

# KIC 003554031

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
003554031-01	OBS	1194.01	8.707930	136.653788	1343.9	2.701	23.3	25.6	0.55	4362	2.41	20.61
003554031-02	OBS	1194.03	4.176316	131.655492	527.6	2.433	12.6	14.0	0.55	4362	1.55	54.90
003554031-03	OBS	1194.02	14.862384	131.634361	772.2	3.606	10.9	12.4	0.55	4362	1.83	10.11

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
003554031-01	OBS	PC	1.00	0	0	0	0	CENT_KIC_POS
003554031-02	OBS	PC	1.00	0	0	0	0	CENT_KIC_POS
003554031-03	OBS	FP	0.00	0	0	1	0	CENT_RESOLVED_OFFSET—HALO_GHOST

**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.

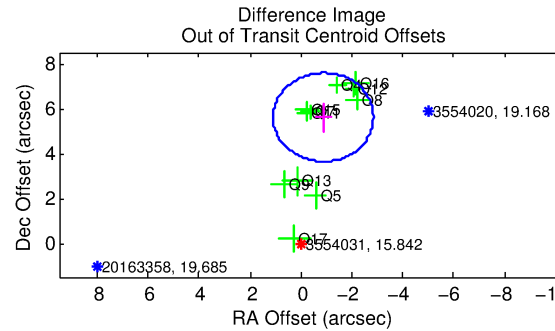
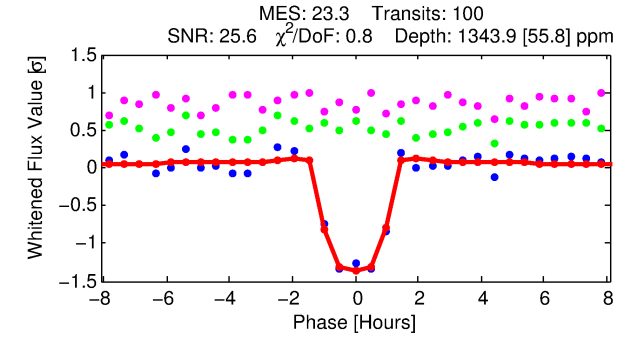
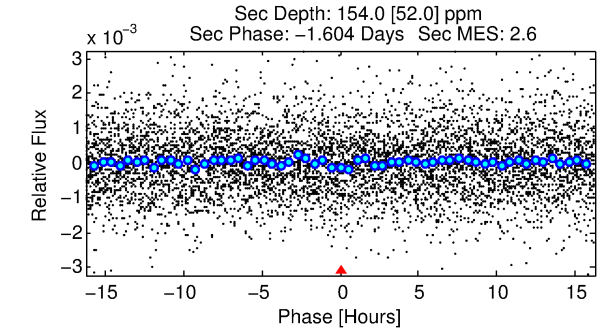
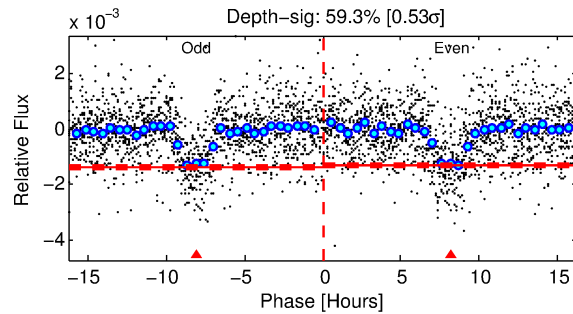
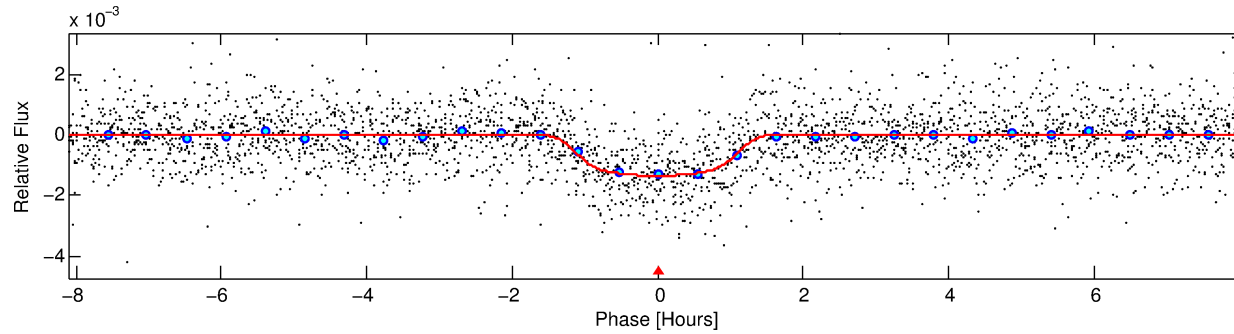
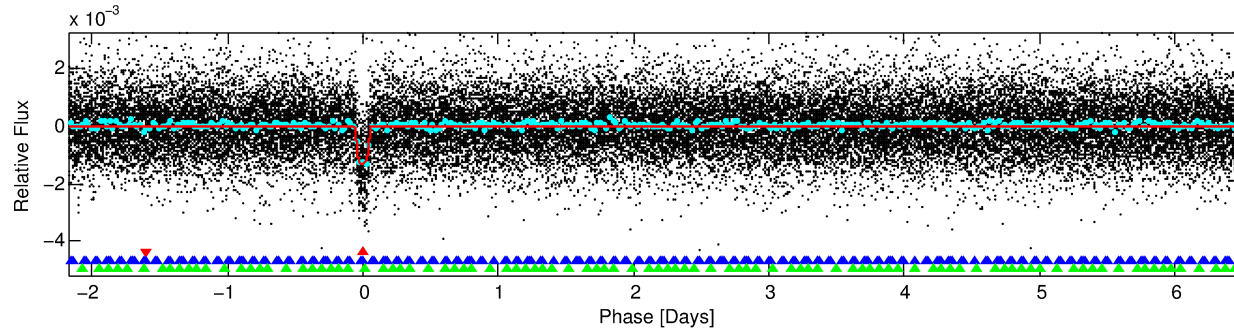
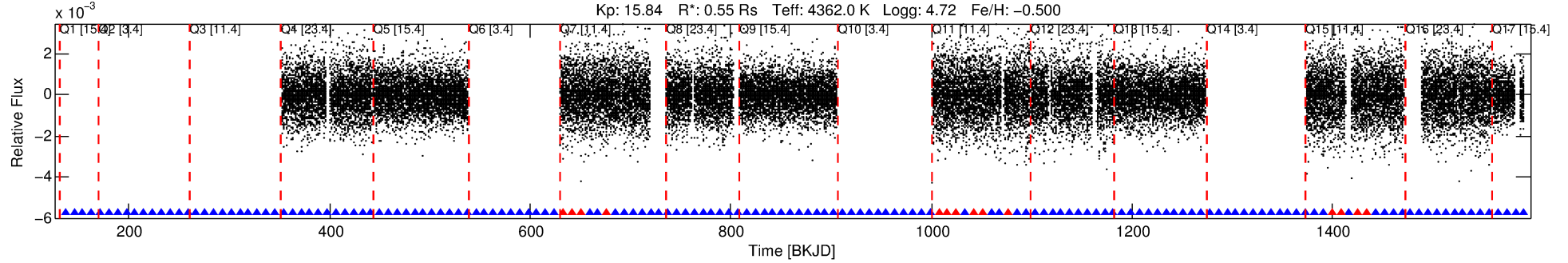
## Ephemeris Match Information For 003554031-01

No Significant Match Found

# DV One-Page Summary

KIC: 3554031 Candidate: 1 of 3 Period: 8.708 d  
KOI: K01194.01 Name: Kepler-415c Corr: 0.967

Kp: 15.84 R\*: 0.55 Rs Teff: 4362.0 K Logg: 4.72 Fe/H: -0.500



## DV Fit Results:

Period = 8.70793 [0.00003] d  
Epoch = 136.6538 [0.0025] BKJD  
Rp/R\* = 0.0399 [0.0047]  
a/R\* = 13.83 [5.94]  
b = 0.88 [0.12]  
Seff = 20.61 [2.53]  
Teq = 543 [17] K  
Rp = 2.41 [0.34] Re  
a = 0.0695 [0.0044] AU  
Ag = 70.23 [29.64] [2.34σ]  
Teffp = 2432 [255] K [7.39σ]

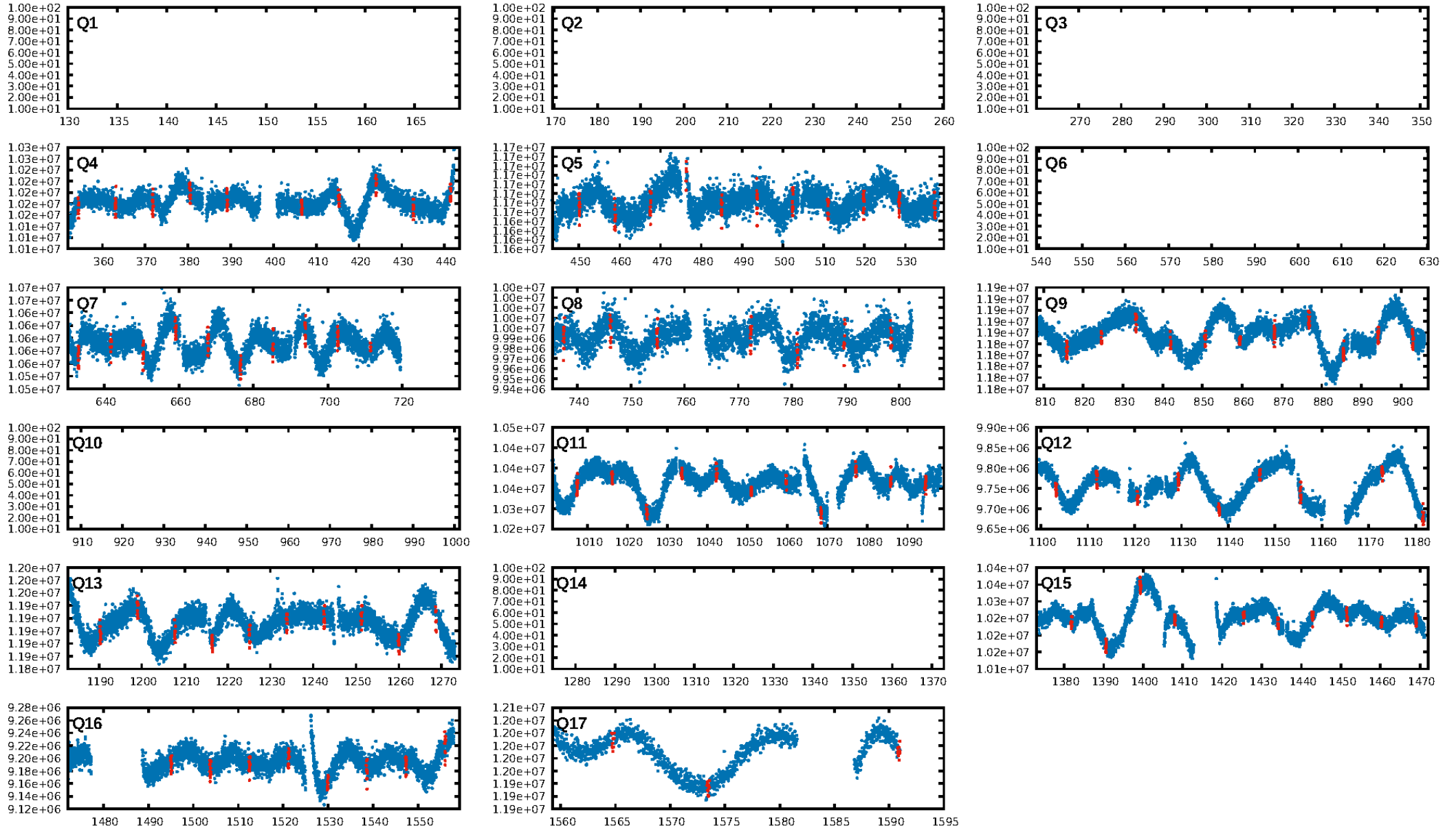
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [29.92σ]  
LongPeriod-sig: 100.0% [32.78σ]  
ModelChiSquare2-sig: 98.7%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 7.61e-116  
RollingBand-fgt: 0.86 [83/97]  
GhostDiagnostic-chr: 3.365  
Centroid-sig: 0.0%  
Centroid-so: 2.481 arcsec [11.34σ]  
OotOffset-rm: 5.680 arcsec [8.63σ]  
KicOffset-rm: 0.419 arcsec [2.01σ]  
OotOffset-st: 0/3/4/4 [11]  
KicOffset-st: 0/3/4/4 [11]  
DiffImageQuality-fgm: 1.00 [11/11]  
DiffImageOverlap-fno: 1.00 [11/11]

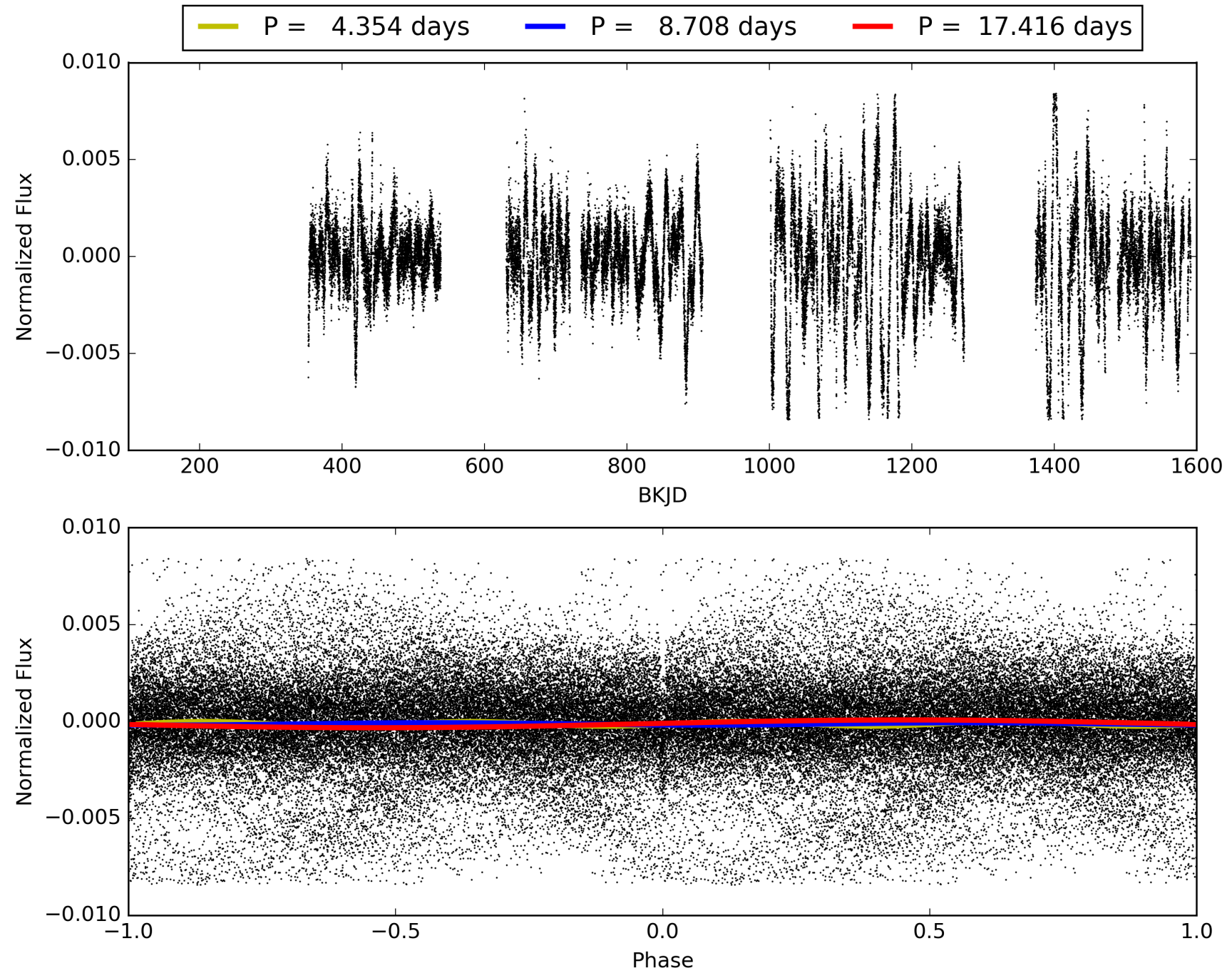
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 18:50:11 Z

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

# TCE 003554031-01, PDC Light Curves

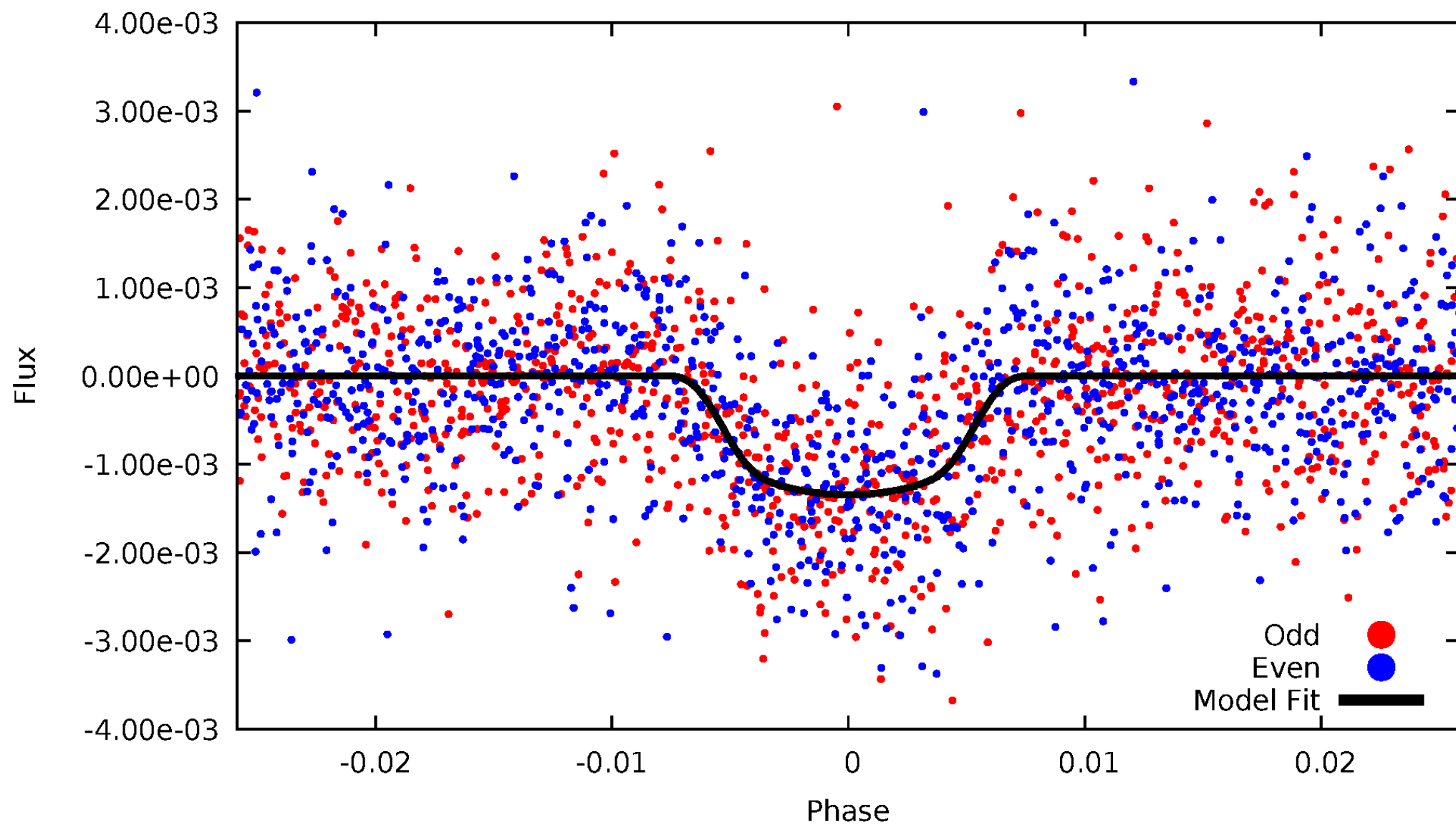


TCE 003554031-01



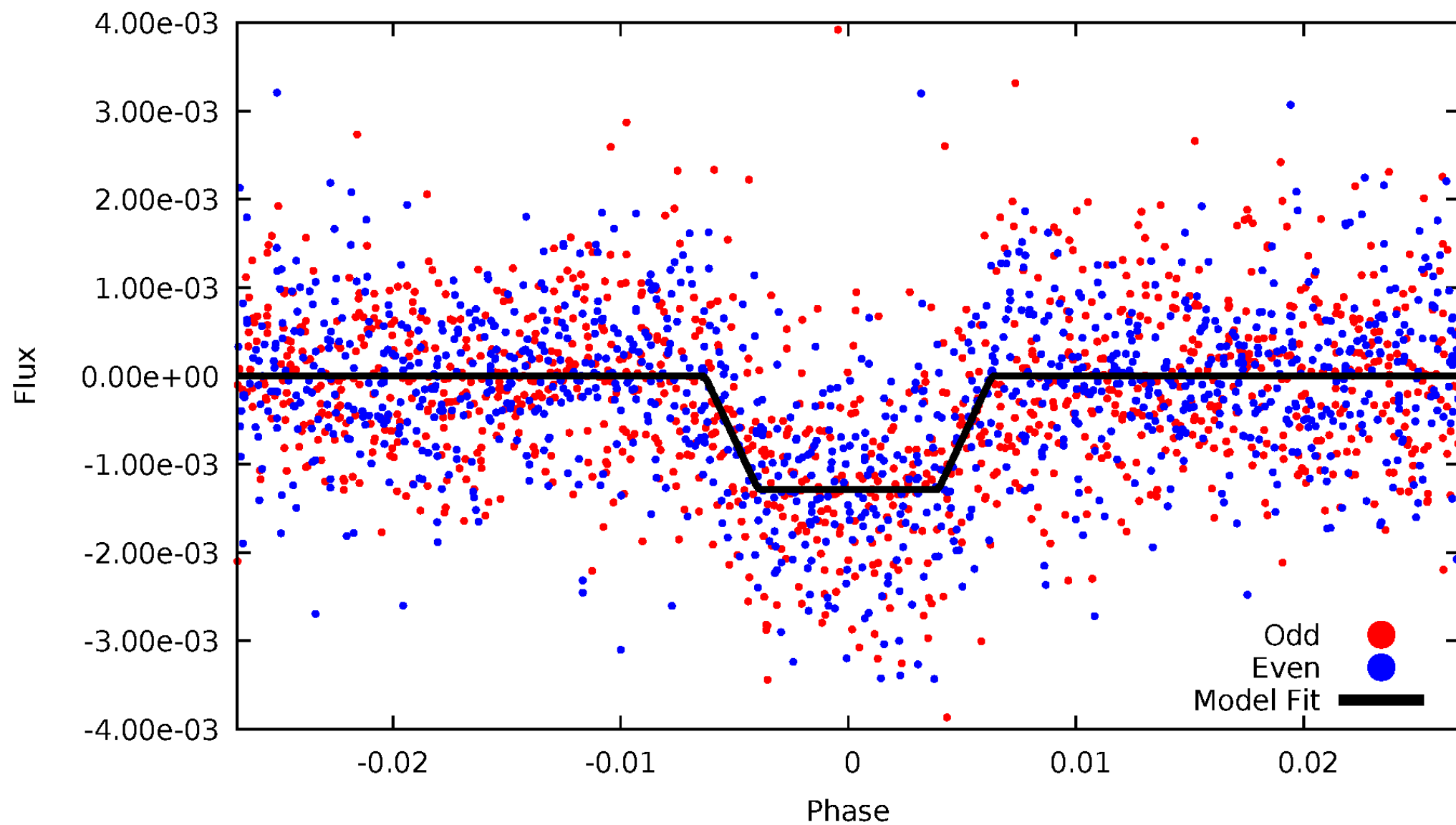
# DV Odd/Even

TCE 003554031-01



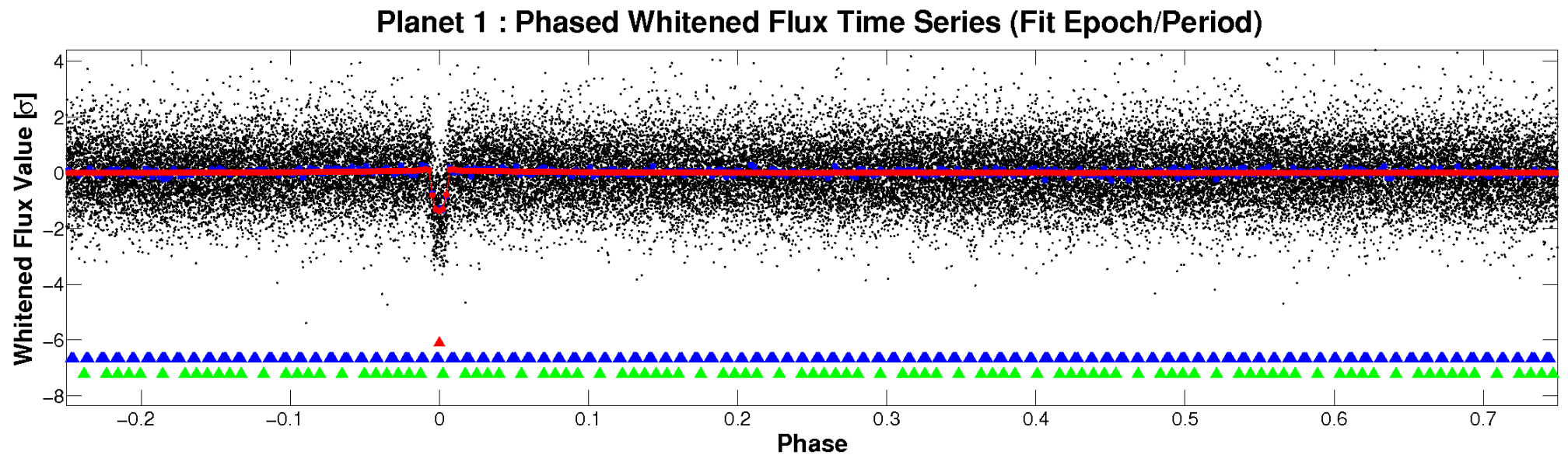
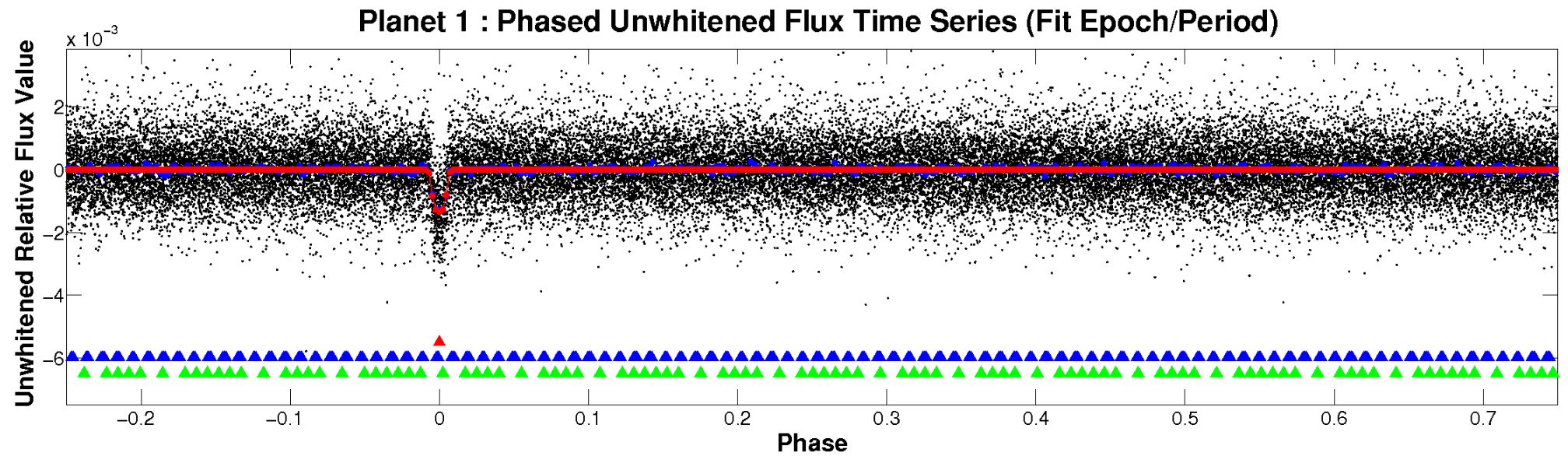
# ALT Odd/Even

TCE 003554031-01



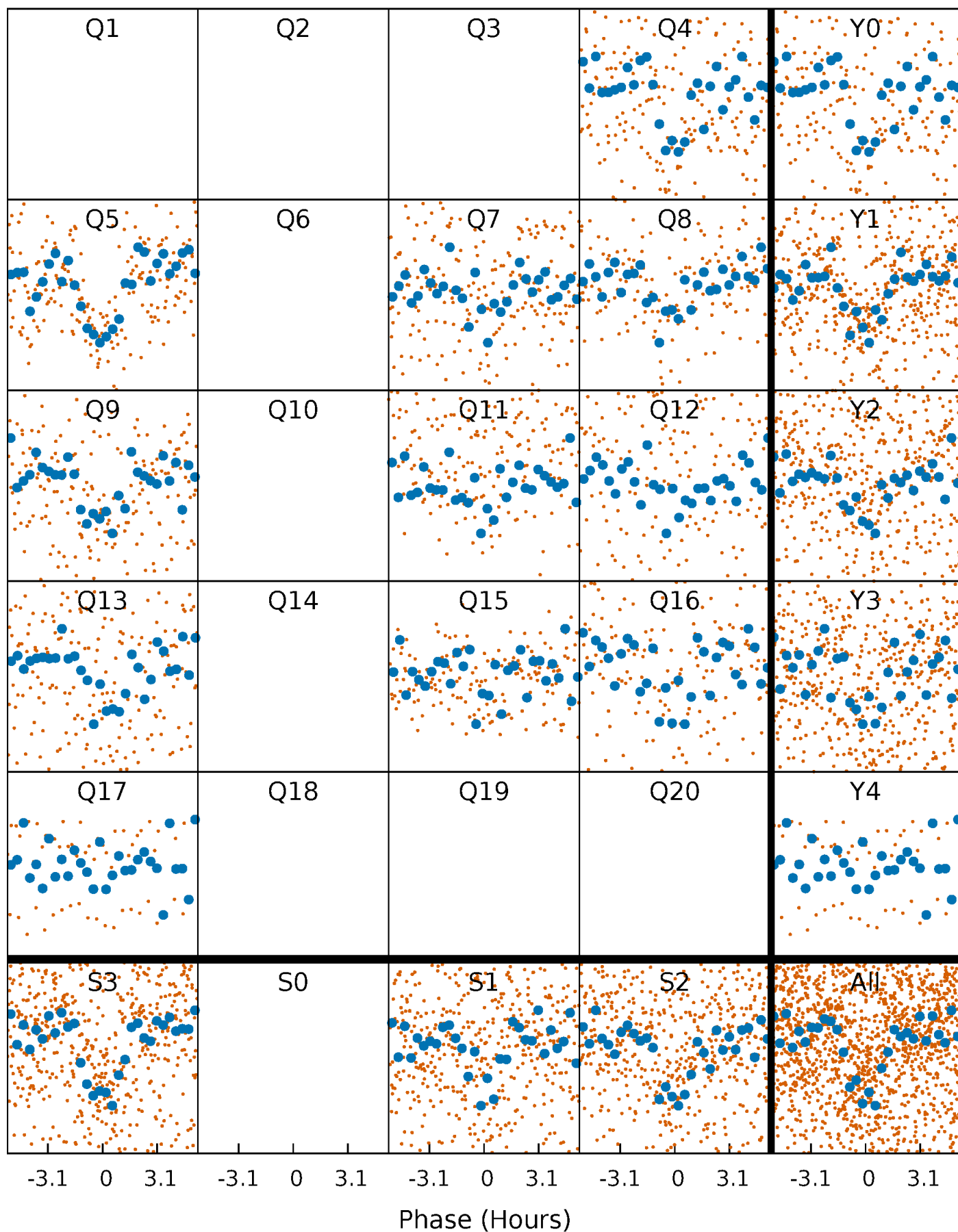


# Non-Whitened Vs. Whitened Light Curve



# PDC Quarter-Phased Transit Curves

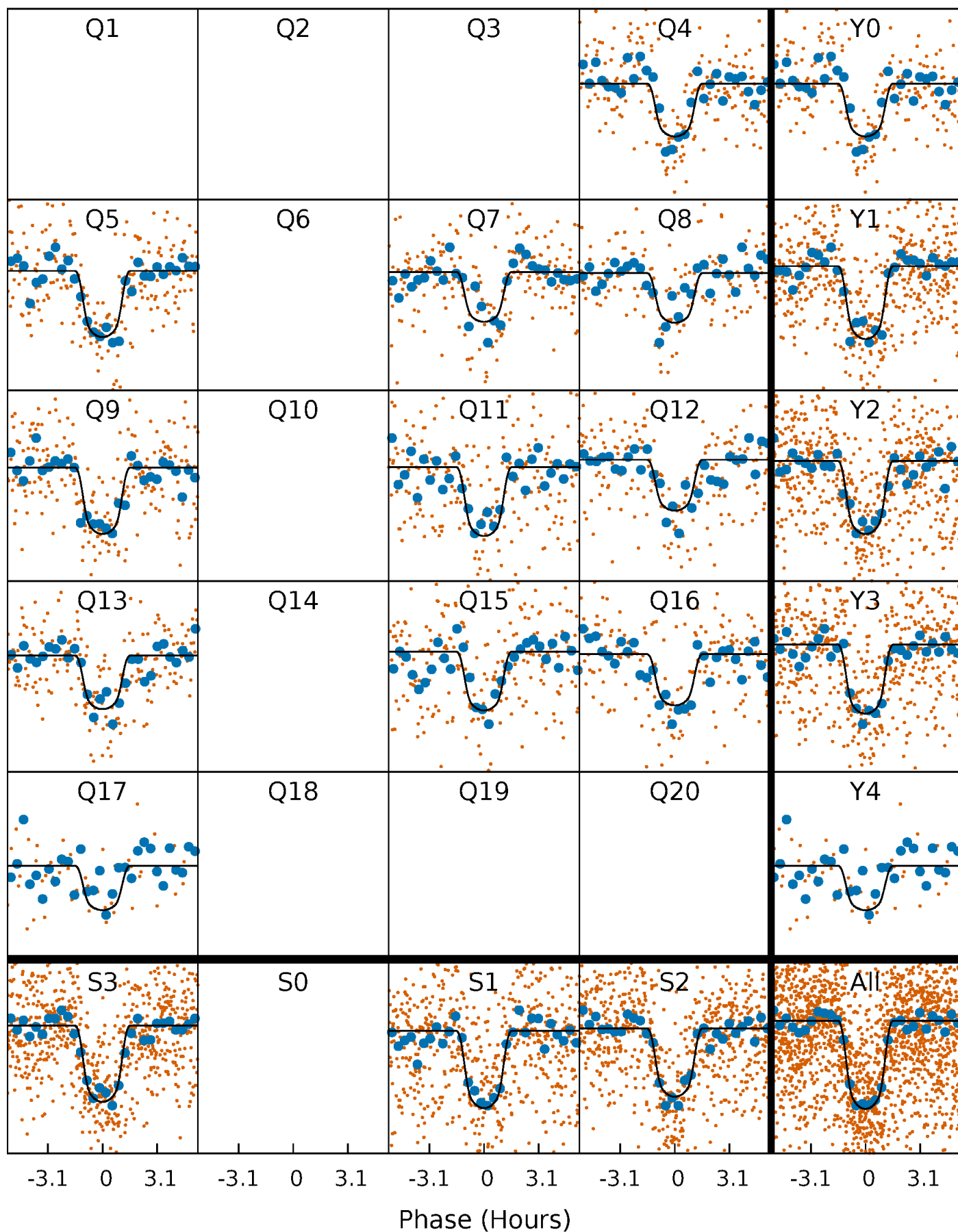
TCE 003554031-01 P= 8.707930 Days  $T_0=136.653788$  (BKJD)





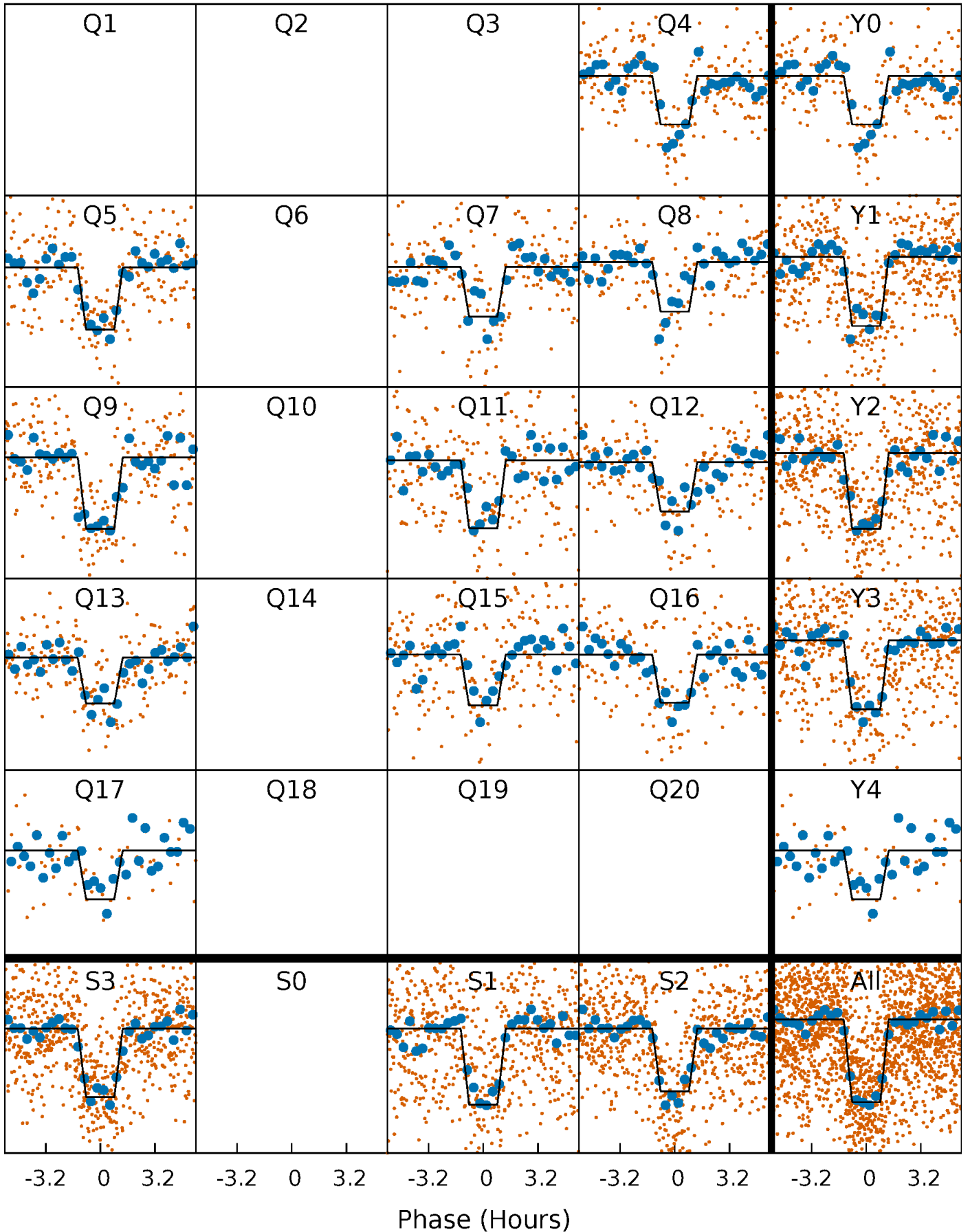
# DV Quarter-Phased Transit Curves

TCE 003554031-01 P= 8.707930 Days  $T_0=136.653788$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

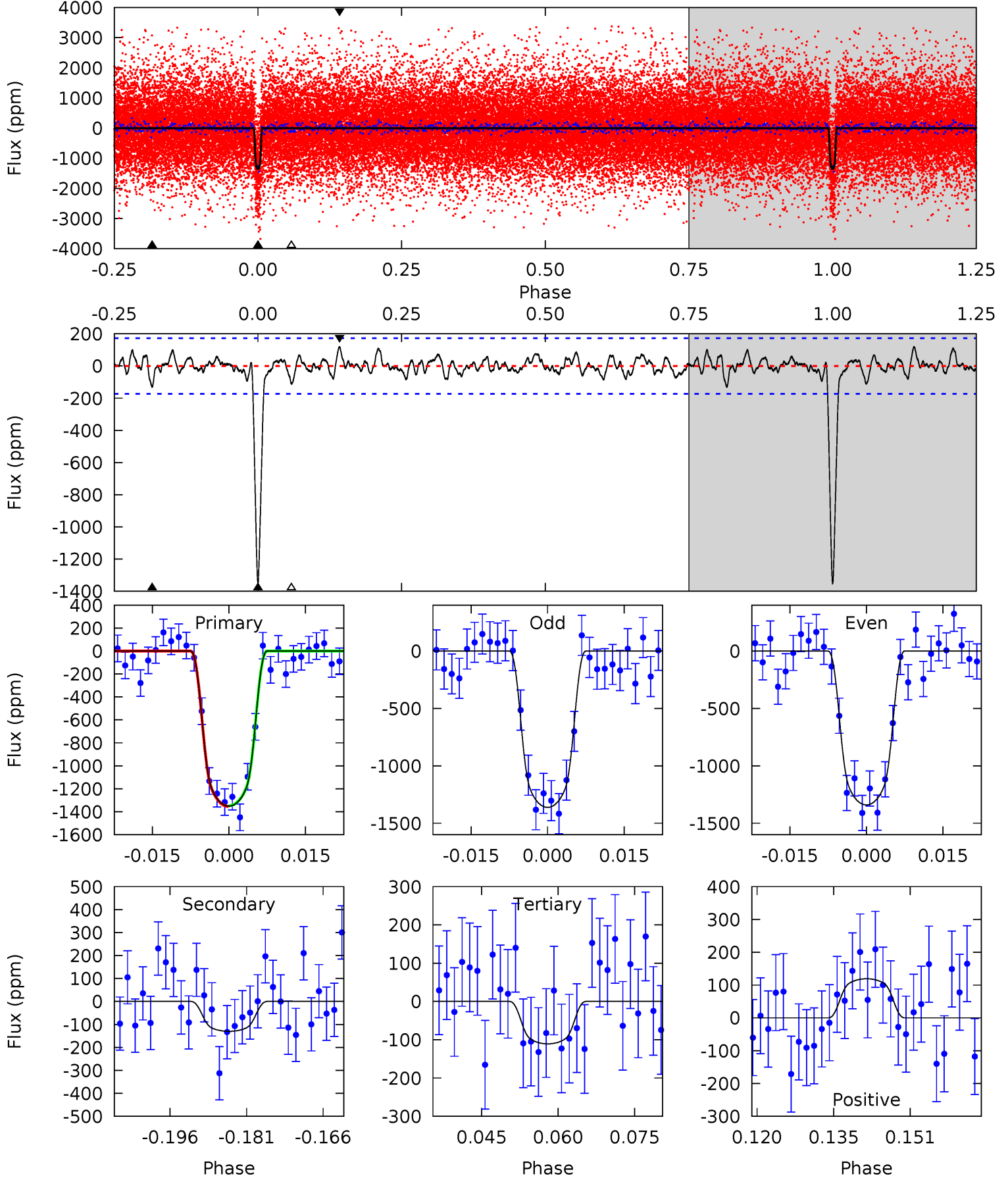
TCE 003554031-01 P= 8.707950 Days  $T_0=136.651171$  (BKJD)



# DV Model-Shift Uniqueness Test

003554031-01, P = 8.707930 Days, E = 136.653788 Days

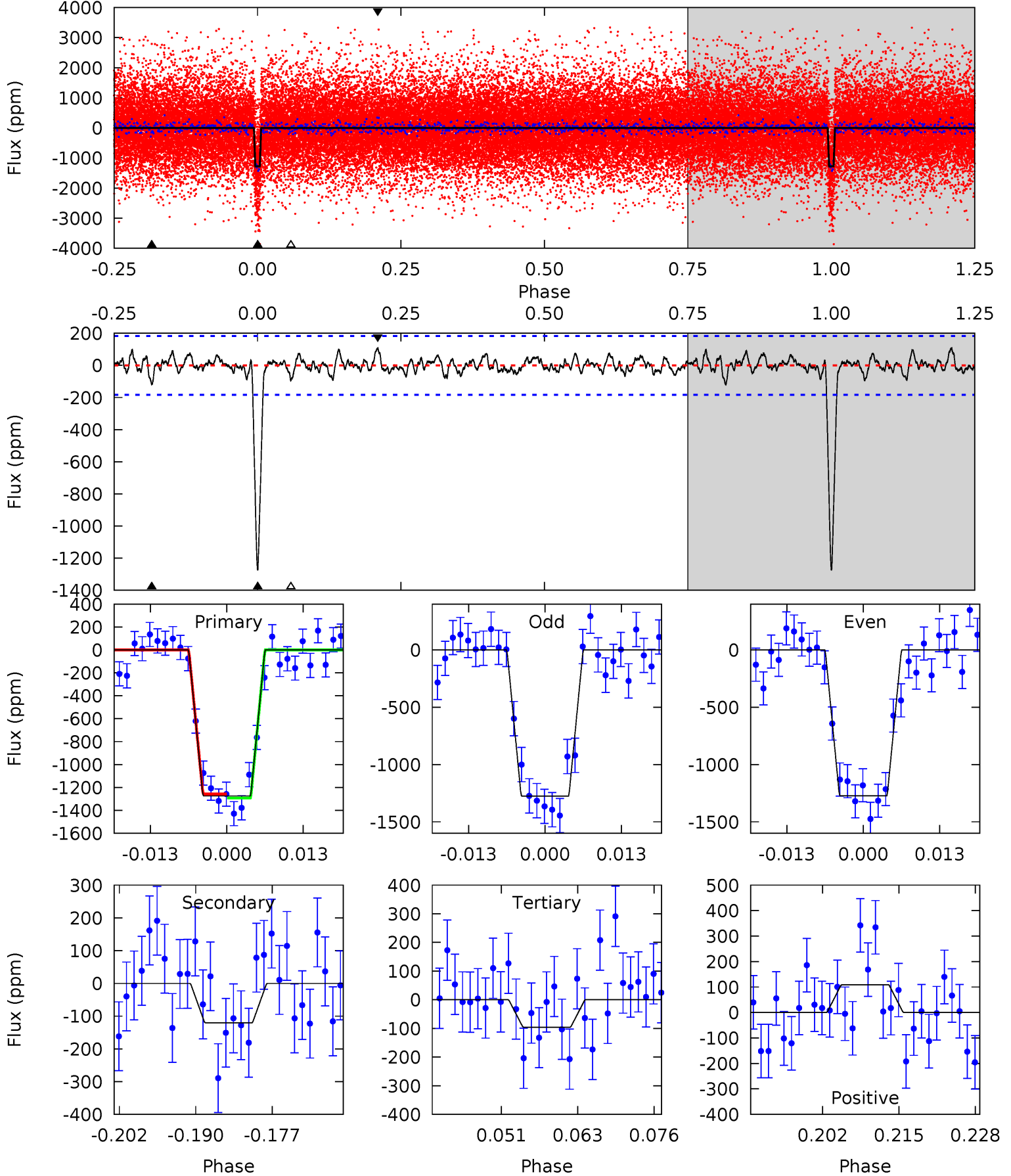
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
38.7	3.72	3.17	3.41	4.95	2.43	1.10	35.5	35.3	0.55	0.31	0.31	0.99	0.08	0.09



# Alt Model-Shift Uniqueness Test

003554031-01, P = 8.707950 Days, E = 136.651171 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
34.6	3.27	2.60	2.95	4.98	2.49	0.94	32.0	31.7	0.67	0.31	0.02	0.97	0.08	0.48



### Stellar Parameters For KIC 003554031

	$T_{\text{eff}}(K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$4362^{+87}_{-78}$	$4.722^{+0.012}_{-0.051}$	$-0.500^{+0.150}_{-0.150}$	$0.554^{+0.042}_{-0.017}$	$0.590^{+0.029}_{-0.029}$	$4.884^{+0.320}_{-0.847}$
	+2%/-2%	+0%/-1%	+30%/-30%	+8%/-3%	+5%/-5%	+7%/-17%
Source	SPE68	SPE68	SPE68	DSEP		

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

### Secondary Eclipse Parameters for KIC 003554031-01 / KOI 1194.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-130 \pm 35$	$2.44^{+0.33}_{-0.29}$	$766^{+18}_{-17}$	$2916^{+149}_{-161}$	$57^{+24}_{-20}$
Alt.	$-120 \pm 37$	$2.19^{+0.34}_{-0.28}$	$764^{+19}_{-16}$	$2956^{+184}_{-178}$	$64^{+31}_{-22}$

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

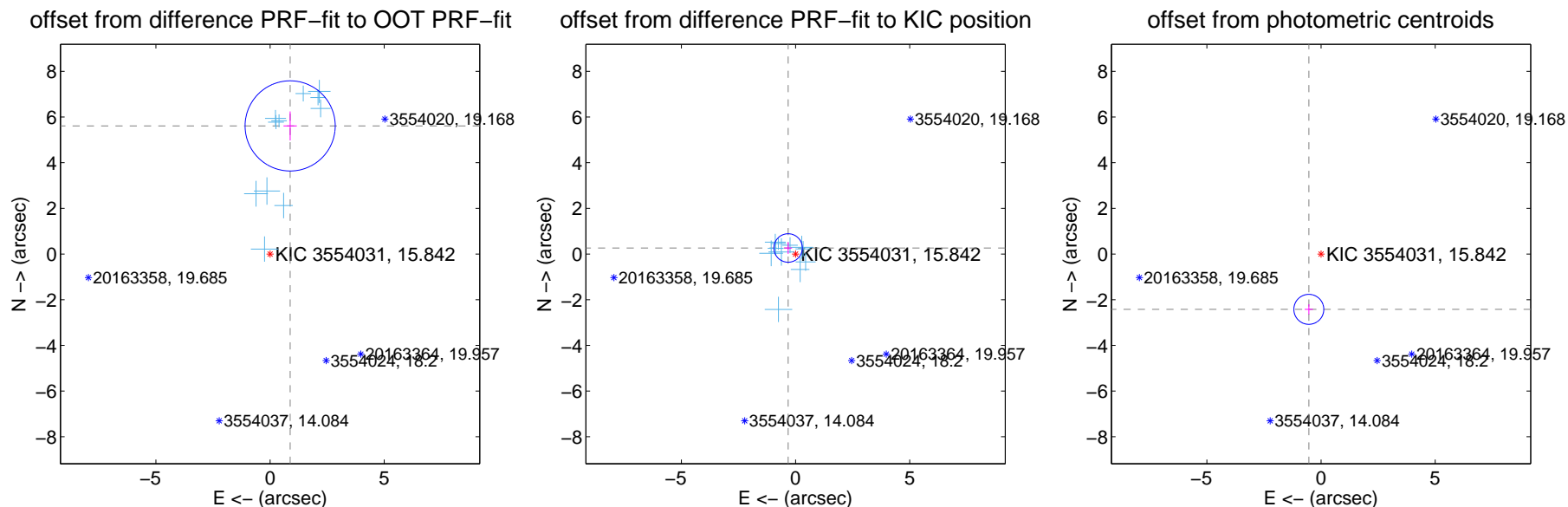
## DV Centroid Data

Supplemental centroid analysis for 003554031-01. Kepler magnitude: 15.84. Transit SNR 25.62

There are 11 quarters with good PRF difference image offsets

The OOT PRF centroid is offset from the target star catalog position by about 2.69 arcsec so the offset from difference PRF-fit to OOT-fit may be invalid.

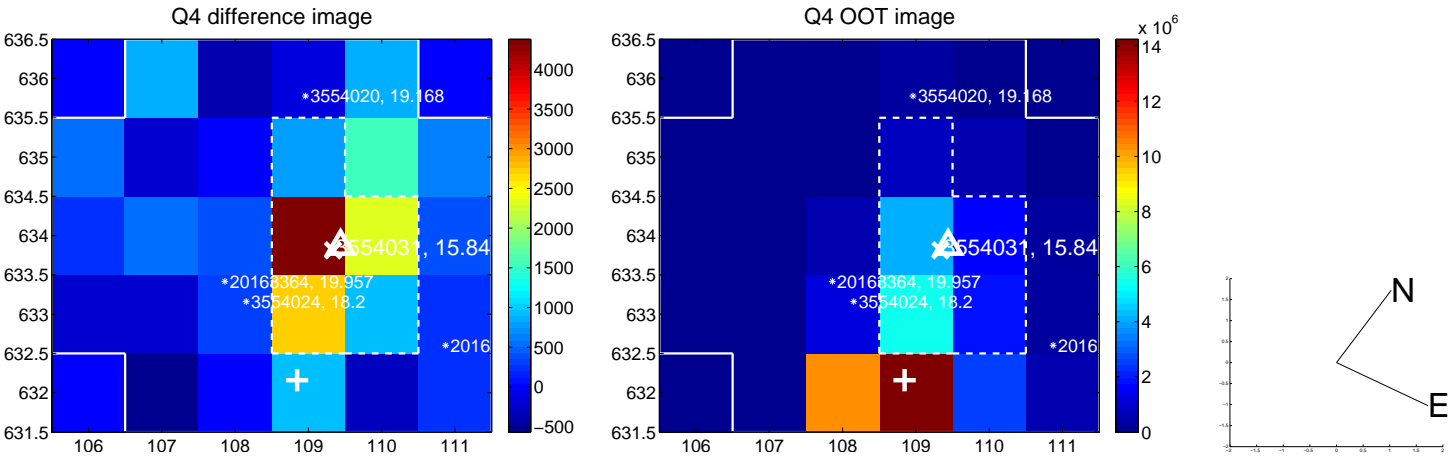
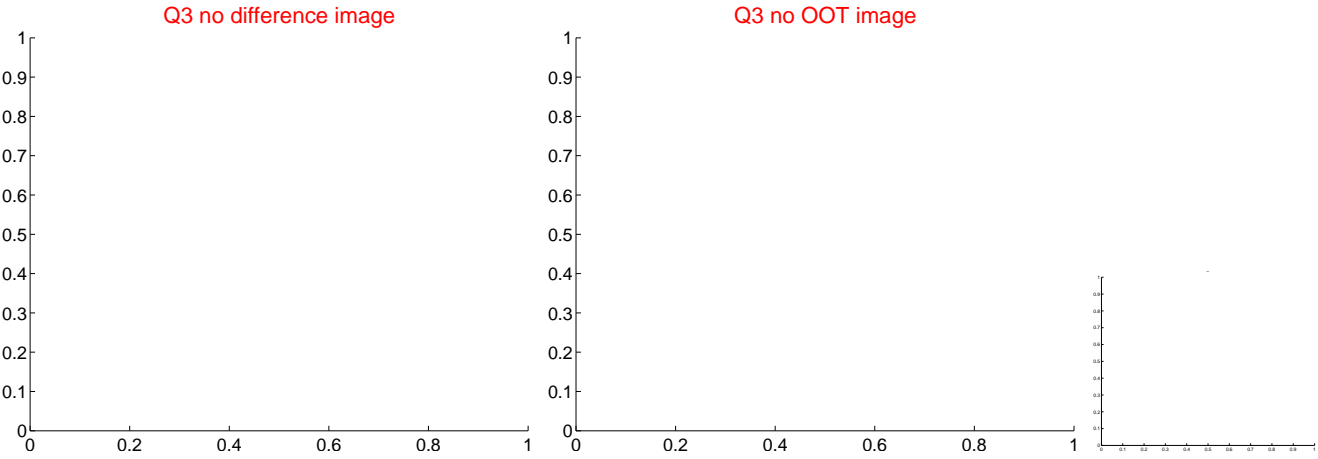
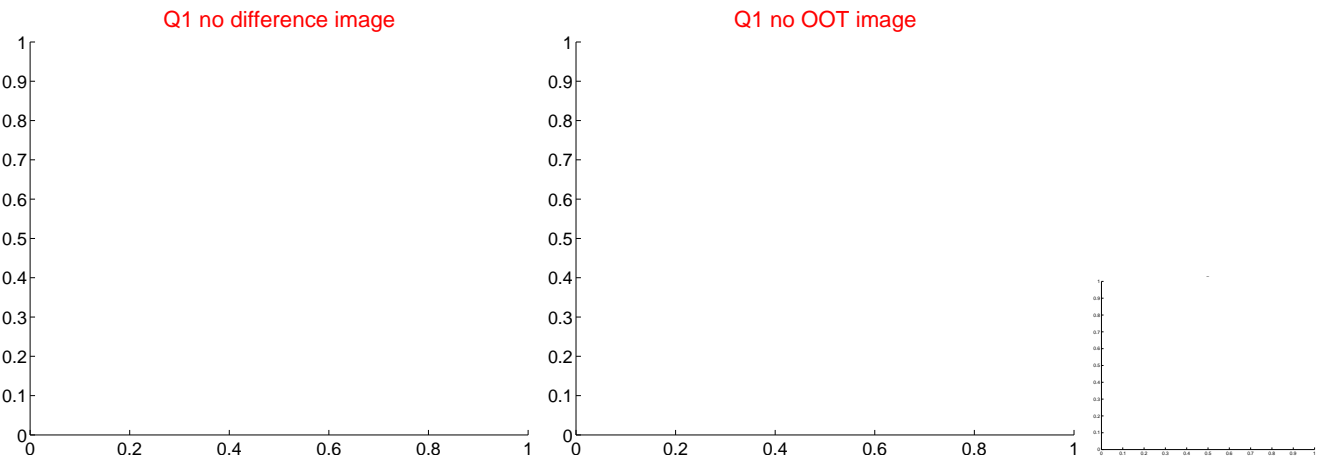
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$5.680 \pm 0.658$	8.63	$-0.880 \pm 0.291$	$5.612 \pm 0.635$
PRF-fit source offset from KIC position	$0.419 \pm 0.208$	2.01	$0.325 \pm 0.170$	$0.265 \pm 0.256$
photometric centroid source offset	$2.48 \pm 0.22$	11.34	$0.53 \pm 0.18$	$-2.42 \pm 0.22$



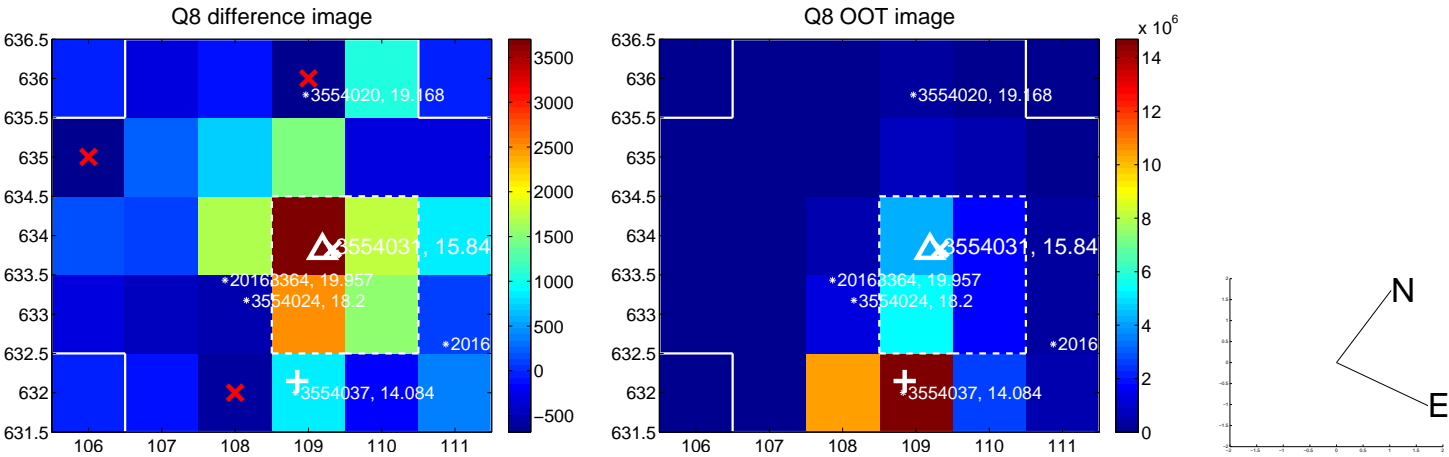
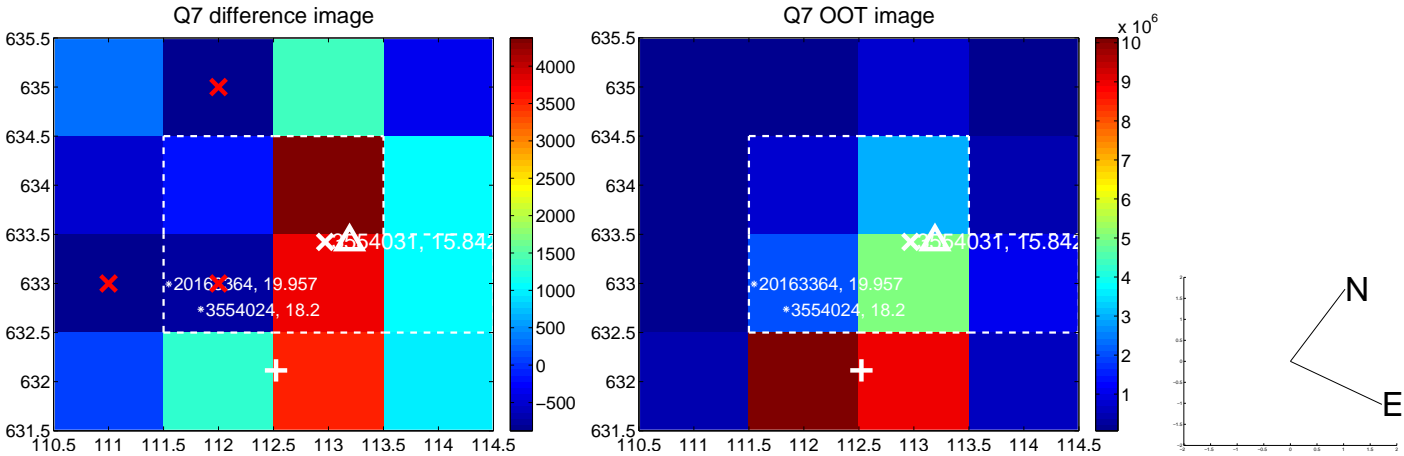
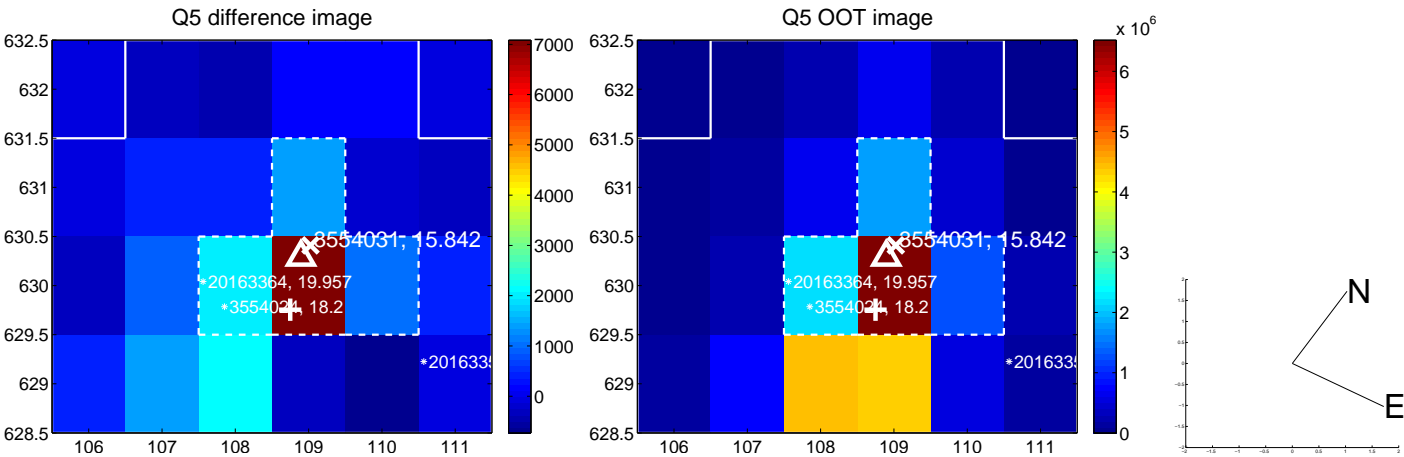
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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



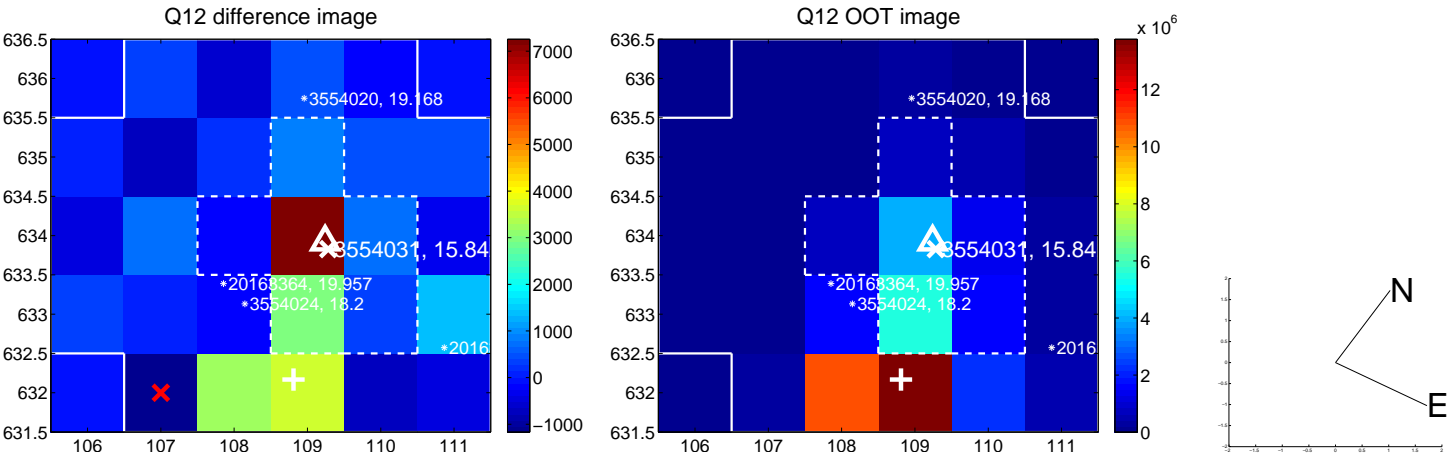
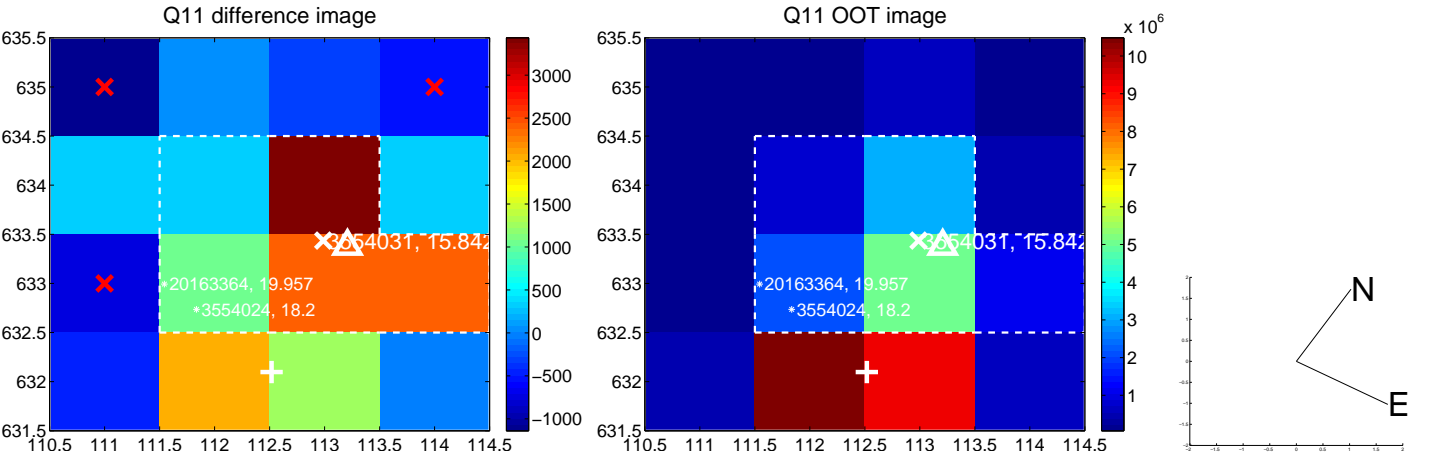
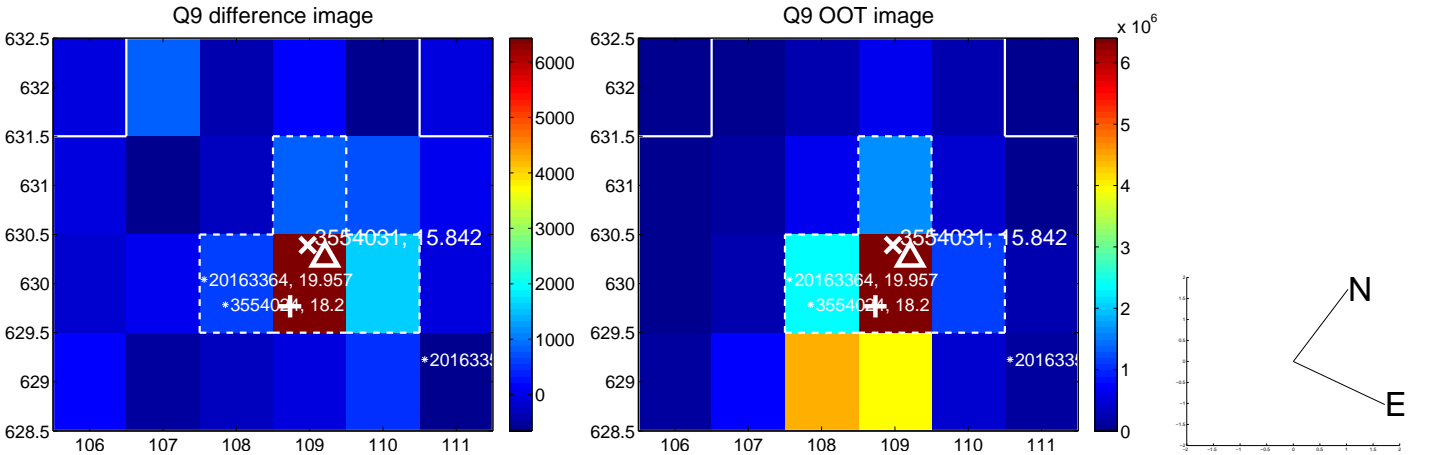
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.



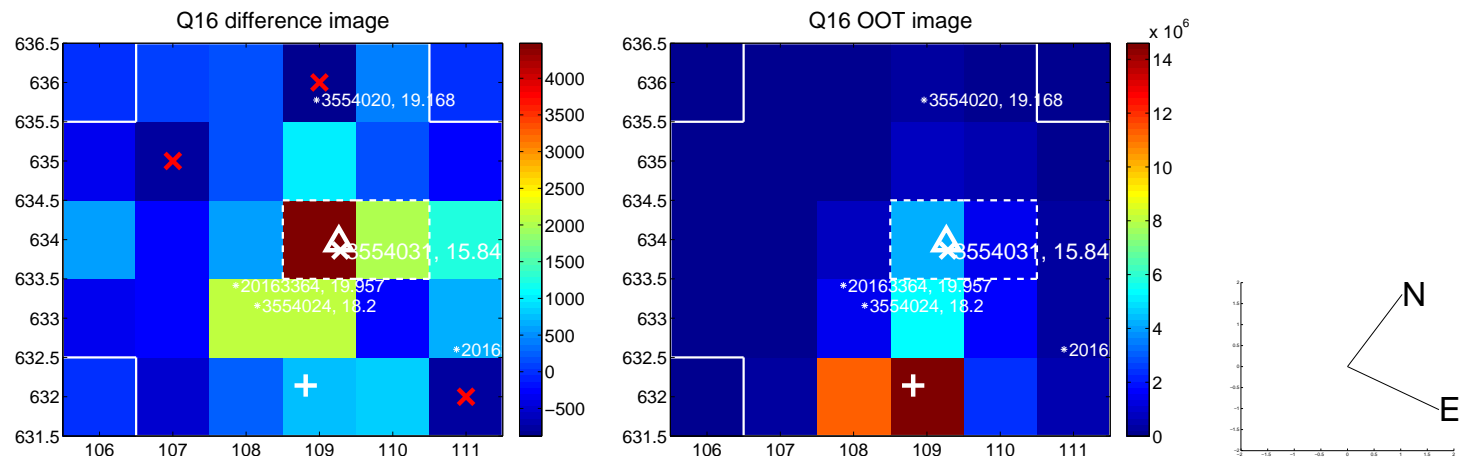
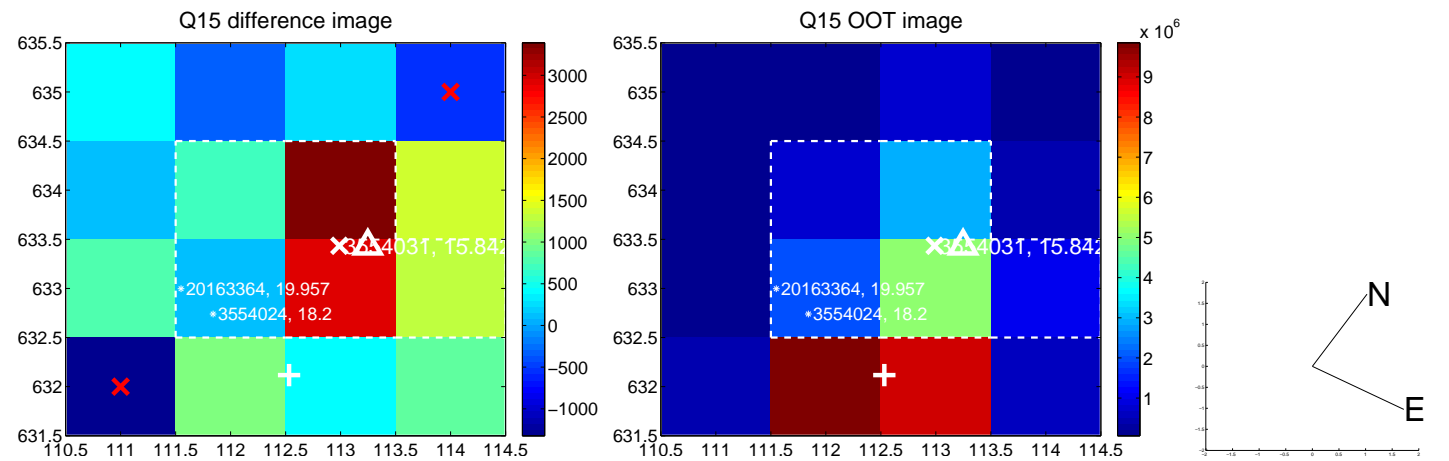
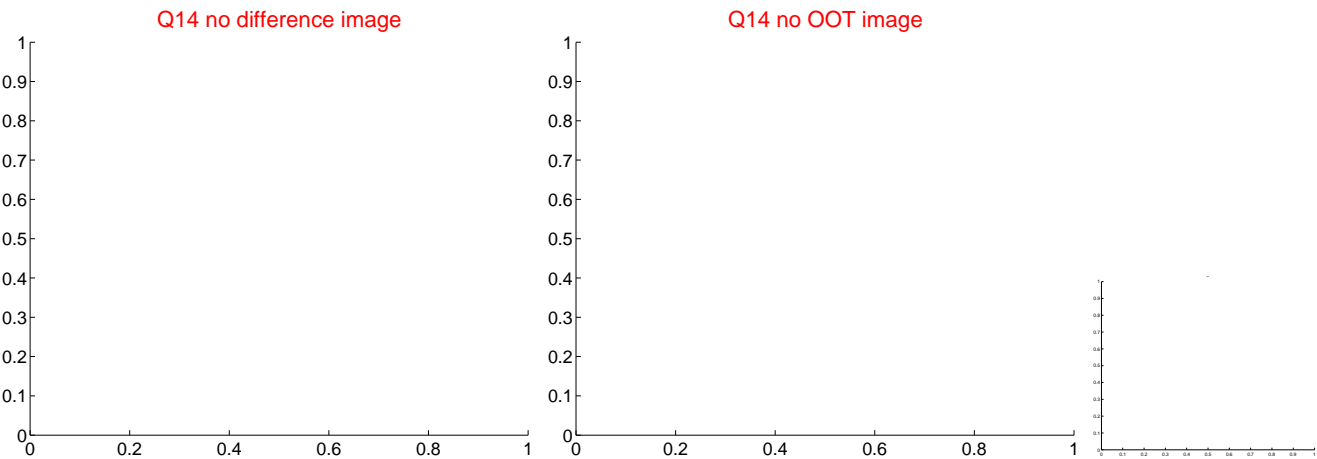
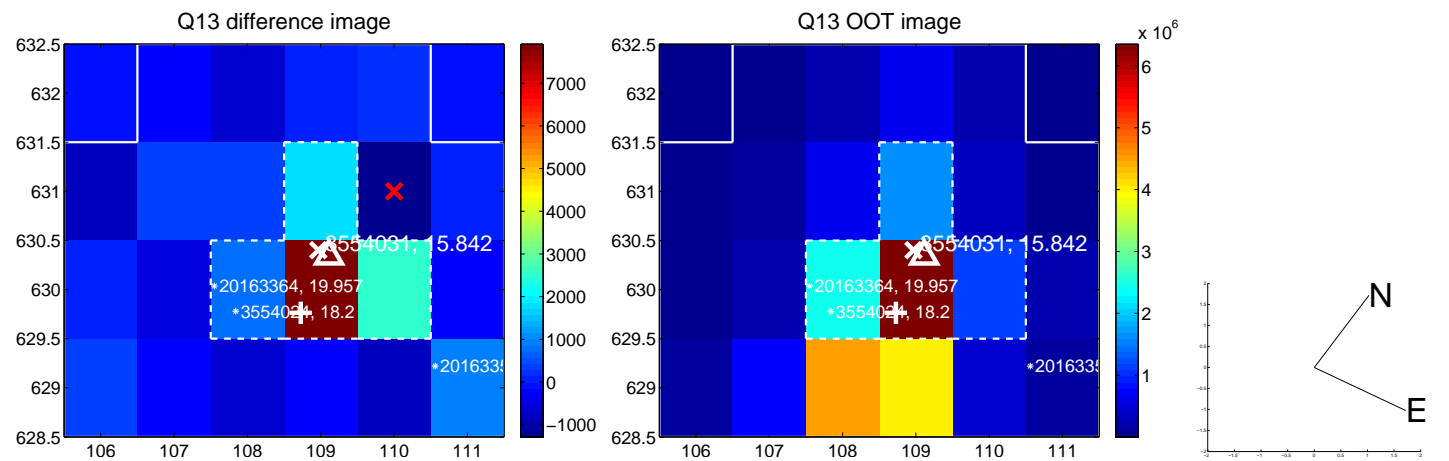
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



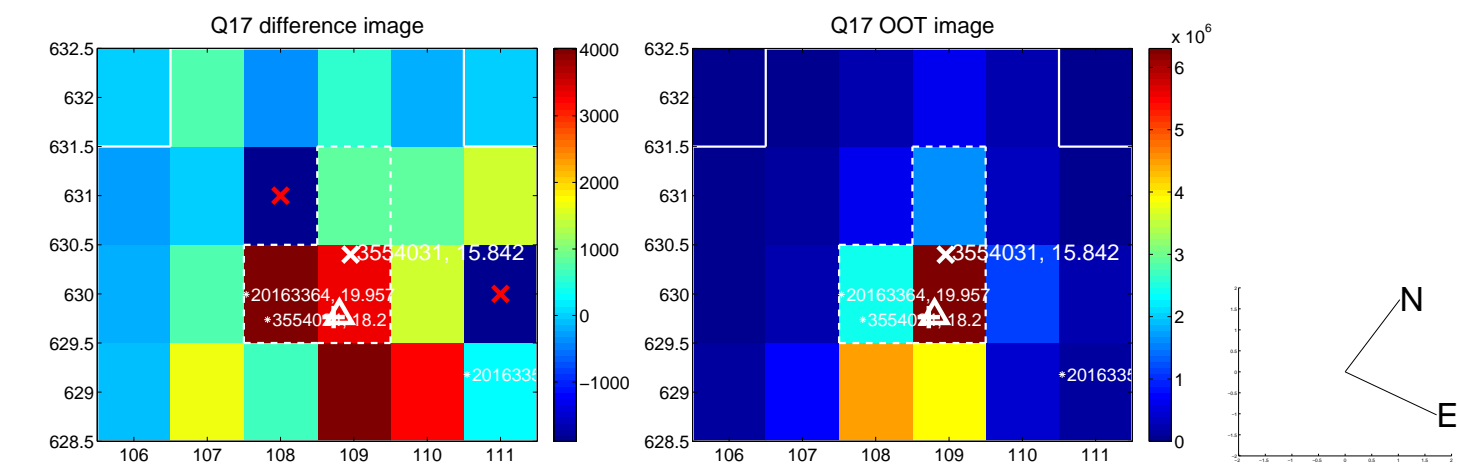
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



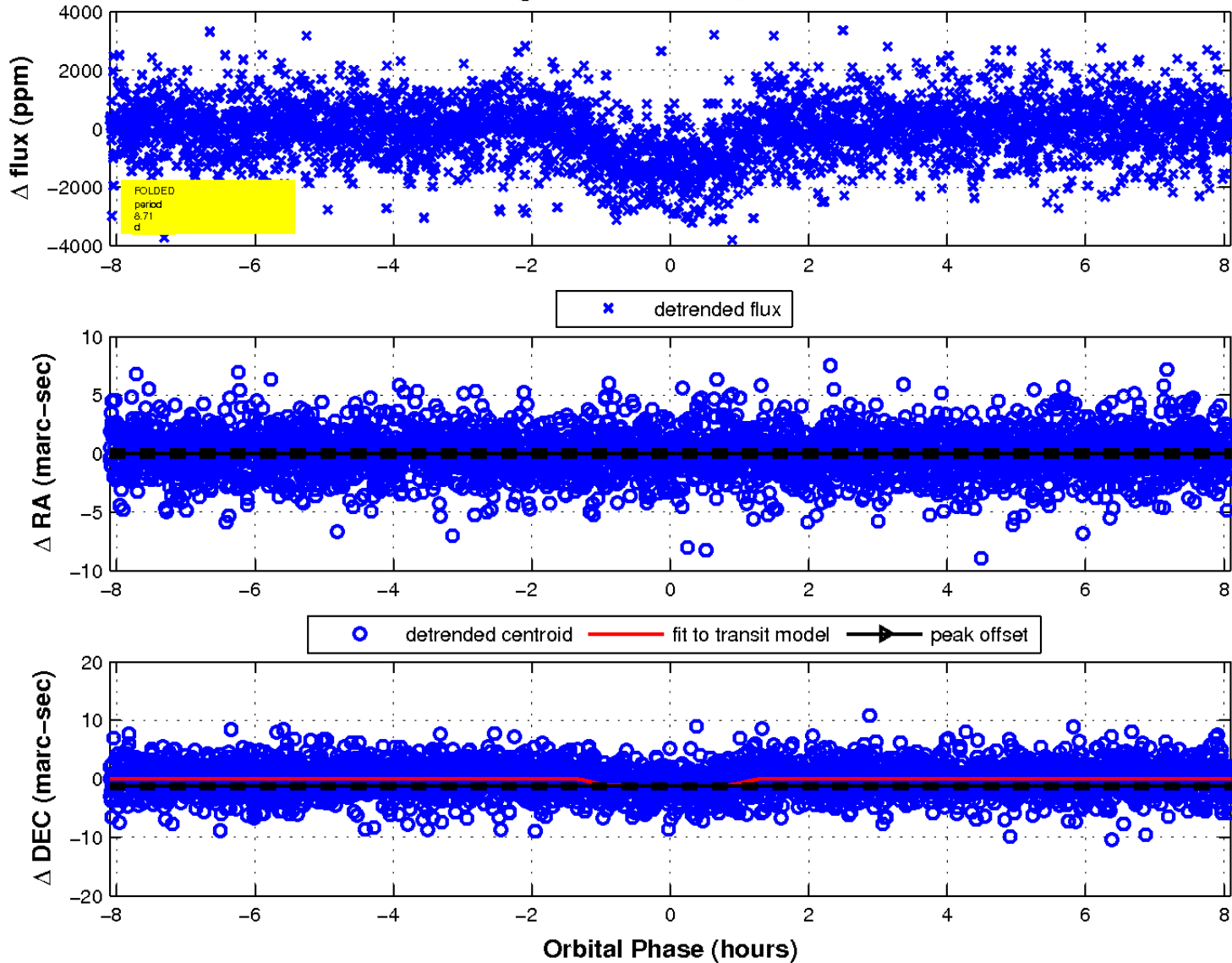
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

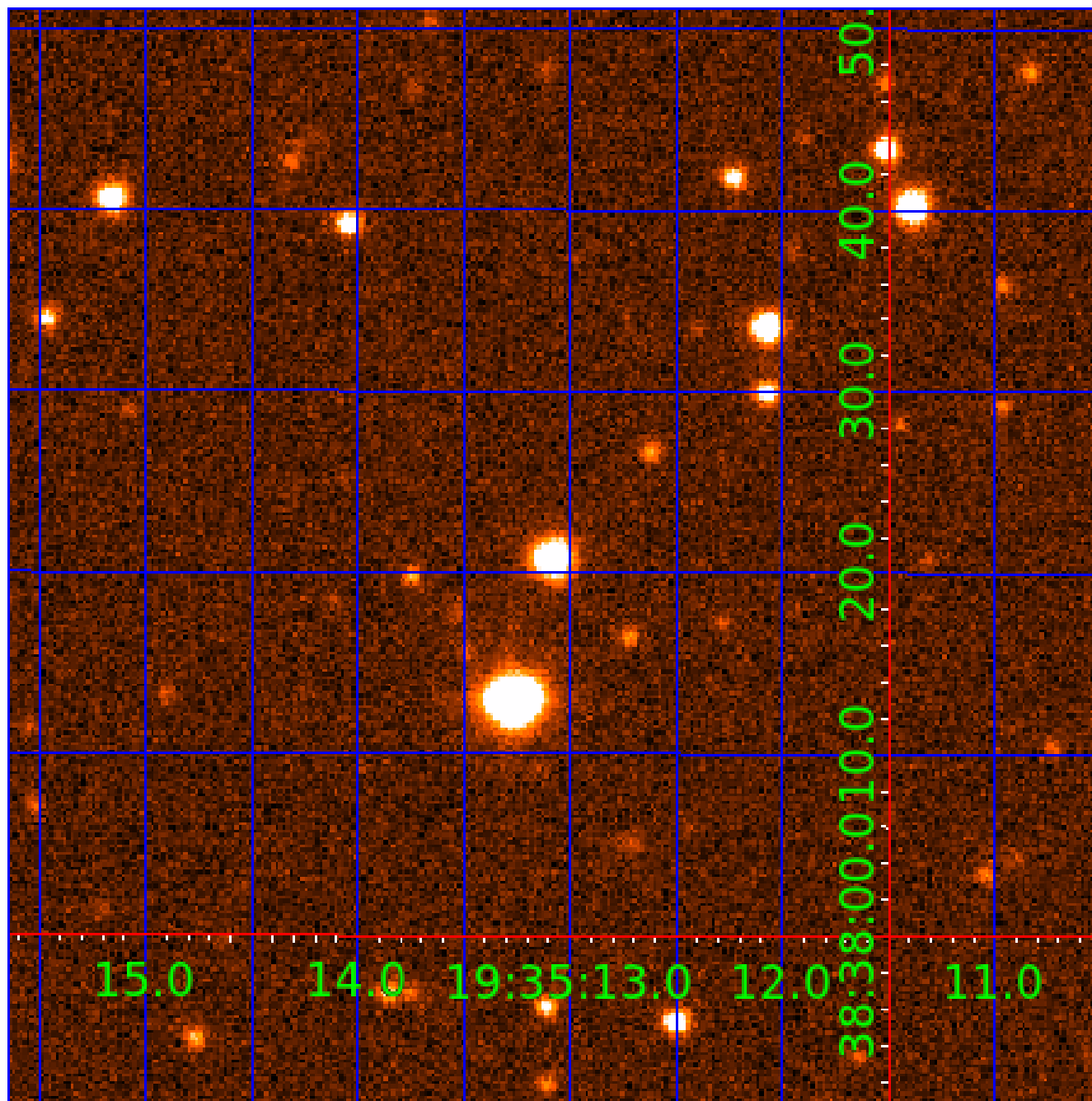


fluxWeightedCentroids, Planet 1 of 3



UKIRT Image

Declination





# KIC 003554031

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
003554031-01	OBS	1194.01	8.707930	136.653788	1343.9	2.701	23.3	25.6	0.55	4362	2.41	20.61
003554031-02	OBS	1194.03	4.176316	131.655492	527.6	2.433	12.6	14.0	0.55	4362	1.55	54.90
003554031-03	OBS	1194.02	14.862384	131.634361	772.2	3.606	10.9	12.4	0.55	4362	1.83	10.11

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
003554031-01	OBS	PC	1.00	0	0	0	0	CENT_KIC_POS
003554031-02	OBS	PC	1.00	0	0	0	0	CENT_KIC_POS
003554031-03	OBS	FP	0.00	0	0	1	0	CENT_RESOLVED_OFFSET—HALO_GHOST

**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.

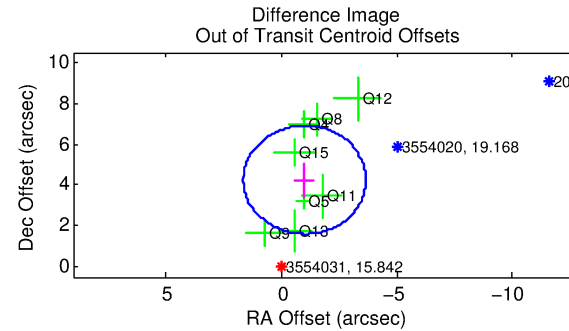
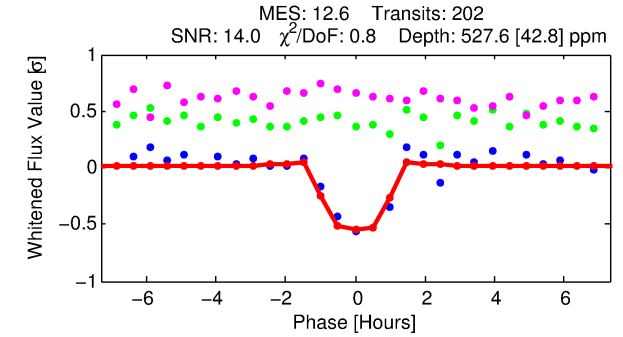
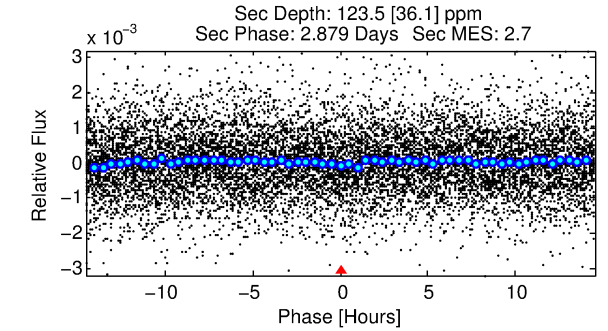
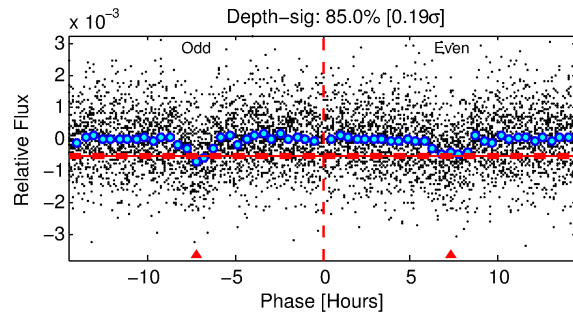
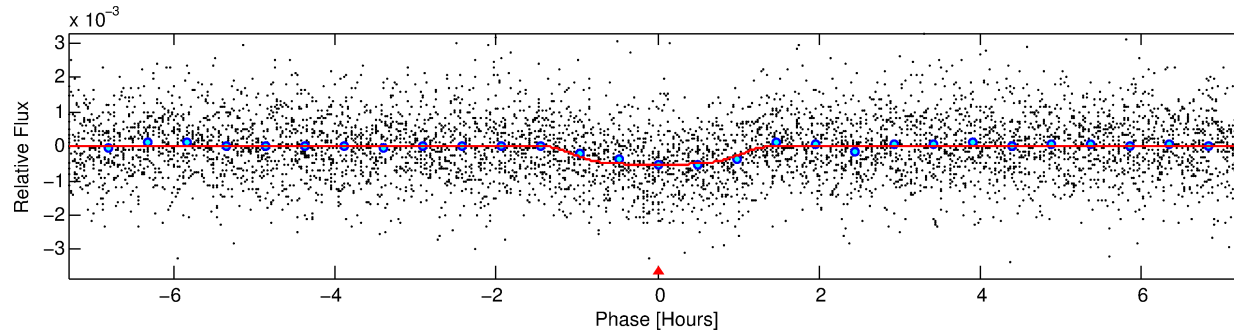
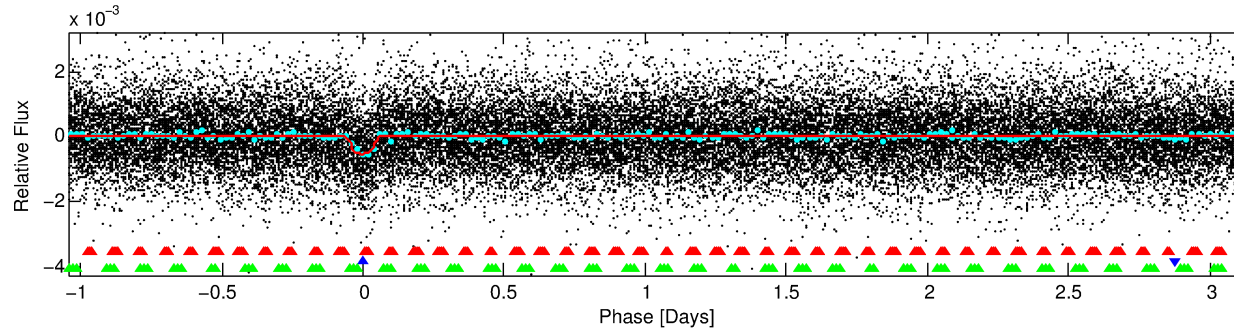
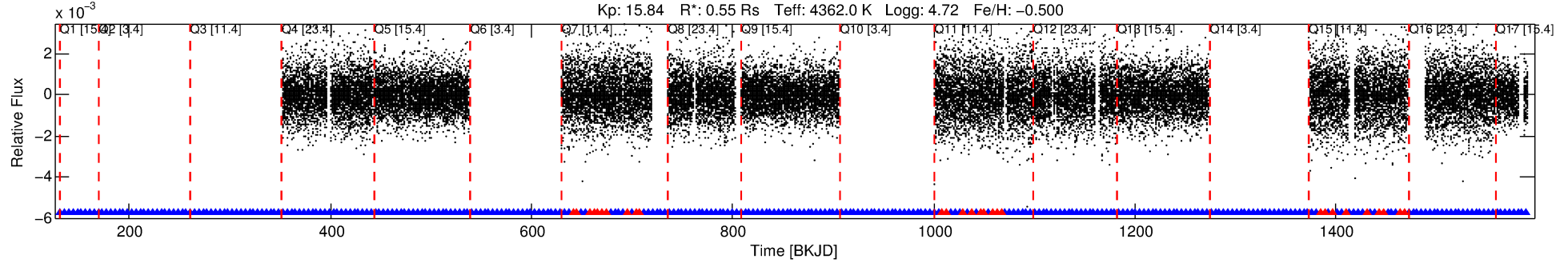
## Ephemeris Match Information For 003554031-02

No Significant Match Found

# DV One-Page Summary

KIC: 3554031 Candidate: 2 of 3 Period: 4.176 d  
KOI: K01194.03 Name: Kepler-415b Corr: 0.971

Kp: 15.84 R\*: 0.55 Rs Teff: 4362.0 K Logg: 4.72 Fe/H: -0.500



## DV Fit Results:

Period = 4.17632 [0.00002] d  
Epoch = 131.6555 [0.0030] BKJD  
Rp/R\* = 0.0257 [0.0077]  
a/R\* = 6.49 [7.52]  
b = 0.90 [0.25]  
Seff = 54.90 [6.73]  
Teq = 694 [21] K  
Rp = 1.55 [0.48] Re  
a = 0.0426 [0.0027] AU  
Ag = 51.12 [34.31] [1.46σ]  
Teffp = 2869 [480] K [4.52σ]

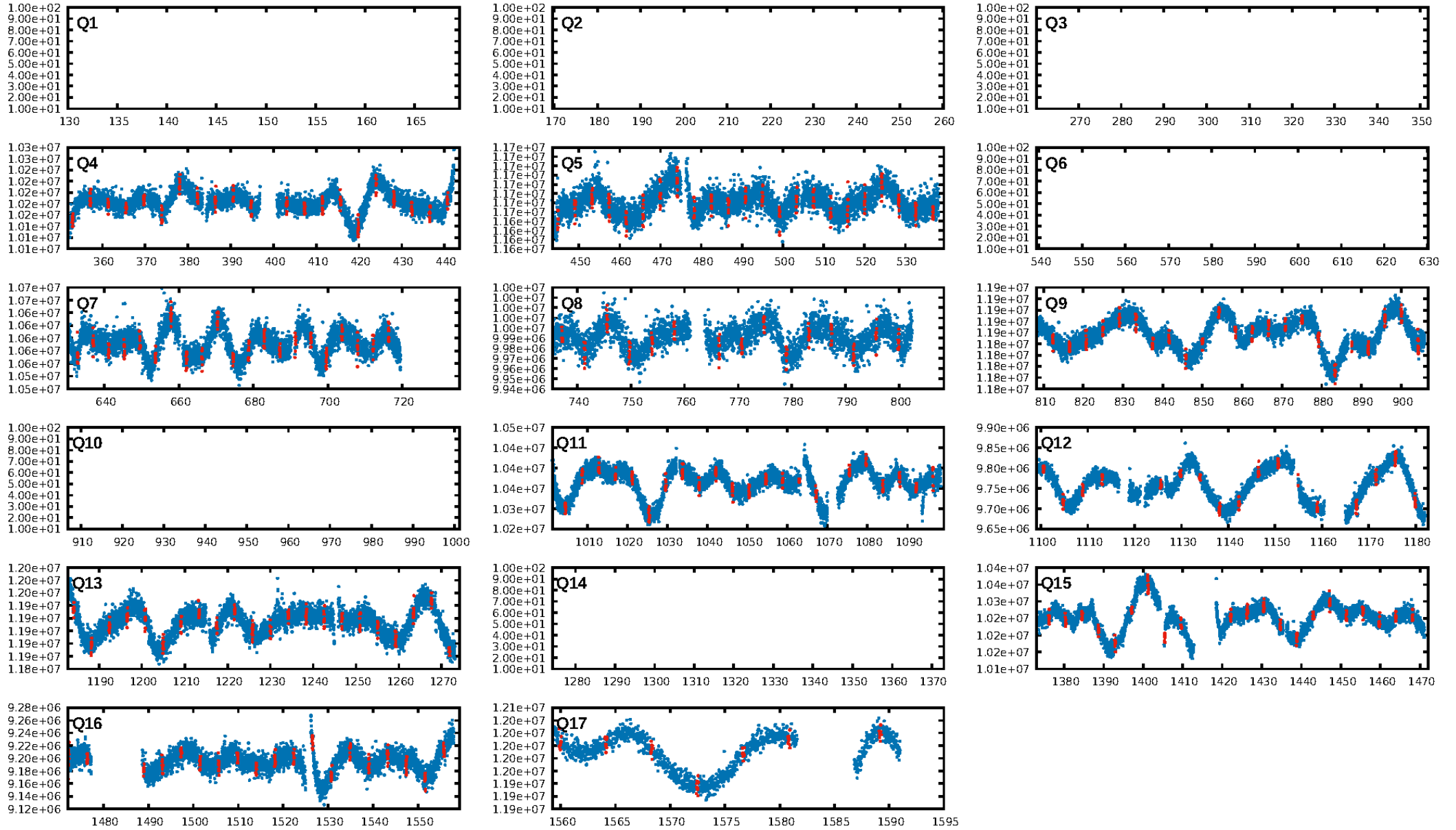
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [29.92σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 1.50e-35  
RollingBand-fgt: 0.86 [167/195]  
GhostDiagnostic-chr: 3.659  
Centroid-sig: 14.1%  
Centroid-so: 2.952 arcsec [7.36σ]  
OotOffset-rm: 4.373 arcsec [4.95σ]  
KicOffset-rm: 0.204 arcsec [0.65σ]  
OotOffset-st: 0/2/3/3 [8]  
KicOffset-st: 0/2/3/3 [8]  
DiffImageQuality-fgm: 0.62 [5/8]  
DiffImageOverlap-fno: 1.00 [11/11]

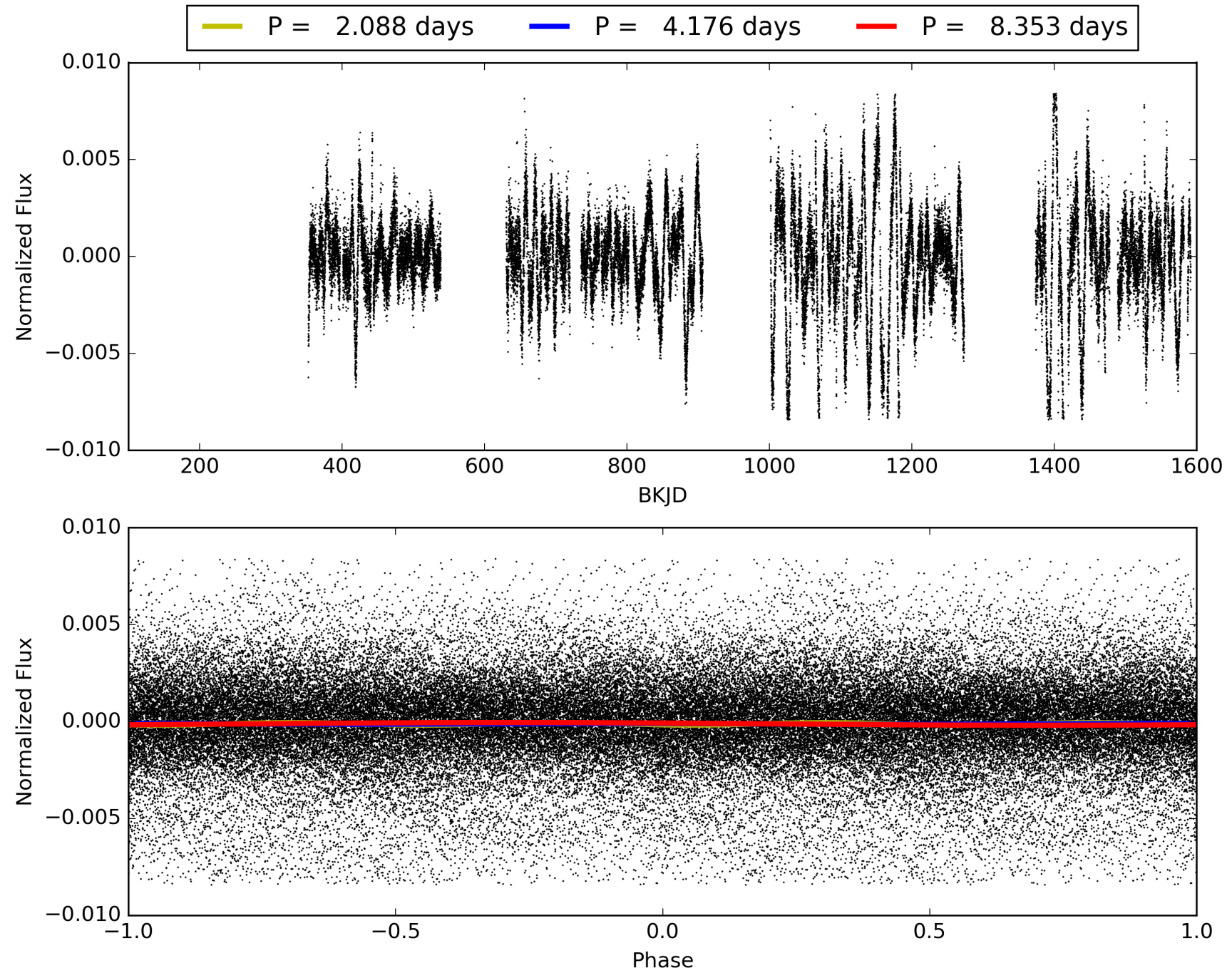
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 18:50:17 Z

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

# TCE 003554031-02, PDC Light Curves

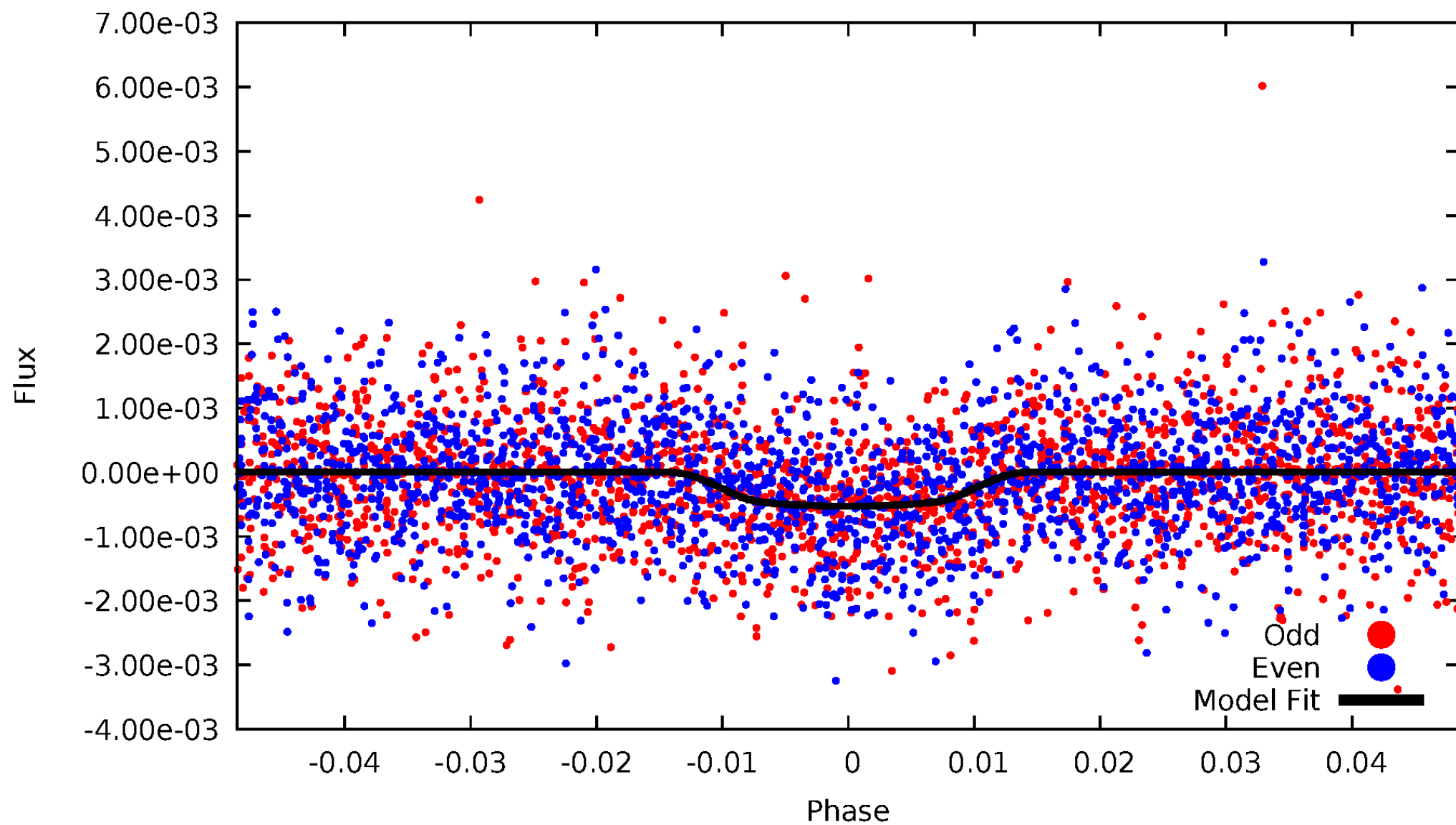


TCE 003554031-02



DV Odd/Even

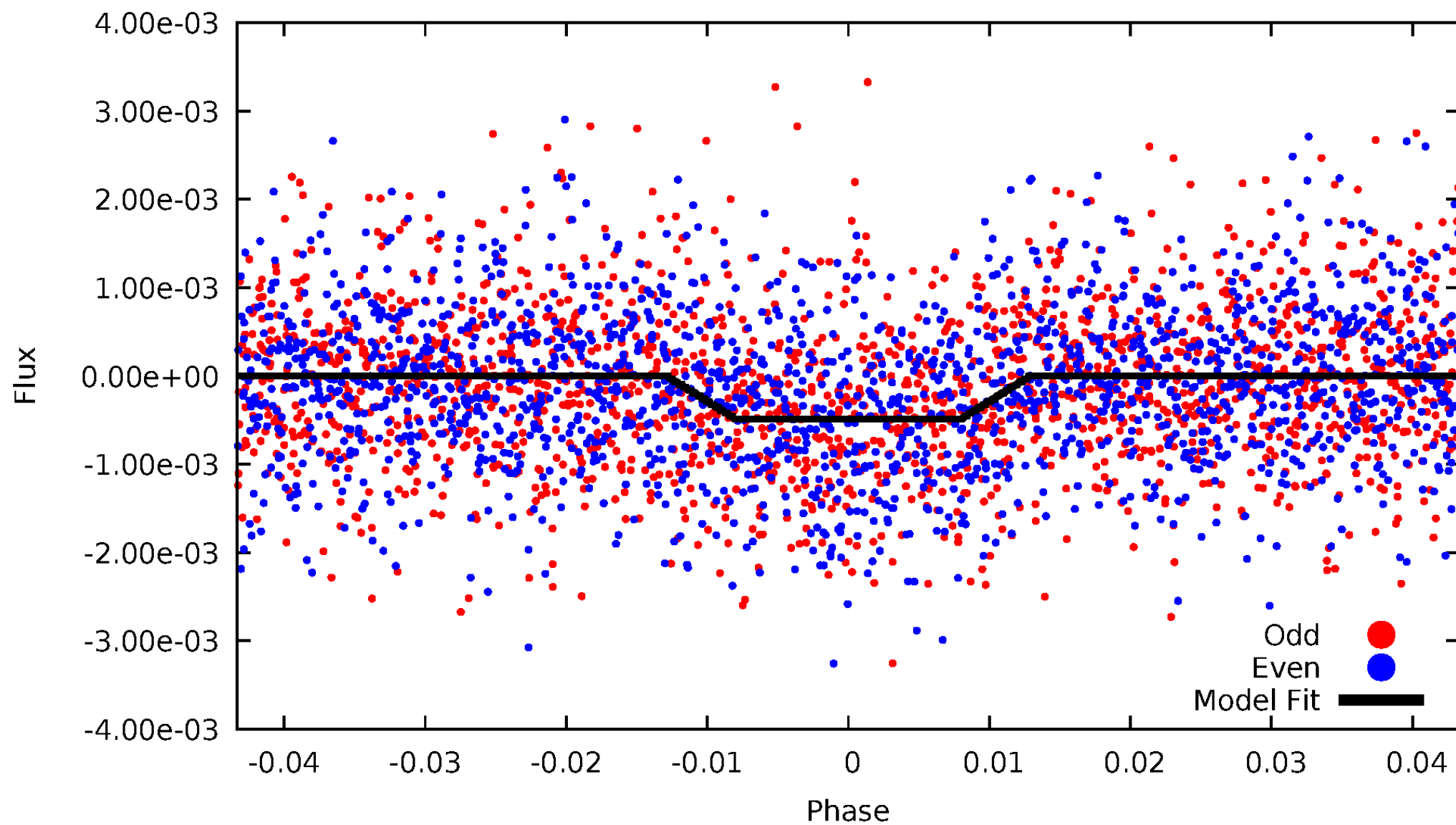
TCE 003554031-02





# ALT Odd/Even

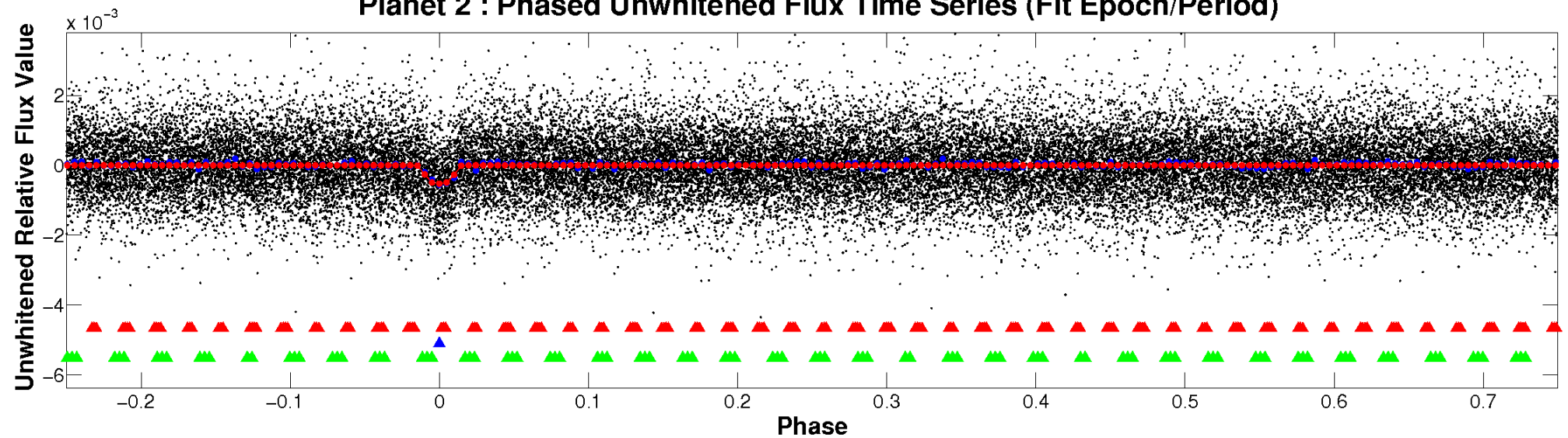
TCE 003554031-02



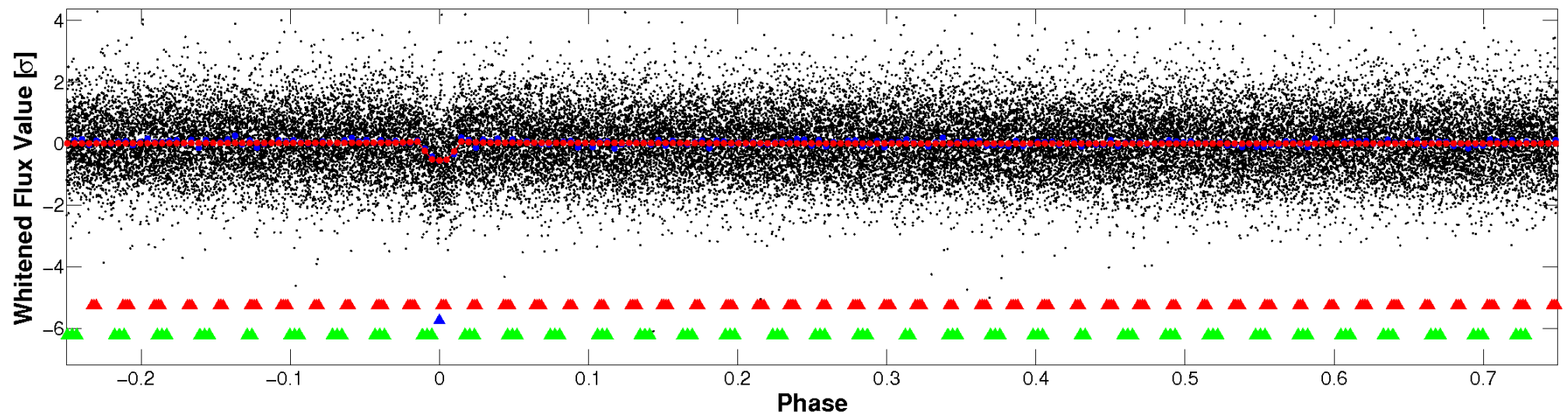


# Non-Whitened Vs. Whitened Light Curve

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

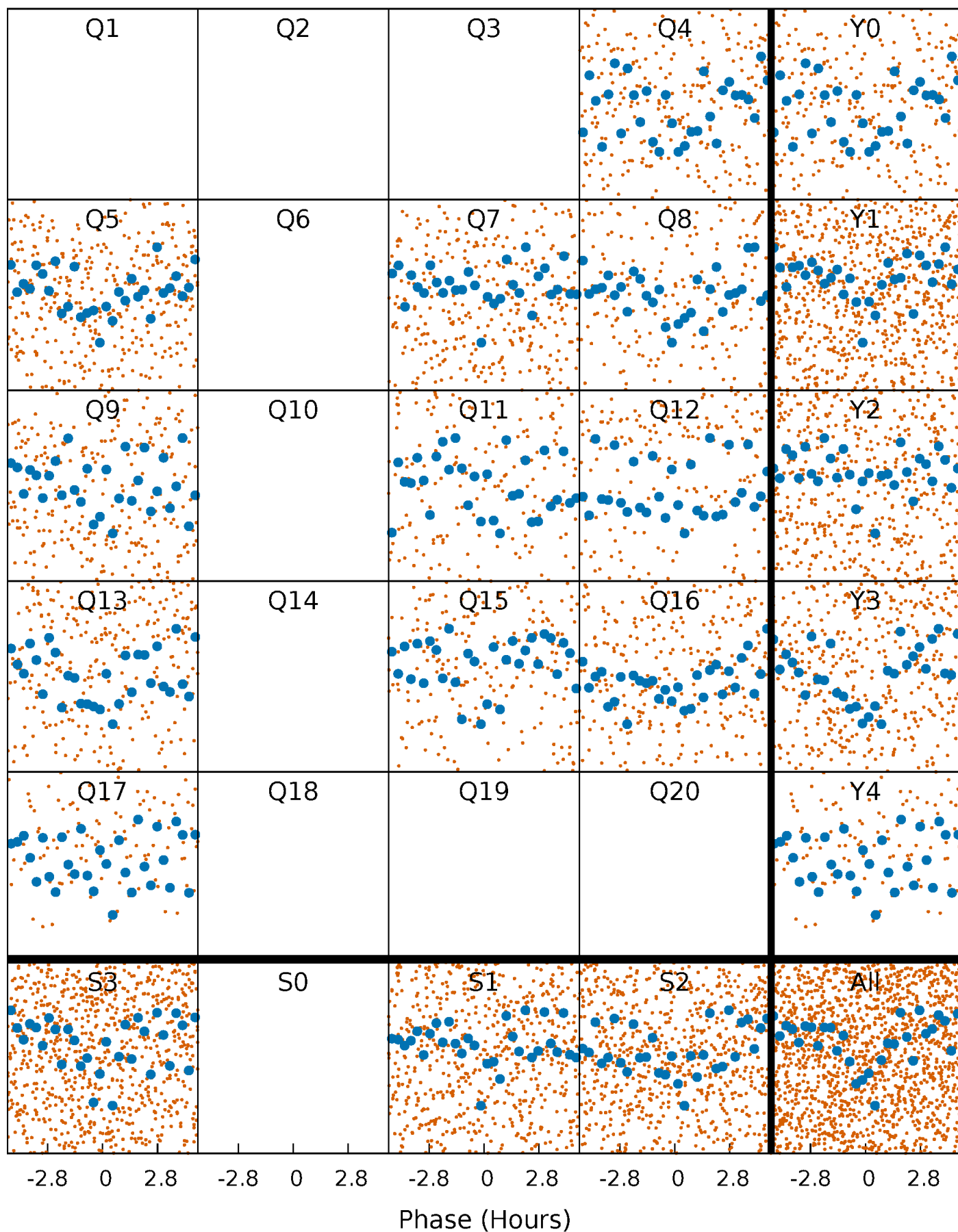


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



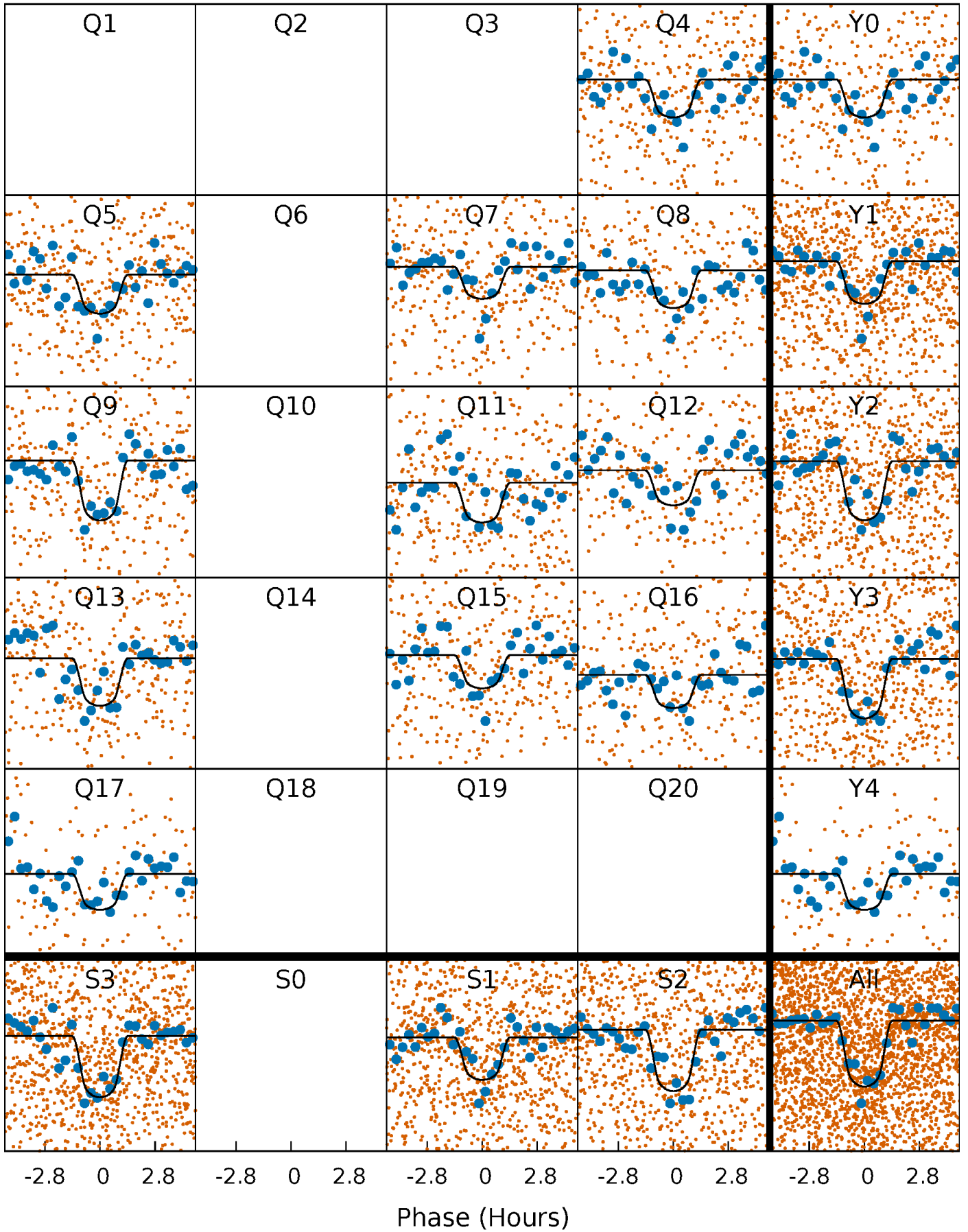
# PDC Quarter-Phased Transit Curves

TCE 003554031-02 P= 4.176316 Days  $T_0=131.655492$  (BKJD)



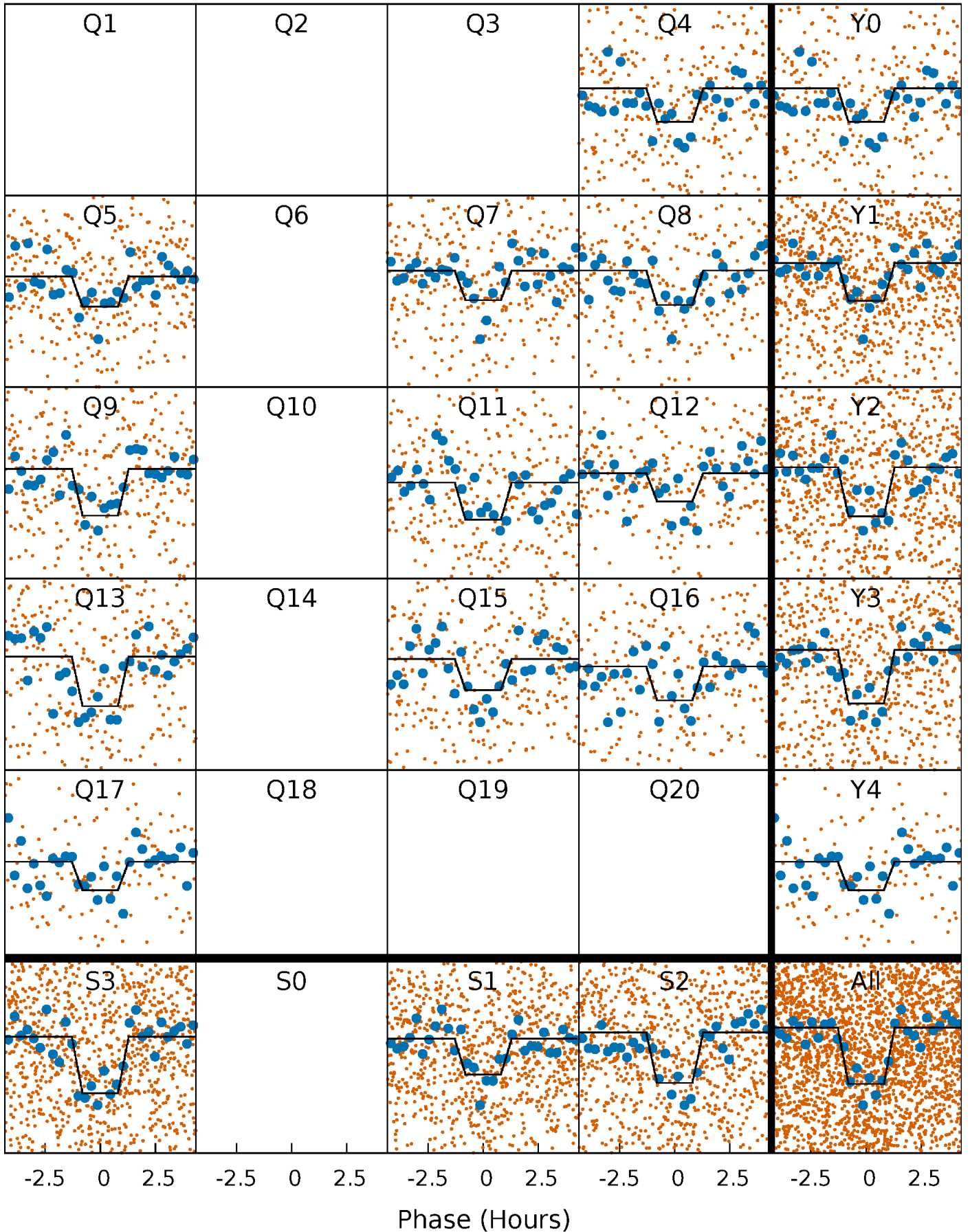
# DV Quarter-Phased Transit Curves

TCE 003554031-02   P= 4.176316 Days    $T_0=131.655492$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 003554031-02 P= 4.176323 Days  $T_0=131.654875$  (BKJD)

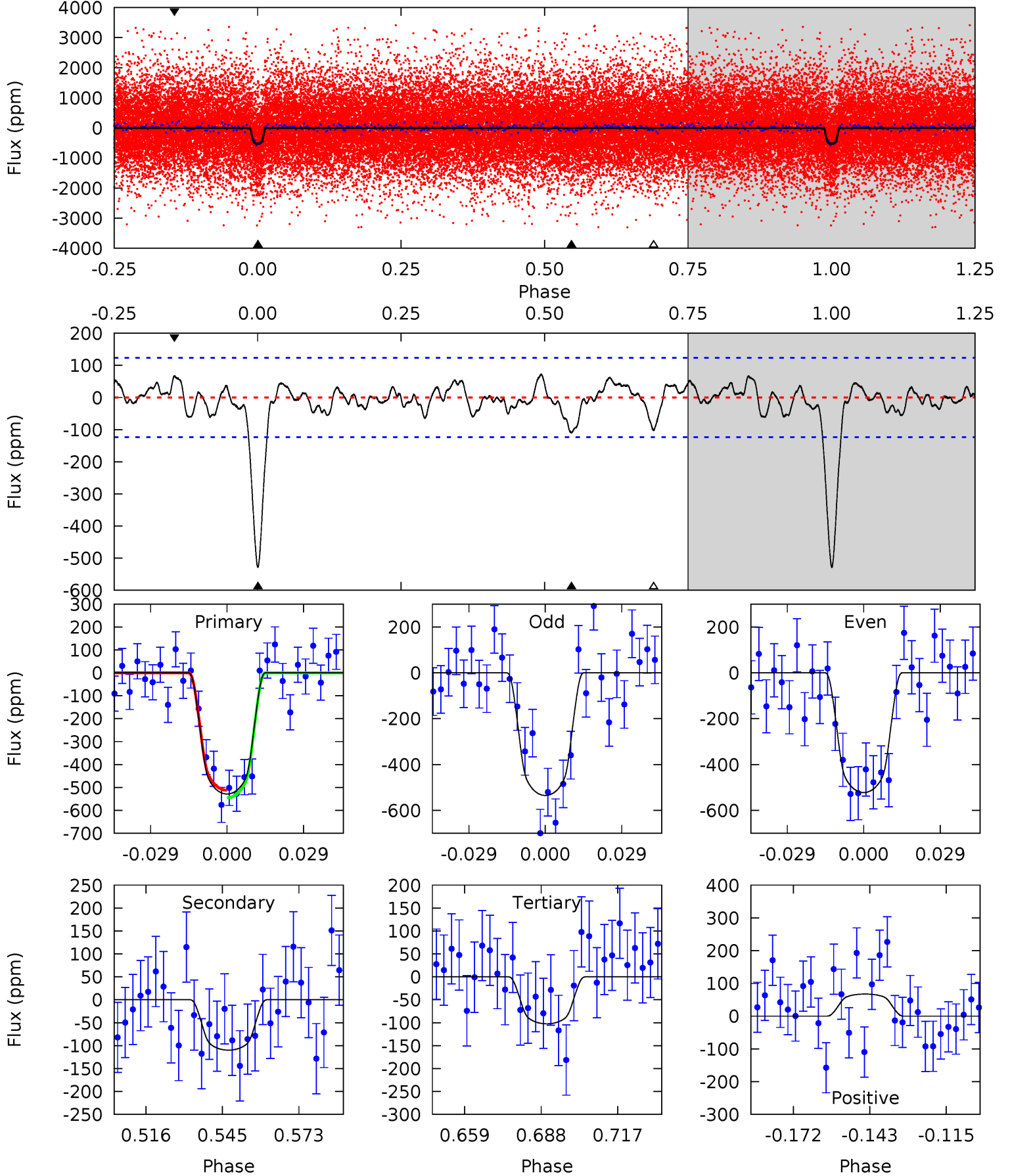




# DV Model-Shift Uniqueness Test

003554031-02, P = 4.176316 Days, E = 131.655492 Days

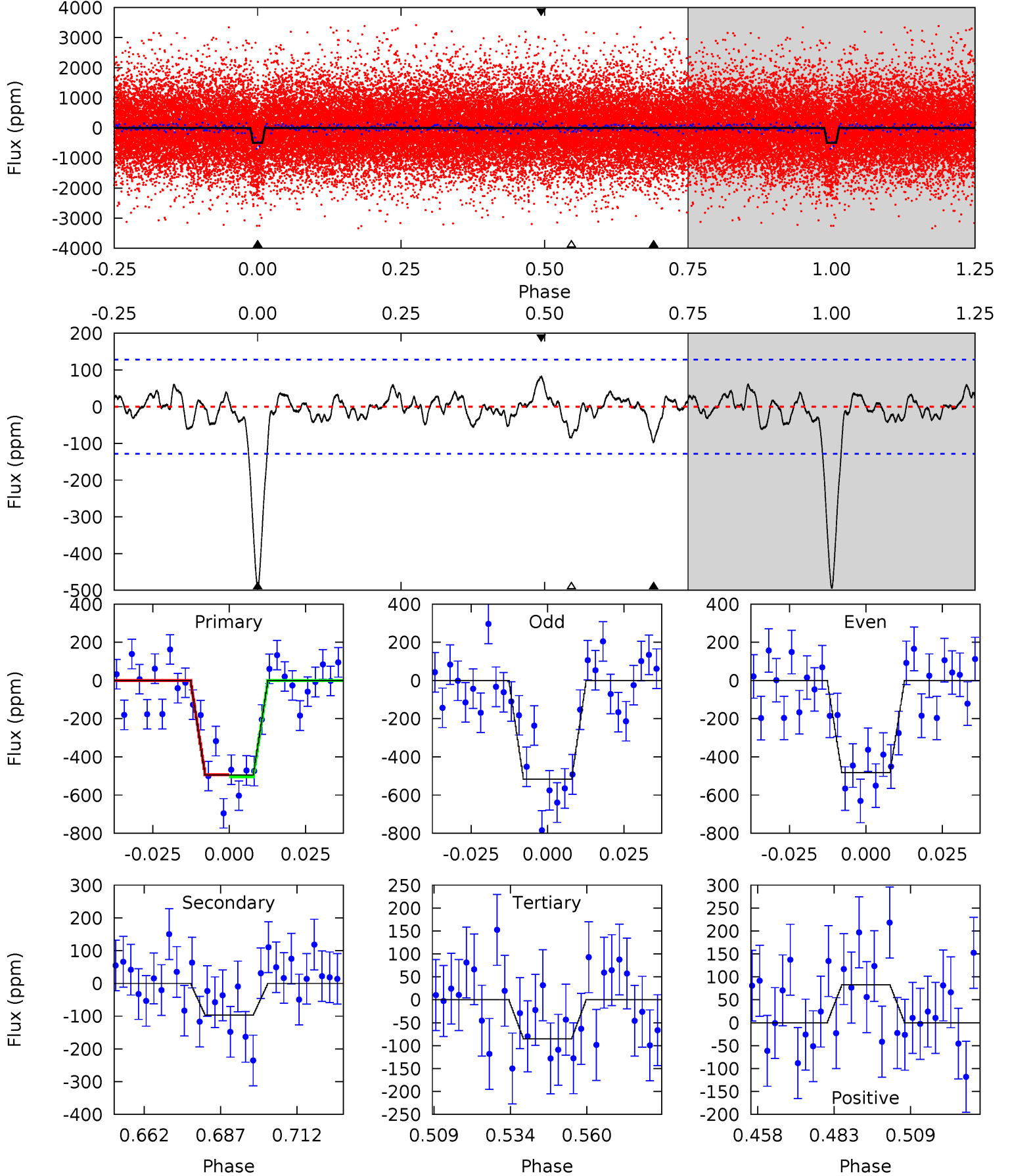
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
20.7	4.30	4.01	2.64	4.82	2.19	1.25	16.7	18.0	0.29	1.66	0.25	0.98	0.12	0.65



# Alt Model-Shift Uniqueness Test

003554031-02, P = 4.176323 Days, E = 131.654875 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
18.7	3.67	3.22	3.12	4.84	2.23	1.05	15.5	15.6	0.44	0.55	0.65	0.94	0.14	0.21





### Stellar Parameters For KIC 003554031

	$T_{\text{eff}}(K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$4362^{+87}_{-78}$	$4.722^{+0.012}_{-0.051}$	$-0.500^{+0.150}_{-0.150}$	$0.554^{+0.042}_{-0.017}$	$0.590^{+0.029}_{-0.029}$	$4.884^{+0.320}_{-0.847}$
	+2%/-2%	+0%/-1%	+30%/-30%	+8%/-3%	+5%/-5%	+7%/-17%
Source	SPE68	SPE68	SPE68	DSEP		

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

### Secondary Eclipse Parameters for KIC 003554031-02 / KOI 1194.03

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-110 \pm 26$	$1.58^{+0.49}_{-0.45}$	$979^{+23}_{-21}$	$3225^{+379}_{-264}$	$43^{+46}_{-19}$
Alt.	$-97 \pm 26$	$1.38^{+0.44}_{-0.47}$	$977^{+23}_{-23}$	$3290^{+470}_{-307}$	$51^{+62}_{-26}$

$T_{\text{max}}$  = 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

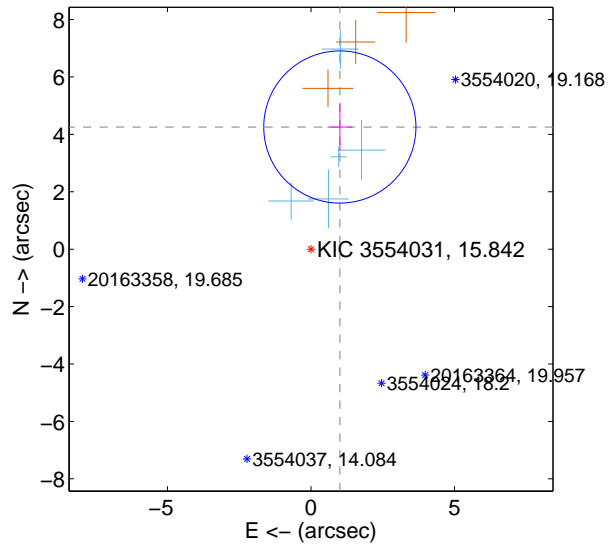
Supplemental centroid analysis for 003554031-02. Kepler magnitude: 15.84. Transit SNR 14.01

There are 5 quarters with good PRF difference image offsets

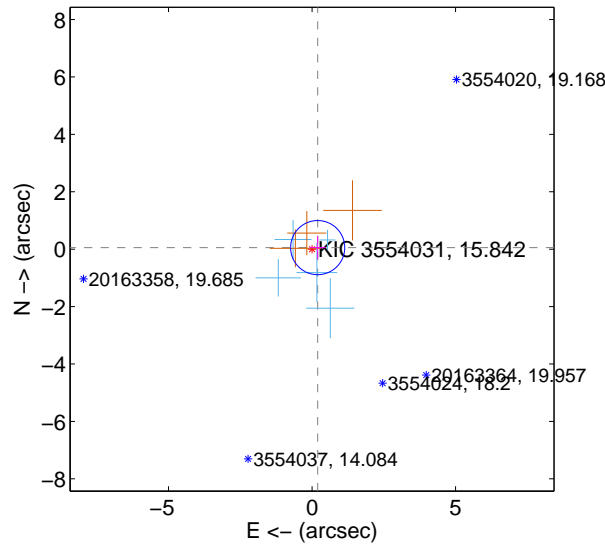
The OOT PRF centroid is offset from the target star catalog position by about 5.69 arcsec so the offset from difference PRF-fit to OOT-fit may be invalid.

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$4.373 \pm 0.884$	4.95	$-1.005 \pm 0.427$	$4.256 \pm 0.835$
PRF-fit source offset from KIC position	$0.204 \pm 0.314$	0.65	$-0.197 \pm 0.279$	$0.055 \pm 0.398$
photometric centroid source offset	$2.95 \pm 0.40$	7.36	$0.47 \pm 0.33$	$-2.91 \pm 0.40$

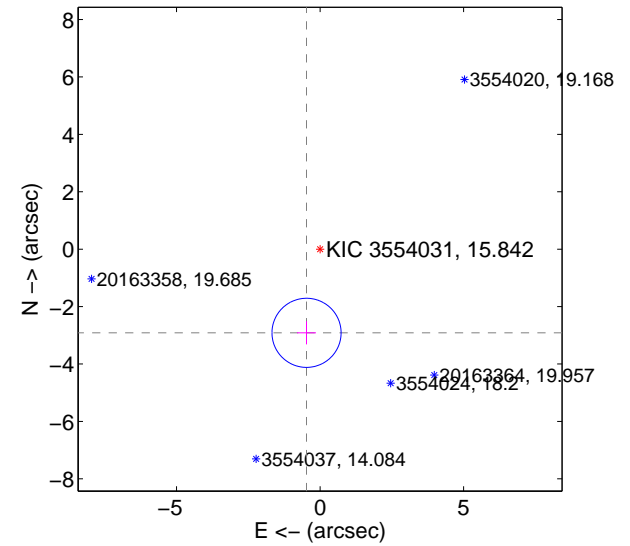
offset from difference PRF-fit to OOT PRF-fit



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.

Q1 no difference image



Q1 no OOT image



Q2 no difference image



Q2 no OOT image



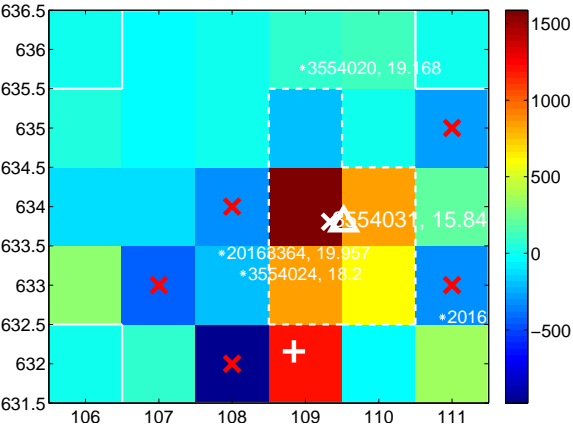
Q3 no difference image



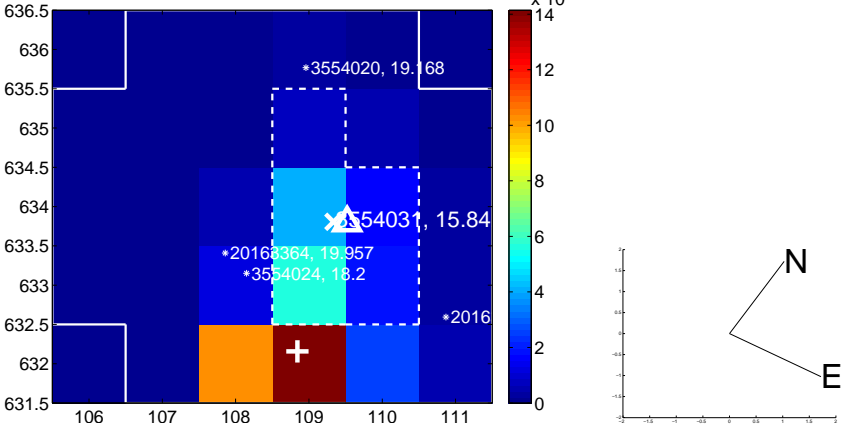
Q3 no OOT image



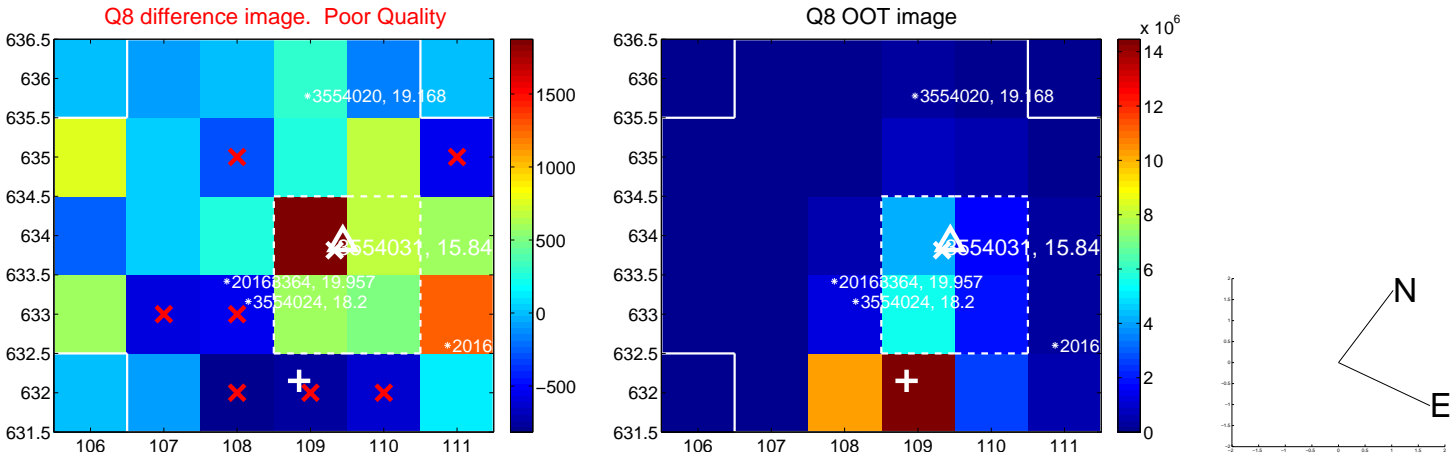
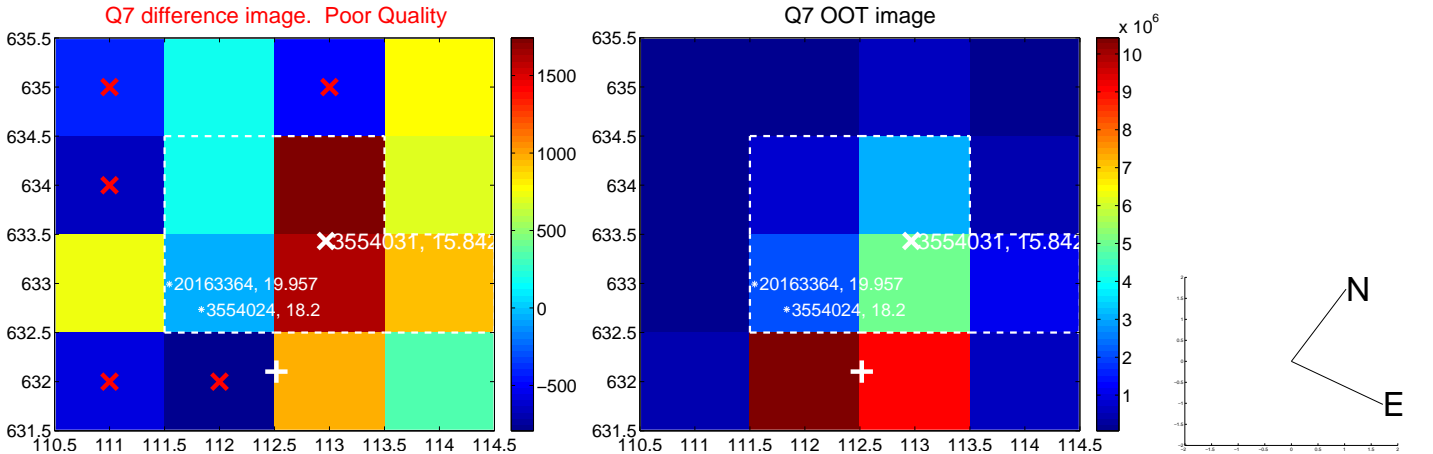
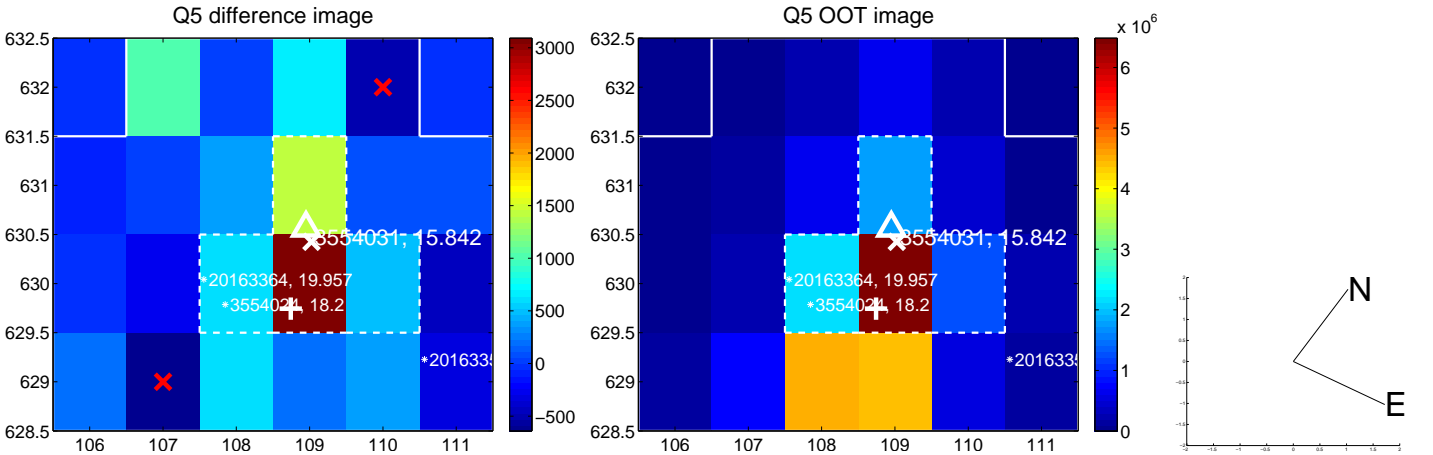
Q4 difference image



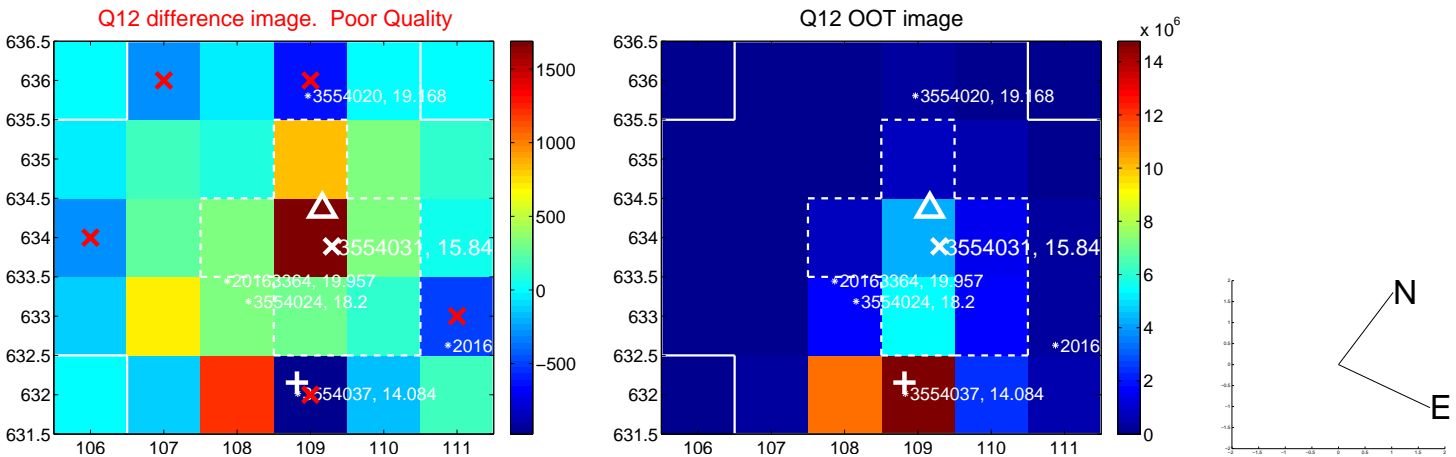
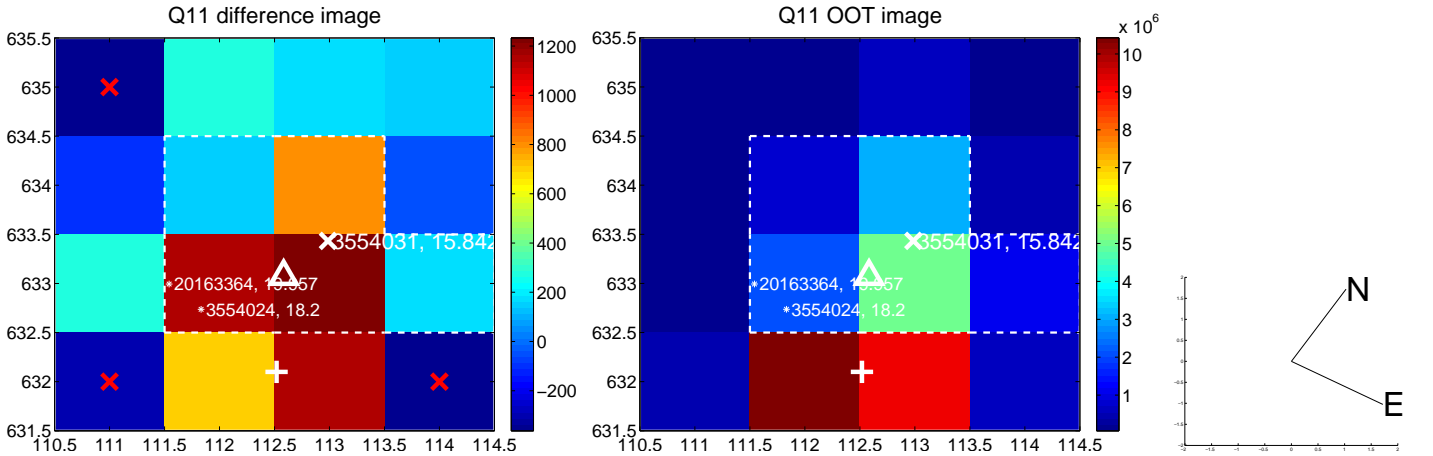
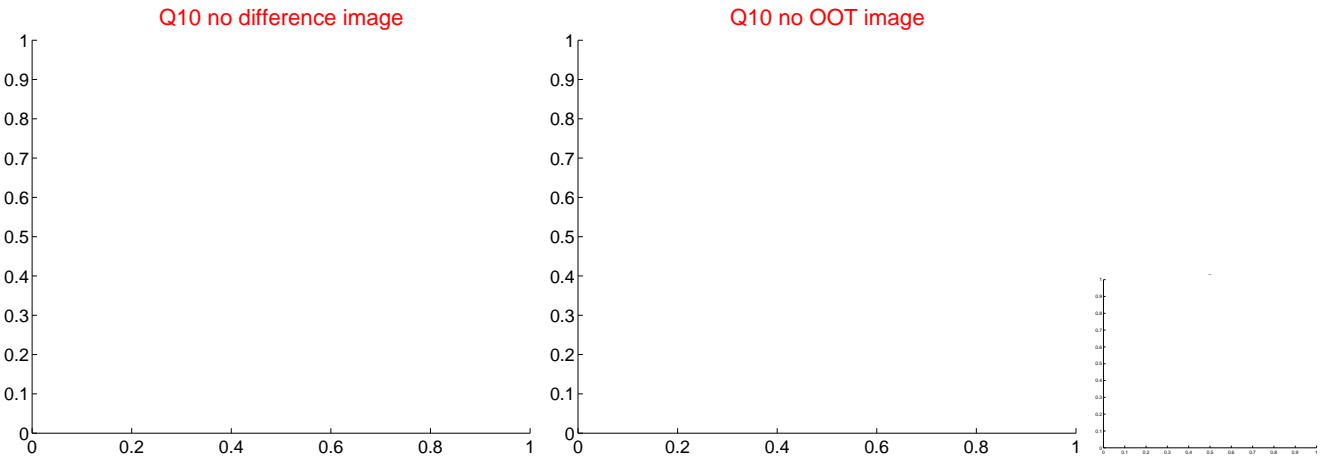
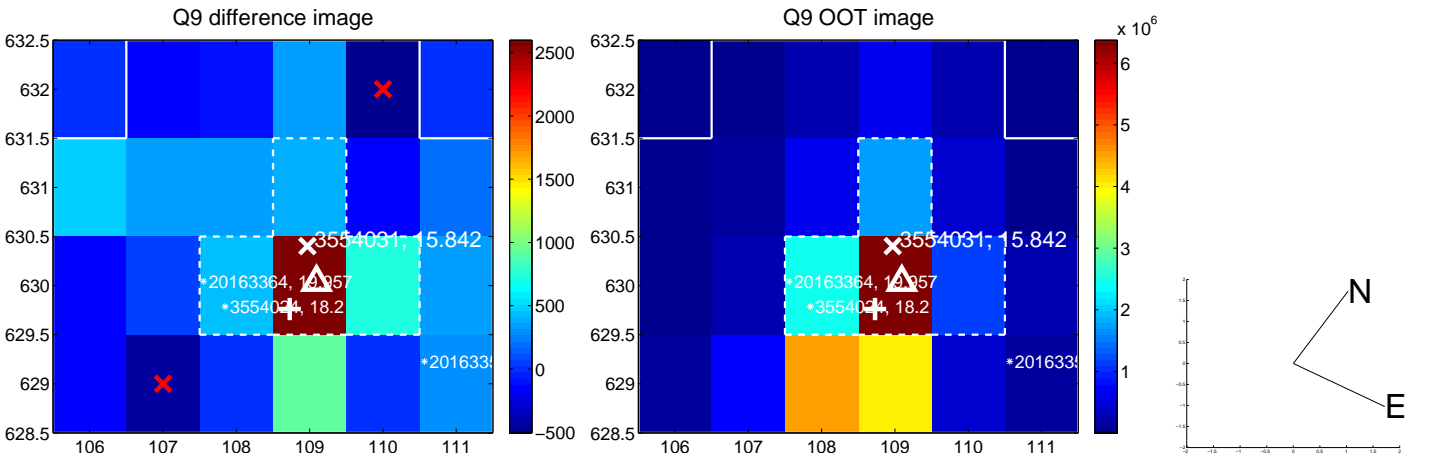
Q4 OOT image



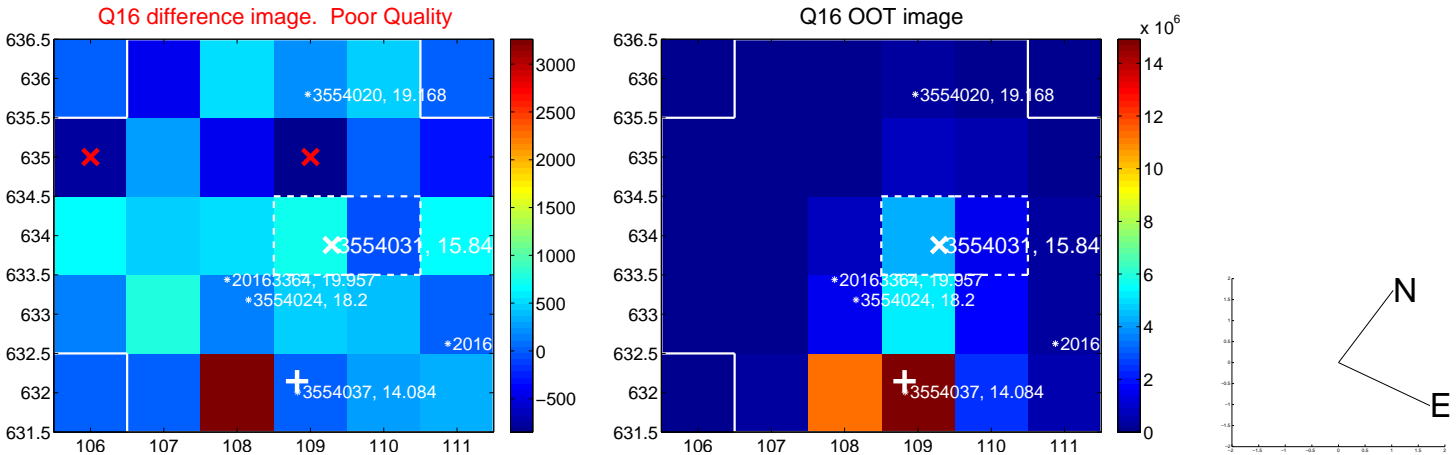
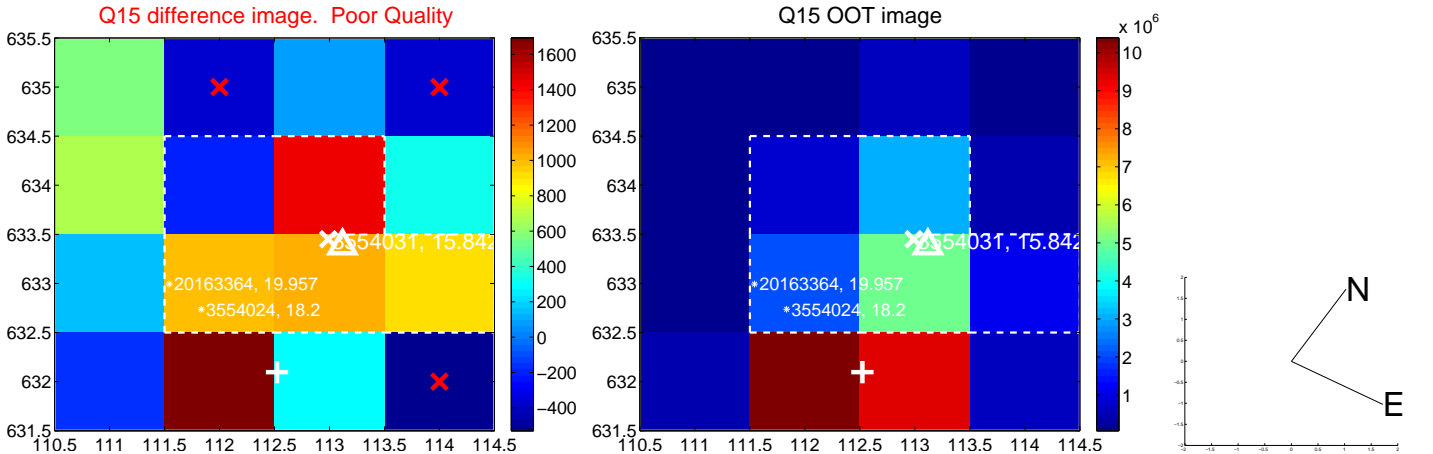
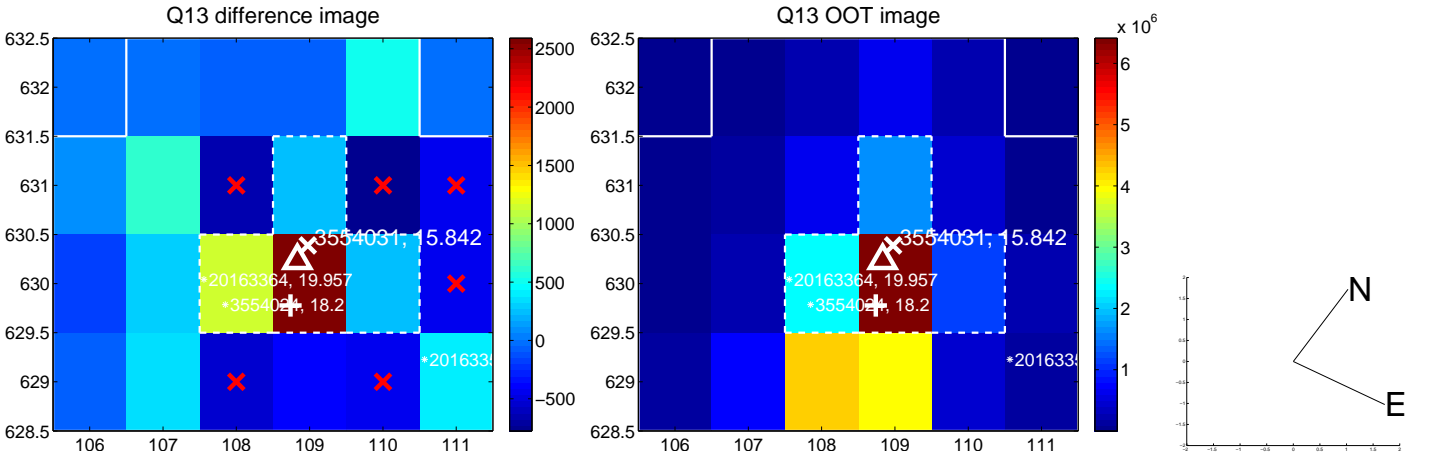
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



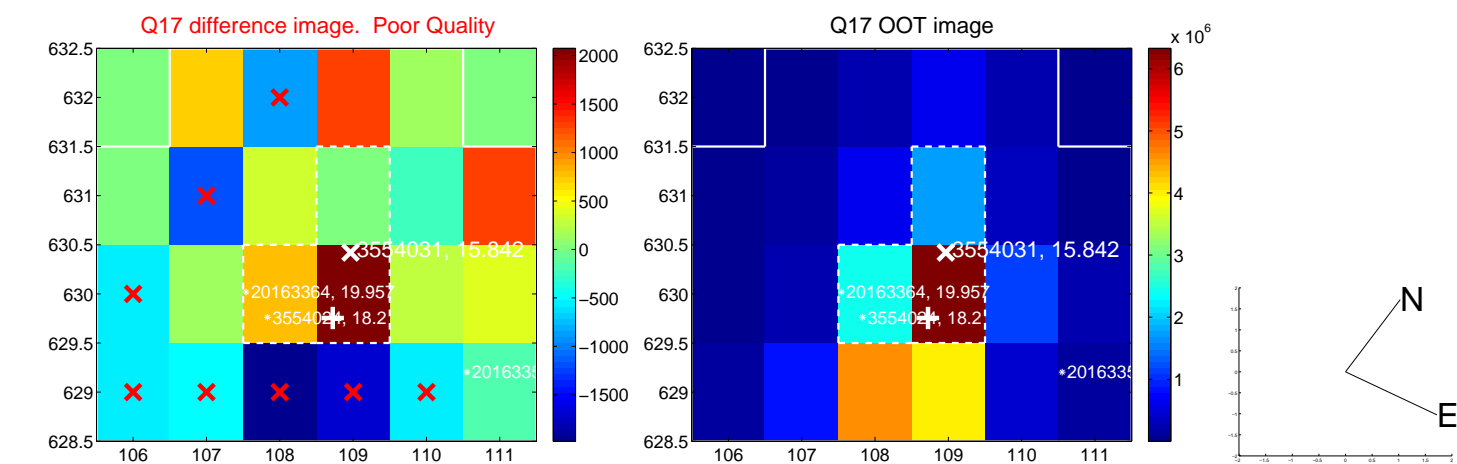
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



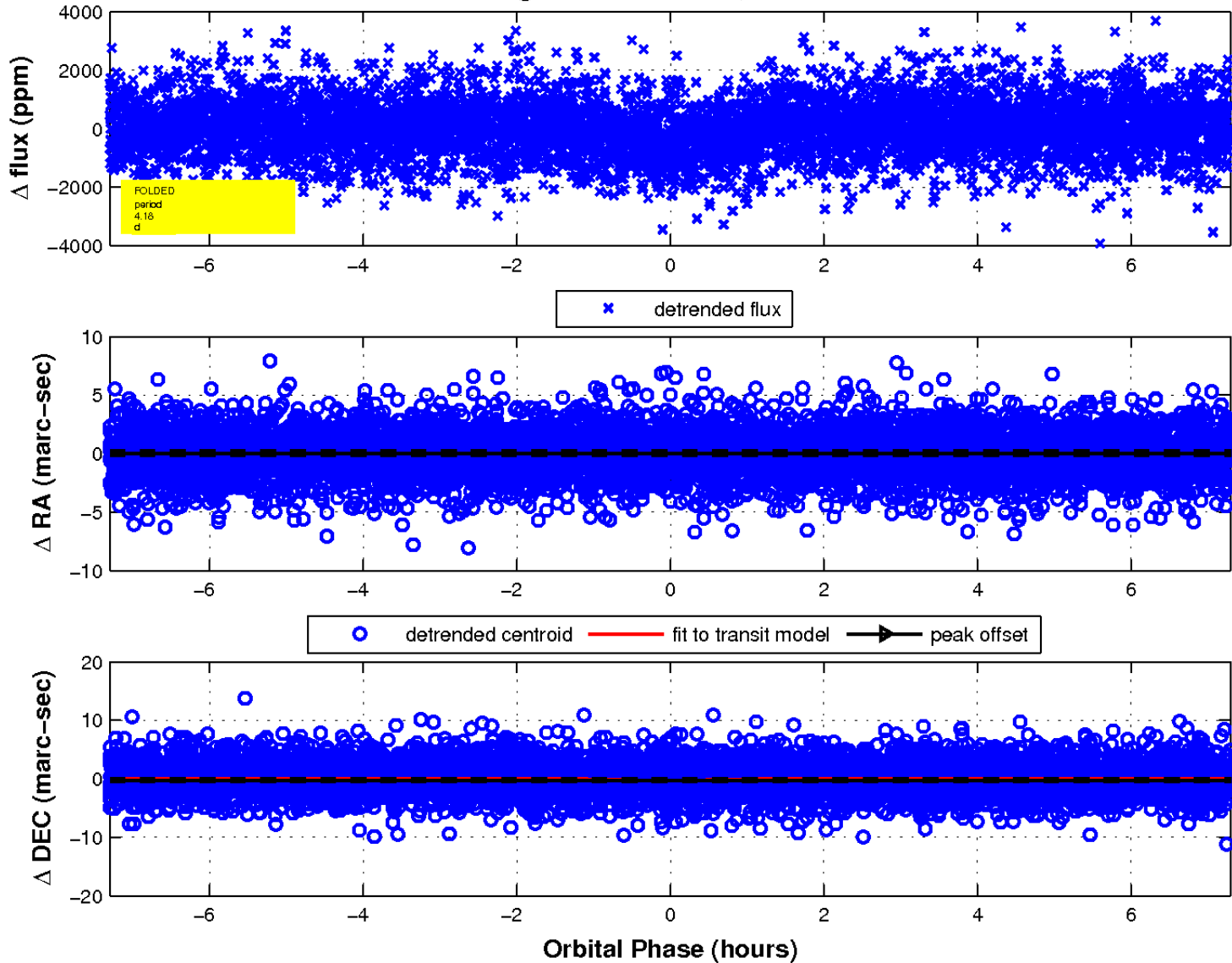
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



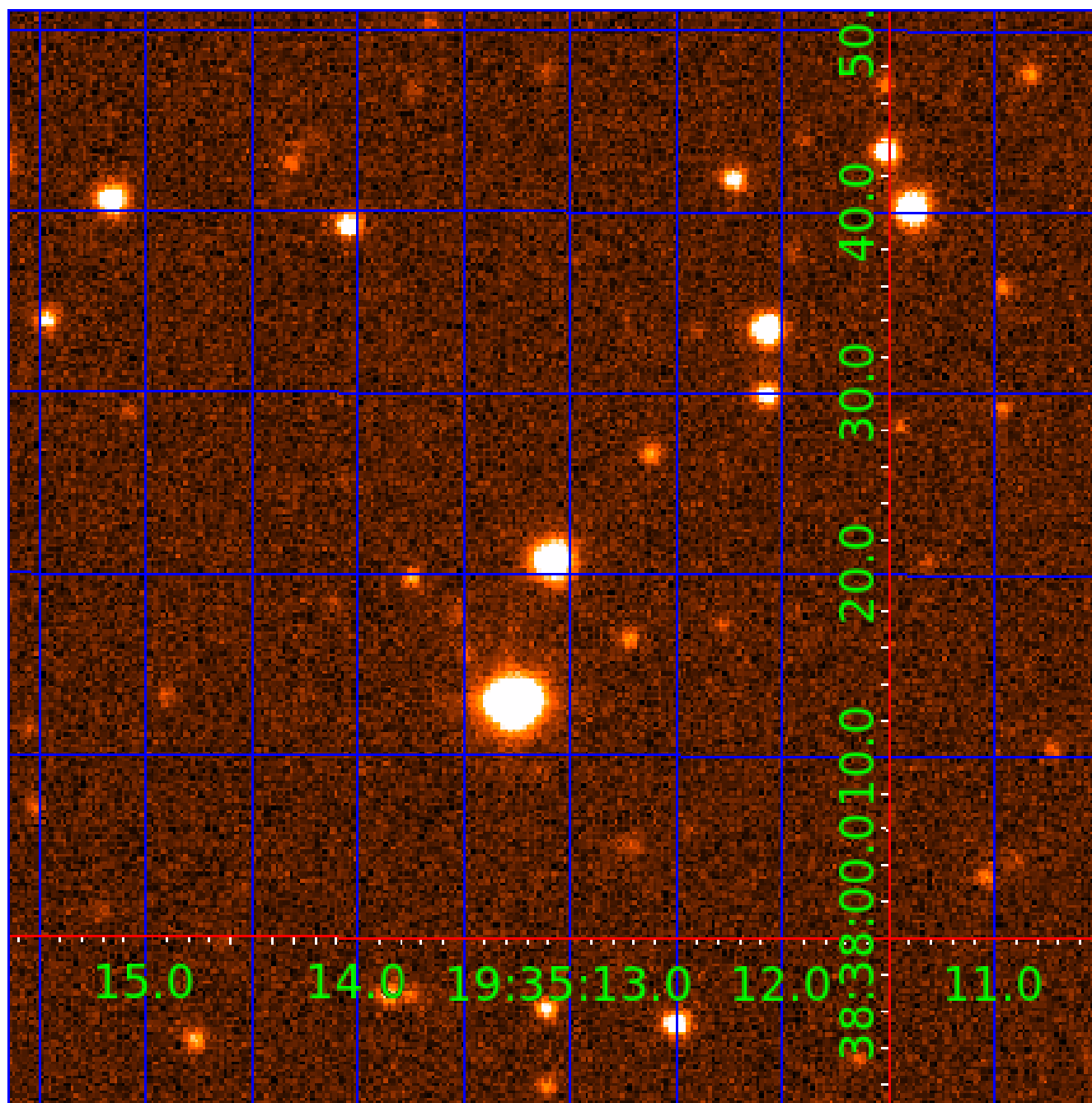
fluxWeightedCentroids, Planet 2 of 3





UKIRT Image

Declination



# KIC 003554031

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
003554031-01	OBS	1194.01	8.707930	136.653788	1343.9	2.701	23.3	25.6	0.55	4362	2.41	20.61
003554031-02	OBS	1194.03	4.176316	131.655492	527.6	2.433	12.6	14.0	0.55	4362	1.55	54.90
003554031-03	OBS	1194.02	14.862384	131.634361	772.2	3.606	10.9	12.4	0.55	4362	1.83	10.11

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
003554031-01	OBS	PC	1.00	0	0	0	0	CENT_KIC_POS
003554031-02	OBS	PC	1.00	0	0	0	0	CENT_KIC_POS
003554031-03	OBS	FP	0.00	0	0	1	0	CENT_RESOLVED_OFFSET—HALO_GHOST

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

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

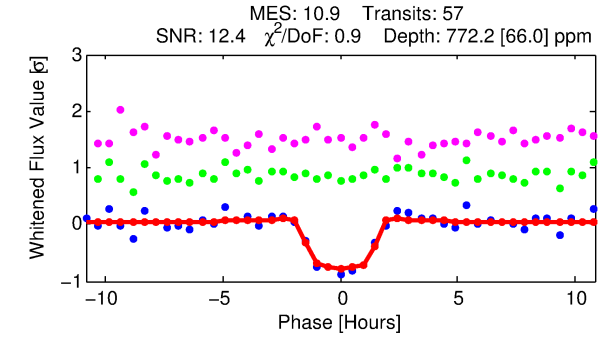
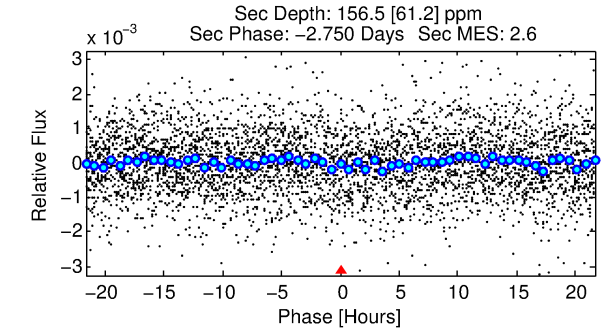
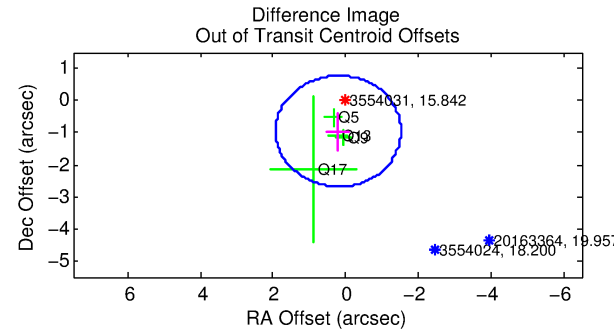
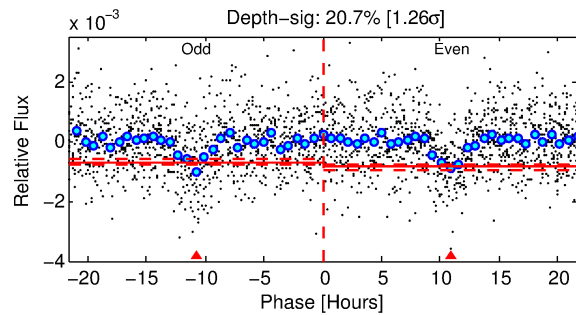
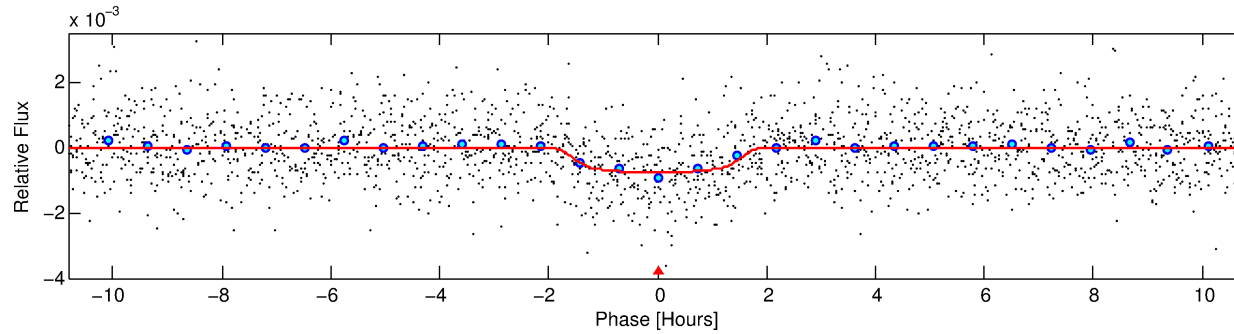
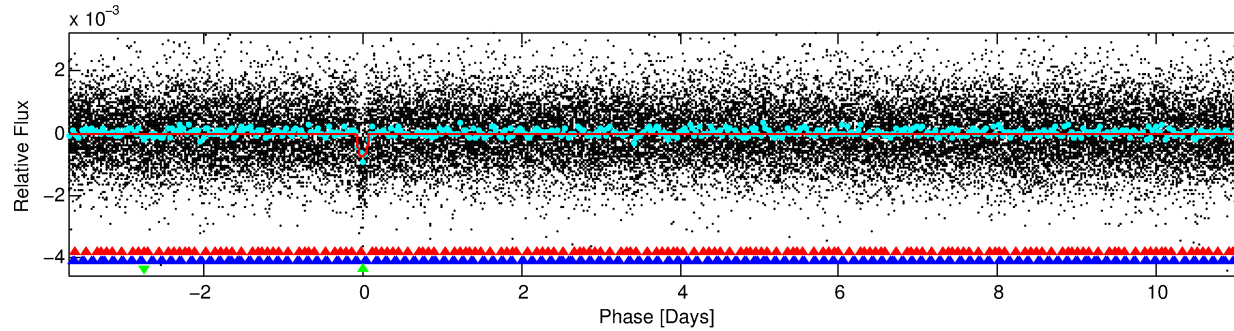
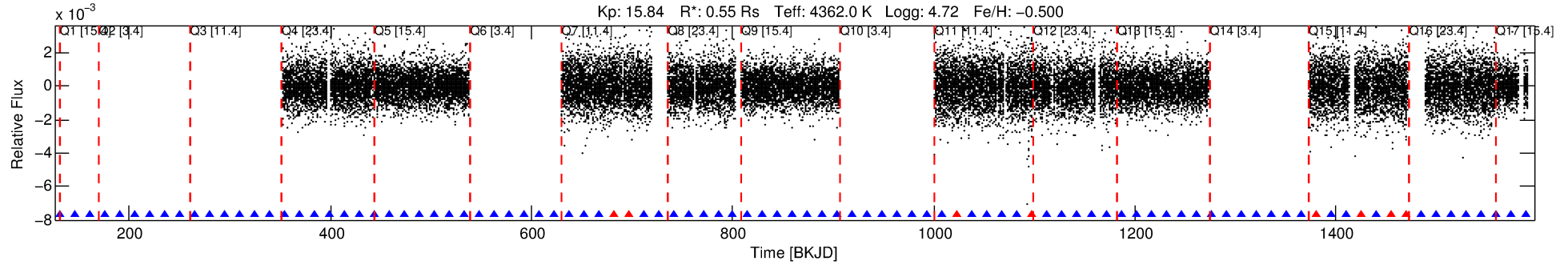
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 003554031-03

No Significant Match Found

# DV One-Page Summary

KIC: 3554031 Candidate: 3 of 3 Period: 14.862 d  
KOI: K01194.02 Corr: 0.925



## DV Fit Results:

Period = 14.86238 [0.00013] d  
Epoch = 131.6344 [0.0075] BKJD  
Rp/R\* = 0.0303 [0.0078]  
a/R\* = 16.96 [16.41]  
b = 0.88 [0.26]  
Seff = 10.10 [1.24]  
Teq = 455 [14] K  
Rp = 1.83 [0.49] Re  
a = 0.0993 [0.0063] AU  
Ag = 252.67 [165.64] [1.52 $\sigma$ ]  
Teffp = 2802 [458] K [5.12 $\sigma$ ]

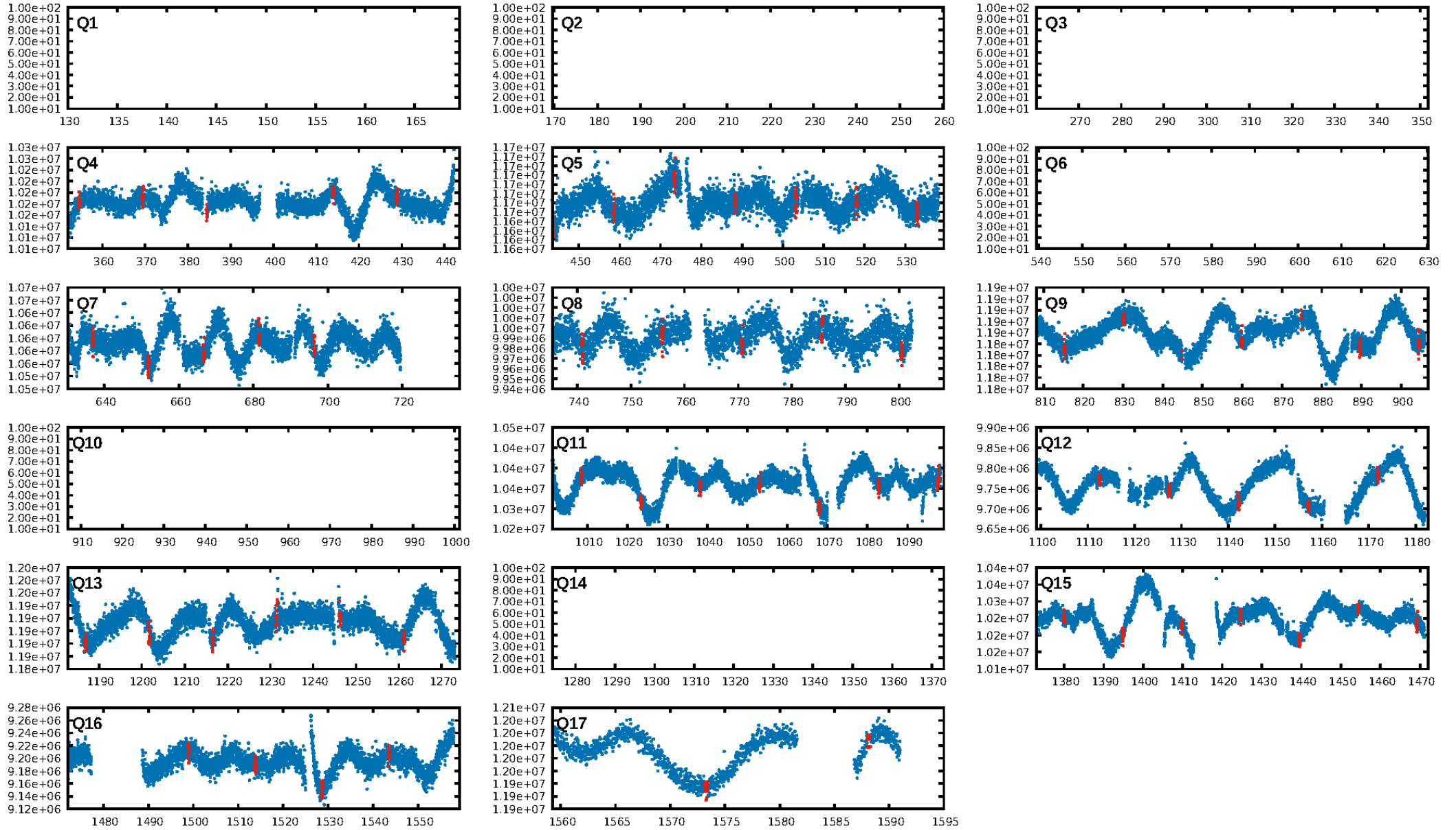
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [32.78 $\sigma$ ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 63.7%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 8.79e-27  
RollingBand-fgt: 0.85 [47/55]  
GhostDiagnostic-chr: 0.08906  
Centroid-sig: 0.5%  
Centroid-so: 4.243 arcsec [9.69 $\sigma$ ]  
OotOffset-rm: 0.978 arcsec [1.70 $\sigma$ ]  
OotOffset-st: 0/0/0/4 [4]  
KicOffset-rm: 3.706 arcsec [6.41 $\sigma$ ]  
KicOffset-st: 0/0/0/4 [4]  
DiffImageQuality-fgm: 1.00 [4/4]  
DiffImageOverlap-fno: 1.00 [11/11]

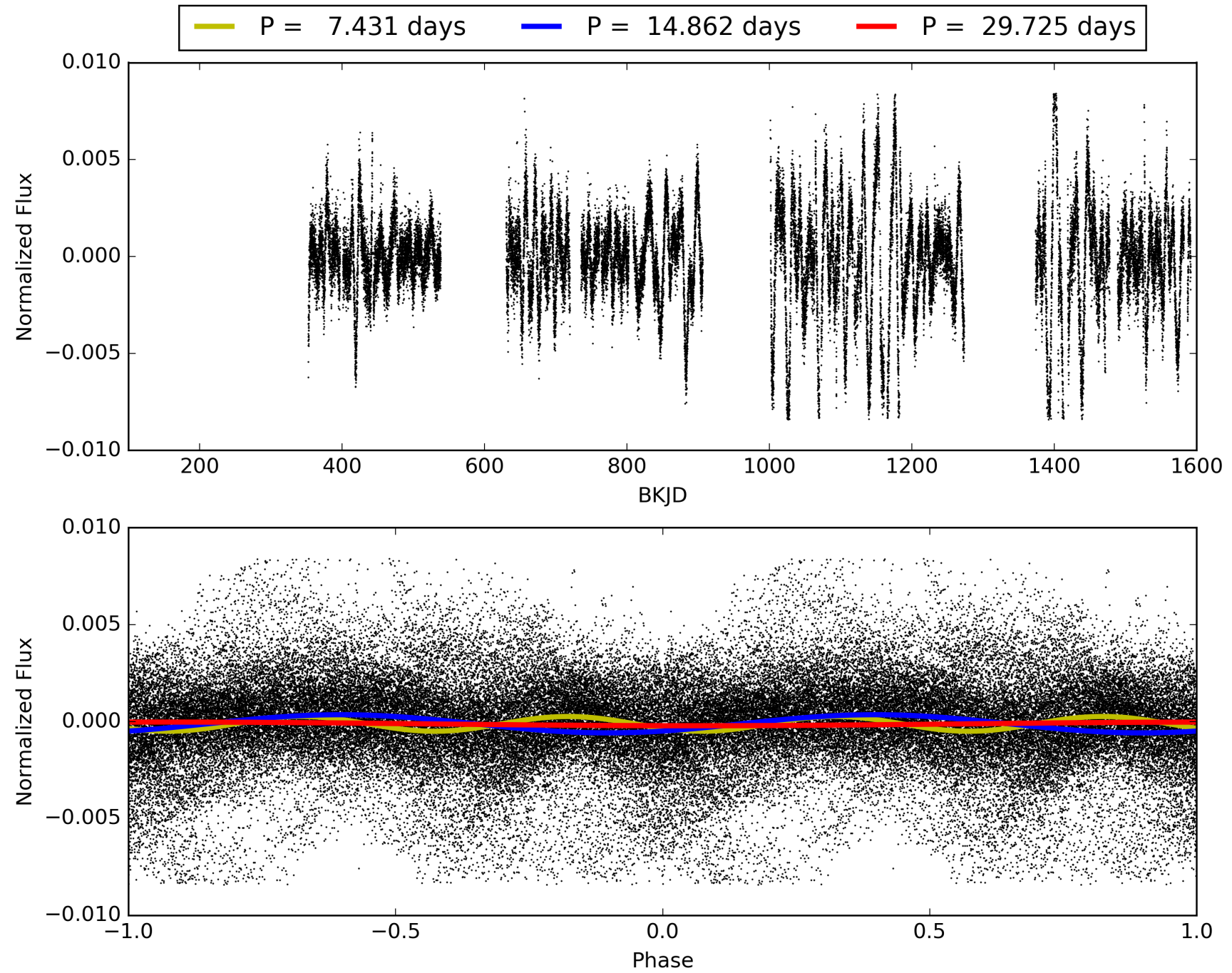
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 18:50:23 Z

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

# TCE 003554031-03, PDC Light Curves

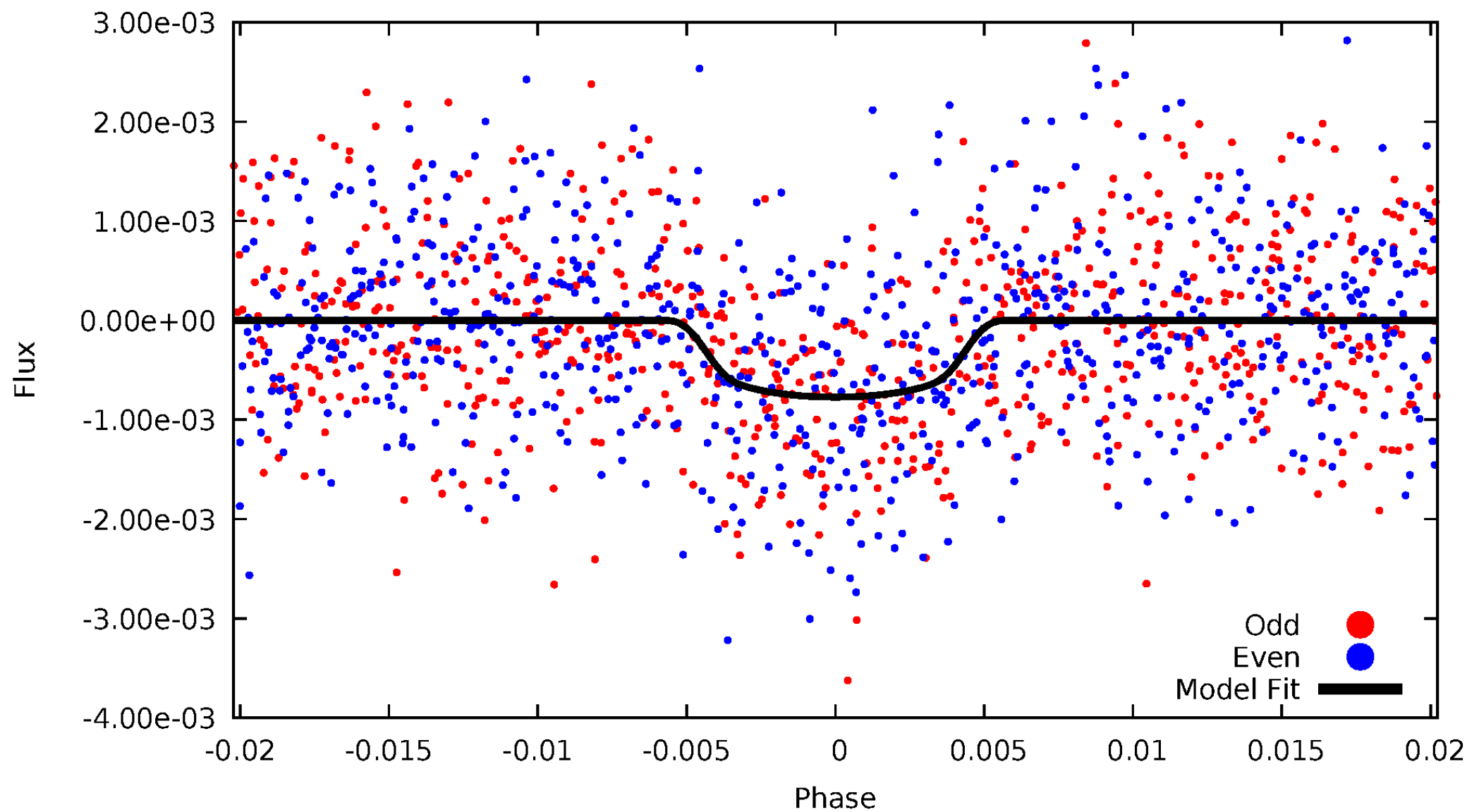


TCE 003554031-03



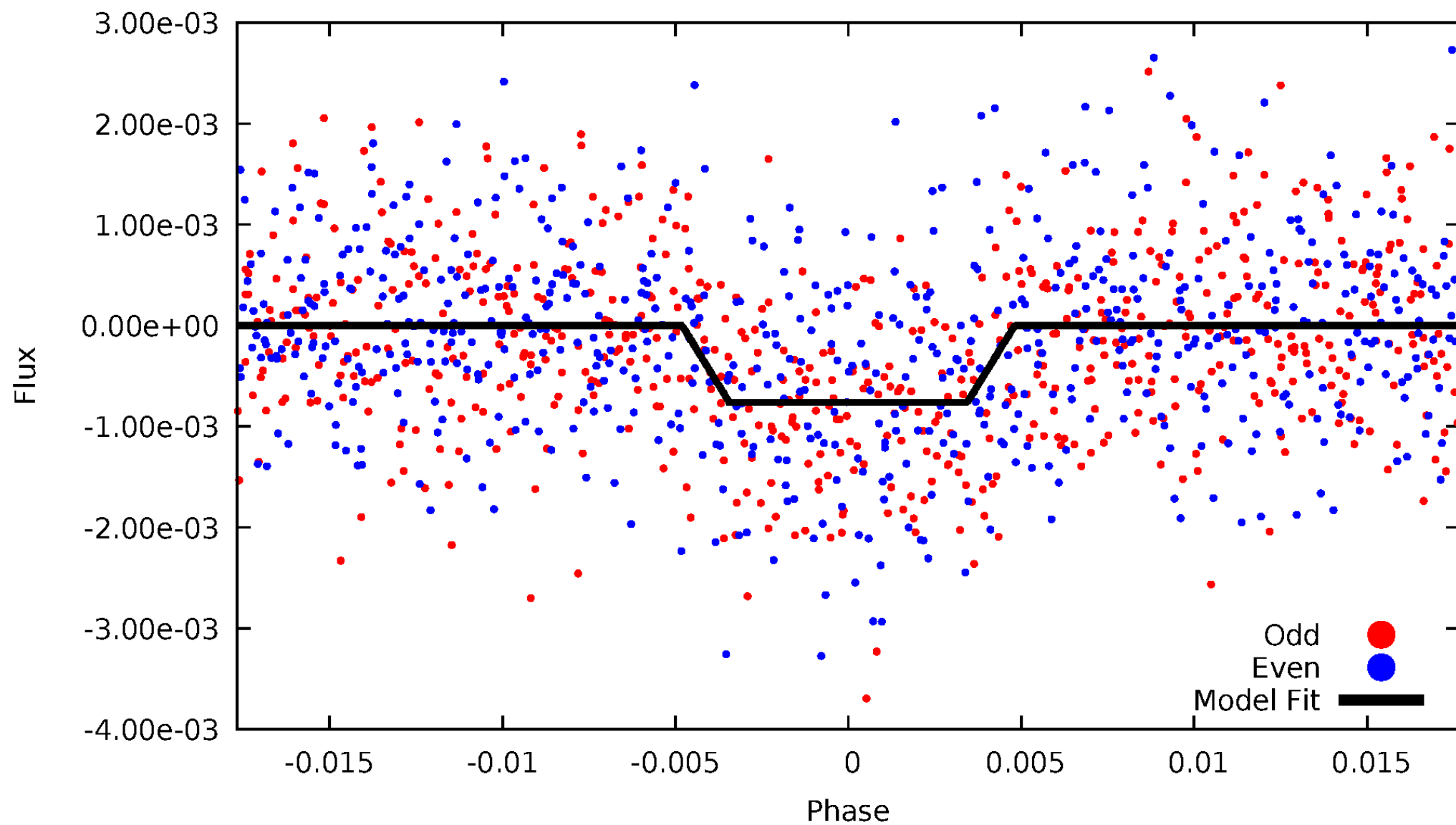
# DV Odd/Even

TCE 003554031-03



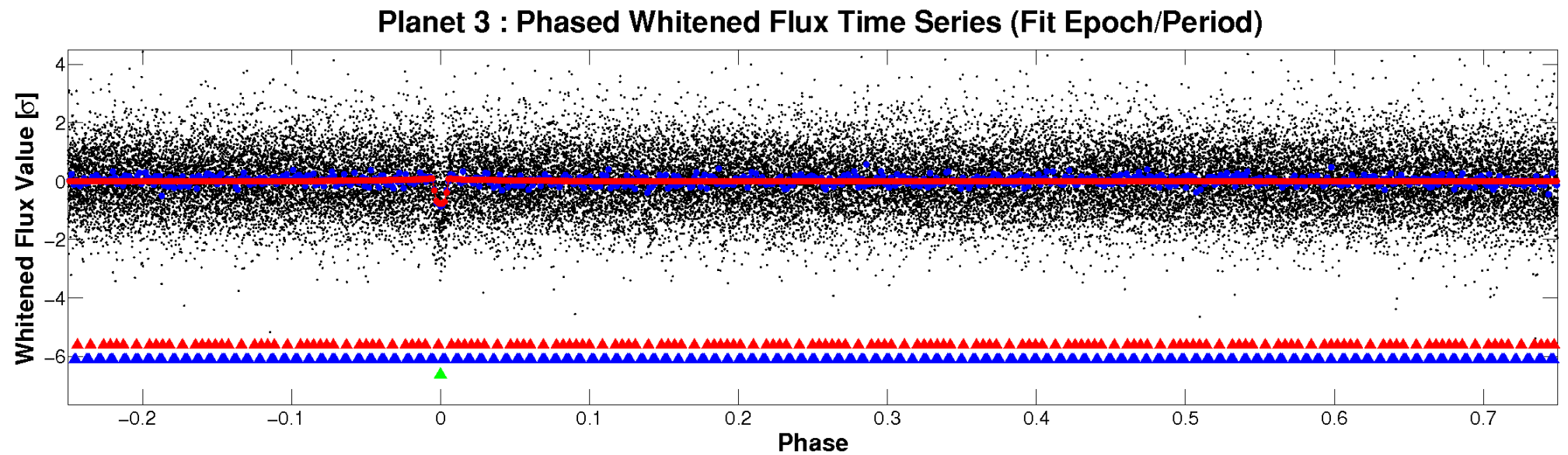
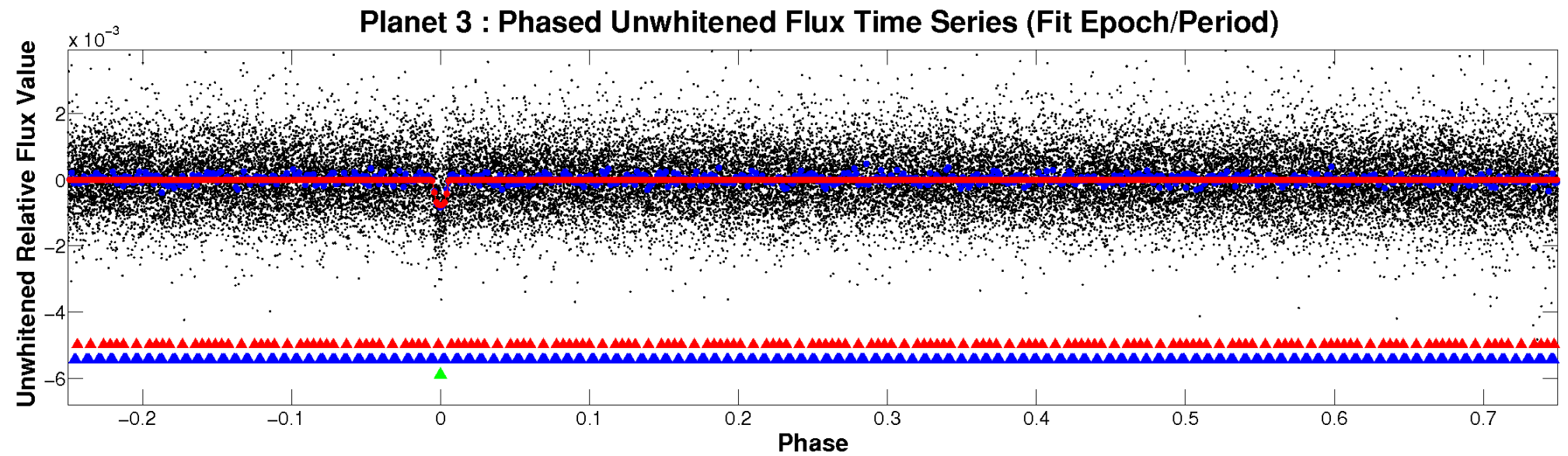
# ALT Odd/Even

TCE 003554031-03



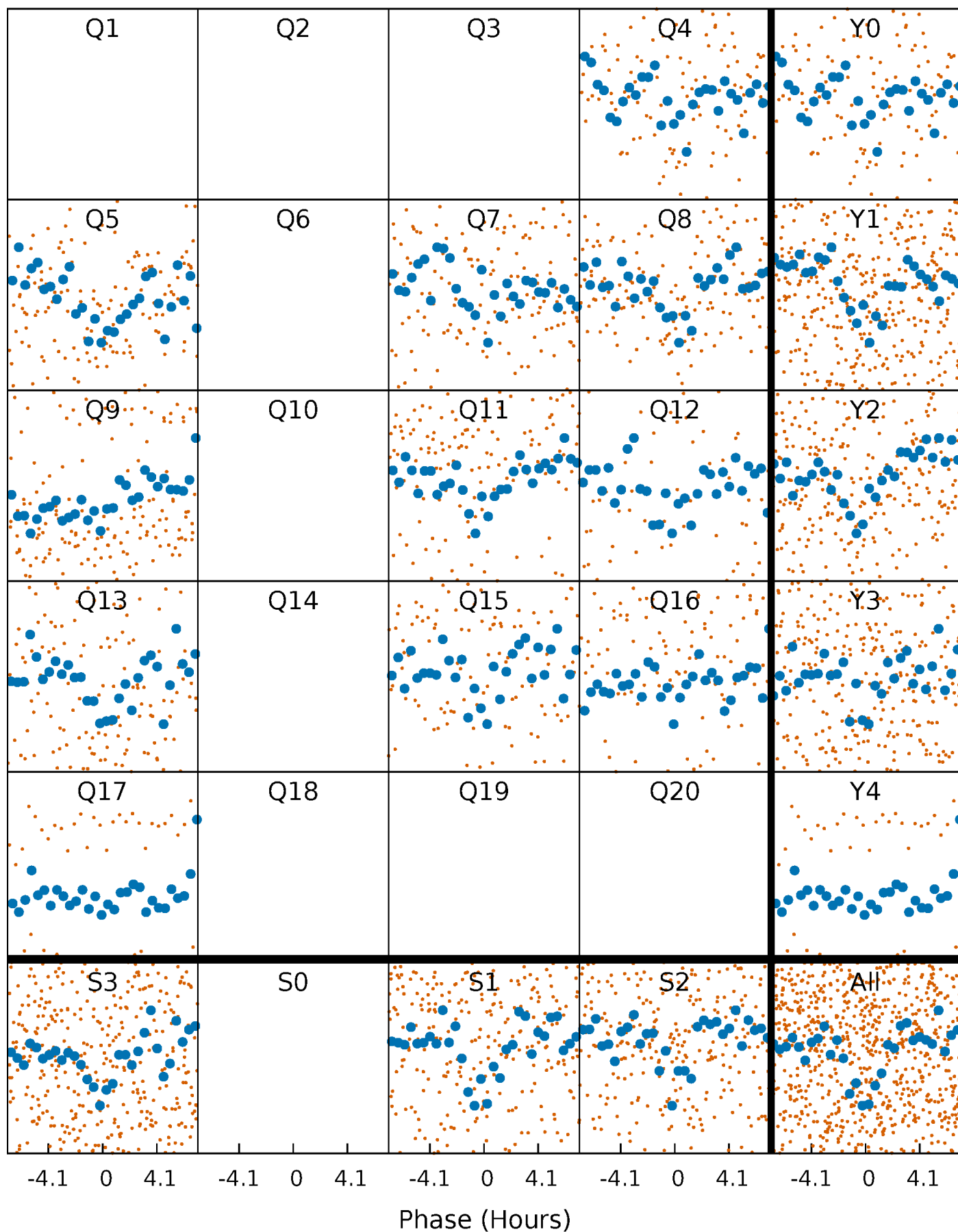


# Non-Whitened Vs. Whitened Light Curve



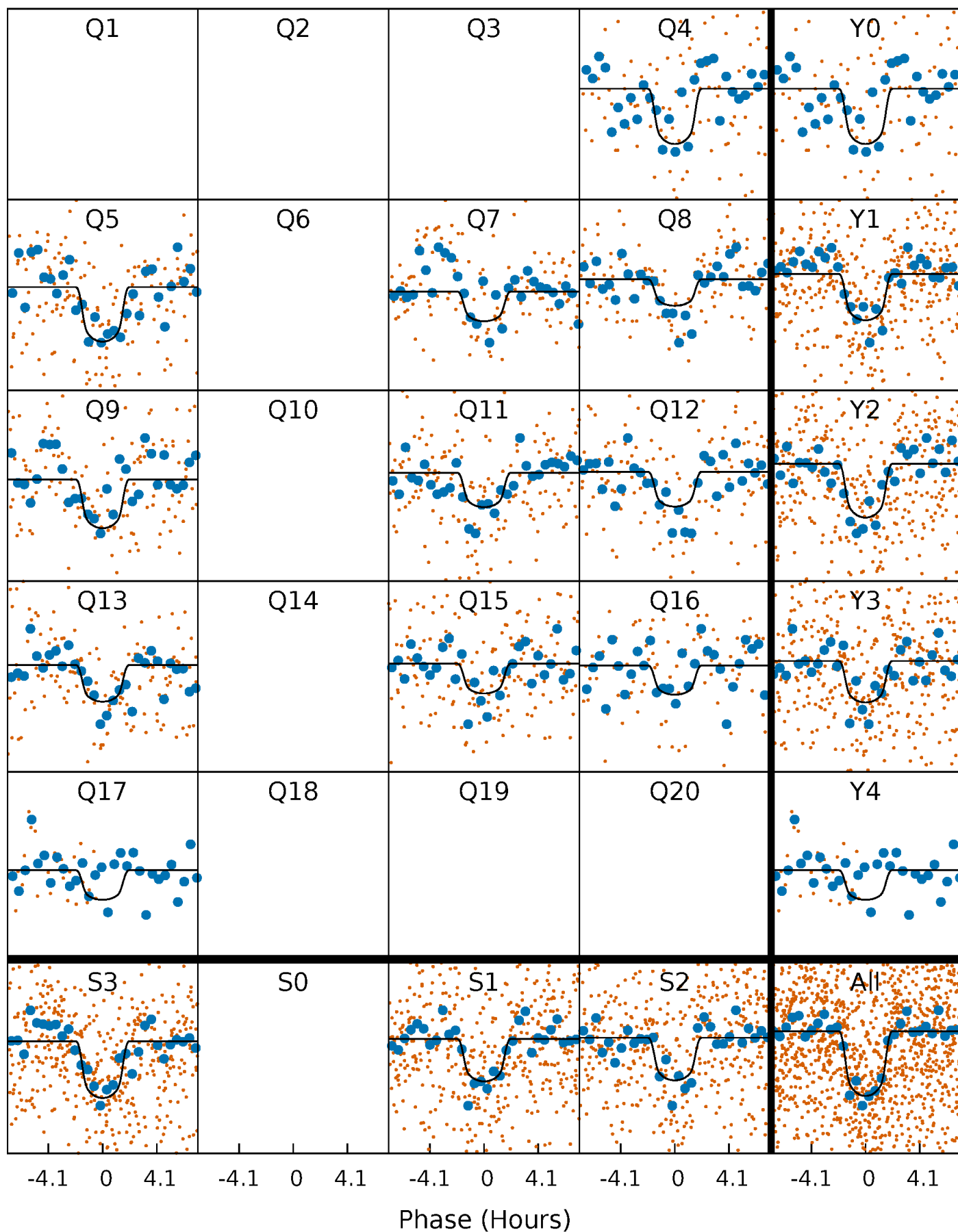
# PDC Quarter-Phased Transit Curves

TCE 003554031-03   P= 14.862384 Days    $T_0=131.634361$  (BKJD)



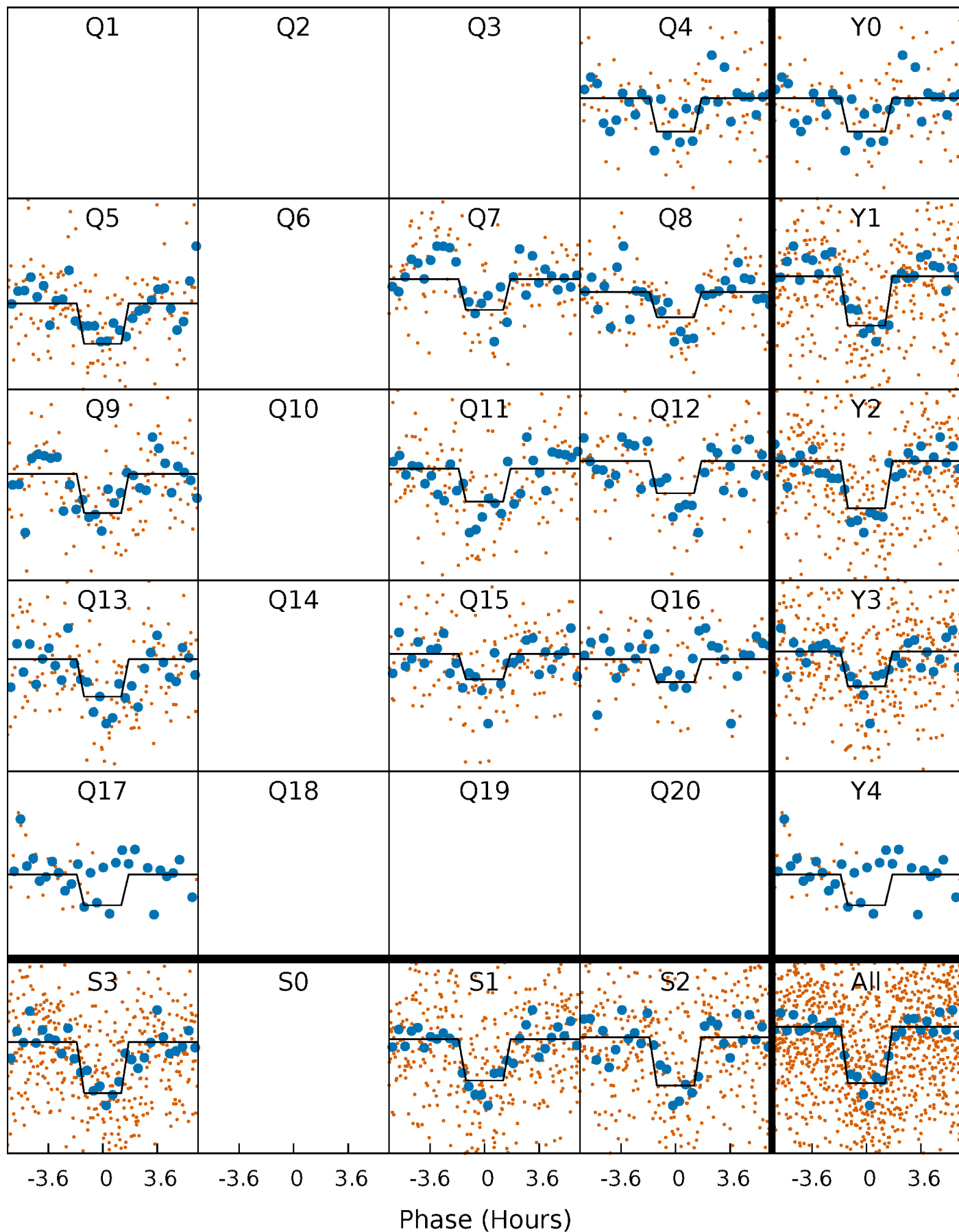
# DV Quarter-Phased Transit Curves

TCE 003554031-03   P= 14.862384 Days    $T_0=131.634361$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

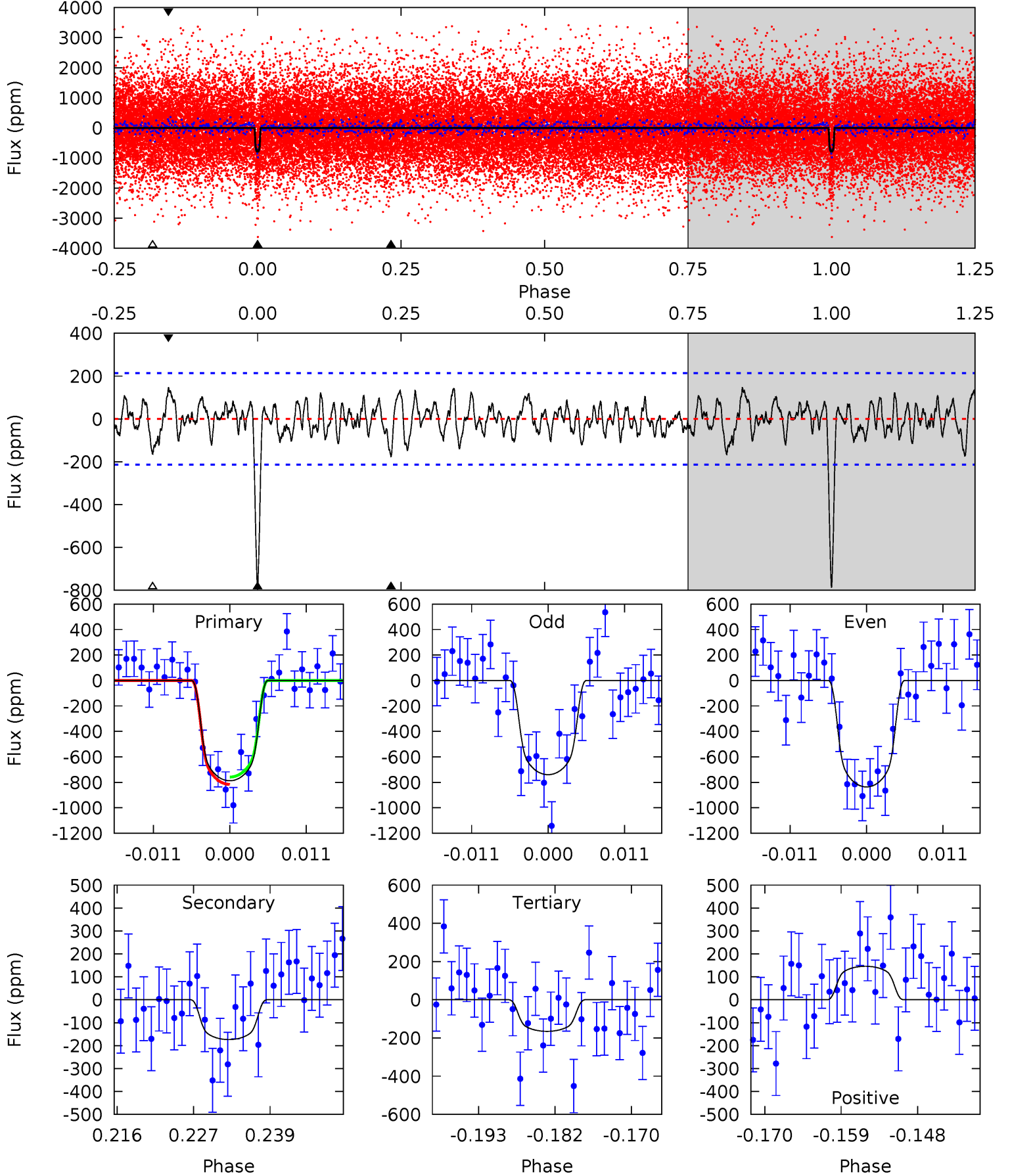
TCE 003554031-03 P= 14.862493 Days  $T_0=131.623330$  (BKJD)



# DV Model-Shift Uniqueness Test

003554031-03, P = 14.862384 Days, E = 131.634361 Days

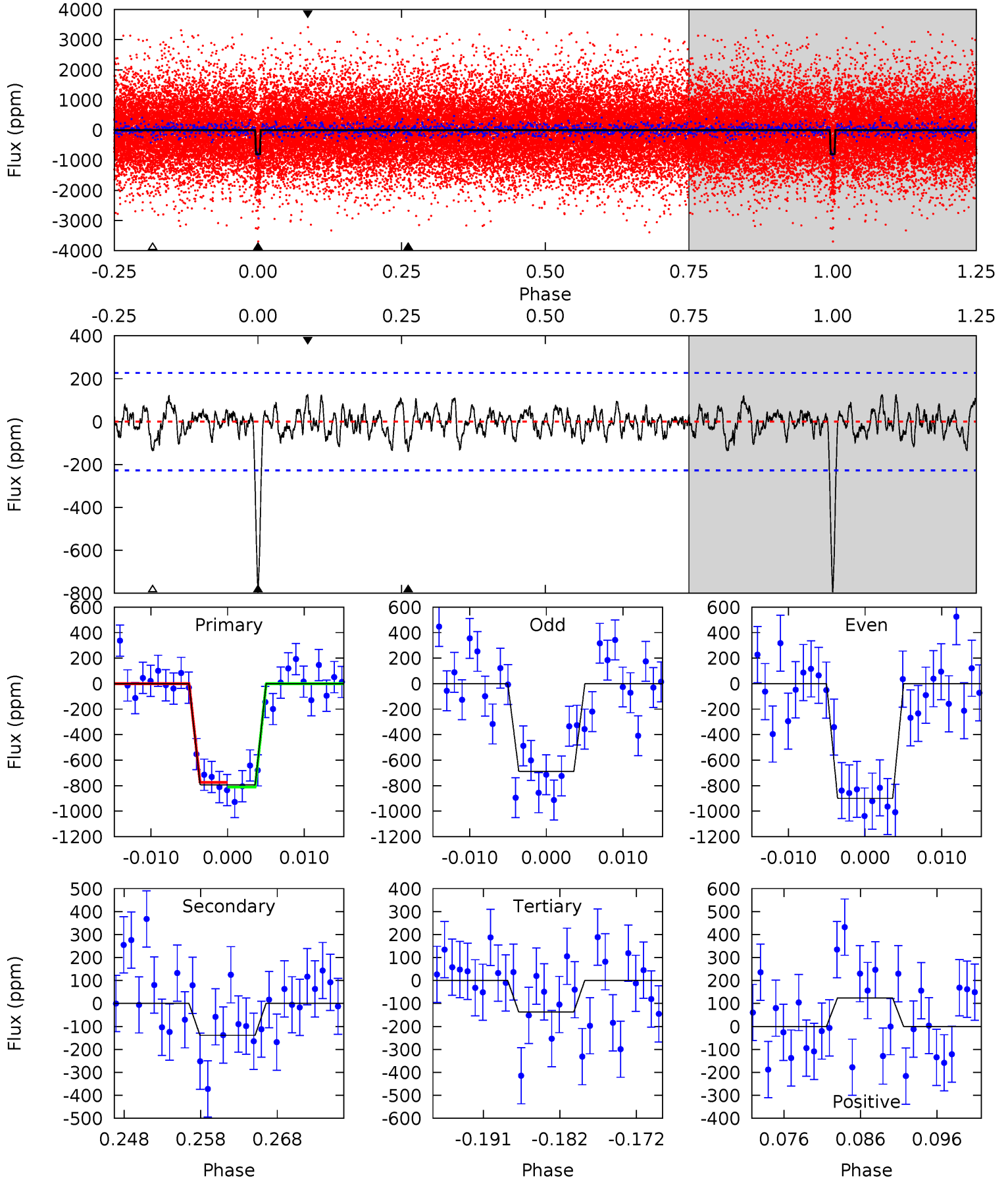
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
18.4	4.07	3.87	3.42	5.00	2.53	1.36	14.6	15.0	0.20	0.65	1.13	0.99	0.16	0.68



# Alt Model-Shift Uniqueness Test

003554031-03, P = 14.862493 Days, E = 131.623330 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
17.6	3.08	3.03	2.74	5.03	2.59	1.05	14.5	14.8	0.05	0.33	2.35	0.99	0.14	0.42





### Stellar Parameters For KIC 003554031

	$T_{\text{eff}}(K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$4362^{+87}_{-78}$	$4.722^{+0.012}_{-0.051}$	$-0.500^{+0.150}_{-0.150}$	$0.554^{+0.042}_{-0.017}$	$0.590^{+0.029}_{-0.029}$	$4.884^{+0.320}_{-0.847}$
	+2%/-2%	+0%/-1%	+30%/-30%	+8%/-3%	+5%/-5%	+7%/-17%
Source	SPE68	SPE68	SPE68	DSEP		

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

### Secondary Eclipse Parameters for KIC 003554031-03 / KOI 1194.02

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-174 \pm 43$	$1.86^{+0.51}_{-0.47}$	$640^{+17}_{-15}$	$3295^{+334}_{-263}$	$270^{+224}_{-119}$
Alt.	$-139 \pm 45$	$1.71^{+0.52}_{-0.49}$	$640^{+17}_{-14}$	$3244^{+414}_{-294}$	$252^{+269}_{-125}$

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



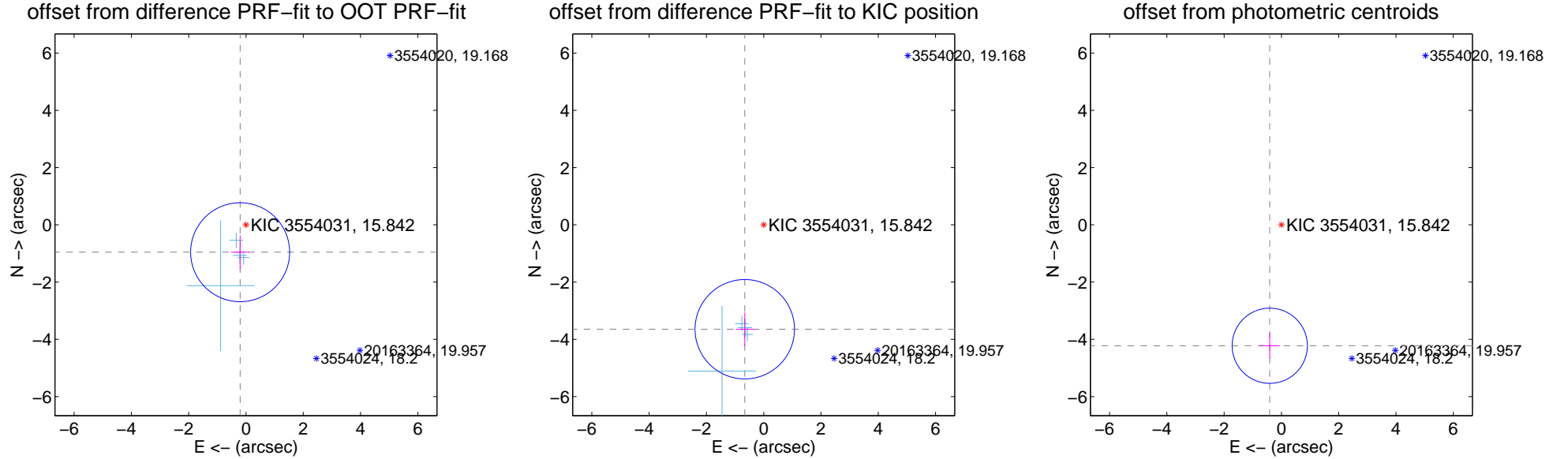
## DV Centroid Data

Supplemental centroid analysis for 003554031-03. Kepler magnitude: 15.84. Transit SNR 12.38

There are 4 quarters with good PRF difference image offsets

The OOT PRF centroid is offset from the target star catalog position by about 3.04 arcsec so the offset from difference PRF-fit to OOT-fit may be invalid.

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.978 \pm 0.576$	1.70	$0.204 \pm 0.319$	$-0.956 \pm 0.585$
PRF-fit source offset from KIC position	$3.706 \pm 0.579$	6.41	$0.661 \pm 0.319$	$-3.646 \pm 0.585$
photometric centroid source offset	$4.24 \pm 0.44$	9.69	$0.41 \pm 0.35$	$-4.22 \pm 0.44$



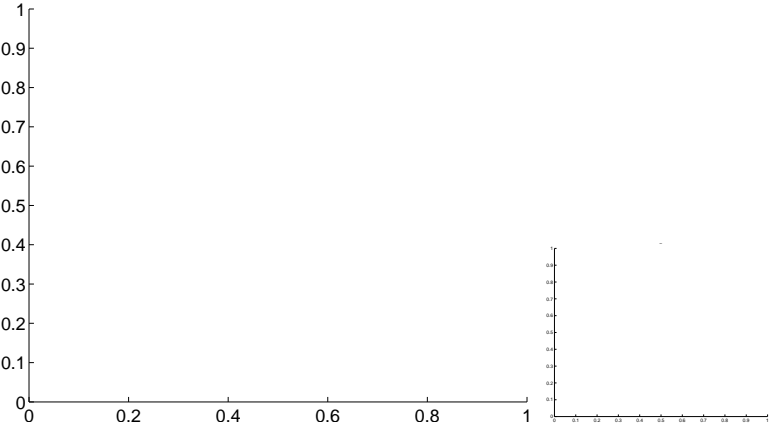
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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



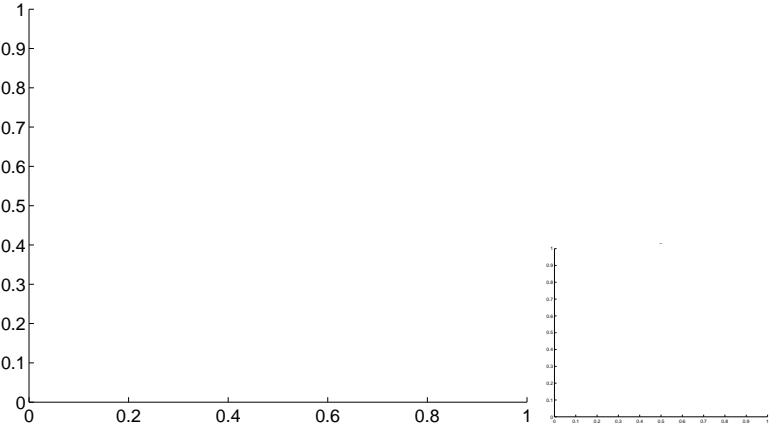
Q1 no OOT image



Q2 no difference image



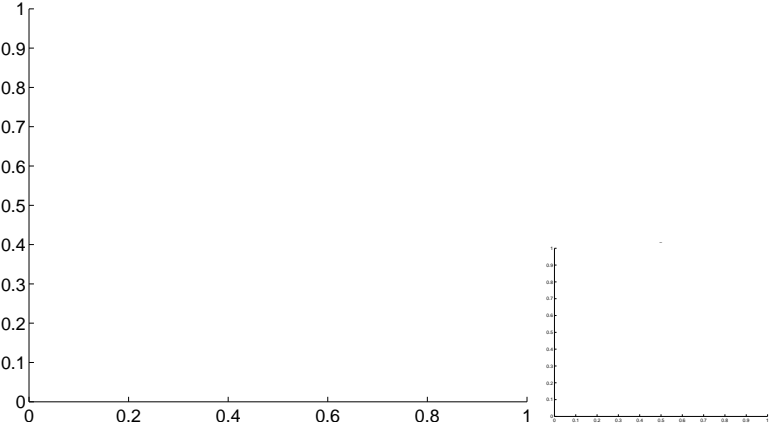
Q2 no OOT image



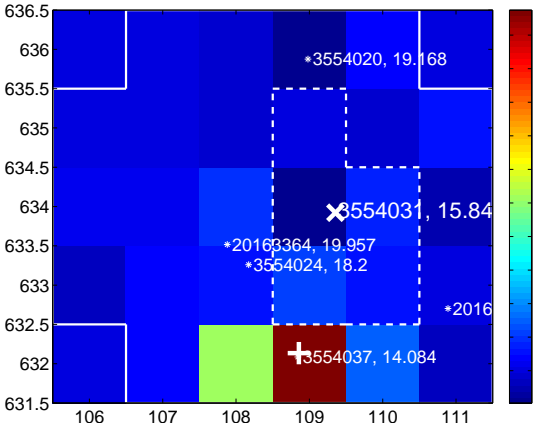
Q3 no difference image



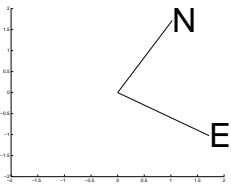
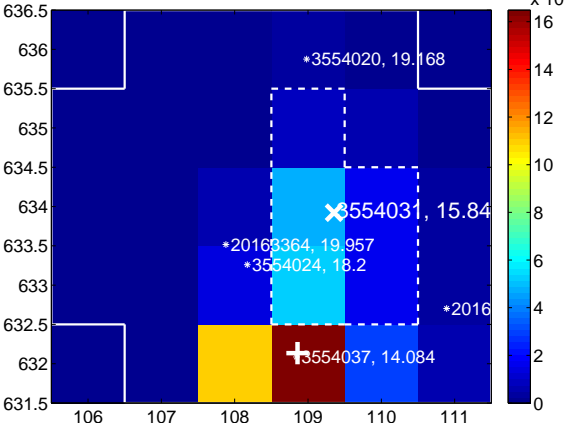
Q3 no OOT image



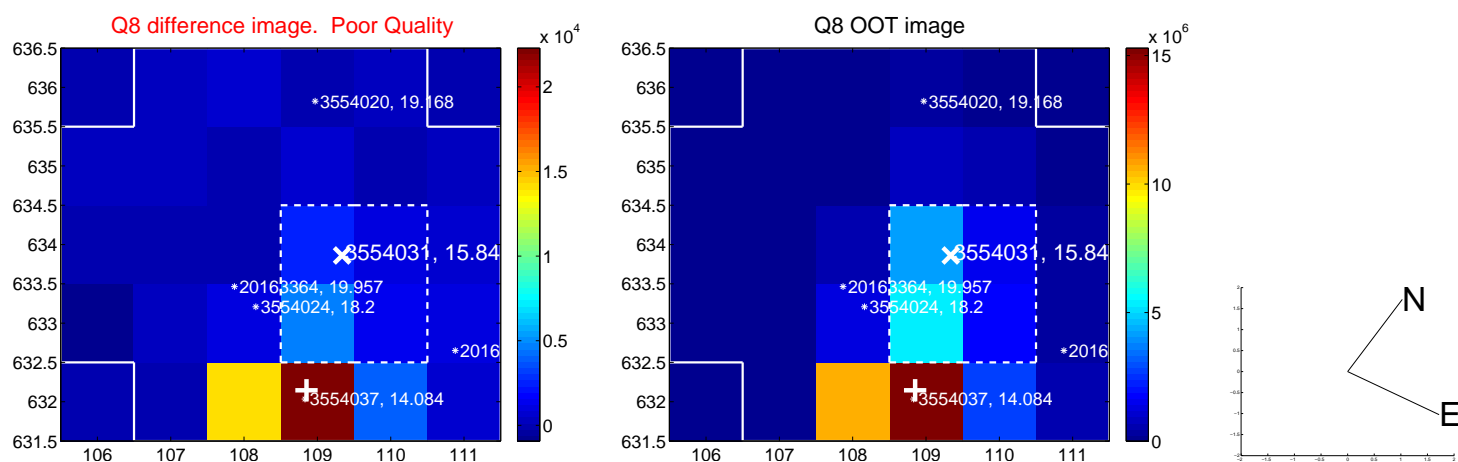
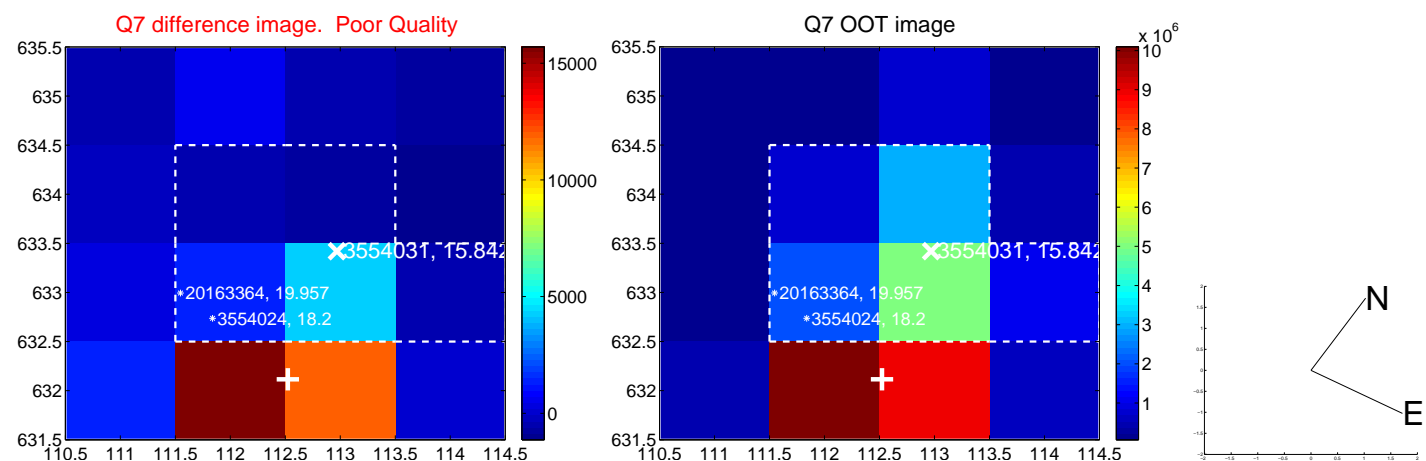
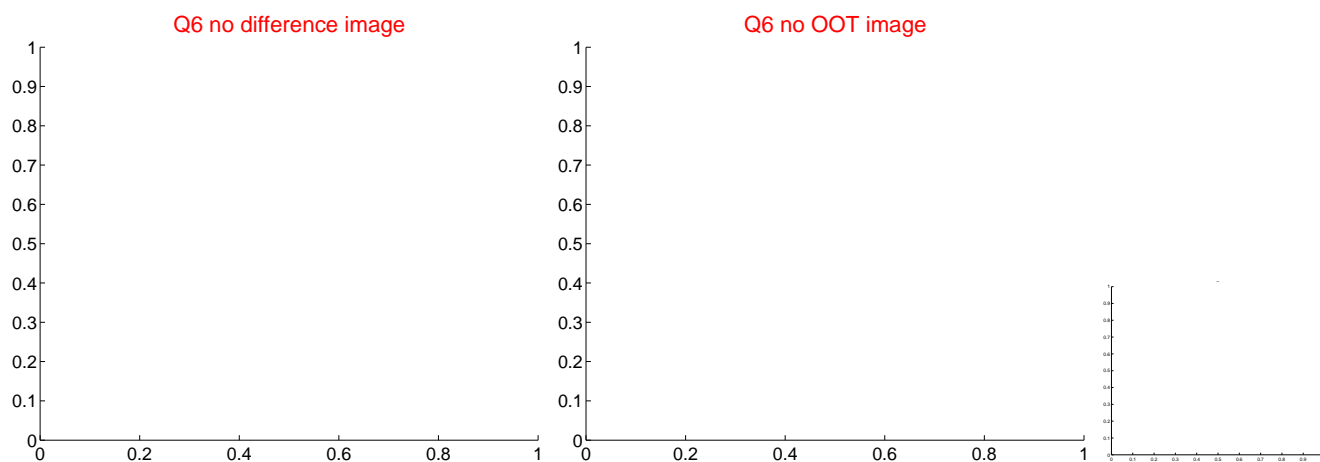
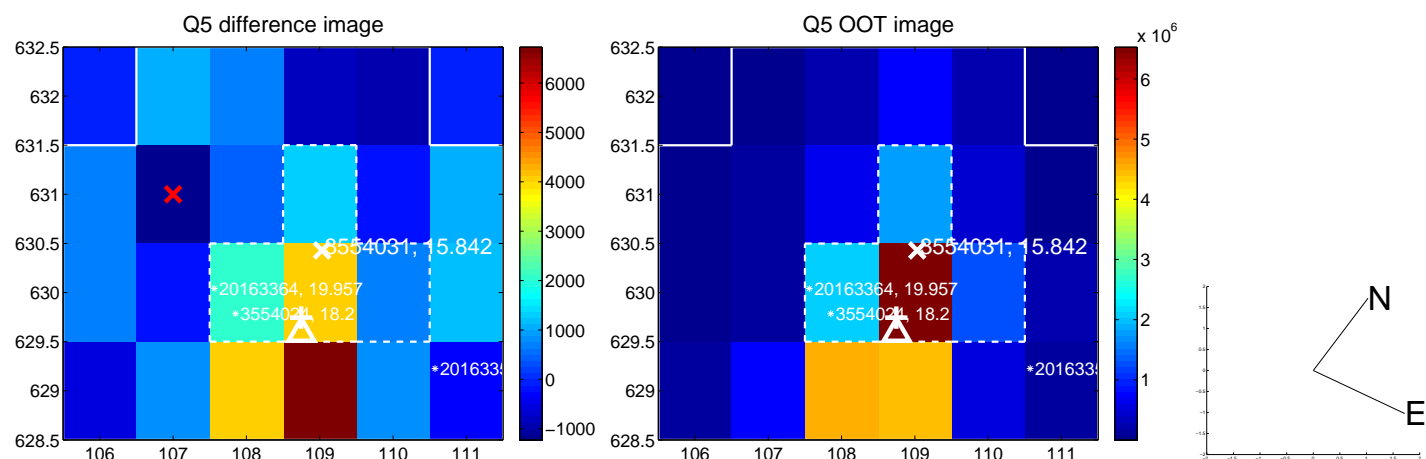
Q4 difference image. Poor Quality



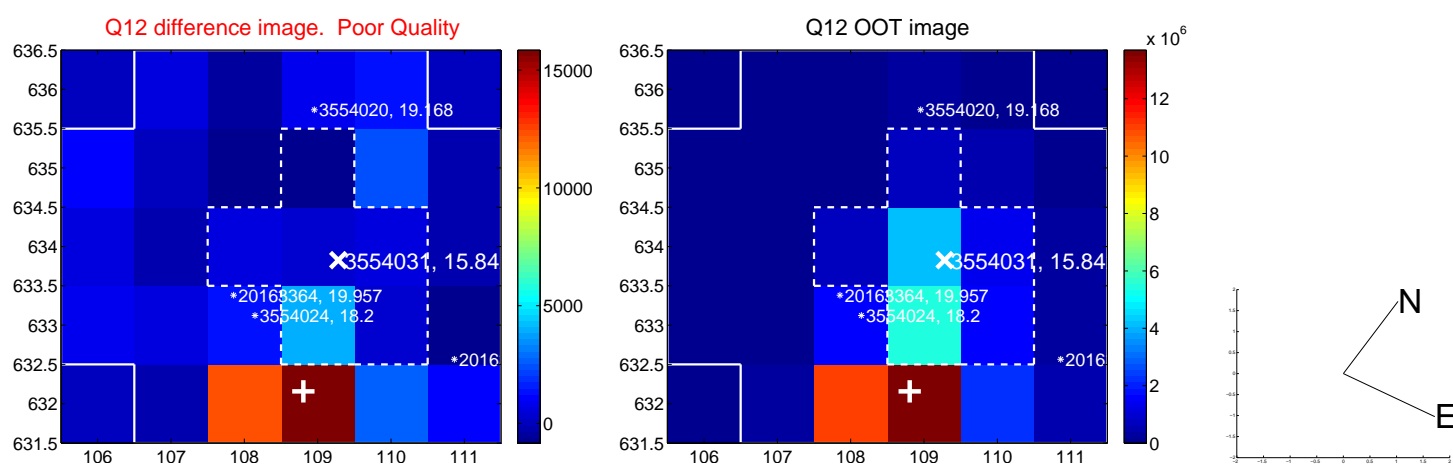
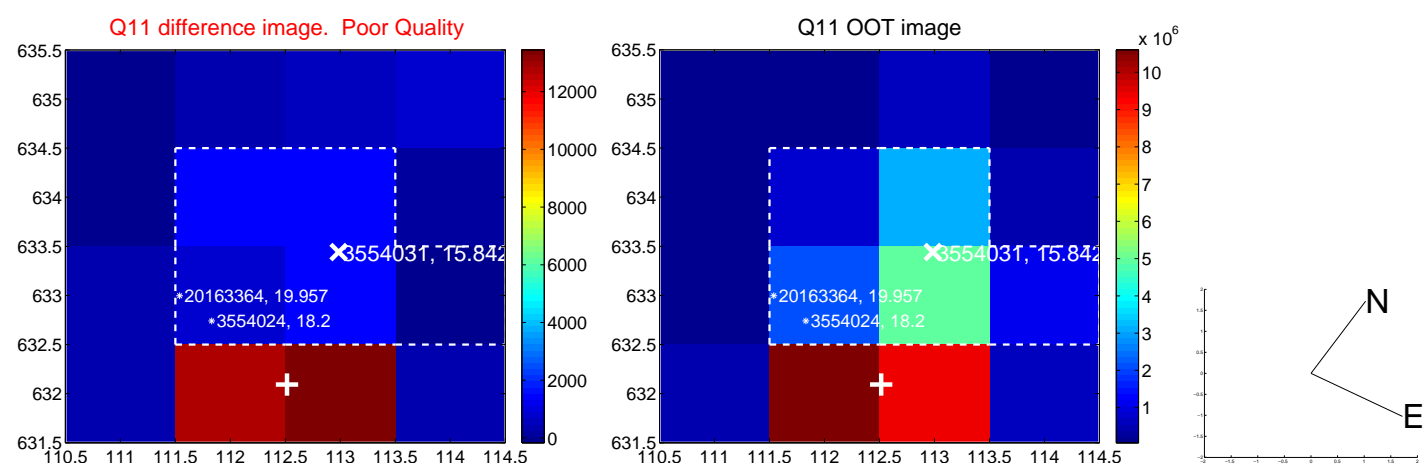
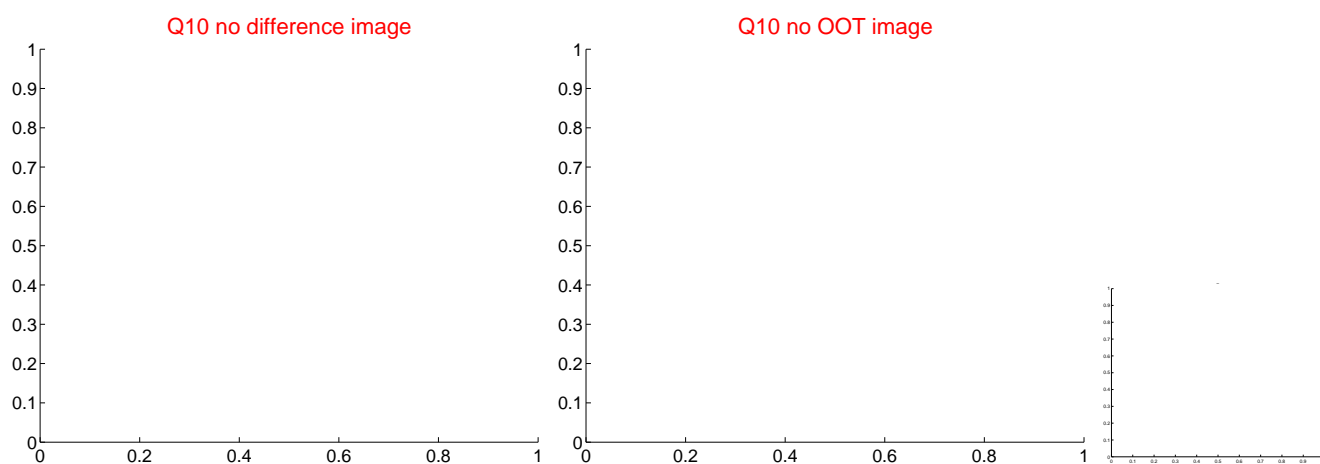
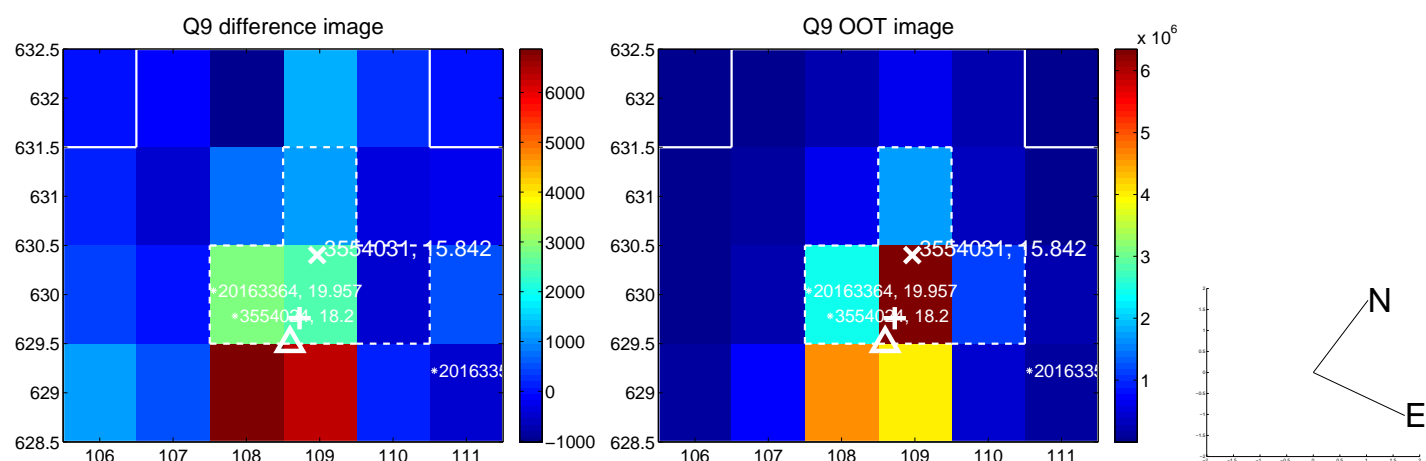
Q4 OOT image



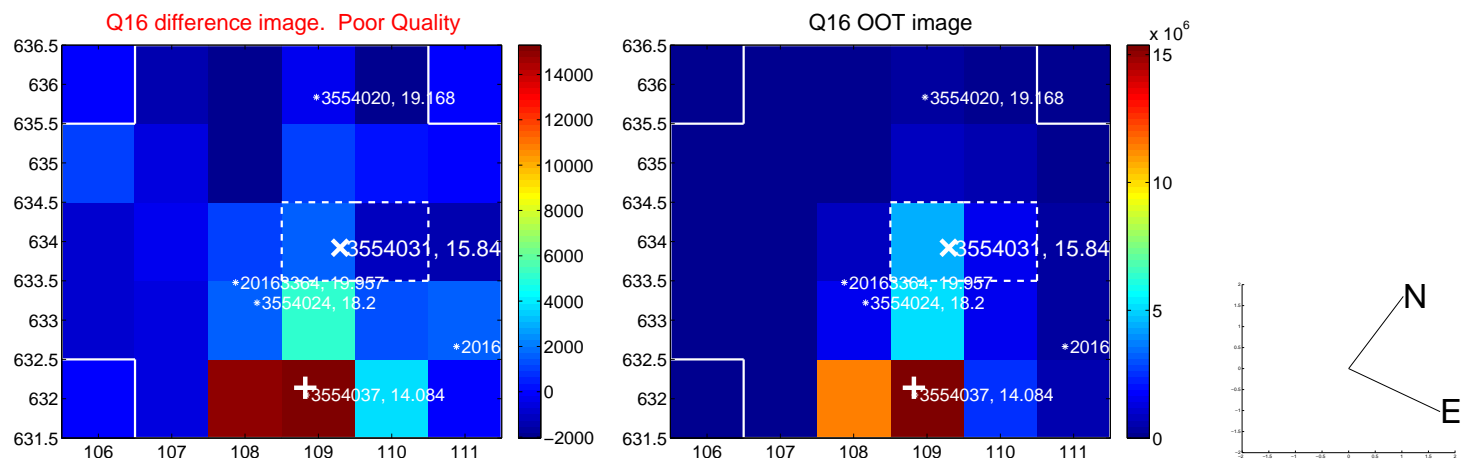
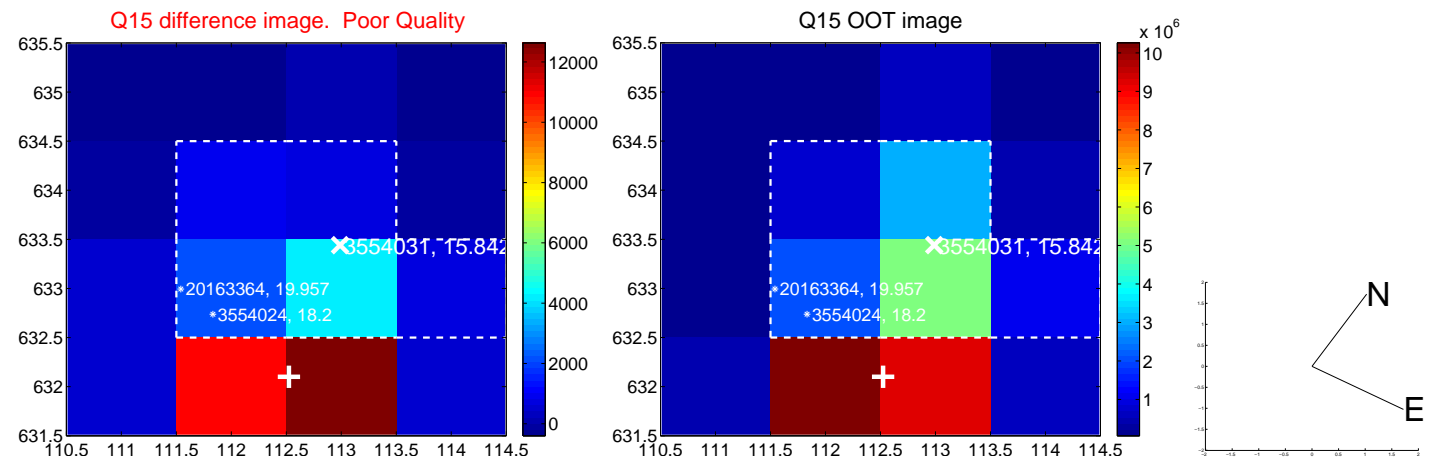
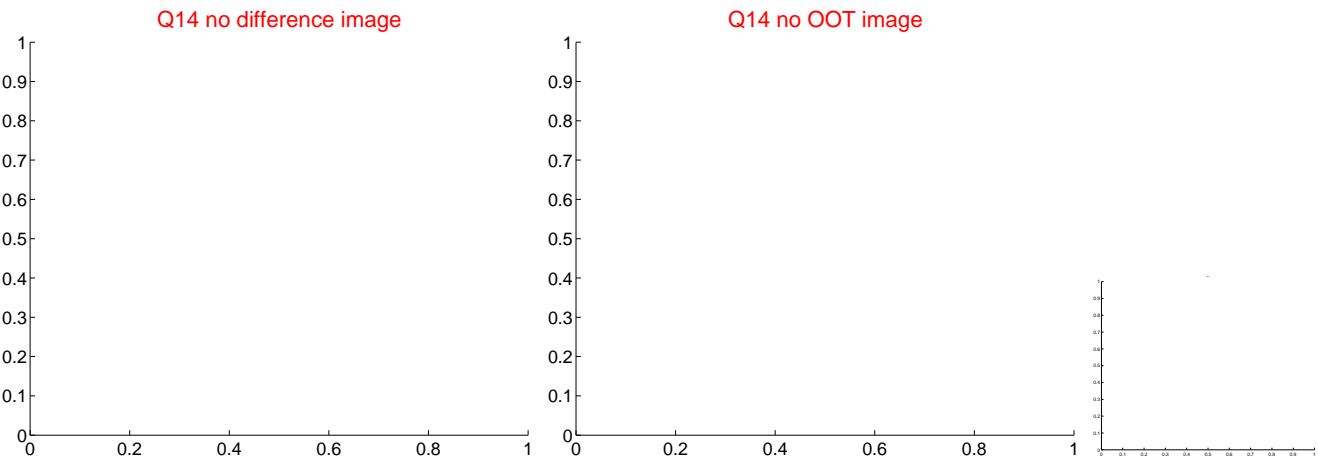
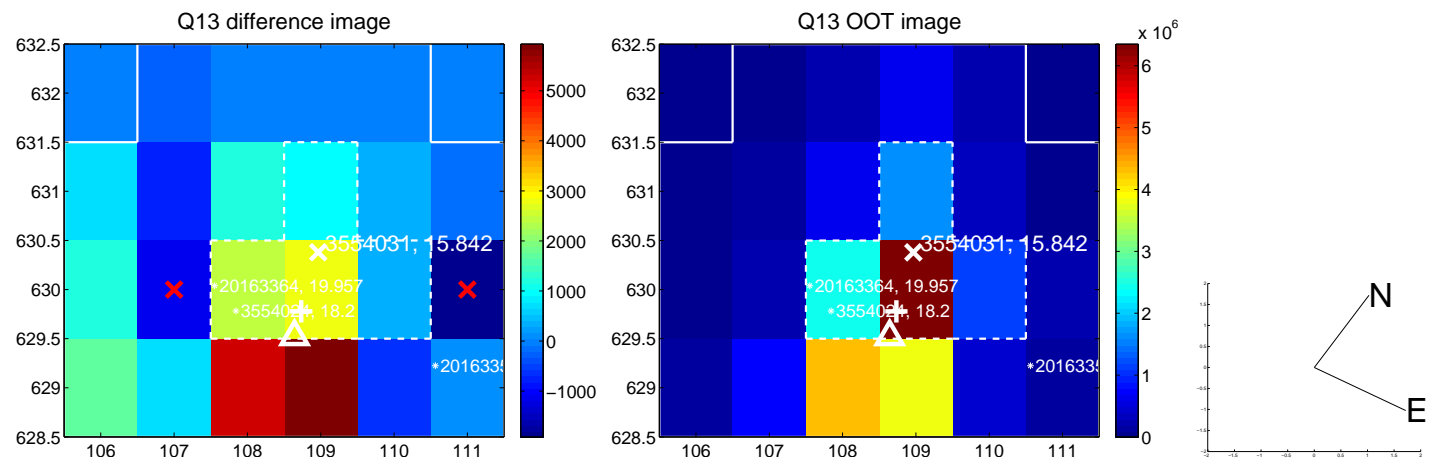
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



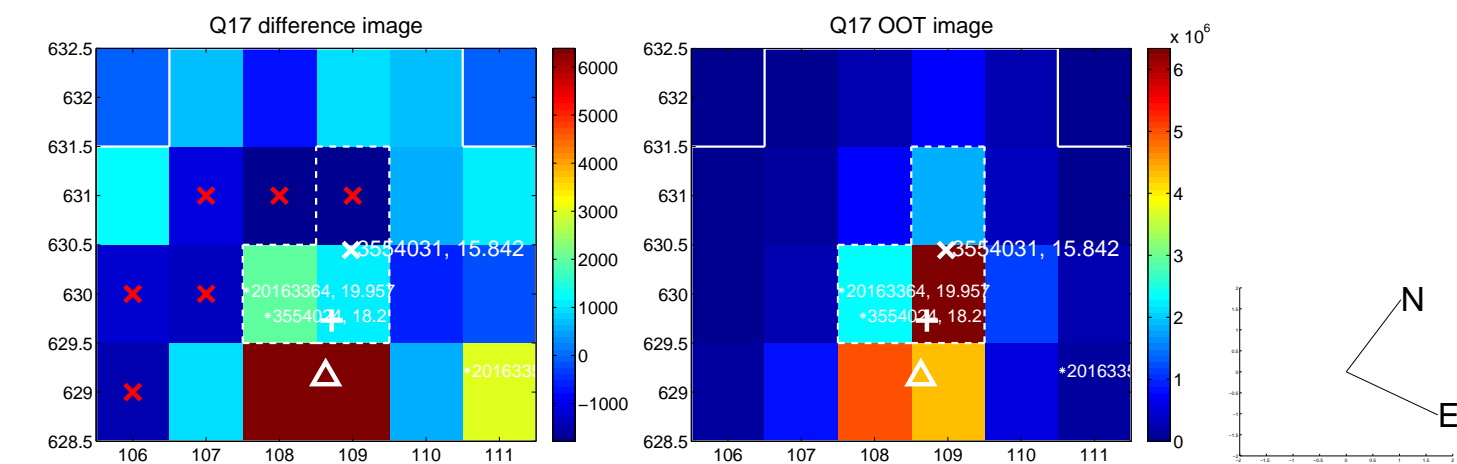
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



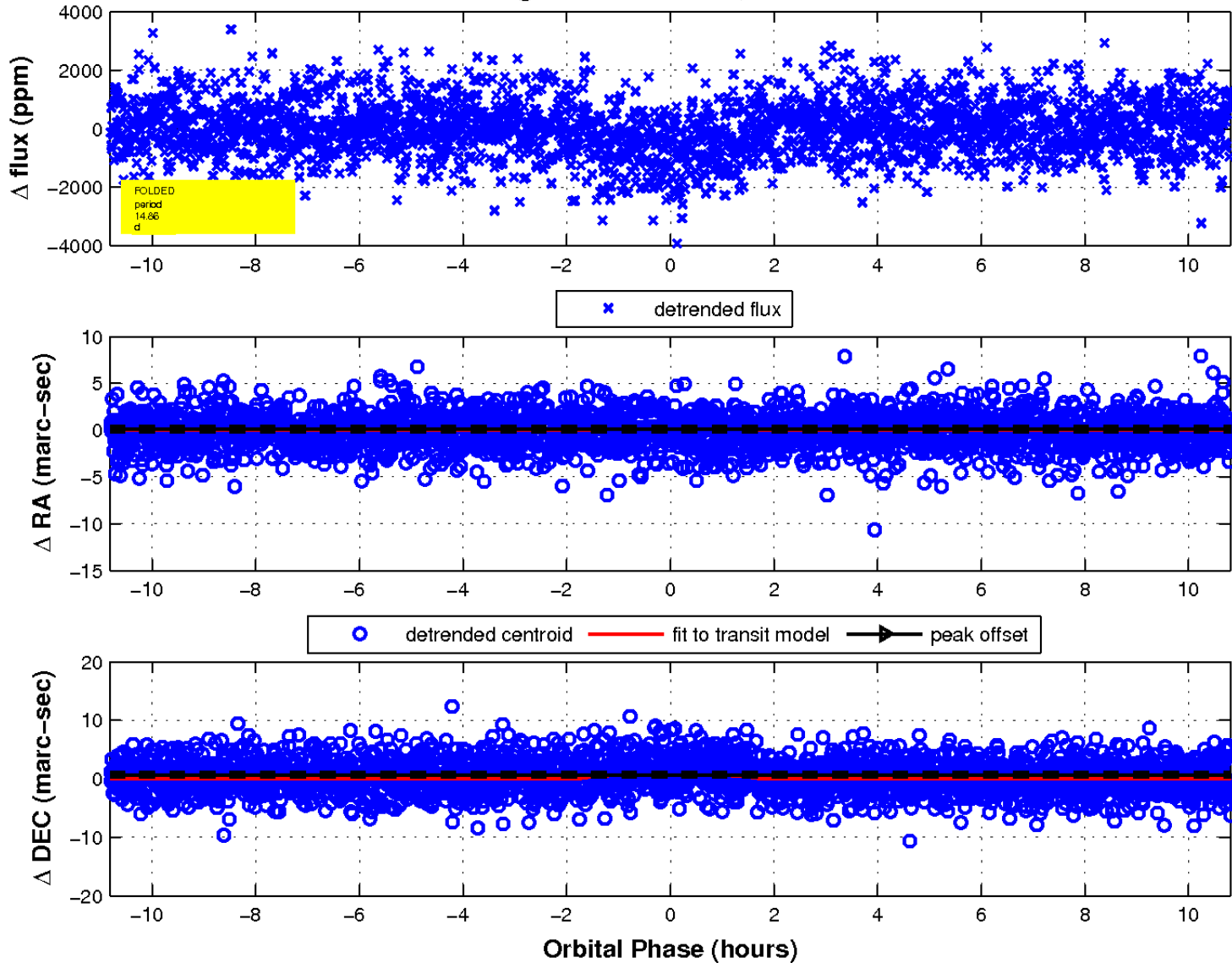
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



fluxWeightedCentroids, Planet 3 of 3



UKIRT Image

Declination

