

# KIC 011913073

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
011913073-01	OBS	0011.01	3.747824	134.189318	480.6	4.639	98.6	92.0	0.83	5514	2.52	267.33
011913073-02	OBS	No	3.747811	132.324477	85.1	3.182	16.7	19.0	0.83	5514	0.83	267.33

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
011913073-01	OBS	FP	0.00	0	1	1	1	MOD_SEC_DV—MOD_SEC_ALT—HAS_SEC_TCE—CENT_RESOLVED_OFFSET—HALO_GHOST—EPHEM_MATCH
011913073-02	OBS	FP	0.00	1	1	1	1	IS_SEC_TCE—CENT_RESOLVED_OFFSET—HALO_GHOST—EPHEM_MATCH

**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 011913073-01

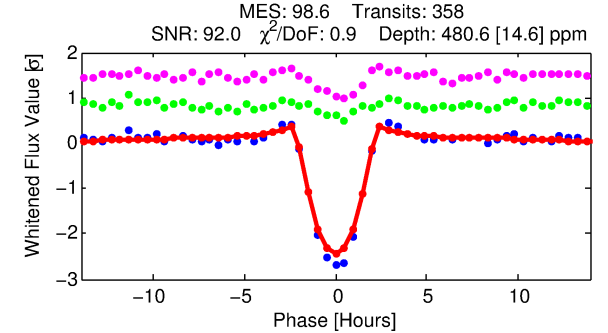
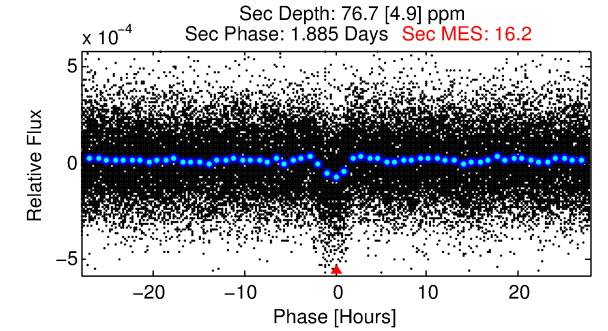
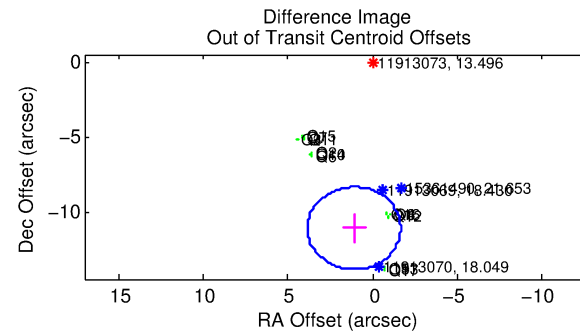
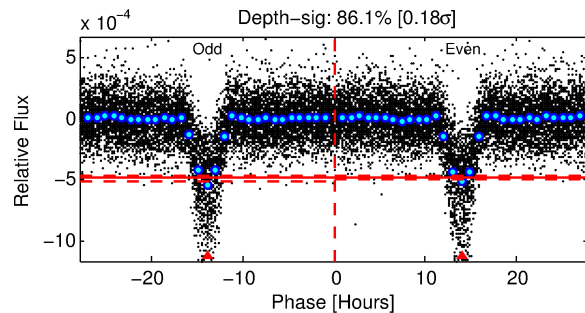
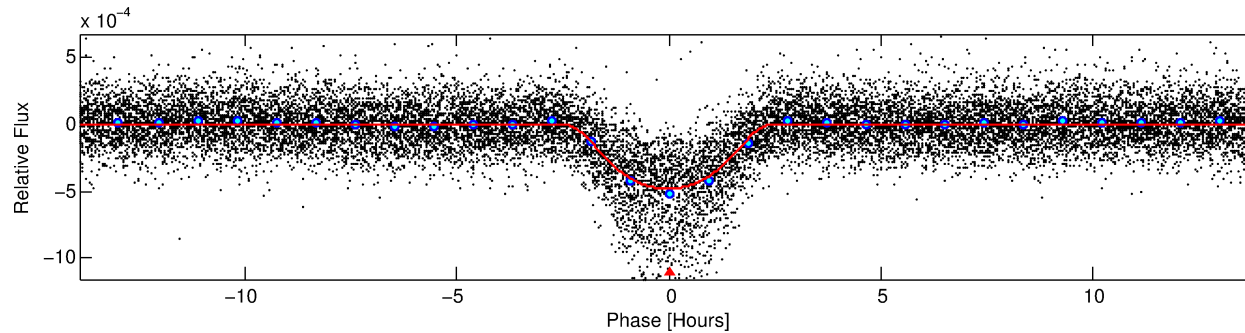
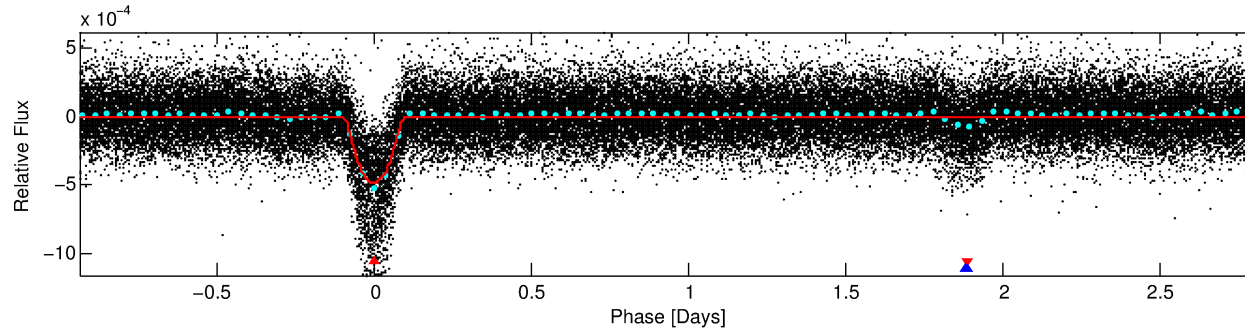
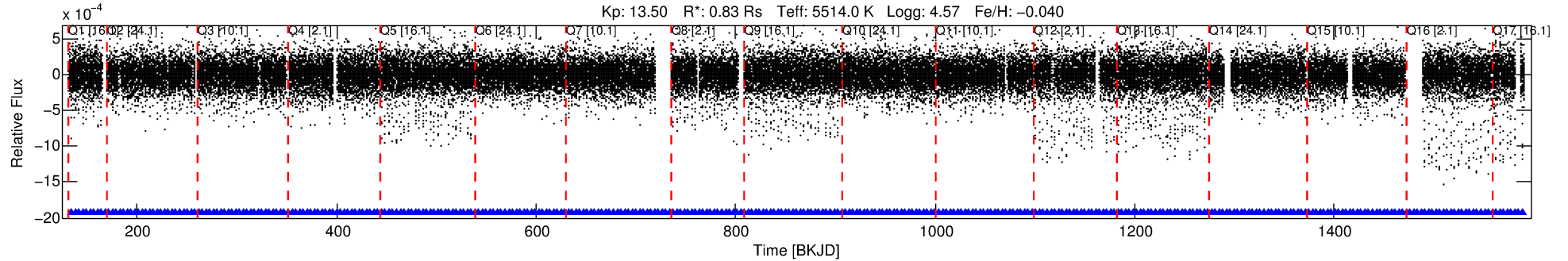
TCE (1)	KIC	Parent (2)	Parent KIC	$P_1:P_2$	Dist ( $''$ )	$\Delta$ Row	$\Delta$ Col	$m_2$	$m_1$	$D_2/D_1$	Mechanism	Flag	$\sigma_P$	$\sigma_T$
011913073-01	11913073	011913071-pri	11913071	1:1	34.9	7	-5	9.53	13.49	392.93	Direct-PRF	0	0.17	0.11

**Notes:**  $P_1:P_2$  is the period ratio. Dist is the distance in arcseconds.  $\Delta$ Row and  $\Delta$ Col are the number of pixels apart in row and column.  $m_2$  and  $m_1$  are the magnitudes of the parent and child.  $D_2/D_1$  is the parent's transit depth divided by the child's.  $\sigma_P$  and  $\sigma_T$  are the significance of the match in period and epoch. For a match to be considered significant  $\sigma_P < 5.0$  and  $\sigma_T < 5.0$ . Matches which have  $\sigma_P$  and  $\sigma_T$  very close to this cutoff should receive extra scrutiny, especially if the period ratio is very large.

# DV One-Page Summary

KIC: 11913073 Candidate: 1 of 2 Period: 3.748 d  
KOI: K00011.01 Corr: 0.953

Kp: 13.50 R\*: 0.83 Rs Teff: 5514.0 K Logg: 4.57 Fe/H: -0.040



## DV Fit Results:

Period = 3.74782 [0.00000] d  
Epoch = 134.1893 [0.0009] BKJD  
Rp/R\* = 0.0279 [0.0009]  
a/R\* = 2.25 [0.05]  
b = 0.97 [0.00]  
Seff = 267.33 [83.06]  
Teq = 1031 [80] K  
Rp = 2.52 [0.58] Re  
a = 0.0460 [0.0090] AU  
Ag = 14.09 [4.29] [3.05σ]  
Teff = 3088 [108] K [15.31σ]

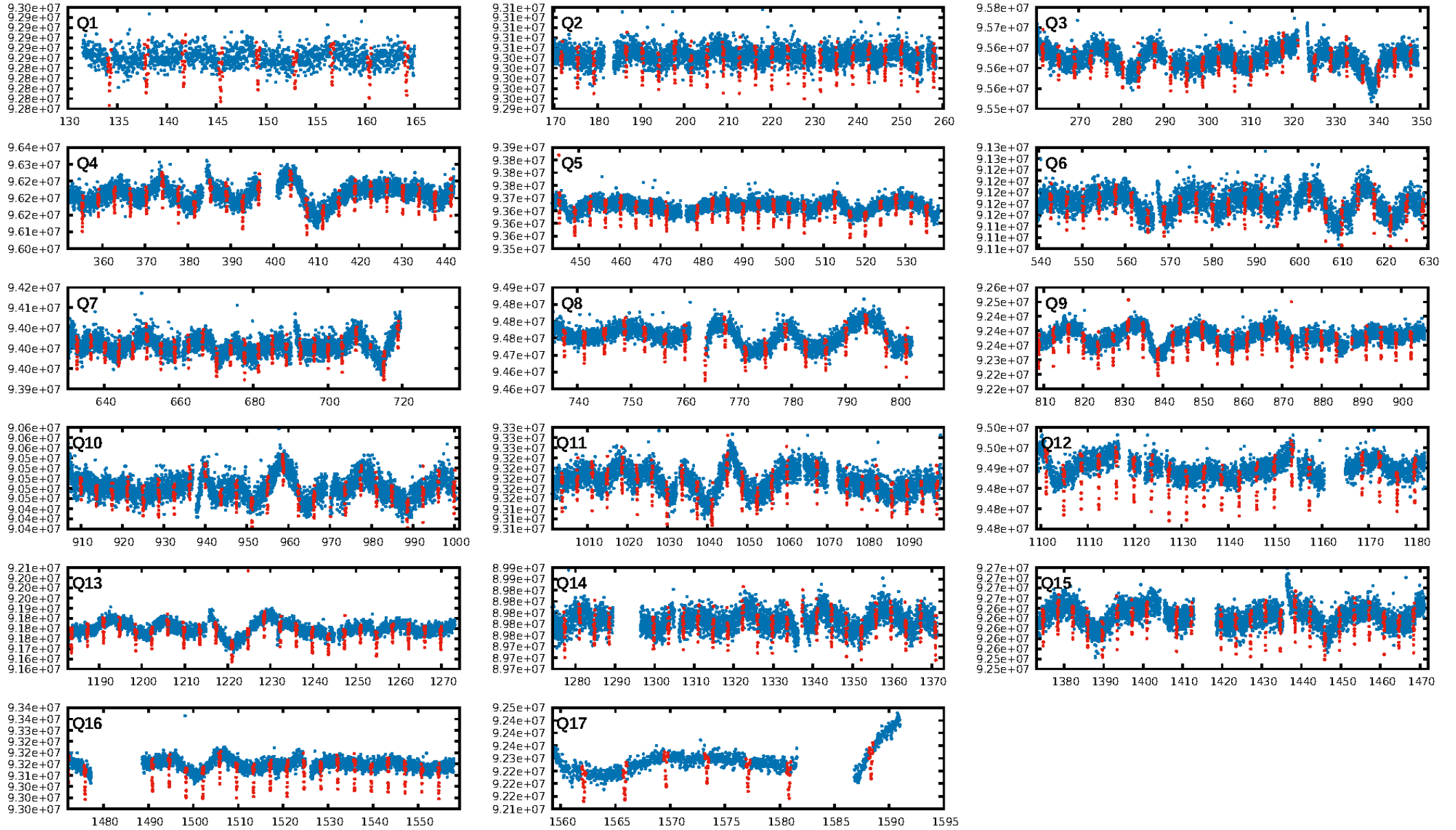
## DV Diagnostic Results:

ShortPeriod-sig: 0.0% [0.00σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 0.00e+00  
RollingBand-fgt: 1.00 [342/342]  
GhostDiagnostic-chr: -0.1591  
Centroid-sig: 0.0%  
Centroid-so: 9.707 arcsec [77.73σ]  
OotOffset-rm: 11.166 arcsec [12.16σ]  
KicOffset-rm: 11.232 arcsec [12.21σ]  
OotOffset-st: 4/4/4/4 [16]  
KicOffset-st: 4/4/4/4 [16]  
DiffImageQuality-fgm: 0.50 [8/16]  
DiffImageOverlap-fno: 1.00 [17/17]

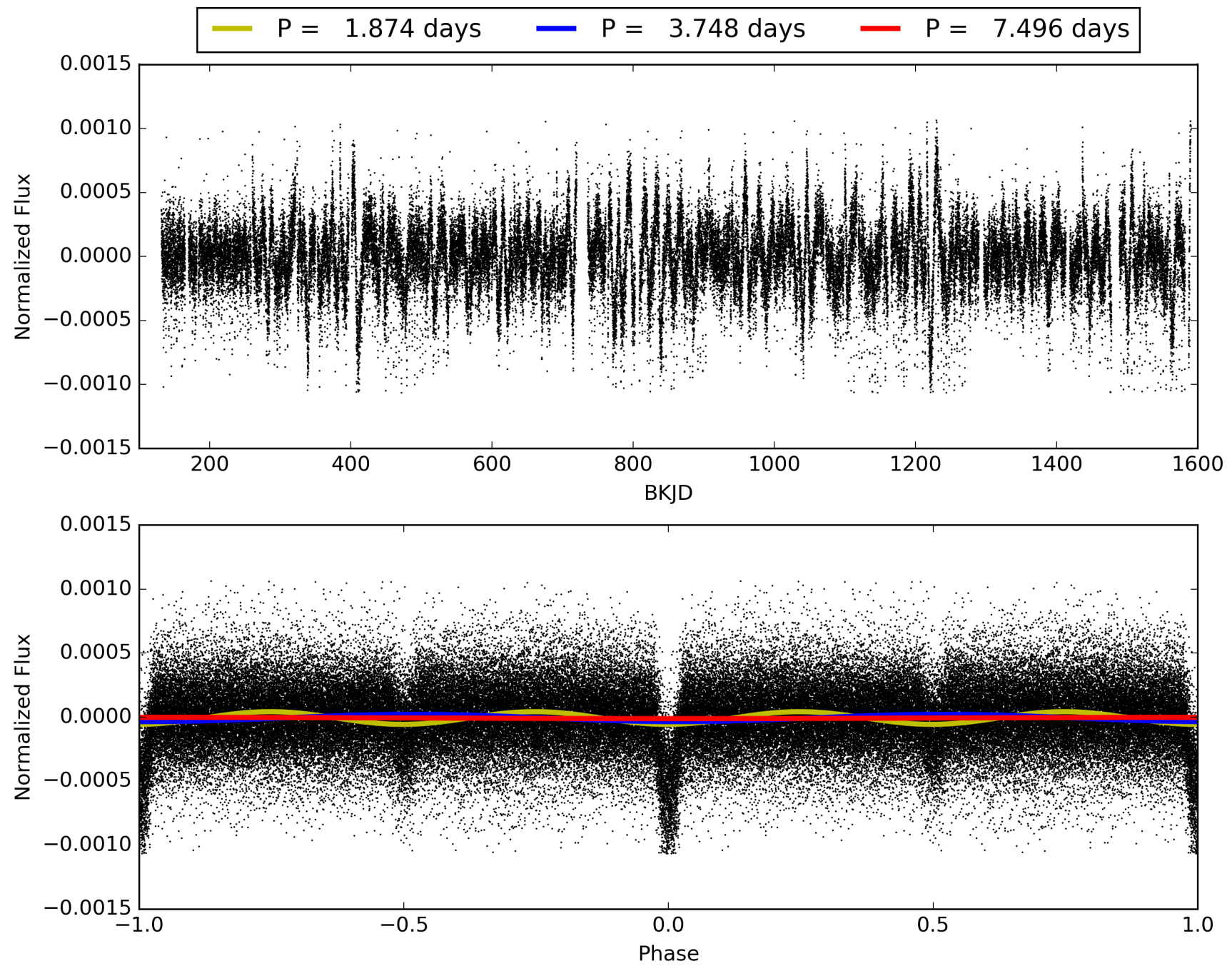
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 10:38:14 Z

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

# TCE 011913073-01, PDC Light Curves

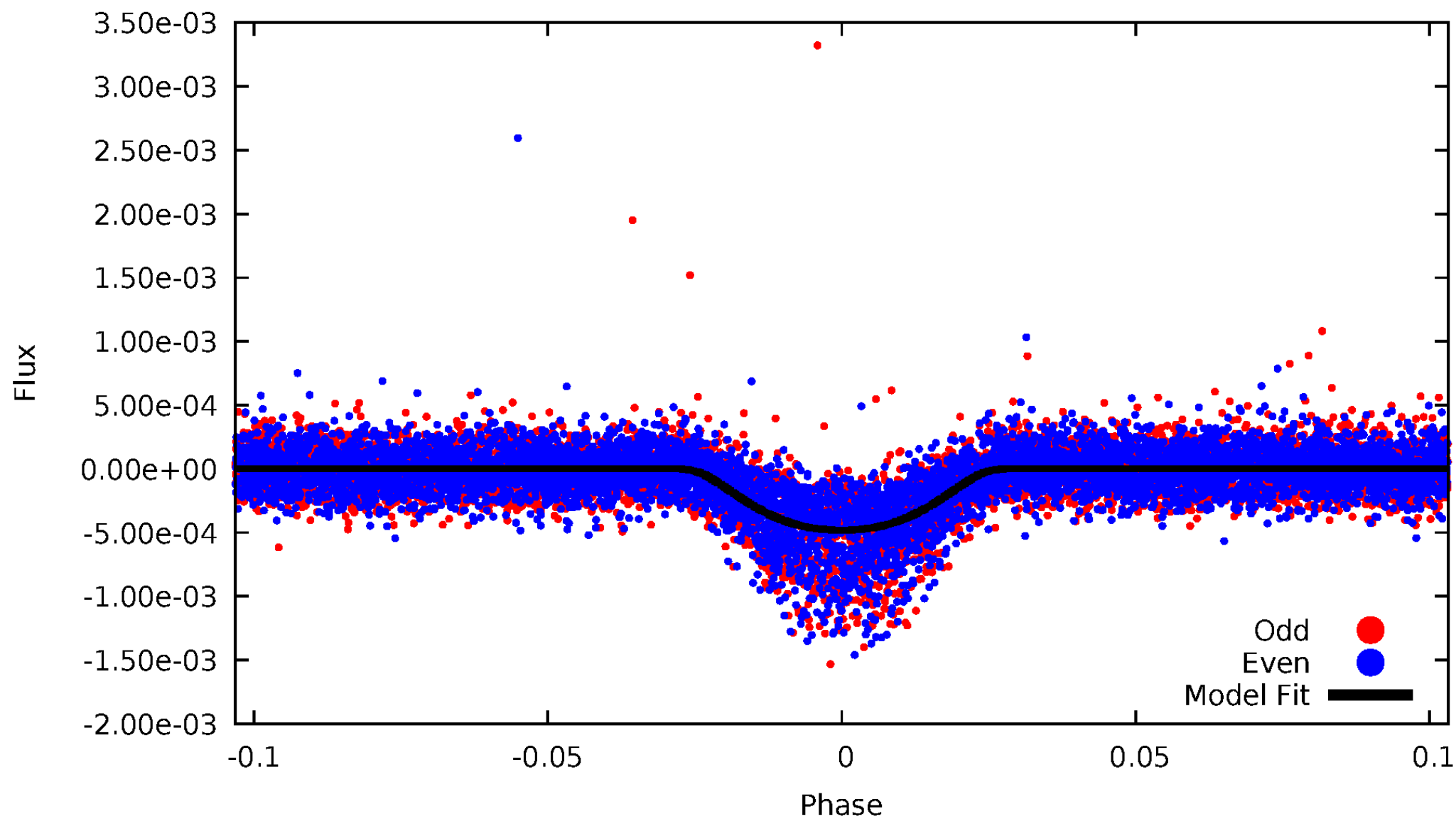


TCE 011913073-01



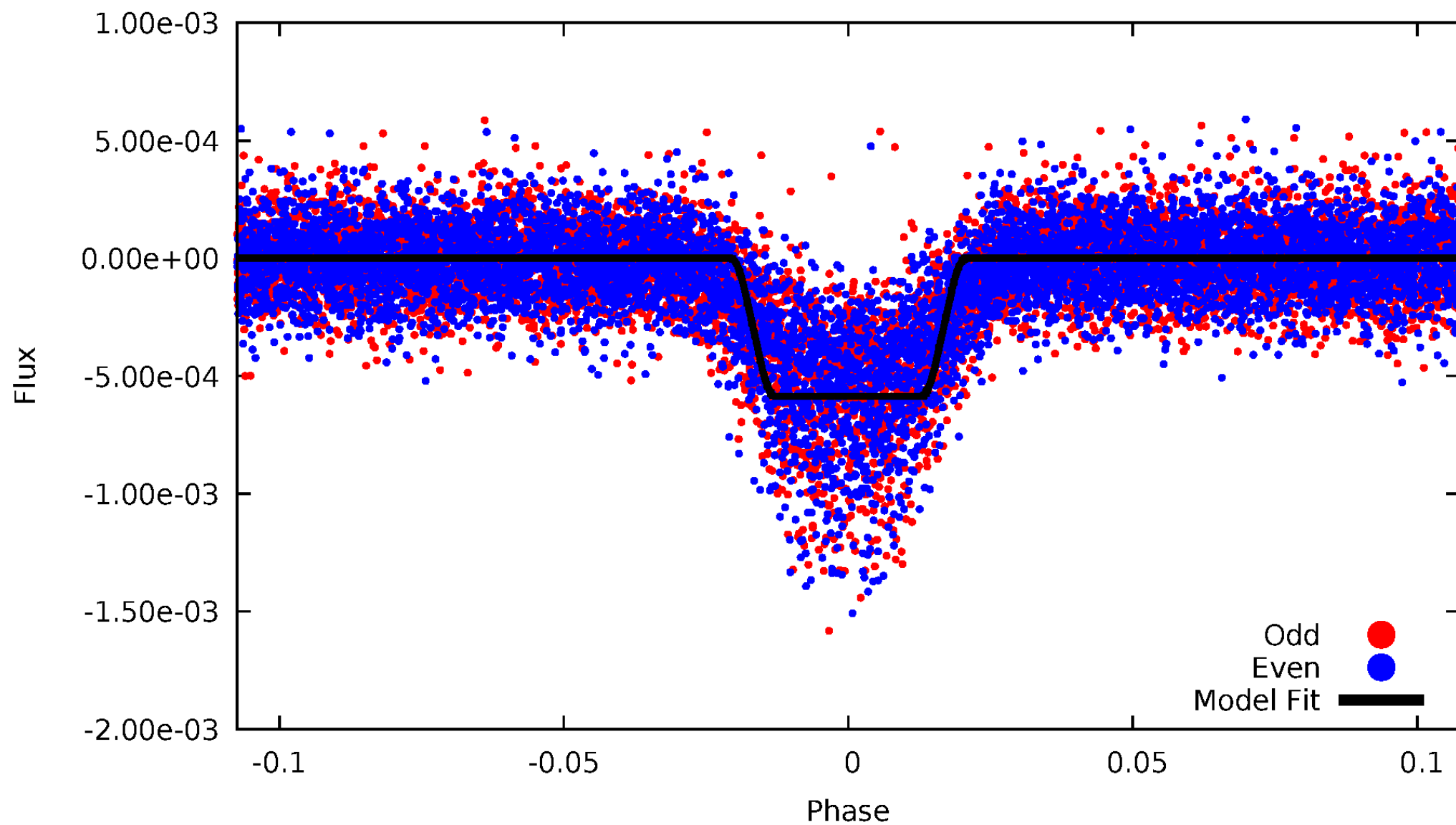
# DV Odd/Even

TCE 011913073-01



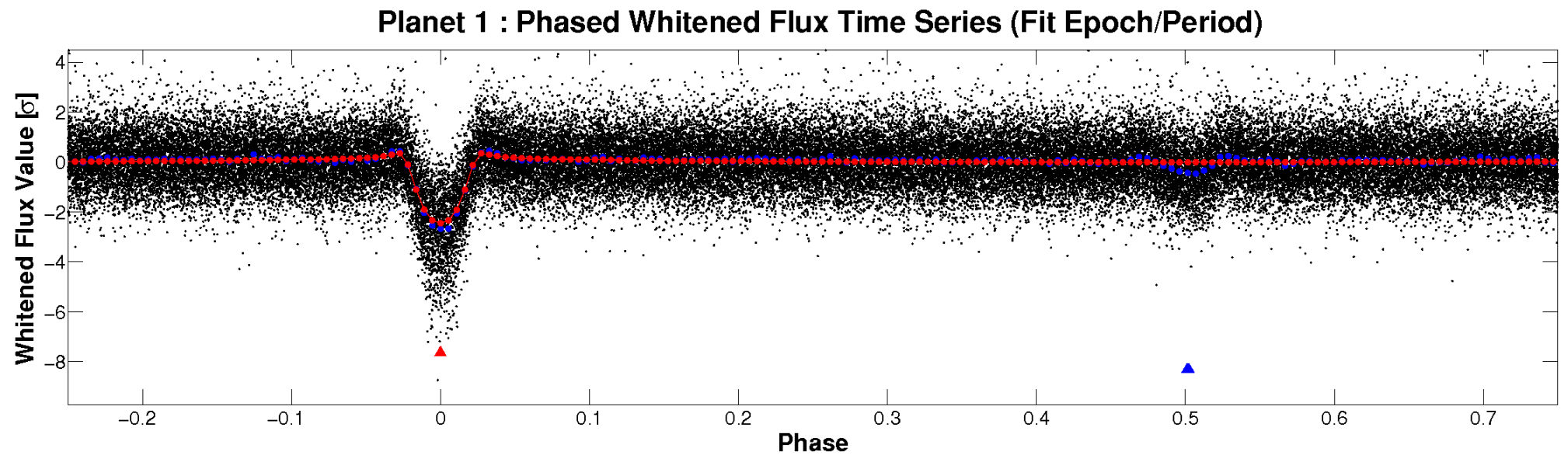
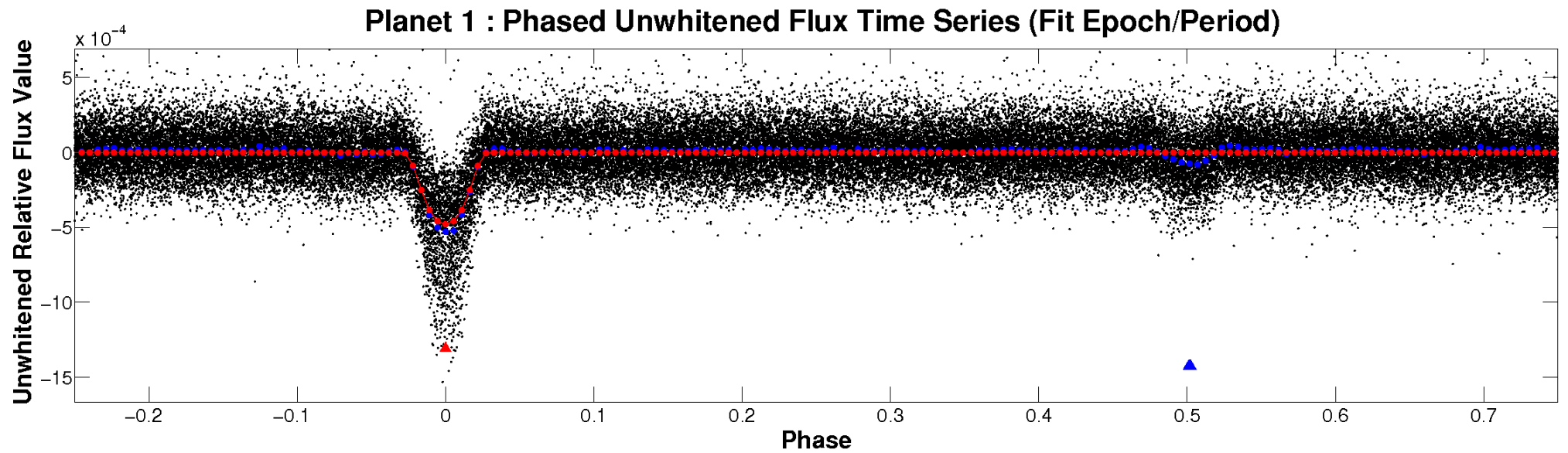
# ALT Odd/Even

TCE 011913073-01



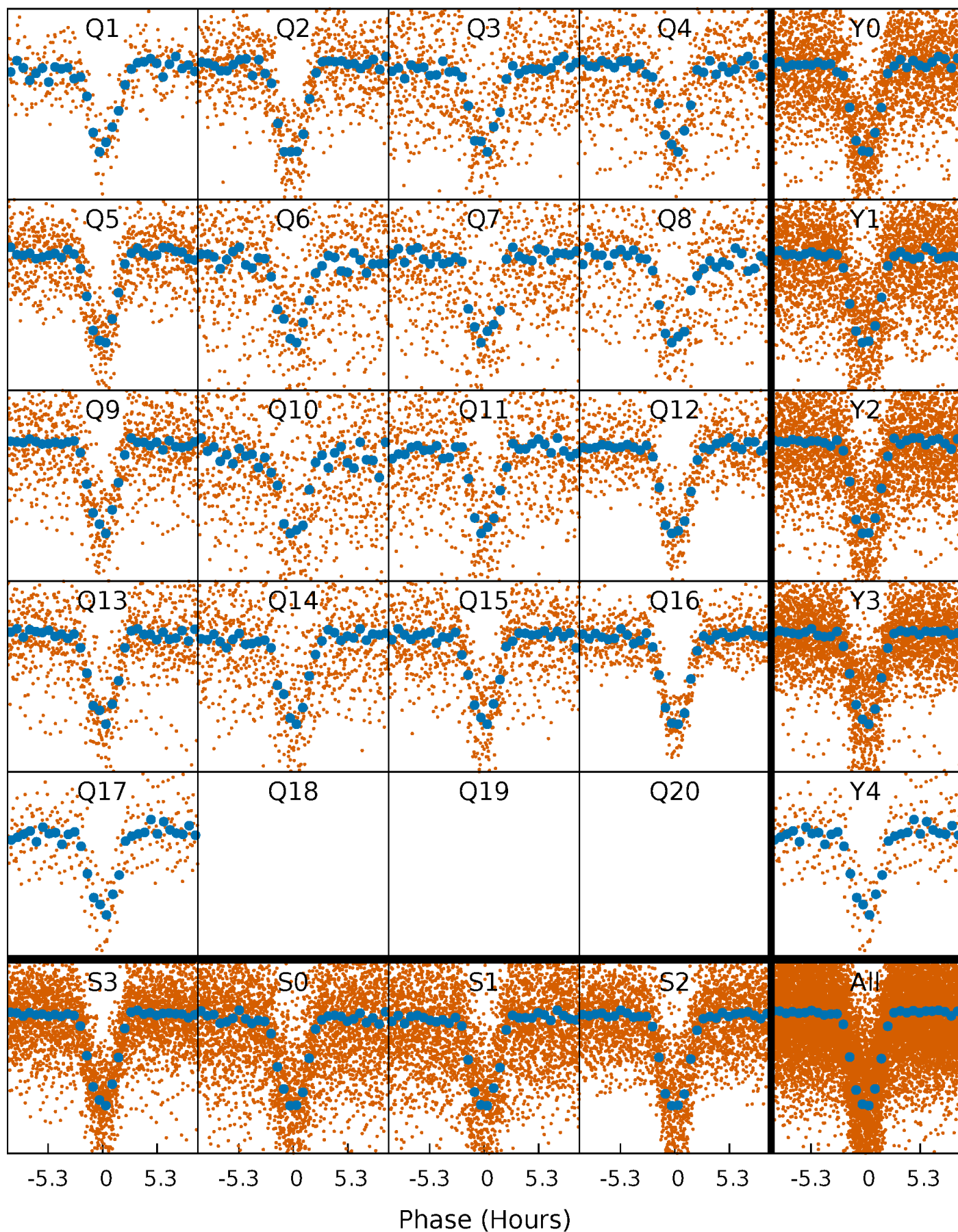


# Non-Whitened Vs. Whitened Light Curve



# PDC Quarter-Phased Transit Curves

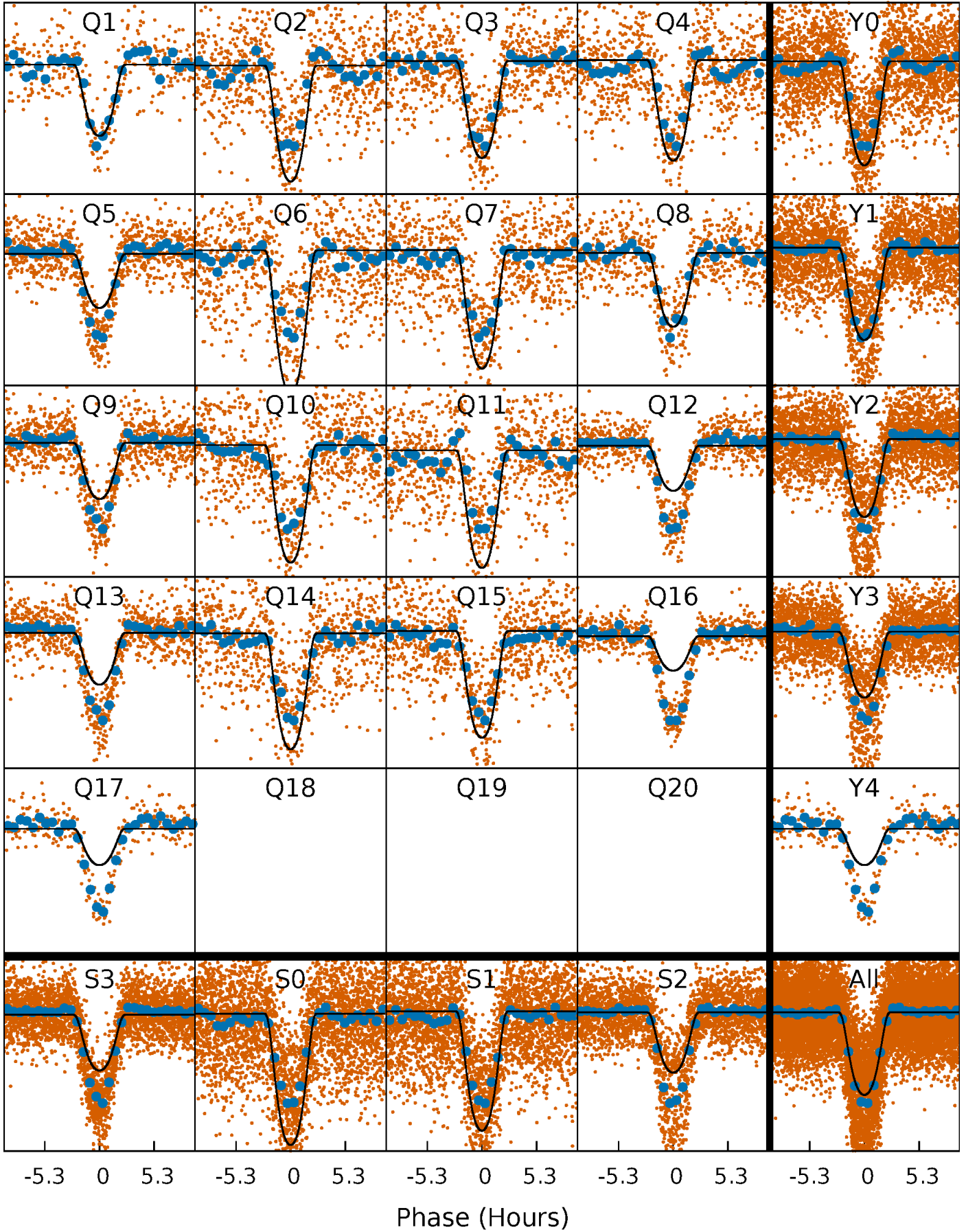
TCE 011913073-01 P= 3.747824 Days  $T_0=134.189318$  (BKJD)





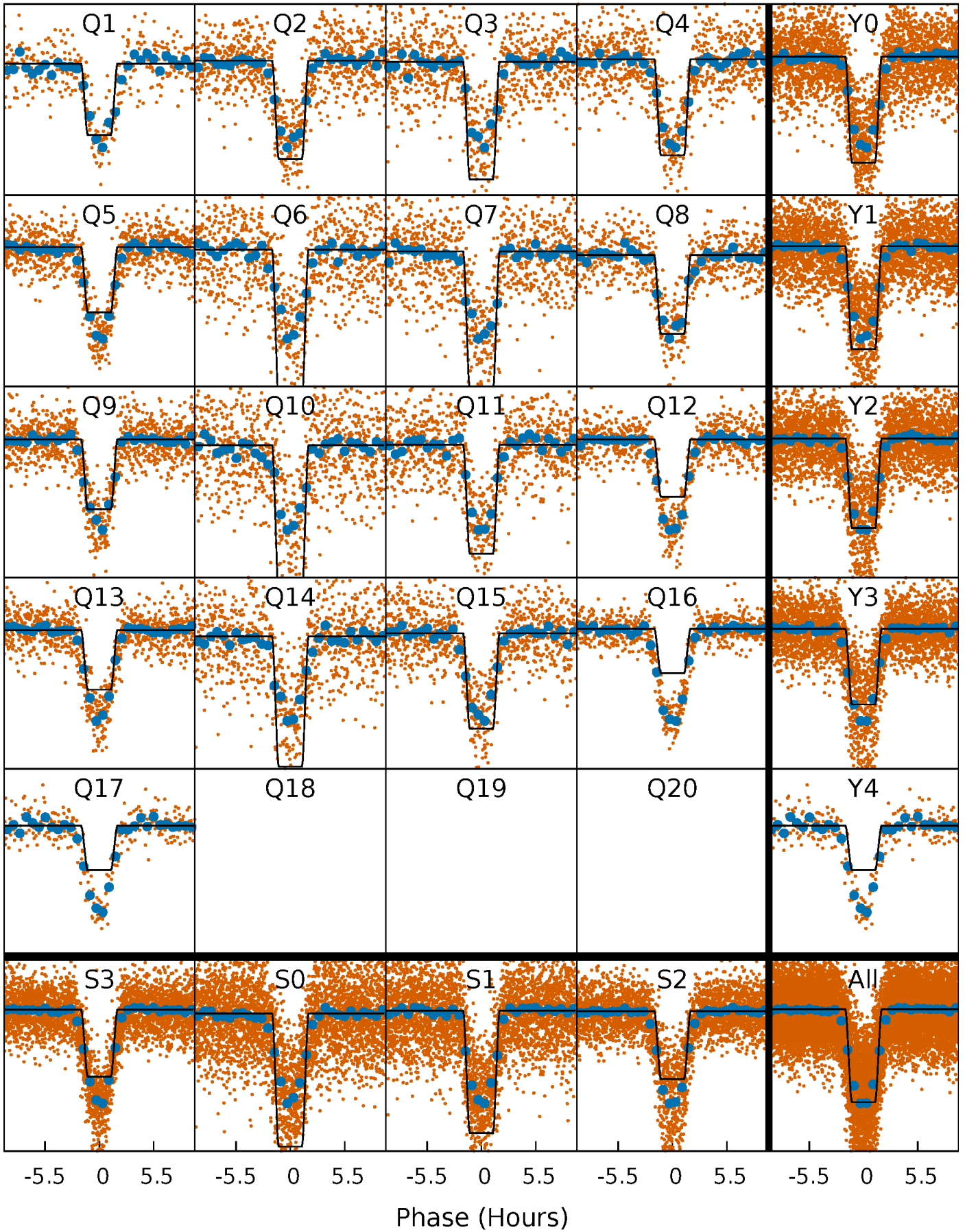
# DV Quarter-Phased Transit Curves

TCE 011913073-01 P= 3.747824 Days  $T_0=134.189318$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

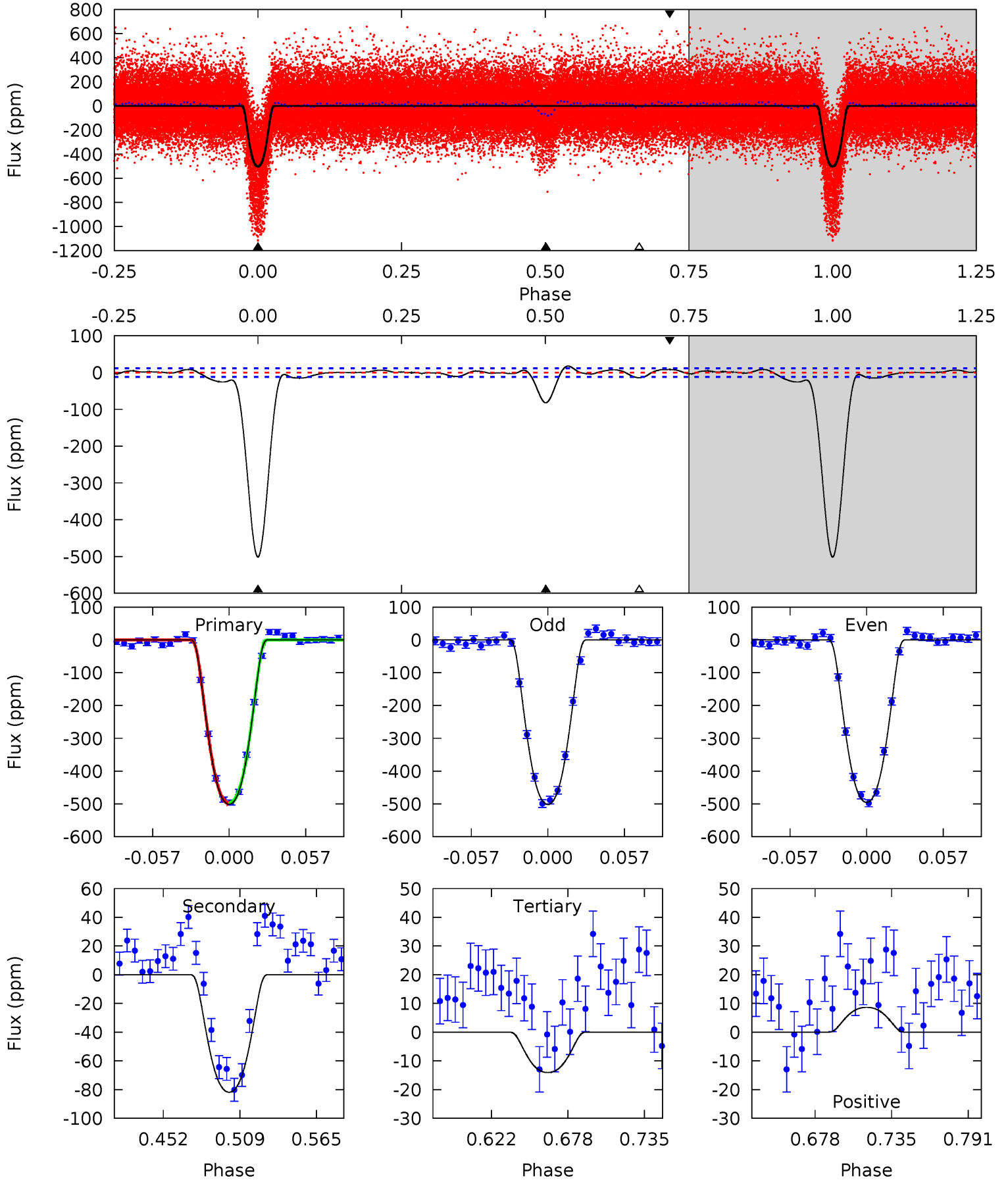
TCE 011913073-01 P= 3.747857 Days  $T_0=134.182515$  (BKJD)



# DV Model-Shift Uniqueness Test

011913073-01, P = 3.747824 Days, E = 130.441494 Days

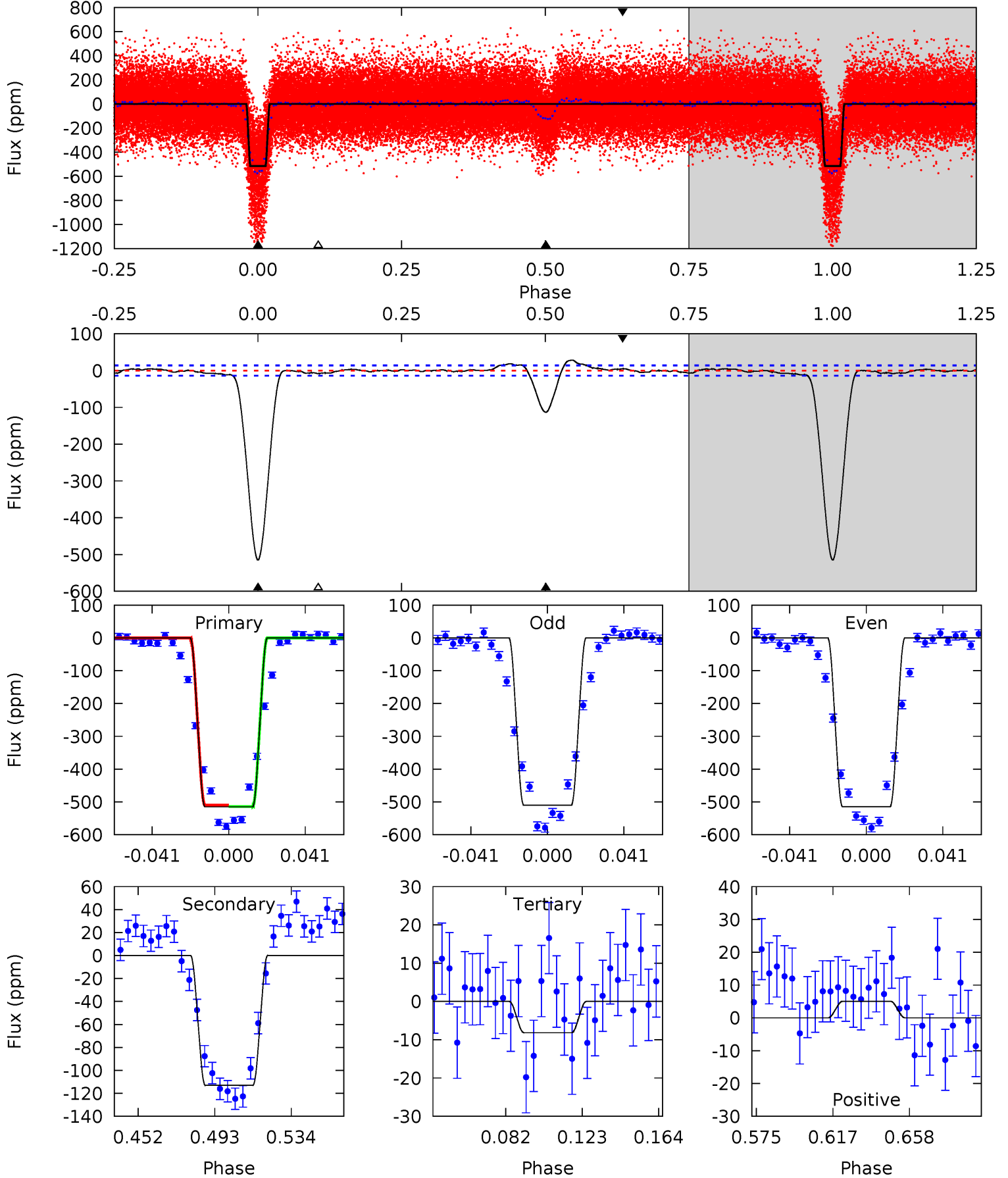
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
196.1	32.0	5.50	3.38	4.68	1.91	2.72	190.6	192.7	26.5	28.6	1.22	1.21	0.03	0.09



# Alt Model-Shift Uniqueness Test

011913073-01, P = 3.747857 Days, E = 130.434658 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
176.0	38.7	2.79	1.73	4.75	2.04	2.32	173.2	174.3	35.9	36.9	0.77	1.10	0.05	0.79



### Stellar Parameters For KIC 011913073

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5514^{+149}_{-149}$	$4.569^{+0.029}_{-0.162}$	$-0.040^{+0.300}_{-0.300}$	$0.826^{+0.188}_{-0.063}$	$0.926^{+0.075}_{-0.108}$	$2.312^{+0.451}_{-1.003}$
	+3%/-3%	+1%/-4%	+750%/-750%	+23%/-8%	+8%/-12%	+19%/-43%
Source	PHO1	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 011913073-01 / KOI 0011.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-82 \pm 3$	$2.59^{+0.28}_{-0.19}$	$1469^{+83}_{-59}$	$3564^{+85}_{-75}$	$14^{+2}_{-2}$
Alt.	$-113 \pm 3$	$2.26^{+0.27}_{-0.17}$	$1477^{+78}_{-65}$	$3957^{+96}_{-93}$	$25^{+4}_{-5}$

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



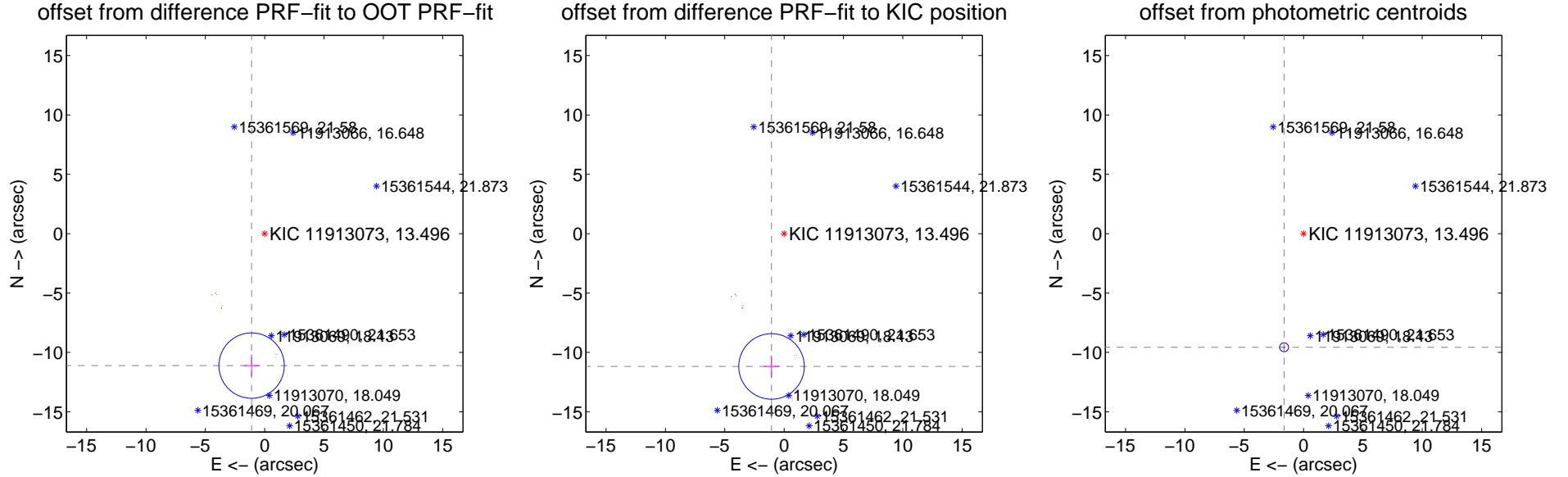
## DV Centroid Data

Supplemental centroid analysis for 011913073-01. Kepler magnitude: 13.50. Transit SNR 91.99

There are 8 quarters with good PRF difference image offsets

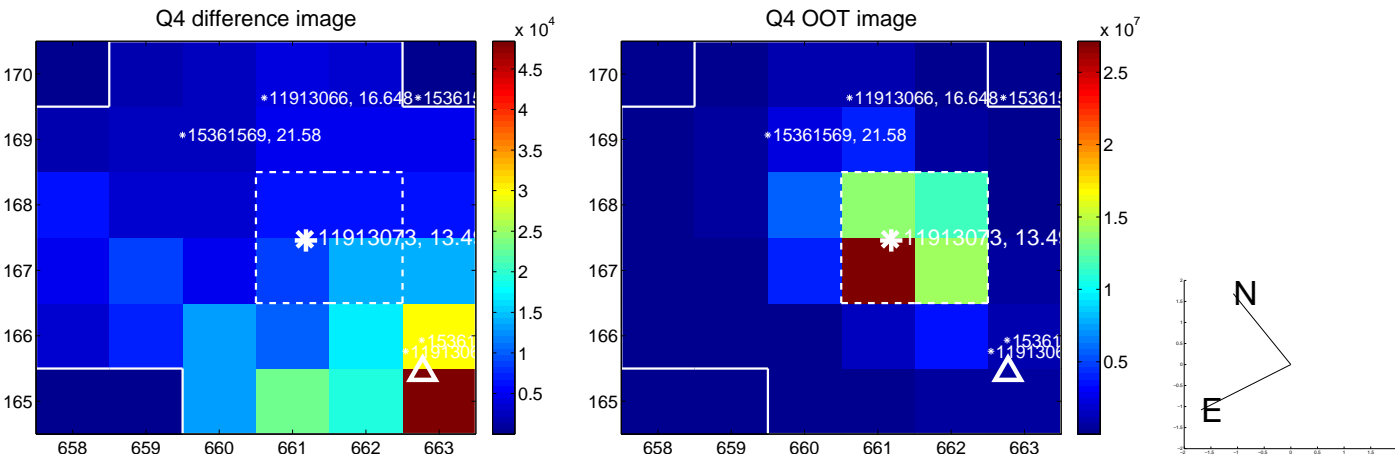
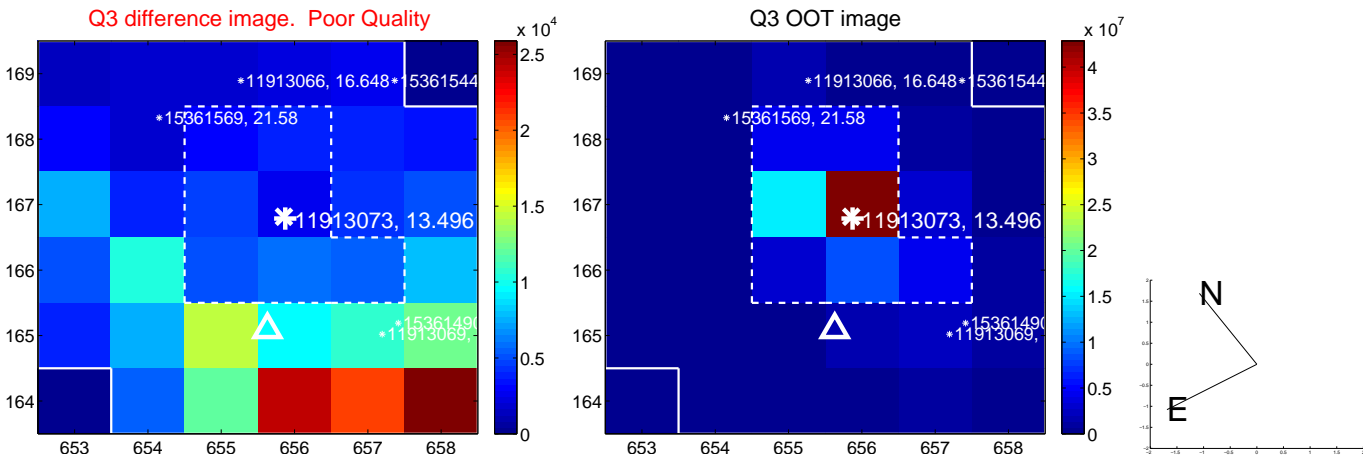
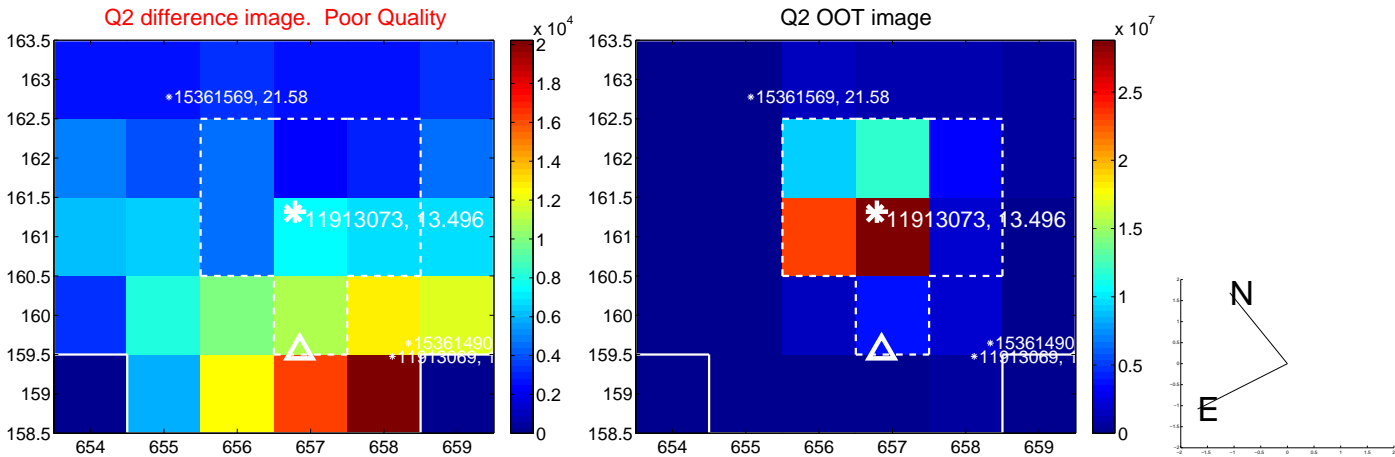
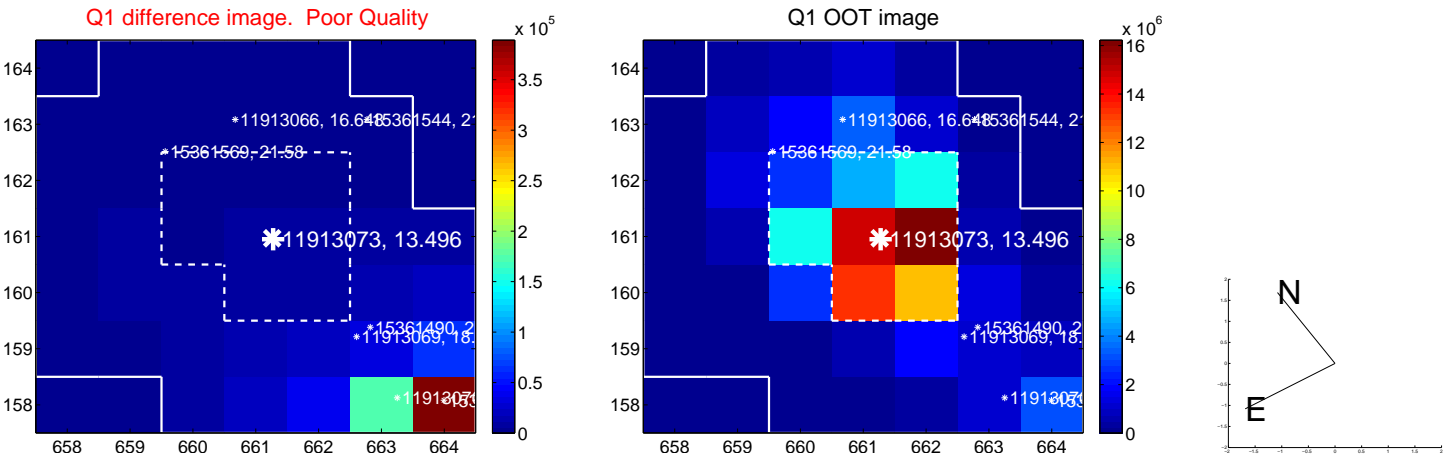
The direct PRF centroid is offset from the target star catalog position by about 0.13 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$11.166 \pm 0.918$	12.16	$1.101 \pm 0.650$	$-11.111 \pm 0.920$
PRF-fit source offset from KIC position	$11.232 \pm 0.920$	12.21	$1.061 \pm 0.643$	$-11.182 \pm 0.922$
photometric centroid source offset	$9.71 \pm 0.12$	77.73	$1.64 \pm 0.10$	$-9.57 \pm 0.13$

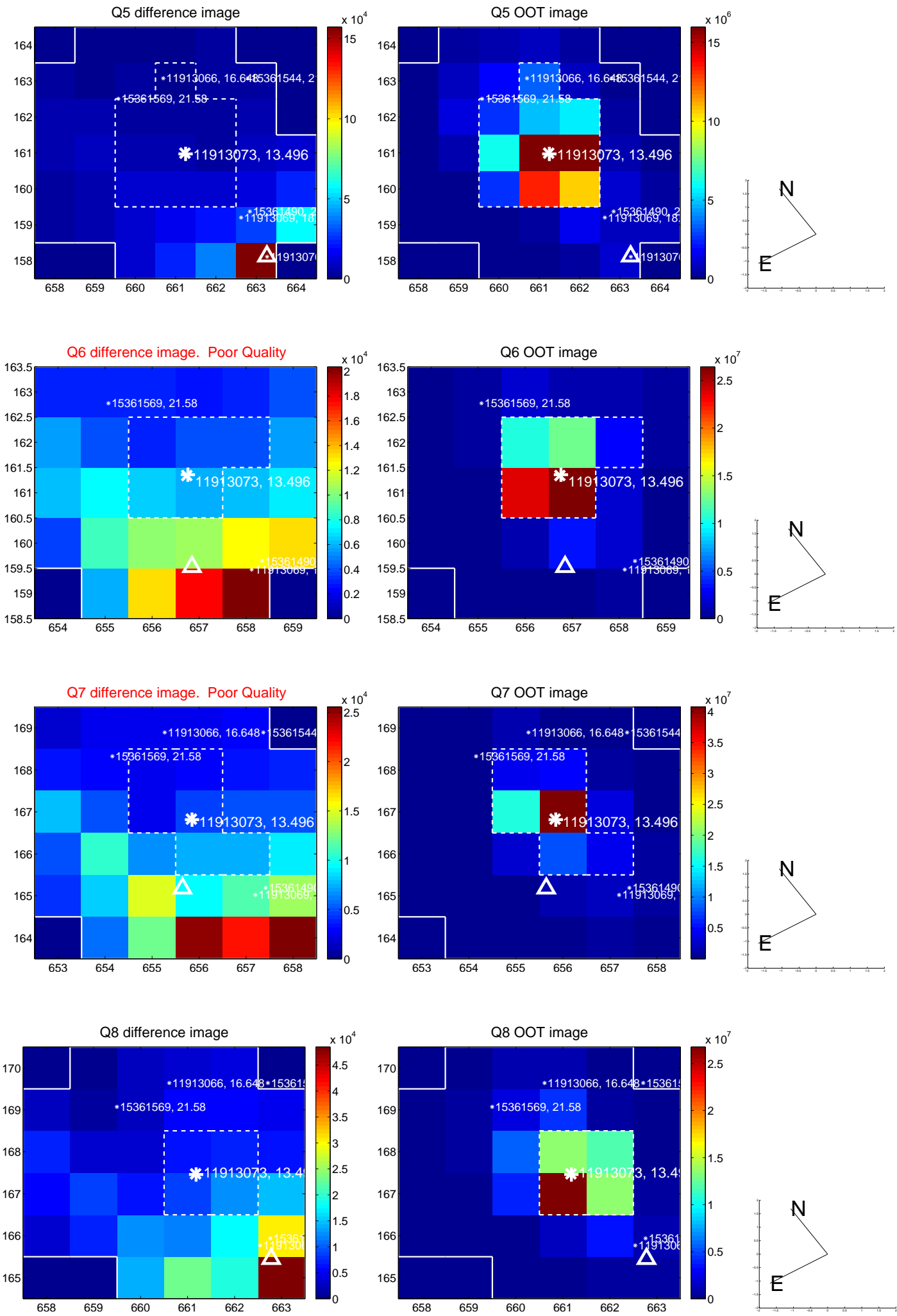


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

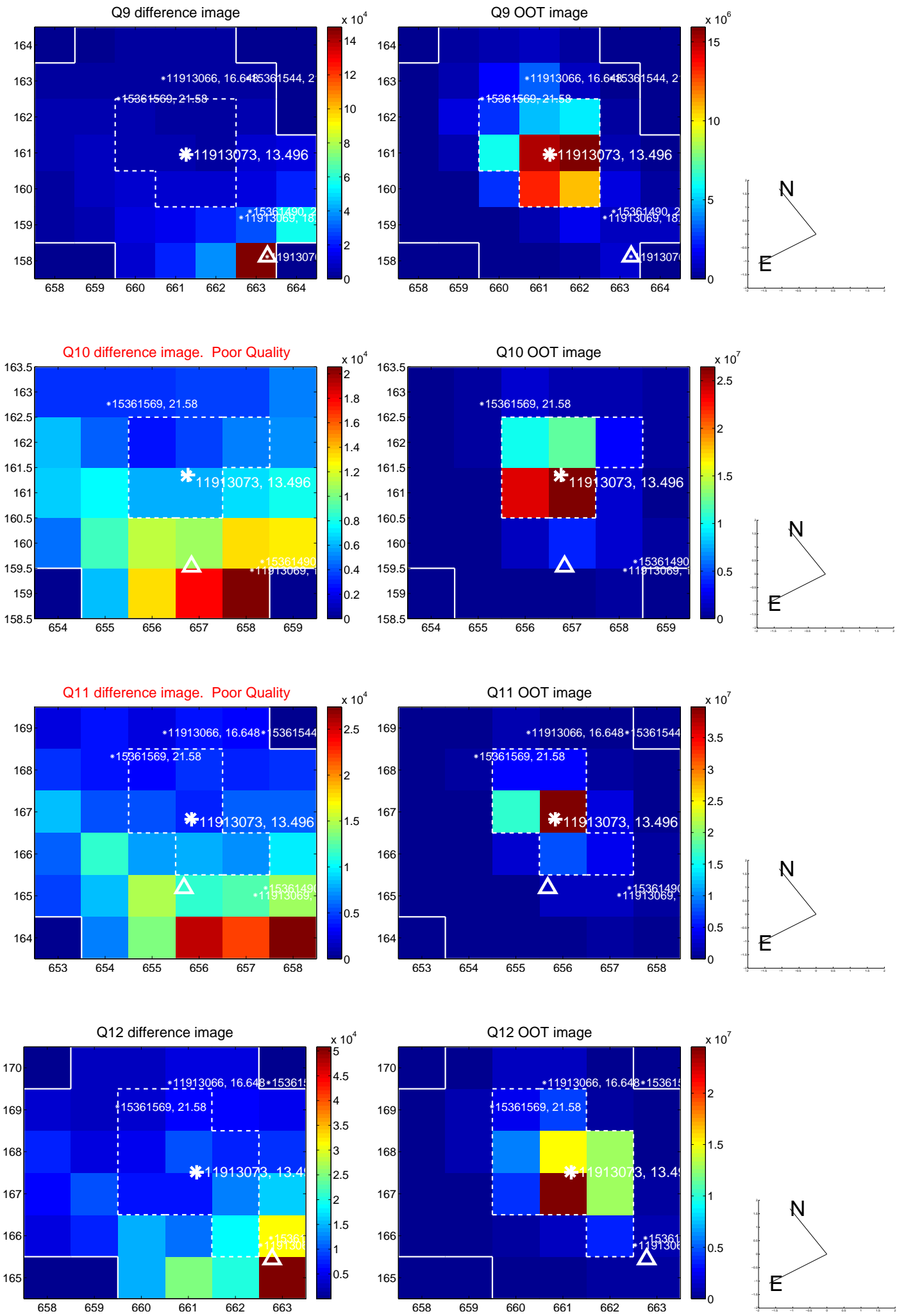
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



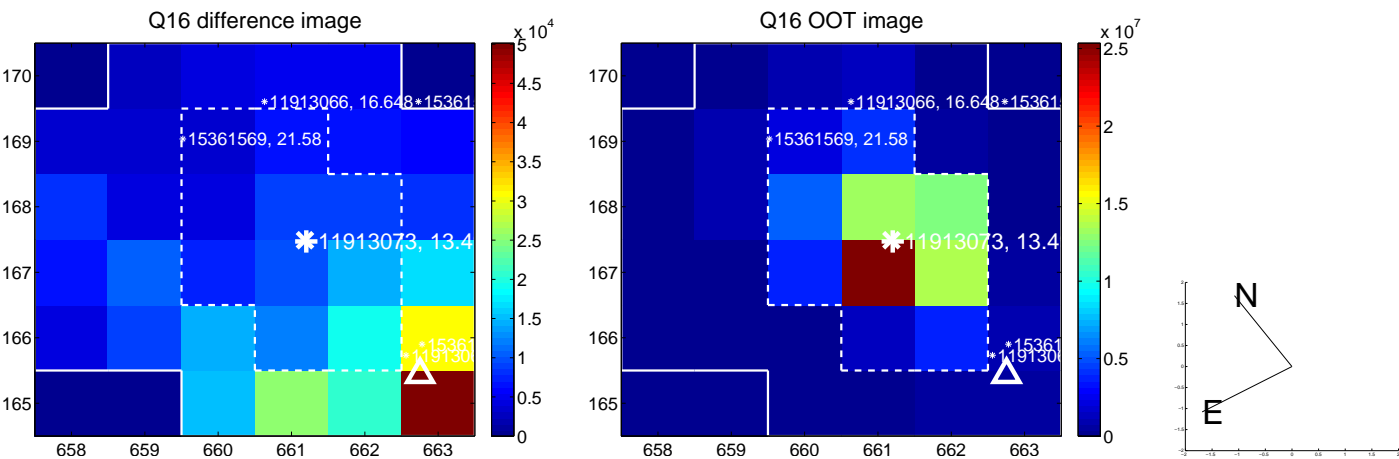
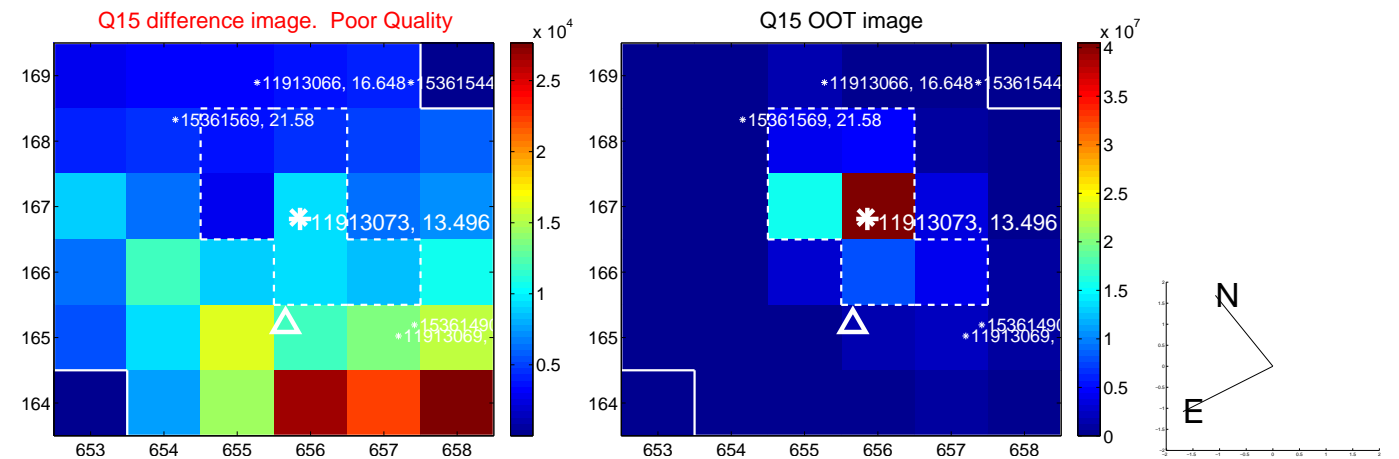
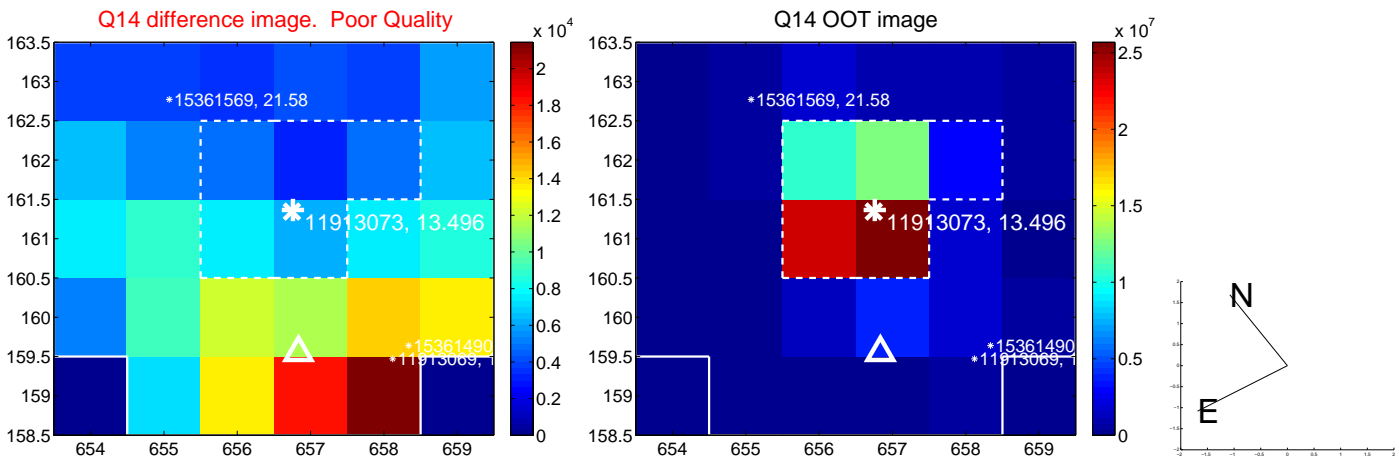
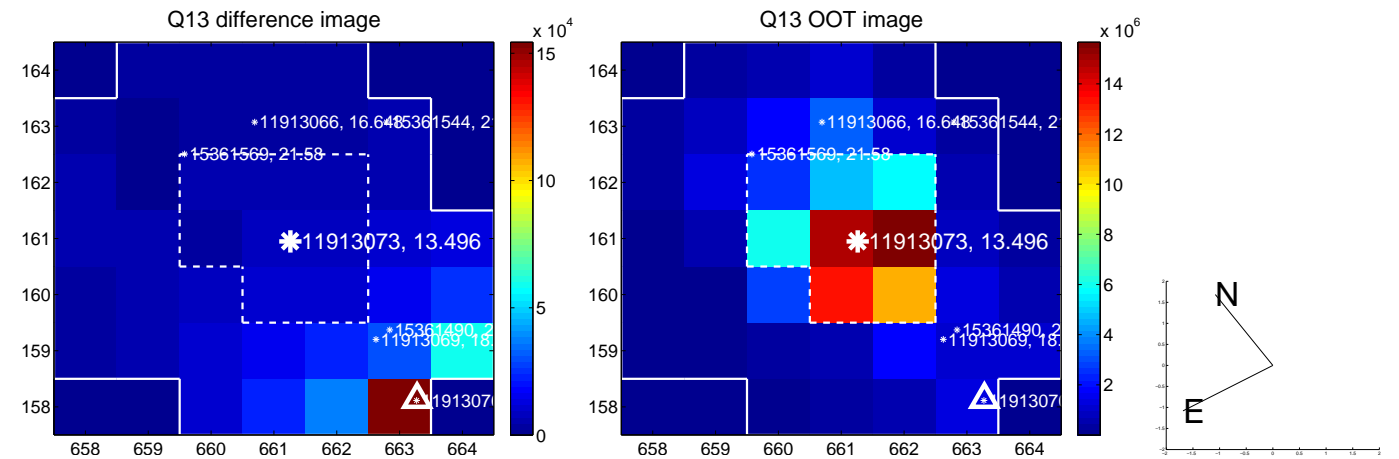
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

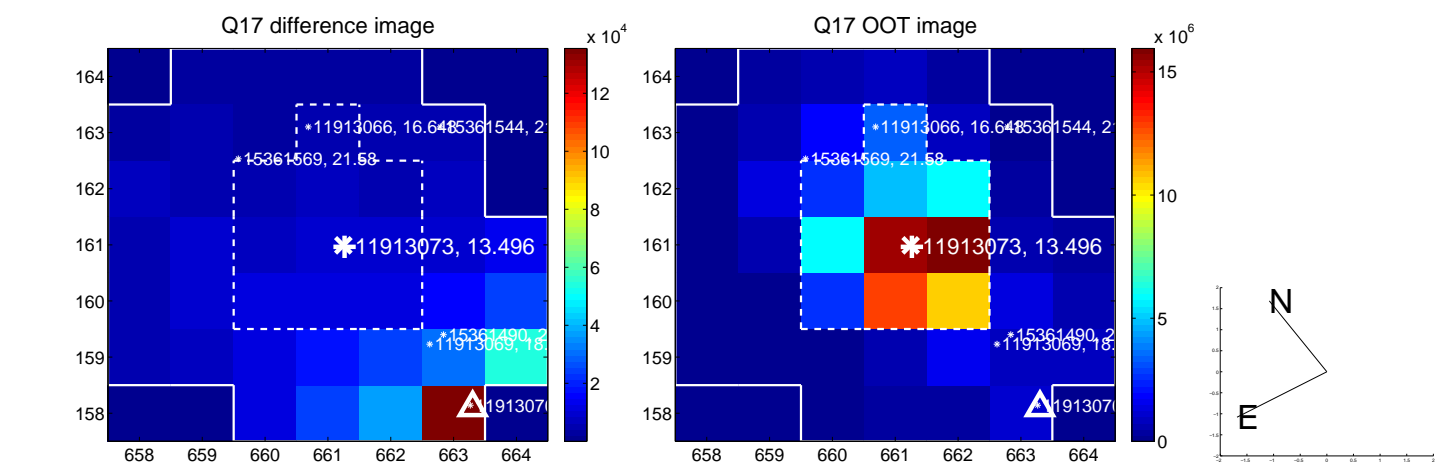


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

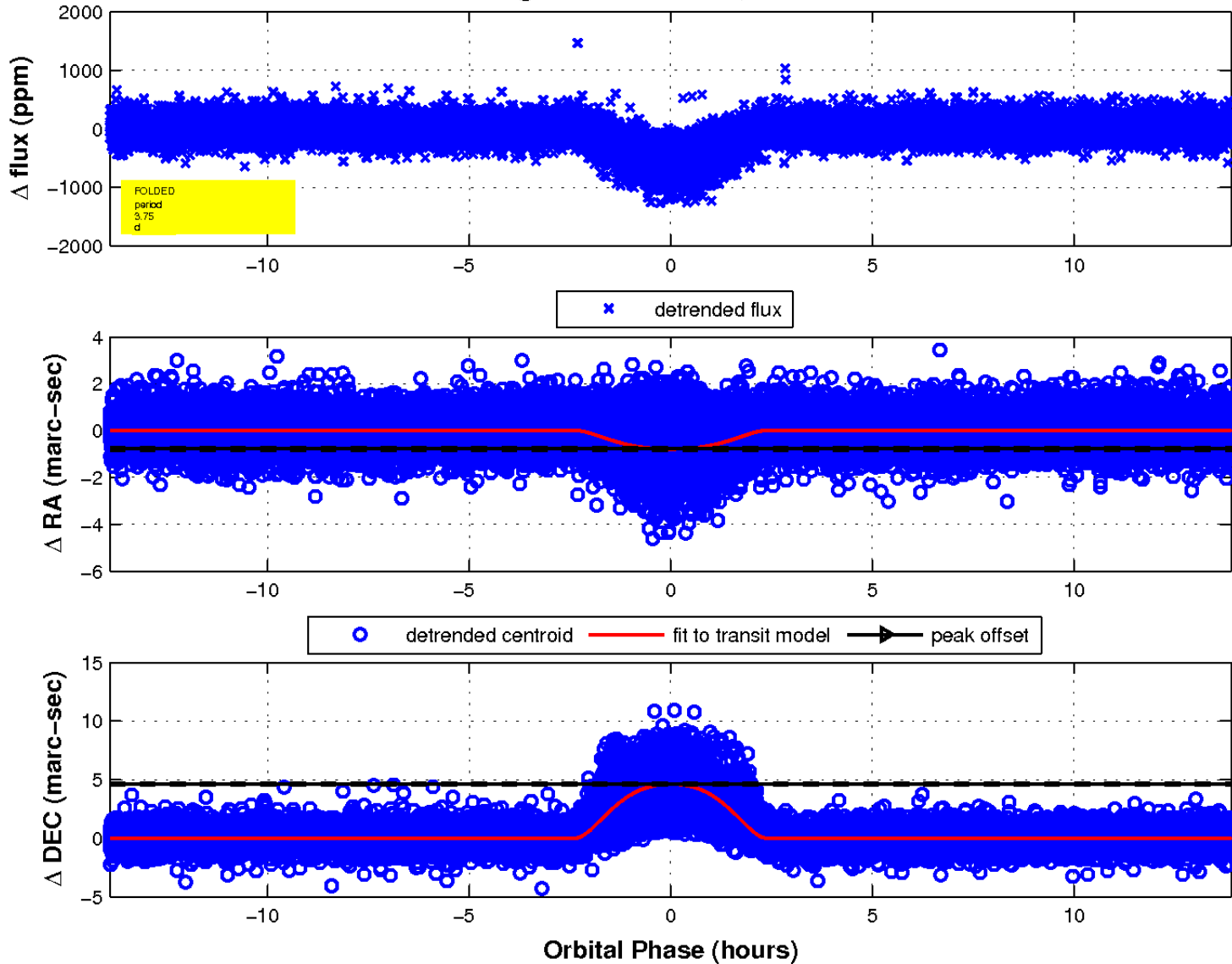




white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

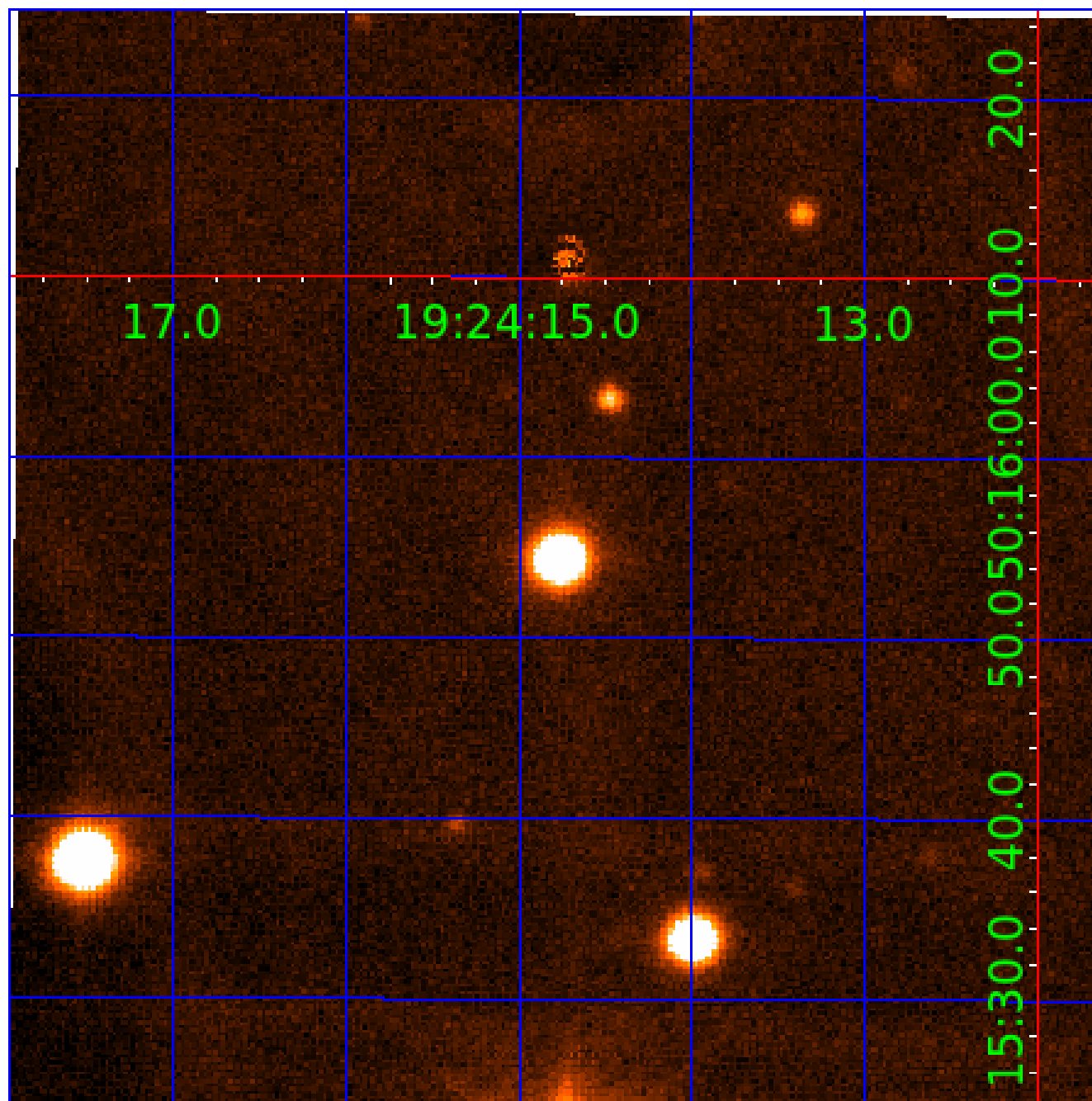


fluxWeightedCentroids, Planet 1 of 2



UKIRT Image

Declination



# KIC 011913073

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
011913073-01	OBS	0011.01	3.747824	134.189318	480.6	4.639	98.6	92.0	0.83	5514	2.52	267.33
011913073-02	OBS	No	3.747811	132.324477	85.1	3.182	16.7	19.0	0.83	5514	0.83	267.33

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
011913073-01	OBS	FP	0.00	0	1	1	1	MOD_SEC_DV—MOD_SEC_ALT—HAS_SEC_TCE—CENT_RESOLVED_OFFSET—HALO_GHOST—EPHEM_MATCH
011913073-02	OBS	FP	0.00	1	1	1	1	IS_SEC_TCE—CENT_RESOLVED_OFFSET—HALO_GHOST—EPHEM_MATCH

**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 011913073-02

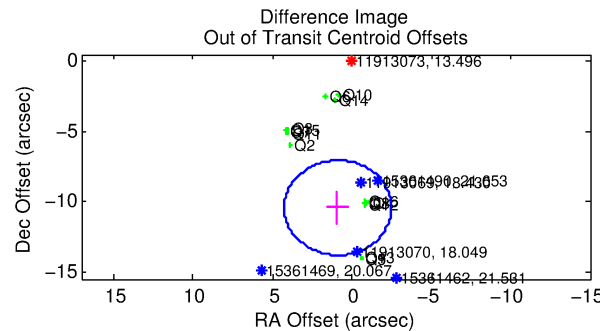
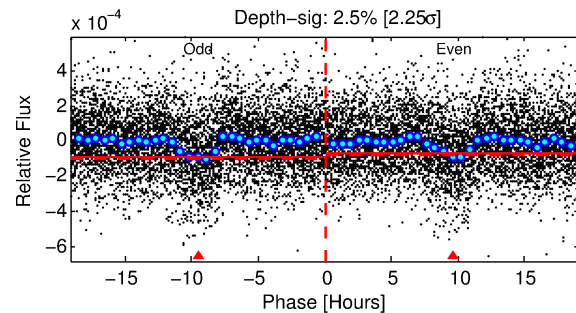
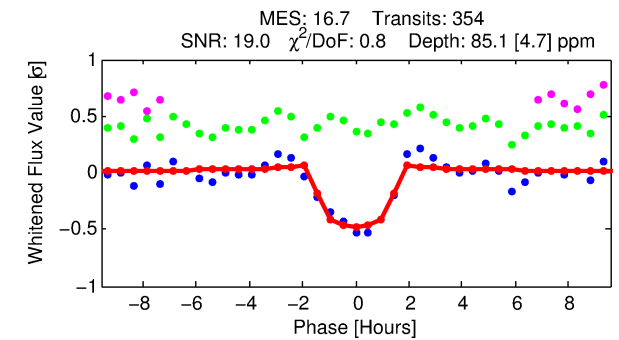
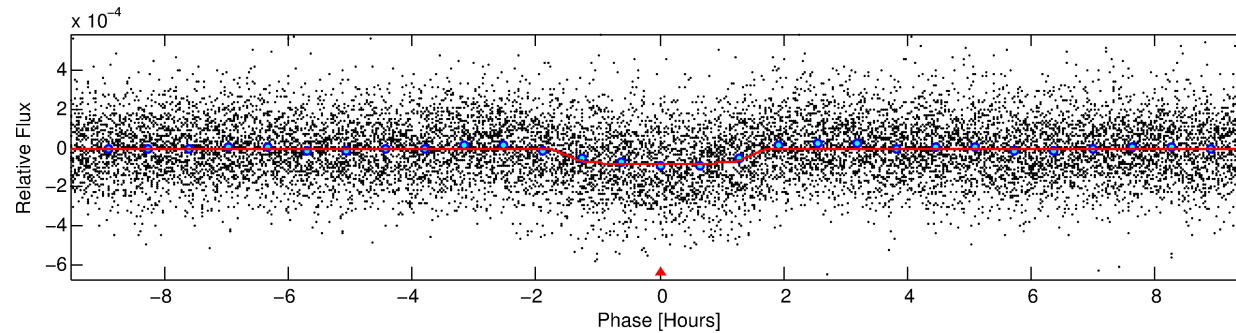
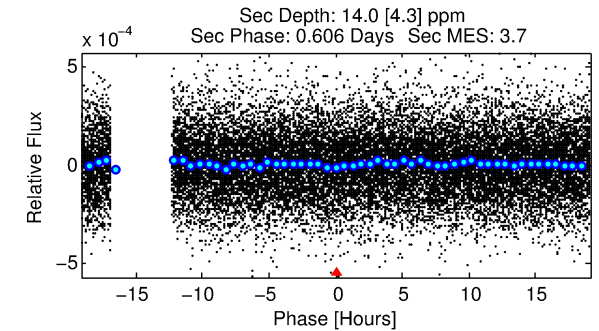
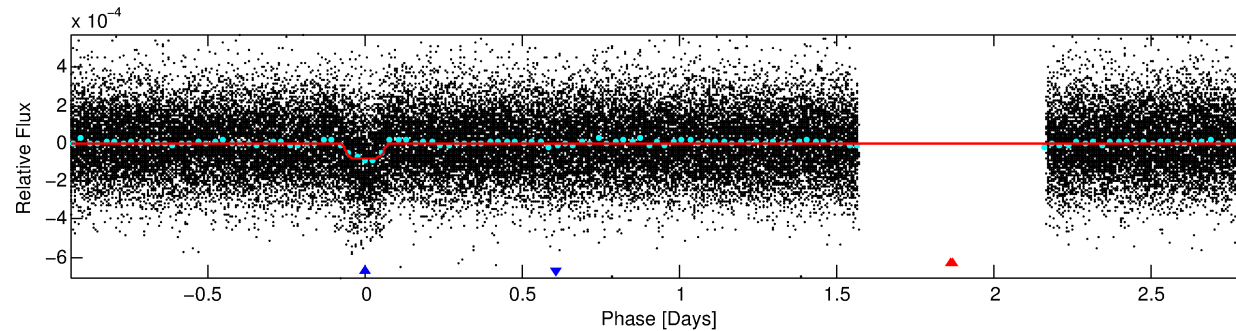
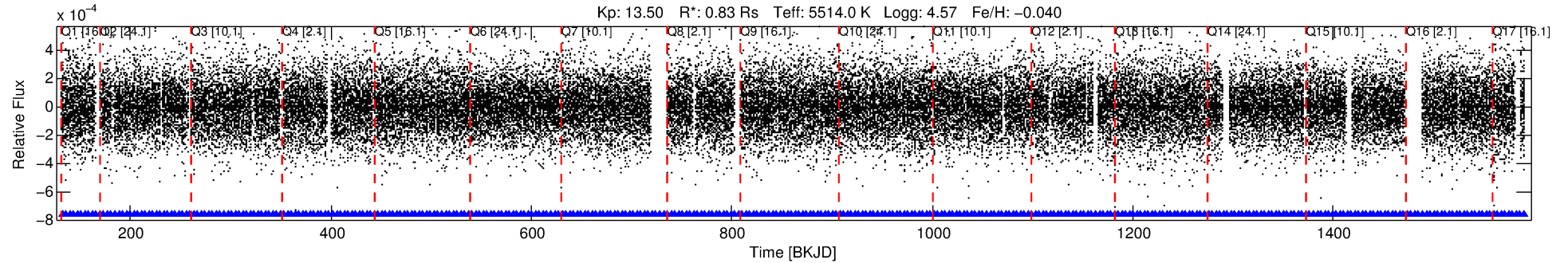
TCE (1)	KIC	Parent (2)	Parent KIC	$P_1:P_2$	Dist ( $''$ )	$\Delta$ Row	$\Delta$ Col	$m_2$	$m_1$	$D_2/D_1$	Mechanism	Flag	$\sigma_P$	$\sigma_T$
011913073-02	11913073	011913071-sec	11913071	1:1	34.9	7	-5	9.53	13.49	549.41	Direct-PRF	0	0.36	0.75

**Notes:**  $P_1:P_2$  is the period ratio. Dist is the distance in arcseconds.  $\Delta$ Row and  $\Delta$ Col are the number of pixels apart in row and column.  $m_2$  and  $m_1$  are the magnitudes of the parent and child.  $D_2/D_1$  is the parent's transit depth divided by the child's.  $\sigma_P$  and  $\sigma_T$  are the significance of the match in period and epoch. For a match to be considered significant  $\sigma_P < 5.0$  and  $\sigma_T < 5.0$ . Matches which have  $\sigma_P$  and  $\sigma_T$  very close to this cutoff should receive extra scrutiny, especially if the period ratio is very large.

# DV One-Page Summary

KIC: 11913073 Candidate: 2 of 2 Period: 3.748 d  
KOI: K00011 Corr: No Ephemeris Match

Kp: 13.50 R\*: 0.83 Rs Teff: 5514.0 K Logg: 4.57 Fe/H: -0.040



## DV Fit Results:

Period = 3.74781 [0.00001] d  
Epoch = 132.3245 [0.0025] BKJD  
Rp/R\* = 0.0093 [0.0032]  
a/R\* = 5.96 [8.30]  
b = 0.77 [0.78]  
Seff = 267.33 [83.06]  
Teq = 1031 [80] K  
Rp = 0.84 [0.35] Re  
a = 0.0460 [0.0090] AU  
Ag = 23.35 [18.98] [1.18σ]  
Teff = 3504 [671] K [3.66σ]

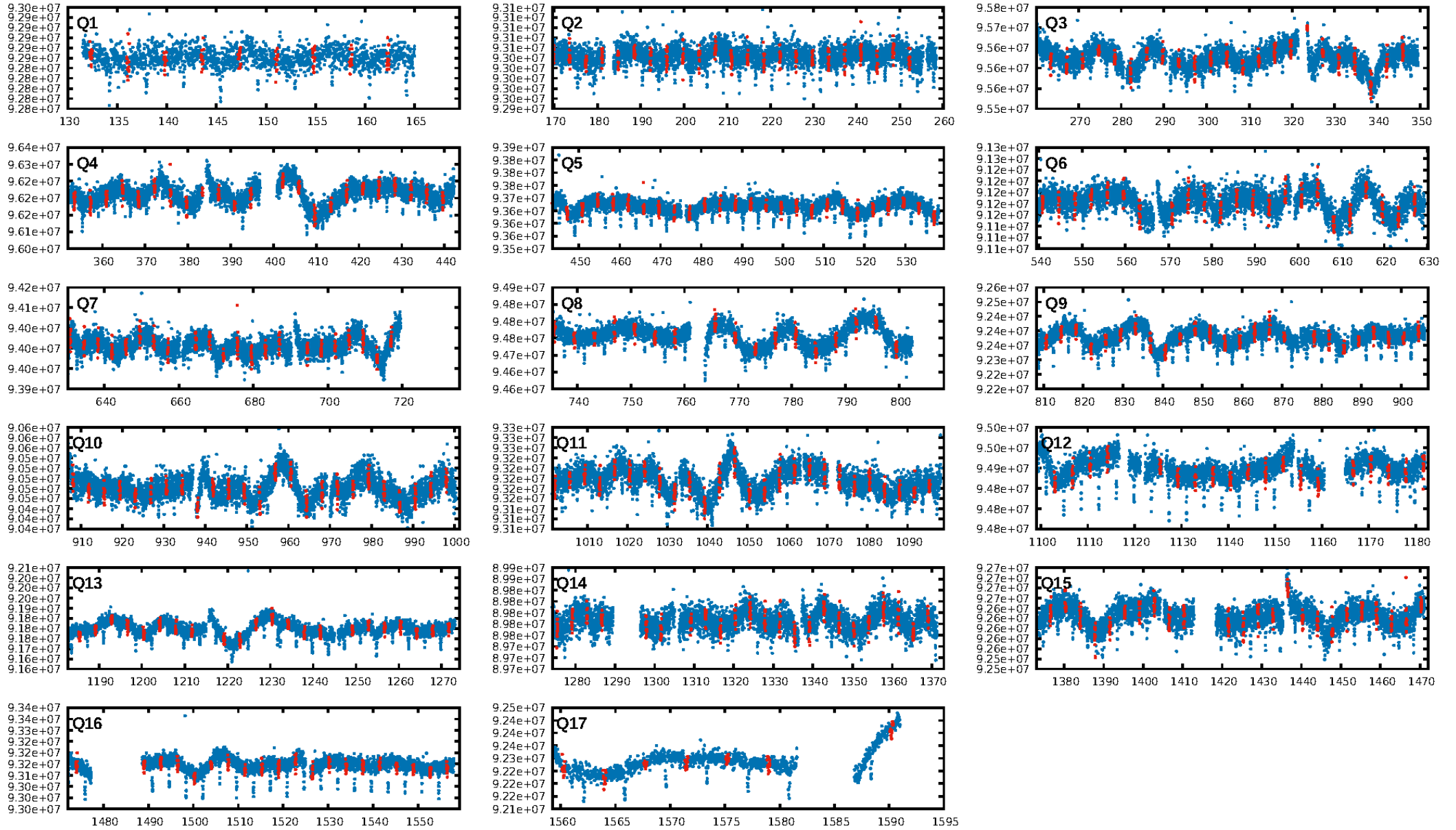
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 0.0% [0.00σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGoF-sig: N/A  
Bootstrap-pfa: 9.56e-61  
RollingBand-fgt: 1.00 [338/338]  
GhostDiagnostic-chr: -0.1364  
Centroid-sig: 0.0%  
Centroid-so: 12.436 arcsec [18.43σ]  
OotOffset-rm: 10.469 arcsec [9.31σ]  
KicOffset-rm: 10.542 arcsec [9.38σ]  
OotOffset-st: 4/4/4/3 [15]  
KicOffset-st: 4/4/4/3 [15]  
DiffImageQuality-fgm: 0.47 [7/15]  
DiffImageOverlap-fno: 1.00 [17/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 10:38:22 Z

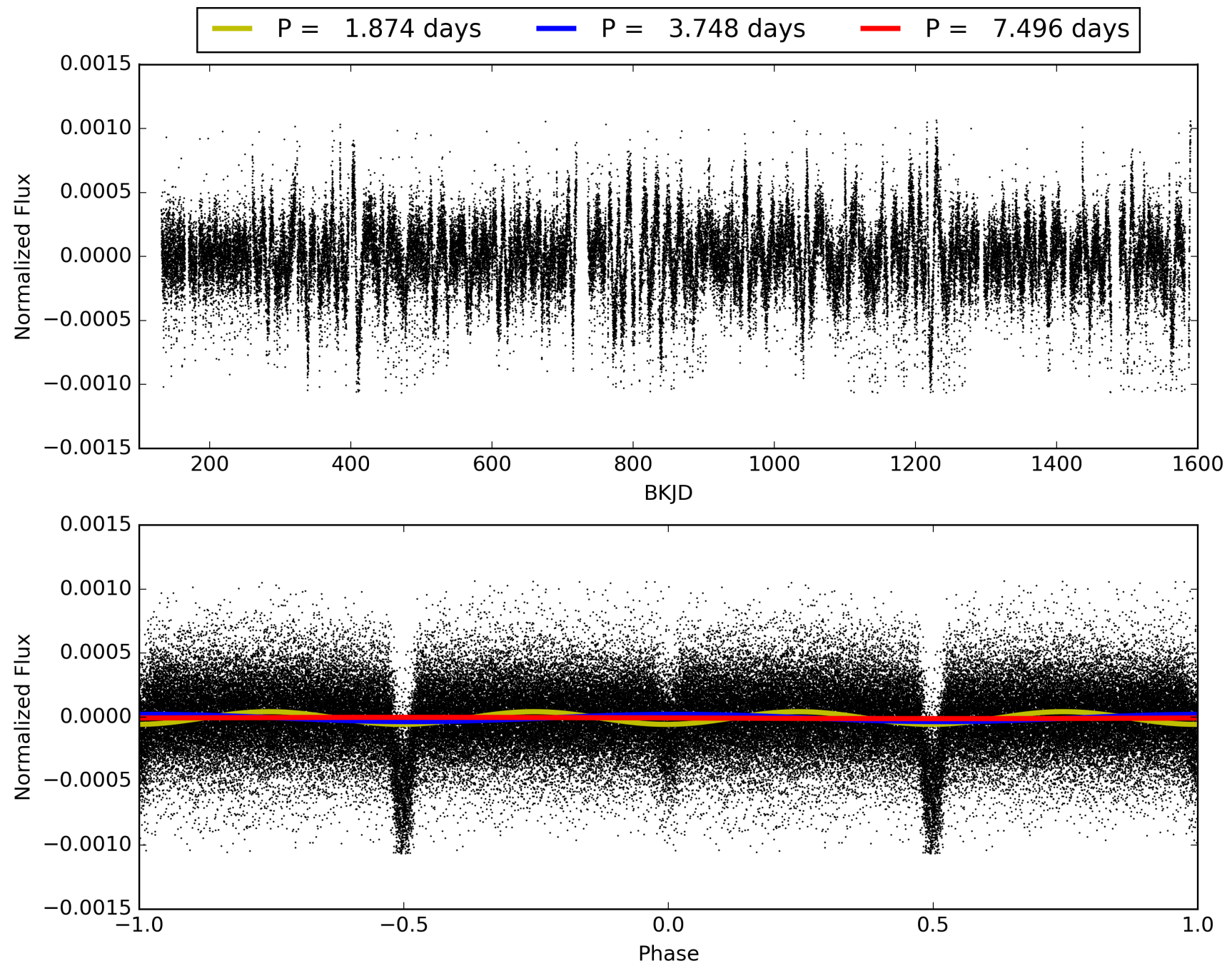
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 011913073-02, PDC Light Curves



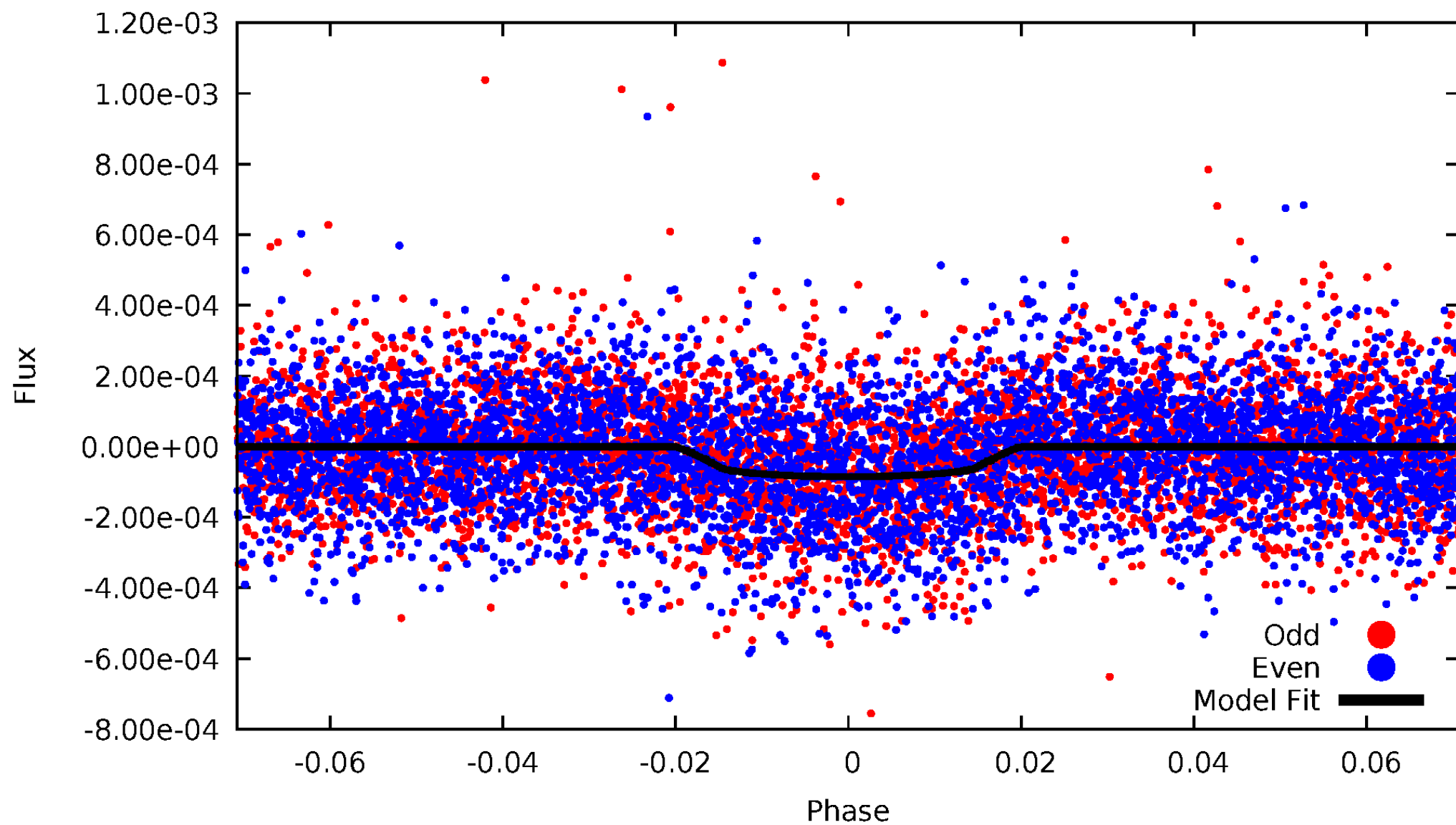


TCE 011913073-02



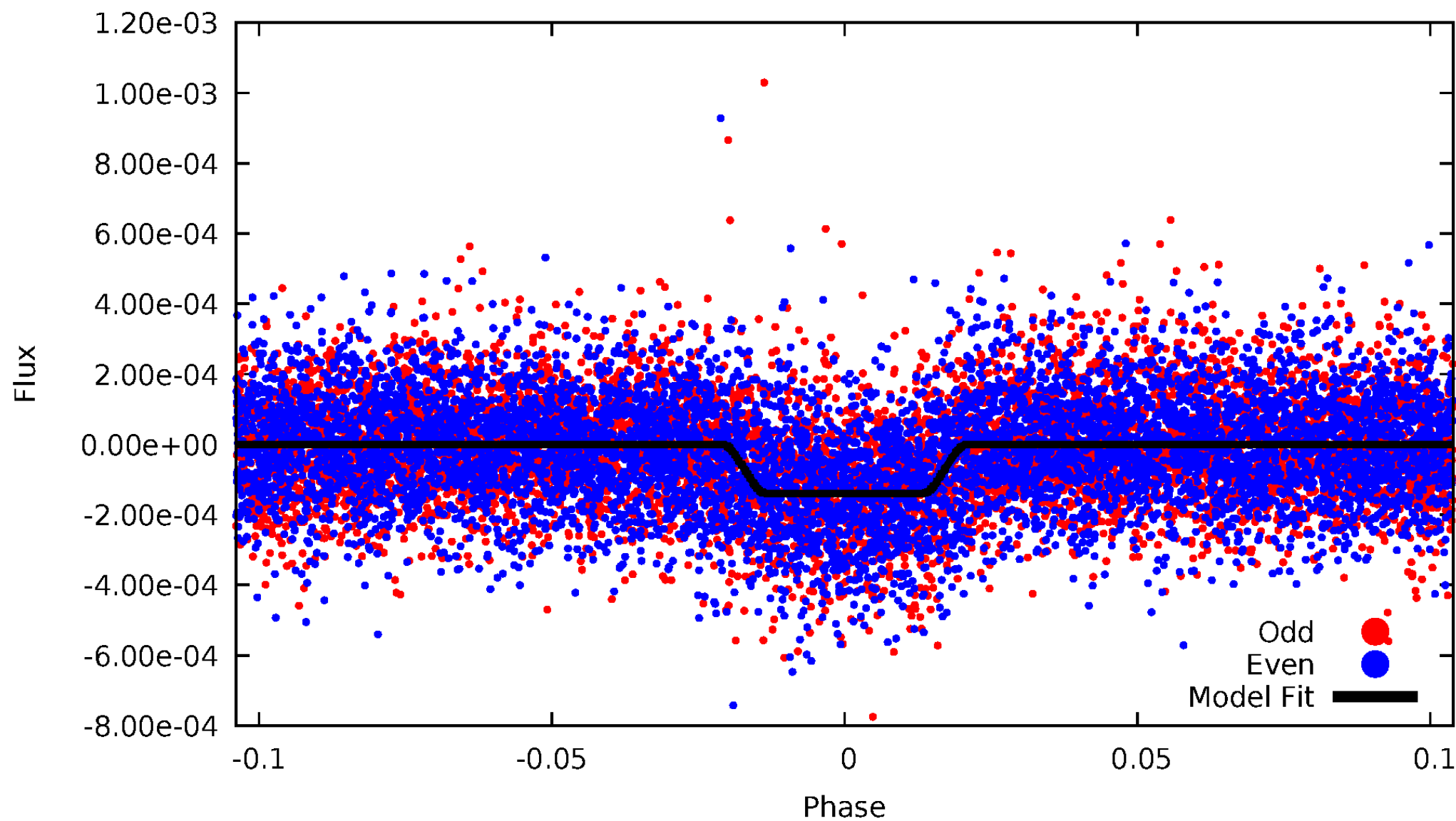
# DV Odd/Even

TCE 011913073-02



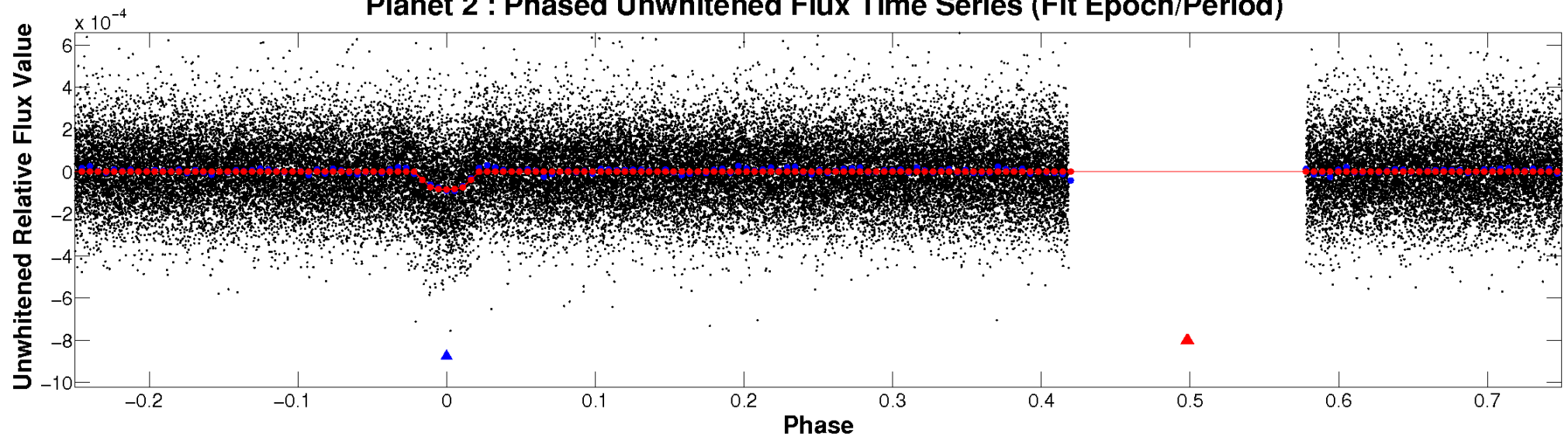
# ALT Odd/Even

TCE 011913073-02

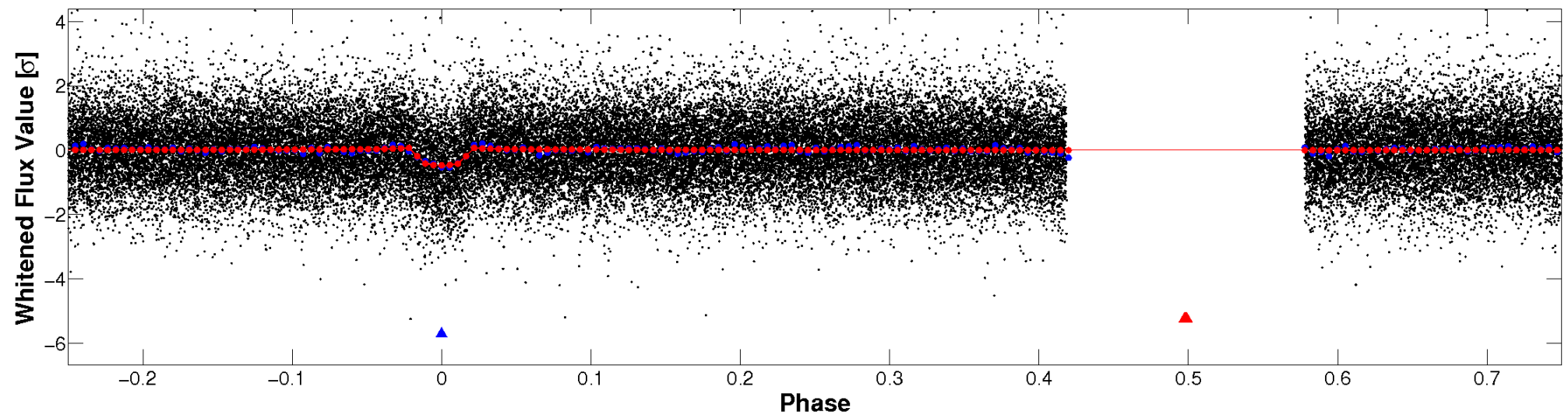


# Non-Whitened Vs. Whitened Light Curve

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



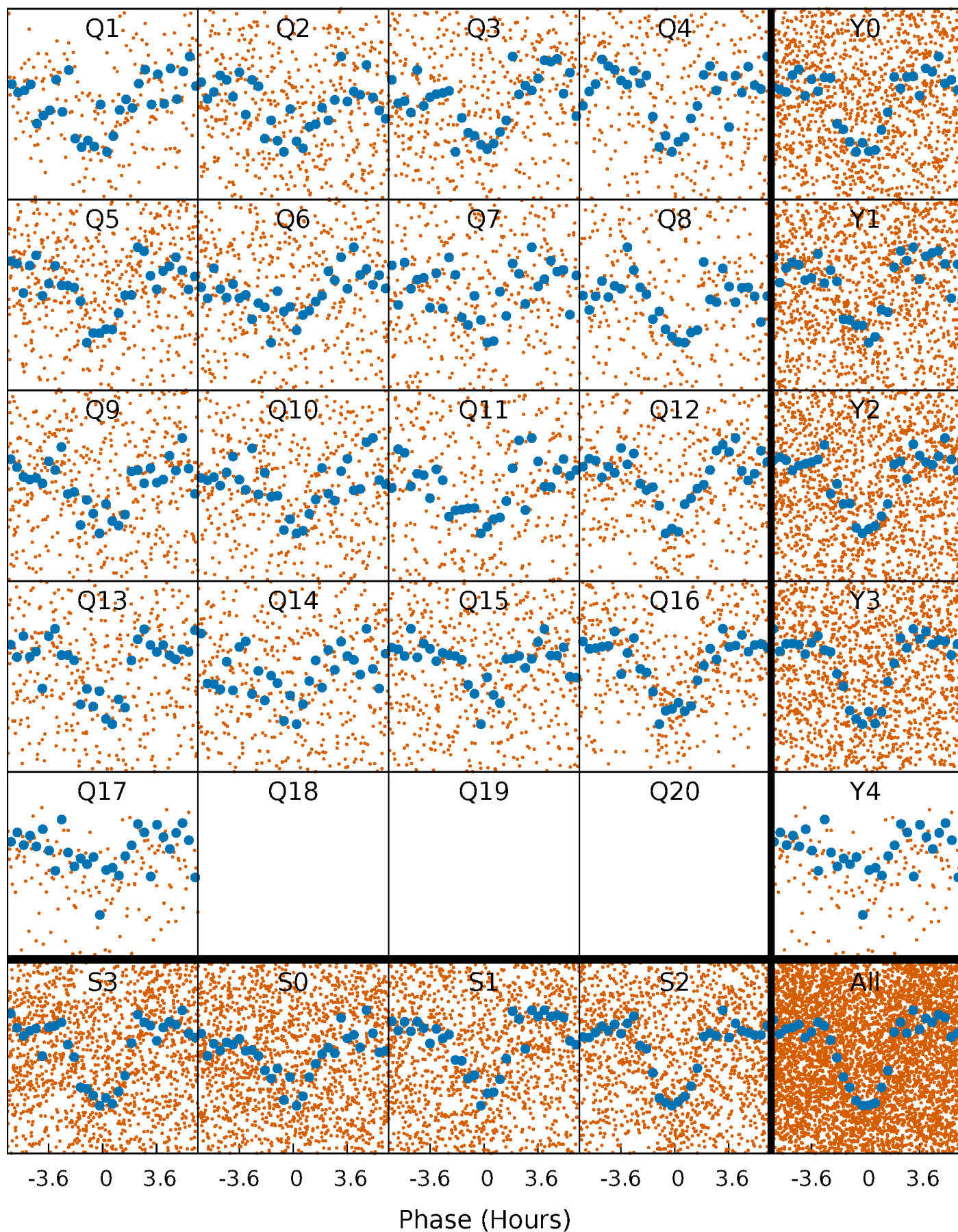
## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)





# PDC Quarter-Phased Transit Curves

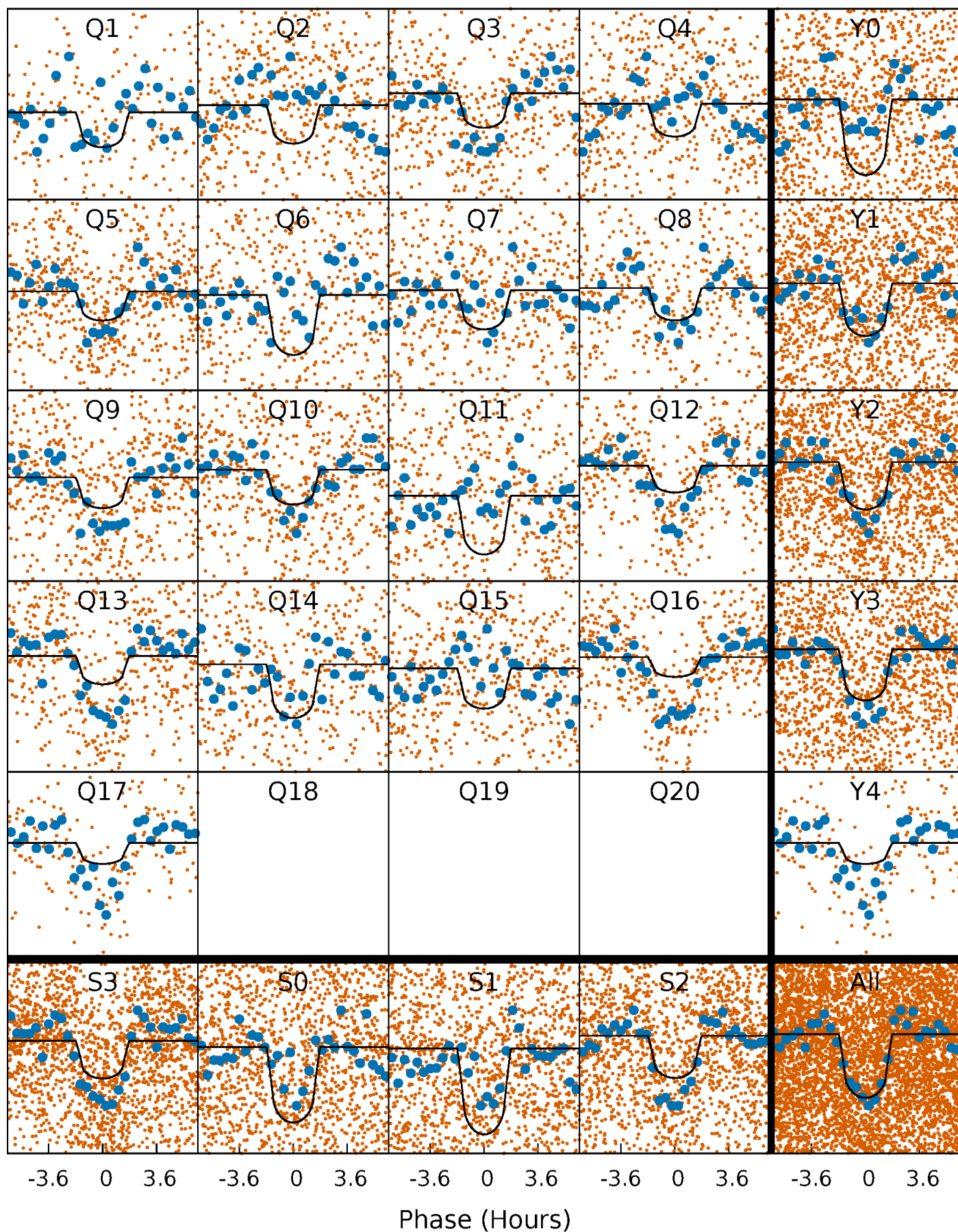
TCE 011913073-02 P= 3.747811 Days  $T_0=132.324477$  (BKJD)





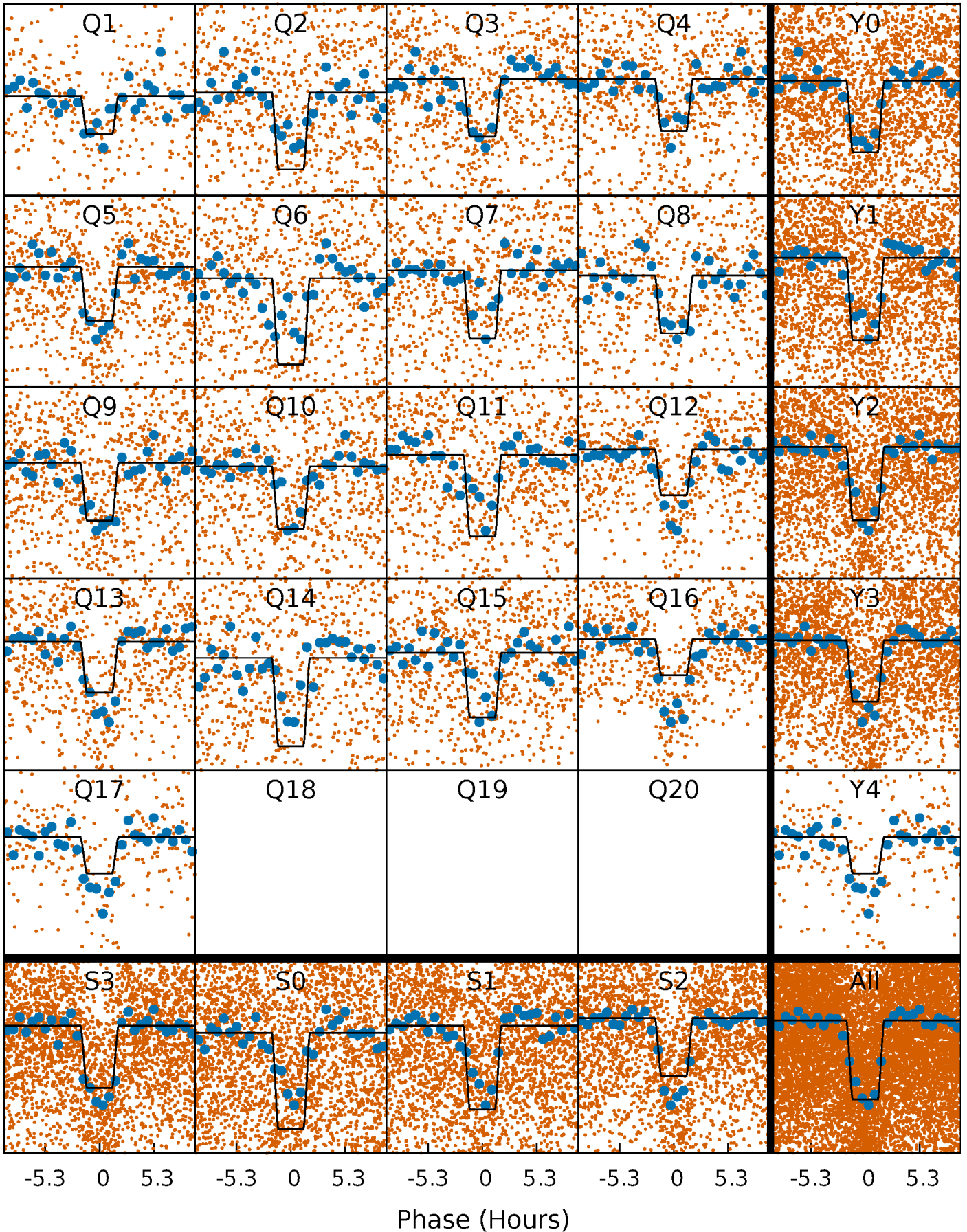
# DV Quarter-Phased Transit Curves

TCE 011913073-02 P= 3.747811 Days  $T_0=132.324477$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

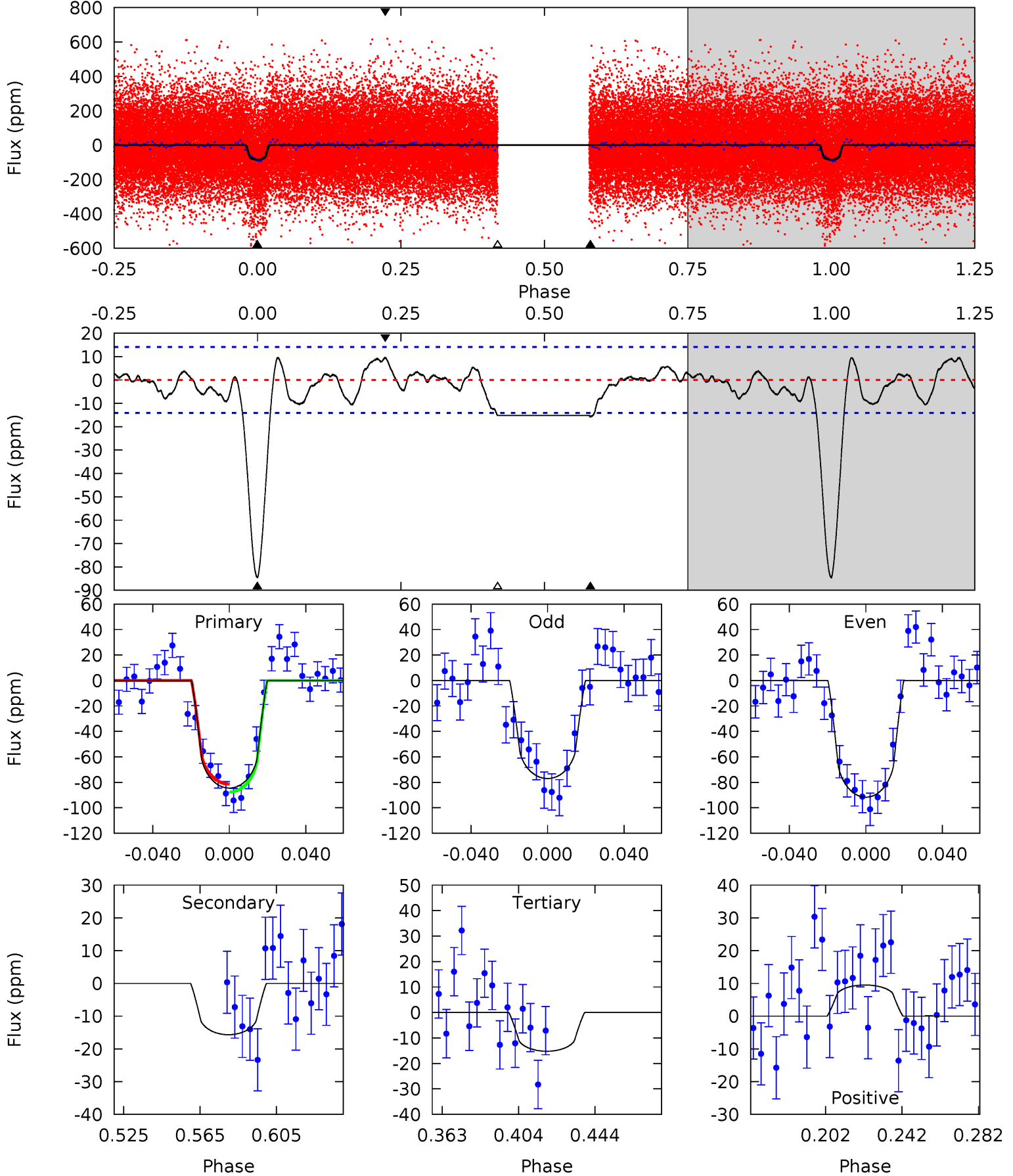
TCE 011913073-02   P= 3.747793 Days    $T_0=132.322889$  (BKJD)



# DV Model-Shift Uniqueness Test

011913073-02, P = 3.747811 Days, E = 128.576666 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
28.5	5.28	5.13	3.21	4.75	2.05	1.59	23.4	25.3	0.15	2.08	2.47	0.95	0.10	1.06

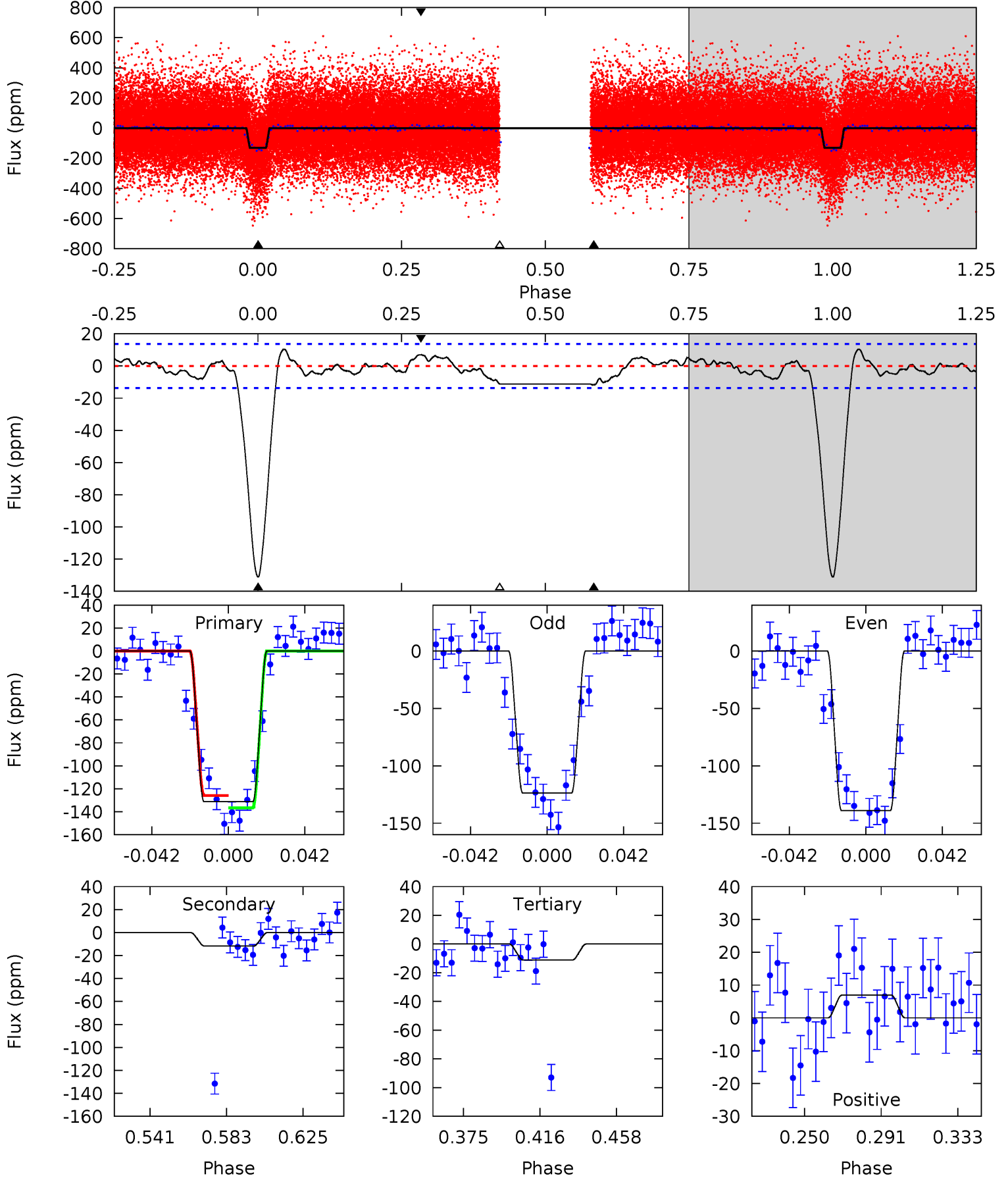




# Alt Model-Shift Uniqueness Test

011913073-02, P = 3.747793 Days, E = 128.575096 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
45.5	4.08	3.87	2.42	4.75	2.04	1.38	41.6	43.1	0.21	1.67	2.63	1.01	0.07	1.88



### Stellar Parameters For KIC 011913073

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5514^{+149}_{-149}$	$4.569^{+0.029}_{-0.162}$	$-0.040^{+0.300}_{-0.300}$	$0.826^{+0.188}_{-0.063}$	$0.926^{+0.075}_{-0.108}$	$2.312^{+0.451}_{-1.003}$
	+3%/-3%	+1%/-4%	+750%/-750%	+23%/-8%	+8%/-12%	+19%/-43%
Source	PHO1	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 011913073-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-16 \pm 3$	$0.90^{+0.31}_{-0.31}$	$1468^{+88}_{-56}$	$3852^{+717}_{-370}$	$22^{+30}_{-10}$
Alt.	$-12 \pm 3$	$1.12^{+0.34}_{-0.32}$	$1473^{+76}_{-59}$	$3415^{+436}_{-295}$	$10^{+11}_{-5}$

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

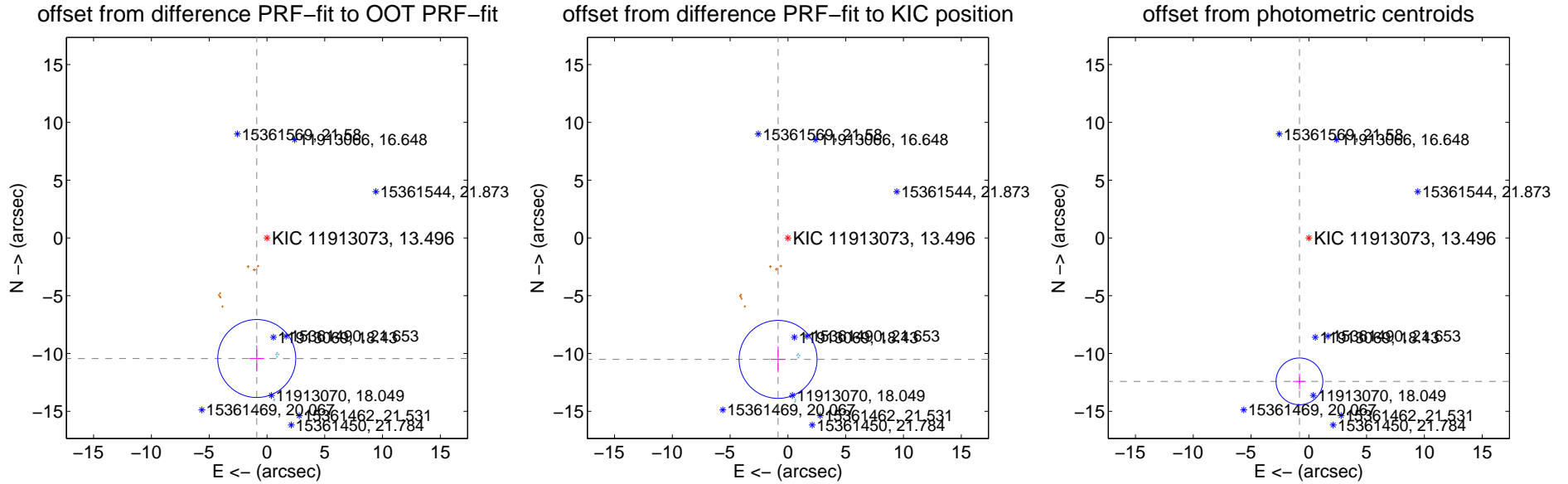
## DV Centroid Data

Supplemental centroid analysis for 011913073-02. Kepler magnitude: 13.50. Transit SNR 18.97

There are 7 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.10 arcsec

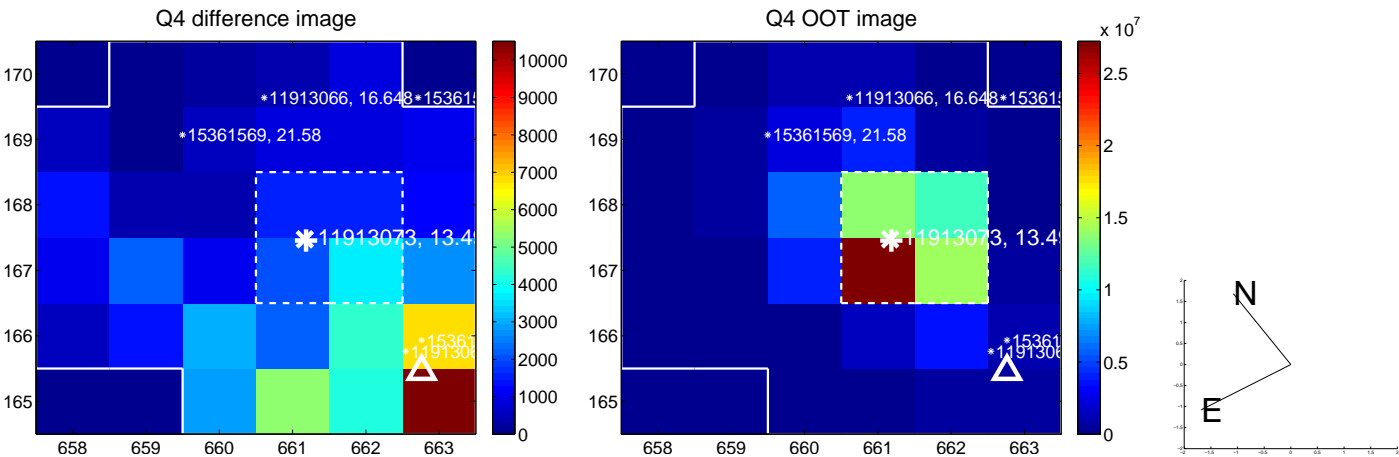
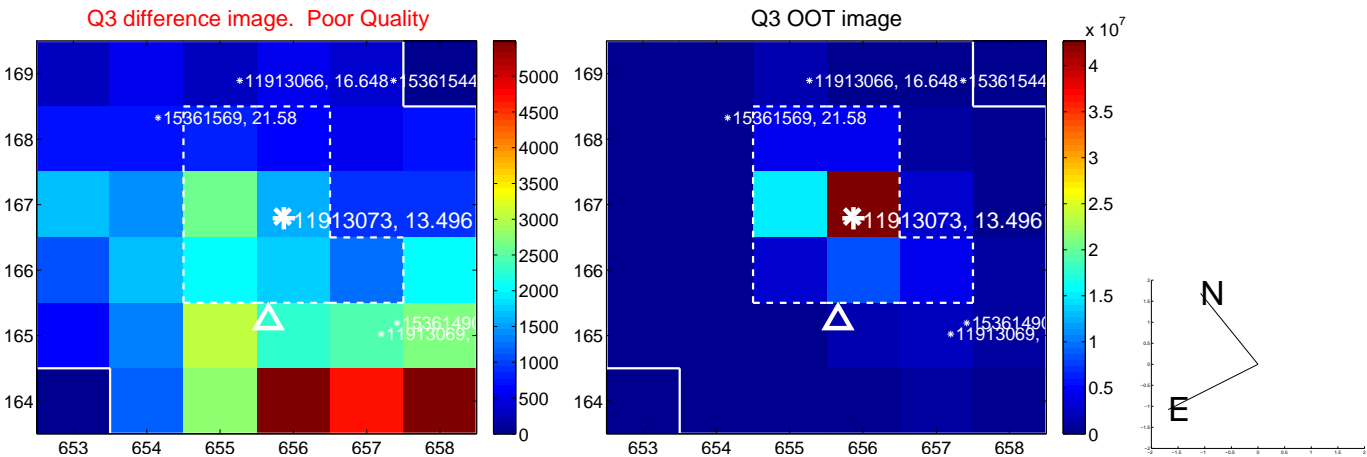
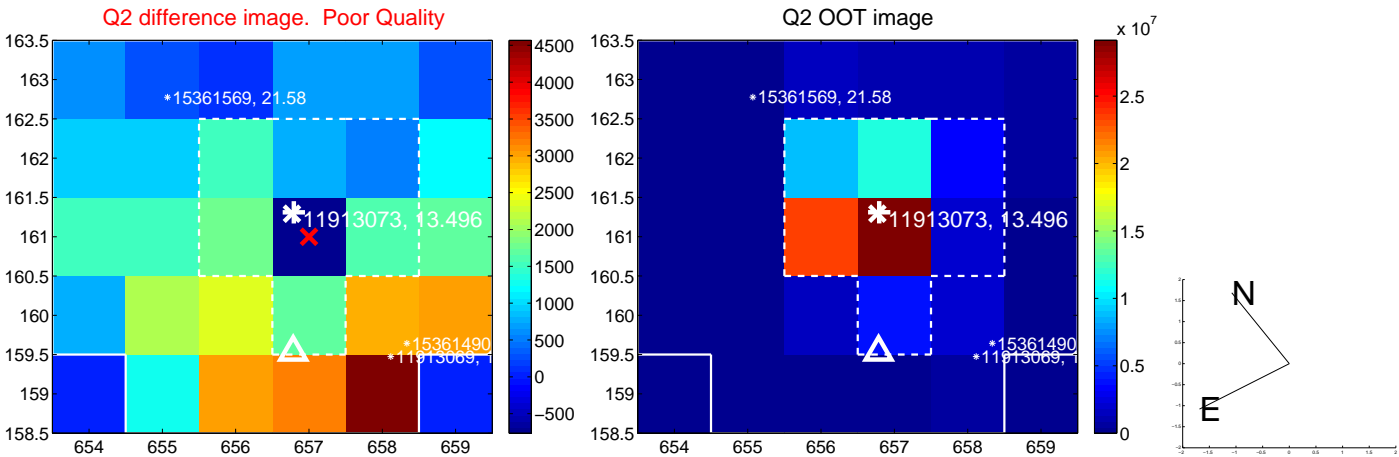
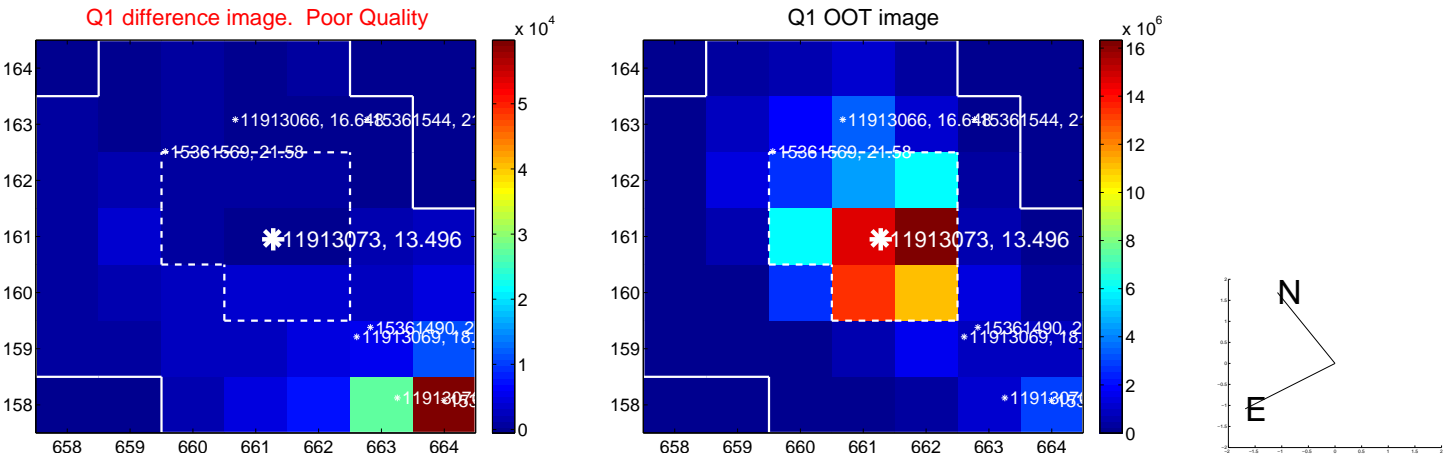
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$10.469 \pm 1.124$	<b>9.31</b>	$0.884 \pm 0.651$	$-10.432 \pm 1.127$
PRF-fit source offset from KIC position	$10.542 \pm 1.124$	<b>9.38</b>	$0.850 \pm 0.651$	$-10.508 \pm 1.127$
photometric centroid source offset	$12.44 \pm 0.67$	<b>18.43</b>	$0.81 \pm 0.55$	$-12.41 \pm 0.68$



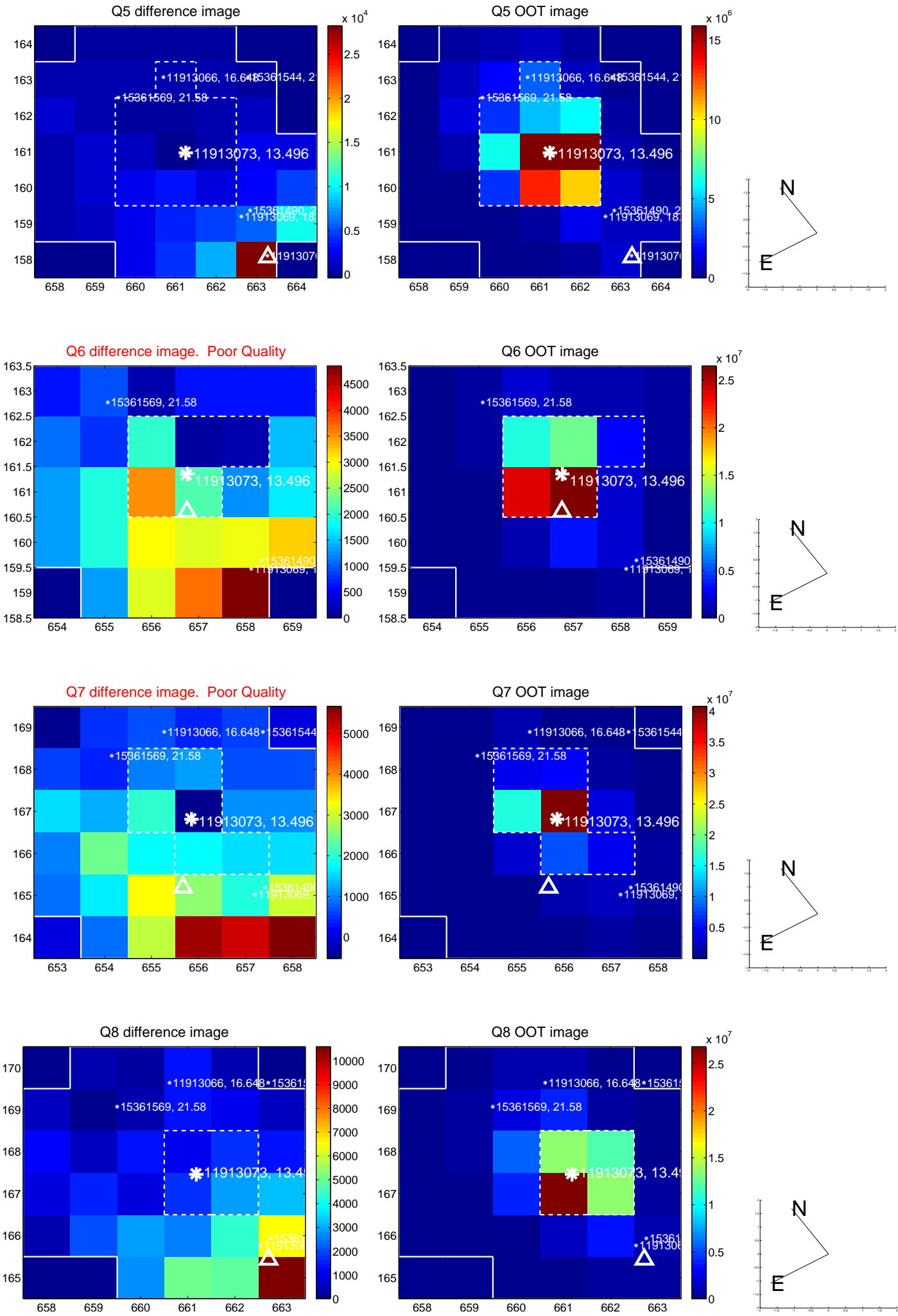
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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



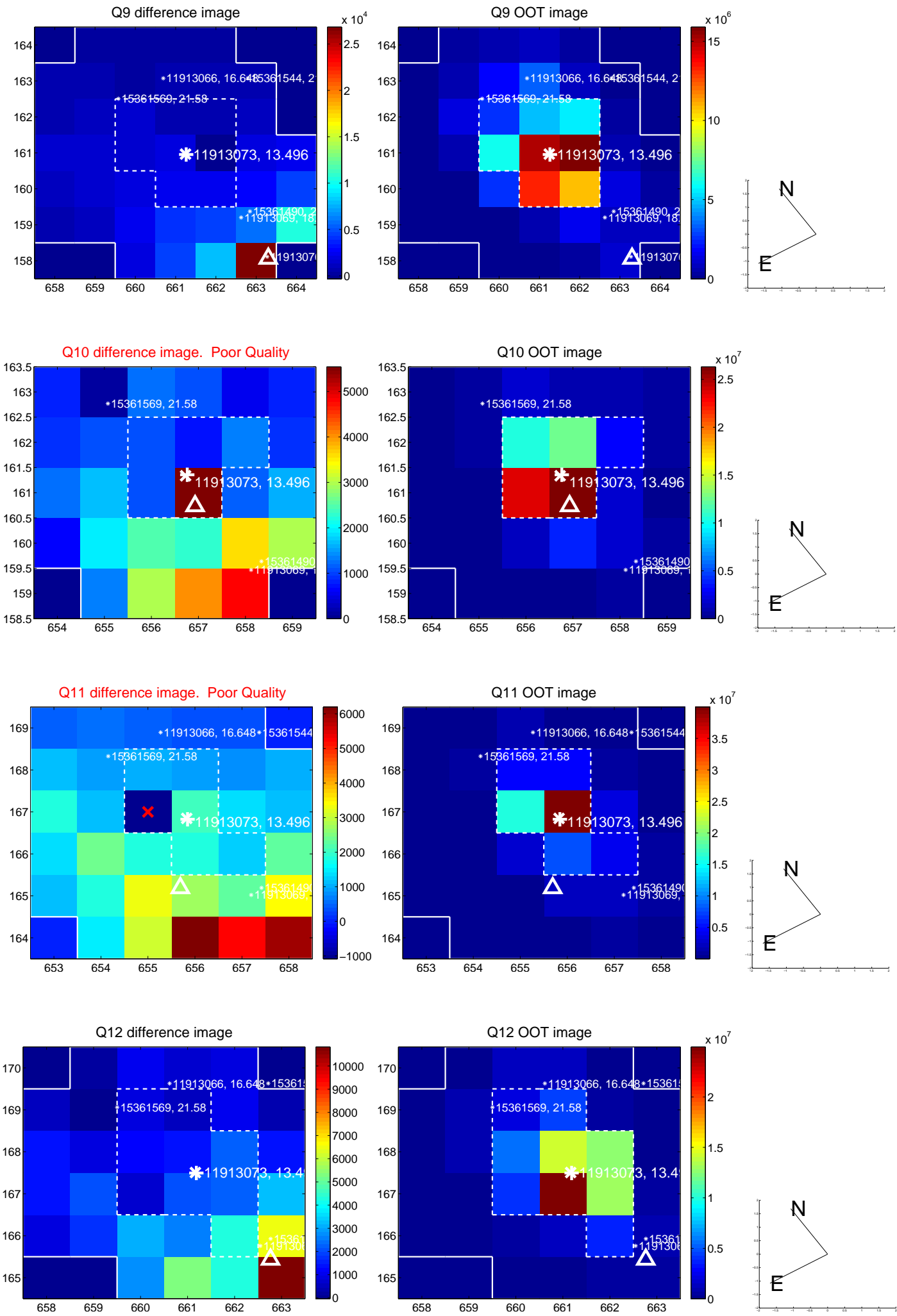
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



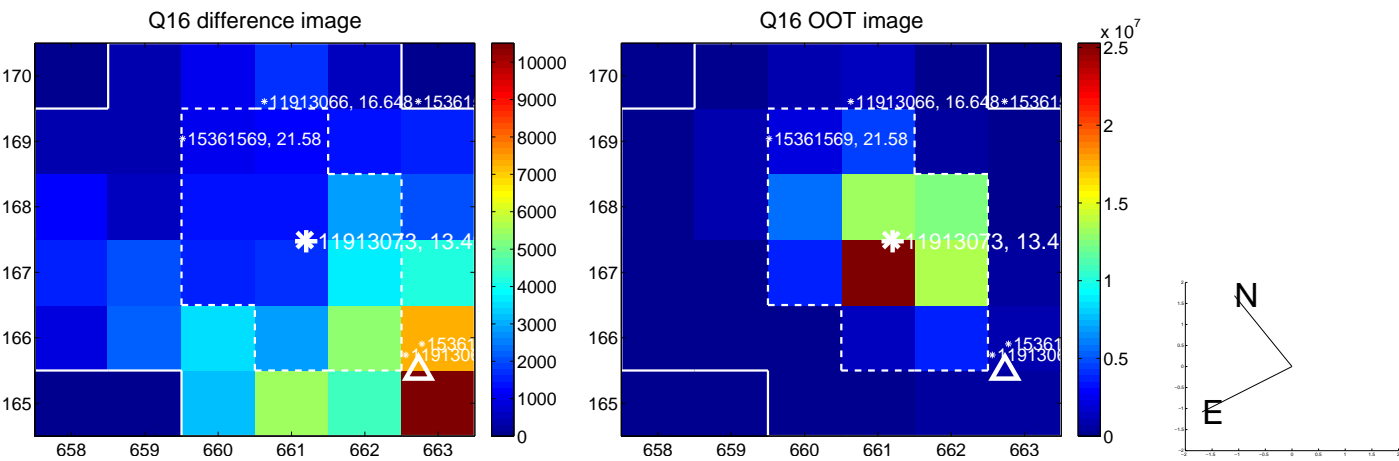
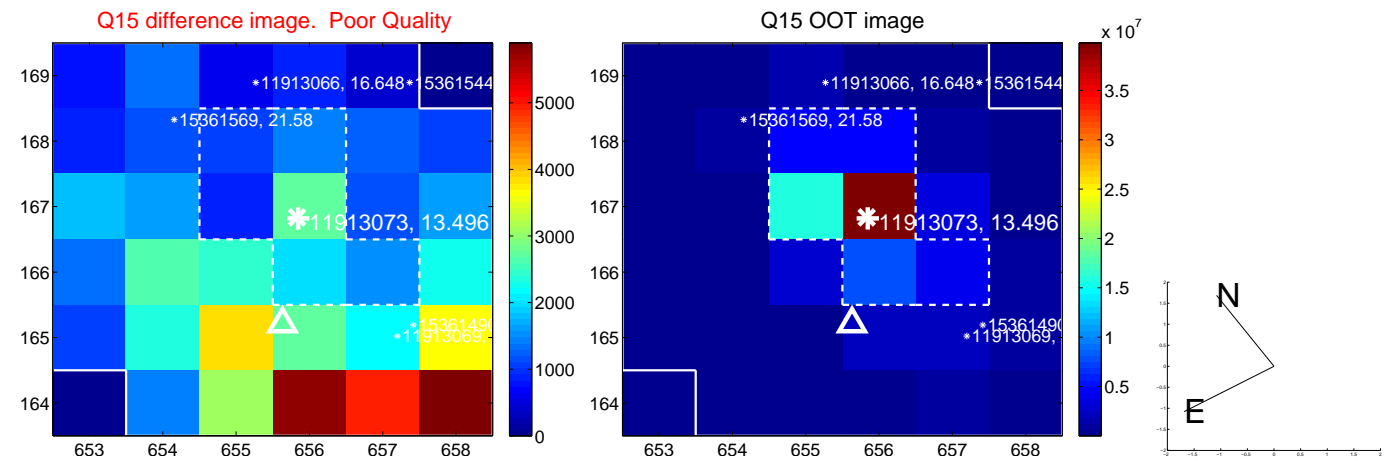
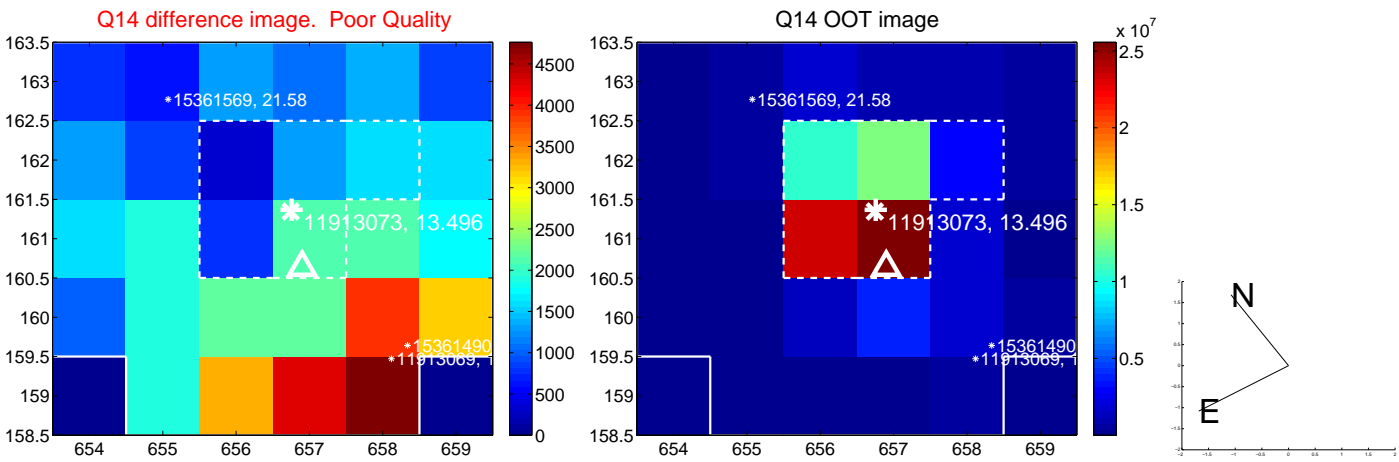
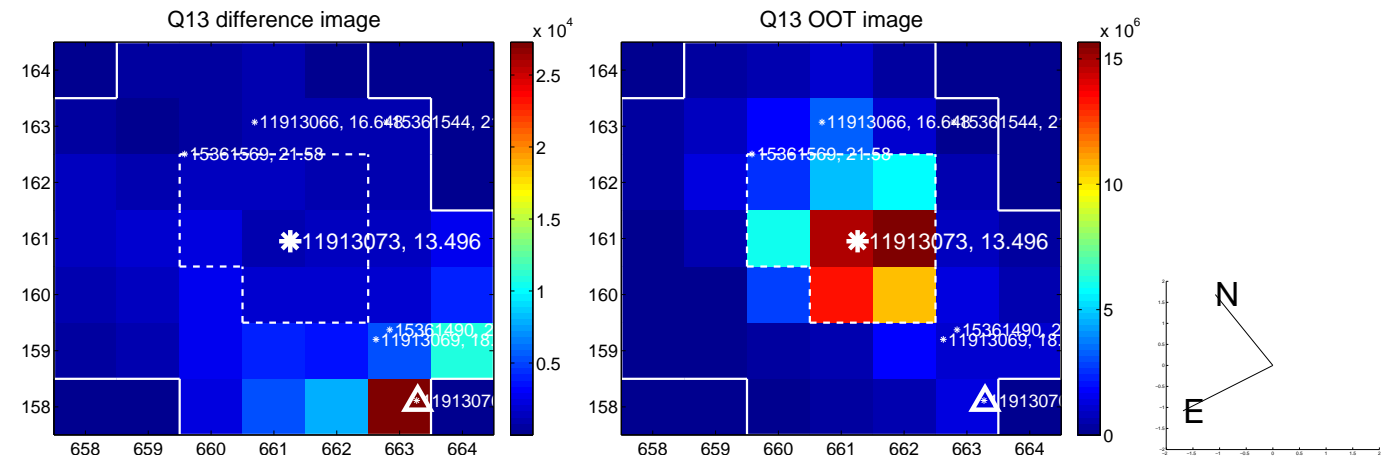
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



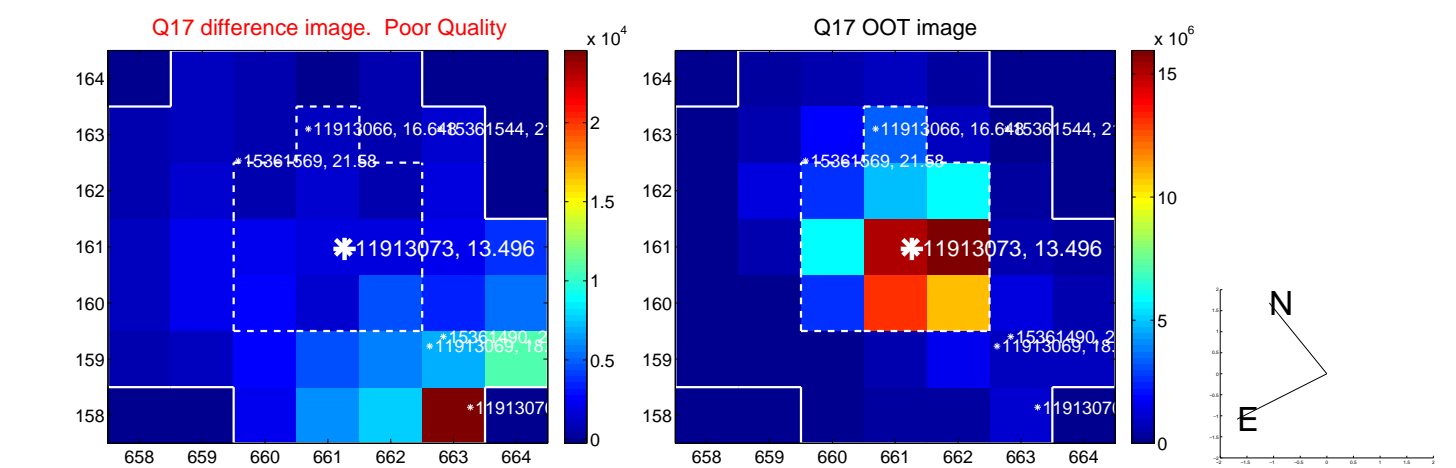
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



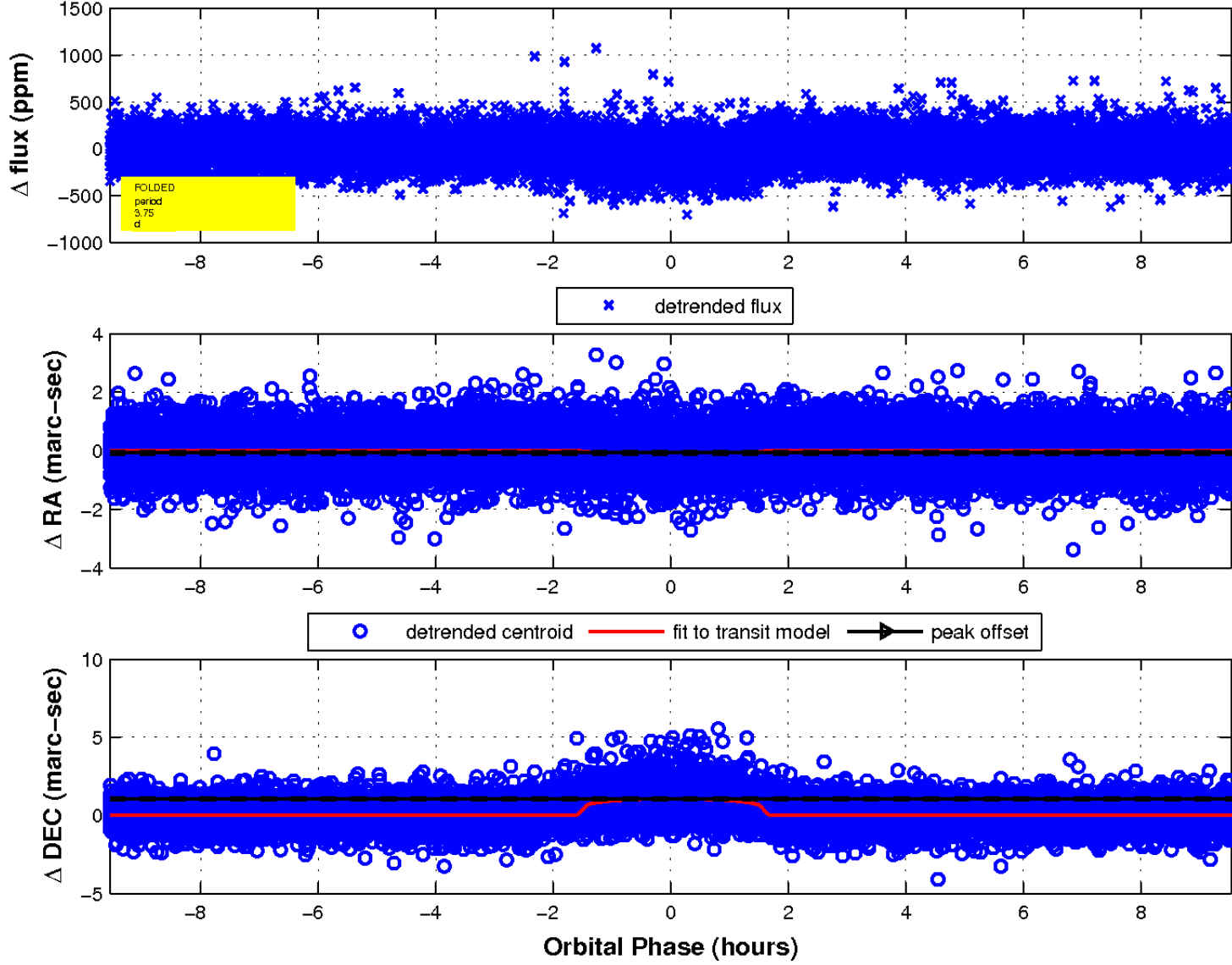
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



fluxWeightedCentroids, Planet 2 of 2



Declination