

# KIC 004949801

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
004949801-01	OBS	No	1.564024	133.066929	77.6	7.385	9.6	10.7	0.93	5480	0.82	992.18
004949801-02	OBS	No	192.627654	248.772367	630.6	28.769	8.0	6.8	0.93	5480	2.52	1.62

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004949801-01	OBS	FP	0.00	1	0	1	1	LPP_DV—CENT_FEW_DIFFS—HALO_GHOST—EPHEM_MATCH
004949801-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL_SKYE—TRANS_GAPPED—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT— INCONSISTENT_TRANS—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.

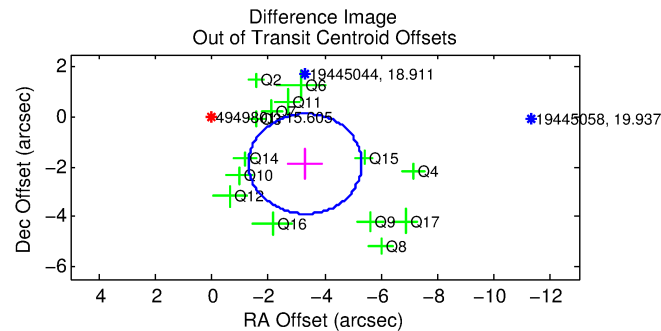
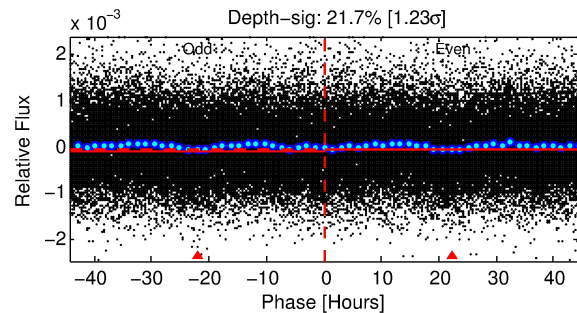
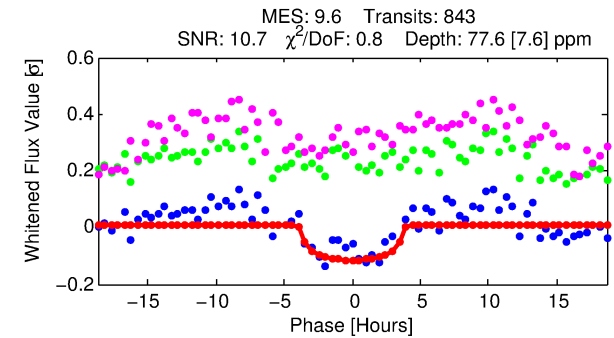
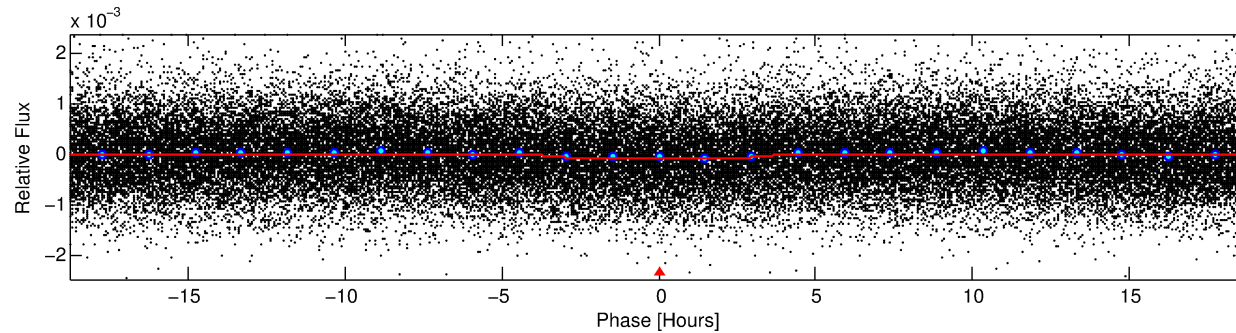
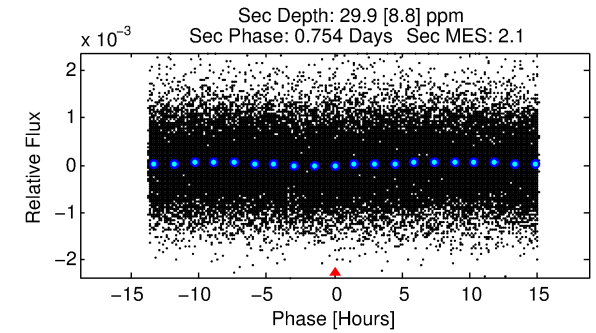
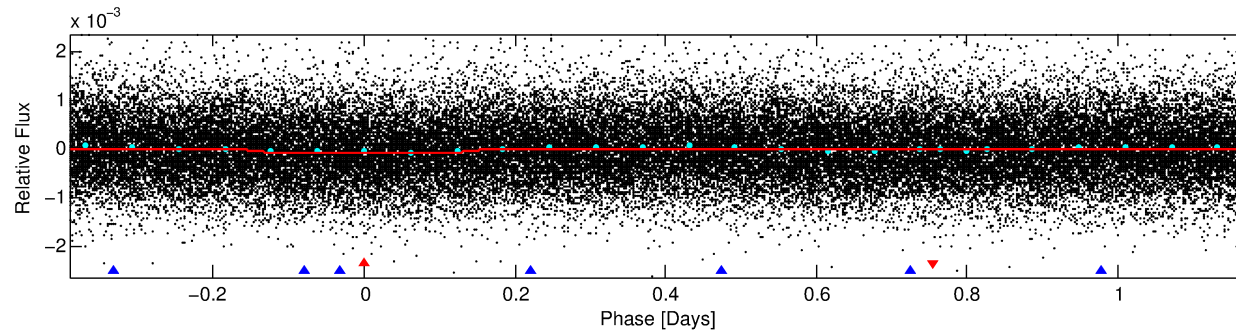
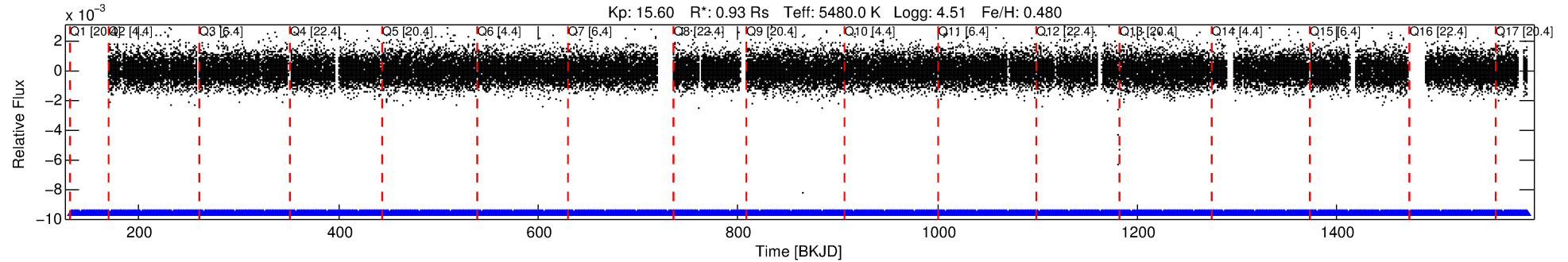
## Ephemeris Match Information For 004949801-01

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	$\sigma_P$	$\sigma_T$
004949801-01	4949801	004949770-pri	4949770	1:1	40.8	6	8	12.57	15.61	1735.90	Direct-PRF	0	3.34	2.34

**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: 4949801 Candidate: 1 of 2 Period: 1.564 d



## DV Fit Results:

Period = 1.56402 [0.00002] d  
Epoch = 133.0669 [0.0078] BKJD  
Rp/R\* = 0.0081 [0.0088]  
a/R\* = 1.63 [4.10]  
b = 0.43 [7.85]  
Seff = 992.18 [342.48]  
Teq = 1431 [123] K  
Rp = 0.82 [0.92] Re  
a = 0.0267 [0.0057] AU  
Ag = 17.21 [38.05] [0.43σ]  
Teffp = 4507 [2471] K [1.24σ]

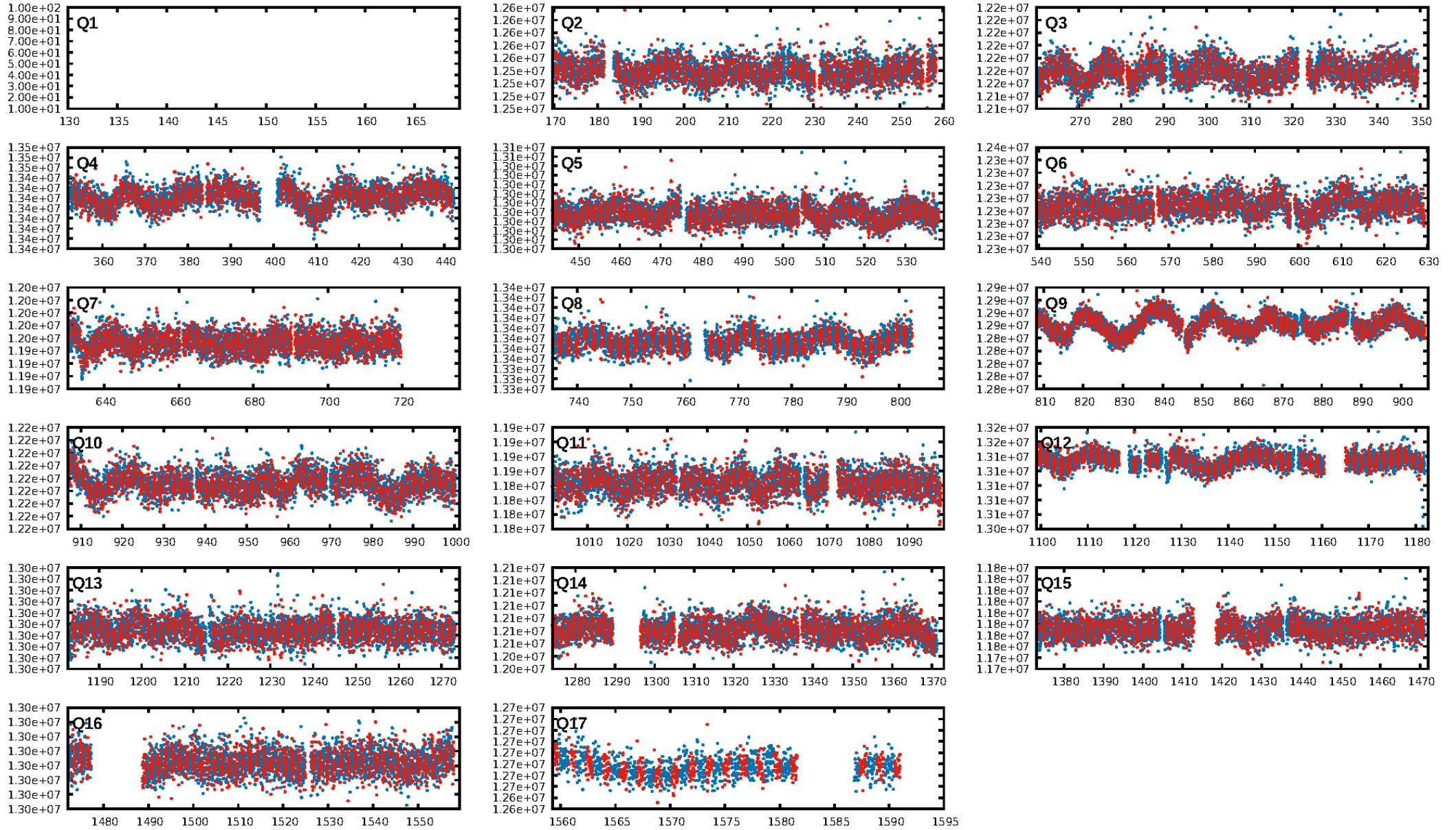
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [154.38σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 1.85e-20  
RollingBand-fgt: 1.00 [825/825]  
GhostDiagnostic-chr: 0.1915  
Centroid-sig: 0.0%  
Centroid-so: 2.668 arcsec [2.09σ]  
OotOffset-rm: 3.813 arcsec [5.71σ]  
KicOffset-rm: 3.891 arcsec [5.42σ]  
OotOffset-st: 4/4/4/2 [14]  
KicOffset-st: 4/4/4/2 [14]  
DiffImageQuality-fgm: 0.07 [1/14]  
DiffImageOverlap-fno: 1.00 [16/16]

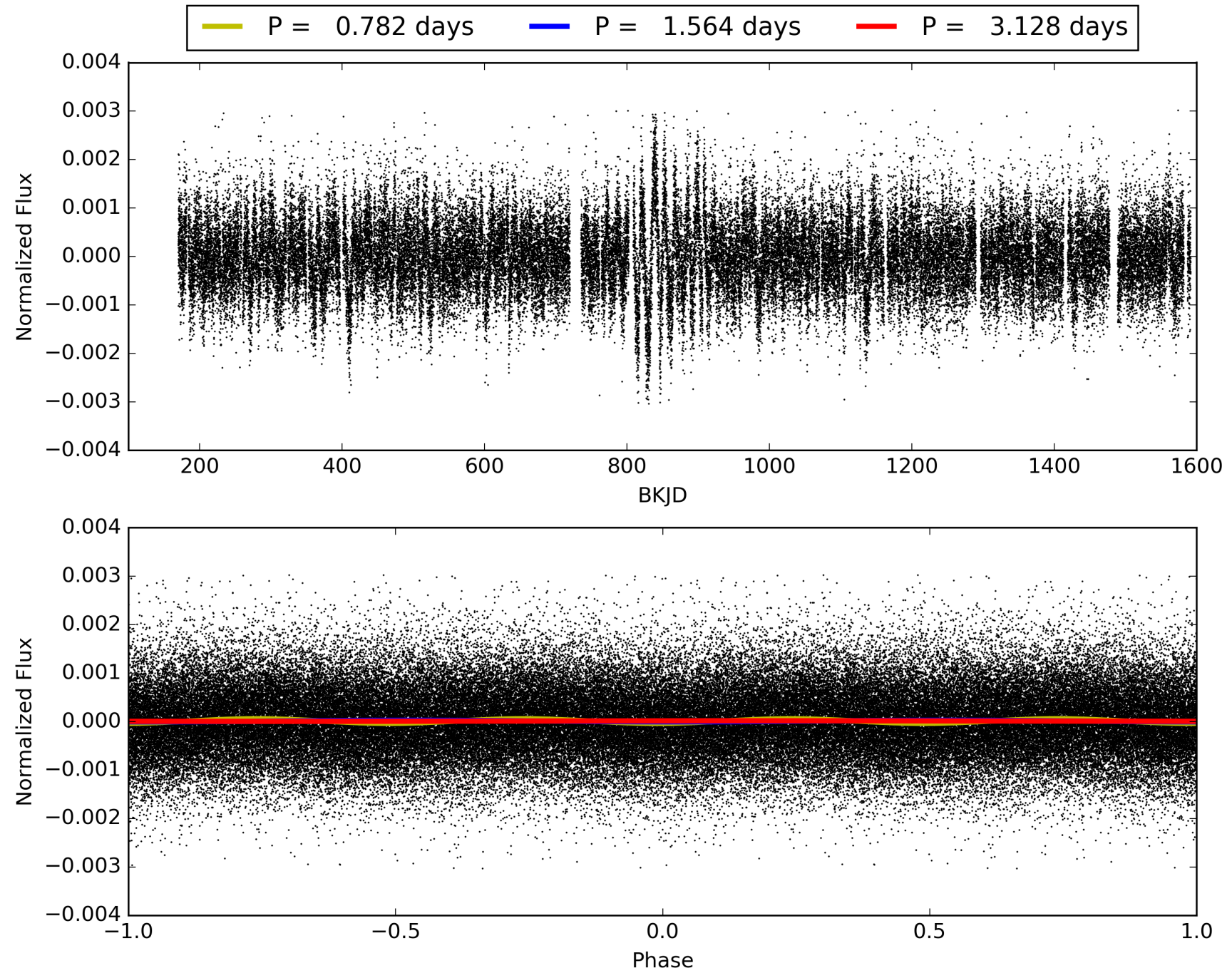
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 10:56:55 Z

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

# TCE 004949801-01, PDC Light Curves



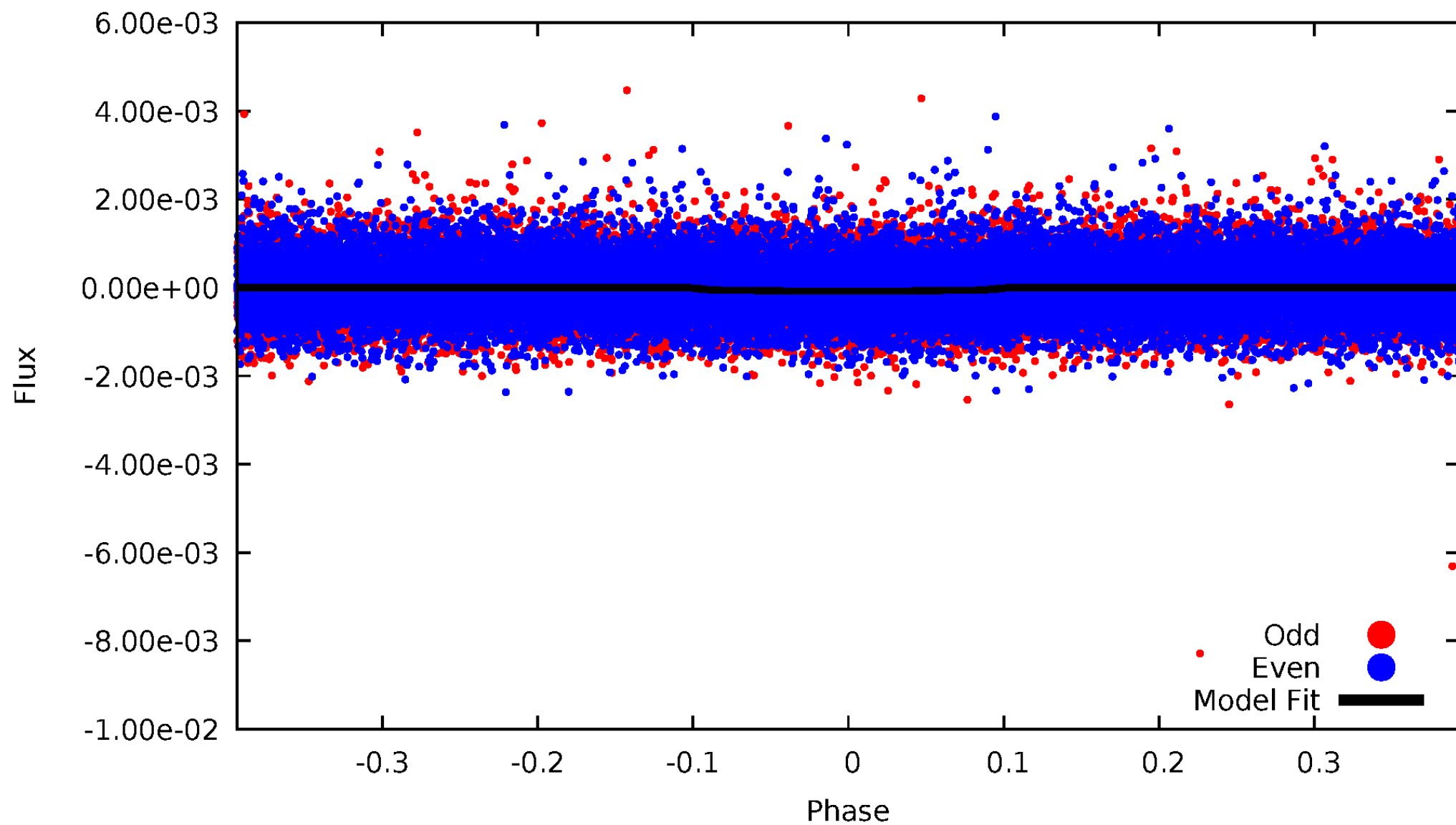
TCE 004949801-01





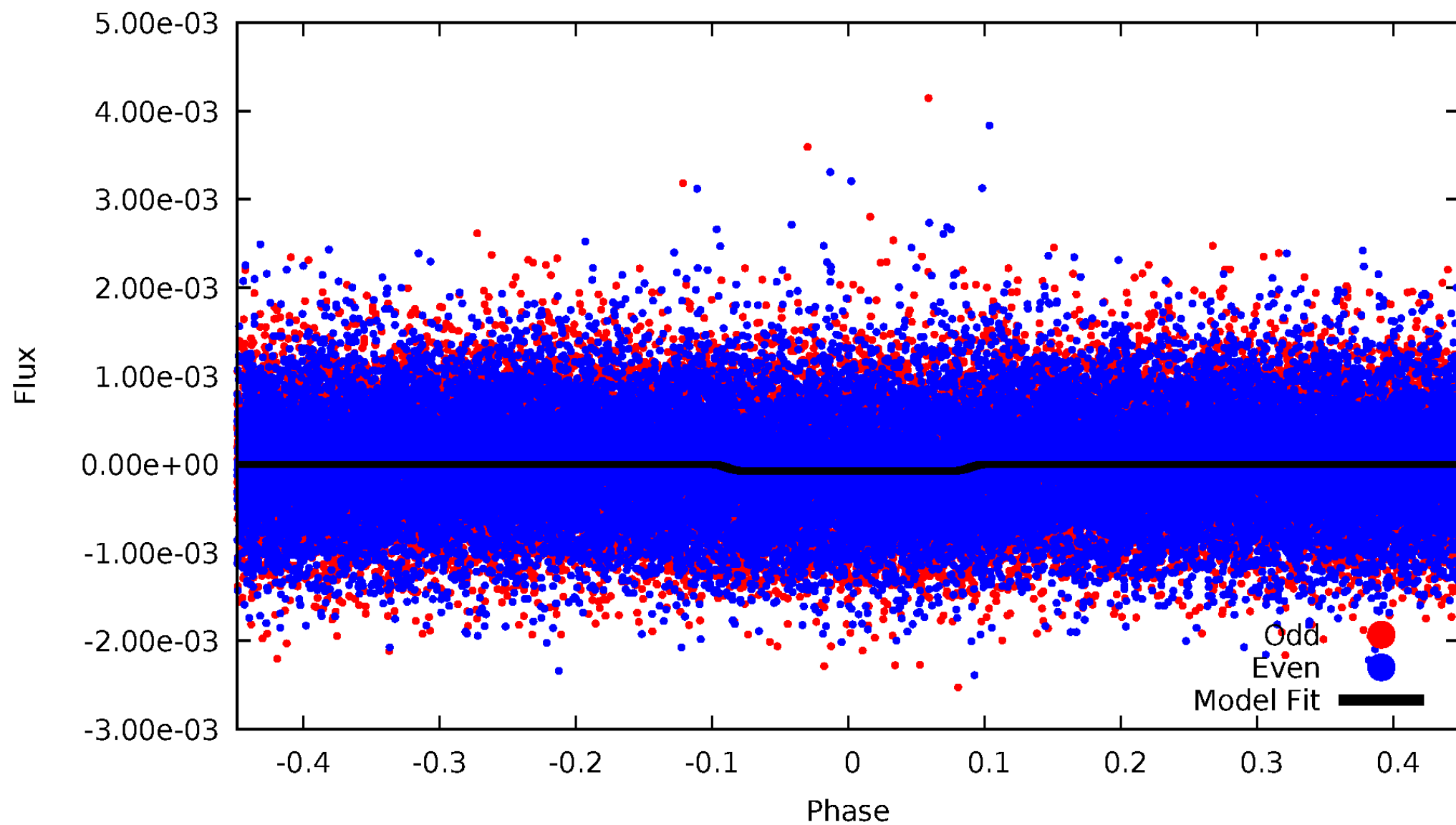
# DV Odd/Even

TCE 004949801-01

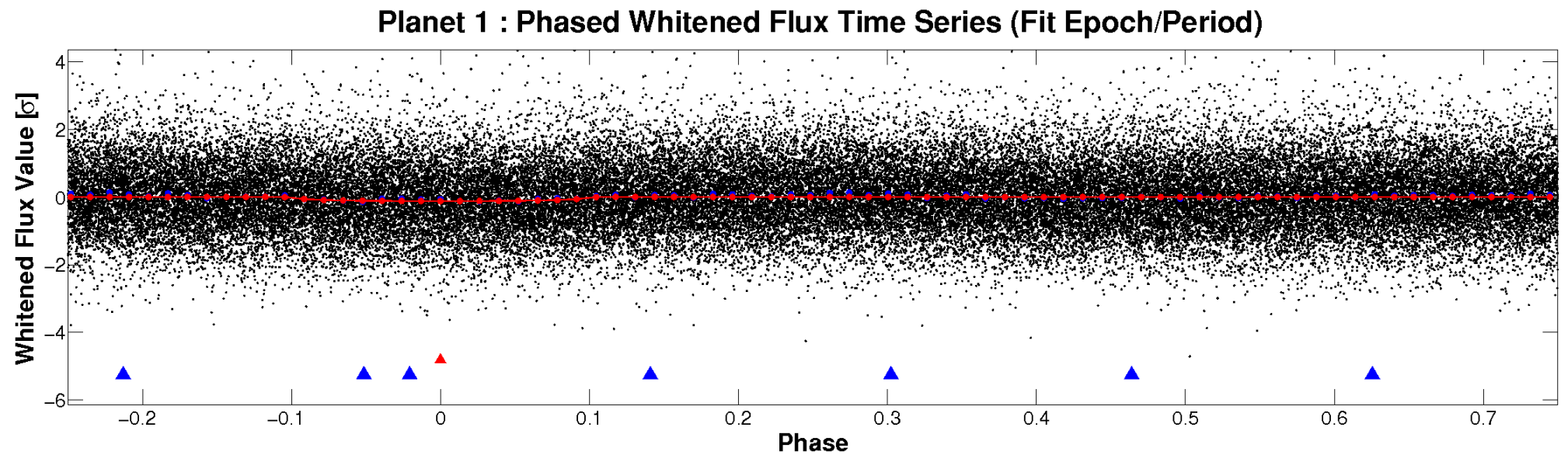
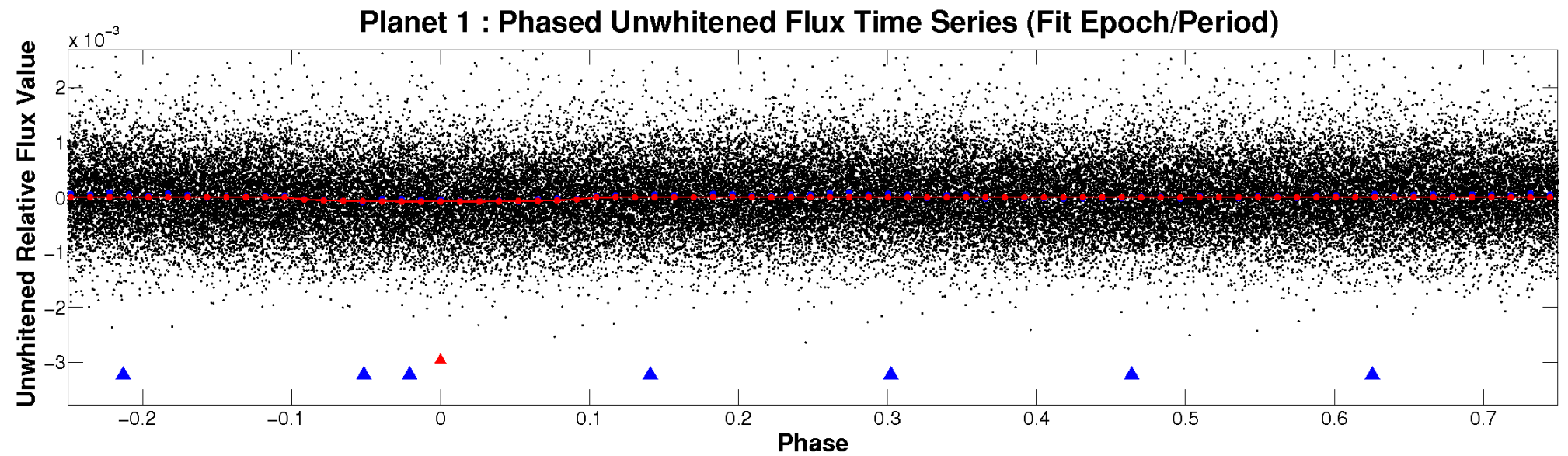


# ALT Odd/Even

TCE 004949801-01

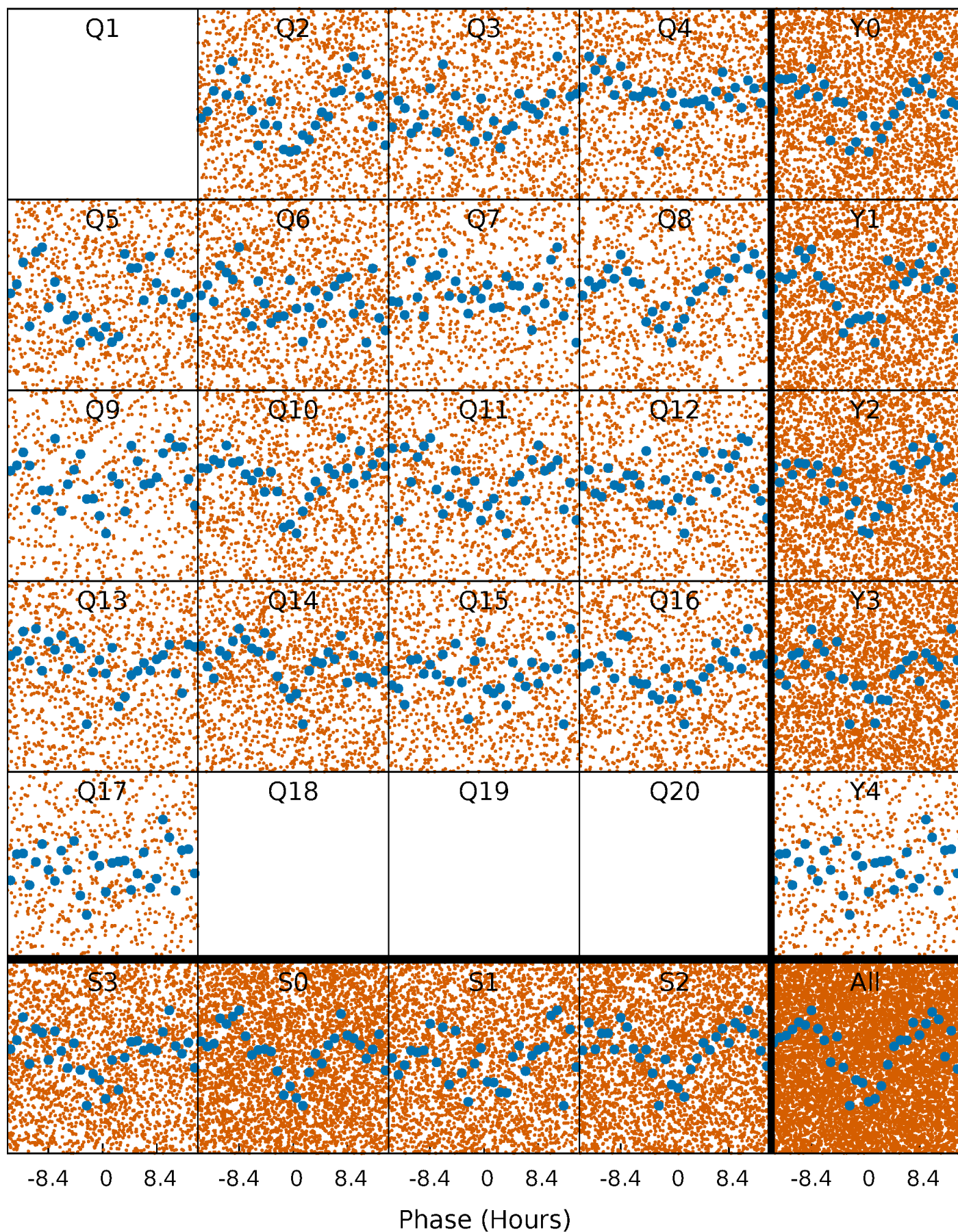


# Non-Whitened Vs. Whitened Light Curve



# PDC Quarter-Phased Transit Curves

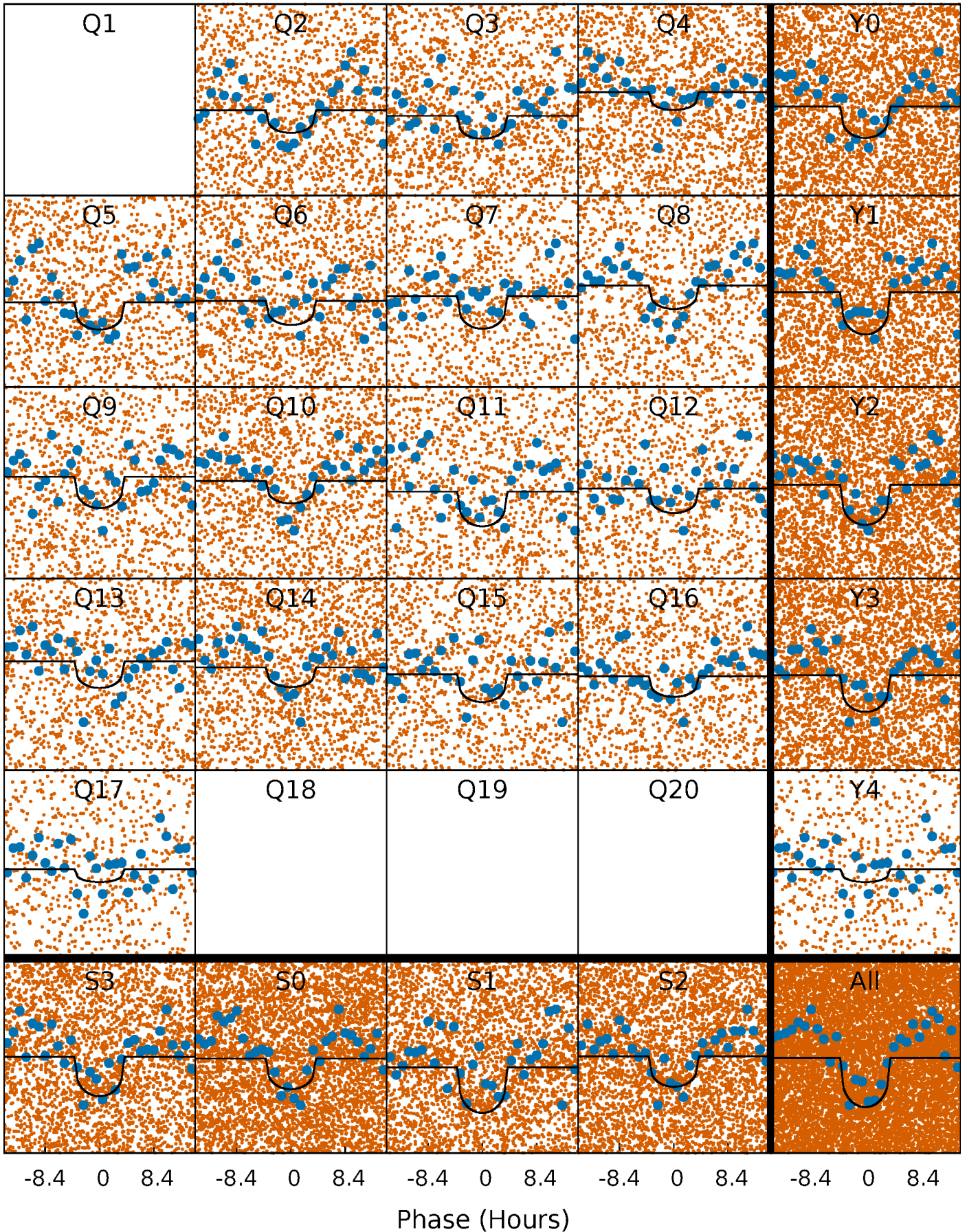
TCE 004949801-01 P= 1.564024 Days  $T_0=133.066929$  (BKJD)





# DV Quarter-Phased Transit Curves

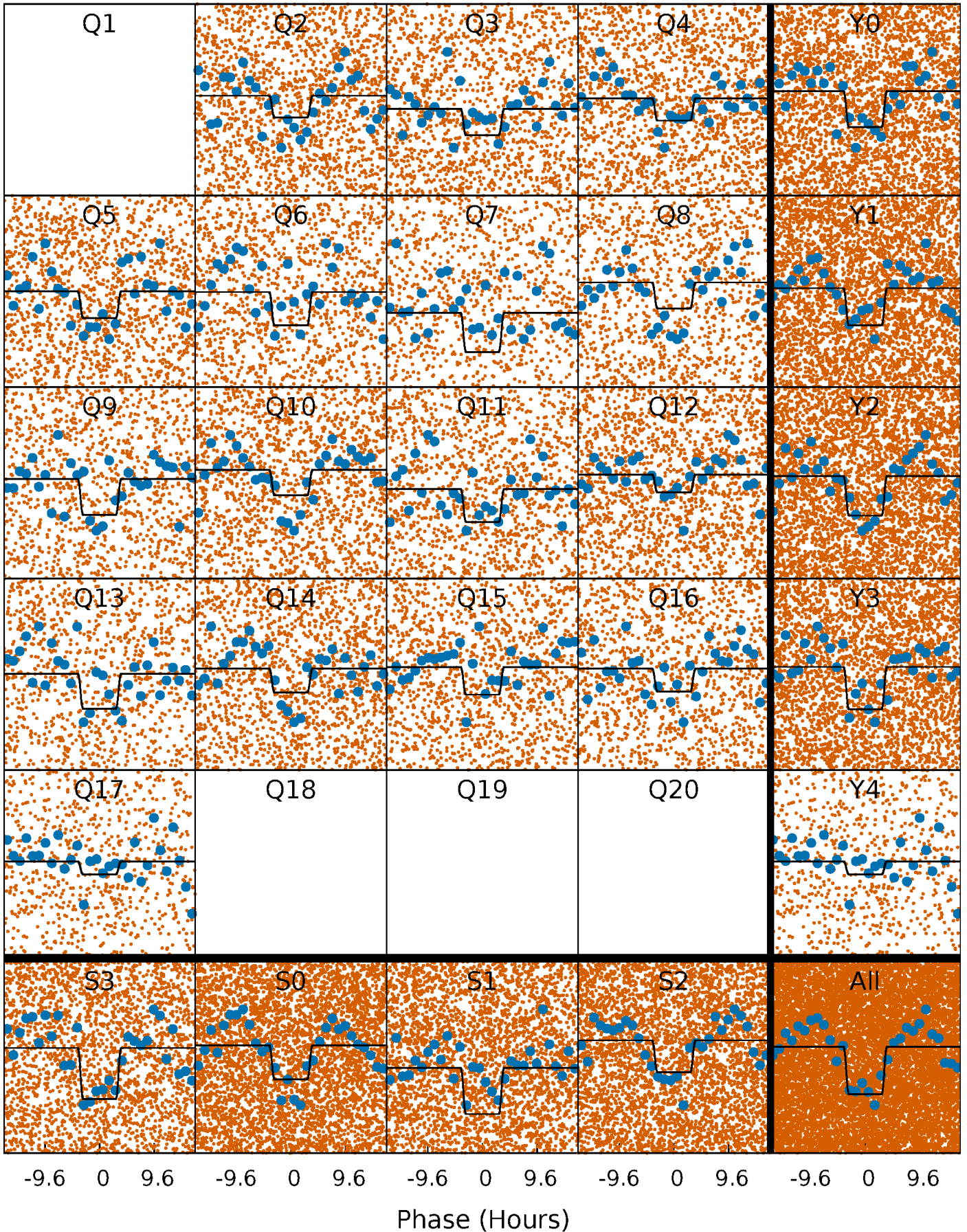
TCE 004949801-01 P= 1.564024 Days  $T_0=133.066929$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

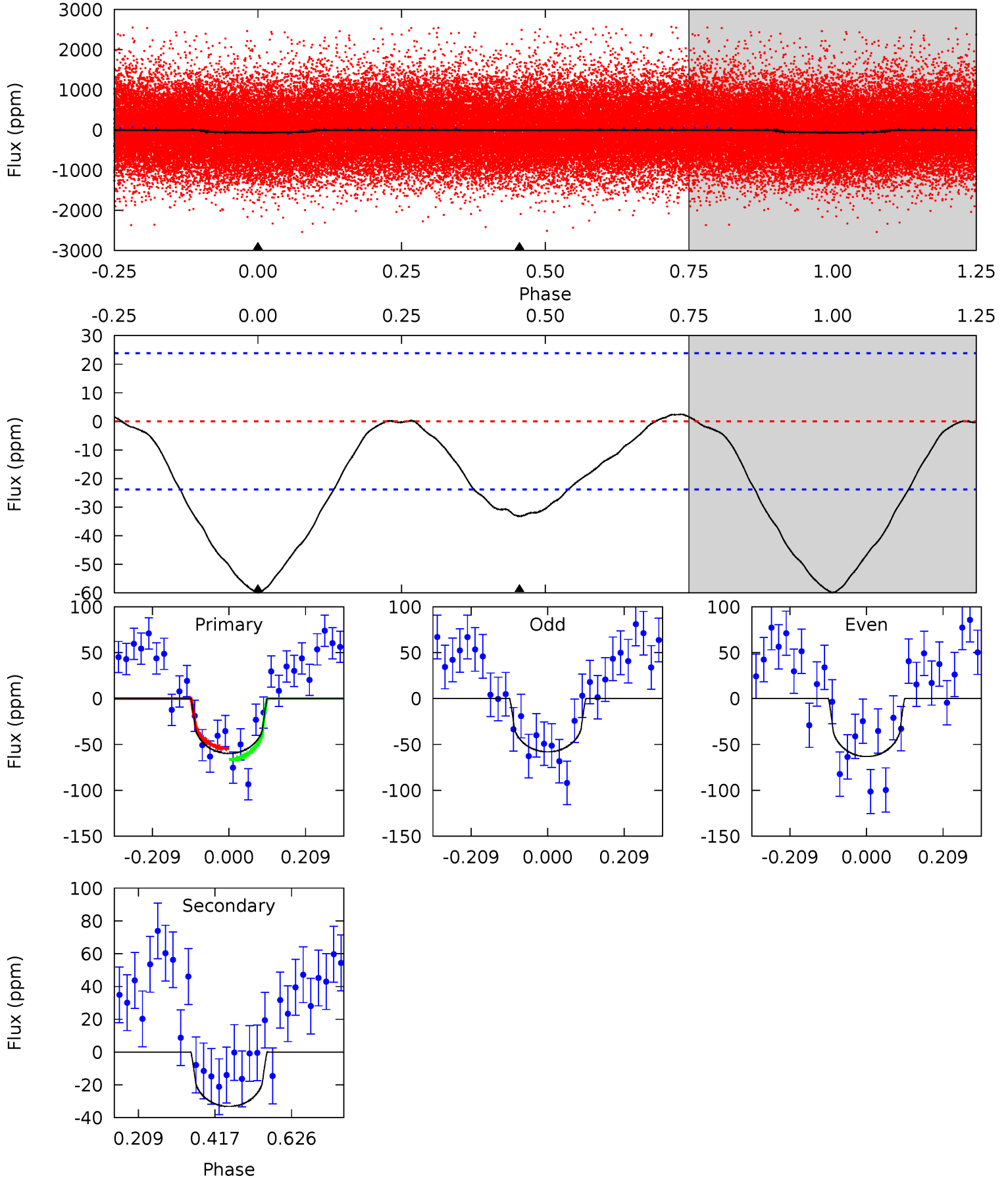
TCE 004949801-01 P= 1.564052 Days  $T_0=133.047400$  (BKJD)



# DV Model-Shift Uniqueness Test

004949801-01, P = 1.564024 Days, E = 133.066929 Days

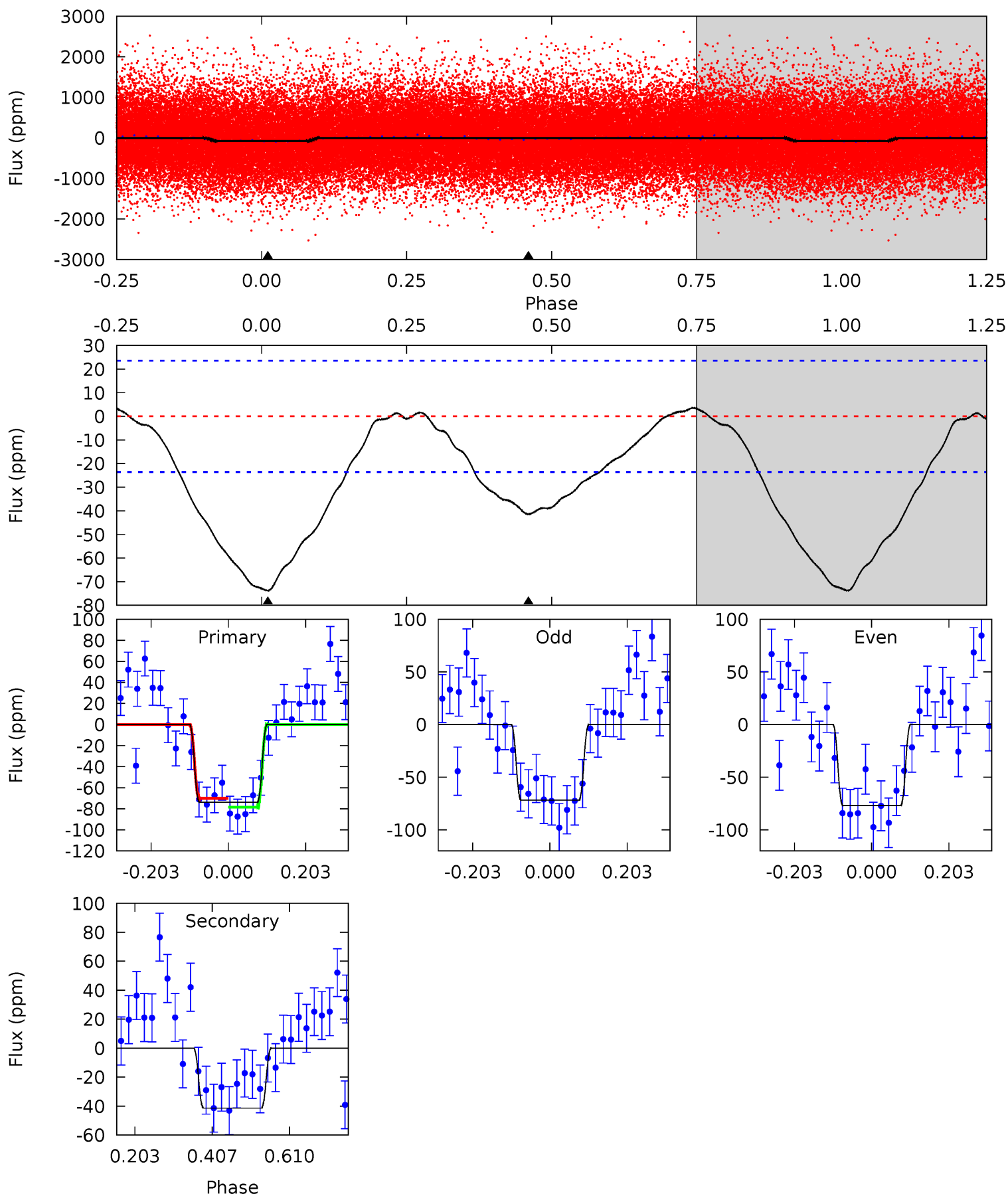
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
11.1	6.14	0	0	4.41	1.26	0.32	11.1	11.1	6.14	6.14	0.48	1.01	0.04	1.10



# Alt Model-Shift Uniqueness Test

004949801-01, P = 1.564052 Days, E = 133.047400 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
13.8	7.75	0	0	4.41	1.27	0.49	13.8	13.8	7.75	7.75	0.47	0.86	0.05	0.78





### Stellar Parameters For KIC 004949801

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5480^{+172}_{-191}$	$4.511^{+0.033}_{-0.176}$	$0.480^{+0.050}_{-0.300}$	$0.934^{+0.229}_{-0.076}$	$1.031^{+0.072}_{-0.112}$	$1.785^{+0.380}_{-0.818}$
	+3%/-3%	+1%/-4%	+10%/-62%	+25%/-8%	+7%/-11%	+21%/-46%
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 004949801-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-33 \pm 5$	$1.07^{+0.86}_{-0.70}$	$2047^{+125}_{-95}$	$4303^{+2747}_{-796}$	$10^{+78}_{-7}$
Alt.	$-41 \pm 5$	$1.14^{+0.90}_{-0.75}$	$2046^{+120}_{-95}$	$4411^{+2932}_{-835}$	$13^{+92}_{-9}$

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

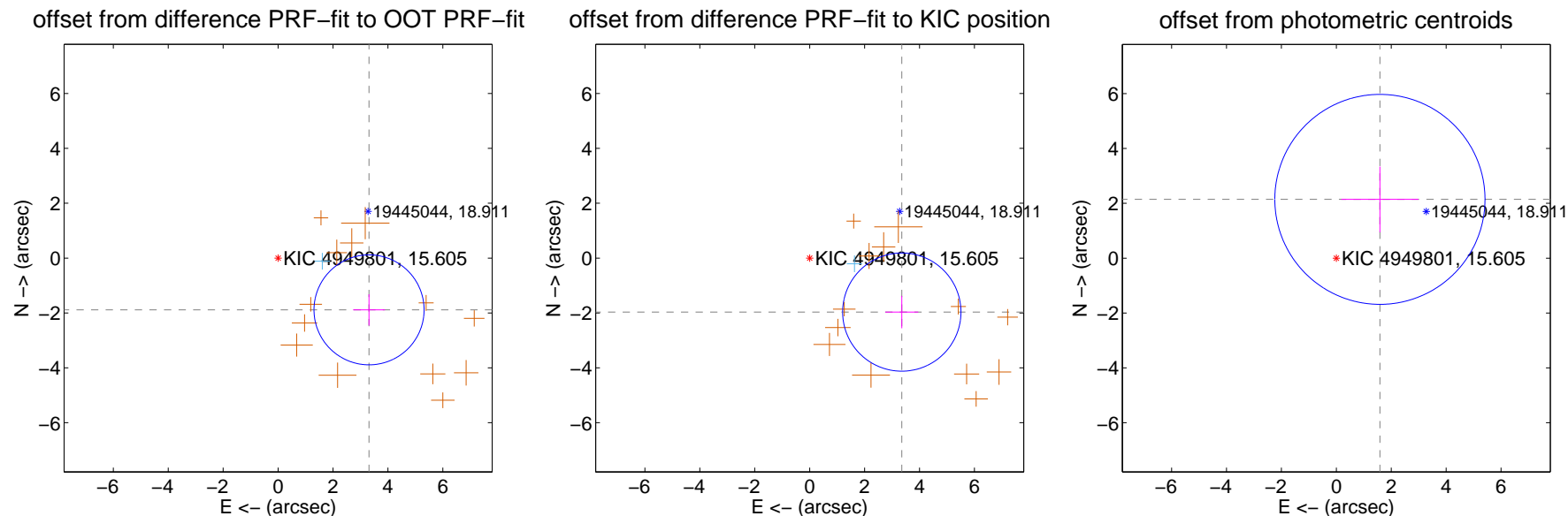
## DV Centroid Data

Supplemental centroid analysis for 004949801-01. Kepler magnitude: 15.61. Transit SNR 10.74

There are 1 quarters with good PRF difference image offsets

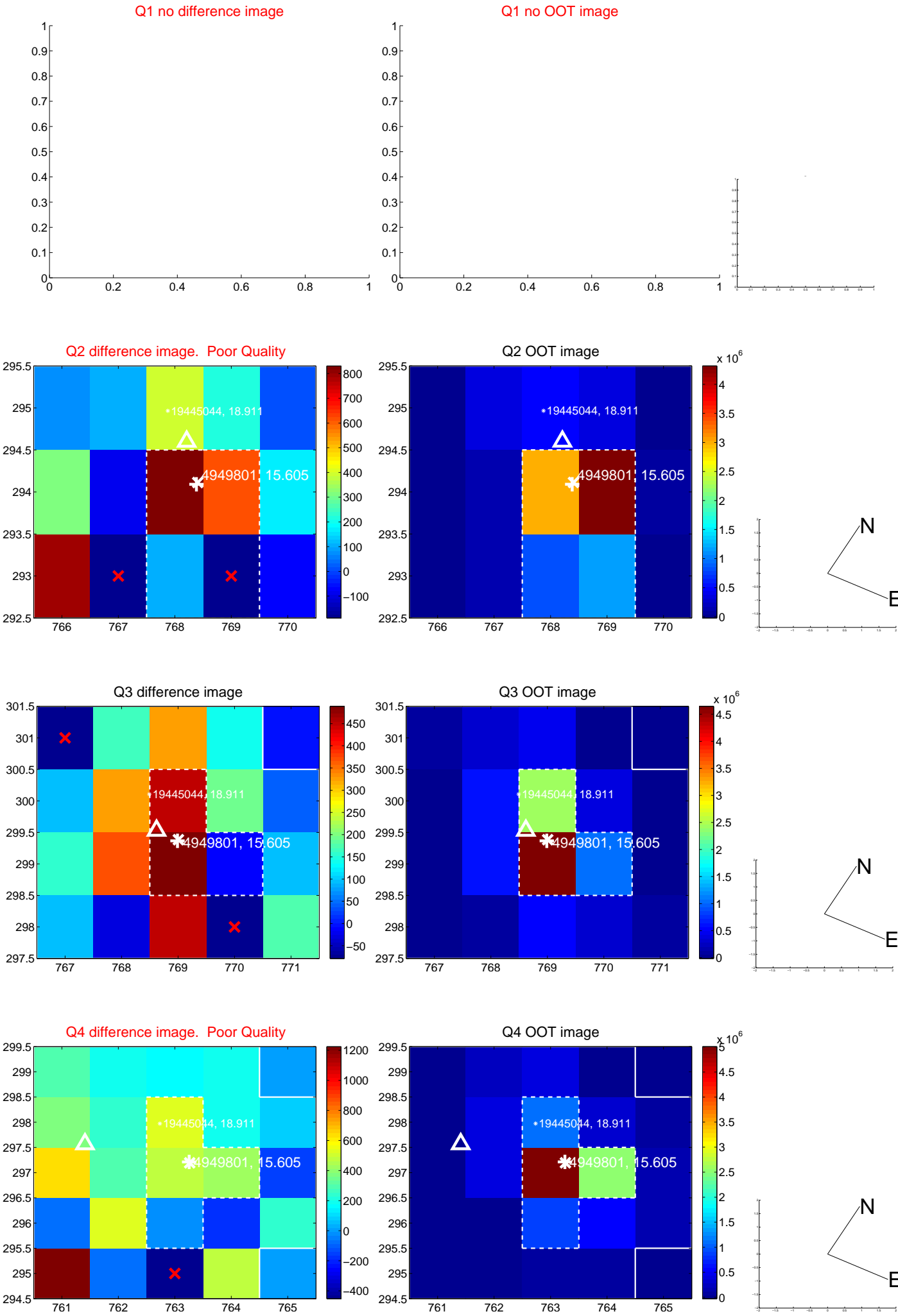
The direct PRF centroid is offset from the target star catalog position by about 0.05 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$3.813 \pm 0.668$	5.71	$-3.313 \pm 0.576$	$-1.887 \pm 0.567$
PRF-fit source offset from KIC position	$3.891 \pm 0.718$	5.42	$-3.356 \pm 0.603$	$-1.969 \pm 0.589$
photometric centroid source offset	$2.67 \pm 1.28$	2.09	$-1.59 \pm 1.41$	$2.14 \pm 1.20$

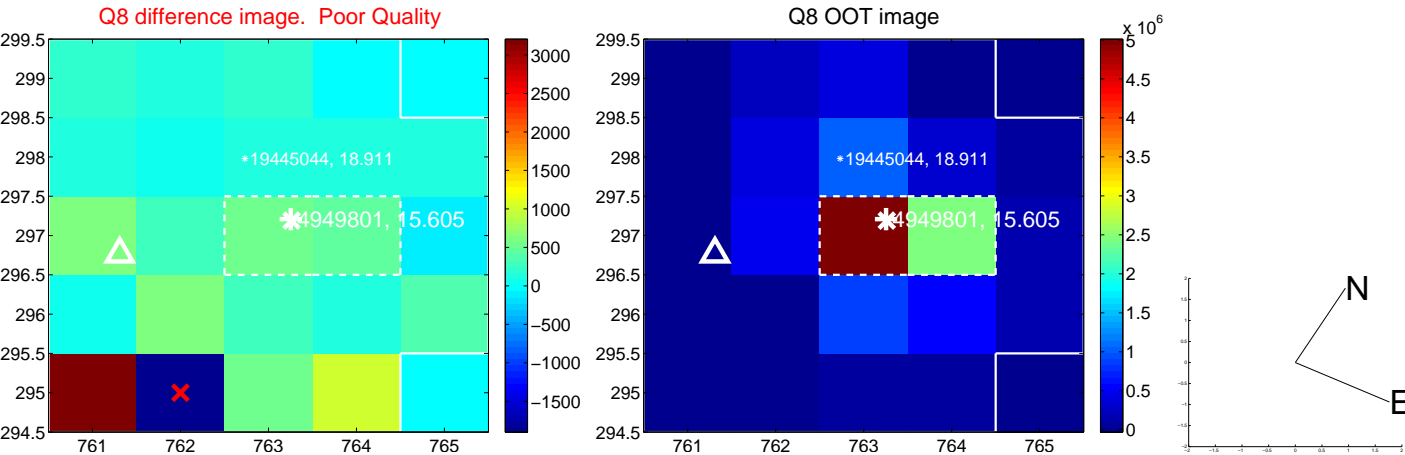
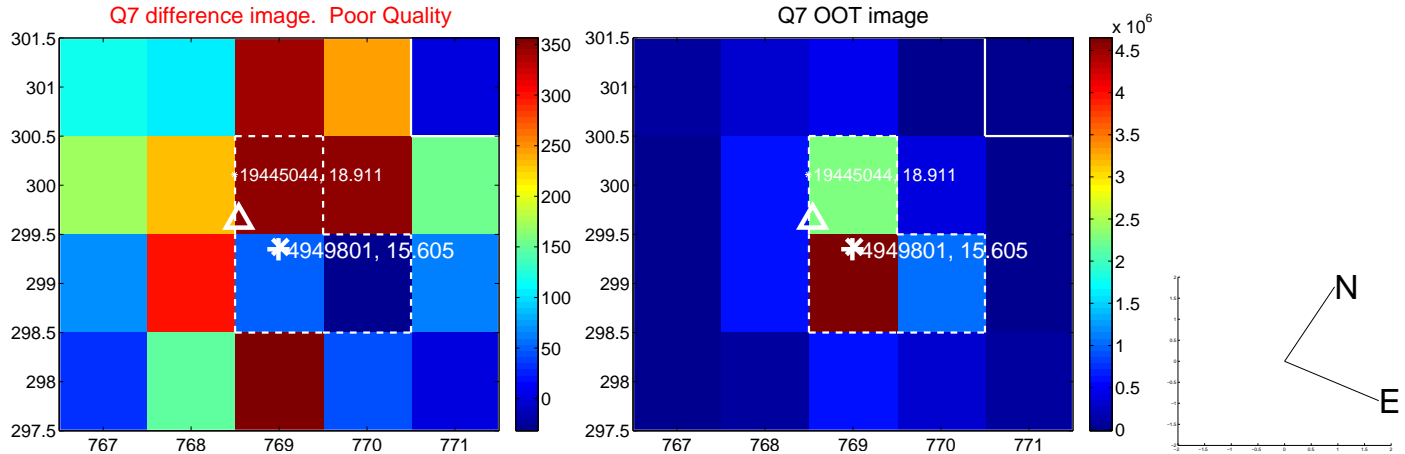
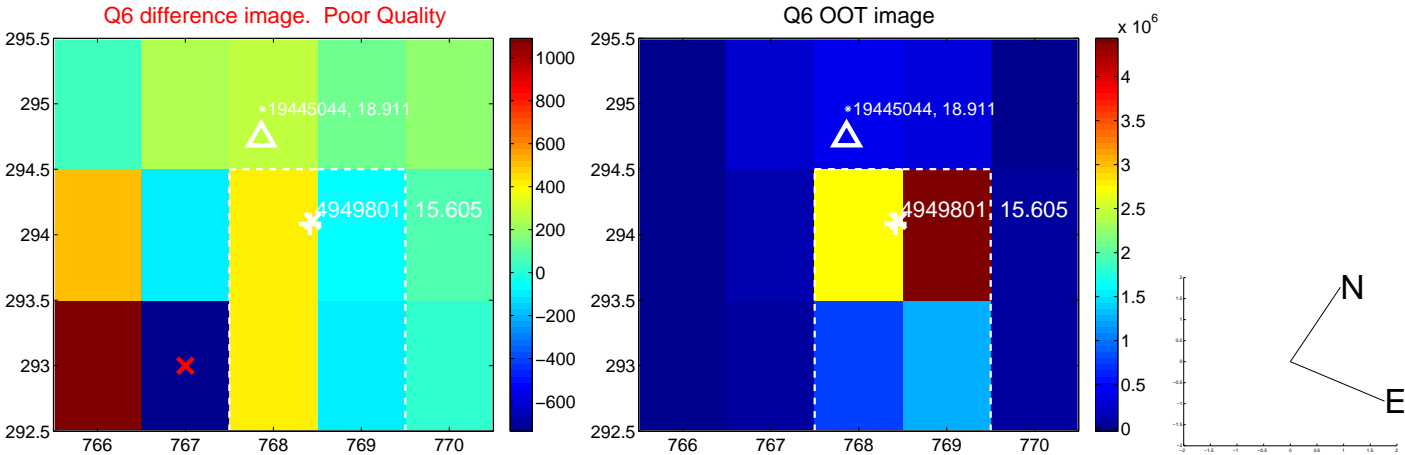
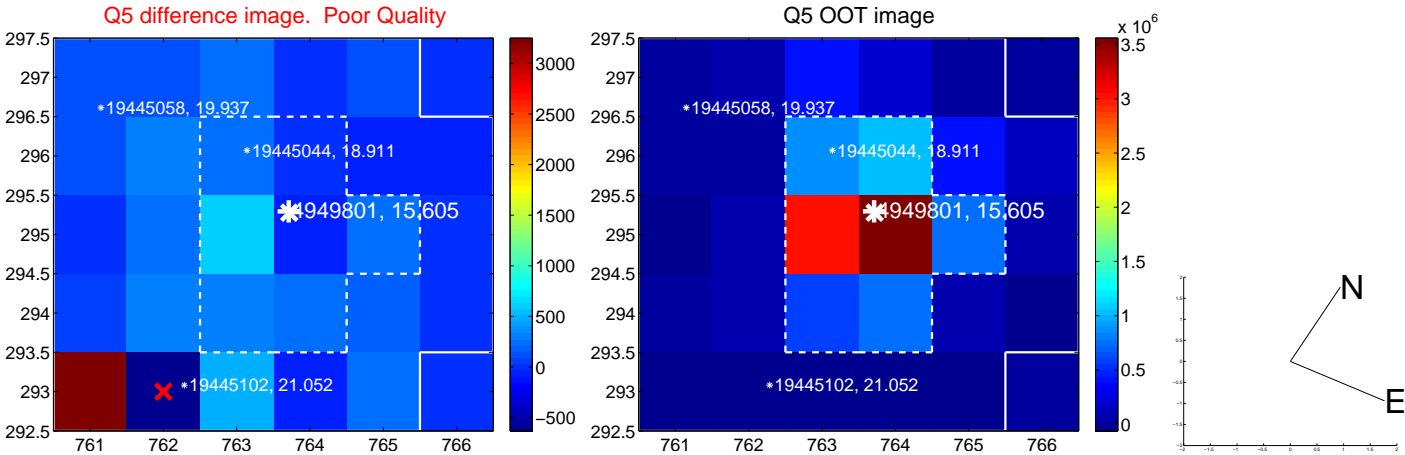


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

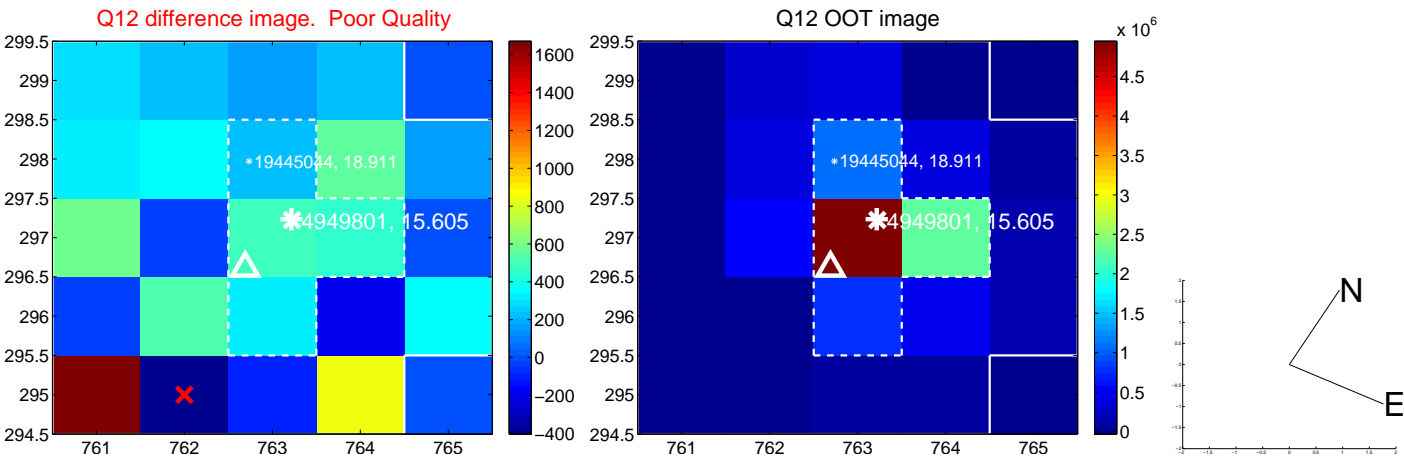
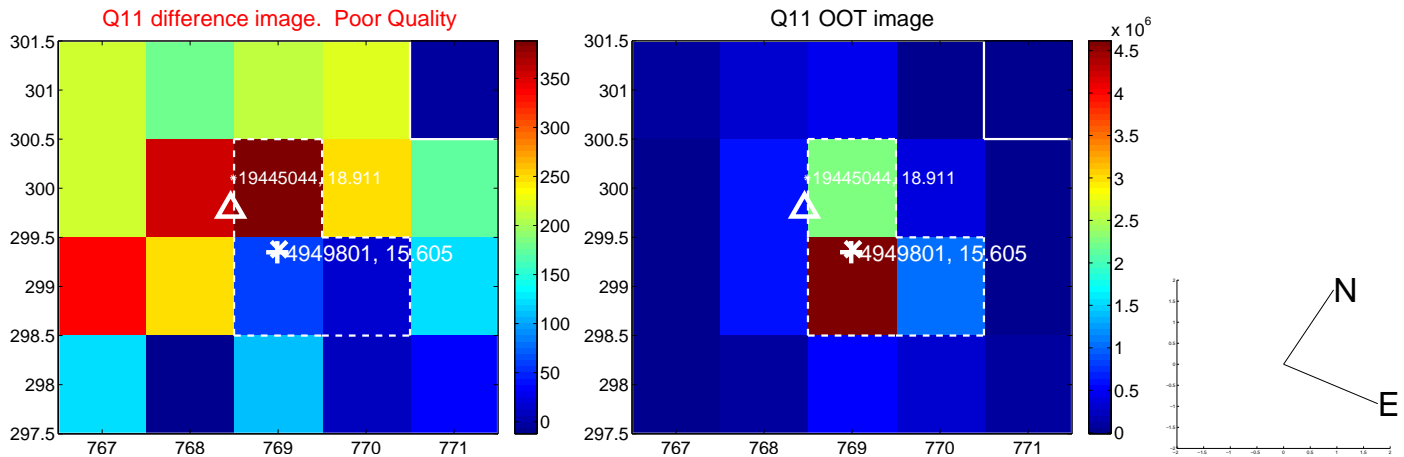
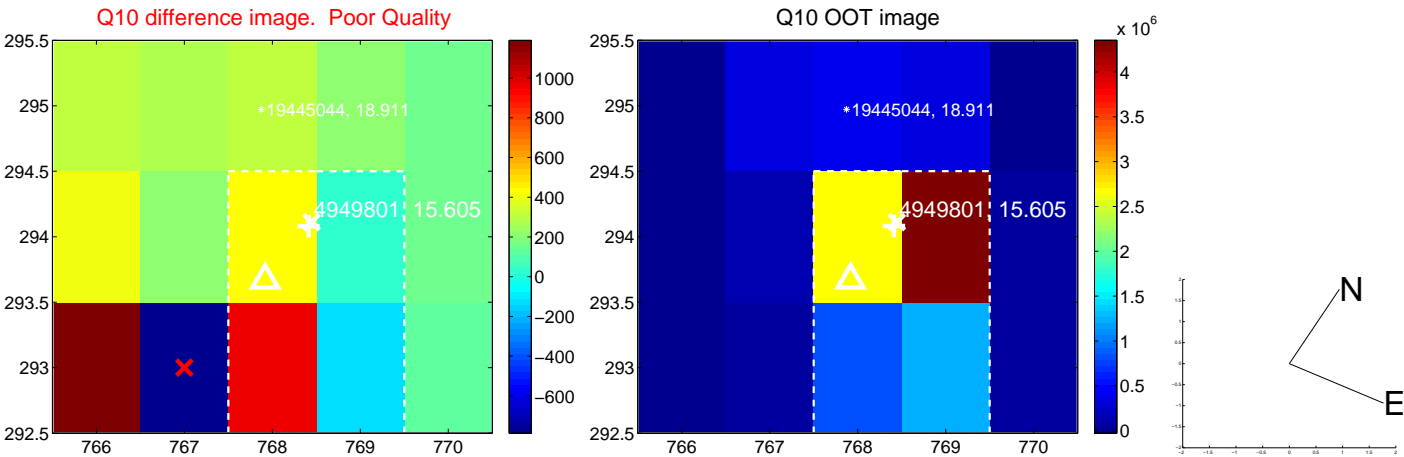
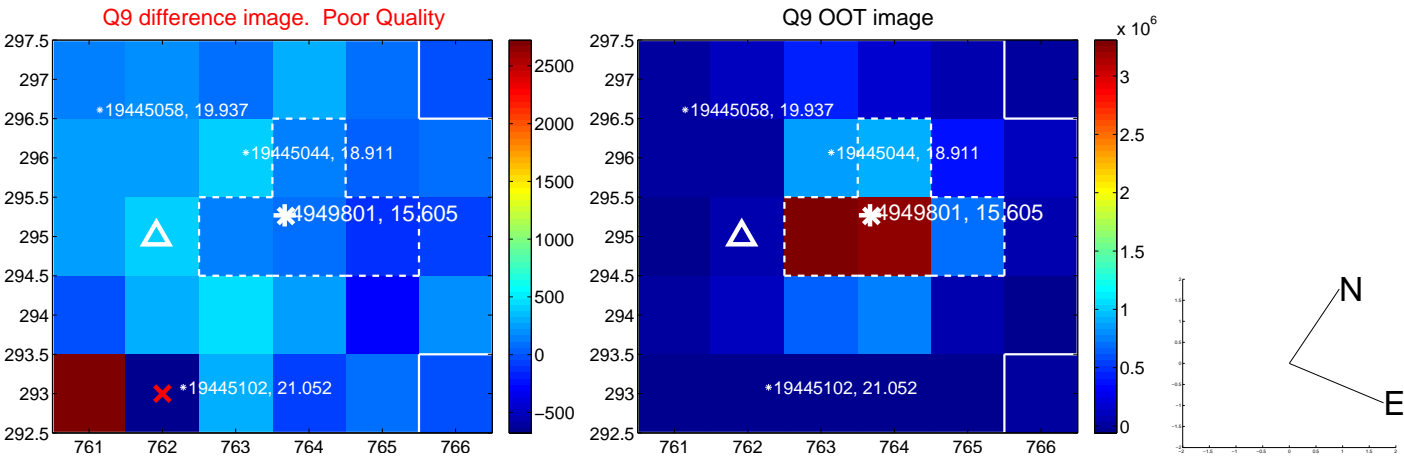


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

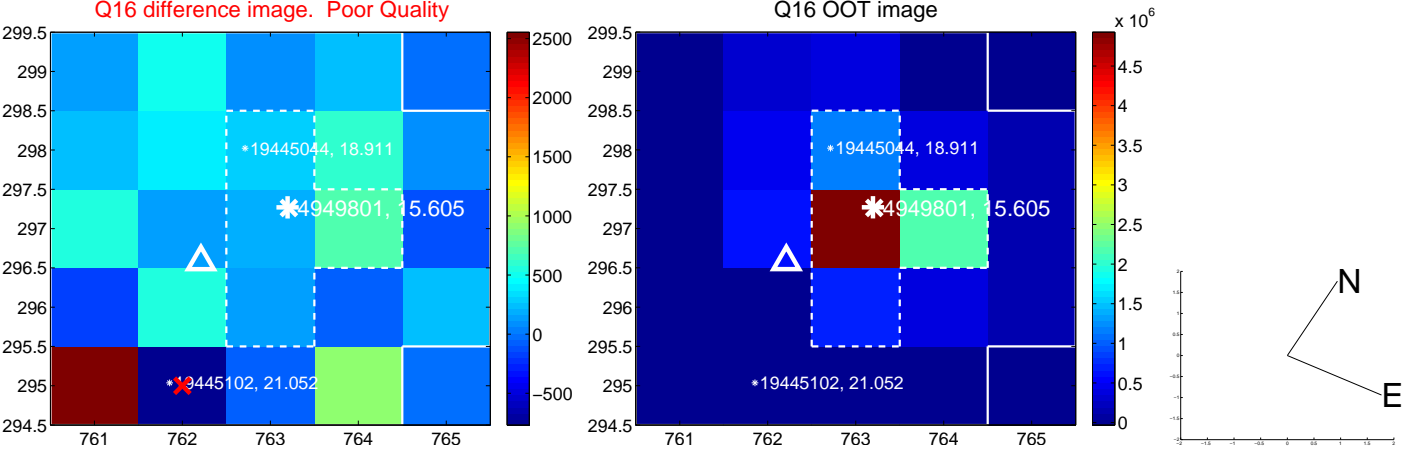
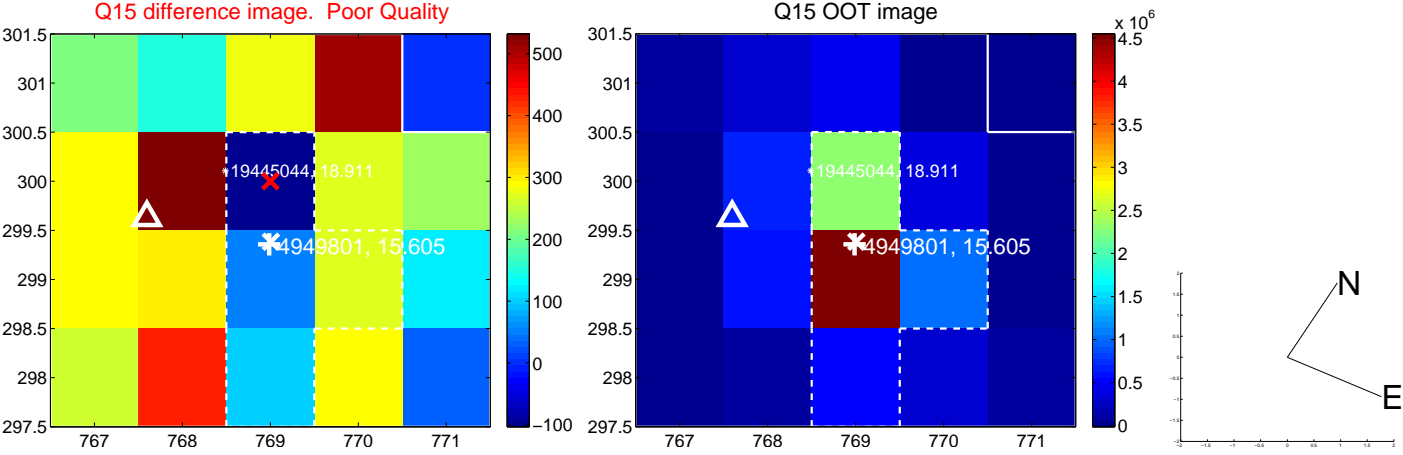
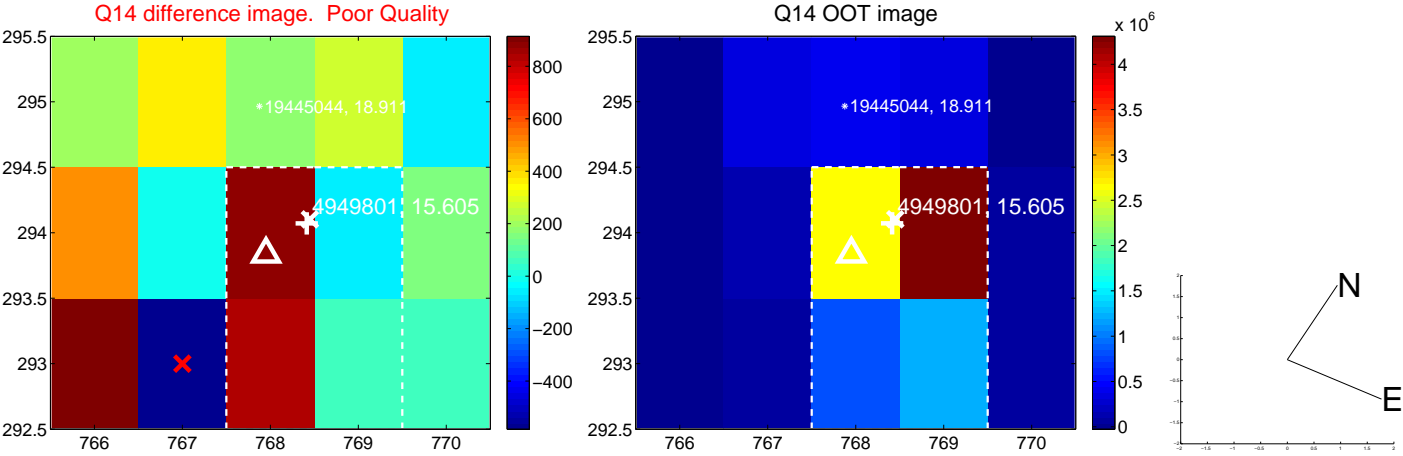
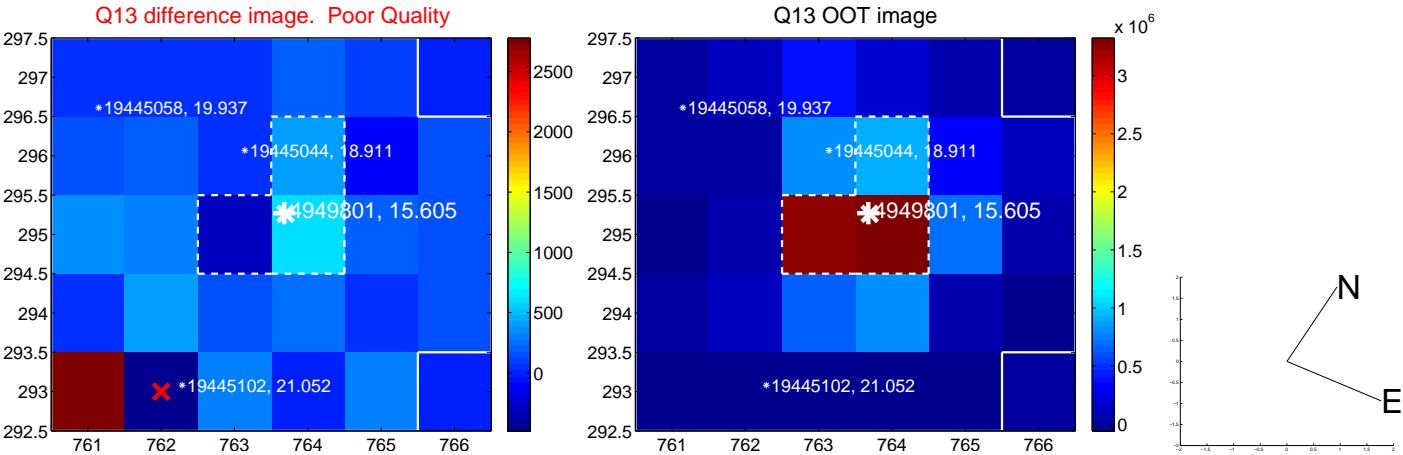




white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

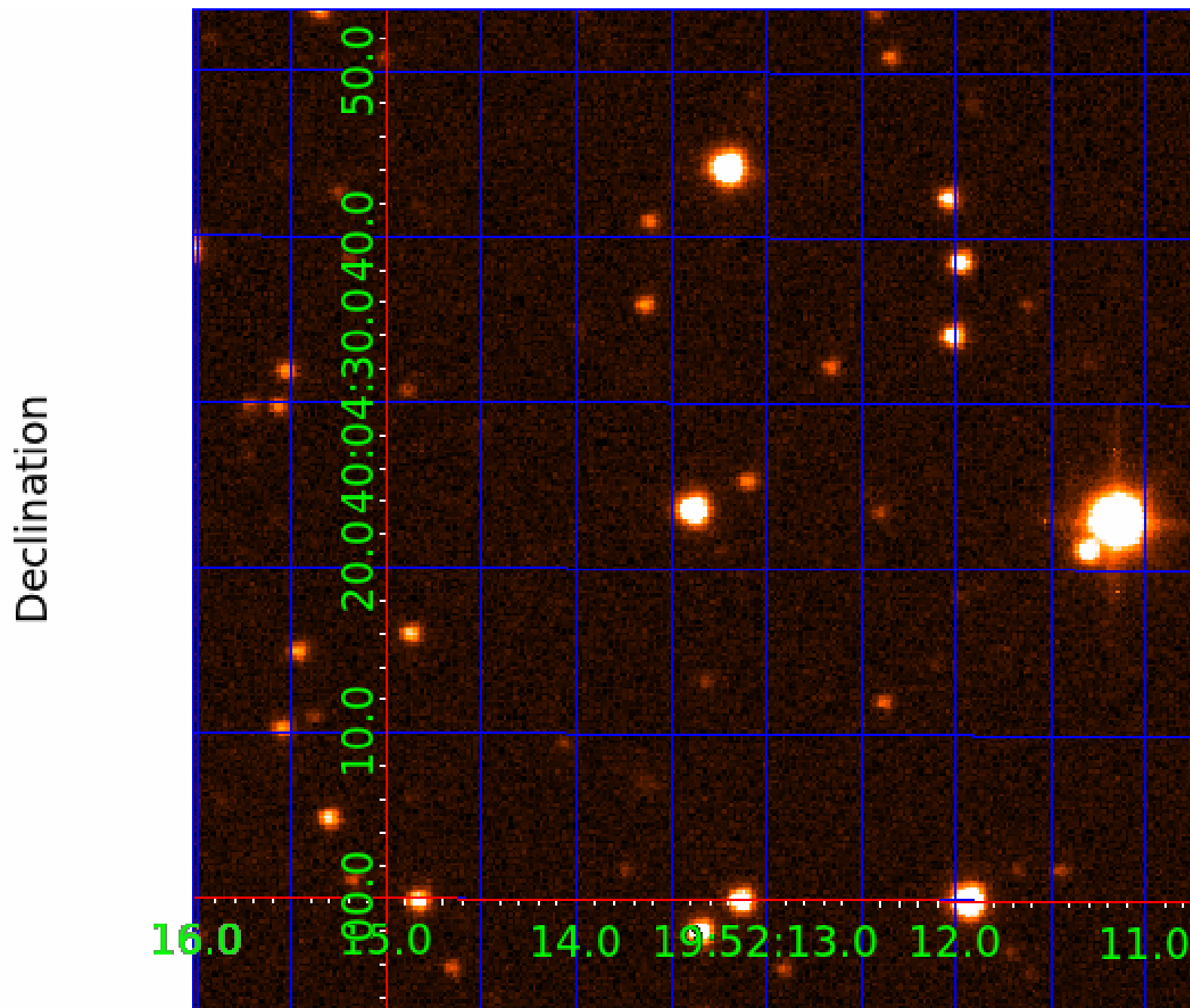


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.





UKIRT Image





# KIC 004949801

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
004949801-01	OBS	No	1.564024	133.066929	77.6	7.385	9.6	10.7	0.93	5480	0.82	992.18
004949801-02	OBS	No	192.627654	248.772367	630.6	28.769	8.0	6.8	0.93	5480	2.52	1.62

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004949801-01	OBS	FP	0.00	1	0	1	1	LPP_DV—CENT_FEW_DIFFS—HALO_GHOST—EPHEM_MATCH
004949801-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL_SKYE—TRANS_GAPPED—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—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.

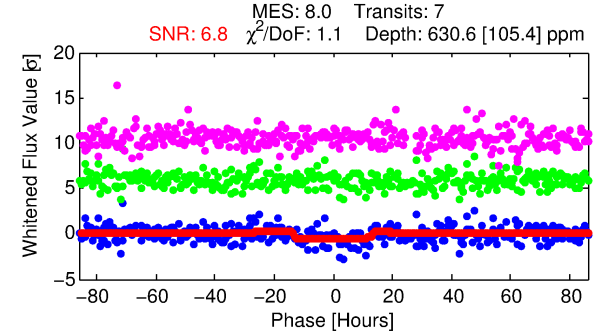
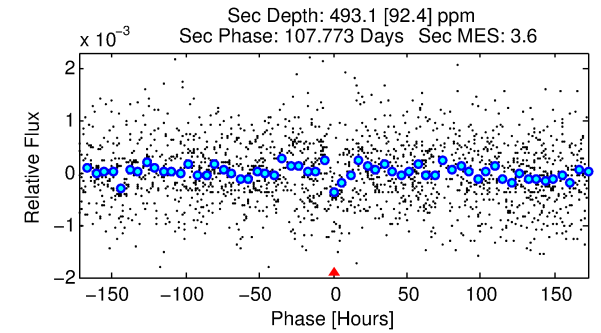
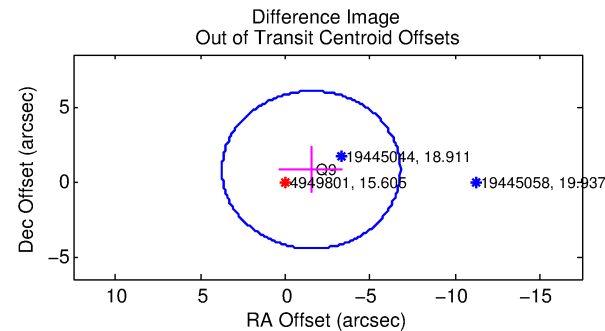
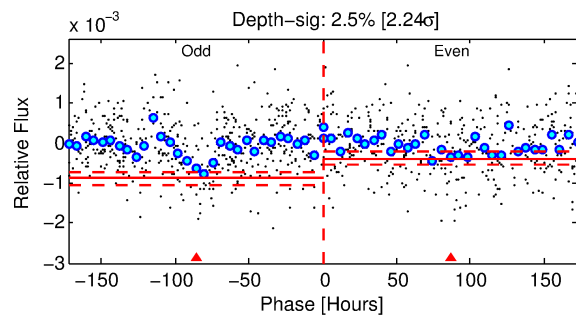
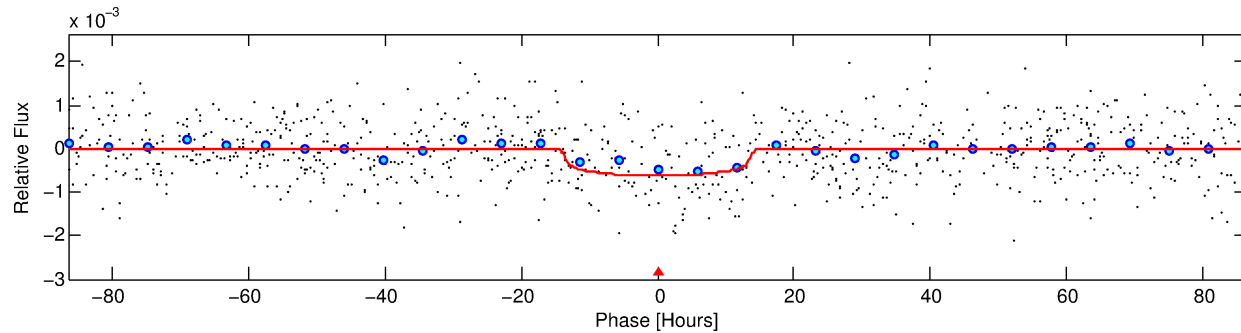
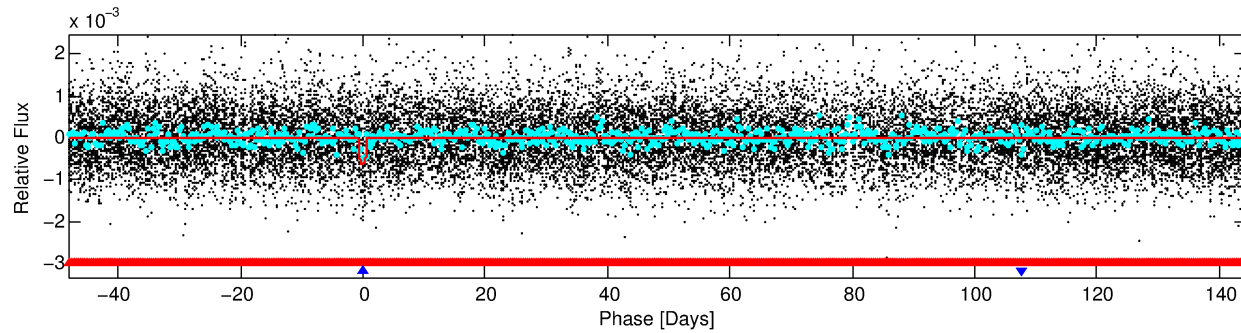
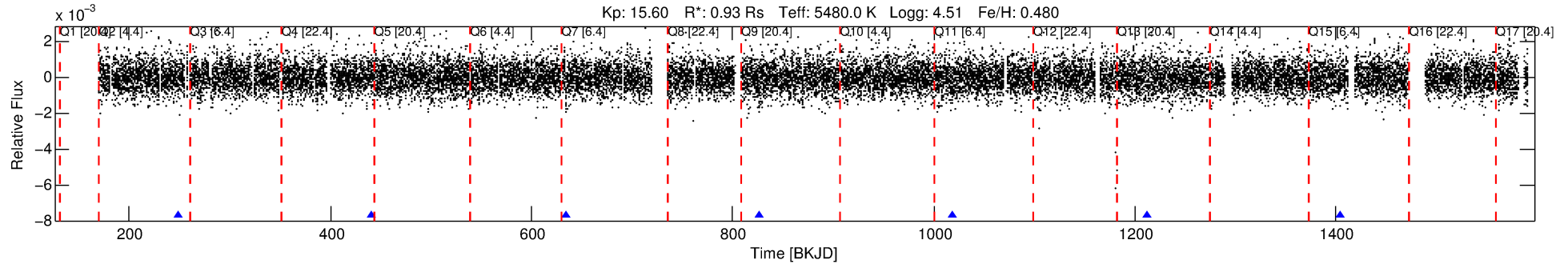
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 004949801-02

No Significant Match Found

# DV One-Page Summary

KIC: 4949801 Candidate: 2 of 2 Period: 192.628 d



## DV Fit Results:

Period = 192.62765 [0.01264] d  
Epoch = 248.7724 [0.0393] BKJD  
Rp/R\* = 0.0247 [0.0072]  
a/R\* = 37.52 [39.39]  
b = 0.72 [0.72]  
Seff = 1.62 [0.56]  
Teq = 288 [25] K  
Rp = 2.52 [0.96] Re  
a = 0.6598 [0.1399] AU  
Ag = 18663.49 [12830.02] [1.45 $\sigma$ ]  
Teffp = 5198 [814] K [6.03 $\sigma$ ]

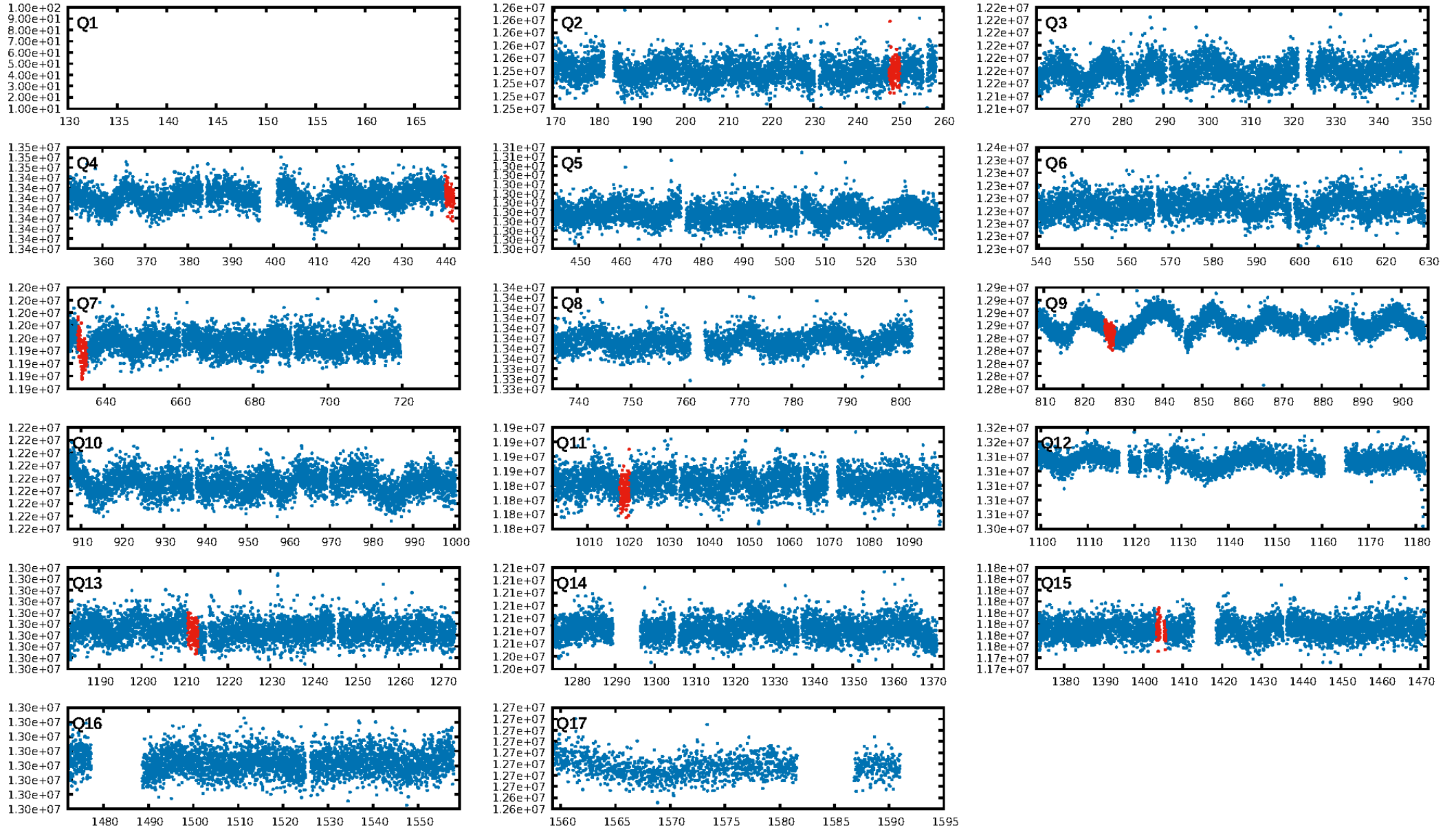
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [154.38 $\sigma$ ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 6.6%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 1.98e-10  
RollingBand-fgt: 1.00 [7/7]  
GhostDiagnostic-chr: 3.394  
Centroid-sig: 1.1%  
Centroid-so: 2.299 arcsec [2.10 $\sigma$ ]  
OotOffset-rm: 1.730 arcsec [0.99 $\sigma$ ]  
OotOffset-st: 0/0/0/1 [1]  
KicOffset-rm: 1.777 arcsec [1.01 $\sigma$ ]  
KicOffset-st: 0/0/0/1 [1]  
DiffImageQuality-fgm: 0.00 [0/1]  
DiffImageOverlap-fno: 0.00 [0/4]

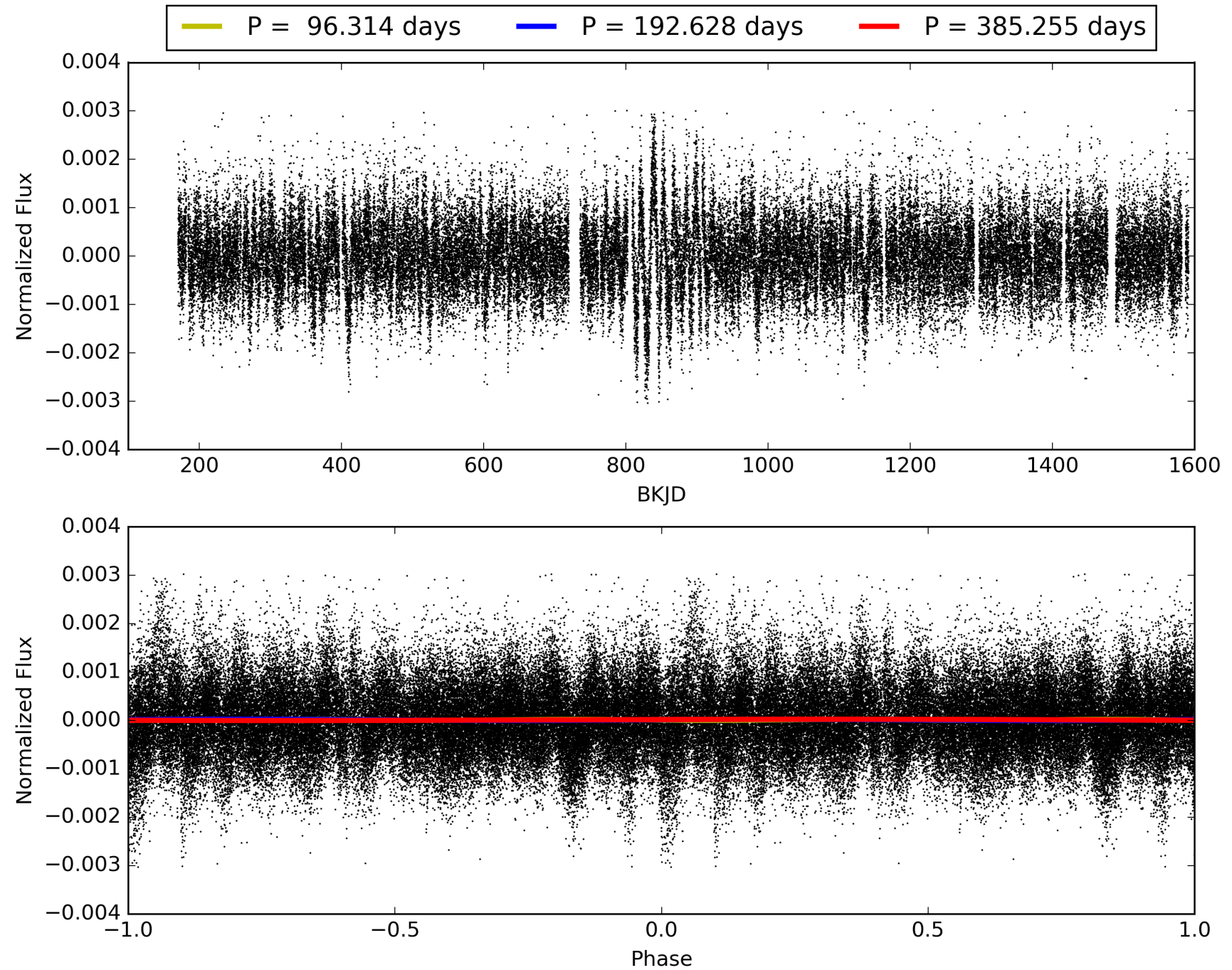
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 10:57:06 Z

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

# TCE 004949801-02, PDC Light Curves



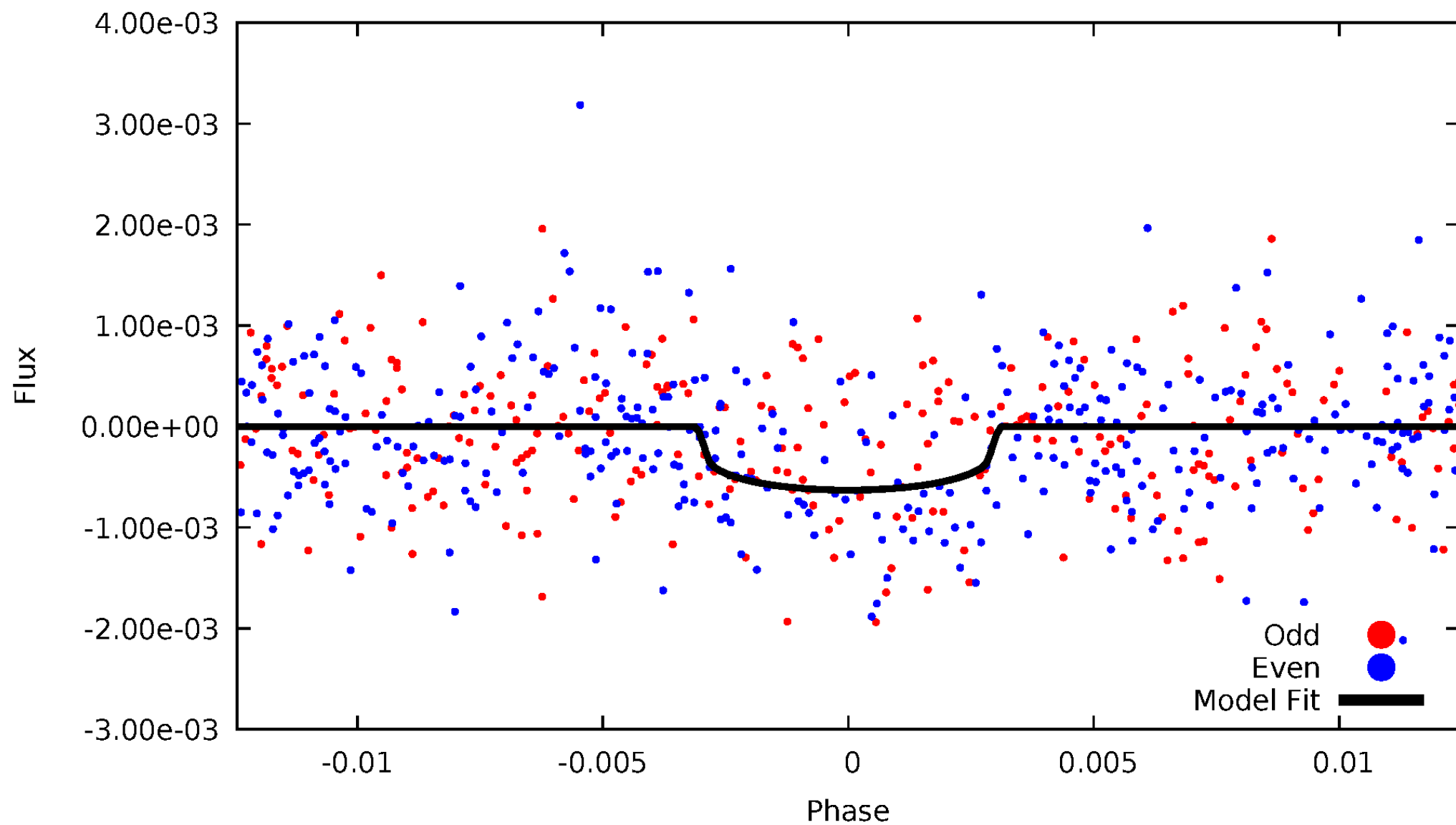
# TCE 004949801-02





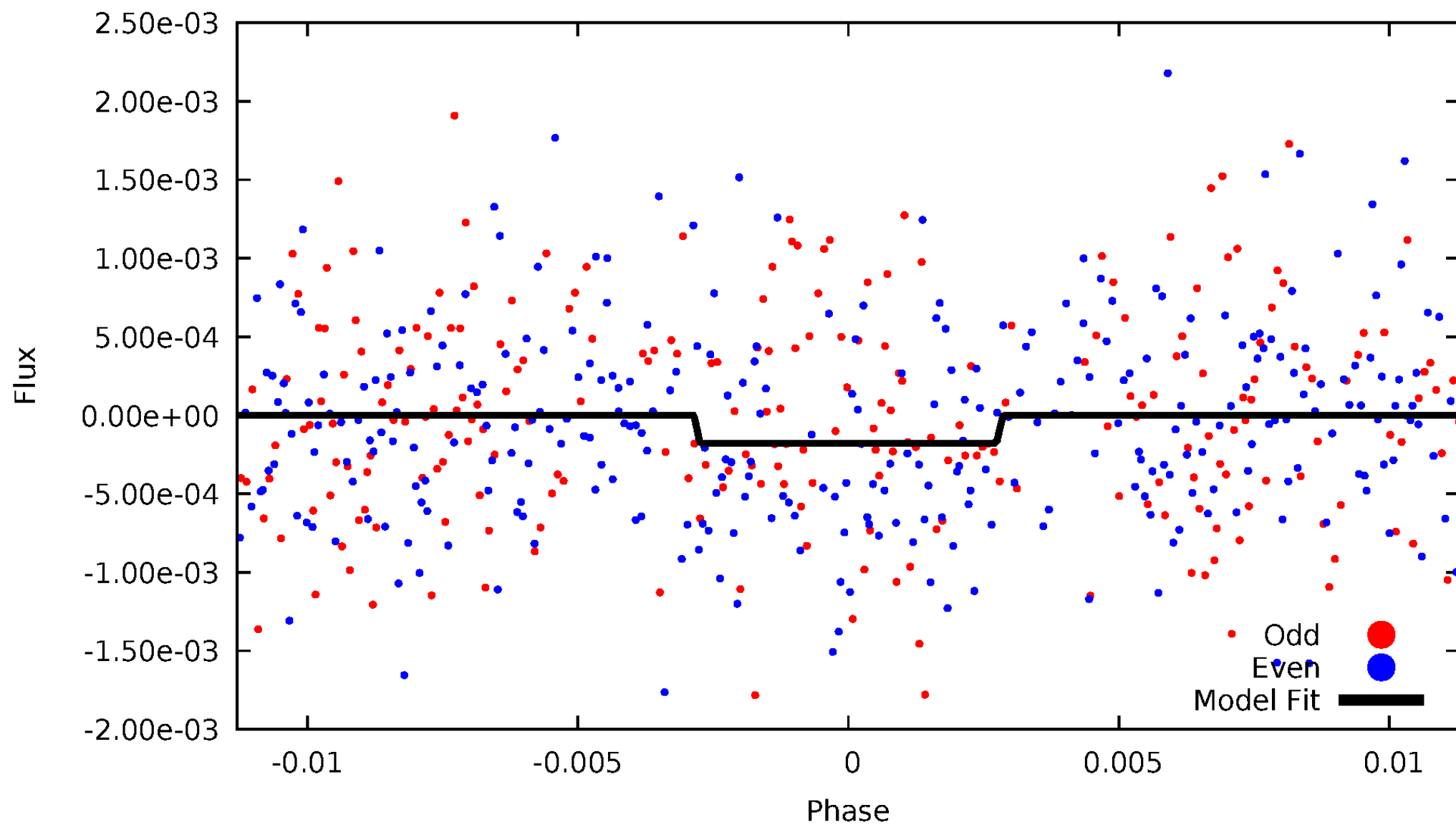
# DV Odd/Even

TCE 004949801-02



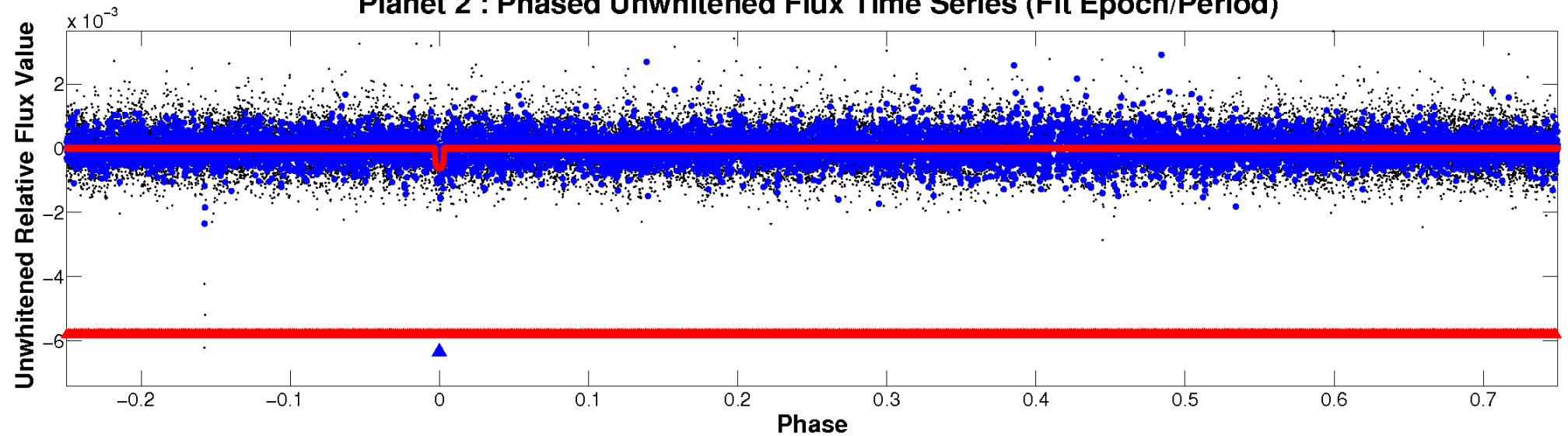
# ALT Odd/Even

TCE 004949801-02

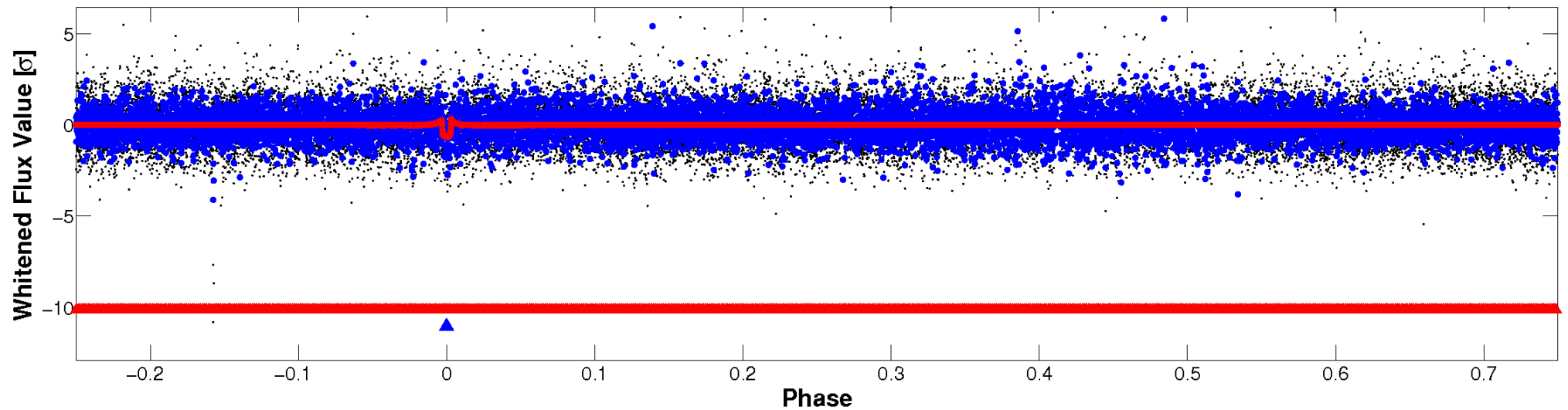


# Non-Whitened Vs. Whitened Light Curve

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

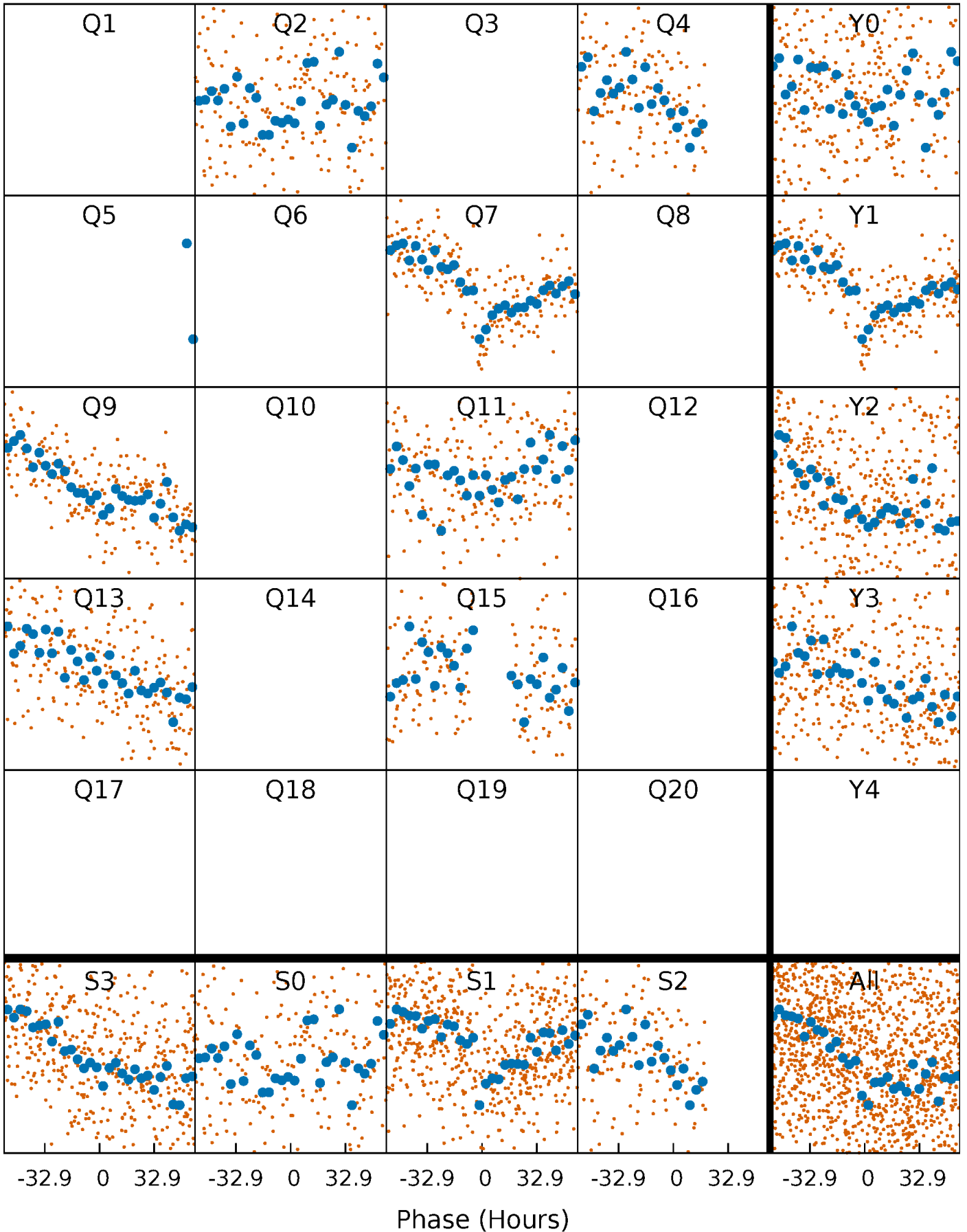


**Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



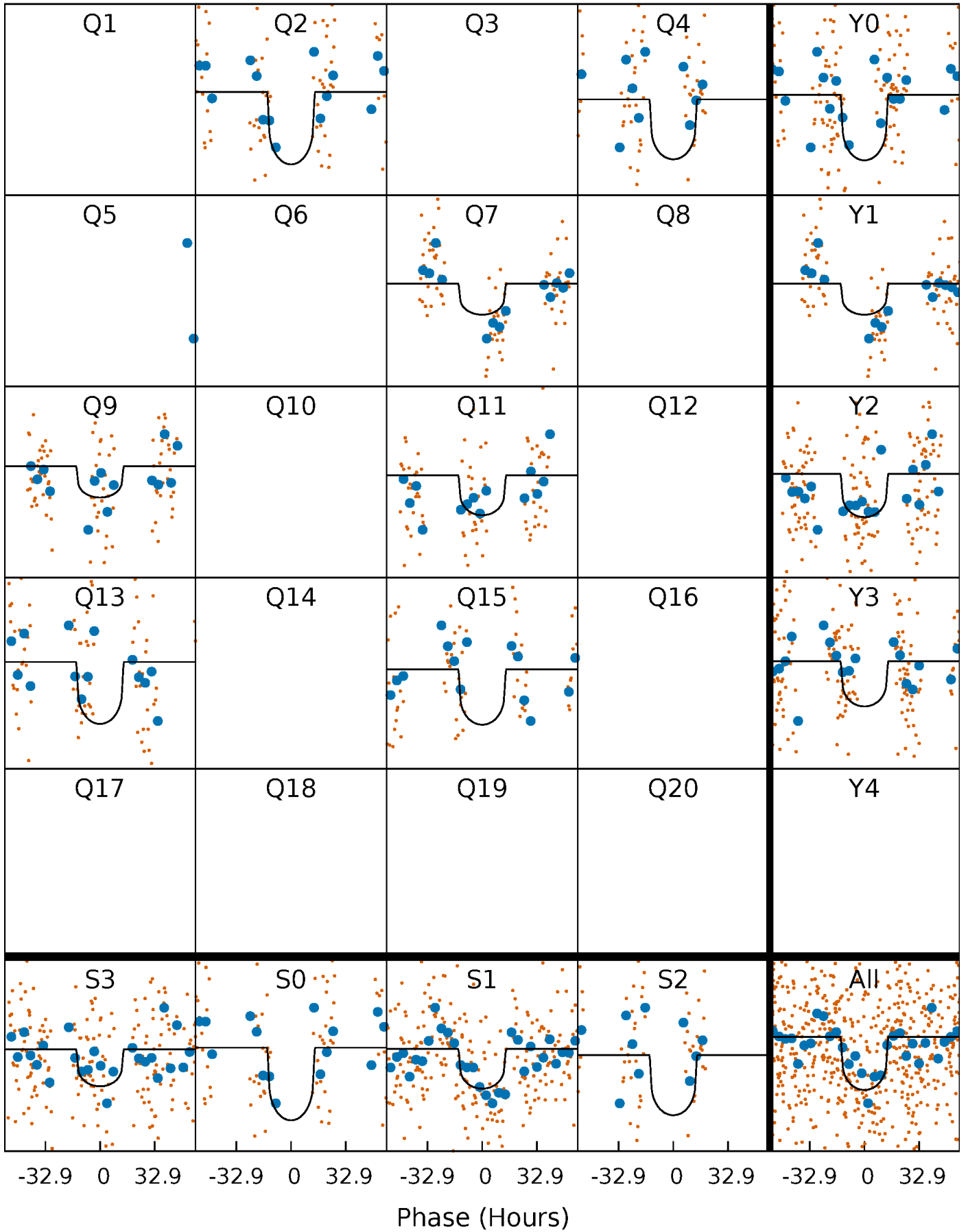
# PDC Quarter-Phased Transit Curves

TCE 004949801-02     $P=192.627655$  Days     $T_0=248.772367$  (BKJD)



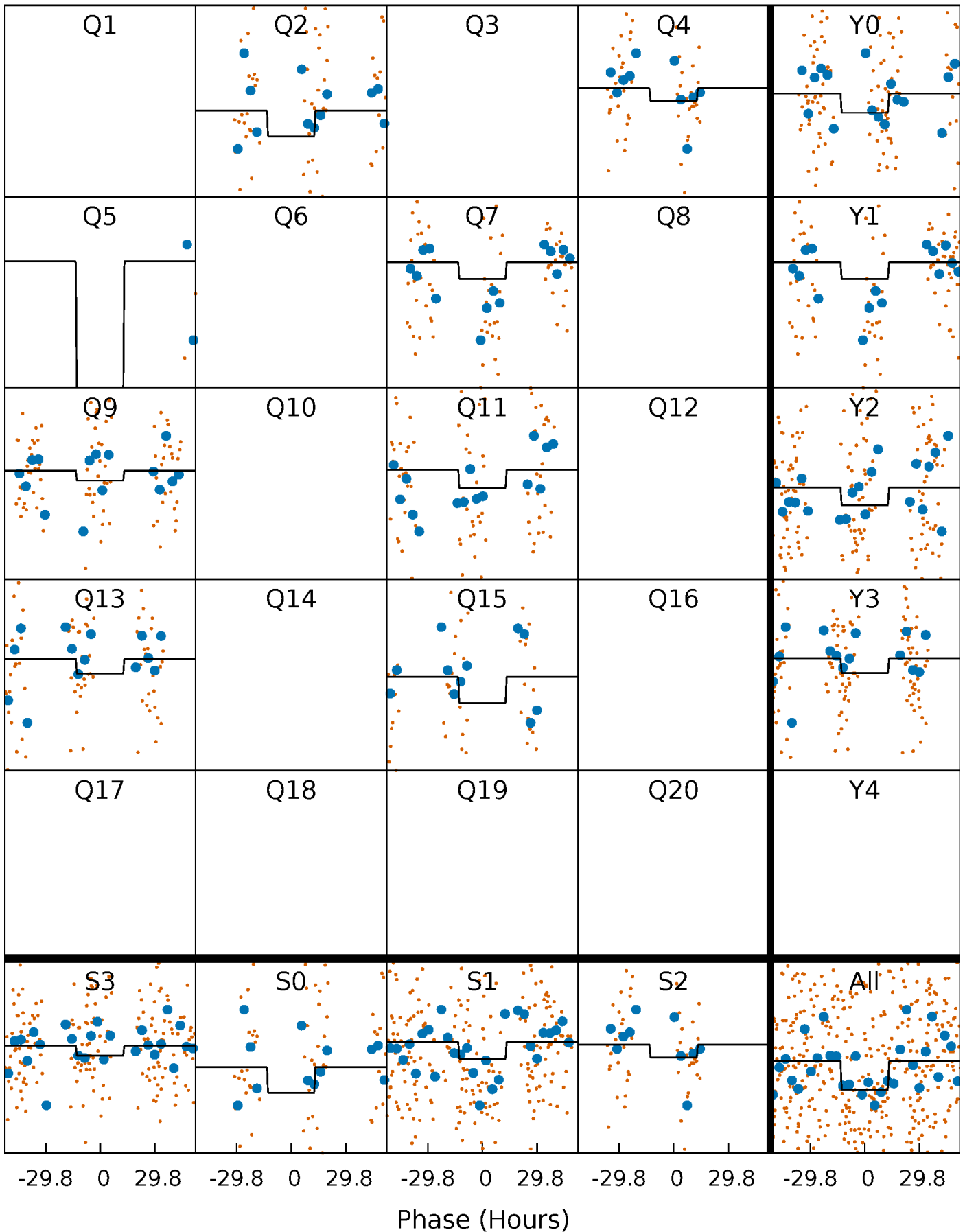
# DV Quarter-Phased Transit Curves

TCE 004949801-02     $P=192.627655$  Days     $T_0=248.772367$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 004949801-02 P=192.572681 Days  $T_0=249.029163$  (BKJD)

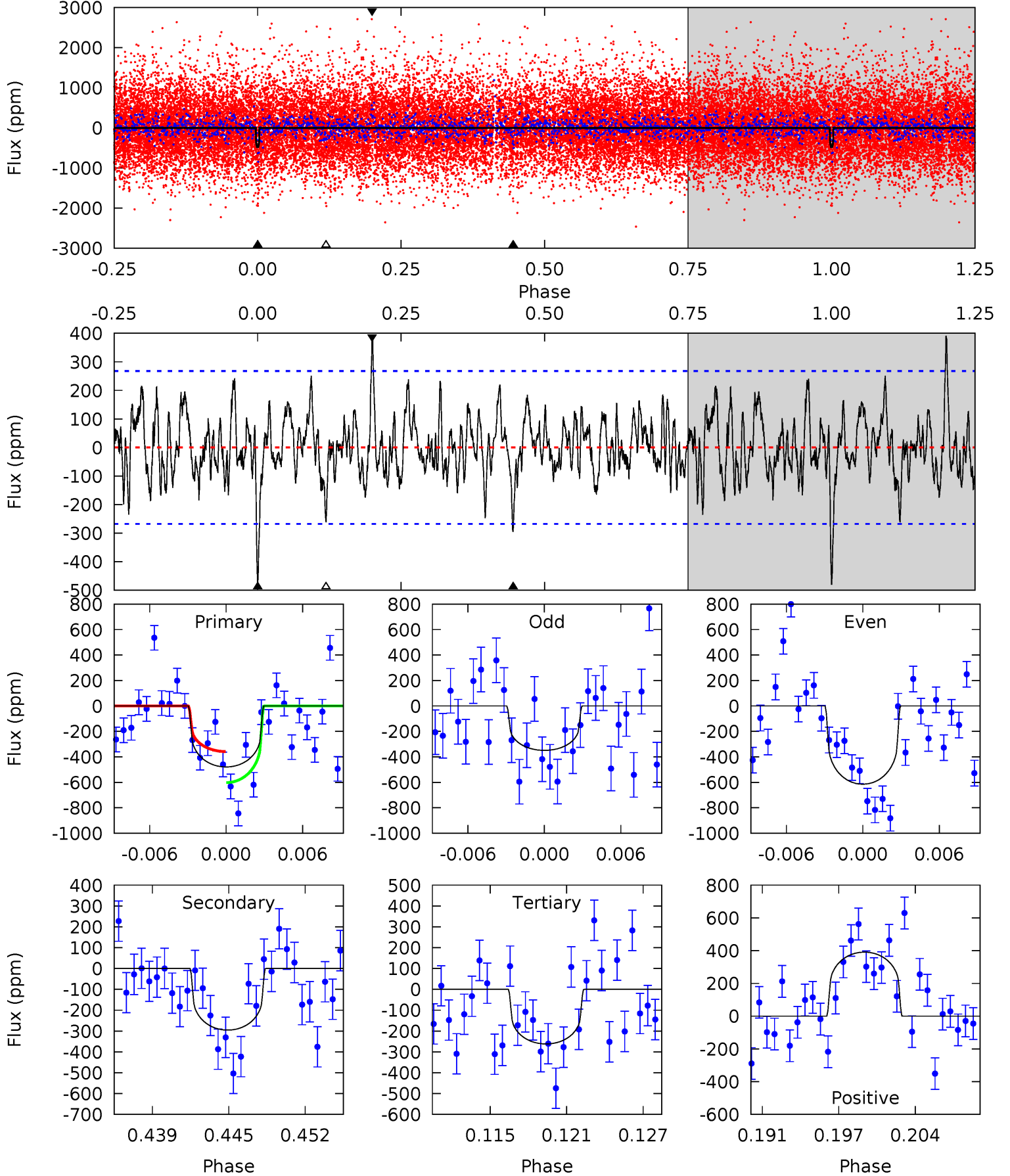




# DV Model-Shift Uniqueness Test

004949801-02, P = 192.627655 Days, E = 56.144712 Days

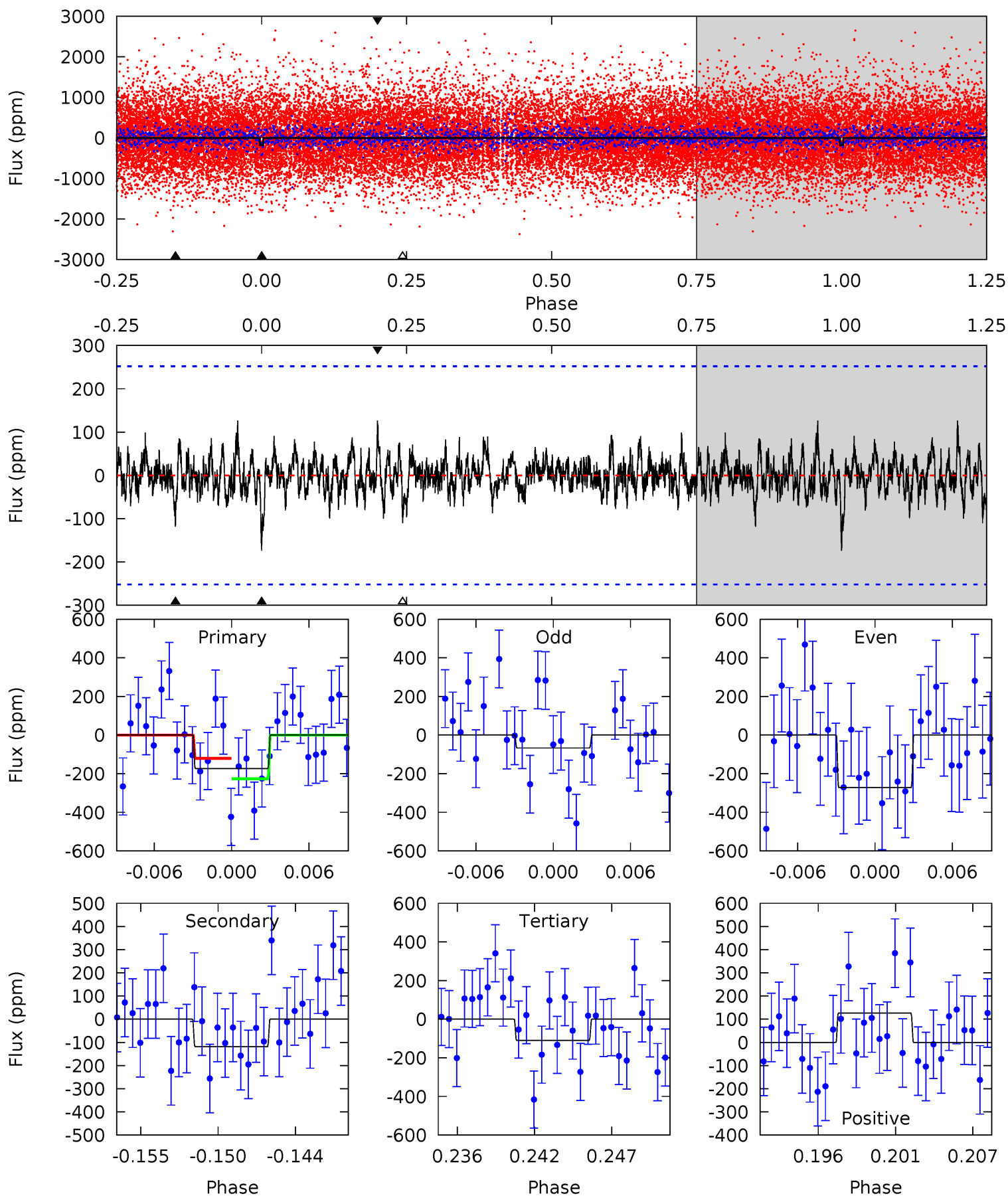
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
9.15	5.64	5.00	7.46	5.11	2.73	1.74	4.14	1.68	0.64	-1.82	2.52	1.17	0.45	2.33



# Alt Model-Shift Uniqueness Test

004949801-02,  $P = 192.572681$  Days,  $E = 56.456482$  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
3.54	2.41	2.25	2.58	5.13	2.76	0.66	1.30	0.96	0.17	-0.17	2.09	1.87	0.42	1.08



### Stellar Parameters For KIC 004949801

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5480^{+172}_{-191}$	$4.511^{+0.033}_{-0.176}$	$0.480^{+0.050}_{-0.300}$	$0.934^{+0.229}_{-0.076}$	$1.031^{+0.072}_{-0.112}$	$1.785^{+0.380}_{-0.818}$
	+3%/-3%	+1%/-4%	+10%/-62%	+25%/-8%	+7%/-11%	+21%/-46%
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 004949801-02 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-296 \pm 52$	$2.59^{+0.85}_{-0.79}$	$411^{+23}_{-20}$	$4685^{+871}_{-478}$	$9995^{+10713}_{-4320}$
Alt.	$-118 \pm 49$	$1.44^{+0.86}_{-0.71}$	$411^{+25}_{-19}$	$4869^{+2091}_{-806}$	$12254^{+41331}_{-7586}$

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

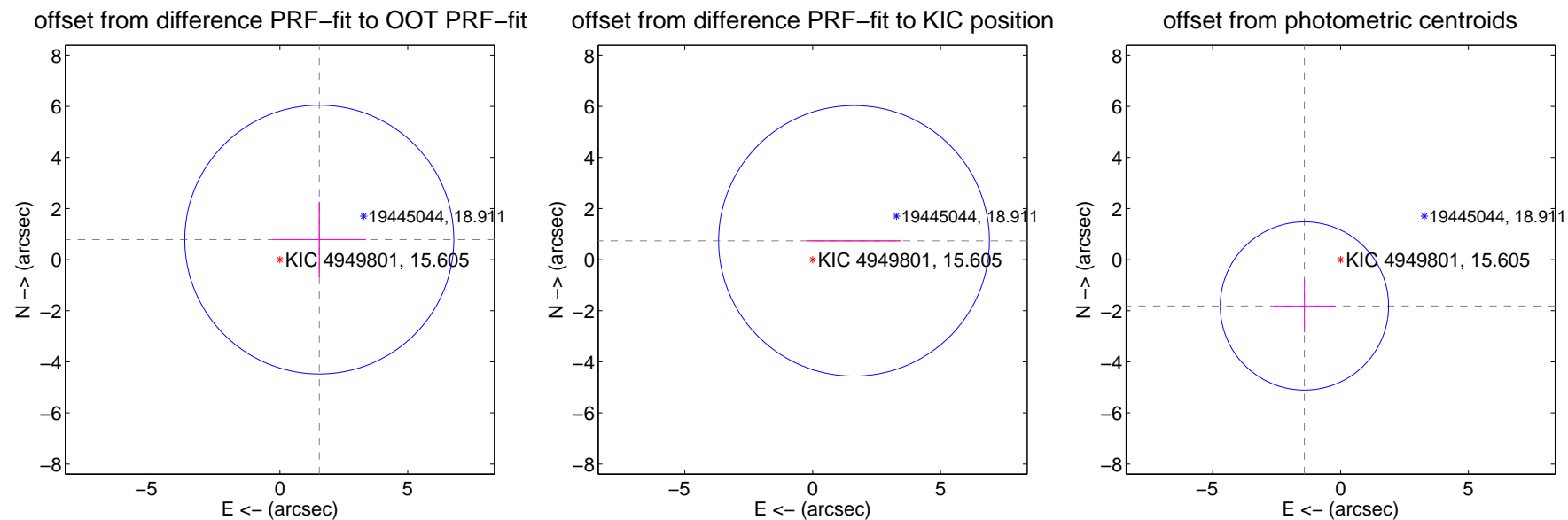
## DV Centroid Data

Supplemental centroid analysis for 004949801-02. Kepler magnitude: 15.61. Transit SNR 6.78

There are 0 quarters with good PRF difference image offsets

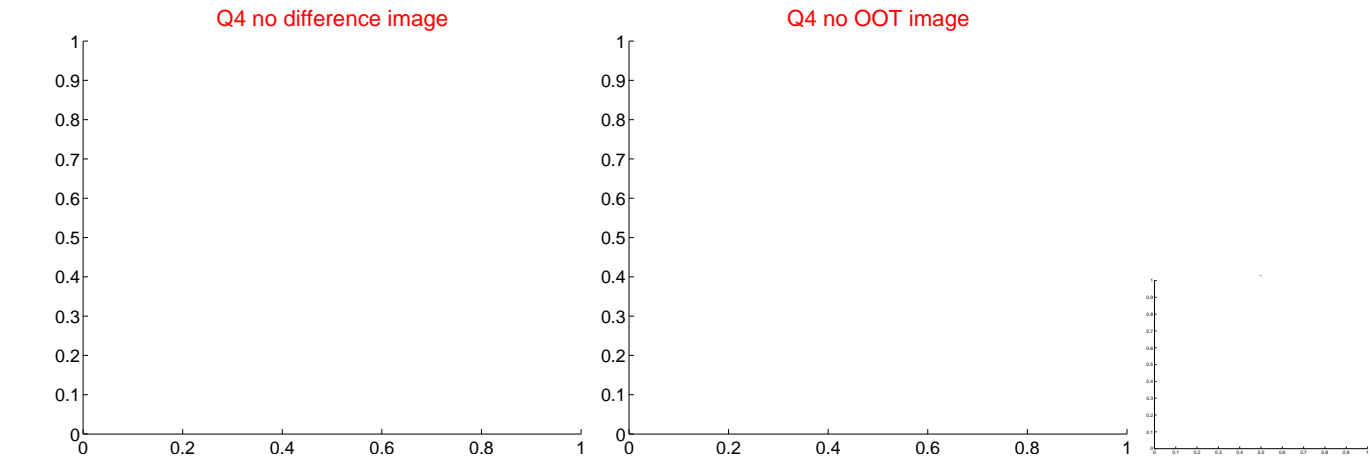
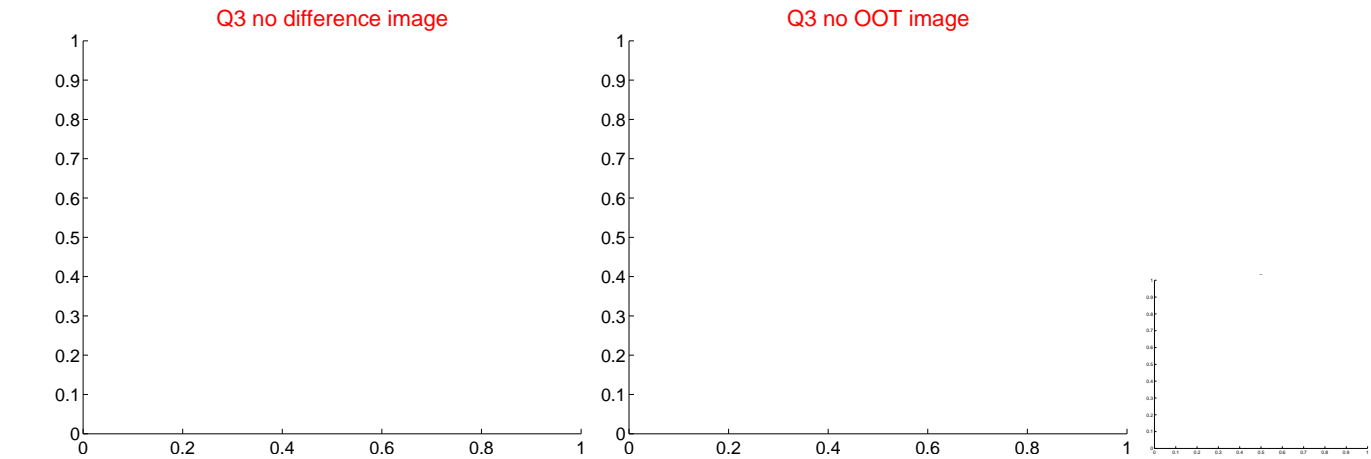
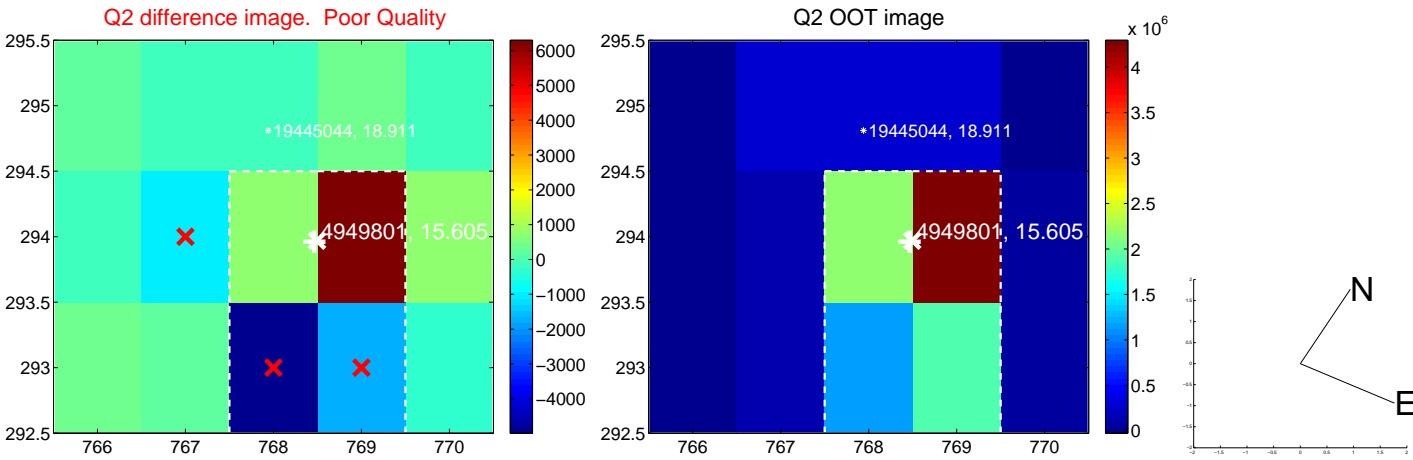
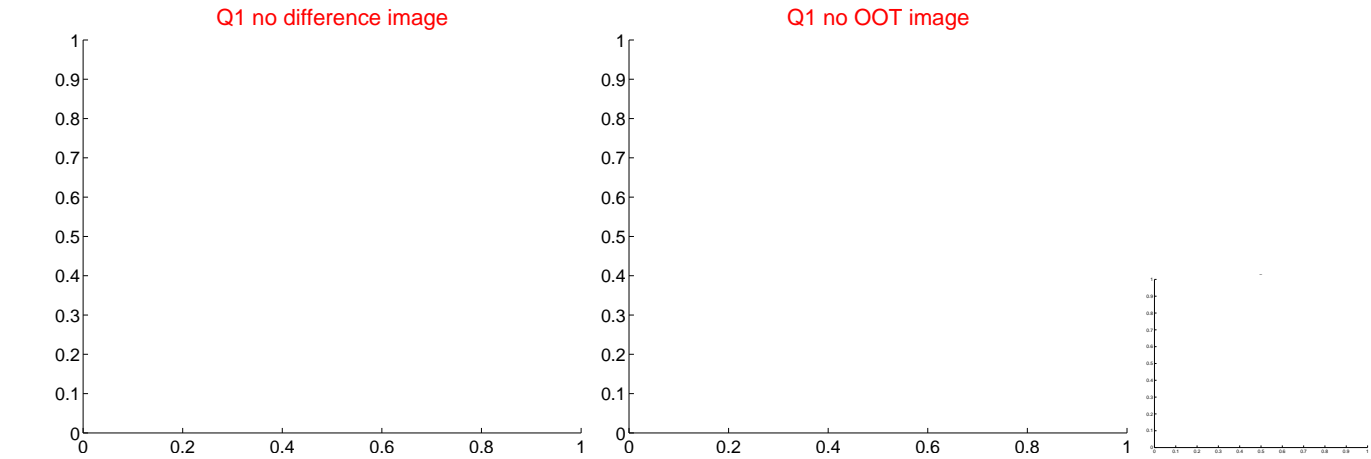
The direct PRF centroid is offset from the target star catalog position by about 0.09 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.730 \pm 1.754$	0.99	$-1.542 \pm 1.820$	$0.786 \pm 1.472$
PRF-fit source offset from KIC position	$1.777 \pm 1.765$	1.01	$-1.617 \pm 1.820$	$0.737 \pm 1.472$
photometric centroid source offset	$2.30 \pm 1.10$	2.10	$1.41 \pm 1.20$	$-1.81 \pm 1.03$

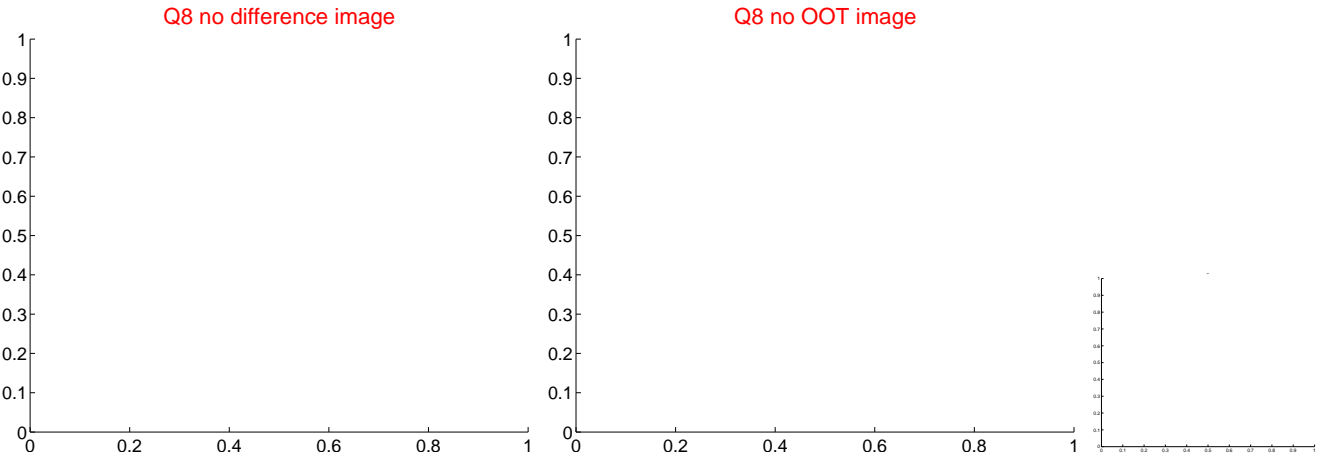
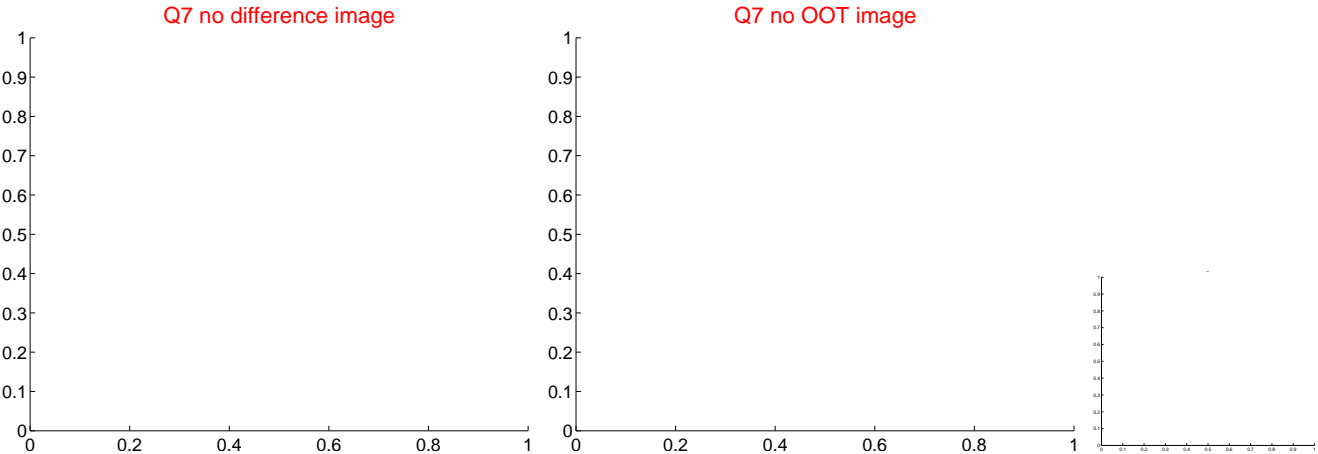
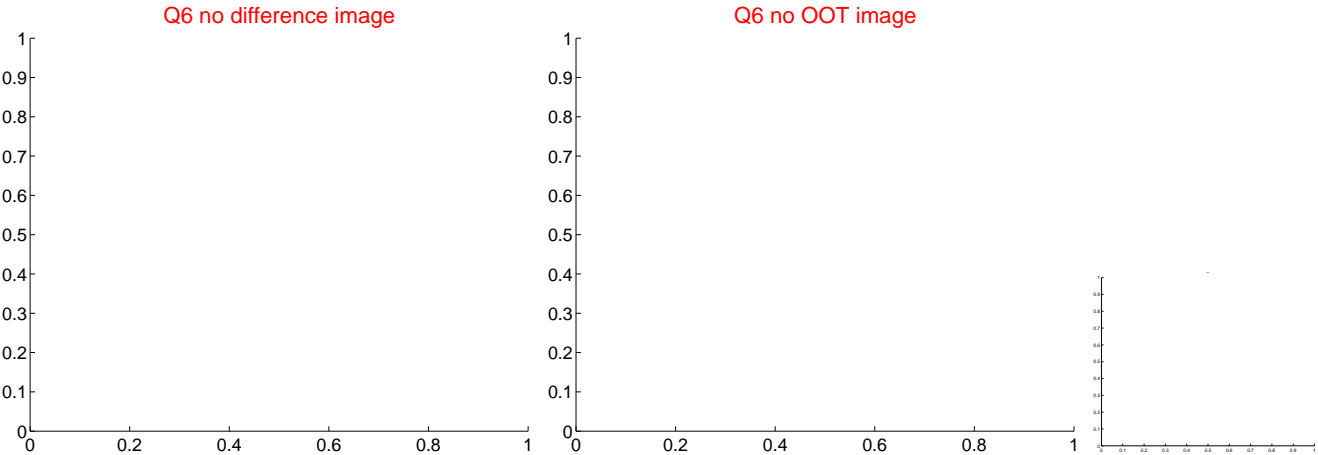
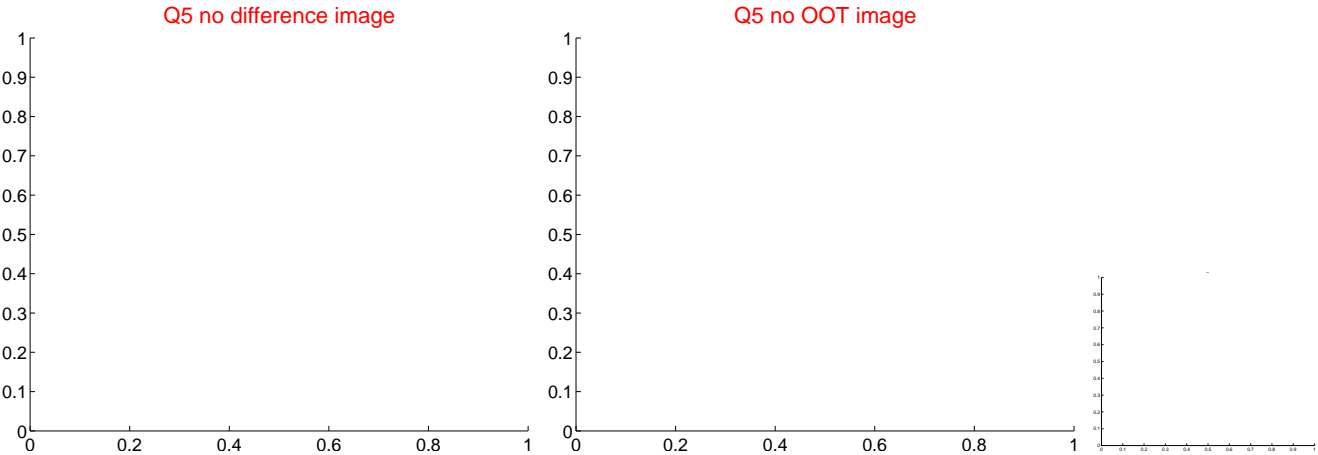


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three- $\sigma$ . 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 ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.

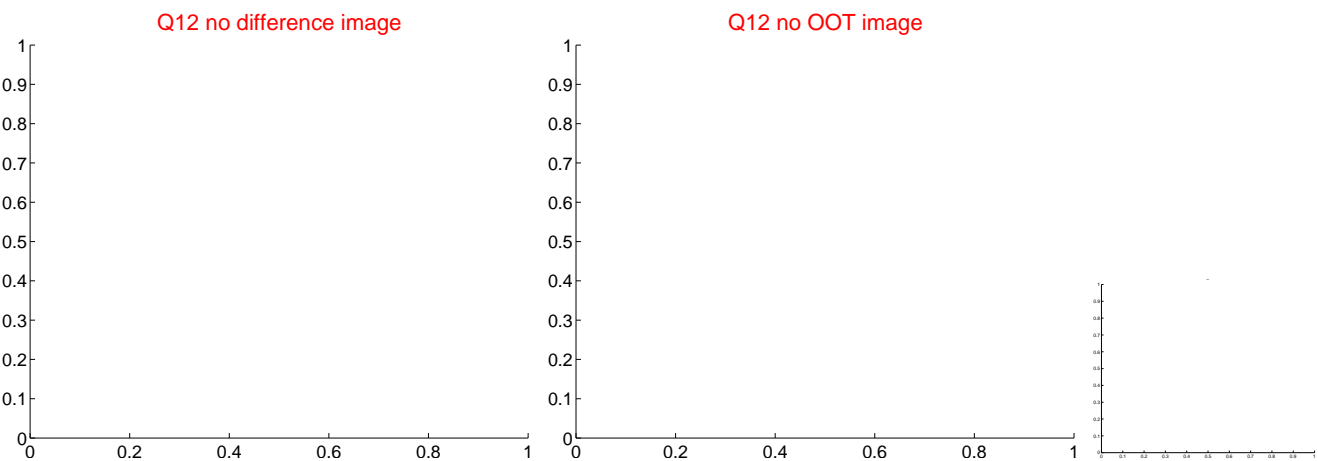
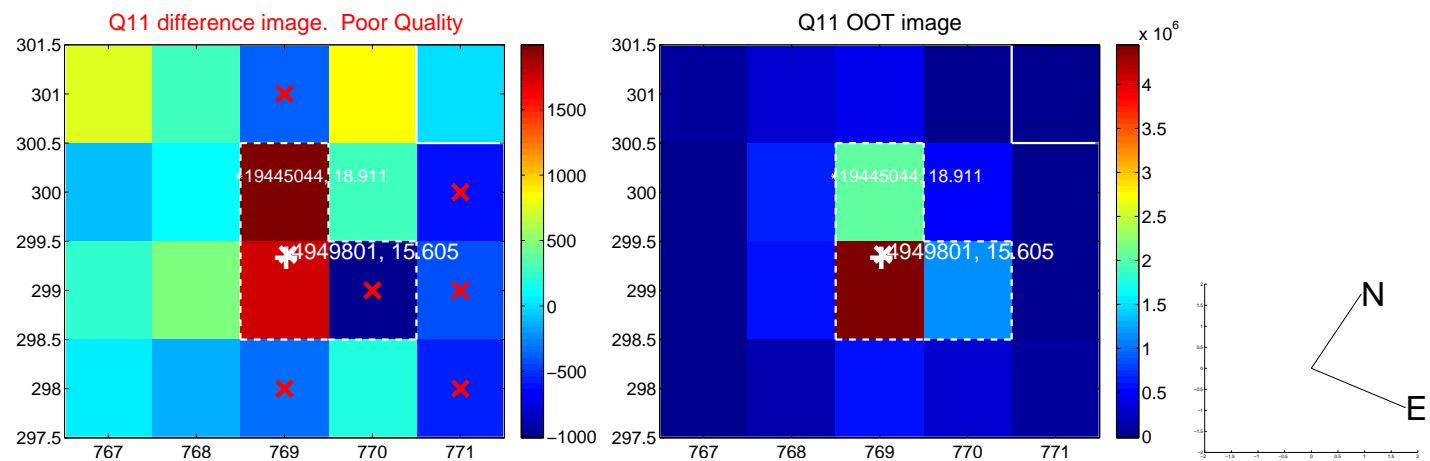
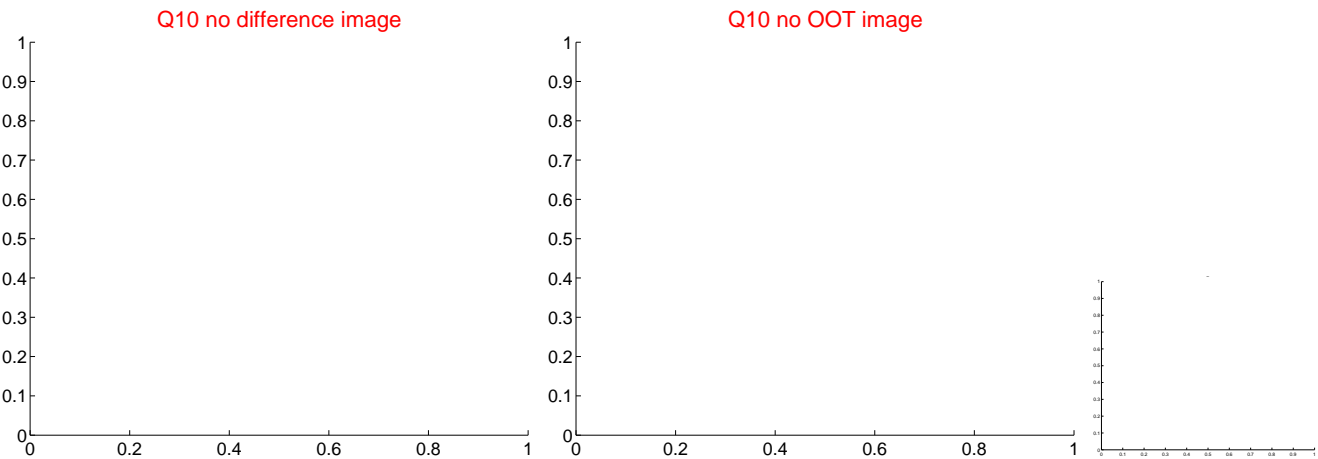
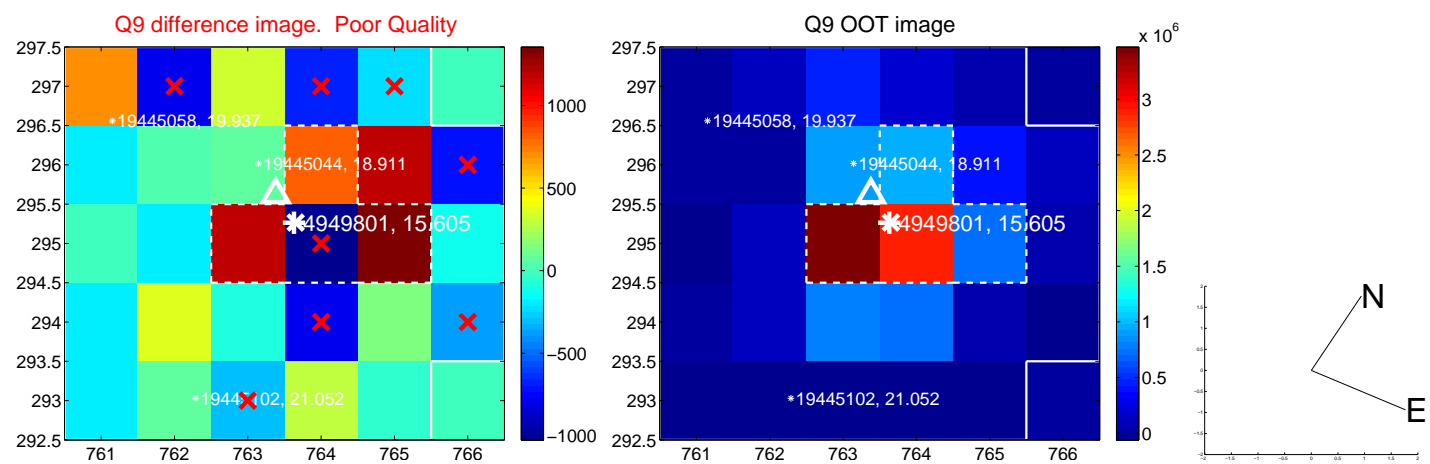


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

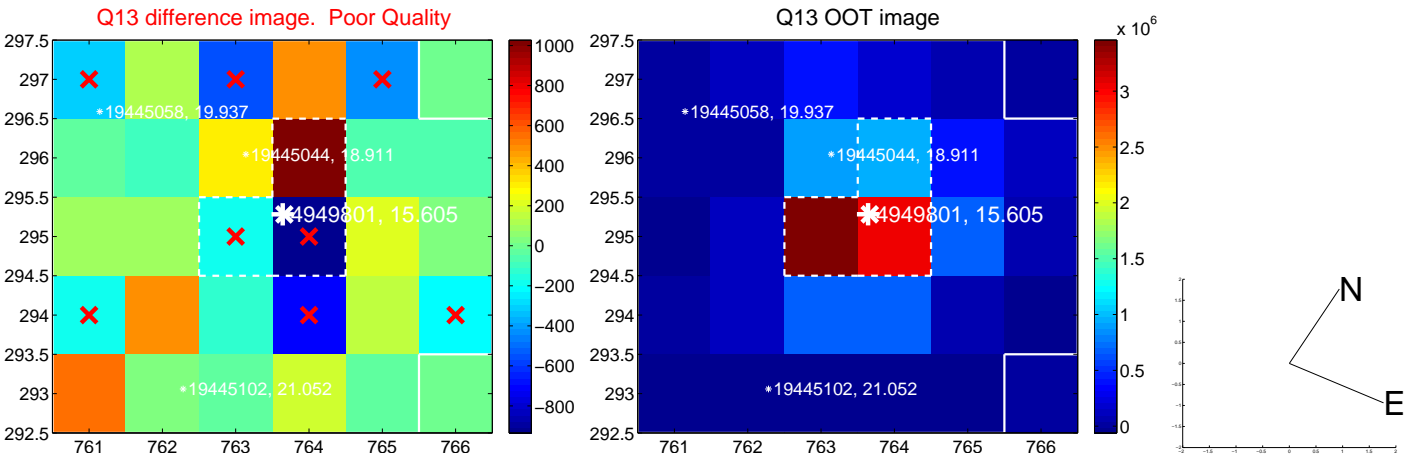




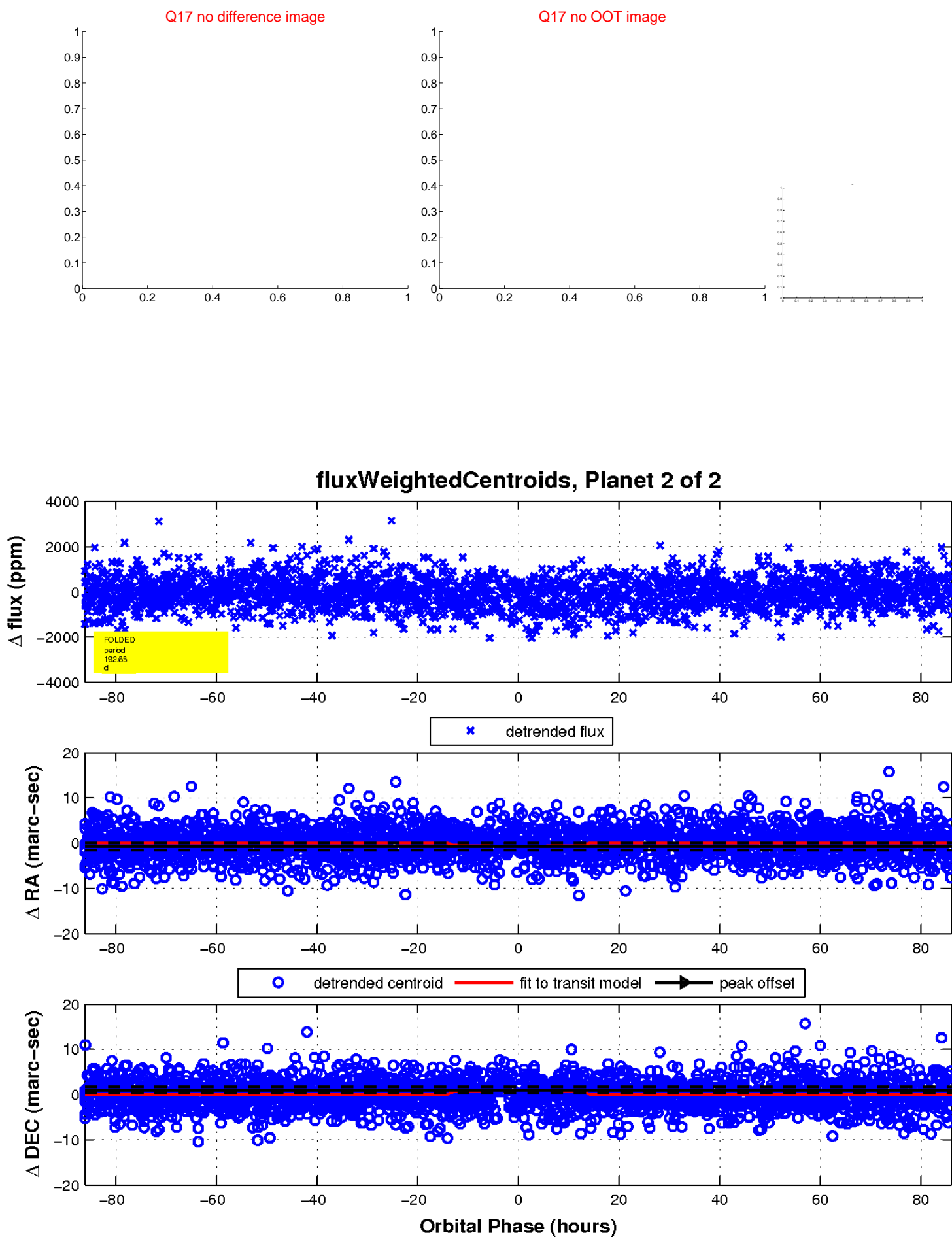
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.



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



UKIRT Image

