

# KIC 009837661

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009837661-01	OBS	2715.01	11.128266	139.545309	6106.7	2.692	55.1	59.5	0.50	3640	4.26	6.53
009837661-02	OBS	2715.02	2.226485	133.376721	1820.7	1.952	31.1	35.5	0.50	3640	2.55	55.83
009837661-03	OBS	2715.03	5.720918	134.656416	1293.7	2.743	15.1	17.3	0.50	3640	1.96	15.86

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009837661-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
009837661-02	OBS	PC	1.00	0	0	0	0	NO_COMMENT
009837661-03	OBS	PC	1.00	0	0	0	0	NO_COMMENT

**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.

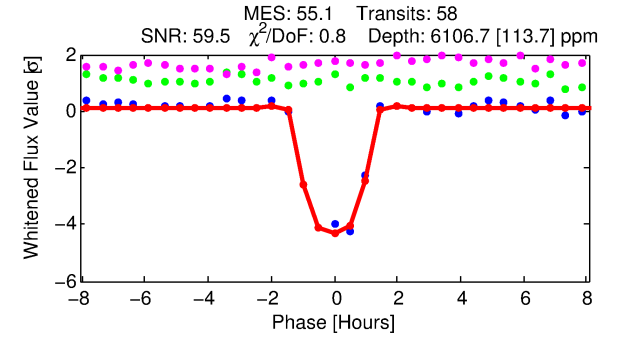
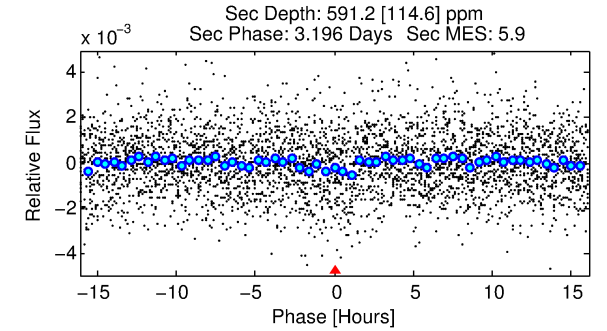
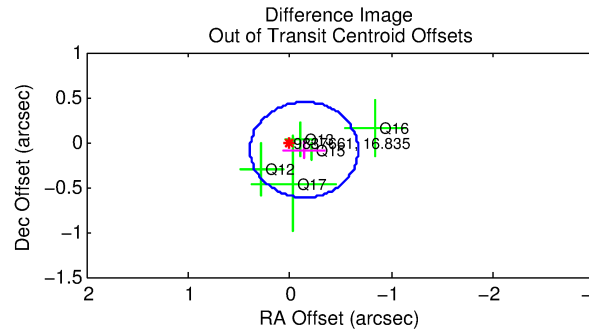
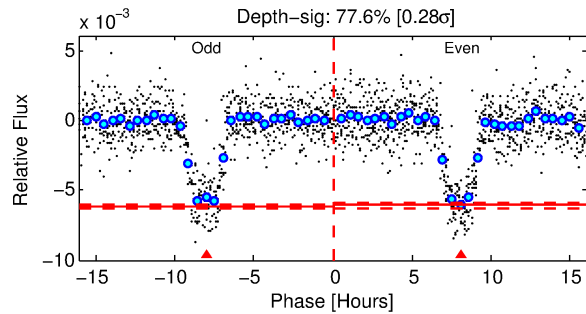
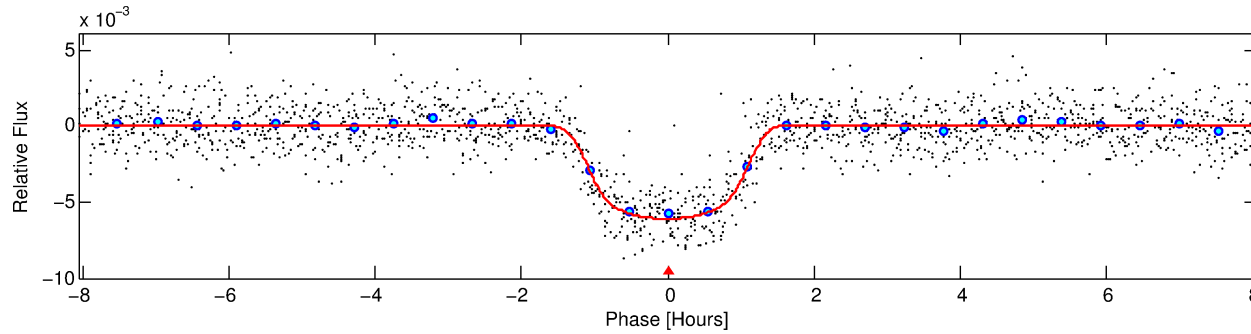
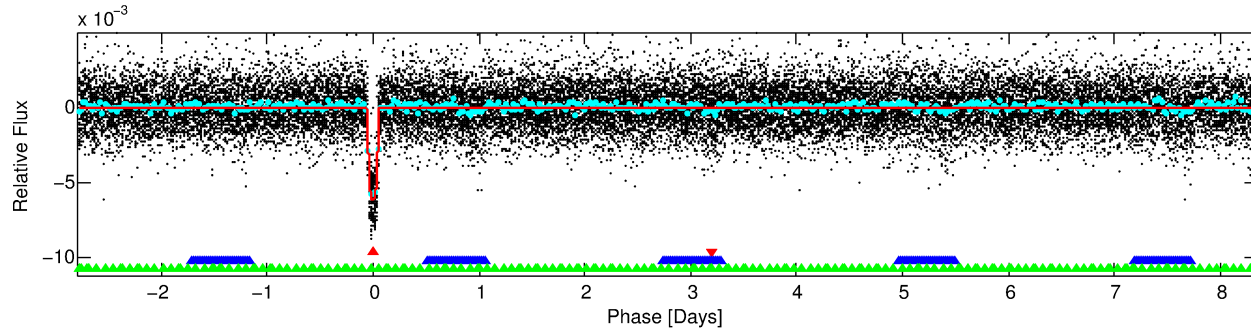
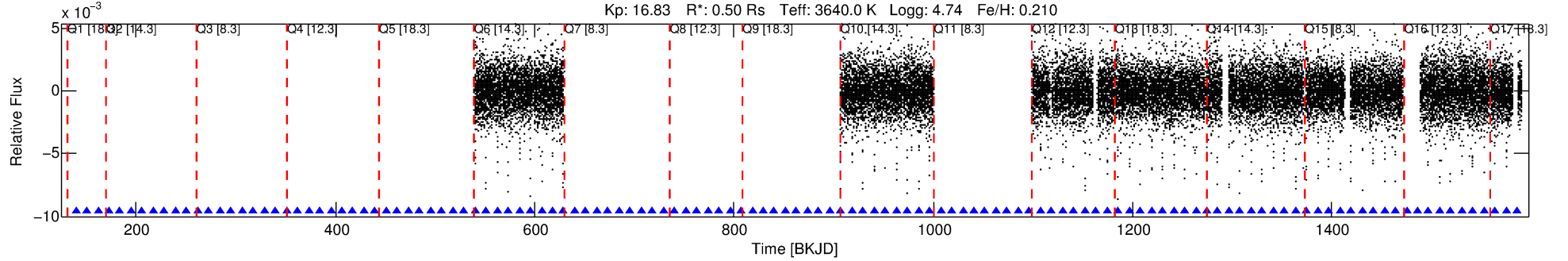
## Ephemeris Match Information For 009837661-01

No Significant Match Found

# DV One-Page Summary

KIC: 9837661 Candidate: 1 of 3 Period: 11.128 d

KOI: K02715.01 Corr: 0.982



## DV Fit Results:

Period = 11.12827 [0.00002] d  
Epoch = 139.5453 [0.0017] BKJD  
Rp/R\* = 0.0776 [0.0044]  
a/R\* = 24.87 [5.17]  
b = 0.74 [0.13]  
Seff = 6.53 [0.98]  
Teq = 408 [15] K  
Rp = 4.26 [0.53] Re  
a = 0.0780 [0.0067] AU  
Ag = 109.33 [27.52] [3.94 $\sigma$ ]  
Teffp = 2038 [125] K [12.94 $\sigma$ ]

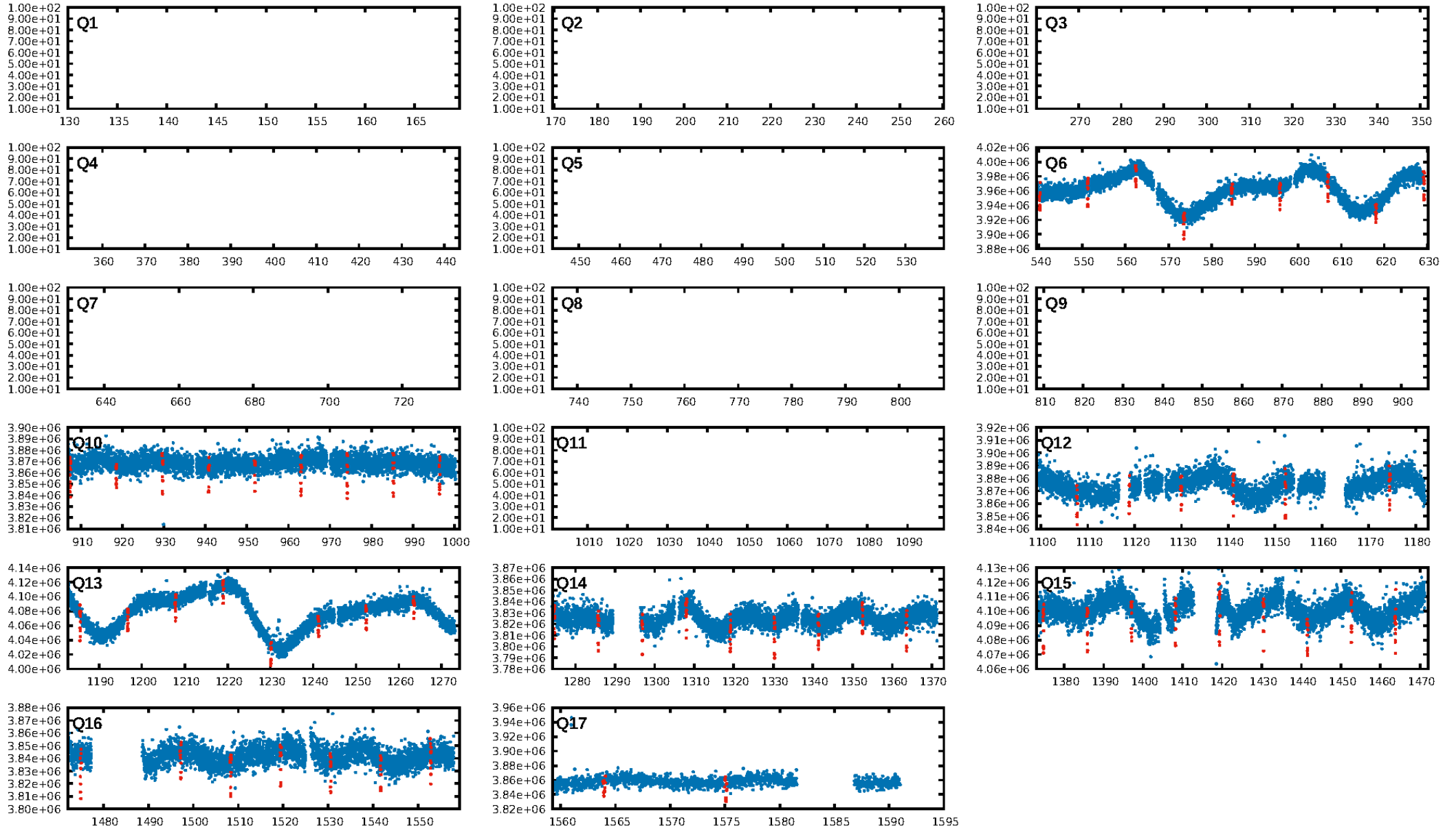
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [33.77 $\sigma$ ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 93.8%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 0.00e+00  
RollingBand-fgt: 1.00 [56/56]  
GhostDiagnostic-chr: 6.542  
Centroid-sig: 0.0%  
Centroid-so: 0.974 arcsec [4.57 $\sigma$ ]  
OotOffset-rm: 0.164 arcsec [0.93 $\sigma$ ]  
KicOffset-rm: 0.157 arcsec [1.33 $\sigma$ ]  
OotOffset-st: 0/1/2/2 [5]  
KicOffset-st: 3/1/2/2 [8]  
DiffImageQuality-fgm: 1.00 [8/8]  
DiffImageOverlap-fno: 1.00 [8/8]

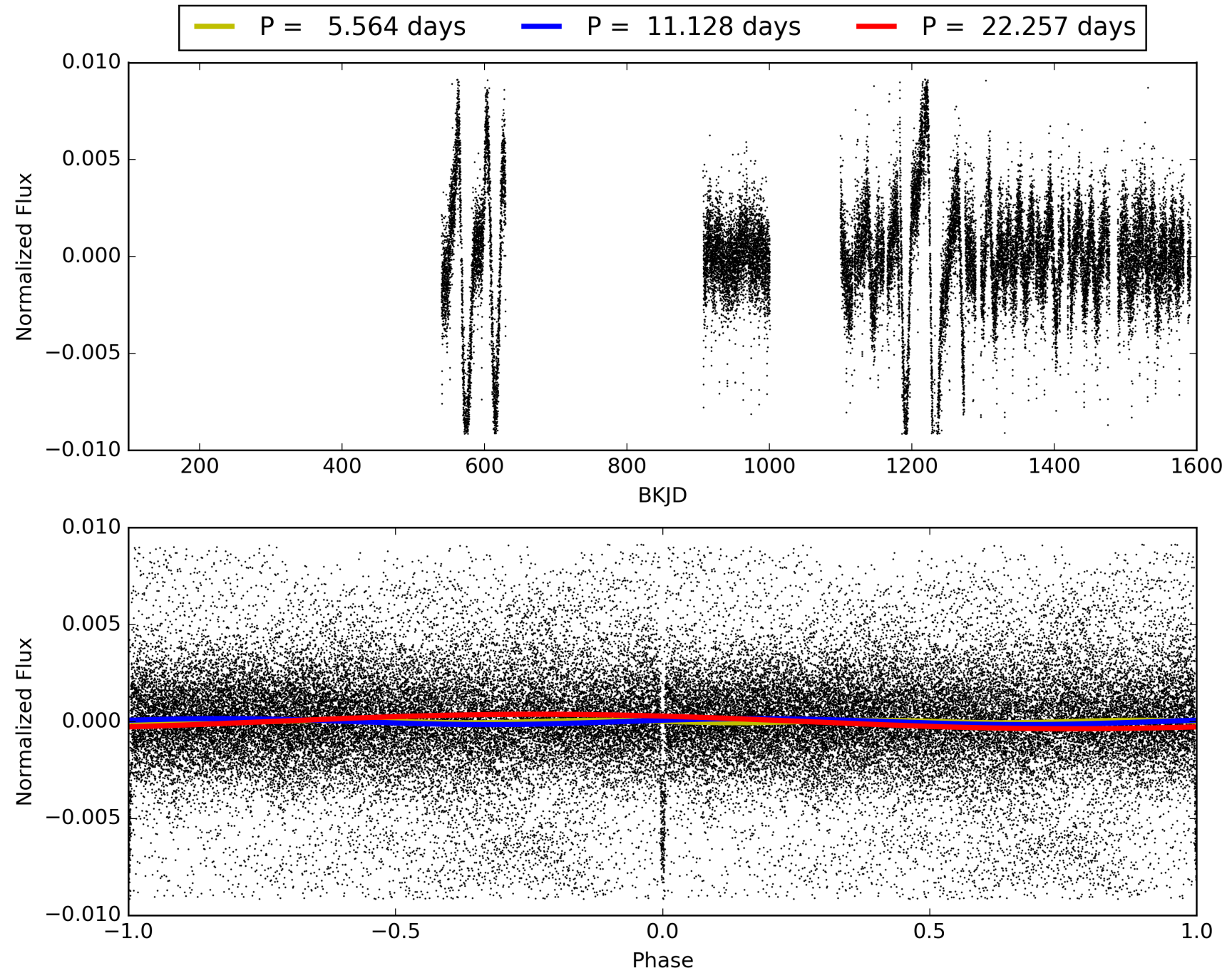
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 08:18:32 Z

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

# TCE 009837661-01, PDC Light Curves

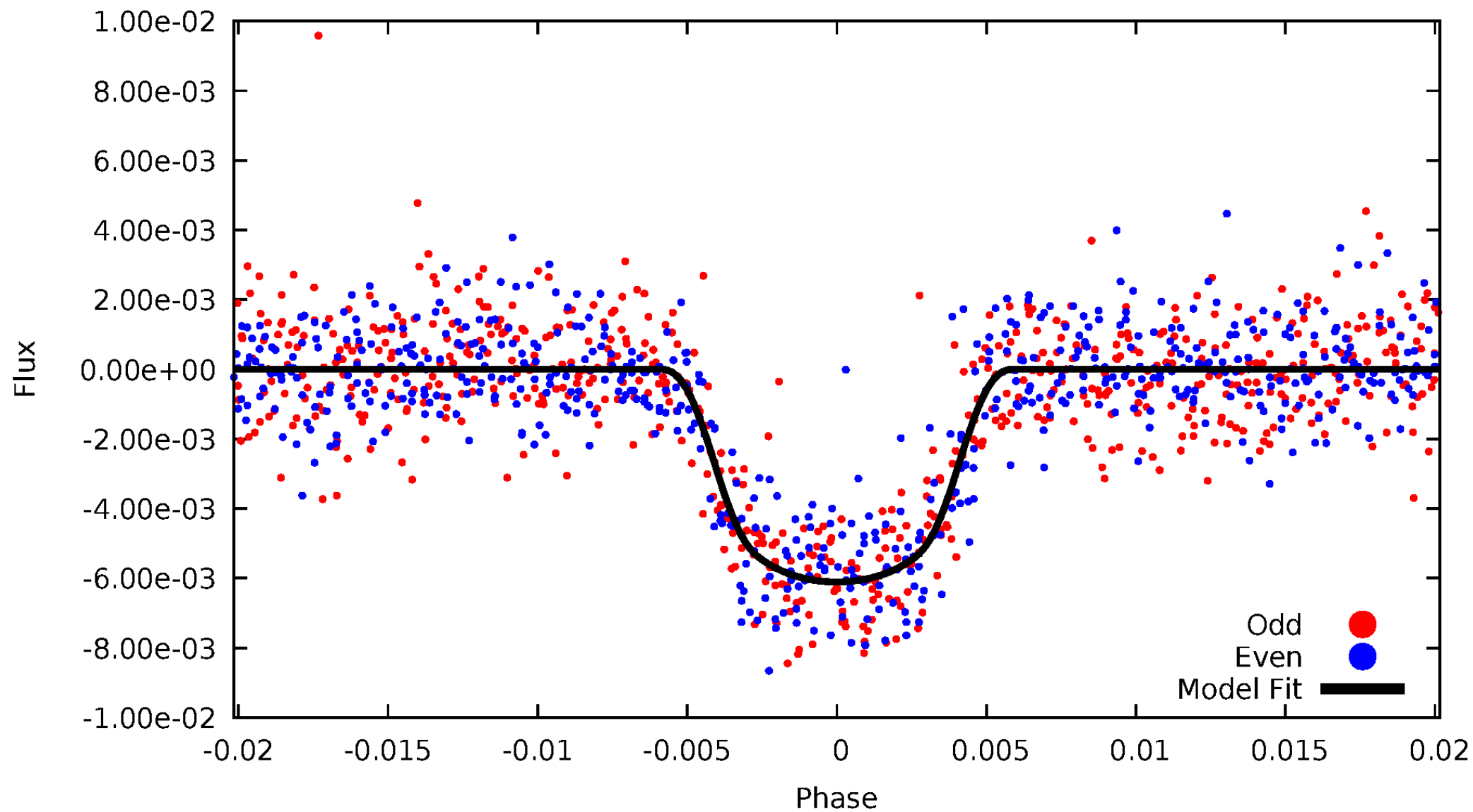


TCE 009837661-01



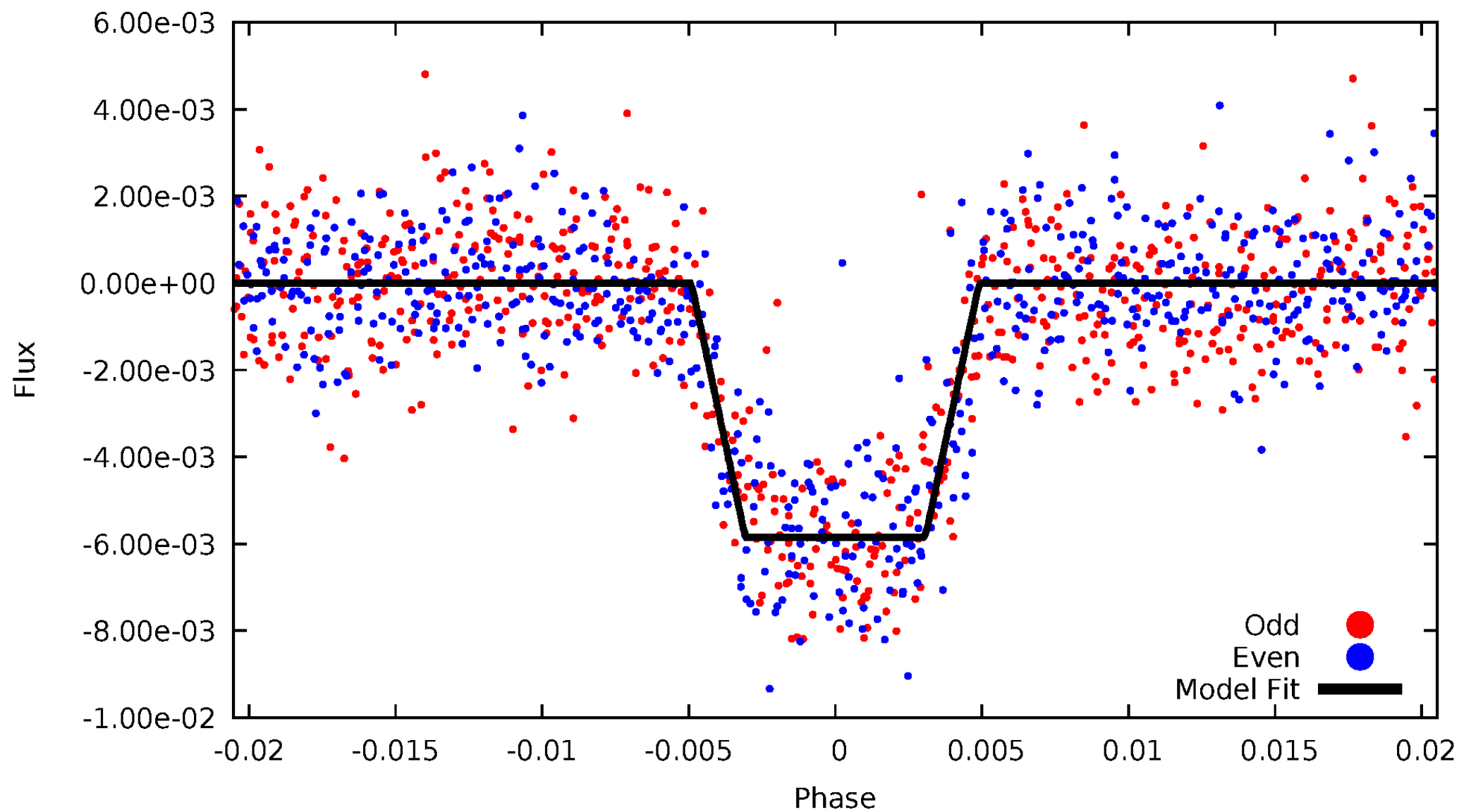
# DV Odd/Even

TCE 009837661-01

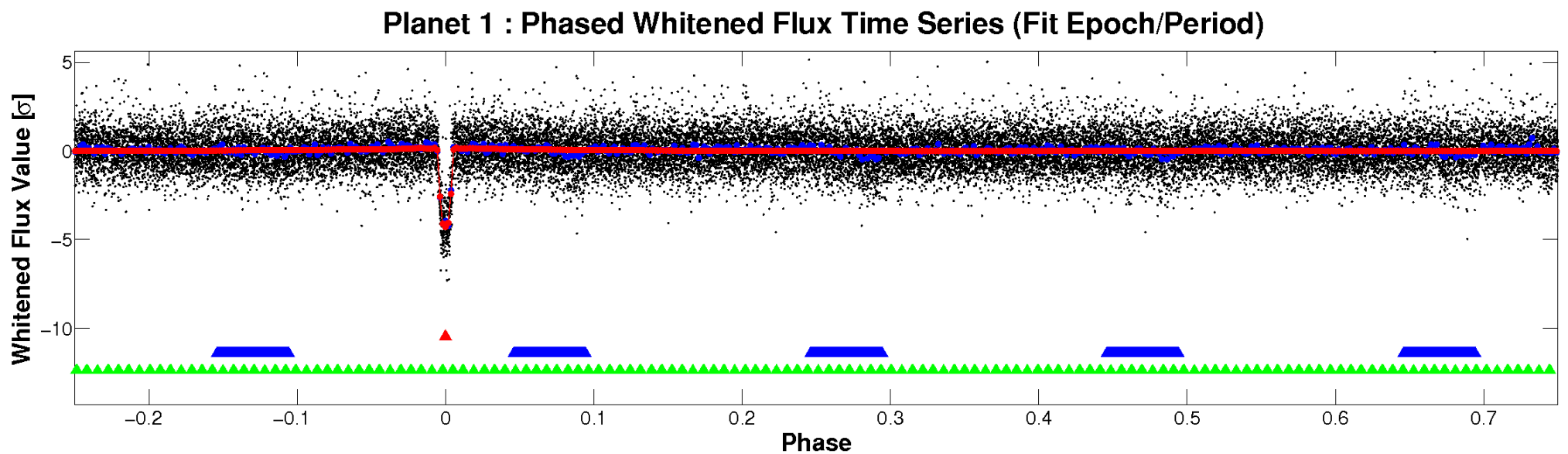
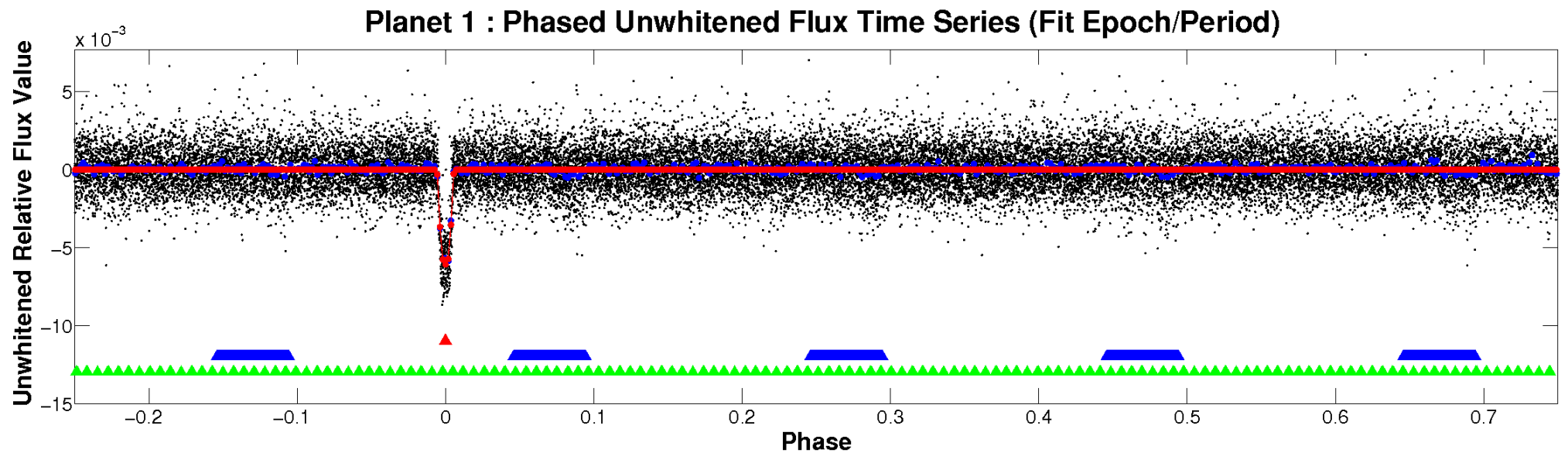


# ALT Odd/Even

TCE 009837661-01



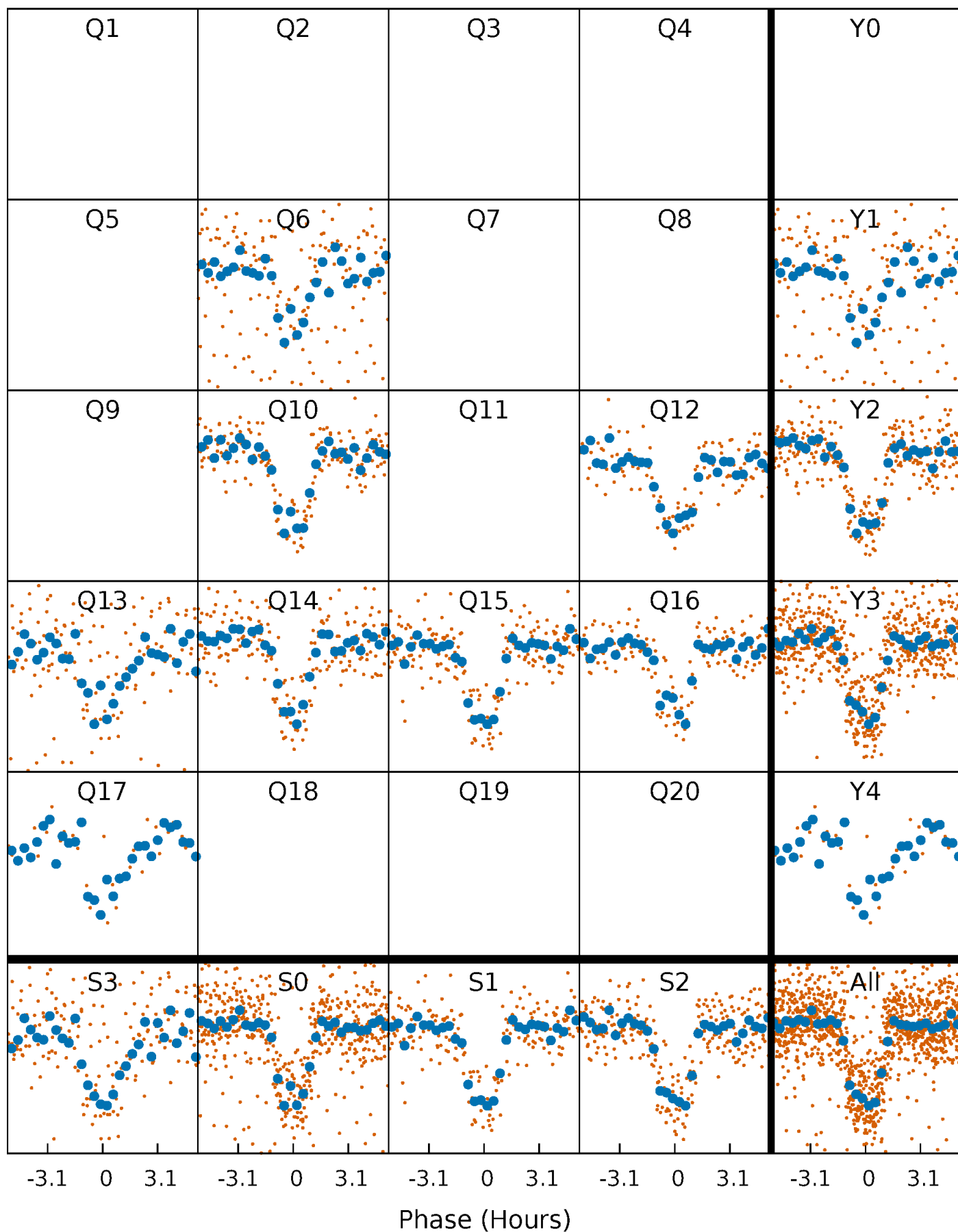
# Non-Whitened Vs. Whitened Light Curve





# PDC Quarter-Phased Transit Curves

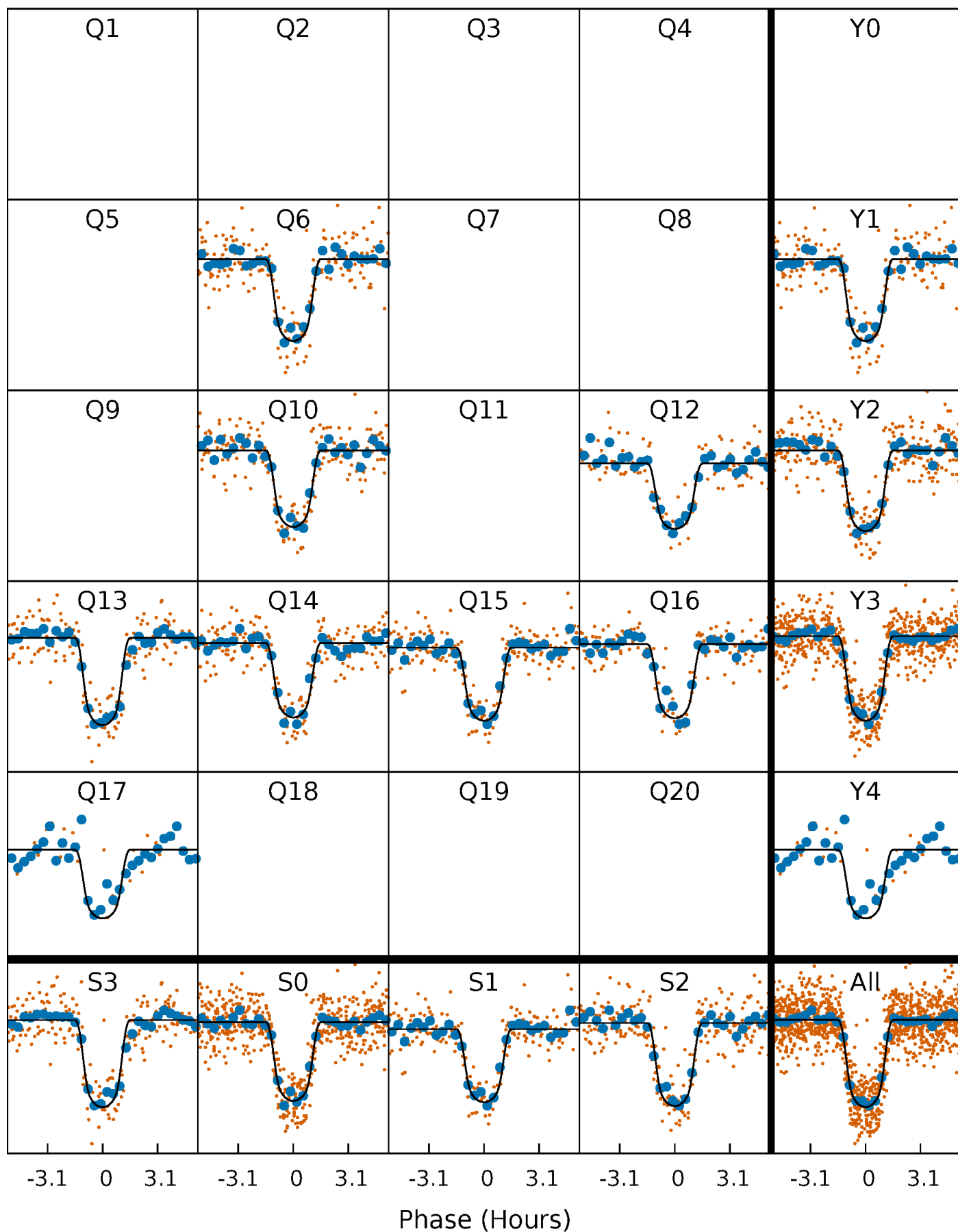
TCE 009837661-01 P= 11.128266 Days  $T_0=139.545309$  (BKJD)





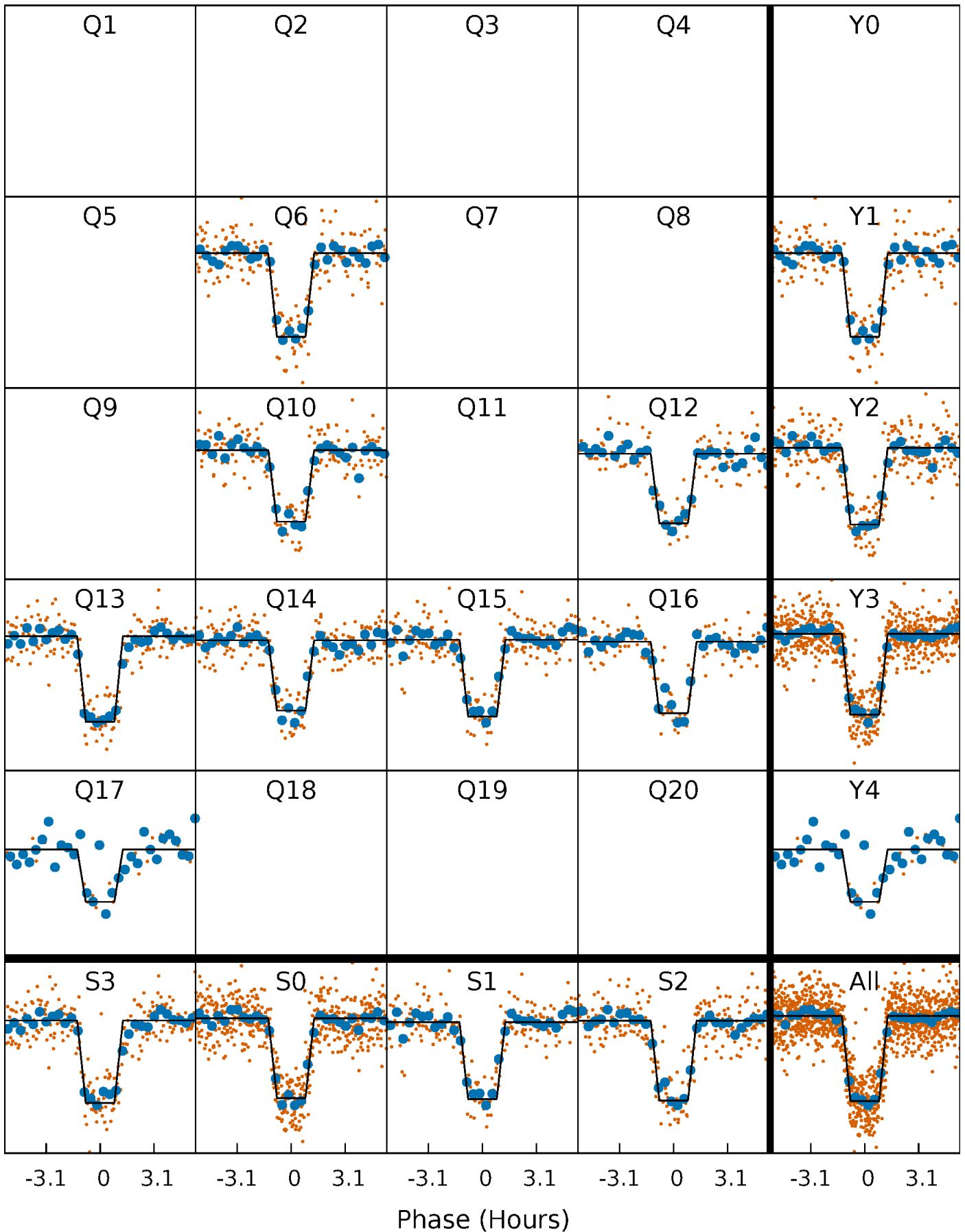
# DV Quarter-Phased Transit Curves

TCE 009837661-01   P= 11.128266 Days    $T_0=139.545309$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

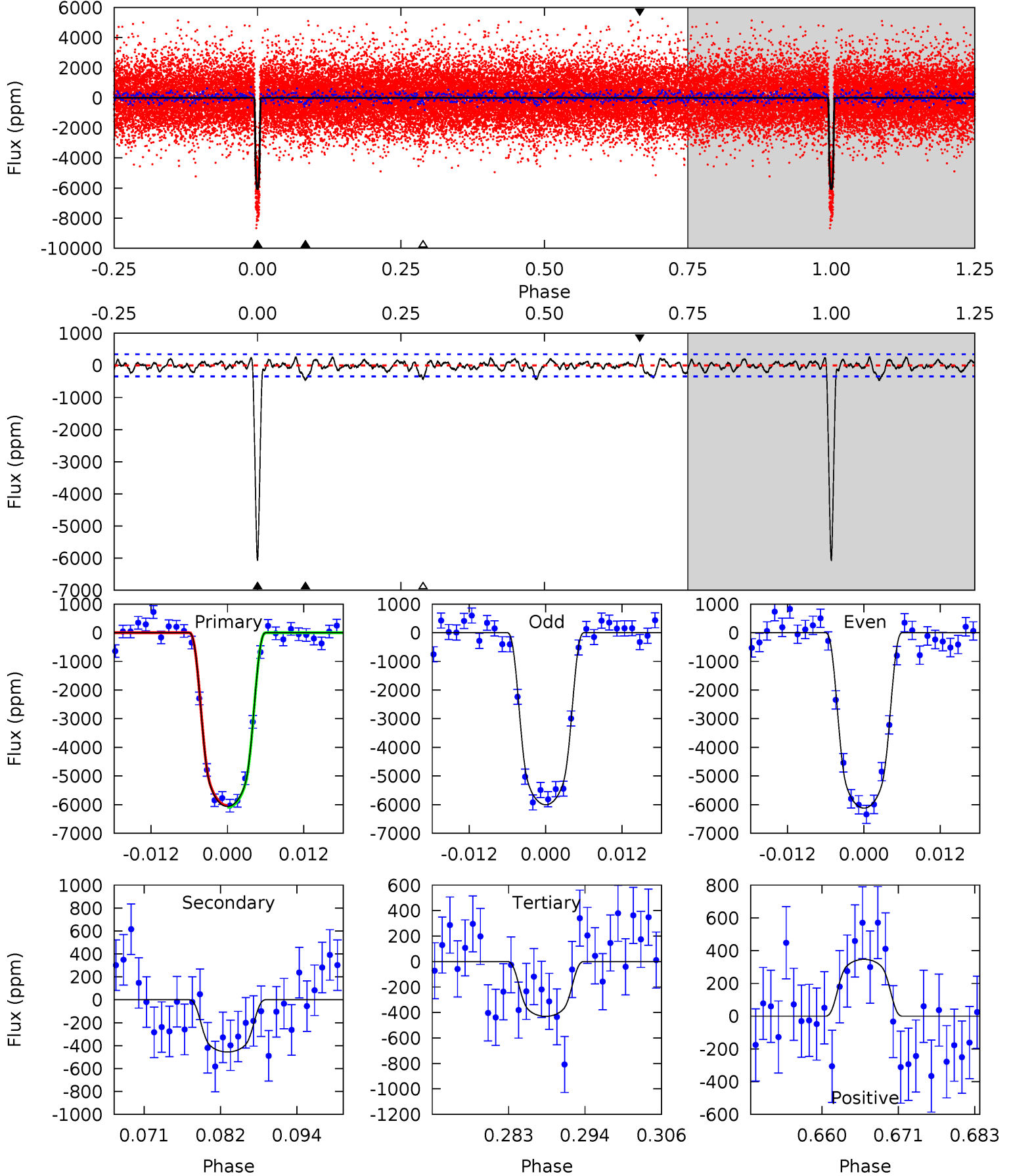
TCE 009837661-01 P= 11.128293 Days  $T_0=139.542402$  (BKJD)



# DV Model-Shift Uniqueness Test

009837661-01,  $P = 11.128266$  Days,  $E = 139.545309$  Days

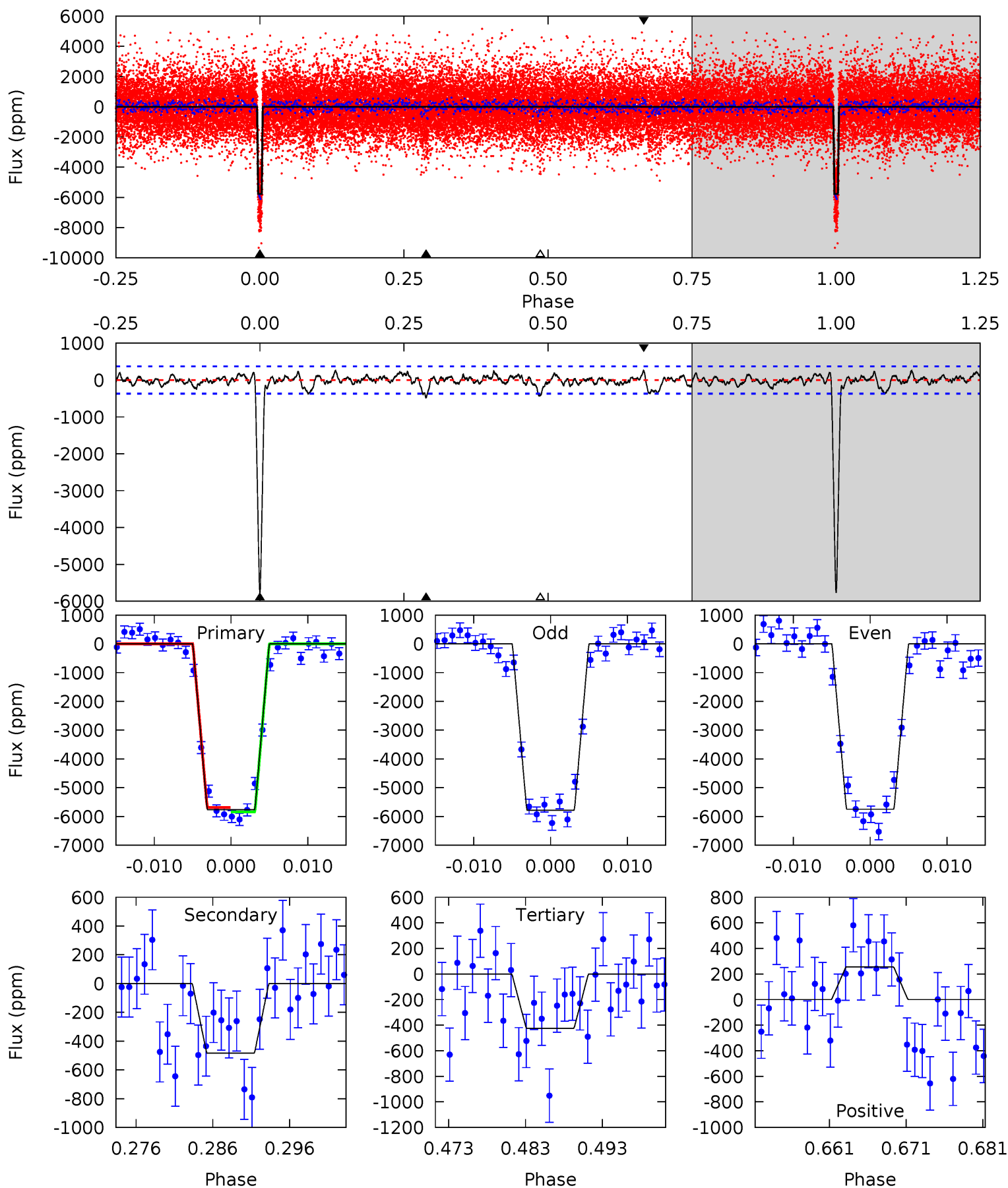
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
87.9	6.60	6.23	5.03	4.99	2.52	1.67	81.6	82.8	0.37	1.57	0.85	1.01	0.05	0.42



# Alt Model-Shift Uniqueness Test

009837661-01,  $P = 11.128293$  Days,  $E = 139.542402$  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
78.1	6.55	5.76	3.46	5.03	2.58	1.50	72.3	74.6	0.79	3.09	0.23	1.00	0.04	1.09



### Stellar Parameters For KIC 009837661

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$3640^{+81}_{-90}$	$4.744^{+0.056}_{-0.024}$	$0.210^{+0.150}_{-0.150}$	$0.503^{+0.030}_{-0.056}$	$0.513^{+0.036}_{-0.054}$	$5.663^{+1.653}_{-0.588}$
	+2%/-2%	+1%/-1%	+71%/-71%	+6%/-11%	+7%/-11%	+29%/-10%
Source	SPE70	KIC0	SPE70	DSEP		

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

### Secondary Eclipse Parameters for KIC 009837661-01 / KOI 2715.01

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-456 \pm 69$	$4.22^{+0.31}_{-0.30}$	$566^{+16}_{-16}$	$2524^{+74}_{-72}$	$86^{+20}_{-17}$
Alt.	$-484 \pm 74$	$4.16^{+0.30}_{-0.35}$	$567^{+16}_{-18}$	$2554^{+80}_{-74}$	$94^{+23}_{-18}$

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

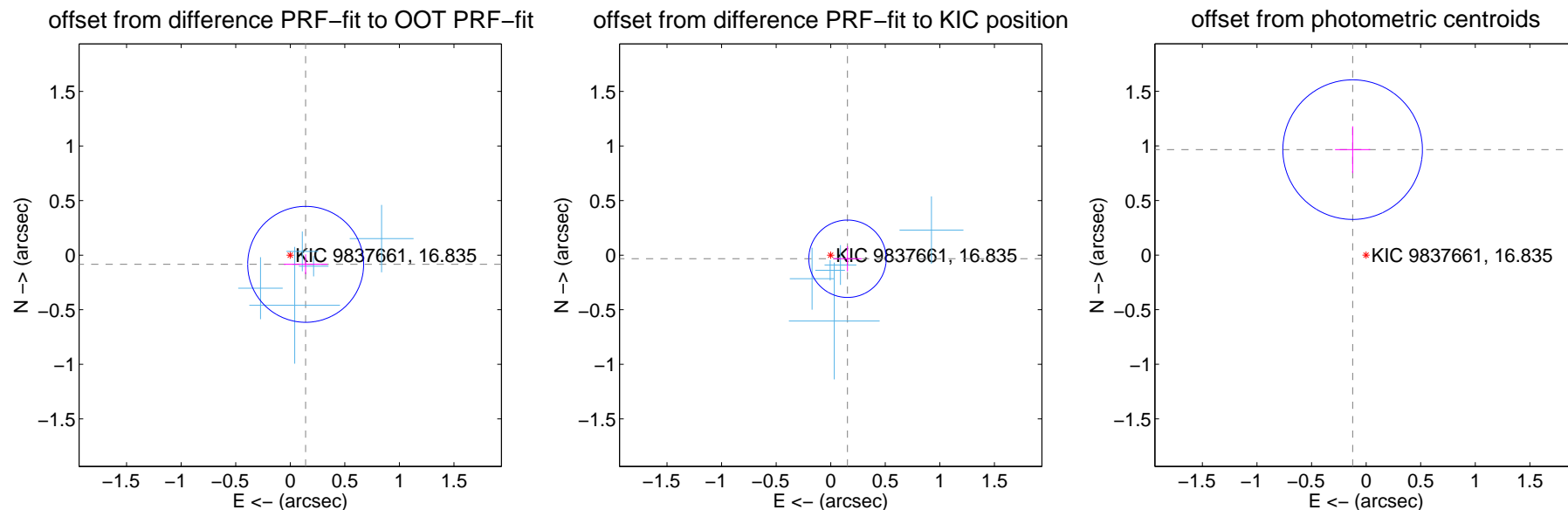
## DV Centroid Data

Supplemental centroid analysis for 009837661-01. Kepler magnitude: 16.84. Transit SNR 59.54

There are 8 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.14 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.164 \pm 0.177$	0.93	$-0.141 \pm 0.199$	$-0.084 \pm 0.091$
PRF-fit source offset from KIC position	$0.157 \pm 0.118$	1.33	$-0.154 \pm 0.130$	$-0.033 \pm 0.115$
photometric centroid source offset	$0.97 \pm 0.21$	4.57	$0.12 \pm 0.16$	$0.97 \pm 0.21$



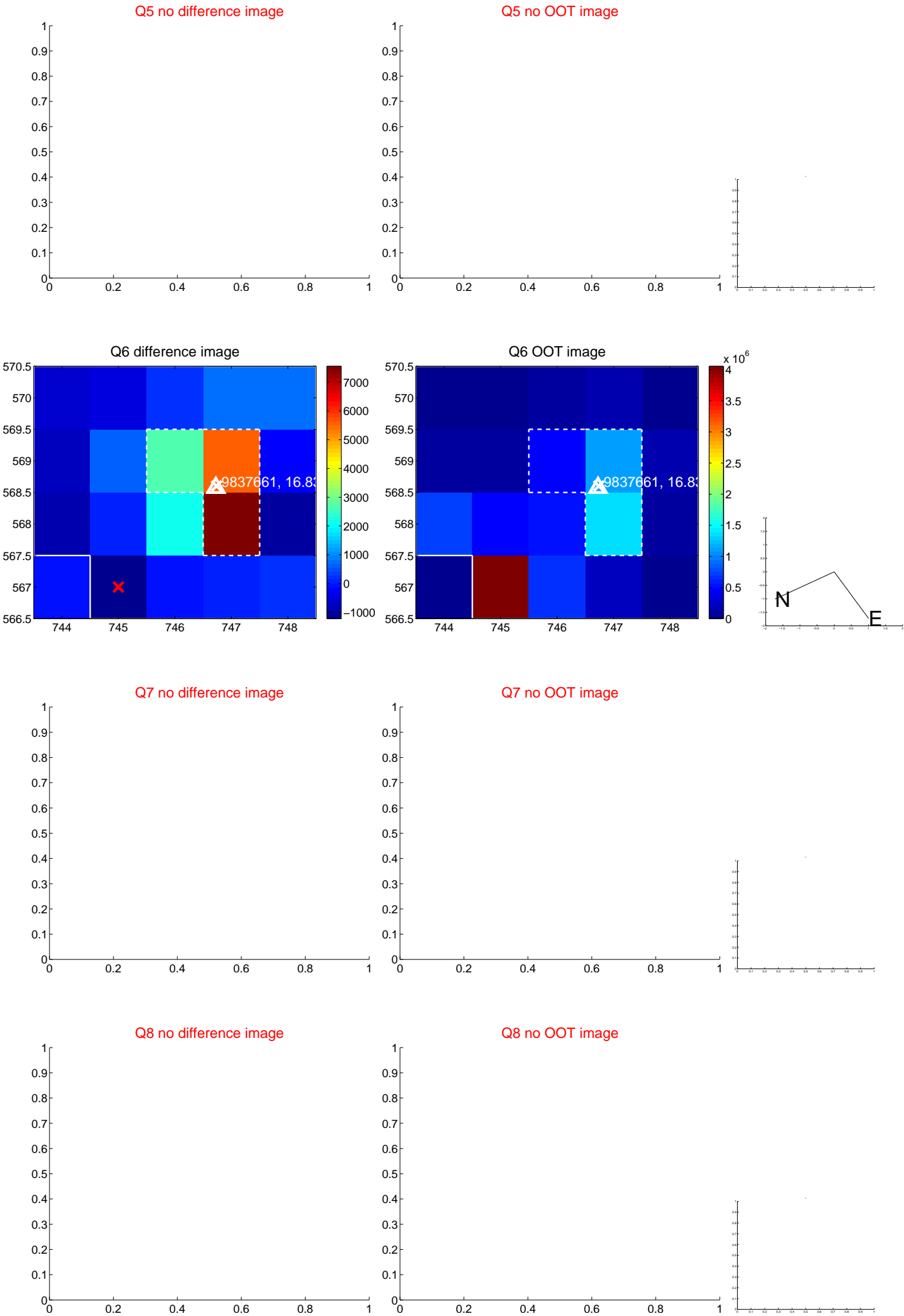
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

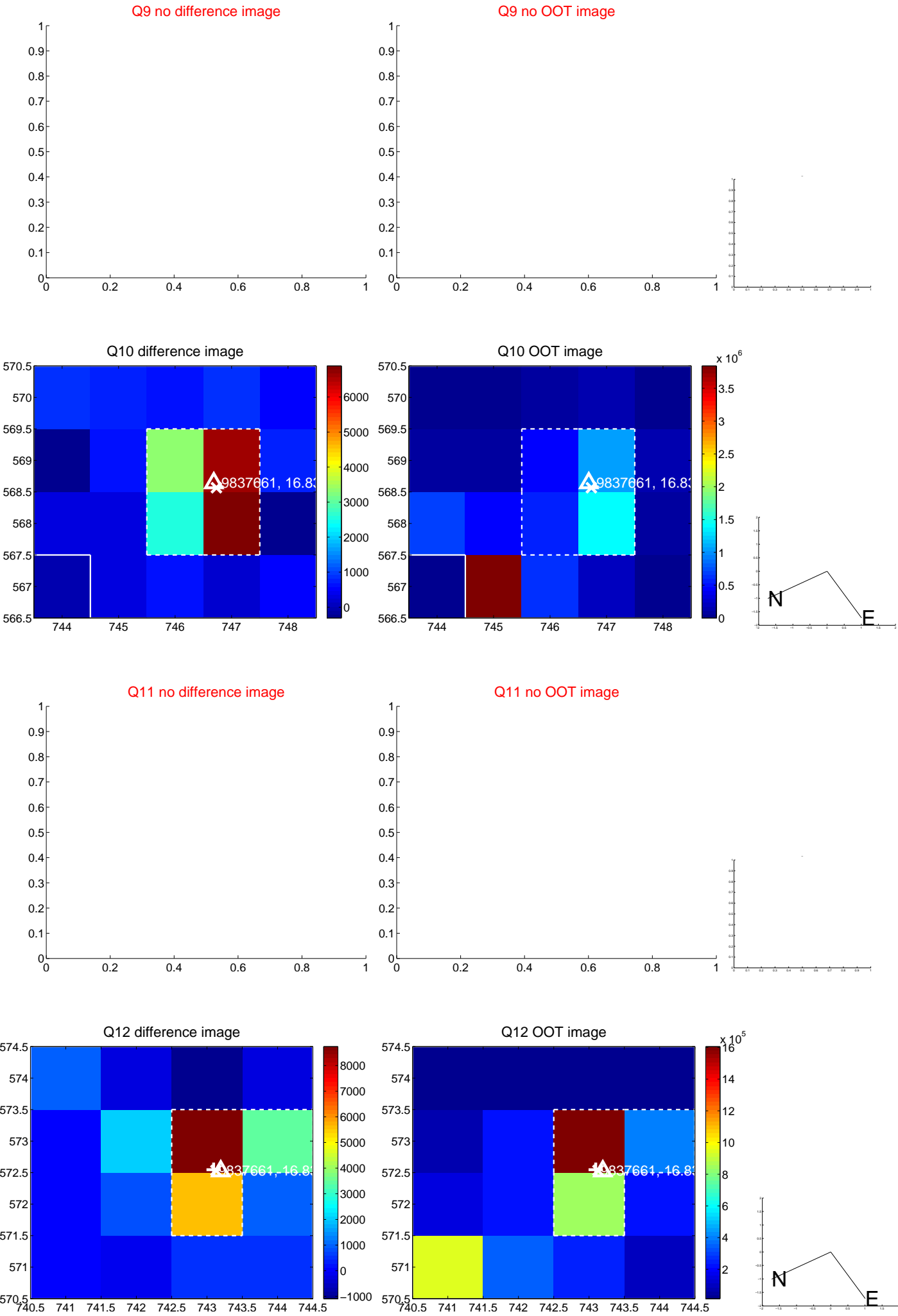




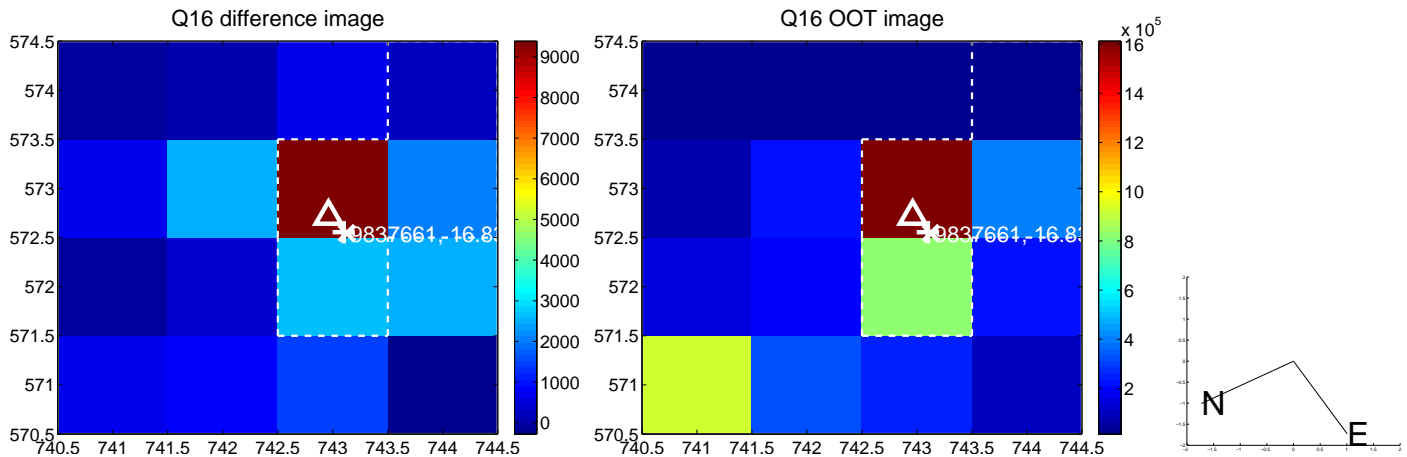
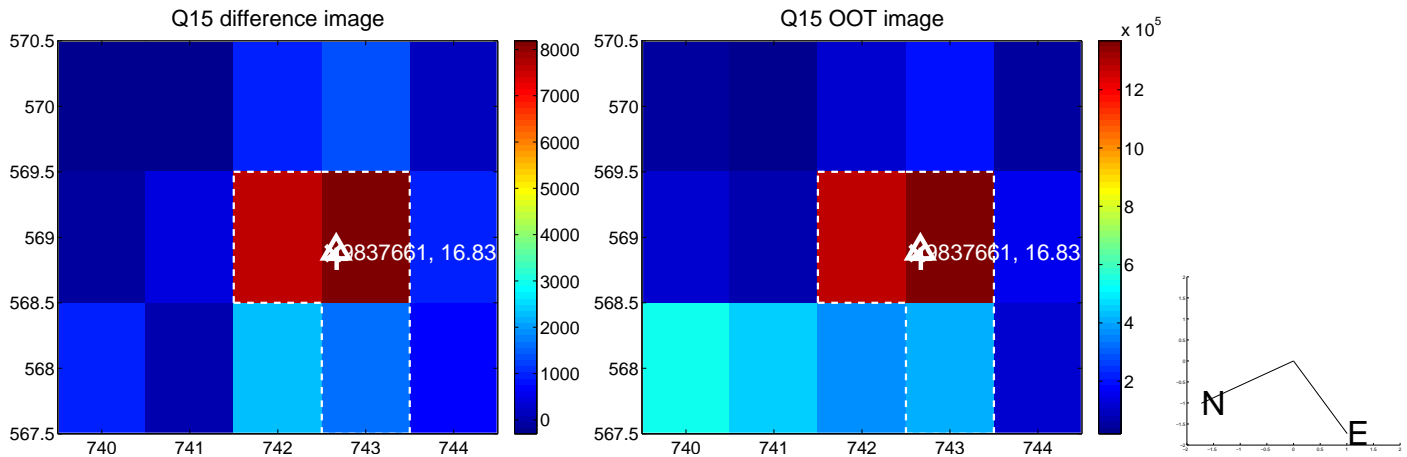
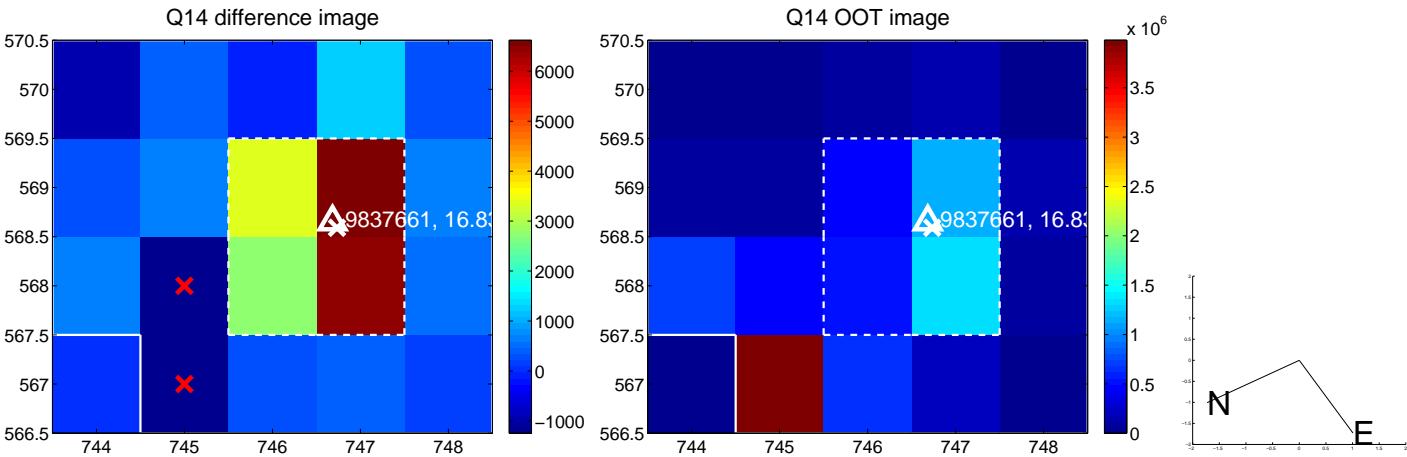
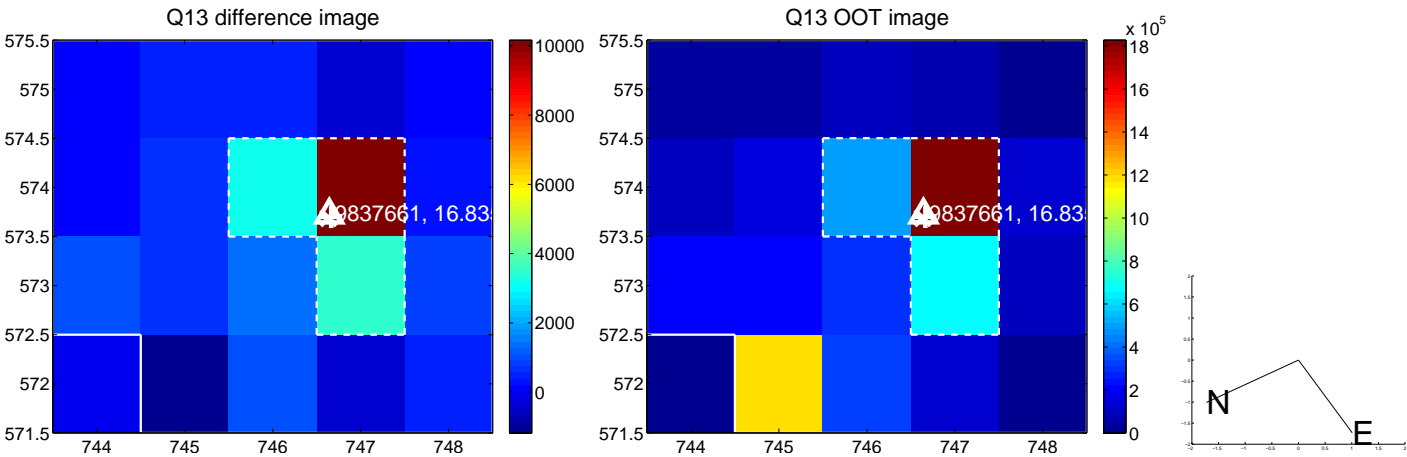
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



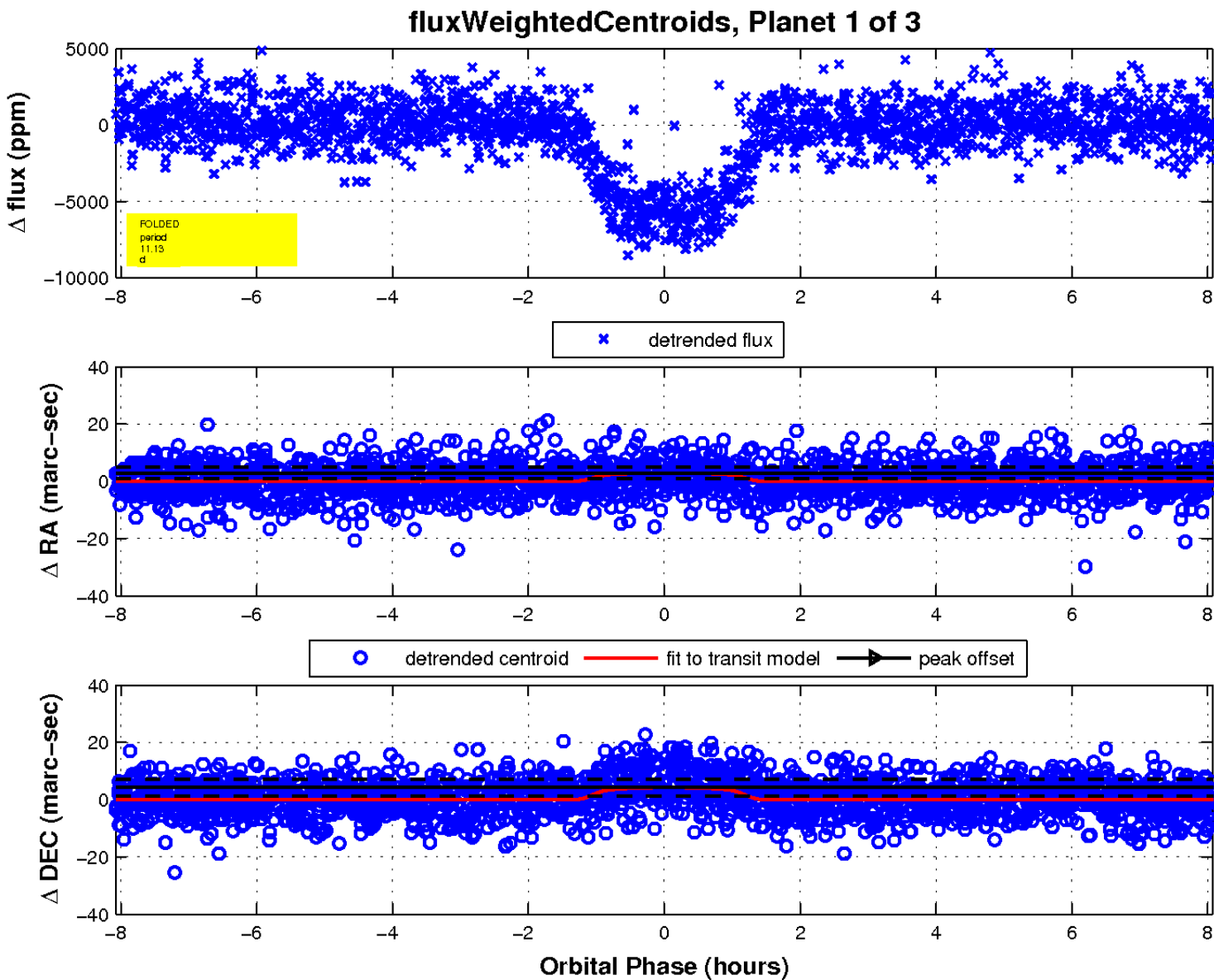
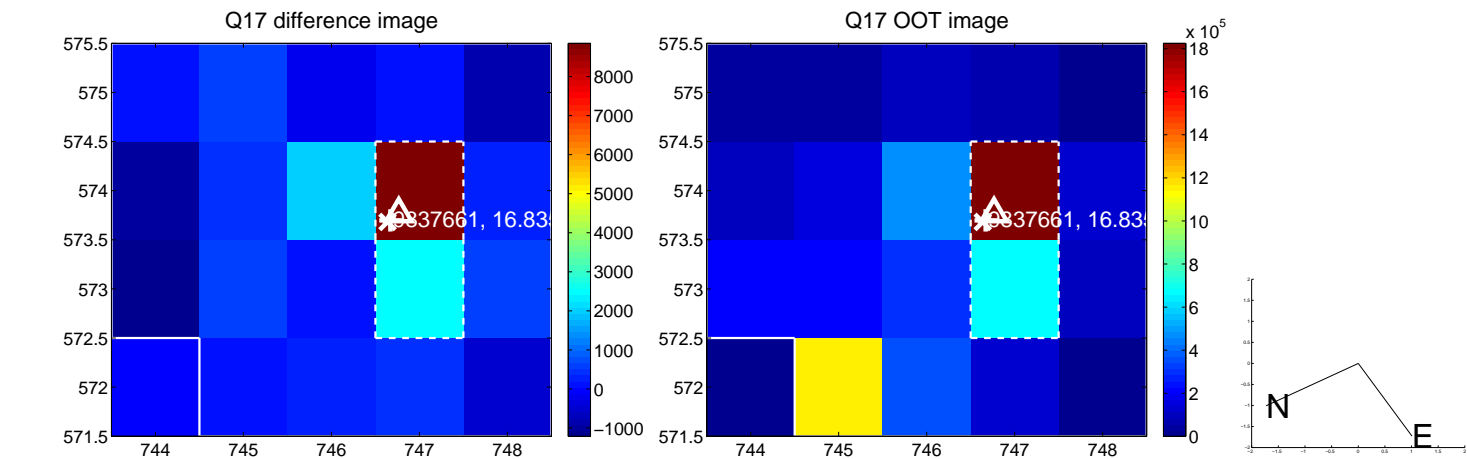
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

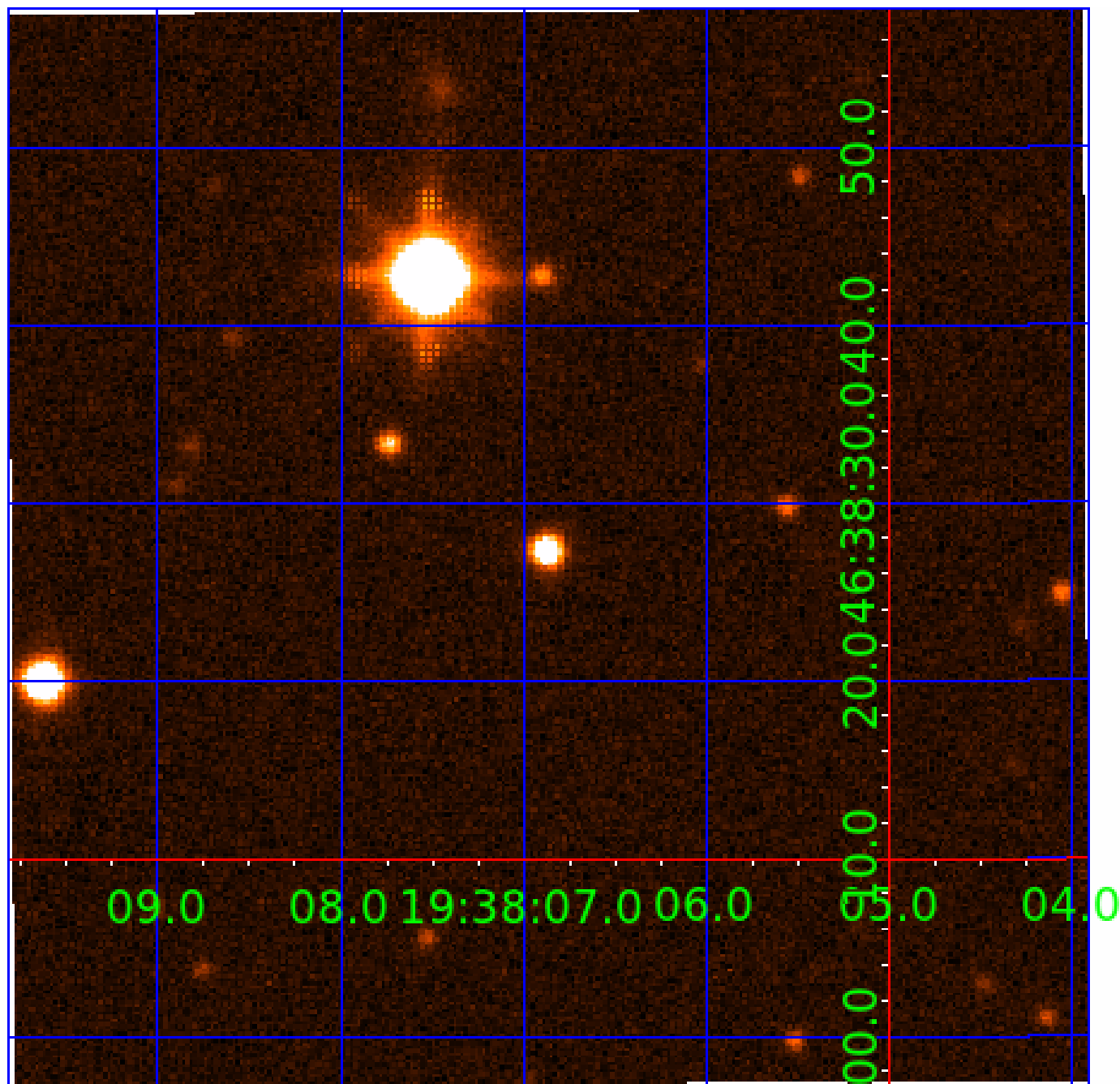


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 009837661

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009837661-01	OBS	2715.01	11.128266	139.545309	6106.7	2.692	55.1	59.5	0.50	3640	4.26	6.53
009837661-02	OBS	2715.02	2.226485	133.376721	1820.7	1.952	31.1	35.5	0.50	3640	2.55	55.83
009837661-03	OBS	2715.03	5.720918	134.656416	1293.7	2.743	15.1	17.3	0.50	3640	1.96	15.86

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009837661-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
009837661-02	OBS	PC	1.00	0	0	0	0	NO_COMMENT
009837661-03	OBS	PC	1.00	0	0	0	0	NO_COMMENT

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

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

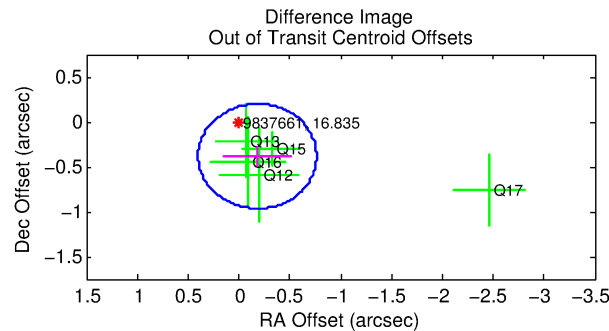
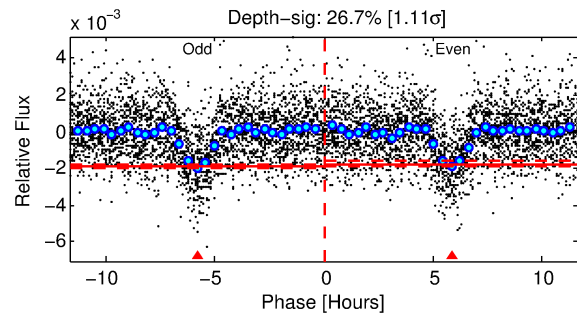
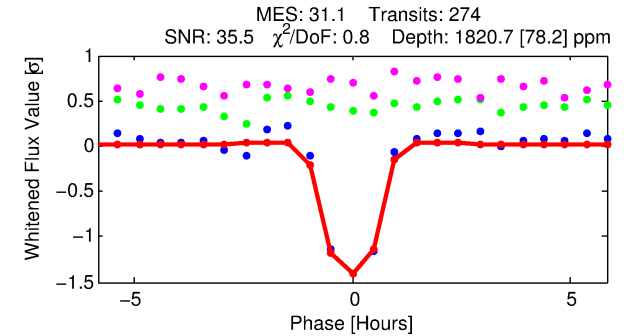
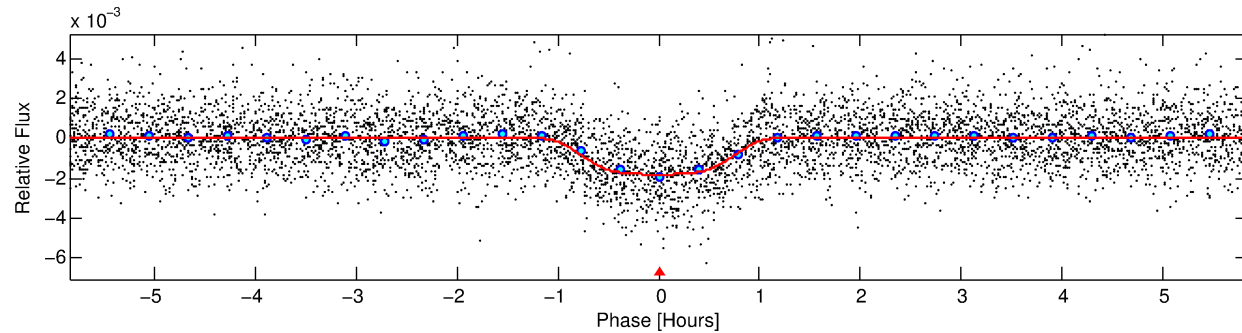
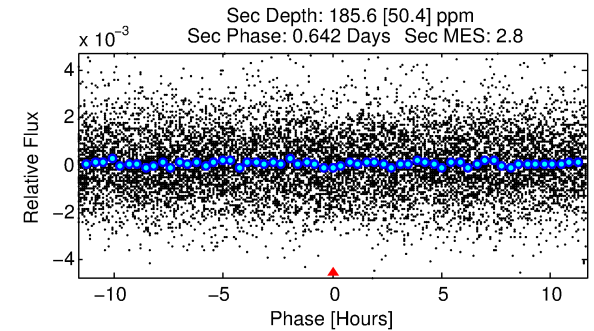
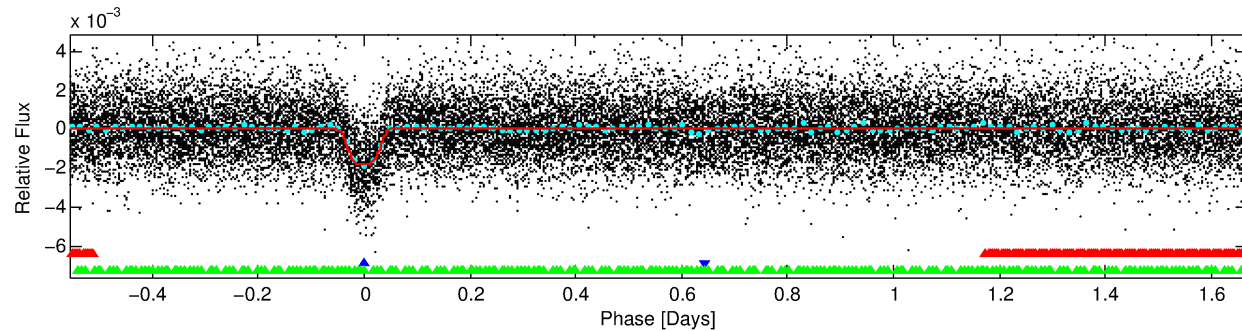
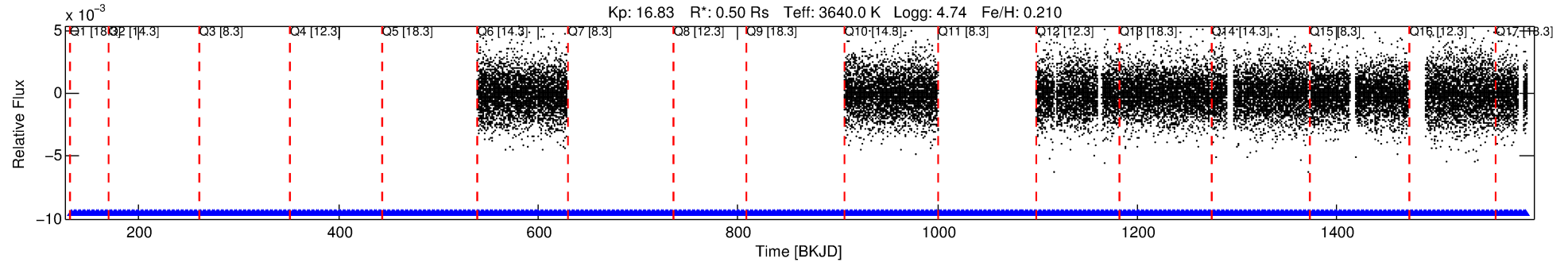
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 009837661-02

No Significant Match Found

# DV One-Page Summary

KIC: 9837661 Candidate: 2 of 3 Period: 2.226 d  
KOI: K02715.02 Corr: 0.939



## DV Fit Results:

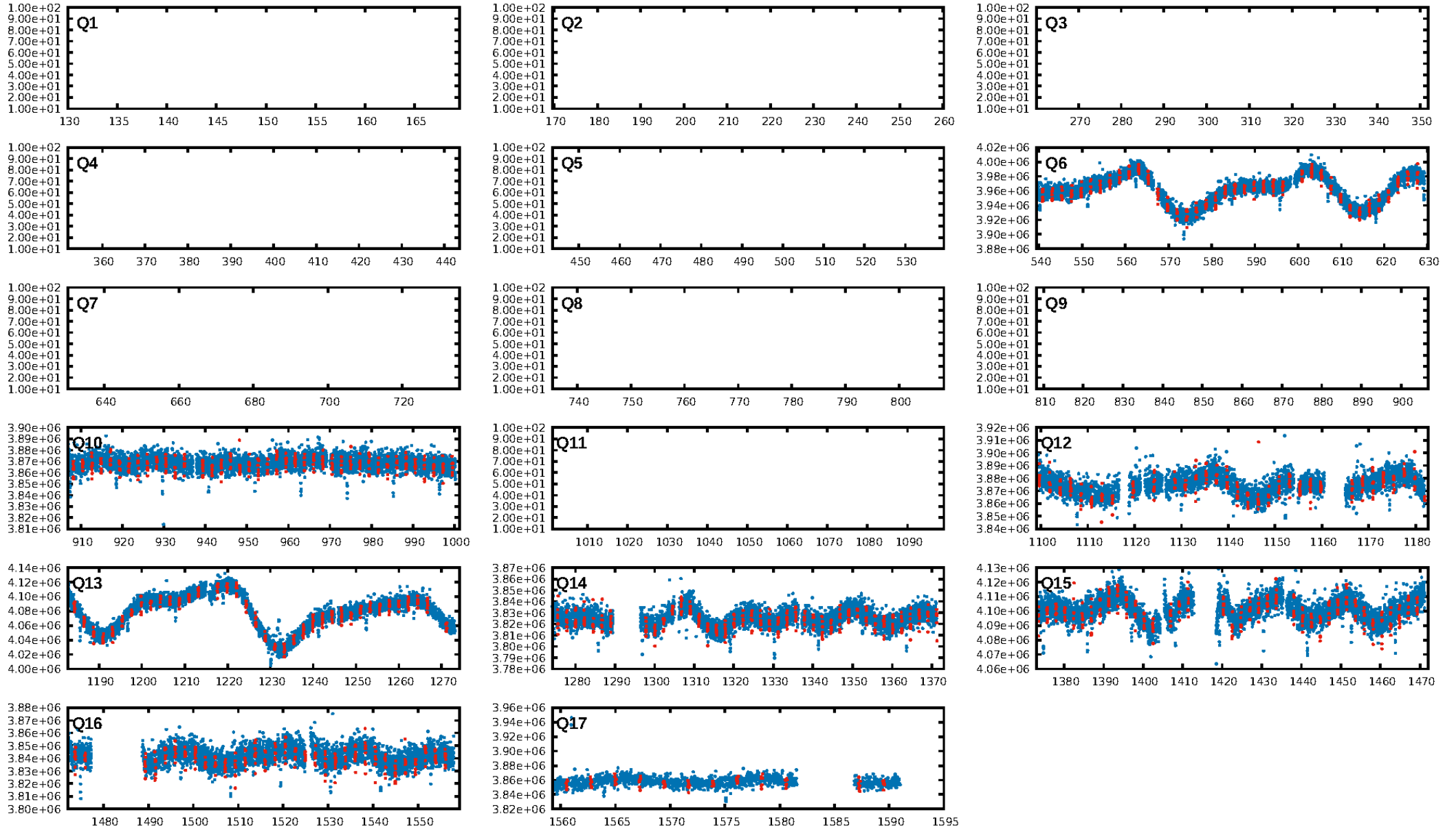
Period = 2.22649 [0.00000] d  
Epoch = 133.3767 [0.0008] BKJD  
Rp/R\* = 0.0465 [0.0038]  
a/R\* = 4.97 [1.43]  
b = 0.88 [0.08]  
Seff = 55.83 [8.41]  
Teq = 697 [26] K  
Rp = 2.55 [0.35] Re  
a = 0.0267 [0.0023] AU  
Ag = 11.20 [3.78] [2.70σ]  
Teffp = 1971 [164] K [7.66σ]

## DV Diagnostic Results:

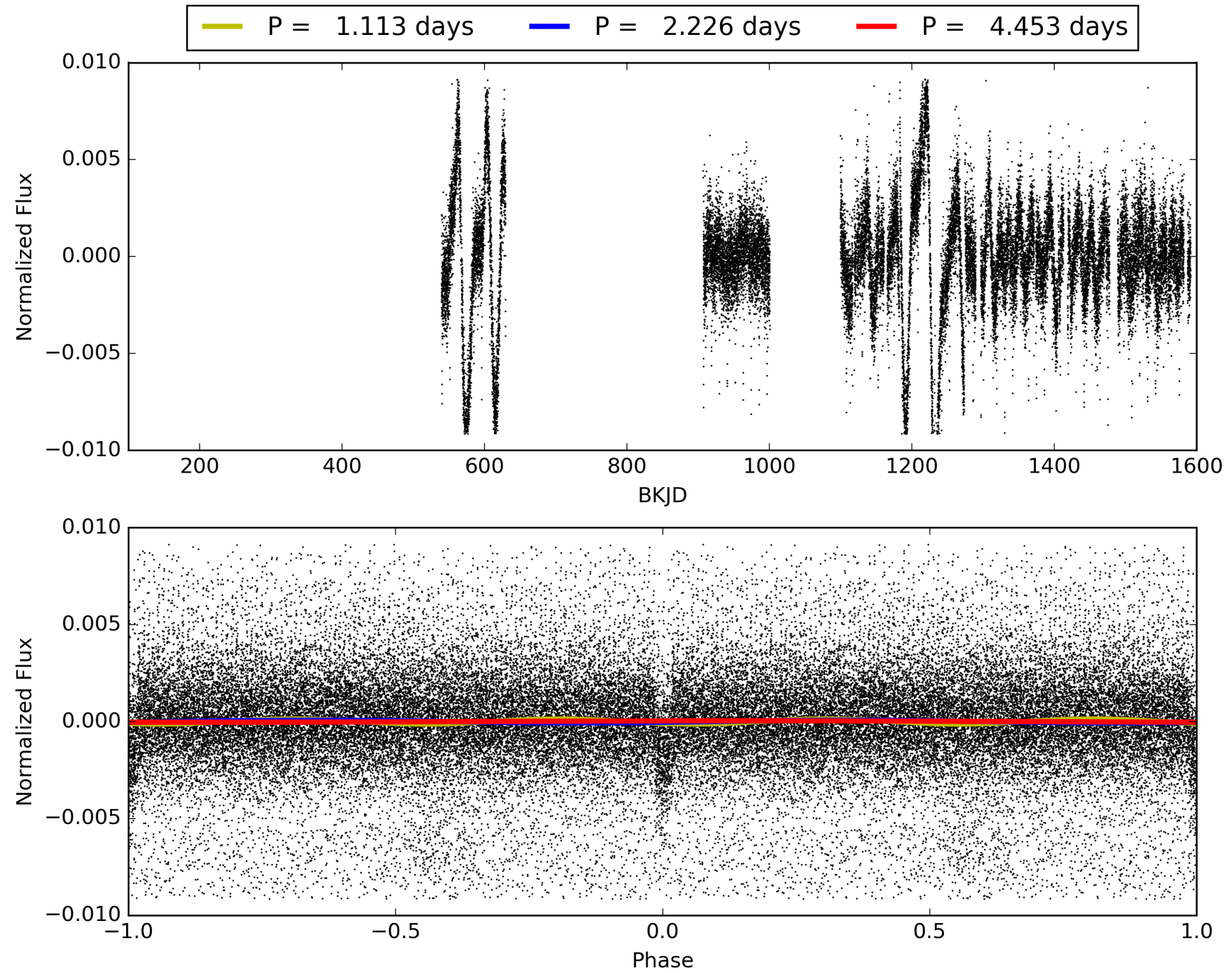
ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [24.91σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 3.01e-212  
RollingBand-fgt: 1.00 [262/262]  
GhostDiagnostic-chr: 11.43  
Centroid-sig: 0.0%  
Centroid-so: 1.066 arcsec [3.32σ]  
OotOffset-rm: 0.424 arcsec [2.18σ]  
KicOffset-rm: 0.273 arcsec [1.85σ]  
OotOffset-st: 0/1/2/2 [5]  
KicOffset-st: 3/1/2/2 [8]  
DiffImageQuality-fgm: 1.00 [8/8]  
DiffImageOverlap-fno: 1.00 [8/8]



# TCE 009837661-02, PDC Light Curves

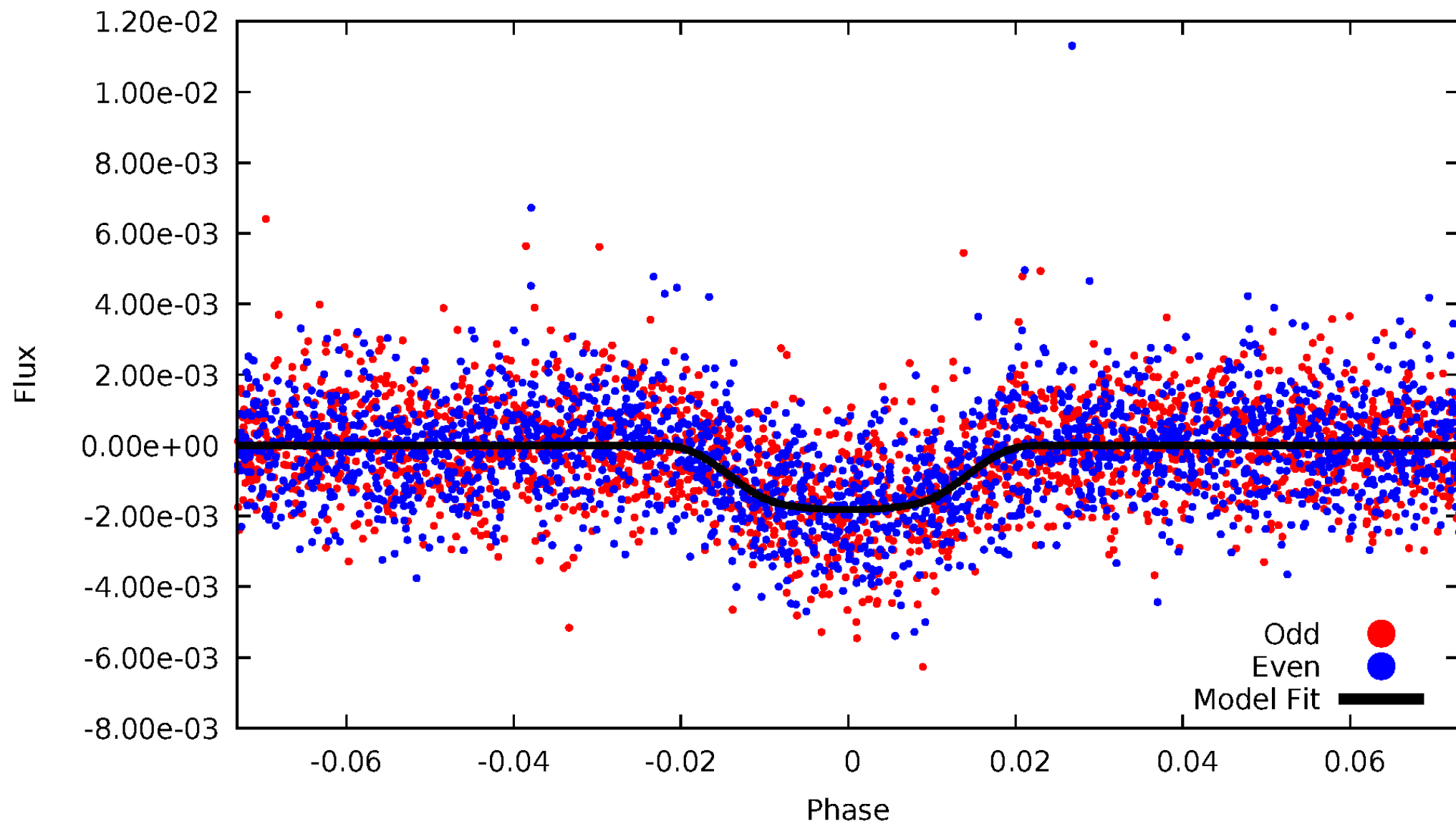


TCE 009837661-02



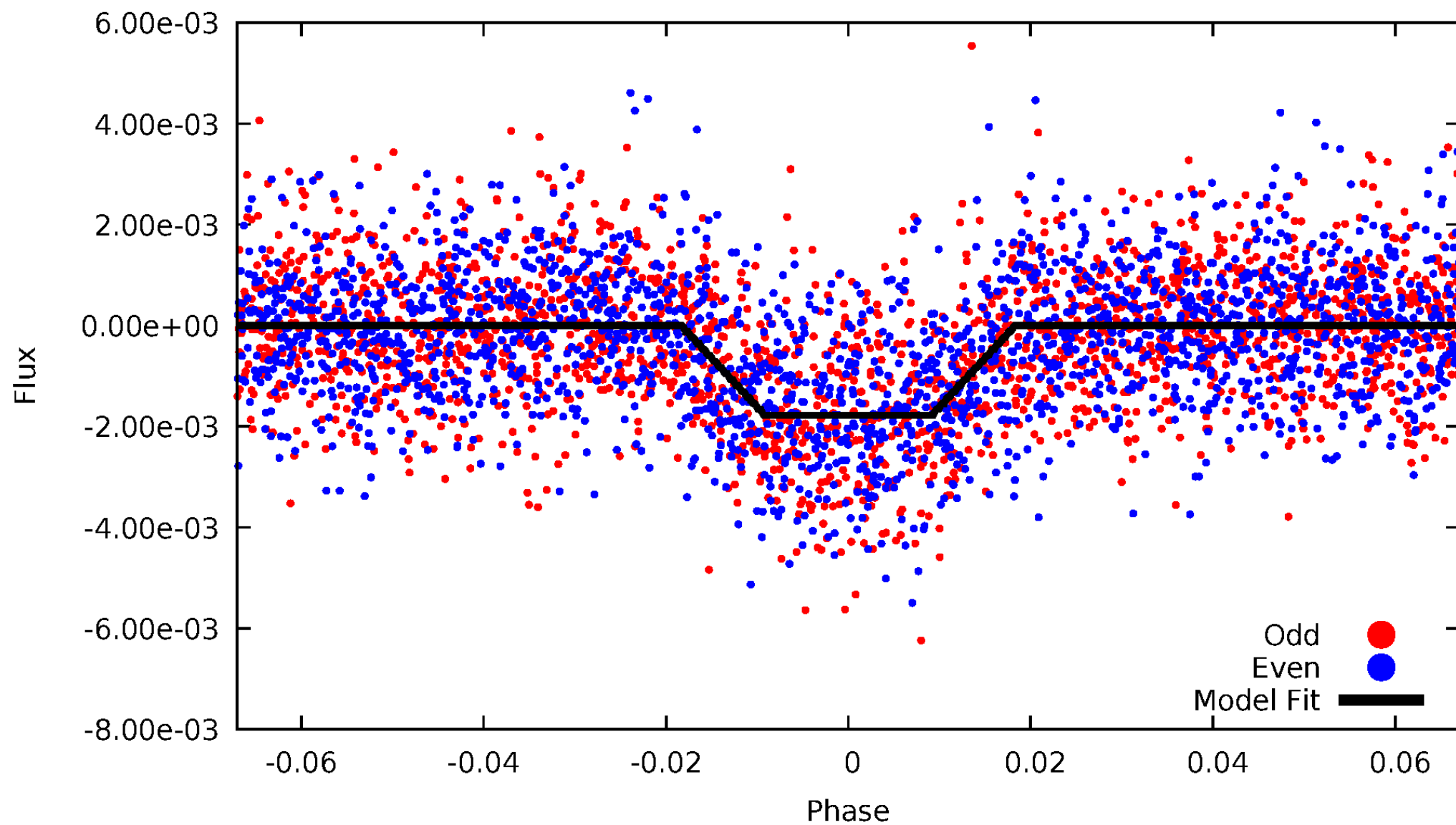
# DV Odd/Even

TCE 009837661-02



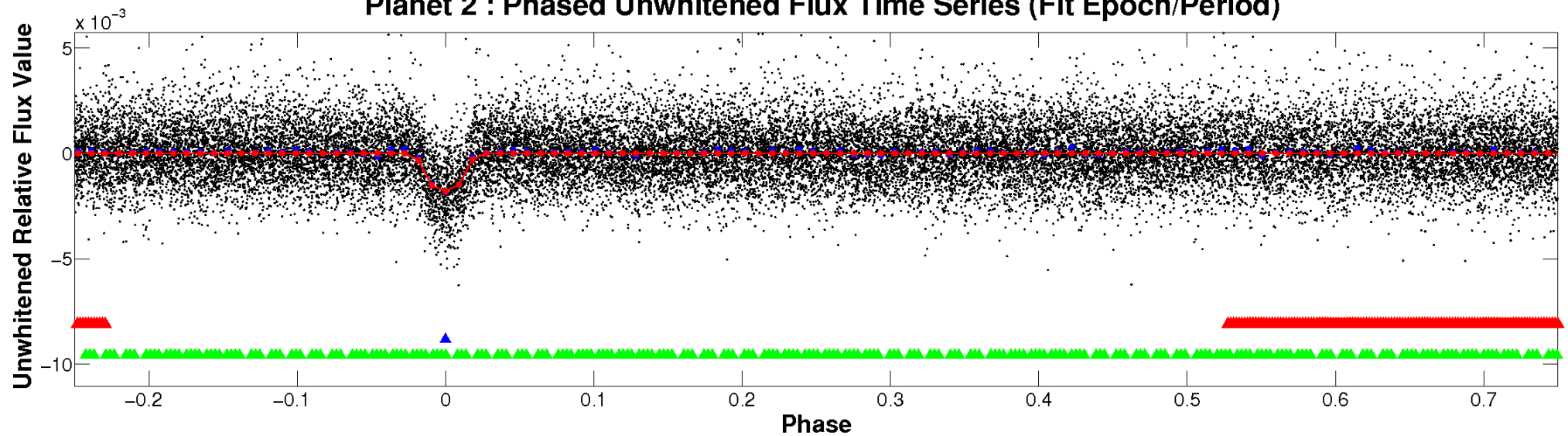
# ALT Odd/Even

TCE 009837661-02

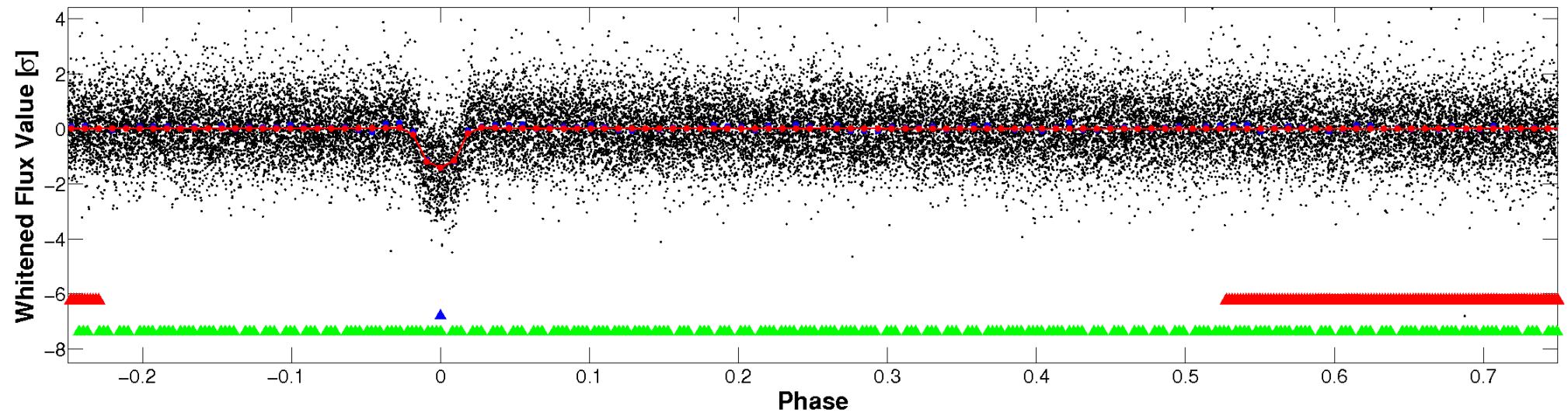


# Non-Whitened Vs. Whitened Light Curve

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



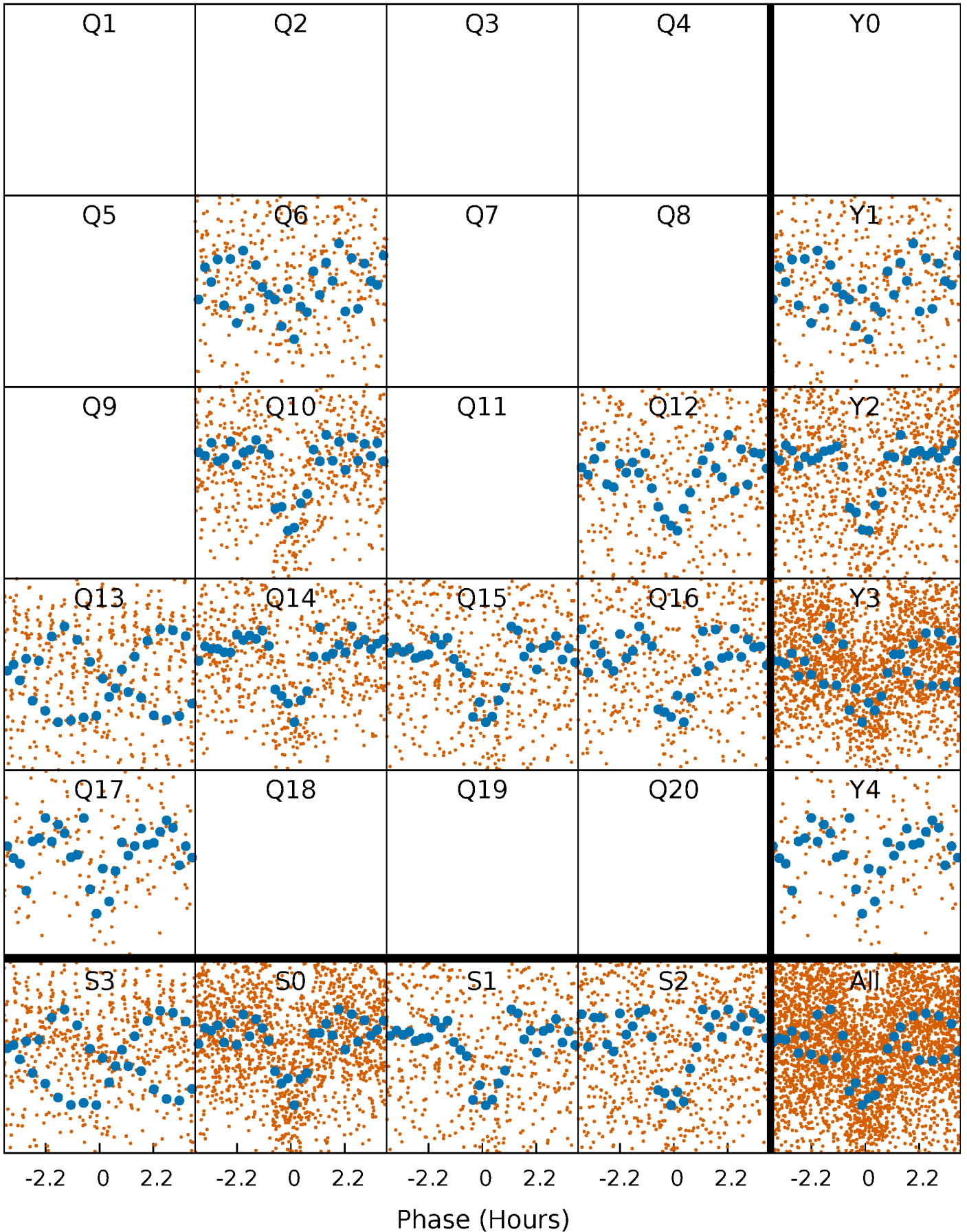
## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)





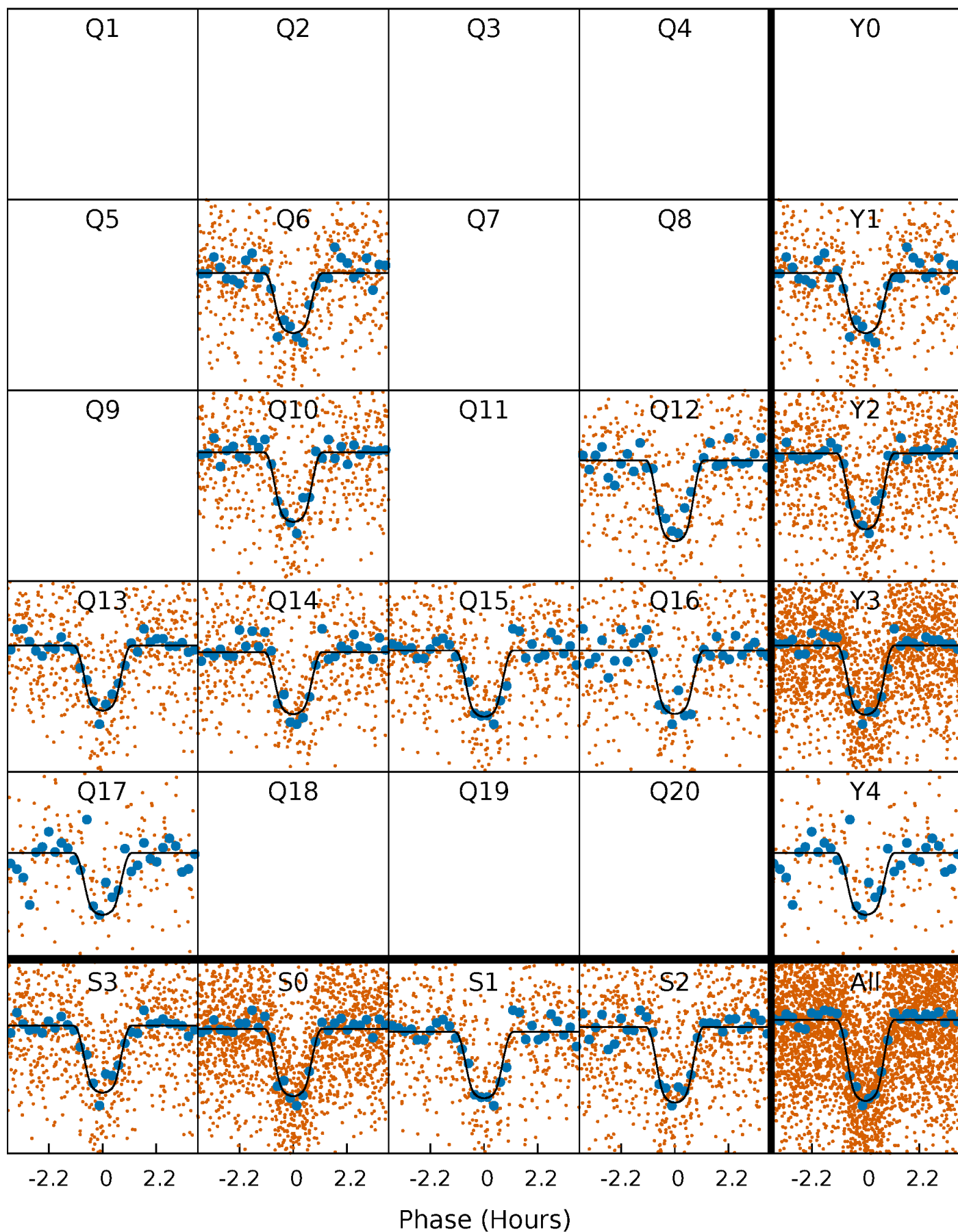
# PDC Quarter-Phased Transit Curves

TCE 009837661-02   P= 2.226485 Days    $T_0=133.376721$  (BKJD)



# DV Quarter-Phased Transit Curves

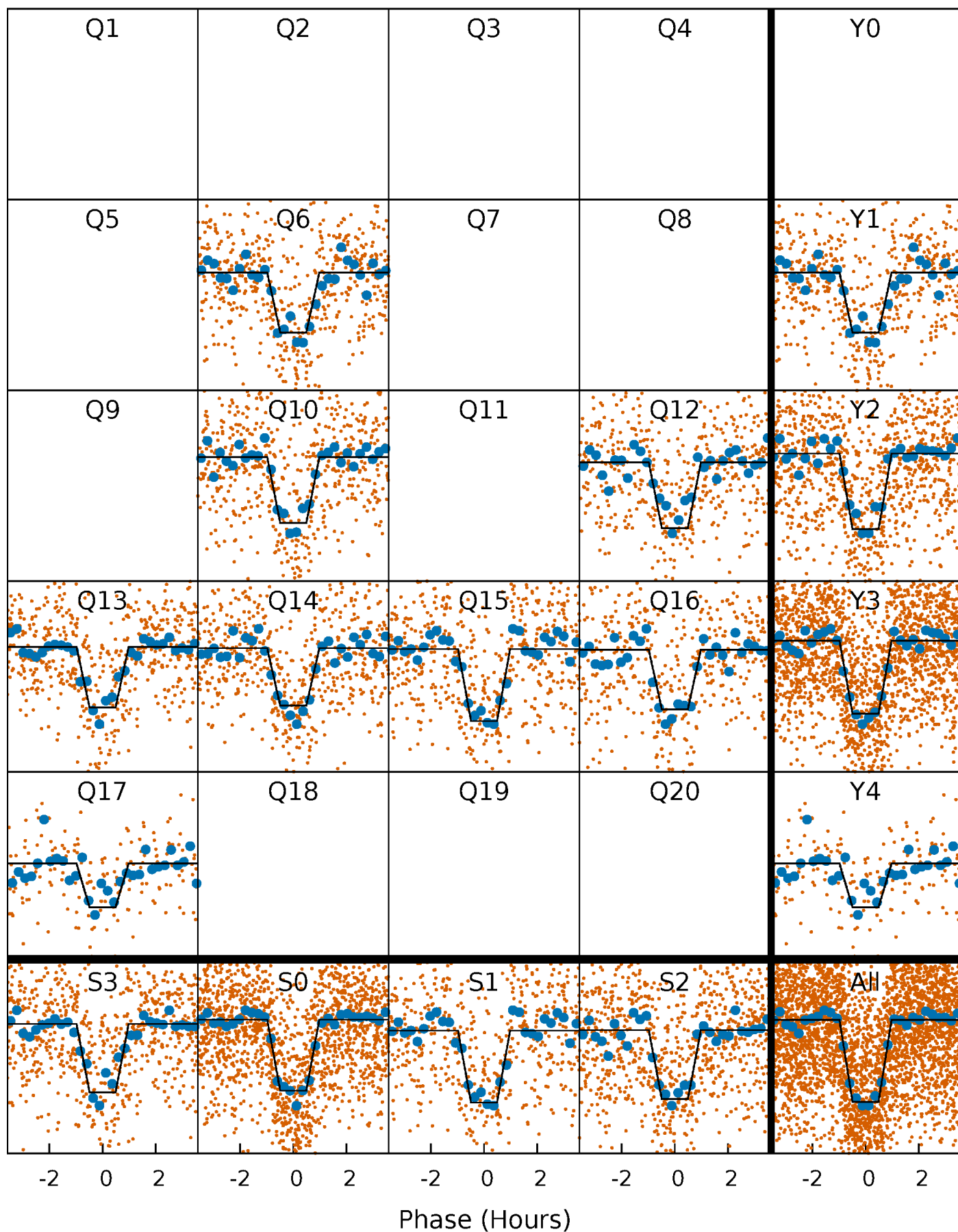
TCE 009837661-02   P= 2.226485 Days    $T_0=133.376721$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

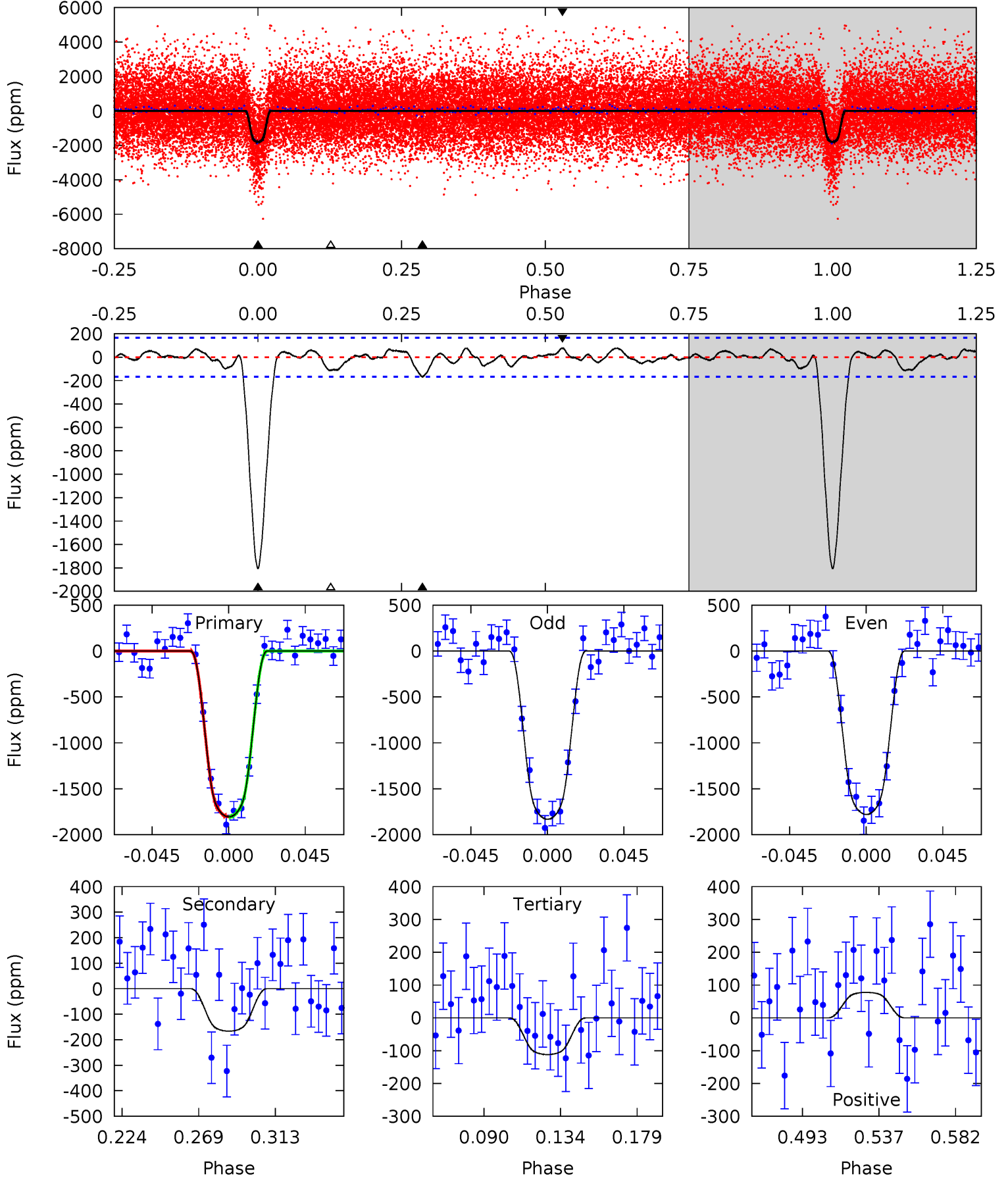
TCE 009837661-02   P= 2.226502 Days    $T_0=133.369240$  (BKJD)



# DV Model-Shift Uniqueness Test

009837661-02, P = 2.226485 Days, E = 133.376721 Days

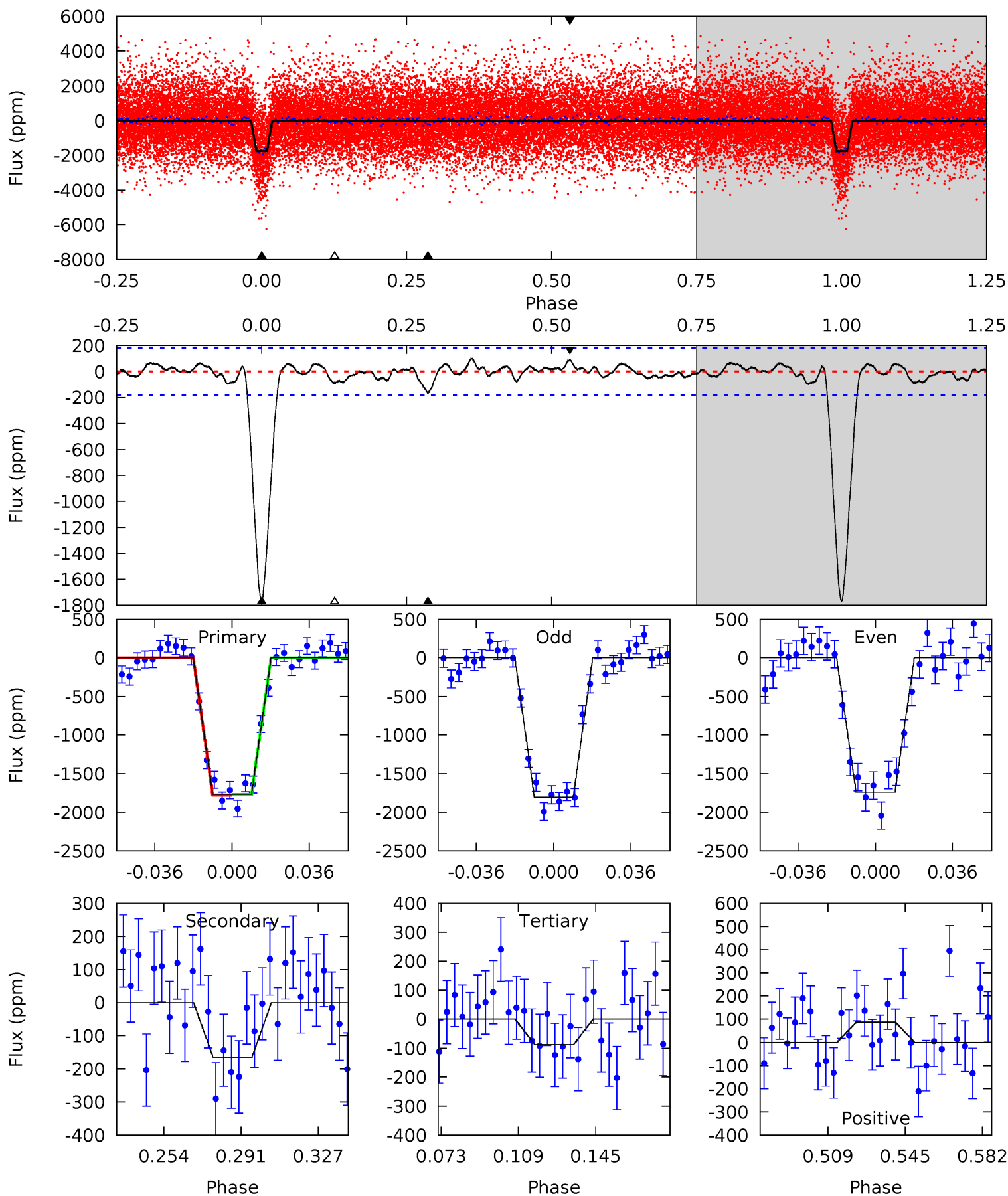
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
51.3	4.73	3.18	2.21	4.73	2.01	1.15	48.1	49.1	1.55	2.52	0.75	1.00	0.04	0.00



# Alt Model-Shift Uniqueness Test

009837661-02, P = 2.226502 Days, E = 133.369240 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
46.0	4.30	2.29	2.29	4.77	2.09	1.02	43.7	43.7	2.01	2.01	0.84	0.96	0.05	0.11



### Stellar Parameters For KIC 009837661

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$3640^{+81}_{-90}$	$4.744^{+0.056}_{-0.024}$	$0.210^{+0.150}_{-0.150}$	$0.503^{+0.030}_{-0.056}$	$0.513^{+0.036}_{-0.054}$	$5.663^{+1.653}_{-0.588}$
	+2%/-2%	+1%/-1%	+71%/-71%	+6%/-11%	+7%/-11%	+29%/-10%
Source	SPE70	KIC0	SPE70	DSEP		

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

### Secondary Eclipse Parameters for KIC 009837661-02 / KOI 2715.02

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-166 \pm 35$	$2.51^{+0.25}_{-0.23}$	$967^{+28}_{-30}$	$2524^{+96}_{-101}$	$10^{+3}_{-3}$
Alt.	$-165 \pm 38$	$2.30^{+0.24}_{-0.23}$	$967^{+27}_{-31}$	$2580^{+101}_{-107}$	$13^{+4}_{-4}$

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

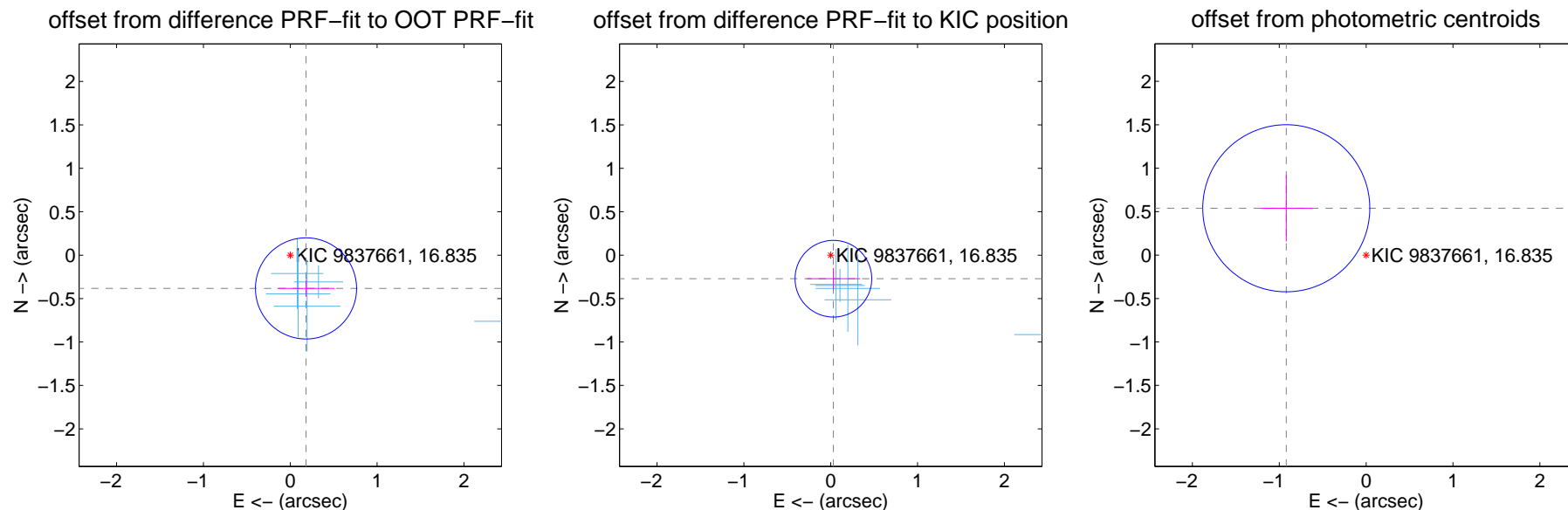
## DV Centroid Data

Supplemental centroid analysis for 009837661-02. Kepler magnitude: 16.84. Transit SNR 35.54

There are 8 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.15 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.424 \pm 0.194$	2.18	$-0.181 \pm 0.329$	$-0.383 \pm 0.097$
PRF-fit source offset from KIC position	$0.273 \pm 0.147$	1.85	$-0.031 \pm 0.307$	$-0.271 \pm 0.123$
photometric centroid source offset	$1.07 \pm 0.32$	<b>3.32</b>	$0.92 \pm 0.30$	$0.54 \pm 0.38$

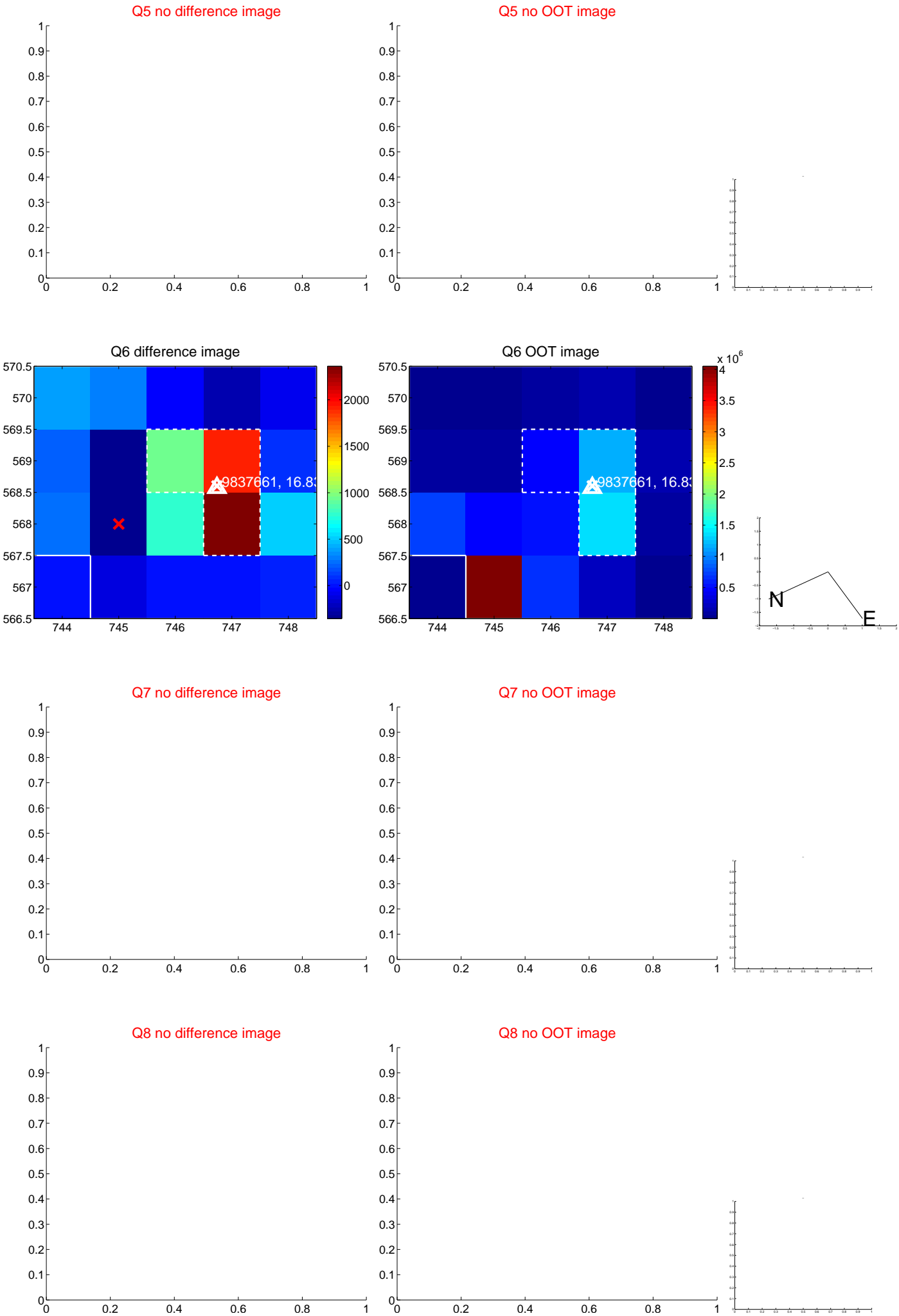


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

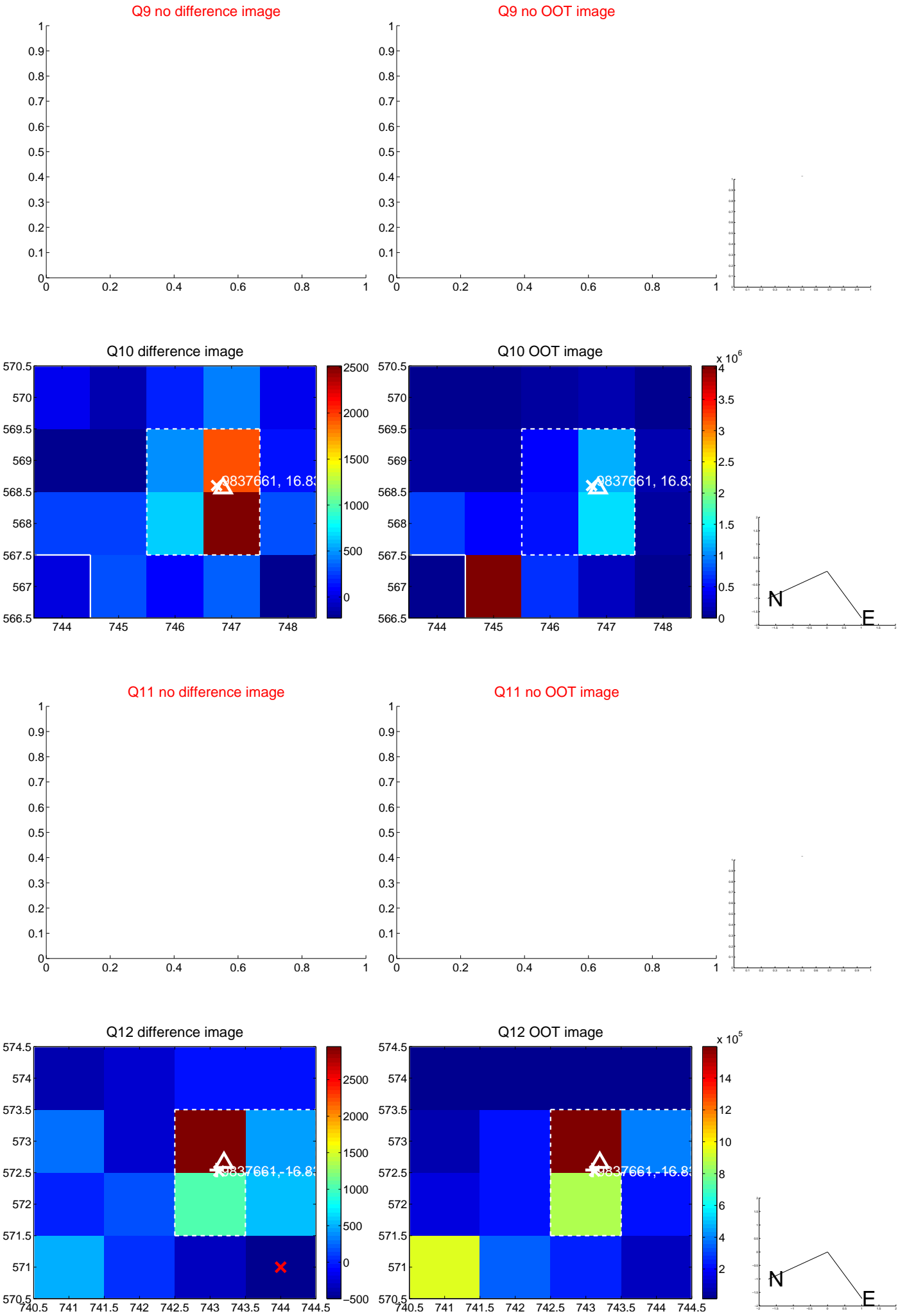


white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.

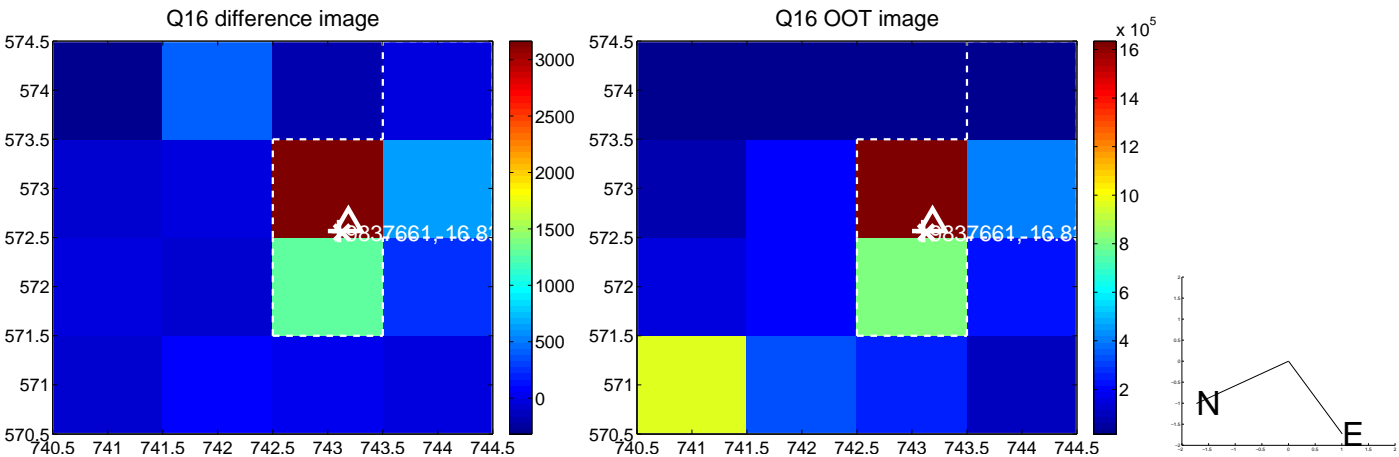
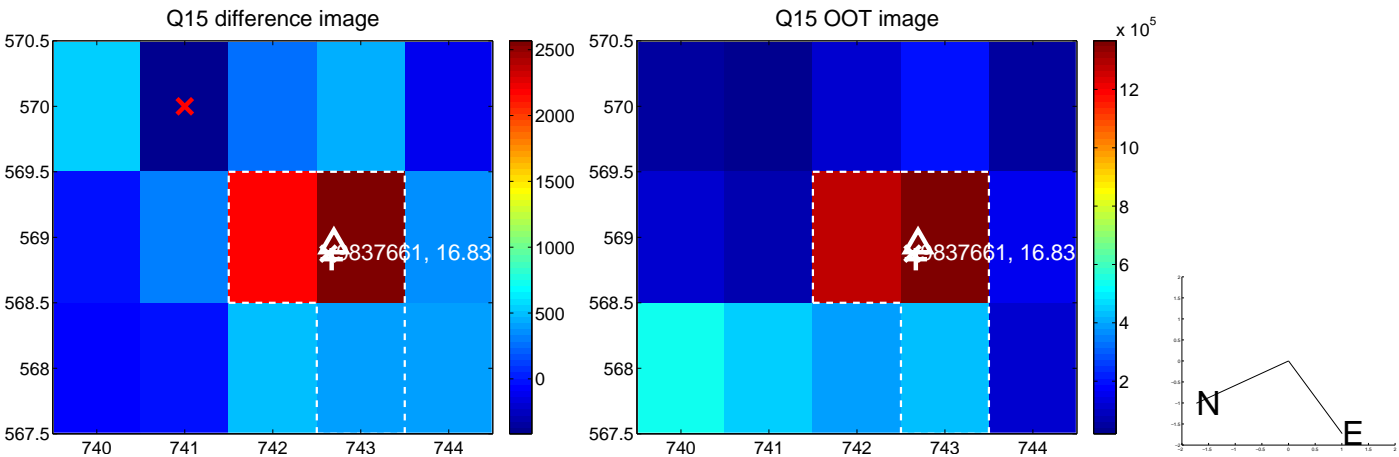
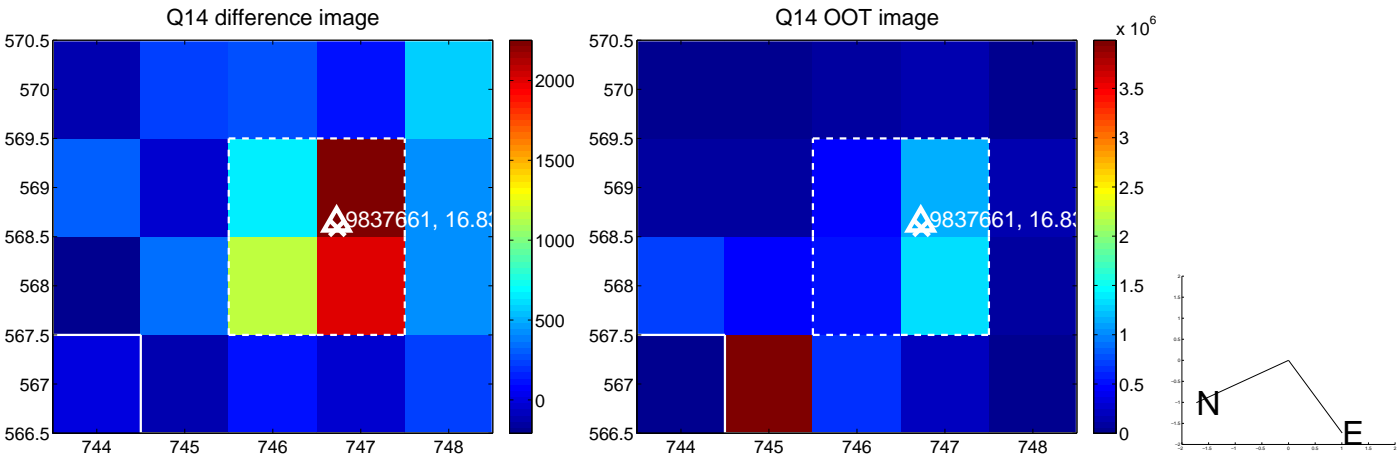
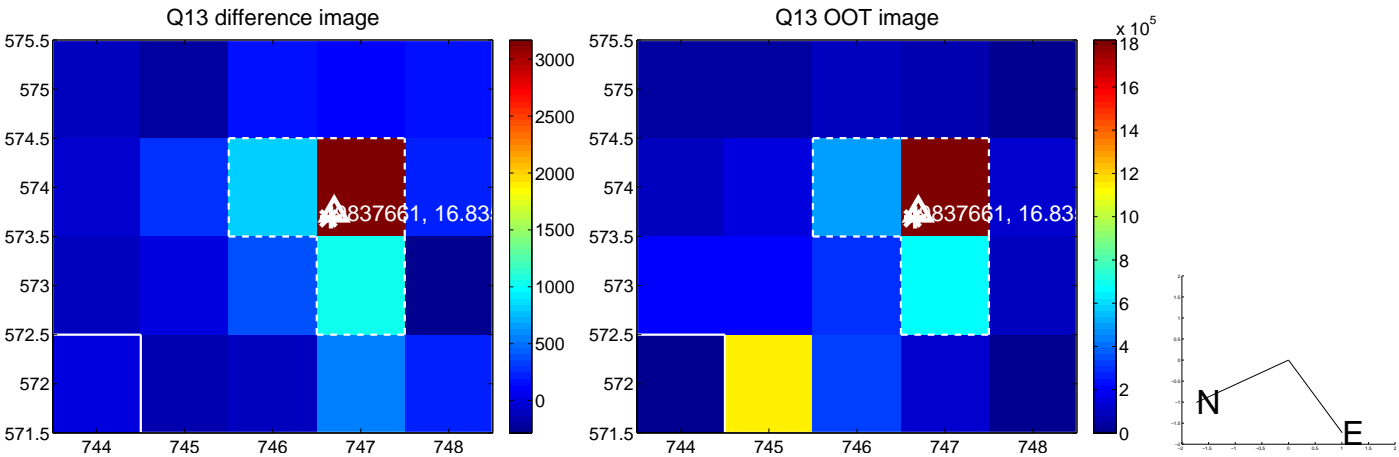




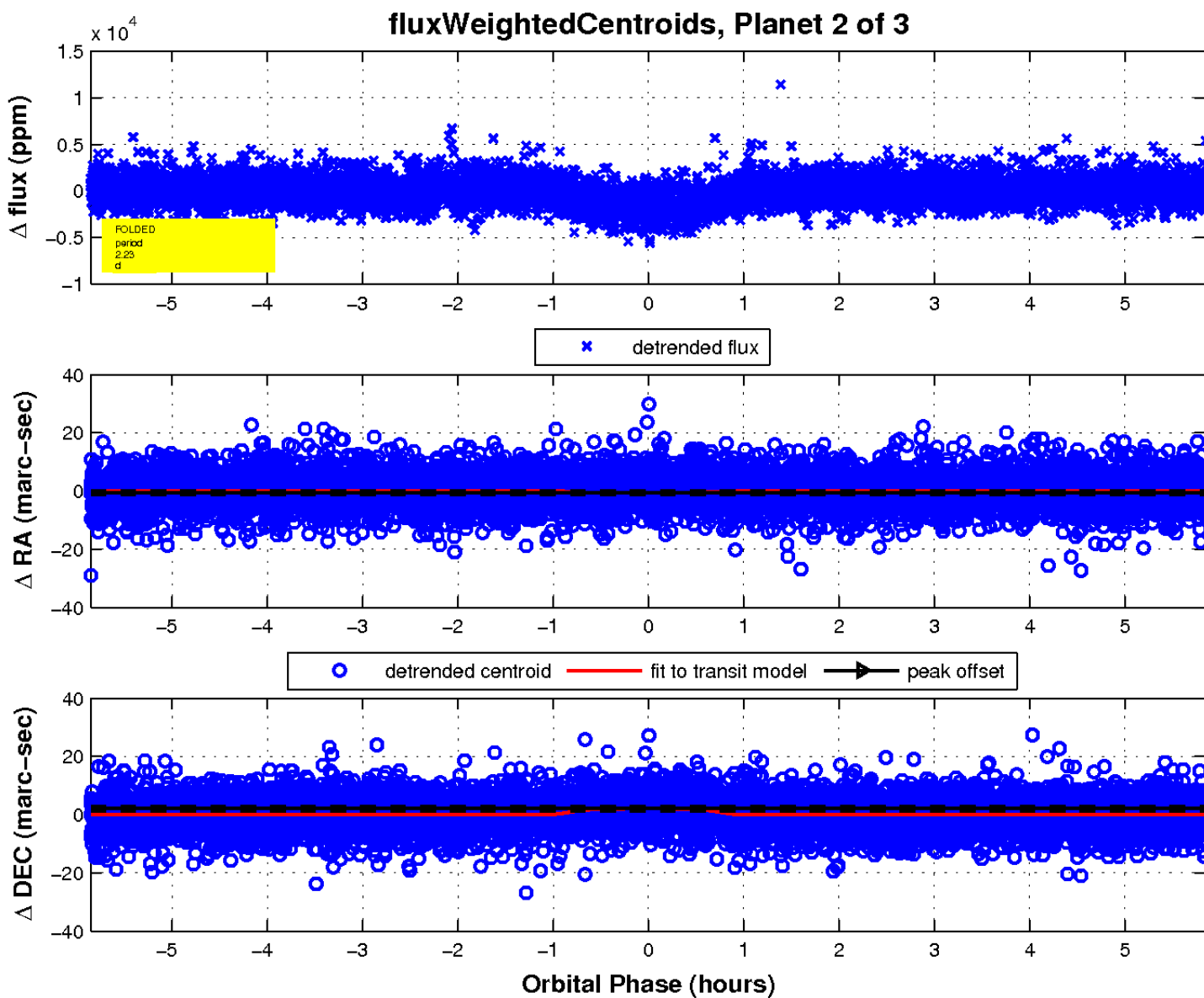
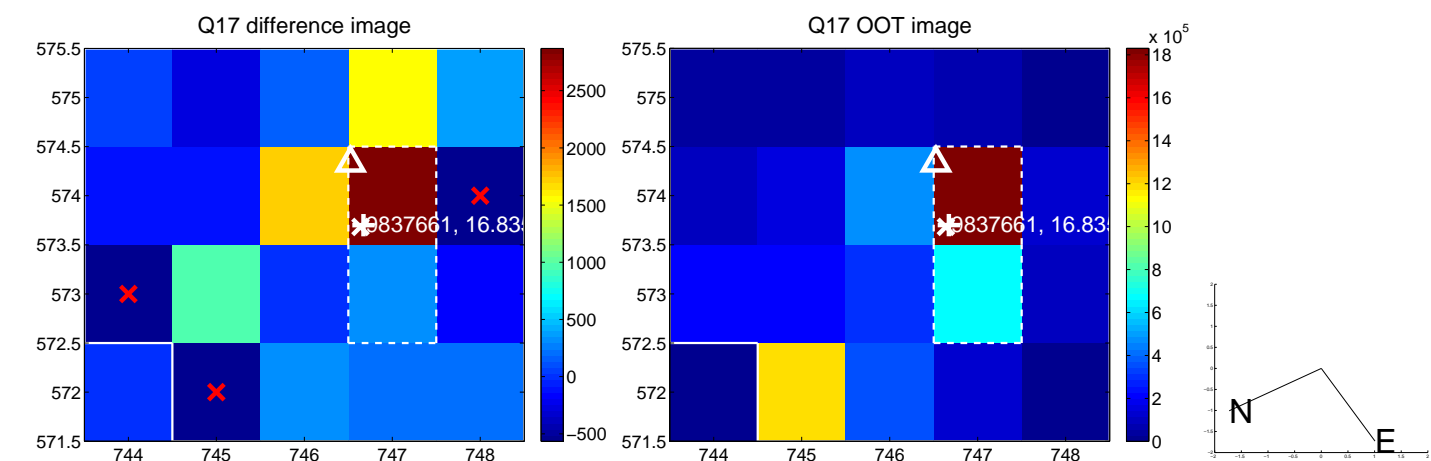
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

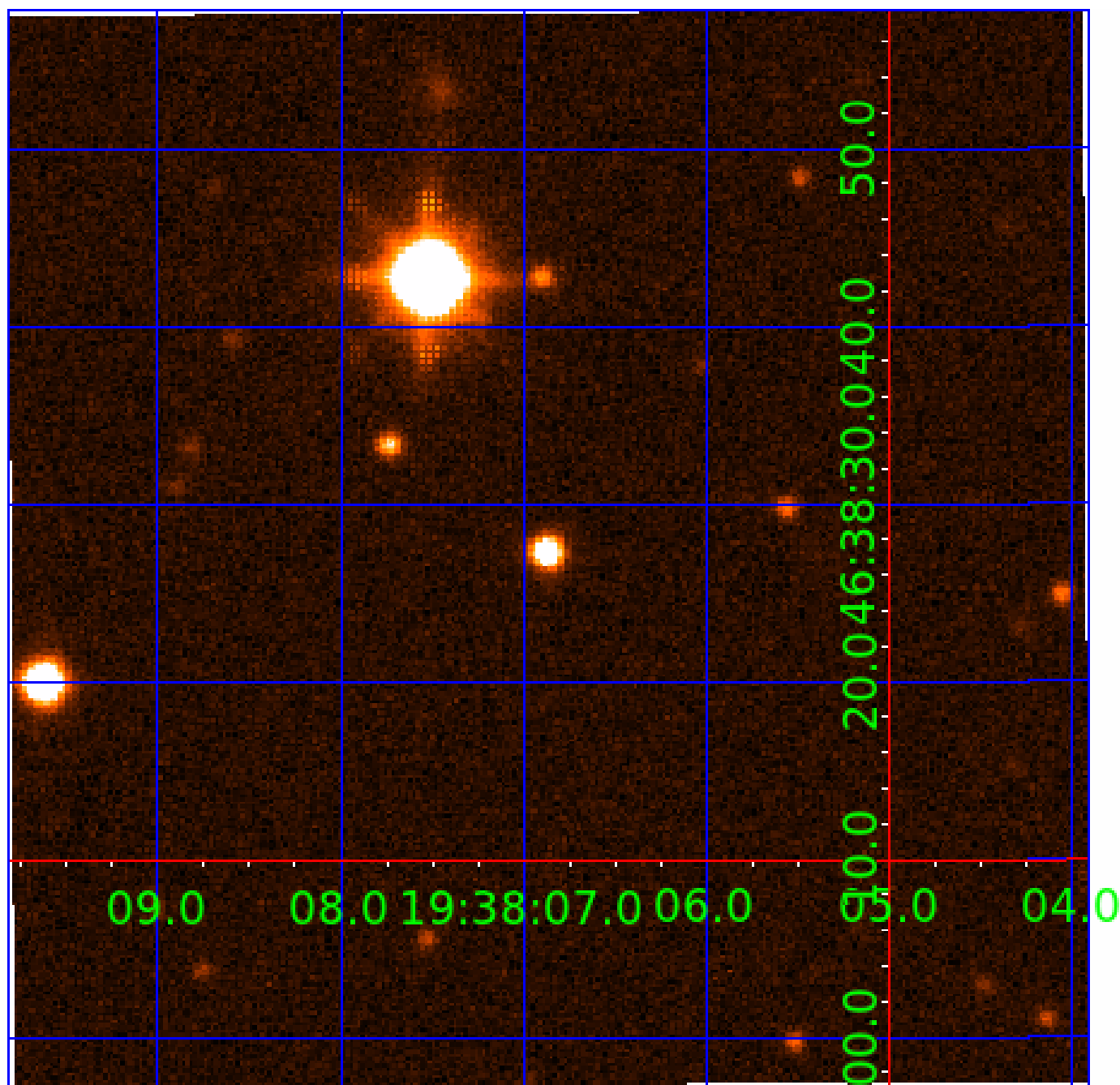


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 009837661

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009837661-01	OBS	2715.01	11.128266	139.545309	6106.7	2.692	55.1	59.5	0.50	3640	4.26	6.53
009837661-02	OBS	2715.02	2.226485	133.376721	1820.7	1.952	31.1	35.5	0.50	3640	2.55	55.83
009837661-03	OBS	2715.03	5.720918	134.656416	1293.7	2.743	15.1	17.3	0.50	3640	1.96	15.86

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009837661-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
009837661-02	OBS	PC	1.00	0	0	0	0	NO_COMMENT
009837661-03	OBS	PC	1.00	0	0	0	0	NO_COMMENT

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

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

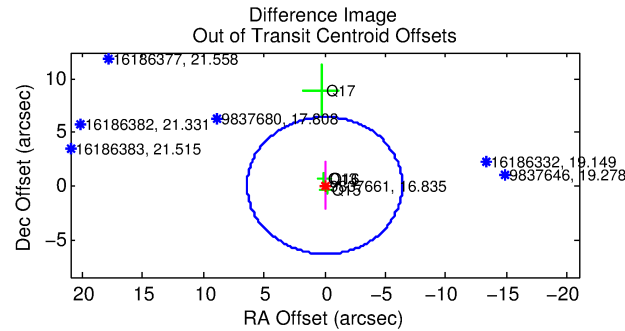
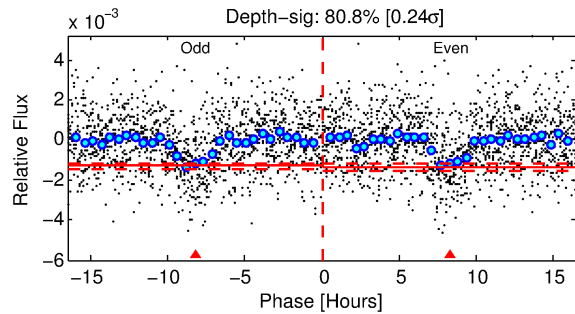
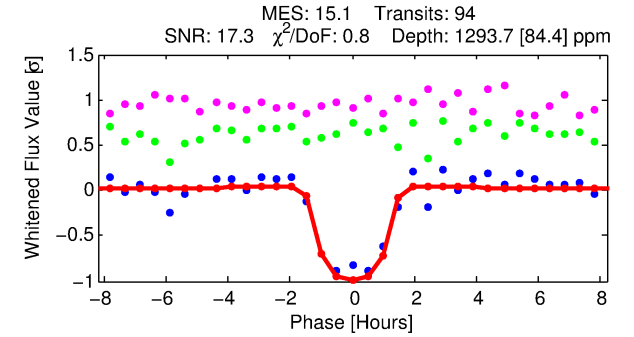
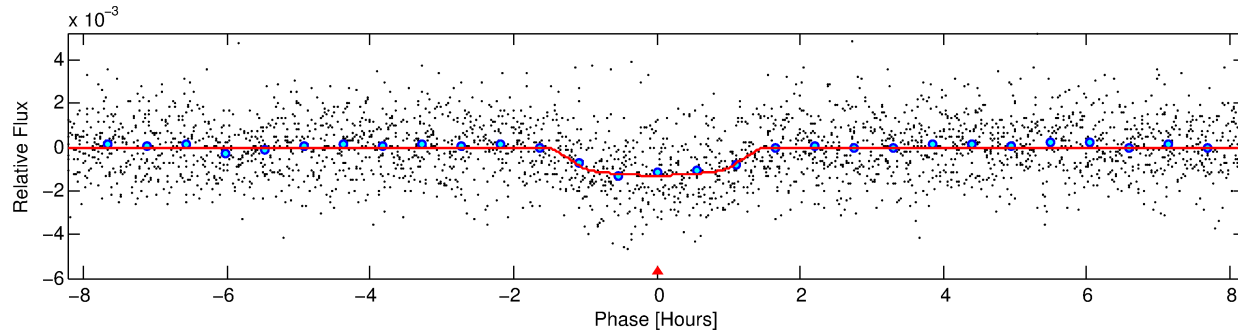
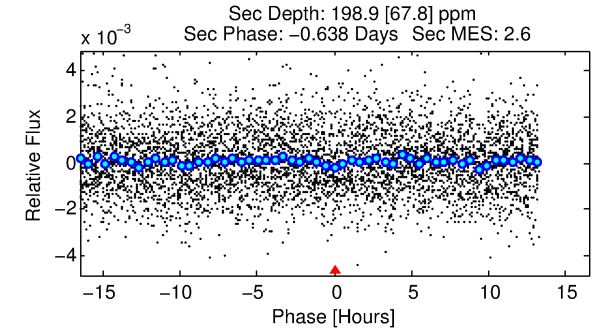
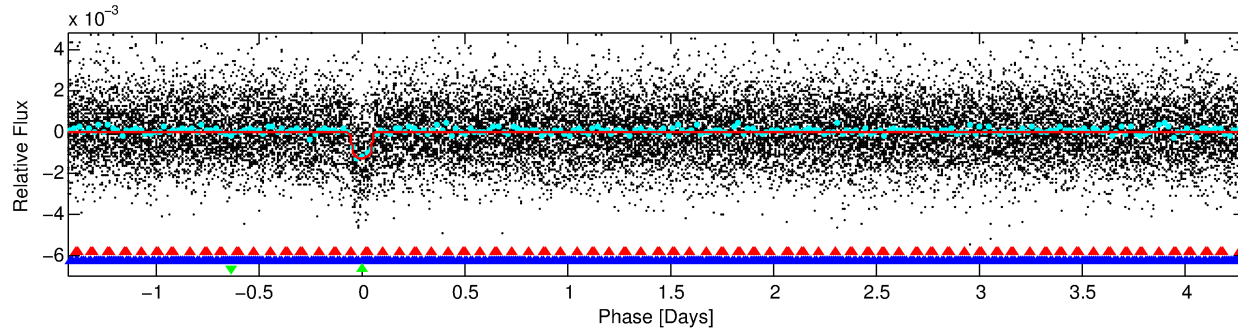
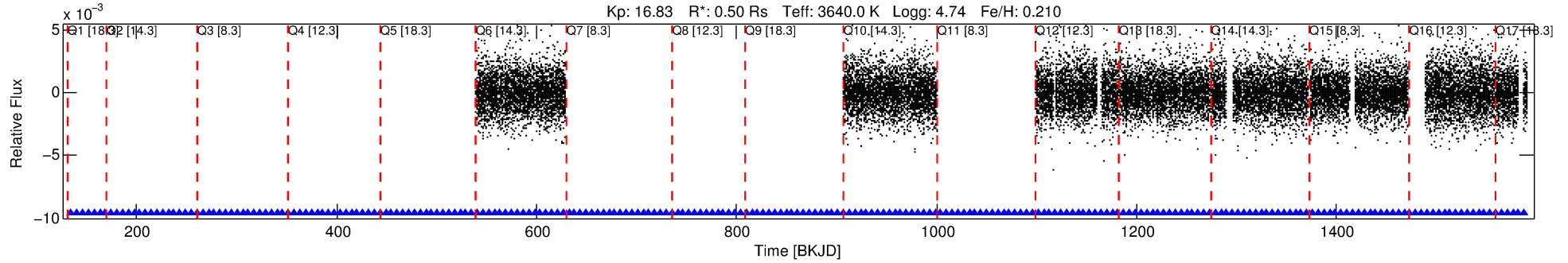
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 009837661-03

No Significant Match Found

# DV One-Page Summary

KIC: 9837661 Candidate: 3 of 3 Period: 5.721 d  
KOI: K02715.03 Corr: 0.970



## DV Fit Results:

Period = 5.72092 [0.00002] d  
Epoch = 134.6564 [0.0035] BKJD  
Rp/R\* = 0.0358 [0.0202]  
a/R\* = 11.50 [25.25]  
b = 0.75 [1.34]  
Seff = 15.86 [2.39]  
Teq = 509 [19] K  
Rp = 1.96 [1.13] Re  
a = 0.0501 [0.0043] AU  
Ag = 71.19 [84.38] [0.83σ]  
Teffp = 2285 [676] K [2.63σ]

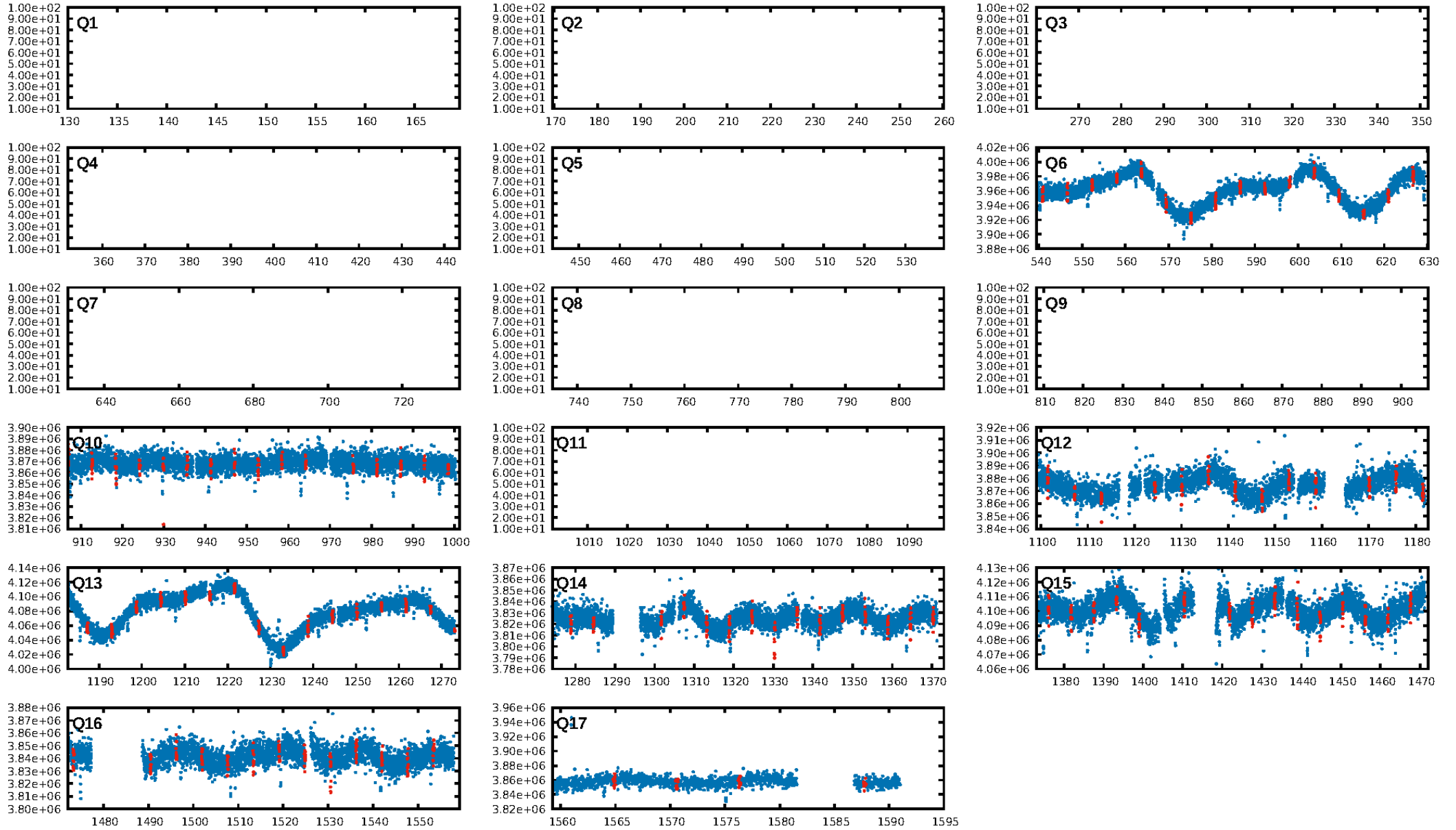
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [24.91σ]  
LongPeriod-sig: 100.0% [33.77σ]  
ModelChiSquare2-sig: 90.3%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 5.23e-54  
RollingBand-fgt: 1.00 [90/90]  
GhostDiagnostic-chr: -136.1  
Centroid-sig: 17.3%  
Centroid-so: 1.106 arcsec [1.60σ]  
OotOffset-rm: 0.054 arcsec [0.03σ]  
OotOffset-st: 0/1/1/2 [4]  
KicOffset-rm: 0.511 arcsec [0.42σ]  
KicOffset-st: 2/1/1/2 [6]  
DiffImageQuality-fgm: 0.67 [4/6]  
DiffImageOverlap-fno: 1.00 [8/8]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 08:18:43 Z

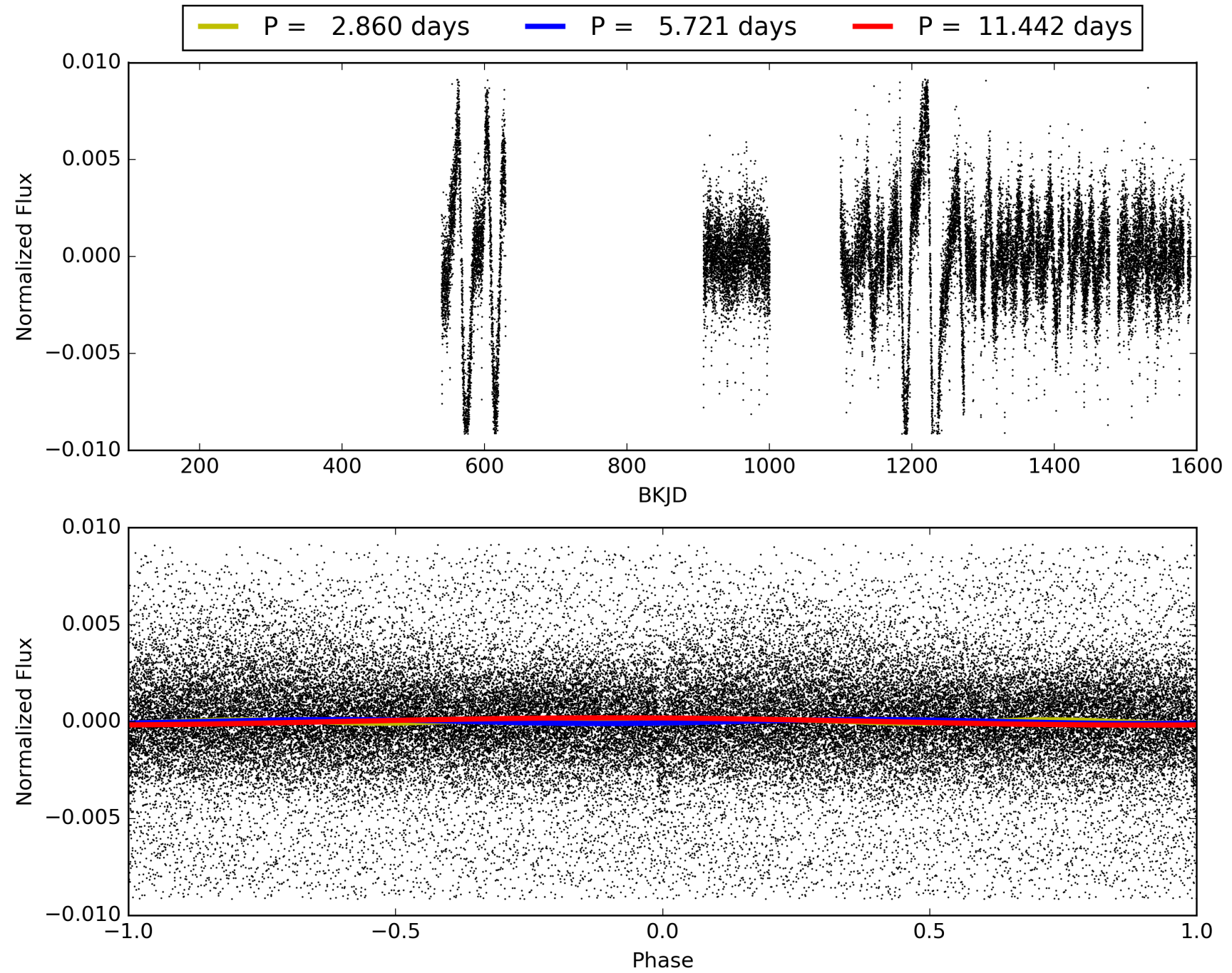
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 009837661-03, PDC Light Curves



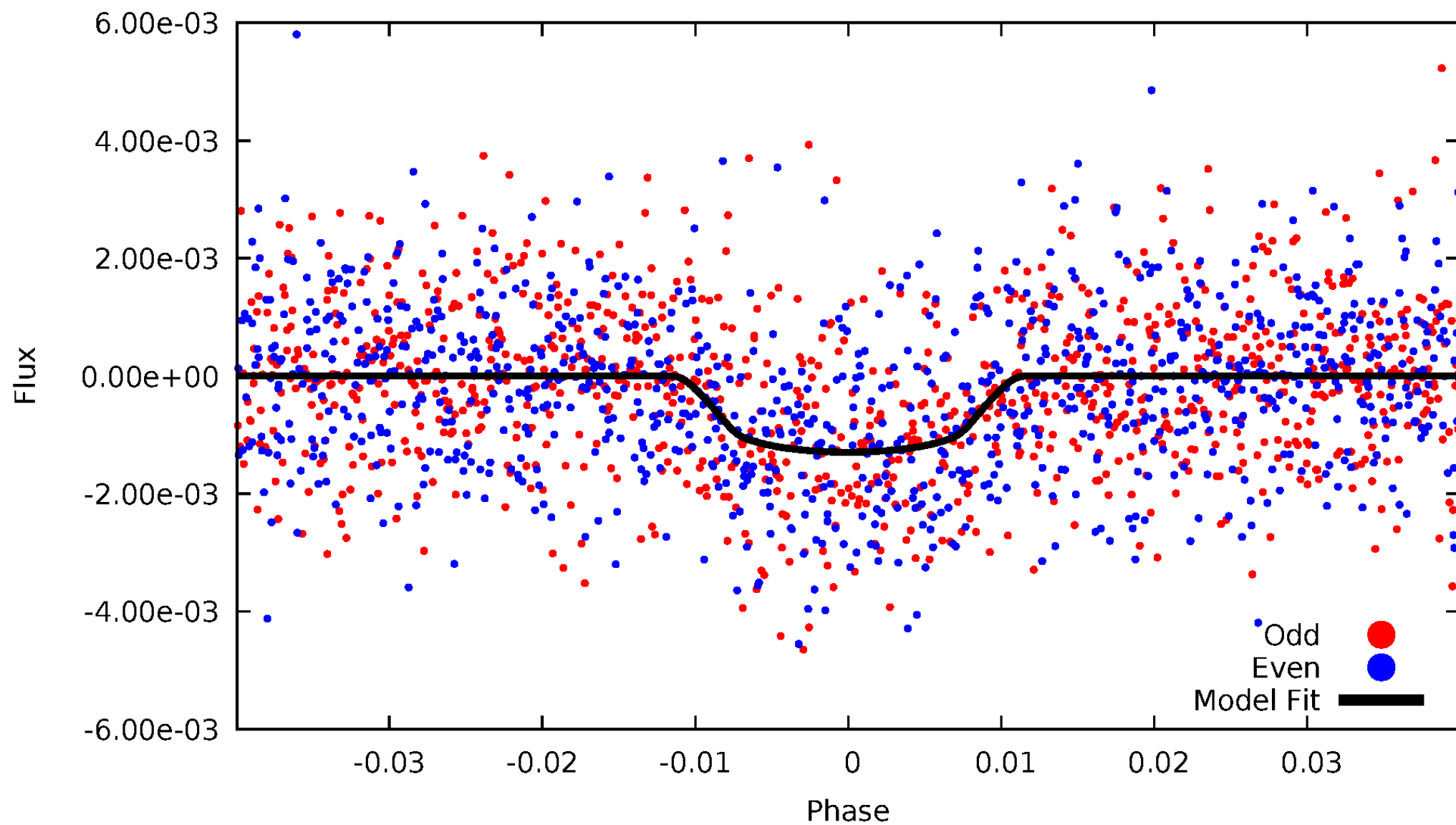


TCE 009837661-03



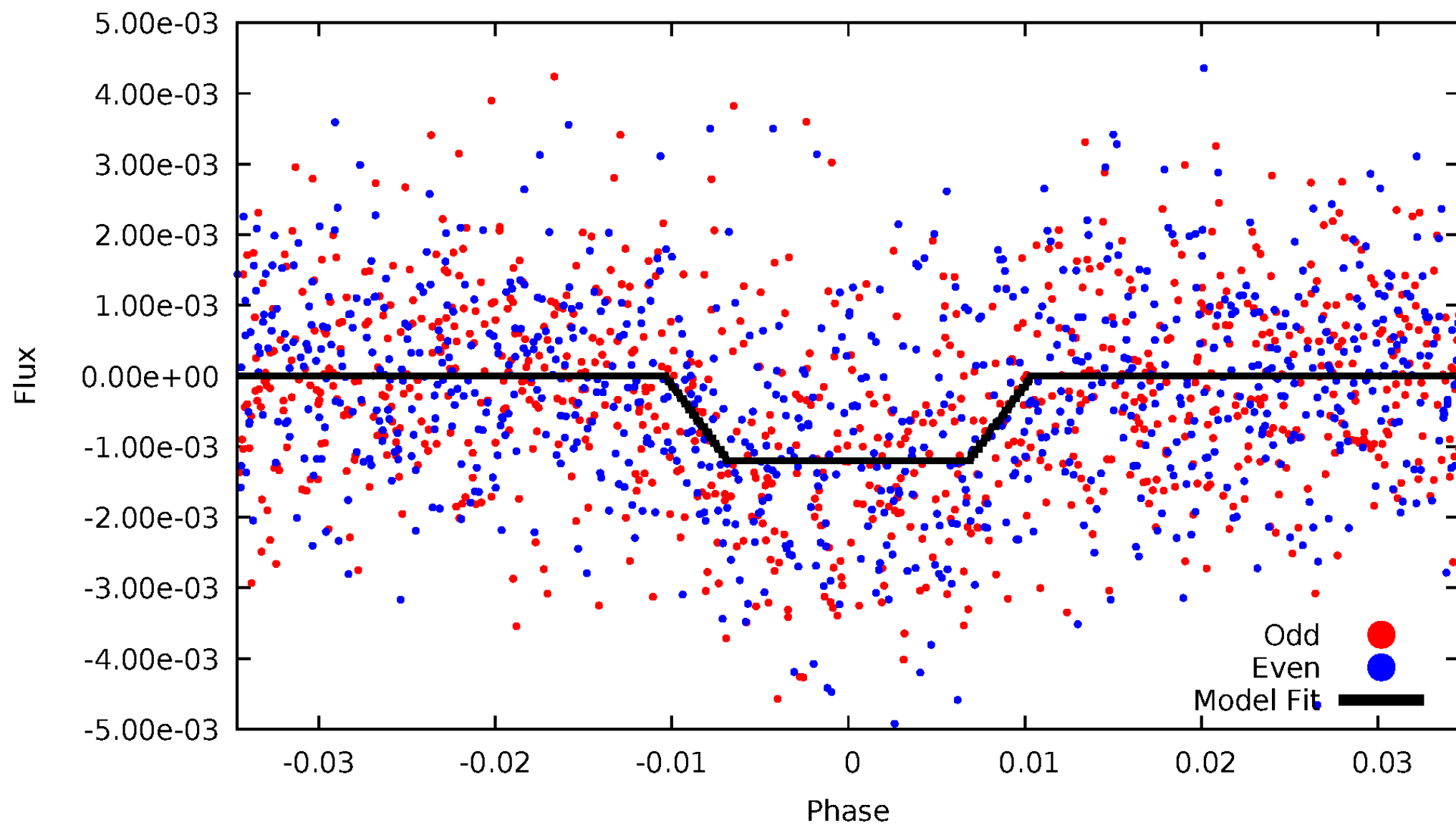
# DV Odd/Even

TCE 009837661-03

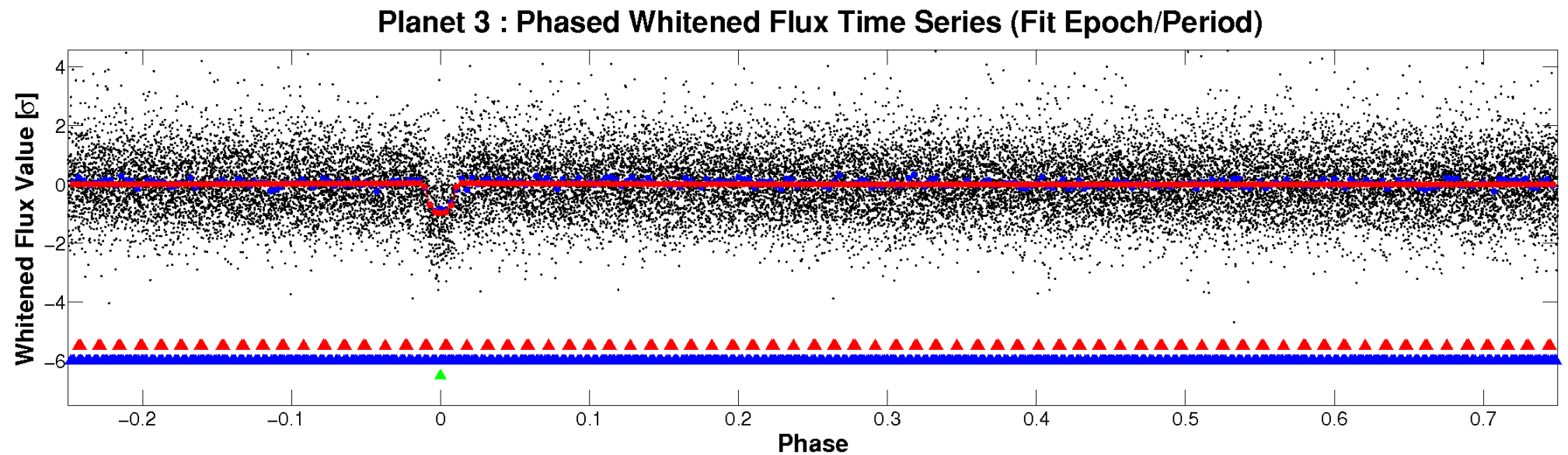
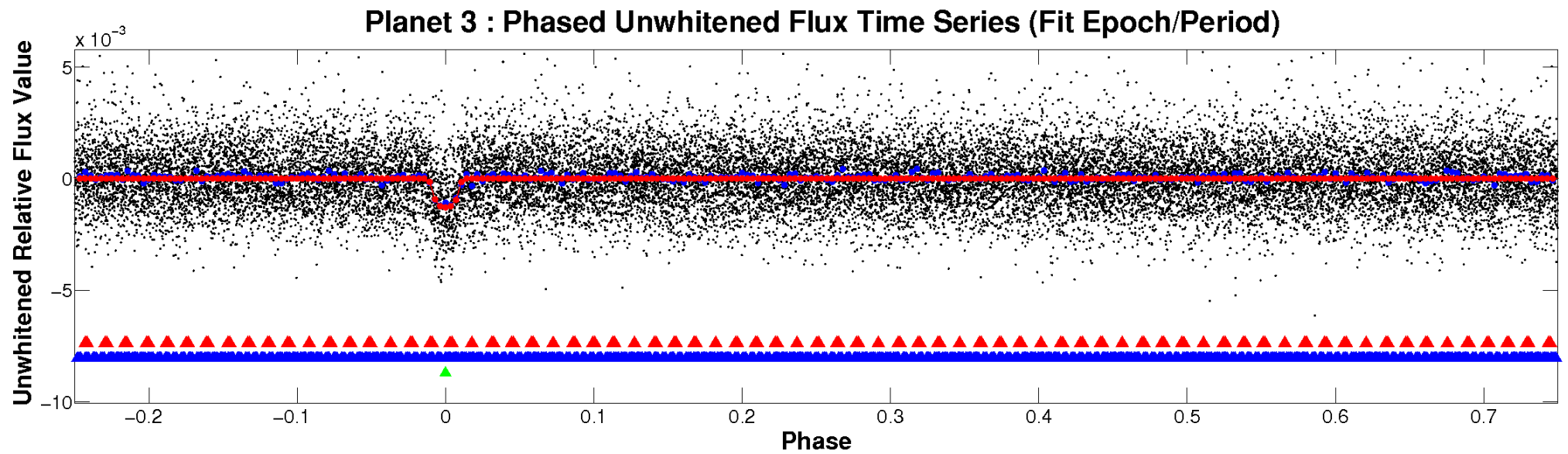


# ALT Odd/Even

TCE 009837661-03

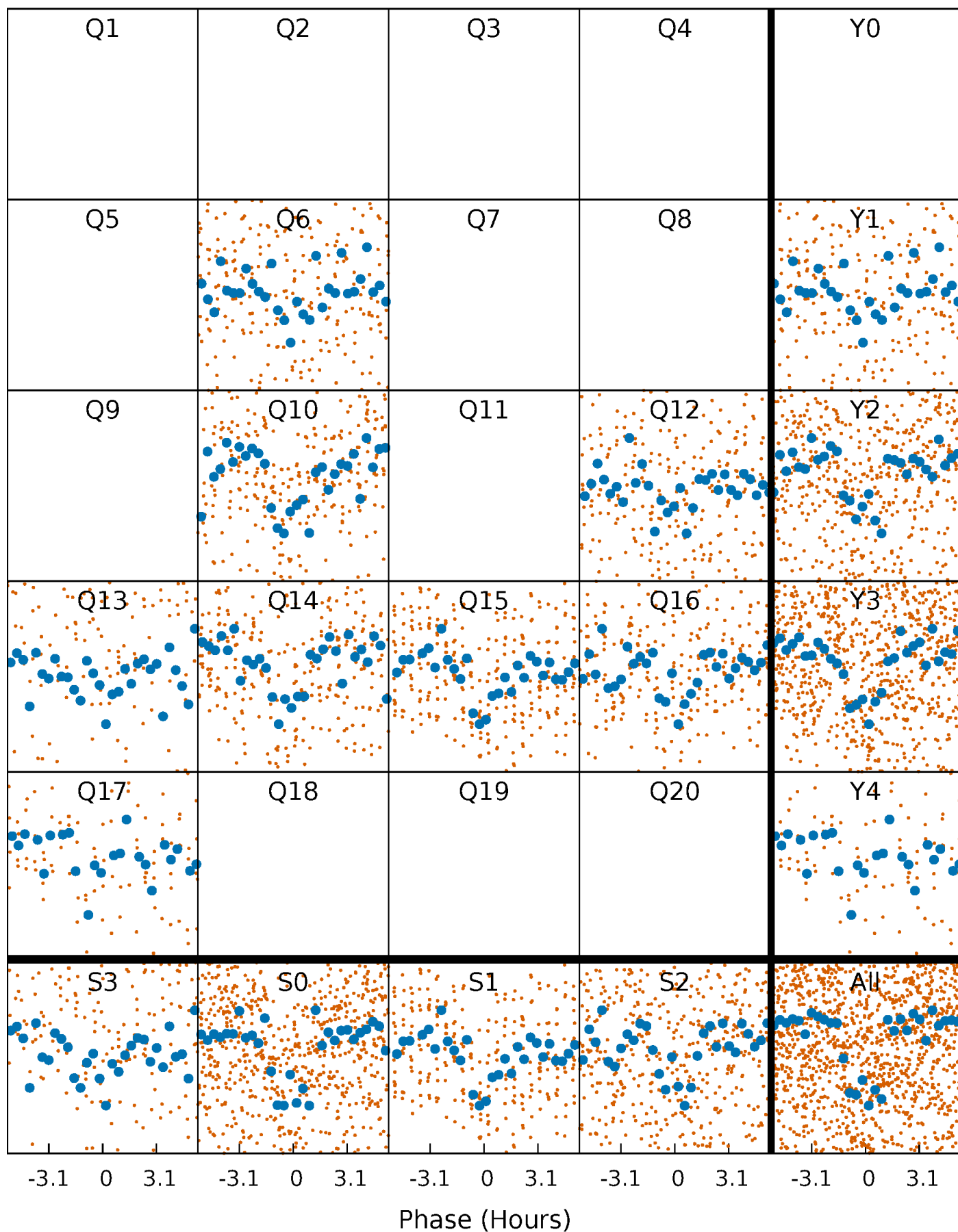


# Non-Whitened Vs. Whitened Light Curve



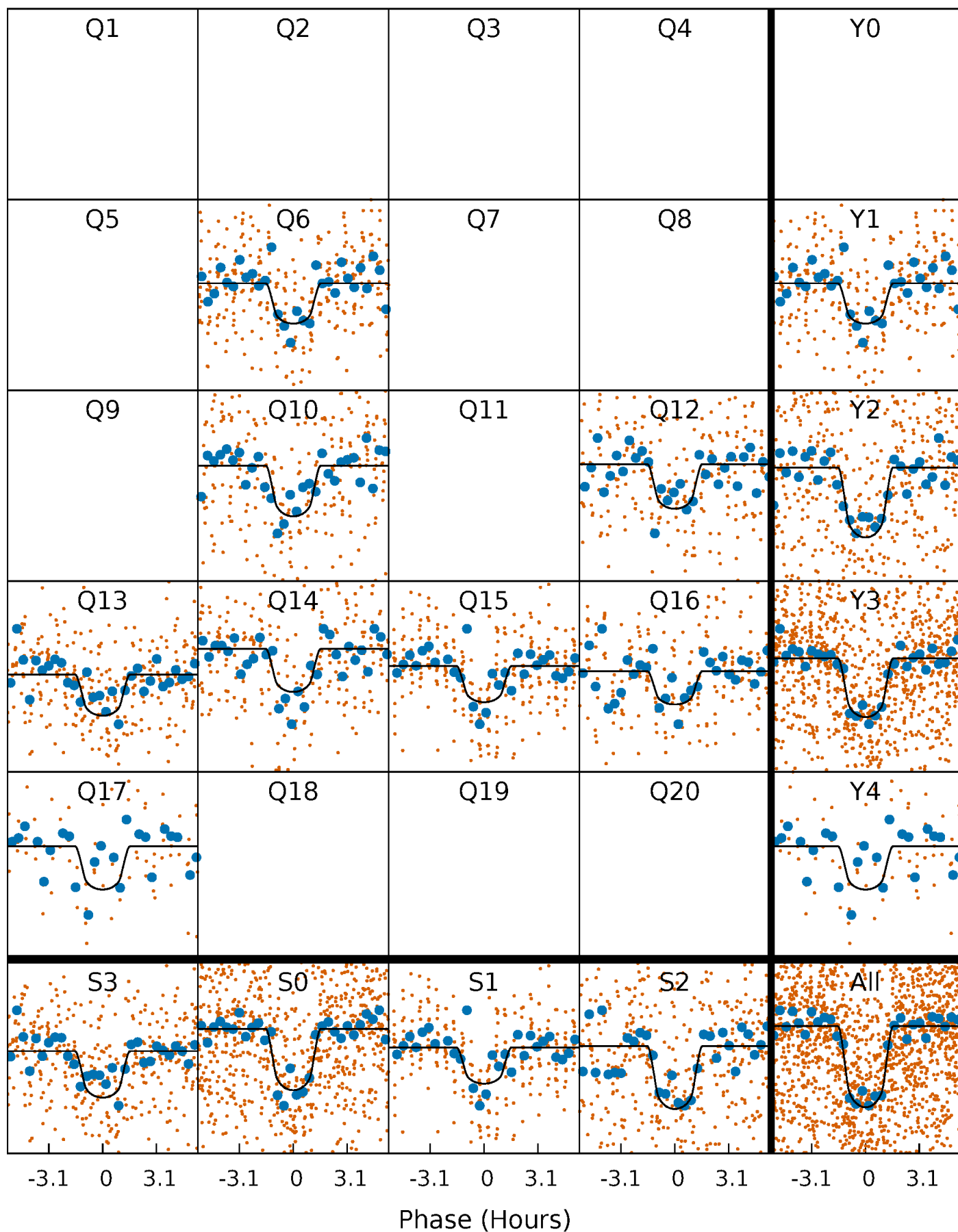
# PDC Quarter-Phased Transit Curves

TCE 009837661-03 P= 5.720918 Days  $T_0=134.656416$  (BKJD)



# DV Quarter-Phased Transit Curves

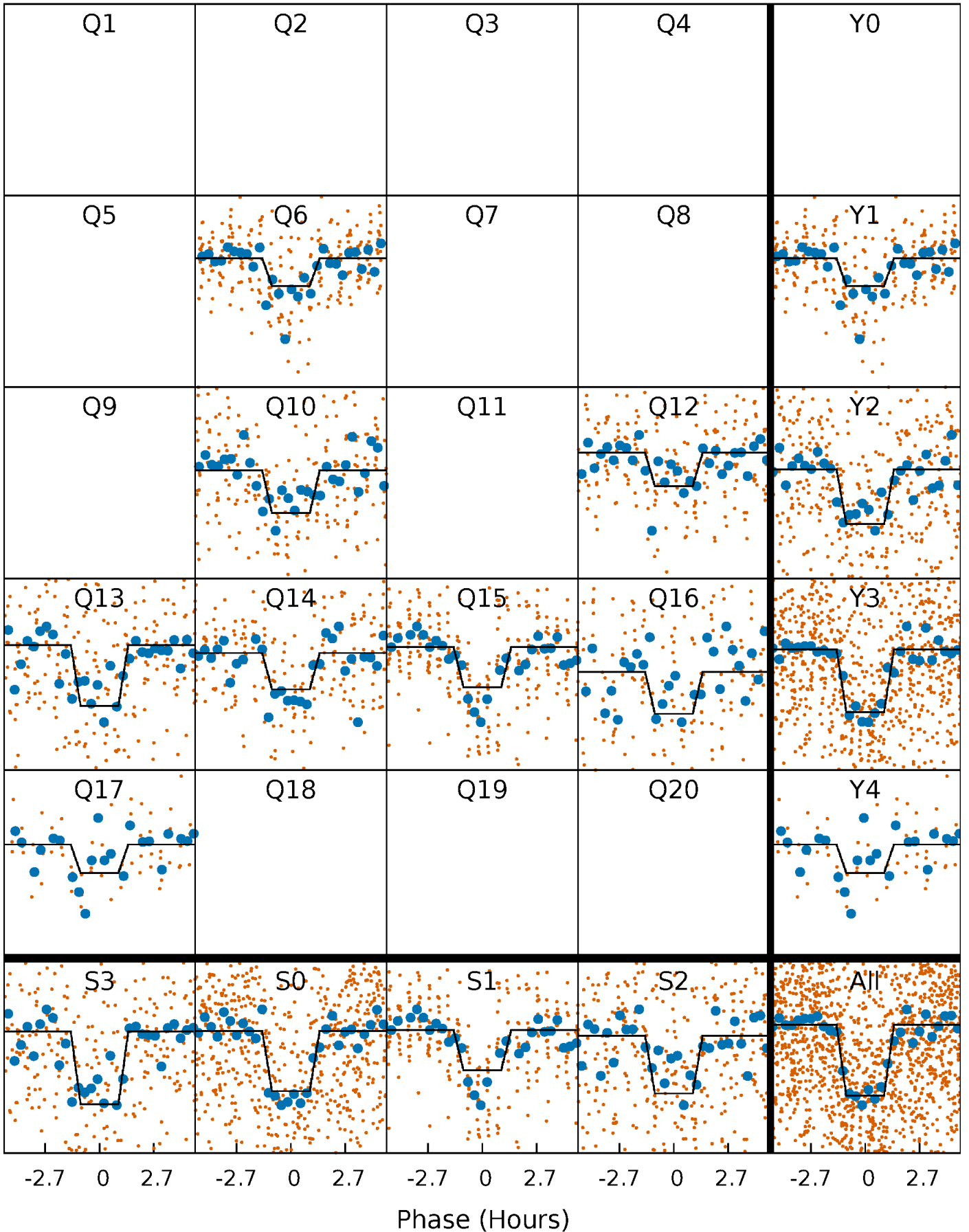
TCE 009837661-03 P= 5.720918 Days  $T_0=134.656416$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

TCE 009837661-03   P= 5.720883 Days    $T_0=134.662632$  (BKJD)

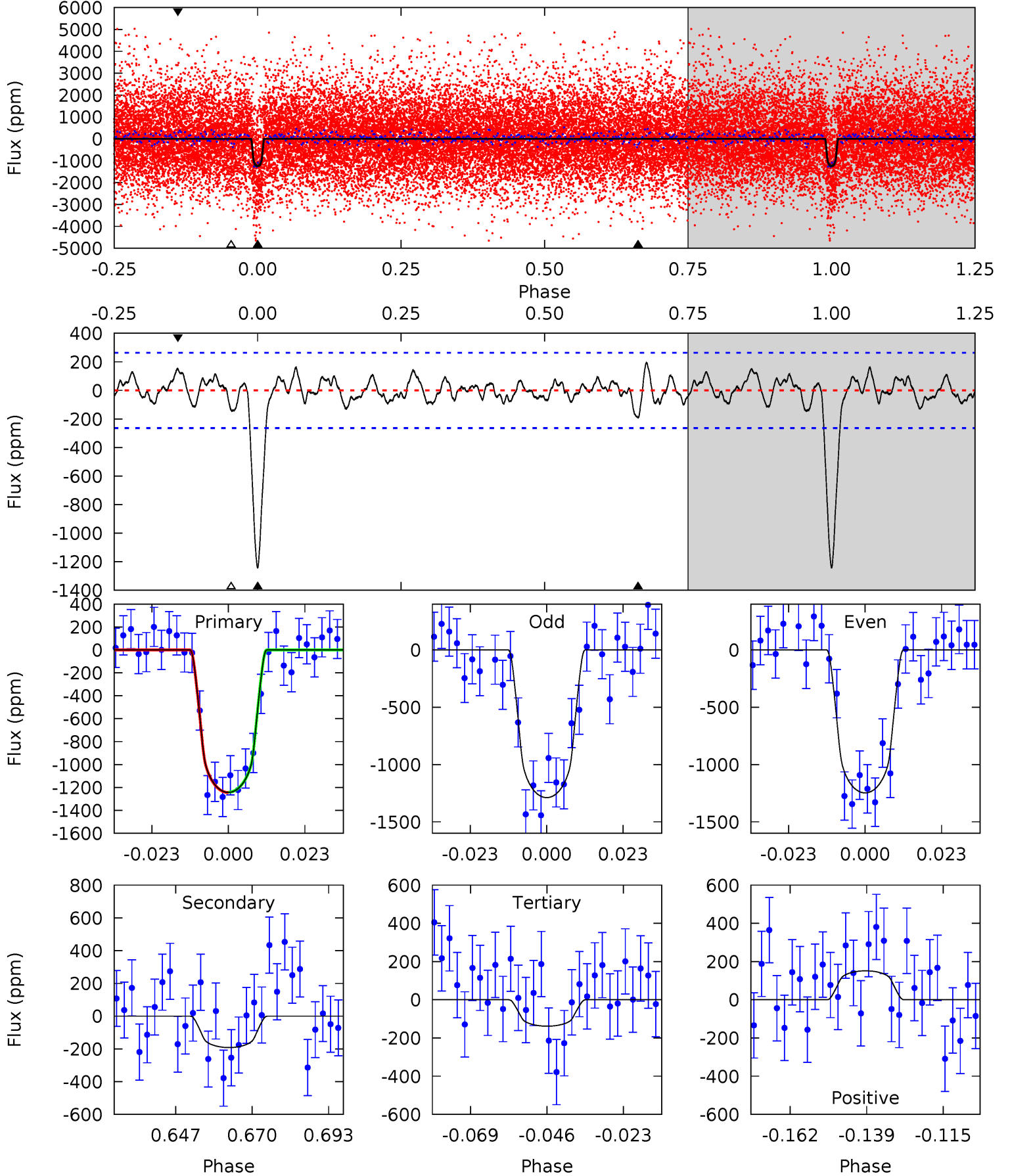




# DV Model-Shift Uniqueness Test

009837661-03, P = 5.720918 Days, E = 134.656416 Days

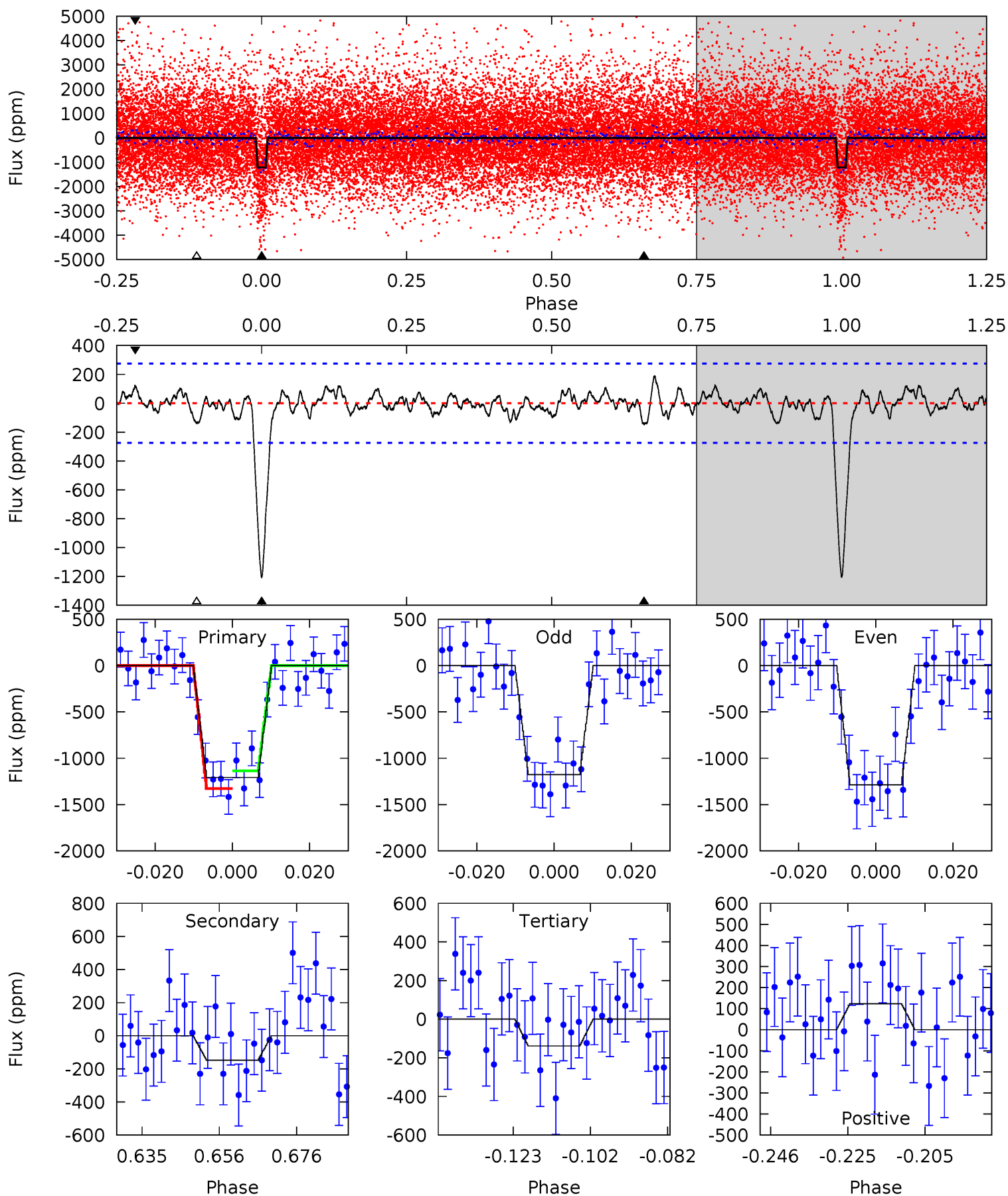
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
22.9	3.54	2.55	2.80	4.86	2.27	1.12	20.4	20.2	0.99	0.74	0.38	1.00	0.14	0.03



# Alt Model-Shift Uniqueness Test

009837661-03, P = 5.720883 Days, E = 134.662632 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
21.5	2.64	2.47	2.20	4.89	2.32	0.95	19.0	19.3	0.17	0.44	0.99	0.94	0.14	1.70



### Stellar Parameters For KIC 009837661

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$3640^{+81}_{-90}$	$4.744^{+0.056}_{-0.024}$	$0.210^{+0.150}_{-0.150}$	$0.503^{+0.030}_{-0.056}$	$0.513^{+0.036}_{-0.054}$	$5.663^{+1.653}_{-0.588}$
	+2%/-2%	+1%/-1%	+71%/-71%	+6%/-11%	+7%/-11%	+29%/-10%
Source	SPE70	KIC0	SPE70	DSEP		

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

### Secondary Eclipse Parameters for KIC 009837661-03 / KOI 2715.03

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-192 \pm 54$	$2.04^{+1.04}_{-1.10}$	$708^{+18}_{-20}$	$2714^{+641}_{-291}$	$63^{+240}_{-38}$
Alt.	$-148 \pm 56$	$1.92^{+1.13}_{-1.01}$	$706^{+20}_{-20}$	$2653^{+642}_{-328}$	$53^{+197}_{-35}$

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

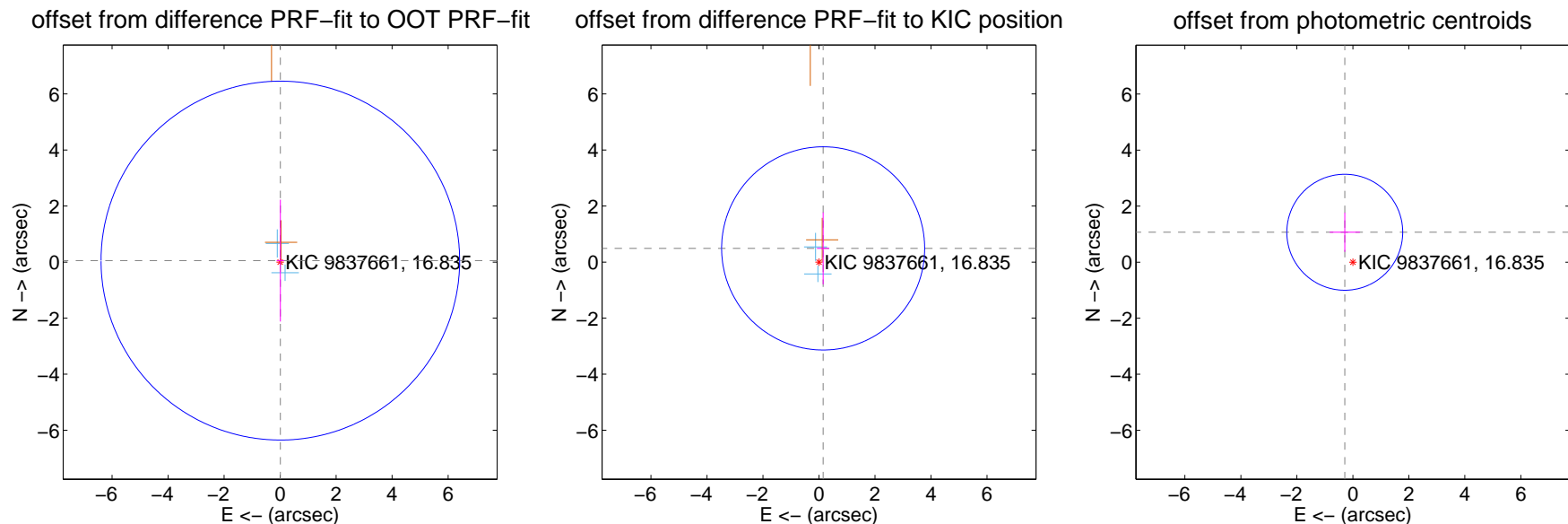
## DV Centroid Data

Supplemental centroid analysis for 009837661-03. Kepler magnitude: 16.84. Transit SNR 17.33

There are 4 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.15 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.054 \pm 2.134$	0.03	$-0.008 \pm 0.130$	$0.053 \pm 2.176$
PRF-fit source offset from KIC position	$0.511 \pm 1.209$	0.42	$-0.148 \pm 0.220$	$0.489 \pm 1.283$
photometric centroid source offset	$1.11 \pm 0.69$	1.60	$0.29 \pm 0.54$	$1.07 \pm 0.70$

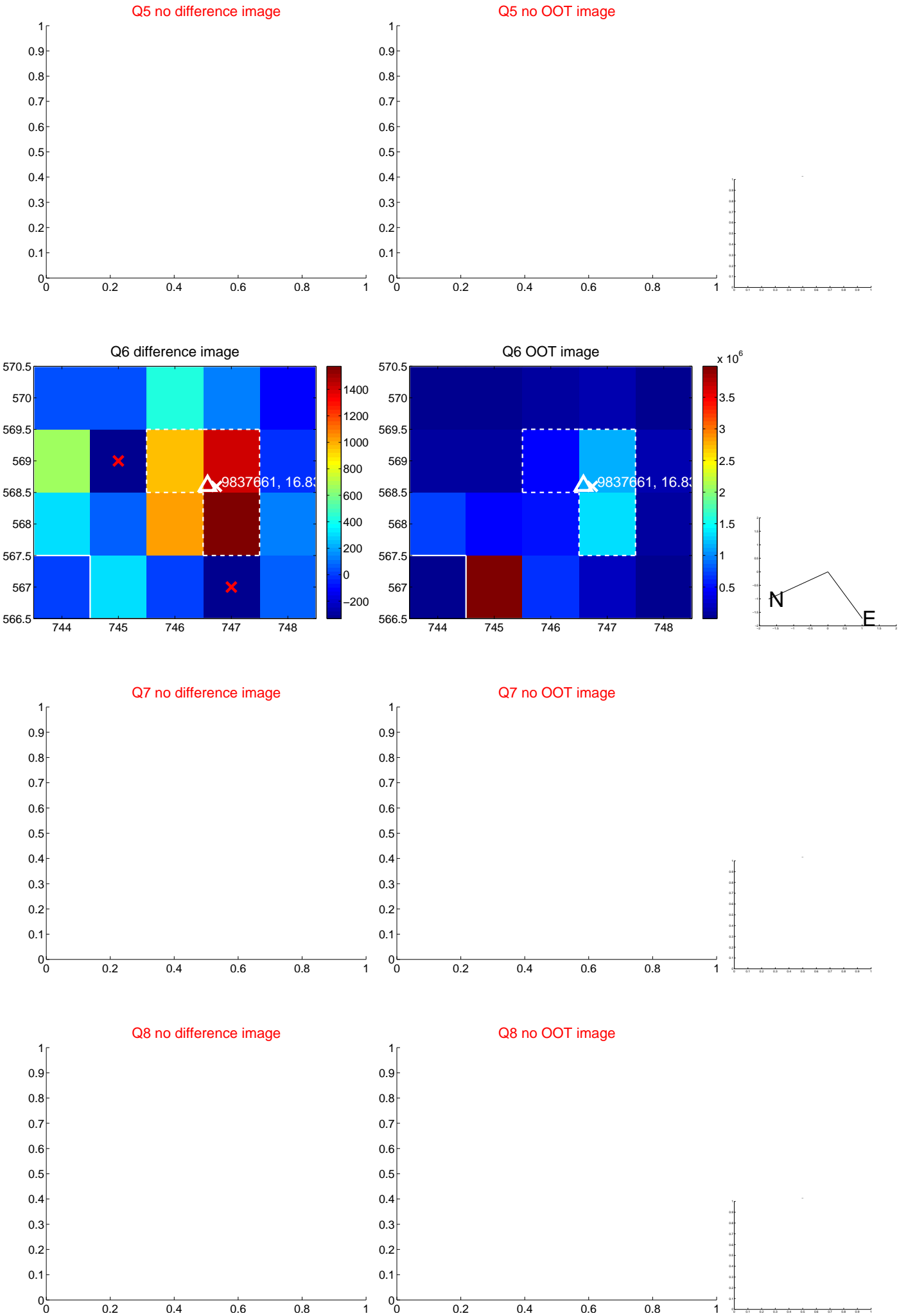


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

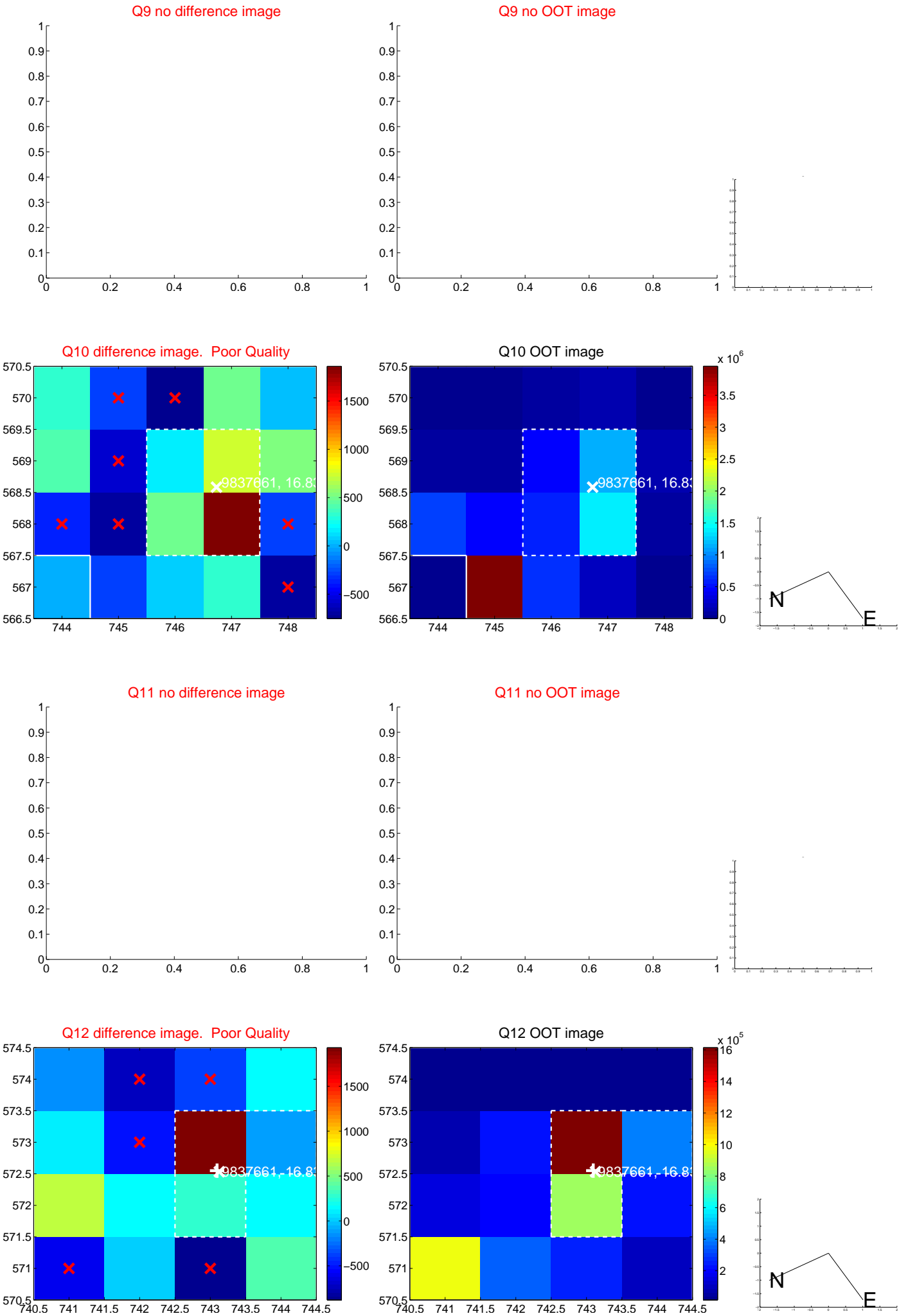
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



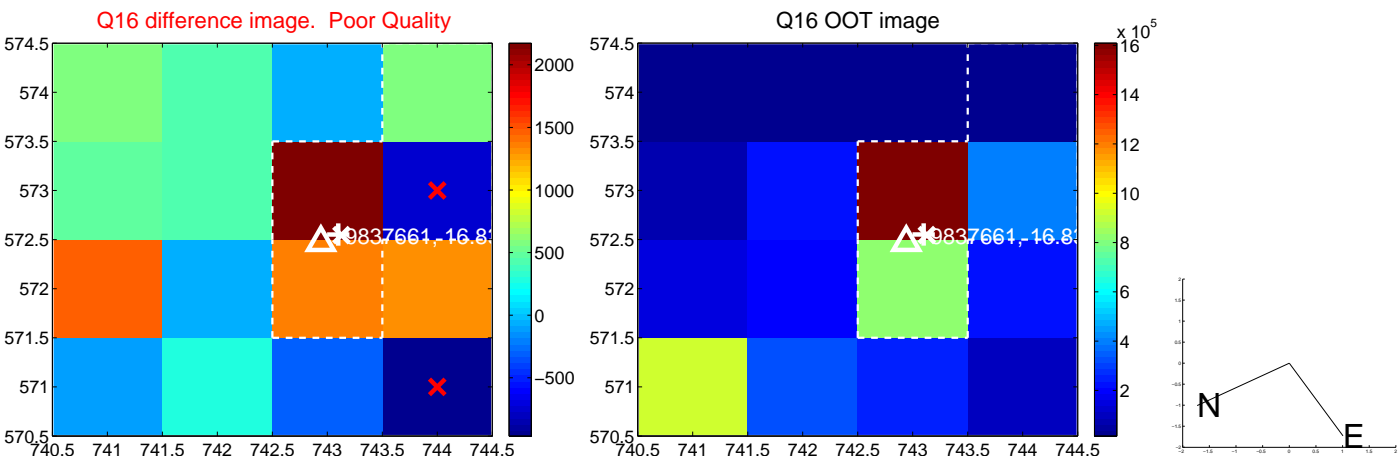
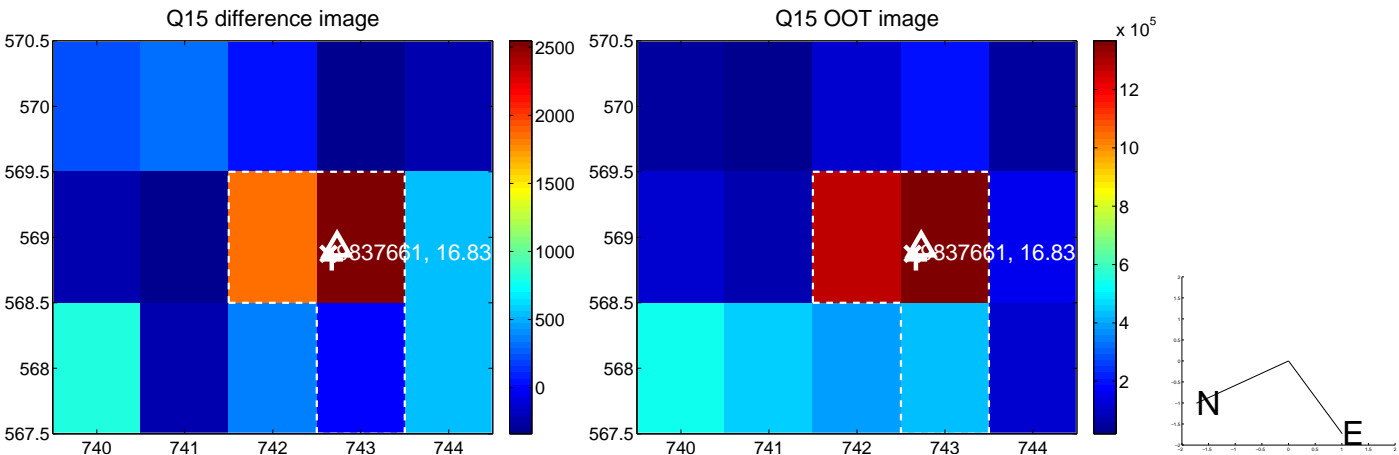
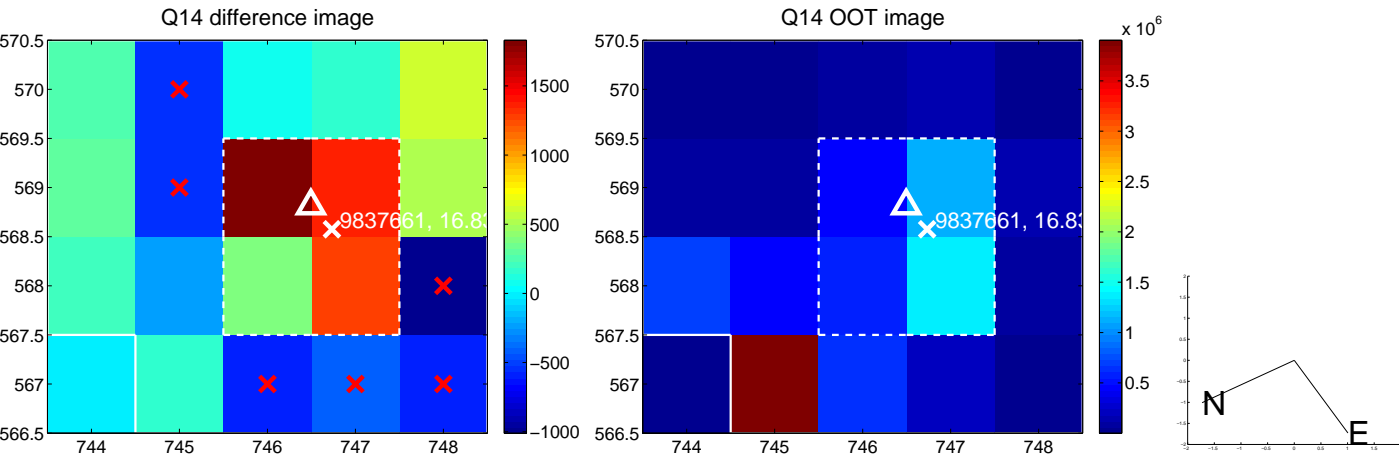
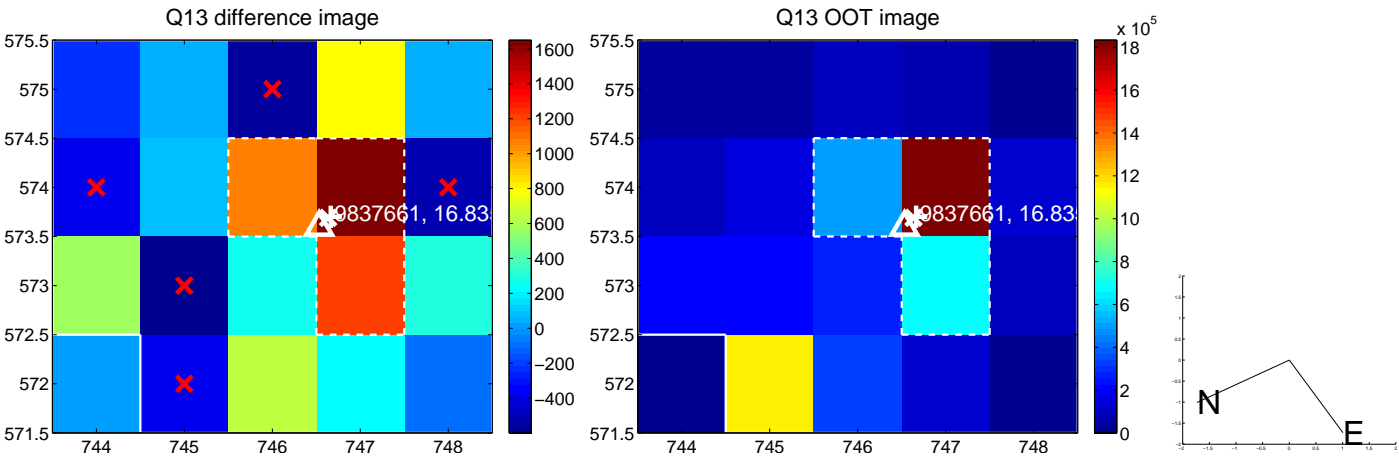
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.



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

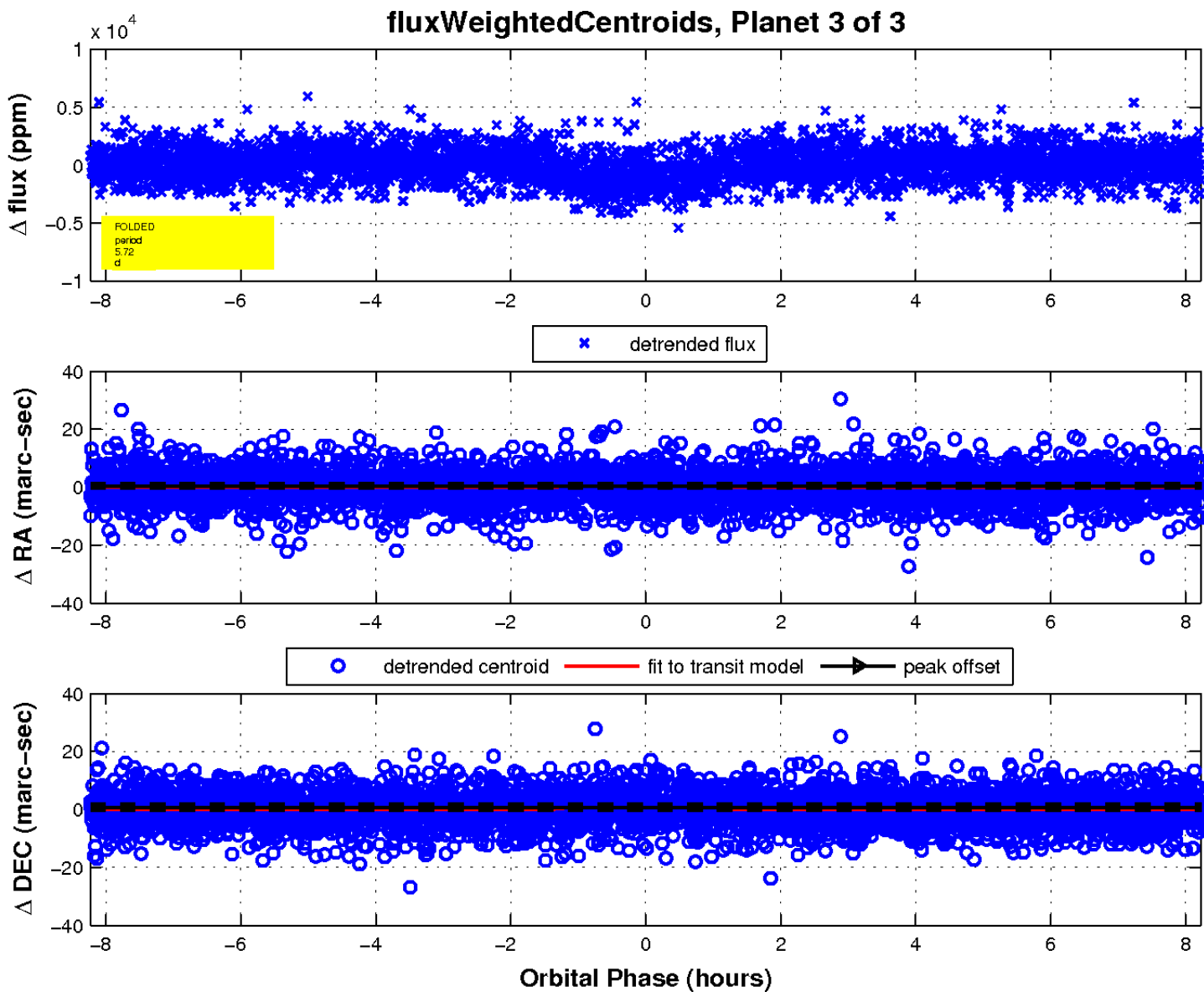
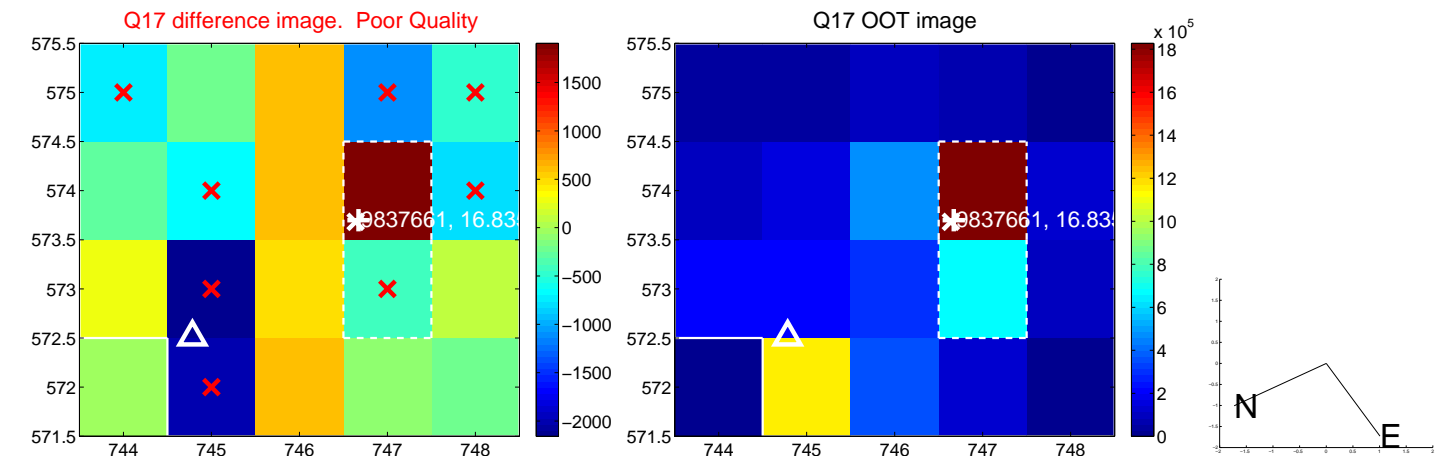


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.





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



UKIRT Image

Declination

