

# KIC 003970621

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
003970621-01	OBS	No	1.548029	132.403814	23.4	1.525	8.8	3.8	5.01	6645	2.83	41300.78
003970621-02	OBS	No	1.546762	131.860599	5.8	0.788	9.1	0.7	5.01	6645	1.64	41345.92
003970621-03	OBS	No	1.548315	131.791500	0.0	5.734	9.1	0.0	5.01	6645	0.07	41290.61

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
003970621-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_SKYE_ZUMA_TRACKER—SWEET_NTL—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT
003970621-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV
003970621-03	OBS	FP	0.00	1	0	0	0	SWEET_NTL—LPP_DV—LPP_ALT—SAME_NTL_PERIOD

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

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

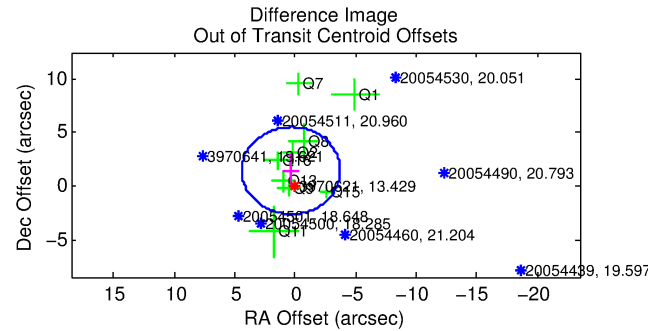
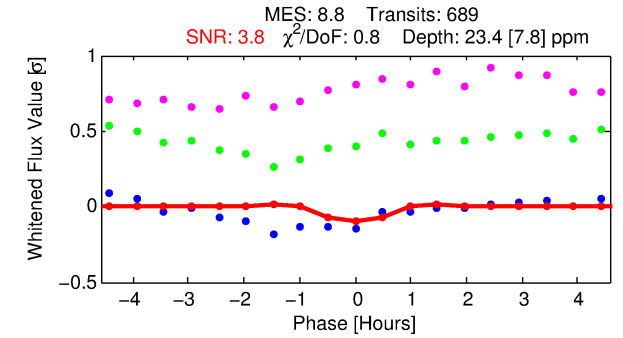
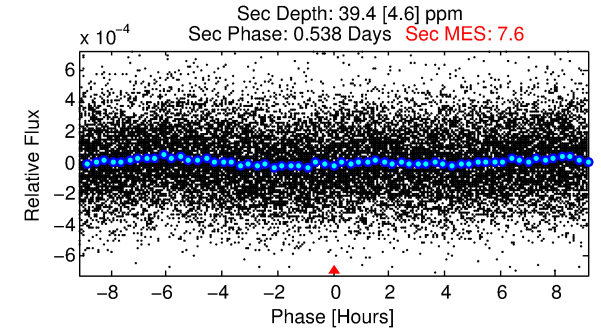
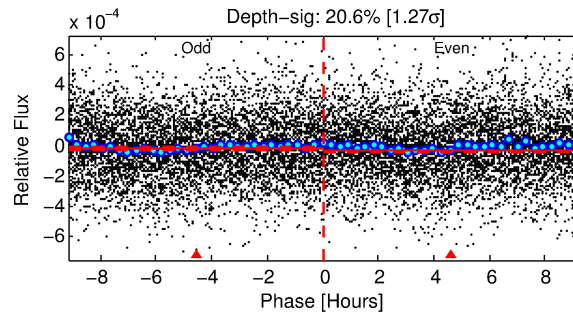
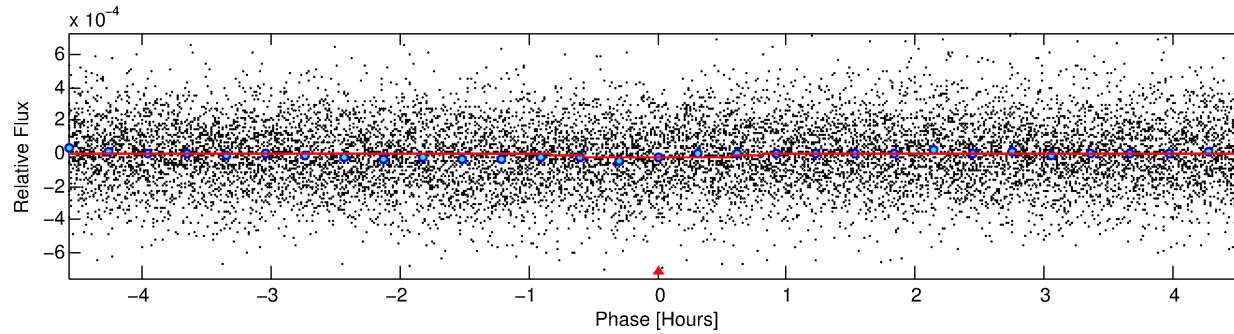
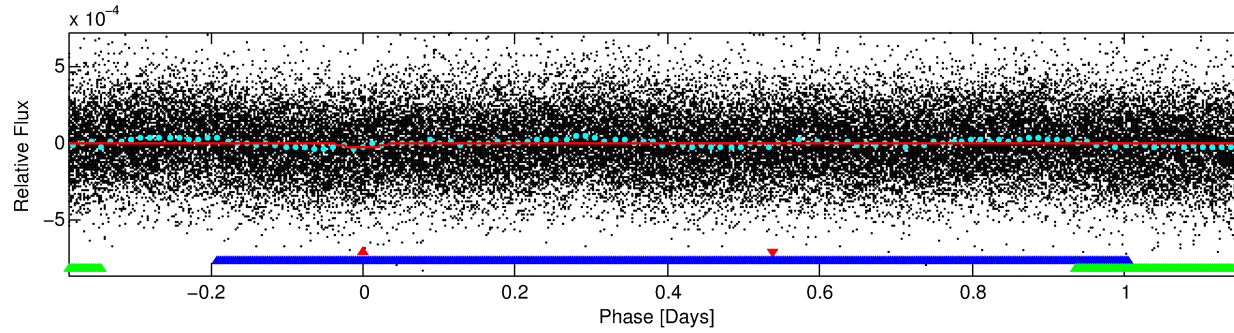
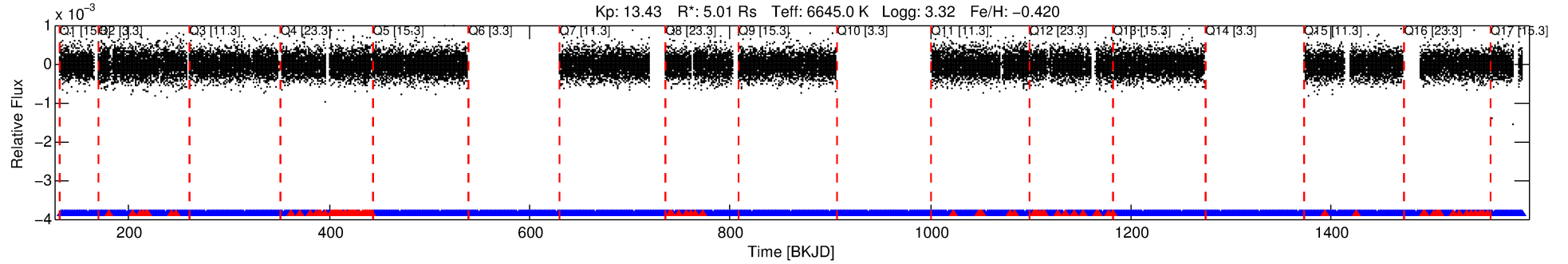
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 003970621-01

No Significant Match Found

# DV One-Page Summary

KIC: 3970621 Candidate: 1 of 3 Period: 1.548 d



## DV Fit Results:

Period = 1.54803 [0.00003] d  
Epoch = 132.4038 [0.0054] BKJD  
Rp/R\* = 0.0052 [0.0025]  
a/R\* = 3.60 [8.92]  
b = 0.90 [0.58]  
Seff = 41300.78 [32004.20]  
Teq = 3635 [704] K  
Rp = 2.83 [1.93] Re  
a = 0.0326 [0.0155] AU  
Ag = 2.88 [3.52] [0.53 $\sigma$ ]  
Teffp = 7320 [1765] K [1.94 $\sigma$ ]

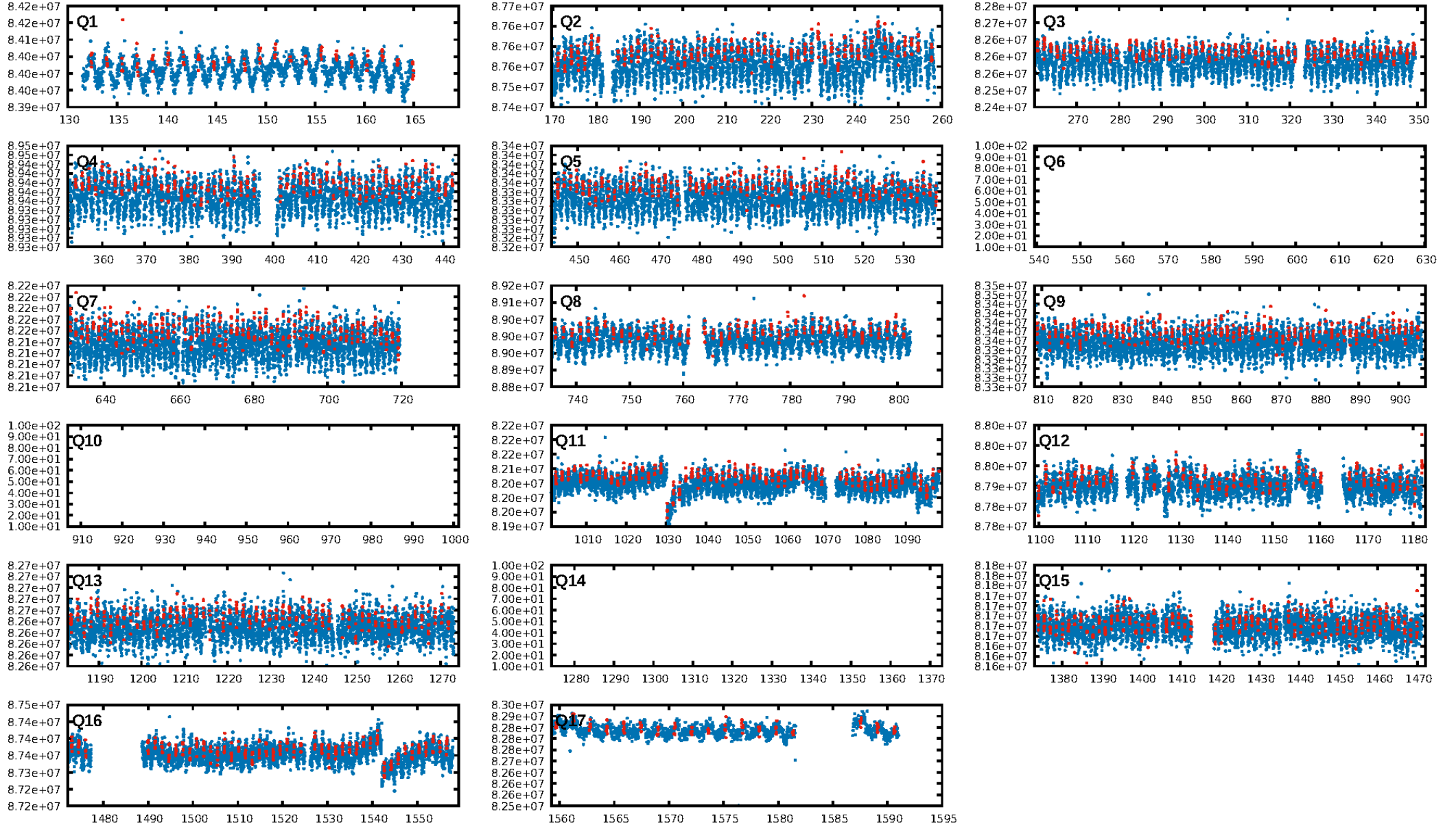
## DV Diagnostic Results:

ShortPeriod-sig: 1.4% [0.02 $\sigma$ ]  
LongPeriod-sig: 0.1% [0.00 $\sigma$ ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 1.59e-14  
RollingBand-fgt: 0.87 [567/649]  
GhostDiagnostic-chr: -0.7578  
Centroid-sig: 1.3%  
Centroid-so: 4.327 arcsec [1.76 $\sigma$ ]  
OotOffset-rm: 1.481 arcsec [1.09 $\sigma$ ]  
OotOffset-st: 1/3/2/3 [9]  
KicOffset-rm: 1.519 arcsec [1.27 $\sigma$ ]  
KicOffset-st: 1/3/2/3 [9]  
DiffImageQuality-fgm: 0.11 [1/9]  
DiffImageOverlap-fno: 0.64 [9/14]

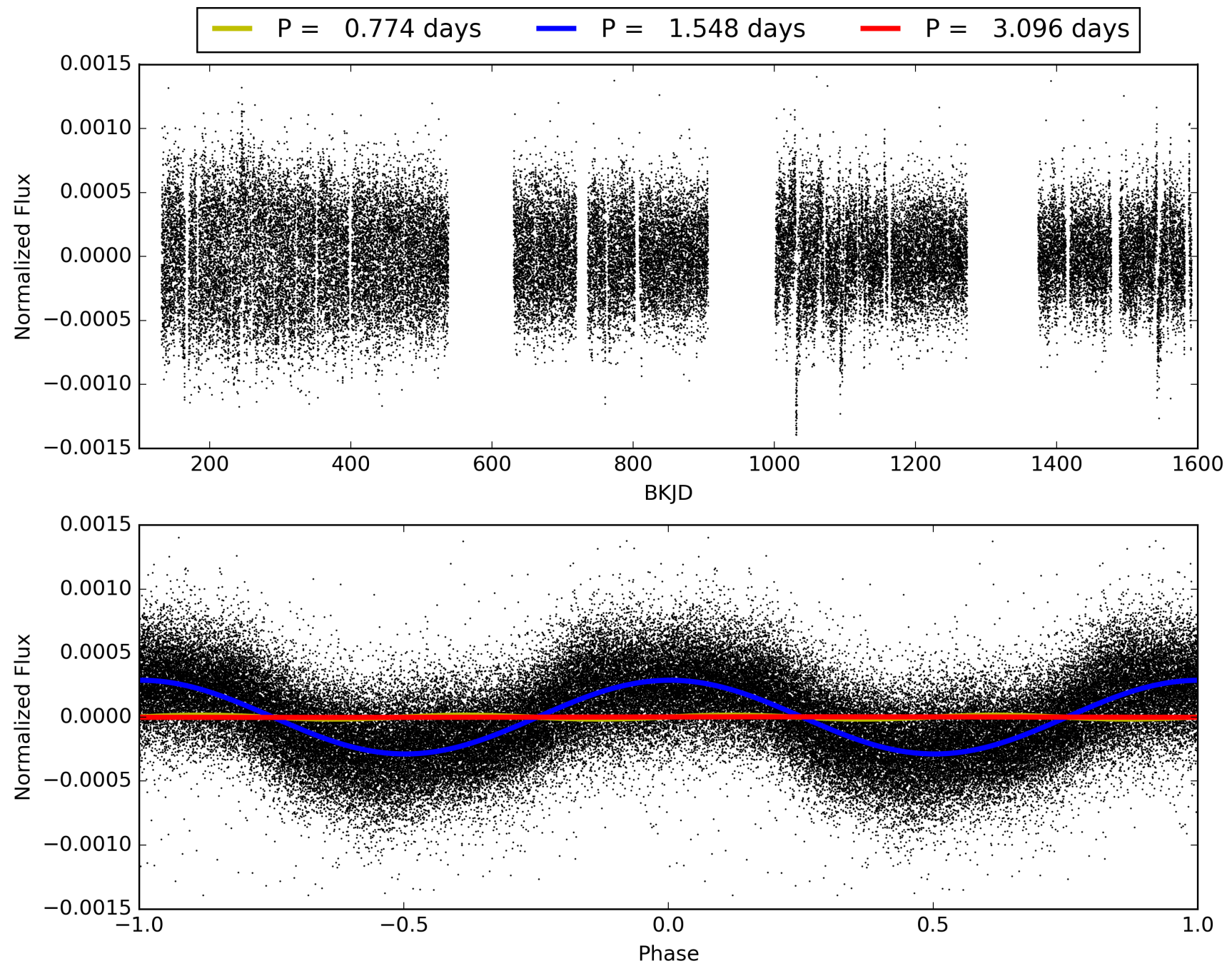
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 10:59:25 Z

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

# TCE 003970621-01, PDC Light Curves



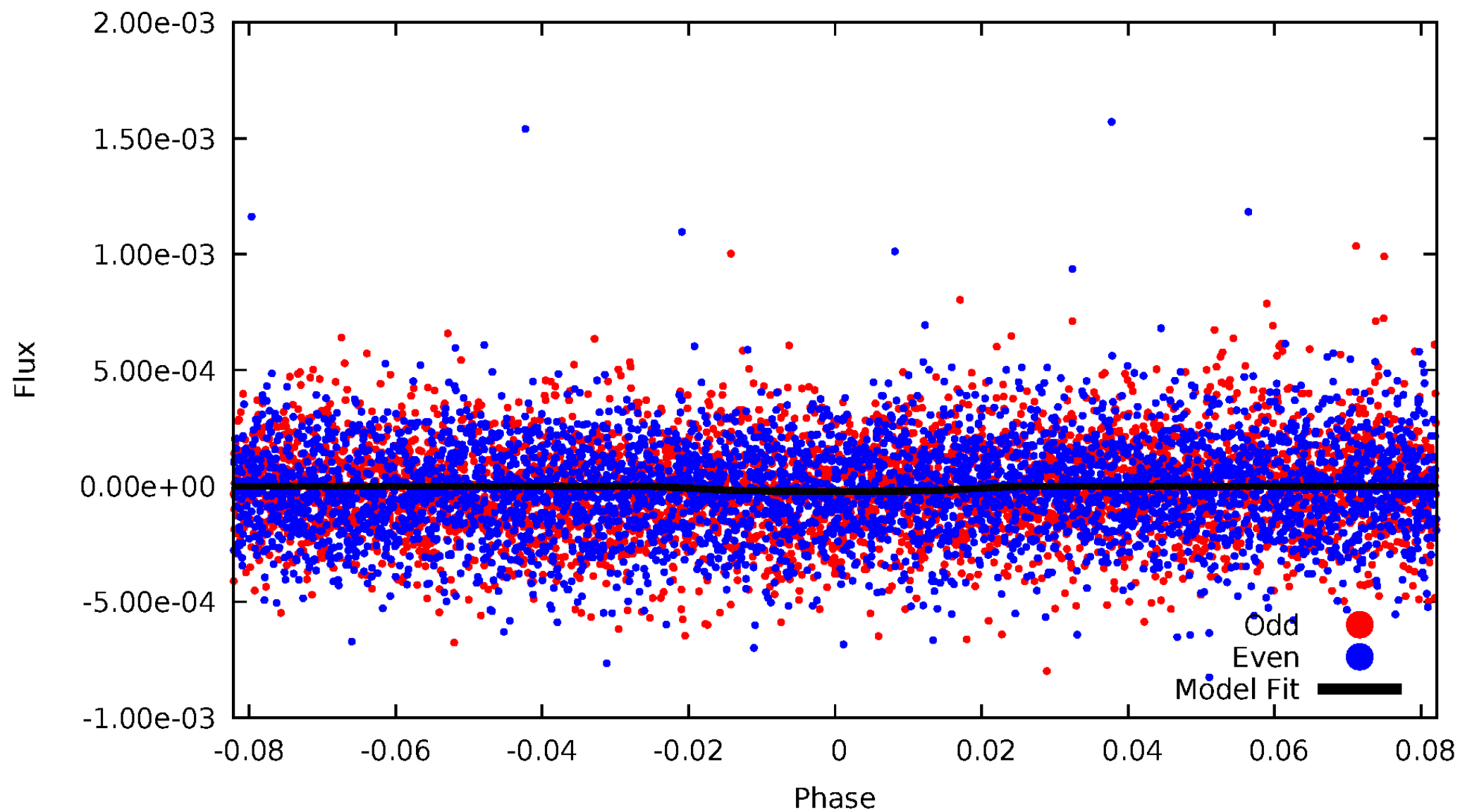
TCE 003970621-01





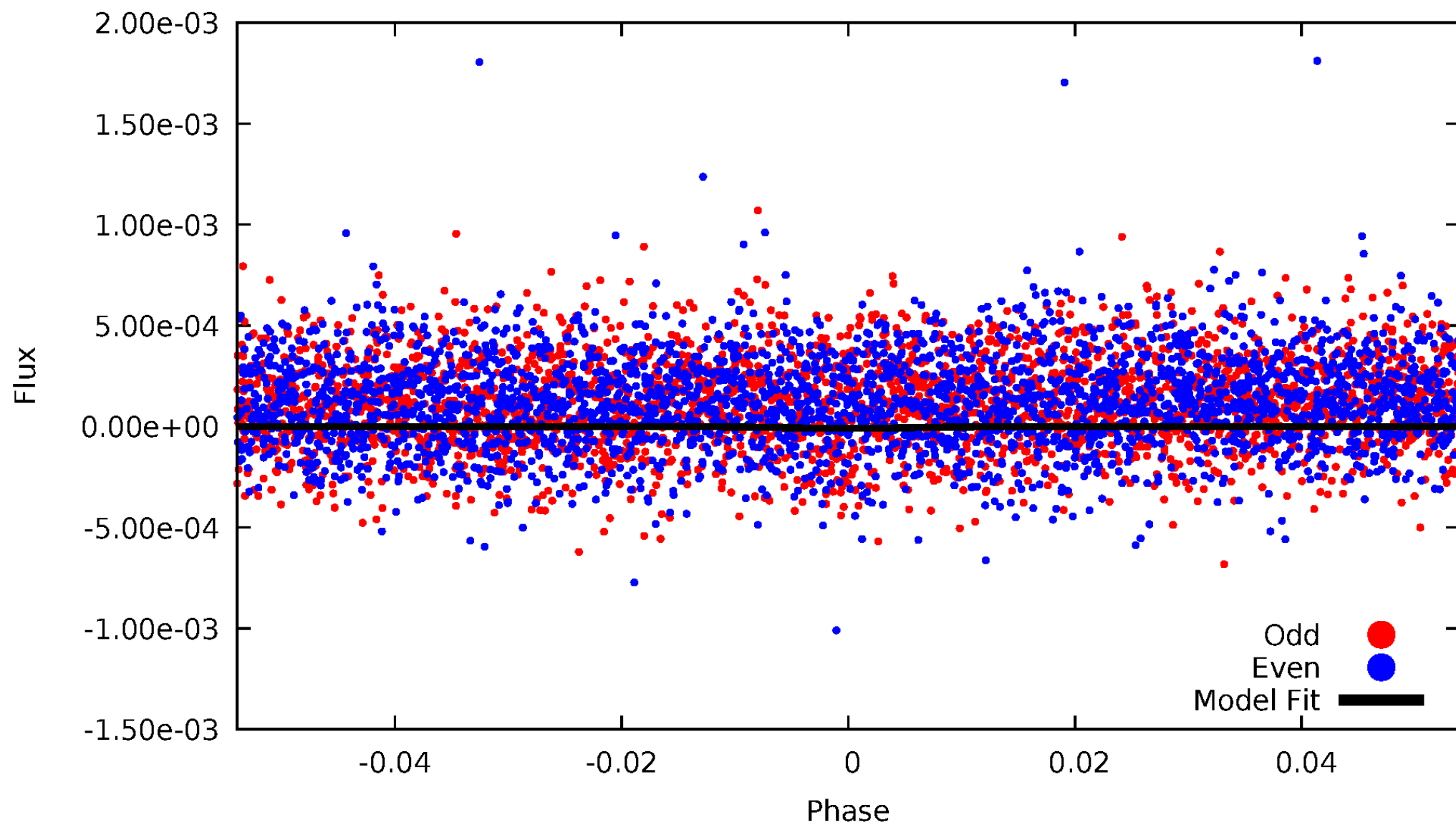
# DV Odd/Even

TCE 003970621-01

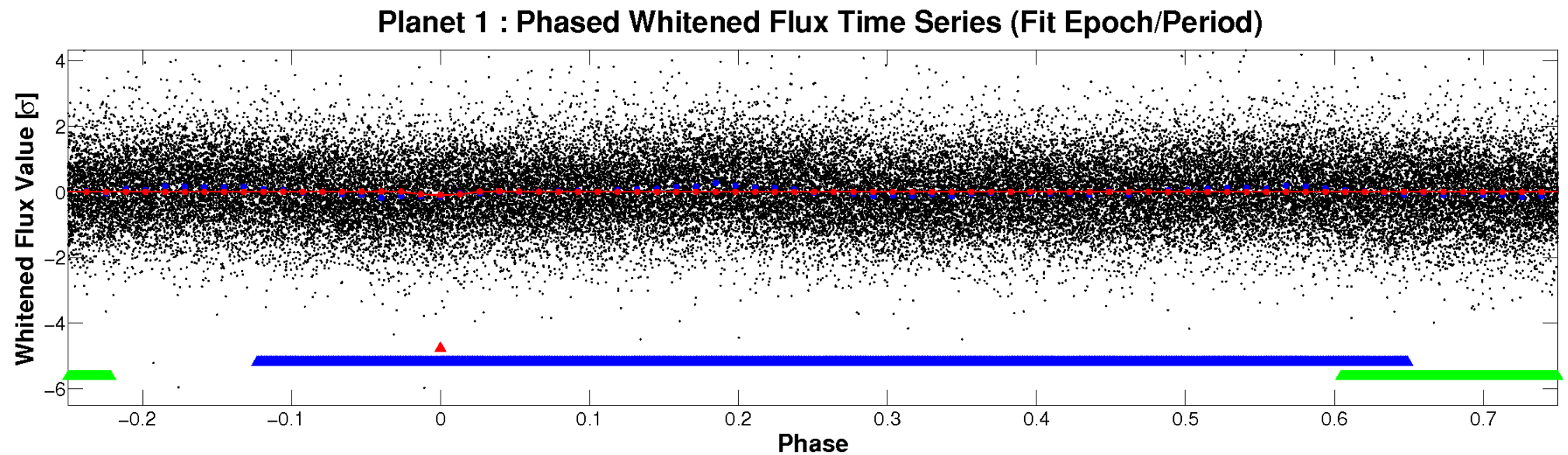
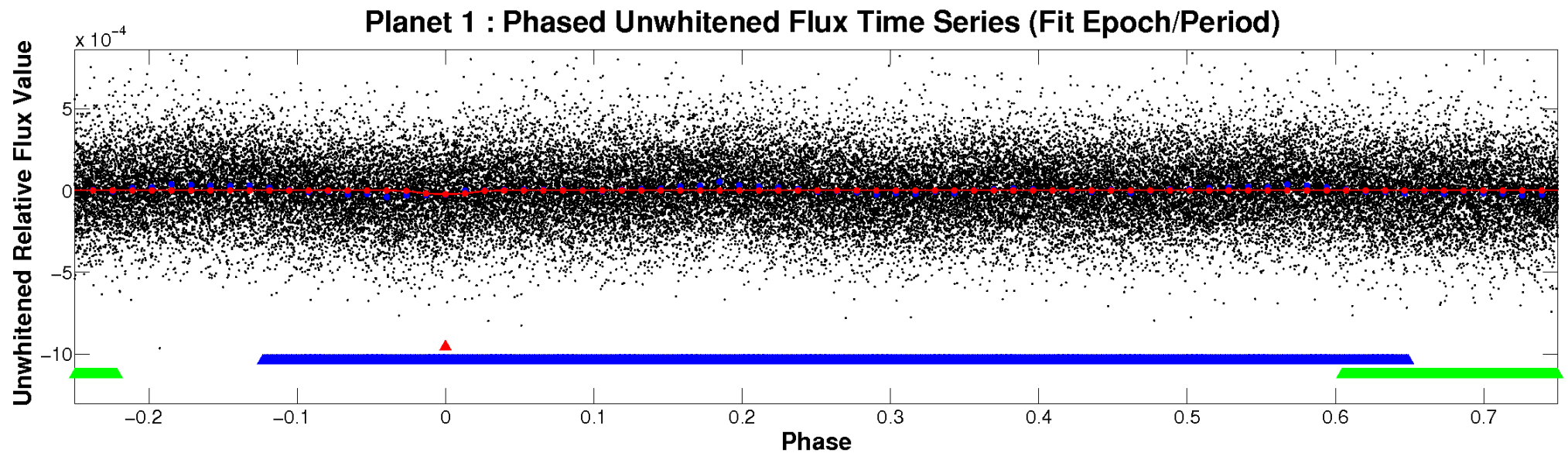


# ALT Odd/Even

TCE 003970621-01

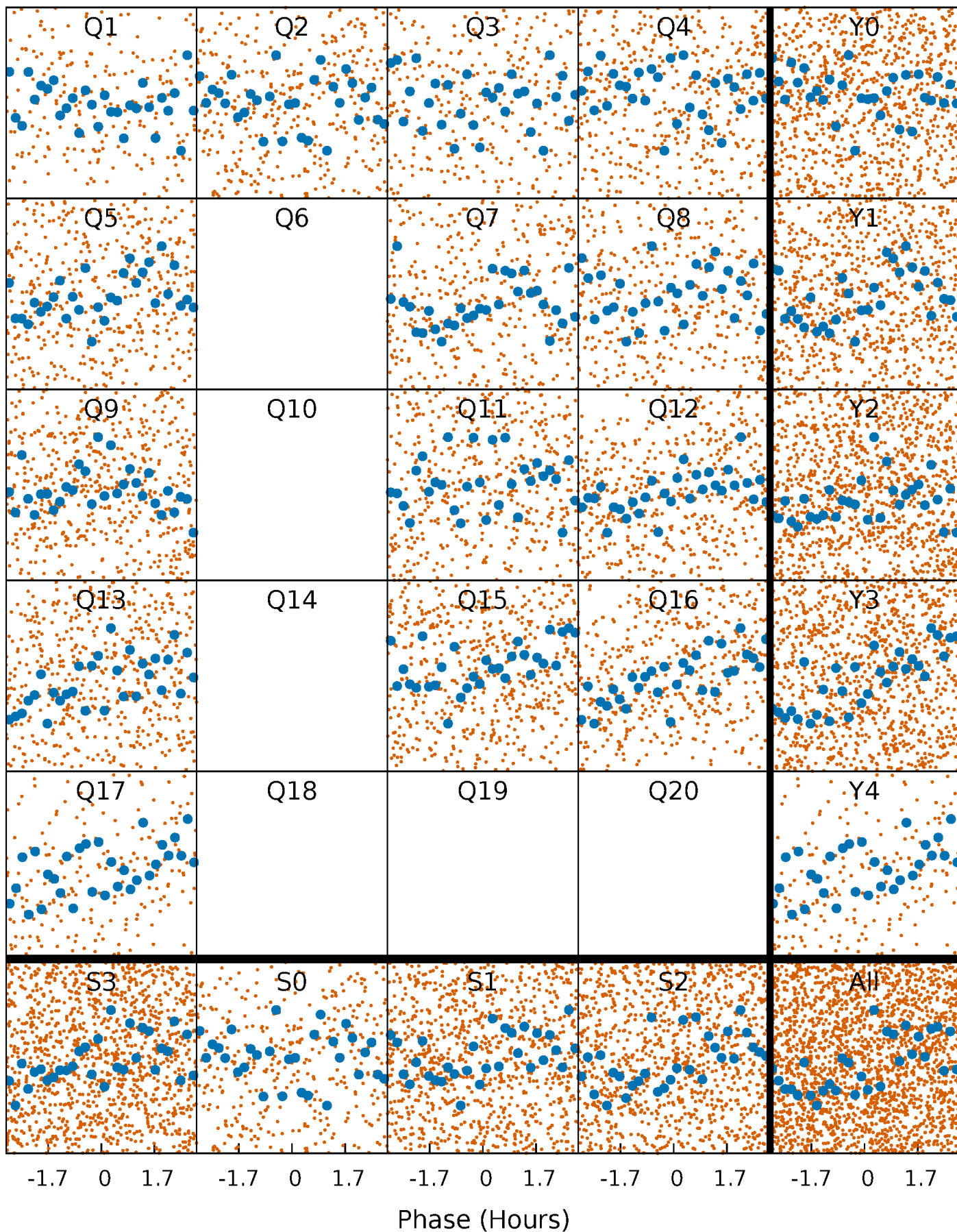


# Non-Whitened Vs. Whitened Light Curve



# PDC Quarter-Phased Transit Curves

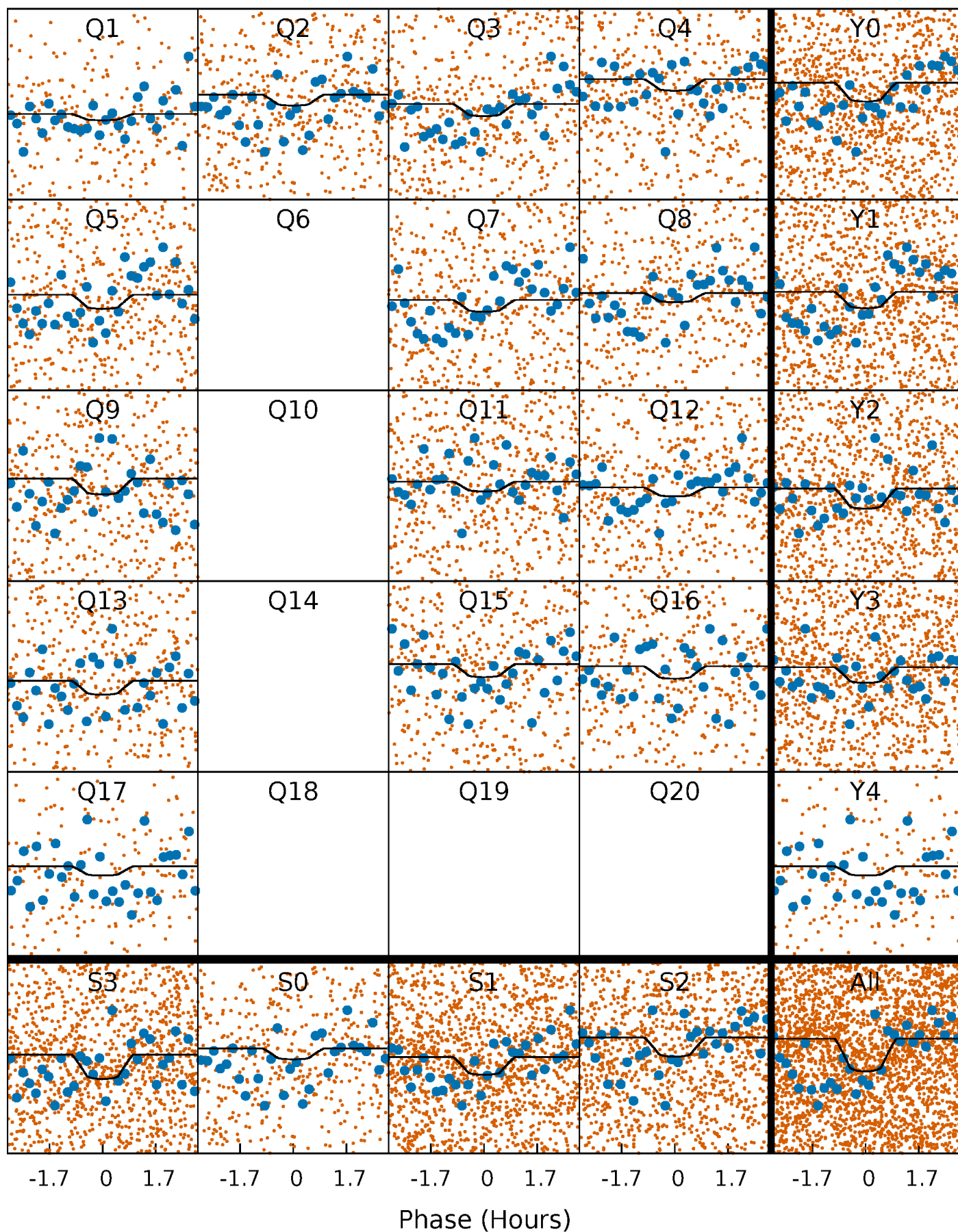
TCE 003970621-01 P= 1.548029 Days  $T_0=132.403814$  (BKJD)





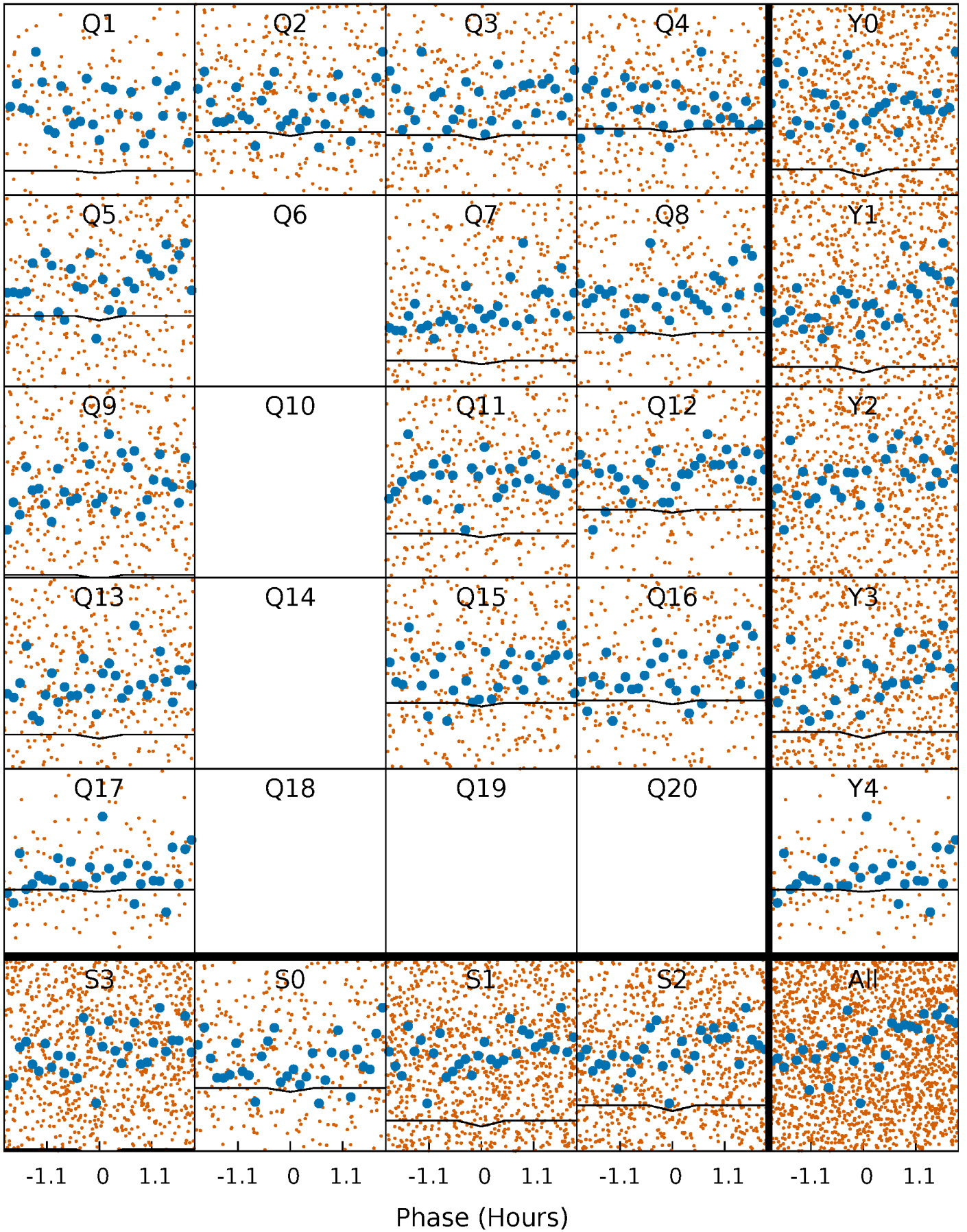
# DV Quarter-Phased Transit Curves

TCE 003970621-01 P= 1.548029 Days  $T_0=132.403814$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

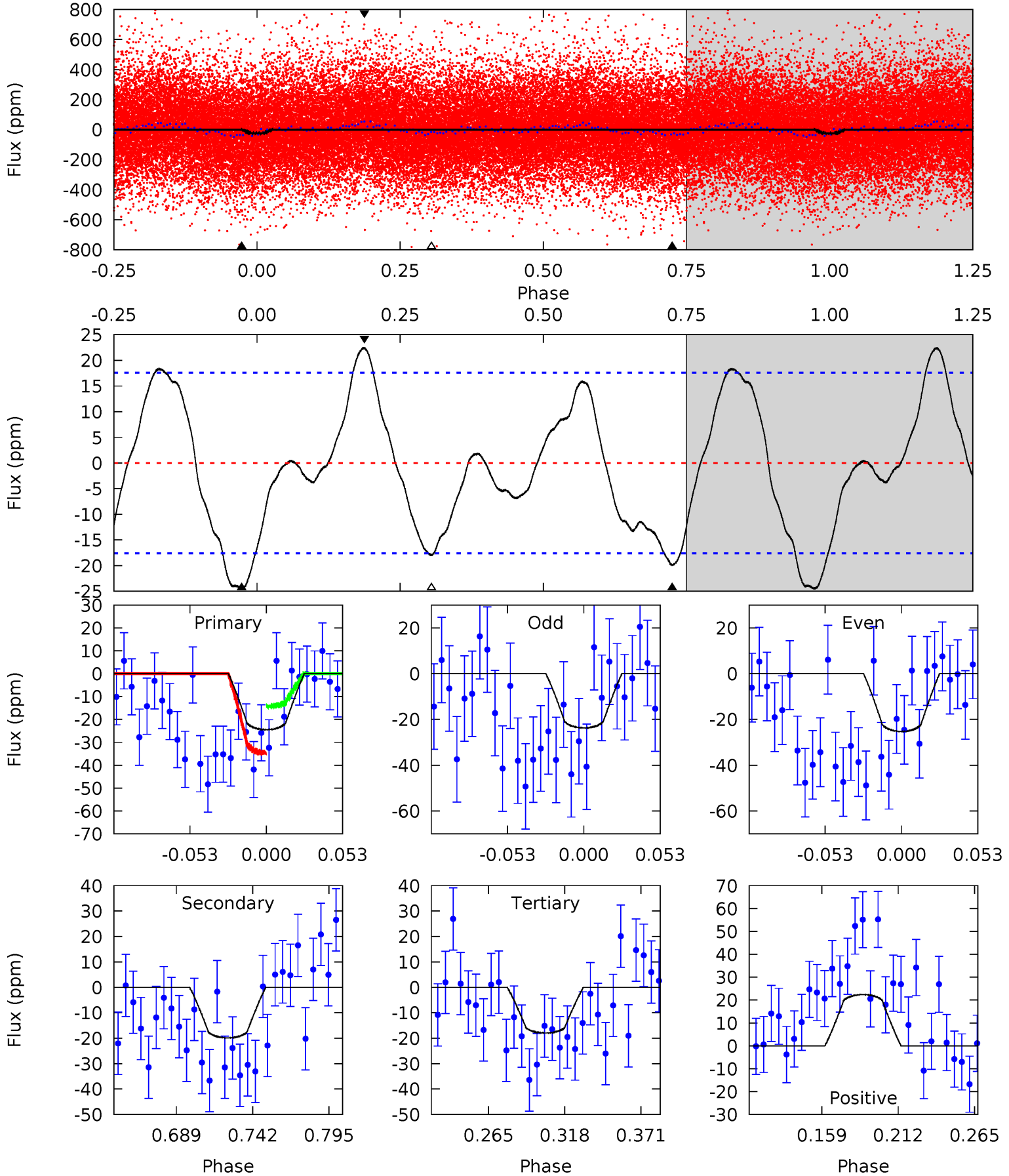
TCE 003970621-01   P= 1.548013 Days    $T_0=132.398269$  (BKJD)



# DV Model-Shift Uniqueness Test

003970621-01, P = 1.548029 Days, E = 130.855785 Days

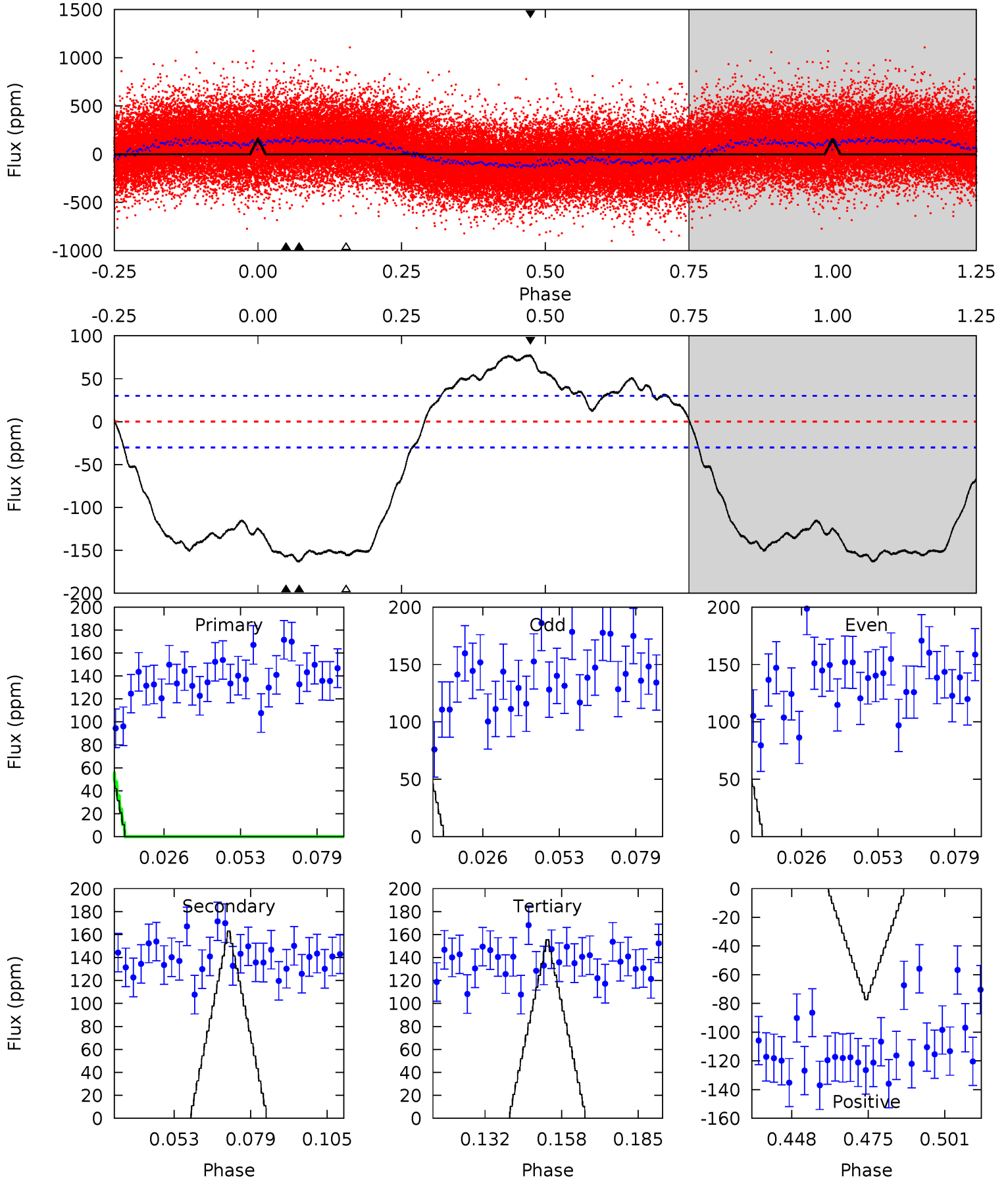
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
6.53	5.30	4.79	5.97	4.70	1.93	2.70	1.74	0.56	0.51	-0.67	0.21	0.91	0.48	2.74



# Alt Model-Shift Uniqueness Test

003970621-01, P = 1.548013 Days, E = 130.850256 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
25.3	26.2	25.0	12.5	4.84	2.22	13.6	0.25	12.8	1.18	13.8	1.23	1.04	0.32	3.61





### Stellar Parameters For KIC 003970621

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6645^{+180}_{-220}$	$3.323^{+0.450}_{-0.050}$	$-0.420^{+0.400}_{-0.300}$	$5.014^{+0.272}_{-2.446}$	$1.932^{+0.137}_{-0.549}$	$0.022^{+0.095}_{-0.004}$
	+3%/-3%	+14%/-2%	+95%/-71%	+5%/-49%	+7%/-28%	+442%/-17%
Source	PHO1	FLK73	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 003970621-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-20 \pm 4$	$2.49^{+1.51}_{-1.24}$	$4935^{+262}_{-522}$	$5872^{+2856}_{-1301}$	$1.848^{+5.448}_{-1.127}$
Alt.	$-163 \pm 6$	$1.69^{+1.25}_{-1.02}$	$4912^{+280}_{-590}$	$17416^{+42503}_{-6573}$	$33^{+176}_{-22}$

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

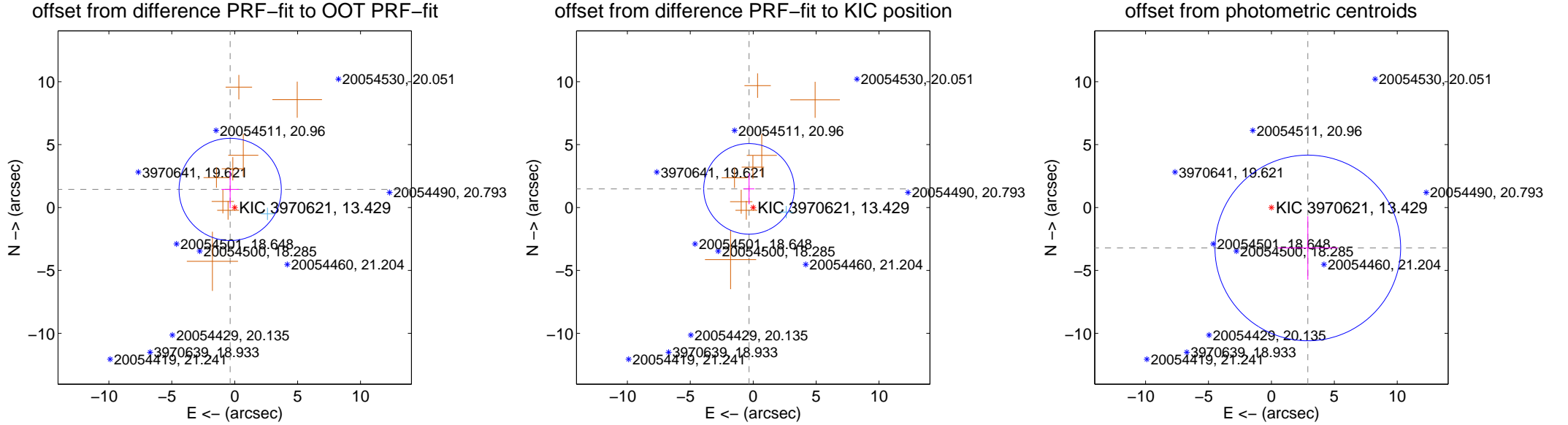
## DV Centroid Data

Supplemental centroid analysis for 003970621-01. Kepler magnitude: 13.43. Transit SNR 3.83

There are 1 quarters with good PRF difference image offsets

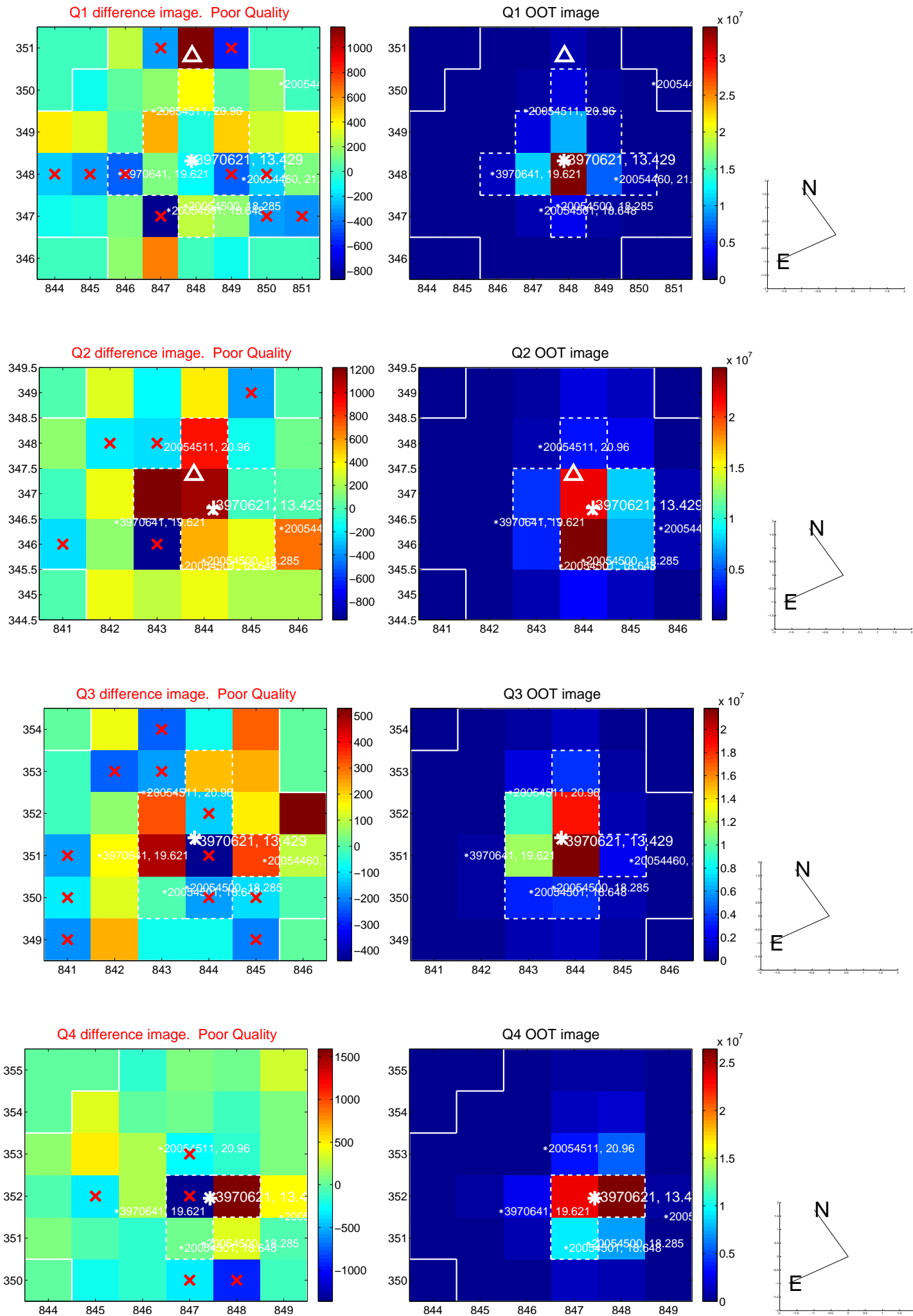
The direct PRF centroid is offset from the target star catalog position by about 0.04 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.481 \pm 1.355$	1.09	$0.361 \pm 0.690$	$1.437 \pm 1.497$
PRF-fit source offset from KIC position	$1.519 \pm 1.200$	1.27	$0.332 \pm 0.431$	$1.482 \pm 1.226$
photometric centroid source offset	$4.33 \pm 2.46$	1.76	$-2.89 \pm 2.38$	$-3.22 \pm 2.52$

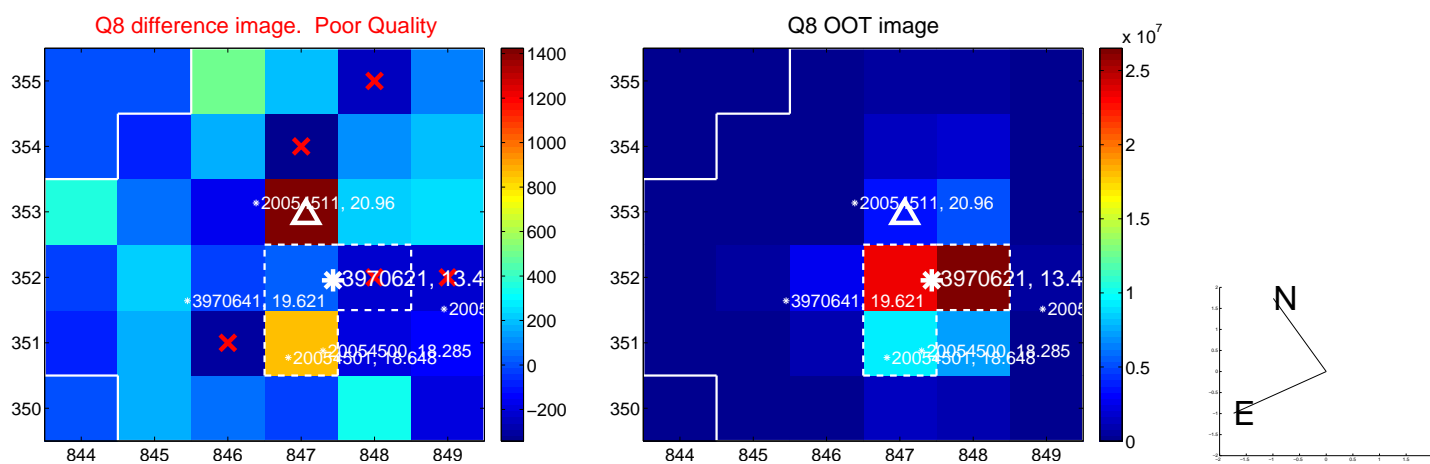
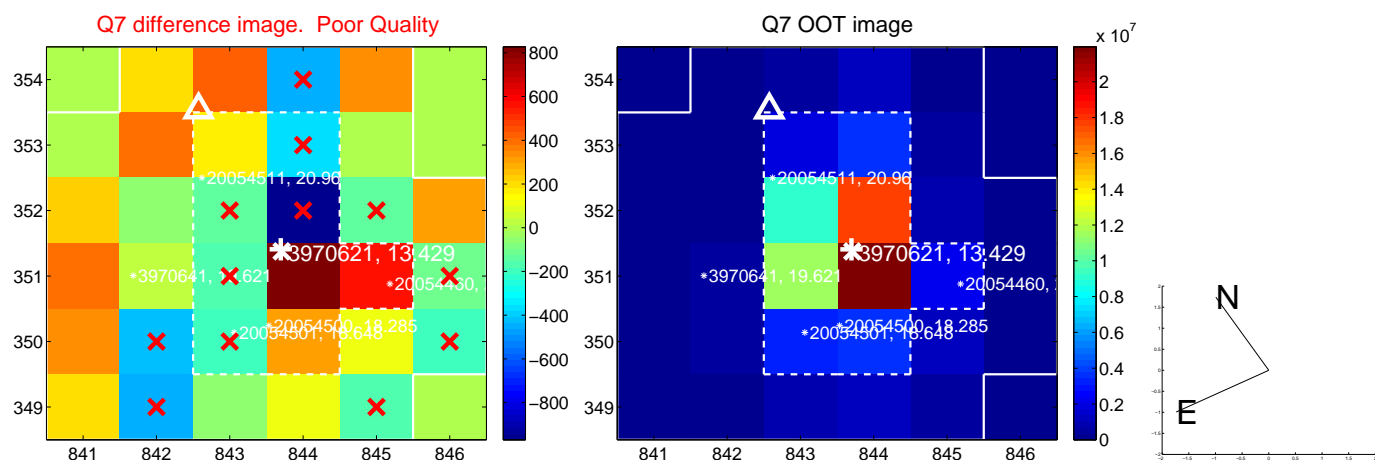
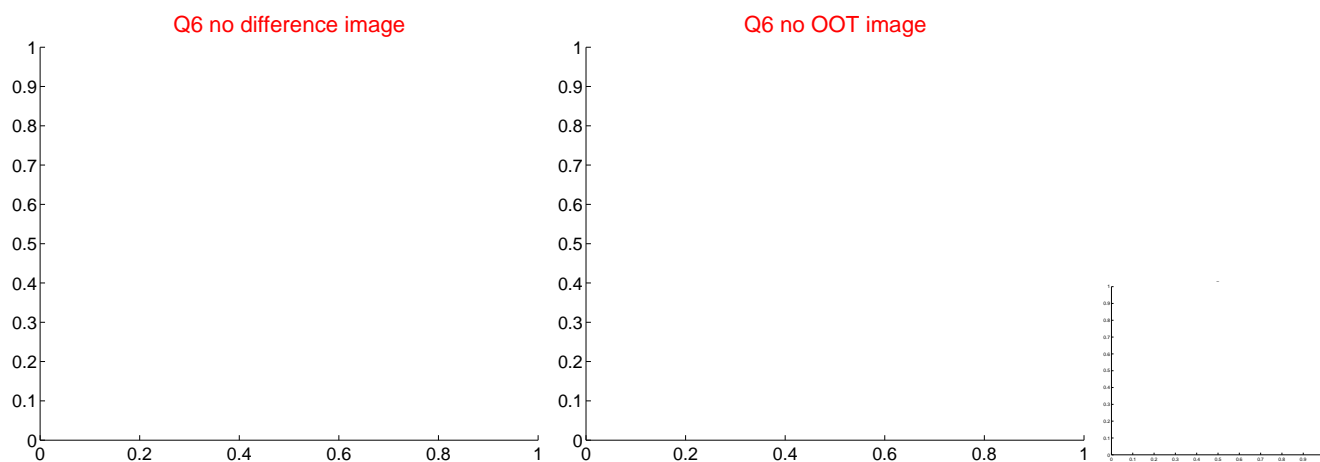
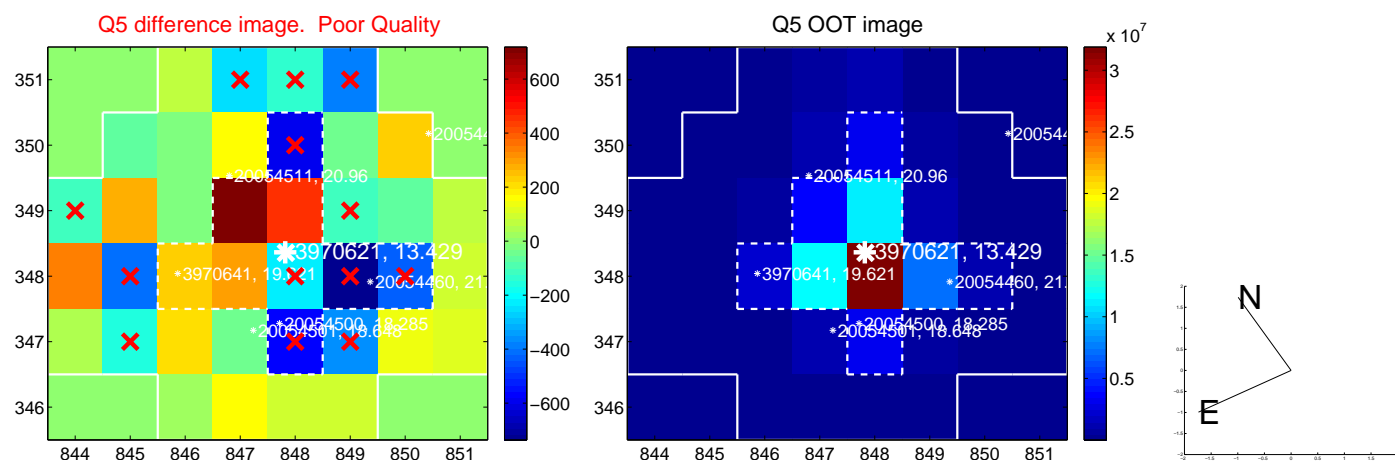


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

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

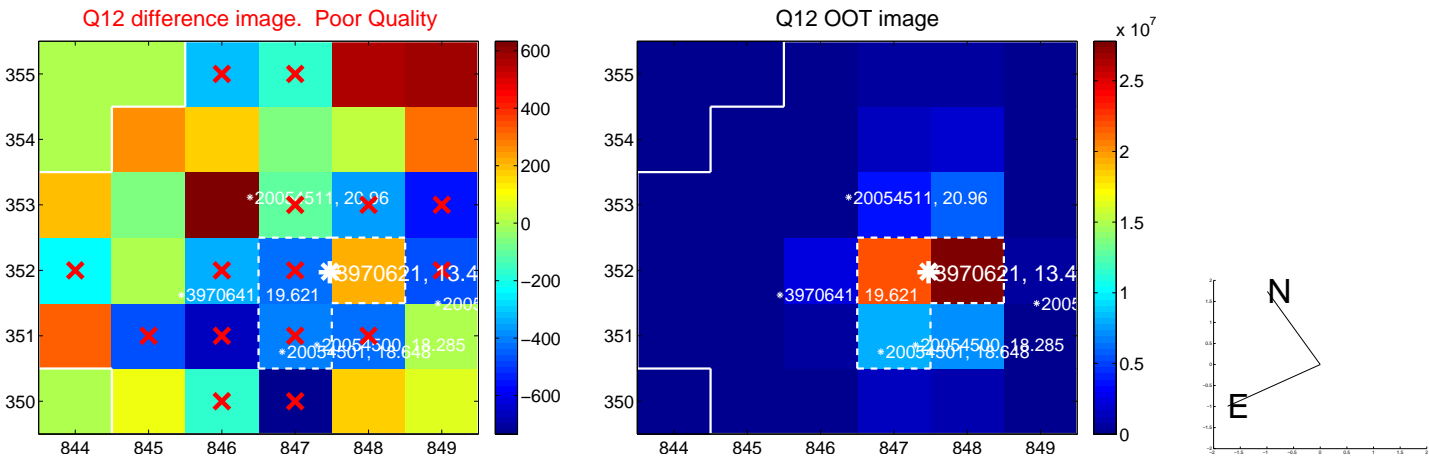
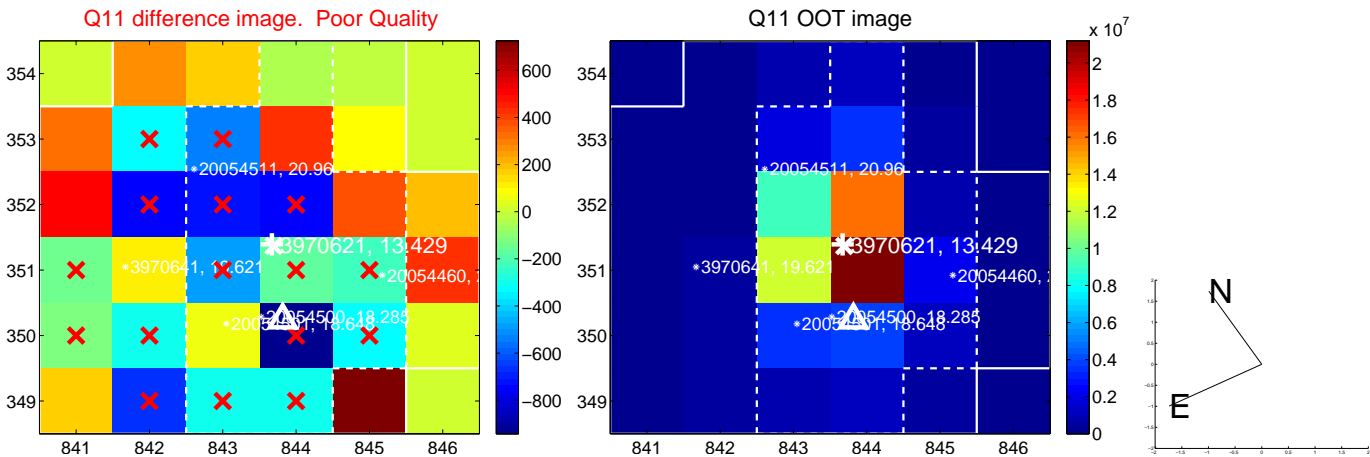
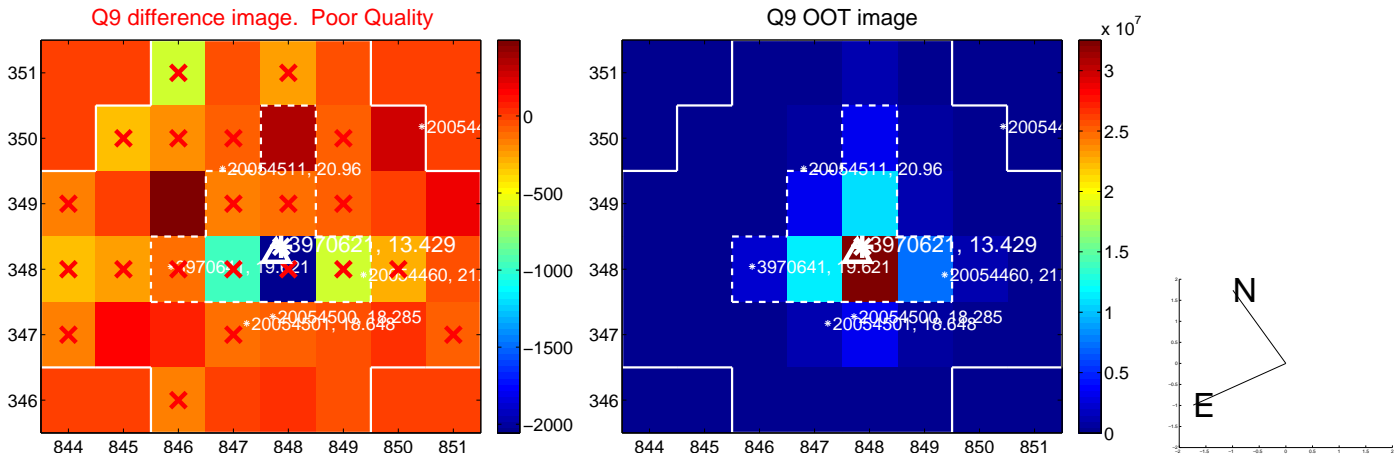


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

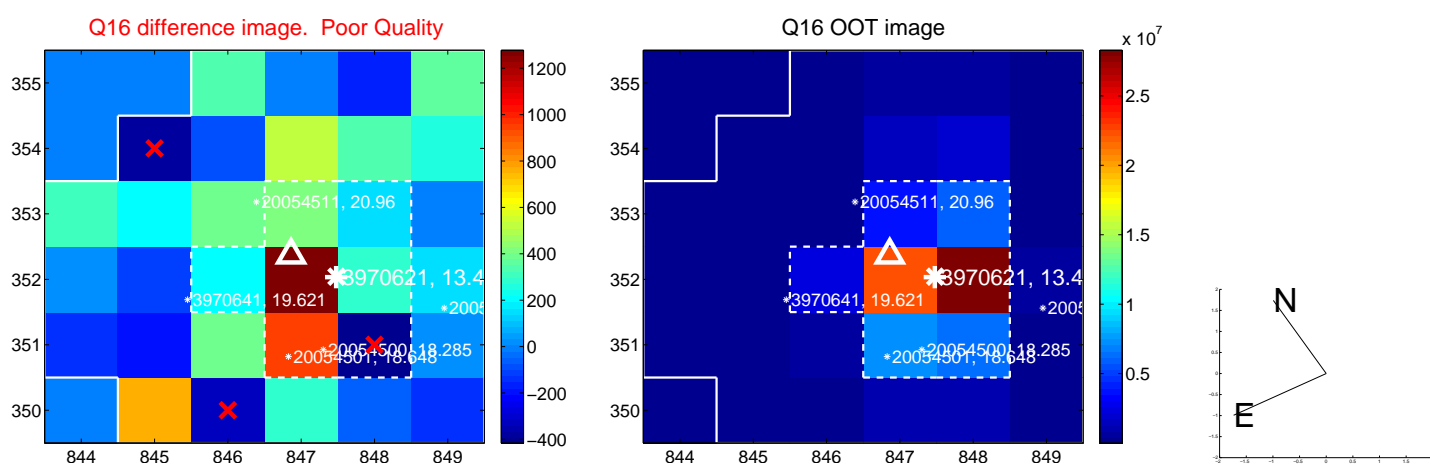
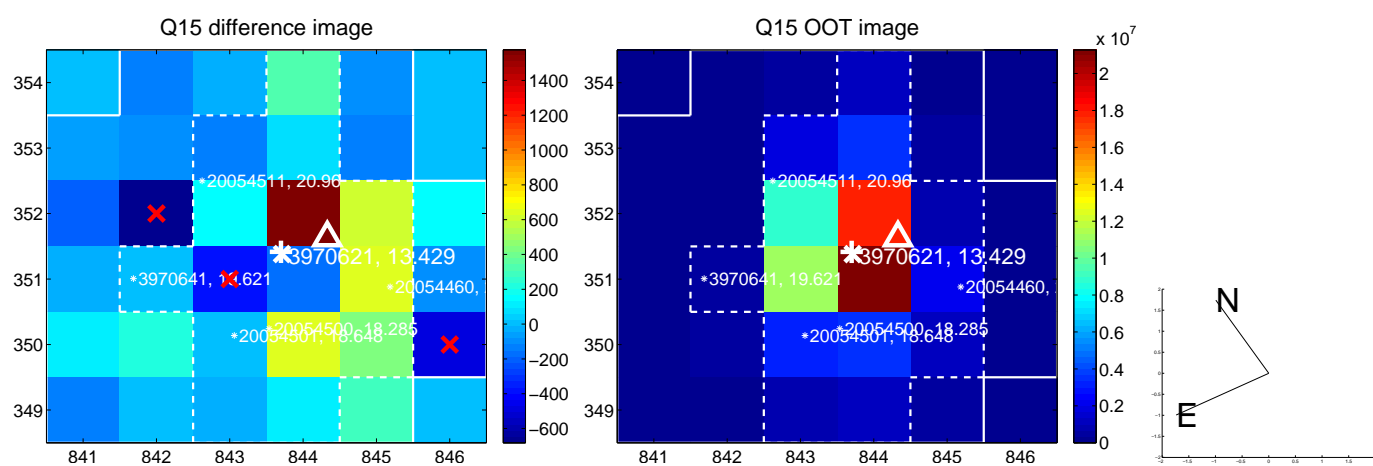
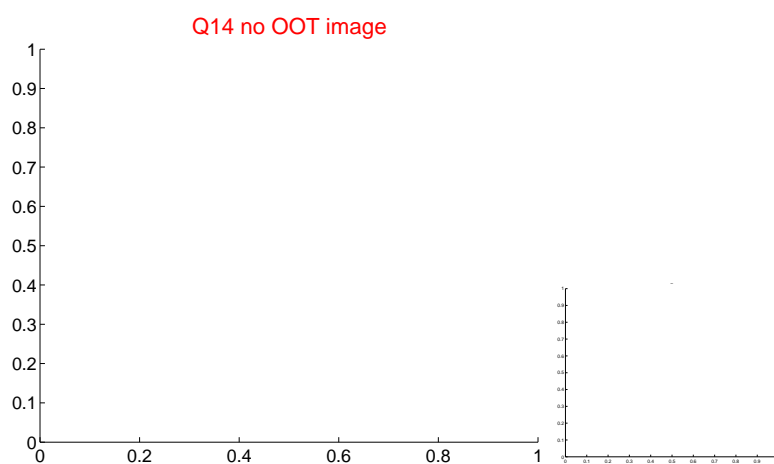
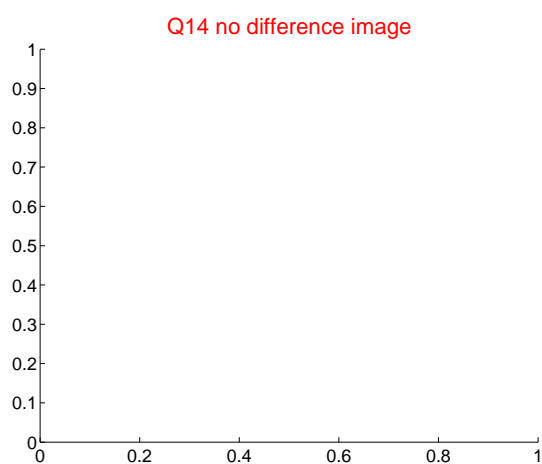
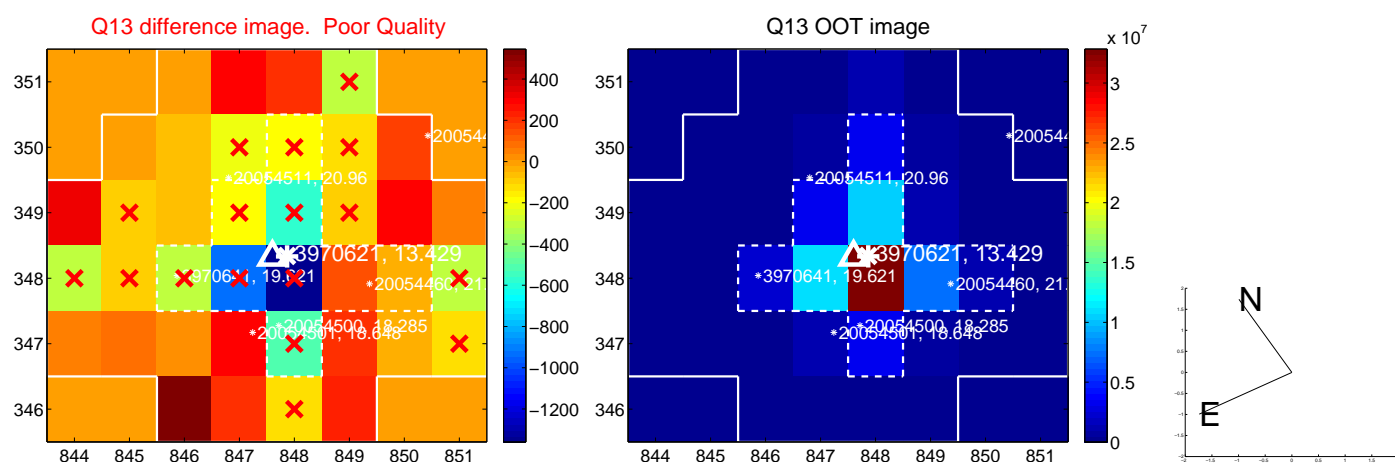




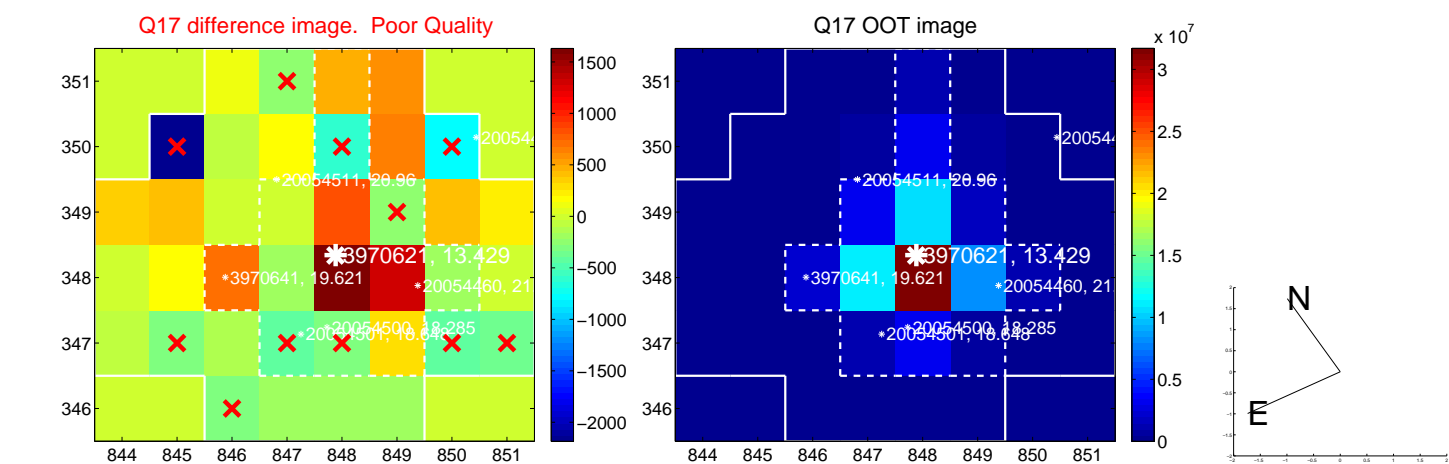
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



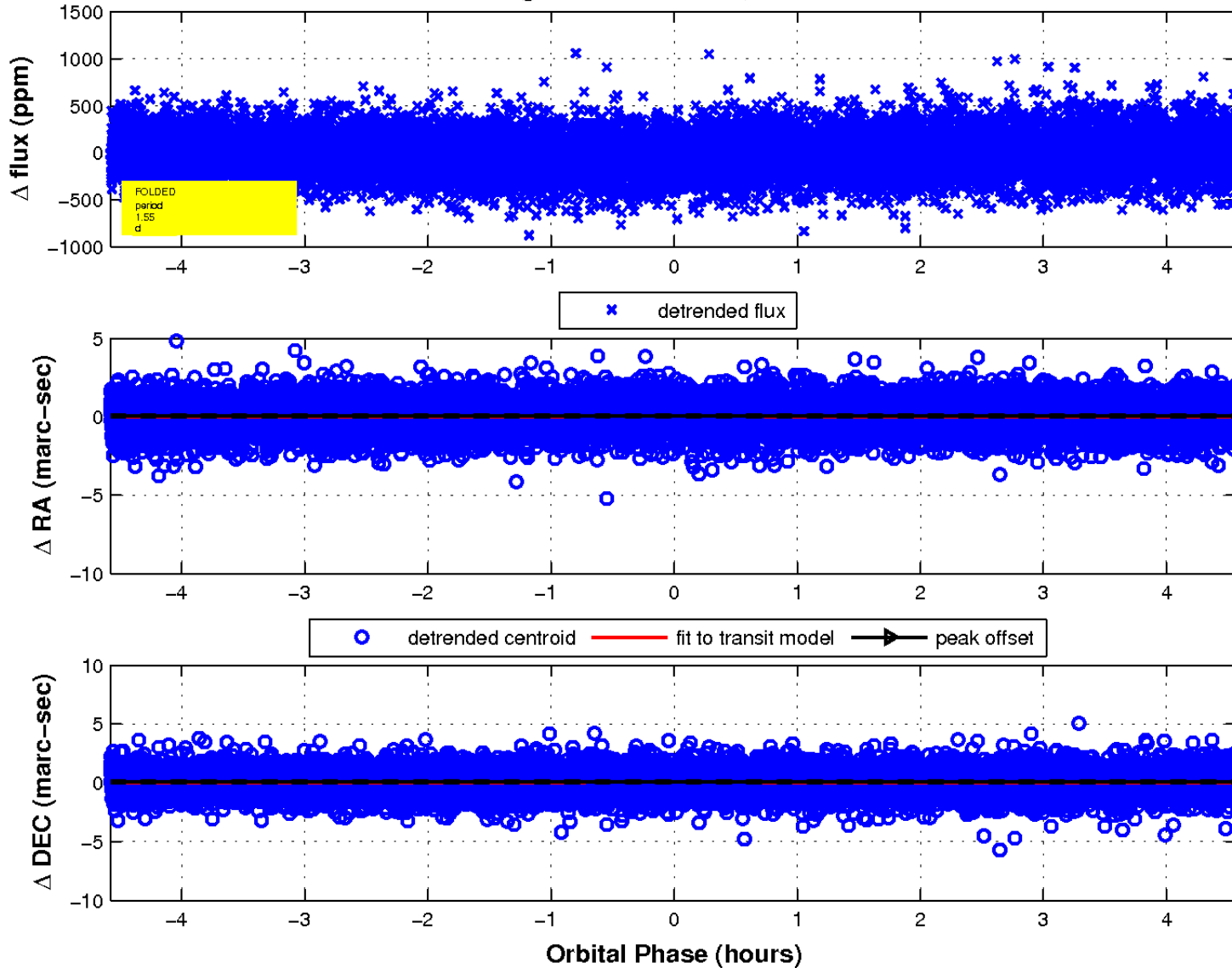
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

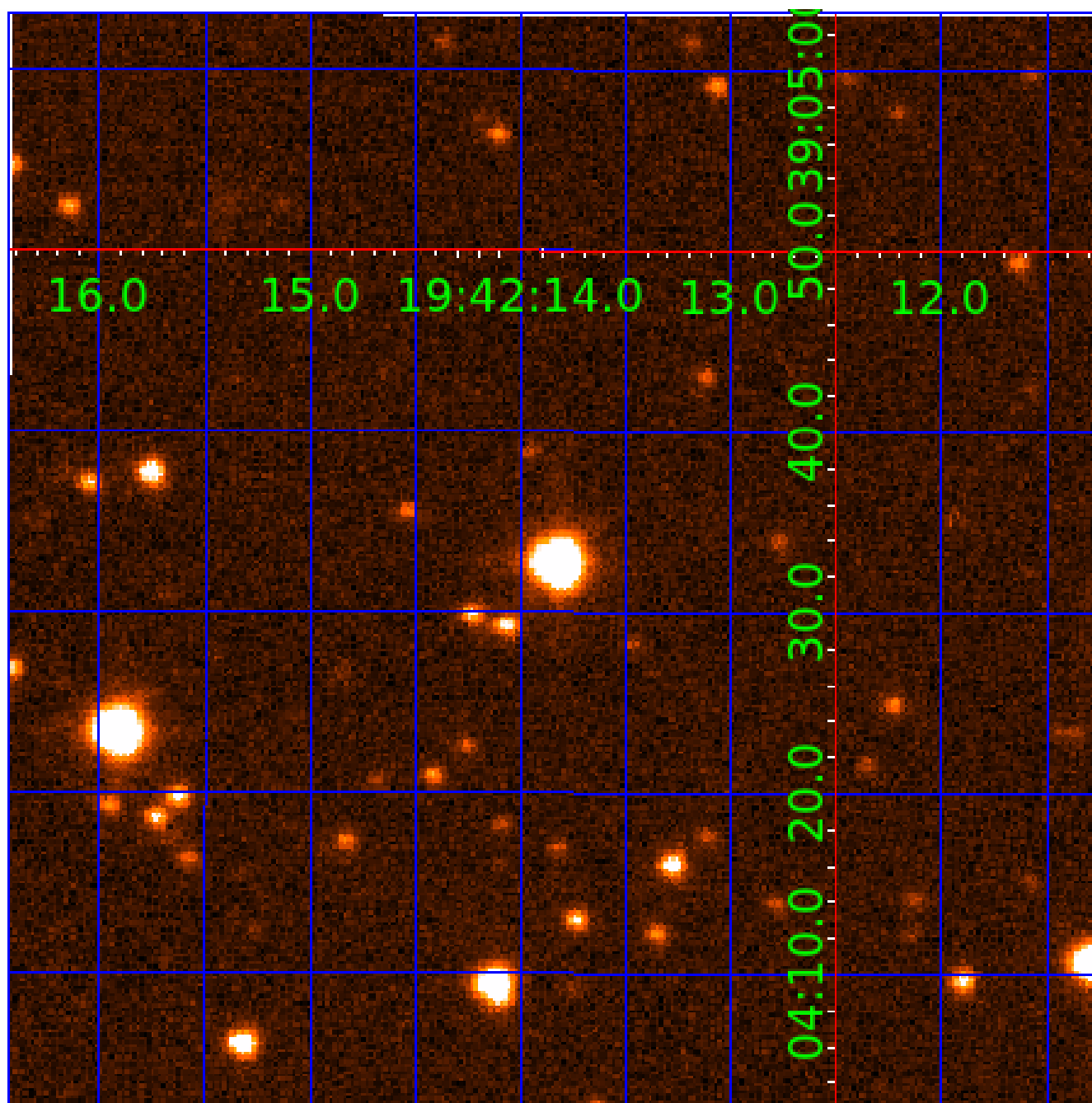


fluxWeightedCentroids, Planet 1 of 3



UKIRT Image

Declination





# KIC 003970621

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
003970621-01	OBS	No	1.548029	132.403814	23.4	1.525	8.8	3.8	5.01	6645	2.83	41300.78
003970621-02	OBS	No	1.546762	131.860599	5.8	0.788	9.1	0.7	5.01	6645	1.64	41345.92
003970621-03	OBS	No	1.548315	131.791500	0.0	5.734	9.1	0.0	5.01	6645	0.07	41290.61

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
003970621-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_SKYE_ZUMA_TRACKER—SWEET_NTL—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT
003970621-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV
003970621-03	OBS	FP	0.00	1	0	0	0	SWEET_NTL—LPP_DV—LPP_ALT—SAME_NTL_PERIOD

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

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

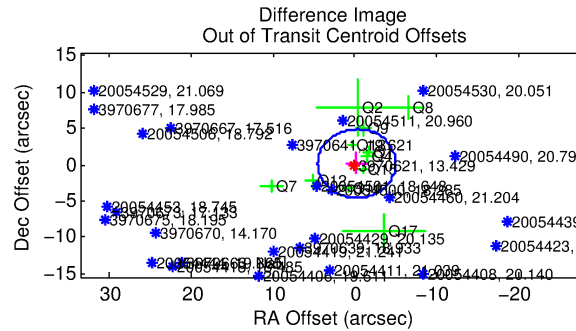
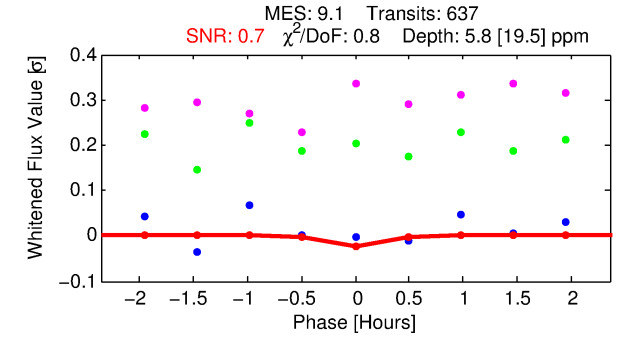
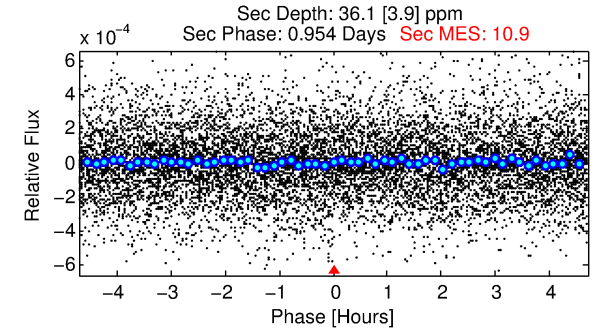
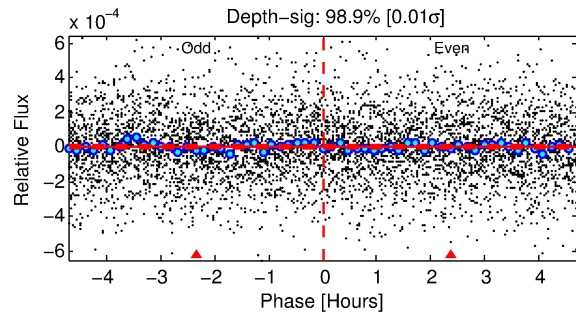
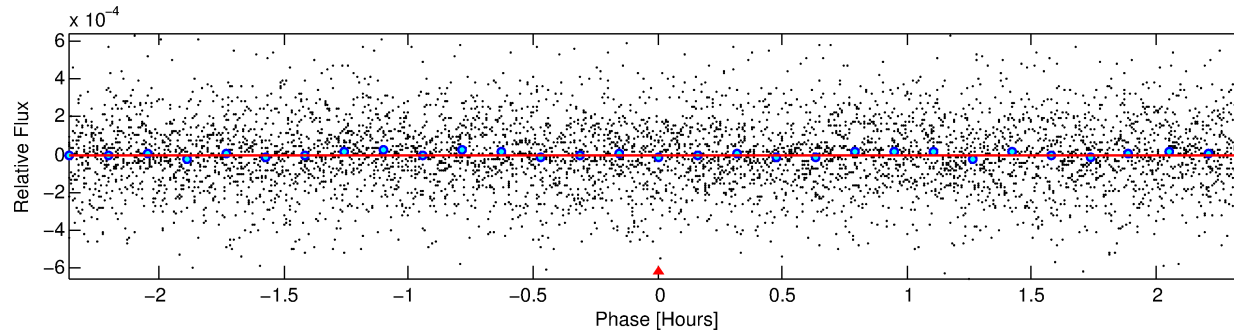
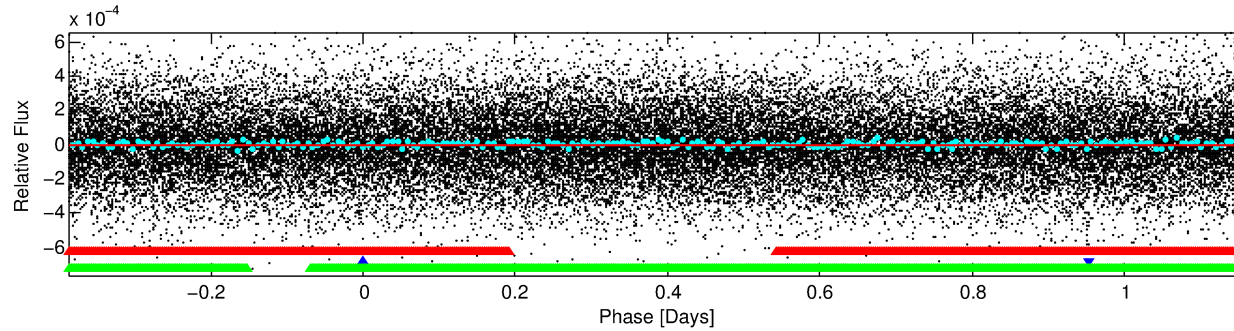
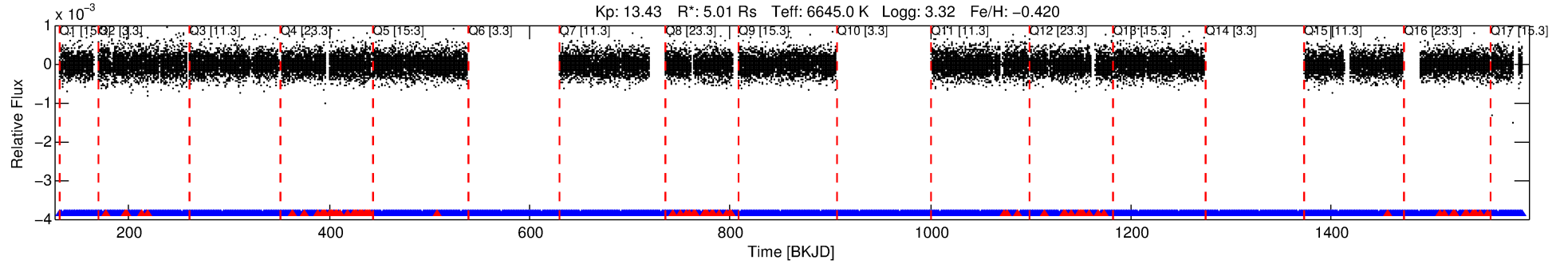
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 003970621-02

No Significant Match Found

# DV One-Page Summary

KIC: 3970621 Candidate: 2 of 3 Period: 1.547 d



## DV Fit Results:

Period = 1.54676 [0.00016] d  
Epoch = 131.8606 [0.0209] BKJD  
Rp/R\* = 0.0030 [0.0129]  
a/R\* = 2.92 [74.14]  
b = 0.99 [0.83]  
Seff = 41345.92 [32039.18]  
Teq = 3636 [704] K  
Rp = 1.64 [7.09] Re  
a = 0.0326 [0.0155] AU  
Ag = 7.82 [67.31] [0.10 $\sigma$ ]  
Teffp = 9401 [20154] K [0.29 $\sigma$ ]

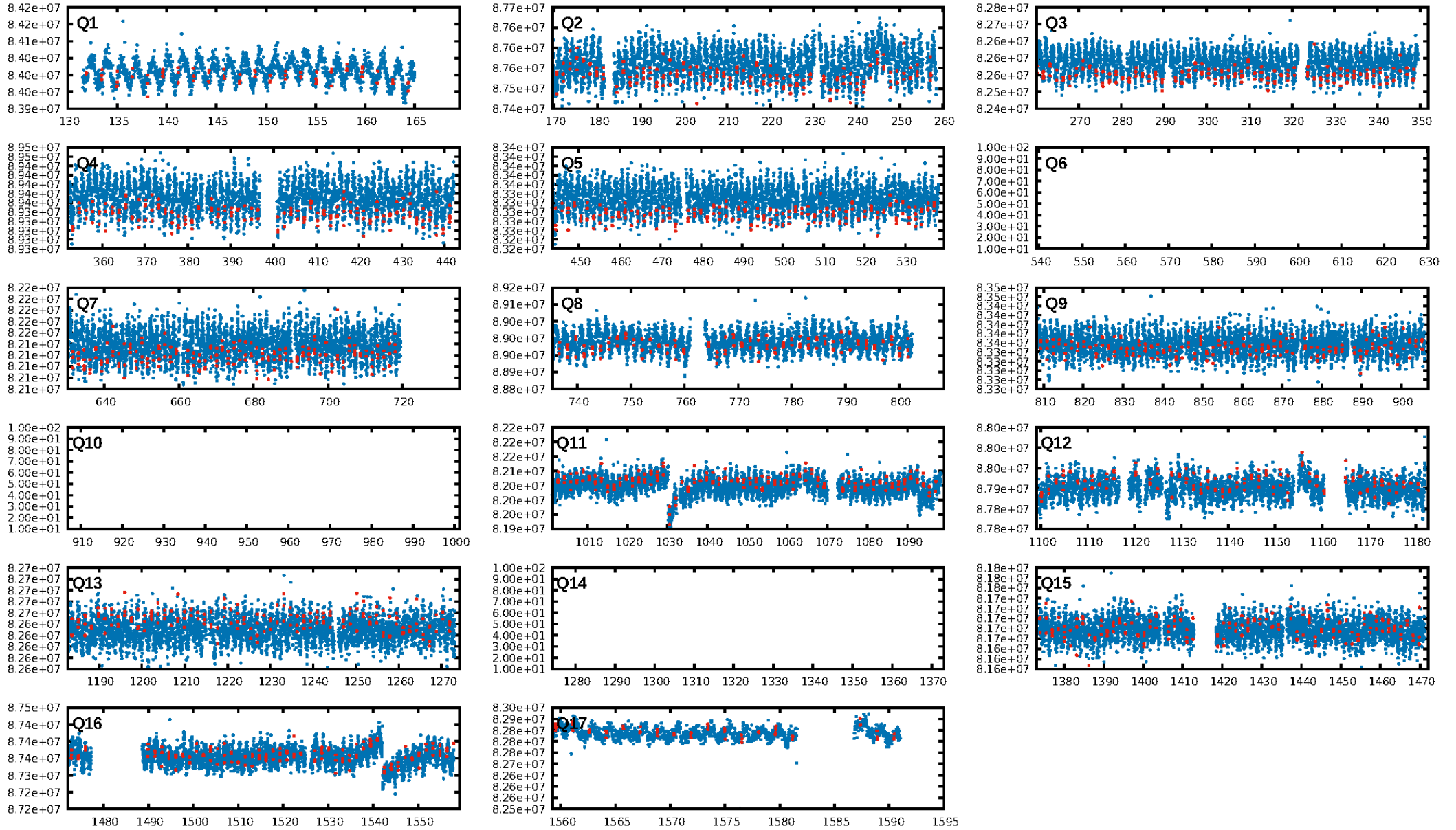
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 1.4% [0.02 $\sigma$ ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 9.73e-14  
RollingBand-fgt: 0.88 [527/597]  
GhostDiagnostic-chr: -3.488  
Centroid-sig: 4.8%  
Centroid-so: 25.387 arcsec [1.79 $\sigma$ ]  
OotOffset-rm: 0.253 arcsec [0.16 $\sigma$ ]  
KicOffset-rm: 0.227 arcsec [0.14 $\sigma$ ]  
OotOffset-st: 1/3/3/4 [11]  
KicOffset-st: 1/3/3/4 [11]  
DiffImageQuality-fgm: 0.27 [3/11]  
DiffImageOverlap-fno: 0.36 [5/14]

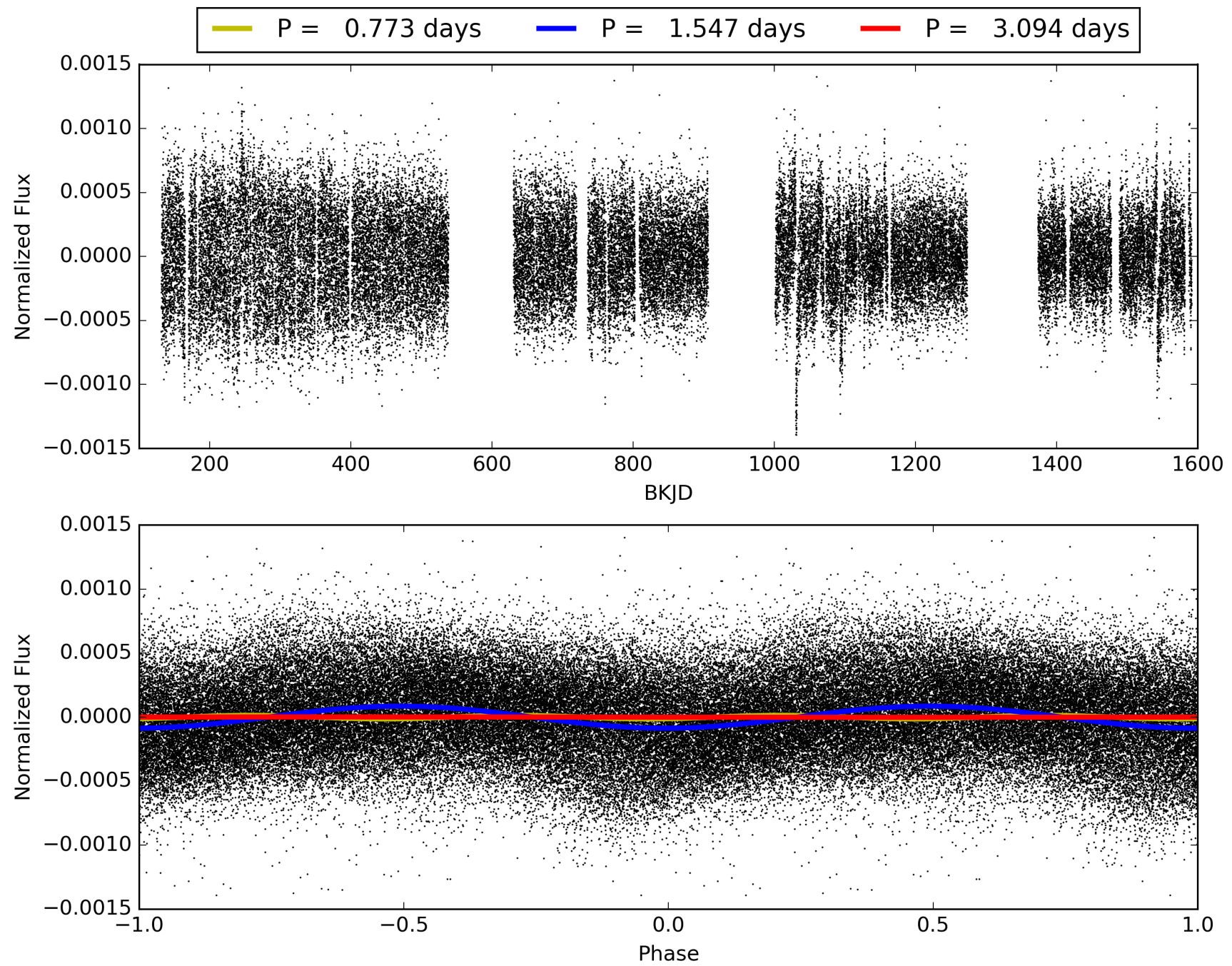
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 10:59:32 Z

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

# TCE 003970621-02, PDC Light Curves



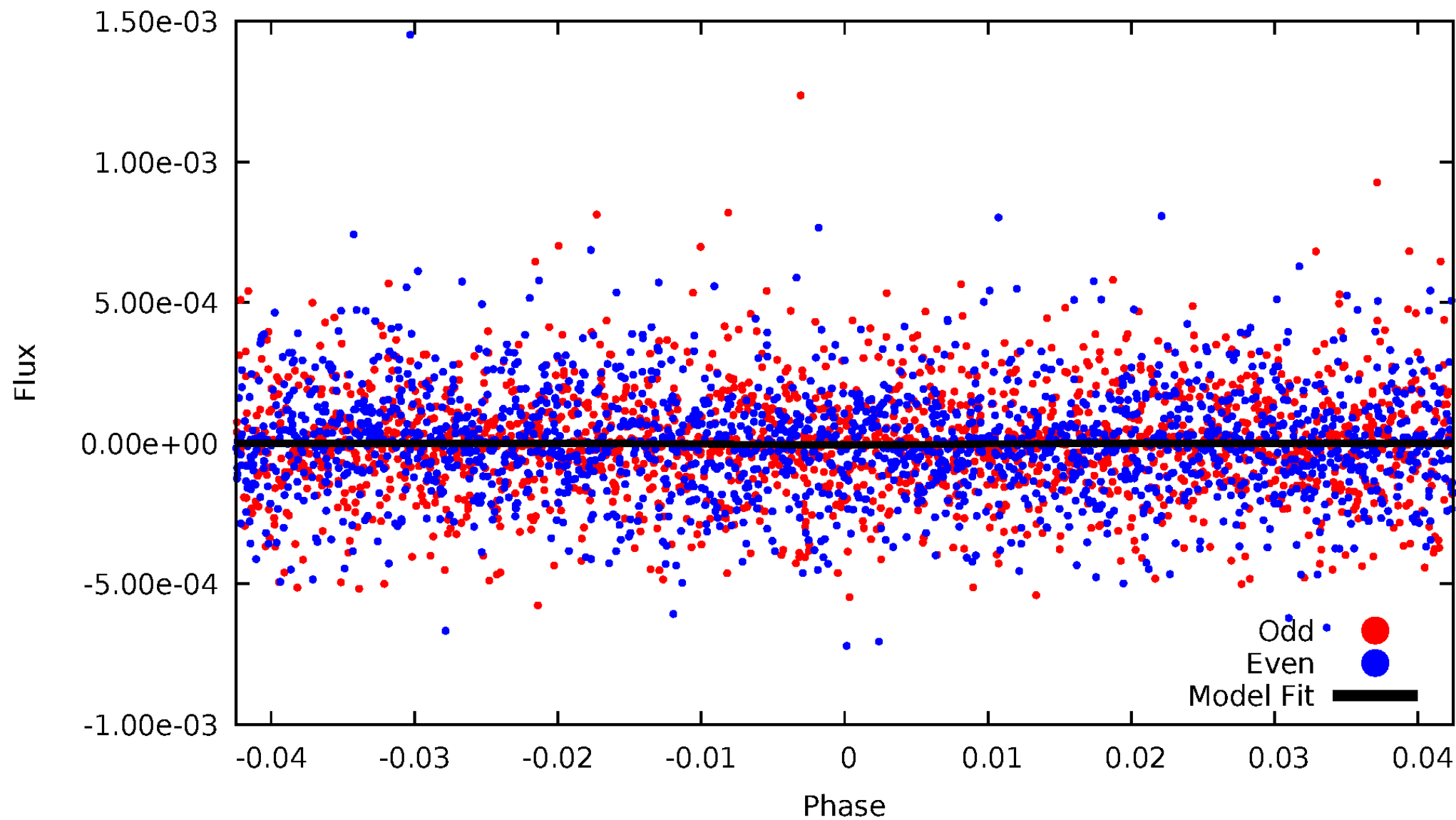
TCE 003970621-02





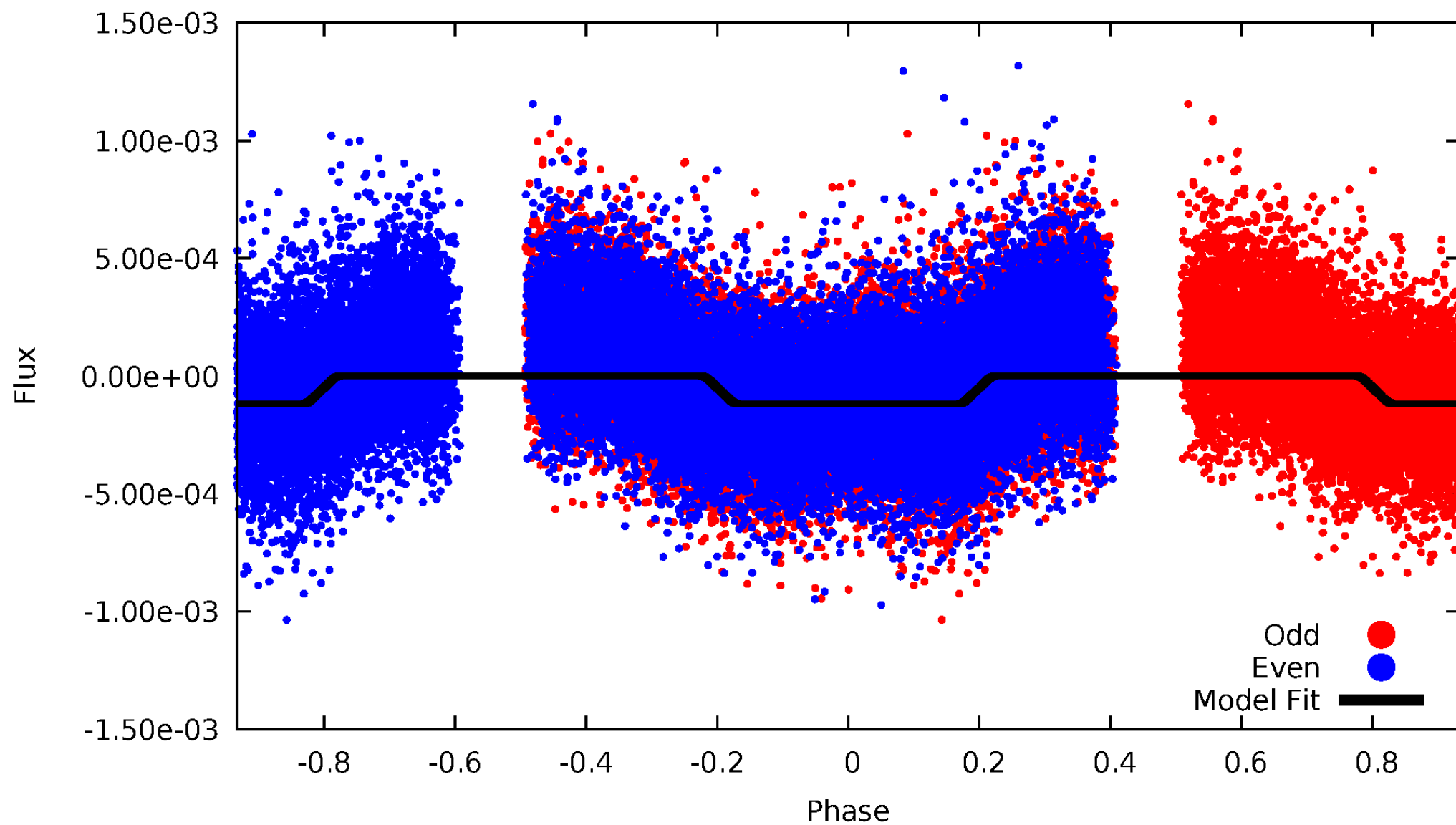
# DV Odd/Even

TCE 003970621-02



# ALT Odd/Even

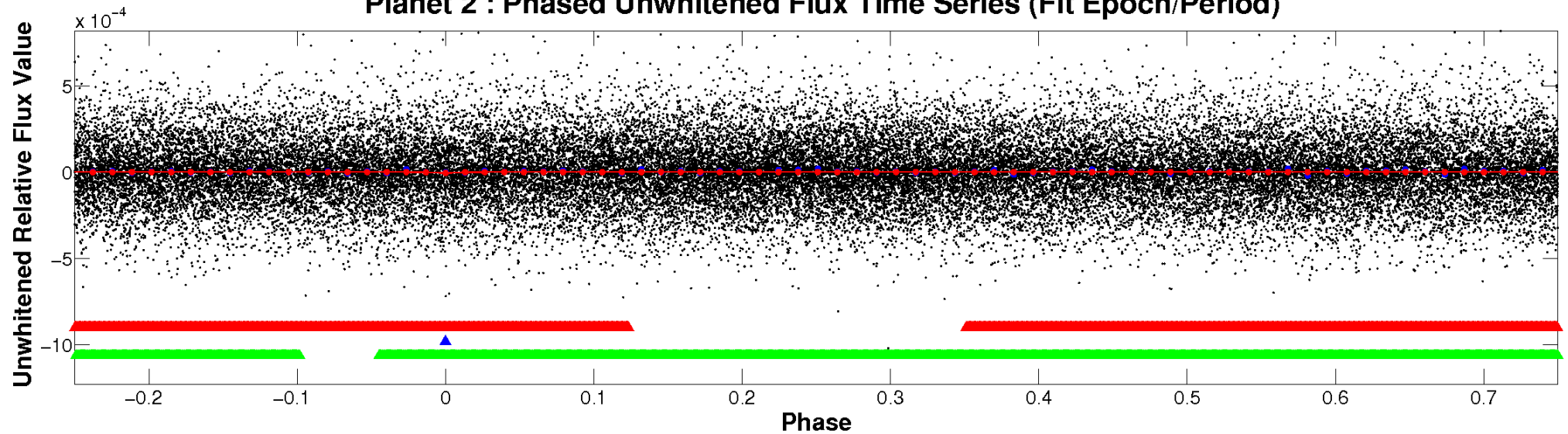
TCE 003970621-02



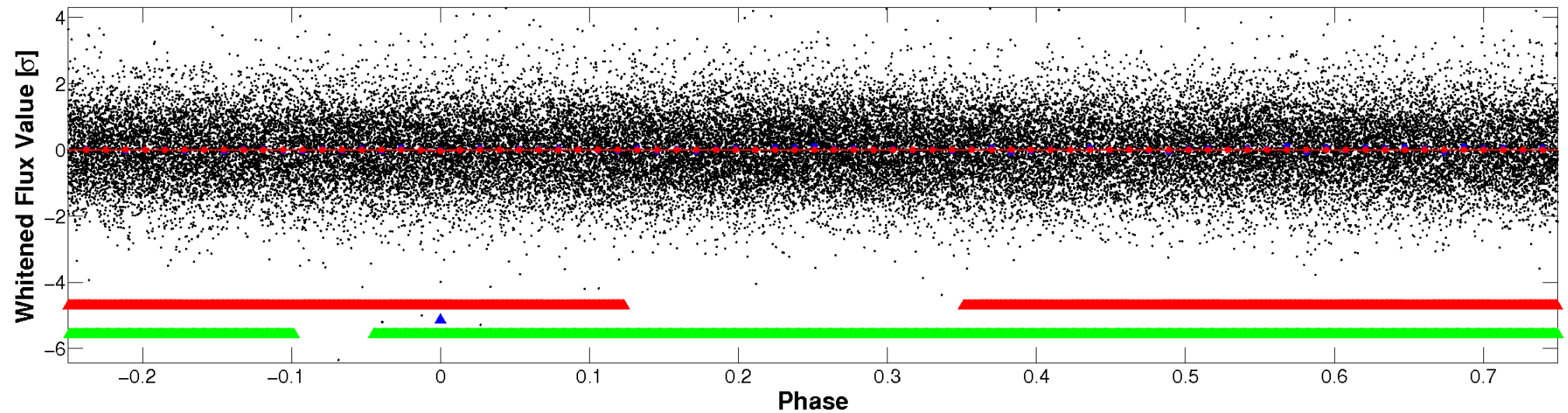


# Non-Whitened Vs. Whitened Light Curve

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

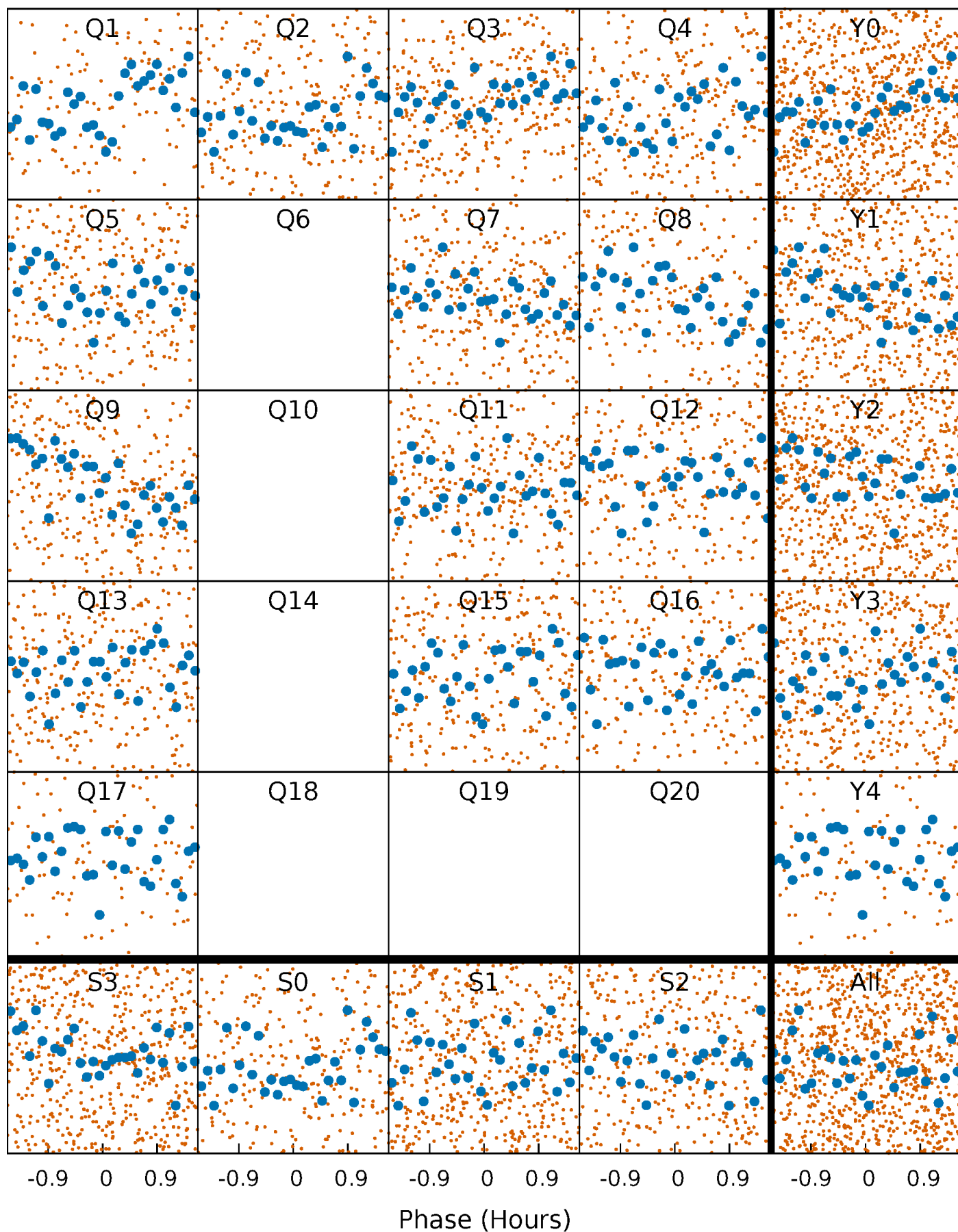


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



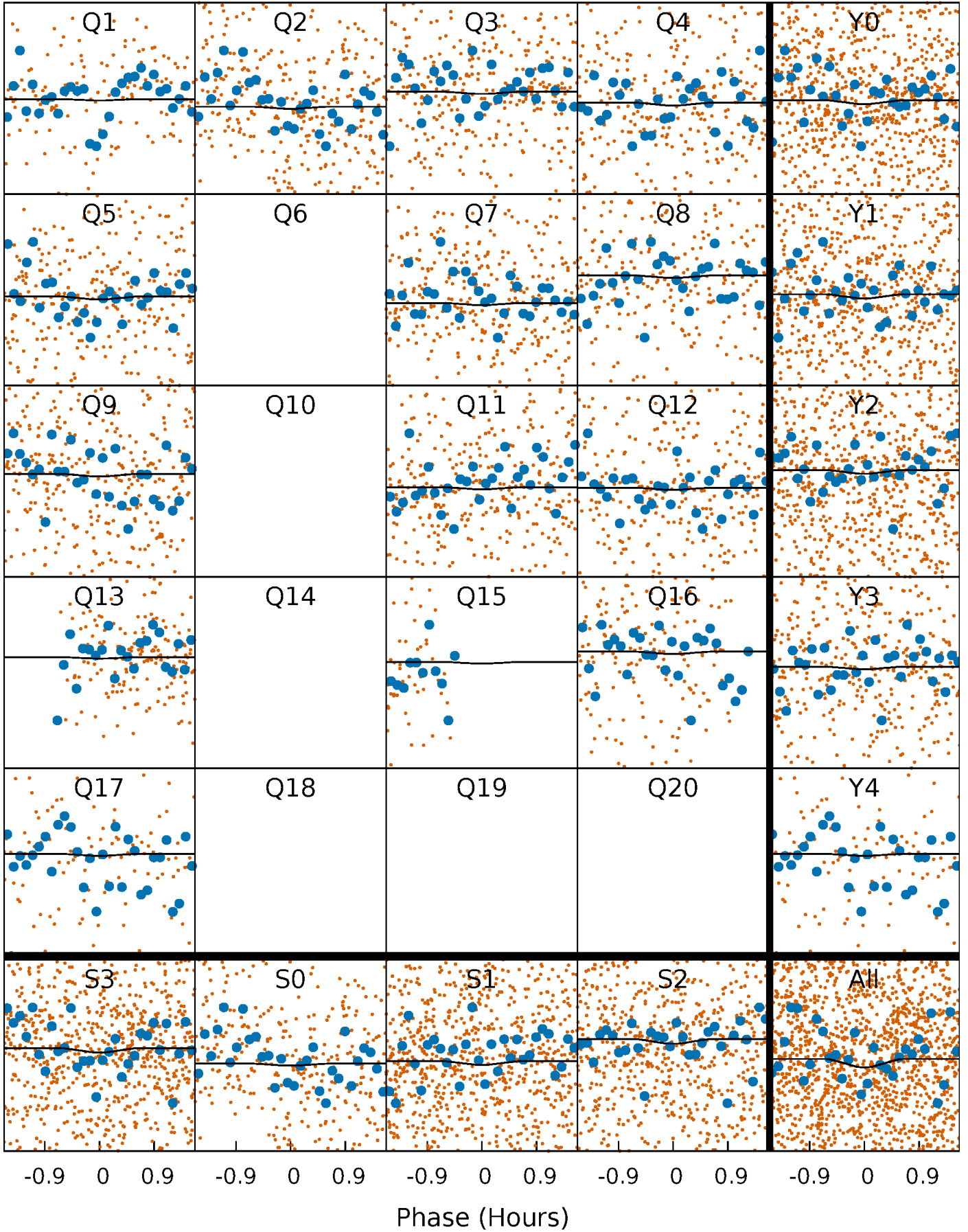
# PDC Quarter-Phased Transit Curves

TCE 003970621-02 P= 1.546762 Days  $T_0=131.860599$  (BKJD)



# DV Quarter-Phased Transit Curves

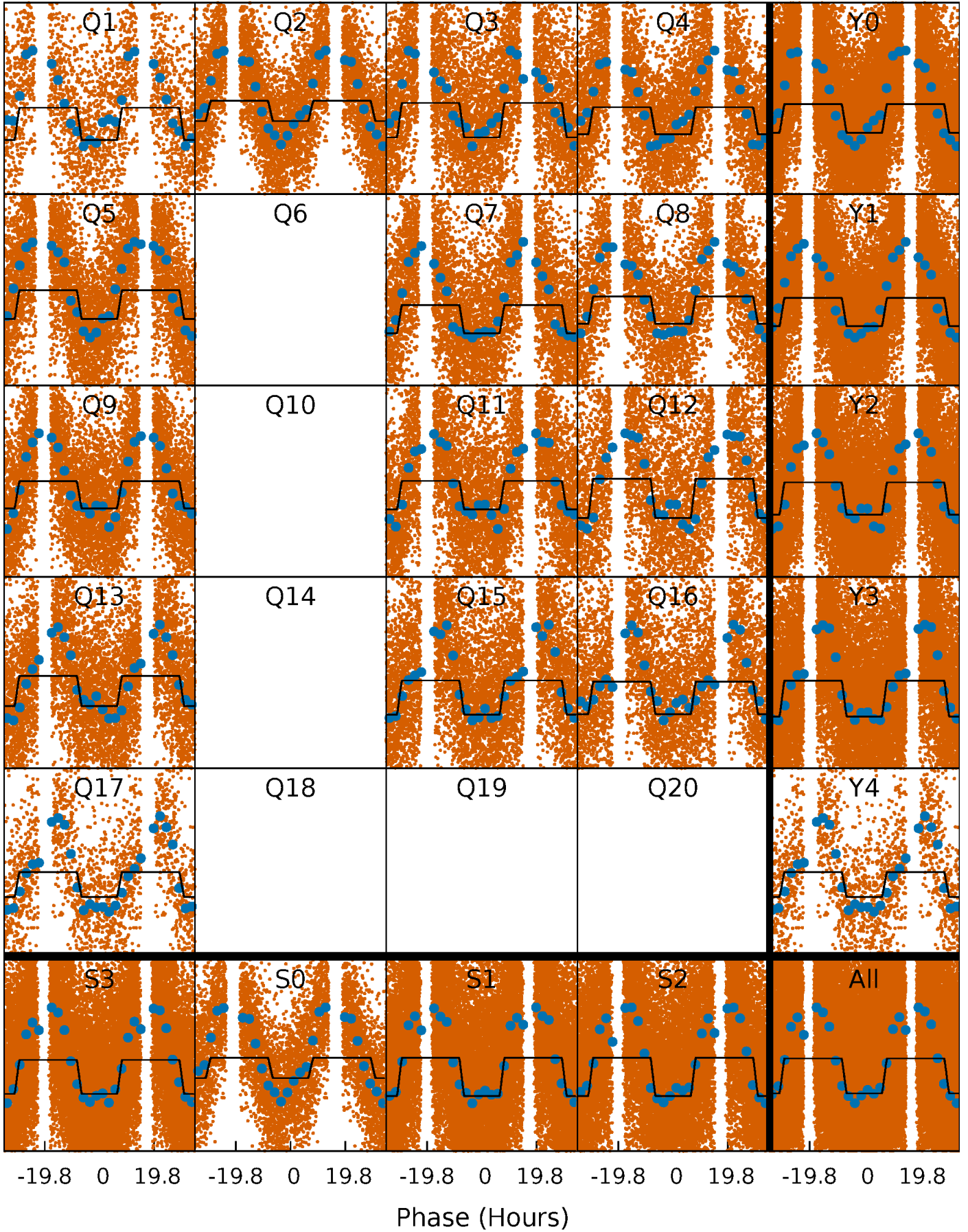
TCE 003970621-02   P= 1.546762 Days    $T_0=131.860599$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

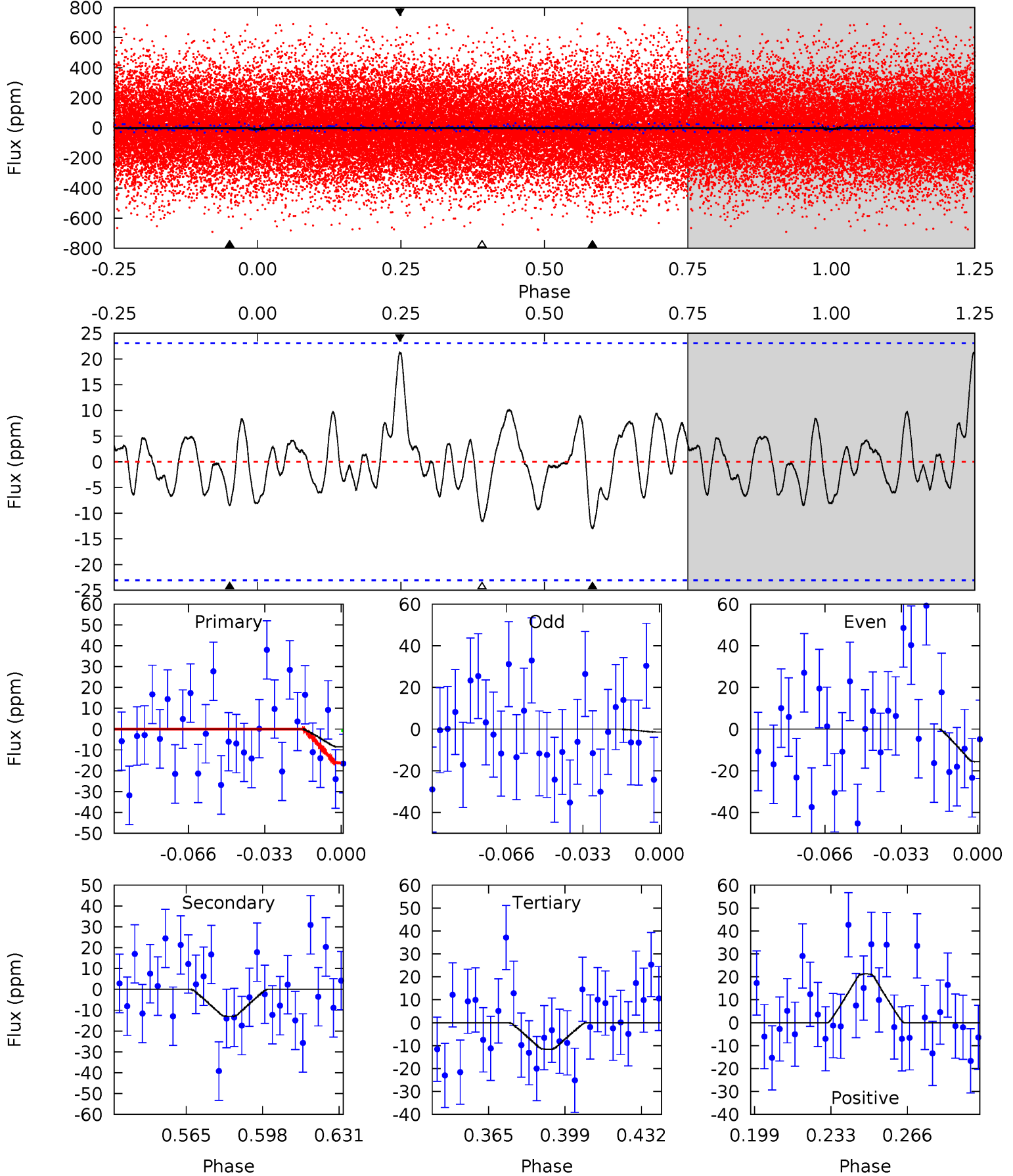
TCE 003970621-02   P= 1.547962 Days    $T_0=131.727647$  (BKJD)



# DV Model-Shift Uniqueness Test

003970621-02, P = 1.546762 Days, E = 130.313837 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
1.77	2.70	2.41	4.43	4.79	2.13	1.11	-0.64	-2.66	0.29	-1.73	1.48	2.21	0.62	1.62

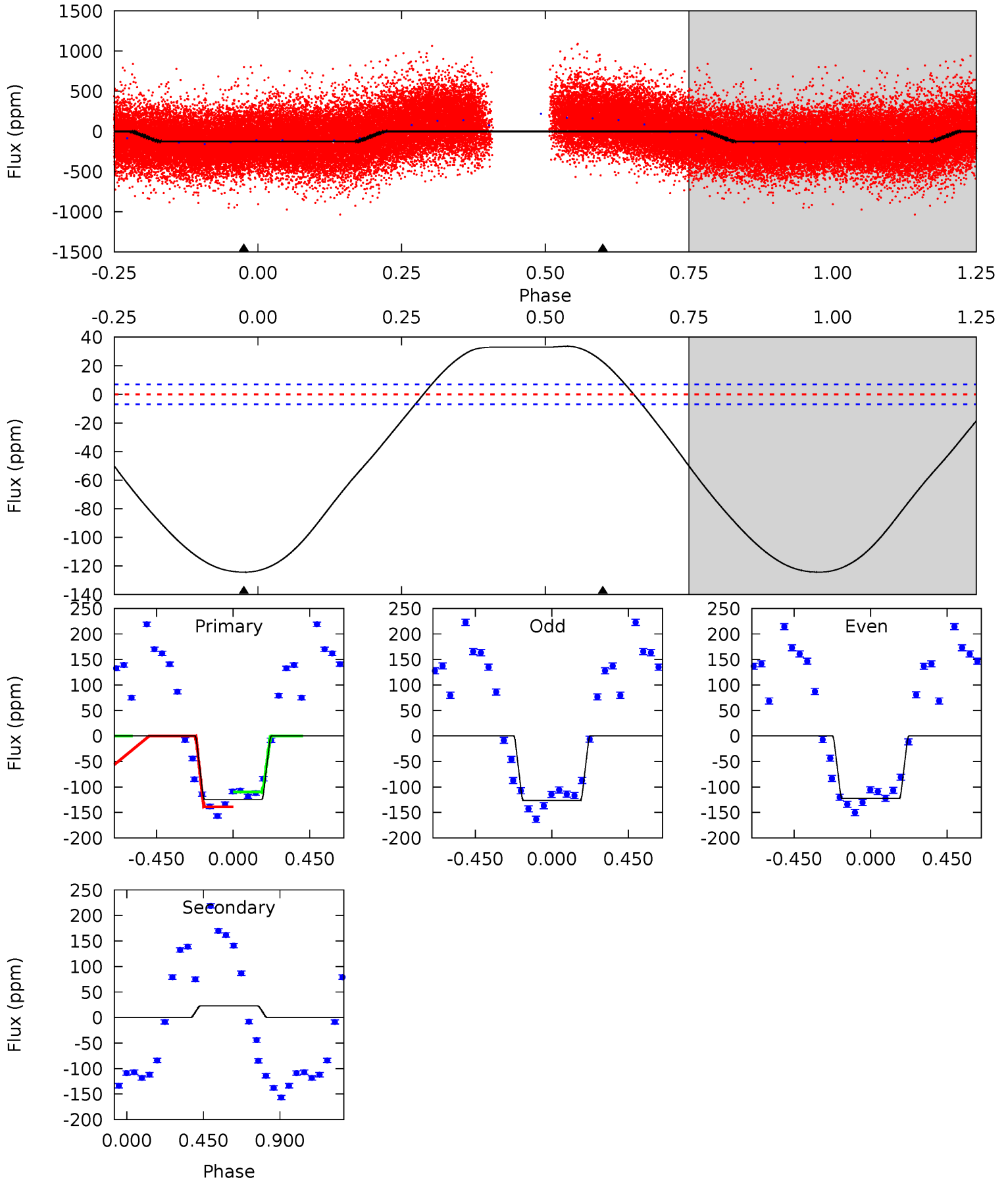




# Alt Model-Shift Uniqueness Test

003970621-02, P = 1.547962 Days, E = 130.179685 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
75.6	-13.8	0	0	4.24	0.76	7.41	75.6	75.6	-13.8	-13.8	1.16	1.03	0.21	9.73



### Stellar Parameters For KIC 003970621

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6645^{+180}_{-220}$	$3.323^{+0.450}_{-0.050}$	$-0.420^{+0.400}_{-0.300}$	$5.014^{+0.272}_{-2.446}$	$1.932^{+0.137}_{-0.549}$	$0.022^{+0.095}_{-0.004}$
	+3%/-3%	+14%/-2%	+95%/-71%	+5%/-49%	+7%/-28%	+442%/-17%
Source	PHO1	FLK73	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 003970621-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-13 \pm 5$	$5.14^{+5.31}_{-3.65}$	$4972^{+245}_{-510}$	$-2819^{+9975}_{-1316}$	$0.276^{+3.065}_{-0.215}$
Alt.	$23 \pm 2$	$6.74^{+6.01}_{-4.25}$	$4938^{+254}_{-581}$	$-4810^{+398}_{-1762}$	$-0.285^{+0.202}_{-1.802}$

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

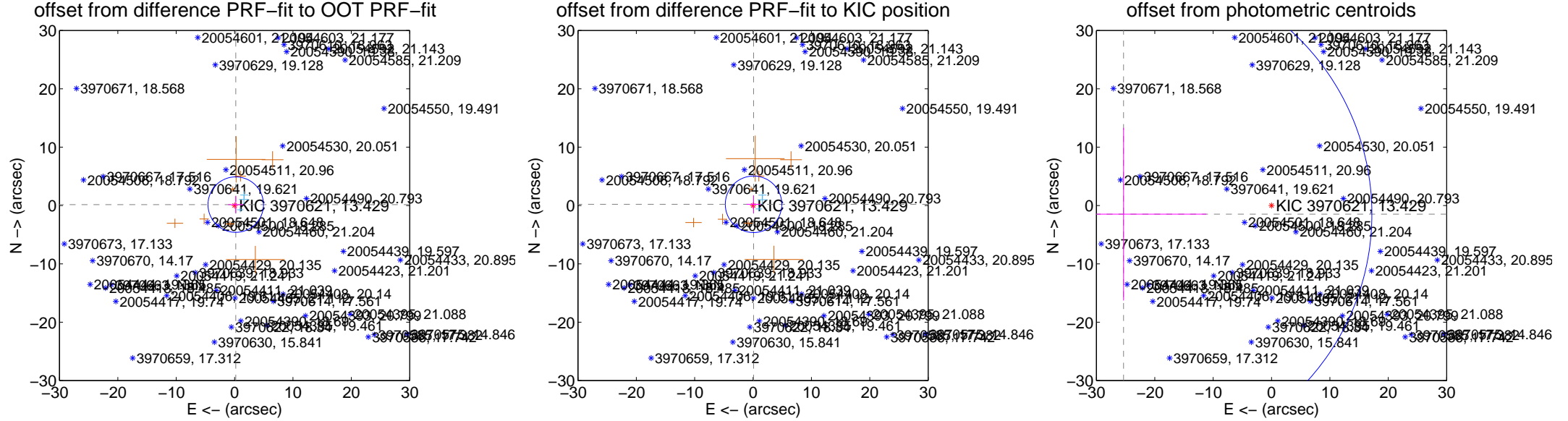
## DV Centroid Data

Supplemental centroid analysis for 003970621-02. Kepler magnitude: 13.43. Transit SNR 0.66

There are 3 quarters with good PRF difference image offsets

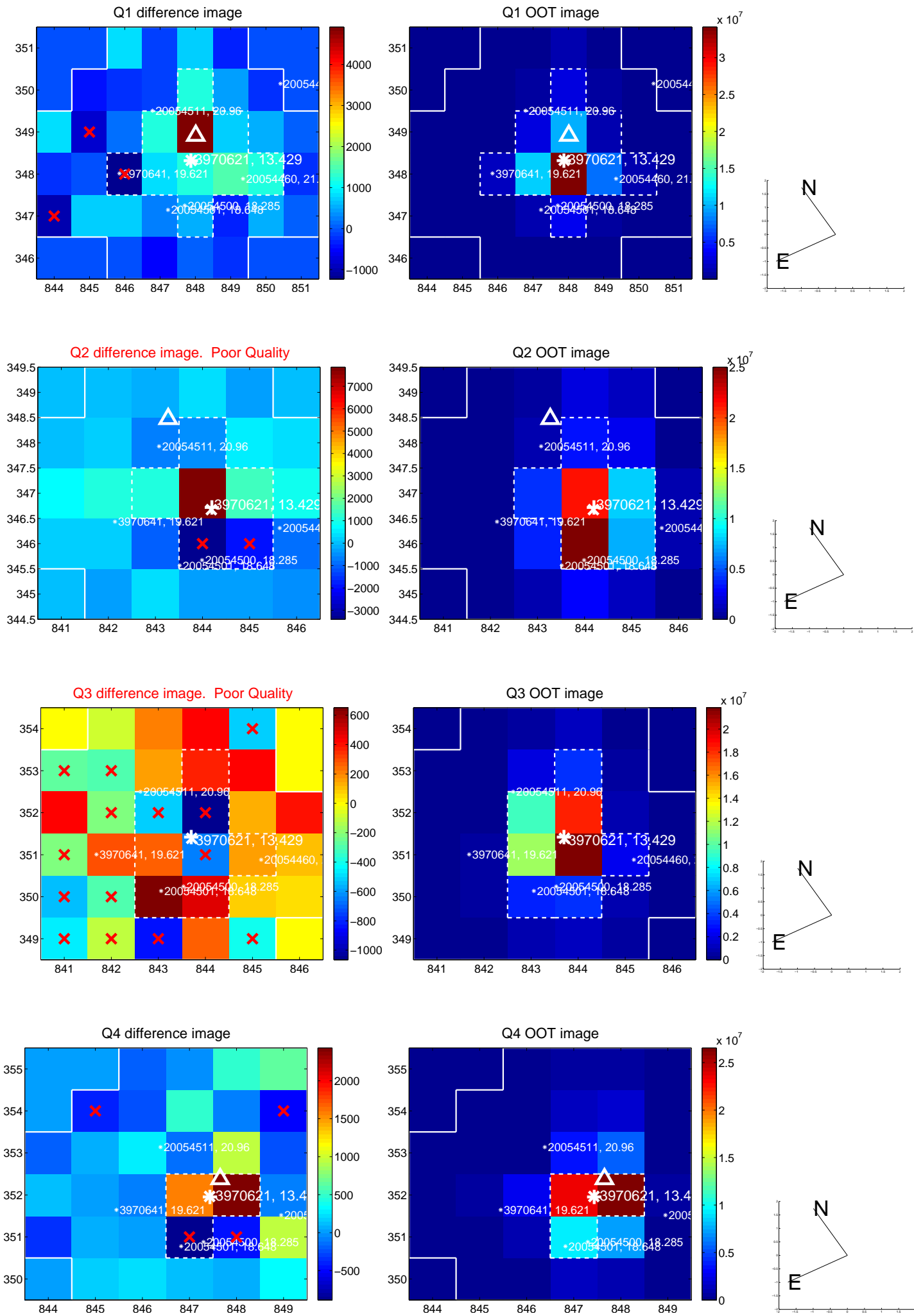
The direct PRF centroid is offset from the target star catalog position by about 0.03 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.253 \pm 1.584$	0.16	$-0.199 \pm 1.298$	$0.155 \pm 1.444$
PRF-fit source offset from KIC position	$0.227 \pm 1.614$	0.14	$-0.086 \pm 1.202$	$0.210 \pm 1.522$
photometric centroid source offset	$25.39 \pm 14.18$	1.79	$25.34 \pm 14.18$	$-1.48 \pm 14.80$

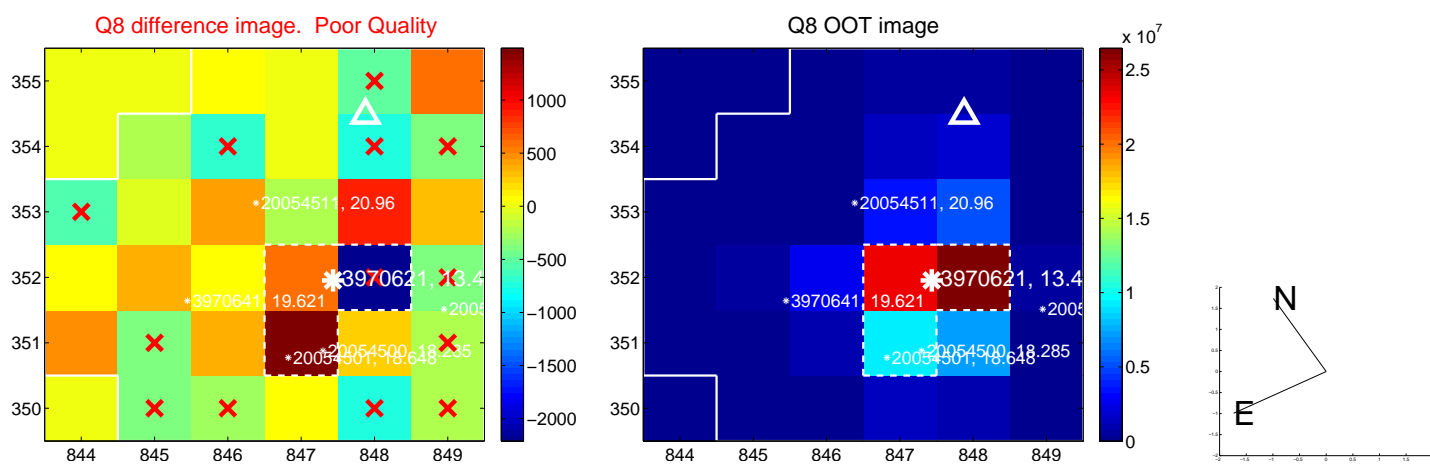
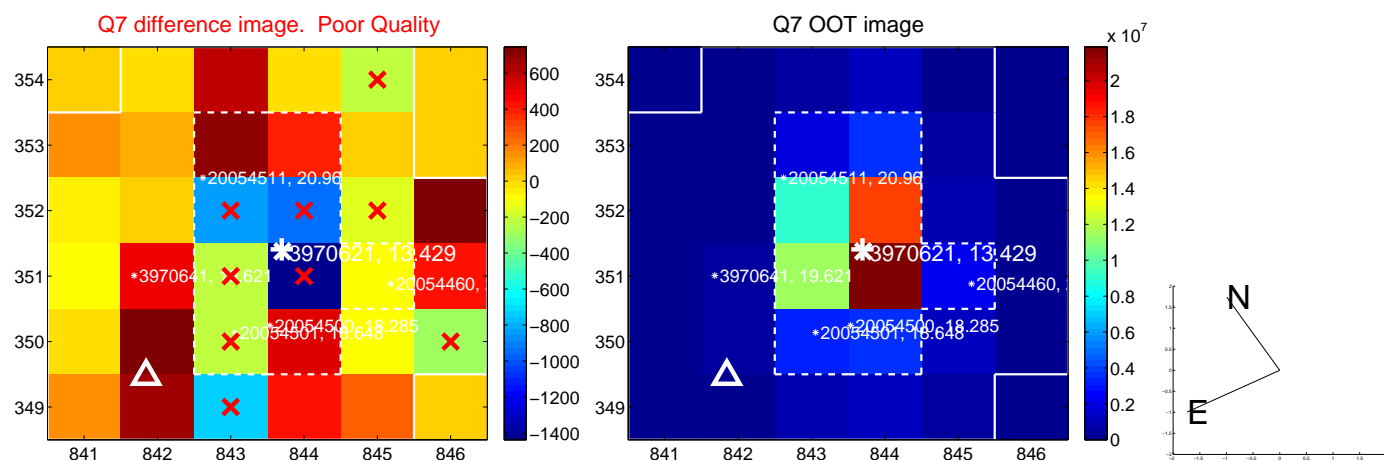
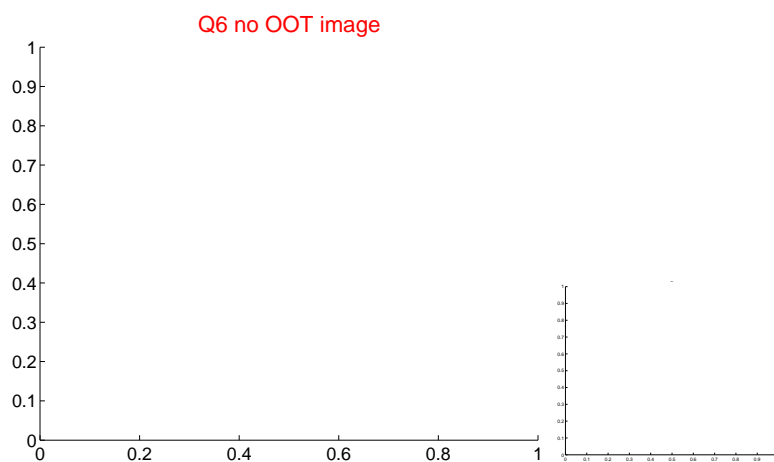
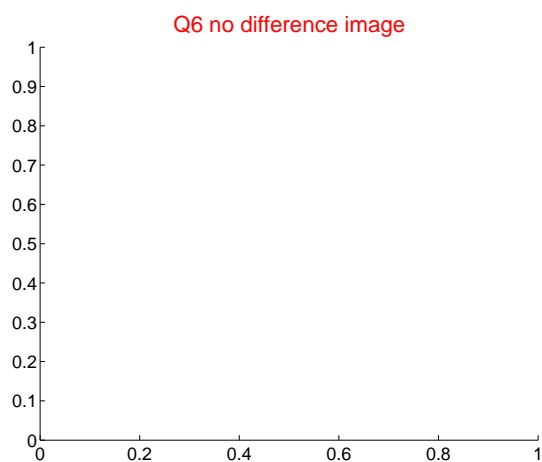
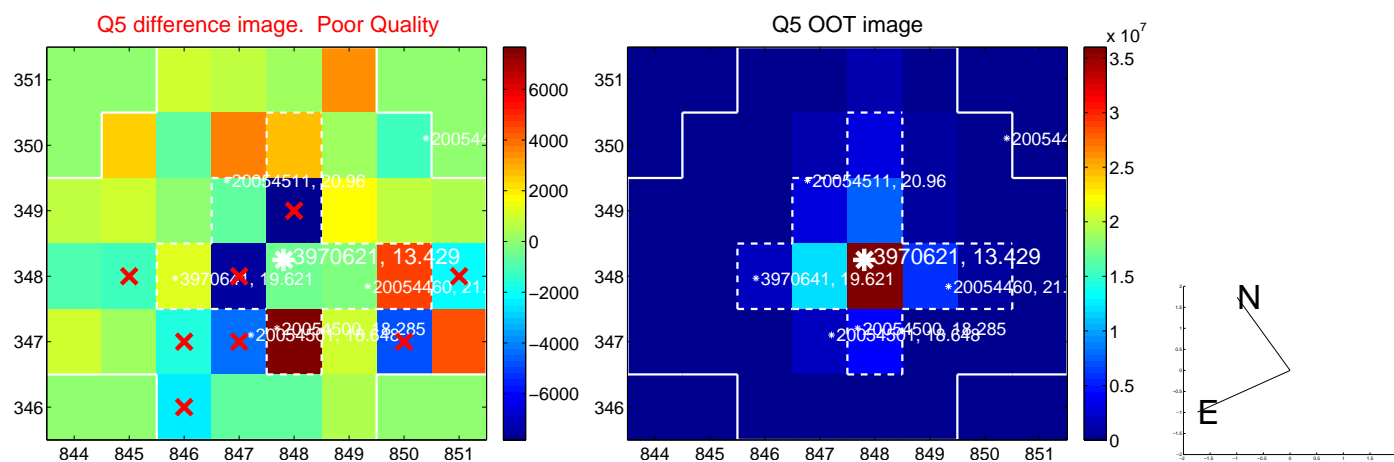


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

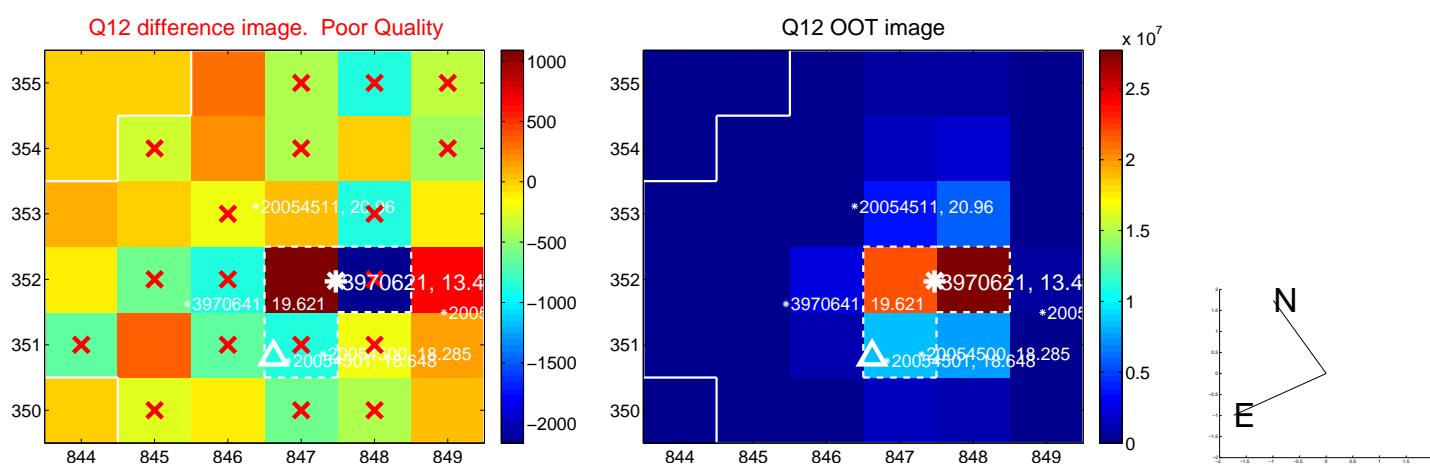
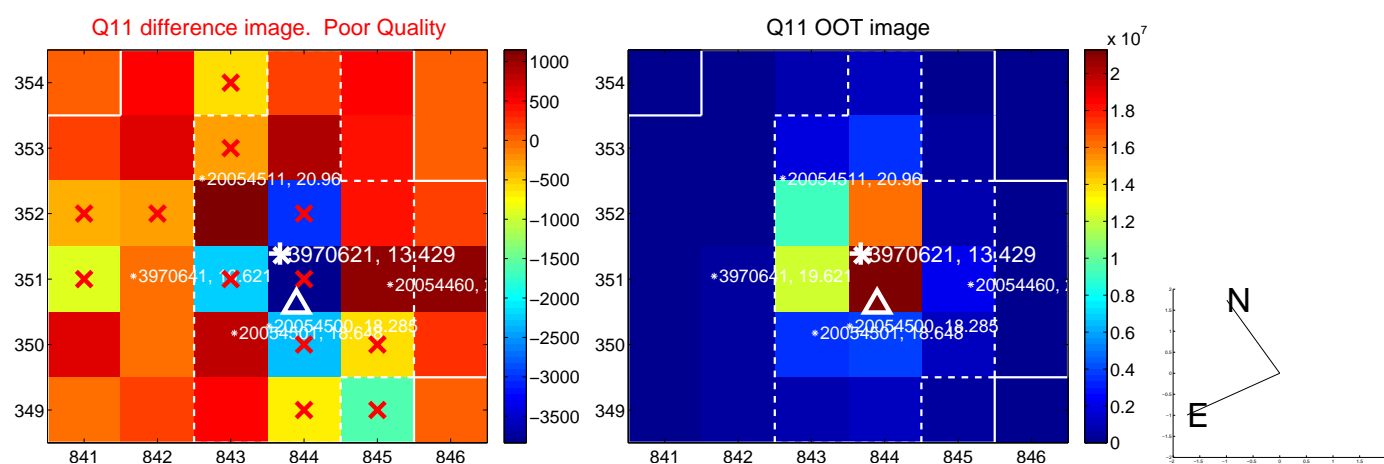
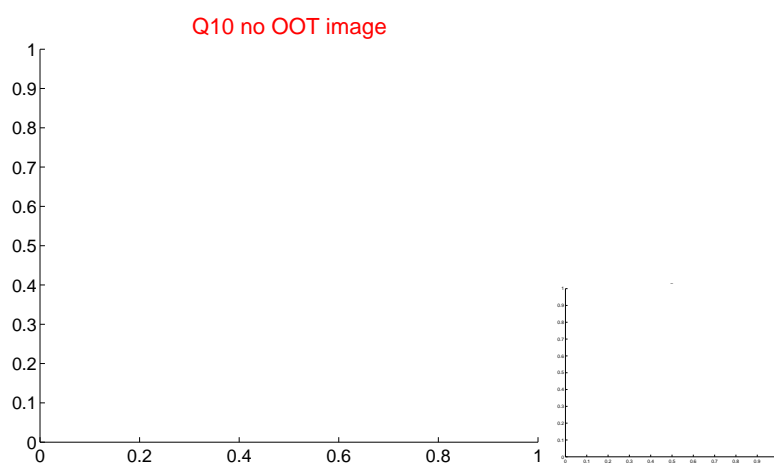
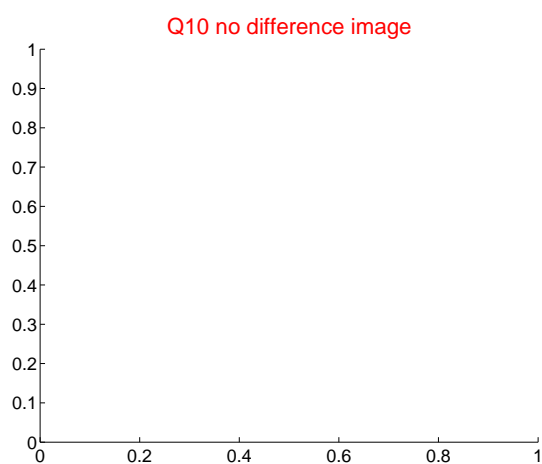
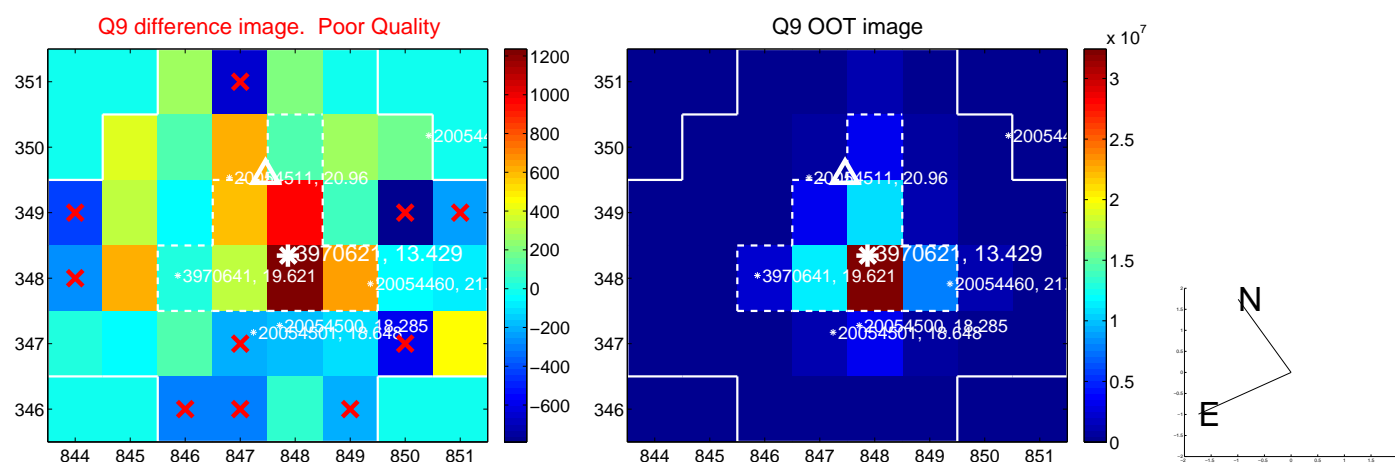
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

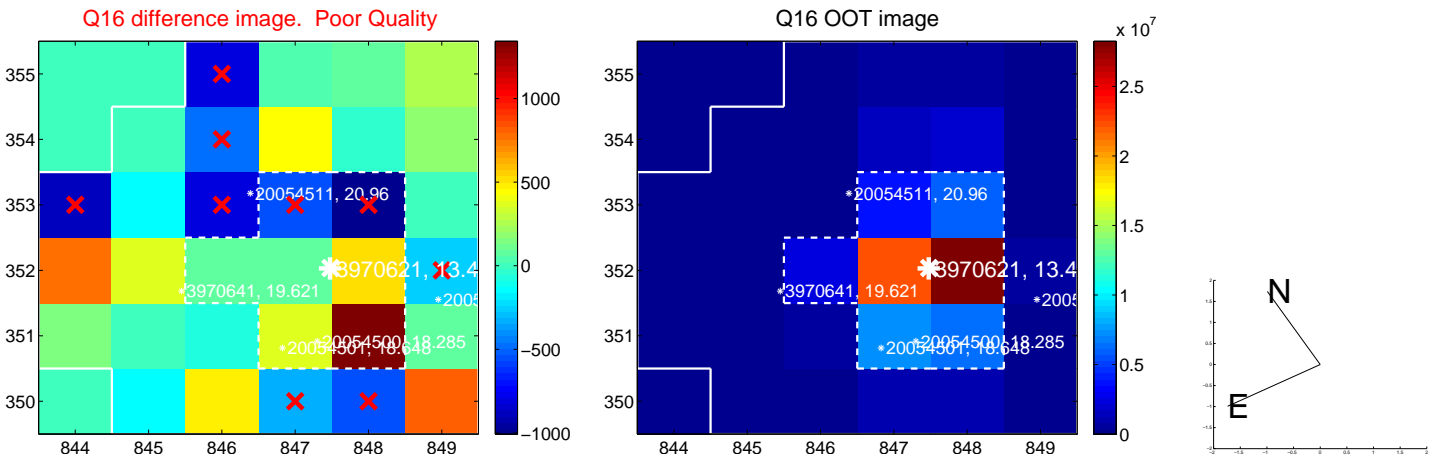
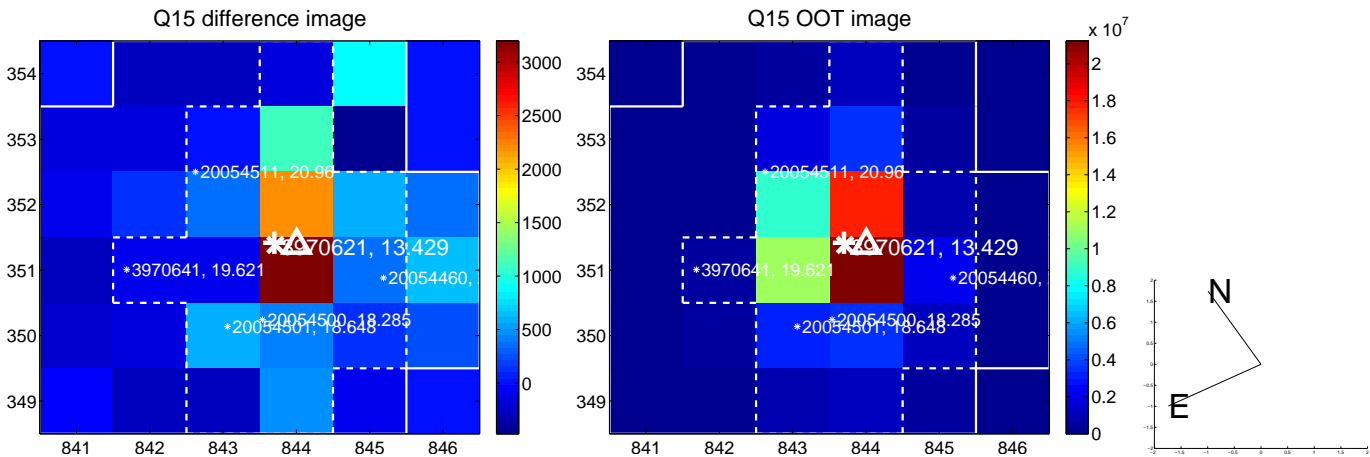
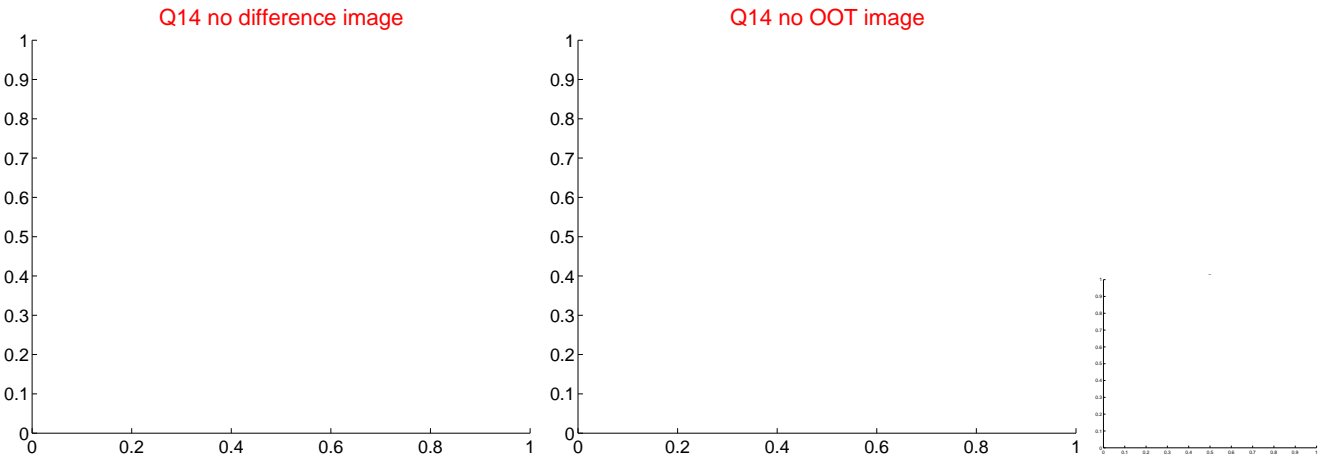
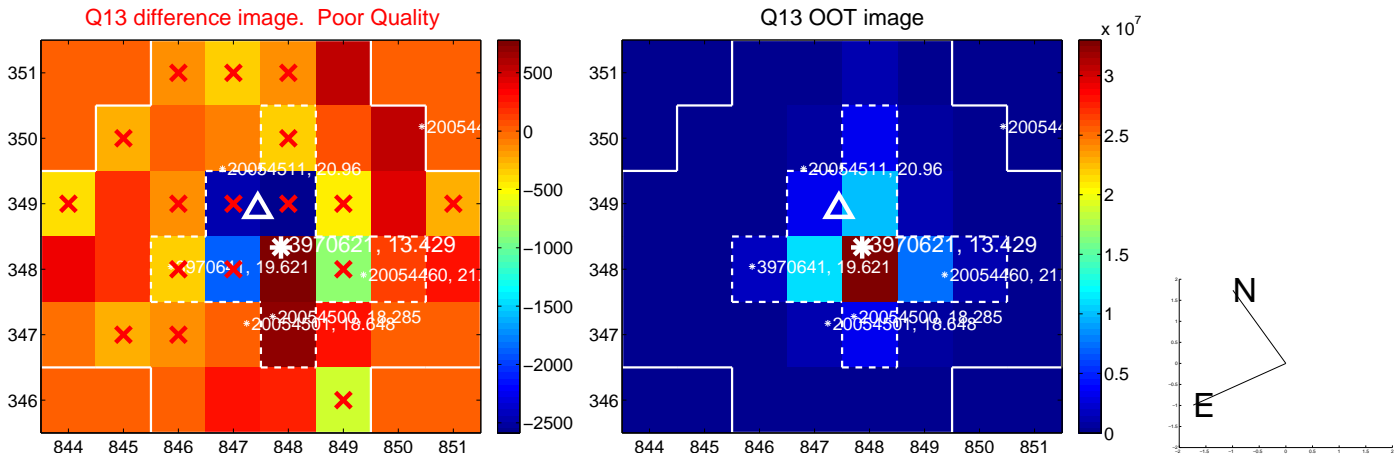


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

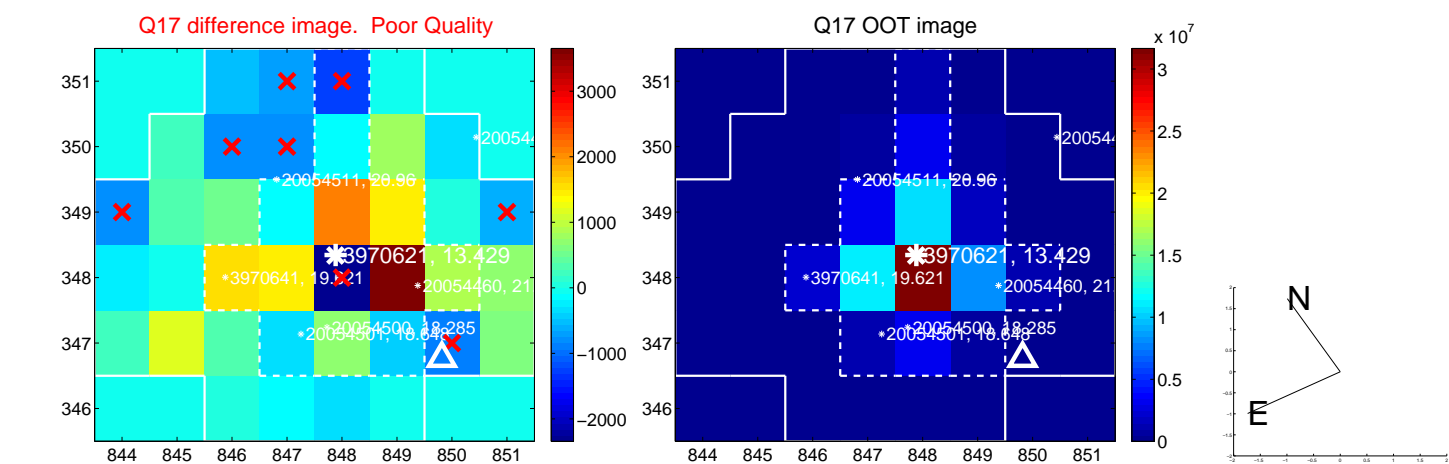




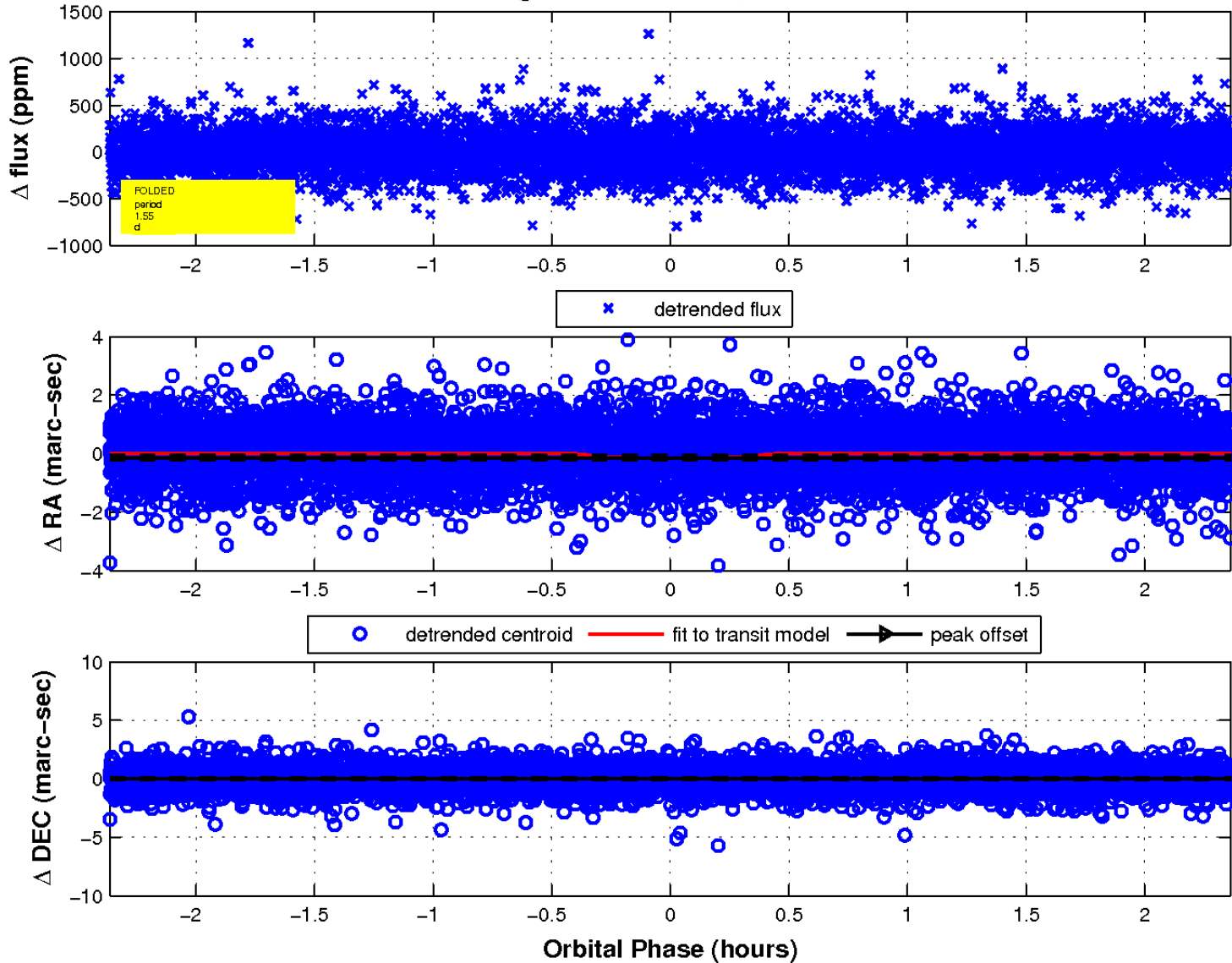
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

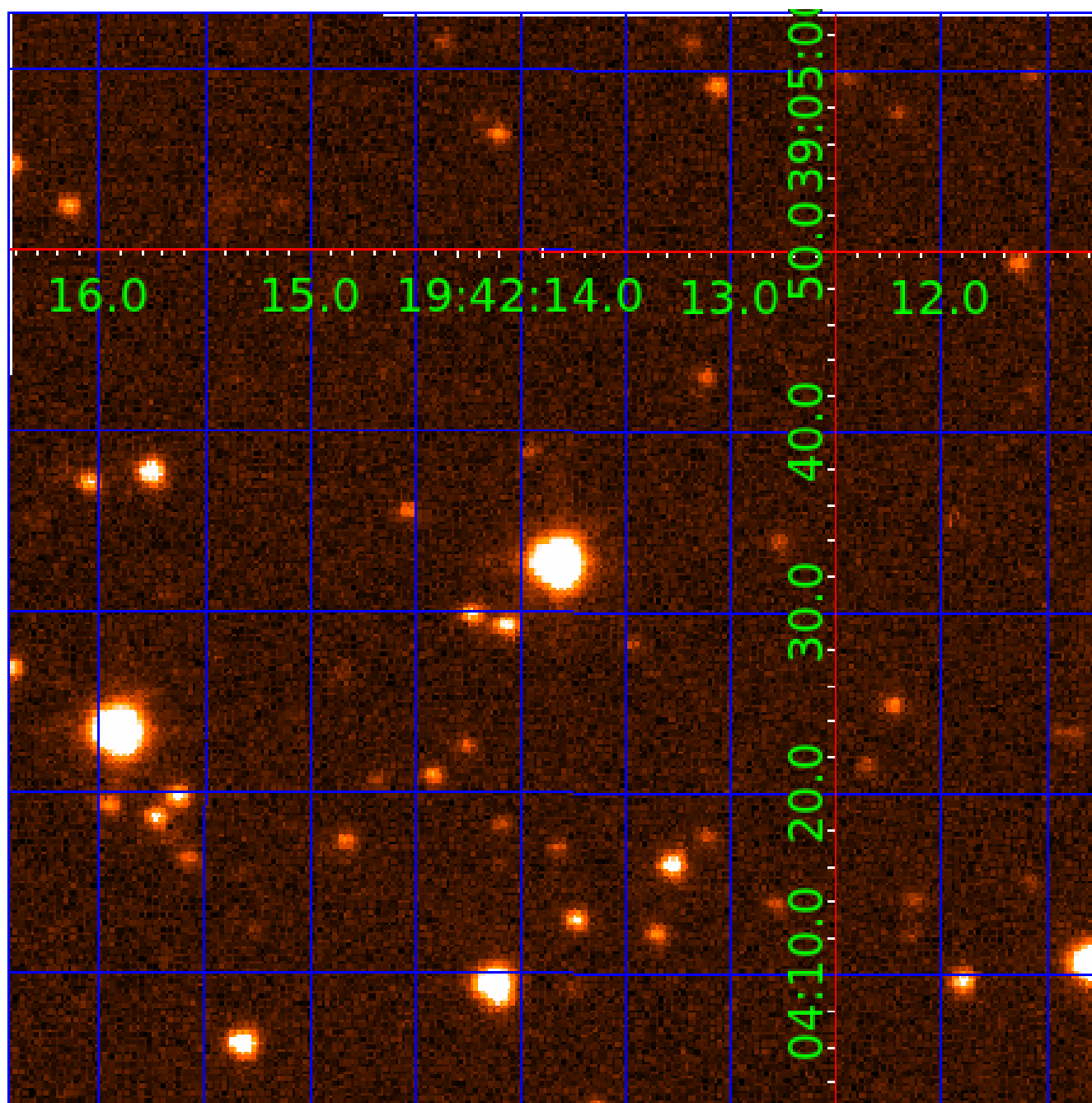


### fluxWeightedCentroids, Planet 2 of 3



UKIRT Image

Declination



# KIC 003970621

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
003970621-01	OBS	No	1.548029	132.403814	23.4	1.525	8.8	3.8	5.01	6645	2.83	41300.78
003970621-02	OBS	No	1.546762	131.860599	5.8	0.788	9.1	0.7	5.01	6645	1.64	41345.92
003970621-03	OBS	No	1.548315	131.791500	0.0	5.734	9.1	0.0	5.01	6645	0.07	41290.61

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
003970621-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_SKYE_ZUMA_TRACKER—SWEET_NTL—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT
003970621-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV
003970621-03	OBS	FP	0.00	1	0	0	0	SWEET_NTL—LPP_DV—LPP_ALT—SAME_NTL_PERIOD

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

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

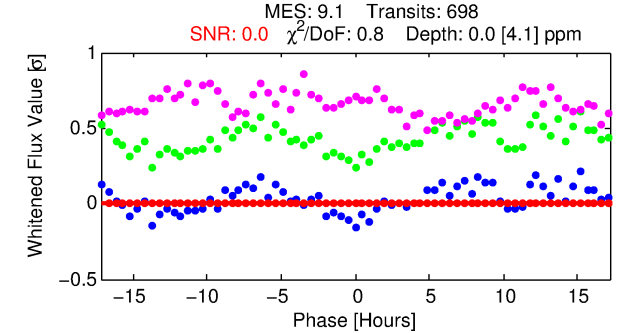
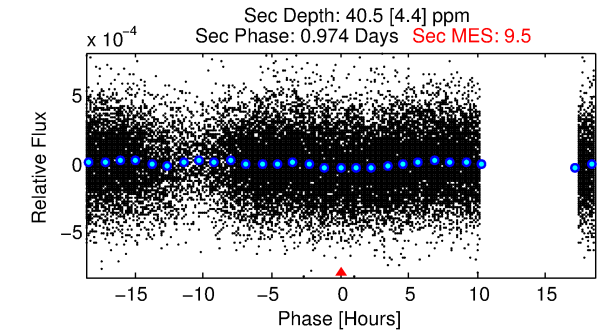
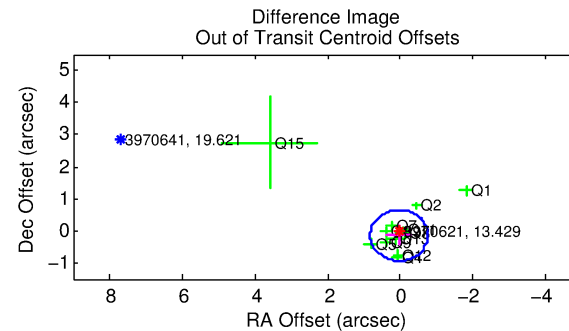
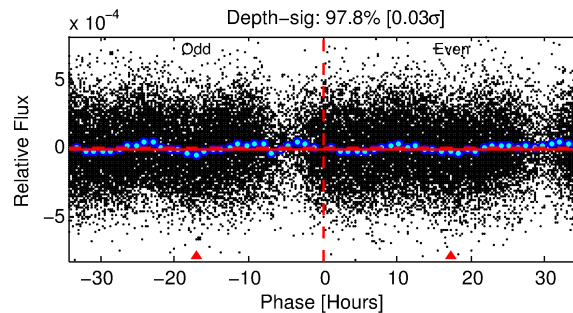
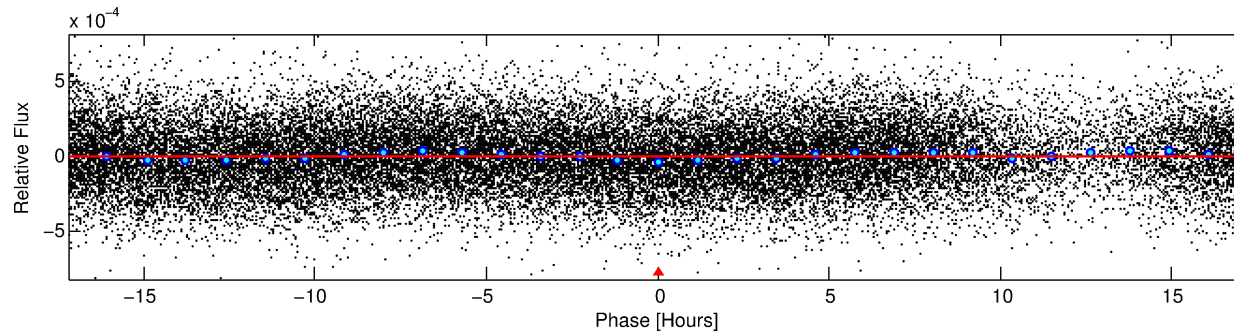
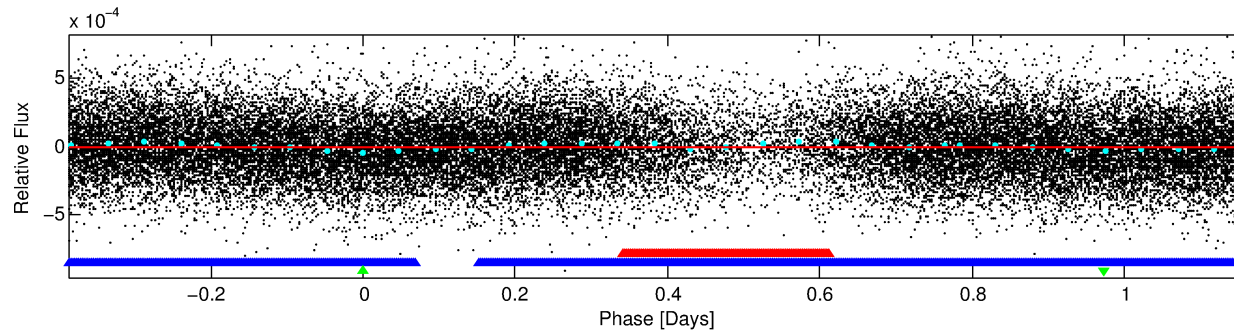
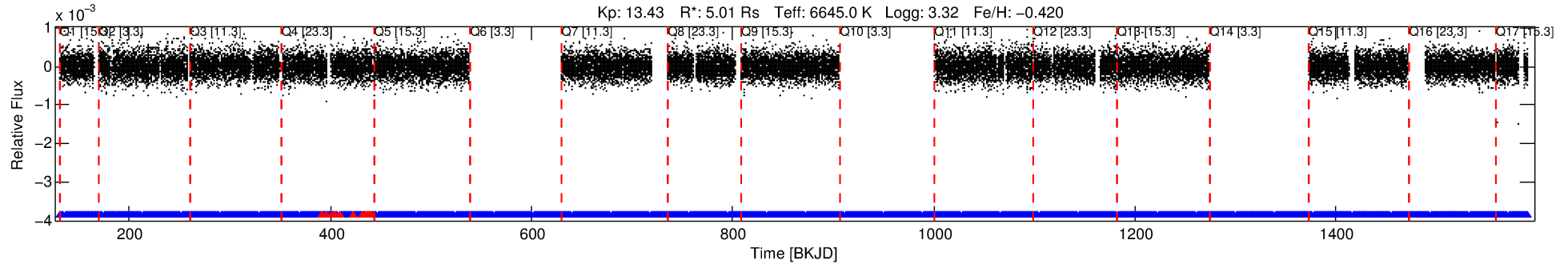
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 003970621-03

No Significant Match Found

# DV One-Page Summary

KIC: 3970621 Candidate: 3 of 3 Period: 1.548 d



## DV Fit Results:

Period = 1.54832 [0.05905] d  
Epoch = 131.7915 [15.2496] BKJD  
Rp/R\* = 0.0001 [0.0233]  
a/R\* = 1.09 [20.65]  
b = 0.97 [7.42]  
Seff = 41290.61 [32065.12]  
Teq = 3635 [706] K  
Rp = 0.07 [12.76] Re  
a = 0.0326 [0.0155] AU  
Ag = 5033.43 [1872524.96] [0.00 $\sigma$ ]  
Teff = 47336 [4402712] K [0.01 $\sigma$ ]

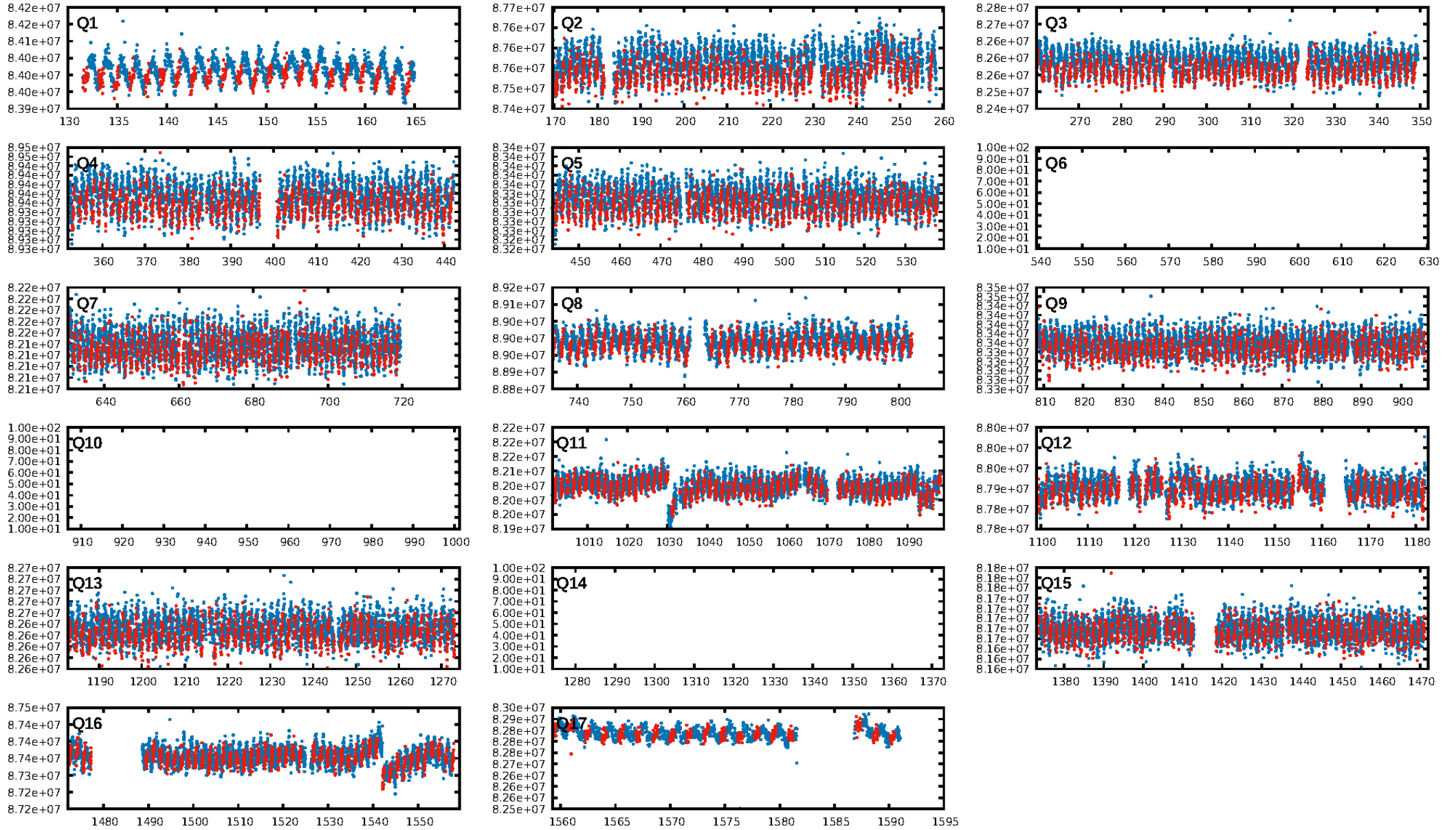
## DV Diagnostic Results:

ShortPeriod-sig: 0.1% [0.00 $\sigma$ ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 9.29e-14  
RollingBand-fgt: 0.98 [646/658]  
GhostDiagnostic-chr: N/A  
Centroid-sig: N/A  
Centroid-so: N/A  
OotOffset-rm: 0.147 arcsec [0.56 $\sigma$ ]  
KicOffset-rm: 0.059 arcsec [0.24 $\sigma$ ]  
OotOffset-st: 1/4/3/4 [12]  
KicOffset-st: 1/4/3/4 [12]  
DiffImageQuality-fgm: 0.92 [11/12]  
DiffImageOverlap-fno: 0.00 [0/14]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 10:59:40 Z

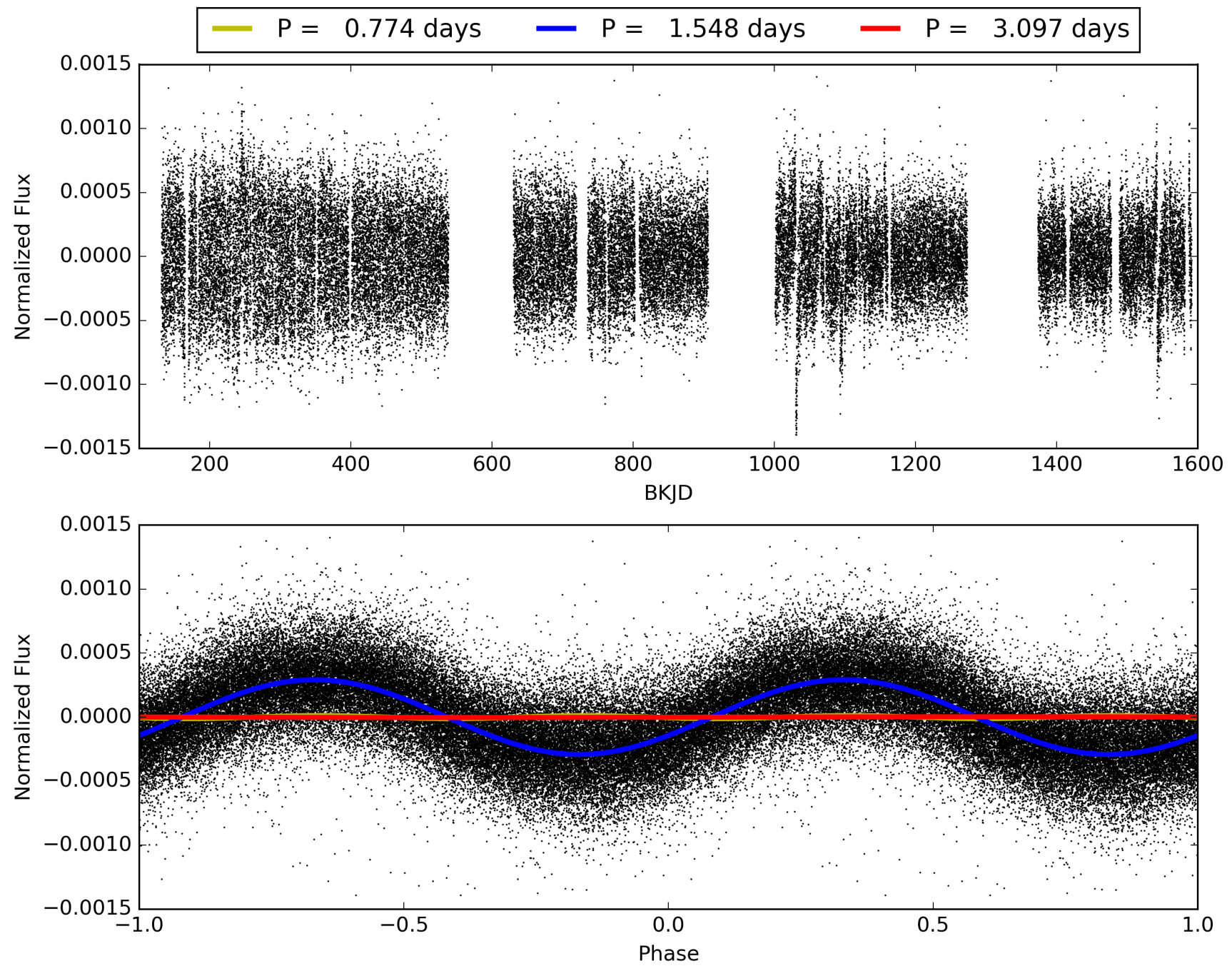
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 003970621-03, PDC Light Curves



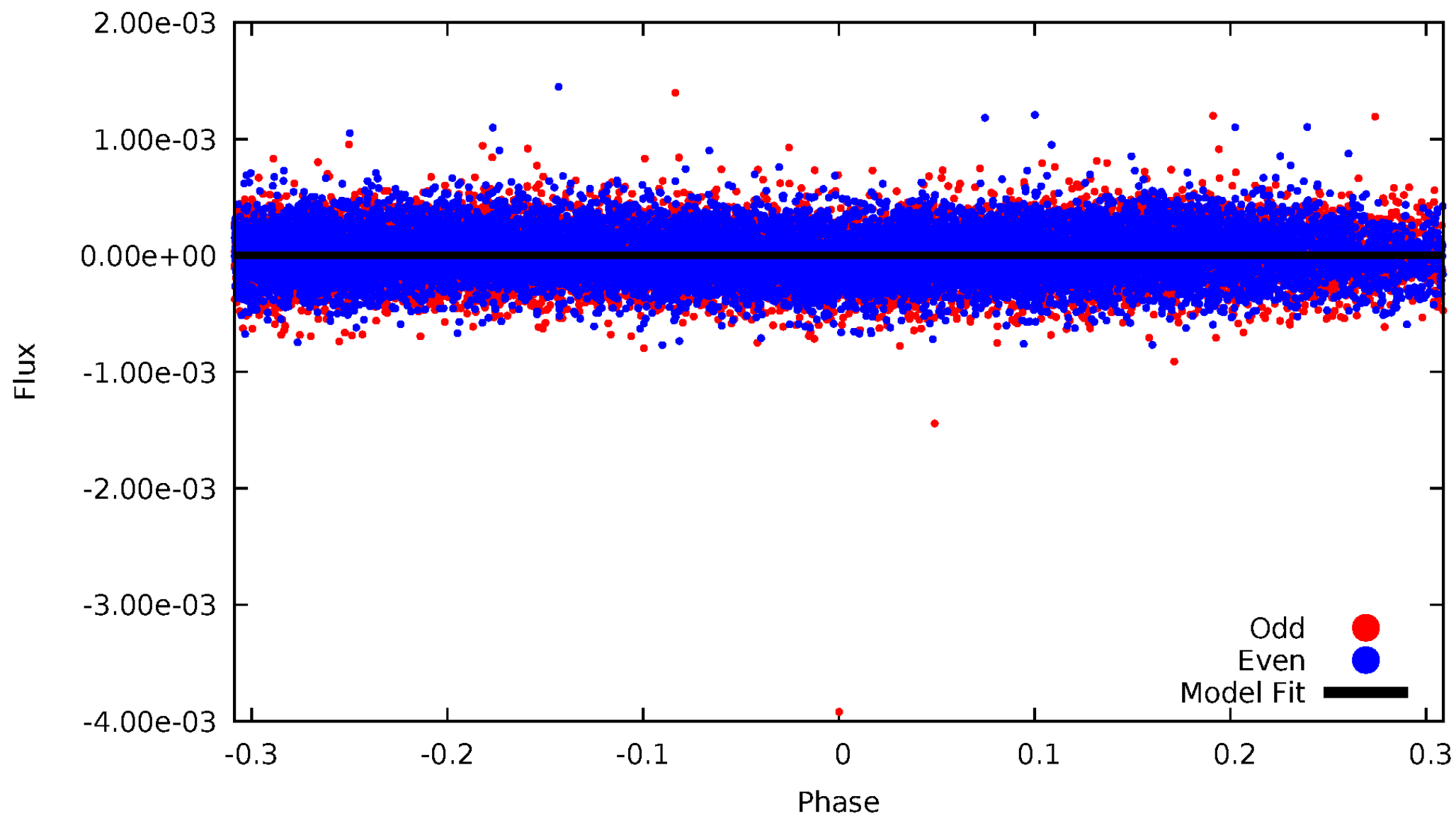


TCE 003970621-03



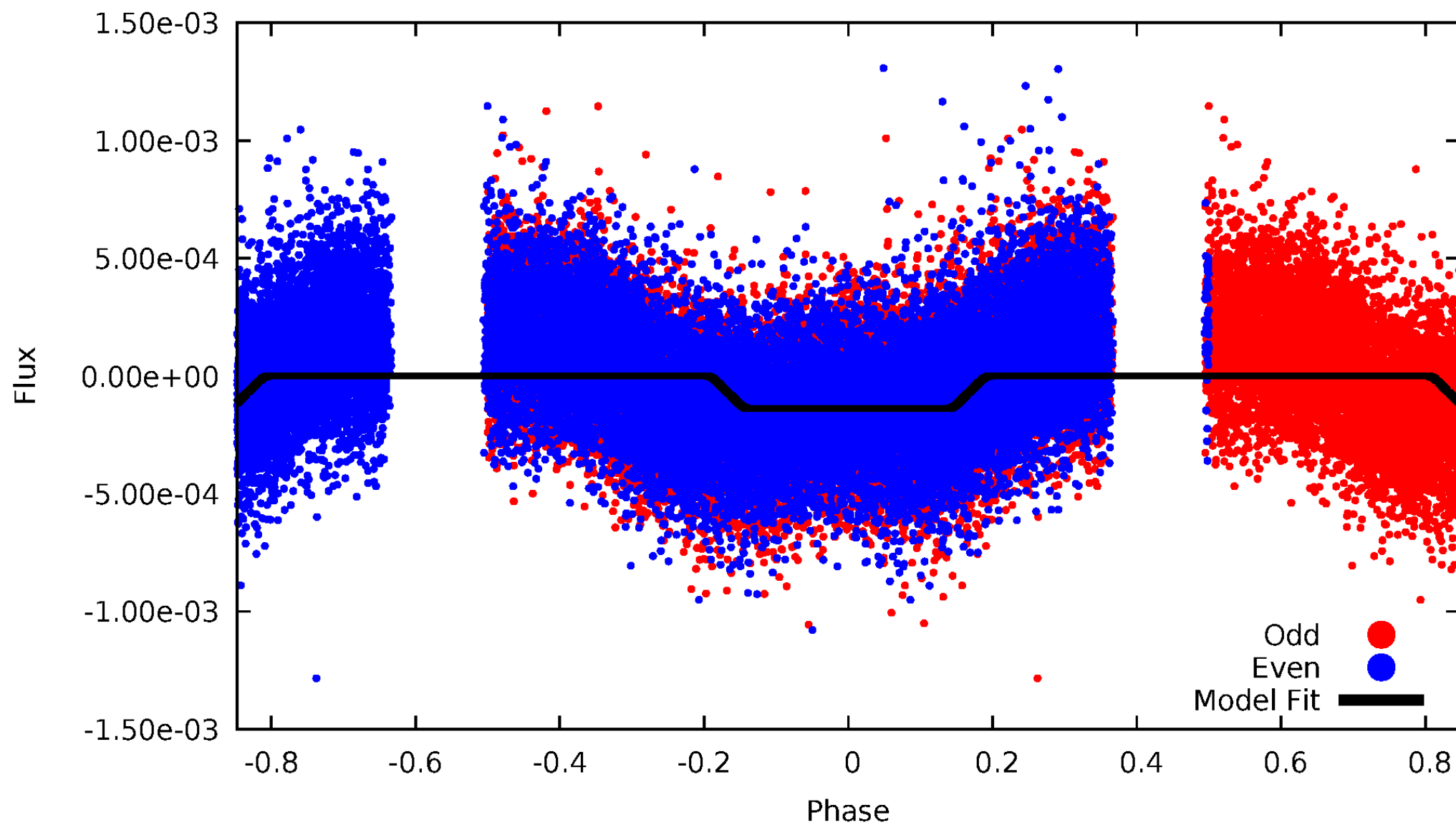
# DV Odd/Even

TCE 003970621-03

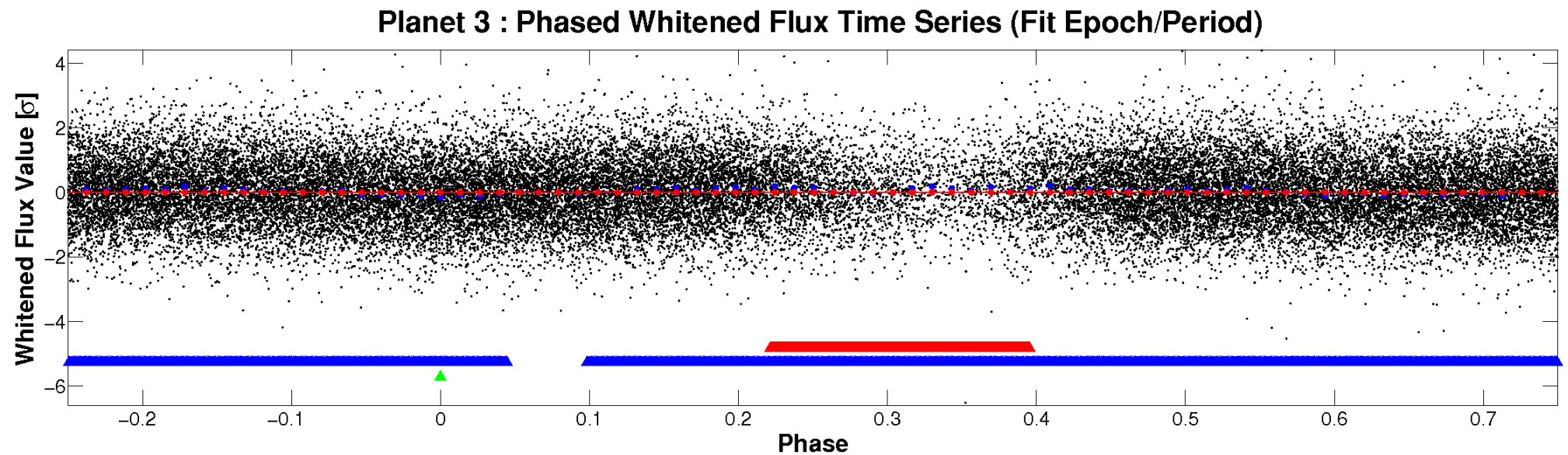
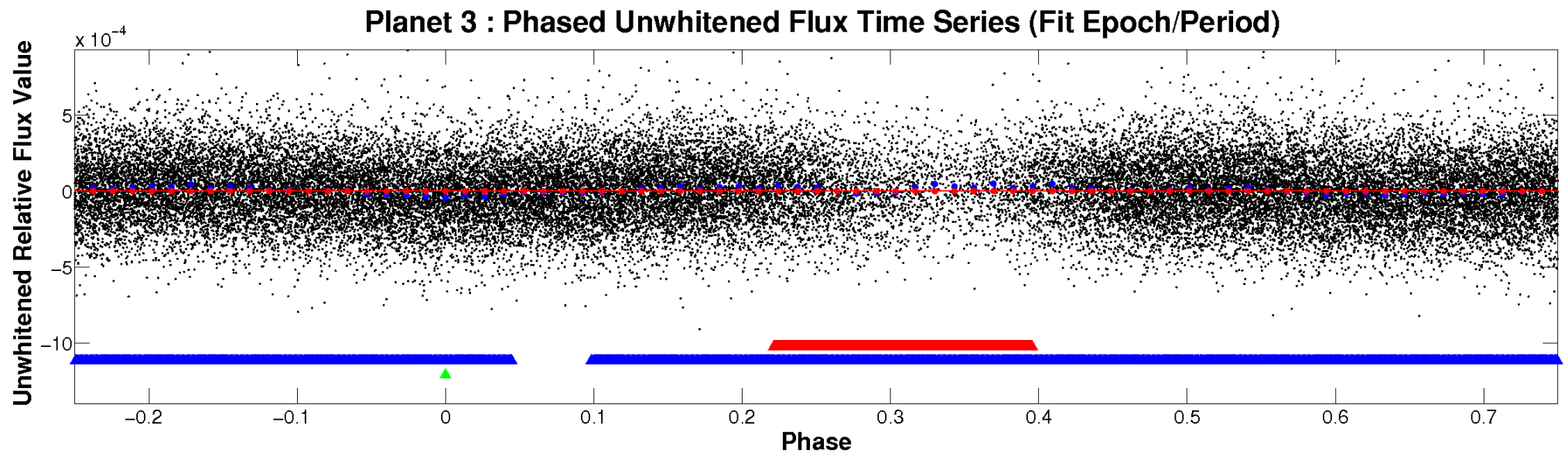


# ALT Odd/Even

TCE 003970621-03



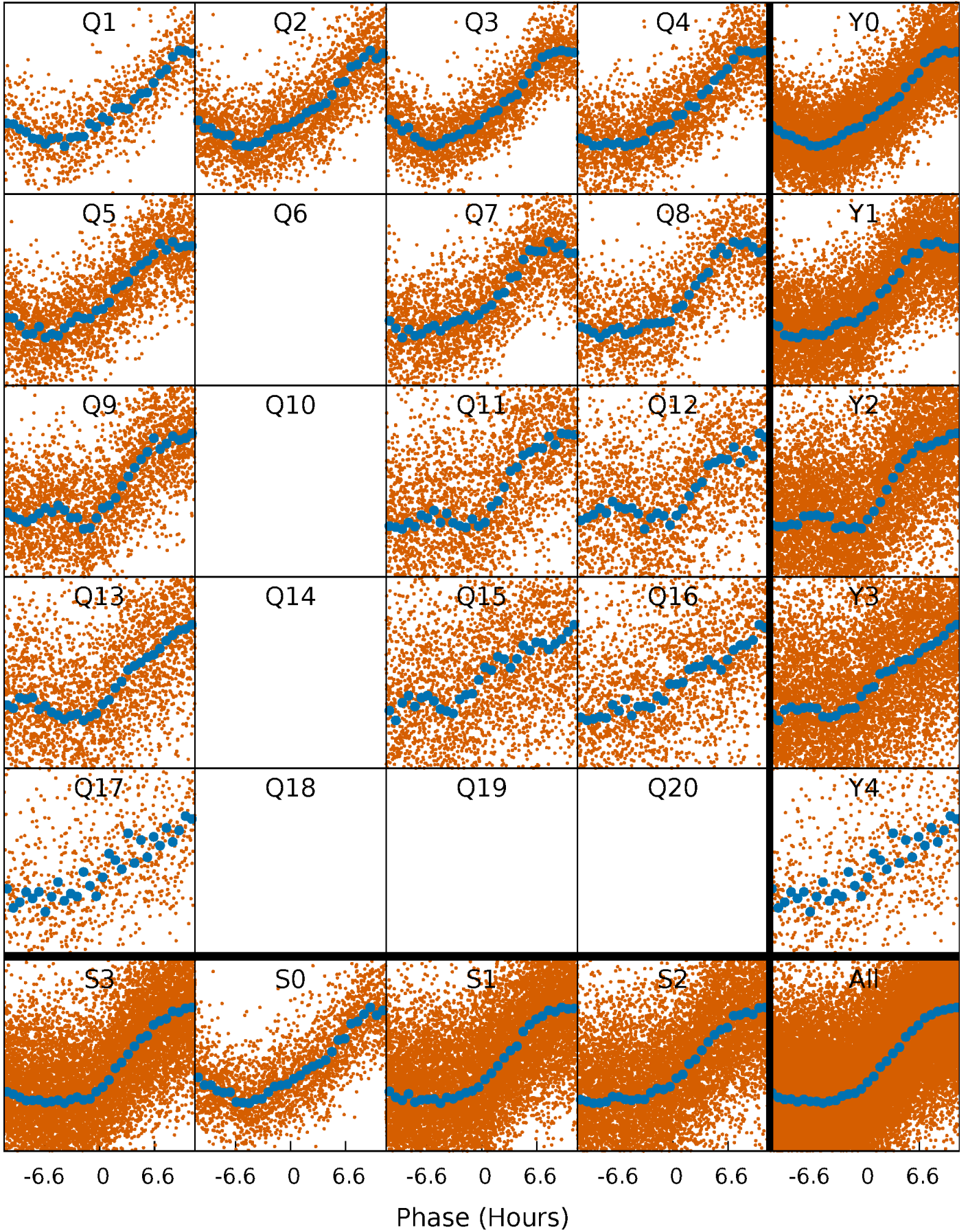
# Non-Whitened Vs. Whitened Light Curve





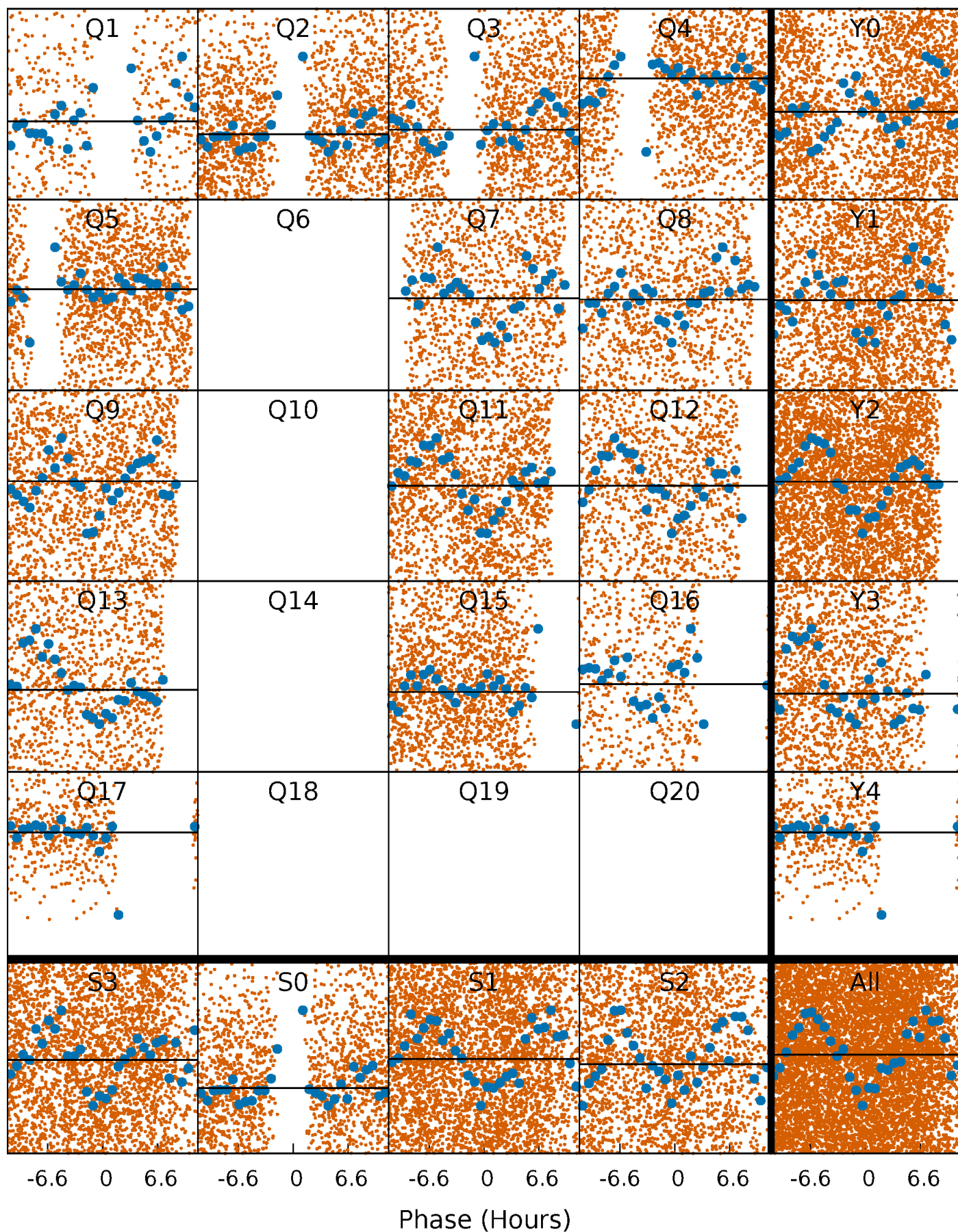
# PDC Quarter-Phased Transit Curves

TCE 003970621-03   P= 1.548315 Days    $T_0=131.791500$  (BKJD)



# DV Quarter-Phased Transit Curves

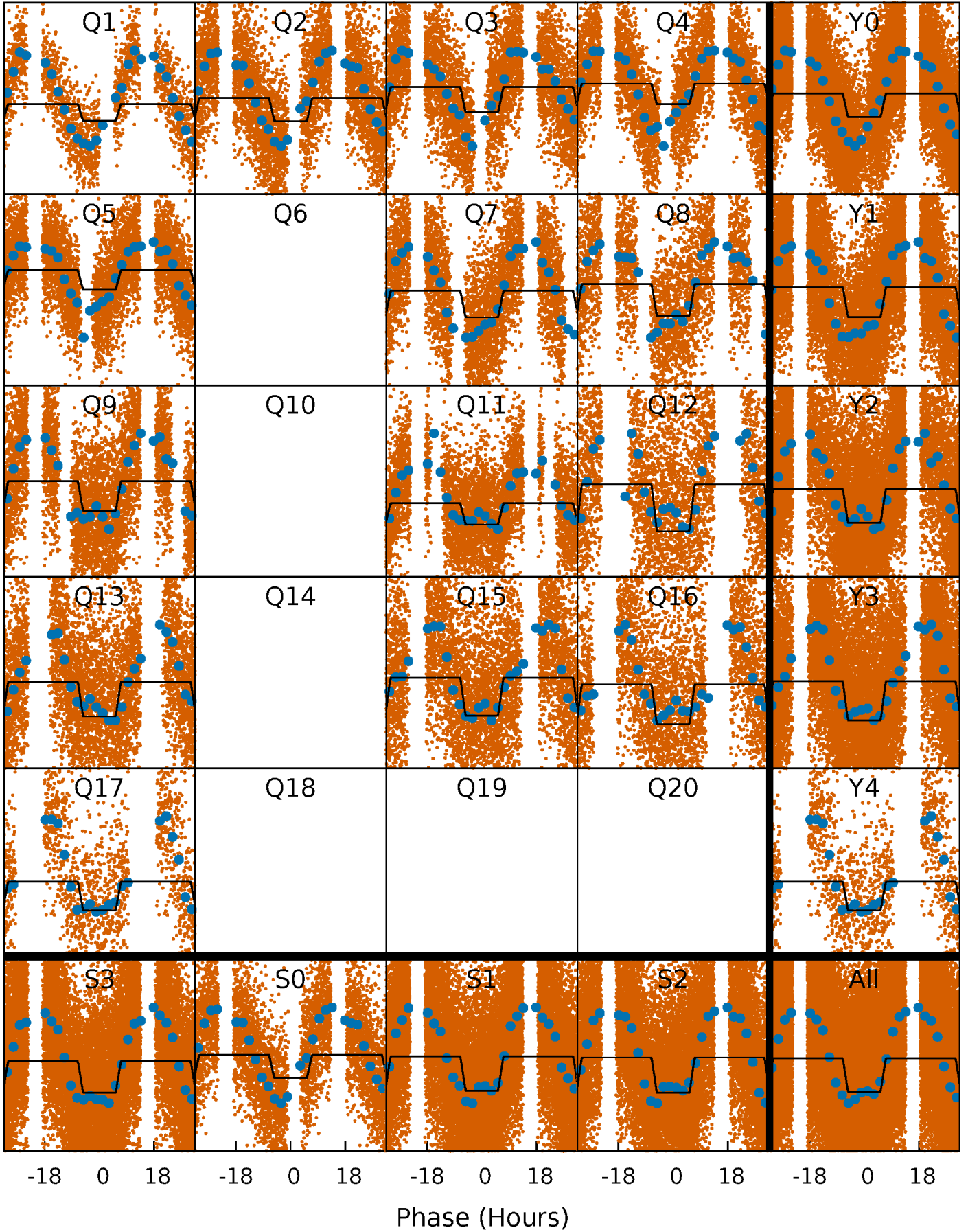
TCE 003970621-03 P= 1.548315 Days  $T_0=131.791500$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

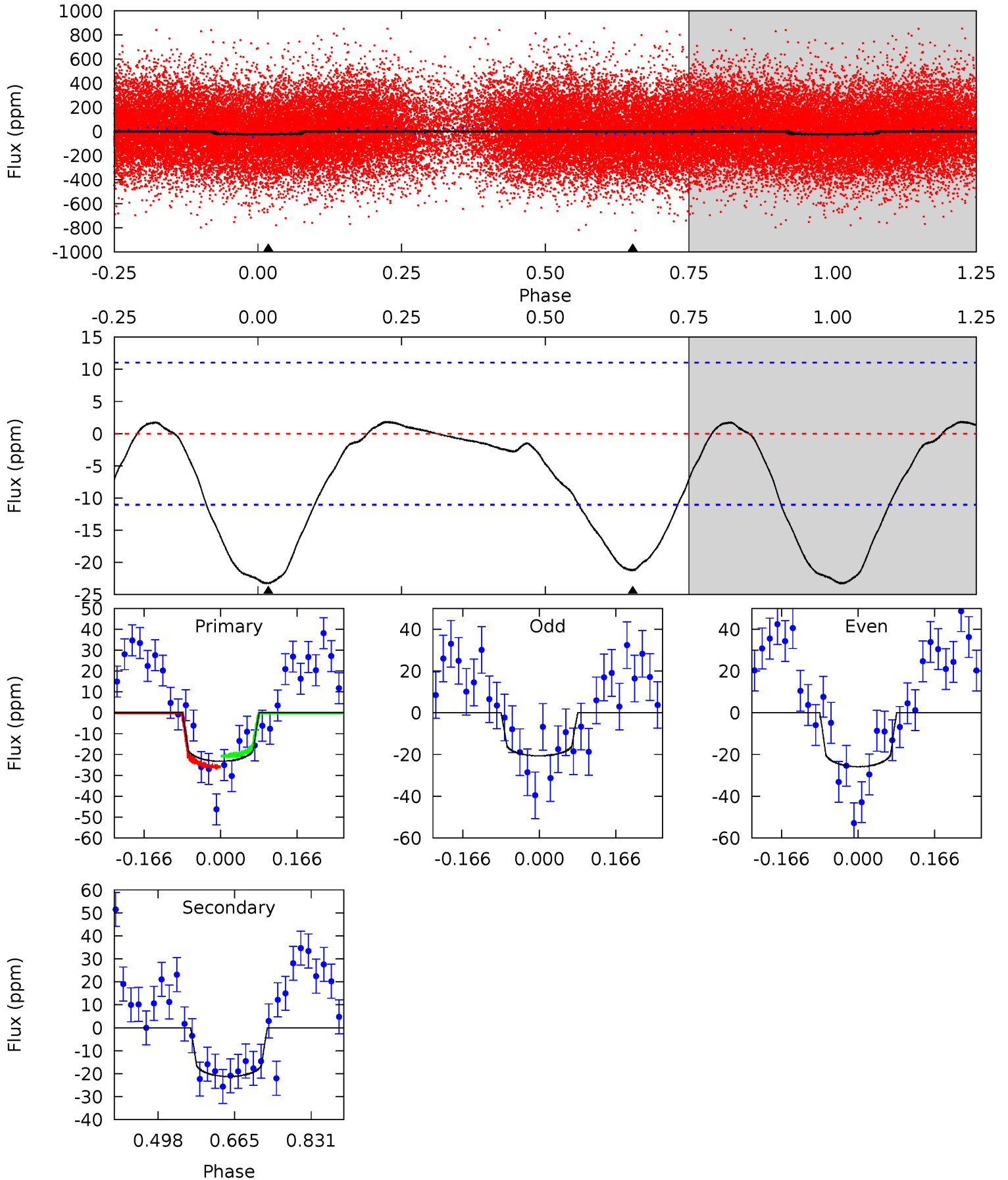
TCE 003970621-03 P= 1.548007 Days  $T_0=131.746134$  (BKJD)



# DV Model-Shift Uniqueness Test

003970621-03, P = 1.548315 Days, E = 130.243185 Days

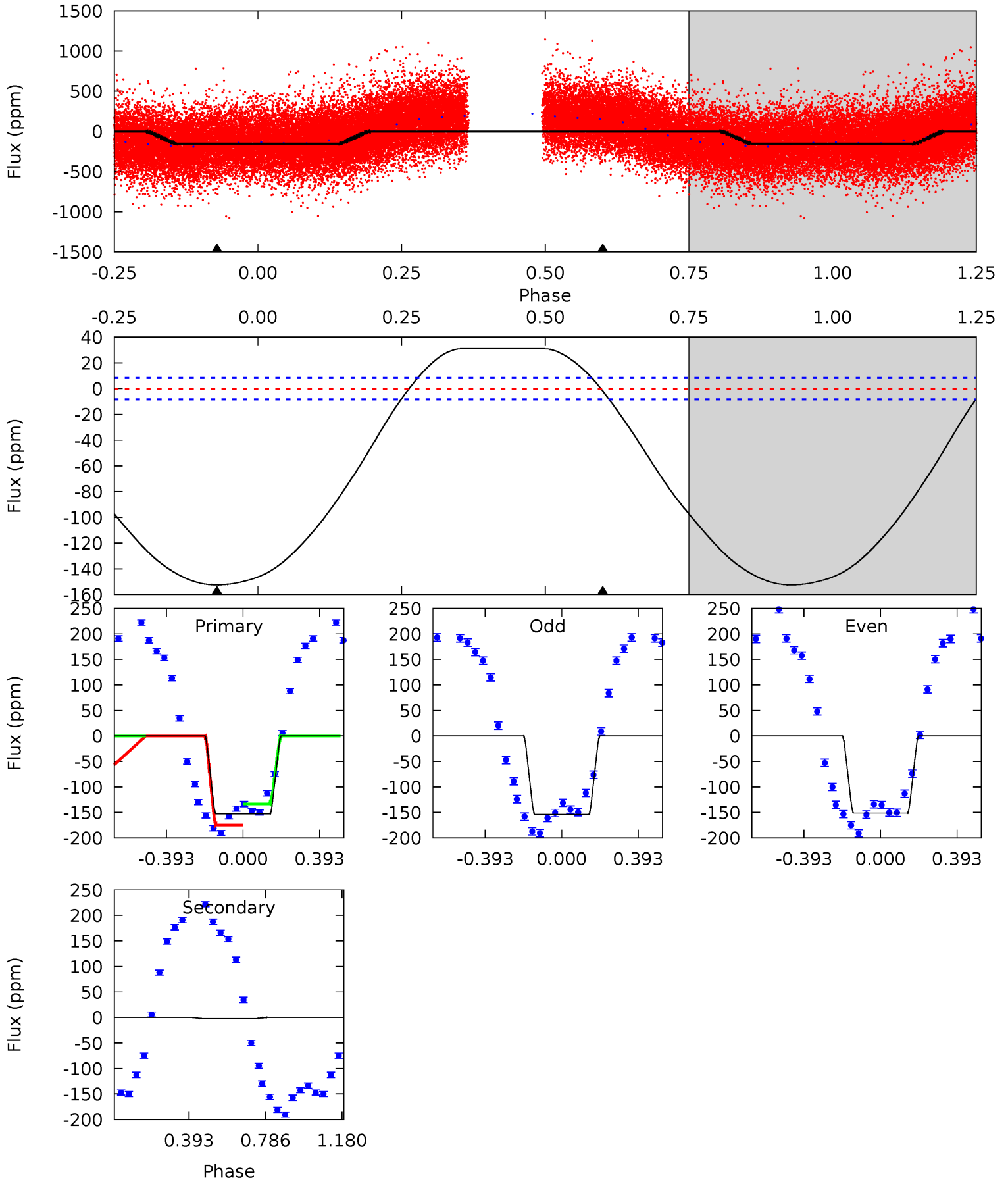
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
9.38	8.57	0	0	4.46	1.38	0.63	9.38	9.38	8.57	8.57	1.05	0.89	0.07	1.05



# Alt Model-Shift Uniqueness Test

003970621-03, P = 1.548007 Days, E = 130.198127 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
78.7	0.96	0	0	4.27	0.85	6.61	78.7	78.7	0.96	0.96	0.70	1.06	0.17	11.5



### Stellar Parameters For KIC 003970621

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6645^{+180}_{-220}$	$3.323^{+0.450}_{-0.050}$	$-0.420^{+0.400}_{-0.300}$	$5.014^{+0.272}_{-2.446}$	$1.932^{+0.137}_{-0.549}$	$0.022^{+0.095}_{-0.004}$
	+3%/-3%	+14%/-2%	+95%/-71%	+5%/-49%	+7%/-28%	+442%/-17%
Source	PHO1	FLK73	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 003970621-03 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-21 \pm 2$	$7.85^{+8.70}_{-5.45}$	$4946^{+265}_{-510}$	$-3438^{+9788}_{-746}$	$0.197^{+2.050}_{-0.152}$
Alt.	$-2 \pm 2$	$10.04^{+10.43}_{-6.68}$	$4955^{+251}_{-534}$	$-4218^{+583}_{-215}$	$0.007^{+0.081}_{-0.008}$

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

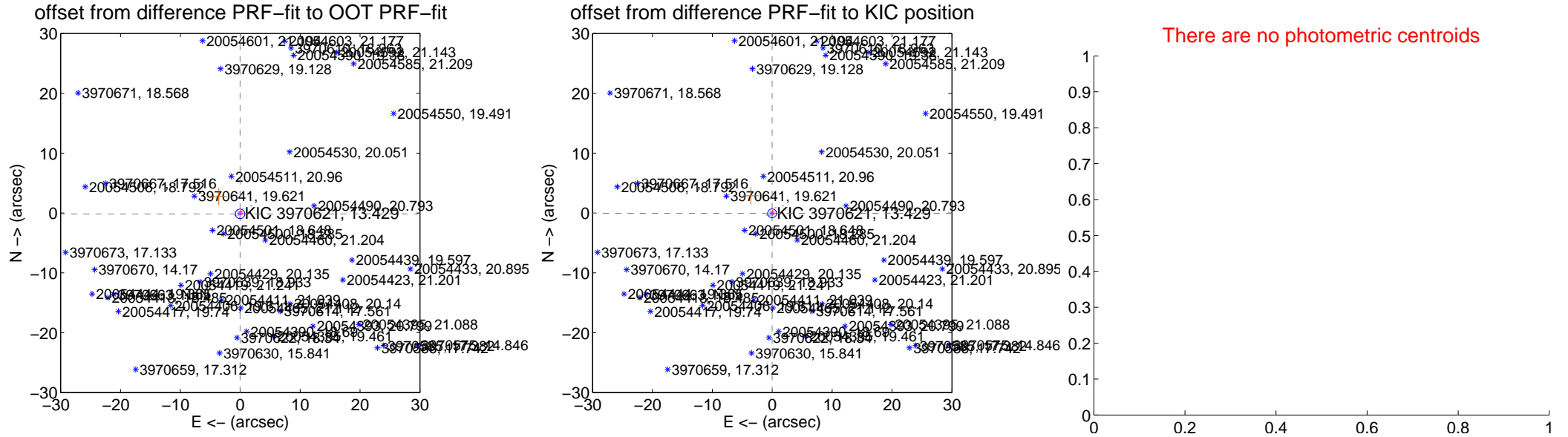
## DV Centroid Data

Supplemental centroid analysis for 003970621-03. Kepler magnitude: 13.43. Transit SNR 0.00

There are 11 quarters with good PRF difference image offsets

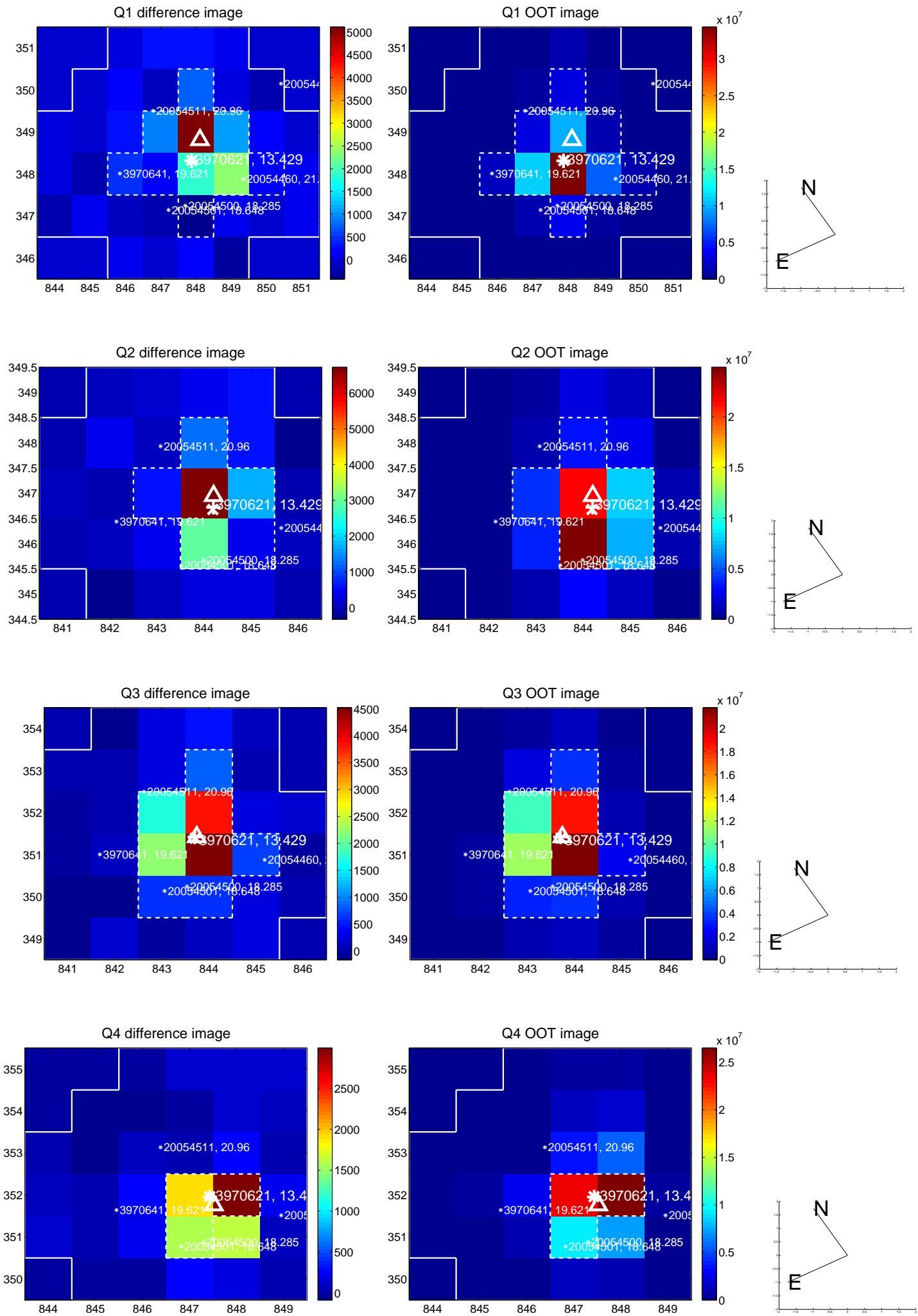
The direct PRF centroid is offset from the target star catalog position by about 0.14 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.147 \pm 0.265$	0.56	$0.032 \pm 0.339$	$-0.143 \pm 0.292$
PRF-fit source offset from KIC position	$0.059 \pm 0.246$	0.24	$0.018 \pm 0.333$	$-0.056 \pm 0.299$
photometric centroid source offset	—	—	—	—



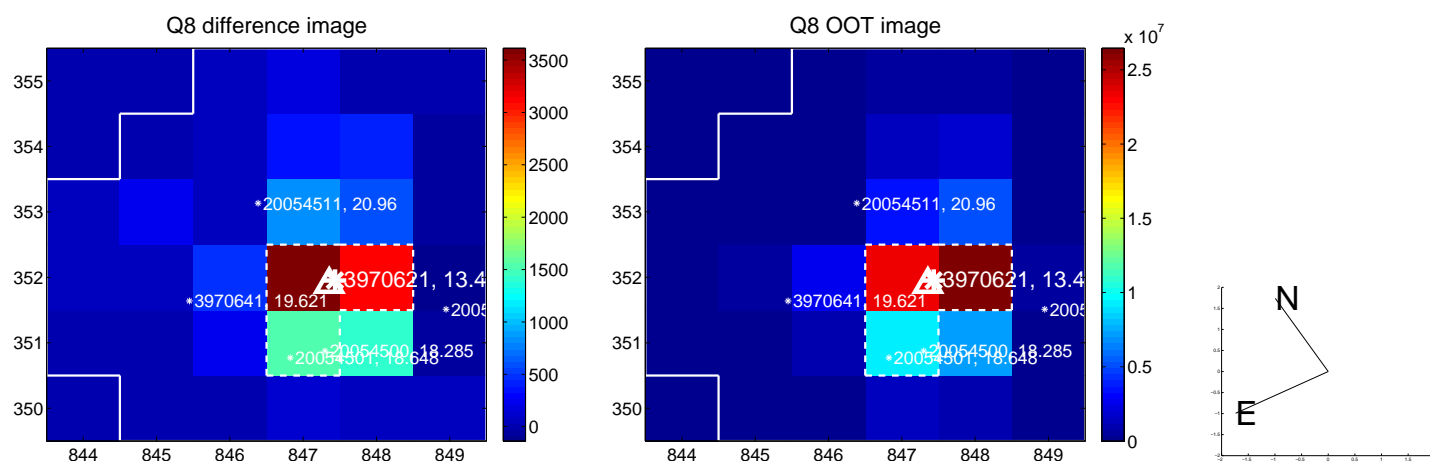
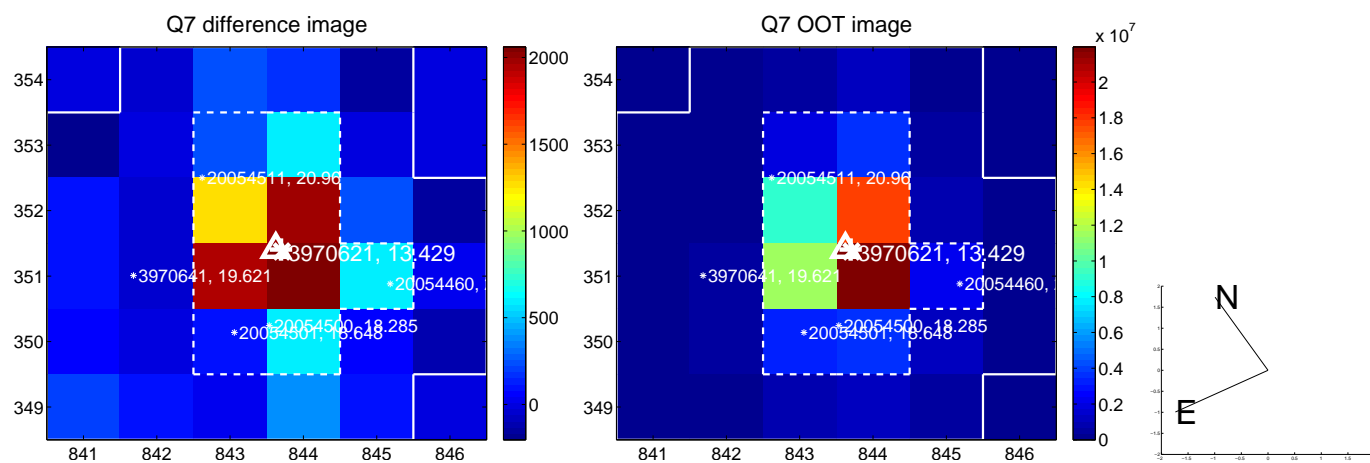
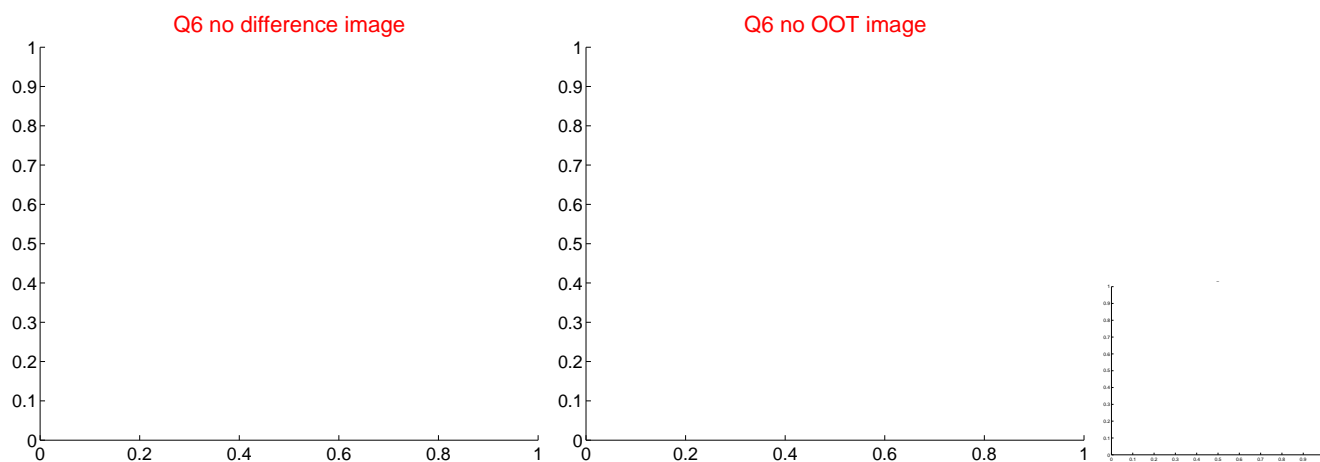
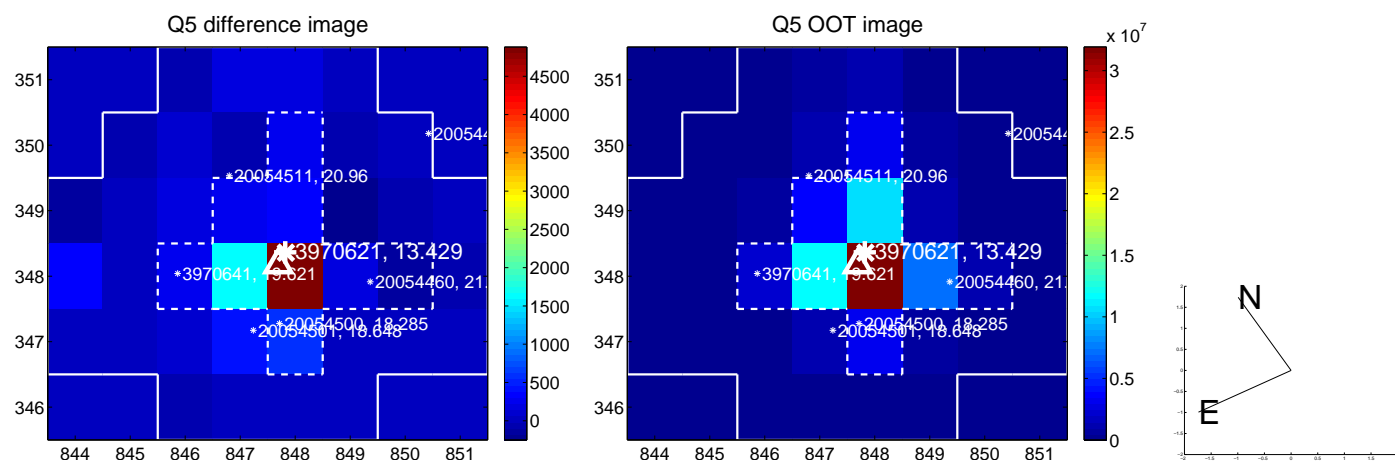
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

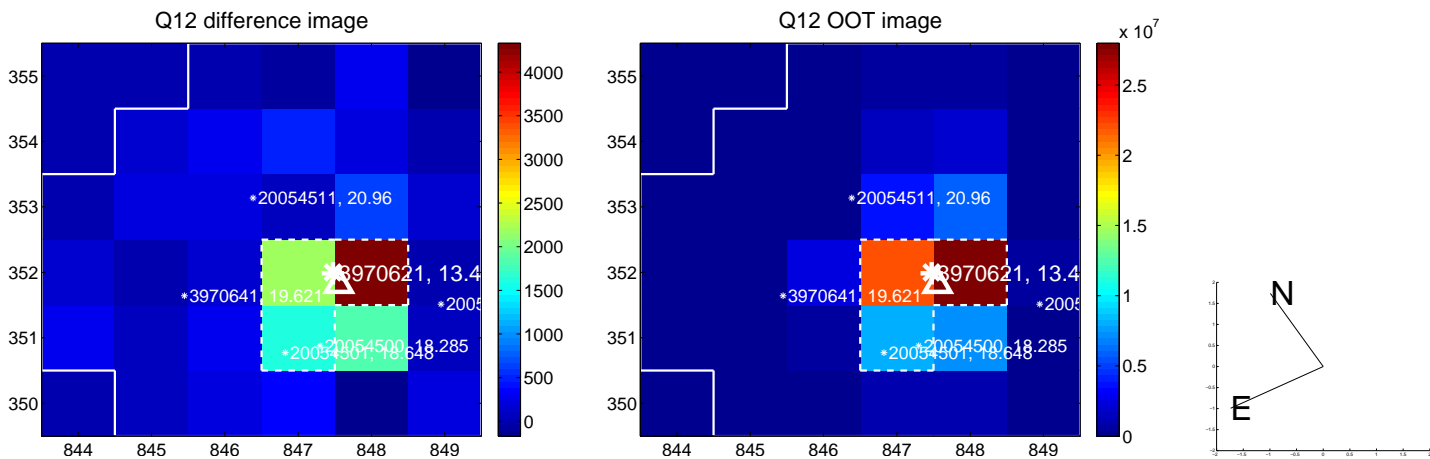
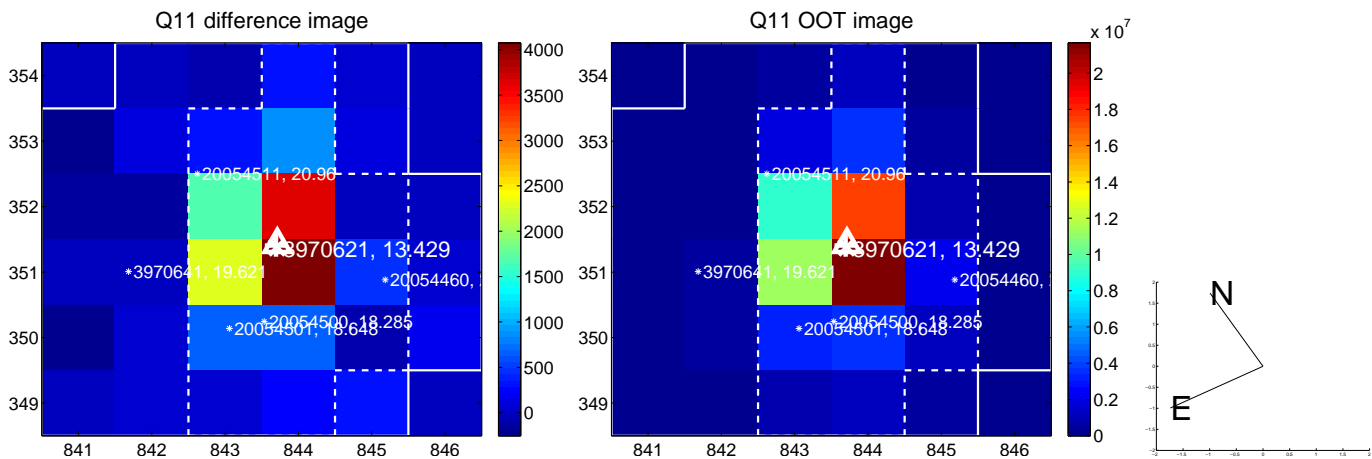
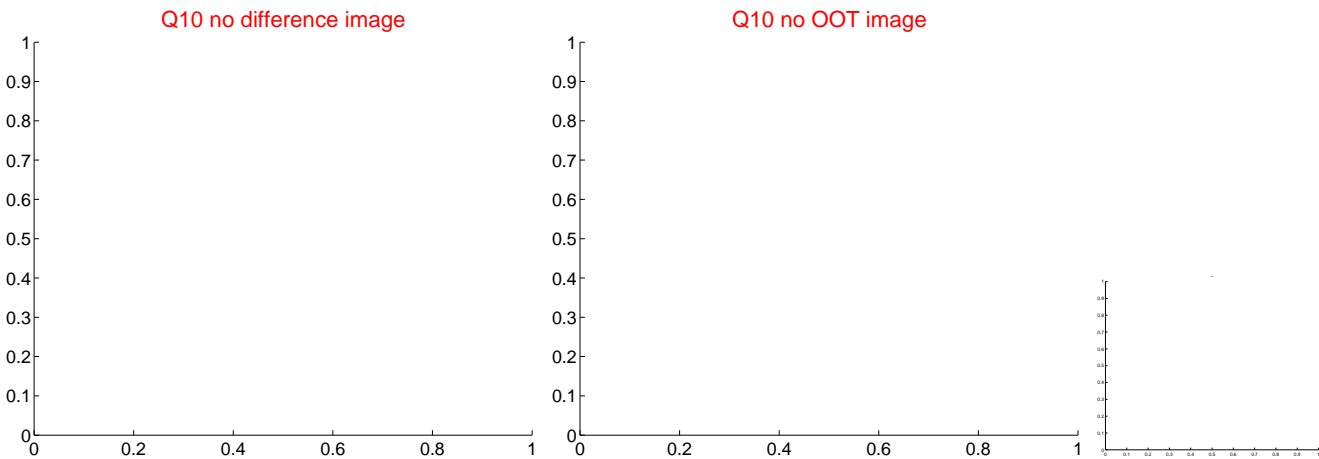
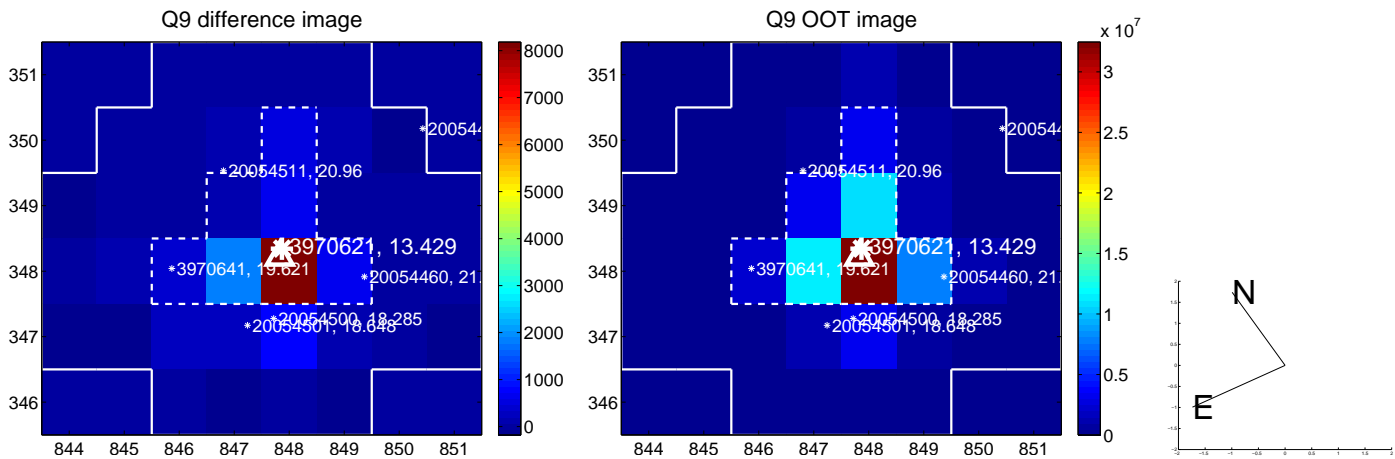




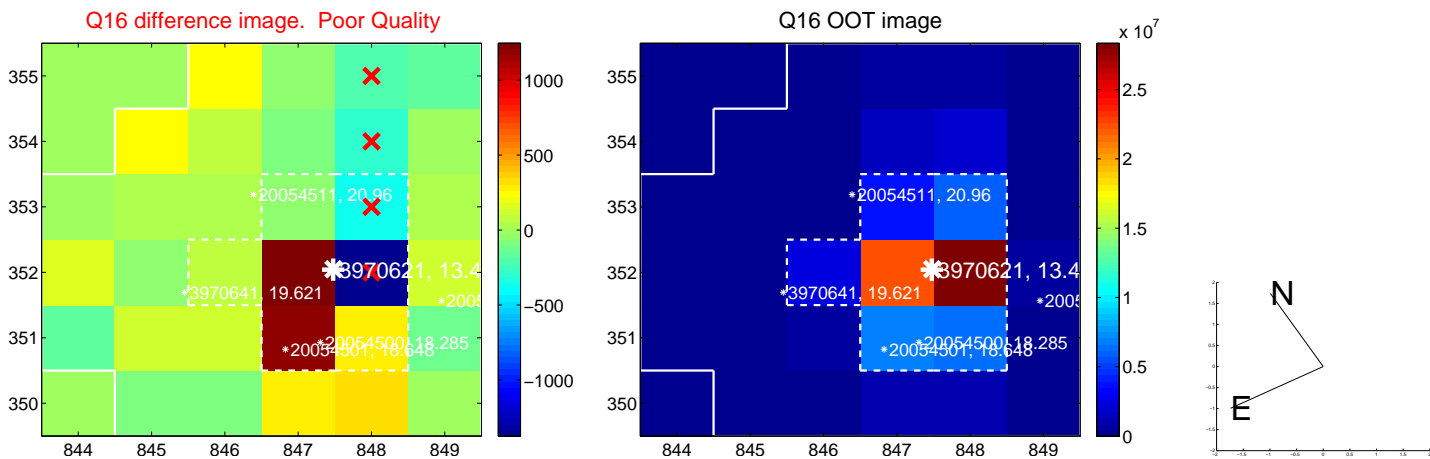
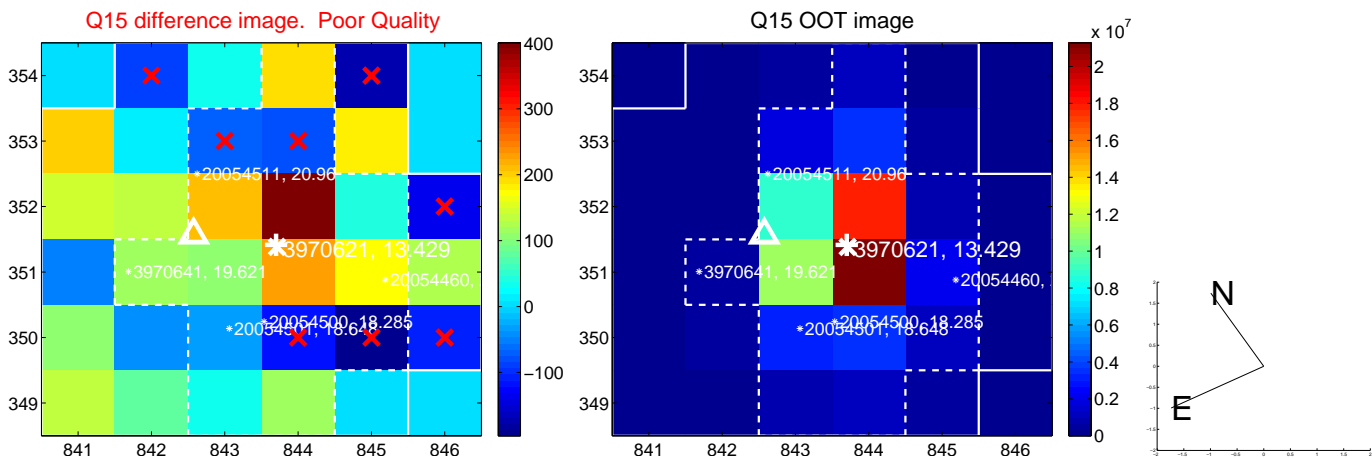
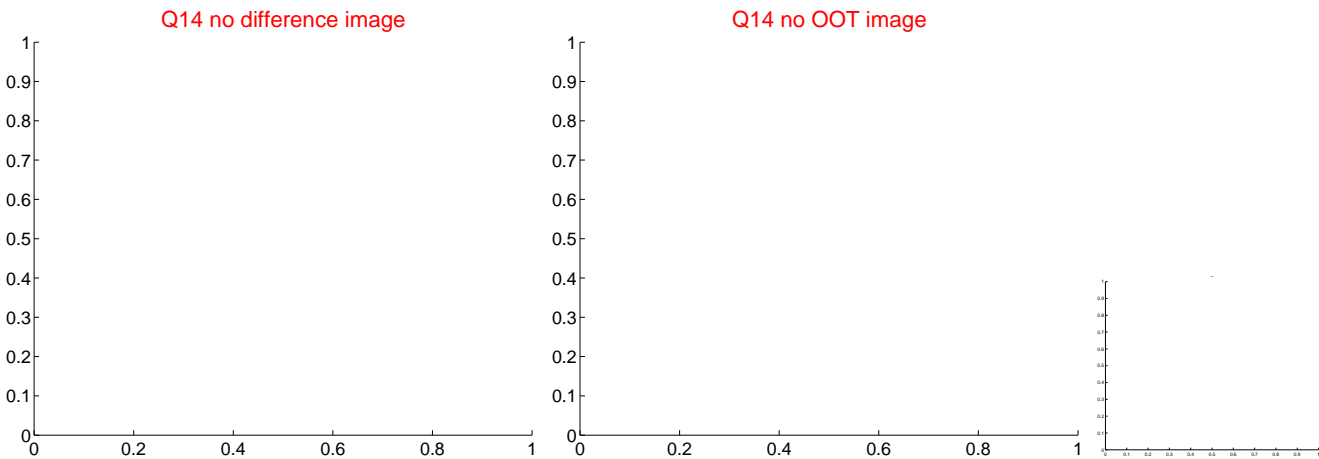
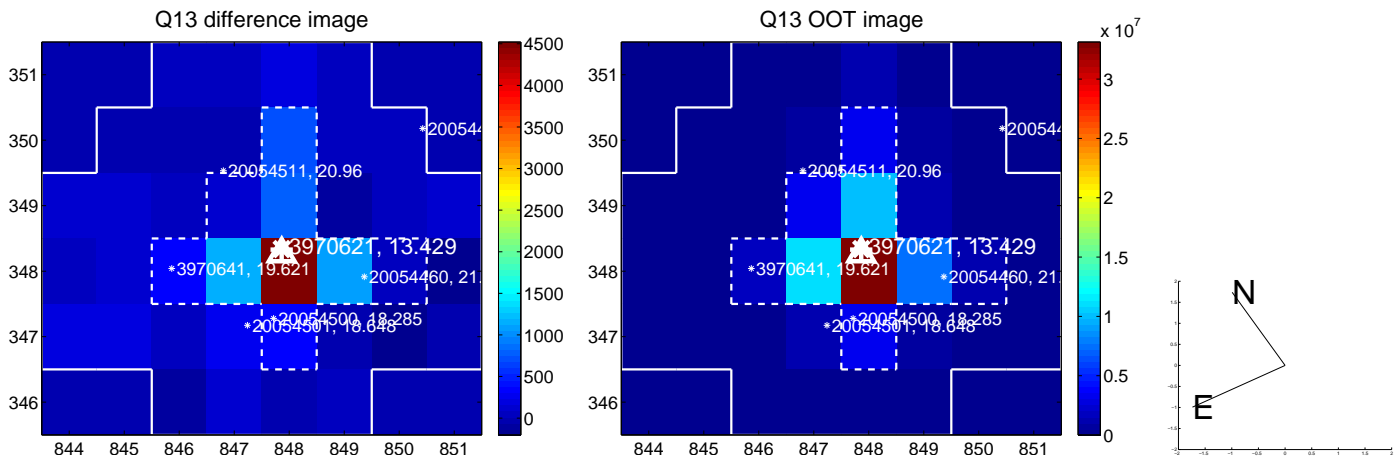
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



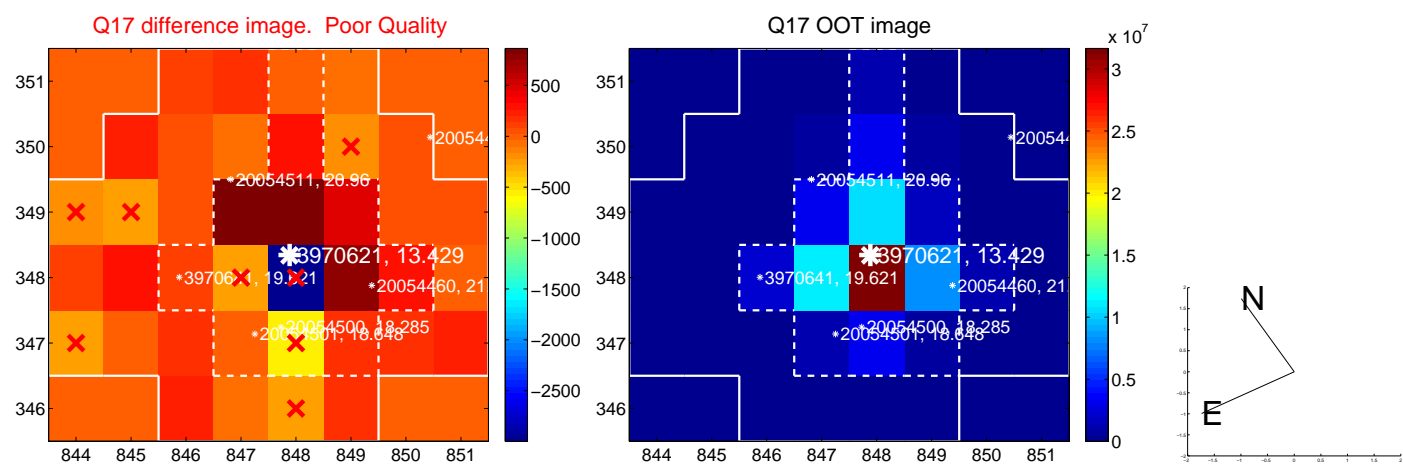
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

