.09 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.067 \pm 0.195$	0.35	$-0.036 \pm 0.156$	$0.057 \pm 0.150$
PRF-fit source offset from KIC position	$0.155 \pm 0.109$	1.42	$0.074 \pm 0.095$	$0.136 \pm 0.113$
photometric centroid source offset	—	—	—	—

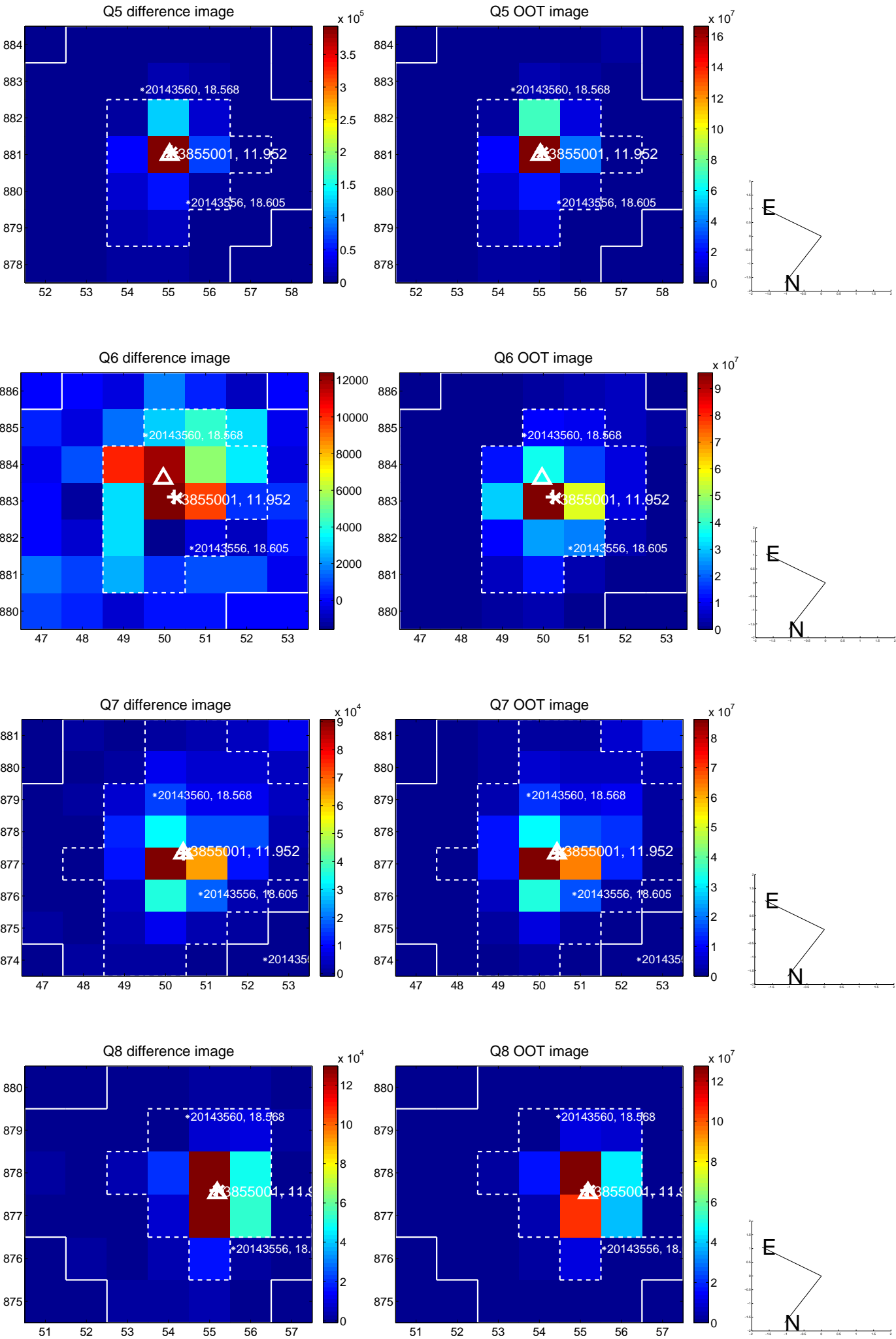


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

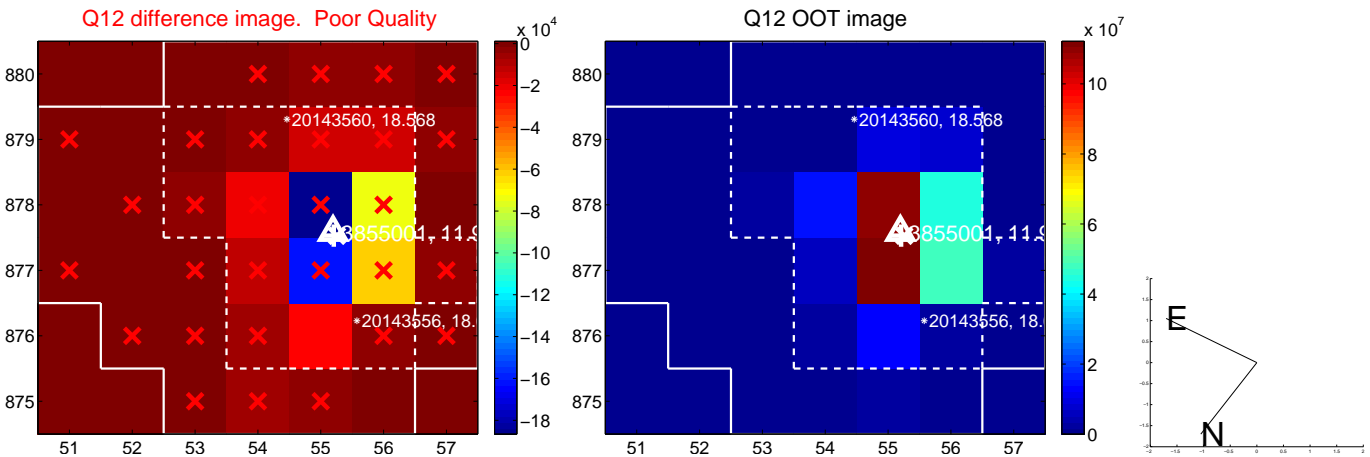
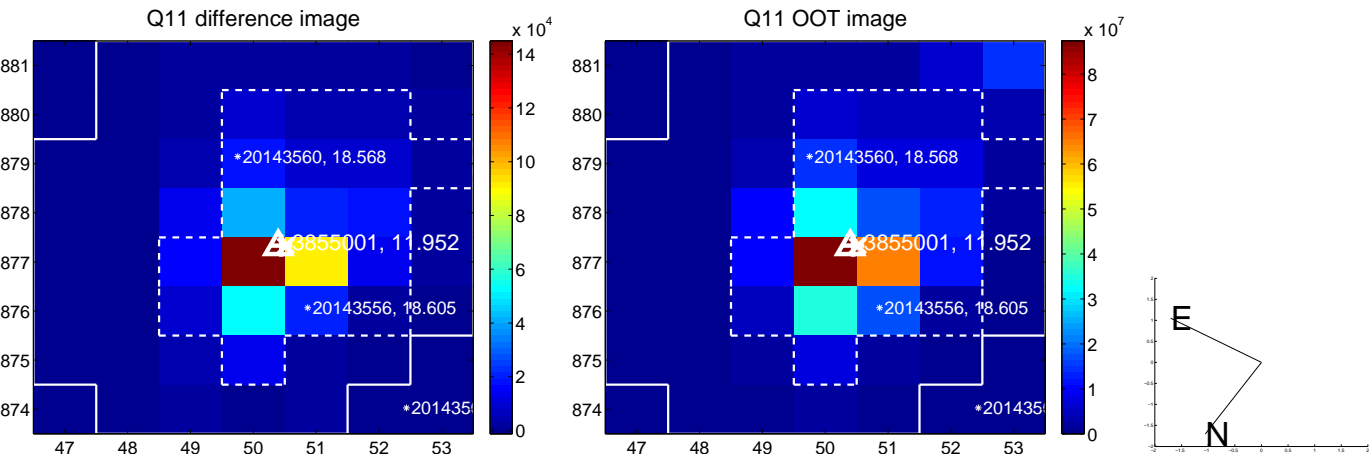
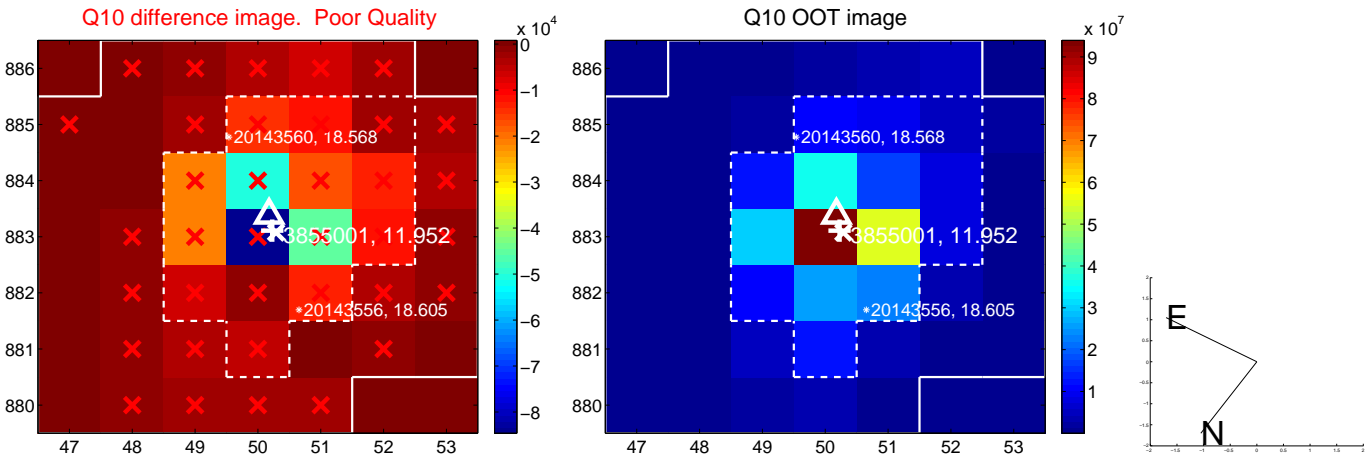
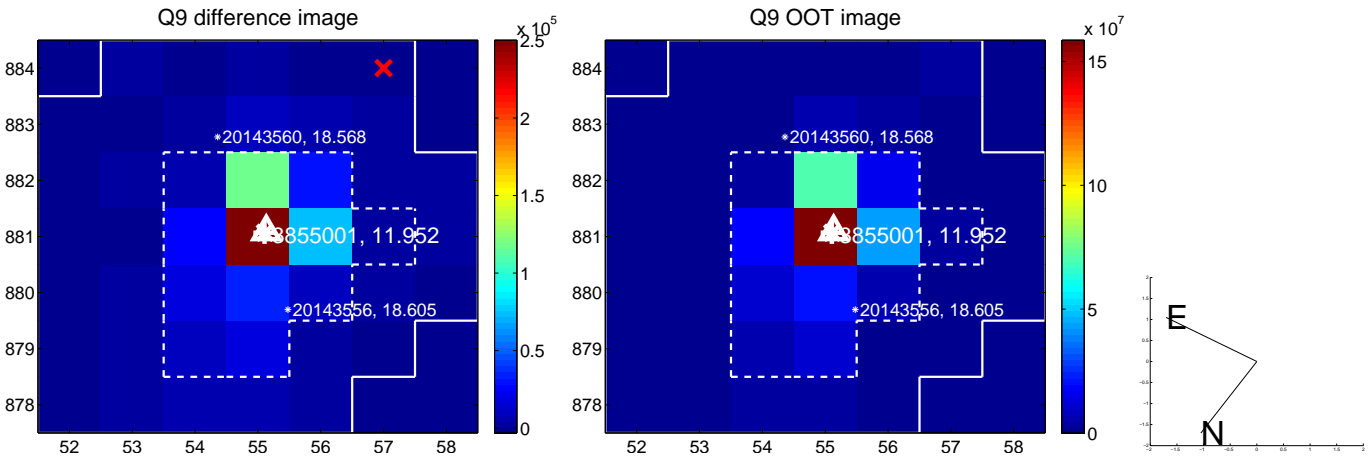
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



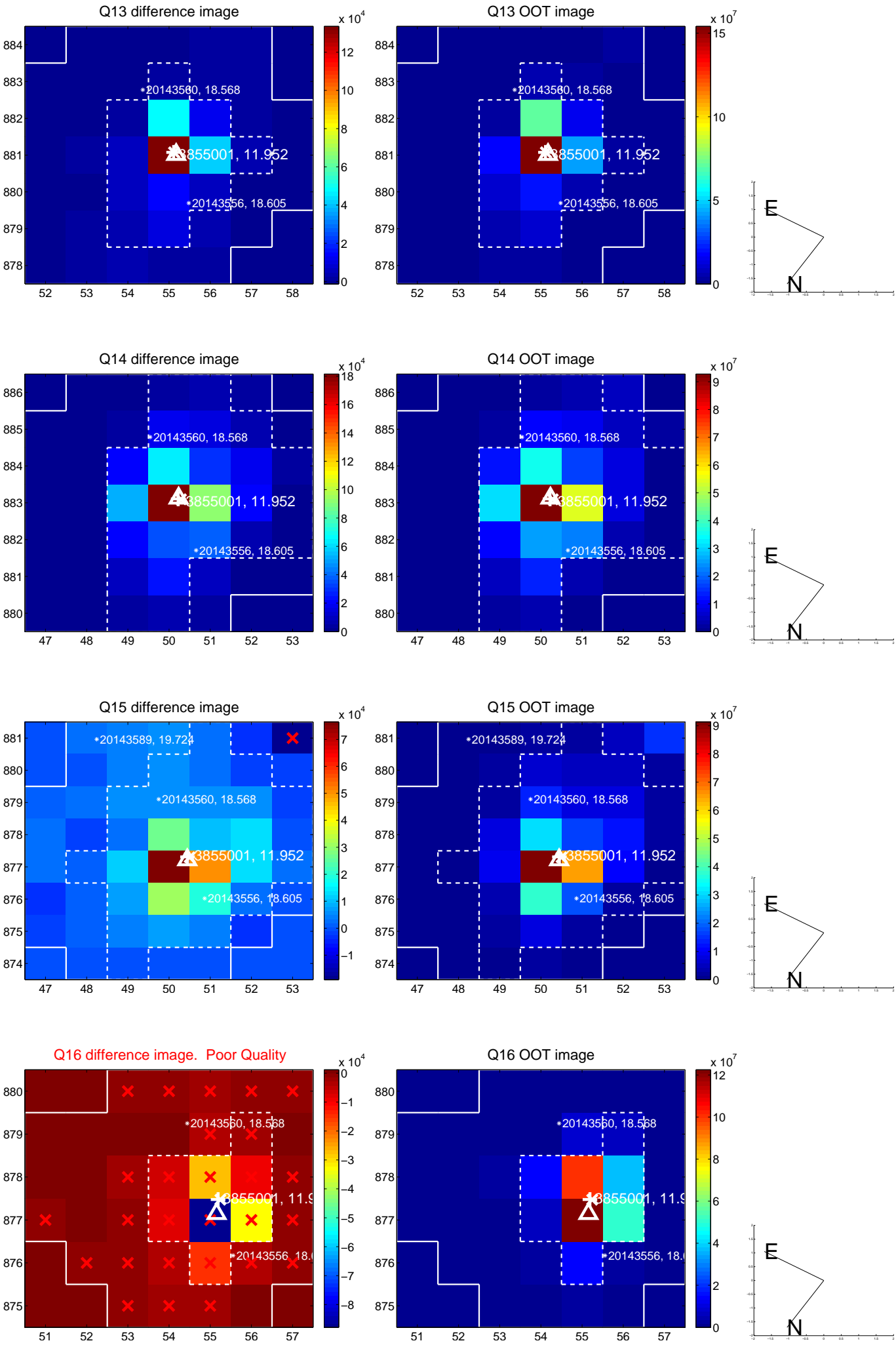
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



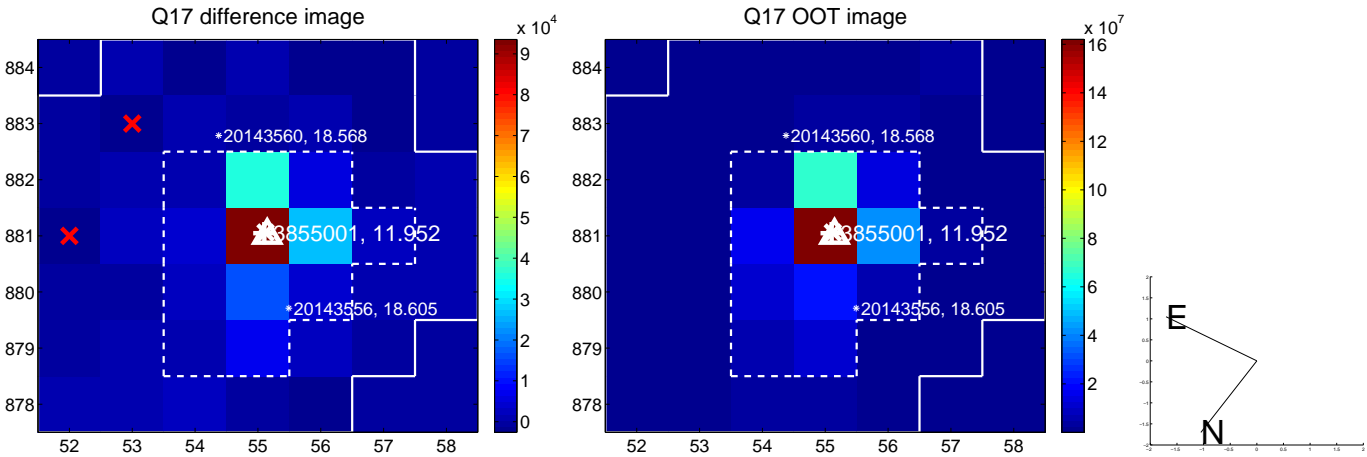
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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.



folded centroid time series figure for this object.



UKIRT Image

Declination

