

# KIC 010877182

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
010877182-01	OBS	No	0.979397	131.845091	20.8	2.365	9.1	10.1	2.31	7368	1.23	24741.30
010877182-02	OBS	No	0.955280	131.844096	25.4	4.706	7.8	10.8	2.31	7368	1.35	25577.62

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010877182-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT
010877182-02	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT

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

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

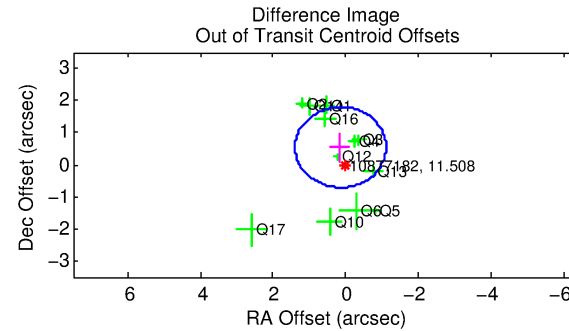
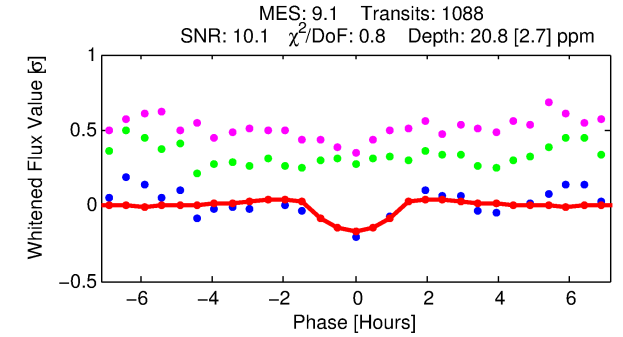
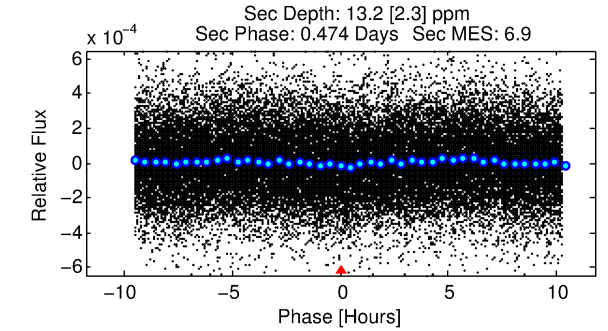
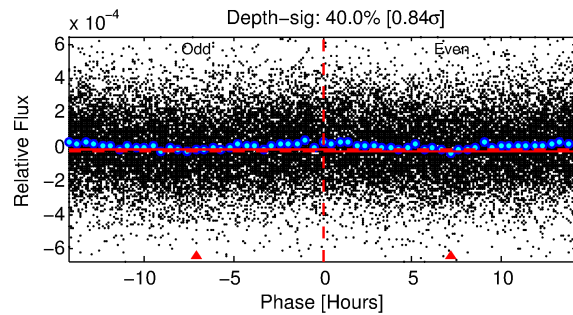
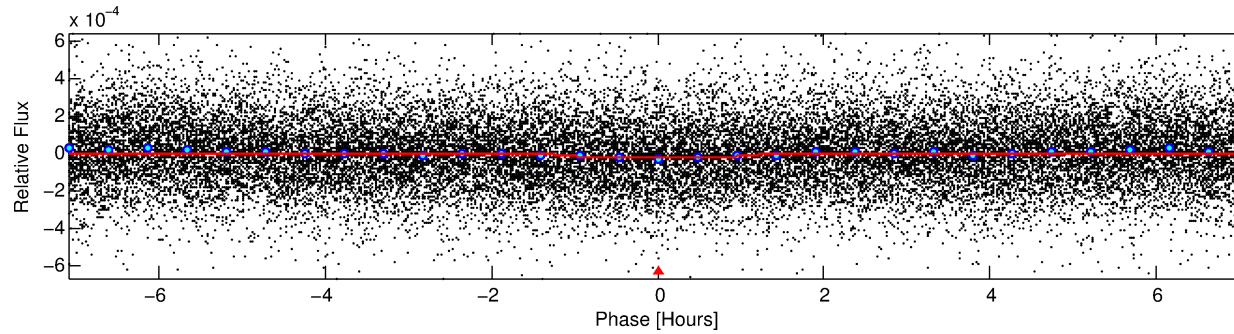
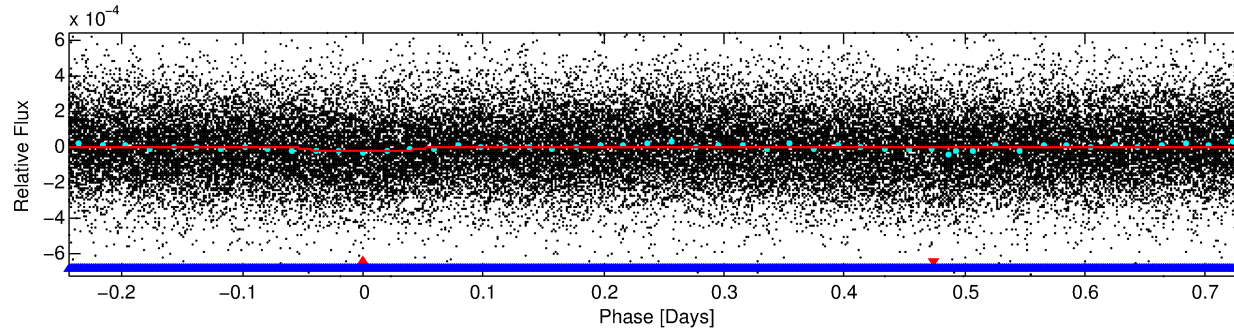
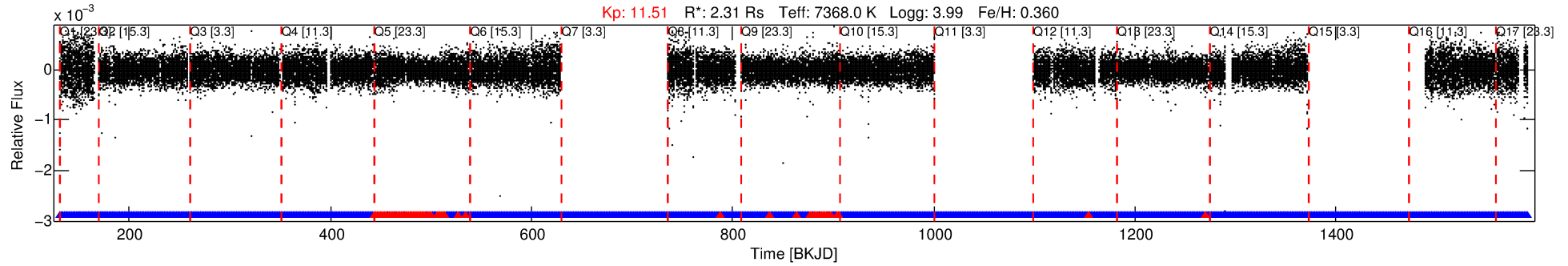
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 010877182-01

No Significant Match Found

# DV One-Page Summary

KIC: 10877182 Candidate: 1 of 2 Period: 0.979 d



## DV Fit Results:

Period = 0.97940 [0.00001] d  
Epoch = 131.8451 [0.0031] BKJD  
Rp/R\* = 0.0049 [0.0019]  
a/R\* = 1.66 [2.58]  
b = 0.91 [0.48]  
Seff = 24741.30 [9231.39]  
Teq = 3198 [298] K  
Rp = 1.23 [0.56] Re  
a = 0.0239 [0.0051] AU  
Ag = 2.75 [2.34] [0.75 $\sigma$ ]  
Teffp = 6365 [1289] K [2.39 $\sigma$ ]

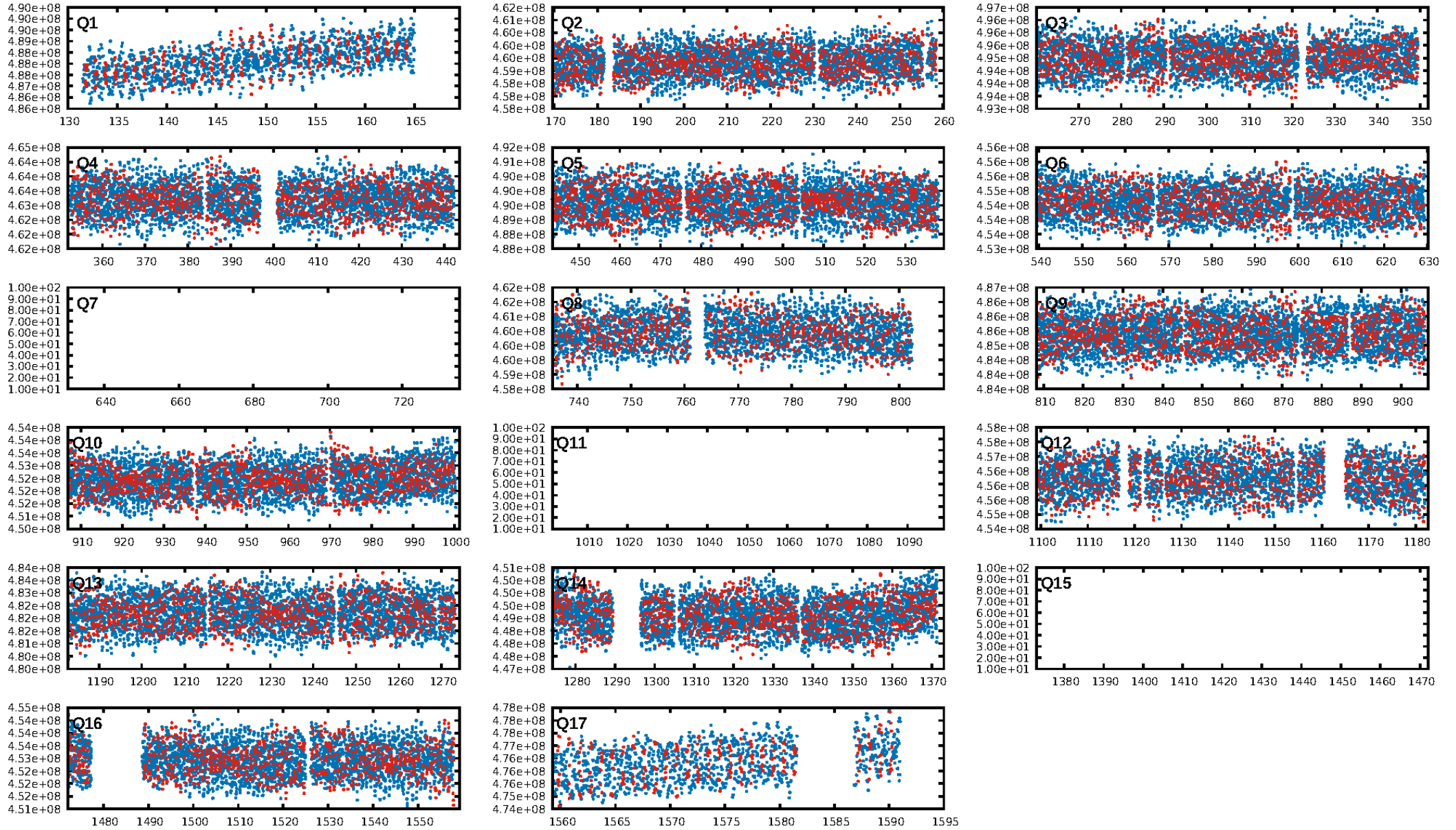
## DV Diagnostic Results:

ShortPeriod-sig: 8.8% [0.11 $\sigma$ ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 1.00e-16  
RollingBand-fgt: 0.92 [946/1027]  
GhostDiagnostic-chr: 5.15  
Centroid-sig: 47.3%  
Centroid-so: 0.596 arcsec [0.90 $\sigma$ ]  
OotOffset-rm: 0.560 arcsec [1.34 $\sigma$ ]  
KicOffset-rm: 0.518 arcsec [1.18 $\sigma$ ]  
OotOffset-st: 4/1/3/4 [12]  
KicOffset-st: 4/1/3/4 [12]  
DiffImageQuality-fgm: 0.75 [9/12]  
DiffImageOverlap-fno: 1.00 [14/14]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 09:56:50 Z

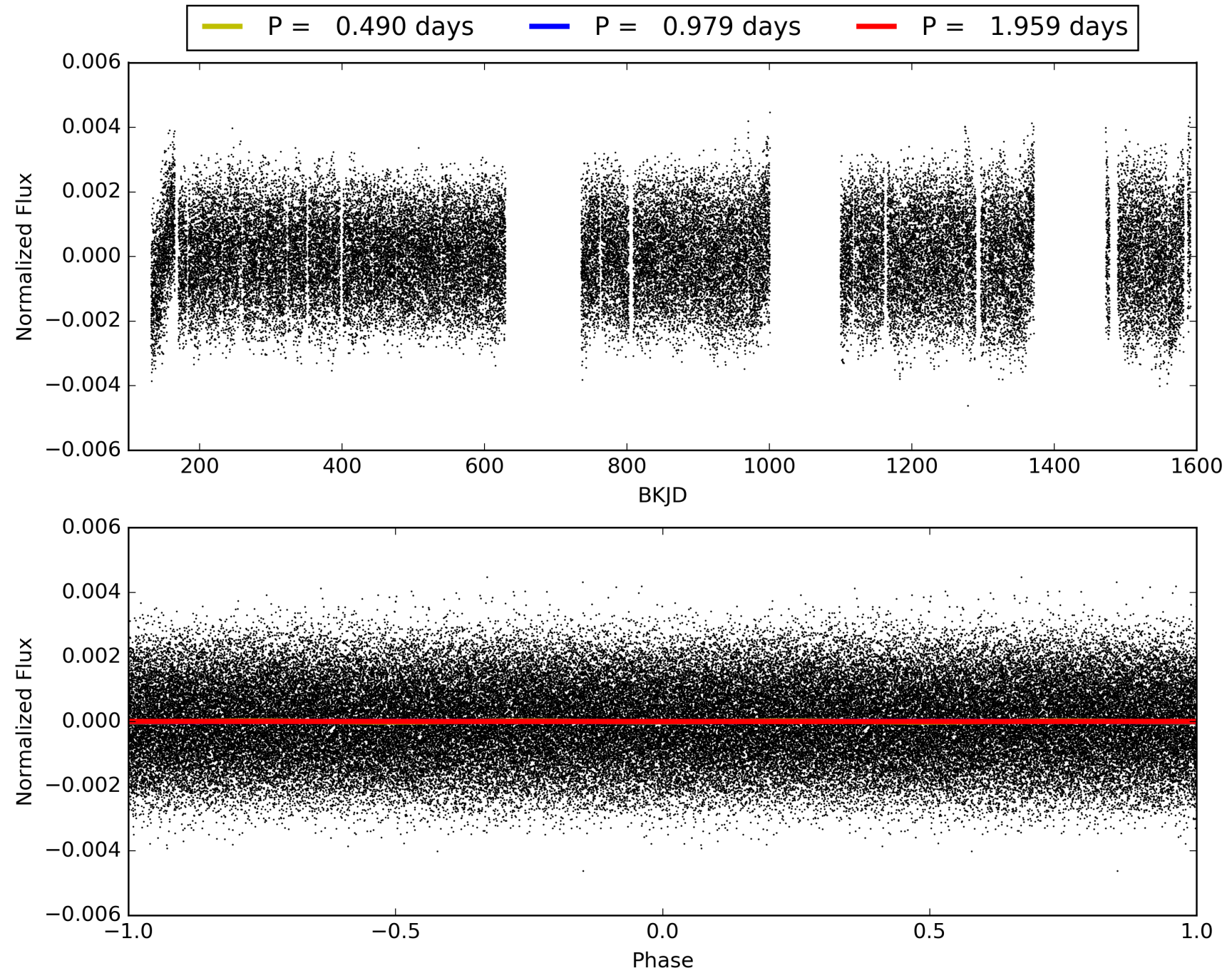
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 010877182-01, PDC Light Curves



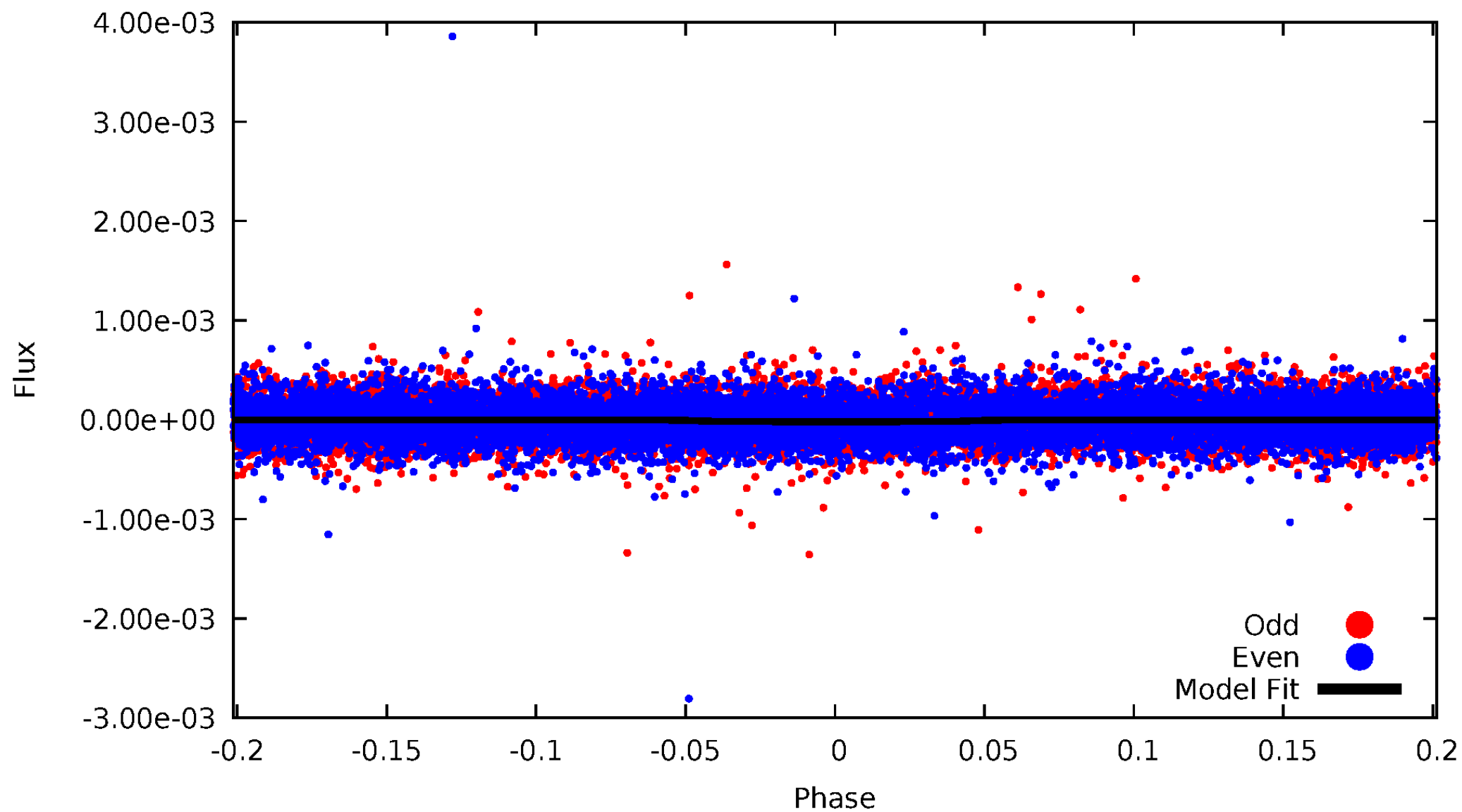


TCE 010877182-01



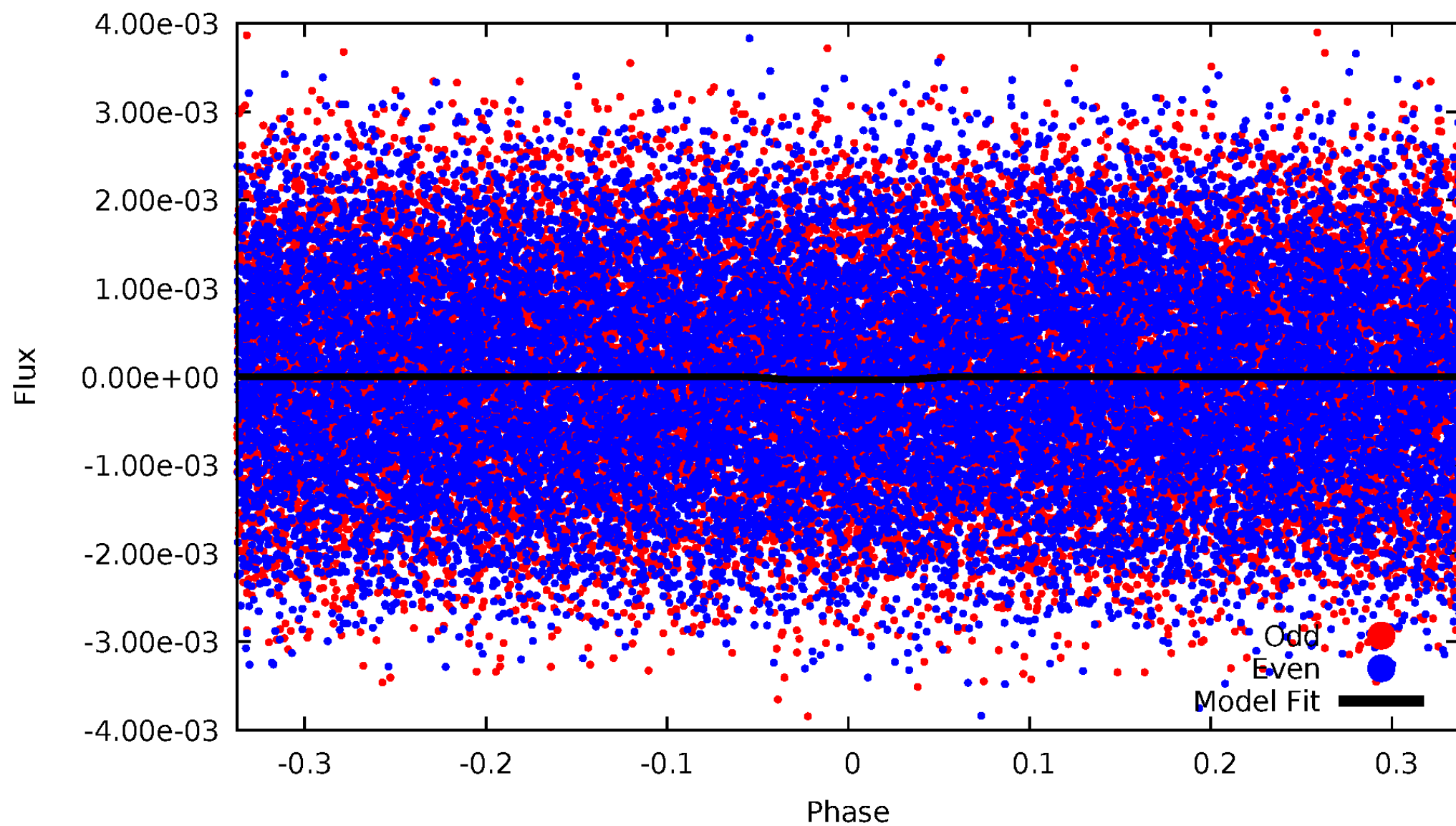
# DV Odd/Even

TCE 010877182-01

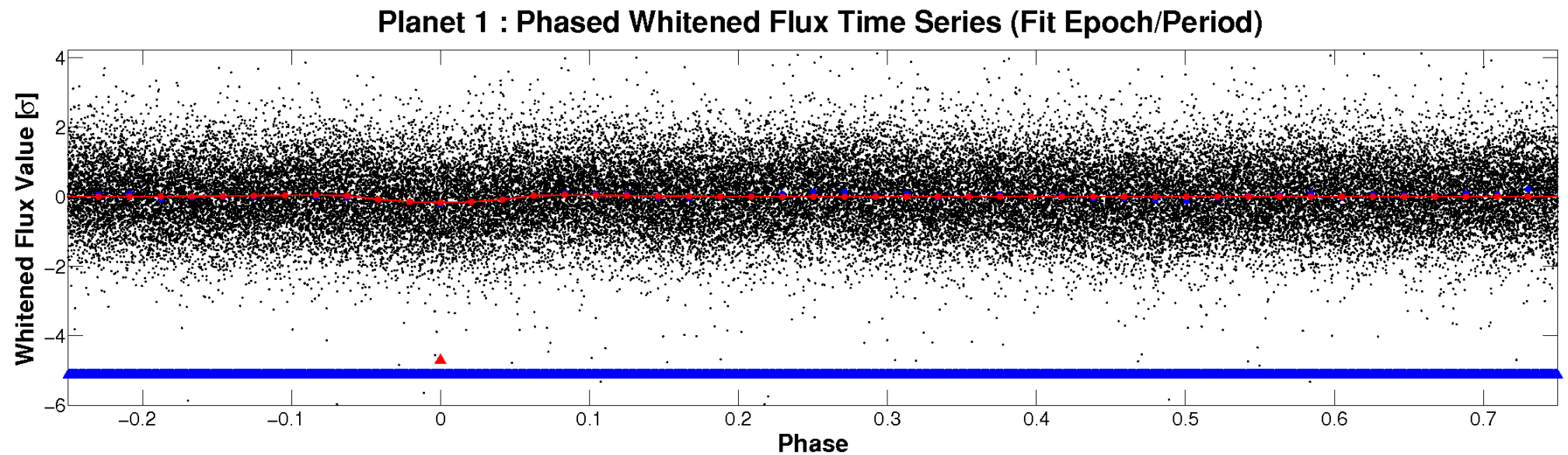
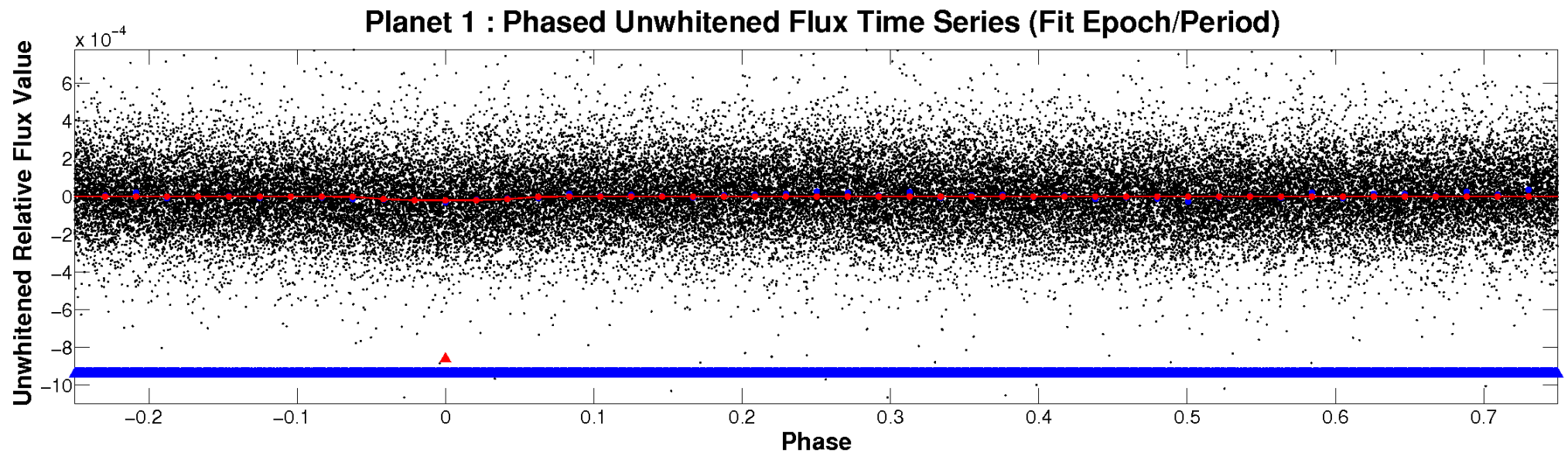


# ALT Odd/Even

TCE 010877182-01



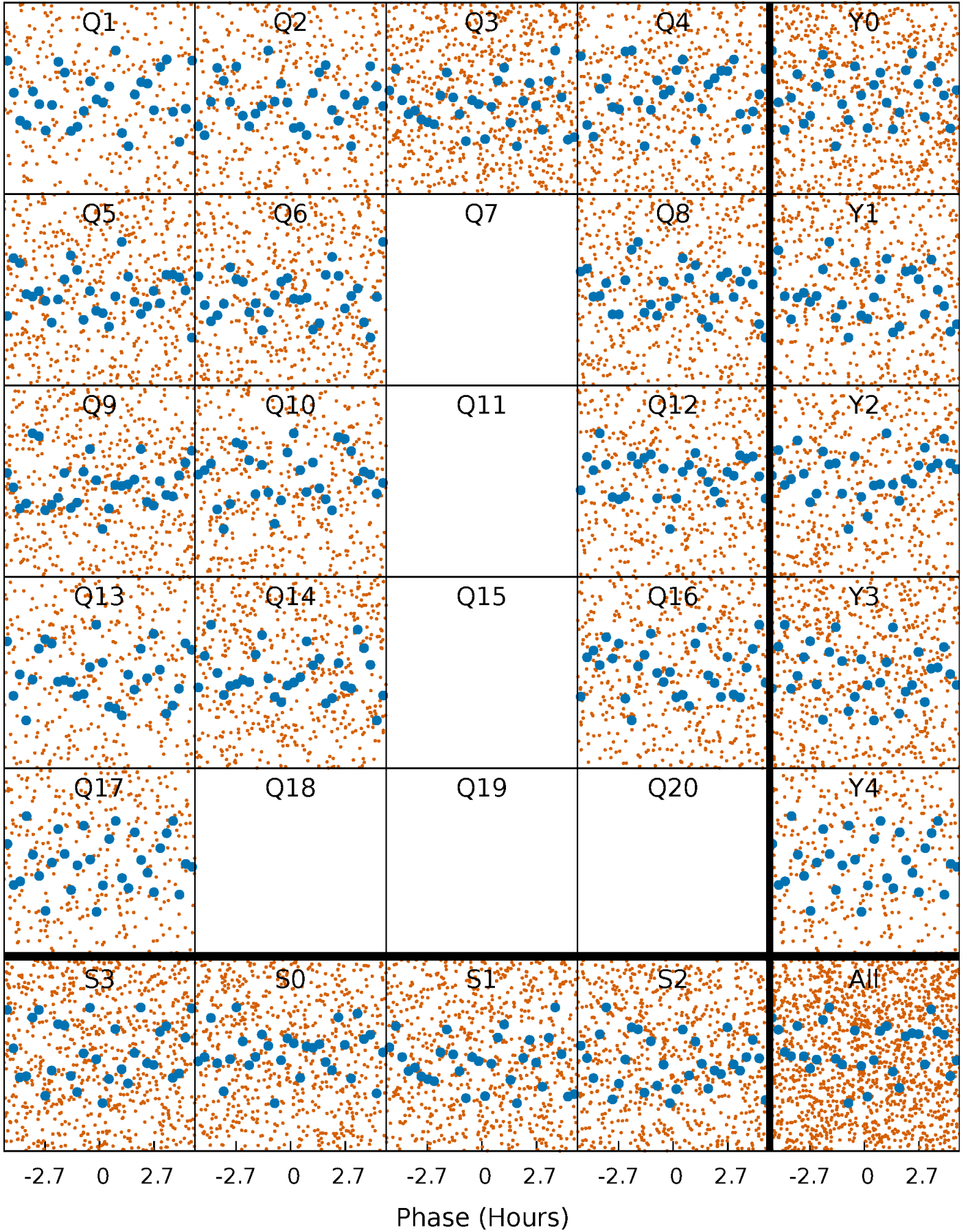
# Non-Whitened Vs. Whitened Light Curve





# PDC Quarter-Phased Transit Curves

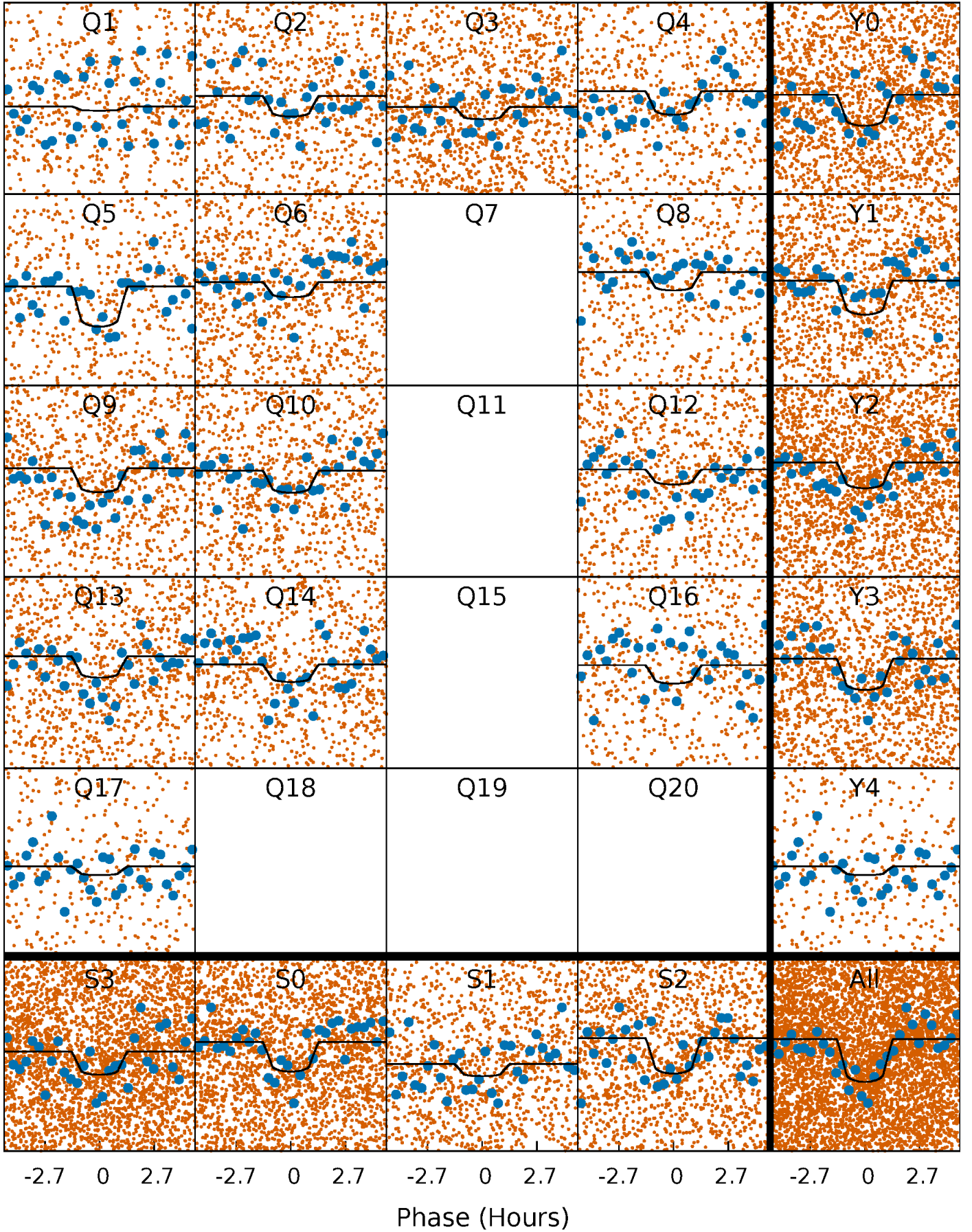
TCE 010877182-01   P= 0.979397 Days    $T_0=131.845091$  (BKJD)





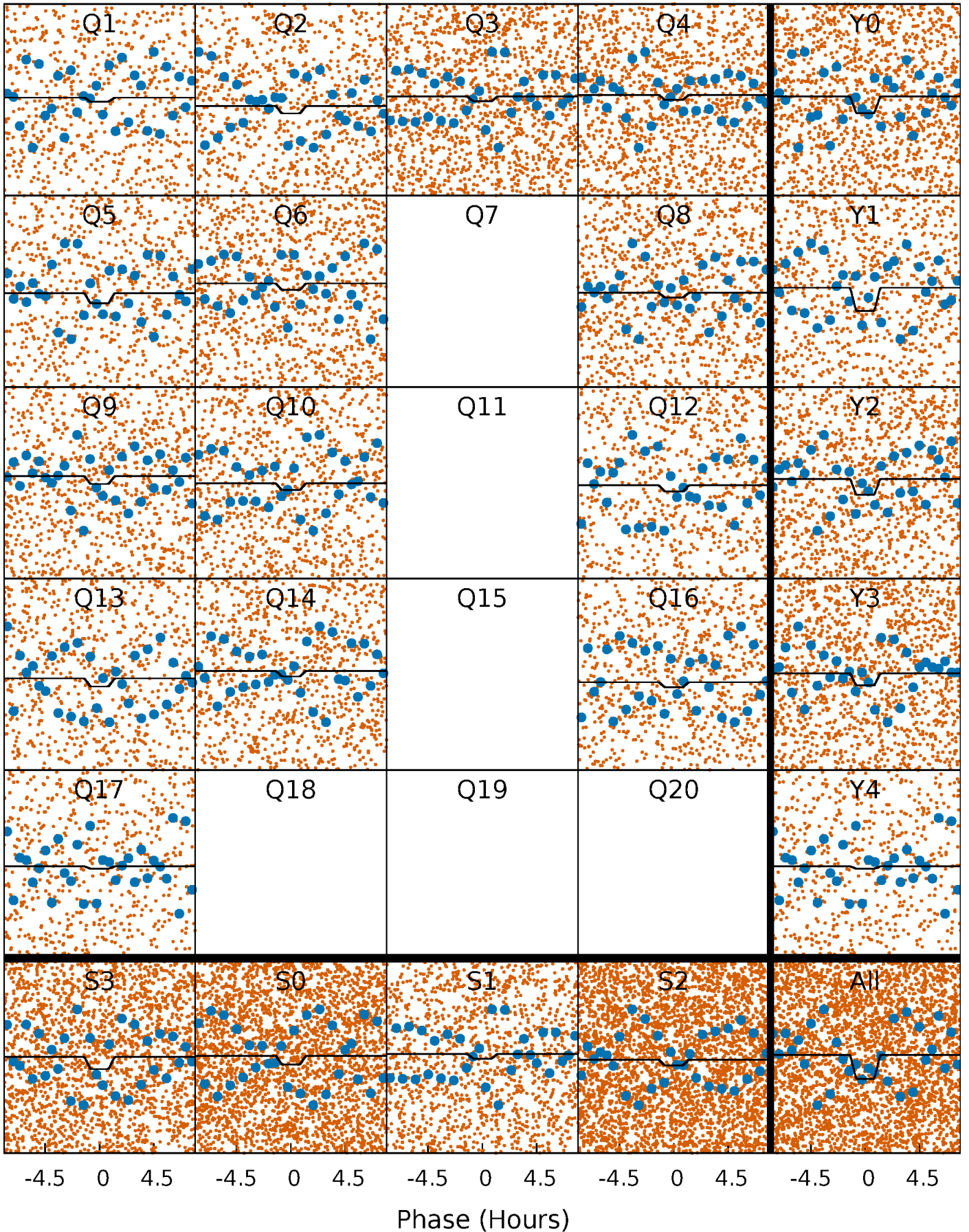
# DV Quarter-Phased Transit Curves

TCE 010877182-01 P= 0.979397 Days  $T_0=131.845091$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

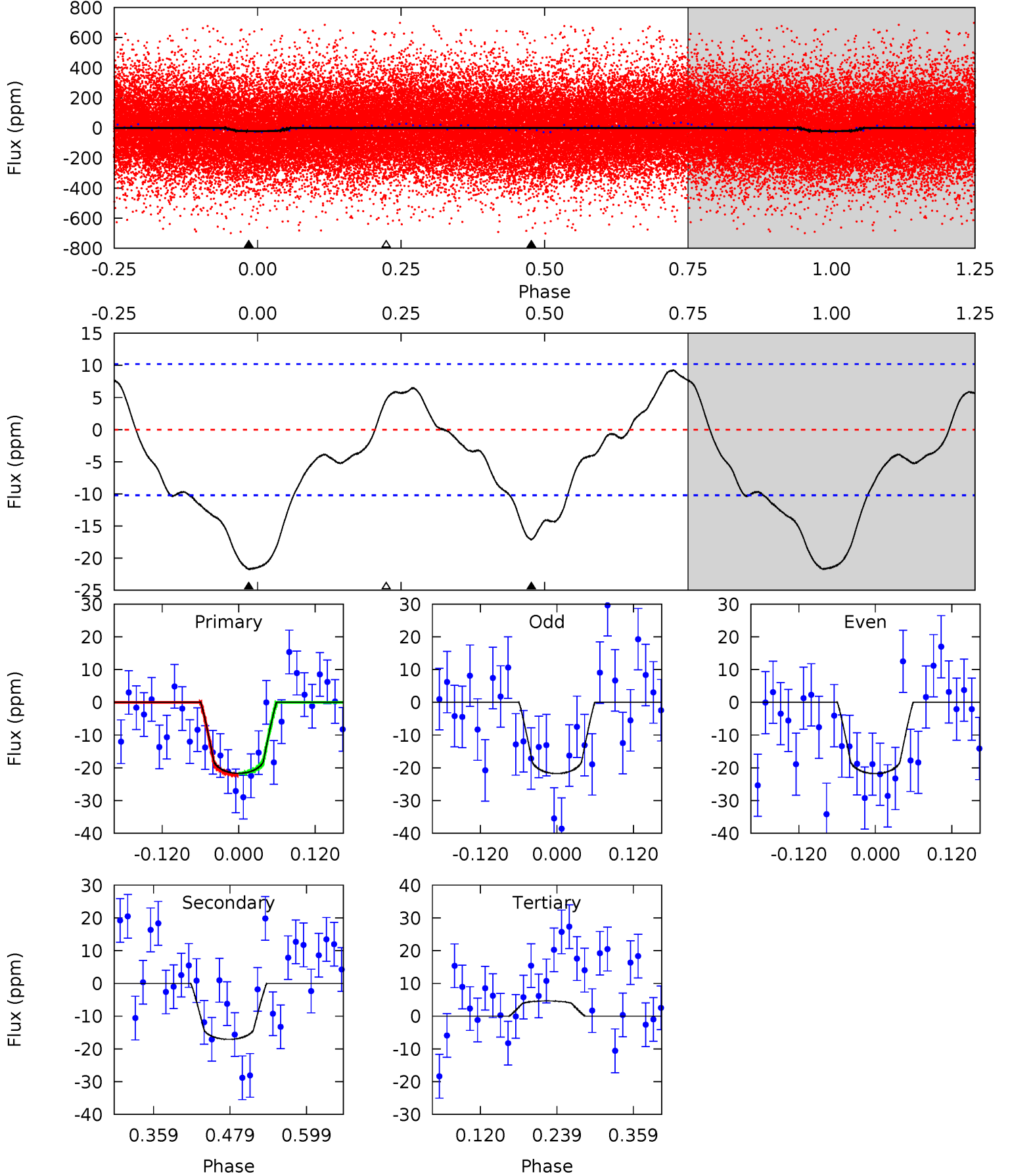
TCE 010877182-01 P= 0.979389 Days  $T_0=131.855036$  (BKJD)



# DV Model-Shift Uniqueness Test

010877182-01, P = 0.979397 Days, E = 130.865694 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
9.61	7.57	-2.06	0	4.53	1.56	2.24	11.7	9.61	9.63	7.57	0.01	1.07	0.30	0.11

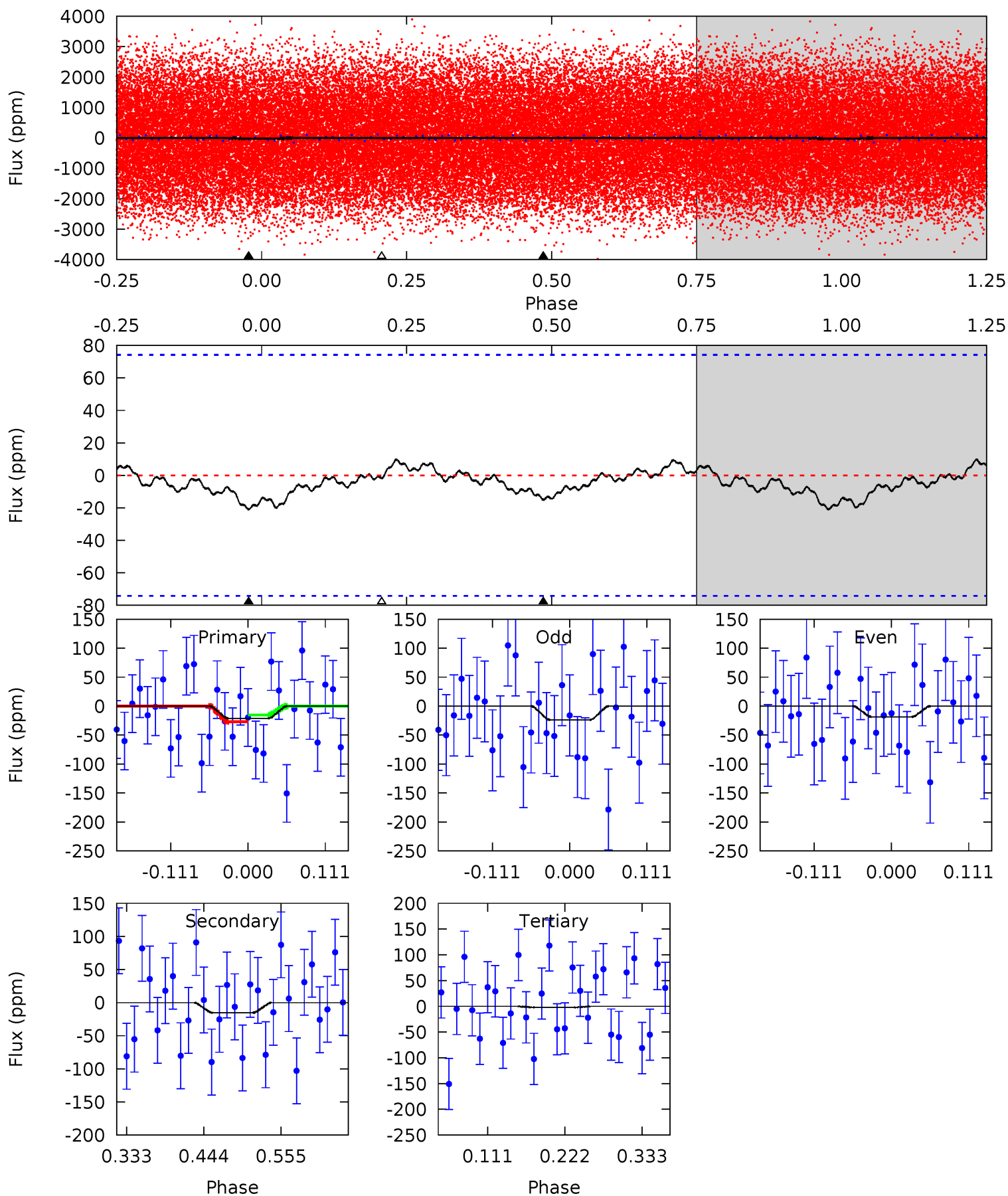




# Alt Model-Shift Uniqueness Test

010877182-01, P = 0.979389 Days, E = 130.875647 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
1.29	0.93	0.12	0	4.54	1.59	0.28	1.17	1.29	0.82	0.93	0.16	1.03	0.32	0.36





### Stellar Parameters For KIC 010877182

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$7368^{+203}_{-349}$	$3.987^{+0.181}_{-0.165}$	$0.360^{+0.050}_{-0.400}$	$2.310^{+0.560}_{-0.560}$	$1.890^{+0.140}_{-0.326}$	$0.216^{+0.193}_{-0.095}$
	+3%/-5%	+5%/-4%	+14%/-111%	+24%/-24%	+7%/-17%	+89%/-44%
Source	PHO54	PHO54	PHO54	DSEP		

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

### Secondary Eclipse Parameters for KIC 010877182-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-17 \pm 2$	$1.20^{+0.53}_{-0.47}$	$4435^{+341}_{-340}$	$6545^{+2109}_{-1187}$	$3.633^{+5.851}_{-1.940}$
Alt.	$-15 \pm 16$	$1.49^{+0.59}_{-0.47}$	$4439^{+343}_{-318}$	$5622^{+1737}_{-9750}$	$1.945^{+3.686}_{-1.981}$

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

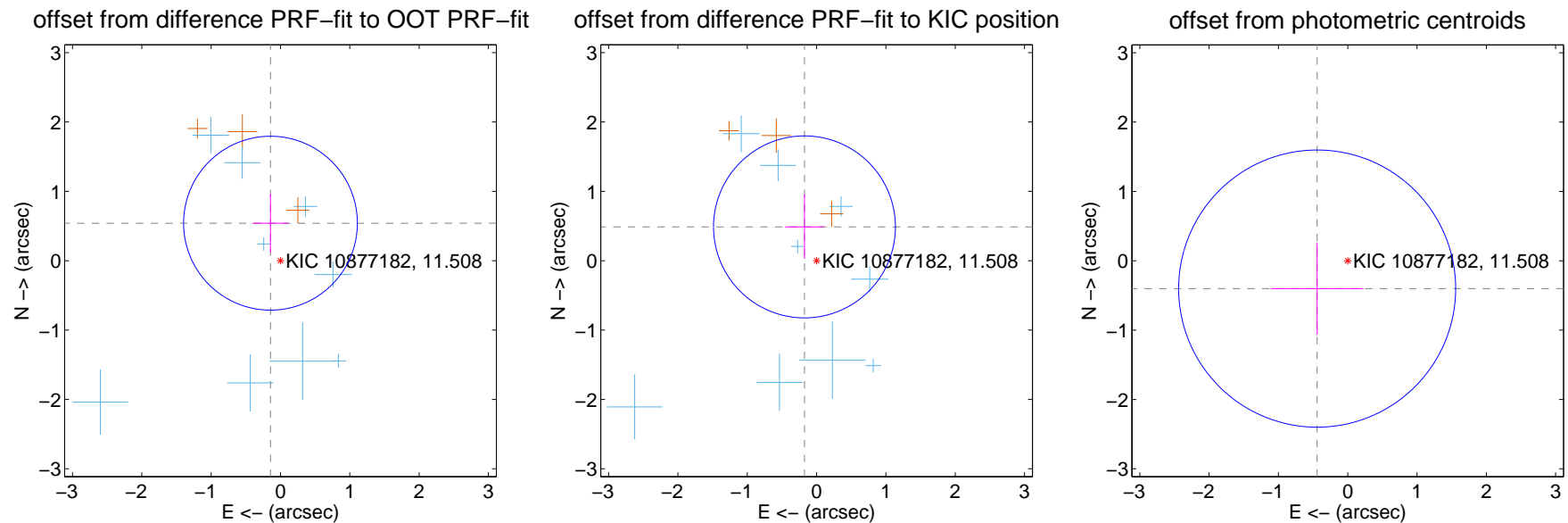
## DV Centroid Data

Supplemental centroid analysis for 010877182-01. **Kepler magnitude: 11.51.** Transit SNR 10.13

There are 9 quarters with good PRF difference image offsets

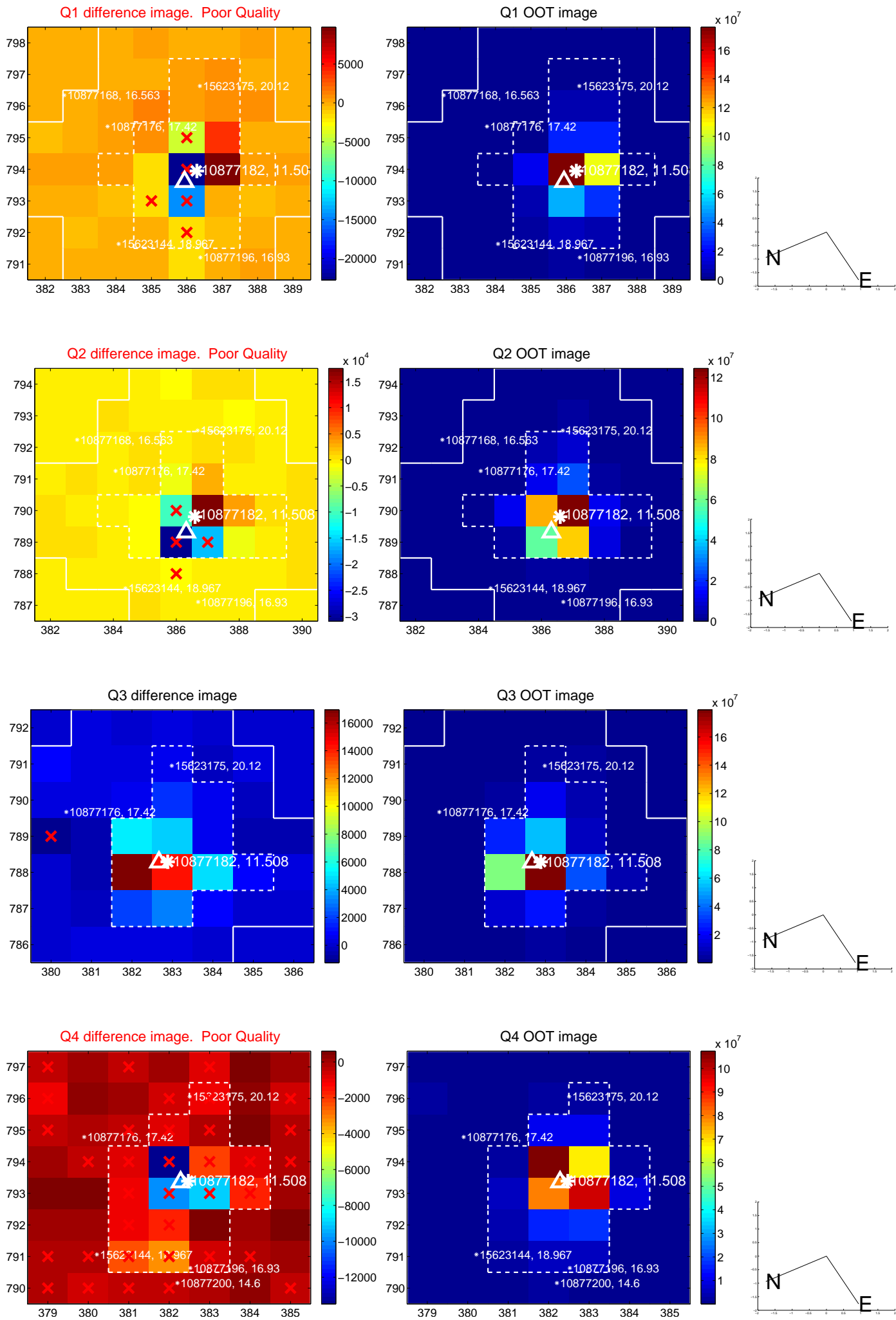
The direct PRF centroid is offset from the target star catalog position by about 0.07 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.560 \pm 0.418$	1.34	$0.144 \pm 0.259$	$0.541 \pm 0.424$
PRF-fit source offset from KIC position	$0.518 \pm 0.437$	1.18	$0.175 \pm 0.279$	$0.487 \pm 0.462$
photometric centroid source offset	$0.60 \pm 0.67$	0.90	$0.44 \pm 0.67$	$-0.40 \pm 0.66$

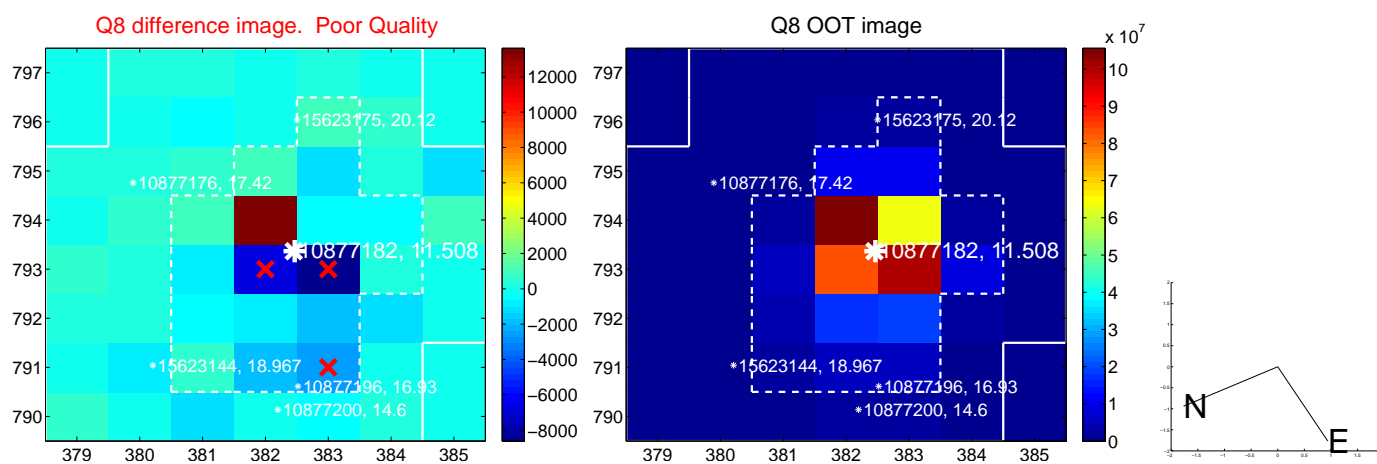
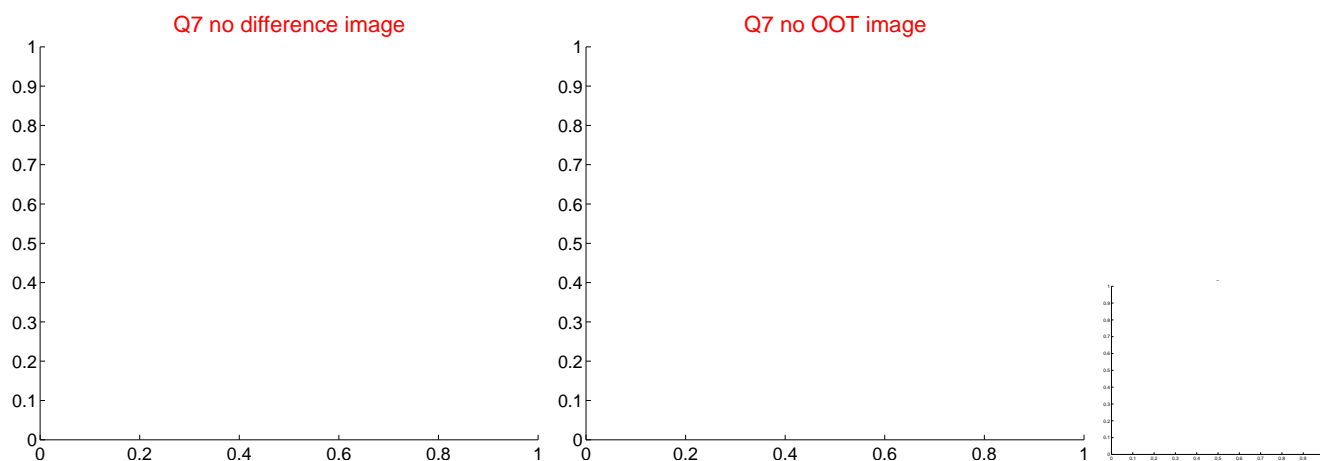
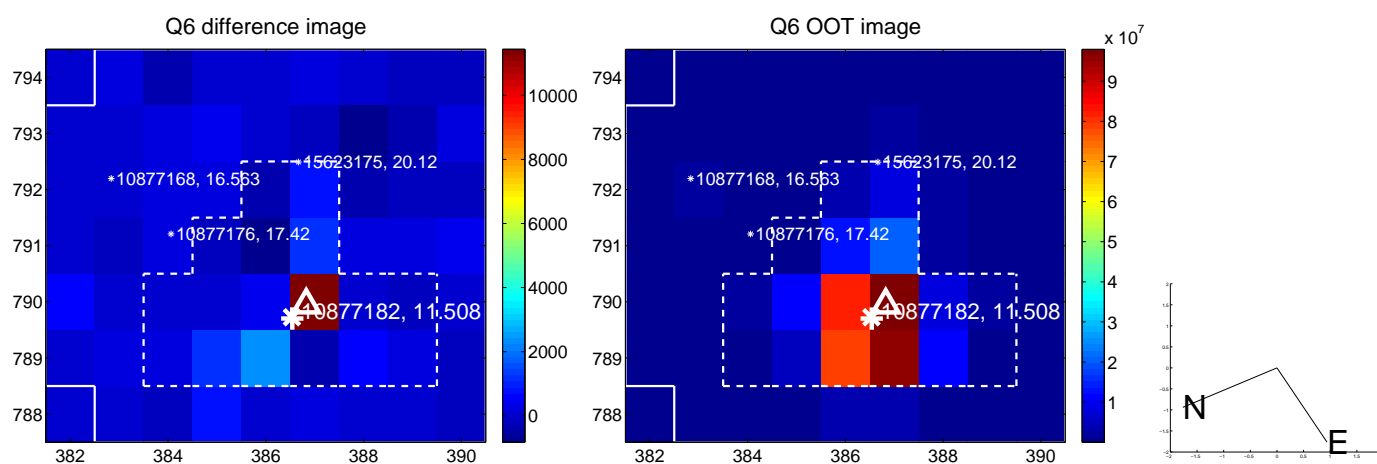
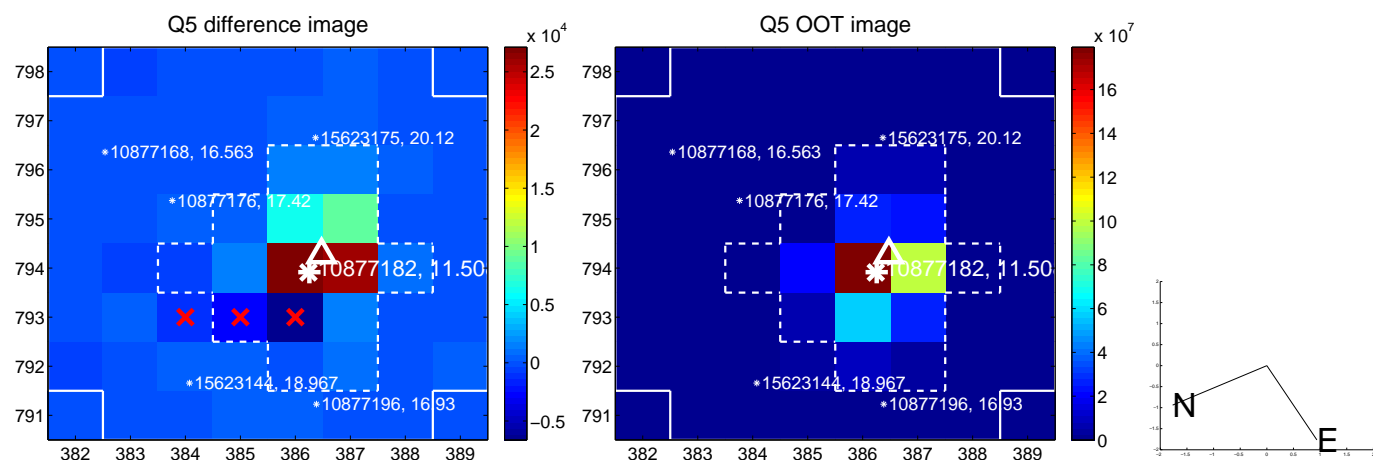


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

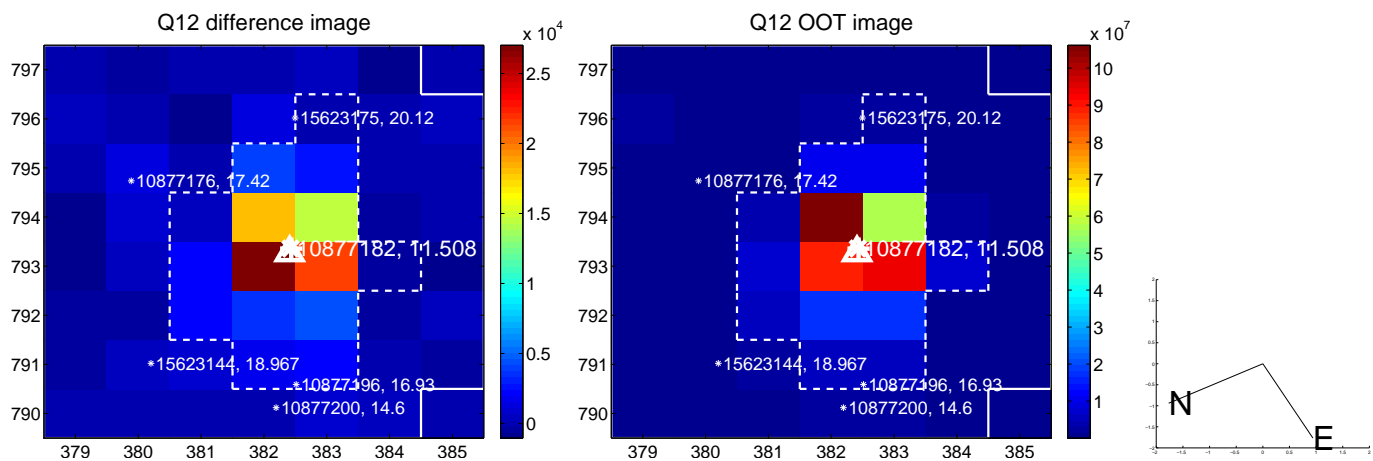
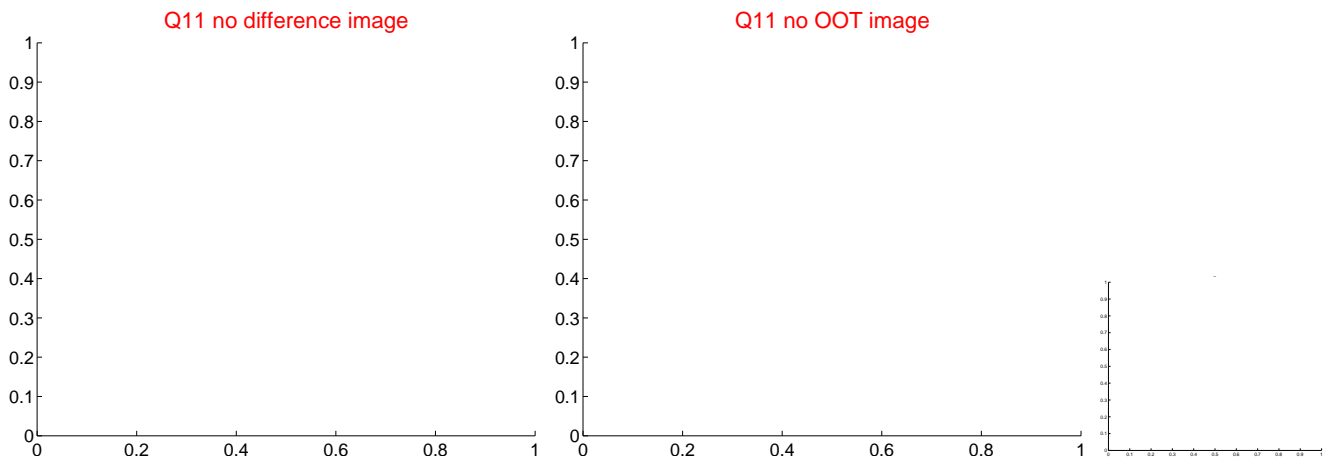
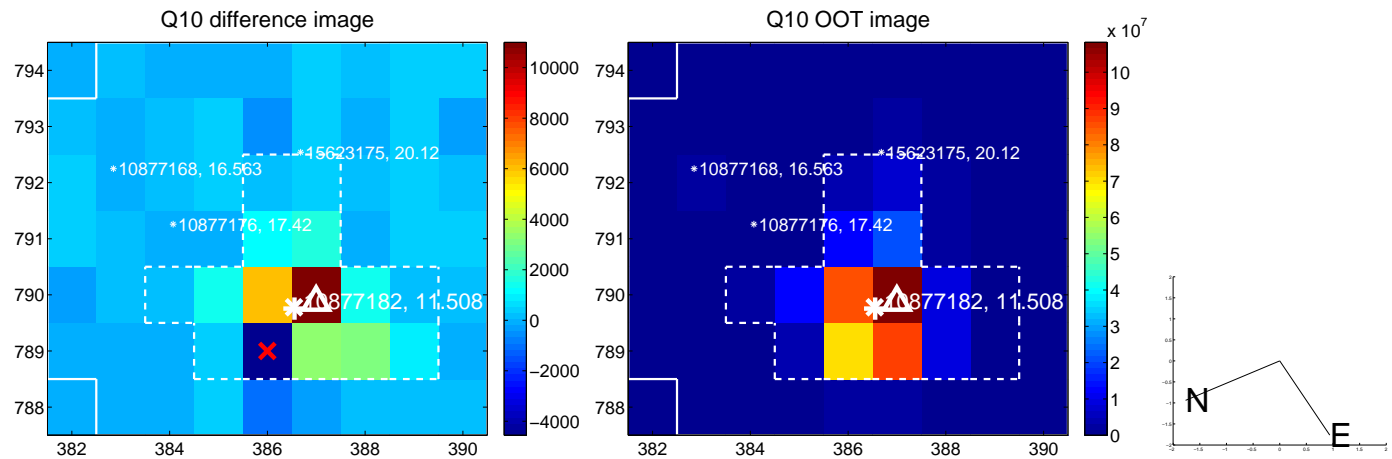
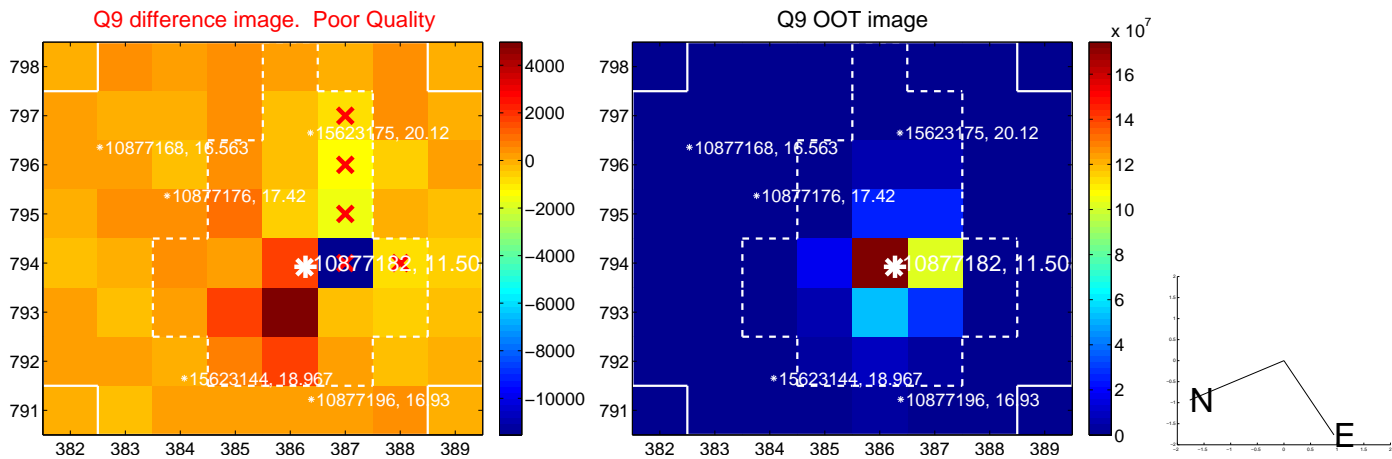


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

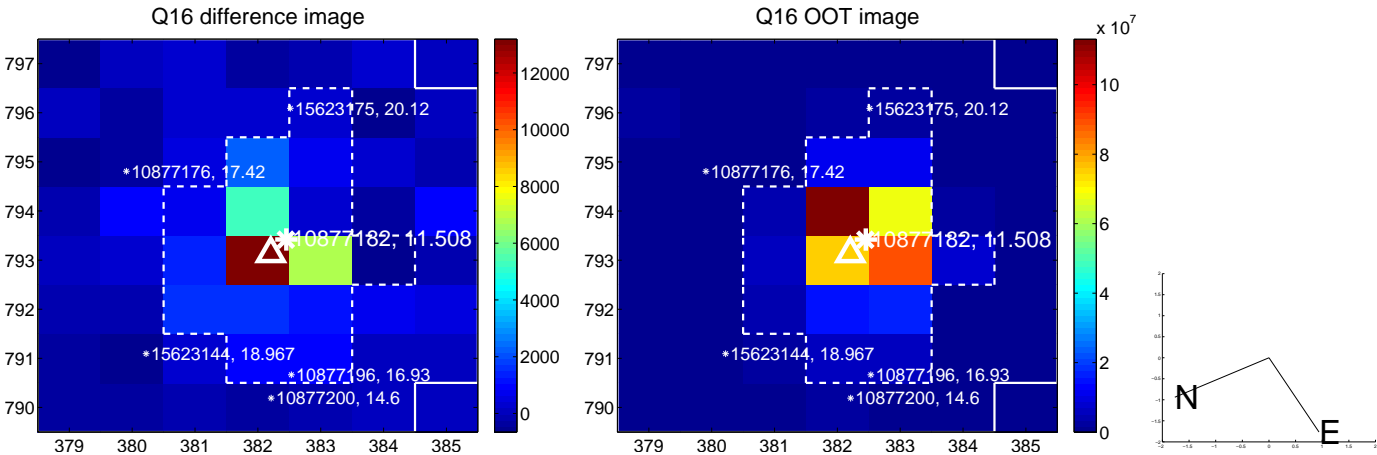
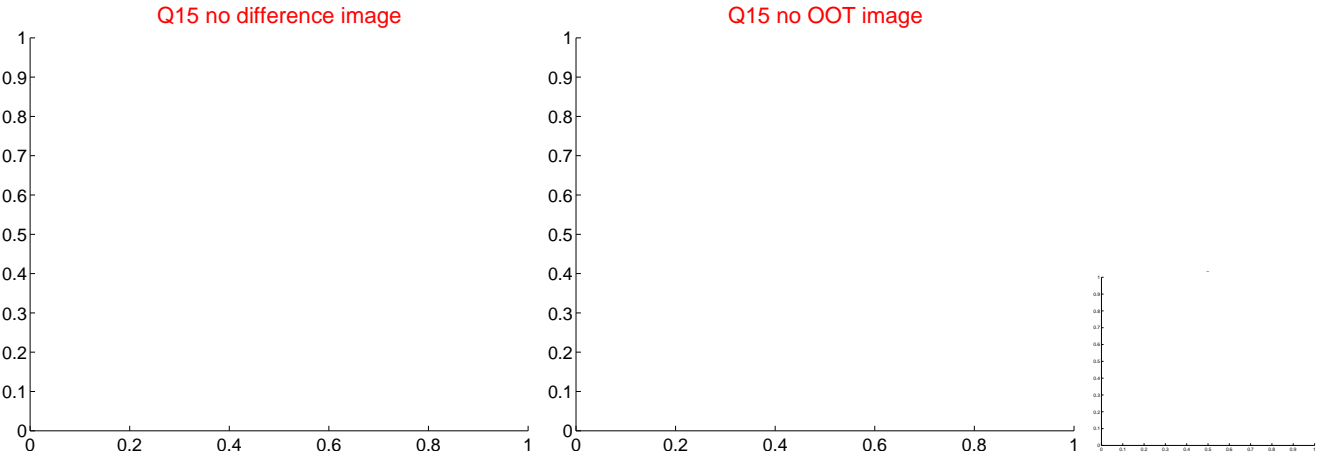
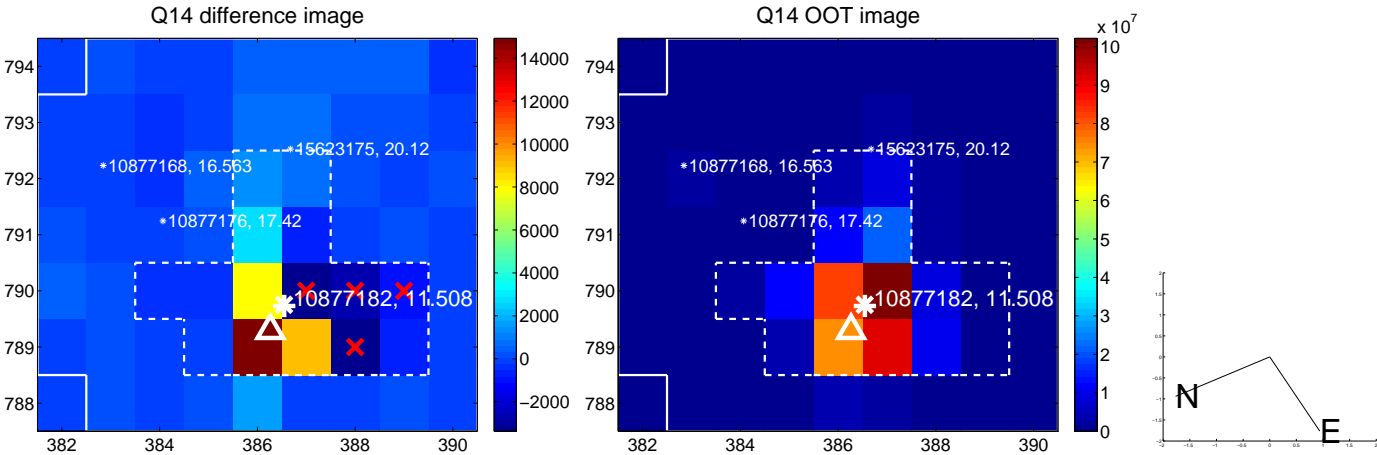
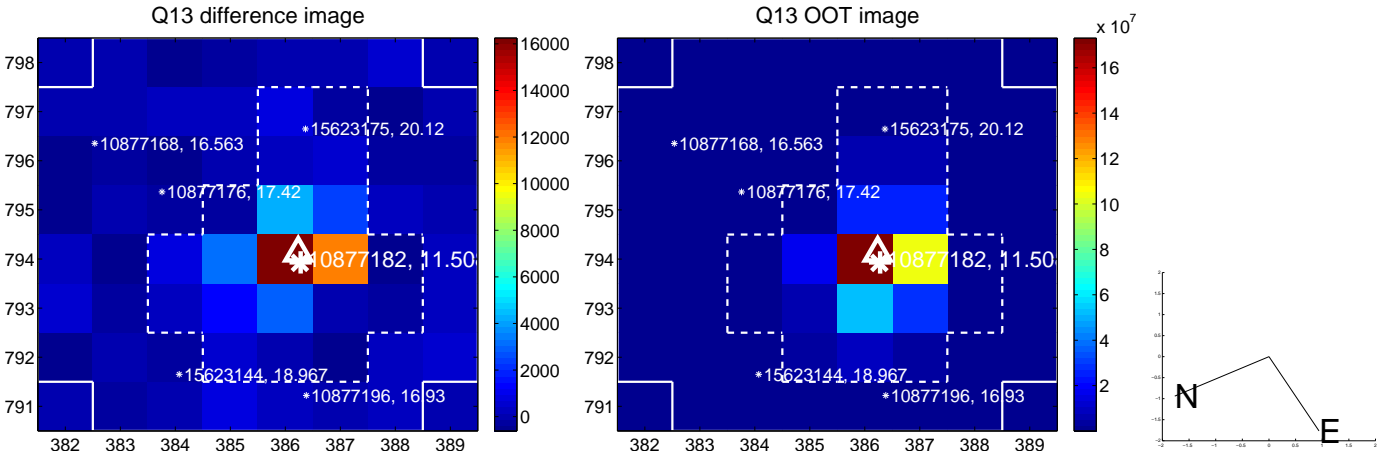




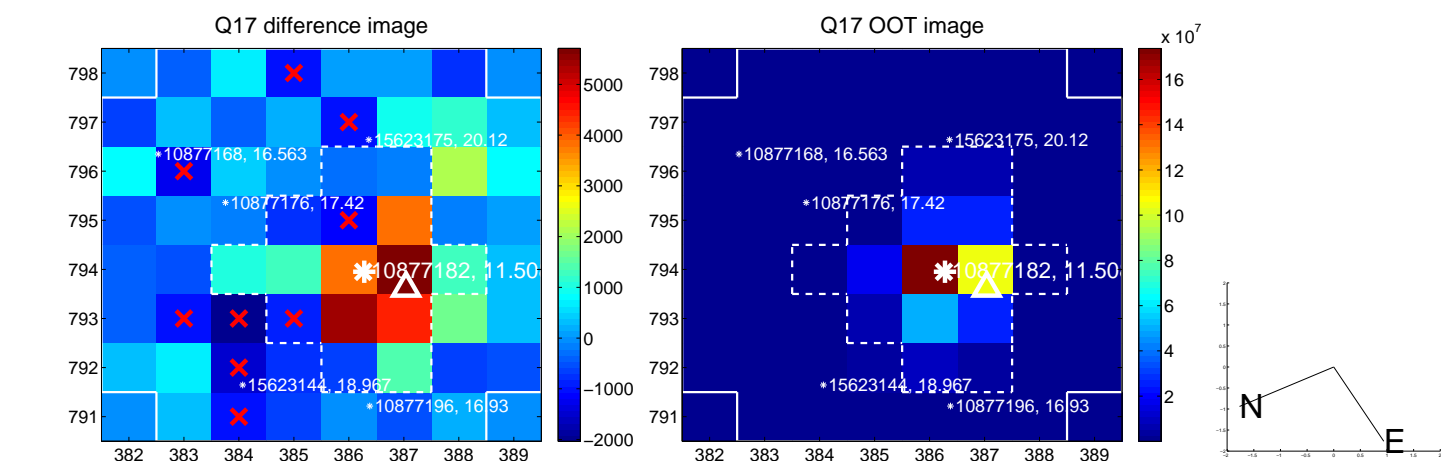
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



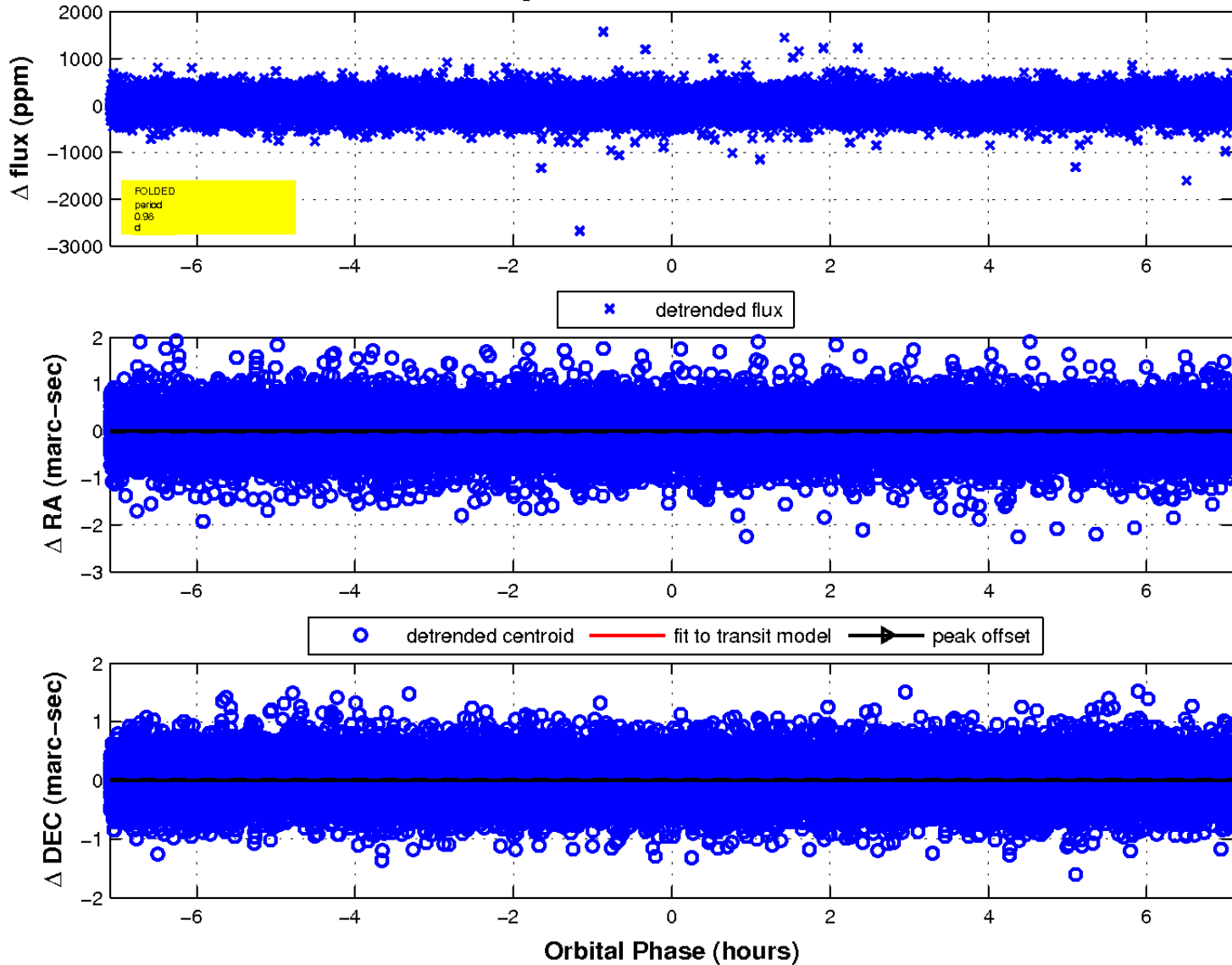
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

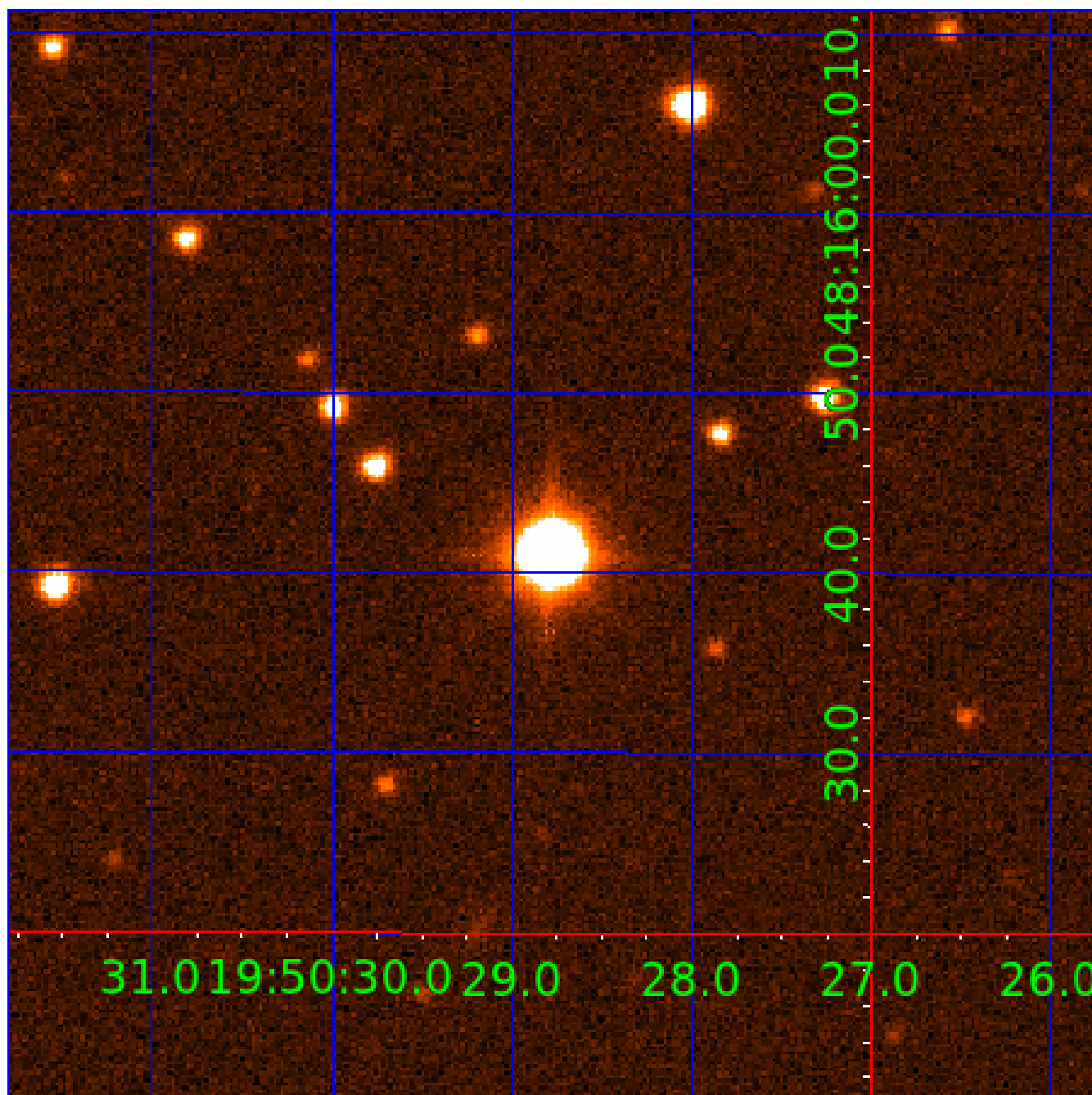


fluxWeightedCentroids, Planet 1 of 2



UKIRT Image

Declination





# KIC 010877182

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
010877182-01	OBS	No	0.979397	131.845091	20.8	2.365	9.1	10.1	2.31	7368	1.23	24741.30
010877182-02	OBS	No	0.955280	131.844096	25.4	4.706	7.8	10.8	2.31	7368	1.35	25577.62

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010877182-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT
010877182-02	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT

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

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

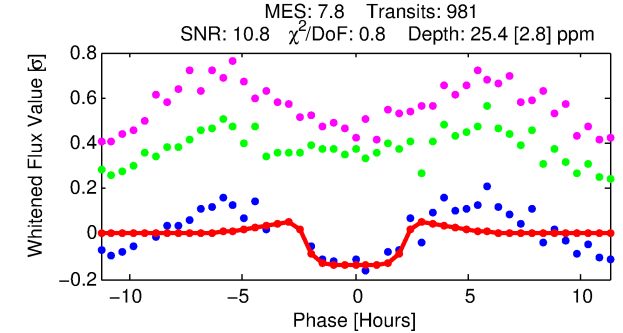
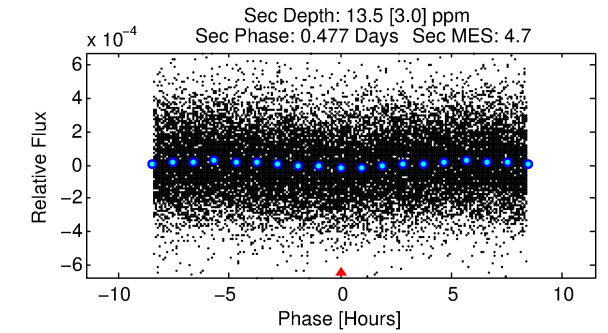
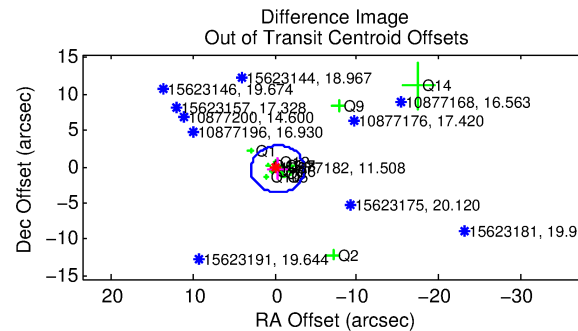
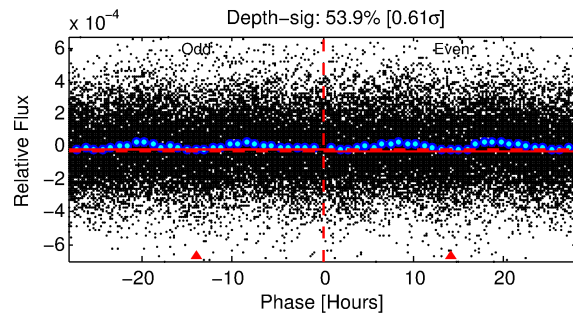
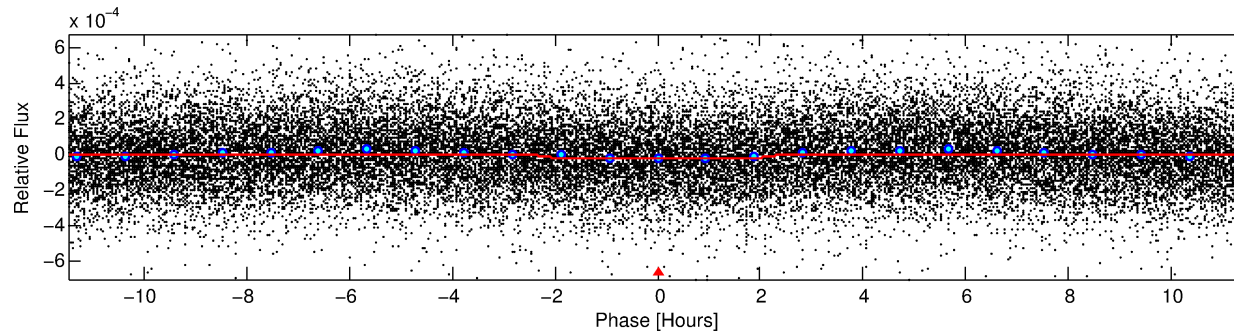
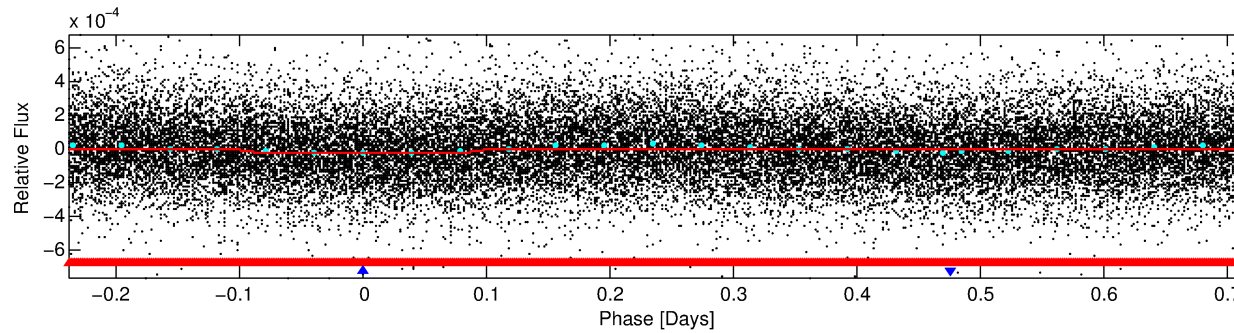
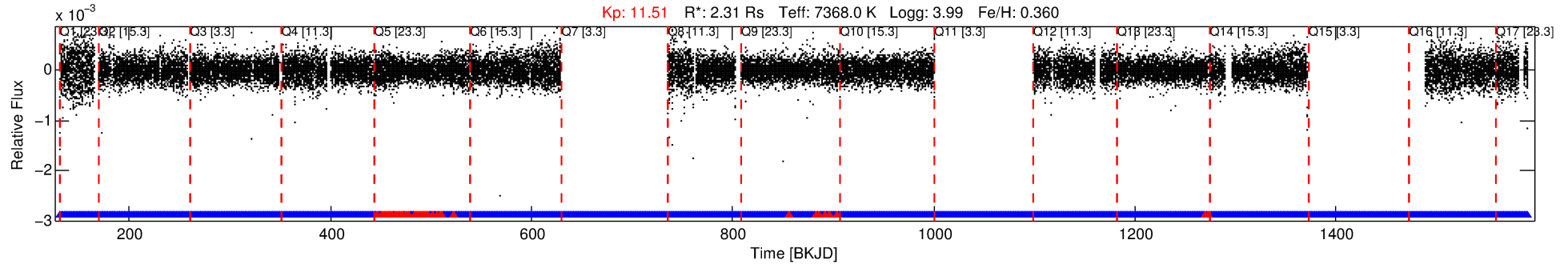
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 010877182-02

No Significant Match Found

# DV One-Page Summary

KIC: 10877182 Candidate: 2 of 2 Period: 0.955 d



## DV Fit Results:

Period = 0.95528 [0.00001] d  
Epoch = 131.8441 [0.0041] BKJD  
Rp/R\* = 0.0053 [0.0025]  
a/R\* = 1.17 [0.95]  
b = 0.90 [0.66]  
Seff = 25577.62 [9543.43]  
Teq = 3225 [301] K  
Rp = 1.35 [0.70] Re  
a = 0.0235 [0.0050] AU  
Ag = 2.26 [2.27] [0.56 $\sigma$ ]  
Teffp = 6115 [1483] K [1.91 $\sigma$ ]

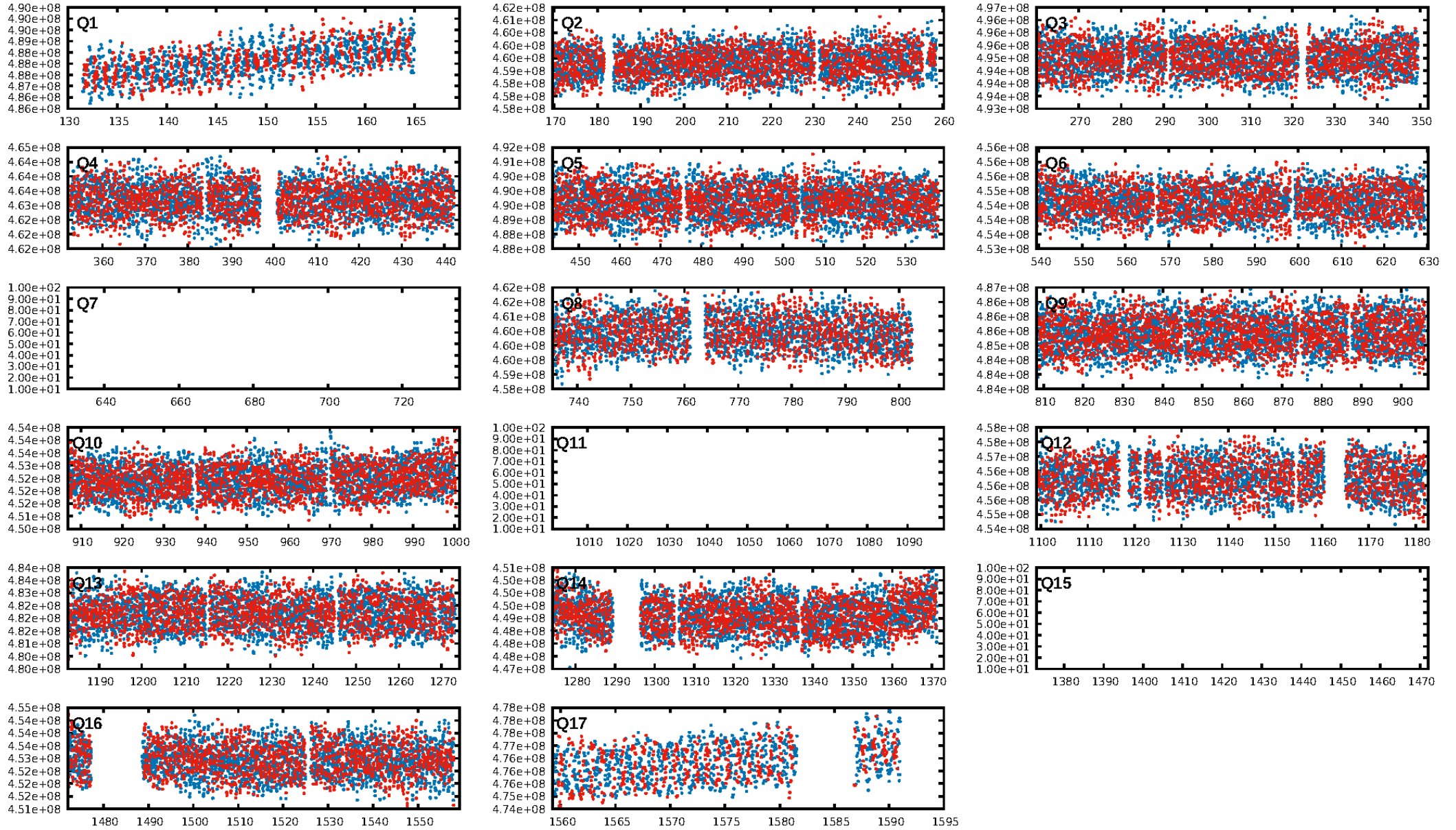
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 8.8% [0.11 $\sigma$ ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
**Bootstrap-pfa: 2.71e-10**  
RollingBand-fgt: 0.94 [875/926]  
GhostDiagnostic-chr: 2.562  
Centroid-sig: 55.3%  
Centroid-so: 0.234 arcsec [0.58 $\sigma$ ]  
OotOffset-rm: 0.465 arcsec [0.43 $\sigma$ ]  
KicOffset-rm: 0.478 arcsec [0.45 $\sigma$ ]  
OotOffset-st: 4/1/3/5 [13]  
KicOffset-st: 4/1/3/5 [13]  
DiffImageQuality-fgm: 0.69 [9/13]  
DiffImageOverlap-fno: 0.93 [13/14]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 09:57:01 Z

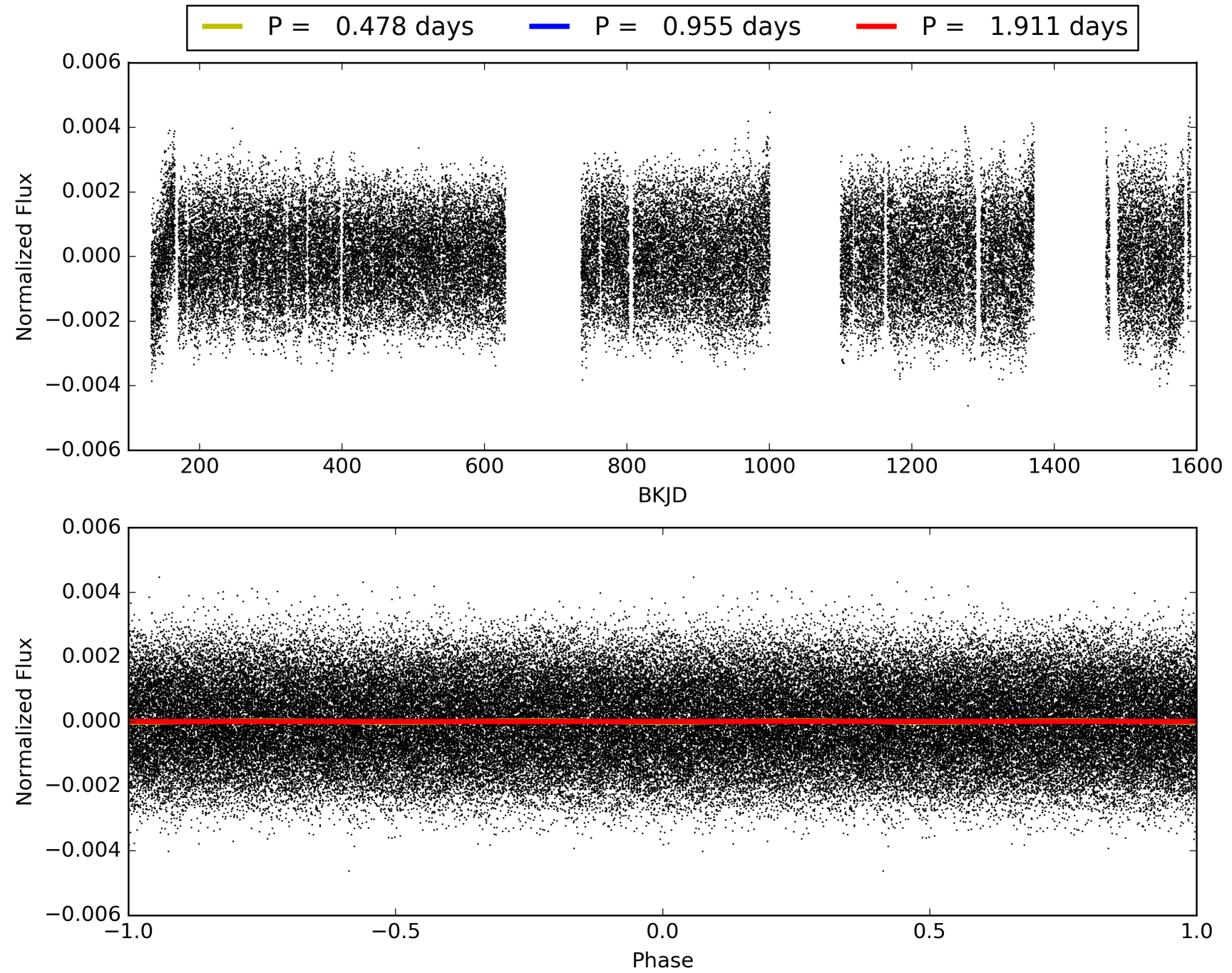
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 010877182-02, PDC Light Curves





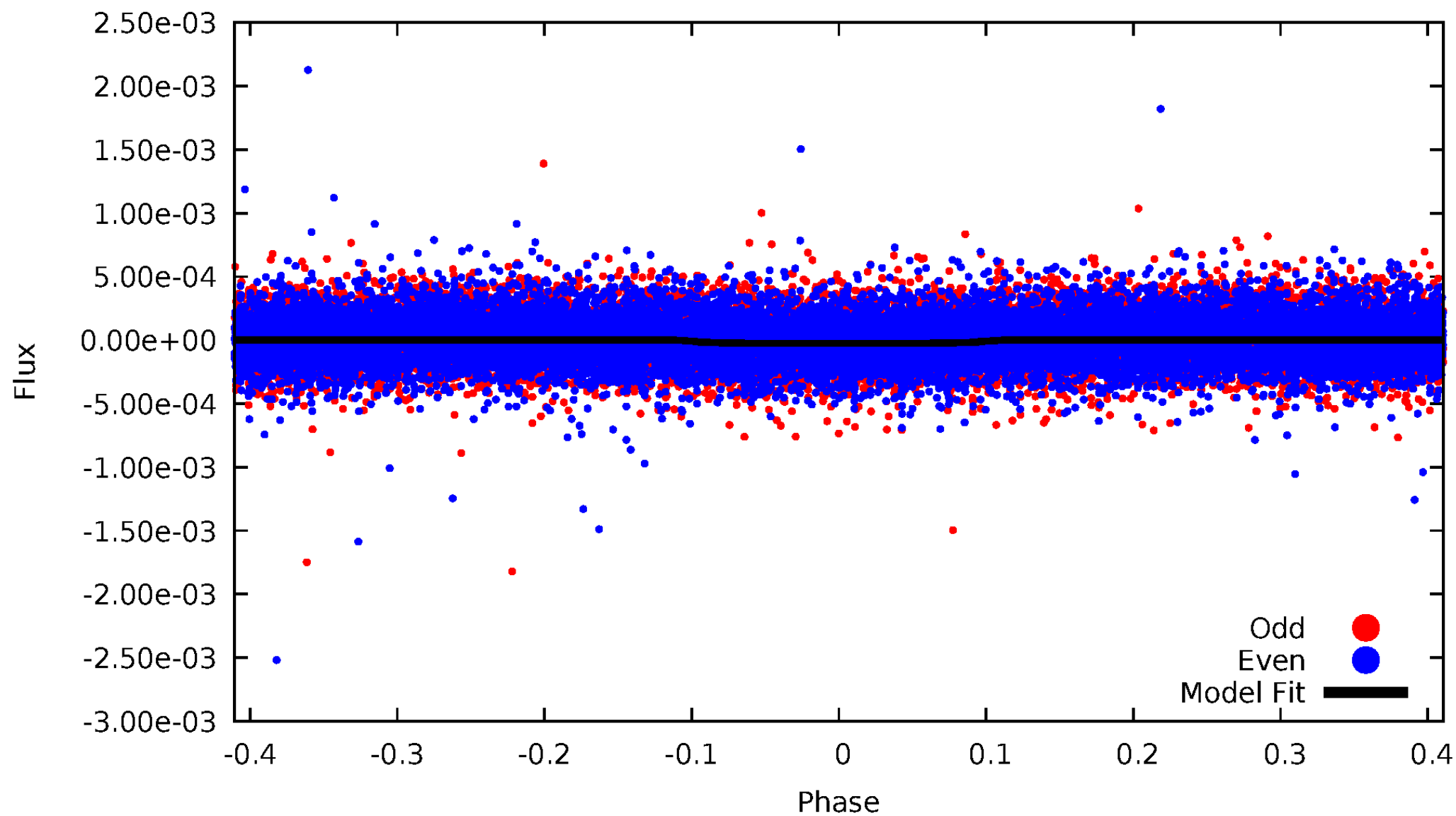
TCE 010877182-02





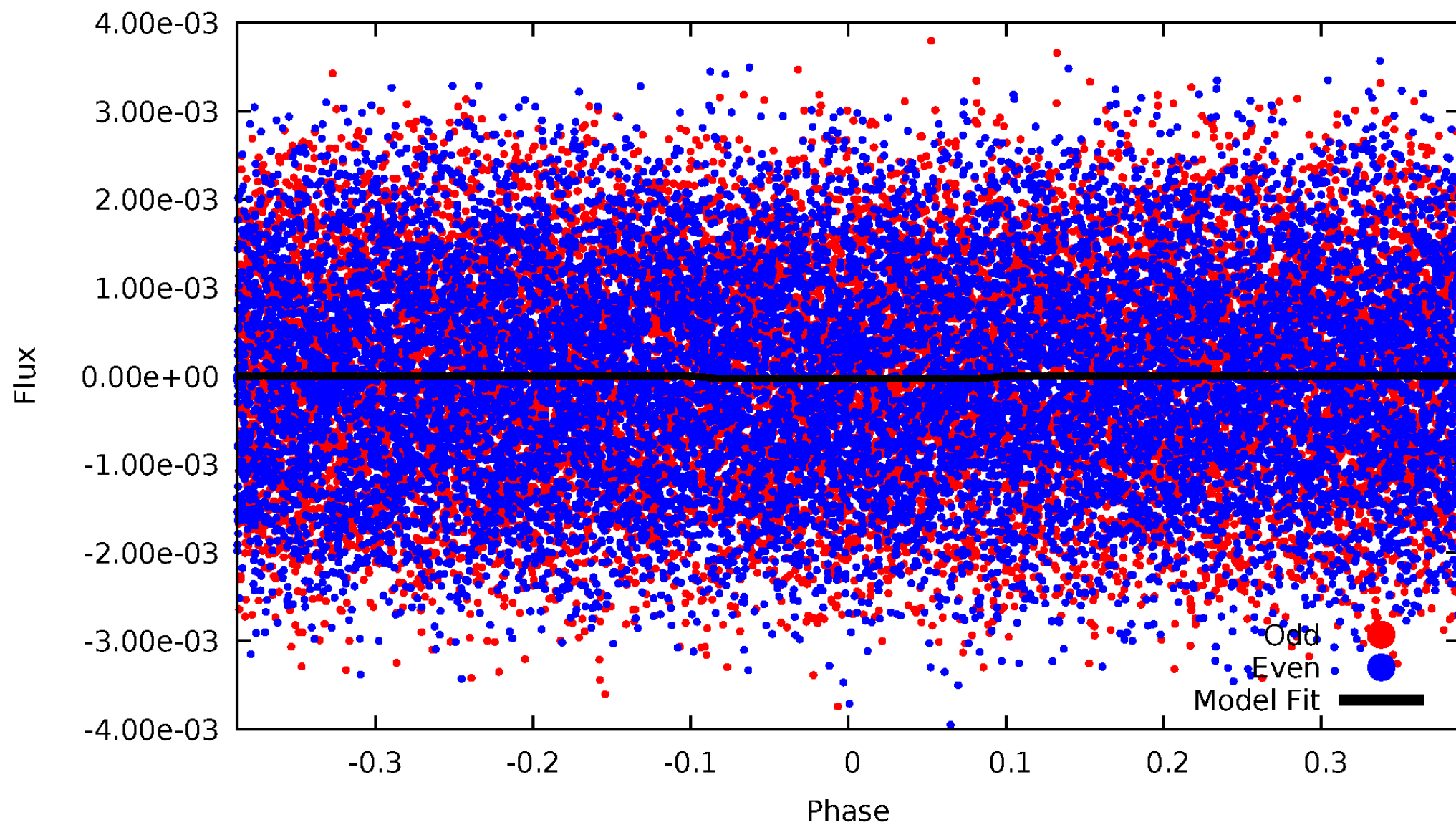
# DV Odd/Even

TCE 010877182-02



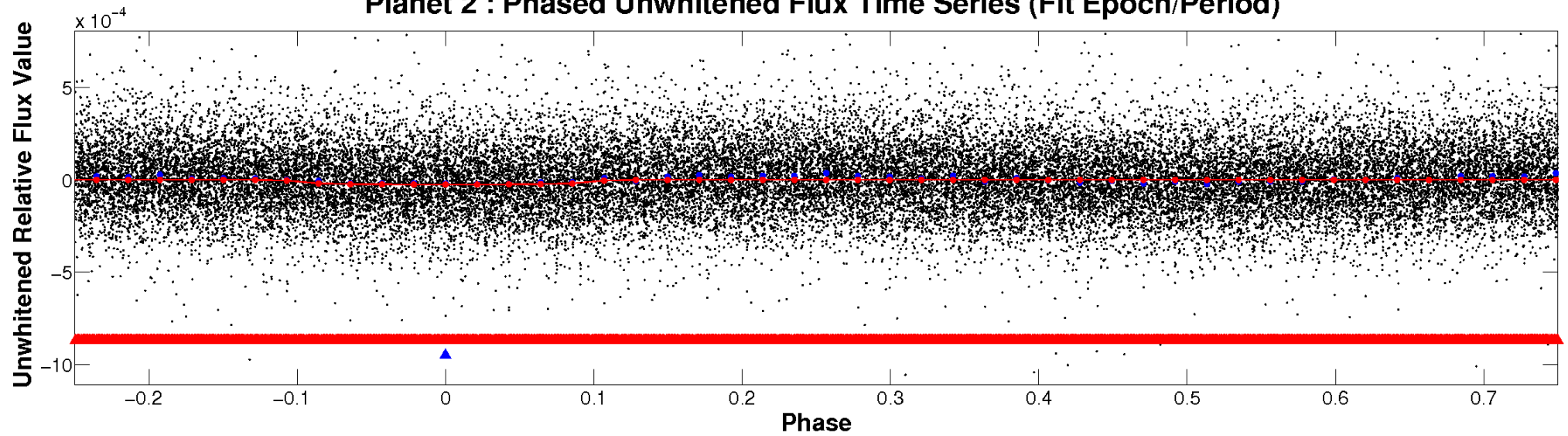
# ALT Odd/Even

TCE 010877182-02

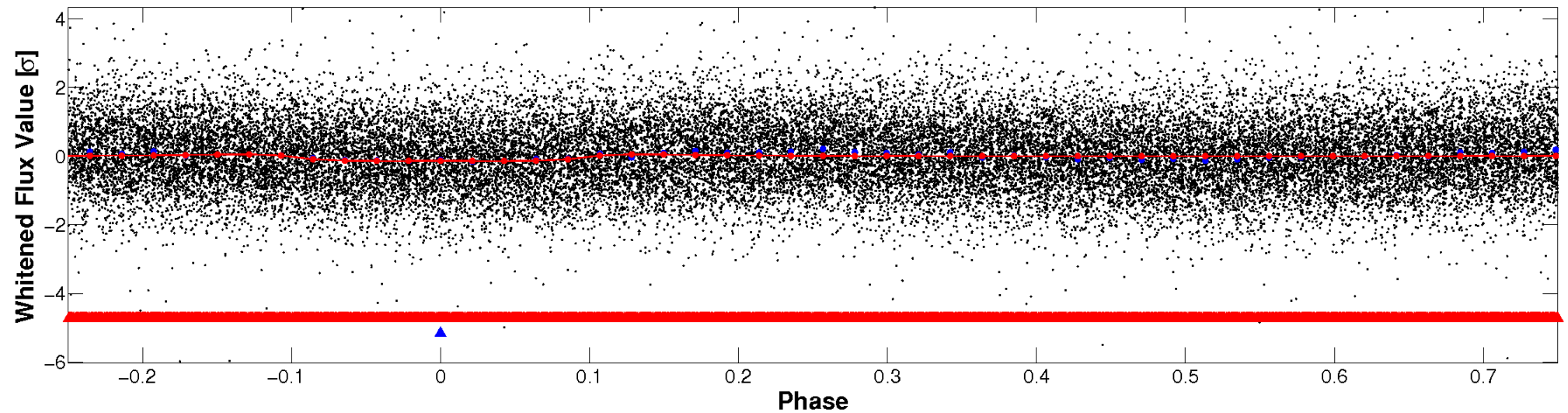


# Non-Whitened Vs. Whitened Light Curve

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

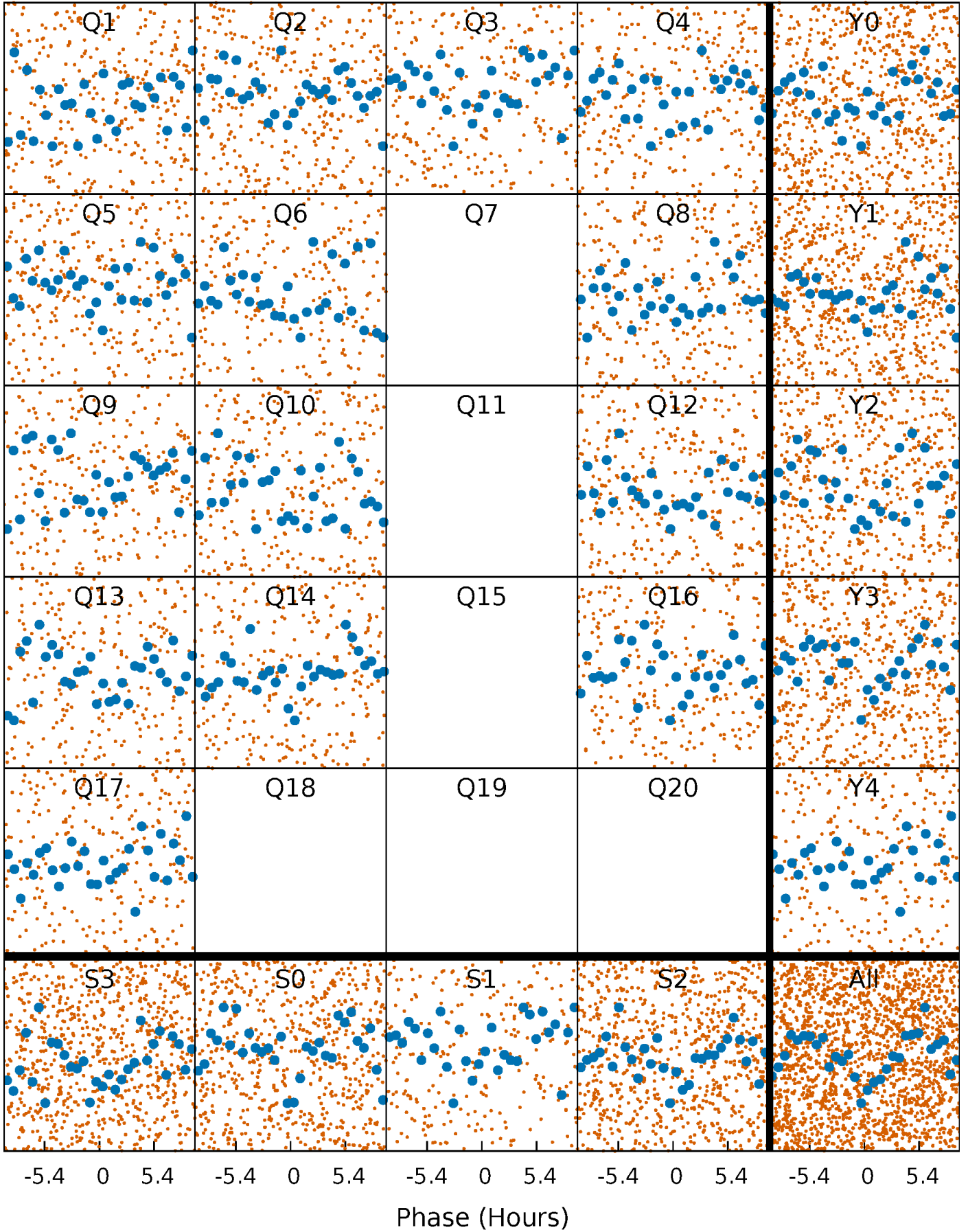


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

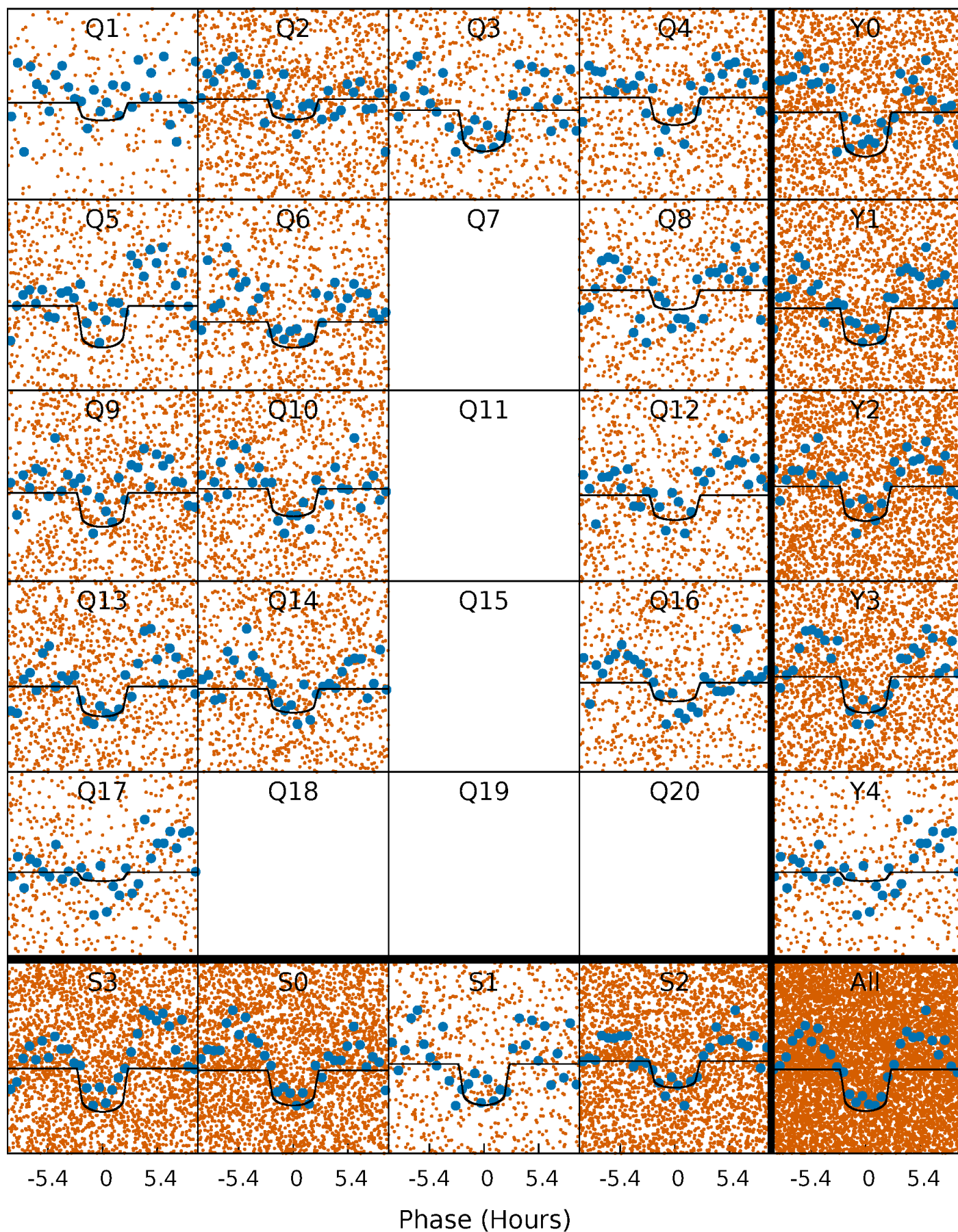
TCE 010877182-02   P= 0.955280 Days    $T_0=131.844096$  (BKJD)





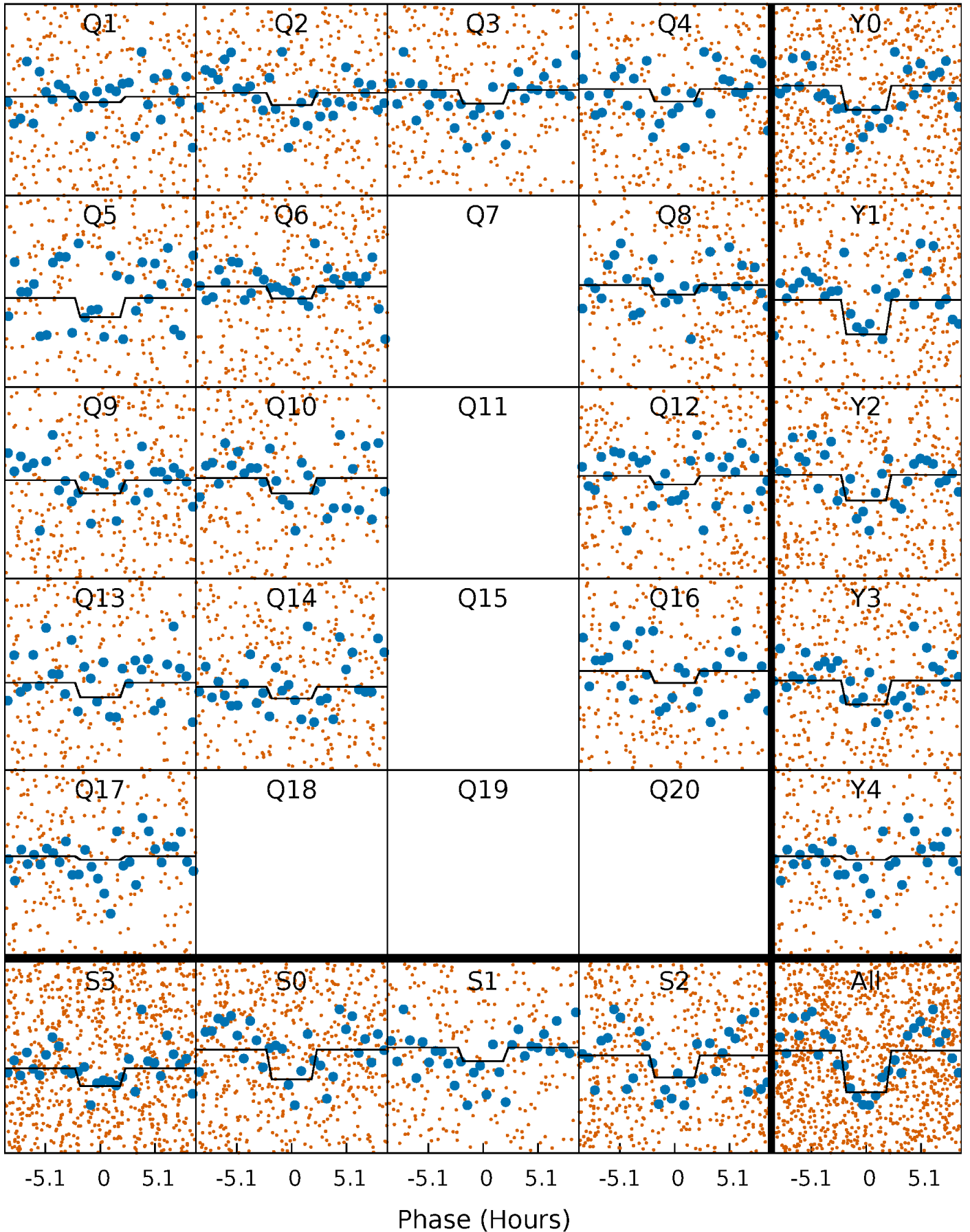
# DV Quarter-Phased Transit Curves

TCE 010877182-02 P= 0.955280 Days  $T_0=131.844096$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 010877182-02 P= 0.955288 Days  $T_0=131.841372$  (BKJD)

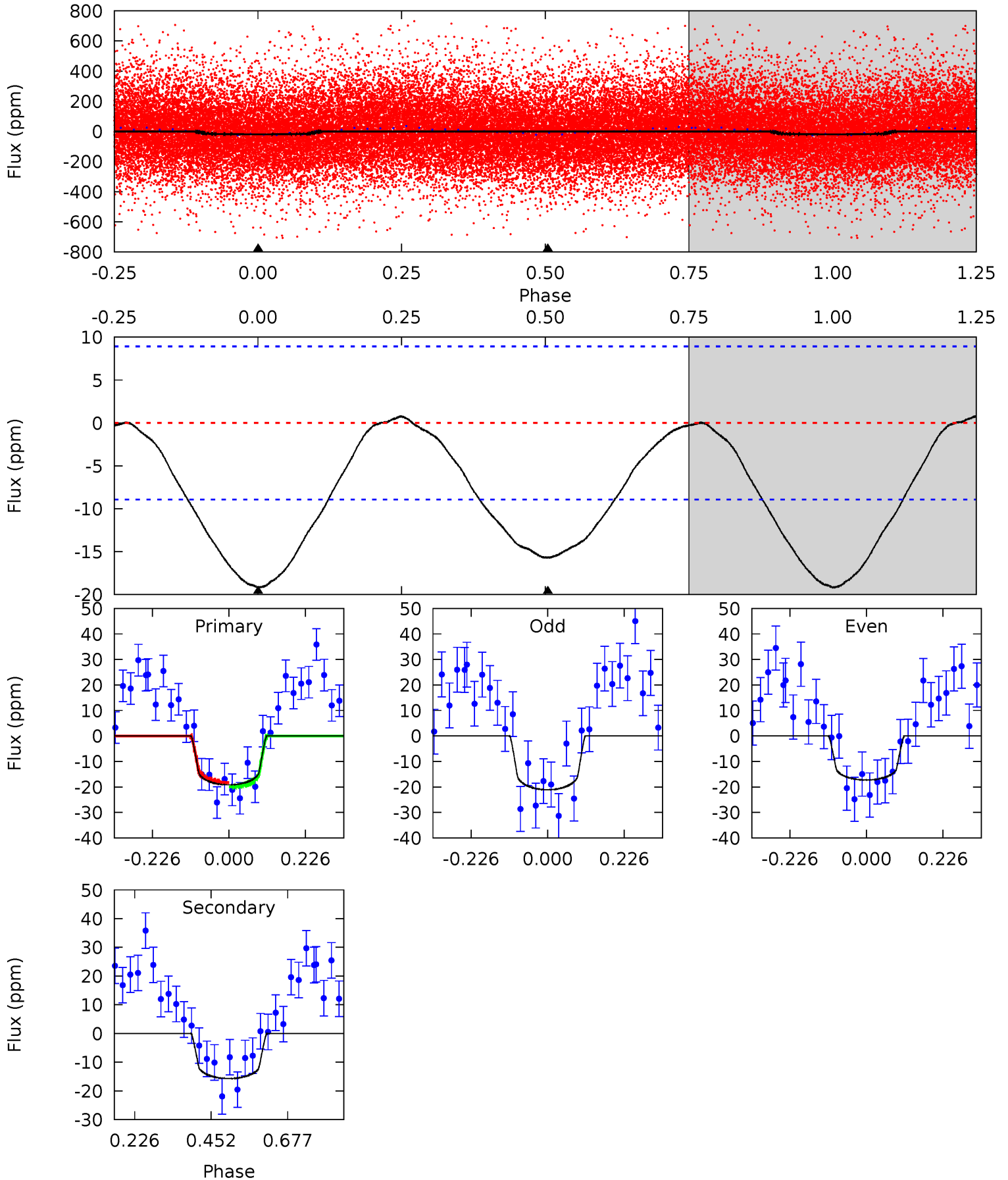




# DV Model-Shift Uniqueness Test

010877182-02, P = 0.955280 Days, E = 130.888816 Days

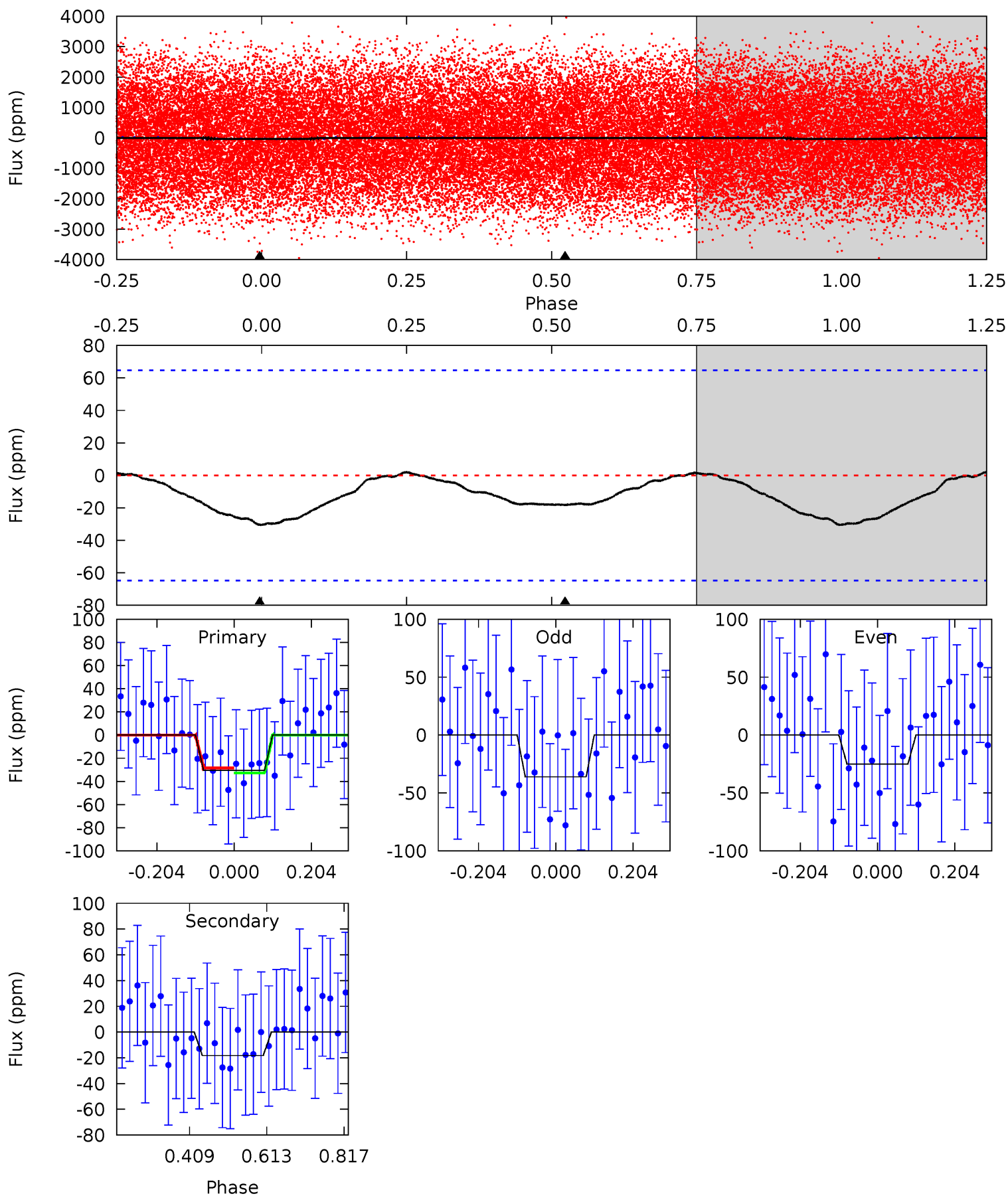
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
9.43	7.72	0	0	4.39	1.21	0.20	9.43	9.43	7.72	7.72	0.94	0.93	0.04	0.42



# Alt Model-Shift Uniqueness Test

010877182-02, P = 0.955288 Days, E = 130.886084 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
2.08	1.24	0	0	4.41	1.27	0.10	2.08	2.08	1.24	1.24	0.37	1.09	0.06	0.15



### Stellar Parameters For KIC 010877182

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$7368^{+203}_{-349}$	$3.987^{+0.181}_{-0.165}$	$0.360^{+0.050}_{-0.400}$	$2.310^{+0.560}_{-0.560}$	$1.890^{+0.140}_{-0.326}$	$0.216^{+0.193}_{-0.095}$
	+3%/-5%	+5%/-4%	+14%/-111%	+24%/-24%	+7%/-17%	+89%/-44%
Source	PHO54	PHO54	PHO54	DSEP		

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

### Secondary Eclipse Parameters for KIC 010877182-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-16 \pm 2$	$1.30^{+0.70}_{-0.58}$	$4472^{+331}_{-335}$	$6039^{+2588}_{-1142}$	$2.712^{+6.224}_{-1.541}$
Alt.	$-18 \pm 15$	$1.34^{+0.70}_{-0.60}$	$4483^{+316}_{-340}$	$5923^{+3456}_{-2836}$	$2.396^{+8.356}_{-2.040}$

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

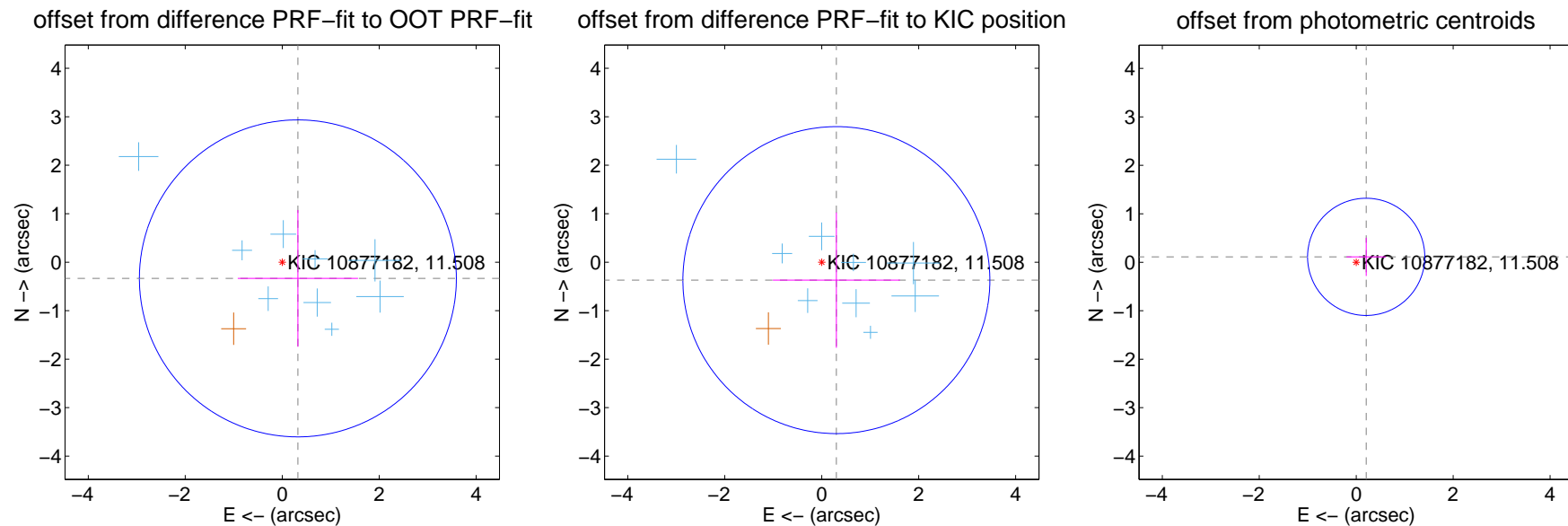
## DV Centroid Data

Supplemental centroid analysis for 010877182-02. **Kepler magnitude: 11.51.** Transit SNR 10.80

There are 9 quarters with good PRF difference image offsets

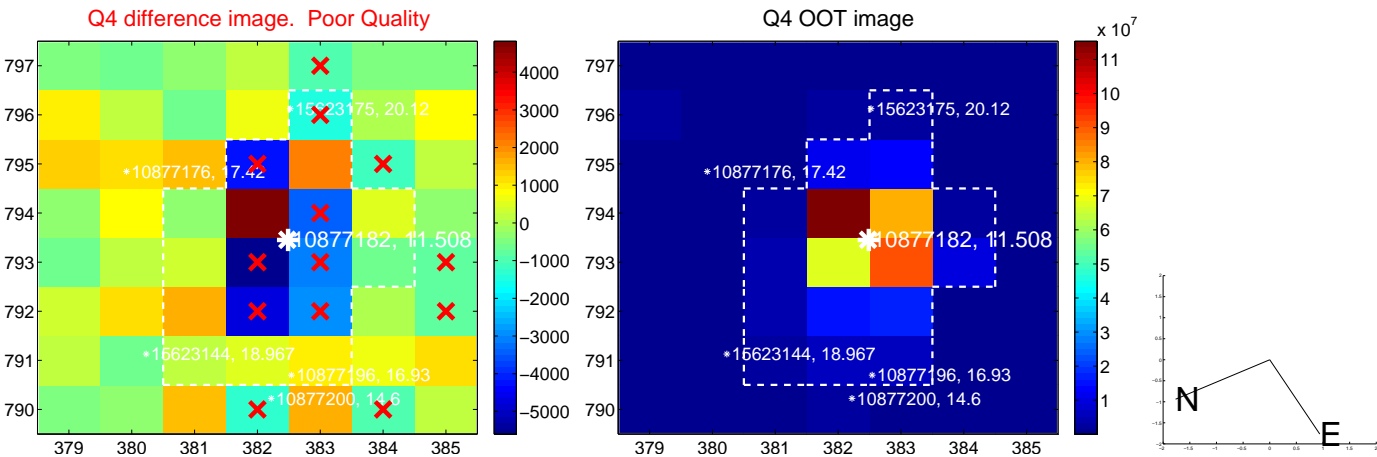
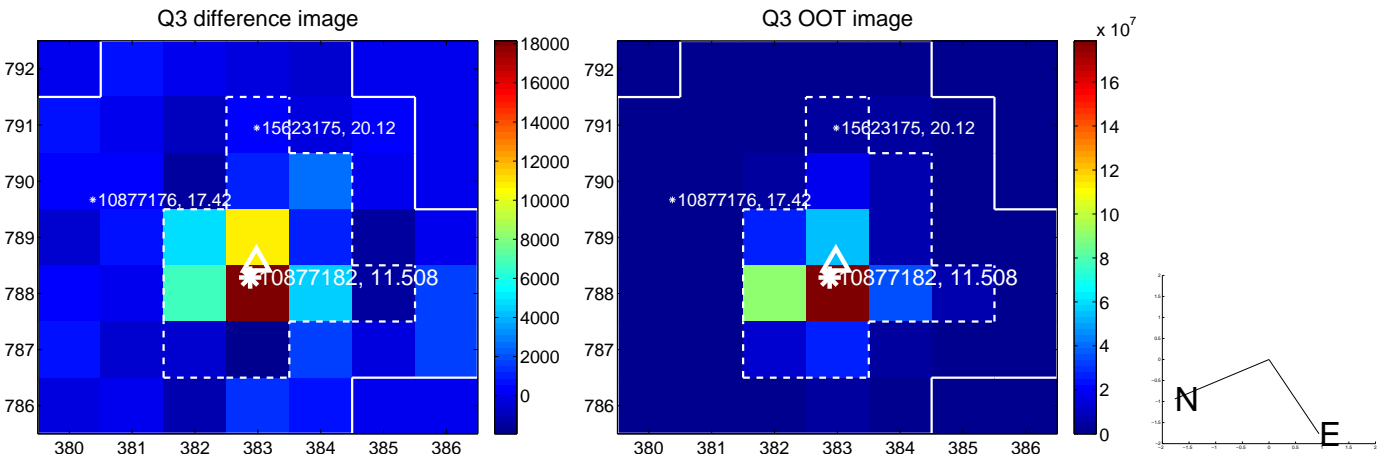
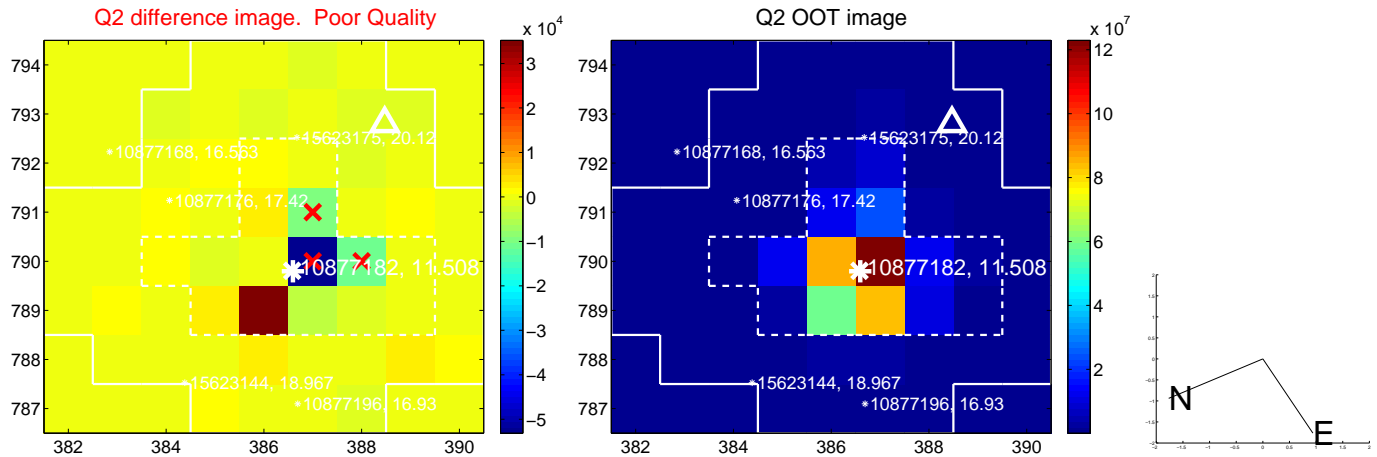
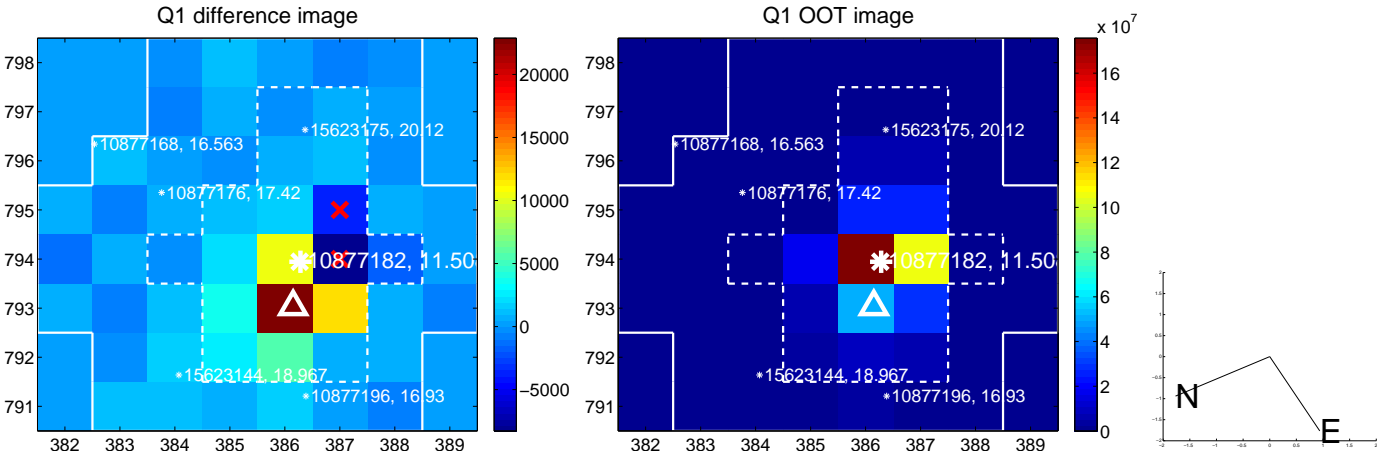
The direct PRF centroid is offset from the target star catalog position by about 0.08 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.465 \pm 1.090$	0.43	$-0.323 \pm 1.240$	$-0.334 \pm 1.410$
PRF-fit source offset from KIC position	$0.478 \pm 1.055$	0.45	$-0.303 \pm 1.311$	$-0.370 \pm 1.396$
photometric centroid source offset	$0.23 \pm 0.40$	0.58	$-0.21 \pm 0.41$	$0.11 \pm 0.39$

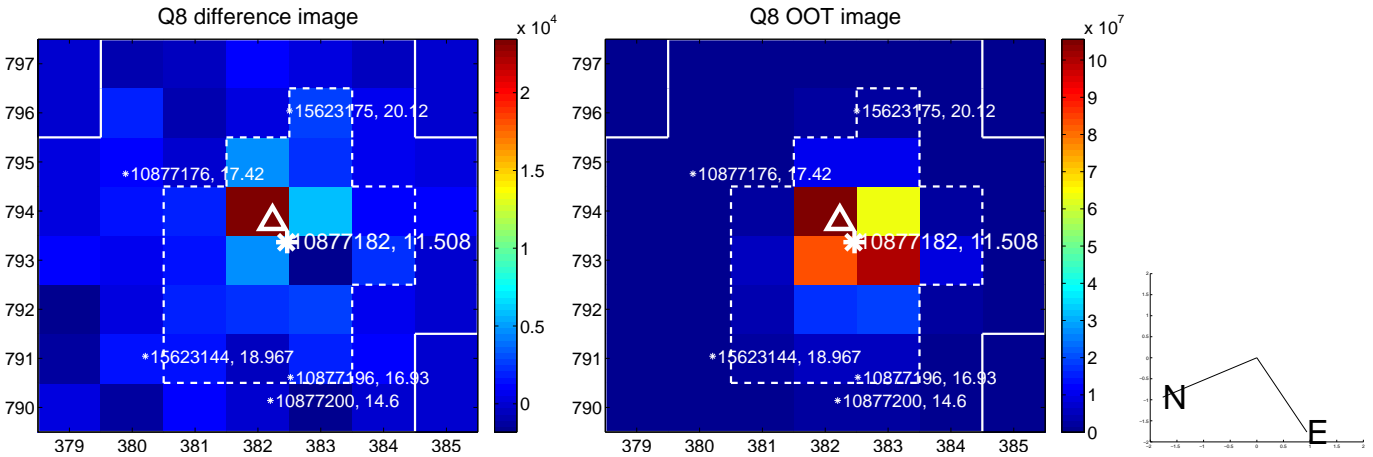
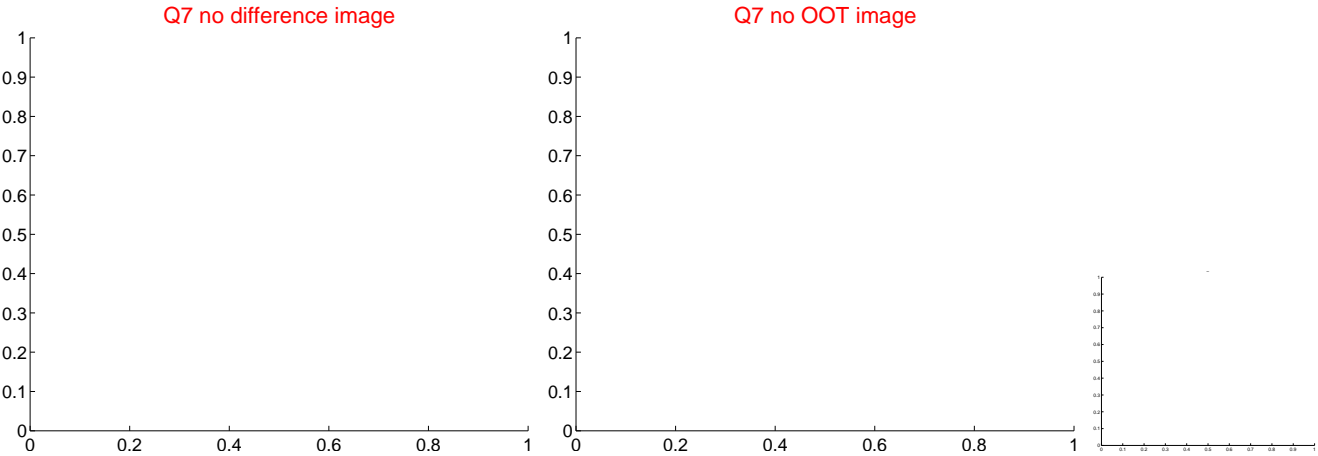
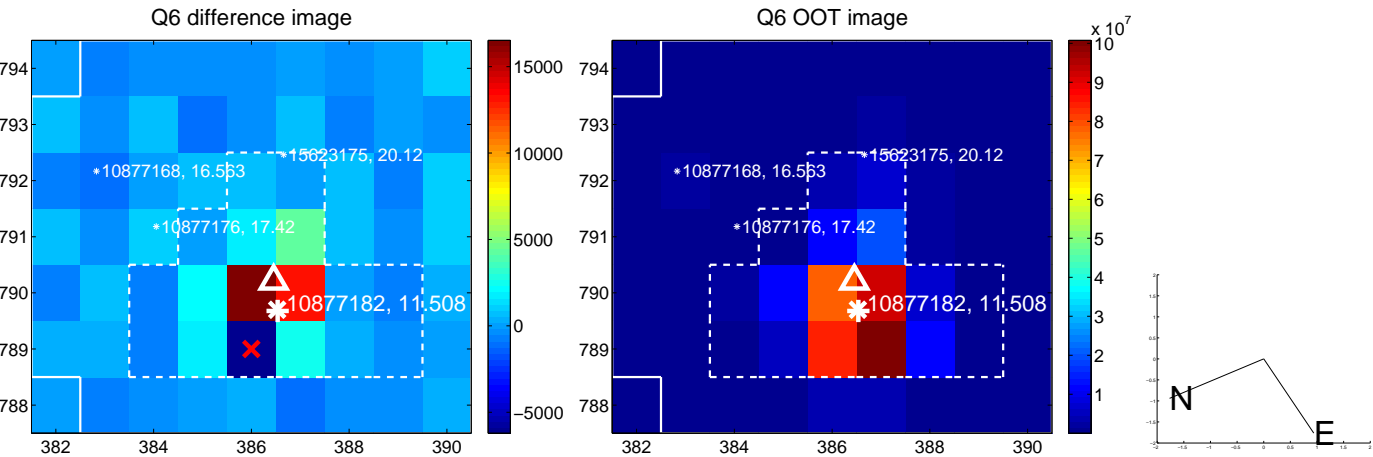
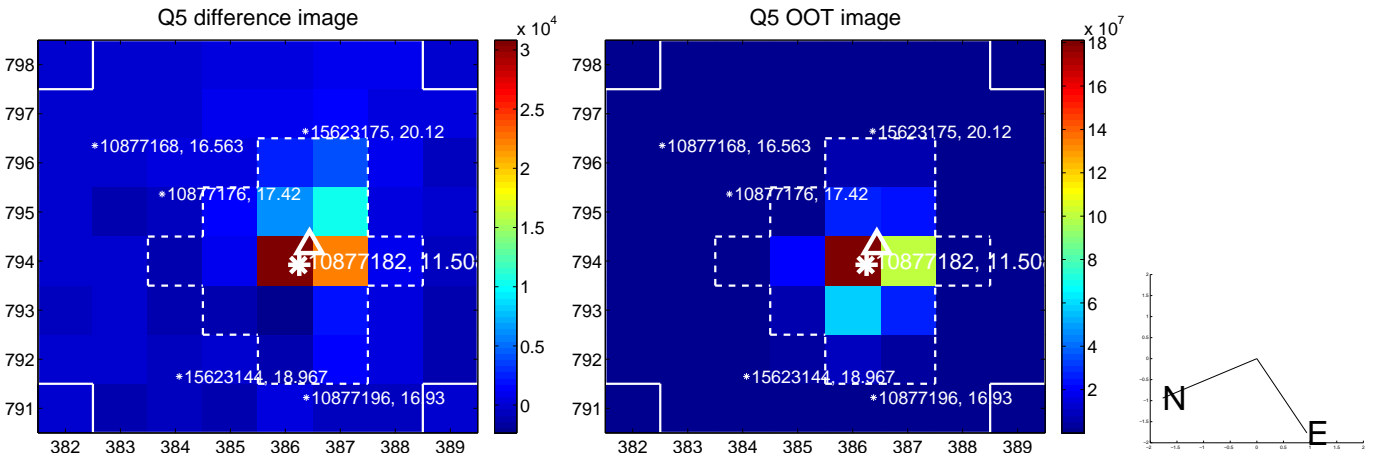


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

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

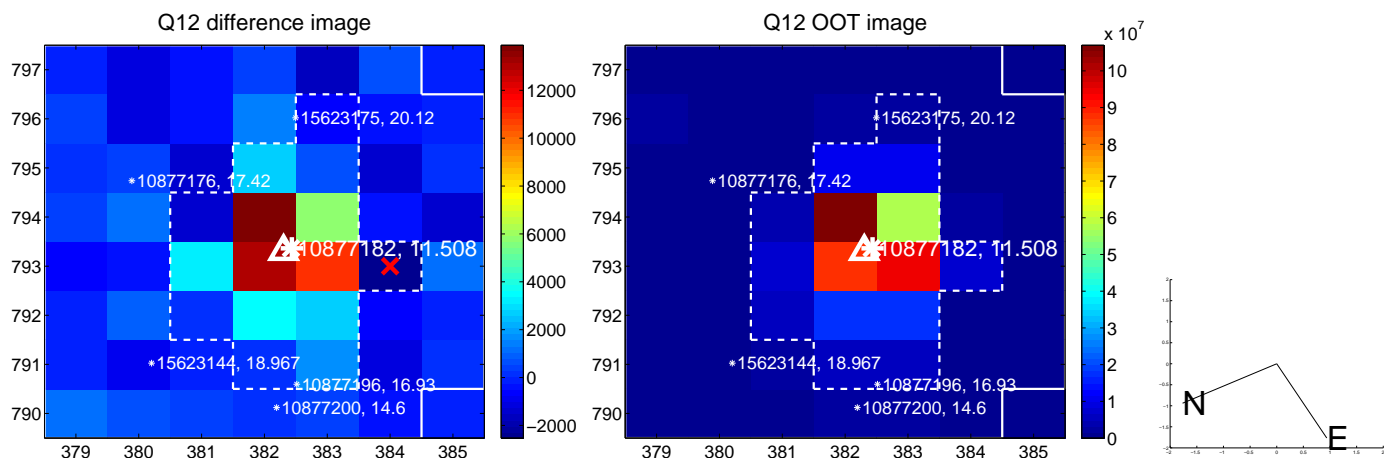
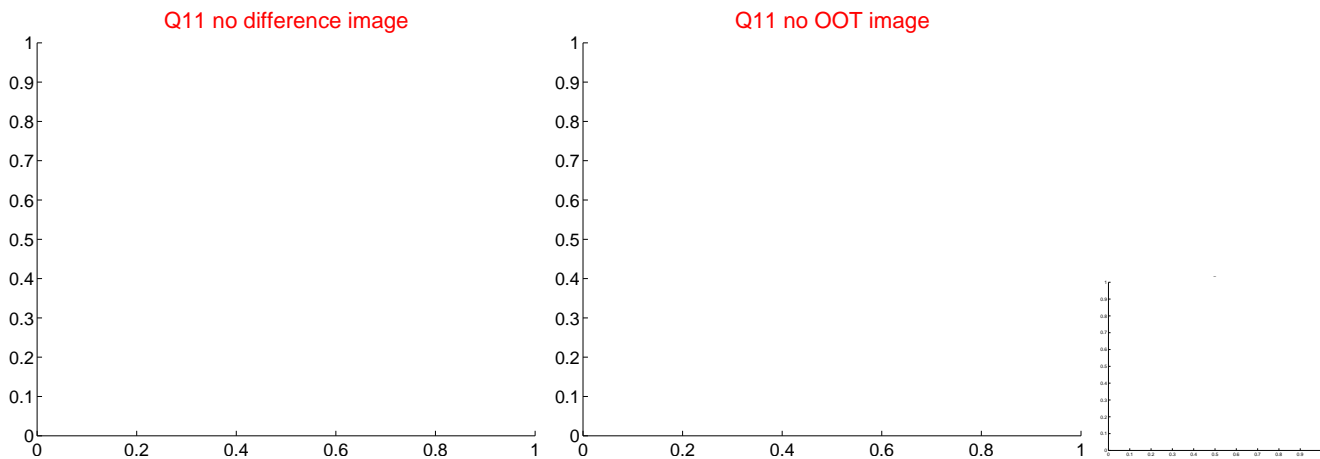
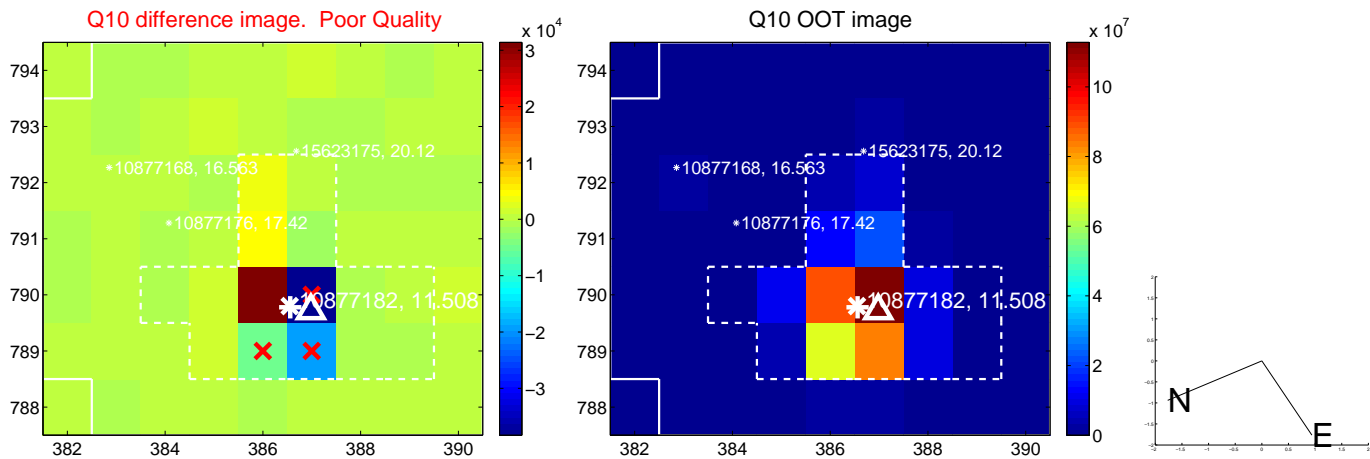
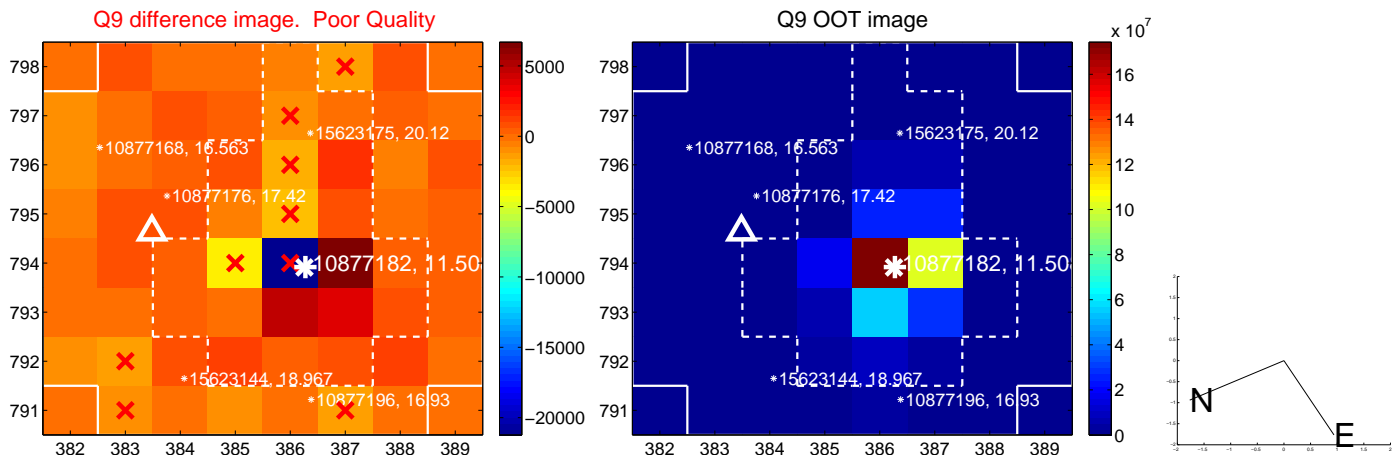


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

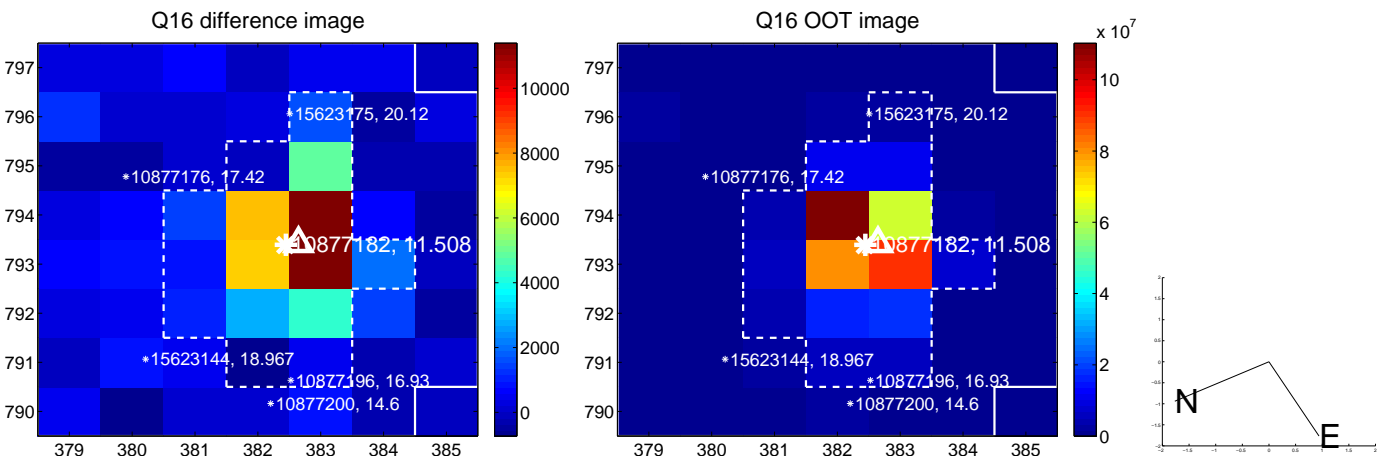
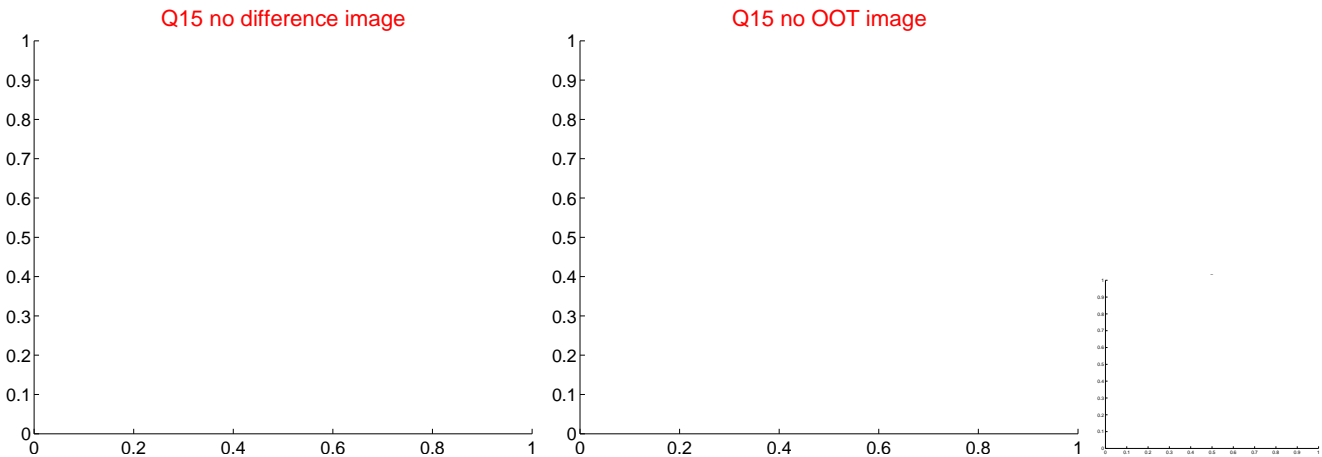
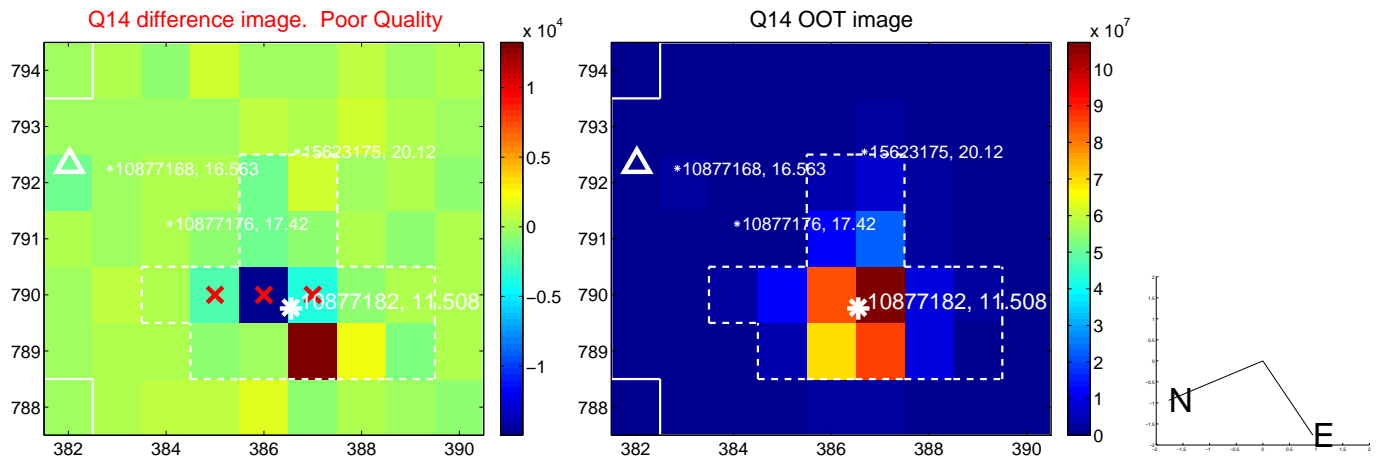
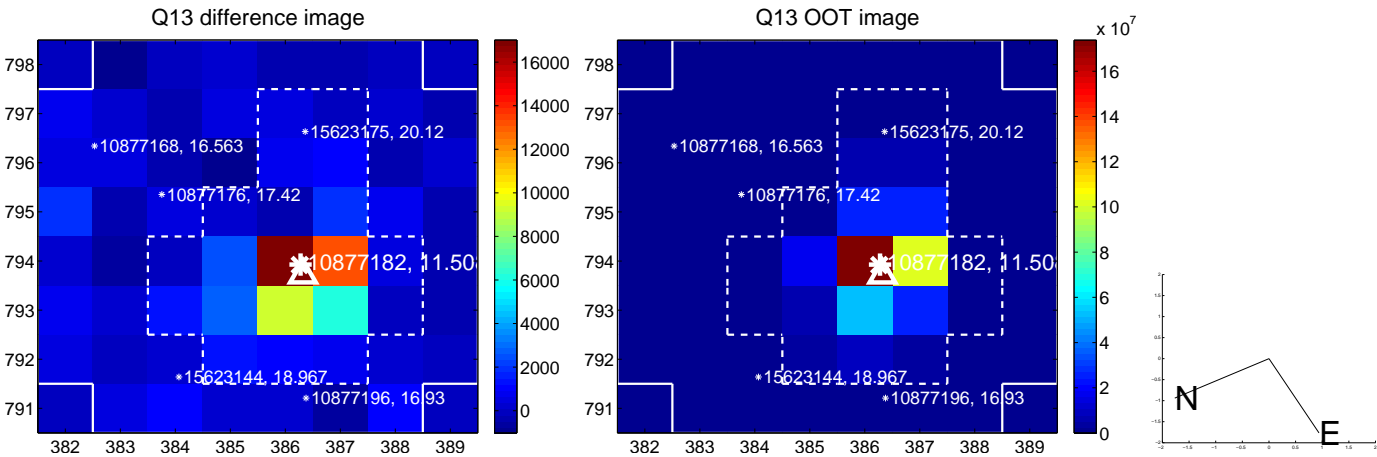




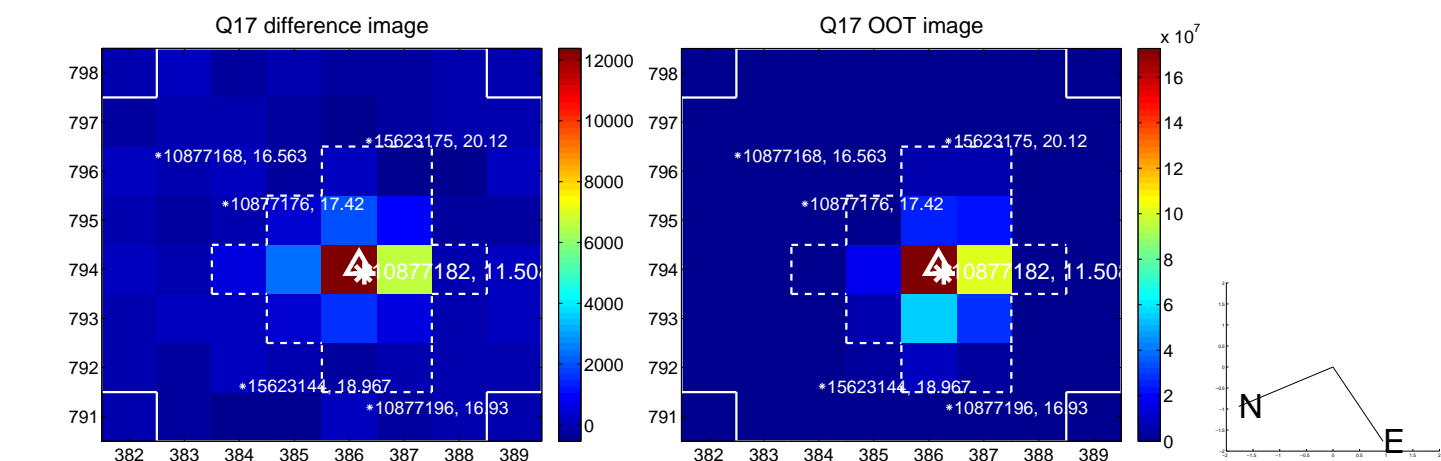
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



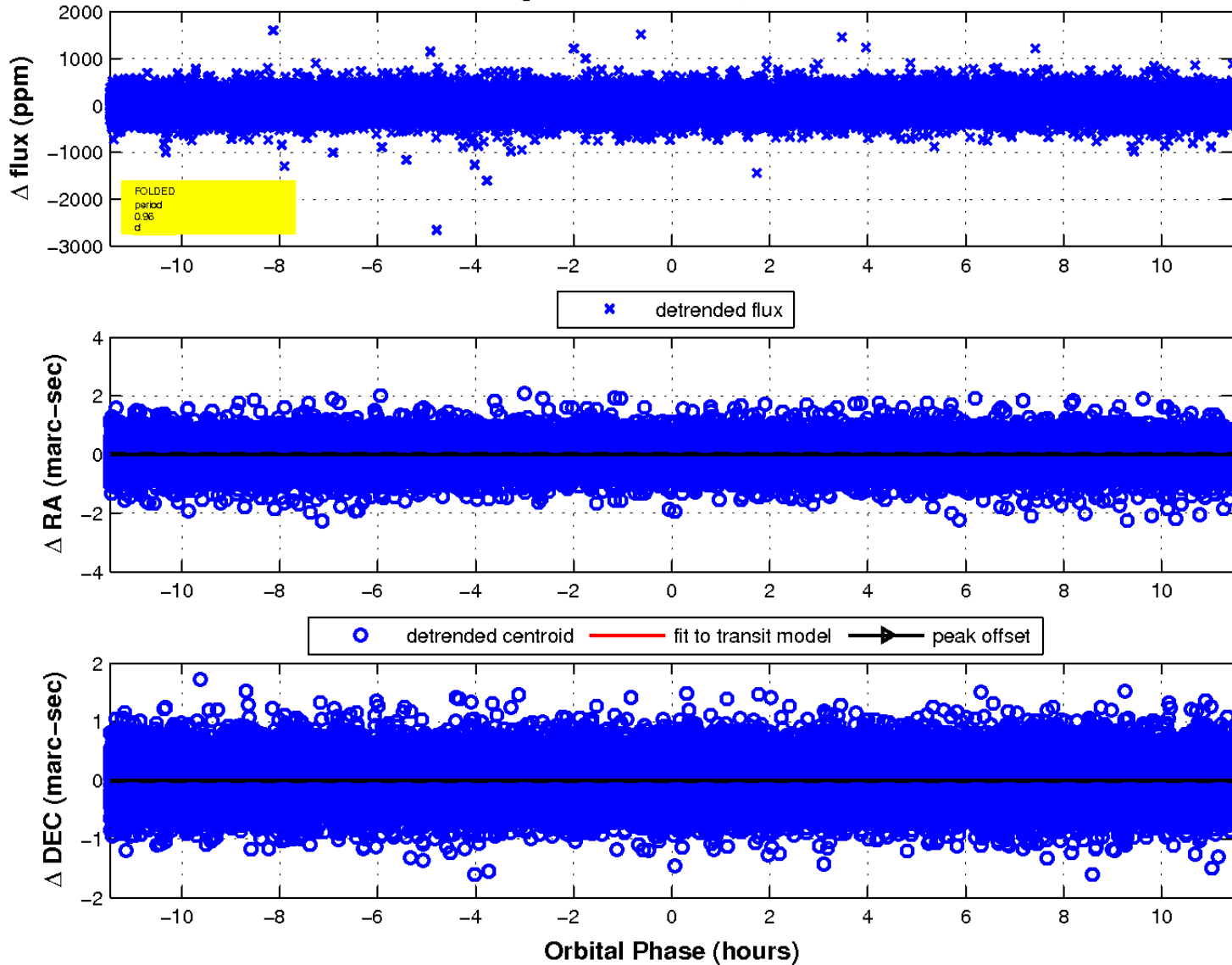
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



fluxWeightedCentroids, Planet 2 of 2



UKIRT Image

Declination

