

# KIC 003747373

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
003747373-01	OBS	No	1.185707	131.983319	26.7	8.573	9.4	10.9	3.01	7351	1.58	33216.54
003747373-02	OBS	No	27.080771	143.707222	376.6	1.189	11.5	10.3	3.01	7351	5.99	512.60
003747373-03	OBS	No	16.498008	143.280157	244.8	2.178	9.9	9.8	3.01	7351	5.26	992.54
003747373-04	OBS	No	26.345693	139.797733	274.8	2.693	9.9	9.5	3.01	7351	5.06	531.75

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
003747373-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT
003747373-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV
003747373-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
003747373-04	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

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

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

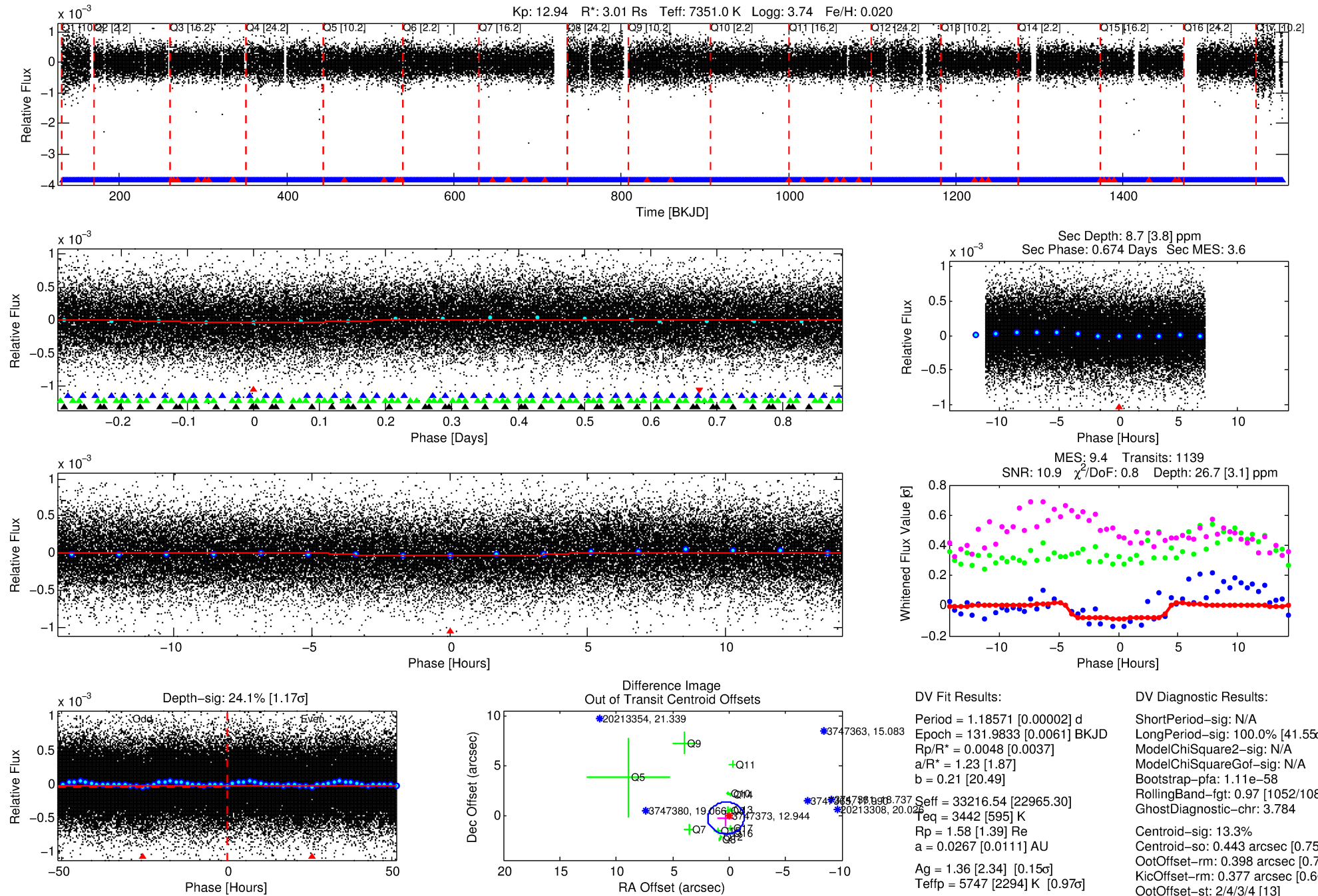
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 003747373-01

No Significant Match Found

# DV One-Page Summary

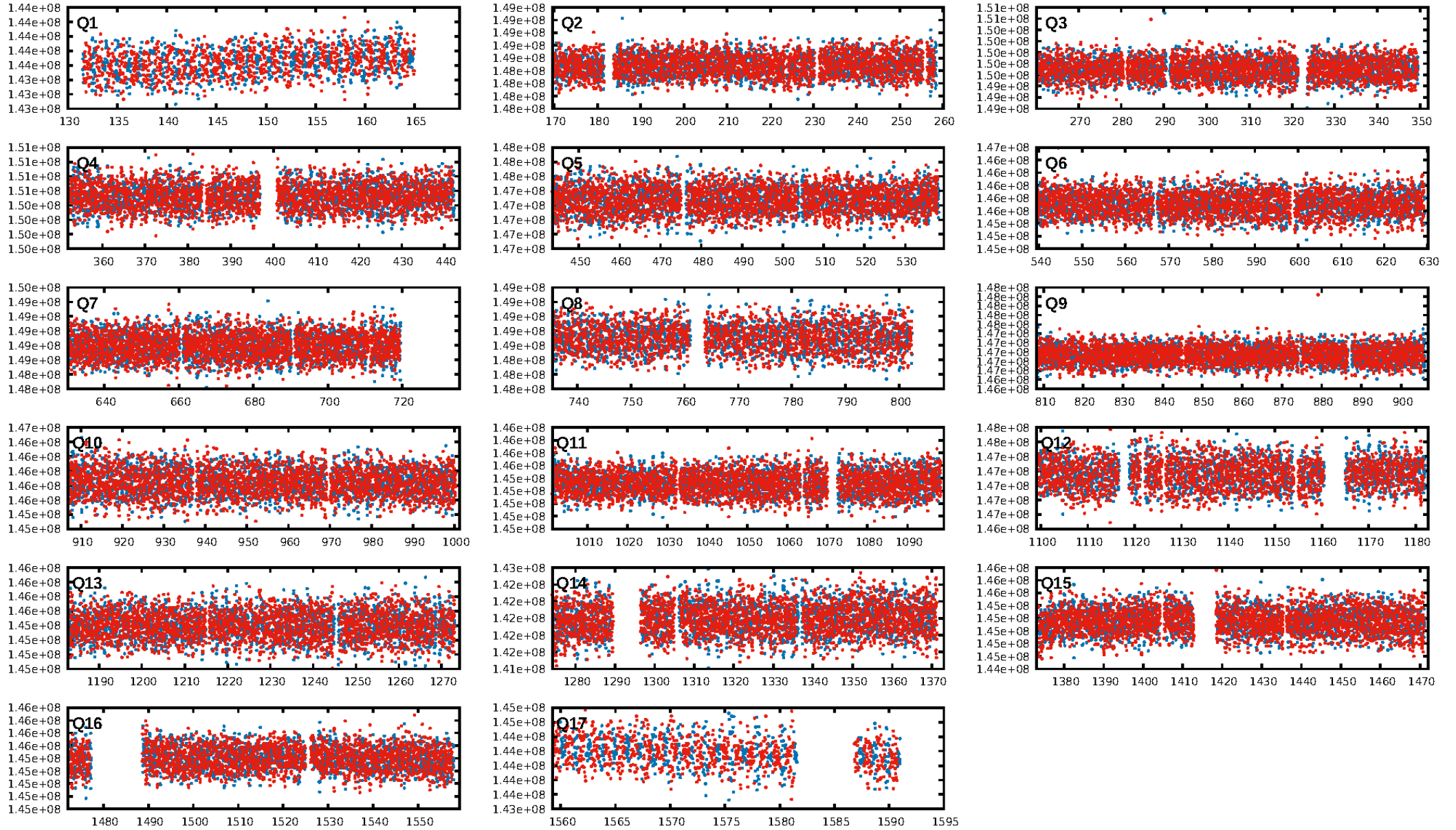
KIC: 3747373 Candidate: 1 of 4 Period: 1.186 d



Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 19:47:29 Z

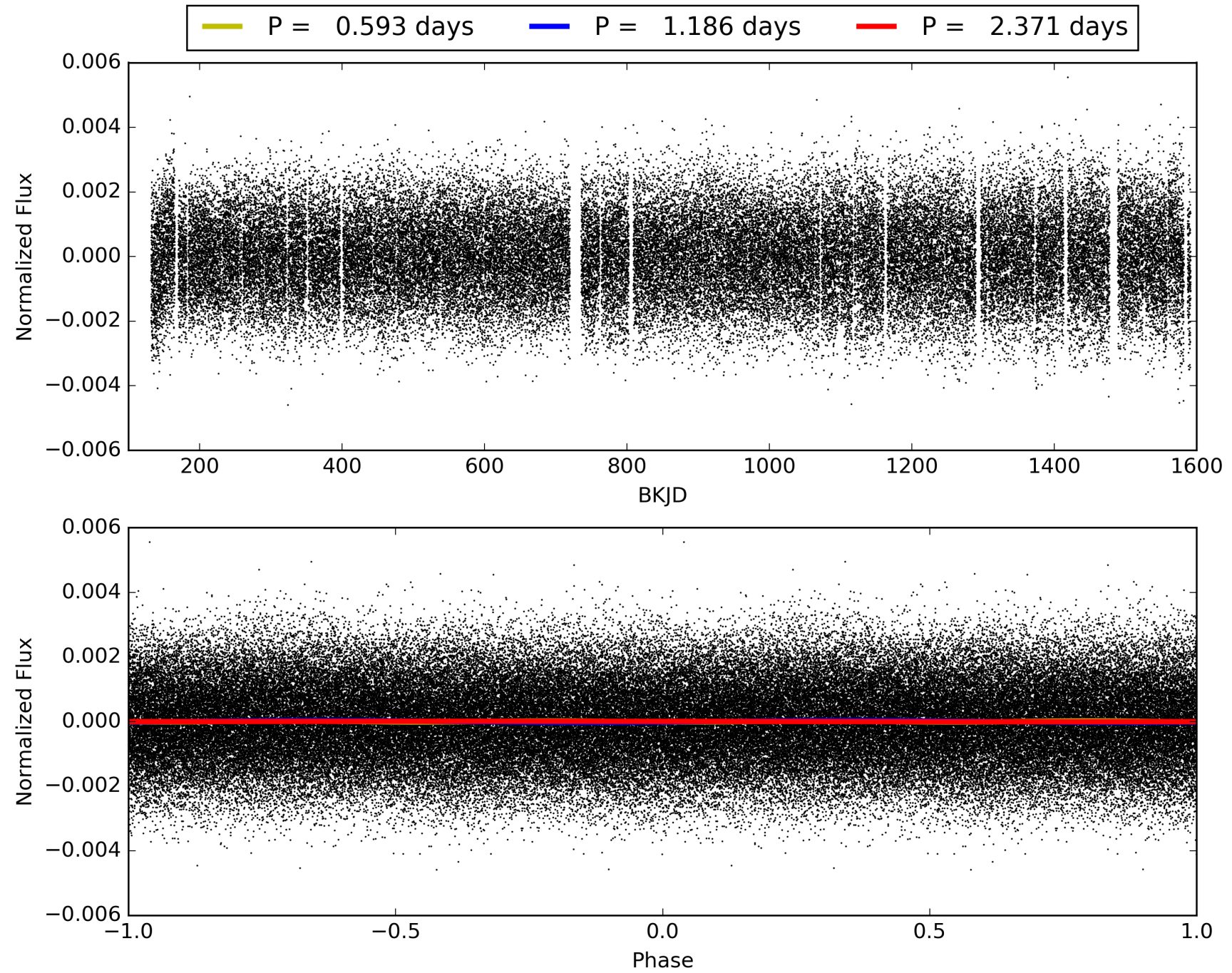
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 003747373-01, PDC Light Curves





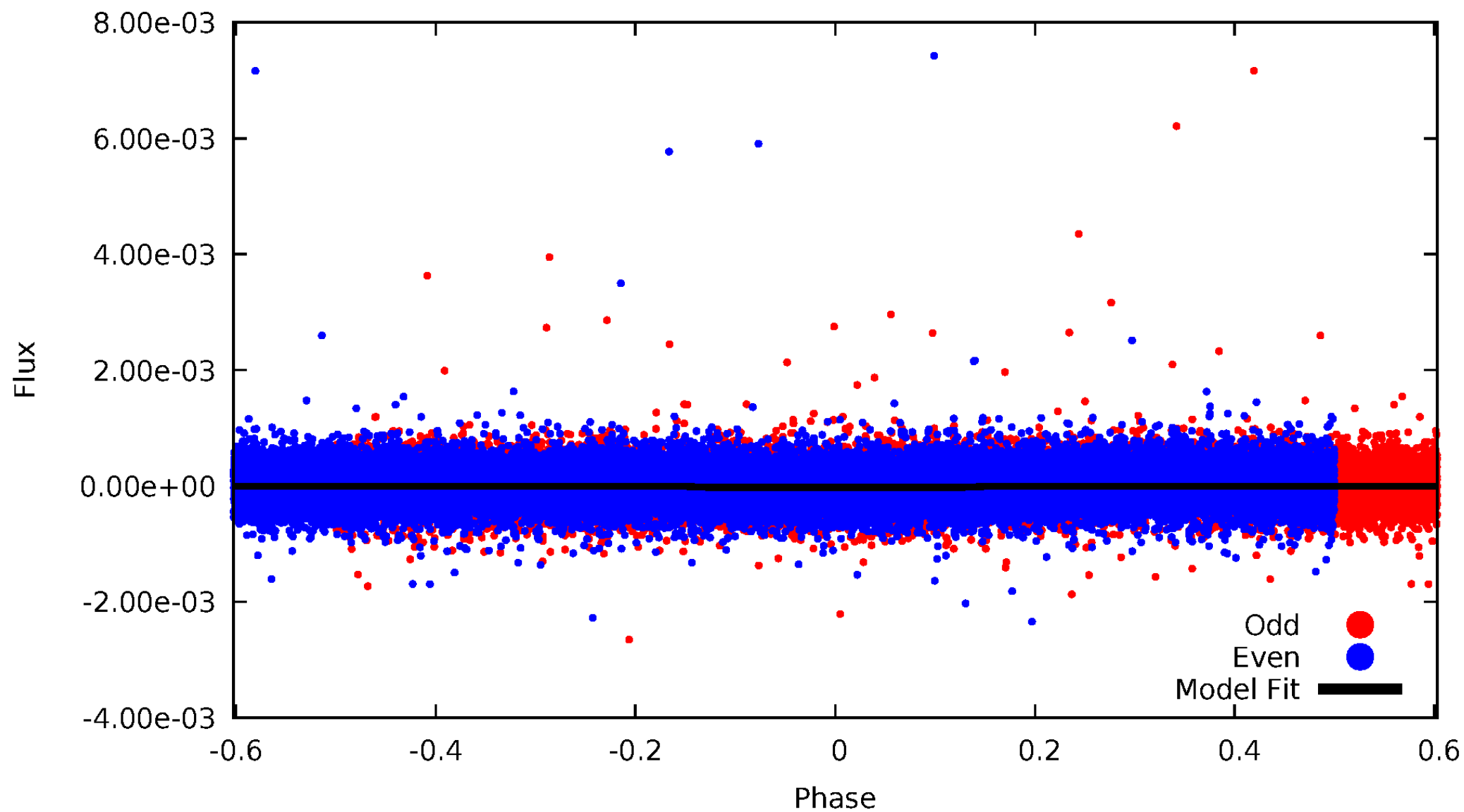
TCE 003747373-01





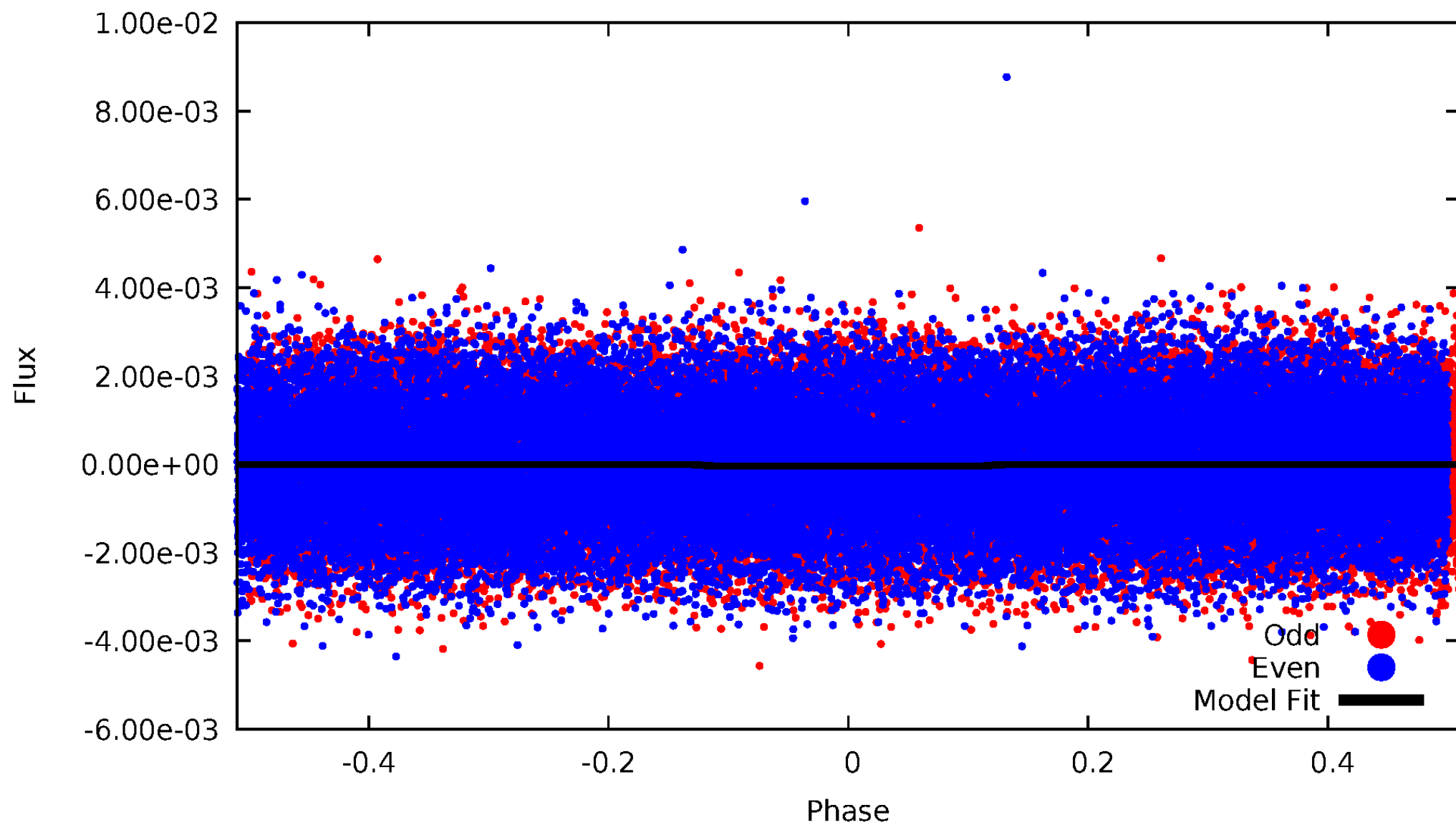
# DV Odd/Even

TCE 003747373-01

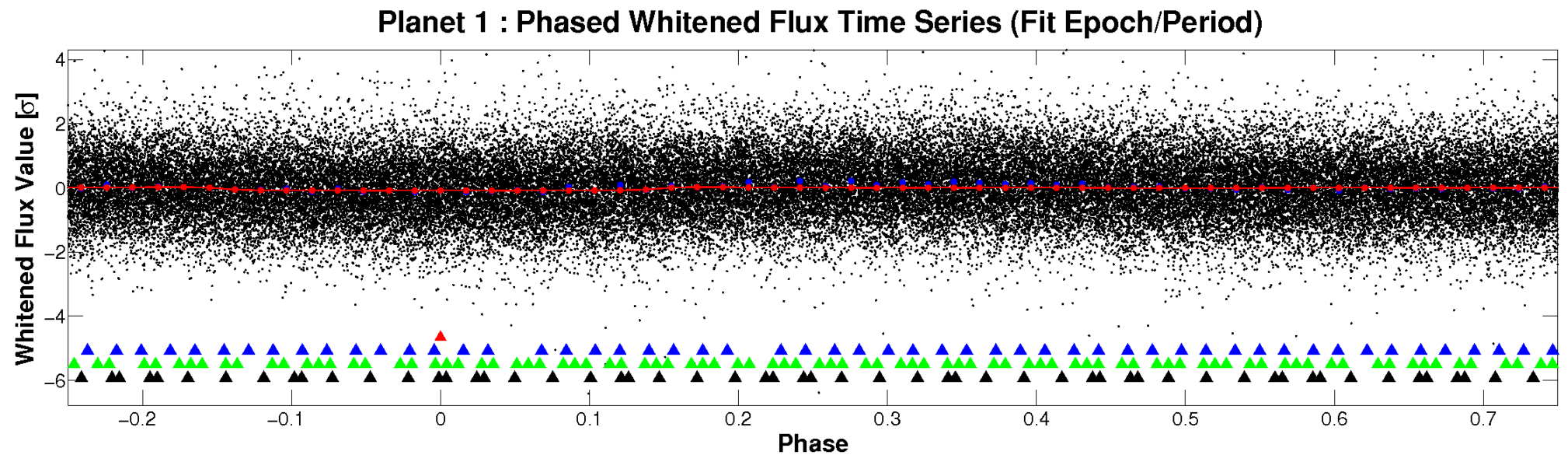
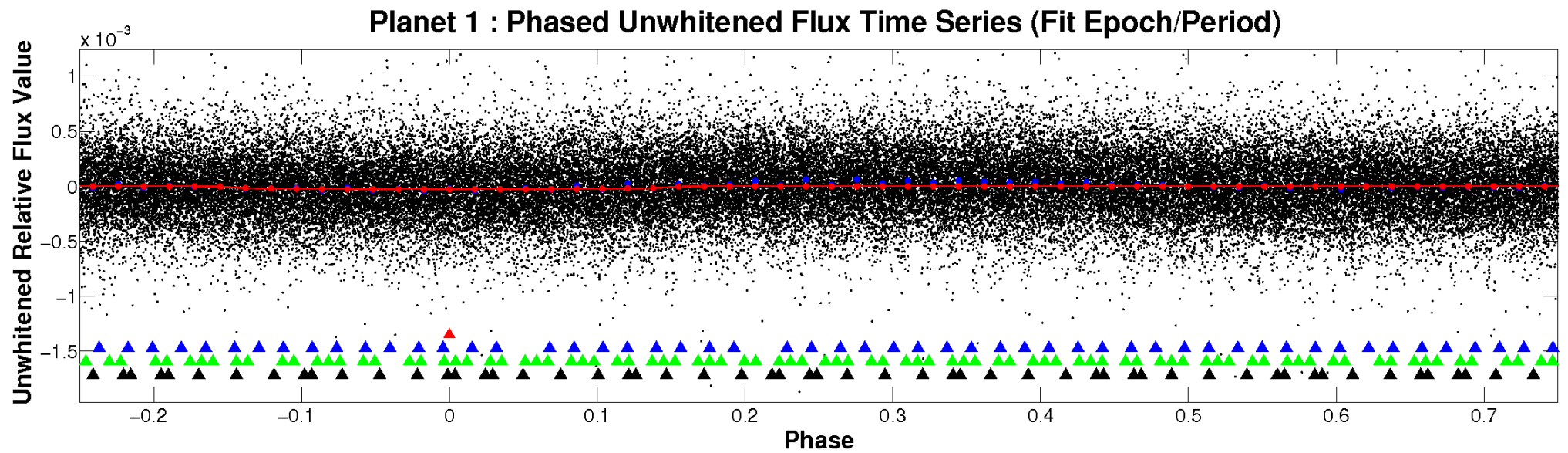


# ALT Odd/Even

TCE 003747373-01



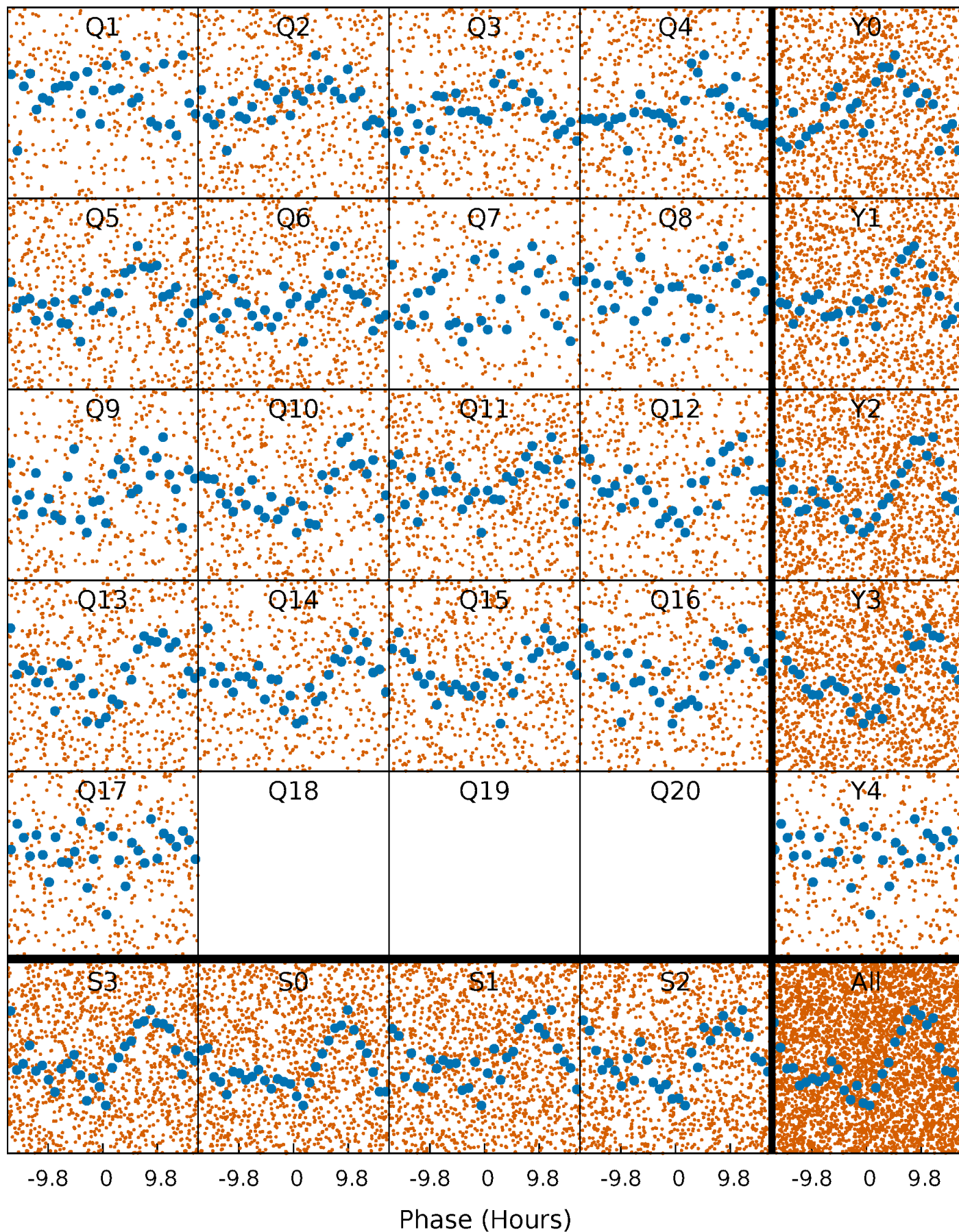
# Non-Whitened Vs. Whitened Light Curve





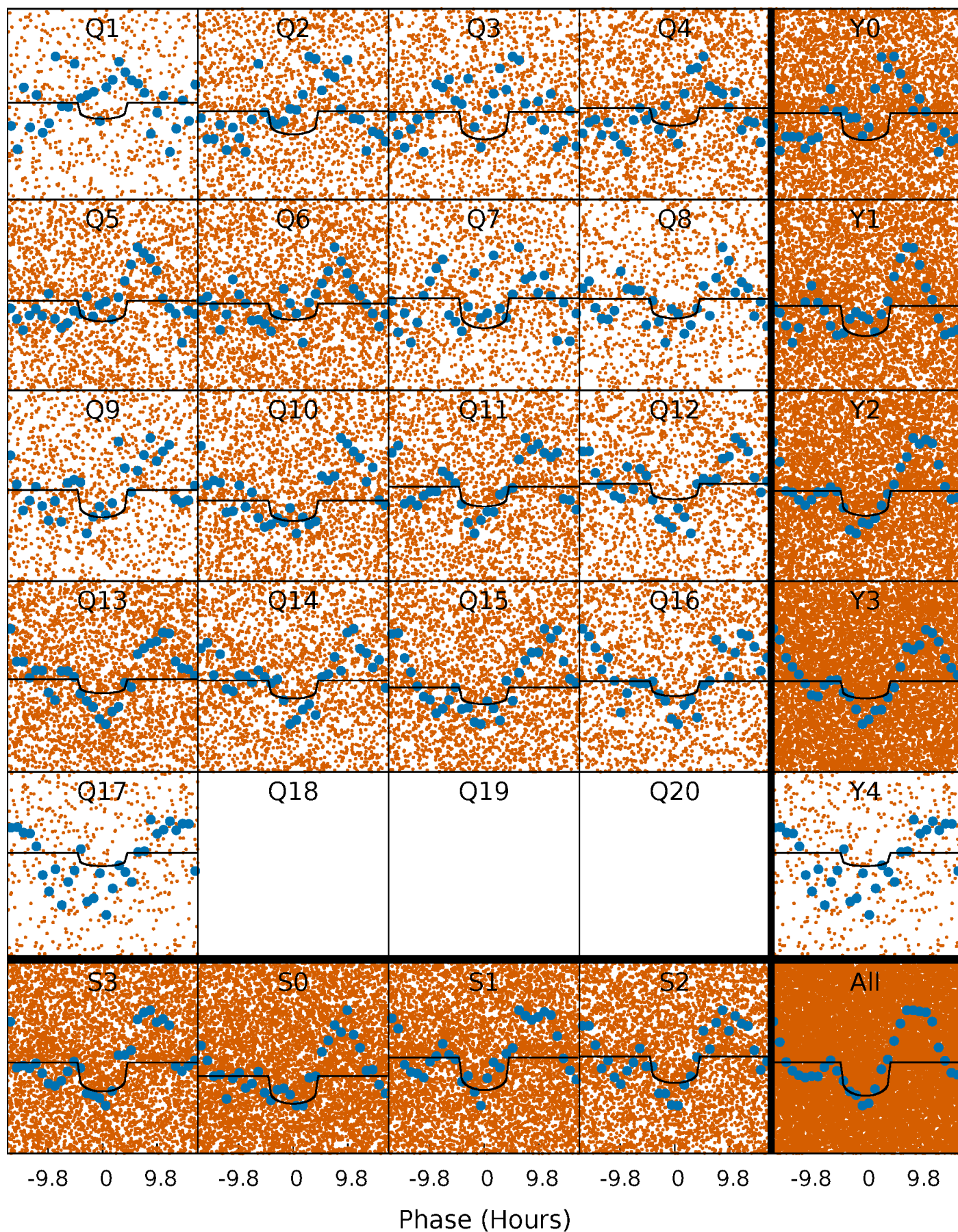
# PDC Quarter-Phased Transit Curves

TCE 003747373-01 P= 1.185707 Days  $T_0=131.983319$  (BKJD)



# DV Quarter-Phased Transit Curves

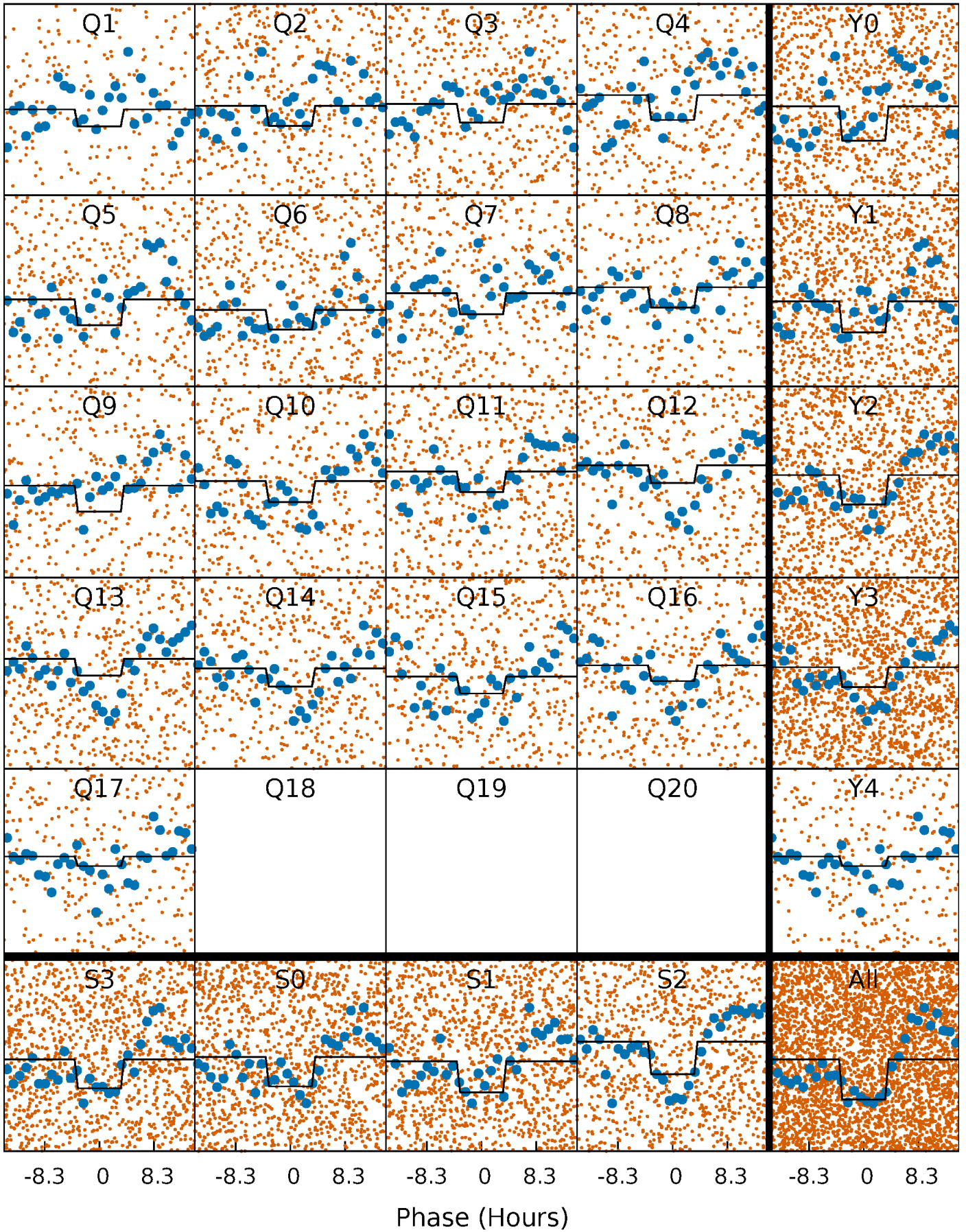
TCE 003747373-01 P= 1.185707 Days  $T_0=131.983319$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

TCE 003747373-01 P= 1.185741 Days  $T_0=131.923167$  (BKJD)

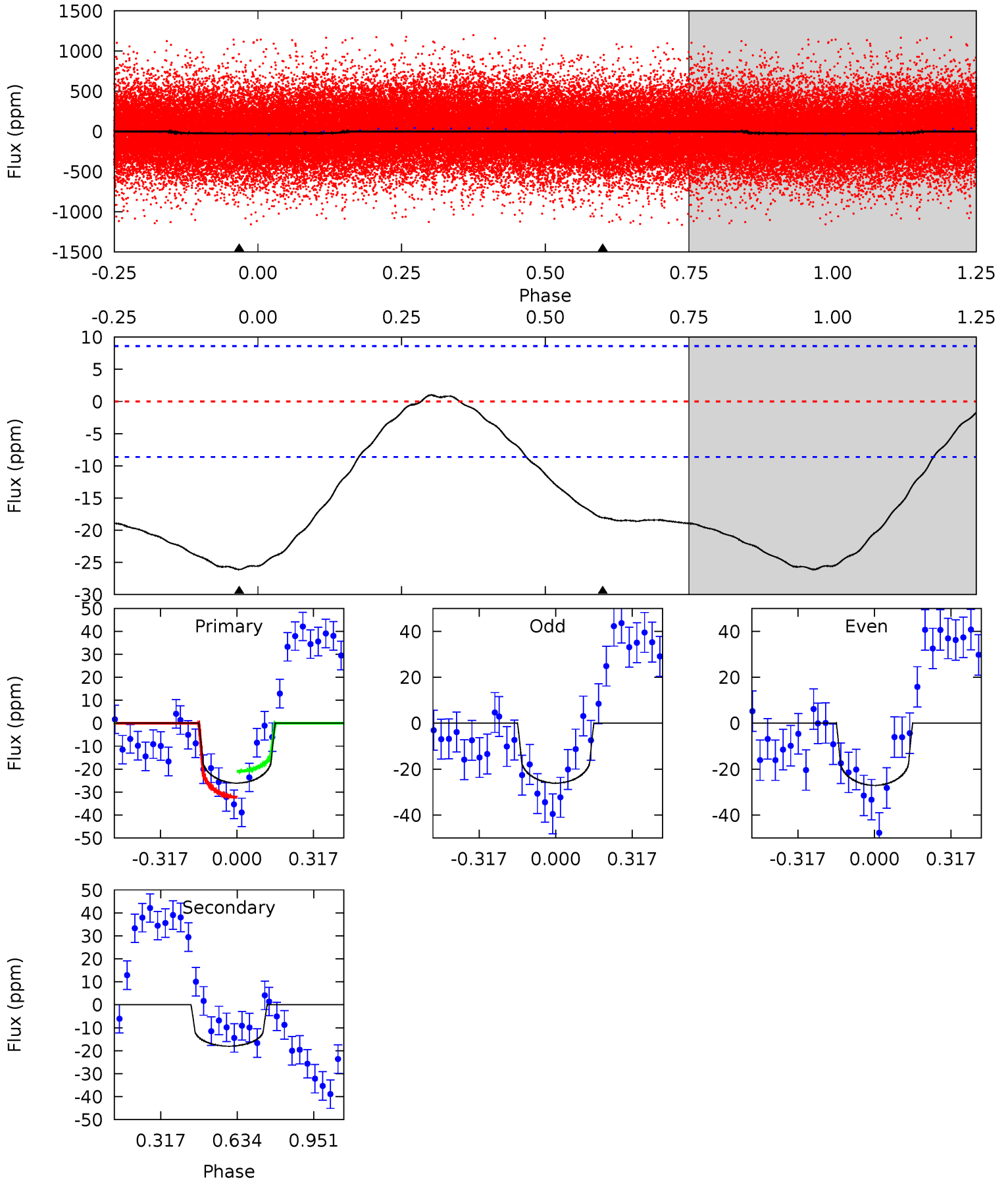




# DV Model-Shift Uniqueness Test

003747373-01, P = 1.185707 Days, E = 130.797612 Days

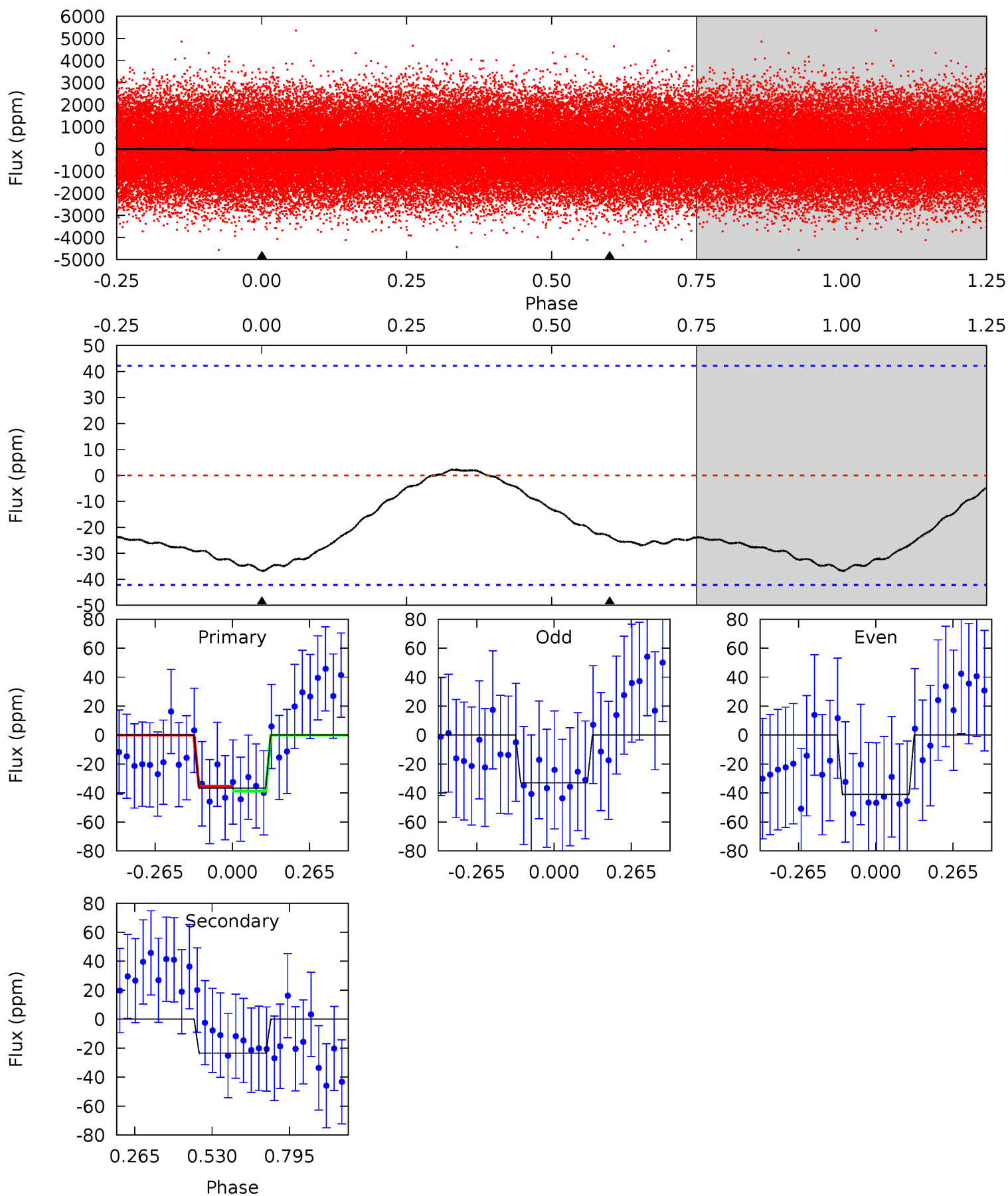
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
13.1	9.05	0	0	4.32	1.00	0.59	13.1	13.1	9.05	9.05	0.25	0.90	0.04	2.83



# Alt Model-Shift Uniqueness Test

003747373-01, P = 1.185741 Days, E = 130.737426 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
3.79	2.42	0	0	4.36	1.11	0.24	3.79	3.79	2.42	2.42	0.42	1.01	0.06	0.18



### Stellar Parameters For KIC 003747373

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$7351^{+203}_{-330}$	$3.738^{+0.392}_{-0.098}$	$0.020^{+0.200}_{-0.350}$	$3.010^{+0.435}_{-1.306}$	$1.808^{+0.184}_{-0.368}$	$0.093^{+0.312}_{-0.029}$
	+3%/-4%	+10%/-3%	+1000%/-1750%	+14%/-43%	+10%/-20%	+334%/-31%
Source	KIC0	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 003747373-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-18 \pm 2$	$1.62^{+1.26}_{-0.92}$	$4666^{+339}_{-490}$	$6147^{+4911}_{-1581}$	$2.703^{+11.919}_{-1.833}$
Alt.	$-23 \pm 10$	$1.79^{+1.24}_{-0.93}$	$4665^{+330}_{-463}$	$6267^{+3958}_{-1787}$	$2.755^{+9.516}_{-1.963}$

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



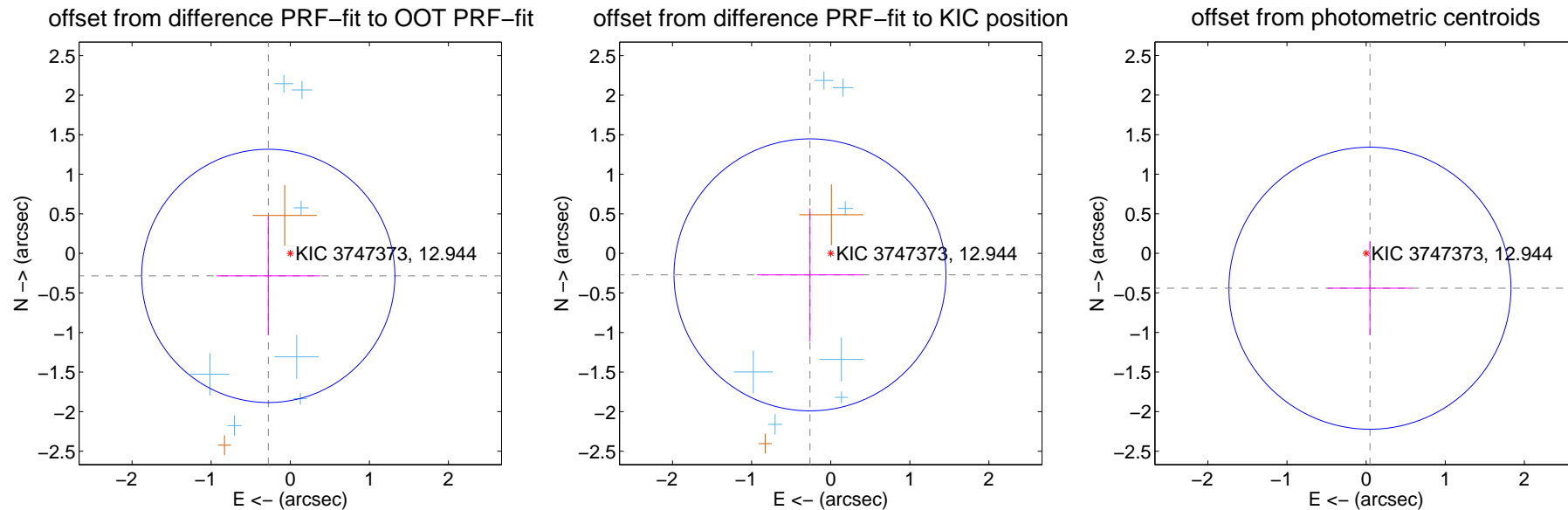
## DV Centroid Data

Supplemental centroid analysis for 003747373-01. Kepler magnitude: 12.94. Transit SNR 10.93

There are 7 quarters with good PRF difference image offsets

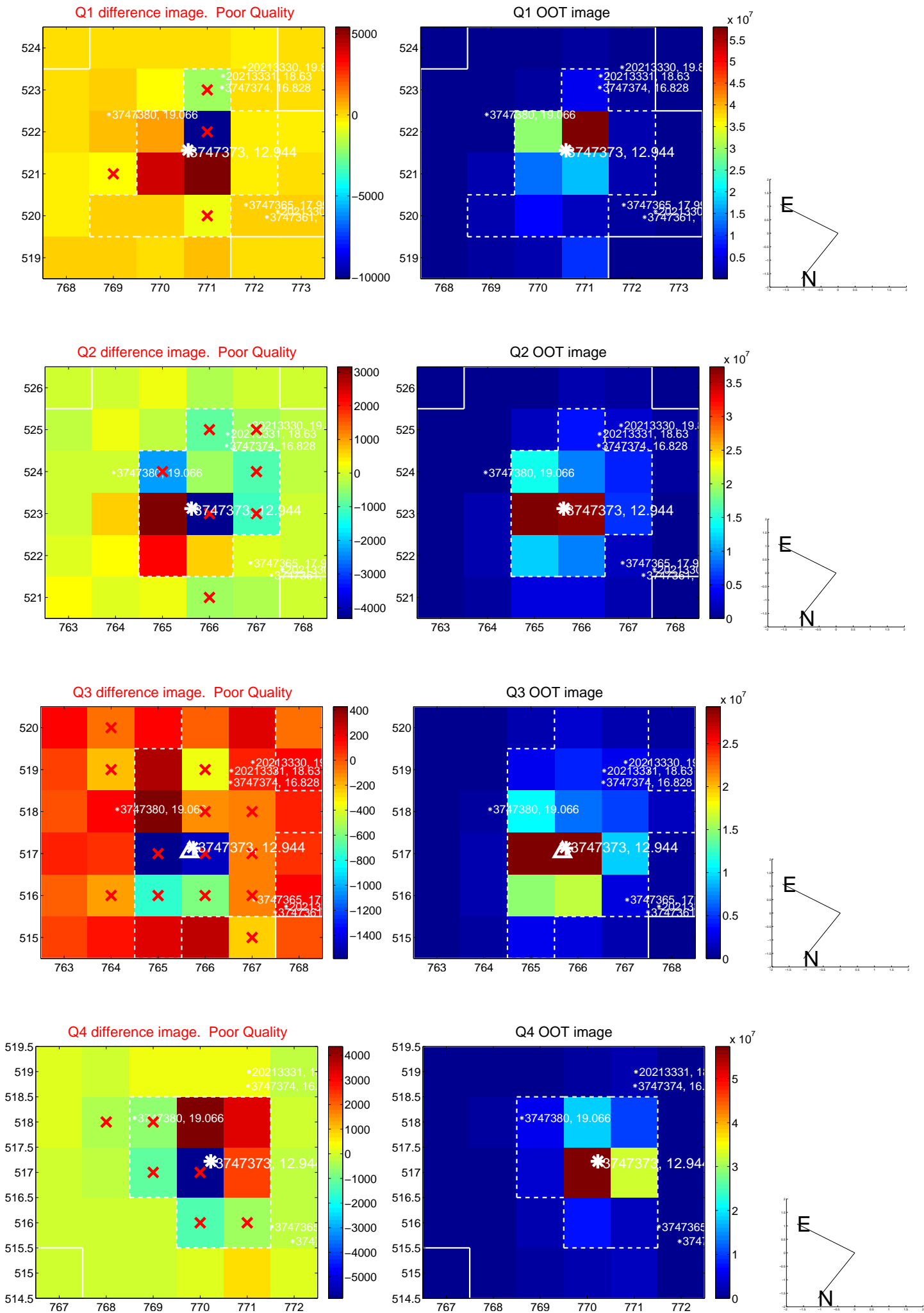
The direct PRF centroid is offset from the target star catalog position by about 0.06 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.398 \pm 0.533$	0.75	$0.278 \pm 0.655$	$-0.284 \pm 0.748$
PRF-fit source offset from KIC position	$0.377 \pm 0.573$	0.66	$0.262 \pm 0.673$	$-0.271 \pm 0.841$
photometric centroid source offset	$0.44 \pm 0.59$	0.75	$-0.05 \pm 0.53$	$-0.44 \pm 0.59$

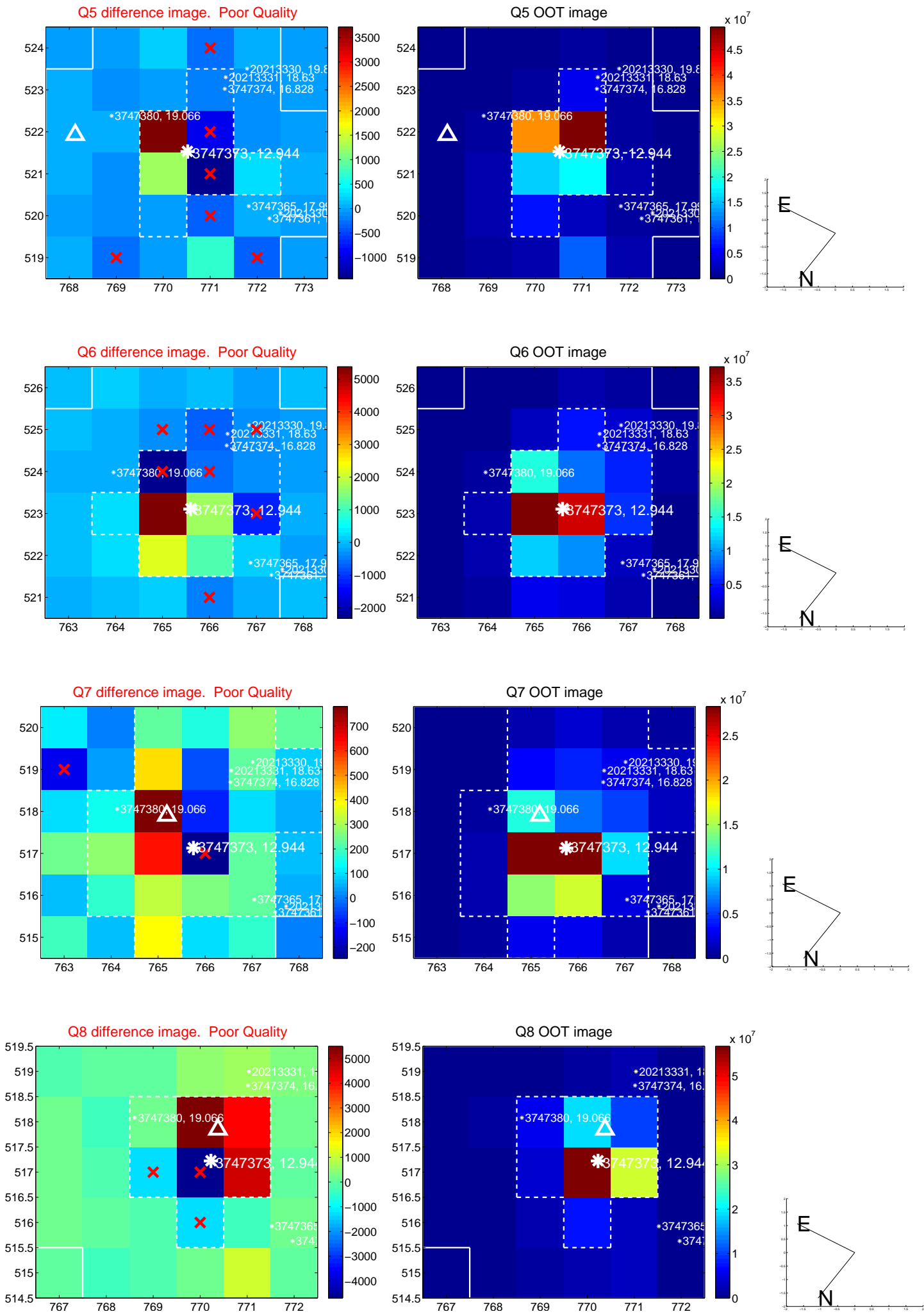


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

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

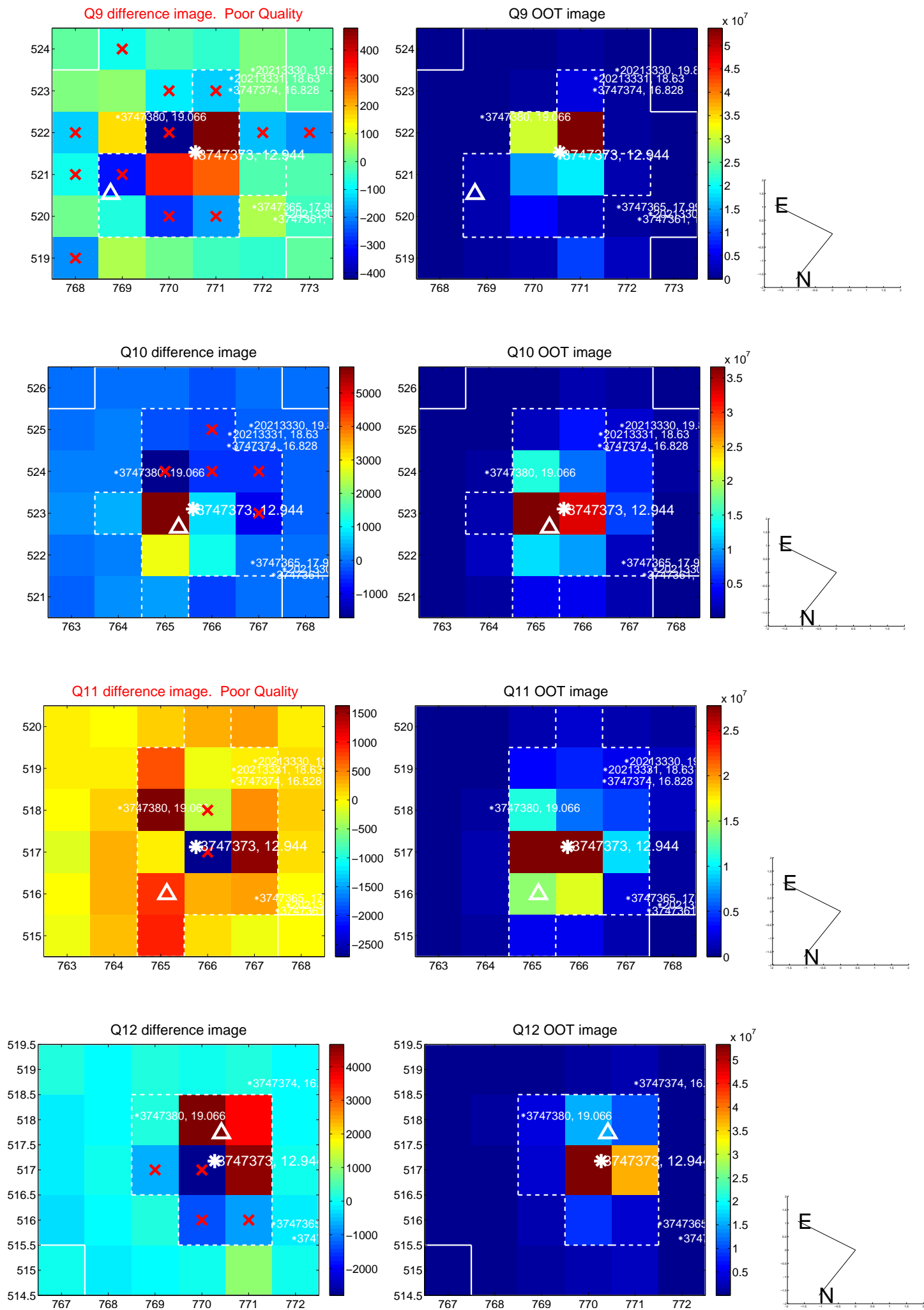


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

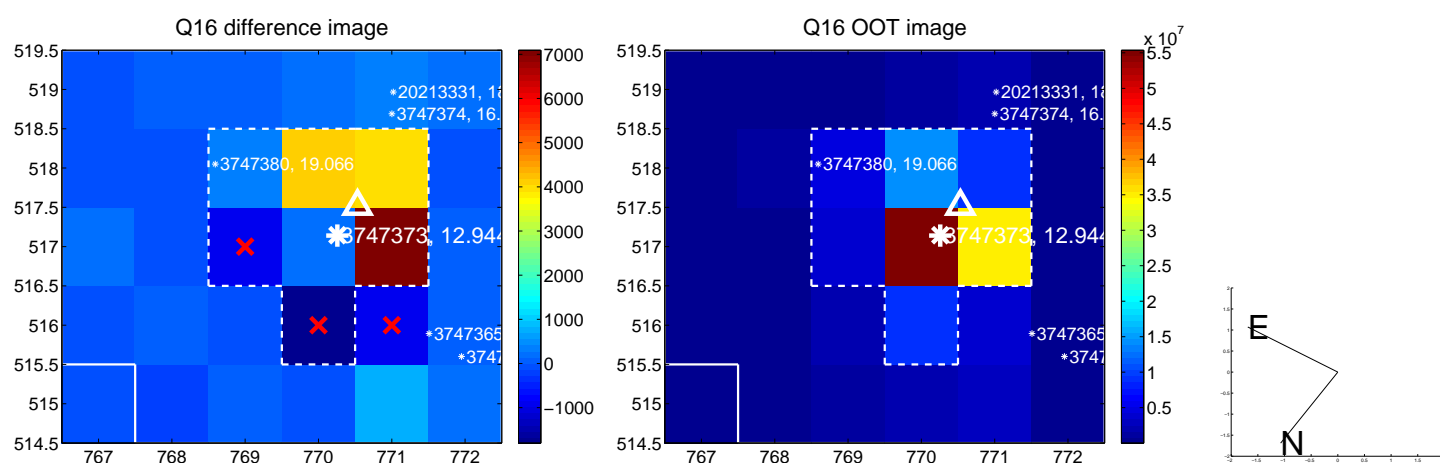
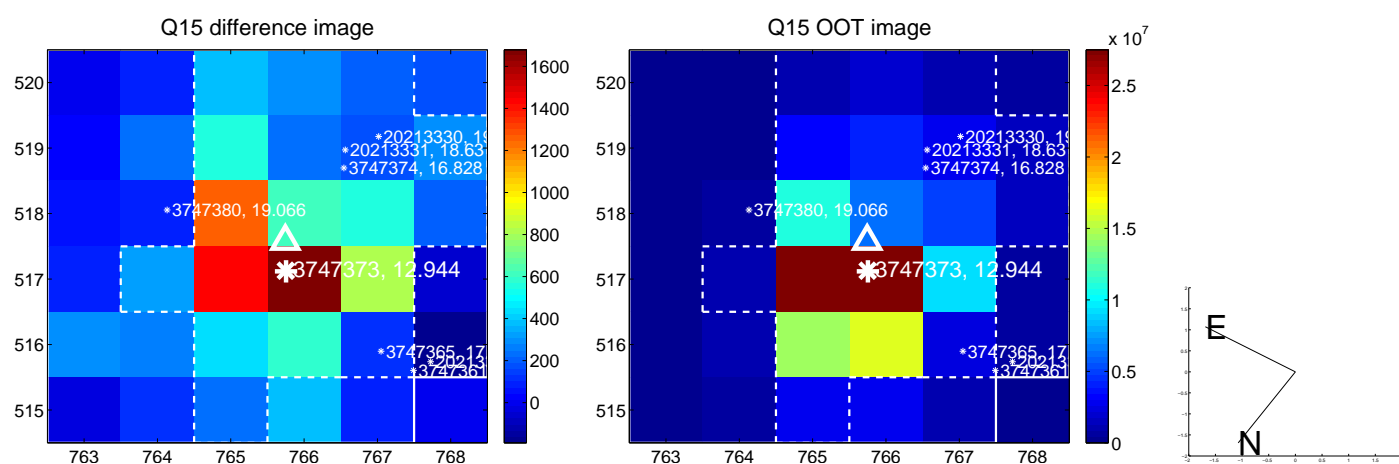
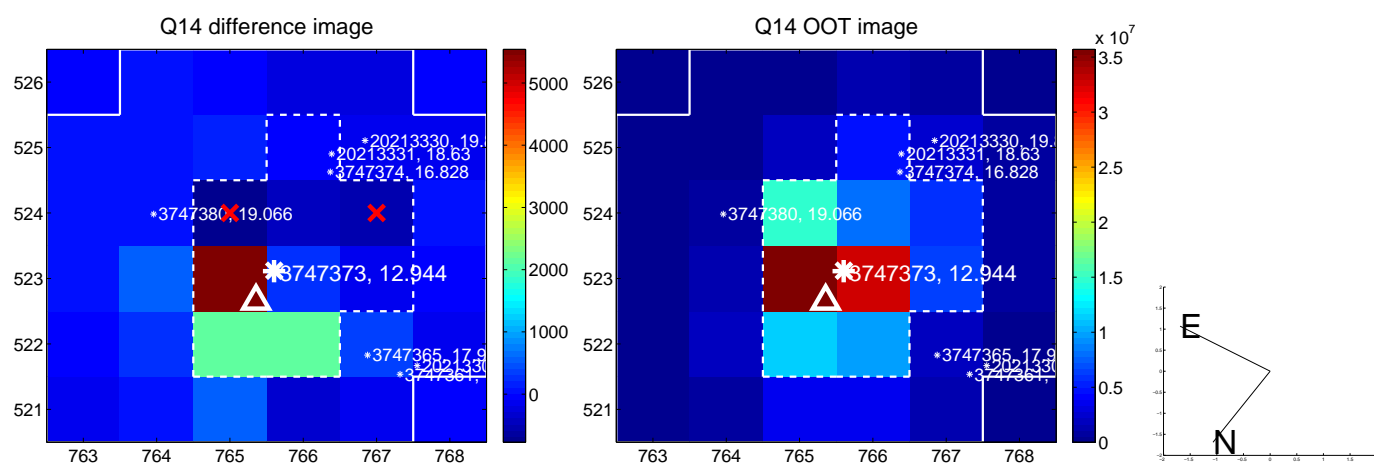
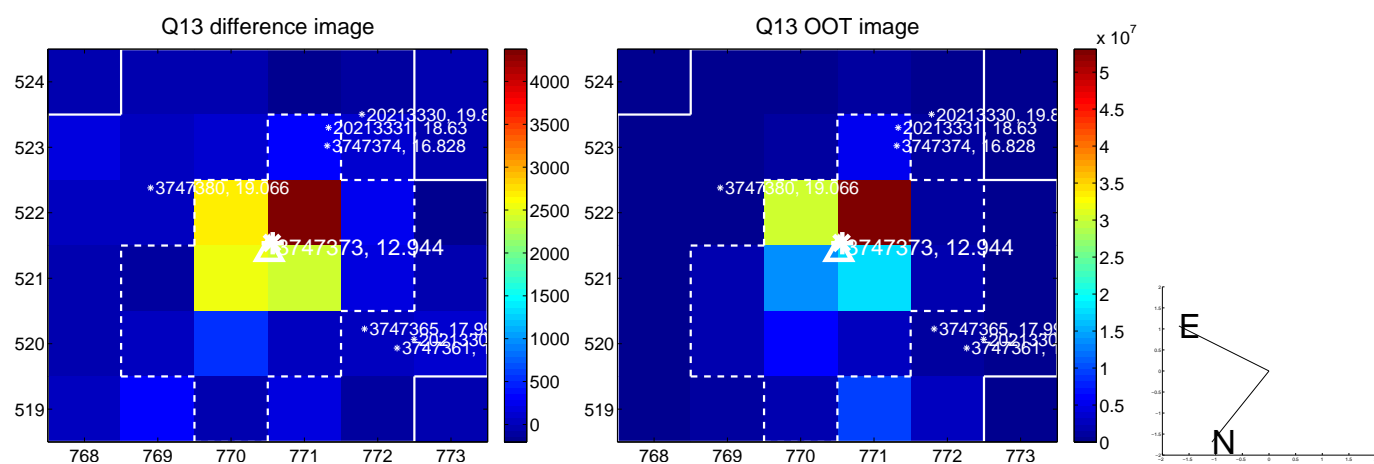




white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



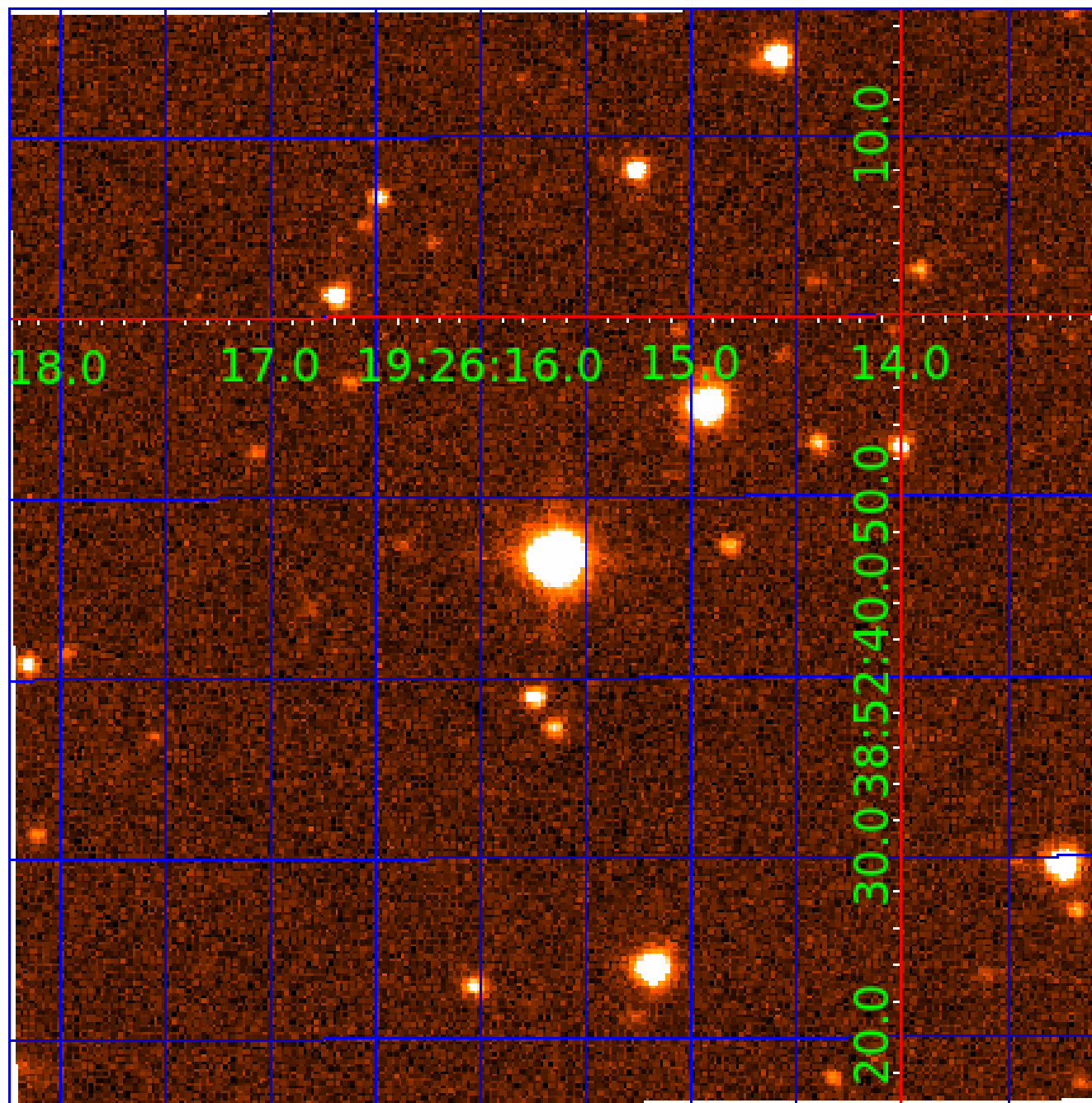
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.





UKIRT Image

Declination





# KIC 003747373

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
003747373-01	OBS	No	1.185707	131.983319	26.7	8.573	9.4	10.9	3.01	7351	1.58	33216.54
003747373-02	OBS	No	27.080771	143.707222	376.6	1.189	11.5	10.3	3.01	7351	5.99	512.60
003747373-03	OBS	No	16.498008	143.280157	244.8	2.178	9.9	9.8	3.01	7351	5.26	992.54
003747373-04	OBS	No	26.345693	139.797733	274.8	2.693	9.9	9.5	3.01	7351	5.06	531.75

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
003747373-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT
003747373-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV
003747373-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
003747373-04	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

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

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

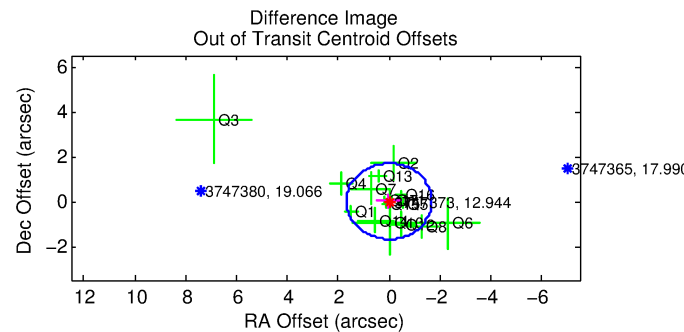
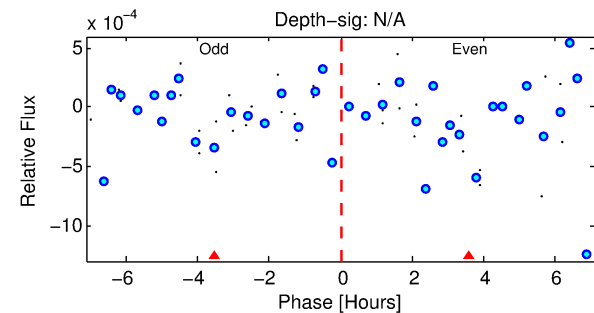
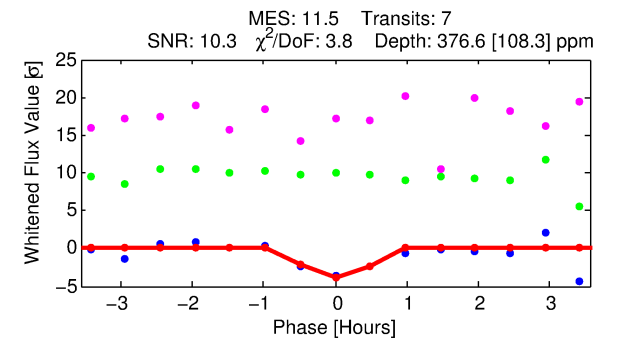
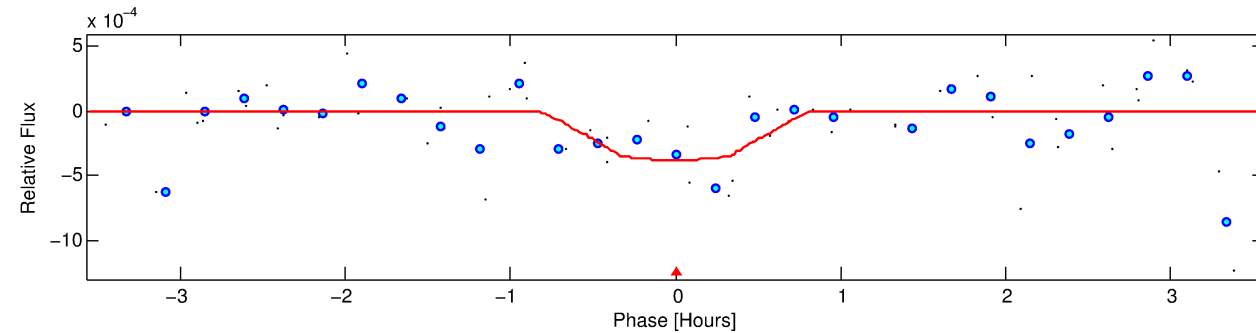
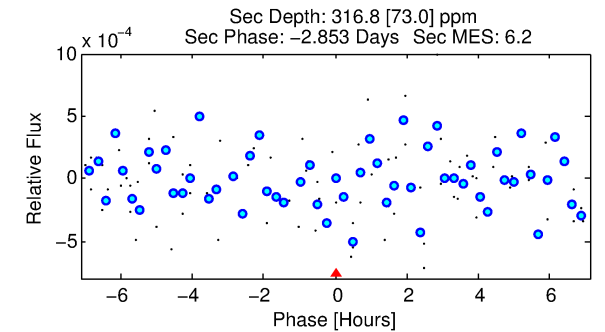
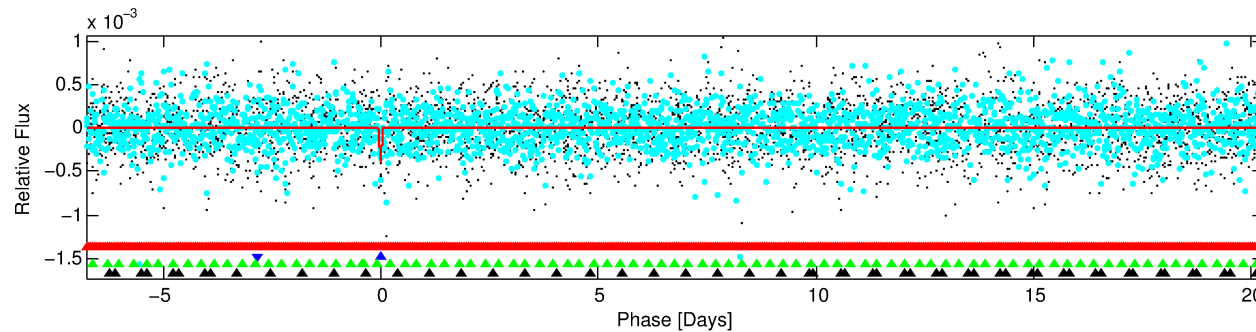
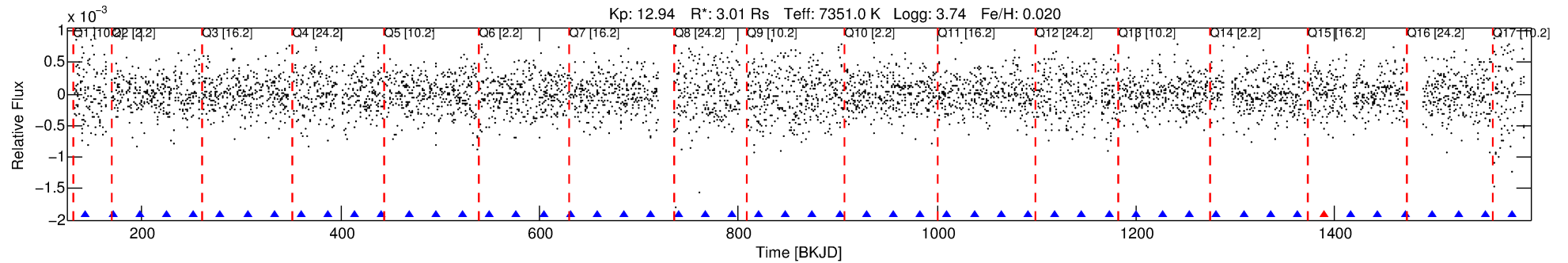
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 003747373-02

No Significant Match Found

# DV One-Page Summary

KIC: 3747373 Candidate: 2 of 4 Period: 27.081 d



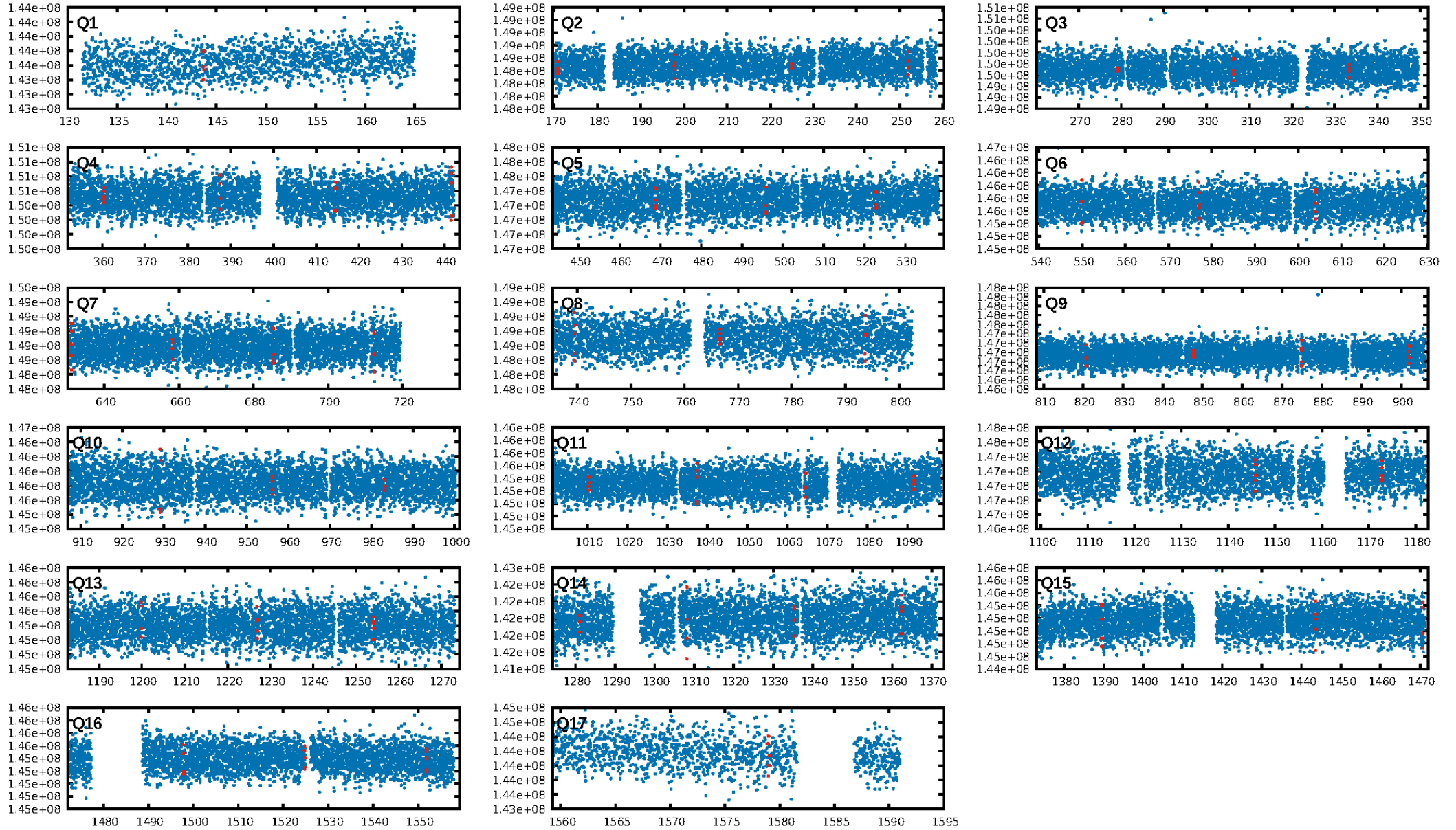
## DV Fit Results:

Period = 27.08077 [0.00039] d  
Epoch = 143.7072 [0.0151] BKJD  
Rp/R\* = 0.0182 [0.0553]  
a/R\* = 169.93 [2993.73]  
b = 0.29 [56.82]  
Seff = 512.60 [354.40]  
Teff = 1213 [210] K  
Rp = 5.99 [18.36] Re  
a = 0.2150 [0.0897] AU  
Ag = 224.43 [1370.60] [0.16] $\sigma$   
Teffp = 7261 [11024] K [0.55] $\sigma$

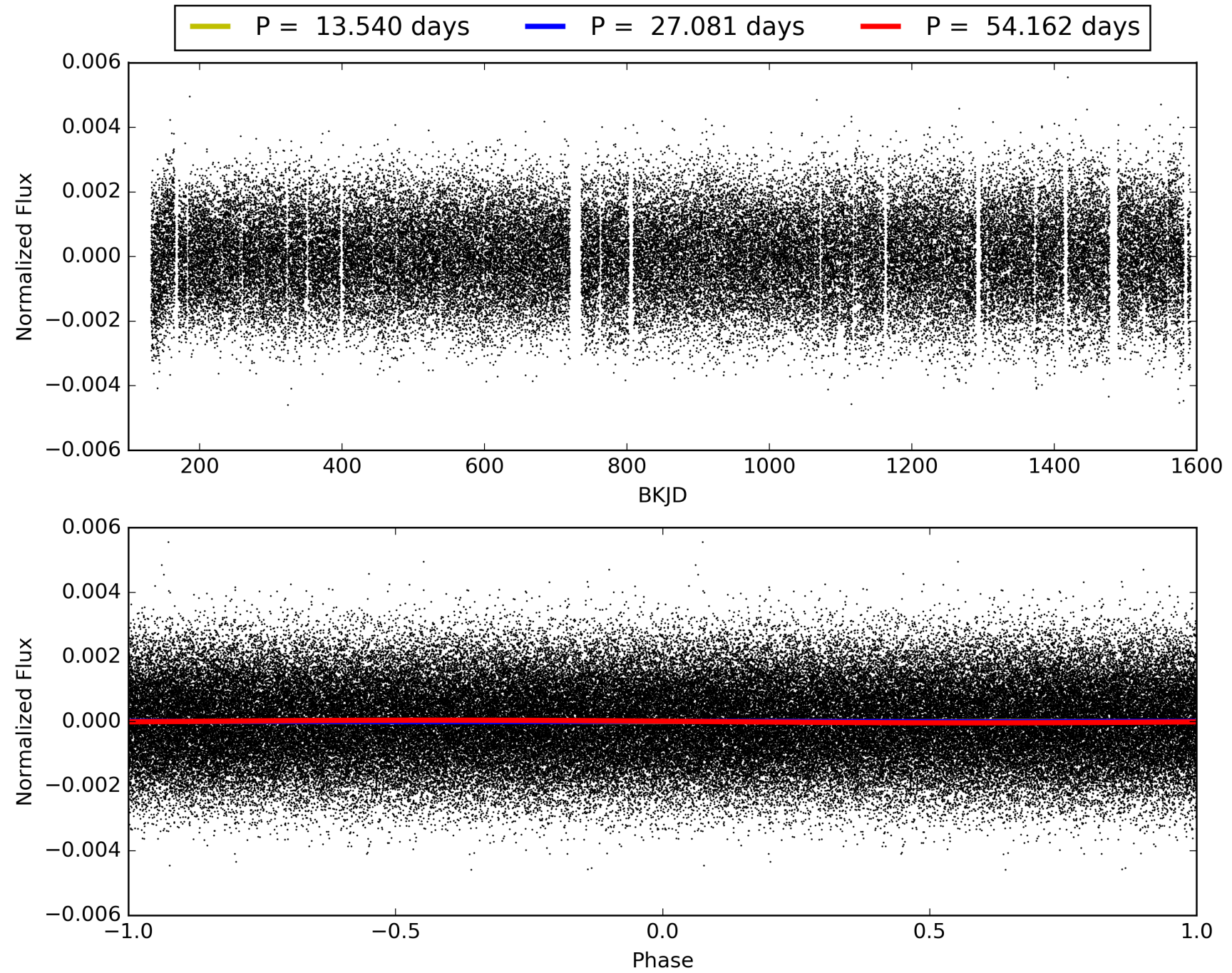
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [5.99] $\sigma$   
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 2.2%  
ModelChiSquareGof-sig: 30.0%  
**Bootstrap-pfa: 3.19e-11**  
RollingBand-fgt: 0.86 [6/7]  
**GhostDiagnostic-chr: 42.33**  
Centroid-sig: 81.1%  
Centroid-so: 0.306 arcsec [0.68] $\sigma$   
OotOffset-rm: 0.005 arcsec [0.01] $\sigma$   
KicOffset-rm: 0.046 arcsec [0.11] $\sigma$   
OotOffset-st: 4/4/4/4 [16]  
KicOffset-st: 4/4/4/4 [16]  
DiffImageQuality-fgm: 0.38 [6/16]  
DiffImageOverlap-fno: 0.65 [11/17]

# TCE 003747373-02, PDC Light Curves

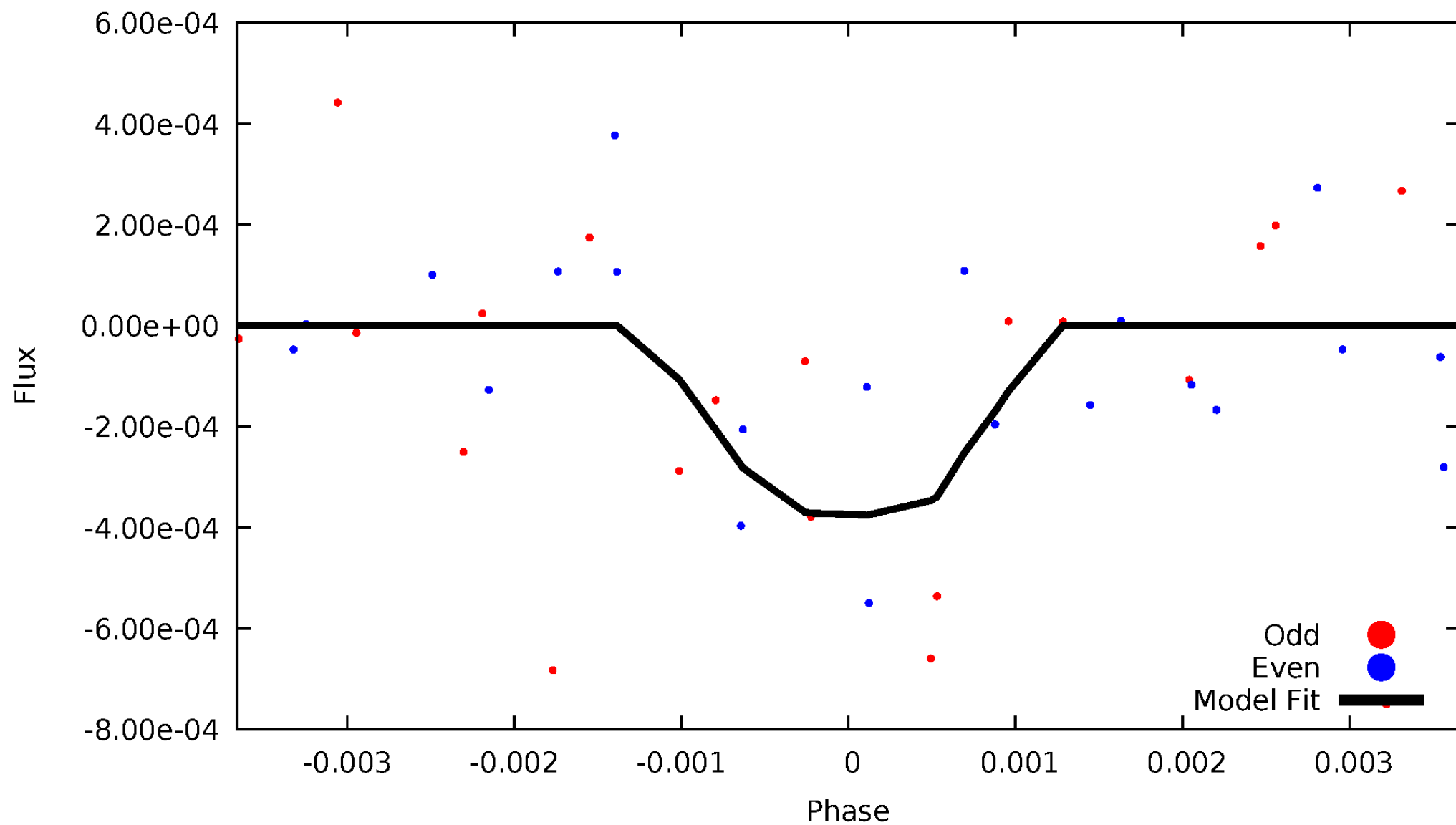


TCE 003747373-02



# DV Odd/Even

TCE 003747373-02





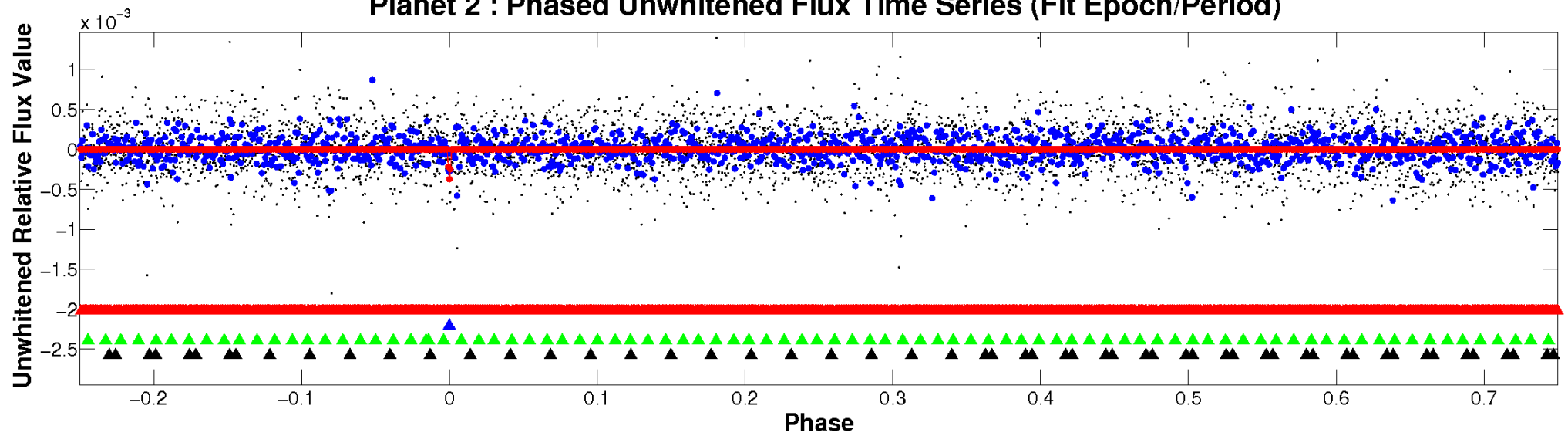


ALT Odd/Even

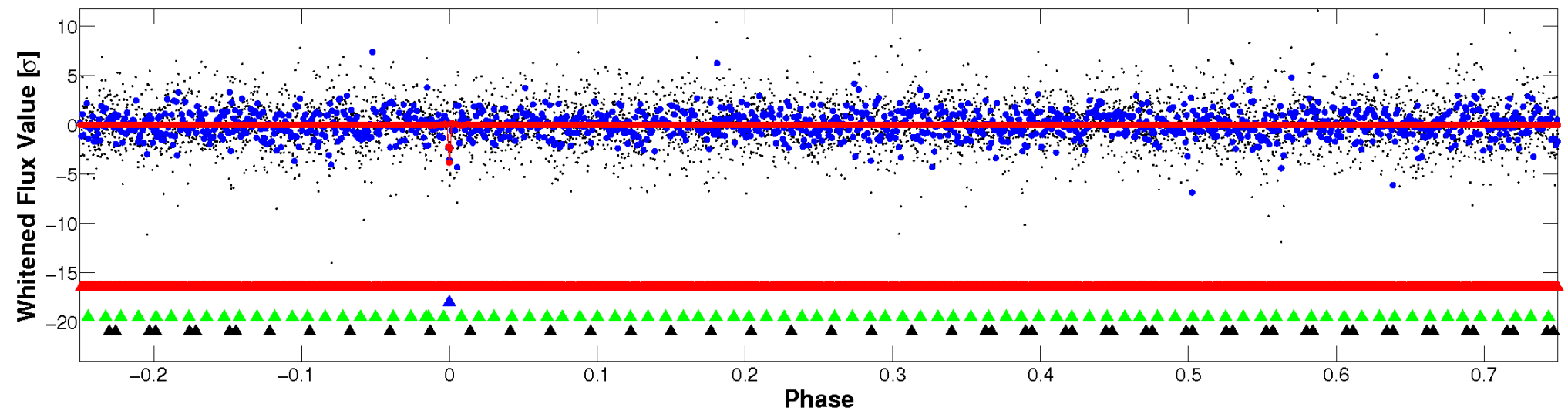
This plot does not exist for this TCE.

# Non-Whitened Vs. Whitened Light Curve

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

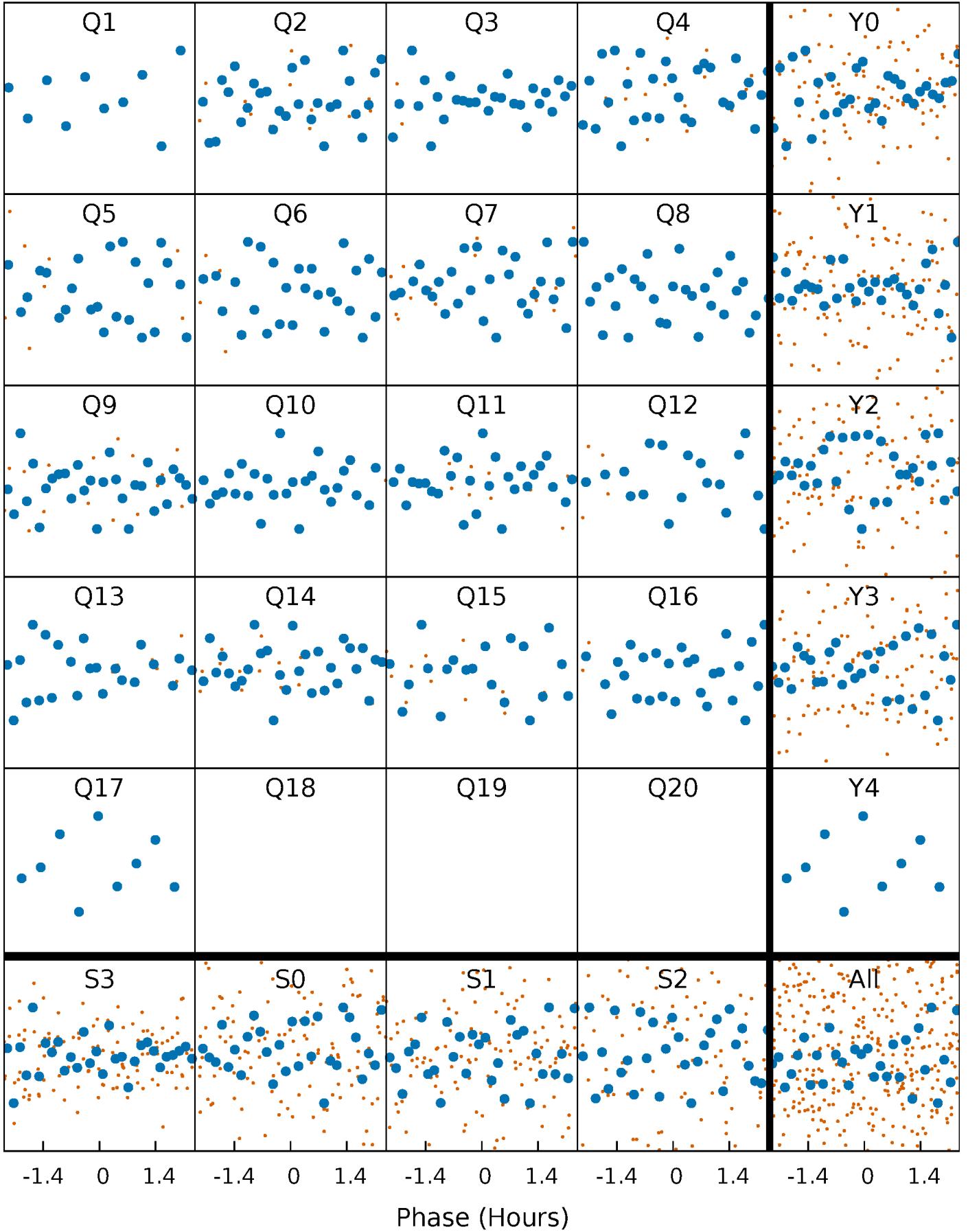


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



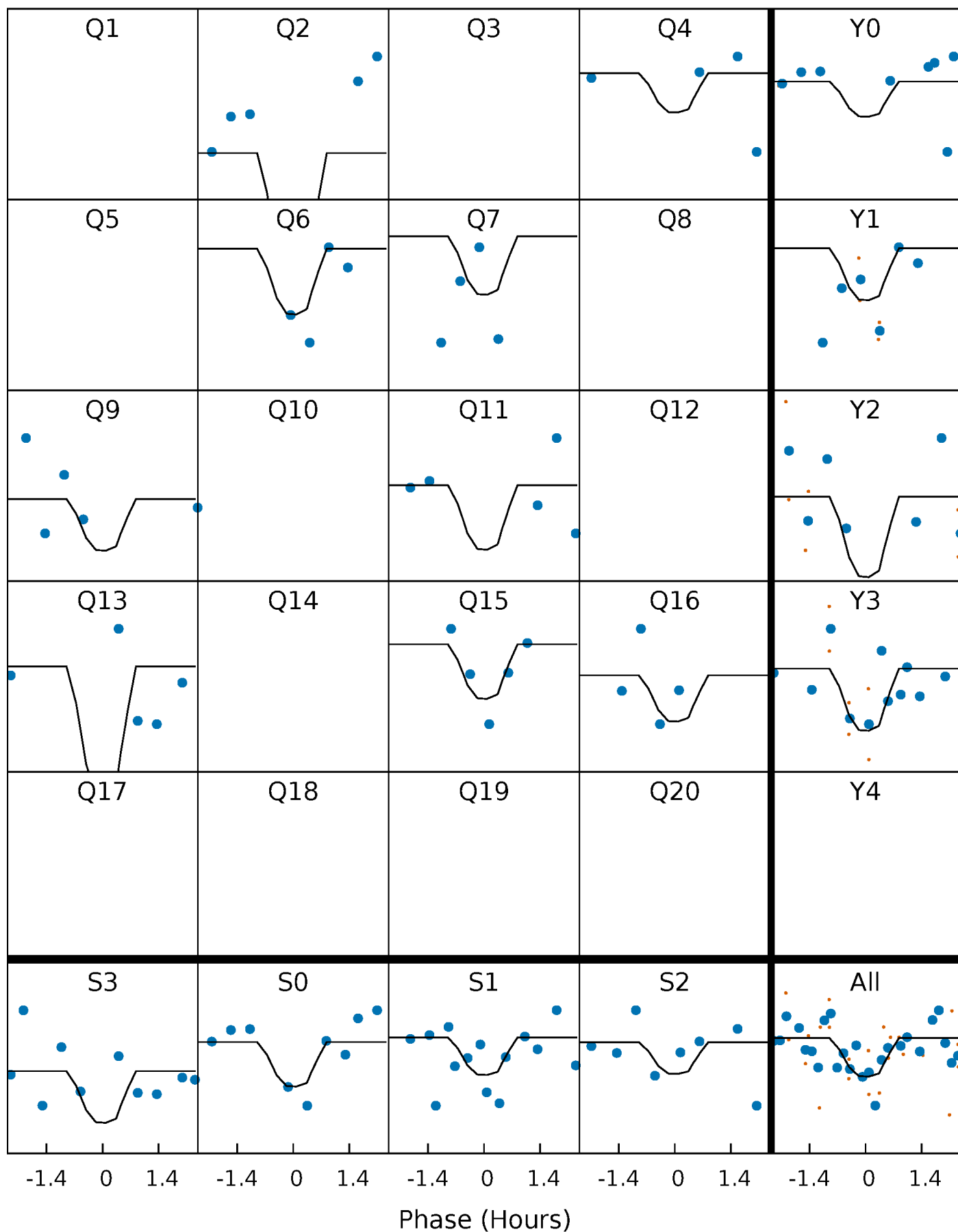
# PDC Quarter-Phased Transit Curves

TCE 003747373-02   P= 27.080771 Days    $T_0=143.707222$  (BKJD)



# DV Quarter-Phased Transit Curves

TCE 003747373-02 P= 27.080771 Days  $T_0=143.707222$  (BKJD)

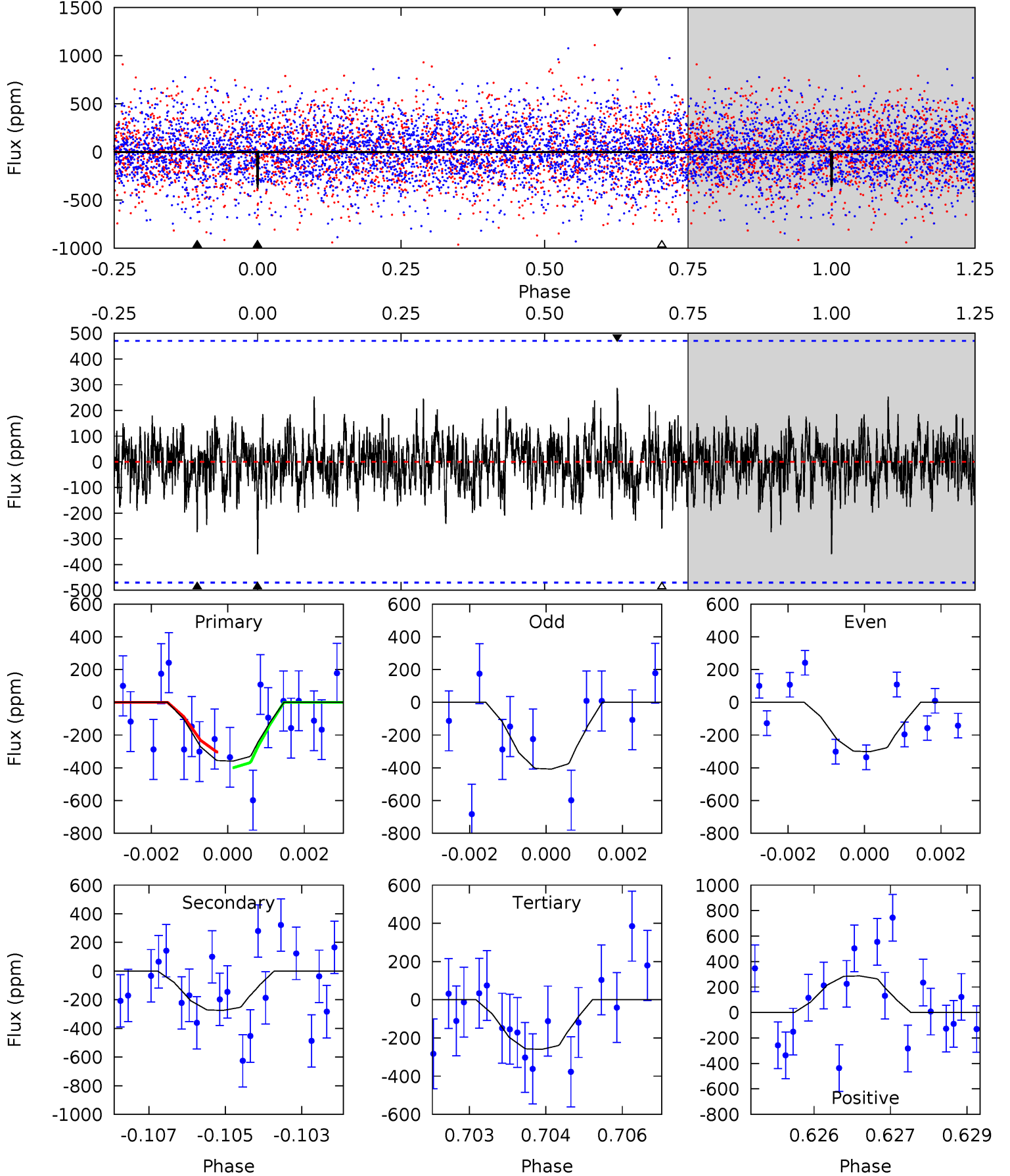


This plot does not exist for this TCE.

# DV Model-Shift Uniqueness Test

003747373-02, P = 27.080771 Days, E = 116.626451 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
4.09	3.12	2.95	3.27	5.35	3.13	0.91	1.13	0.82	0.16	-0.15	0.61	0.94	0.44	0.54





## Alt Model-Shift Uniqueness Test

This plot does not exist for this TCE.

### Stellar Parameters For KIC 003747373

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$7351^{+203}_{-330}$	$3.738^{+0.392}_{-0.098}$	$0.020^{+0.200}_{-0.350}$	$3.010^{+0.435}_{-1.306}$	$1.808^{+0.184}_{-0.368}$	$0.093^{+0.312}_{-0.029}$
	+3%/-4%	+10%/-3%	+1000%/-1750%	+14%/-43%	+10%/-20%	+334%/-31%
Source	KIC0	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 003747373-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-274 \pm 88$	$13.62^{+13.18}_{-9.19}$	$1636^{+122}_{-150}$	$4505^{+3069}_{-1047}$	$37^{+282}_{-29}$
Alt.	N/A	N/A	N/A	N/A	N/A

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

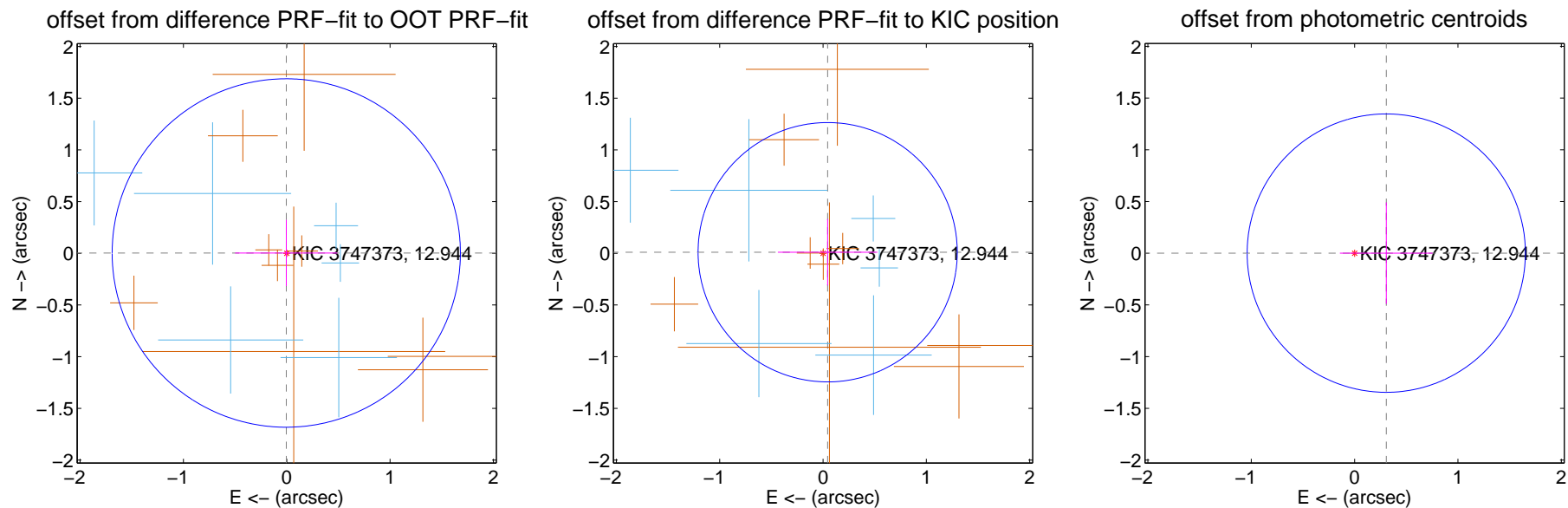
## DV Centroid Data

Supplemental centroid analysis for 003747373-02. Kepler magnitude: 12.94. Transit SNR 10.25

There are 6 quarters with good PRF difference image offsets

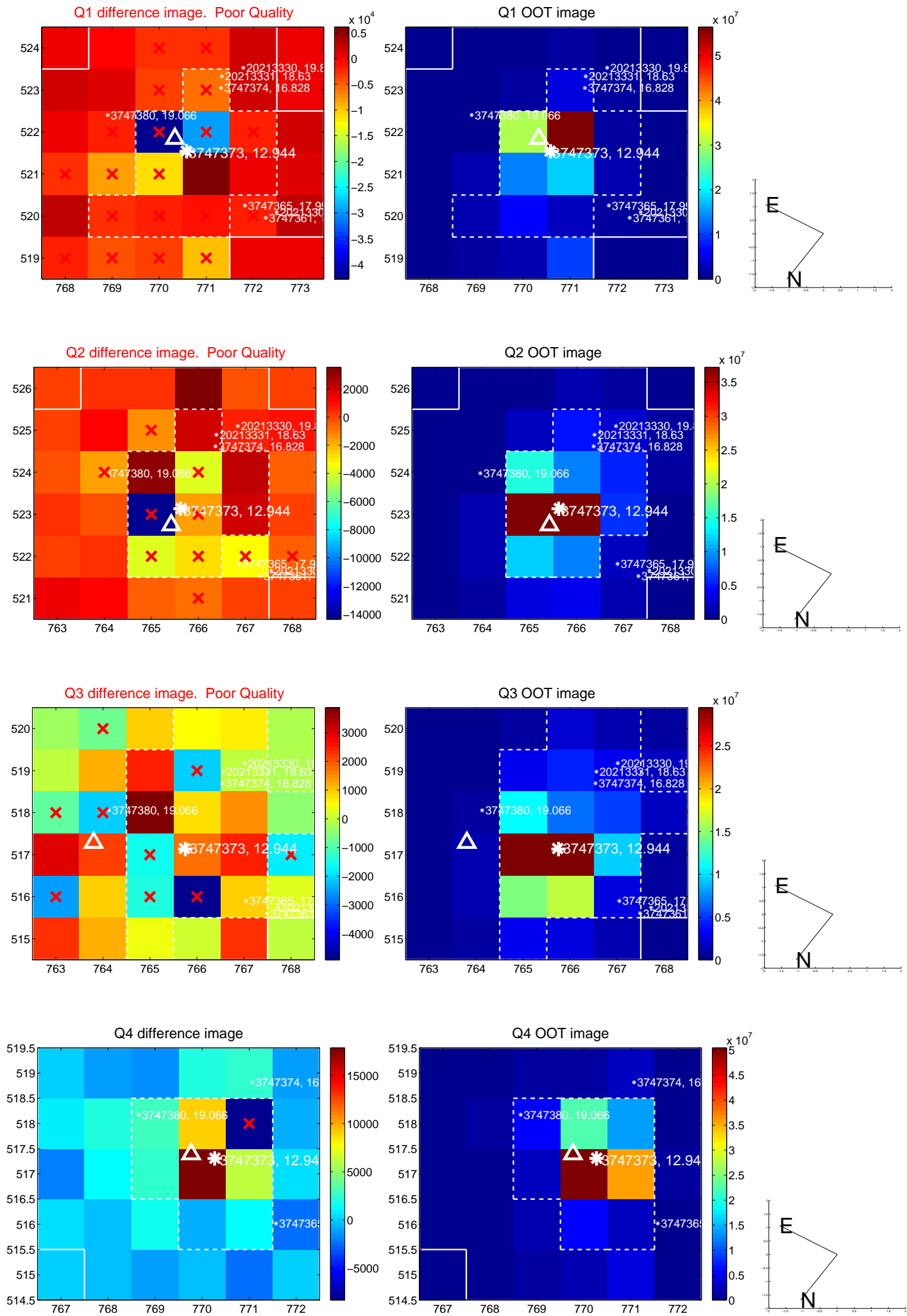
The direct PRF centroid is offset from the target star catalog position by about 0.06 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.005 \pm 0.562$	0.01	$0.005 \pm 0.495$	$0.003 \pm 0.320$
PRF-fit source offset from KIC position	$0.046 \pm 0.418$	0.11	$-0.045 \pm 0.482$	$0.010 \pm 0.322$
photometric centroid source offset	$0.31 \pm 0.45$	0.68	$-0.31 \pm 0.45$	$0.00 \pm 0.49$

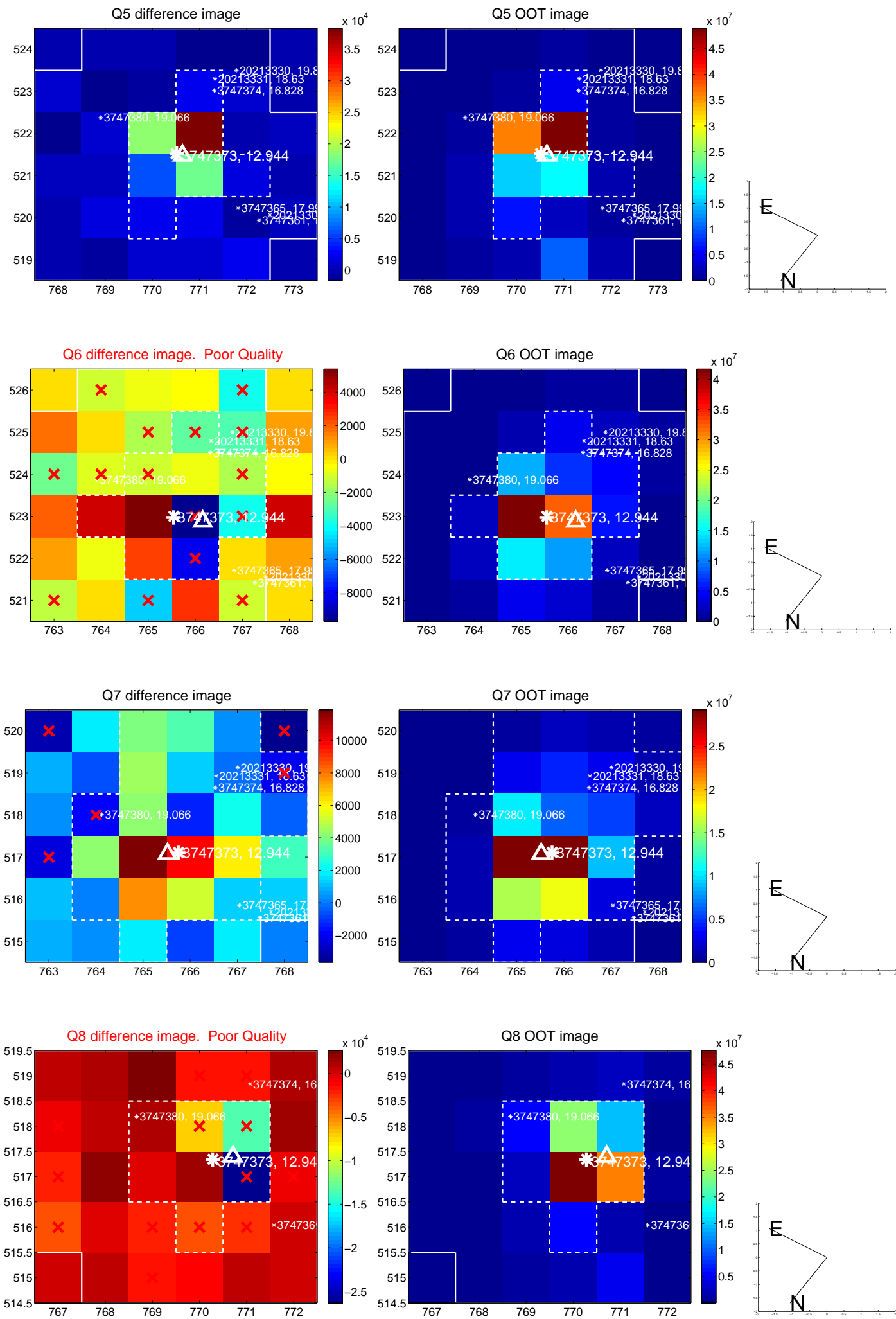


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

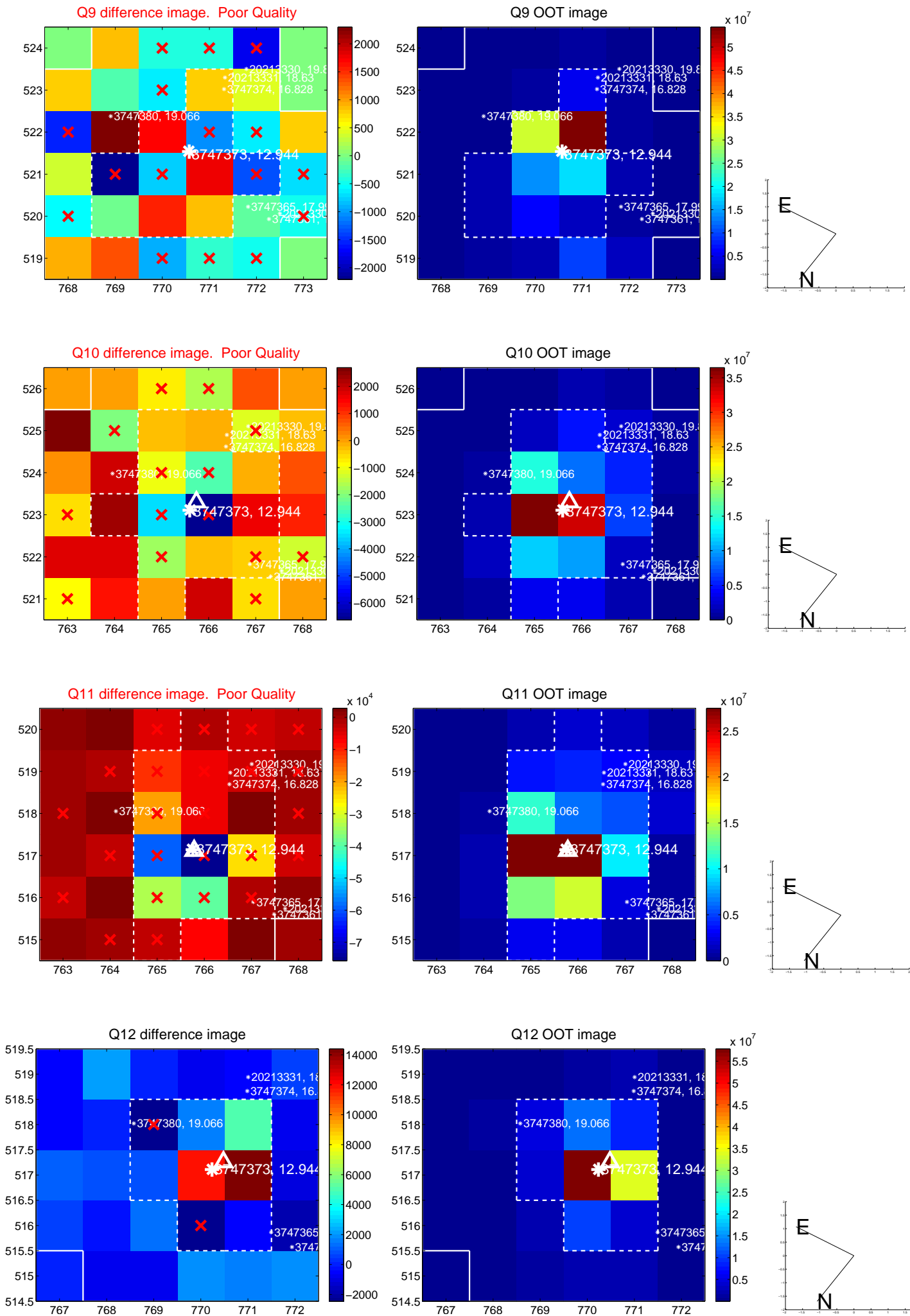


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

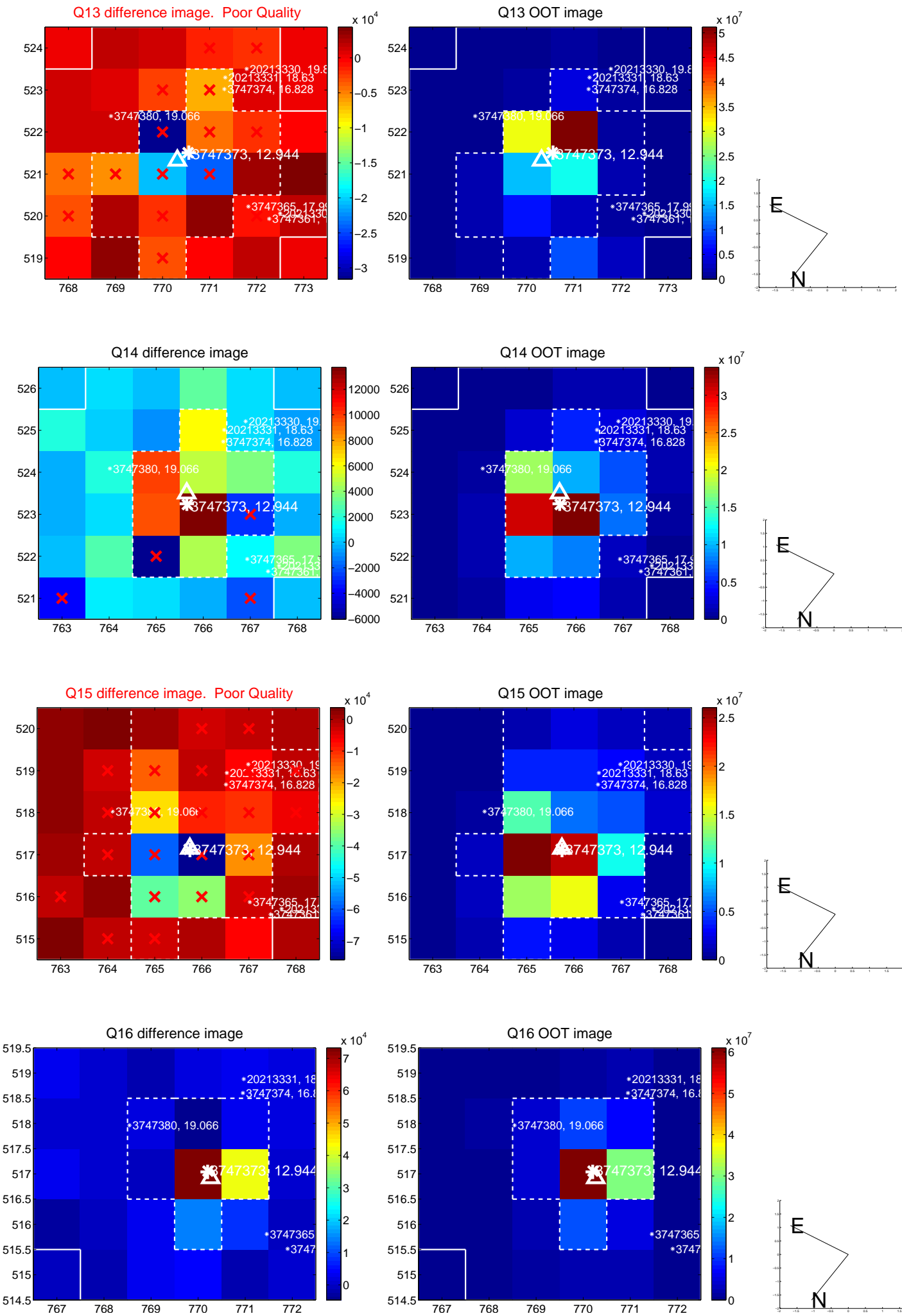




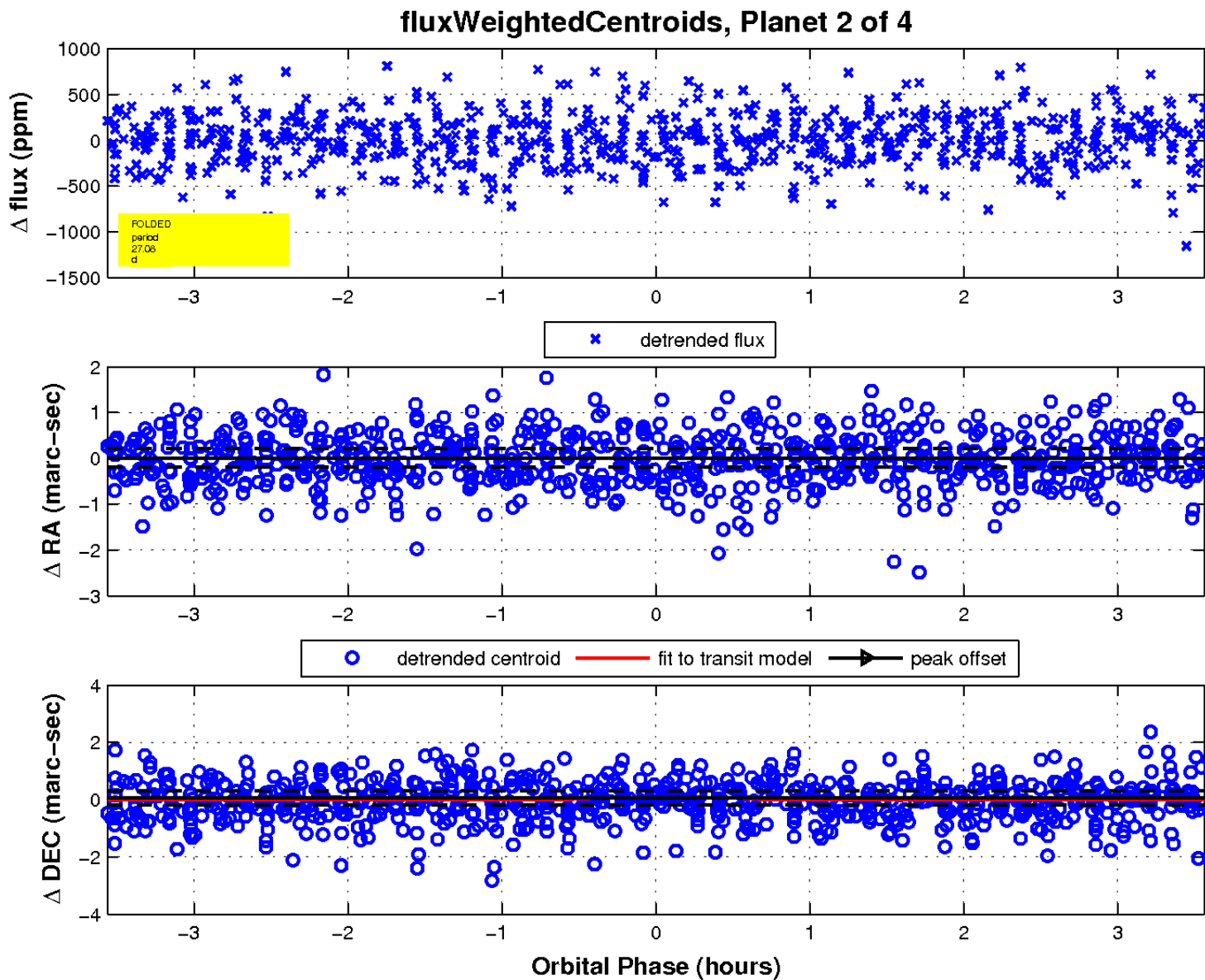
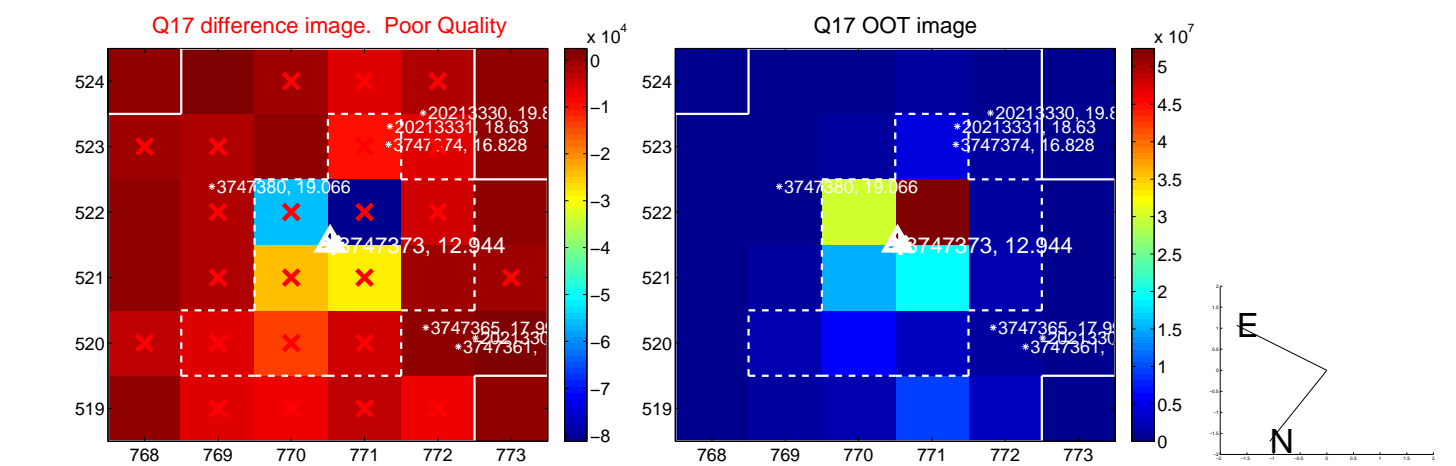
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

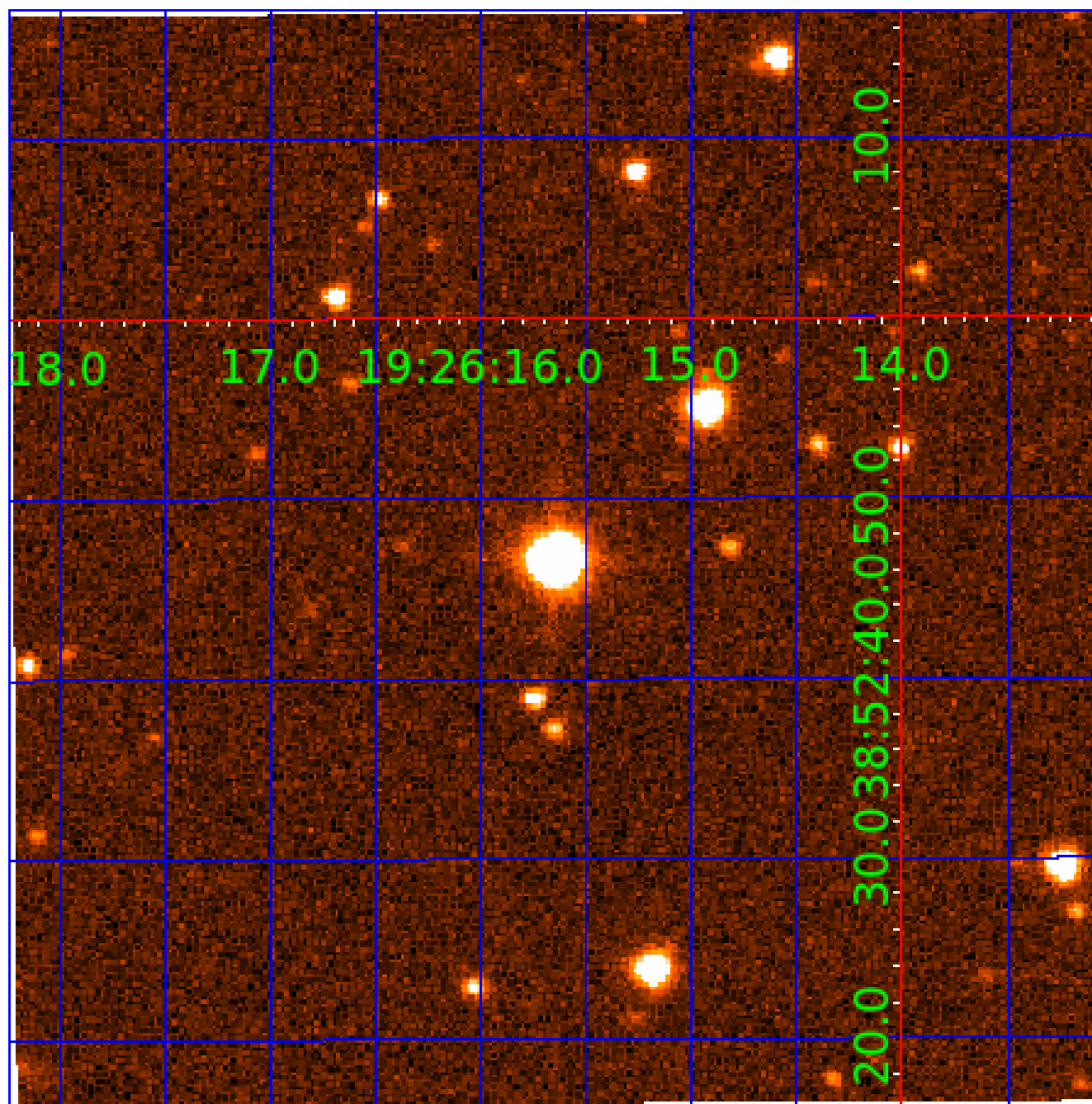


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 003747373

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
003747373-01	OBS	No	1.185707	131.983319	26.7	8.573	9.4	10.9	3.01	7351	1.58	33216.54
003747373-02	OBS	No	27.080771	143.707222	376.6	1.189	11.5	10.3	3.01	7351	5.99	512.60
003747373-03	OBS	No	16.498008	143.280157	244.8	2.178	9.9	9.8	3.01	7351	5.26	992.54
003747373-04	OBS	No	26.345693	139.797733	274.8	2.693	9.9	9.5	3.01	7351	5.06	531.75

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
003747373-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT
003747373-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV
003747373-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
003747373-04	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

**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.

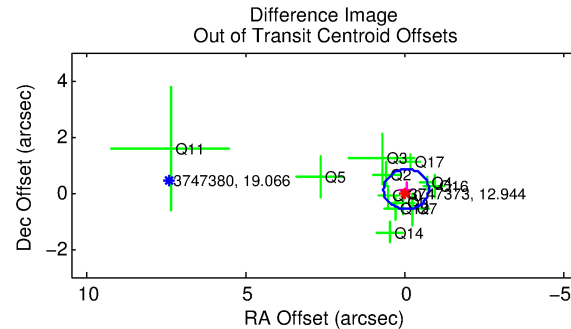
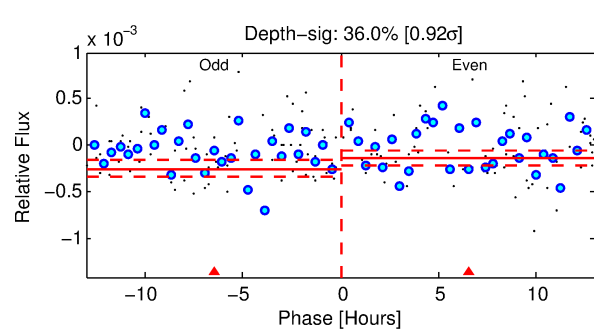
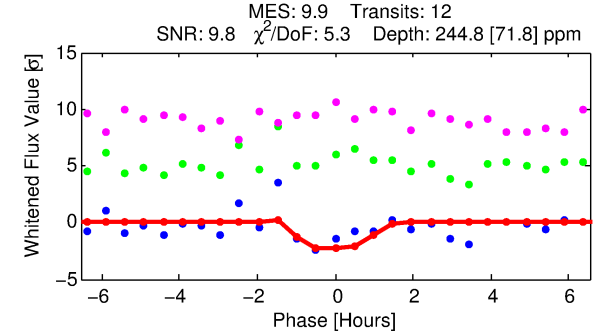
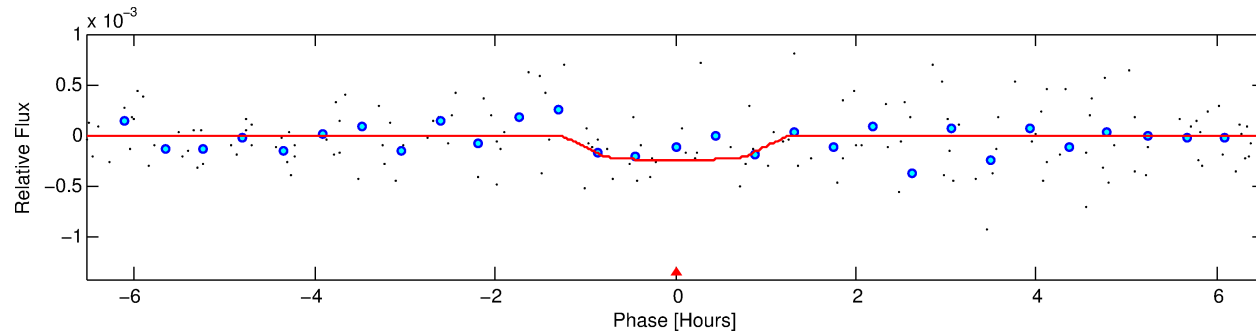
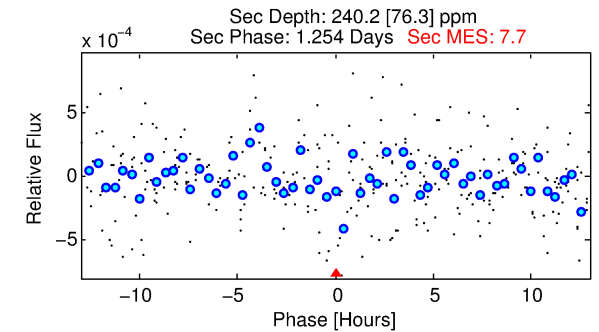
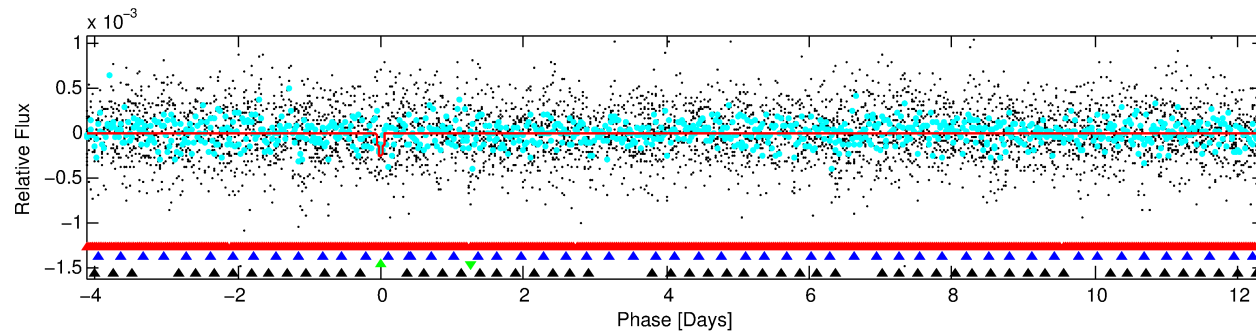
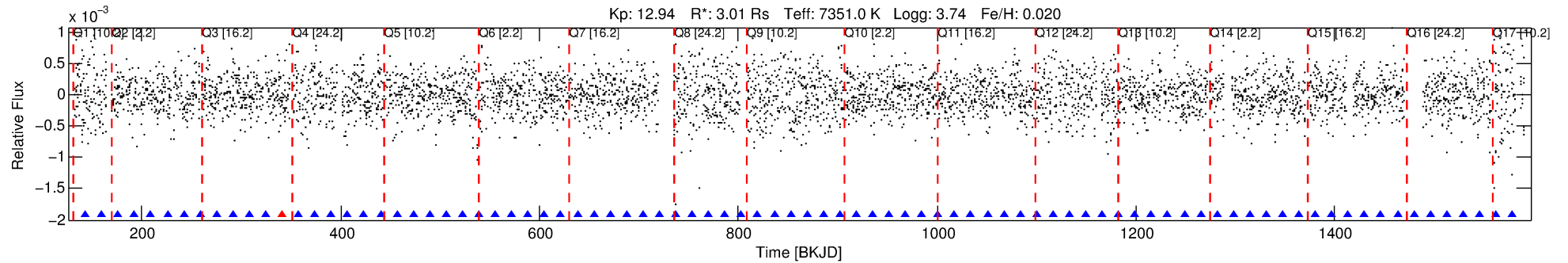
## Ephemeris Match Information For 003747373-03

No Significant Match Found



# DV One-Page Summary

KIC: 3747373 Candidate: 3 of 4 Period: 16.498 d



## DV Fit Results:

Period = 16.49801 [0.00029] d  
Epoch = 143.2802 [0.0136] BKJD  
Rp/R\* = 0.0160 [0.0341]  
a/R\* = 33.95 [459.33]  
b = 0.83 [5.11]  
Seff = 992.54 [686.23]  
Teff = 1431 [247] K  
Rp = 5.26 [11.44] Re  
a = 0.1545 [0.0645] AU  
Ag = 114.23 [494.67] [0.23 $\sigma$ ]  
Teffp = 7234 [7745] K [0.75 $\sigma$ ]

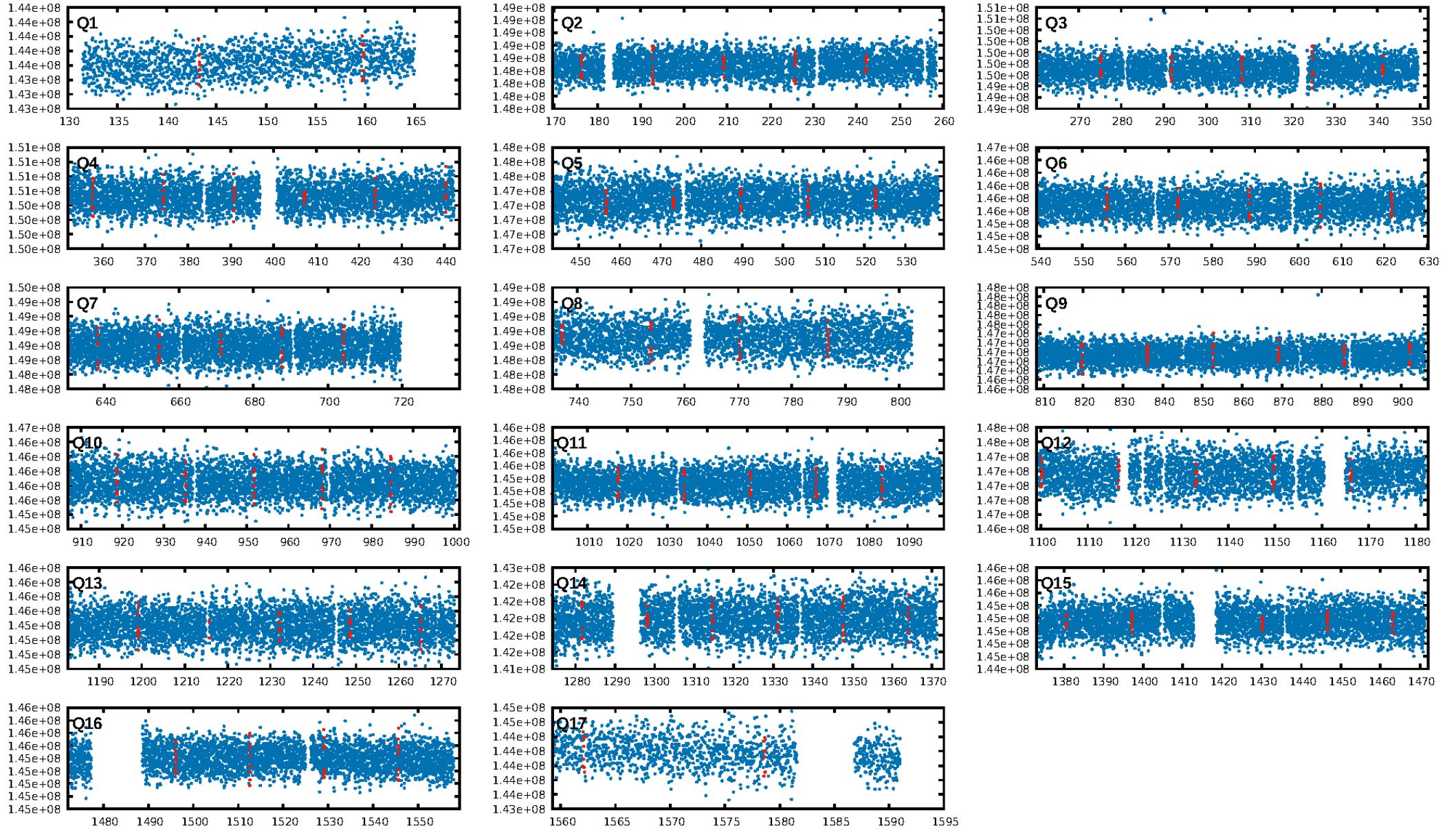
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [41.55 $\sigma$ ]  
LongPeriod-sig: 100.0% [68.23 $\sigma$ ]  
**ModelChiSquare2-sig: 0.0%**  
ModelChiSquareGof-sig: 45.5%  
**Bootstrap-pfa: 1.28e-11**  
RollingBand-fgt: 0.90 [9/10]  
**GhostDiagnostic-chr: -1.016**  
Centroid-sig: 1.6%  
Centroid-so: 0.567 arcsec [1.34 $\sigma$ ]  
OotOffset-rm: 0.120 arcsec [0.51 $\sigma$ ]  
OotOffset-st: 3/3/3/3 [12]  
KicOffset-rm: 0.161 arcsec [0.67 $\sigma$ ]  
KicOffset-st: 3/3/3/3 [12]  
DiffImageQuality-fgm: 0.42 [5/12]  
DiffImageOverlap-fno: 0.53 [9/17]

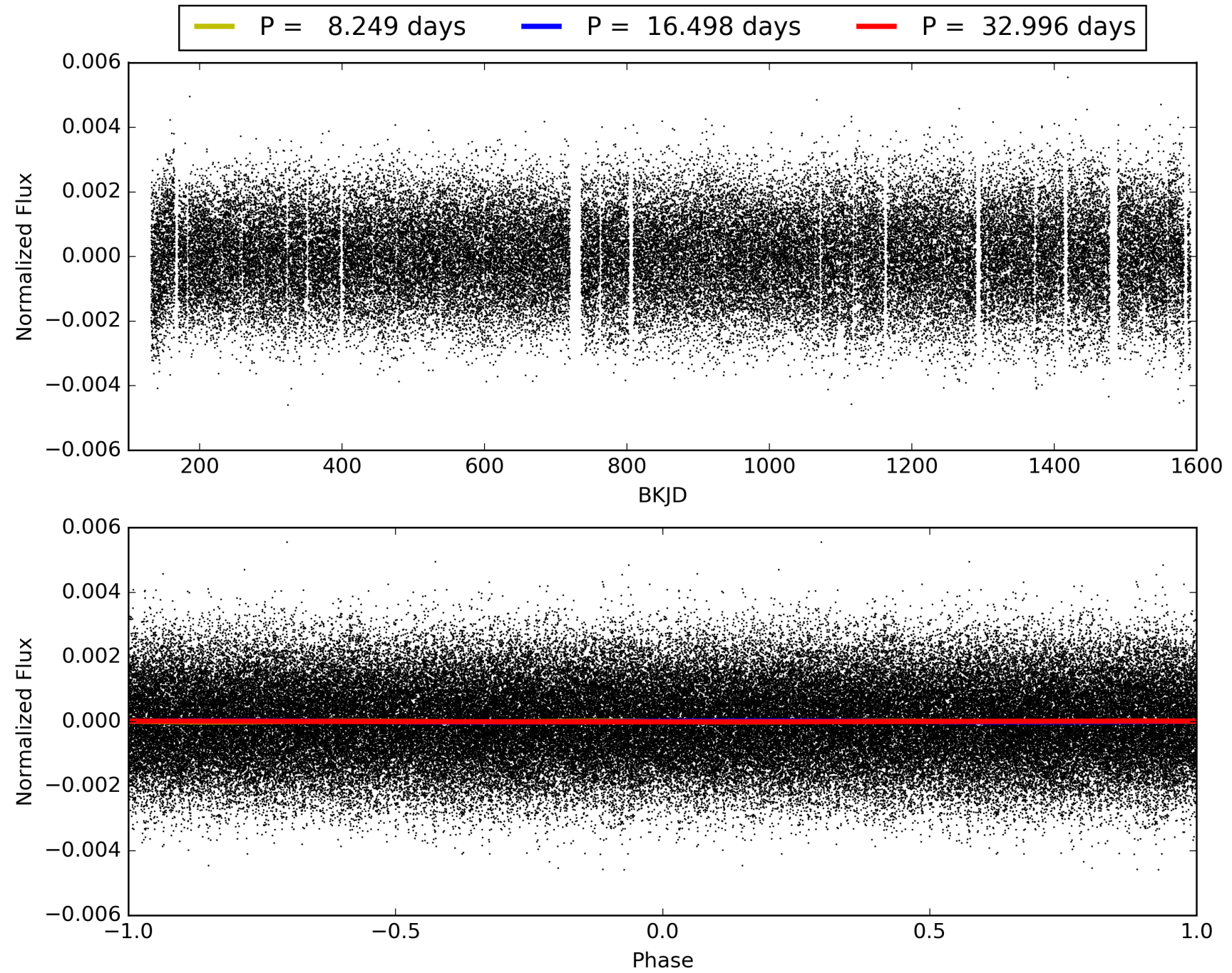
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 19:47:43 Z

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

# TCE 003747373-03, PDC Light Curves

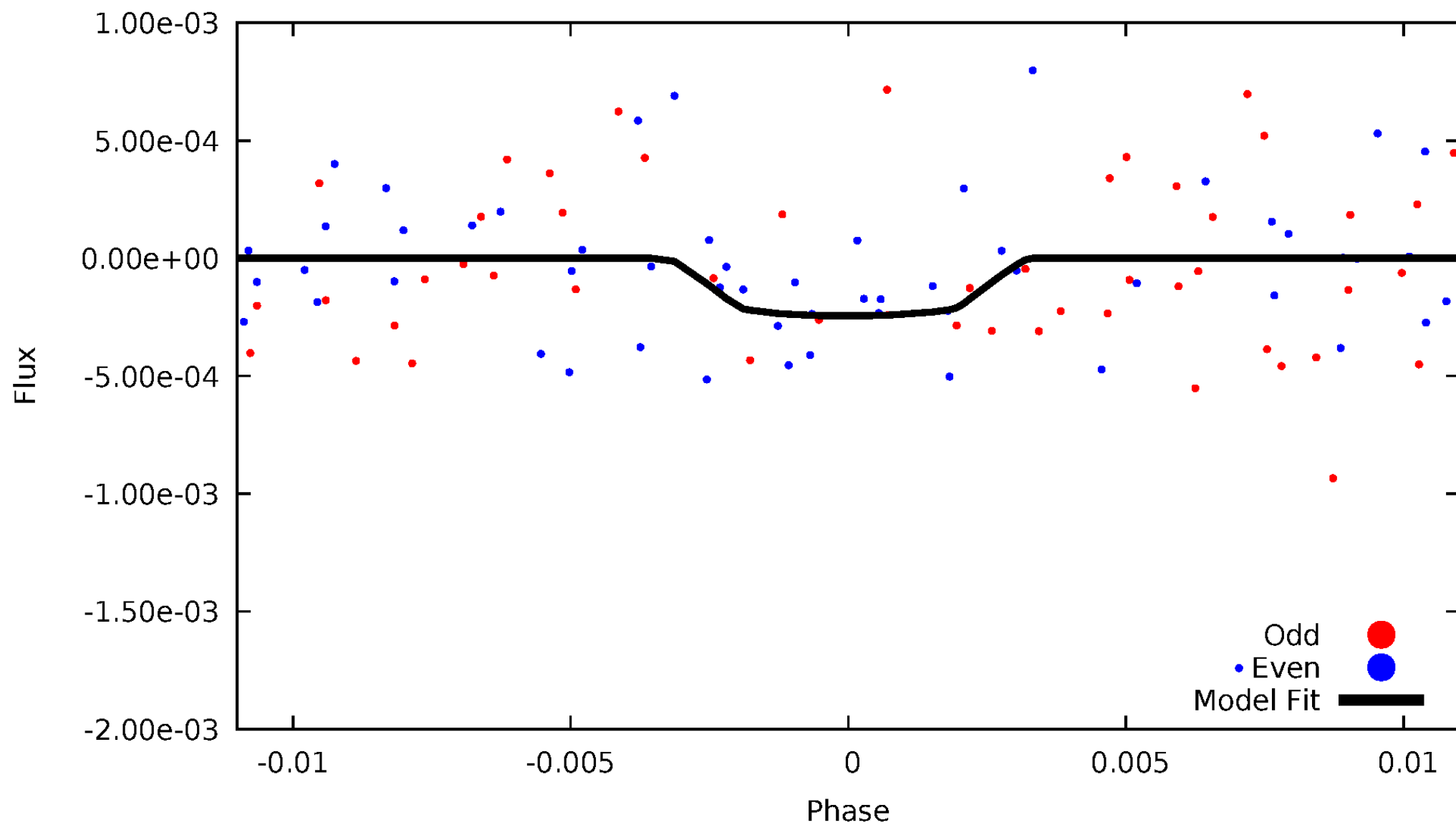


TCE 003747373-03



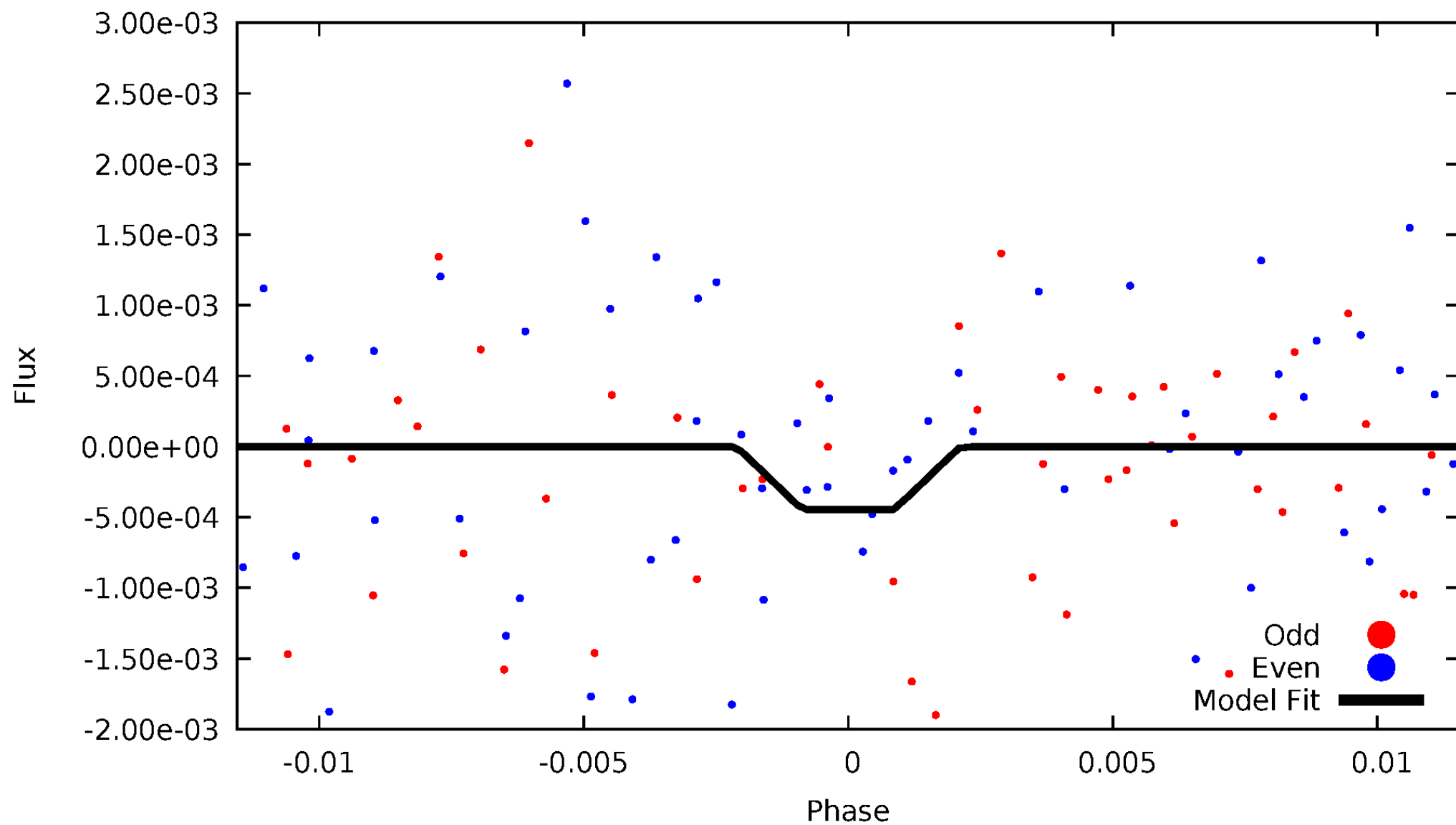
# DV Odd/Even

TCE 003747373-03

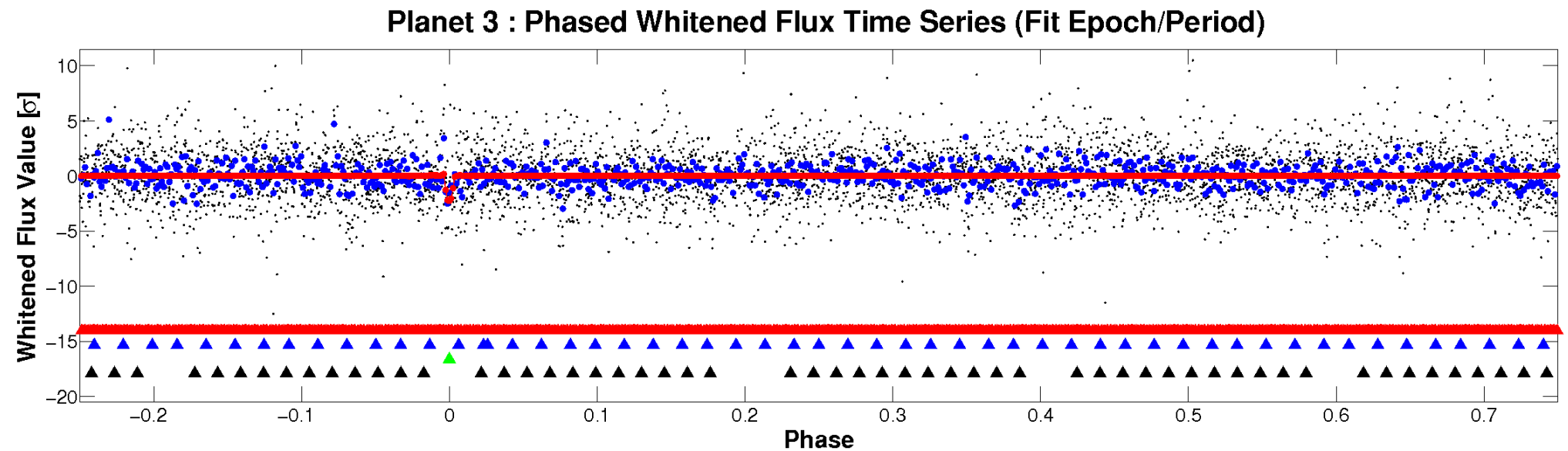
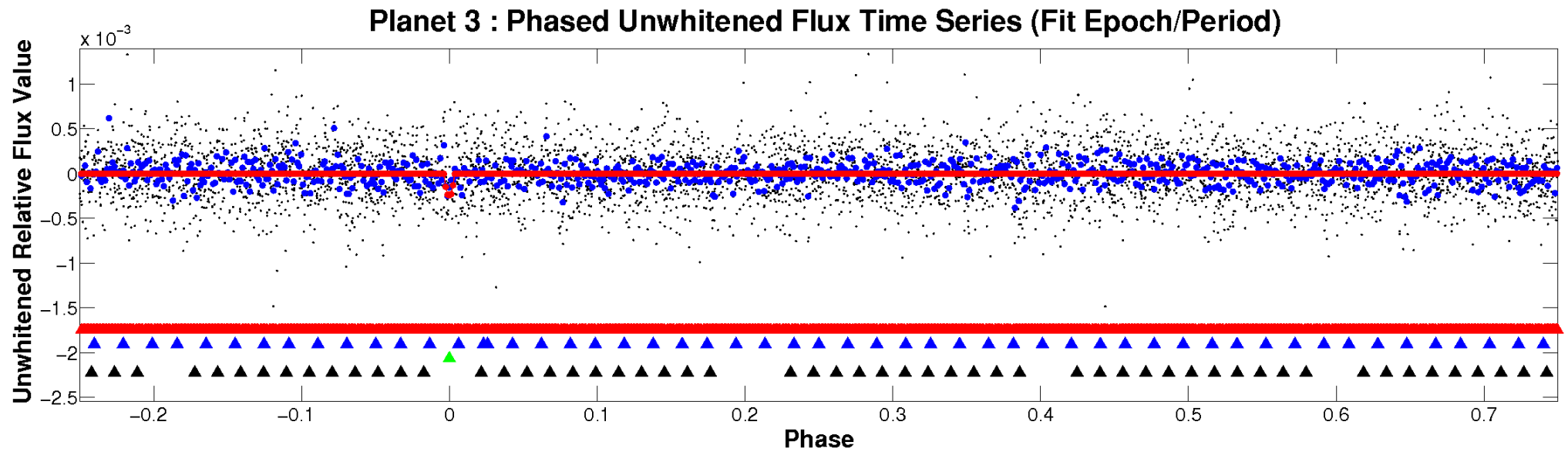


# ALT Odd/Even

TCE 003747373-03



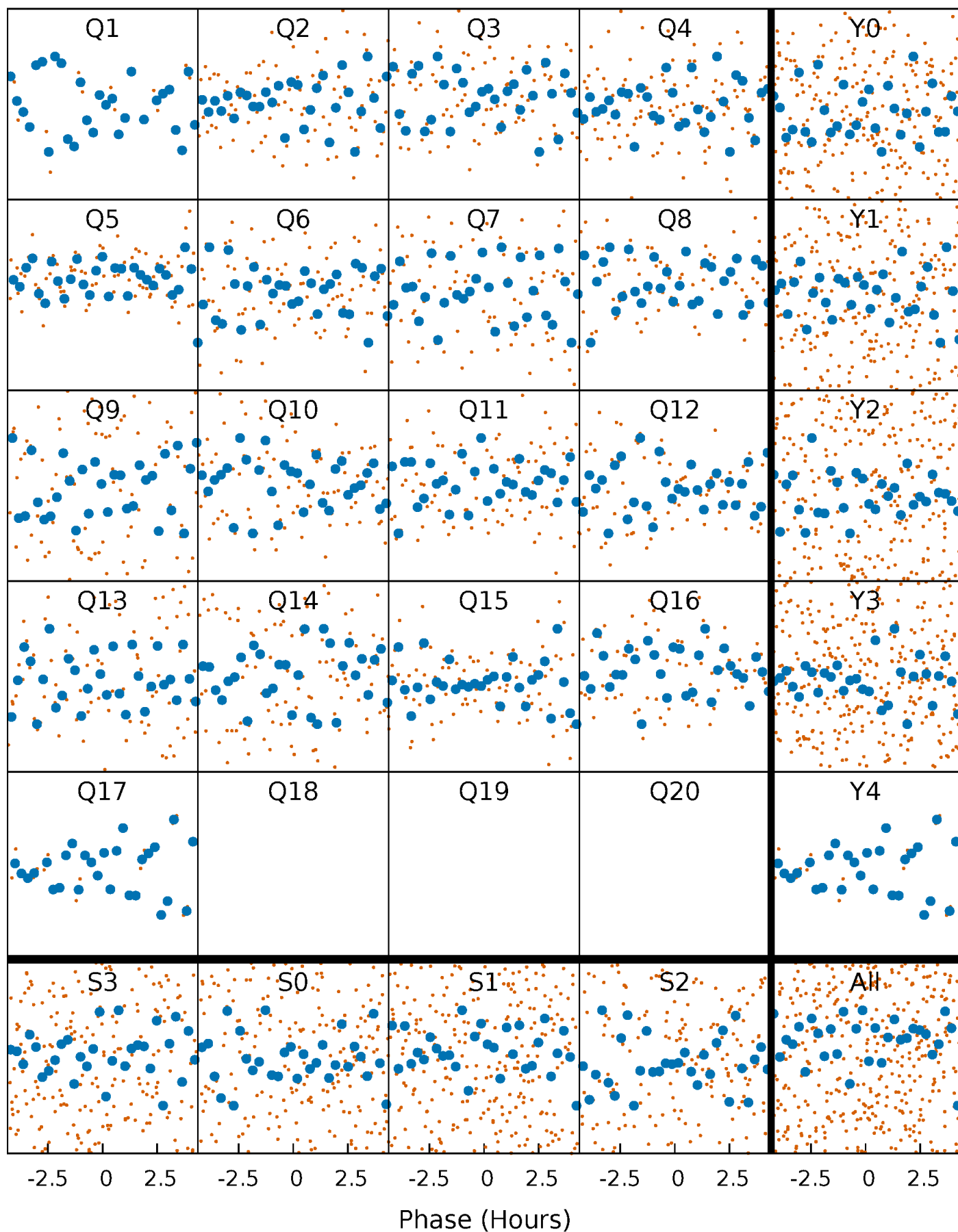
# Non-Whitened Vs. Whitened Light Curve





# PDC Quarter-Phased Transit Curves

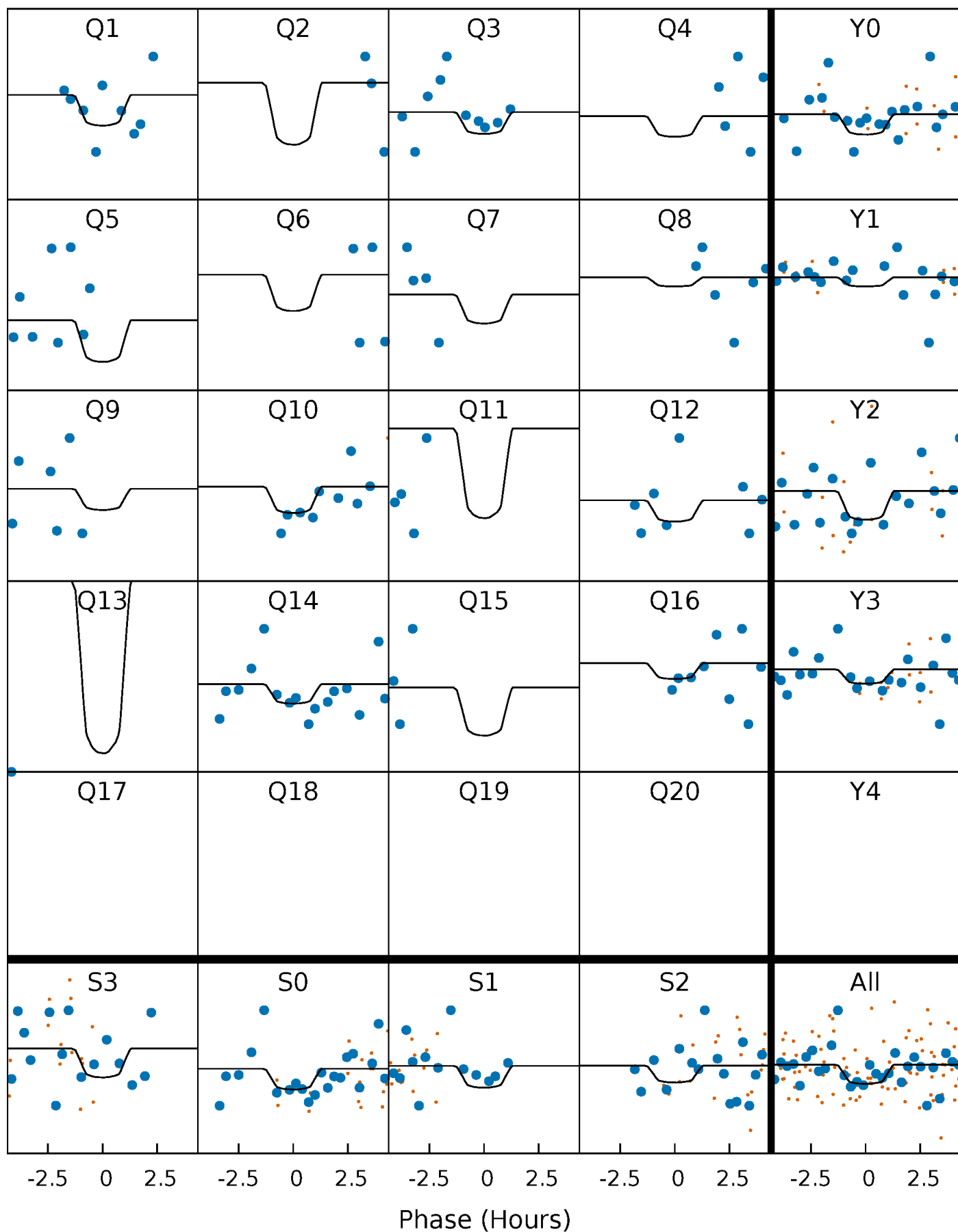
TCE 003747373-03 P= 16.498008 Days  $T_0=143.280157$  (BKJD)





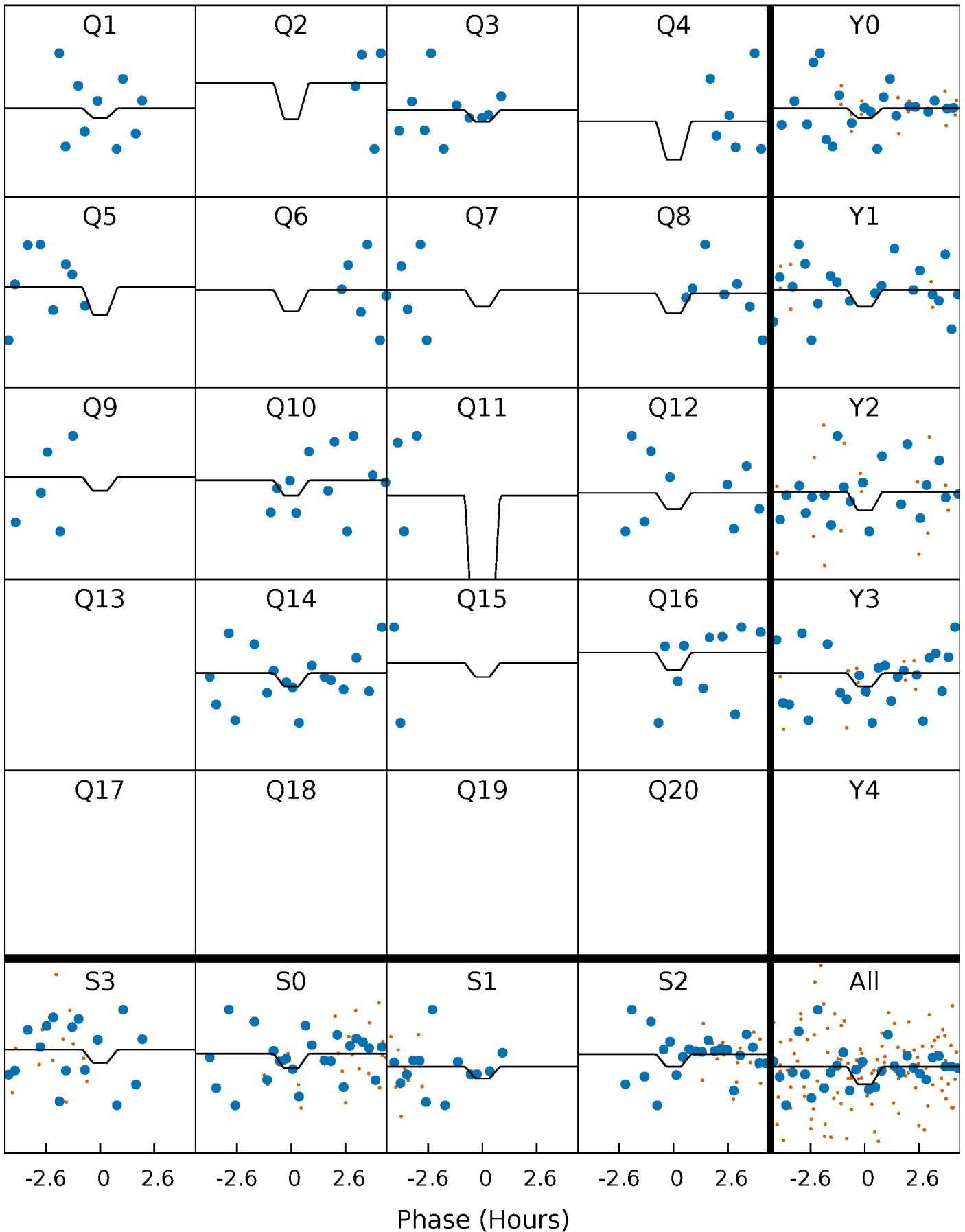
# DV Quarter-Phased Transit Curves

TCE 003747373-03 P= 16.498008 Days  $T_0=143.280157$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

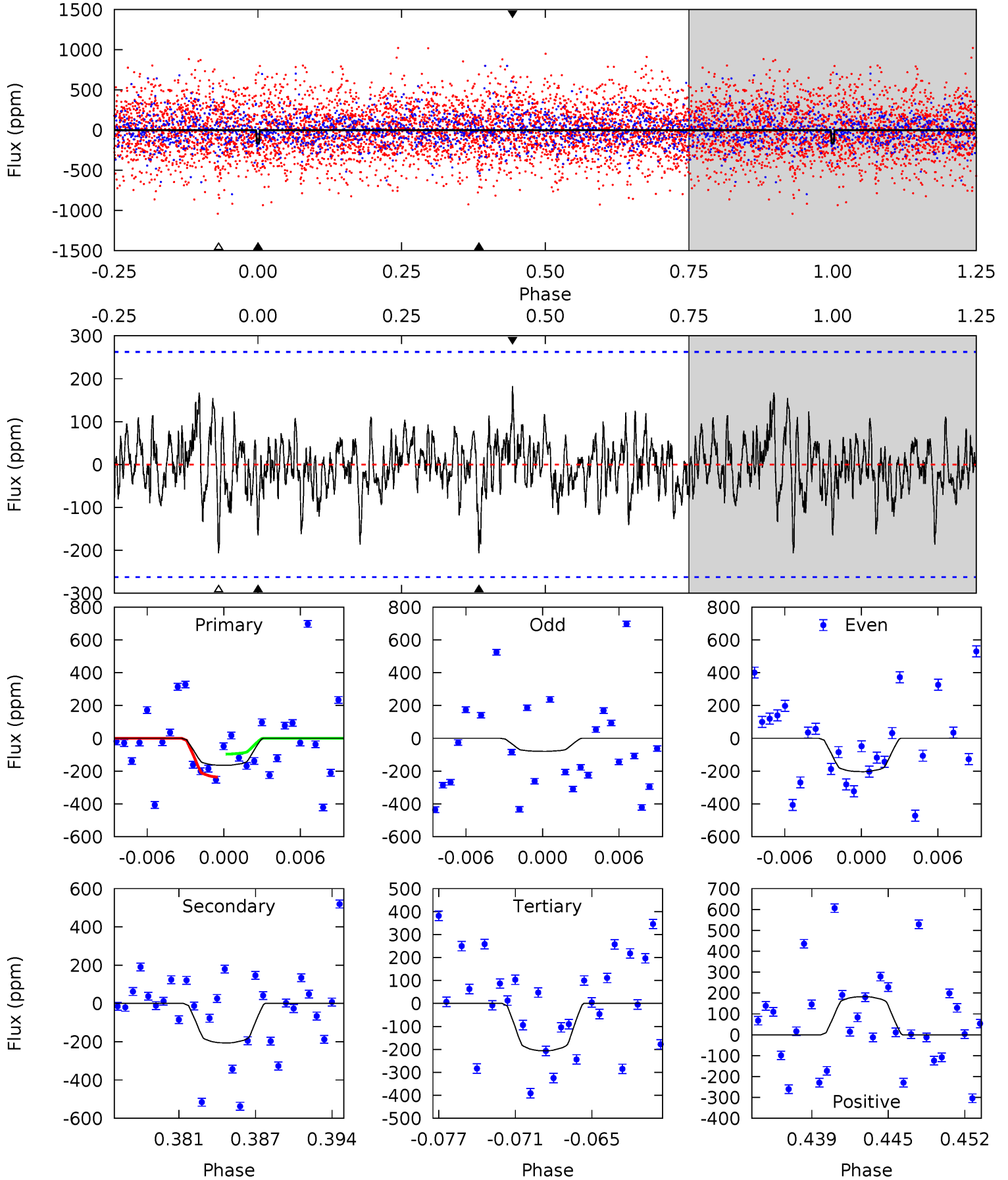
TCE 003747373-03 P= 16.498207 Days  $T_0=143.288880$  (BKJD)



# DV Model-Shift Uniqueness Test

003747373-03, P = 16.498008 Days, E = 126.782149 Days

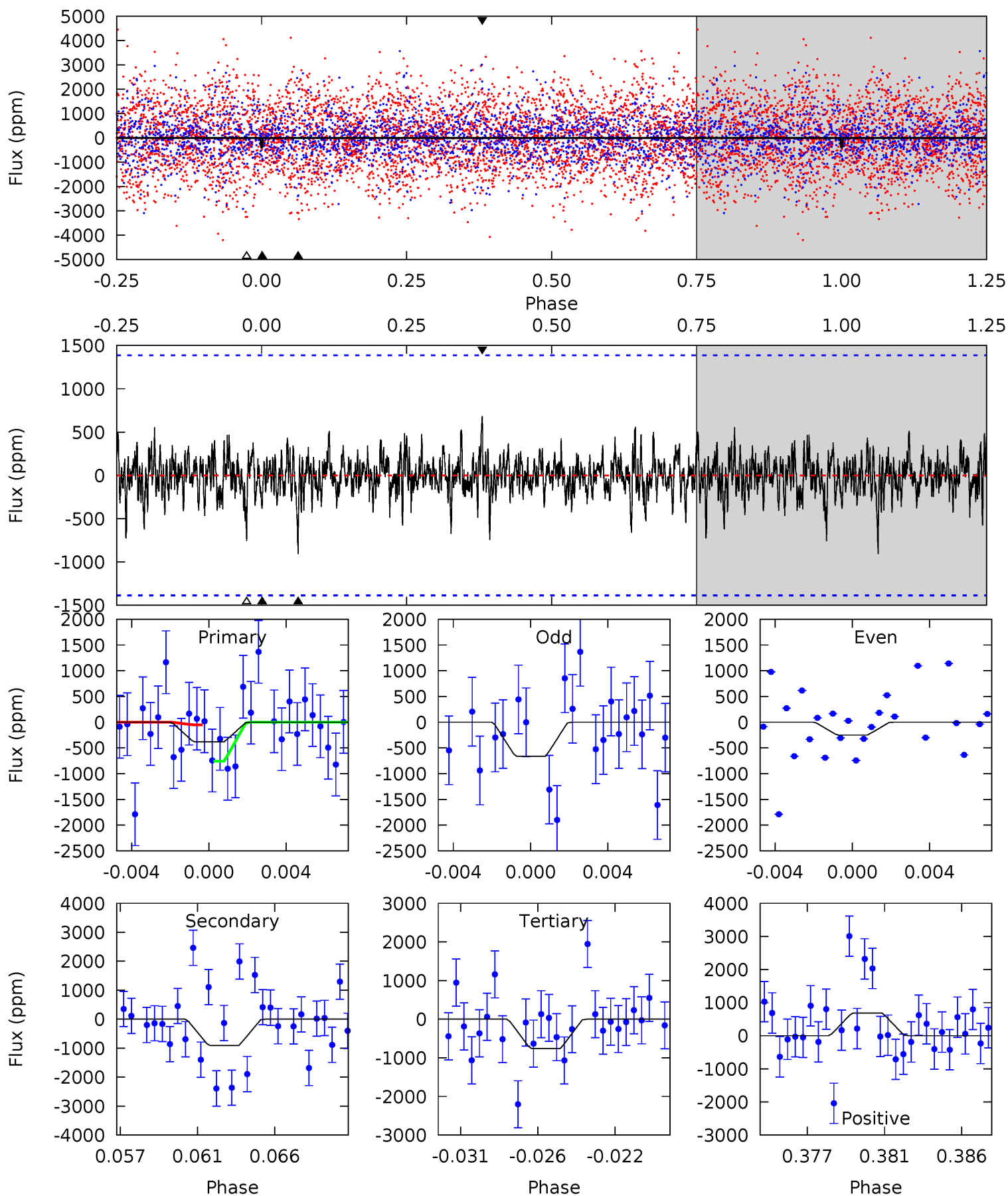
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
3.21	4.02	4.02	3.56	5.11	2.72	1.06	-0.80	-0.34	0.00	0.46	1.15	0.88	0.47	1.38



# Alt Model-Shift Uniqueness Test

003747373-03, P = 16.498207 Days, E = 126.790673 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
1.43	3.39	2.83	2.56	5.18	2.85	0.68	-1.40	-1.13	0.56	0.82	0.77	1.12	0.43	1.32



### Stellar Parameters For KIC 003747373

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$7351^{+203}_{-330}$	$3.738^{+0.392}_{-0.098}$	$0.020^{+0.200}_{-0.350}$	$3.010^{+0.435}_{-1.306}$	$1.808^{+0.184}_{-0.368}$	$0.093^{+0.312}_{-0.029}$
	+3%/-4%	+10%/-3%	+1000%/-1750%	+14%/-43%	+10%/-20%	+334%/-31%
Source	KIC0	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 003747373-03 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-206 \pm 51$	$8.67^{+9.03}_{-6.02}$	$1944^{+132}_{-206}$	$5153^{+5185}_{-1252}$	$35^{+344}_{-27}$
Alt.	$-907 \pm 268$	$10.50^{+8.48}_{-7.25}$	$1934^{+139}_{-186}$	$6699^{+8399}_{-1691}$	$107^{+945}_{-75}$

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

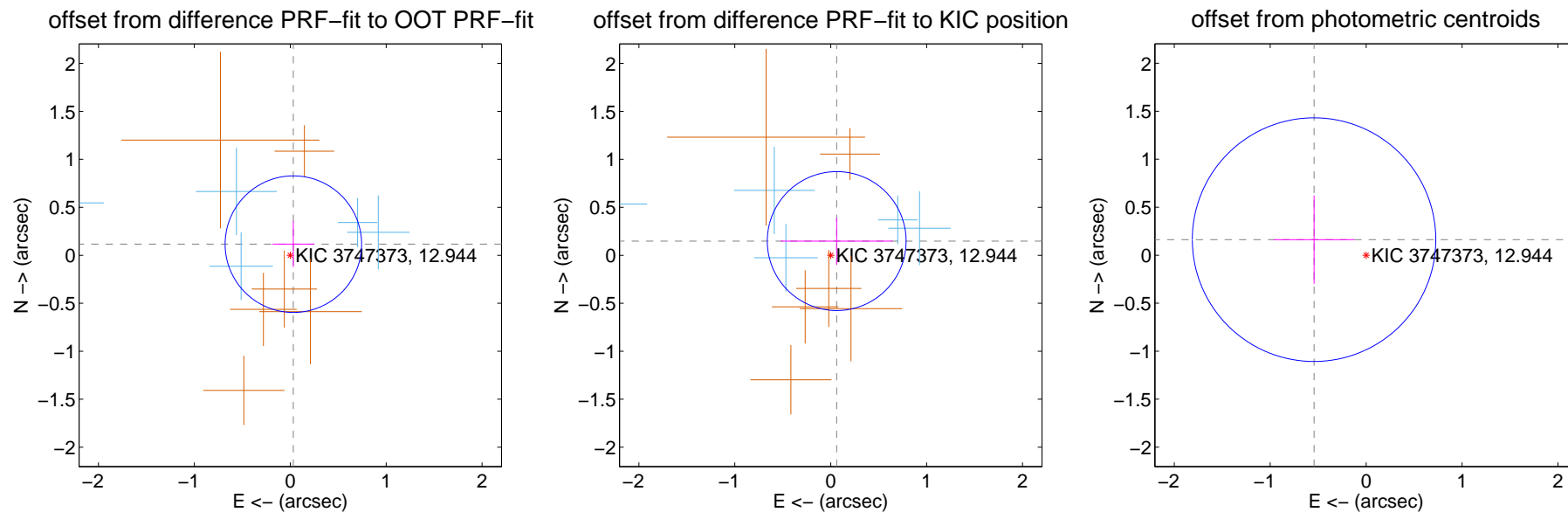
## DV Centroid Data

Supplemental centroid analysis for 003747373-03. Kepler magnitude: 12.94. Transit SNR 9.82

There are 5 quarters with good PRF difference image offsets

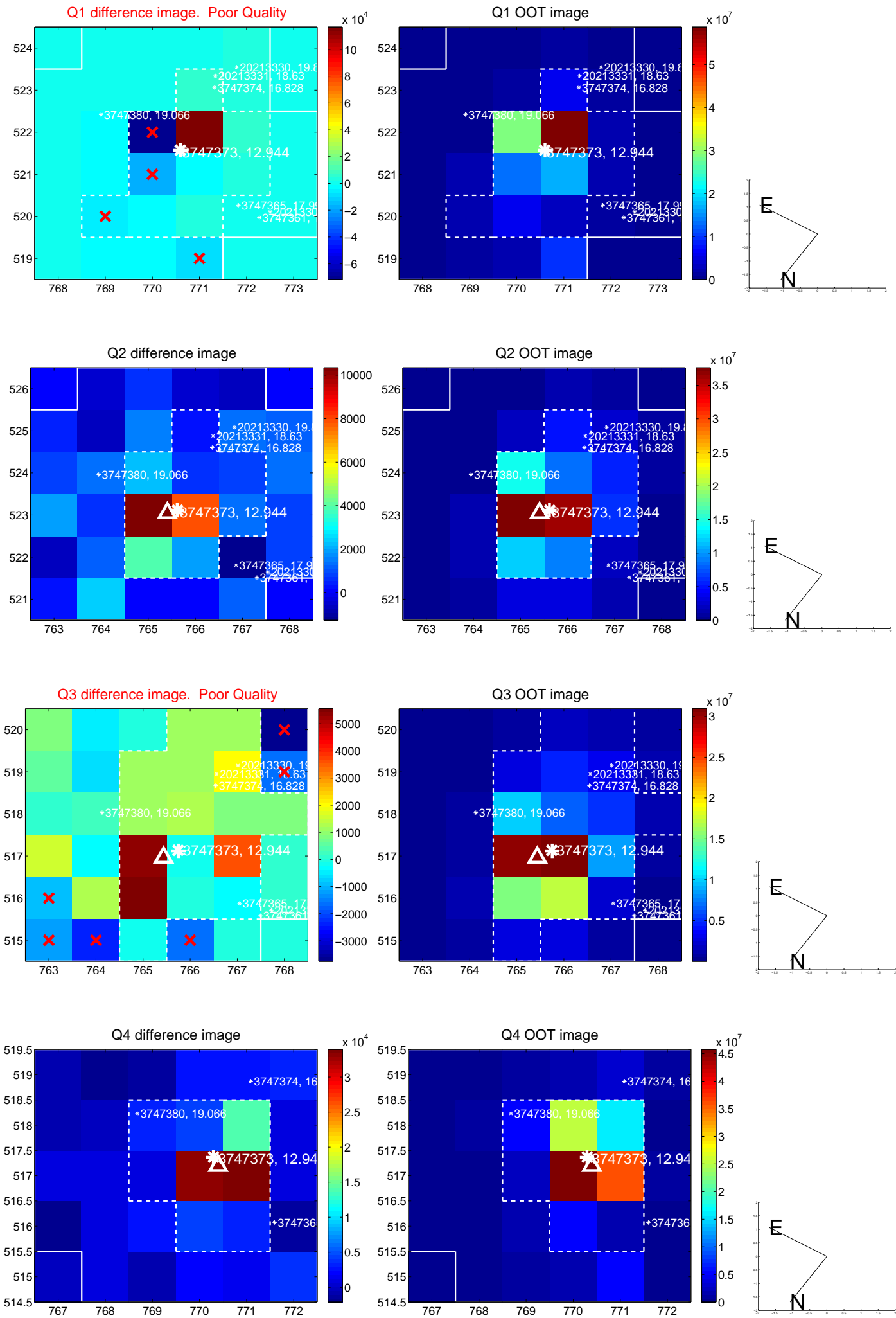
The direct PRF centroid is offset from the target star catalog position by about 0.06 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.120 \pm 0.237$	0.51	$-0.032 \pm 0.218$	$0.116 \pm 0.239$
PRF-fit source offset from KIC position	$0.161 \pm 0.241$	0.67	$-0.062 \pm 0.583$	$0.148 \pm 0.243$
photometric centroid source offset	$0.57 \pm 0.42$	1.34	$0.54 \pm 0.42$	$0.16 \pm 0.46$



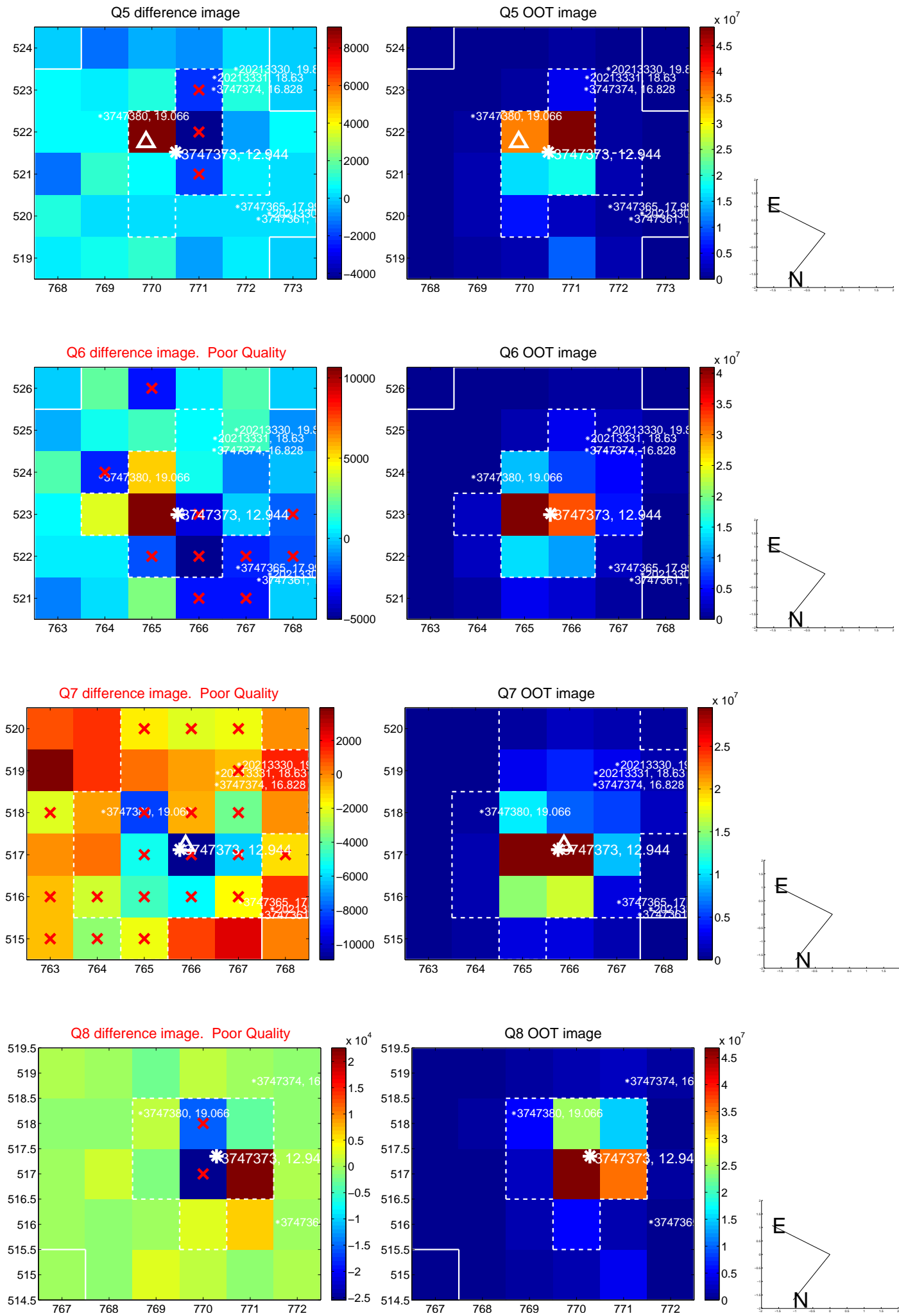
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

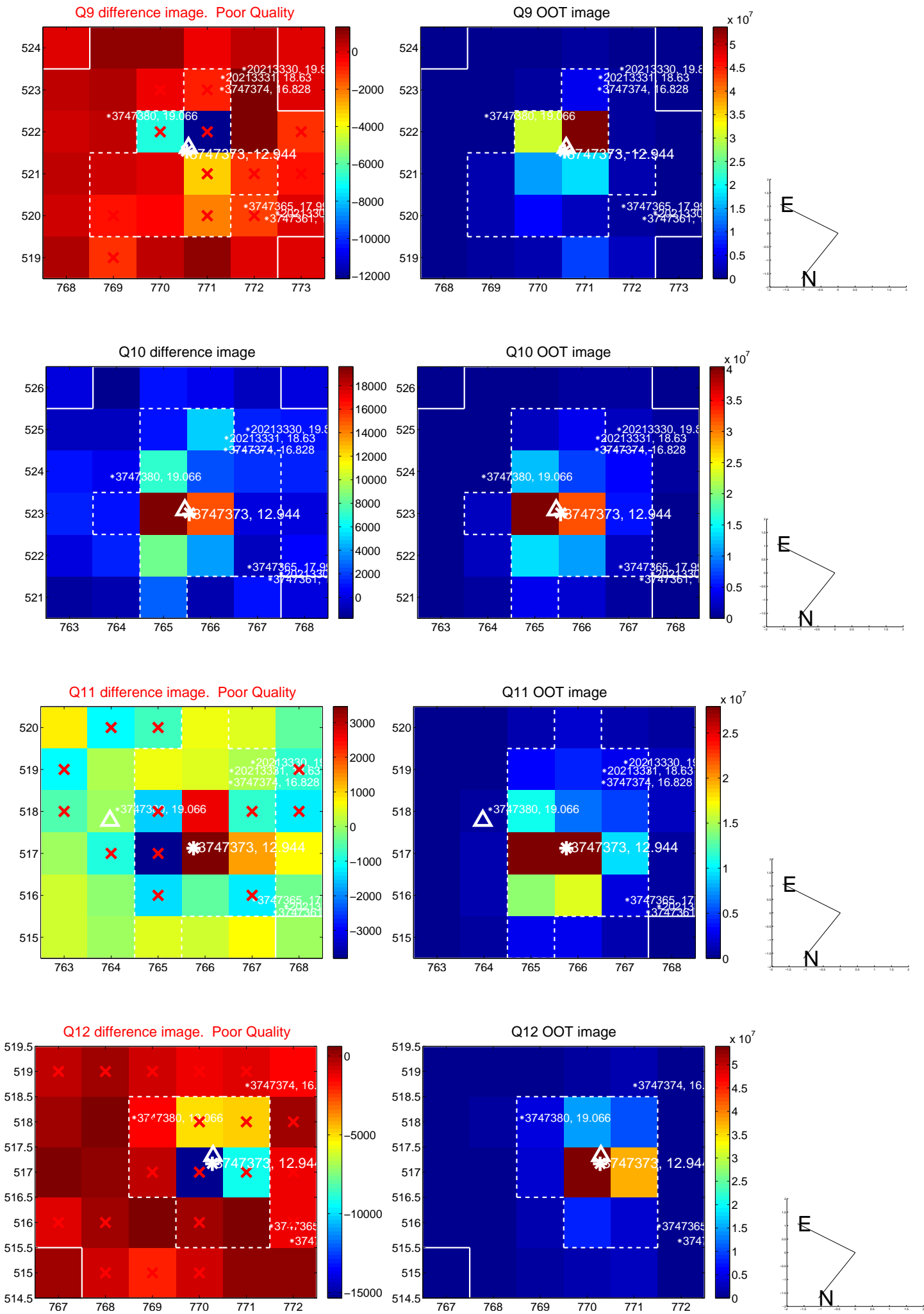




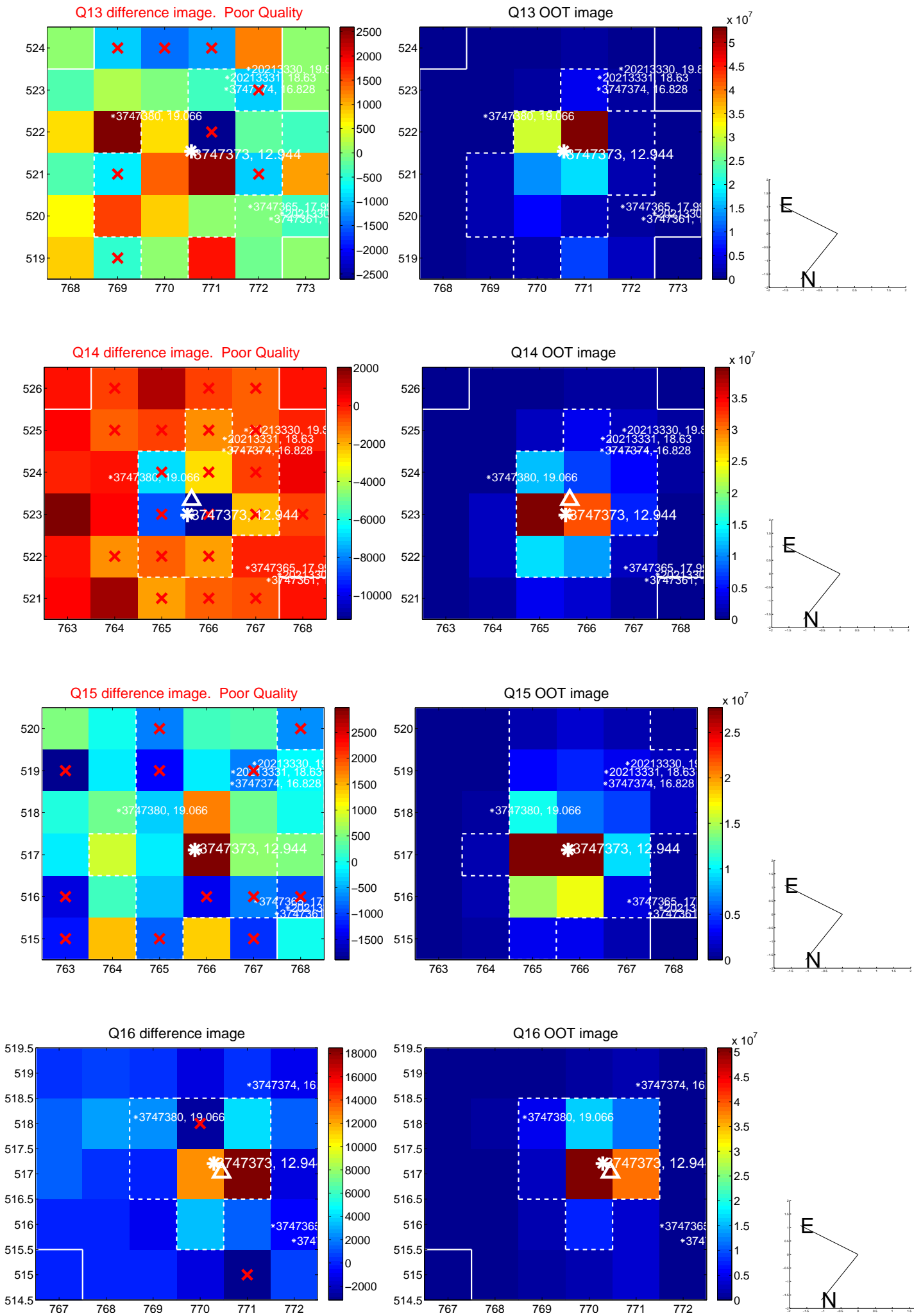
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



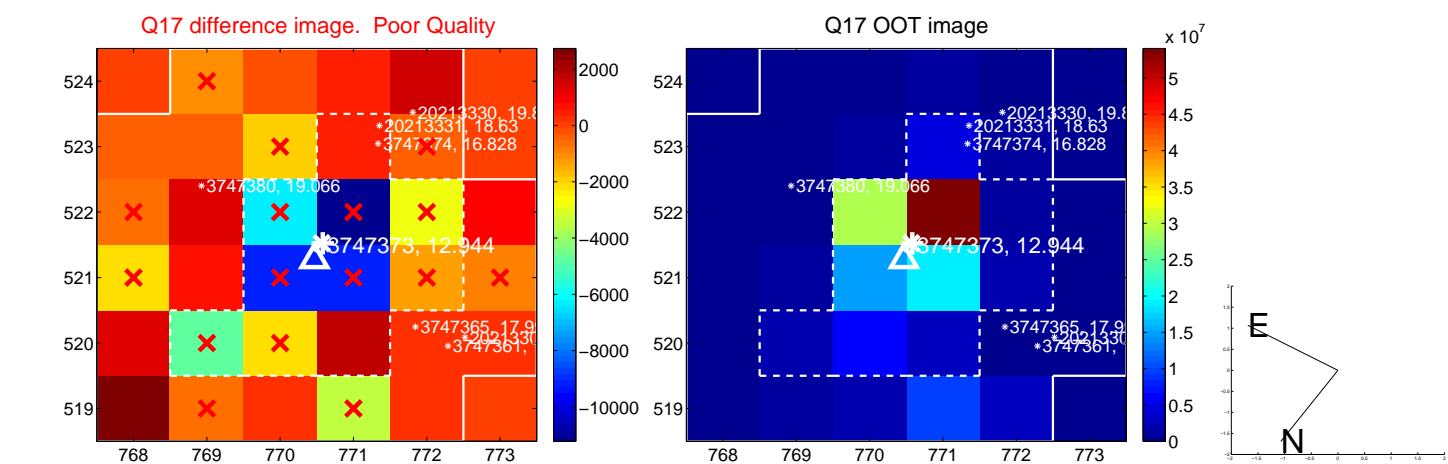
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



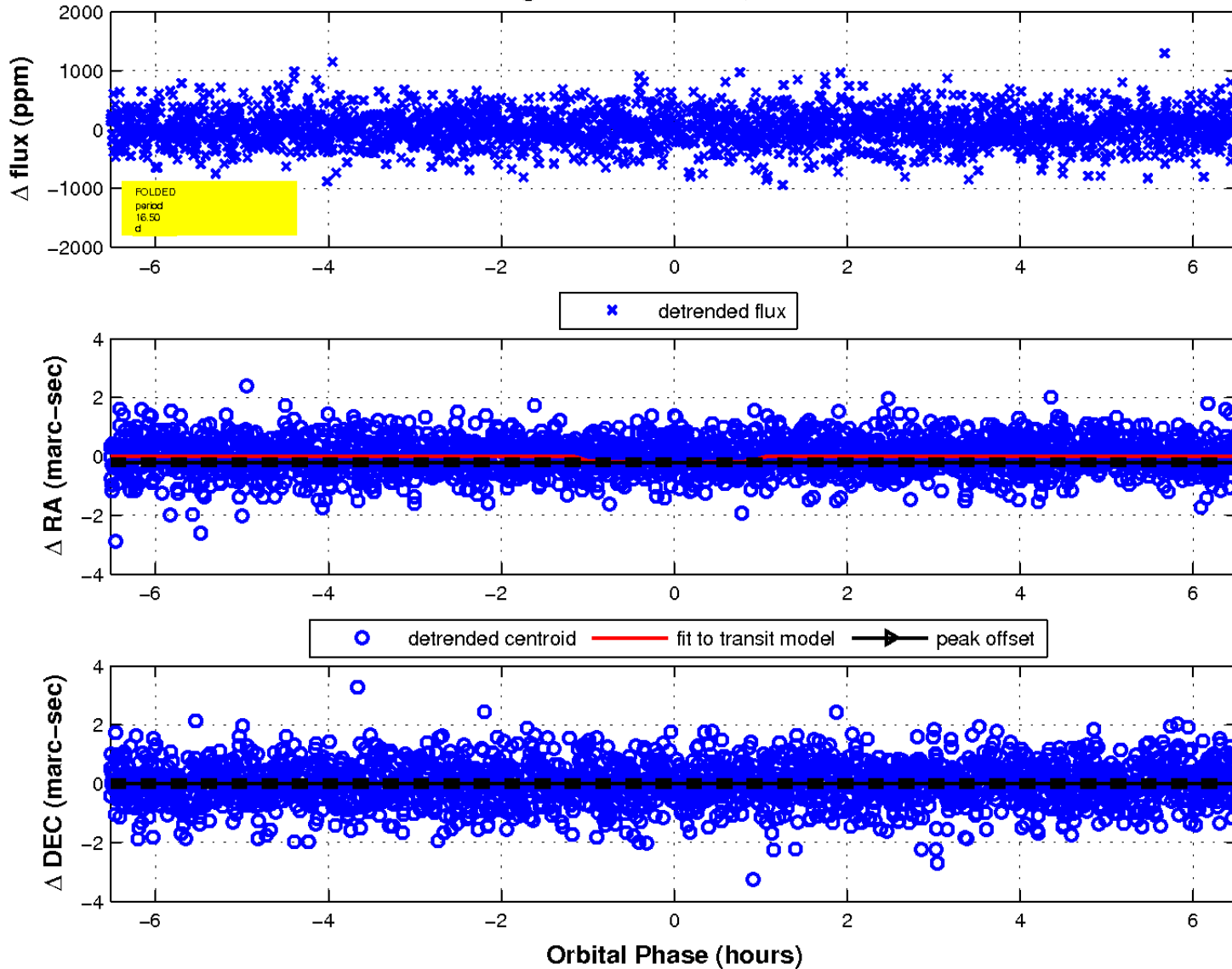
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

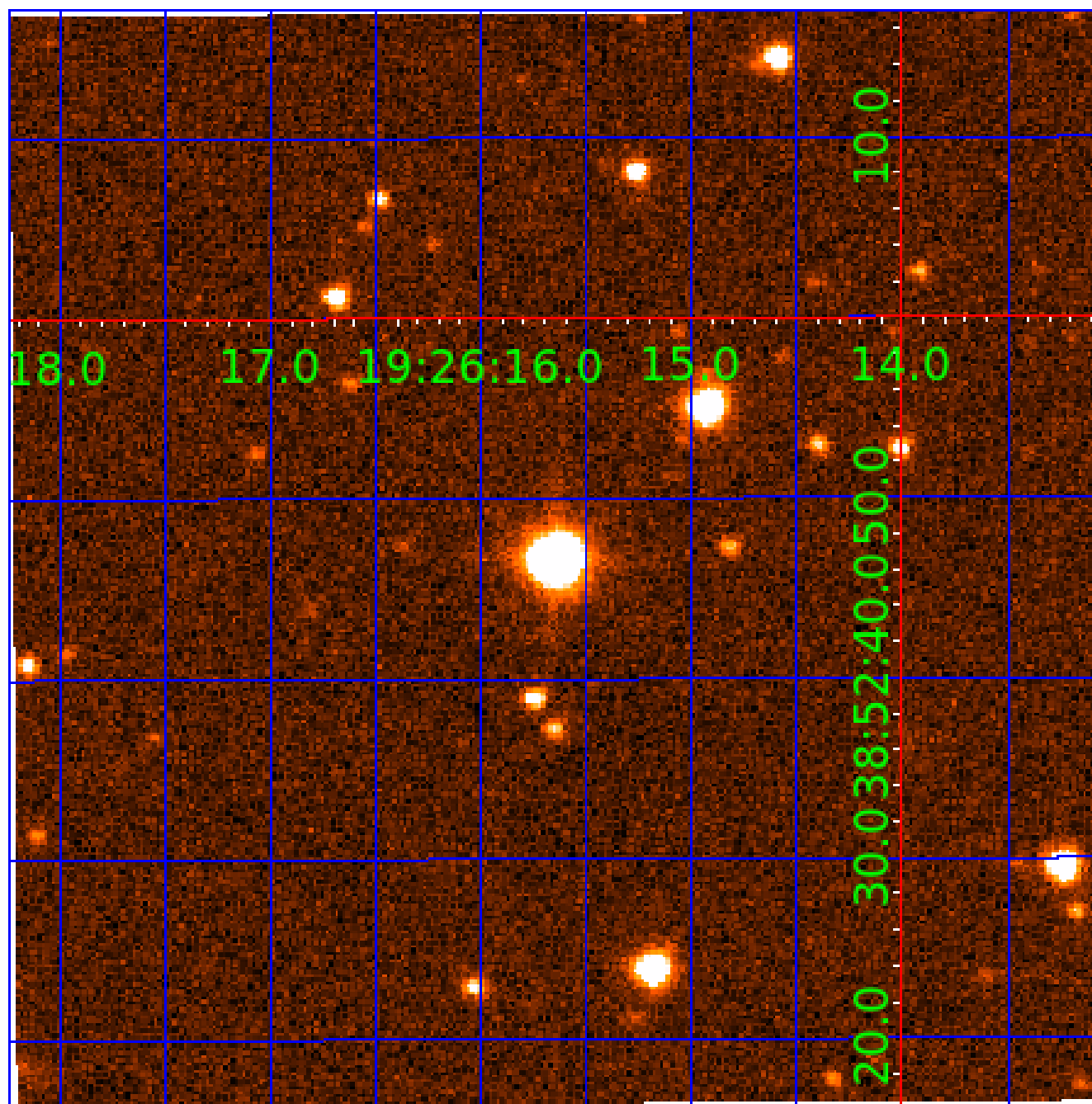


fluxWeightedCentroids, Planet 3 of 4



UKIRT Image

Declination



# KIC 003747373

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
003747373-01	OBS	No	1.185707	131.983319	26.7	8.573	9.4	10.9	3.01	7351	1.58	33216.54
003747373-02	OBS	No	27.080771	143.707222	376.6	1.189	11.5	10.3	3.01	7351	5.99	512.60
003747373-03	OBS	No	16.498008	143.280157	244.8	2.178	9.9	9.8	3.01	7351	5.26	992.54
003747373-04	OBS	No	26.345693	139.797733	274.8	2.693	9.9	9.5	3.01	7351	5.06	531.75

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
003747373-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT
003747373-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV
003747373-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
003747373-04	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

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

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

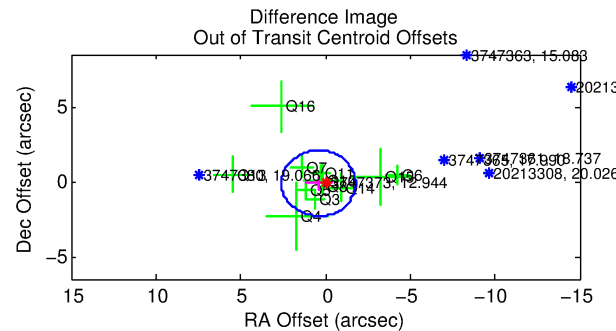
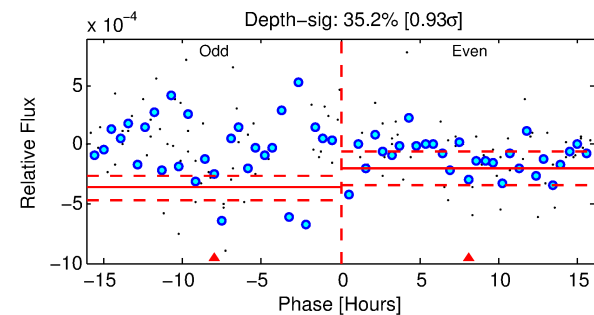
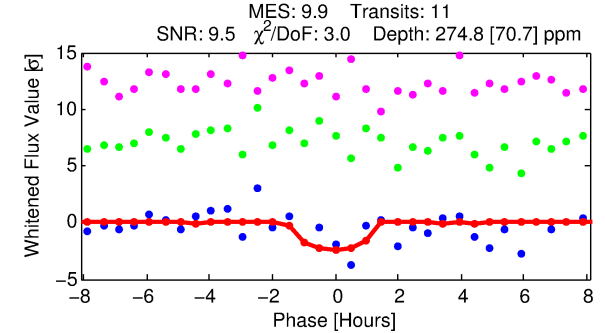
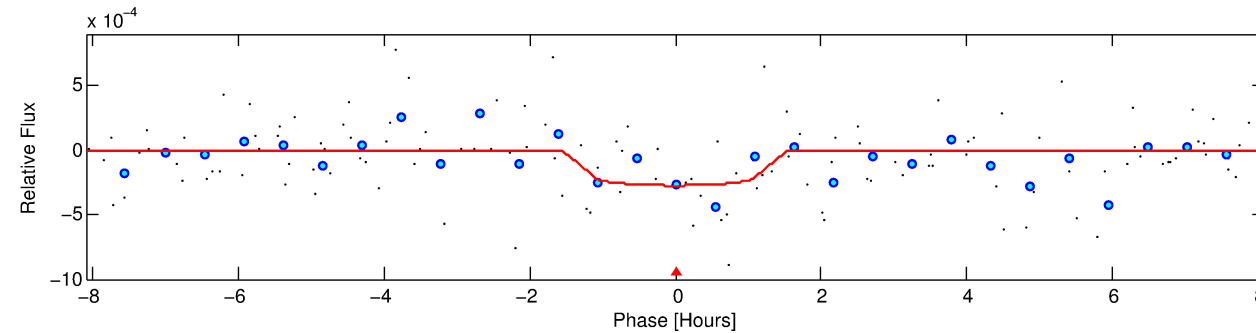
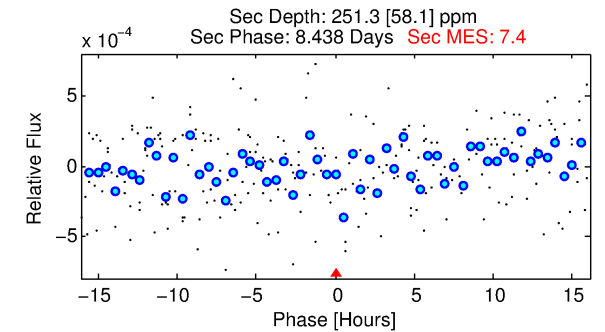
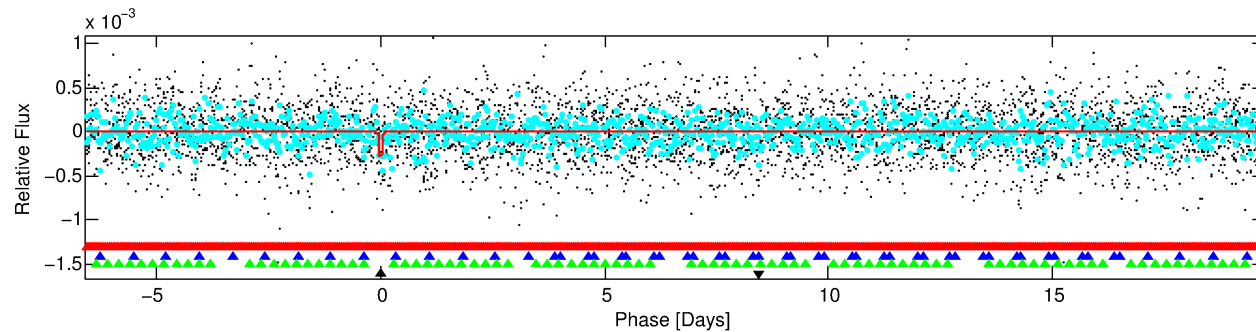
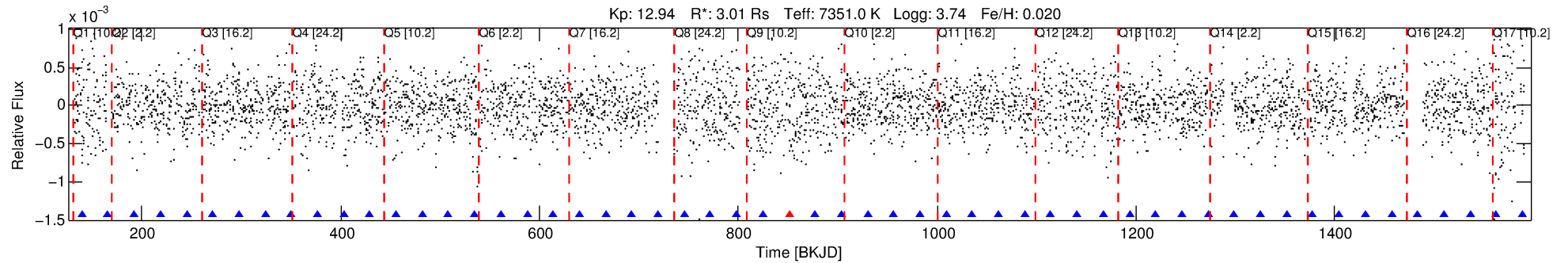
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 003747373-04

No Significant Match Found

# DV One-Page Summary

KIC: 3747373 Candidate: 4 of 4 Period: 26.346 d



## DV Fit Results:

Period = 26.34569 [0.00043] d  
Epoch = 139.7977 [0.0155] BKJD  
Rp/R\* = 0.0154 [0.0366]  
a/R\* = 75.87 [1038.49]  
b = 0.02 [873.00]  
Seff = 531.75 [367.65]  
Teff = 1224 [212] K  
Rp = 5.06 [12.23] Re  
a = 0.2111 [0.0881] AU  
Ag = 240.75 [1157.26] [0.21 $\sigma$ ]  
Teffp = 7457 [8881] K [0.70 $\sigma$ ]

## DV Diagnostic Results:

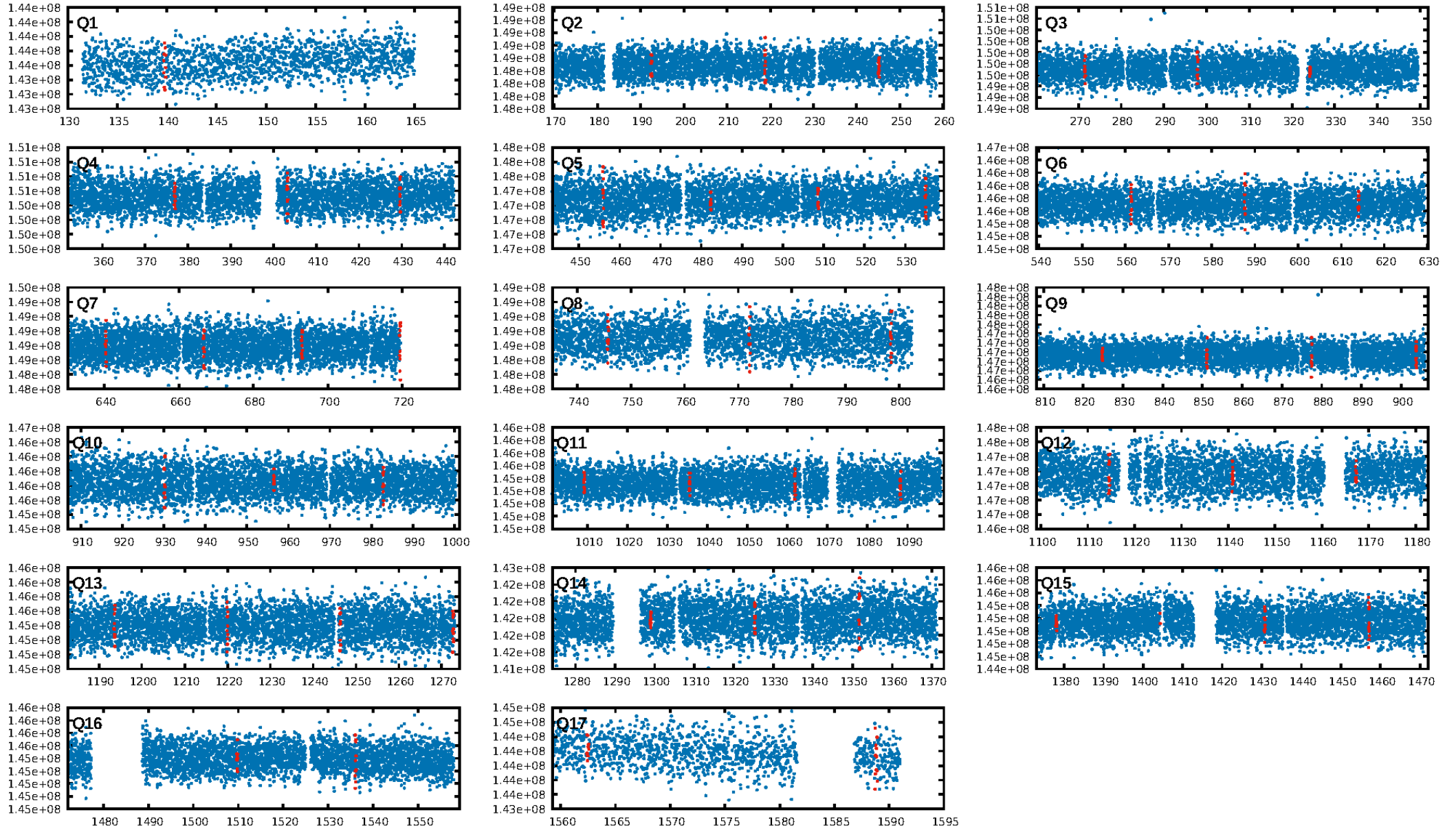
ShortPeriod-sig: 100.0% [68.23 $\sigma$ ]  
LongPeriod-sig: 100.0% [5.99 $\sigma$ ]  
**ModelChiSquare2-sig: 0.1%**  
ModelChiSquareGof-sig: 97.1%  
**Bootstrap-pfa: 5.81e-09**  
RollingBand-fgt: 0.90 [9/10]  
GhostDiagnostic-chr: -2.576  
Centroid-sig: 0.5%  
Centroid-so: 1.221 arcsec [2.93 $\sigma$ ]  
OotOffset-rm: 0.426 arcsec [0.58 $\sigma$ ]  
KicOffset-rm: 0.419 arcsec [0.63 $\sigma$ ]  
OotOffset-st: 3/4/3/2 [12]  
KicOffset-st: 3/4/3/2 [12]  
DiffImageQuality-fgm: 0.17 [2/12]  
DiffImageOverlap-fno: 0.59 [10/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 19:47:46 Z

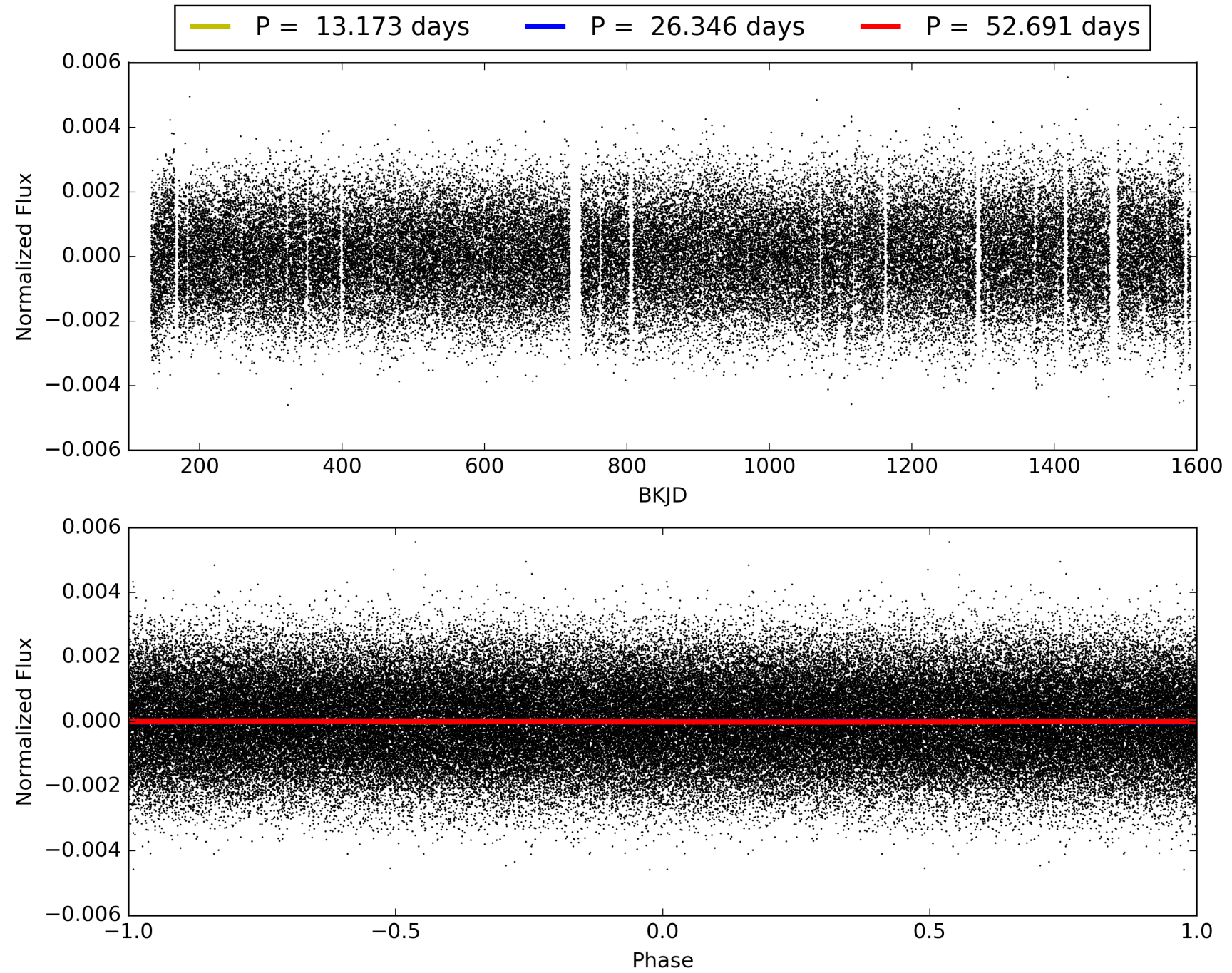
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center



# TCE 003747373-04, PDC Light Curves

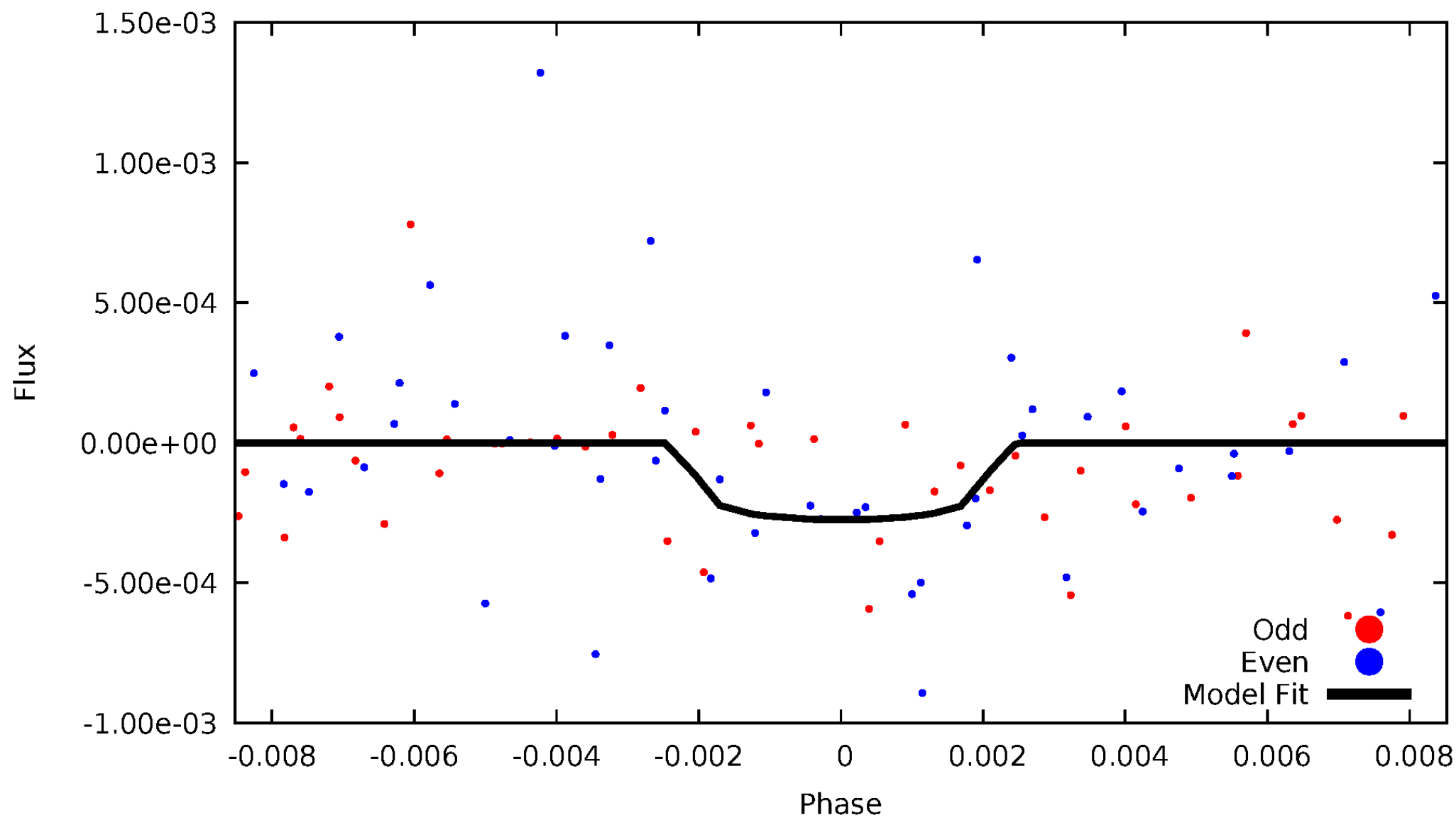


TCE 003747373-04



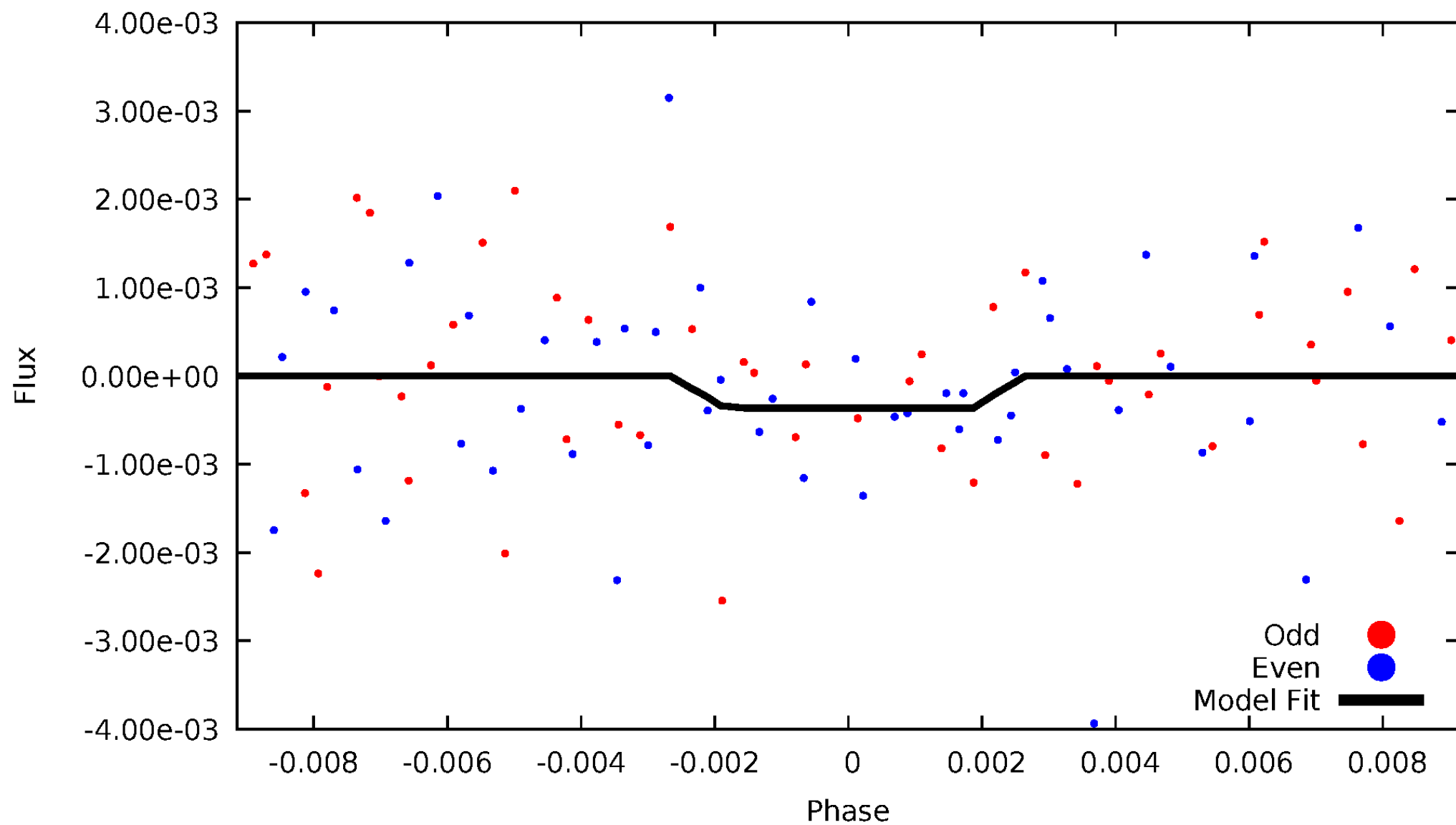
# DV Odd/Even

TCE 003747373-04



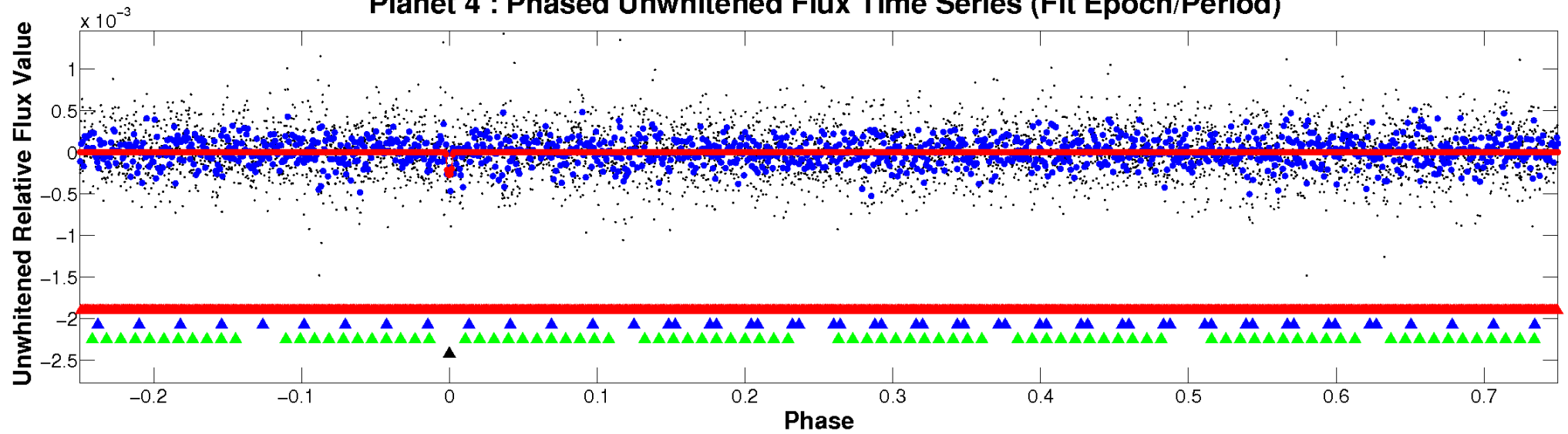
# ALT Odd/Even

TCE 003747373-04

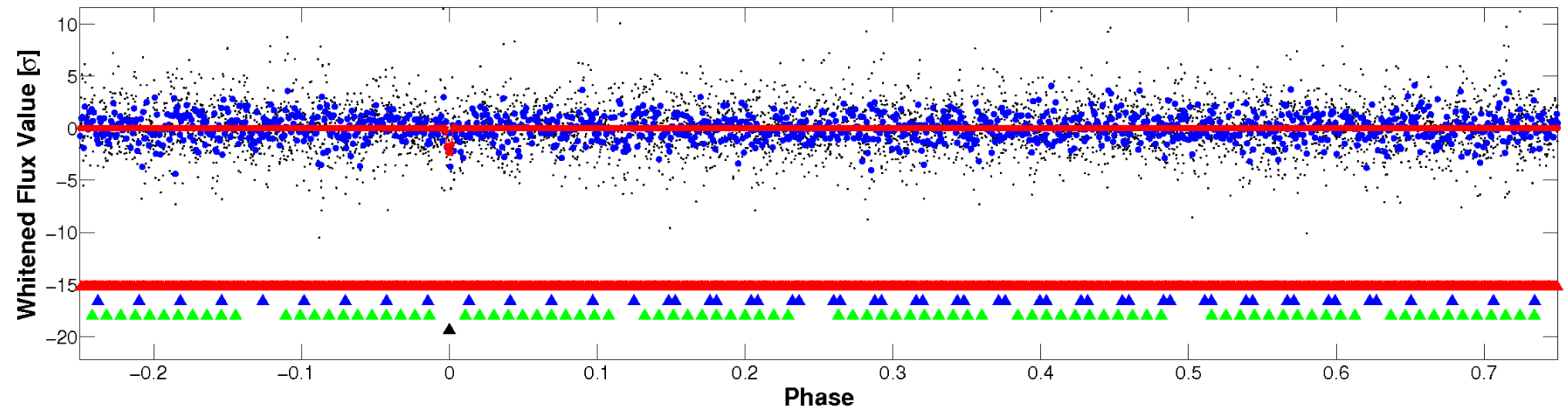


# Non-Whitened Vs. Whitened Light Curve

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

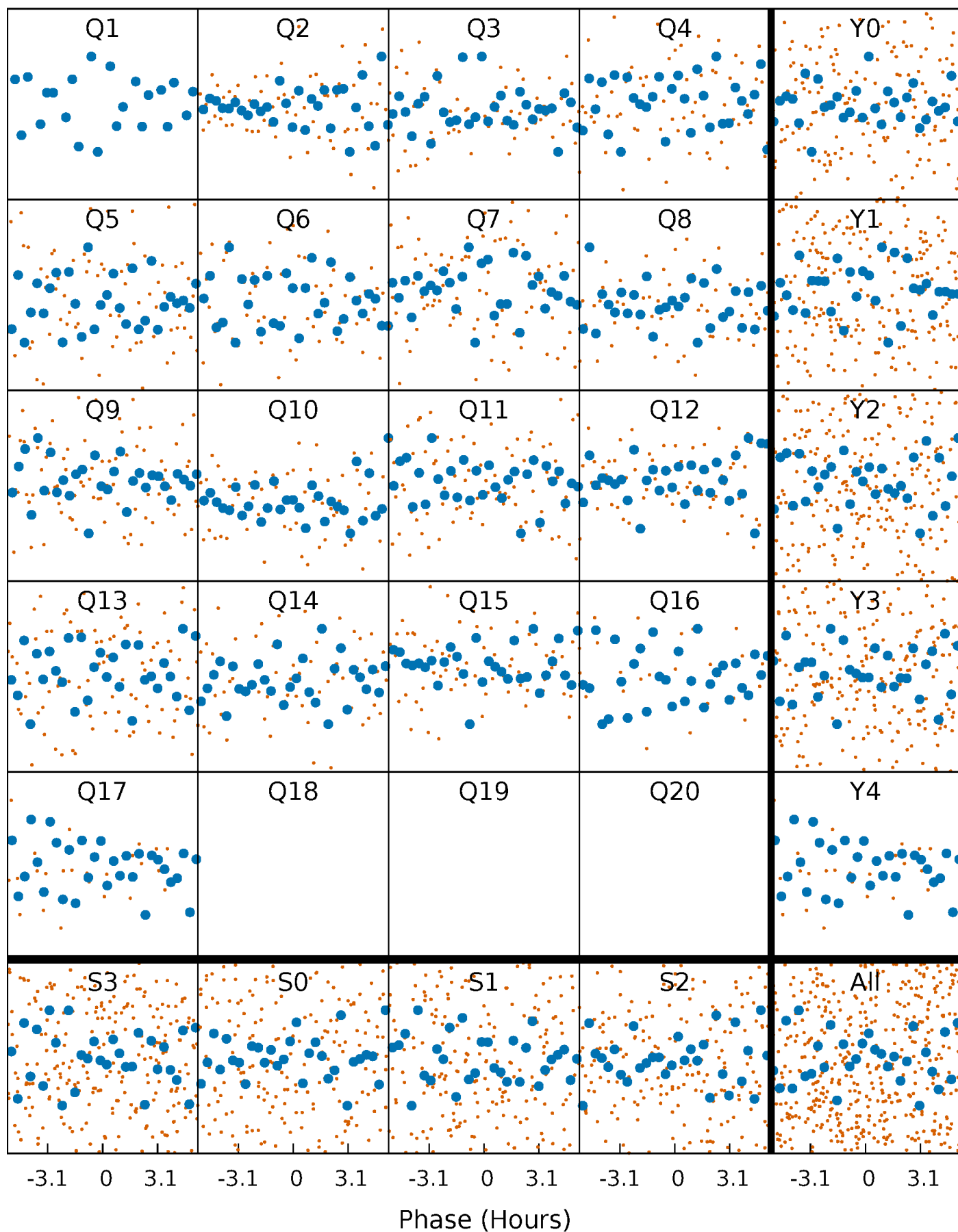


## Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



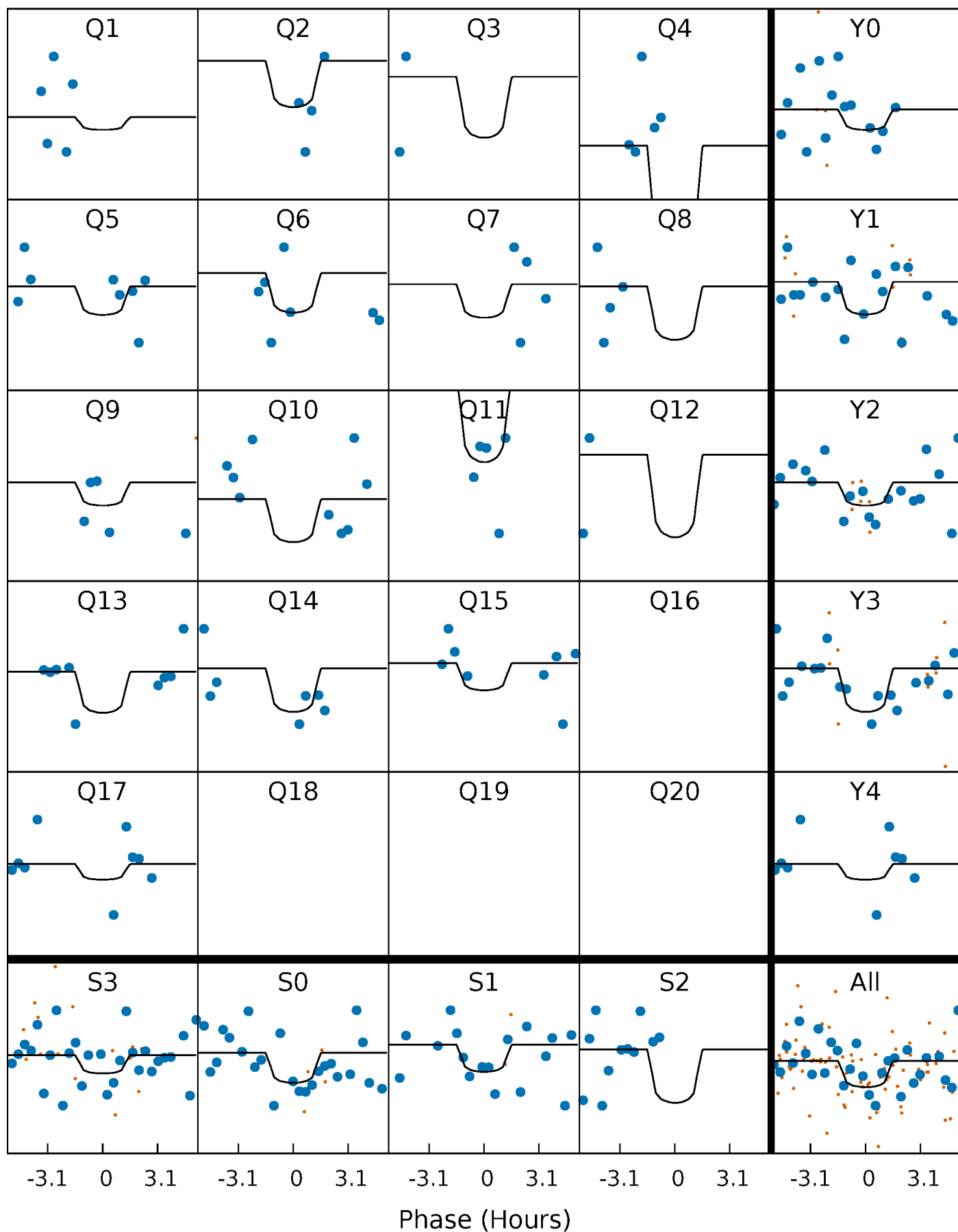
# PDC Quarter-Phased Transit Curves

TCE 003747373-04 P= 26.345693 Days  $T_0=139.797733$  (BKJD)



# DV Quarter-Phased Transit Curves

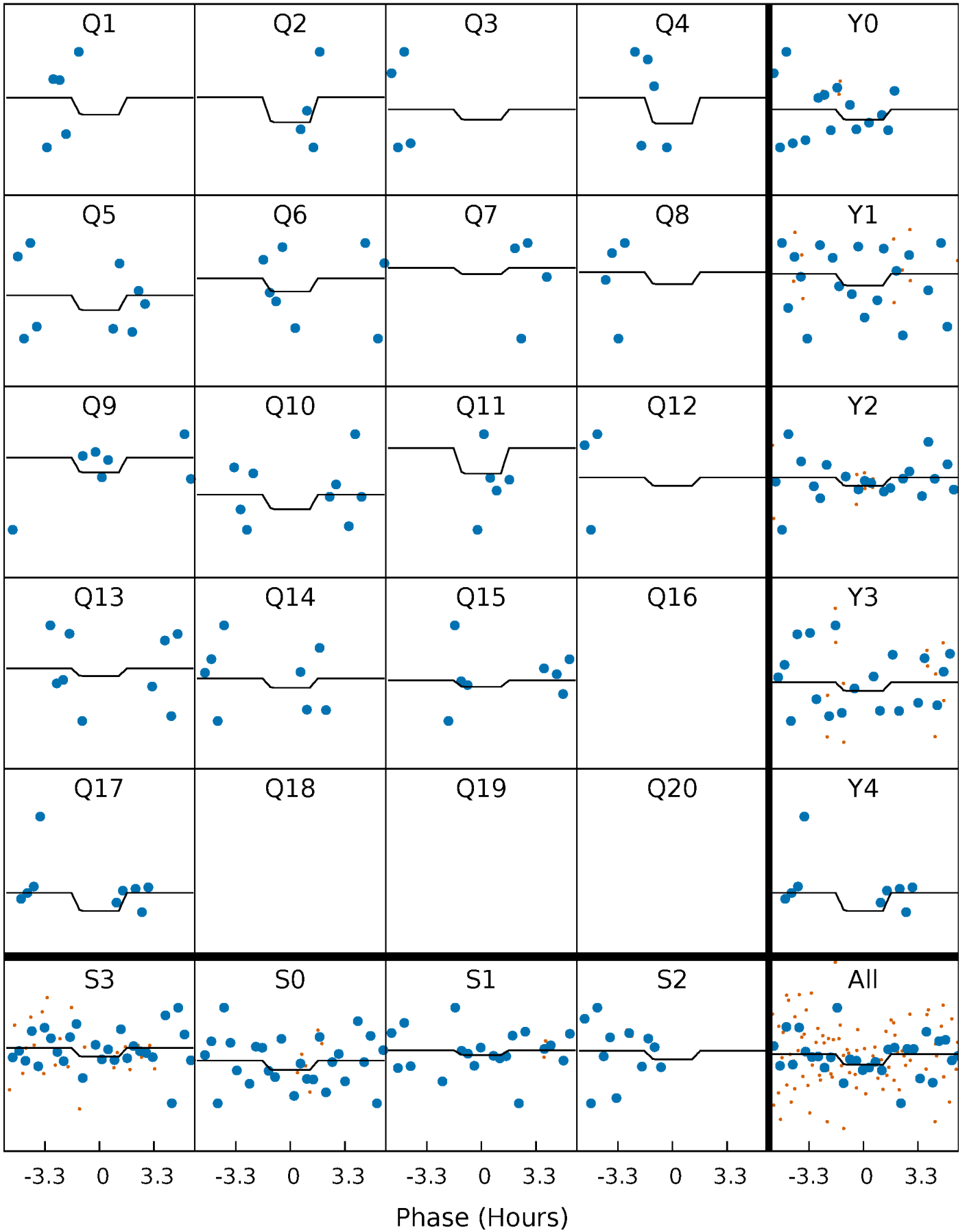
TCE 003747373-04 P= 26.345693 Days  $T_0=139.797733$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

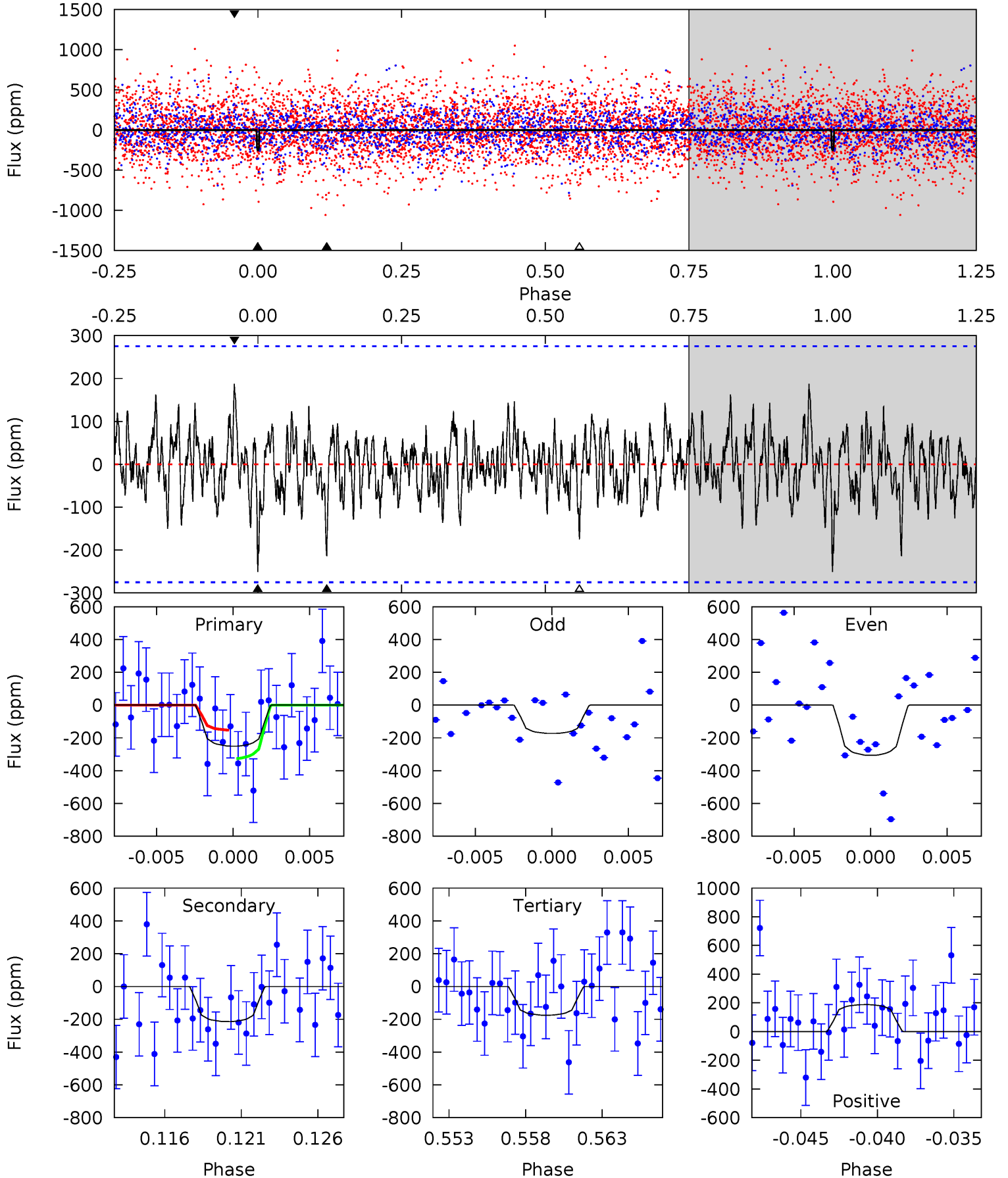
TCE 003747373-04 P= 26.345636 Days  $T_0=139.785651$  (BKJD)



# DV Model-Shift Uniqueness Test

003747373-04, P = 26.345693 Days, E = 113.452040 Days

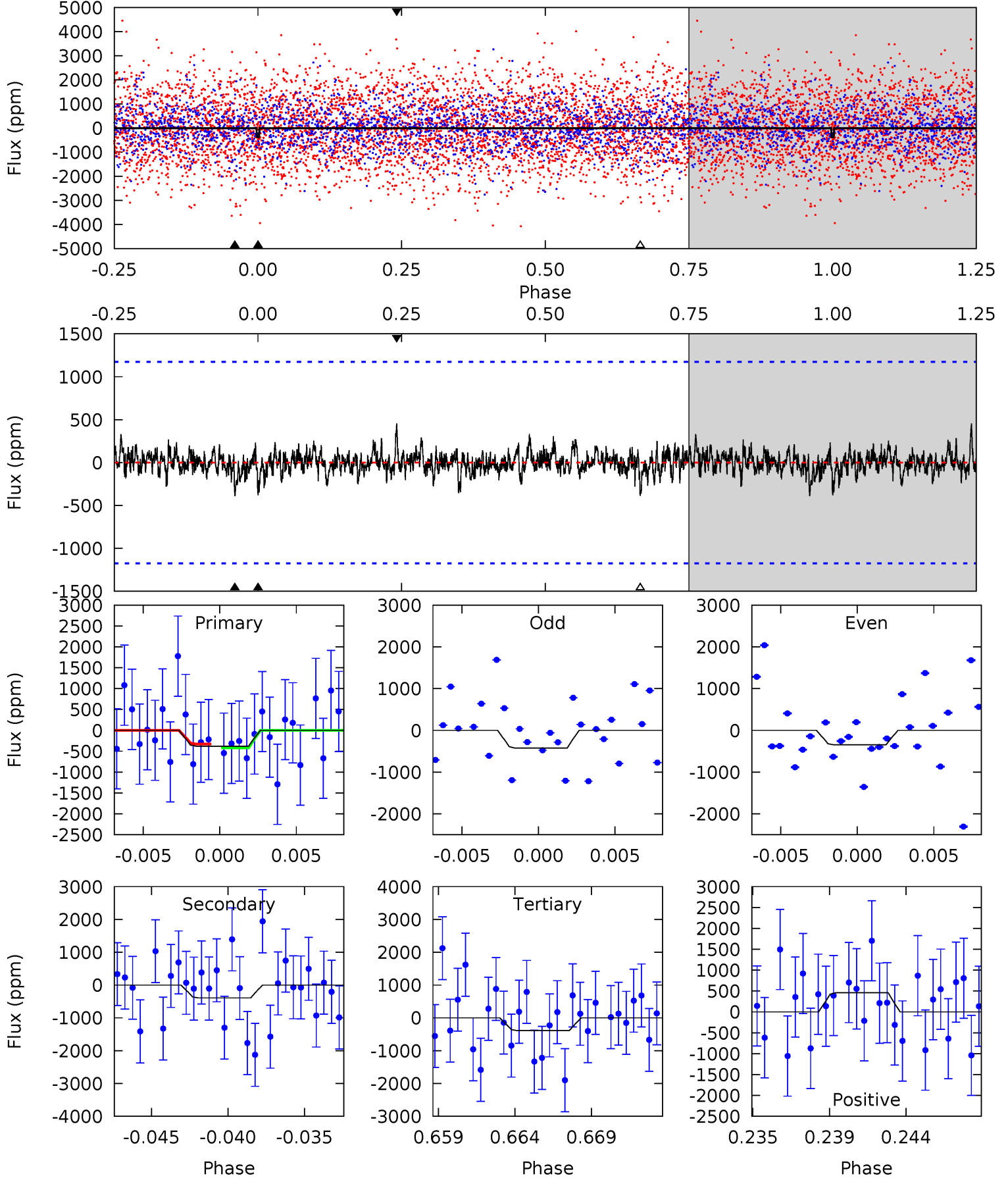
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
4.70	4.02	3.28	3.52	5.16	2.81	1.07	1.42	1.18	0.73	0.50	1.27	0.82	0.43	1.61



# Alt Model-Shift Uniqueness Test

003747373-04, P = 26.345636 Days, E = 113.440015 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
1.67	1.72	1.69	2.01	5.16	2.81	0.45	-0.03	-0.34	0.02	-0.29	0.17	1.16	0.54	0.20



### Stellar Parameters For KIC 003747373

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$7351^{+203}_{-330}$	$3.738^{+0.392}_{-0.098}$	$0.020^{+0.200}_{-0.350}$	$3.010^{+0.435}_{-1.306}$	$1.808^{+0.184}_{-0.368}$	$0.093^{+0.312}_{-0.029}$
	+3%/-4%	+10%/-3%	+1000%/-1750%	+14%/-43%	+10%/-20%	+334%/-31%
Source	KIC0	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 003747373-04 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-214 \pm 53$	$9.22^{+10.32}_{-6.27}$	$1675^{+113}_{-183}$	$5029^{+4452}_{-1239}$	$60^{+517}_{-47}$
Alt.	$-391 \pm 228$	$9.51^{+10.39}_{-6.34}$	$1665^{+115}_{-194}$	$5557^{+4820}_{-1711}$	$92^{+850}_{-78}$

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

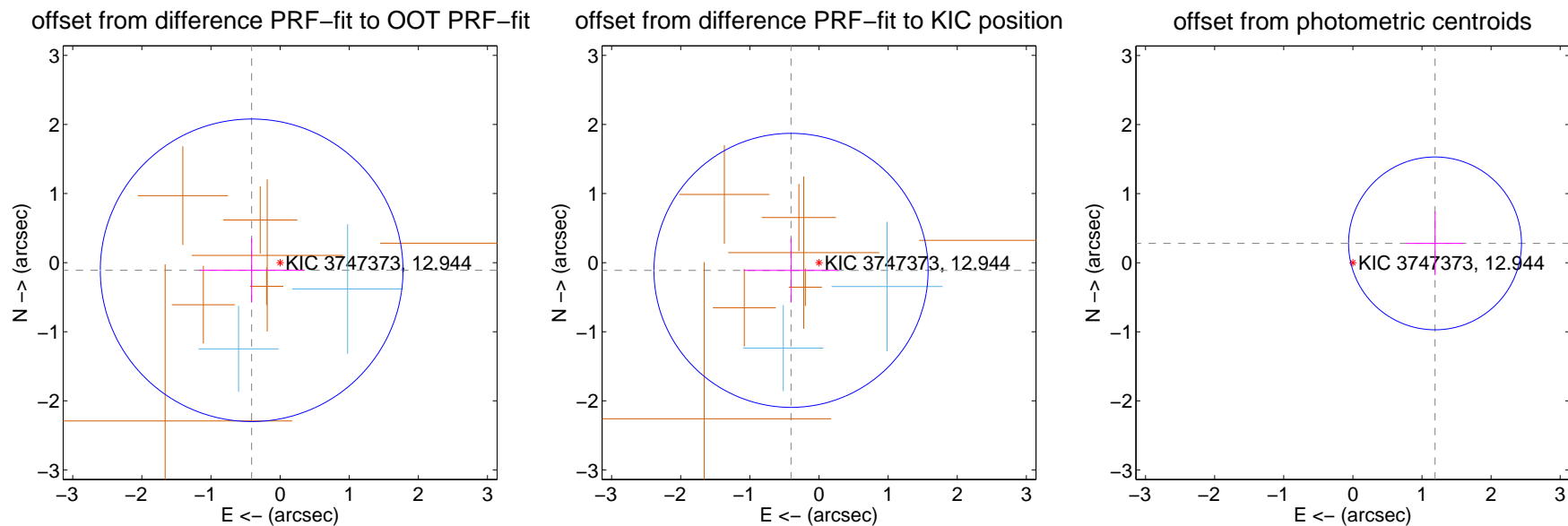
## DV Centroid Data

Supplemental centroid analysis for 003747373-04. Kepler magnitude: 12.94. Transit SNR 9.45

There are 2 quarters with good PRF difference image offsets

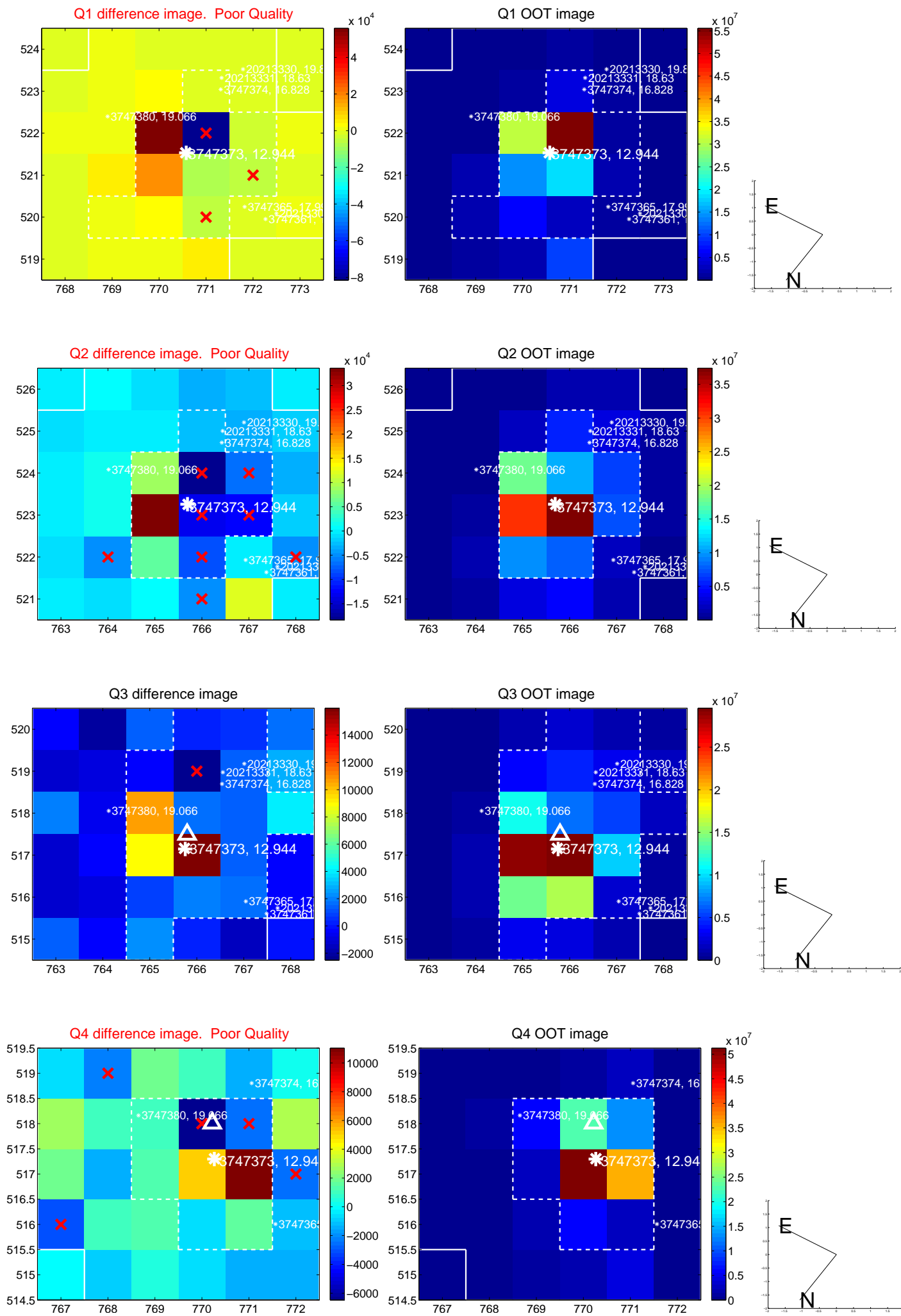
The direct PRF centroid is offset from the target star catalog position by about 0.02 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.426 \pm 0.730$	0.58	$0.412 \pm 0.759$	$-0.111 \pm 0.465$
PRF-fit source offset from KIC position	$0.419 \pm 0.661$	0.63	$0.404 \pm 0.686$	$-0.112 \pm 0.466$
photometric centroid source offset	$1.22 \pm 0.42$	2.93	$-1.19 \pm 0.41$	$0.28 \pm 0.46$

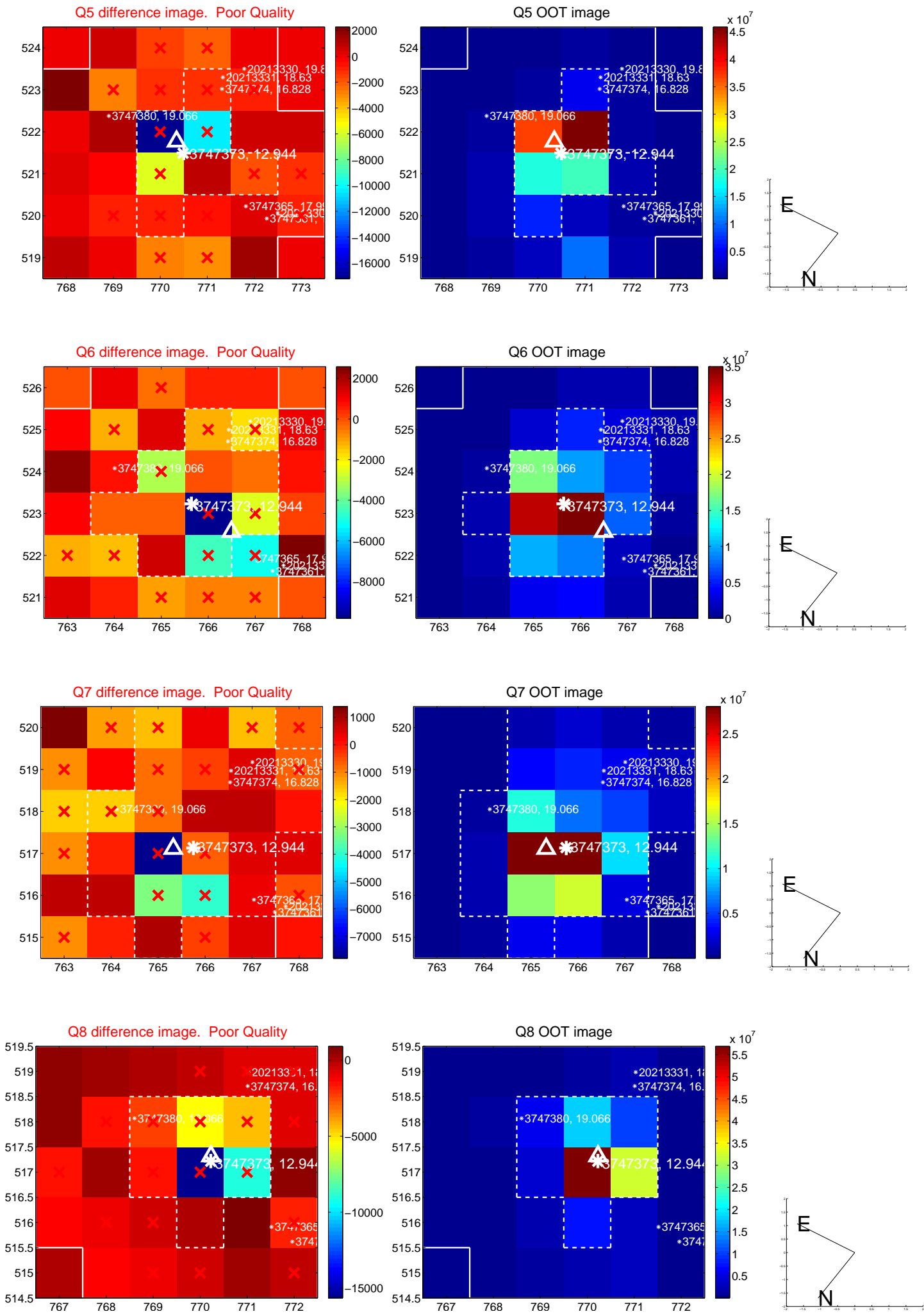


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

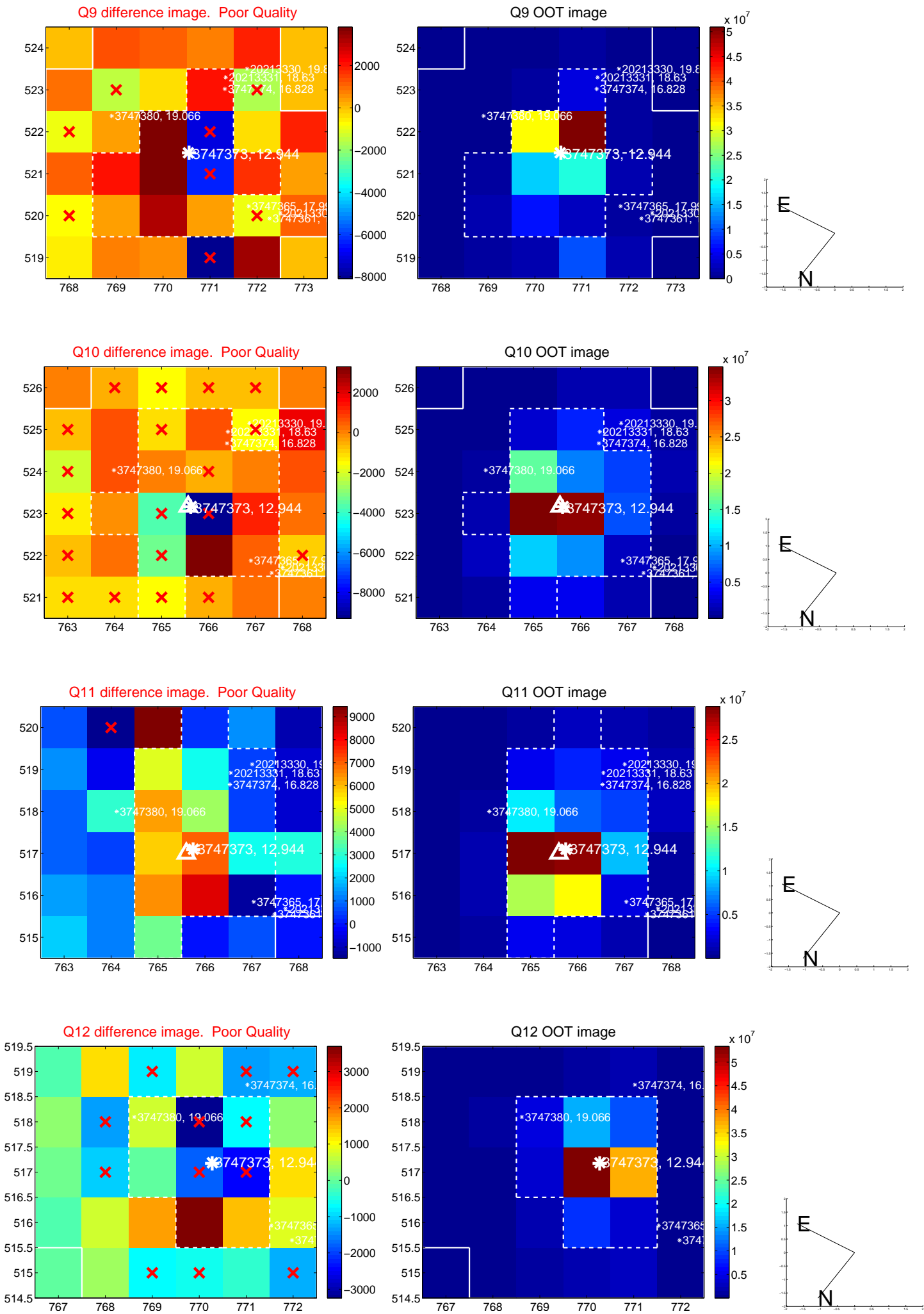


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

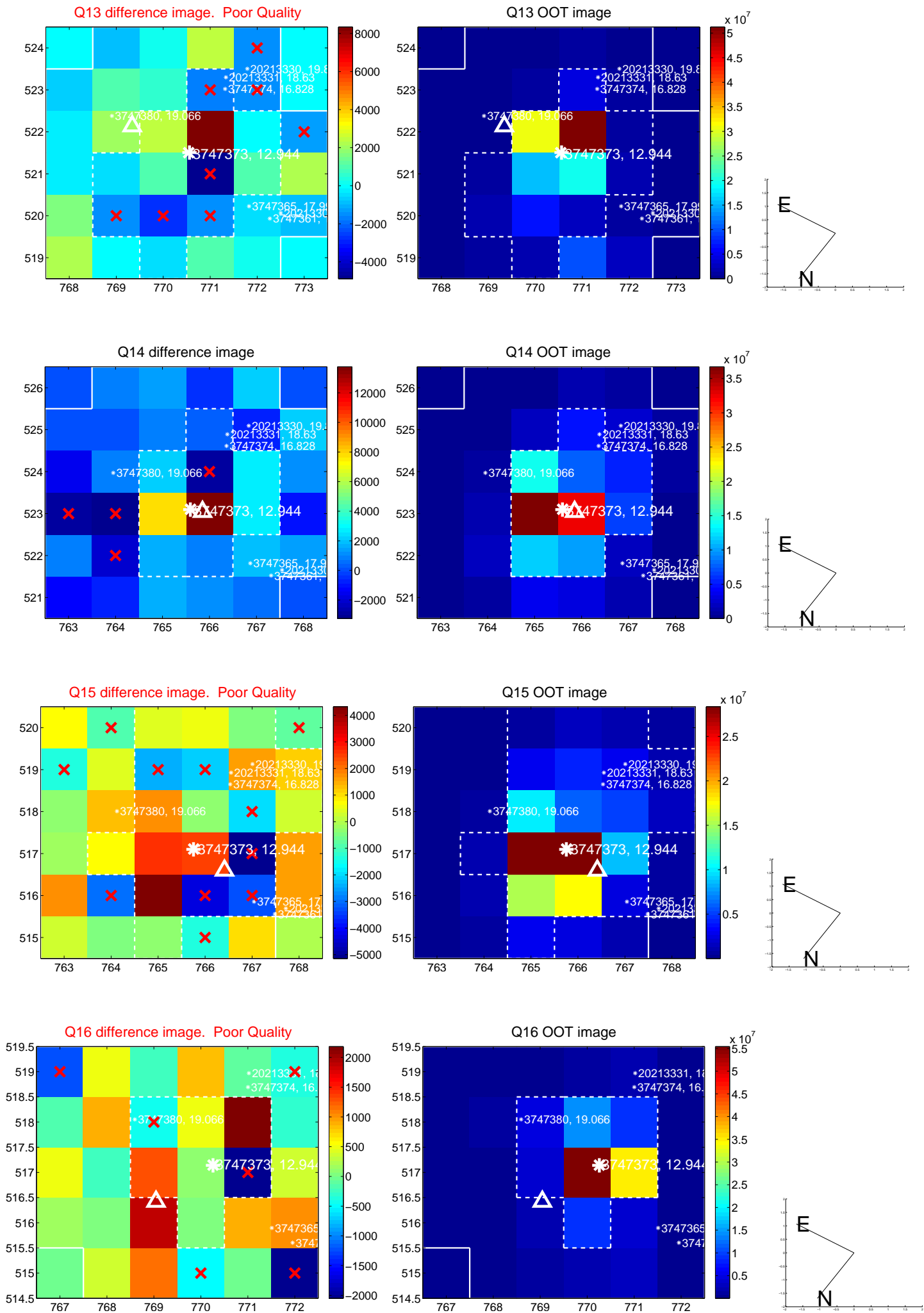




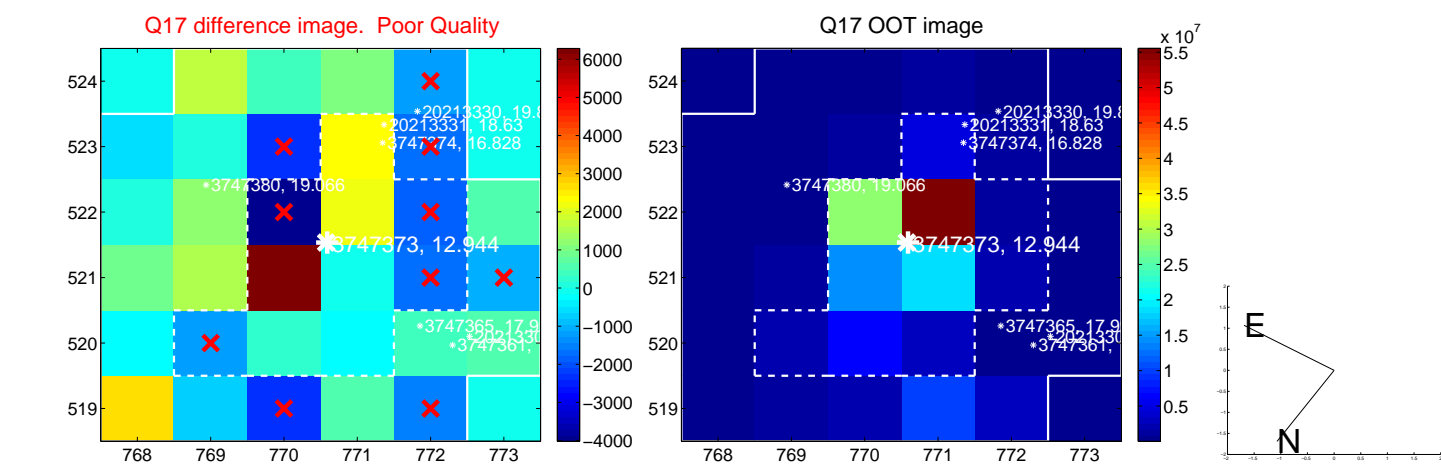
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



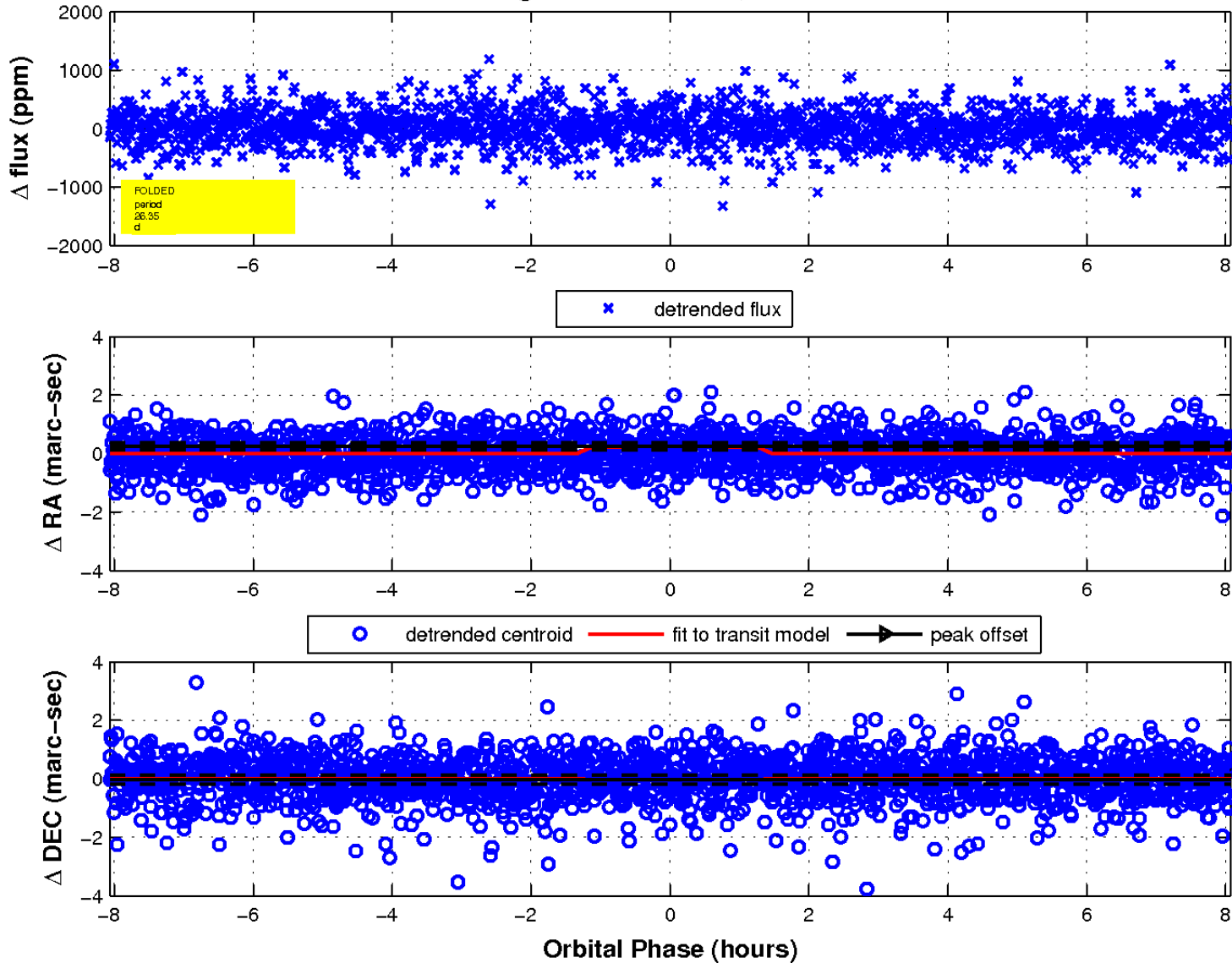
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



fluxWeightedCentroids, Planet 4 of 4



UKIRT Image

Declination

