

# KIC 005360974

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005360974-01	OBS	3289.01	29.804276	150.680441	1034.6	3.166	15.7	17.8	0.83	5223	4.70	15.37
005360974-02	OBS	No	29.803808	145.636753	477.1	4.082	10.0	11.4	0.83	5223	2.09	15.37

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005360974-01	OBS	FP	0.00	0	1	1	0	MOD_SEC_DV—MOD_SEC_ALT—DEEP_V_SHAPED—HAS_SEC_TCE—CENT_UNRESOLVED_OFFSET
005360974-02	OBS	FP	0.00	1	1	1	0	IS_SEC_TCE—CENT_UNRESOLVED_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 005360974-01

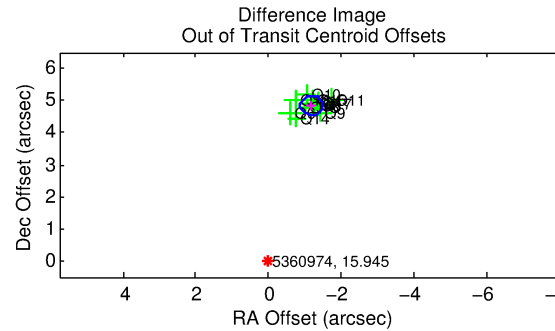
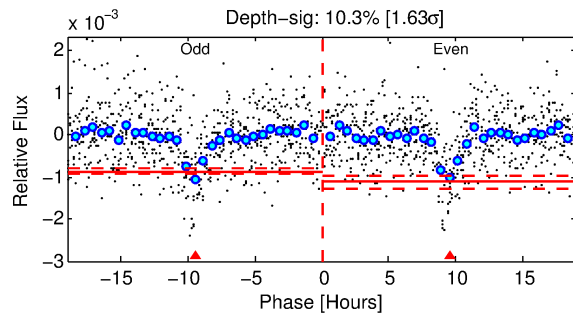
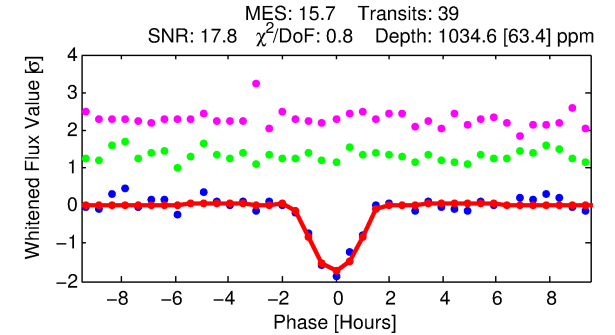
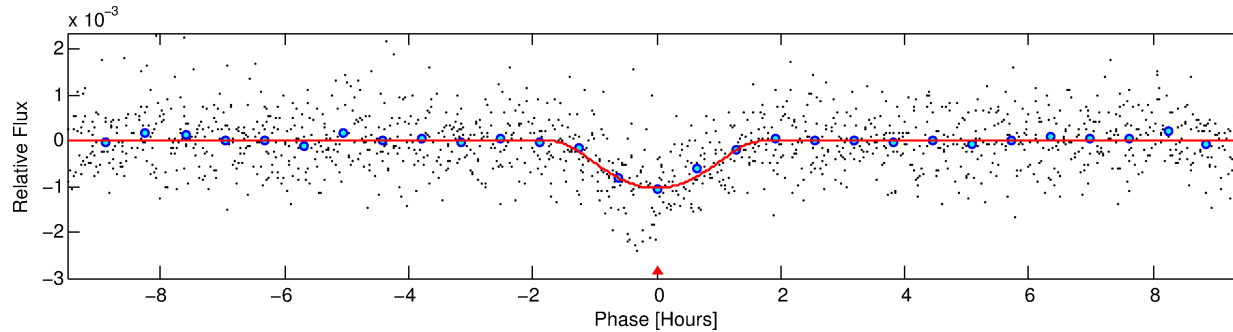
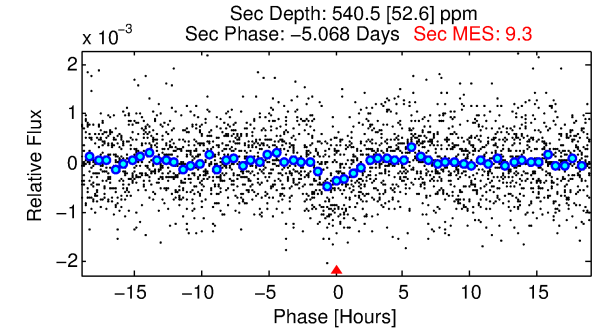
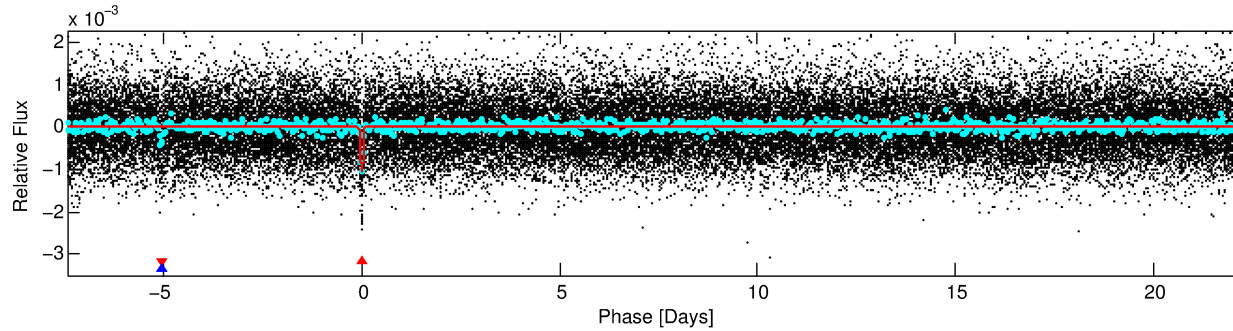
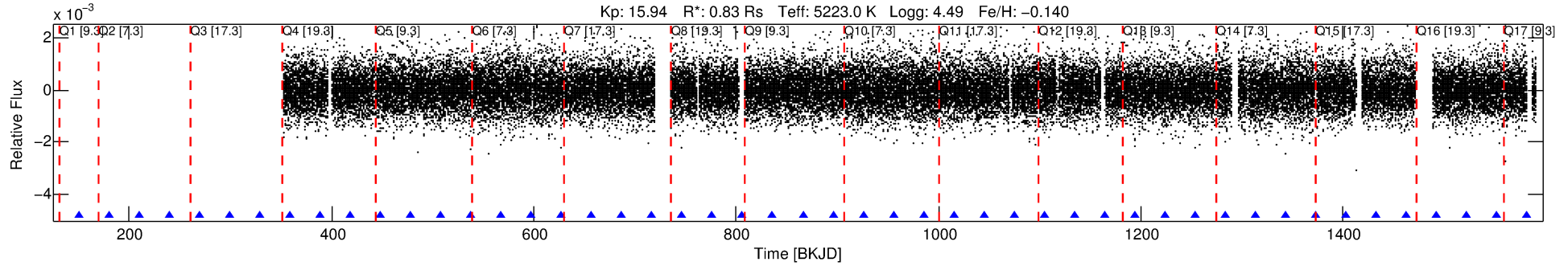
No Significant Match Found

# DV One-Page Summary

KIC: 5360974 Candidate: 1 of 2 Period: 29.804 d

KOI: K03289.01 Corr: 0.972

Kp: 15.94 R\*: 0.83 Rs Teff: 5223.0 K Logg: 4.49 Fe/H: -0.140



## DV Fit Results:

Period = 29.80428 [0.00018] d  
Epoch = 150.6804 [0.0052] BKJD  
Rp/R\* = 0.0521 [0.0828]  
a/R\* = 25.85 [11.86]  
b = 0.99 [0.14]  
Seff = 15.37 [3.62]  
Teq = 505 [30] K  
Rp = 4.70 [7.50] Re  
a = 0.1723 [0.0201] AU  
Ag = 399.96 [1275.28] [0.31σ]  
Teff = 3491 [2782] K [1.07σ]

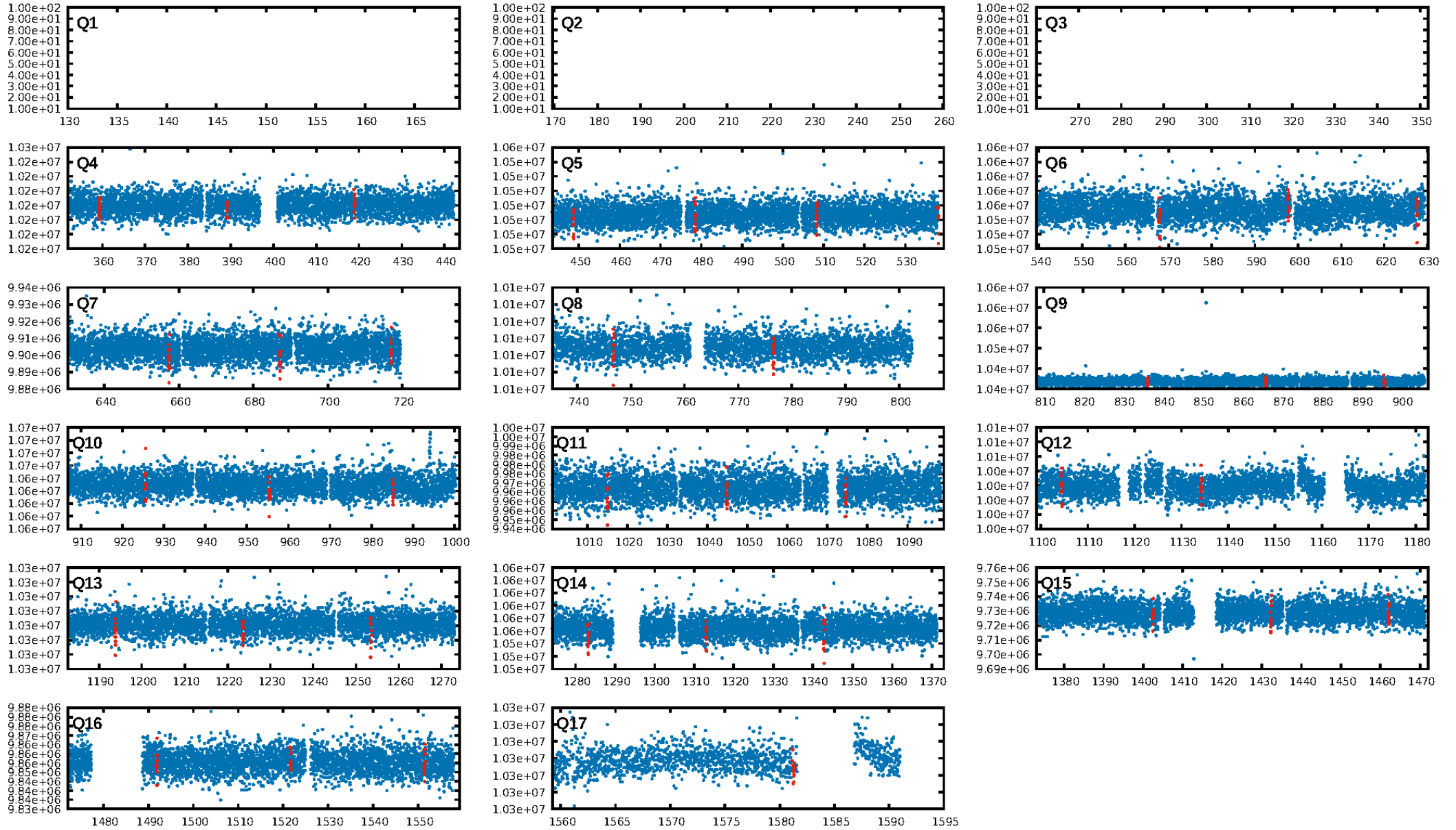
## DV Diagnostic Results:

ShortPeriod-sig: 0.2% [0.00σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 27.7%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 3.50e-55  
RollingBand-fgt: 1.00 [38/38]  
GhostDiagnostic-chr: 0.3804  
Centroid-sig: N/A  
Centroid-so: 8.329 arcsec [11.86σ]  
OotOffset-rm: 4.992 arcsec [49.05σ]  
KicOffset-rm: 4.902 arcsec [44.59σ]  
OotOffset-st: 3/3/3/3 [12]  
KicOffset-st: 3/3/3/3 [12]  
DiffImageQuality-fgm: 1.00 [12/12]  
DiffImageOverlap-fno: 1.00 [13/13]

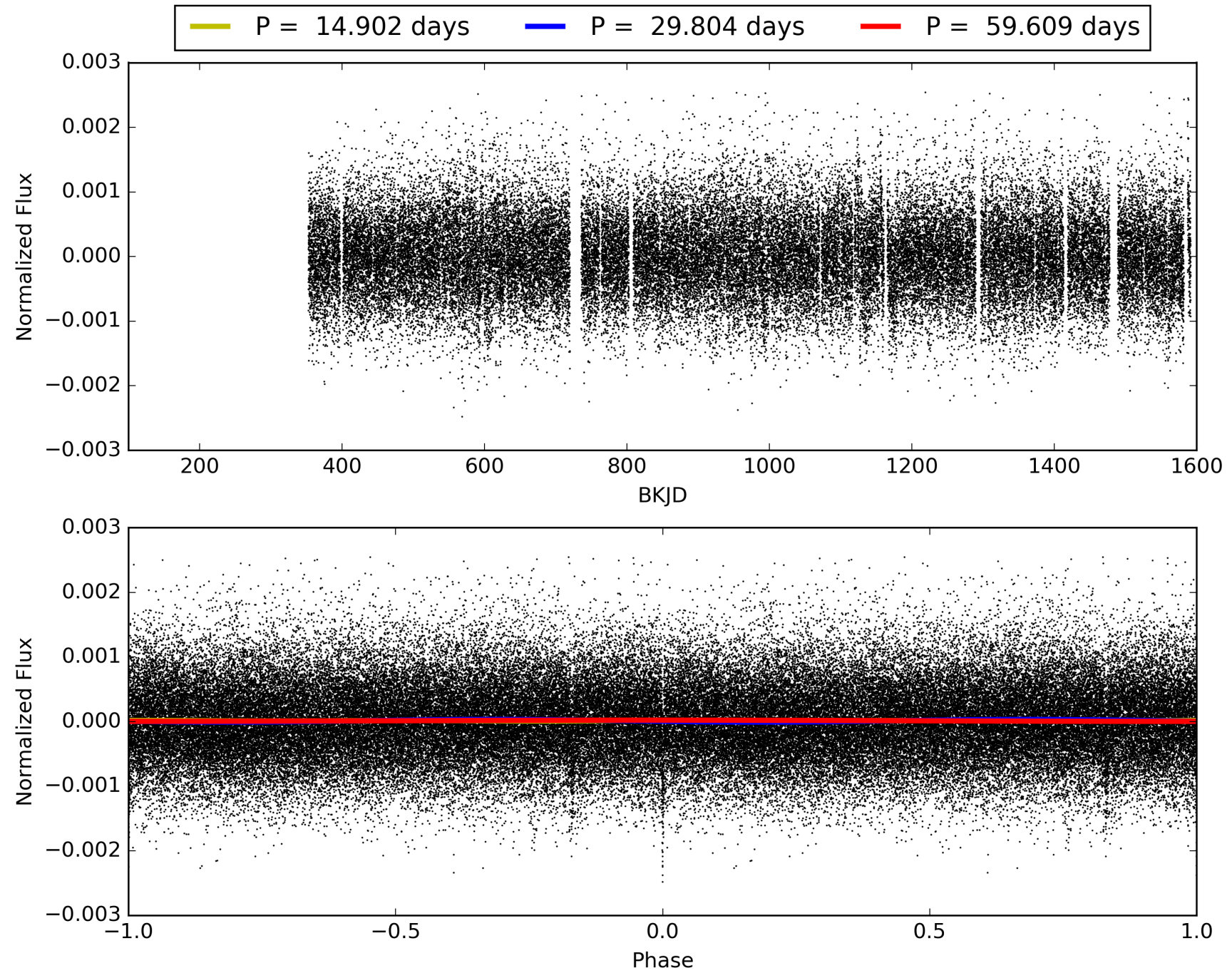
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 08:11:28 Z

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

# TCE 005360974-01, PDC Light Curves

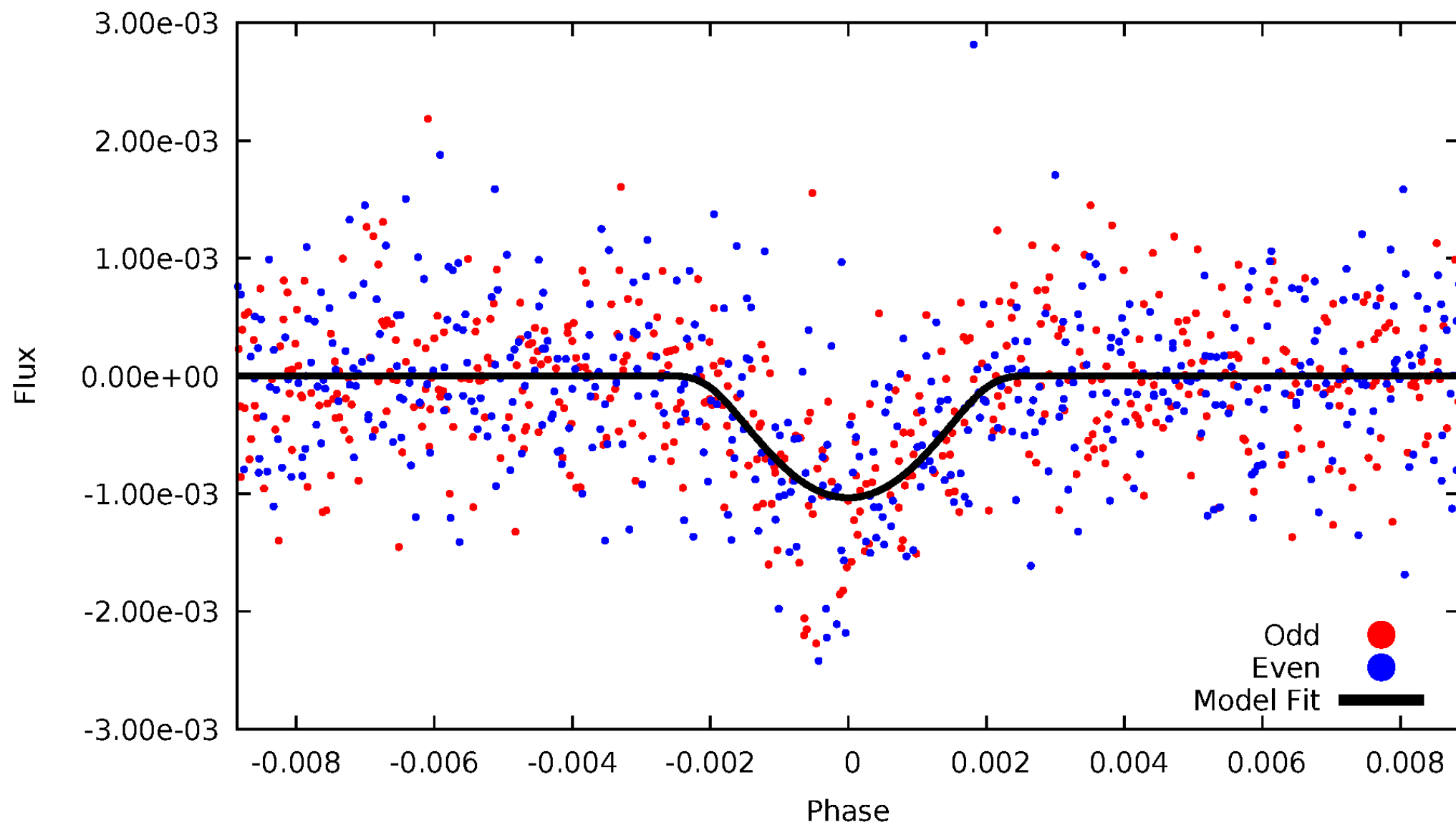


TCE 005360974-01



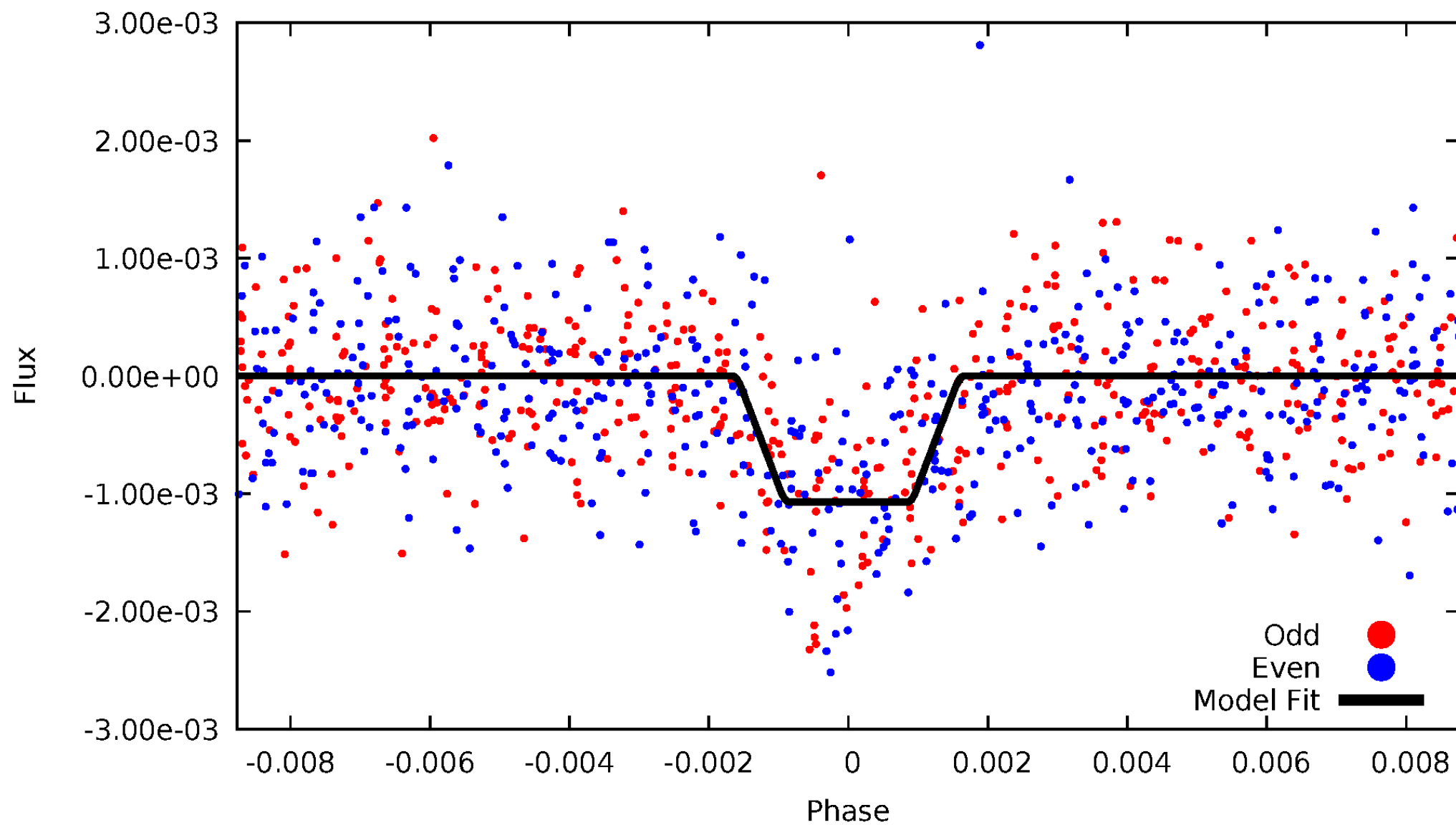
# DV Odd/Even

TCE 005360974-01



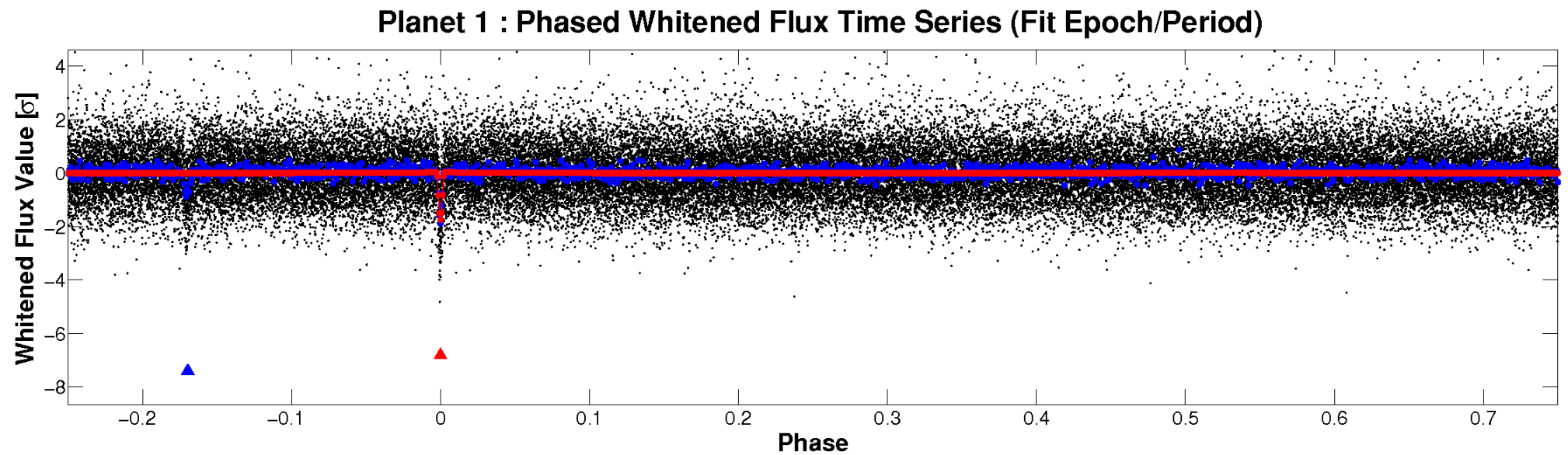
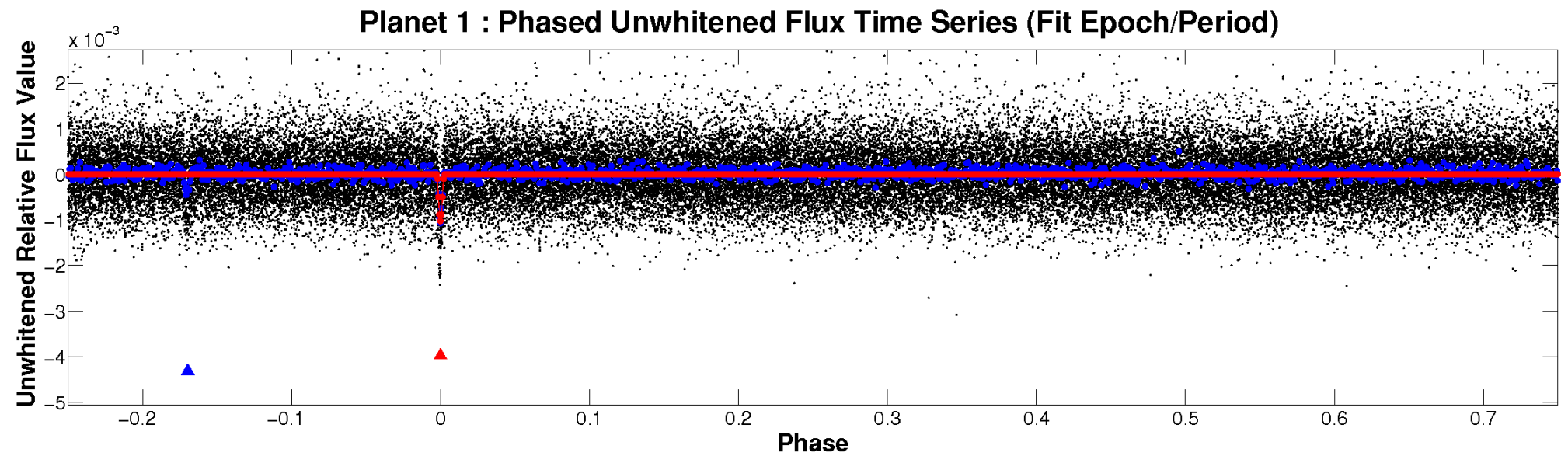
# ALT Odd/Even

TCE 005360974-01



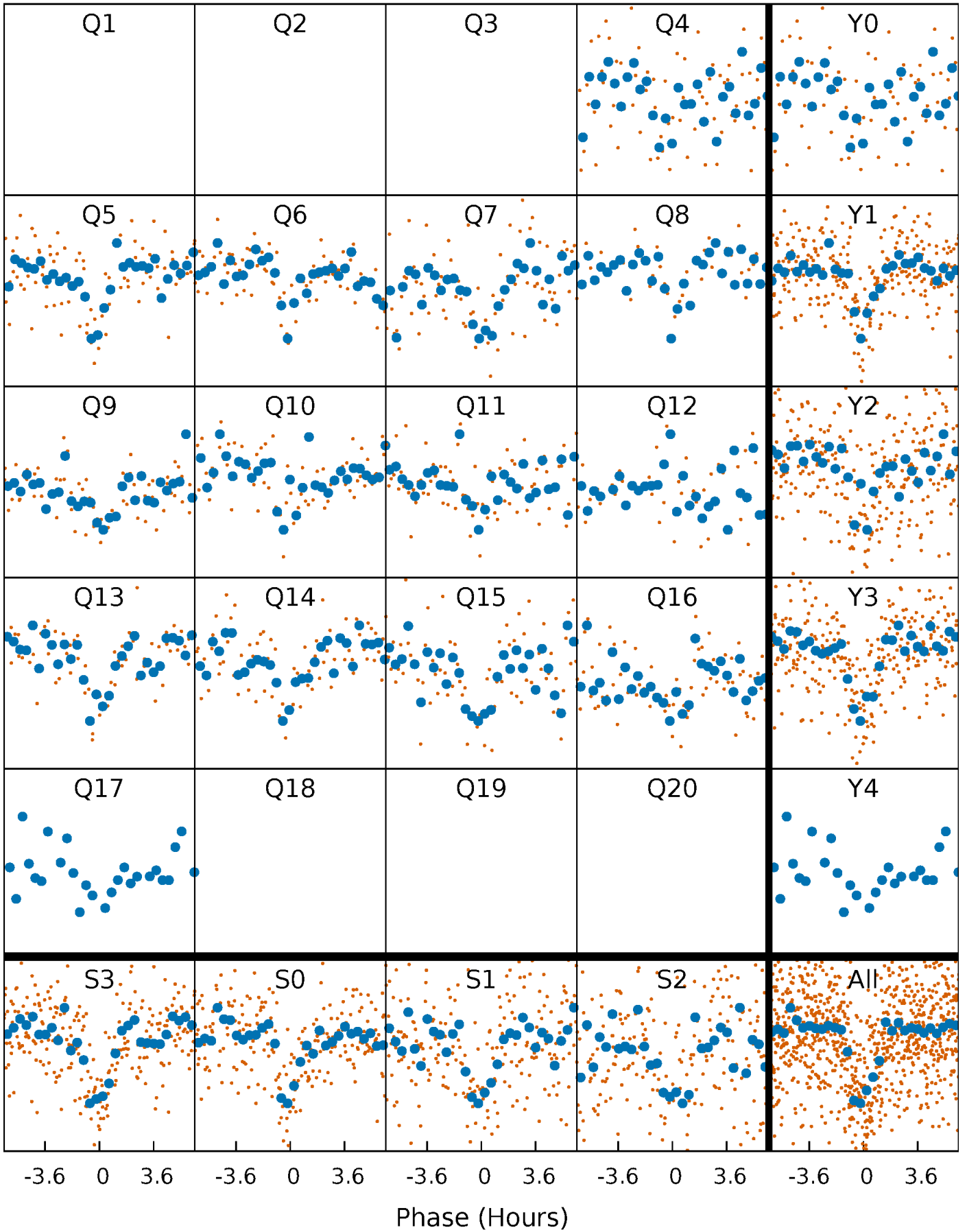


# Non-Whitened Vs. Whitened Light Curve



# PDC Quarter-Phased Transit Curves

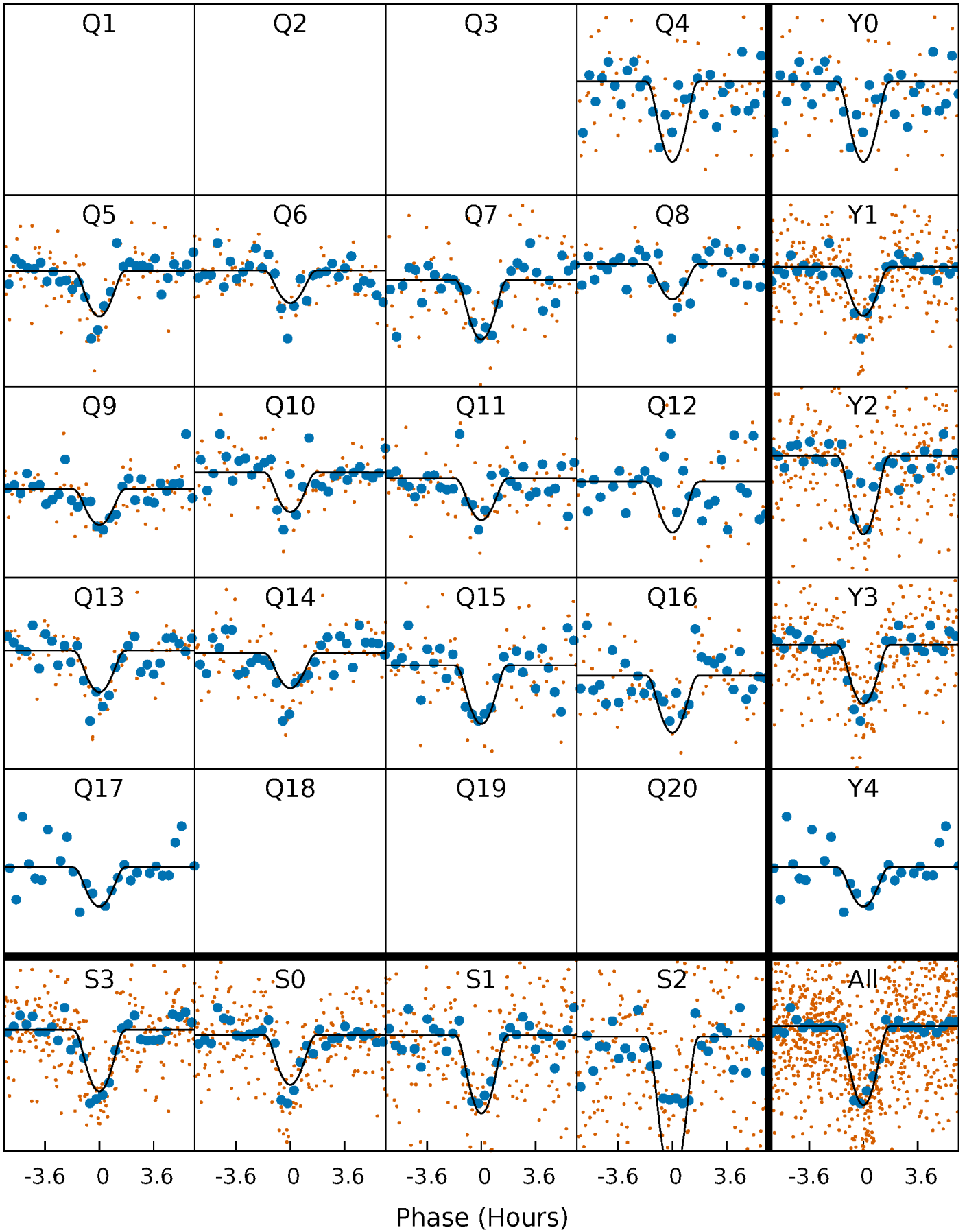
TCE 005360974-01 P= 29.804276 Days  $T_0=150.680441$  (BKJD)





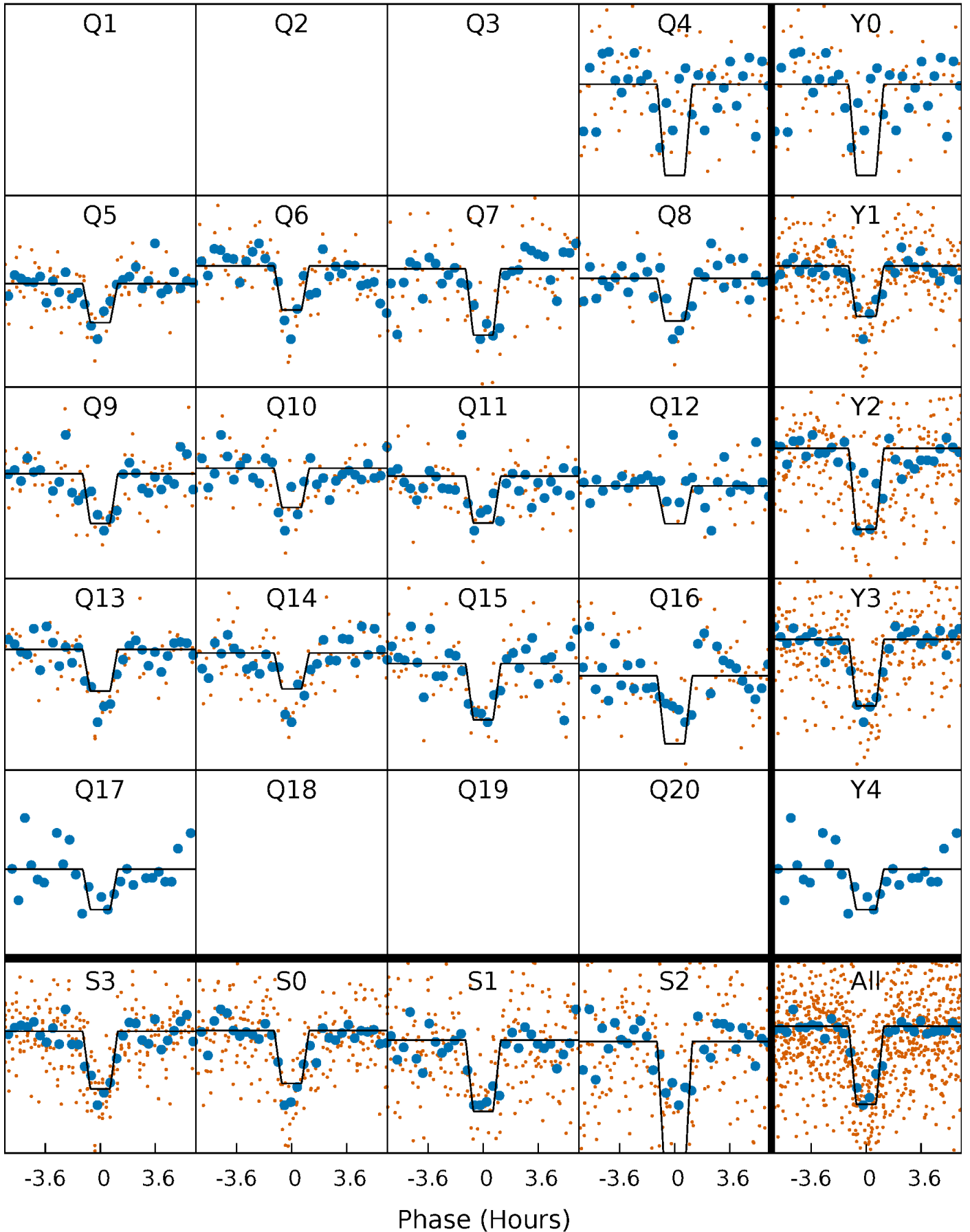
# DV Quarter-Phased Transit Curves

TCE 005360974-01   P= 29.804276 Days    $T_0=150.680441$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

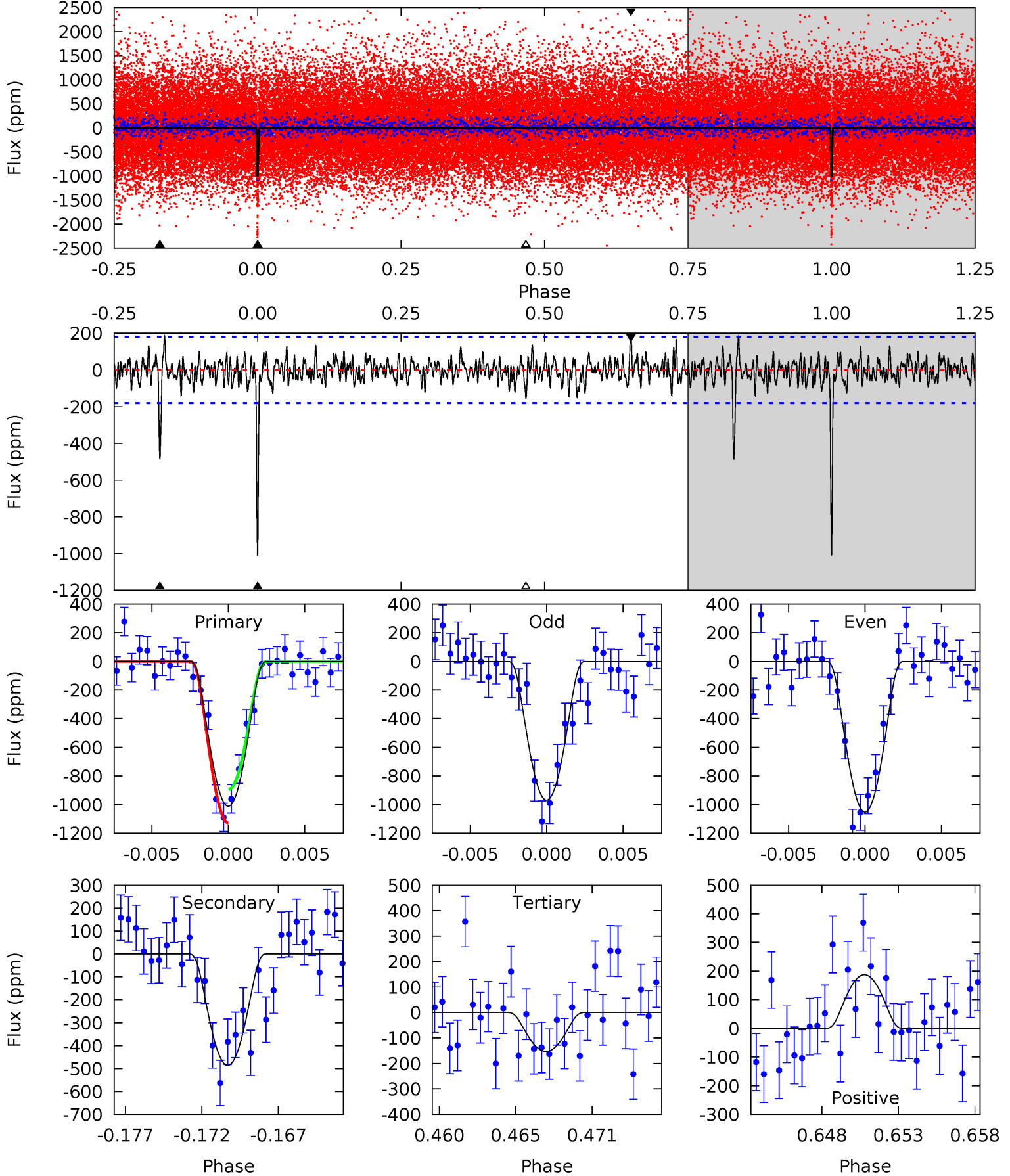
TCE 005360974-01 P= 29.804057 Days  $T_0=150.683934$  (BKJD)



# DV Model-Shift Uniqueness Test

005360974-01, P = 29.804276 Days, E = 150.680441 Days

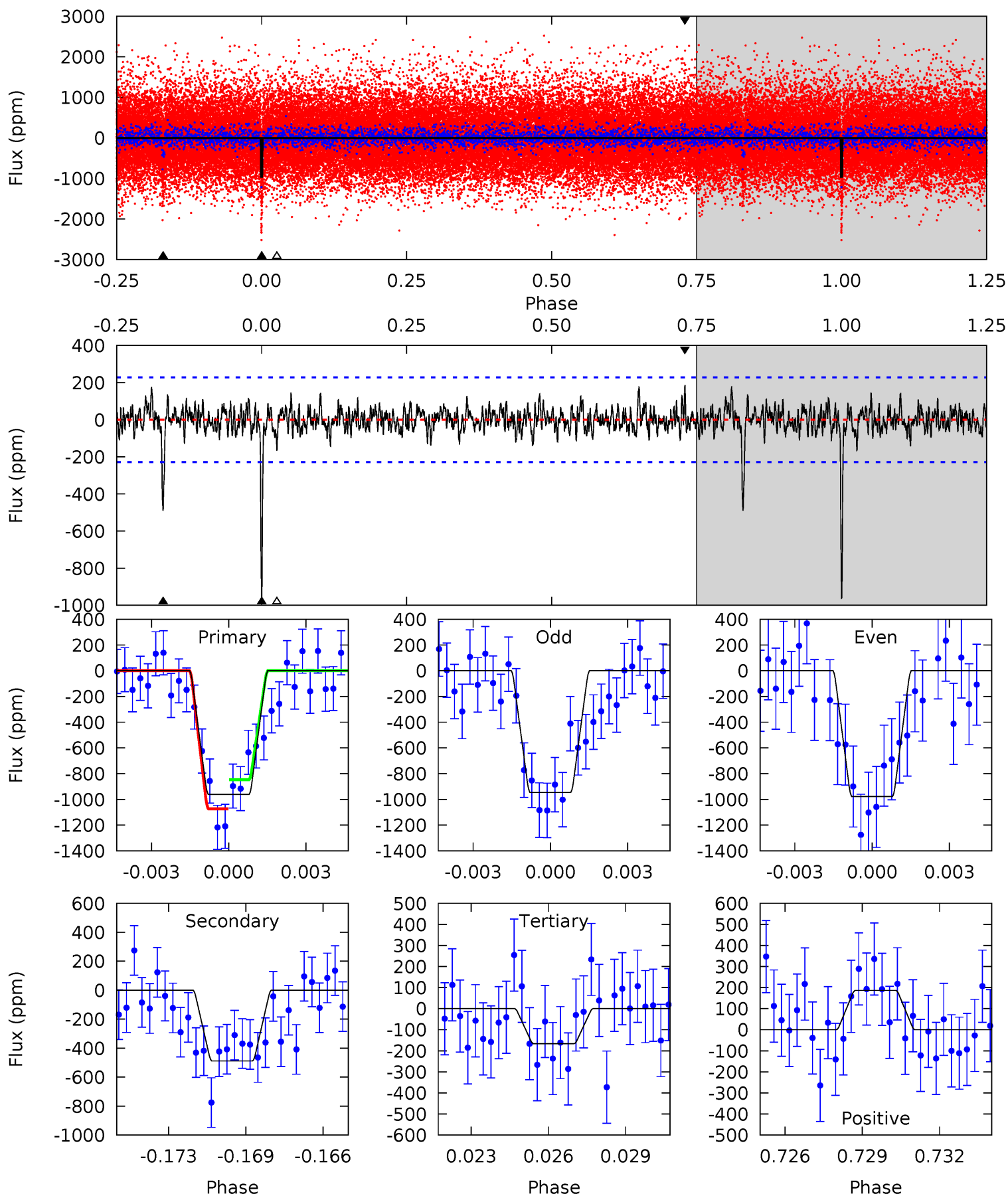
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
28.8	13.9	4.35	5.34	5.16	2.80	1.44	24.5	23.5	9.51	8.53	1.19	0.98	0.16	3.31



# Alt Model-Shift Uniqueness Test

005360974-01, P = 29.804057 Days, E = 150.683934 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
22.1	11.2	3.82	4.29	5.24	2.94	1.14	18.3	17.8	7.42	6.94	0.37	1.01	0.16	2.61



### Stellar Parameters For KIC 005360974

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5223^{+203}_{-166}$	$4.488^{+0.100}_{-0.100}$	$-0.140^{+0.300}_{-0.300}$	$0.827^{+0.109}_{-0.098}$	$0.767^{+0.112}_{-0.060}$	$1.913^{+0.851}_{-0.589}$
	+4%/-3%	+2%/-2%	+214%/-214%	+13%/-12%	+15%/-8%	+44%/-31%
Source	KIC0	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 005360974-01 / KOI 3289.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-487 \pm 35$	$7.31^{+6.51}_{-4.73}$	$705^{+36}_{-34}$	$3283^{+1380}_{-537}$	$153^{+1048}_{-110}$
Alt.	$-489 \pm 44$	$6.28^{+6.61}_{-4.36}$	$708^{+37}_{-32}$	$3437^{+1971}_{-661}$	$202^{+2057}_{-155}$

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

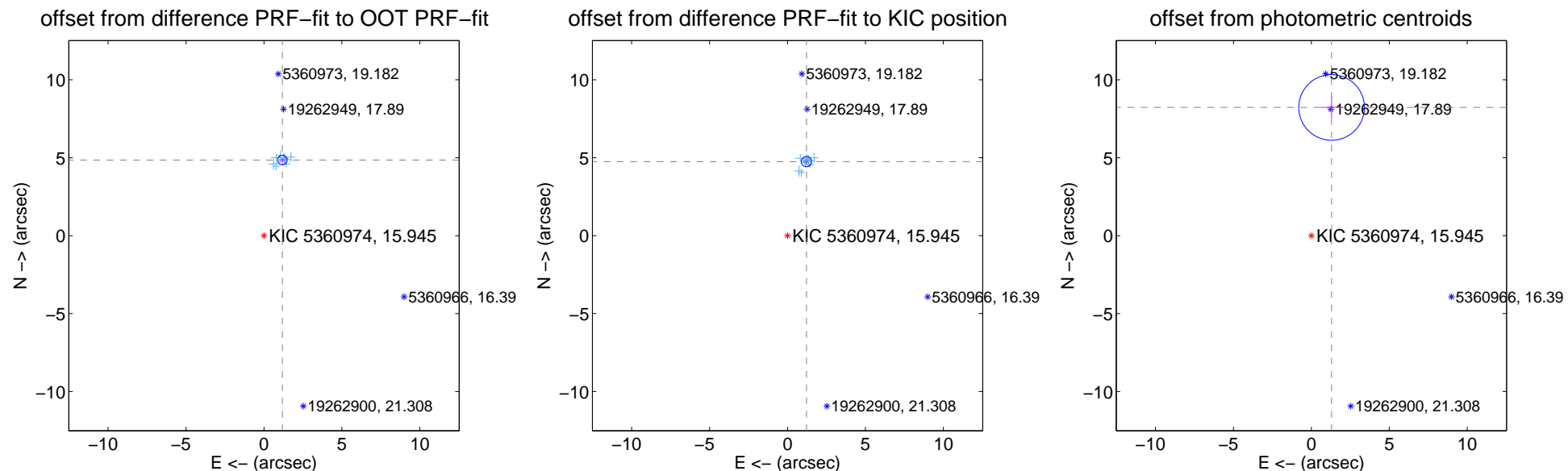
## DV Centroid Data

Supplemental centroid analysis for 005360974-01. Kepler magnitude: 15.95. Transit SNR 17.76

There are 12 quarters with good PRF difference image offsets

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

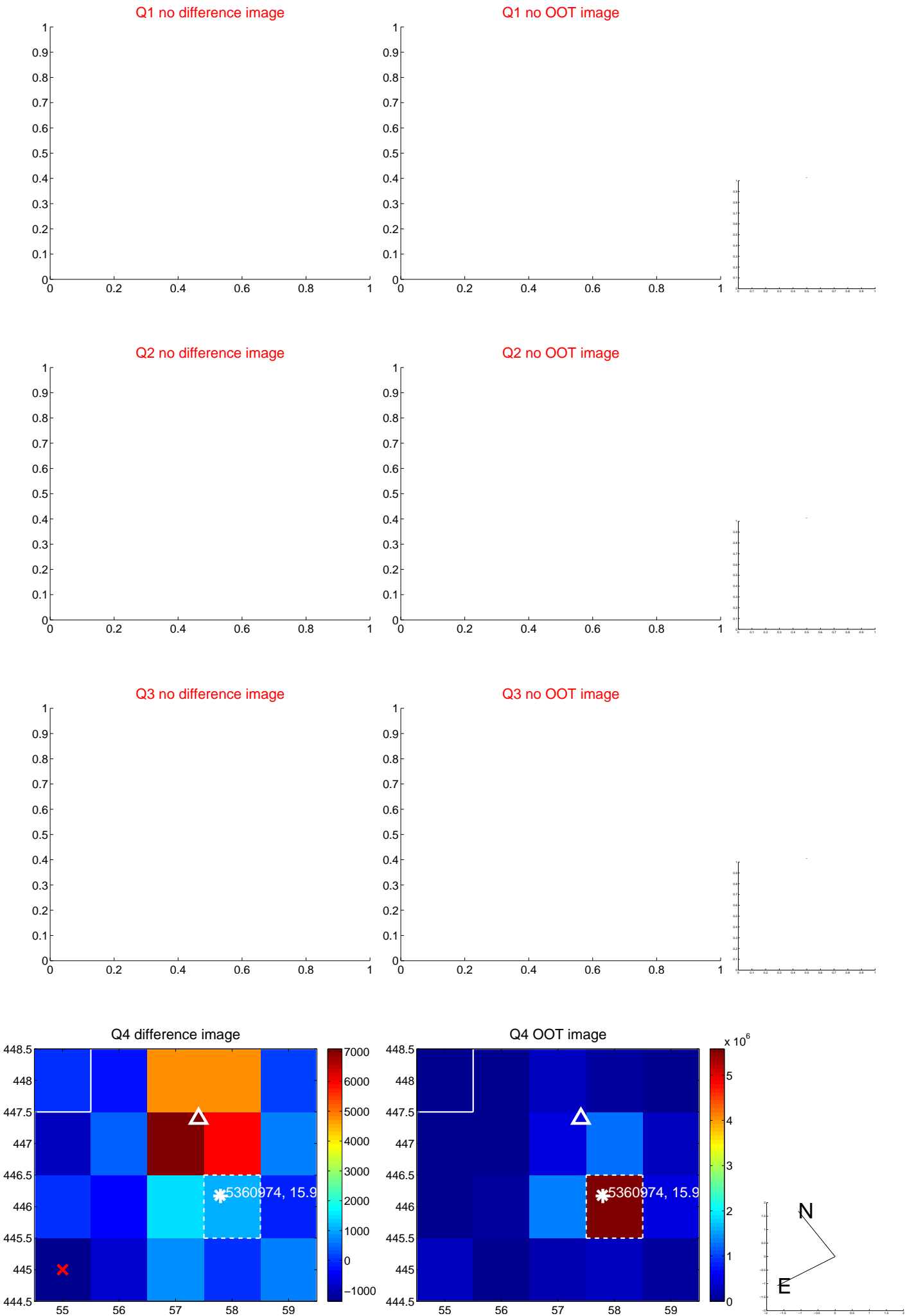
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$4.992 \pm 0.102$	49.05	$-1.181 \pm 0.103$	$4.850 \pm 0.102$
PRF-fit source offset from KIC position	$4.902 \pm 0.110$	44.59	$-1.216 \pm 0.102$	$4.749 \pm 0.103$
photometric centroid source offset	$8.33 \pm 0.70$	11.86	$-1.30 \pm 0.71$	$8.23 \pm 0.70$



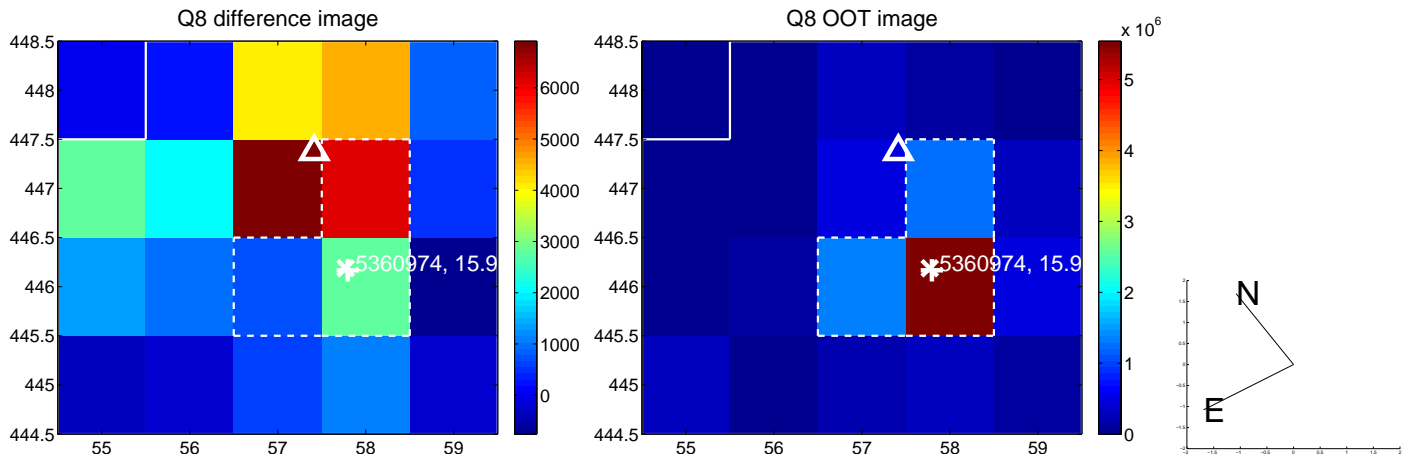
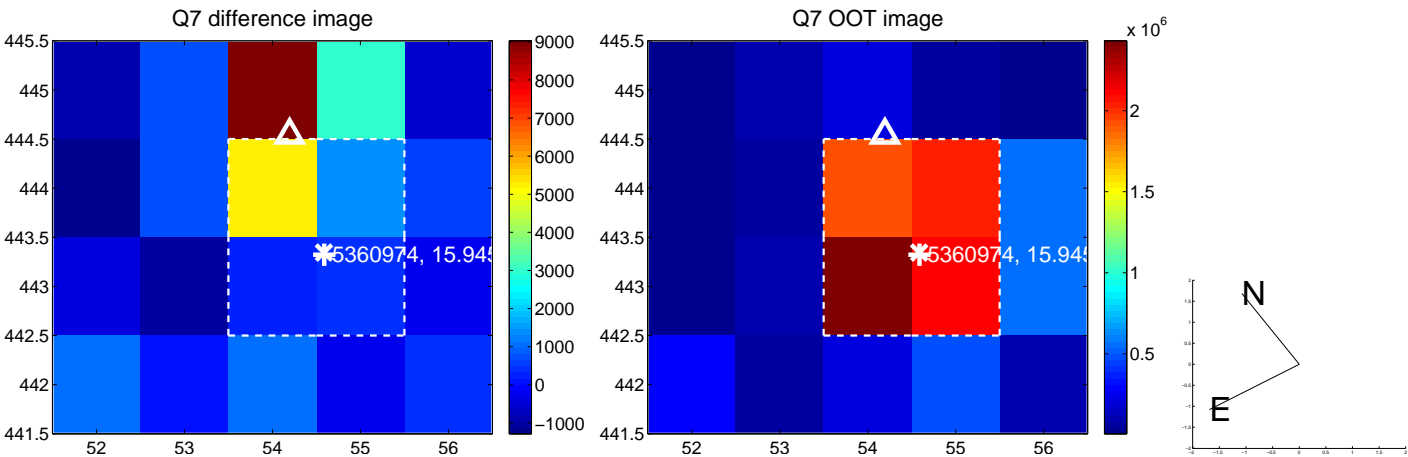
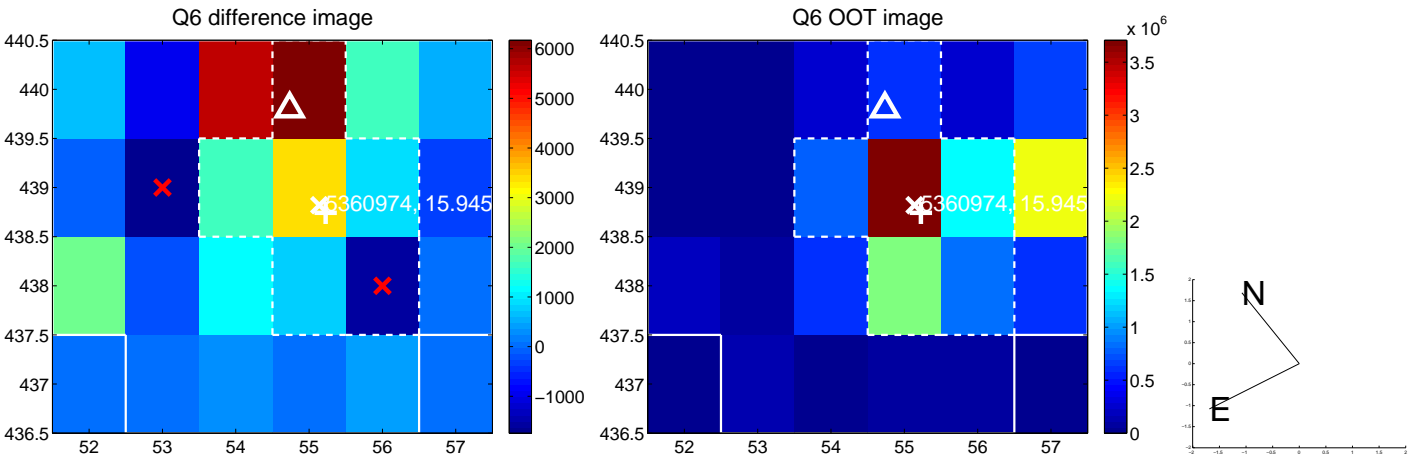
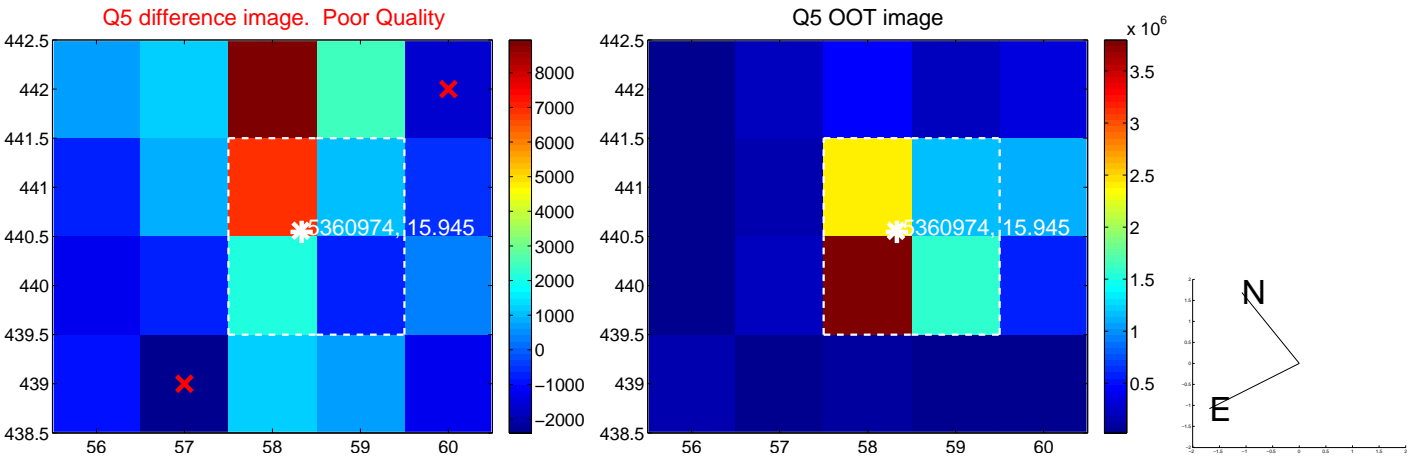
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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



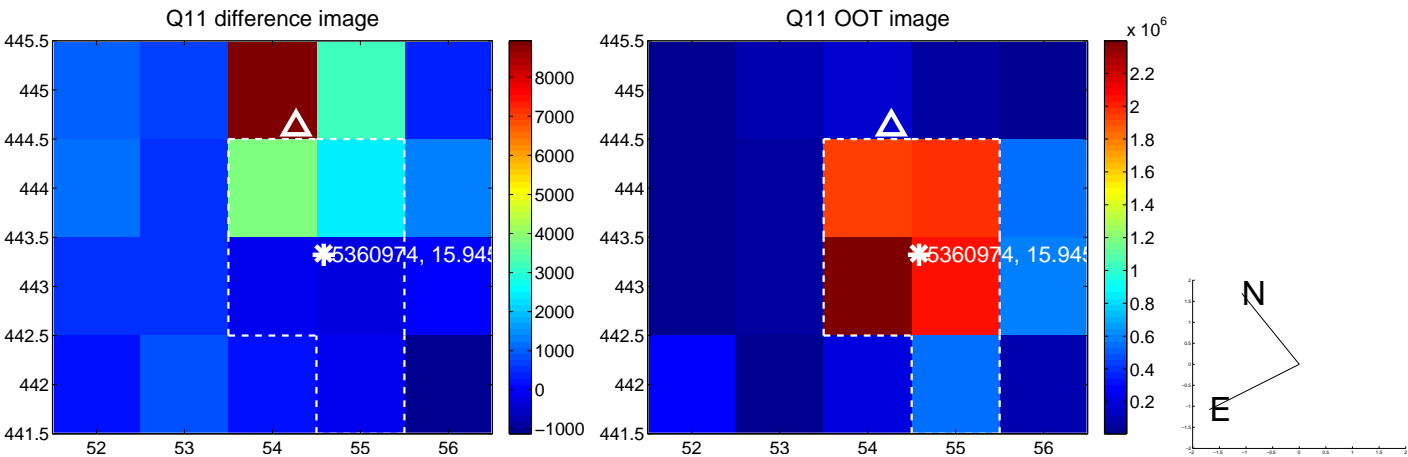
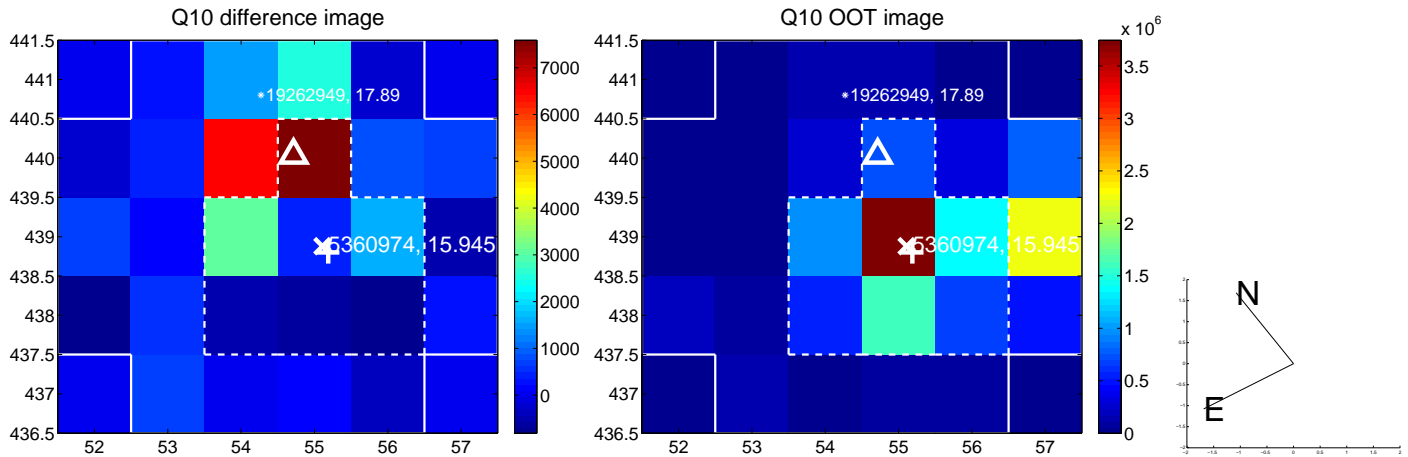
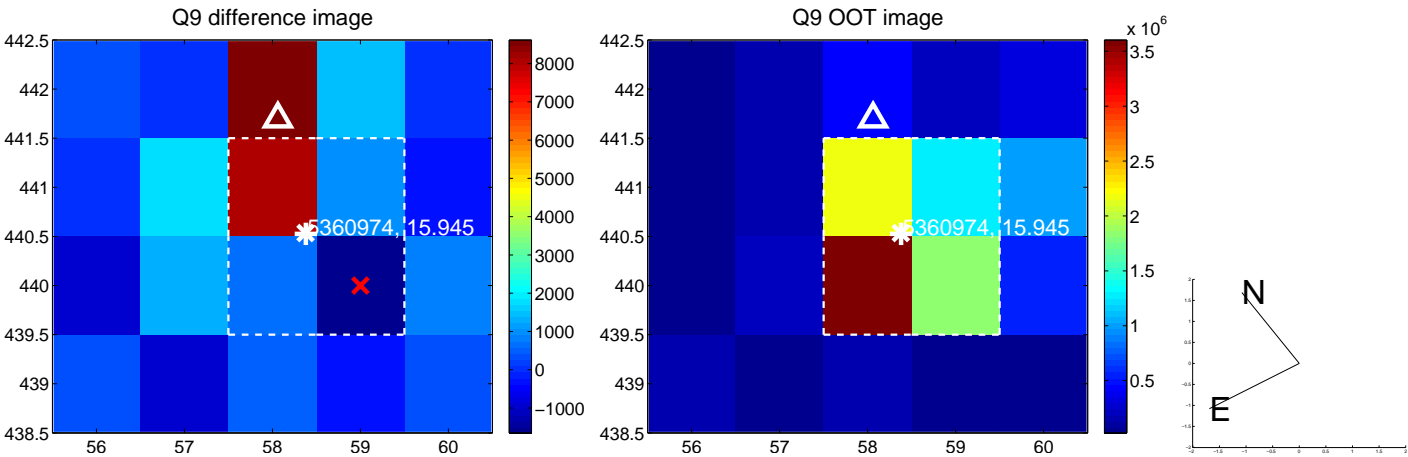
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



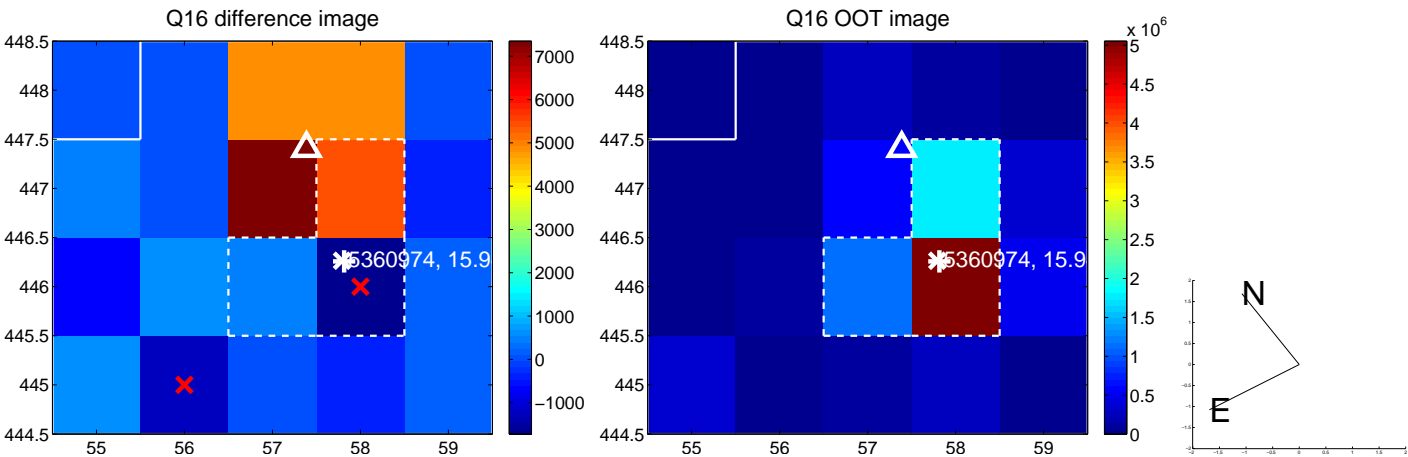
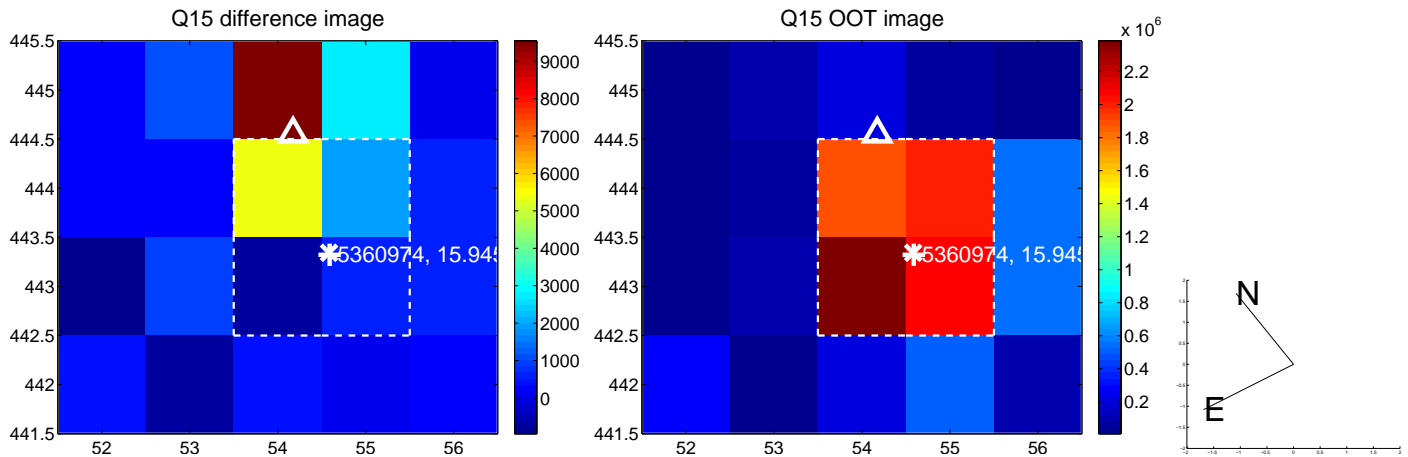
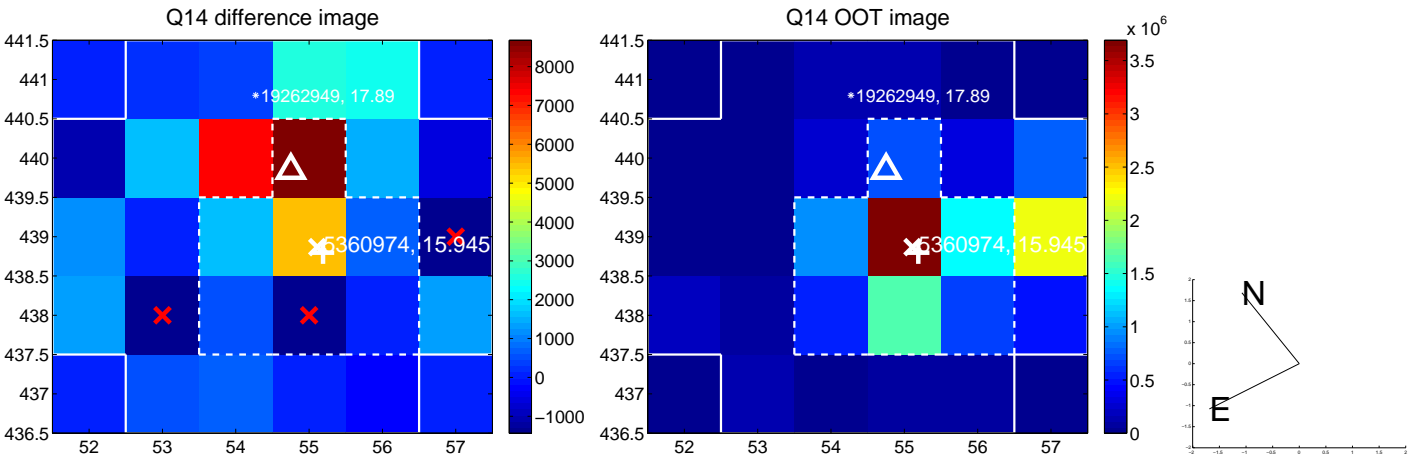
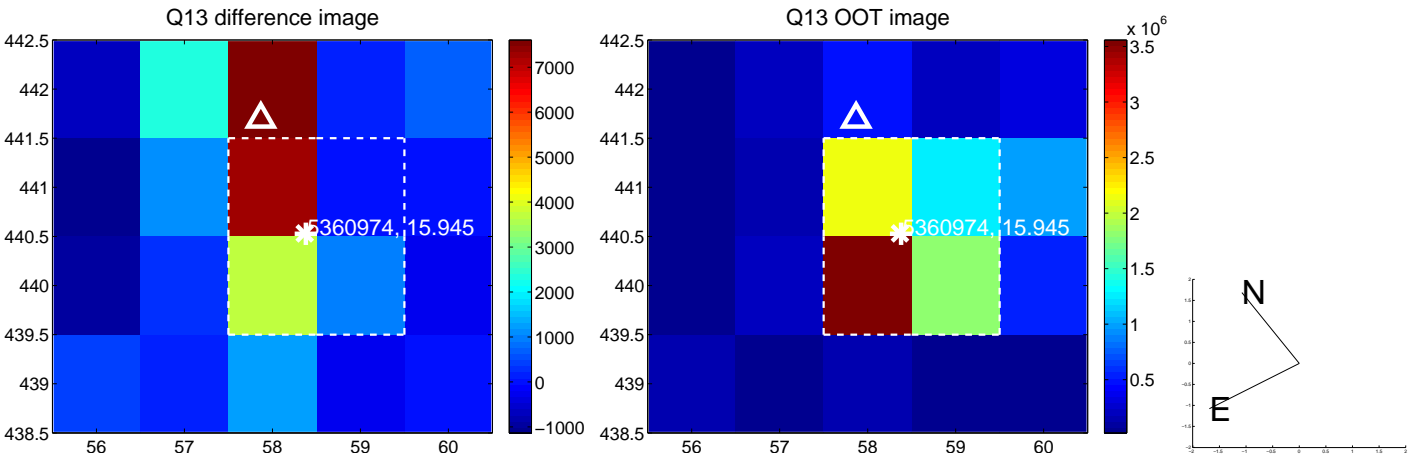
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



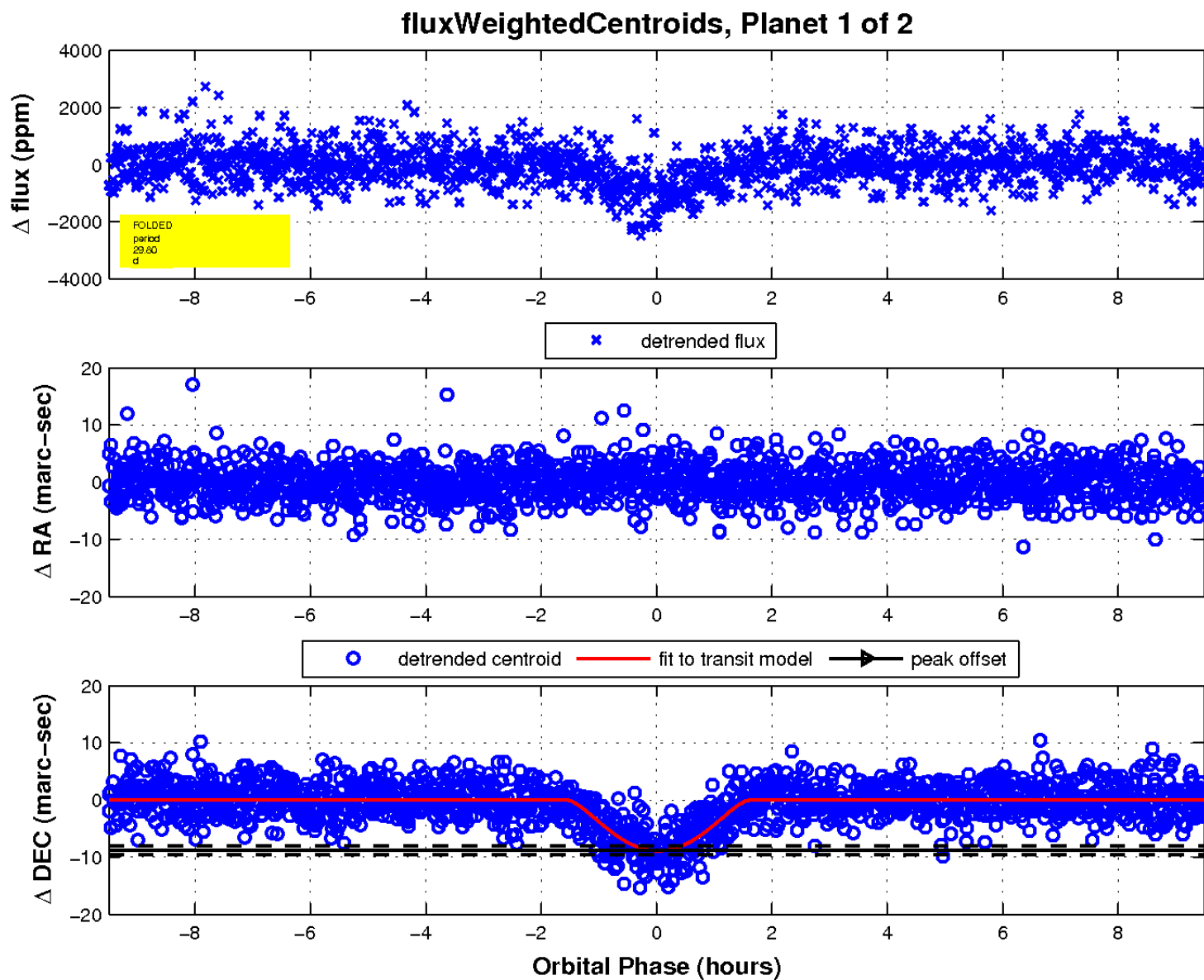
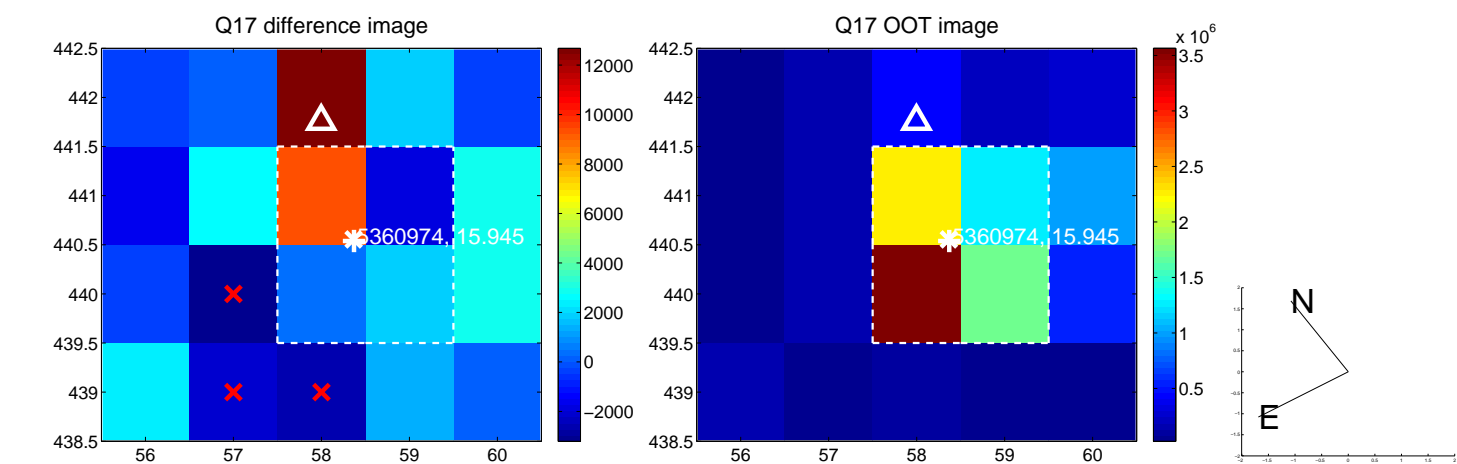
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

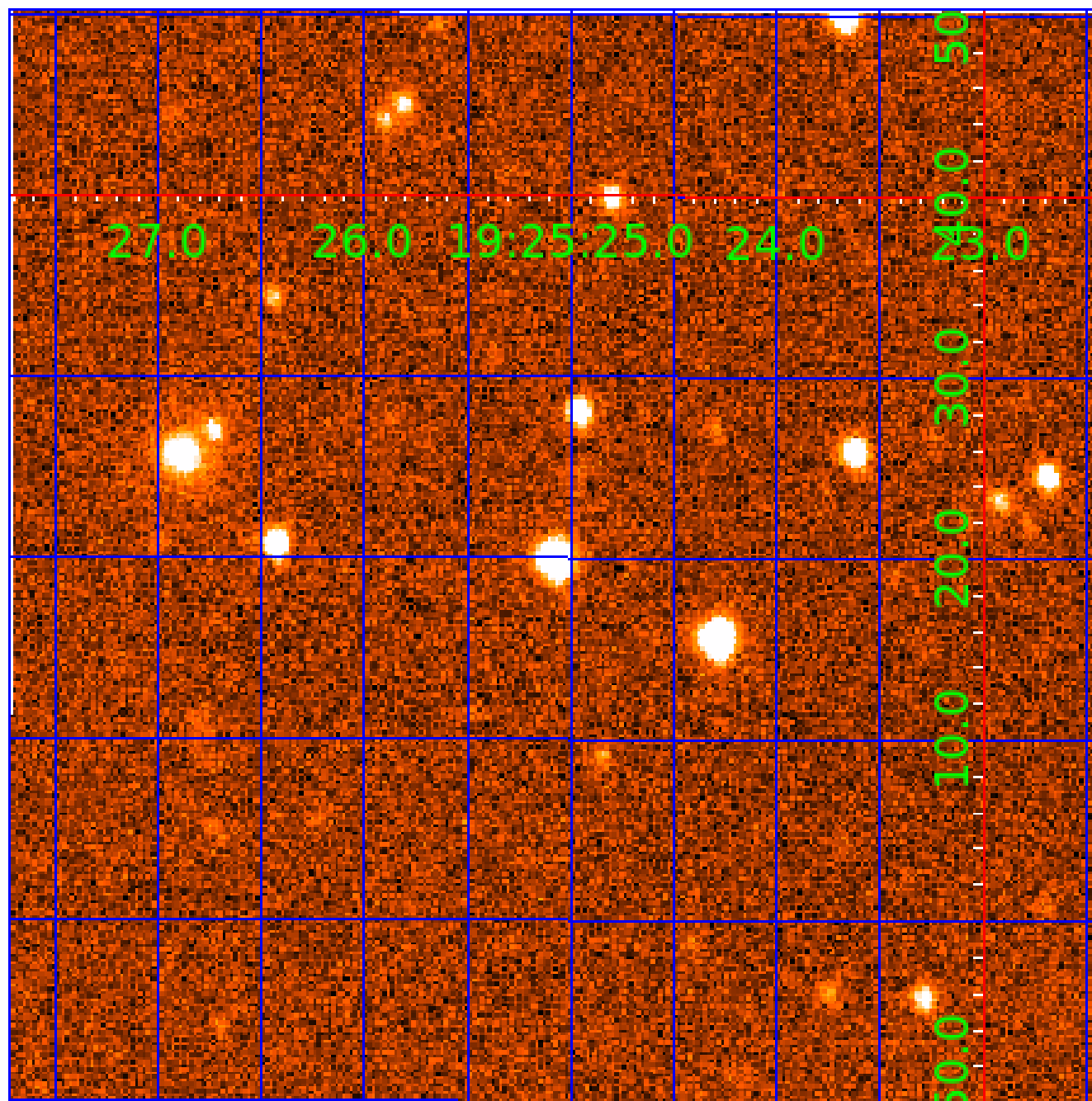


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination





# KIC 005360974

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005360974-01	OBS	3289.01	29.804276	150.680441	1034.6	3.166	15.7	17.8	0.83	5223	4.70	15.37
005360974-02	OBS	No	29.803808	145.636753	477.1	4.082	10.0	11.4	0.83	5223	2.09	15.37

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005360974-01	OBS	FP	0.00	0	1	1	0	MOD_SEC_DV—MOD_SEC_ALT—DEEP_V_SHAPED—HAS_SEC_TCE—CENT_UNRESOLVED_OFFSET
005360974-02	OBS	FP	0.00	1	1	1	0	IS_SEC_TCE—CENT_UNRESOLVED_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.

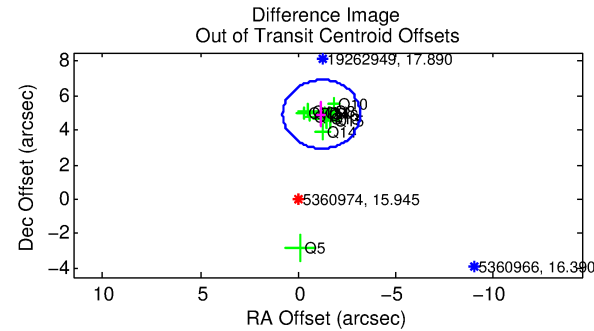
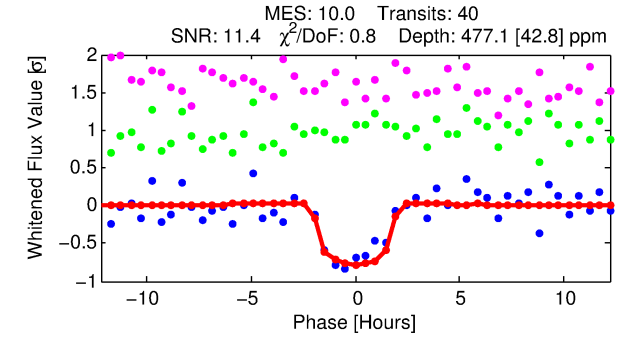
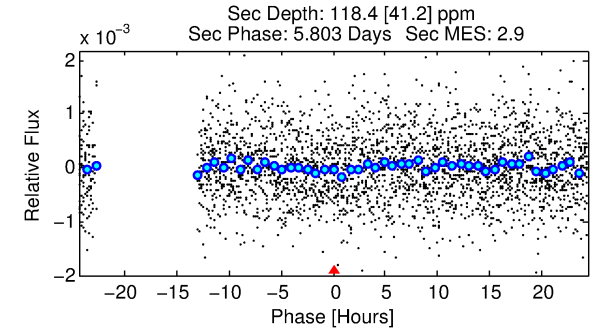
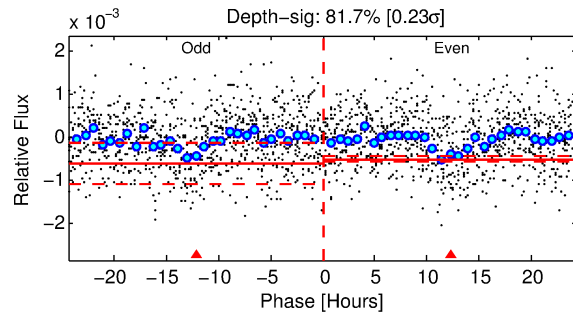
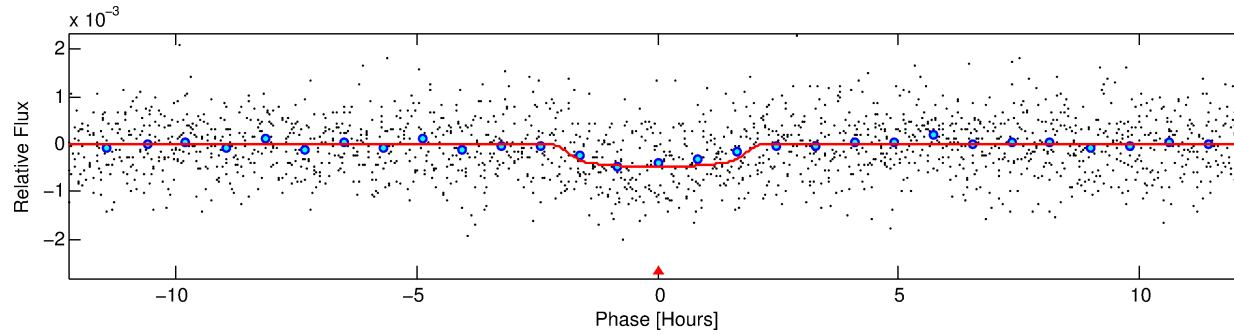
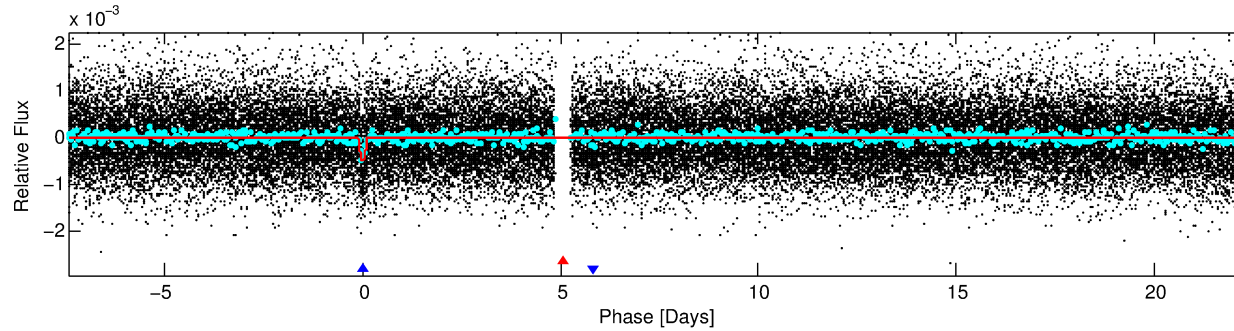
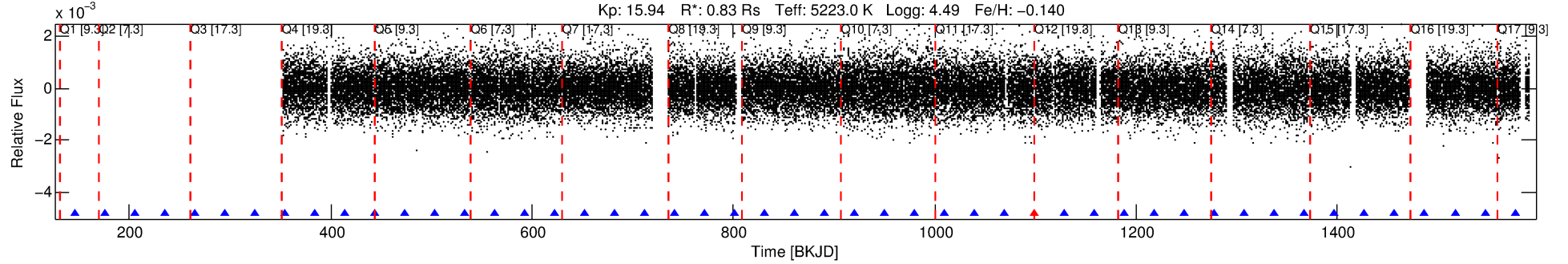
## Ephemeris Match Information For 005360974-02

No Significant Match Found

# DV One-Page Summary

KIC: 5360974 Candidate: 2 of 2 Period: 29.804 d  
KOI: K03289 Corr: No Ephemeris Match

Kp: 15.94 R\*: 0.83 Rs Teff: 5223.0 K Logg: 4.49 Fe/H: -0.140



## DV Fit Results:

Period = 29.80381 [0.00033] d  
Epoch = 145.6368 [0.0100] BKJD  
Rp/R\* = 0.0232 [0.0106]  
a/R\* = 31.39 [56.98]  
b = 0.85 [0.59]  
Seff = 15.37 [3.62]  
Teq = 505 [30] K  
Rp = 2.09 [0.99] Re  
a = 0.1723 [0.0201] AU  
Ag = 442.16 [438.35] [1.01σ]  
Teffp = 3579 [884] K [3.48σ]

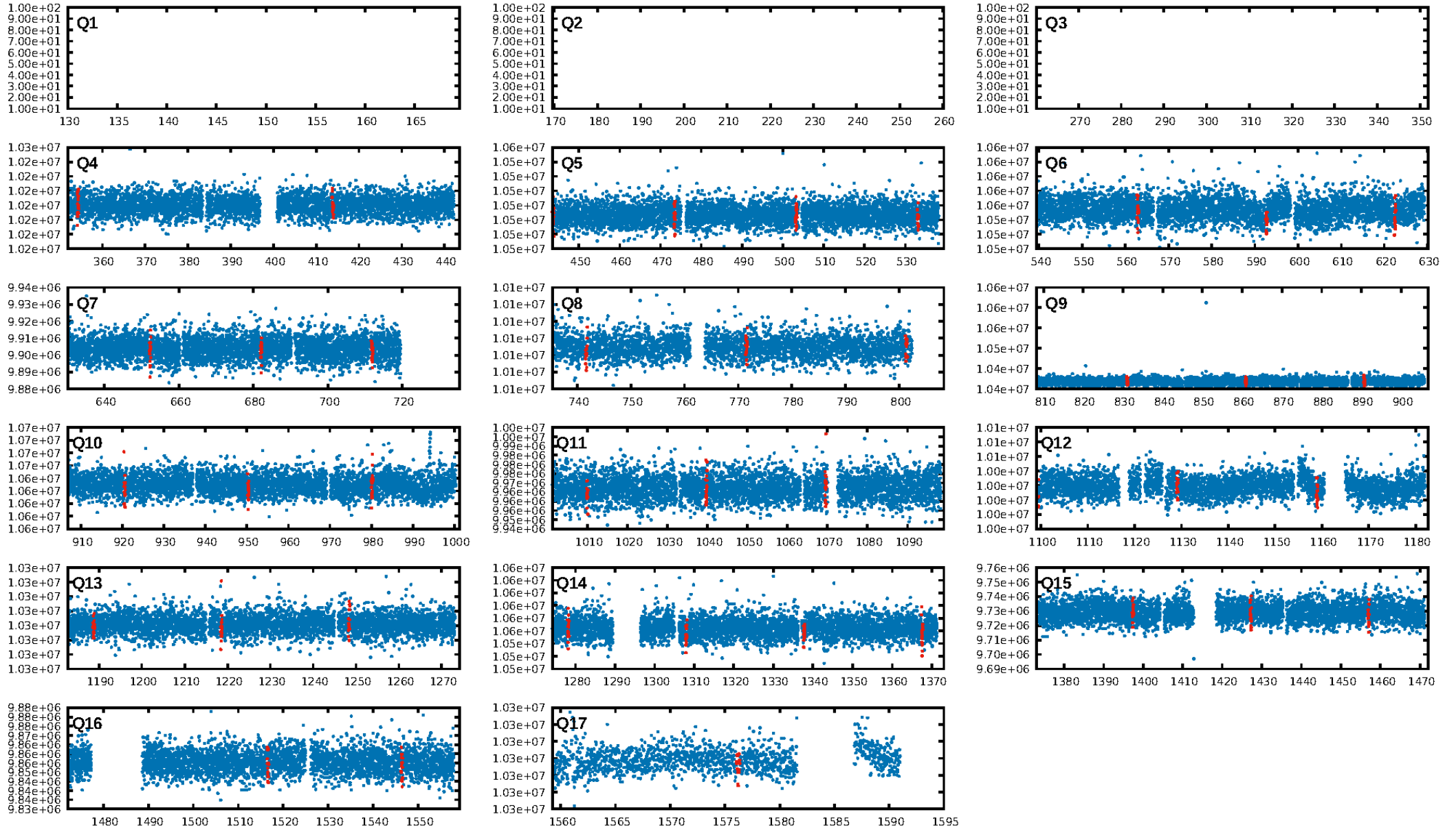
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 0.2% [0.00σ]  
ModelChiSquare2-sig: 81.2%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 2.92e-23  
RollingBand-fgm: 0.97 [38/39]  
GhostDiagnostic-chr: 1.191  
Centroid-sig: N/A  
Centroid-so: 6.934 arcsec [6.20σ]  
OotOffset-rm: 5.064 arcsec [7.67σ]  
KicOffset-rm: 5.000 arcsec [7.06σ]  
OotOffset-st: 2/3/4/3 [12]  
KicOffset-st: 2/3/4/3 [12]  
DiffImageQuality-fgm: 0.83 [10/12]  
DiffImageOverlap-fno: 1.00 [14/14]

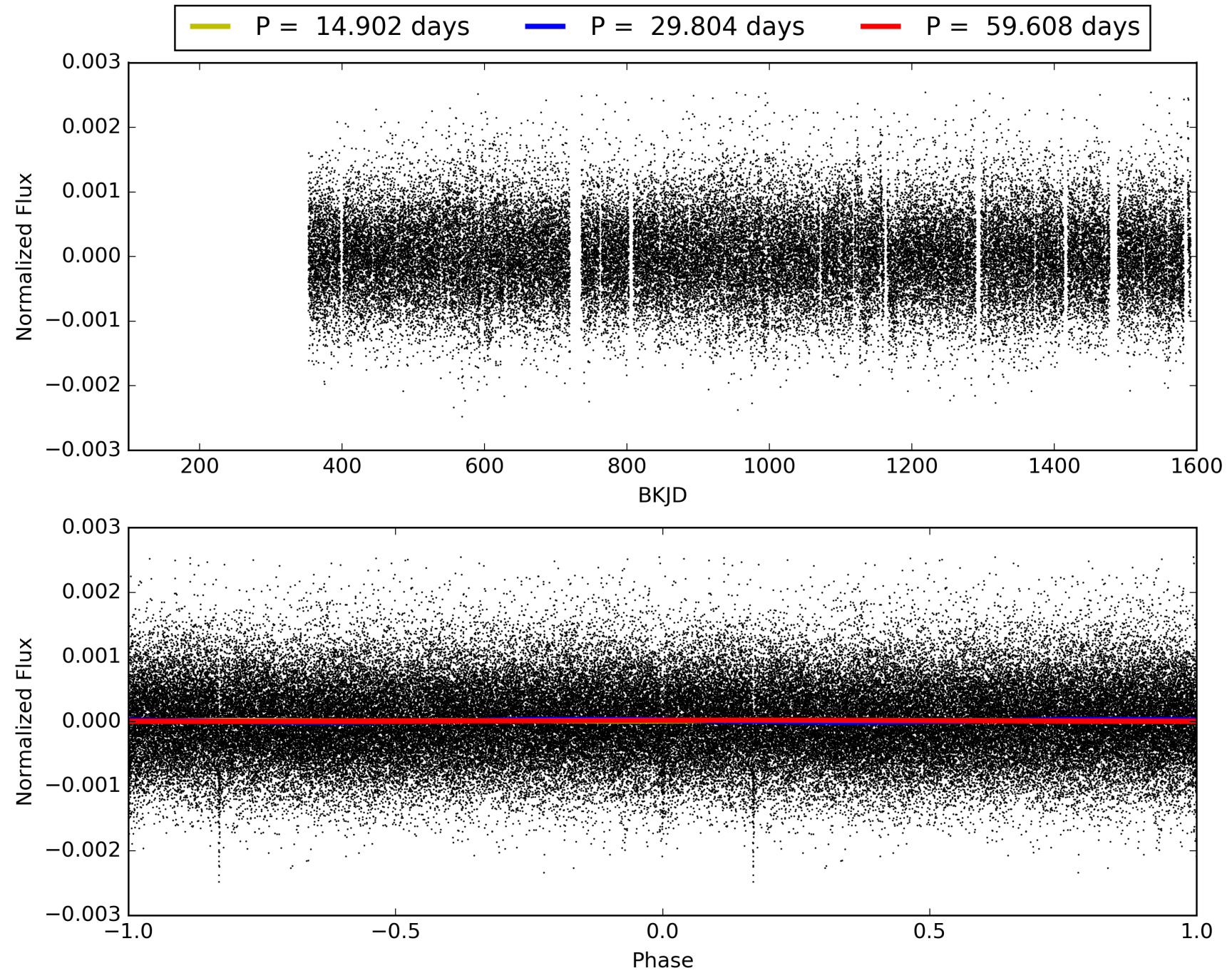
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 08:11:34 Z

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

# TCE 005360974-02, PDC Light Curves

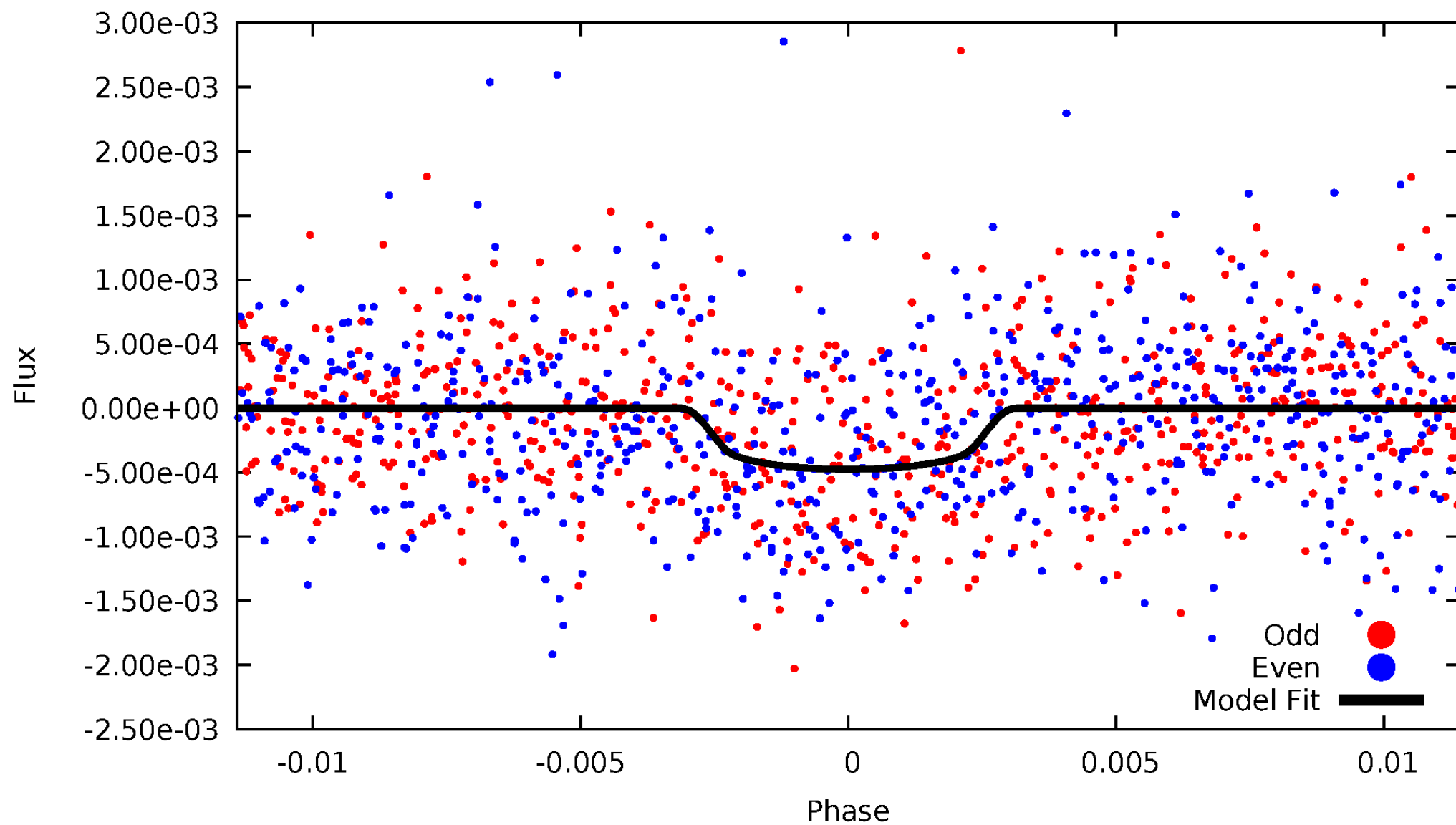


TCE 005360974-02



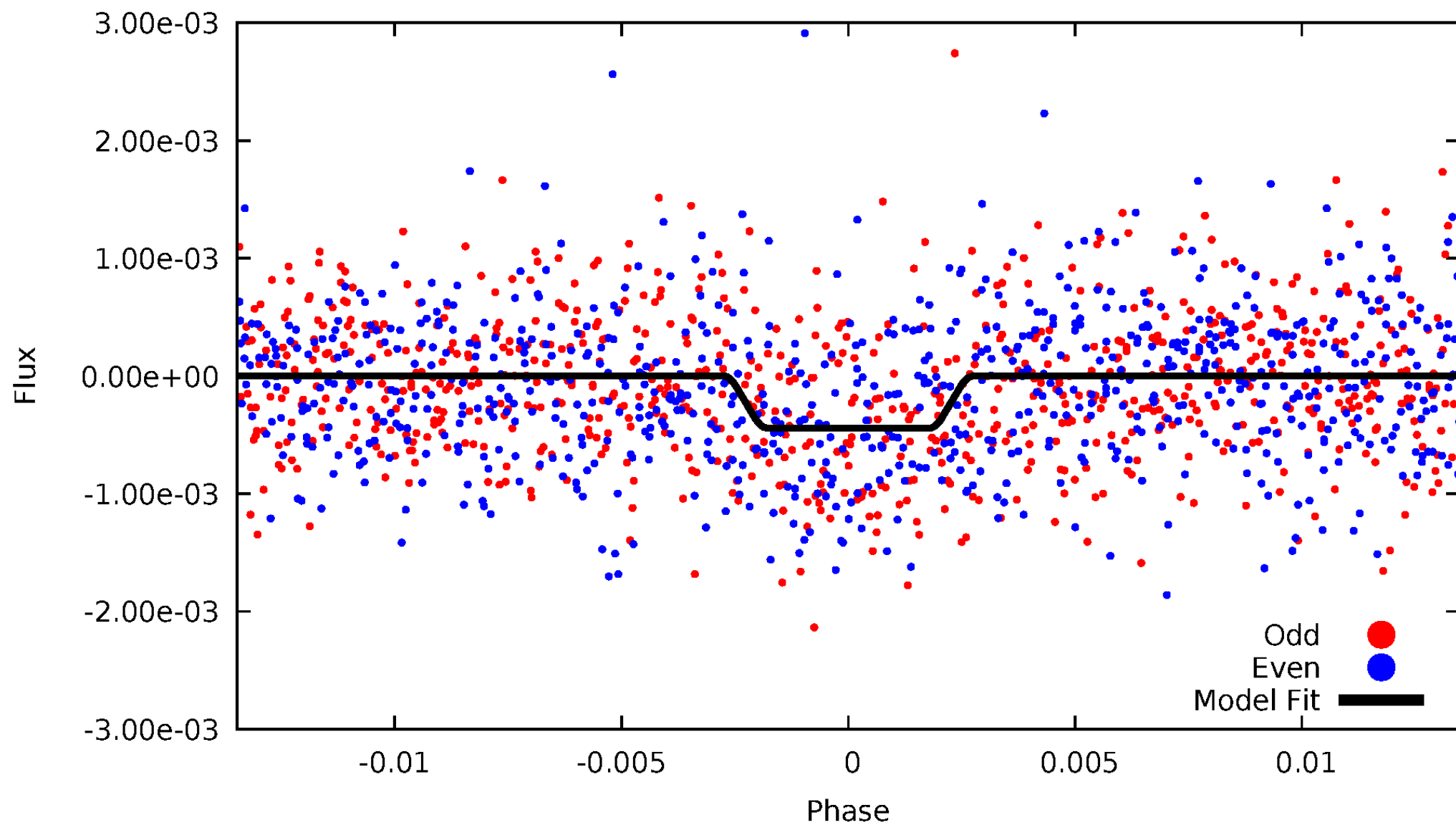
# DV Odd/Even

TCE 005360974-02



# ALT Odd/Even

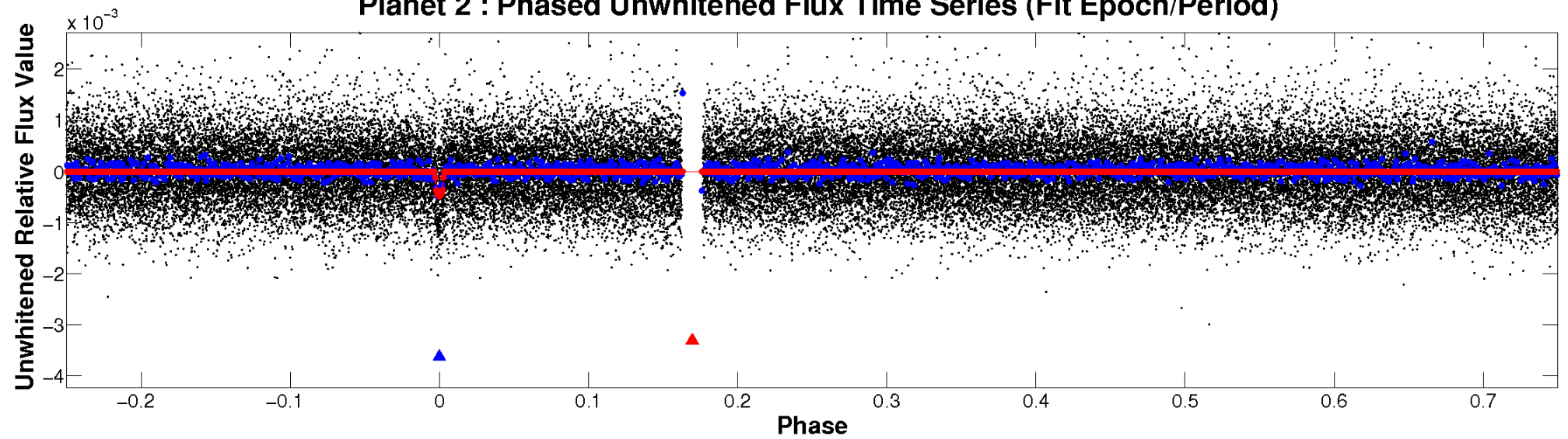
TCE 005360974-02



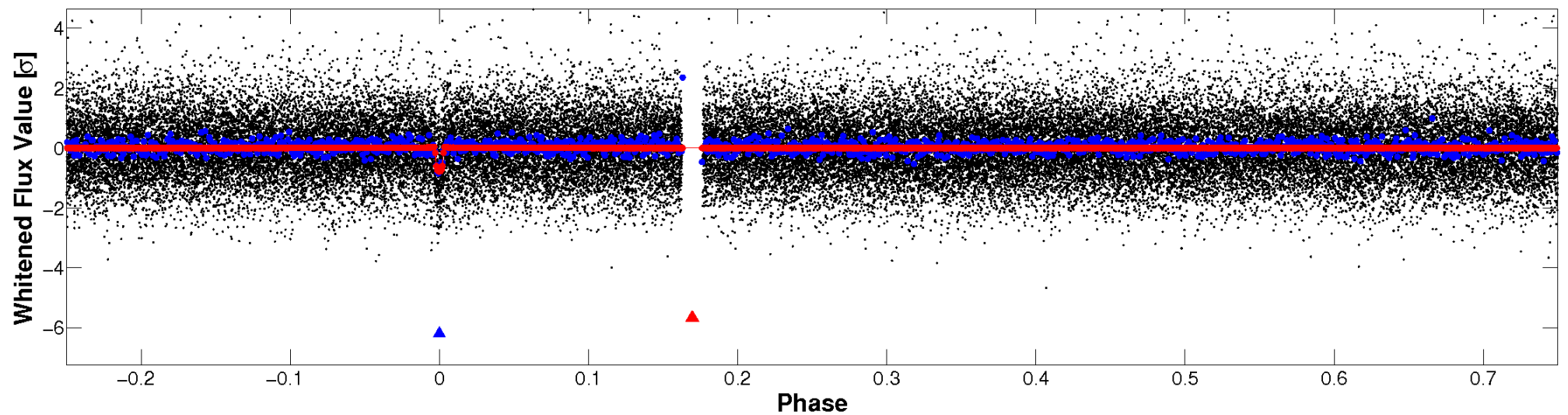


# Non-Whitened Vs. Whitened Light Curve

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

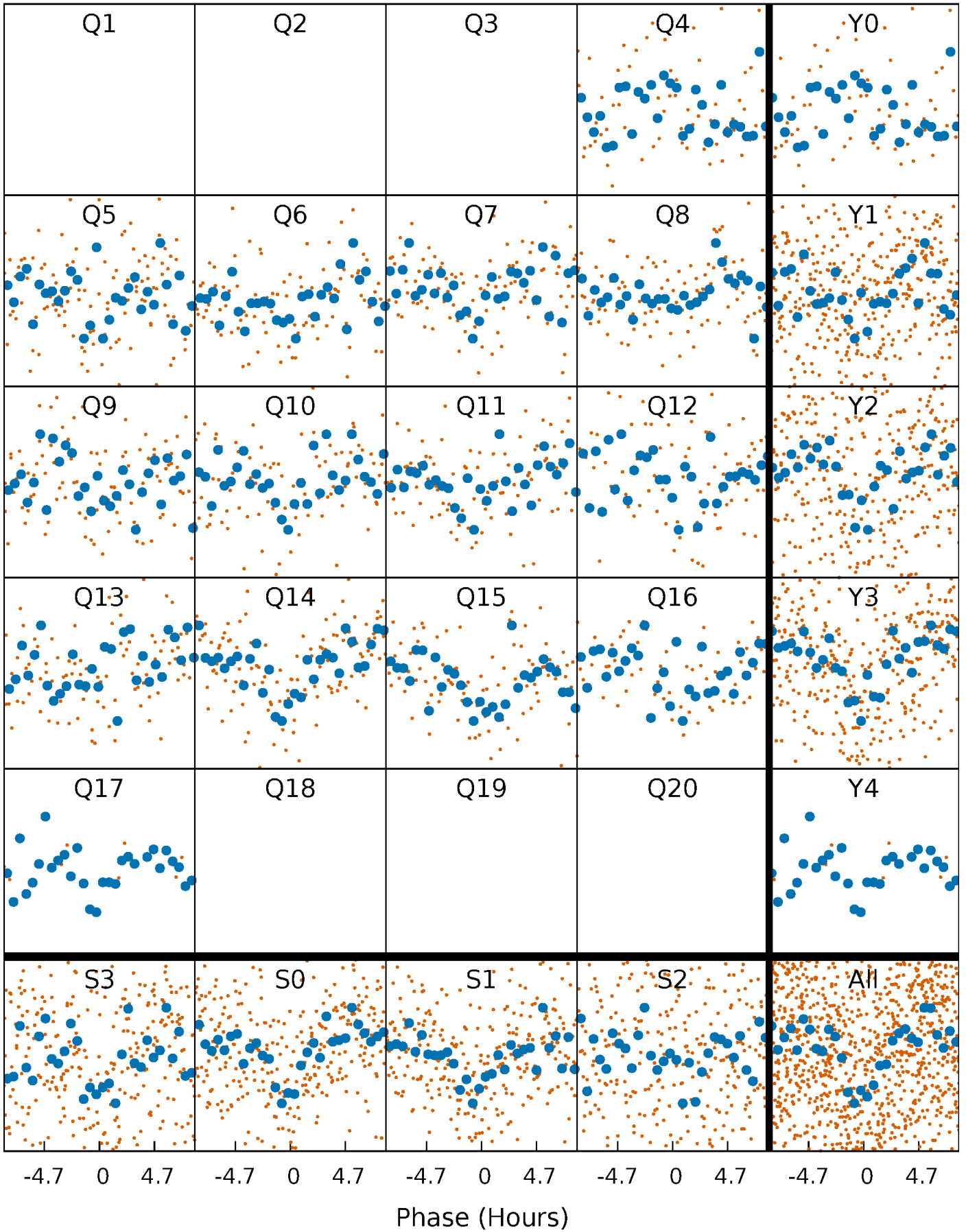


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



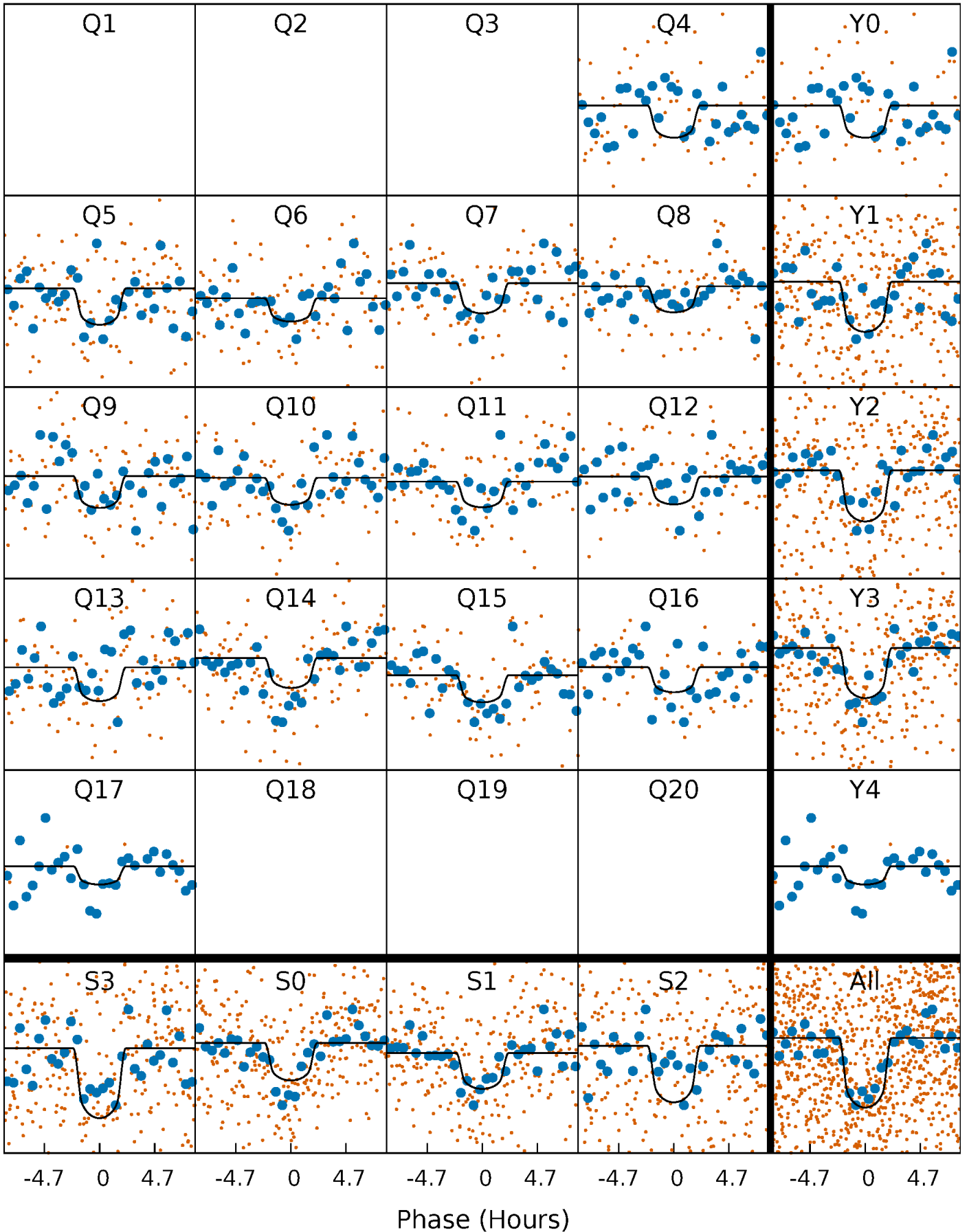
# PDC Quarter-Phased Transit Curves

TCE 005360974-02   P= 29.803808 Days    $T_0=145.636753$  (BKJD)



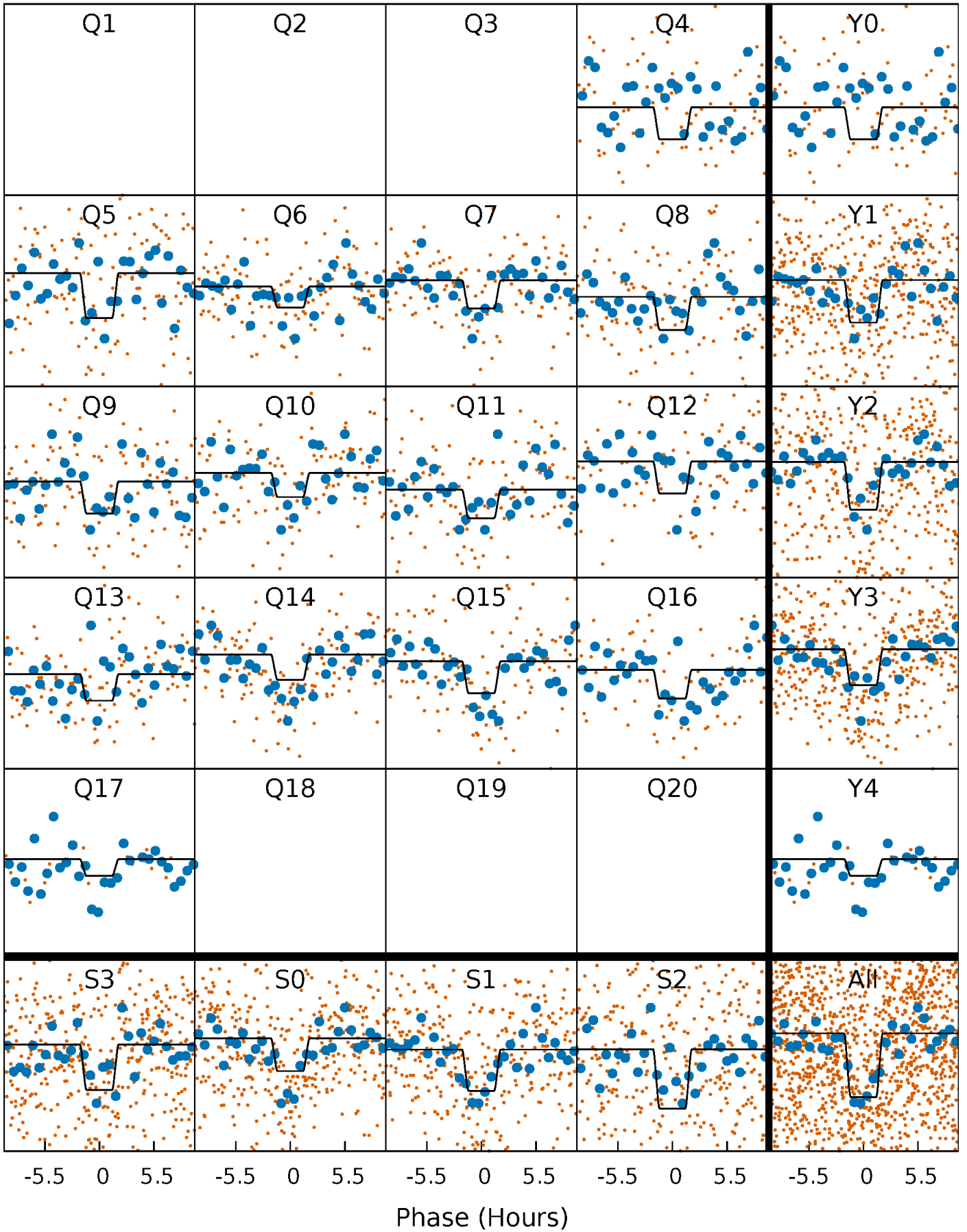
# DV Quarter-Phased Transit Curves

TCE 005360974-02     $P = 29.803808$  Days     $T_0 = 145.636753$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

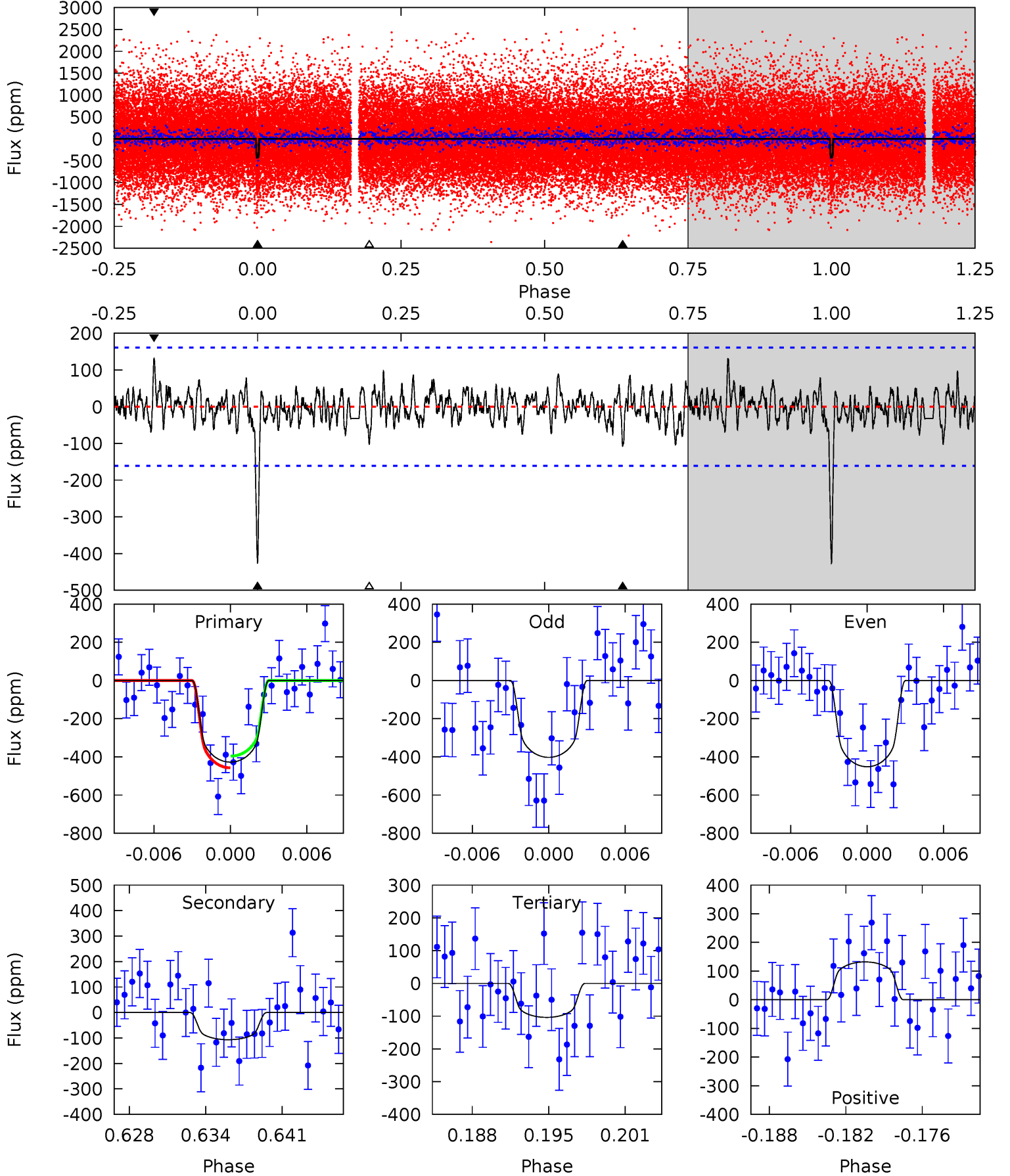
TCE 005360974-02 P= 29.803779 Days  $T_0=145.630261$  (BKJD)



# DV Model-Shift Uniqueness Test

005360974-02,  $P = 29.803808$  Days,  $E = 145.636753$  Days

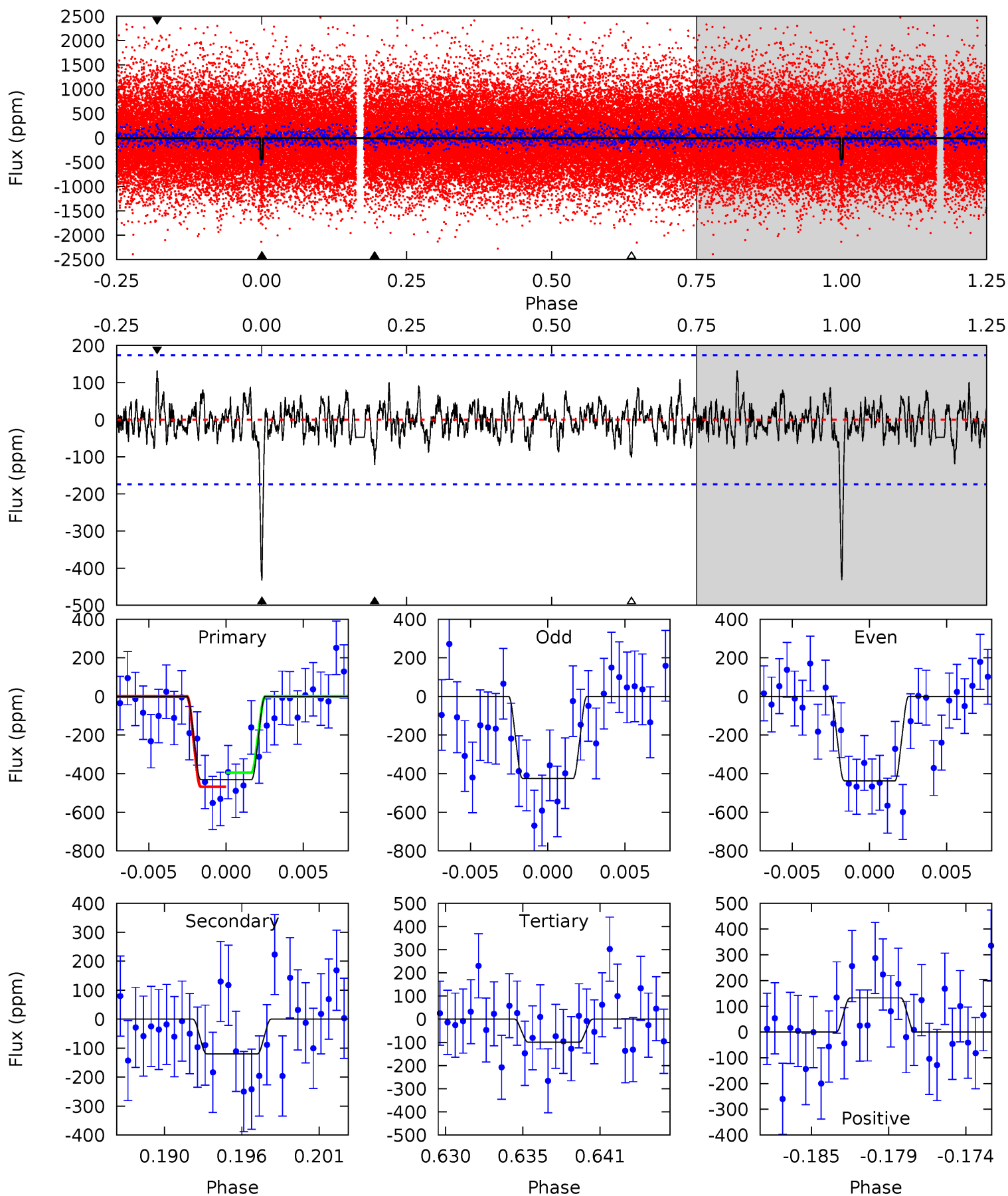
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
13.6	3.40	3.30	4.20	5.11	2.73	1.07	10.3	9.39	0.10	-0.80	0.78	0.87	0.24	0.98



# Alt Model-Shift Uniqueness Test

005360974-02, P = 29.803779 Days, E = 145.630261 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
12.7	3.54	2.95	3.92	5.14	2.78	1.01	9.80	8.82	0.60	-0.38	0.19	1.02	0.24	1.08





### Stellar Parameters For KIC 005360974

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5223^{+203}_{-166}$	$4.488^{+0.100}_{-0.100}$	$-0.140^{+0.300}_{-0.300}$	$0.827^{+0.109}_{-0.098}$	$0.767^{+0.112}_{-0.060}$	$1.913^{+0.851}_{-0.589}$
	+4%/-3%	+2%/-2%	+214%/-214%	+13%/-12%	+15%/-8%	+44%/-31%
Source	KIC0	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 005360974-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-107 \pm 31$	$2.13^{+1.04}_{-0.96}$	$707^{+34}_{-37}$	$3824^{+916}_{-509}$	$398^{+840}_{-233}$
Alt.	$-120 \pm 34$	$2.00^{+0.88}_{-1.03}$	$705^{+37}_{-35}$	$3963^{+1269}_{-512}$	$501^{+1591}_{-284}$

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

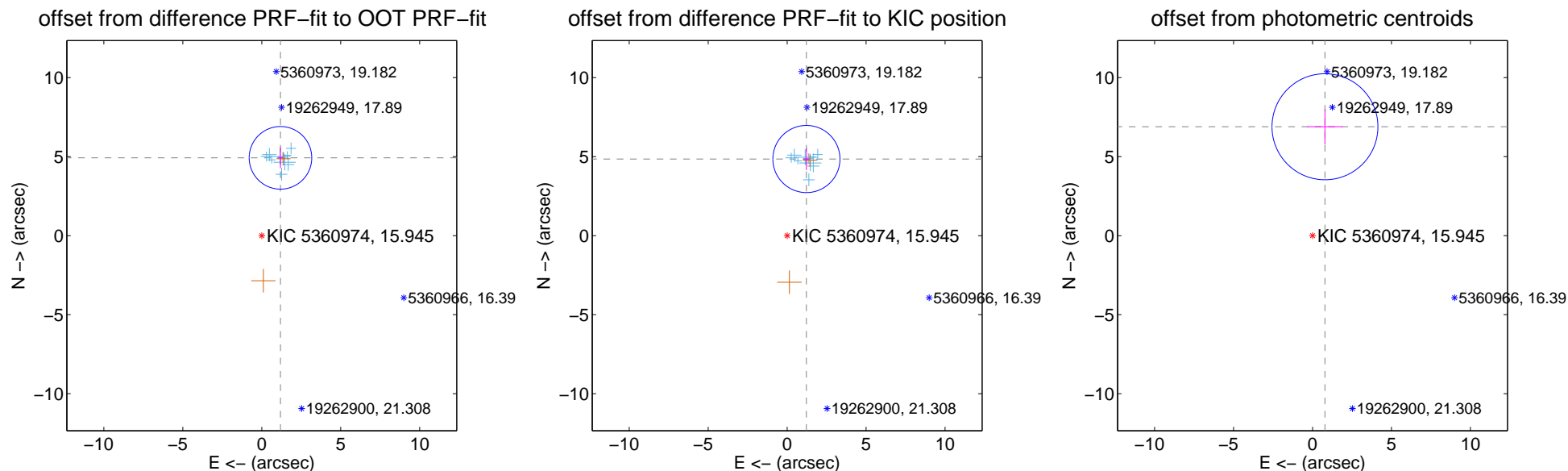
## DV Centroid Data

Supplemental centroid analysis for 005360974-02. Kepler magnitude: 15.95. Transit SNR 11.40

There are 10 quarters with good PRF difference image offsets

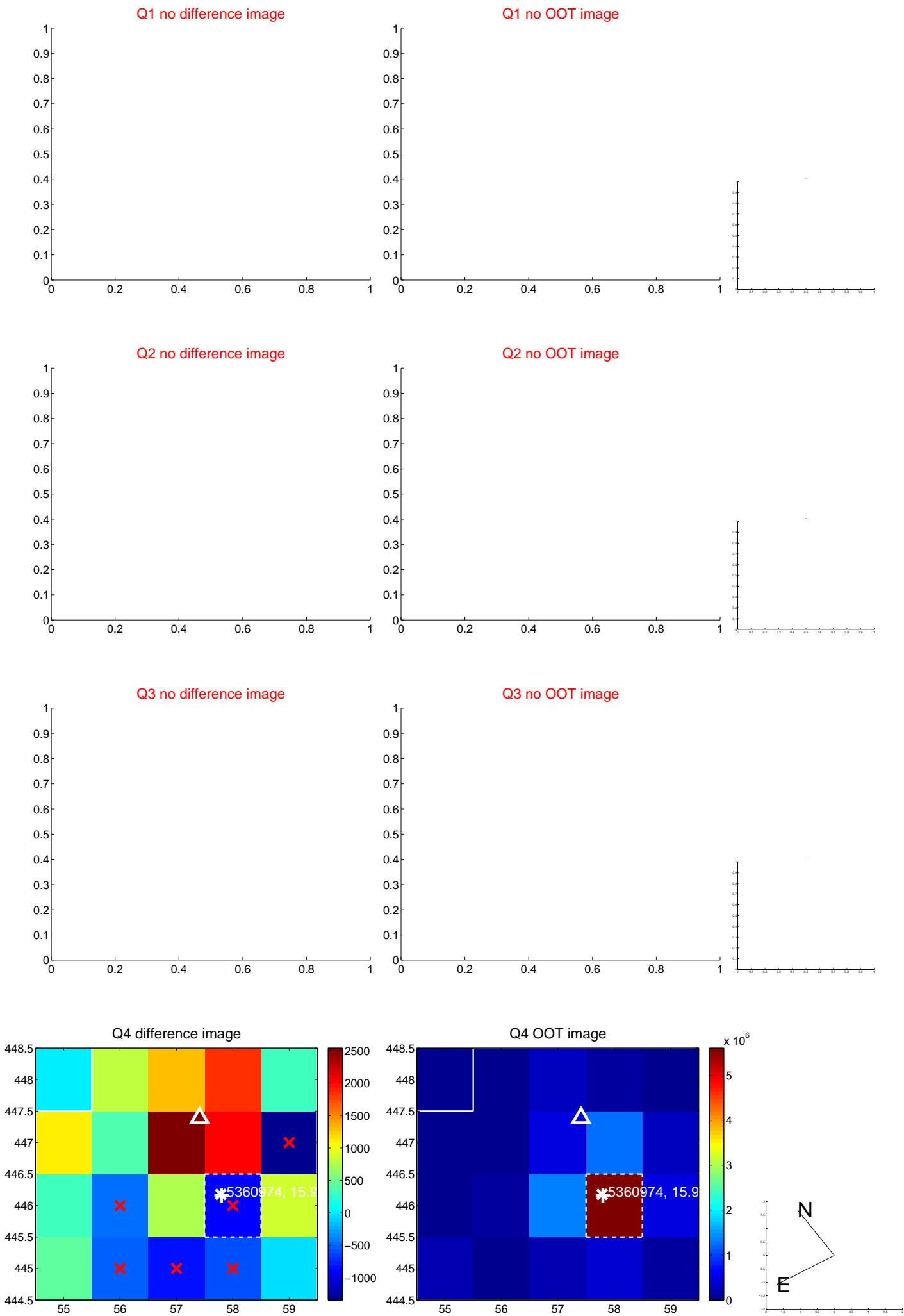
The direct PRF centroid is offset from the target star catalog position by about 0.12 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$5.064 \pm 0.661$	$7.67$	$-1.184 \pm 0.167$	$4.923 \pm 0.658$
PRF-fit source offset from KIC position	$5.000 \pm 0.708$	$7.06$	$-1.220 \pm 0.185$	$4.848 \pm 0.705$
photometric centroid source offset	$6.93 \pm 1.12$	$6.20$	$-0.79 \pm 1.13$	$6.89 \pm 1.12$

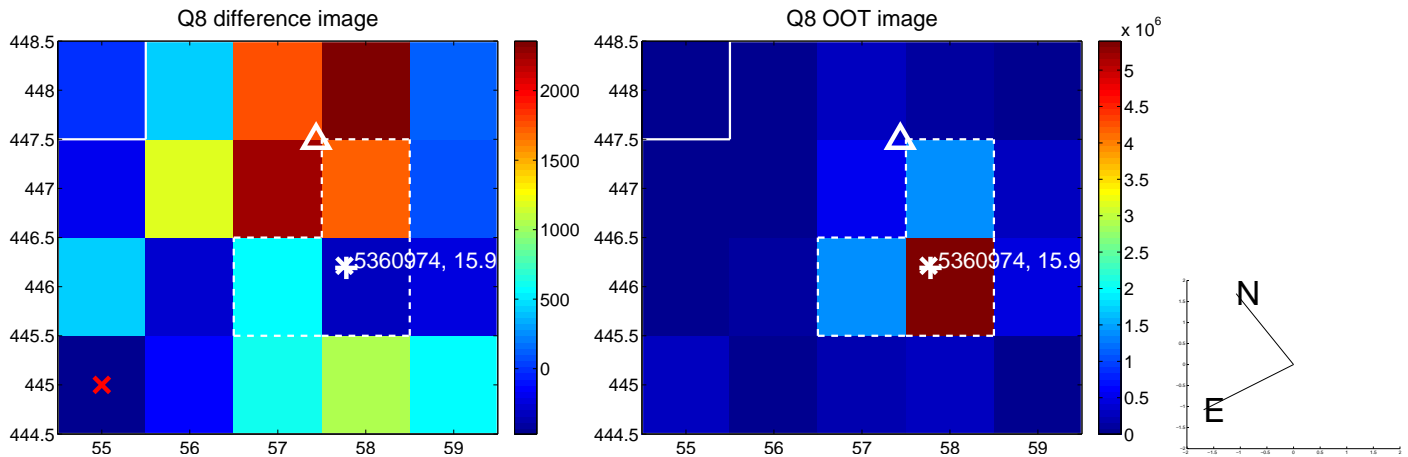
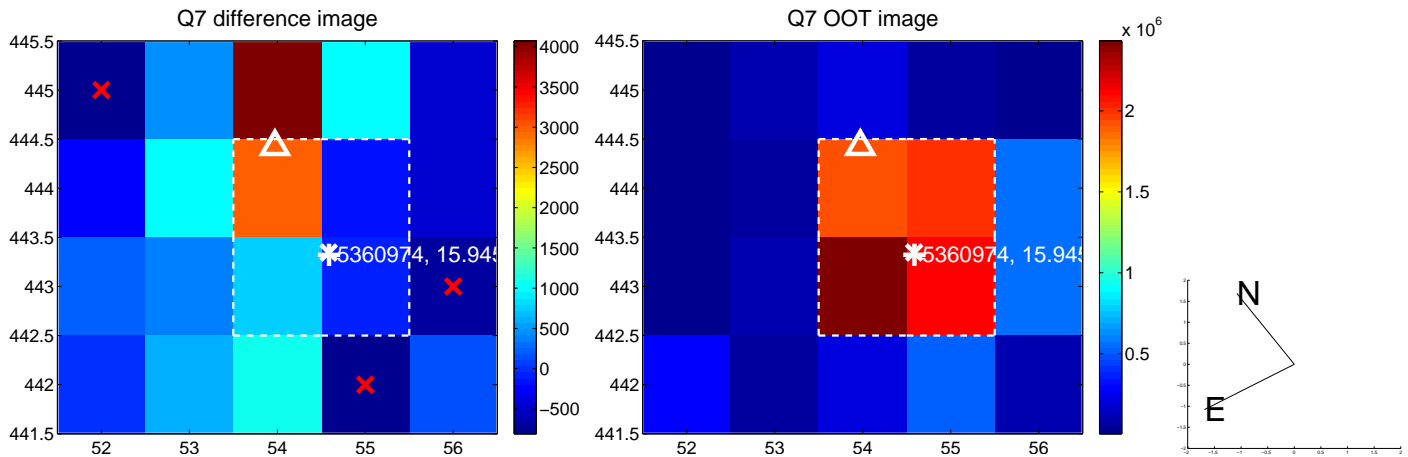
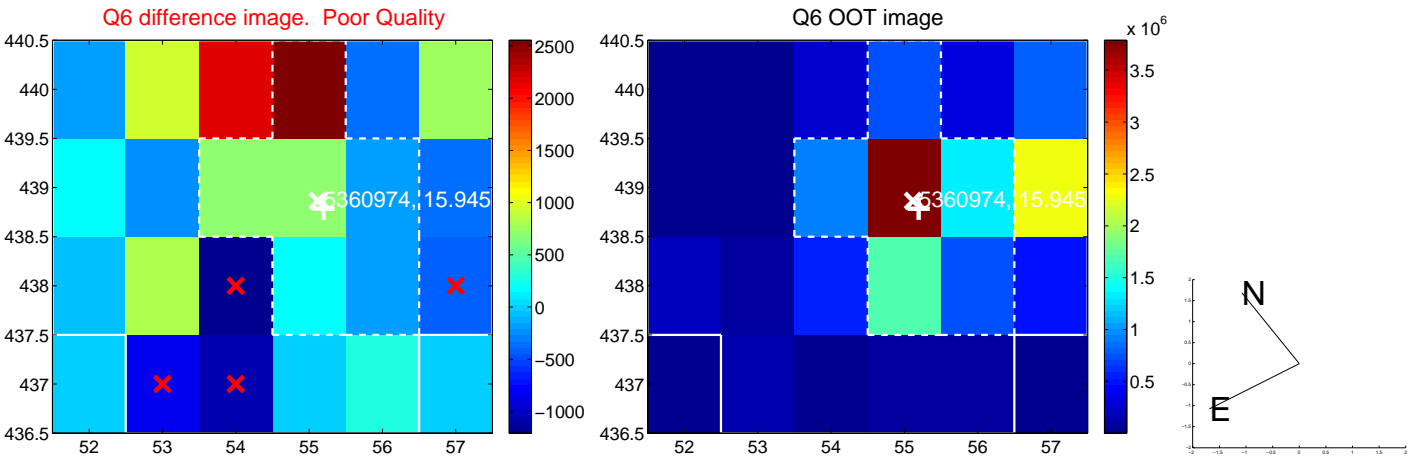
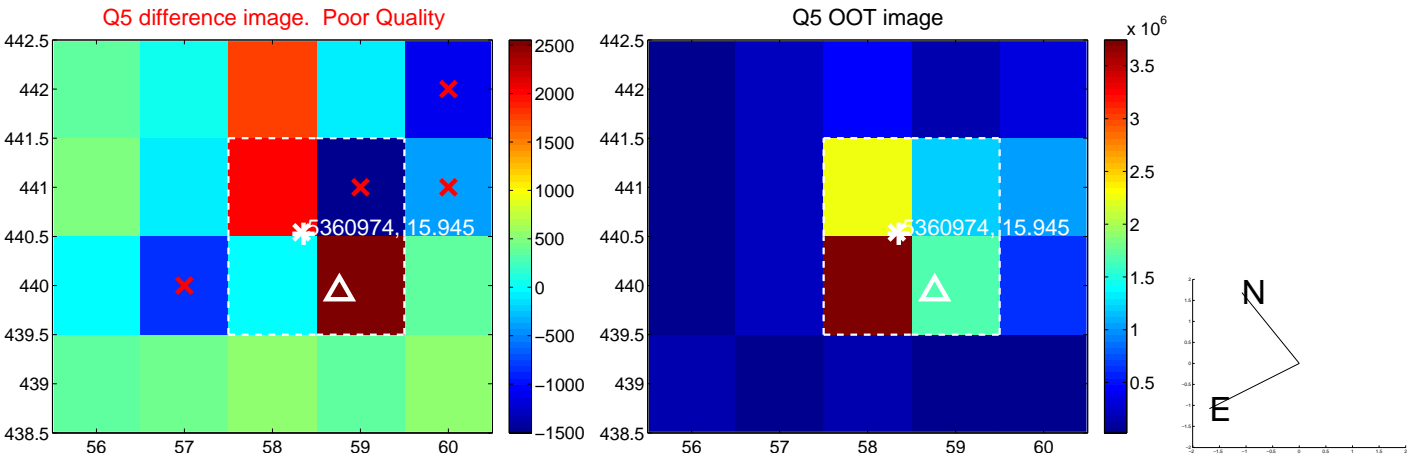


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets**; **Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

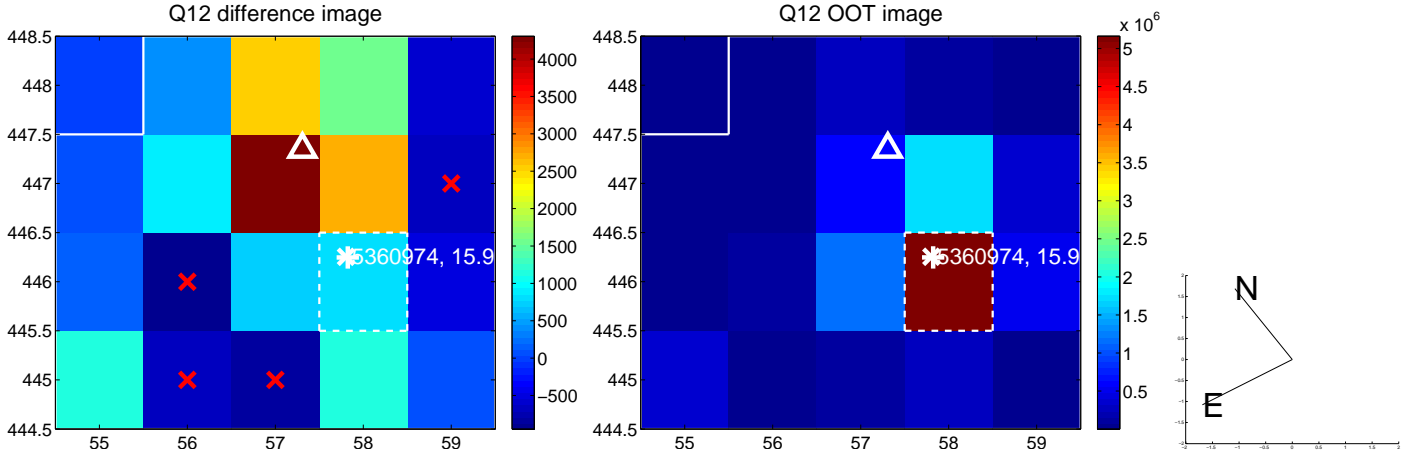
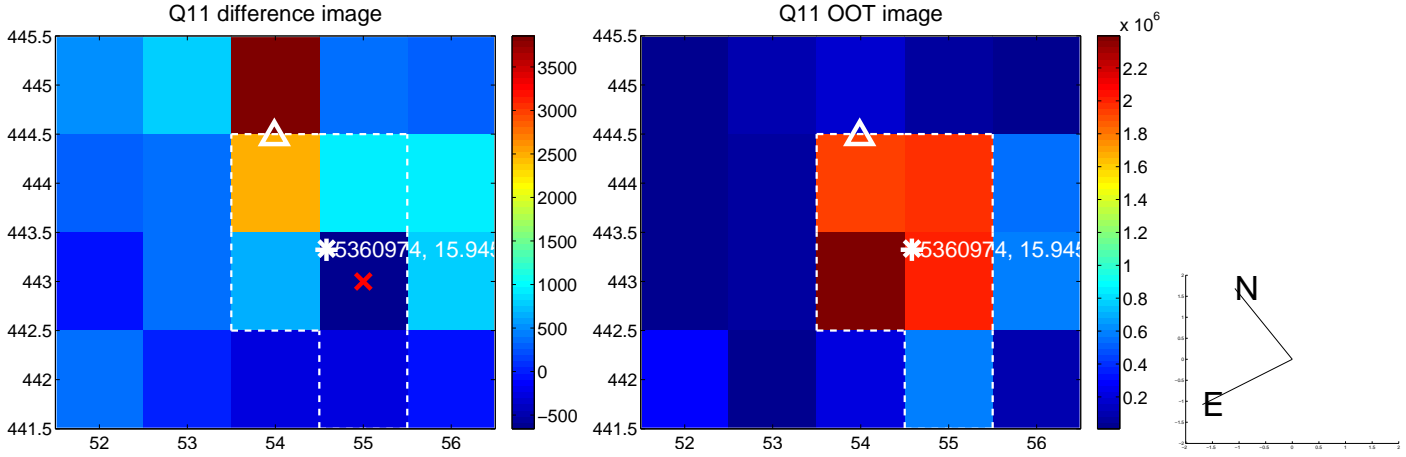
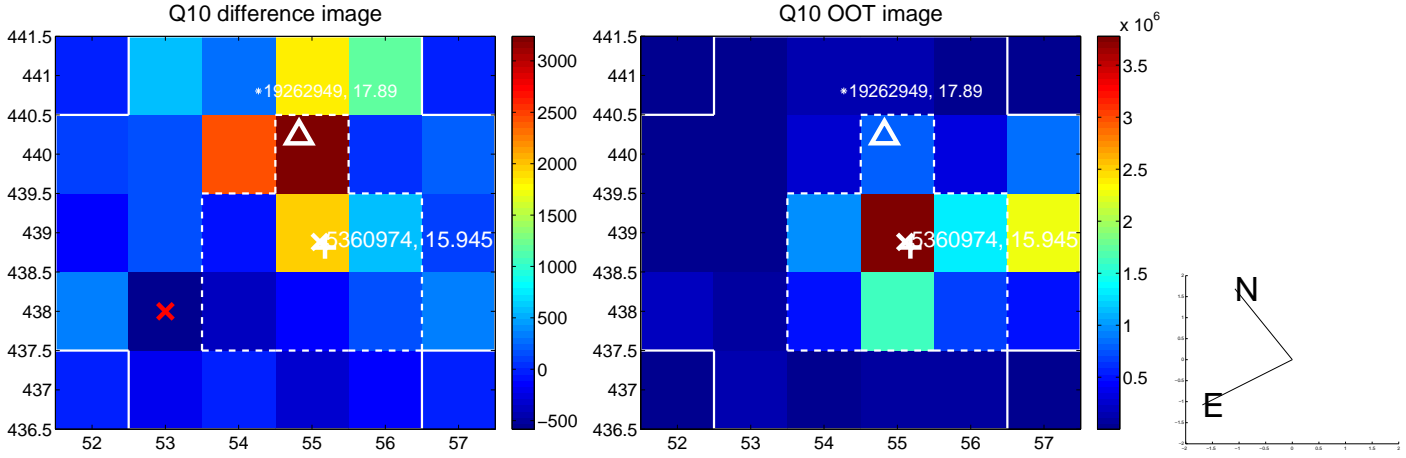
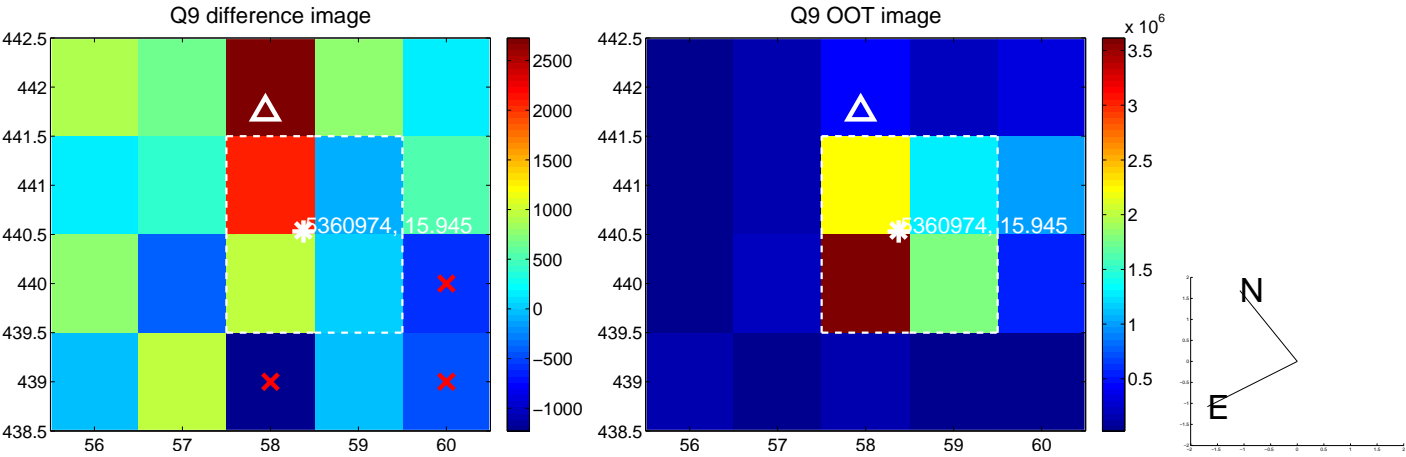
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



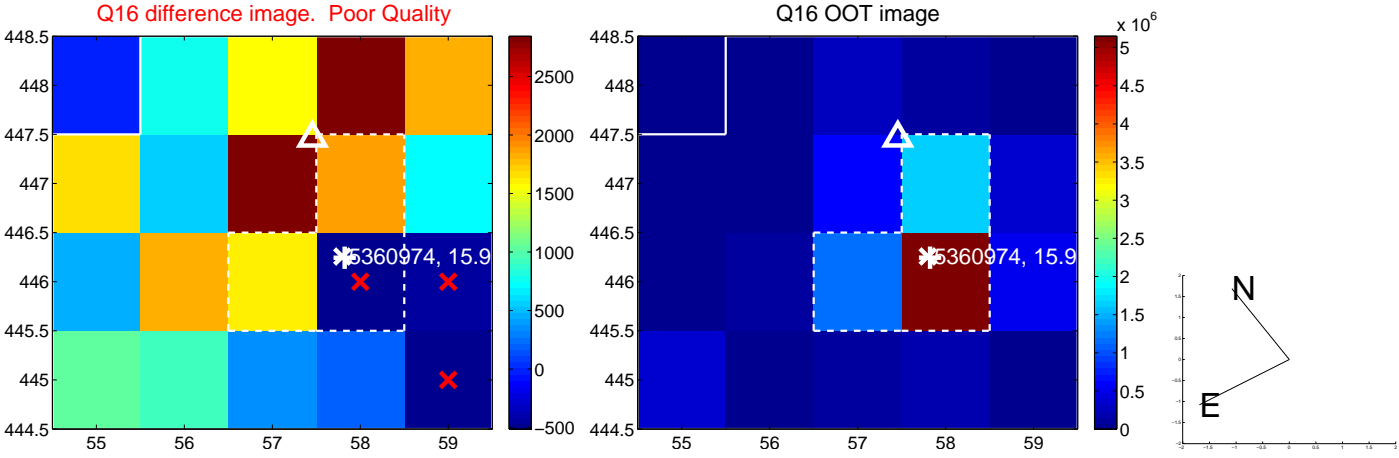
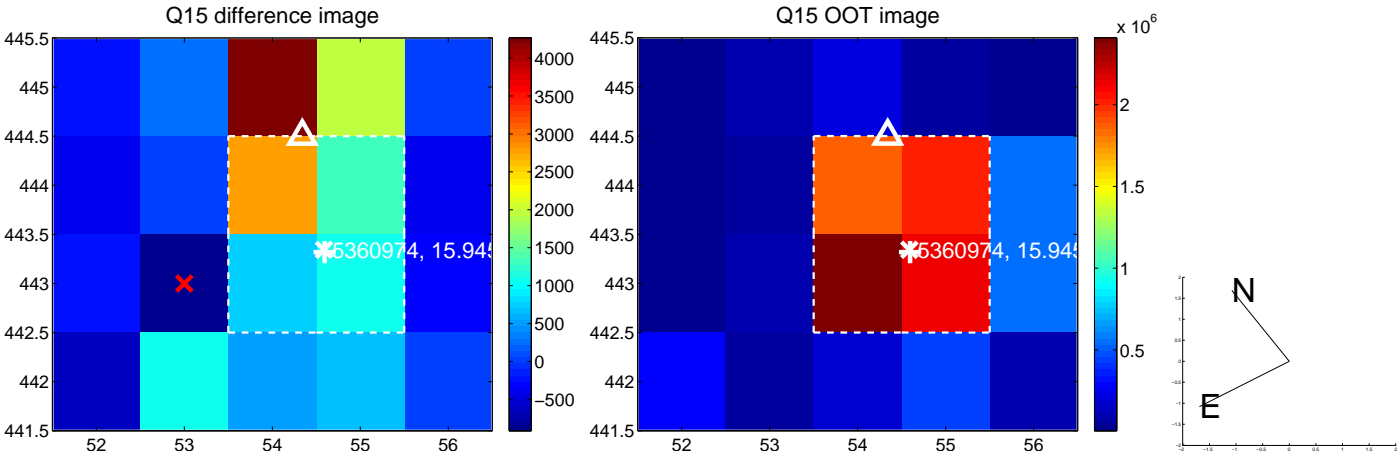
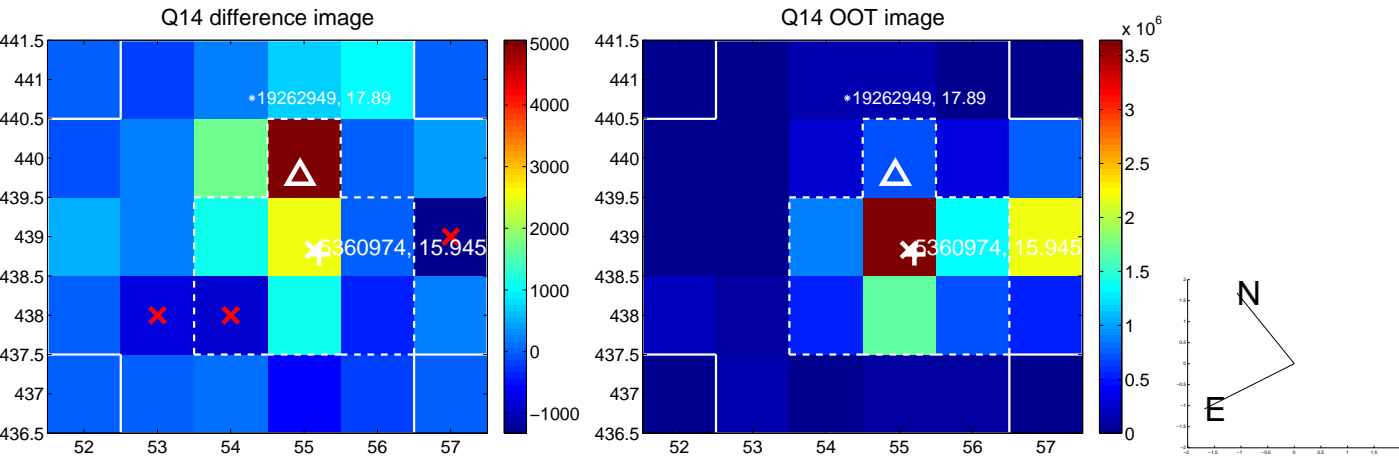
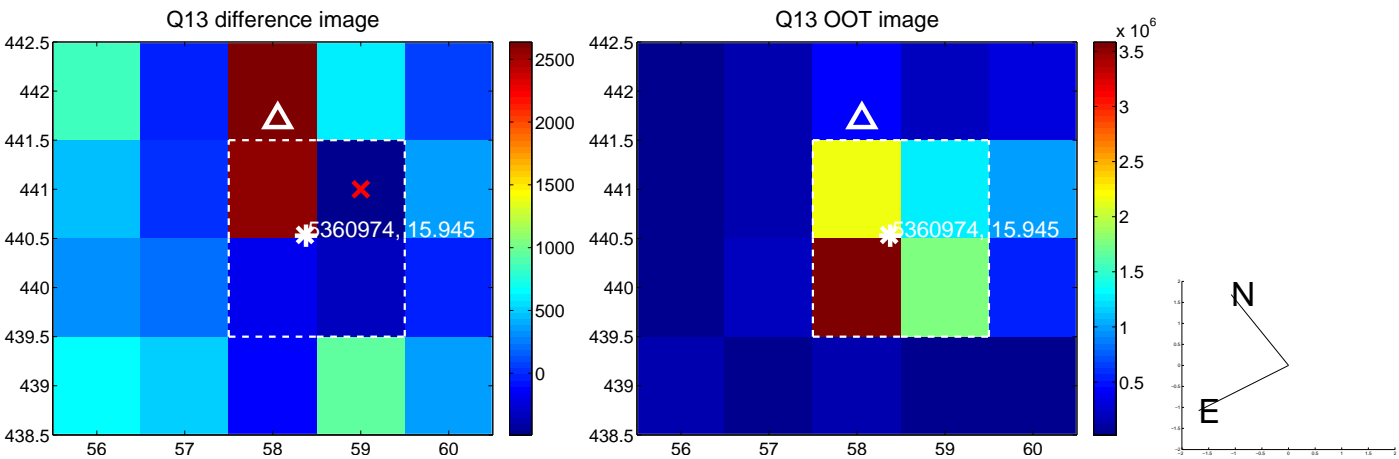
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



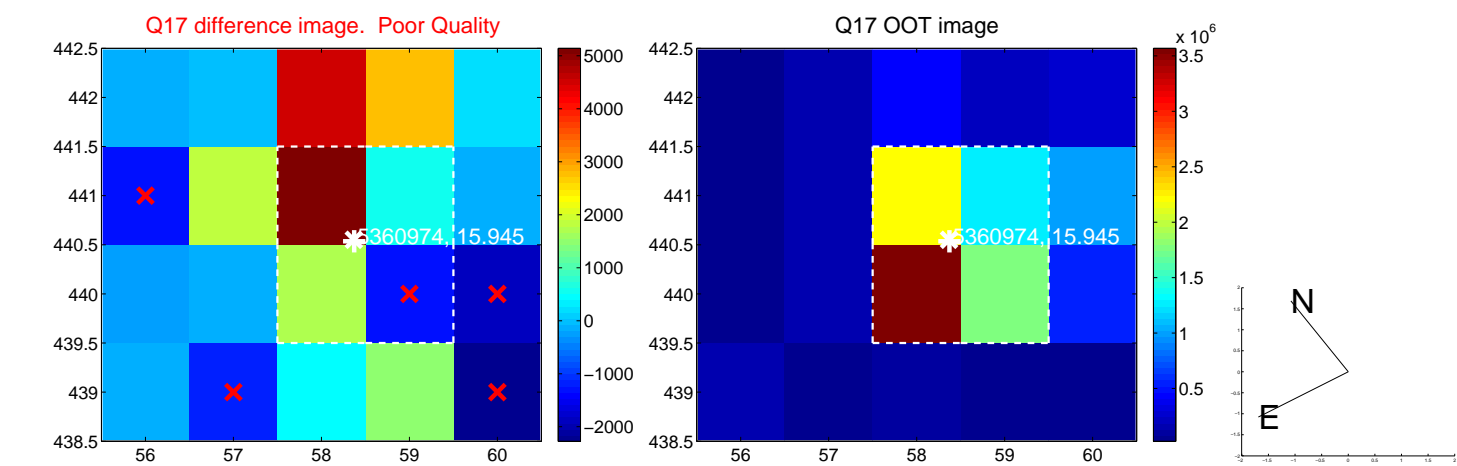
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



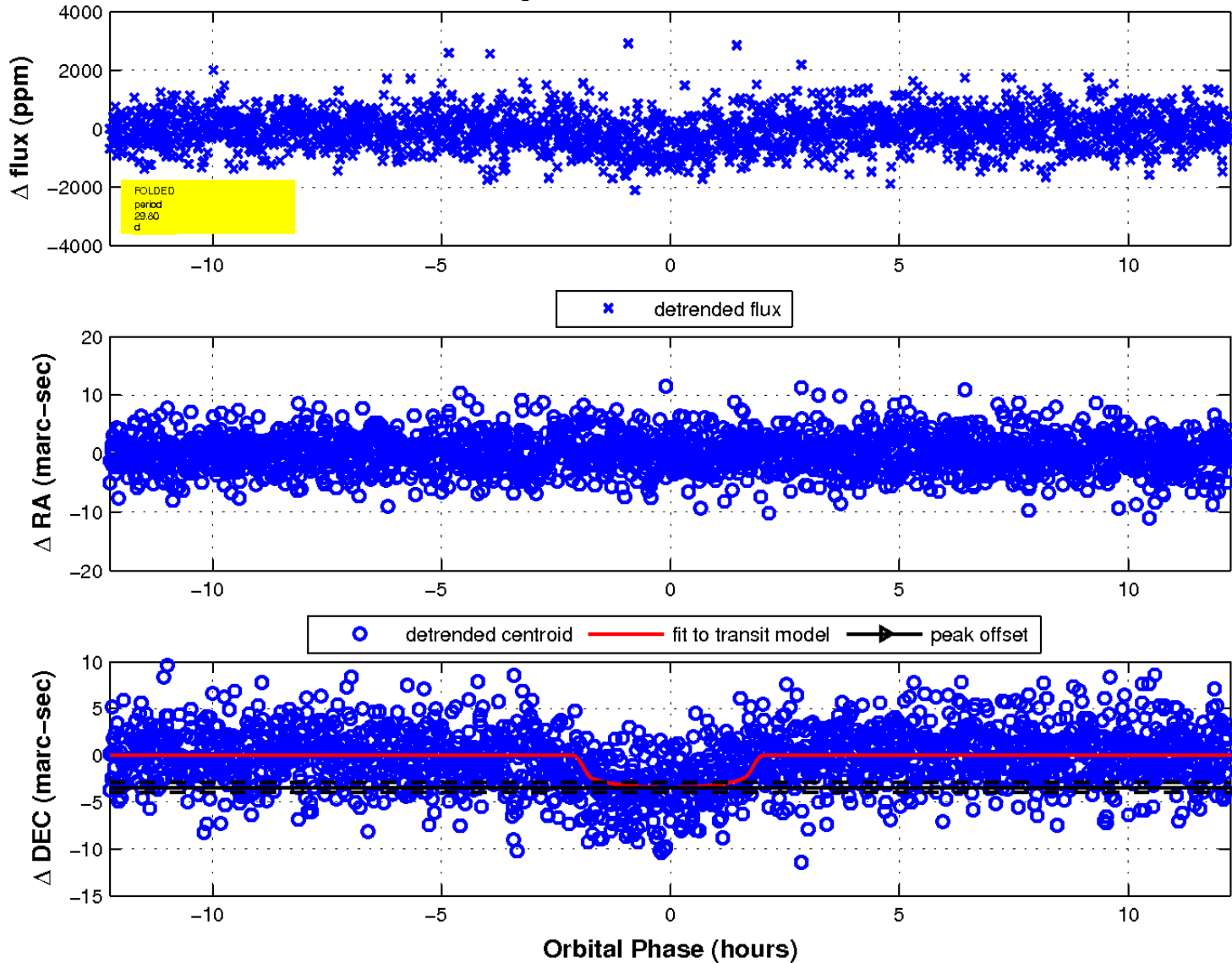
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



fluxWeightedCentroids, Planet 2 of 2





UKIRT Image

Declination

