

# KIC 011402951

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
011402951-01	OBS	No	0.675626	131.948270	21.1	2.416	13.2	9.1	4.24	7242	2.30	0.00
011402951-02	OBS	No	0.675638	132.163533	22.5	2.341	8.5	8.3	4.24	7242	2.37	0.00

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
011402951-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED
011402951-02	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—SAME_NTL_PERIOD—CENT_SATURATED

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

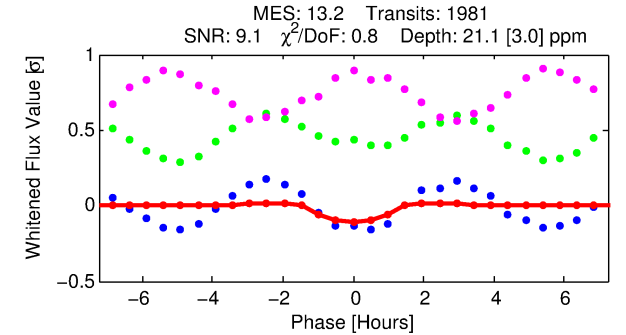
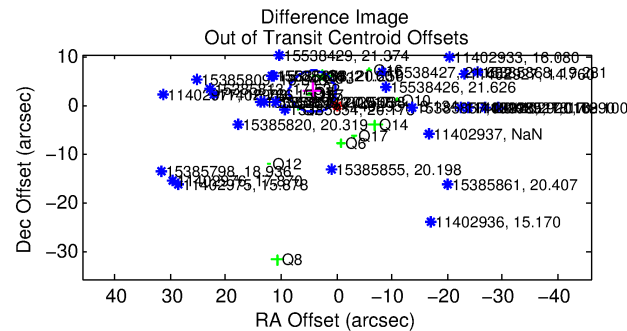
N = Not Transit-Like. S = Stellar Eclipse. C = Centroid Offset. E = Ephemeris Match.

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

## Ephemeris Match Information For 011402951-01

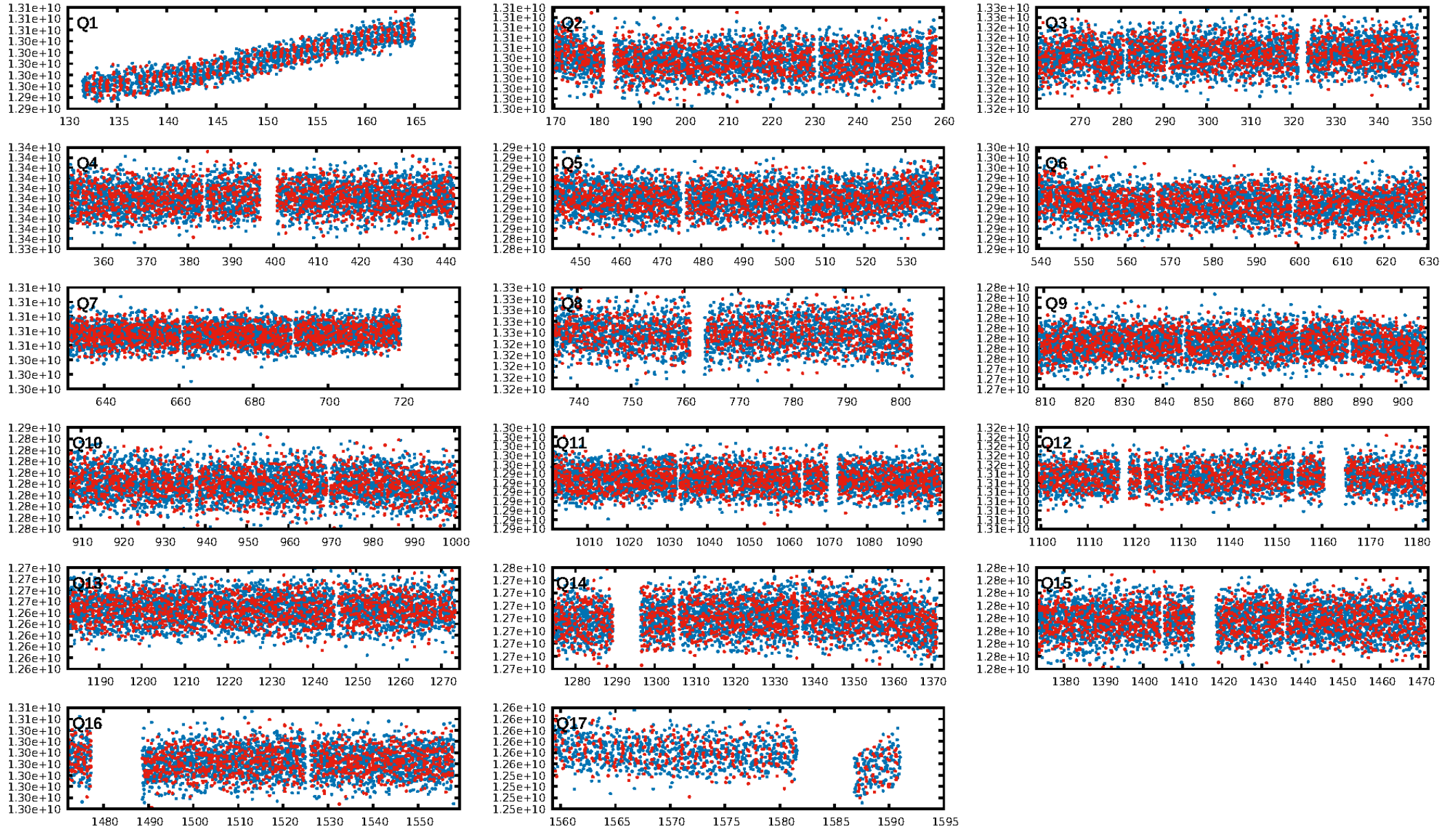
No Significant Match Found

KIC: 11402951    Candidate: 1 of 2    Period: 0.676 d



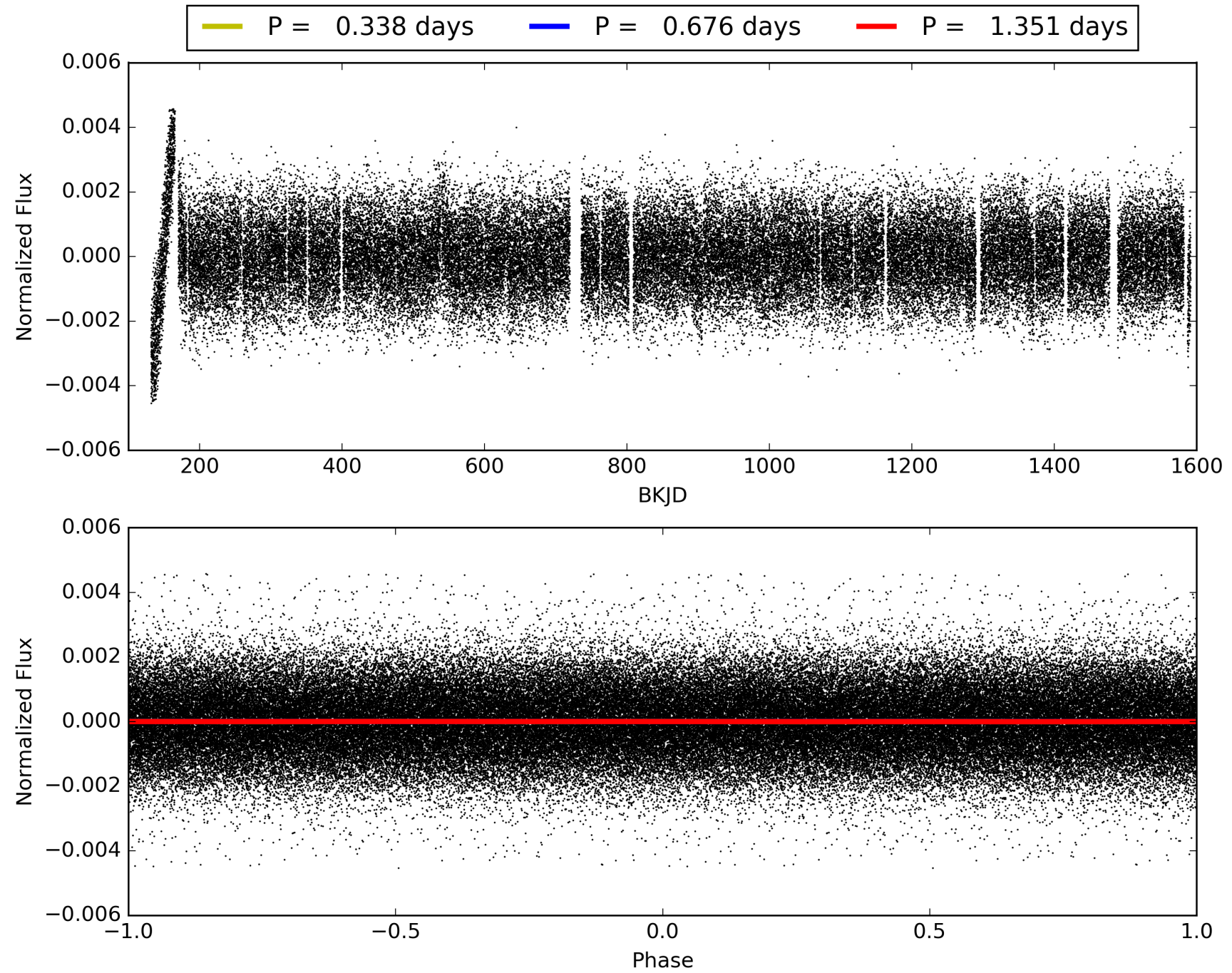
ShortPeriod-sig: N/A  
 LongPeriod-sig: 0.0% [0.00σ]  
 ModelChiSquare2-sig: N/A  
 ModelChiSquareGof-sig: N/A  
 Bootstrap-pfa: 8.04e-25  
 RollingBand-fgt: 0.97 [1841/1893]  
 GhostDiagnostic-chr: N/A  
 Centroid-sig: 0.0%  
 Centroid-so: 4.078 arcsec [3.51σ]  
 OotOffset-rm: 5.200 arcsec [3.70σ]  
 KicOffset-rm: 6.456 arcsec [3.20σ]  
 OotOffset-st: 4/4/3/4 [15]  
 KicOffset-st: 4/4/3/4 [15]  
 DiffImageQuality-fgm: 0.00 [0/15]  
 DiffImageOverlap-fno: 0.00 [0/17]

# TCE 011402951-01, PDC Light Curves



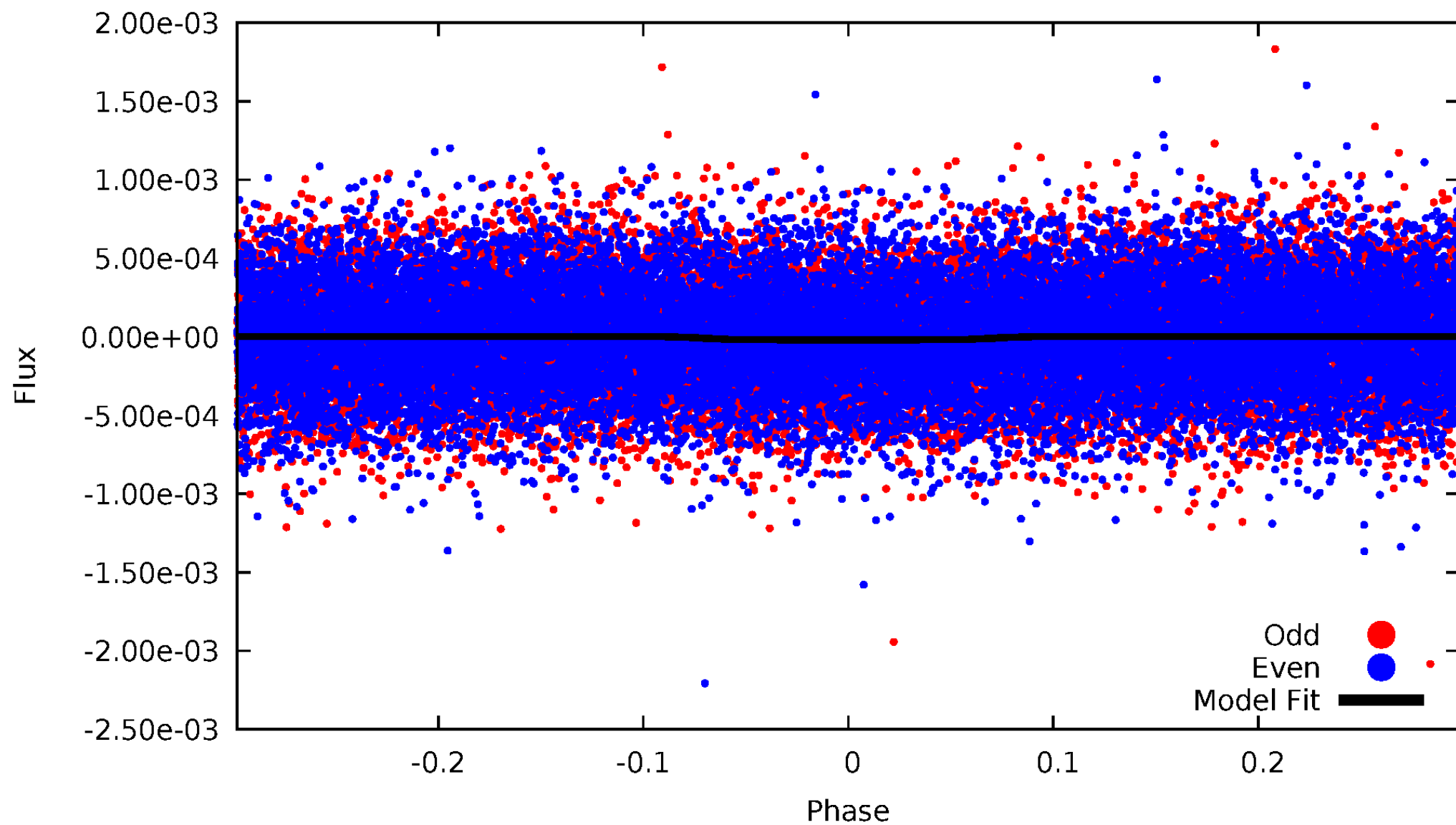


# TCE 011402951-01



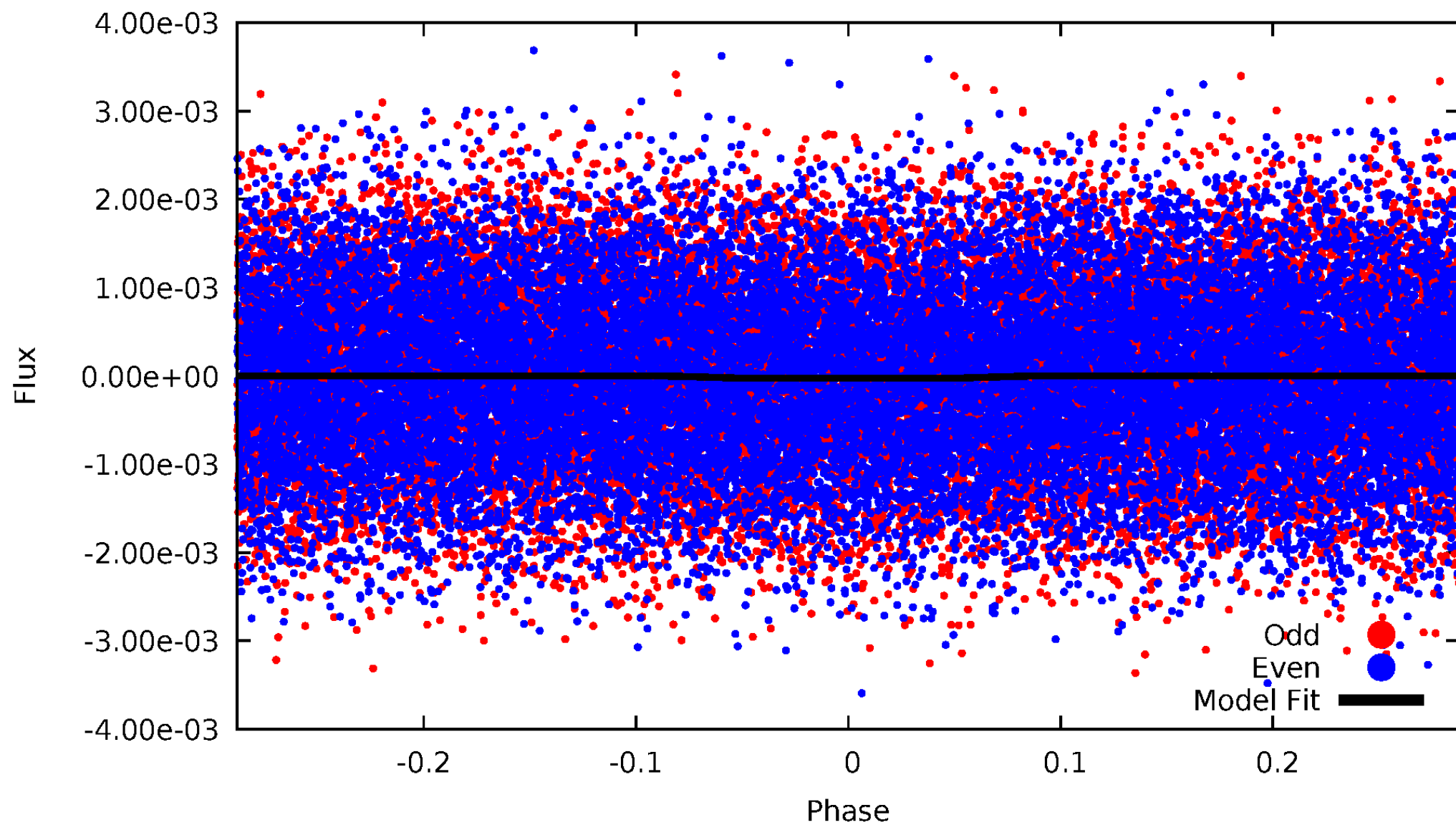
# DV Odd/Even

TCE 011402951-01



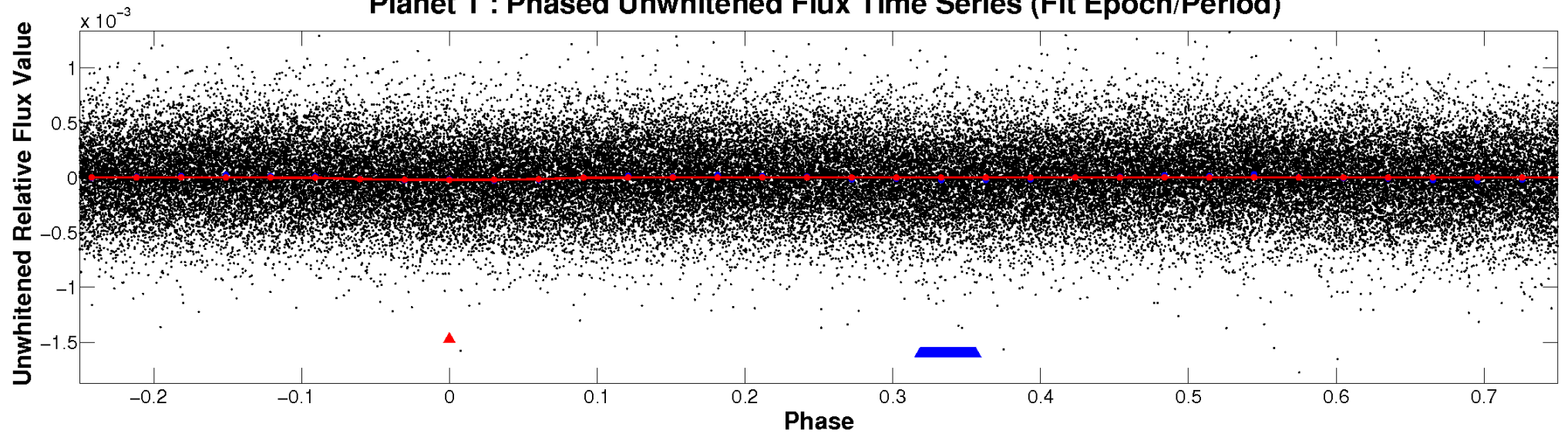
# ALT Odd/Even

TCE 011402951-01

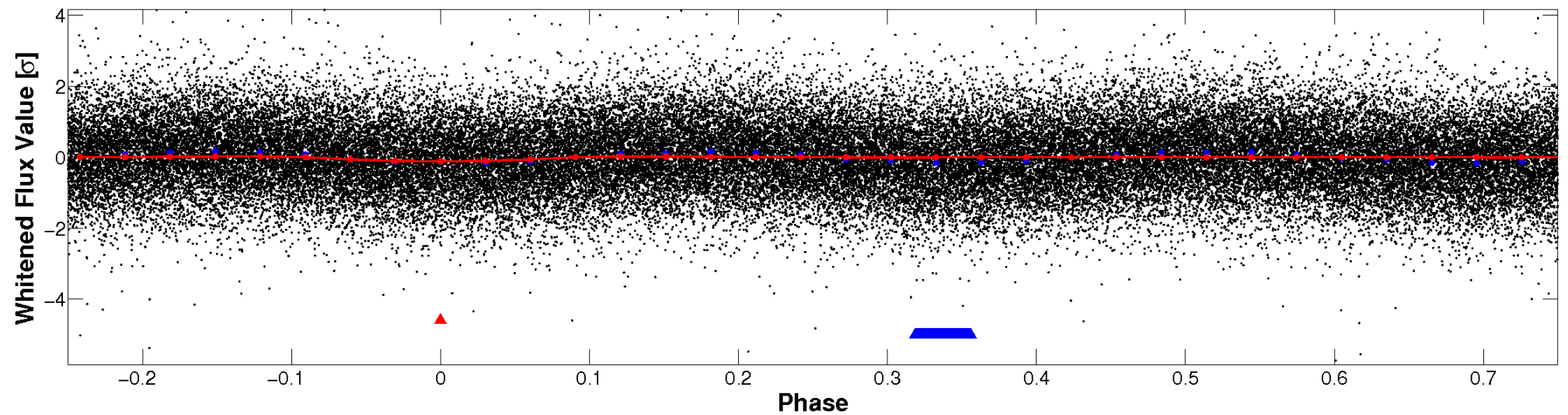


# Non-Whitened Vs. Whitened Light Curve

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



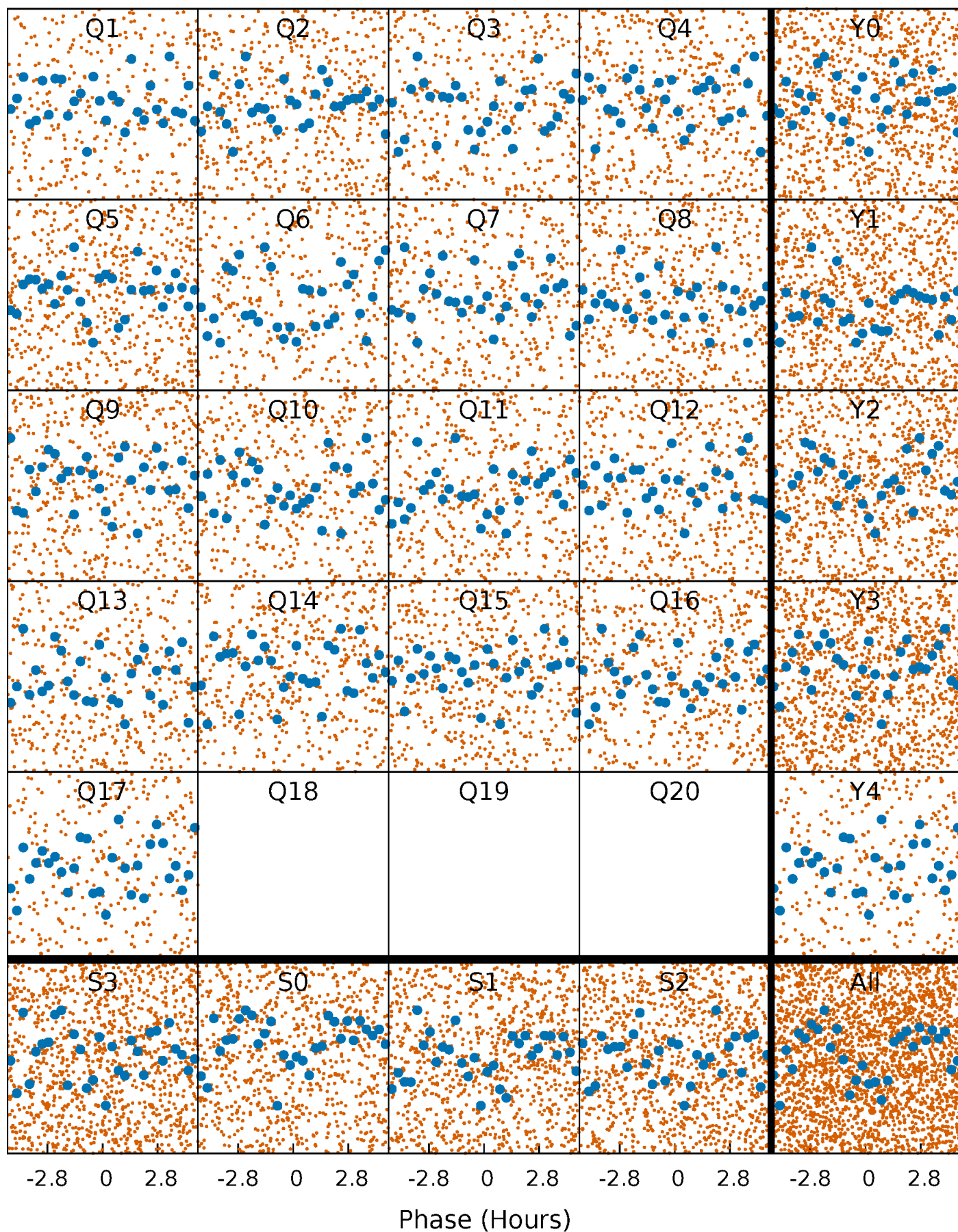
**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**





# PDC Quarter-Phased Transit Curves

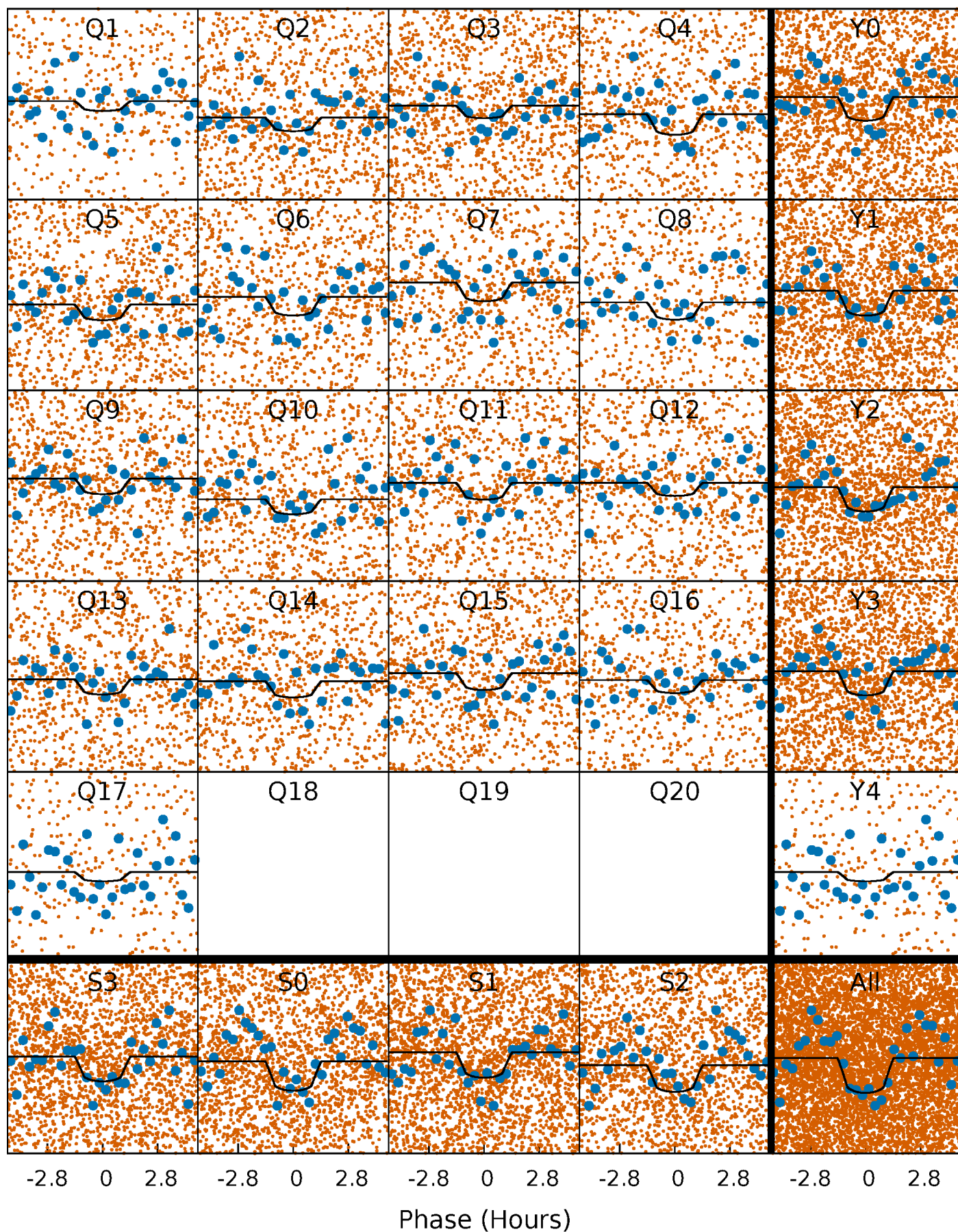
TCE 011402951-01 P= 0.675626 Days  $T_0=131.948270$  (BKJD)





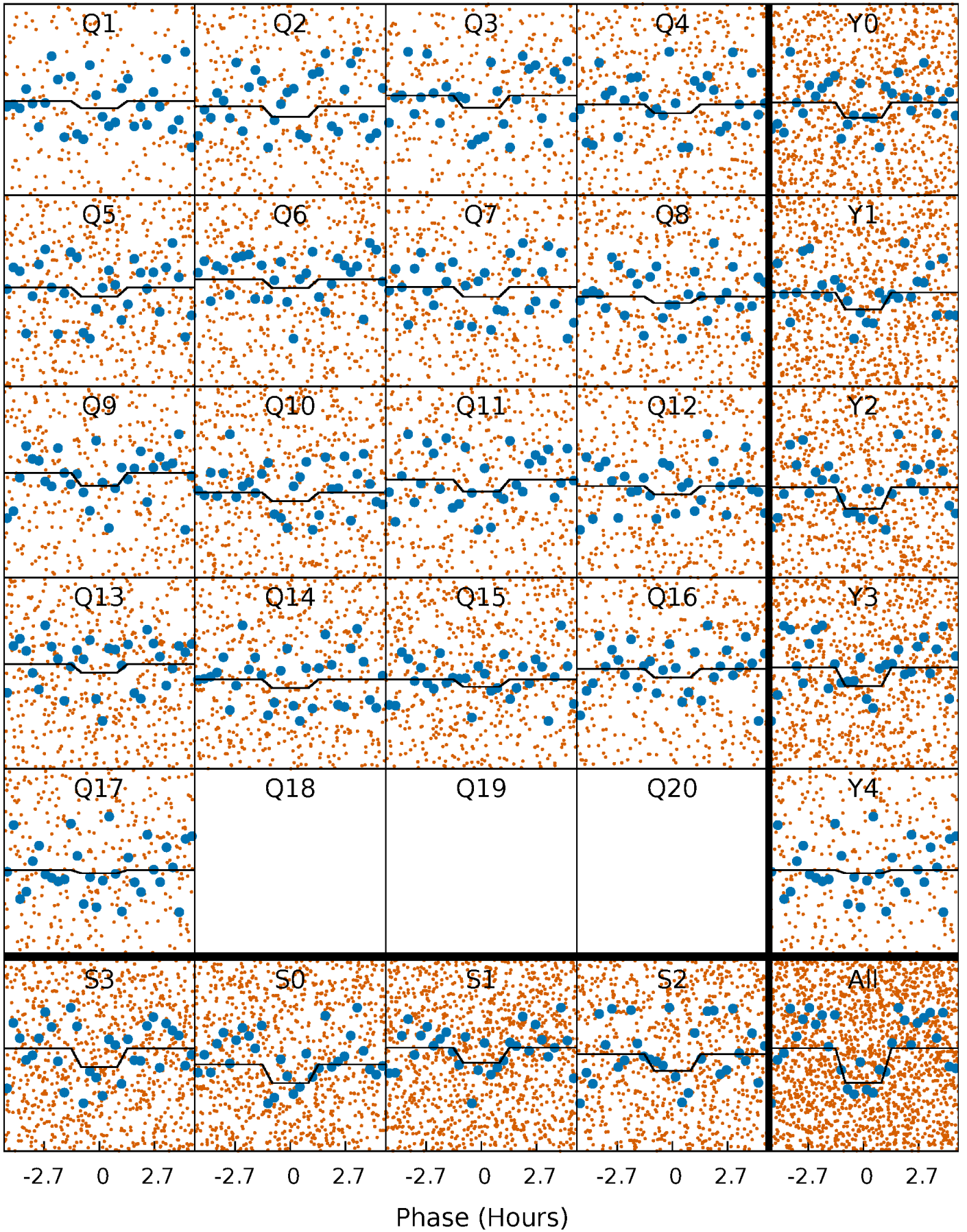
# DV Quarter-Phased Transit Curves

TCE 011402951-01 P= 0.675626 Days  $T_0=131.948270$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

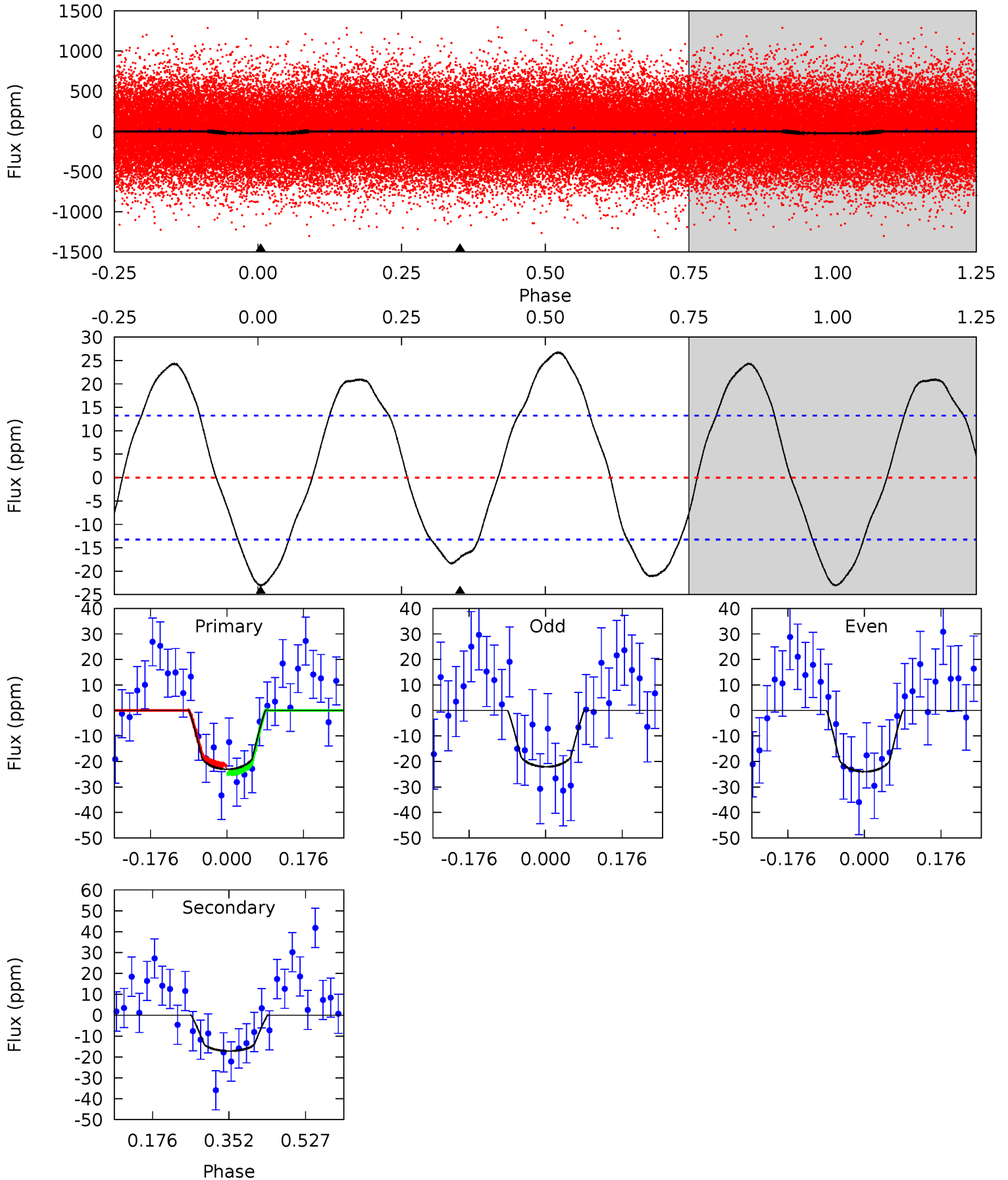
TCE 011402951-01 P= 0.675633 Days  $T_0=131.948241$  (BKJD)



# DV Model-Shift Uniqueness Test

011402951-01, P = 0.675626 Days, E = 131.272644 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
7.74	5.76	0	0	4.45	1.35	5.26	7.74	7.74	5.76	5.76	0.32	1.01	0.54	0.53

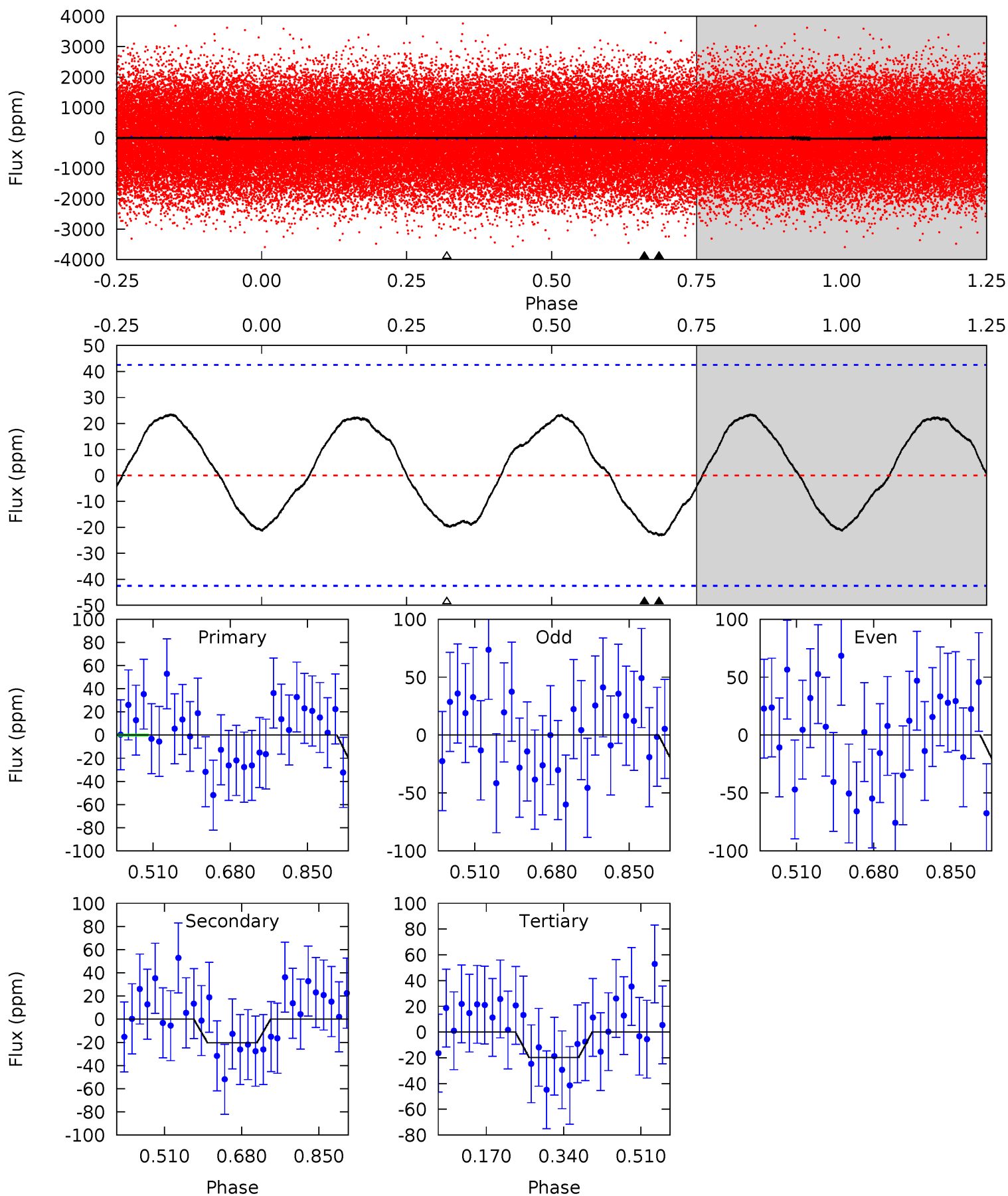




# Alt Model-Shift Uniqueness Test

011402951-01, P = 0.675633 Days, E = 131.272608 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
2.46	2.13	2.07	0	4.45	1.37	1.50	0.38	2.46	0.05	2.13	0.06	0.92	0.50	0.28





### Stellar Parameters For KIC 011402951

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$7242^{+129}_{-158}$	$3.484^{+0.288}_{-0.032}$	$-0.240^{+0.150}_{-0.100}$	$4.236^{+0.160}_{-1.364}$	$1.996^{+0.049}_{-0.293}$	$0.037^{+0.066}_{-0.004}$
	+2%/-2%	+8%/-1%	+62%/-42%	+4%/-32%	+2%/-15%	+179%/-11%
Source	SPE4	SPE4	SPE4	DSEP		

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

### Secondary Eclipse Parameters for KIC 011402951-01 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-17 \pm 3$	$2.18^{+1.44}_{-1.17}$	$6558^{+226}_{-504}$	$5703^{+4659}_{-9444}$	$0.717^{+2.770}_{-0.463}$
Alt.	$-20 \pm 10$	$2.12^{+1.42}_{-1.22}$	$6537^{+233}_{-517}$	$5952^{+6210}_{-9650}$	$0.842^{+4.169}_{-0.595}$

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

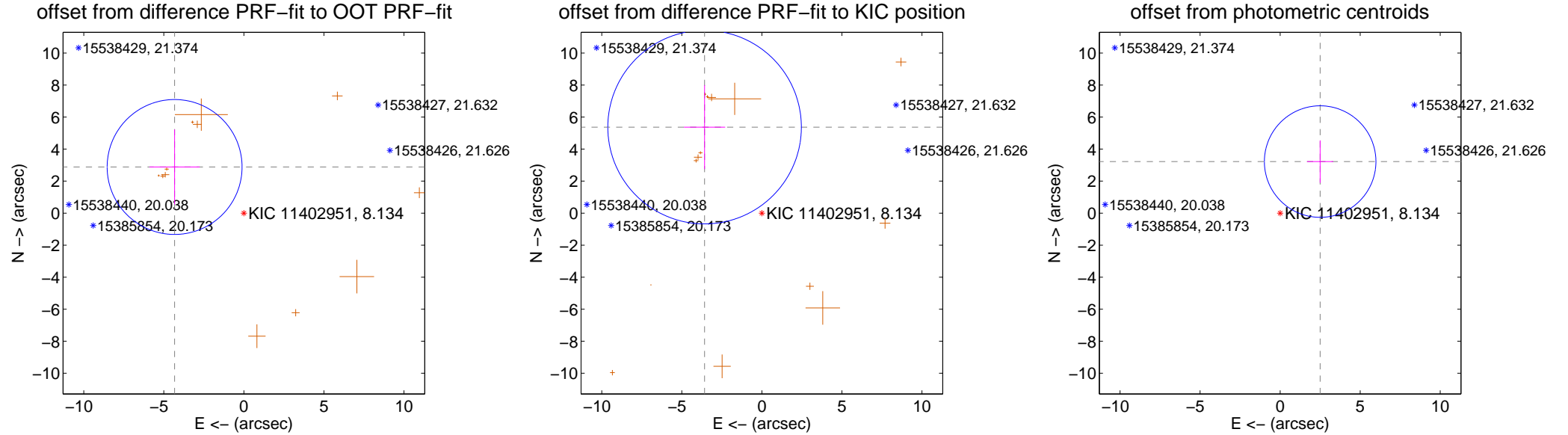
## DV Centroid Data

Supplemental centroid analysis for 011402951-01. **Kepler magnitude: 8.13.** Transit SNR 9.13

**There are 0 quarters with good PRF difference image offsets**

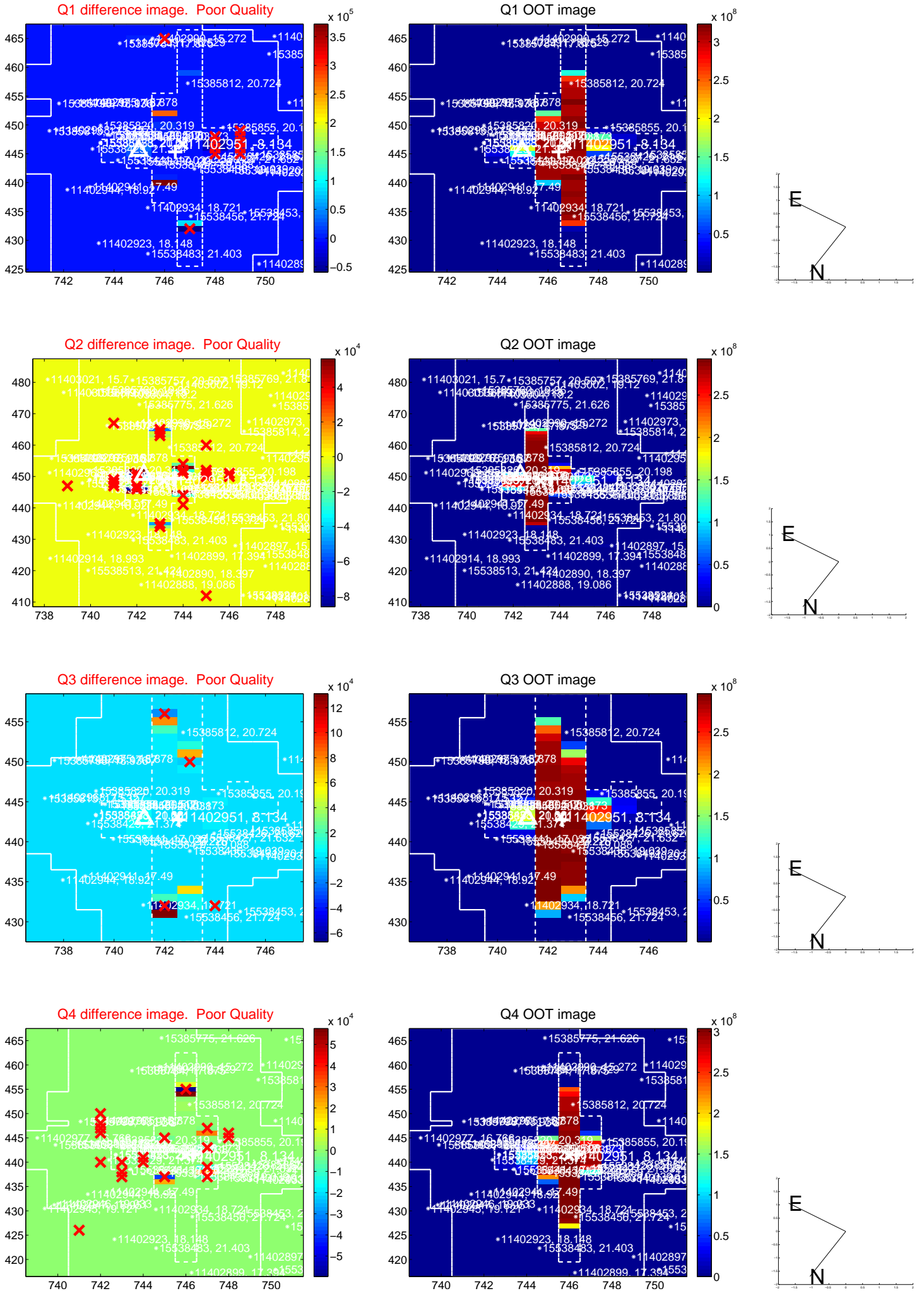
The direct PRF centroid is offset from the target star catalog position by about 1.67 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	<b><math>5.200 \pm 1.405</math></b>	<b>3.70</b>	$4.328 \pm 1.566$	$2.884 \pm 2.345$
PRF-fit source offset from KIC position	<b><math>6.456 \pm 2.015</math></b>	<b>3.20</b>	$3.579 \pm 1.290$	$5.373 \pm 2.624$
photometric centroid source offset	<b><math>4.08 \pm 1.16</math></b>	<b>3.51</b>	$-2.50 \pm 0.82$	$3.22 \pm 1.33$

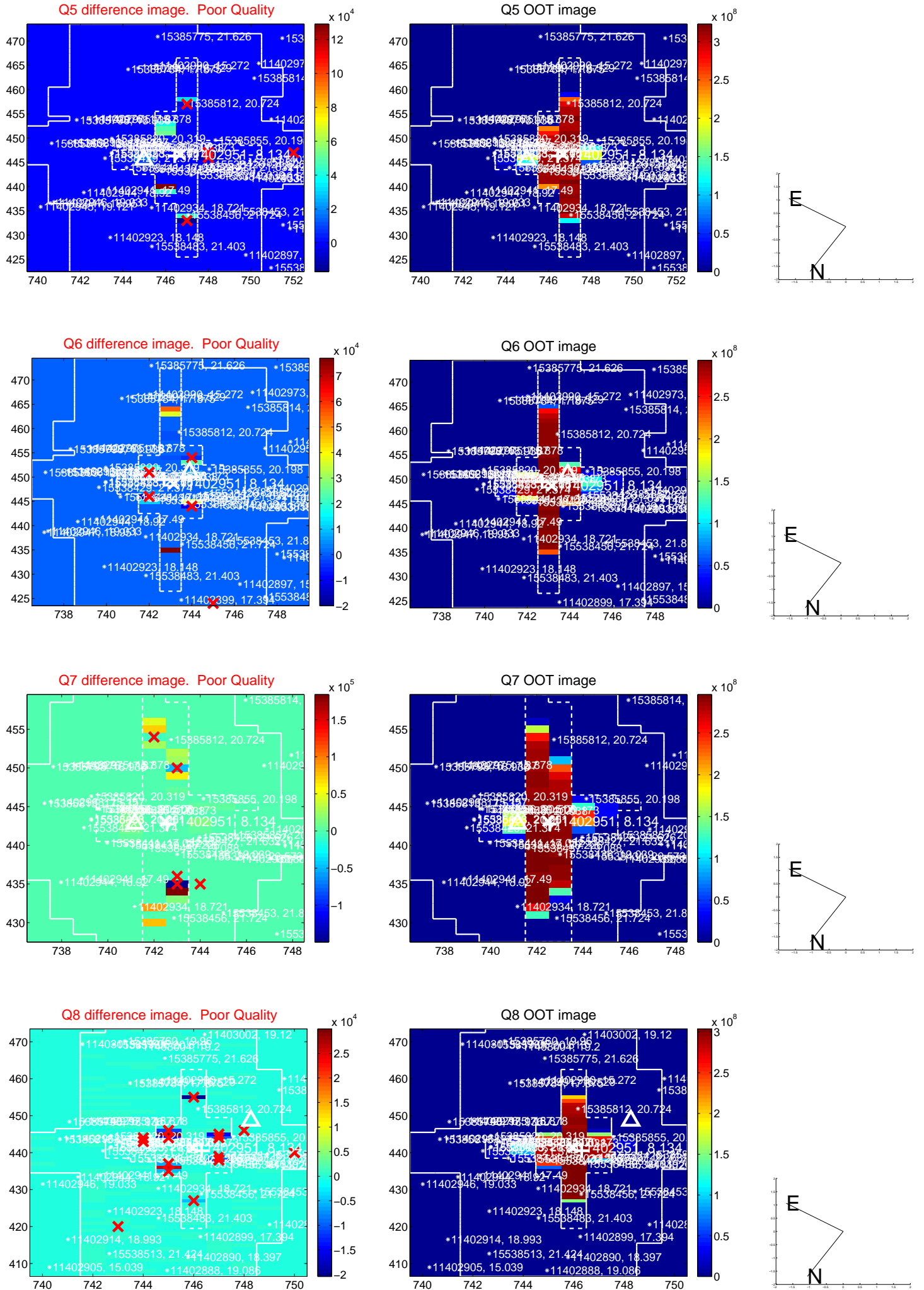


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

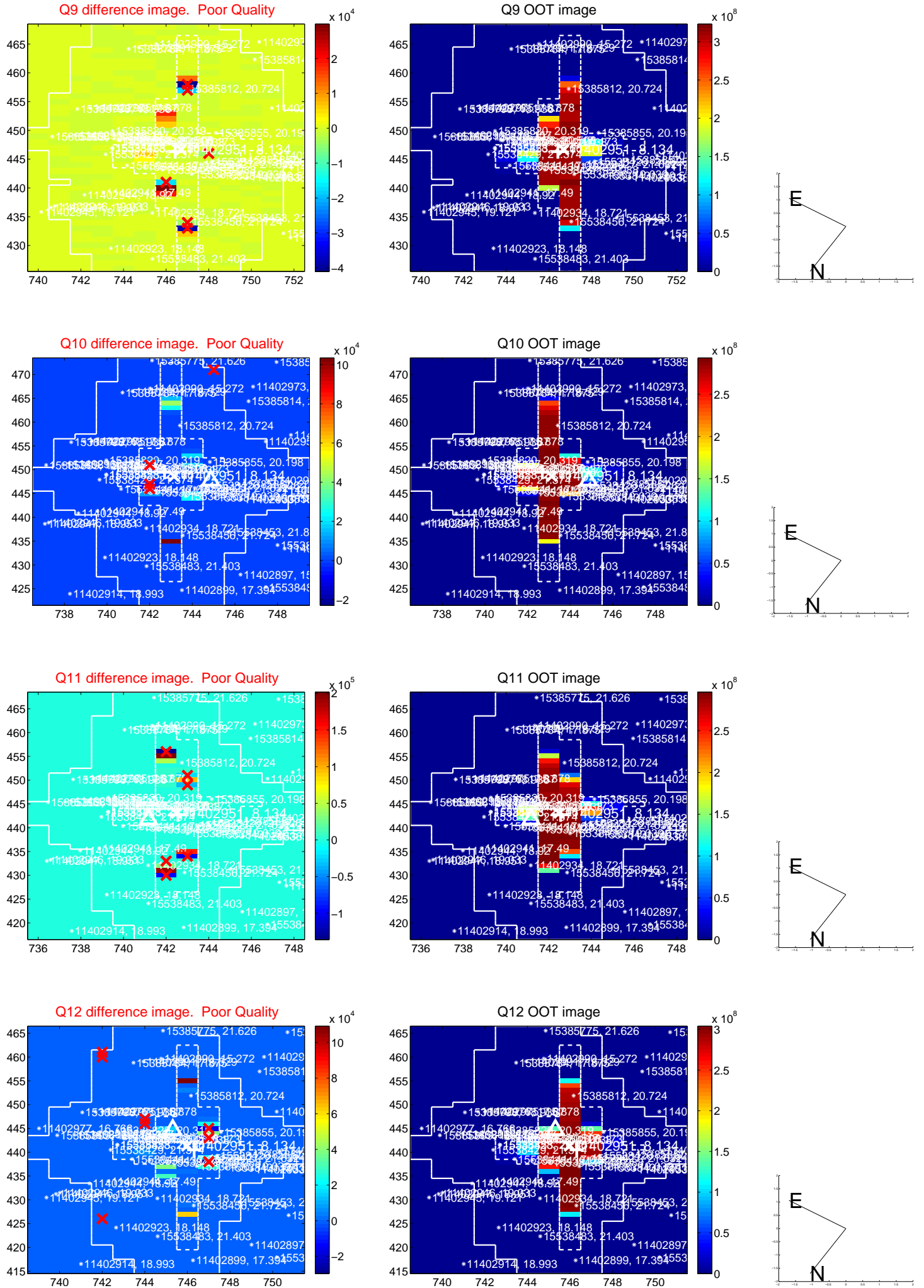


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

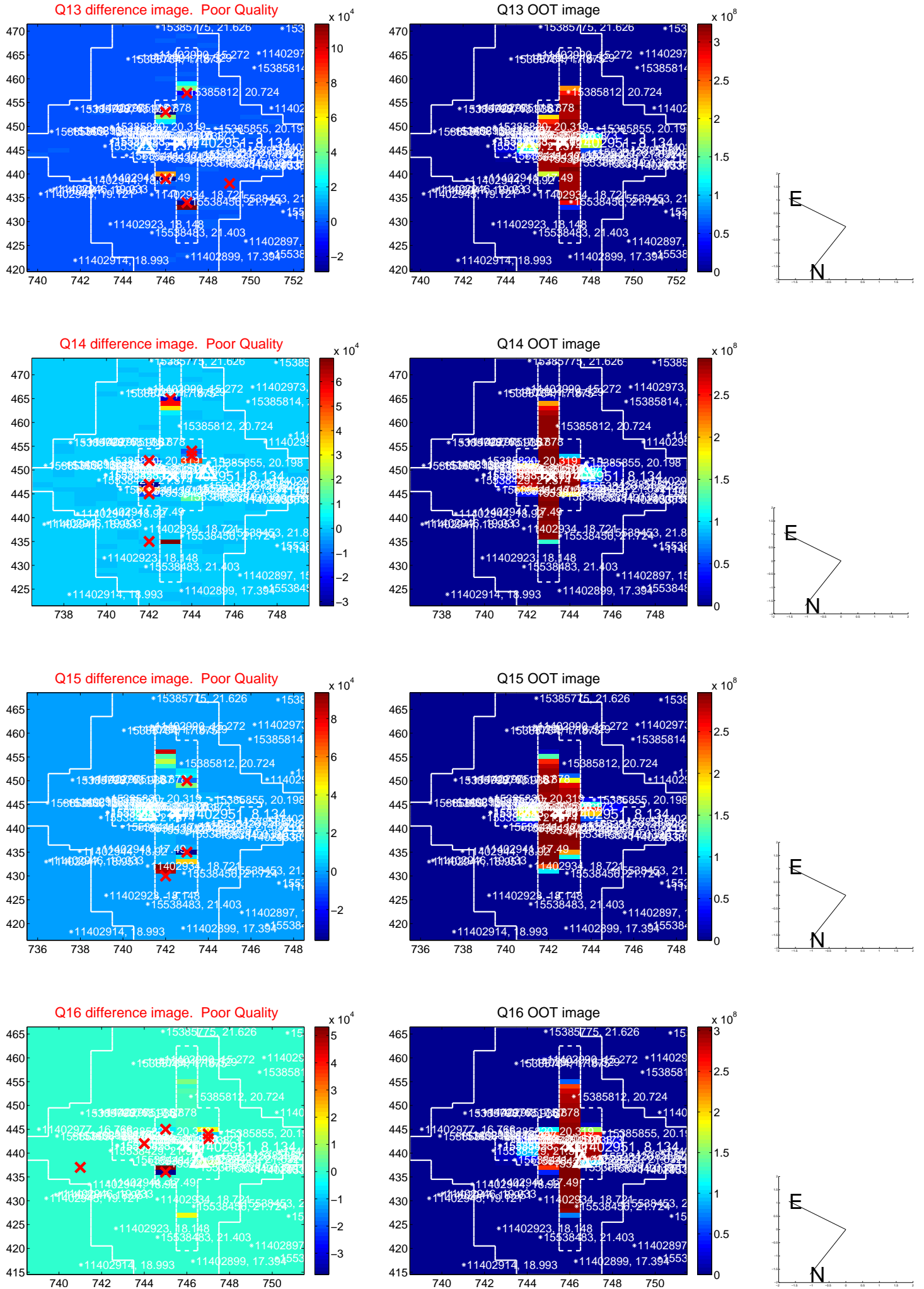




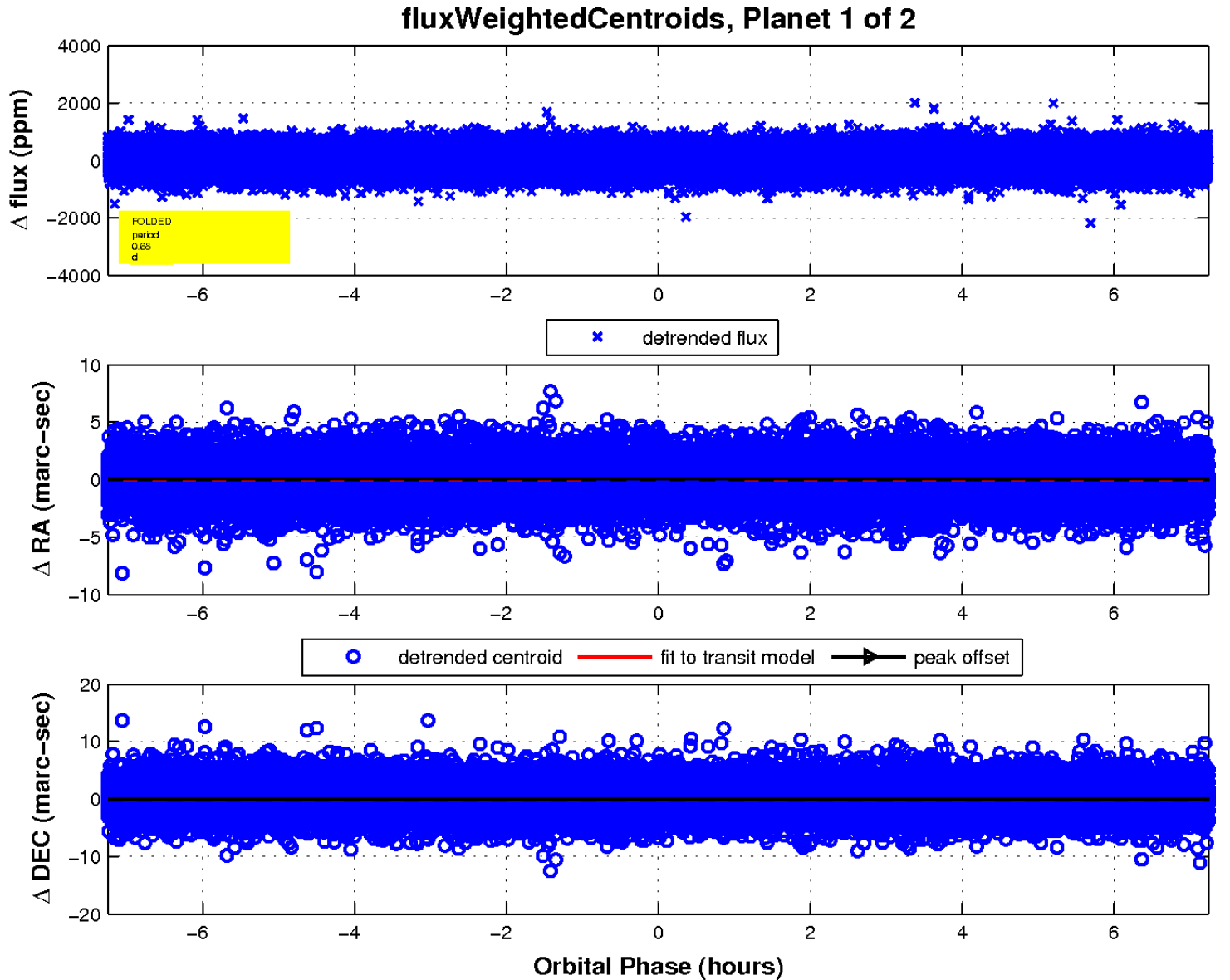
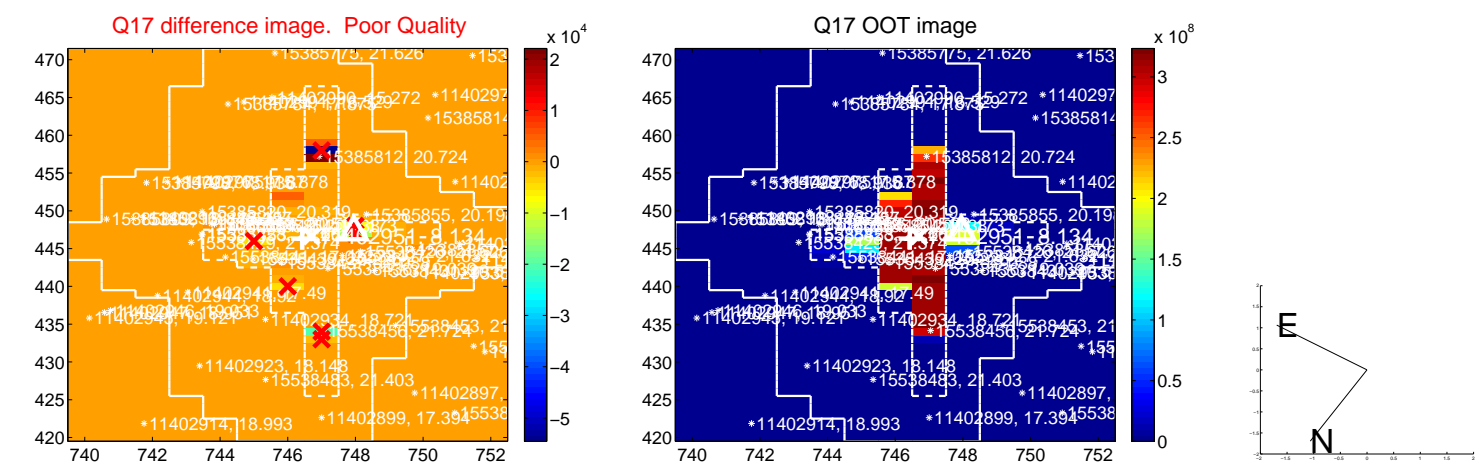
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

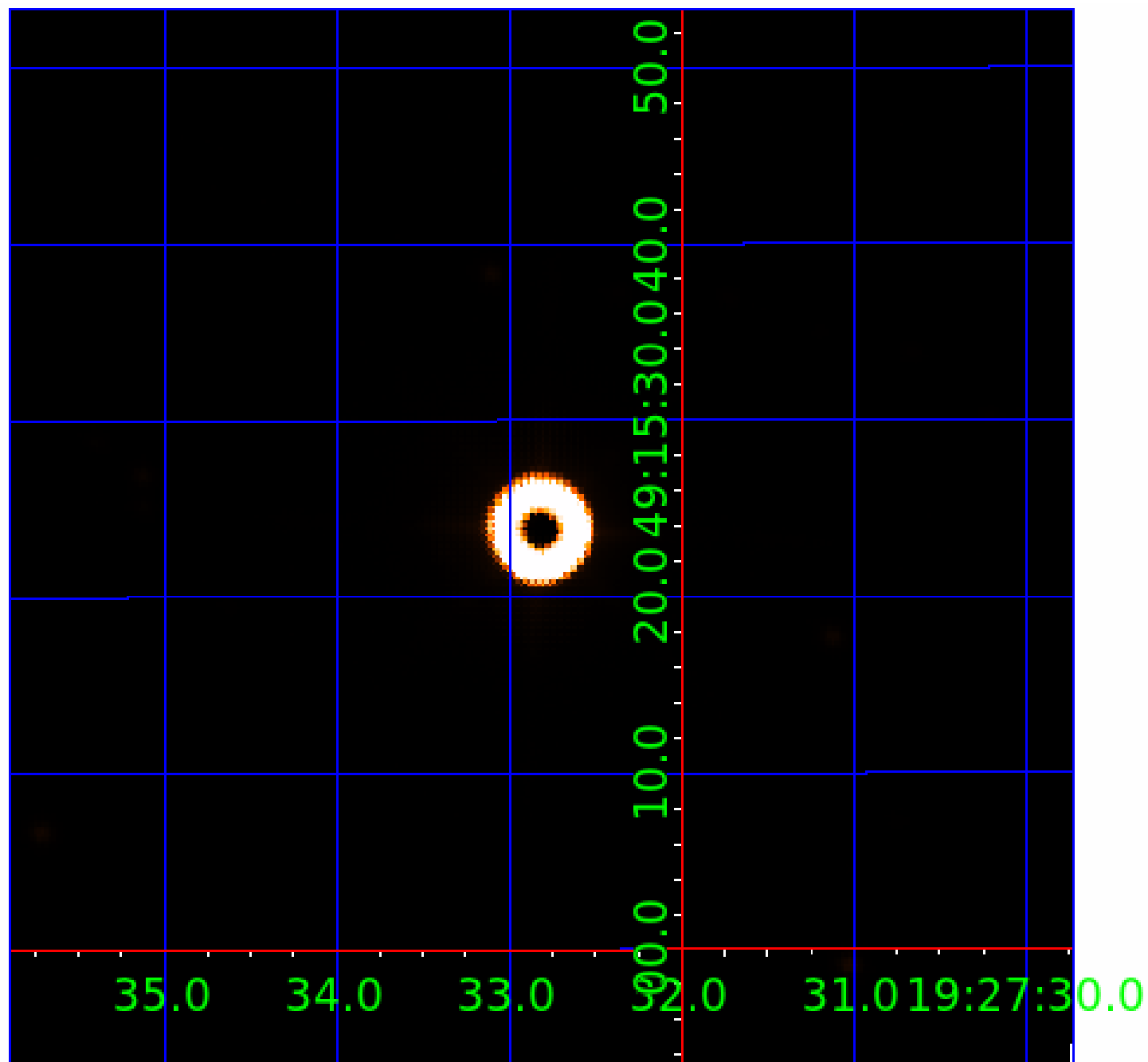


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination





# KIC 011402951

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
011402951-01	OBS	No	0.675626	131.948270	21.1	2.416	13.2	9.1	4.24	7242	2.30	0.00
011402951-02	OBS	No	0.675638	132.163533	22.5	2.341	8.5	8.3	4.24	7242	2.37	0.00

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
011402951-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED
011402951-02	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—SAME_NTL_PERIOD—CENT_SATURATED

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

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

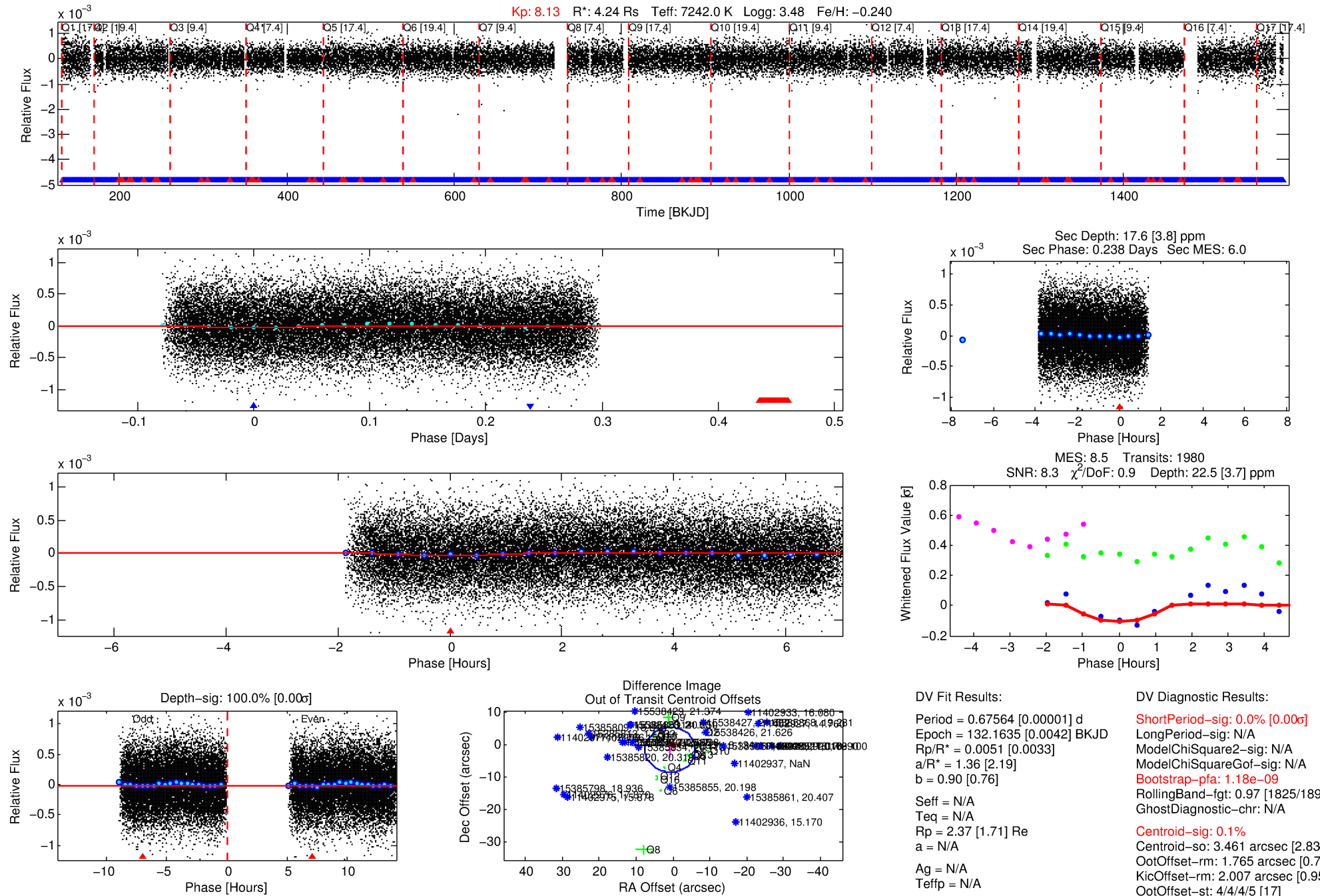
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 011402951-02

No Significant Match Found

# DV One-Page Summary

KIC: 11402951 Candidate: 2 of 2 Period: 0.676 d



## DV Fit Results:

Period = 0.67564 [0.00001] d  
Epoch = 132.1635 [0.0042] BKJD  
Rp/R\* = 0.0051 [0.0033]  
a/R\* = 1.36 [2.19]  
b = 0.90 [0.76]  
Seff = N/A  
Teq = N/A  
Rp = 2.37 [1.71] Re  
a = N/A  
Ag = N/A  
Teffp = N/A

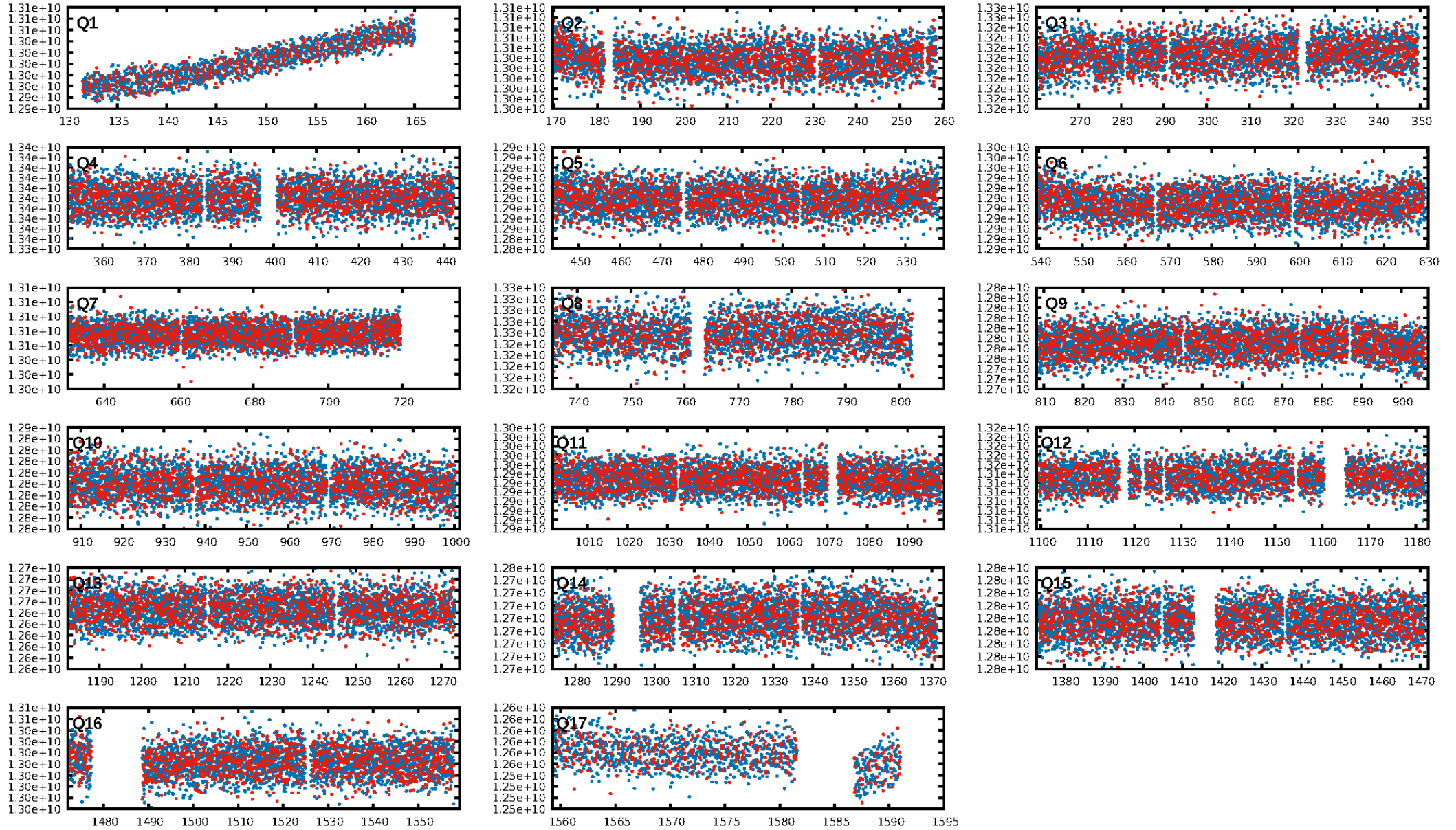
## DV Diagnostic Results:

ShortPeriod-sig: 0.0% [0.00%]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 1.18e-09  
RollingBand-fgt: 0.97 [1825/1890]  
GhostDiagnostic-chr: N/A  
Centroid-sig: 0.1%  
Centroid-so: 3.461 arcsec [2.83]  
OotOffset-rm: 1.765 arcsec [0.77]  
KicOffset-rm: 2.007 arcsec [0.95]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 0.00 [0/17]  
DiffImageOverlap-fno: 0.00 [0/17]

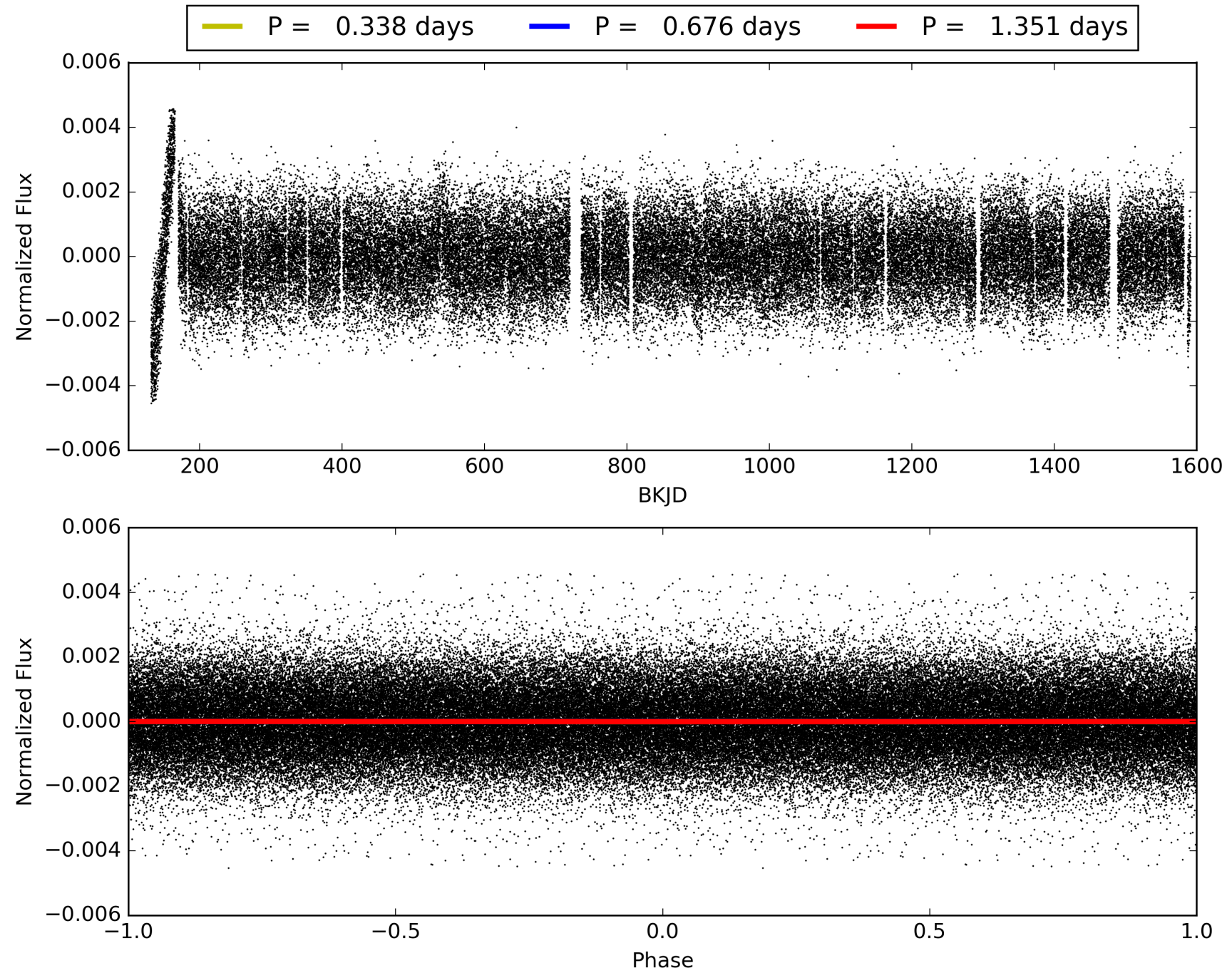
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 08:35:37 Z

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

# TCE 011402951-02, PDC Light Curves



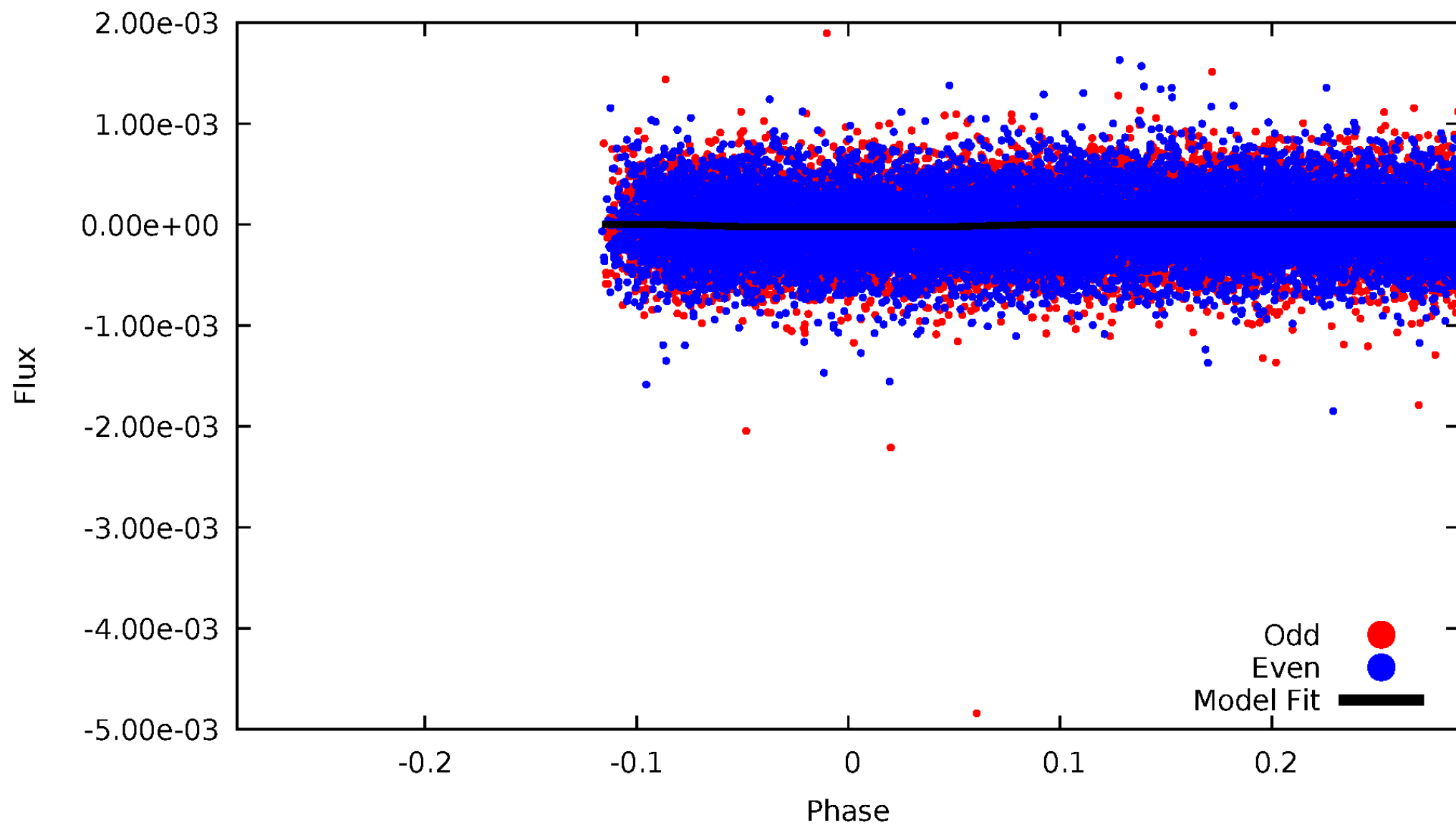
# TCE 011402951-02





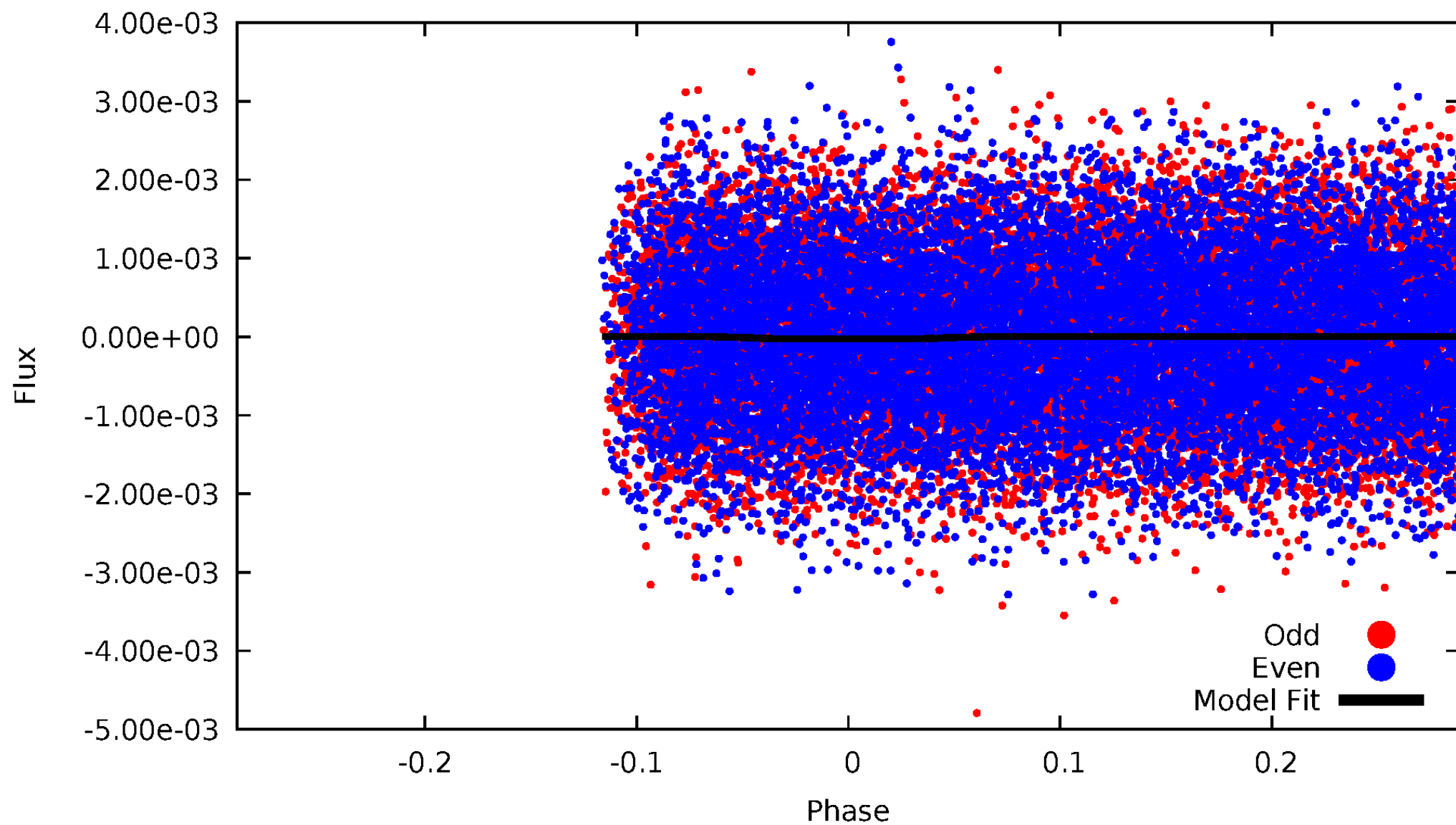
# DV Odd/Even

TCE 011402951-02



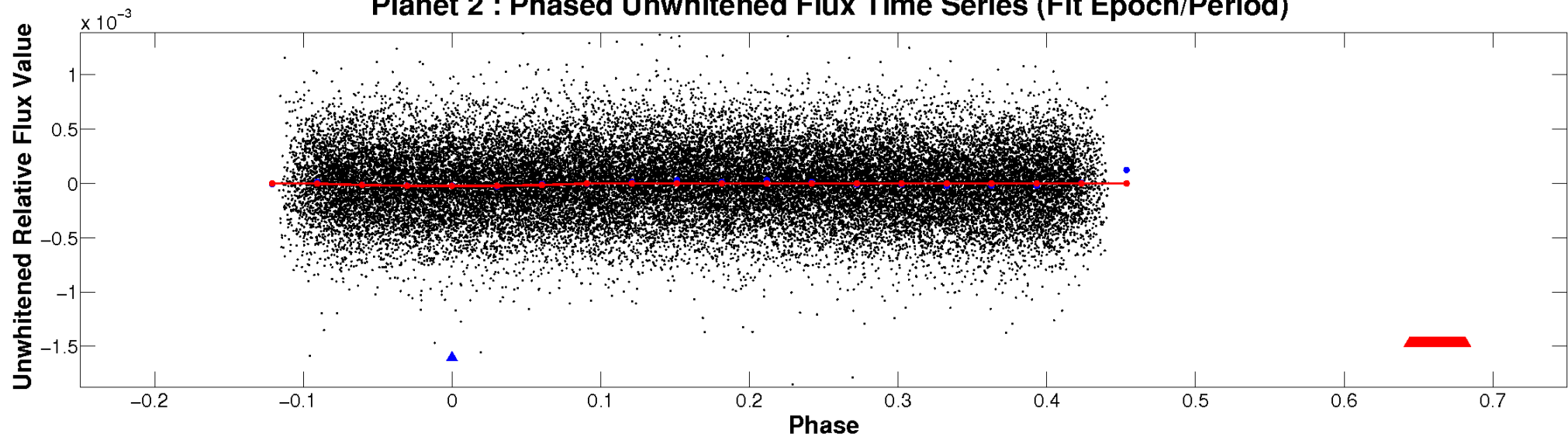
# ALT Odd/Even

TCE 011402951-02

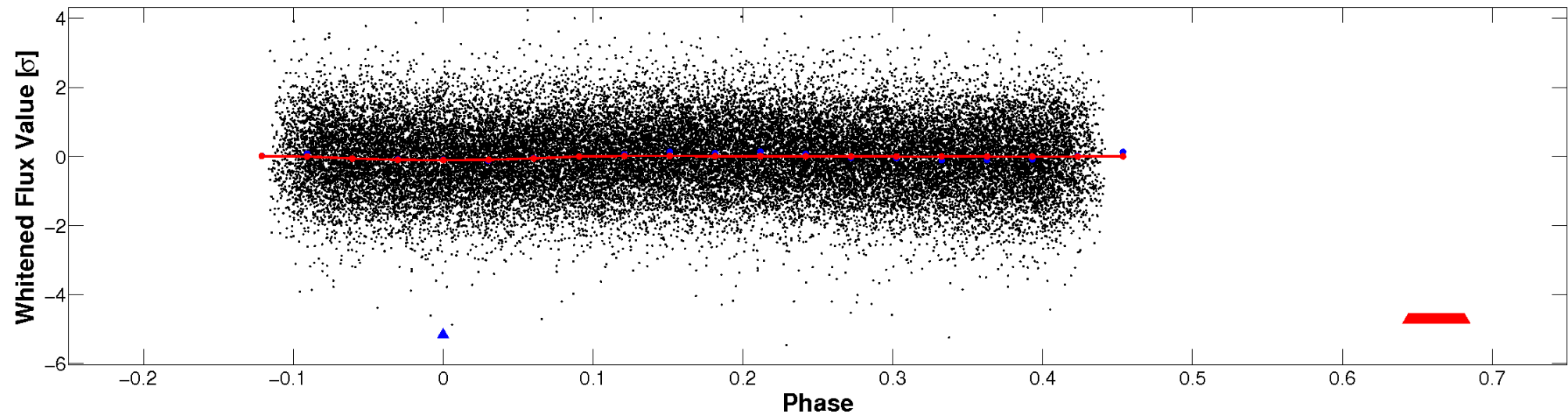


# Non-Whitened Vs. Whitened Light Curve

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

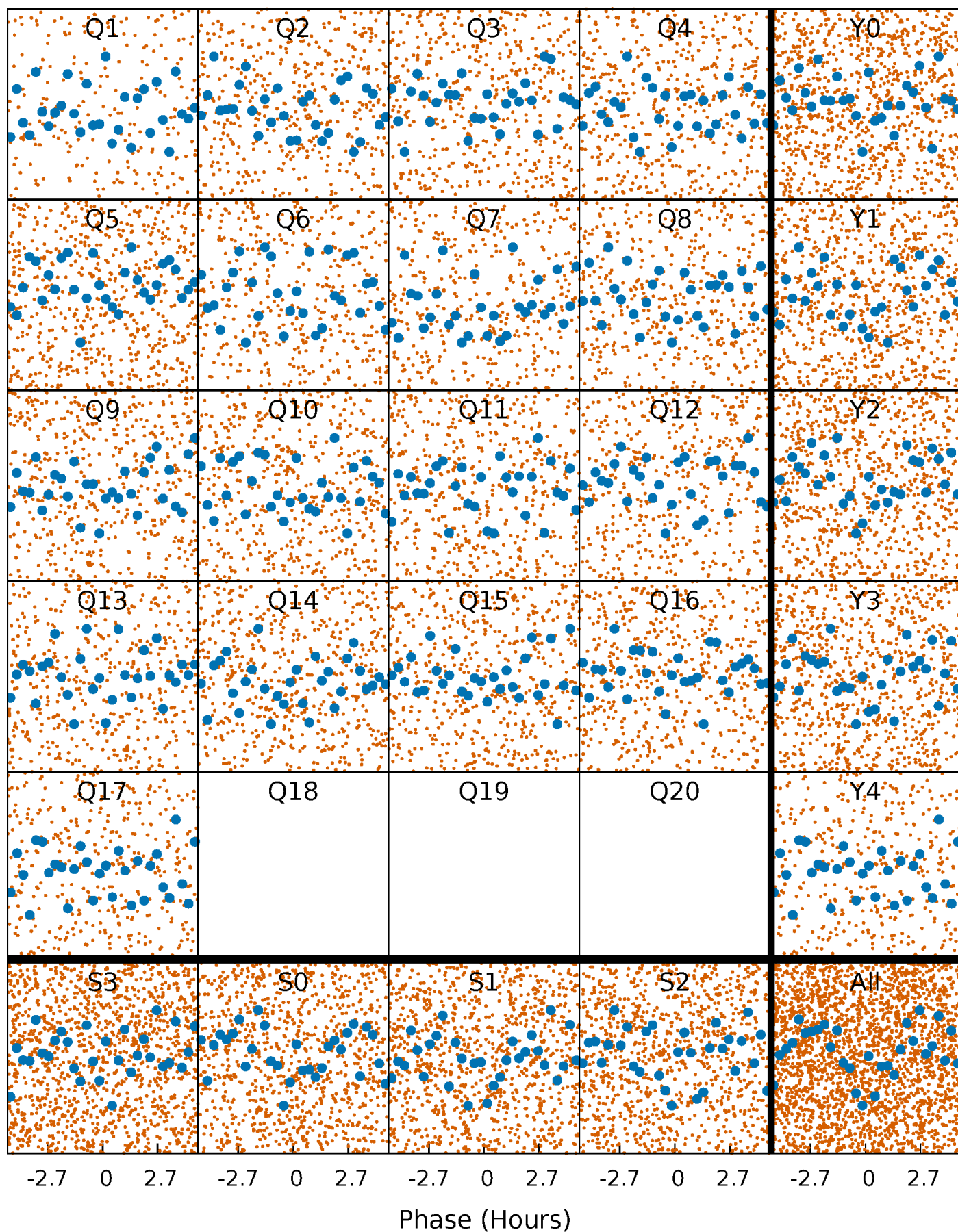


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



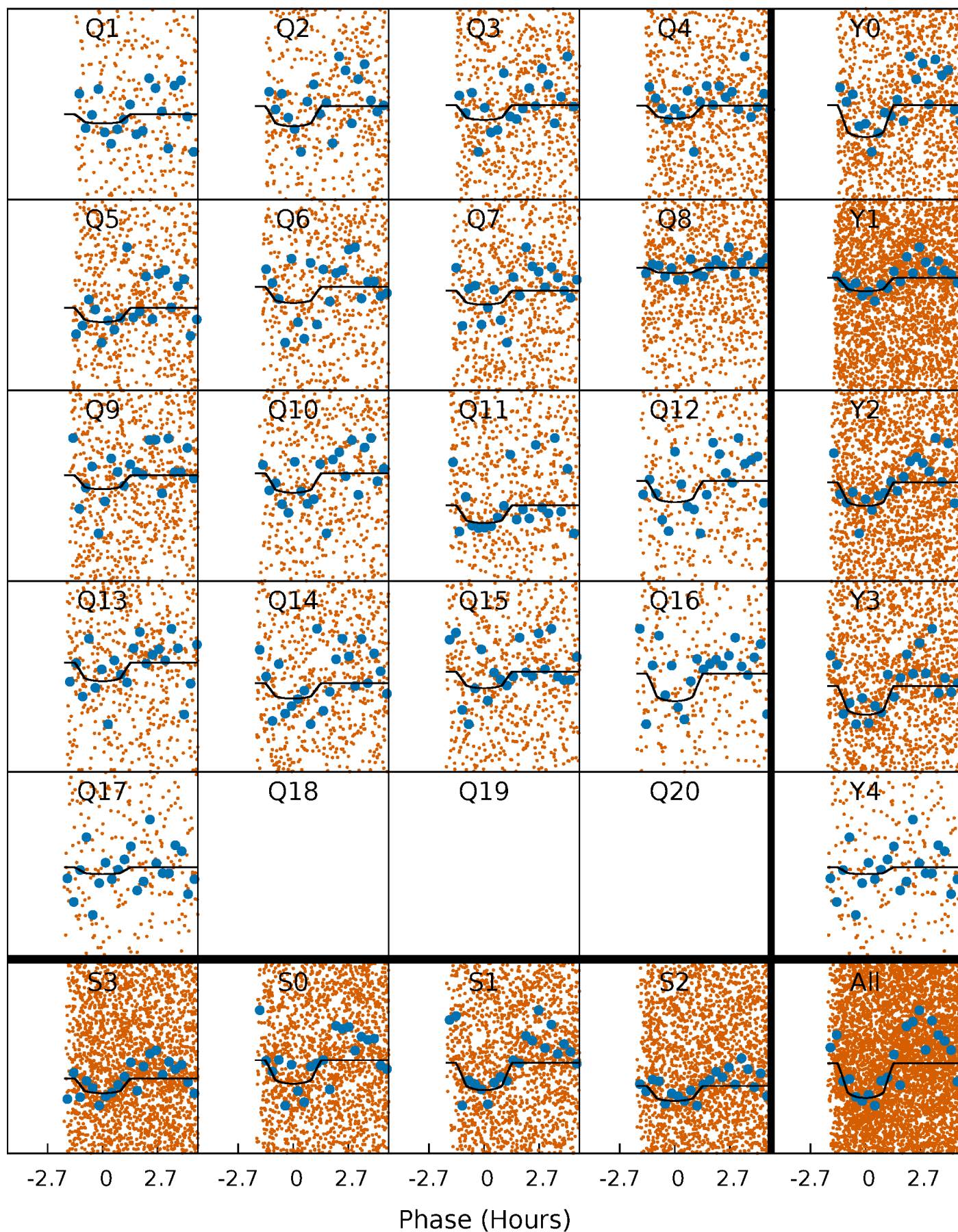
# PDC Quarter-Phased Transit Curves

TCE 011402951-02 P= 0.675638 Days  $T_0=132.163533$  (BKJD)



# DV Quarter-Phased Transit Curves

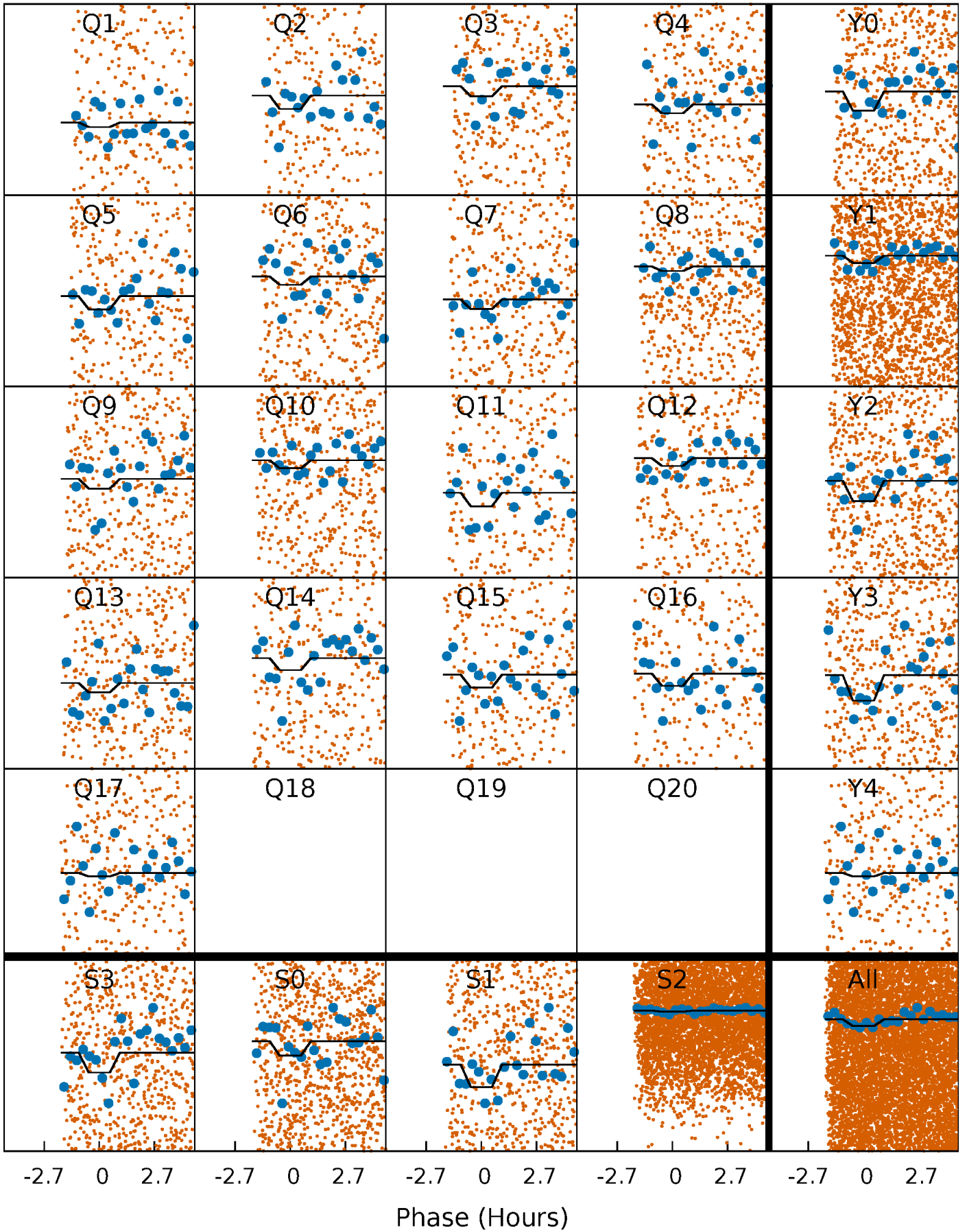
TCE 011402951-02   P= 0.675638 Days    $T_0=132.163533$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

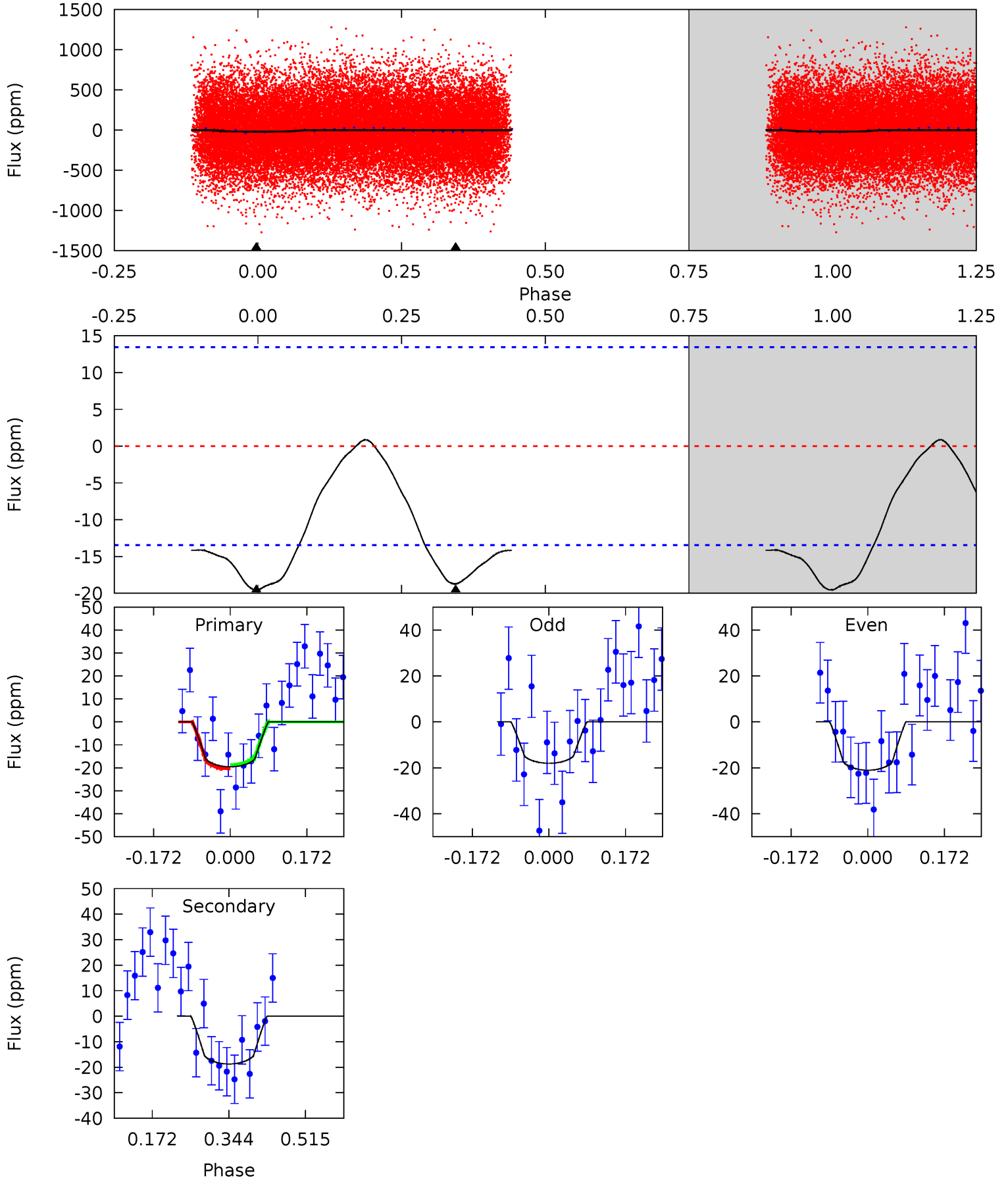
TCE 011402951-02     $P = 0.675638$  Days     $T_0 = 132.163533$  (BKJD)



# DV Model-Shift Uniqueness Test

011402951-02, P = 0.675638 Days, E = 131.487895 Days

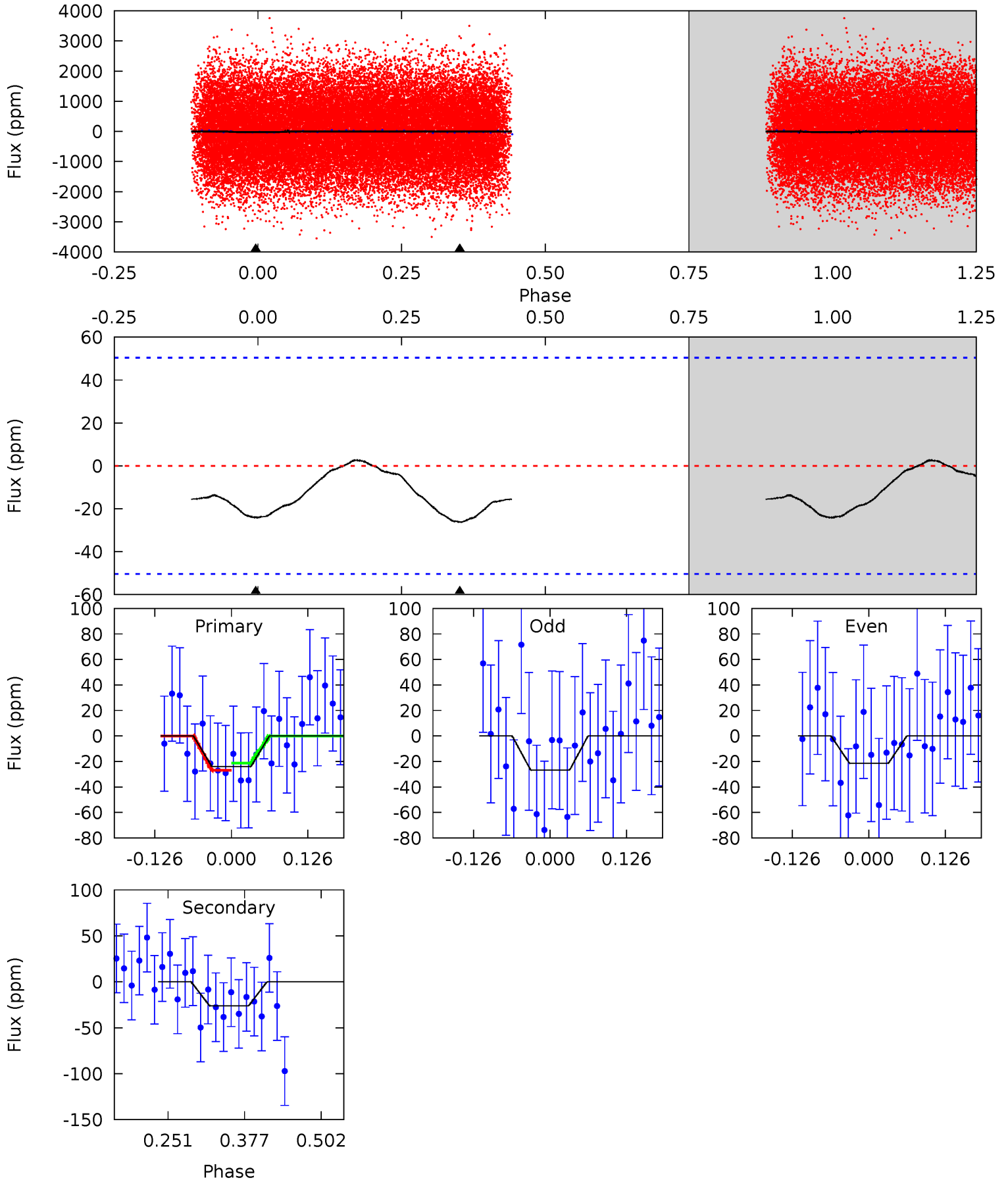
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
6.46	6.19	0	0	4.45	1.37	0.30	6.46	6.46	6.19	6.19	0.50	1.00	0.04	0.31



# Alt Model-Shift Uniqueness Test

011402951-02, P = 0.675638 Days, E = 131.487895 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
2.16	2.35	0	0	4.52	1.53	0.16	2.16	2.16	2.35	2.35	0.24	1.06	0.09	0.25



### Stellar Parameters For KIC 011402951

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$7242^{+129}_{-158}$	$3.484^{+0.288}_{-0.032}$	$-0.240^{+0.150}_{-0.100}$	$4.236^{+0.160}_{-1.364}$	$1.996^{+0.049}_{-0.293}$	$0.037^{+0.066}_{-0.004}$
	+2%/-2%	+8%/-1%	+62%/-42%	+4%/-32%	+2%/-15%	+179%/-11%
Source	SPE4	SPE4	SPE4	DSEP		

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

### Secondary Eclipse Parameters for KIC 011402951-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-19 \pm 3$	$2.16^{+1.45}_{-1.19}$	$6524^{+256}_{-514}$	$5800^{+4525}_{-9134}$	$0.783^{+2.910}_{-0.511}$
Alt.	$-26 \pm 11$	$2.34^{+1.34}_{-1.25}$	$6544^{+231}_{-483}$	$6226^{+5421}_{-8776}$	$0.905^{+3.571}_{-0.609}$

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

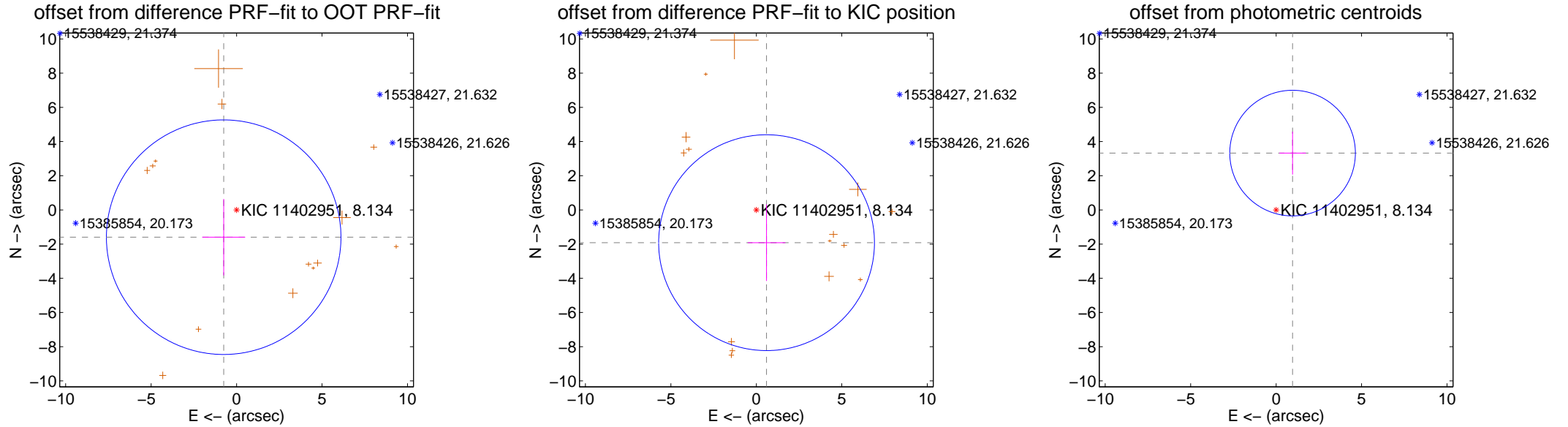
## DV Centroid Data

Supplemental centroid analysis for 011402951-02. **Kepler magnitude: 8.13.** Transit SNR 8.30

**There are 0 quarters with good PRF difference image offsets**

The direct PRF centroid is offset from the target star catalog position by about 1.67 arcsec

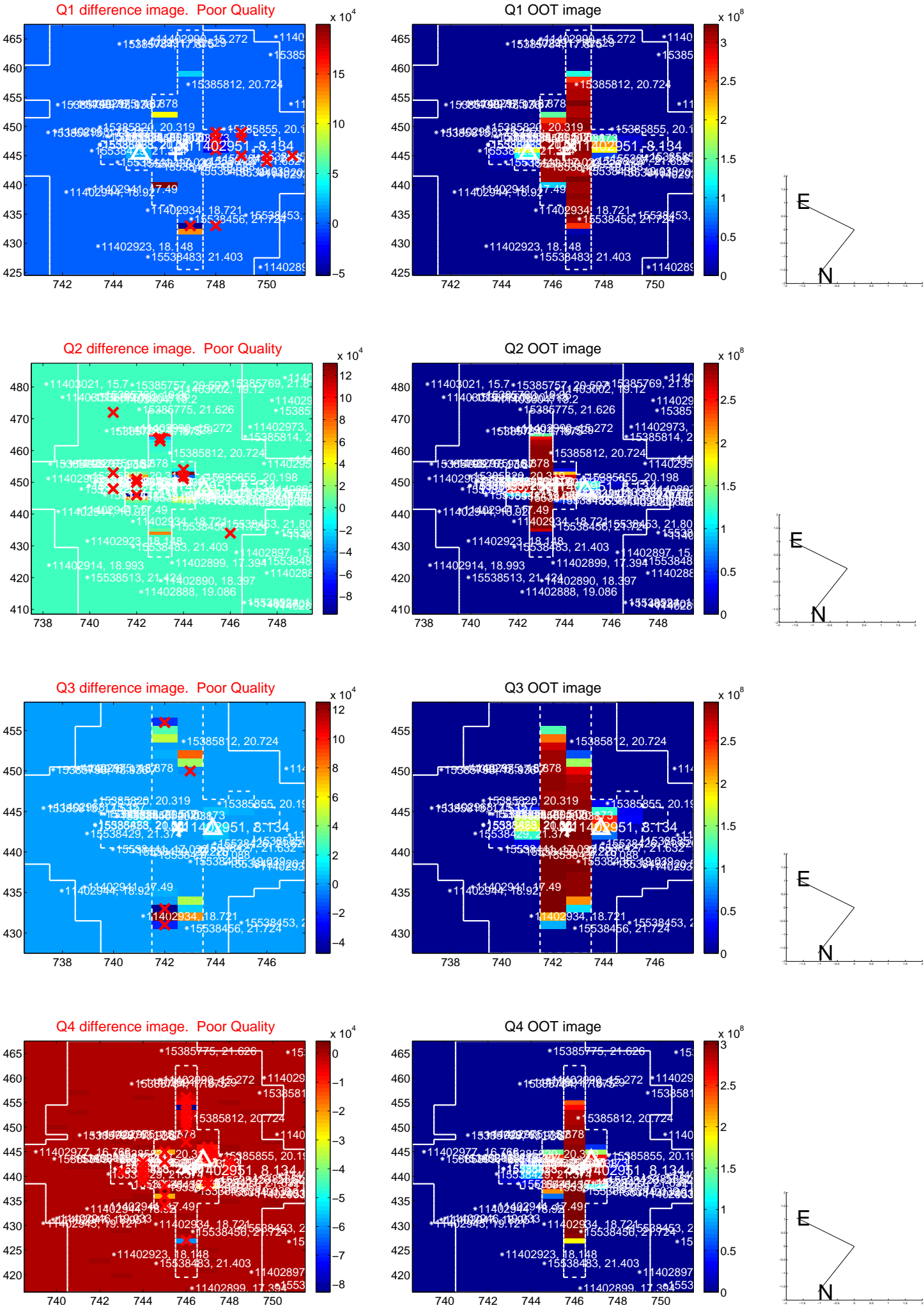
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.765 \pm 2.287$	0.77	$0.754 \pm 1.255$	$-1.595 \pm 2.234$
PRF-fit source offset from KIC position	$2.007 \pm 2.104$	0.95	$-0.598 \pm 1.098$	$-1.916 \pm 2.242$
photometric centroid source offset	$3.46 \pm 1.22$	2.83	$-0.96 \pm 0.78$	$3.32 \pm 1.26$



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.

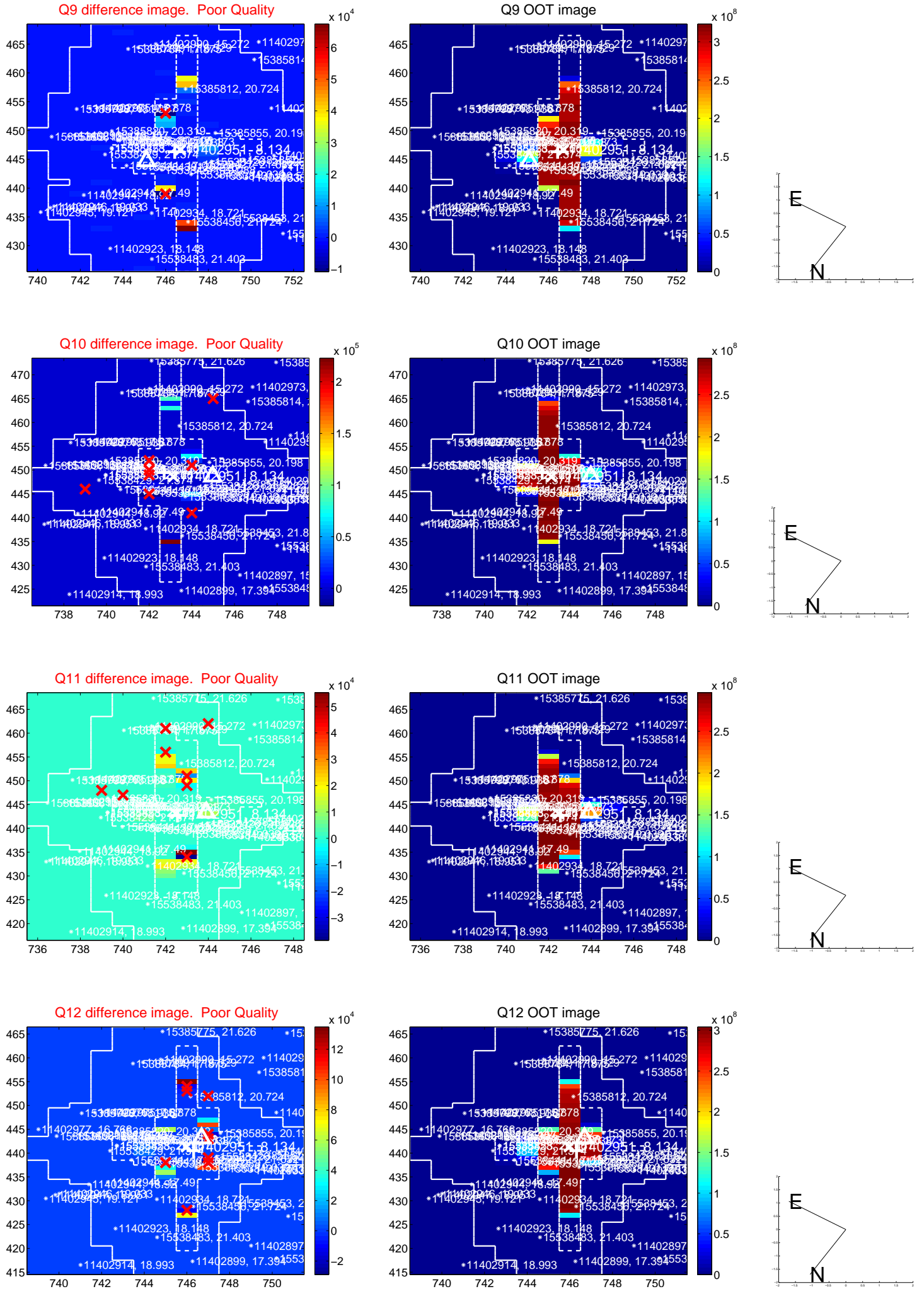


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



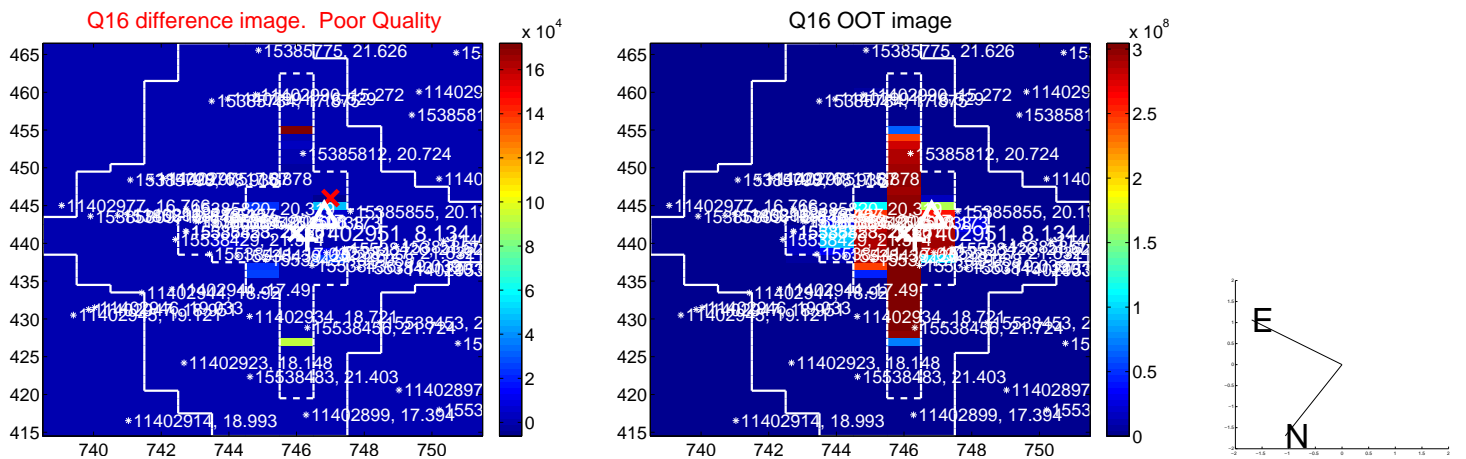
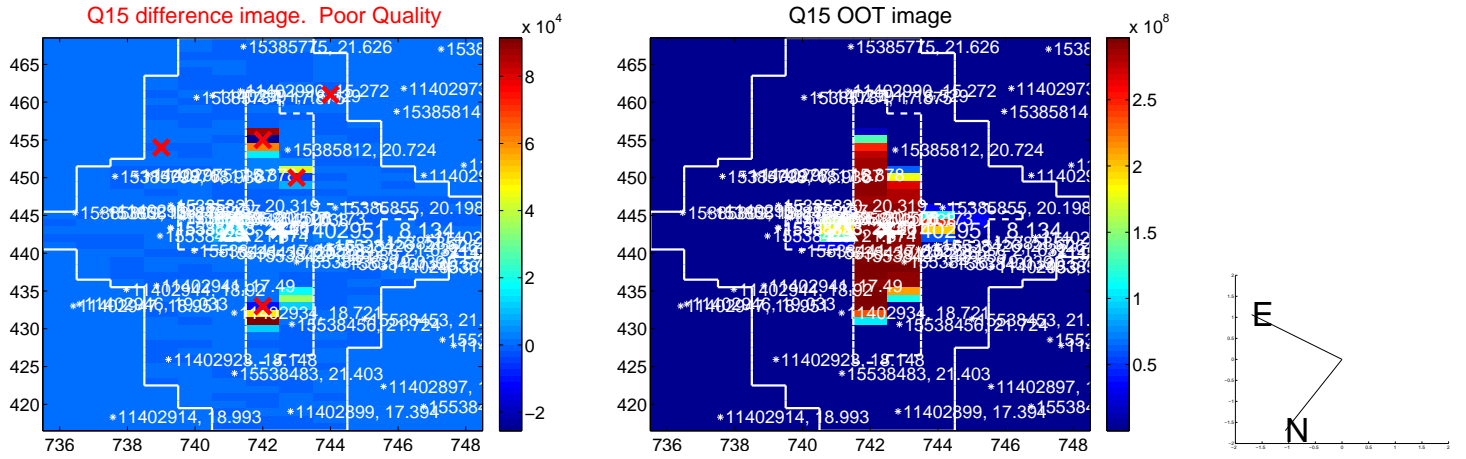
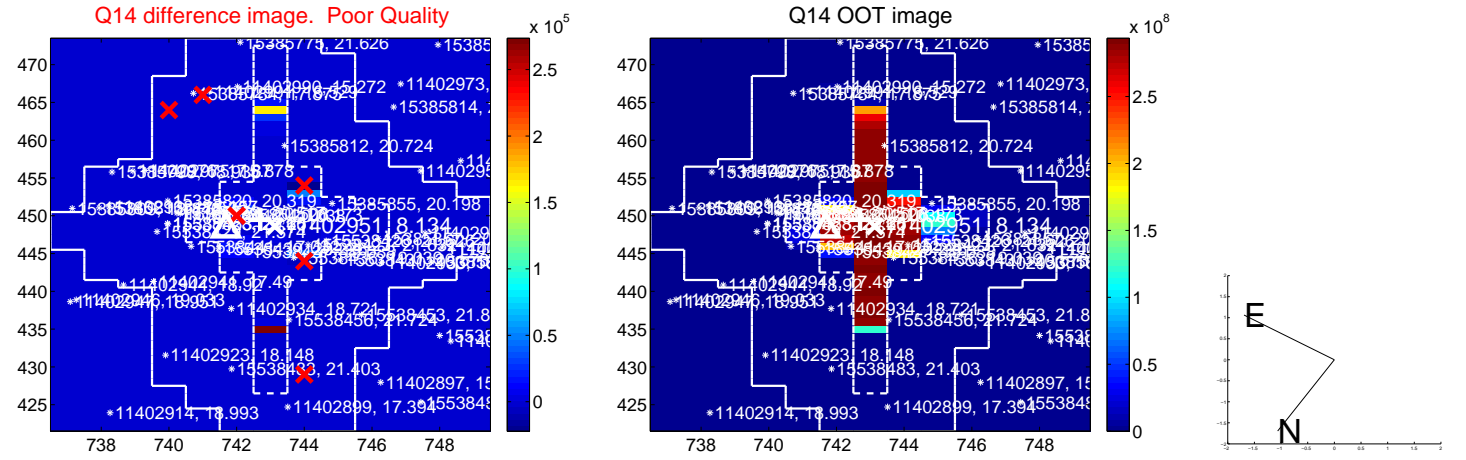
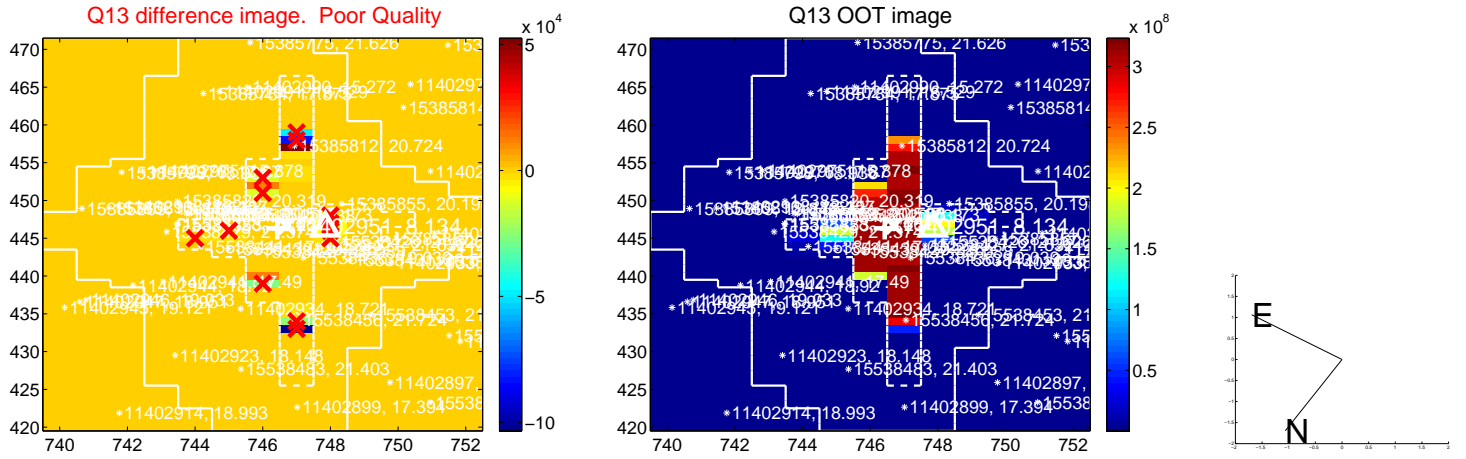


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



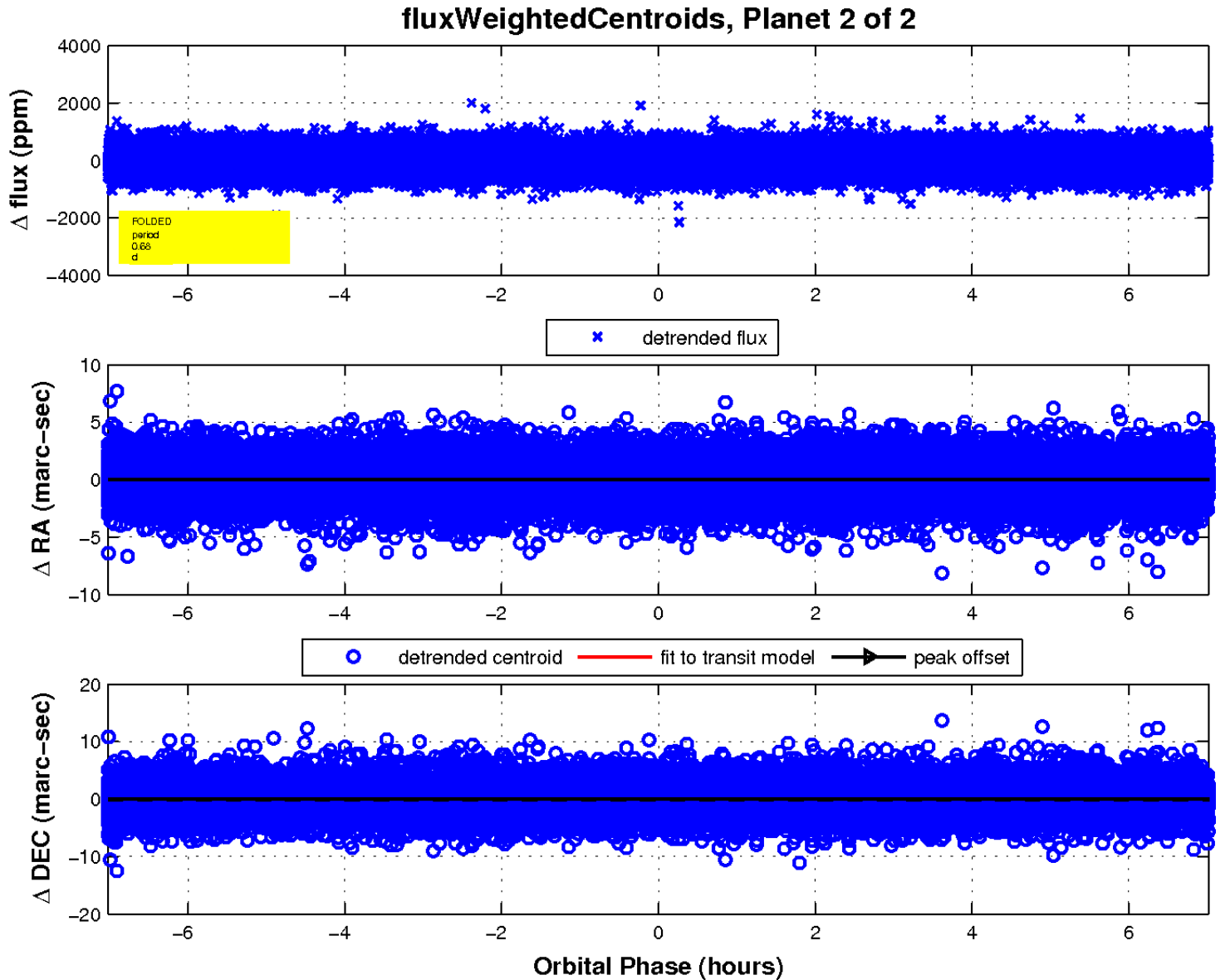
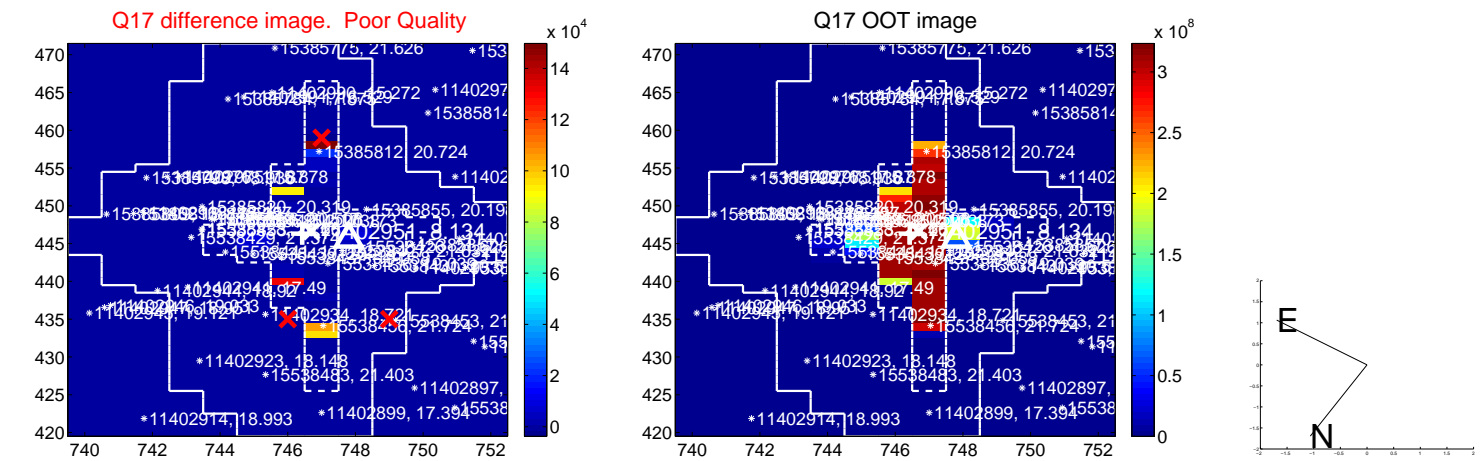


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.





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



UKIRT Image

Declination

