

# KIC 005978682

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005978682-01	OBS	No	0.692126	131.738122	12.5	4.894	7.8	6.6	0.97	6480	0.35	6148.86
005978682-02	OBS	No	24.556245	141.930135	188.7	4.447	17.8	5.5	0.97	6480	1.48	52.74
005978682-03	OBS	No	23.517485	142.468375	380.7	2.809	14.8	8.1	0.97	6480	1.91	55.87
005978682-04	OBS	No	49.124797	141.099078	409.0	2.988	10.3	7.4	0.97	6480	2.05	20.92
005978682-05	OBS	No	60.189547	145.263653	577.9	2.486	9.7	9.2	0.97	6480	2.68	15.96
005978682-06	OBS	No	29.747329	148.690933	849.2	0.510	8.9	6.4	0.97	6480	3.64	40.84
005978682-07	OBS	No	59.562405	152.822565	453.6	1.528	9.9	5.9	0.97	6480	2.45	16.18

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005978682-01	OBS	FP	0.00	1	0	1	0	LPP_DV—LPP_ALT—CENT_RESOLVED_OFFSET
005978682-02	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_TRACKER—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—CENT_RESOLVED_OFFSET
005978682-03	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_RESOLVED_OFFSET
005978682-04	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_ZUMA—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—CENT_RESOLVED_OFFSET
005978682-05	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—CENT_RESOLVED_OFFSET
005978682-06	OBS	FP	0.00	1	0	1	0	TRANS_GAPPED—LPP_DV—LPP_ALT—CENT_RESOLVED_OFFSET
005978682-07	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—CENT_RESOLVED_OFFSET

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

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

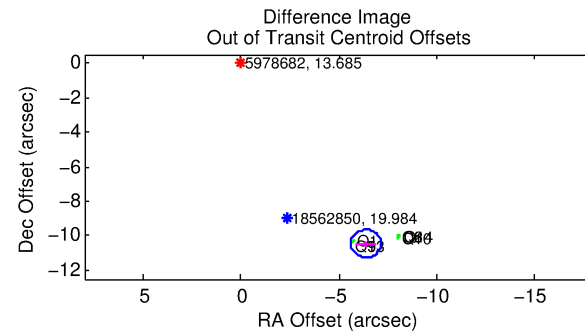
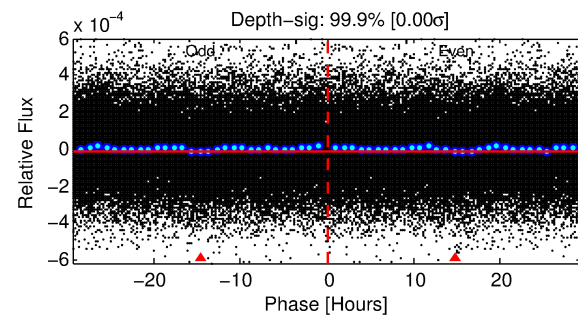
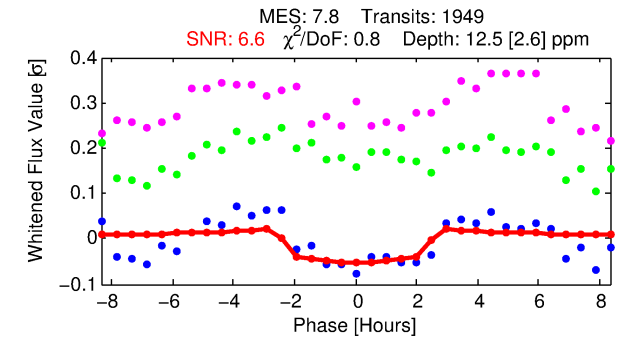
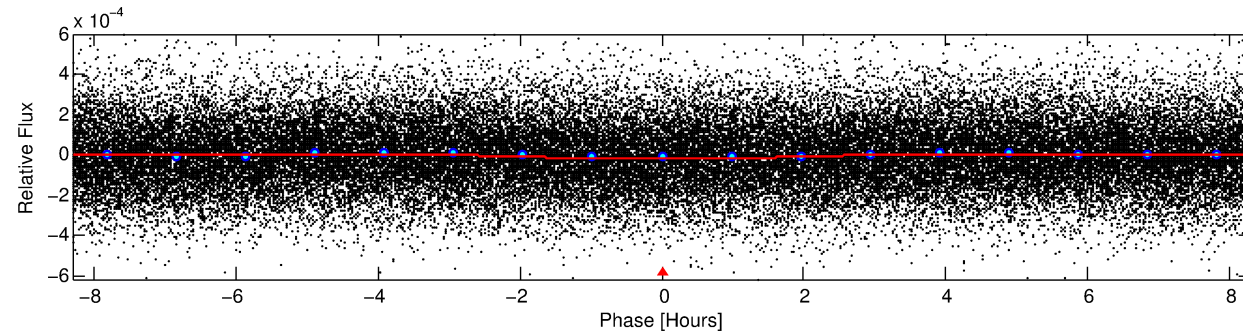
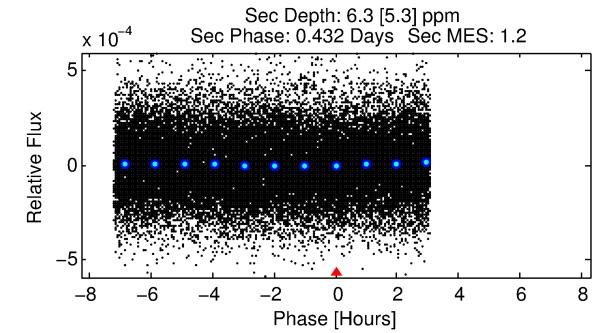
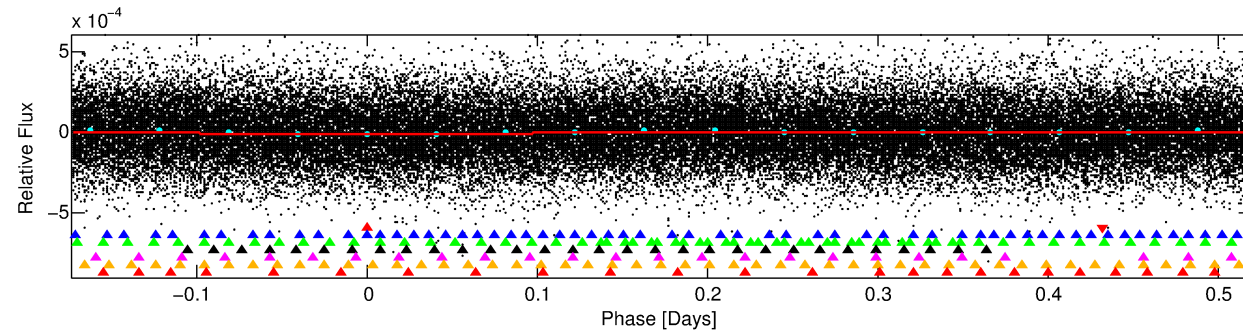
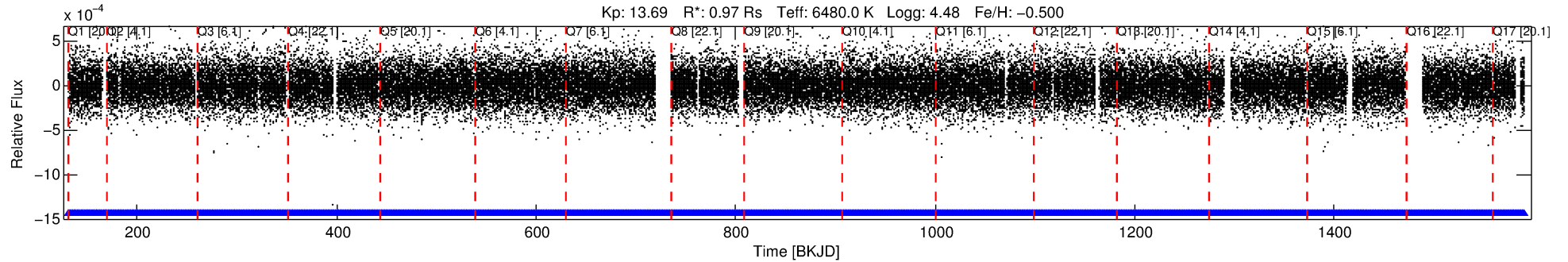
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 005978682-01

No Significant Match Found

# DV One-Page Summary

KIC: 5978682 Candidate: 1 of 7 Period: 0.692 d



## DV Fit Results:

Period = 0.69213 [0.00002] d  
Epoch = 131.7381 [0.0062] BKJD  
Rp/R\* = 0.0033 [0.0039]  
a/R\* = 1.24 [2.74]  
b = 0.28 [21.05]  
Seff = 6148.86 [2607.64]  
Teq = 2258 [239] K  
Rp = 0.35 [0.42] Re  
a = 0.0155 [0.0042] AU  
Ag = 6.91 [17.52] [0.34σ]  
Teff = 5661 [3545] K [0.96σ]

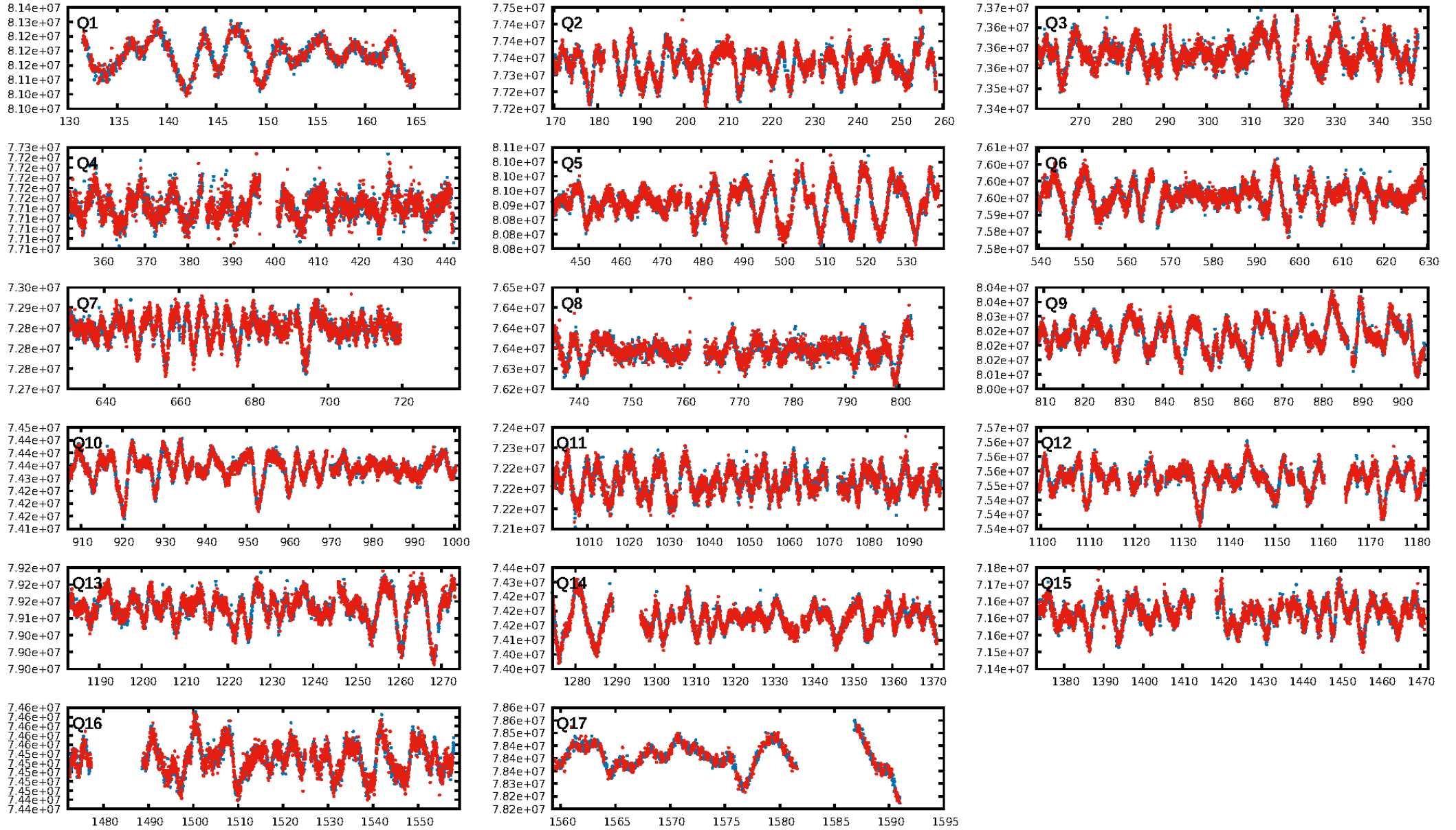
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [97.08σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 5.63e-18  
RollingBand-fgt: 1.00 [1862/1862]  
GhostDiagnostic-chr: -0.4515  
Centroid-sig: 6.6%  
Centroid-so: 2.414 arcsec [1.55σ]  
OotOffset-rm: 12.248 arcsec [46.63σ]  
KicOffset-rm: 12.294 arcsec [45.53σ]  
OotOffset-st: 4/0/0/4 [8]  
KicOffset-st: 4/0/0/4 [8]  
DiffImageQuality-fgm: 0.50 [4/8]  
DiffImageOverlap-fno: 1.00 [17/17]

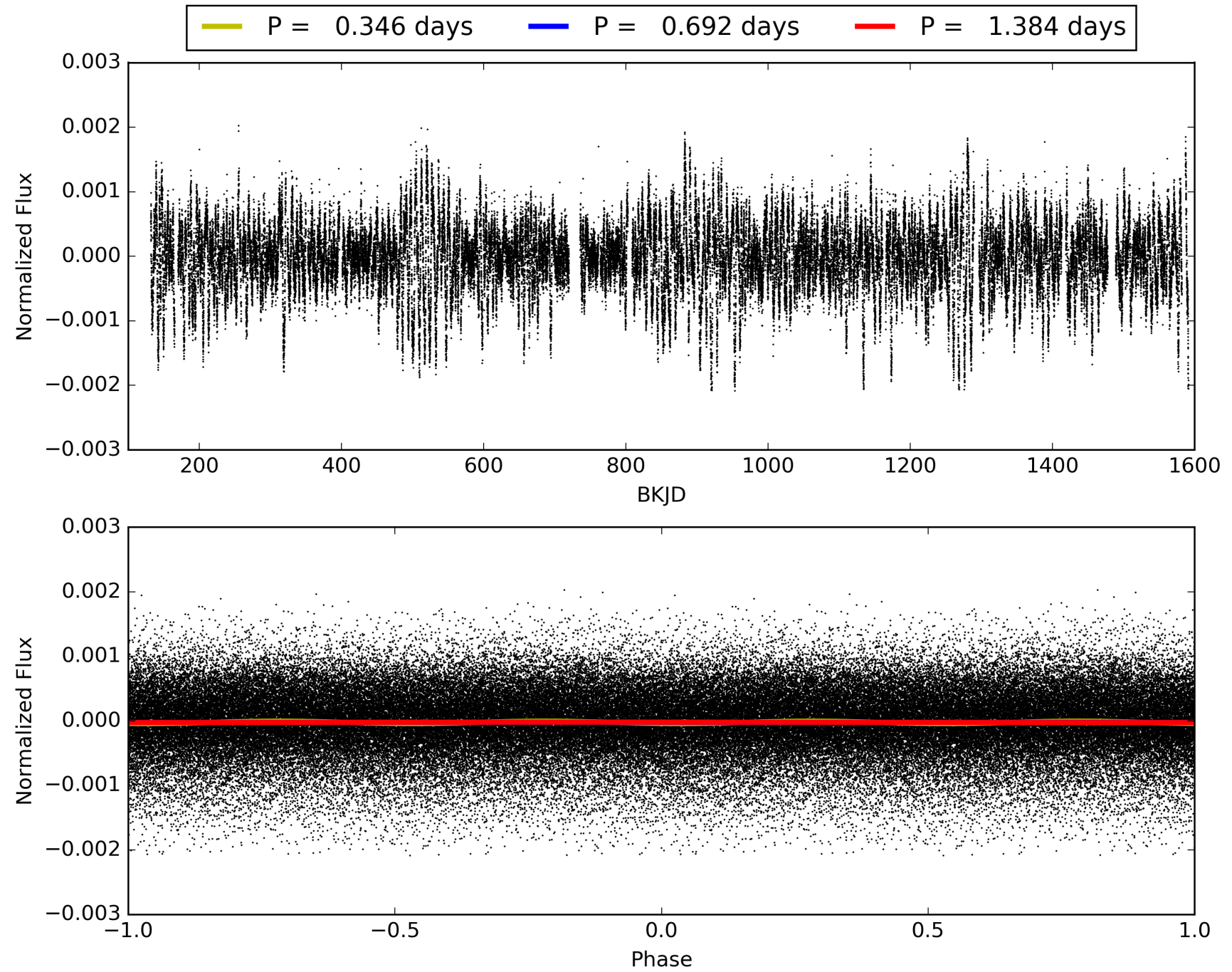
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 03-Feb-2016 06:55:48 Z

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

# TCE 005978682-01, PDC Light Curves



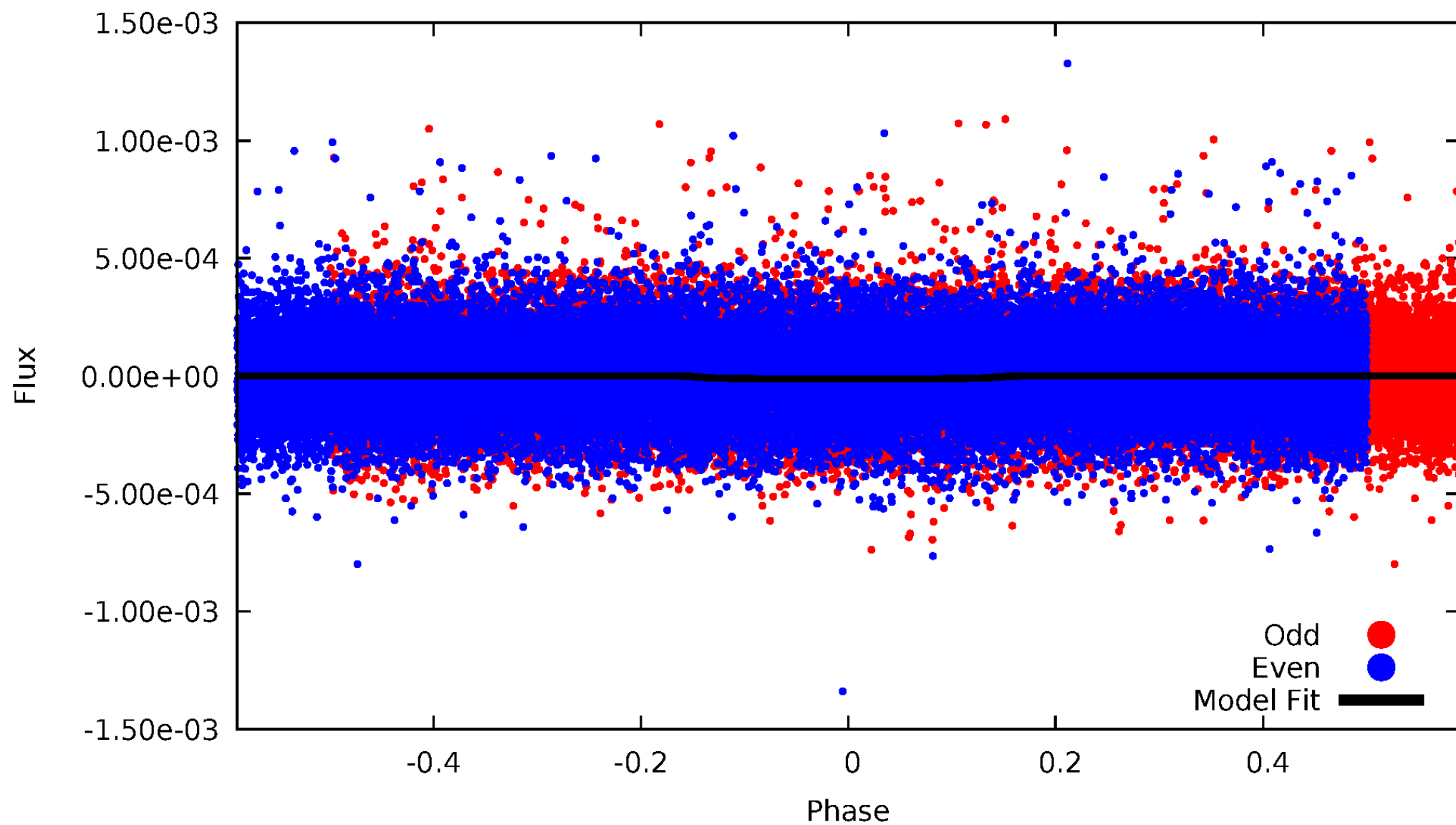
# TCE 005978682-01





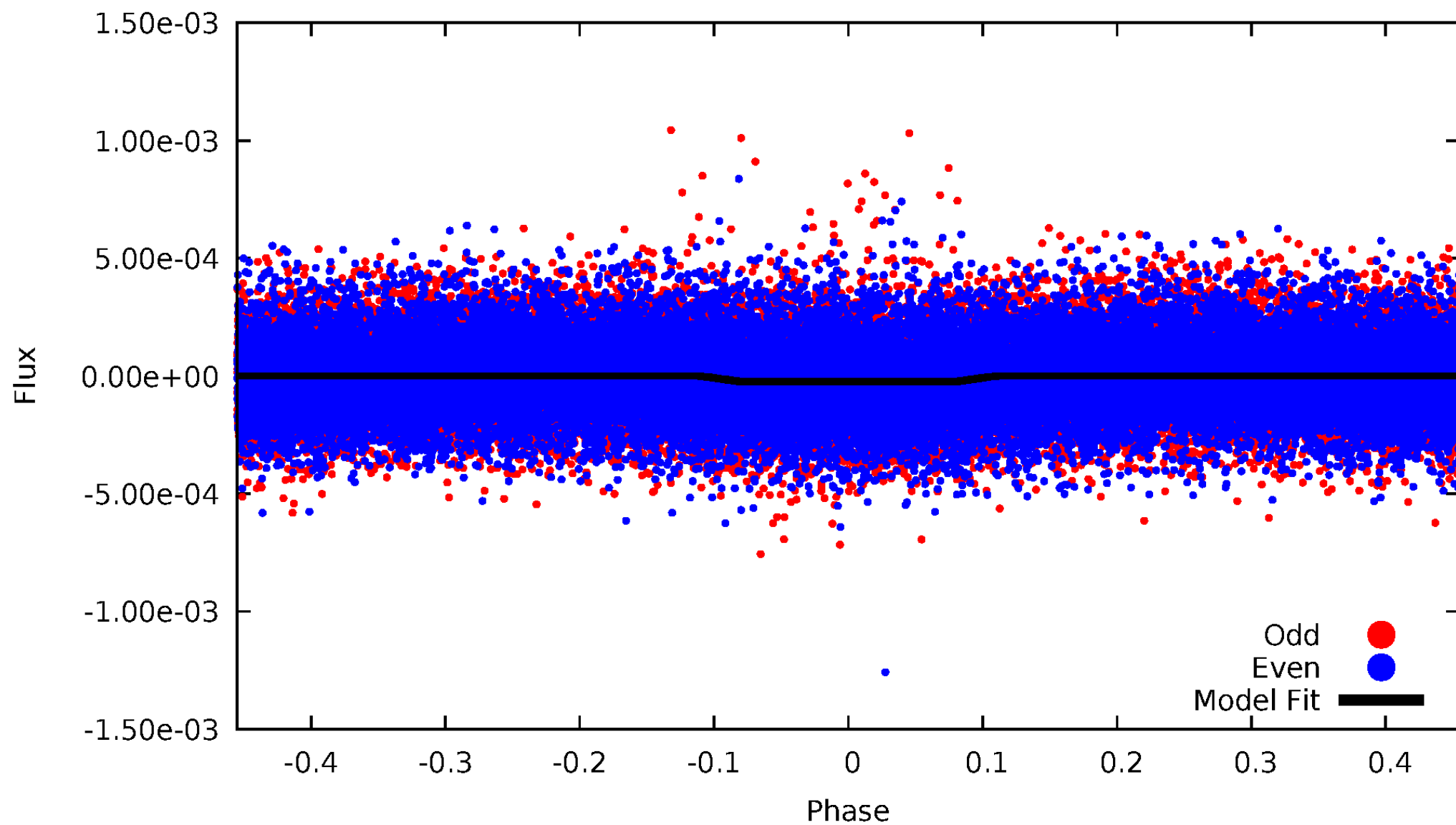
DV Odd/Even

TCE 005978682-01



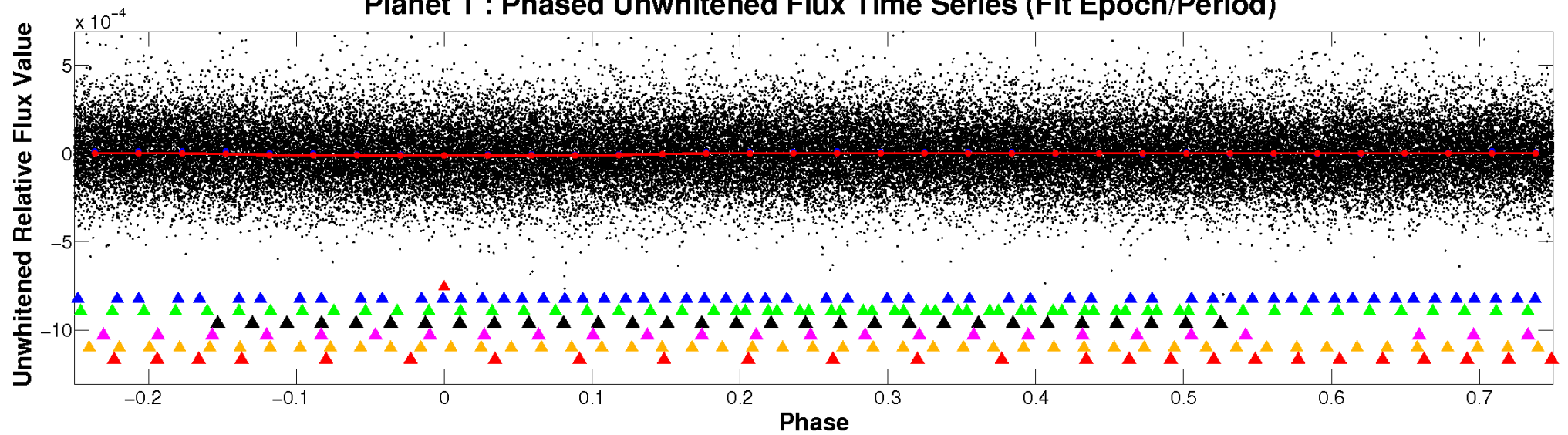
# ALT Odd/Even

TCE 005978682-01

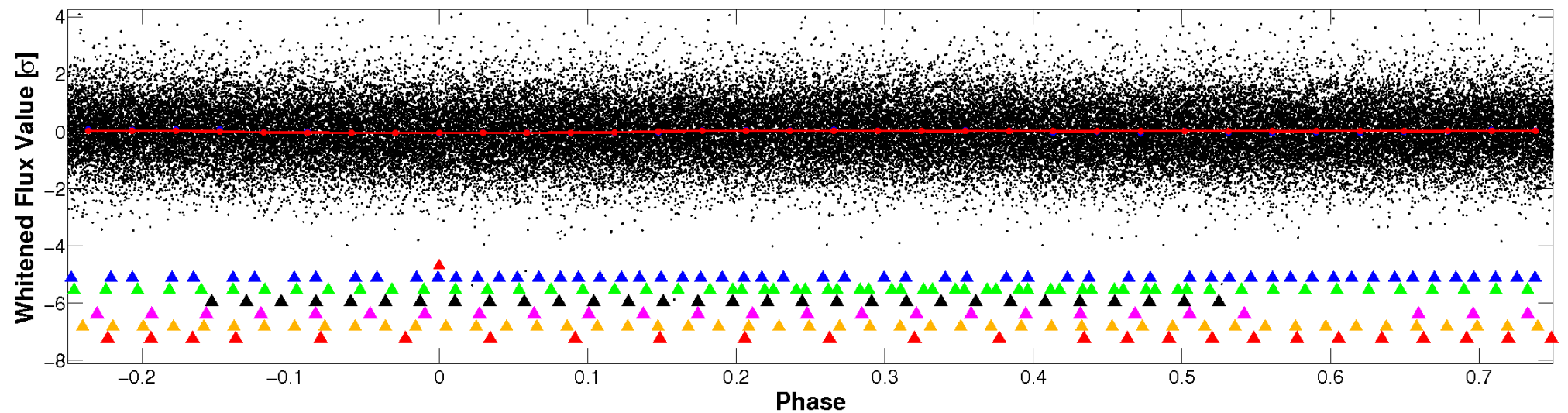


# Non-Whitened Vs. Whitened Light Curve

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

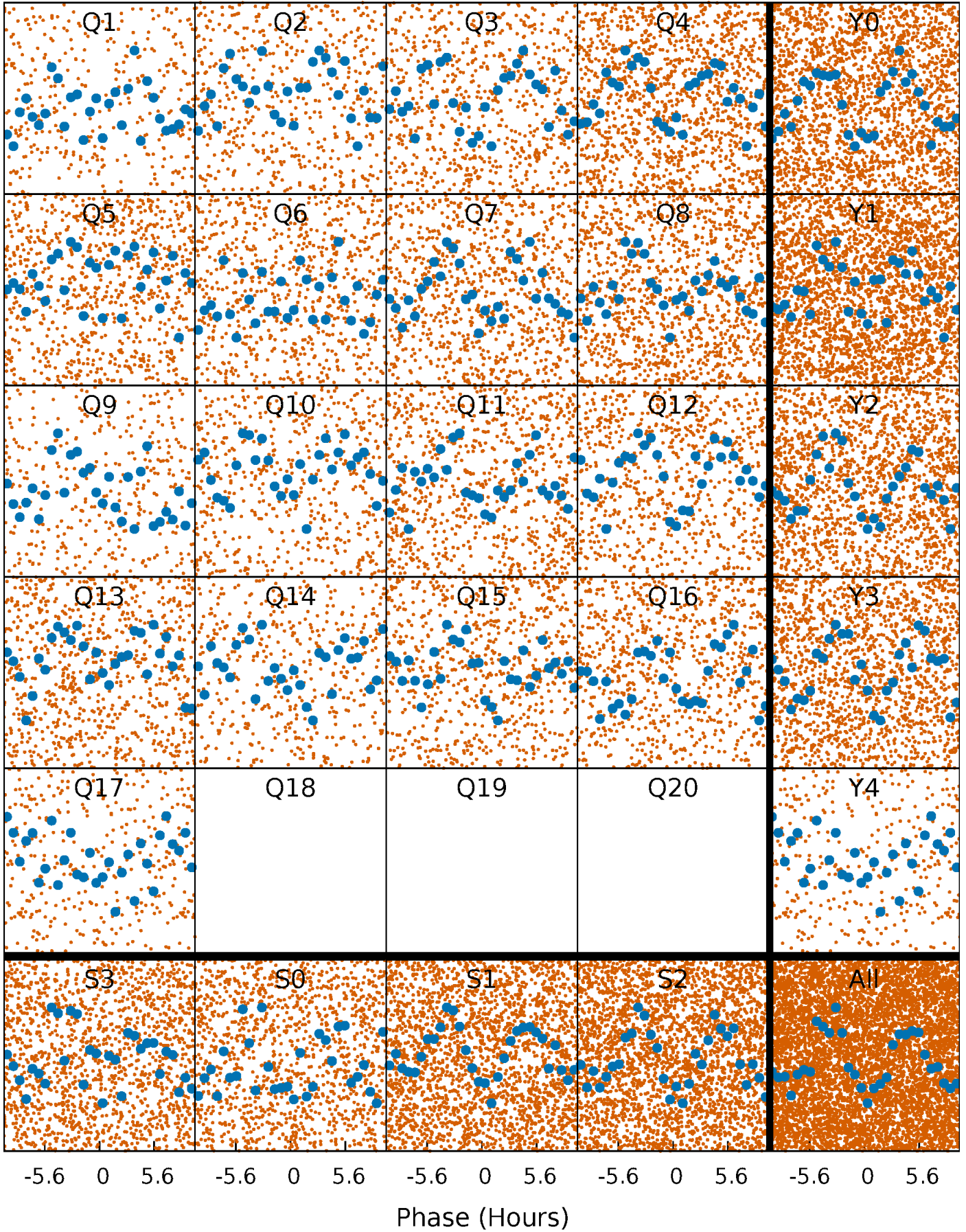


## Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

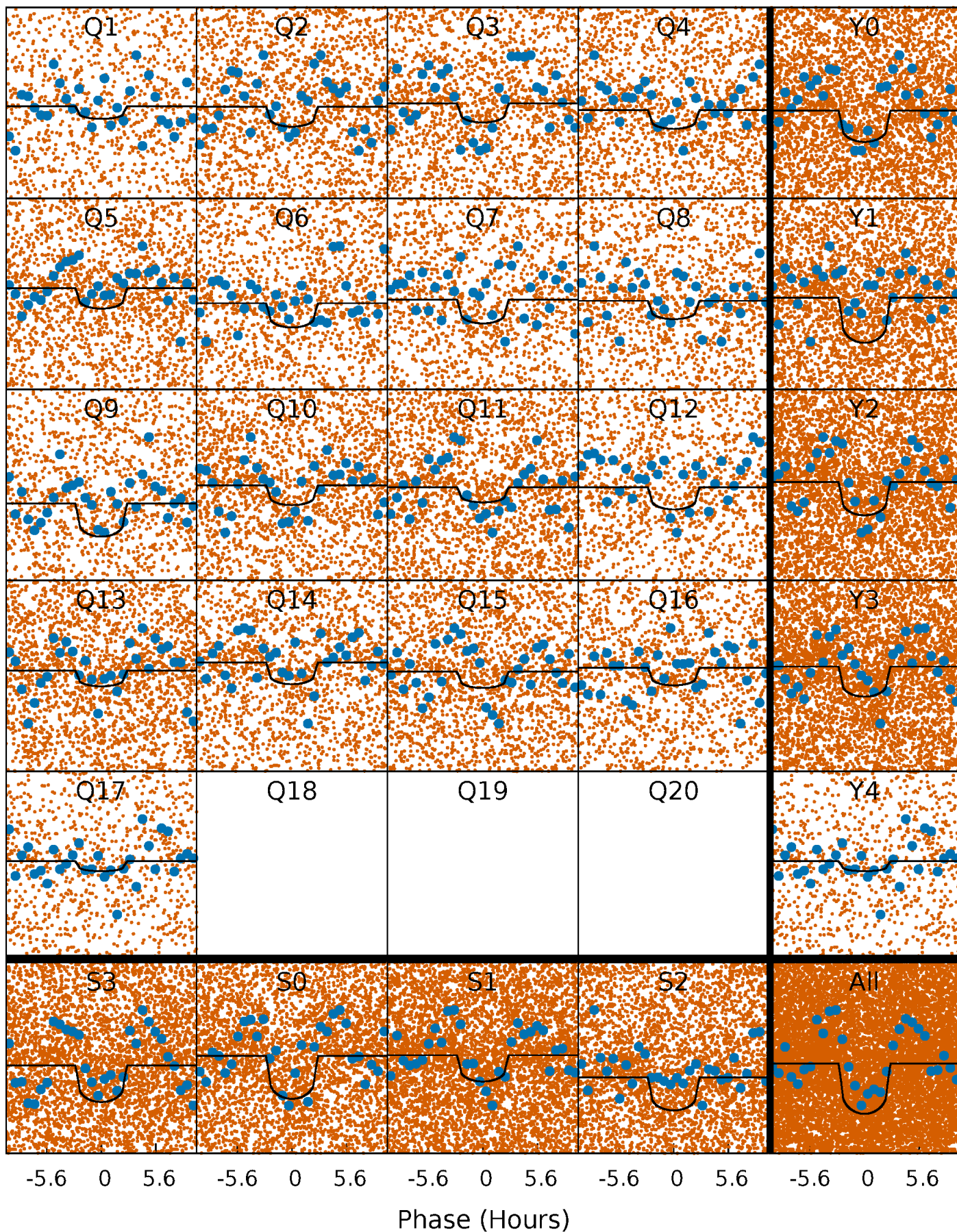
TCE 005978682-01 P= 0.692126 Days  $T_0=131.738122$  (BKJD)





# DV Quarter-Phased Transit Curves

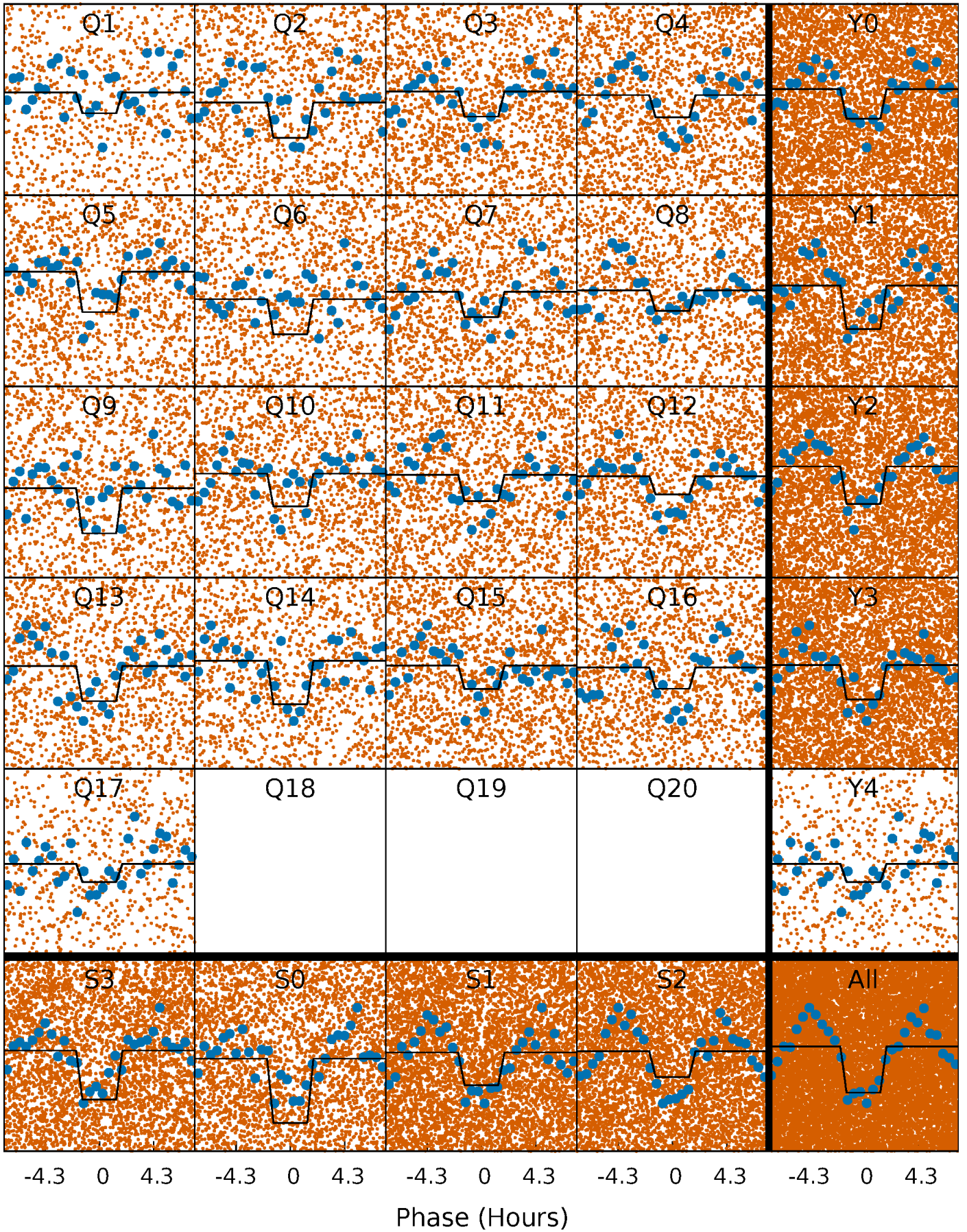
TCE 005978682-01 P= 0.692126 Days  $T_0=131.738122$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

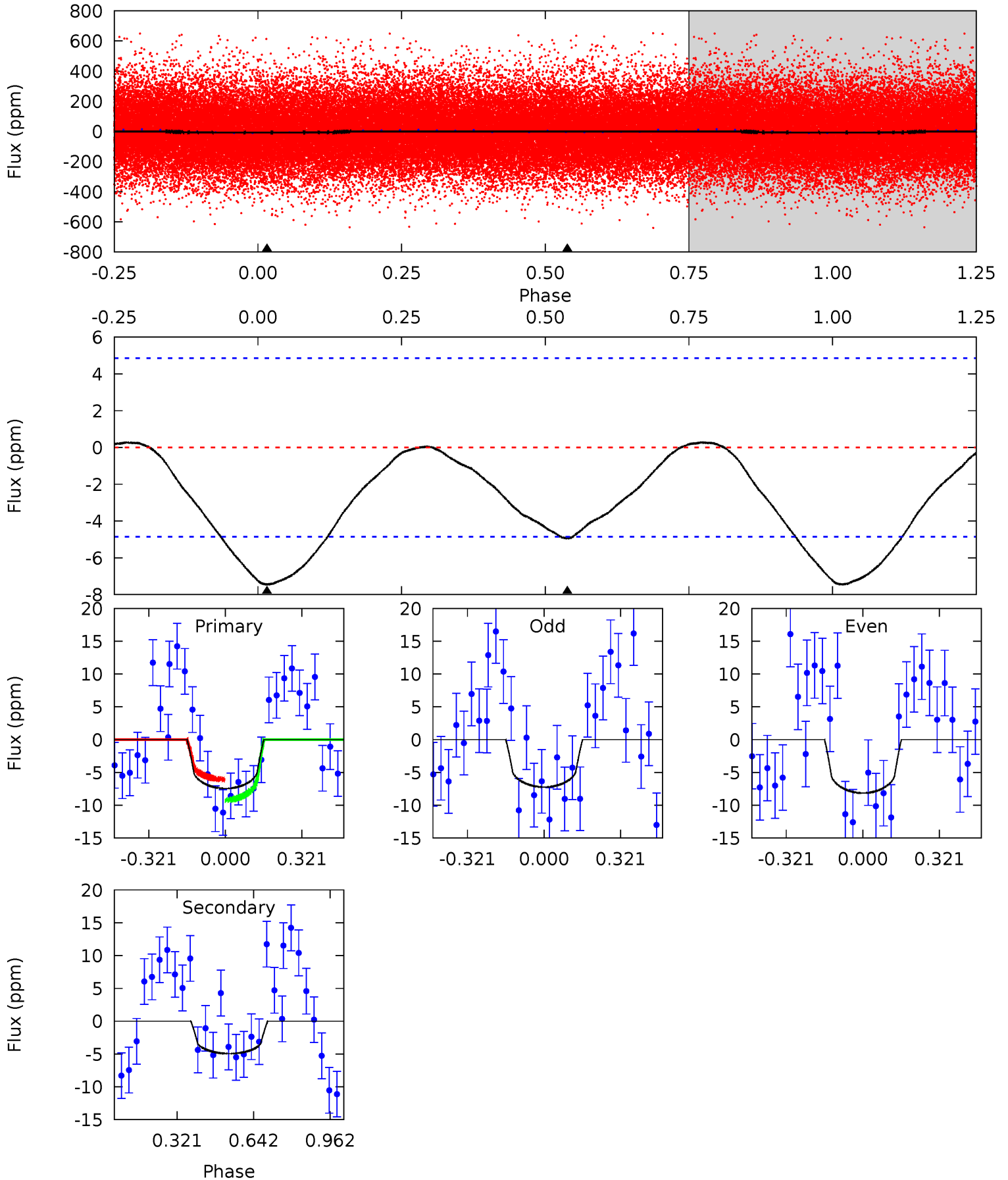
TCE 005978682-01 P= 0.692185 Days  $T_0=131.692970$  (BKJD)



# DV Model-Shift Uniqueness Test

005978682-01, P = 0.692126 Days, E = 131.045996 Days

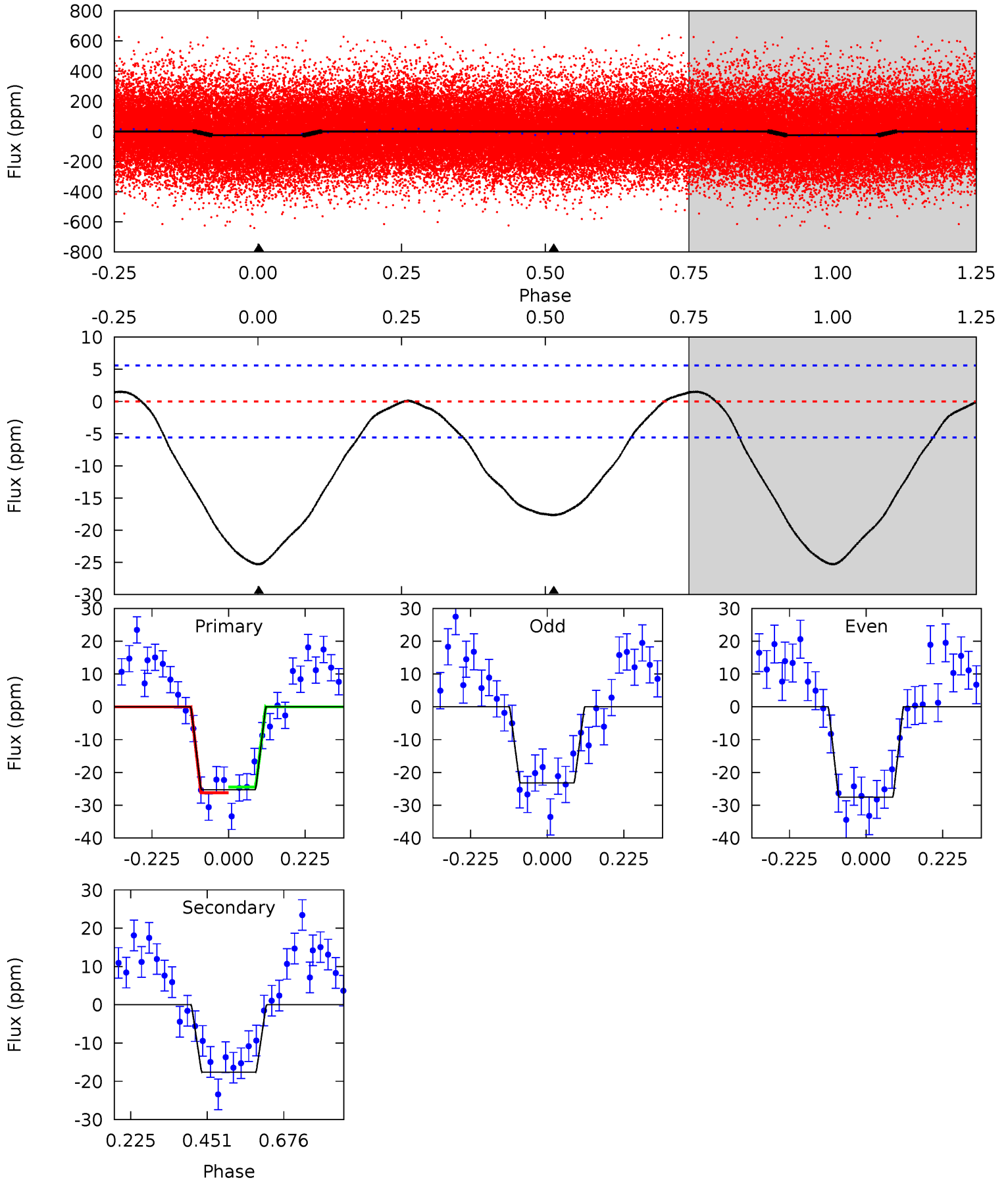
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
6.62	4.40	0	0	4.31	0.99	0.18	6.62	6.62	4.40	4.40	0.40	0.68	0.04	1.39



# Alt Model-Shift Uniqueness Test

005978682-01, P = 0.692185 Days, E = 131.000785 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
19.9	13.9	0	0	4.39	1.21	0.70	19.9	19.9	13.9	13.9	1.70	0.91	0.06	0.66





### Stellar Parameters For KIC 005978682

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6480^{+145}_{-210}$	$4.484^{+0.042}_{-0.224}$	$-0.500^{+0.300}_{-0.300}$	$0.970^{+0.308}_{-0.082}$	$1.045^{+0.133}_{-0.133}$	$1.614^{+0.345}_{-0.863}$
	+2%/-3%	+1%/-5%	+60%/-60%	+32%/-8%	+13%/-13%	+21%/-53%
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 005978682-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-5 \pm 1$	$0.49^{+0.41}_{-0.31}$	$3223^{+238}_{-145}$	$4606^{+3389}_{-1117}$	$2.610^{+18.740}_{-1.843}$
Alt.	$-18 \pm 1$	$0.59^{+0.44}_{-0.35}$	$3227^{+244}_{-138}$	$5715^{+4016}_{-1312}$	$6.438^{+36.107}_{-4.296}$

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

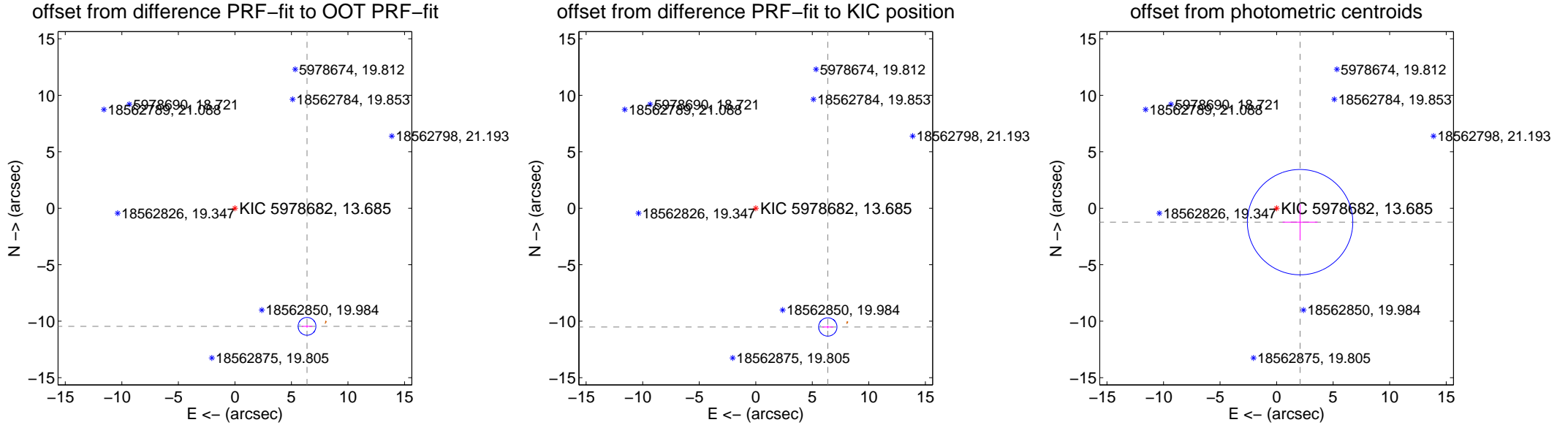
## DV Centroid Data

Supplemental centroid analysis for 005978682-01. Kepler magnitude: 13.69. Transit SNR 6.61

There are 4 quarters with good PRF difference image offsets

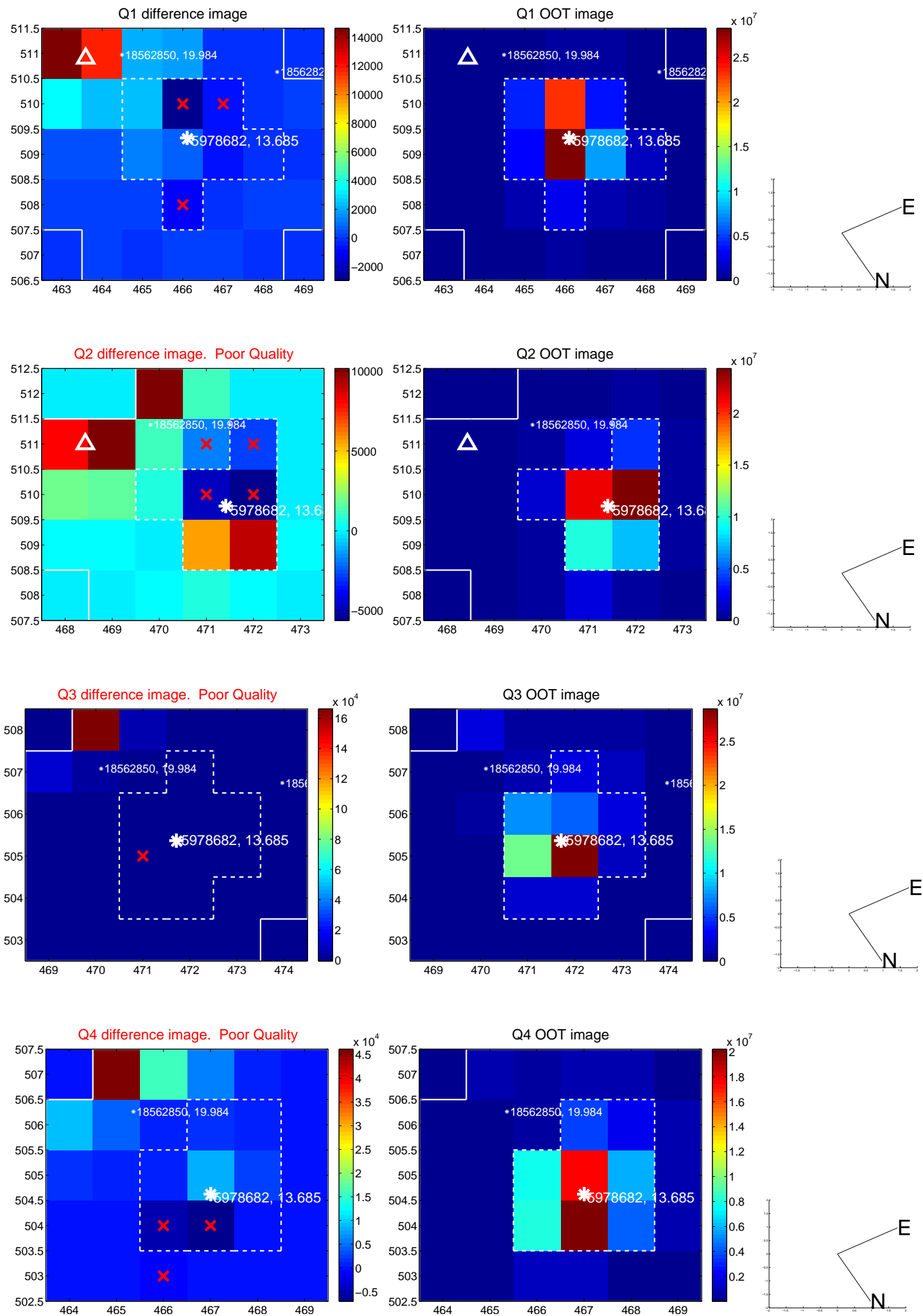
The direct PRF centroid is offset from the target star catalog position by about 0.07 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	<b>12.248 <math>\pm</math> 0.263</b>	<b>46.63</b>	-6.378 $\pm$ 0.466	-10.456 $\pm$ 0.118
PRF-fit source offset from KIC position	<b>12.294 <math>\pm</math> 0.270</b>	<b>45.53</b>	-6.374 $\pm$ 0.481	-10.512 $\pm$ 0.121
photometric centroid source offset	2.41 $\pm$ 1.55	1.55	-2.08 $\pm$ 1.54	-1.23 $\pm$ 1.59

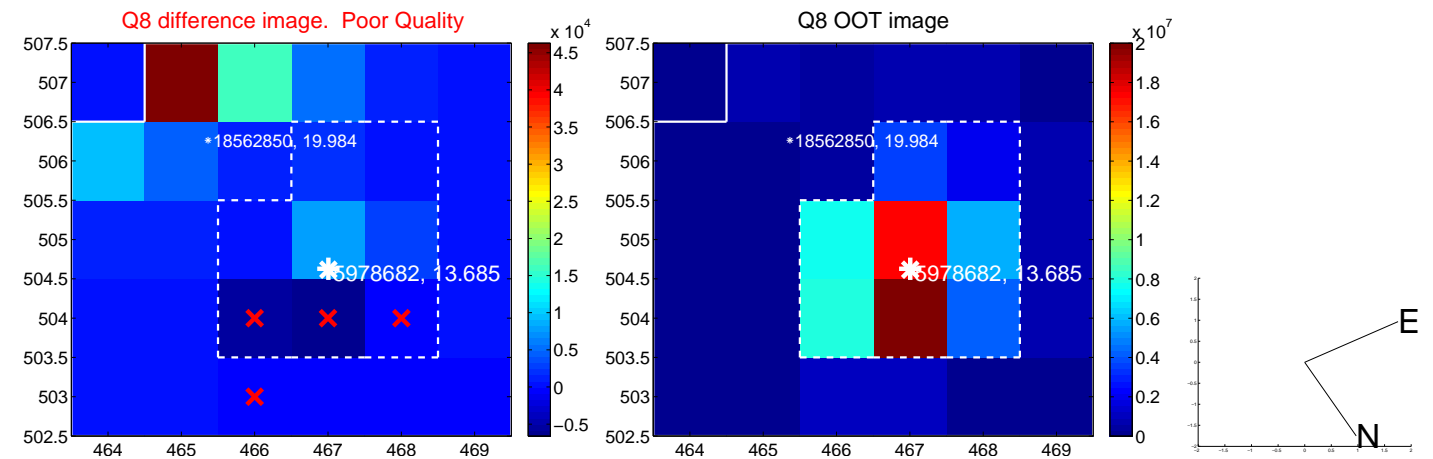
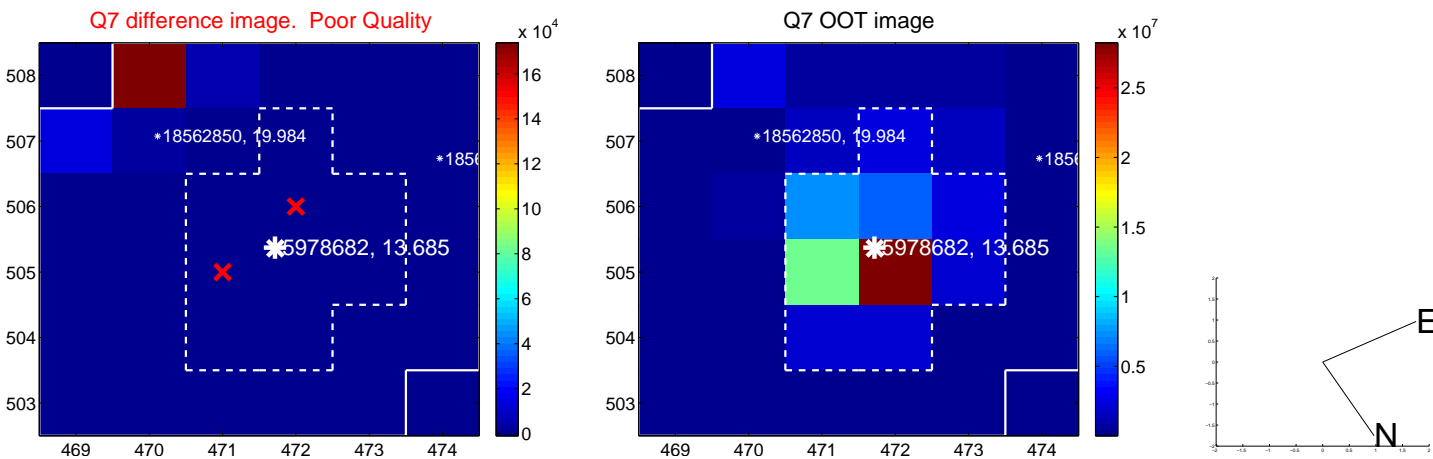
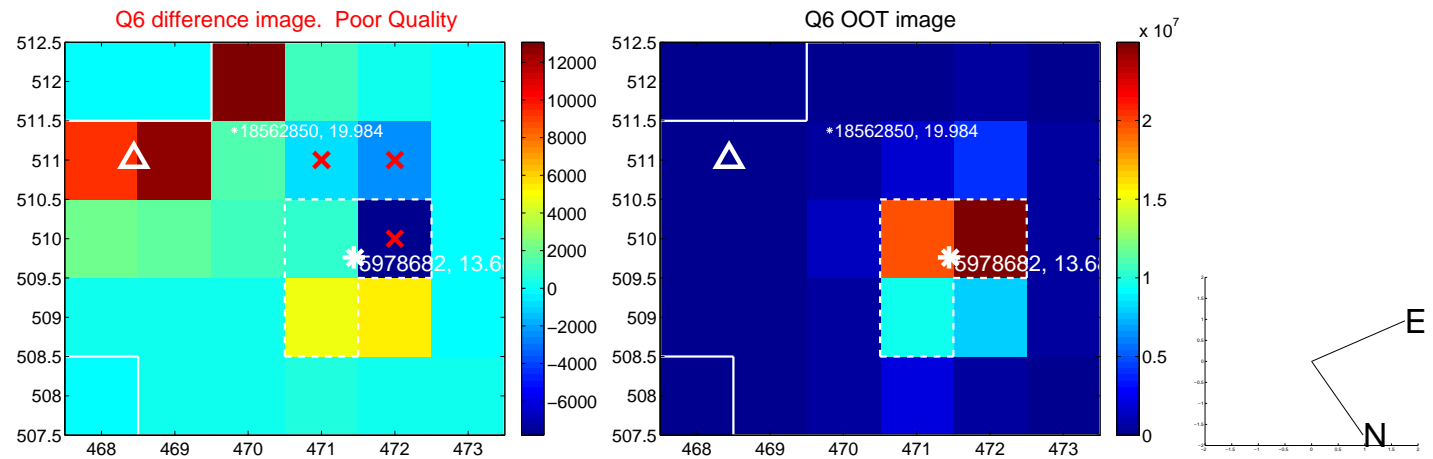
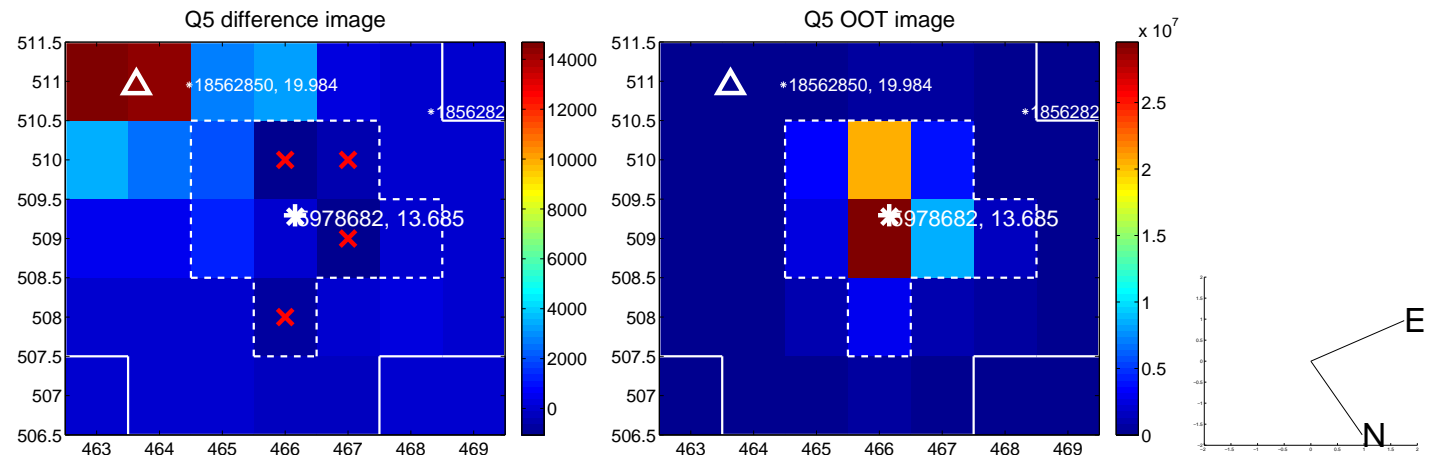


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

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

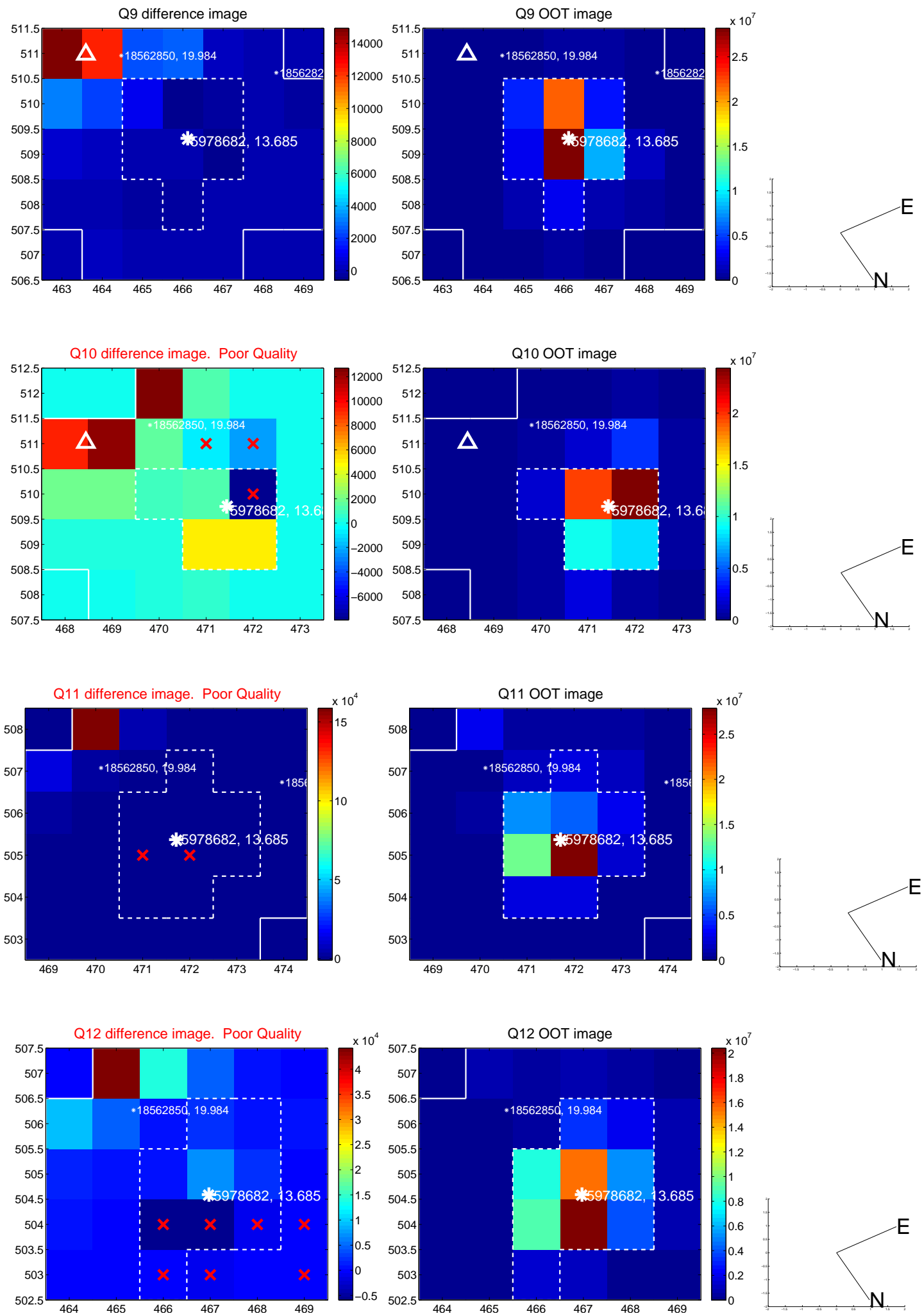


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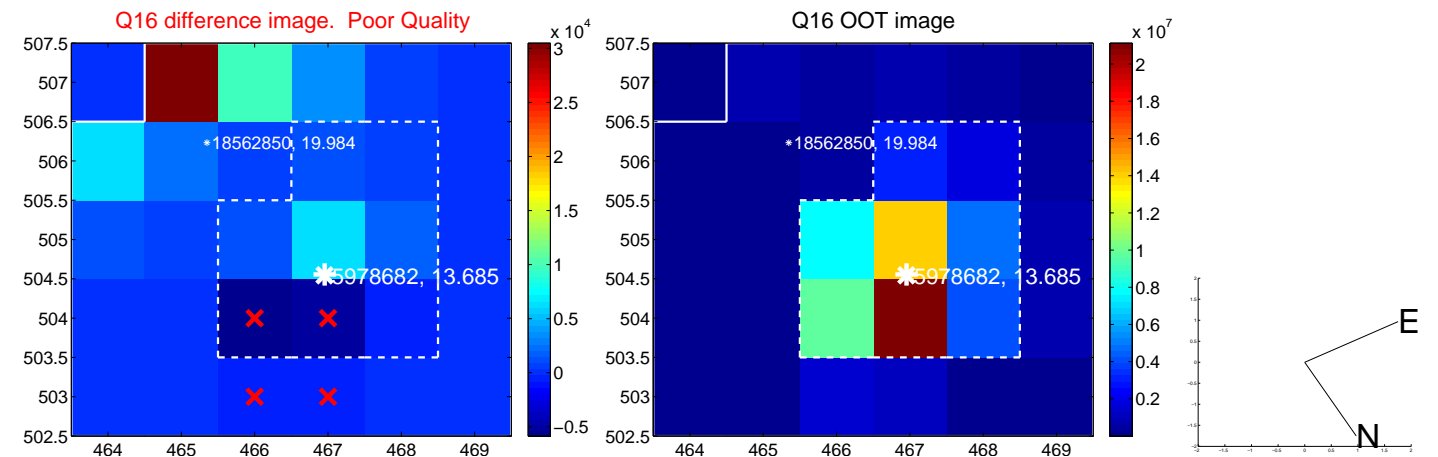
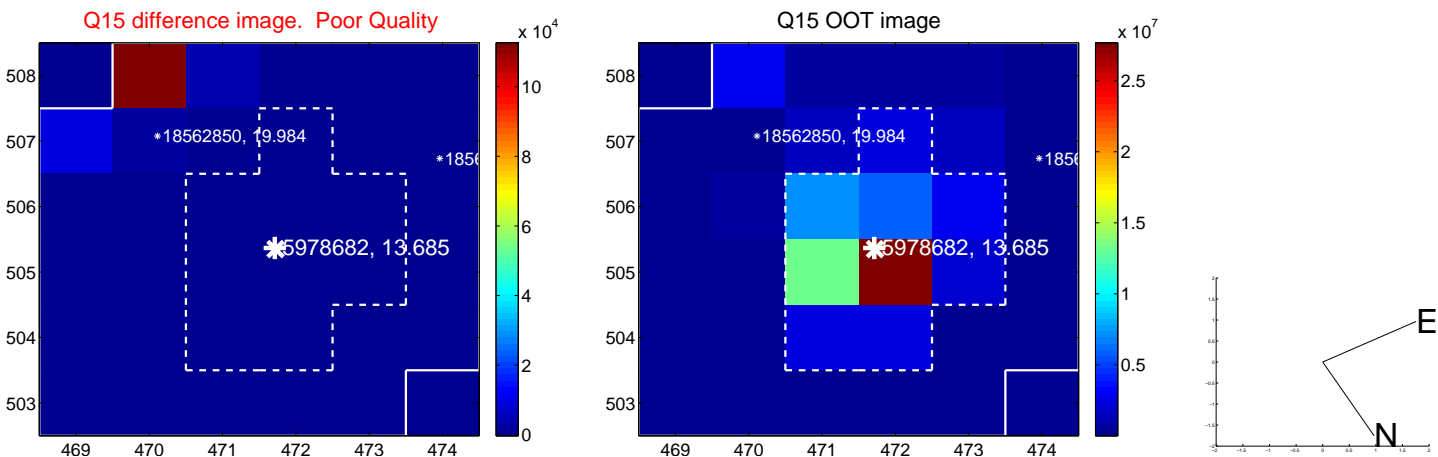
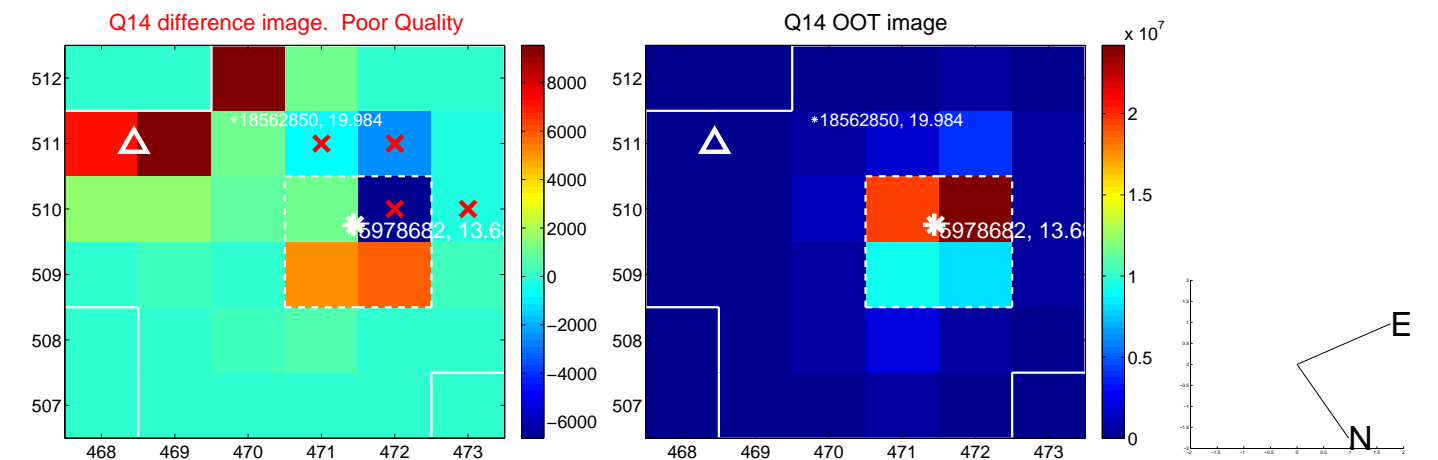
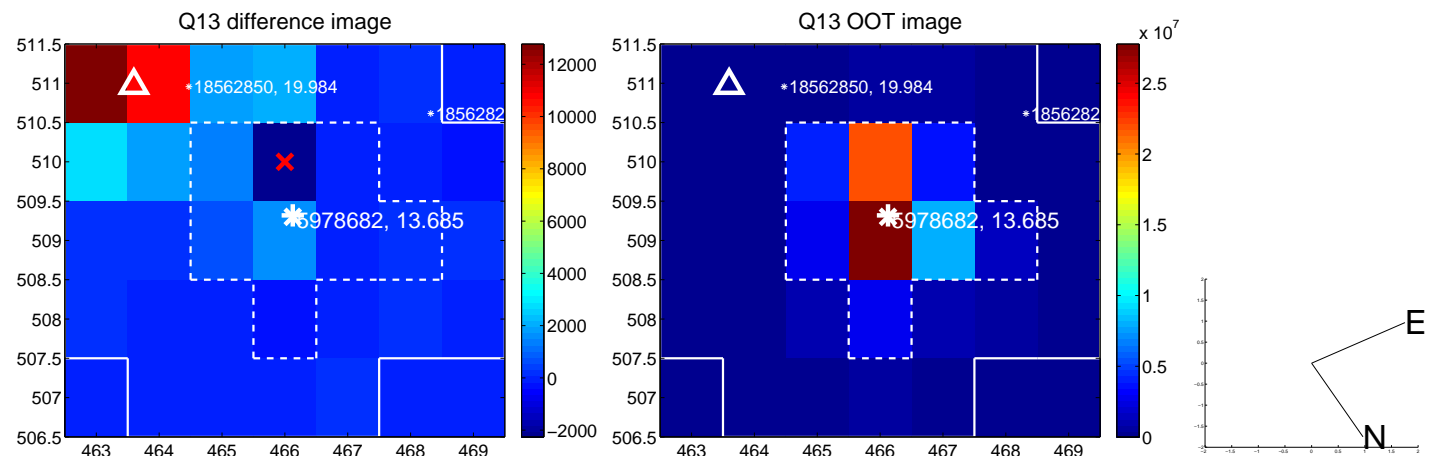




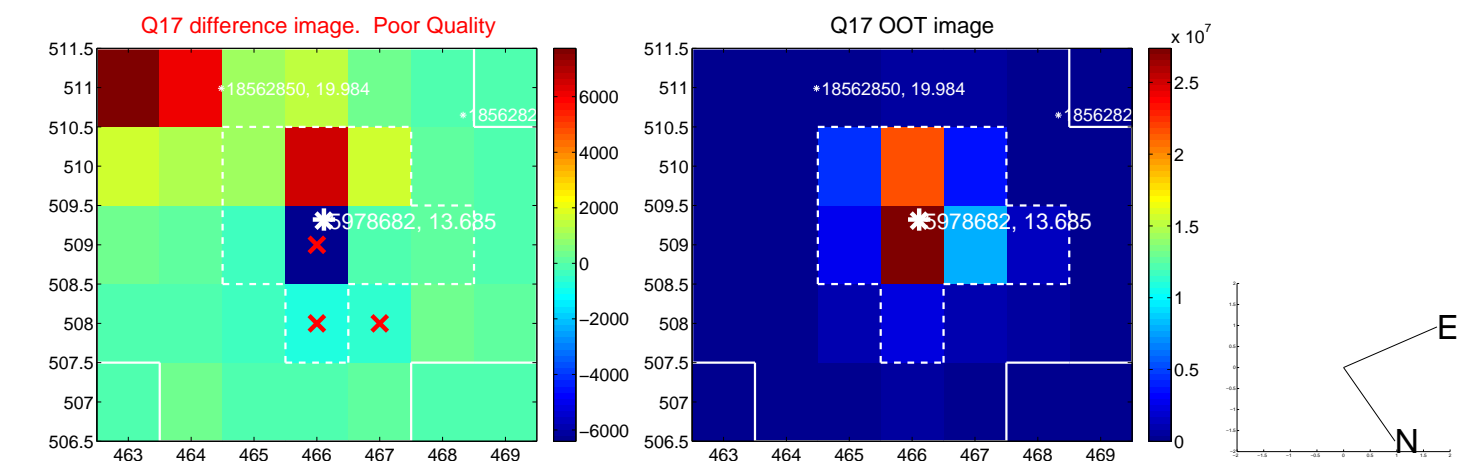
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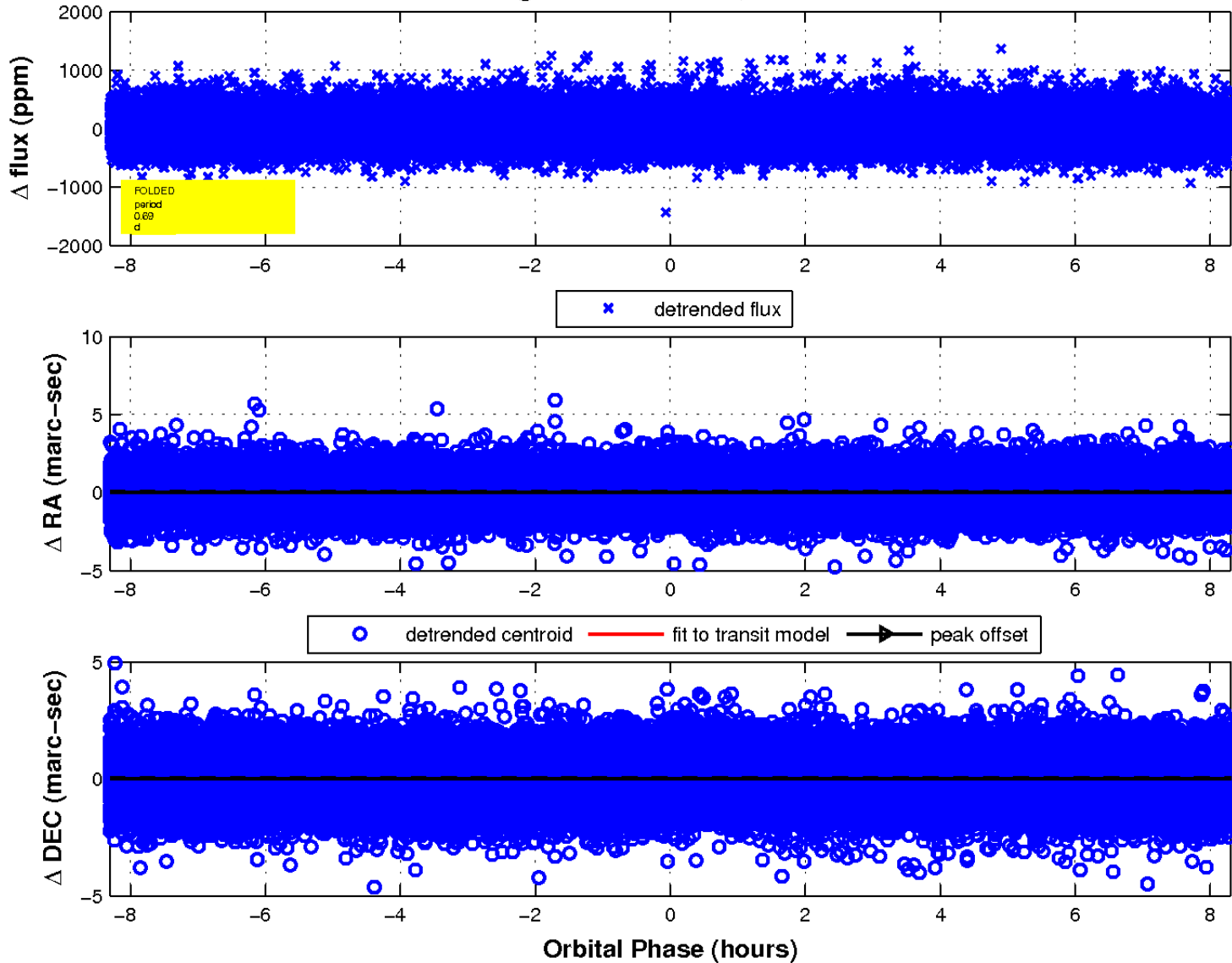
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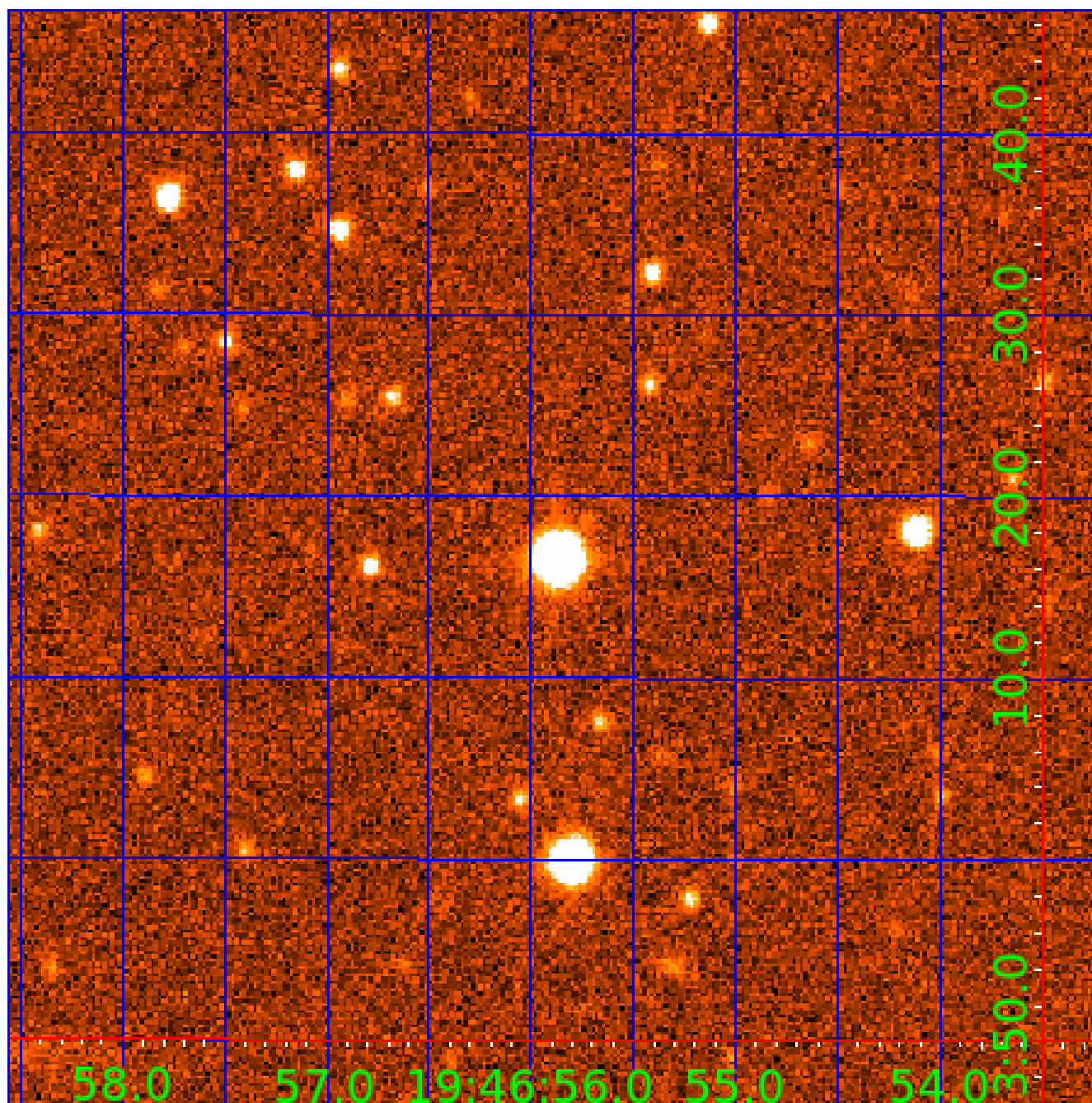


fluxWeightedCentroids, Planet 1 of 7



UKIRT Image

Declination





# KIC 005978682

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
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## Robovetter Results

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005978682-03	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_RESOLVED_OFFSET
005978682-04	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_ZUMA—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—CENT_RESOLVED_OFFSET
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005978682-06	OBS	FP	0.00	1	0	1	0	TRANS_GAPPED—LPP_DV—LPP_ALT—CENT_RESOLVED_OFFSET
005978682-07	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—CENT_RESOLVED_OFFSET

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

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

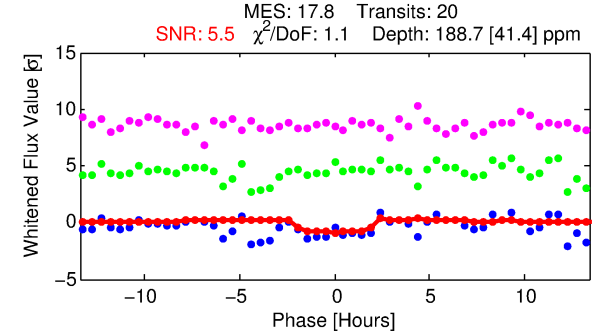
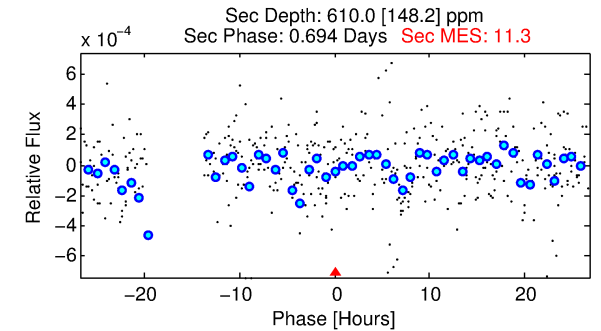
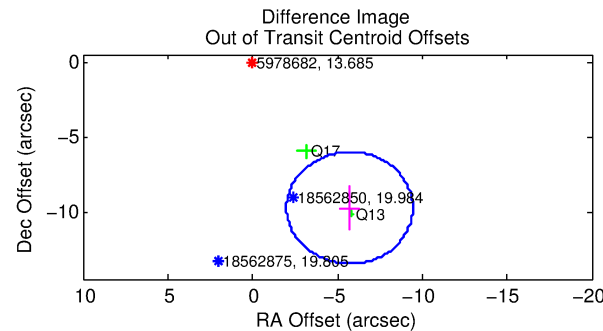
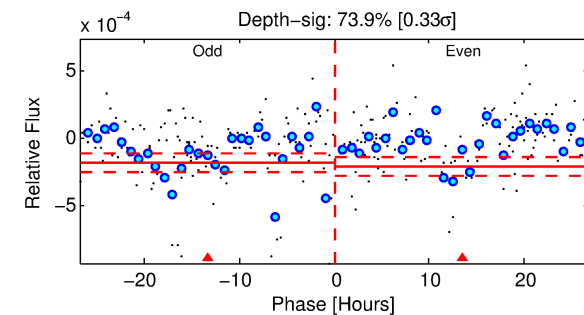
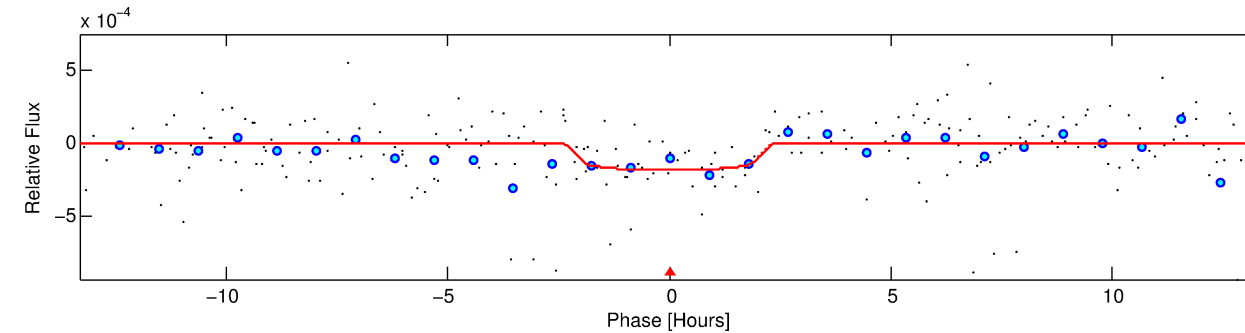
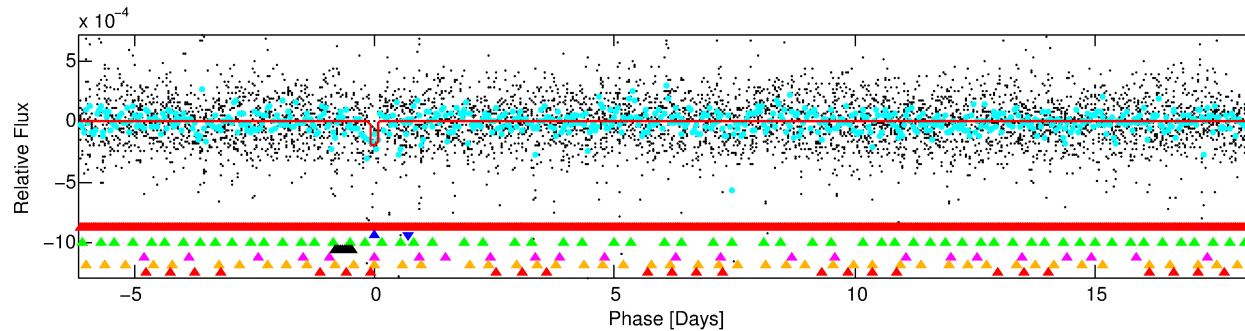
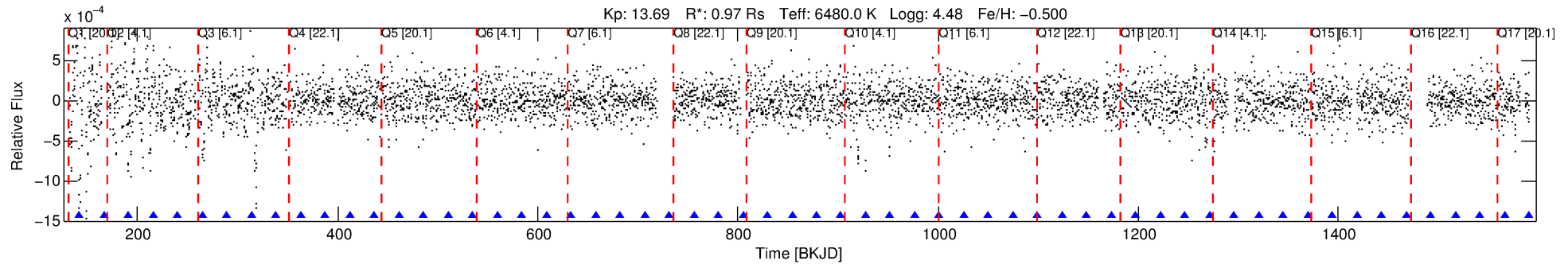
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 005978682-02

No Significant Match Found

# DV One-Page Summary

KIC: 5978682 Candidate: 2 of 7 Period: 24.556 d



## DV Fit Results:

Period = 24.55624 [0.00046] d  
Epoch = 141.9301 [0.0158] BKJD  
Rp/R\* = 0.0140 [0.0103]  
a/R\* = 25.69 [105.81]  
b = 0.81 [1.74]  
Seff = 52.74 [22.37]  
Teq = 687 [73] K  
Rp = 1.48 [1.19] Re  
a = 0.1679 [0.0458] AU  
Ag = 4330.73 [6705.11] [0.65 $\sigma$ ]  
Teffp = 8619 [3233] K [2.45 $\sigma$ ]

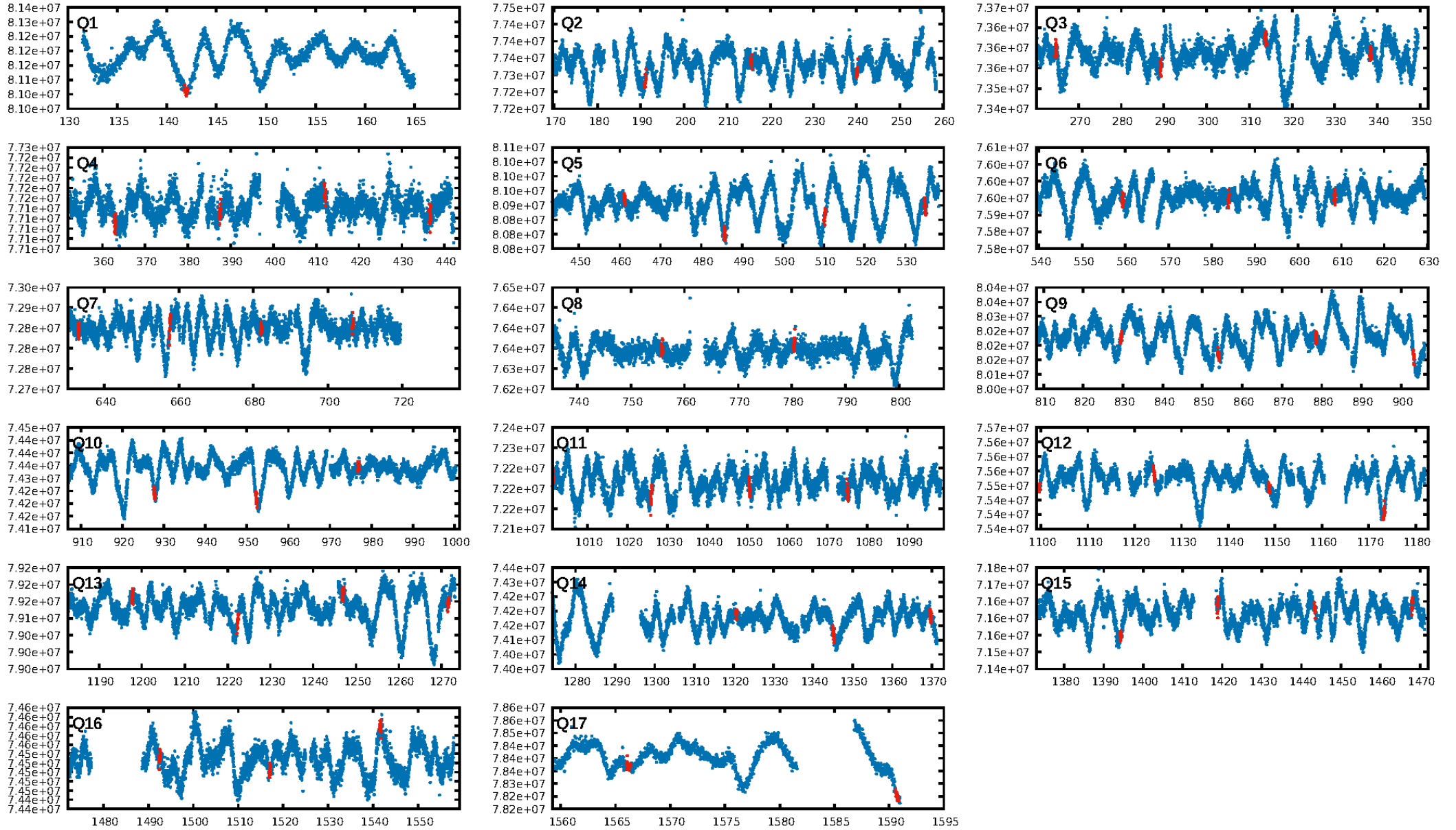
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [4.74 $\sigma$ ]  
LongPeriod-sig: 100.0% [27.83 $\sigma$ ]  
ModelChiSquare2-sig: 74.2%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 2.75e-49  
RollingBand-fgt: 1.00 [19/19]  
**GhostDiagnostic-chr: -2.014**  
Centroid-sig: 42.7%  
Centroid-so: 0.599 arcsec [0.90 $\sigma$ ]  
**OotOffset-rm: 11.307 arcsec [9.10 $\sigma$ ]**  
**KicOffset-rm: 11.340 arcsec [3.96 $\sigma$ ]**  
OotOffset-st: 0/0/0/2 [2]  
KicOffset-st: 0/0/0/2 [2]  
DiffImageQuality-fgm: 0.00 [0/2]  
DiffImageOverlap-fno: 0.00 [0/17]

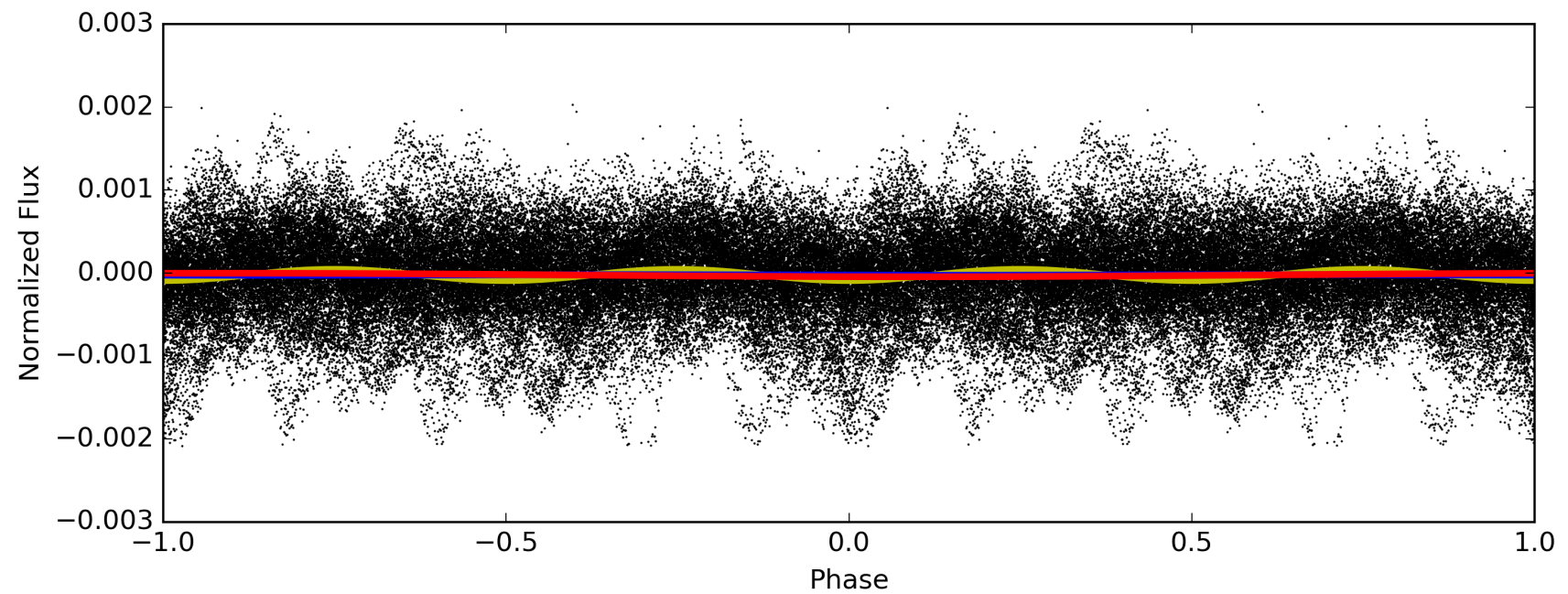
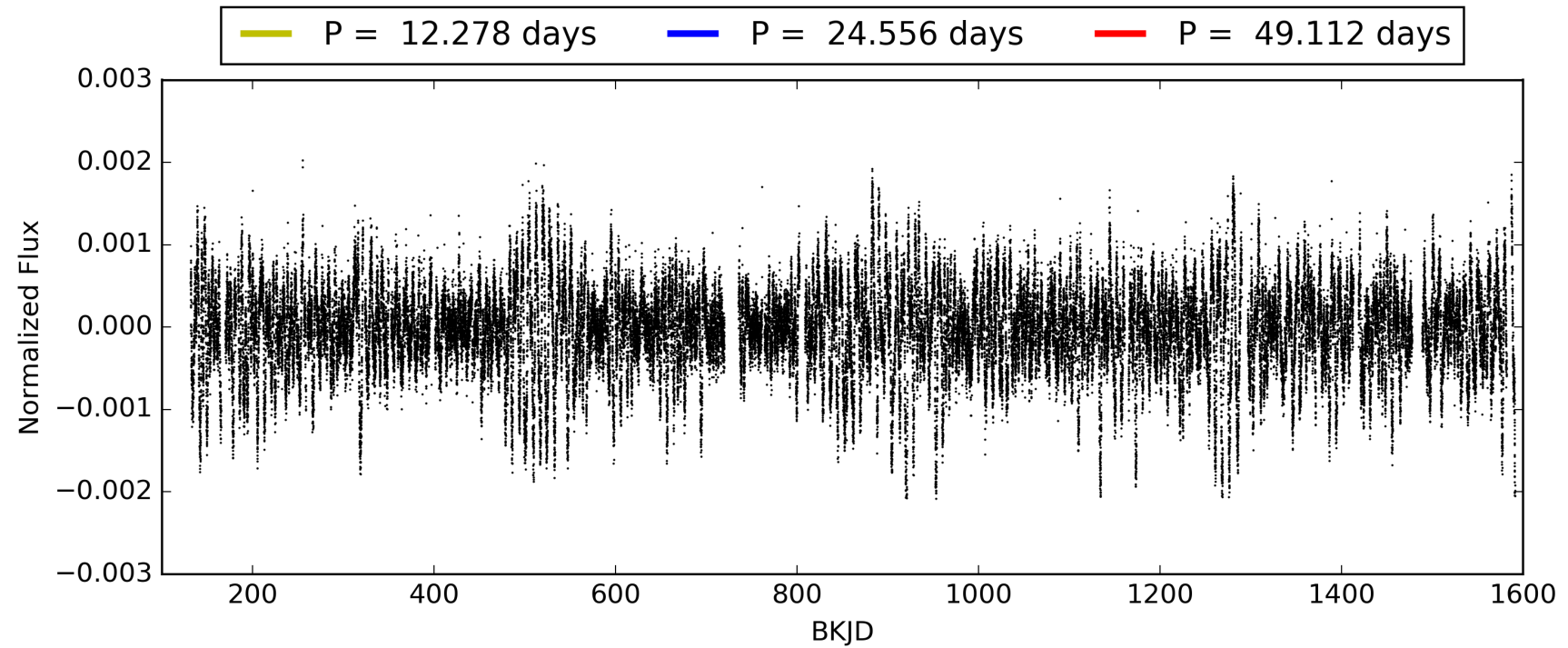
Software Revision: svn-ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 03-Feb-2016 06:55:59 Z

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

# TCE 005978682-02, PDC Light Curves

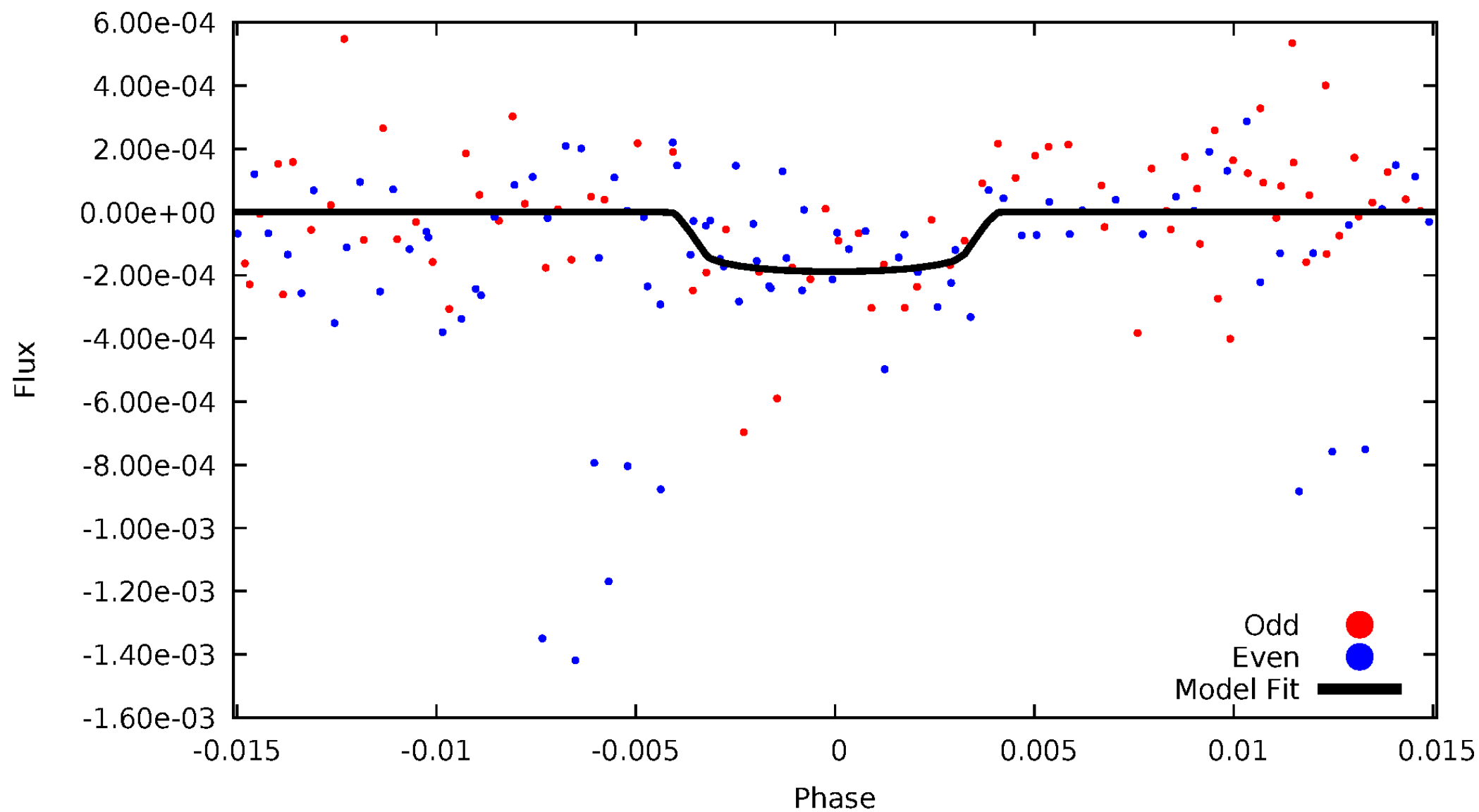


TCE 005978682-02



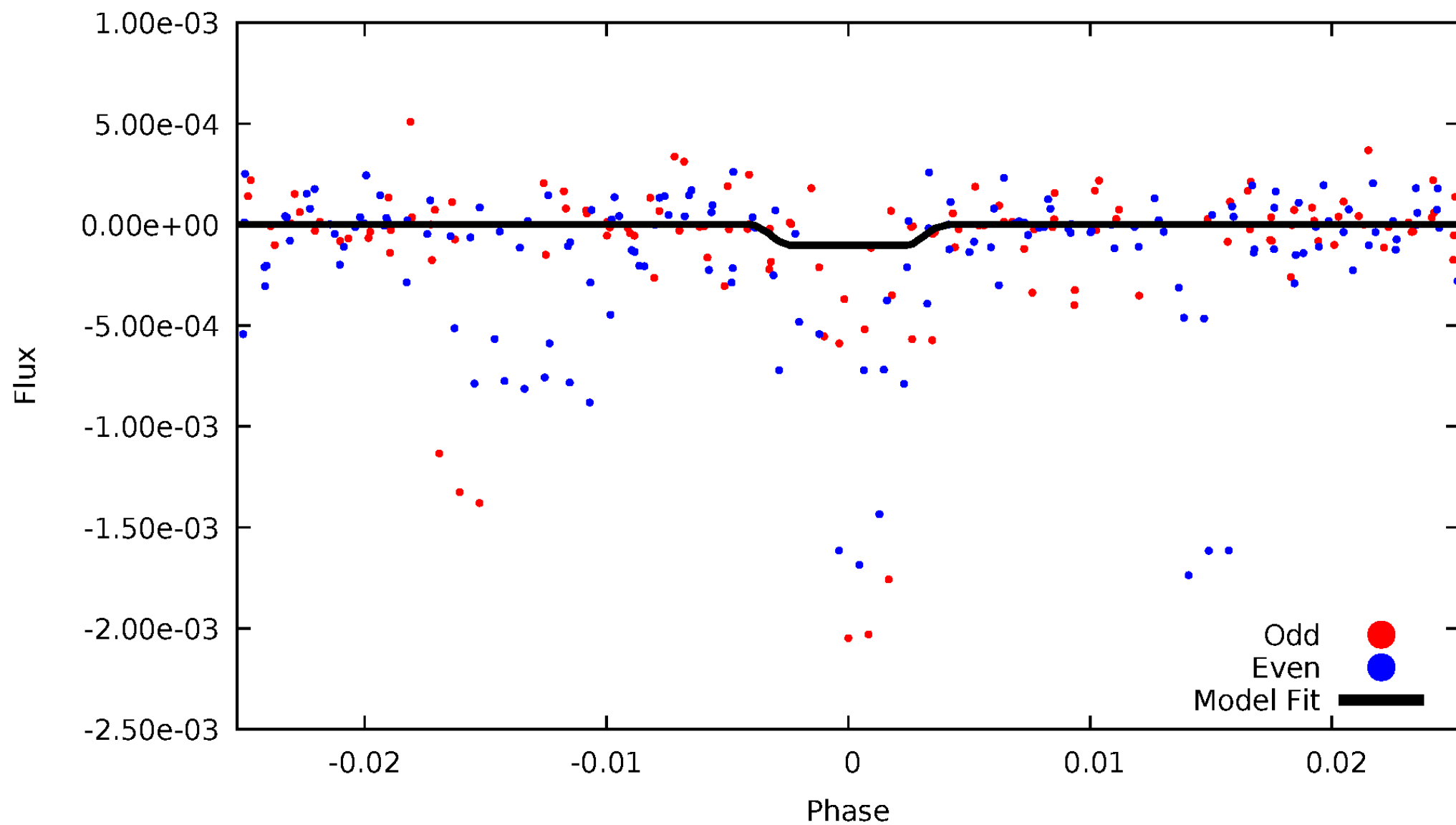
# DV Odd/Even

TCE 005978682-02



# ALT Odd/Even

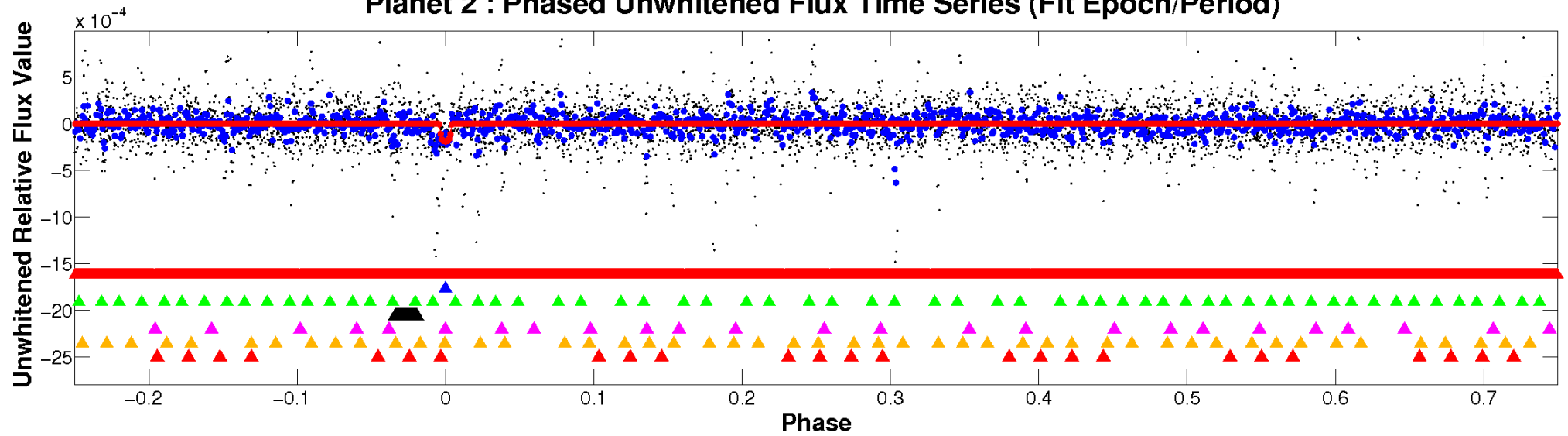
TCE 005978682-02



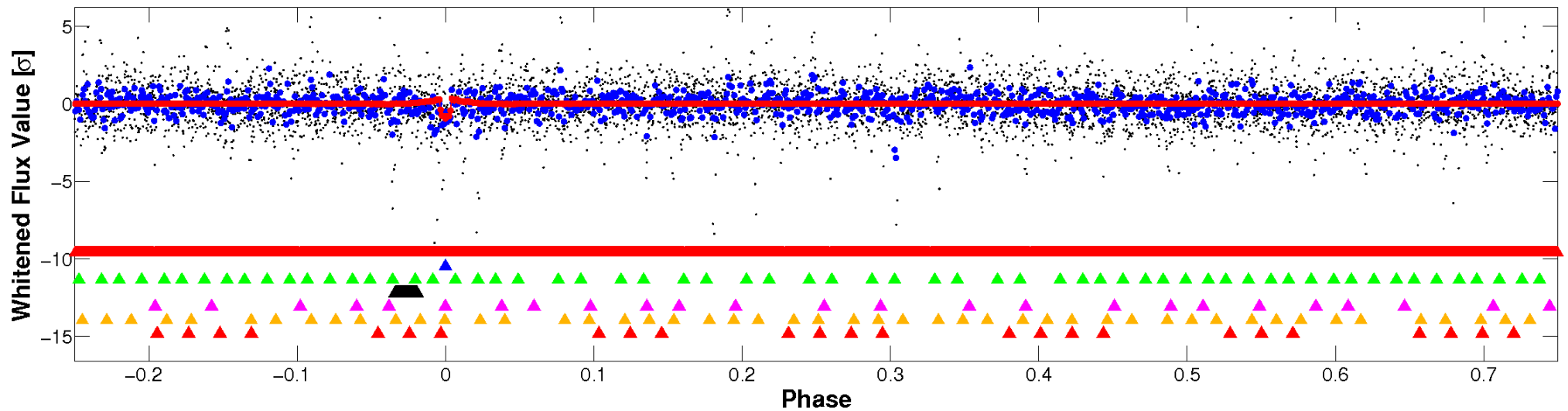


# Non-Whitened Vs. Whitened Light Curve

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

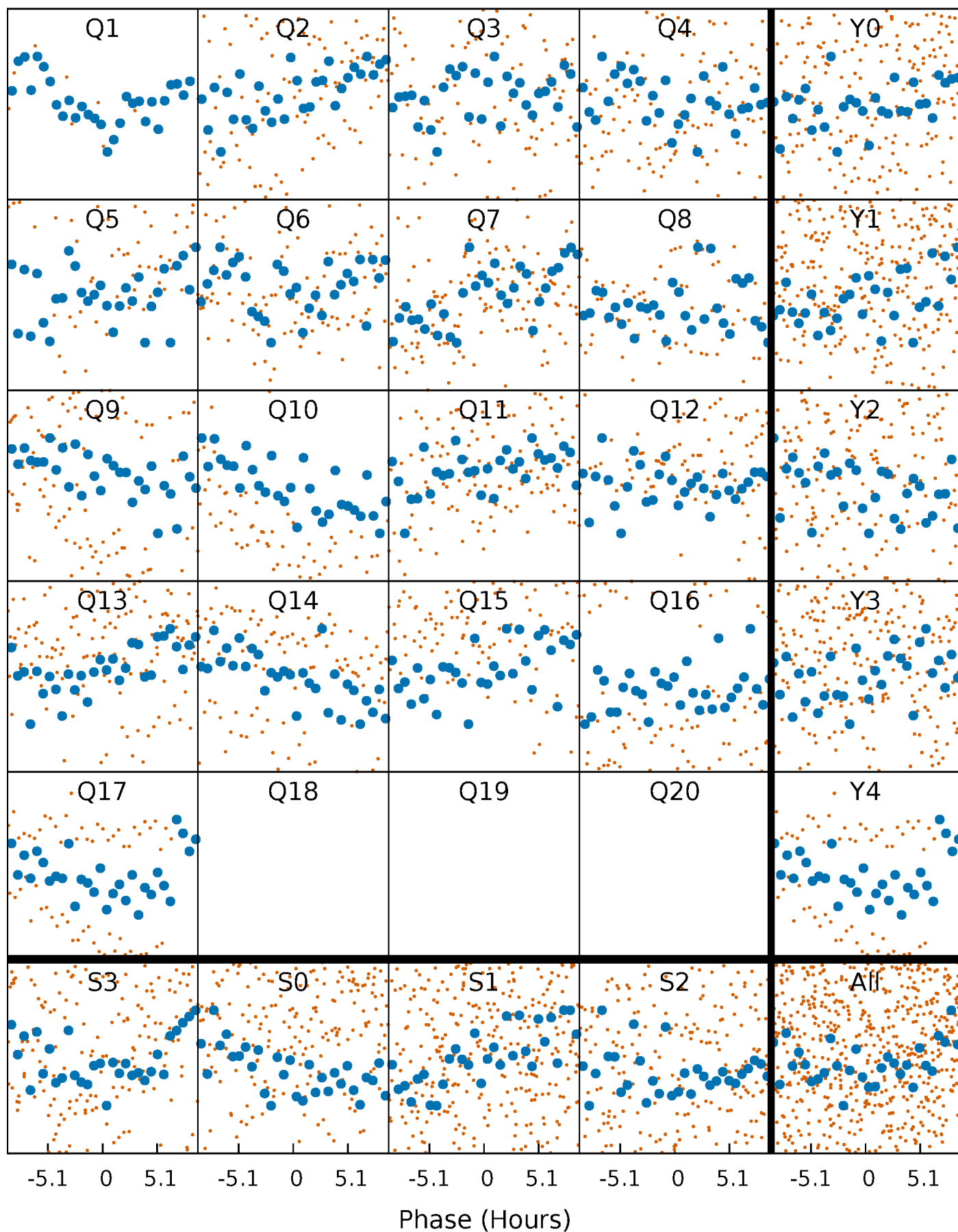


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



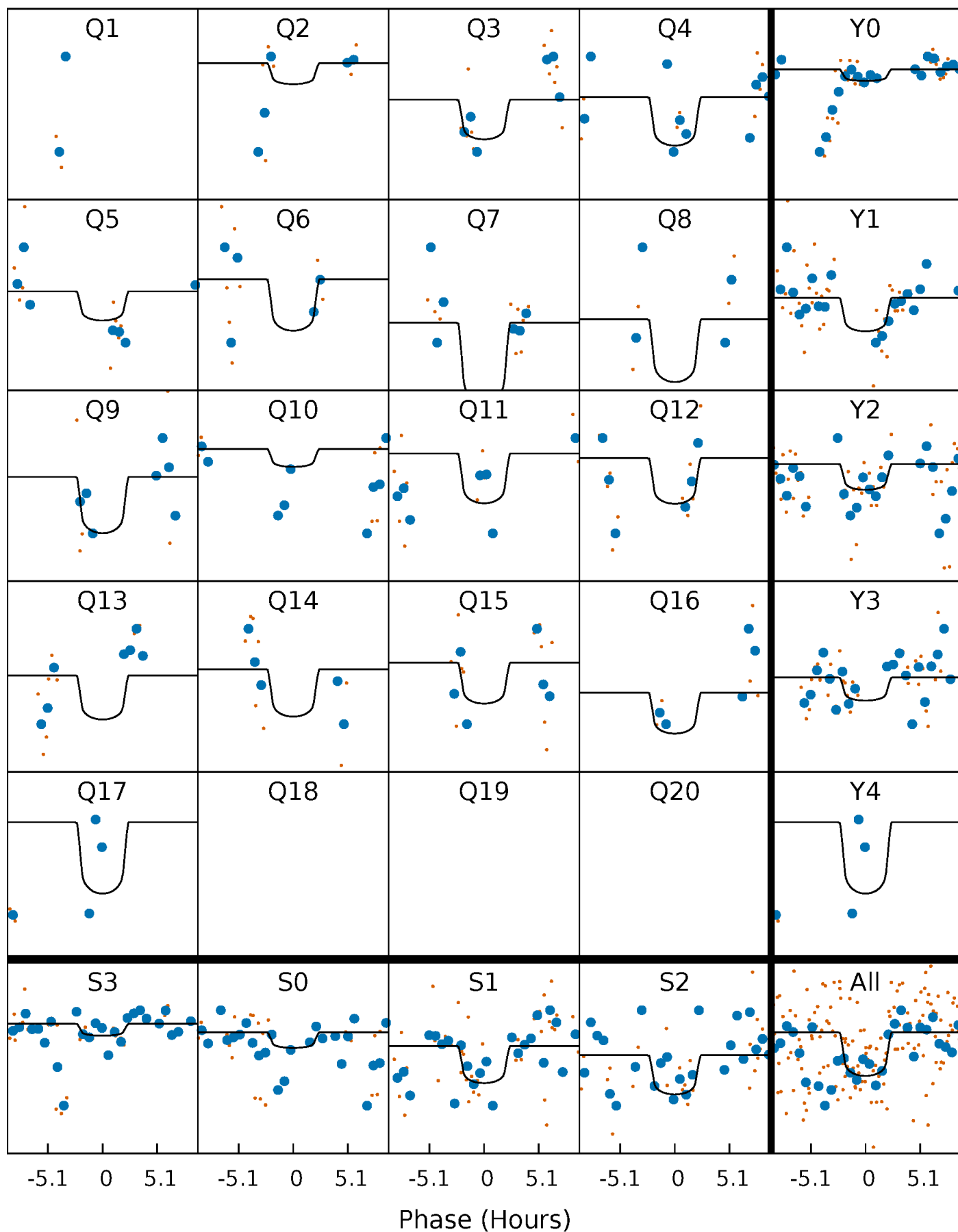
# PDC Quarter-Phased Transit Curves

TCE 005978682-02 P= 24.556245 Days  $T_0=141.930135$  (BKJD)



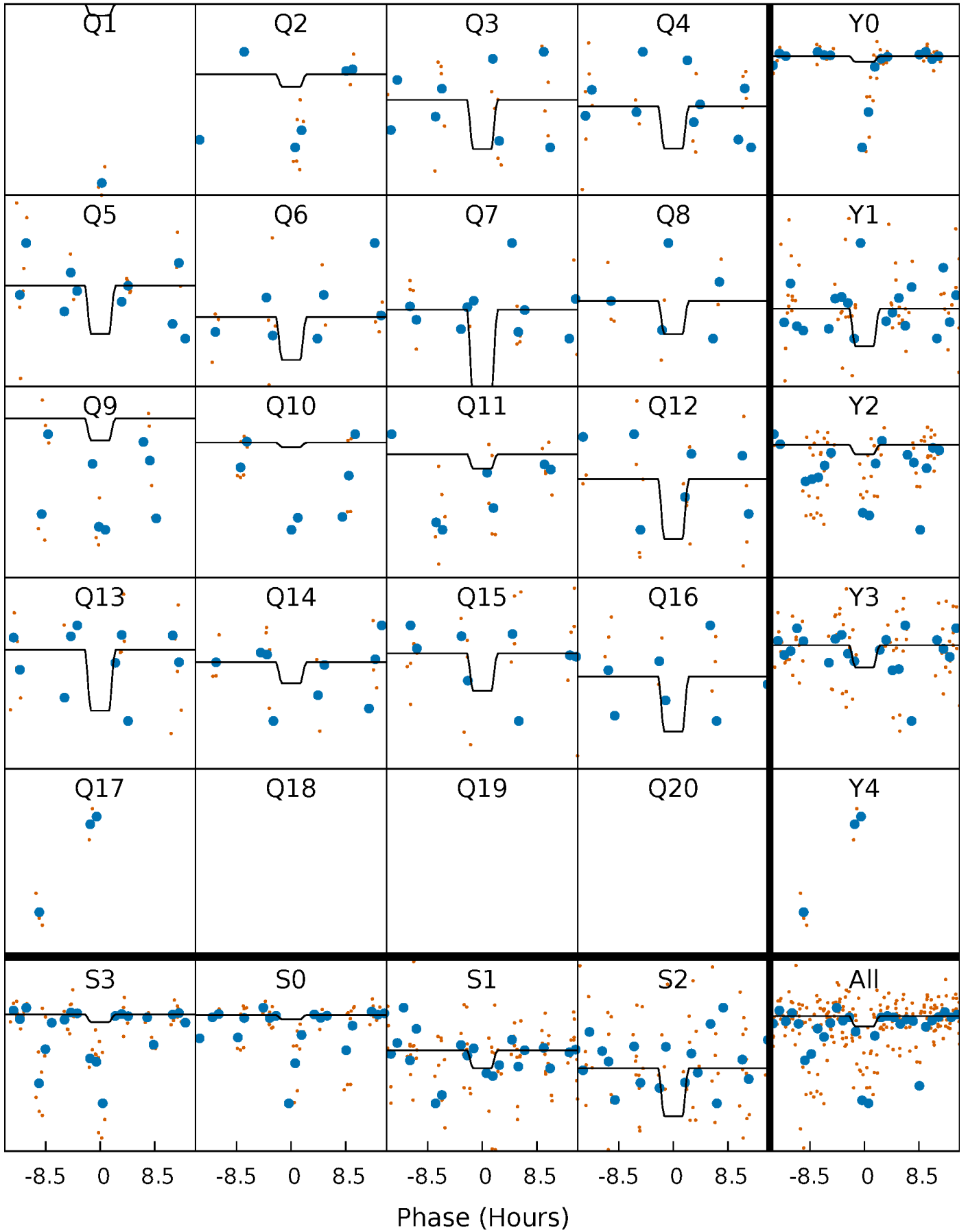
# DV Quarter-Phased Transit Curves

TCE 005978682-02   P= 24.556245 Days    $T_0=141.930135$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

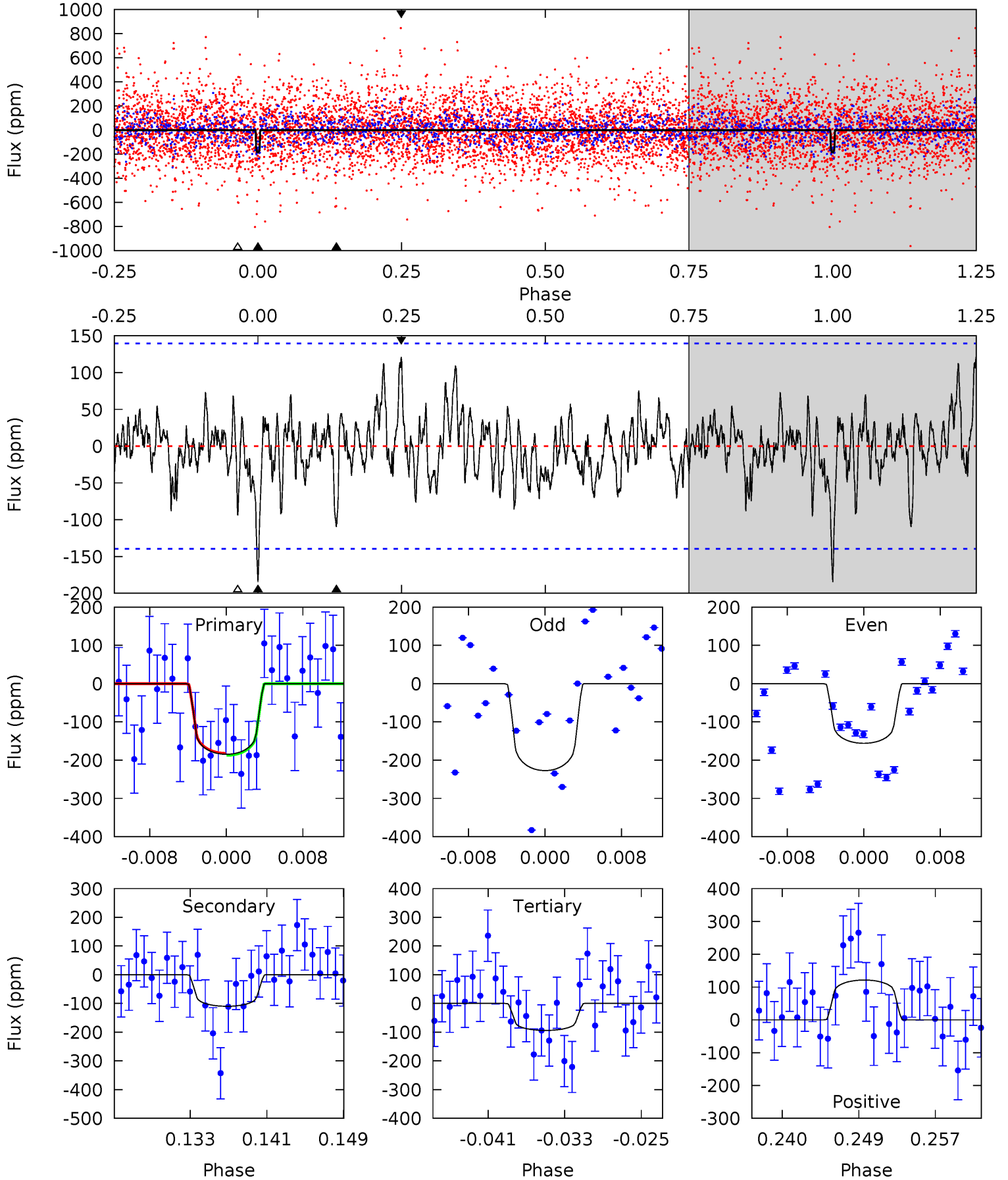
TCE 005978682-02   P= 24.559723 Days    $T_0=141.759175$  (BKJD)



# DV Model-Shift Uniqueness Test

005978682-02, P = 24.556245 Days, E = 117.373890 Days

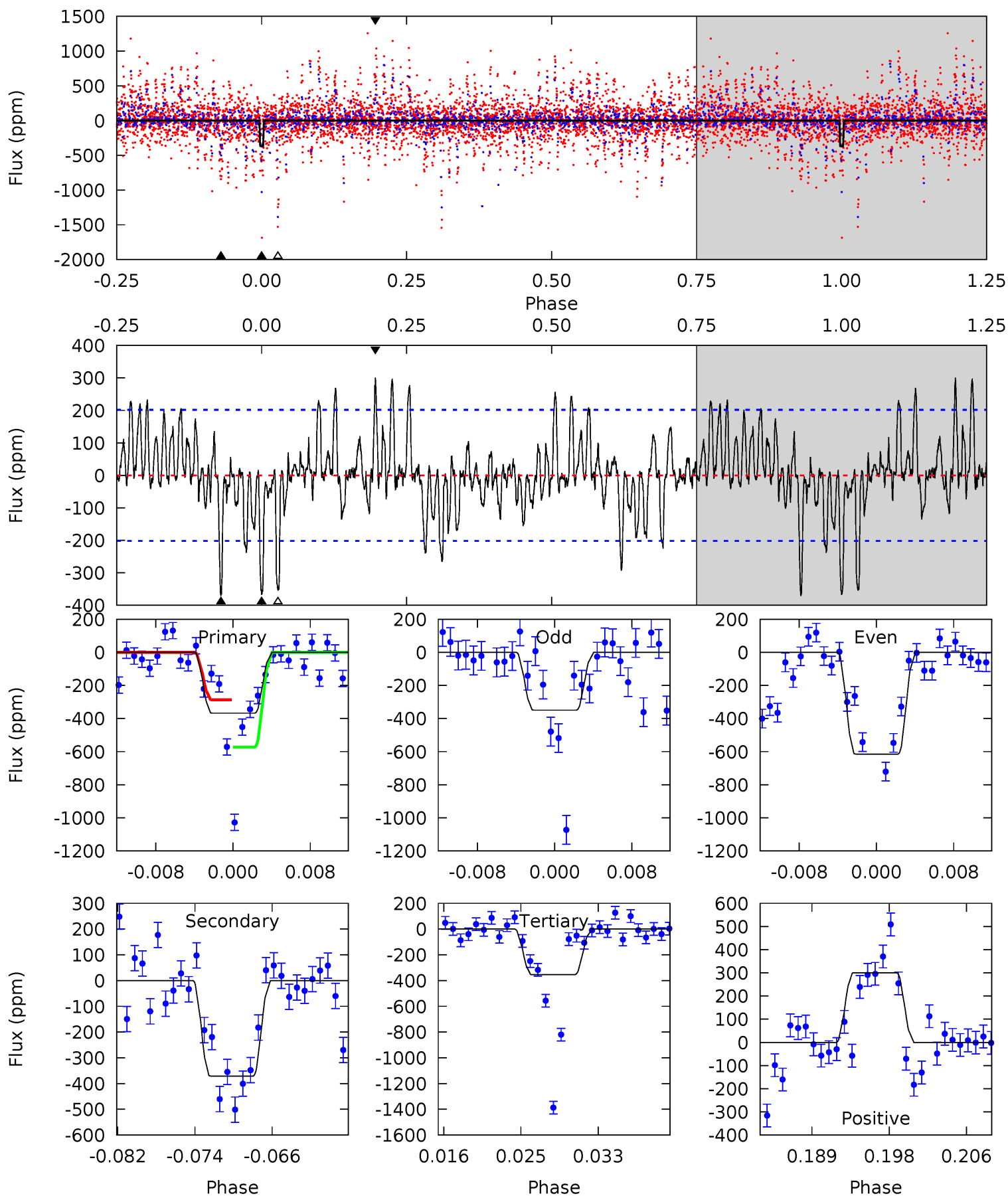
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
6.70	3.99	3.41	4.40	5.06	2.64	1.25	3.29	2.30	0.58	-0.41	1.27	1.09	0.40	0.09



# Alt Model-Shift Uniqueness Test

005978682-02, P = 24.559723 Days, E = 117.199452 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
9.23	9.31	8.90	7.54	5.06	2.64	2.19	0.33	1.68	0.41	1.76	3.01	1.17	0.45	3.67





### Stellar Parameters For KIC 005978682

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6480^{+145}_{-210}$	$4.484^{+0.042}_{-0.224}$	$-0.500^{+0.300}_{-0.300}$	$0.970^{+0.308}_{-0.082}$	$1.045^{+0.133}_{-0.133}$	$1.614^{+0.345}_{-0.863}$
	+2%/-3%	+1%/-5%	+60%/-60%	+32%/-8%	+13%/-13%	+21%/-53%
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 005978682-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-110 \pm 28$	$1.68^{+1.14}_{-1.01}$	$982^{+70}_{-42}$	$5403^{+3426}_{-1072}$	$557^{+3018}_{-355}$
Alt.	$-371 \pm 40$	$1.34^{+1.16}_{-0.83}$	$982^{+74}_{-47}$	$8483^{+10873}_{-2431}$	$3043^{+20048}_{-2120}$

$T_{max}$  = 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

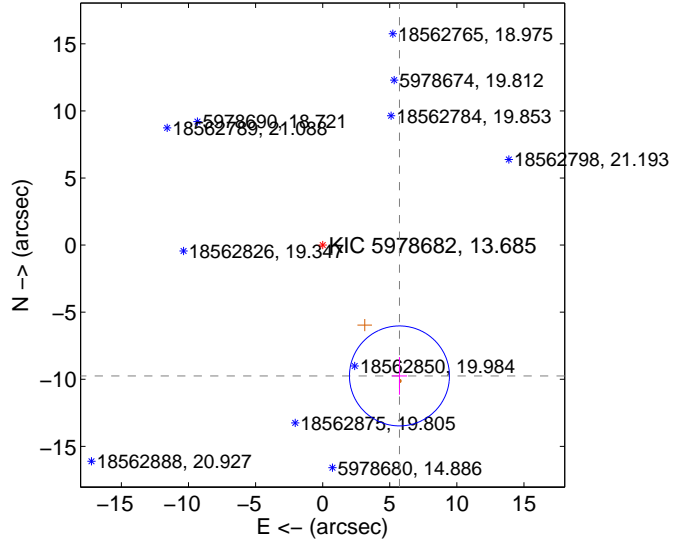
Supplemental centroid analysis for 005978682-02. Kepler magnitude: 13.69. Transit SNR 5.48

There are 0 quarters with good PRF difference image offsets

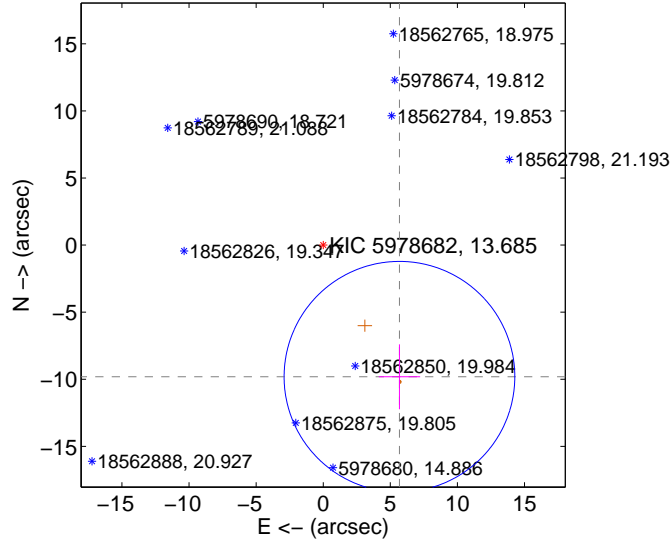
The direct PRF centroid is offset from the target star catalog position by about 0.05 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$11.307 \pm 1.242$	9.10	$-5.724 \pm 0.560$	$-9.751 \pm 1.402$
PRF-fit source offset from KIC position	$11.340 \pm 2.866$	3.96	$-5.682 \pm 1.541$	$-9.814 \pm 2.420$
photometric centroid source offset	$0.60 \pm 0.67$	0.90	$0.36 \pm 0.66$	$-0.48 \pm 0.67$

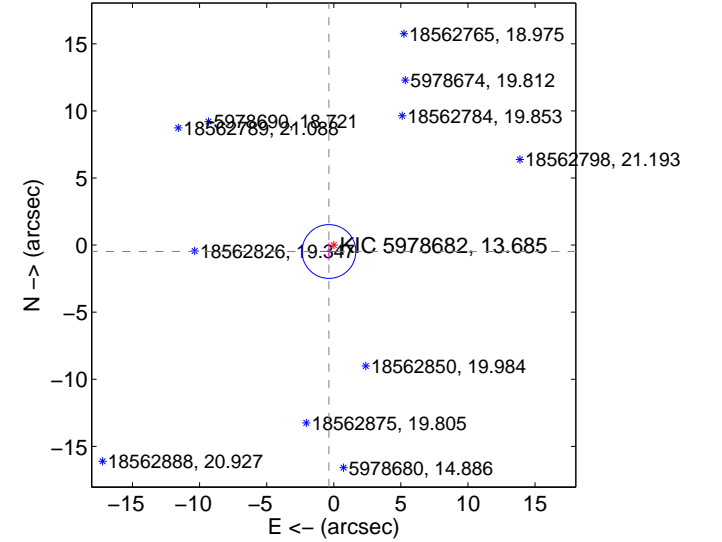
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

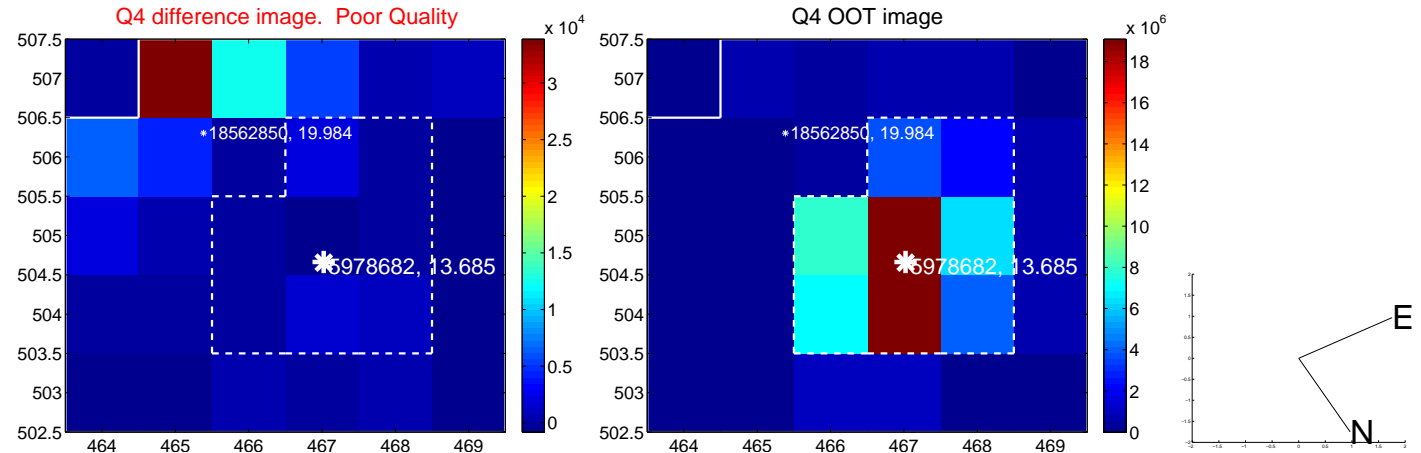
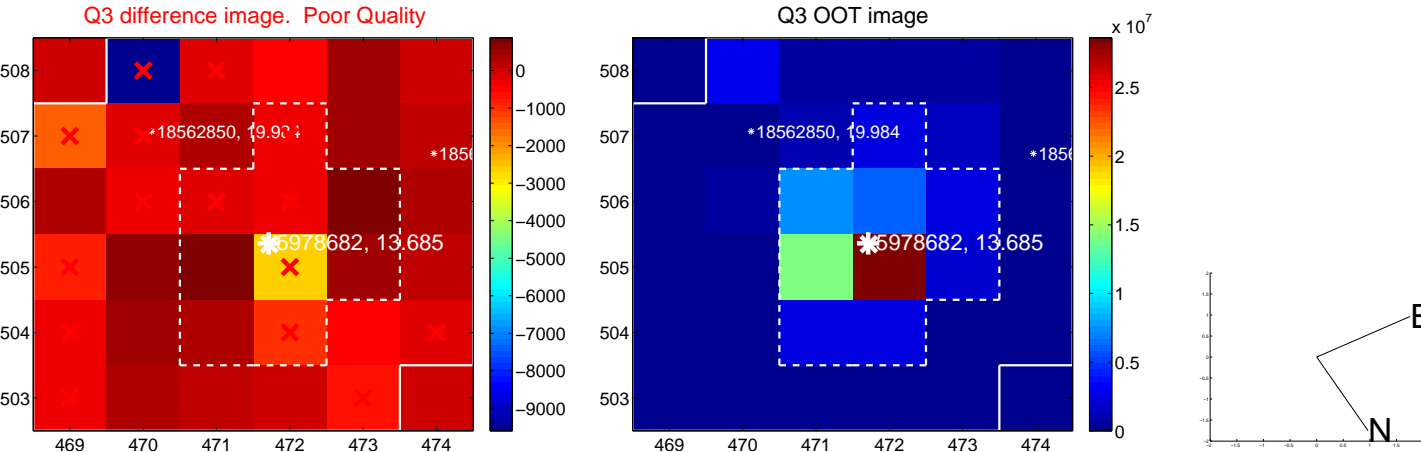
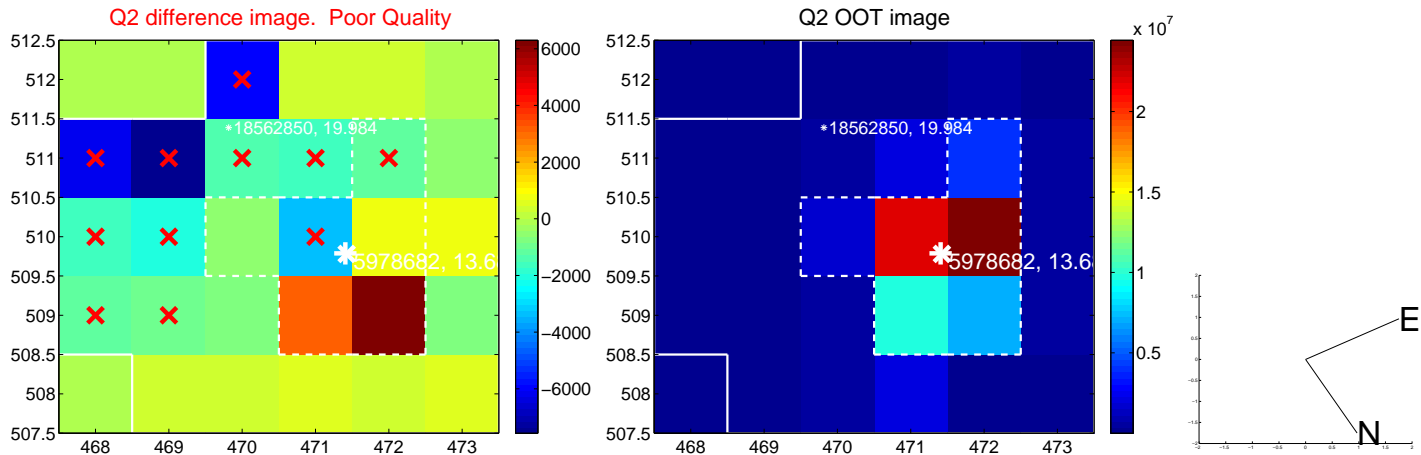
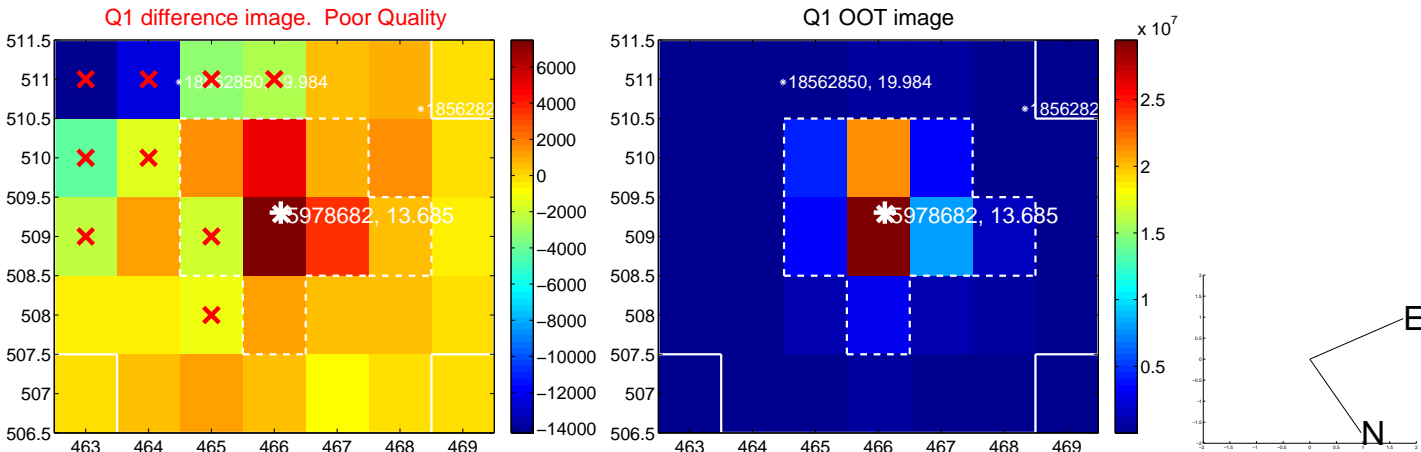


offset from photometric centroids

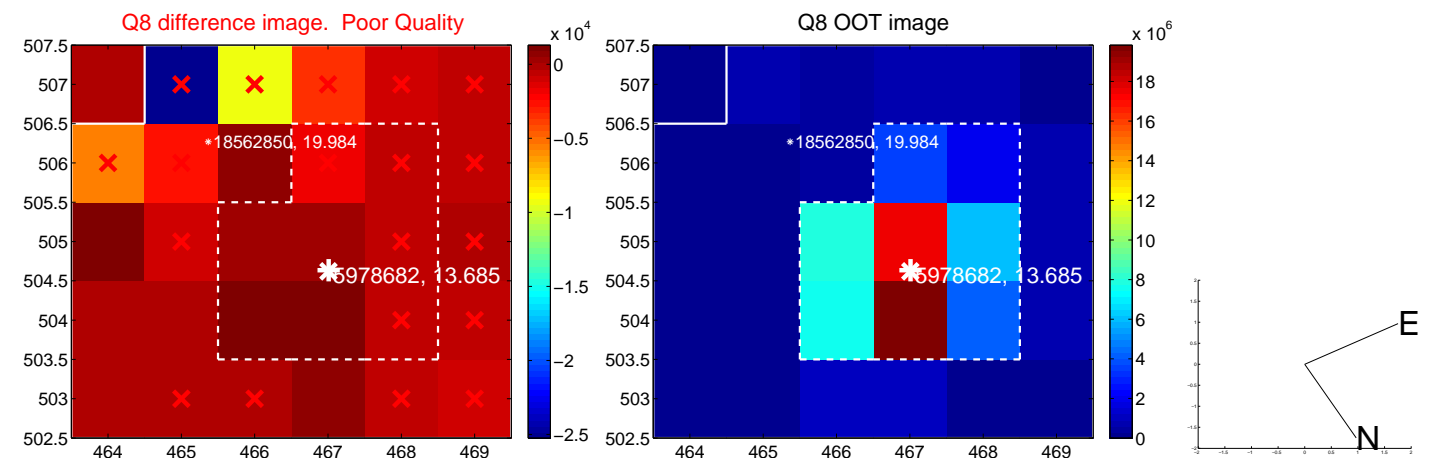
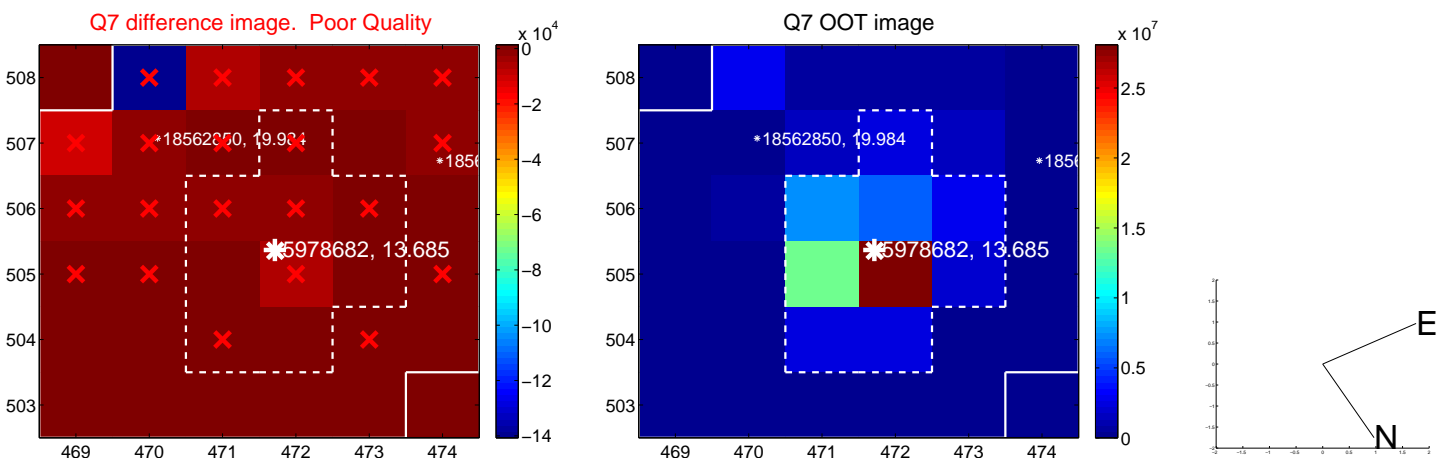
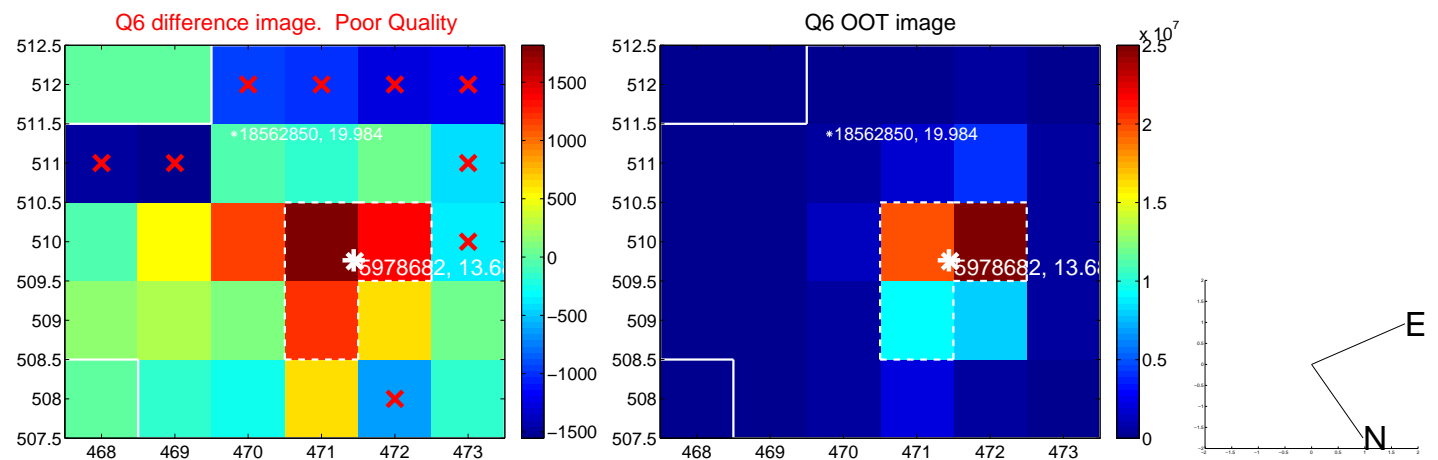
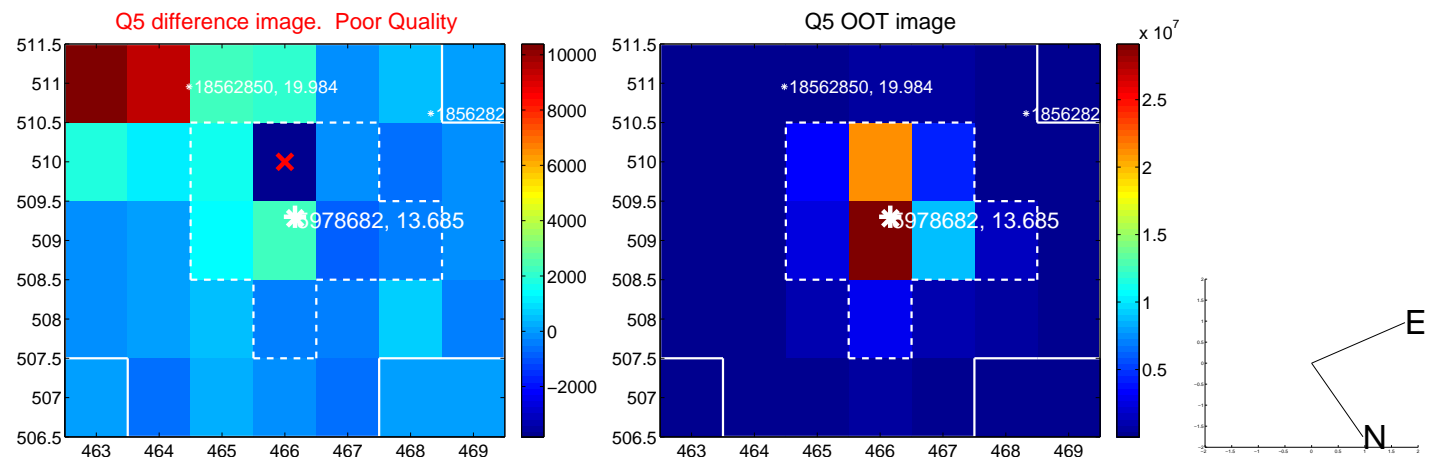


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

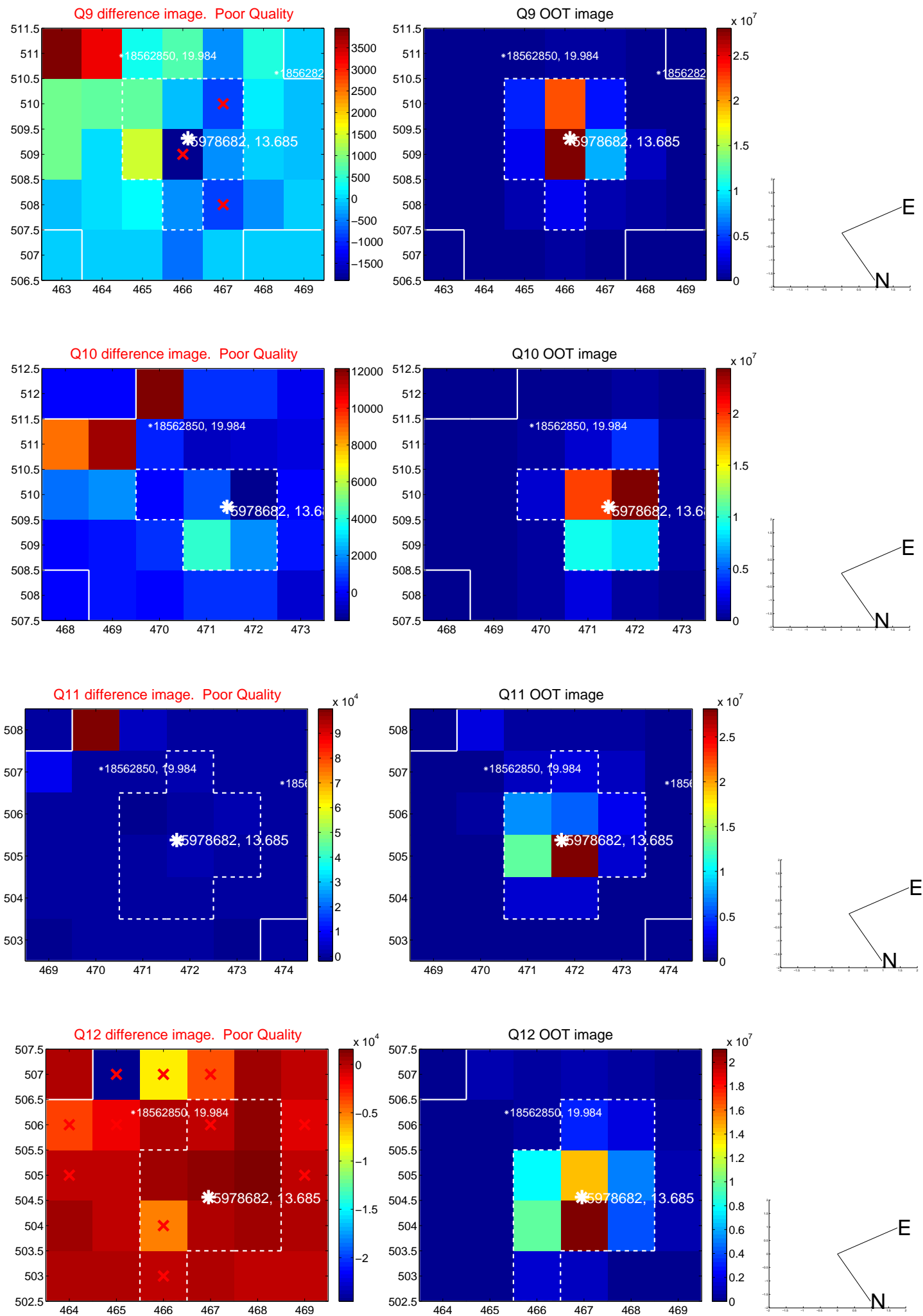
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



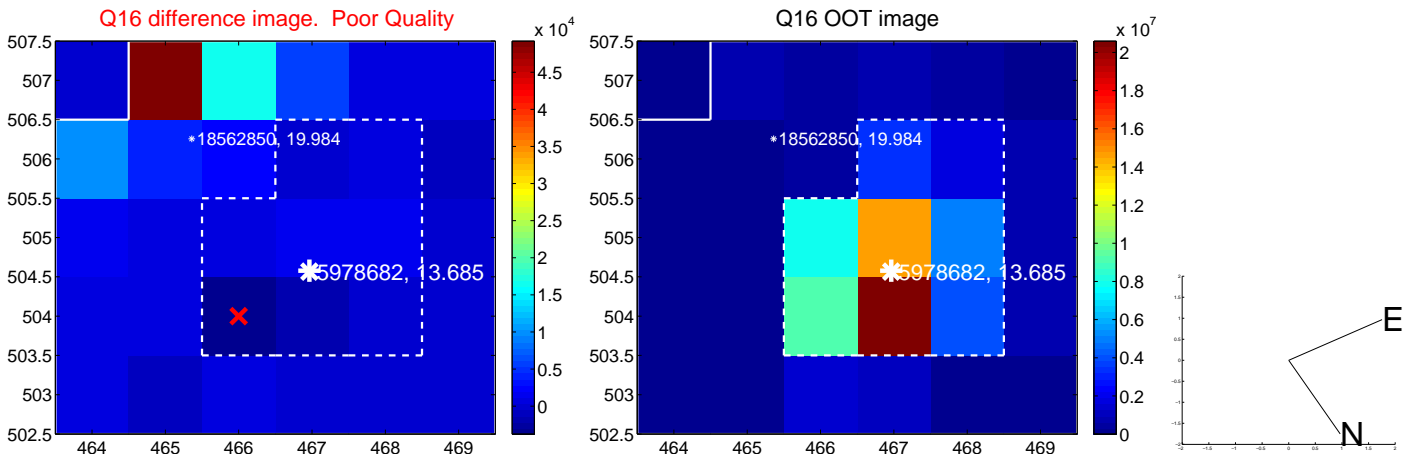
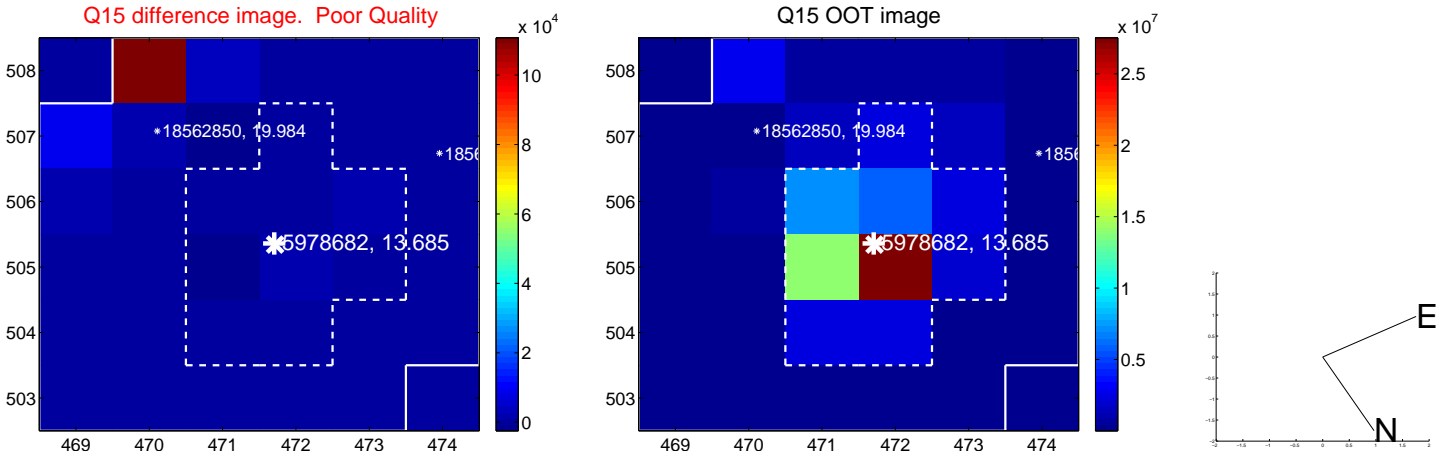
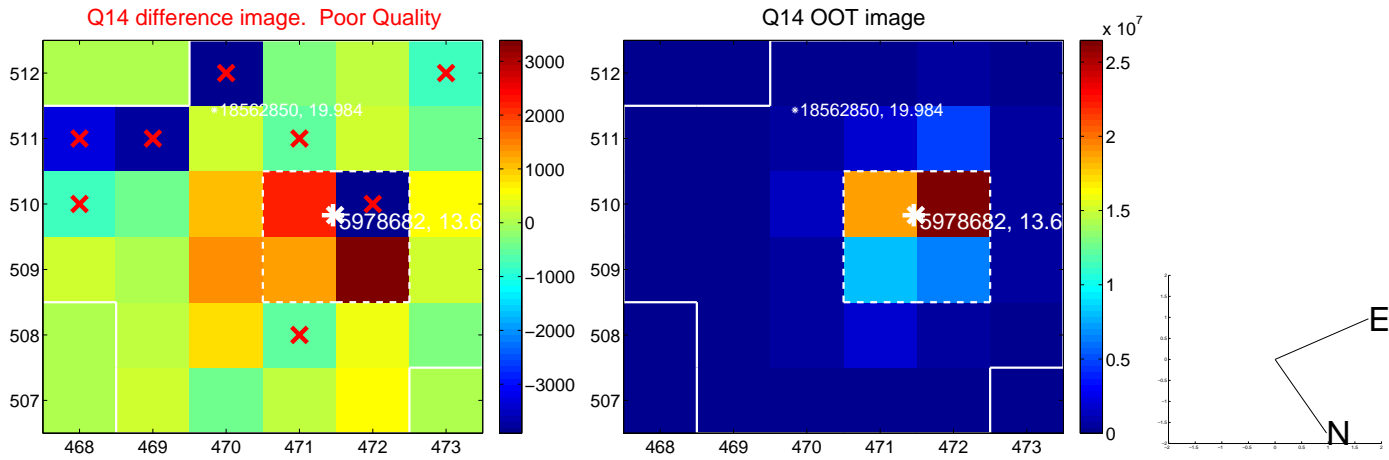
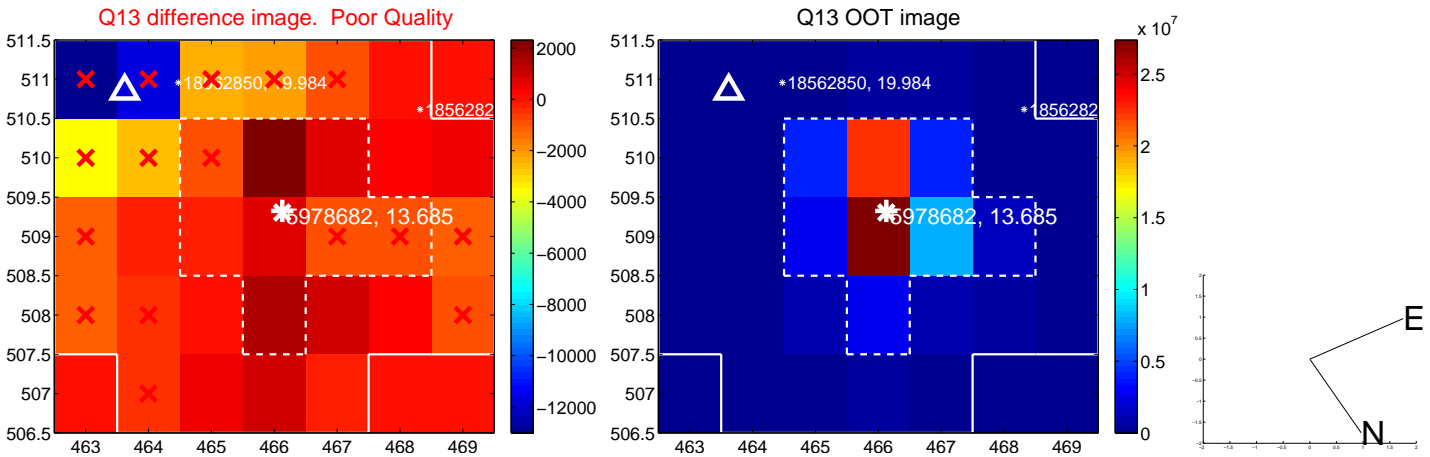
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

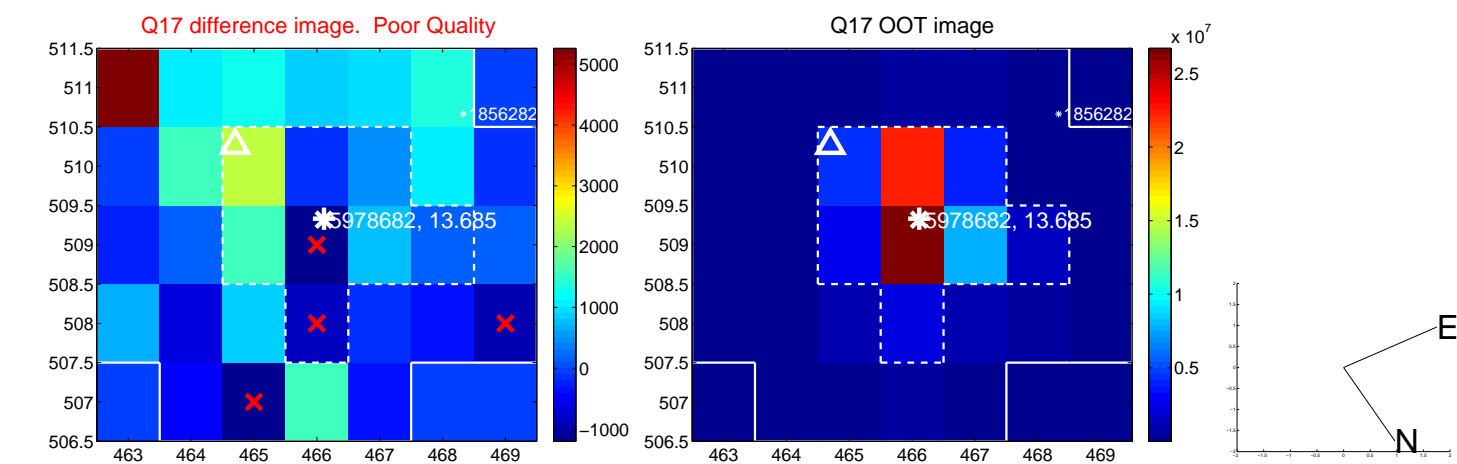


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

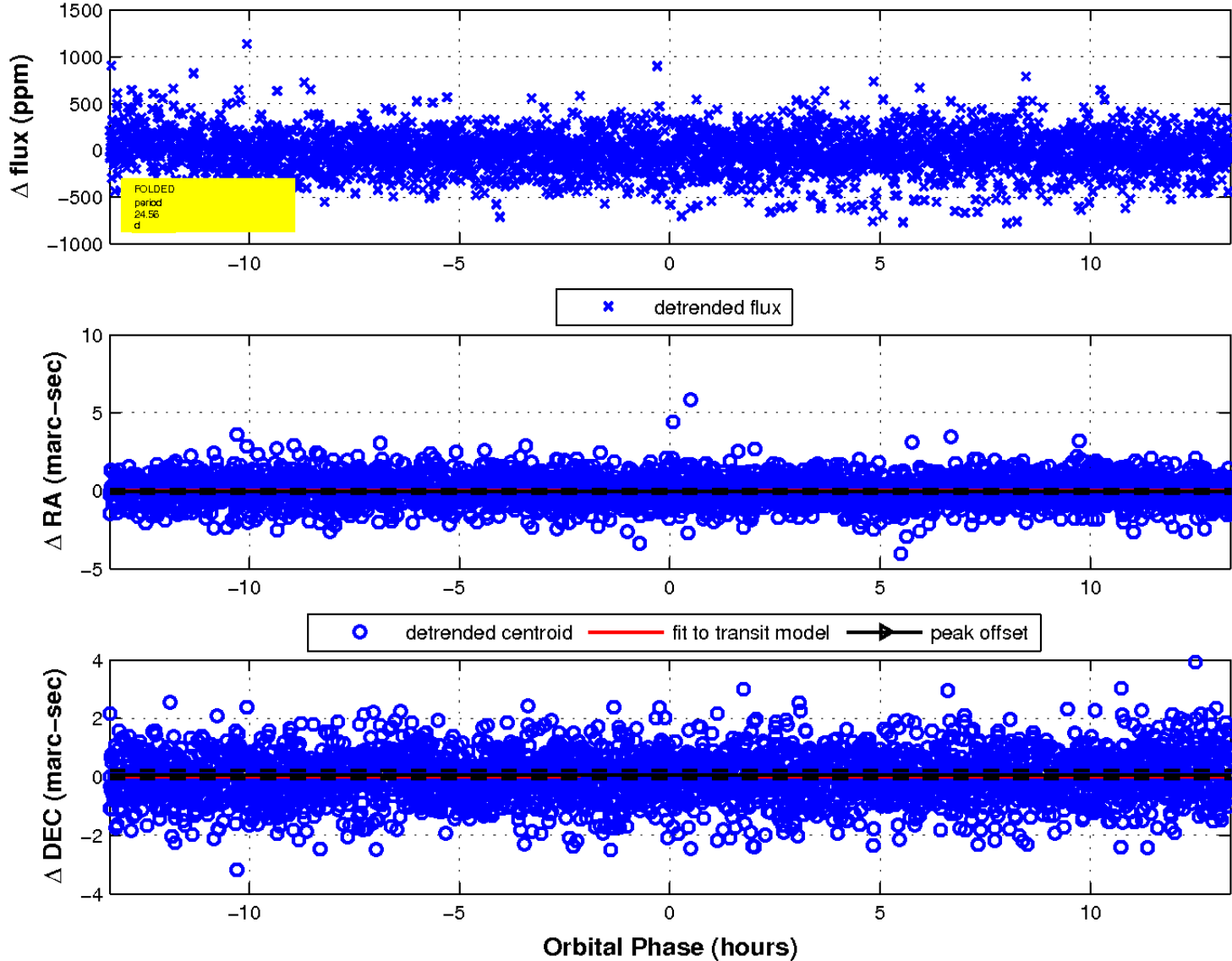




white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

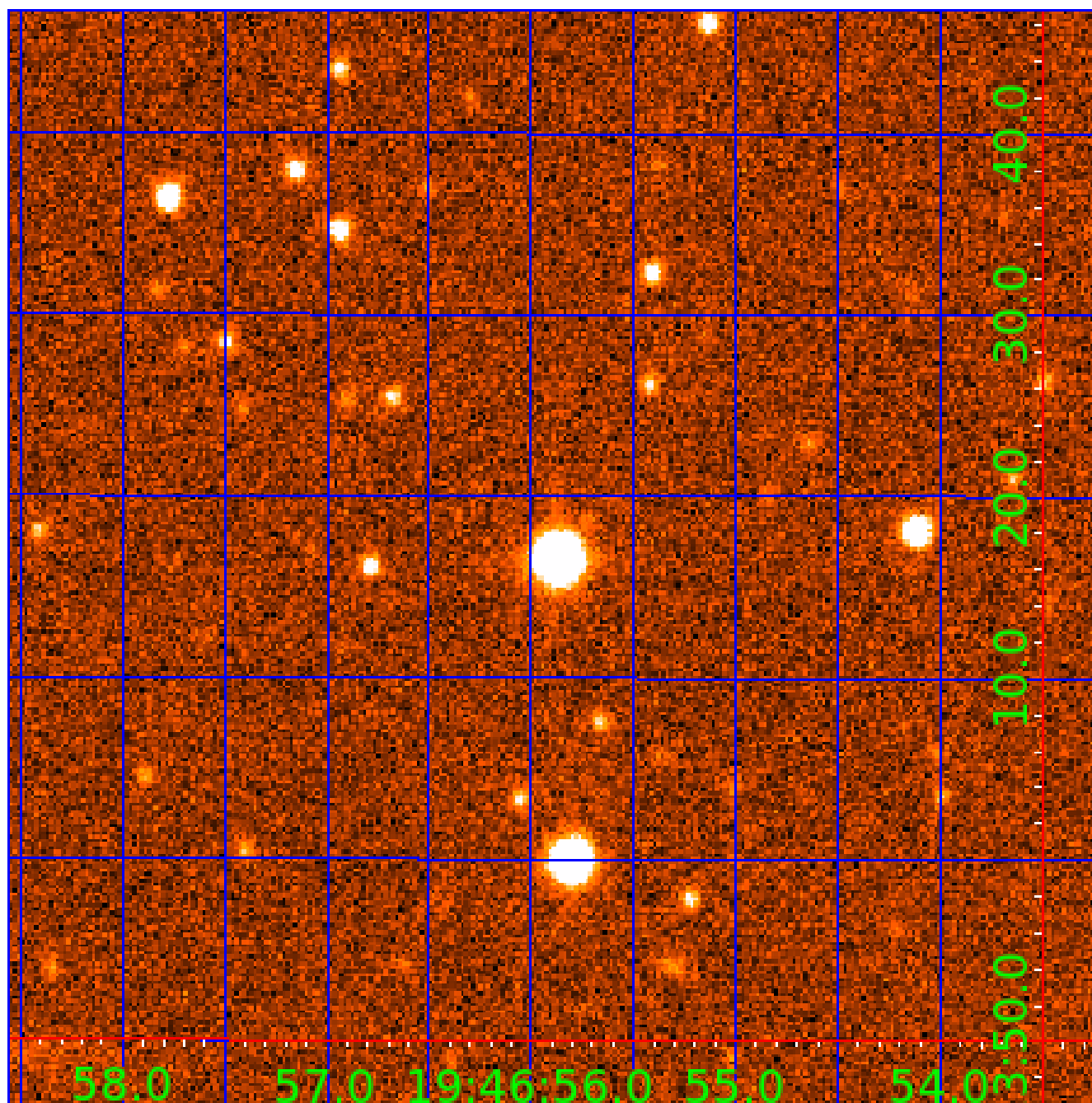


fluxWeightedCentroids, Planet 2 of 7



UKIRT Image

Declination



# KIC 005978682

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005978682-01	OBS	No	0.692126	131.738122	12.5	4.894	7.8	6.6	0.97	6480	0.35	6148.86
005978682-02	OBS	No	24.556245	141.930135	188.7	4.447	17.8	5.5	0.97	6480	1.48	52.74
005978682-03	OBS	No	23.517485	142.468375	380.7	2.809	14.8	8.1	0.97	6480	1.91	55.87
005978682-04	OBS	No	49.124797	141.099078	409.0	2.988	10.3	7.4	0.97	6480	2.05	20.92
005978682-05	OBS	No	60.189547	145.263653	577.9	2.486	9.7	9.2	0.97	6480	2.68	15.96
005978682-06	OBS	No	29.747329	148.690933	849.2	0.510	8.9	6.4	0.97	6480	3.64	40.84
005978682-07	OBS	No	59.562405	152.822565	453.6	1.528	9.9	5.9	0.97	6480	2.45	16.18

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005978682-01	OBS	FP	0.00	1	0	1	0	LPP_DV—LPP_ALT—CENT_RESOLVED_OFFSET
005978682-02	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_TRACKER—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—CENT_RESOLVED_OFFSET
005978682-03	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_RESOLVED_OFFSET
005978682-04	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_ZUMA—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—CENT_RESOLVED_OFFSET
005978682-05	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—CENT_RESOLVED_OFFSET
005978682-06	OBS	FP	0.00	1	0	1	0	TRANS_GAPPED—LPP_DV—LPP_ALT—CENT_RESOLVED_OFFSET
005978682-07	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—CENT_RESOLVED_OFFSET

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

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

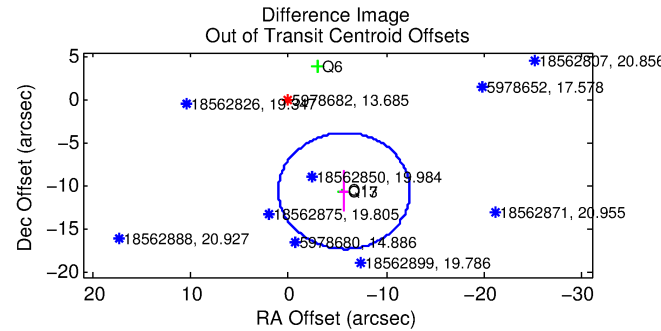
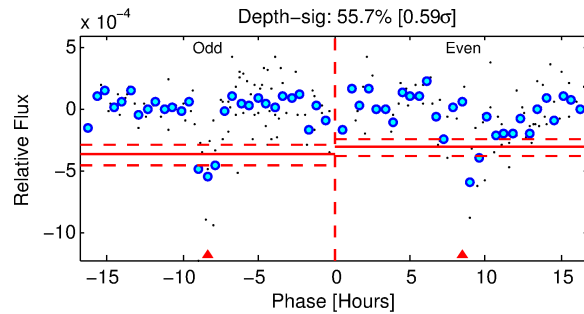
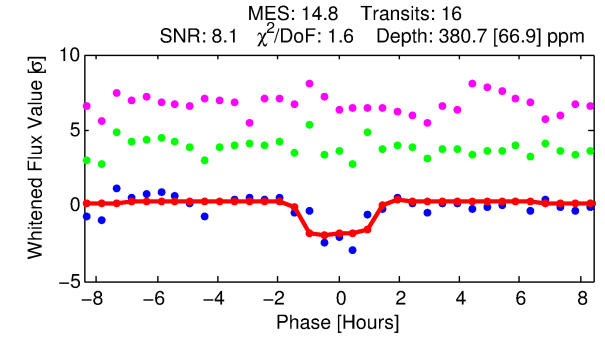
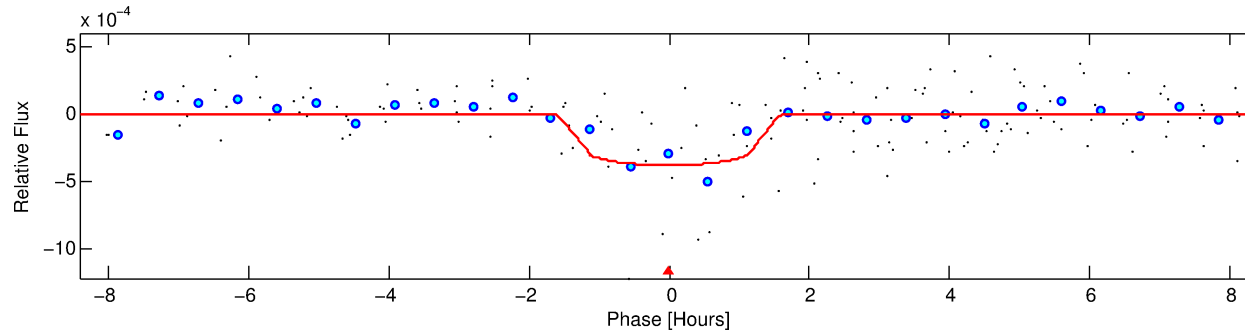
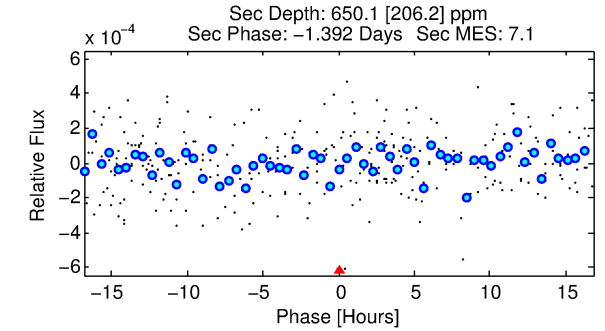
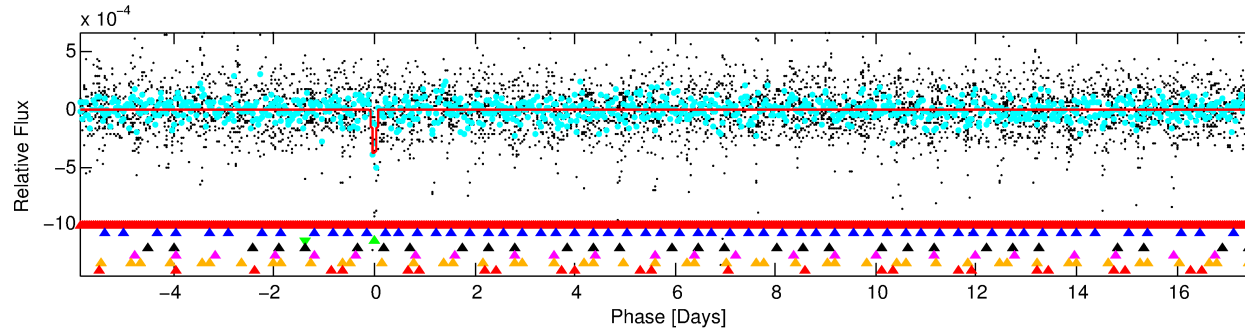
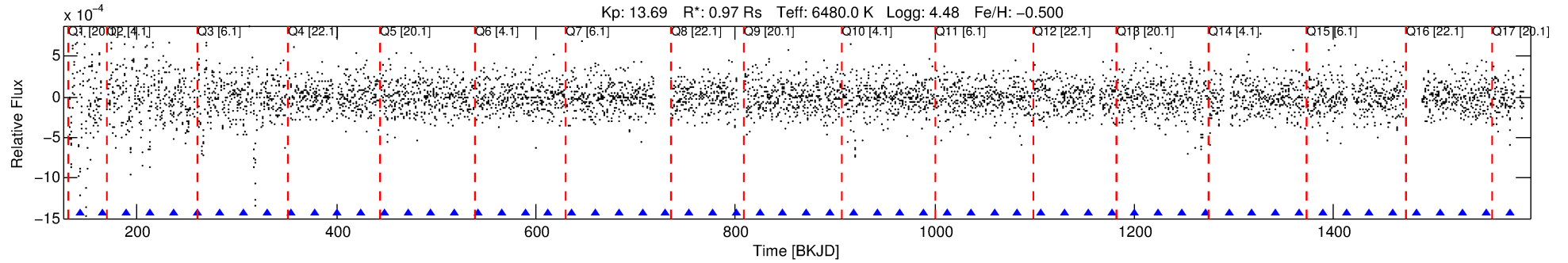
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 005978682-03

No Significant Match Found

# DV One-Page Summary

KIC: 5978682 Candidate: 3 of 7 Period: 23.517 d



## DV Fit Results:

Period = 23.51749 [0.00027] d  
Epoch = 142.4684 [0.0120] BKJD  
Rp/R\* = 0.0180 [0.0314]  
a/R\* = 65.06 [608.52]  
b = 0.04 [243.56]  
Seff = 55.87 [23.69]  
Teq = 697 [74] K  
Rp = 1.91 [3.38] Re  
a = 0.1631 [0.0445] AU  
Ag = 2619.92 [9245.13] [0.28σ]  
Teffp = 7711 [6763] K [1.04σ]

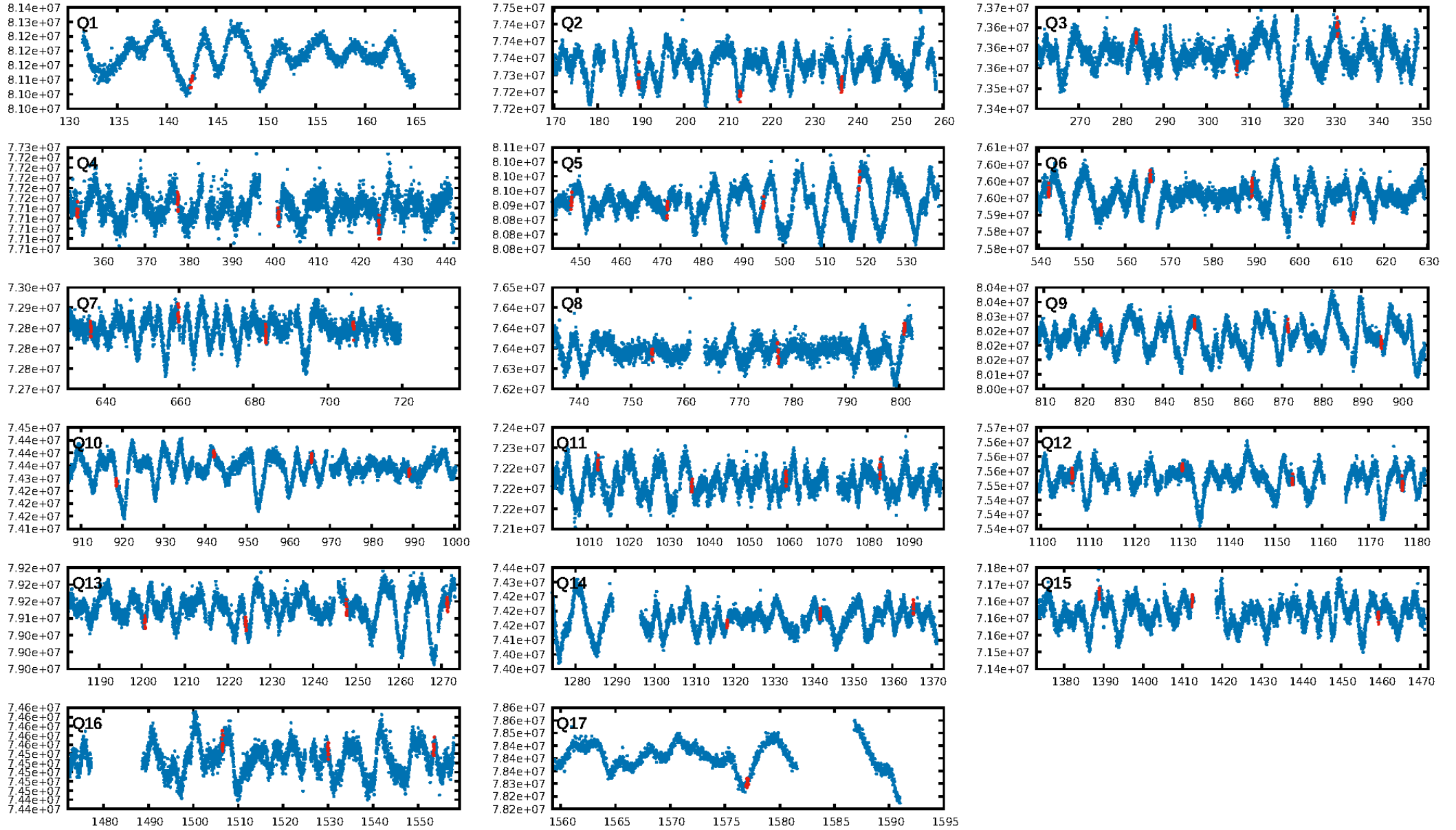
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [97.08σ]  
LongPeriod-sig: 100.0% [4.74σ]  
ModelChiSquare2-sig: 0.1%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 1.28e-33  
RollingBand-fgt: 1.00 [15/15]  
GhostDiagnostic-chr: -4.026  
Centroid-sig: 0.2%  
Centroid-so: 0.659 arcsec [1.68σ]  
OotOffset-rm: 11.978 arcsec [5.35σ]  
KicOffset-rm: 12.028 arcsec [4.25σ]  
OotOffset-st: 1/0/0/3 [4]  
KicOffset-st: 1/0/0/3 [4]  
DiffImageQuality-fgm: 0.75 [3/4]  
DiffImageOverlap-fno: 0.00 [0/17]

Software Revision: svn-ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 03-Feb-2016 06:56:02 Z

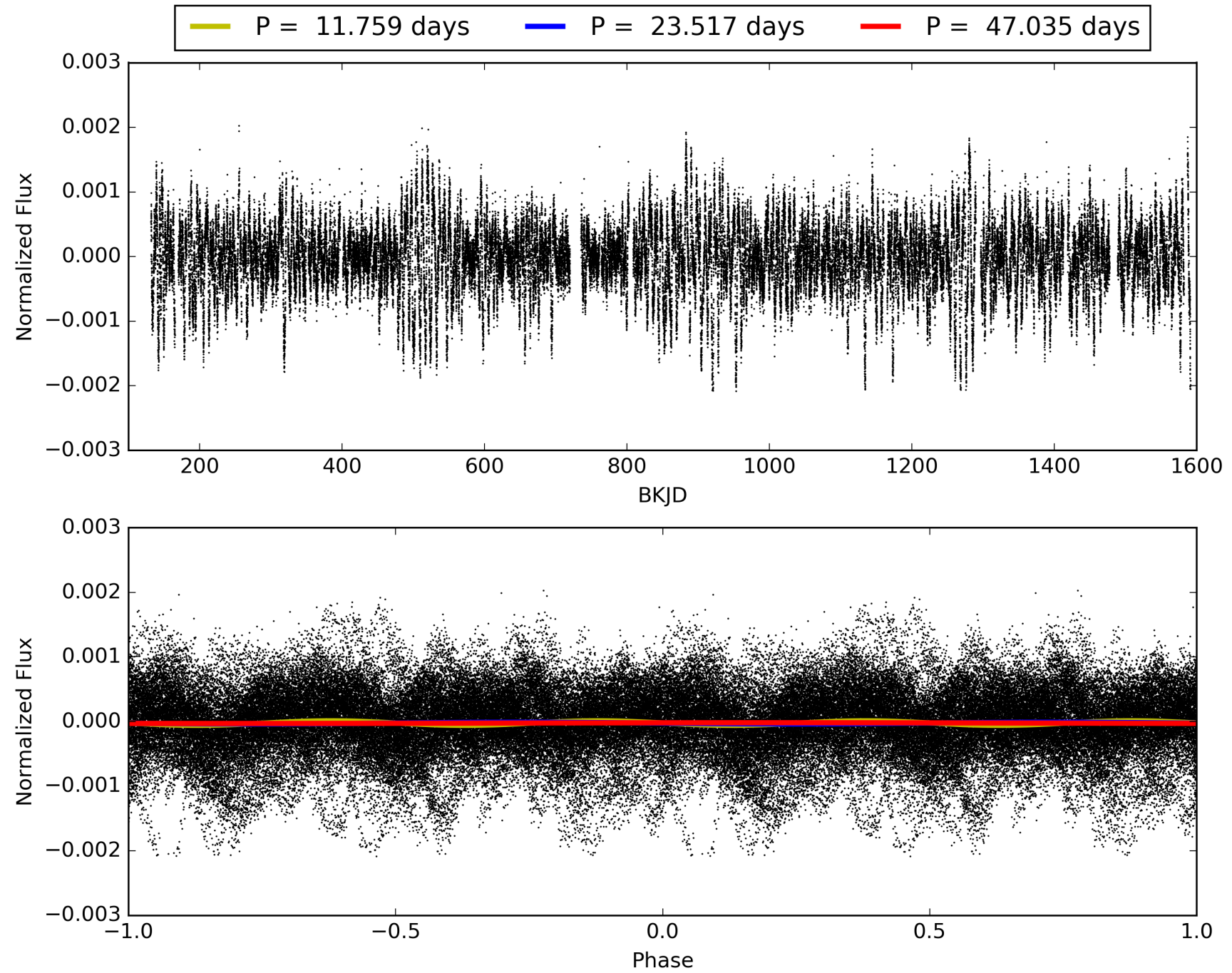
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 005978682-03, PDC Light Curves



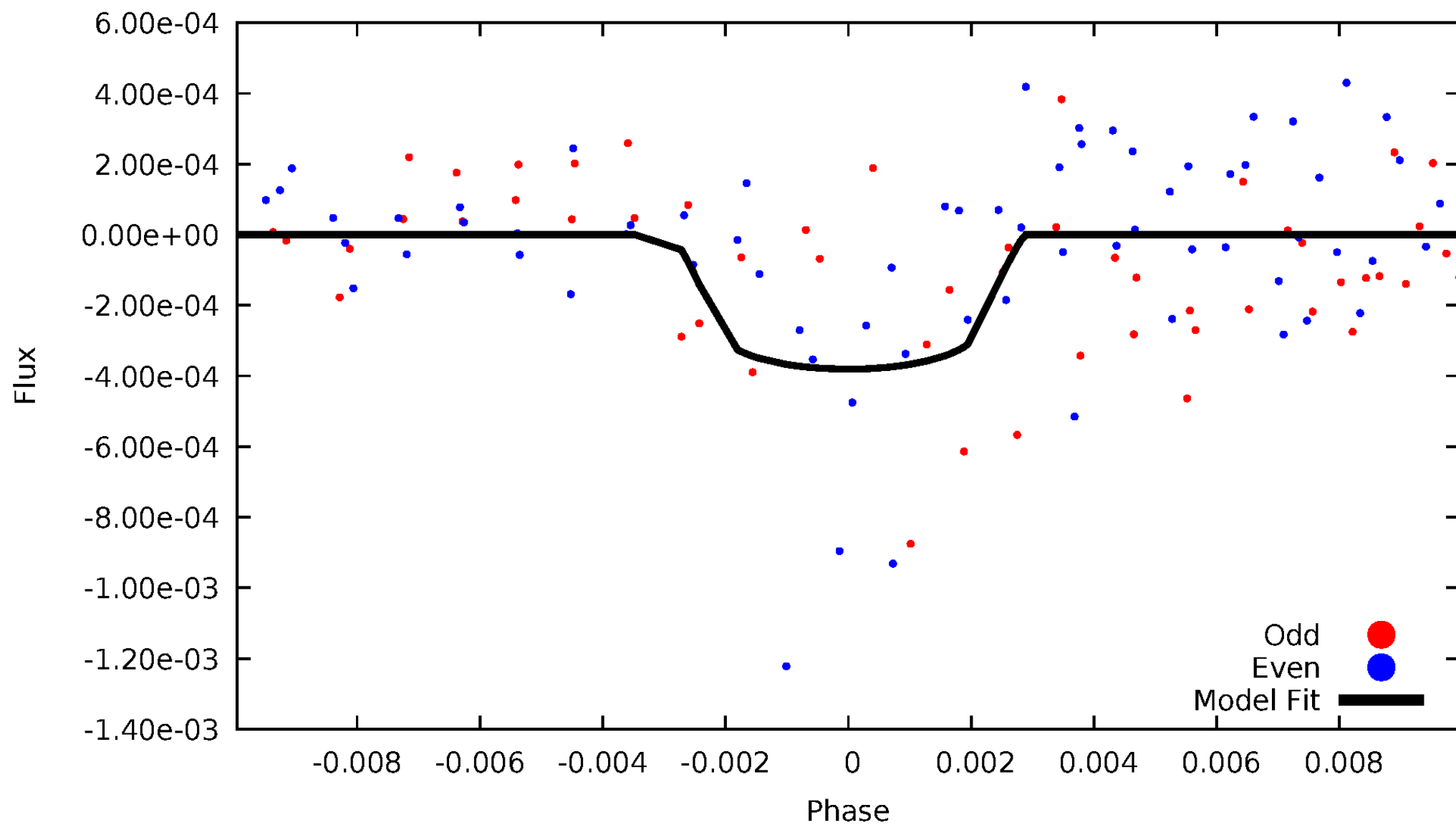


TCE 005978682-03



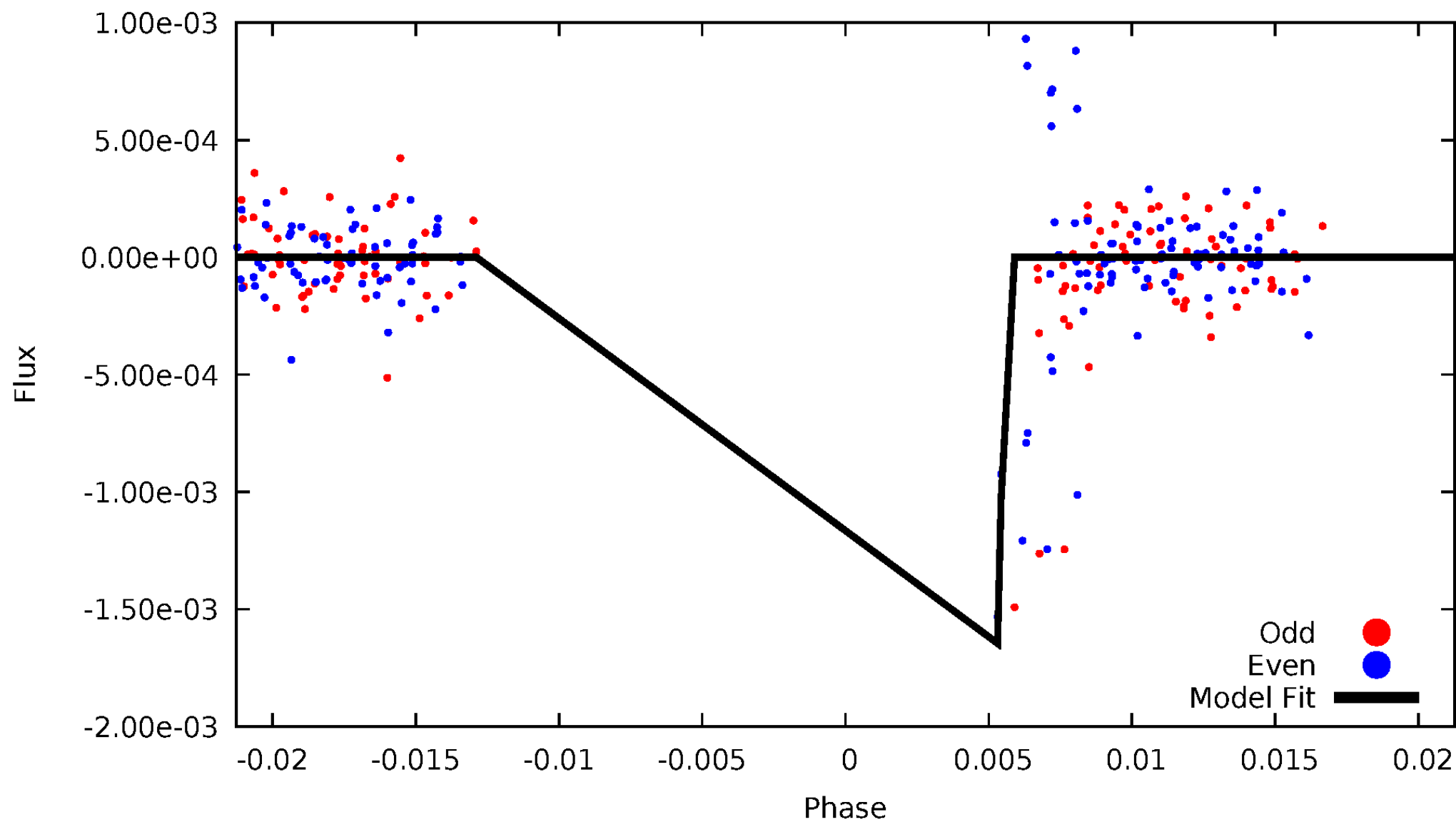
# DV Odd/Even

TCE 005978682-03



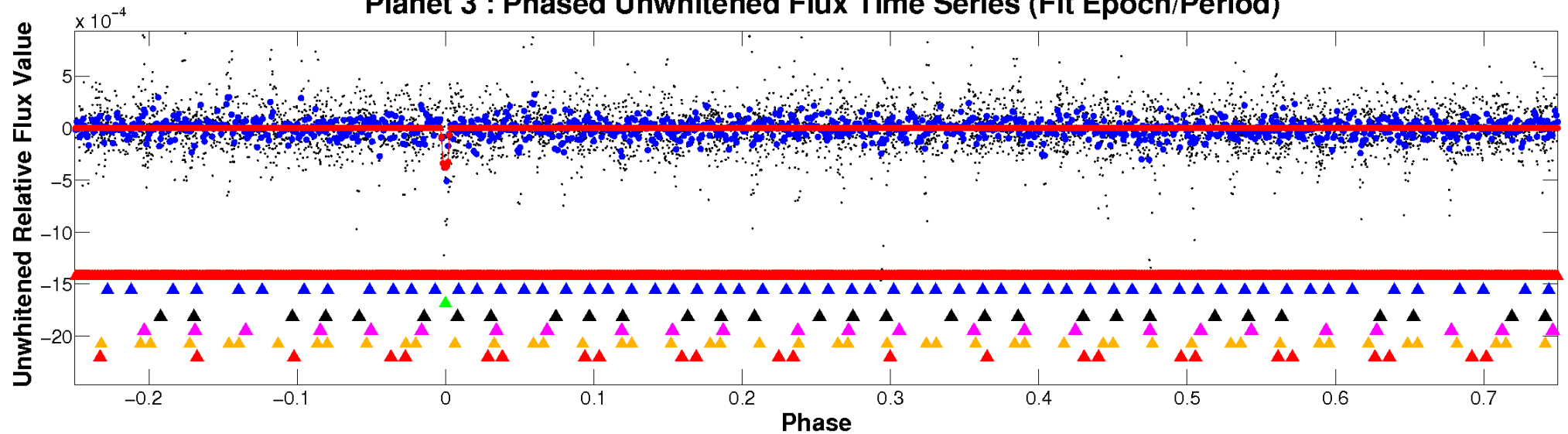
# ALT Odd/Even

TCE 005978682-03

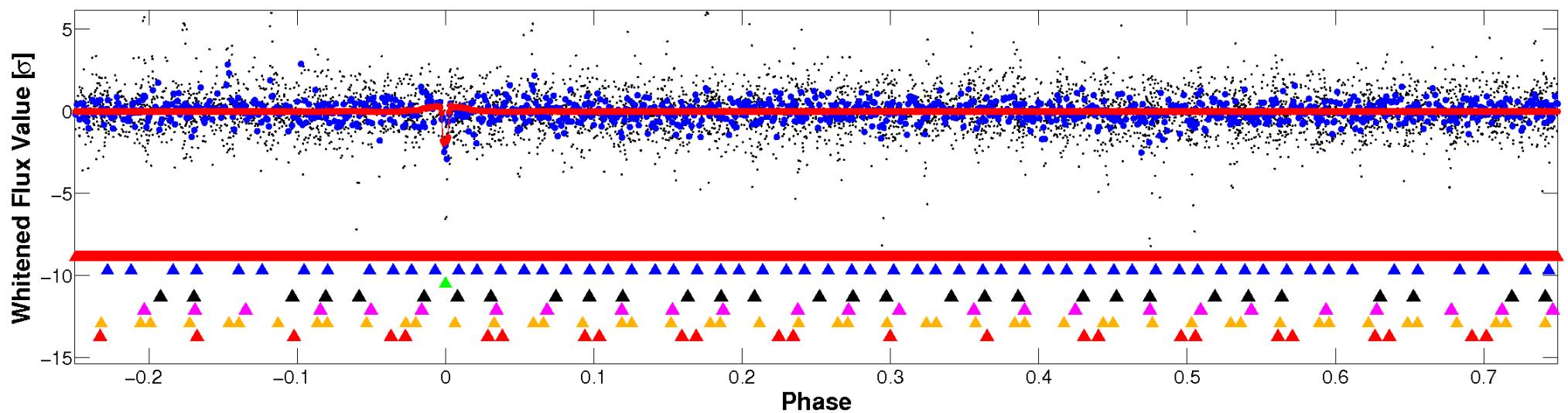


# Non-Whitened Vs. Whitened Light Curve

## Planet 3 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

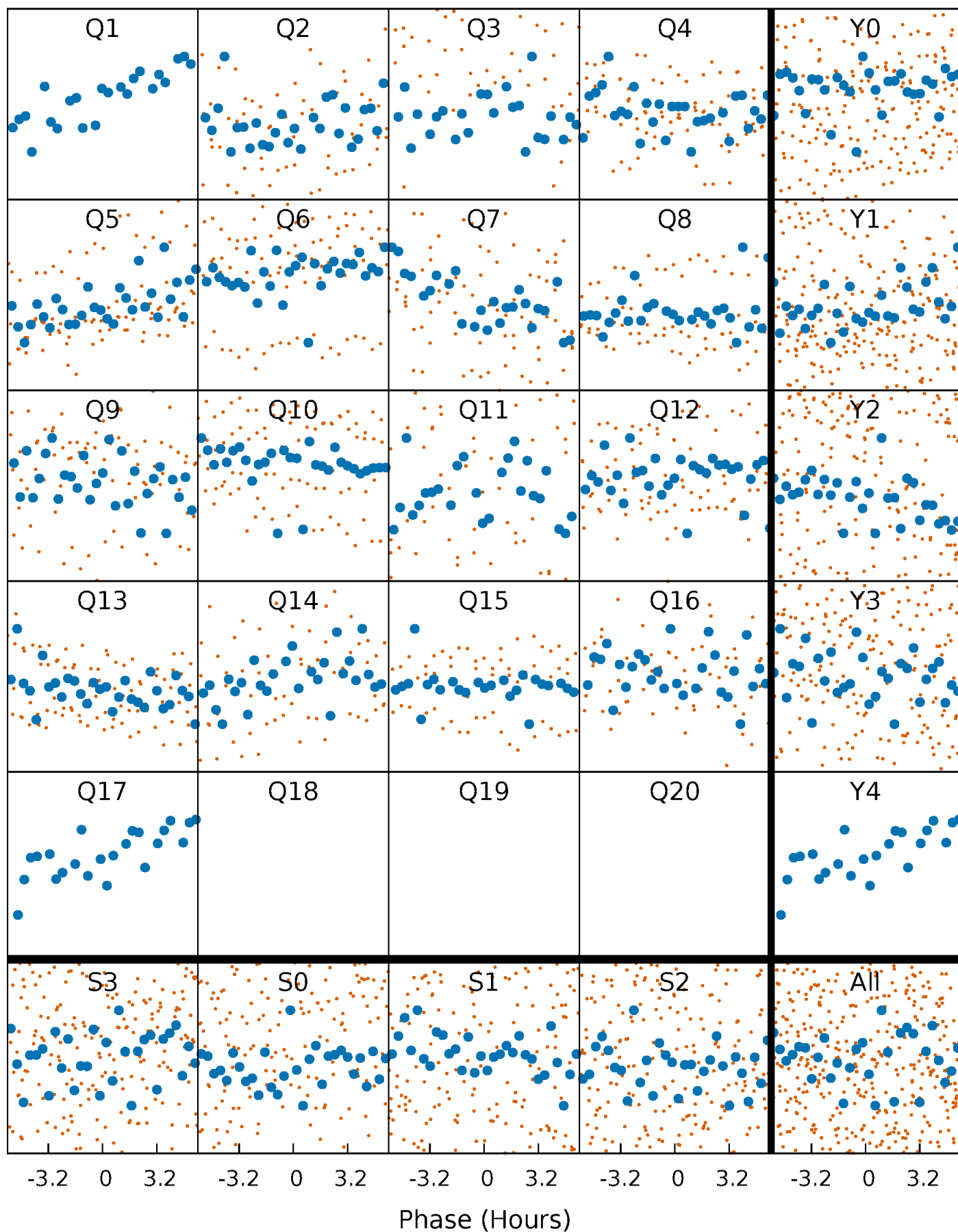


## Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



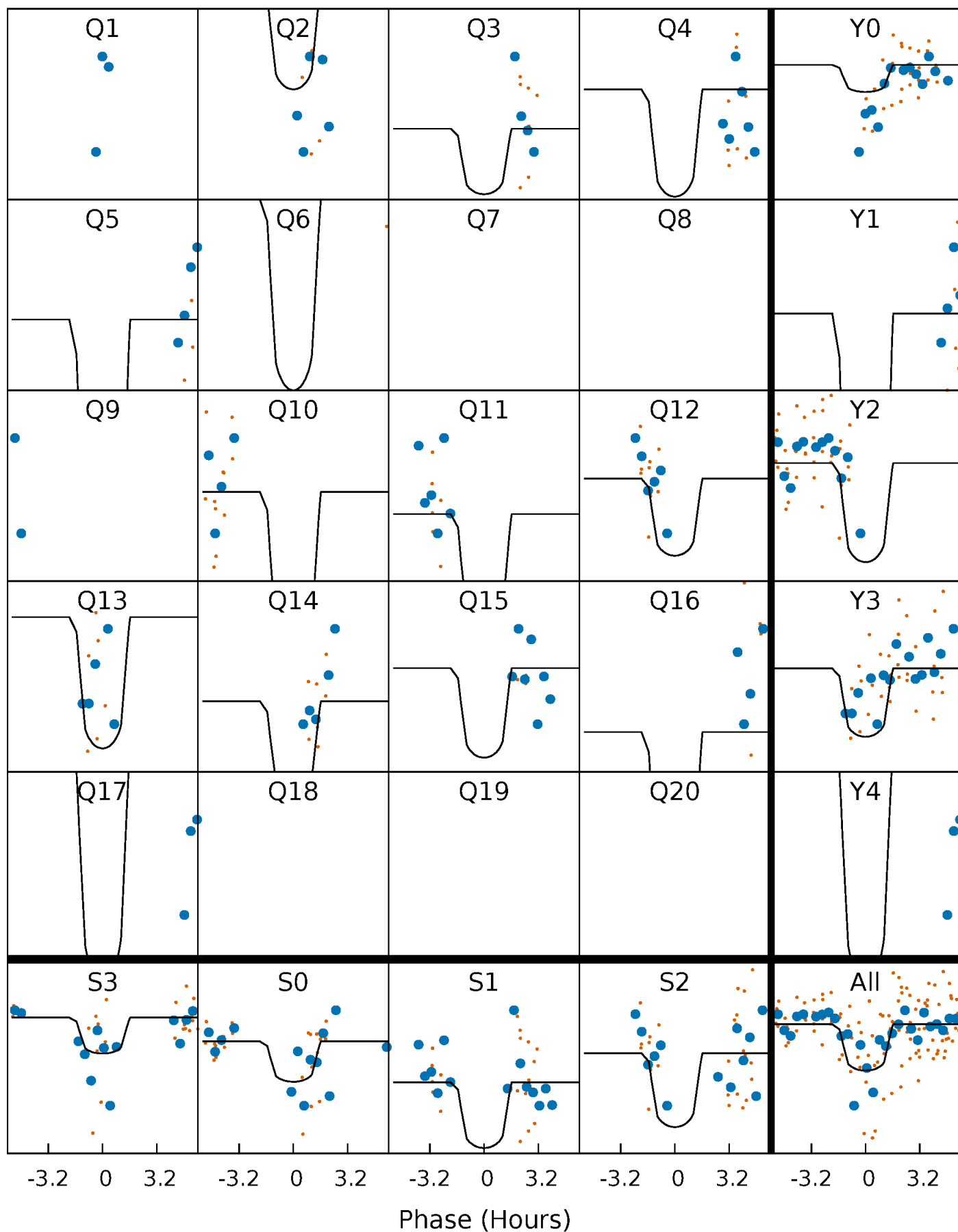
# PDC Quarter-Phased Transit Curves

TCE 005978682-03     $P = 23.517485$  Days     $T_0 = 142.468375$  (BKJD)



# DV Quarter-Phased Transit Curves

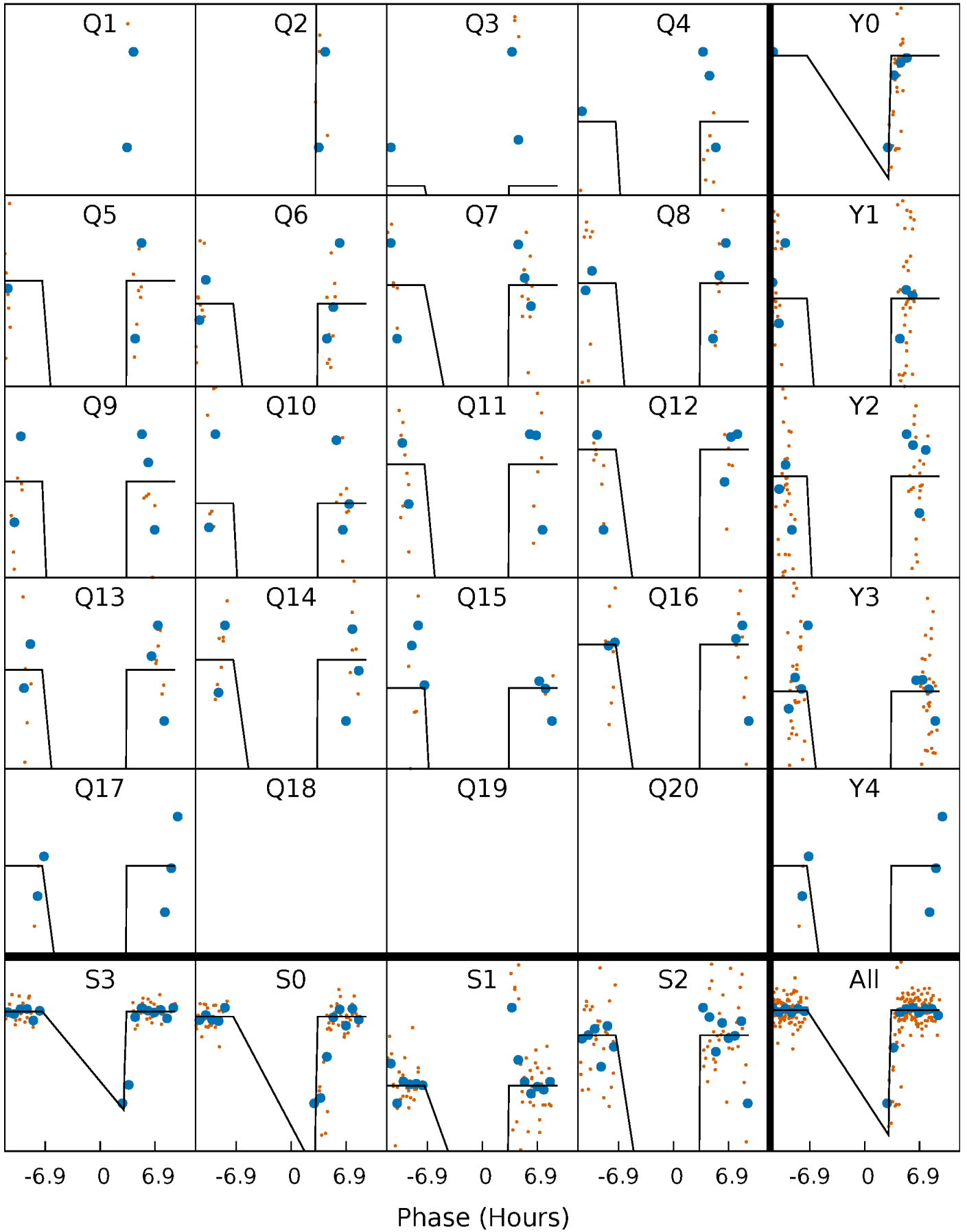
TCE 005978682-03 P= 23.517485 Days  $T_0=142.468375$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

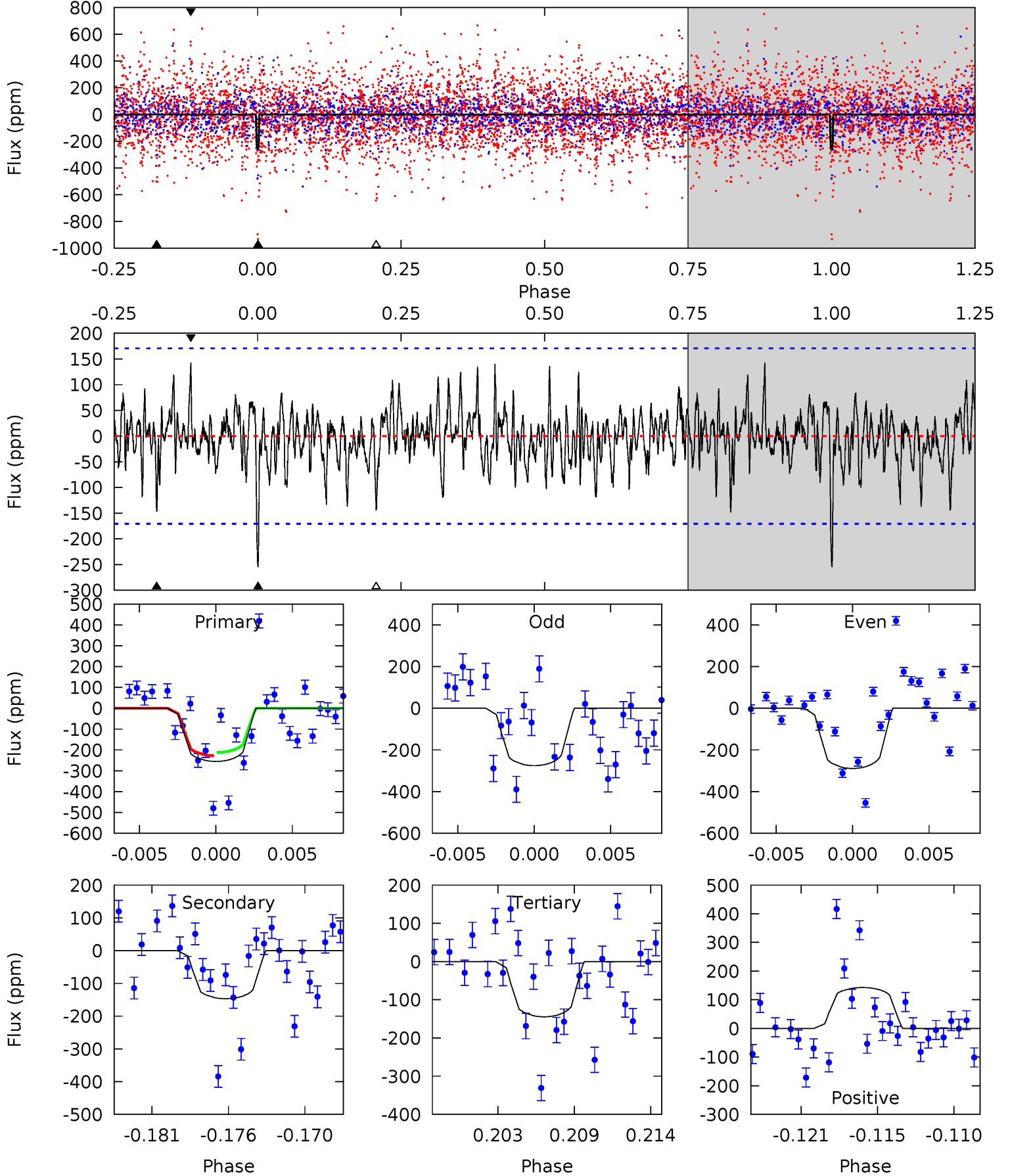
TCE 005978682-03   P= 23.528728 Days    $T_0=142.319584$  (BKJD)



# DV Model-Shift Uniqueness Test

005978682-03,  $P = 23.517485$  Days,  $E = 118.950890$  Days

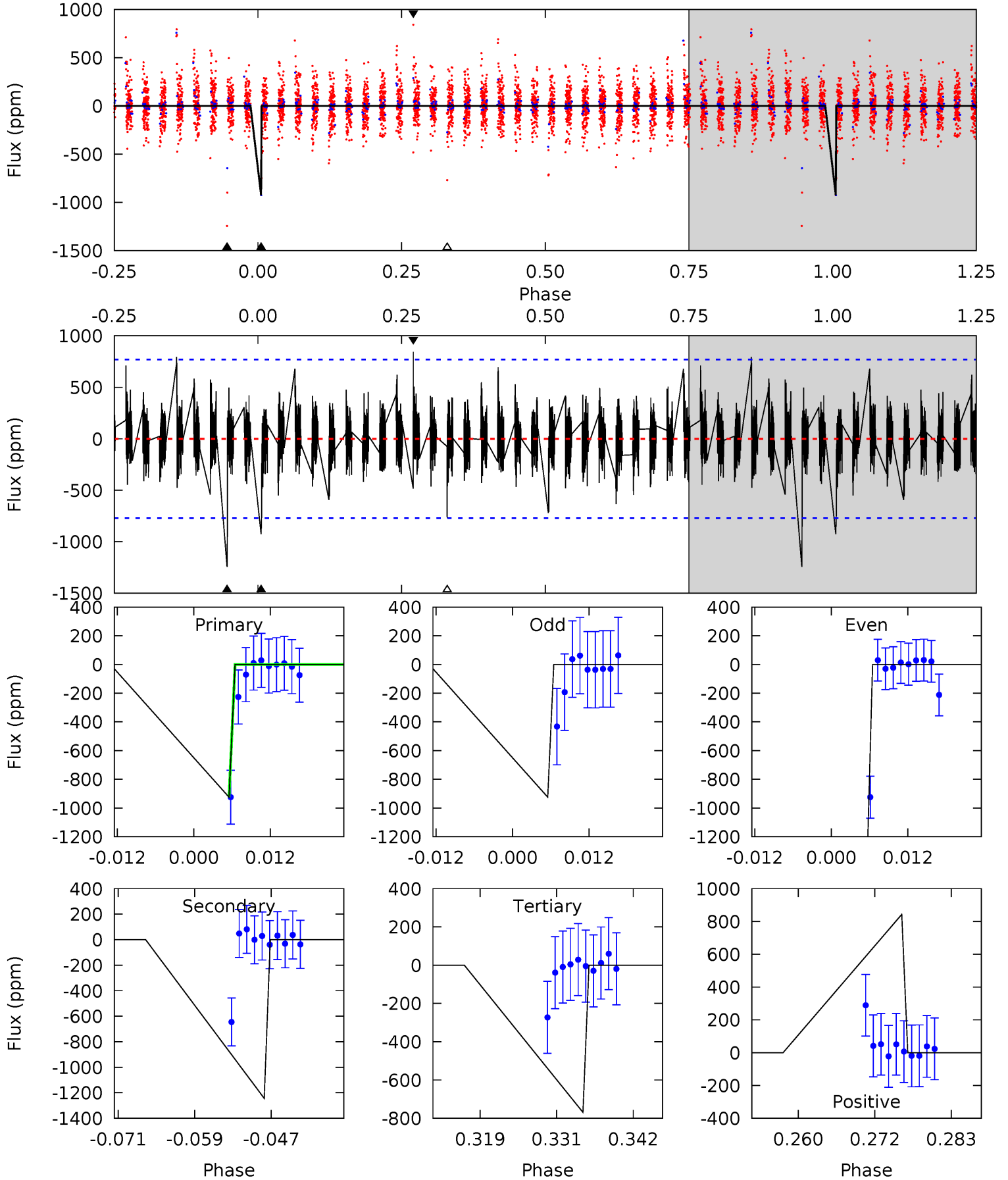
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
7.68	4.42	4.35	4.29	5.14	2.78	1.36	3.33	3.39	0.07	0.12	0.21	1.33	0.36	0.24



# Alt Model-Shift Uniqueness Test

005978682-03, P = 23.528728 Days, E = 118.790856 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
6.00	8.07	4.99	5.47	4.99	2.52	1.00	1.01	0.53	3.08	2.60	3.15	0	0.40	0



### Stellar Parameters For KIC 005978682

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6480^{+145}_{-210}$	$4.484^{+0.042}_{-0.224}$	$-0.500^{+0.300}_{-0.300}$	$0.970^{+0.308}_{-0.082}$	$1.045^{+0.133}_{-0.133}$	$1.614^{+0.345}_{-0.863}$
	+2%/-3%	+1%/-5%	+60%/-60%	+32%/-8%	+13%/-13%	+21%/-53%
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 005978682-03 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-147 \pm 33$	$3.39^{+2.76}_{-2.19}$	$994^{+70}_{-45}$	$4330^{+2609}_{-838}$	$185^{+1395}_{-132}$
Alt.	$-1244 \pm 154$	$6.13^{+3.82}_{-3.07}$	$996^{+77}_{-47}$	$5179^{+2171}_{-866}$	$472^{+1457}_{-291}$

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

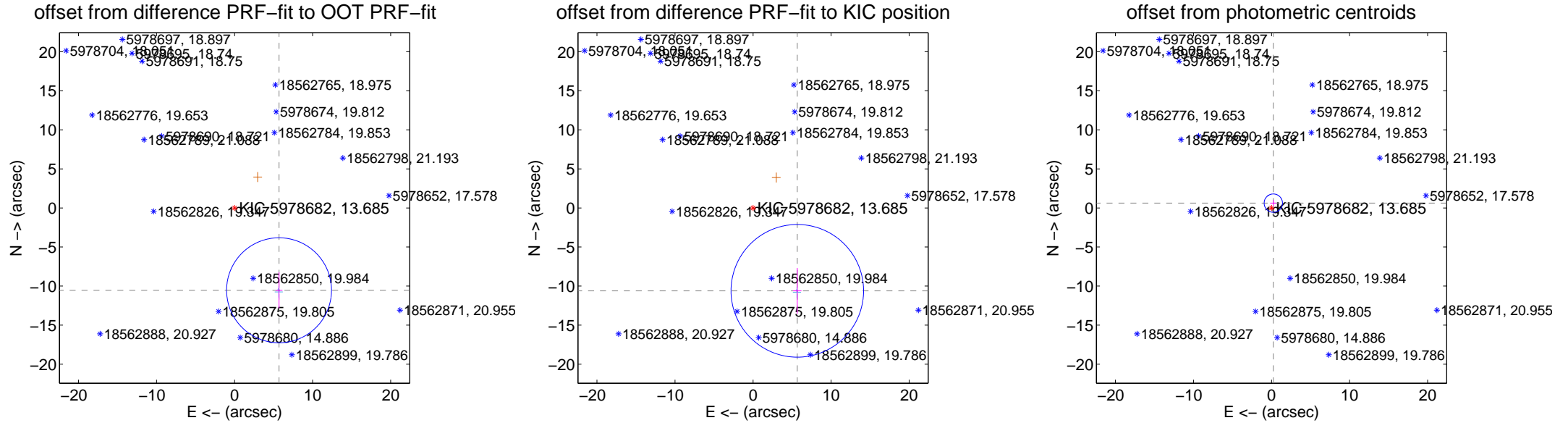
## DV Centroid Data

Supplemental centroid analysis for 005978682-03. Kepler magnitude: 13.69. Transit SNR 8.05

There are 3 quarters with good PRF difference image offsets

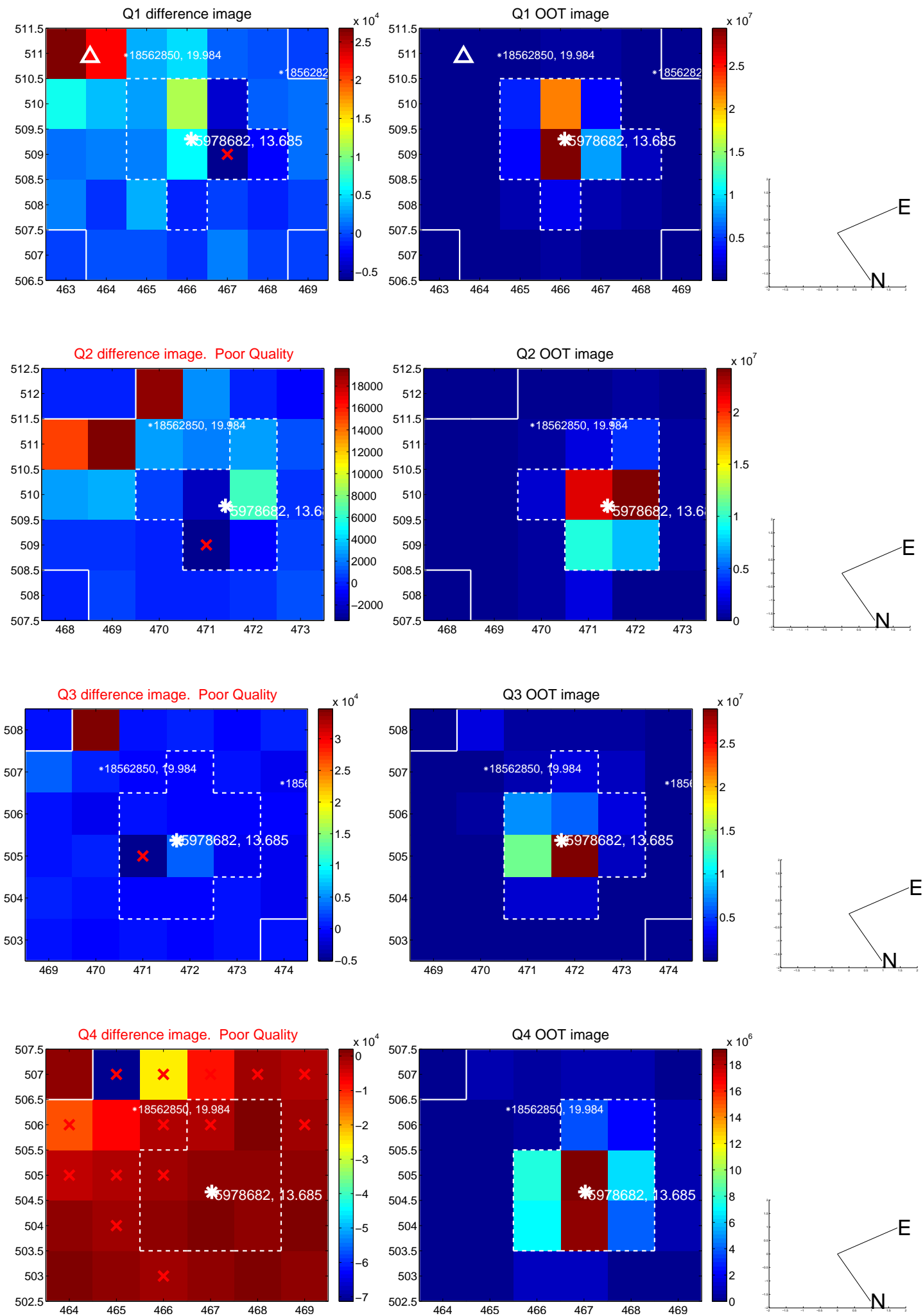
The direct PRF centroid is offset from the target star catalog position by about 0.06 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$11.978 \pm 2.240$	5.35	$-5.696 \pm 0.437$	$-10.537 \pm 2.313$
PRF-fit source offset from KIC position	$12.028 \pm 2.830$	4.25	$-5.669 \pm 0.532$	$-10.608 \pm 2.927$
photometric centroid source offset	$0.66 \pm 0.39$	1.68	$-0.23 \pm 0.39$	$0.62 \pm 0.39$



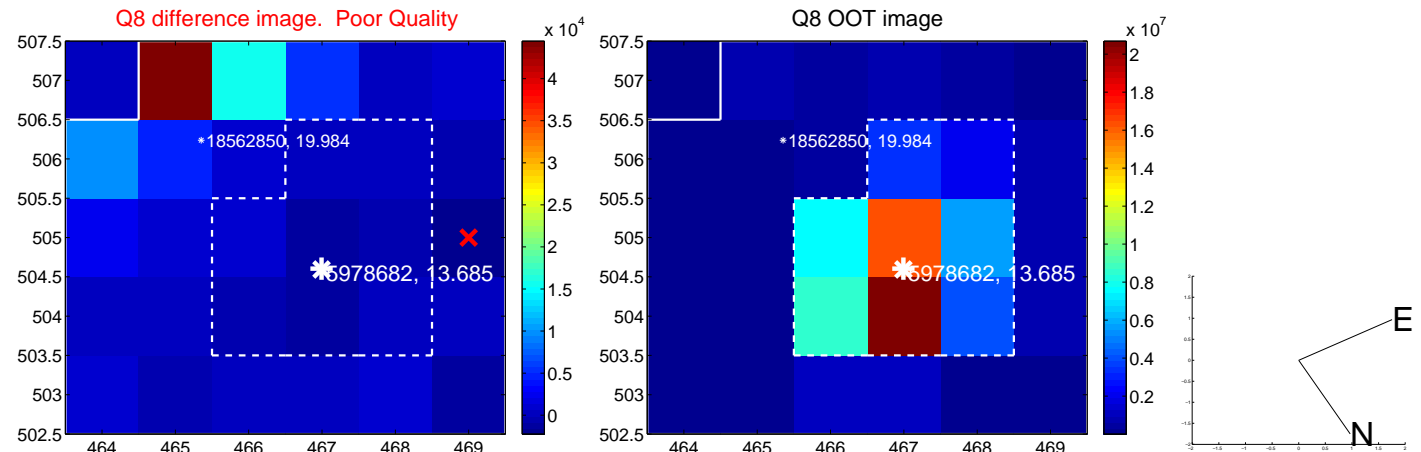
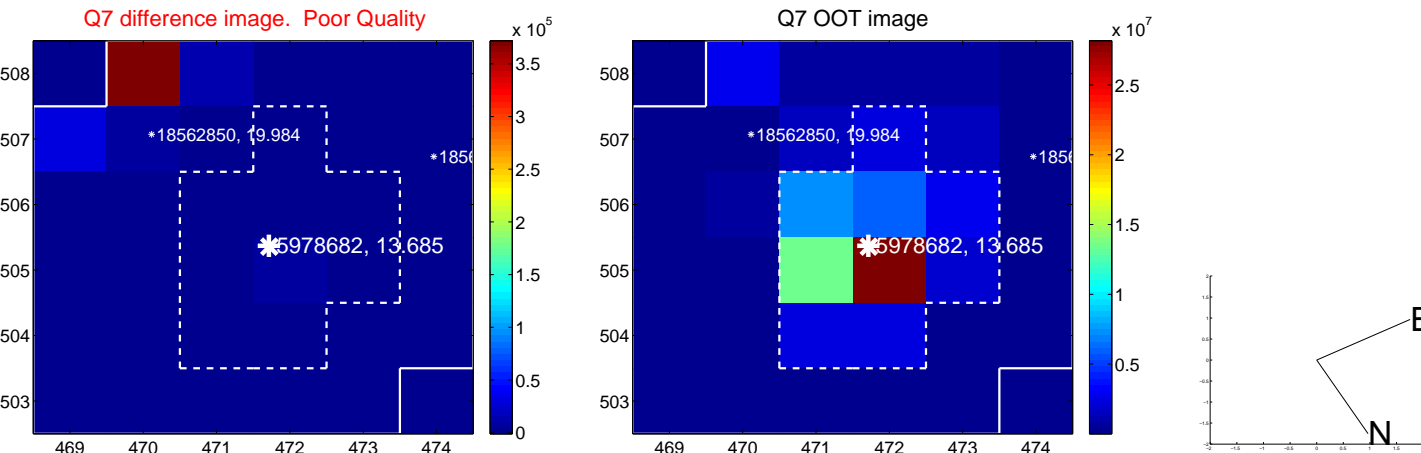
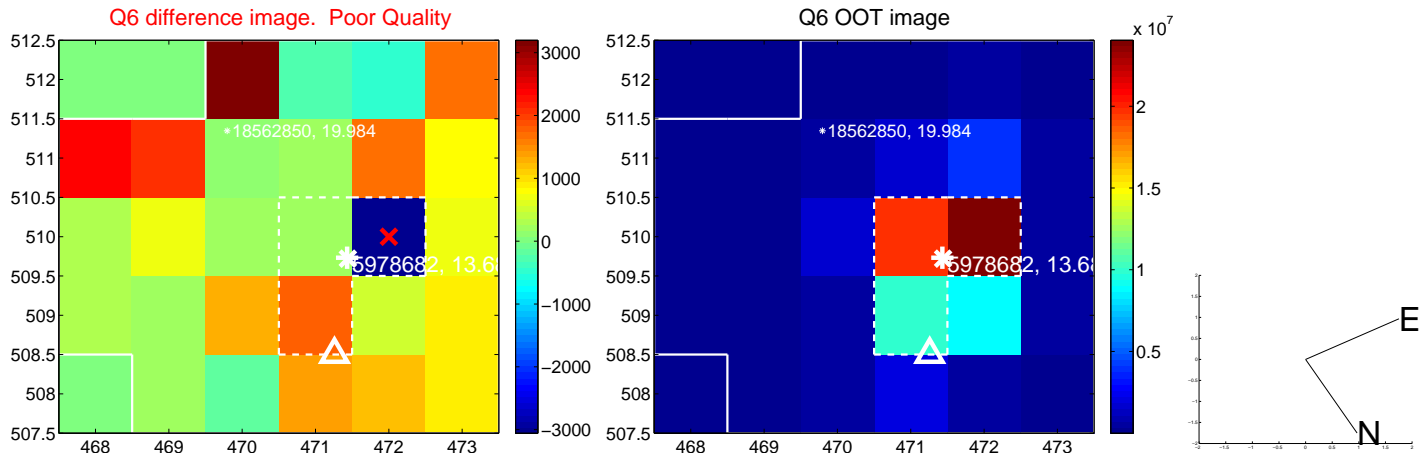
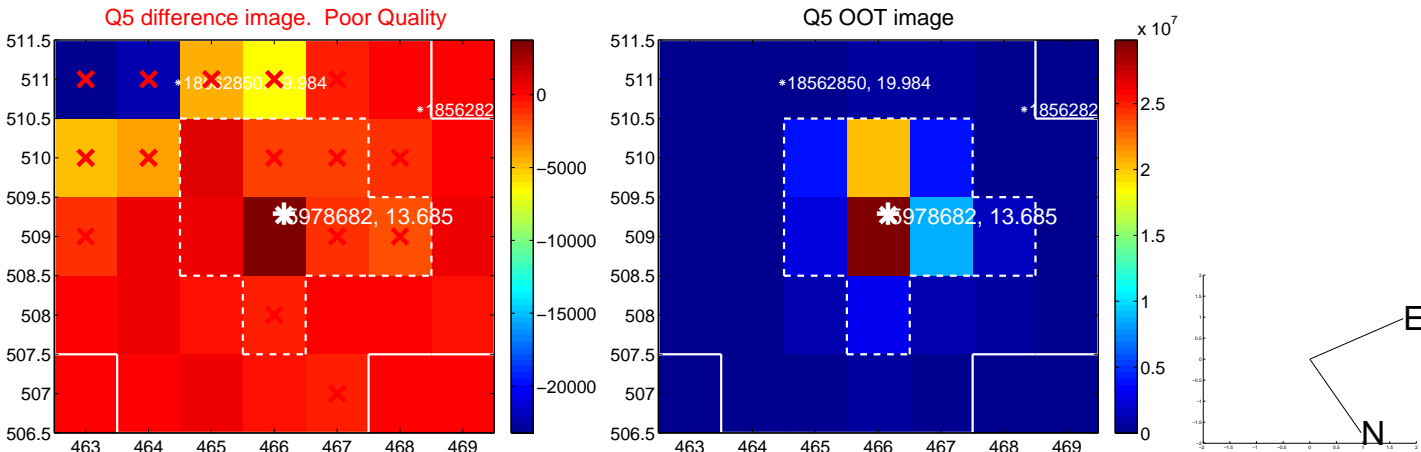
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

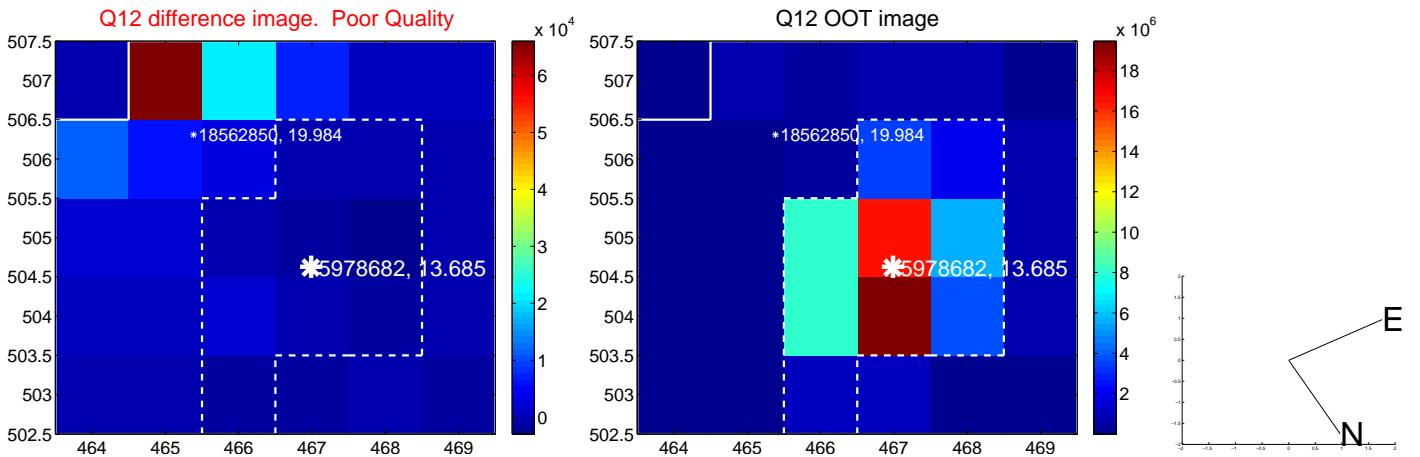
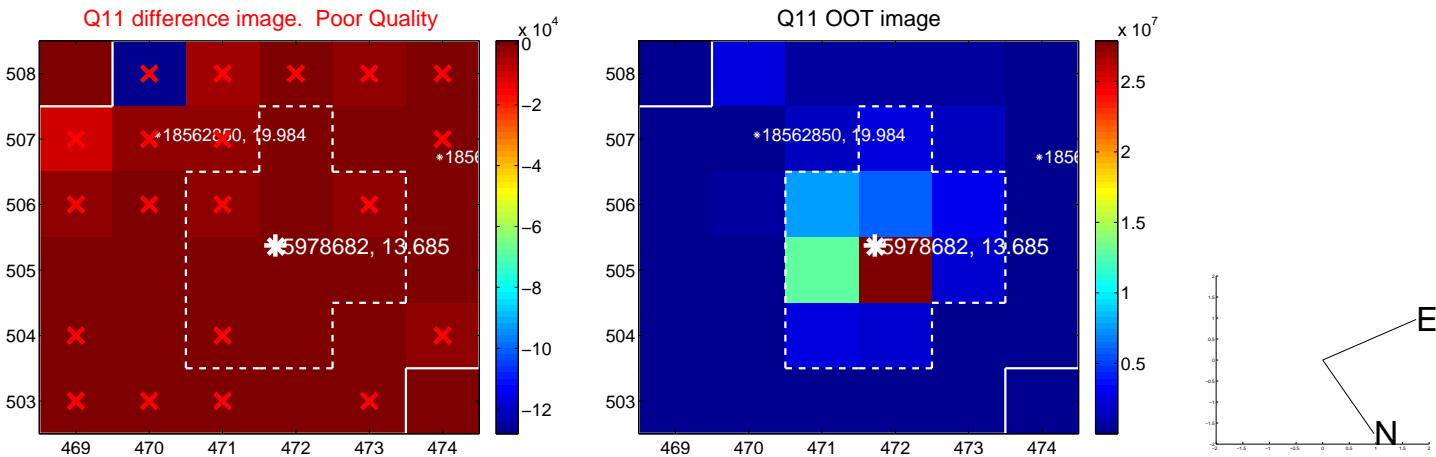
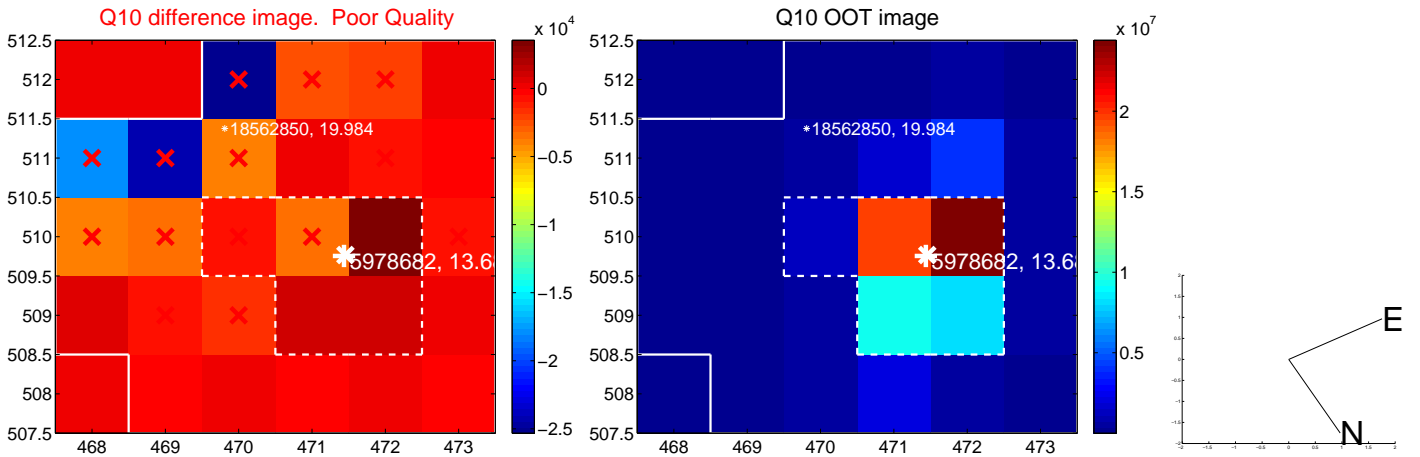
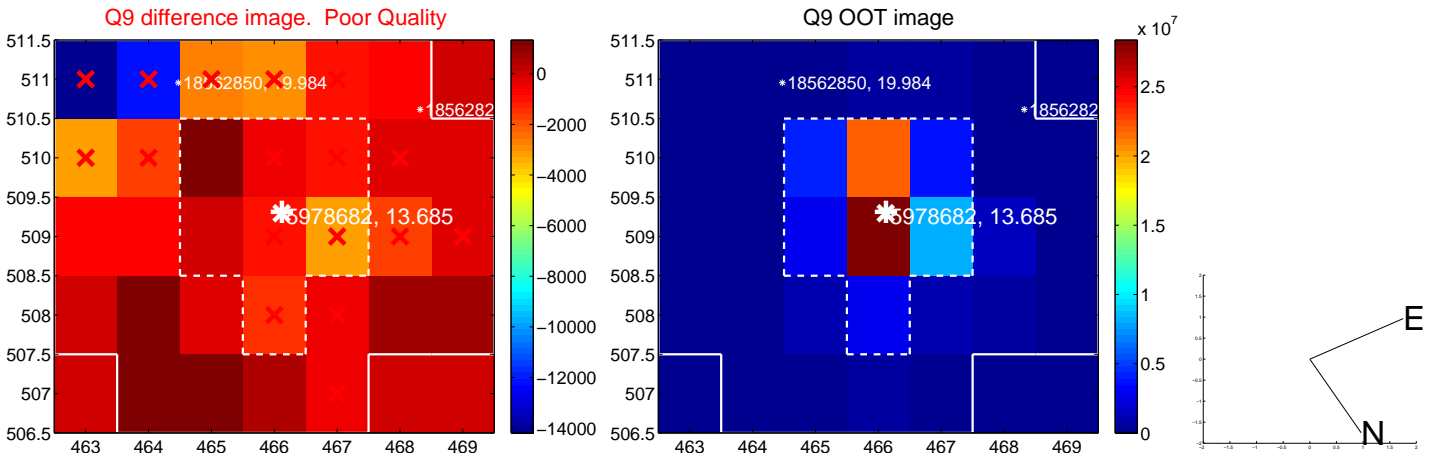




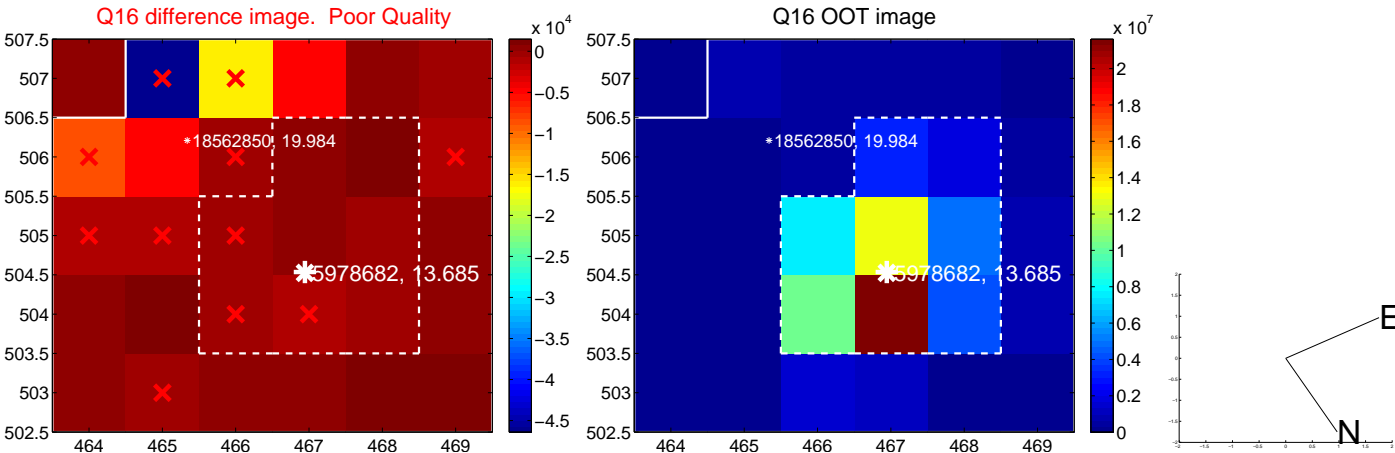
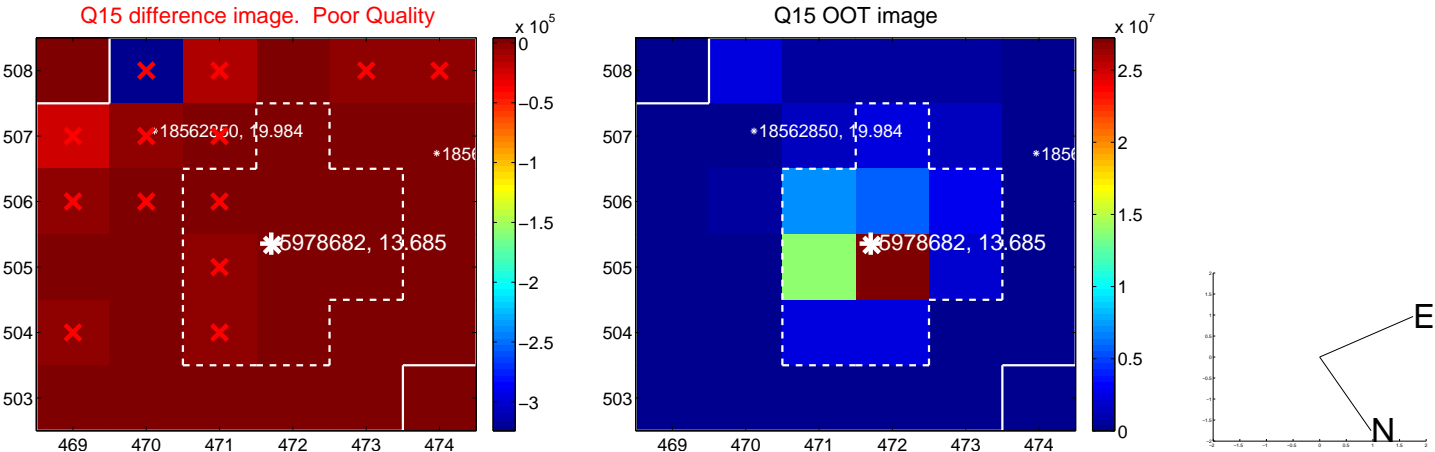
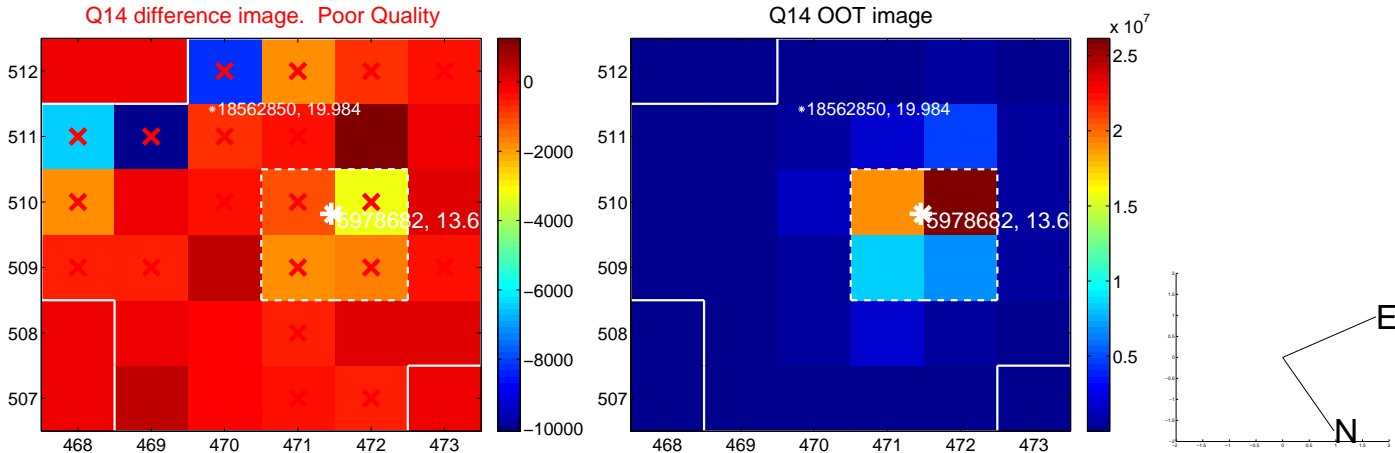
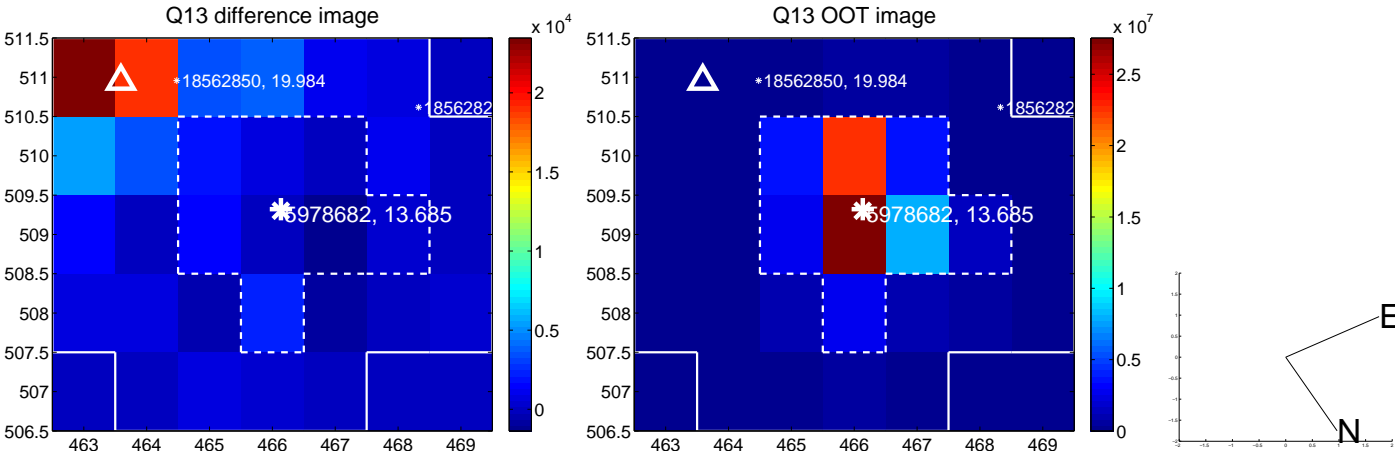
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



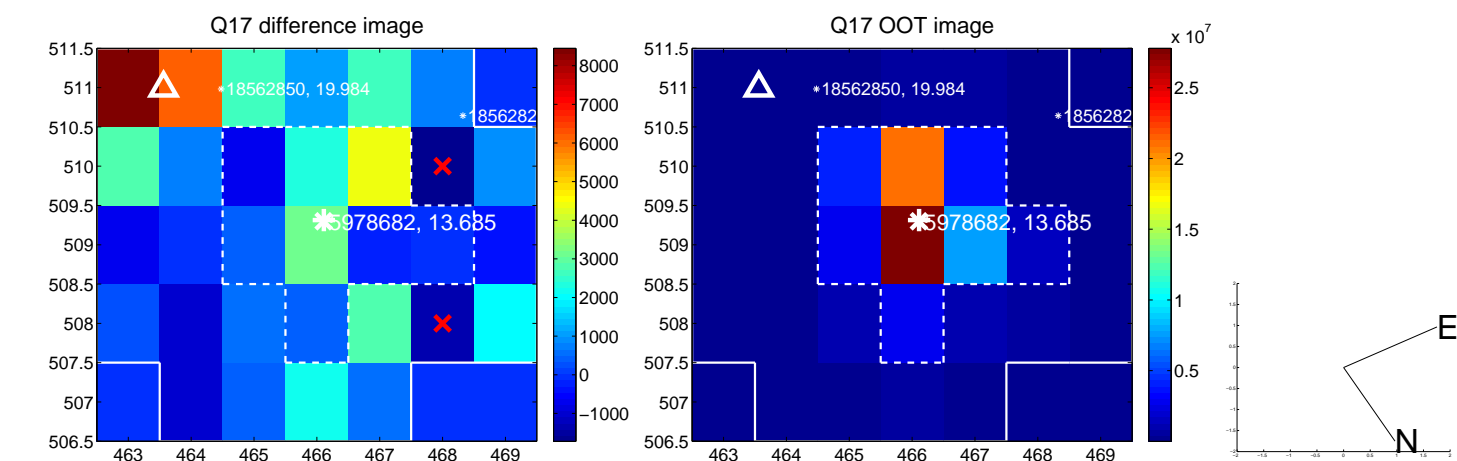
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



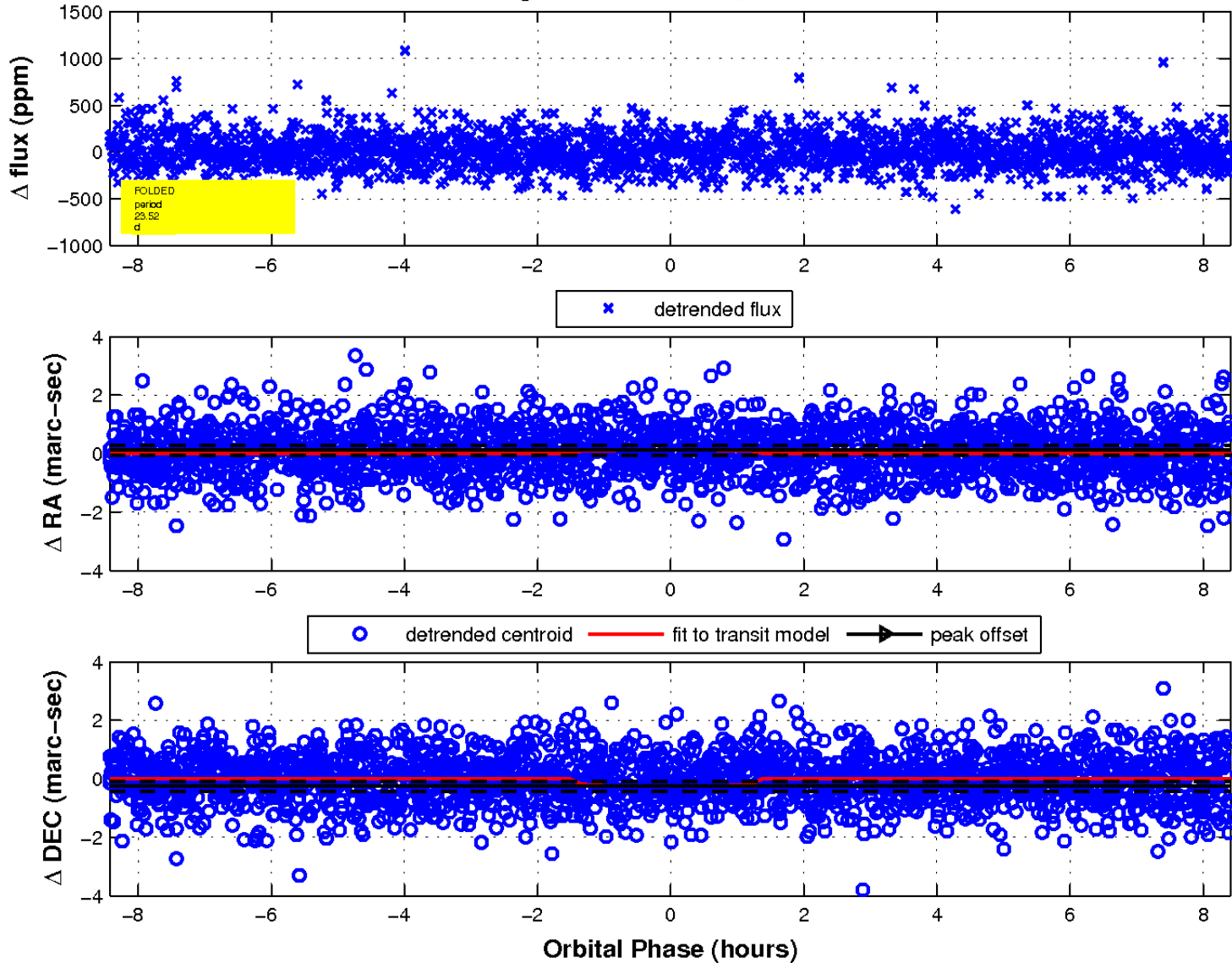
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

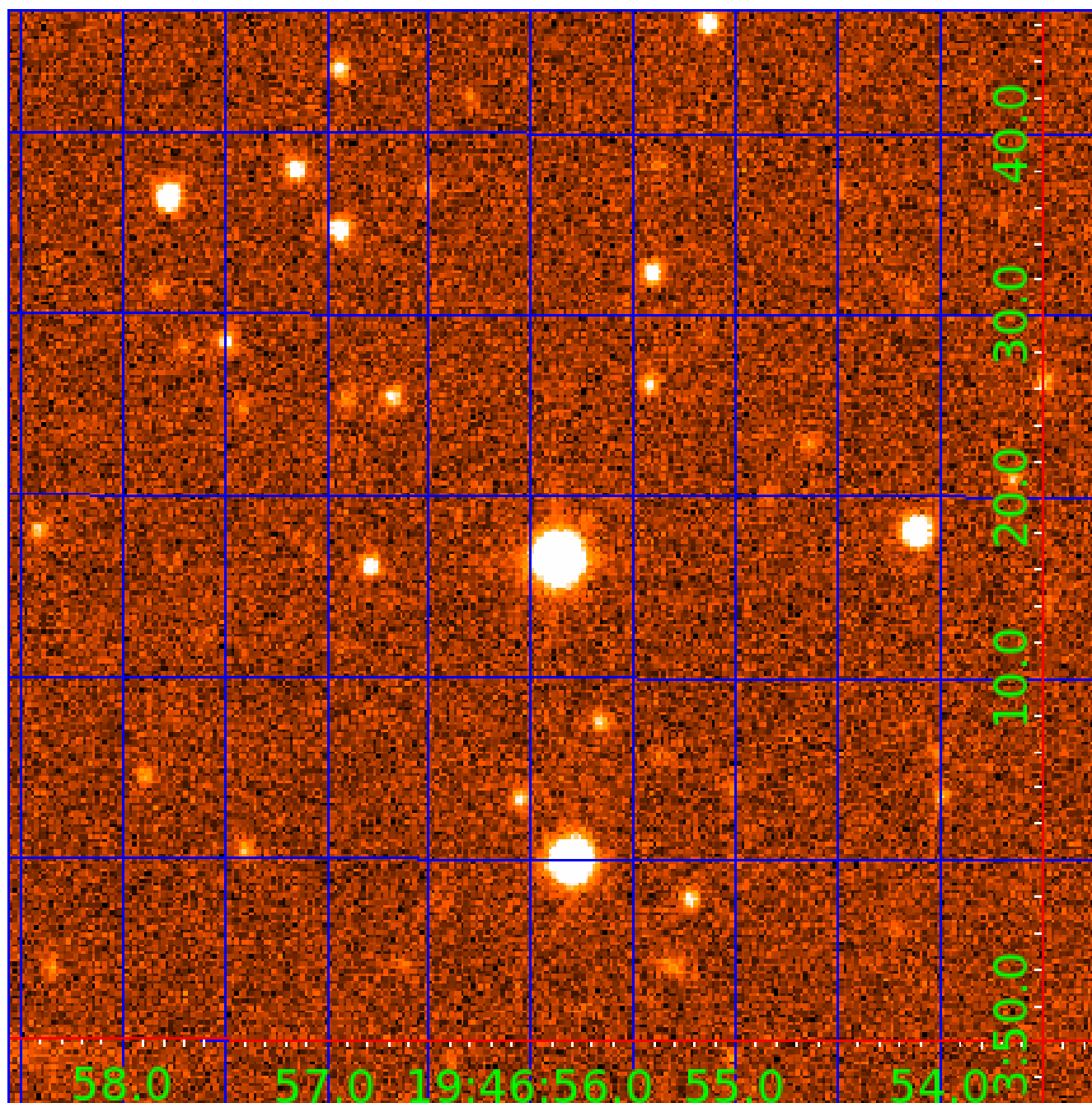


fluxWeightedCentroids, Planet 3 of 7



UKIRT Image

Declination



# KIC 005978682

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005978682-01	OBS	No	0.692126	131.738122	12.5	4.894	7.8	6.6	0.97	6480	0.35	6148.86
005978682-02	OBS	No	24.556245	141.930135	188.7	4.447	17.8	5.5	0.97	6480	1.48	52.74
005978682-03	OBS	No	23.517485	142.468375	380.7	2.809	14.8	8.1	0.97	6480	1.91	55.87
005978682-04	OBS	No	49.124797	141.099078	409.0	2.988	10.3	7.4	0.97	6480	2.05	20.92
005978682-05	OBS	No	60.189547	145.263653	577.9	2.486	9.7	9.2	0.97	6480	2.68	15.96
005978682-06	OBS	No	29.747329	148.690933	849.2	0.510	8.9	6.4	0.97	6480	3.64	40.84
005978682-07	OBS	No	59.562405	152.822565	453.6	1.528	9.9	5.9	0.97	6480	2.45	16.18

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005978682-01	OBS	FP	0.00	1	0	1	0	LPP_DV—LPP_ALT—CENT_RESOLVED_OFFSET
005978682-02	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_TRACKER—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—CENT_RESOLVED_OFFSET
005978682-03	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_RESOLVED_OFFSET
005978682-04	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_ZUMA—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—CENT_RESOLVED_OFFSET
005978682-05	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—CENT_RESOLVED_OFFSET
005978682-06	OBS	FP	0.00	1	0	1	0	TRANS_GAPPED—LPP_DV—LPP_ALT—CENT_RESOLVED_OFFSET
005978682-07	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—CENT_RESOLVED_OFFSET

**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.

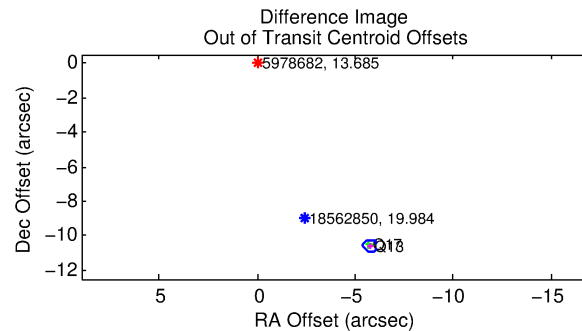
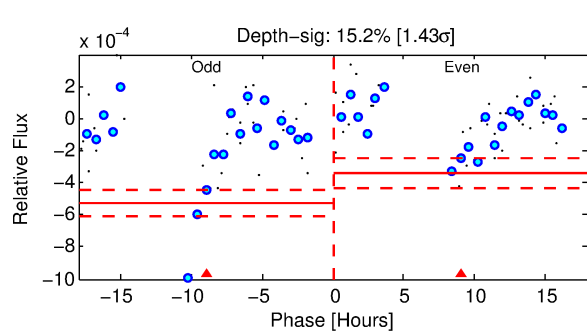
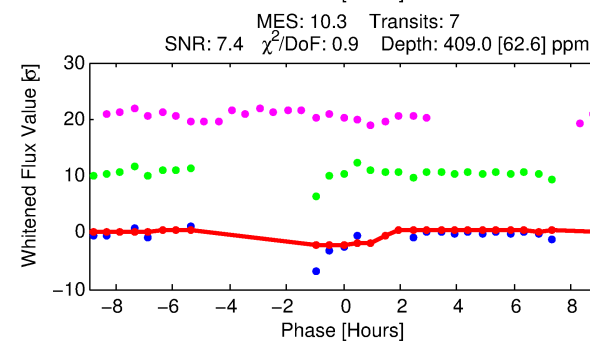
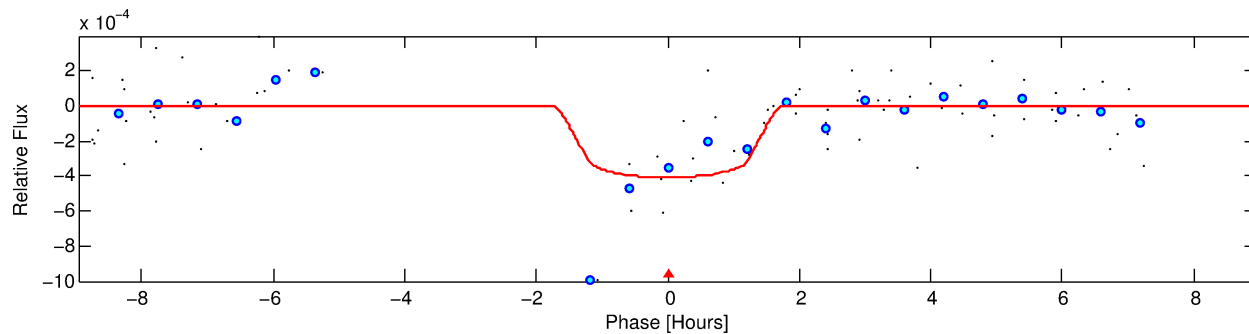
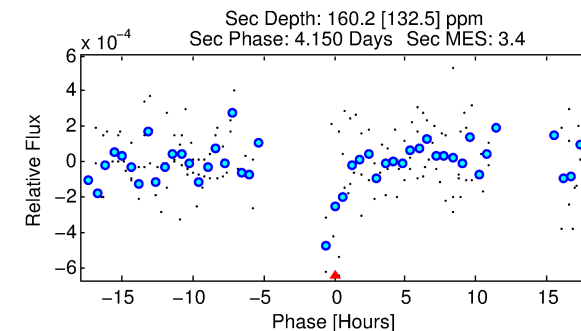
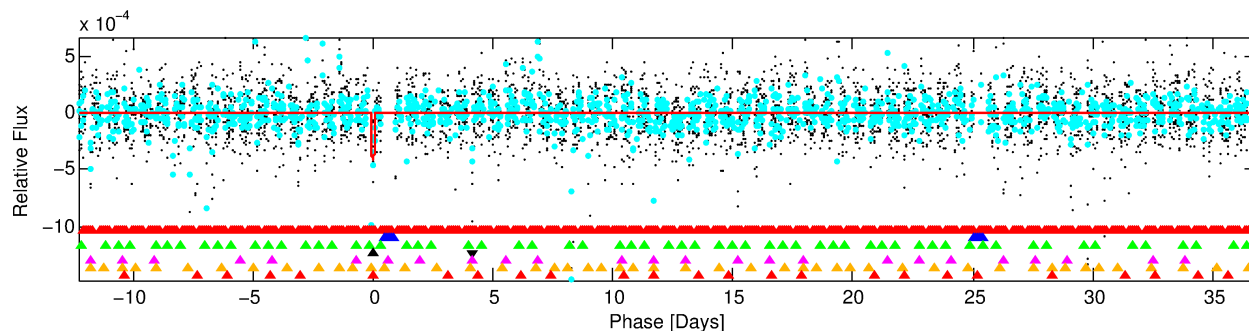
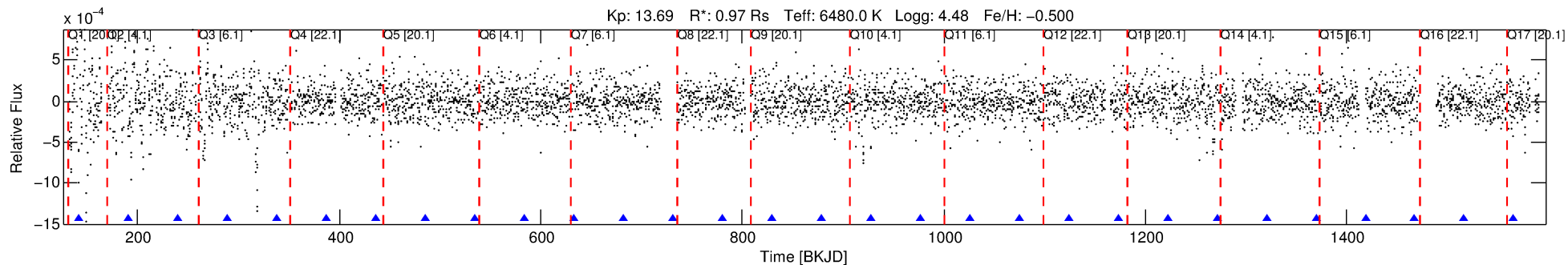
Ephemeris Match Information For 005978682-04

No Significant Match Found



# DV One-Page Summary

KIC: 5978682 Candidate: 4 of 7 Period: 49.125 d



## DV Fit Results:

Period = 49.12480 [0.00459] d  
Epoch = 141.0991 [0.0228] BKJD  
Rp/R\* = 0.0194 [0.0480]  
a/R\* = 106.04 [1442.97]  
b = 0.57 [16.22]  
Seff = 20.92 [8.87]  
Teq = 545 [58] K  
Rp = 2.05 [5.12] Re  
a = 0.2665 [0.0727] AU  
Ag = 1491.67 [7525.56] [0.20 $\sigma$ ]  
Teff = 5240 [6590] K [0.71 $\sigma$ ]

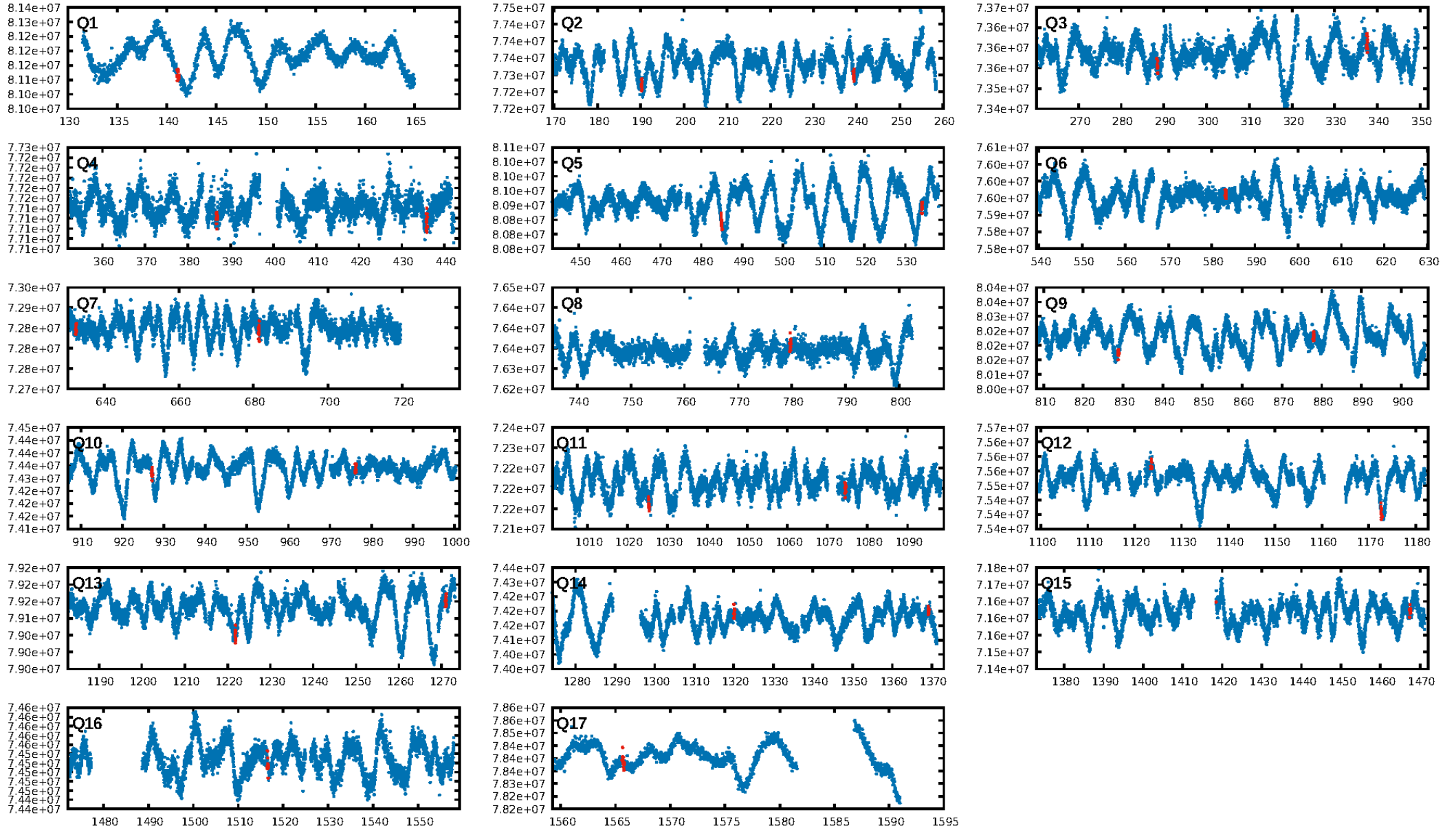
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [153.44 $\sigma$ ]  
LongPeriod-sig: 100.0% [74.65 $\sigma$ ]  
ModelChiSquare2-sig: 68.3%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 2.69e-17  
RollingBand-fgt: 1.00 [6/6]  
**GhostDiagnostic-chr: -4.73**  
Centroid-sig: 72.8%  
Centroid-so: 0.328 arcsec [0.64 $\sigma$ ]  
**OotOffset-rm: 12.048 arcsec [101.71 $\sigma$ ]**  
**KicOffset-rm: 12.085 arcsec [101.95 $\sigma$ ]**  
OotOffset-st: 0/0/0/2 [2]  
KicOffset-st: 0/0/0/2 [2]  
DiffImageQuality-fgm: 0.50 [1/2]  
DiffImageOverlap-fno: 0.00 [0/17]

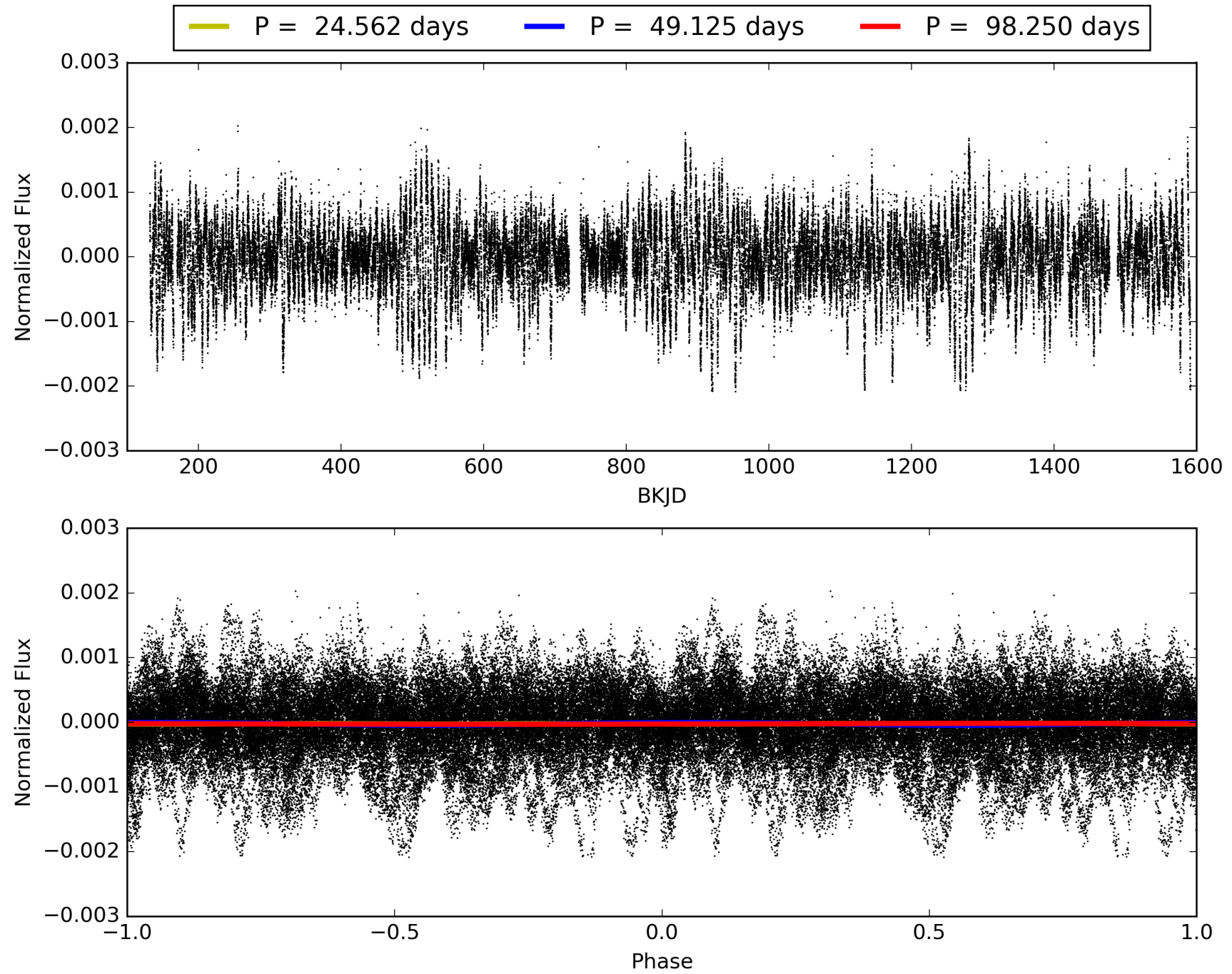
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 03-Feb-2016 06:56:05 Z

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

# TCE 005978682-04, PDC Light Curves

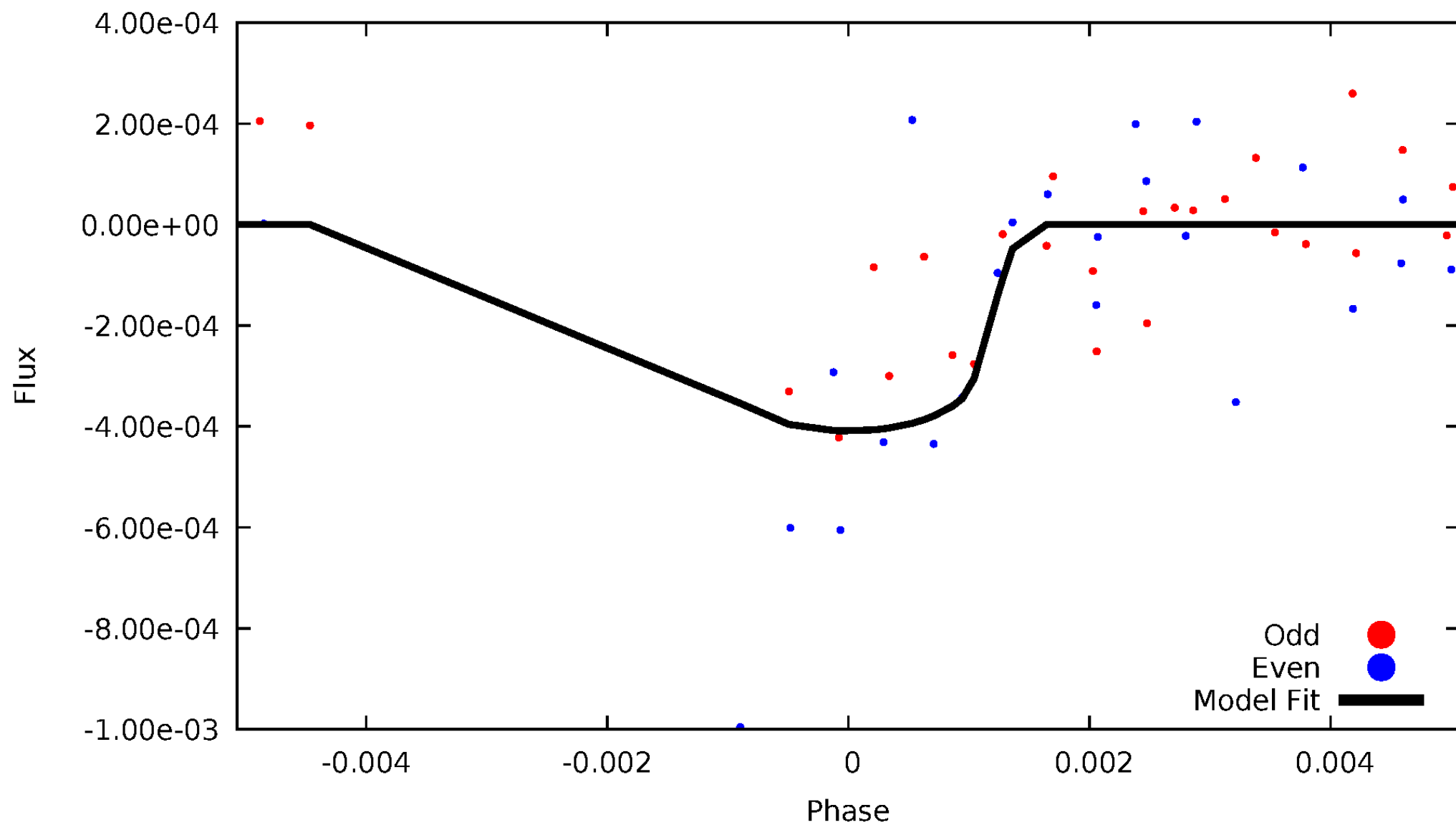


TCE 005978682-04



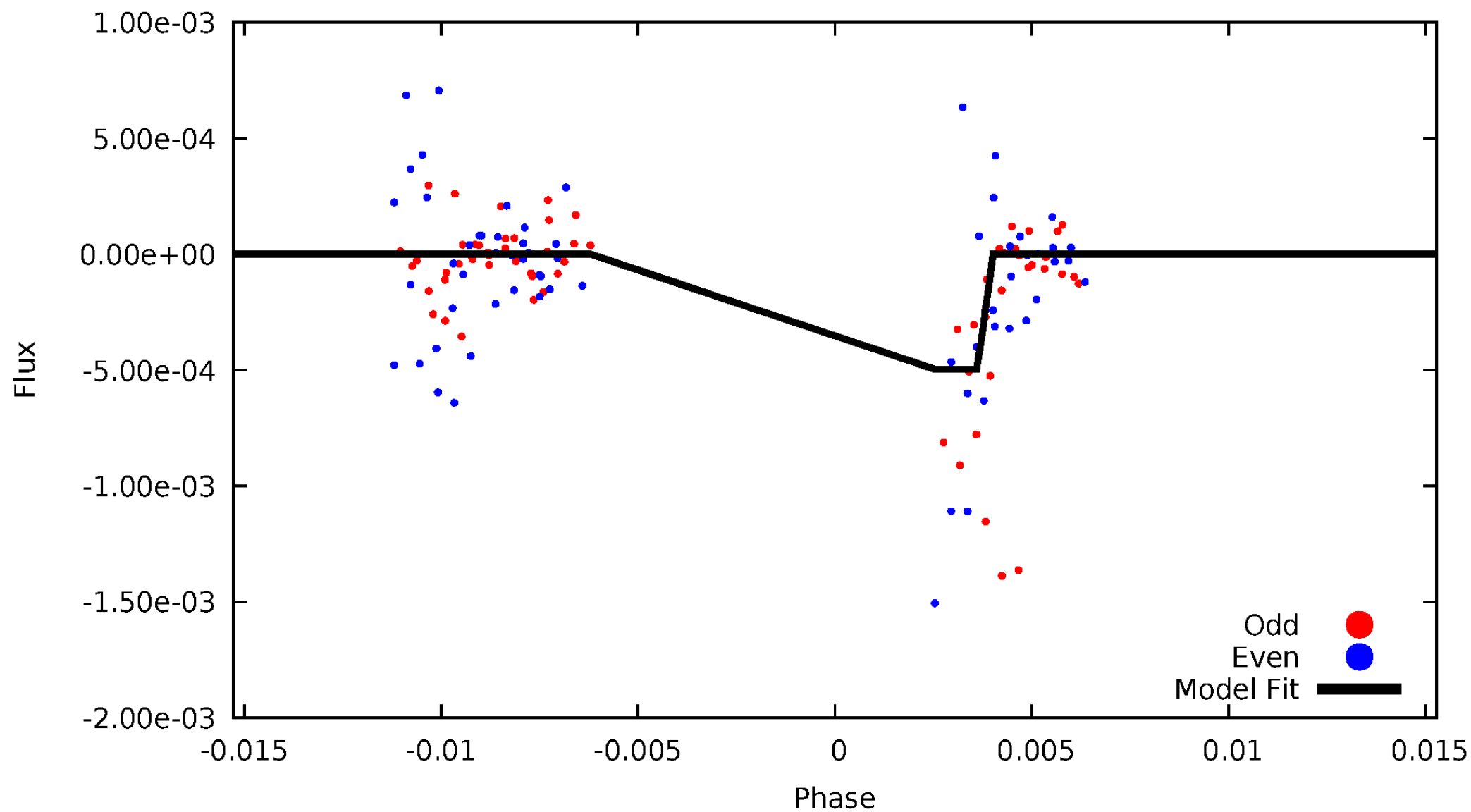
# DV Odd/Even

TCE 005978682-04



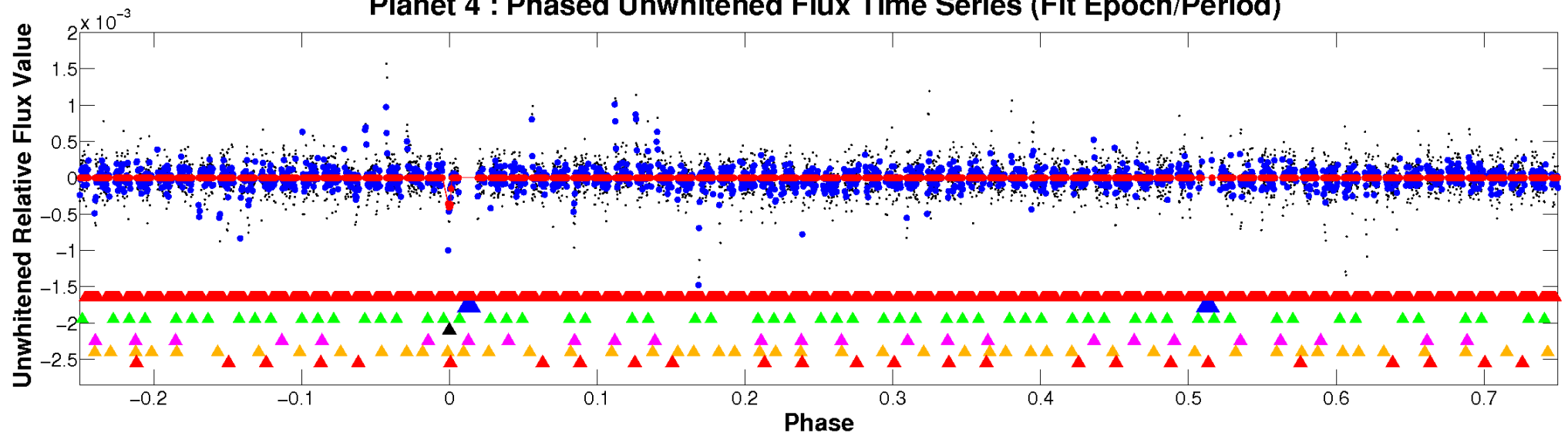
# ALT Odd/Even

TCE 005978682-04

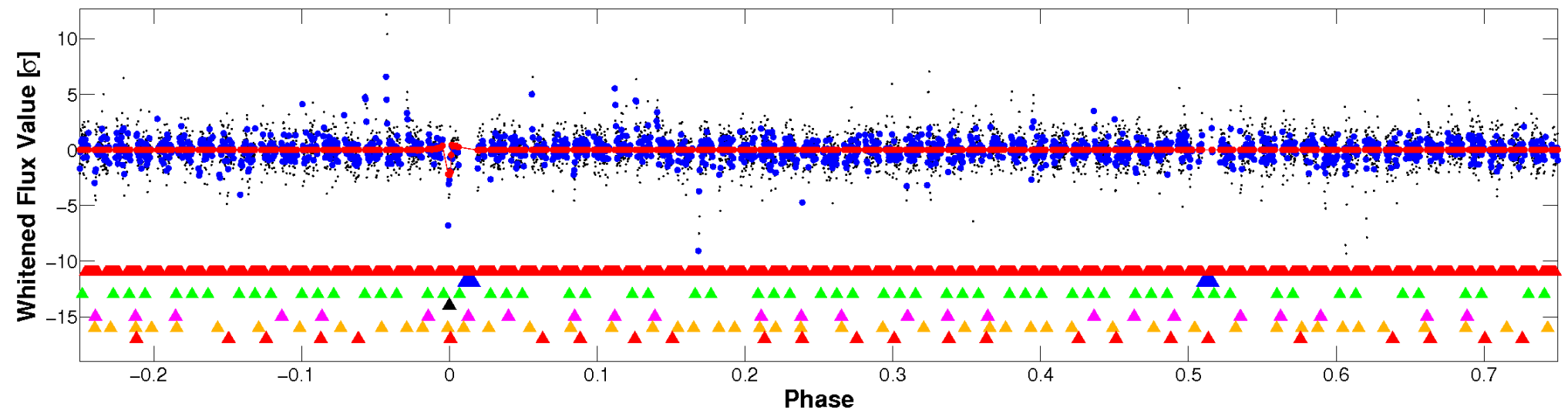


# Non-Whitened Vs. Whitened Light Curve

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



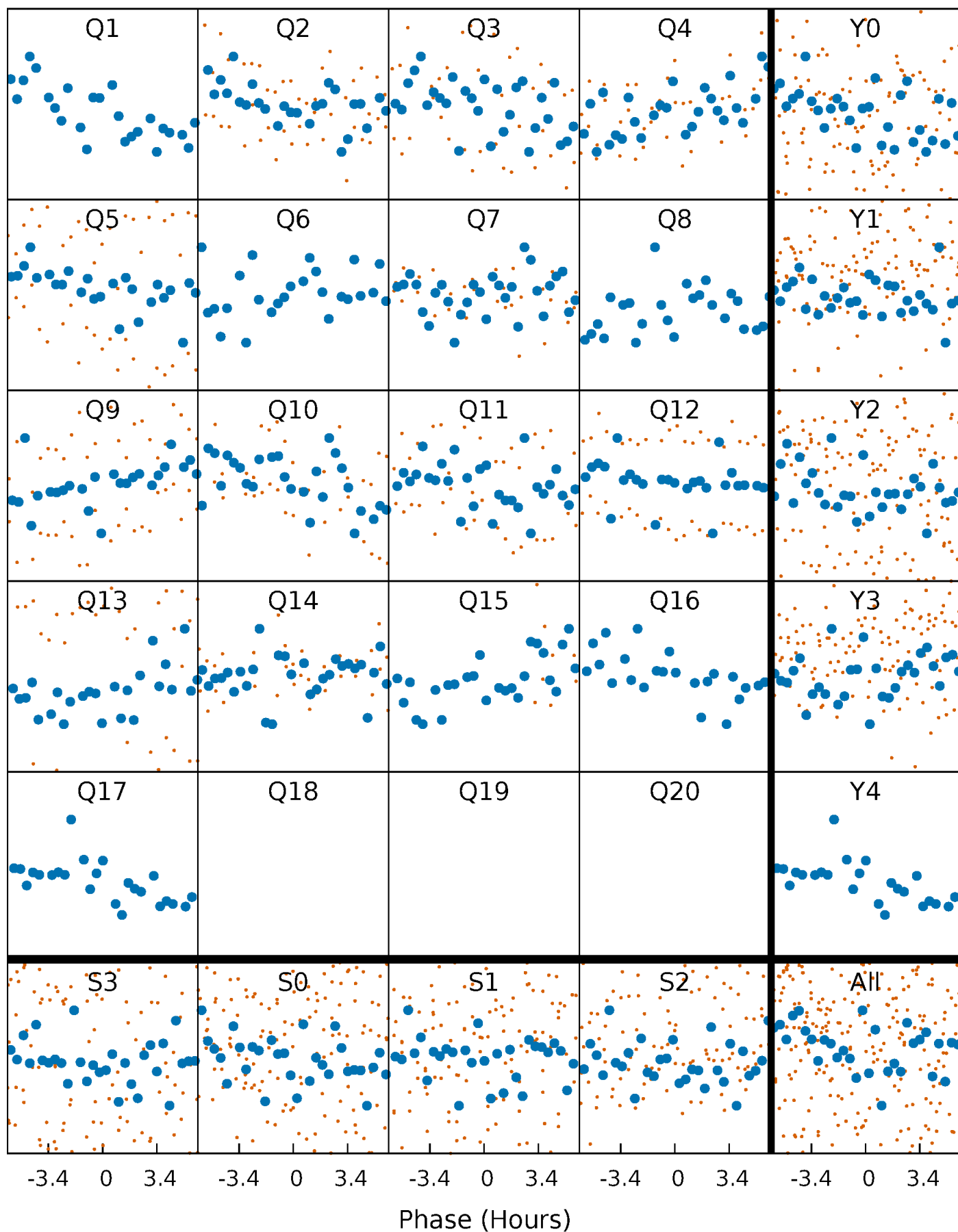
## Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)





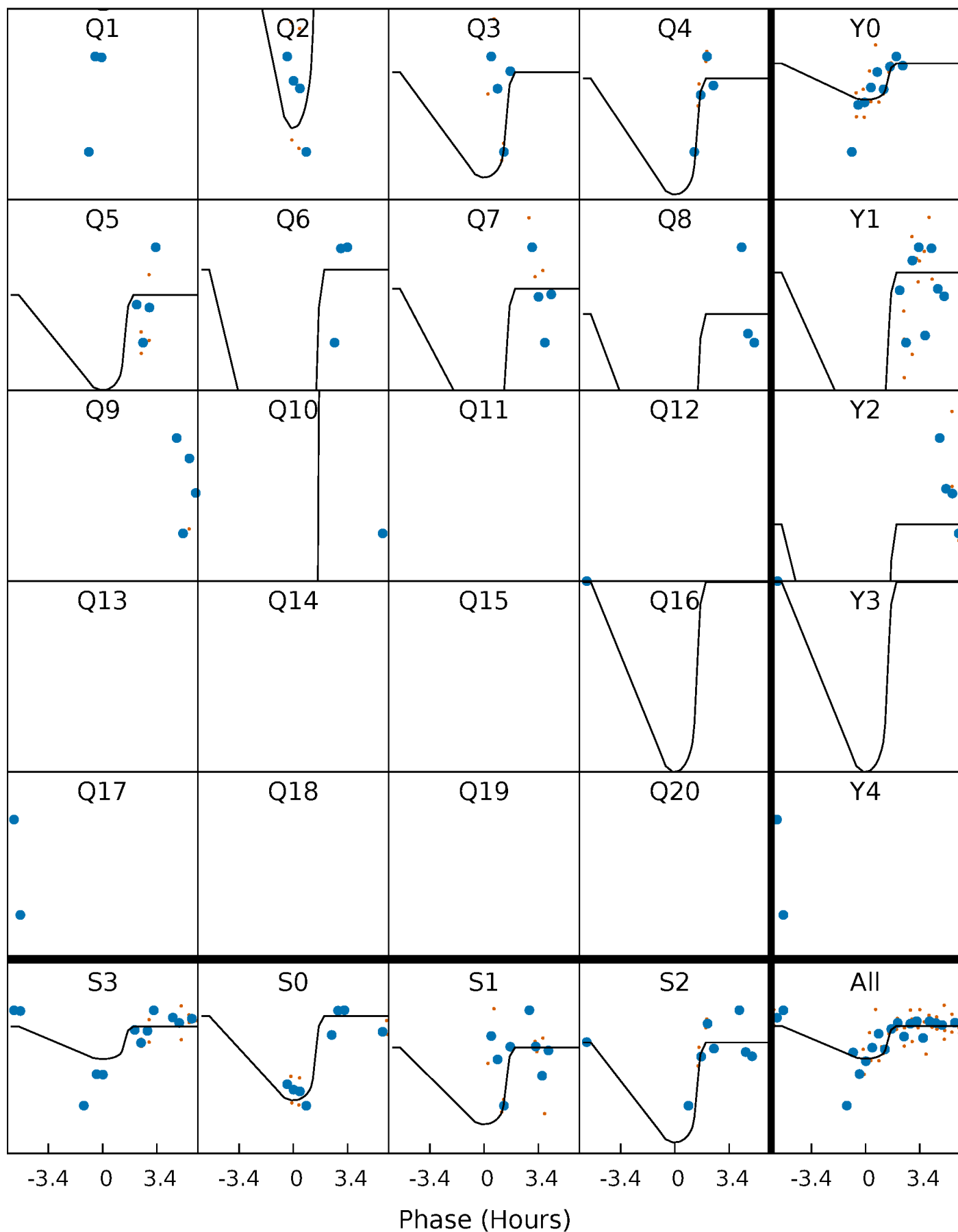
# PDC Quarter-Phased Transit Curves

TCE 005978682-04 P= 49.124797 Days  $T_0=141.099078$  (BKJD)



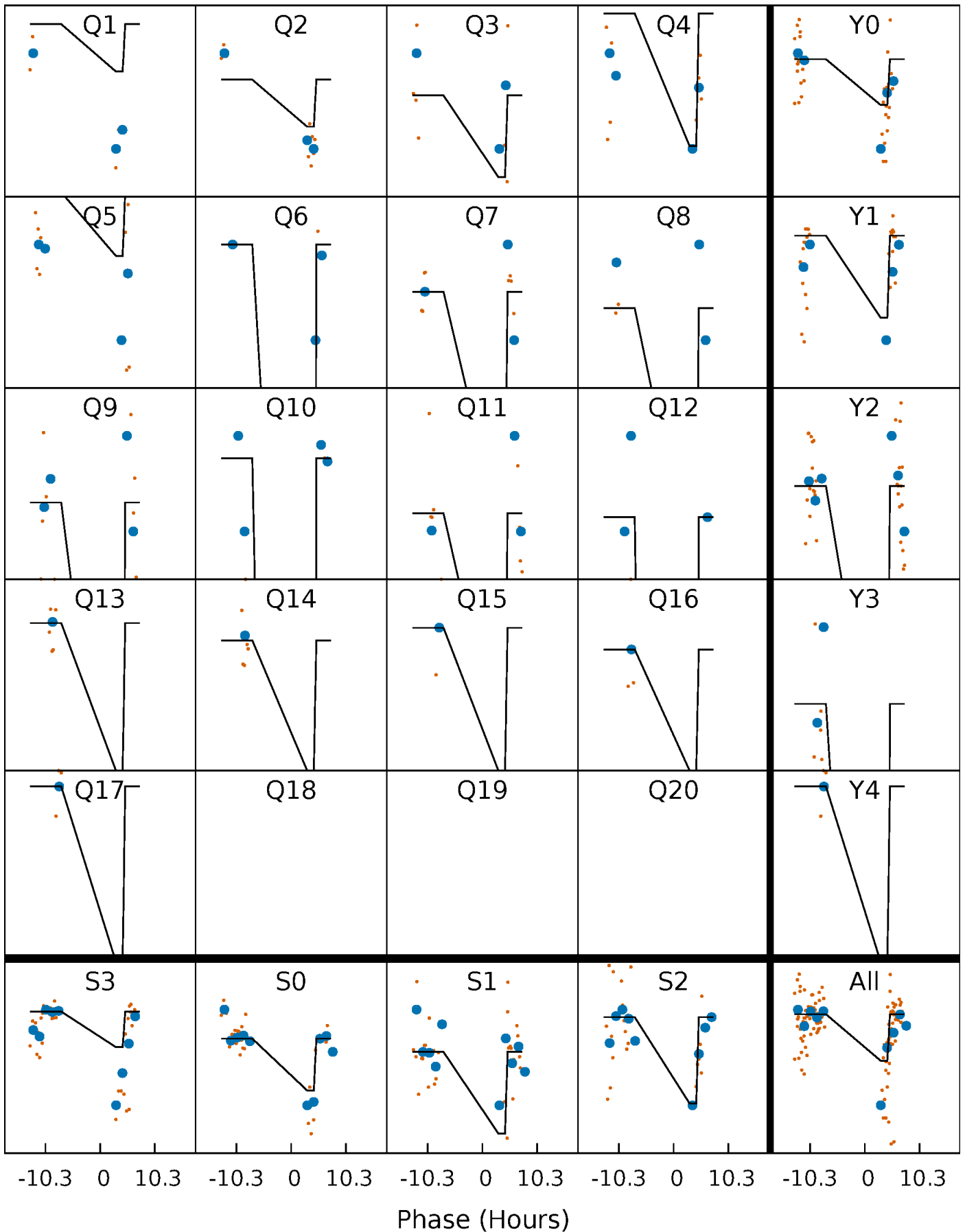
# DV Quarter-Phased Transit Curves

TCE 005978682-04   P= 49.124797 Days    $T_0=141.099078$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

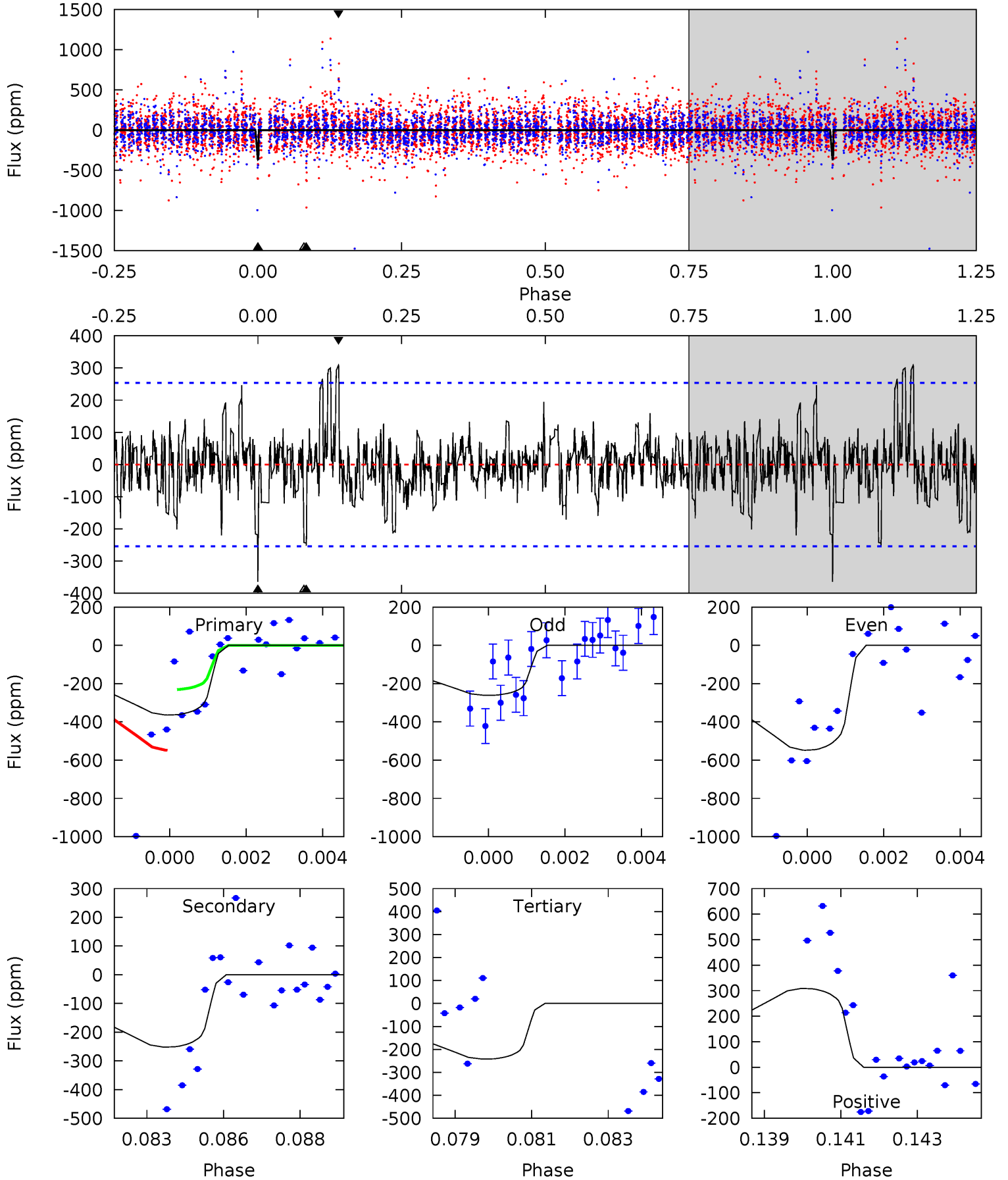
TCE 005978682-04   P= 49.133567 Days    $T_0=140.930378$  (BKJD)



# DV Model-Shift Uniqueness Test

005978682-04, P = 49.124797 Days, E = 91.974281 Days

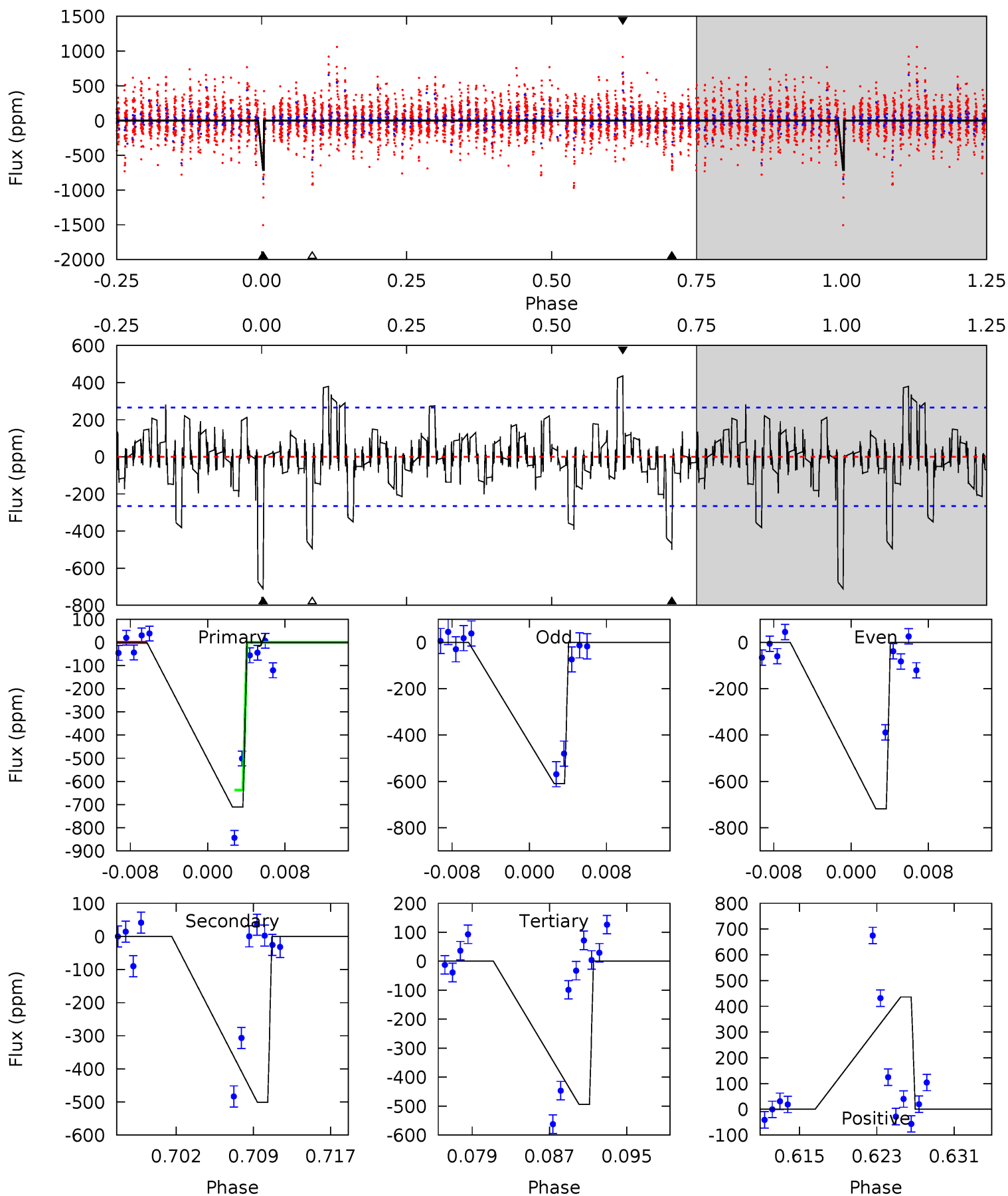
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
7.62	5.28	5.07	6.46	5.31	3.07	1.26	2.55	1.16	0.20	-1.19	2.79	1.05	0.46	2.88



# Alt Model-Shift Uniqueness Test

005978682-04, P = 49.133567 Days, E = 91.796811 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
13.6	9.57	9.44	8.34	5.07	2.66	1.54	4.15	5.26	0.13	1.24	0.97	0.93	0.38	0



### Stellar Parameters For KIC 005978682

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$\rho_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6480^{+145}_{-210}$	$4.484^{+0.042}_{-0.224}$	$-0.500^{+0.300}_{-0.300}$	$0.970^{+0.308}_{-0.082}$	$1.045^{+0.133}_{-0.133}$	$1.614^{+0.345}_{-0.863}$
	+2%/-3%	+1%/-5%	+60%/-60%	+32%/-8%	+13%/-13%	+21%/-53%
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 005978682-04 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-252 \pm 48$	$4.46^{+4.44}_{-3.02}$	$778^{+59}_{-35}$	$4307^{+2958}_{-901}$	$490^{+4113}_{-372}$
Alt.	$-501 \pm 52$	$4.67^{+4.70}_{-3.21}$	$780^{+52}_{-33}$	$4826^{+4090}_{-1066}$	$880^{+8338}_{-663}$

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

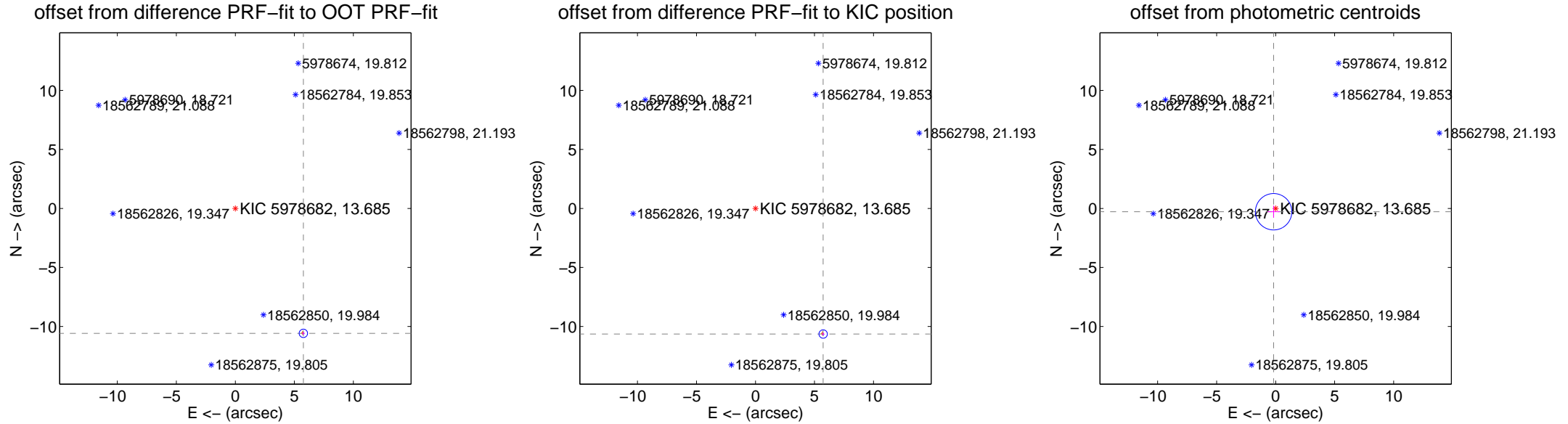
## DV Centroid Data

Supplemental centroid analysis for 005978682-04. Kepler magnitude: 13.69. Transit SNR 7.39

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

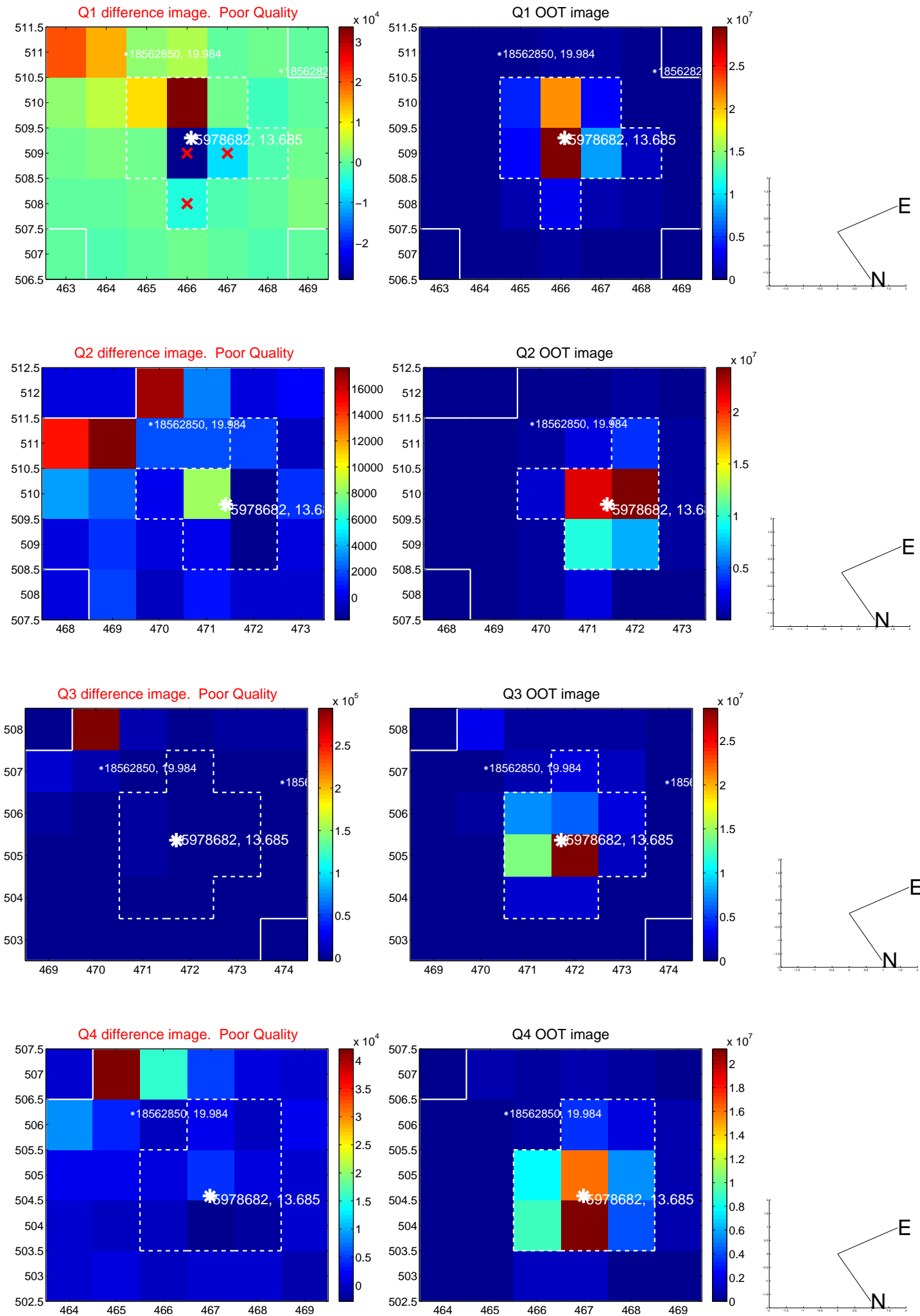
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$12.048 \pm 0.118$	101.71	$-5.763 \pm 0.099$	$-10.580 \pm 0.124$
PRF-fit source offset from KIC position	$12.085 \pm 0.119$	101.95	$-5.733 \pm 0.099$	$-10.638 \pm 0.124$
photometric centroid source offset	$0.33 \pm 0.51$	0.64	$0.17 \pm 0.51$	$-0.28 \pm 0.51$



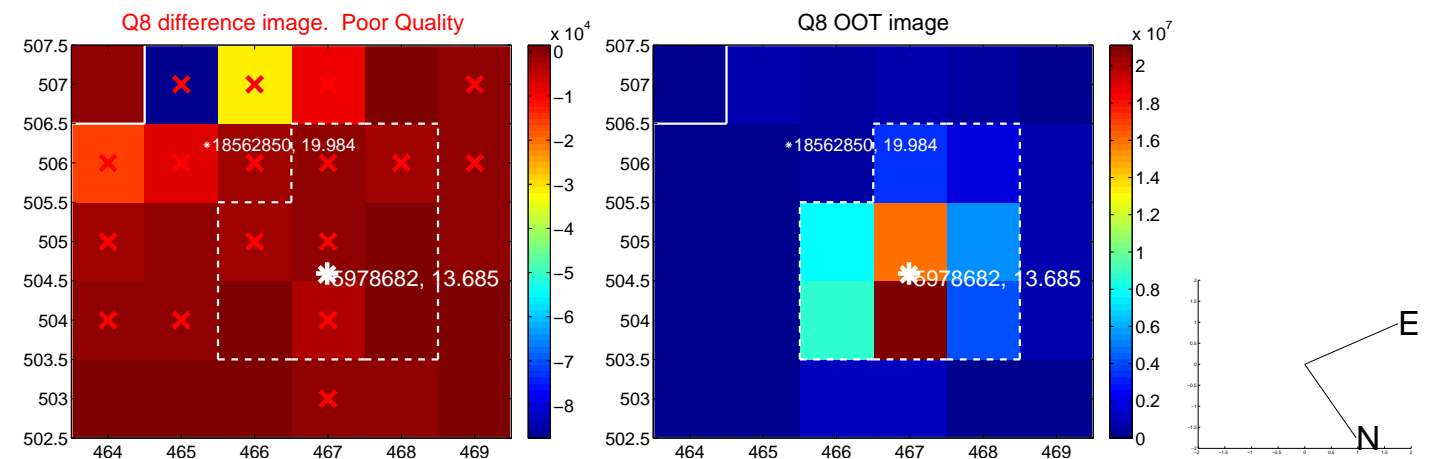
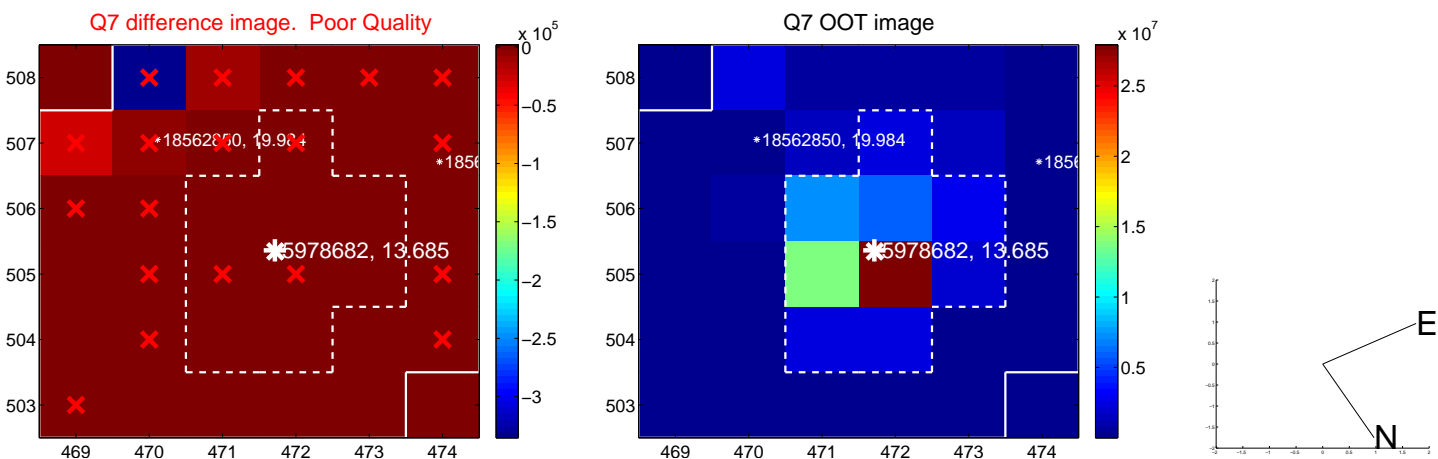
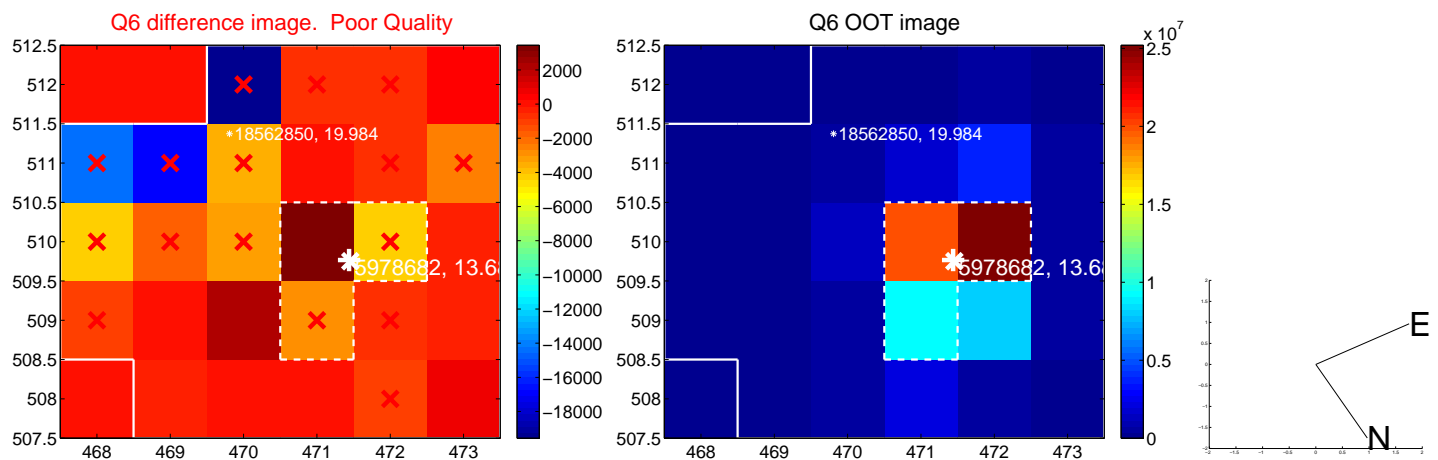
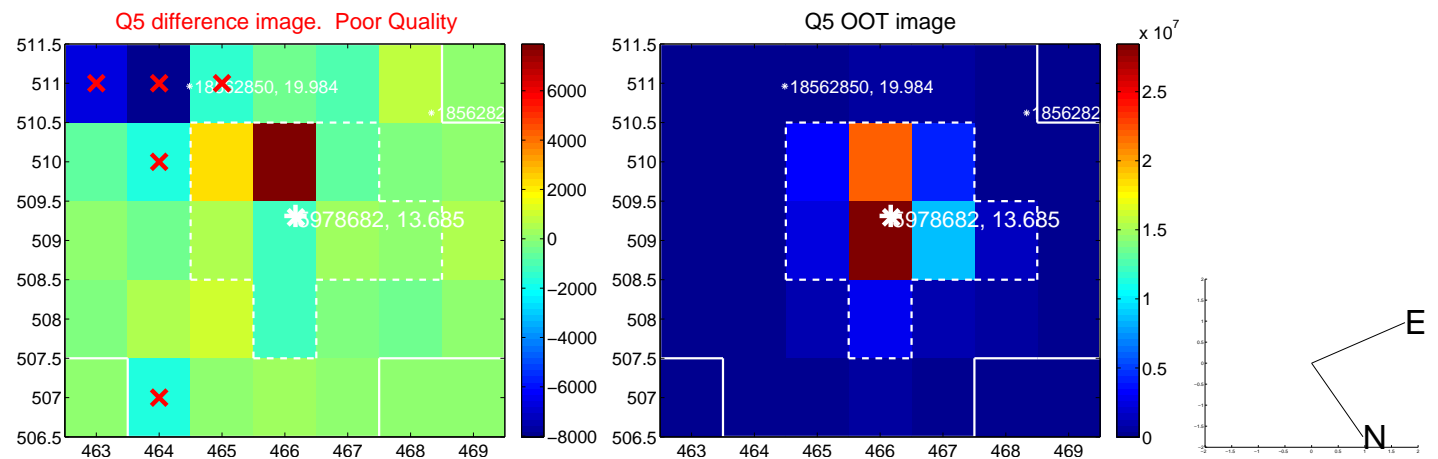
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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



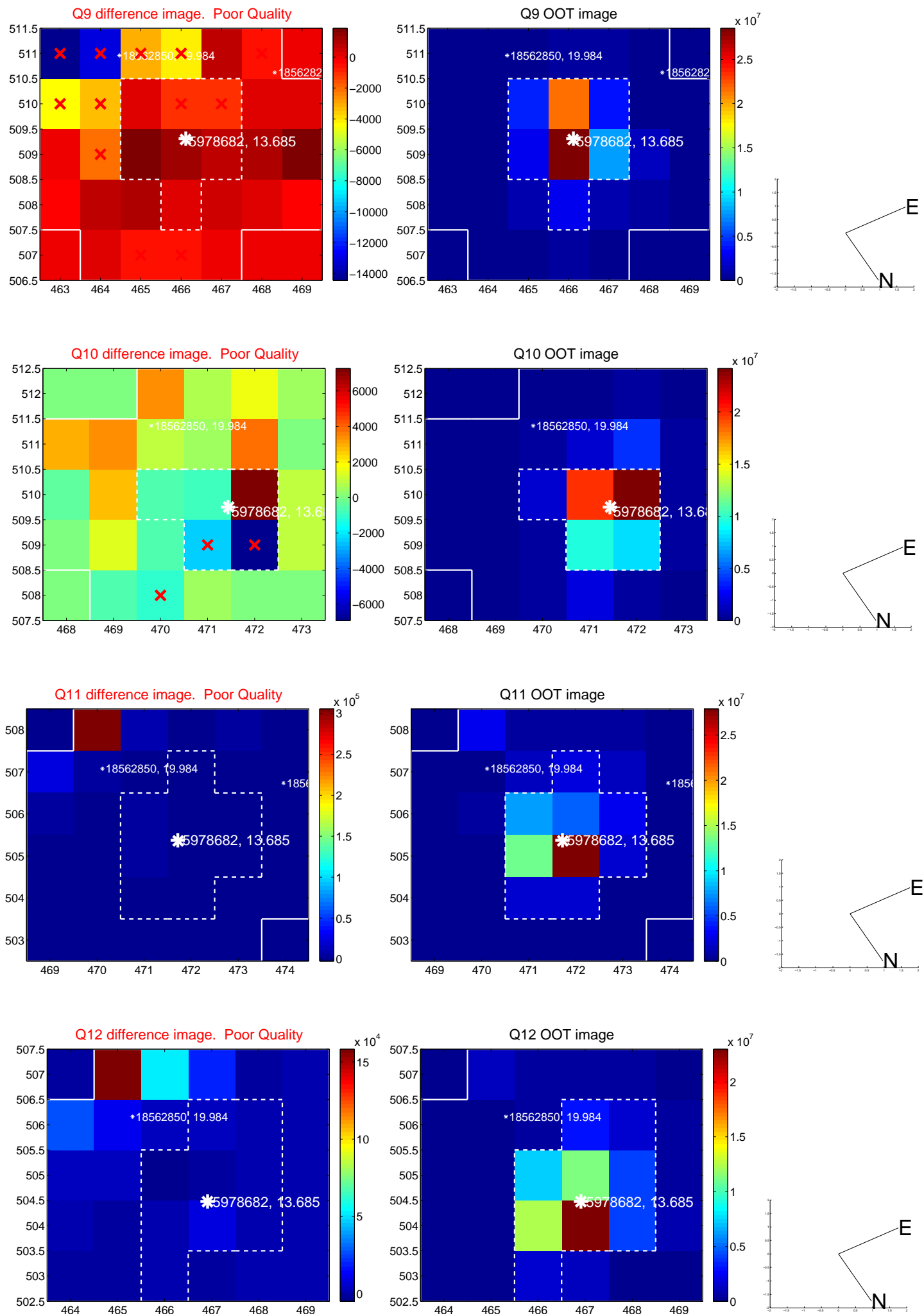
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



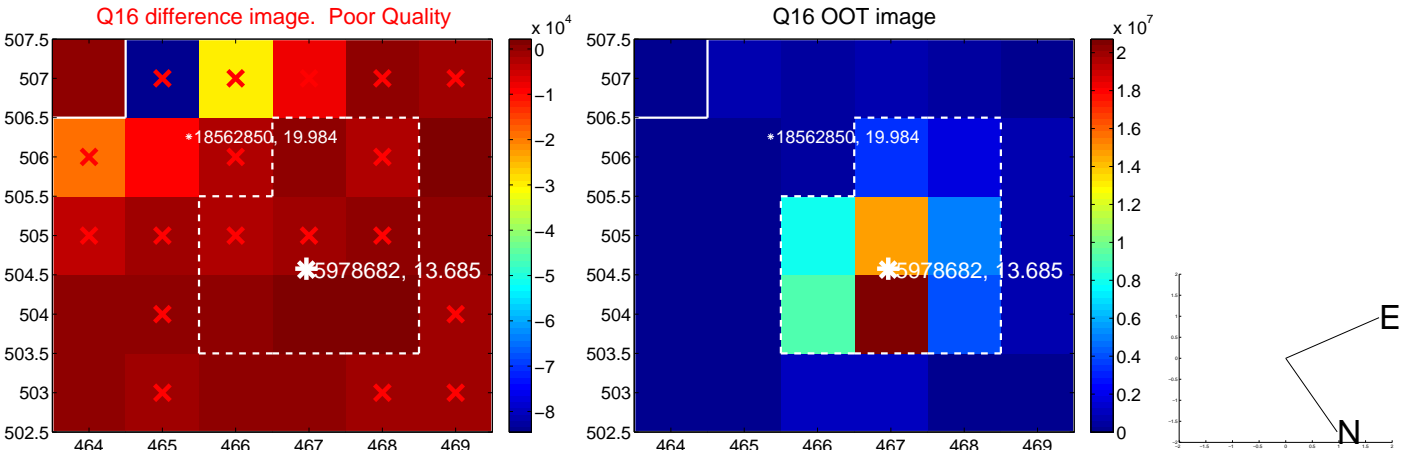
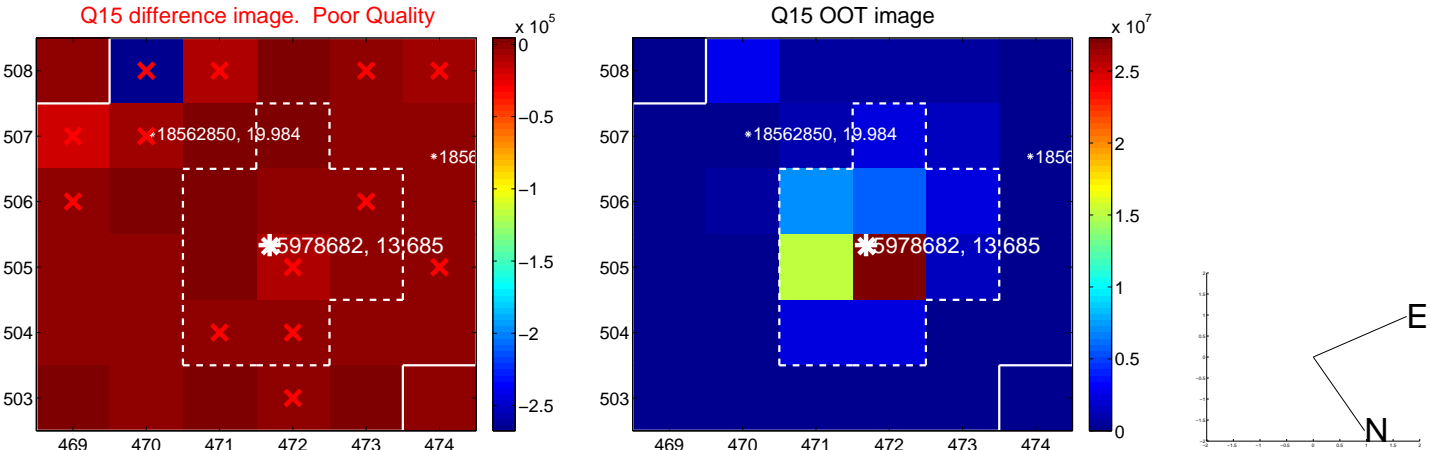
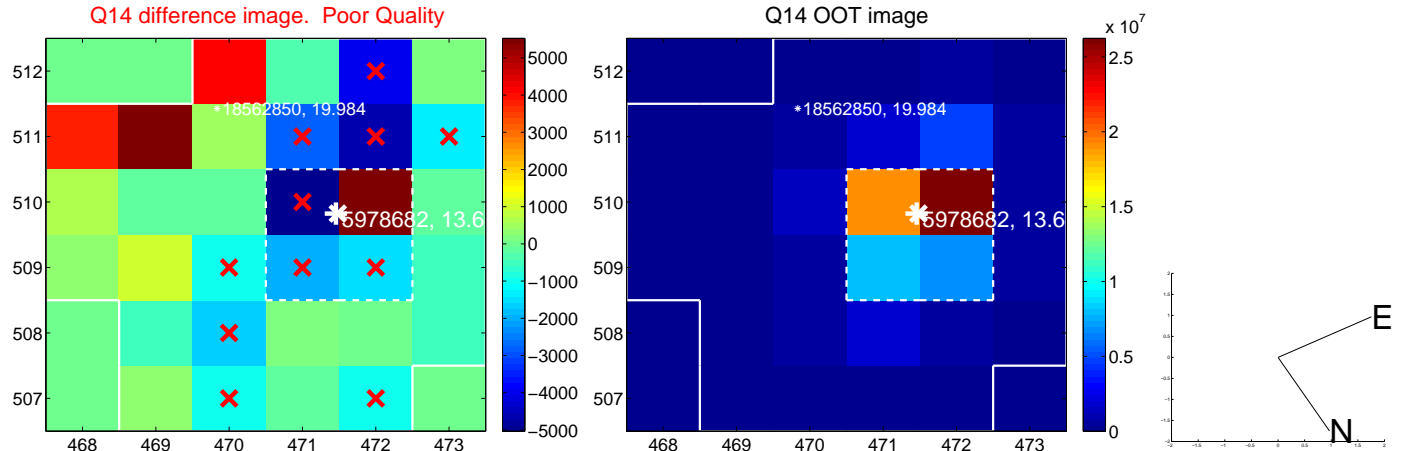
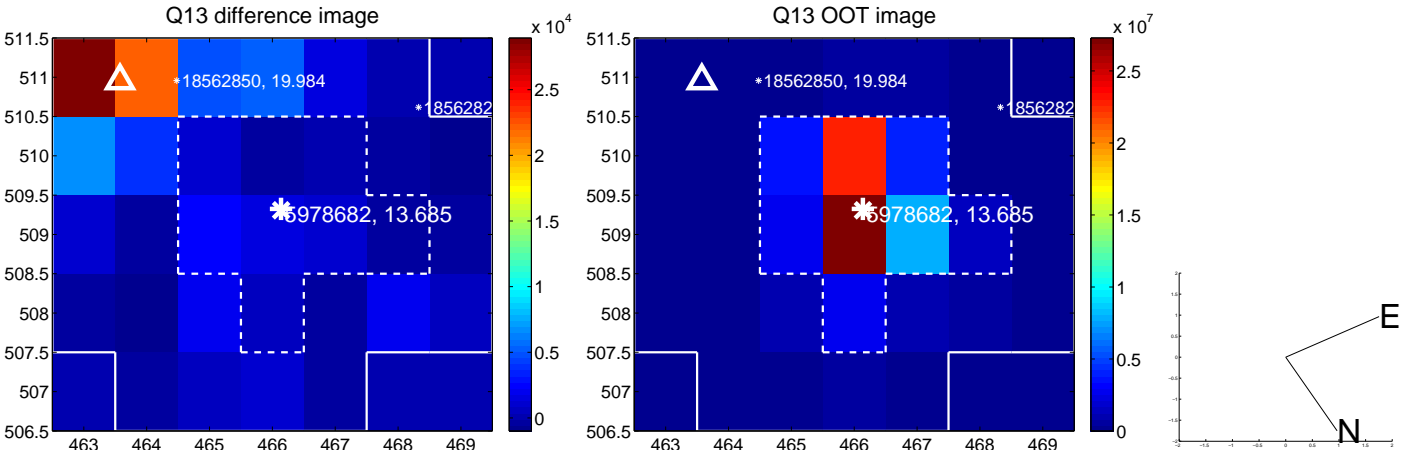
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



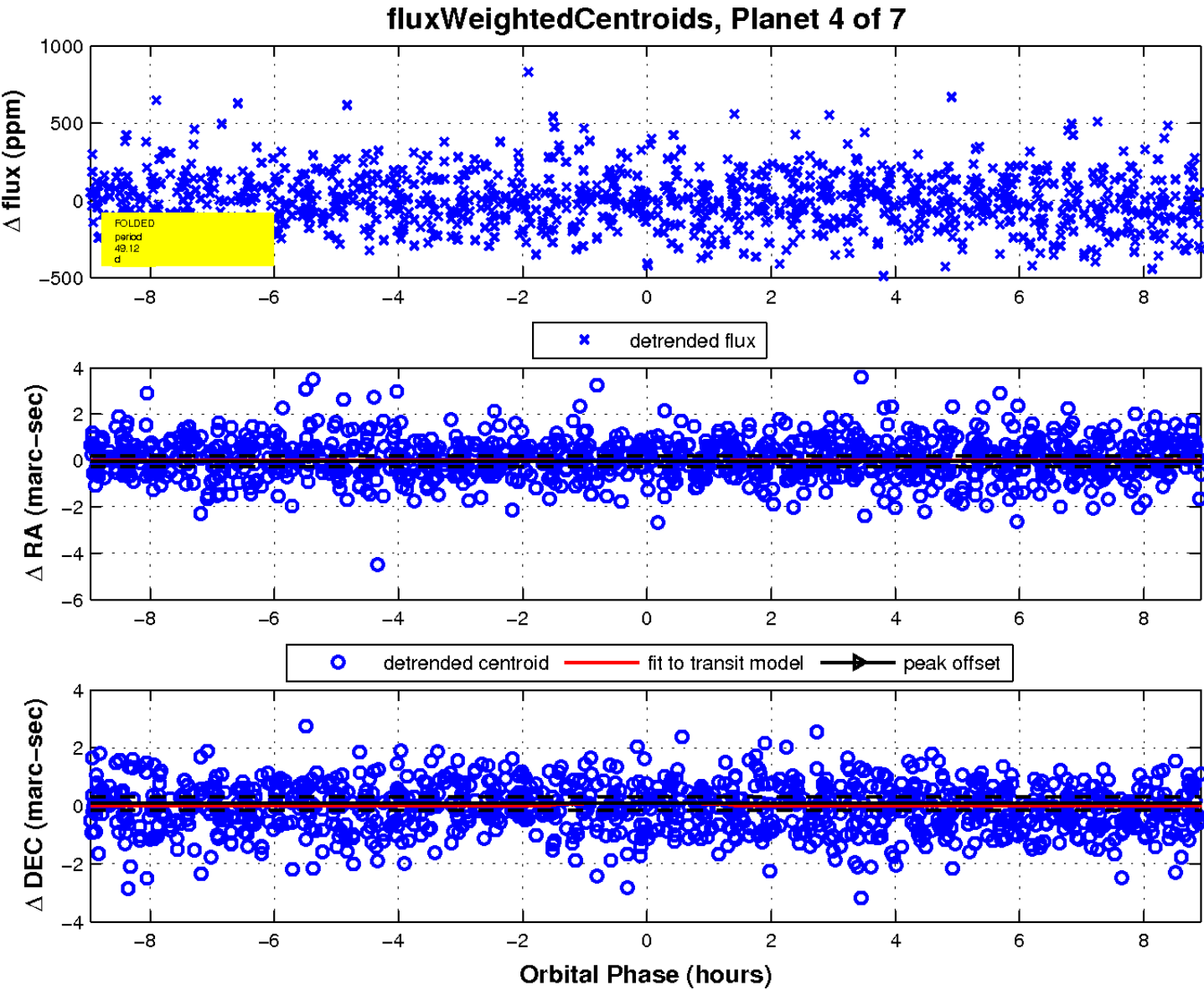
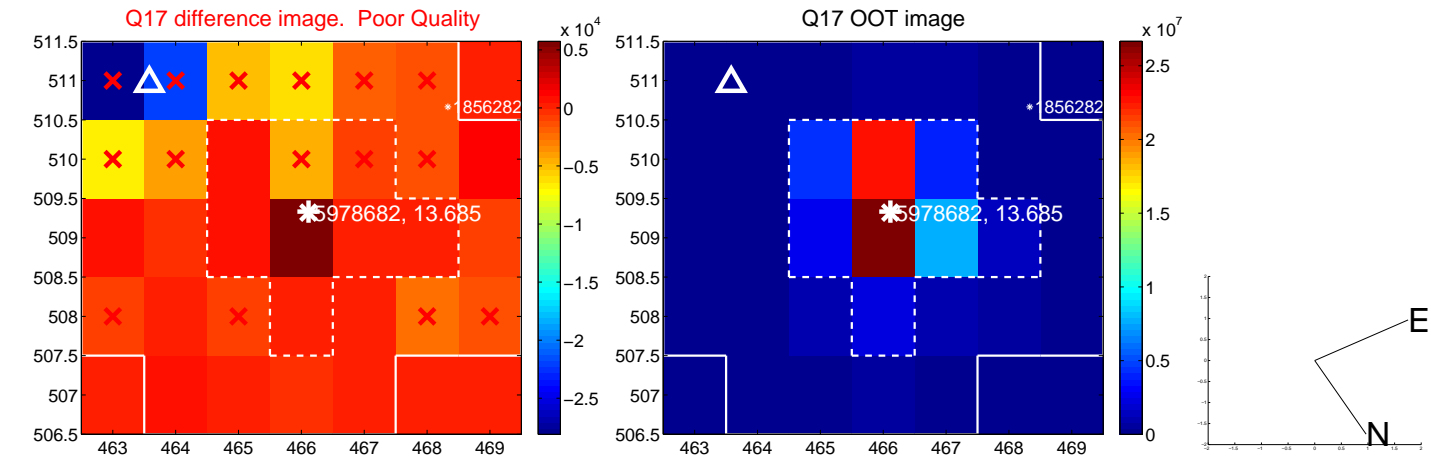
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

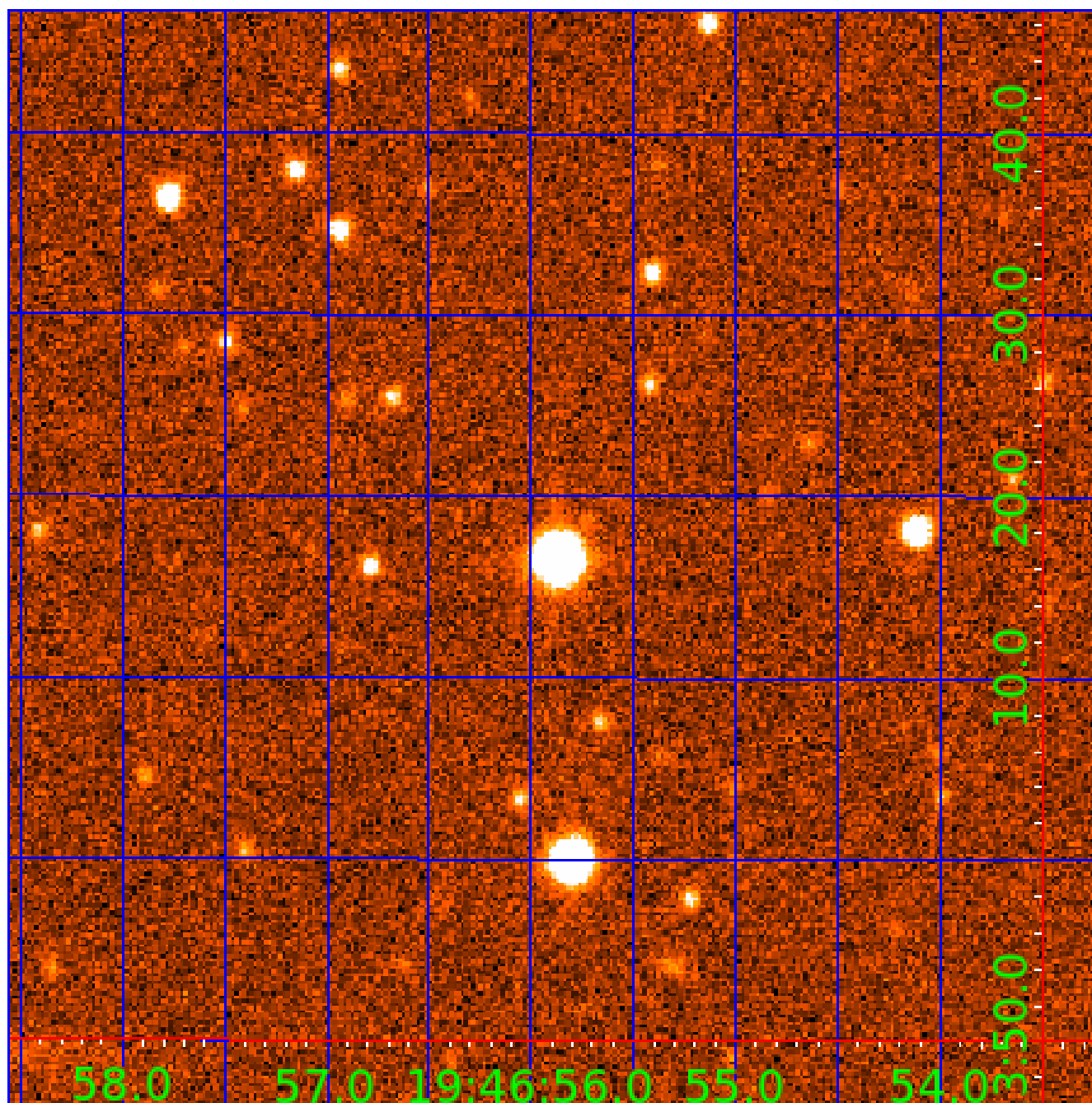


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 005978682

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005978682-01	OBS	No	0.692126	131.738122	12.5	4.894	7.8	6.6	0.97	6480	0.35	6148.86
005978682-02	OBS	No	24.556245	141.930135	188.7	4.447	17.8	5.5	0.97	6480	1.48	52.74
005978682-03	OBS	No	23.517485	142.468375	380.7	2.809	14.8	8.1	0.97	6480	1.91	55.87
005978682-04	OBS	No	49.124797	141.099078	409.0	2.988	10.3	7.4	0.97	6480	2.05	20.92
005978682-05	OBS	No	60.189547	145.263653	577.9	2.486	9.7	9.2	0.97	6480	2.68	15.96
005978682-06	OBS	No	29.747329	148.690933	849.2	0.510	8.9	6.4	0.97	6480	3.64	40.84
005978682-07	OBS	No	59.562405	152.822565	453.6	1.528	9.9	5.9	0.97	6480	2.45	16.18

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005978682-01	OBS	FP	0.00	1	0	1	0	LPP_DV—LPP_ALT—CENT_RESOLVED_OFFSET
005978682-02	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_TRACKER—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—CENT_RESOLVED_OFFSET
005978682-03	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_RESOLVED_OFFSET
005978682-04	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_ZUMA—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—CENT_RESOLVED_OFFSET
005978682-05	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—CENT_RESOLVED_OFFSET
005978682-06	OBS	FP	0.00	1	0	1	0	TRANS_GAPPED—LPP_DV—LPP_ALT—CENT_RESOLVED_OFFSET
005978682-07	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—CENT_RESOLVED_OFFSET

**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.

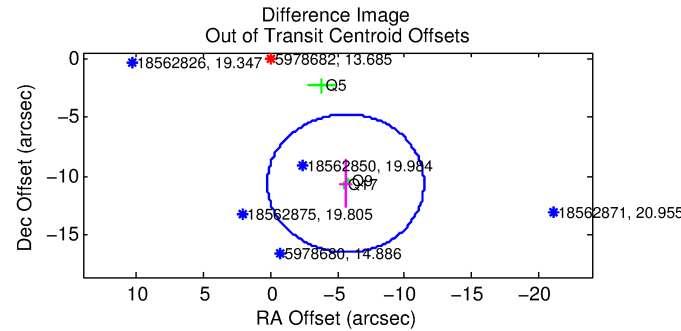
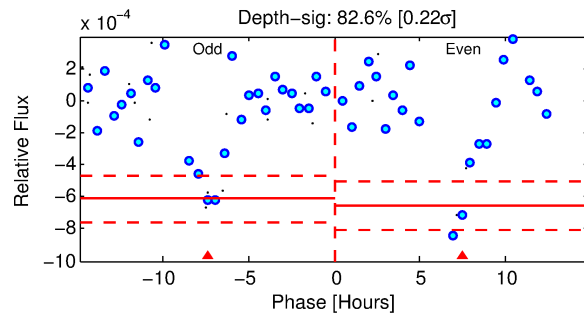
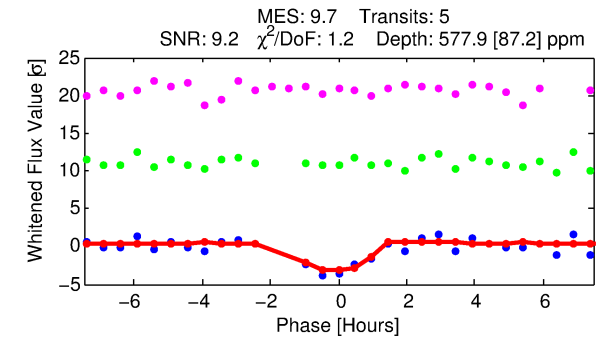
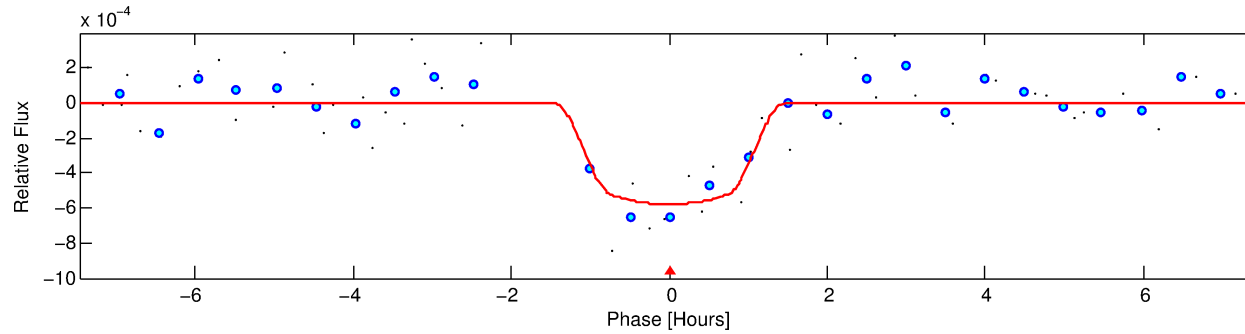
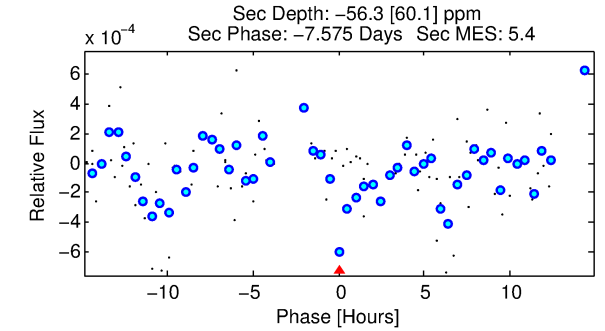
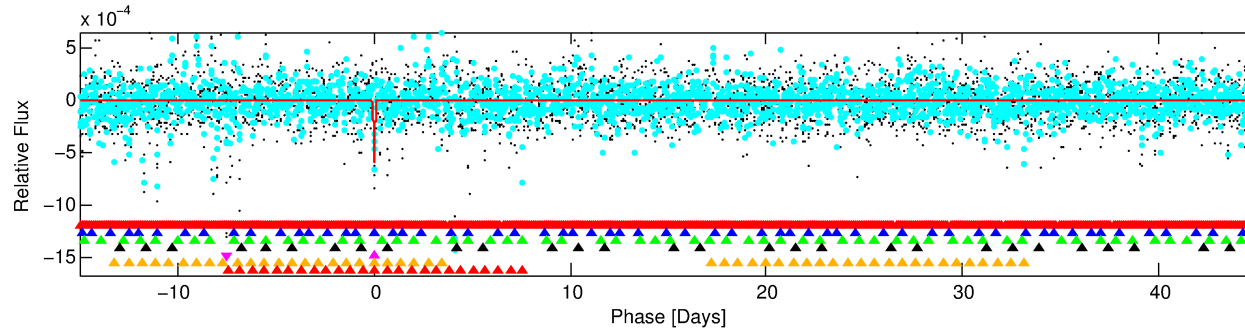
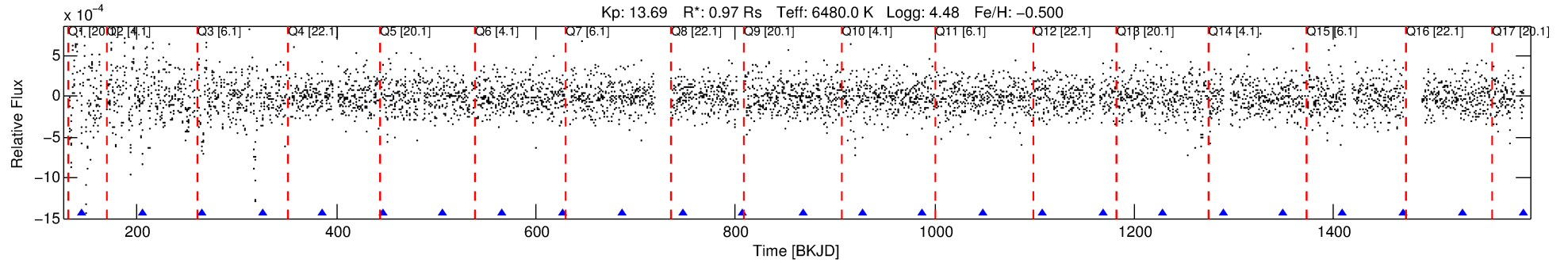
Ephemeris Match Information For 005978682-05

No Significant Match Found



# DV One-Page Summary

KIC: 5978682 Candidate: 5 of 7 Period: 60.190 d



## DV Fit Results:

Period = 60.18955 [0.00460] d  
Epoch = 145.2637 [0.0087] BKJD  
Rp/R\* = 0.0253 [0.0221]  
a/R\* = 98.31 [497.59]  
b = 0.88 [1.32]  
Seff = 15.96 [6.77]  
Teff = 510 [54] K  
Rp = 2.68 [2.48] Re  
a = 0.3052 [0.0832] AU  
Ag = N/A  
Teffp = N/A

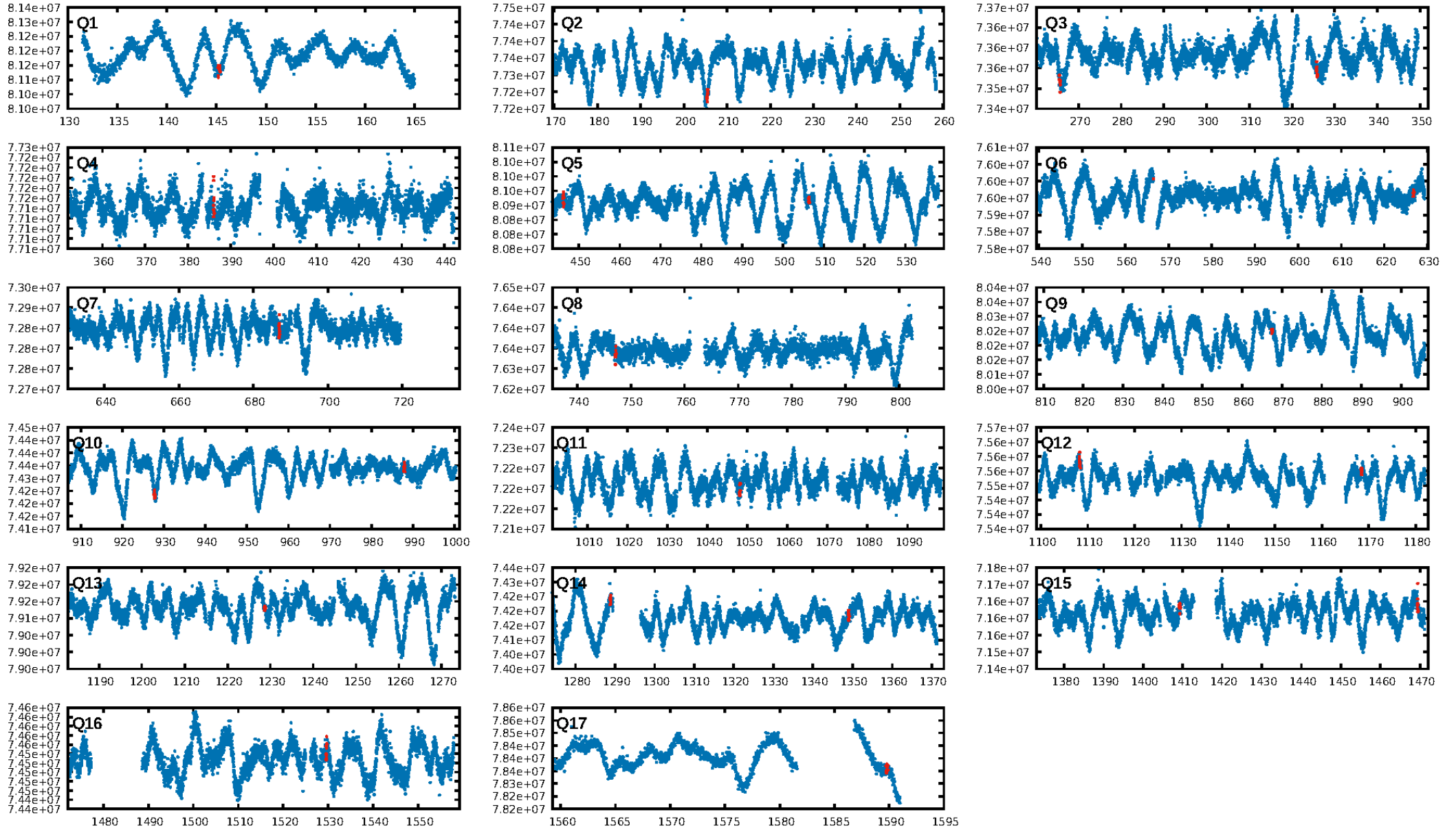
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [5.16σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 70.0%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 3.66e-15  
RollingBand-fgt: 1.00 [4/4]  
GhostDiagnostic-chr: 2.102  
Centroid-sig: 16.4%  
Centroid-so: 0.395 arcsec [0.86σ]  
OotOffset-rm: 11.988 arcsec [6.16σ]  
KicOffset-rm: 12.008 arcsec [5.08σ]  
OotOffset-st: 0/0/0/3 [3]  
KicOffset-st: 0/0/0/3 [3]  
DiffImageQuality-fgm: 0.67 [2/3]  
DiffImageOverlap-fno: 0.00 [0/16]

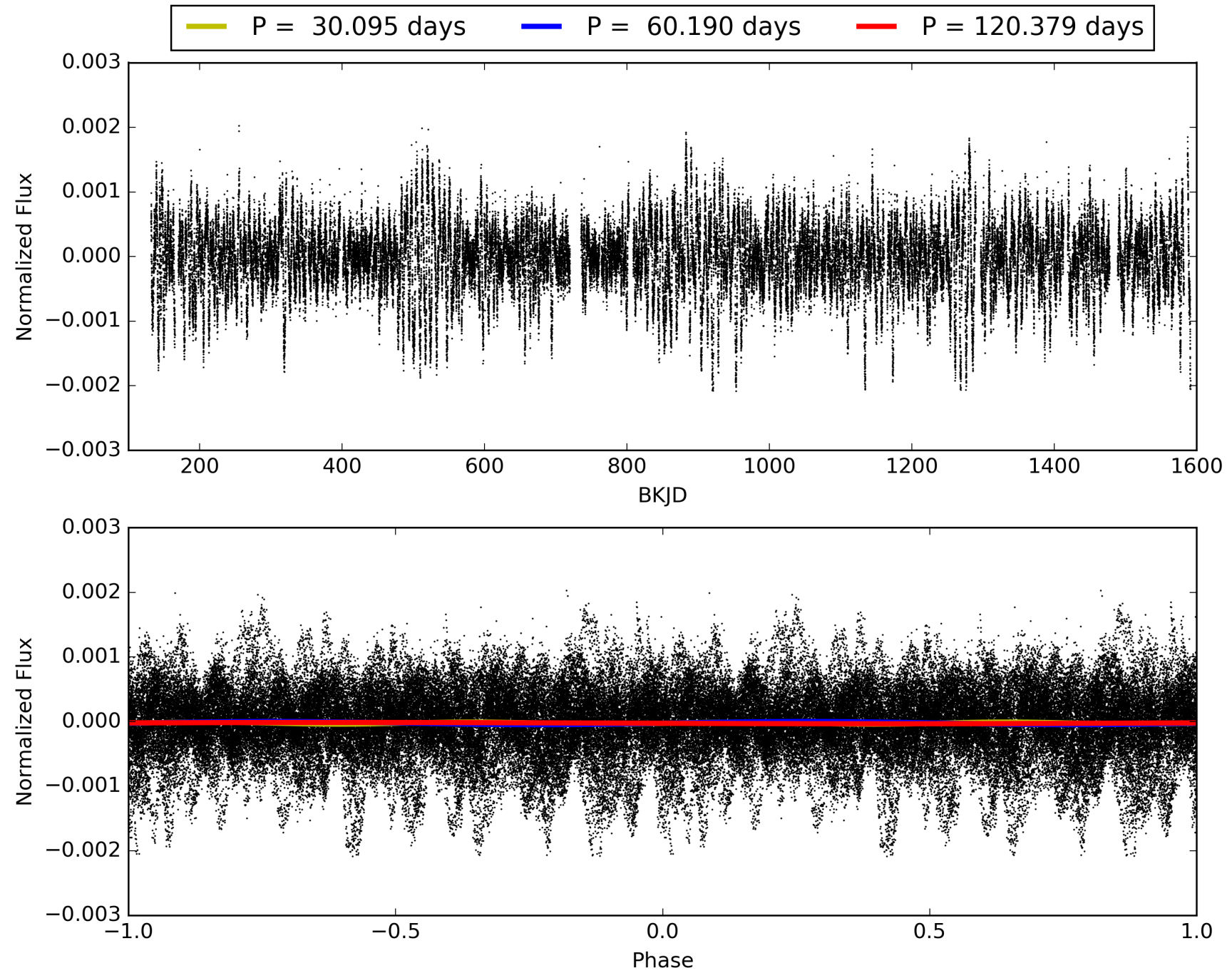
Software Revision: svn-ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 03-Feb-2016 06:56:08 Z

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

# TCE 005978682-05, PDC Light Curves

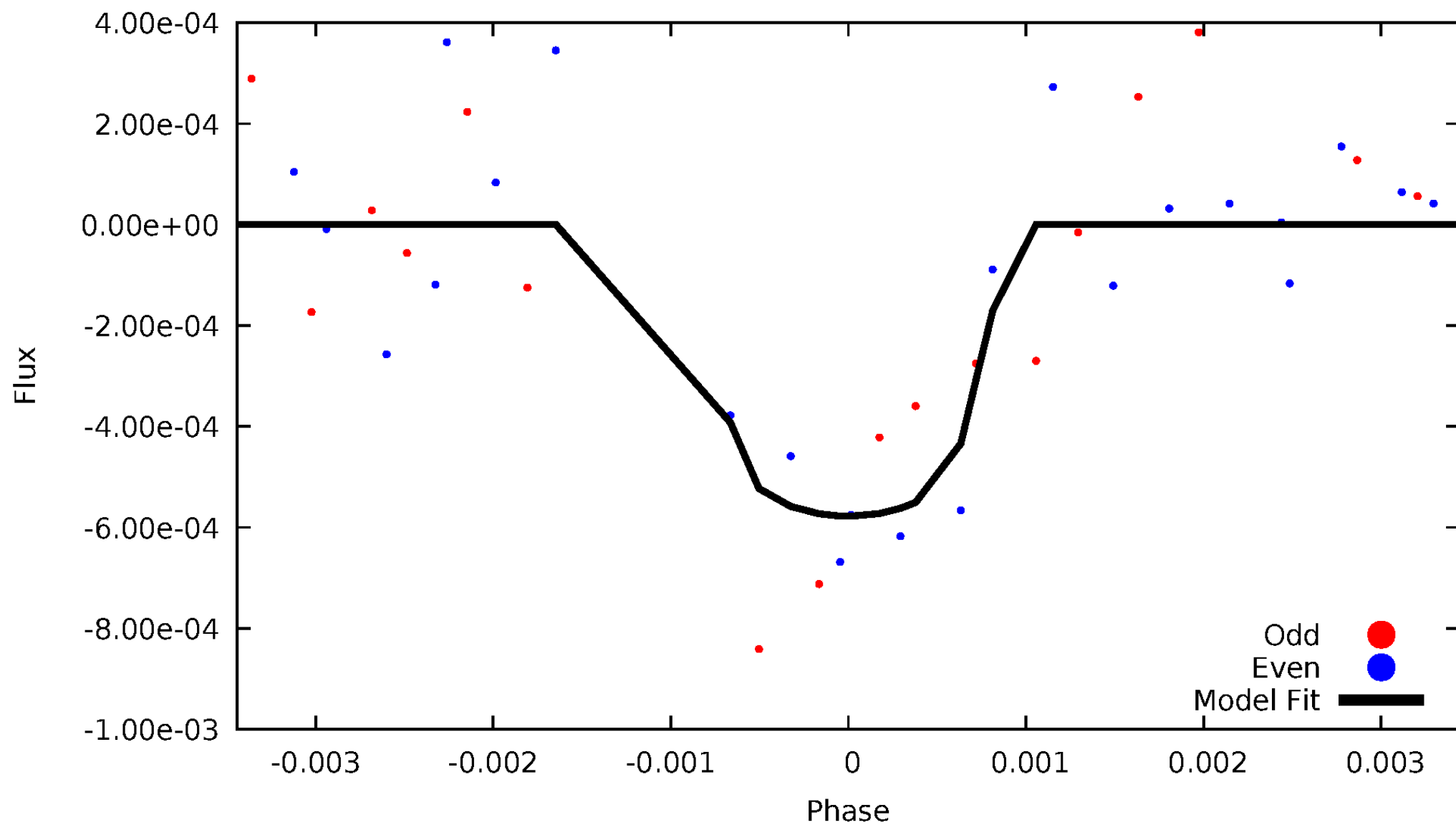


TCE 005978682-05



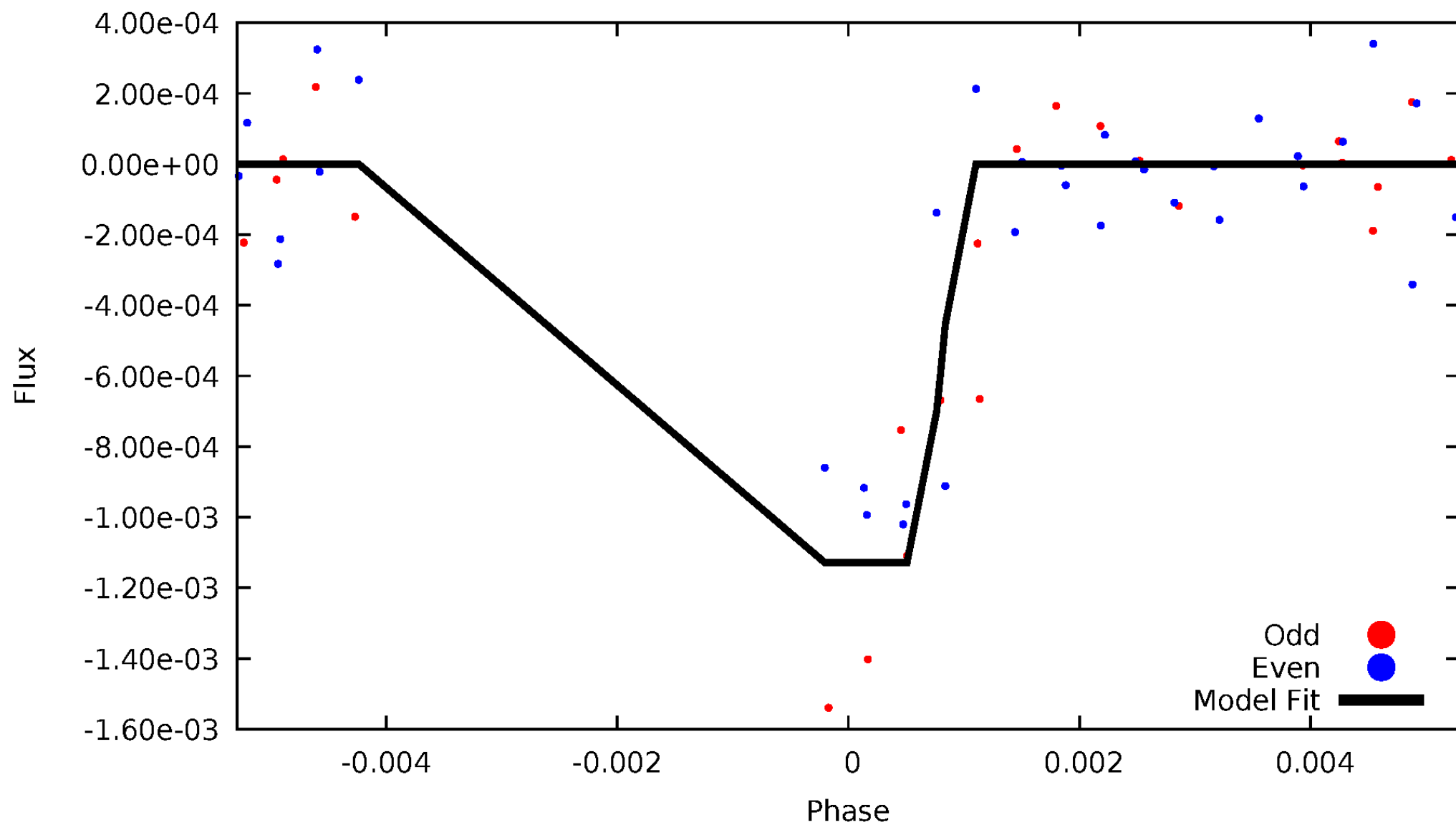
# DV Odd/Even

TCE 005978682-05



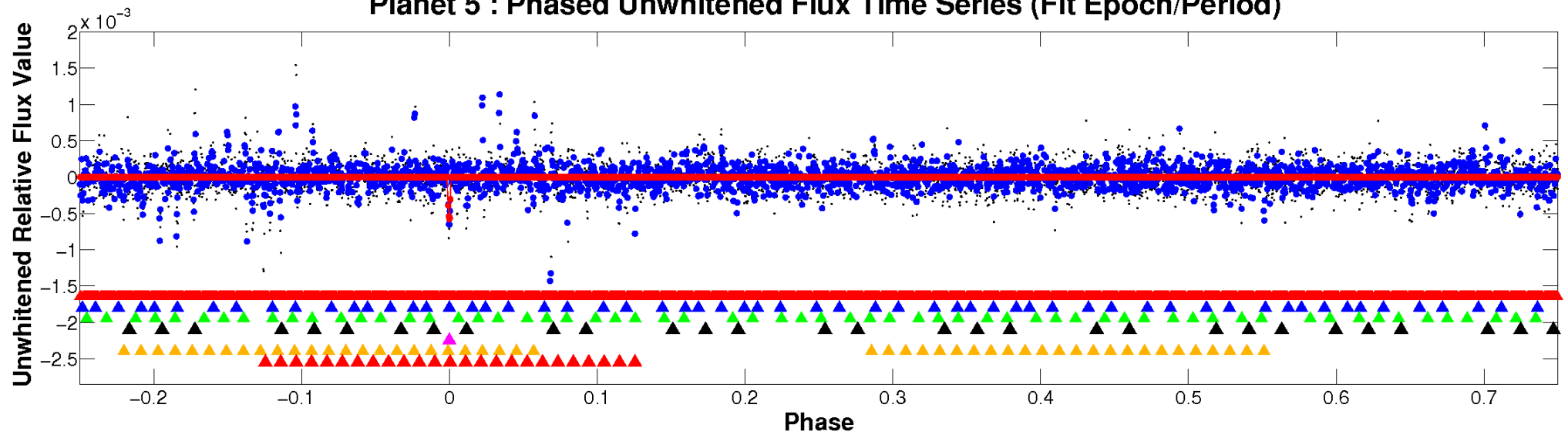
# ALT Odd/Even

TCE 005978682-05

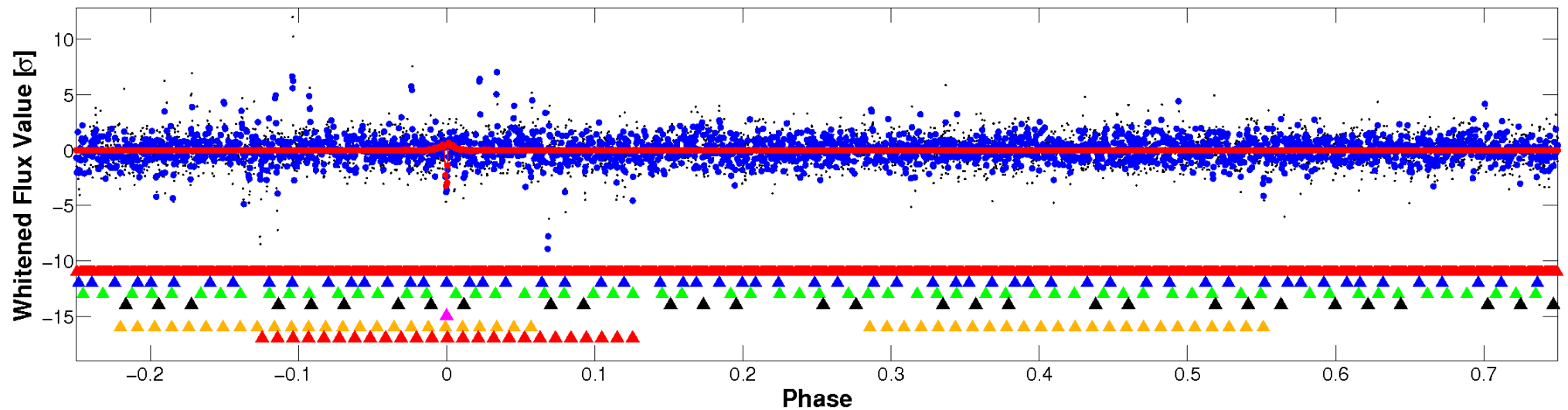


# Non-Whitened Vs. Whitened Light Curve

## Planet 5 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

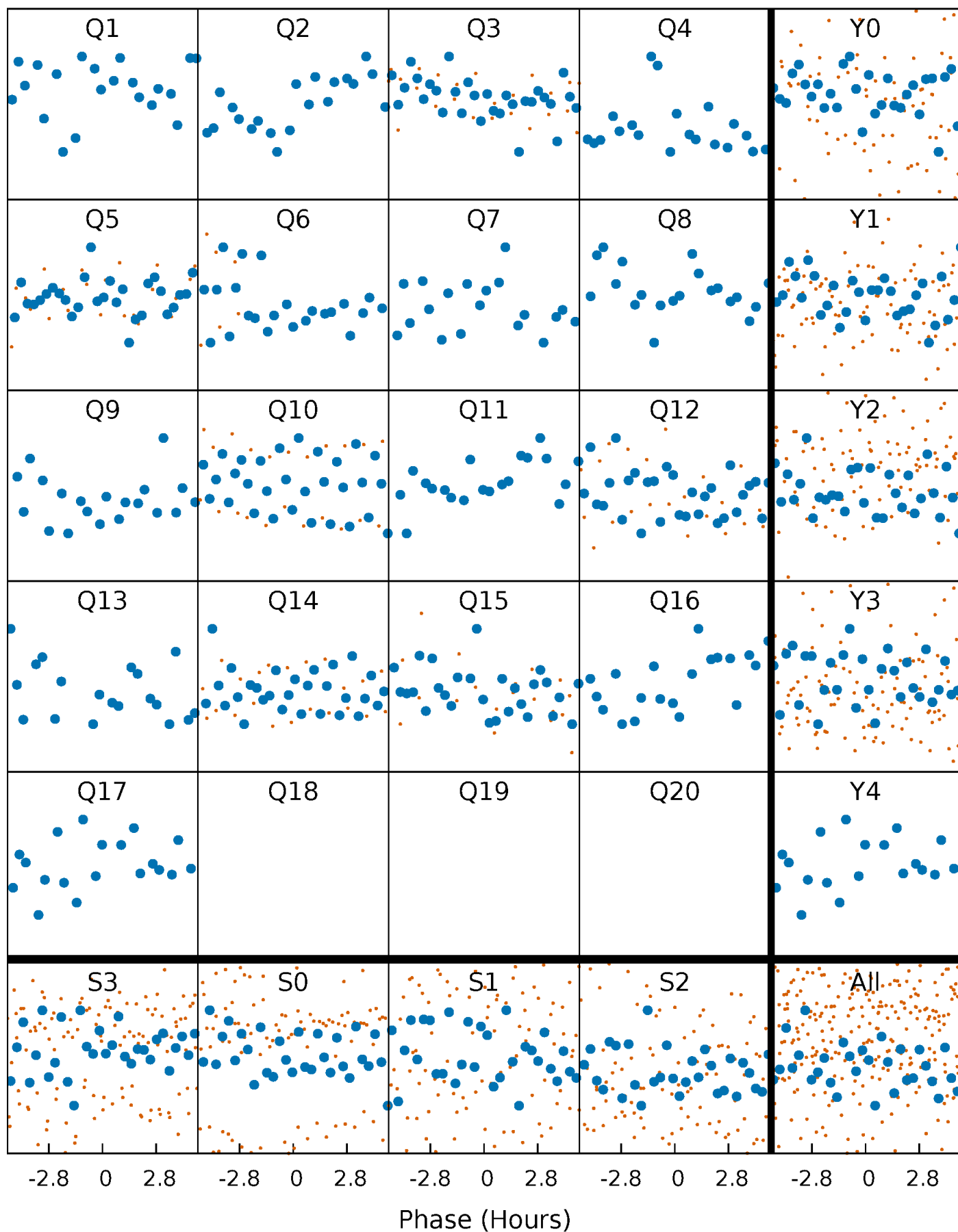


## Planet 5 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

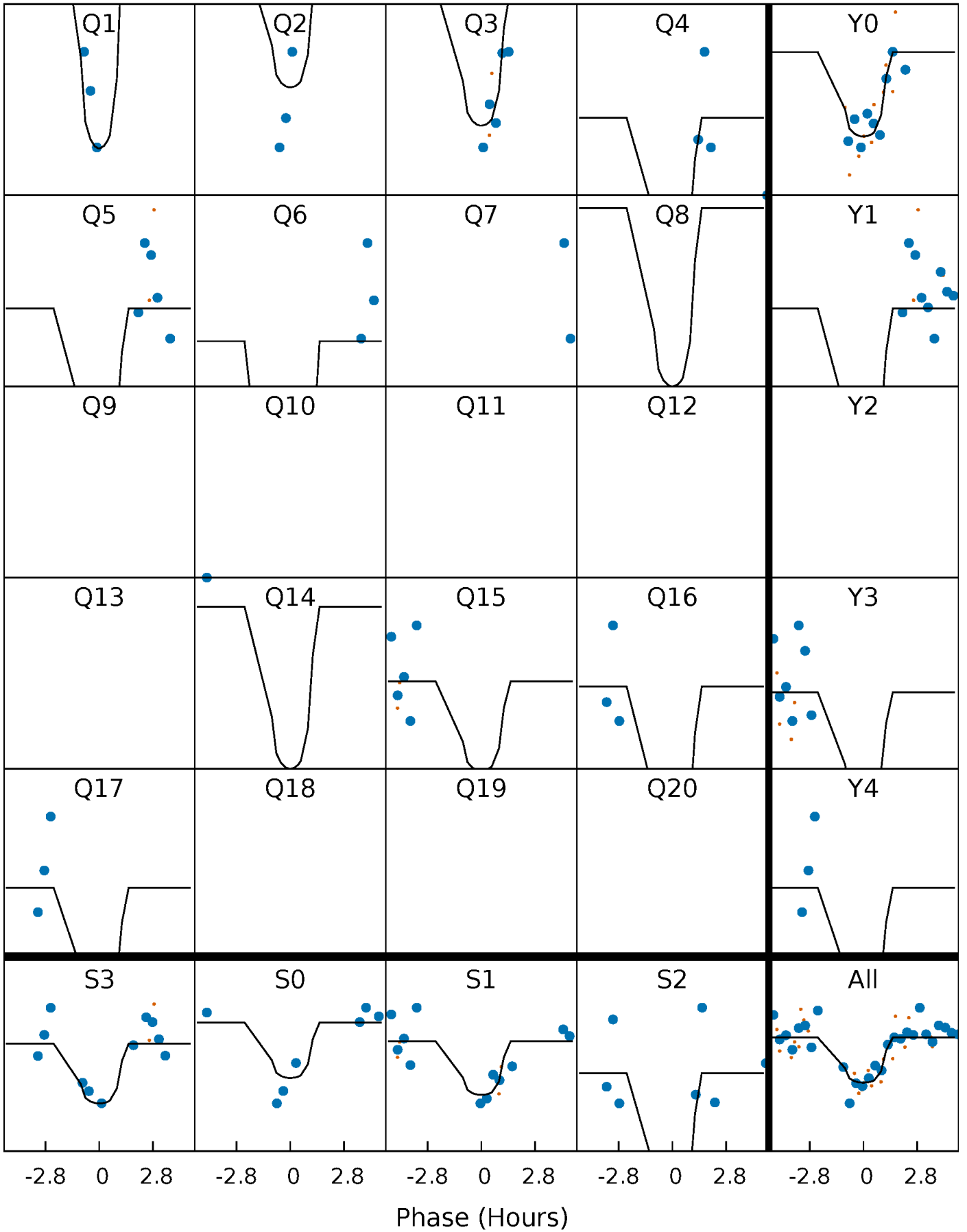
TCE 005978682-05   P= 60.189547 Days    $T_0=145.263653$  (BKJD)





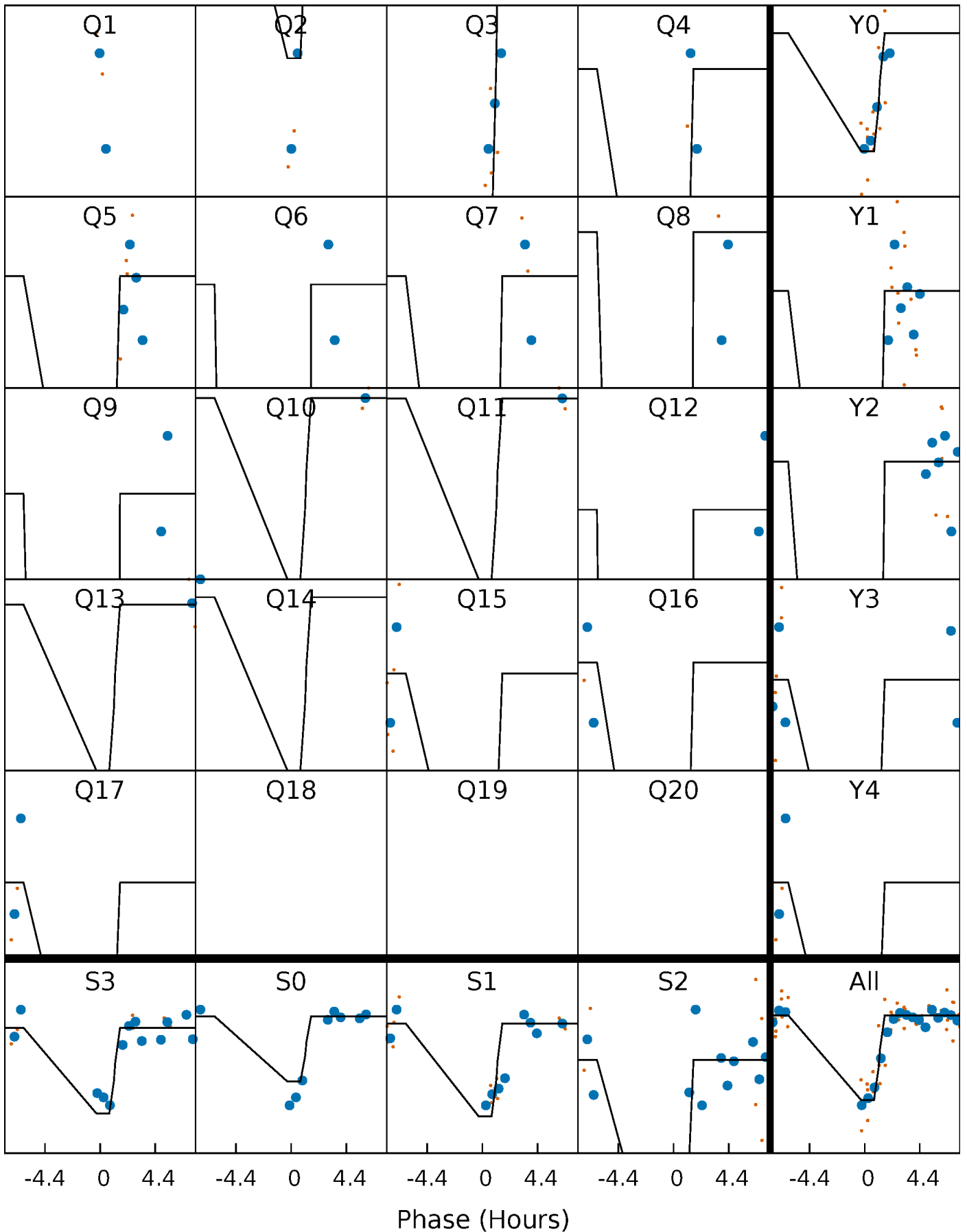
# DV Quarter-Phased Transit Curves

TCE 005978682-05     $P = 60.189547$  Days     $T_0 = 145.263653$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

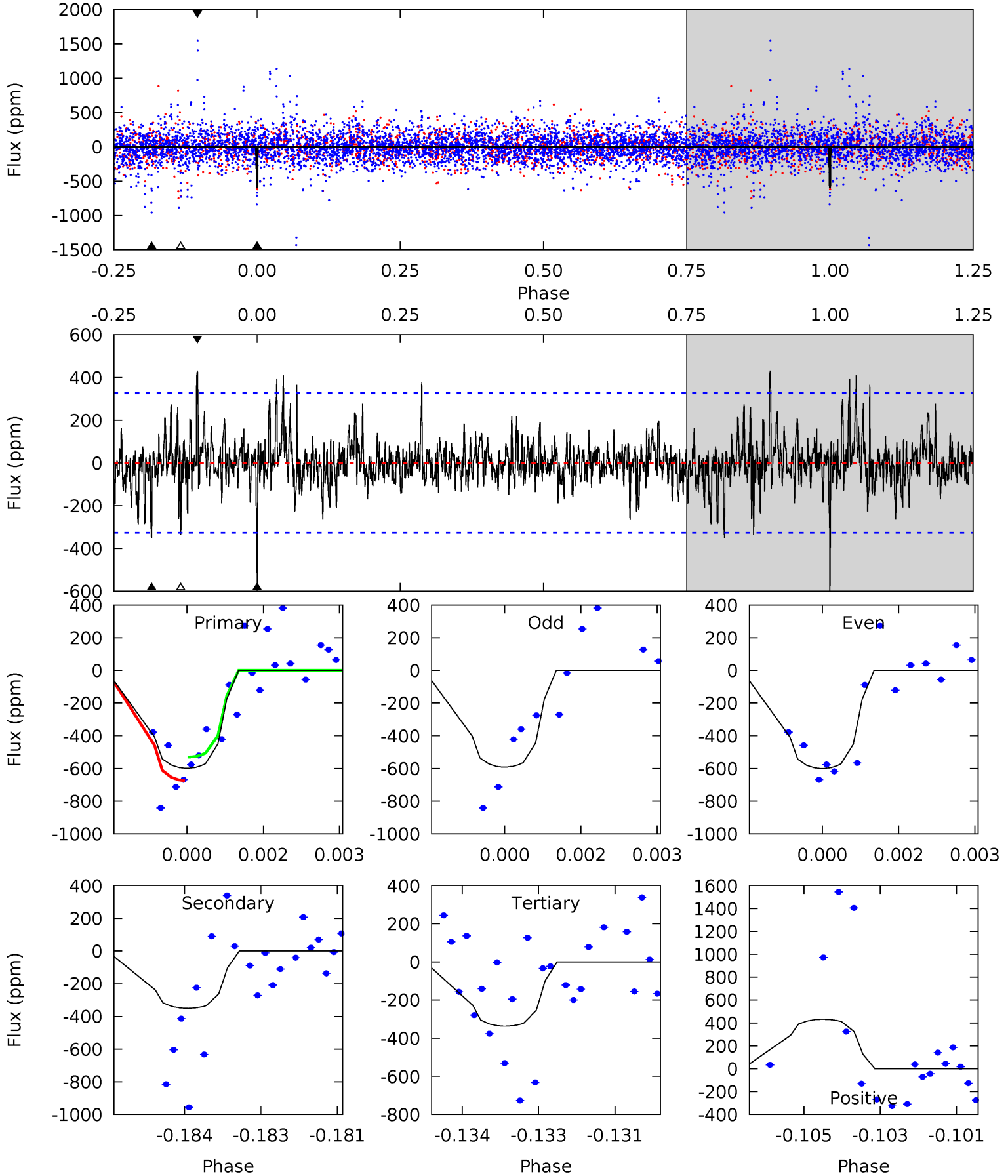
TCE 005978682-05     $P = 60.197198$  Days     $T_0 = 145.235945$  (BKJD)



# DV Model-Shift Uniqueness Test

005978682-05, P = 60.189547 Days, E = 85.074106 Days

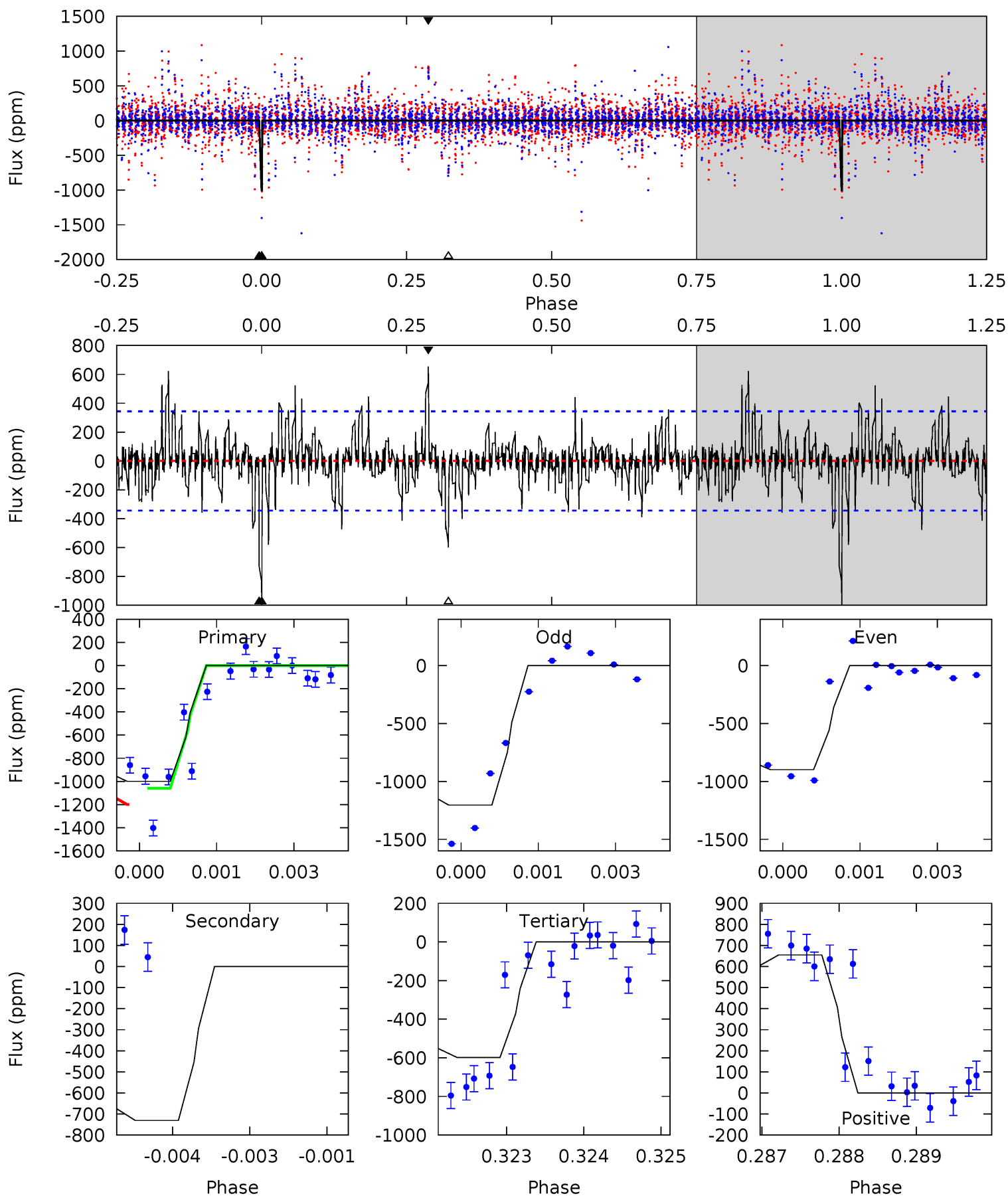
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
9.86	5.77	5.55	7.11	5.37	3.16	1.30	4.31	2.75	0.23	-1.33	0.07	0.95	0.42	1.09



# Alt Model-Shift Uniqueness Test

005978682-05, P = 60.197198 Days, E = 85.038747 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
15.7	11.5	9.40	10.3	5.41	3.22	1.57	6.32	5.42	2.09	1.19	2.16	1.05	0.40	0.00



### Stellar Parameters For KIC 005978682

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6480^{+145}_{-210}$	$4.484^{+0.042}_{-0.224}$	$-0.500^{+0.300}_{-0.300}$	$0.970^{+0.308}_{-0.082}$	$1.045^{+0.133}_{-0.133}$	$1.614^{+0.345}_{-0.863}$
	+2%/-3%	+1%/-5%	+60%/-60%	+32%/-8%	+13%/-13%	+21%/-53%
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 005978682-05 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-351 \pm 61$	$3.10^{+2.38}_{-1.92}$	$729^{+56}_{-34}$	$5361^{+3832}_{-1103}$	$1769^{+11107}_{-1192}$
Alt.	$-731 \pm 64$	$3.83^{+2.47}_{-2.02}$	$727^{+50}_{-36}$	$5708^{+2871}_{-1086}$	$2518^{+8174}_{-1588}$

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

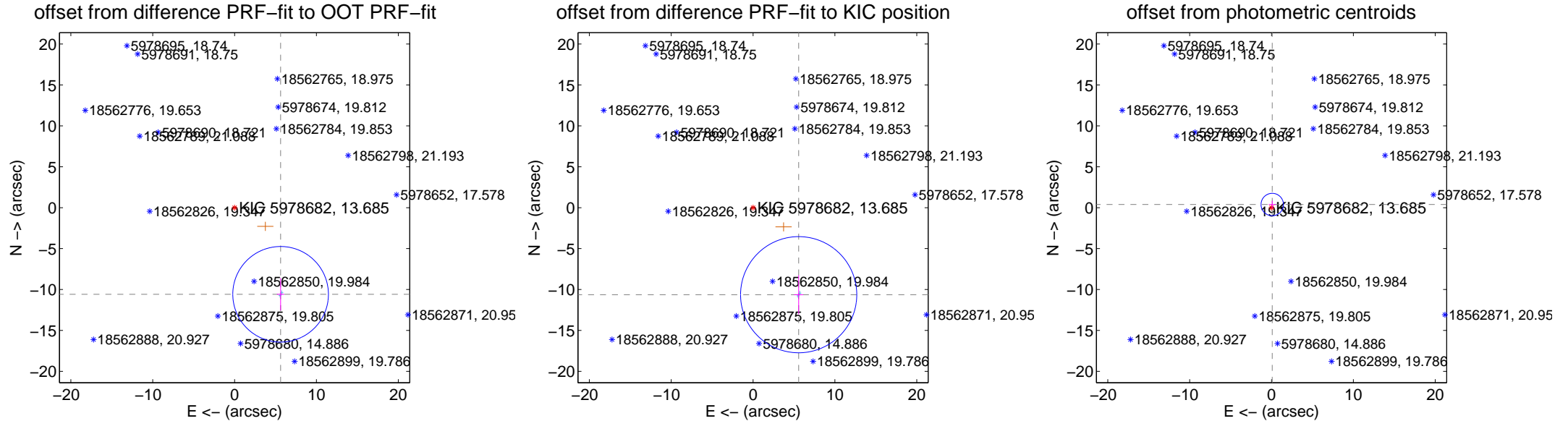
## DV Centroid Data

Supplemental centroid analysis for 005978682-05. Kepler magnitude: 13.69. Transit SNR 9.15

There are 2 quarters with good PRF difference image offsets

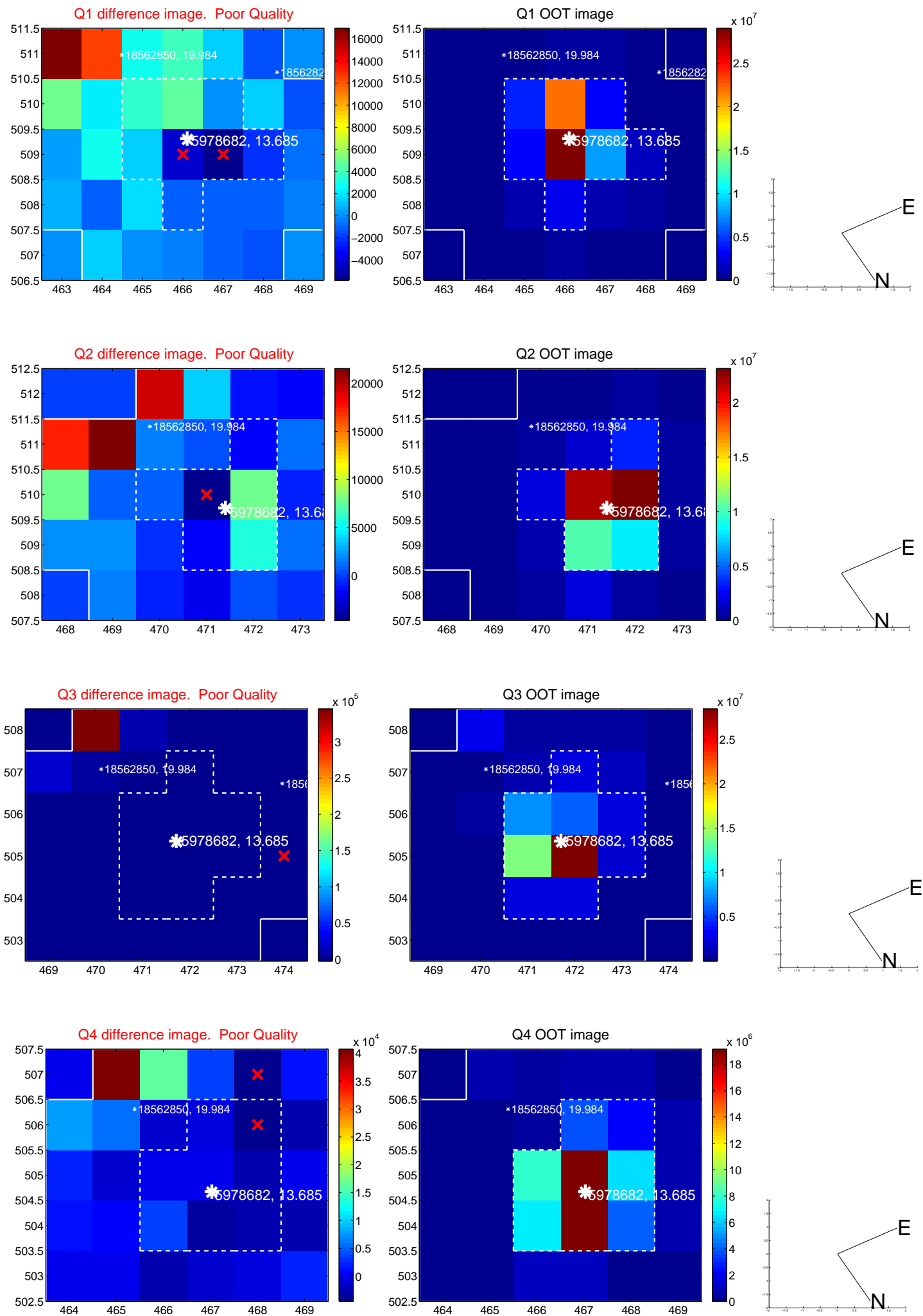
The direct PRF centroid is offset from the target star catalog position by about 0.07 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$11.988 \pm 1.947$	6.16	$-5.624 \pm 0.442$	$-10.587 \pm 1.974$
PRF-fit source offset from KIC position	$12.008 \pm 2.366$	5.08	$-5.573 \pm 0.547$	$-10.636 \pm 2.388$
photometric centroid source offset	$0.39 \pm 0.46$	0.86	$-0.09 \pm 0.44$	$0.38 \pm 0.46$



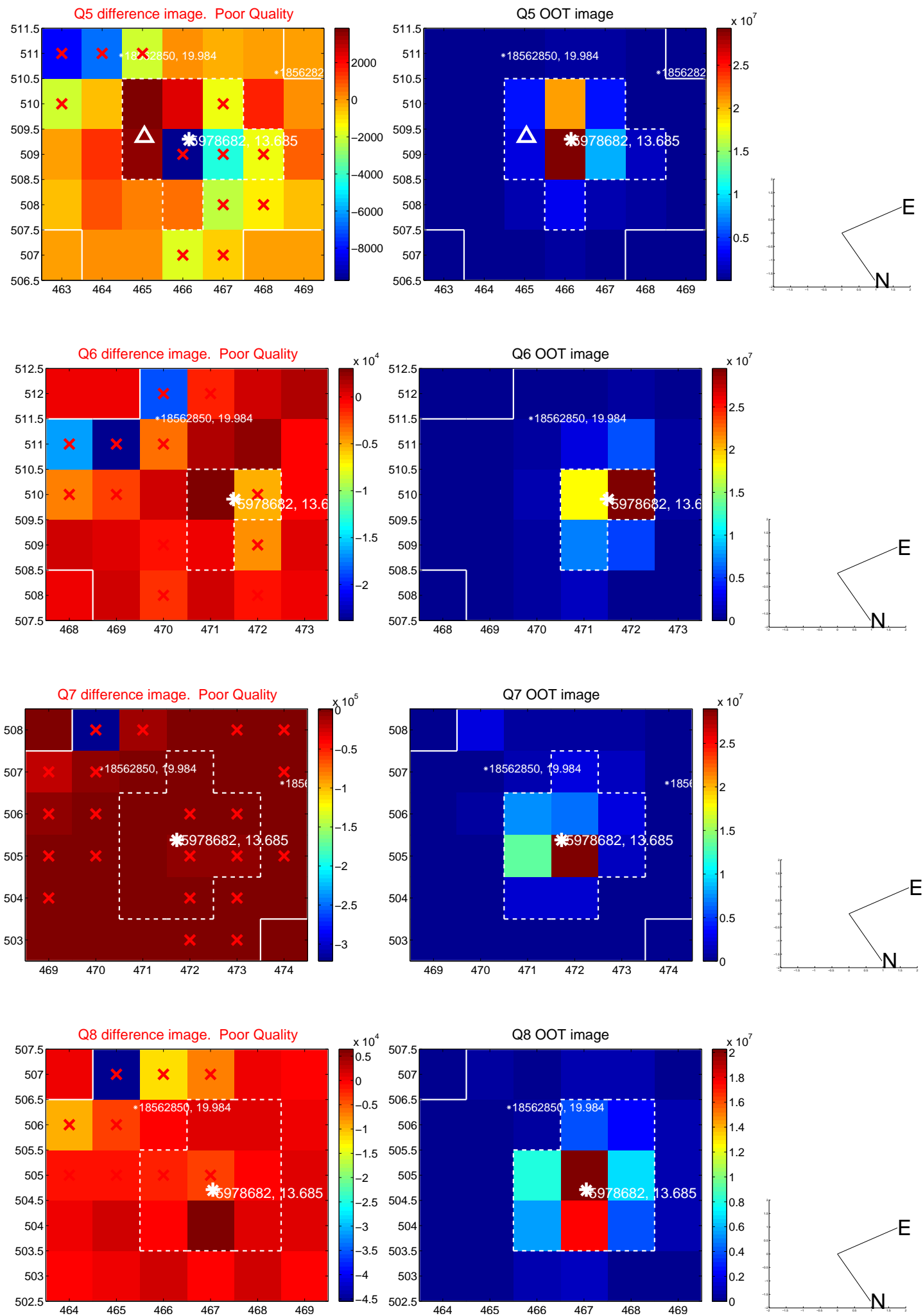
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

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

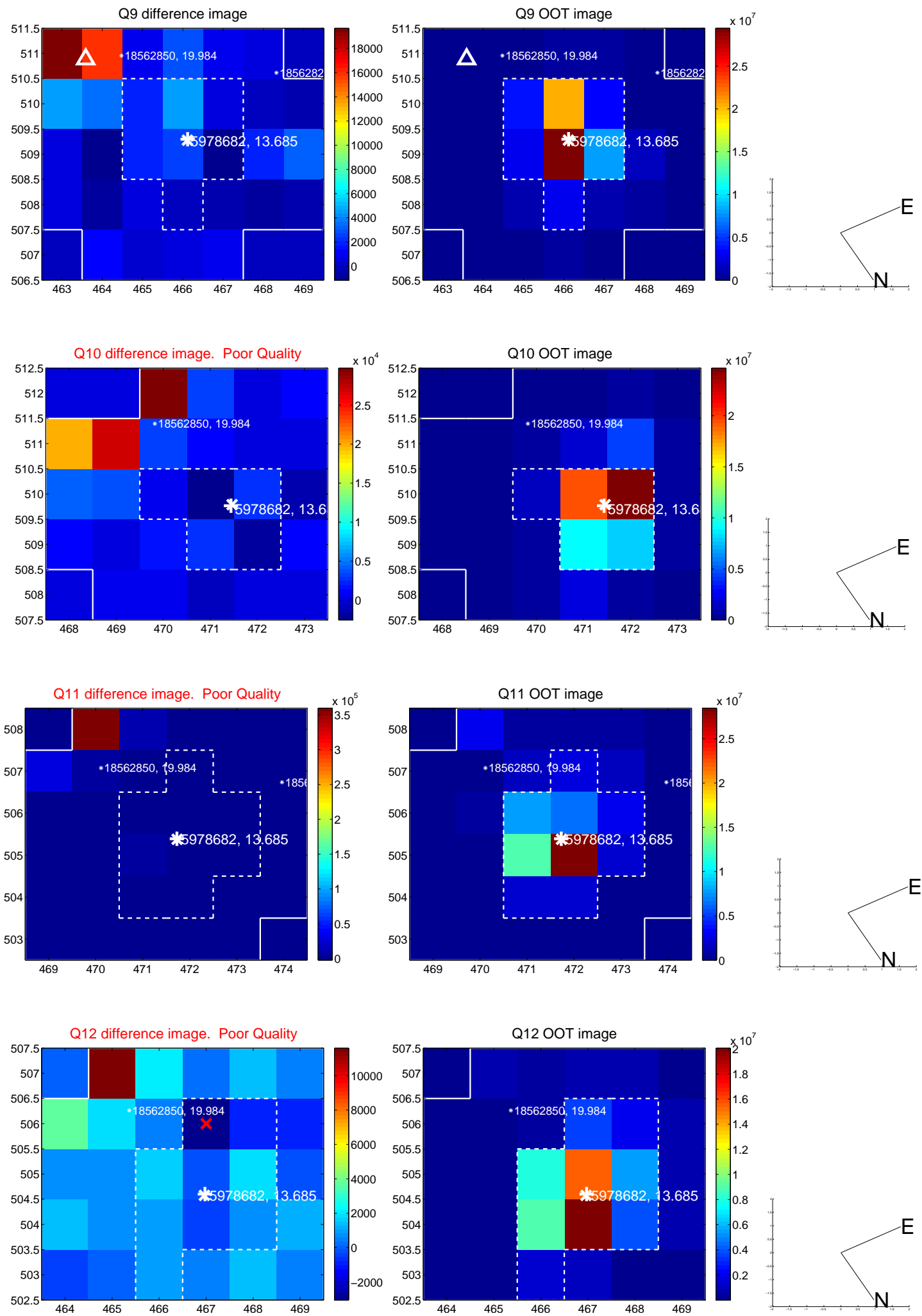




white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



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

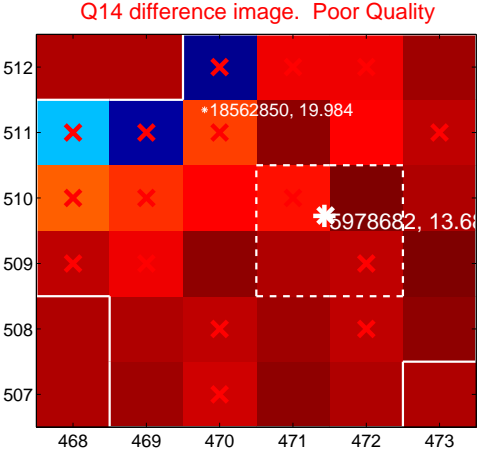
Q13 no difference image



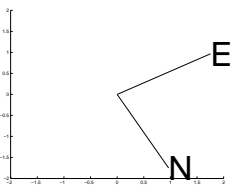
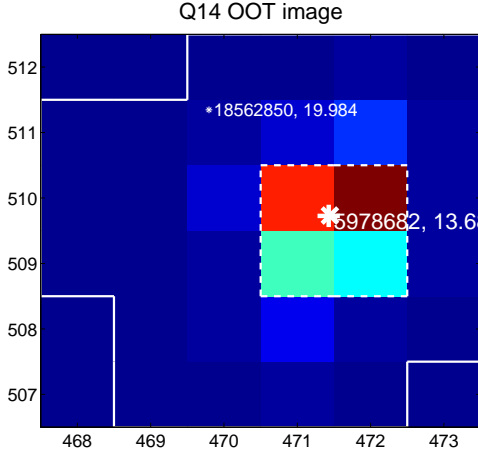
Q13 no OOT image



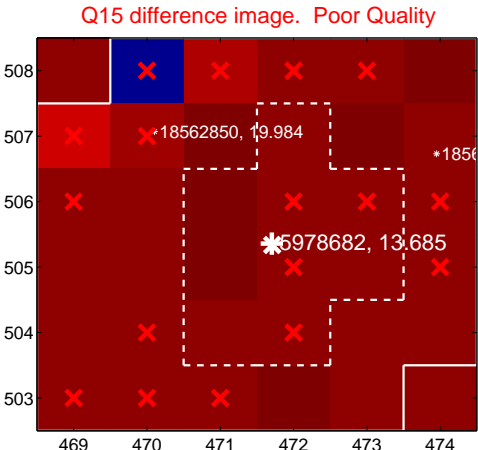
Q14 difference image. Poor Quality



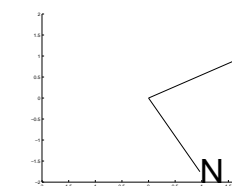
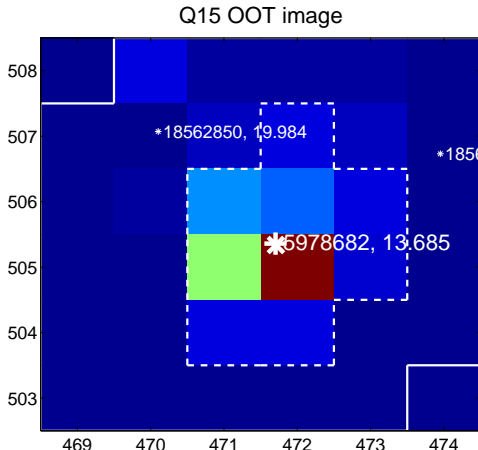
Q14 OOT image



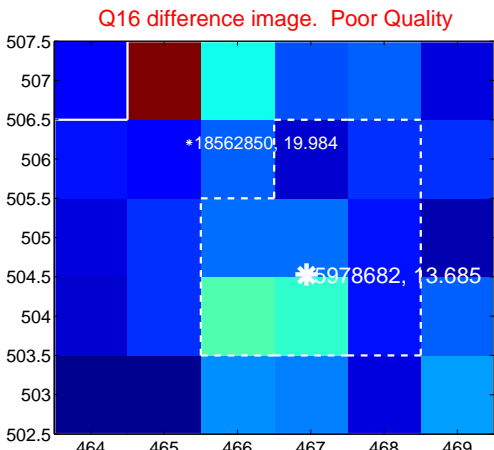
Q15 difference image. Poor Quality



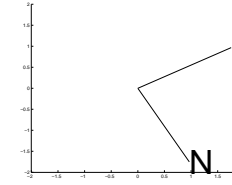
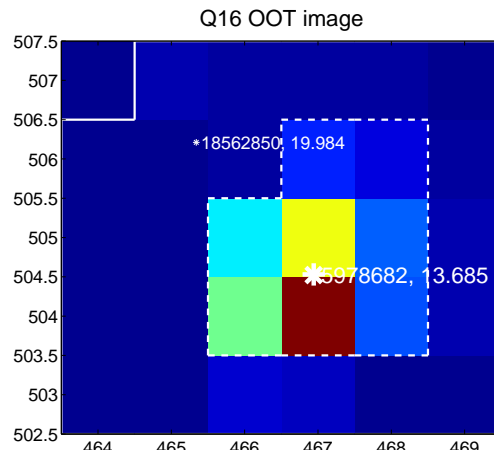
Q15 OOT image



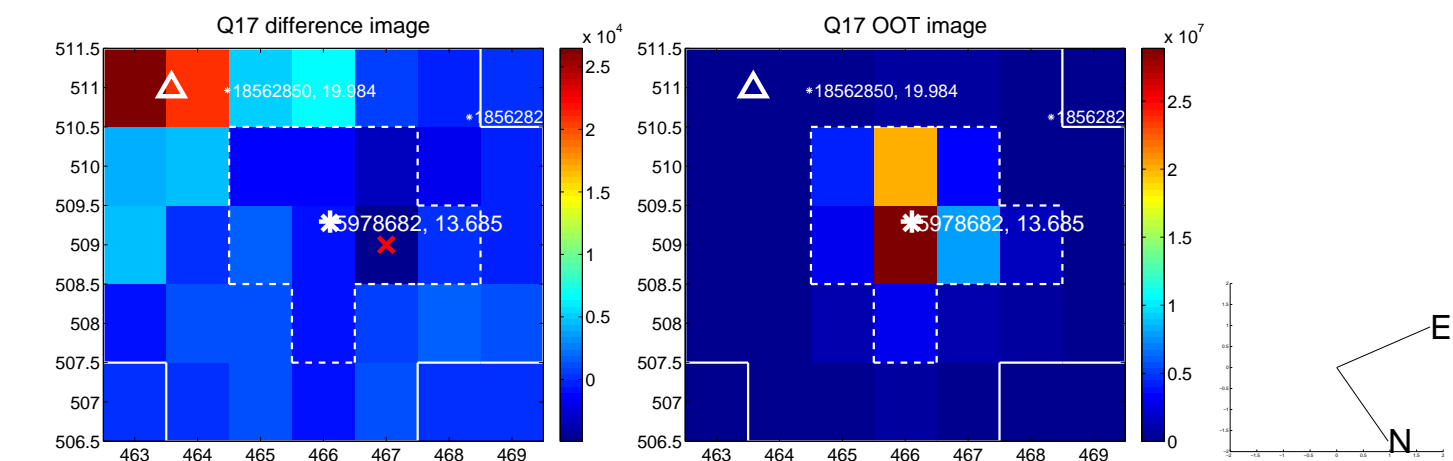
Q16 difference image. Poor Quality



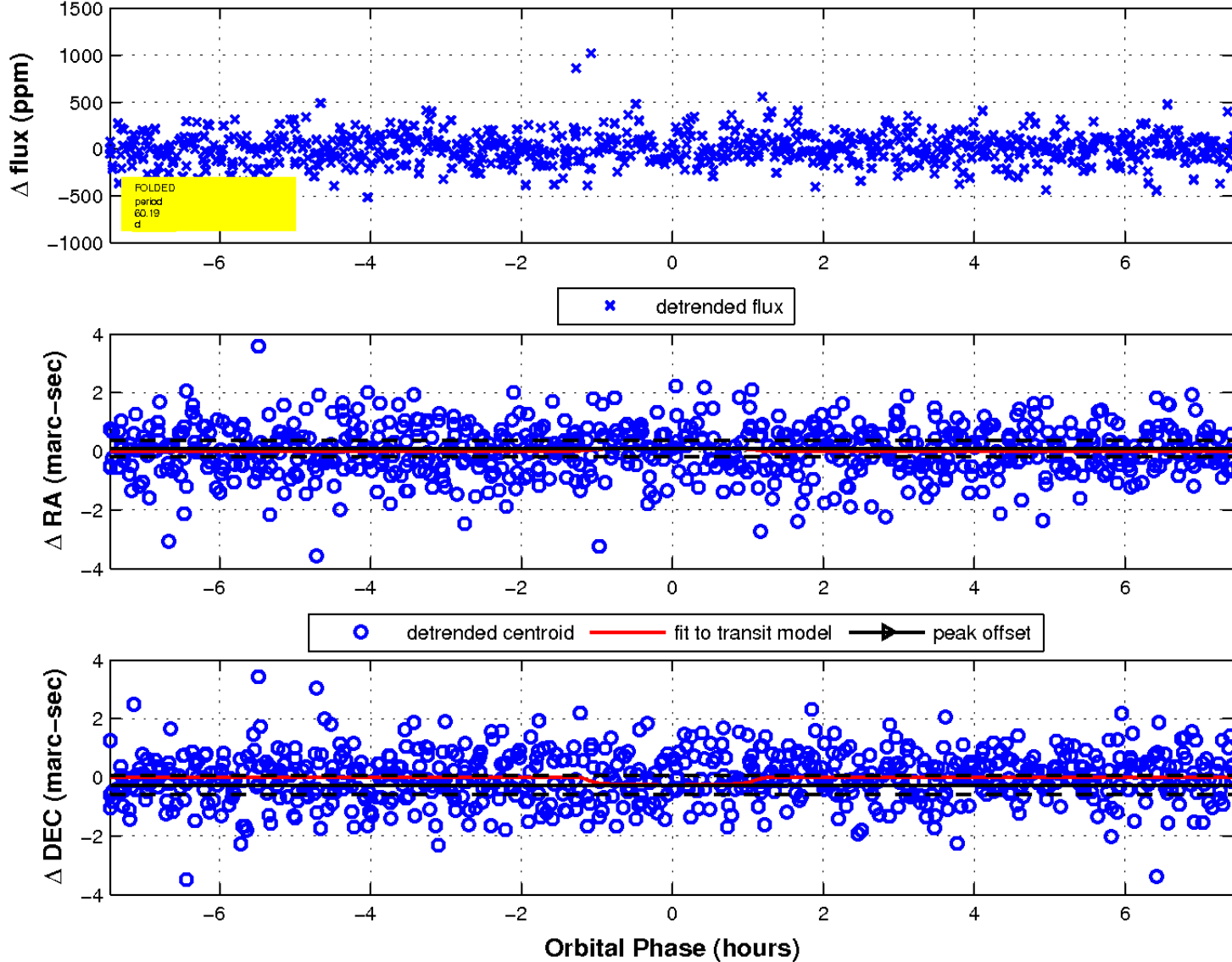
Q16 OOT image



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

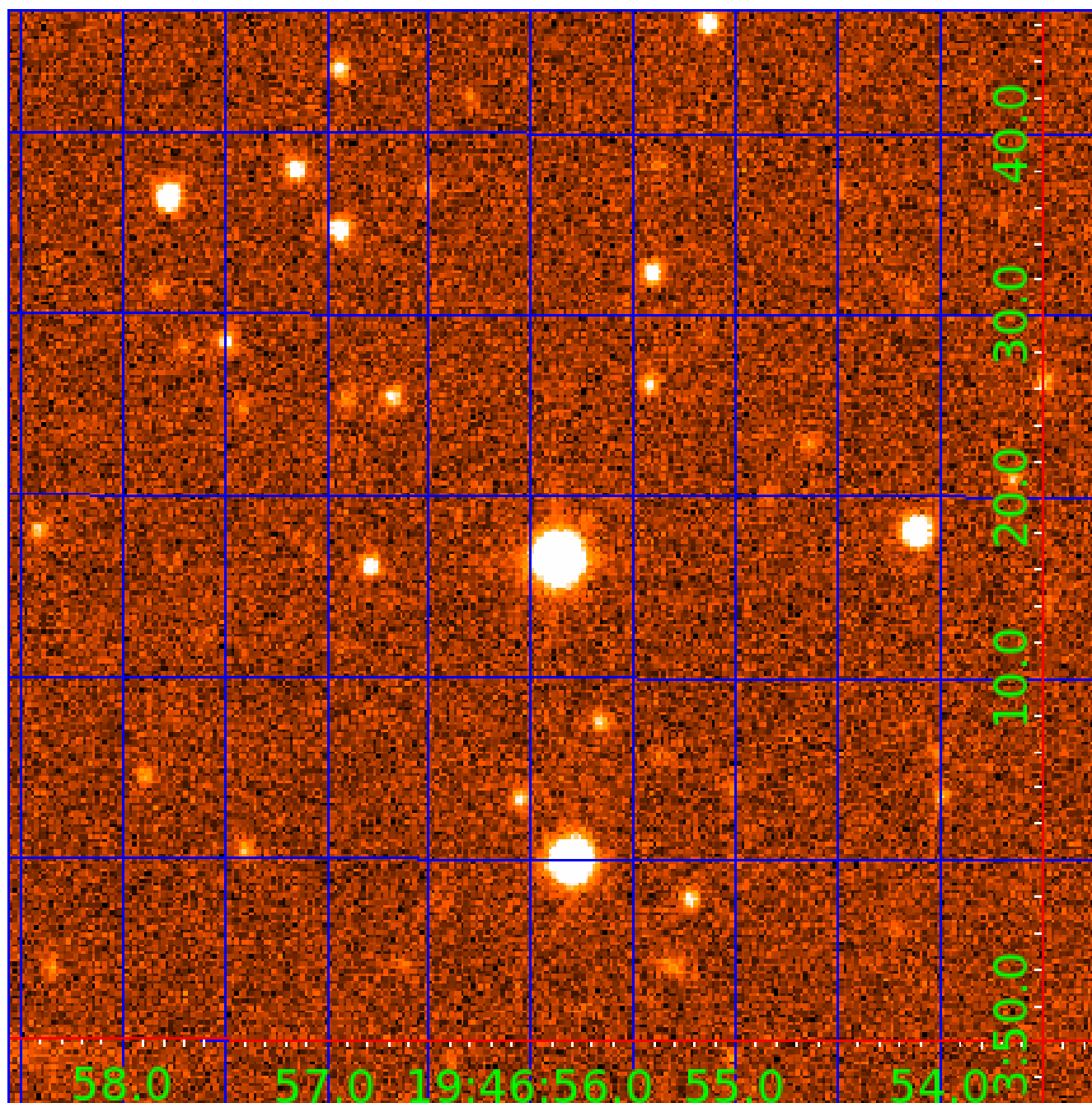


fluxWeightedCentroids, Planet 5 of 7



UKIRT Image

Declination



# KIC 005978682

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005978682-01	OBS	No	0.692126	131.738122	12.5	4.894	7.8	6.6	0.97	6480	0.35	6148.86
005978682-02	OBS	No	24.556245	141.930135	188.7	4.447	17.8	5.5	0.97	6480	1.48	52.74
005978682-03	OBS	No	23.517485	142.468375	380.7	2.809	14.8	8.1	0.97	6480	1.91	55.87
005978682-04	OBS	No	49.124797	141.099078	409.0	2.988	10.3	7.4	0.97	6480	2.05	20.92
005978682-05	OBS	No	60.189547	145.263653	577.9	2.486	9.7	9.2	0.97	6480	2.68	15.96
005978682-06	OBS	No	29.747329	148.690933	849.2	0.510	8.9	6.4	0.97	6480	3.64	40.84
005978682-07	OBS	No	59.562405	152.822565	453.6	1.528	9.9	5.9	0.97	6480	2.45	16.18

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005978682-01	OBS	FP	0.00	1	0	1	0	LPP_DV—LPP_ALT—CENT_RESOLVED_OFFSET
005978682-02	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_TRACKER—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—CENT_RESOLVED_OFFSET
005978682-03	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_RESOLVED_OFFSET
005978682-04	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_ZUMA—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—CENT_RESOLVED_OFFSET
005978682-05	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—CENT_RESOLVED_OFFSET
005978682-06	OBS	FP	0.00	1	0	1	0	TRANS_GAPPED—LPP_DV—LPP_ALT—CENT_RESOLVED_OFFSET
005978682-07	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—CENT_RESOLVED_OFFSET

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

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

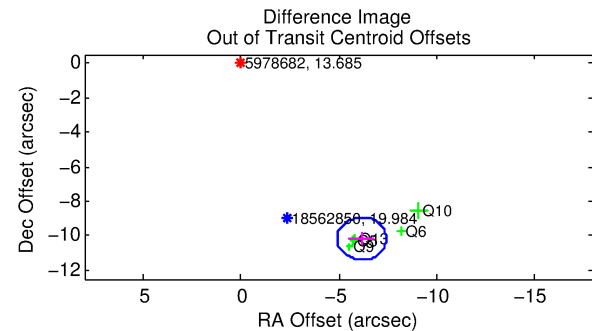
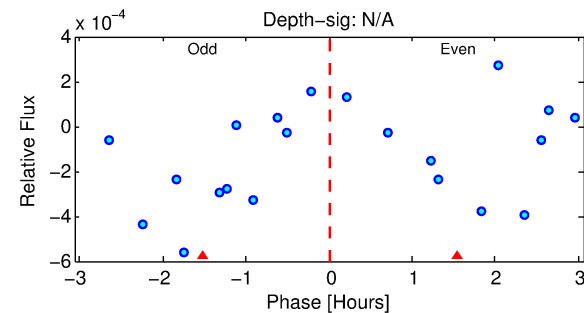
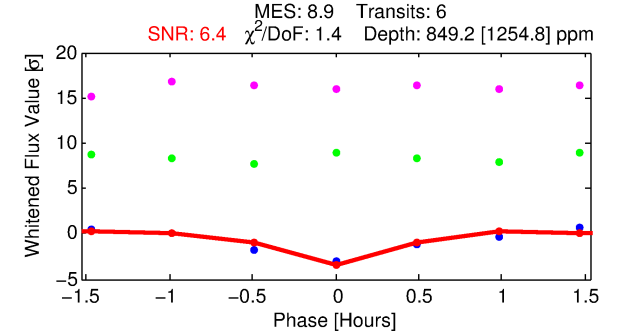
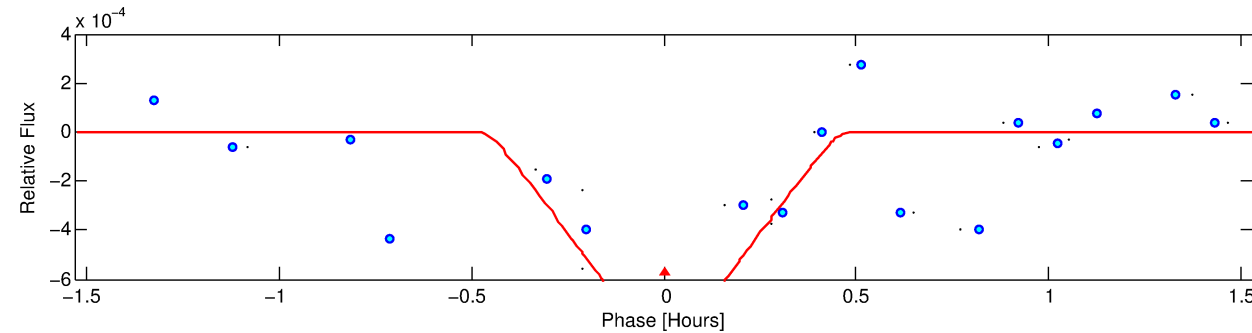
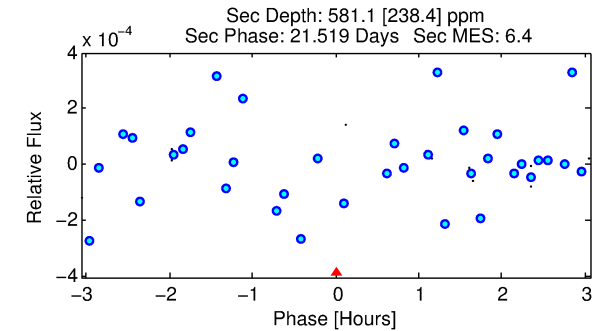
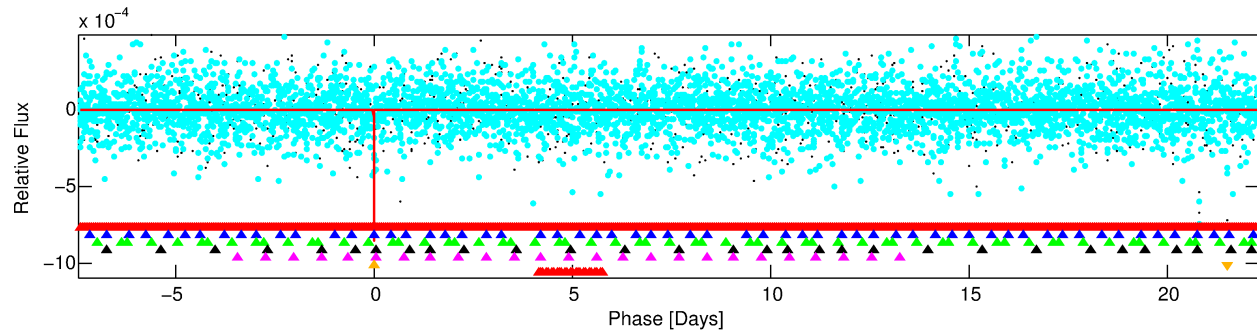
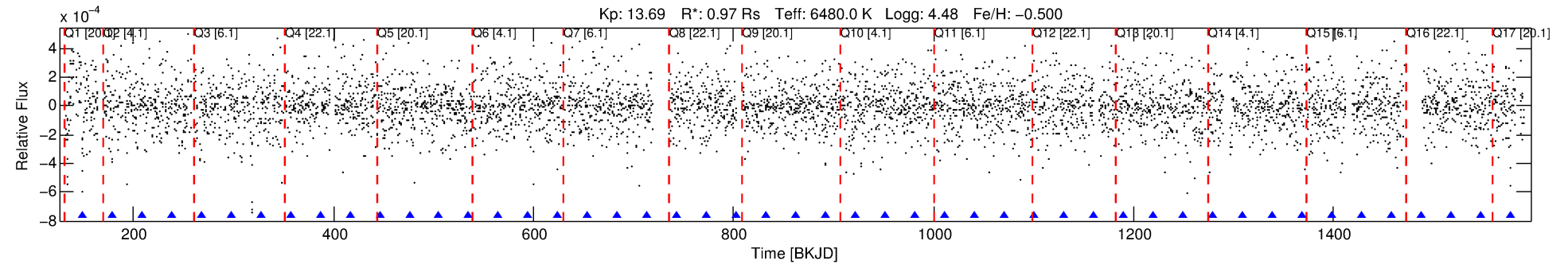
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 005978682-06

No Significant Match Found

# DV One-Page Summary

KIC: 5978682 Candidate: 6 of 7 Period: 29.747 d



## DV Fit Results:

Period = 29.74733 [0.00008] d  
Epoch = 148.6909 [0.0020] BKJD  
Rp/R\* = 0.0344 [0.0652]  
a/R\* = 227.82 [2493.18]  
b = 0.90 [2.37]  
Seff = 40.84 [17.32]  
Teq = 645 [68] K  
Rp = 3.64 [6.99] Re  
a = 0.1908 [0.0520] AU  
Ag = 876.51 [3356.56] [0.26σ]  
Teff = 5423 [5166] K [0.92σ]

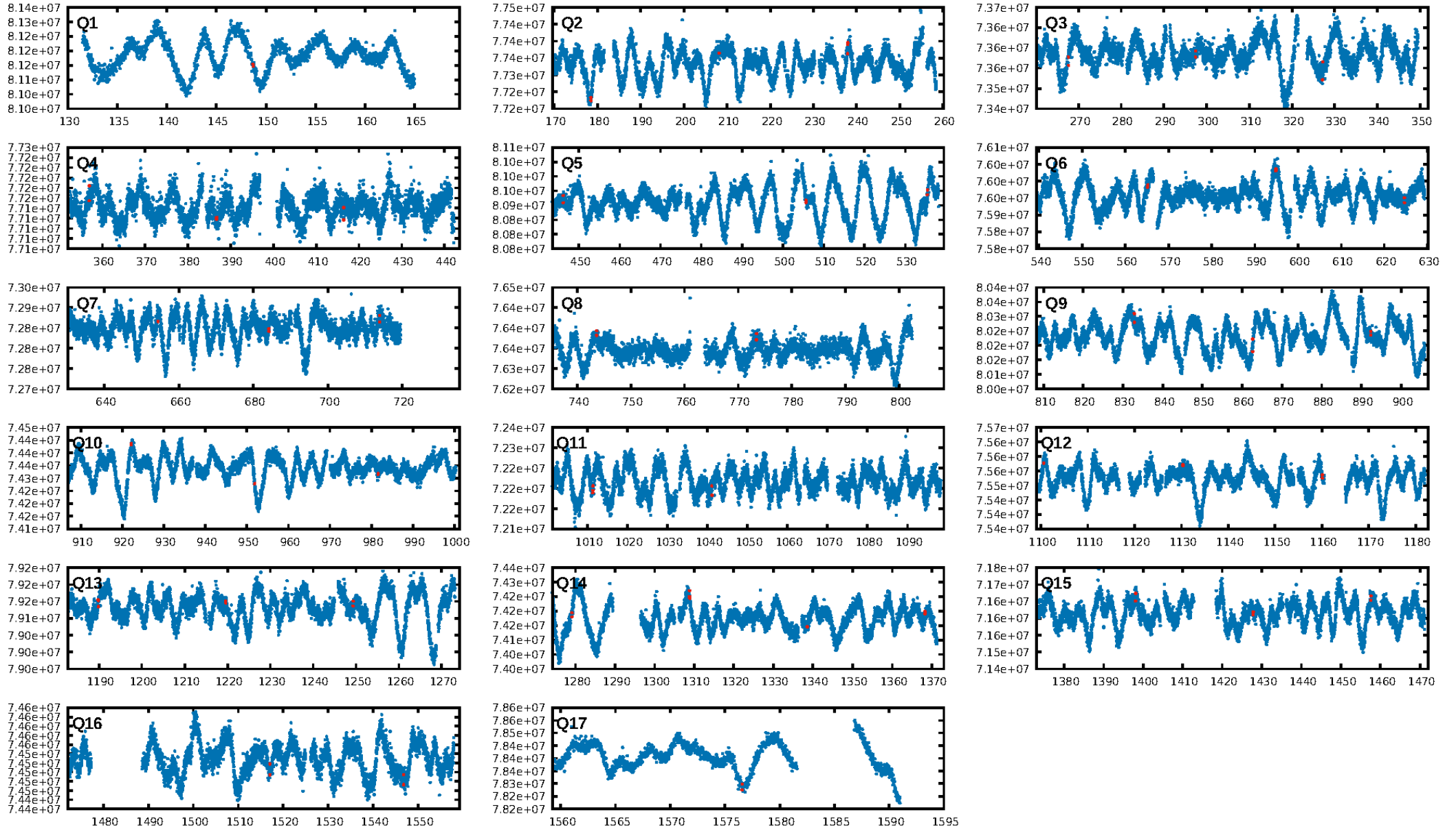
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [27.83σ]  
LongPeriod-sig: 100.0% [153.44σ]  
ModelChiSquare2-sig: 48.8%  
ModelChiSquareGof-sig: 78.8%  
Bootstrap-pfa: 1.79e-13  
RollingBand-fgt: 1.00 [4/4]  
GhostDiagnostic-chr: 0.8769  
Centroid-sig: 14.7%  
Centroid-so: 0.551 arcsec [1.20σ]  
OotOffset-rm: 11.893 arcsec [28.79σ]  
KicOffset-rm: 11.936 arcsec [28.57σ]  
OotOffset-st: 2/0/0/3 [5]  
KicOffset-st: 2/0/0/3 [5]  
DiffImageQuality-fgm: 0.20 [1/5]  
DiffImageOverlap-fno: 0.00 [0/14]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 03-Feb-2016 06:56:12 Z

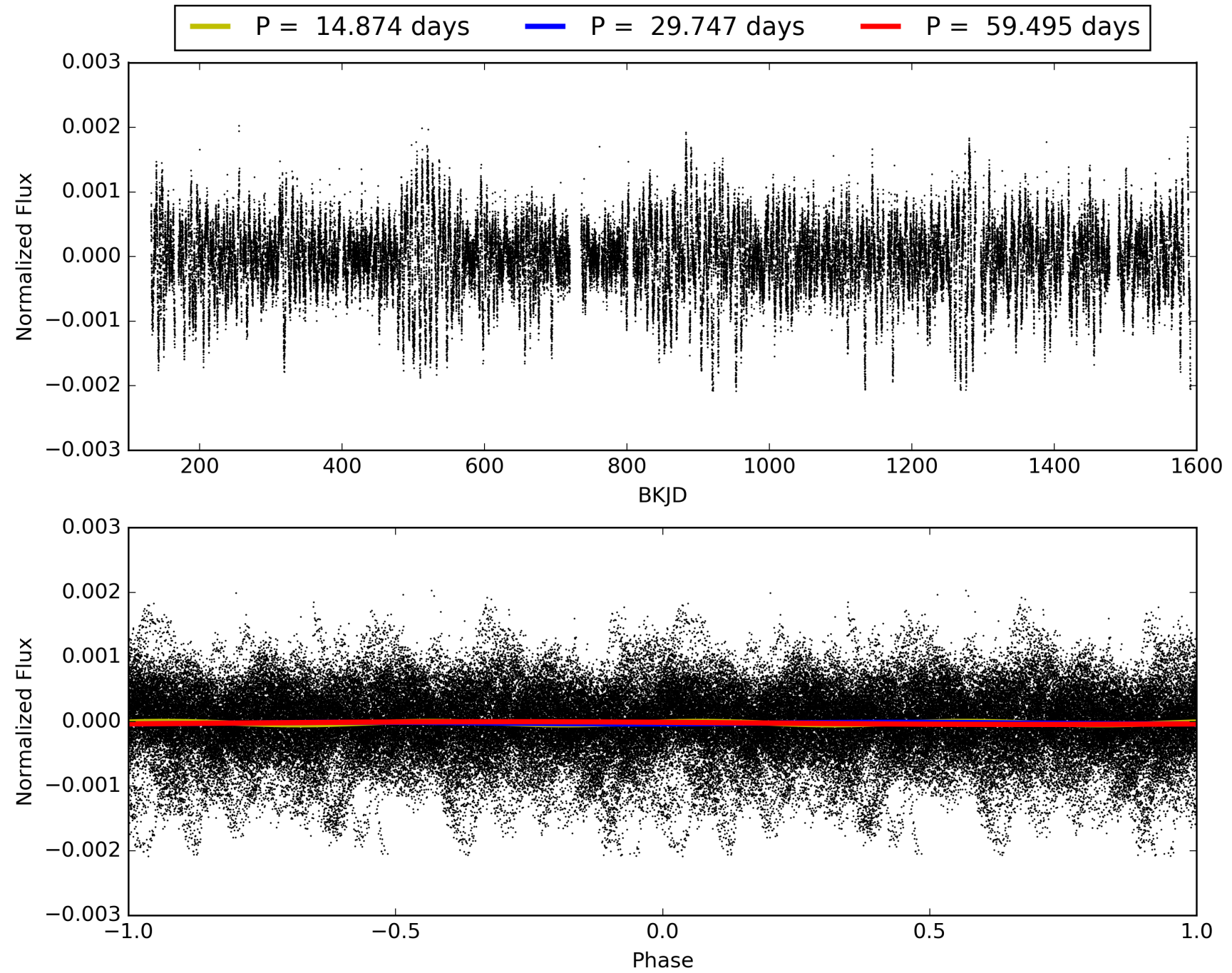
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 005978682-06, PDC Light Curves



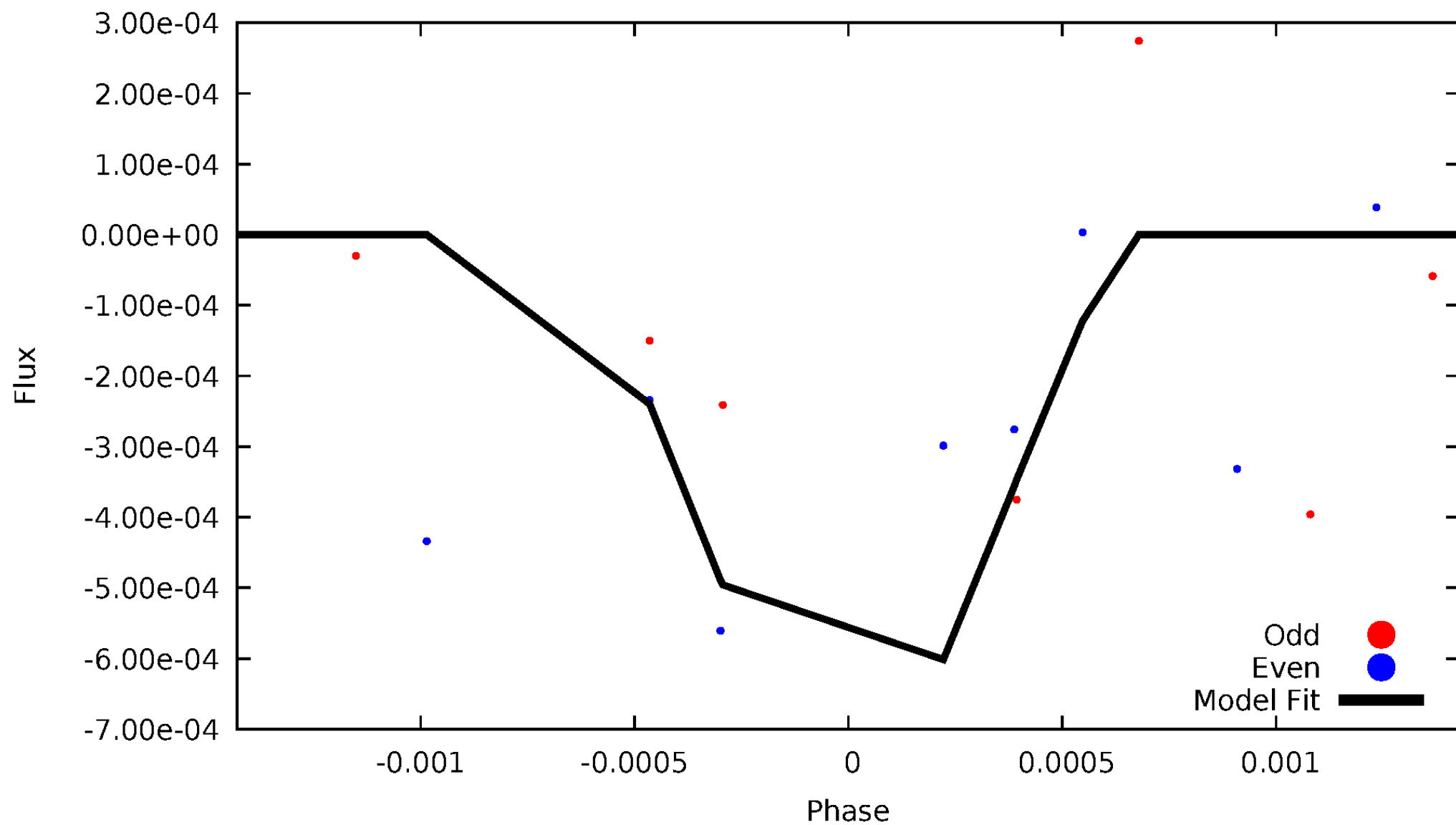


TCE 005978682-06



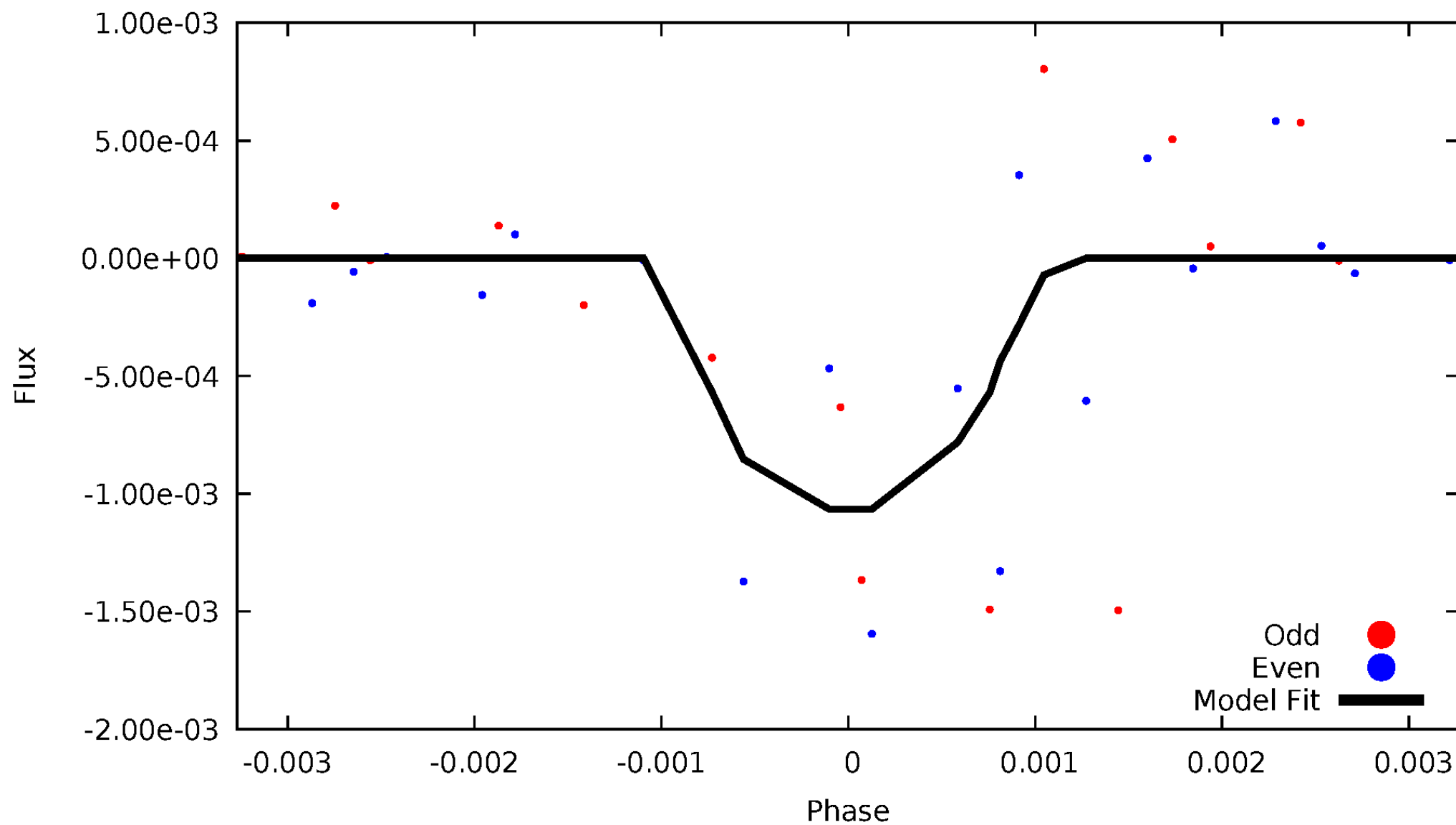
# DV Odd/Even

TCE 005978682-06



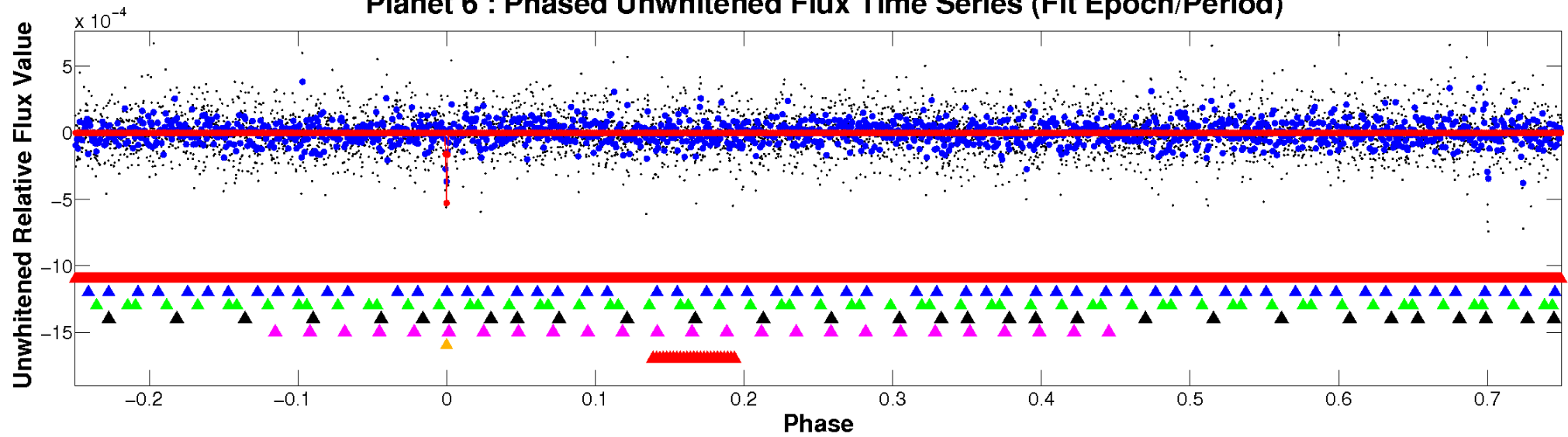
# ALT Odd/Even

TCE 005978682-06

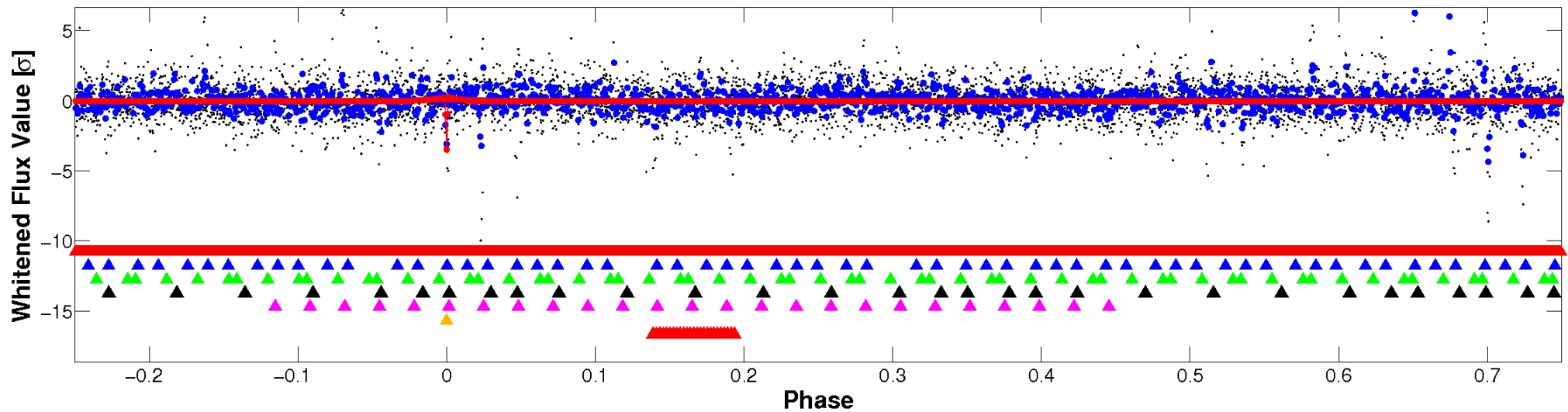


# Non-Whitened Vs. Whitened Light Curve

## Planet 6 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

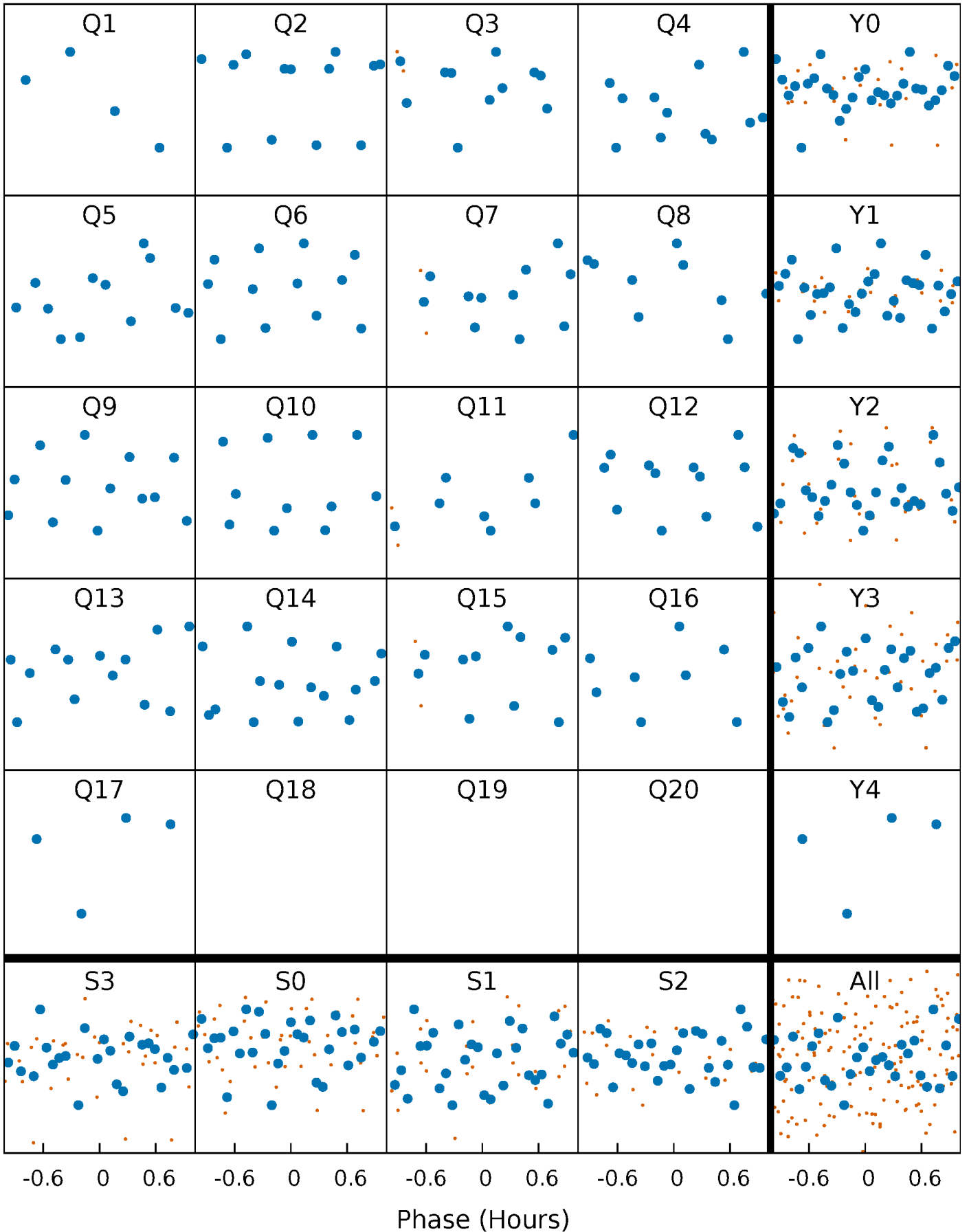


## Planet 6 : Phased Whitened Flux Time Series (Fit Epoch/Period)



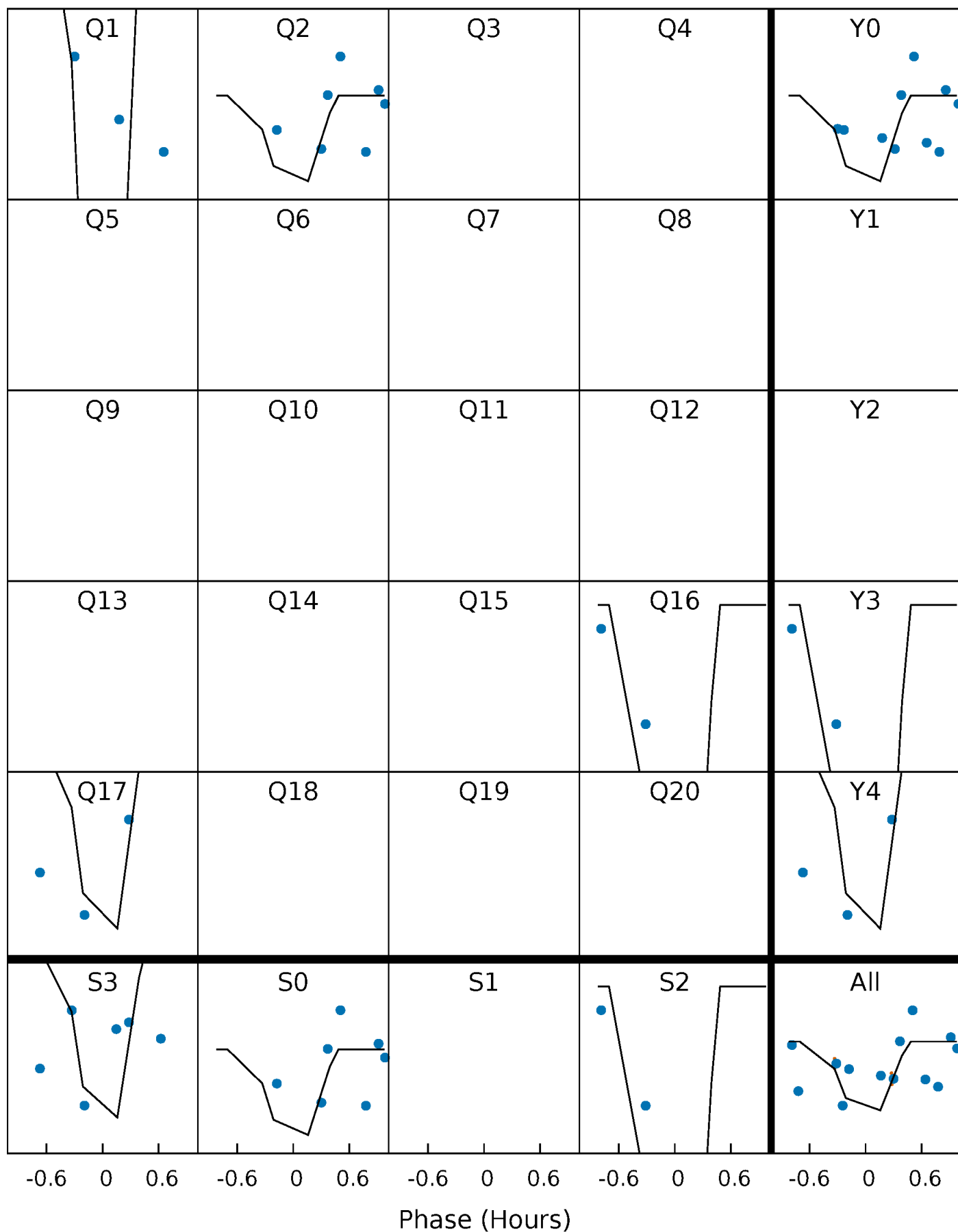
# PDC Quarter-Phased Transit Curves

TCE 005978682-06   P= 29.747329 Days    $T_0=148.690933$  (BKJD)



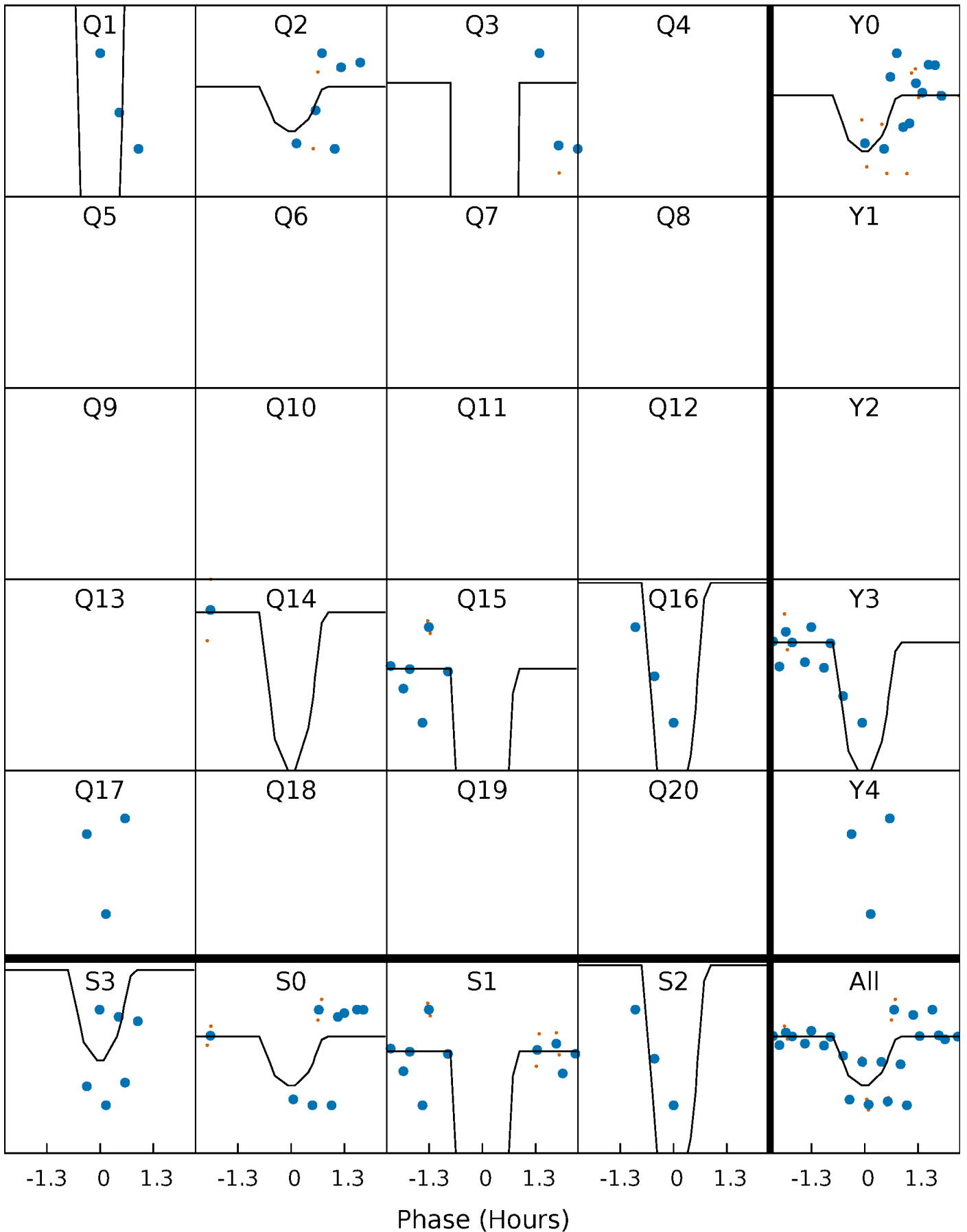
# DV Quarter-Phased Transit Curves

TCE 005978682-06 P= 29.747329 Days  $T_0=148.690933$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

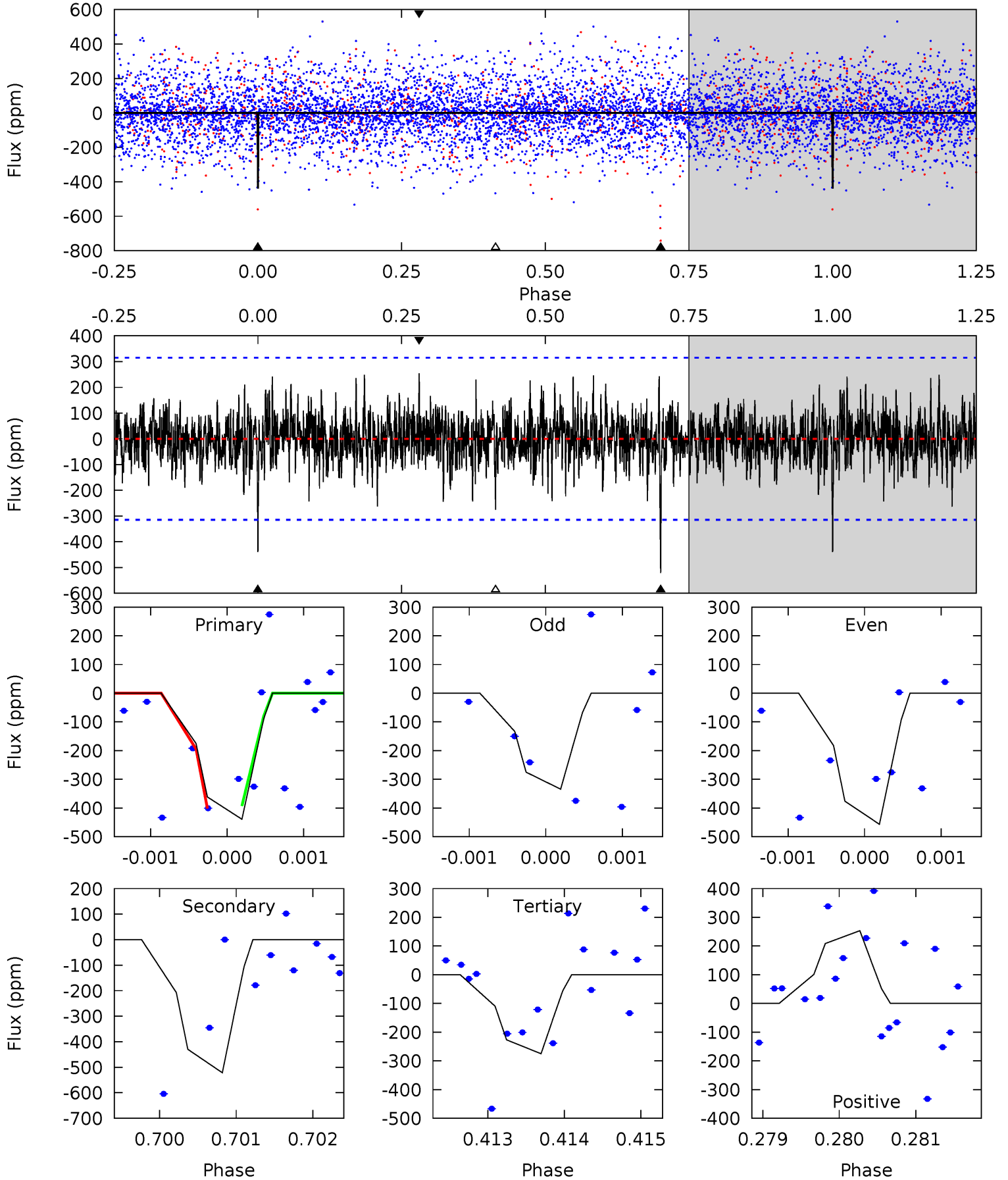
TCE 005978682-06 P= 29.747291 Days  $T_0=148.680147$  (BKJD)



# DV Model-Shift Uniqueness Test

005978682-06, P = 29.747329 Days, E = 118.943604 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
7.58	9.00	4.75	4.38	5.43	3.25	1.27	2.83	3.20	4.25	4.62	1.01	1.11	0.33	0.07

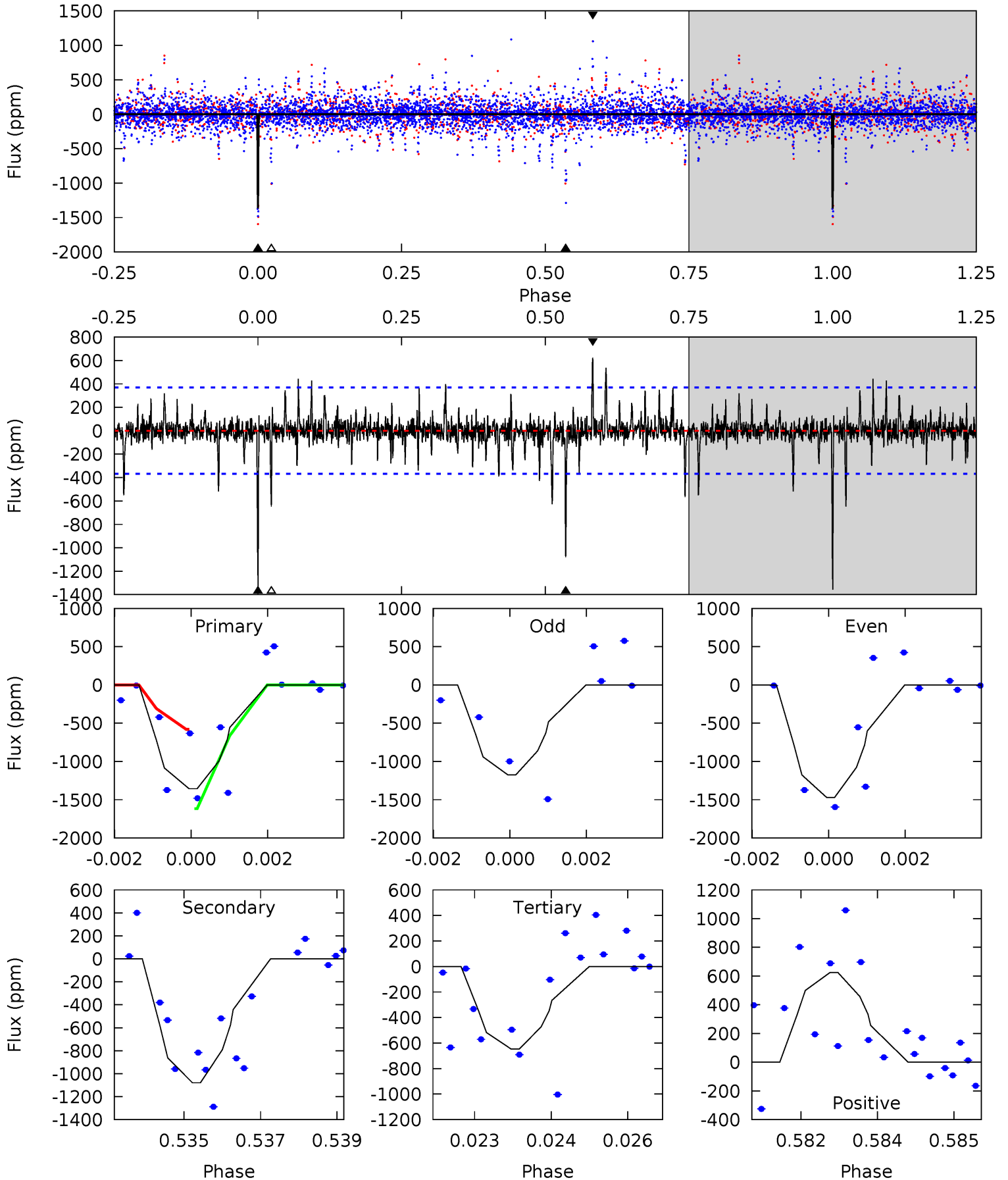




# Alt Model-Shift Uniqueness Test

005978682-06, P = 29.747291 Days, E = 118.932856 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
19.7	15.7	9.41	9.08	5.37	3.15	1.40	10.3	10.6	6.29	6.62	2.09	1.00	0.32	6.87



### Stellar Parameters For KIC 005978682

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6480^{+145}_{-210}$	$4.484^{+0.042}_{-0.224}$	$-0.500^{+0.300}_{-0.300}$	$0.970^{+0.308}_{-0.082}$	$1.045^{+0.133}_{-0.133}$	$1.614^{+0.345}_{-0.863}$
	+2%/-3%	+1%/-5%	+60%/-60%	+32%/-8%	+13%/-13%	+21%/-53%
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 005978682-06 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-522 \pm 58$	$6.73^{+6.47}_{-4.98}$	$927^{+68}_{-43}$	$4271^{+3680}_{-907}$	$226^{+3206}_{-171}$
Alt.	$-1080 \pm 69$	$6.28^{+6.84}_{-4.45}$	$921^{+72}_{-43}$	$5012^{+4864}_{-1189}$	$544^{+5738}_{-418}$

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

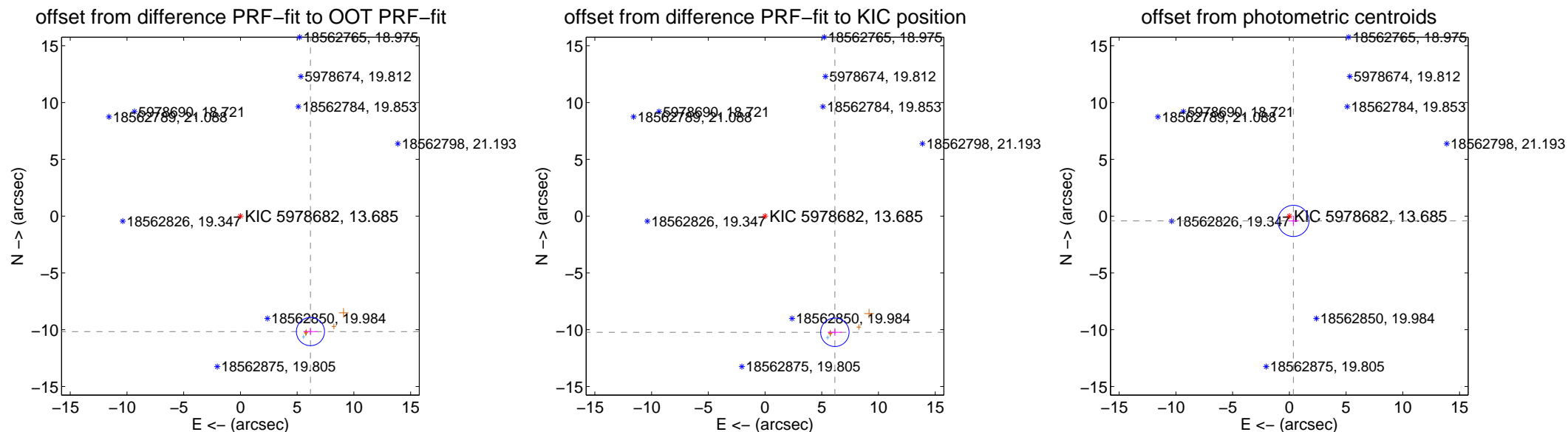
## DV Centroid Data

Supplemental centroid analysis for 005978682-06. Kepler magnitude: 13.69. Transit SNR 6.37

There are 1 quarters with good PRF difference image offsets

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

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$11.893 \pm 0.413$	28.79	$-6.172 \pm 0.610$	$-10.166 \pm 0.310$
PRF-fit source offset from KIC position	$11.936 \pm 0.418$	28.57	$-6.155 \pm 0.626$	$-10.227 \pm 0.310$
photometric centroid source offset	$0.55 \pm 0.46$	1.20	$-0.36 \pm 0.47$	$-0.42 \pm 0.45$



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.

Q1 no difference image



Q1 no OOT image



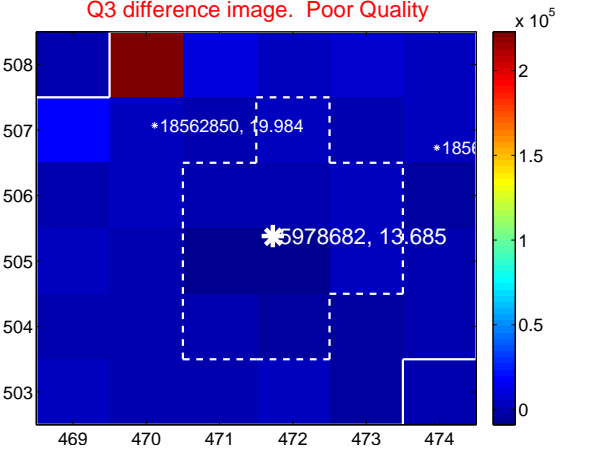
Q2 no difference image



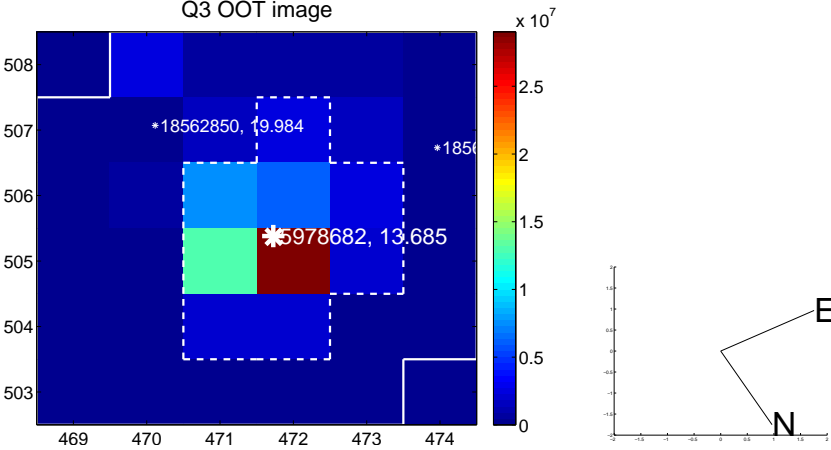
Q2 no OOT image



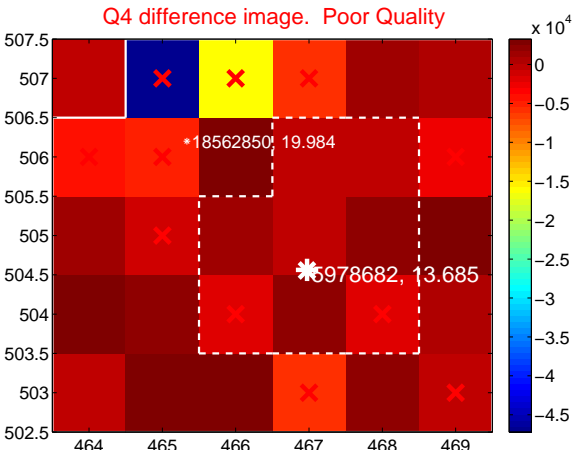
Q3 difference image. Poor Quality



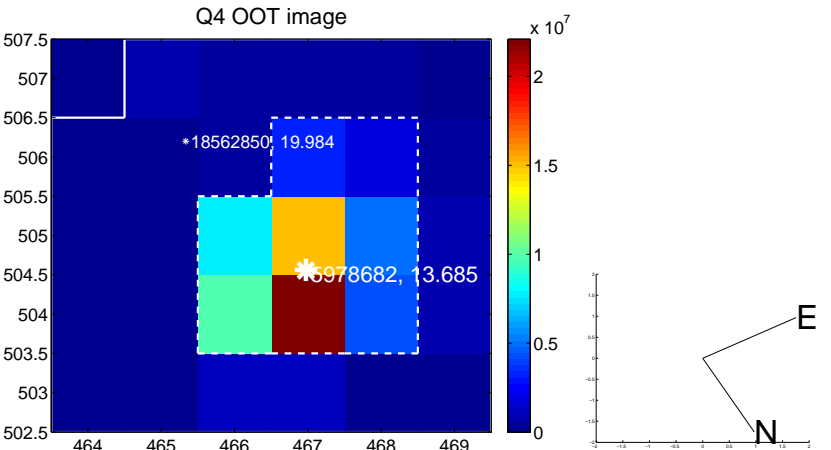
Q3 OOT image



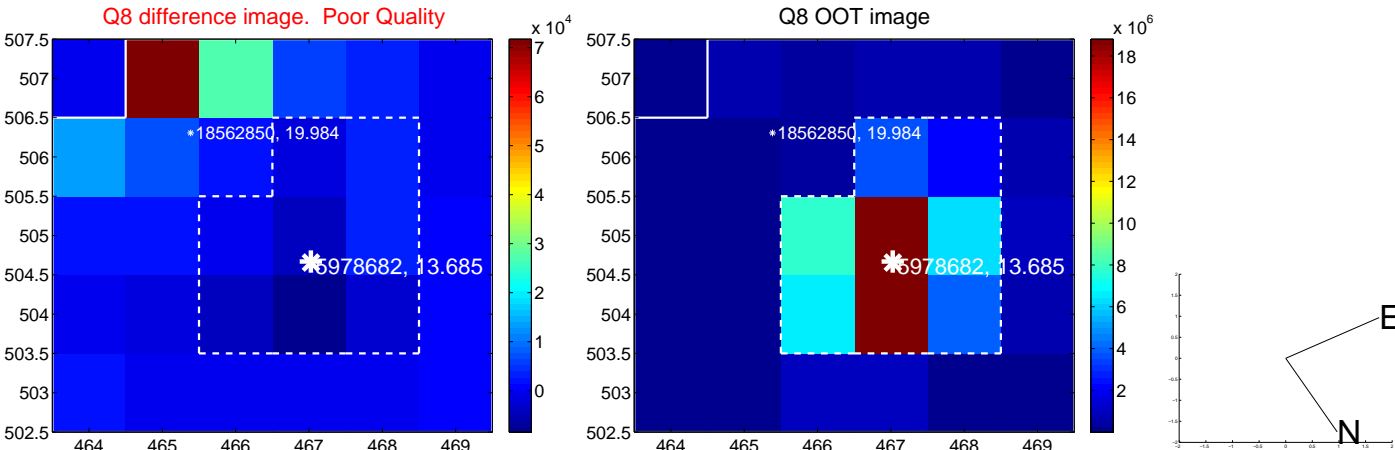
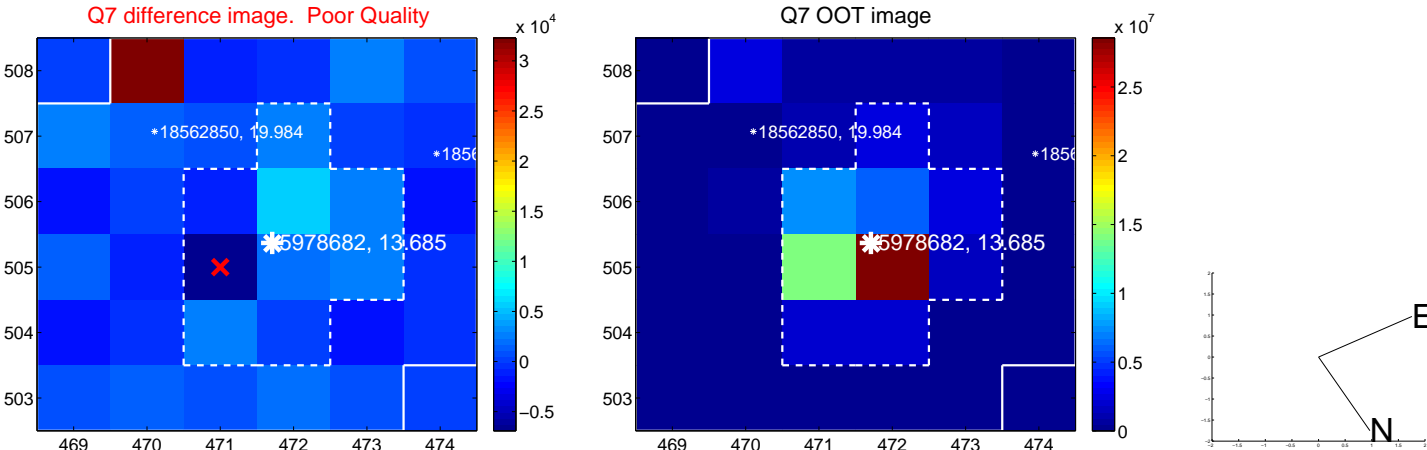
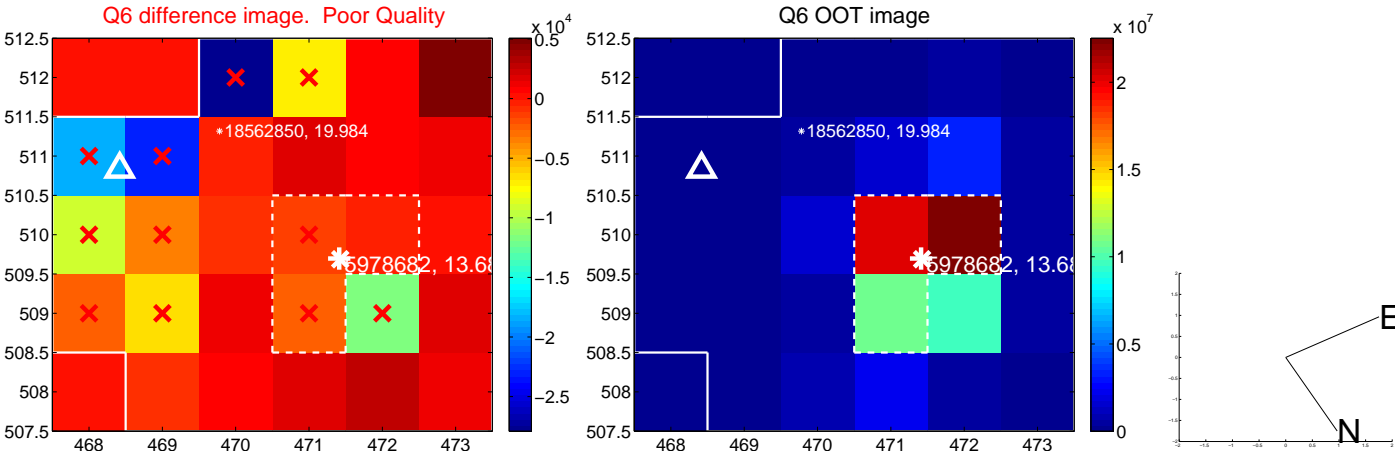
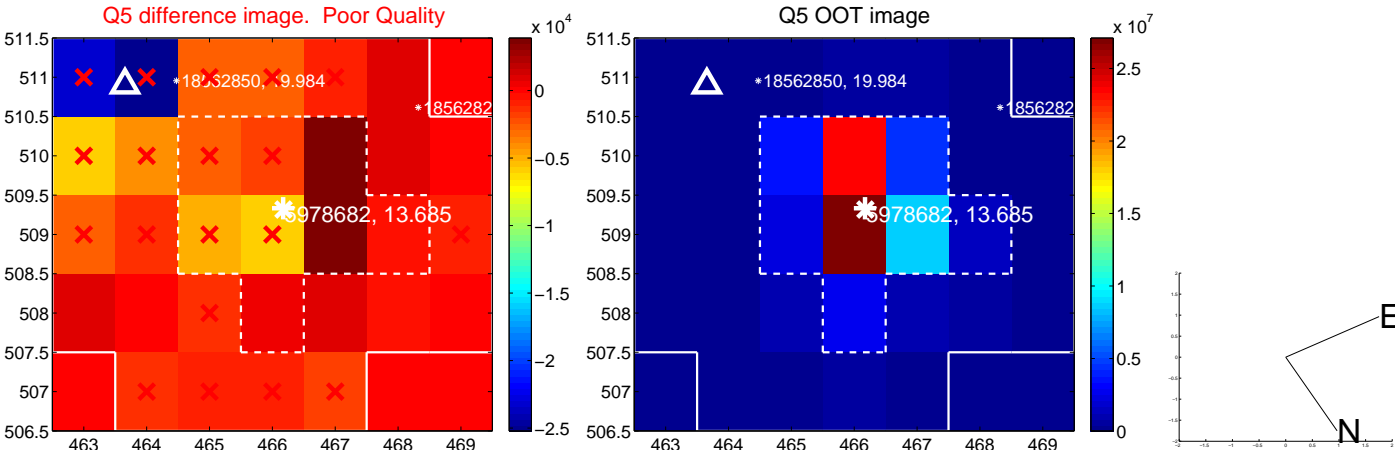
Q4 difference image. Poor Quality



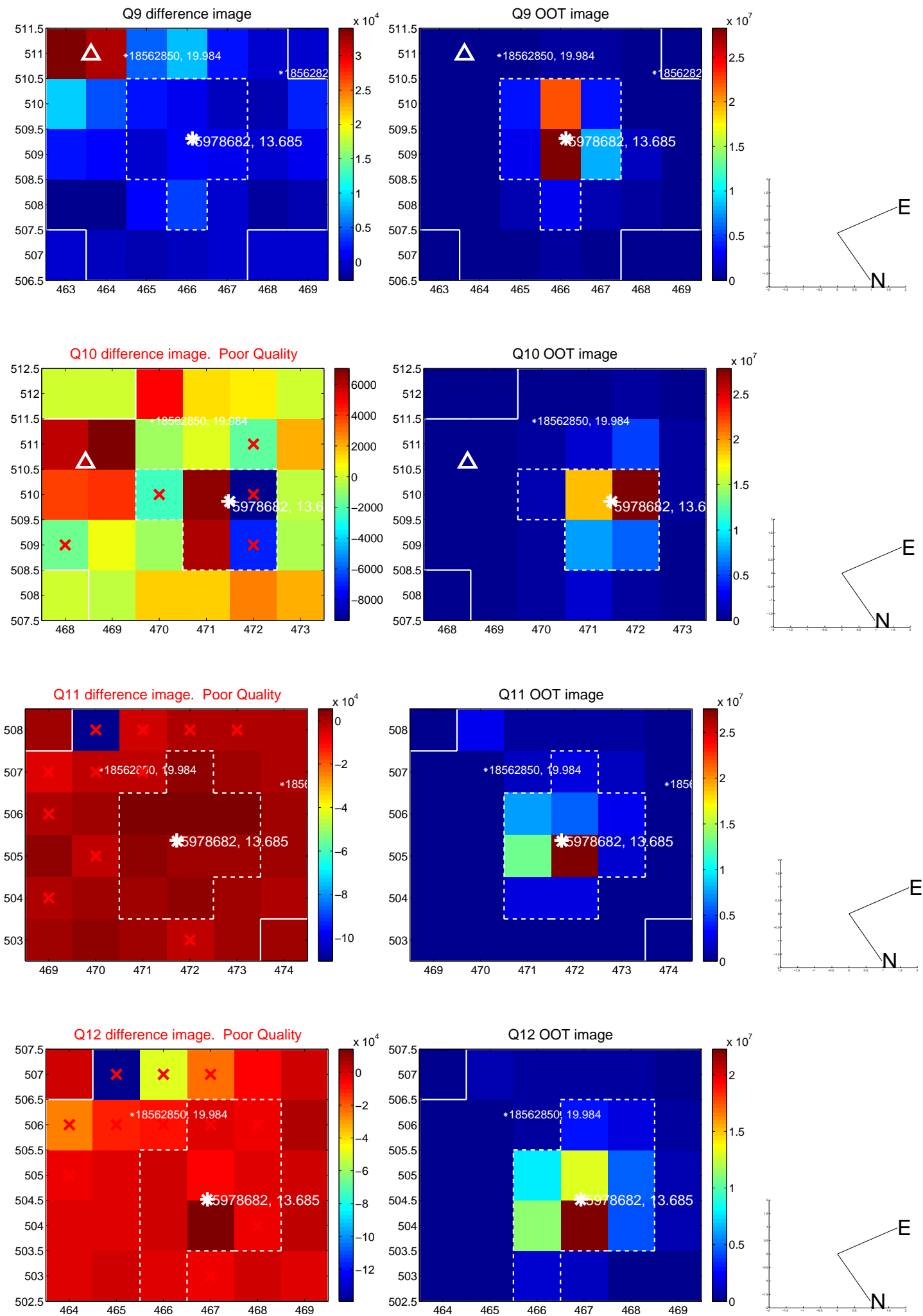
Q4 OOT image



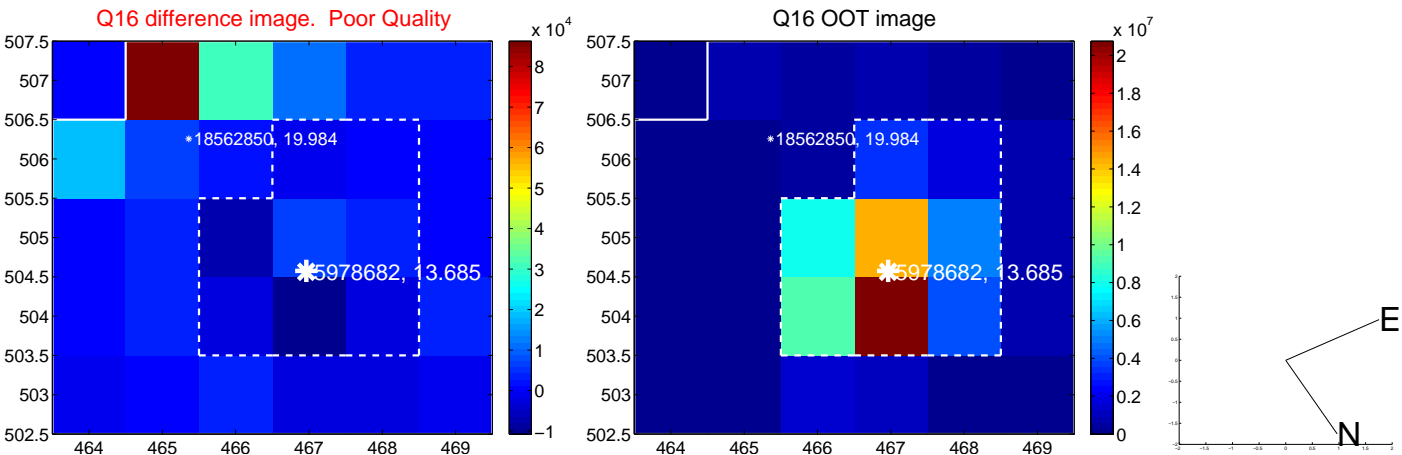
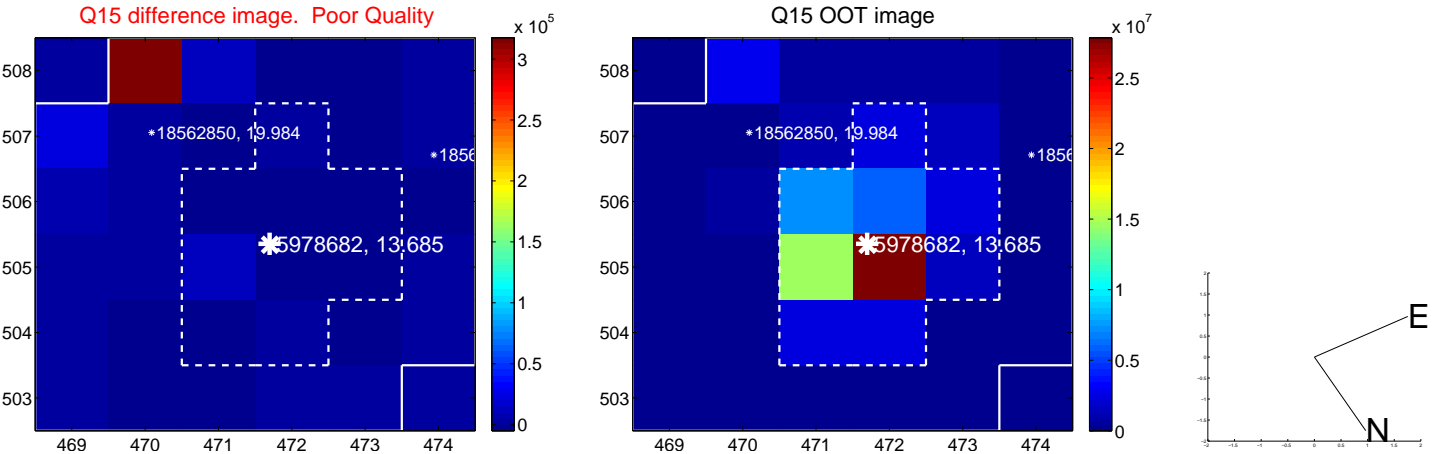
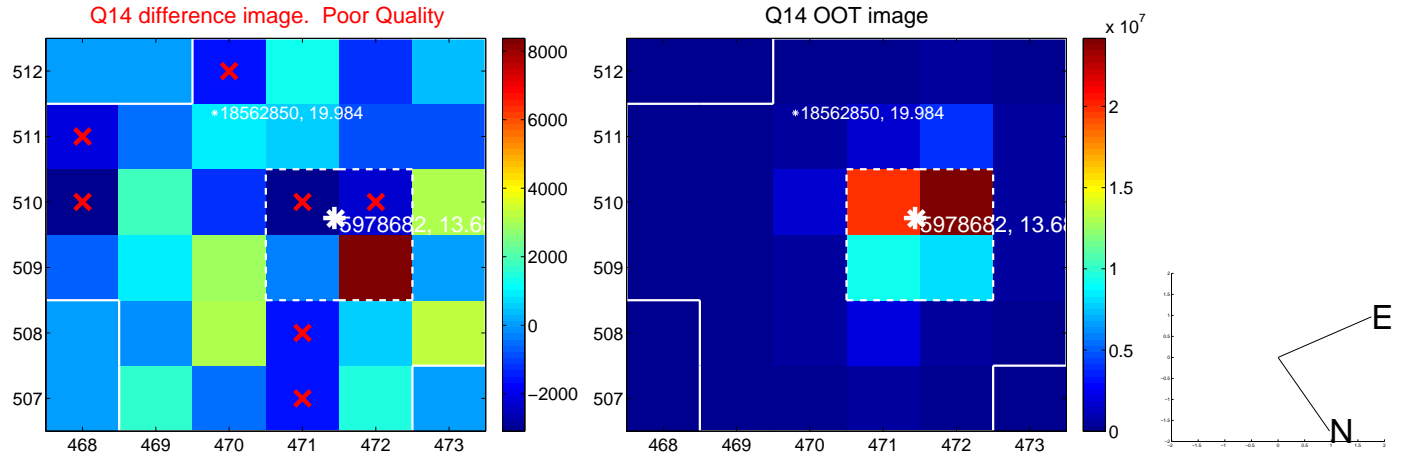
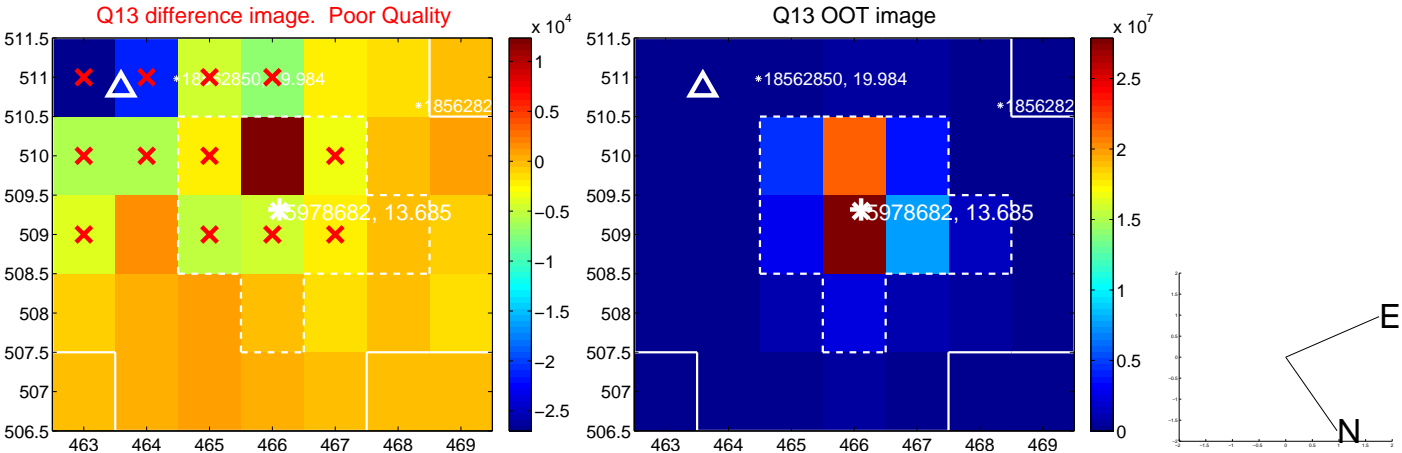
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



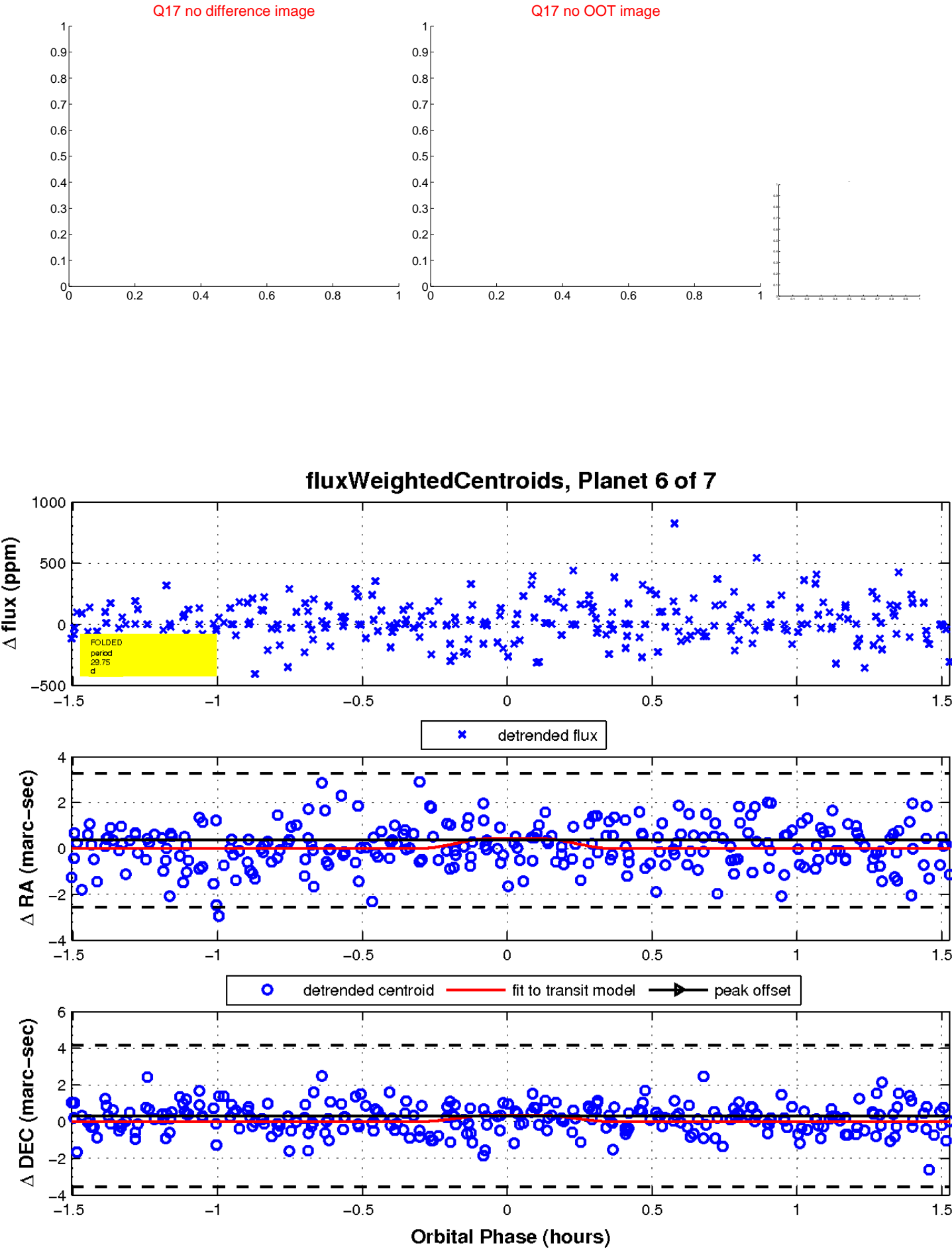
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



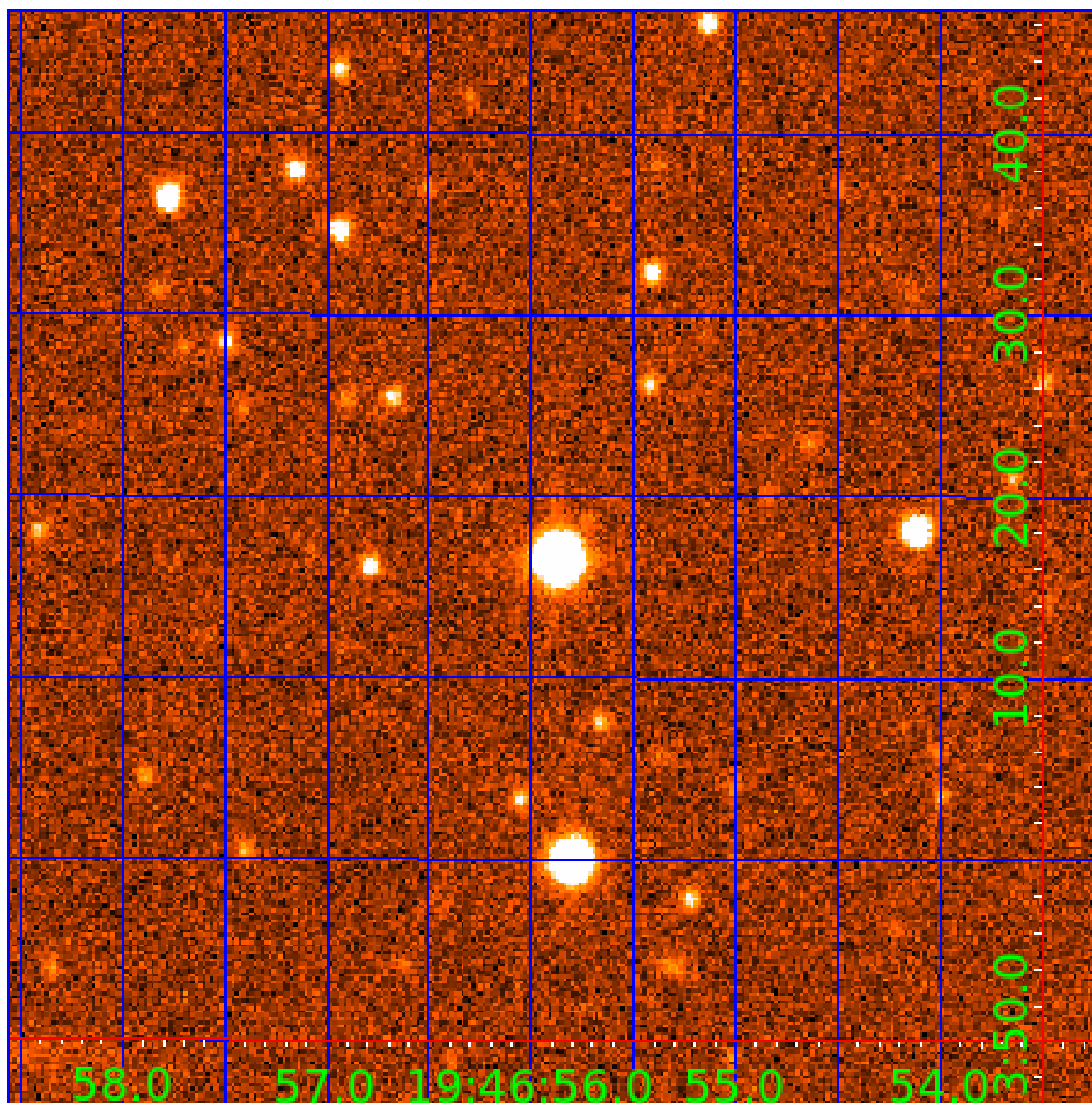
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.





UKIRT Image

Declination



# KIC 005978682

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005978682-01	OBS	No	0.692126	131.738122	12.5	4.894	7.8	6.6	0.97	6480	0.35	6148.86
005978682-02	OBS	No	24.556245	141.930135	188.7	4.447	17.8	5.5	0.97	6480	1.48	52.74
005978682-03	OBS	No	23.517485	142.468375	380.7	2.809	14.8	8.1	0.97	6480	1.91	55.87
005978682-04	OBS	No	49.124797	141.099078	409.0	2.988	10.3	7.4	0.97	6480	2.05	20.92
005978682-05	OBS	No	60.189547	145.263653	577.9	2.486	9.7	9.2	0.97	6480	2.68	15.96
005978682-06	OBS	No	29.747329	148.690933	849.2	0.510	8.9	6.4	0.97	6480	3.64	40.84
005978682-07	OBS	No	59.562405	152.822565	453.6	1.528	9.9	5.9	0.97	6480	2.45	16.18

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005978682-01	OBS	FP	0.00	1	0	1	0	LPP_DV—LPP_ALT—CENT_RESOLVED_OFFSET
005978682-02	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_TRACKER—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—CENT_RESOLVED_OFFSET
005978682-03	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_RESOLVED_OFFSET
005978682-04	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_ZUMA—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—CENT_RESOLVED_OFFSET
005978682-05	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—CENT_RESOLVED_OFFSET
005978682-06	OBS	FP	0.00	1	0	1	0	TRANS_GAPPED—LPP_DV—LPP_ALT—CENT_RESOLVED_OFFSET
005978682-07	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—CENT_RESOLVED_OFFSET

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

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

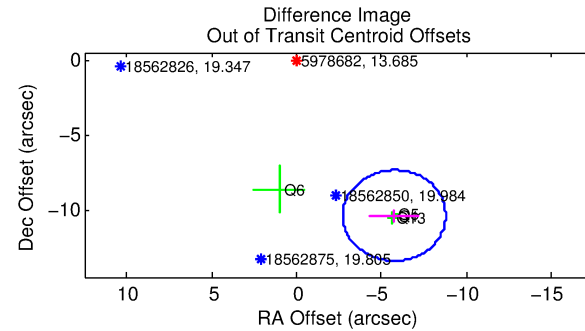
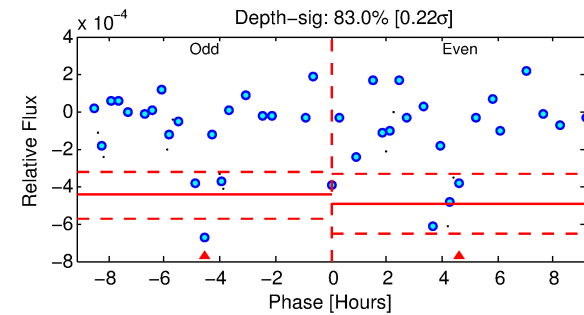
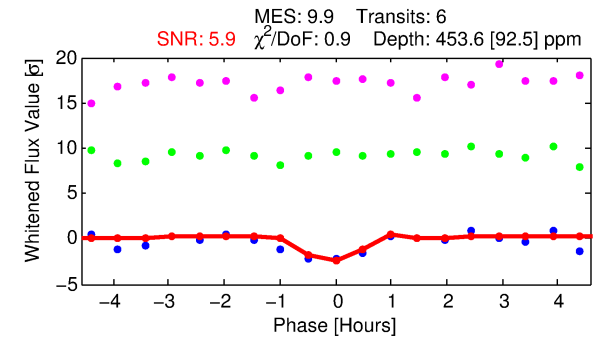
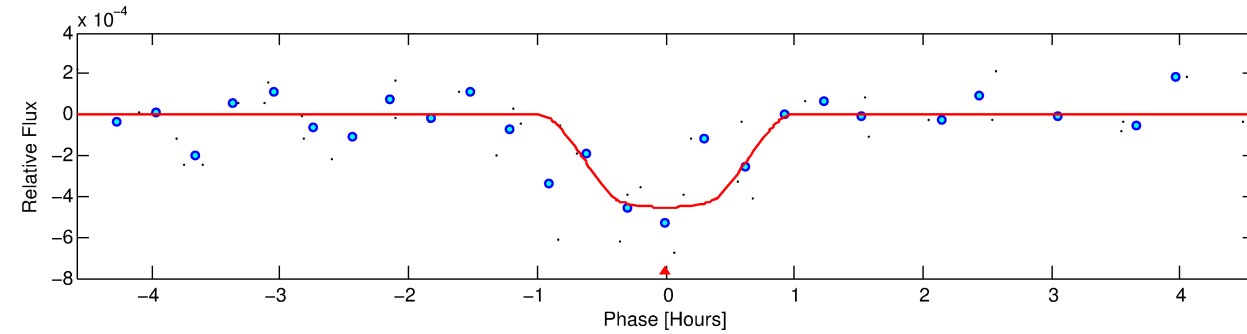
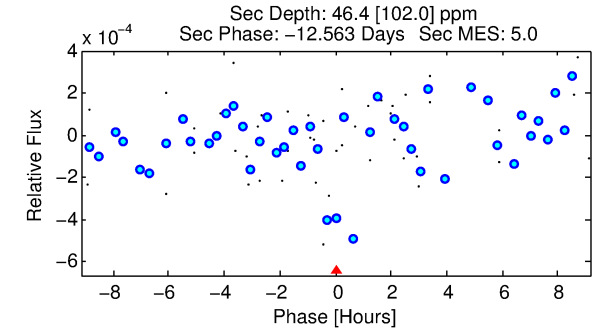
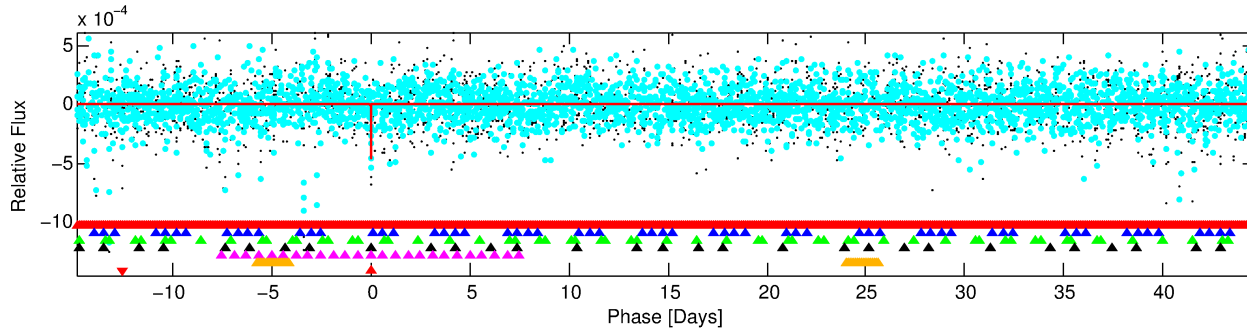
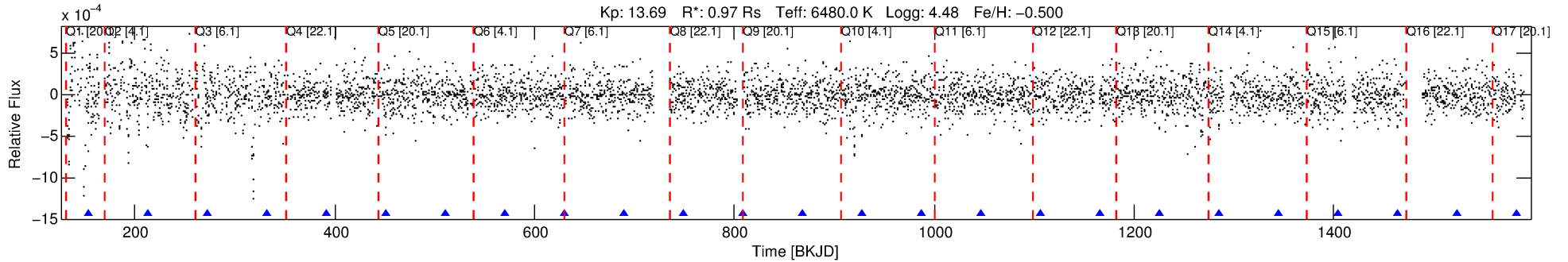
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 005978682-07

No Significant Match Found

# DV One-Page Summary

KIC: 5978682 Candidate: 7 of 7 Period: 59.562 d



## DV Fit Results:

Period = 59.56240 [0.00042] d  
Epoch = 152.8226 [0.0055] BKJD  
Rp/R\* = 0.0231 [0.0208]  
a/R\* = 136.59 [695.28]  
b = 0.91 [0.93]  
Seff = 16.18 [6.86]  
Teq = 511 [54] K  
Rp = 2.45 [2.33] Re  
a = 0.3031 [0.0826] AU  
Ag = 390.57 [1119.29] [0.35σ]  
Teff = 3515 [2496] K [1.20σ]

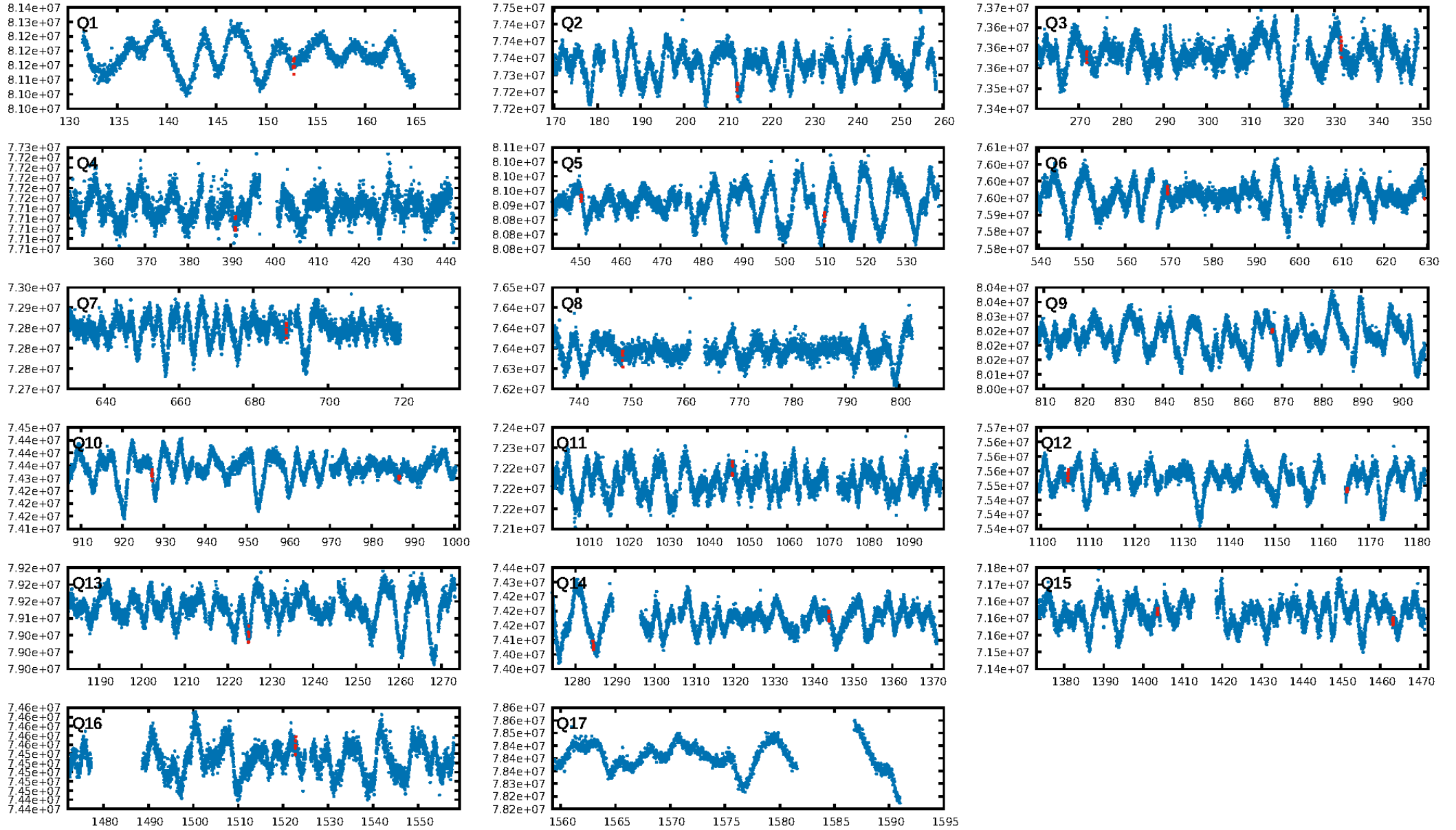
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [74.65σ]  
LongPeriod-sig: 100.0% [5.16σ]  
ModelChiSquare2-sig: 47.3%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 2.45e-15  
RollingBand-fgt: 1.00 [5/5]  
GhostDiagnostic-chr: -0.3953  
Centroid-sig: 9.8%  
Centroid-so: 1.025 arcsec [1.39σ]  
OotOffset-rm: 11.893 arcsec [11.76σ]  
KicOffset-rm: 11.945 arcsec [9.91σ]  
OotOffset-st: 1/0/0/3 [4]  
KicOffset-st: 1/0/0/3 [4]  
DiffImageQuality-fgm: 0.50 [2/4]  
DiffImageOverlap-fno: 0.12 [2/16]

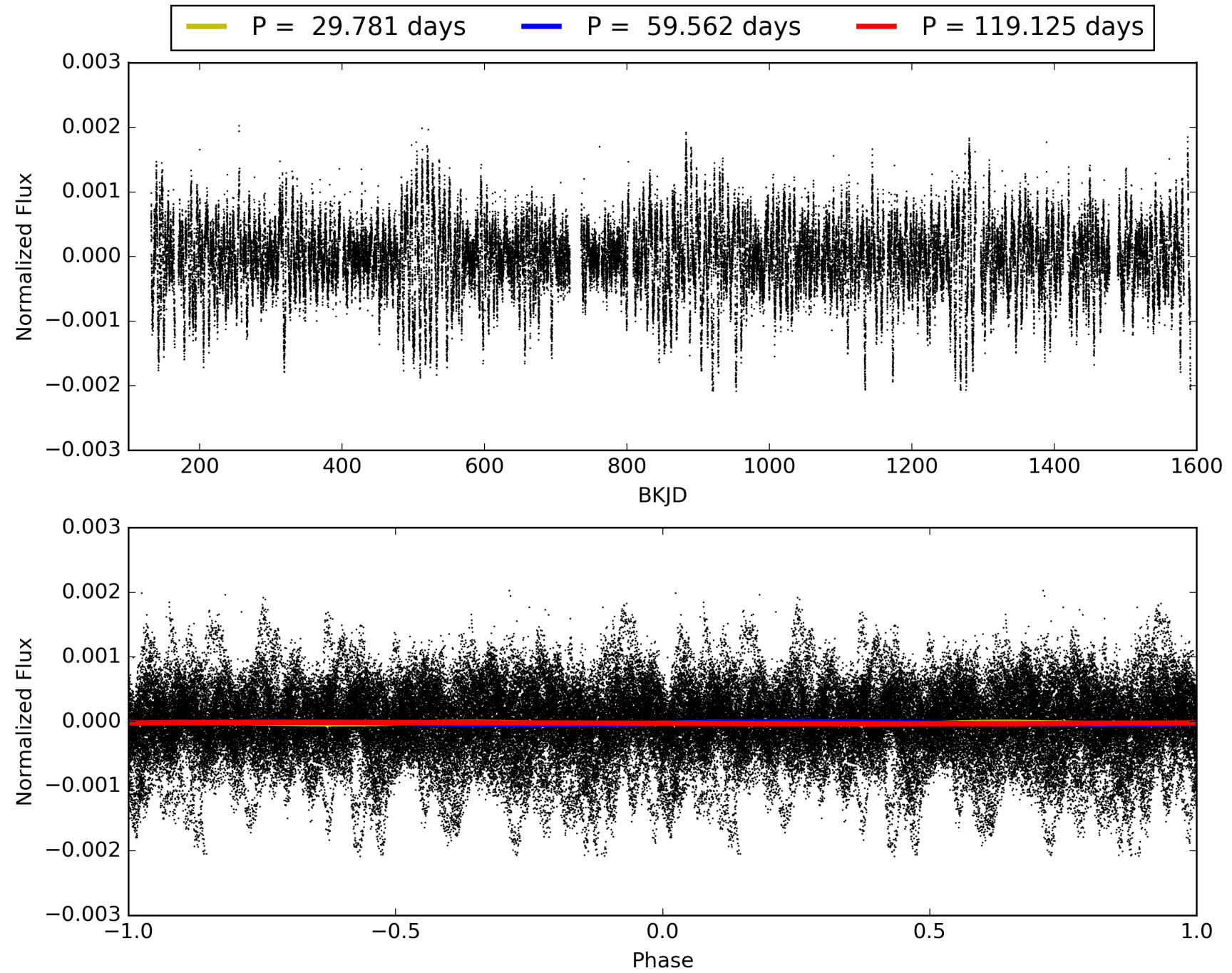
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 03-Feb-2016 06:56:15 Z

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

# TCE 005978682-07, PDC Light Curves

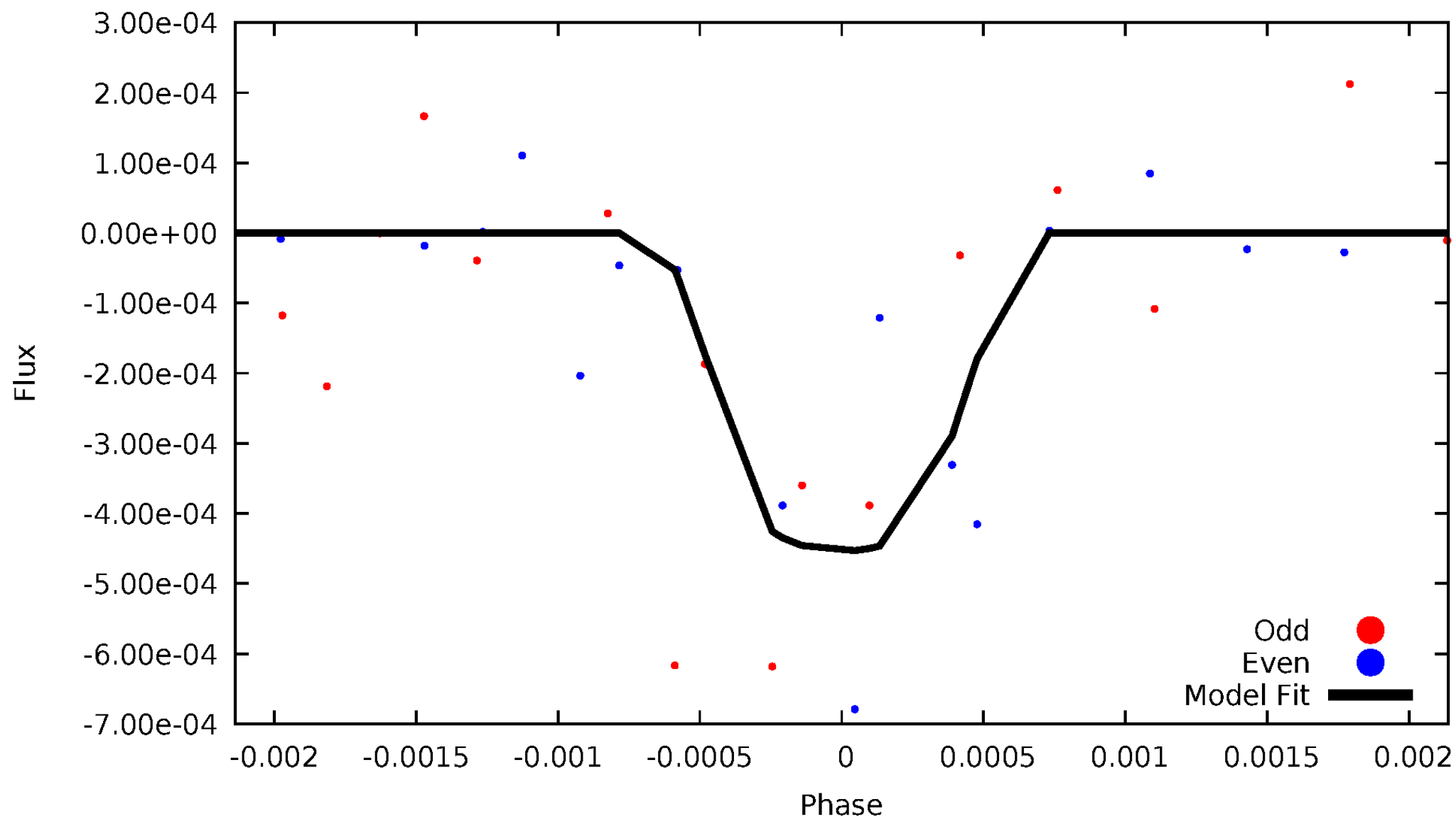


TCE 005978682-07



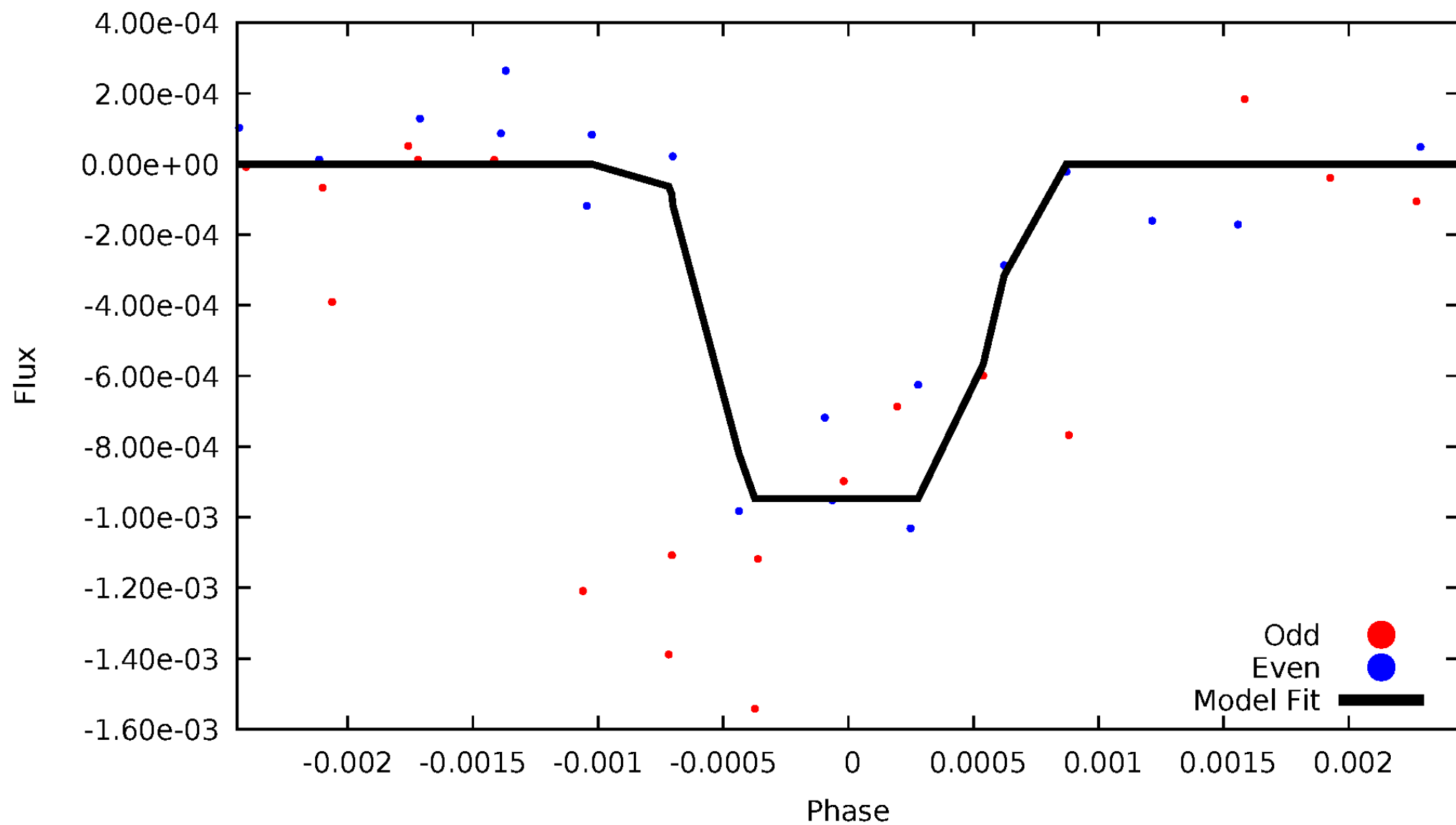
# DV Odd/Even

TCE 005978682-07



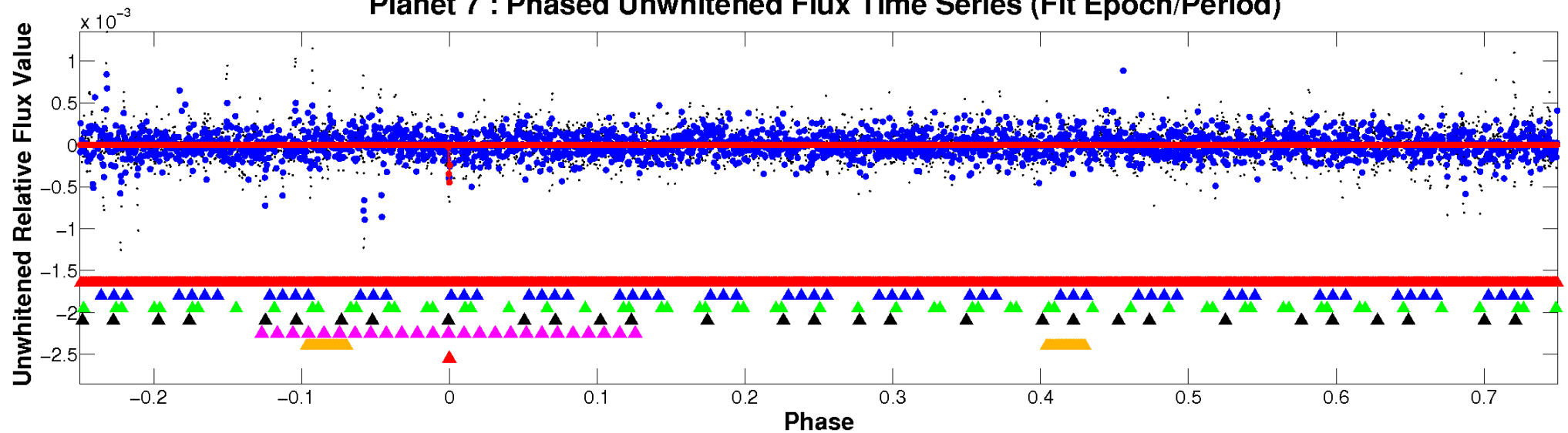
# ALT Odd/Even

TCE 005978682-07

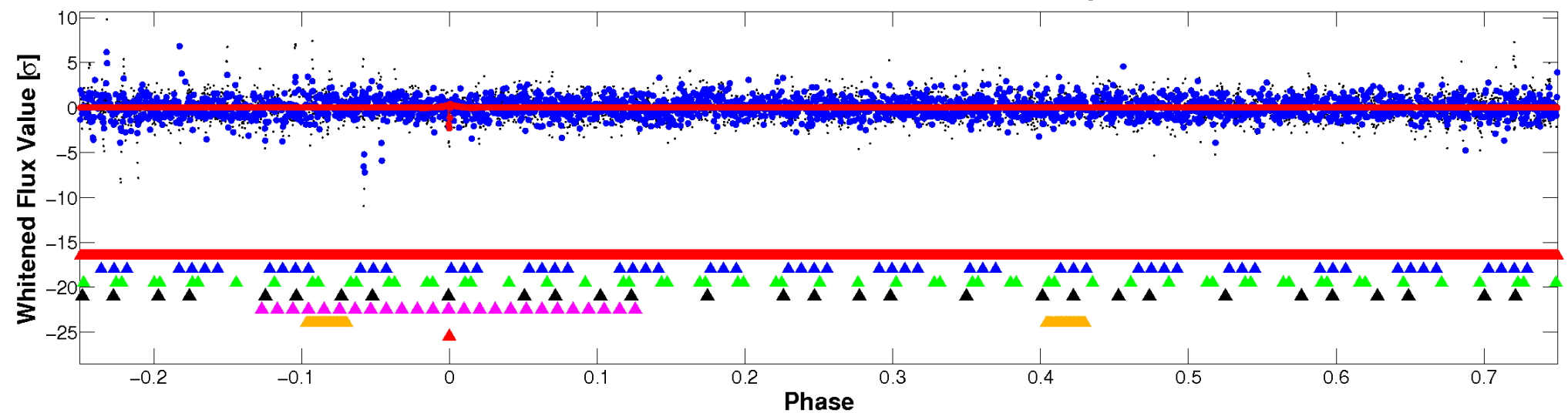


# Non-Whitened Vs. Whitened Light Curve

Planet 7 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)



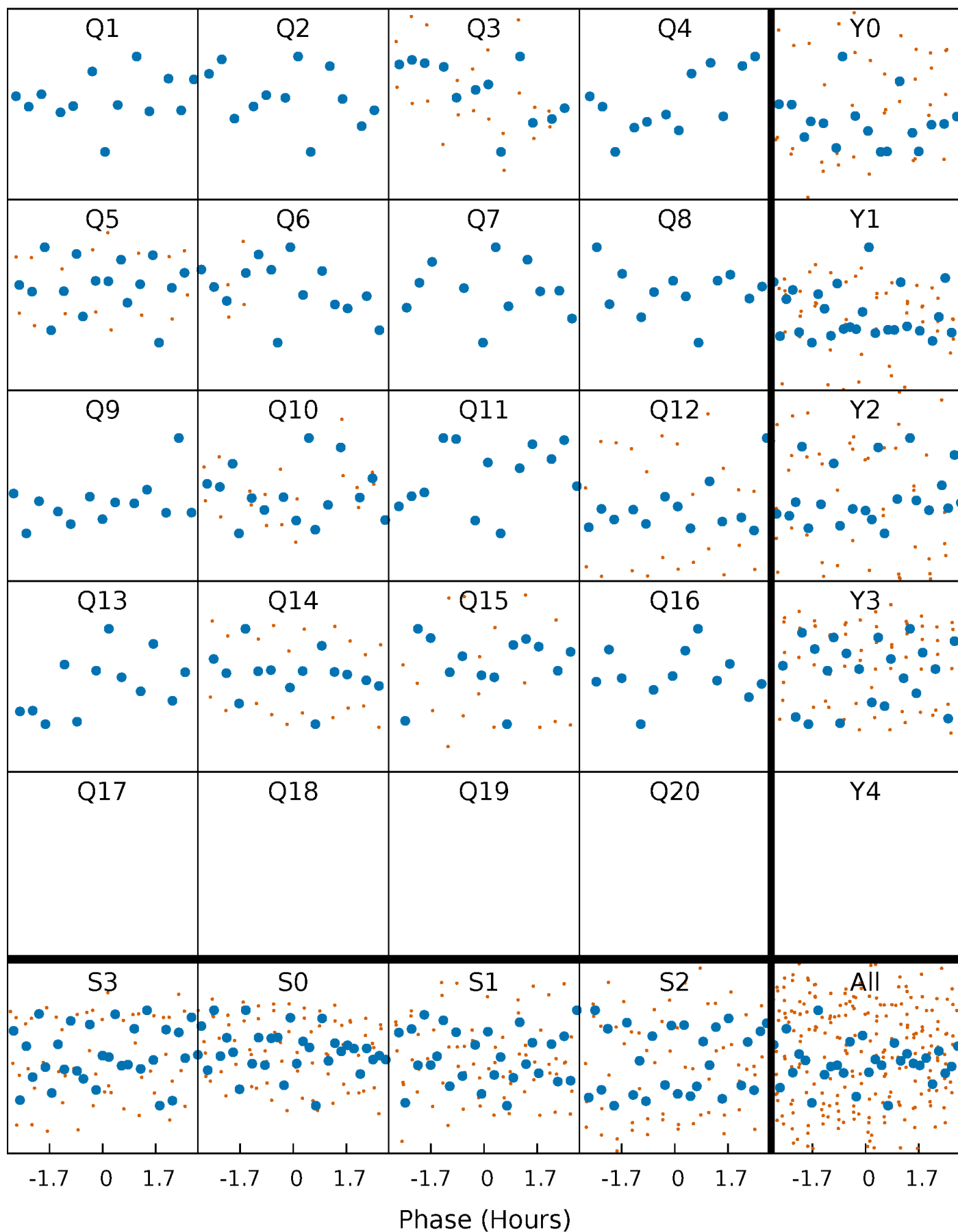
Planet 7 : Phased Whitened Flux Time Series (Fit Epoch/Period)





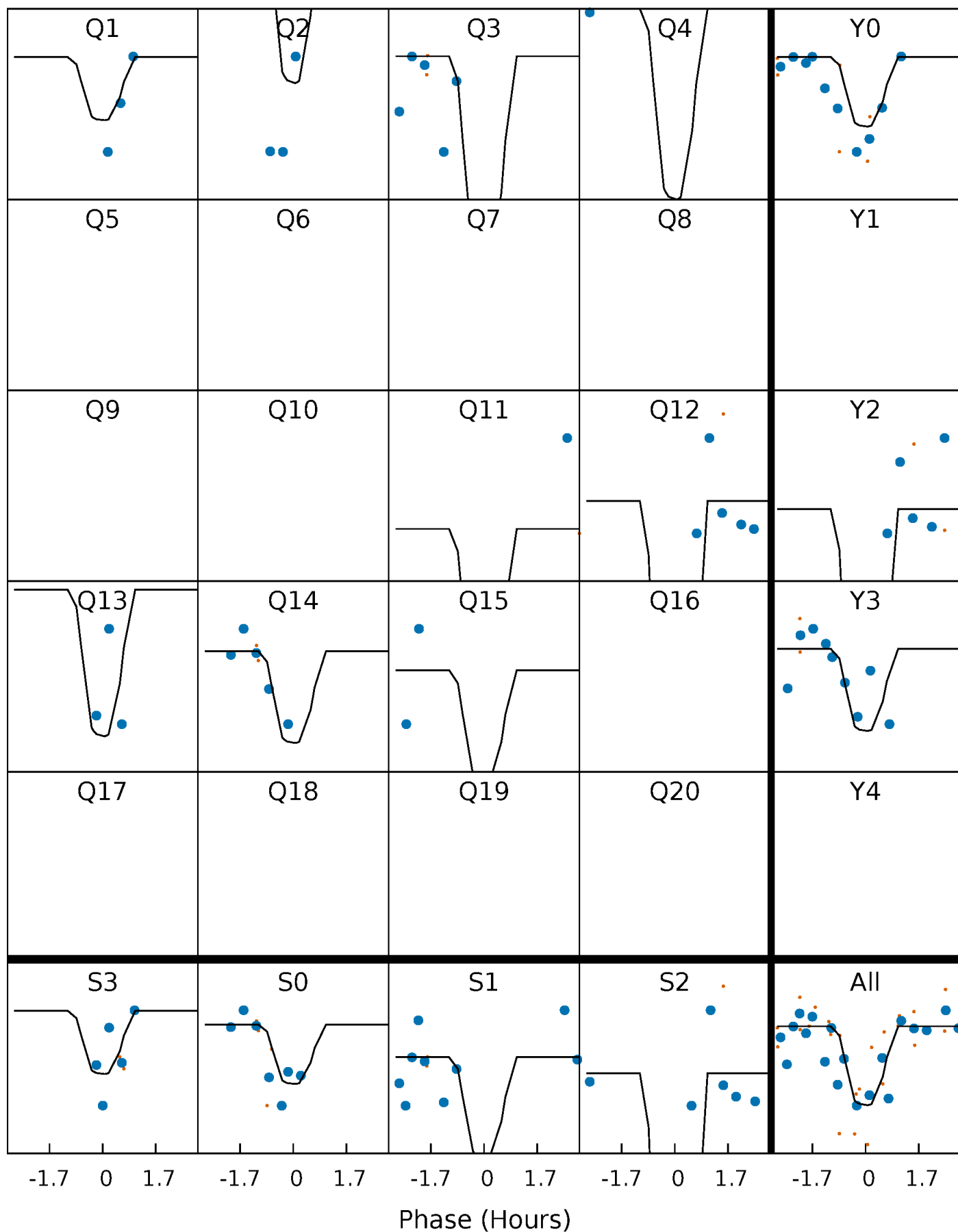
# PDC Quarter-Phased Transit Curves

TCE 005978682-07     $P = 59.562405$  Days     $T_0 = 152.822565$  (BKJD)



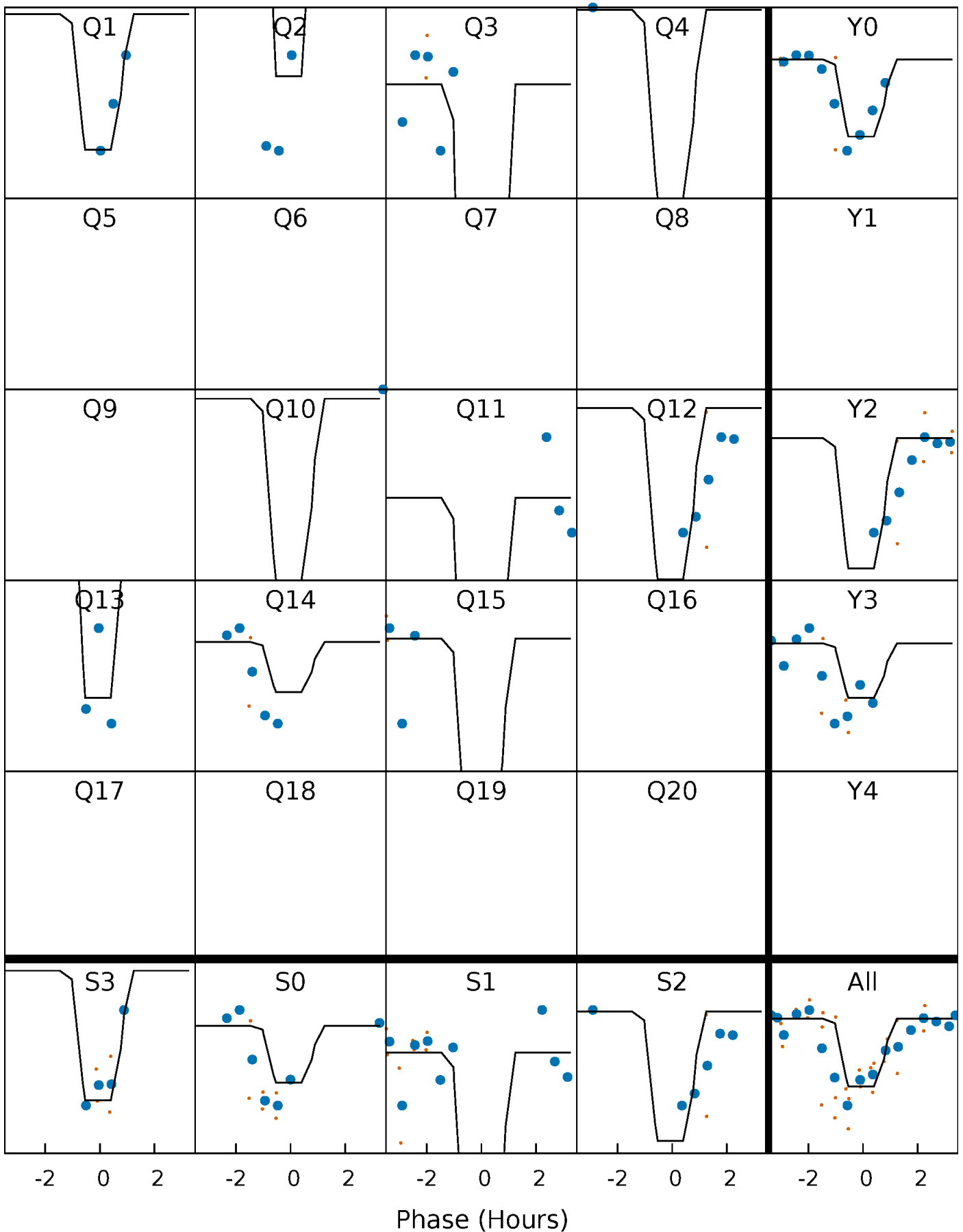
# DV Quarter-Phased Transit Curves

TCE 005978682-07     $P = 59.562405$  Days     $T_0 = 152.822565$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

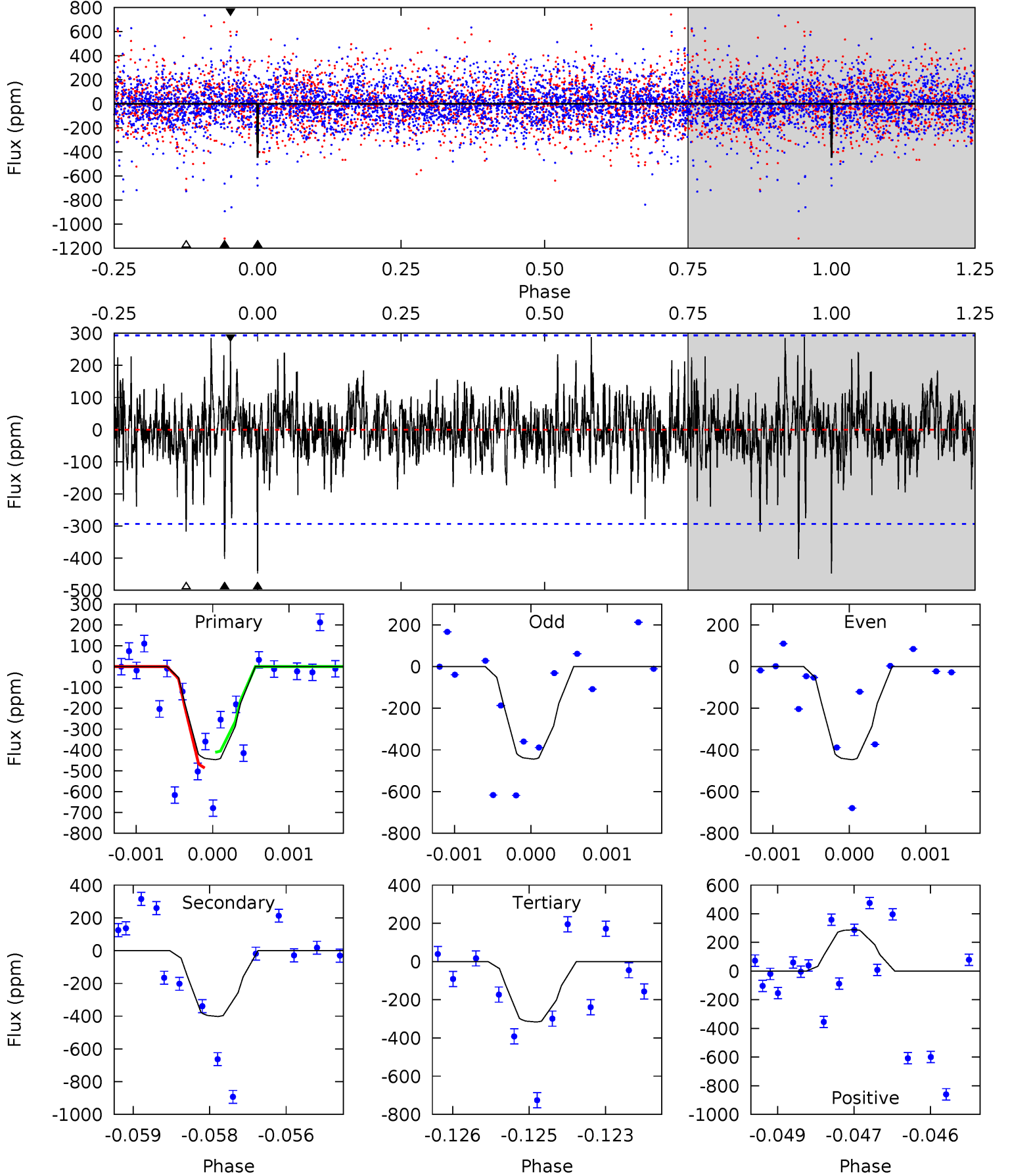
TCE 005978682-07 P= 59.562796 Days  $T_0=152.829111$  (BKJD)



# DV Model-Shift Uniqueness Test

005978682-07, P = 59.562405 Days, E = 93.260160 Days

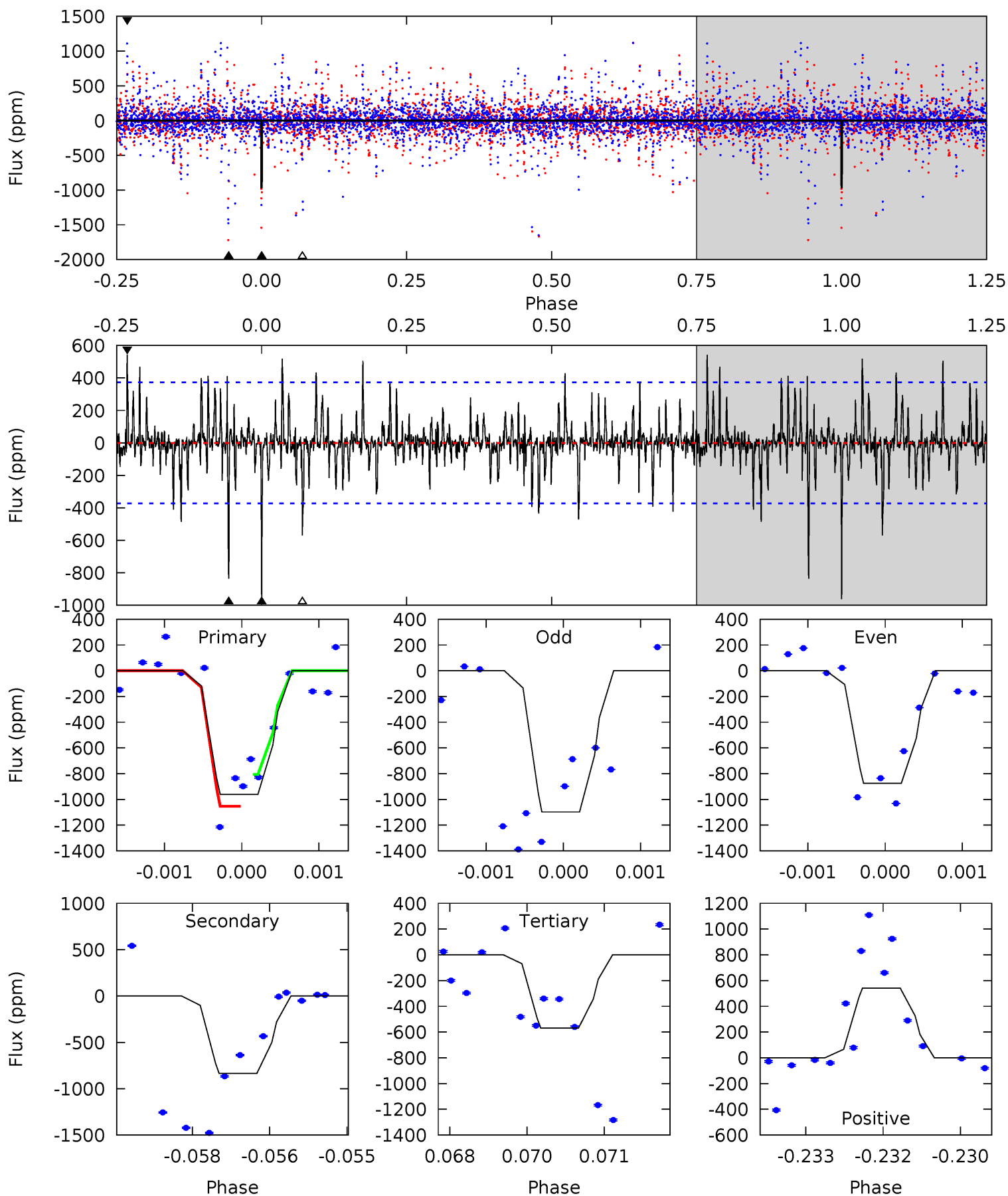
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.23	7.40	5.83	5.32	5.40	3.21	1.32	2.41	2.92	1.58	2.09	0.02	1.01	0.39	0.68



# Alt Model-Shift Uniqueness Test

005978682-07, P = 59.562796 Days, E = 93.266315 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
13.9	12.1	8.25	7.85	5.40	3.21	1.58	5.67	6.07	3.86	4.26	1.43	1.10	0.36	1.77



### Stellar Parameters For KIC 005978682

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$\rho_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6480^{+145}_{-210}$	$4.484^{+0.042}_{-0.224}$	$-0.500^{+0.300}_{-0.300}$	$0.970^{+0.308}_{-0.082}$	$1.045^{+0.133}_{-0.133}$	$1.614^{+0.345}_{-0.863}$
	+2%/-3%	+1%/-5%	+60%/-60%	+32%/-8%	+13%/-13%	+21%/-53%
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 005978682-07 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-402 \pm 54$	$2.96^{+2.13}_{-1.80}$	$727^{+56}_{-31}$	$5600^{+3871}_{-1140}$	$2263^{+12141}_{-1513}$
Alt.	$-836 \pm 69$	$3.68^{+2.23}_{-2.15}$	$731^{+51}_{-33}$	$6055^{+4250}_{-1135}$	$3096^{+14782}_{-1885}$

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

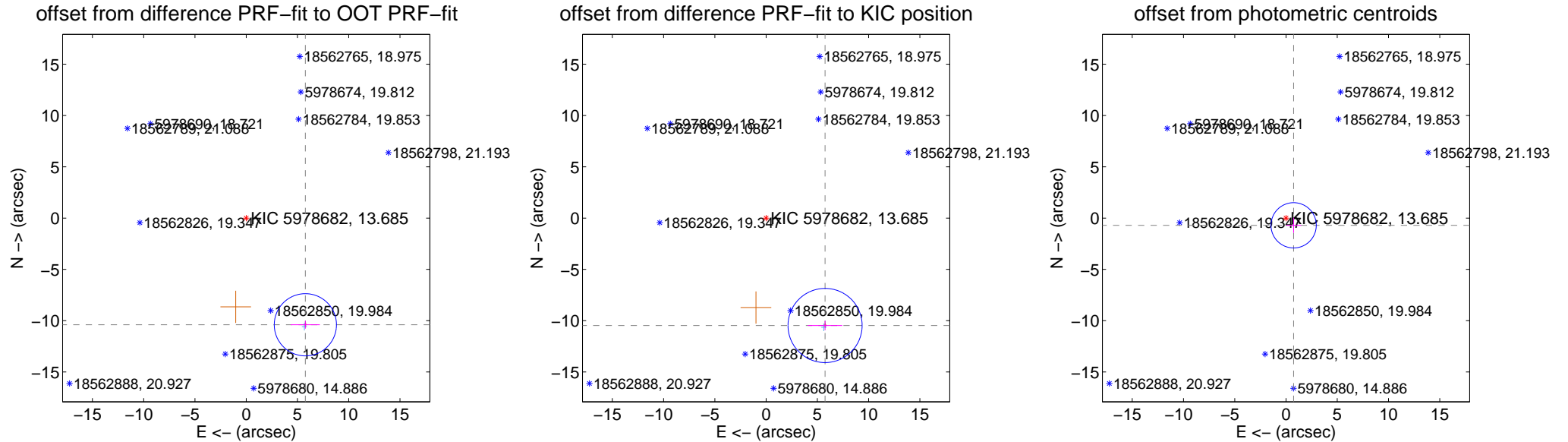
## DV Centroid Data

Supplemental centroid analysis for 005978682-07. Kepler magnitude: 13.69. Transit SNR 5.89

There are 2 quarters with good PRF difference image offsets

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

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$11.893 \pm 1.011$	11.76	$-5.770 \pm 1.416$	$-10.399 \pm 0.376$
PRF-fit source offset from KIC position	$11.945 \pm 1.205$	9.91	$-5.752 \pm 1.679$	$-10.469 \pm 0.457$
photometric centroid source offset	$1.02 \pm 0.74$	1.39	$-0.75 \pm 0.73$	$-0.70 \pm 0.74$

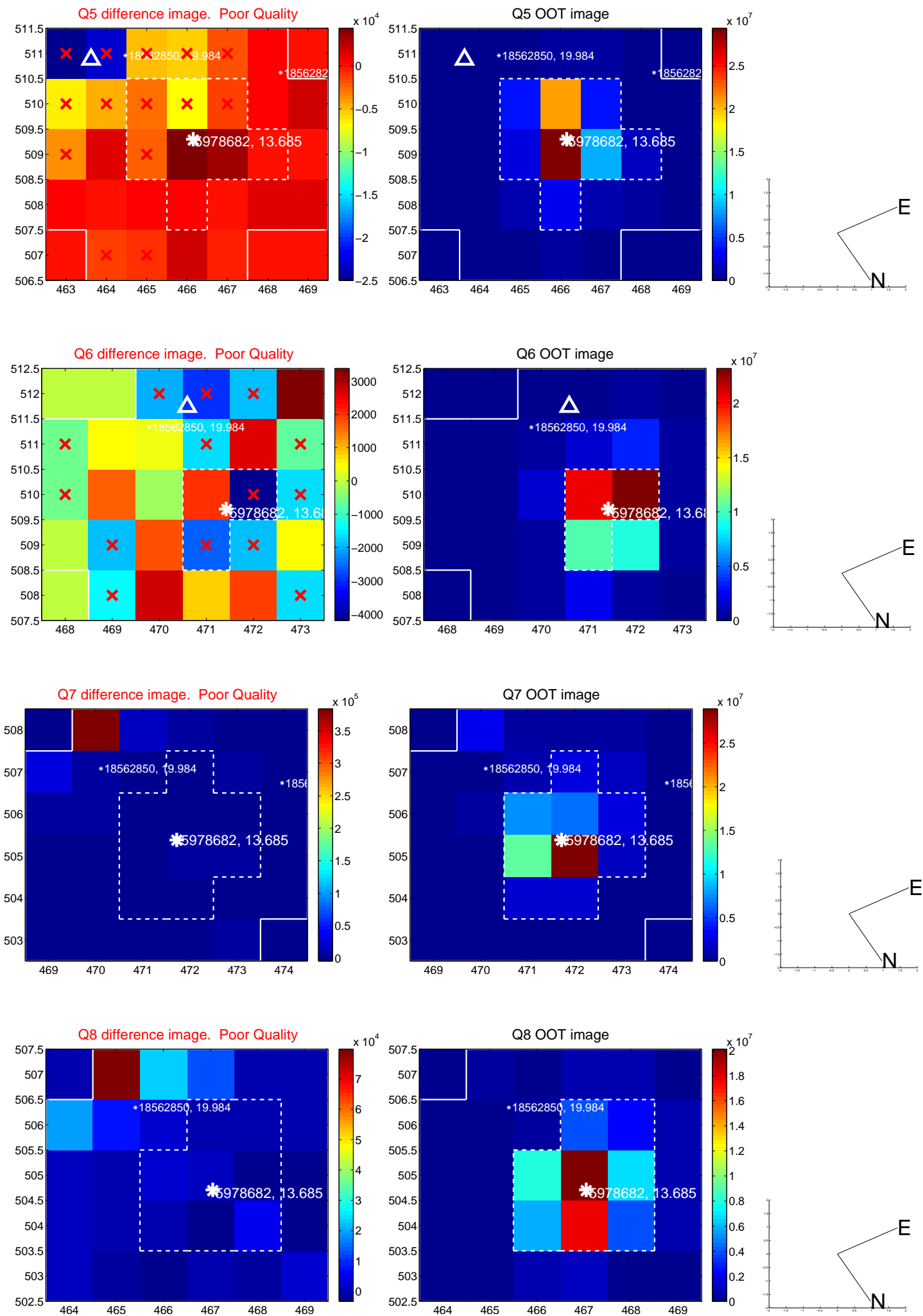


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

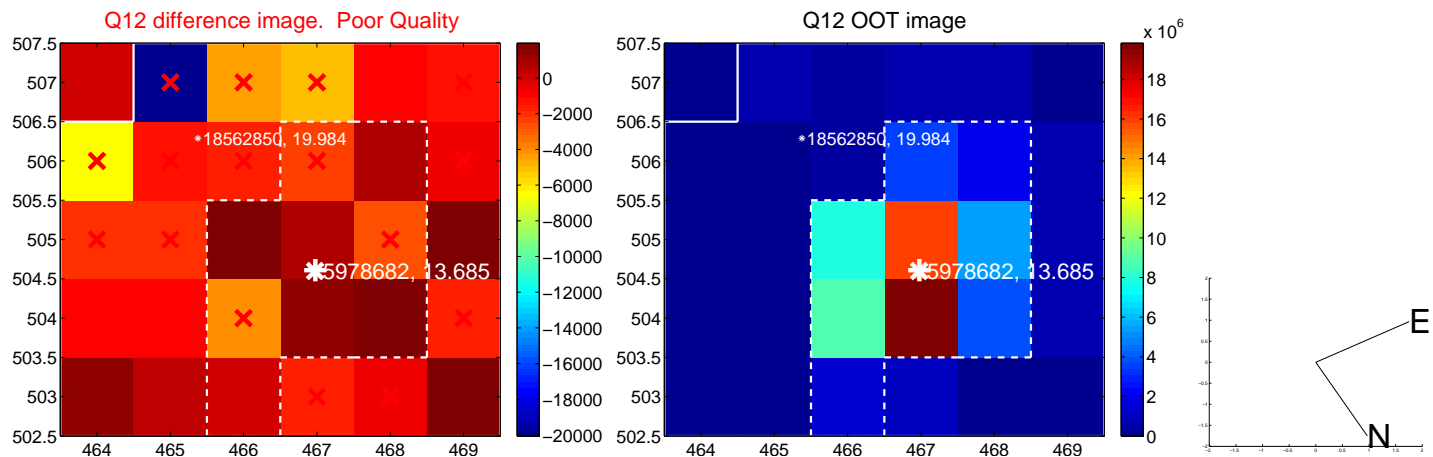
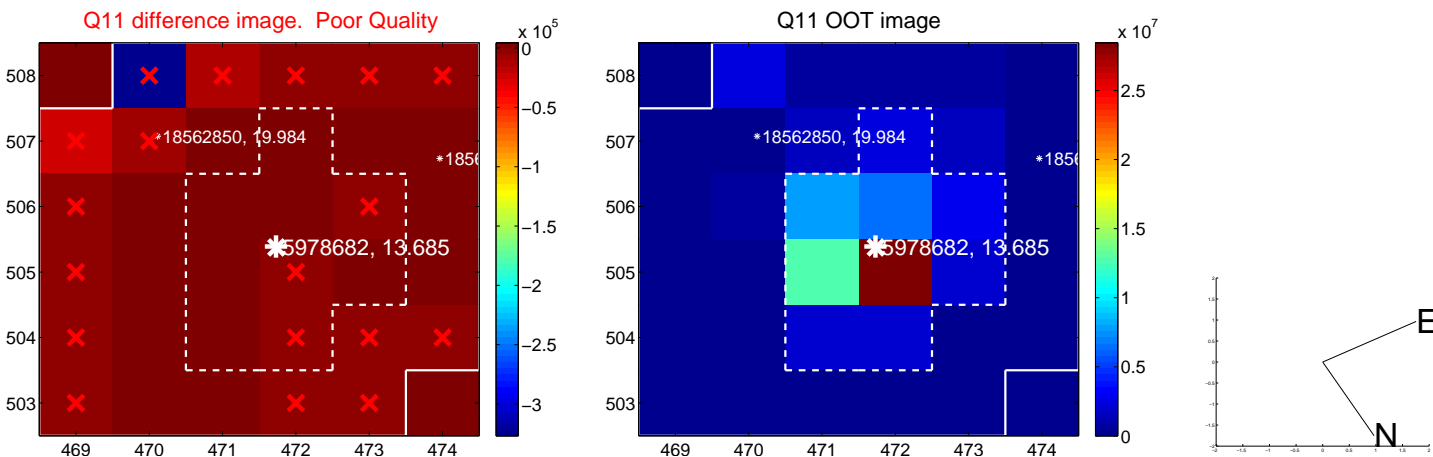
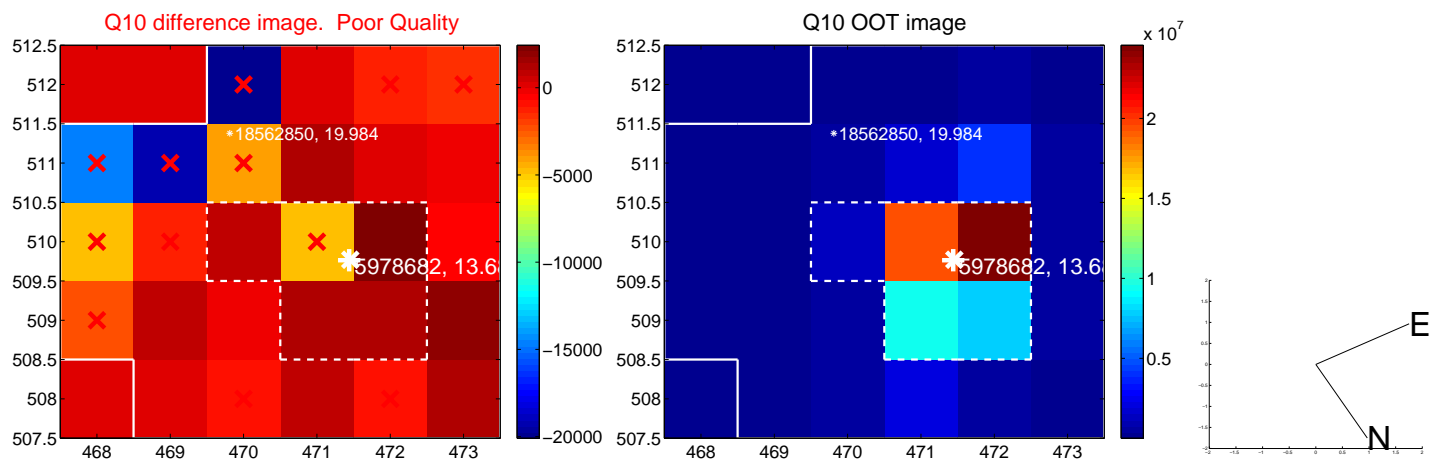
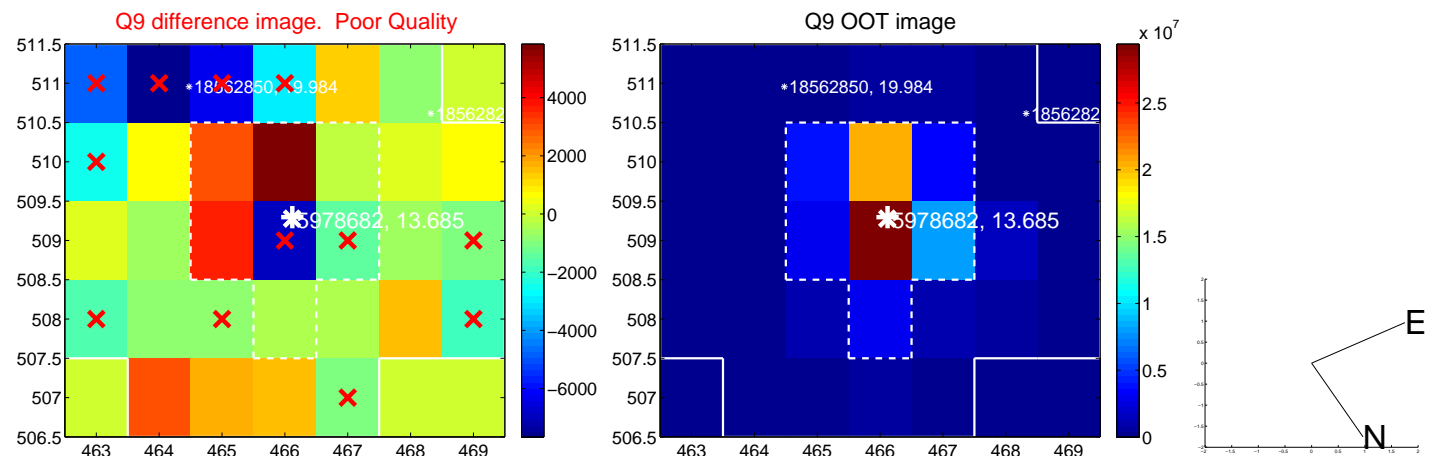




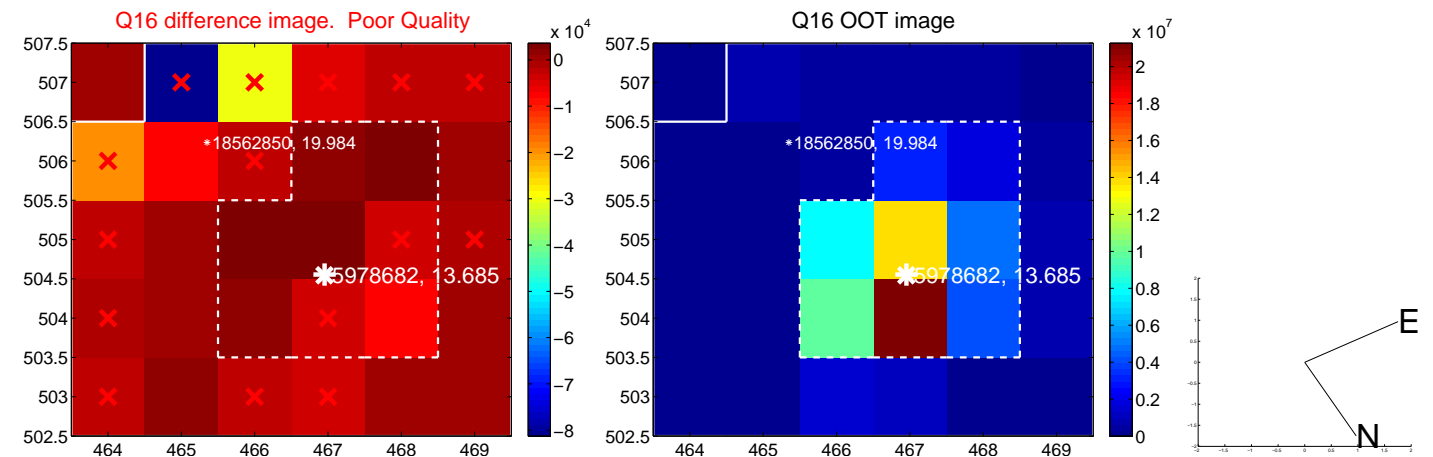
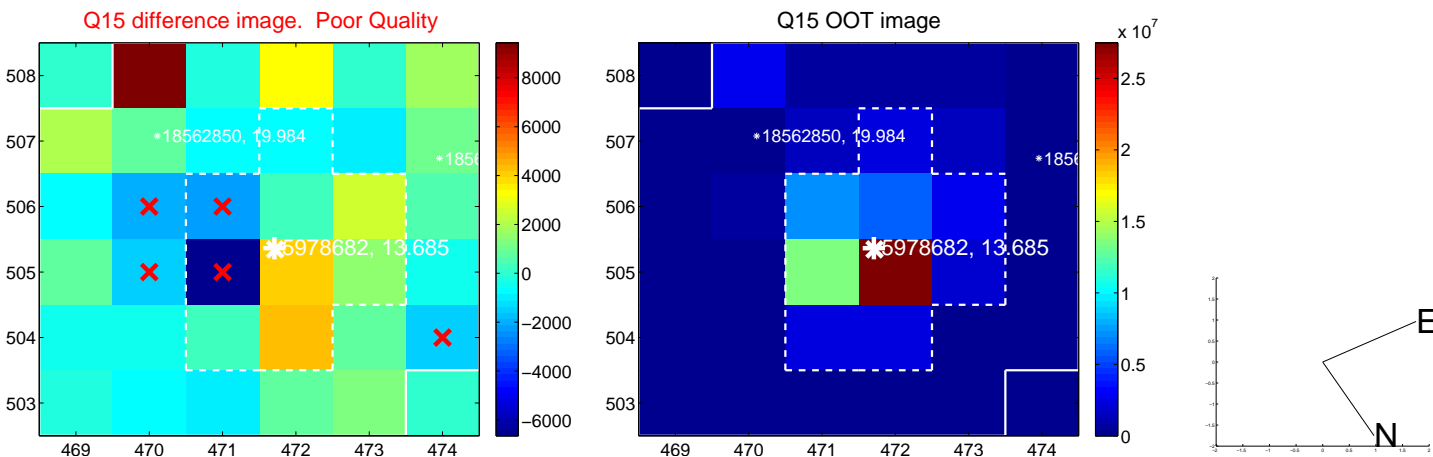
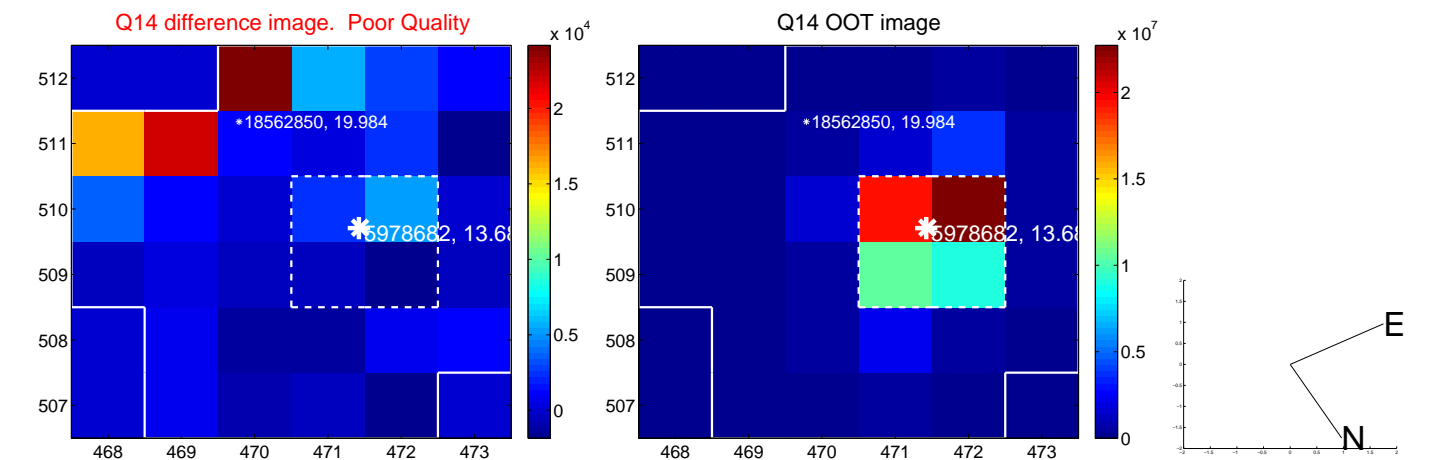
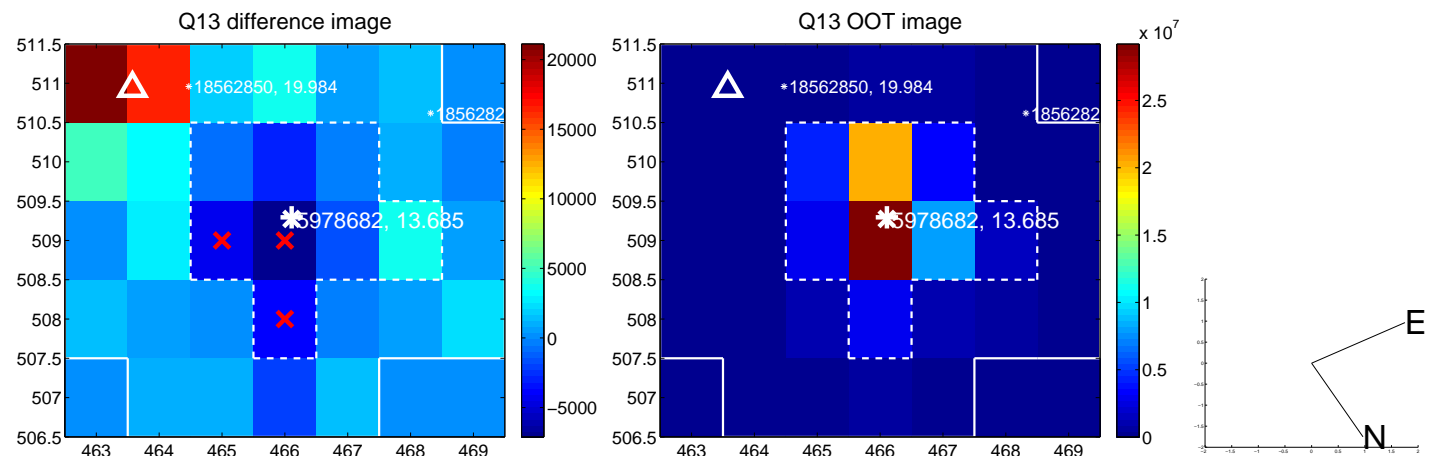
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



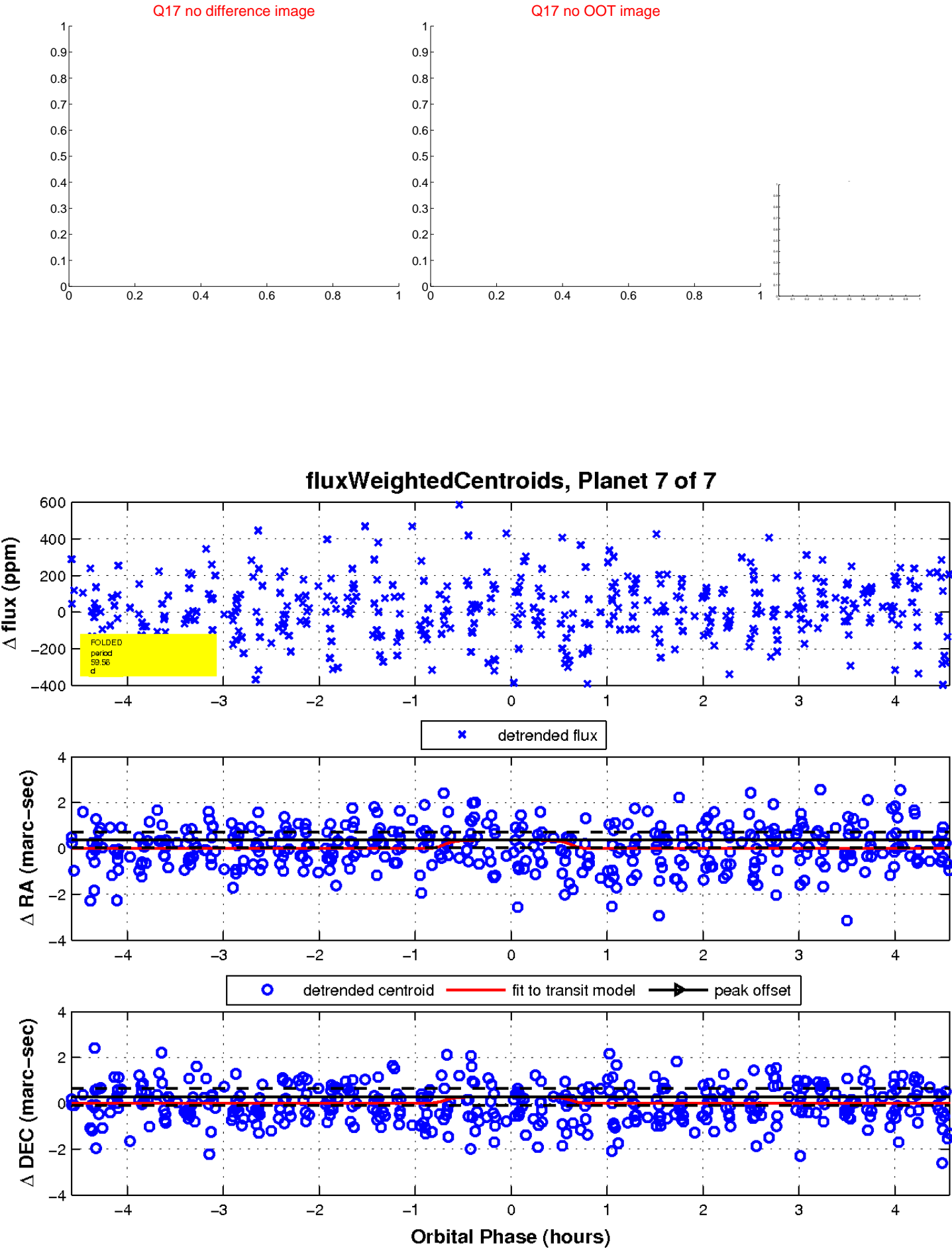
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



UKIRT Image

Declination

