

# KIC 008460993

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008460993-01	OBS	No	0.554839	131.572172	302.2	0.512	15.1	14.7	2.20	6977	4.02	43413.86
008460993-02	OBS	No	0.507028	131.766916	247.8	1.541	9.0	9.2	2.20	6977	4.05	48956.31
008460993-03	OBS	No	124.751364	175.073357	3086.8	1.908	8.0	7.6	2.20	6977	12.77	31.75

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008460993-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_SKYE_ZUMA_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED
008460993-02	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED
008460993-03	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—MOD_NONUNIQ_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.

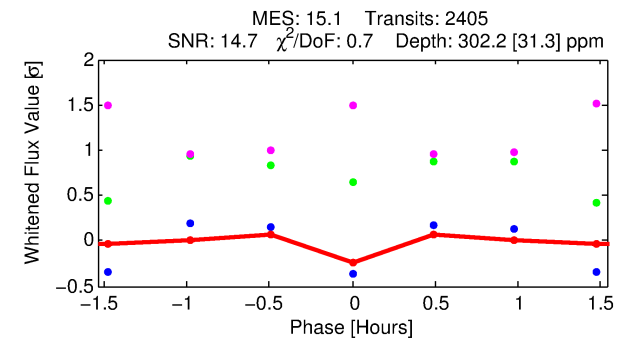
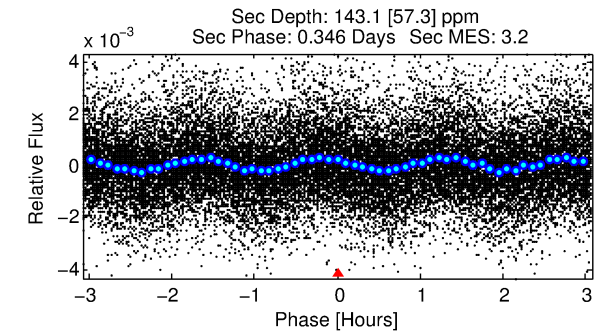
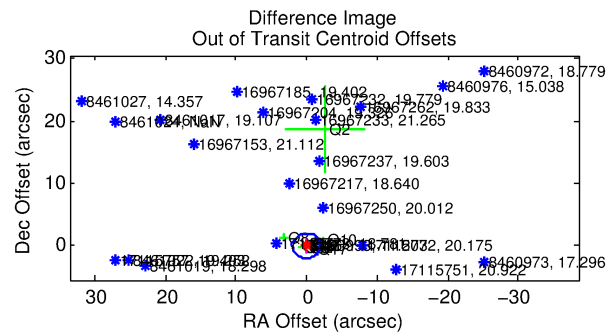
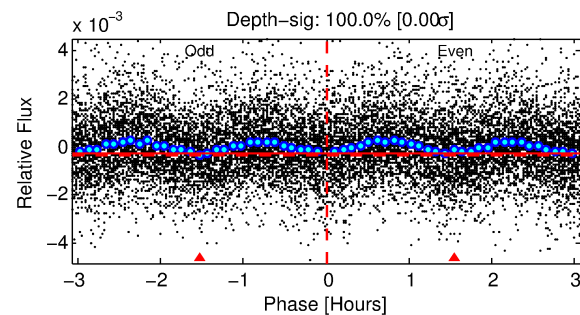
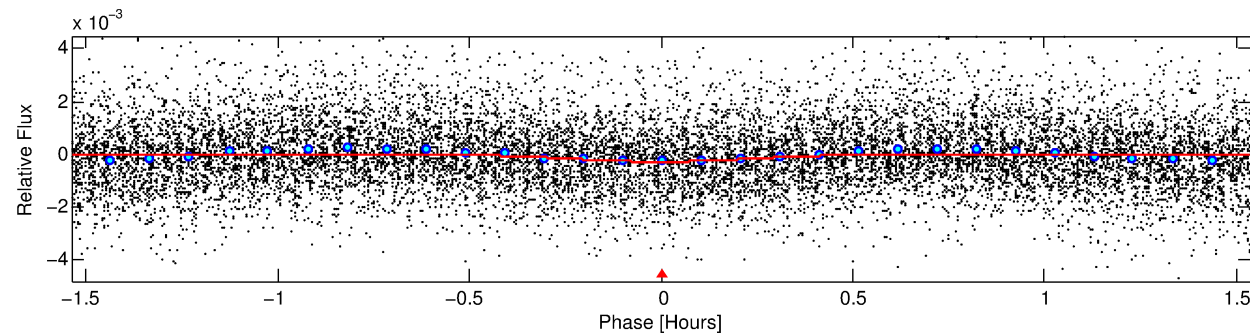
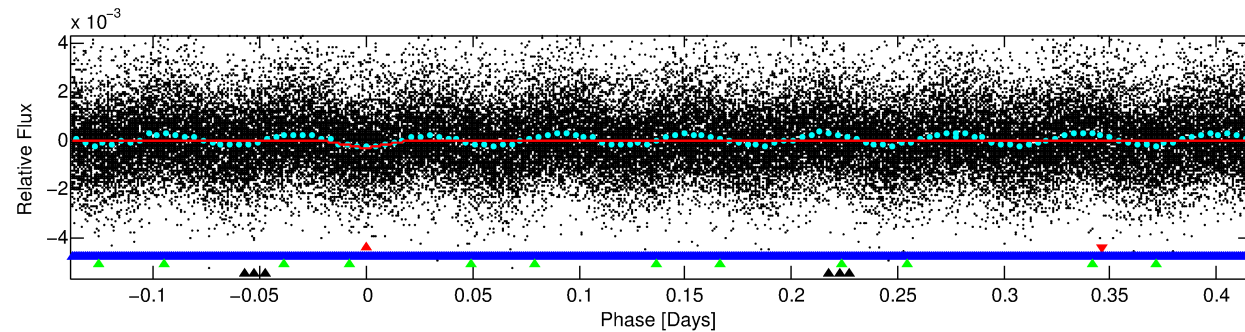
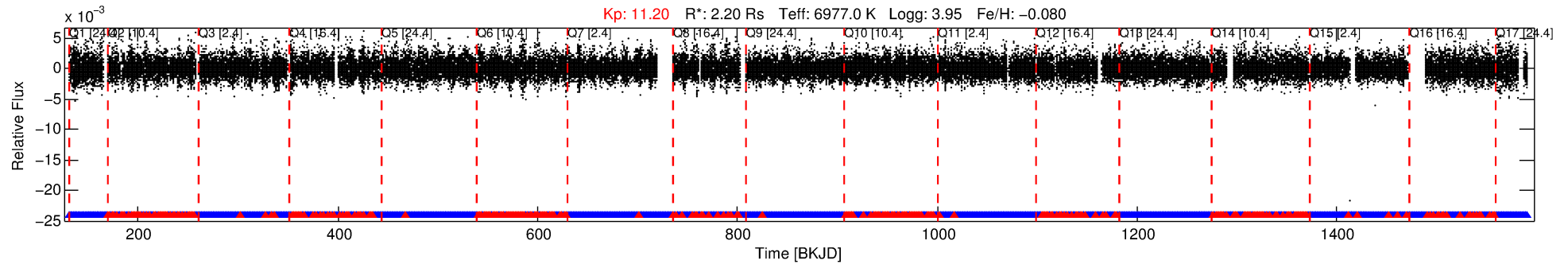
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 008460993-01

No Significant Match Found

# DV One-Page Summary

KIC: 8460993 Candidate: 1 of 4 Period: 0.555 d



## DV Fit Results:

Period = 0.55484 [0.00001] d  
Epoch = 131.5722 [0.0005] BKJD  
Rp/R\* = 0.0168 [0.0085]  
a/R\* = 8.42 [23.81]  
b = 0.06 [52.01]  
Seff = 43413.86 [22160.37]  
Teq = 3681 [470] K  
Rp = 4.02 [2.50] Re  
a = 0.0154 [0.0049] AU  
Ag = 1.15 [1.38] [0.11σ]  
Teffp = 5895 [1625] K [1.31σ]

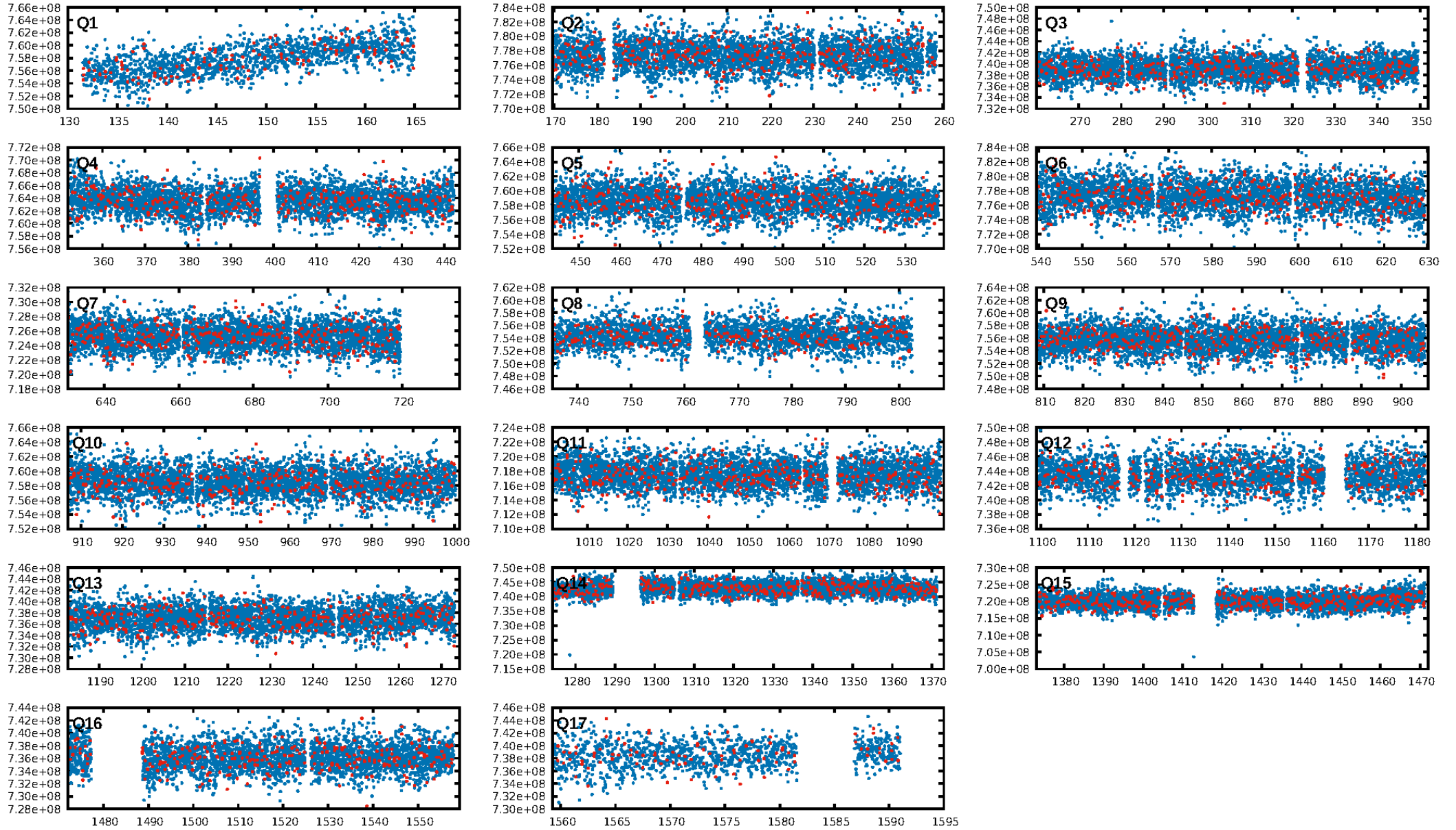
## DV Diagnostic Results:

ShortPeriod-sig: 52.0% [0.71σ]  
LongPeriod-sig: 100.0% [1508.91σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 6.38e-56  
RollingBand-fgt: 0.85 [1946/2296]  
GhostDiagnostic-chr: 2.212  
Centroid-sig: N/A  
Centroid-so: 0.295 arcsec [5.08σ]  
OotOffset-rm: 0.040 arcsec [0.06σ]  
KicOffset-rm: 0.251 arcsec [0.28σ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 0.88 [15/17]  
DiffImageOverlap-fno: 0.00 [0/17]

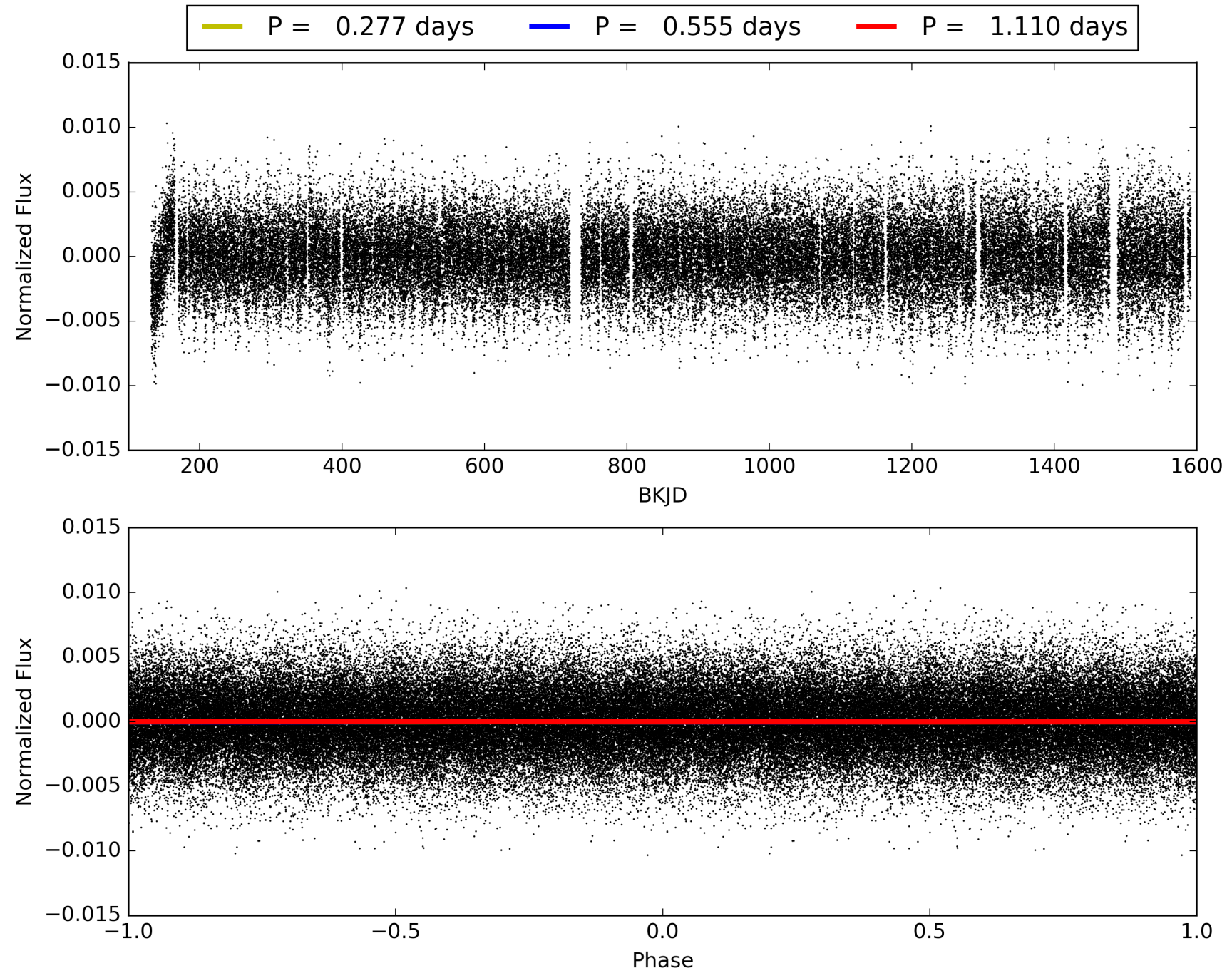
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 23:38:22 Z

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

# TCE 008460993-01, PDC Light Curves



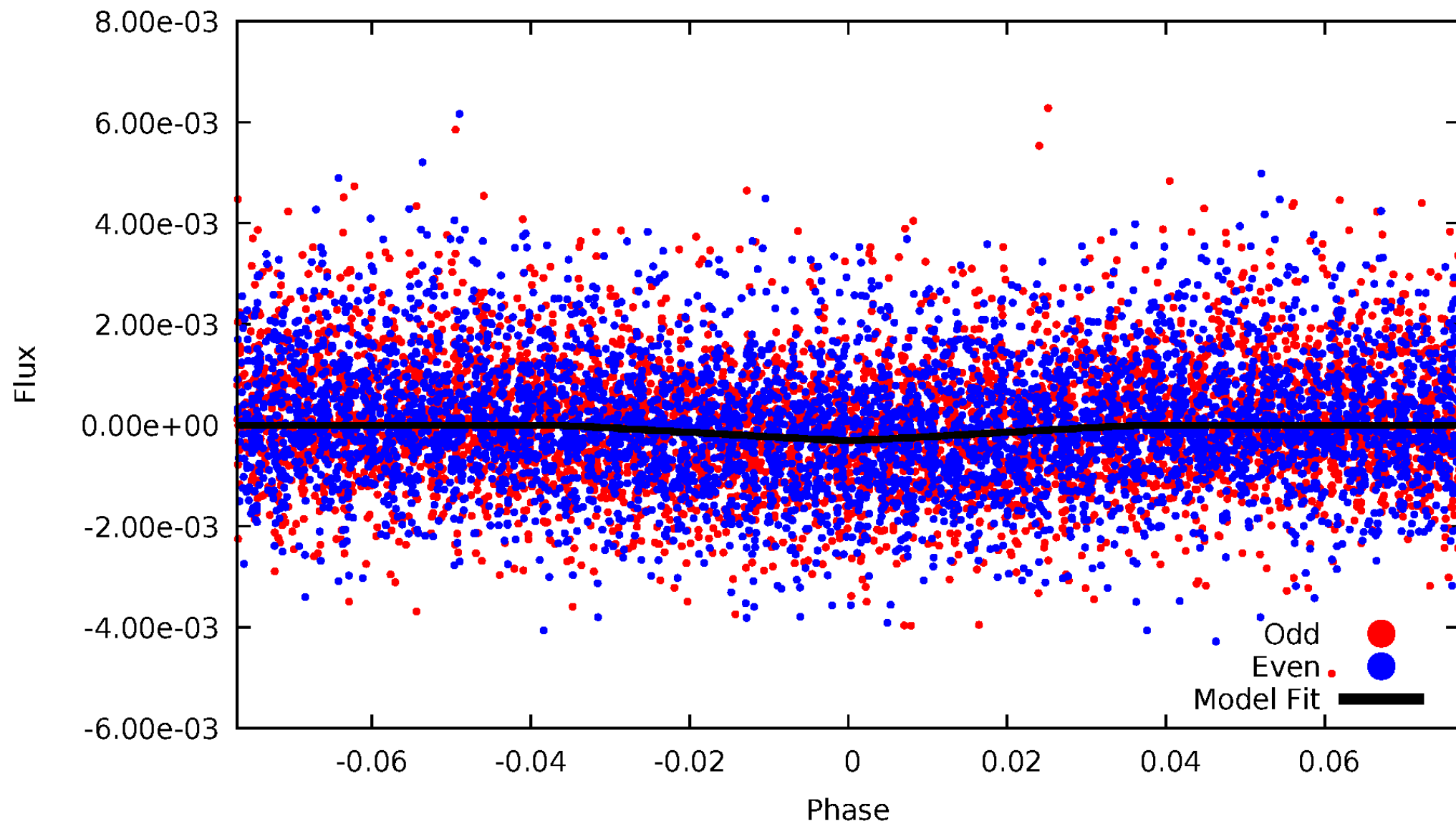
TCE 008460993-01





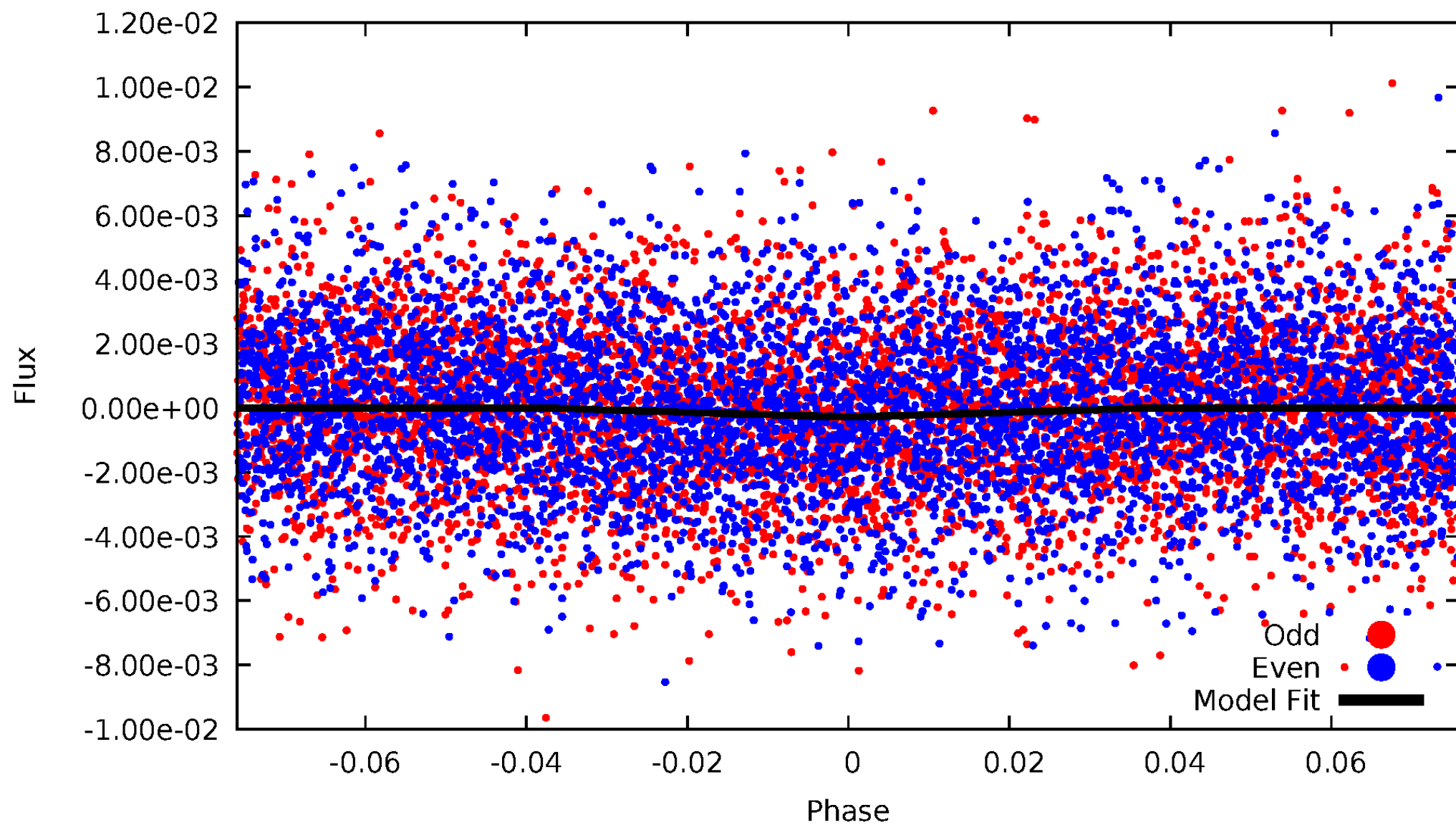
# DV Odd/Even

TCE 008460993-01



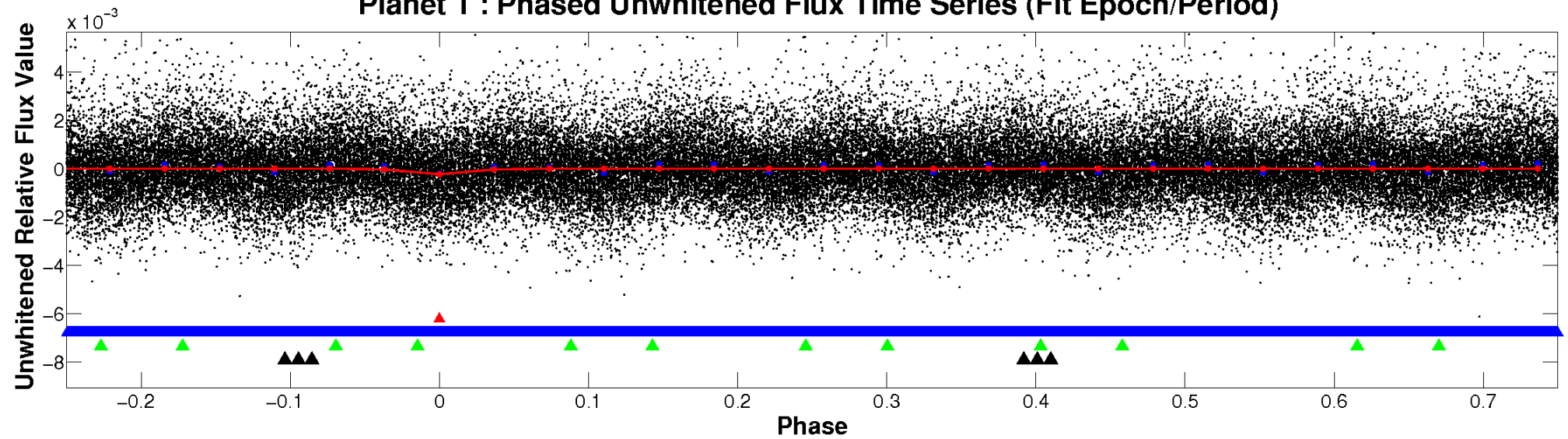
# ALT Odd/Even

TCE 008460993-01

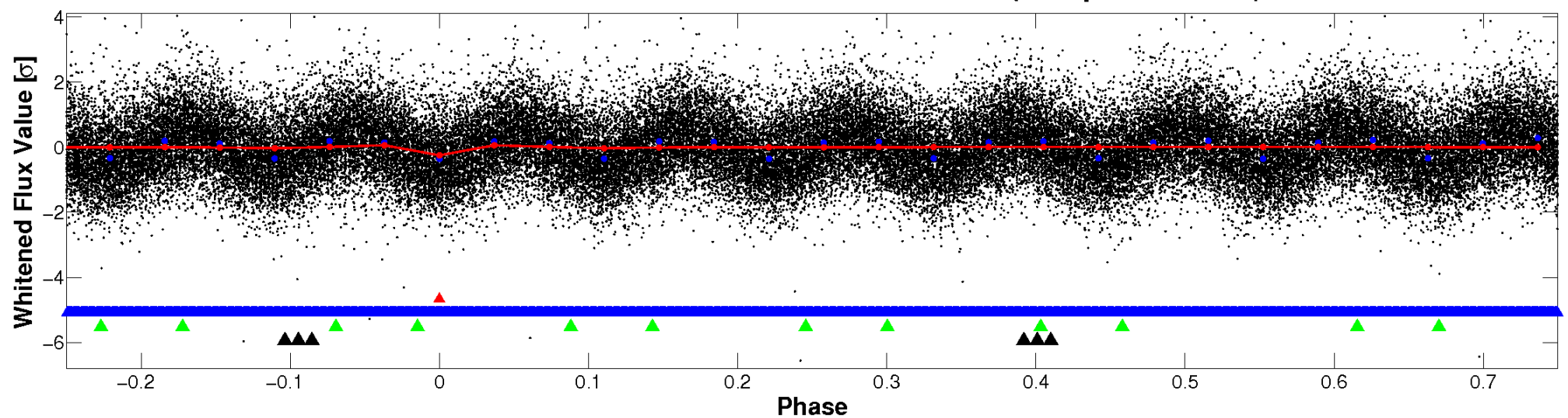


# Non-Whitened Vs. Whitened Light Curve

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

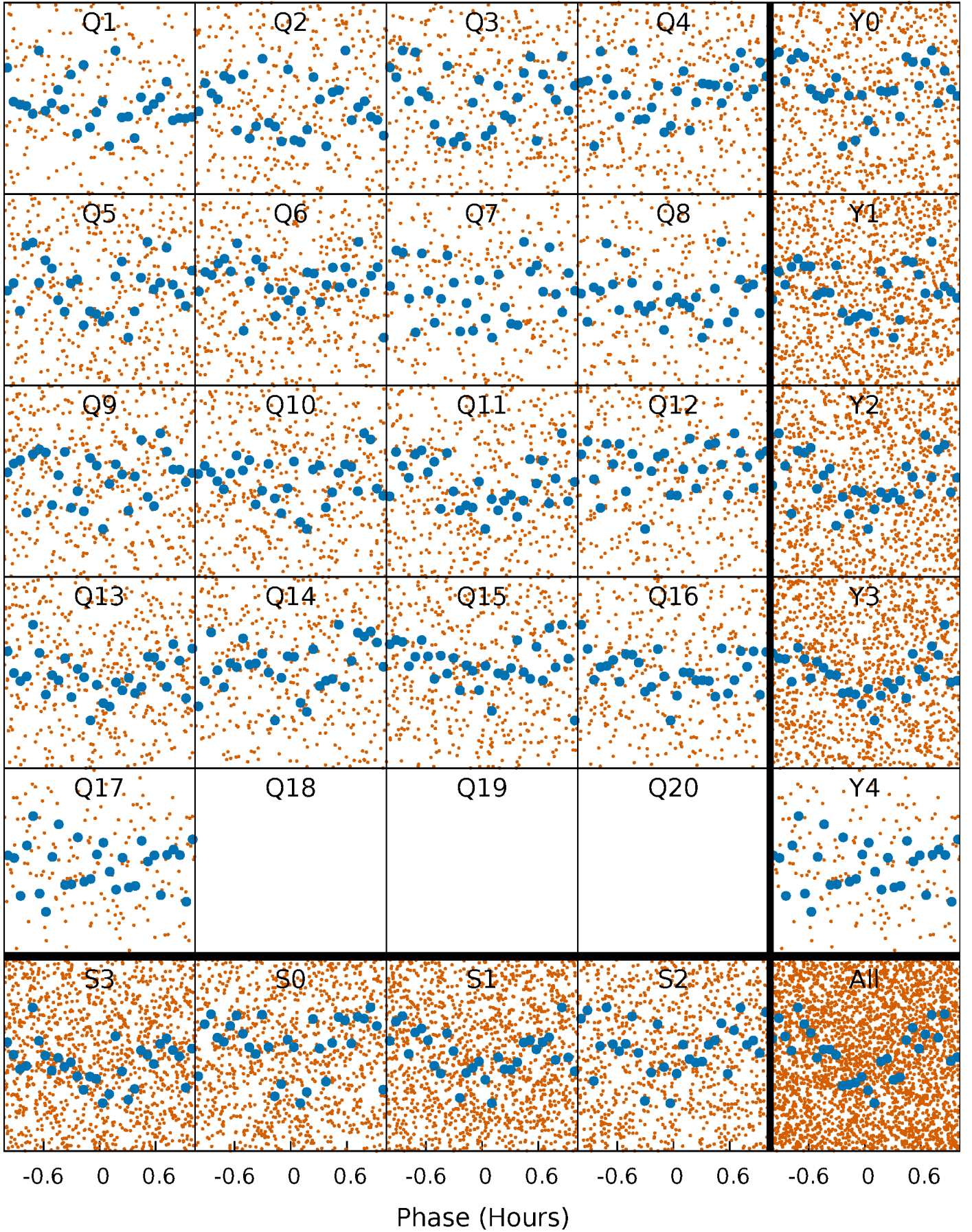


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

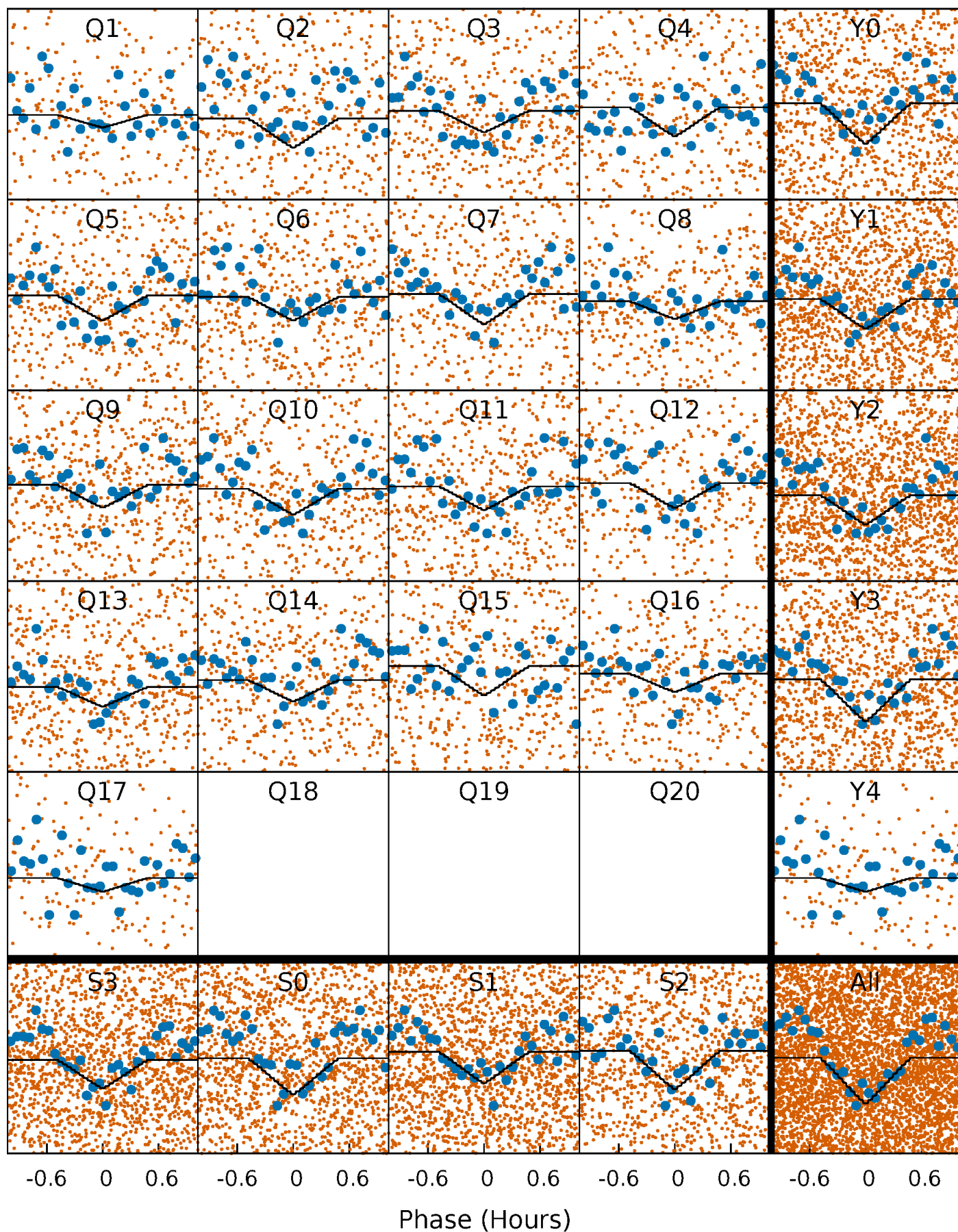
TCE 008460993-01   P= 0.554839 Days    $T_0=131.572172$  (BKJD)





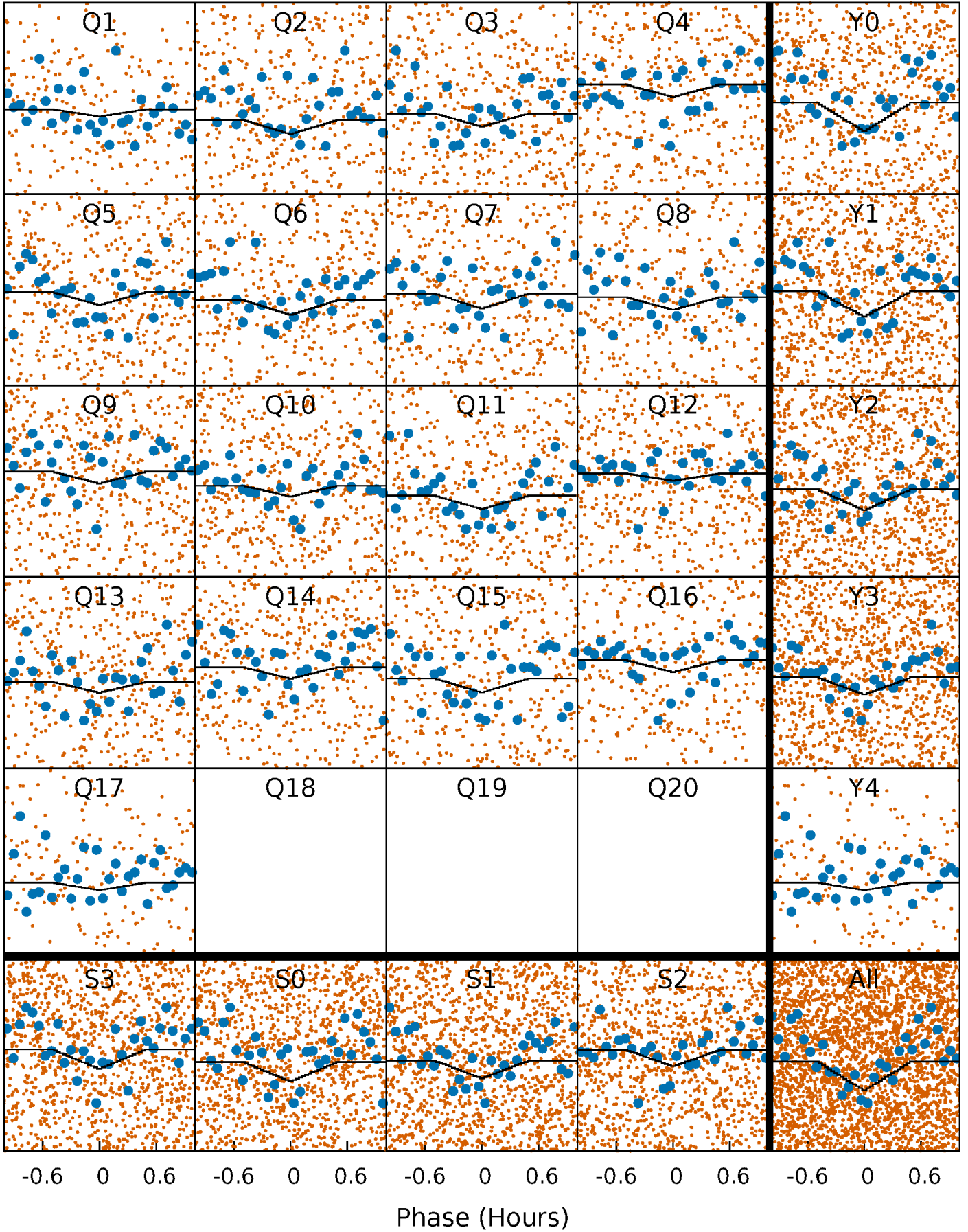
# DV Quarter-Phased Transit Curves

TCE 008460993-01 P= 0.554839 Days  $T_0=131.572172$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

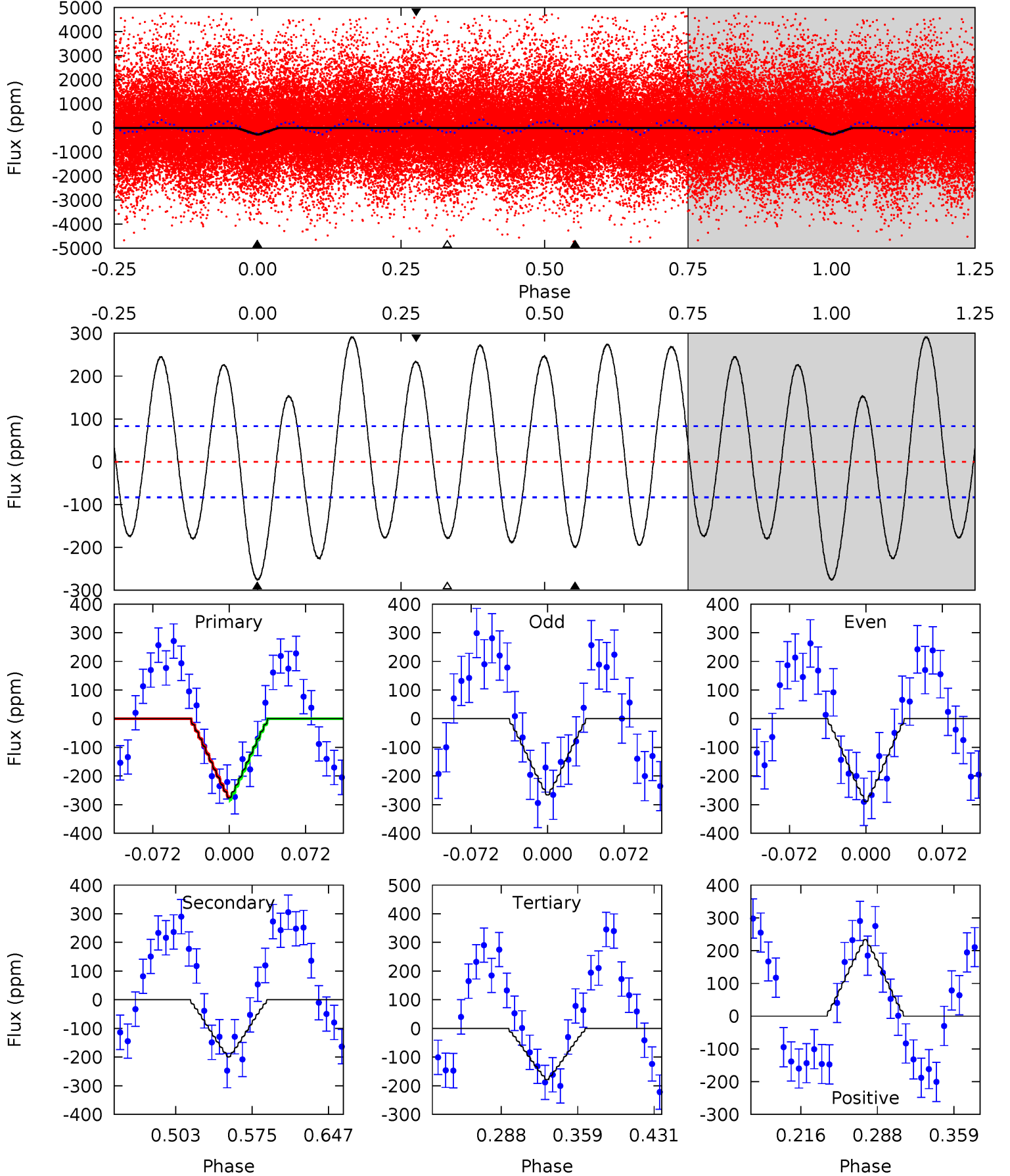
TCE 008460993-01 P= 0.554841 Days  $T_0=131.572266$  (BKJD)



# DV Model-Shift Uniqueness Test

008460993-01, P = 0.554839 Days, E = 131.017333 Days

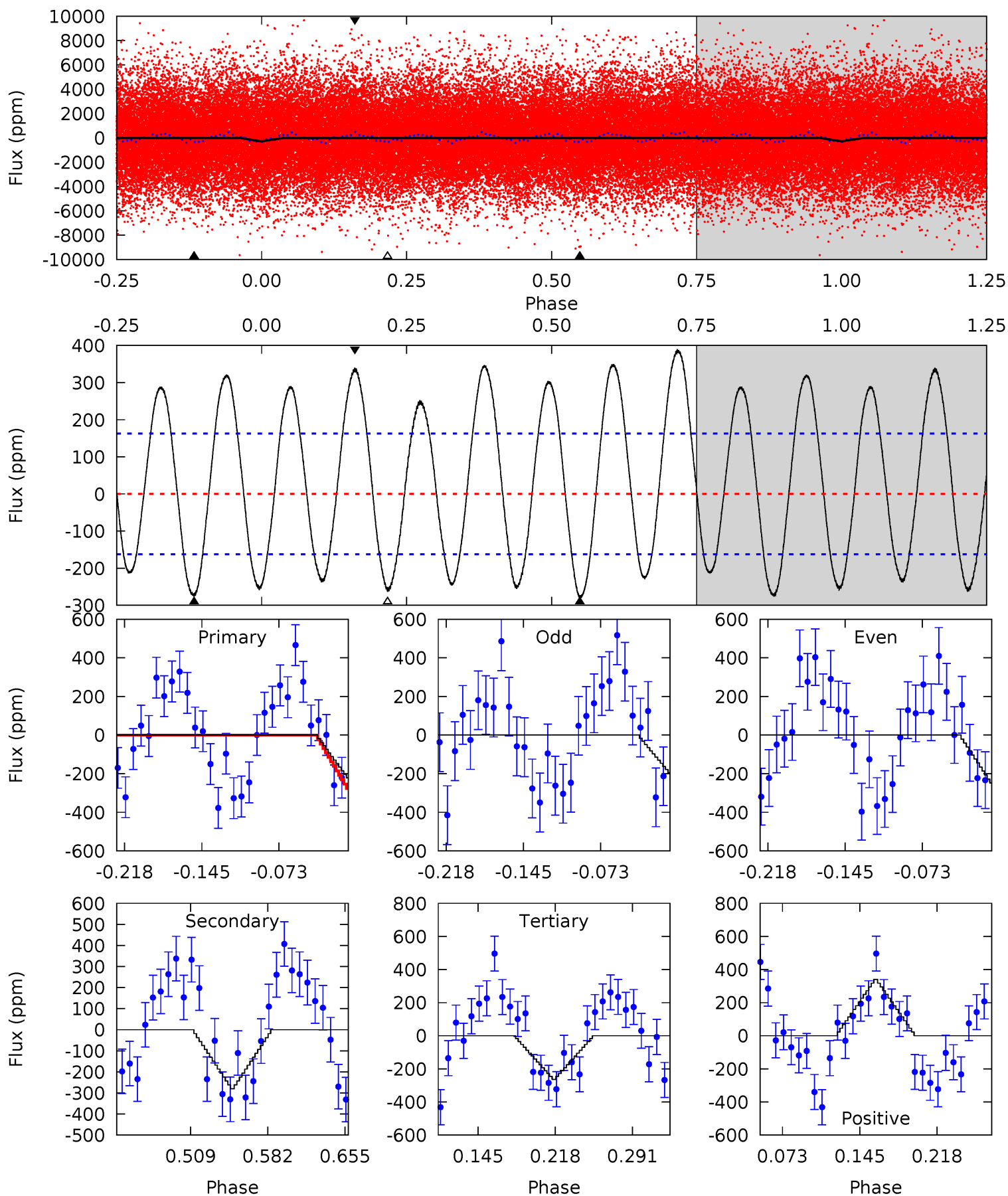
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
15.4	11.1	9.98	13.0	4.63	1.80	8.66	5.42	2.36	1.13	-1.93	0.66	1.04	0.51	0.25



# Alt Model-Shift Uniqueness Test

008460993-01, P = 0.554841 Days, E = 131.017425 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
7.88	7.98	7.50	9.68	4.63	1.79	5.51	0.38	-1.80	0.48	-1.70	0.95	0.98	0.58	2.02





### Stellar Parameters For KIC 008460993

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$\rho_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6977^{+167}_{-250}$	$3.951^{+0.279}_{-0.150}$	$-0.080^{+0.250}_{-0.350}$	$2.200^{+0.589}_{-0.785}$	$1.576^{+0.211}_{-0.317}$	$0.208^{+0.402}_{-0.091}$
	+2%/-4%	+7%/-4%	+312%/-438%	+27%/-36%	+13%/-20%	+193%/-44%
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 008460993-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-199 \pm 18$	$3.91^{+2.19}_{-1.87}$	$5063^{+384}_{-419}$	$5939^{+2817}_{-1320}$	$1.662^{+4.565}_{-0.973}$
Alt.	$-280 \pm 35$	$3.96^{+2.11}_{-1.98}$	$5052^{+408}_{-439}$	$6601^{+3713}_{-1456}$	$2.346^{+6.659}_{-1.350}$

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

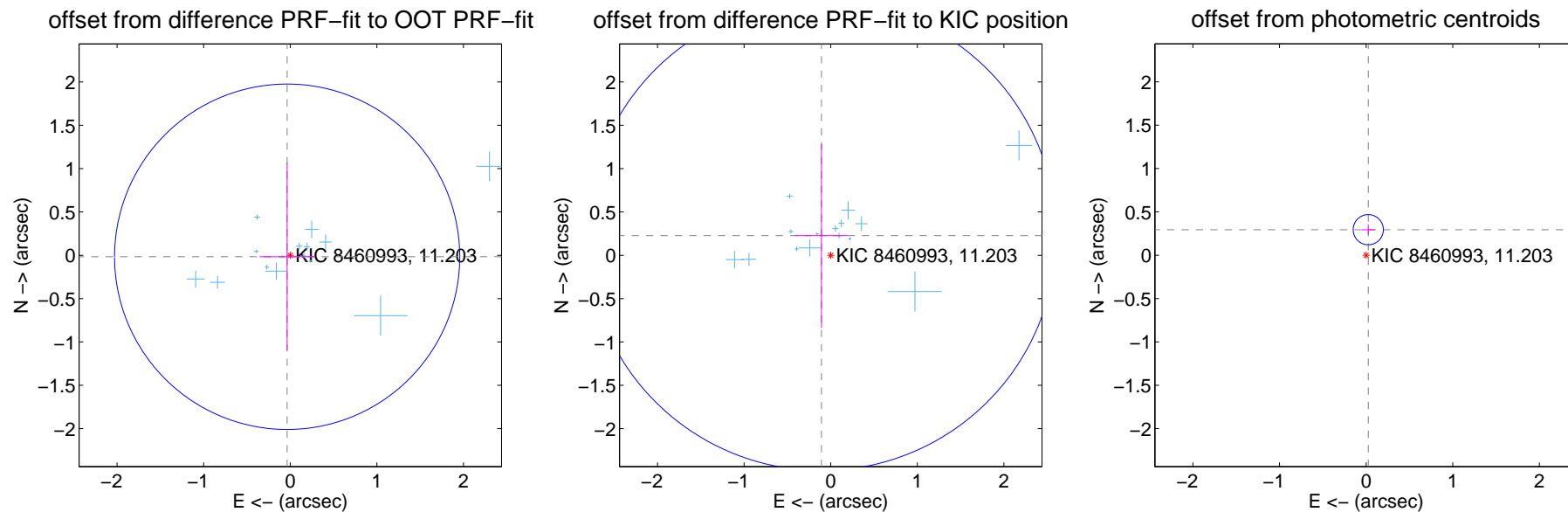
## DV Centroid Data

Supplemental centroid analysis for 008460993-01. **Kepler magnitude: 11.20.** Transit SNR 14.73

There are 15 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.29 arcsec

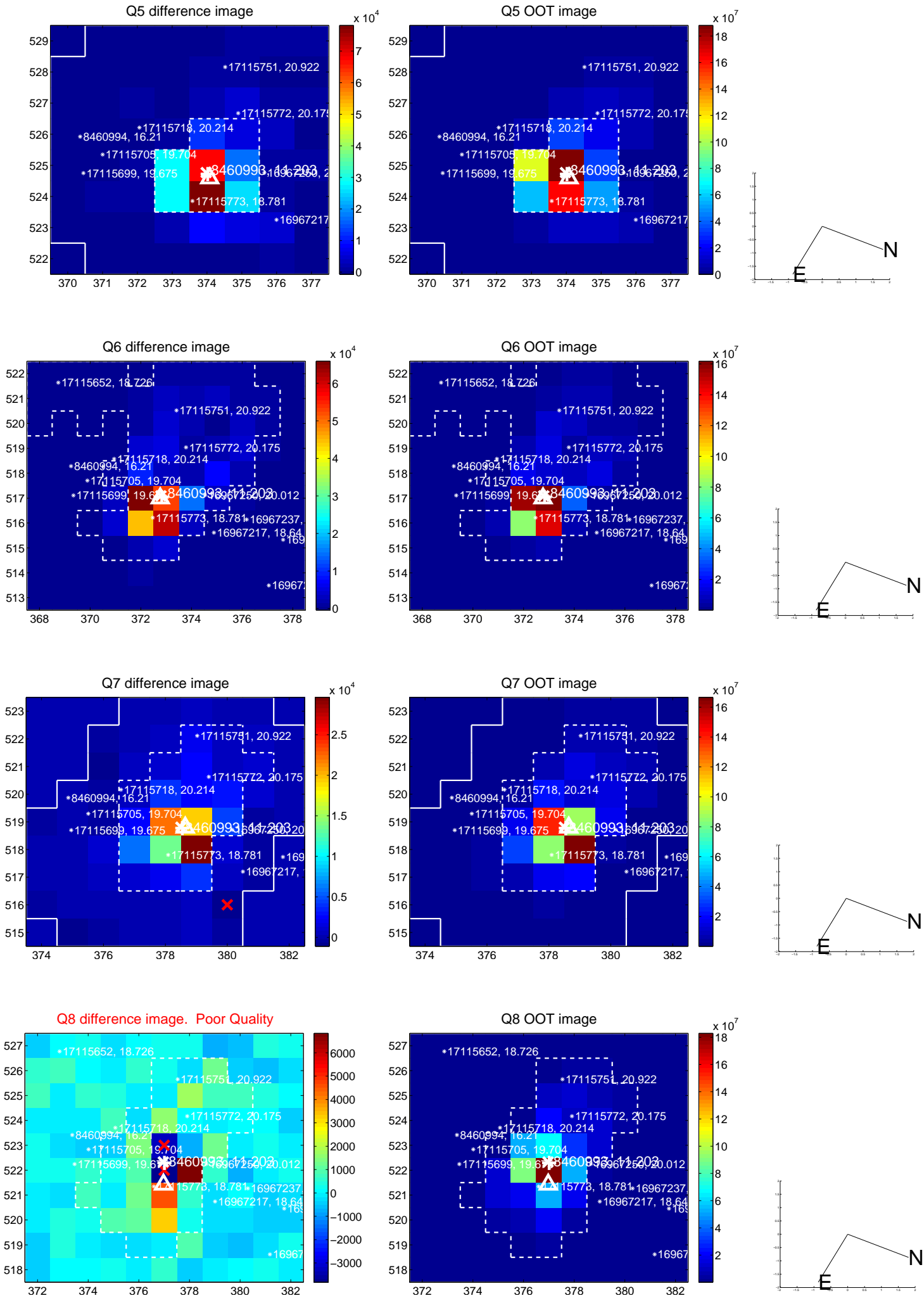
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.040 \pm 0.664$	0.06	$0.036 \pm 0.320$	$-0.017 \pm 1.083$
PRF-fit source offset from KIC position	$0.251 \pm 0.904$	0.28	$0.107 \pm 0.304$	$0.227 \pm 1.061$
photometric centroid source offset	<b><math>0.30 \pm 0.06</math></b>	<b>5.08</b>	$-0.02 \pm 0.07$	$0.29 \pm 0.06$



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.

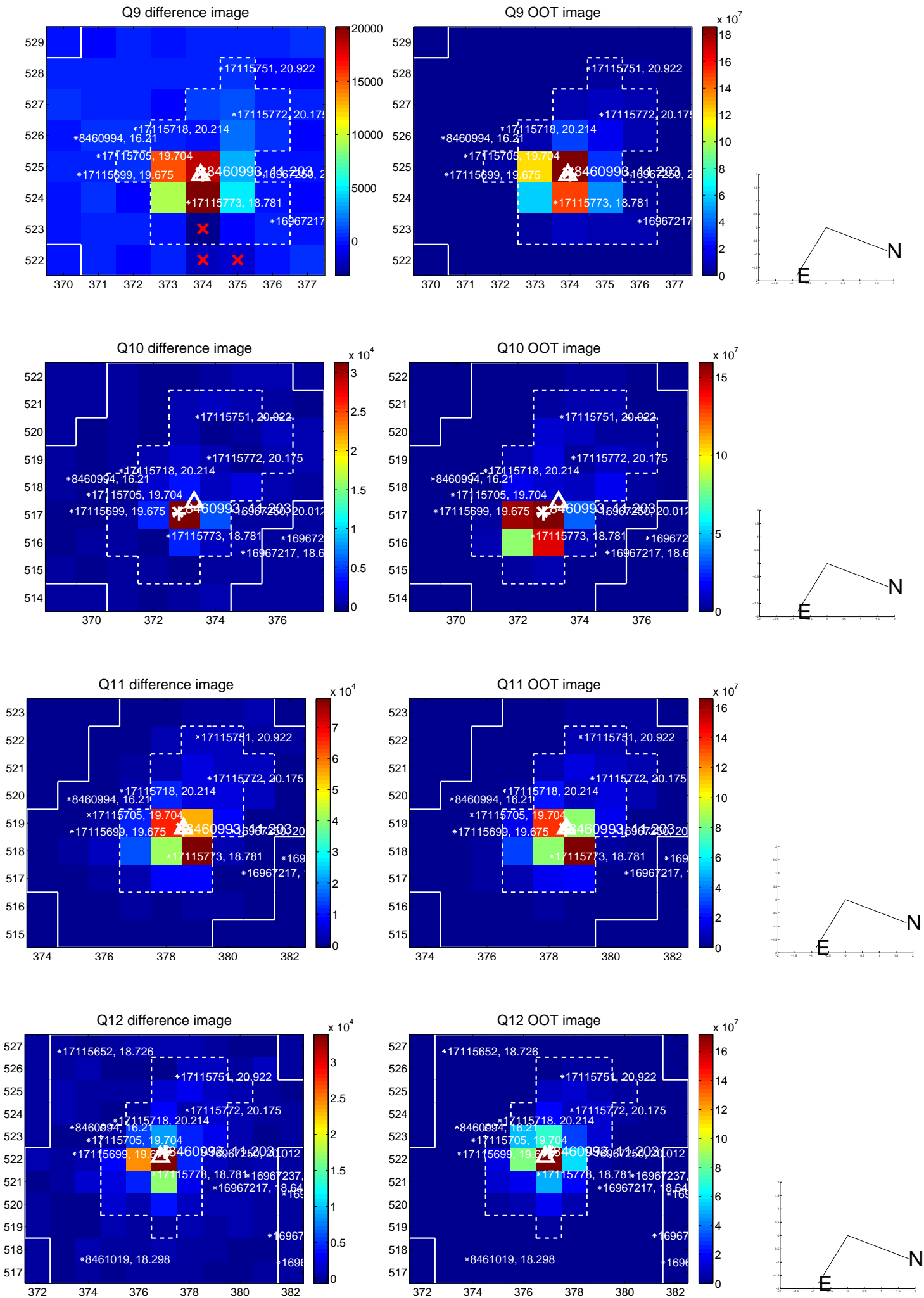


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

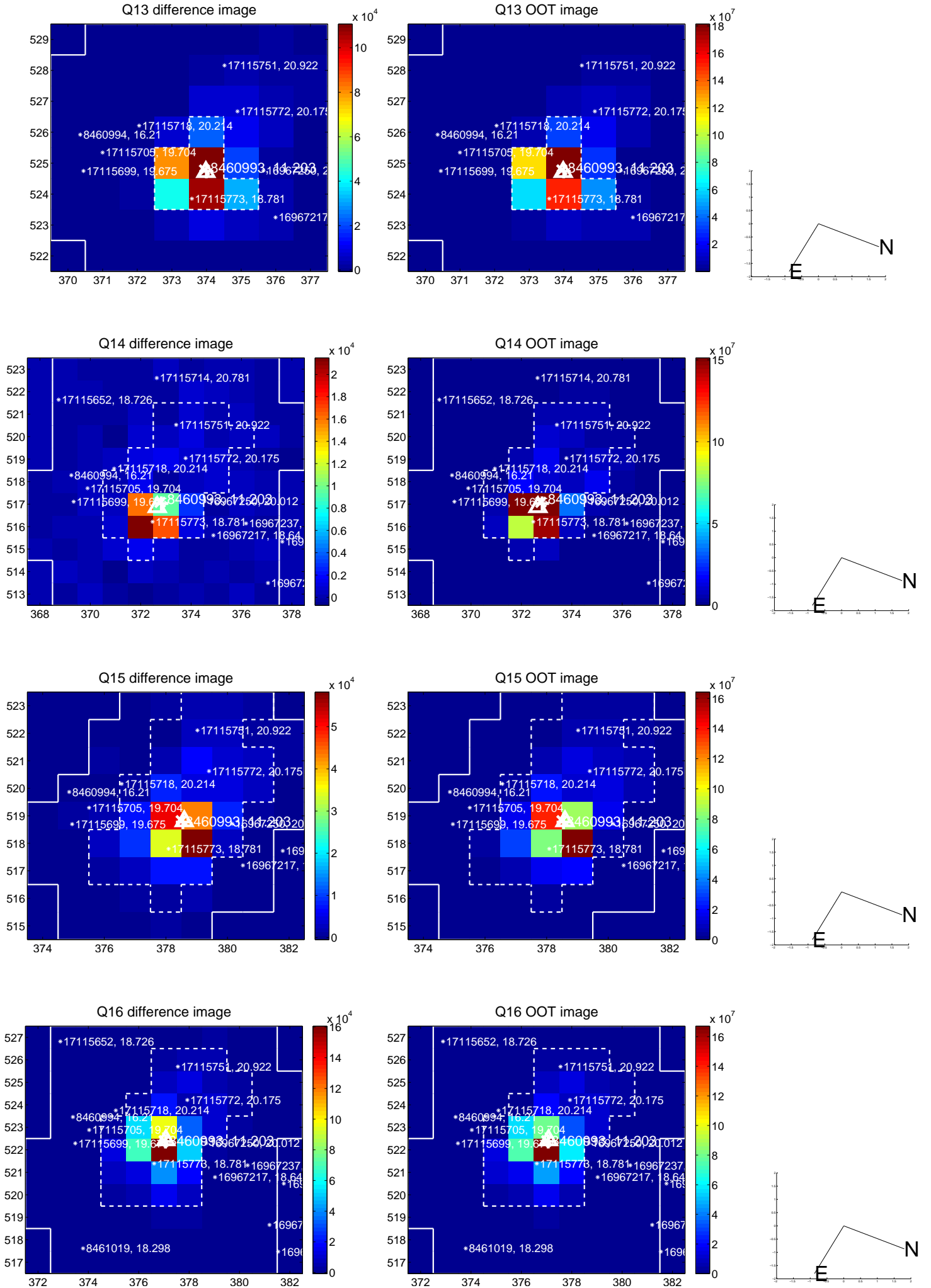




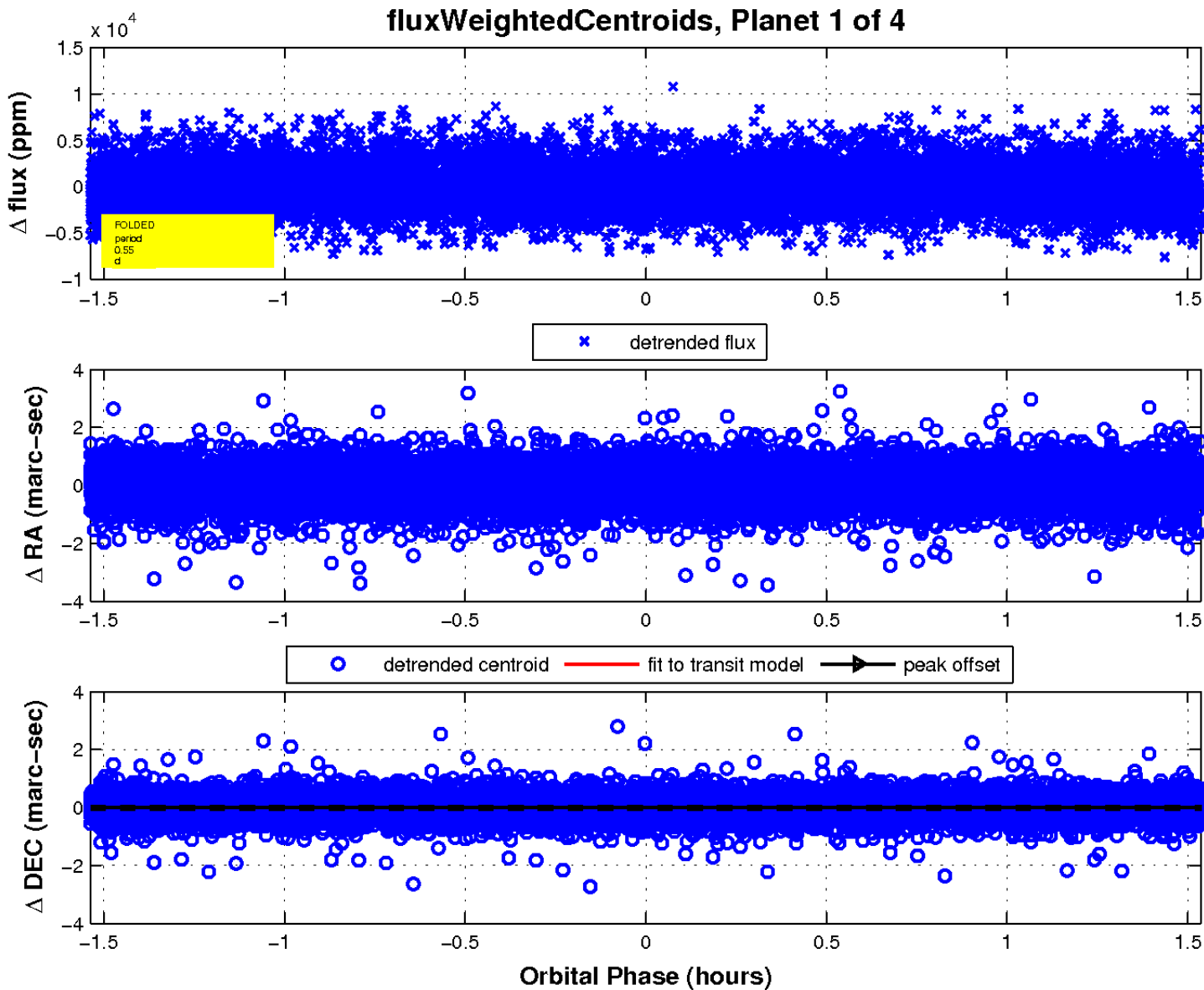
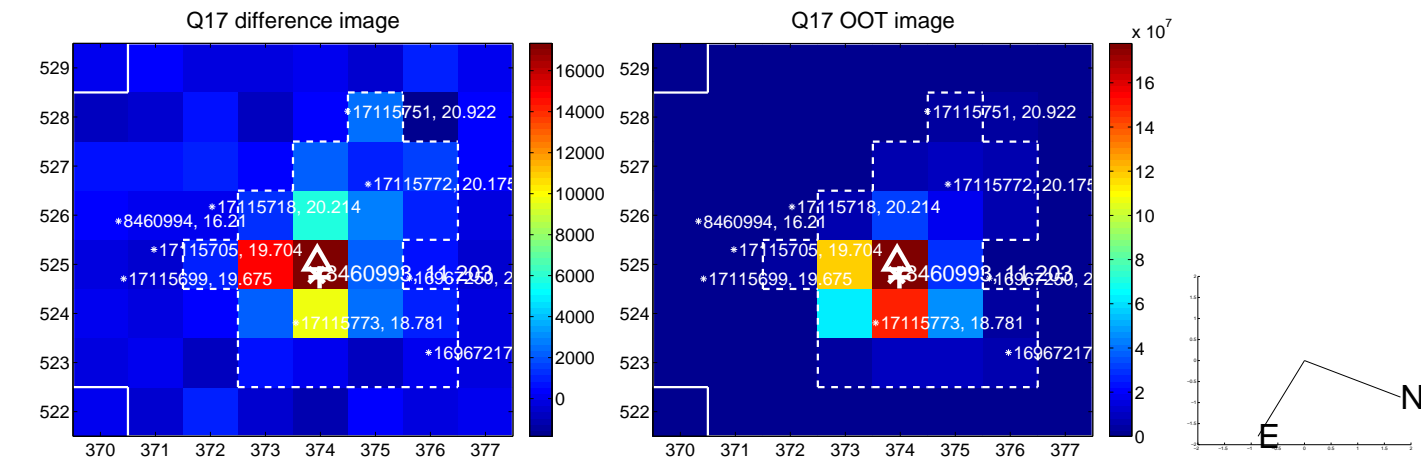
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



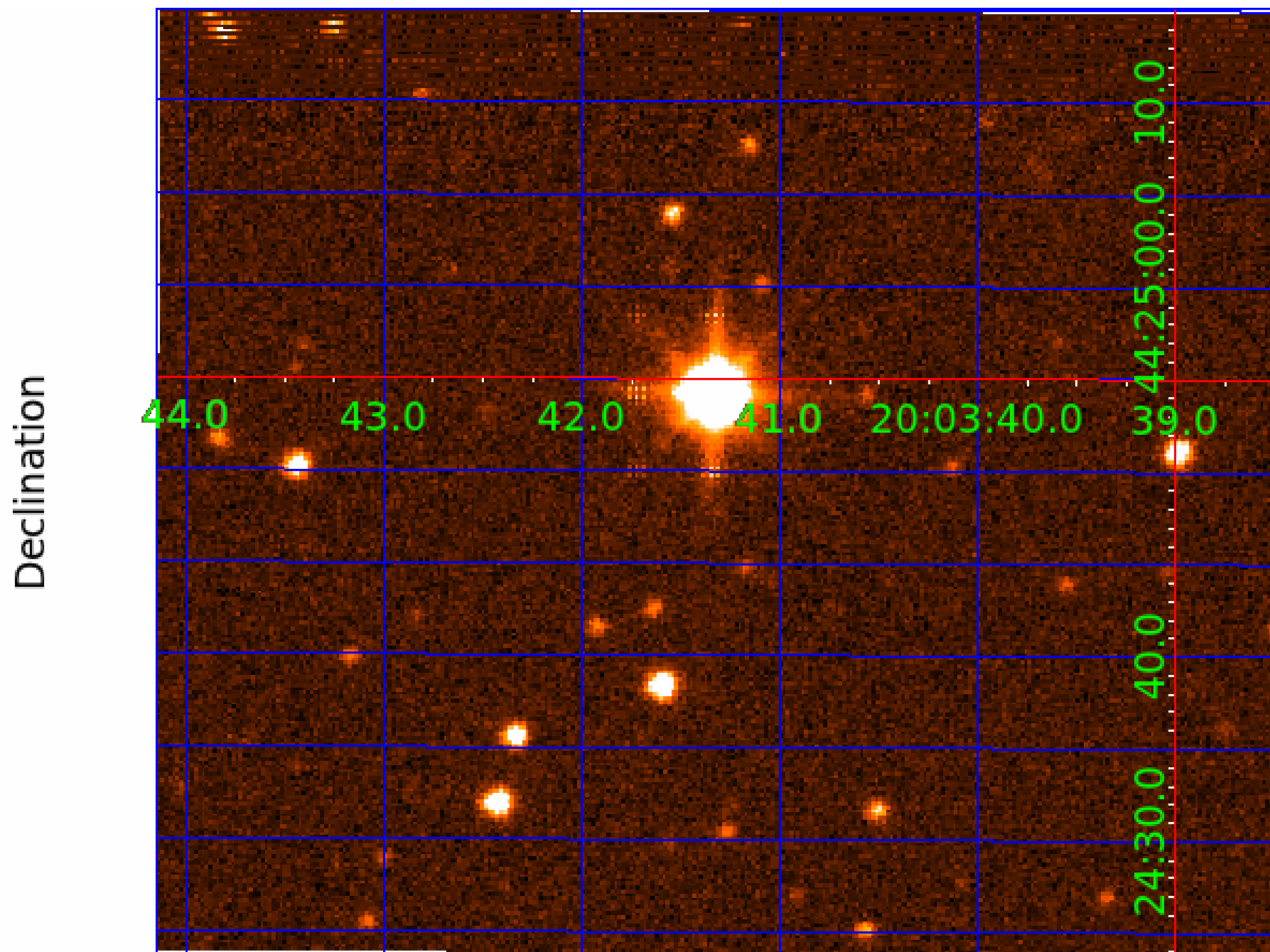
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



UKIRT Image





# KIC 008460993

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008460993-01	OBS	No	0.554839	131.572172	302.2	0.512	15.1	14.7	2.20	6977	4.02	43413.86
008460993-02	OBS	No	0.507028	131.766916	247.8	1.541	9.0	9.2	2.20	6977	4.05	48956.31
008460993-03	OBS	No	124.751364	175.073357	3086.8	1.908	8.0	7.6	2.20	6977	12.77	31.75

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008460993-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_SKYE_ZUMA_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED
008460993-02	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED
008460993-03	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—MOD_NONUNIQ_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.

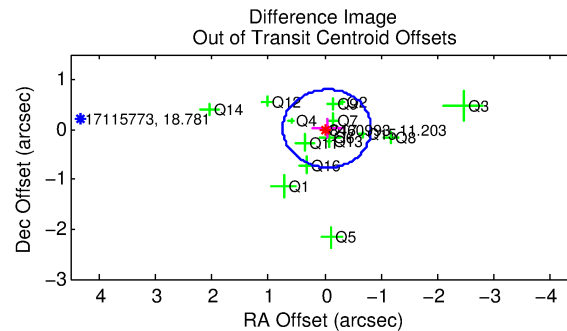
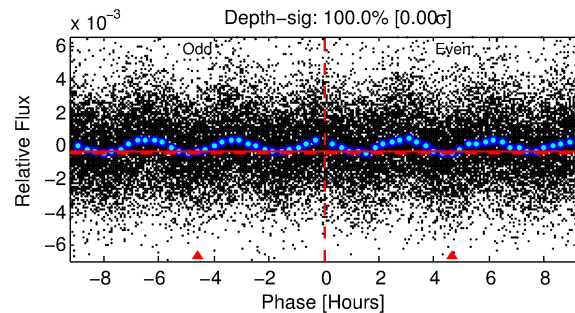
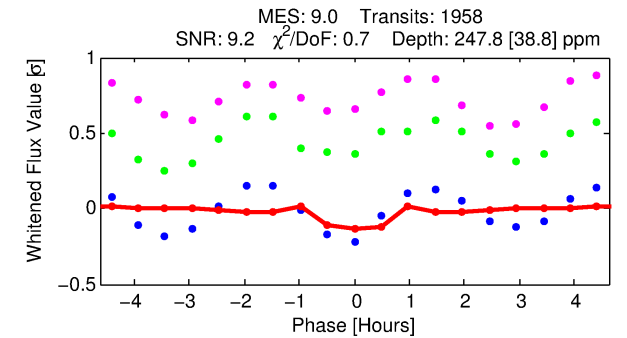
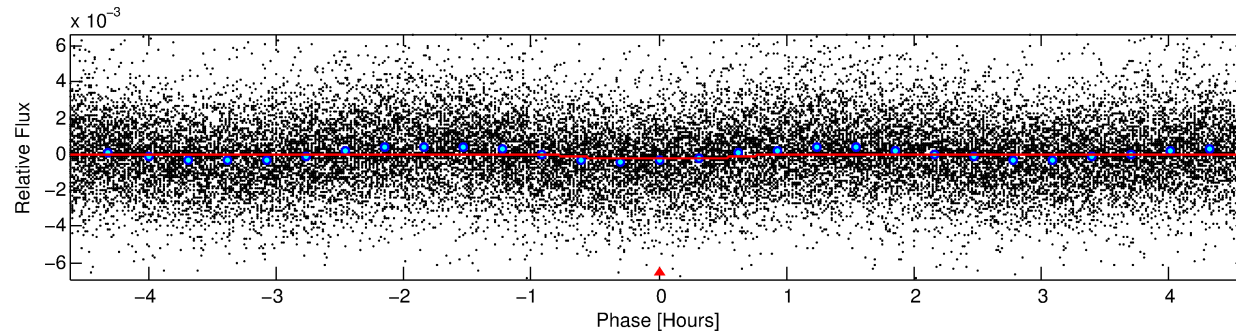
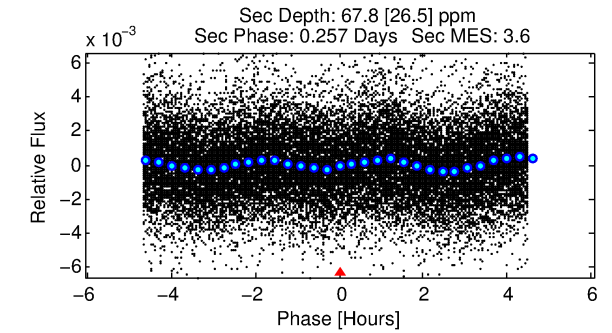
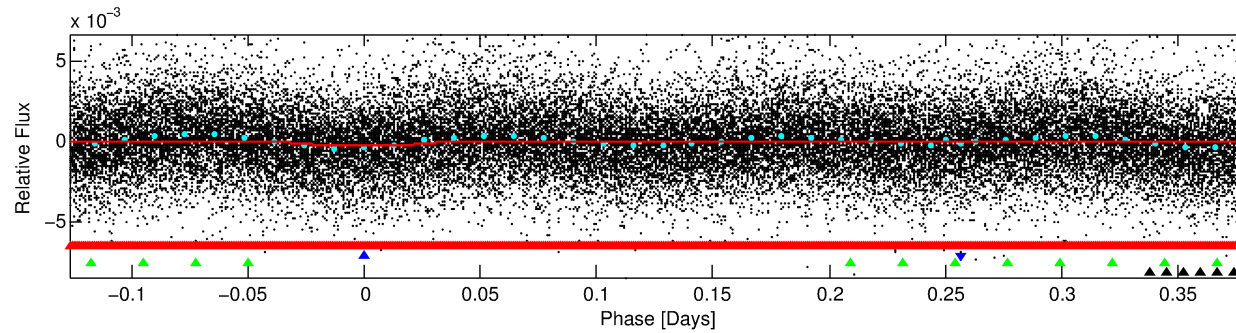
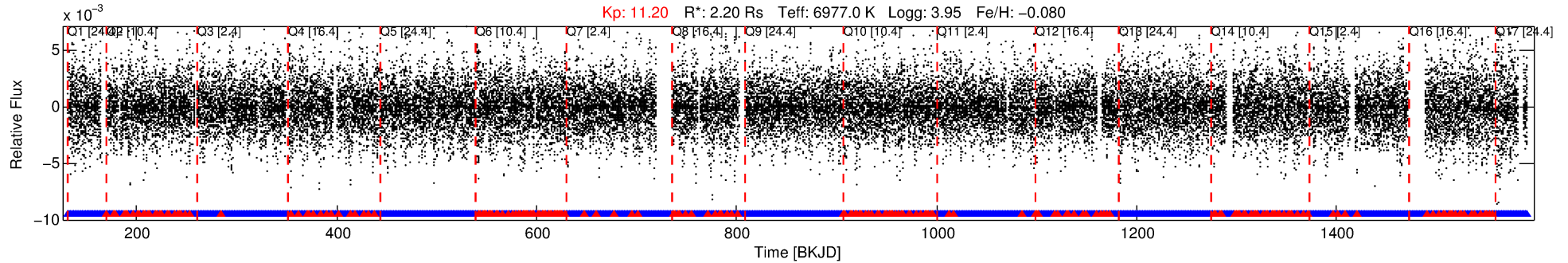
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 008460993-02

No Significant Match Found

# DV One-Page Summary

KIC: 8460993 Candidate: 2 of 4 Period: 0.507 d



## DV Fit Results:

Period = 0.50703 [0.00001] d  
Epoch = 131.7669 [0.0015] BKJD  
Rp/R\* = 0.0169 [0.0048]  
a/R\* = 1.50 [1.35]  
b = 0.91 [0.33]  
Seff = 48956.31 [24989.48]  
Teq = 3793 [484] K  
Rp = 4.05 [1.84] Re  
a = 0.0145 [0.0046] AU  
Ag = 0.48 [0.40] [-1.31σ]  
Teffp = 4872 [853] K [1.10σ]

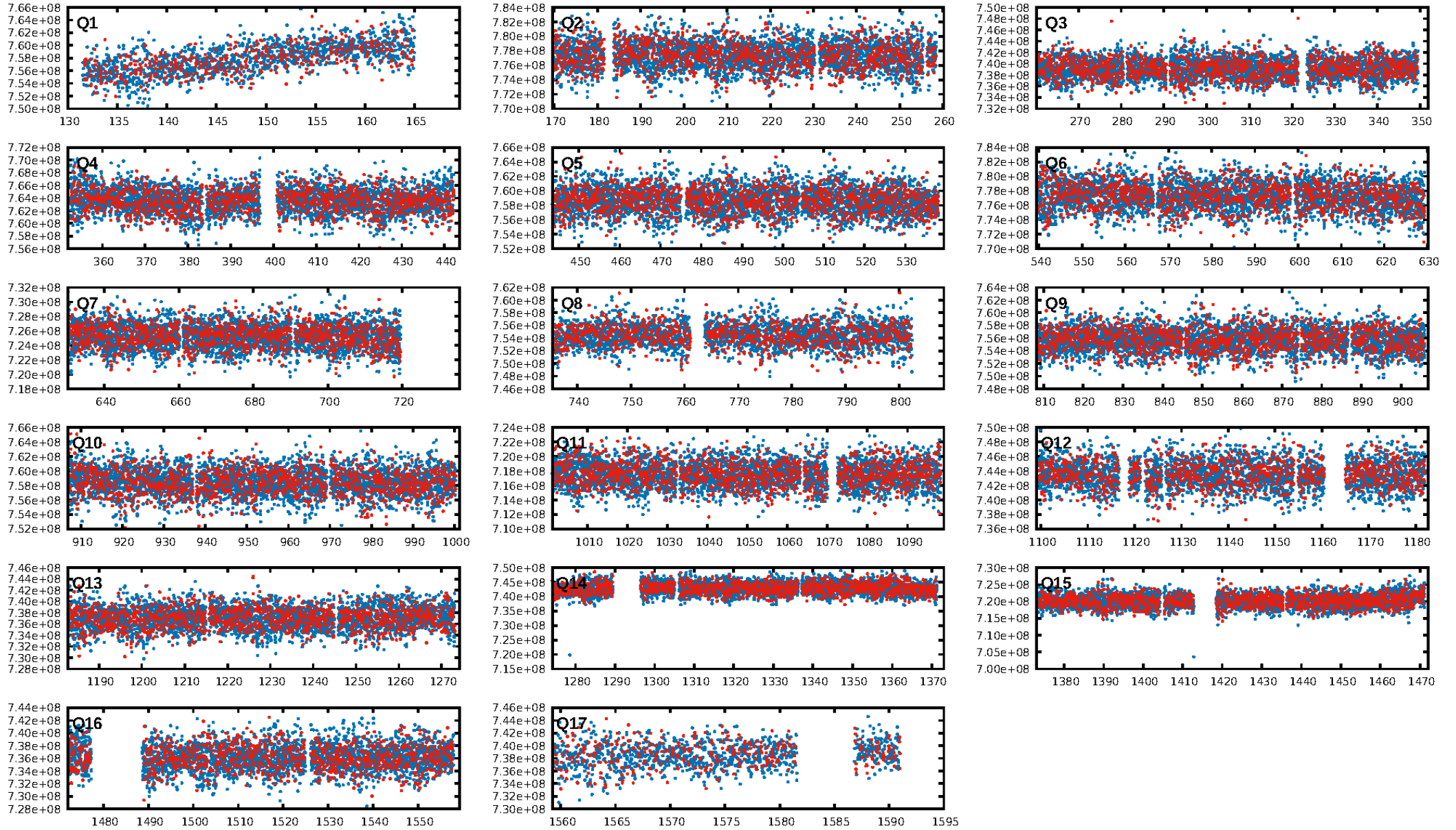
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 52.0% [0.71σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 1.09e-74  
RollingBand-fgt: 0.86 [1612/1871]  
GhostDiagnostic-chr: 2.667  
Centroid-sig: N/A  
Centroid-so: 0.343 arcsec [7.52σ]  
OotOffset-rm: 0.044 arcsec [0.17σ]  
KicOffset-rm: 0.274 arcsec [1.43σ]  
OotOffset-st: 3/4/4/5 [16]  
KicOffset-st: 3/4/4/5 [16]  
DiffImageQuality-fgm: 0.69 [11/16]  
DiffImageOverlap-fno: 1.00 [17/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 23:38:32 Z

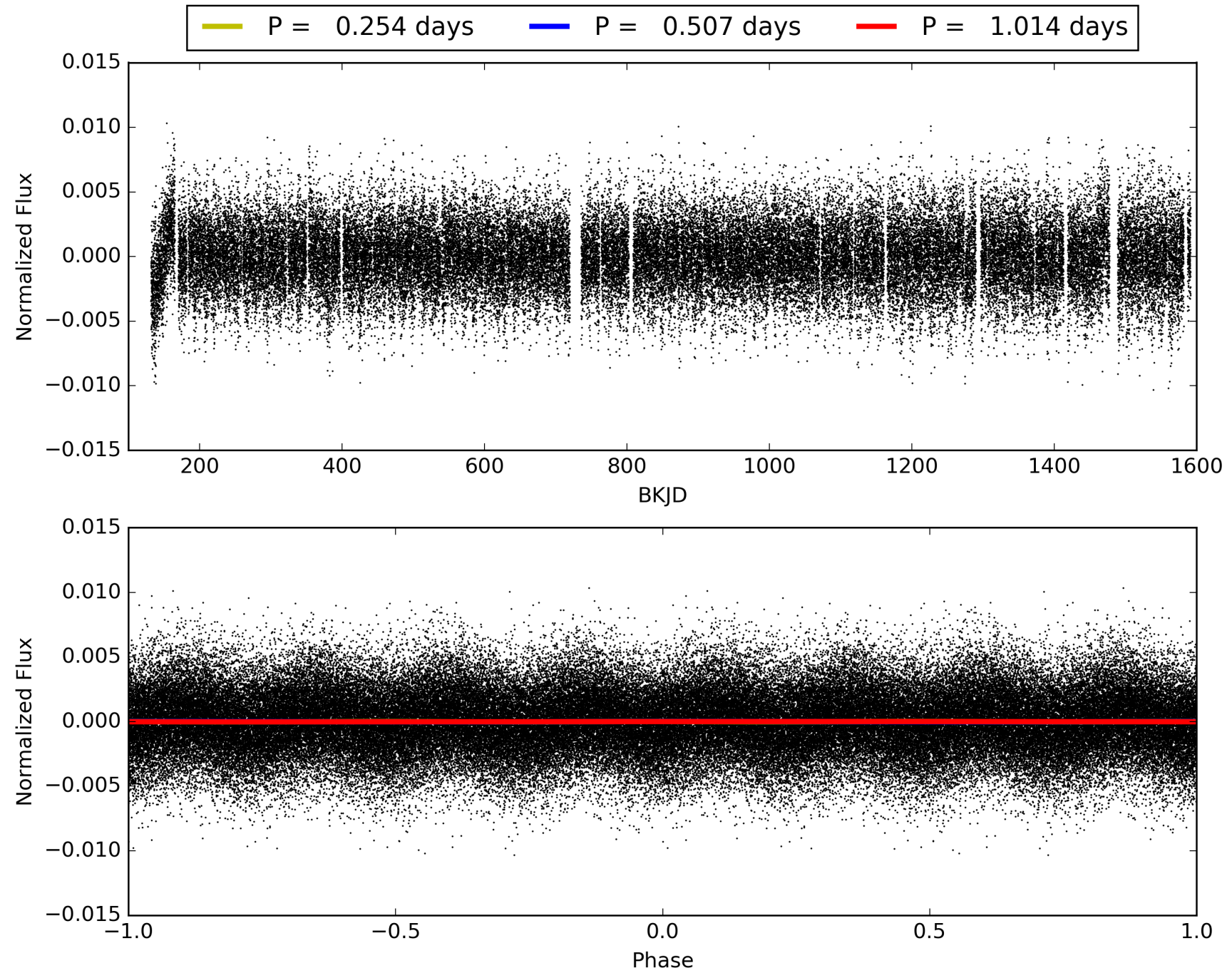
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 008460993-02, PDC Light Curves



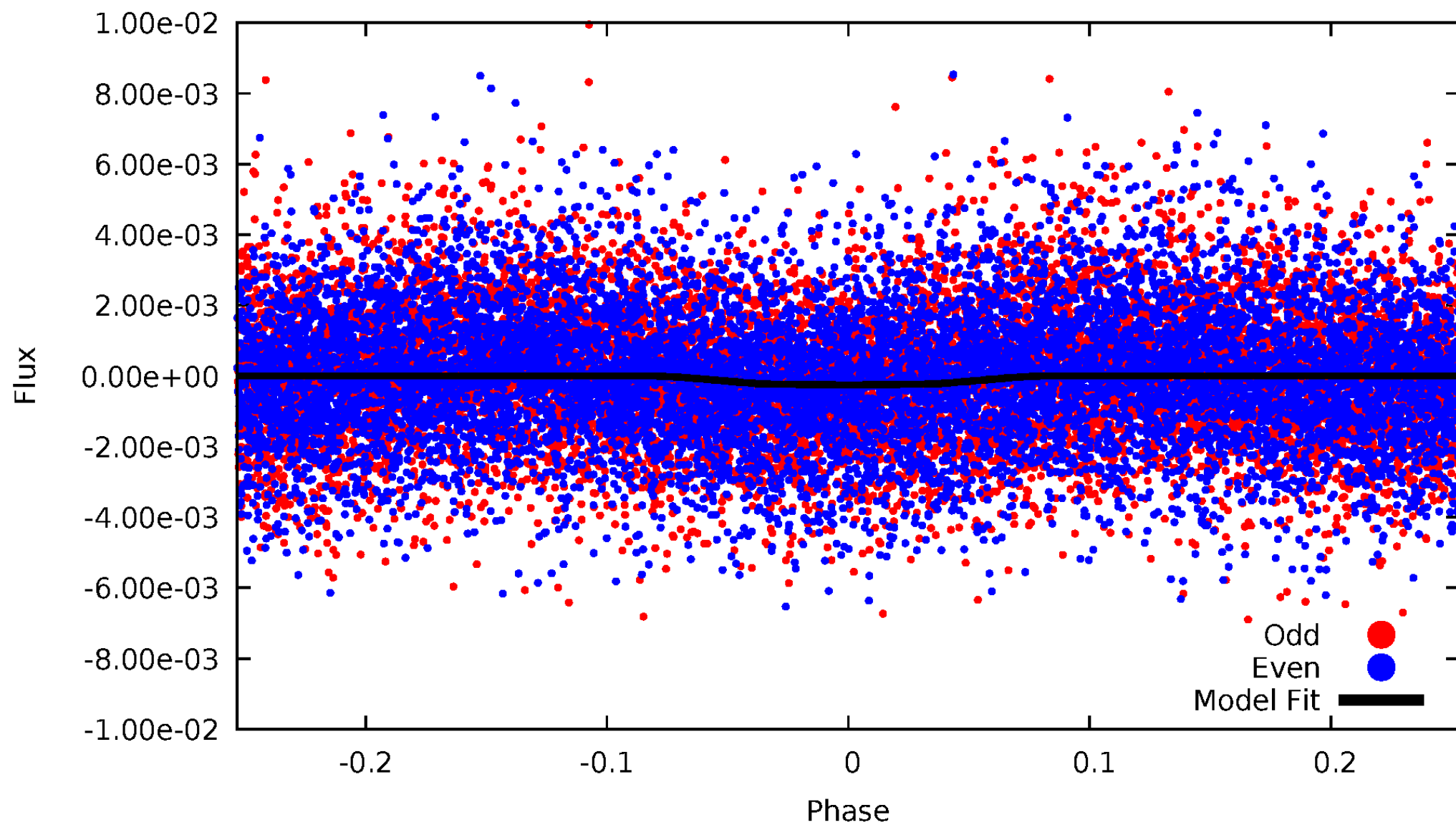


TCE 008460993-02



DV Odd/Even

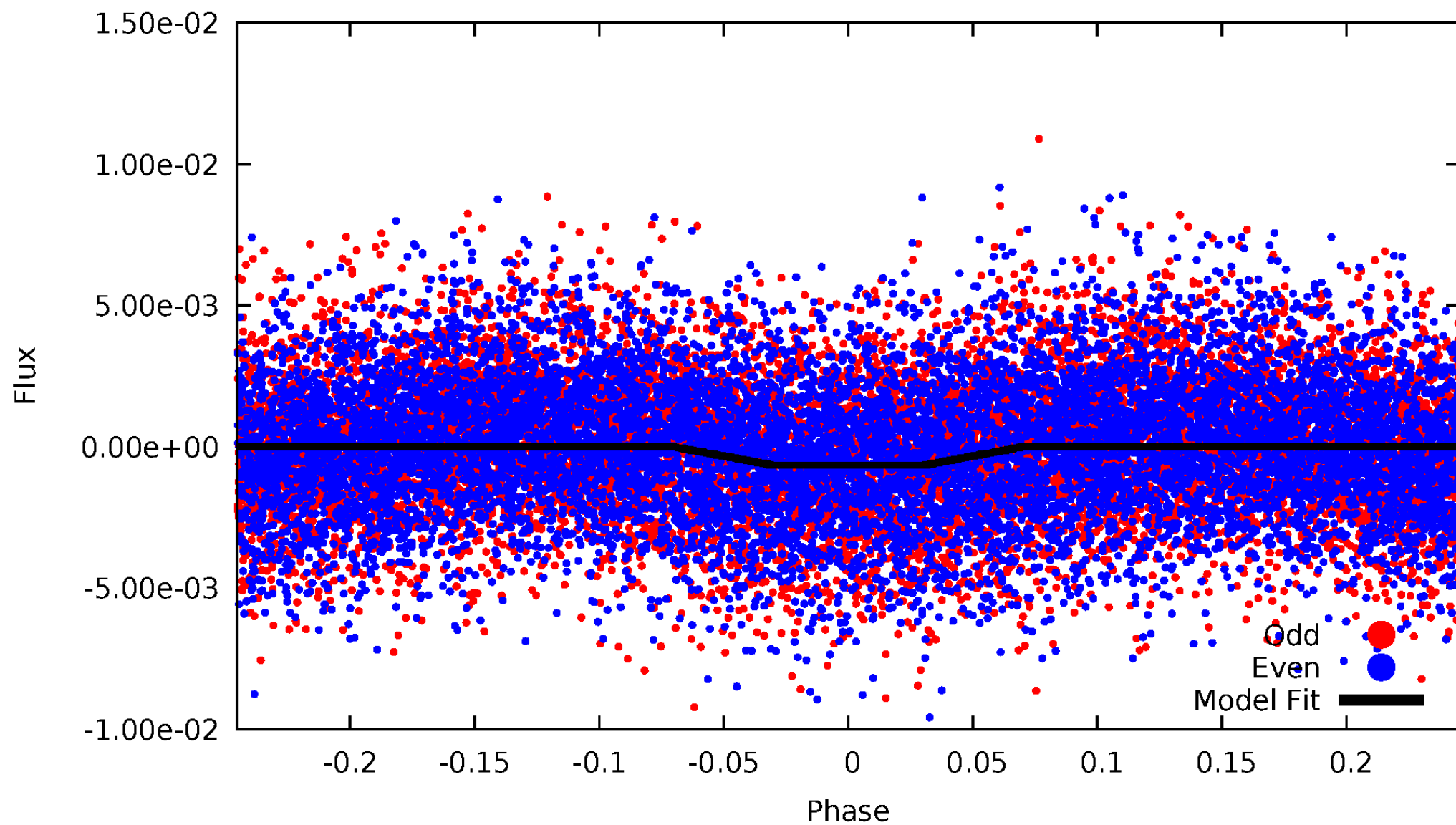
TCE 008460993-02





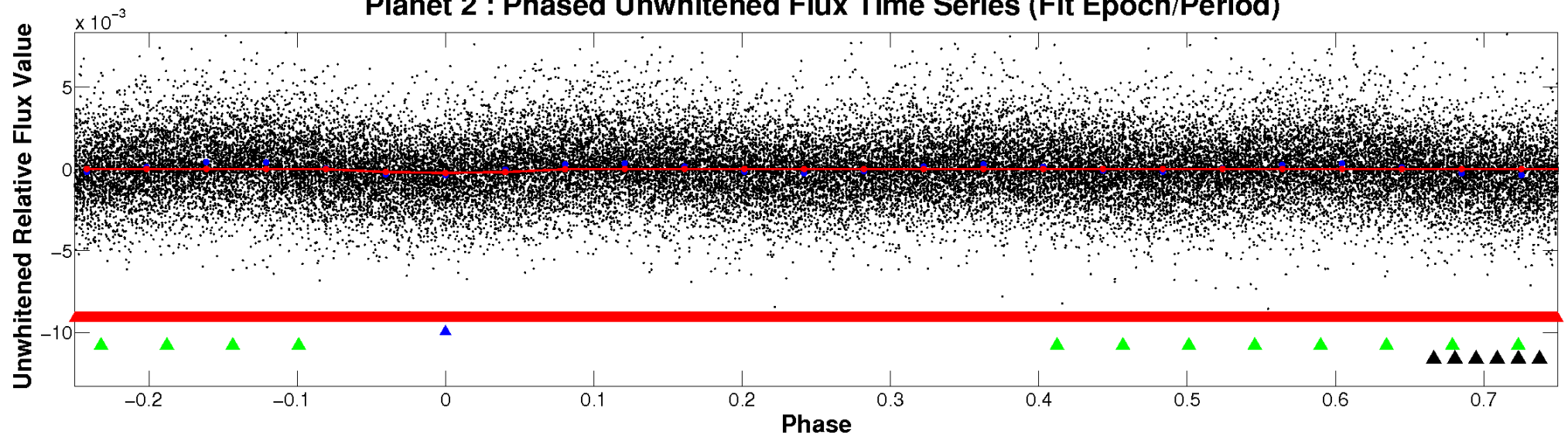
# ALT Odd/Even

TCE 008460993-02

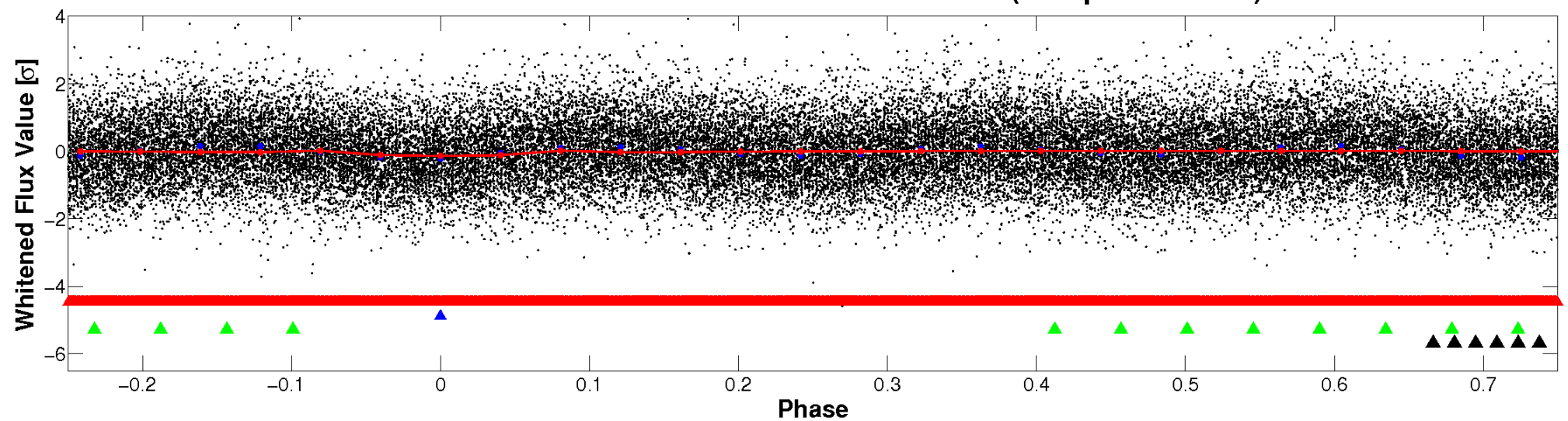


# Non-Whitened Vs. Whitened Light Curve

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

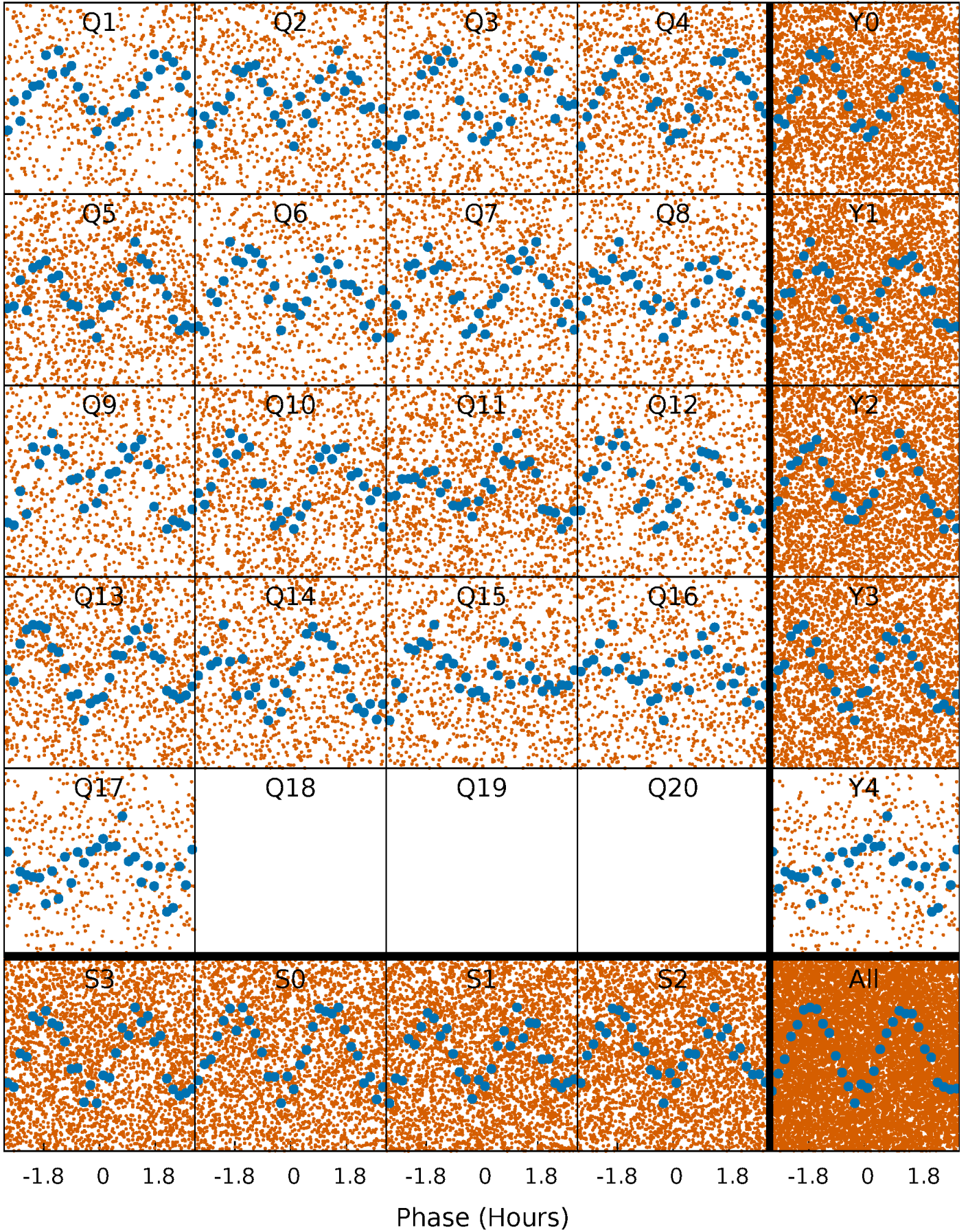


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

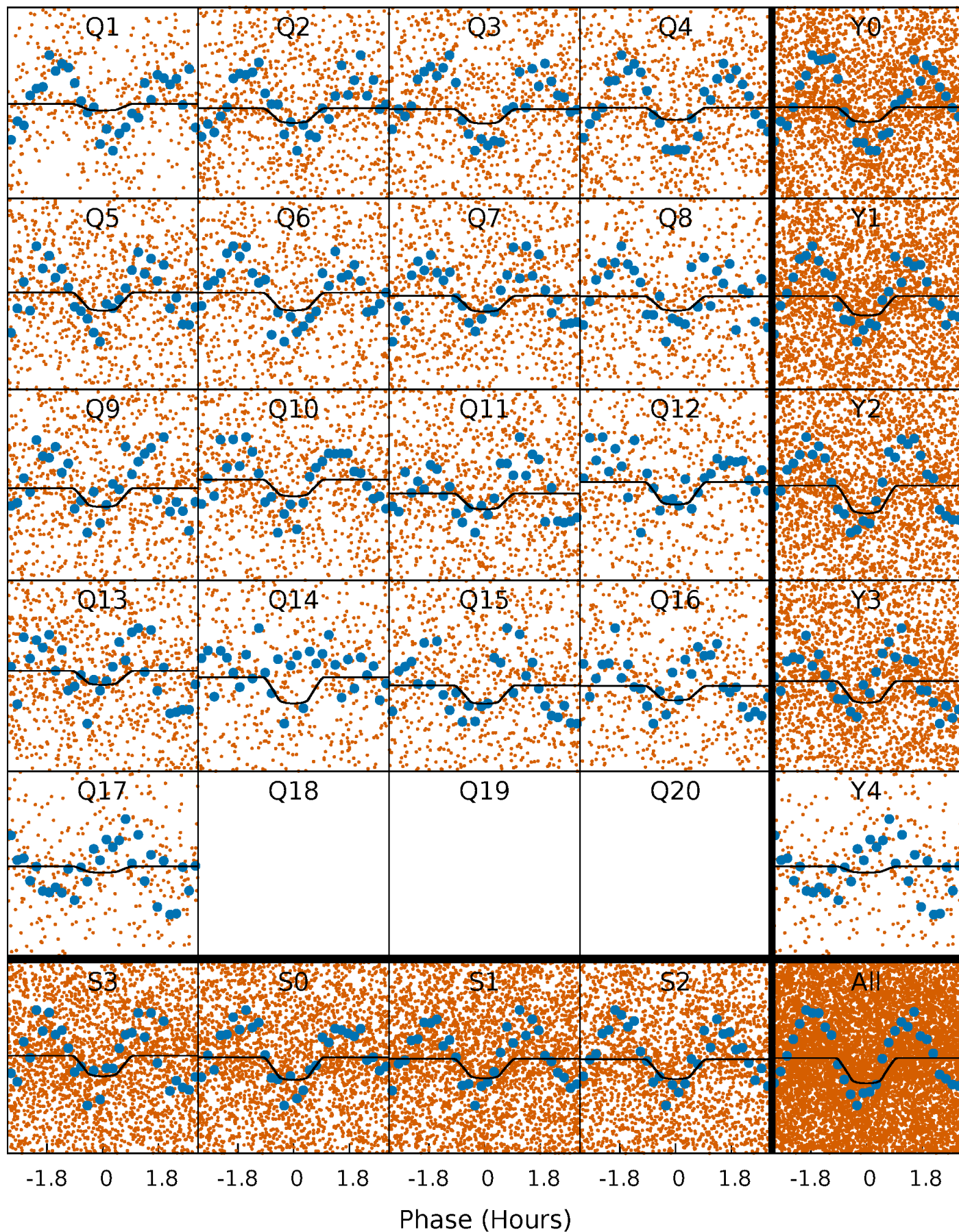
TCE 008460993-02   P= 0.507028 Days    $T_0=131.766916$  (BKJD)





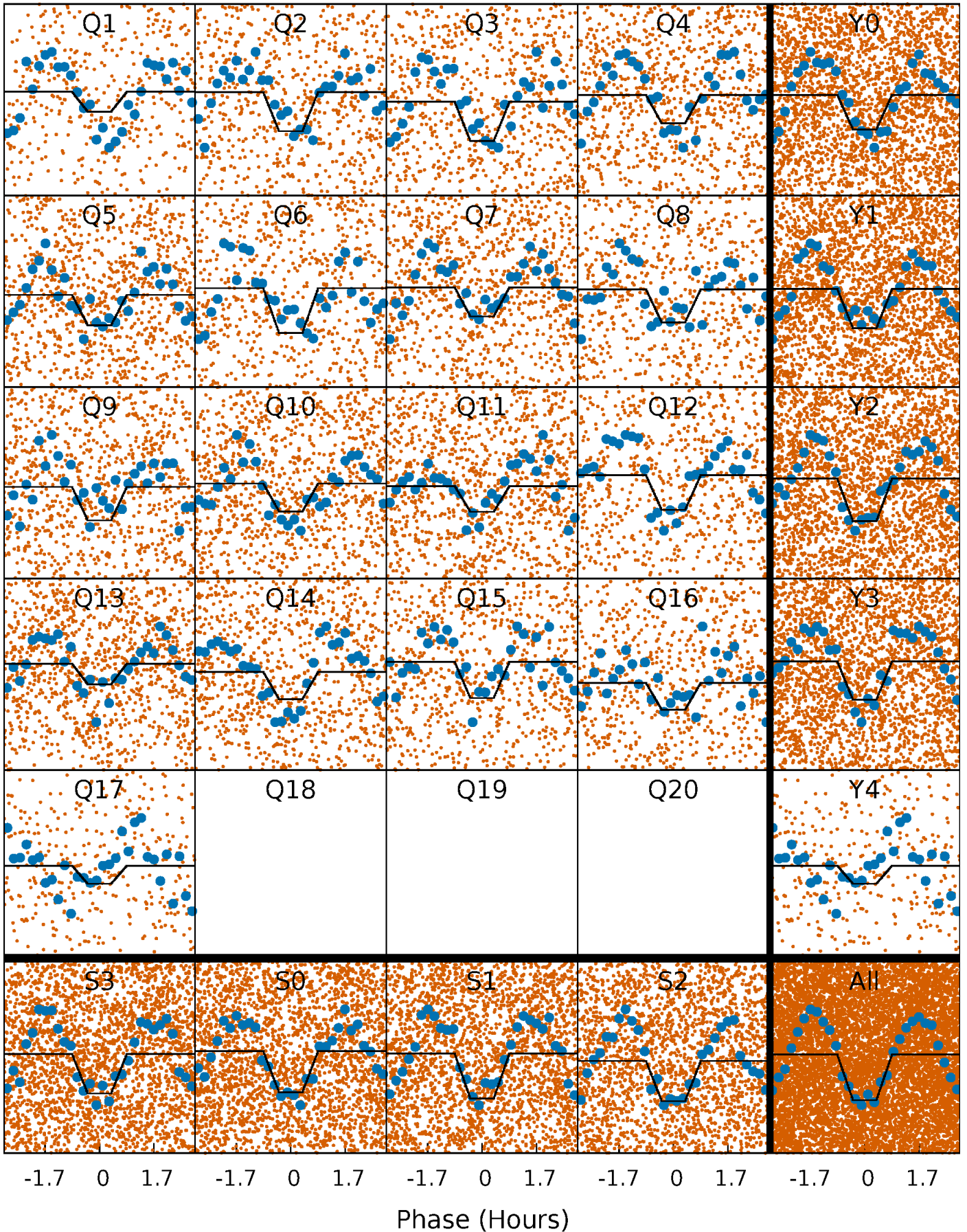
# DV Quarter-Phased Transit Curves

TCE 008460993-02   P= 0.507028 Days    $T_0=131.766916$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 008460993-02   P= 0.507019 Days    $T_0=131.768722$  (BKJD)

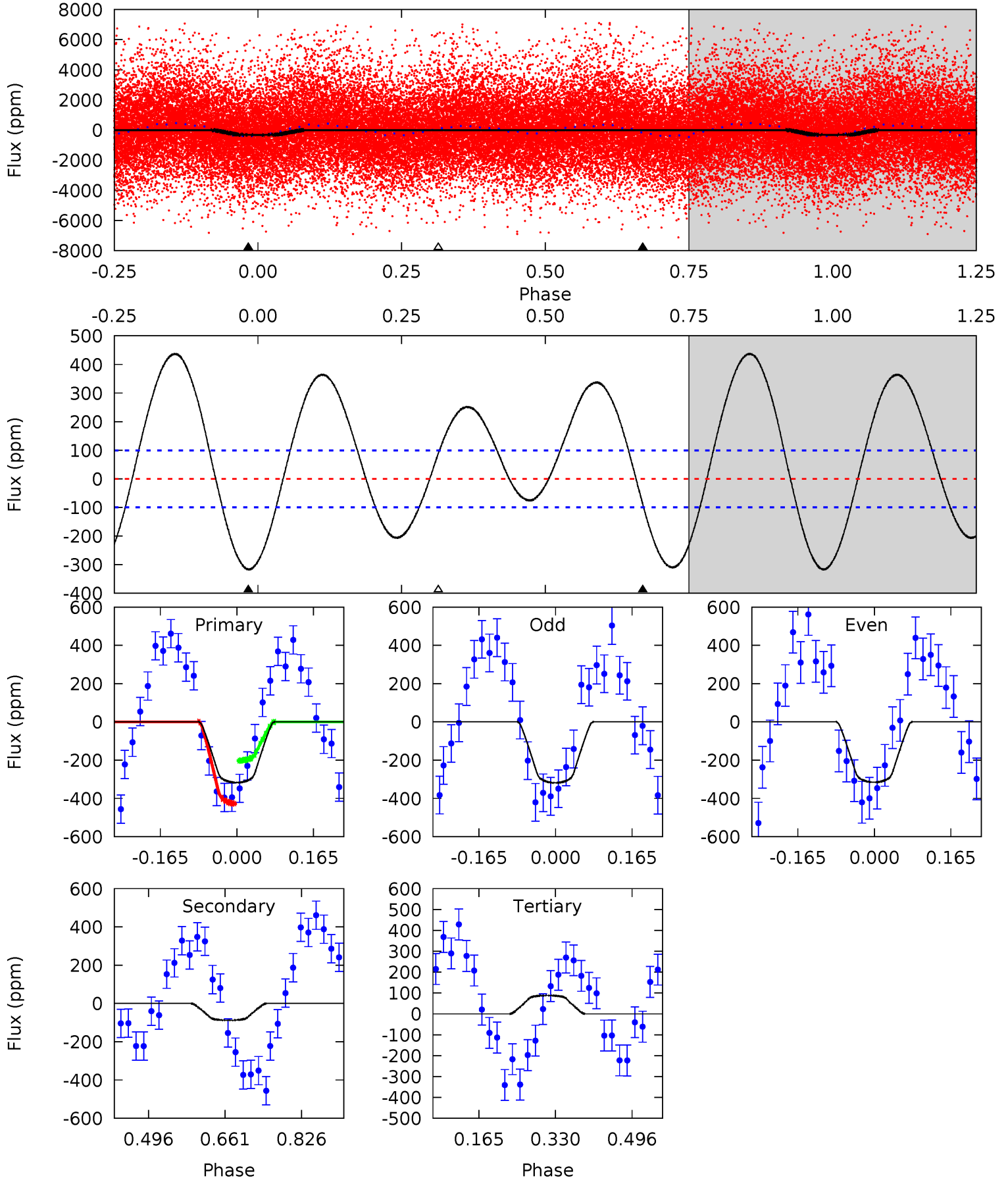




# DV Model-Shift Uniqueness Test

008460993-02, P = 0.507028 Days, E = 131.259888 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
14.2	3.94	-3.96	0	4.46	1.39	6.50	18.2	14.2	7.90	3.94	0.07	1.14	0.58	5.08

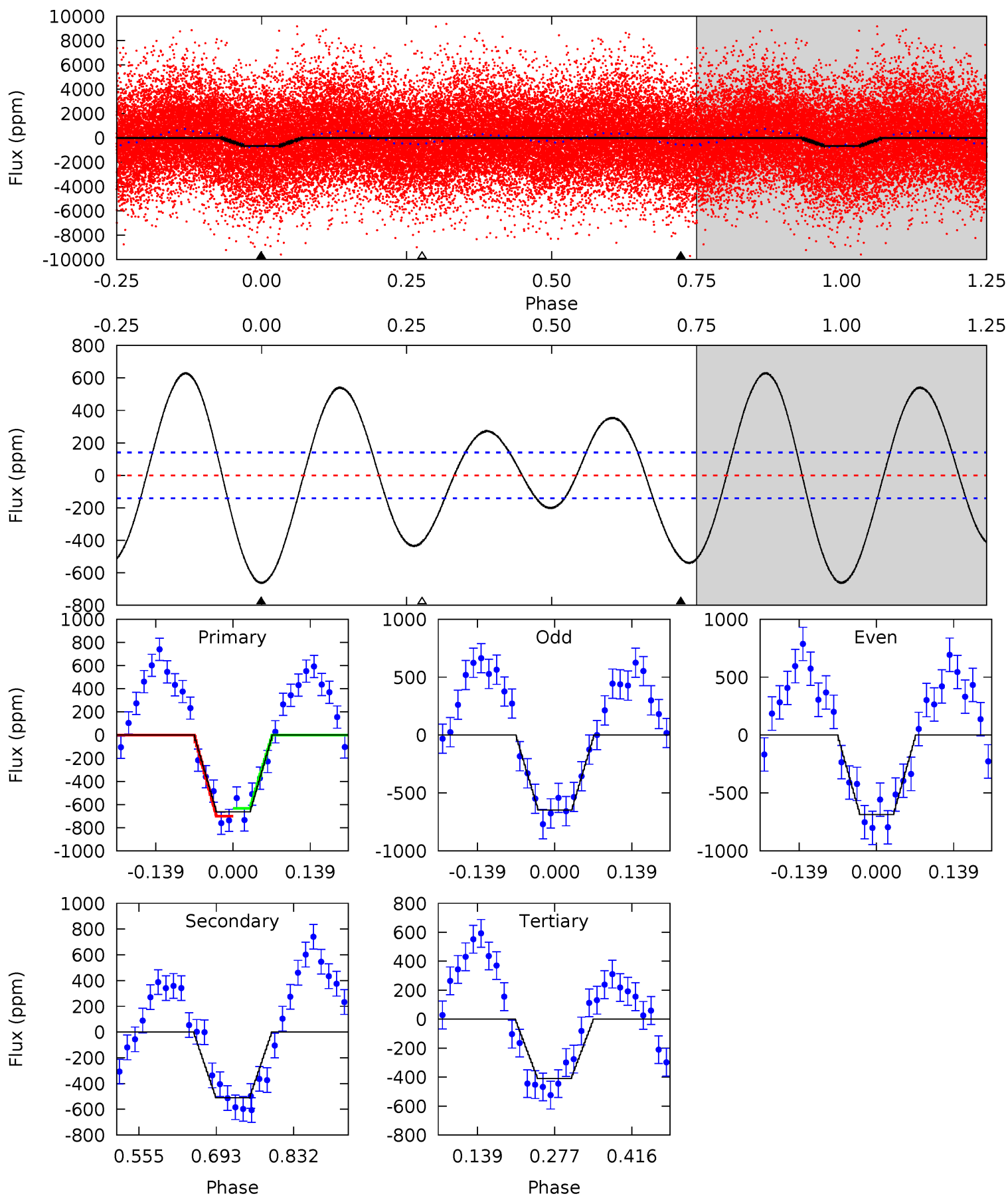




# Alt Model-Shift Uniqueness Test

008460993-02, P = 0.507019 Days, E = 131.261703 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
21.1	16.3	13.1	0	4.50	1.48	8.10	8.08	21.1	3.25	16.3	0.62	1.25	0.49	1.07



### Stellar Parameters For KIC 008460993

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$\rho_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6977^{+167}_{-250}$	$3.951^{+0.279}_{-0.150}$	$-0.080^{+0.250}_{-0.350}$	$2.200^{+0.589}_{-0.785}$	$1.576^{+0.211}_{-0.317}$	$0.208^{+0.402}_{-0.091}$
	+2%/-4%	+7%/-4%	+312%/-438%	+27%/-36%	+13%/-20%	+193%/-44%
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 008460993-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-88 \pm 22$	$3.82^{+1.39}_{-1.11}$	$5251^{+371}_{-457}$	$4545^{+1134}_{-1308}$	$0.650^{+0.722}_{-0.307}$
Alt.	$-511 \pm 31$	$5.98^{+1.75}_{-1.51}$	$5218^{+425}_{-450}$	$6116^{+889}_{-686}$	$1.642^{+1.227}_{-0.659}$

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

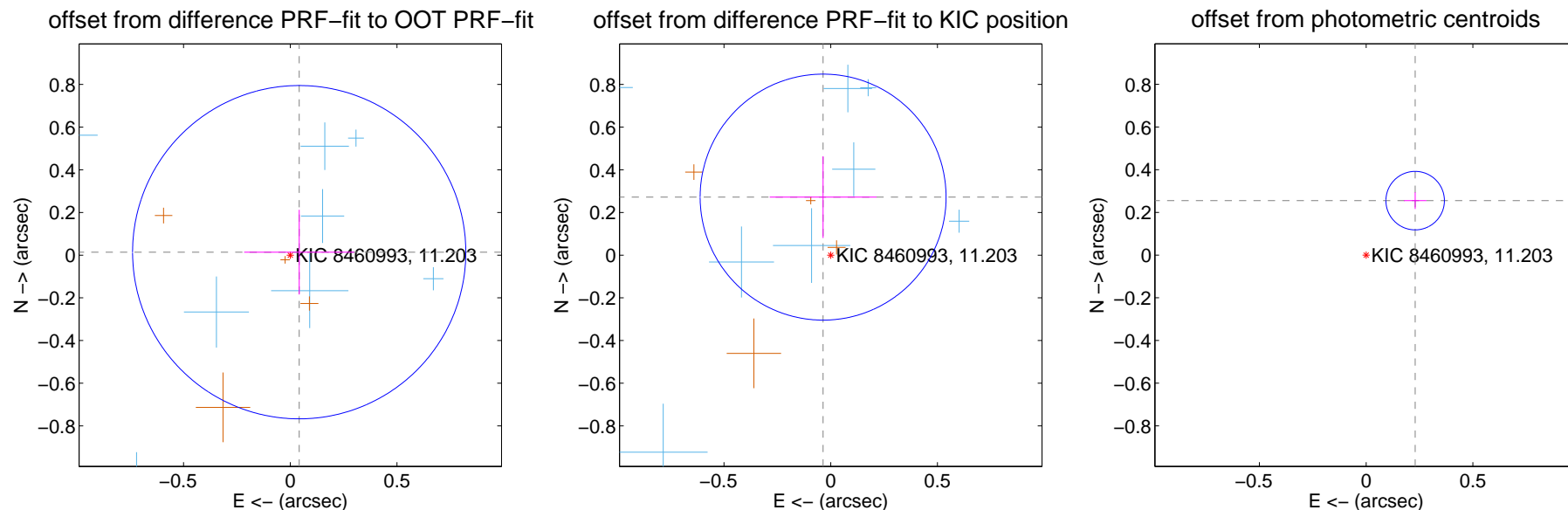
## DV Centroid Data

Supplemental centroid analysis for 008460993-02. **Kepler magnitude: 11.20.** Transit SNR 9.20

There are 11 quarters with good PRF difference image offsets

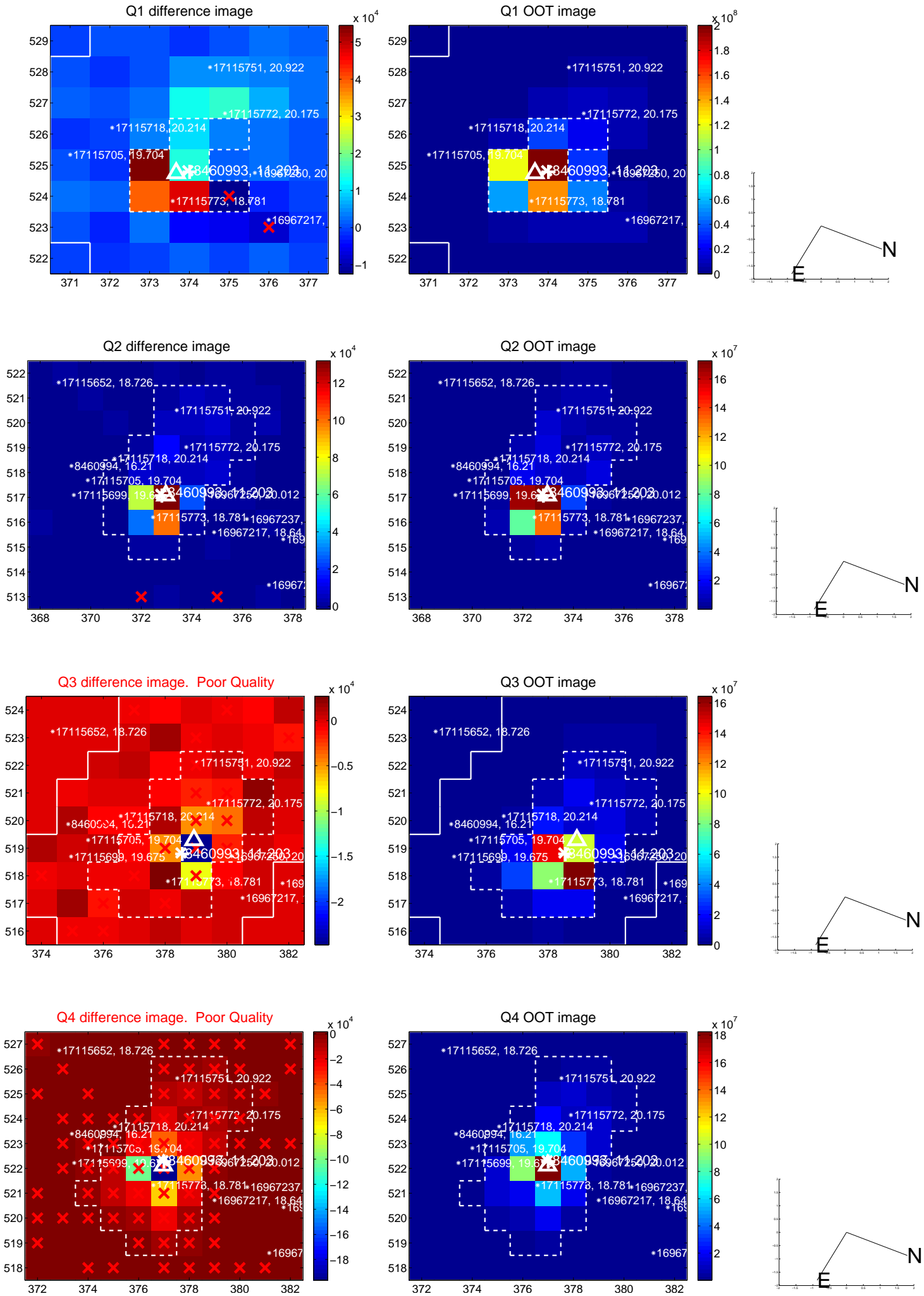
The direct PRF centroid is offset from the target star catalog position by about 0.29 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.044 \pm 0.260$	0.17	$-0.042 \pm 0.258$	$0.014 \pm 0.198$
PRF-fit source offset from KIC position	$0.274 \pm 0.192$	1.43	$0.036 \pm 0.250$	$0.272 \pm 0.192$
photometric centroid source offset	<b><math>0.34 \pm 0.05</math></b>	<b>7.52</b>	$-0.23 \pm 0.05$	$0.26 \pm 0.04$

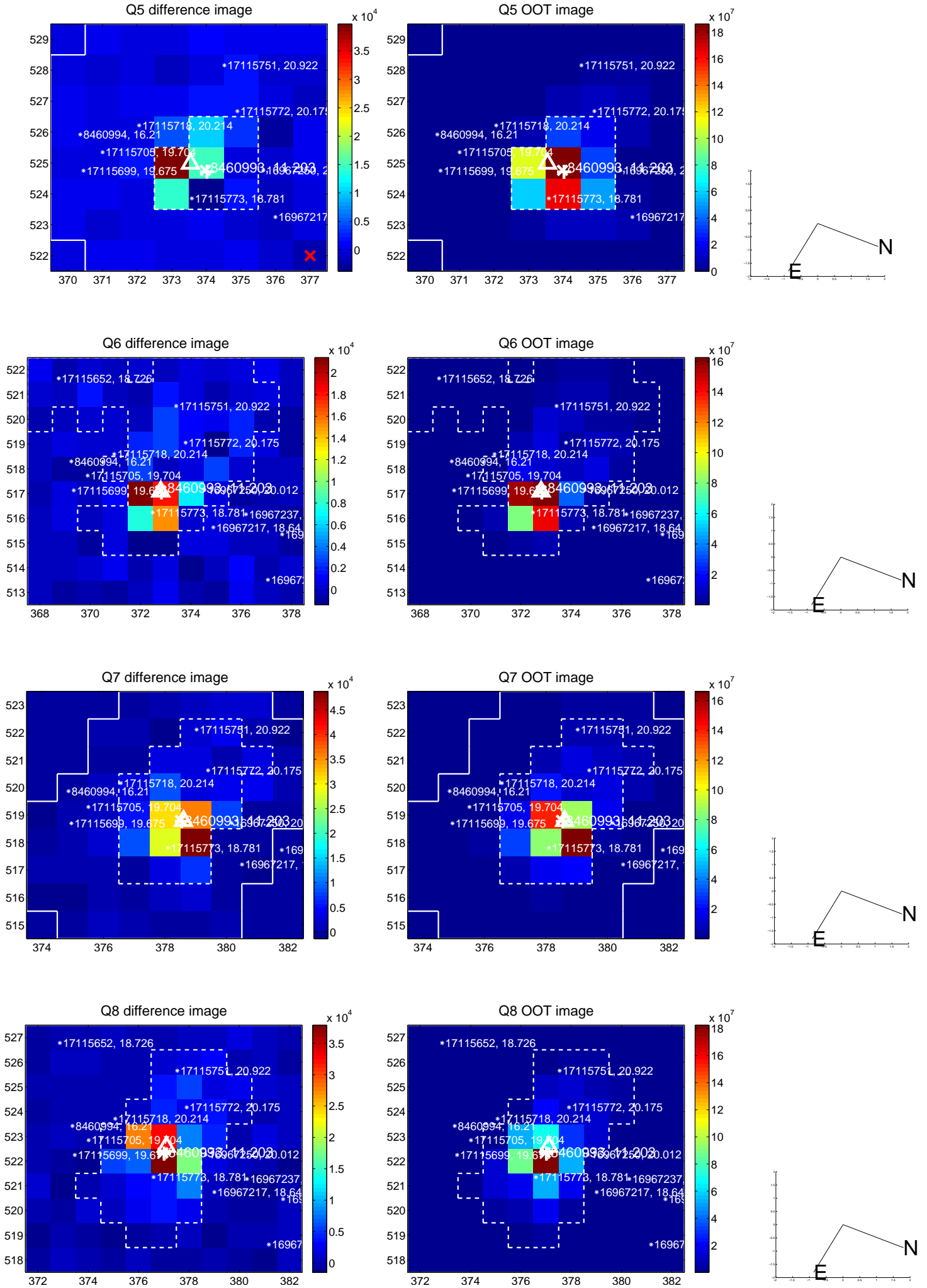


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

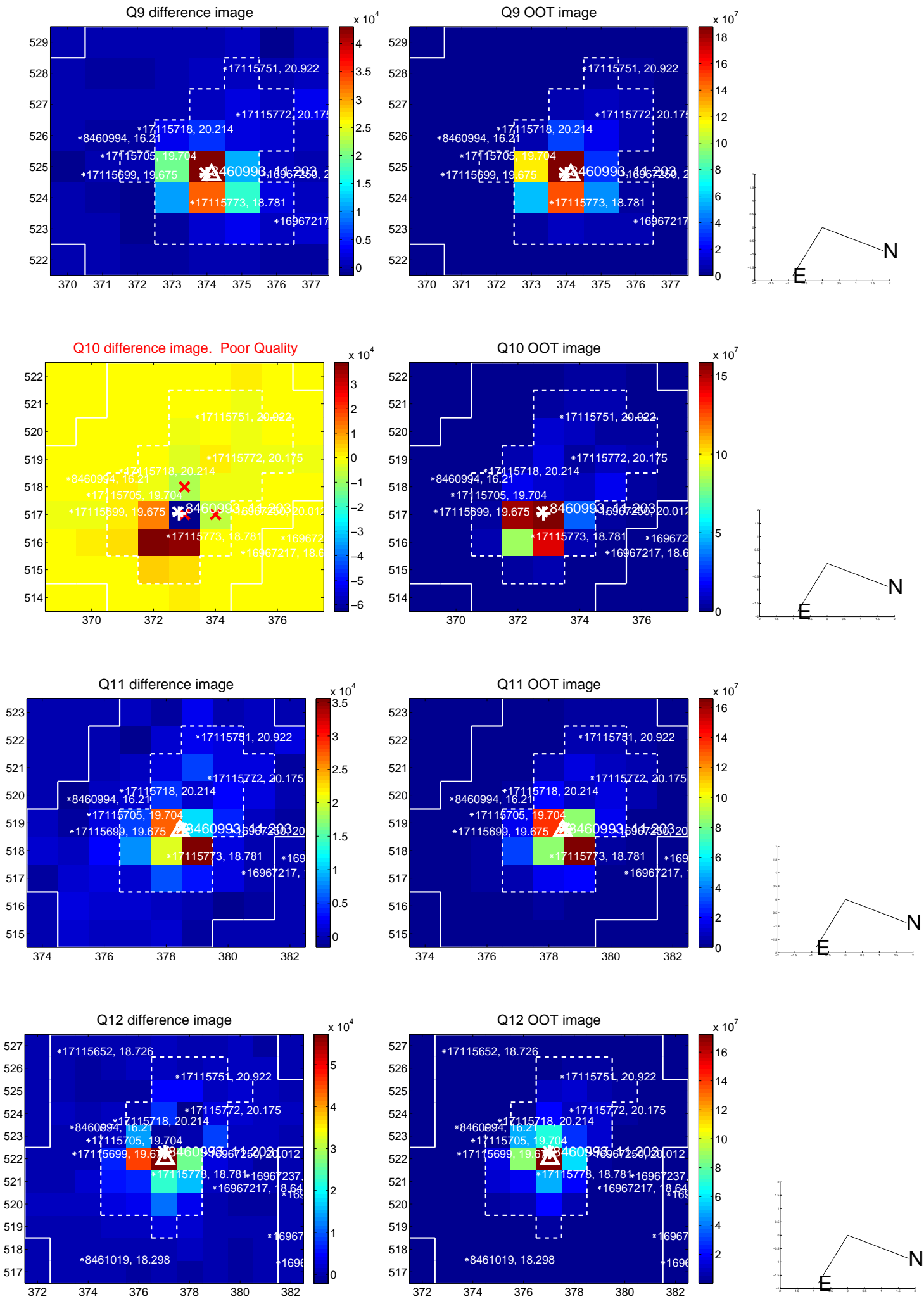
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

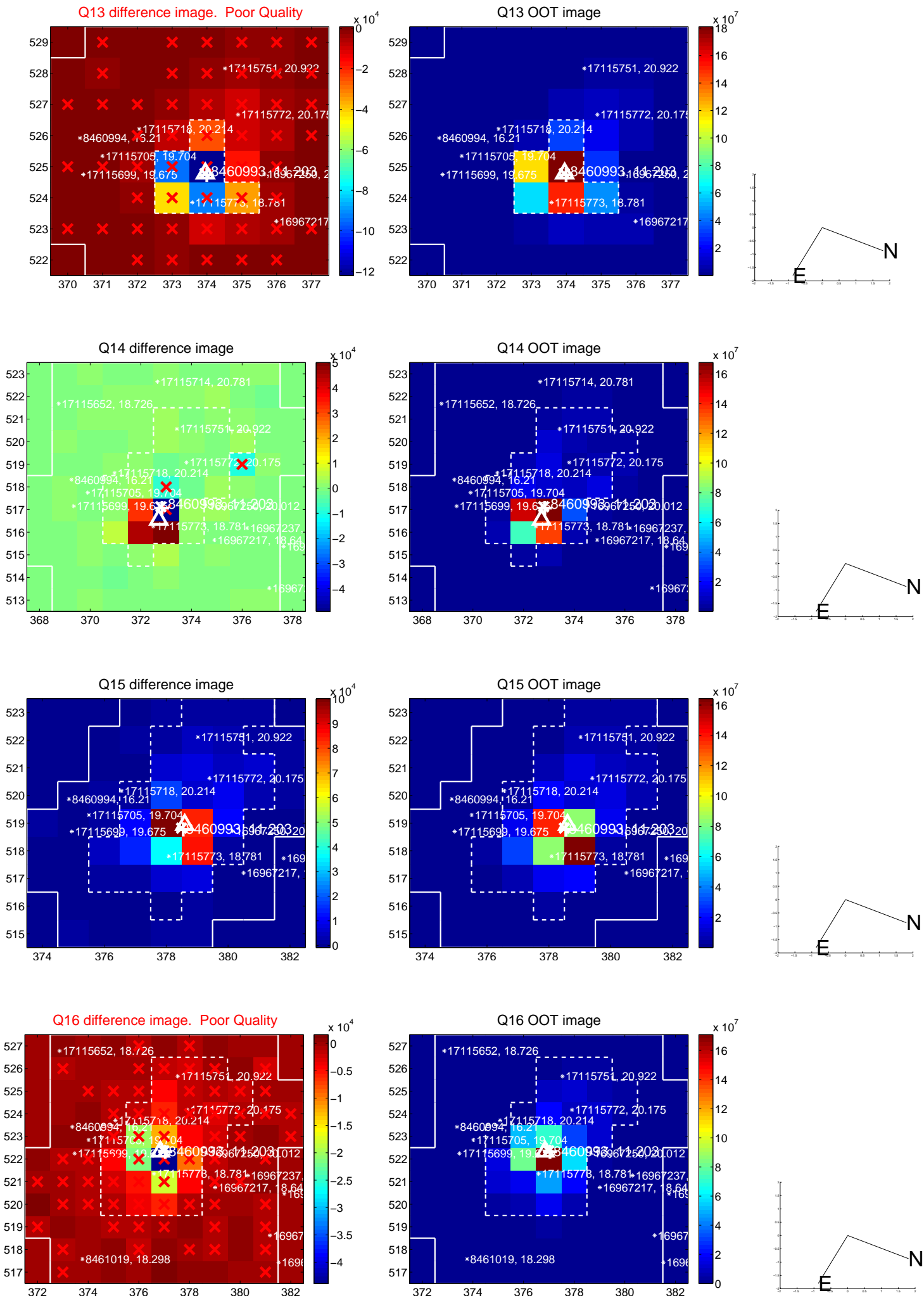


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

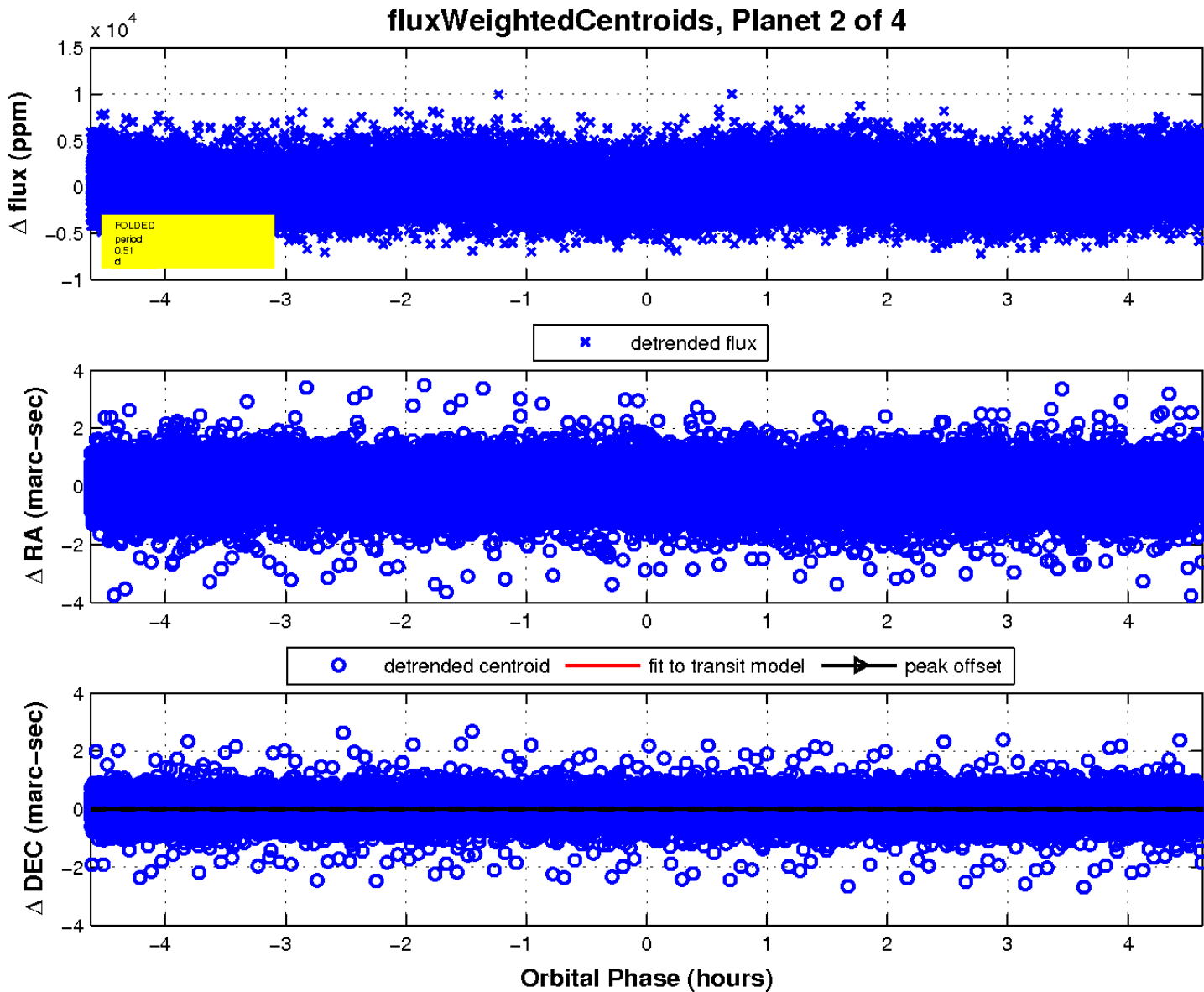
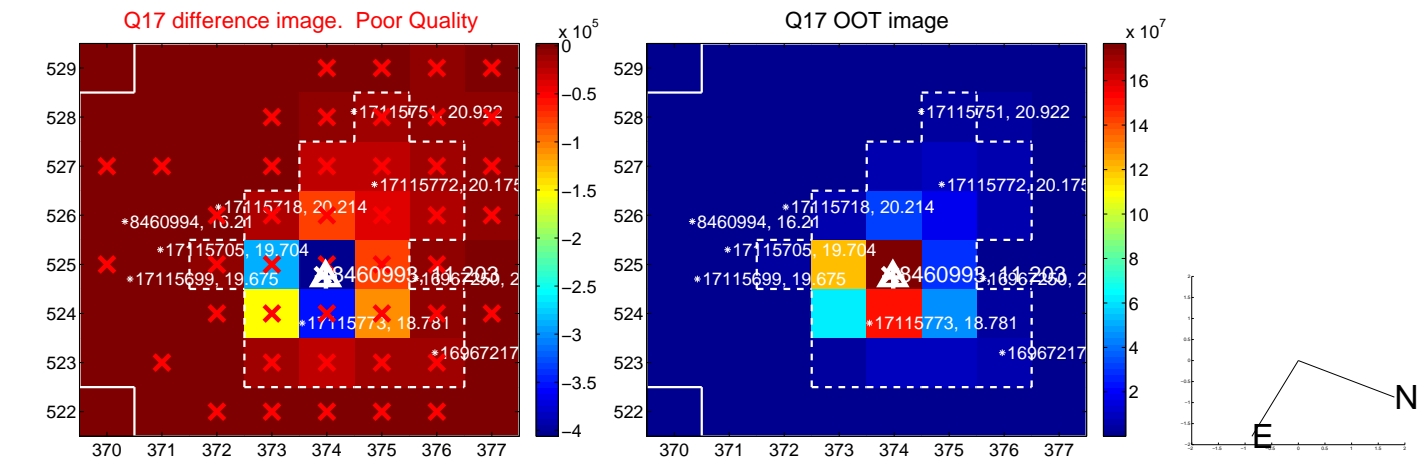




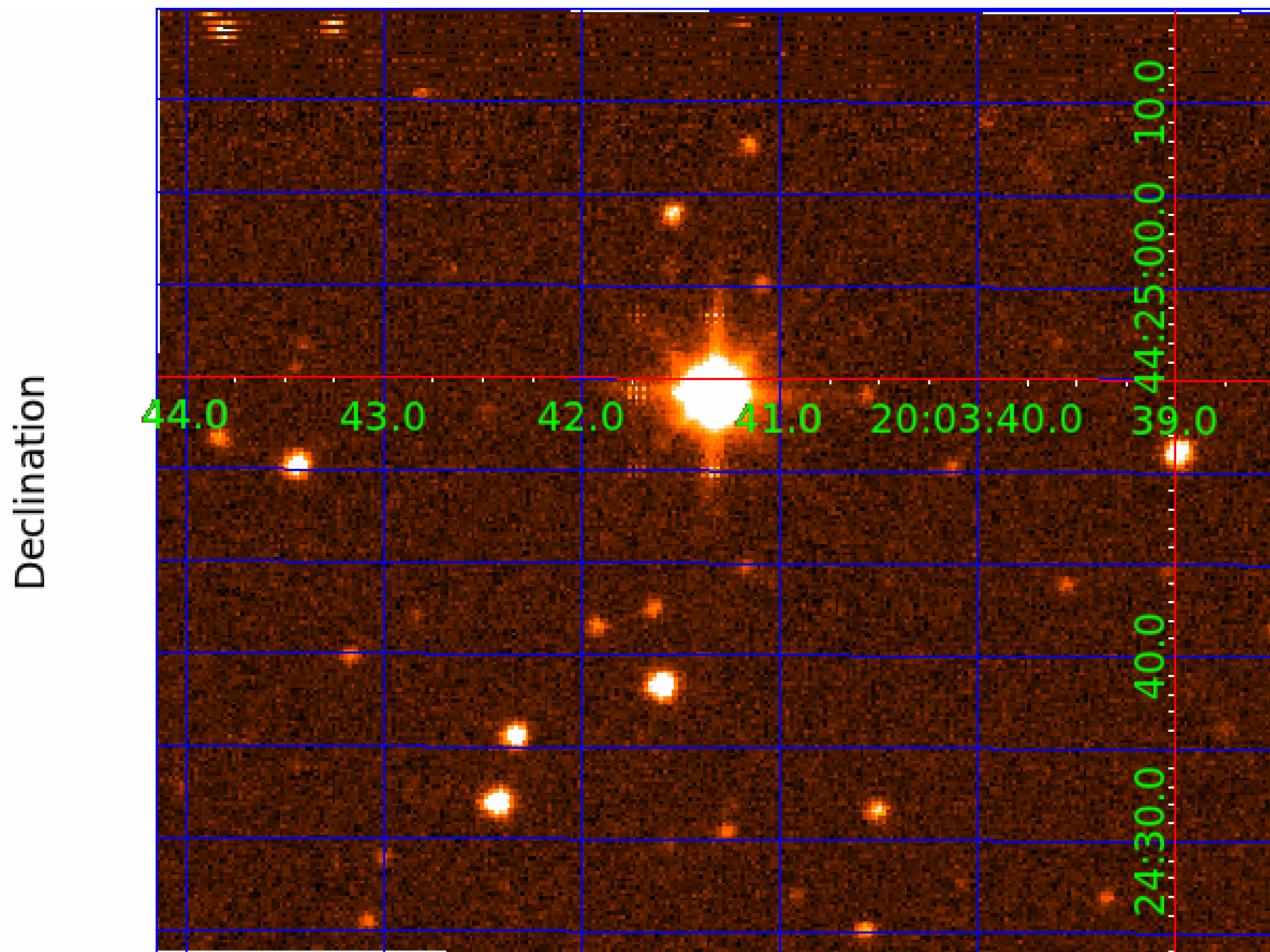
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



UKIRT Image



# KIC 008460993

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008460993-01	OBS	No	0.554839	131.572172	302.2	0.512	15.1	14.7	2.20	6977	4.02	43413.86
008460993-02	OBS	No	0.507028	131.766916	247.8	1.541	9.0	9.2	2.20	6977	4.05	48956.31
008460993-03	OBS	No	124.751364	175.073357	3086.8	1.908	8.0	7.6	2.20	6977	12.77	31.75

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008460993-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_SKYE_ZUMA_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED
008460993-02	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED
008460993-03	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—MOD_NONUNIQ_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.

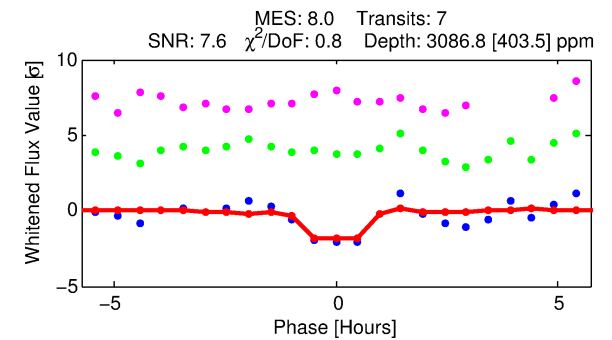
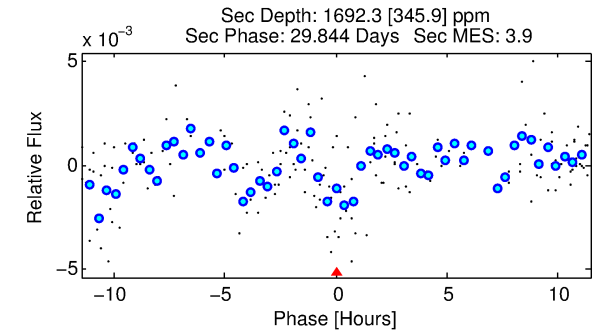
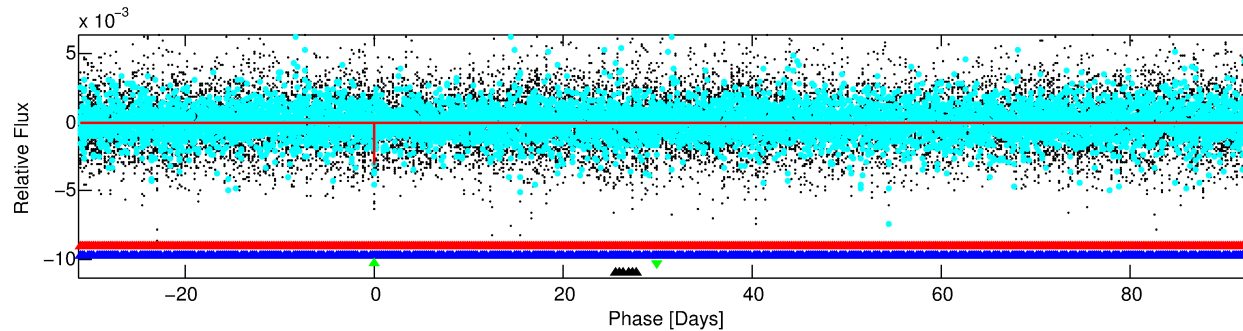
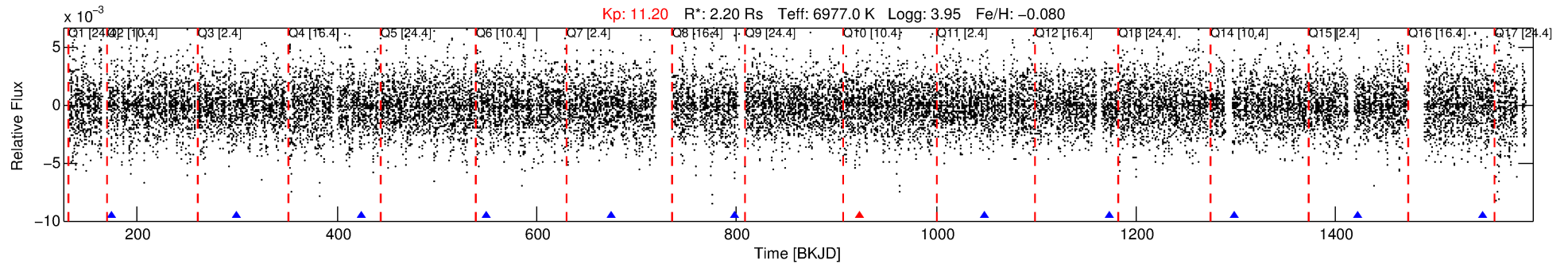
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 008460993-03

No Significant Match Found

# DV One-Page Summary

KIC: 8460993 Candidate: 3 of 4 Period: 124.751 d

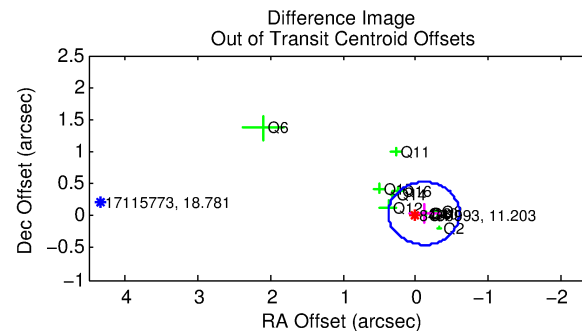
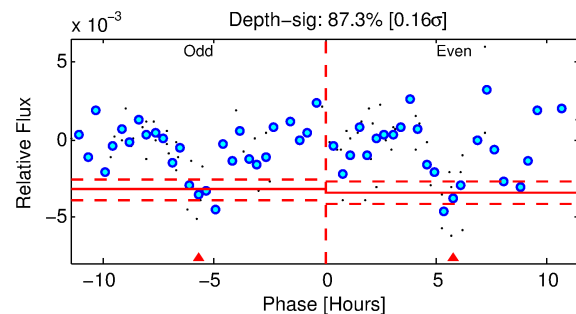
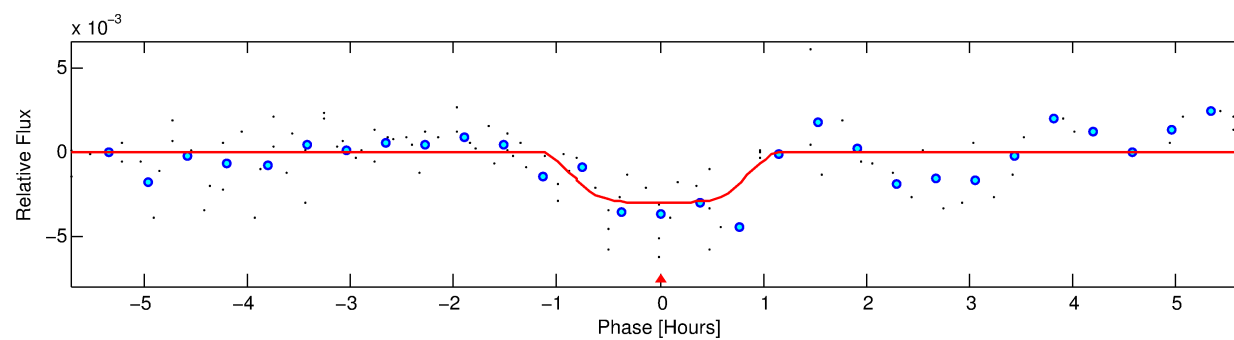


## DV Fit Results:

Period = 124.75136 [0.00107] d  
Epoch = 175.0734 [0.0056] BKJD  
Rp/R\* = 0.0532 [0.0480]  
a/R\* = 448.86 [2278.36]  
b = 0.55 [6.50]  
Seff = 31.75 [16.21]  
Teq = 605 [77] K  
Rp = 12.77 [12.39] Re  
a = 0.5689 [0.1821] AU  
Ag = 1846.88 [3473.08] [0.53σ]  
Teffp = 6135 [2793] K [1.98σ]

## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [1508.91σ]  
LongPeriod-sig: 100.0% [772.10σ]  
ModelChiSquare2-sig: 5.7%  
ModelChiSquareGof-sig: 99.8%  
Bootstrap-pfa: 1.69e-12  
RollingBand-fgt: 0.86 [6/7]  
GhostDiagnostic-chr: -0.2515  
Centroid-sig: N/A  
Centroid-so: 0.336 arcsec [5.84σ]  
OotOffset-rm: 0.120 arcsec [0.73σ]  
KicOffset-rm: 0.269 arcsec [1.75σ]  
OotOffset-st: 4/3/4/0 [11]  
KicOffset-st: 4/3/4/0 [11]  
DiffImageQuality-fgm: 0.73 [8/11]  
DiffImageOverlap-fno: 0.00 [0/12]

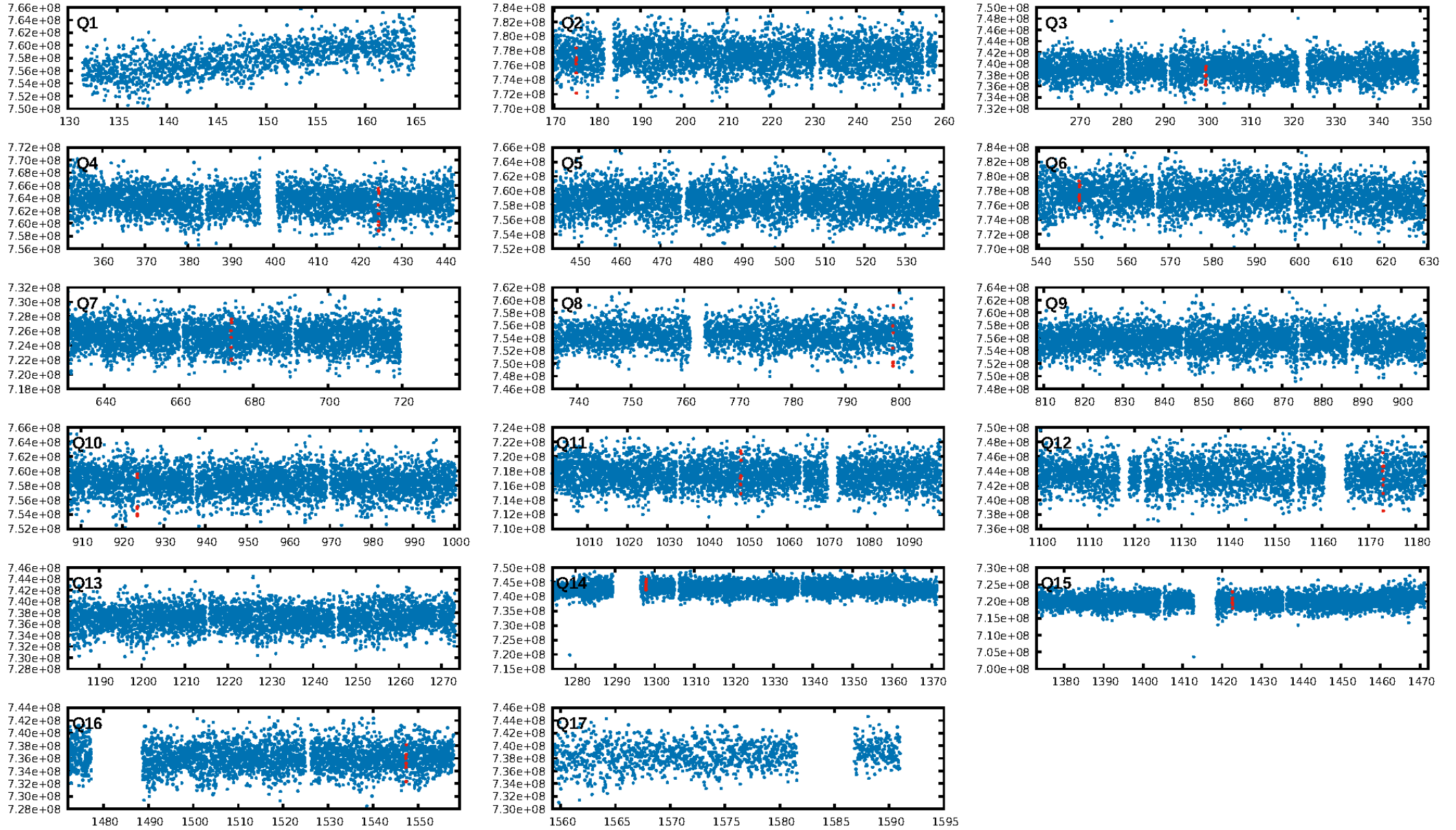


Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 23:38:42 Z

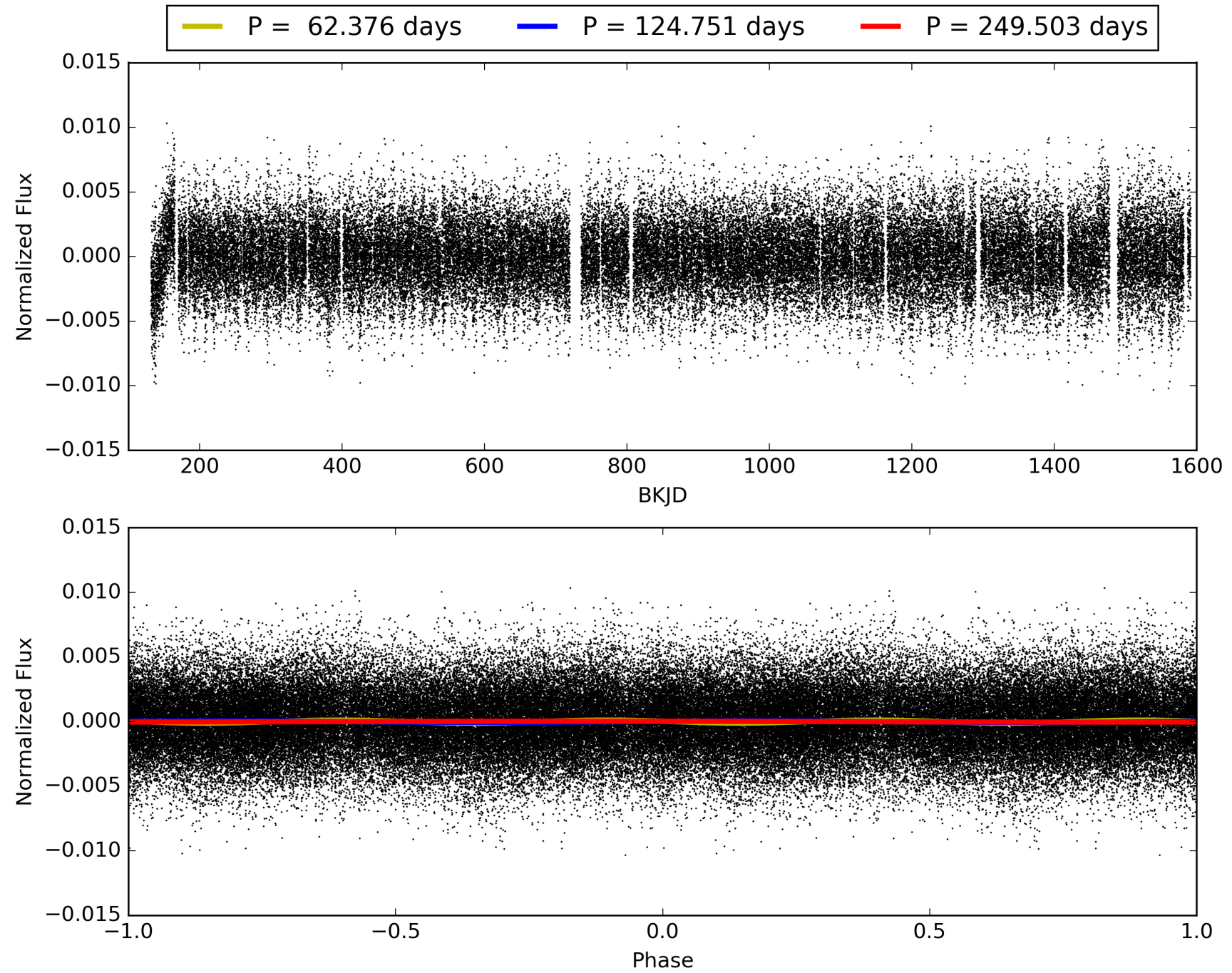
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center



# TCE 008460993-03, PDC Light Curves

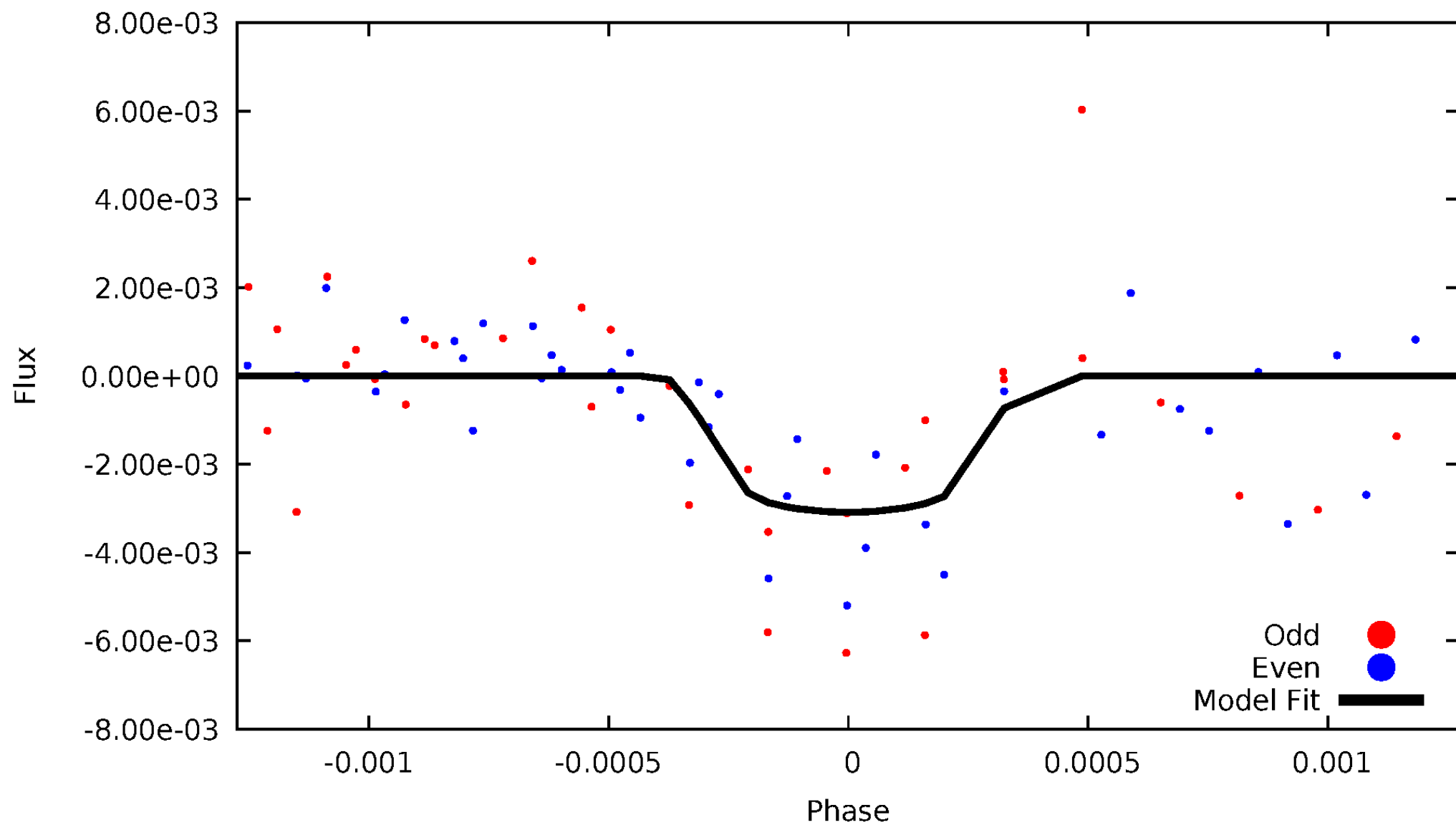


TCE 008460993-03



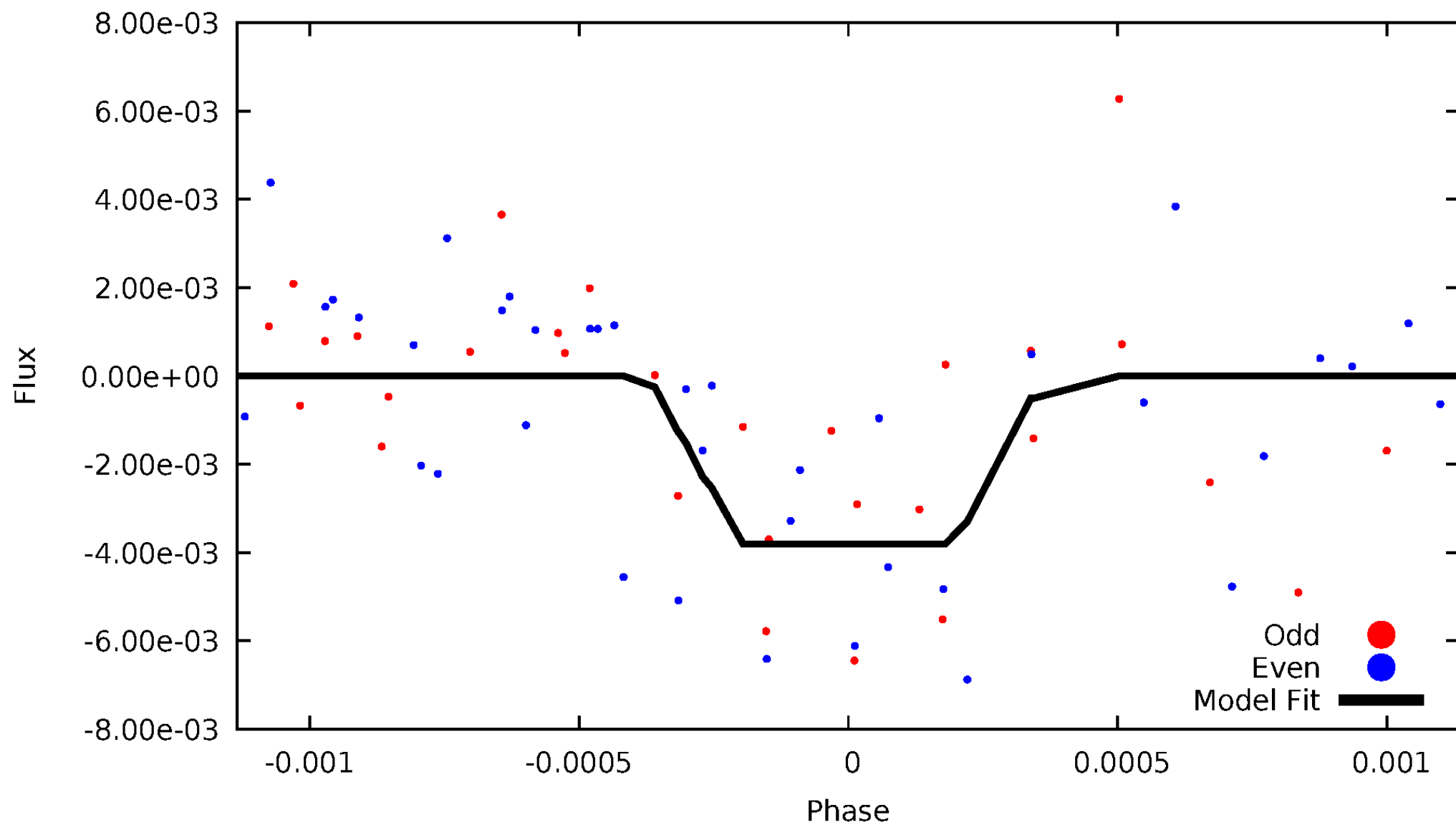
# DV Odd/Even

TCE 008460993-03



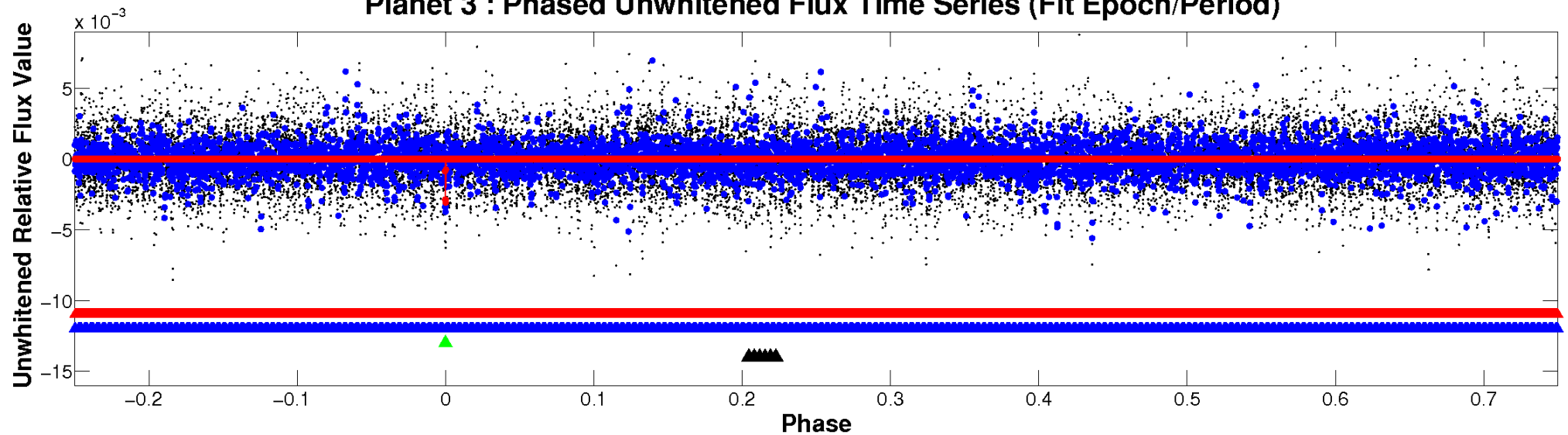
# ALT Odd/Even

TCE 008460993-03

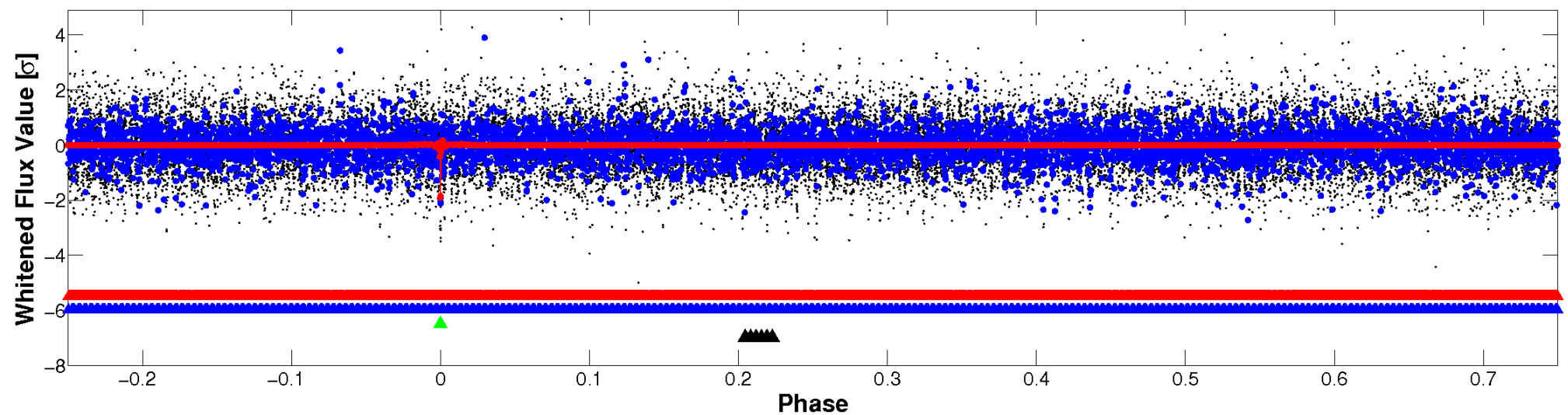


# Non-Whitened Vs. Whitened Light Curve

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



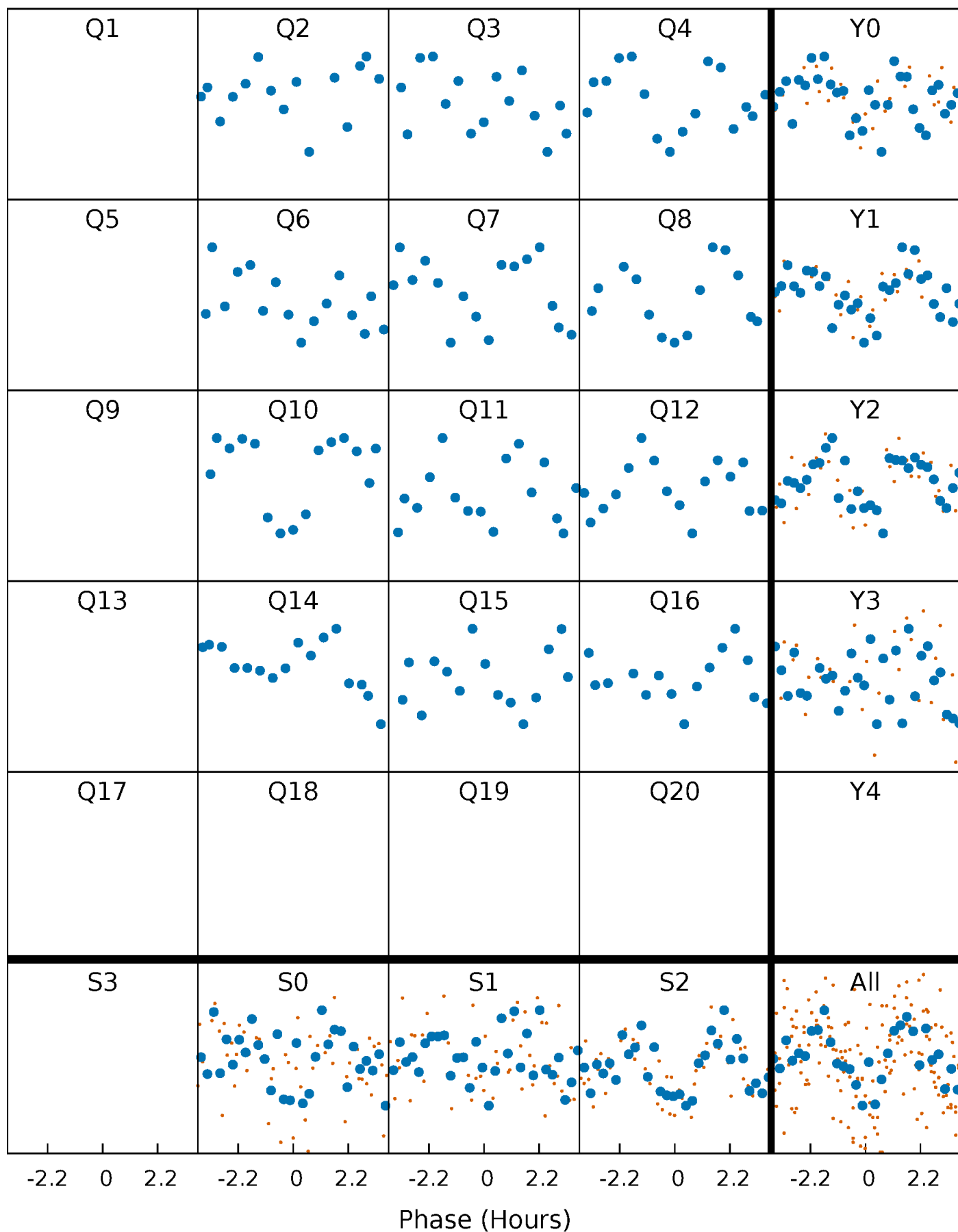
**Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)**





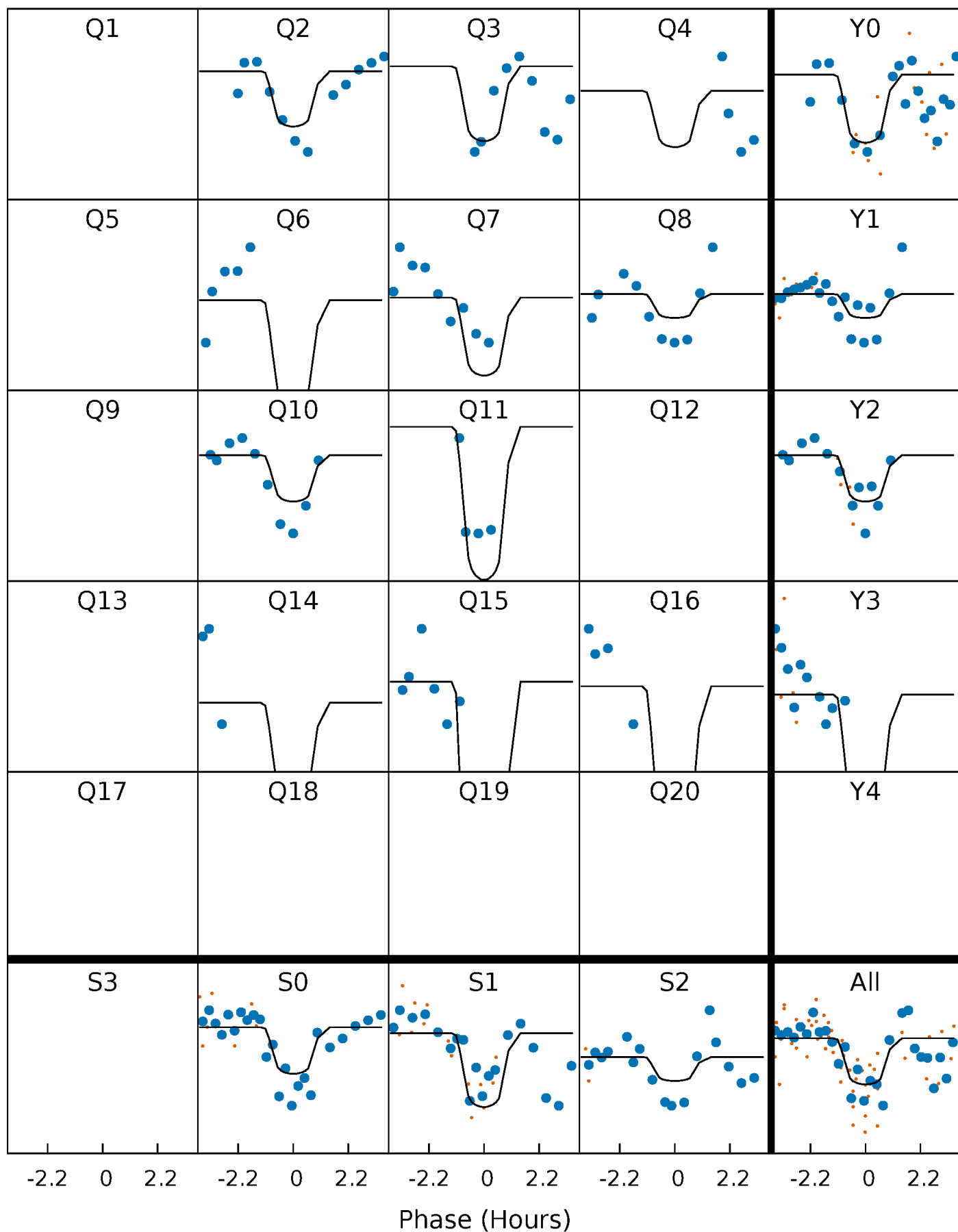
# PDC Quarter-Phased Transit Curves

TCE 008460993-03 P=124.751364 Days  $T_0=175.073357$  (BKJD)



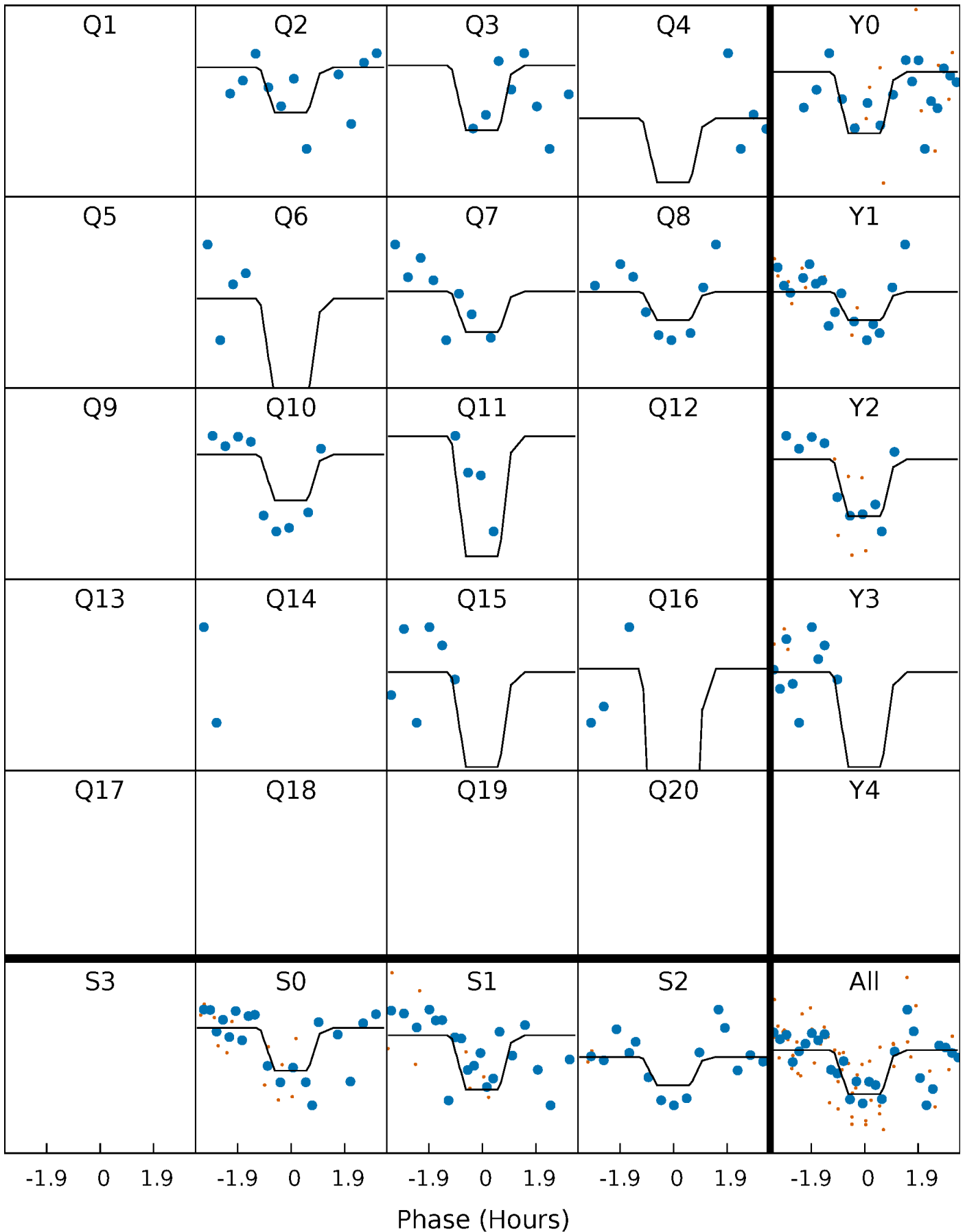
# DV Quarter-Phased Transit Curves

TCE 008460993-03 P=124.751364 Days  $T_0=175.073357$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

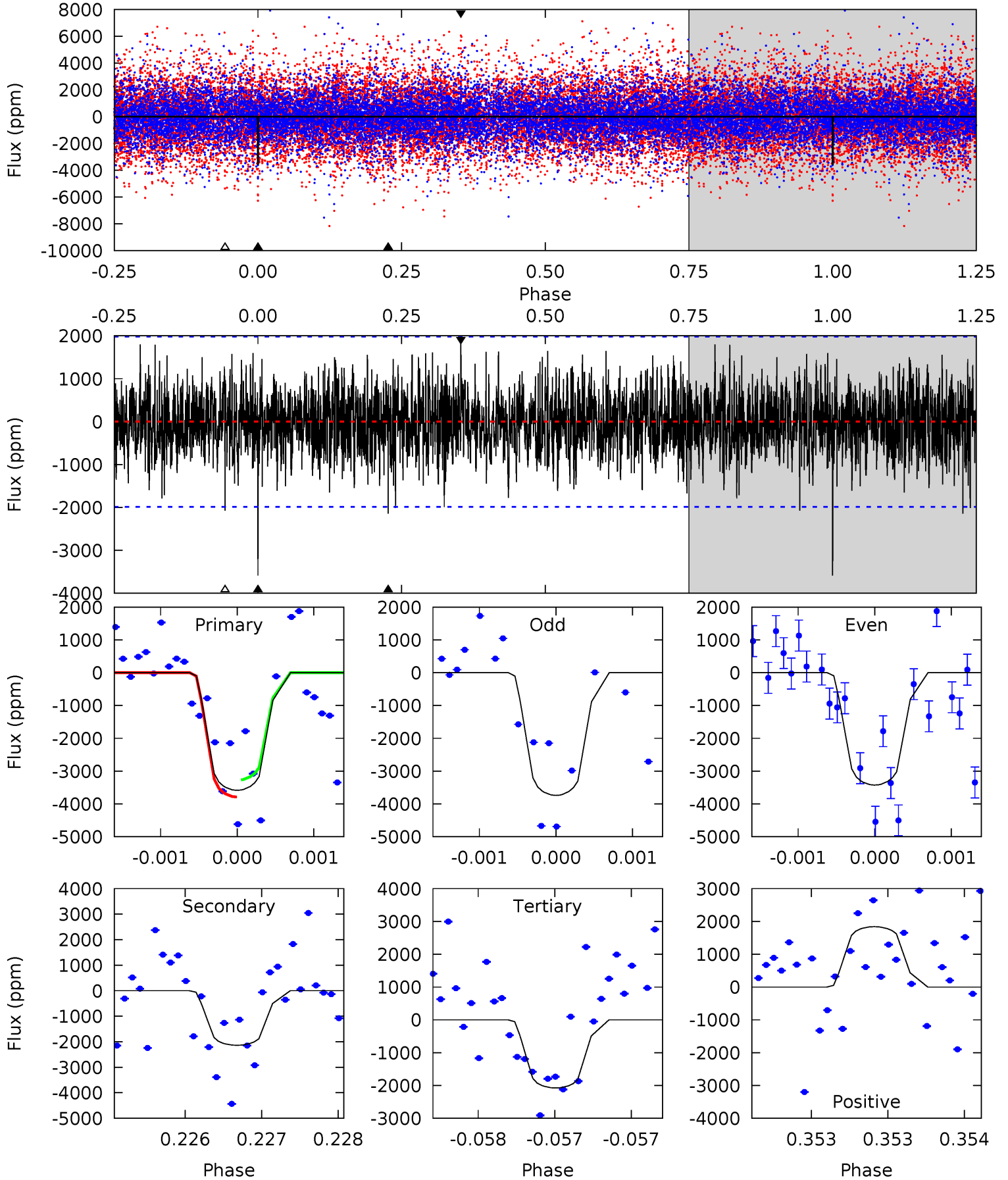
TCE 008460993-03 P=124.751491 Days  $T_0=175.070774$  (BKJD)



# DV Model-Shift Uniqueness Test

008460993-03, P = 124.751364 Days, E = 50.321993 Days

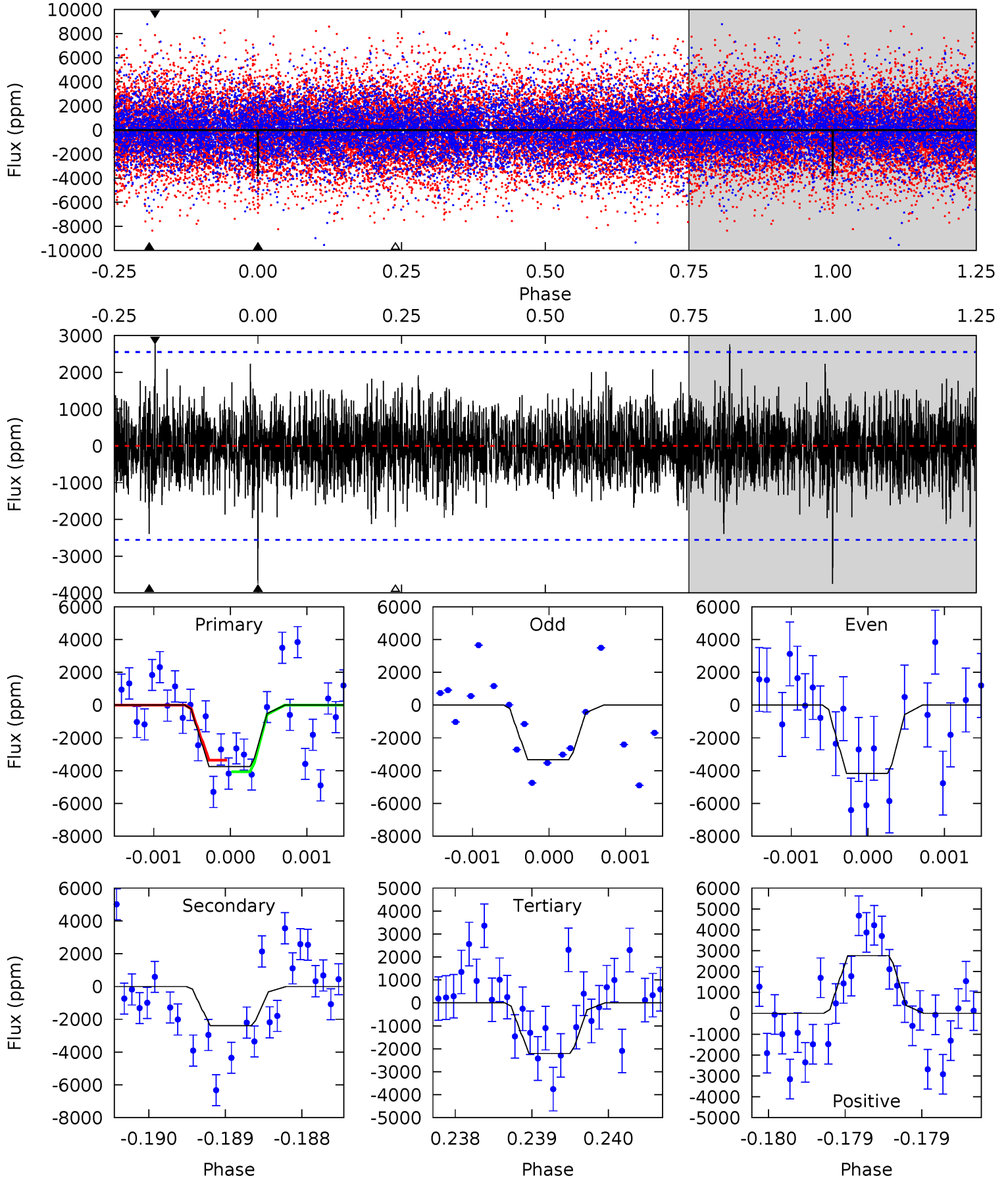
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
9.96	5.94	5.76	5.11	5.51	3.39	1.56	4.20	4.85	0.17	0.83	0.45	1.09	0.34	0.70



# Alt Model-Shift Uniqueness Test

008460993-03, P = 124.751491 Days, E = 50.319283 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.09	5.16	4.76	5.96	5.51	3.39	1.33	3.33	2.12	0.41	-0.80	0.90	1.18	0.42	0.76





### Stellar Parameters For KIC 008460993

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$6977^{+167}_{-250}$	$3.951^{+0.279}_{-0.150}$	$-0.080^{+0.250}_{-0.350}$	$2.200^{+0.589}_{-0.785}$	$1.576^{+0.211}_{-0.317}$	$0.208^{+0.402}_{-0.091}$
	+2%/-4%	+7%/-4%	+312%/-438%	+27%/-36%	+13%/-20%	+193%/-44%
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 008460993-03 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-2138 \pm 360$	$13.21^{+11.22}_{-8.21}$	$835^{+63}_{-79}$	$6095^{+4803}_{-1366}$	$2084^{+12500}_{-1476}$
Alt.	$-2394 \pm 464$	$15.43^{+11.95}_{-8.74}$	$836^{+58}_{-75}$	$5889^{+3642}_{-1255}$	$1826^{+7487}_{-1267}$

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

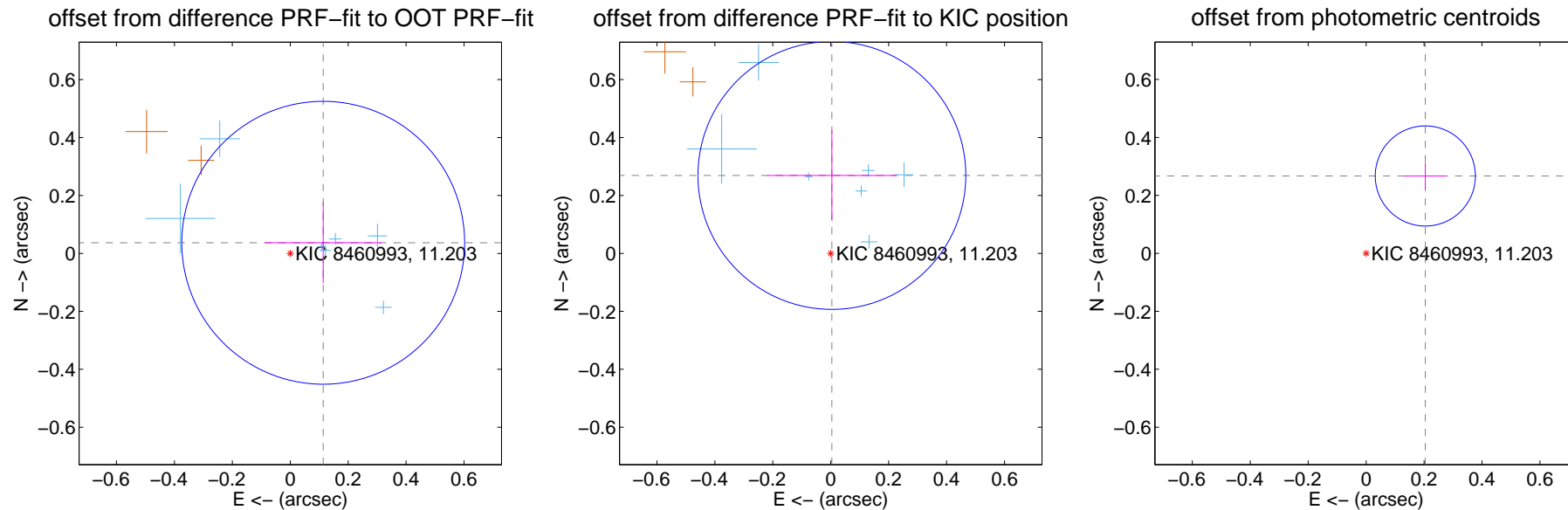
## DV Centroid Data

Supplemental centroid analysis for 008460993-03. **Kepler magnitude: 11.20.** Transit SNR 7.58

There are 8 quarters with good PRF difference image offsets

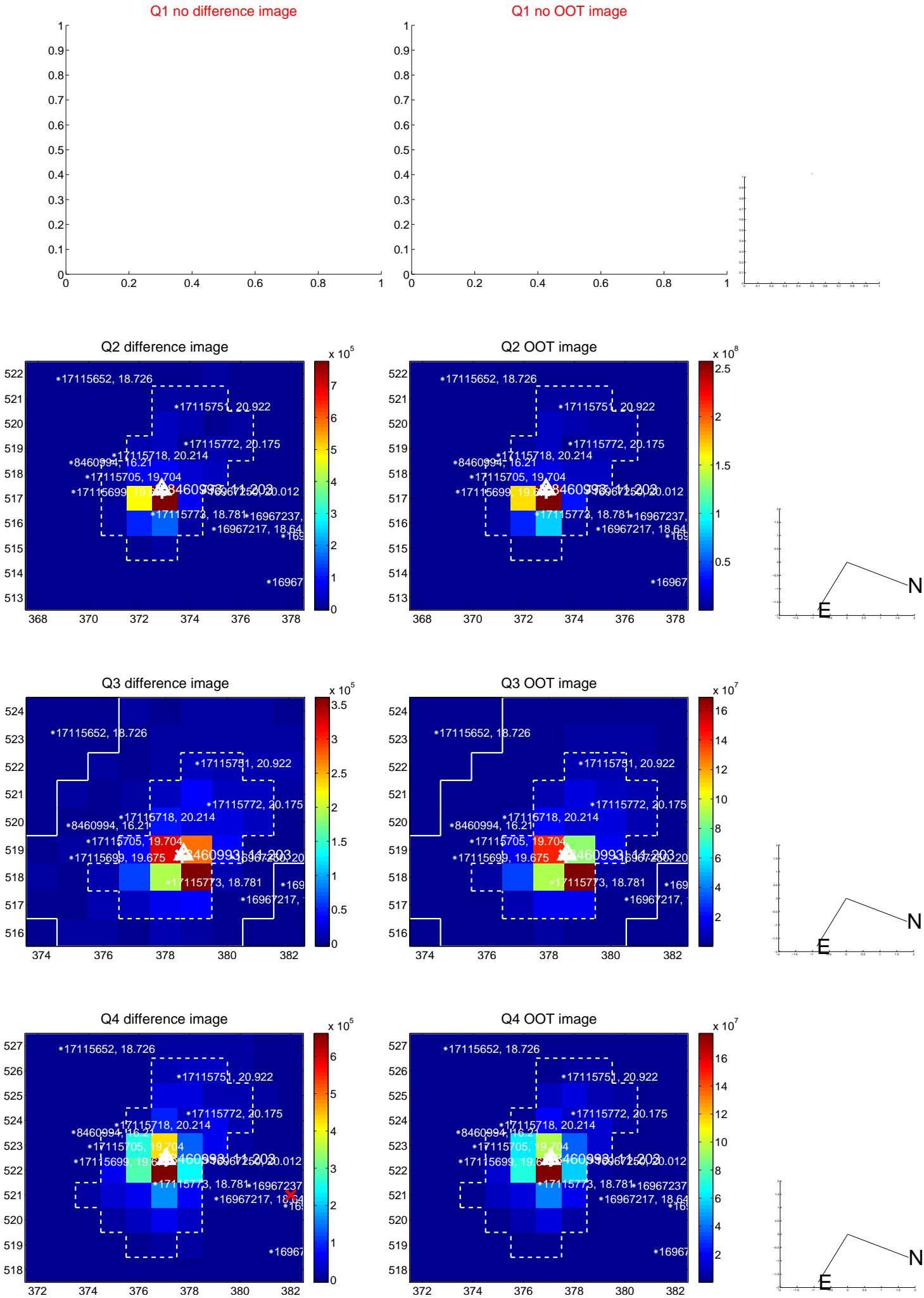
The direct PRF centroid is offset from the target star catalog position by about 0.26 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.120 \pm 0.163$	0.73	$-0.114 \pm 0.201$	$0.037 \pm 0.140$
PRF-fit source offset from KIC position	$0.269 \pm 0.154$	1.75	$-0.004 \pm 0.222$	$0.269 \pm 0.157$
photometric centroid source offset	<b><math>0.34 \pm 0.06</math></b>	<b>5.84</b>	$-0.20 \pm 0.07$	$0.27 \pm 0.05$

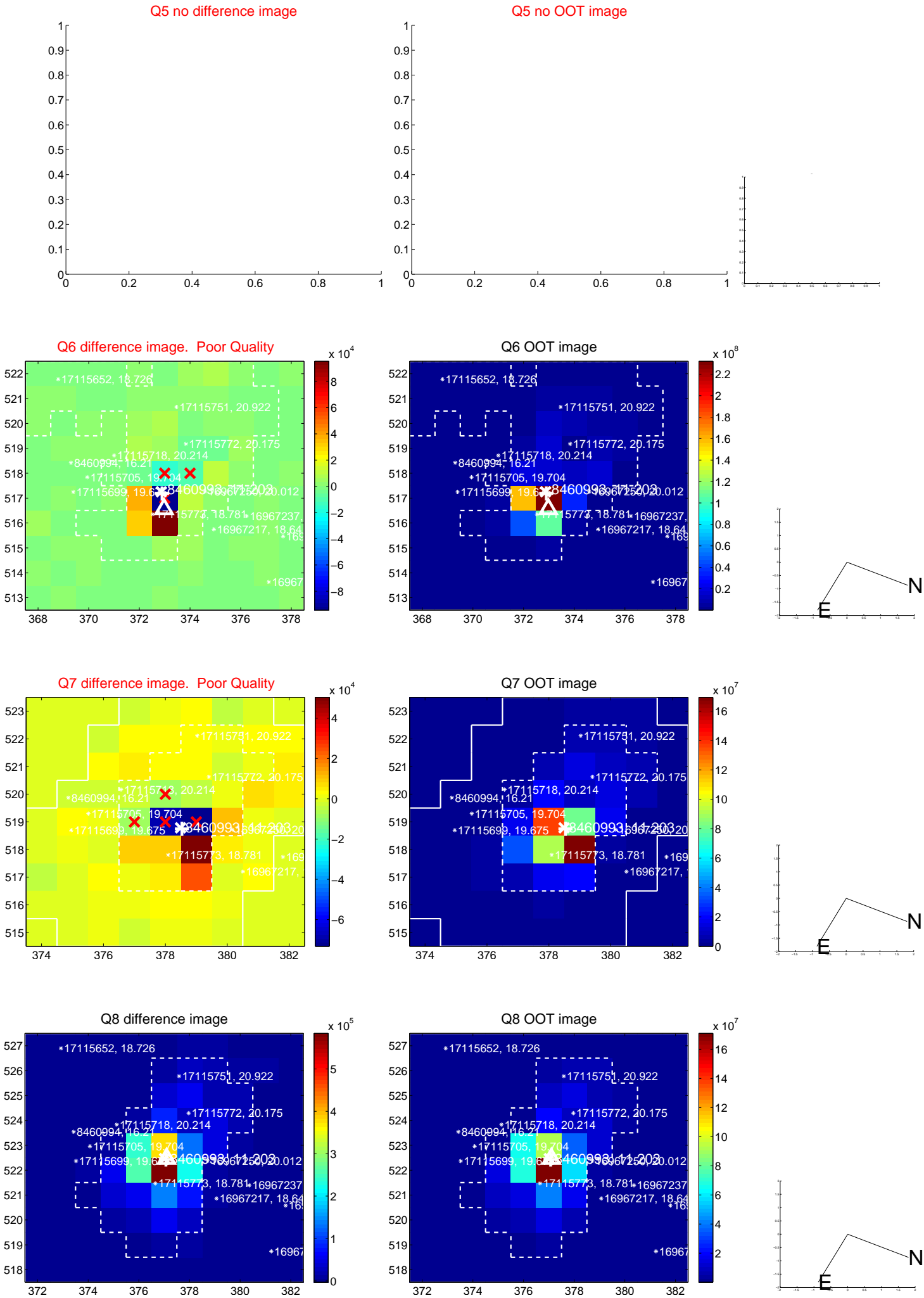


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

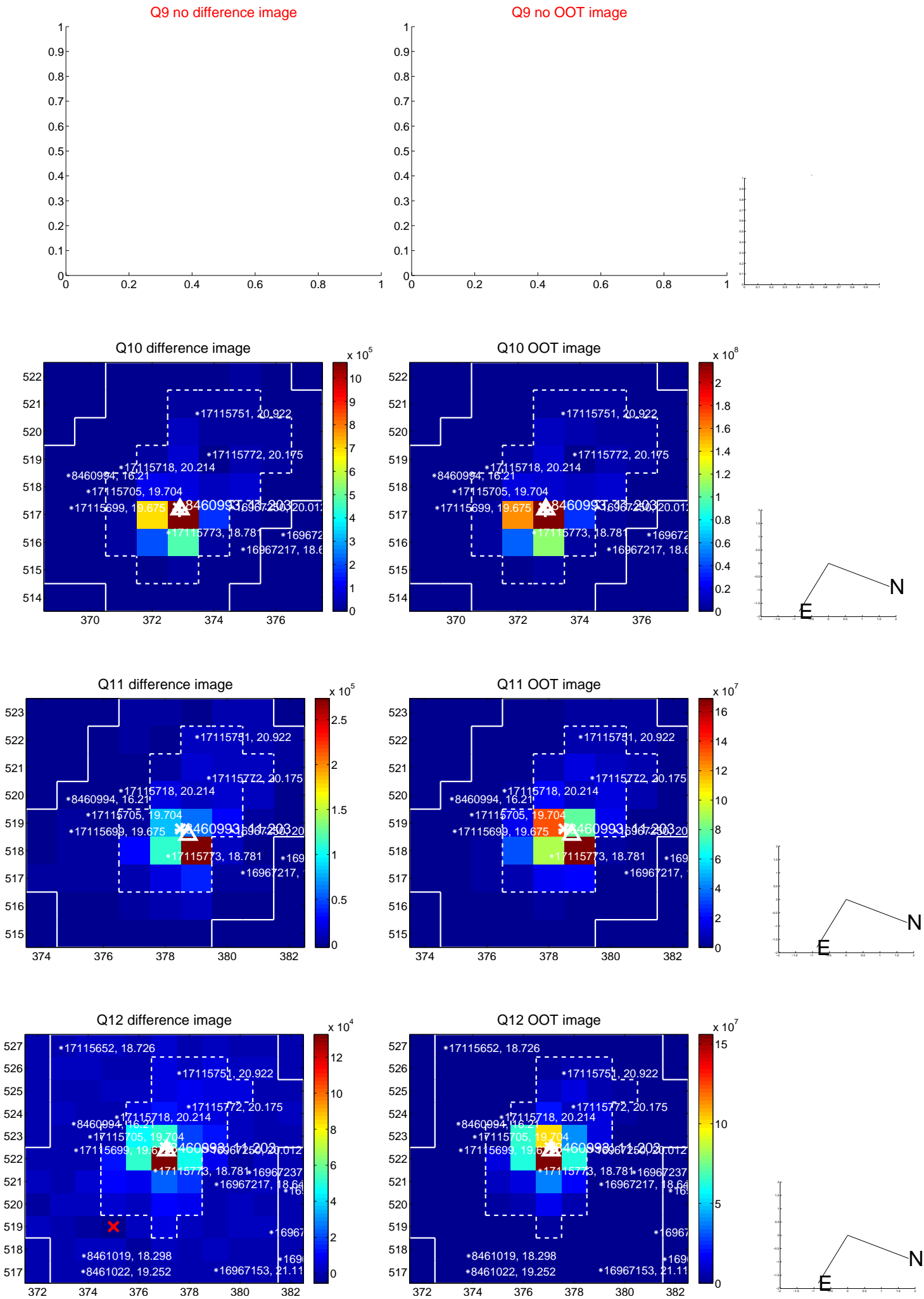
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

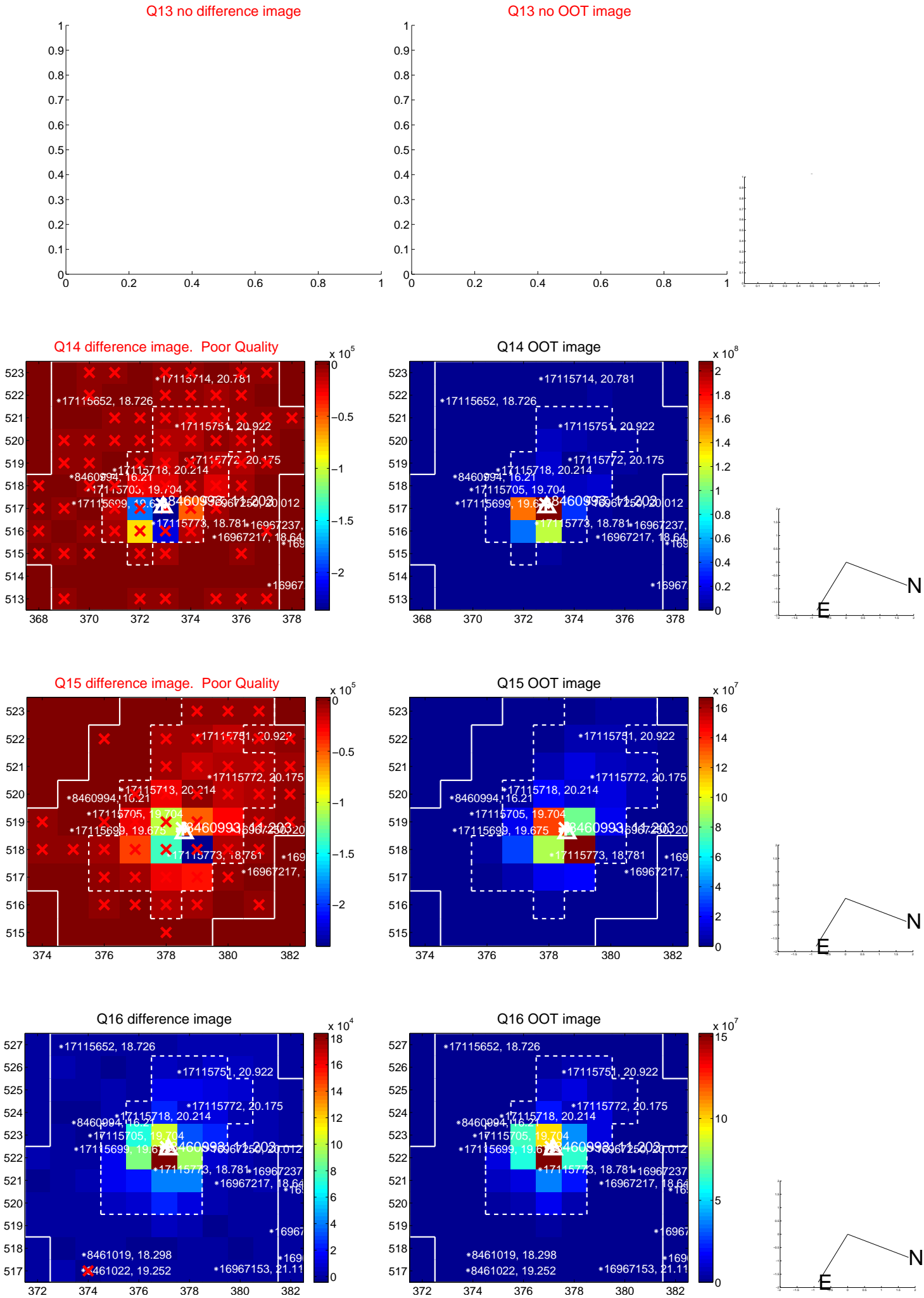


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

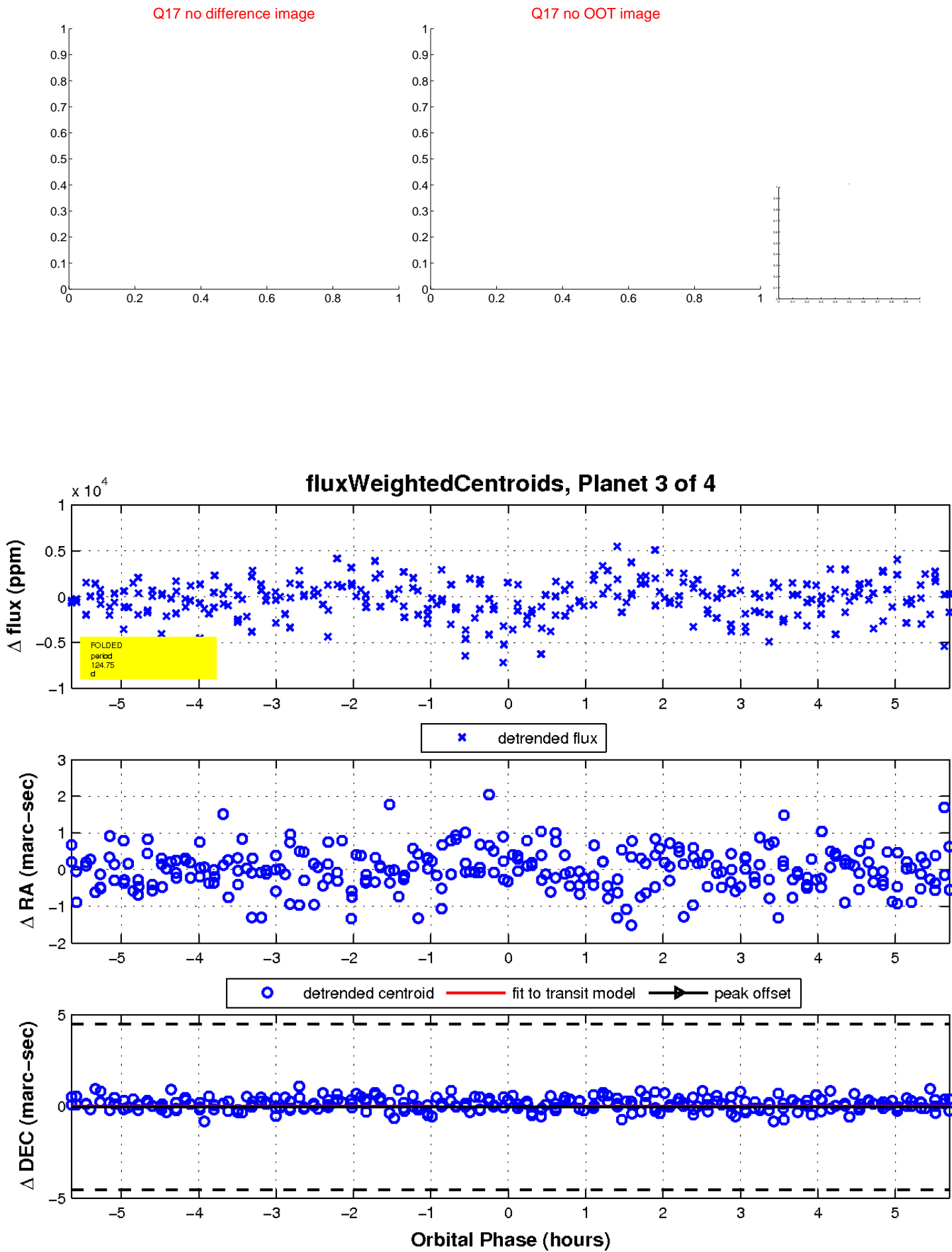




white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



UKIRT Image

