

# KIC 003345973

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
003345973-01	OBS	7652.01	15.346397	143.825241	219.6	5.162	10.7	10.4	2.26	6771	3.94	480.96
003345973-02	OBS	No	1.218657	131.752553	47.4	6.910	8.6	9.1	2.26	6771	1.57	14090.98
003345973-03	OBS	No	83.235609	155.072882	471.3	7.505	19.5	7.0	2.26	6771	5.17	50.47
003345973-04	OBS	No	86.479415	143.283783	341.2	36.687	17.5	6.5	2.26	6771	5.08	47.96
003345973-05	OBS	No	92.144154	216.274303	363.5	17.893	10.0	6.0	2.26	6771	4.96	44.07
003345973-06	OBS	No	100.093604	194.394859	813.2	1.716	8.8	6.7	2.26	6771	6.92	39.47

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
003345973-01	OBS	FP	0.00	0	0	1	0	CENT_RESOLVED_OFFSET—HALO_GHOST
003345973-02	OBS	FP	0.00	1	0	1	0	LPP_DV—CENT_RESOLVED_OFFSET
003345973-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—CENT_KIC_POS
003345973-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS
003345973-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_KIC_POS—CENT_UNCERTAIN
003345973-06	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_TRACKER—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST

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

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

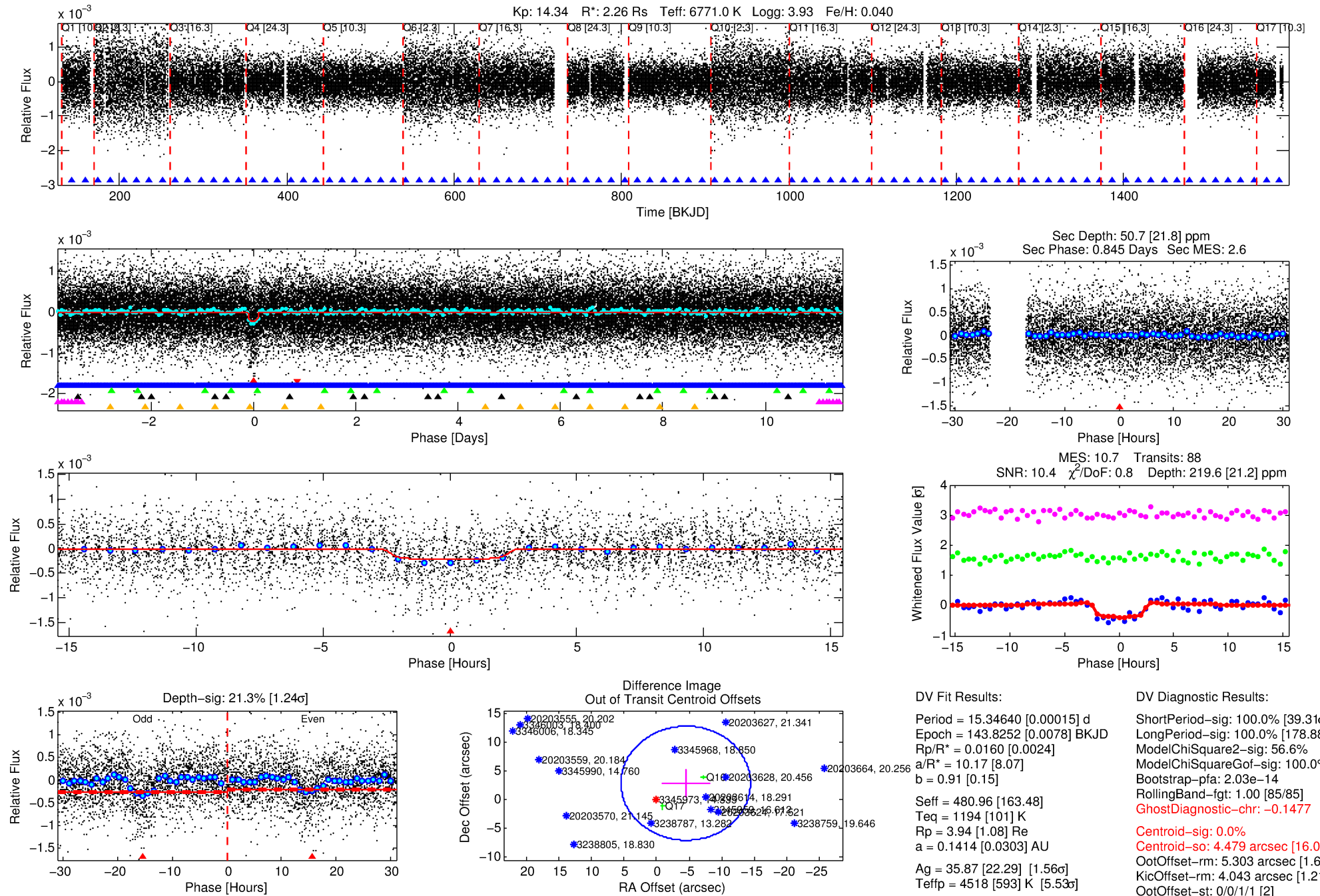
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 003345973-01

No Significant Match Found

# DV One-Page Summary

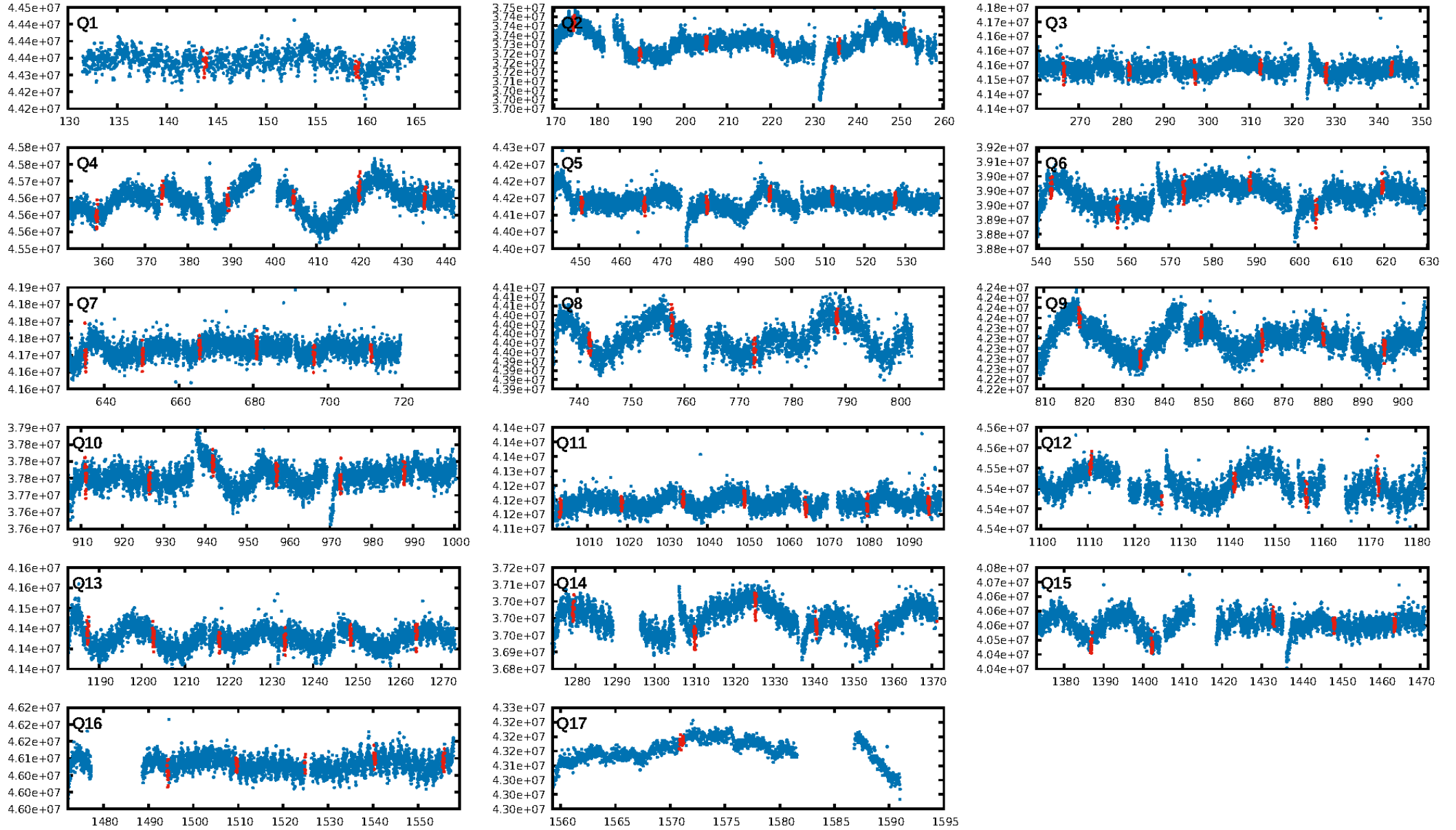
KIC: 3345973 Candidate: 1 of 6 Period: 15.346 d



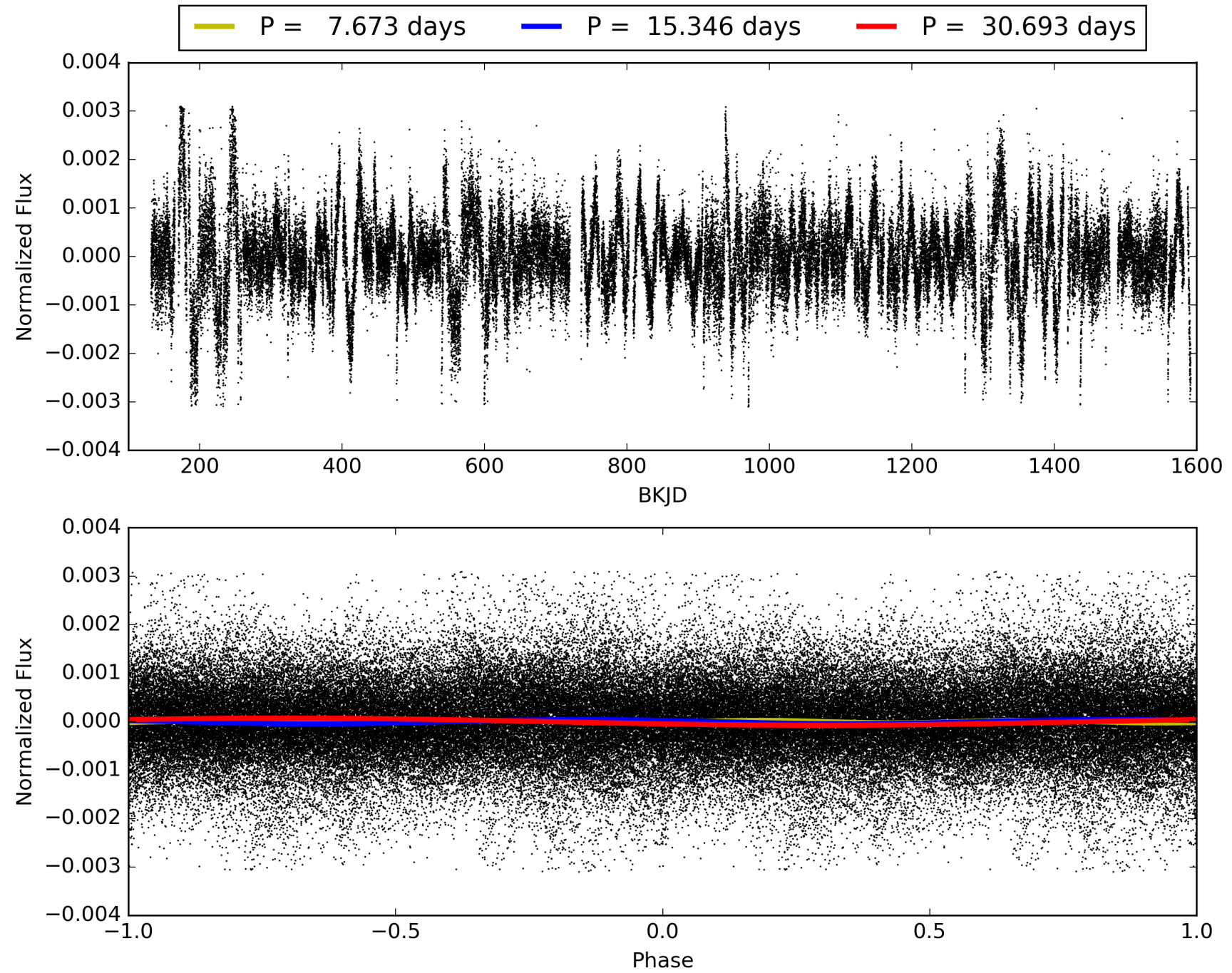
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 21:20:07 Z

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

# TCE 003345973-01, PDC Light Curves



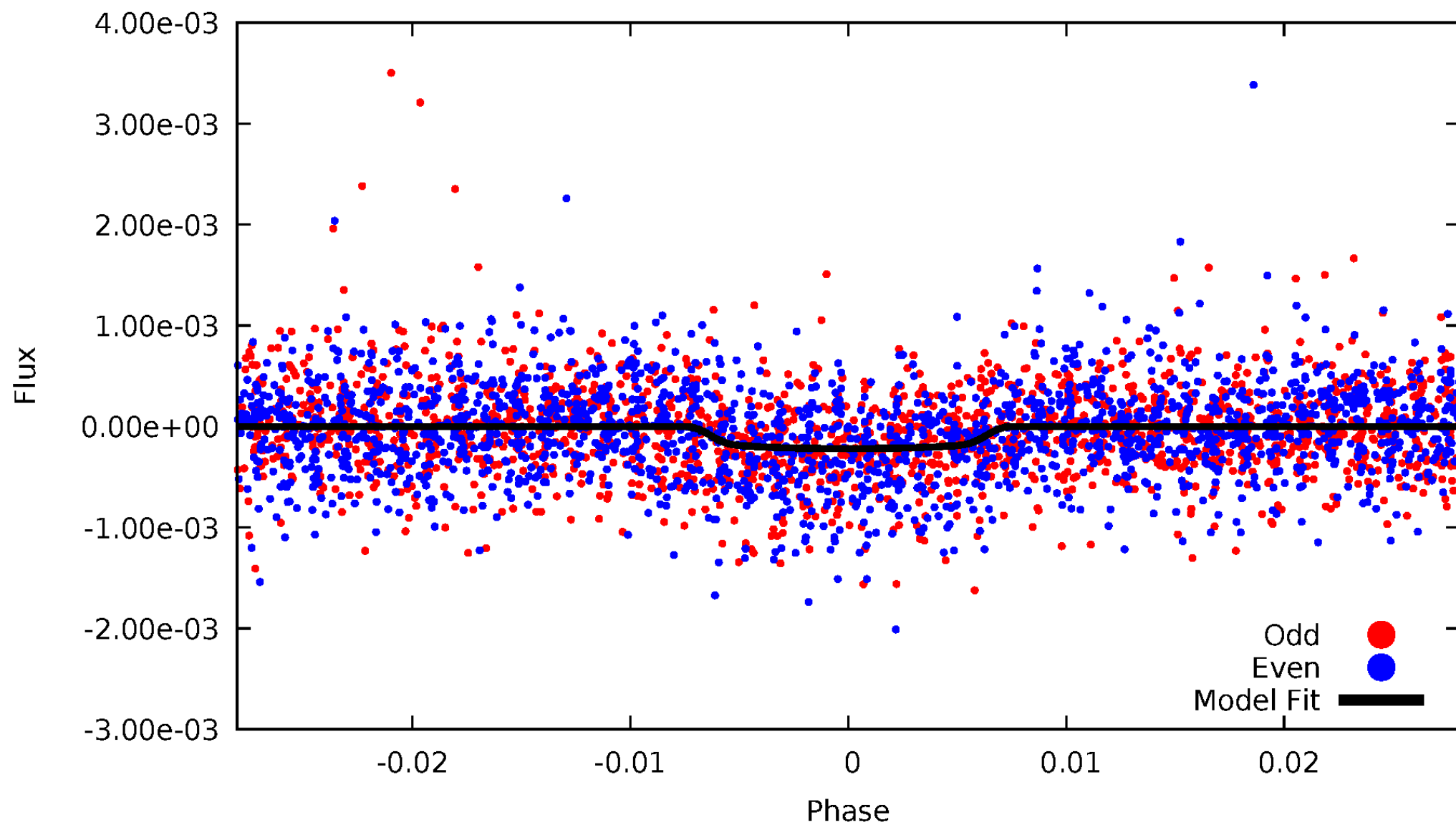
TCE 003345973-01





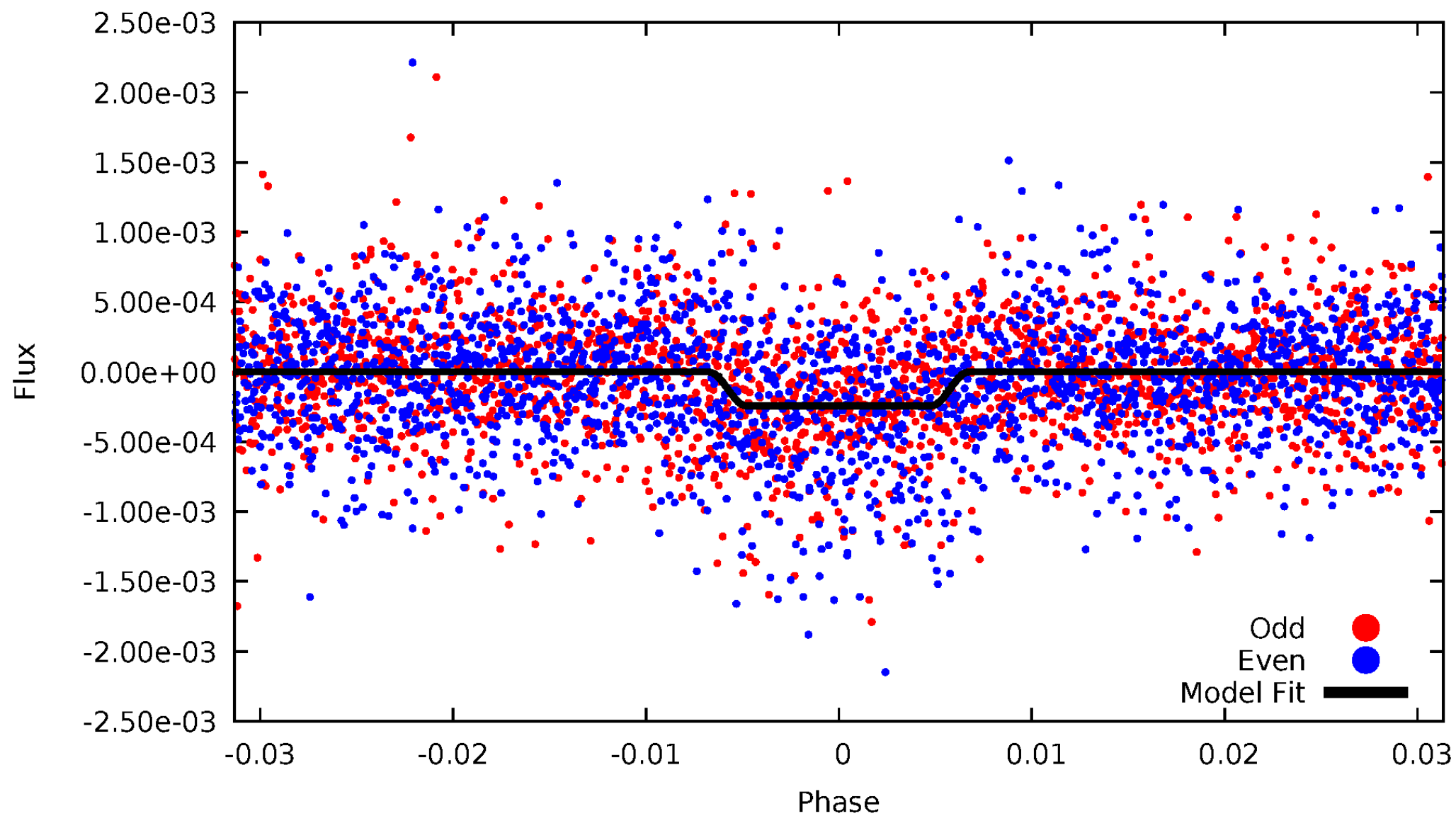
# DV Odd/Even

TCE 003345973-01



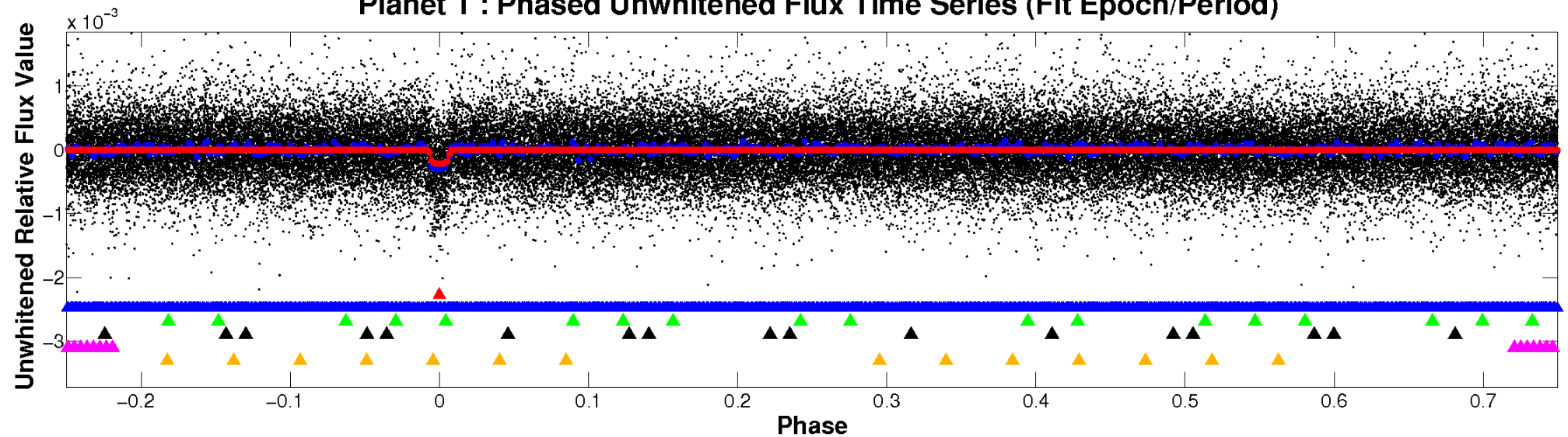
# ALT Odd/Even

TCE 003345973-01

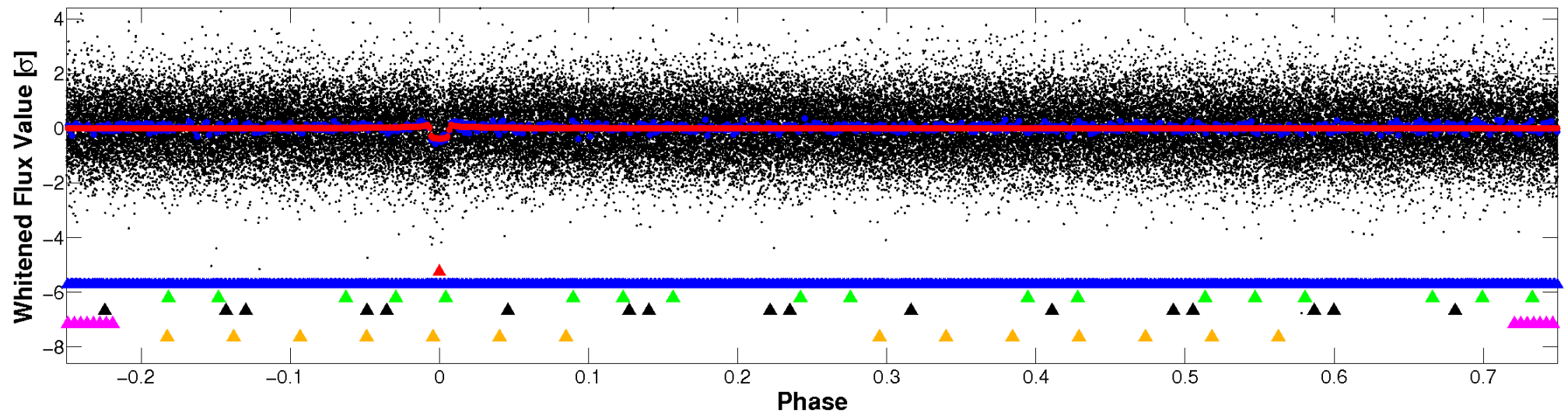


# Non-Whitened Vs. Whitened Light Curve

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

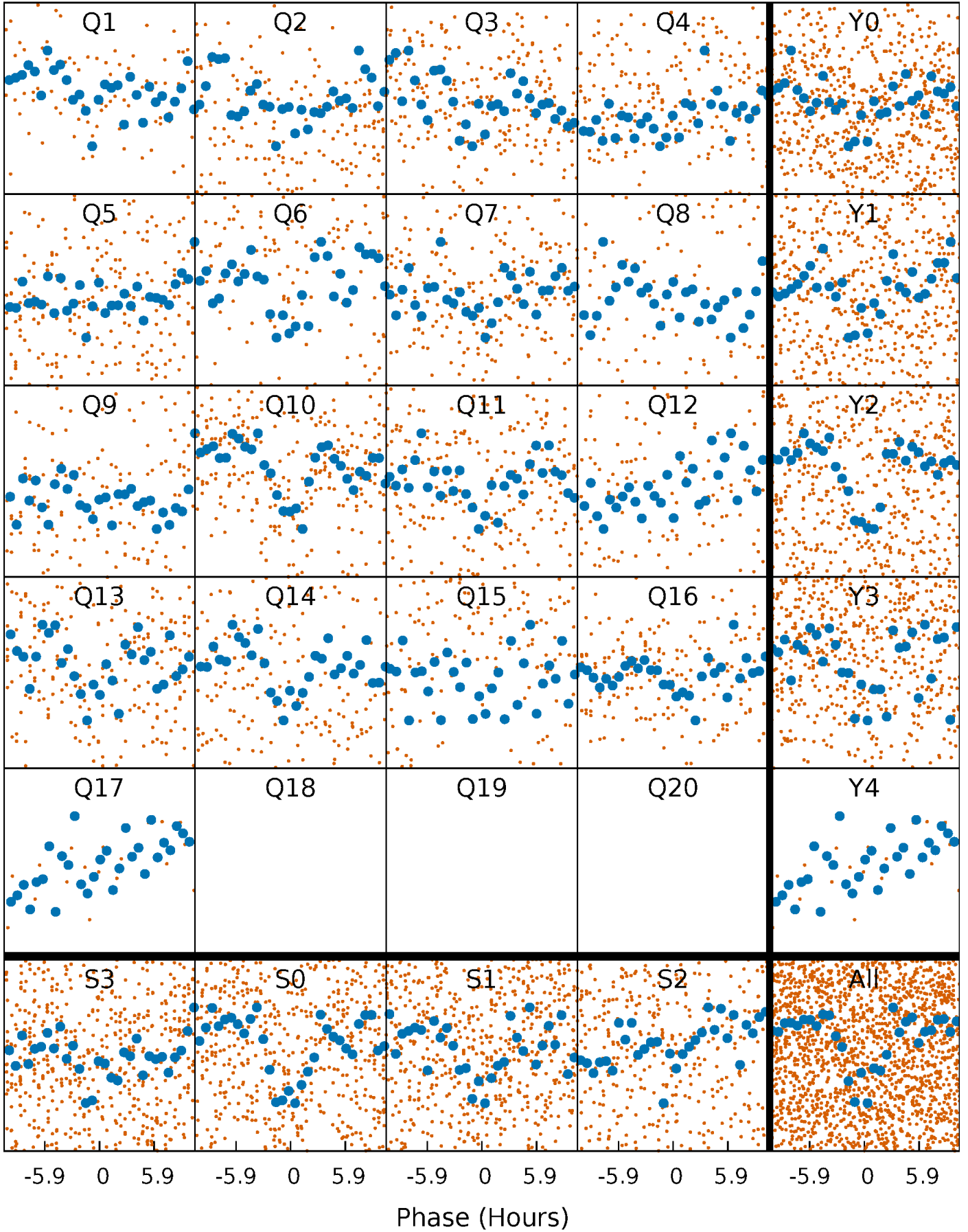


## Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

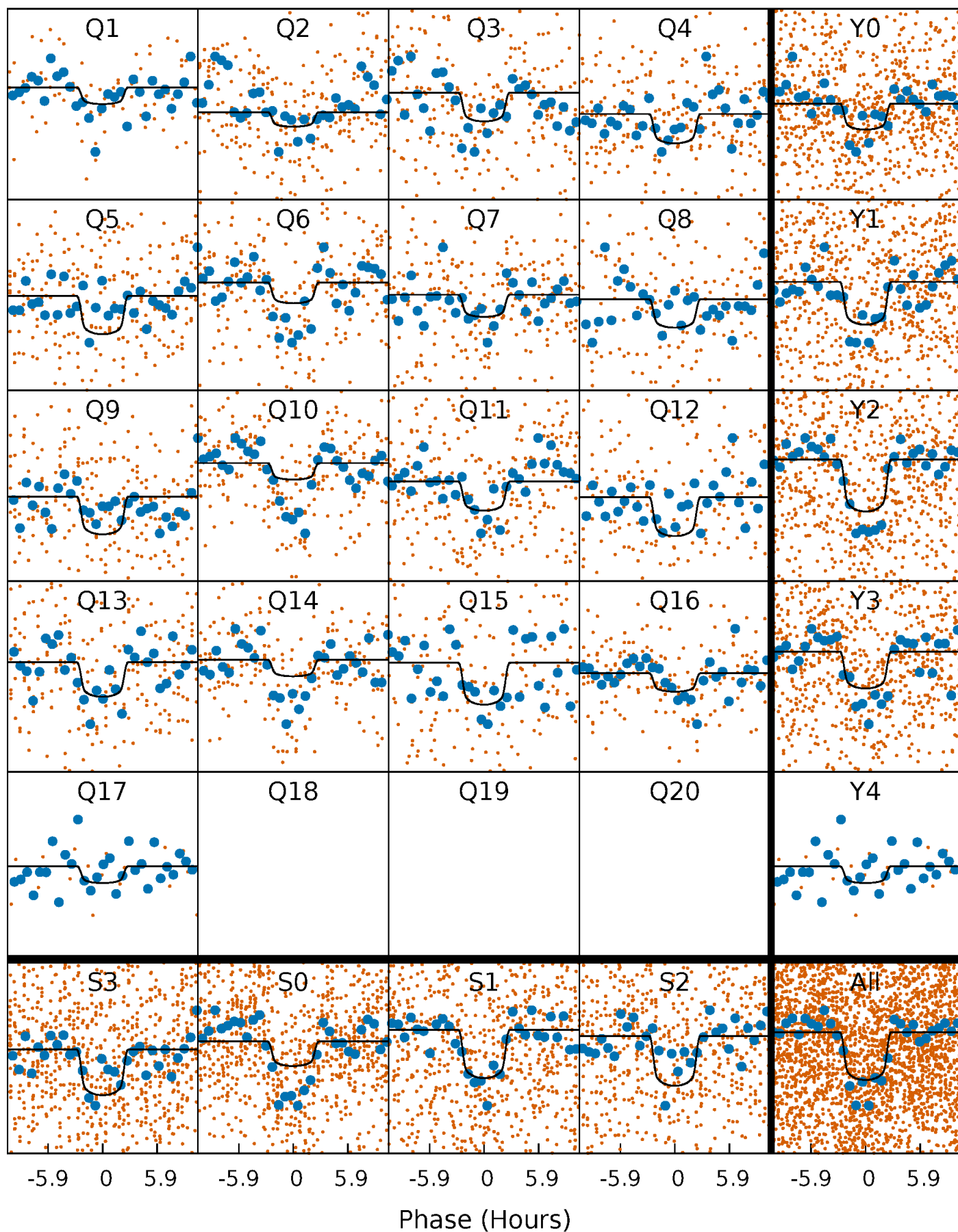
TCE 003345973-01 P= 15.346397 Days  $T_0=143.825241$  (BKJD)





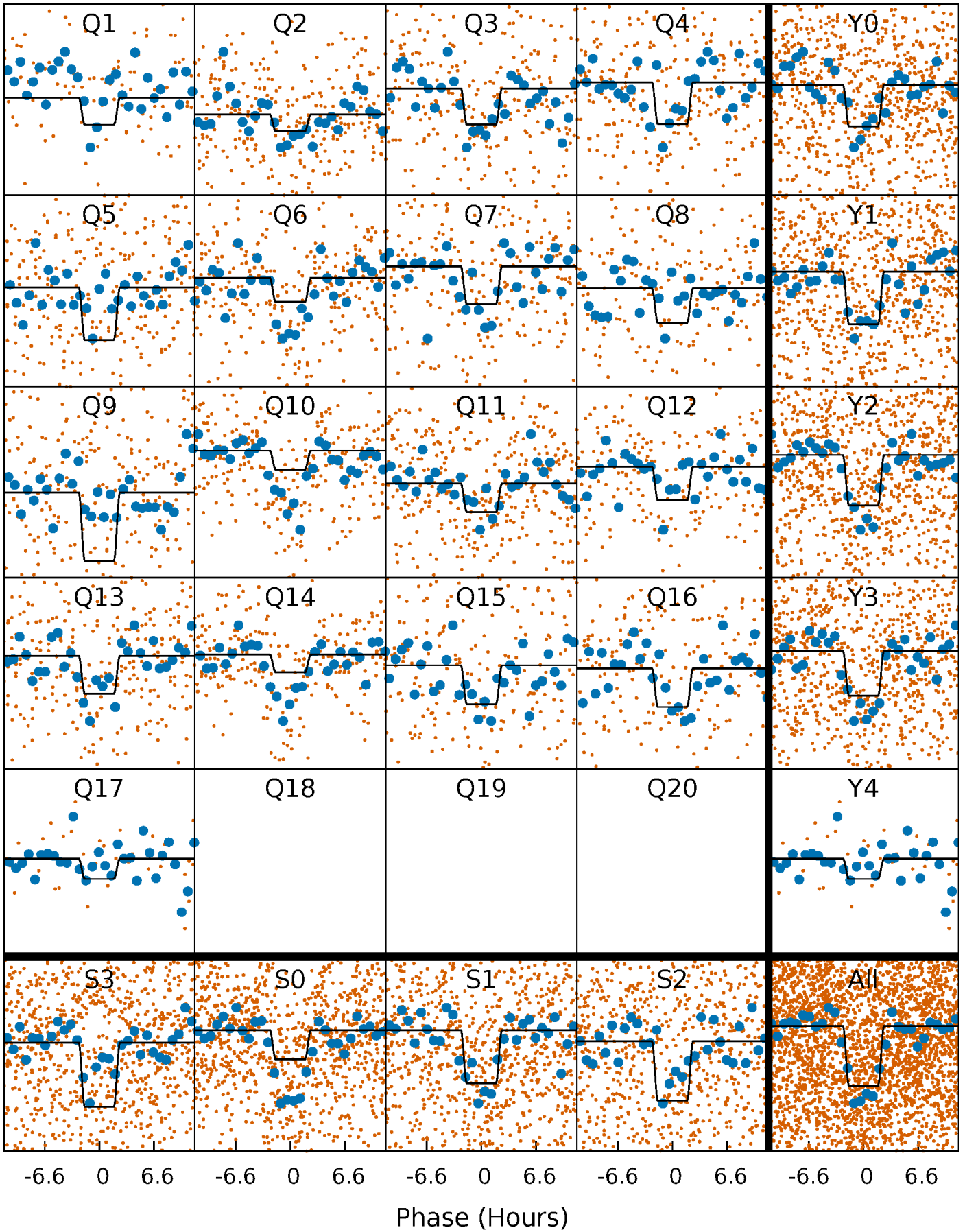
# DV Quarter-Phased Transit Curves

TCE 003345973-01 P= 15.346397 Days  $T_0=143.825241$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

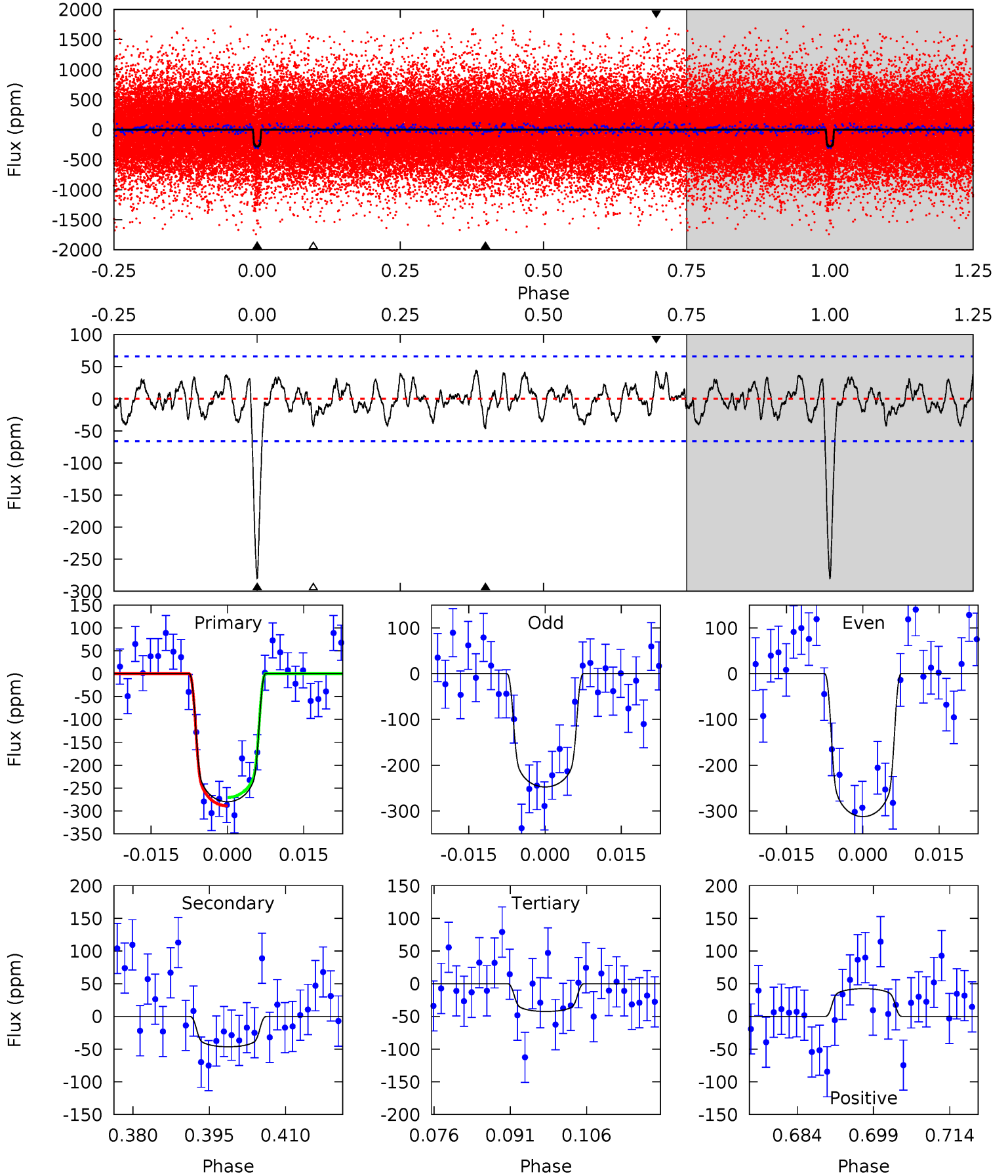
TCE 003345973-01 P= 15.346826 Days  $T_0=143.800099$  (BKJD)



# DV Model-Shift Uniqueness Test

003345973-01, P = 15.346397 Days, E = 128.478844 Days

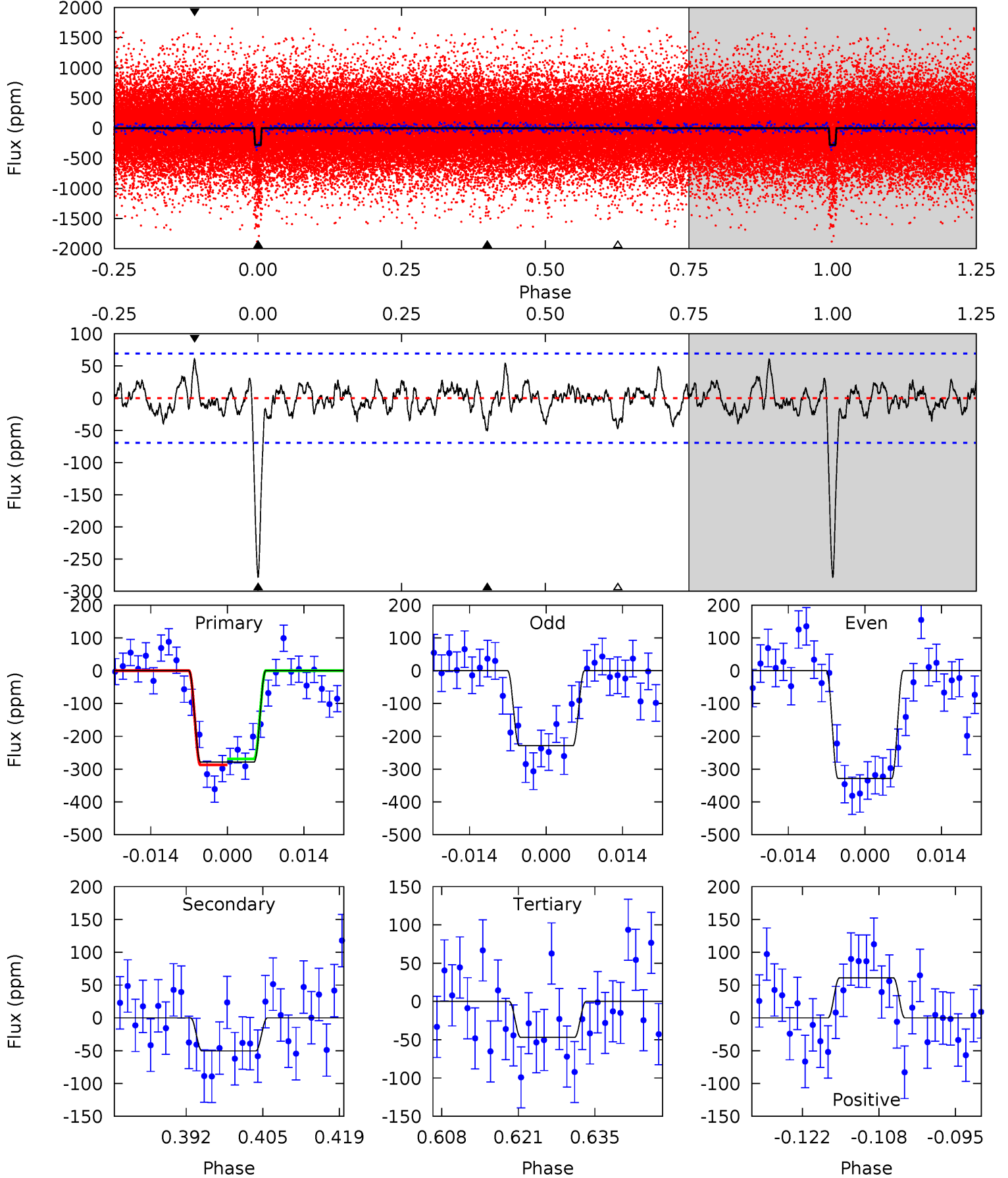
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
20.9	3.48	3.18	3.17	4.95	2.43	1.36	17.8	17.8	0.30	0.31	2.43	1.17	0.14	0.69



# Alt Model-Shift Uniqueness Test

003345973-01, P = 15.346826 Days, E = 128.453273 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
19.9	3.61	3.37	4.37	4.97	2.47	1.21	16.6	15.6	0.24	-0.76	3.58	1.11	0.18	0.66





### Stellar Parameters For KIC 003345973

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6771^{+81}_{-81}$	$3.934^{+0.195}_{-0.120}$	$0.040^{+0.150}_{-0.150}$	$2.259^{+0.426}_{-0.521}$	$1.597^{+0.131}_{-0.180}$	$0.195^{+0.199}_{-0.074}$
	+1%/-1%	+5%/-3%	+375%/-375%	+19%/-23%	+8%/-11%	+102%/-38%
Source	SPE68	SPE68	SPE68	DSEP		

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

### Secondary Eclipse Parameters for KIC 003345973-01 / KOI 7652.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-47 \pm 13$	$3.86^{+0.76}_{-0.69}$	$1659^{+78}_{-103}$	$4535^{+408}_{-331}$	$33^{+21}_{-13}$
Alt.	$-50 \pm 14$	$3.76^{+0.70}_{-0.69}$	$1658^{+87}_{-100}$	$4663^{+399}_{-366}$	$38^{+22}_{-13}$

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

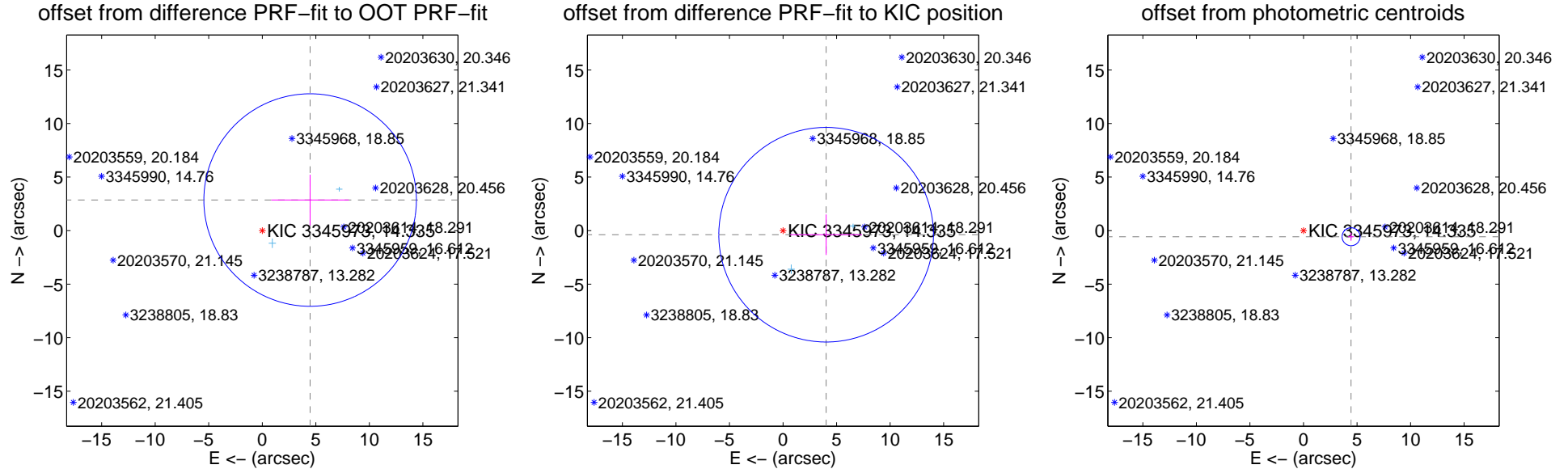
## DV Centroid Data

Supplemental centroid analysis for 003345973-01. Kepler magnitude: 14.34. Transit SNR 10.37

There are 2 quarters with good PRF difference image offsets

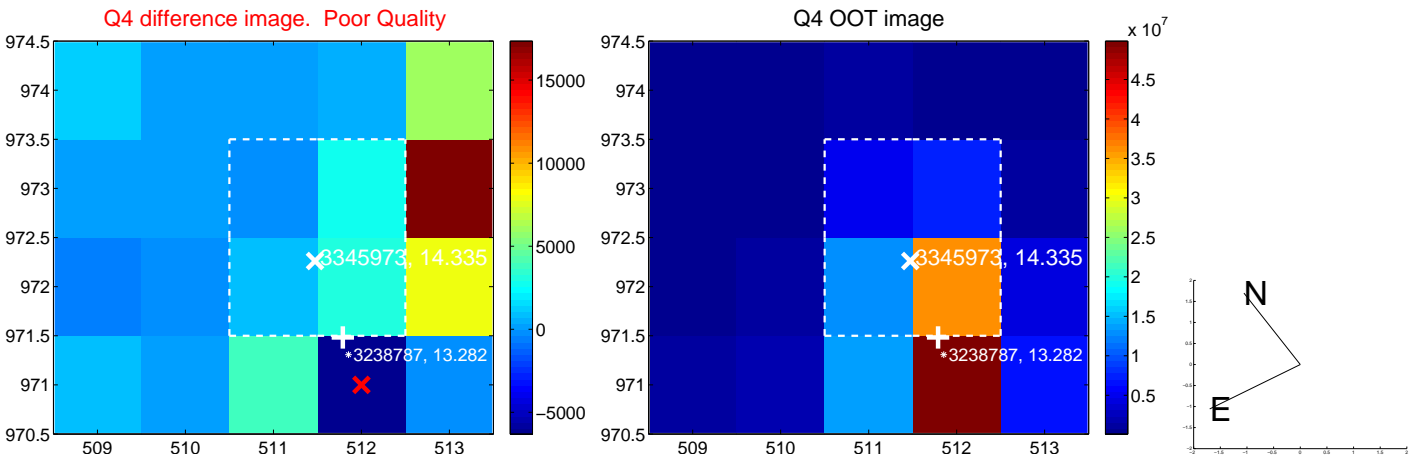
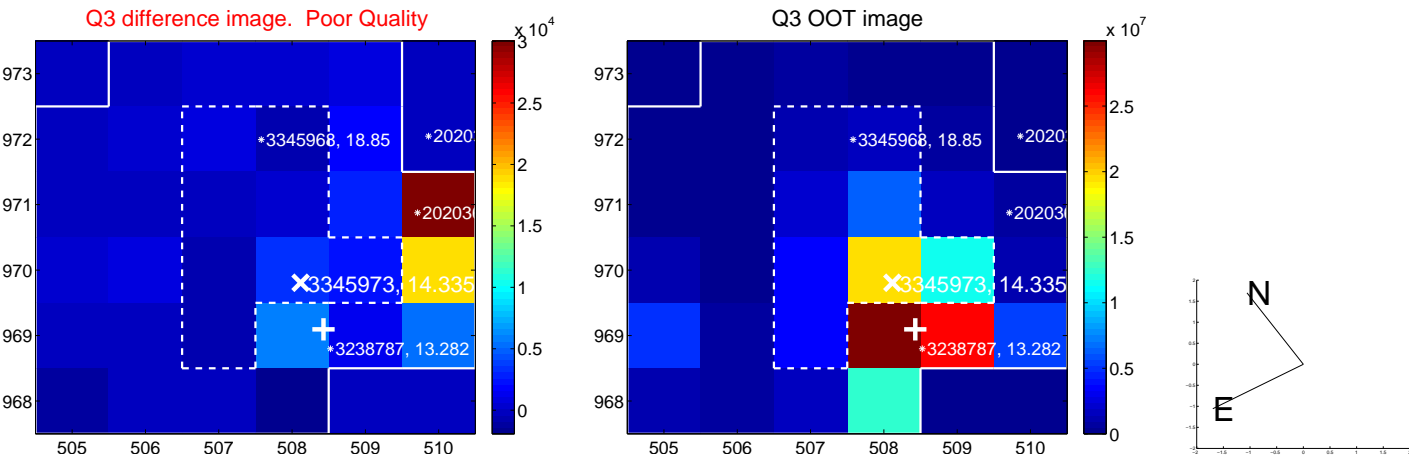
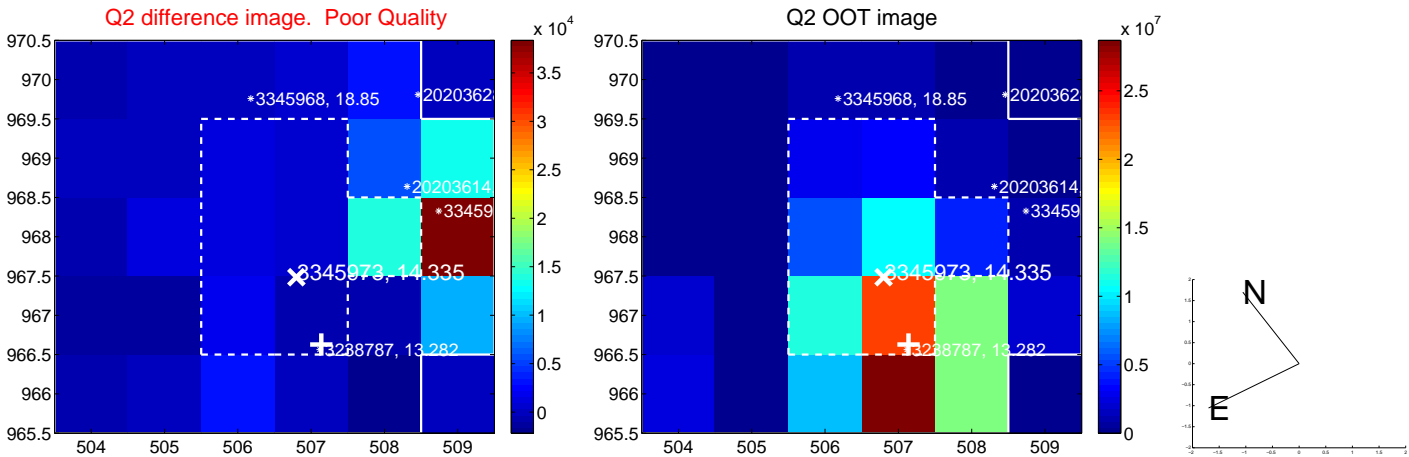
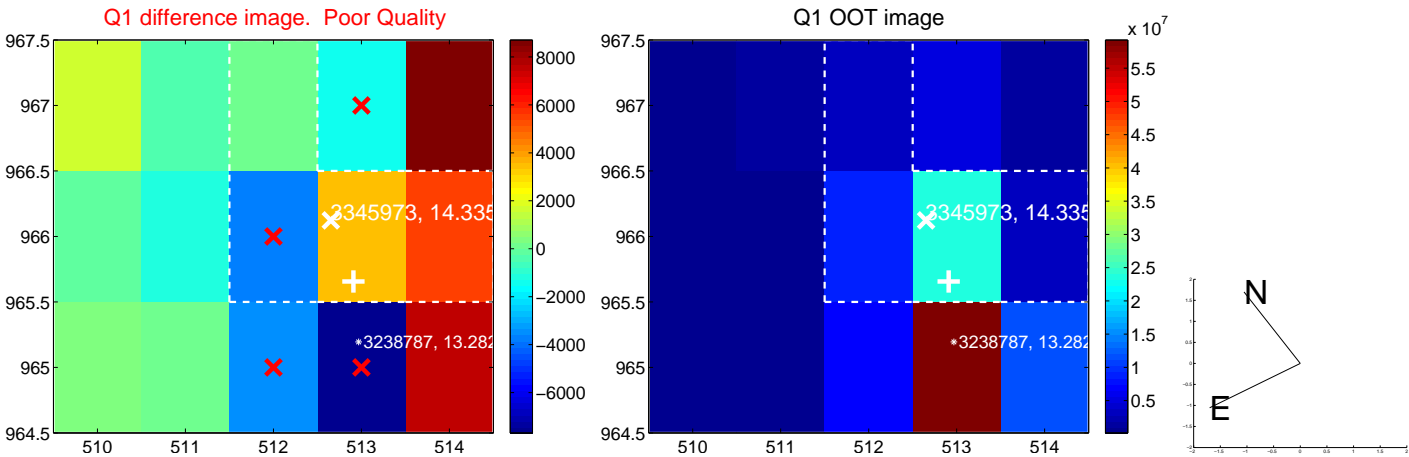
The OOT PRF centroid is offset from the target star catalog position by about 2.44 arcsec so the offset from difference PRF-fit to OOT-fit may be invalid.

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$5.303 \pm 3.308$	1.60	$-4.469 \pm 3.623$	$2.855 \pm 2.365$
PRF-fit source offset from KIC position	$4.043 \pm 3.341$	1.21	$-4.025 \pm 3.351$	$-0.384 \pm 1.891$
photometric centroid source offset	$4.48 \pm 0.28$	16.03	$-4.44 \pm 0.28$	$-0.57 \pm 0.37$

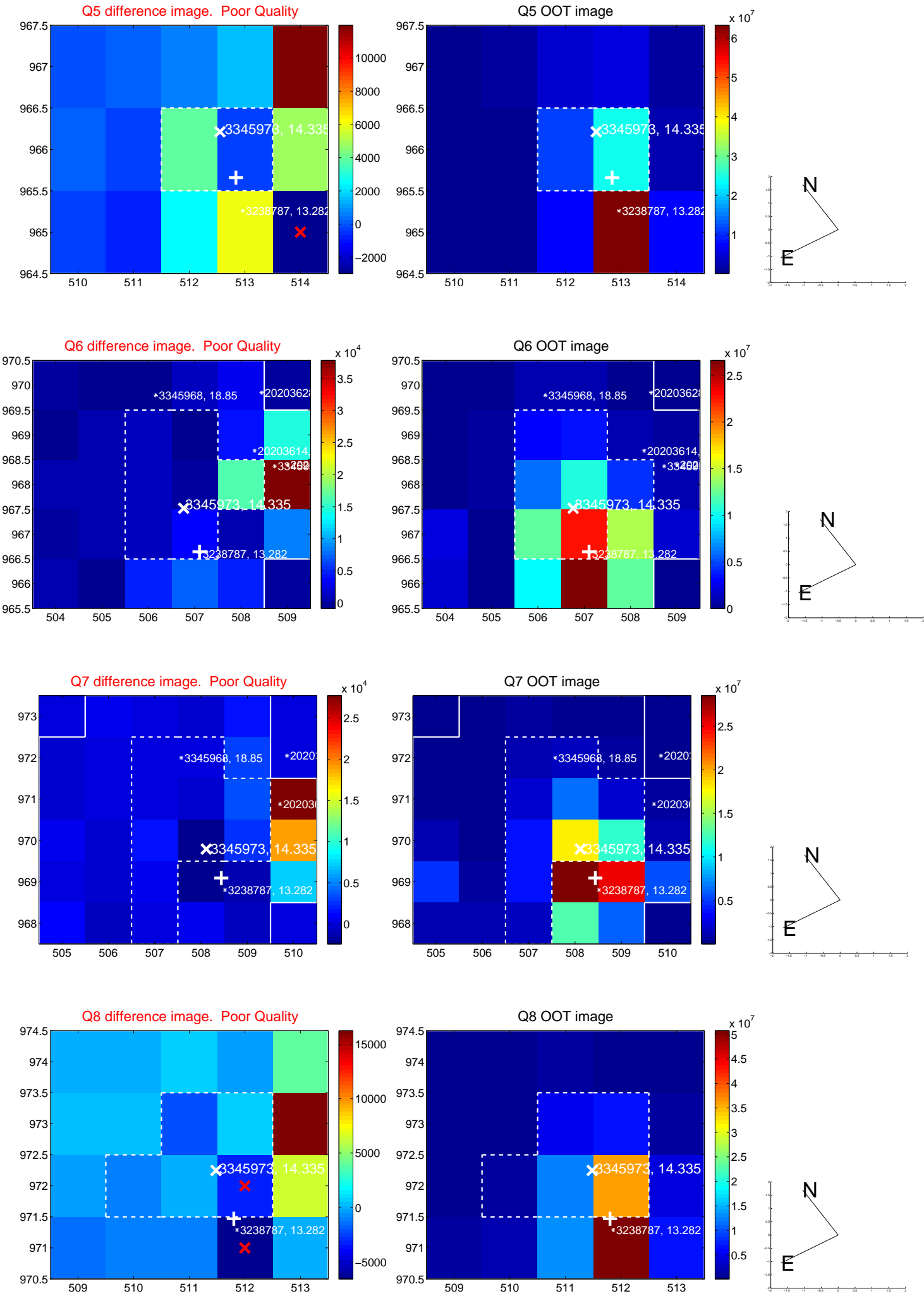


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

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

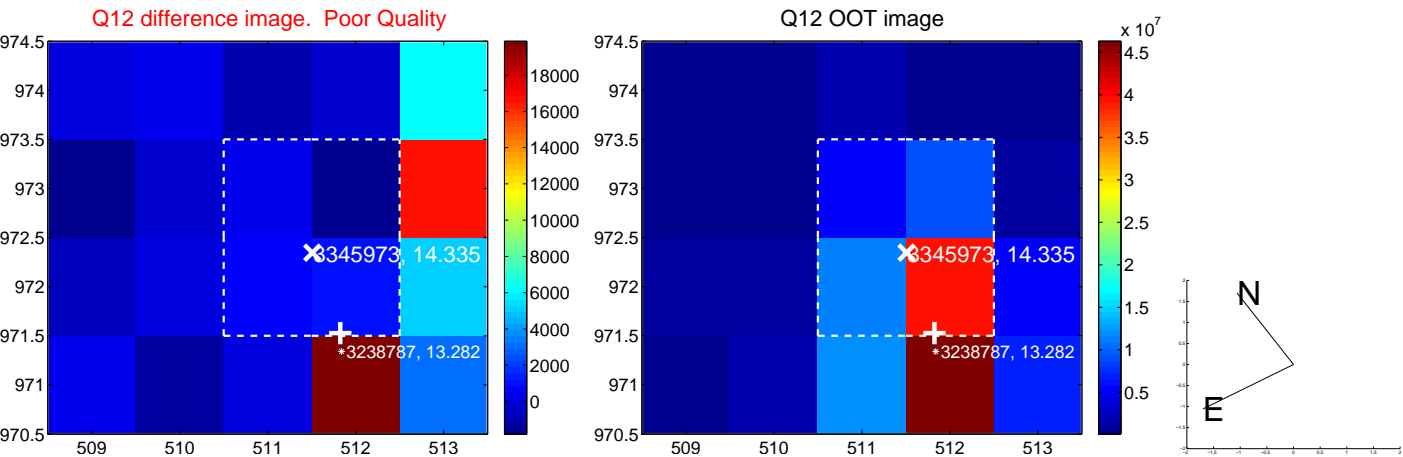
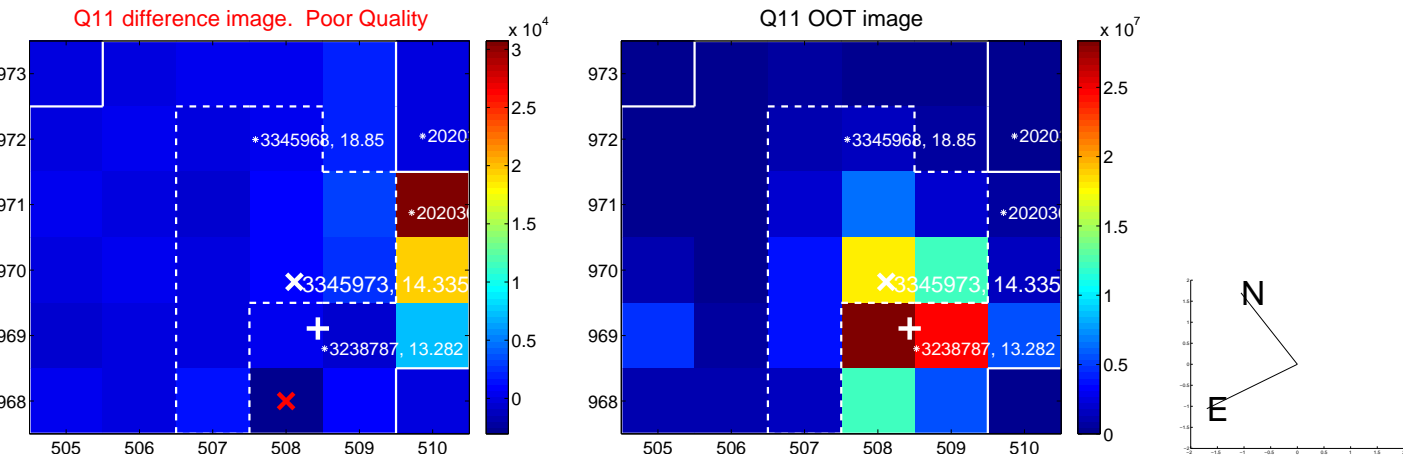
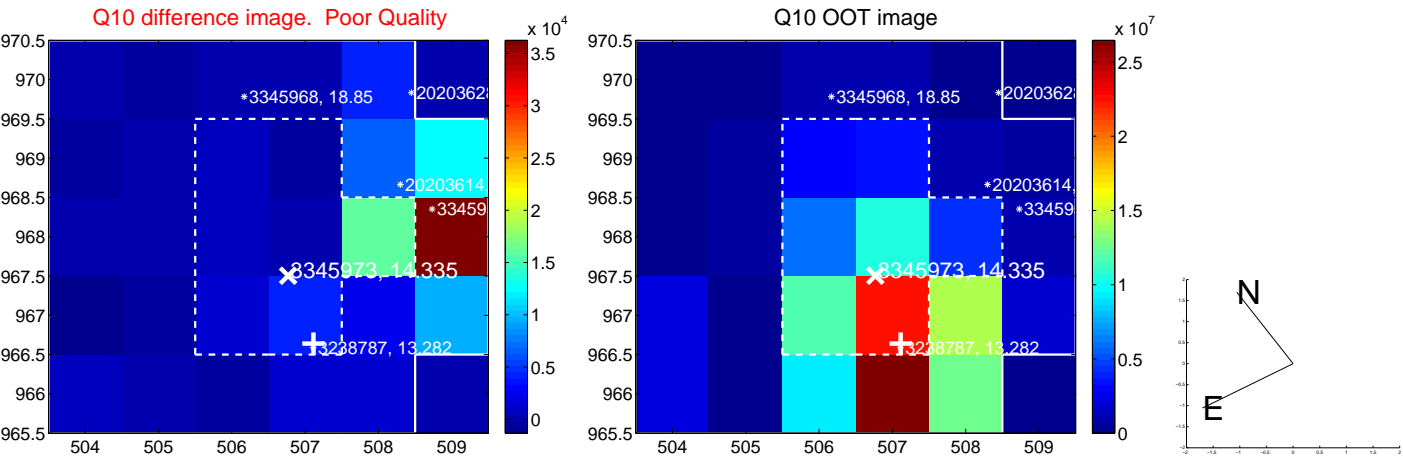
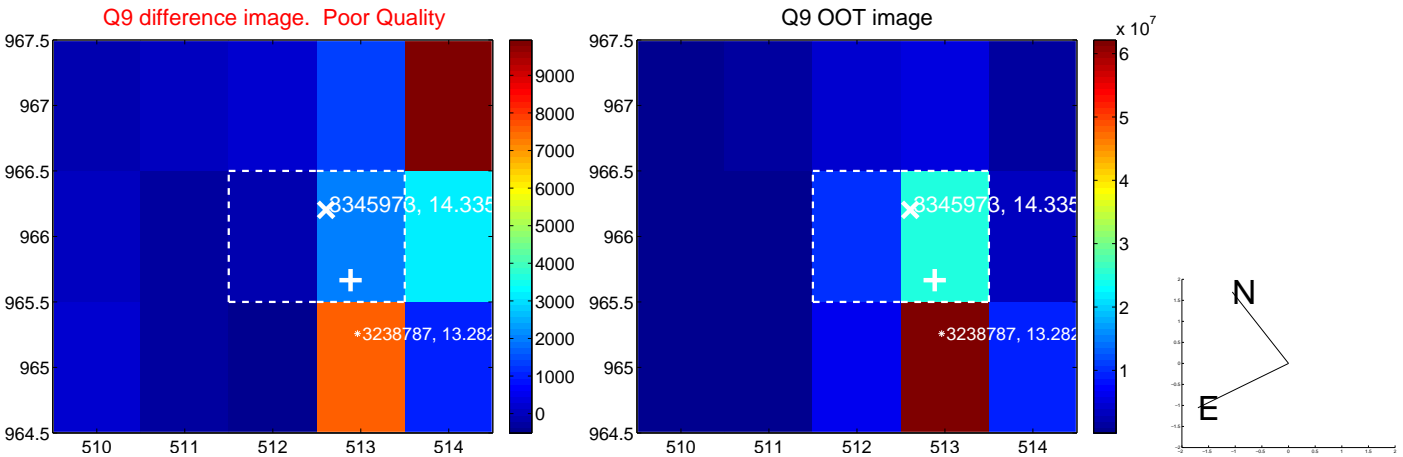


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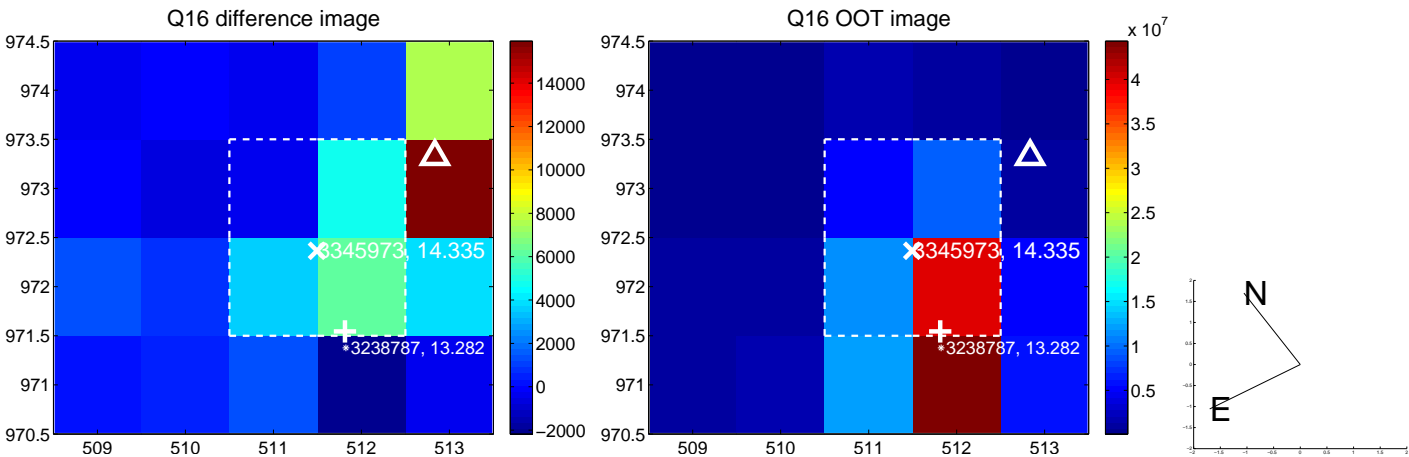
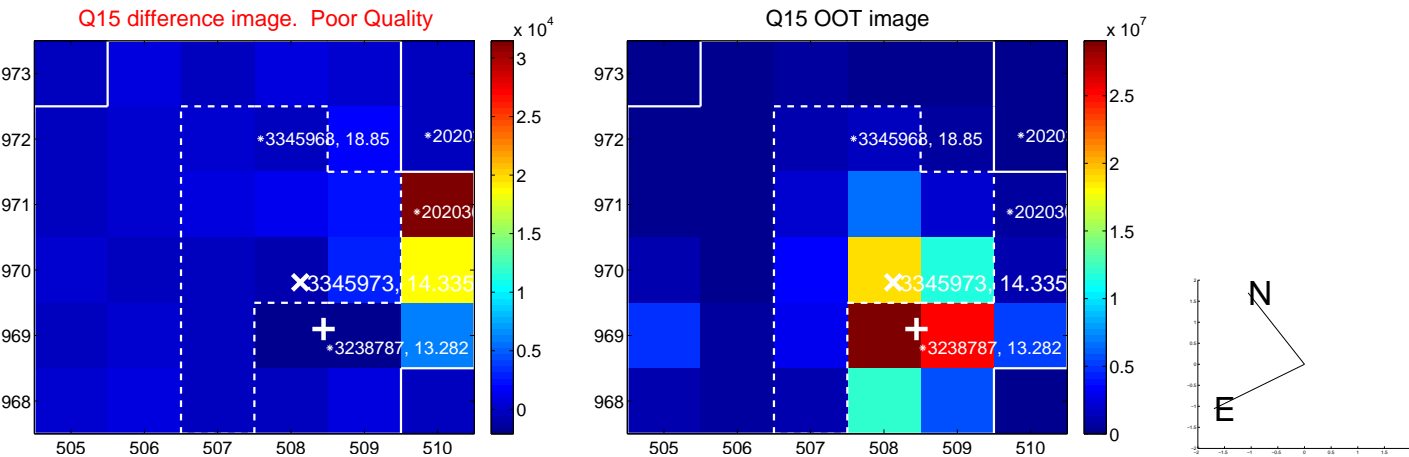
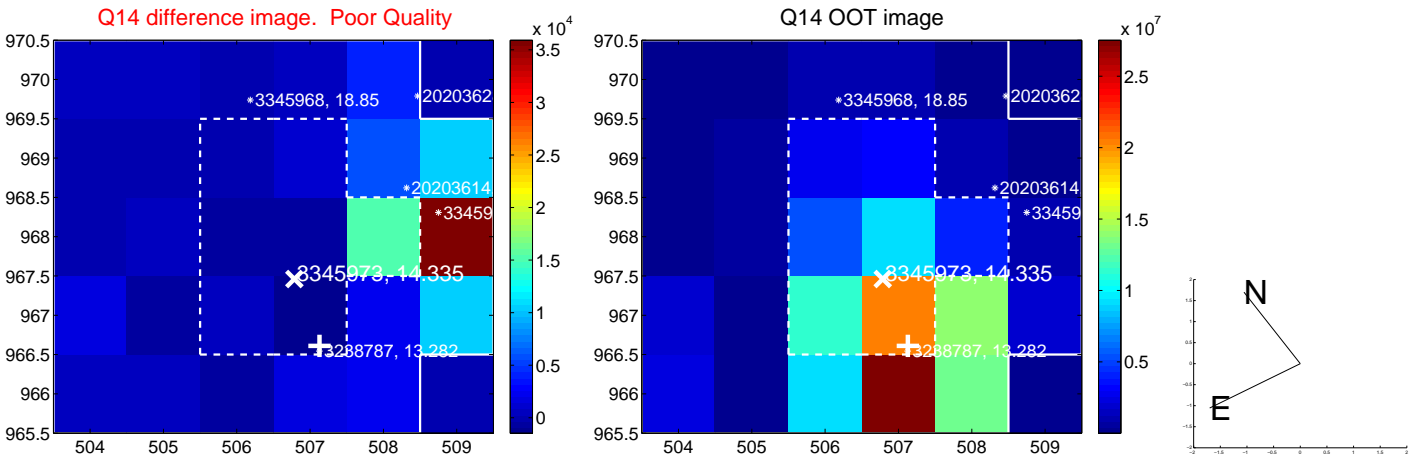
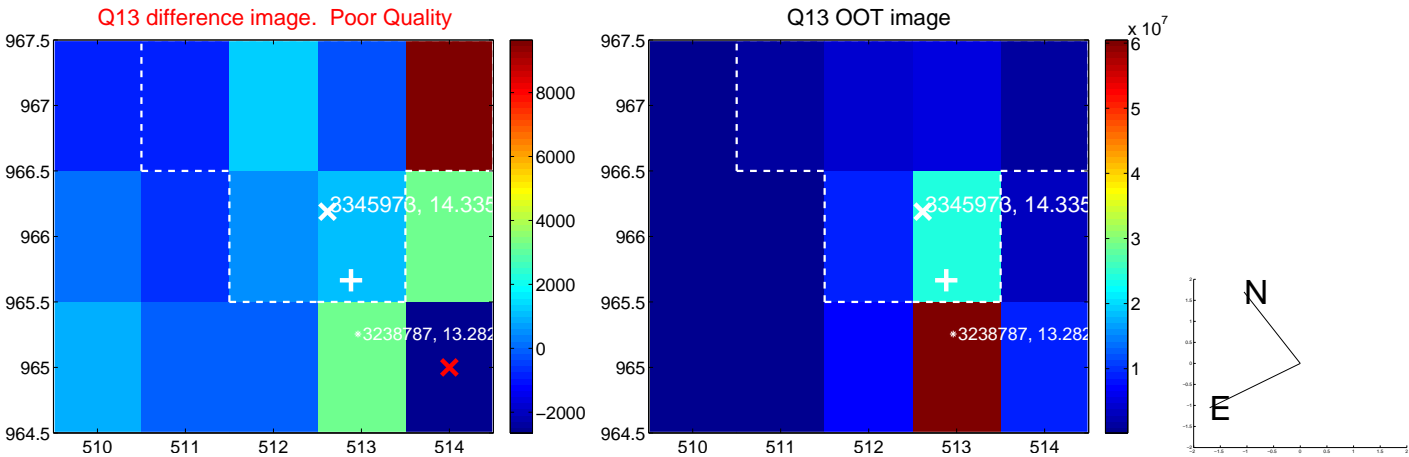




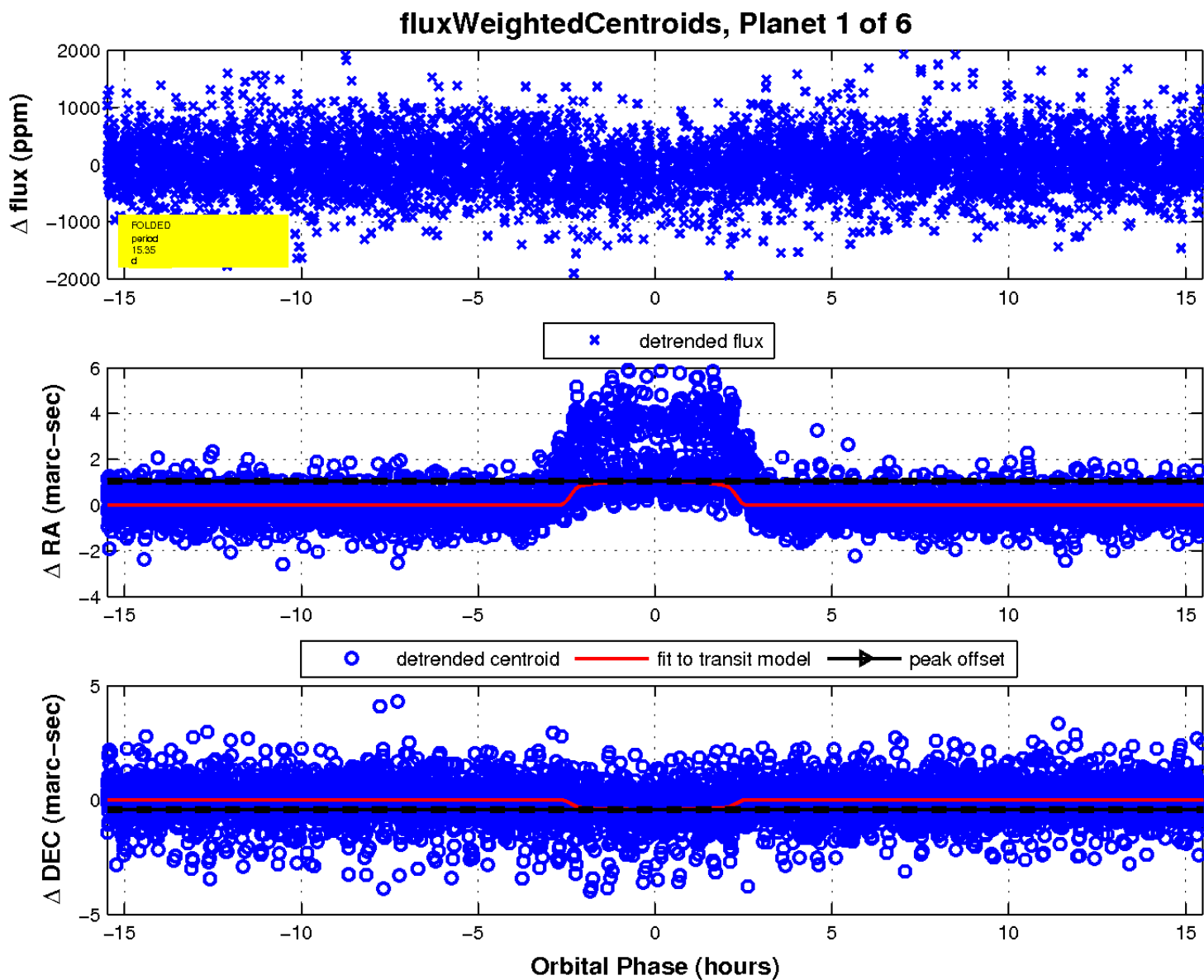
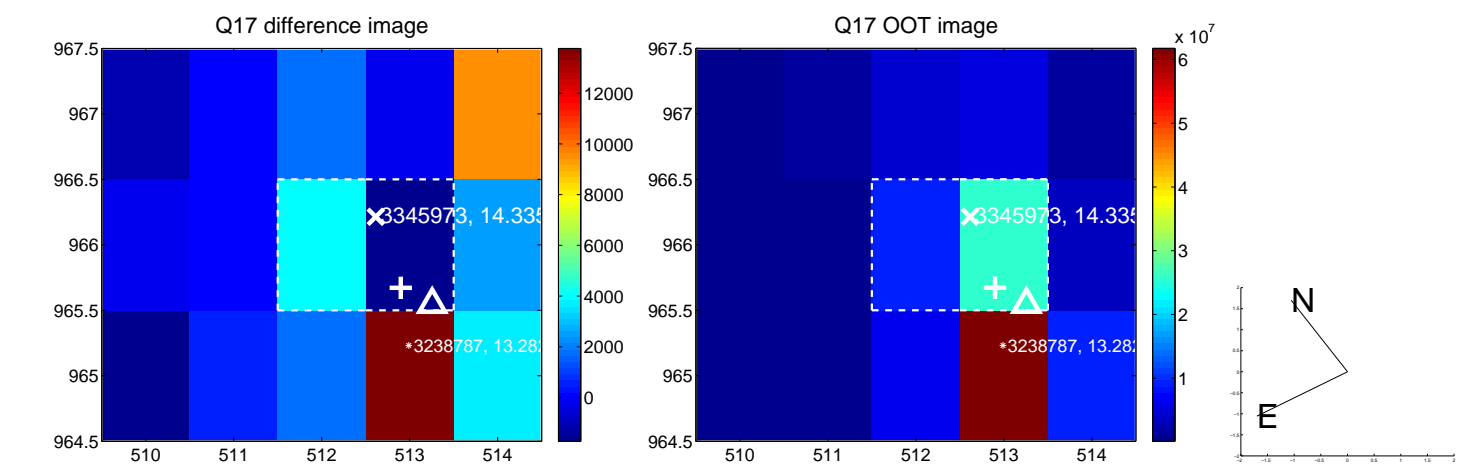
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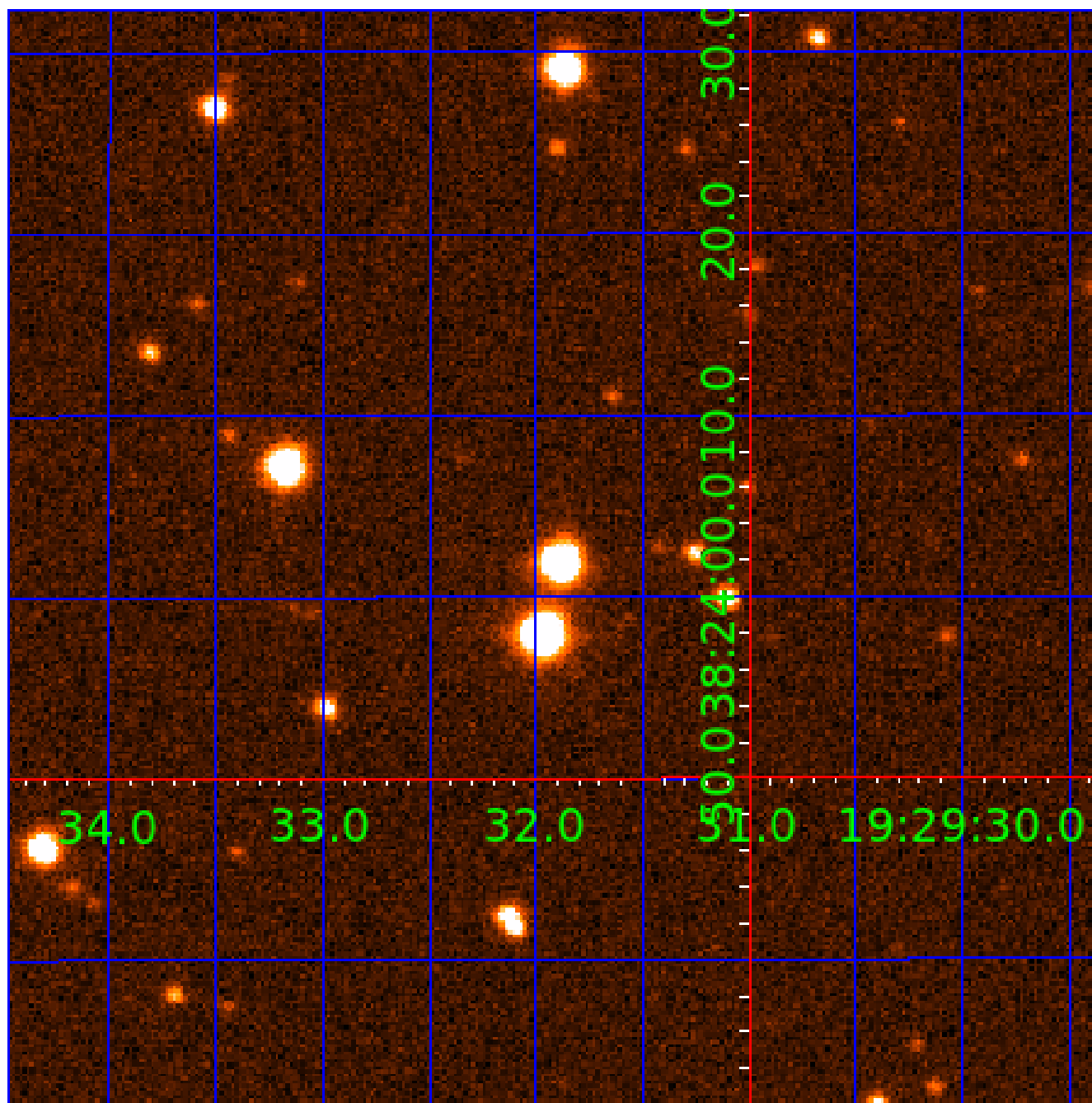


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UKIRT Image

Declination



# KIC 003345973

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
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## Robovetter Results

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003345973-02	OBS	FP	0.00	1	0	1	0	LPP_DV—CENT_RESOLVED_OFFSET
003345973-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—CENT_KIC_POS
003345973-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS
003345973-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_KIC_POS—CENT_UNCERTAIN
003345973-06	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_TRACKER—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST

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

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

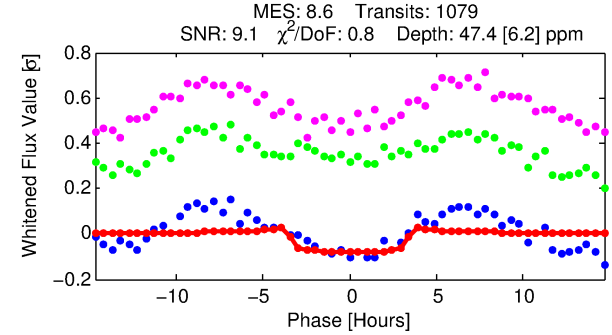
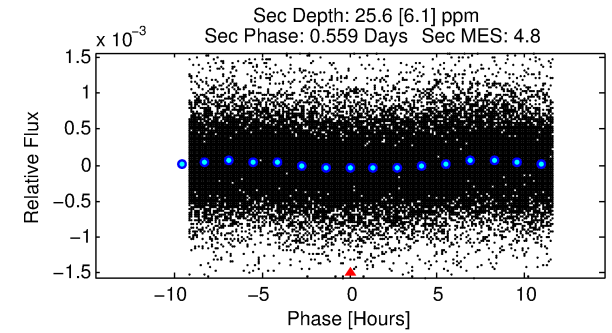
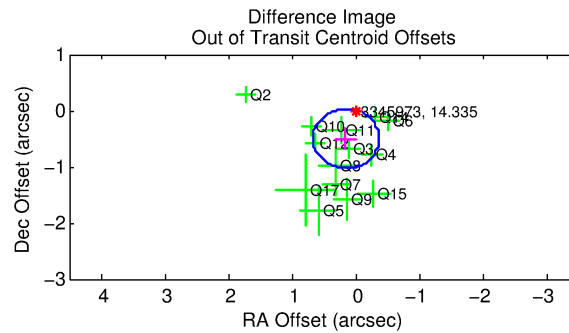
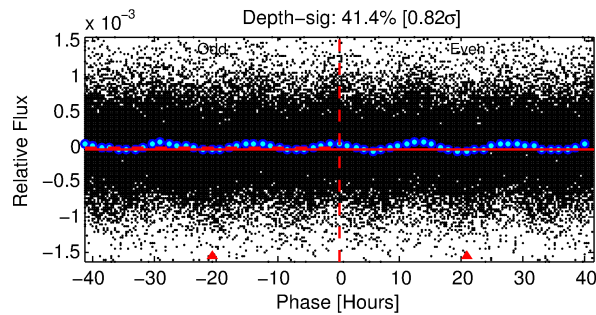
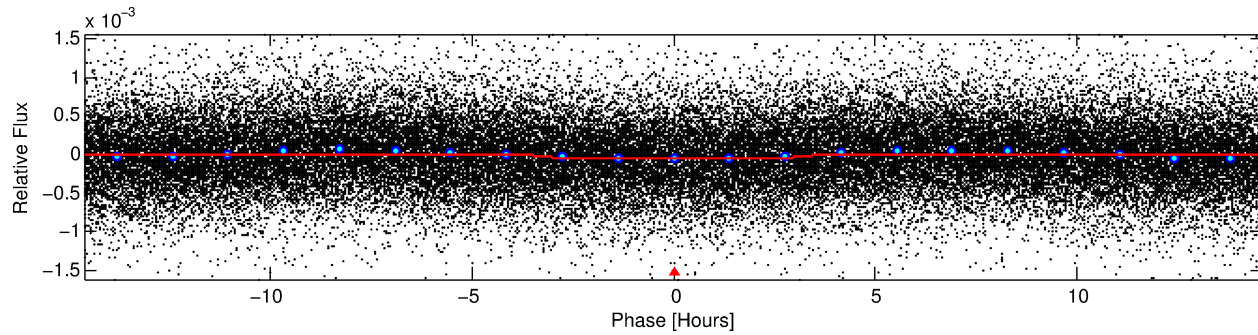
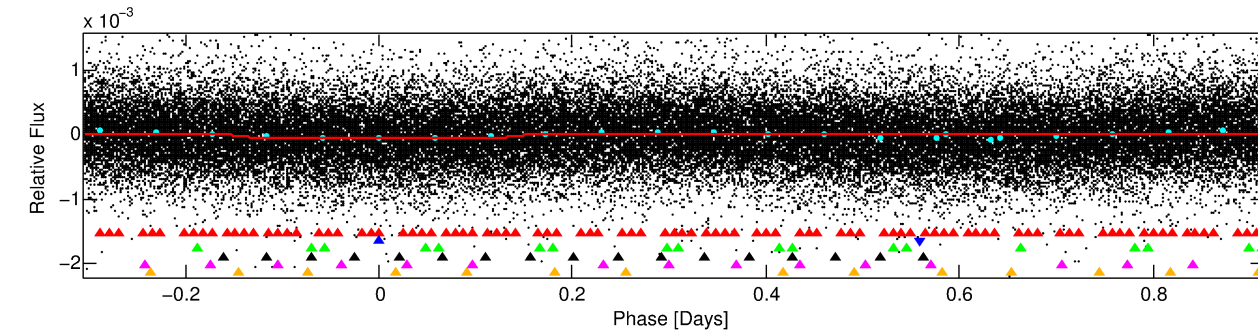
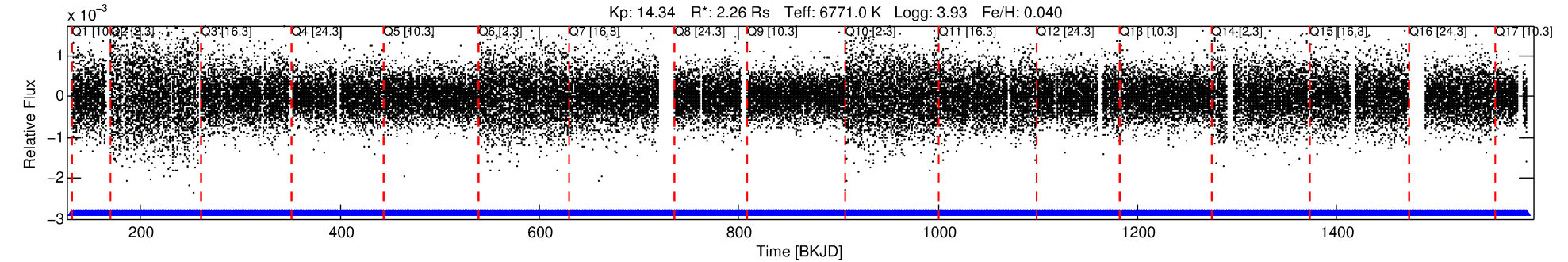
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 003345973-02

No Significant Match Found

# DV One-Page Summary

KIC: 3345973 Candidate: 2 of 6 Period: 1.219 d



## DV Fit Results:

Period = 1.21866 [0.00002] d  
Epoch = 131.7526 [0.0059] BKJD  
Rp/R\* = 0.0064 [0.0063]  
a/R\* = 1.49 [4.42]  
b = 0.01 [669.07]  
Seff = 14090.98 [4789.53]  
Teff = 2778 [236] K  
Rp = 1.57 [1.60] Re  
a = 0.0261 [0.0056] AU  
Ag = 3.91 [7.95] [0.37 $\sigma$ ]  
Teffp = 6041 [3026] K [1.08 $\sigma$ ]

## DV Diagnostic Results:

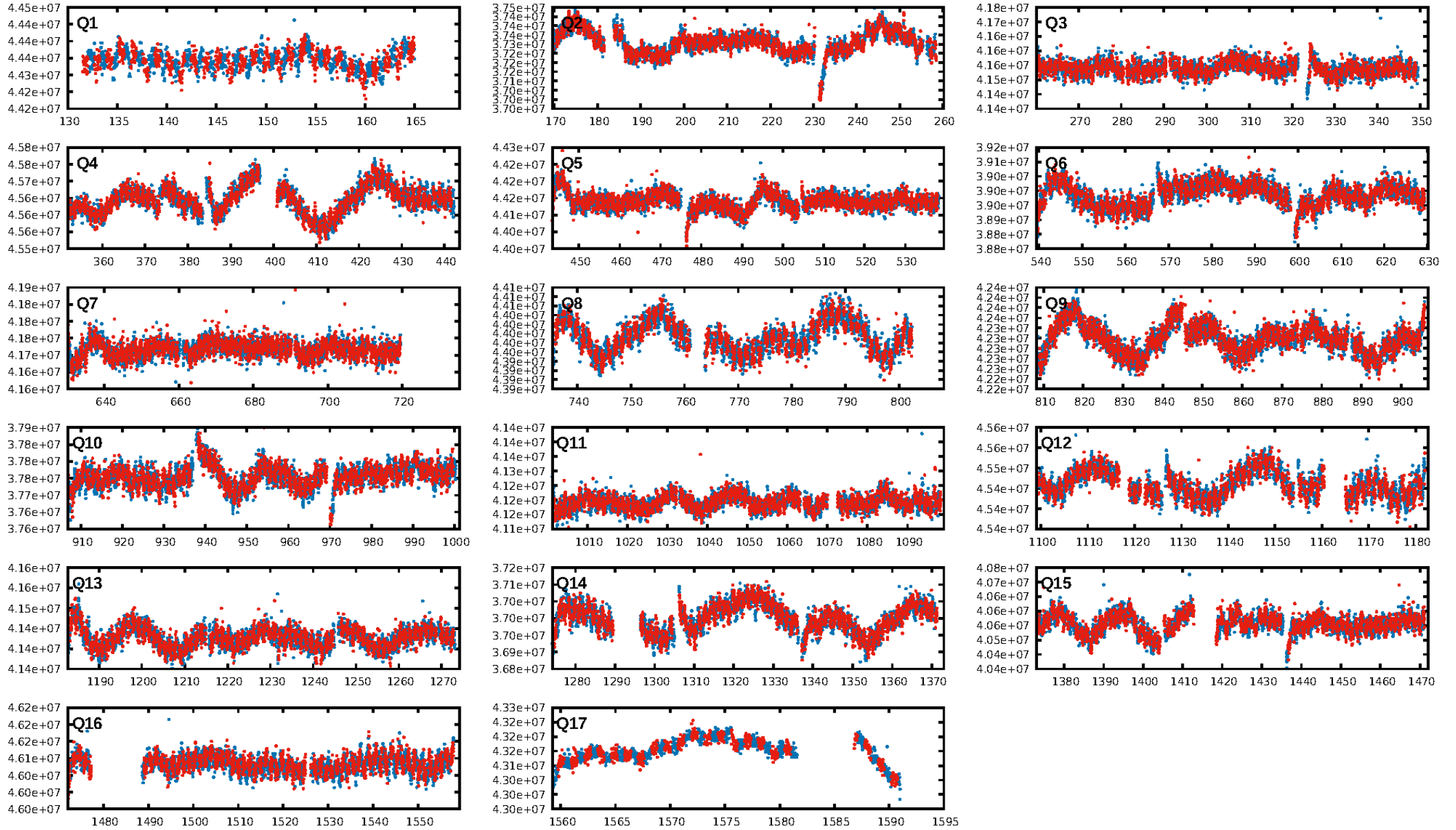
ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [39.31 $\sigma$ ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
**Bootstrap-pfa: 1.59e-09**  
RollingBand-fgt: 1.00 [1031/1031]  
**GhostDiagnostic-chr: 0.8443**  
Centroid-sig: 0.0%  
Centroid-so: 3.535 arcsec [8.77 $\sigma$ ]  
OotOffset-rm: 0.522 arcsec [2.98 $\sigma$ ]  
OotOffset-st: 4/4/3/3 [14]  
KicOffset-rm: 3.928 arcsec [34.62 $\sigma$ ]  
KicOffset-st: 4/4/3/3 [14]  
DiffImageQuality-fgm: 1.00 [14/14]  
DiffImageOverlap-fno: 1.00 [17/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 21:20:17 Z

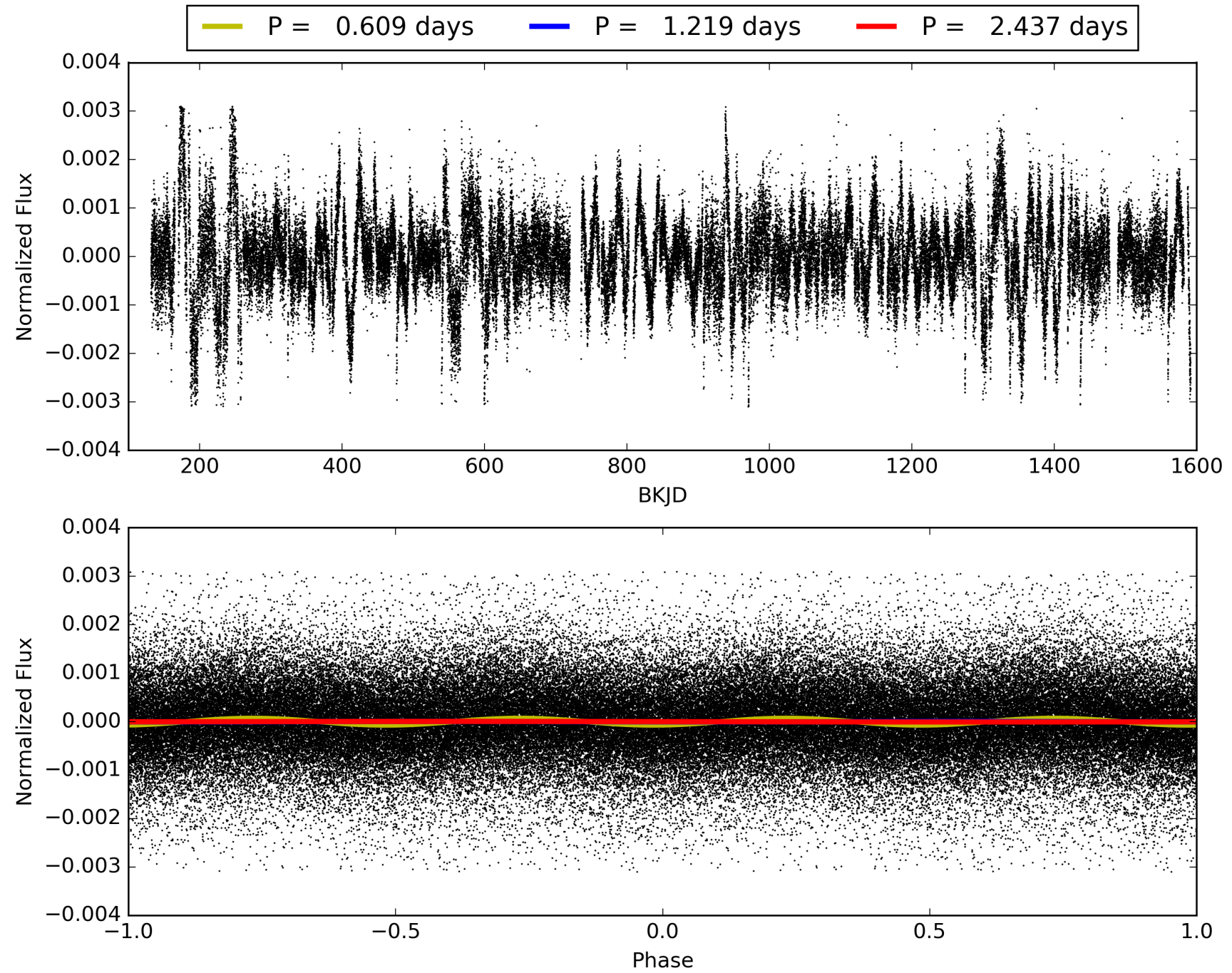
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center



# TCE 003345973-02, PDC Light Curves

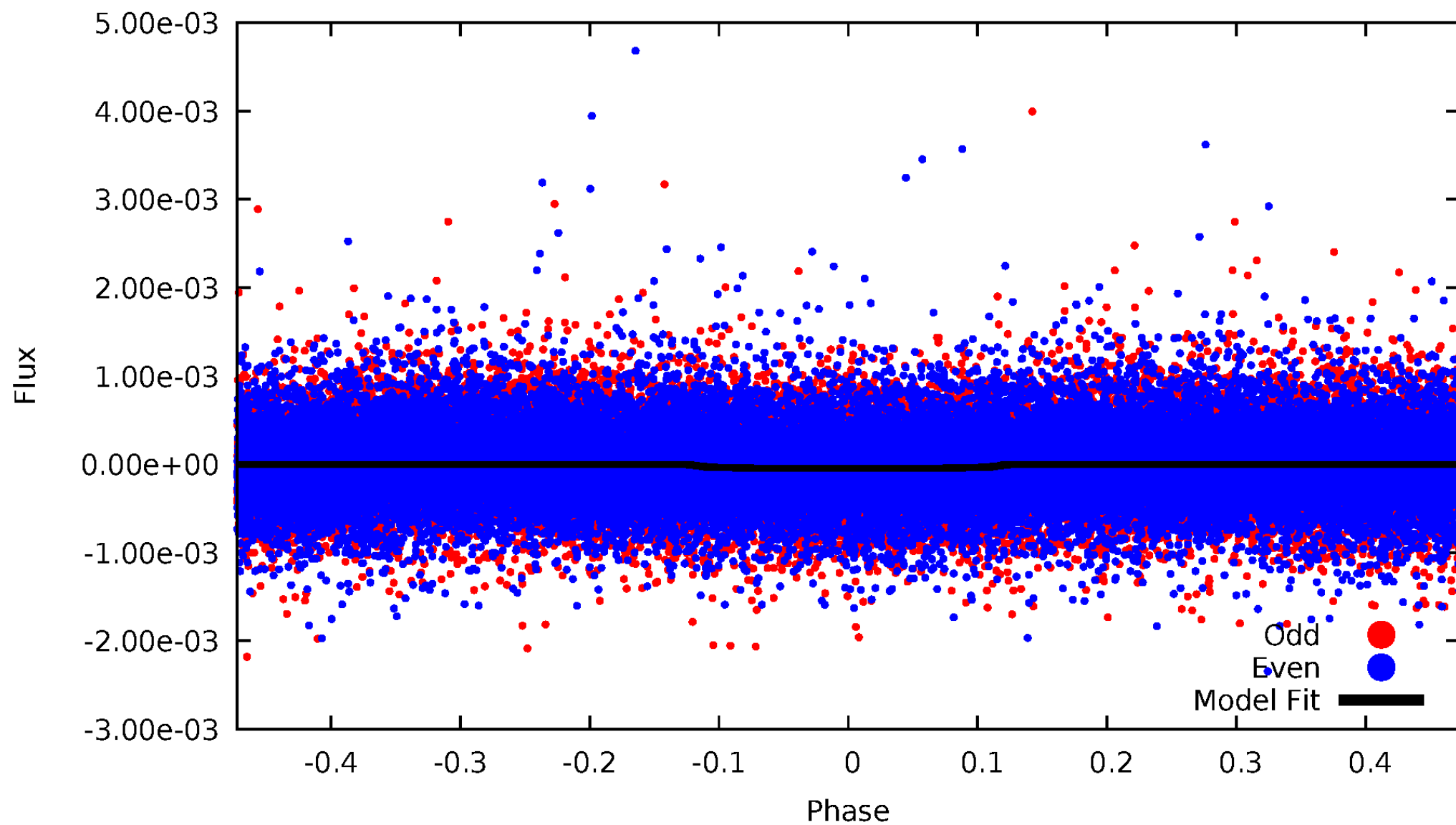


TCE 003345973-02



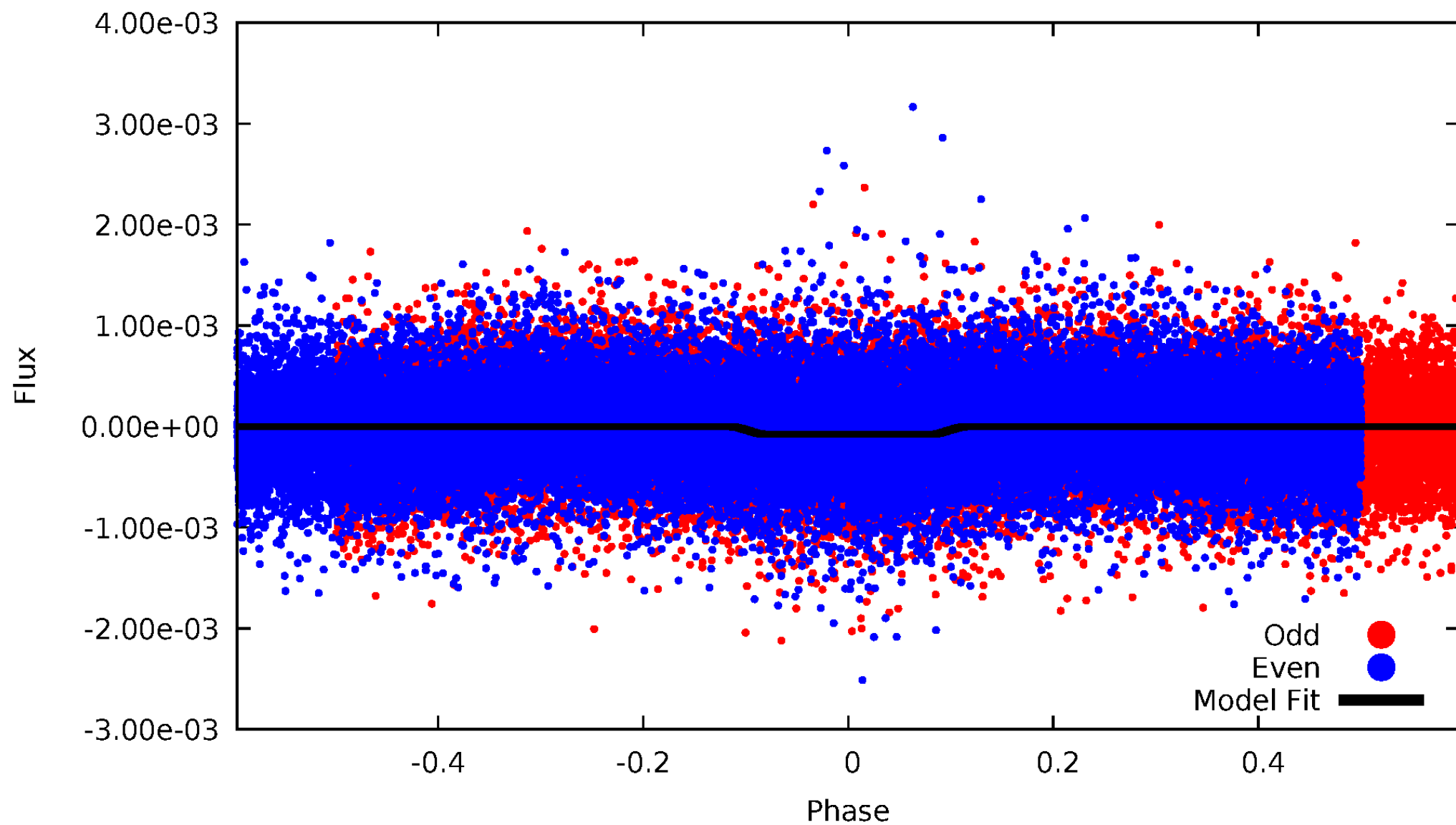
# DV Odd/Even

TCE 003345973-02



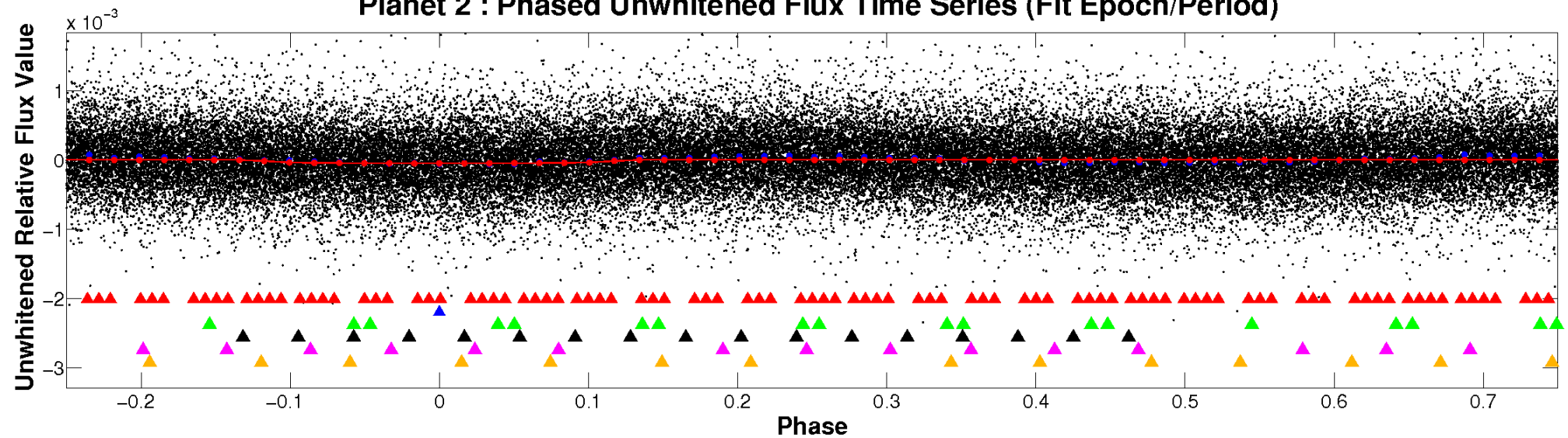
# ALT Odd/Even

TCE 003345973-02

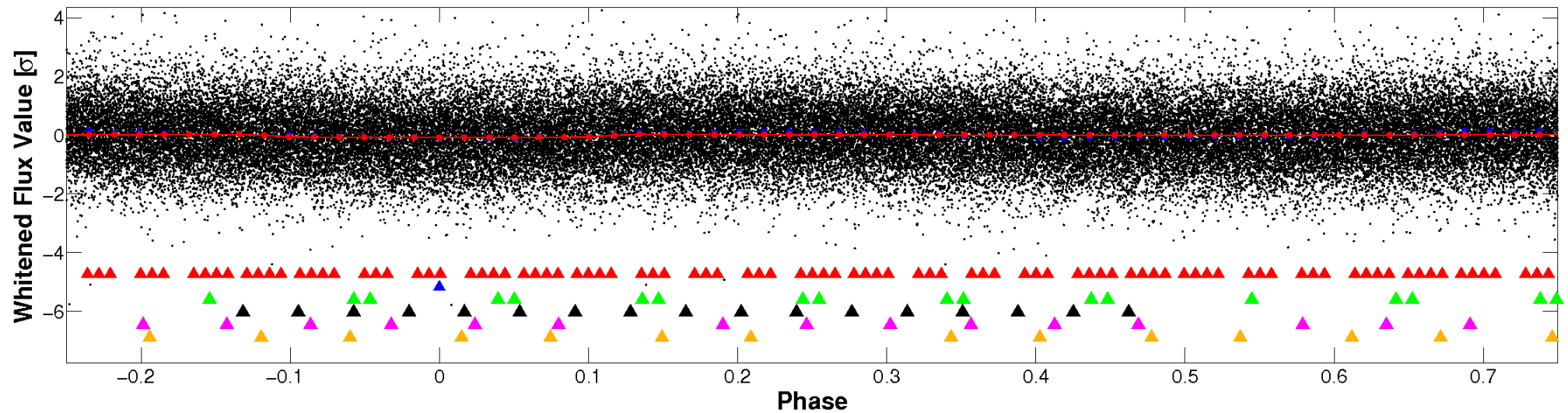


# Non-Whitened Vs. Whitened Light Curve

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



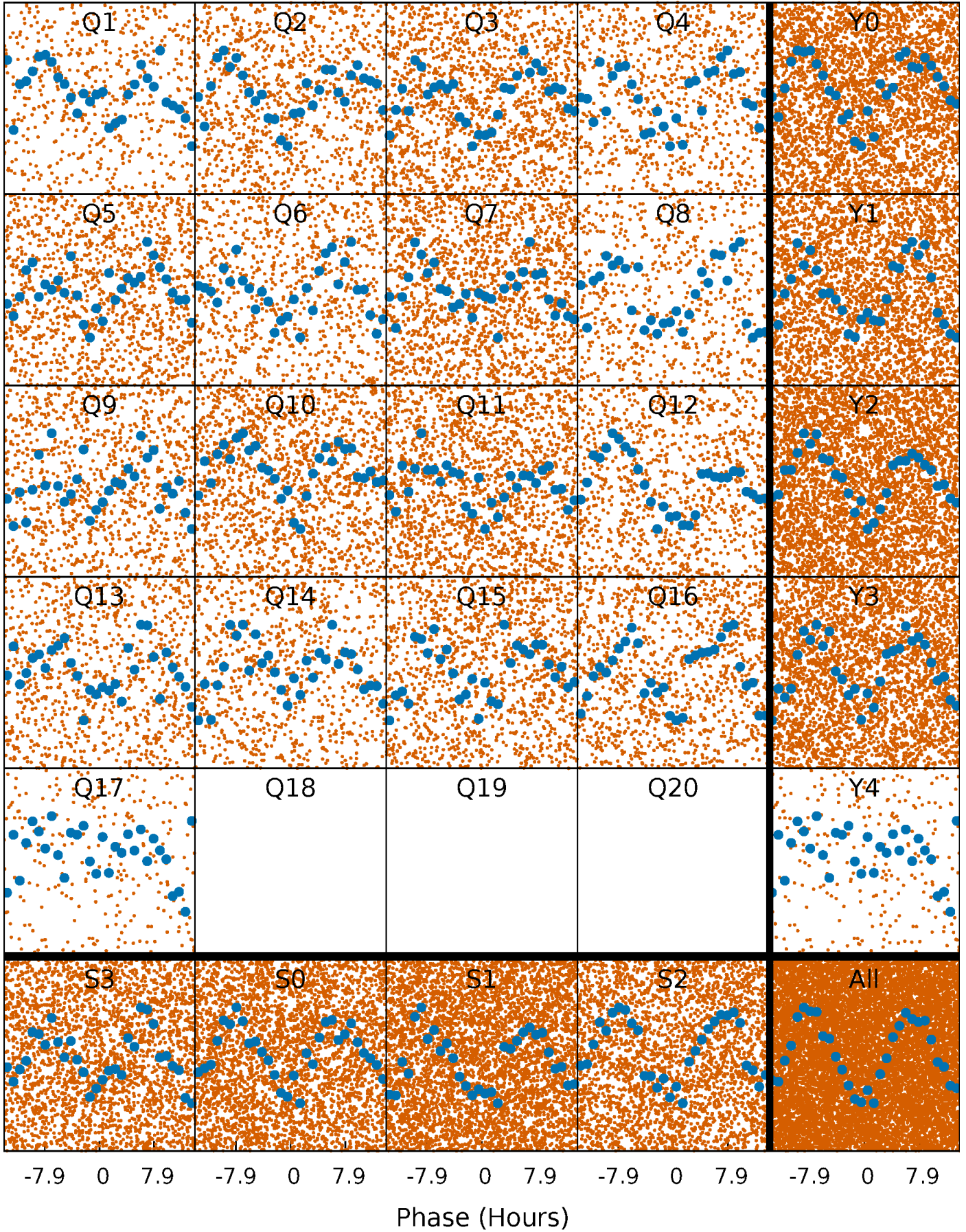
## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)





# PDC Quarter-Phased Transit Curves

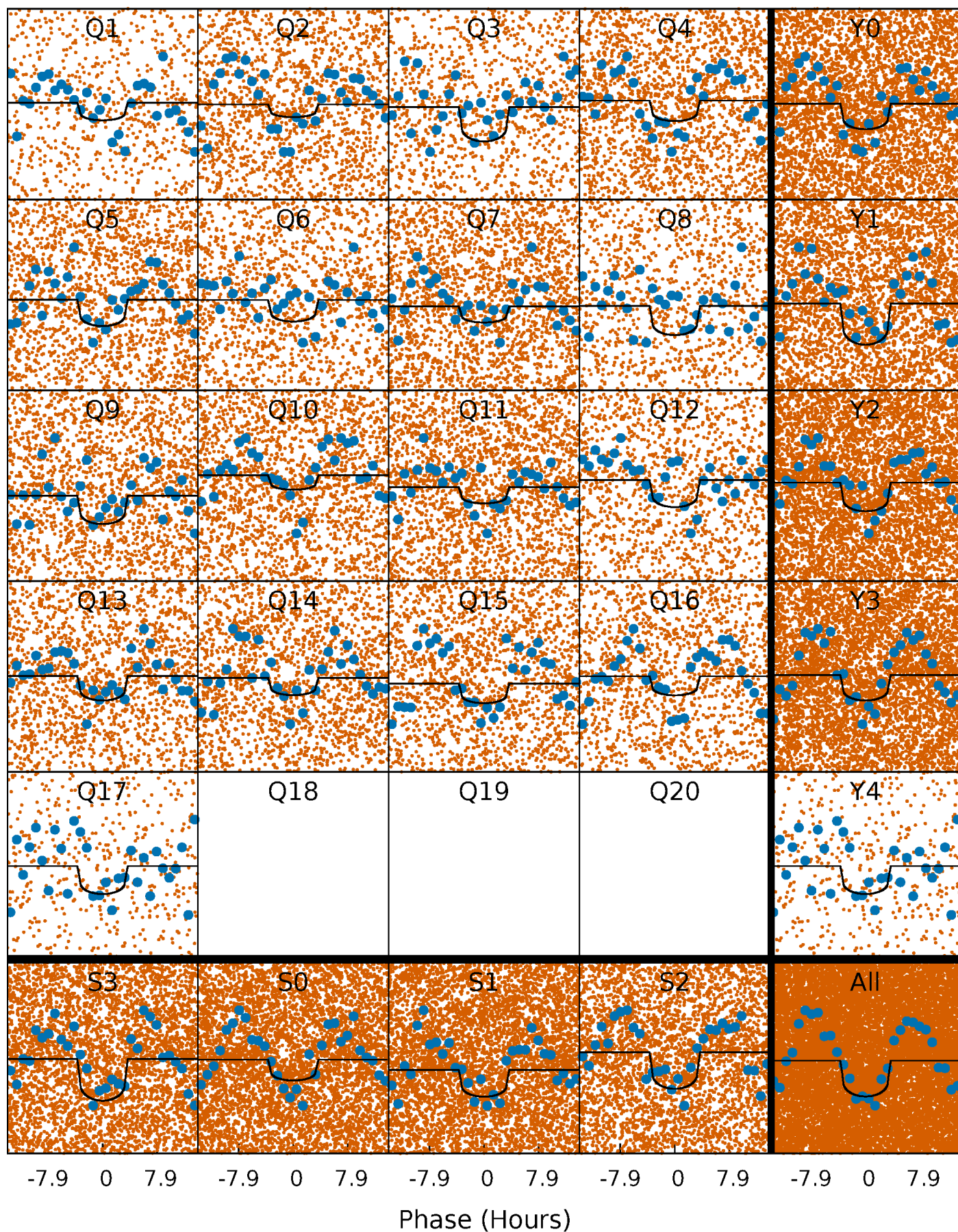
TCE 003345973-02 P= 1.218657 Days  $T_0=131.752553$  (BKJD)





# DV Quarter-Phased Transit Curves

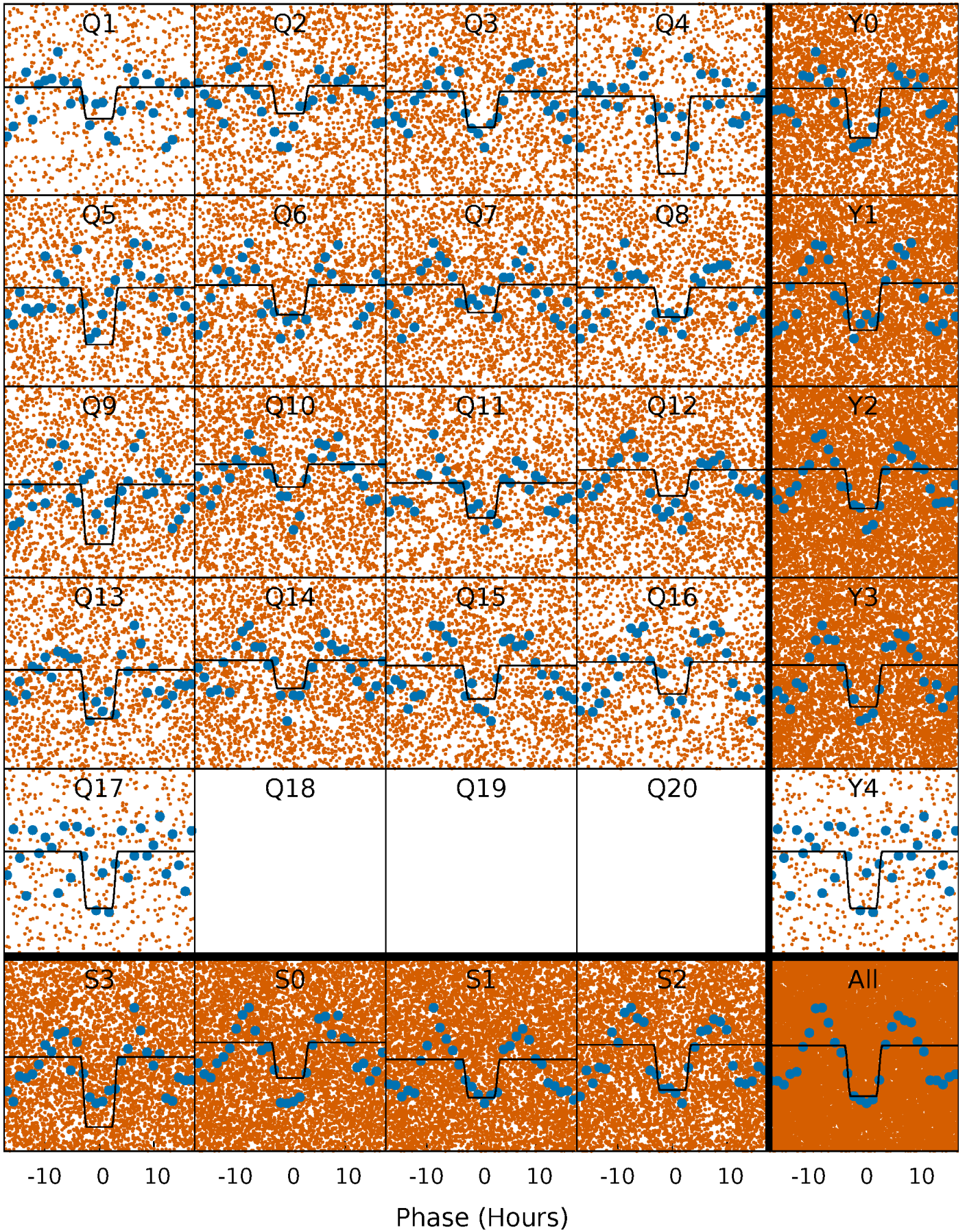
TCE 003345973-02 P= 1.218657 Days  $T_0=131.752553$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

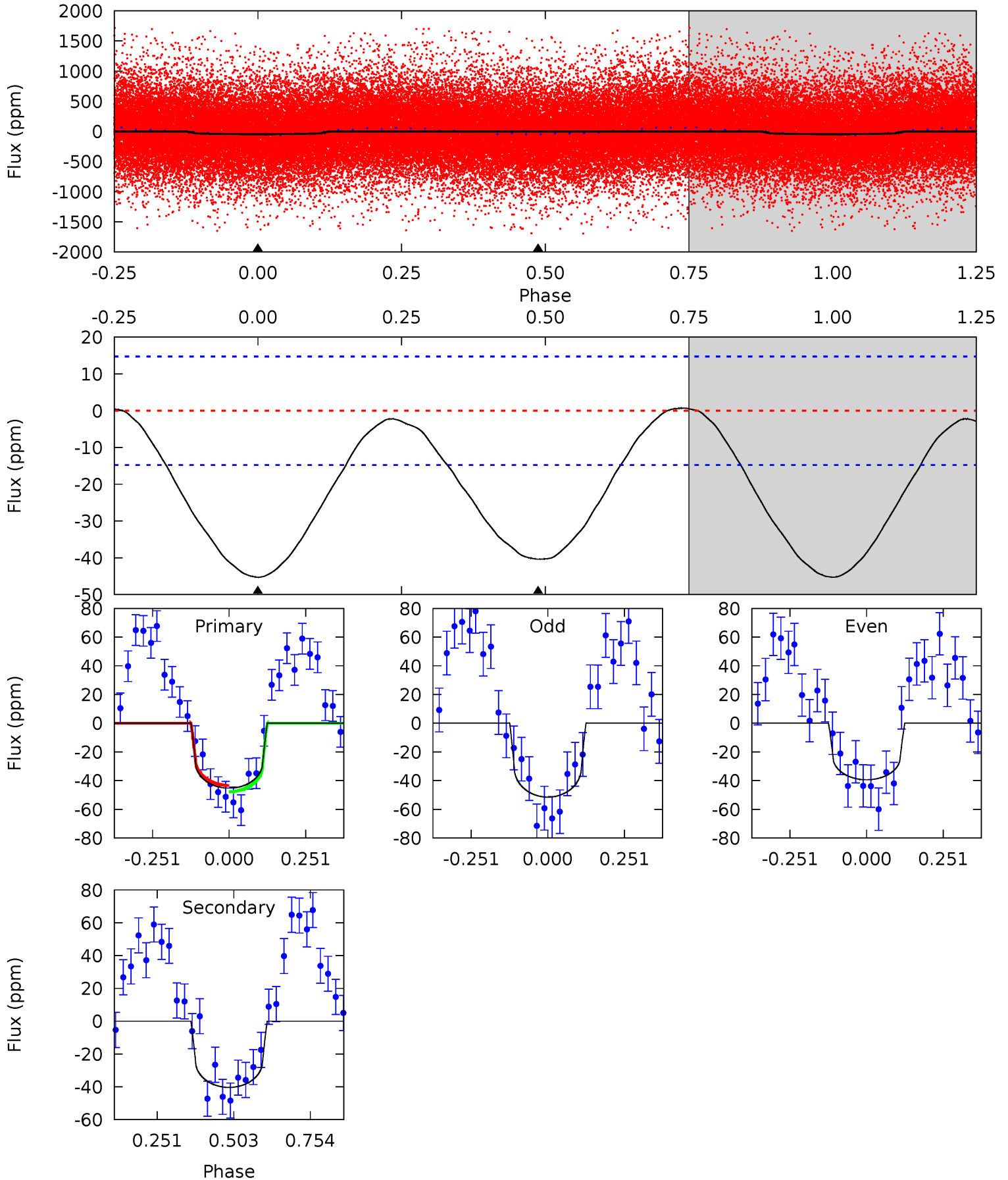
TCE 003345973-02 P= 1.218652 Days  $T_0=131.747881$  (BKJD)



# DV Model-Shift Uniqueness Test

003345973-02, P = 1.218657 Days, E = 130.533896 Days

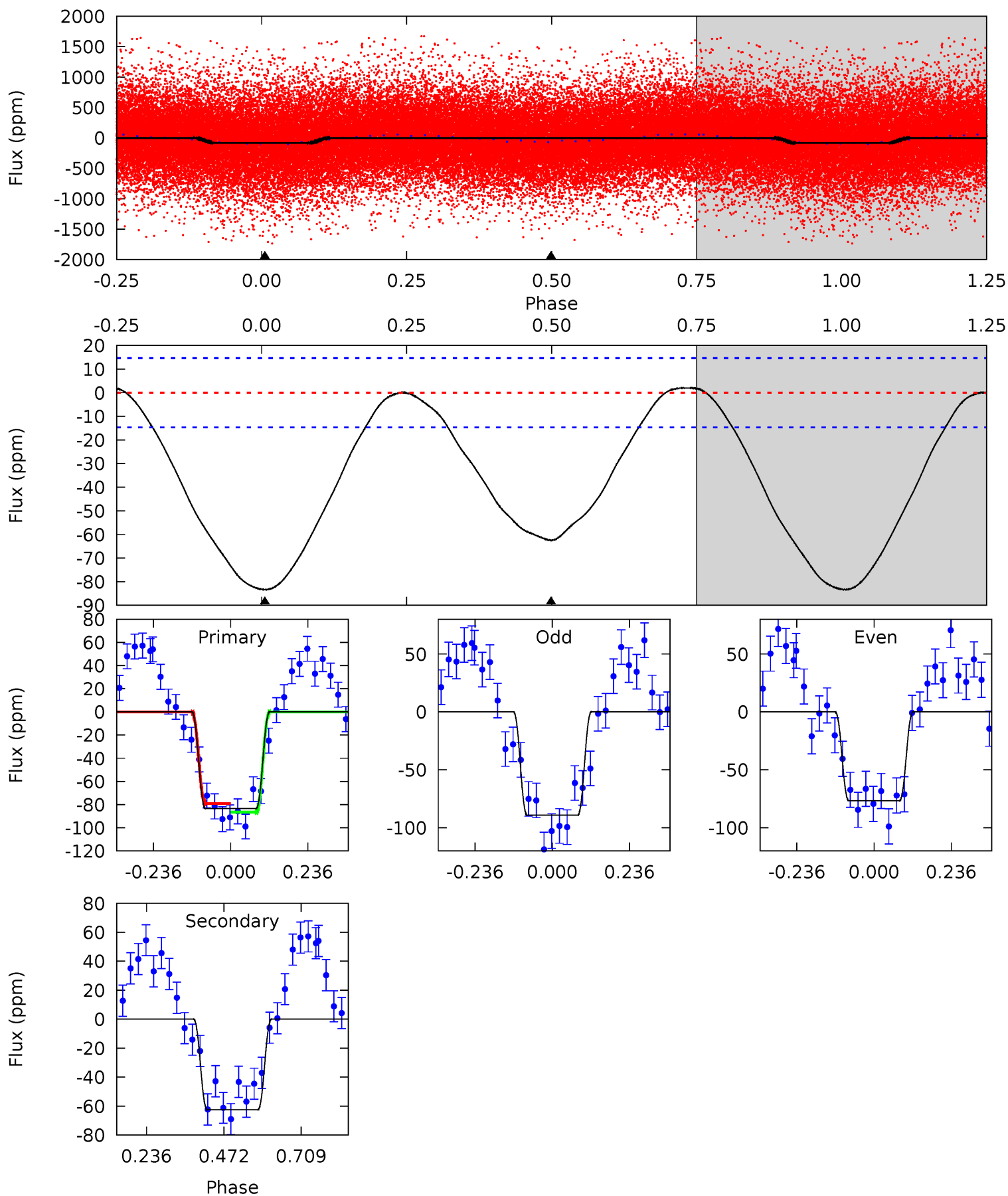
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
13.4	12.0	0	0	4.37	1.15	0.46	13.4	13.4	12.0	12.0	1.79	1.05	0.02	0.64



# Alt Model-Shift Uniqueness Test

003345973-02, P = 1.218652 Days, E = 130.529229 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
24.9	18.7	0	0	4.38	1.18	0.46	24.9	24.9	18.7	18.7	1.87	1.09	0.02	1.08



### Stellar Parameters For KIC 003345973

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6771^{+81}_{-81}$	$3.934^{+0.195}_{-0.120}$	$0.040^{+0.150}_{-0.150}$	$2.259^{+0.426}_{-0.521}$	$1.597^{+0.131}_{-0.180}$	$0.195^{+0.199}_{-0.074}$
	+1%/-1%	+5%/-3%	+375%/-375%	+19%/-23%	+8%/-11%	+102%/-38%
Source	SPE68	SPE68	SPE68	DSEP		

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

### Secondary Eclipse Parameters for KIC 003345973-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-40 \pm 3$	$1.93^{+1.34}_{-1.22}$	$3855^{+197}_{-251}$	$5881^{+5140}_{-1358}$	$3.995^{+27.008}_{-2.598}$
Alt.	$-63 \pm 3$	$2.16^{+1.58}_{-1.13}$	$3871^{+190}_{-238}$	$6219^{+3863}_{-1484}$	$4.897^{+17.773}_{-3.227}$

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

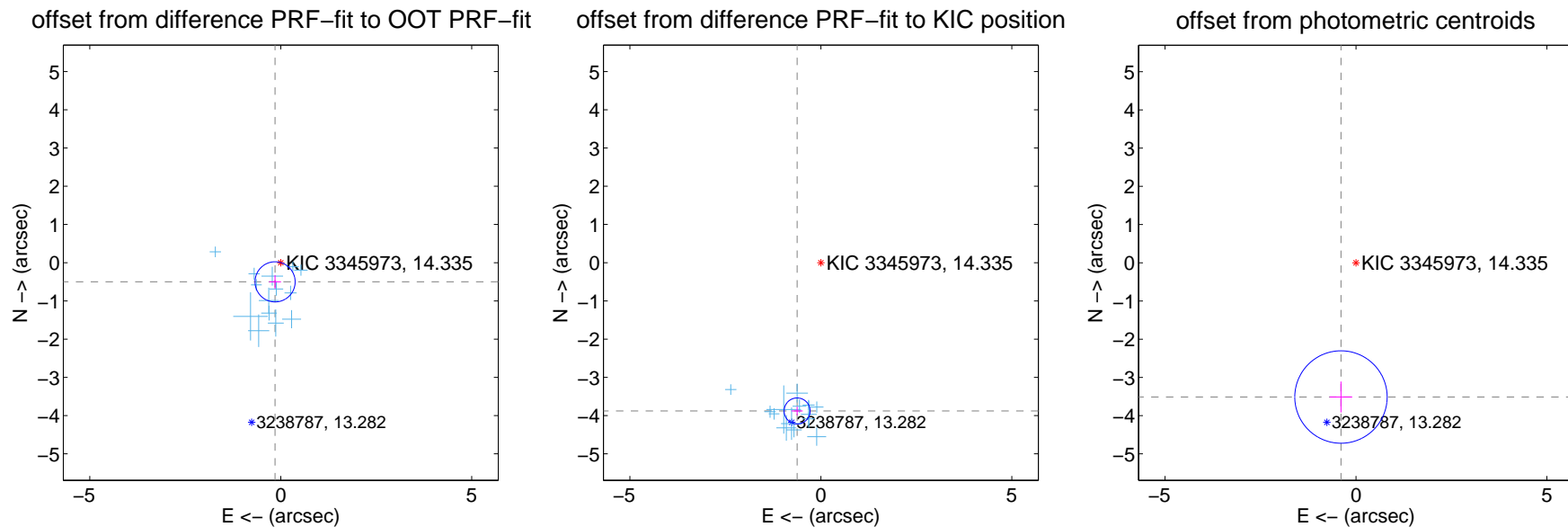
## DV Centroid Data

Supplemental centroid analysis for 003345973-02. Kepler magnitude: 14.34. Transit SNR 9.12

There are 14 quarters with good PRF difference image offsets

The OOT PRF centroid is offset from the target star catalog position by about 2.44 arcsec so the offset from difference PRF-fit to OOT-fit may be invalid.

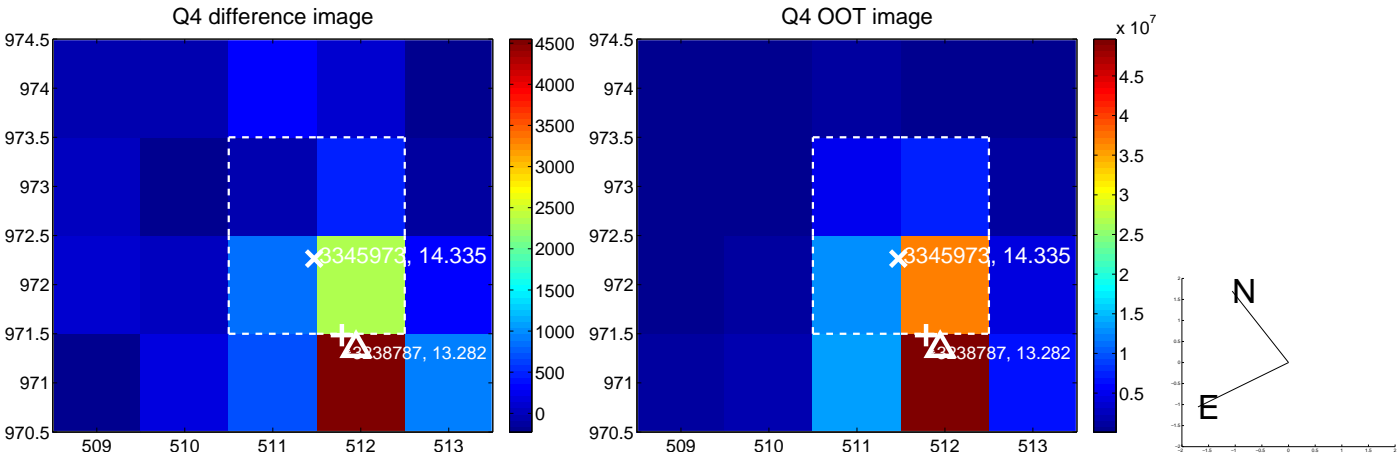
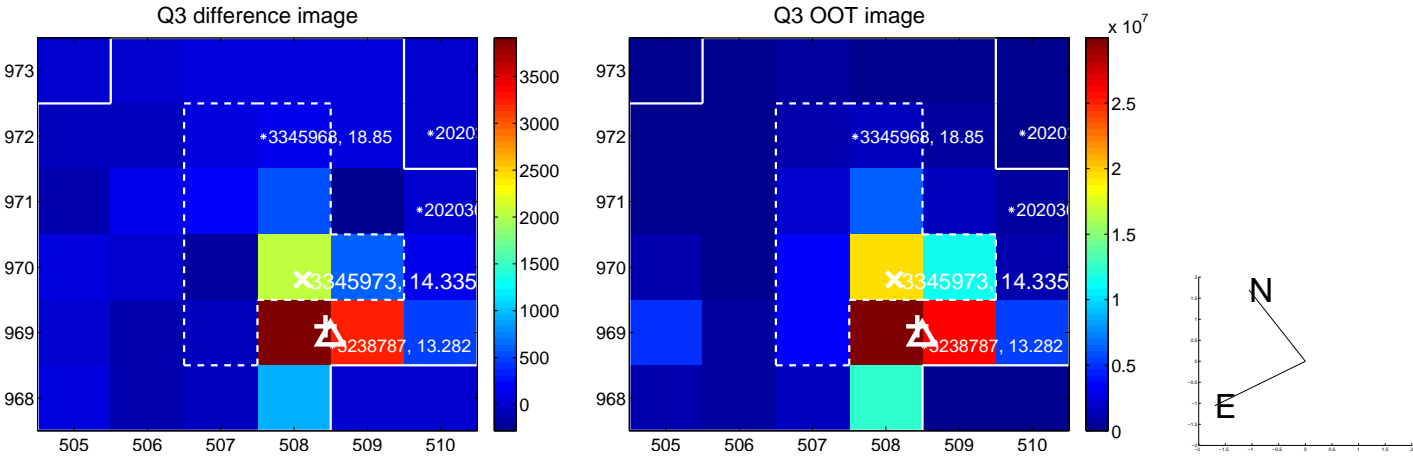
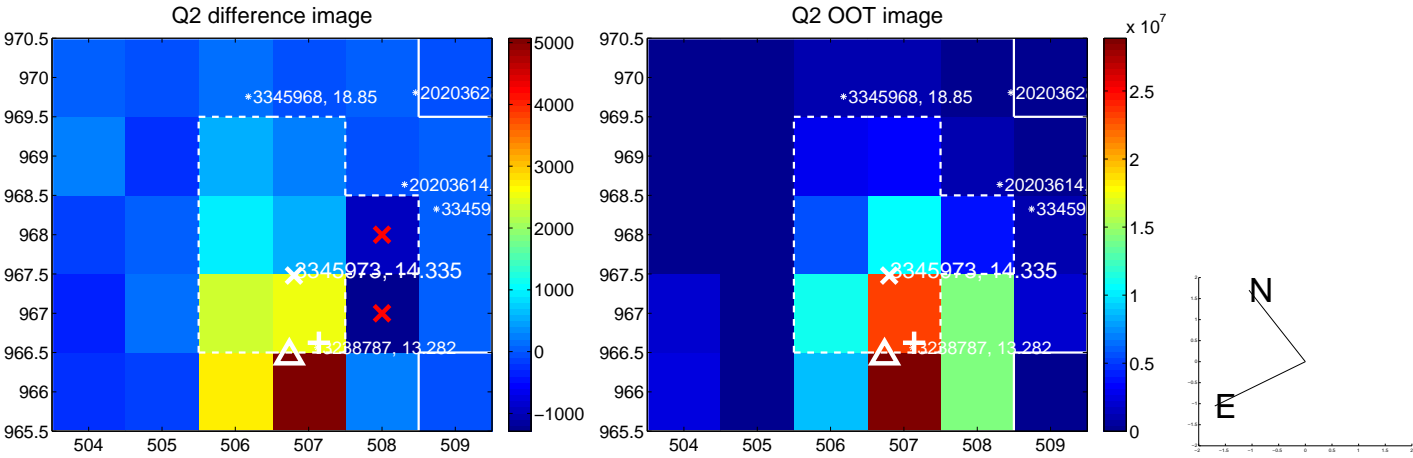
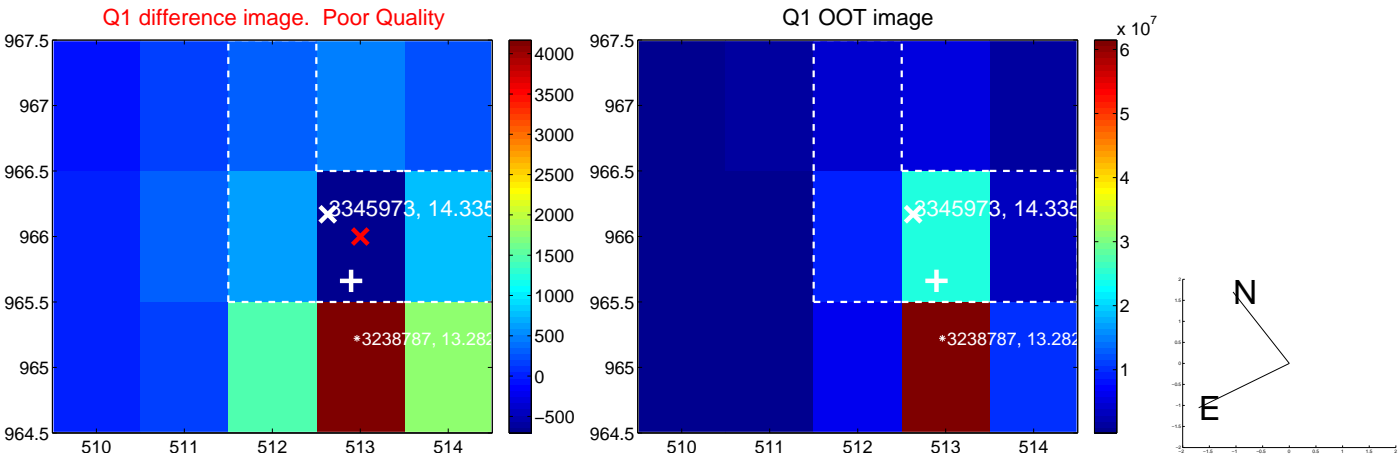
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.522 \pm 0.175$	2.98	$0.148 \pm 0.156$	$-0.501 \pm 0.177$
PRF-fit source offset from KIC position	$3.928 \pm 0.113$	34.62	$0.622 \pm 0.147$	$-3.879 \pm 0.112$
photometric centroid source offset	$3.54 \pm 0.40$	8.77	$0.39 \pm 0.30$	$-3.51 \pm 0.40$



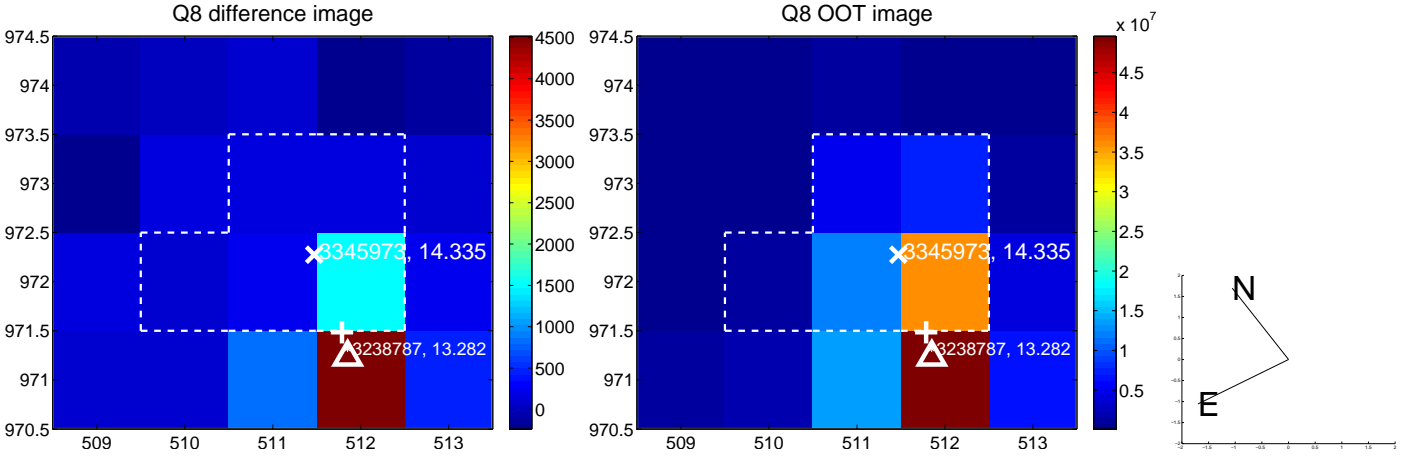
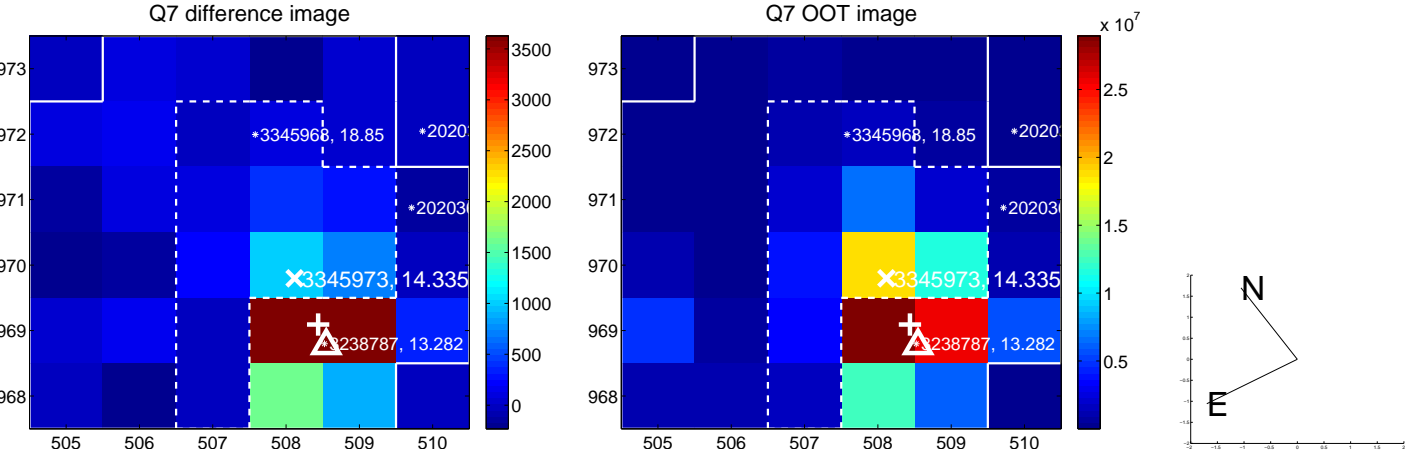
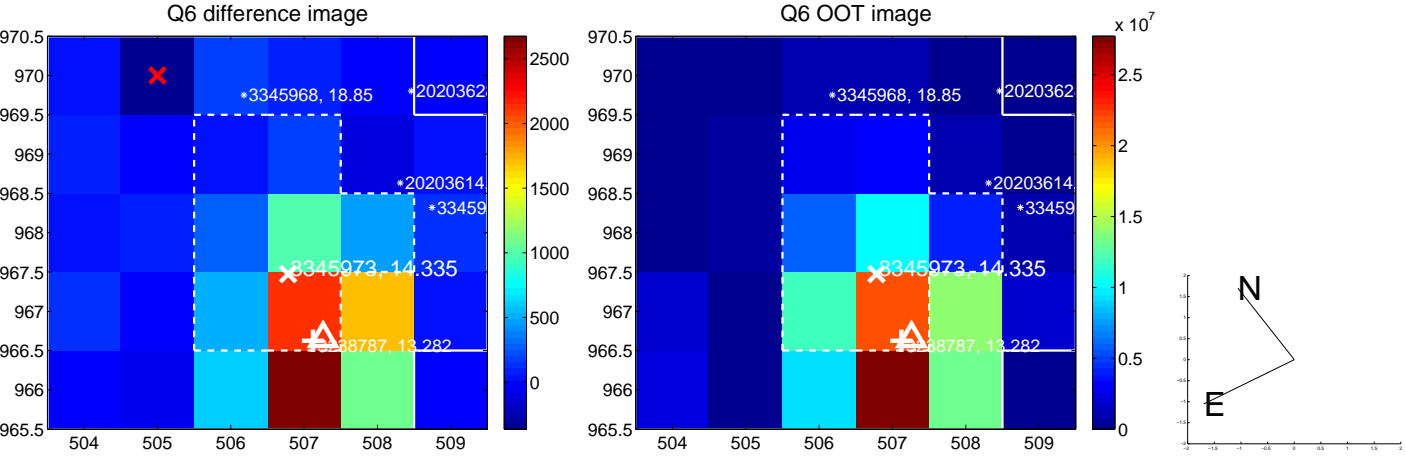
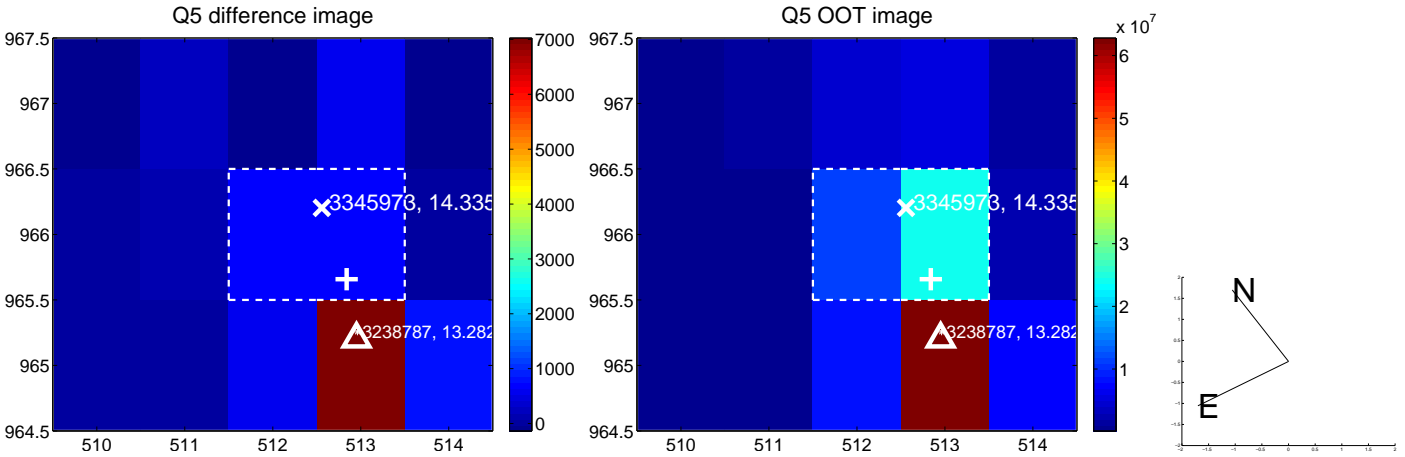
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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



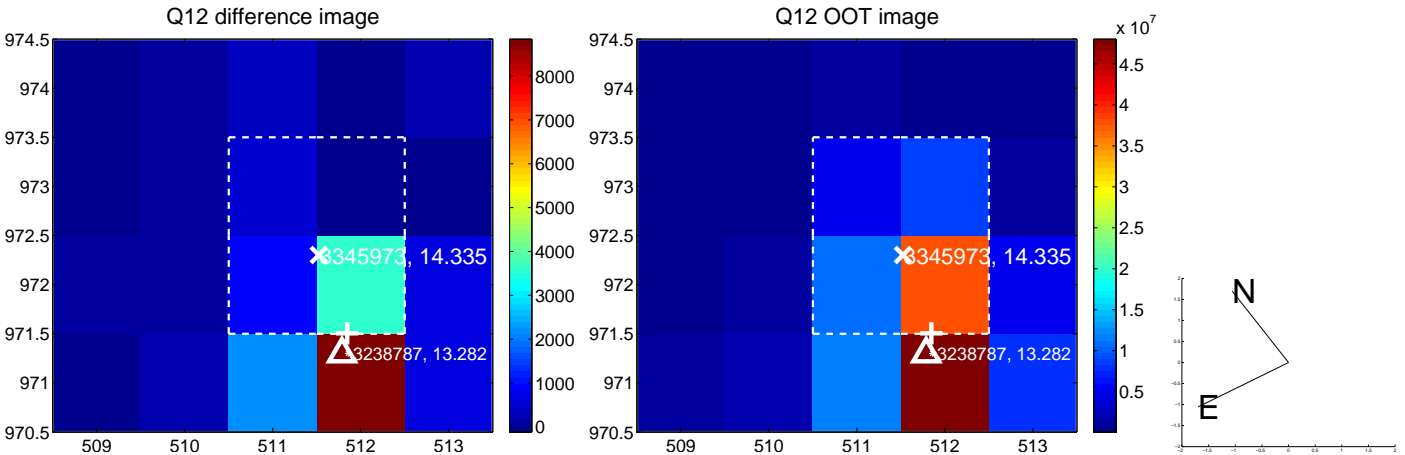
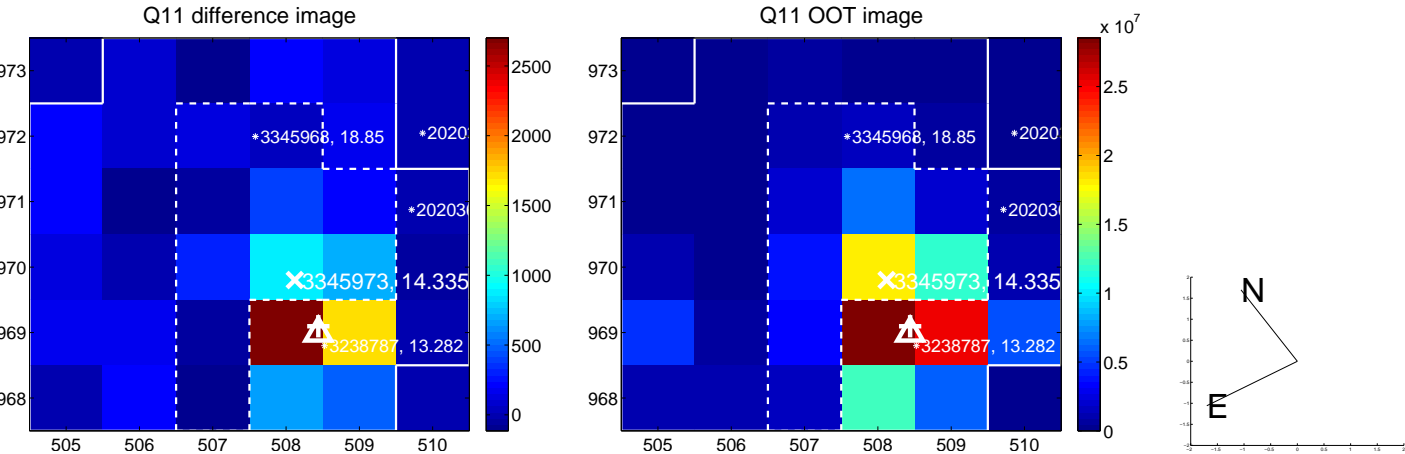
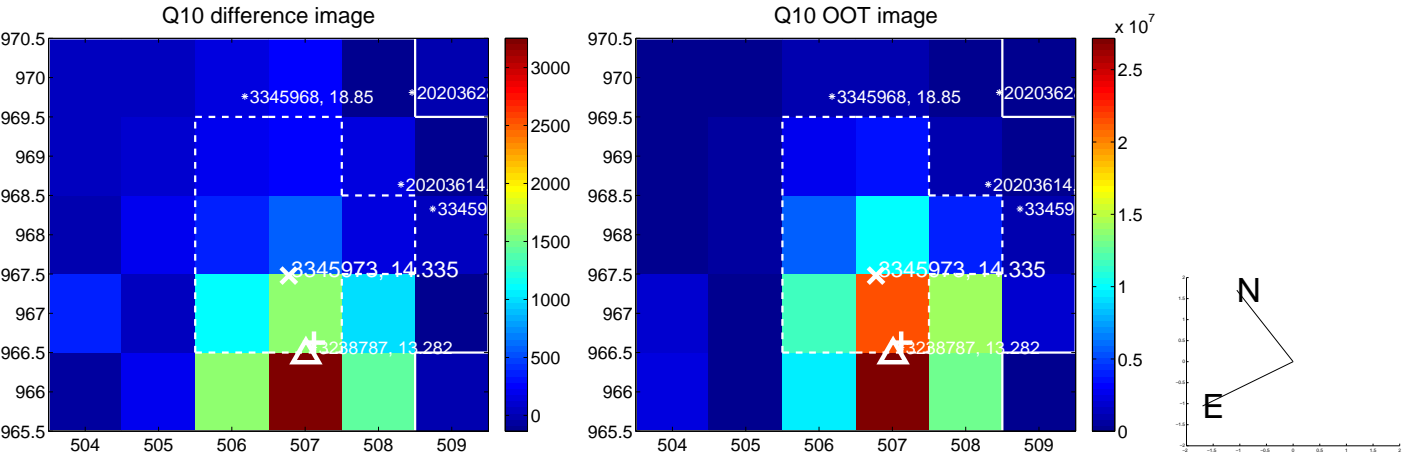
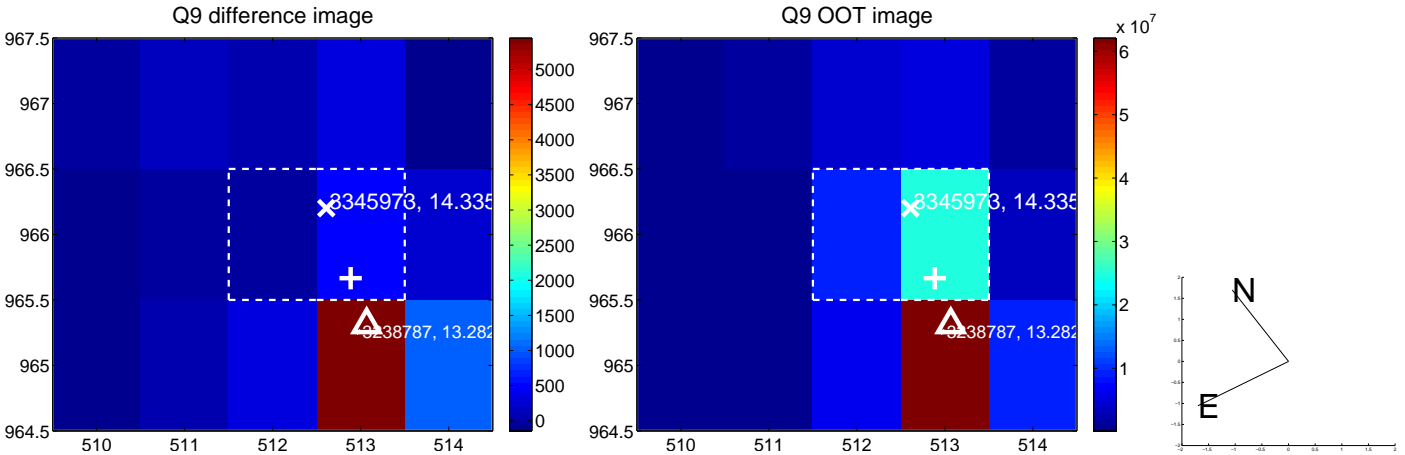
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



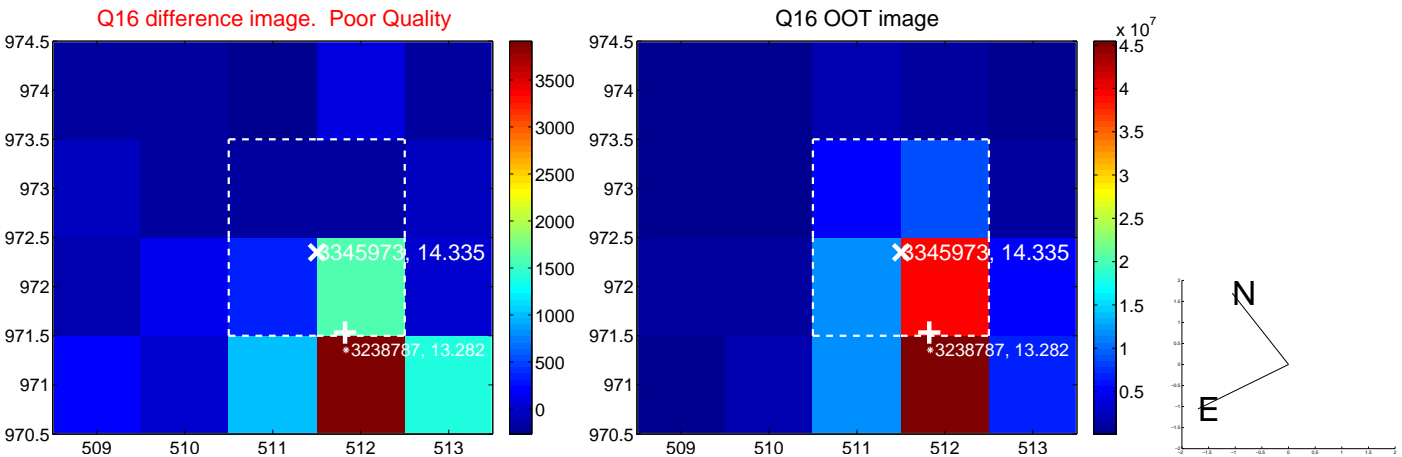
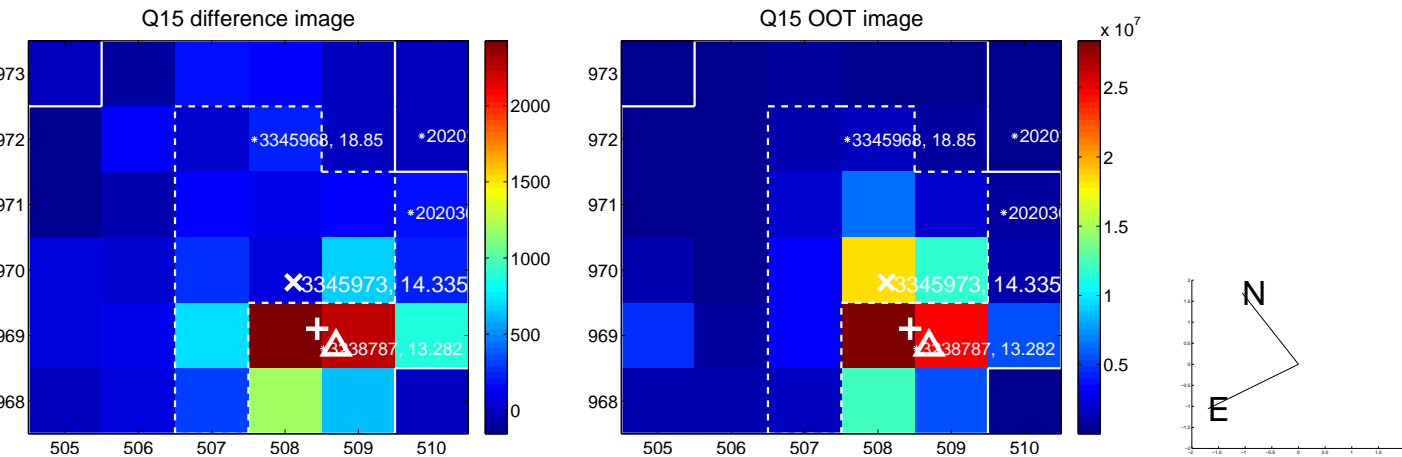
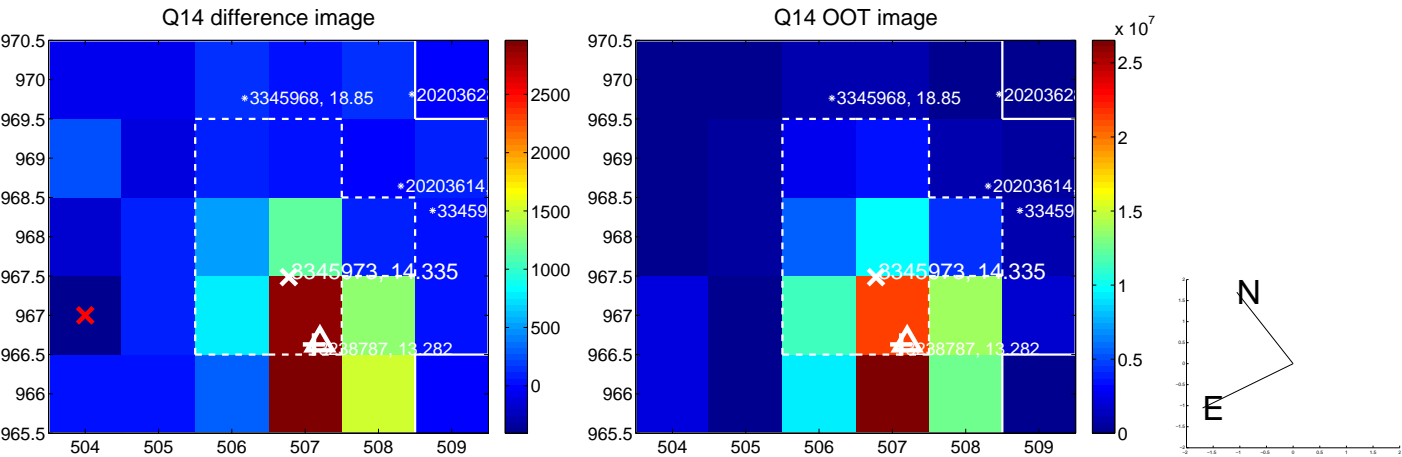
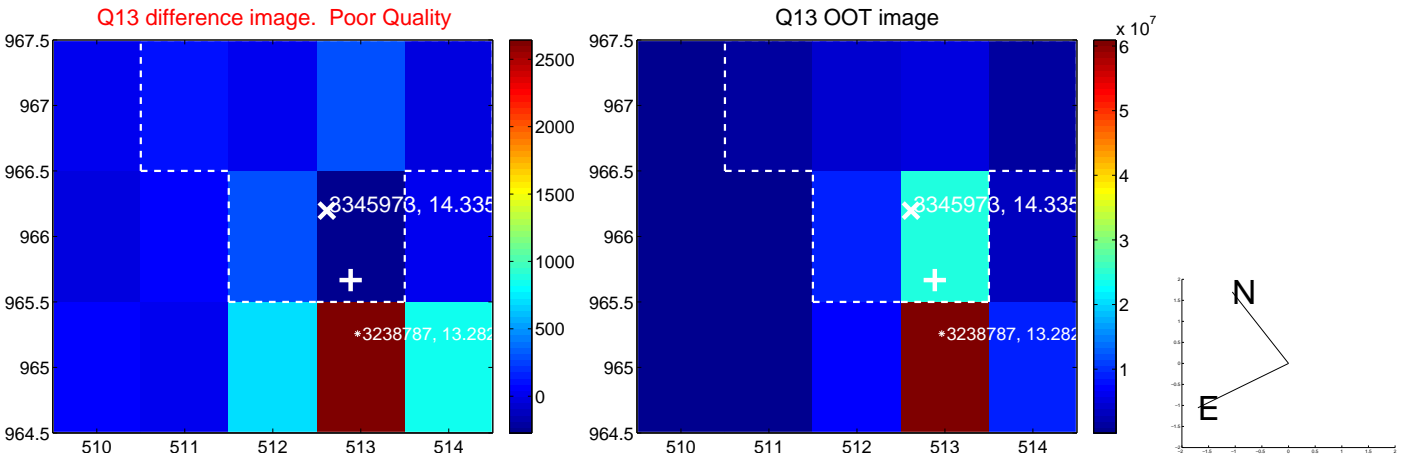
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



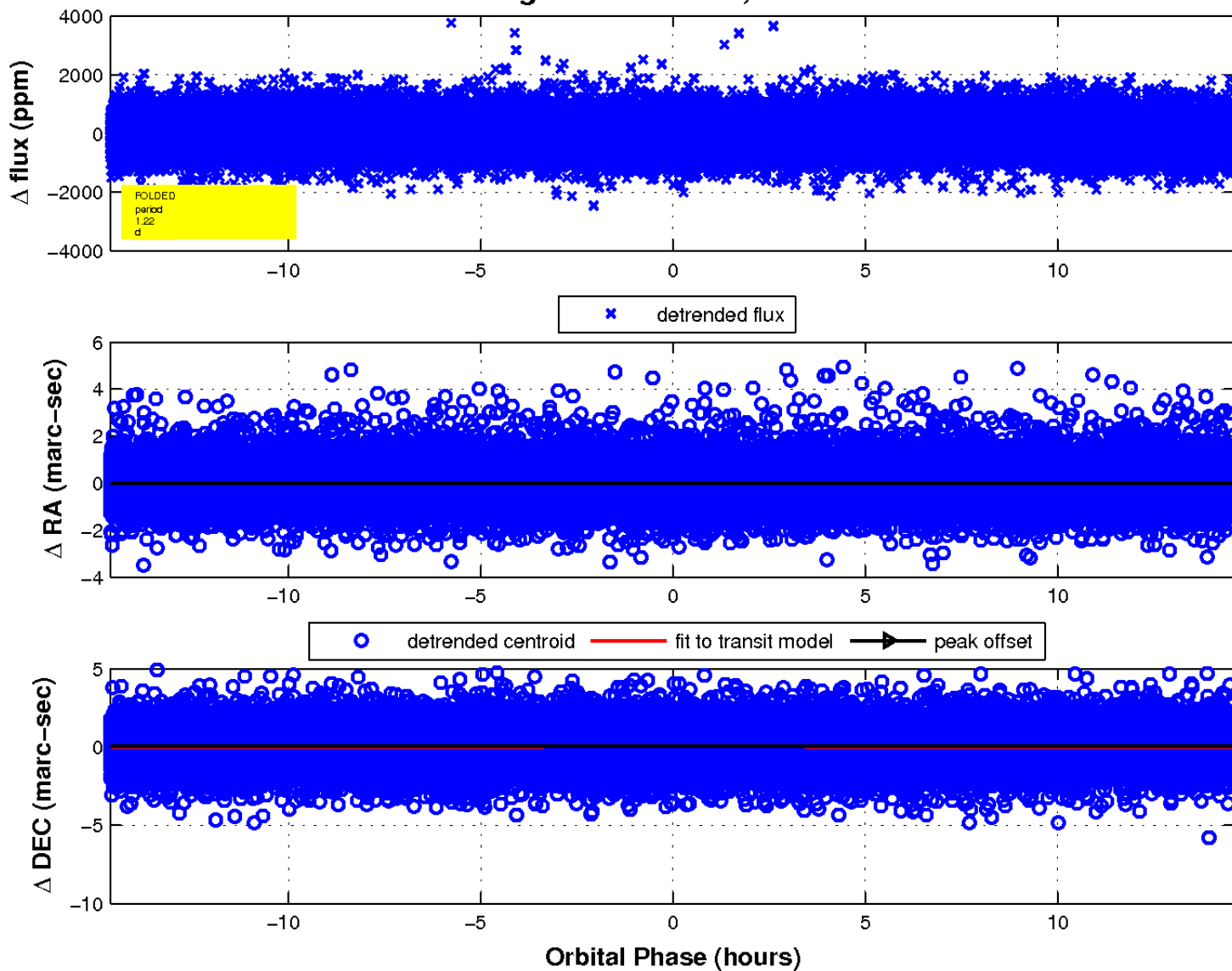
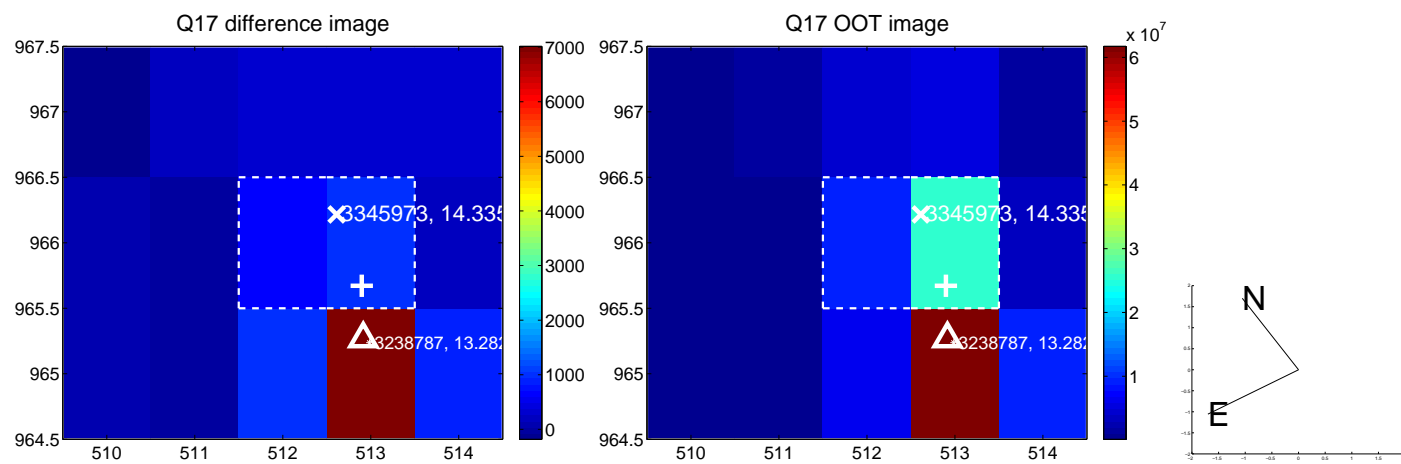
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

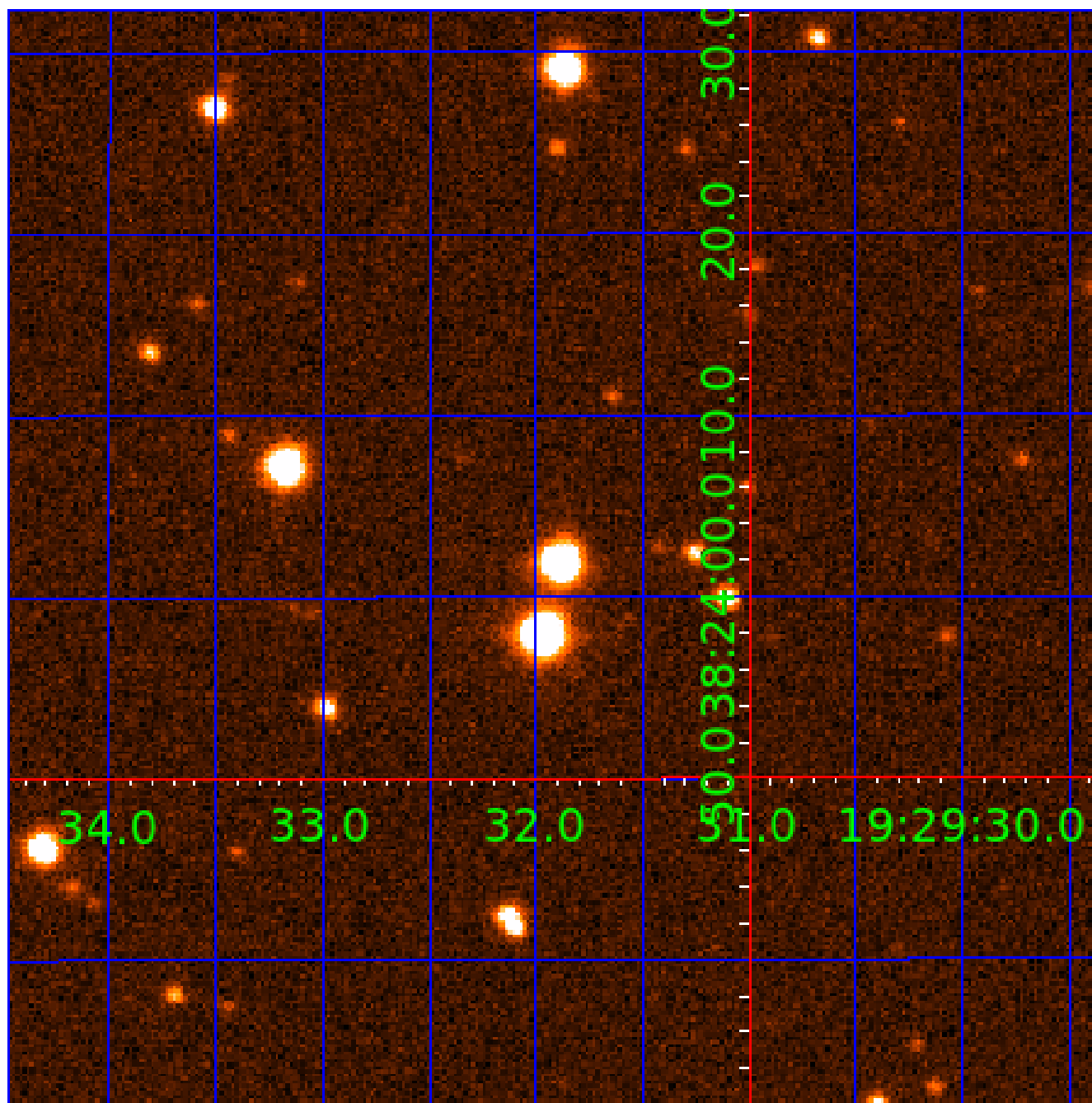


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination





# KIC 003345973

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
003345973-01	OBS	7652.01	15.346397	143.825241	219.6	5.162	10.7	10.4	2.26	6771	3.94	480.96
003345973-02	OBS	No	1.218657	131.752553	47.4	6.910	8.6	9.1	2.26	6771	1.57	14090.98
003345973-03	OBS	No	83.235609	155.072882	471.3	7.505	19.5	7.0	2.26	6771	5.17	50.47
003345973-04	OBS	No	86.479415	143.283783	341.2	36.687	17.5	6.5	2.26	6771	5.08	47.96
003345973-05	OBS	No	92.144154	216.274303	363.5	17.893	10.0	6.0	2.26	6771	4.96	44.07
003345973-06	OBS	No	100.093604	194.394859	813.2	1.716	8.8	6.7	2.26	6771	6.92	39.47

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
003345973-01	OBS	FP	0.00	0	0	1	0	CENT_RESOLVED_OFFSET—HALO_GHOST
003345973-02	OBS	FP	0.00	1	0	1	0	LPP_DV—CENT_RESOLVED_OFFSET
003345973-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—CENT_KIC_POS
003345973-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS
003345973-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_KIC_POS—CENT_UNCERTAIN
003345973-06	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_TRACKER—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST

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

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

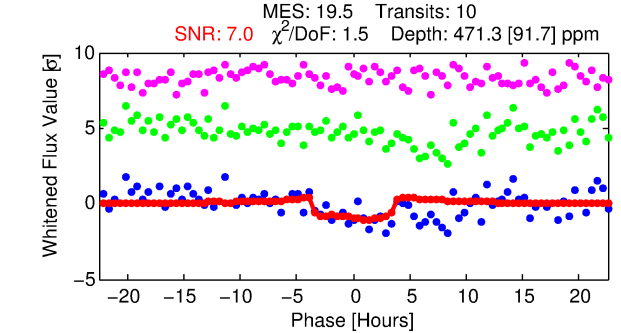
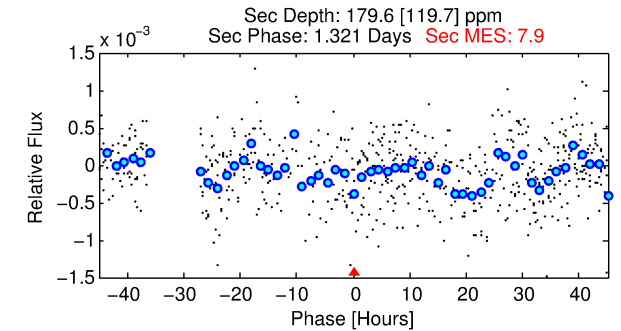
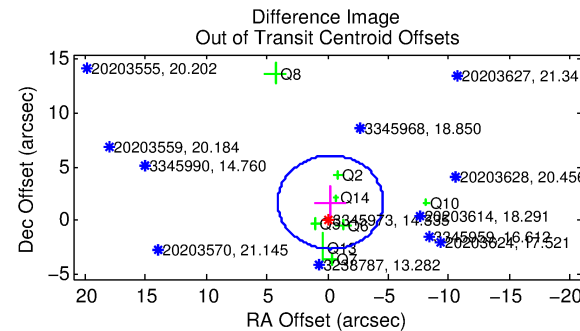
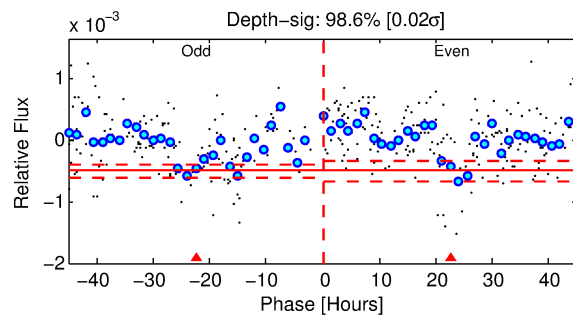
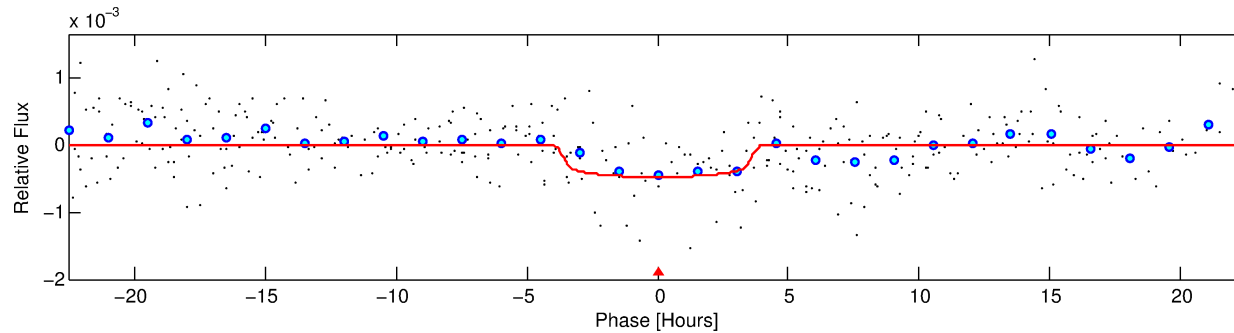
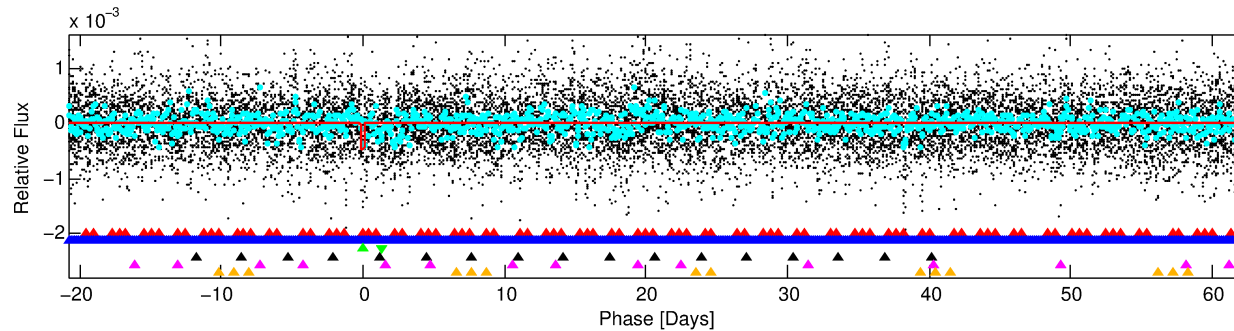
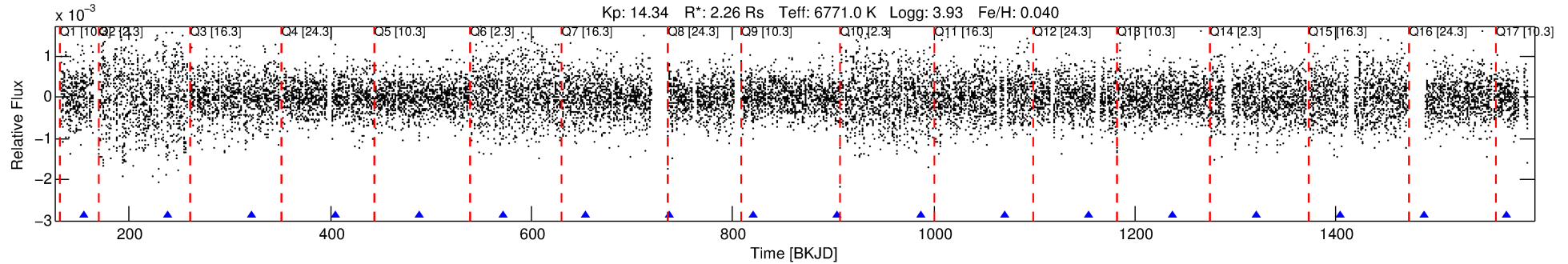
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 003345973-03

No Significant Match Found

# DV One-Page Summary

KIC: 3345973 Candidate: 3 of 6 Period: 83.236 d



## DV Fit Results:

Period = 83.23561 [0.00159] d  
Epoch = 155.0729 [0.0162] BKJD  
Rp/R\* = 0.0210 [0.0135]  
a/R\* = 68.22 [239.83]  
b = 0.63 [3.40]  
Seff = 50.47 [17.15]  
Teq = 680 [58] K  
Rp = 5.17 [3.54] Re  
a = 0.4364 [0.0936] AU  
Ag = 703.71 [1048.74] [0.67σ]  
Teffp = 5412 [1965] K [2.41σ]

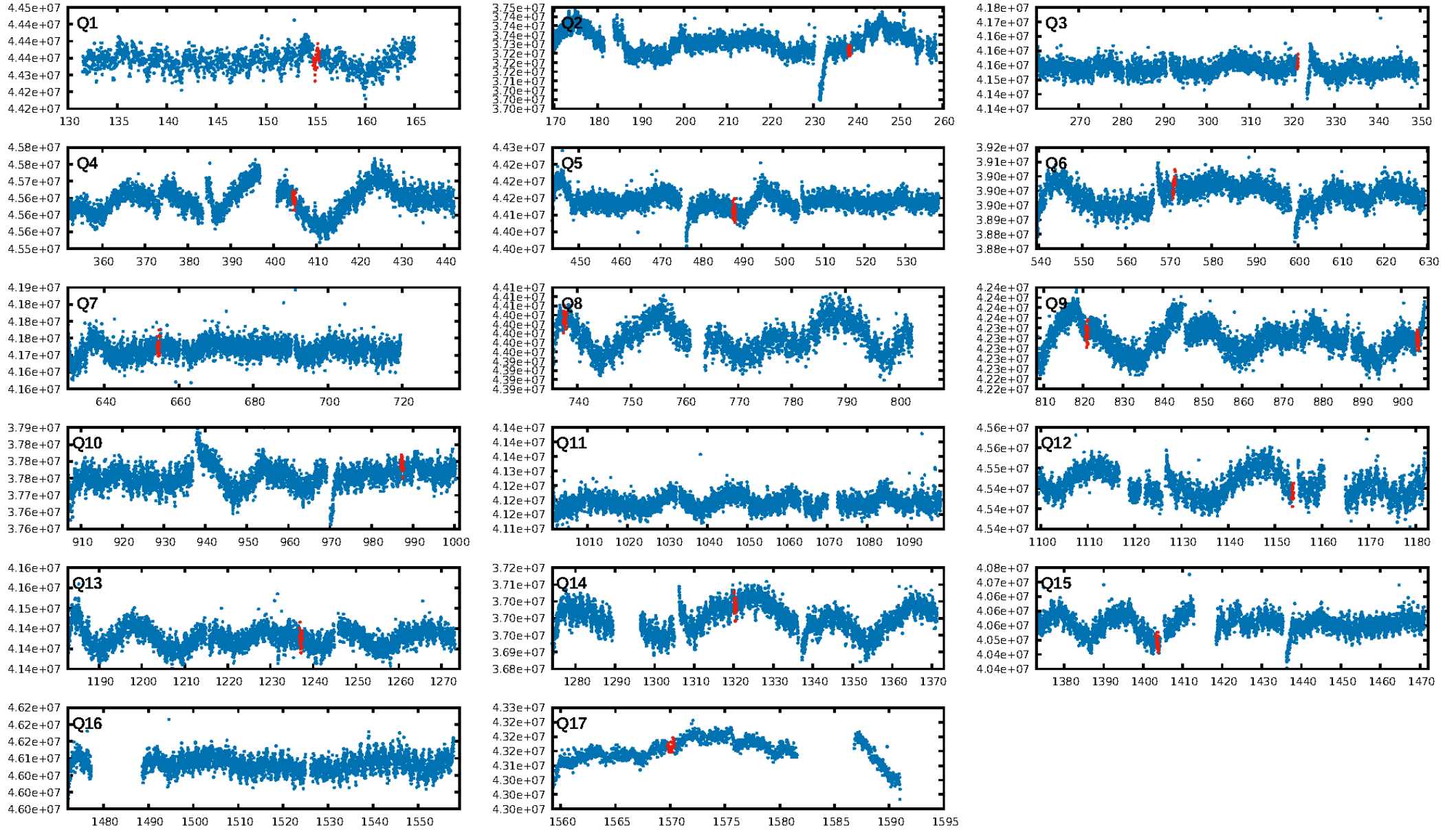
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [178.88σ]  
LongPeriod-sig: 96.2% [2.08σ]  
ModelChiSquare2-sig: 13.5%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 7.25e-47  
RollingBand-fgt: 1.00 [9/9]  
GhostDiagnostic-chr: -0.5046  
Centroid-sig: 0.0%  
Centroid-so: 2.423 arcsec [7.60σ]  
OotOffset-rm: 1.682 arcsec [1.16σ]  
KicOffset-rm: 1.803 arcsec [0.92σ]  
OotOffset-st: 4/1/1/2 [8]  
KicOffset-st: 4/1/1/2 [8]  
DiffImageQuality-fgm: 0.25 [2/8]  
DiffImageOverlap-fno: 0.00 [0/13]

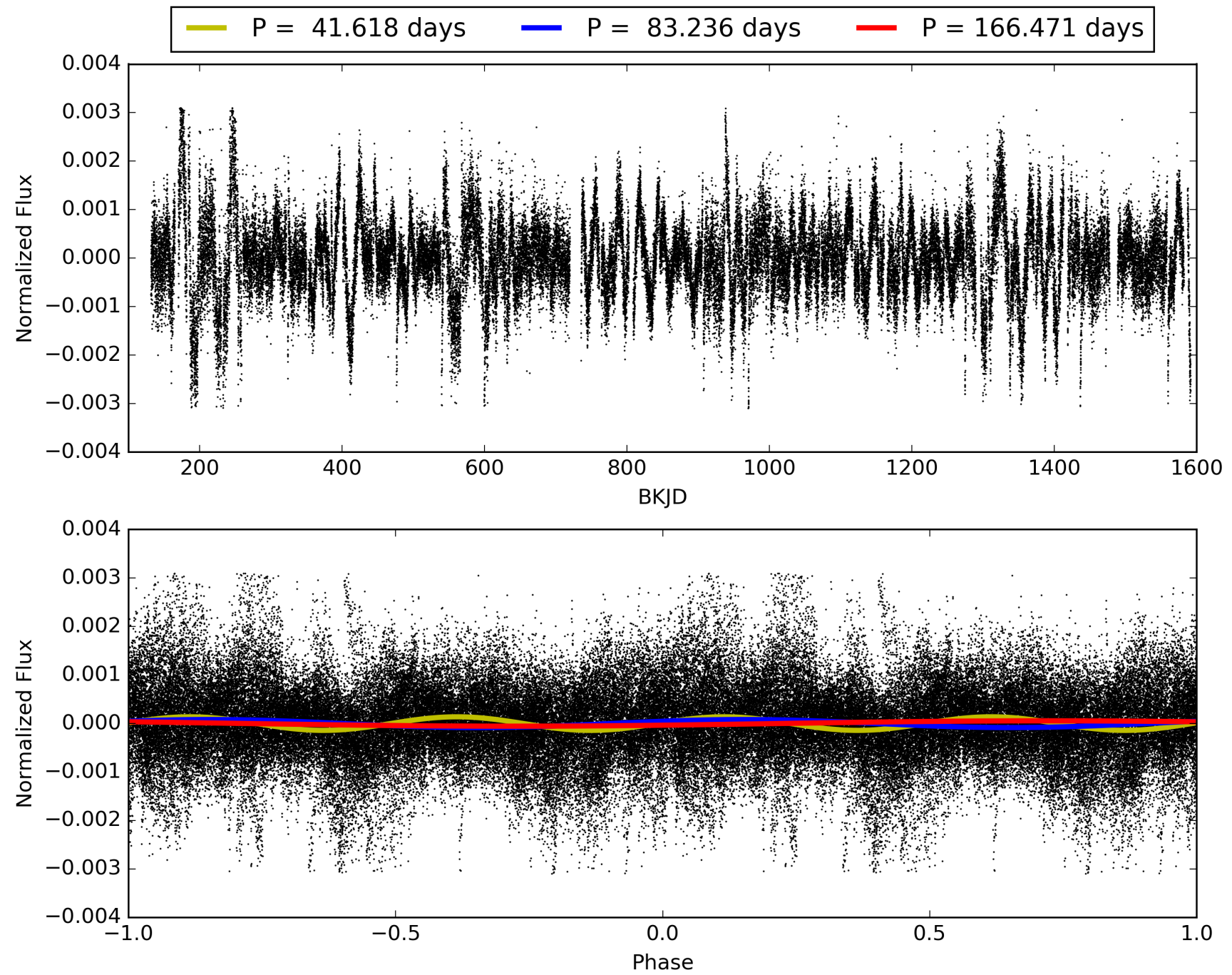
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 21:20:27 Z

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

# TCE 003345973-03, PDC Light Curves

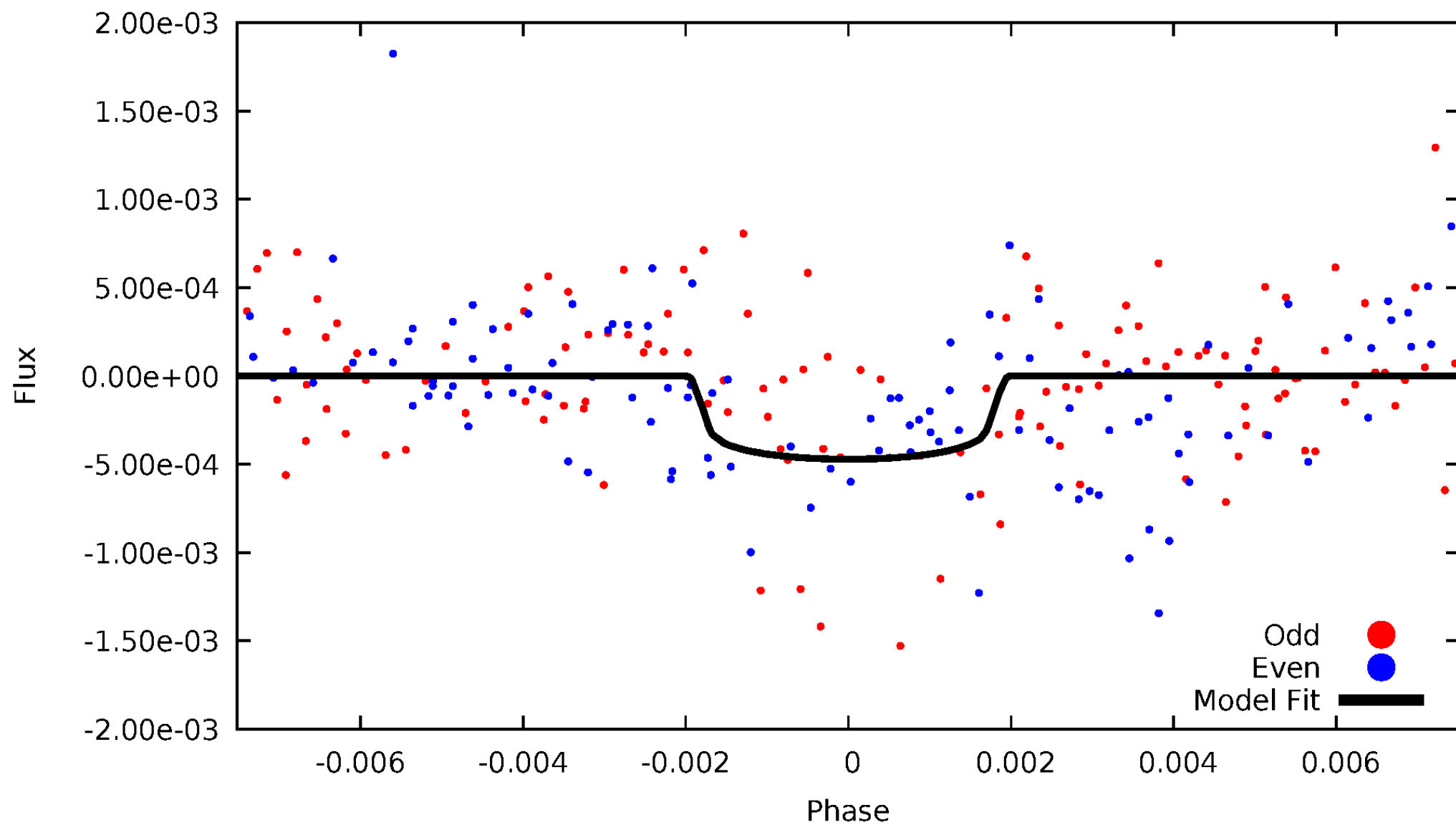


TCE 003345973-03



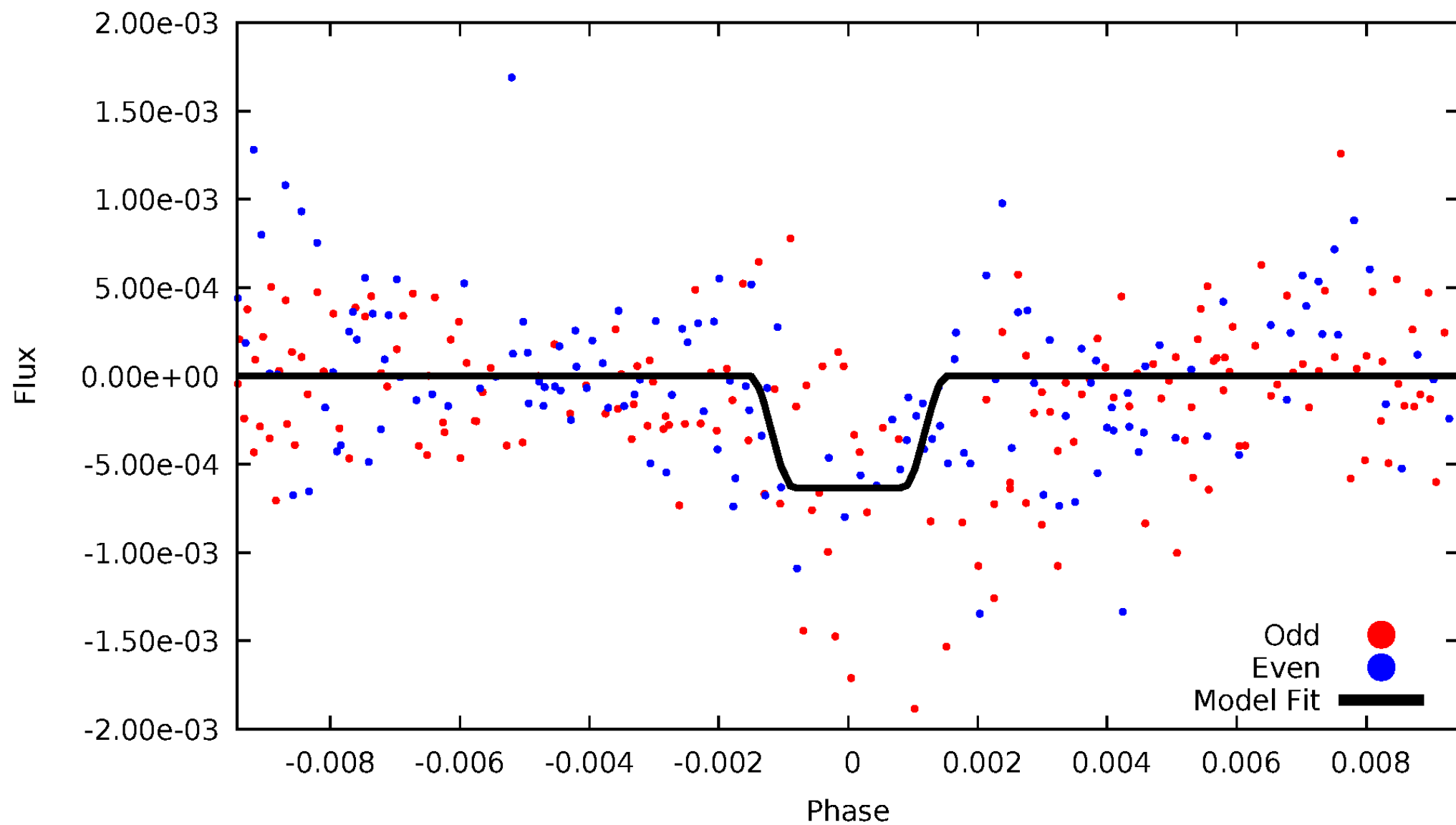
# DV Odd/Even

TCE 003345973-03



# ALT Odd/Even

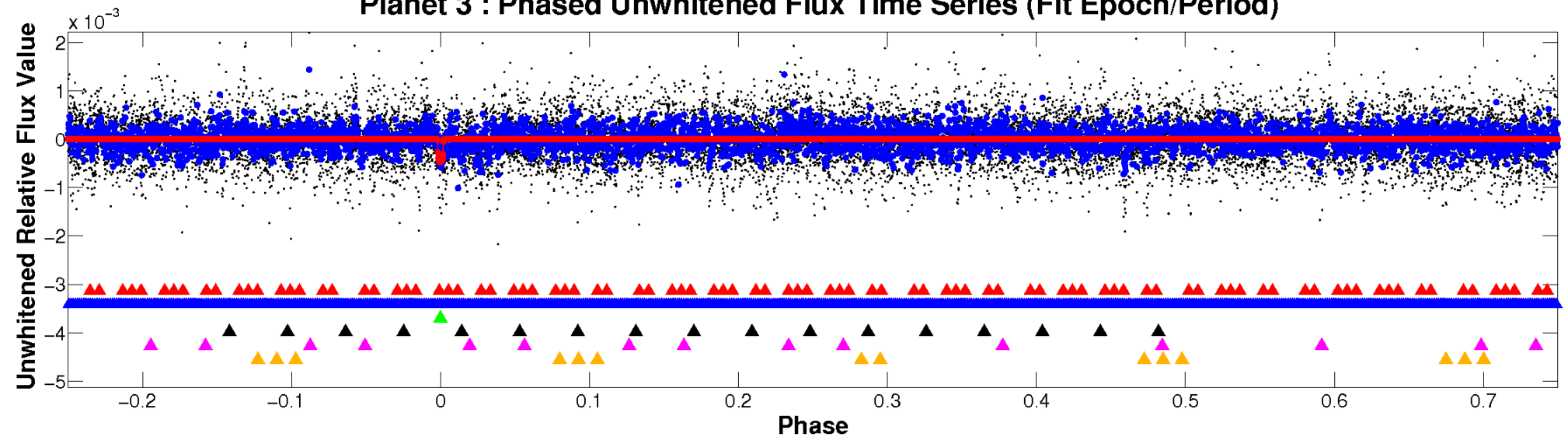
TCE 003345973-03



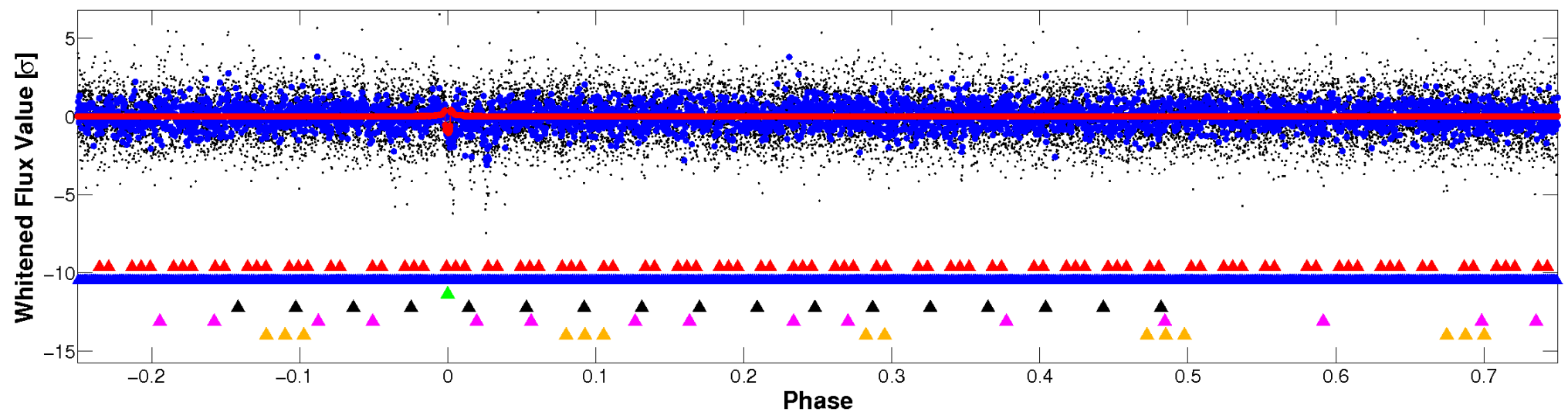


# Non-Whitened Vs. Whitened Light Curve

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

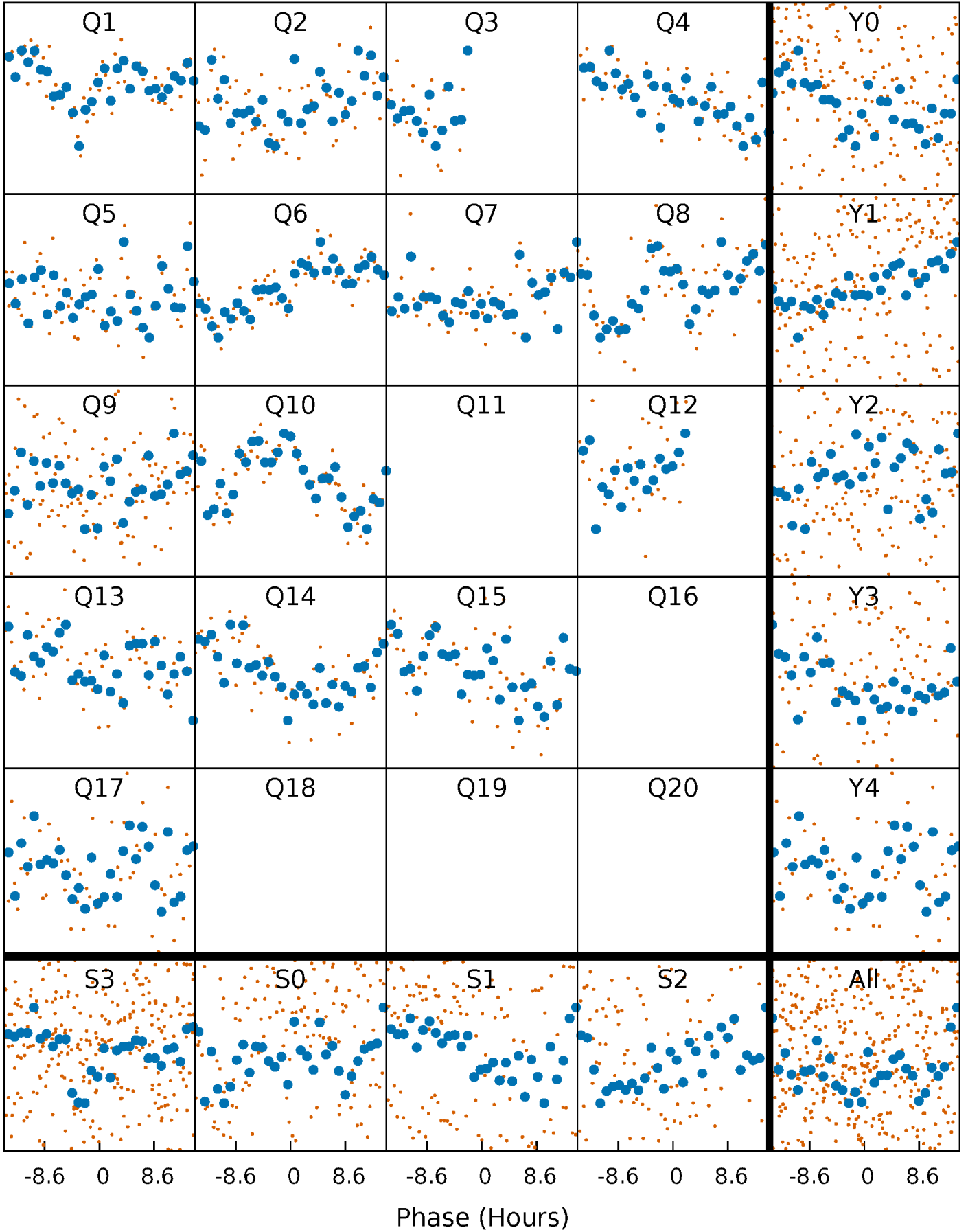


## Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



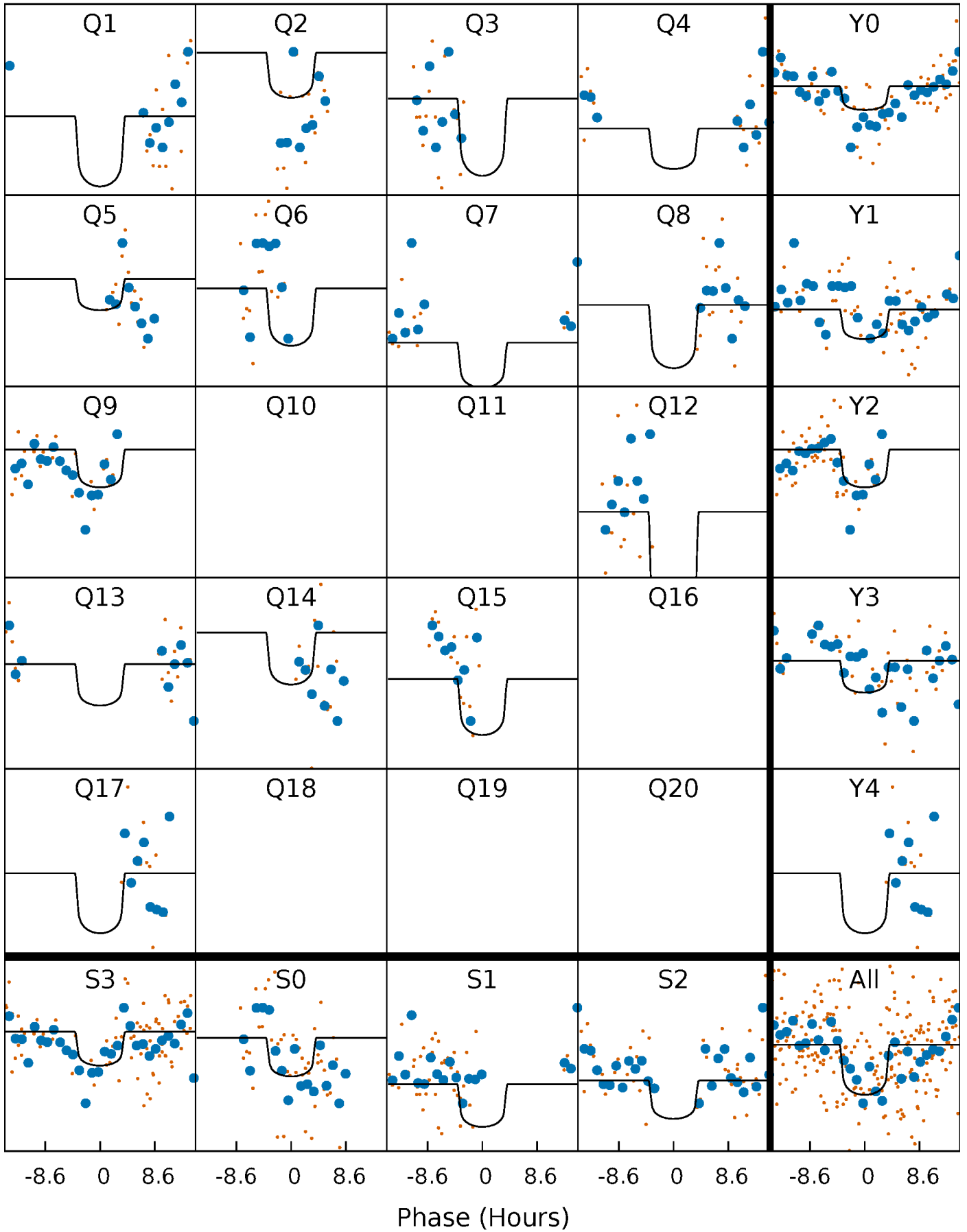
# PDC Quarter-Phased Transit Curves

TCE 003345973-03   P= 83.235609 Days    $T_0=155.072882$  (BKJD)



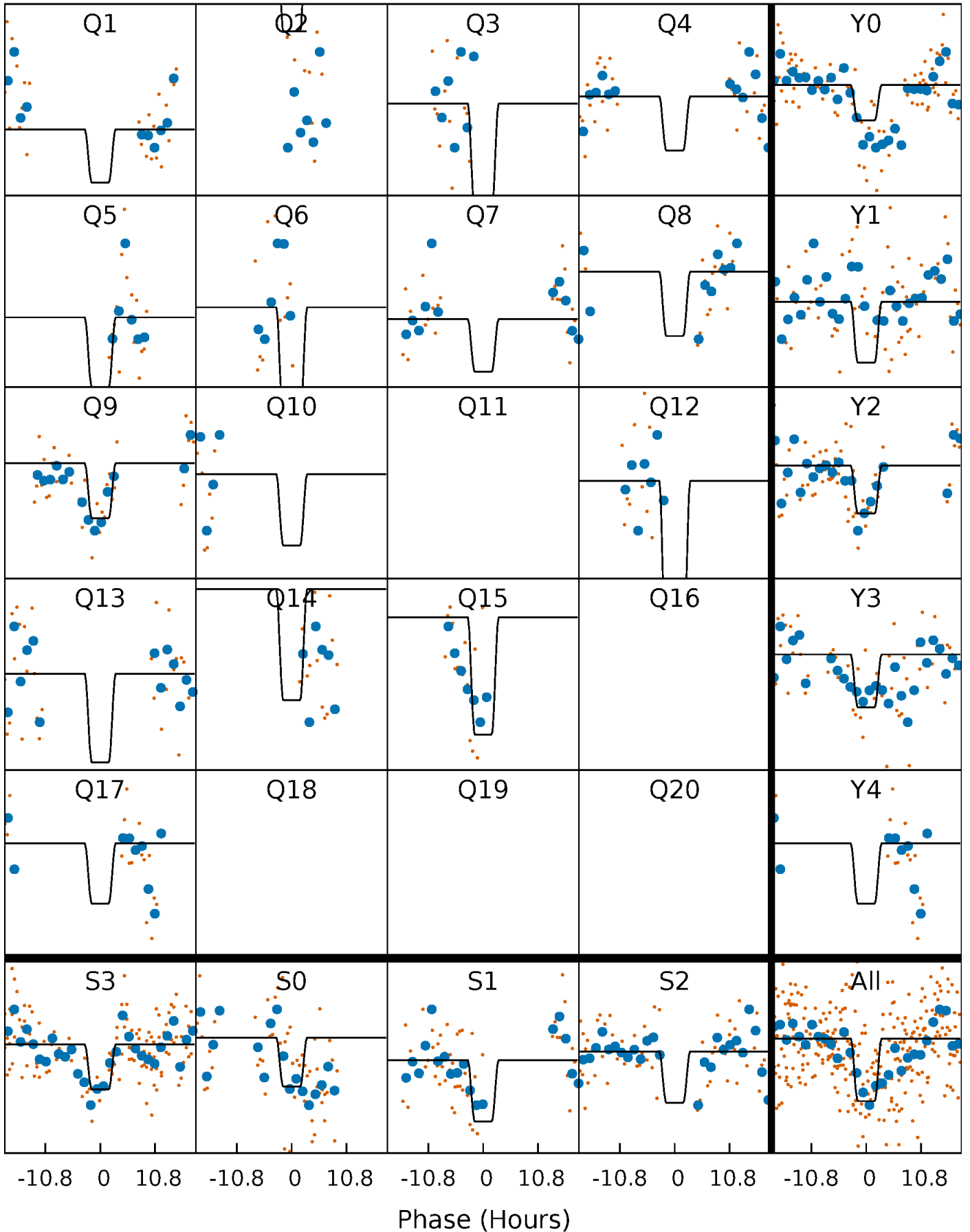
# DV Quarter-Phased Transit Curves

TCE 003345973-03 P= 83.235609 Days  $T_0=155.072882$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

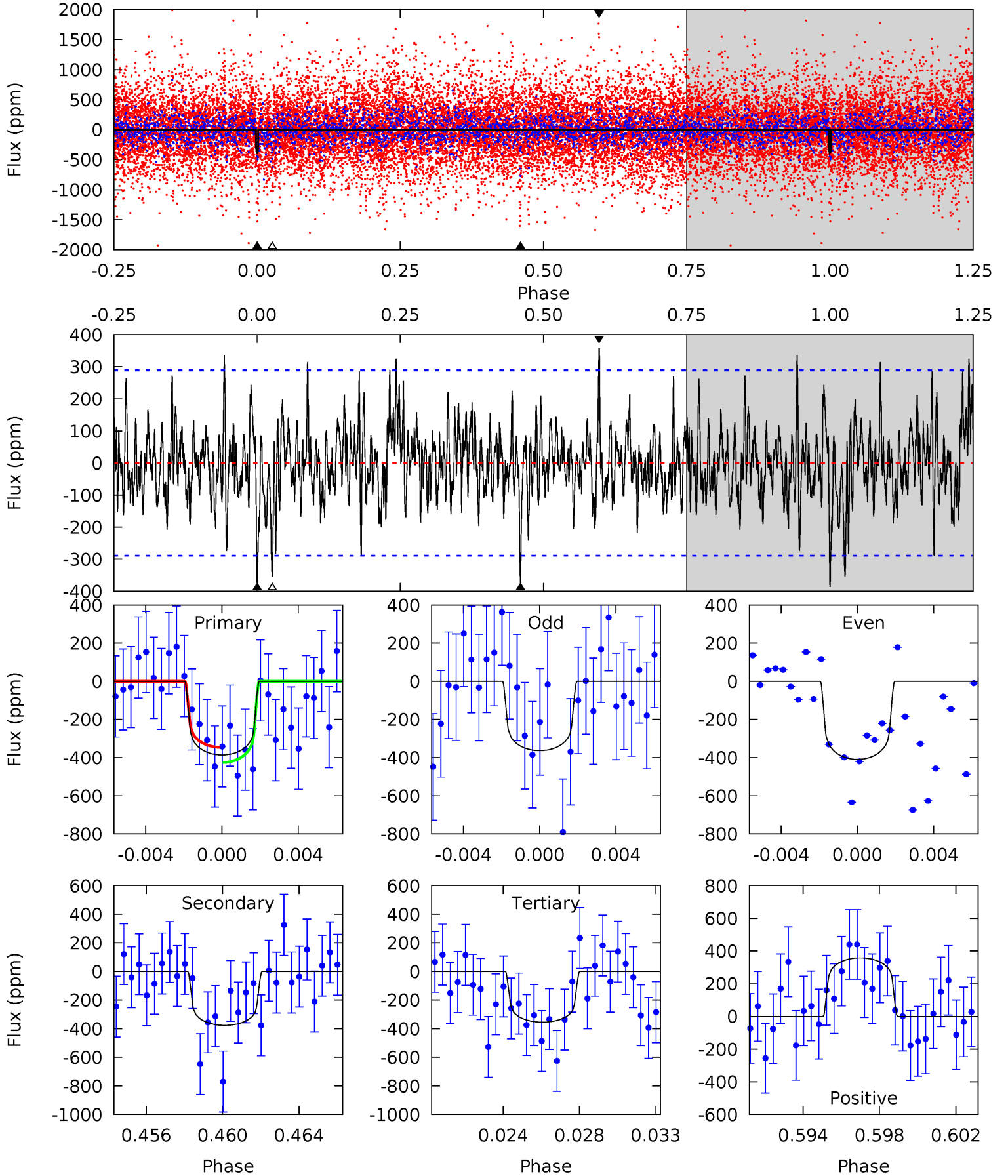
TCE 003345973-03 P= 83.235345 Days  $T_0=155.041156$  (BKJD)



# DV Model-Shift Uniqueness Test

003345973-03, P = 83.235609 Days, E = 71.837273 Days

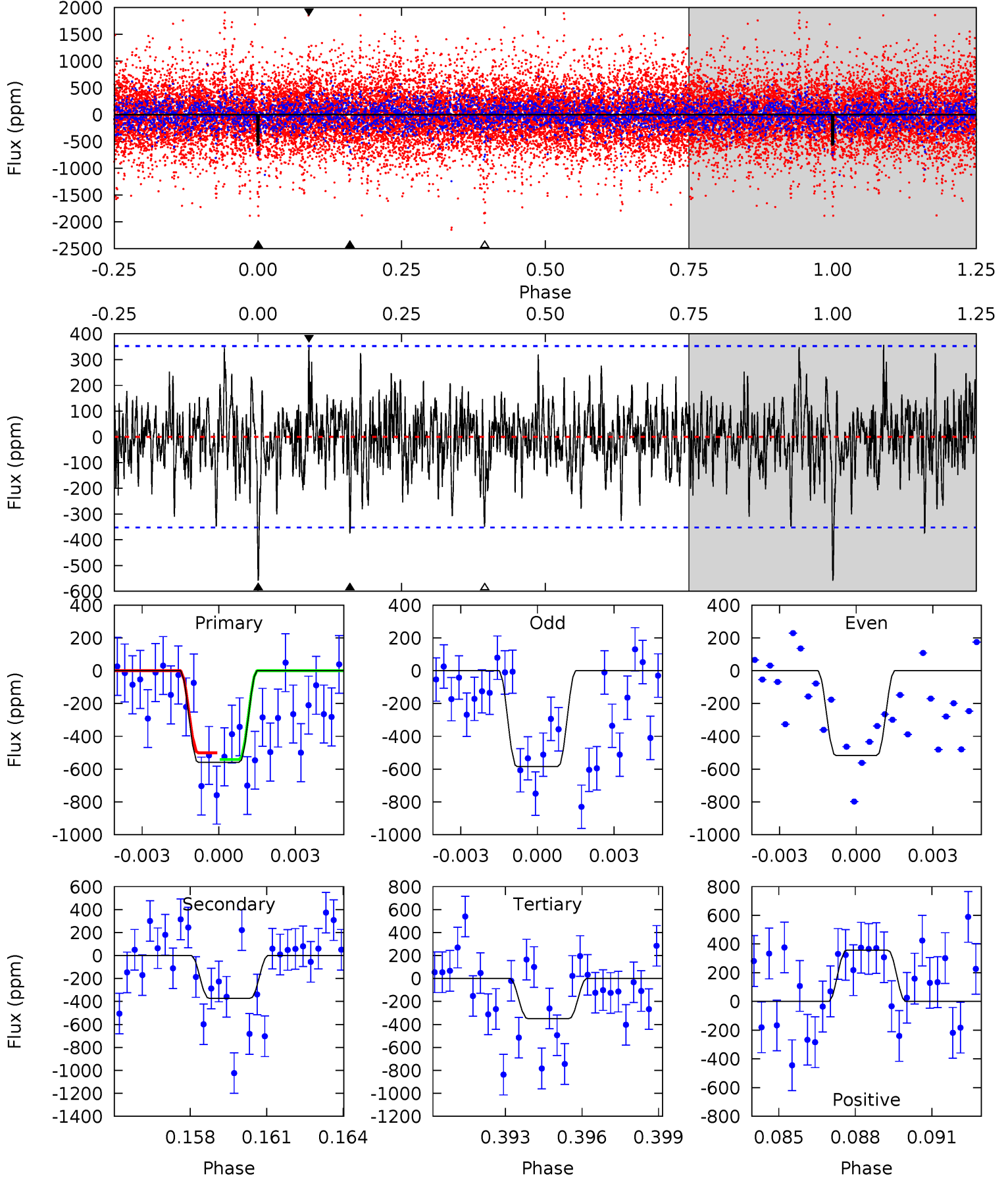
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
6.95	6.78	6.38	6.44	5.20	2.87	1.71	0.57	0.51	0.40	0.34	0.41	0.93	0.48	0.72



# Alt Model-Shift Uniqueness Test

003345973-03, P = 83.235345 Days, E = 71.805811 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
8.33	5.56	5.21	5.32	5.25	2.96	1.49	3.12	3.01	0.34	0.23	0.50	0.87	0.39	0.30





### Stellar Parameters For KIC 003345973

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6771^{+81}_{-81}$	$3.934^{+0.195}_{-0.120}$	$0.040^{+0.150}_{-0.150}$	$2.259^{+0.426}_{-0.521}$	$1.597^{+0.131}_{-0.180}$	$0.195^{+0.199}_{-0.074}$
	+1%/-1%	+5%/-3%	+375%/-375%	+19%/-23%	+8%/-11%	+102%/-38%
Source	SPE68	SPE68	SPE68	DSEP		

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

### Secondary Eclipse Parameters for KIC 003345973-03 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-377 \pm 56$	$5.32^{+3.57}_{-2.96}$	$947^{+49}_{-63}$	$6352^{+4095}_{-1335}$	$1415^{+5548}_{-911}$
Alt.	$-373 \pm 67$	$6.47^{+3.20}_{-3.14}$	$945^{+48}_{-58}$	$5727^{+2397}_{-897}$	$951^{+2594}_{-541}$

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

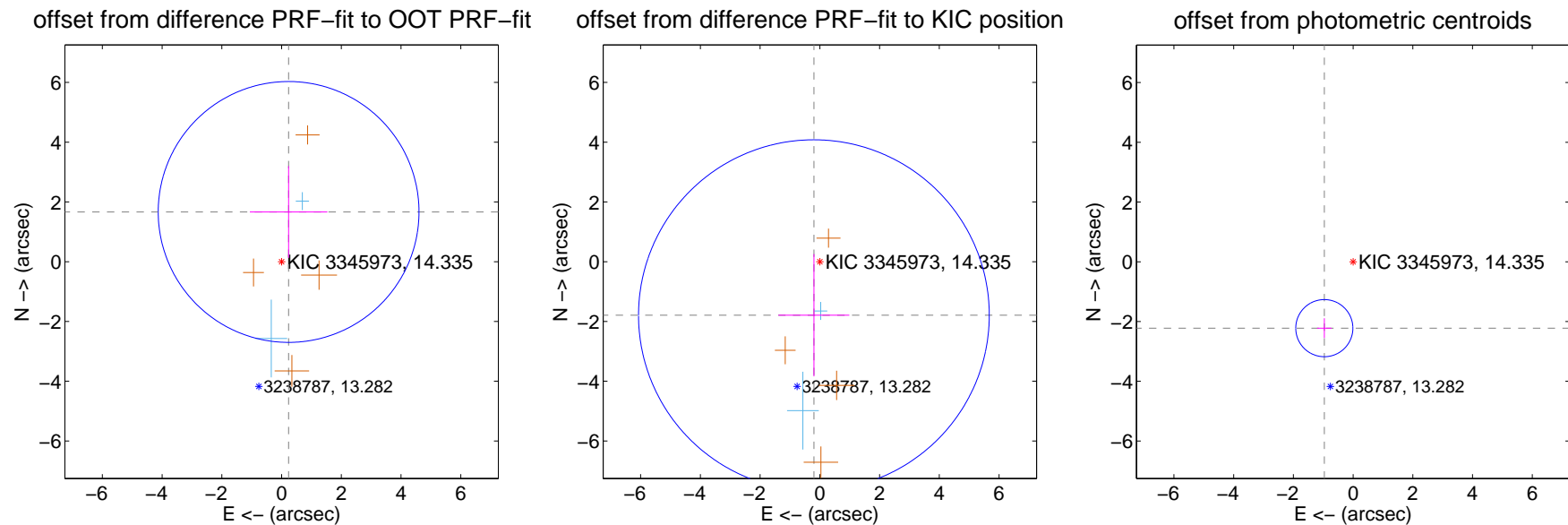
## DV Centroid Data

Supplemental centroid analysis for 003345973-03. Kepler magnitude: 14.34. Transit SNR 7.04

There are 2 quarters with good PRF difference image offsets

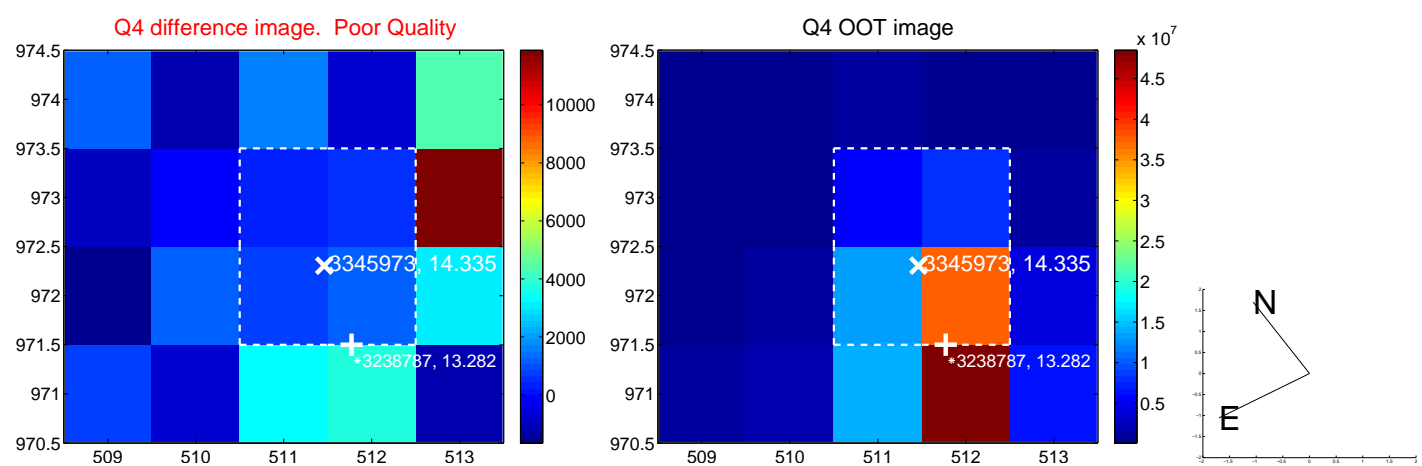
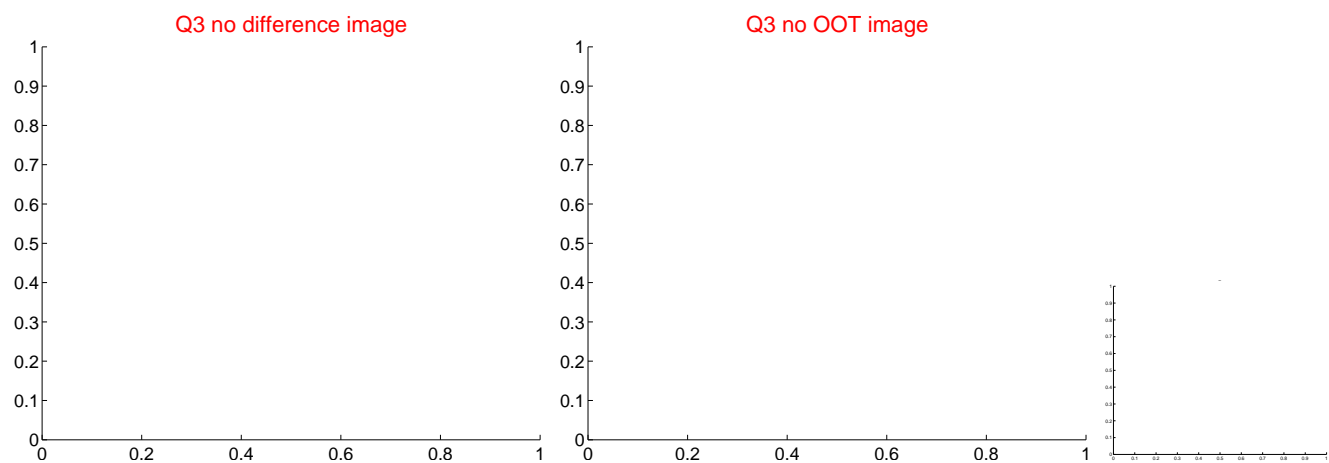
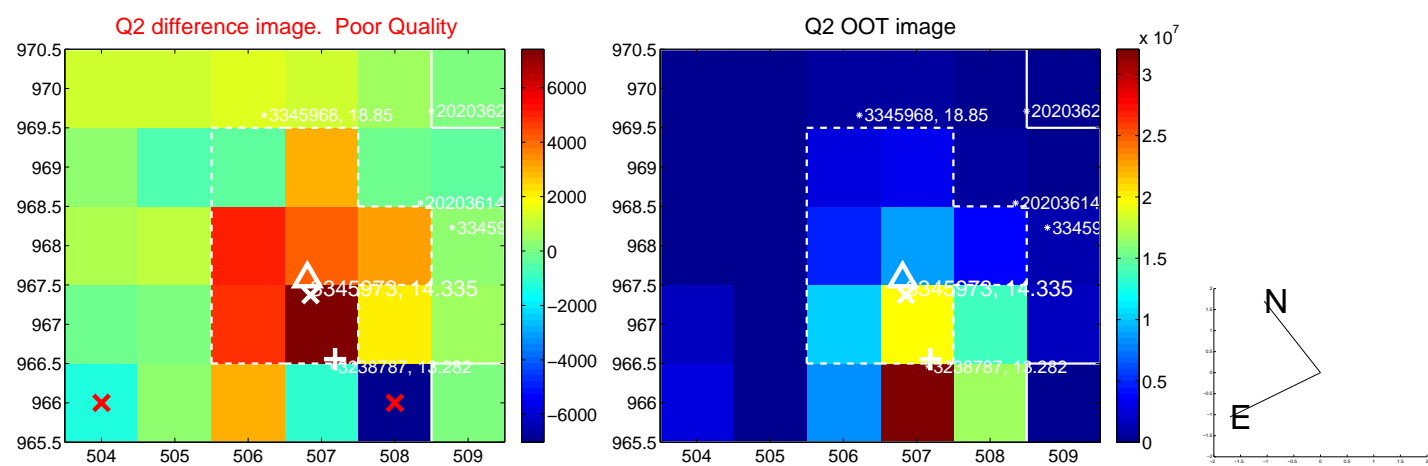
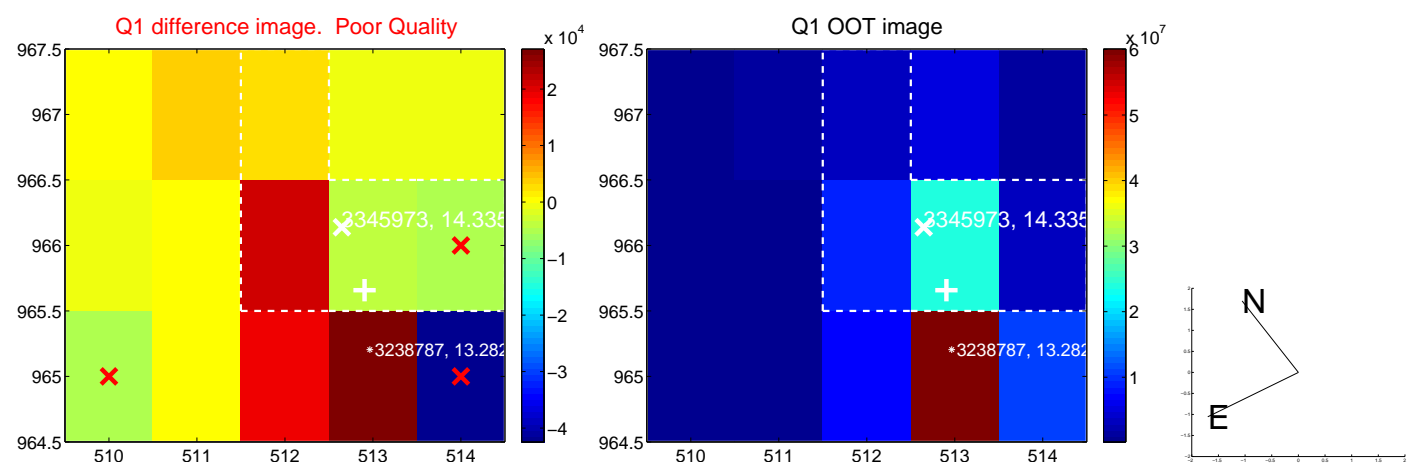
The OOT PRF centroid is offset from the target star catalog position by about 3.74 arcsec so the offset from difference PRF-fit to OOT-fit may be invalid.

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.682 \pm 1.455$	1.16	$-0.235 \pm 1.298$	$1.665 \pm 1.535$
PRF-fit source offset from KIC position	$1.803 \pm 1.957$	0.92	$0.199 \pm 1.187$	$-1.792 \pm 2.046$
photometric centroid source offset	$2.42 \pm 0.32$	7.60	$0.96 \pm 0.24$	$-2.22 \pm 0.33$

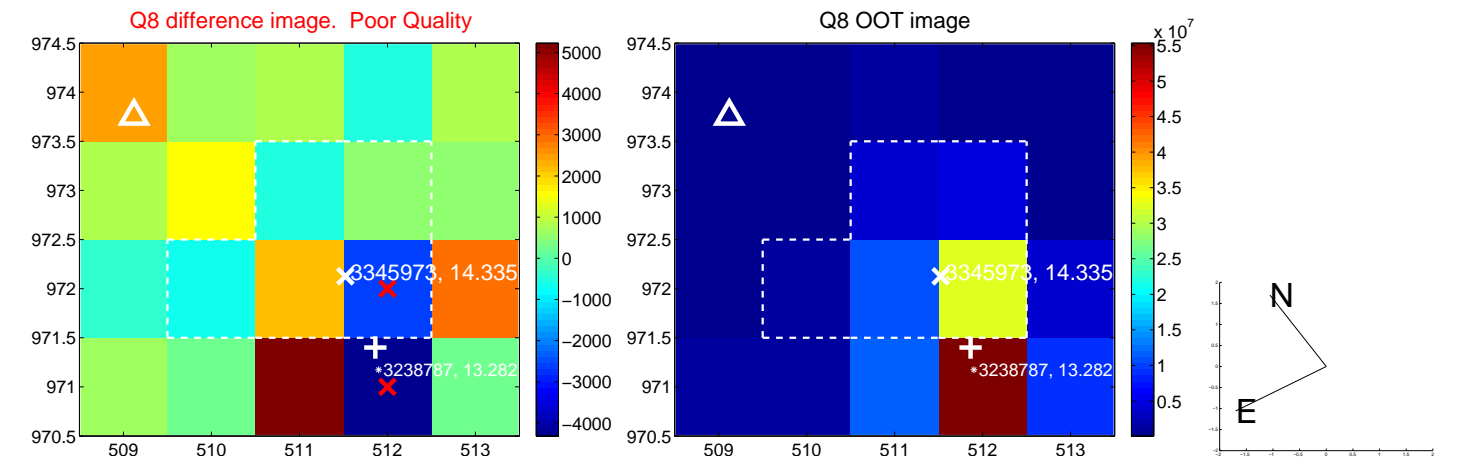
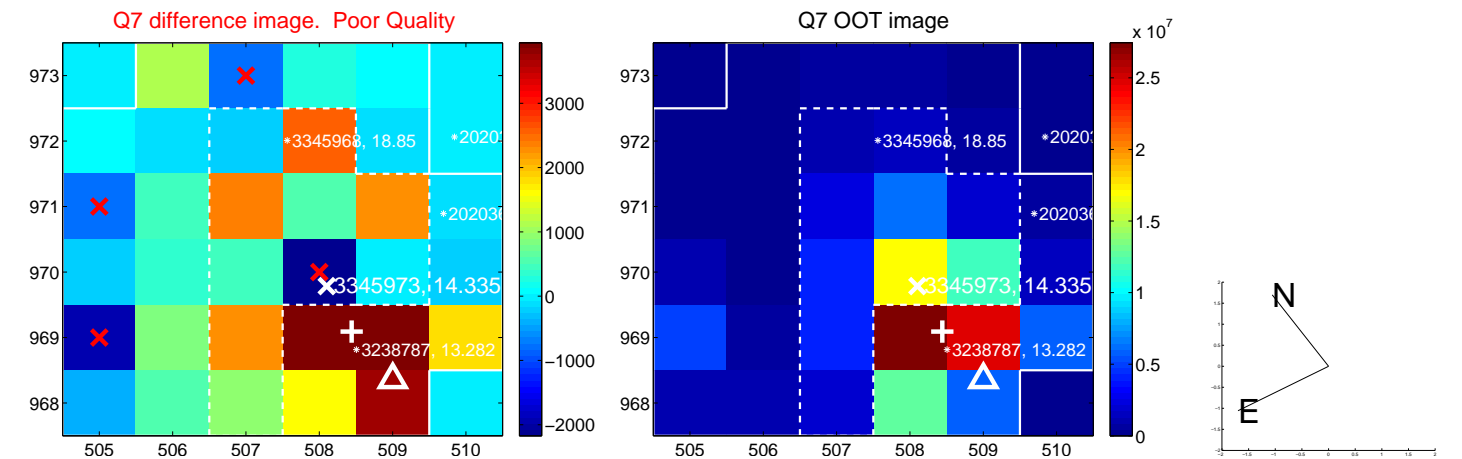
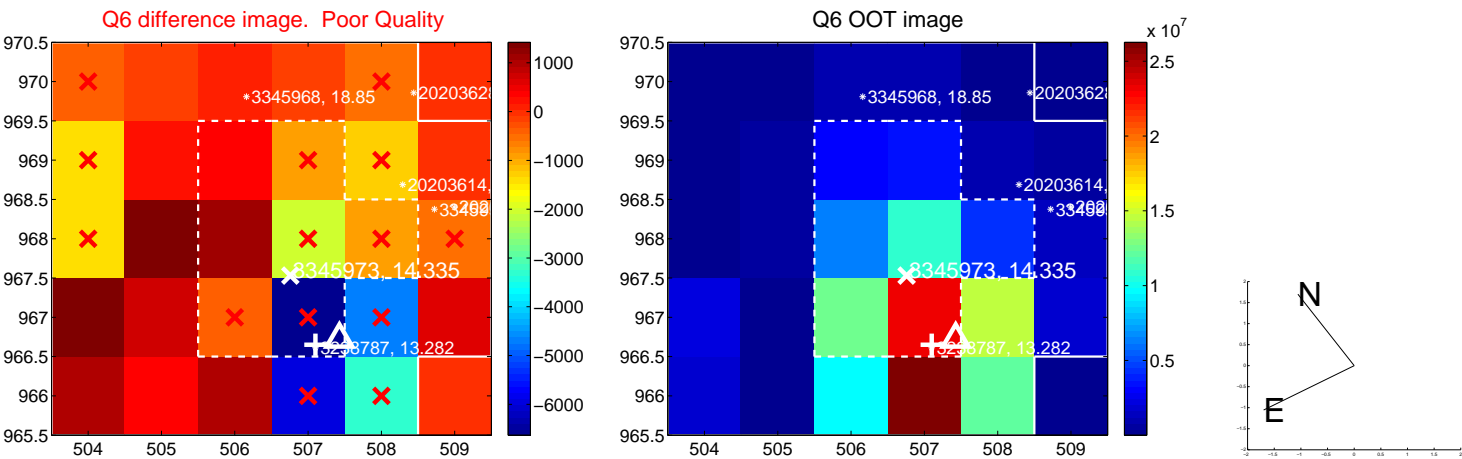
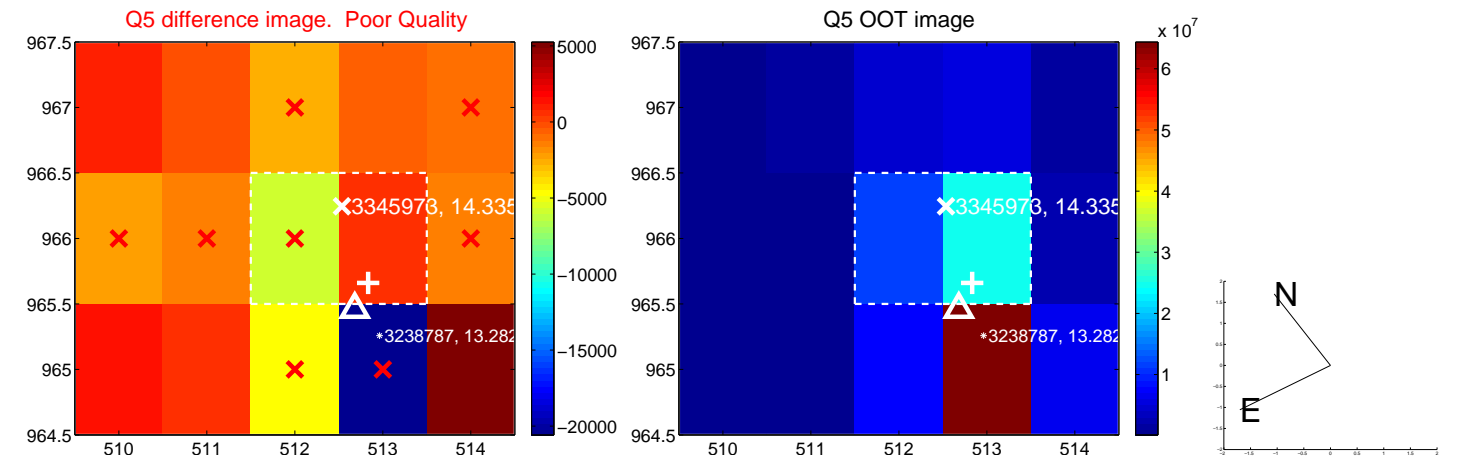


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

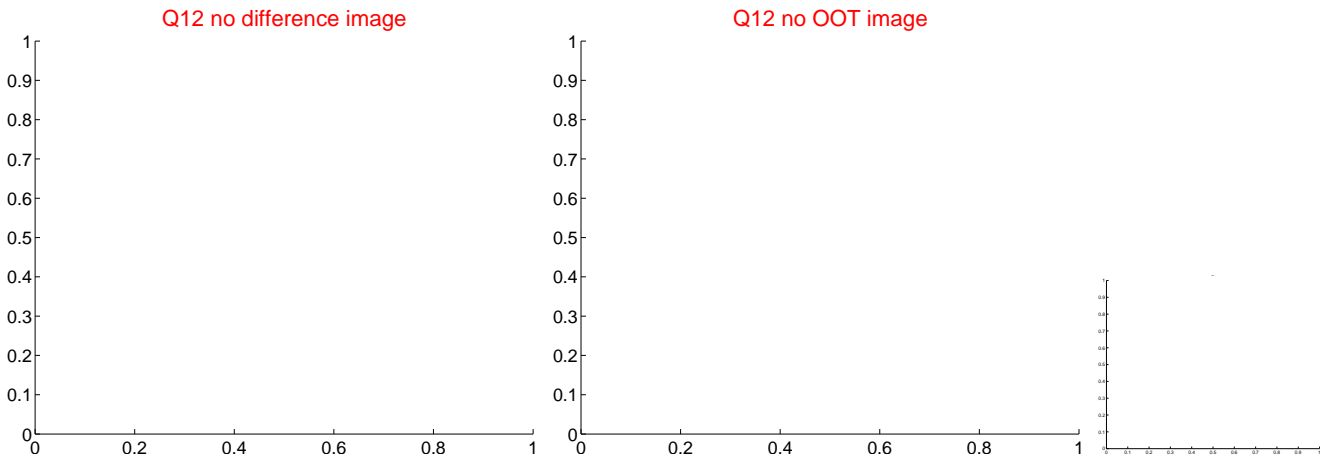
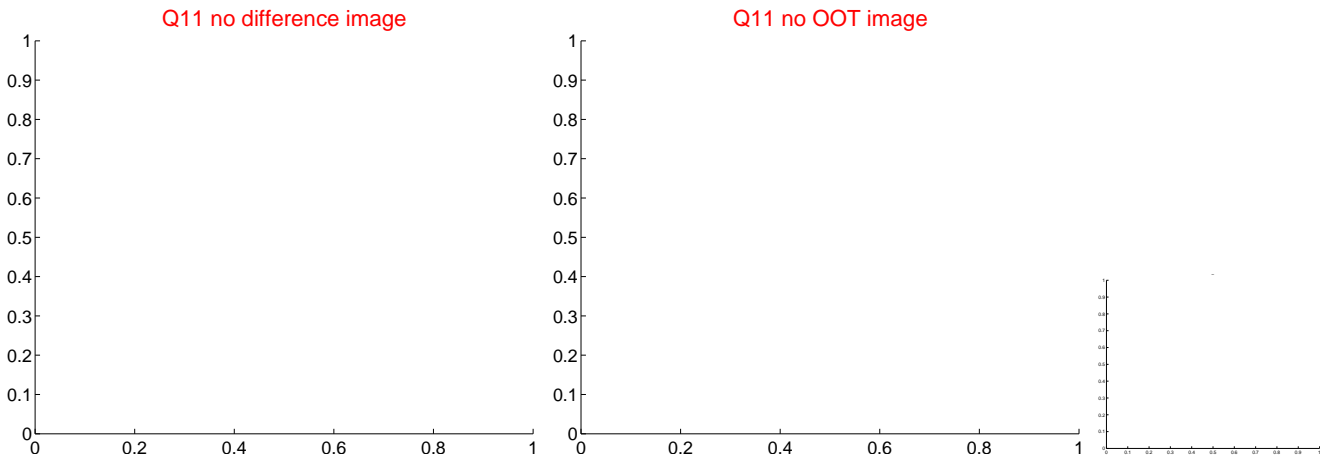
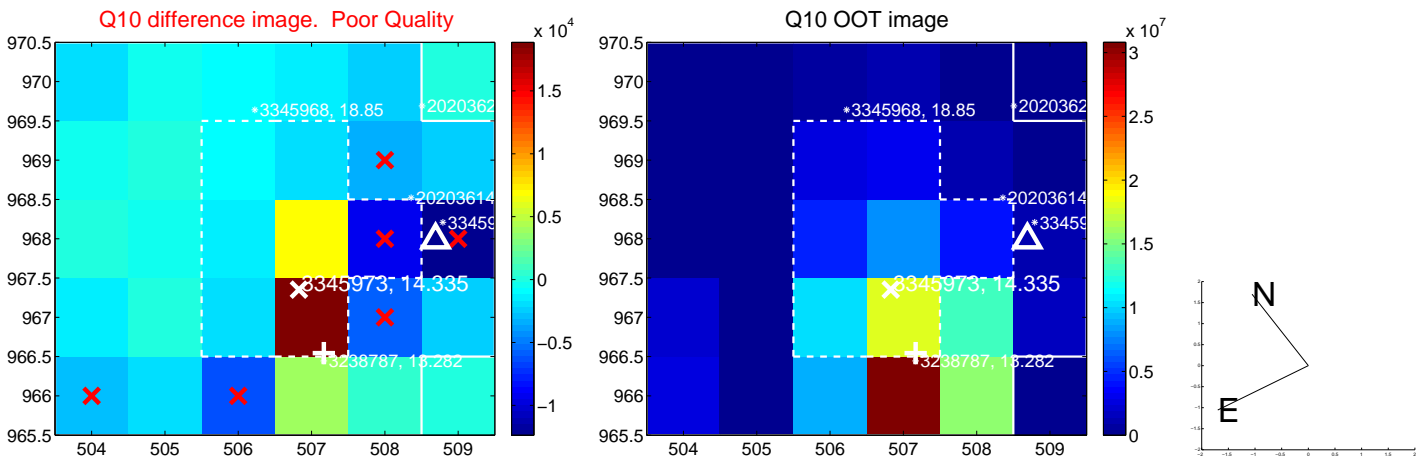
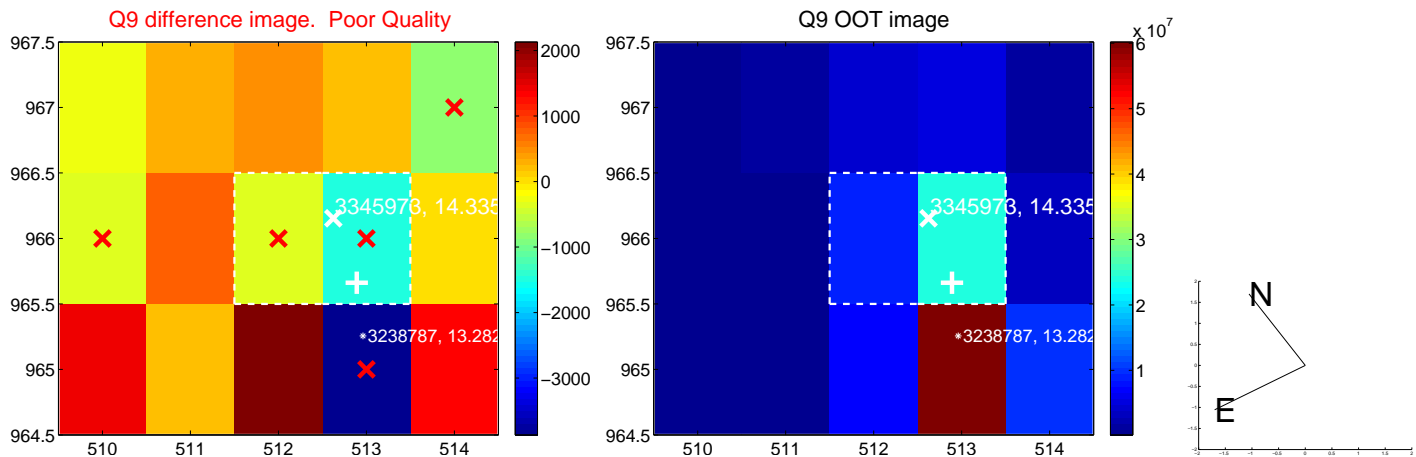
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



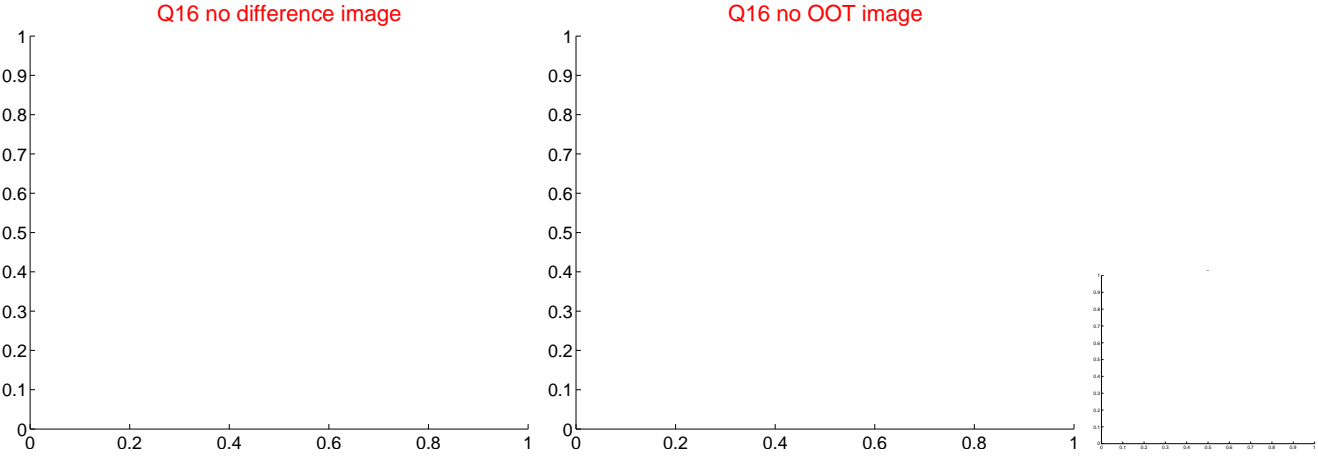
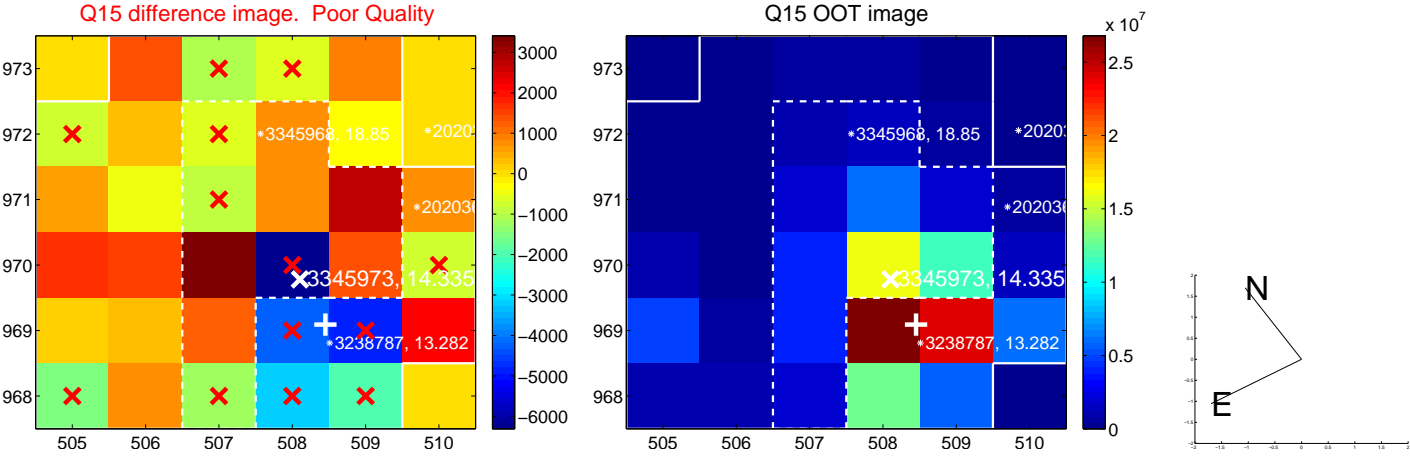
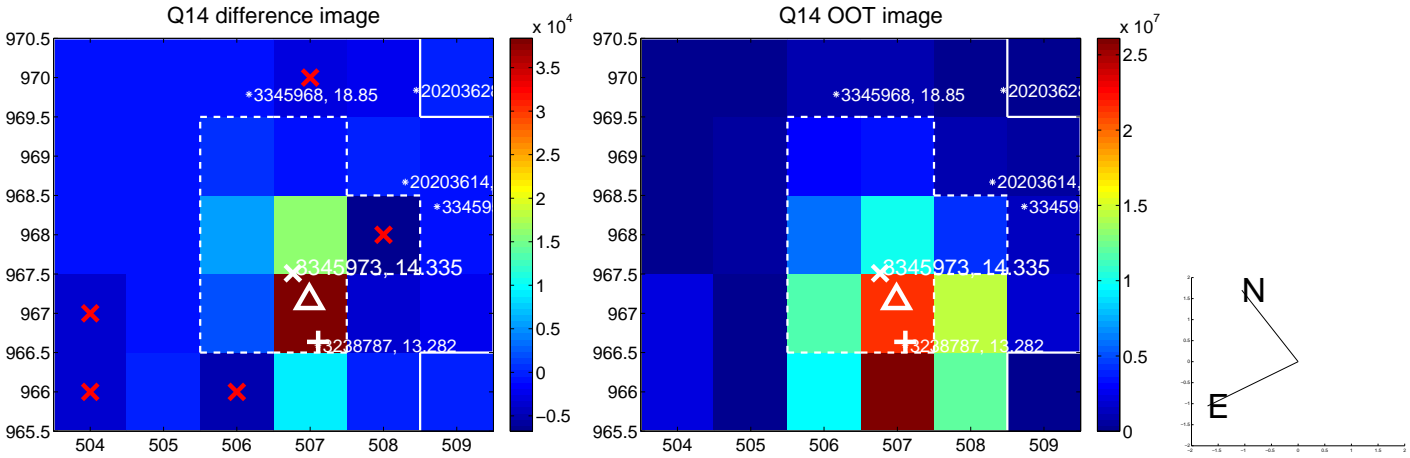
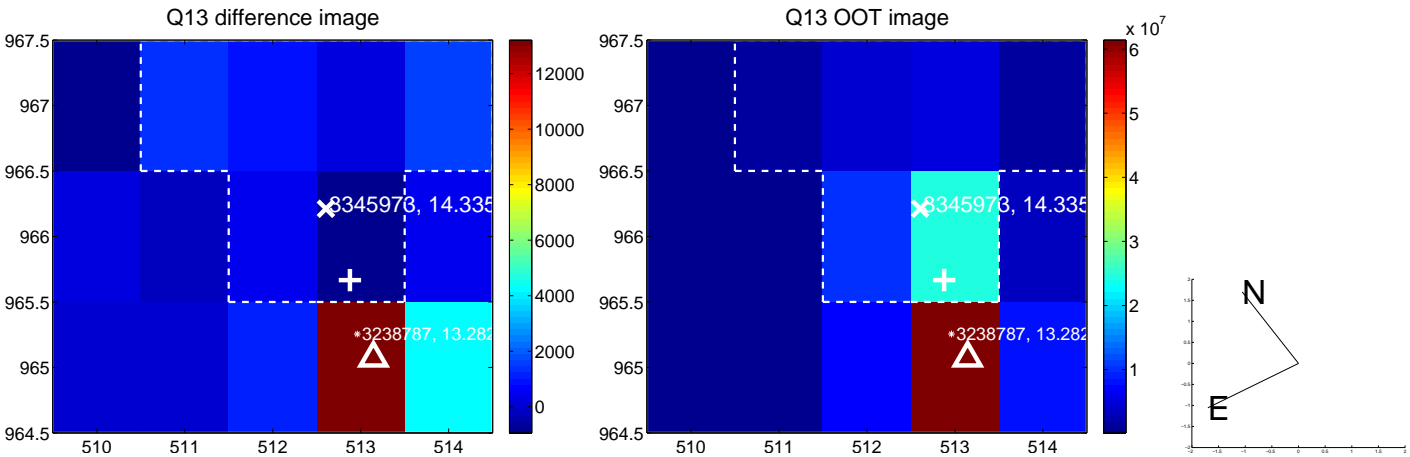
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

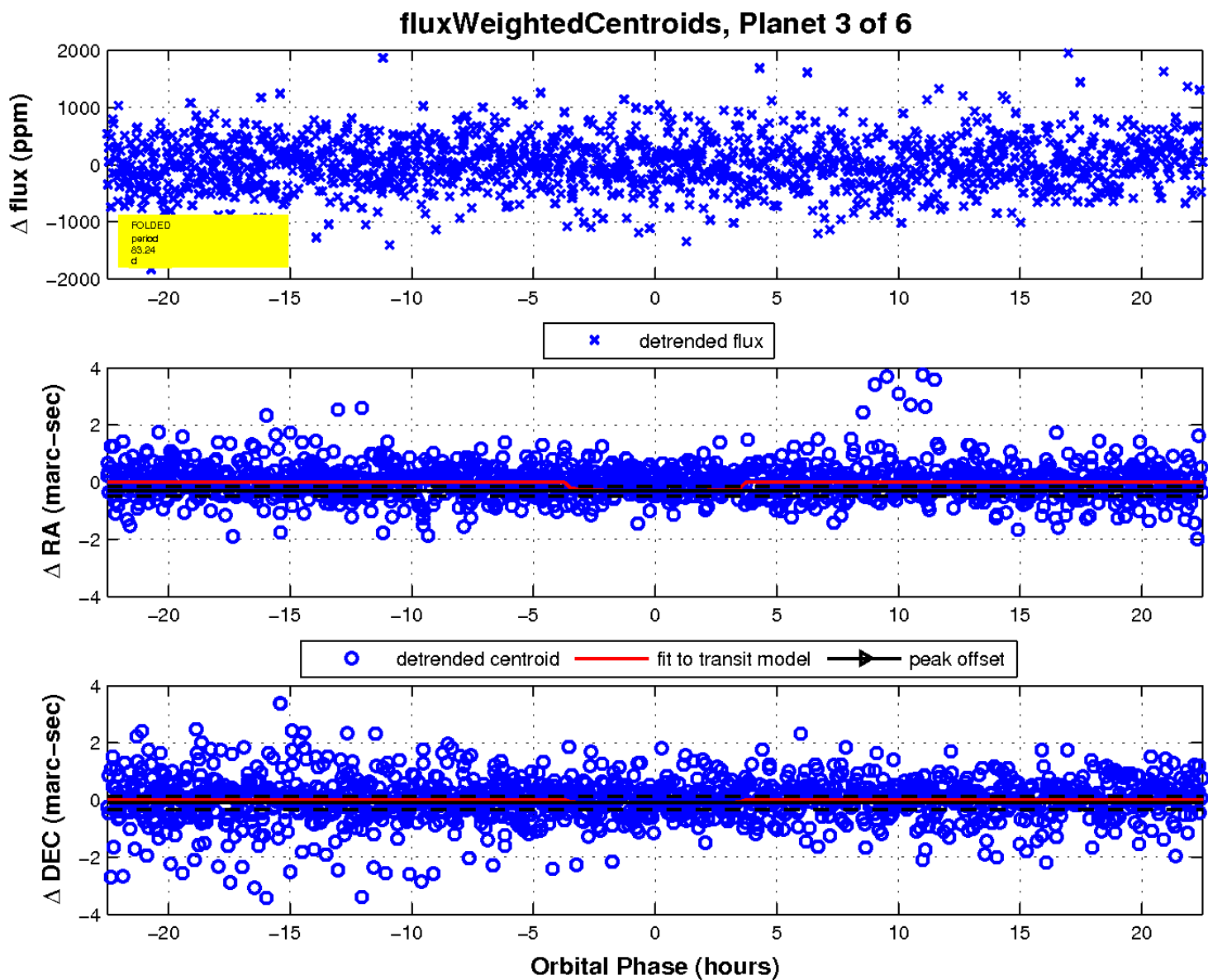
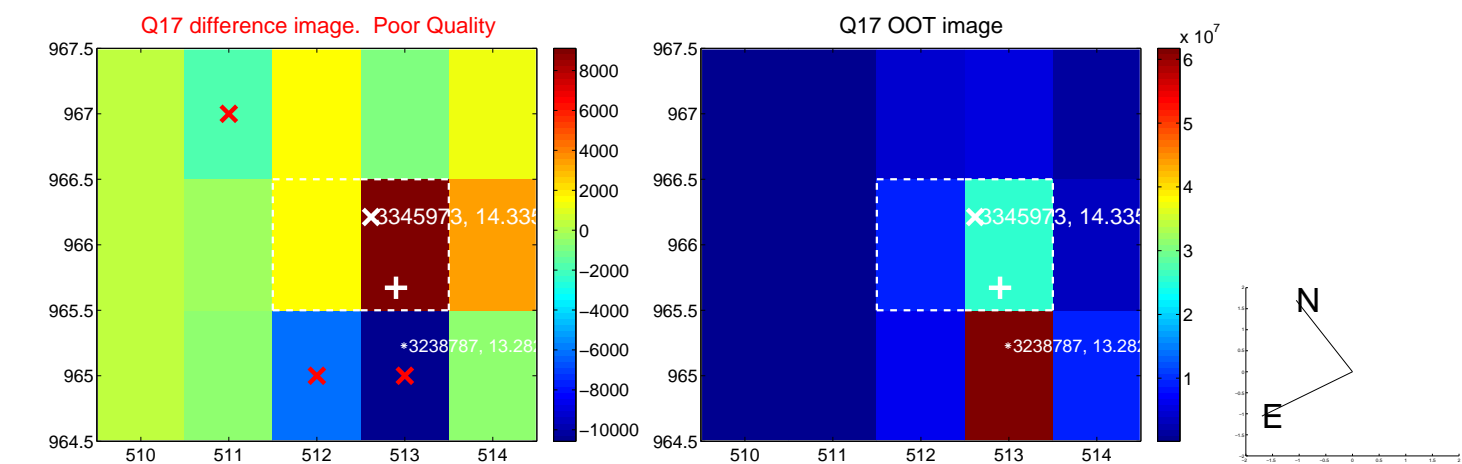


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



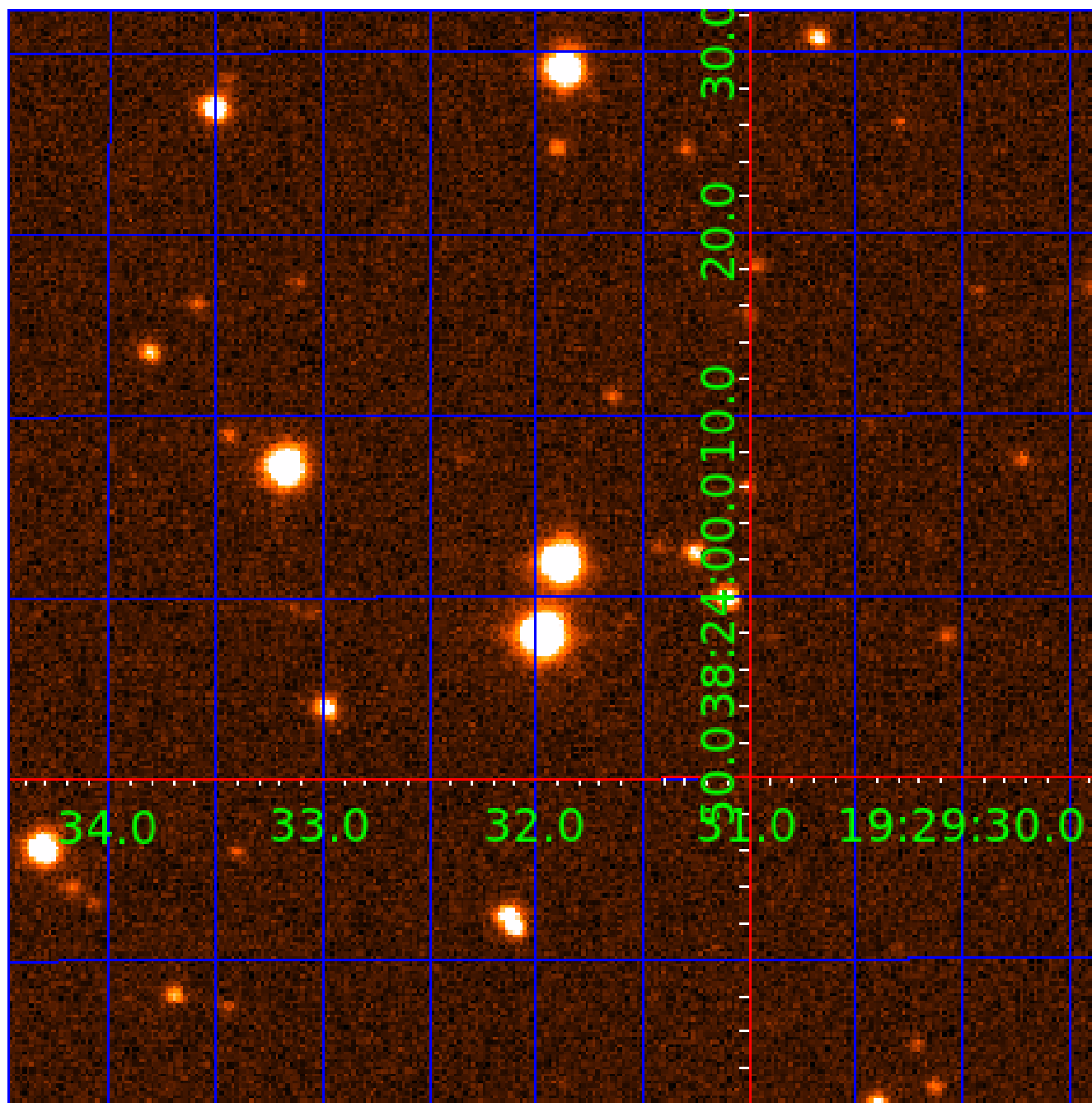


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 003345973

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
003345973-01	OBS	7652.01	15.346397	143.825241	219.6	5.162	10.7	10.4	2.26	6771	3.94	480.96
003345973-02	OBS	No	1.218657	131.752553	47.4	6.910	8.6	9.1	2.26	6771	1.57	14090.98
003345973-03	OBS	No	83.235609	155.072882	471.3	7.505	19.5	7.0	2.26	6771	5.17	50.47
003345973-04	OBS	No	86.479415	143.283783	341.2	36.687	17.5	6.5	2.26	6771	5.08	47.96
003345973-05	OBS	No	92.144154	216.274303	363.5	17.893	10.0	6.0	2.26	6771	4.96	44.07
003345973-06	OBS	No	100.093604	194.394859	813.2	1.716	8.8	6.7	2.26	6771	6.92	39.47

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
003345973-01	OBS	FP	0.00	0	0	1	0	CENT_RESOLVED_OFFSET—HALO_GHOST
003345973-02	OBS	FP	0.00	1	0	1	0	LPP_DV—CENT_RESOLVED_OFFSET
003345973-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—CENT_KIC_POS
003345973-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS
003345973-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_KIC_POS—CENT_UNCERTAIN
003345973-06	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_TRACKER—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST

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

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

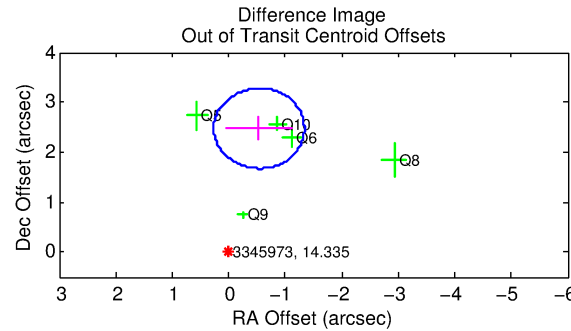
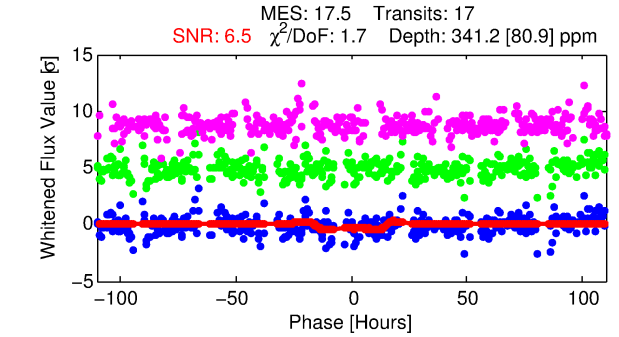
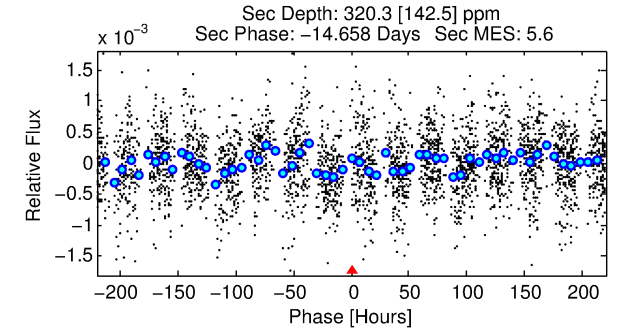
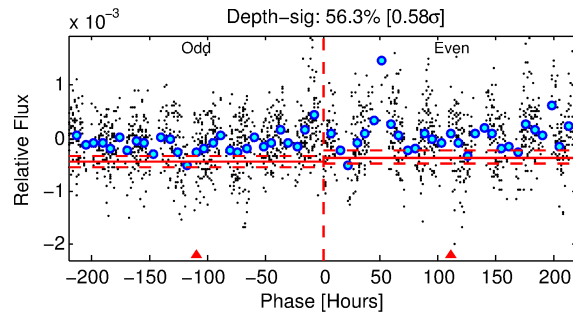
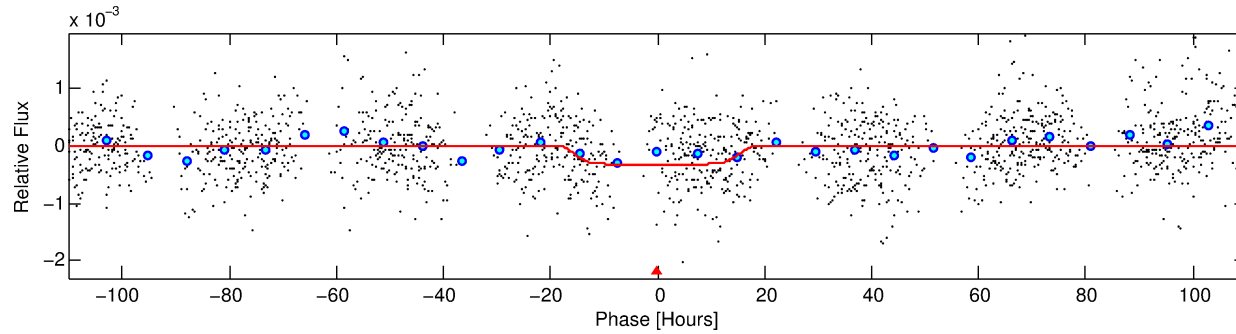
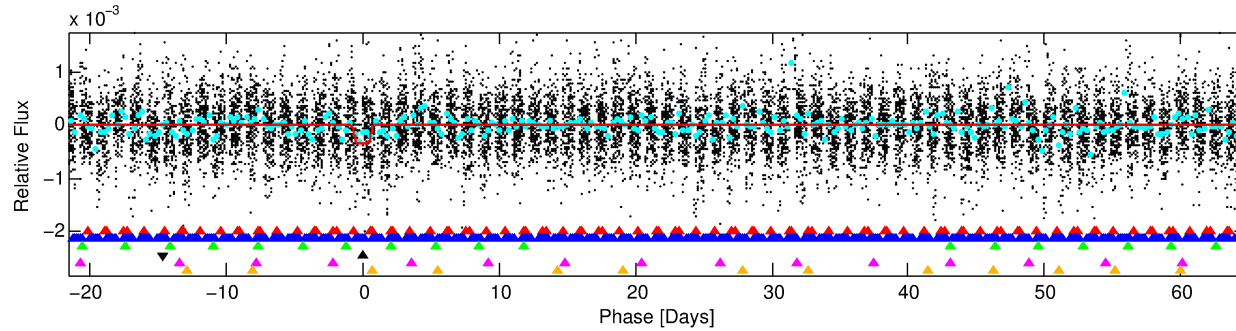
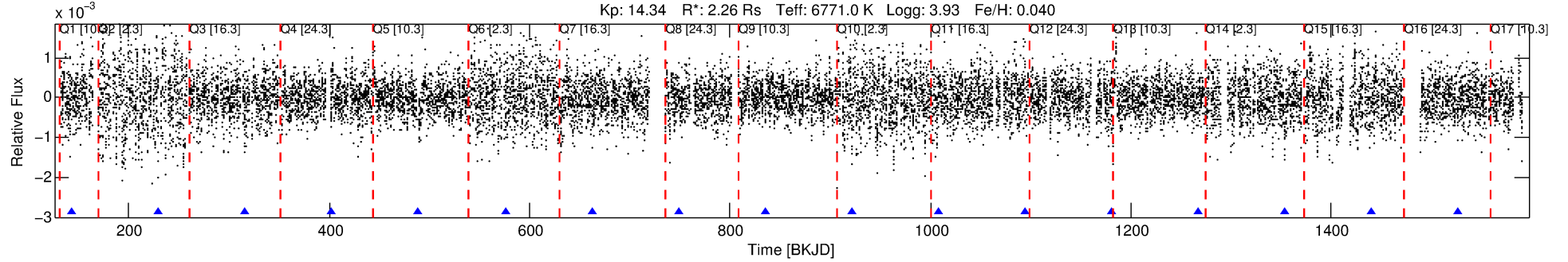
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 003345973-04

No Significant Match Found

# DV One-Page Summary

KIC: 3345973 Candidate: 4 of 6 Period: 86.479 d



## DV Fit Results:

Period = 86.47941 [0.01830] d  
Epoch = 143.2838 [0.2319] BKJD  
Rp/R\* = 0.0206 [0.0029]  
a/R\* = 7.11 [2.27]  
b = 0.94 [0.04]  
Seff = 47.96 [16.30]  
Teq = 671 [57] K  
Rp = 5.08 [1.37] Re  
a = 0.4476 [0.0960] AU  
Ag = 1369.06 [856.61] [1.60 $\sigma$ ]  
Teffp = 6311 [836] K [6.73 $\sigma$ ]

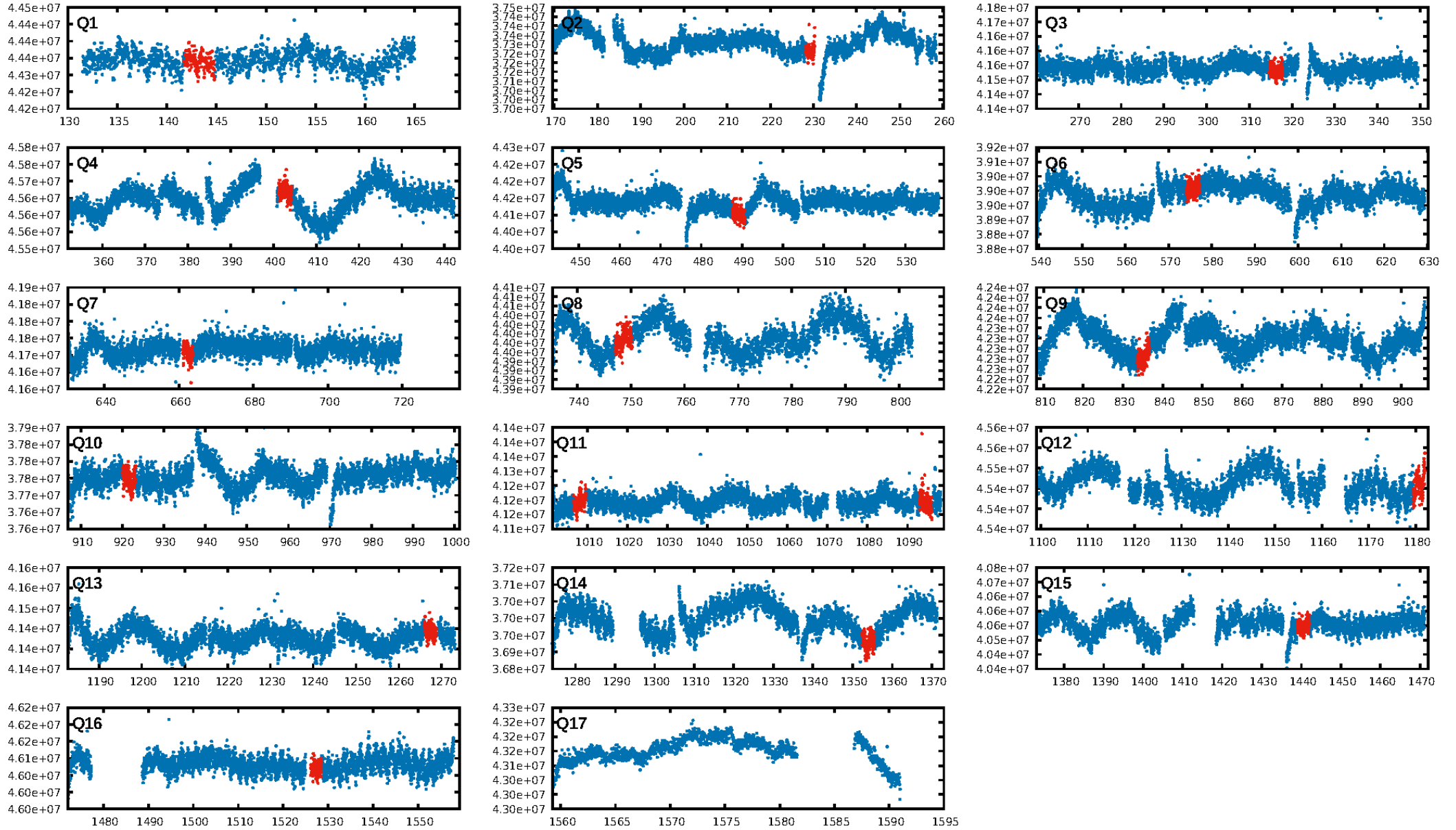
## DV Diagnostic Results:

ShortPeriod-sig: 96.2% [2.08 $\sigma$ ]  
LongPeriod-sig: 99.9% [3.33 $\sigma$ ]  
ModelChiSquare2-sig: 0.0%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 4.32e-38  
RollingBand-fgt: 1.00 [16/16]  
GhostDiagnostic-chr: -0.3714  
Centroid-sig: 0.0%  
Centroid-so: 2.349 arcsec [7.32 $\sigma$ ]  
OotOffset-rm: 2.533 arcsec [9.47 $\sigma$ ]  
KicOffset-rm: 1.585 arcsec [6.64 $\sigma$ ]  
OotOffset-st: 2/0/1/2 [5]  
KicOffset-st: 2/0/1/2 [5]  
DiffImageQuality-fgm: 0.60 [3/5]  
DiffImageOverlap-fno: 0.00 [0/9]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 21:20:32 Z

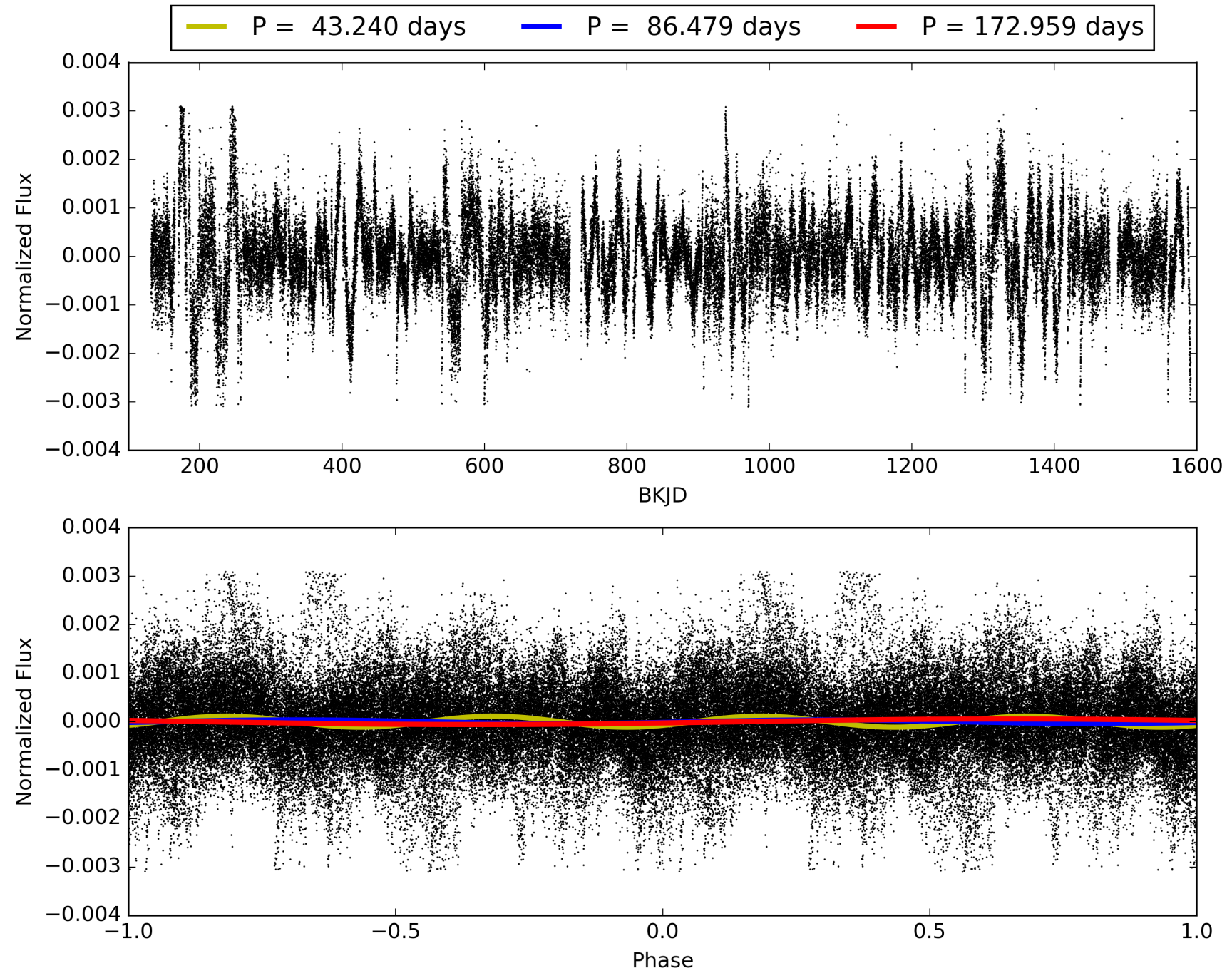
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 003345973-04, PDC Light Curves





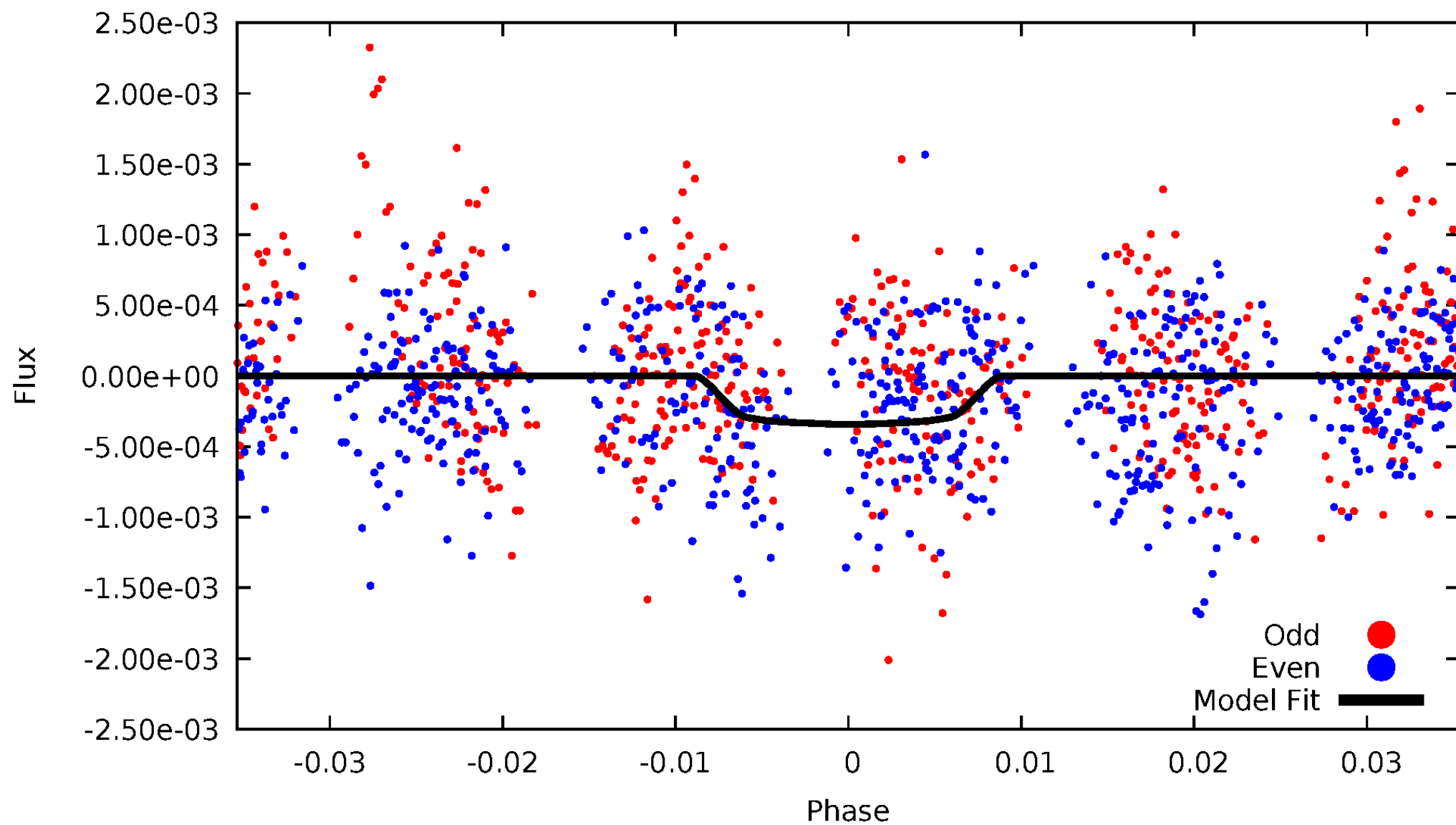
TCE 003345973-04





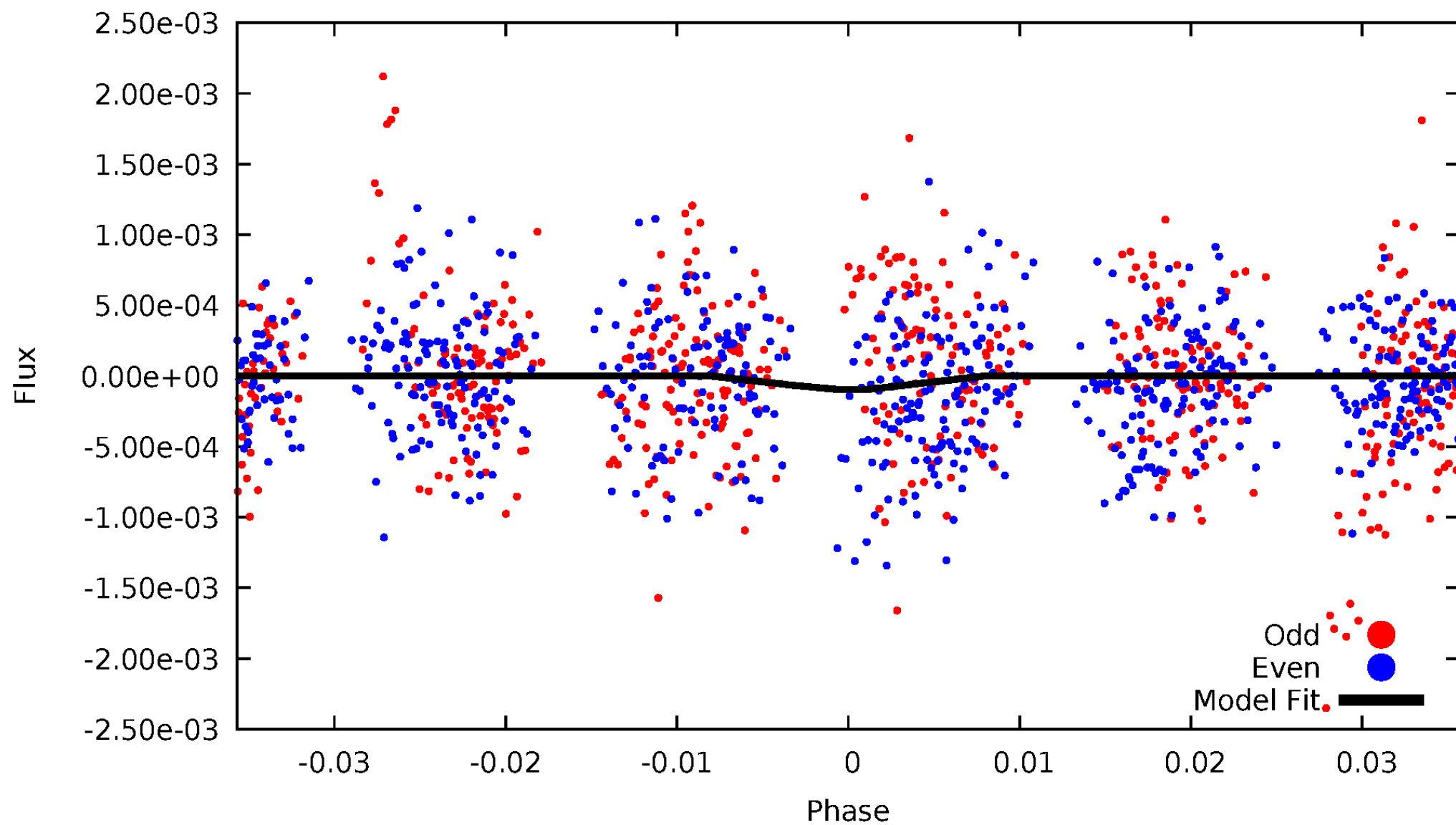
# DV Odd/Even

TCE 003345973-04



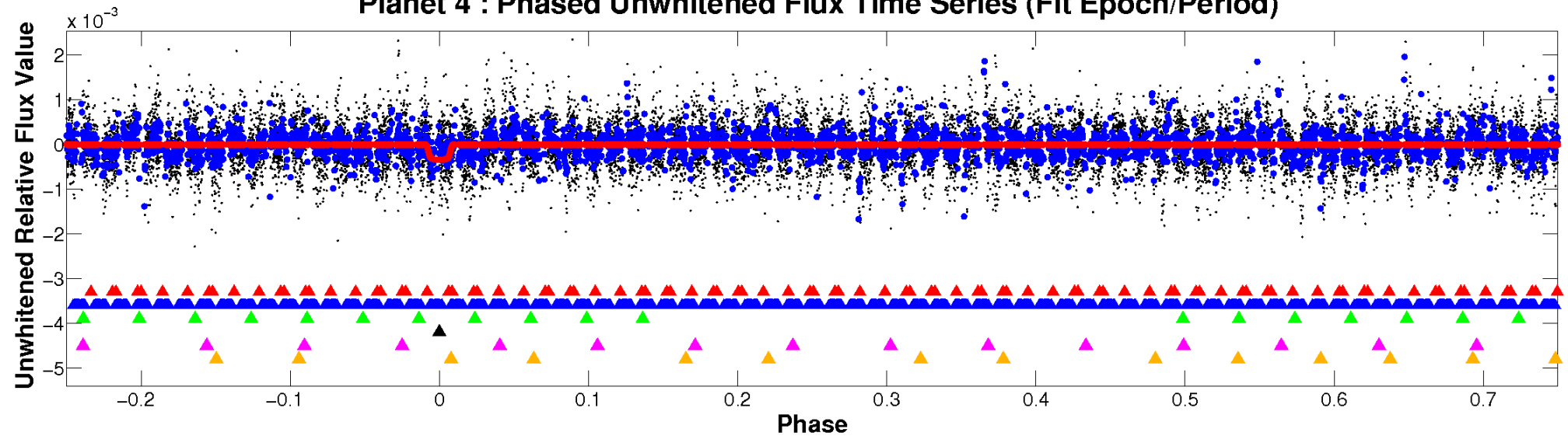
# ALT Odd/Even

TCE 003345973-04

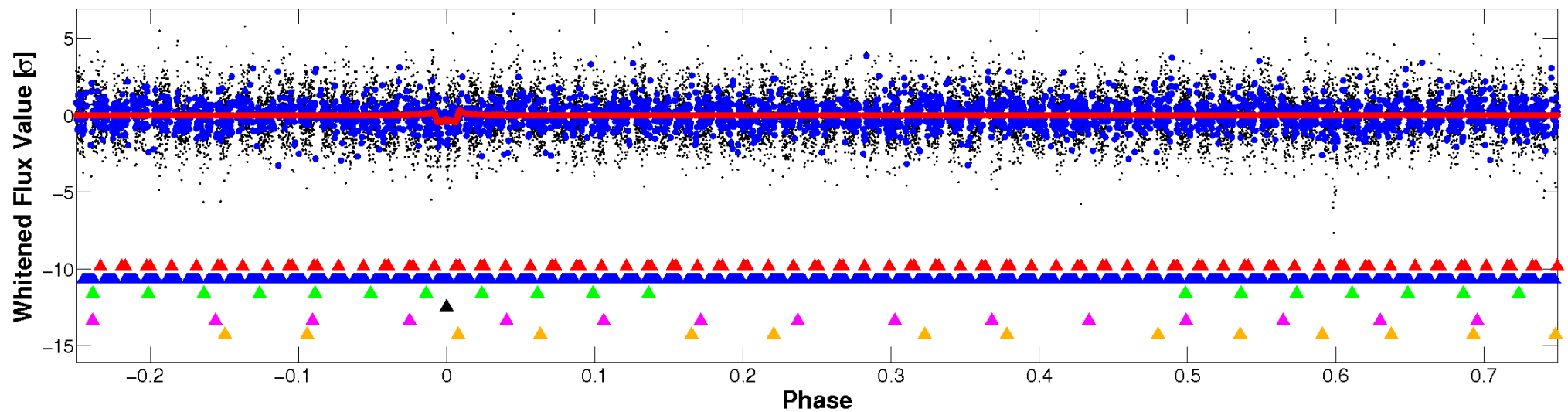


# Non-Whitened Vs. Whitened Light Curve

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

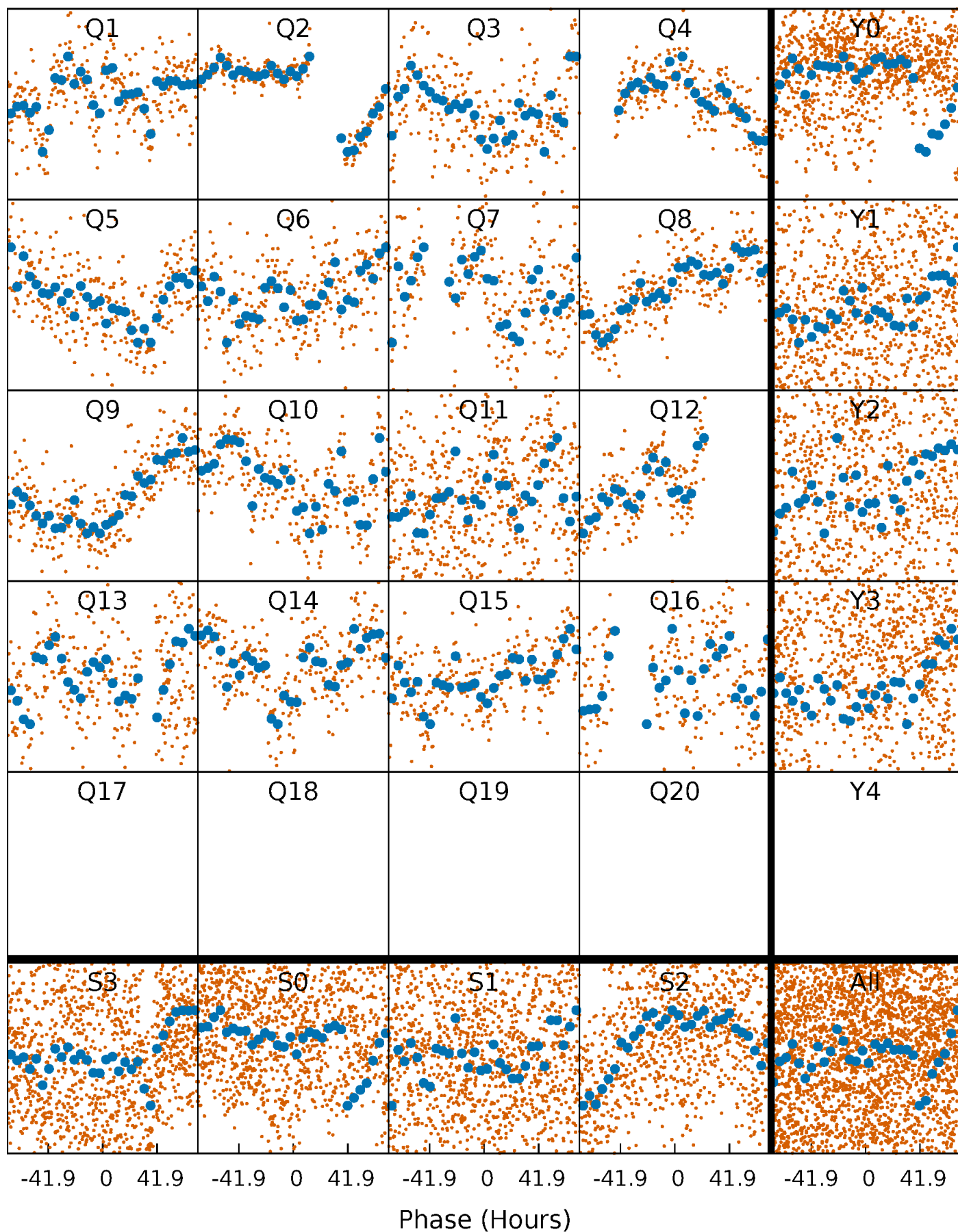


## Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



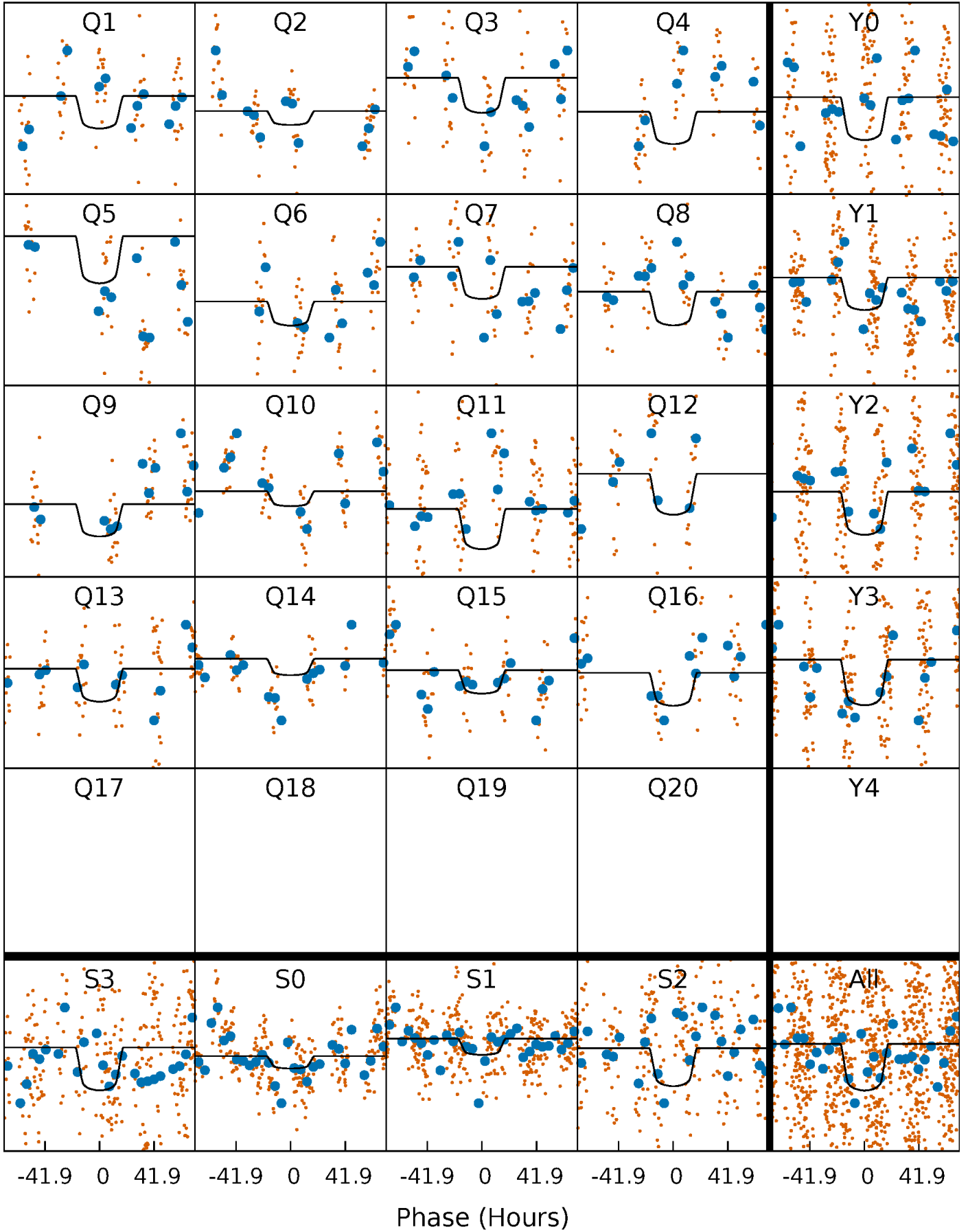
# PDC Quarter-Phased Transit Curves

TCE 003345973-04   P= 86.479415 Days    $T_0=143.283783$  (BKJD)



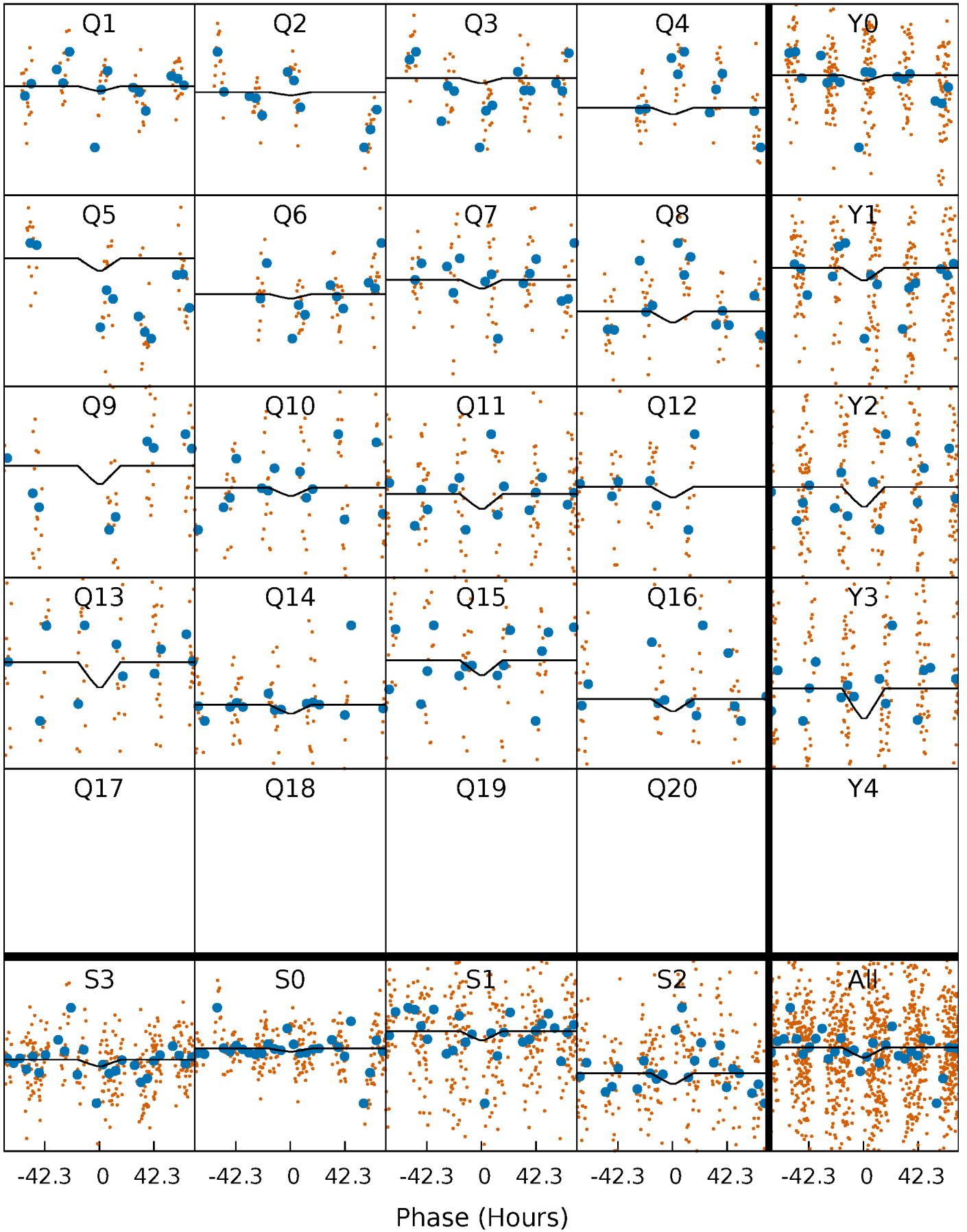
# DV Quarter-Phased Transit Curves

TCE 003345973-04    P= 86.479415 Days     $T_0=143.283783$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 003345973-04     $P = 86.481874$  Days     $T_0 = 143.235839$  (BKJD)

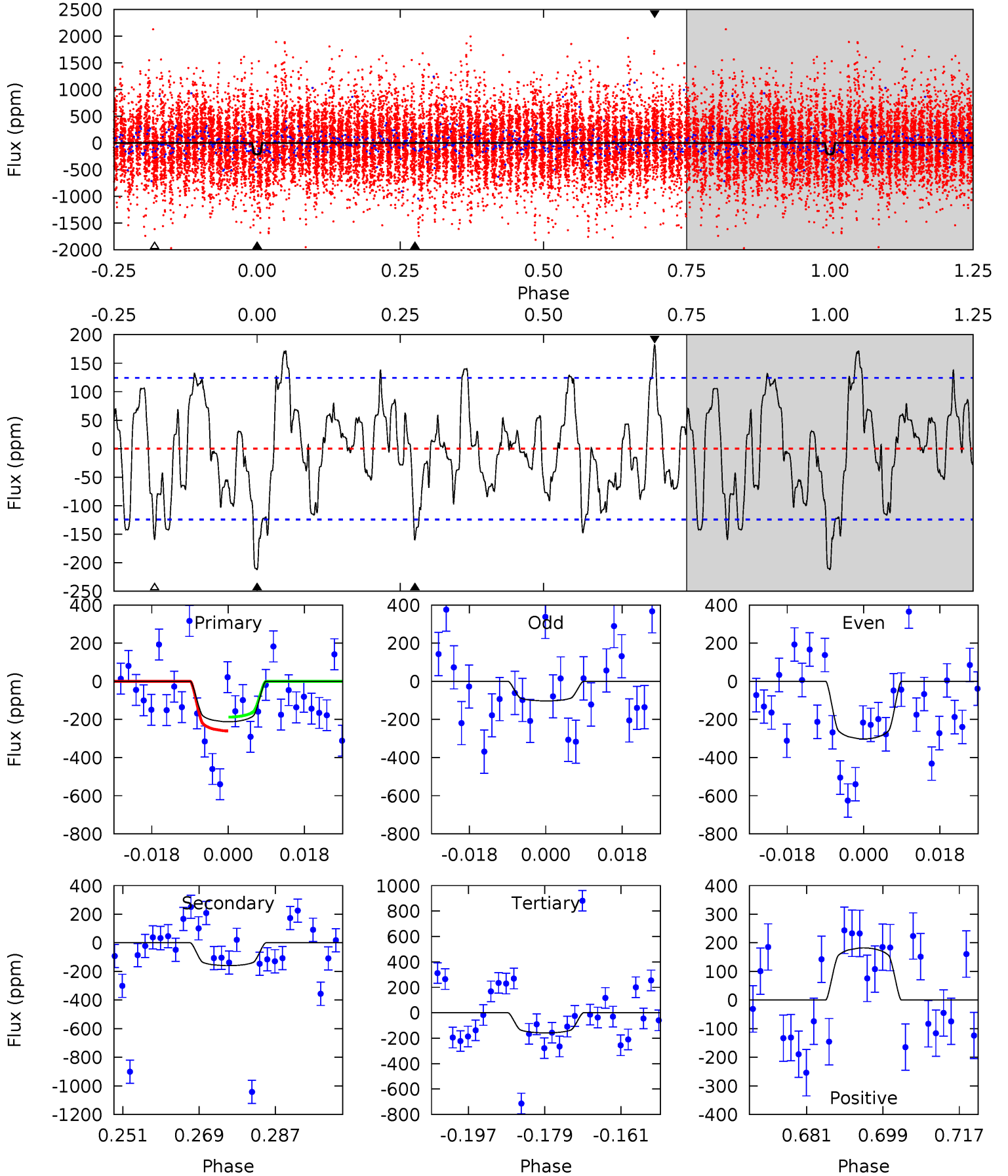




# DV Model-Shift Uniqueness Test

003345973-04, P = 86.479415 Days, E = 56.804368 Days

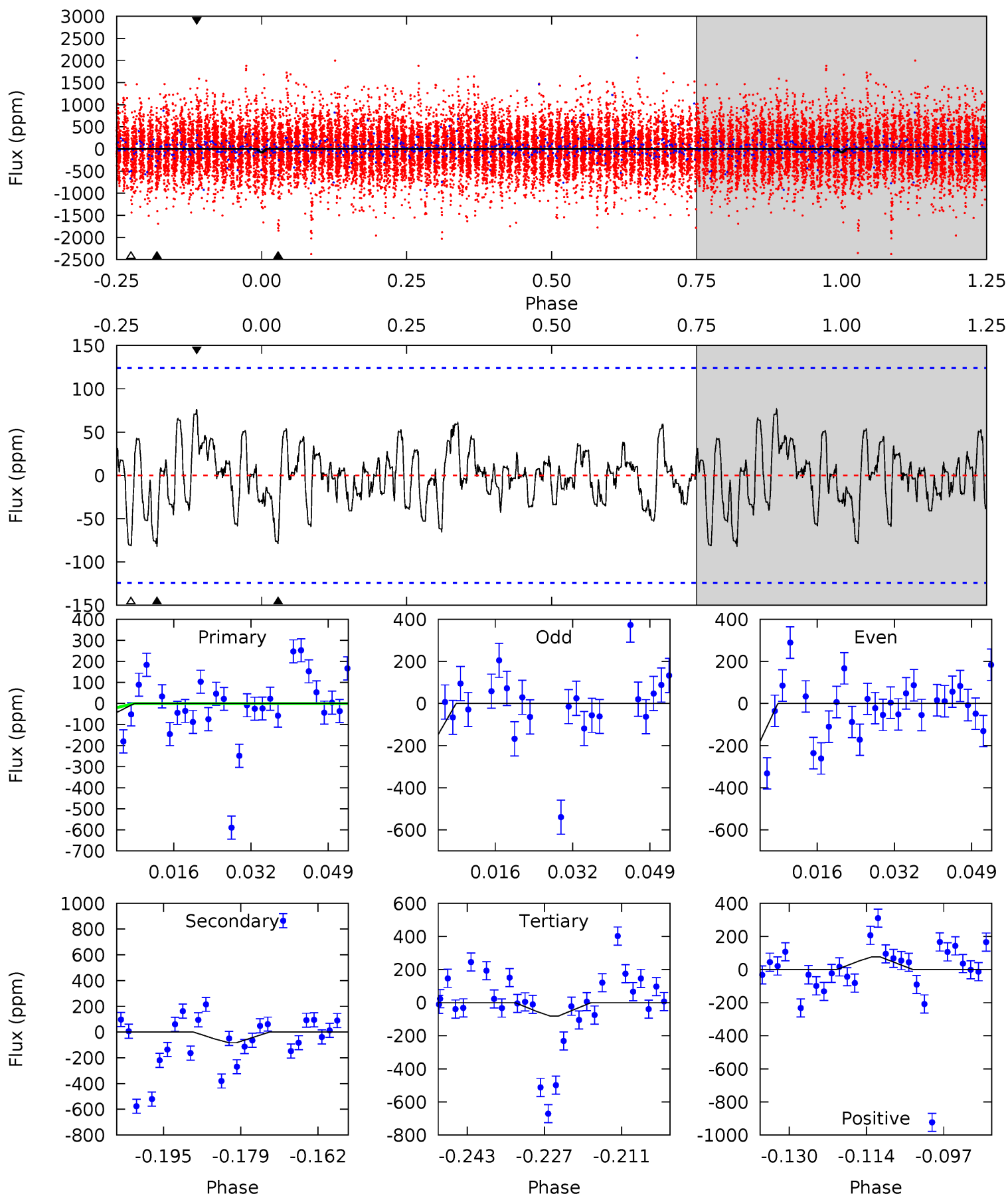
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.39	6.31	6.26	7.20	4.91	2.37	2.76	2.13	1.19	0.05	-0.89	3.86	0.98	0.46	1.37



# Alt Model-Shift Uniqueness Test

003345973-04, P = 86.481874 Days, E = 56.753965 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
3.13	3.28	3.22	3.04	4.93	2.40	0.95	-0.09	0.09	0.05	0.24	1.24	1.67	0.48	3.68



### Stellar Parameters For KIC 003345973

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6771^{+81}_{-81}$	$3.934^{+0.195}_{-0.120}$	$0.040^{+0.150}_{-0.150}$	$2.259^{+0.426}_{-0.521}$	$1.597^{+0.131}_{-0.180}$	$0.195^{+0.199}_{-0.074}$
	+1%/-1%	+5%/-3%	+375%/-375%	+19%/-23%	+8%/-11%	+102%/-38%
Source	SPE68	SPE68	SPE68	DSEP		

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

### Secondary Eclipse Parameters for KIC 003345973-04 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-160 \pm 25$	$4.96^{+0.91}_{-0.90}$	$933^{+46}_{-55}$	$5354^{+401}_{-385}$	$711^{+352}_{-229}$
Alt.	$-82 \pm 25$	$2.37^{+0.75}_{-0.74}$	$934^{+48}_{-57}$	$6449^{+1502}_{-936}$	$1560^{+1759}_{-761}$

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

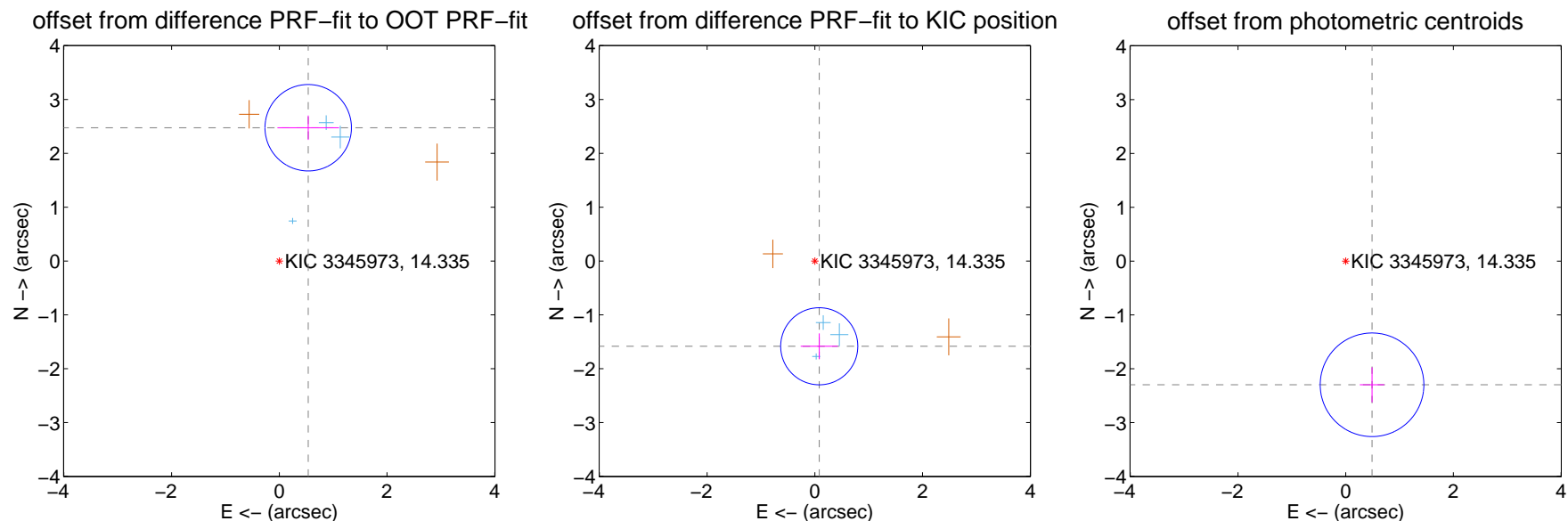
## DV Centroid Data

Supplemental centroid analysis for 003345973-04. Kepler magnitude: 14.34. Transit SNR 6.54

There are 3 quarters with good PRF difference image offsets

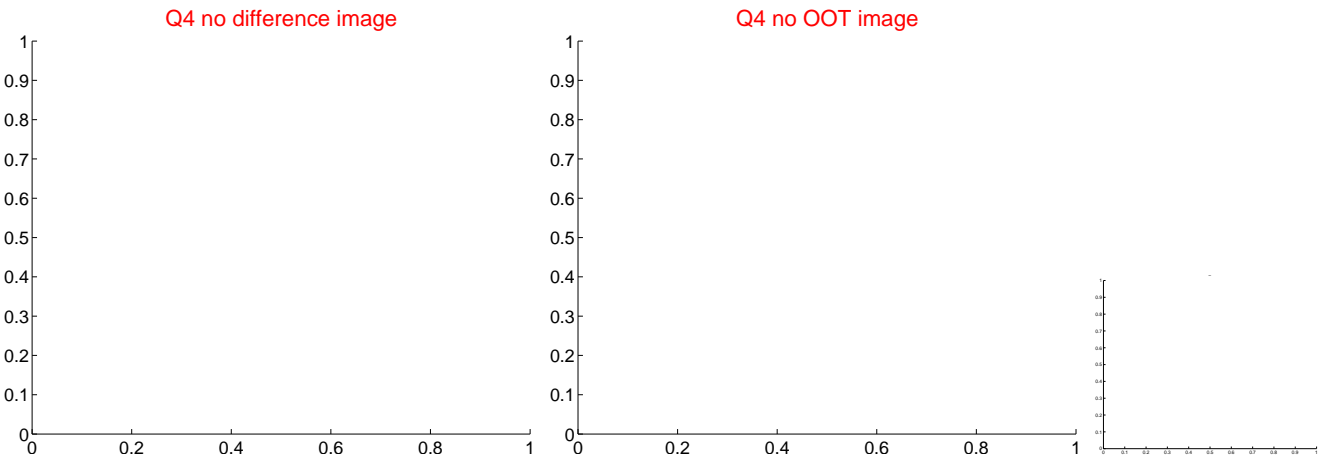
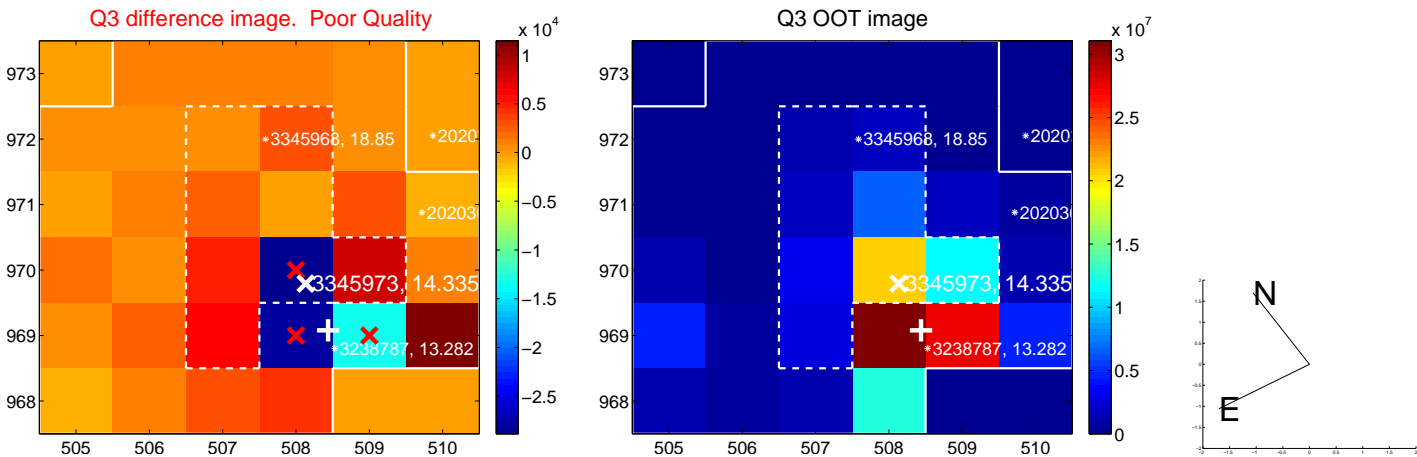
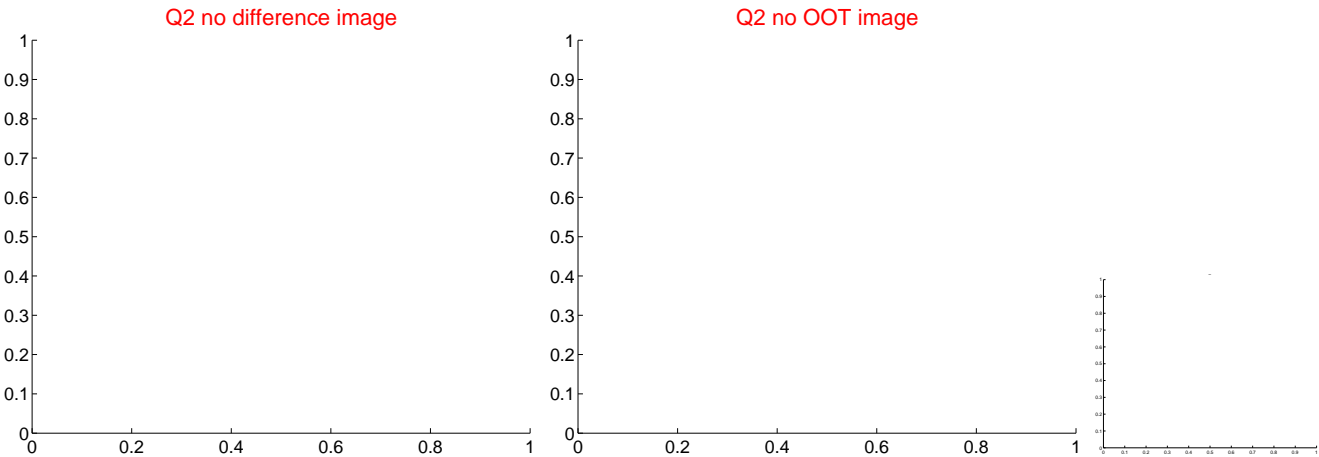
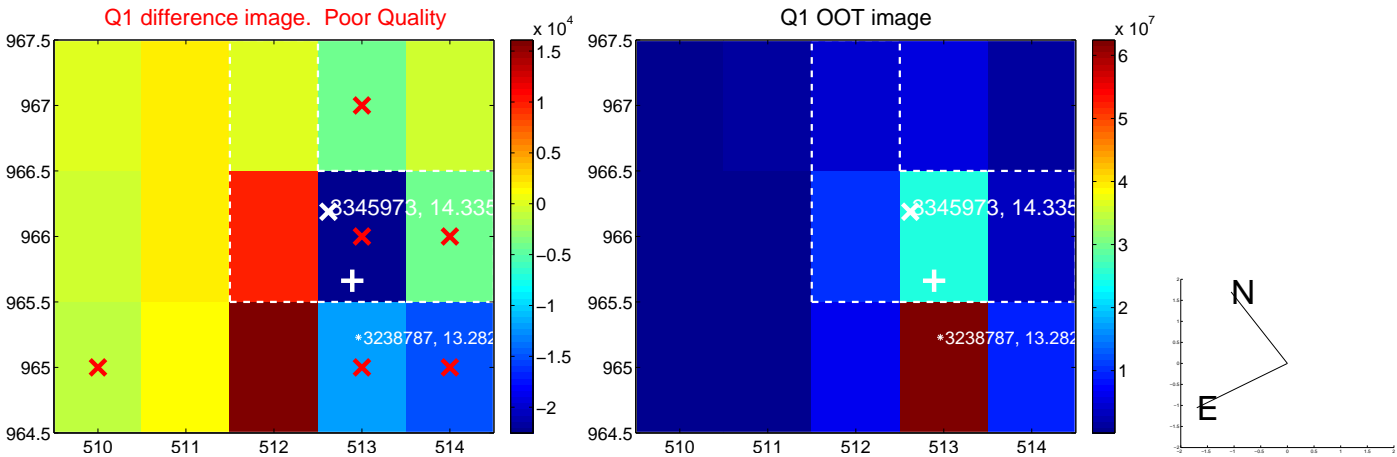
The OOT PRF centroid is offset from the target star catalog position by about 3.78 arcsec so the offset from difference PRF-fit to OOT-fit may be invalid.

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$2.533 \pm 0.267$	9.47	$-0.537 \pm 0.572$	$2.475 \pm 0.227$
PRF-fit source offset from KIC position	$1.585 \pm 0.239$	6.64	$-0.082 \pm 0.345$	$-1.583 \pm 0.238$
photometric centroid source offset	$2.35 \pm 0.32$	7.32	$-0.49 \pm 0.23$	$-2.30 \pm 0.32$

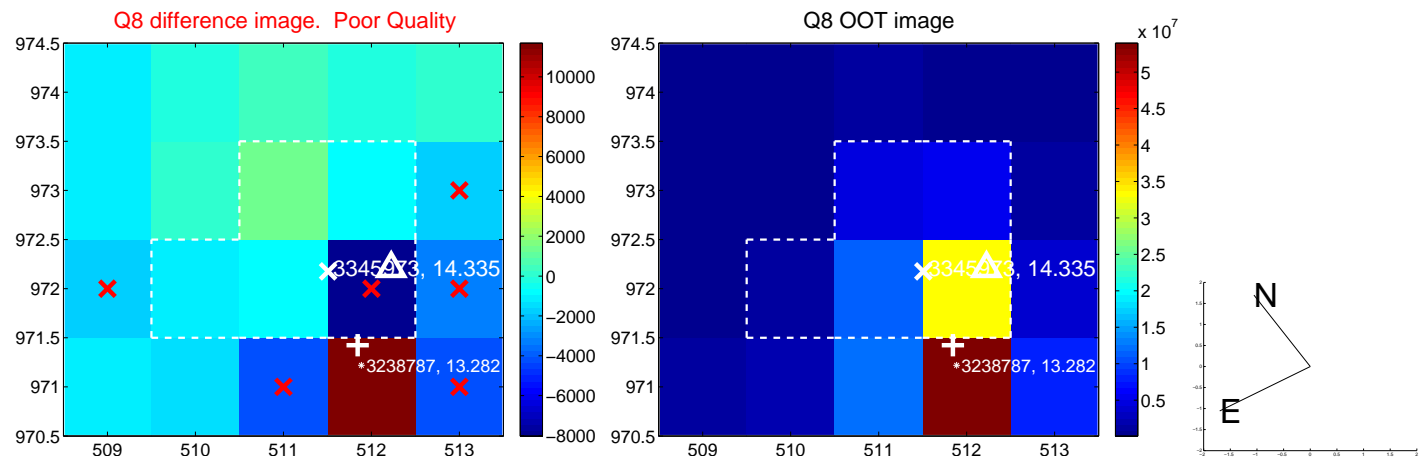
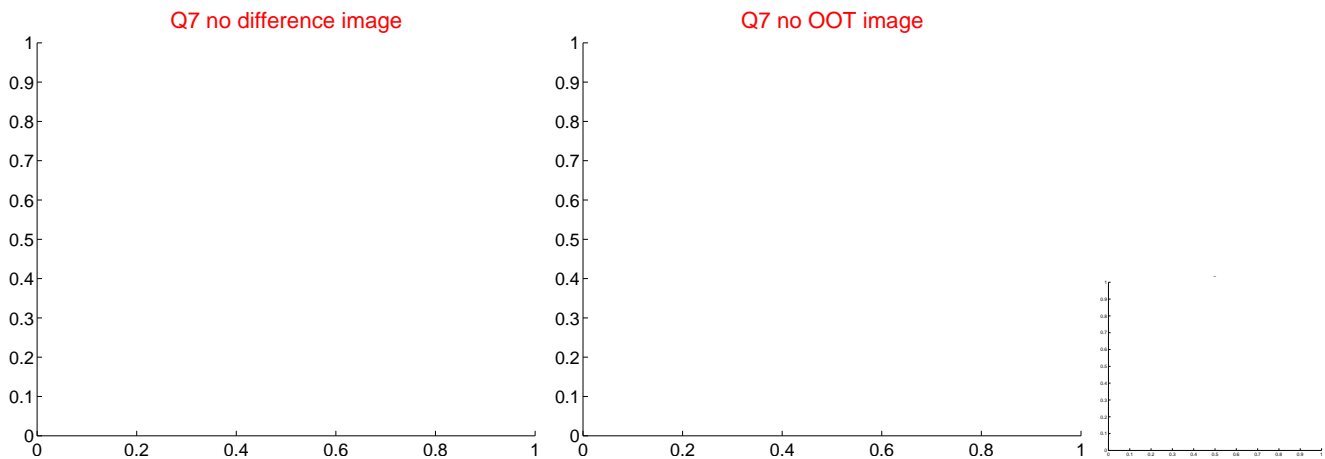
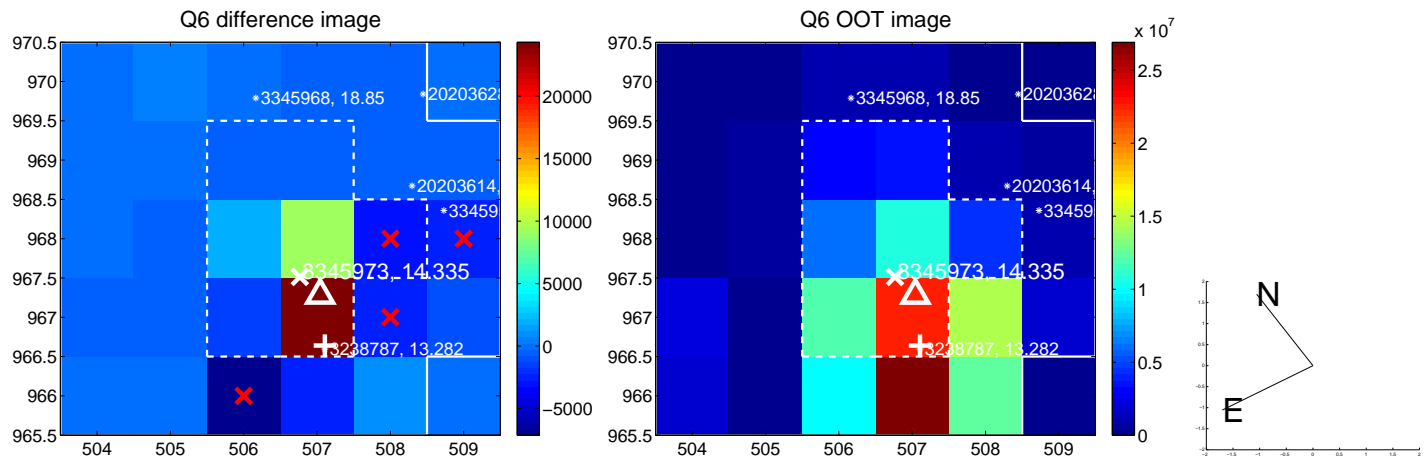
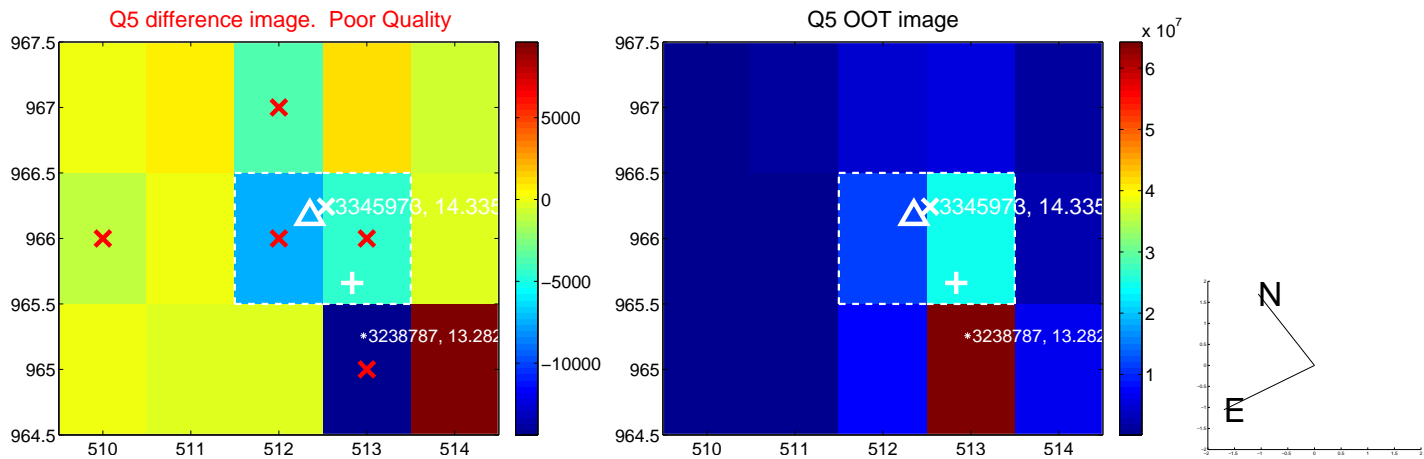


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets**; **Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

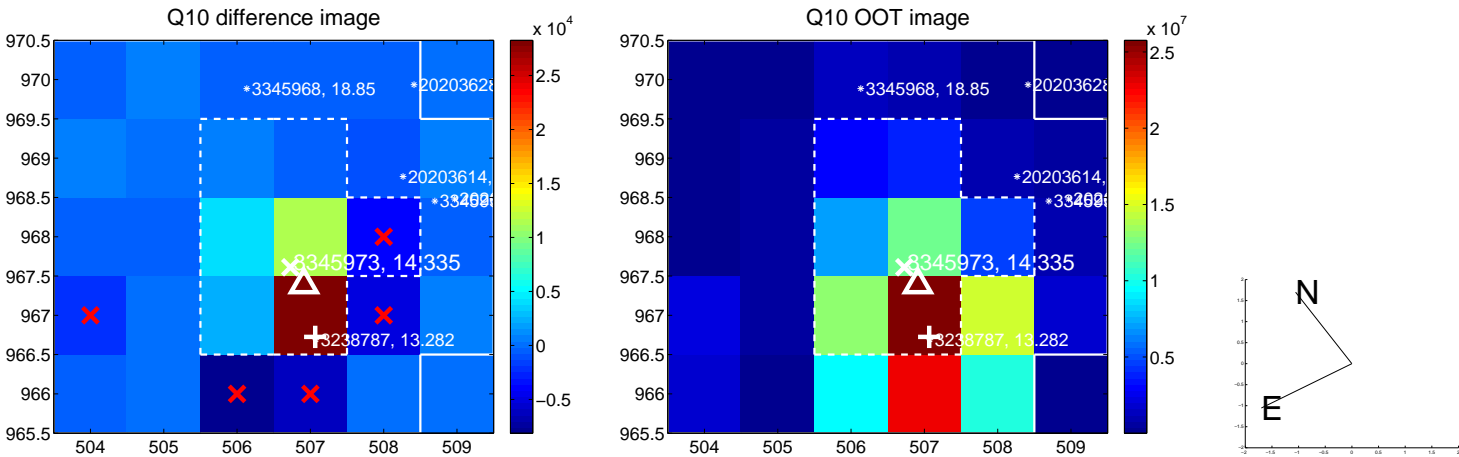
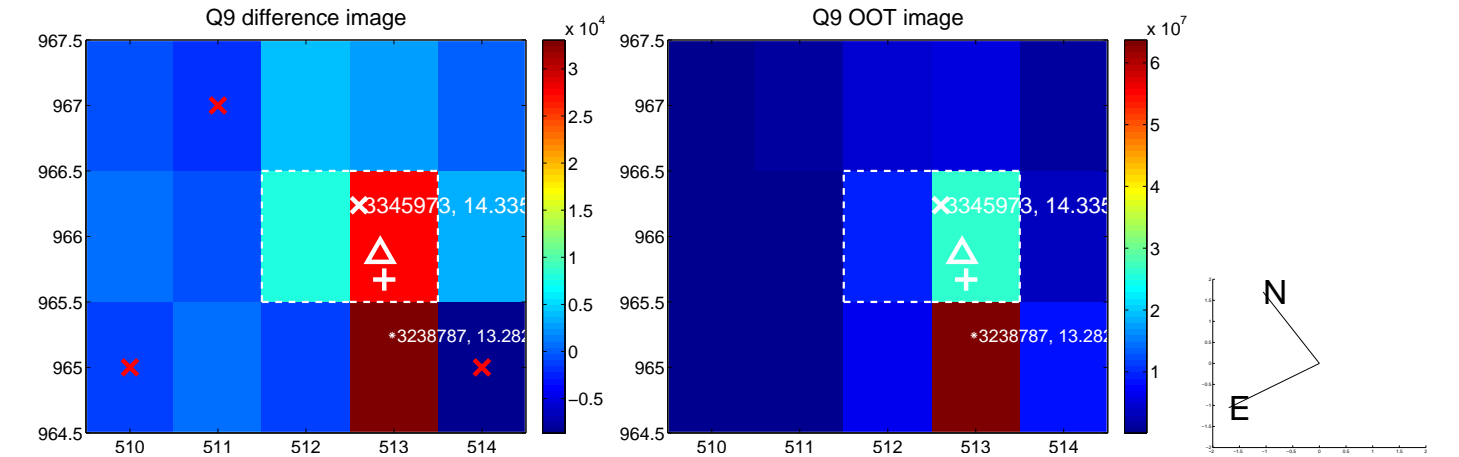


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.





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.

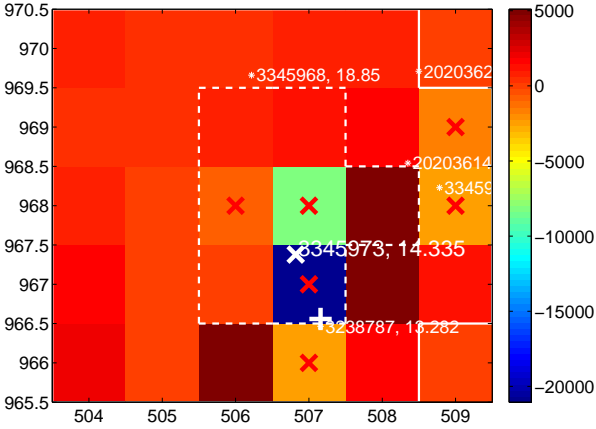
Q13 no difference image



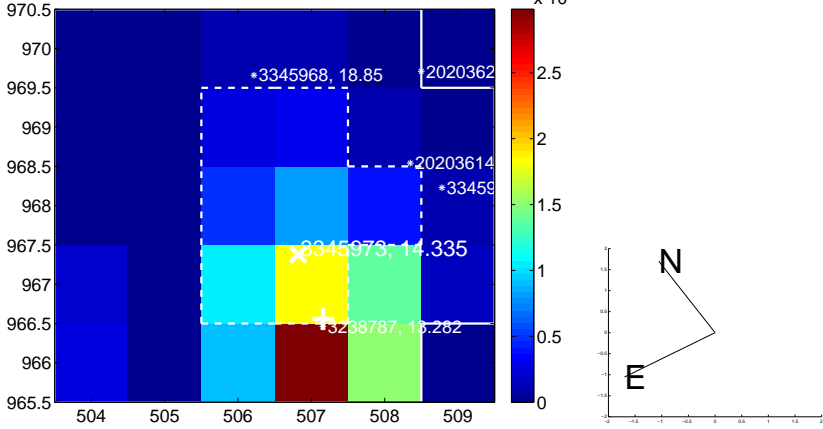
Q13 no OOT image



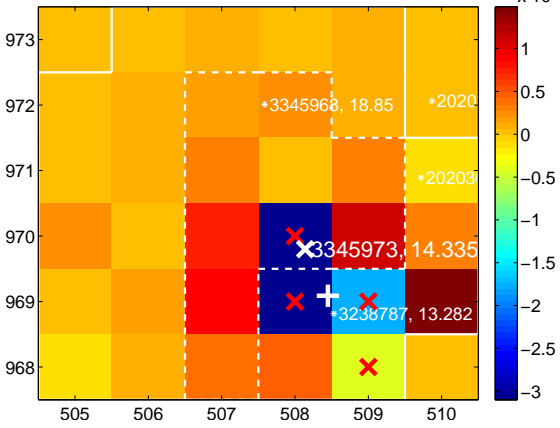
Q14 difference image. Poor Quality



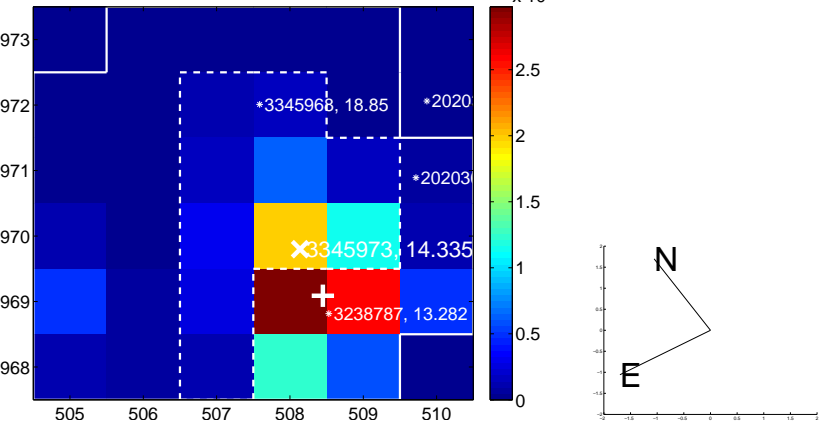
Q14 OOT image



Q15 difference image. Poor Quality



Q15 OOT image



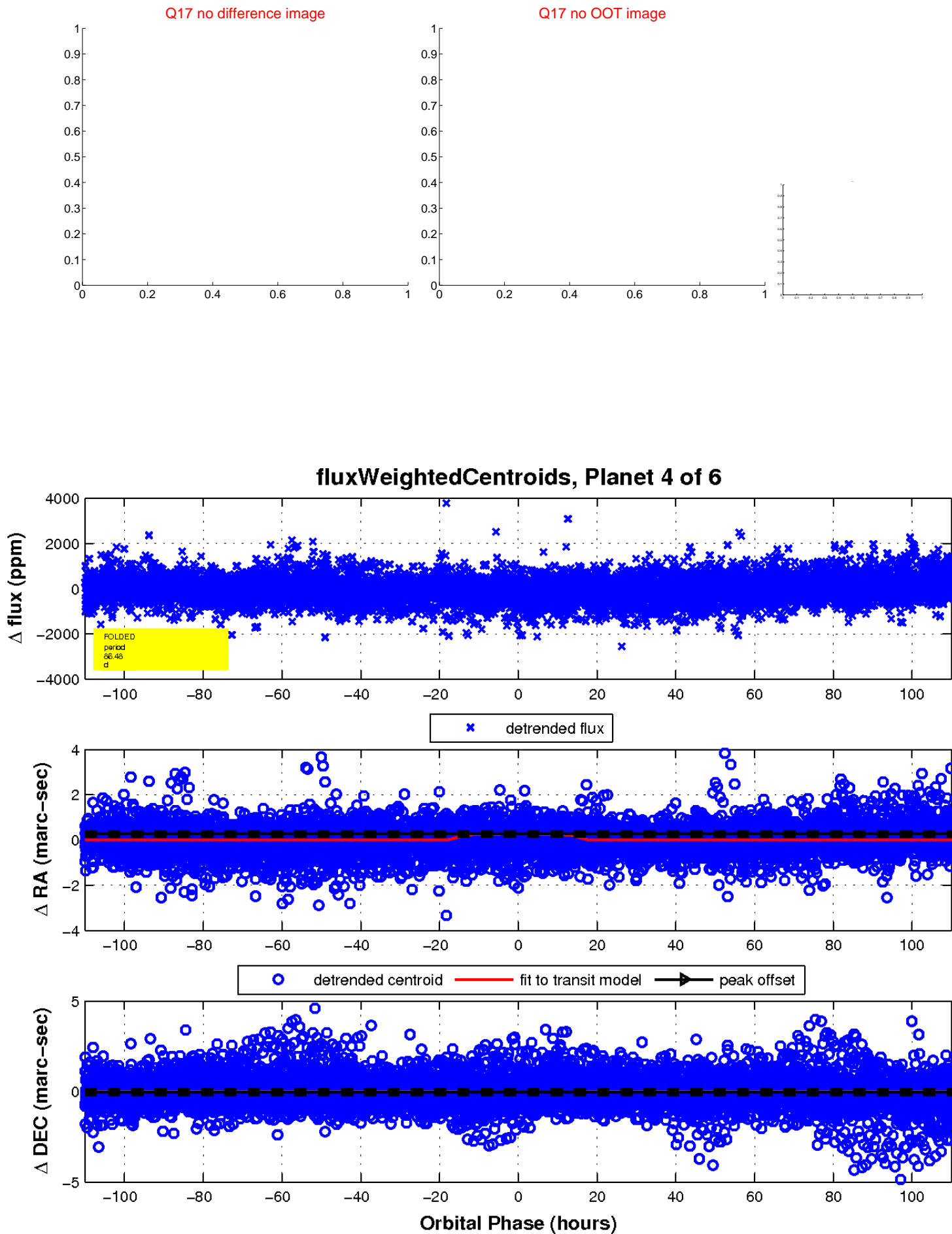
Q16 no difference image



Q16 no OOT image

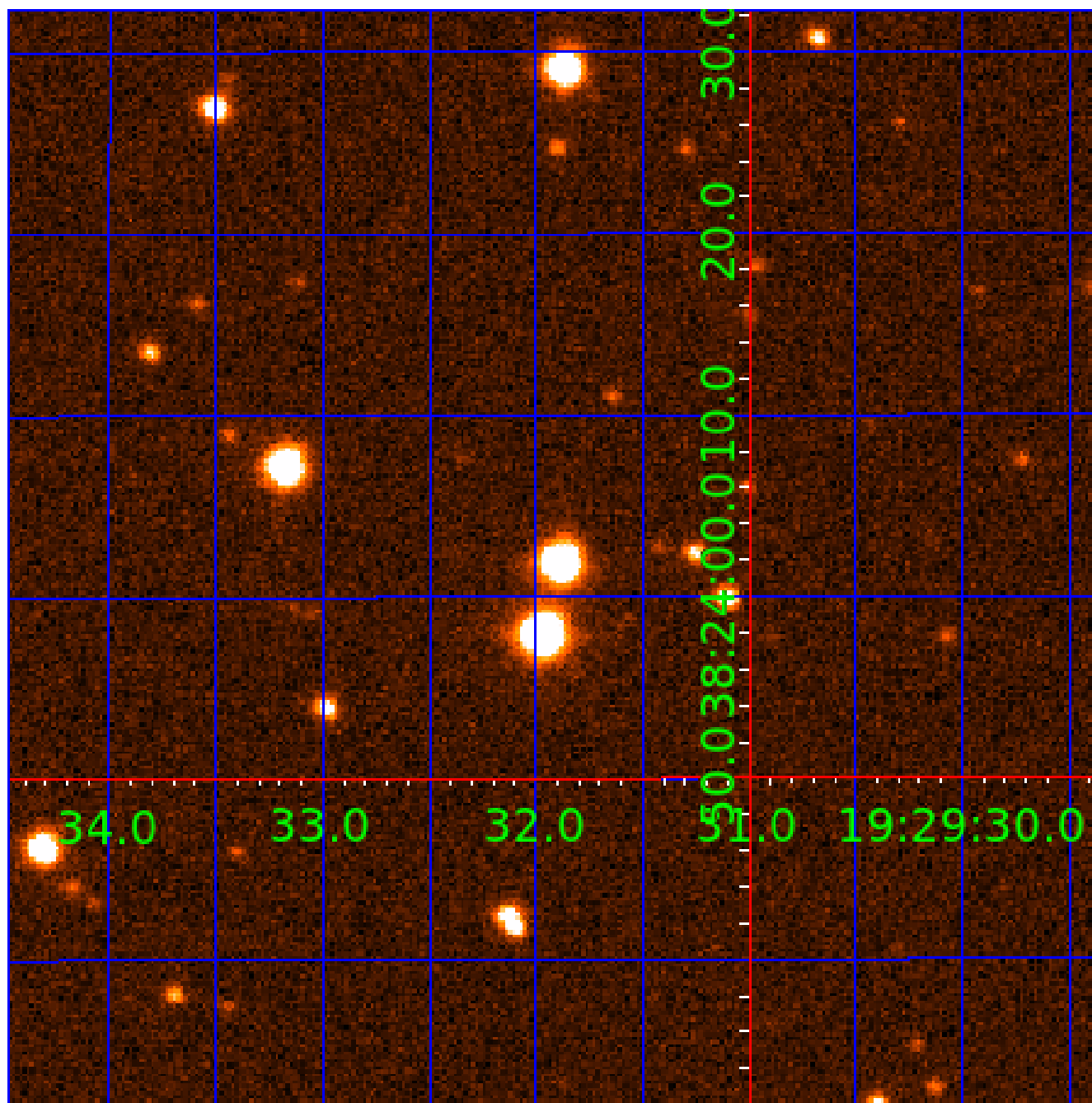


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 003345973

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
003345973-01	OBS	7652.01	15.346397	143.825241	219.6	5.162	10.7	10.4	2.26	6771	3.94	480.96
003345973-02	OBS	No	1.218657	131.752553	47.4	6.910	8.6	9.1	2.26	6771	1.57	14090.98
003345973-03	OBS	No	83.235609	155.072882	471.3	7.505	19.5	7.0	2.26	6771	5.17	50.47
003345973-04	OBS	No	86.479415	143.283783	341.2	36.687	17.5	6.5	2.26	6771	5.08	47.96
003345973-05	OBS	No	92.144154	216.274303	363.5	17.893	10.0	6.0	2.26	6771	4.96	44.07
003345973-06	OBS	No	100.093604	194.394859	813.2	1.716	8.8	6.7	2.26	6771	6.92	39.47

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
003345973-01	OBS	FP	0.00	0	0	1	0	CENT_RESOLVED_OFFSET—HALO_GHOST
003345973-02	OBS	FP	0.00	1	0	1	0	LPP_DV—CENT_RESOLVED_OFFSET
003345973-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—CENT_KIC_POS
003345973-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS
003345973-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_KIC_POS—CENT_UNCERTAIN
003345973-06	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_TRACKER—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST

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

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

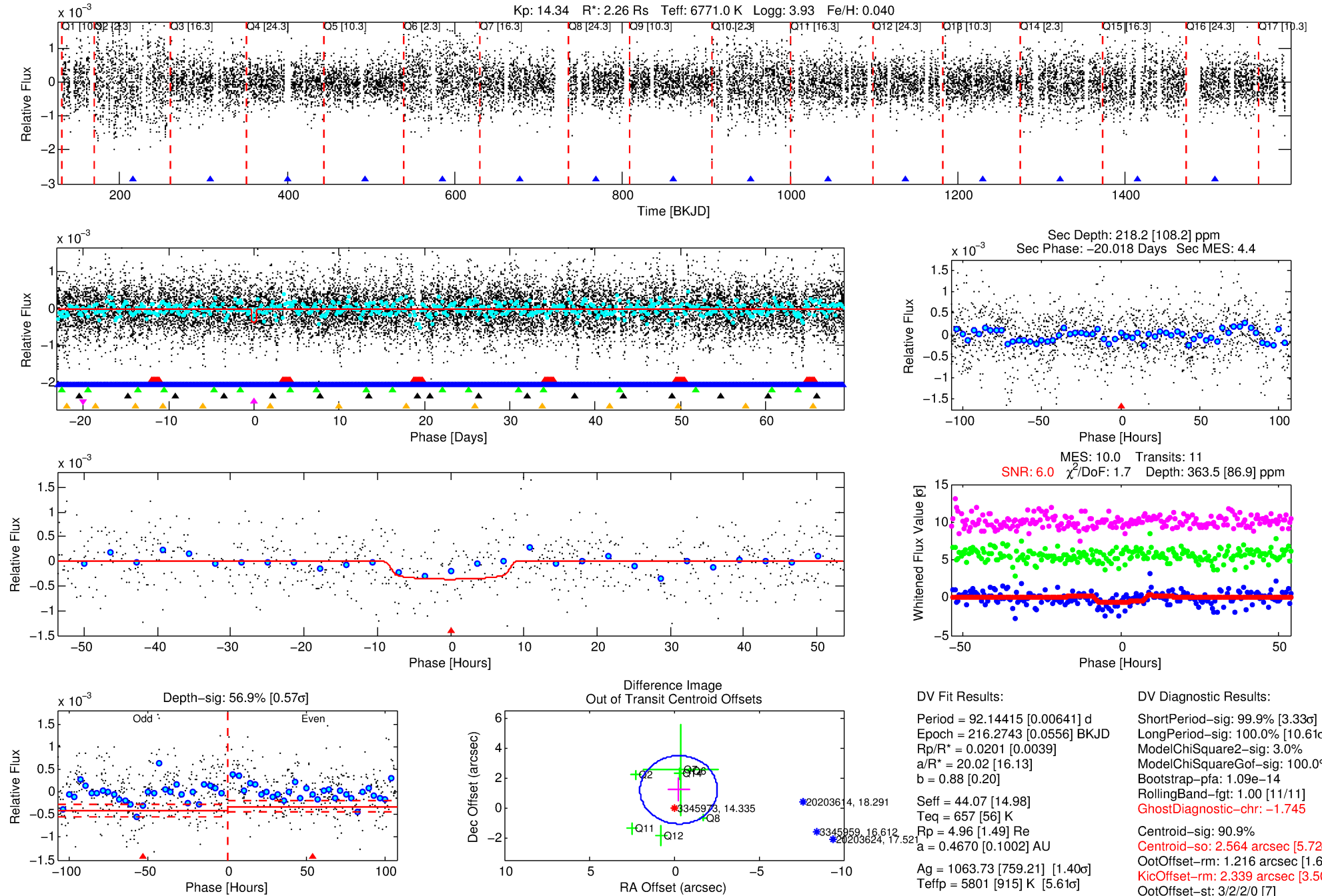
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 003345973-05

No Significant Match Found

# DV One-Page Summary

KIC: 3345973 Candidate: 5 of 6 Period: 92.144 d

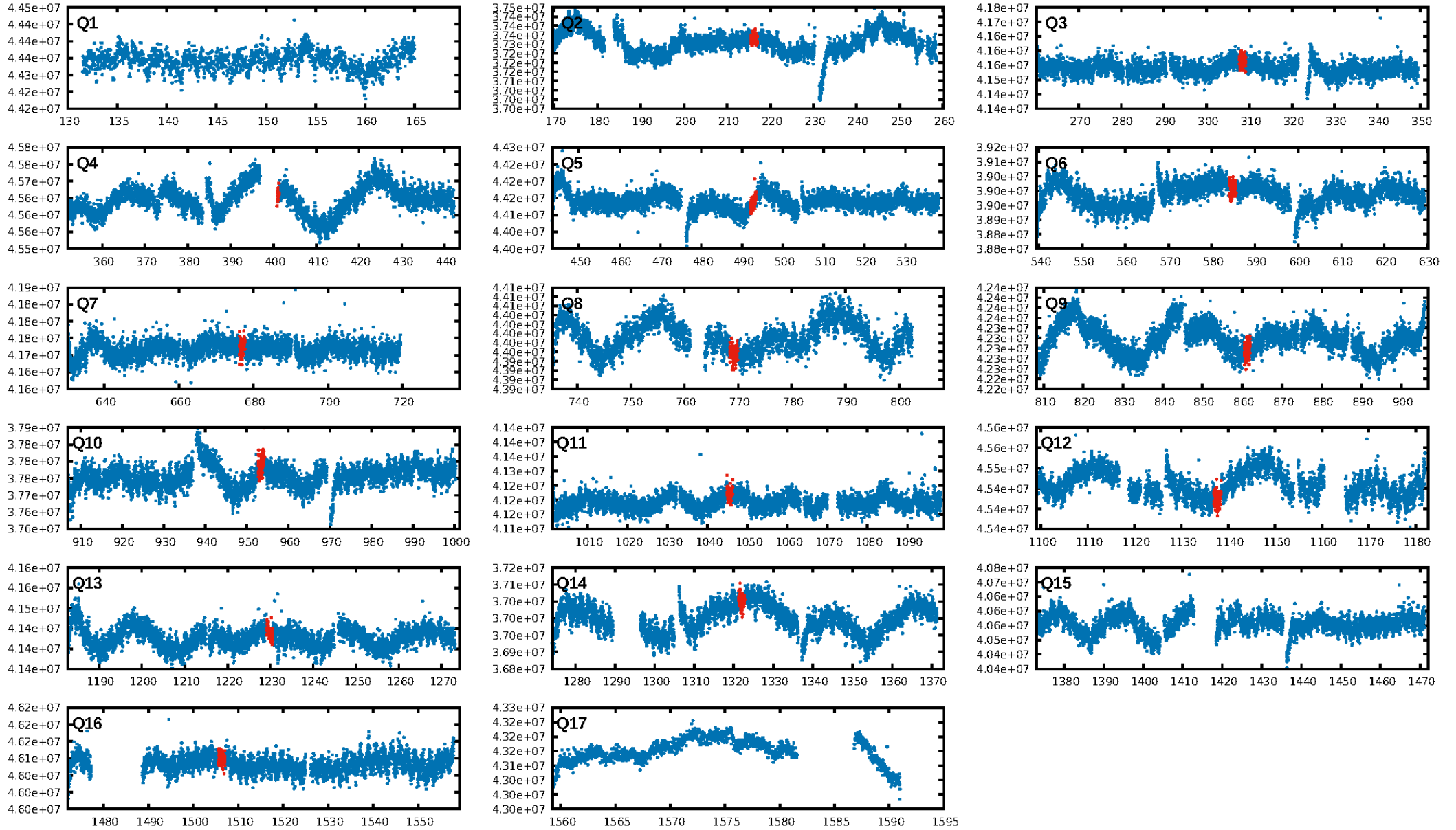


Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 21:20:37 Z

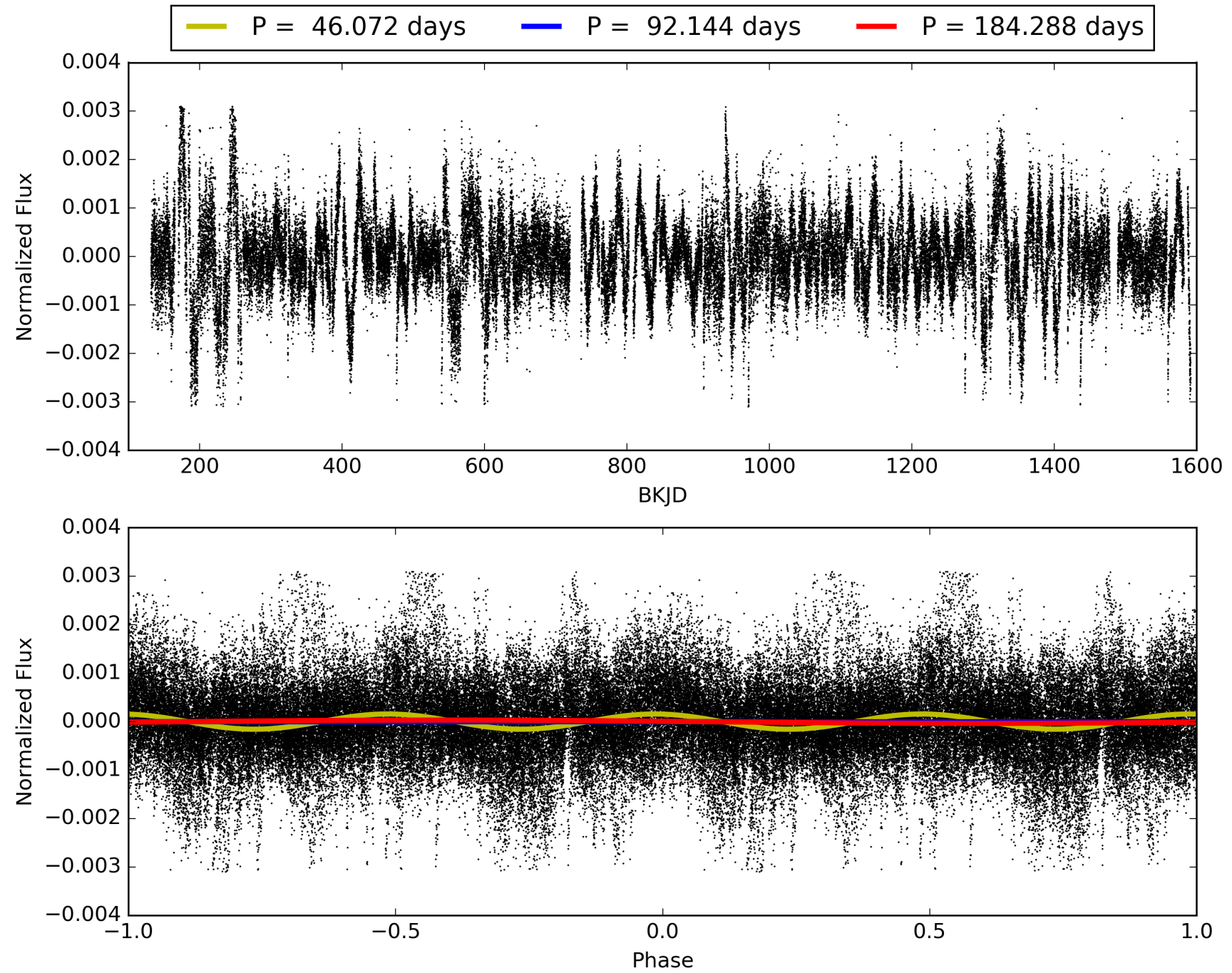
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center



# TCE 003345973-05, PDC Light Curves

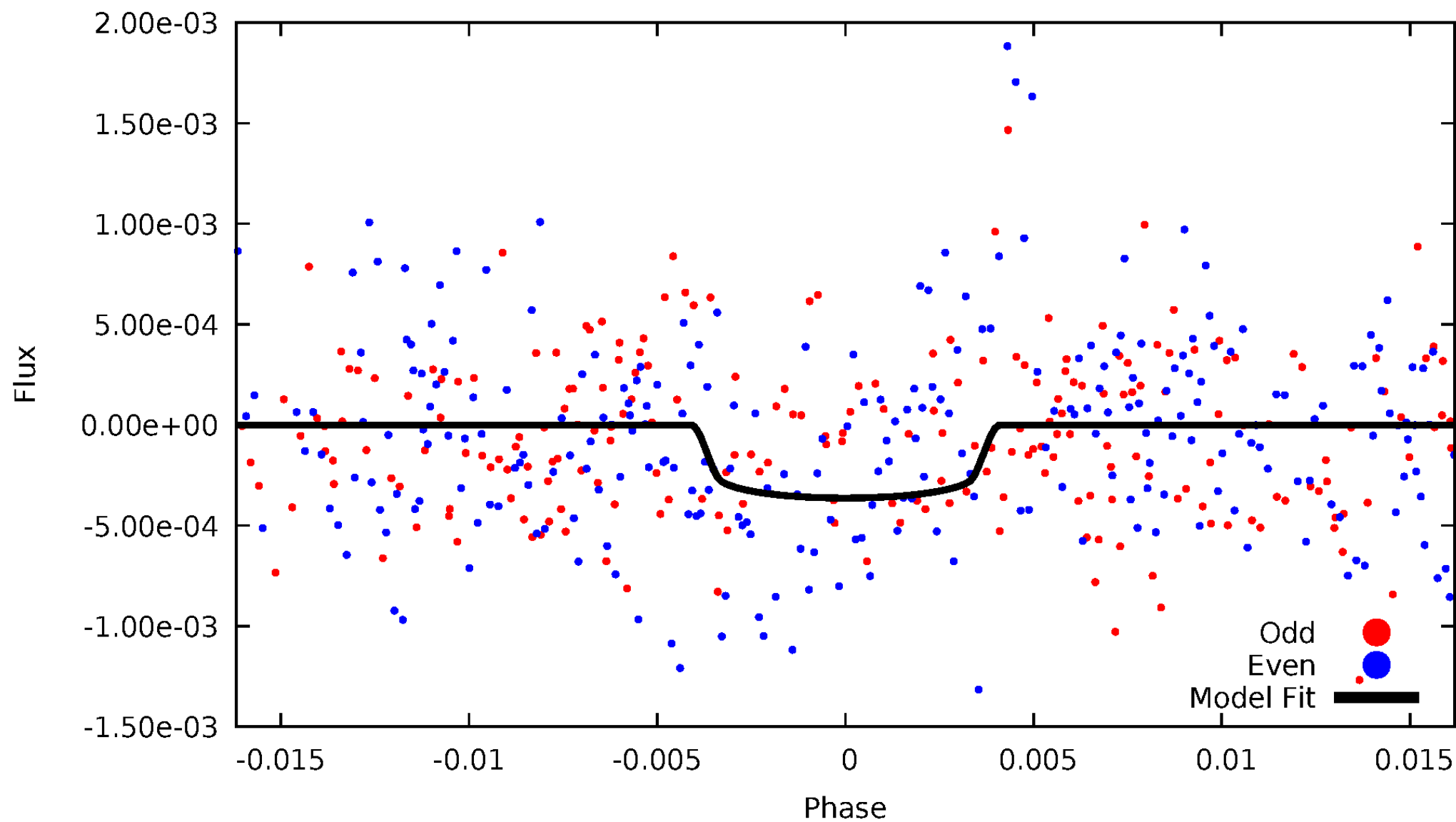


TCE 003345973-05



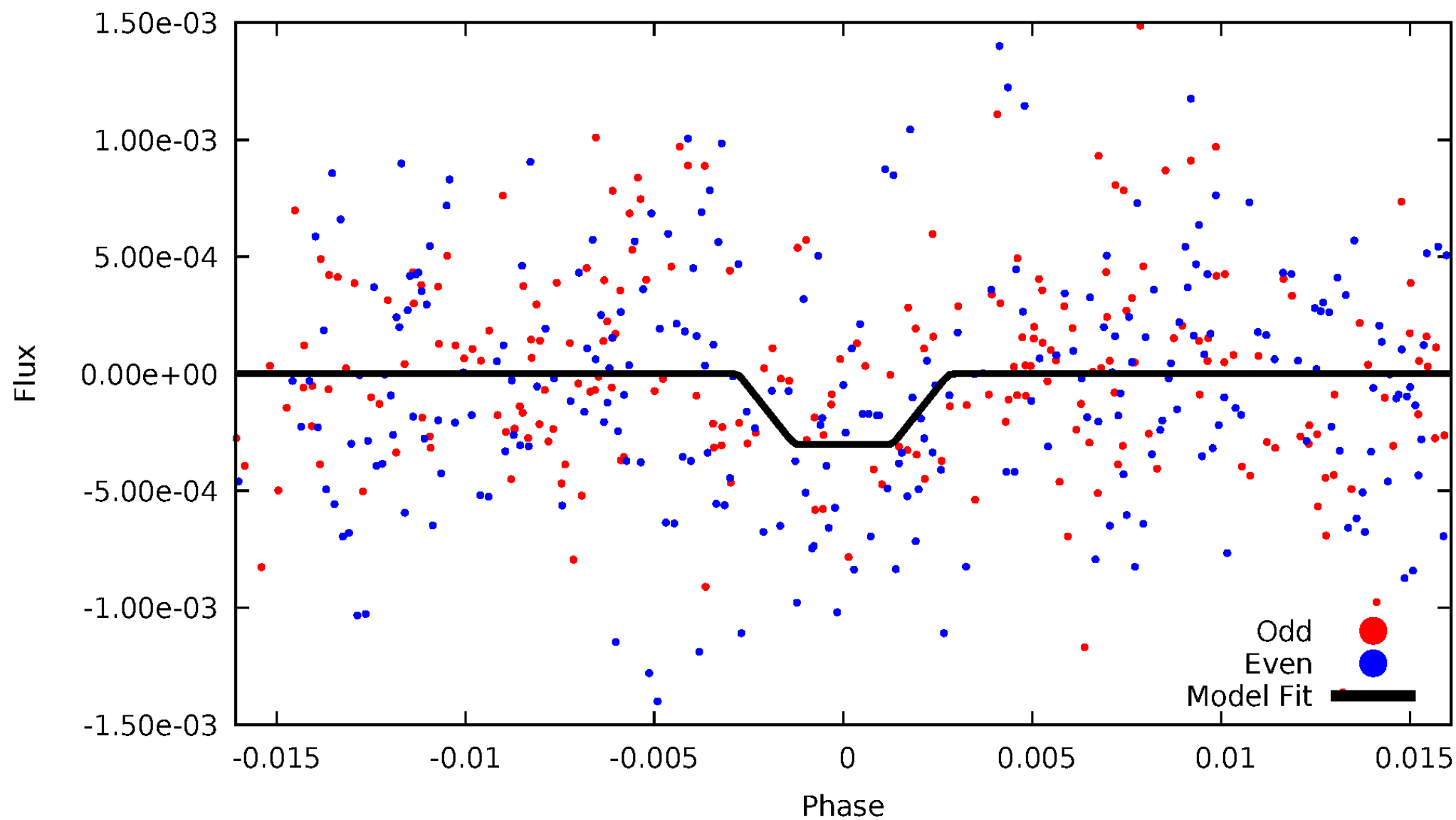
# DV Odd/Even

TCE 003345973-05



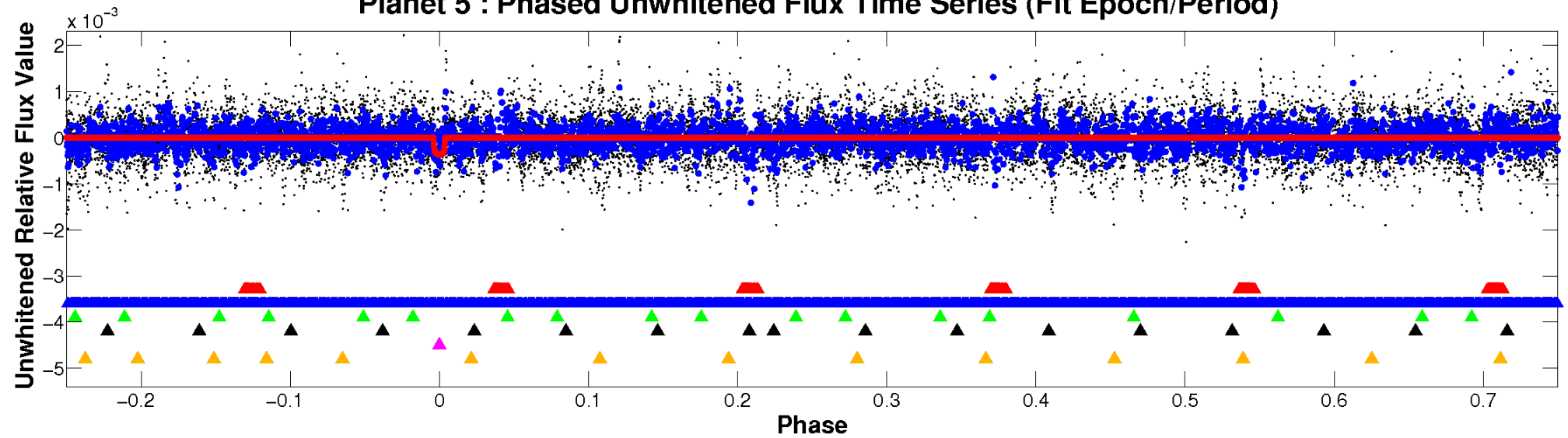
# ALT Odd/Even

TCE 003345973-05

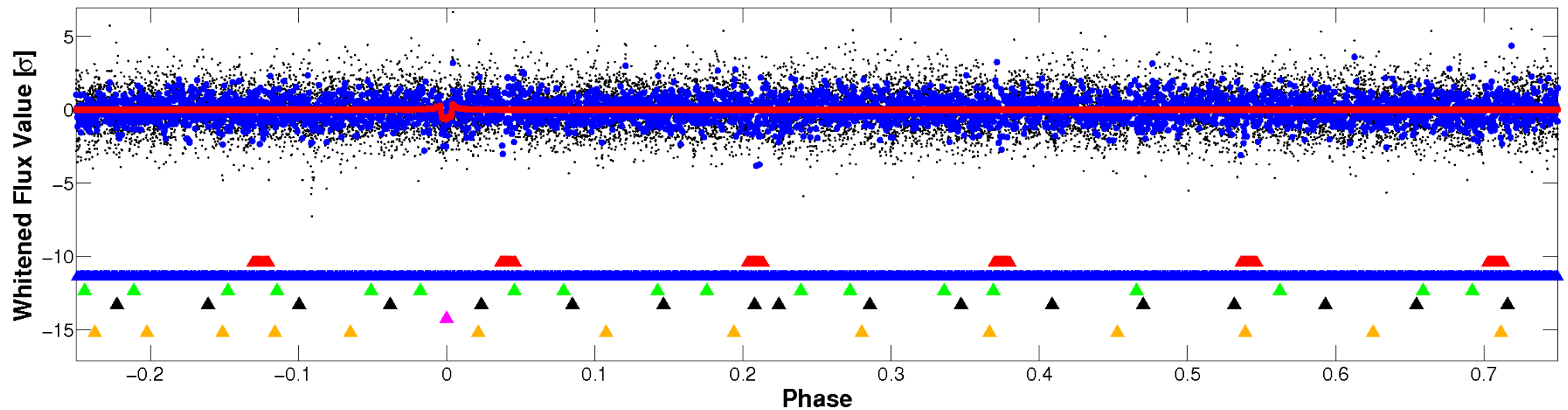


# Non-Whitened Vs. Whitened Light Curve

## Planet 5 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

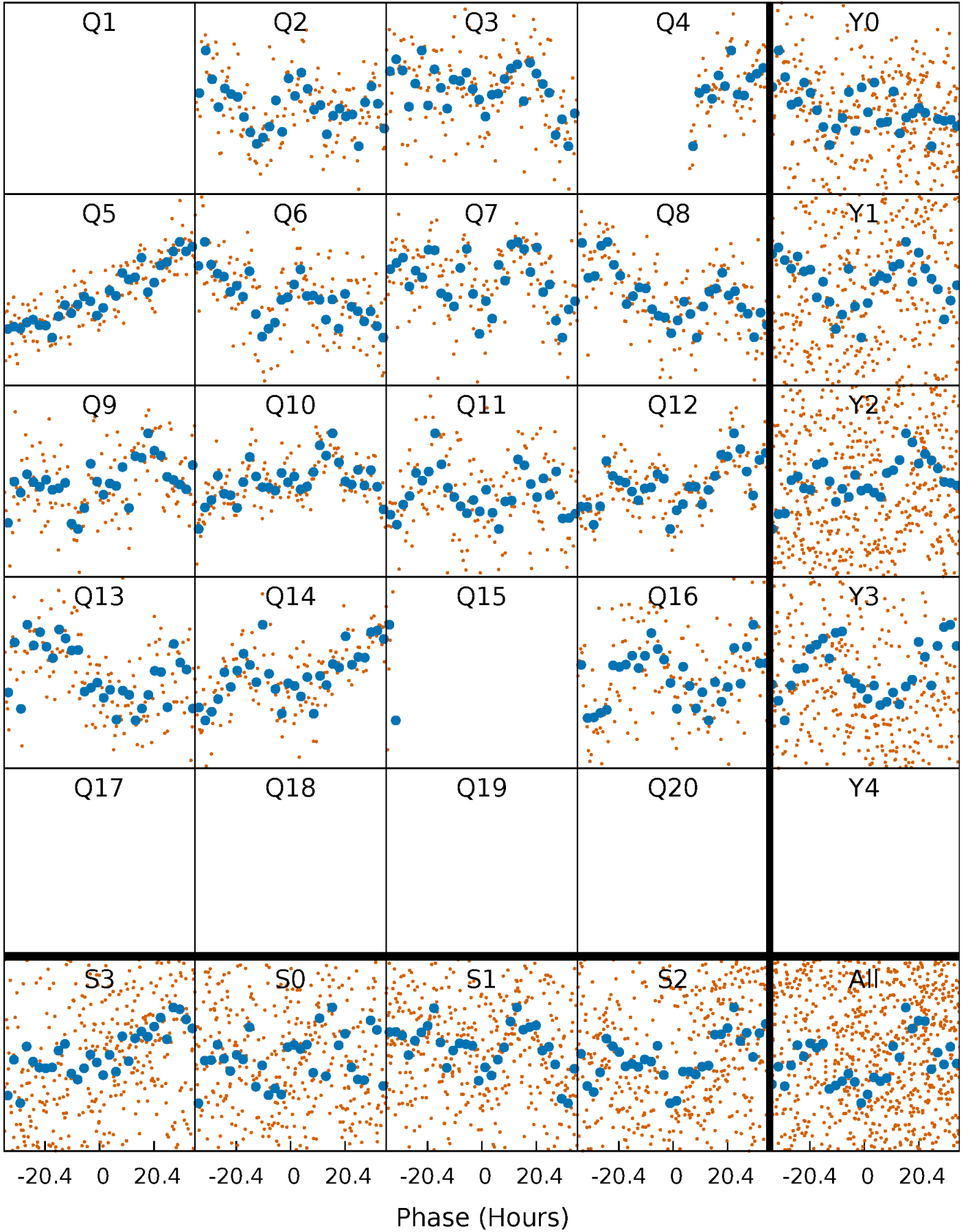


## Planet 5 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

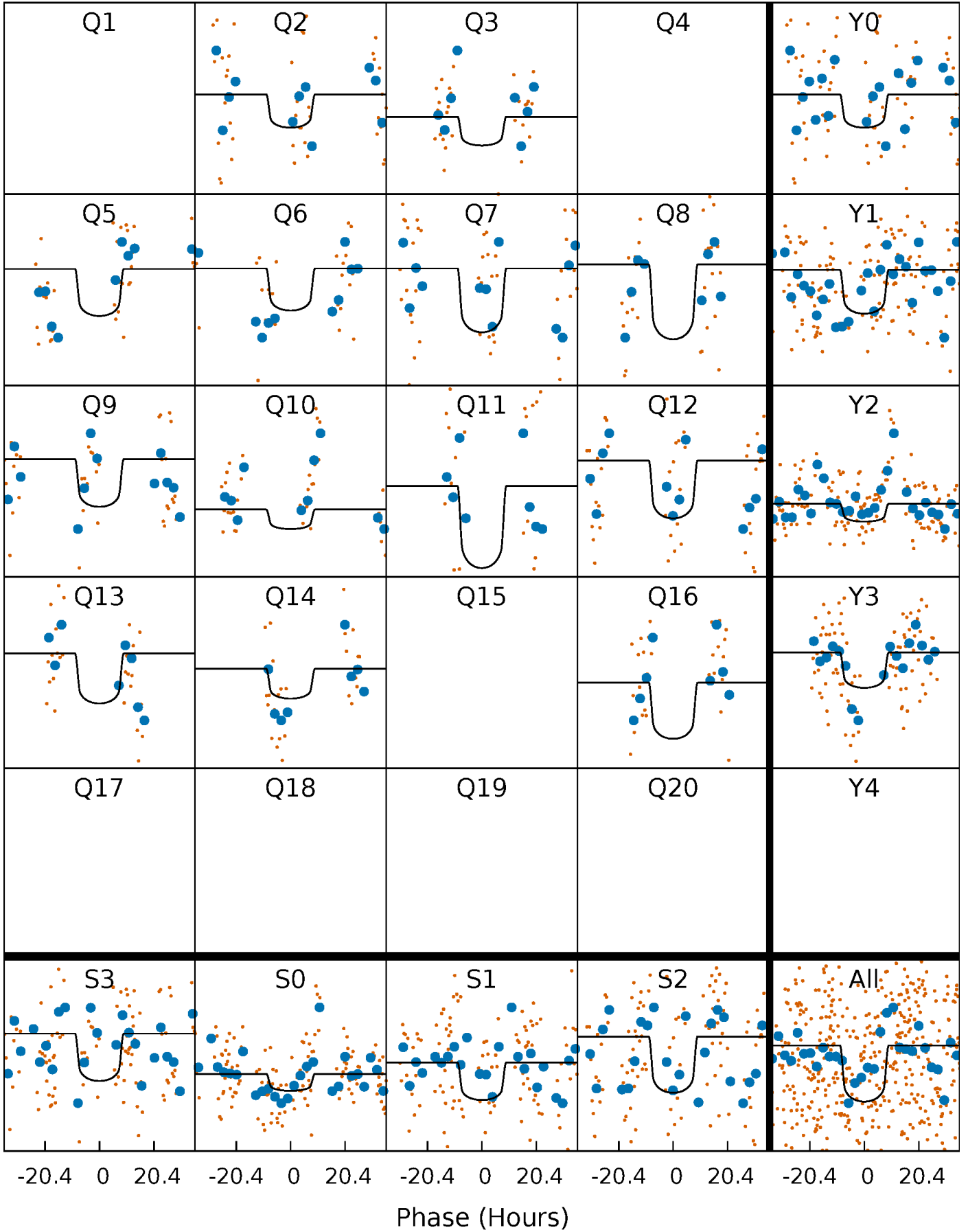
TCE 003345973-05   P= 92.144154 Days    $T_0=216.274303$  (BKJD)





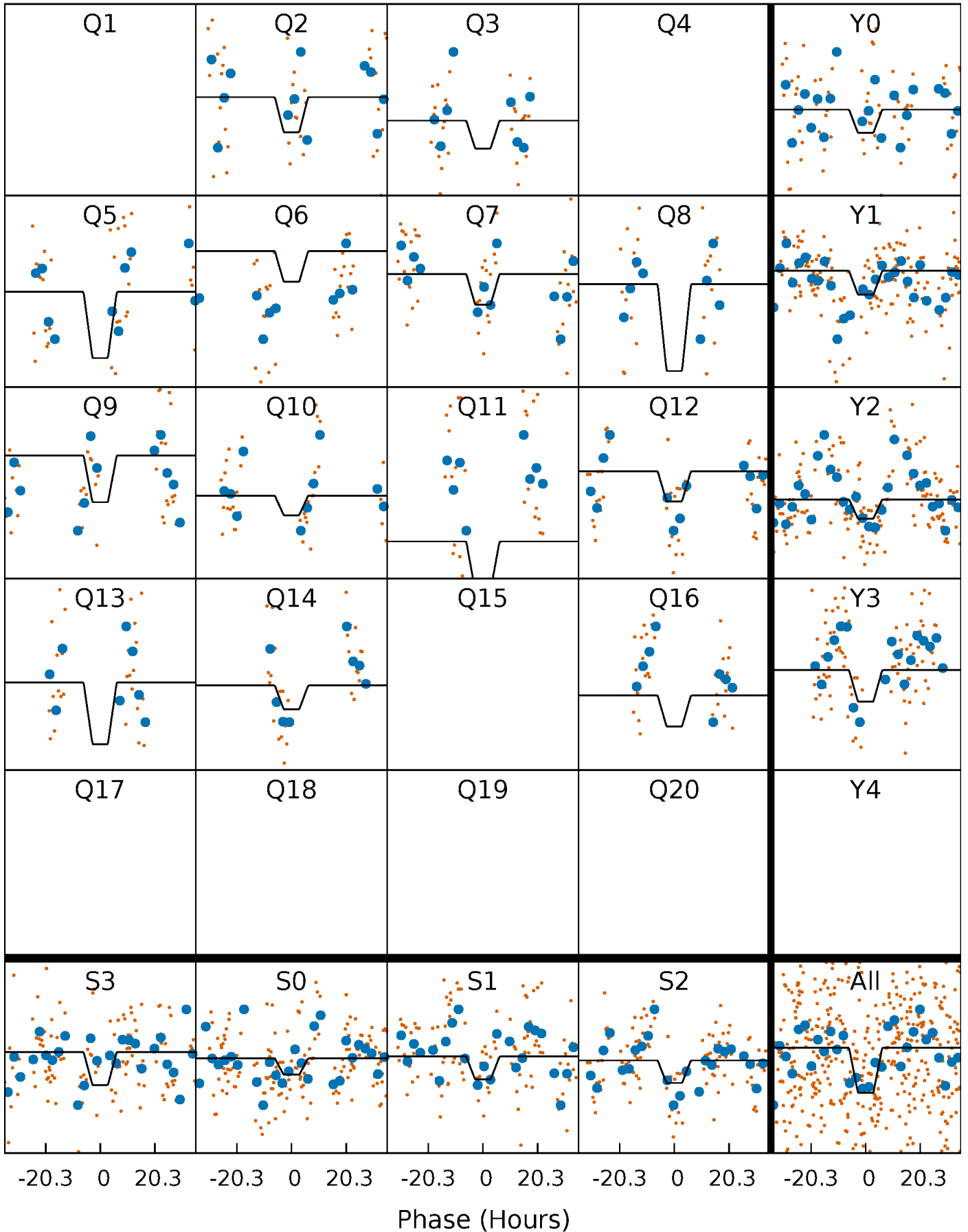
# DV Quarter-Phased Transit Curves

TCE 003345973-05   P= 92.144154 Days    $T_0=216.274303$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

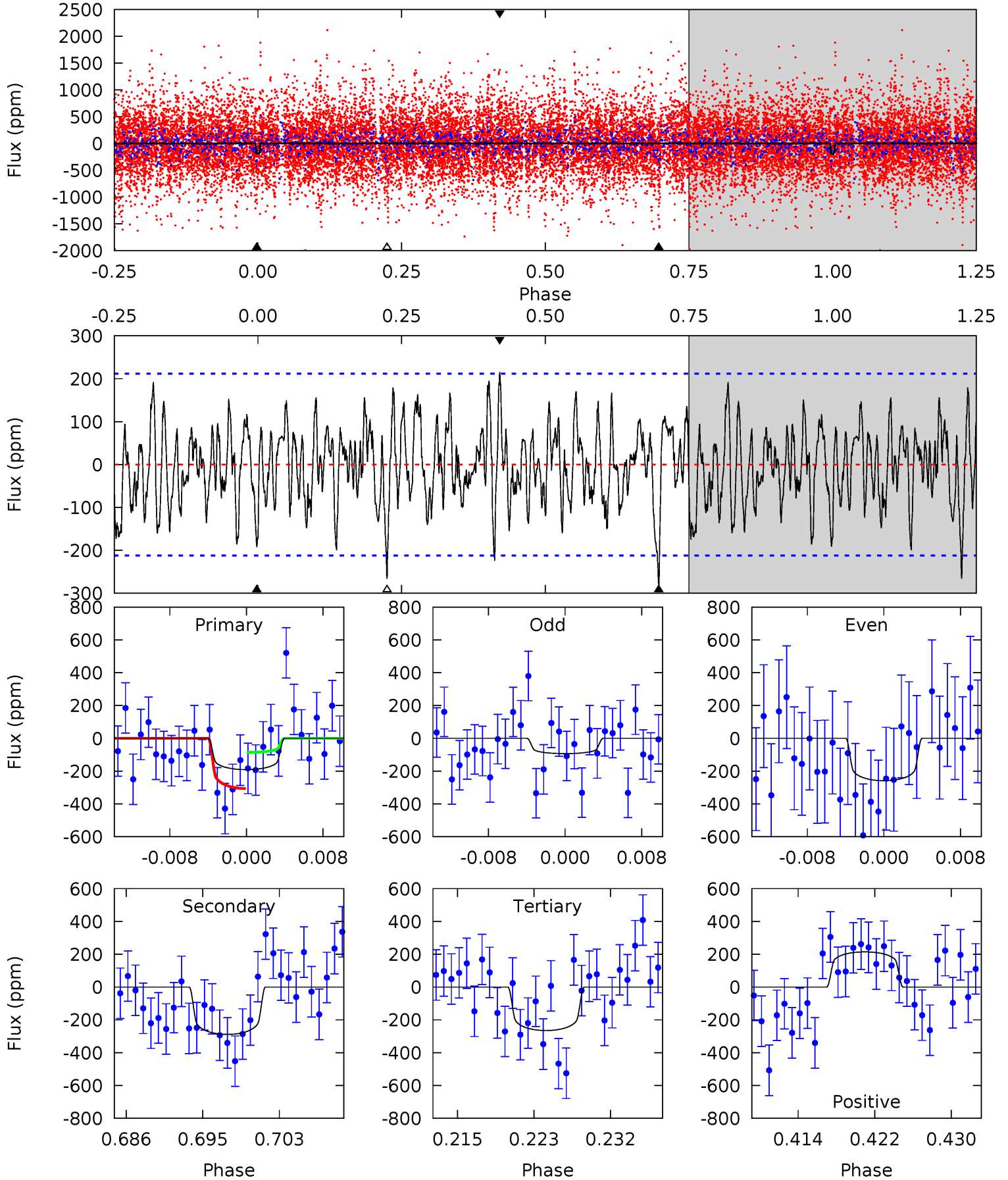
TCE 003345973-05     $P = 92.135980$  Days     $T_0 = 216.355302$  (BKJD)



# DV Model-Shift Uniqueness Test

003345973-05, P = 92.144154 Days, E = 124.130149 Days

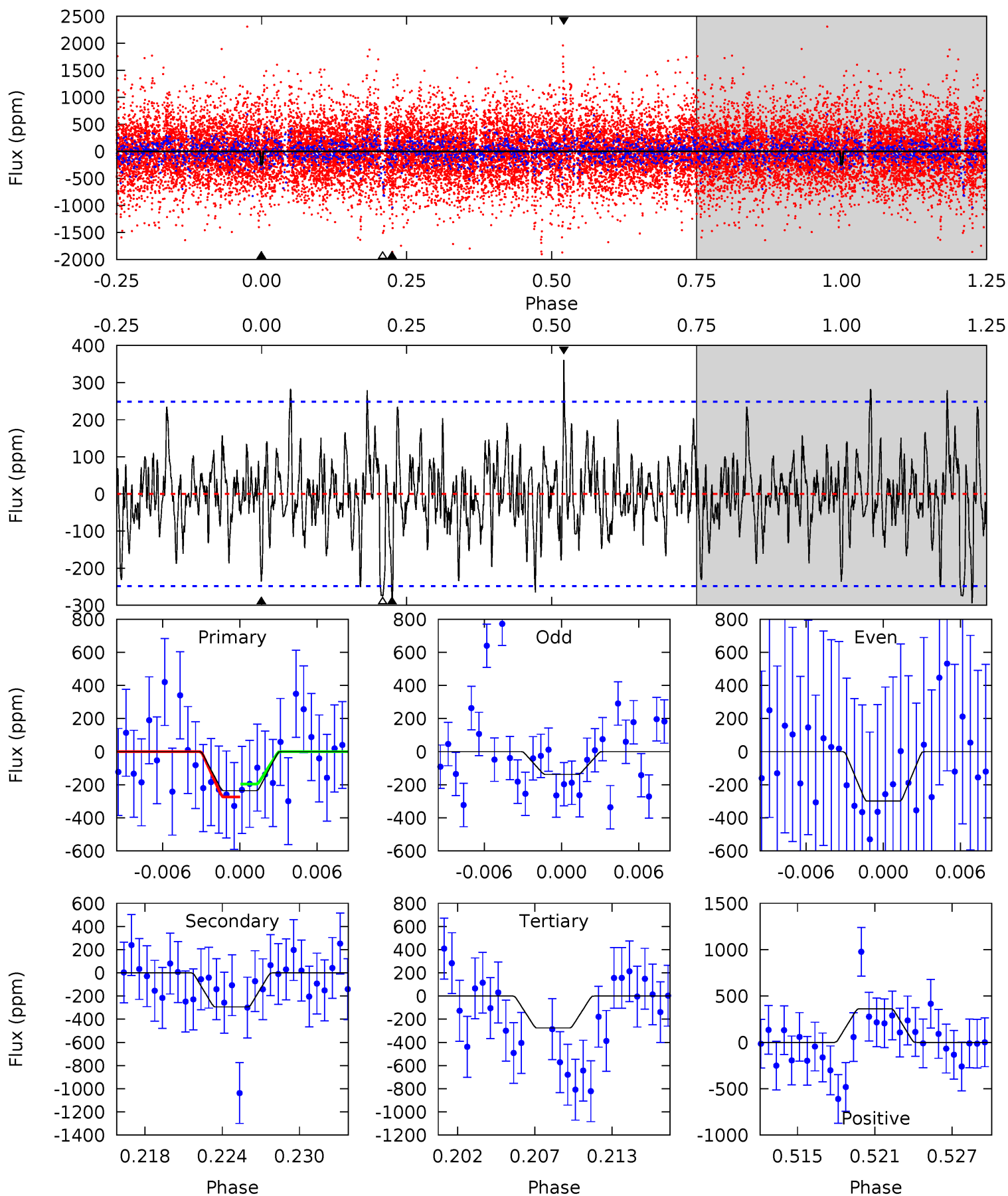
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
4.57	6.90	6.33	5.12	5.06	2.64	1.89	-1.77	-0.55	0.56	1.78	1.98	0.90	0.43	2.65



# Alt Model-Shift Uniqueness Test

003345973-05, P = 92.135980 Days, E = 124.219322 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
4.88	6.08	5.70	7.46	5.14	2.77	1.71	-0.82	-2.58	0.38	-1.38	1.66	1.31	0.55	0.82



### Stellar Parameters For KIC 003345973

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6771^{+81}_{-81}$	$3.934^{+0.195}_{-0.120}$	$0.040^{+0.150}_{-0.150}$	$2.259^{+0.426}_{-0.521}$	$1.597^{+0.131}_{-0.180}$	$0.195^{+0.199}_{-0.074}$
	+1%/-1%	+5%/-3%	+375%/-375%	+19%/-23%	+8%/-11%	+102%/-38%
Source	SPE68	SPE68	SPE68	DSEP		

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

### Secondary Eclipse Parameters for KIC 003345973-05 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-289 \pm 42$	$4.82^{+1.17}_{-1.02}$	$914^{+51}_{-56}$	$6212^{+795}_{-603}$	$1471^{+981}_{-537}$
Alt.	$-294 \pm 48$	$4.11^{+1.18}_{-0.98}$	$910^{+48}_{-59}$	$6678^{+1165}_{-658}$	$2036^{+1600}_{-816}$

$T_{\text{max}}$  = Theoretical Maximum Planetary Temperature

$T_{\text{obs}}$  = Observed Planetary Temperature (Assuming  $A=0.3$ )

$A_{\text{obs}}$  = Observed Albedo (Assuming  $T=0$ )

If a secondary eclipse is present, the system is likely an EB if  $T_{\text{obs}} \gg T_{\text{max}}$  AND  $A_{\text{obs}} \gg 1.0$

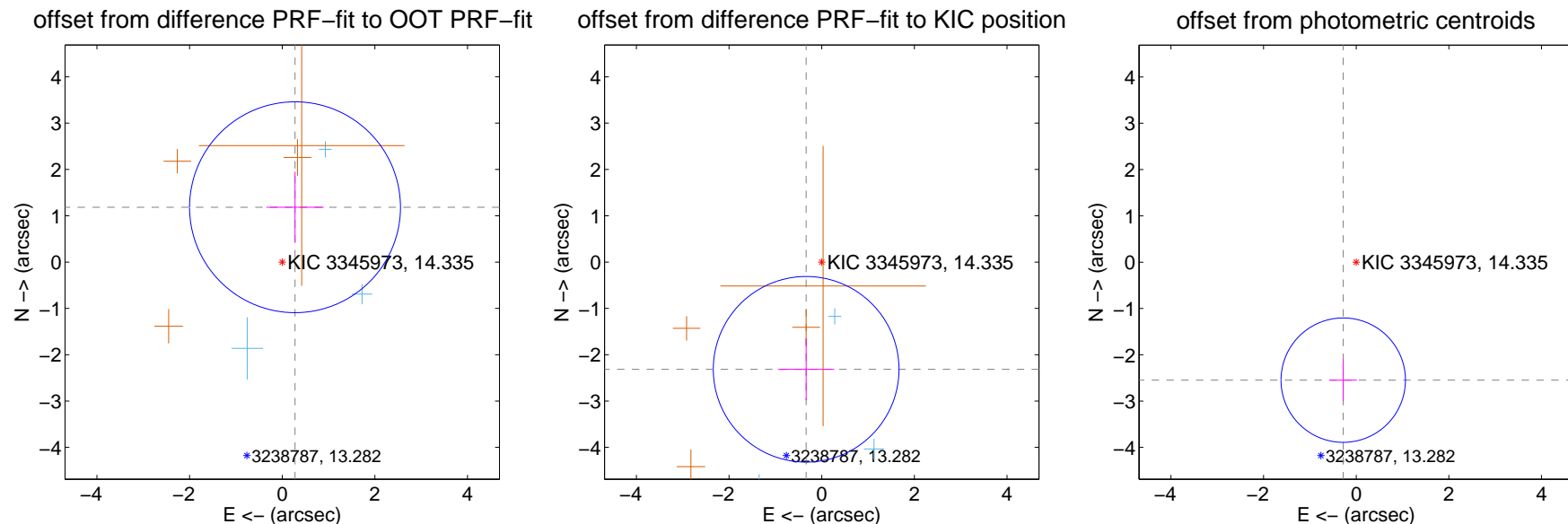
## DV Centroid Data

Supplemental centroid analysis for 003345973-05. Kepler magnitude: 14.34. Transit SNR 6.02

There are 3 quarters with good PRF difference image offsets

The OOT PRF centroid is offset from the target star catalog position by about 3.73 arcsec so the offset from difference PRF-fit to OOT-fit may be invalid.

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.216 \pm 0.759$	1.60	$-0.276 \pm 0.618$	$1.184 \pm 0.766$
PRF-fit source offset from KIC position	$2.339 \pm 0.668$	3.50	$0.336 \pm 0.604$	$-2.315 \pm 0.669$
photometric centroid source offset	$2.56 \pm 0.45$	5.72	$0.28 \pm 0.30$	$-2.55 \pm 0.45$



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



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

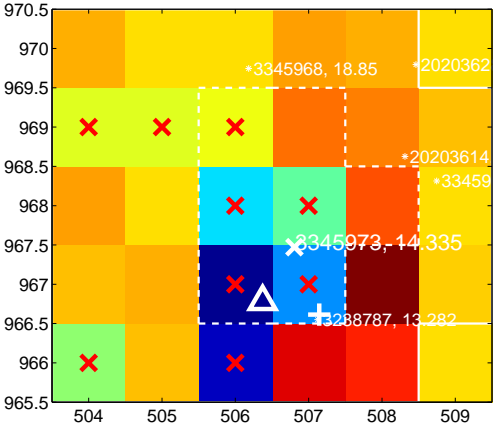
Q1 no difference image



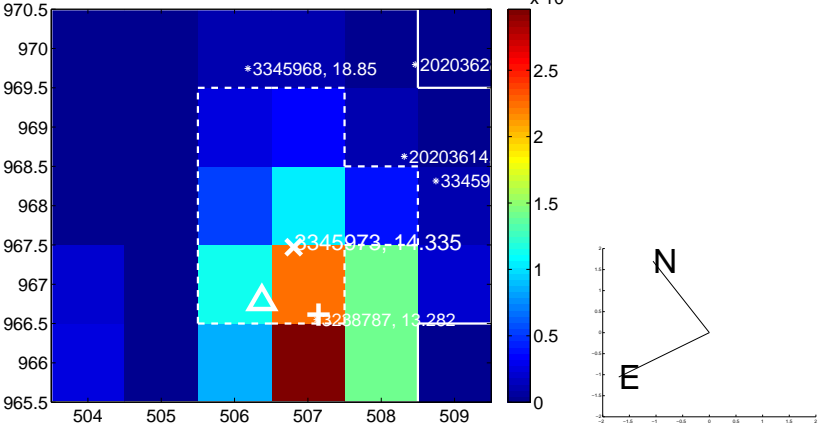
Q1 no OOT image



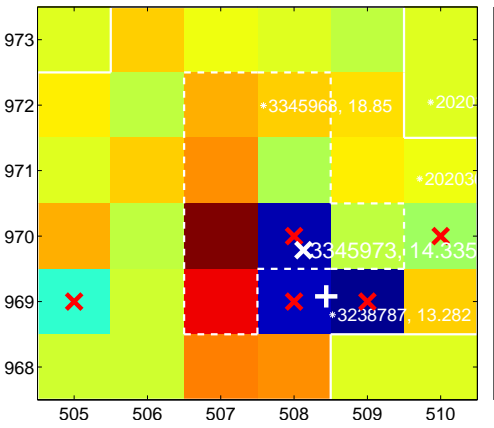
Q2 difference image. Poor Quality



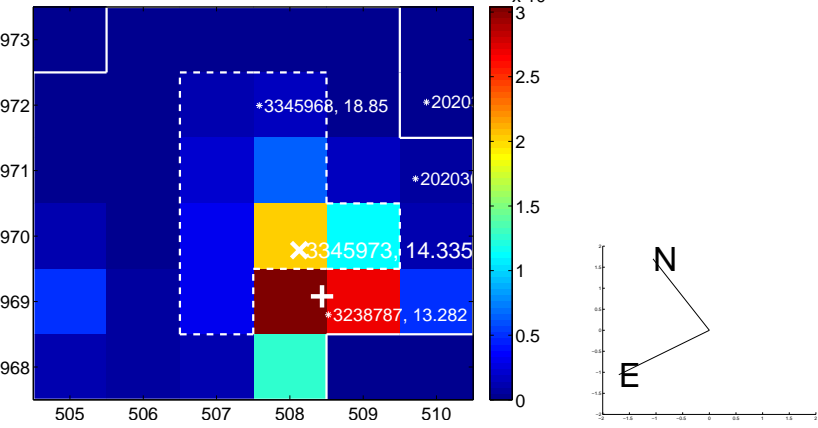
Q2 OOT image



Q3 difference image. Poor Quality



Q3 OOT image



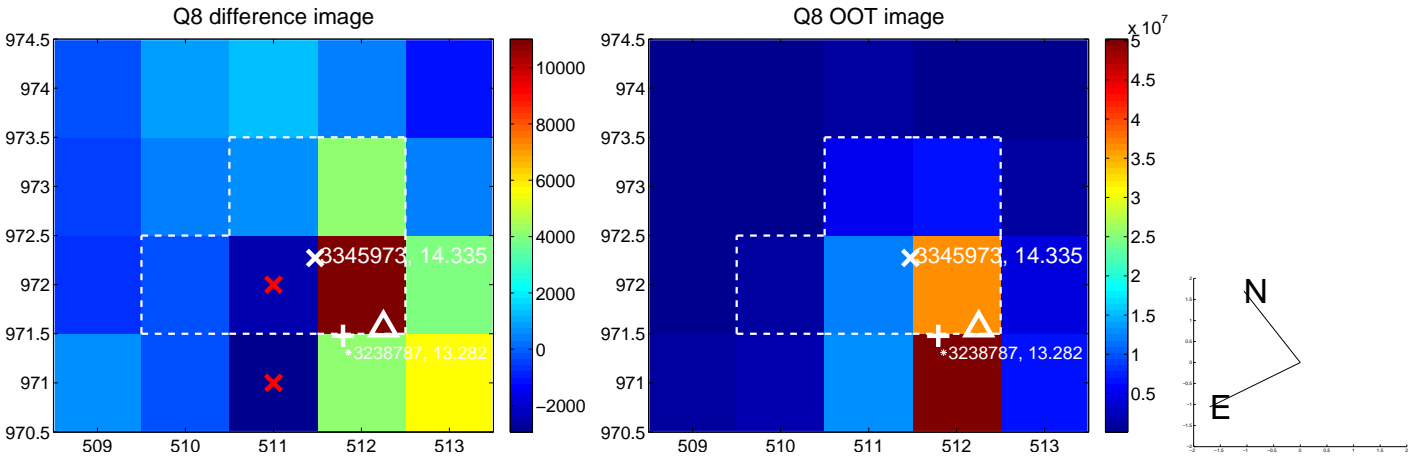
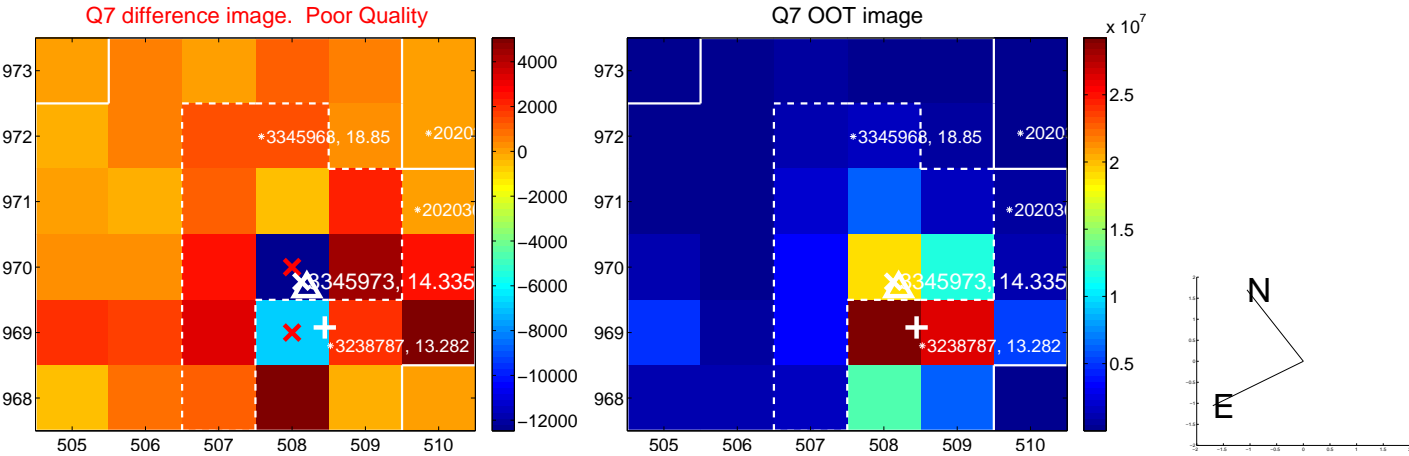
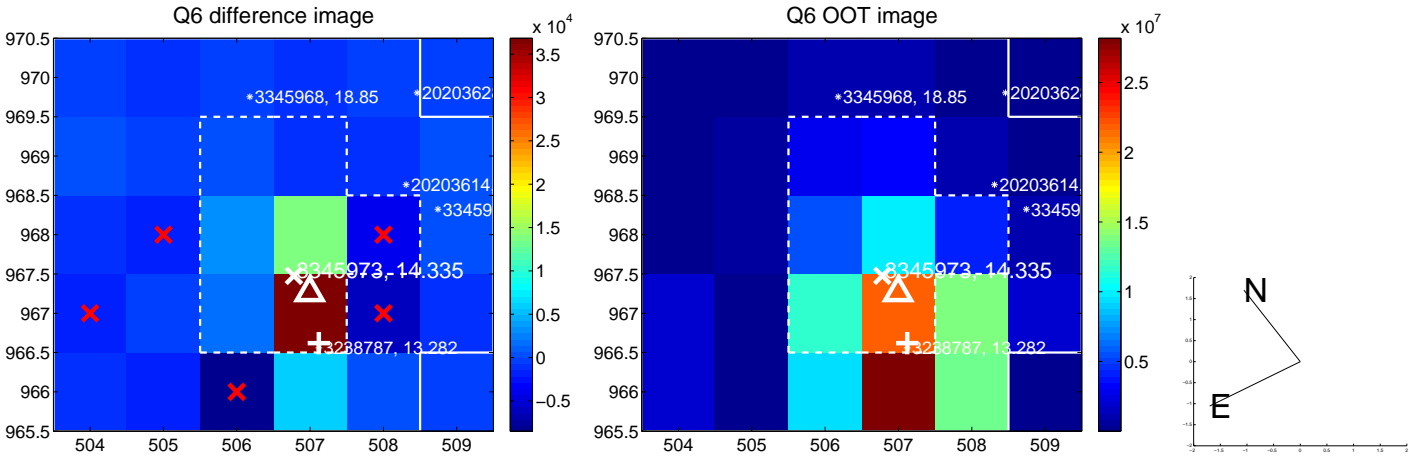
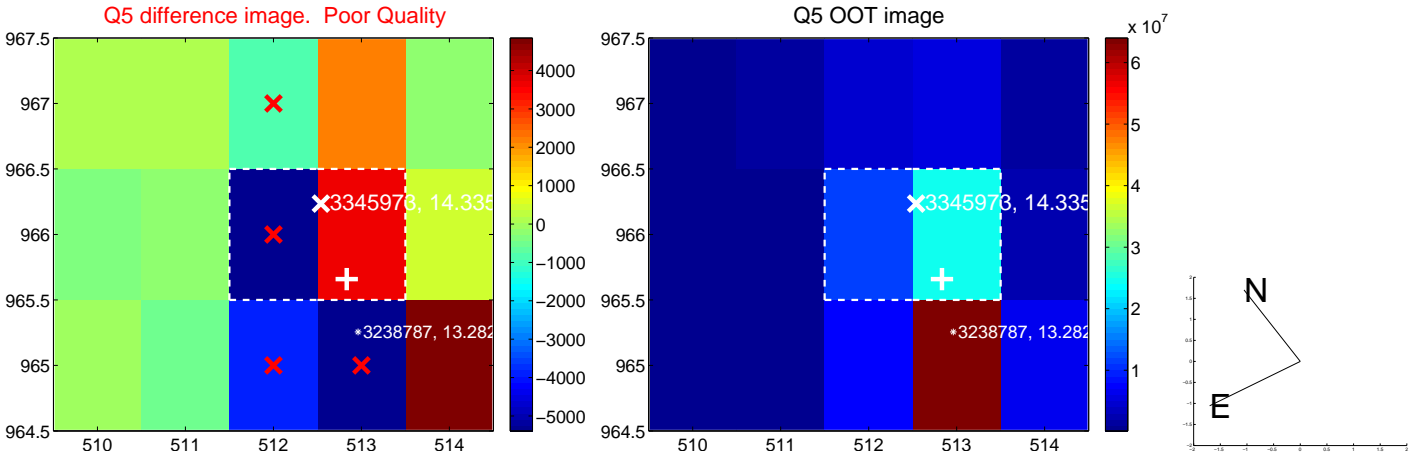
Q4 no difference image



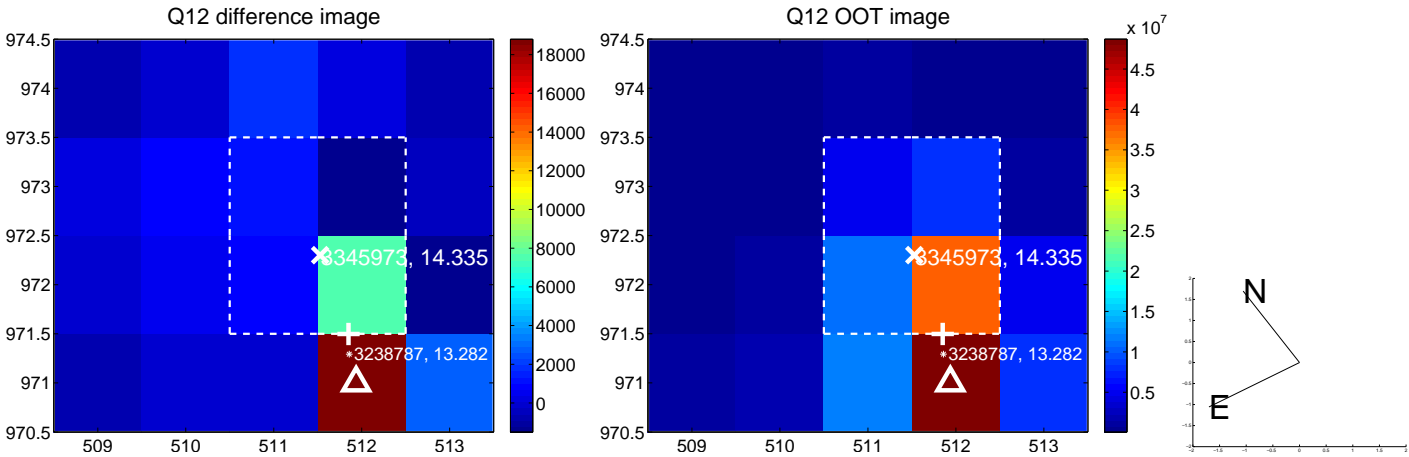
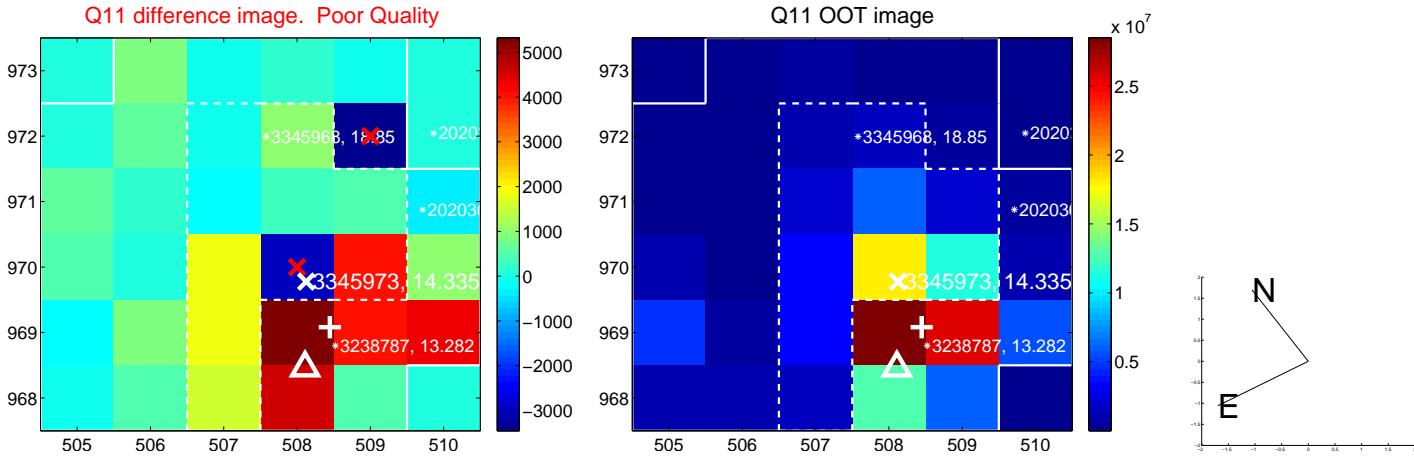
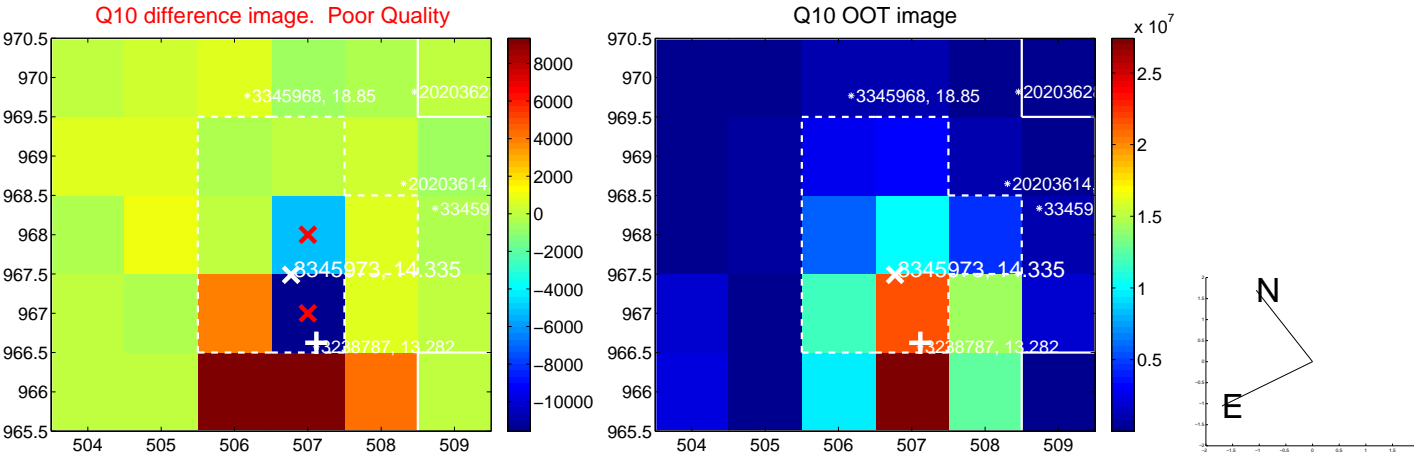
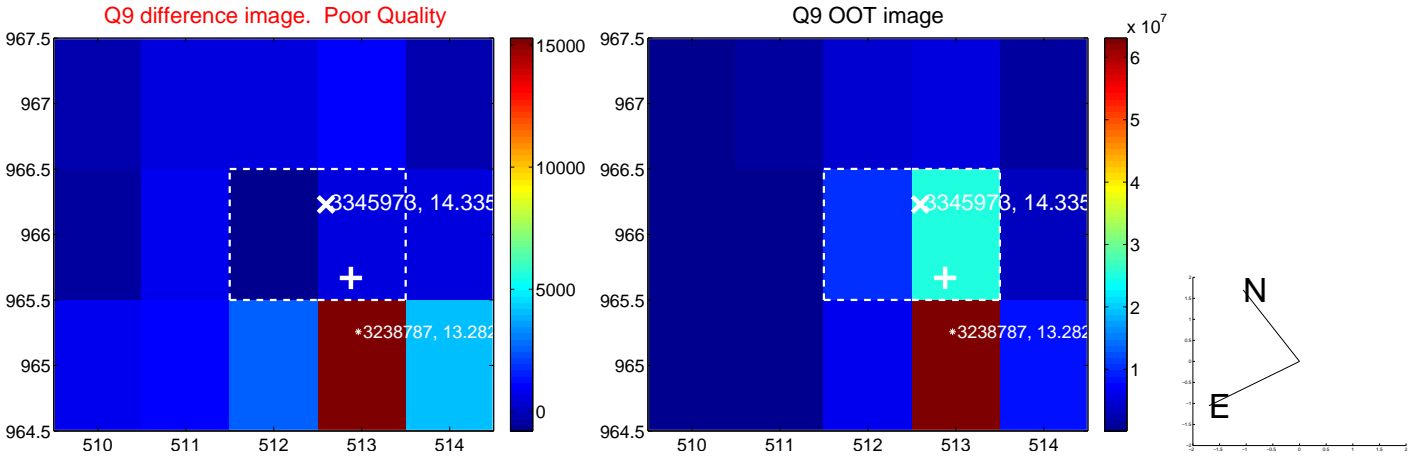
Q4 no OOT image



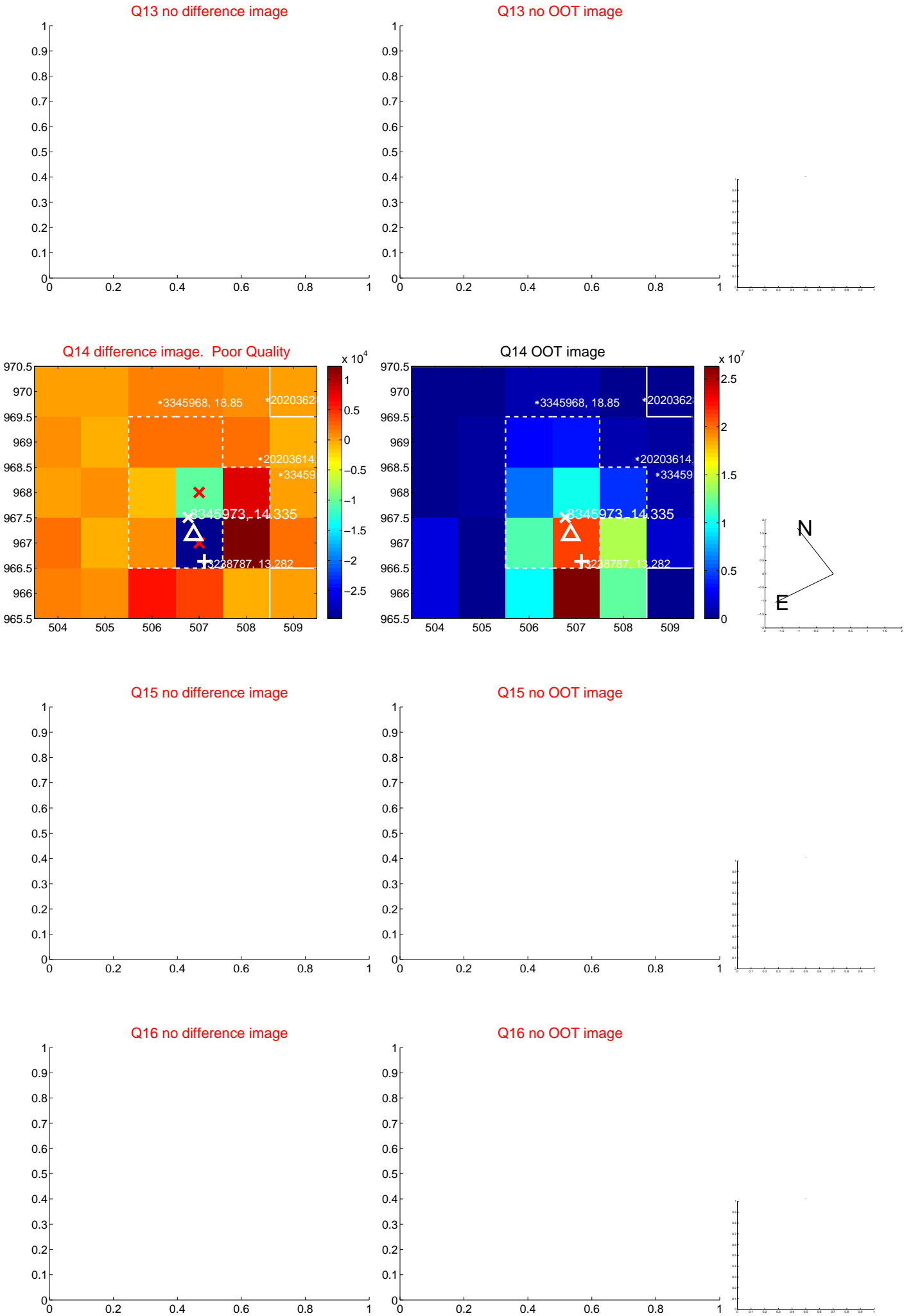
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



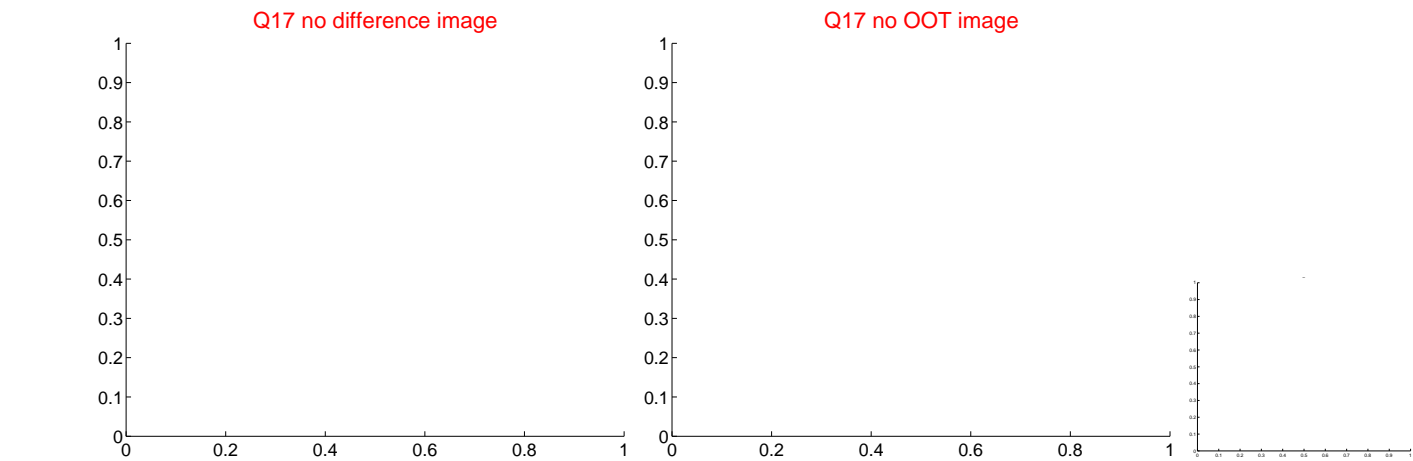
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



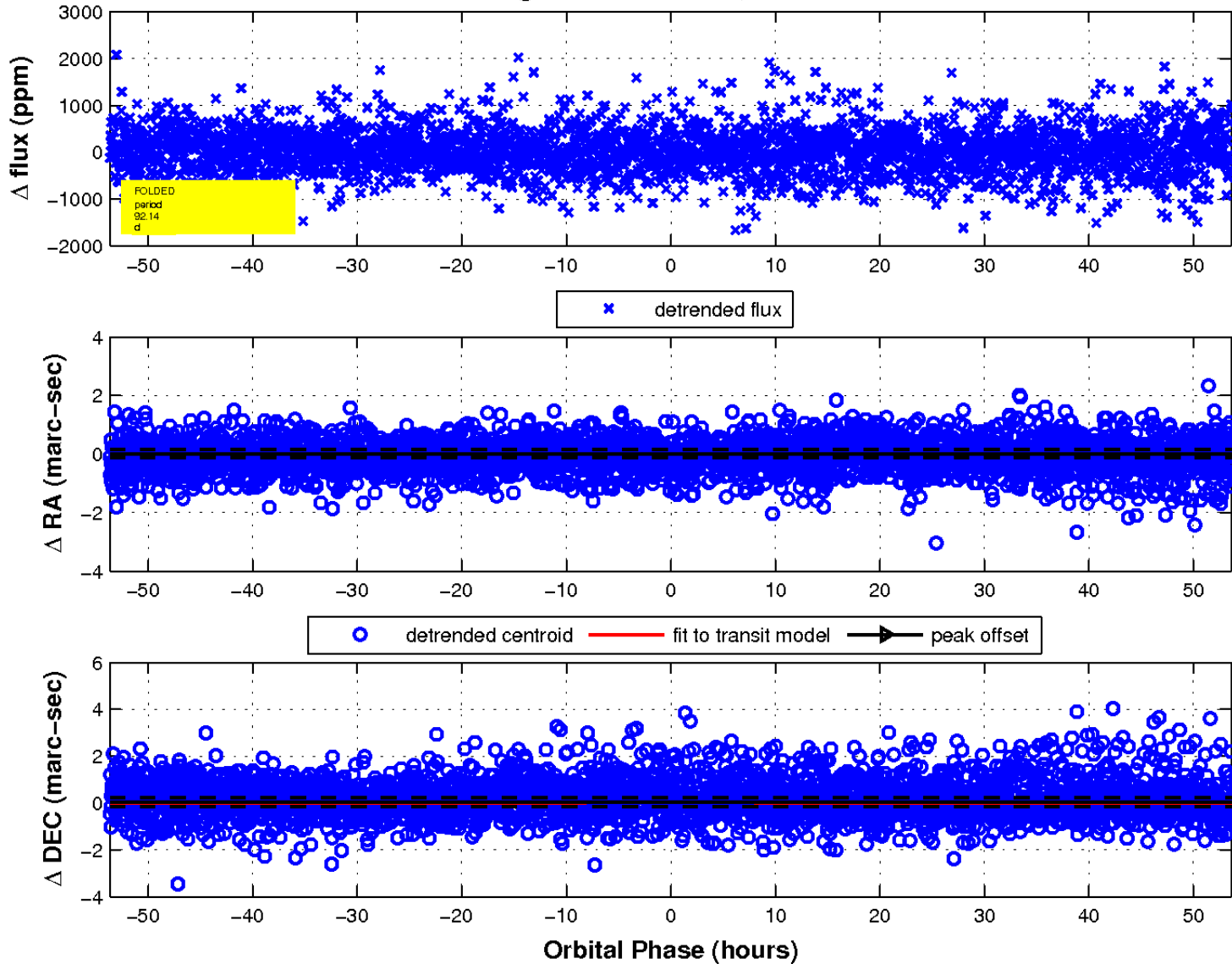
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

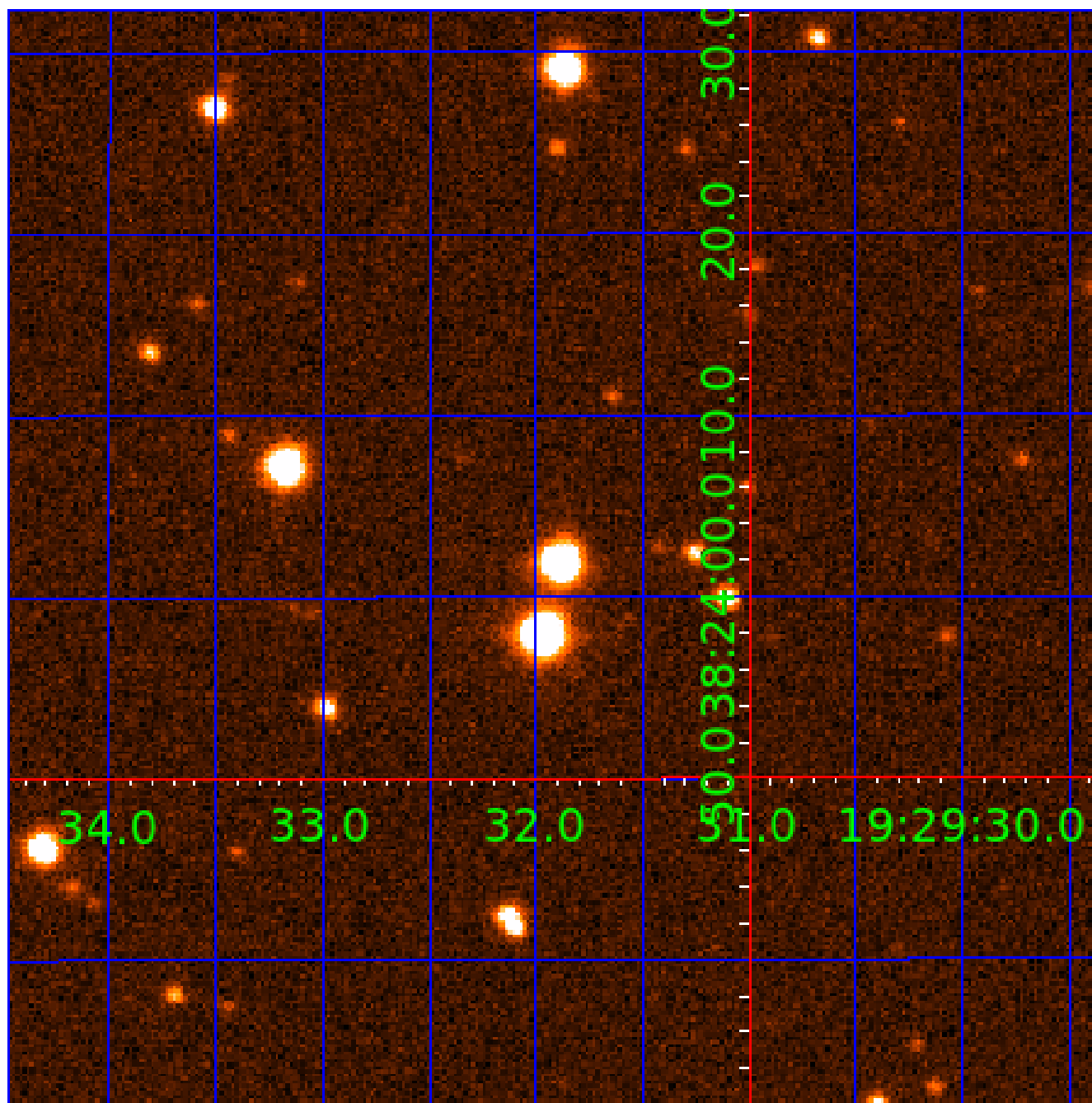


fluxWeightedCentroids, Planet 5 of 6



UKIRT Image

Declination





# KIC 003345973

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
003345973-01	OBS	7652.01	15.346397	143.825241	219.6	5.162	10.7	10.4	2.26	6771	3.94	480.96
003345973-02	OBS	No	1.218657	131.752553	47.4	6.910	8.6	9.1	2.26	6771	1.57	14090.98
003345973-03	OBS	No	83.235609	155.072882	471.3	7.505	19.5	7.0	2.26	6771	5.17	50.47
003345973-04	OBS	No	86.479415	143.283783	341.2	36.687	17.5	6.5	2.26	6771	5.08	47.96
003345973-05	OBS	No	92.144154	216.274303	363.5	17.893	10.0	6.0	2.26	6771	4.96	44.07
003345973-06	OBS	No	100.093604	194.394859	813.2	1.716	8.8	6.7	2.26	6771	6.92	39.47

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
003345973-01	OBS	FP	0.00	0	0	1	0	CENT_RESOLVED_OFFSET—HALO_GHOST
003345973-02	OBS	FP	0.00	1	0	1	0	LPP_DV—CENT_RESOLVED_OFFSET
003345973-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—CENT_KIC_POS
003345973-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS
003345973-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_KIC_POS—CENT_UNCERTAIN
003345973-06	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_TRACKER—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST

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

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

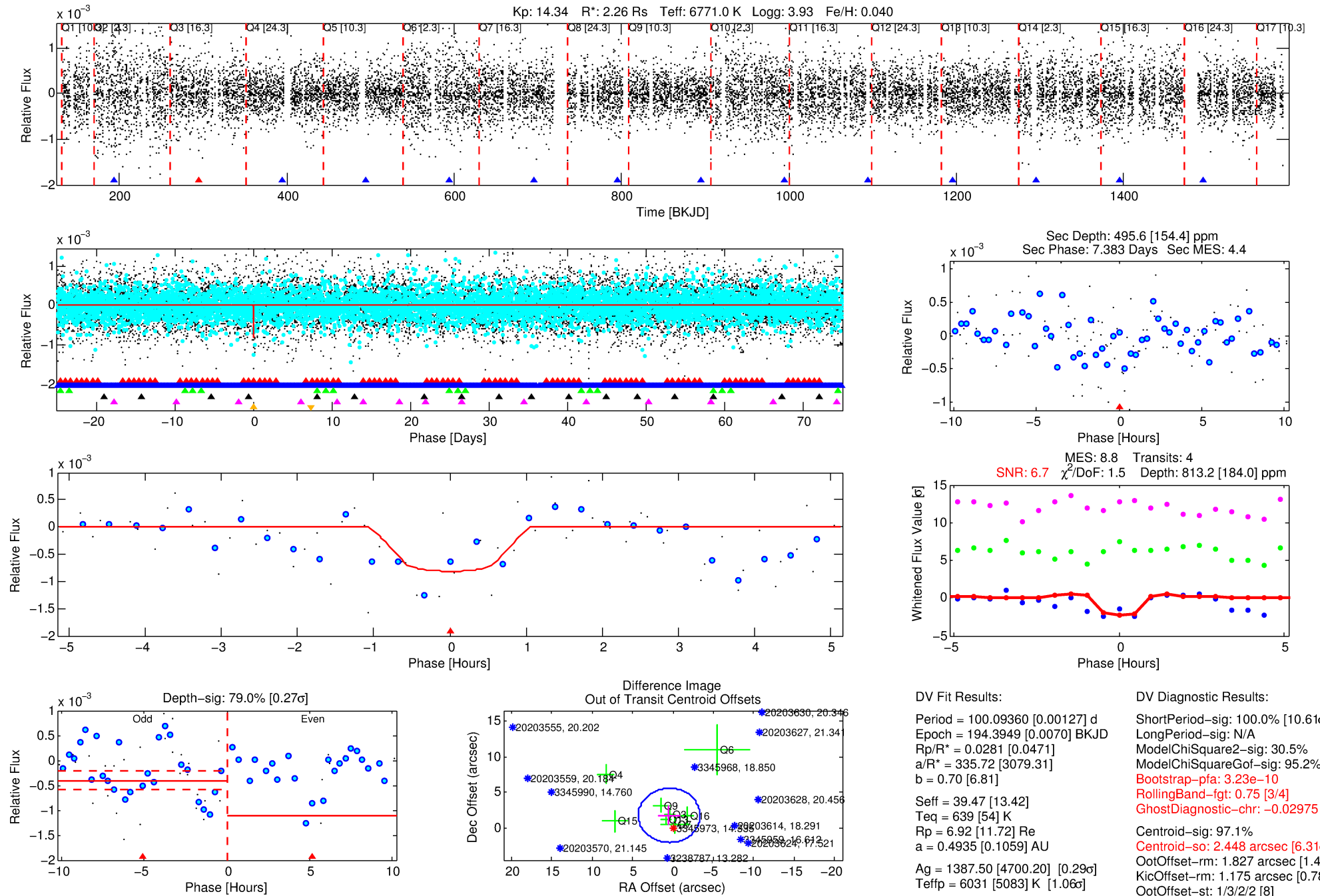
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 003345973-06

No Significant Match Found

# DV One-Page Summary

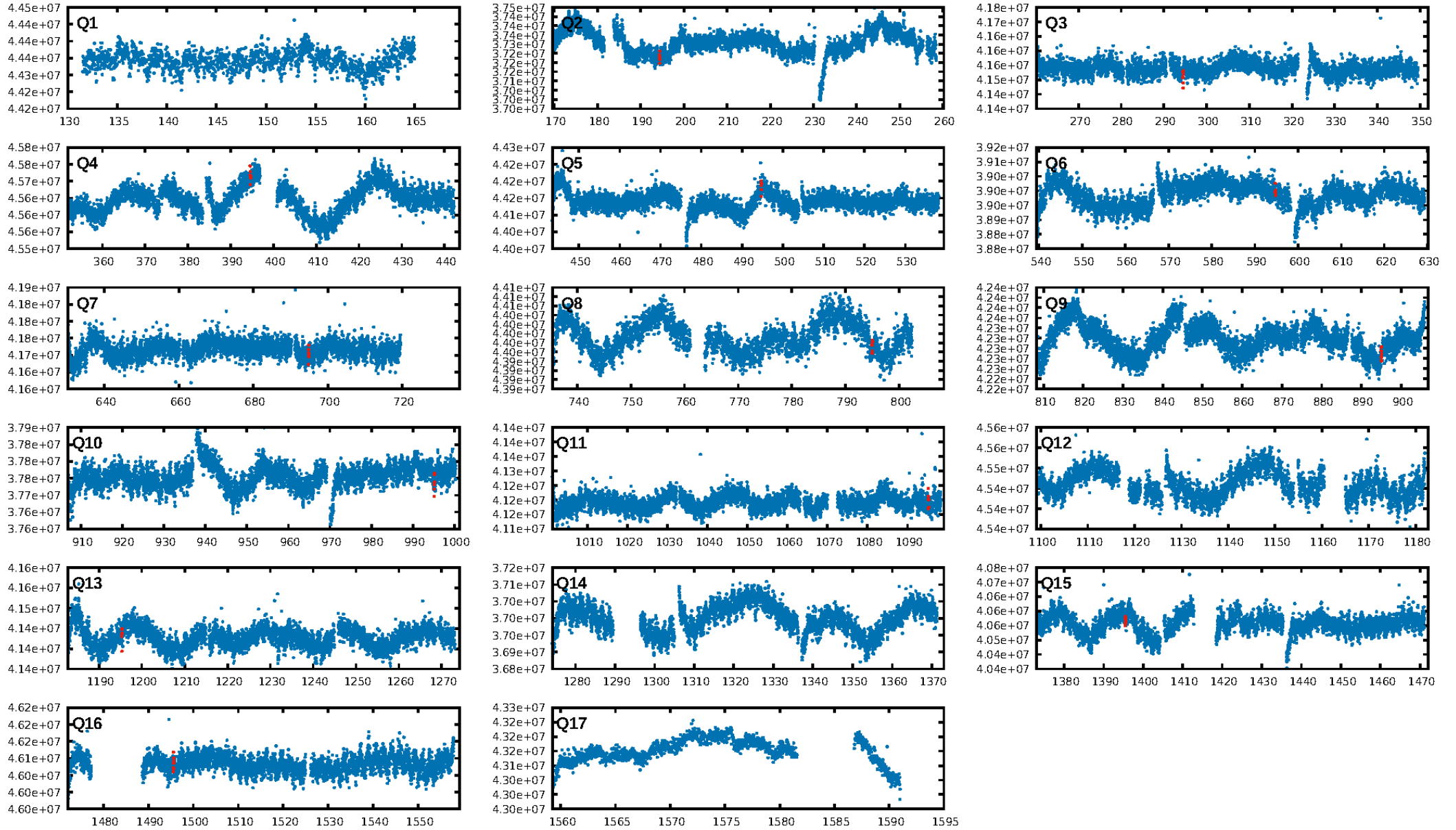
KIC: 3345973 Candidate: 6 of 6 Period: 100.094 d



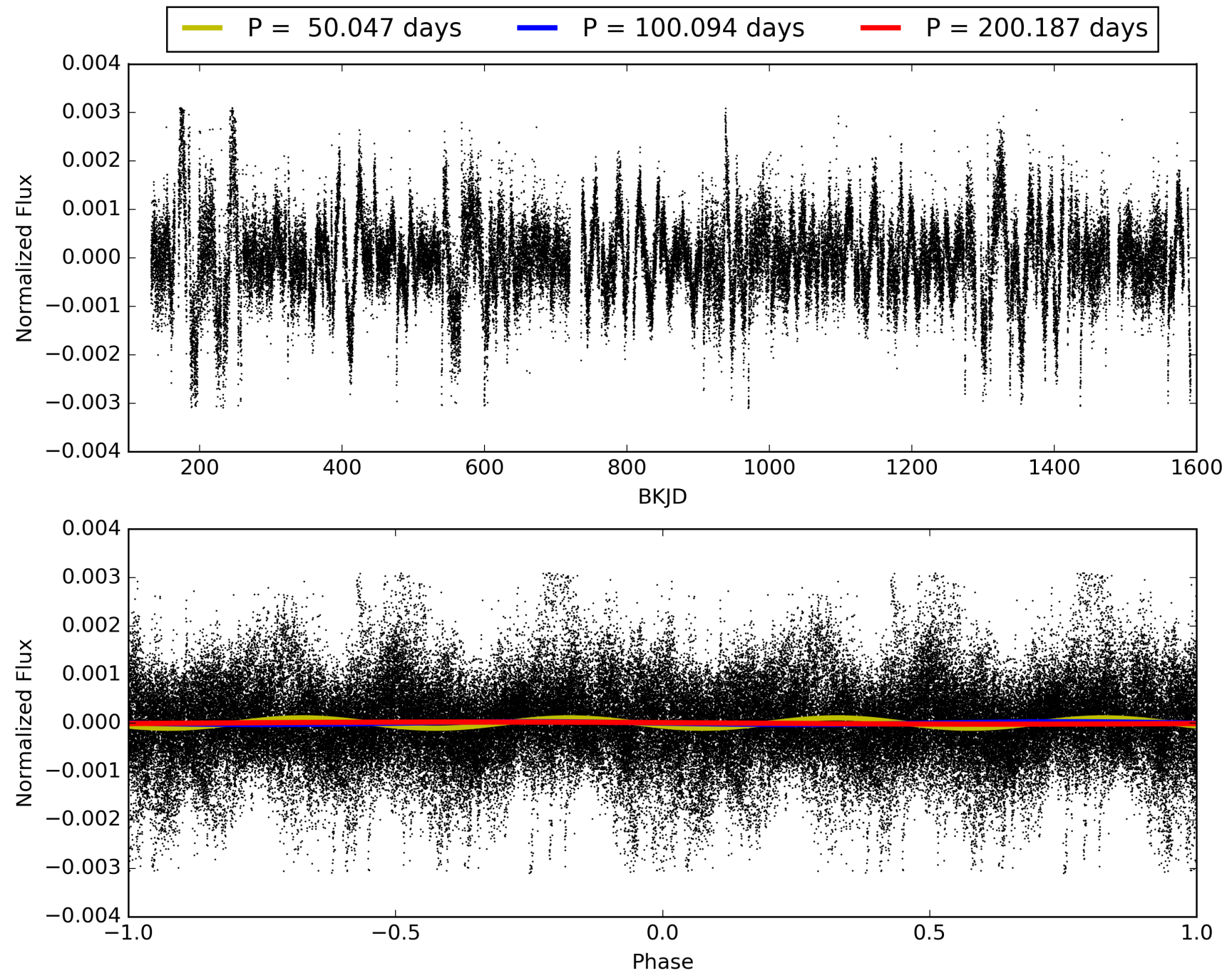
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 21:20:42 Z

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

# TCE 003345973-06, PDC Light Curves

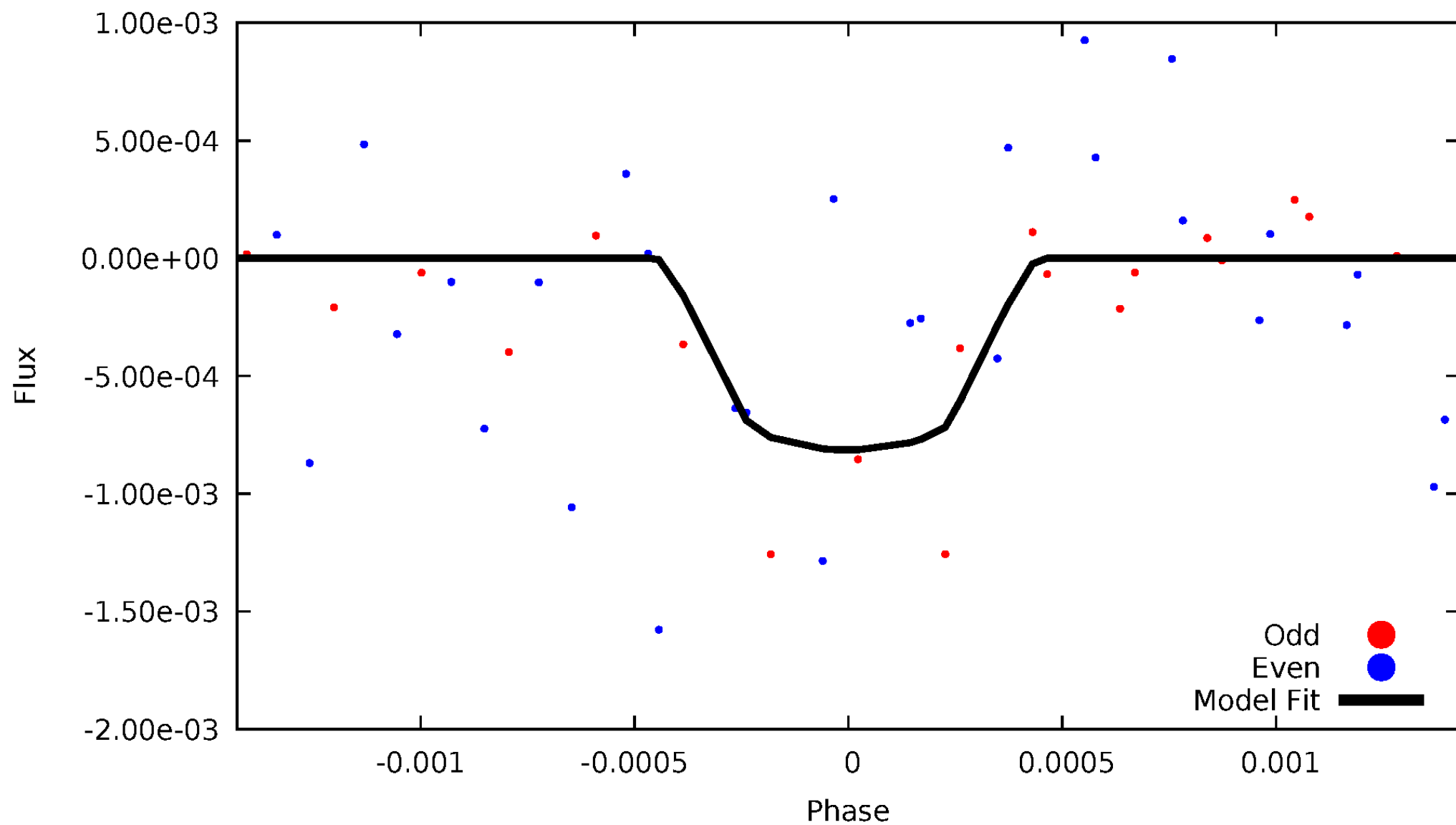


TCE 003345973-06



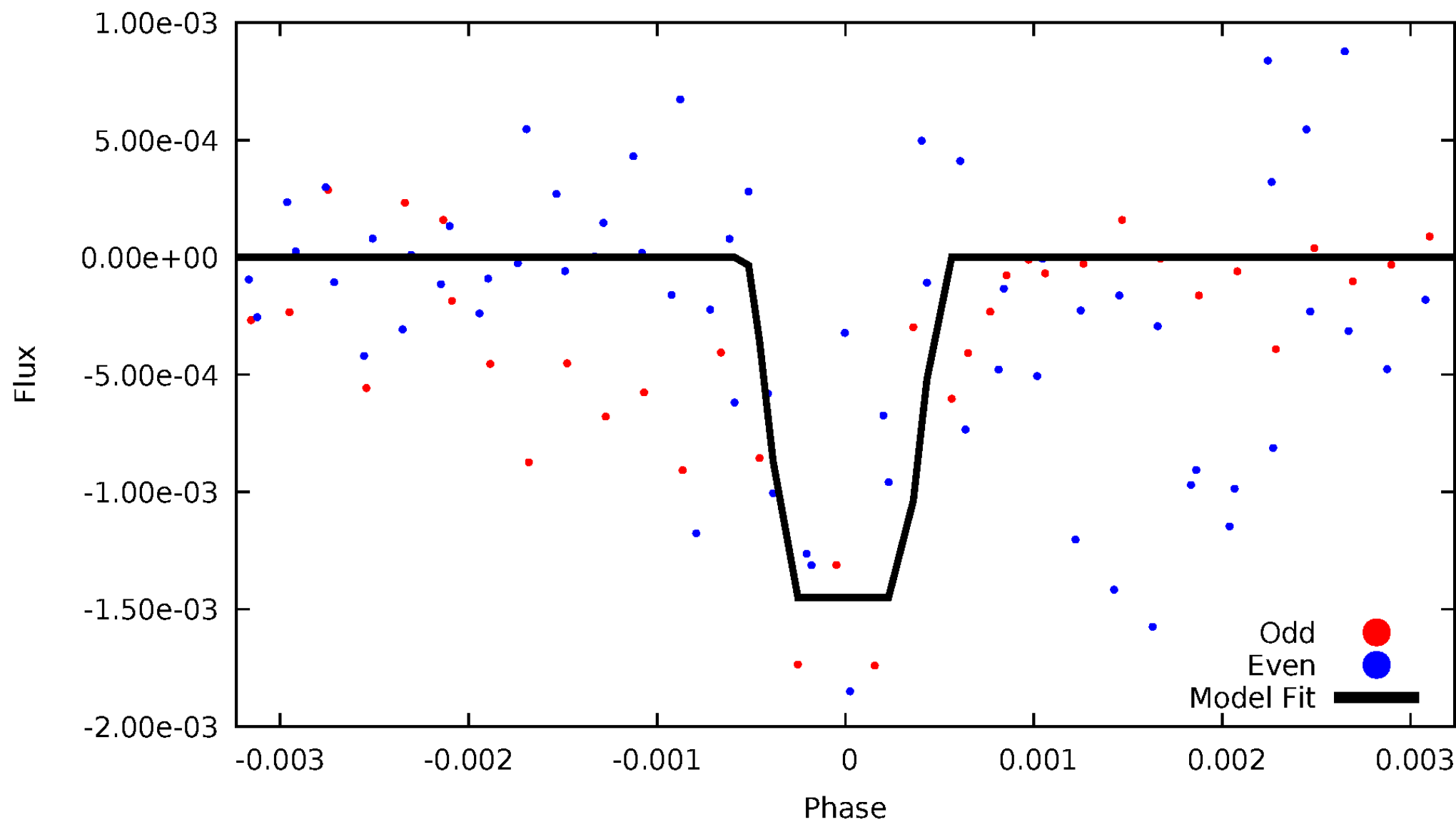
# DV Odd/Even

TCE 003345973-06



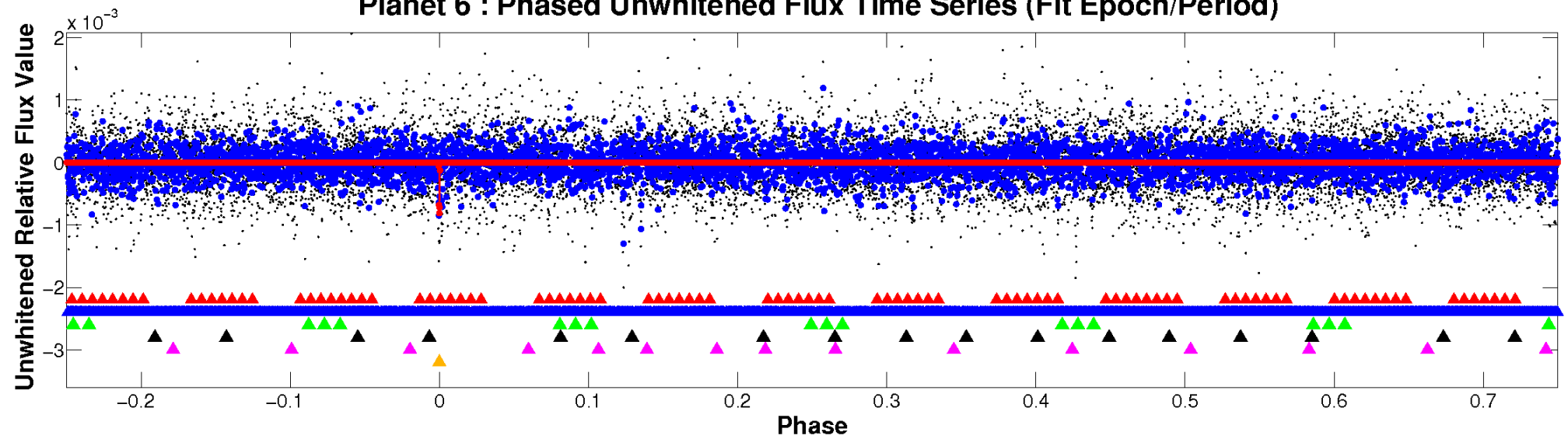
# ALT Odd/Even

TCE 003345973-06

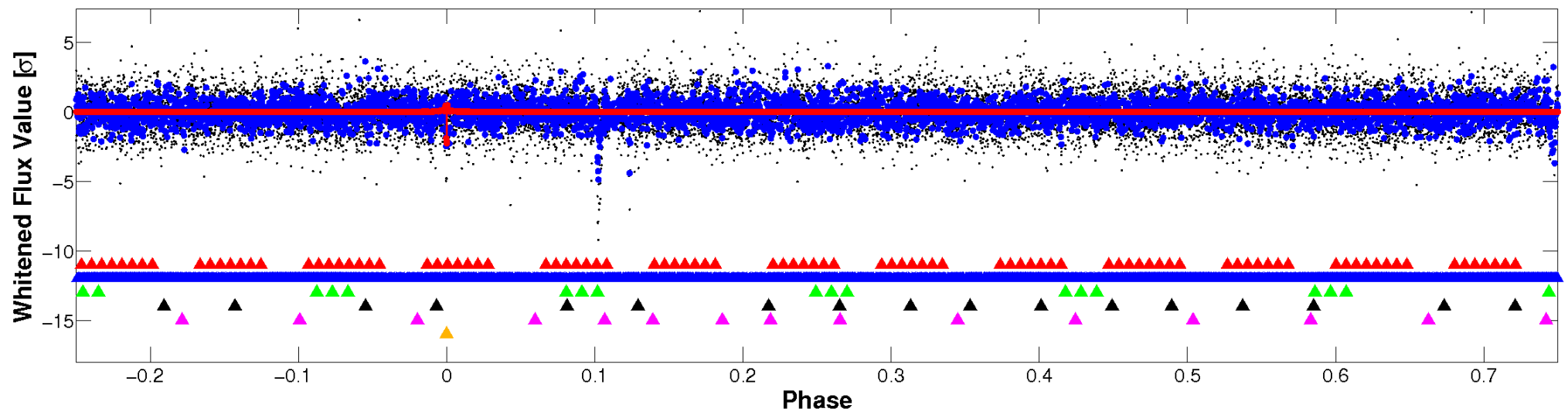


# Non-Whitened Vs. Whitened Light Curve

## Planet 6 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)



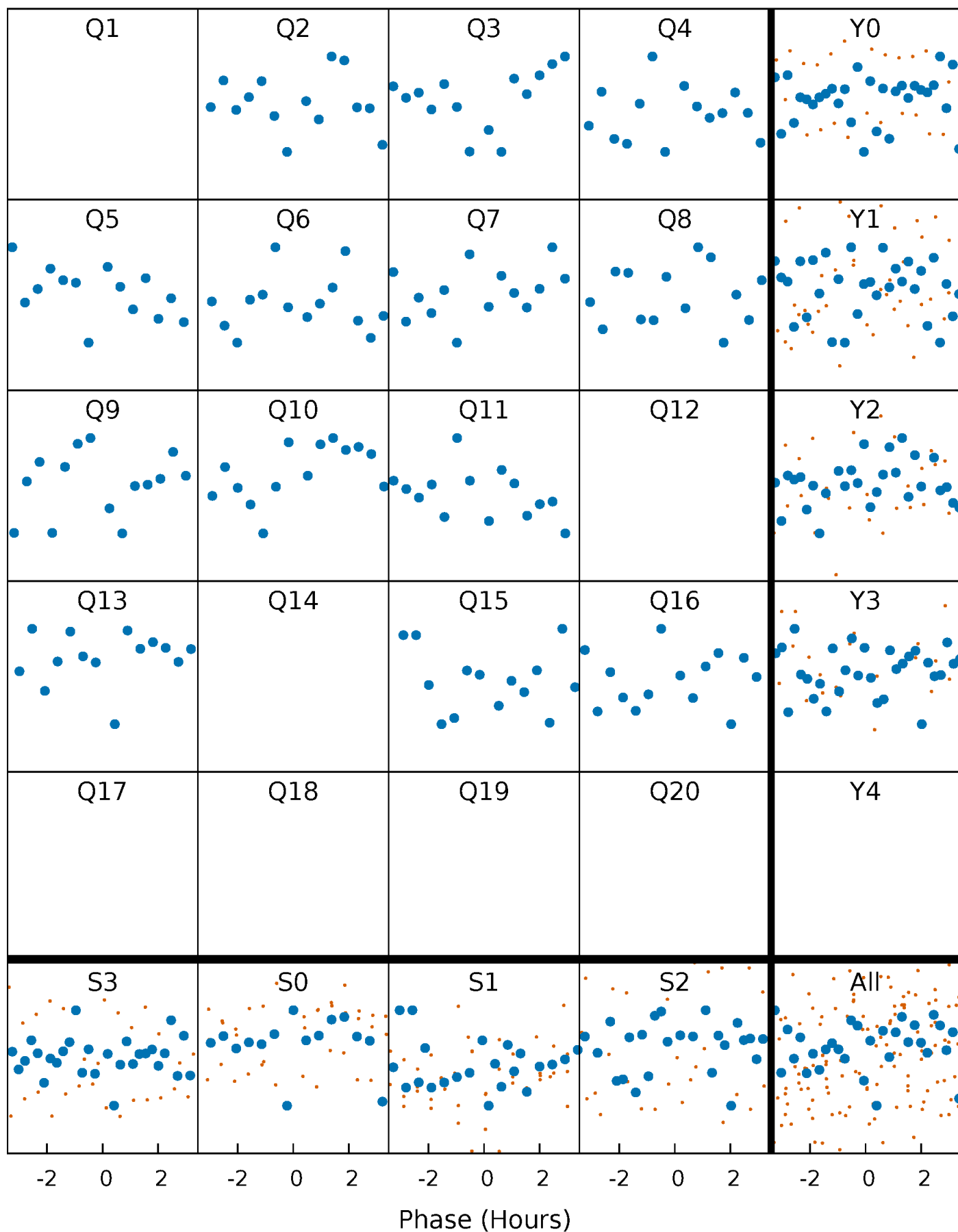
## Planet 6 : Phased Whitened Flux Time Series (Fit Epoch/Period)





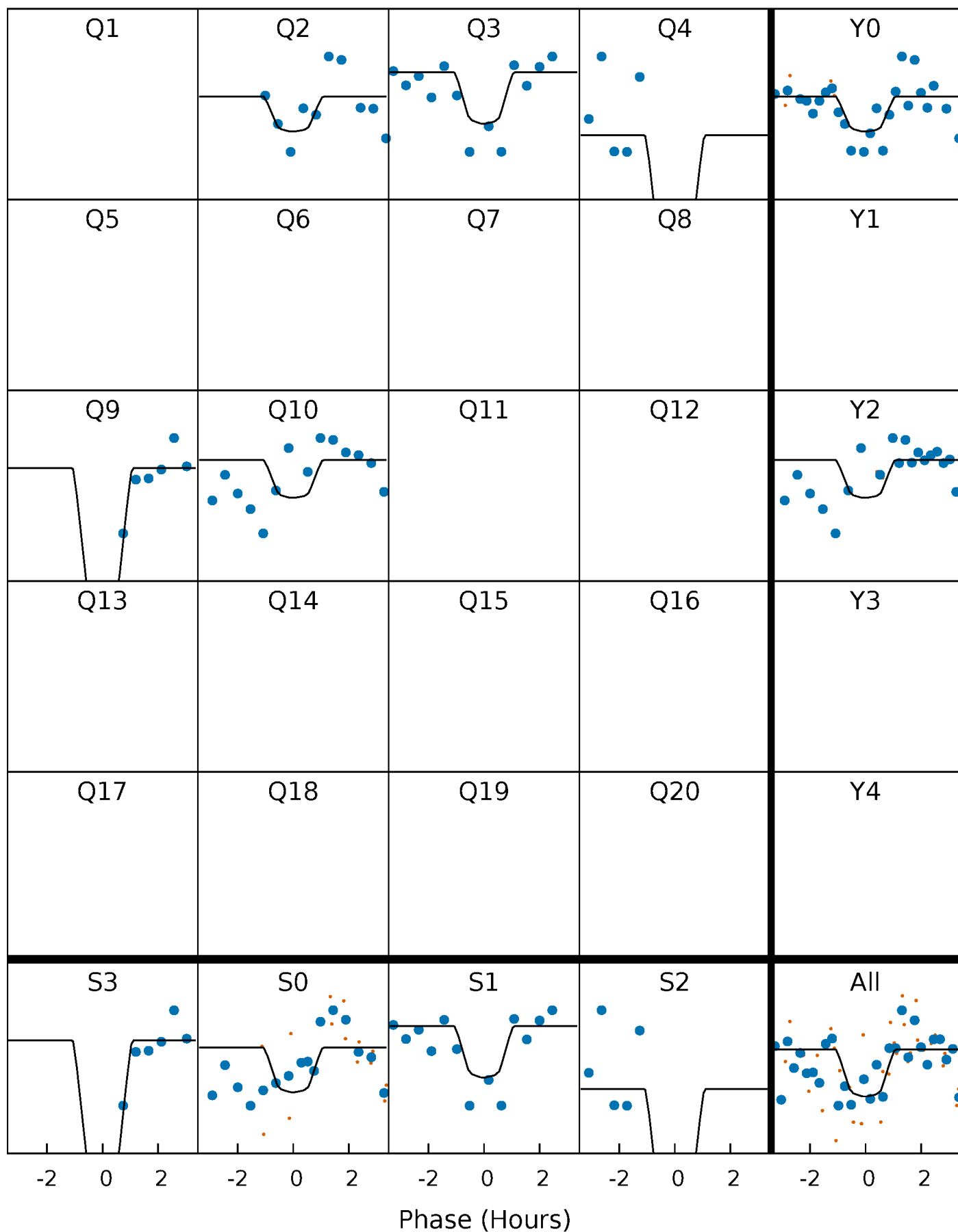
# PDC Quarter-Phased Transit Curves

TCE 003345973-06 P=100.093604 Days  $T_0=194.394859$  (BKJD)



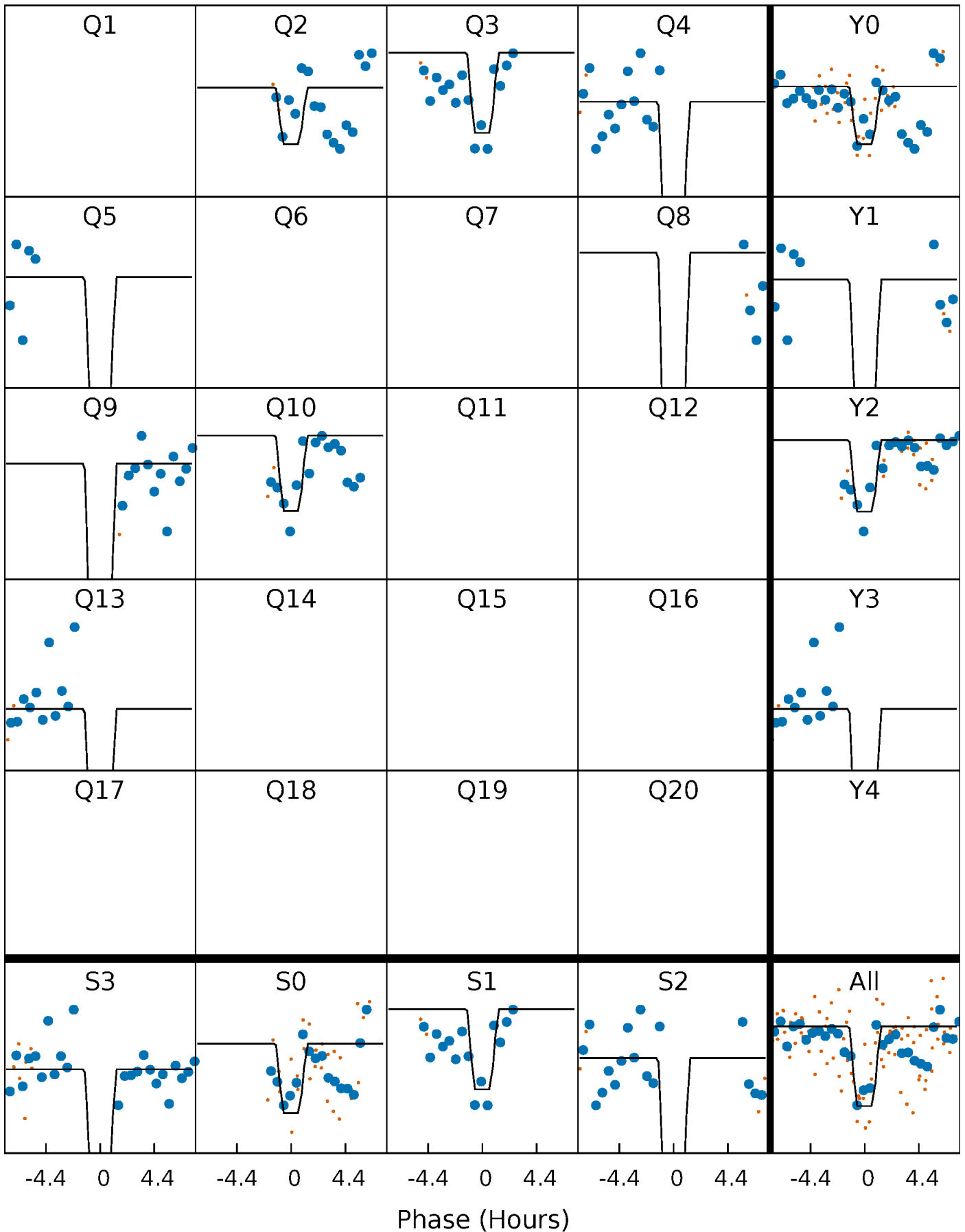
# DV Quarter-Phased Transit Curves

TCE 003345973-06 P=100.093604 Days  $T_0=194.394859$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

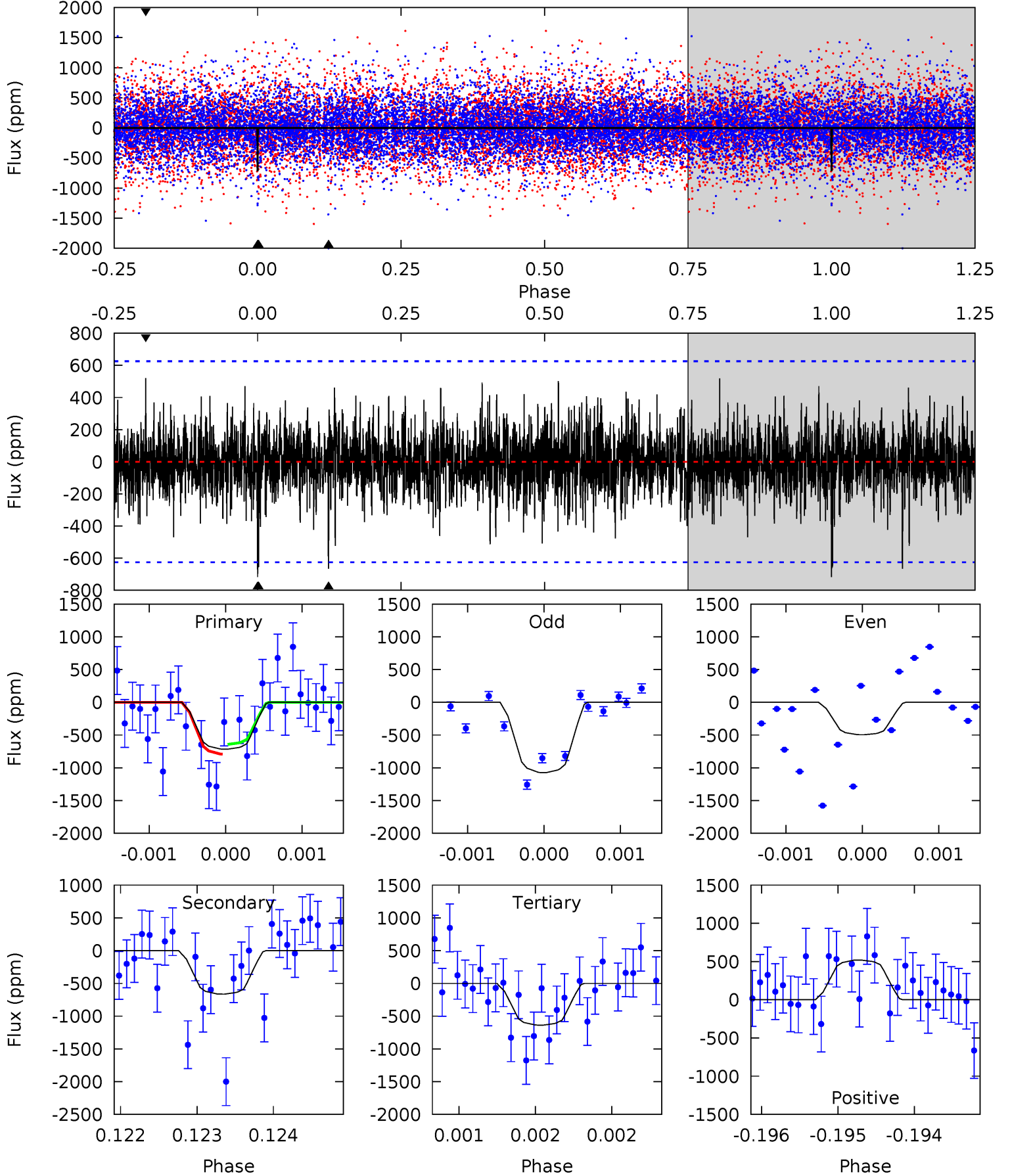
TCE 003345973-06 P=100.085915 Days  $T_0=194.409609$  (BKJD)



# DV Model-Shift Uniqueness Test

003345973-06,  $P = 100.093604$  Days,  $E = 94.301255$  Days

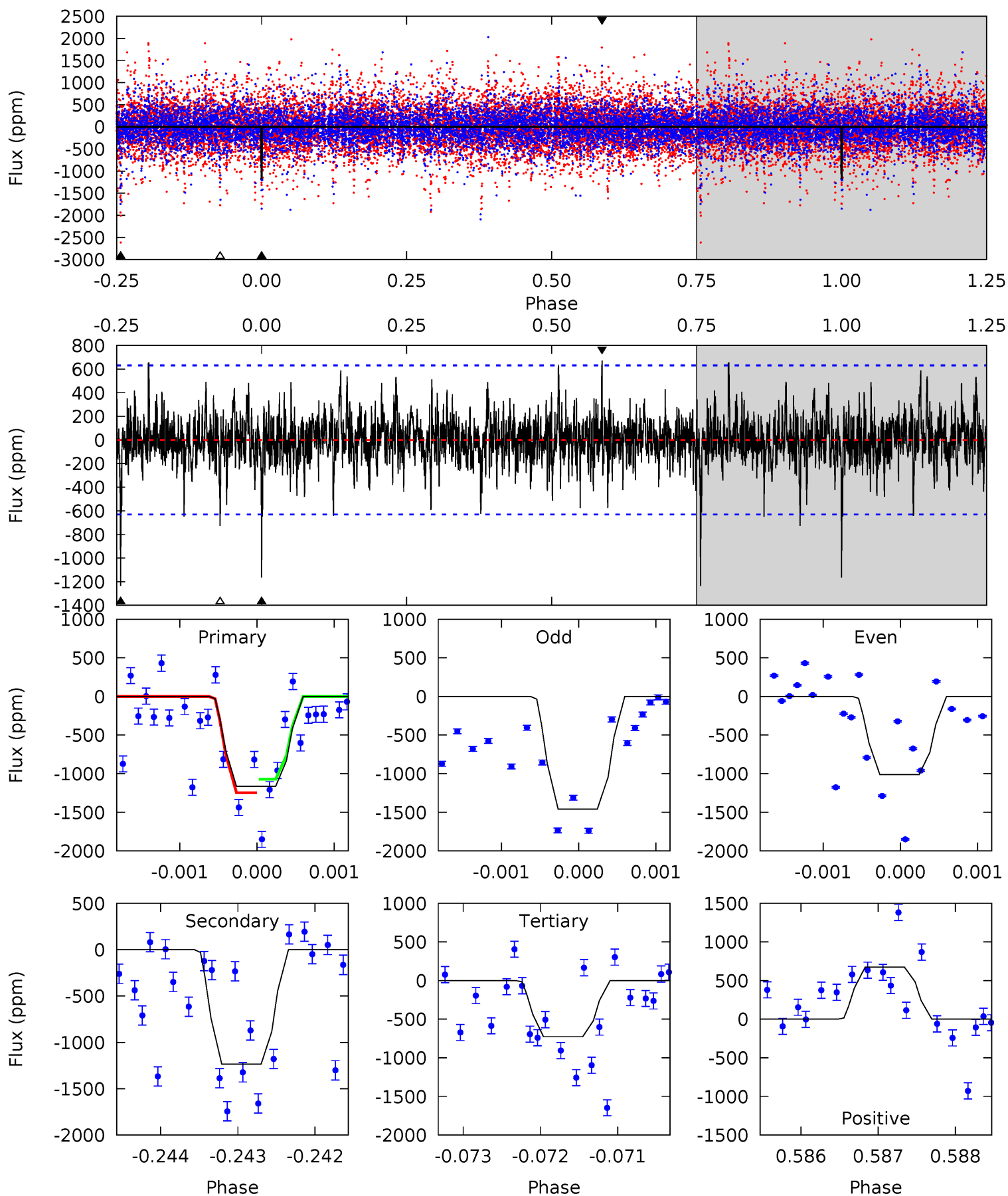
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
6.28	5.83	5.60	4.56	5.49	3.35	1.24	0.69	1.73	0.23	1.27	2.43	0.87	0.42	0.65



# Alt Model-Shift Uniqueness Test

003345973-06, P = 100.085915 Days, E = 94.323694 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
10.1	10.7	6.27	5.82	5.46	3.31	1.40	3.80	4.25	4.42	4.87	1.84	0.85	0.35	0.75



### Stellar Parameters For KIC 003345973

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6771^{+81}_{-81}$	$3.934^{+0.195}_{-0.120}$	$0.040^{+0.150}_{-0.150}$	$2.259^{+0.426}_{-0.521}$	$1.597^{+0.131}_{-0.180}$	$0.195^{+0.199}_{-0.074}$
	+1%/-1%	+5%/-3%	+375%/-375%	+19%/-23%	+8%/-11%	+102%/-38%
Source	SPE68	SPE68	SPE68	DSEP		

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

### Secondary Eclipse Parameters for KIC 003345973-06 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-664 \pm 114$	$10.57^{+10.14}_{-6.93}$	$888^{+49}_{-53}$	$5167^{+4141}_{-1176}$	$797^{+5750}_{-595}$
Alt.	$-1236 \pm 116$	$11.91^{+9.68}_{-7.46}$	$892^{+43}_{-51}$	$5670^{+4435}_{-1251}$	$1147^{+7207}_{-799}$

$T_{max}$  = 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

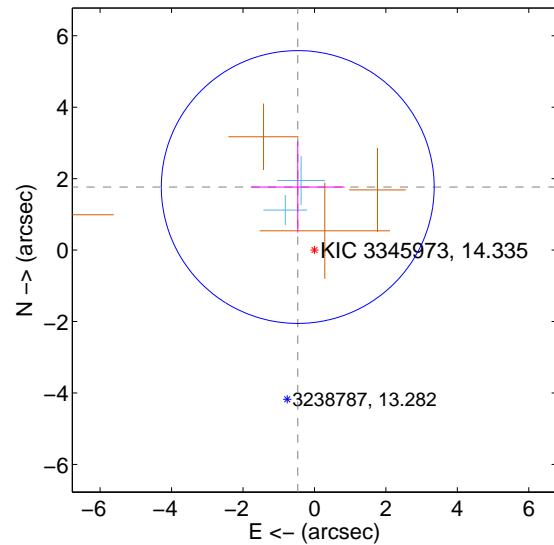
Supplemental centroid analysis for 003345973-06. Kepler magnitude: 14.34. Transit SNR 6.66

There are 2 quarters with good PRF difference image offsets

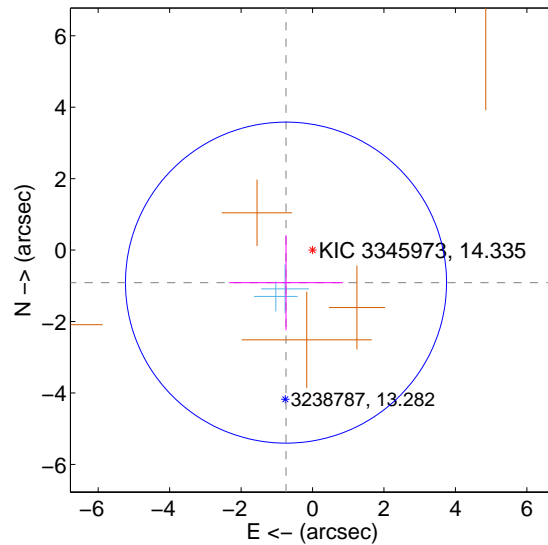
The OOT PRF centroid is offset from the target star catalog position by about 3.33 arcsec so the offset from difference PRF-fit to OOT-fit may be invalid.

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.827 \pm 1.273$	1.44	$0.467 \pm 1.312$	$1.766 \pm 1.278$
PRF-fit source offset from KIC position	$1.175 \pm 1.498$	0.78	$0.742 \pm 1.593$	$-0.911 \pm 1.328$
photometric centroid source offset	$2.45 \pm 0.39$	6.31	$0.34 \pm 0.31$	$-2.42 \pm 0.39$

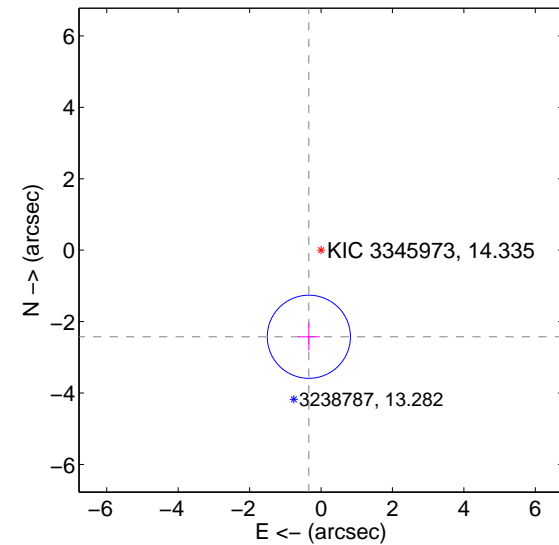
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position



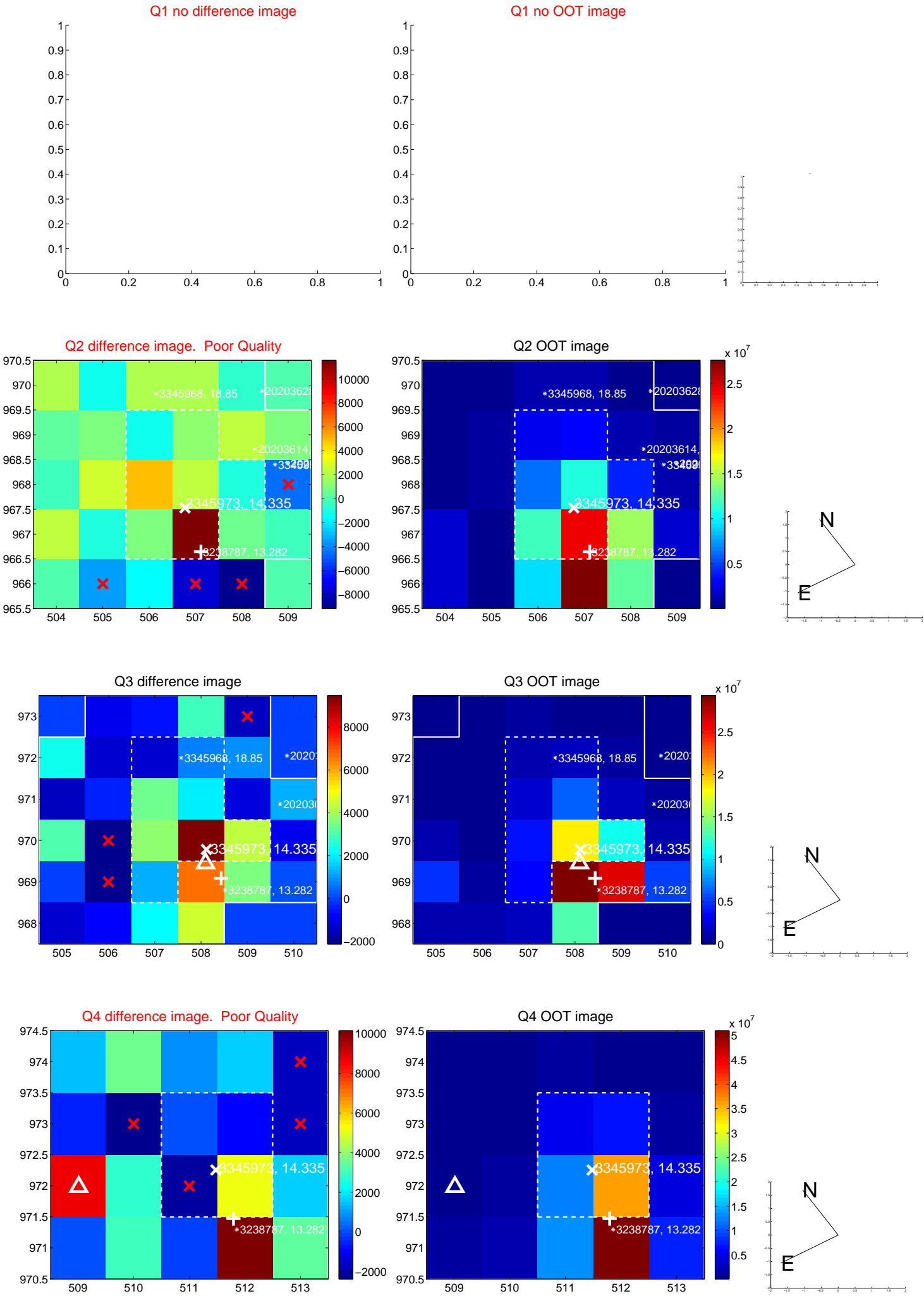
offset from photometric centroids



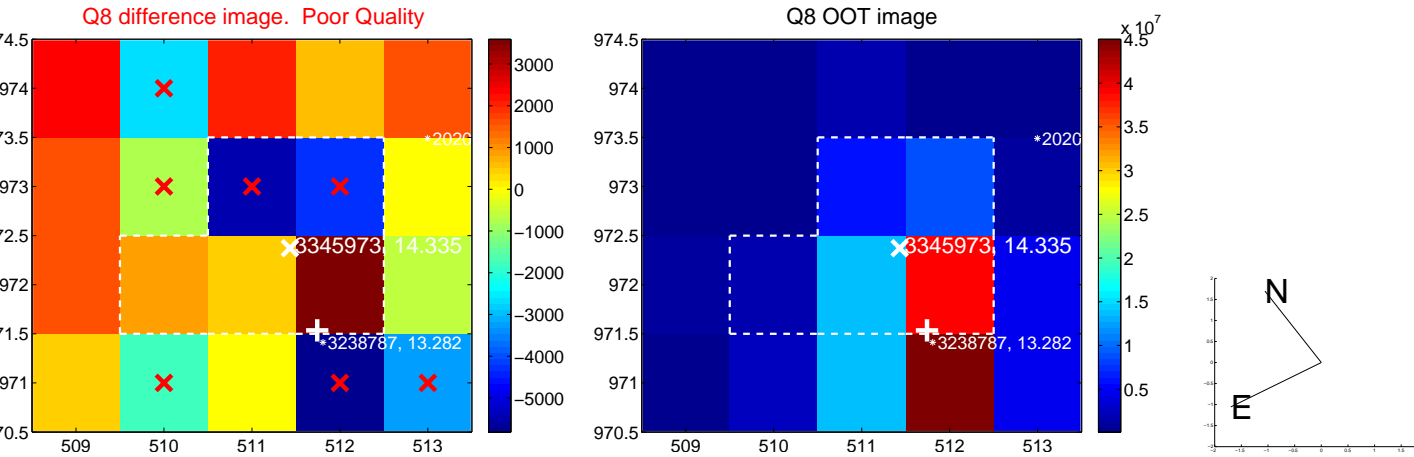
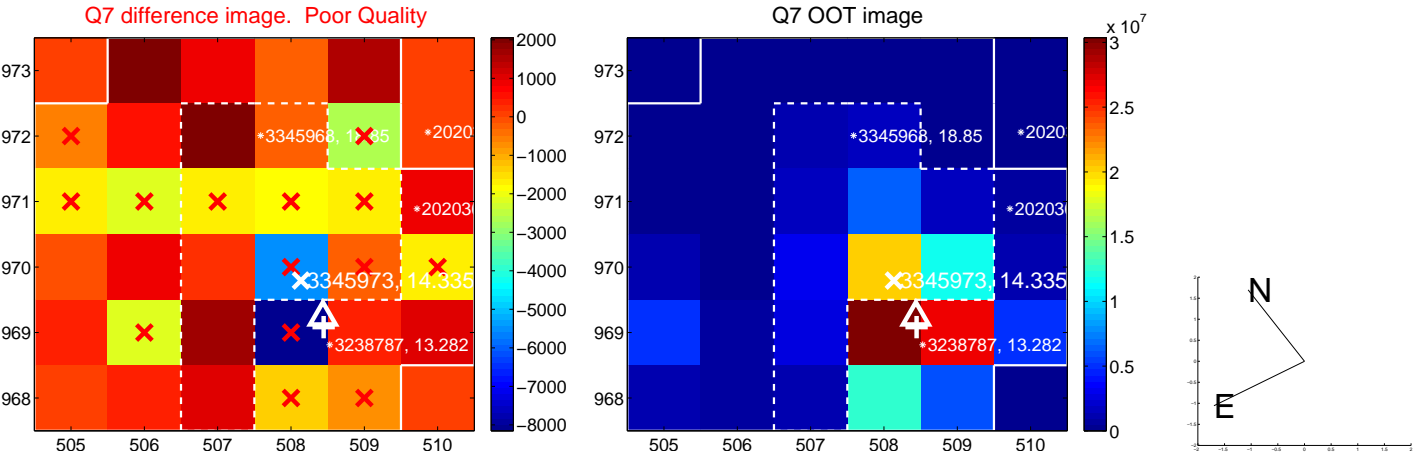
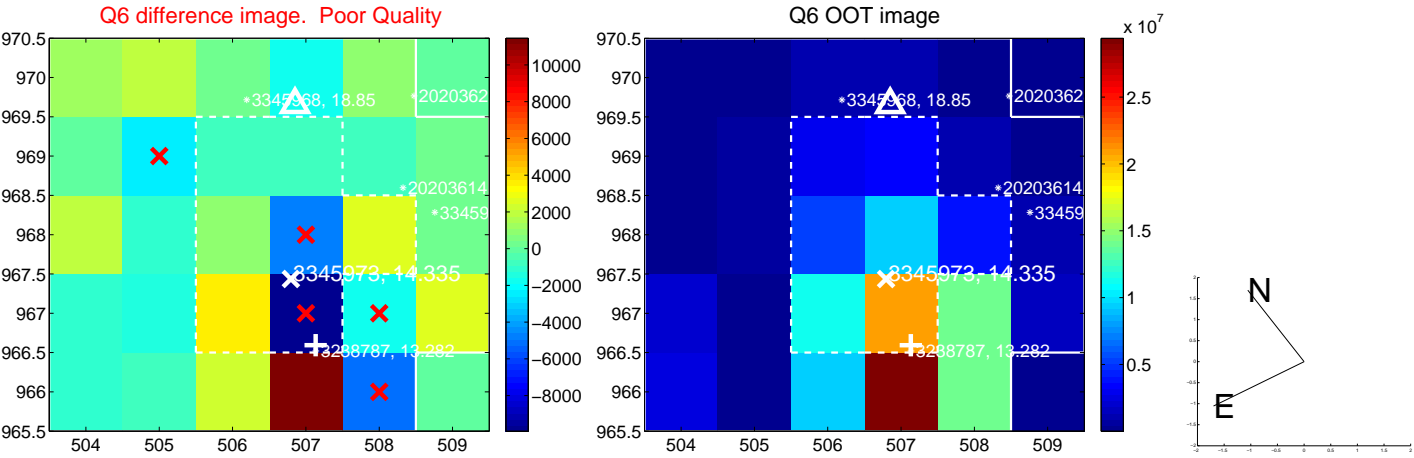
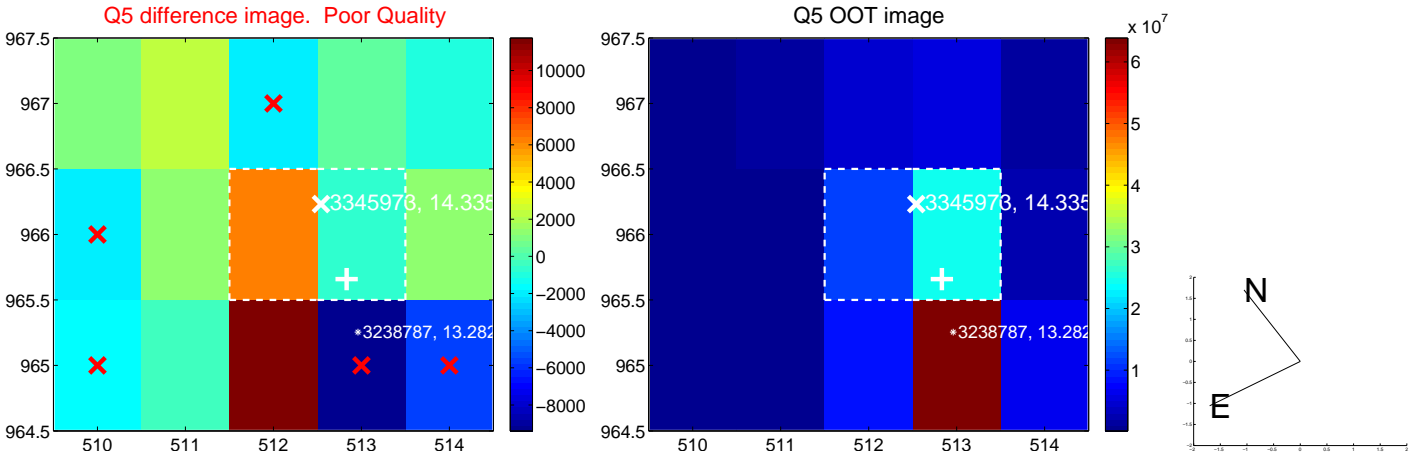
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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



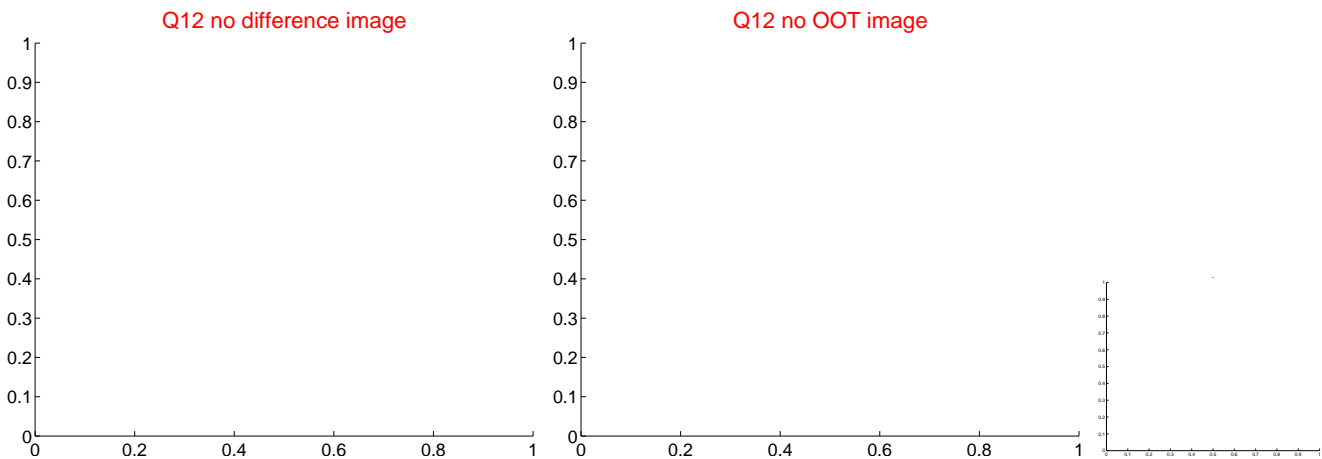
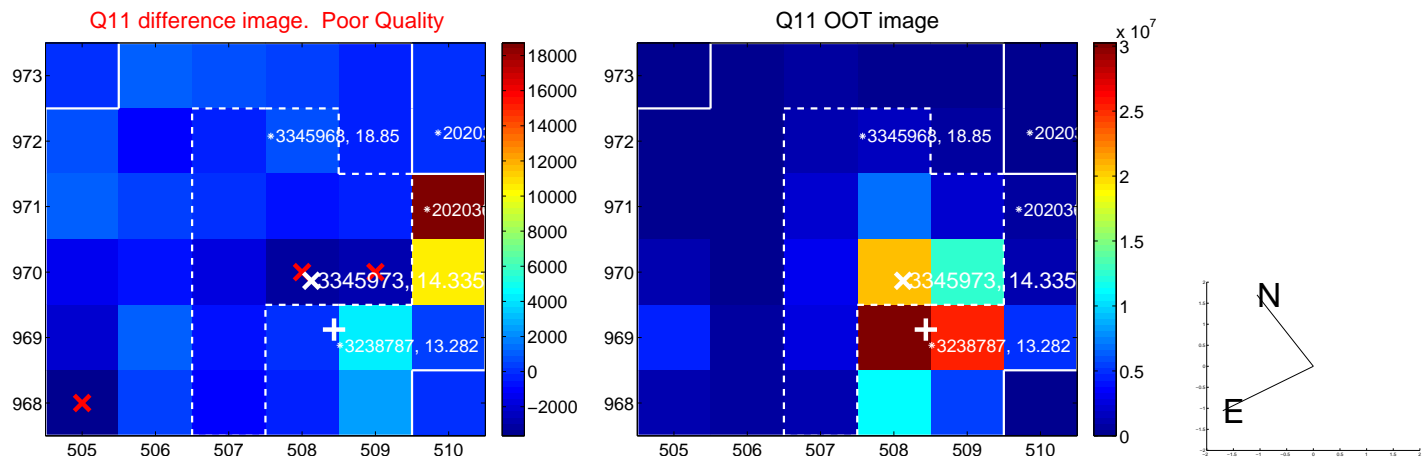
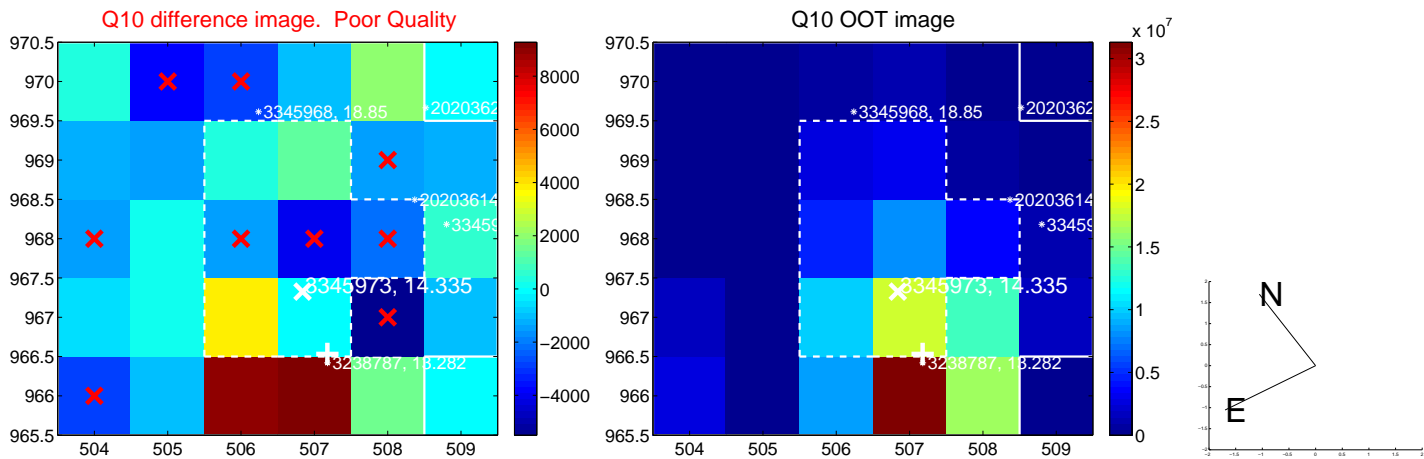
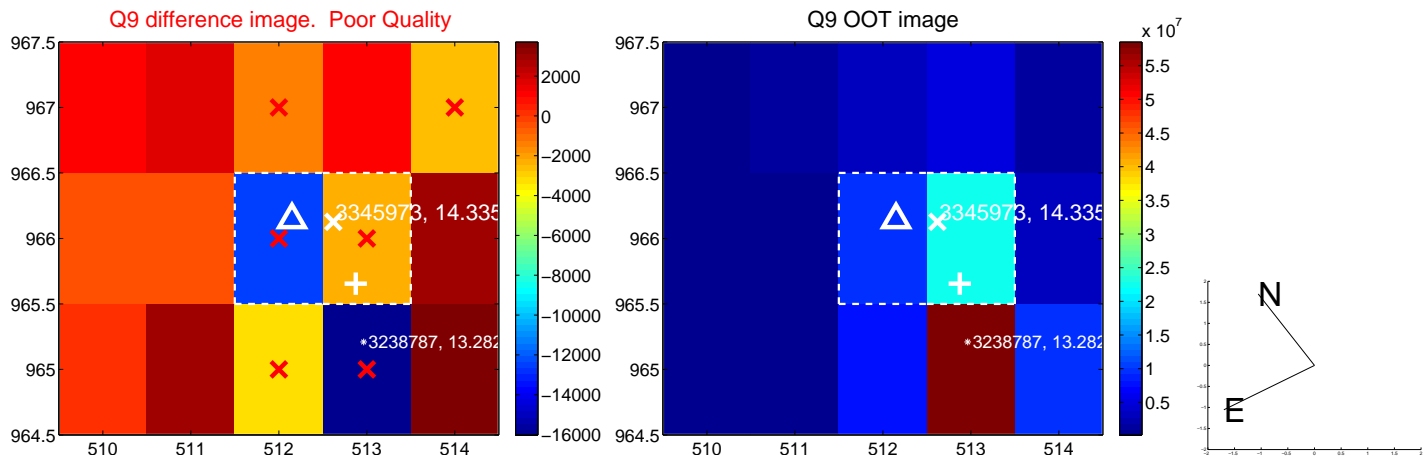
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



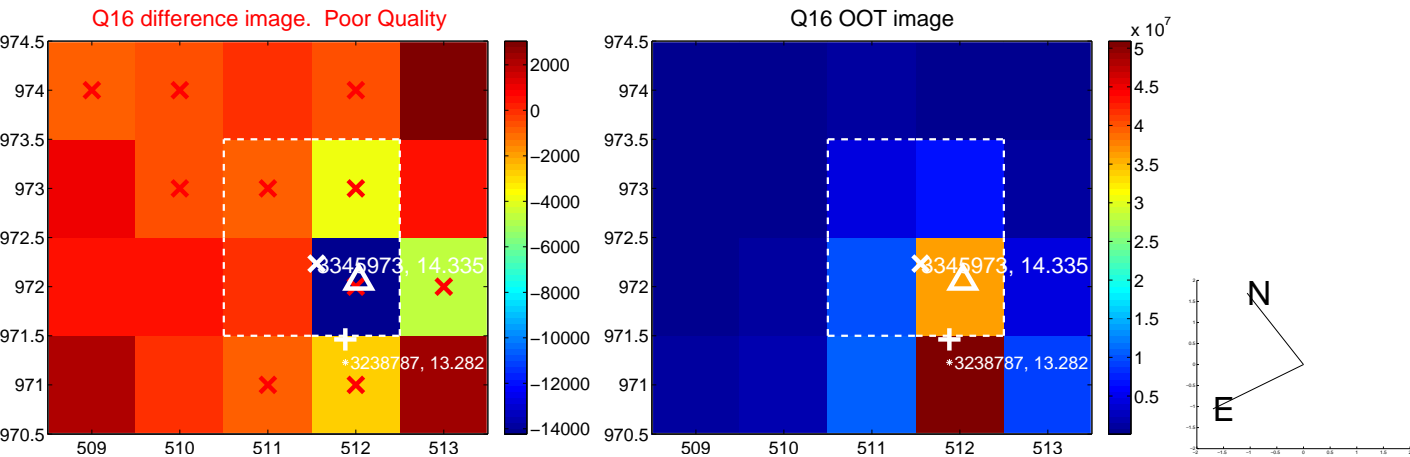
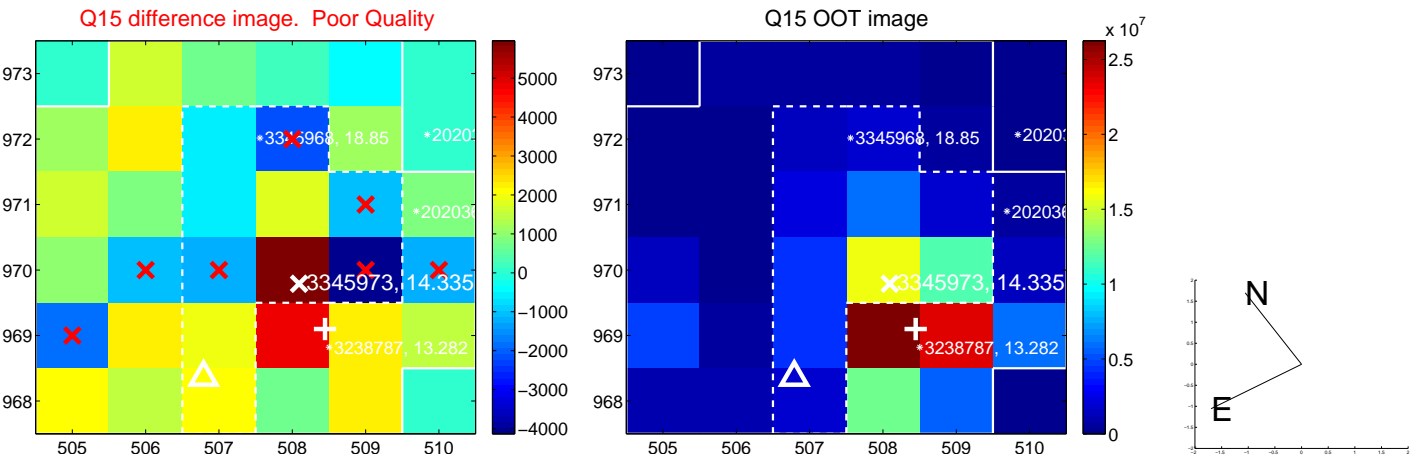
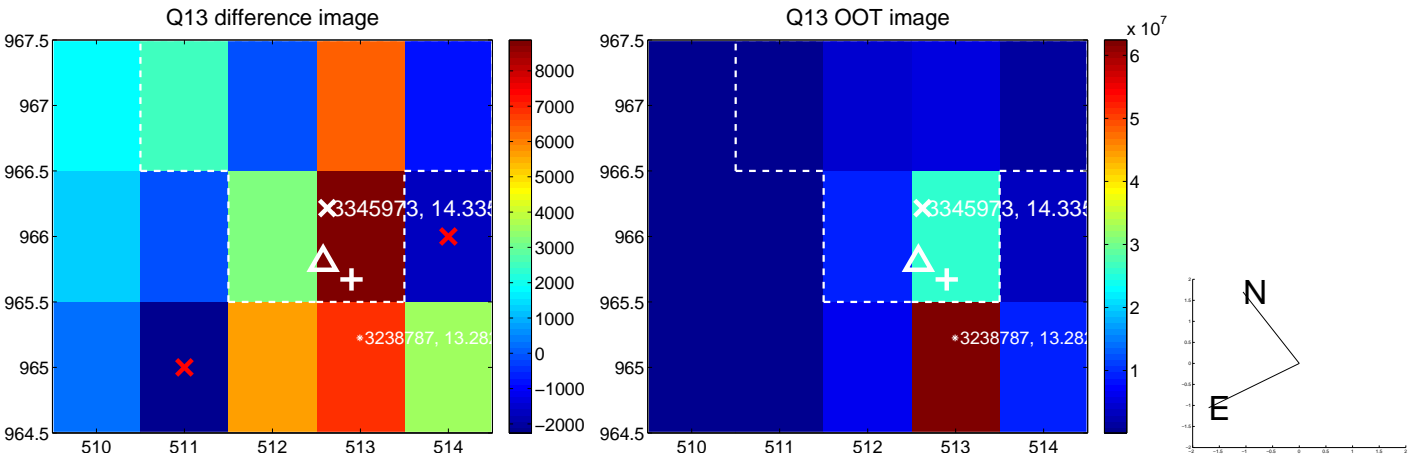
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



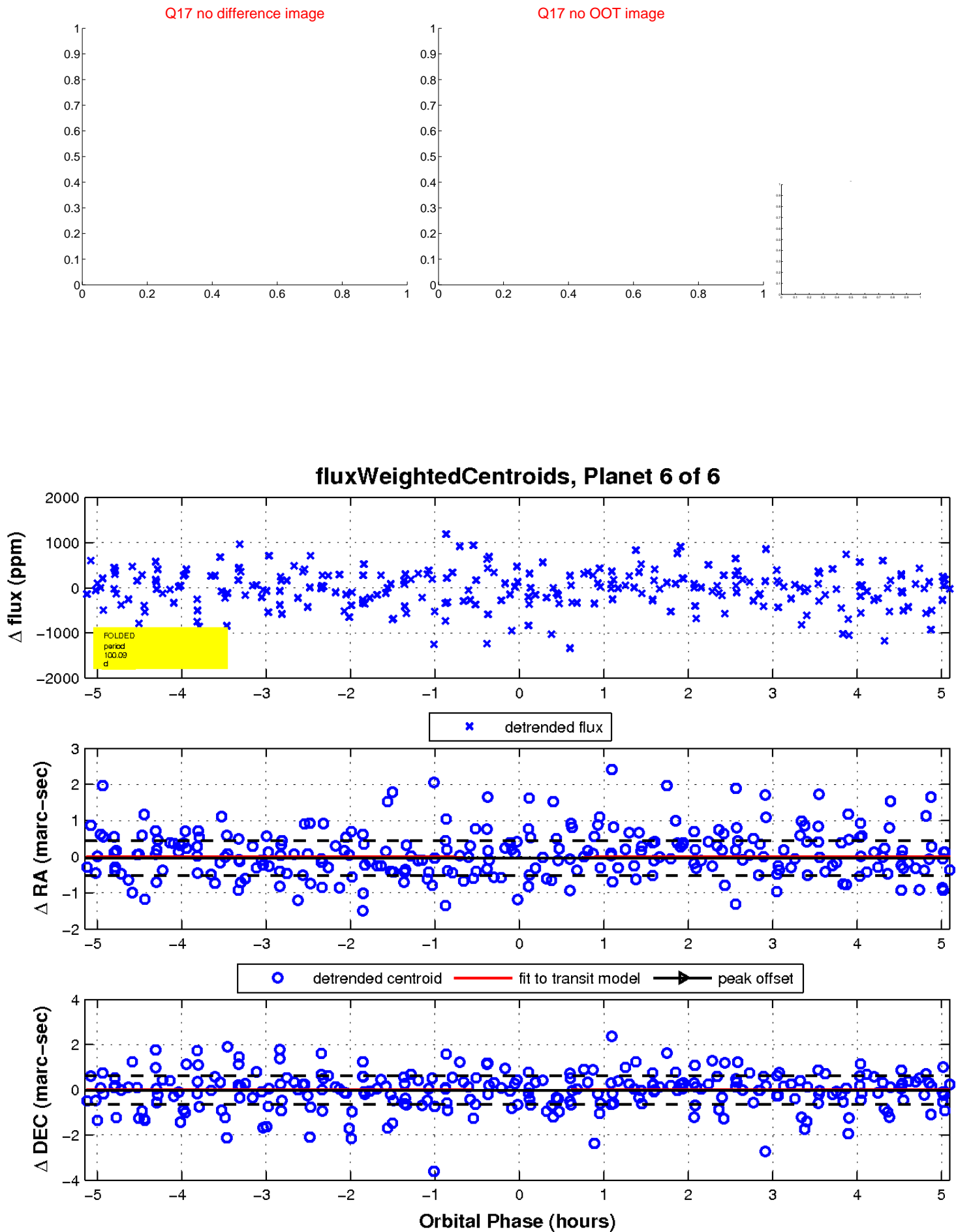
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



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



UKIRT Image

Declination

