

# KIC 004569930

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
004569930-01	OBS	No	406.773692	457.039663	804.6	2.529	15.8	7.9	2.17	6008	6.73	4.17
004569930-02	OBS	No	632.575405	263.952019	806.0	7.372	10.6	5.4	2.17	6008	6.31	2.32
004569930-03	OBS	No	426.732864	206.493021	661.6	5.108	17.2	4.9	2.17	6008	5.63	3.92
004569930-04	OBS	No	289.421898	263.435341	477.5	5.384	13.3	4.2	2.17	6008	5.13	6.57
004569930-05	OBS	No	528.993473	497.365064	363.0	0.564	13.0	2.8	2.17	6008	5.43	2.94
004569930-06	OBS	No	398.271945	434.694599	503.7	3.000	13.3	-1.0	2.17	6008	4.87	4.29

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004569930-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
004569930-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS
004569930-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
004569930-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS
004569930-05	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES_MARSHALL_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS—HALO_GHOST
004569930-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_NOFITS

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

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

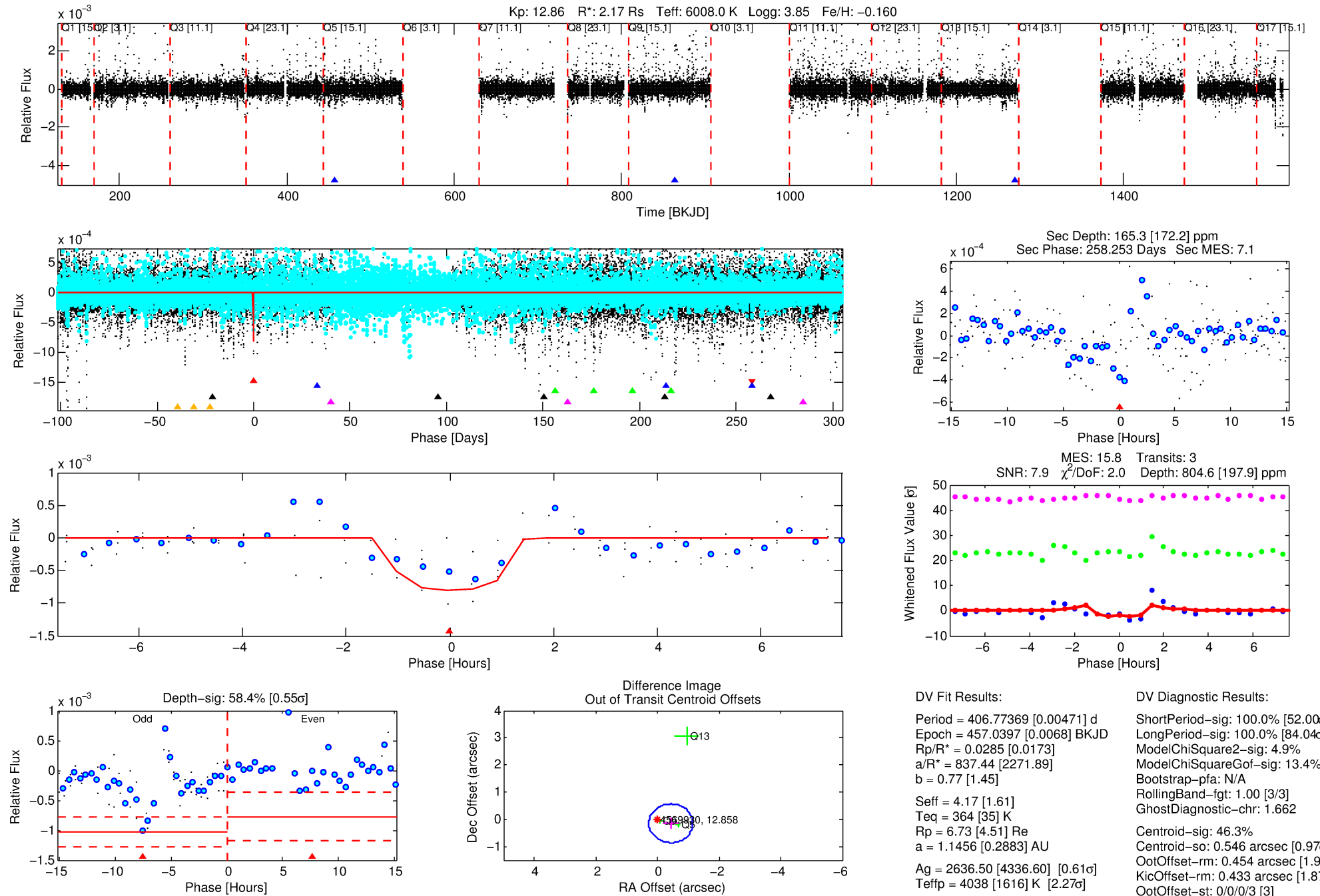
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 004569930-01

No Significant Match Found

# DV One-Page Summary

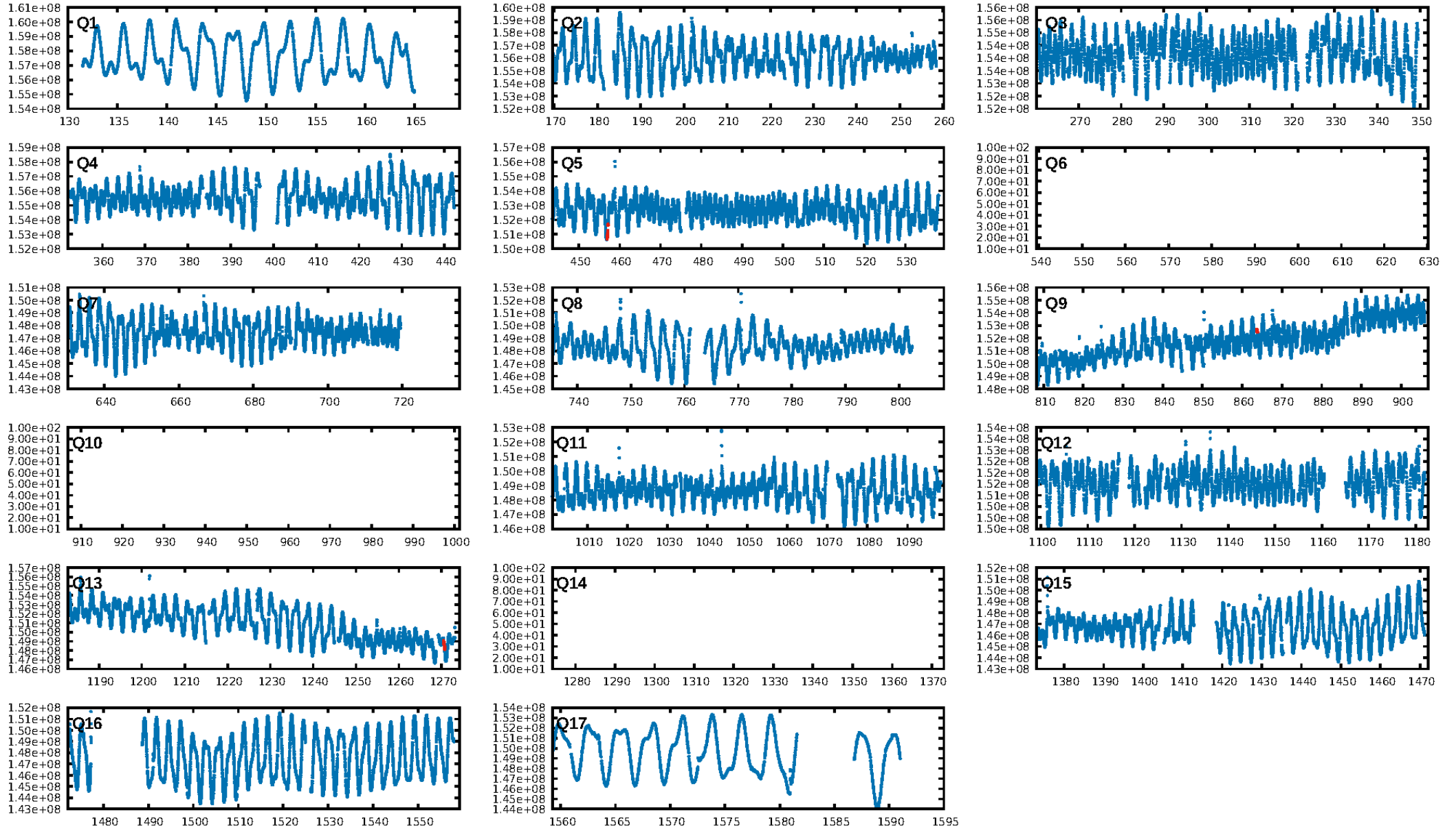
KIC: 4569930 Candidate: 1 of 6 Period: 406.774 d



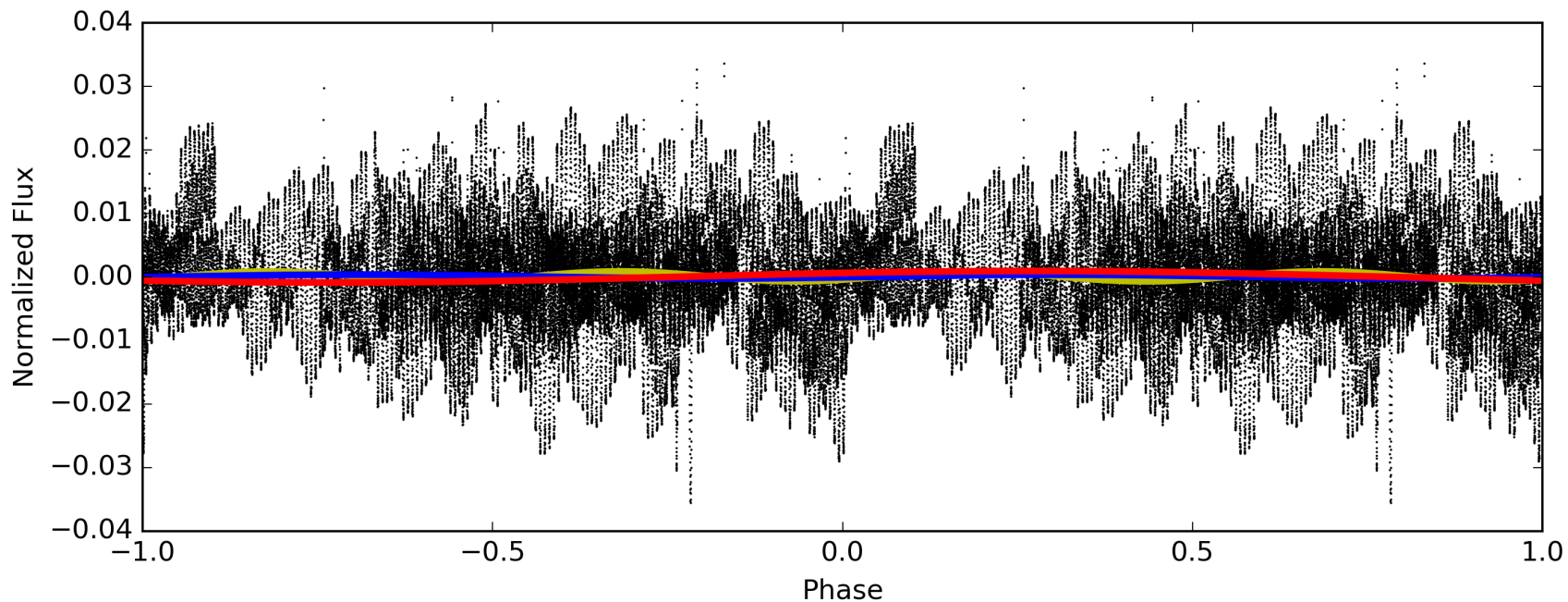
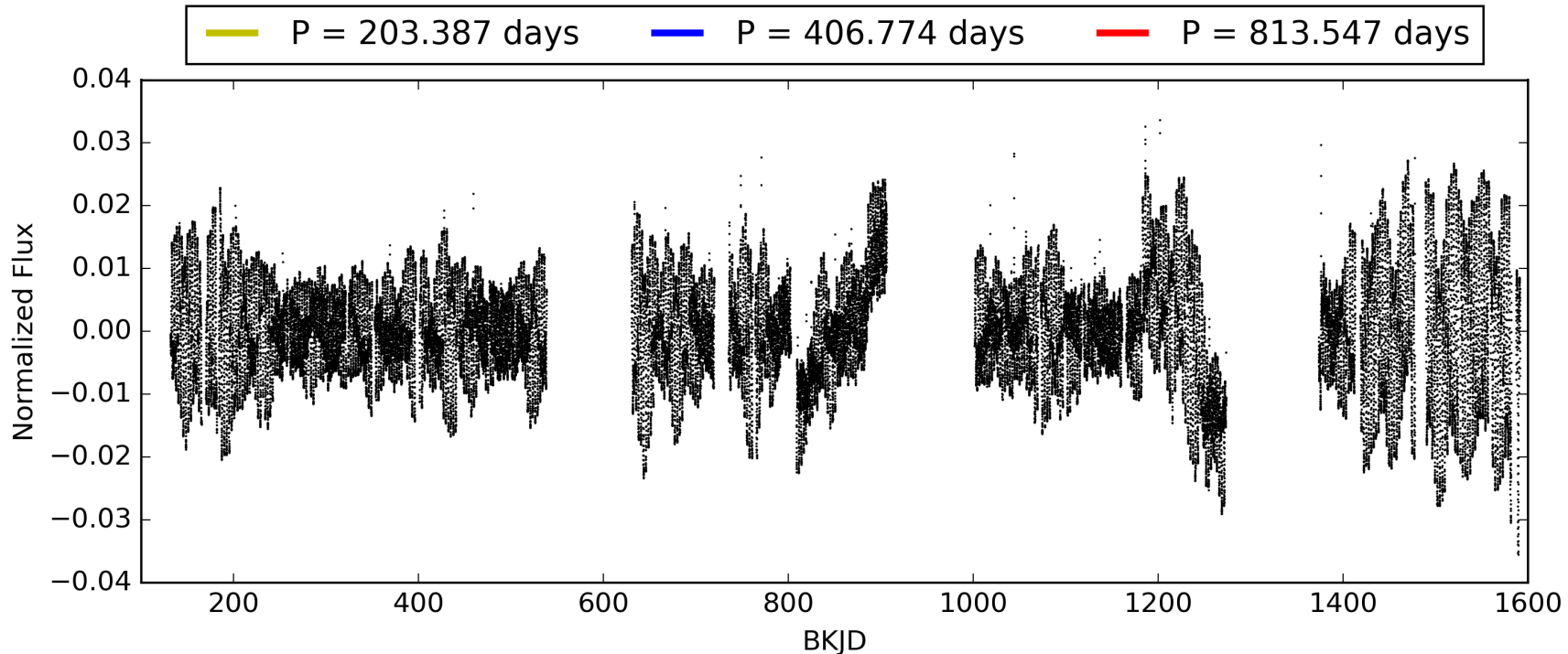
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 12:57:26 Z

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

# TCE 004569930-01, PDC Light Curves



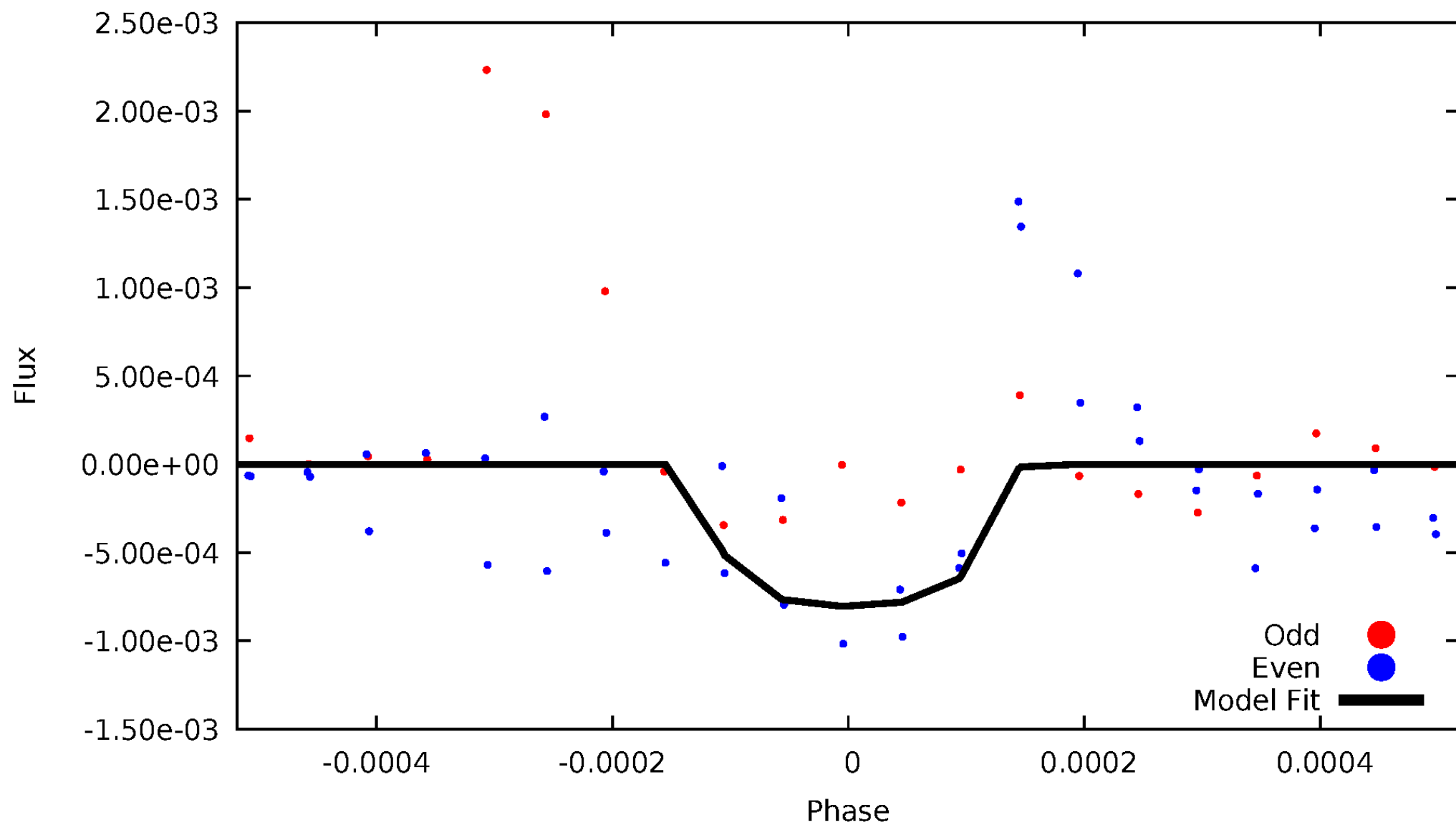
TCE 004569930-01





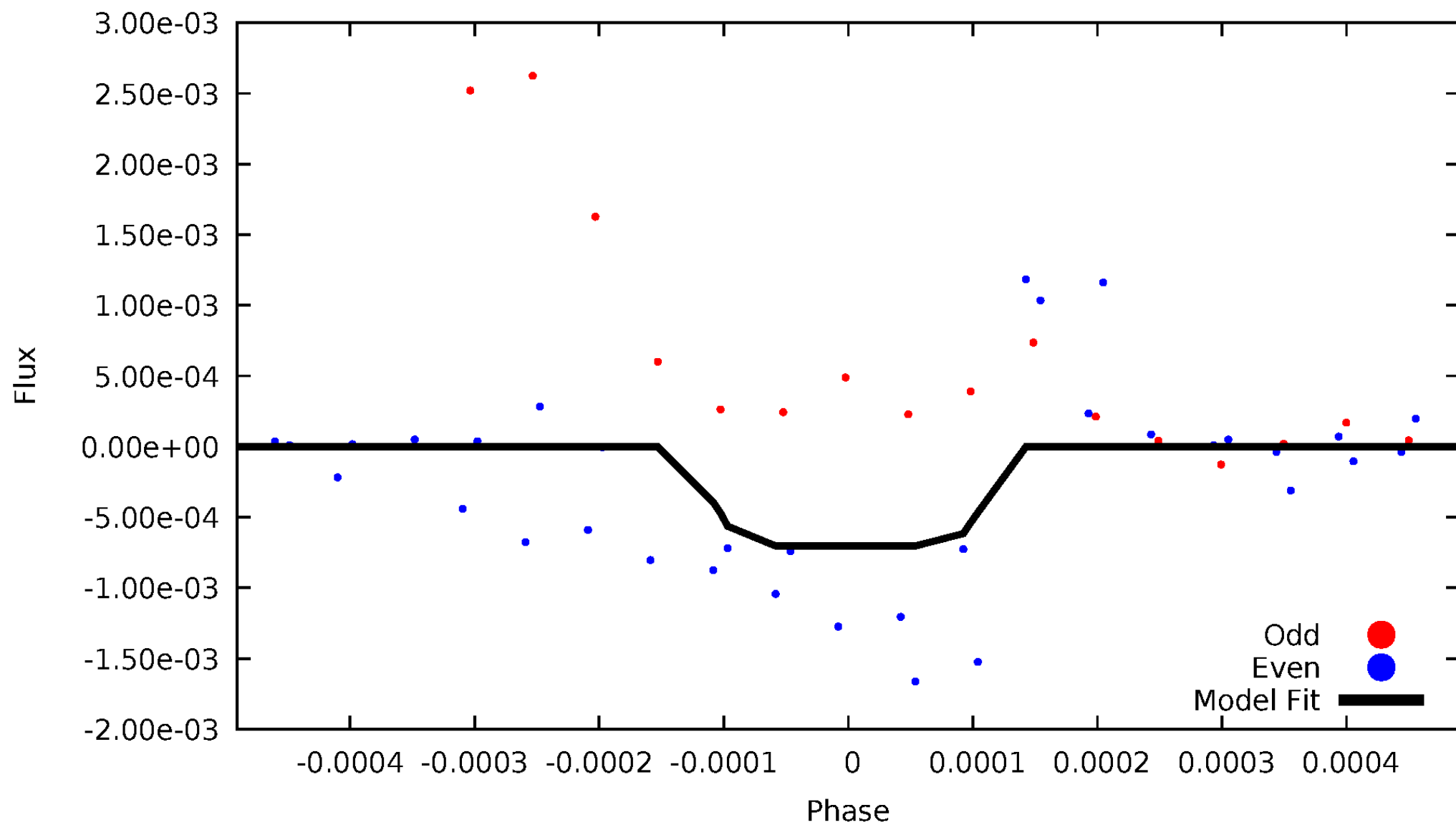
# DV Odd/Even

TCE 004569930-01



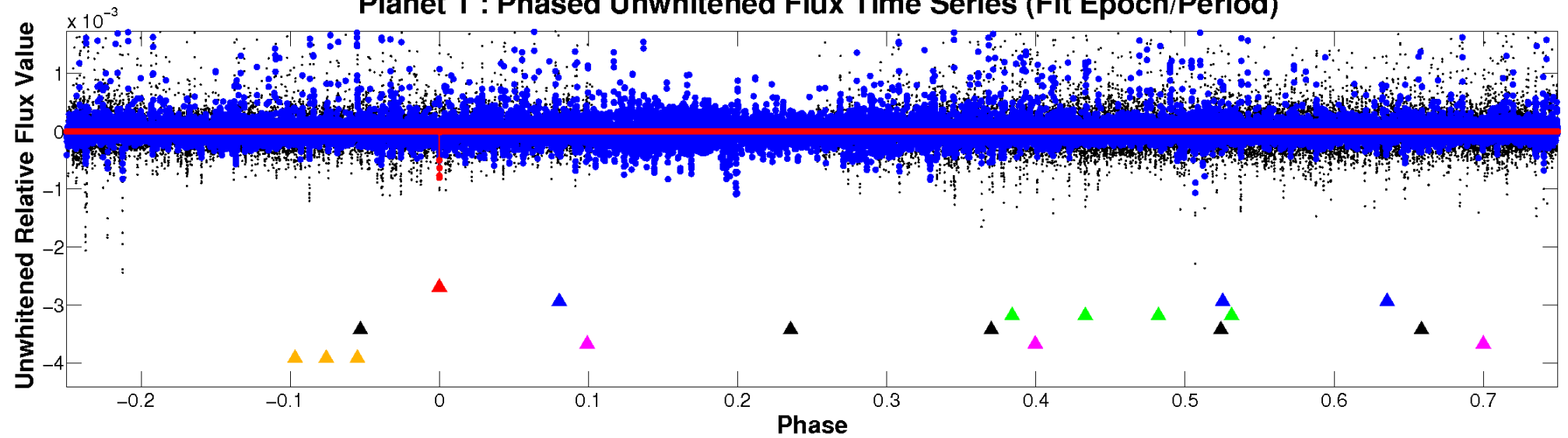
# ALT Odd/Even

TCE 004569930-01

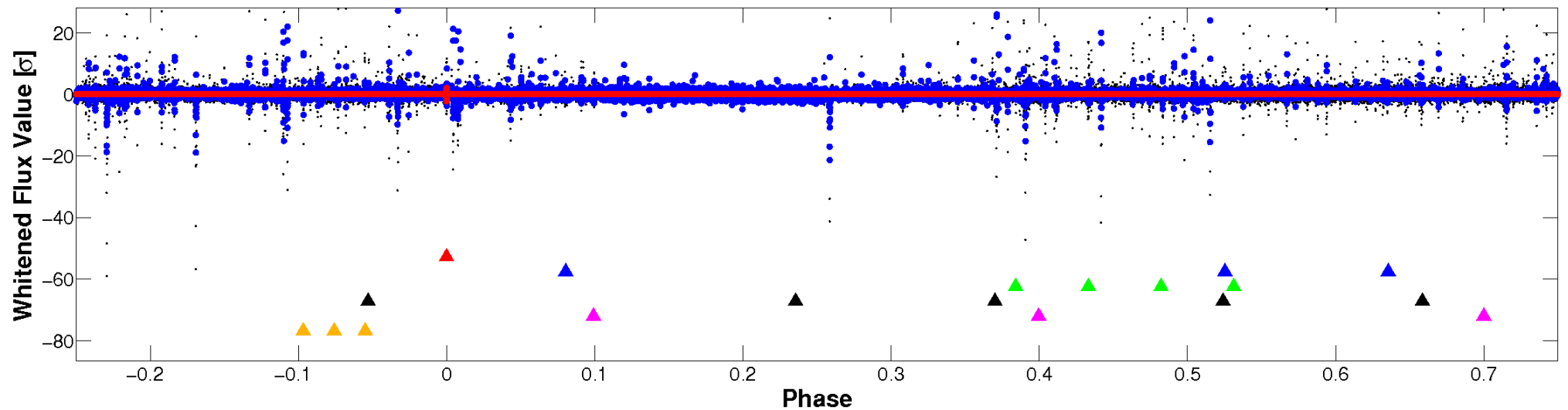


# Non-Whitened Vs. Whitened Light Curve

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

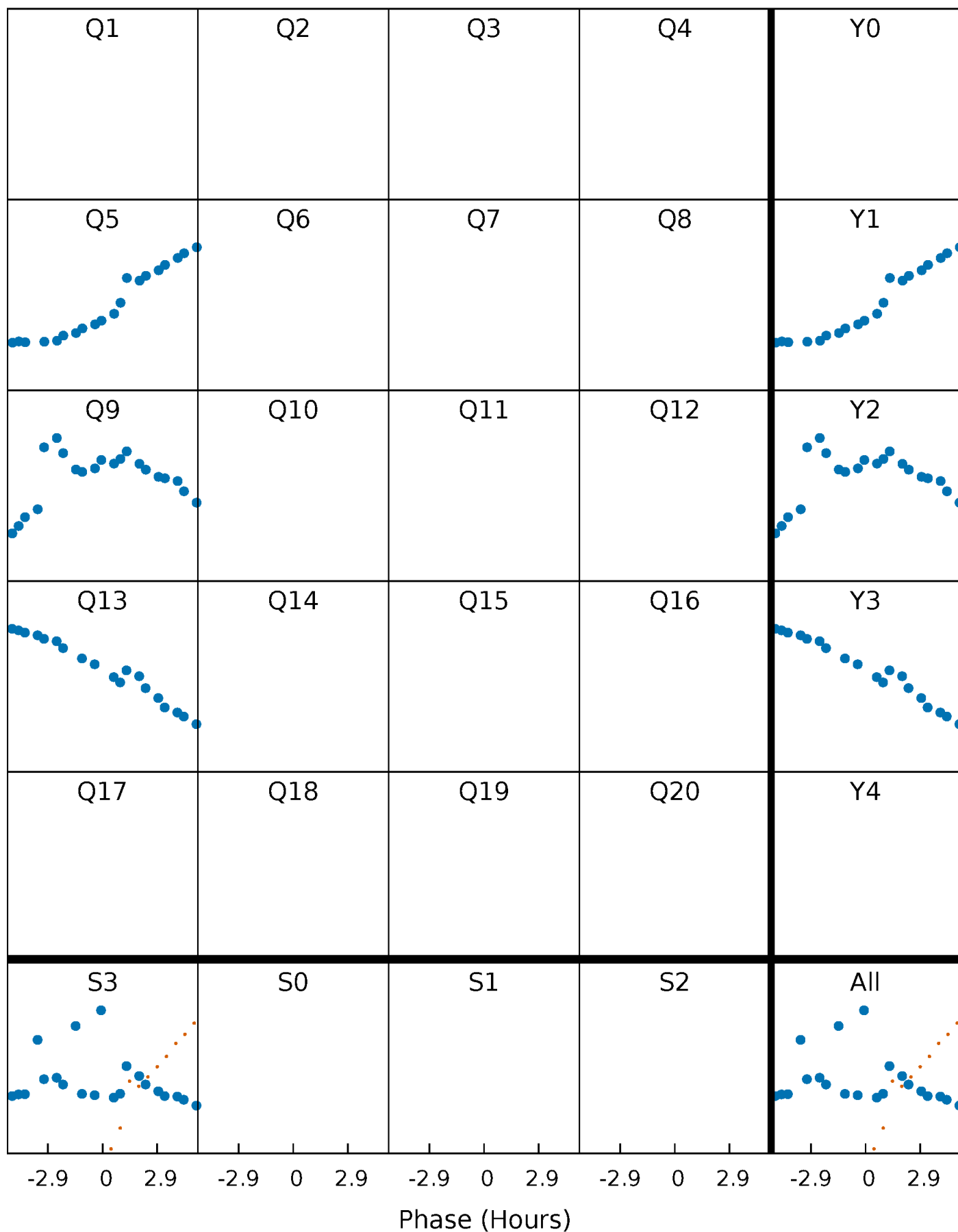


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



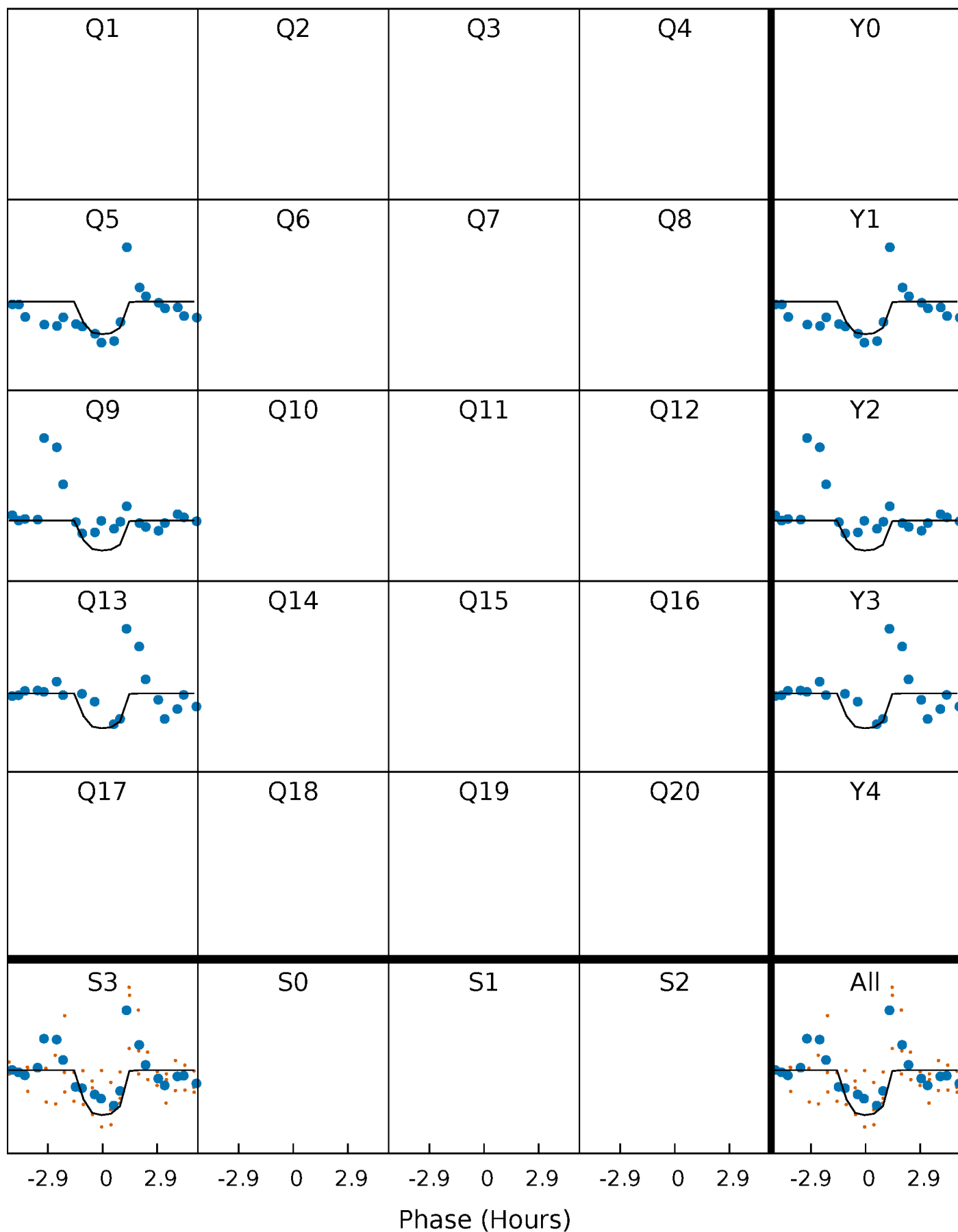
# PDC Quarter-Phased Transit Curves

TCE 004569930-01 P=406.773692 Days  $T_0=457.039663$  (BKJD)



# DV Quarter-Phased Transit Curves

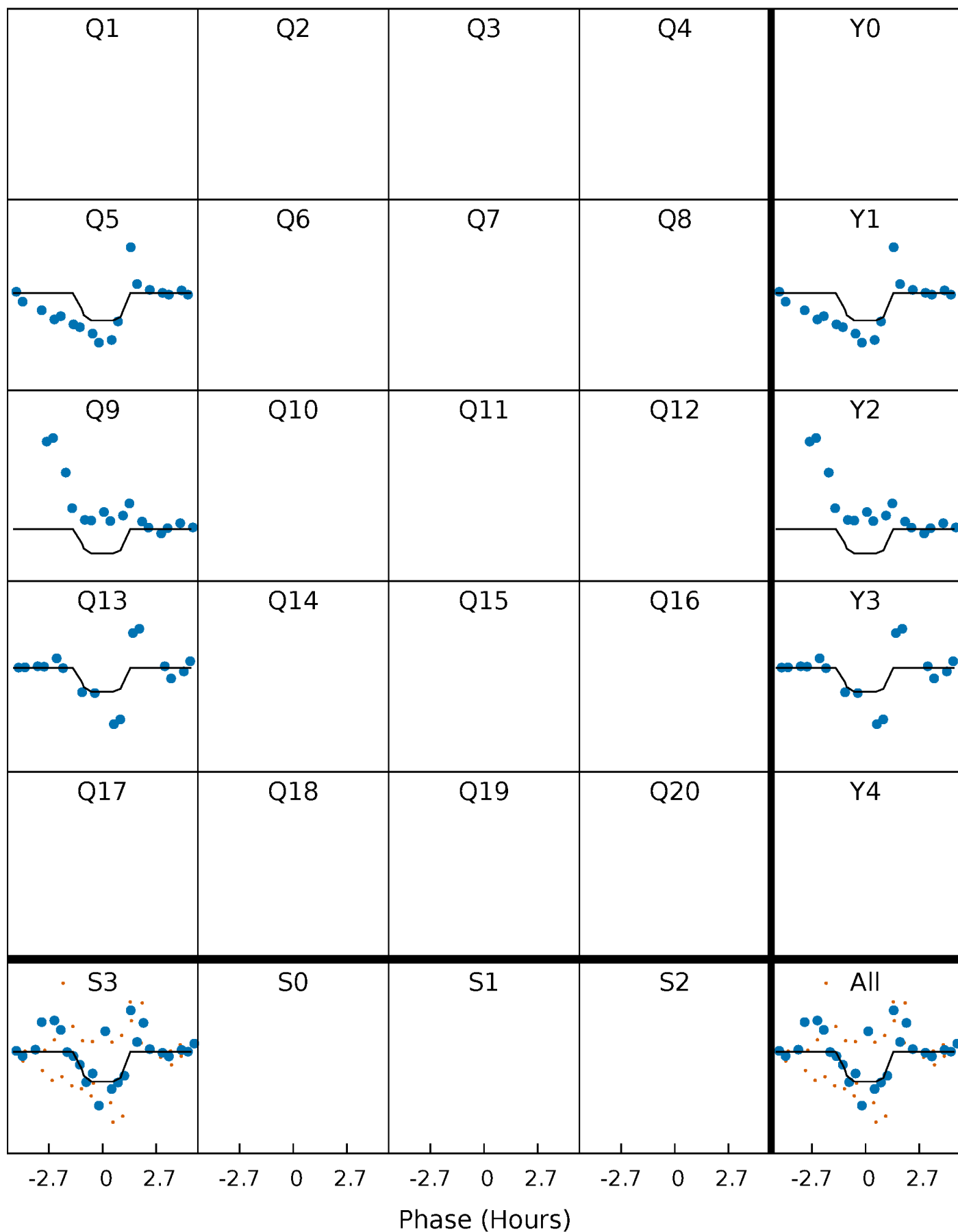
TCE 004569930-01     $P=406.773692$  Days     $T_0=457.039663$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

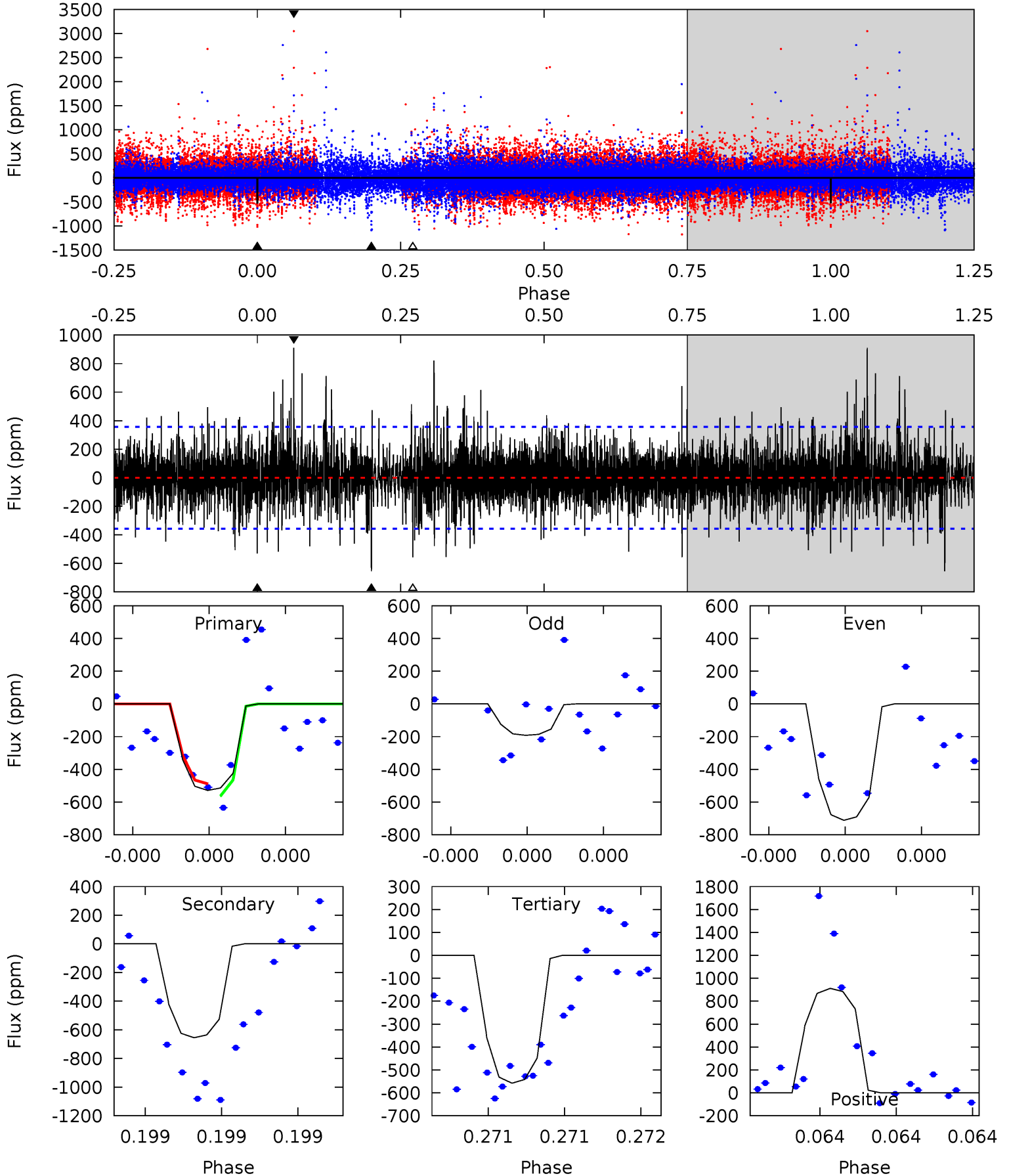
TCE 004569930-01 P=406.770879 Days  $T_0=457.041213$  (BKJD)



# DV Model-Shift Uniqueness Test

004569930-01, P = 406.773692 Days, E = 50.265971 Days

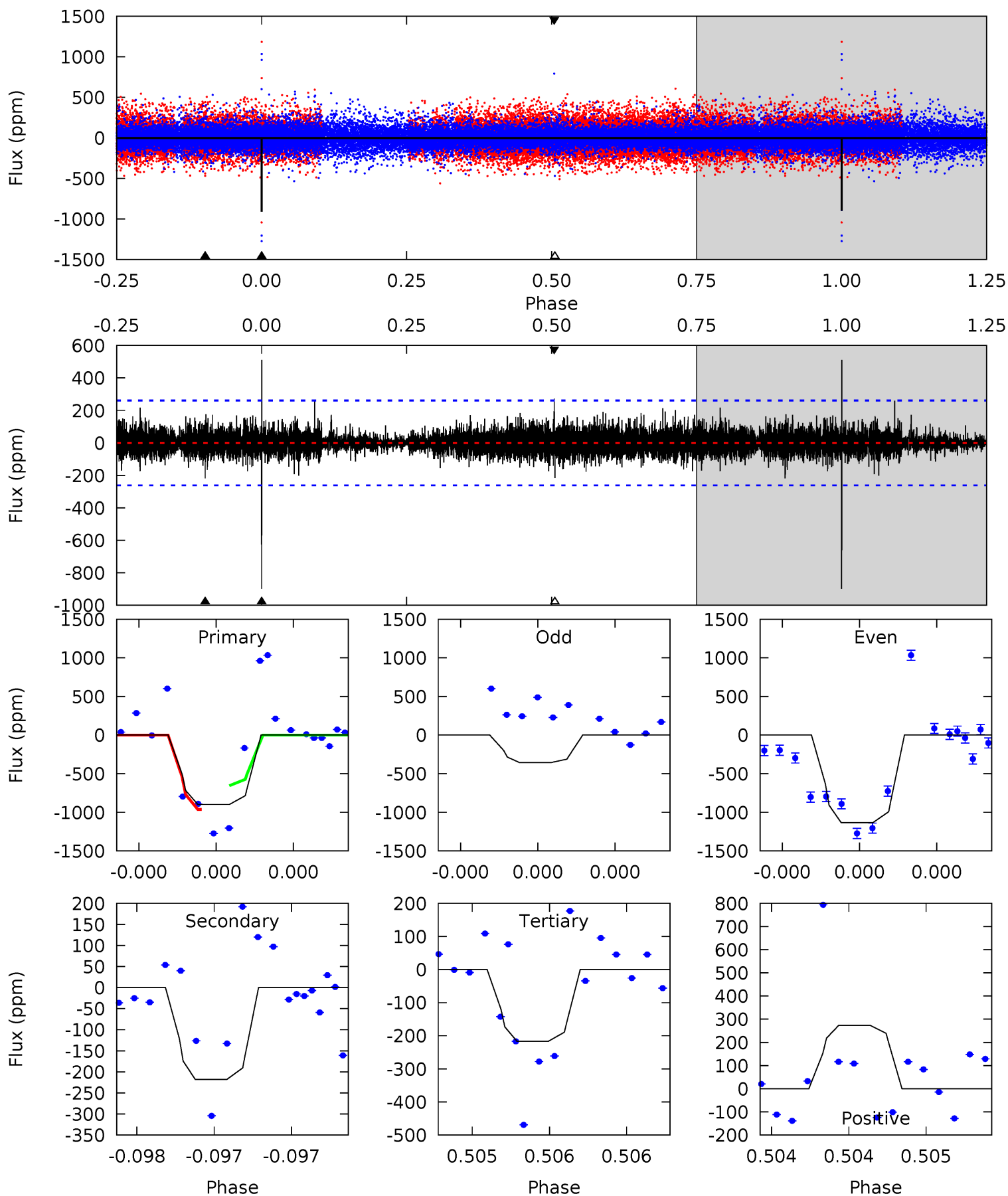
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.38	10.4	8.83	14.4	5.66	3.61	1.94	-0.46	-6.05	1.54	-4.06	2.28	1.13	0.58	0.59



# Alt Model-Shift Uniqueness Test

004569930-01, P = 406.770879 Days, E = 50.270334 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
19.6	4.76	4.72	5.95	5.70	3.67	0.97	14.9	13.6	0.03	-1.20	9.35	0.61	0.36	0



### Stellar Parameters For KIC 004569930

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$6008^{+81}_{-81}$	$3.850^{+0.217}_{-0.093}$	$-0.160^{+0.150}_{-0.150}$	$2.166^{+0.330}_{-0.613}$	$1.211^{+0.125}_{-0.172}$	$0.168^{+0.217}_{-0.050}$
	+1%/-1%	+6%/-2%	+94%/-94%	+15%/-28%	+10%/-14%	+129%/-30%
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 004569930-01 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-655 \pm 63$	$6.78^{+3.87}_{-3.81}$	$505^{+25}_{-31}$	$5590^{+3260}_{-952}$	$10558^{+43537}_{-6326}$
Alt.	$-218 \pm 46$	$6.25^{+3.80}_{-3.32}$	$505^{+22}_{-36}$	$4553^{+1797}_{-693}$	$3966^{+13533}_{-2489}$

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

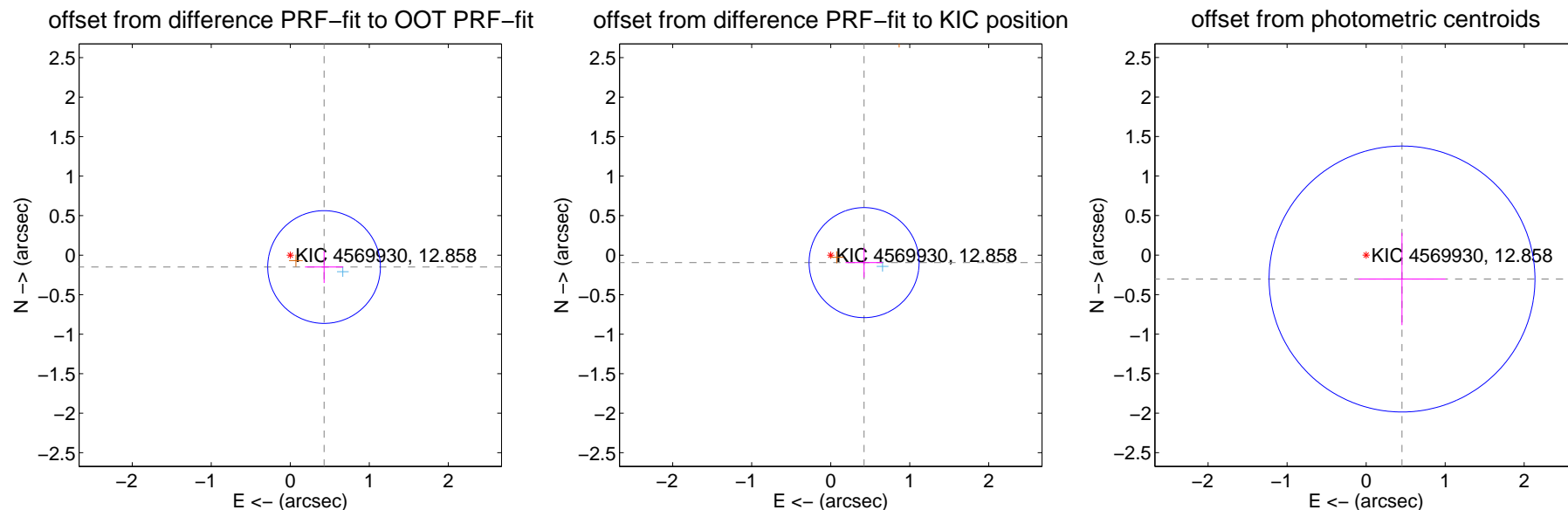
## DV Centroid Data

Supplemental centroid analysis for 004569930-01. Kepler magnitude: 12.86. Transit SNR 7.88

There are 1 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.13 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.454 \pm 0.238$	1.91	$-0.428 \pm 0.242$	$-0.150 \pm 0.202$
PRF-fit source offset from KIC position	$0.433 \pm 0.232$	1.87	$-0.423 \pm 0.234$	$-0.095 \pm 0.189$
photometric centroid source offset	$0.55 \pm 0.56$	0.97	$-0.45 \pm 0.55$	$-0.30 \pm 0.58$



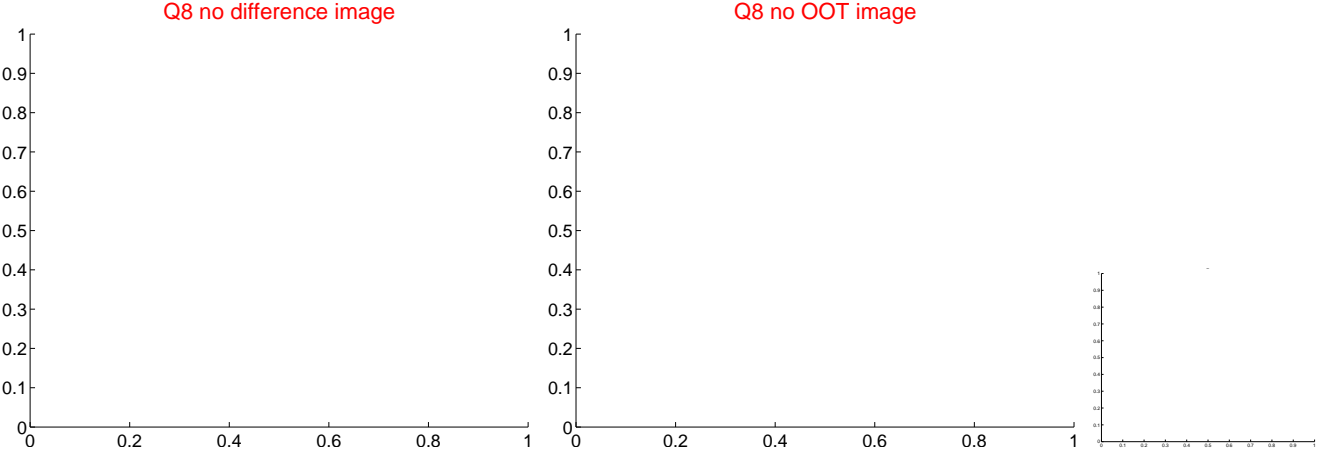
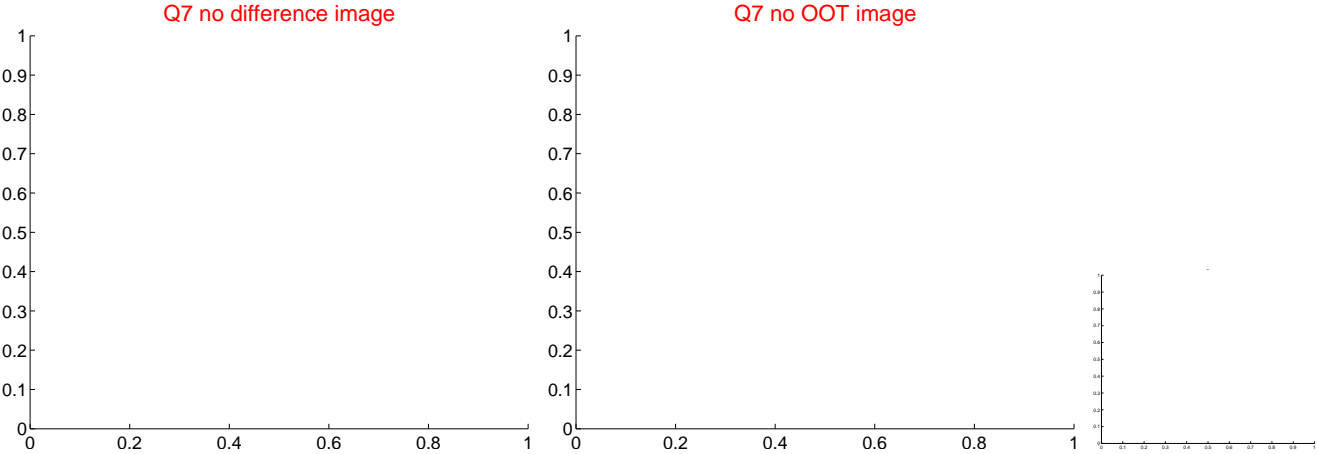
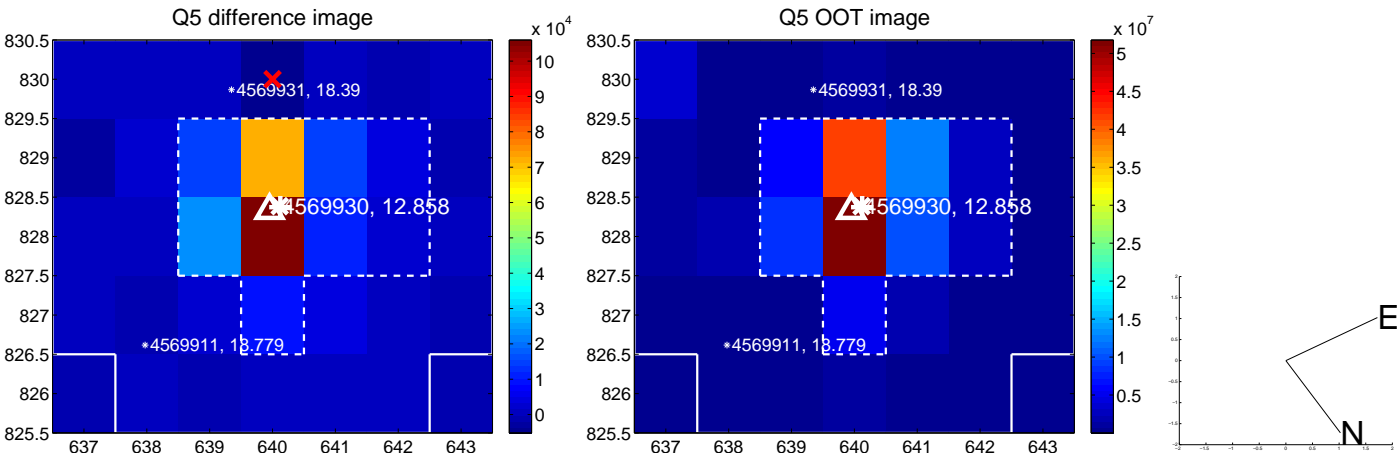
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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



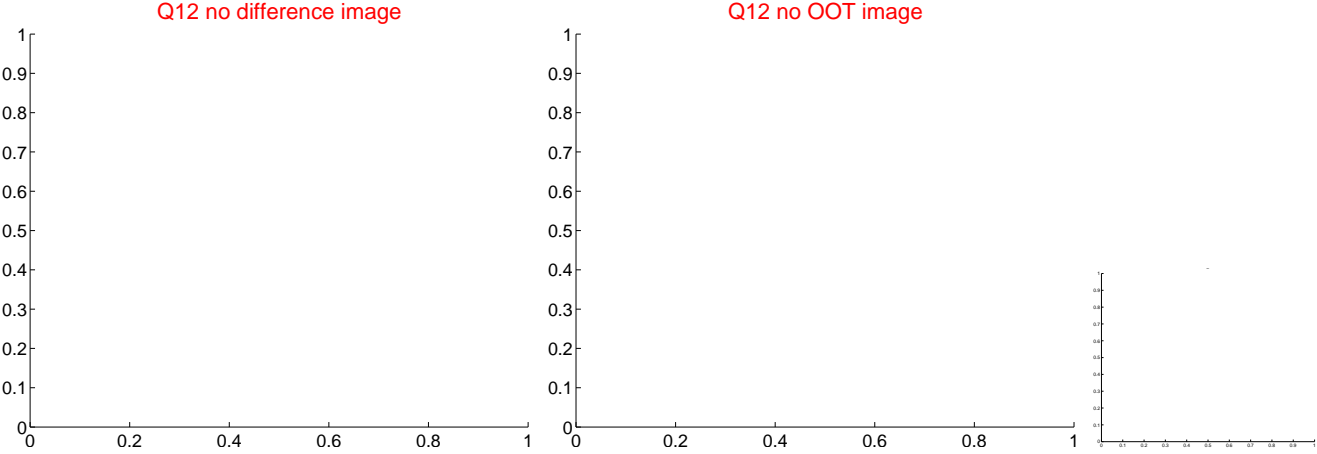
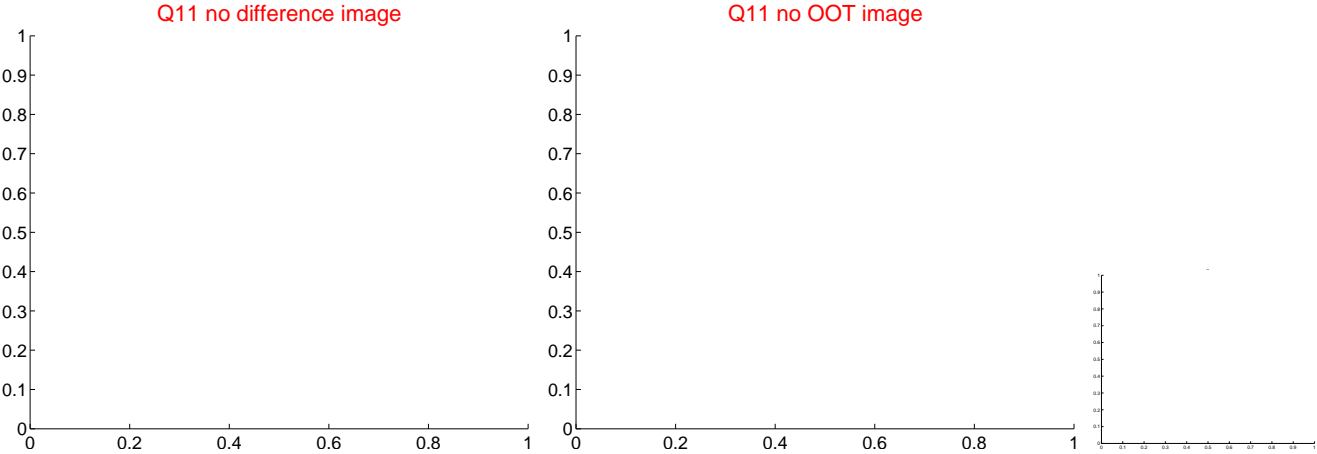
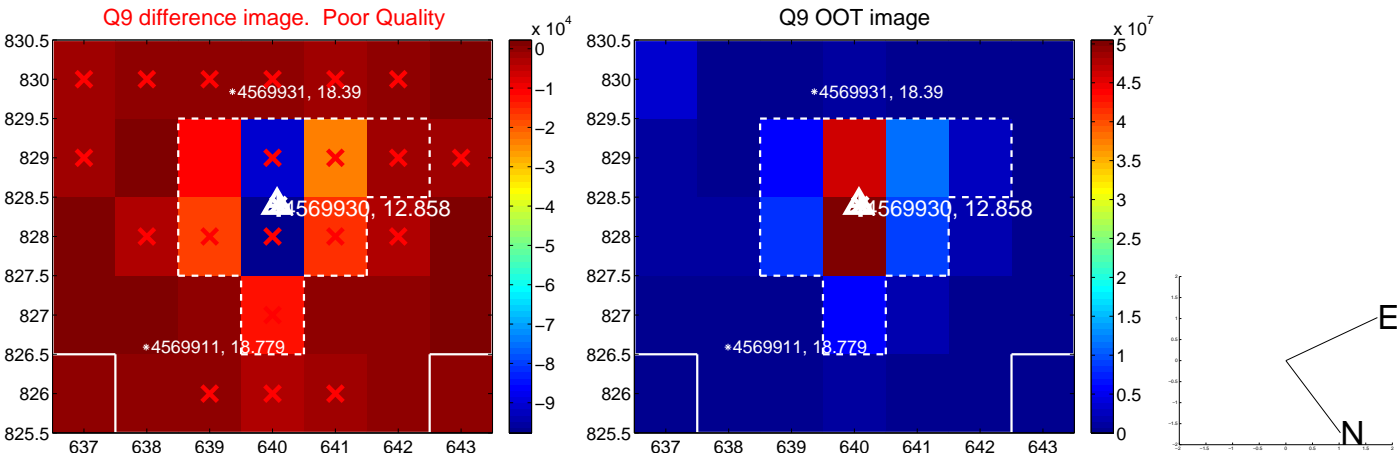
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



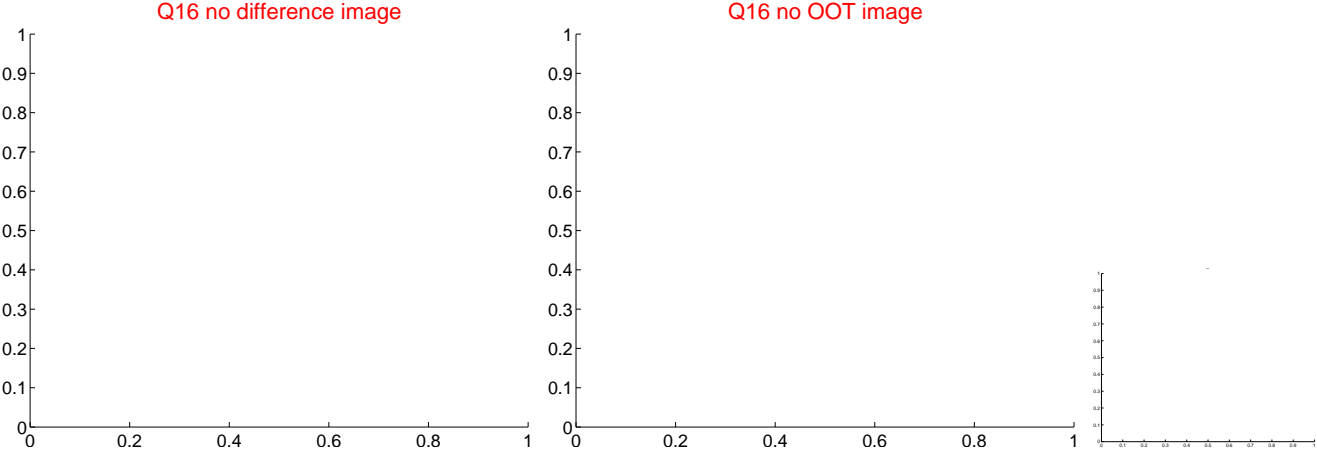
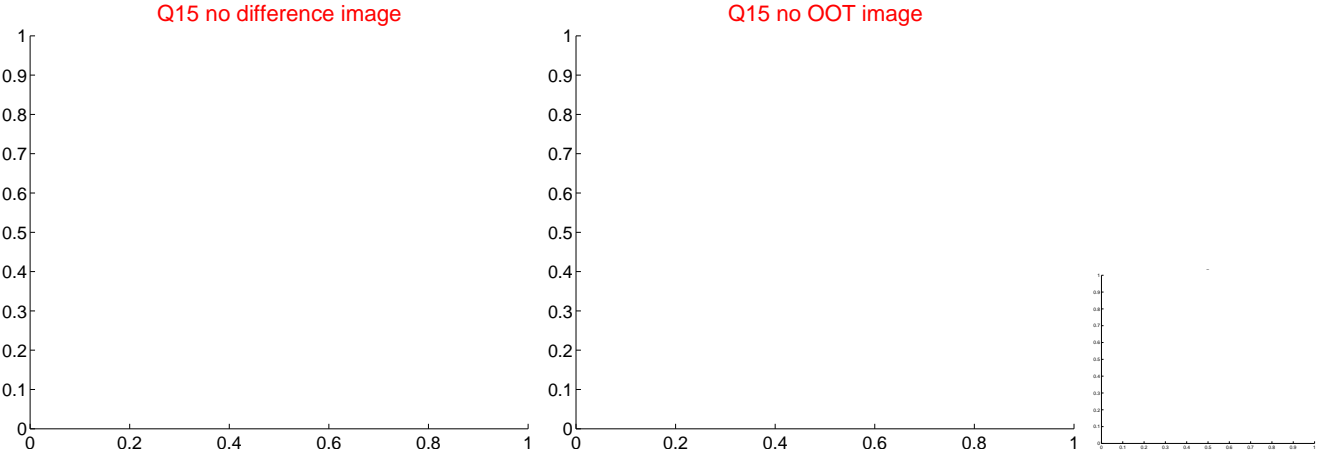
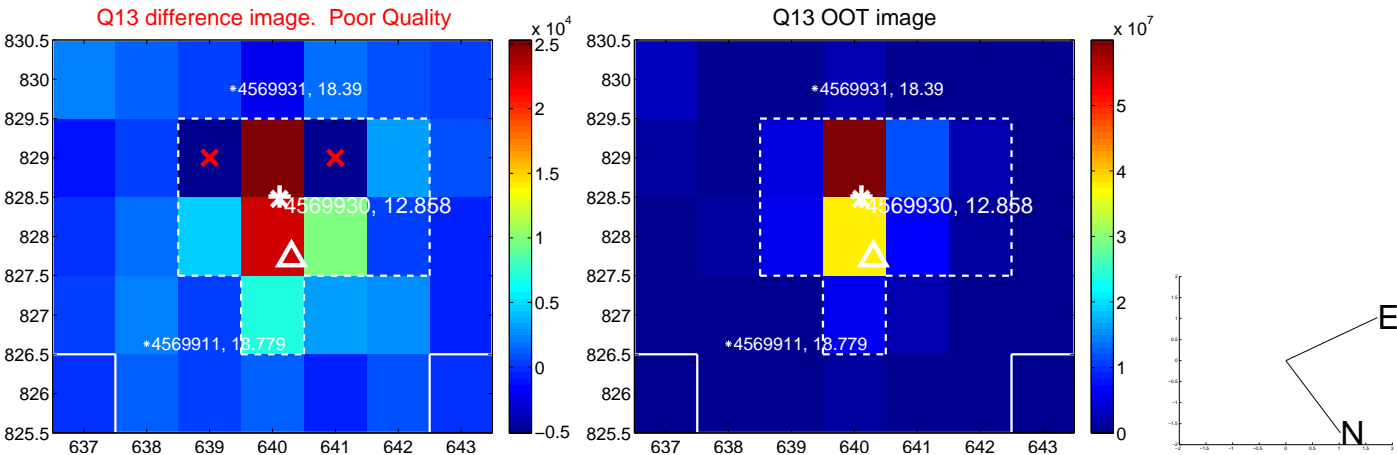
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



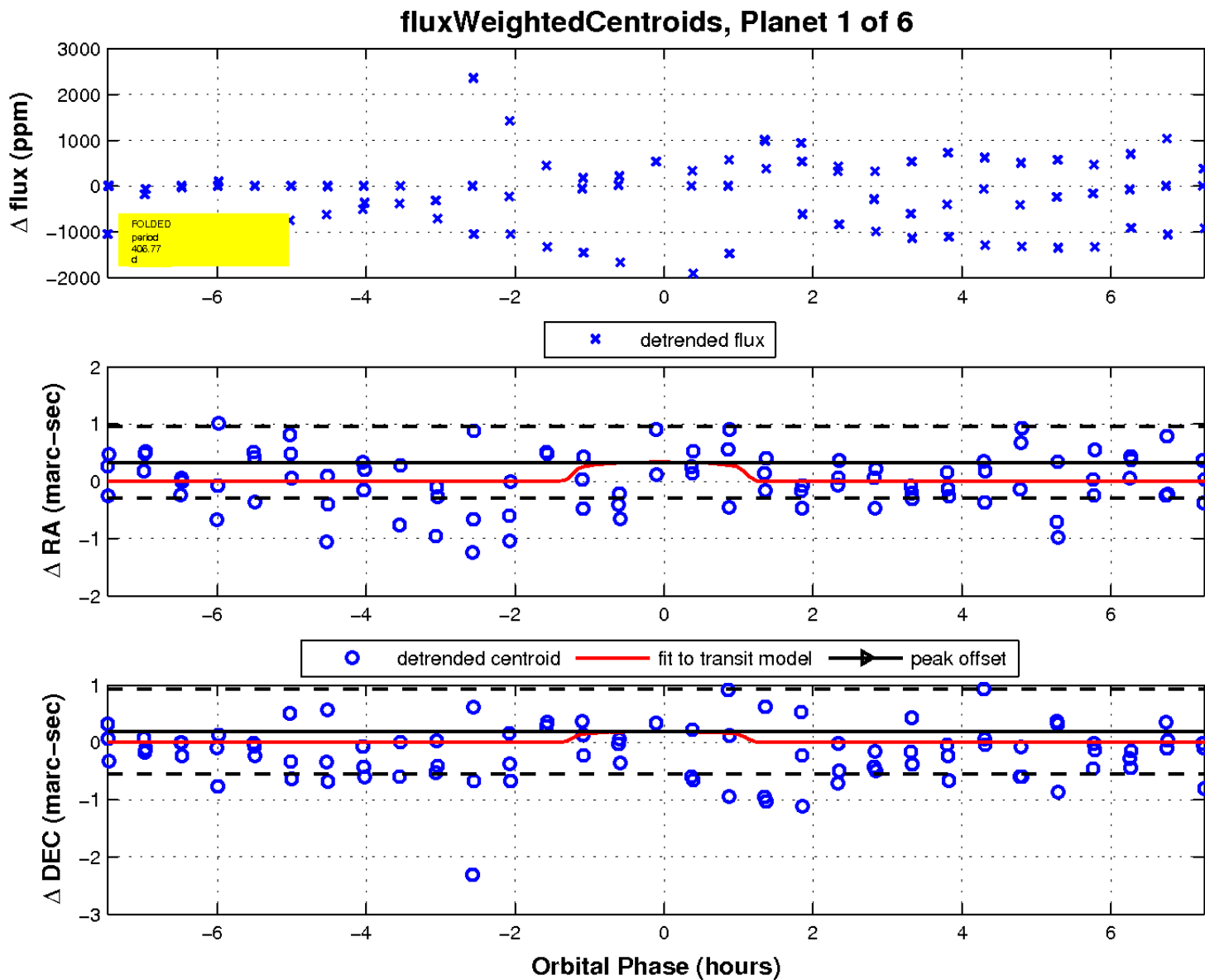
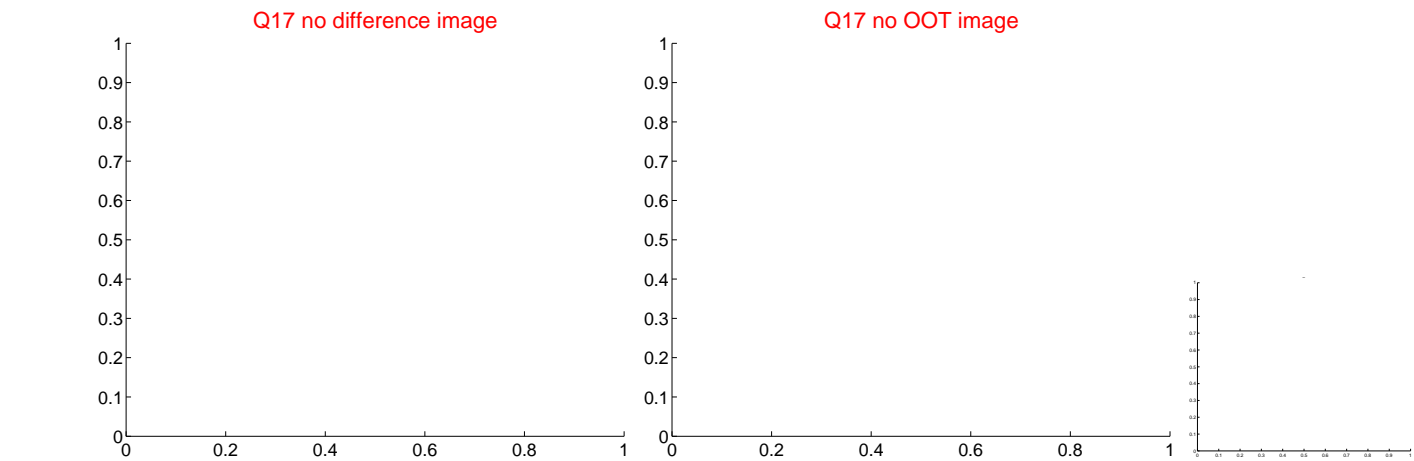
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

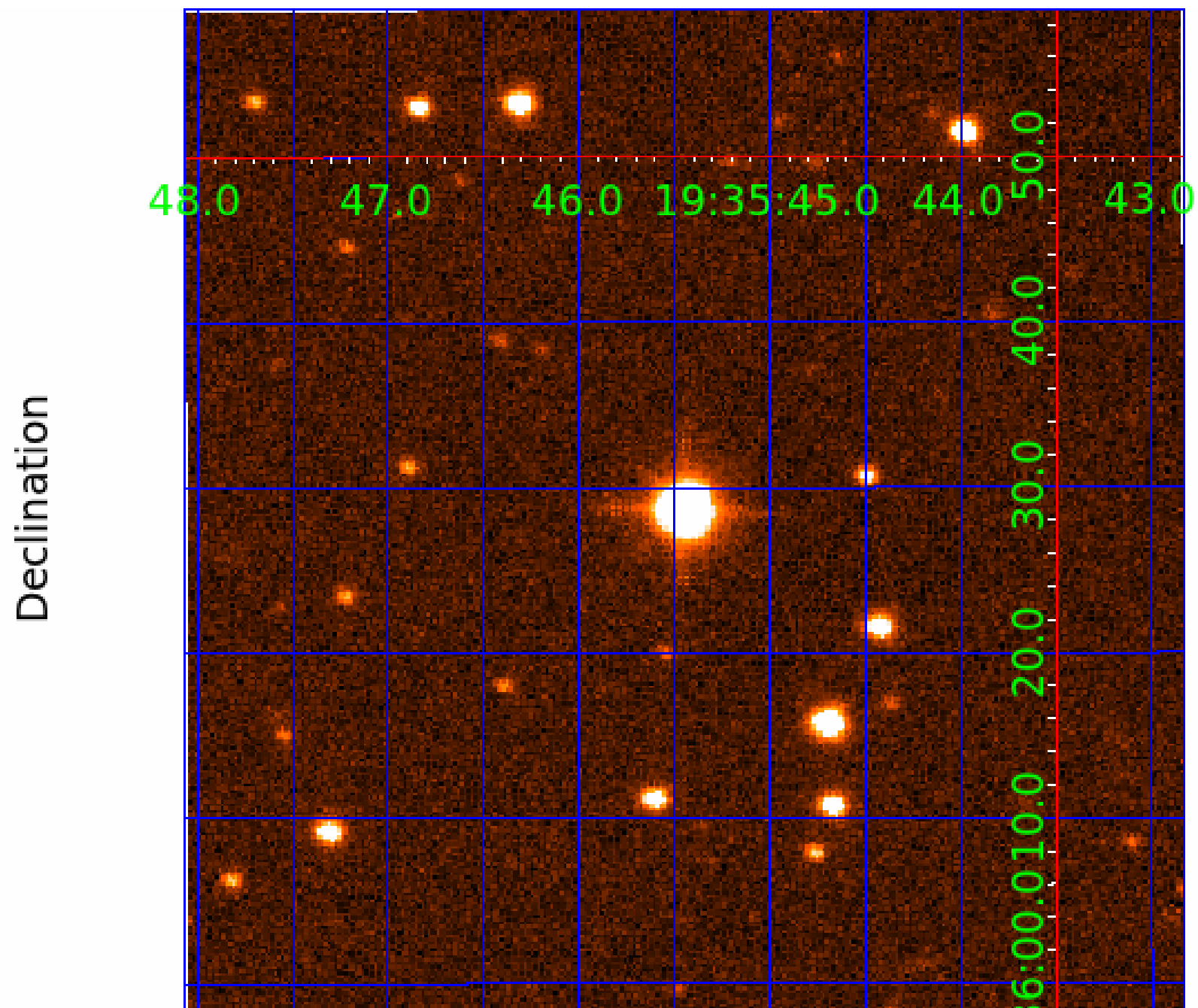


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.





UKIRT Image



# KIC 004569930

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
004569930-01	OBS	No	406.773692	457.039663	804.6	2.529	15.8	7.9	2.17	6008	6.73	4.17
004569930-02	OBS	No	632.575405	263.952019	806.0	7.372	10.6	5.4	2.17	6008	6.31	2.32
004569930-03	OBS	No	426.732864	206.493021	661.6	5.108	17.2	4.9	2.17	6008	5.63	3.92
004569930-04	OBS	No	289.421898	263.435341	477.5	5.384	13.3	4.2	2.17	6008	5.13	6.57
004569930-05	OBS	No	528.993473	497.365064	363.0	0.564	13.0	2.8	2.17	6008	5.43	2.94
004569930-06	OBS	No	398.271945	434.694599	503.7	3.000	13.3	-1.0	2.17	6008	4.87	4.29

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004569930-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
004569930-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS
004569930-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
004569930-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS
004569930-05	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES_MARSHALL_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS—HALO_GHOST
004569930-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_NOFITS

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

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

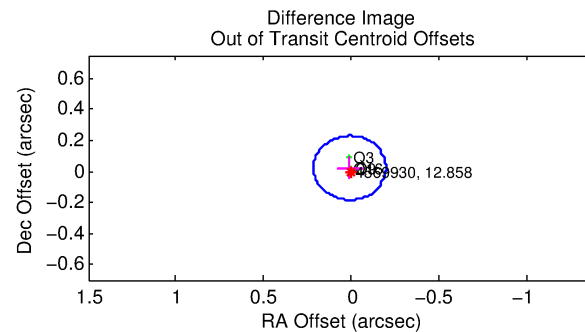
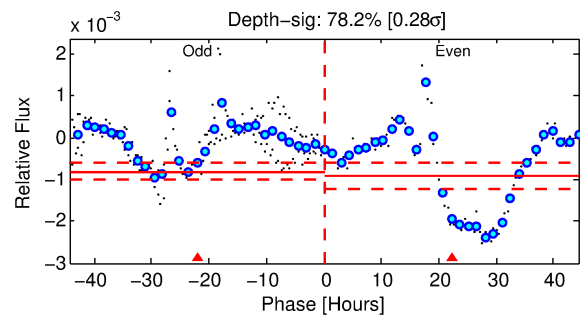
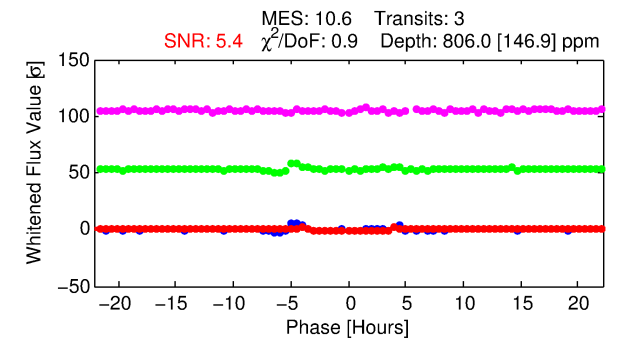
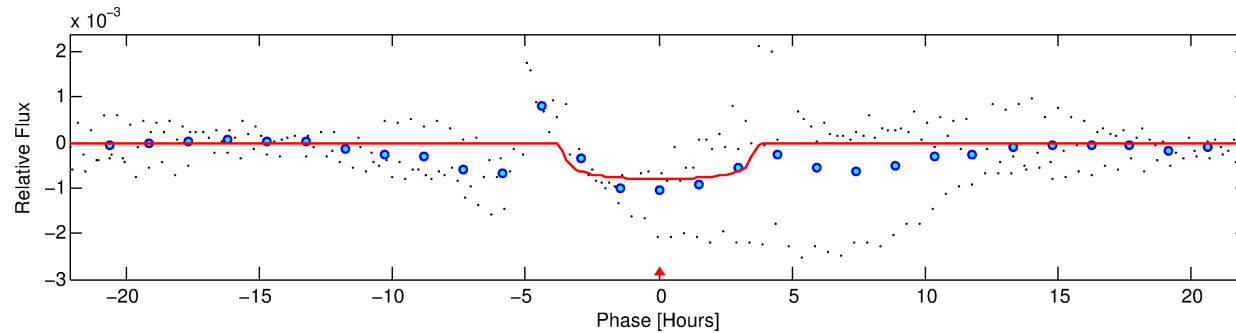
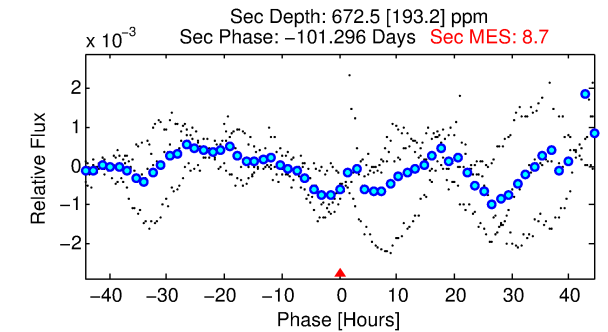
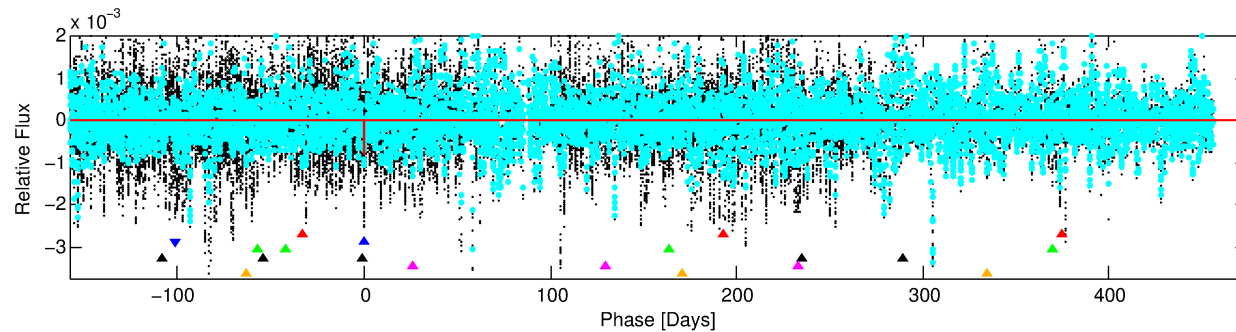
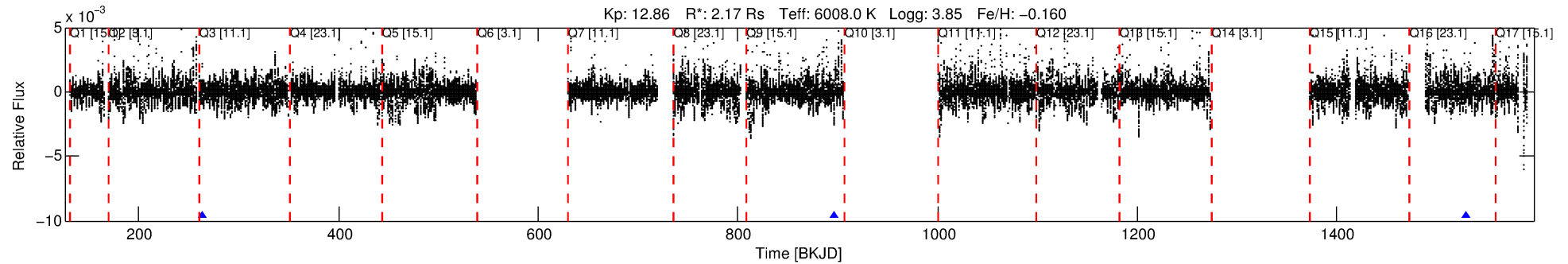
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 004569930-02

No Significant Match Found

# DV One-Page Summary

KIC: 4569930 Candidate: 2 of 6 Period: 632.575 d



## DV Fit Results:

Period = 632.57540 [0.00434] d  
Epoch = 263.9520 [0.0056] BKJD  
Rp/R\* = 0.0267 [0.0142]  
a/R\* = 592.20 [1458.99]  
b = 0.49 [3.88]  
Seff = 2.32 [0.90]  
Teq = 315 [30] K  
Rp = 6.31 [3.81] Re  
a = 1.5377 [0.3870] AU  
Ag = 21996.91 [25732.14] [0.85 $\sigma$ ]  
Teffp = 5923 [1639] K [3.42 $\sigma$ ]

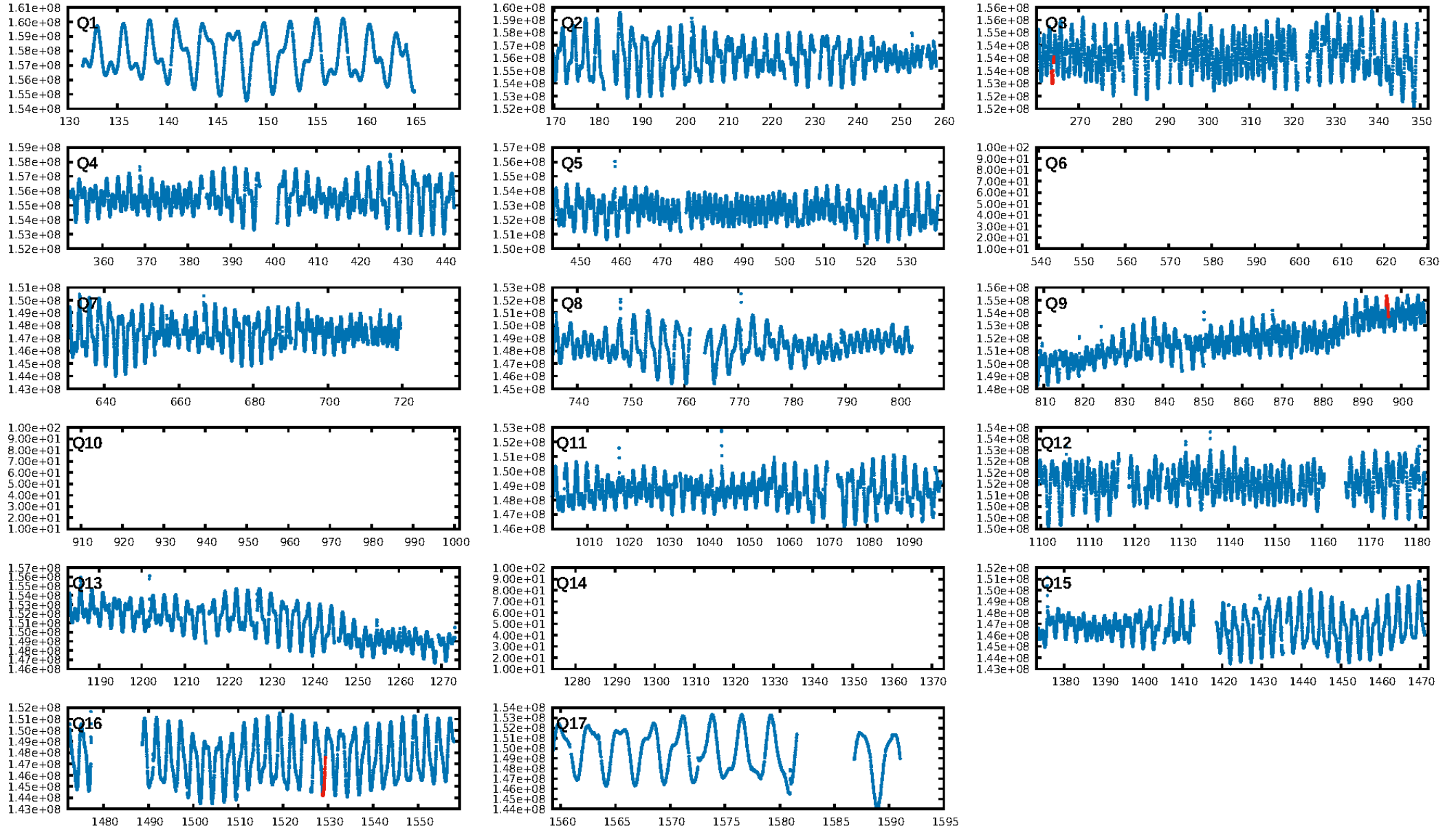
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [336.24 $\sigma$ ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 89.7%  
ModelChiSquareGof-sig: 97.6%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: 1.779  
Centroid-sig: 17.1%  
Centroid-so: 0.370 arcsec [1.09 $\sigma$ ]  
OotOffset-rm: 0.026 arcsec [0.37 $\sigma$ ]  
OotOffset-st: 0/1/1/1 [3]  
KicOffset-rm: 0.021 arcsec [0.30 $\sigma$ ]  
KicOffset-st: 0/1/1/1 [3]  
DiffImageQuality-fgm: 0.67 [2/3]  
DiffImageOverlap-fno: 0.67 [2/3]

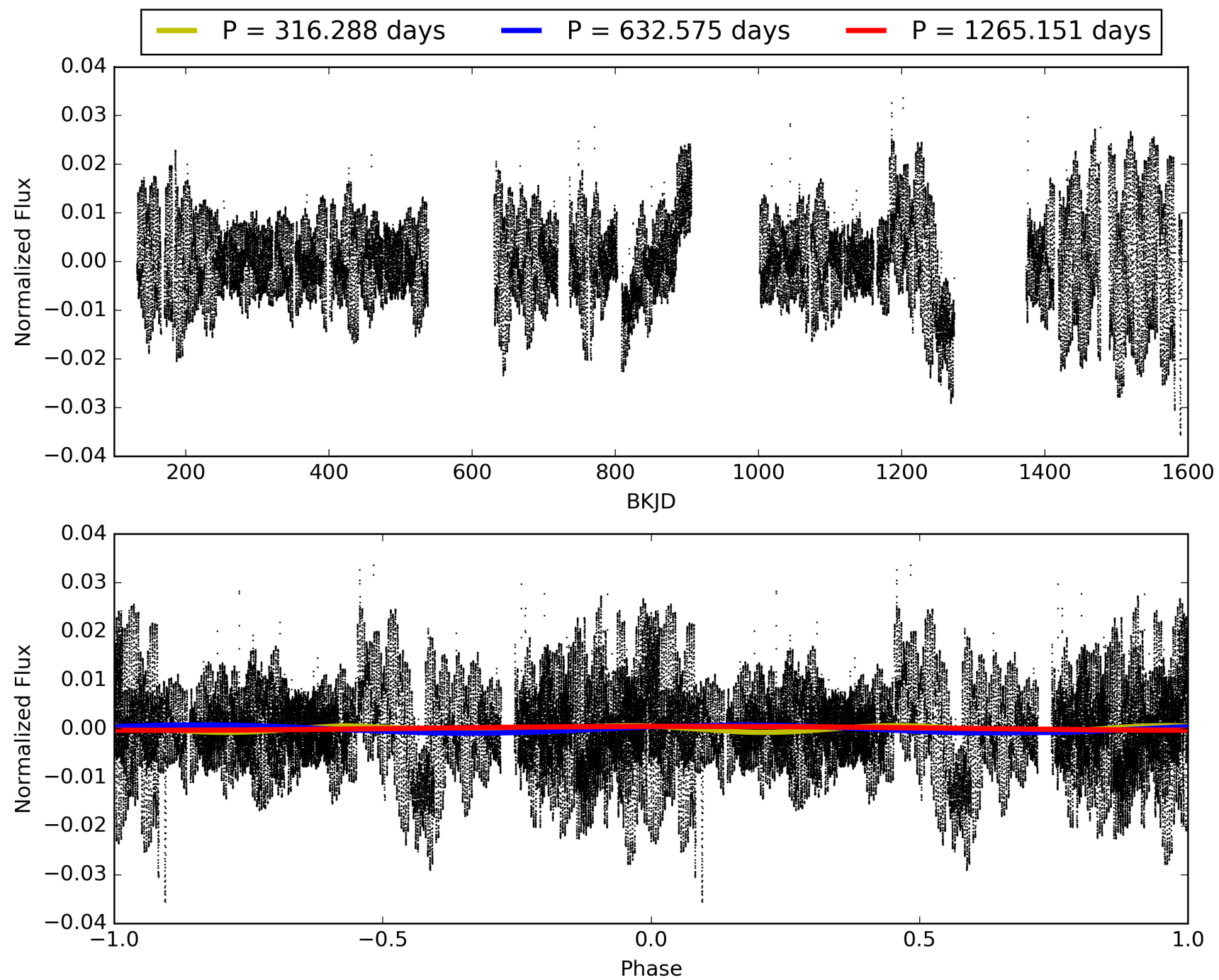
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 12:57:39 Z

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

# TCE 004569930-02, PDC Light Curves



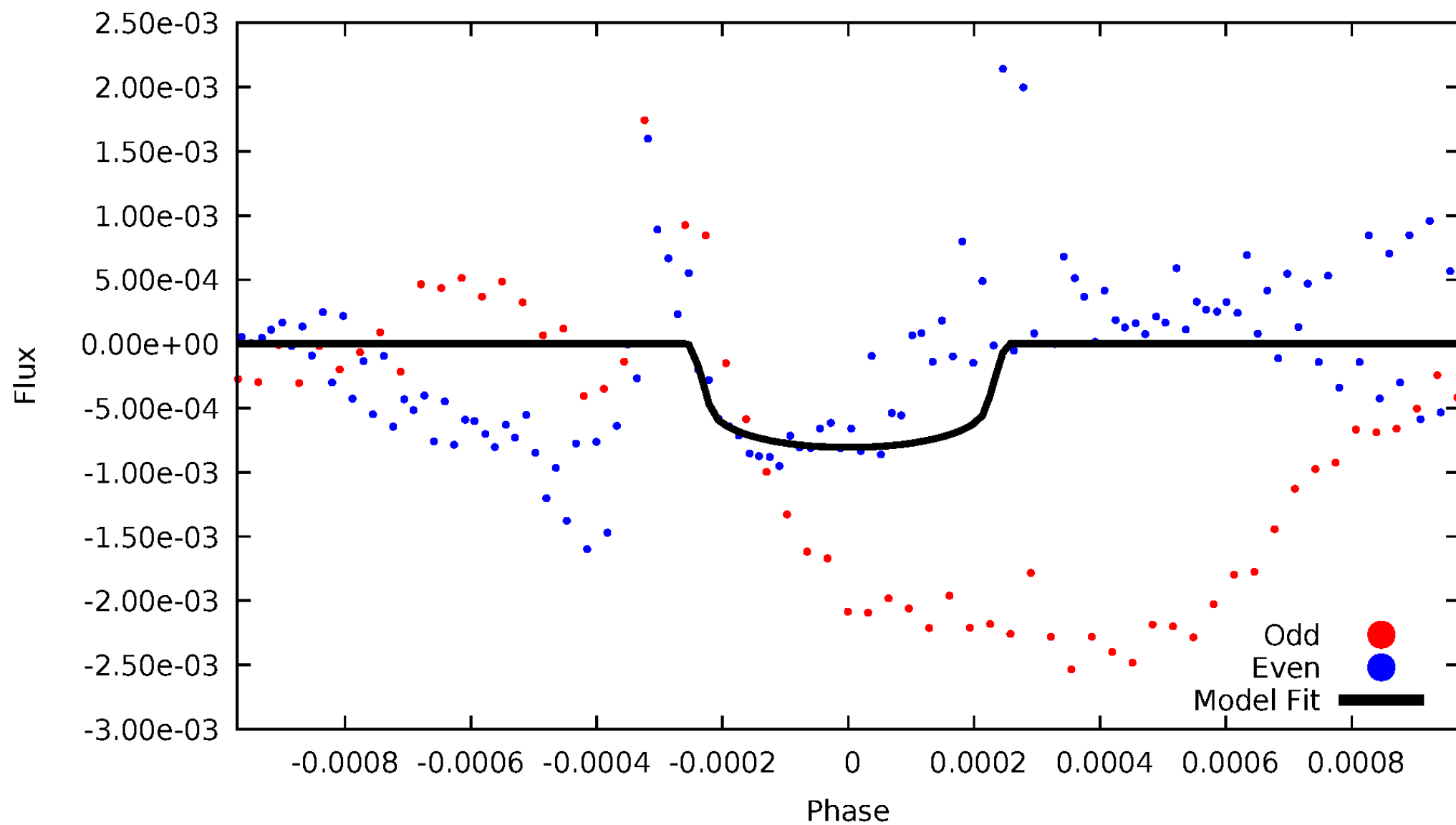
TCE 004569930-02





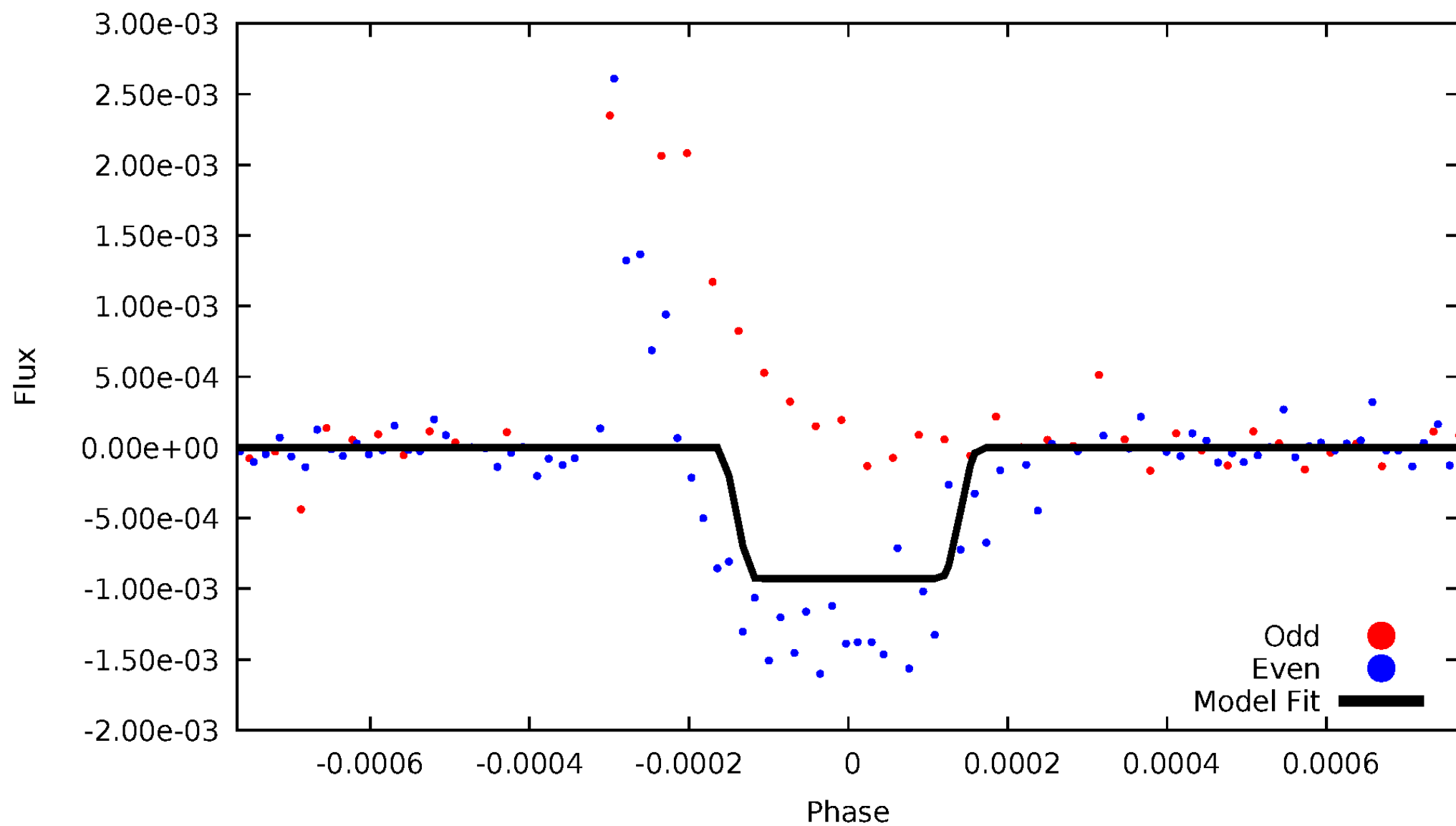
# DV Odd/Even

TCE 004569930-02



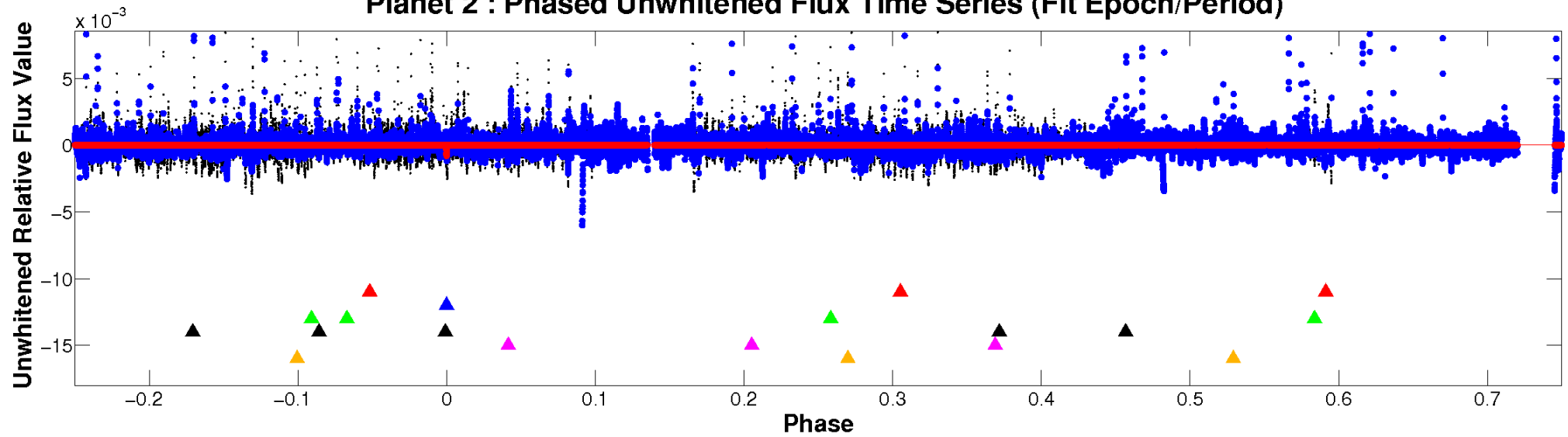
# ALT Odd/Even

TCE 004569930-02

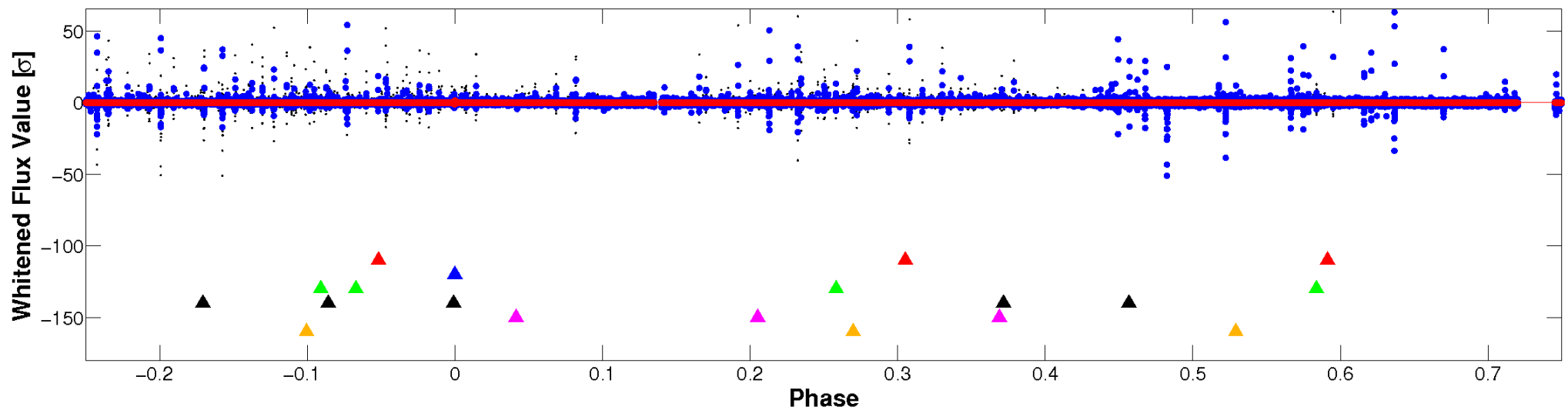


# Non-Whitened Vs. Whitened Light Curve

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

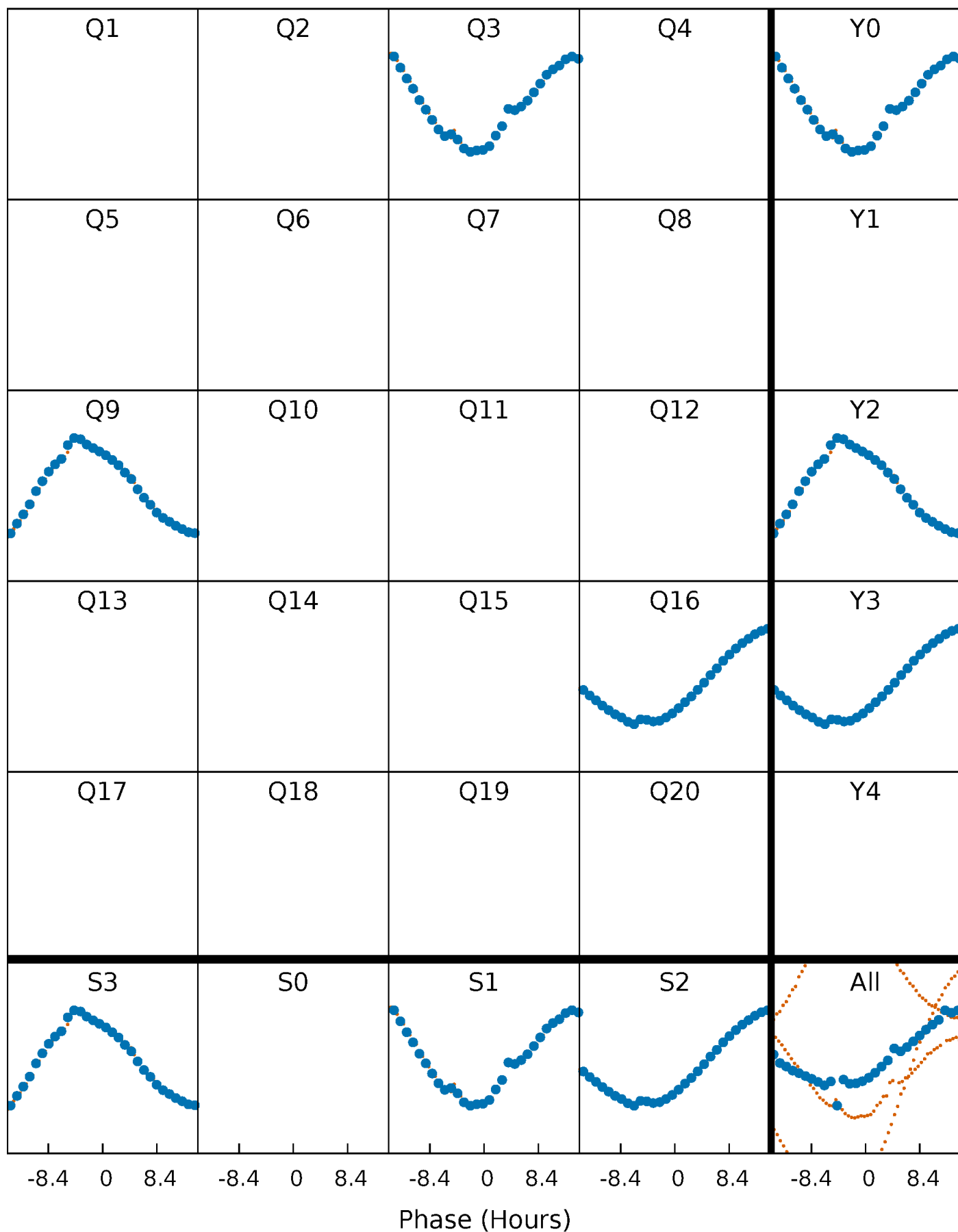


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



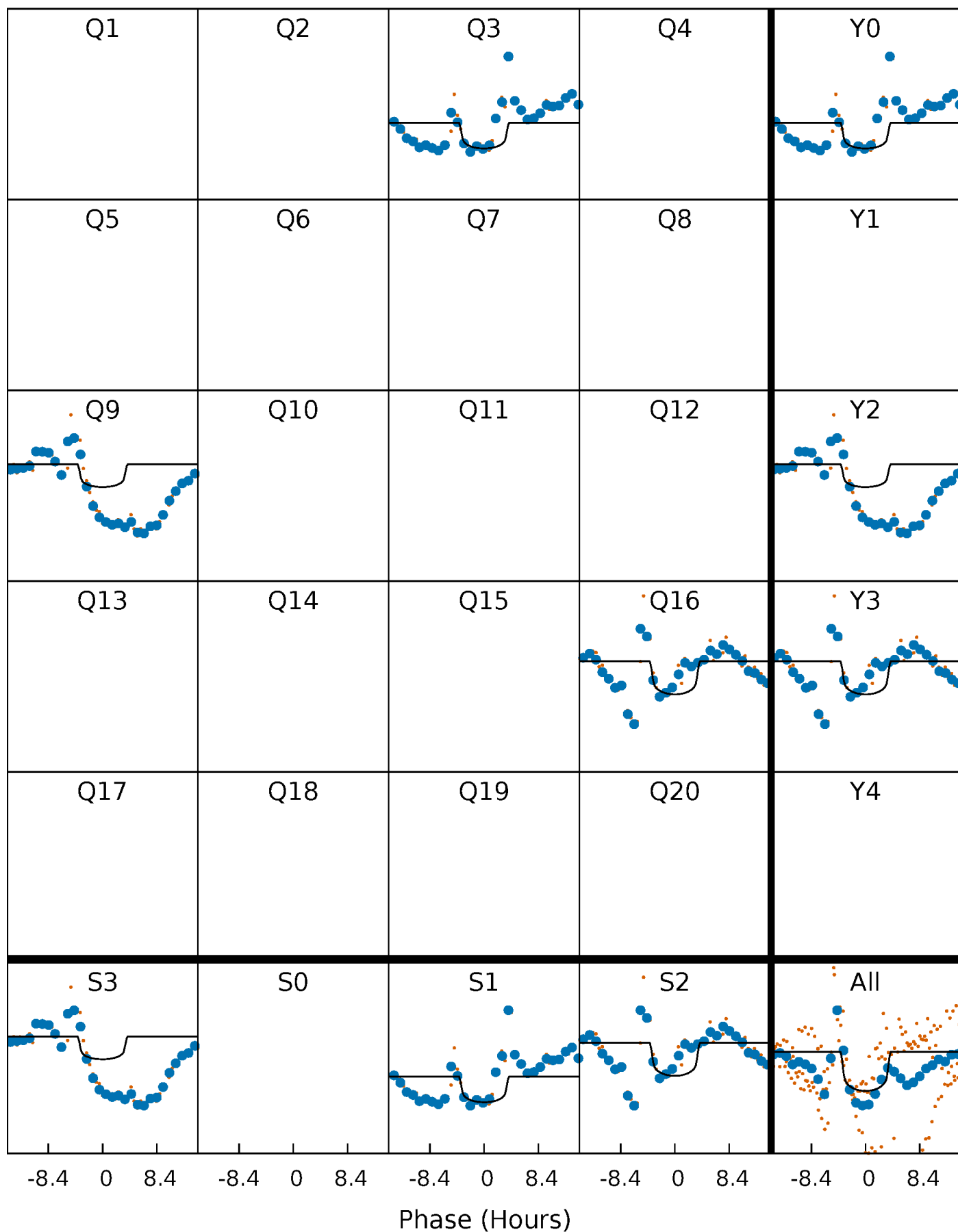
# PDC Quarter-Phased Transit Curves

TCE 004569930-02 P=632.575405 Days  $T_0=263.952019$  (BKJD)



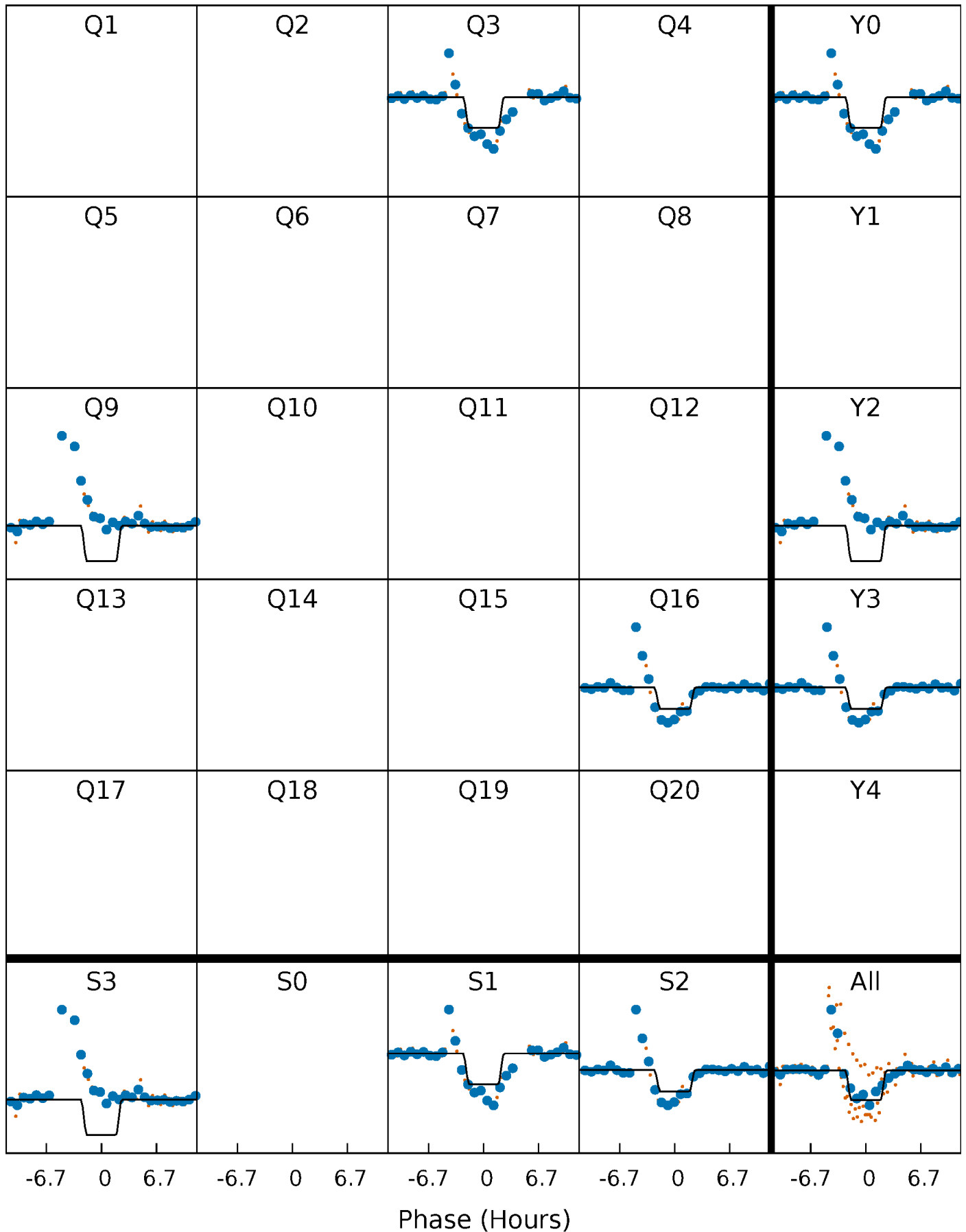
# DV Quarter-Phased Transit Curves

TCE 004569930-02 P=632.575405 Days  $T_0=263.952019$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

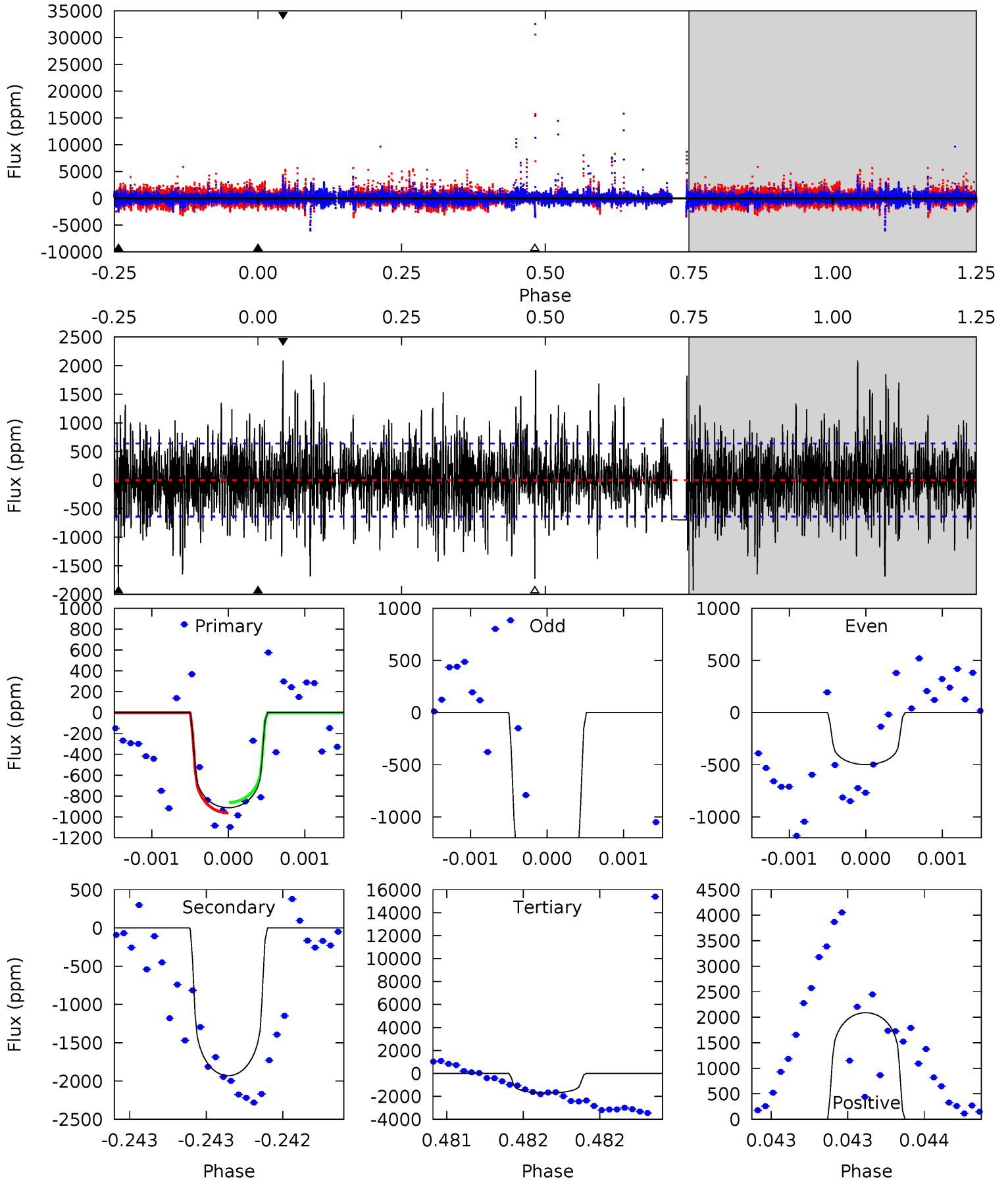
TCE 004569930-02     $P=632.575339$  Days     $T_0=263.936566$  (BKJD)



# DV Model-Shift Uniqueness Test

004569930-02, P = 632.575405 Days, E = 263.952019 Days

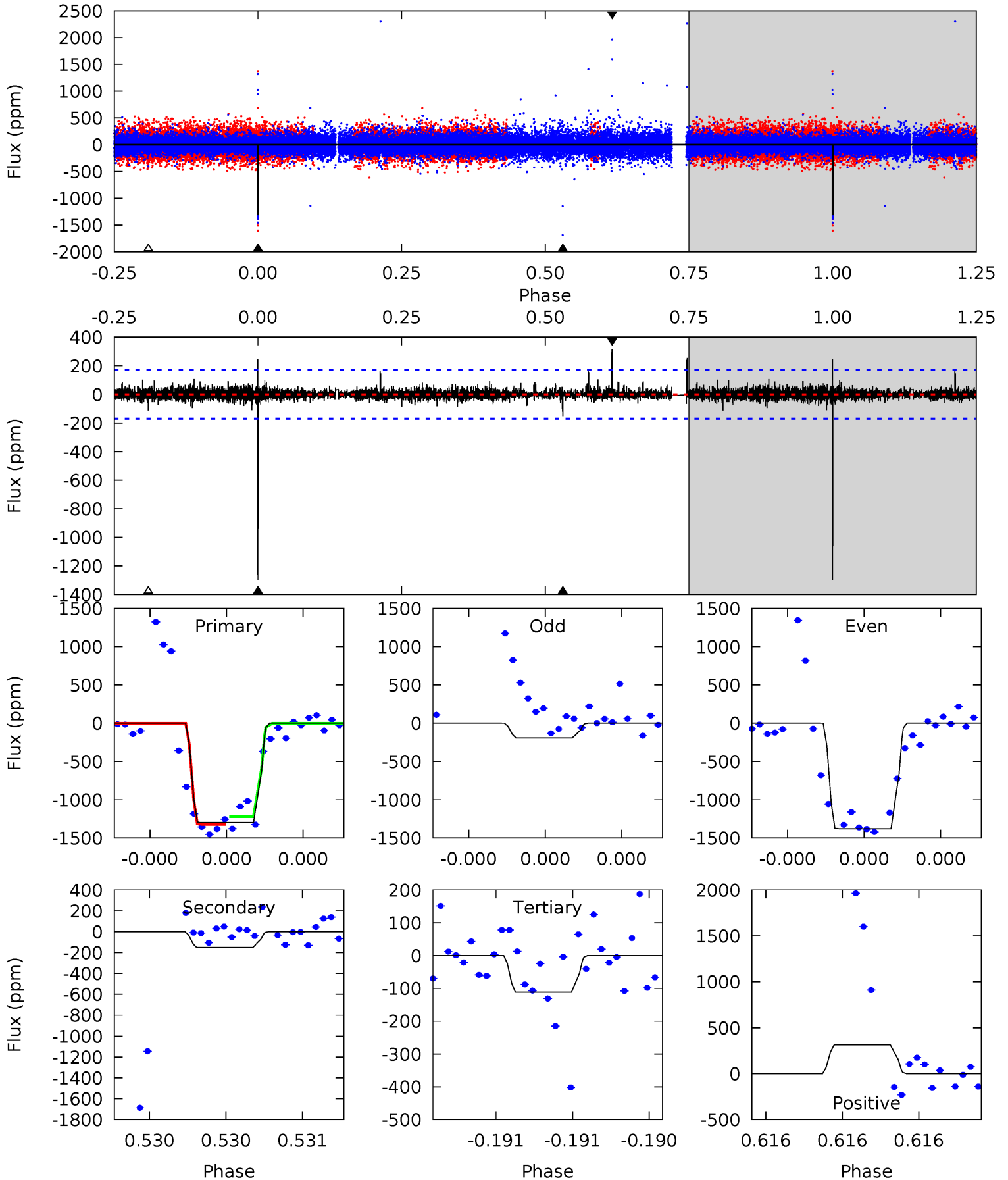
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
7.95	16.8	15.0	18.2	5.57	3.47	3.86	-7.08	-10.3	1.81	-1.38	4.15	1.82	0.52	0.44



# Alt Model-Shift Uniqueness Test

004569930-02, P = 632.575339 Days, E = 263.936566 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
43.0	5.02	3.70	10.4	5.66	3.61	0.69	39.3	32.6	1.32	-5.37	21.6	0.63	0.19	1.59





### Stellar Parameters For KIC 004569930

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$6008^{+81}_{-81}$	$3.850^{+0.217}_{-0.093}$	$-0.160^{+0.150}_{-0.150}$	$2.166^{+0.330}_{-0.613}$	$1.211^{+0.125}_{-0.172}$	$0.168^{+0.217}_{-0.050}$
	+1%/-1%	+6%/-2%	+94%/-94%	+15%/-28%	+10%/-14%	+129%/-30%
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 004569930-02 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-1930 \pm 115$	$6.11^{+3.39}_{-2.98}$	$437^{+19}_{-30}$	$7813^{+4991}_{-1586}$	$68315^{+179011}_{-40441}$
Alt.	$-152 \pm 30$	$7.05^{+3.44}_{-3.26}$	$437^{+18}_{-30}$	$4073^{+1153}_{-503}$	$3928^{+9799}_{-2226}$

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

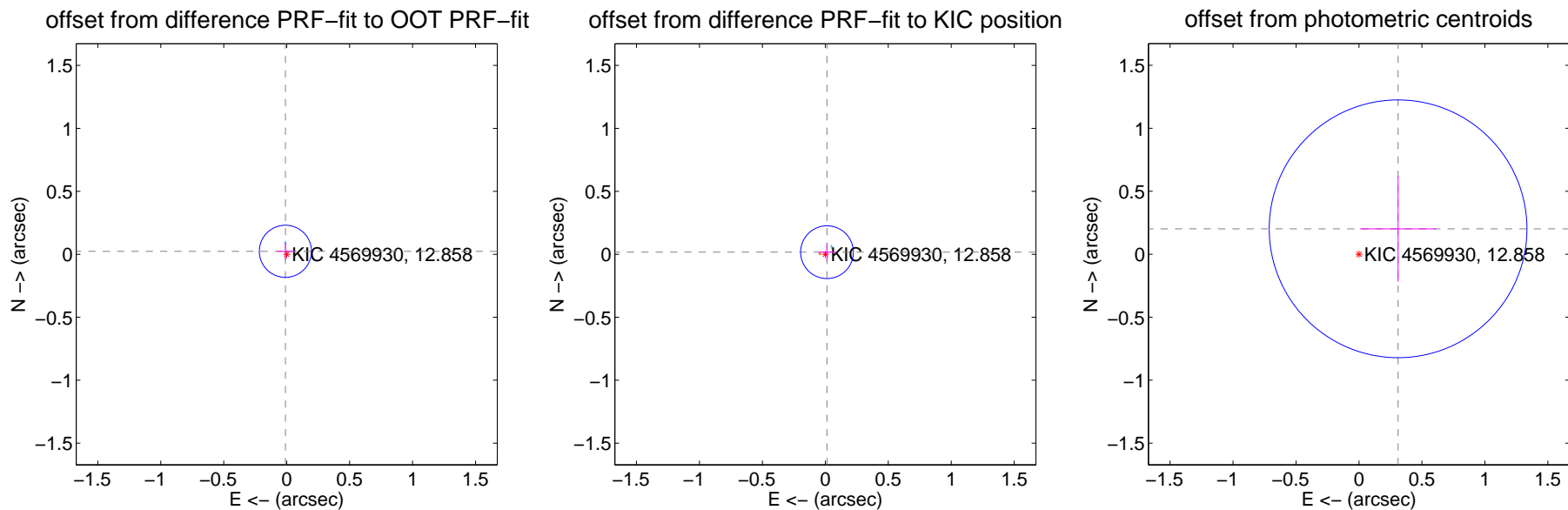
## DV Centroid Data

Supplemental centroid analysis for 004569930-02. Kepler magnitude: 12.86. Transit SNR 5.42

There are 2 quarters with good PRF difference image offsets

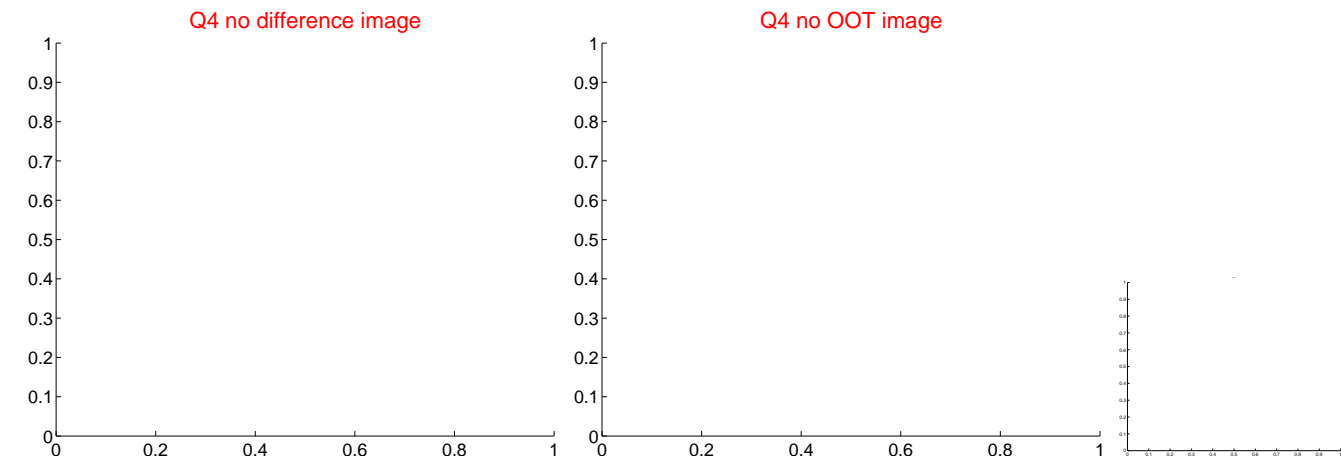
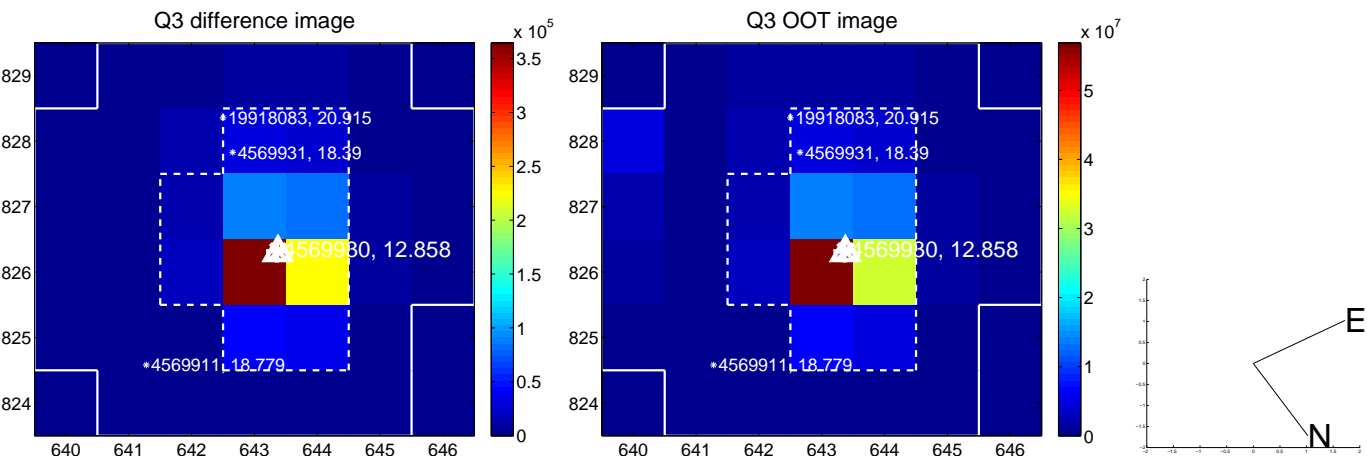
The direct PRF centroid is offset from the target star catalog position by about 0.03 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.026 \pm 0.069$	0.37	$0.010 \pm 0.067$	$0.024 \pm 0.069$
PRF-fit source offset from KIC position	$0.021 \pm 0.070$	0.30	$-0.013 \pm 0.069$	$0.017 \pm 0.068$
photometric centroid source offset	$0.37 \pm 0.34$	1.09	$-0.31 \pm 0.30$	$0.20 \pm 0.42$



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.

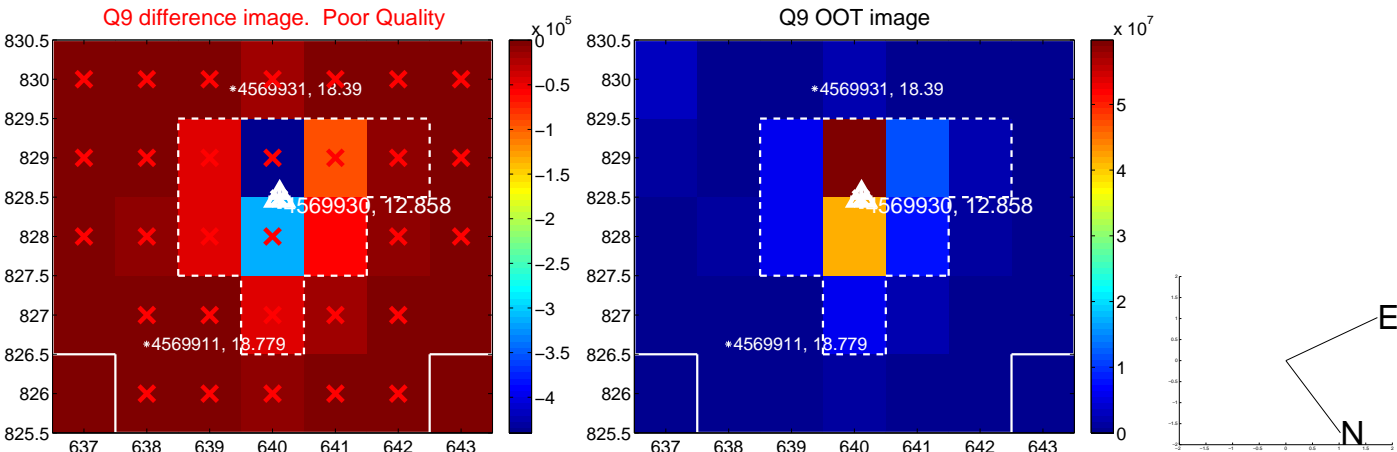
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



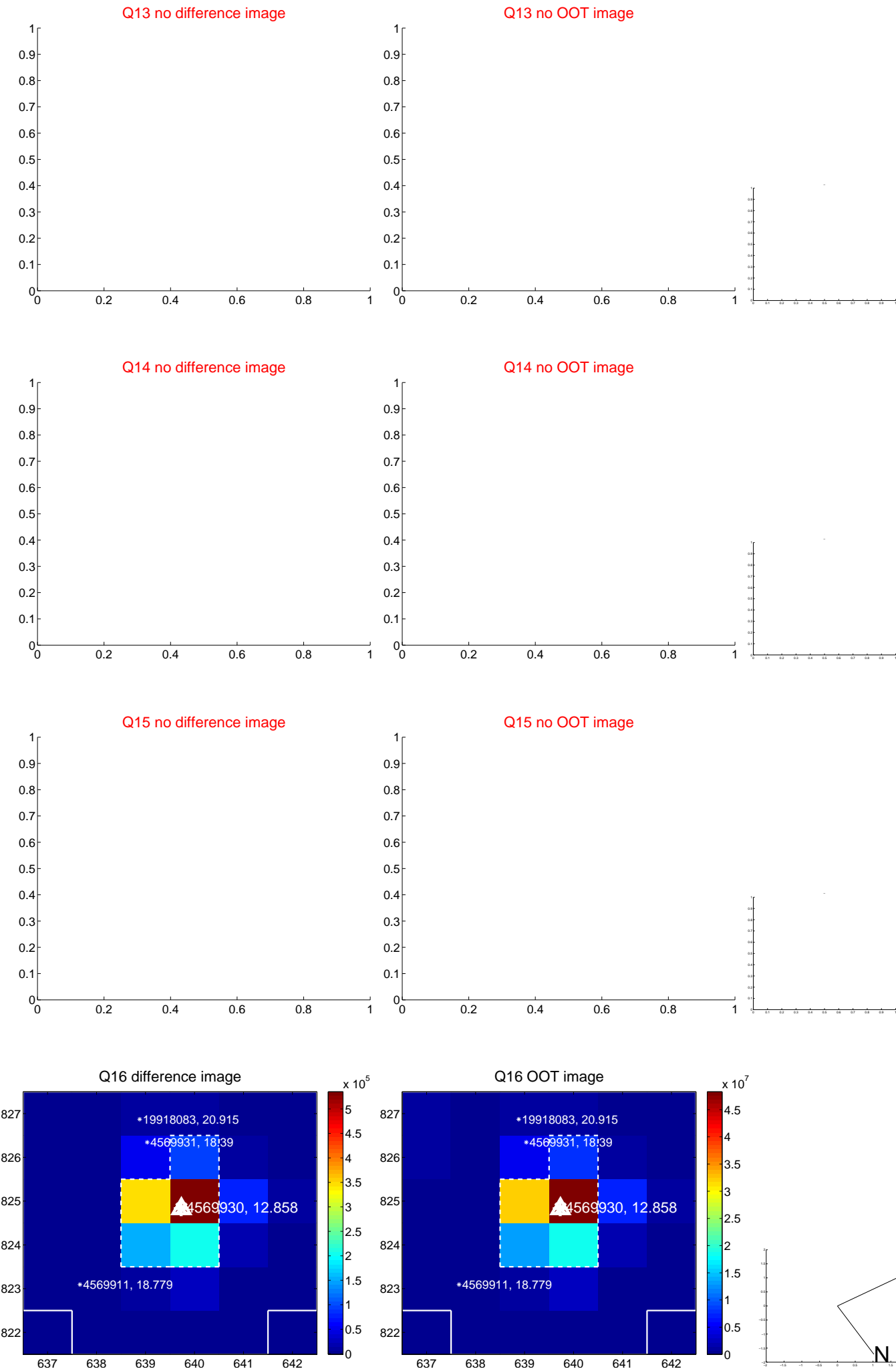
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



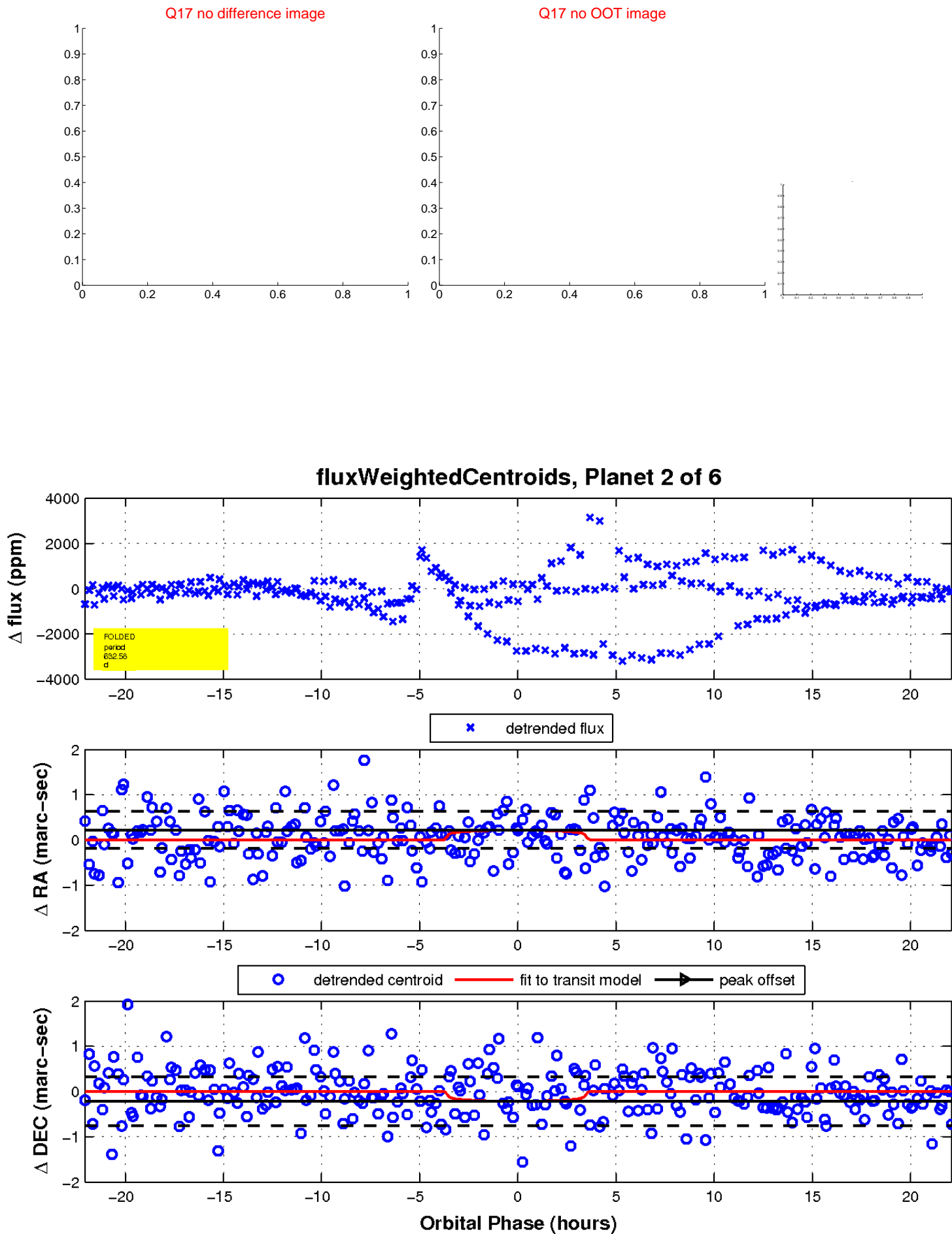
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



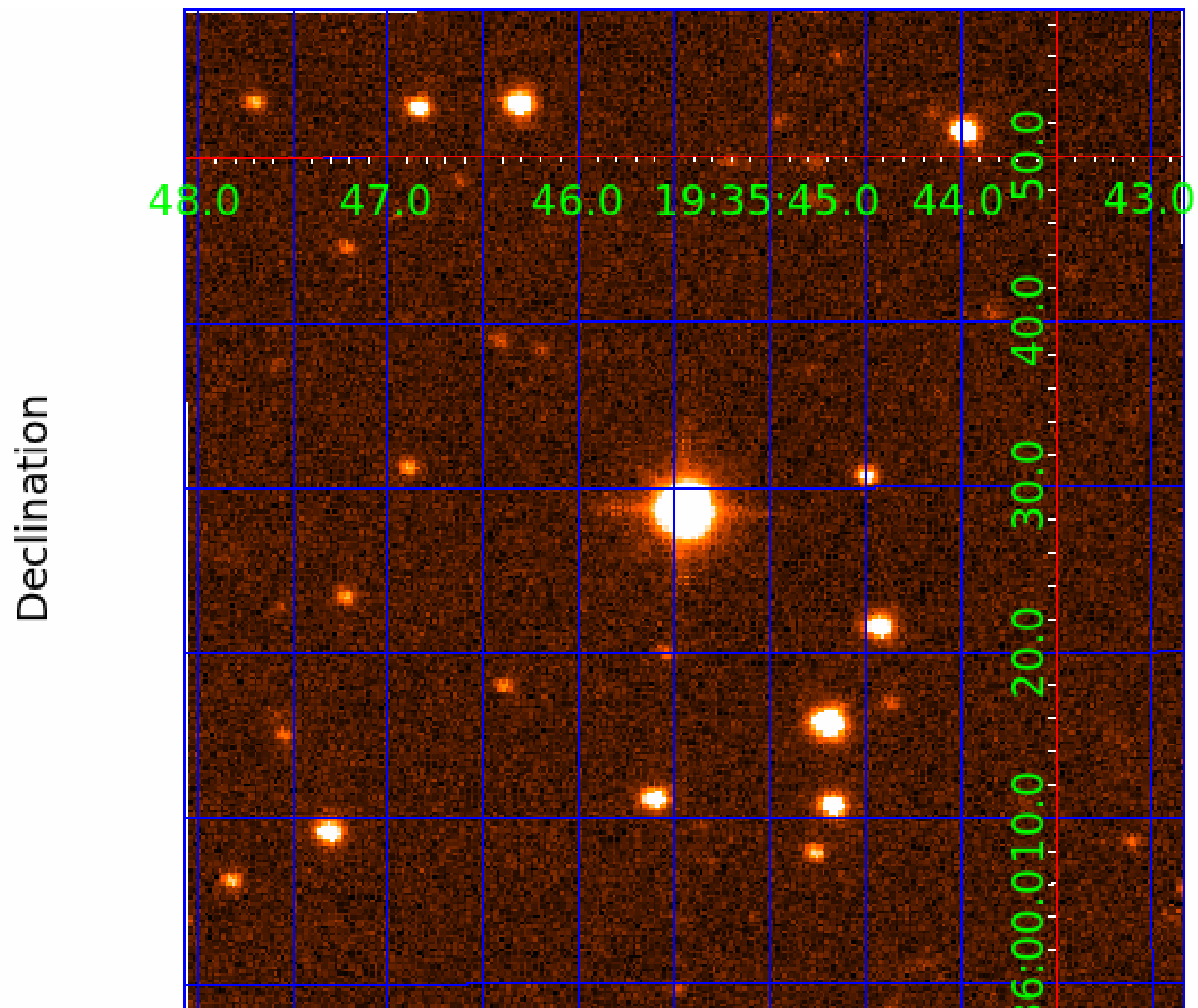
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.



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



UKIRT Image





# KIC 004569930

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
004569930-01	OBS	No	406.773692	457.039663	804.6	2.529	15.8	7.9	2.17	6008	6.73	4.17
004569930-02	OBS	No	632.575405	263.952019	806.0	7.372	10.6	5.4	2.17	6008	6.31	2.32
004569930-03	OBS	No	426.732864	206.493021	661.6	5.108	17.2	4.9	2.17	6008	5.63	3.92
004569930-04	OBS	No	289.421898	263.435341	477.5	5.384	13.3	4.2	2.17	6008	5.13	6.57
004569930-05	OBS	No	528.993473	497.365064	363.0	0.564	13.0	2.8	2.17	6008	5.43	2.94
004569930-06	OBS	No	398.271945	434.694599	503.7	3.000	13.3	-1.0	2.17	6008	4.87	4.29

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004569930-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
004569930-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS
004569930-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
004569930-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS
004569930-05	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES_MARSHALL_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS—HALO_GHOST
004569930-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_NOFITS

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

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

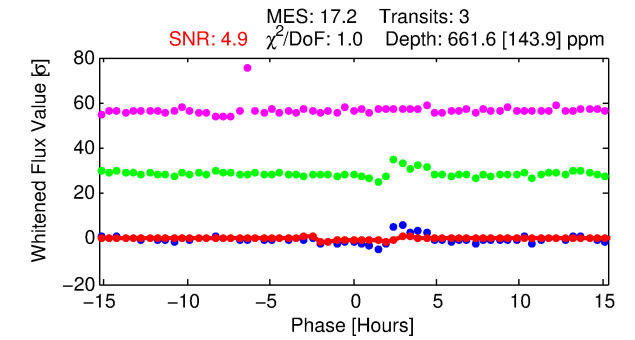
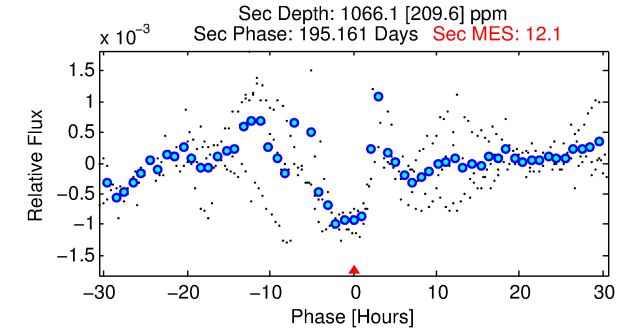
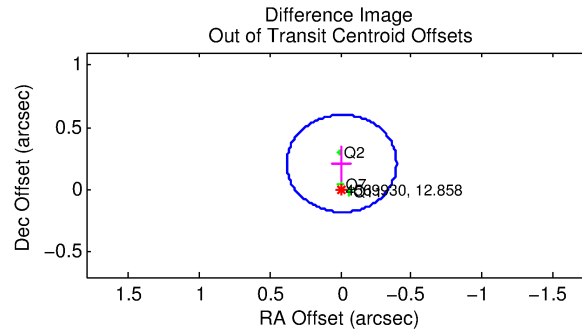
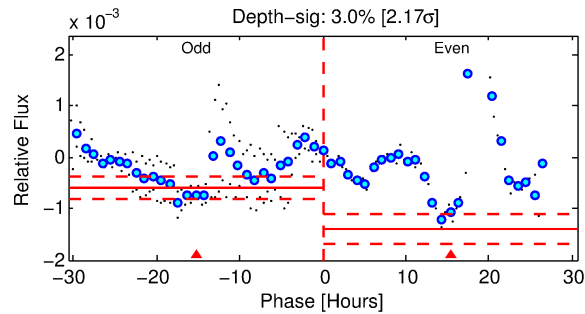
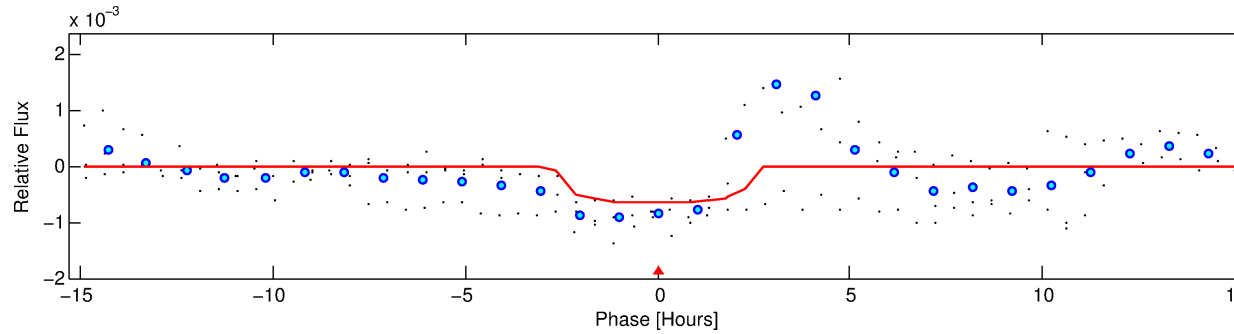
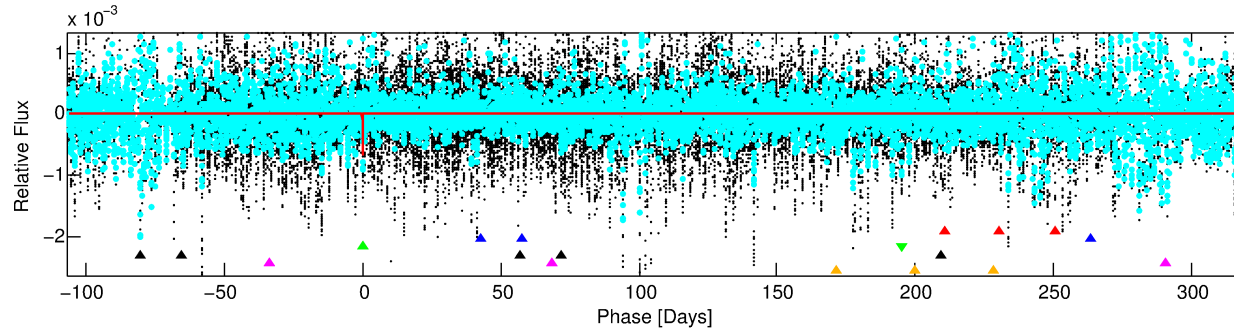
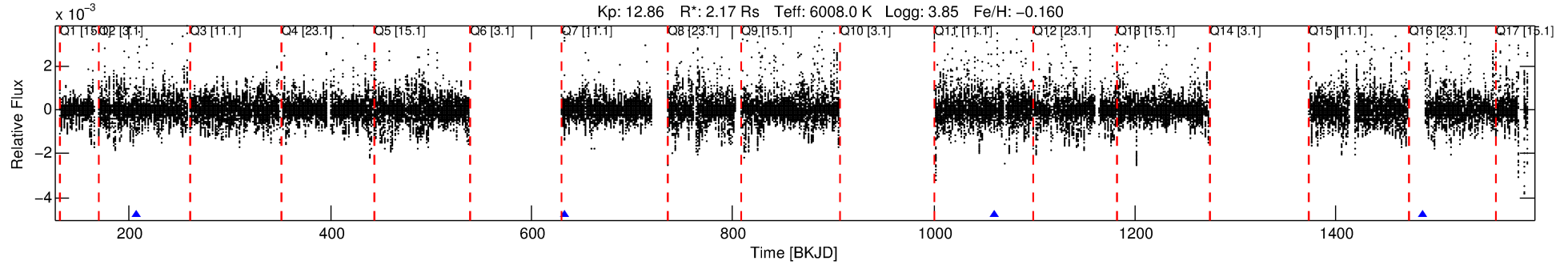
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 004569930-03

No Significant Match Found

# DV One-Page Summary

KIC: 4569930 Candidate: 3 of 6 Period: 426.733 d



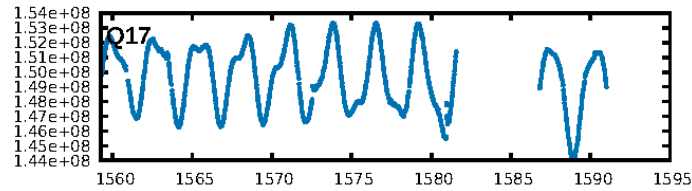
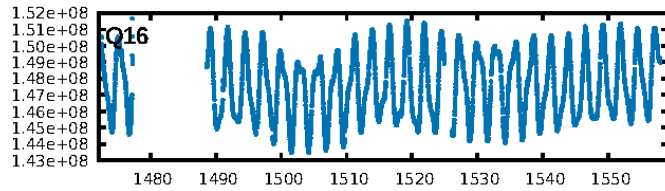
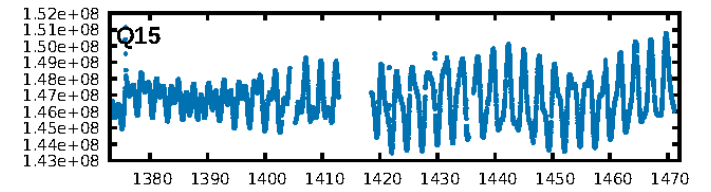
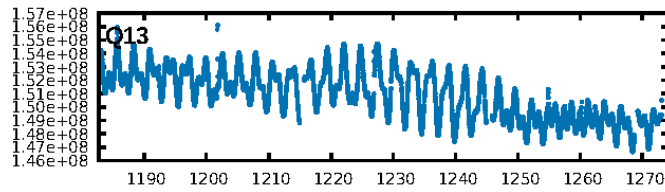
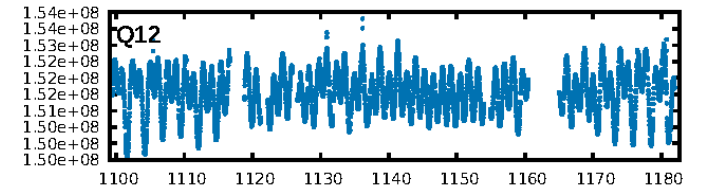
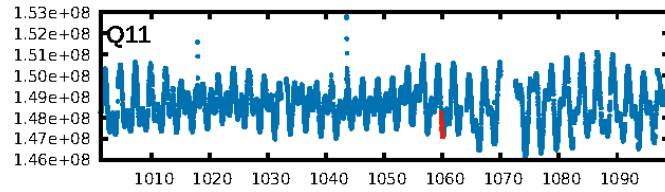
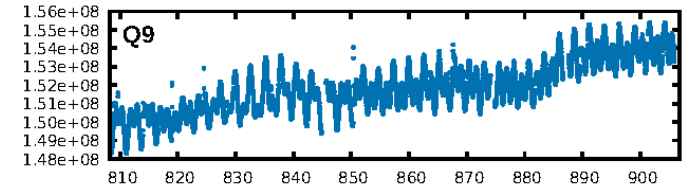
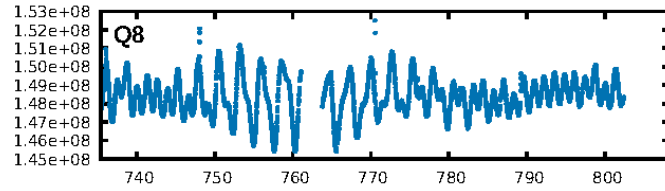
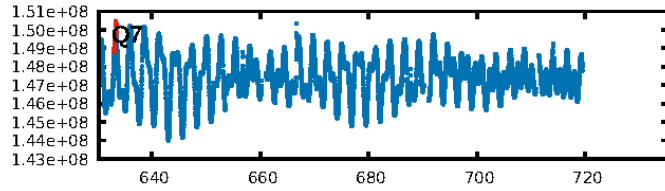
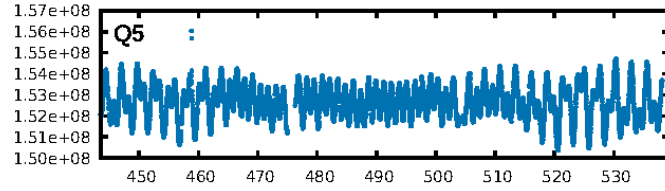
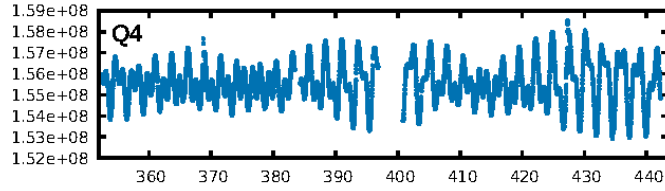
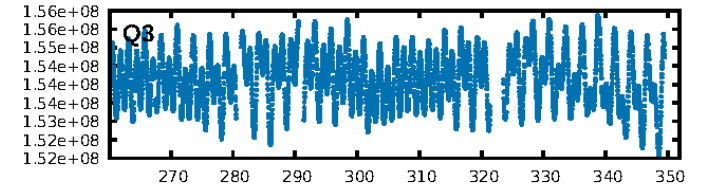
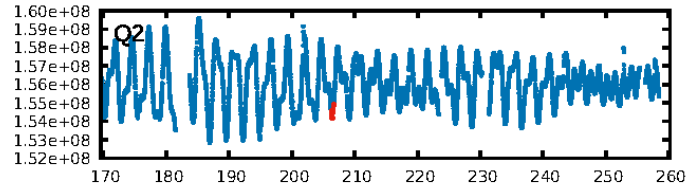
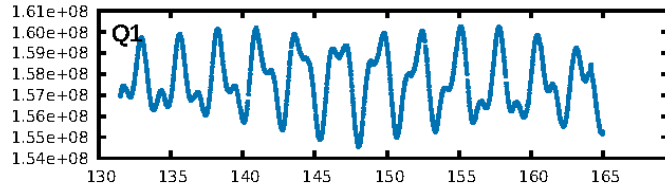
## DV Fit Results:

Period = 426.73286 [0.00541] d  
Epoch = 206.4930 [0.0083] BKJD  
Rp/R\* = 0.0238 [0.0346]  
a/R\* = 614.49 [4237.79]  
b = 0.35 [17.54]  
Seff = 3.91 [1.51]  
Teq = 359 [35] K  
Rp = 5.63 [8.32] Re  
a = 1.1828 [0.2977] AU  
Ag = 25866.11 [75846.55] [0.34σ]  
Teffp = 7033 [5112] K [1.31σ]

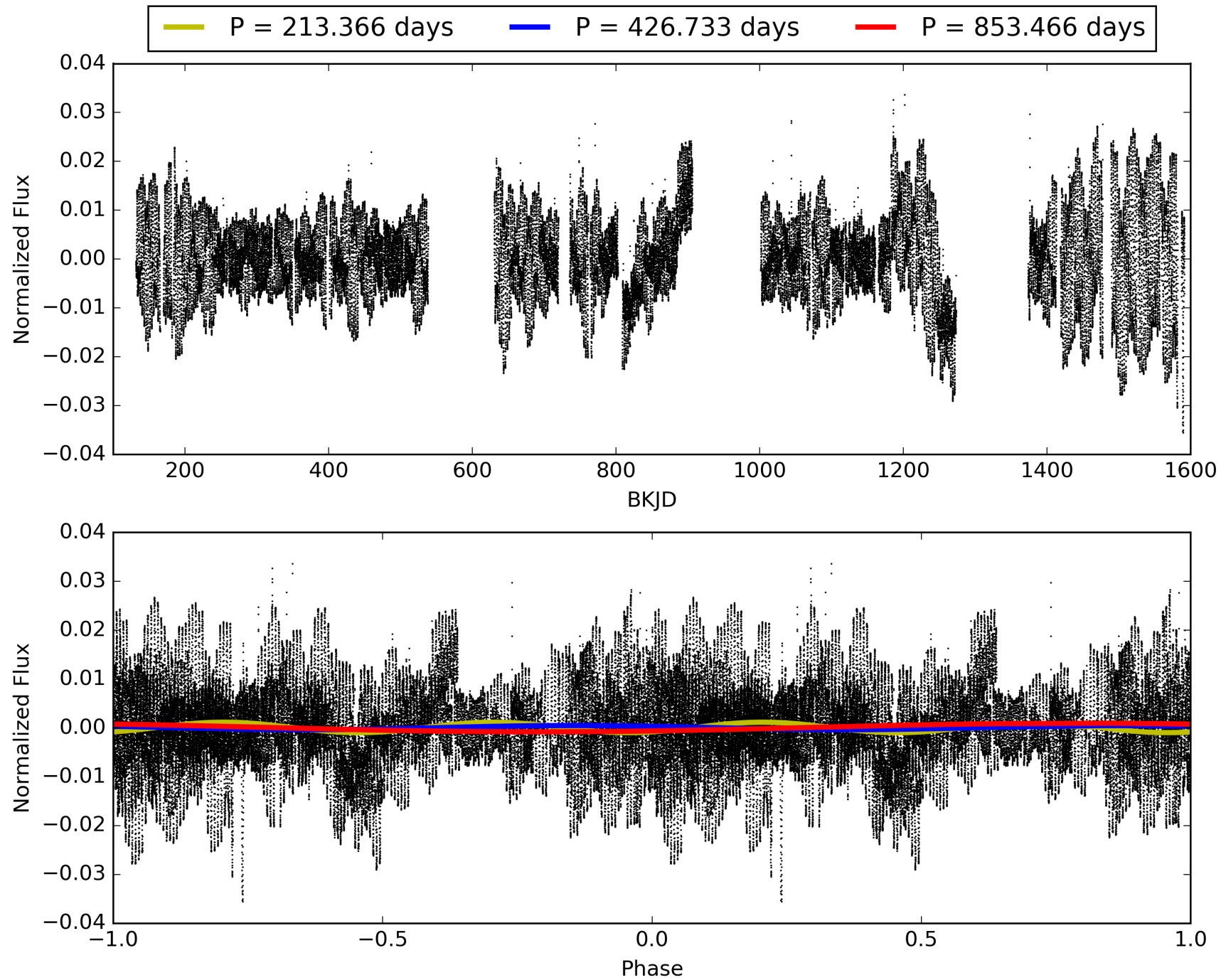
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [84.04σ]  
LongPeriod-sig: 100.0% [477.57σ]  
ModelChiSquare2-sig: 44.5%  
ModelChiSquareGof-sig: 99.9%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: -0.5819  
Centroid-sig: 0.0%  
Centroid-so: 1.280 arcsec [2.04σ]  
OotOffset-rm: 0.209 arcsec [1.61σ]  
KicOffset-rm: 0.205 arcsec [1.42σ]  
OotOffset-st: 1/2/0/0 [3]  
KicOffset-st: 1/2/0/0 [3]  
DiffImageQuality-fgm: 0.67 [2/3]  
DiffImageOverlap-fno: 1.00 [3/3]

# TCE 004569930-03, PDC Light Curves

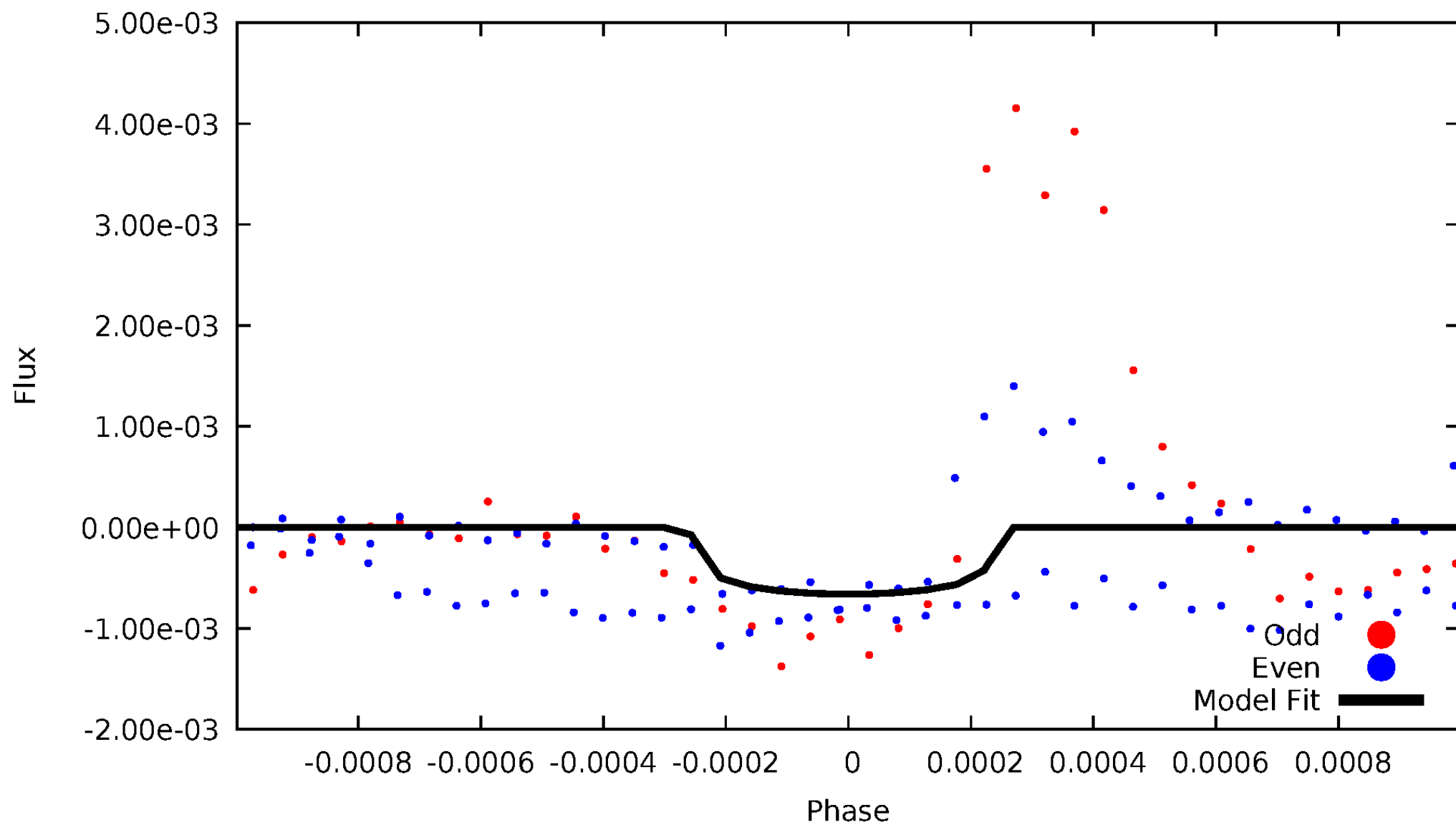


TCE 004569930-03



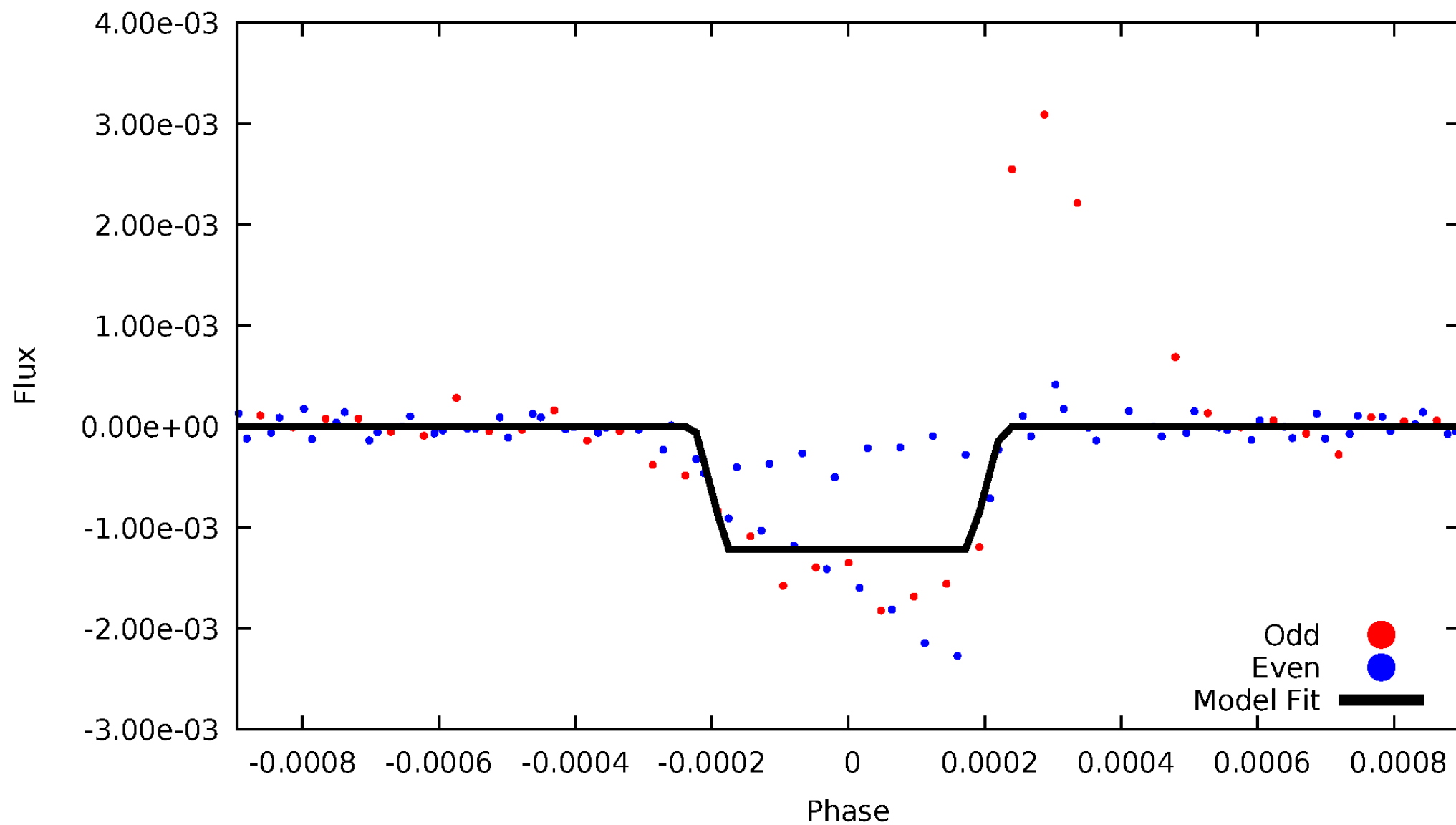
# DV Odd/Even

TCE 004569930-03



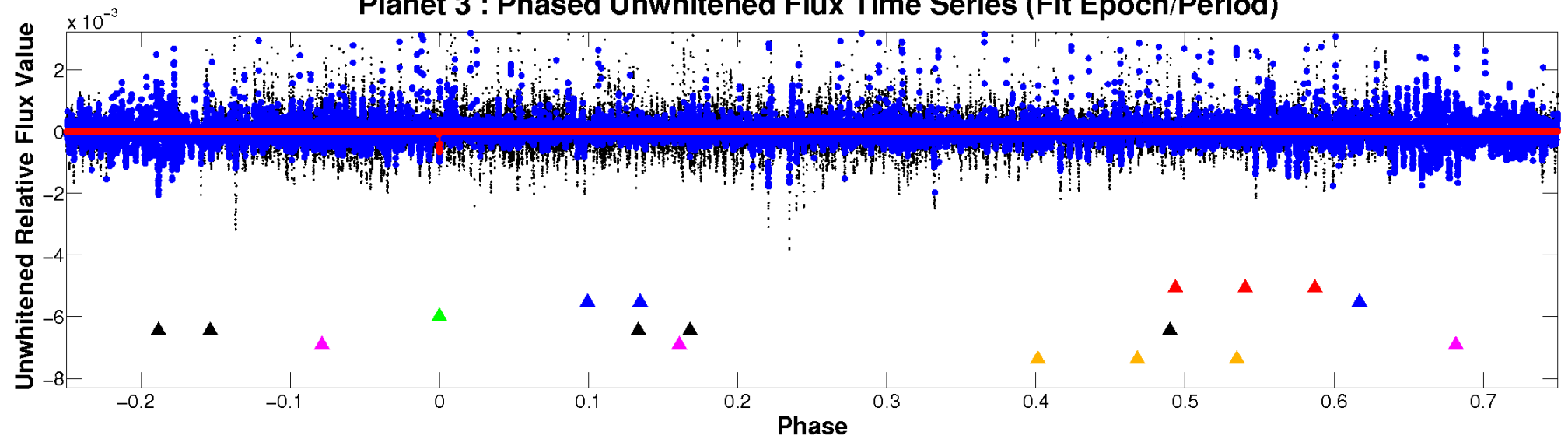
# ALT Odd/Even

TCE 004569930-03

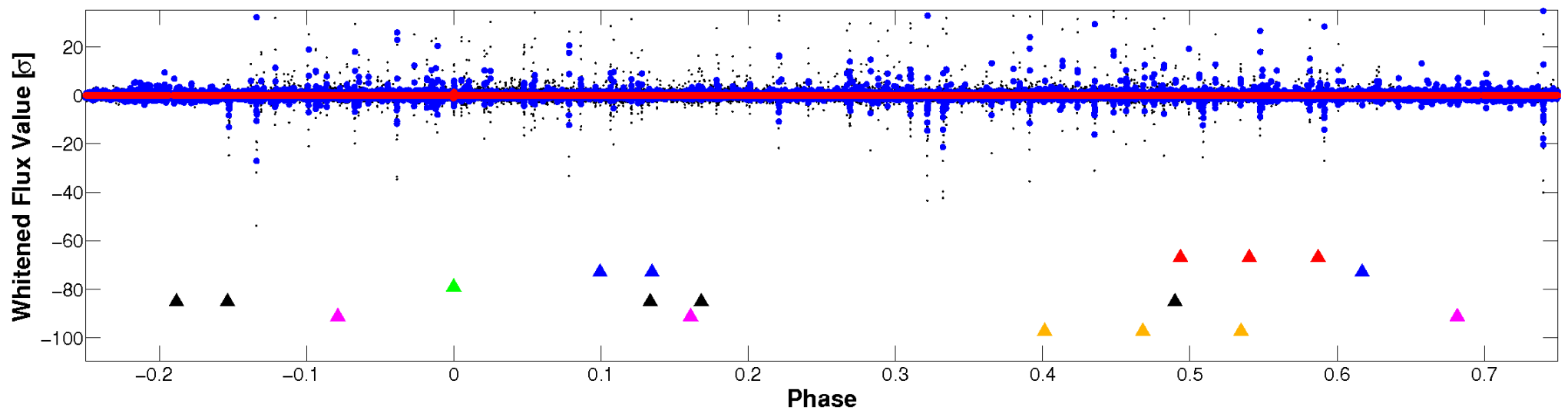


# Non-Whitened Vs. Whitened Light Curve

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

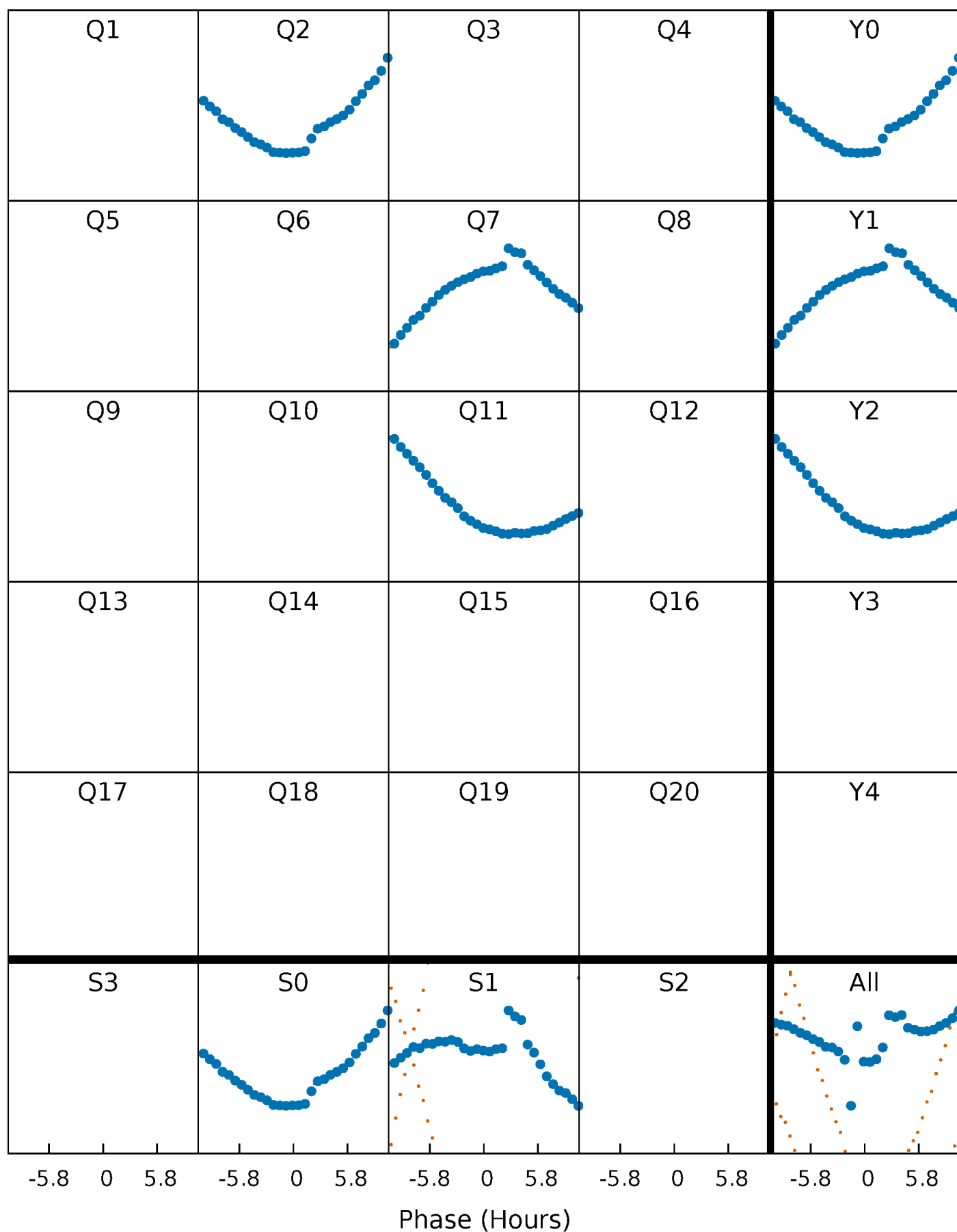


**Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

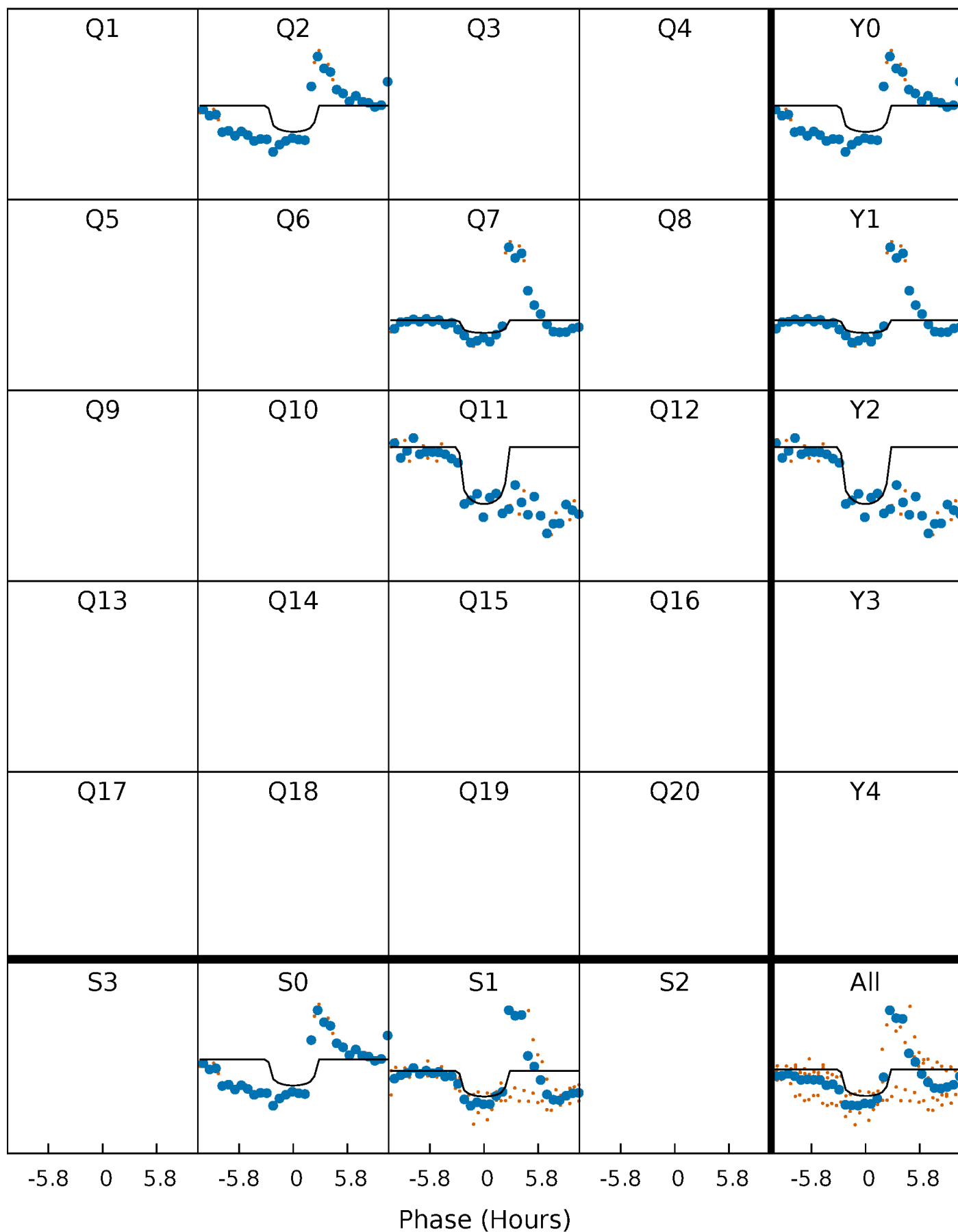
TCE 004569930-03     $P=426.732864$  Days     $T_0=206.493021$  (BKJD)





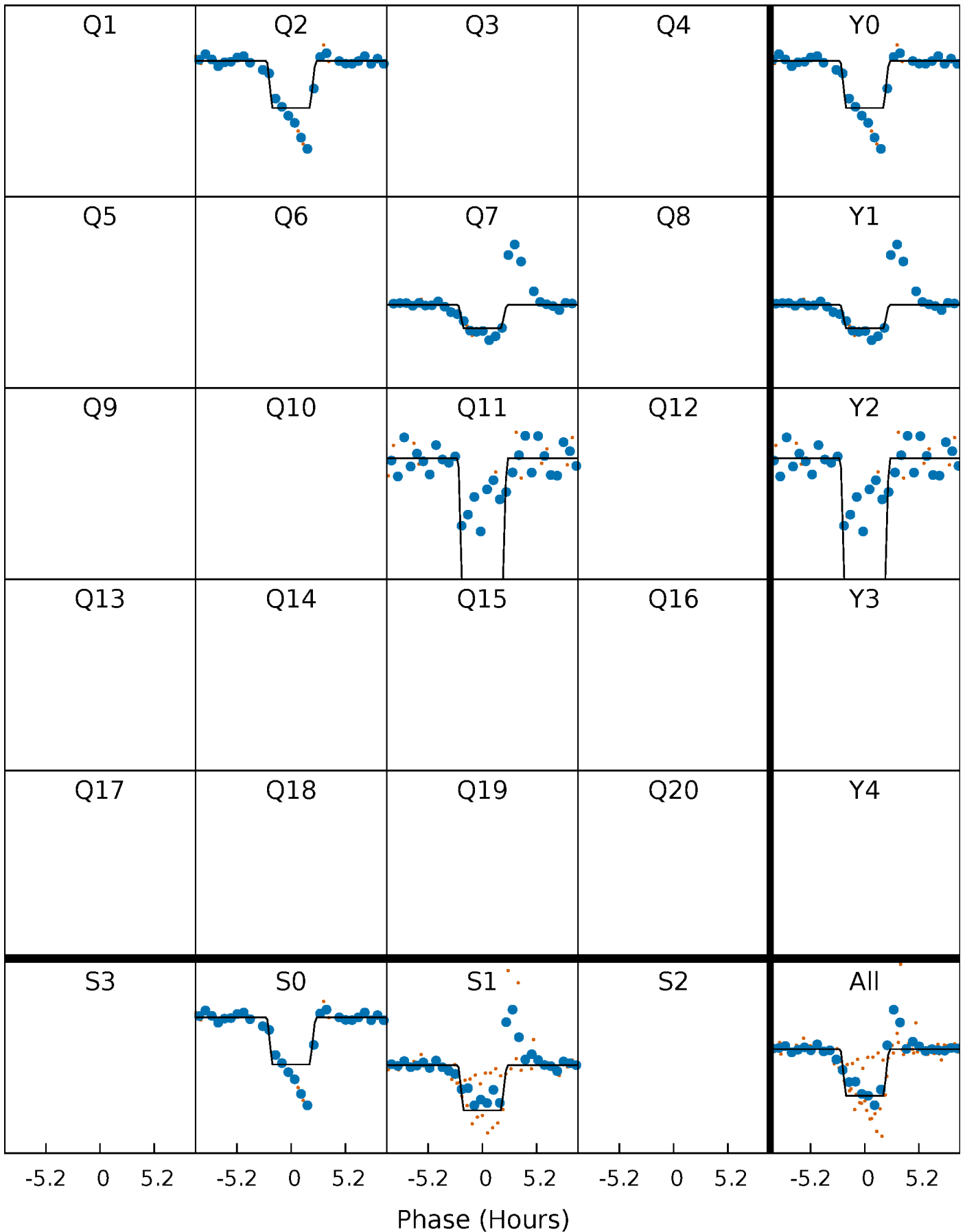
# DV Quarter-Phased Transit Curves

TCE 004569930-03     $P=426.732864$  Days     $T_0=206.493021$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

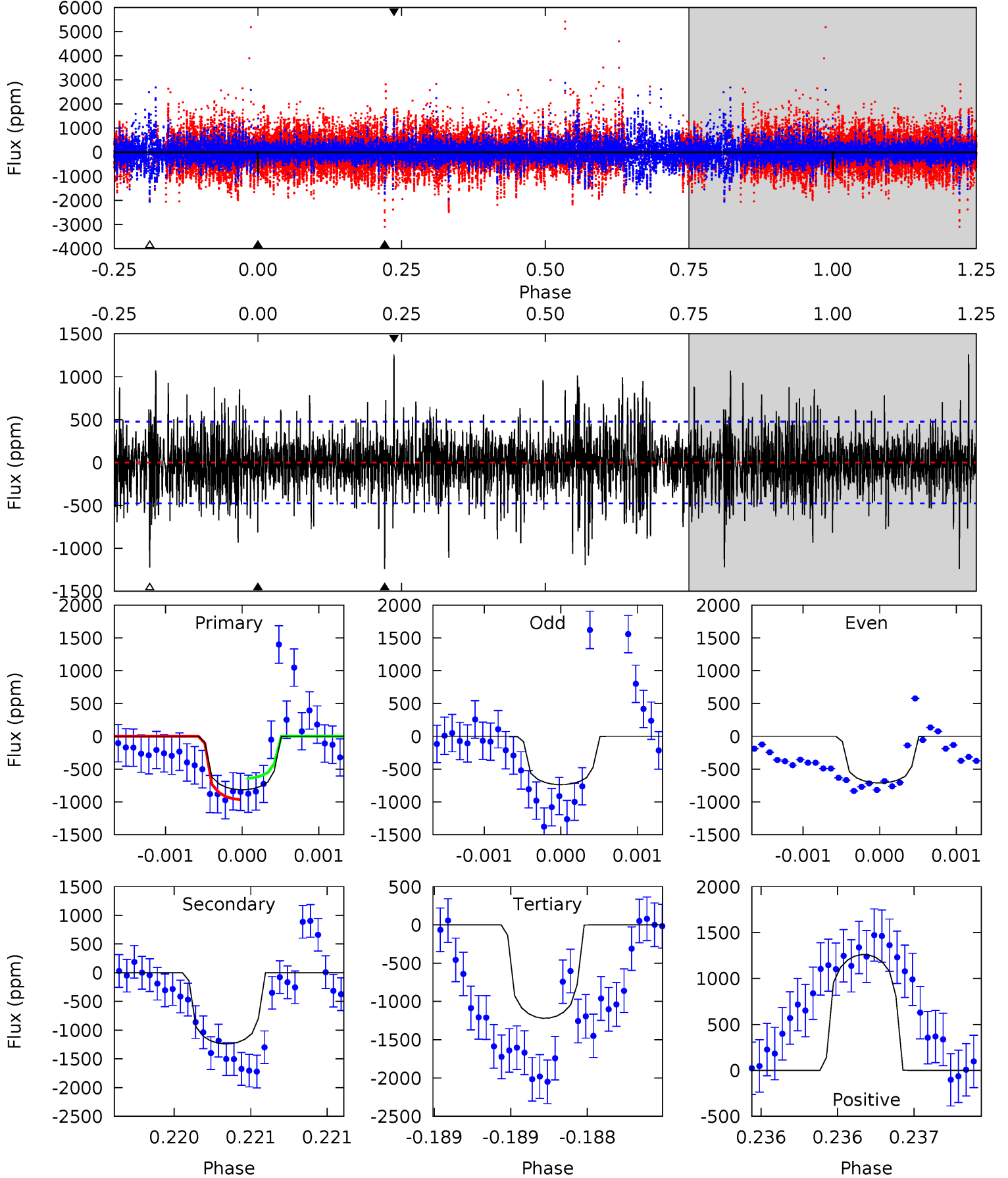
TCE 004569930-03 P=426.741278 Days  $T_0=206.478619$  (BKJD)



# DV Model-Shift Uniqueness Test

004569930-03, P = 426.732864 Days, E = 206.493021 Days

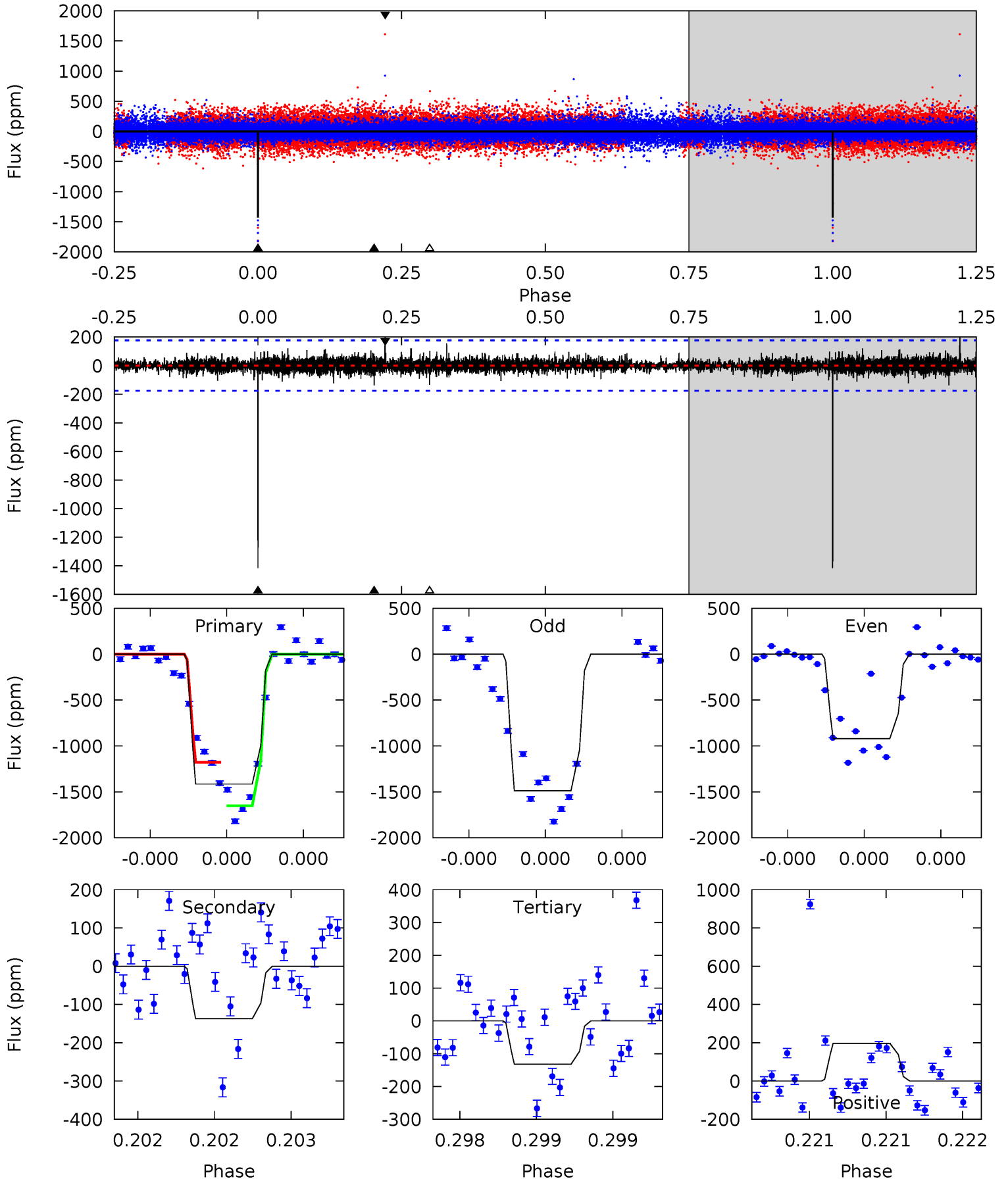
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
9.54	14.5	14.3	14.7	5.56	3.47	2.92	-4.74	-5.21	0.23	-0.24	0.10	1.01	0.50	1.86



# Alt Model-Shift Uniqueness Test

004569930-03, P = 426.741278 Days, E = 206.478619 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
44.9	4.35	4.19	6.25	5.60	3.52	0.79	40.7	38.7	0.16	-1.90	10.3	0.75	0.12	0



### Stellar Parameters For KIC 004569930

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$6008^{+81}_{-81}$	$3.850^{+0.217}_{-0.093}$	$-0.160^{+0.150}_{-0.150}$	$2.166^{+0.330}_{-0.613}$	$1.211^{+0.125}_{-0.172}$	$0.168^{+0.217}_{-0.050}$
	+1%/-1%	+6%/-2%	+94%/-94%	+15%/-28%	+10%/-14%	+129%/-30%
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 004569930-03 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-1239 \pm 85$	$7.55^{+7.21}_{-5.13}$	$496^{+23}_{-34}$	$6197^{+6566}_{-1609}$	$16894^{+141329}_{-12601}$
Alt.	$-137 \pm 32$	$9.51^{+7.47}_{-5.90}$	$498^{+20}_{-33}$	$3637^{+1571}_{-606}$	$1200^{+6518}_{-845}$

$T_{max}$  = 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

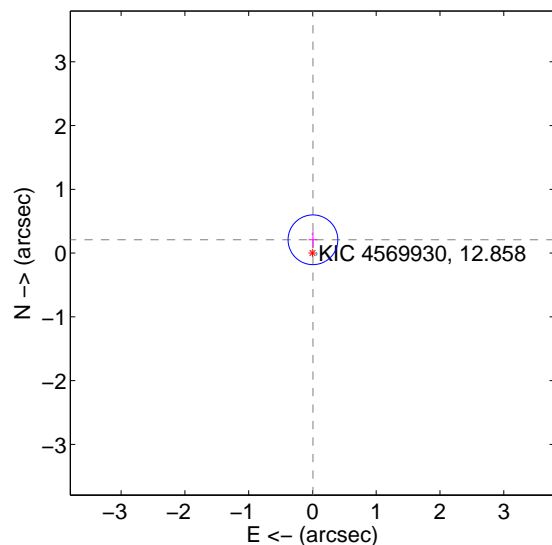
Supplemental centroid analysis for 004569930-03. Kepler magnitude: 12.86. Transit SNR 4.94

There are 2 quarters with good PRF difference image offsets

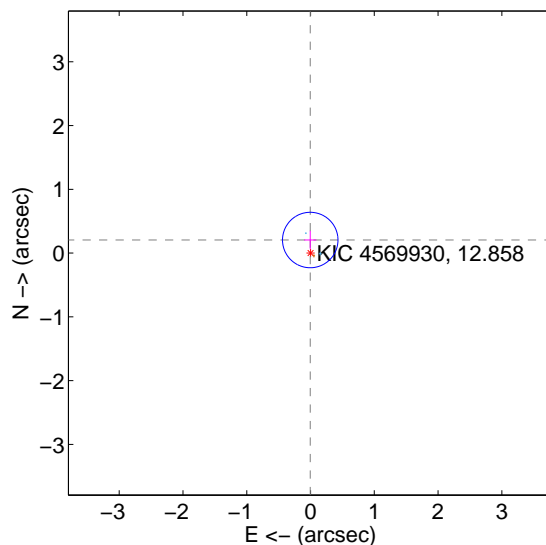
The direct PRF centroid is offset from the target star catalog position by about 0.09 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.209 \pm 0.130$	1.61	$-0.008 \pm 0.069$	$0.209 \pm 0.130$
PRF-fit source offset from KIC position	$0.205 \pm 0.145$	1.42	$0.004 \pm 0.095$	$0.205 \pm 0.145$
photometric centroid source offset	$1.28 \pm 0.63$	2.04	$-0.49 \pm 0.51$	$1.18 \pm 0.65$

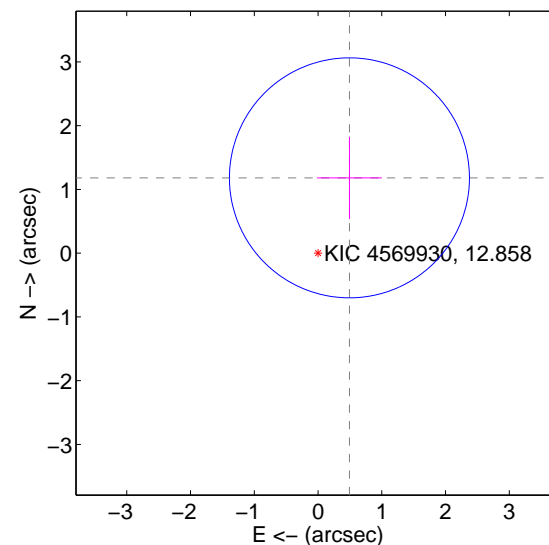
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

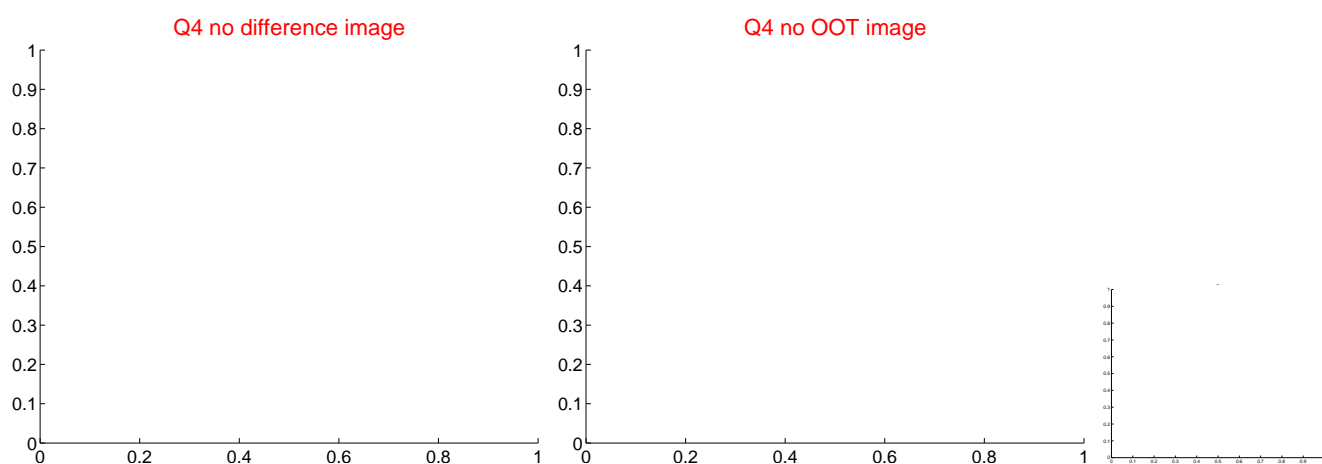
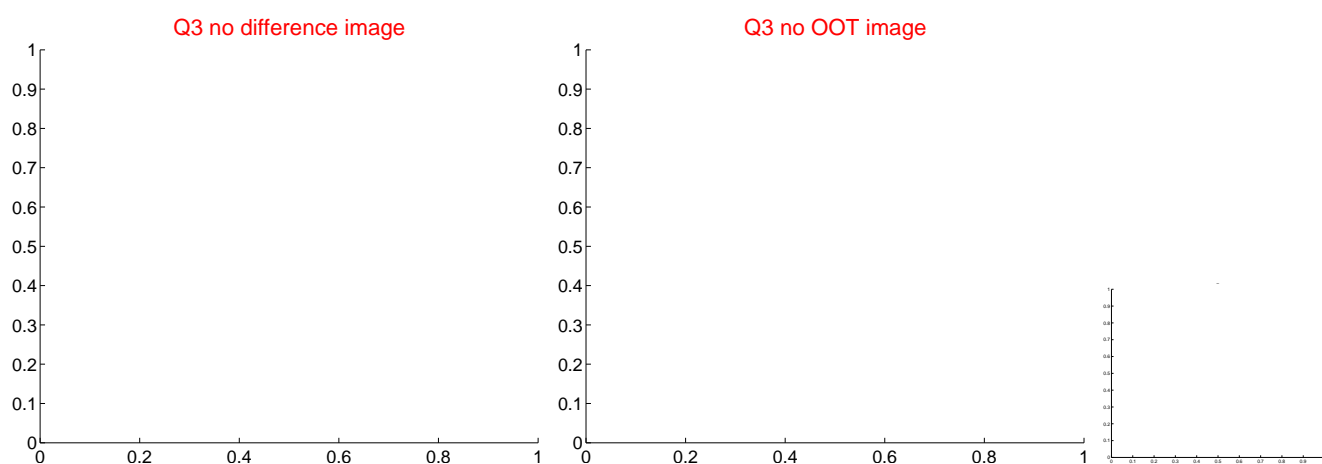
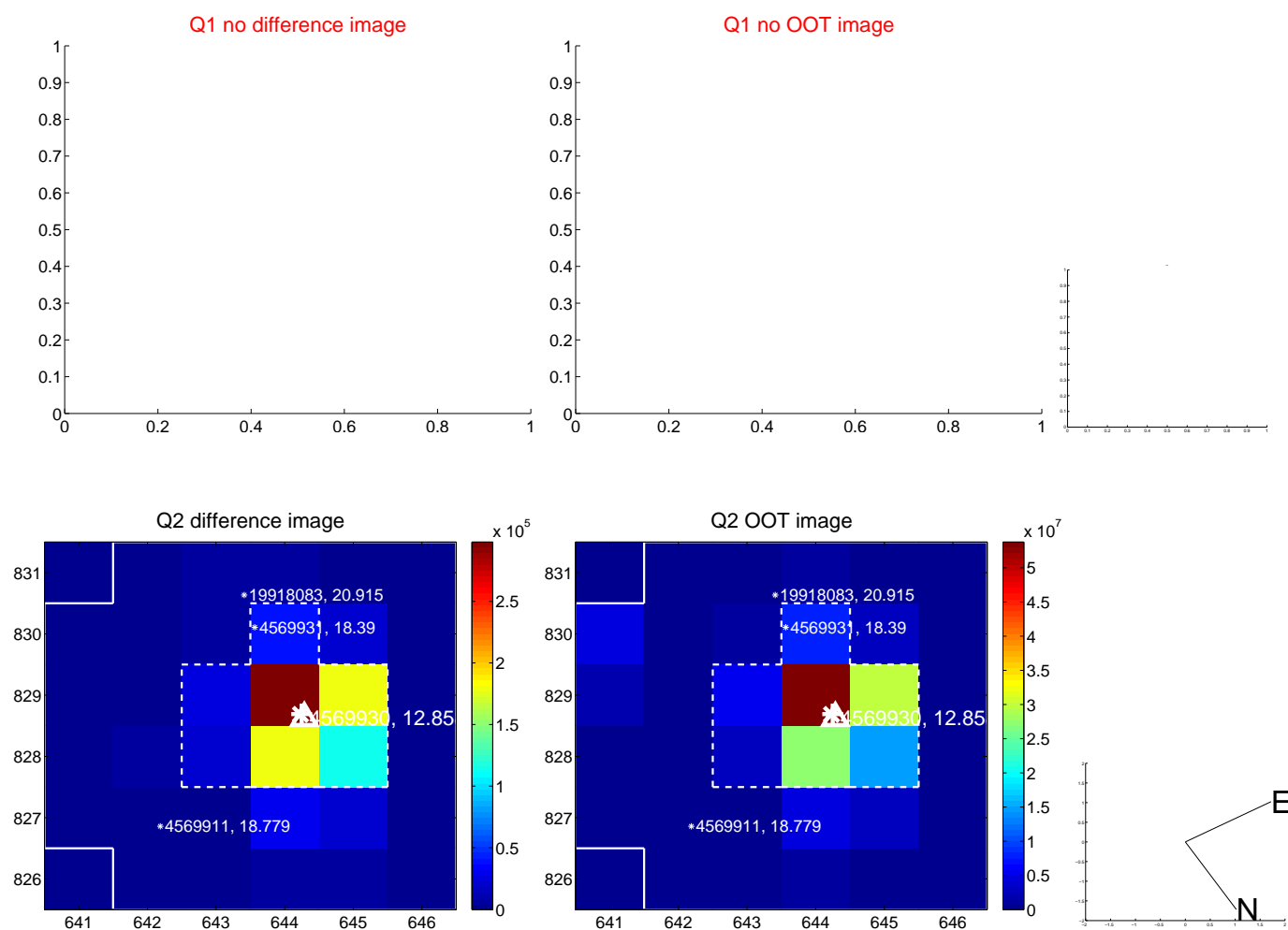


offset from photometric centroids

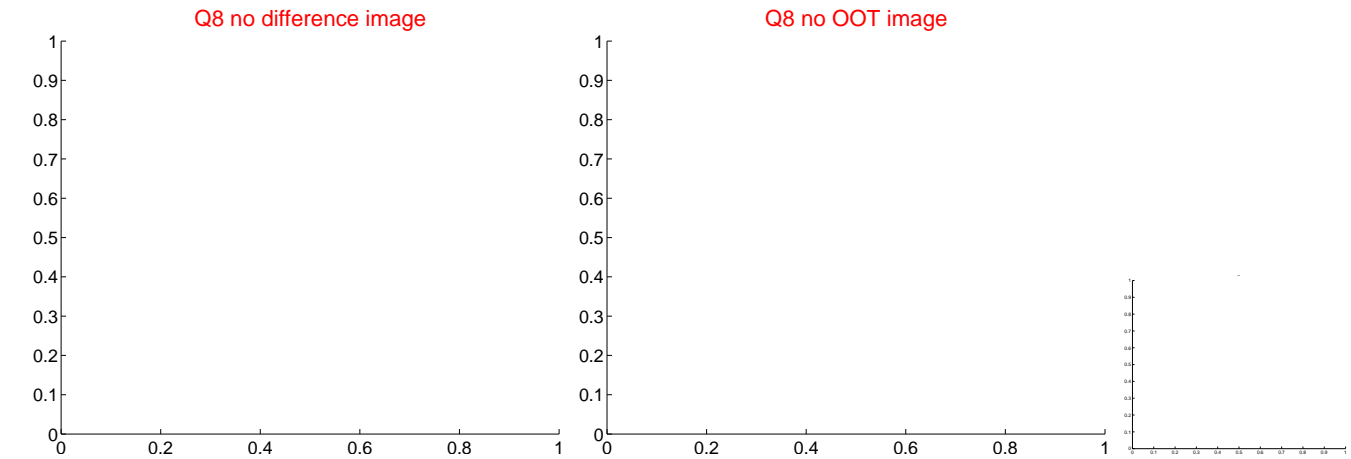
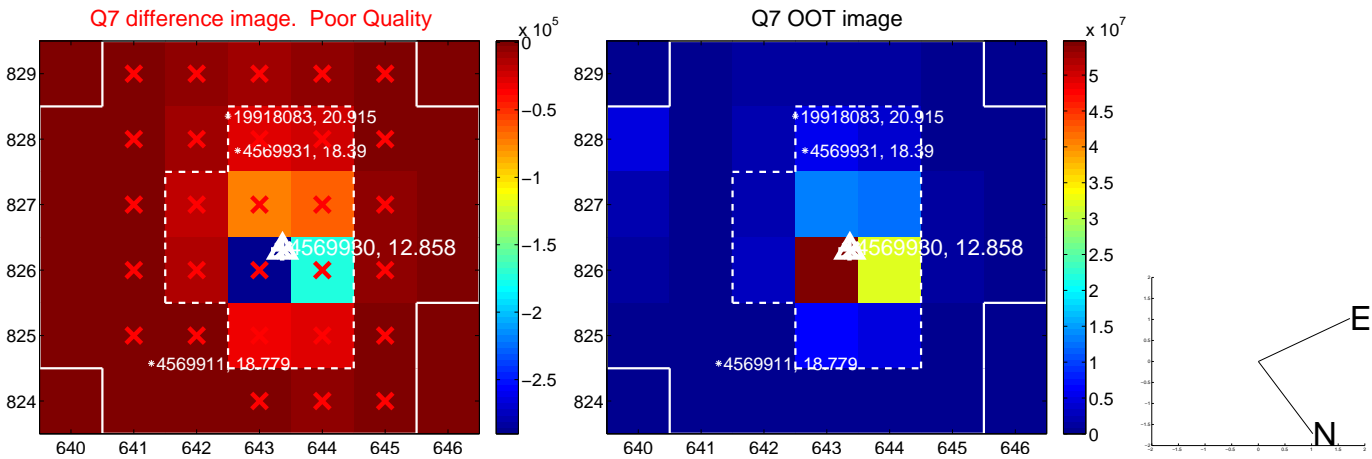
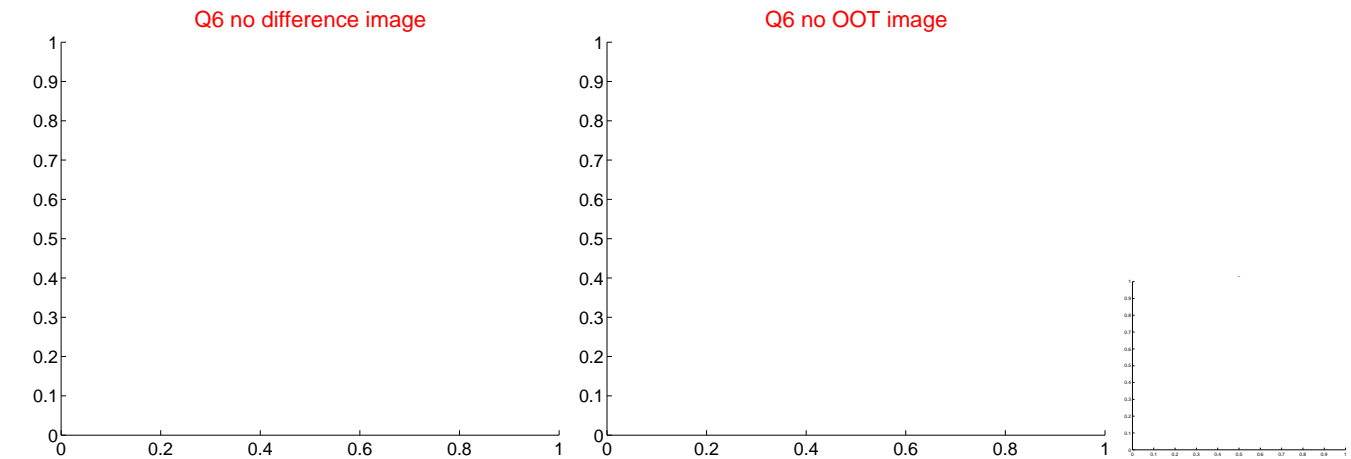
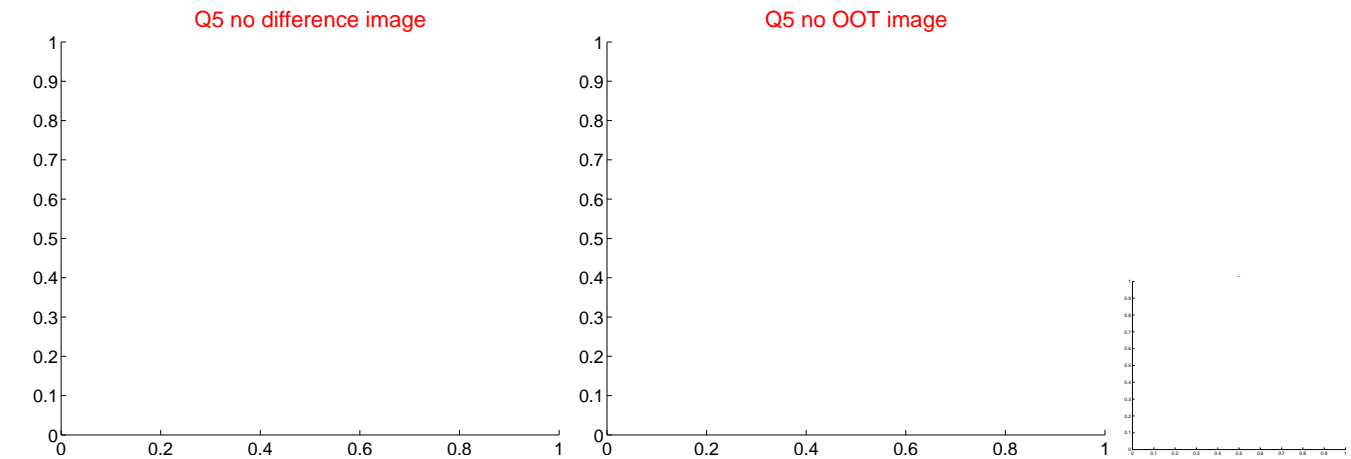


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

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

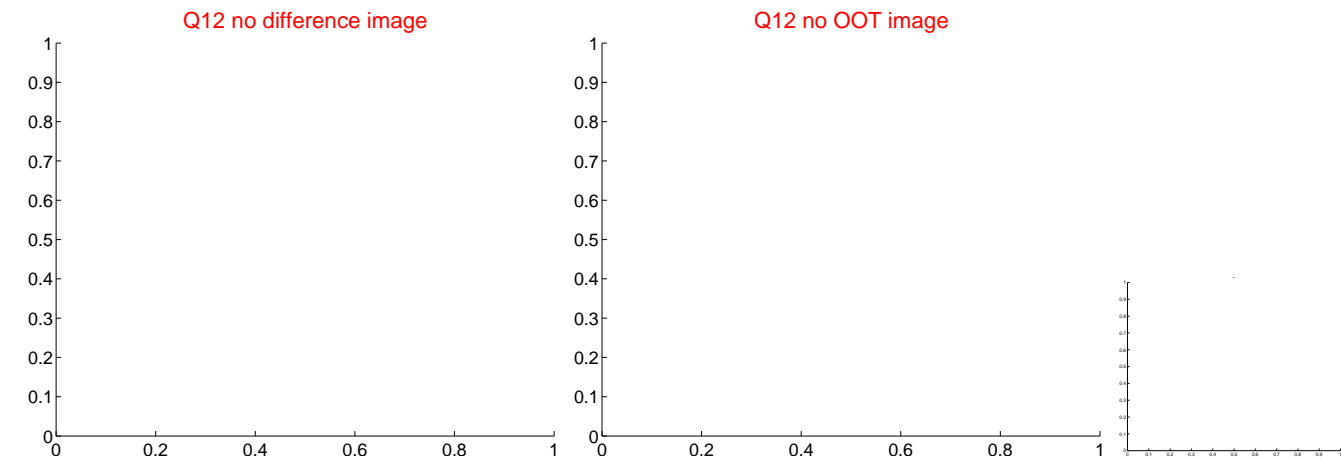
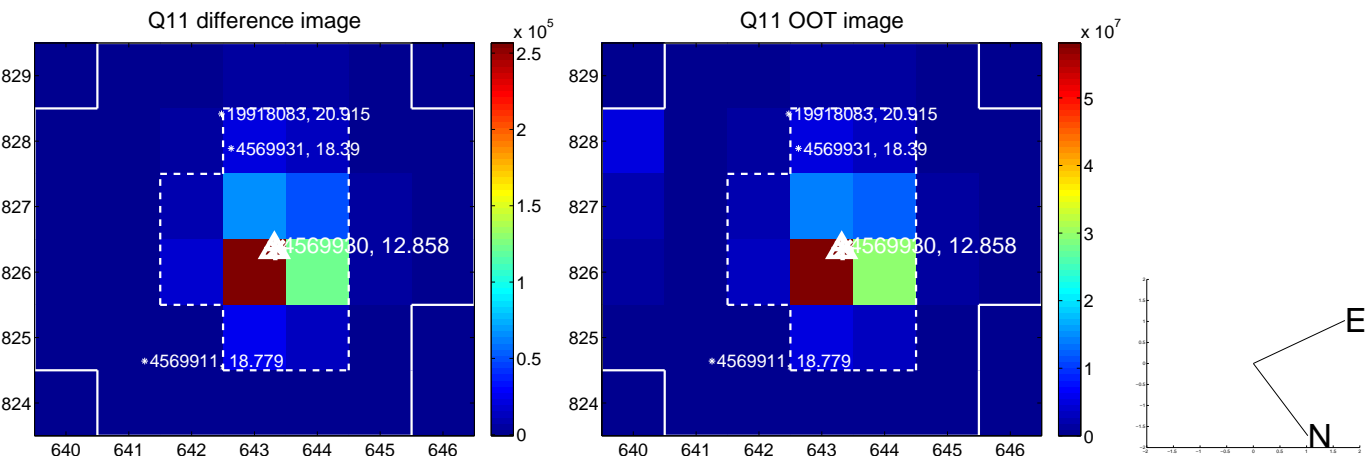


white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.





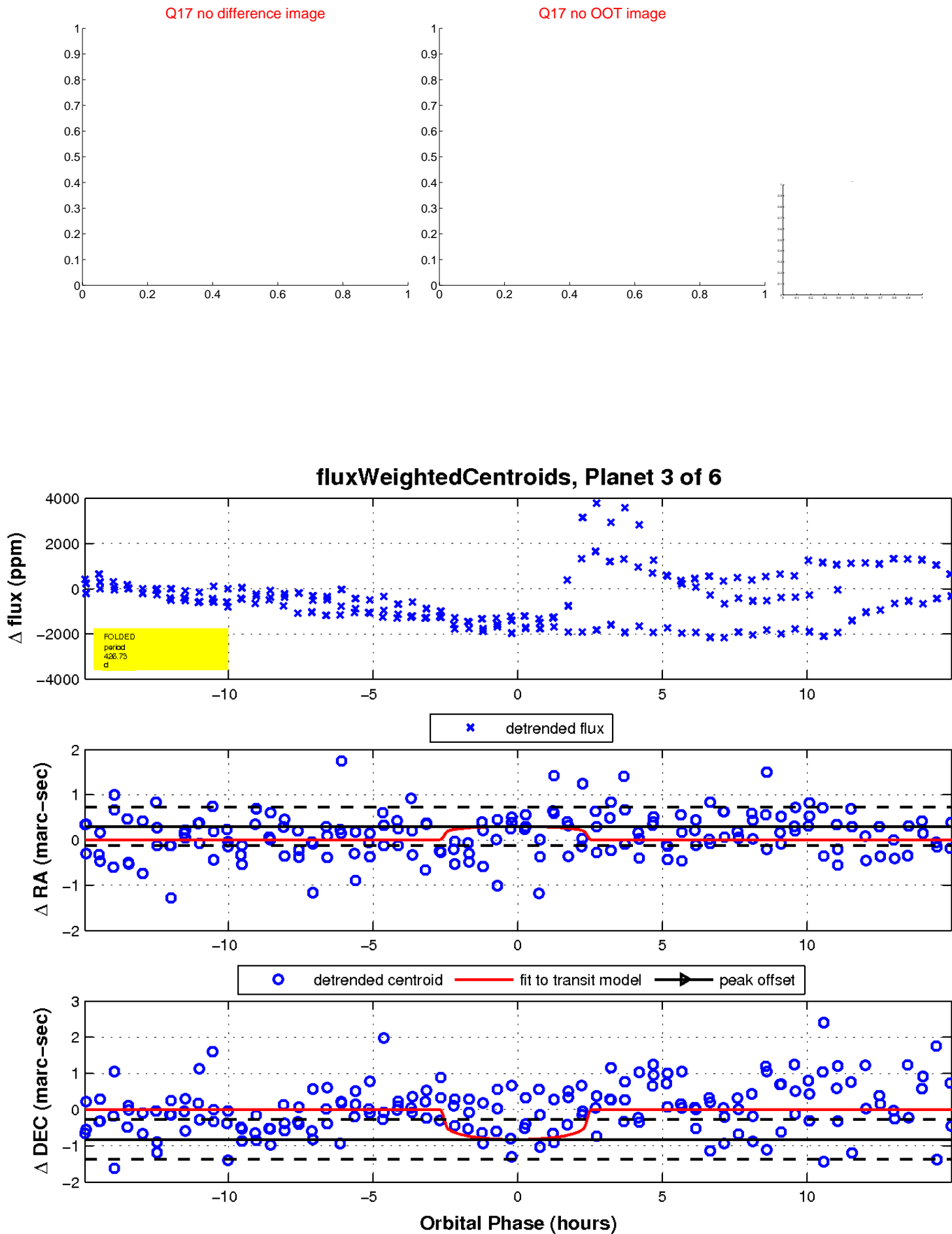
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



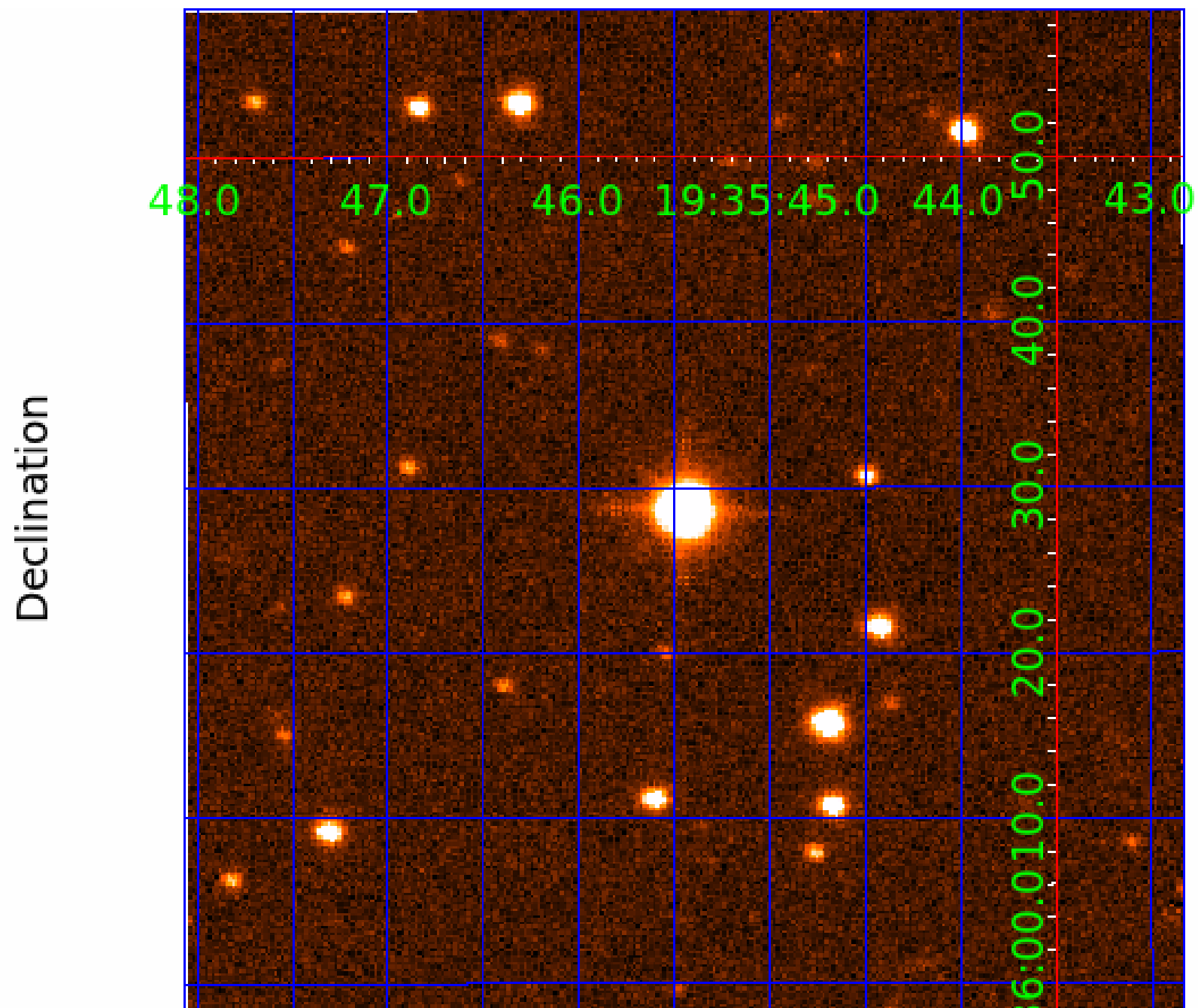
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



UKIRT Image



# KIC 004569930

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
004569930-01	OBS	No	406.773692	457.039663	804.6	2.529	15.8	7.9	2.17	6008	6.73	4.17
004569930-02	OBS	No	632.575405	263.952019	806.0	7.372	10.6	5.4	2.17	6008	6.31	2.32
004569930-03	OBS	No	426.732864	206.493021	661.6	5.108	17.2	4.9	2.17	6008	5.63	3.92
004569930-04	OBS	No	289.421898	263.435341	477.5	5.384	13.3	4.2	2.17	6008	5.13	6.57
004569930-05	OBS	No	528.993473	497.365064	363.0	0.564	13.0	2.8	2.17	6008	5.43	2.94
004569930-06	OBS	No	398.271945	434.694599	503.7	3.000	13.3	-1.0	2.17	6008	4.87	4.29

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004569930-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
004569930-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS
004569930-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
004569930-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS
004569930-05	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES_MARSHALL_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS—HALO_GHOST
004569930-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_NOFITS

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

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

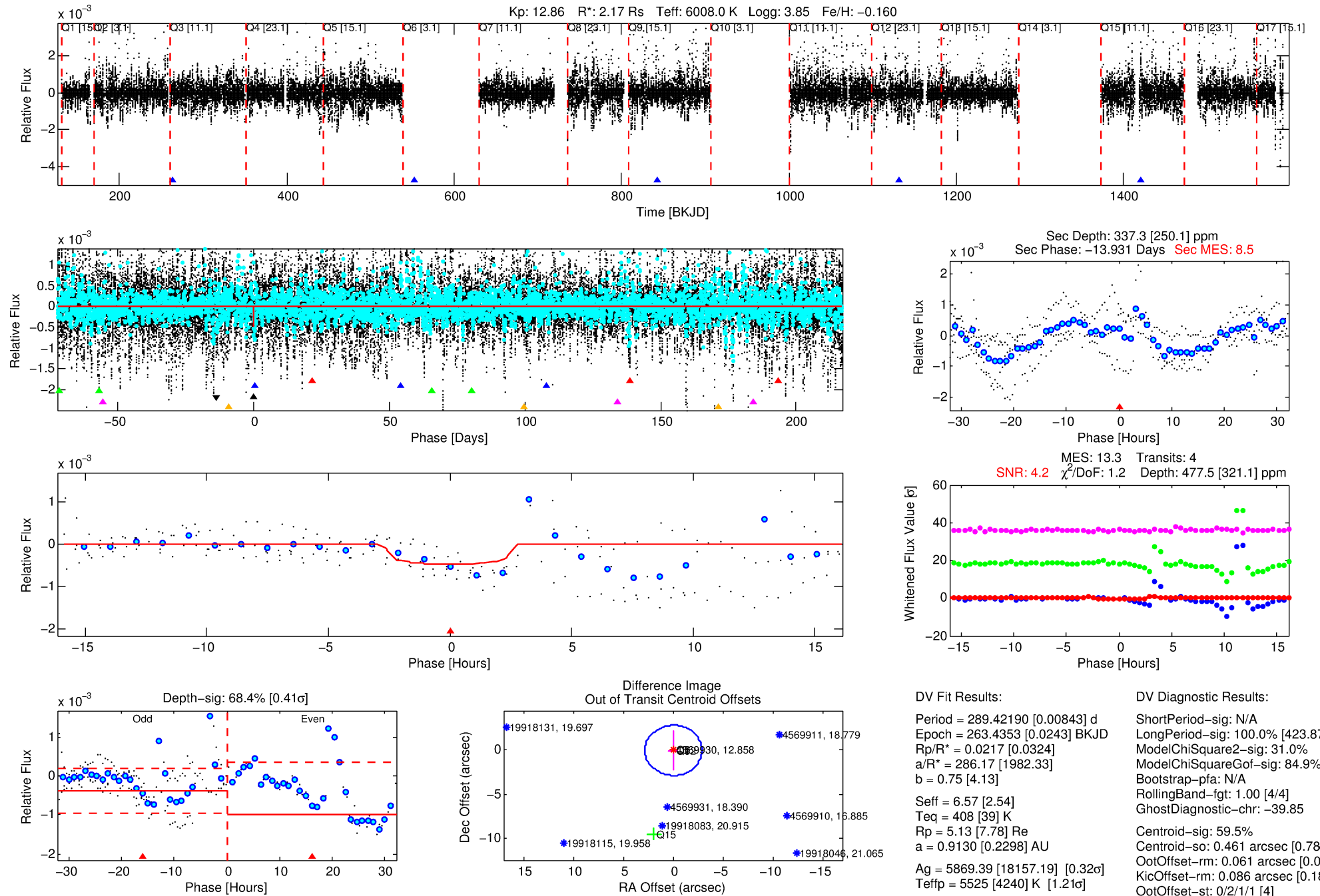
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 004569930-04

No Significant Match Found

# DV One-Page Summary

KIC: 4569930 Candidate: 4 of 6 Period: 289.422 d



## DV Fit Results:

Period = 289.42190 [0.00843] d  
Epoch = 263.4353 [0.0243] BKJD  
Rp/R\* = 0.0217 [0.0324]  
a/R\* = 286.17 [1982.33]  
b = 0.75 [4.13]  
Seff = 6.57 [2.54]  
Teq = 408 [39] K  
Rp = 5.13 [7.78] Re  
a = 0.9130 [0.2298] AU  
Ag = 5869.39 [18157.19] [0.32 $\sigma$ ]  
Teff = 5525 [4240] K [1.21 $\sigma$ ]

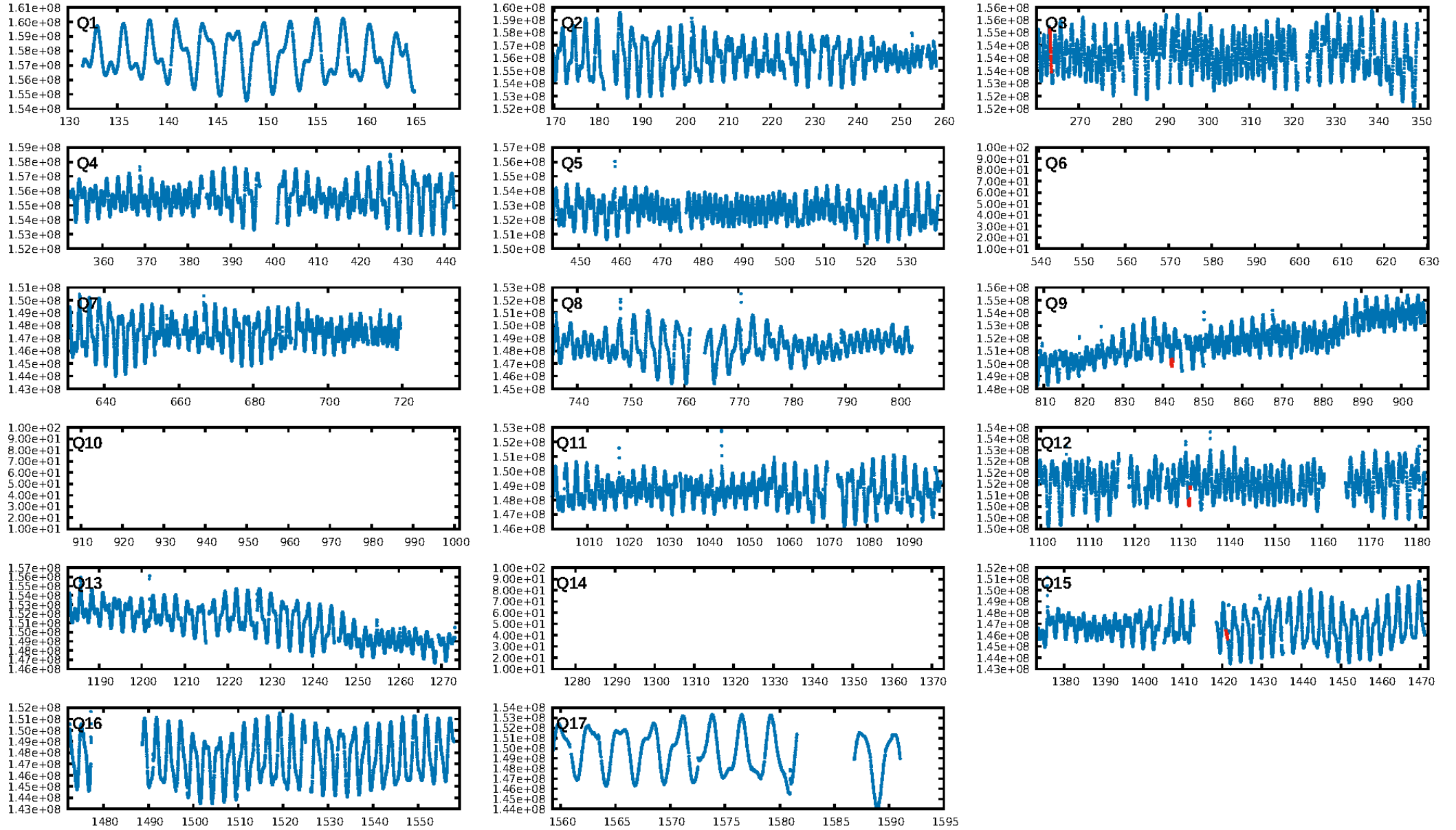
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [423.87 $\sigma$ ]  
ModelChiSquare2-sig: 31.0%  
ModelChiSquareGof-sig: 84.9%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [4/4]  
GhostDiagnostic-chr: -39.85  
Centroid-sig: 59.5%  
Centroid-so: 0.461 arcsec [0.78 $\sigma$ ]  
OotOffset-rm: 0.061 arcsec [0.06 $\sigma$ ]  
KicOffset-rm: 0.086 arcsec [0.18 $\sigma$ ]  
OotOffset-st: 0/2/1/1 [4]  
KicOffset-st: 0/2/1/1 [4]  
DiffImageQuality-fgm: 0.50 [2/4]  
DiffImageOverlap-fno: 0.75 [3/4]

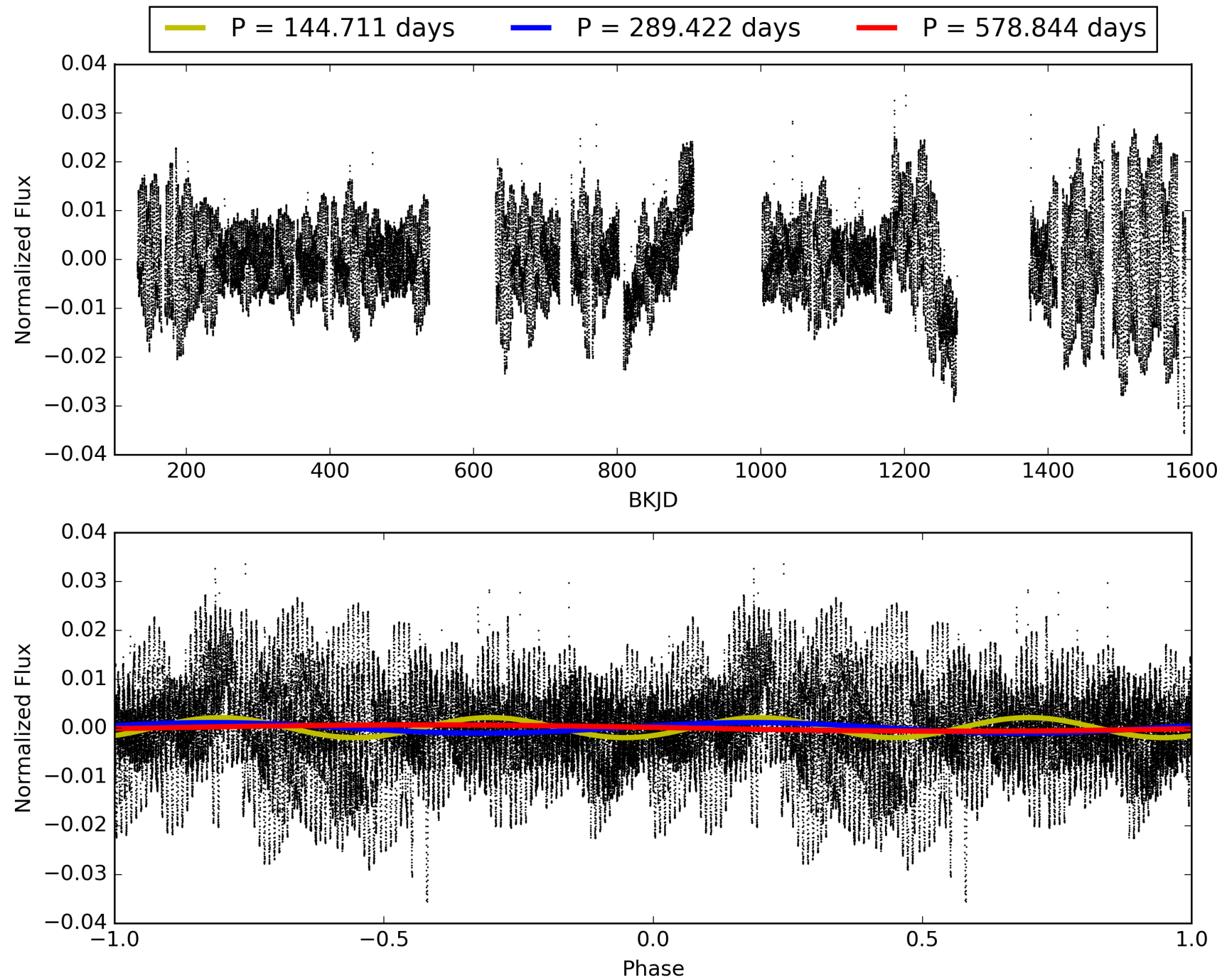
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 12:58:01 Z

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

# TCE 004569930-04, PDC Light Curves



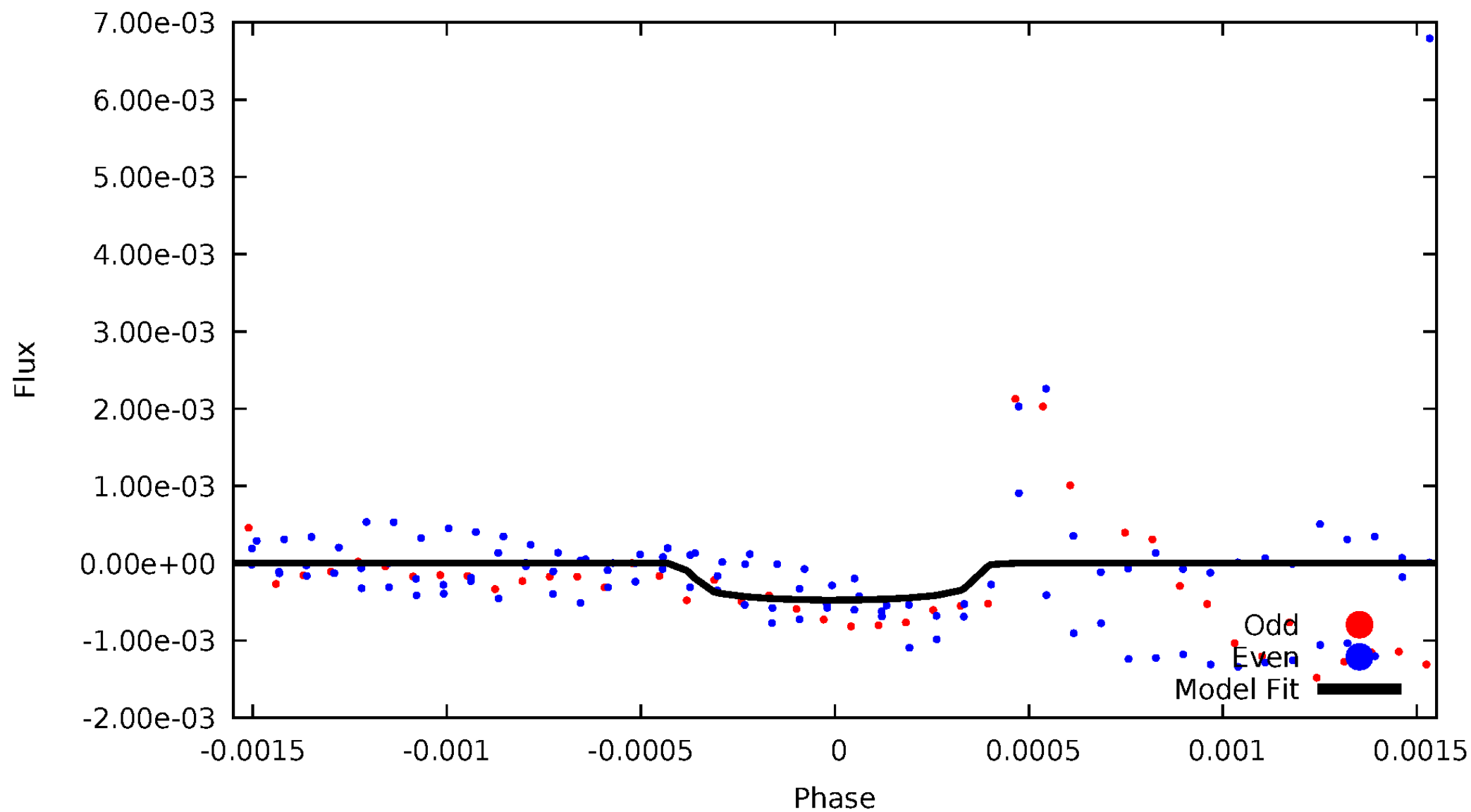
TCE 004569930-04





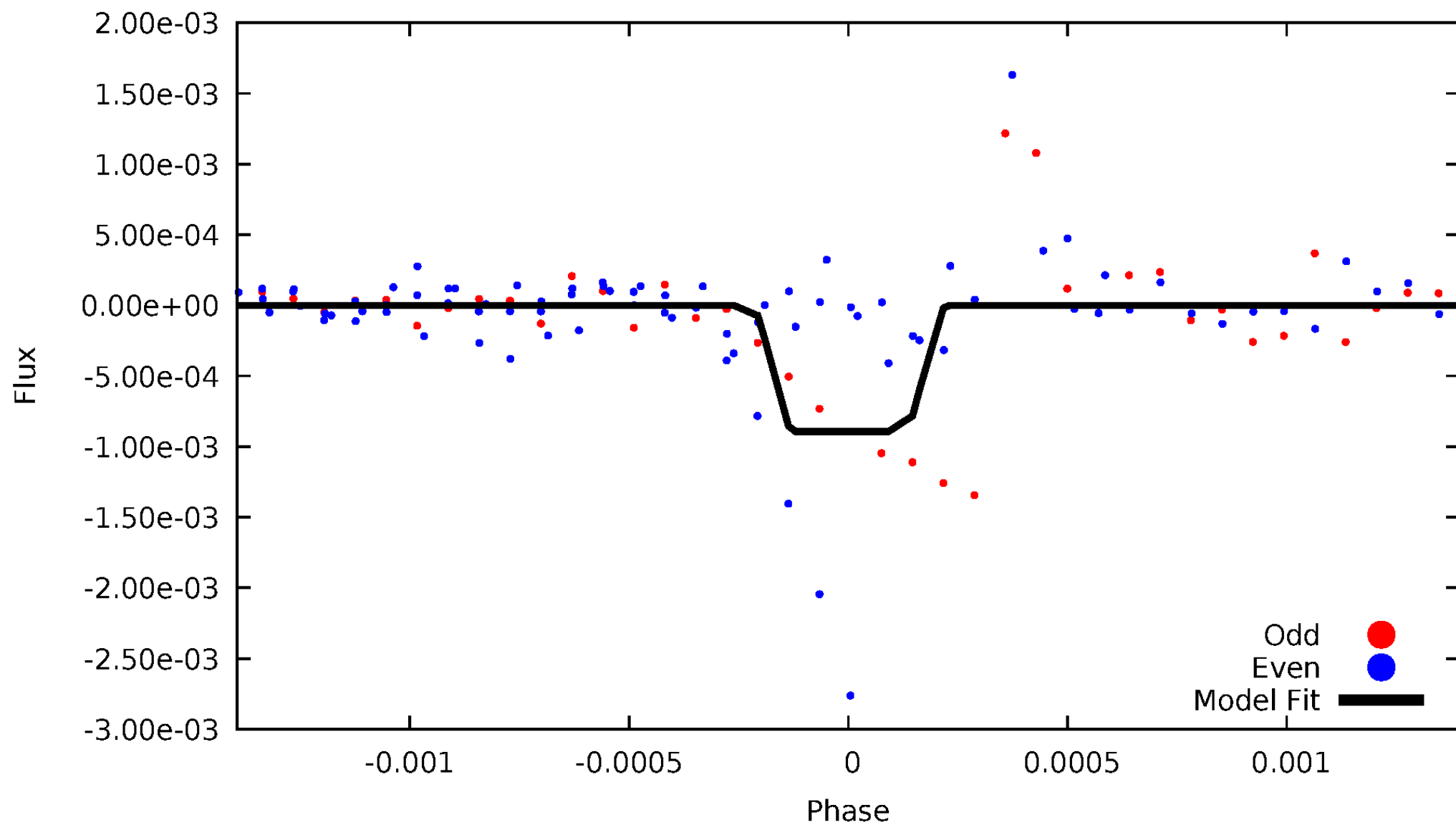
# DV Odd/Even

TCE 004569930-04



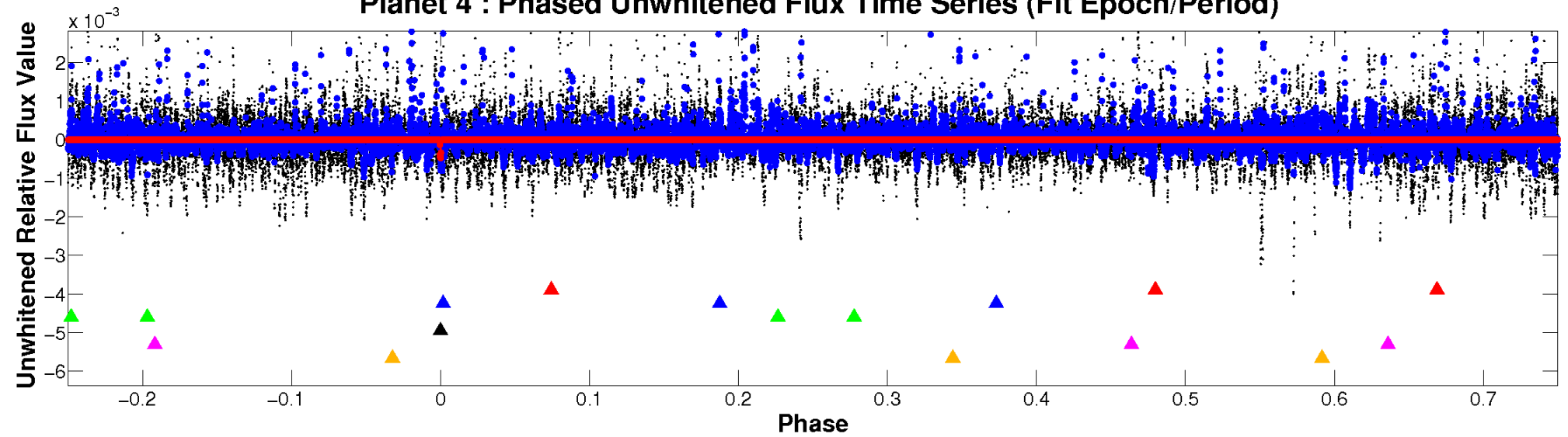
# ALT Odd/Even

TCE 004569930-04

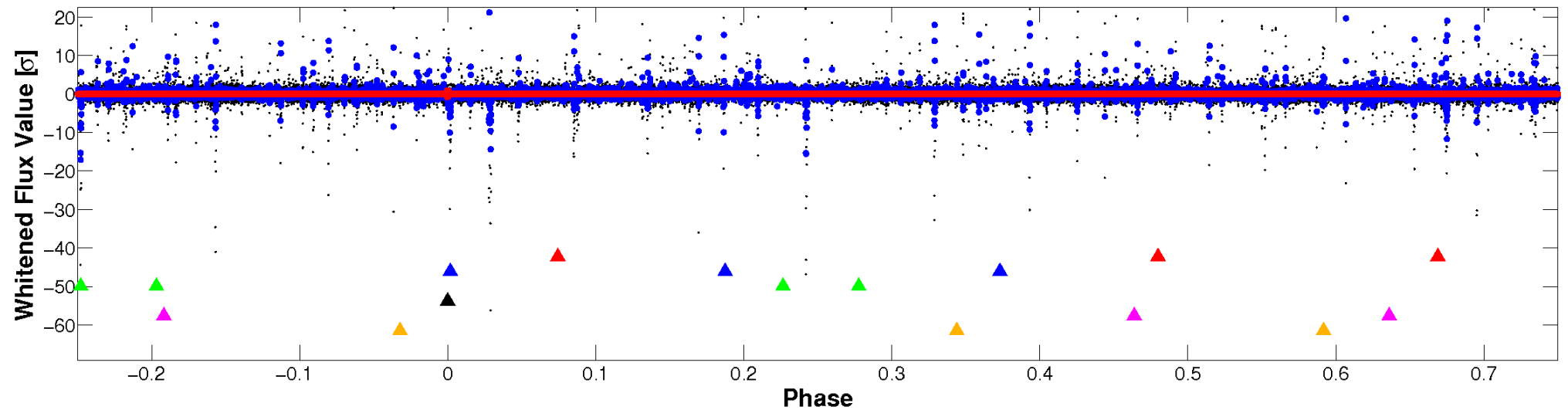


# Non-Whitened Vs. Whitened Light Curve

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

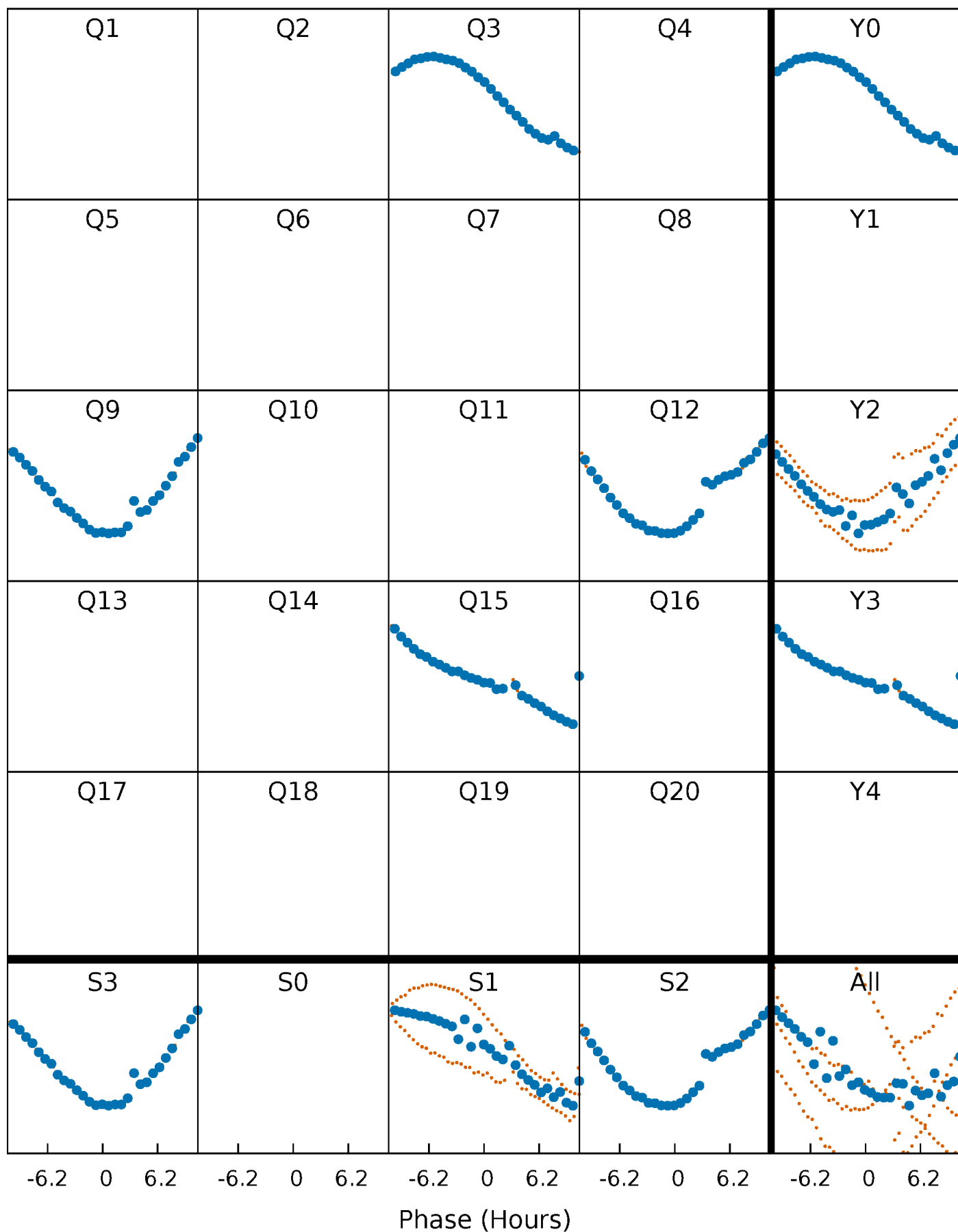


## Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



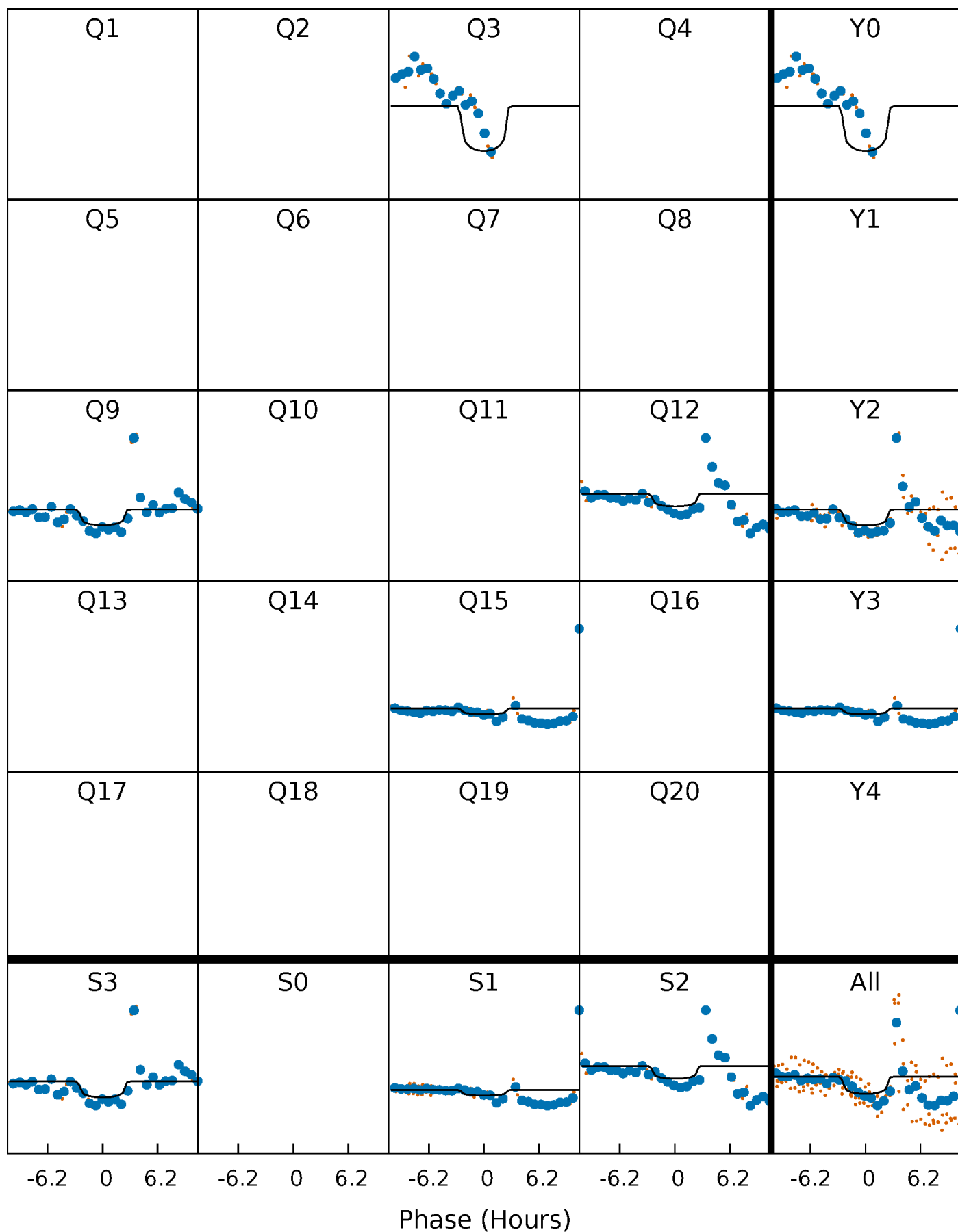
# PDC Quarter-Phased Transit Curves

TCE 004569930-04 P=289.421898 Days  $T_0=263.435341$  (BKJD)



# DV Quarter-Phased Transit Curves

TCE 004569930-04     $P=289.421898$  Days     $T_0=263.435341$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

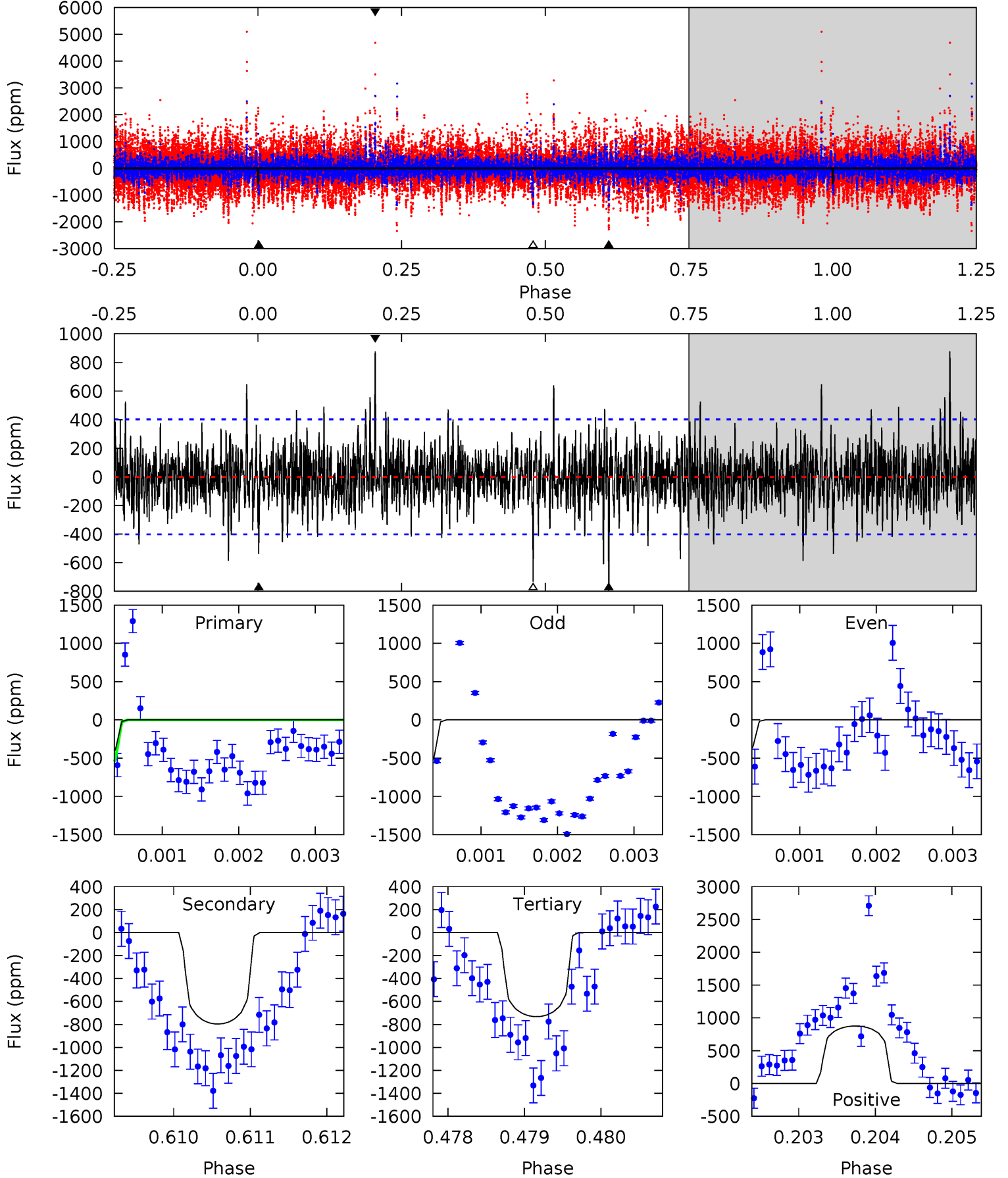
TCE 004569930-04     $P=289.419835$  Days     $T_0=263.472641$  (BKJD)



# DV Model-Shift Uniqueness Test

004569930-04, P = 289.421898 Days, E = 263.435341 Days

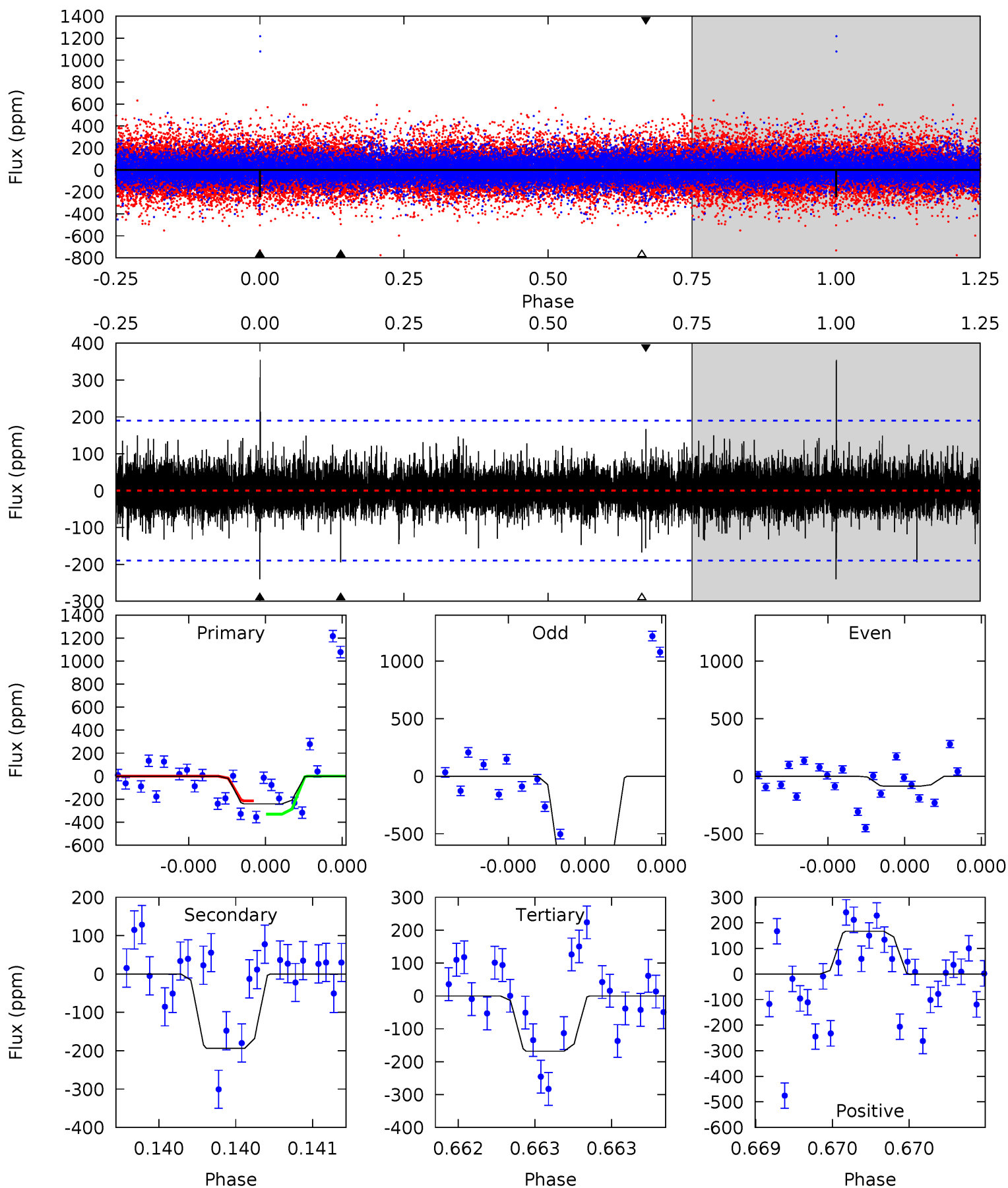
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
7.33	10.9	9.98	12.0	5.48	3.34	2.03	-2.65	-4.62	0.88	-1.09	0.96	0.85	0.52	2.20



# Alt Model-Shift Uniqueness Test

004569930-04, P = 289.419835 Days, E = 263.472641 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
7.10	5.72	4.96	4.93	5.60	3.52	1.02	2.14	2.16	0.77	0.79	13.3	1.58	0.60	0





### Stellar Parameters For KIC 004569930

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$6008^{+81}_{-81}$	$3.850^{+0.217}_{-0.093}$	$-0.160^{+0.150}_{-0.150}$	$2.166^{+0.330}_{-0.613}$	$1.211^{+0.125}_{-0.172}$	$0.168^{+0.217}_{-0.050}$
	+1%/-1%	+6%/-2%	+94%/-94%	+15%/-28%	+10%/-14%	+129%/-30%
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 004569930-04 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-797 \pm 73$	$7.14^{+6.25}_{-4.82}$	$567^{+26}_{-39}$	$5653^{+5406}_{-1297}$	$7098^{+61506}_{-5077}$
Alt.	$-194 \pm 34$	$7.91^{+7.76}_{-5.33}$	$567^{+26}_{-40}$	$4053^{+2804}_{-783}$	$1369^{+11996}_{-1029}$

$T_{max}$  = 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

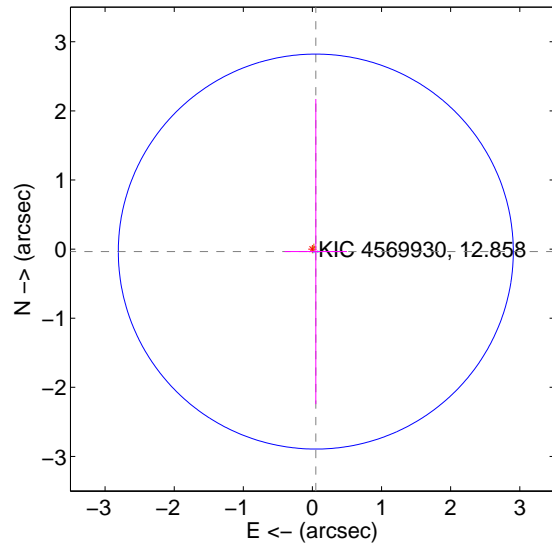
Supplemental centroid analysis for 004569930-04. Kepler magnitude: 12.86. Transit SNR 4.22

There are 2 quarters with good PRF difference image offsets

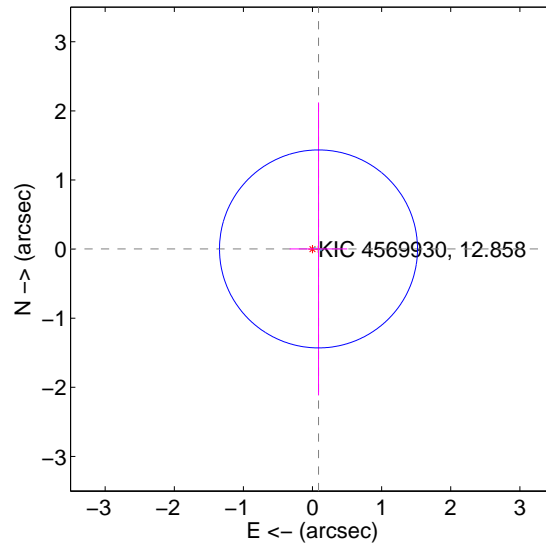
The direct PRF centroid is offset from the target star catalog position by about 0.10 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.061 \pm 0.952$	0.06	$-0.049 \pm 0.450$	$-0.036 \pm 2.207$
PRF-fit source offset from KIC position	$0.086 \pm 0.477$	0.18	$-0.086 \pm 0.416$	$0.003 \pm 2.119$
photometric centroid source offset	$0.46 \pm 0.59$	0.78	$-0.46 \pm 0.59$	$0.03 \pm 0.74$

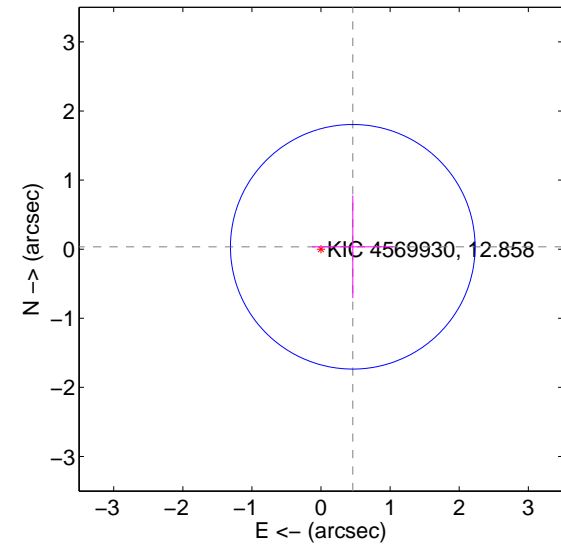
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

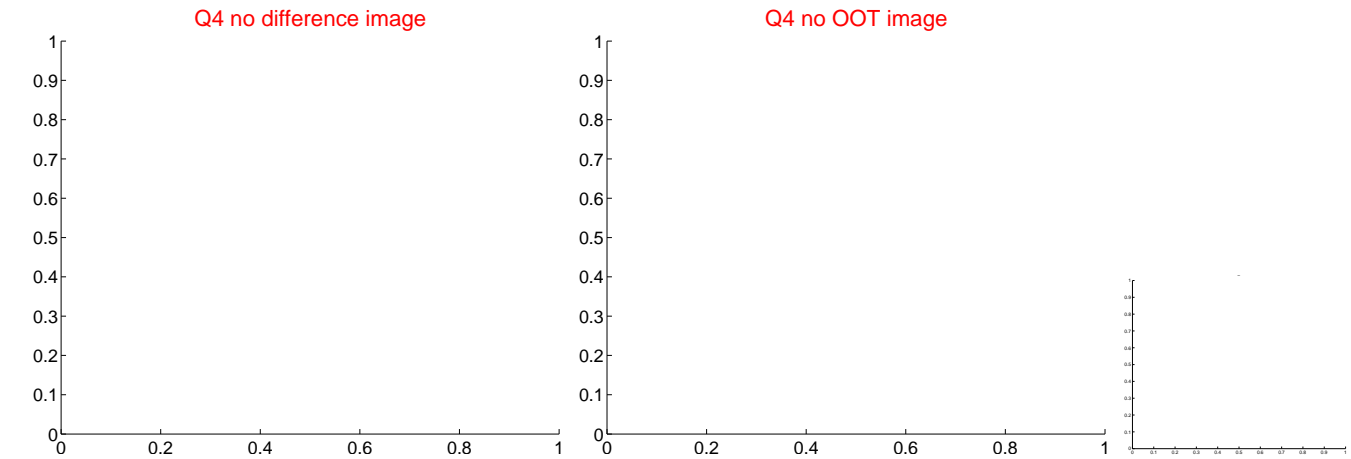
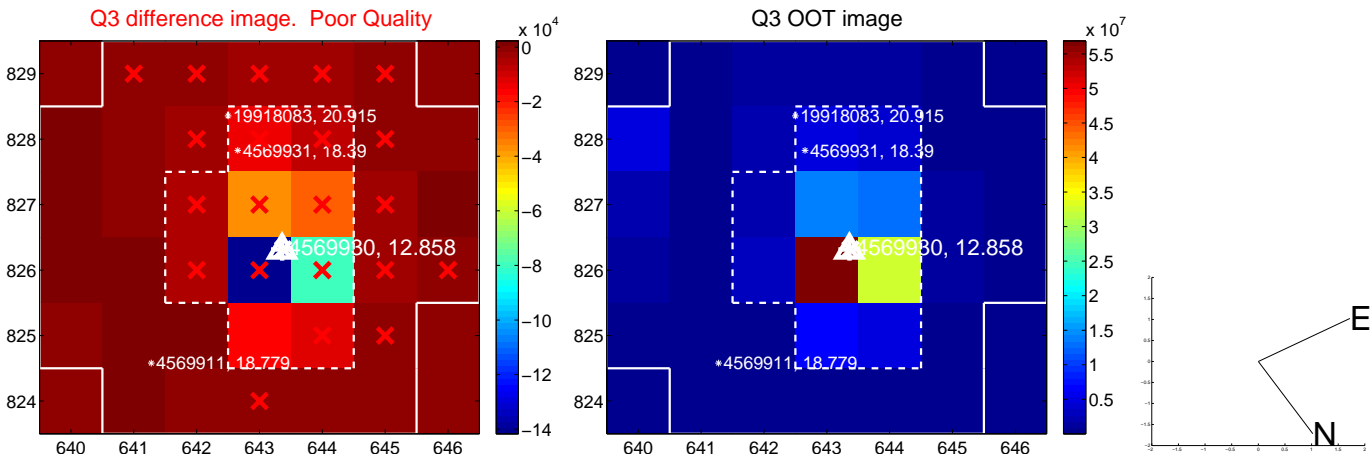
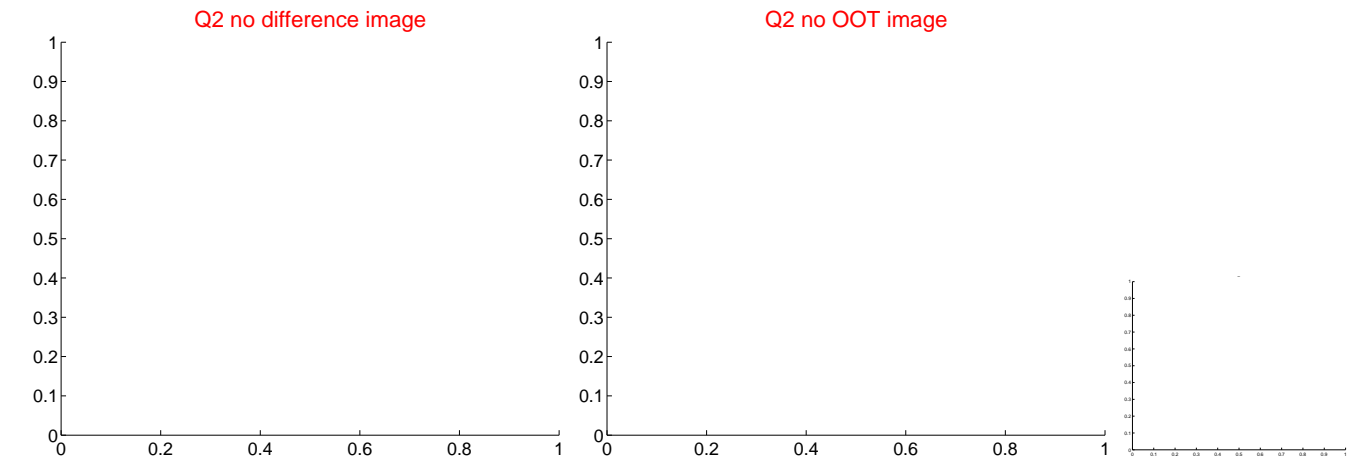
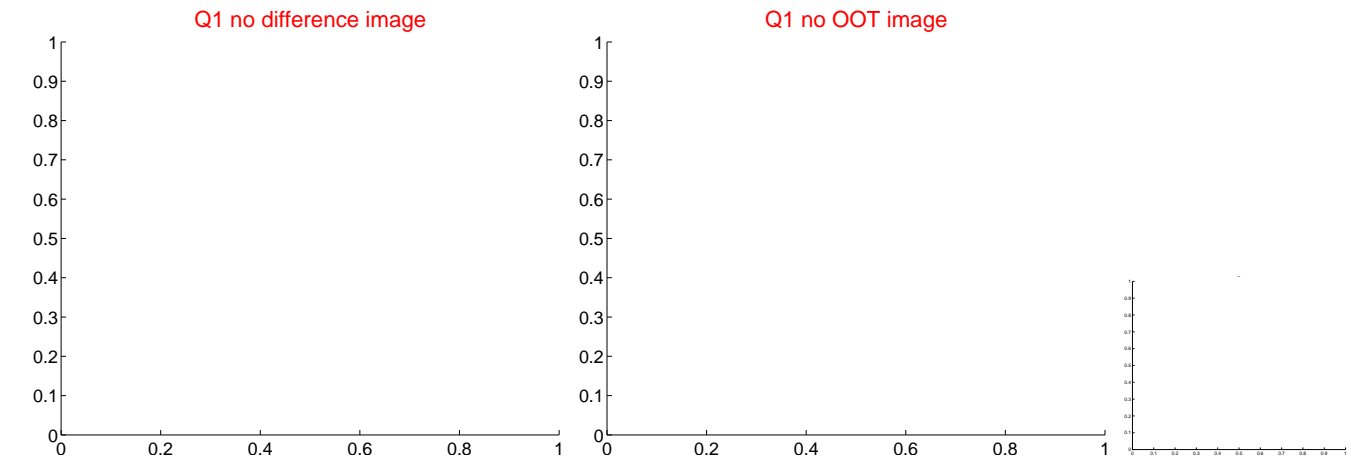


offset from photometric centroids



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

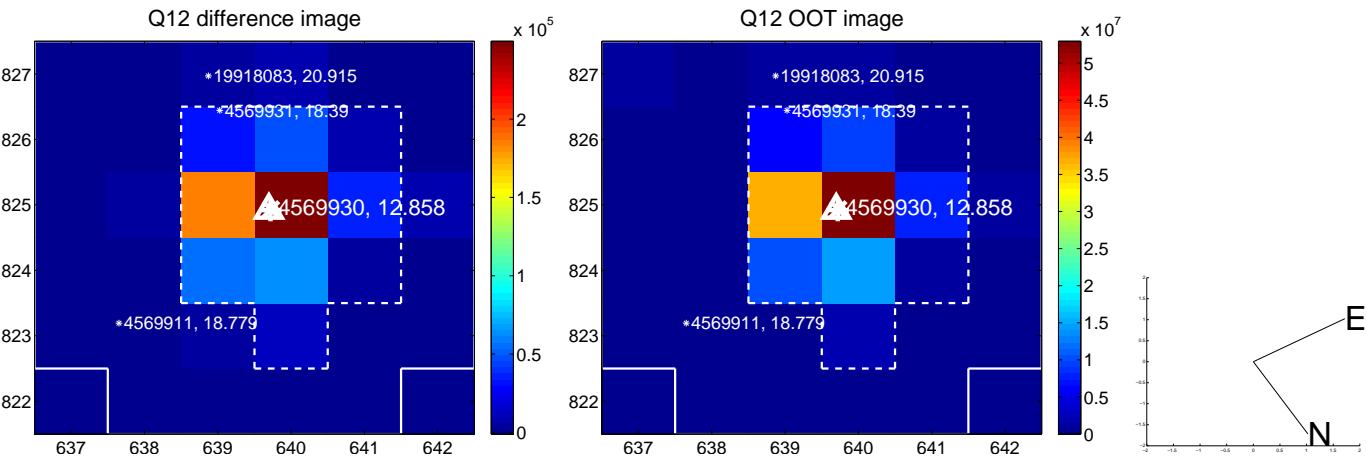
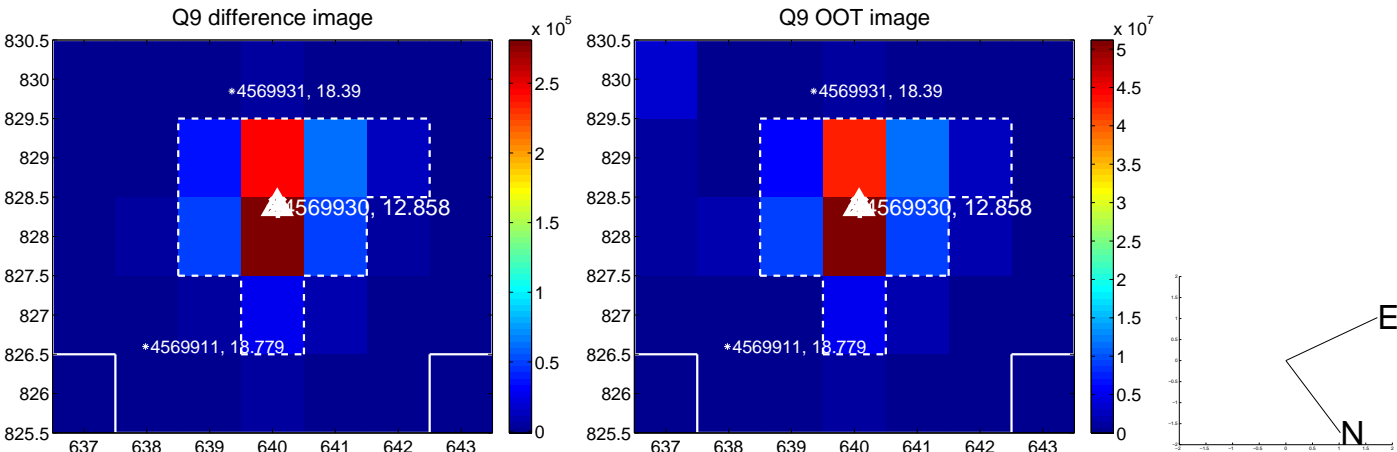
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



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



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

Q13 no difference image



Q13 no OOT image



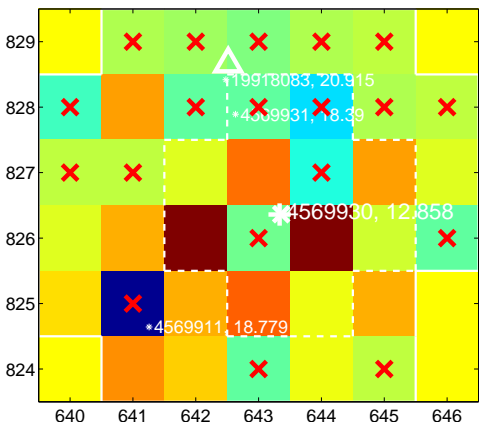
Q14 no difference image



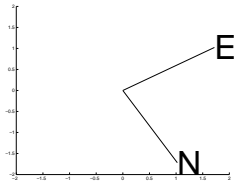
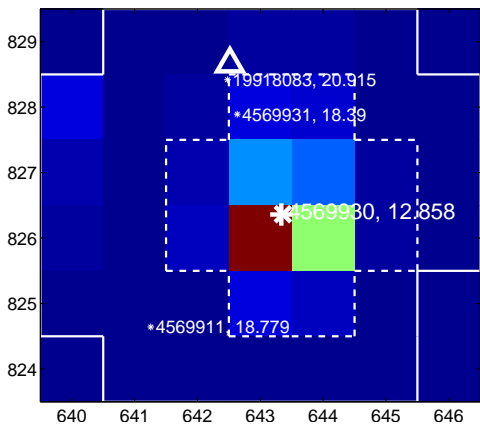
Q14 no OOT image



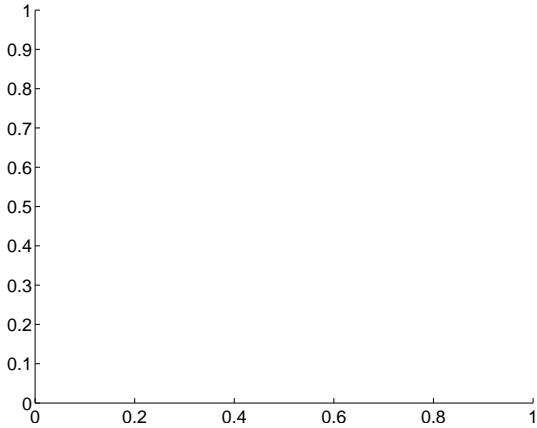
Q15 difference image. Poor Quality



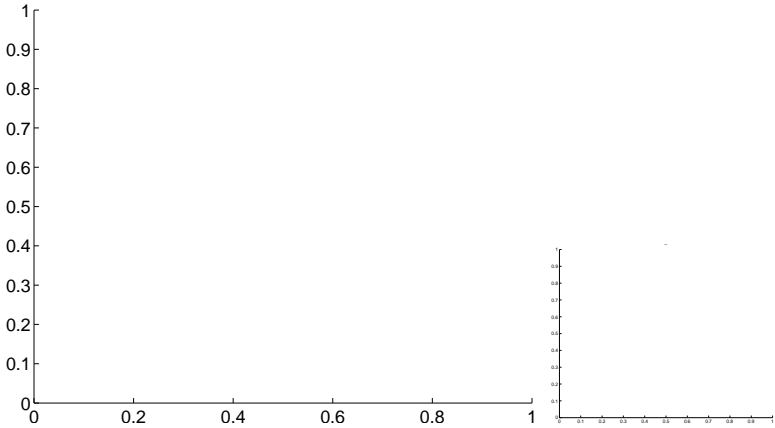
Q15 OOT image



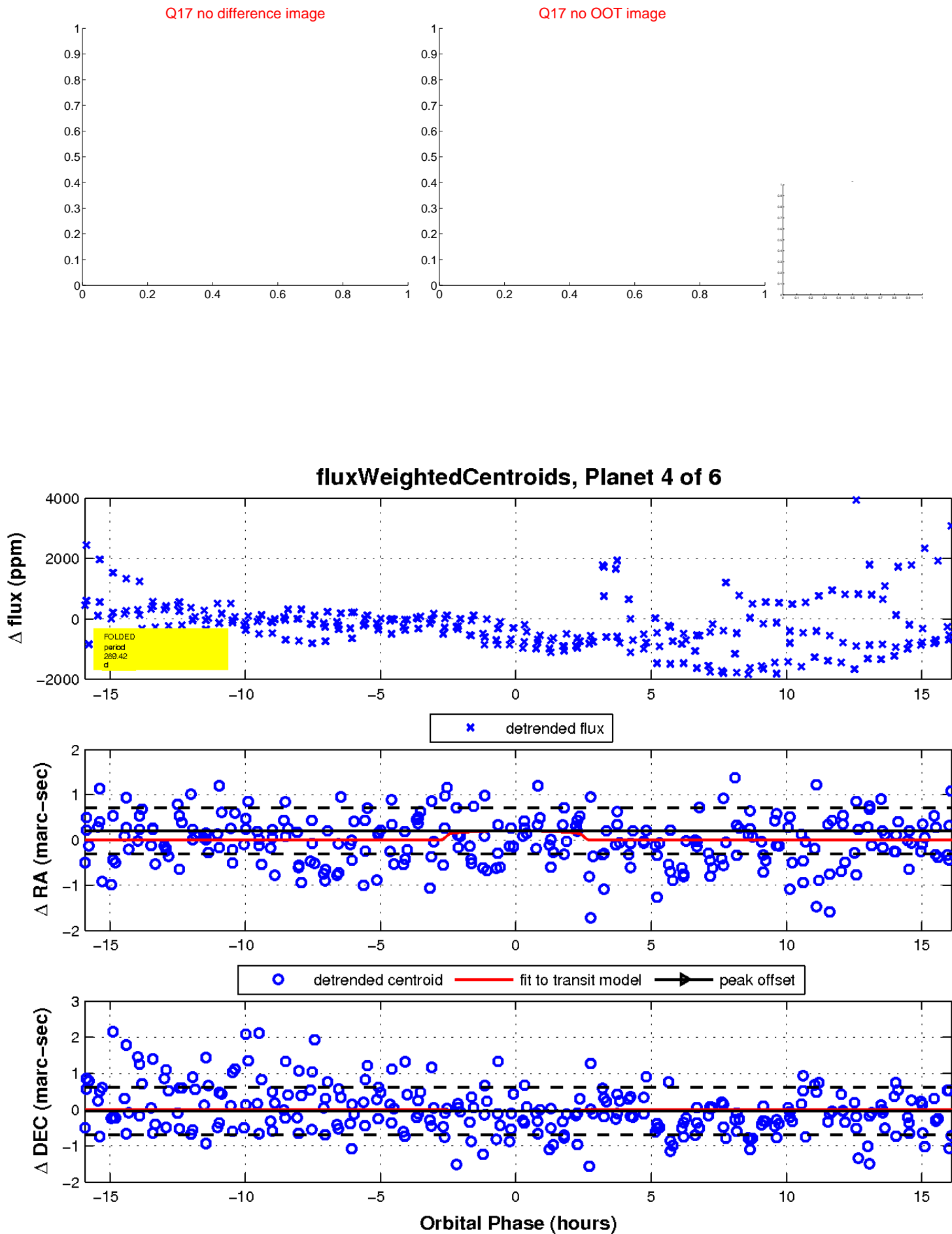
Q16 no difference image



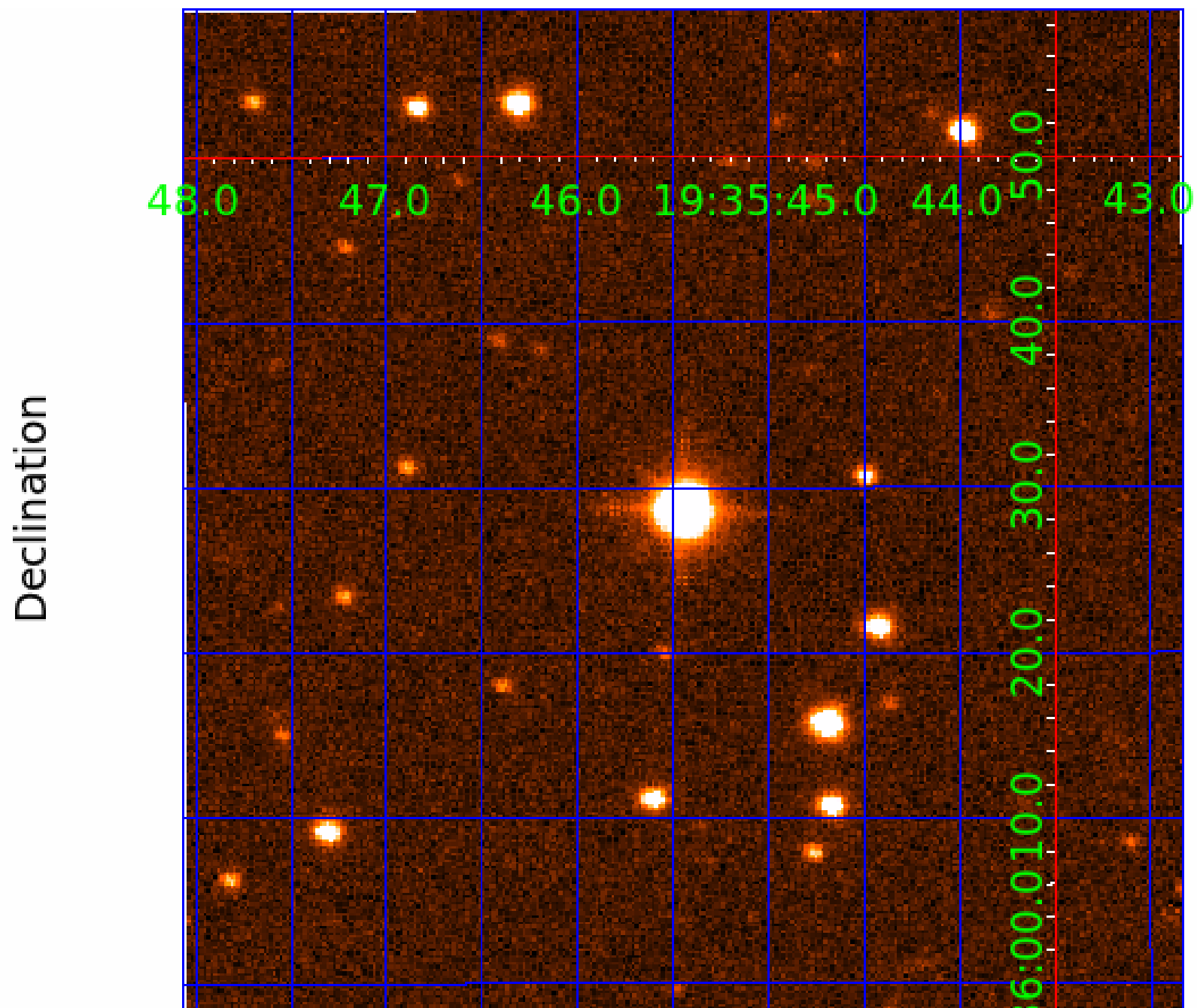
Q16 no OOT image



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



UKIRT Image





# KIC 004569930

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
004569930-01	OBS	No	406.773692	457.039663	804.6	2.529	15.8	7.9	2.17	6008	6.73	4.17
004569930-02	OBS	No	632.575405	263.952019	806.0	7.372	10.6	5.4	2.17	6008	6.31	2.32
004569930-03	OBS	No	426.732864	206.493021	661.6	5.108	17.2	4.9	2.17	6008	5.63	3.92
004569930-04	OBS	No	289.421898	263.435341	477.5	5.384	13.3	4.2	2.17	6008	5.13	6.57
004569930-05	OBS	No	528.993473	497.365064	363.0	0.564	13.0	2.8	2.17	6008	5.43	2.94
004569930-06	OBS	No	398.271945	434.694599	503.7	3.000	13.3	-1.0	2.17	6008	4.87	4.29

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004569930-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
004569930-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS
004569930-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
004569930-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS
004569930-05	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES_MARSHALL_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS—HALO_GHOST
004569930-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_NOFITS

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

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

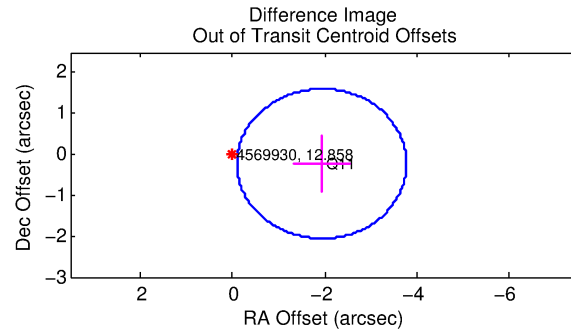
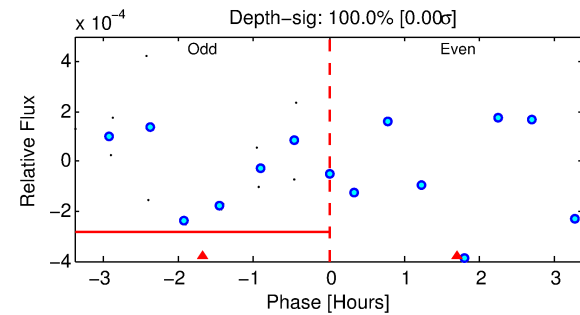
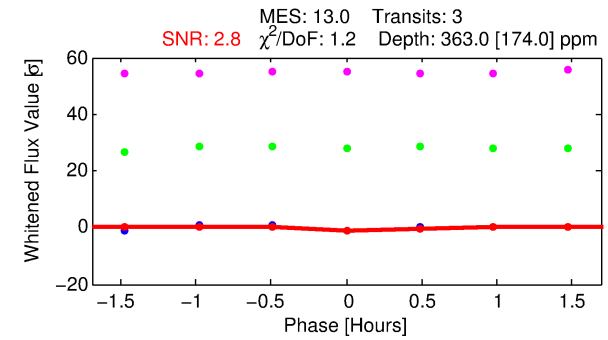
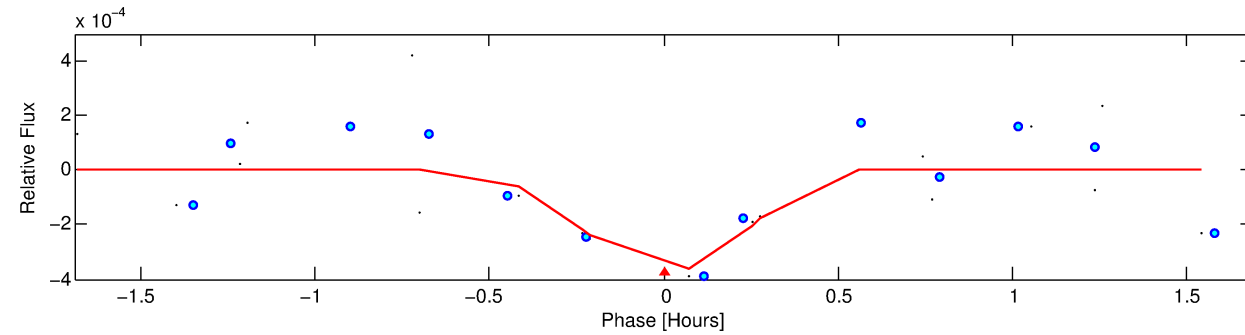
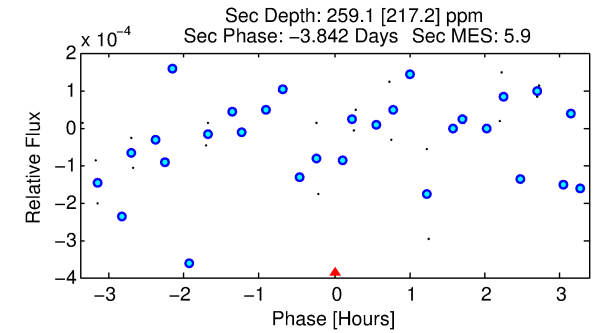
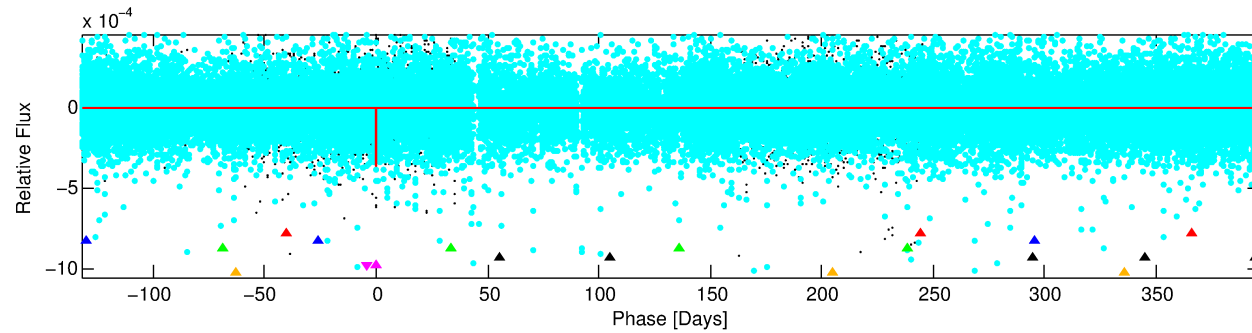
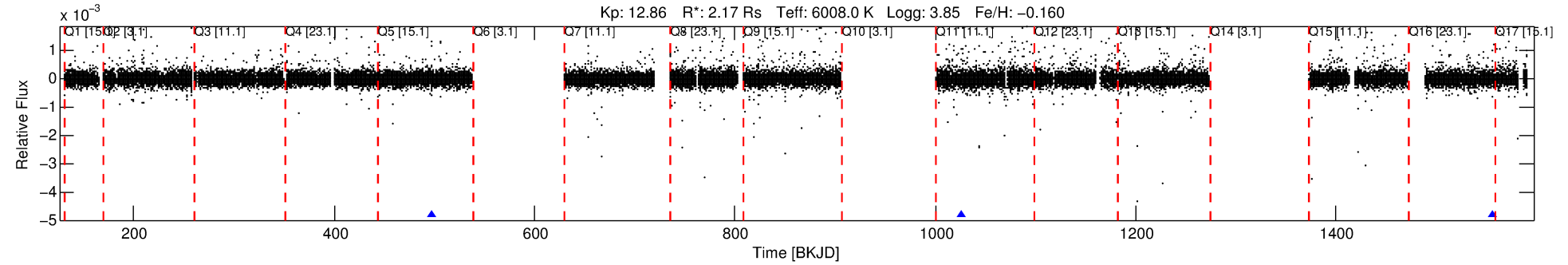
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 004569930-05

No Significant Match Found

# DV One-Page Summary

KIC: 4569930 Candidate: 5 of 6 Period: 528.993 d



## DV Fit Results:

Period = 528.99347 [0.00555] d  
Epoch = 497.3651 [0.0085] BKJD  
Rp/R\* = 0.0230 [0.1070]  
a/R\* = 3437.70 [101329.72]  
b = 0.90 [5.83]  
Seff = 2.94 [1.14]  
Teq = 334 [32] K  
Rp = 5.43 [25.33] Re  
a = 1.3649 [0.3435] AU  
Ag = 9006.46 [84291.56] [0.11 $\sigma$ ]  
Teffp = 5029 [11757] K [0.40 $\sigma$ ]

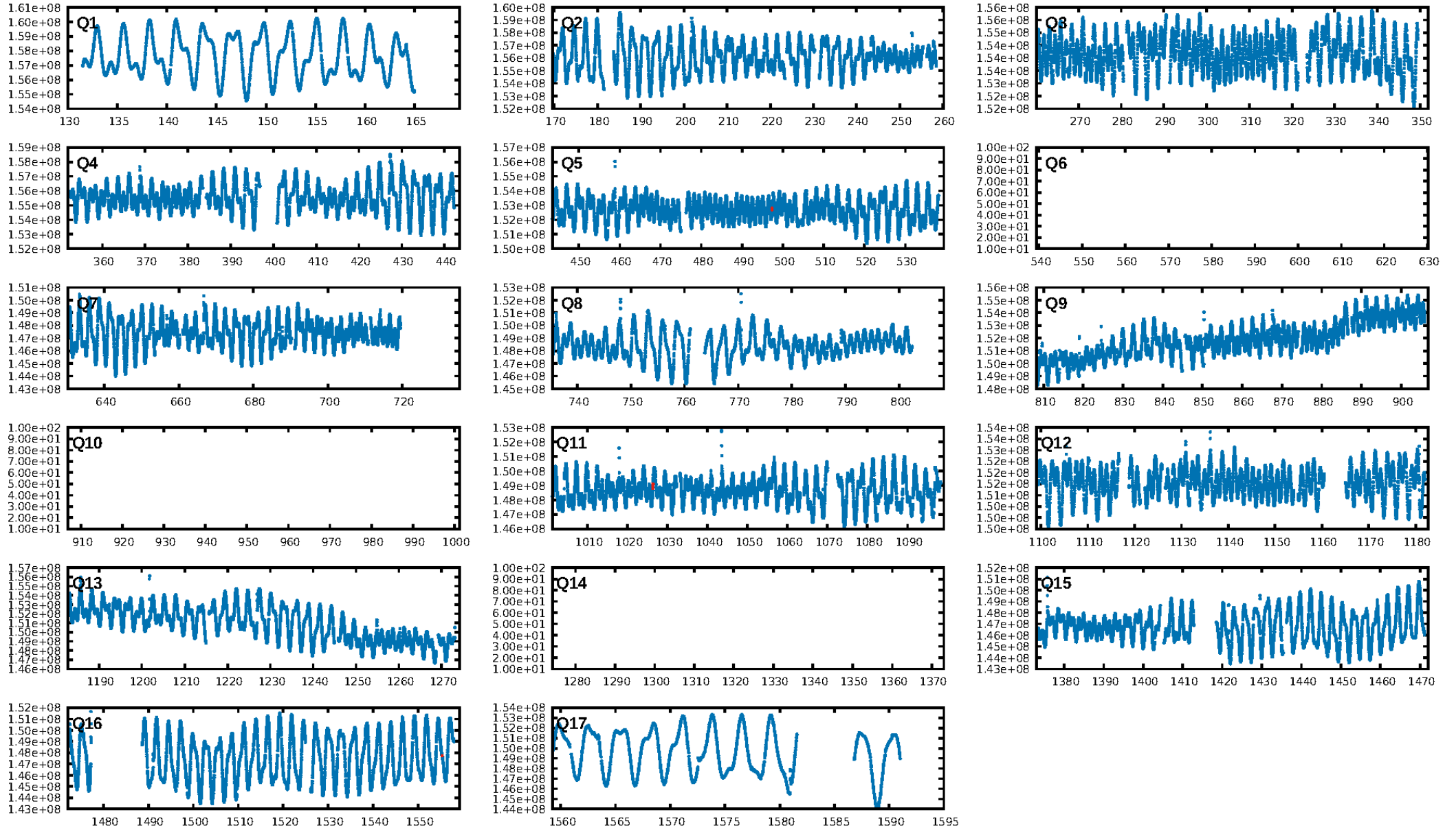
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [477.57 $\sigma$ ]  
LongPeriod-sig: 100.0% [336.24 $\sigma$ ]  
ModelChiSquare2-sig: 34.3%  
ModelChiSquareGof-sig: 87.7%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: -0.004574  
Centroid-sig: 71.1%  
Centroid-so: 1.004 arcsec [0.41 $\sigma$ ]  
OotOffset-rm: 1.947 arcsec [3.19 $\sigma$ ]  
KicOffset-rm: 2.009 arcsec [3.29 $\sigma$ ]  
OotOffset-st: 0/1/0/0 [1]  
KicOffset-st: 0/1/0/0 [1]  
DiffImageQuality-fgm: 0.00 [0/1]  
DiffImageOverlap-fno: 1.00 [1/1]

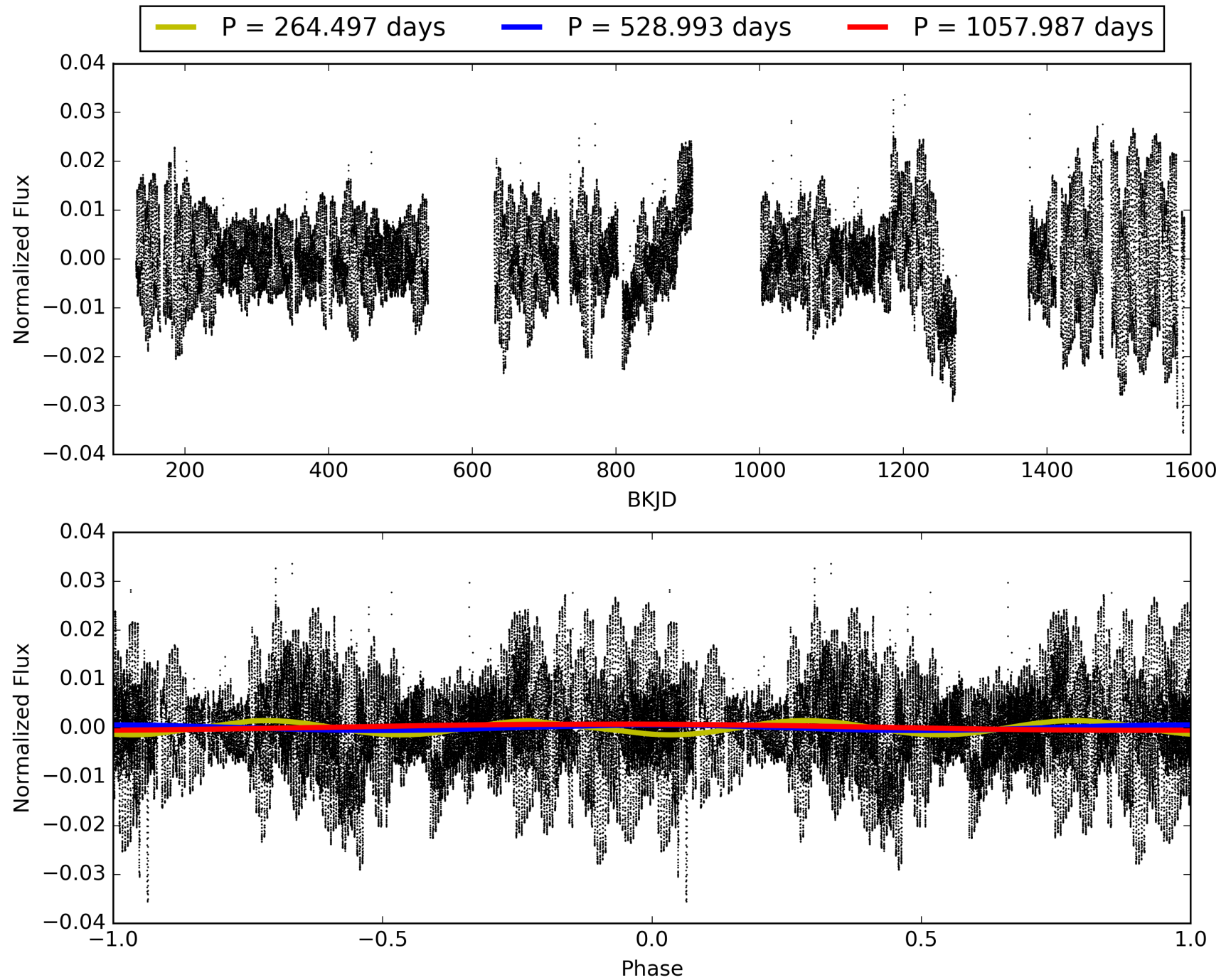
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 12:59:20 Z

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

# TCE 004569930-05, PDC Light Curves

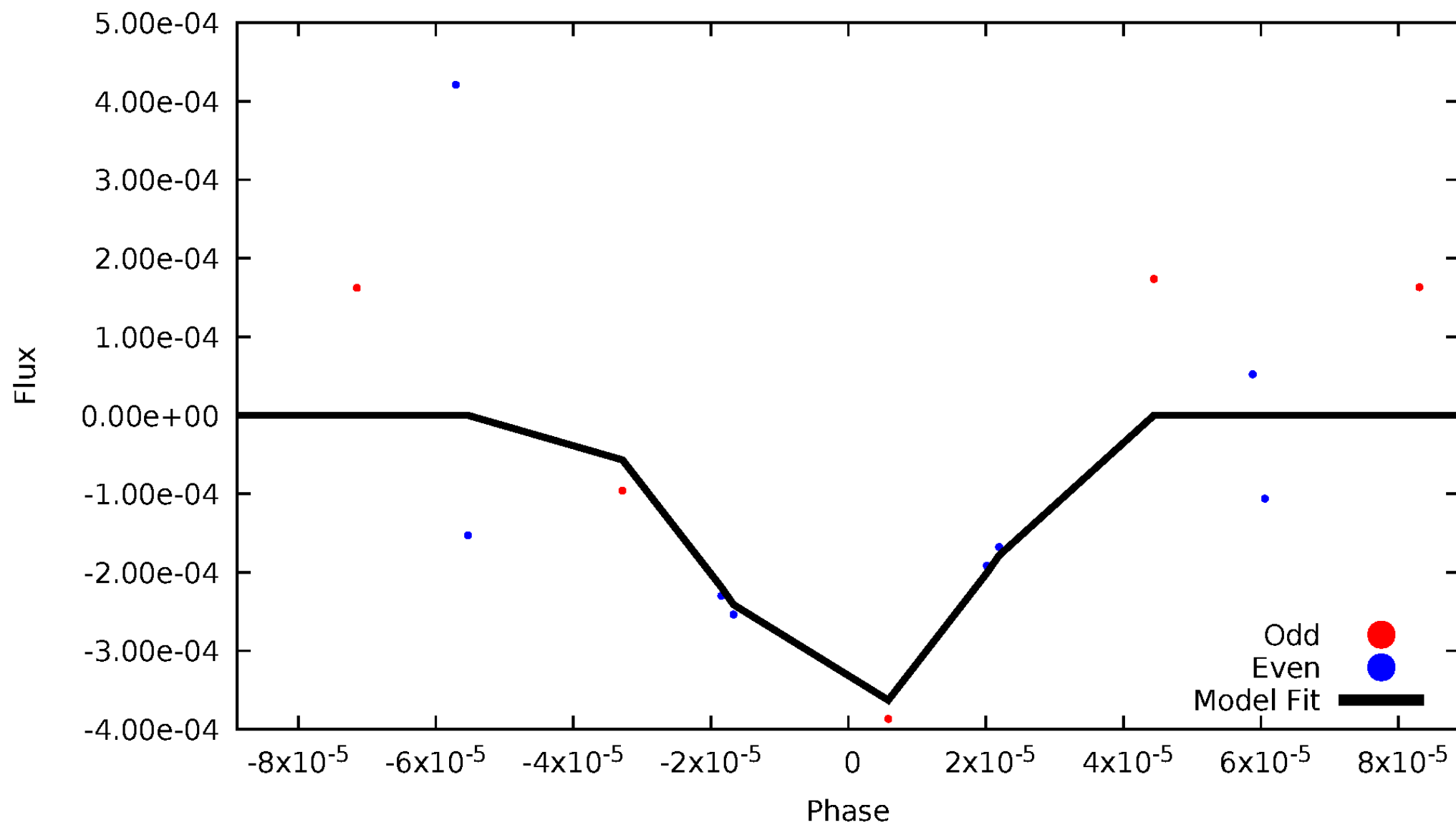


TCE 004569930-05



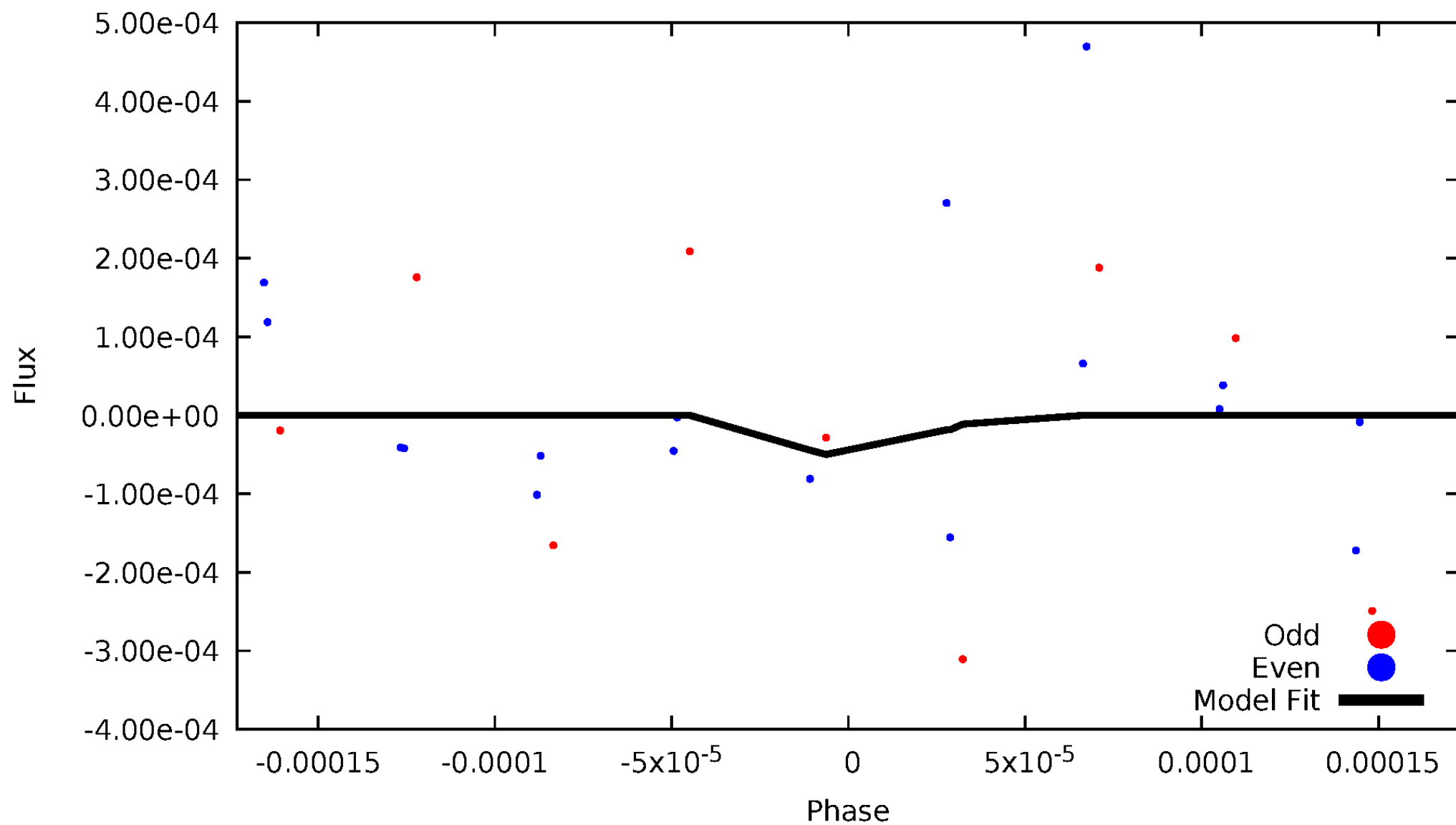
# DV Odd/Even

TCE 004569930-05



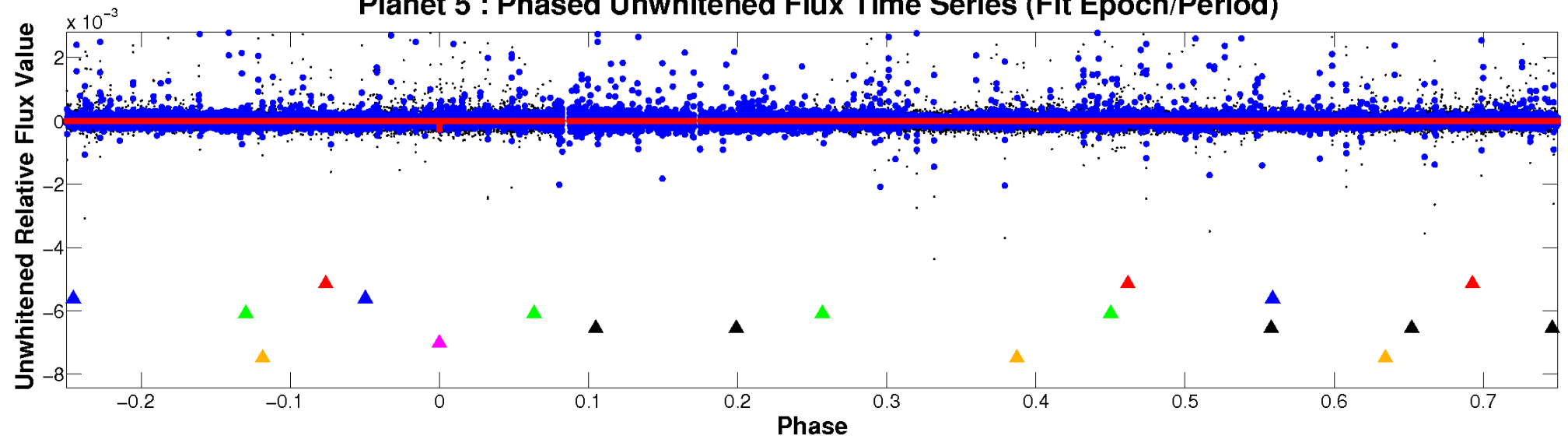
# ALT Odd/Even

TCE 004569930-05

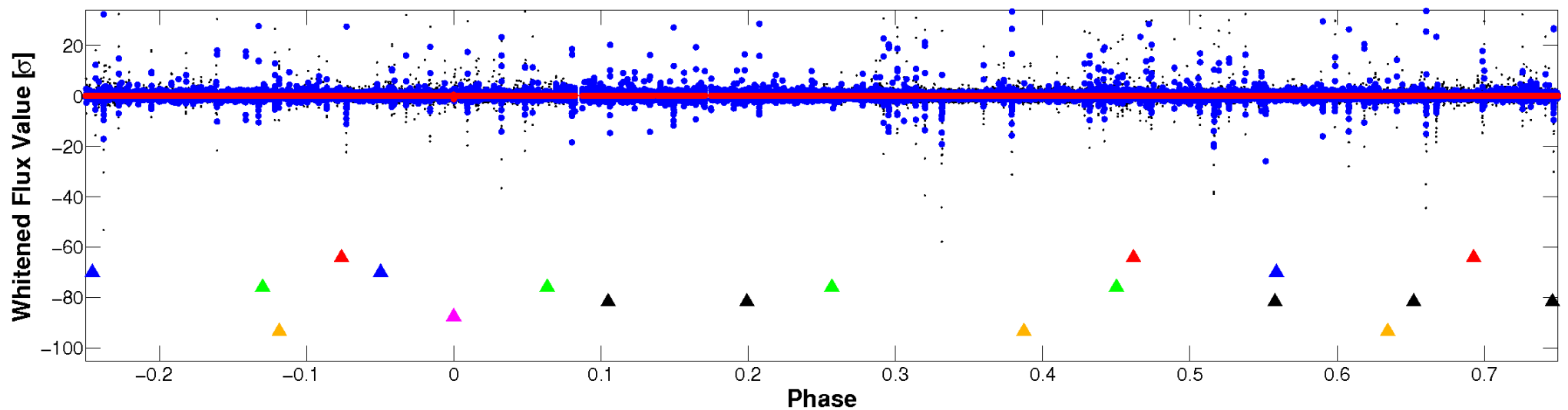


# Non-Whitened Vs. Whitened Light Curve

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

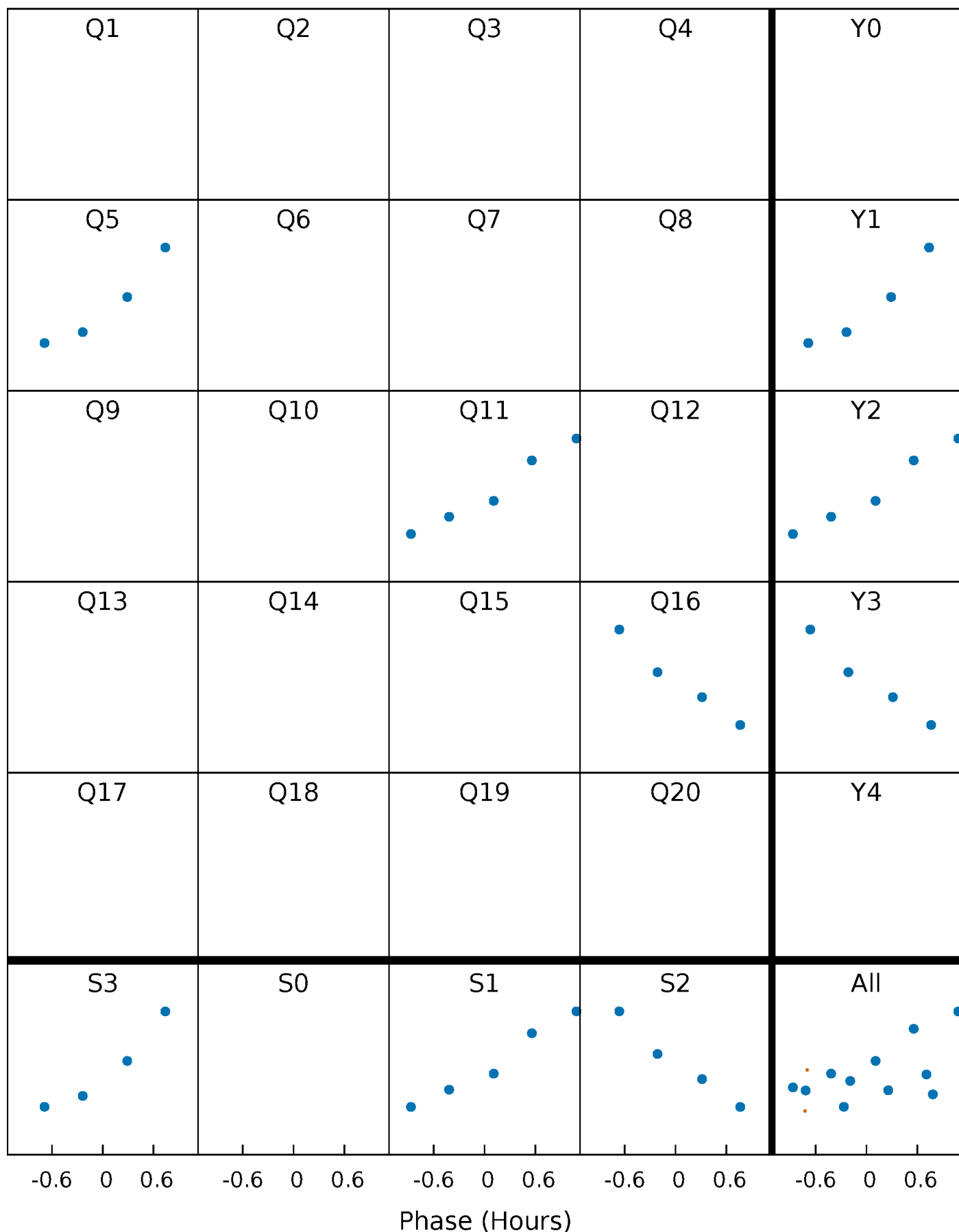


Planet 5 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

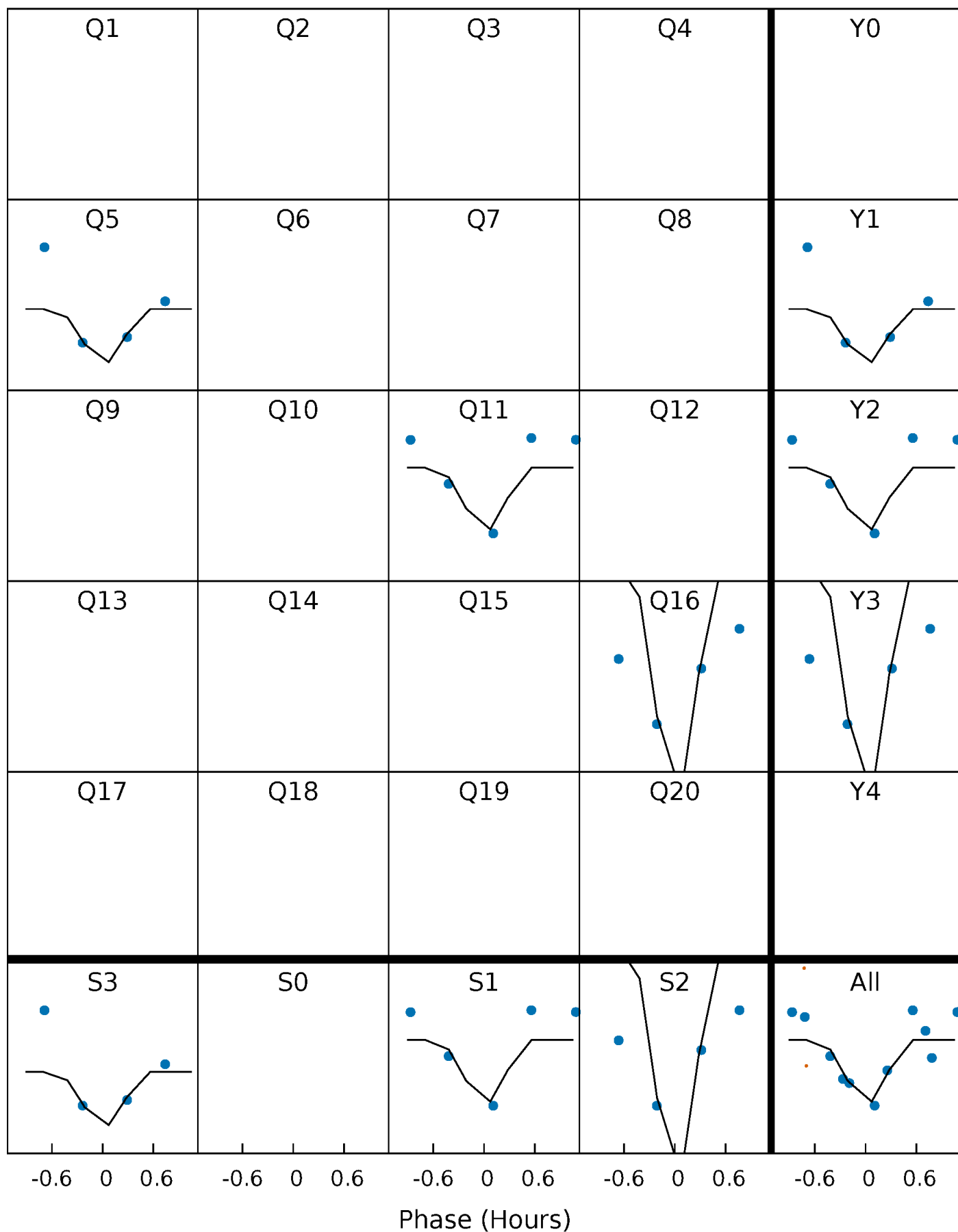
TCE 004569930-05 P=528.993473 Days  $T_0=497.365065$  (BKJD)





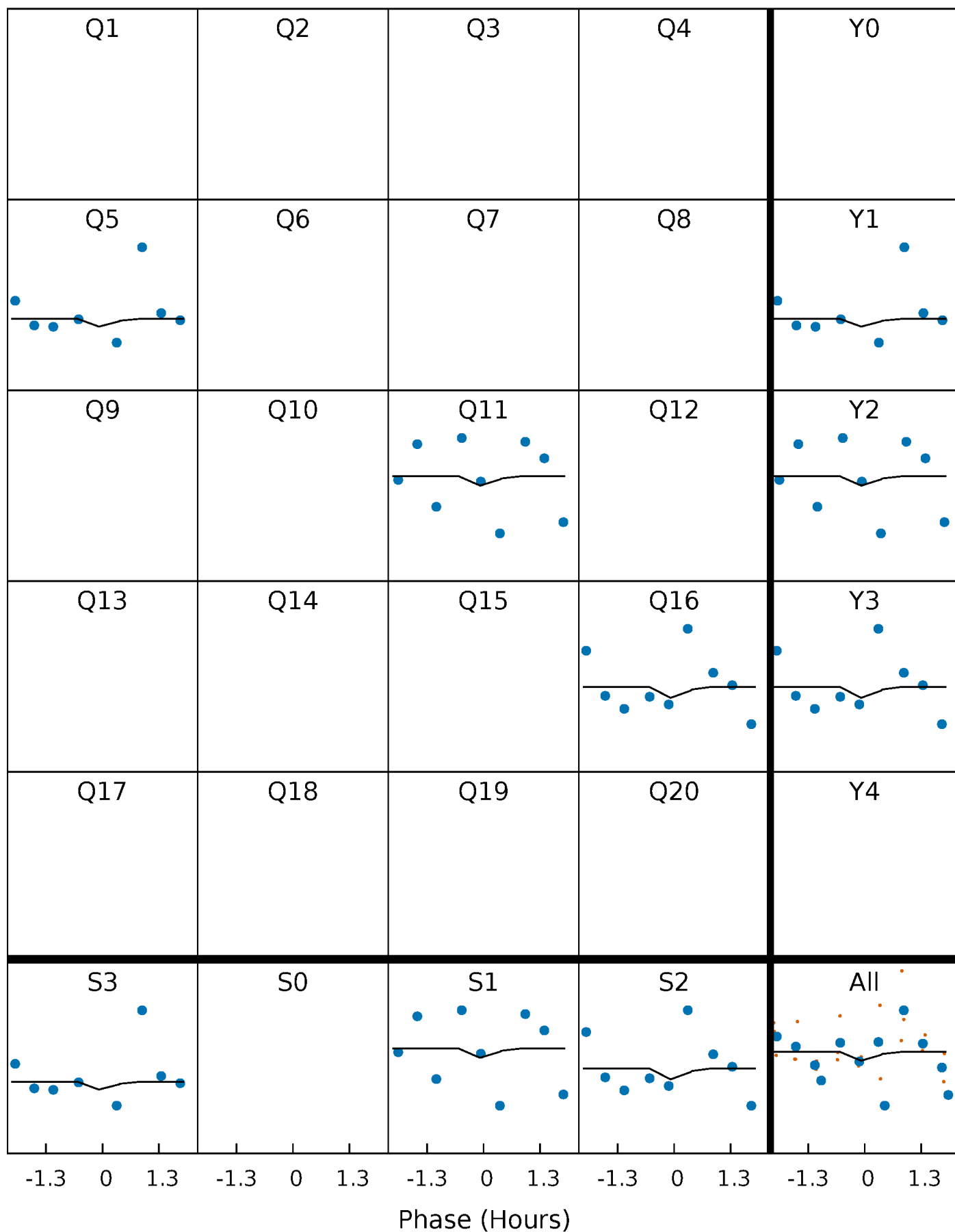
# DV Quarter-Phased Transit Curves

TCE 004569930-05     $P=528.993473$  Days     $T_0=497.365065$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

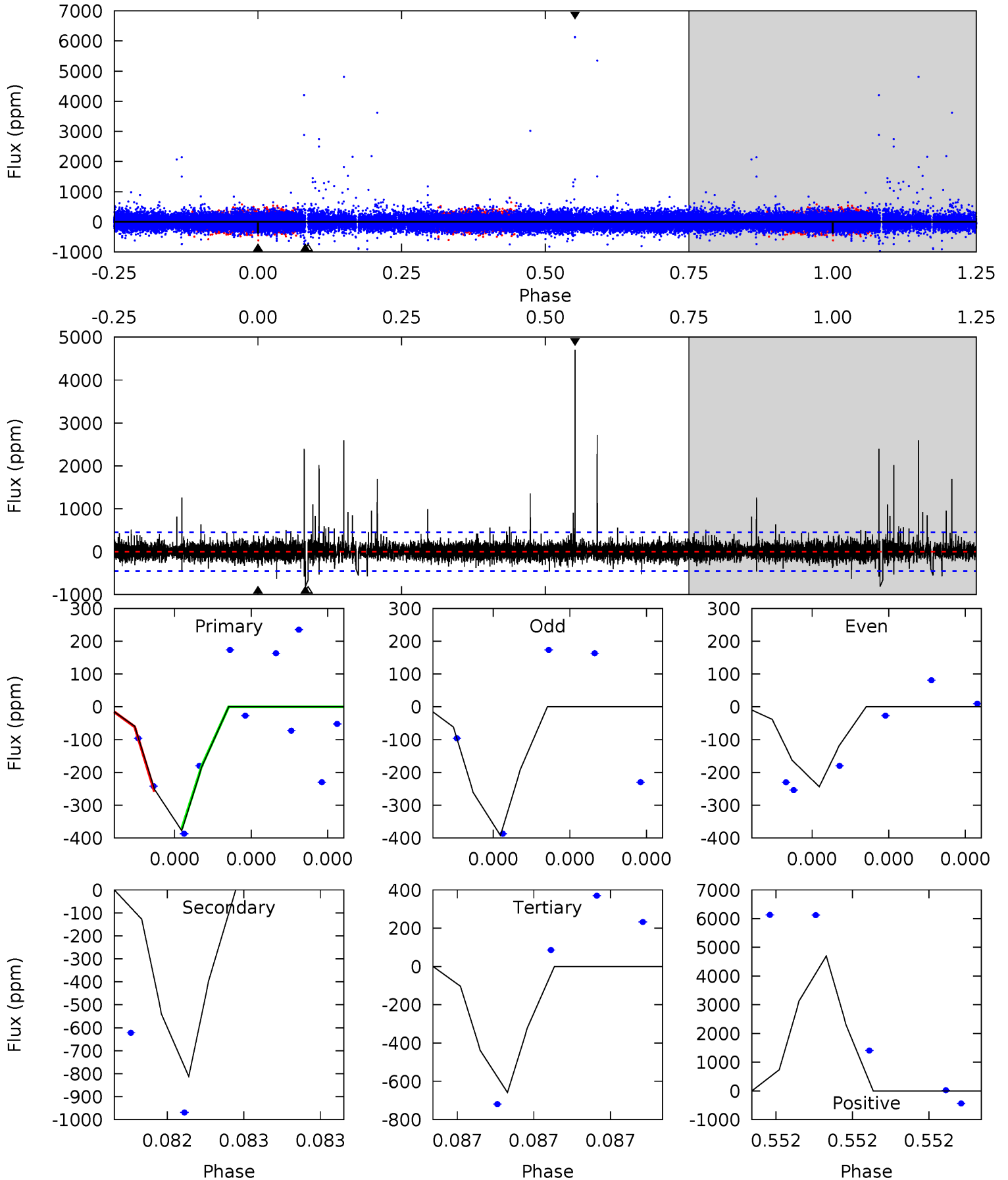
TCE 004569930-05 P=529.045302 Days  $T_0=497.299185$  (BKJD)



# DV Model-Shift Uniqueness Test

004569930-05, P = 528.993473 Days, E = 497.365065 Days

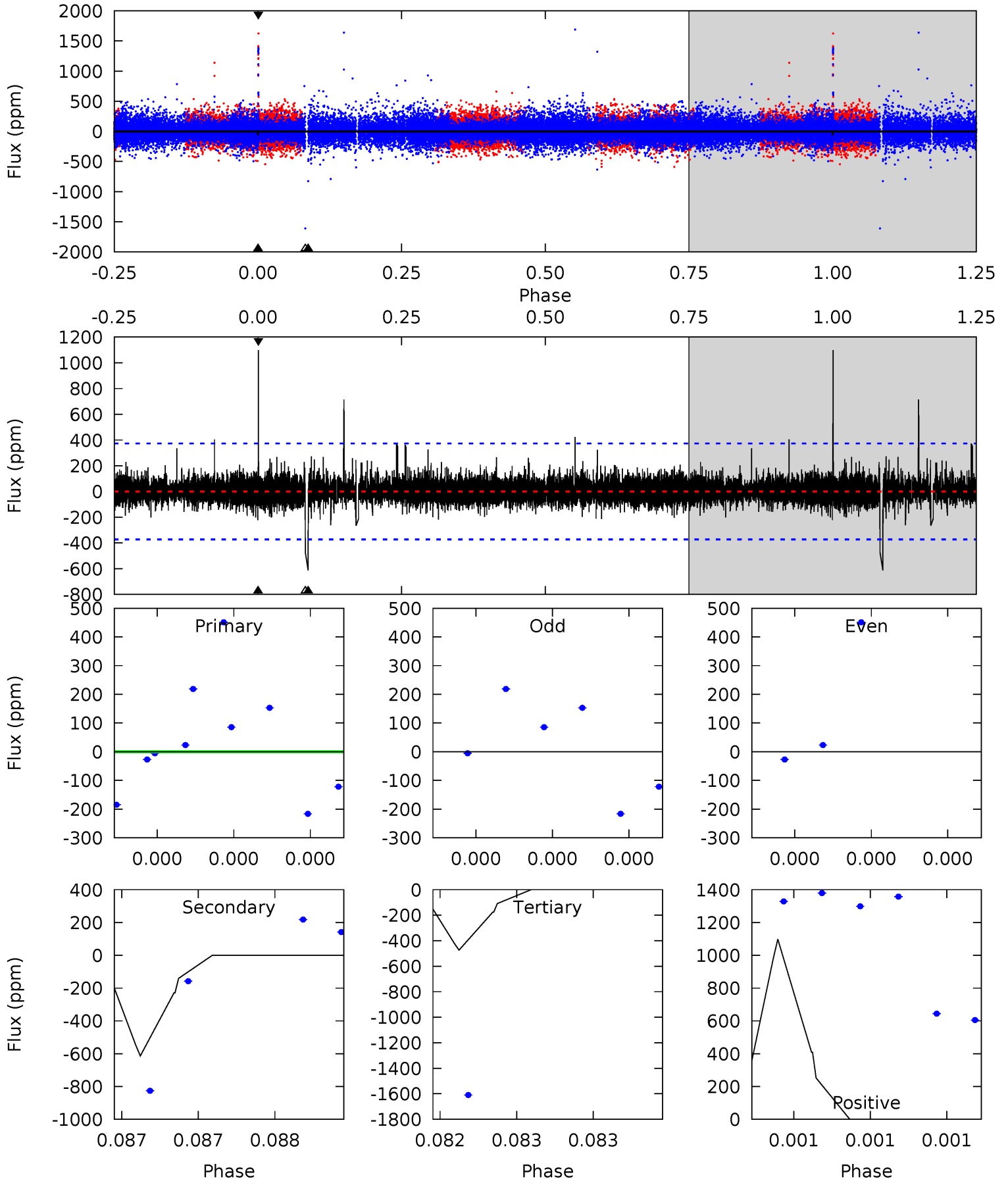
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
4.96	10.7	8.65	61.7	5.92	4.00	1.46	-3.69	-56.8	2.02	-51.1	0.47	1.02	0.85	0.65



# Alt Model-Shift Uniqueness Test

004569930-05, P = 529.045302 Days, E = 497.299185 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
0.96	9.70	7.48	17.4	5.89	3.95	0.83	-6.52	-16.4	2.22	-7.66	0.52	1.00	0.64	0.17



### Stellar Parameters For KIC 004569930

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$6008^{+81}_{-81}$	$3.850^{+0.217}_{-0.093}$	$-0.160^{+0.150}_{-0.150}$	$2.166^{+0.330}_{-0.613}$	$1.211^{+0.125}_{-0.172}$	$0.168^{+0.217}_{-0.050}$
	+1%/-1%	+6%/-2%	+94%/-94%	+15%/-28%	+10%/-14%	+129%/-30%
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 004569930-05 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-812 \pm 76$	$17.51^{+19.44}_{-12.51}$	$462^{+20}_{-30}$	$3993^{+2996}_{-872}$	$2652^{+30289}_{-2061}$
Alt.	$-614 \pm 63$	$16.39^{+16.61}_{-11.83}$	$463^{+22}_{-31}$	$3890^{+2716}_{-778}$	$2302^{+25819}_{-1727}$

$T_{max}$  = 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

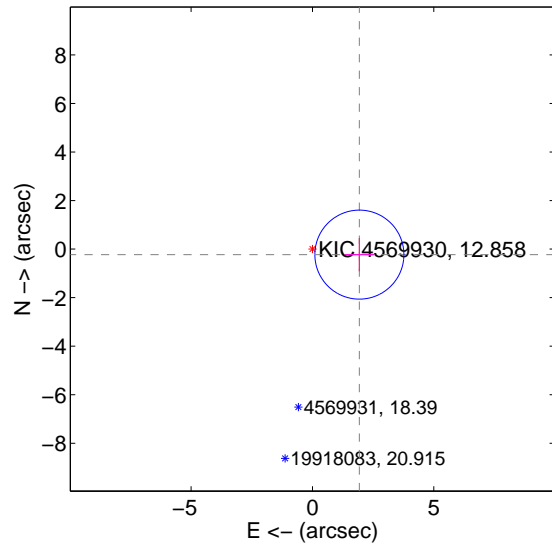
Supplemental centroid analysis for 004569930-05. Kepler magnitude: 12.86. Transit SNR 2.75

There are 0 quarters with good PRF difference image offsets

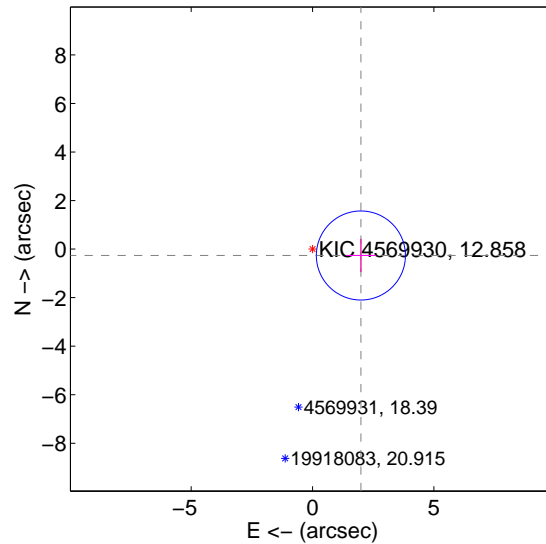
The direct PRF centroid is offset from the target star catalog position by about 0.07 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.947 \pm 0.611$	3.19	$-1.933 \pm 0.610$	$-0.228 \pm 0.684$
PRF-fit source offset from KIC position	$2.009 \pm 0.611$	3.29	$-1.992 \pm 0.610$	$-0.263 \pm 0.684$
photometric centroid source offset	$1.00 \pm 2.43$	0.41	$-0.48 \pm 2.23$	$0.88 \pm 2.49$

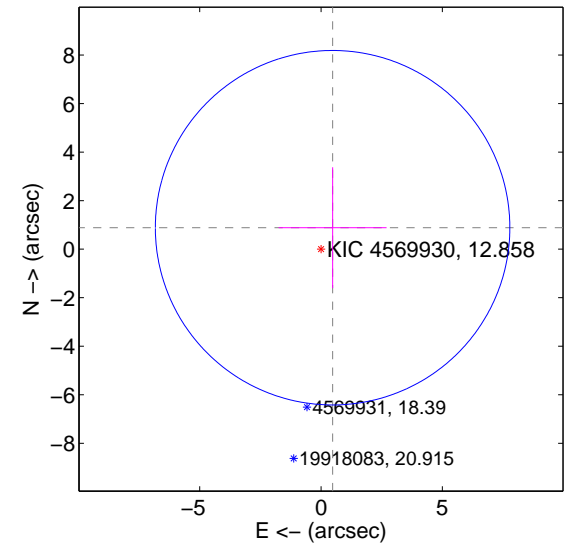
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position



offset from photometric centroids



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

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



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





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

Q9 no difference image



Q9 no OOT image



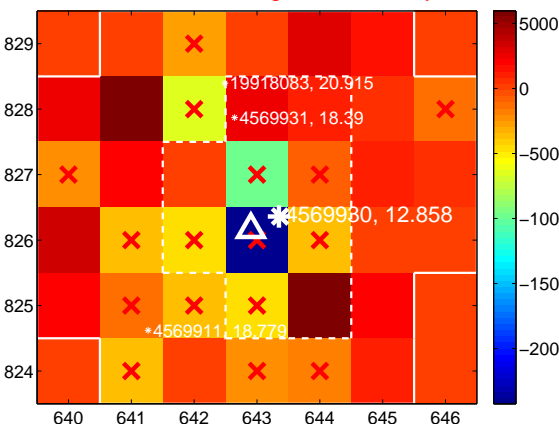
Q10 no difference image



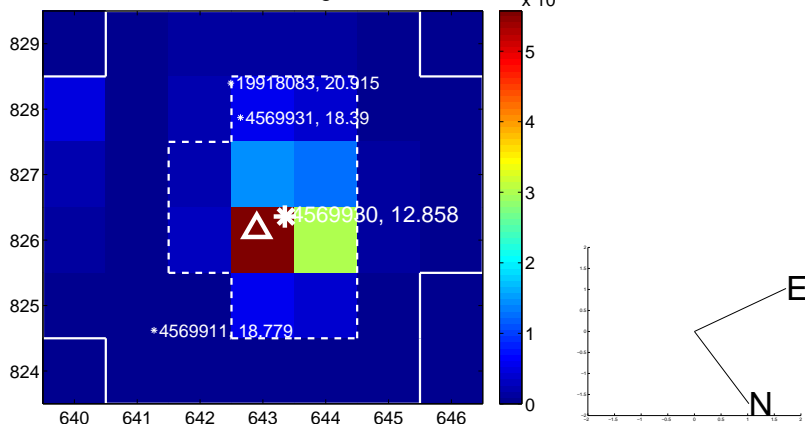
Q10 no OOT image



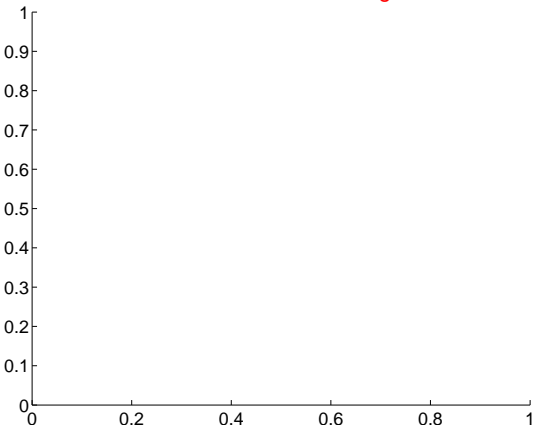
Q11 difference image. Poor Quality



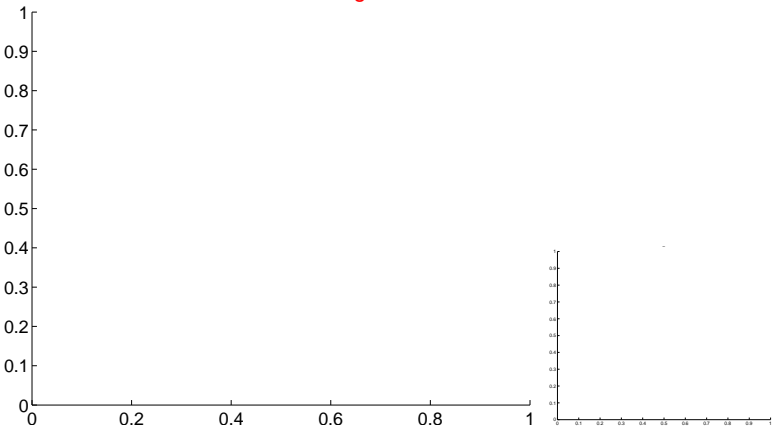
Q11 OOT image



Q12 no difference image



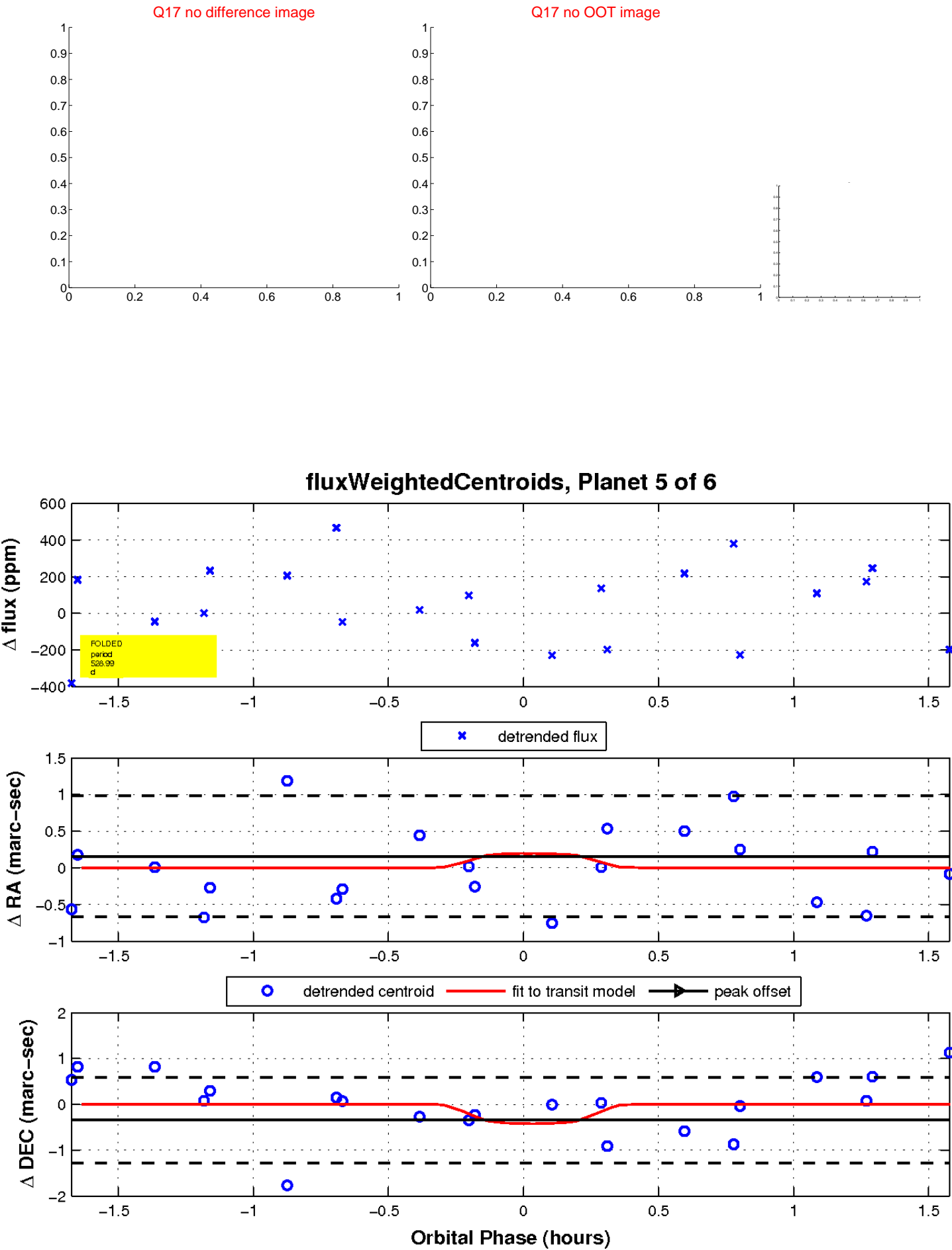
Q12 no OOT image



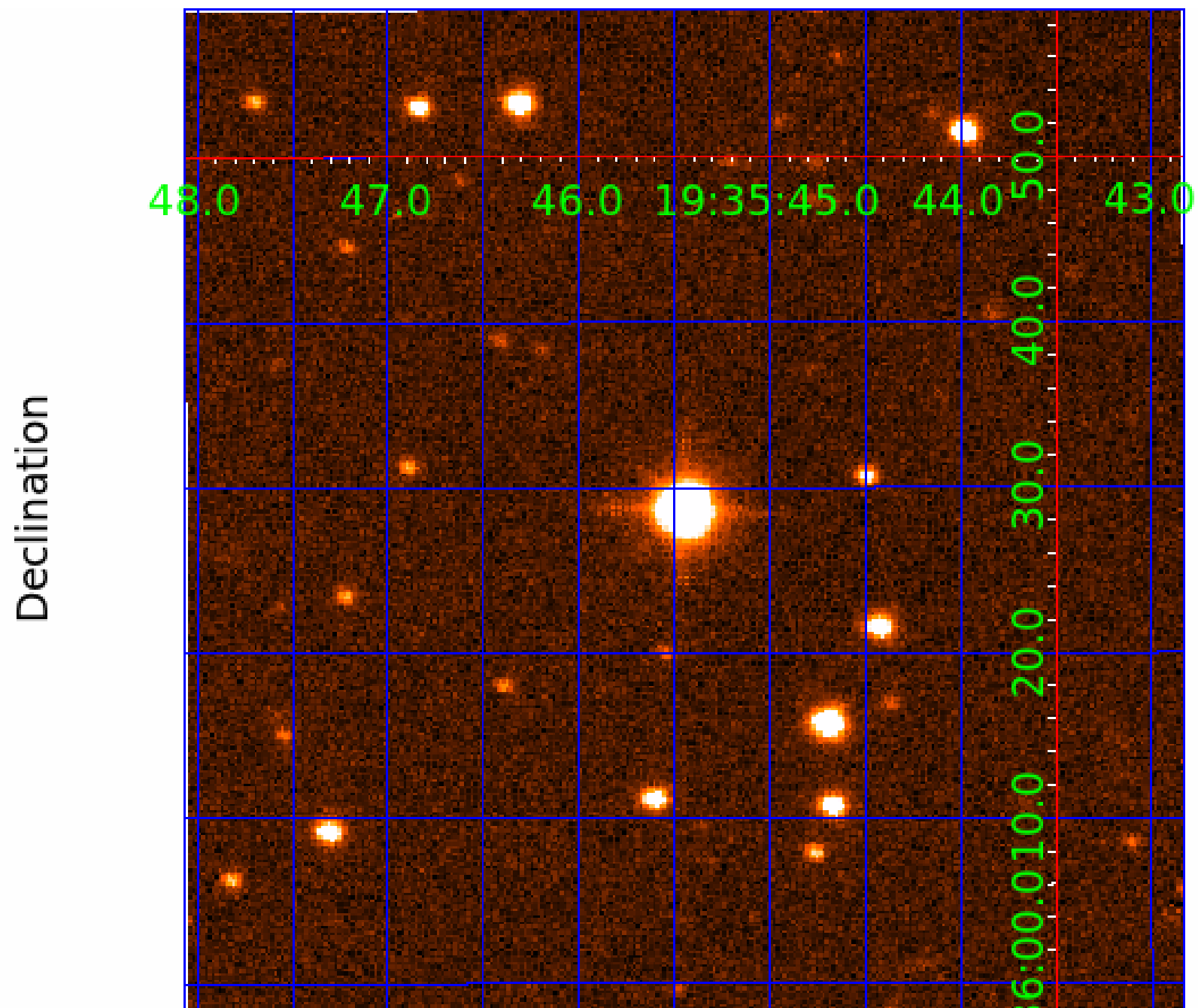
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



UKIRT Image



# KIC 004569930

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
004569930-01	OBS	No	406.773692	457.039663	804.6	2.529	15.8	7.9	2.17	6008	6.73	4.17
004569930-02	OBS	No	632.575405	263.952019	806.0	7.372	10.6	5.4	2.17	6008	6.31	2.32
004569930-03	OBS	No	426.732864	206.493021	661.6	5.108	17.2	4.9	2.17	6008	5.63	3.92
004569930-04	OBS	No	289.421898	263.435341	477.5	5.384	13.3	4.2	2.17	6008	5.13	6.57
004569930-05	OBS	No	528.993473	497.365064	363.0	0.564	13.0	2.8	2.17	6008	5.43	2.94
004569930-06	OBS	No	398.271945	434.694599	503.7	3.000	13.3	-1.0	2.17	6008	4.87	4.29

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004569930-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
004569930-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS
004569930-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
004569930-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS
004569930-05	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES_MARSHALL_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS—HALO_GHOST
004569930-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_NOFITS

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

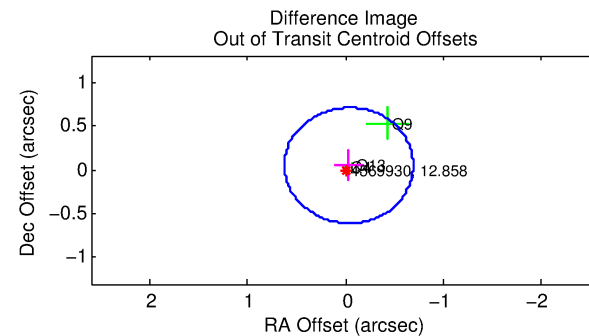
N = Not Transit-Like. S = Stellar Eclipse. C = Centroid Offset. E = Ephemeris Match.

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 004569930-06

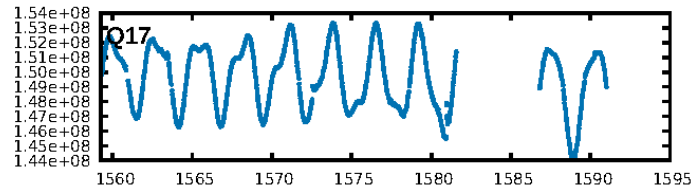
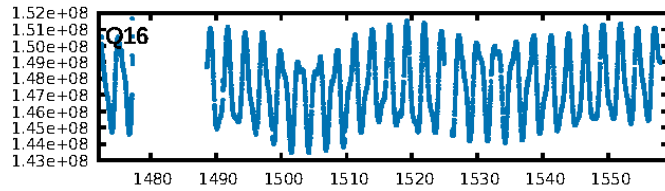
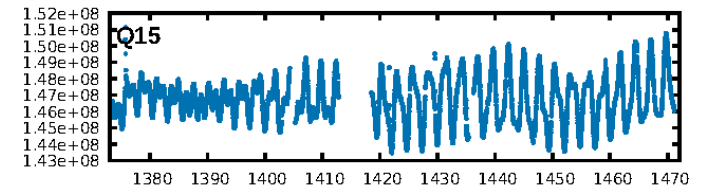
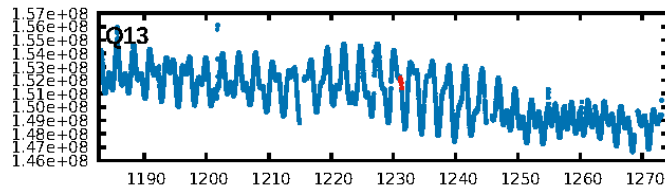
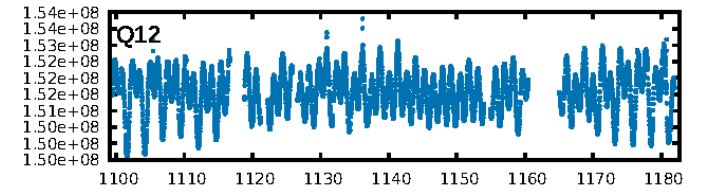
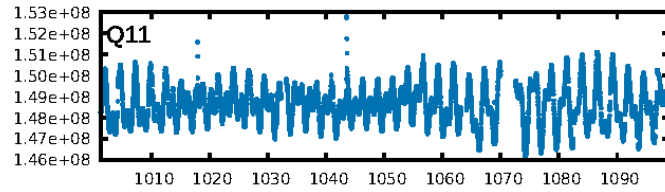
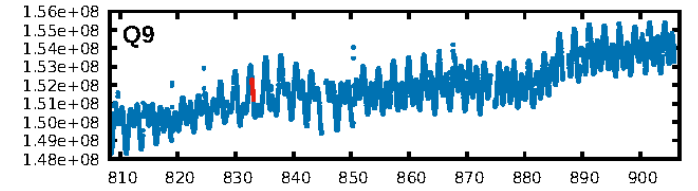
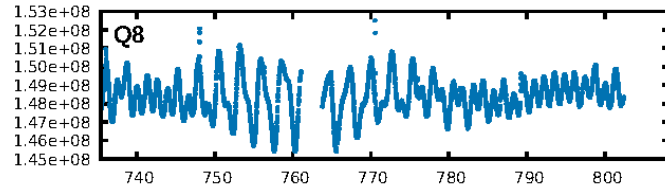
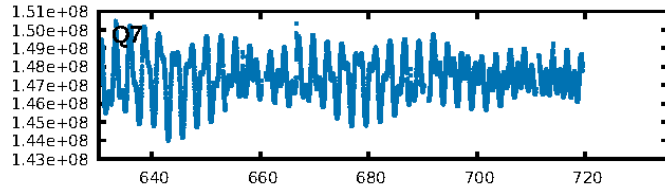
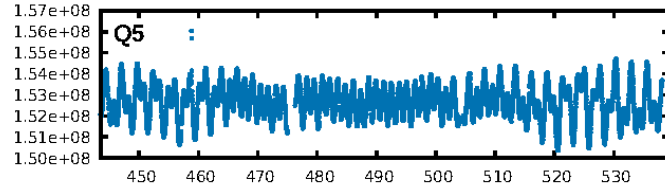
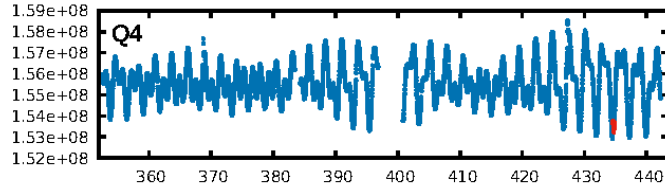
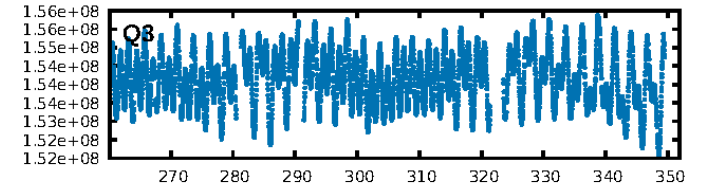
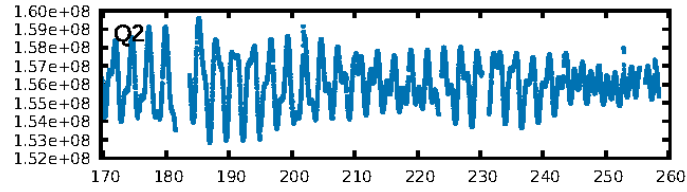
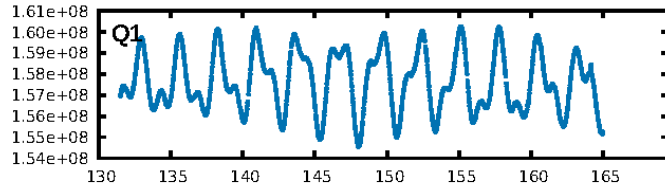
No Significant Match Found

## KIC: 4569930    Candidate: 6 of 6    Period: 398.272 d

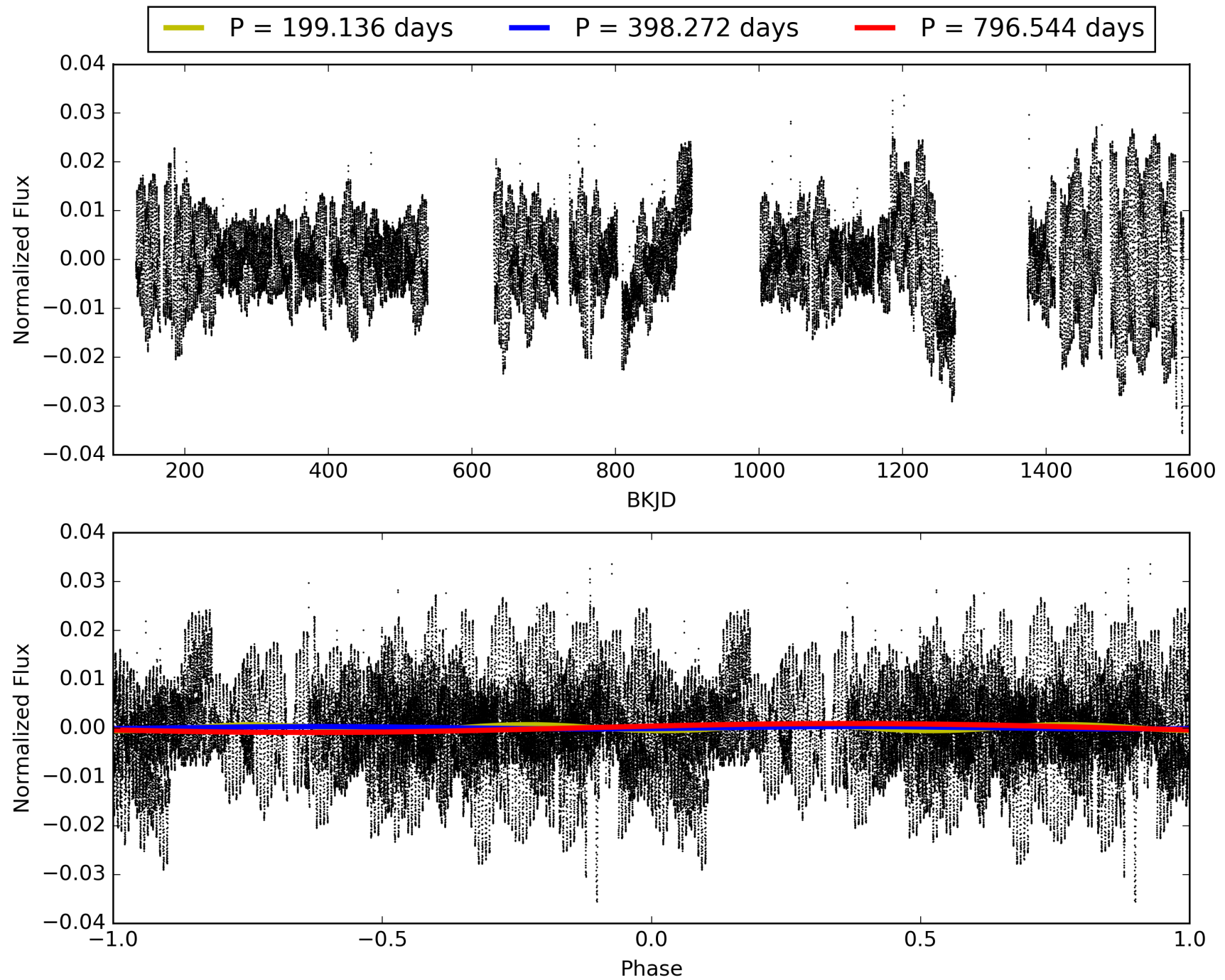


Centroid-sig: 55.4%  
Centroid-so: 0.166 arcsec [0.41σ]  
OotOffset-rm: 0.060 arcsec [0.27σ]  
KicOffset-rm: 0.068 arcsec [0.36σ]  
OotOffset-st: 0/0/1/2 [3]  
KicOffset-st: 0/0/1/2 [3]  
DiffImageQuality-fgm: 0.33 [1/3]  
DiffImageOverlap-fno: 1.00 [3/3]

# TCE 004569930-06, PDC Light Curves



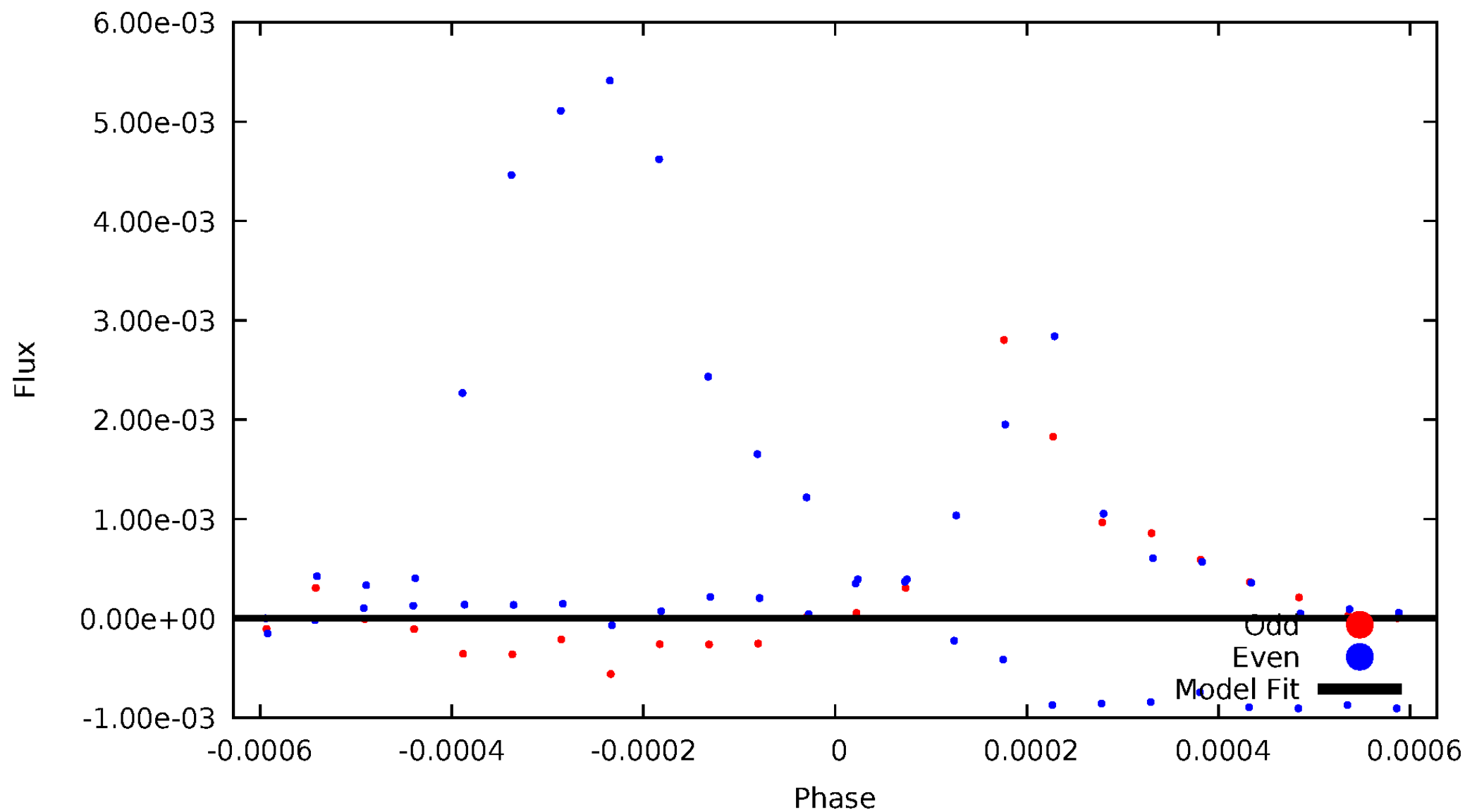
TCE 004569930-06





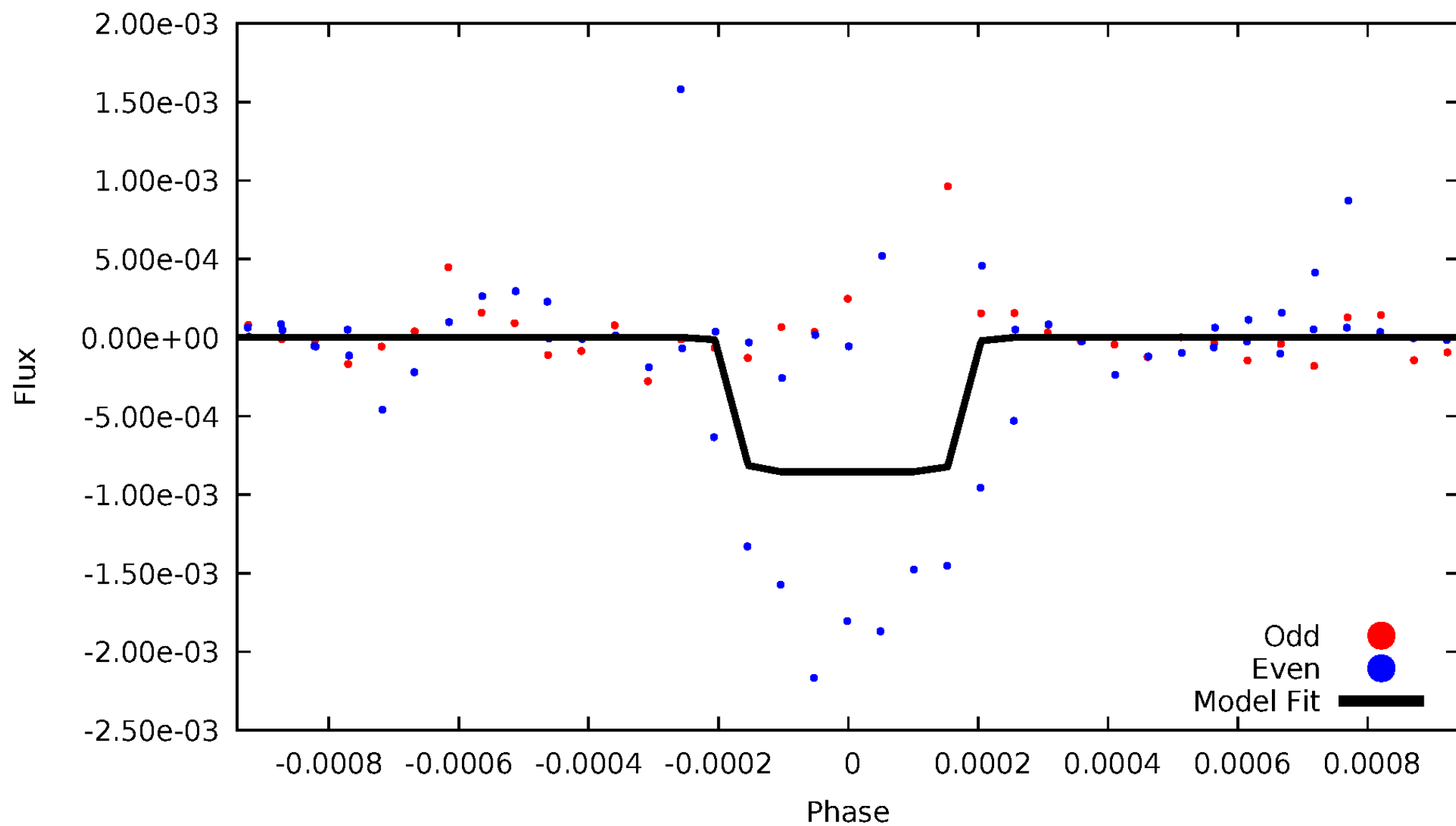
# DV Odd/Even

TCE 004569930-06



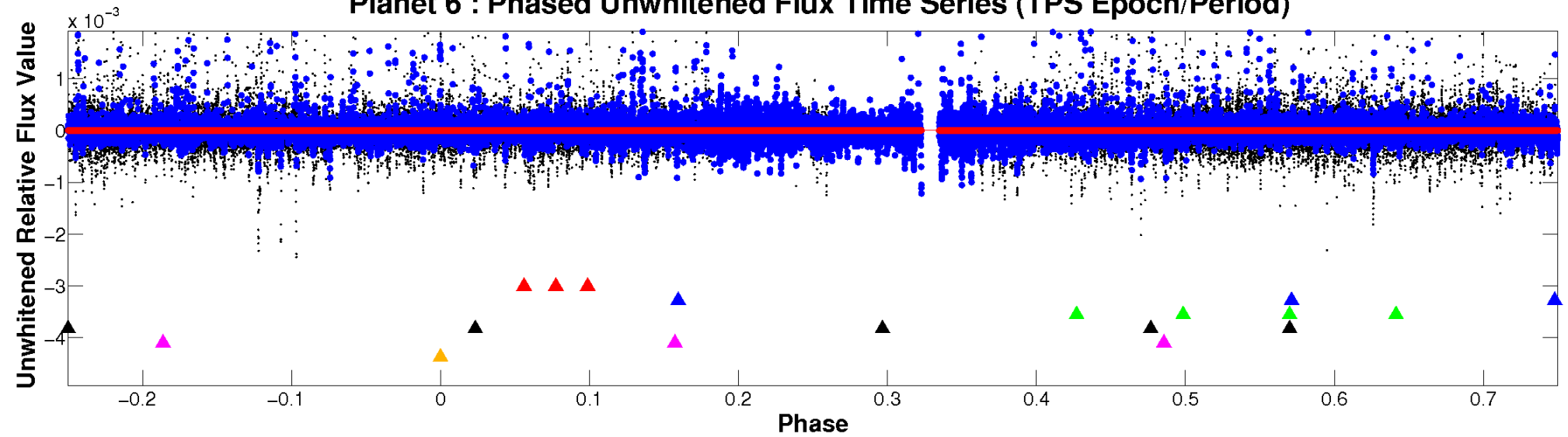
# ALT Odd/Even

TCE 004569930-06



# Non-Whitened Vs. Whitened Light Curve

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

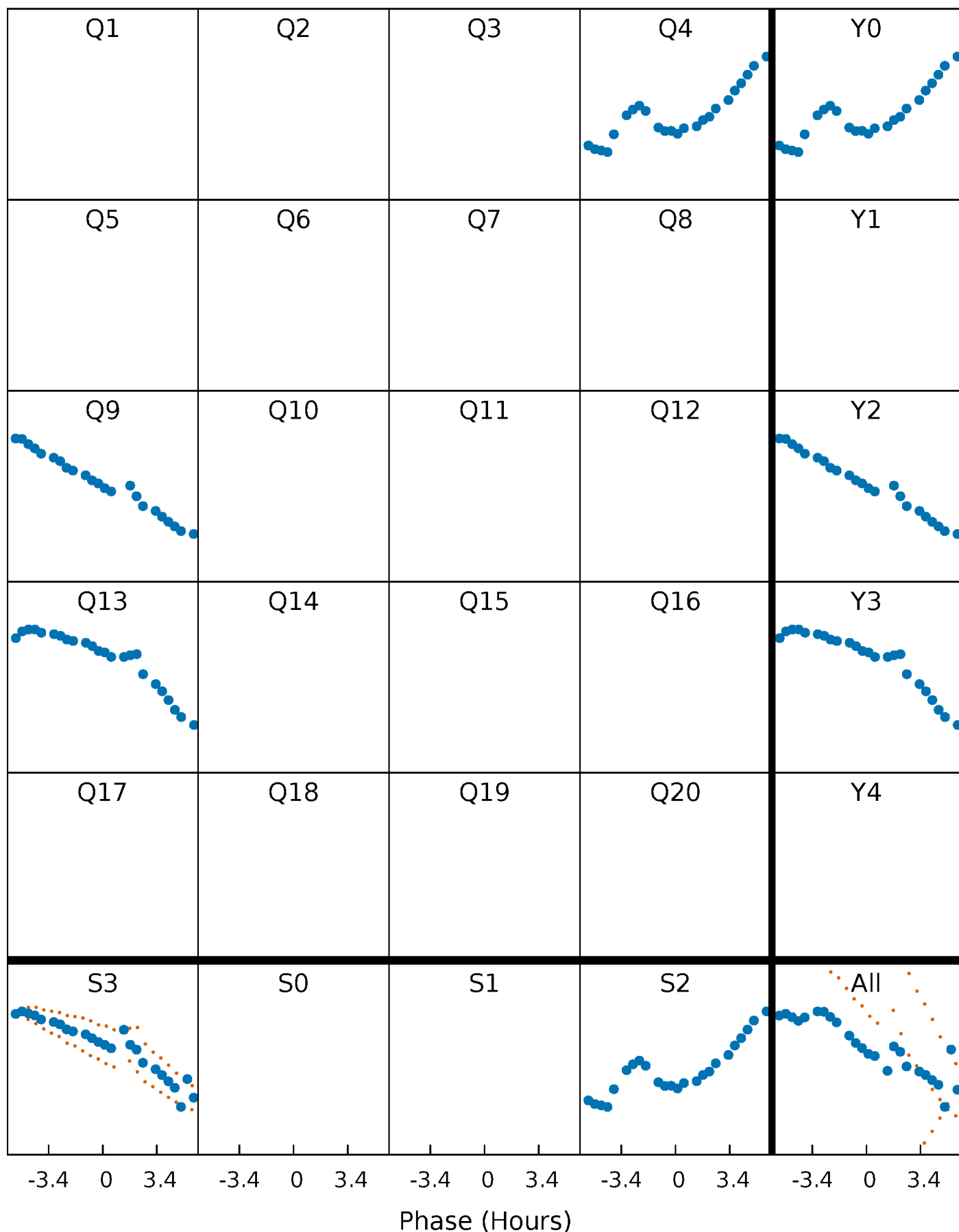


Planet 6 : Phased Whitened Flux Time Series (TPS Epoch/Period)



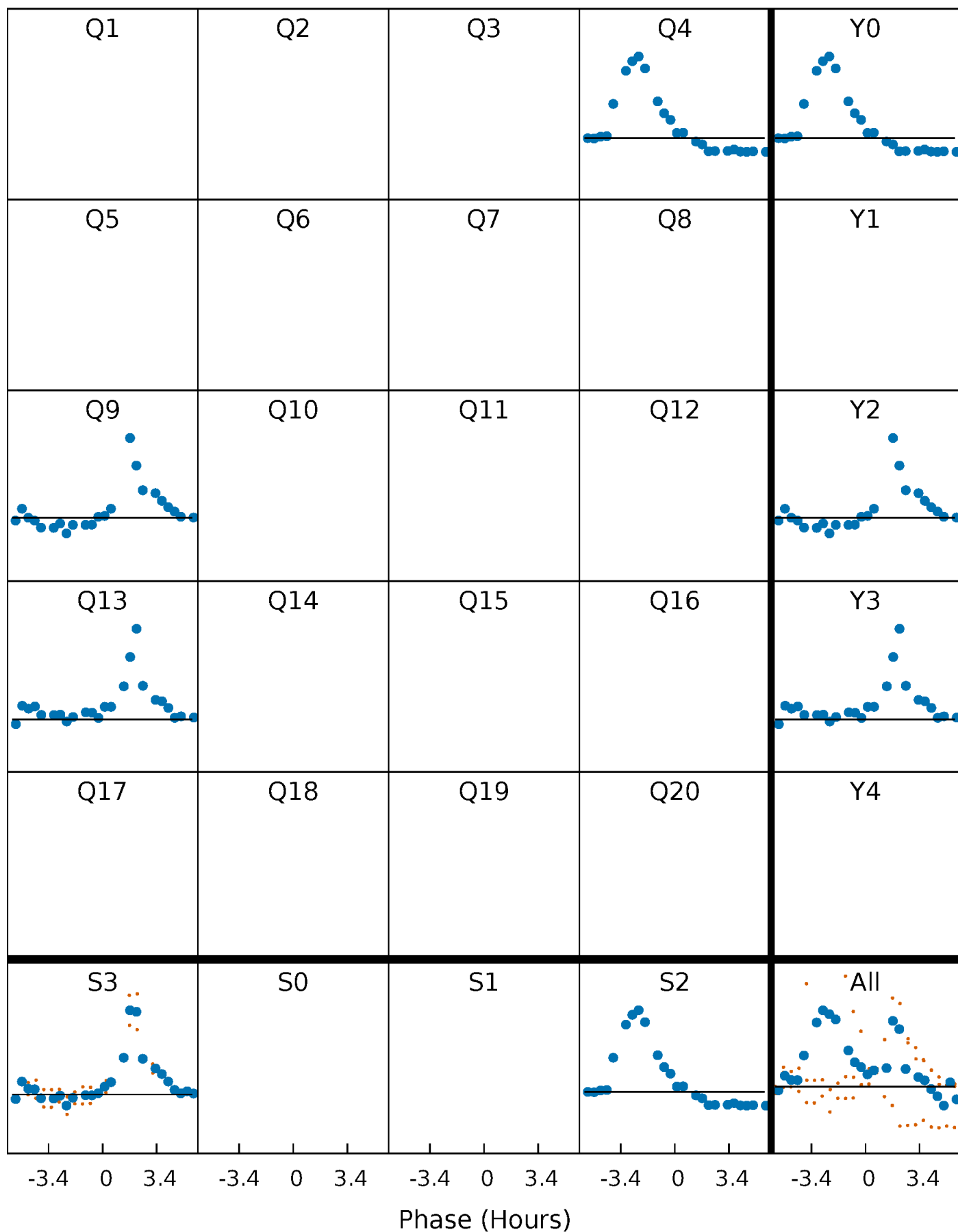
# PDC Quarter-Phased Transit Curves

TCE 004569930-06 P=398.271945 Days  $T_0=434.694599$  (BKJD)



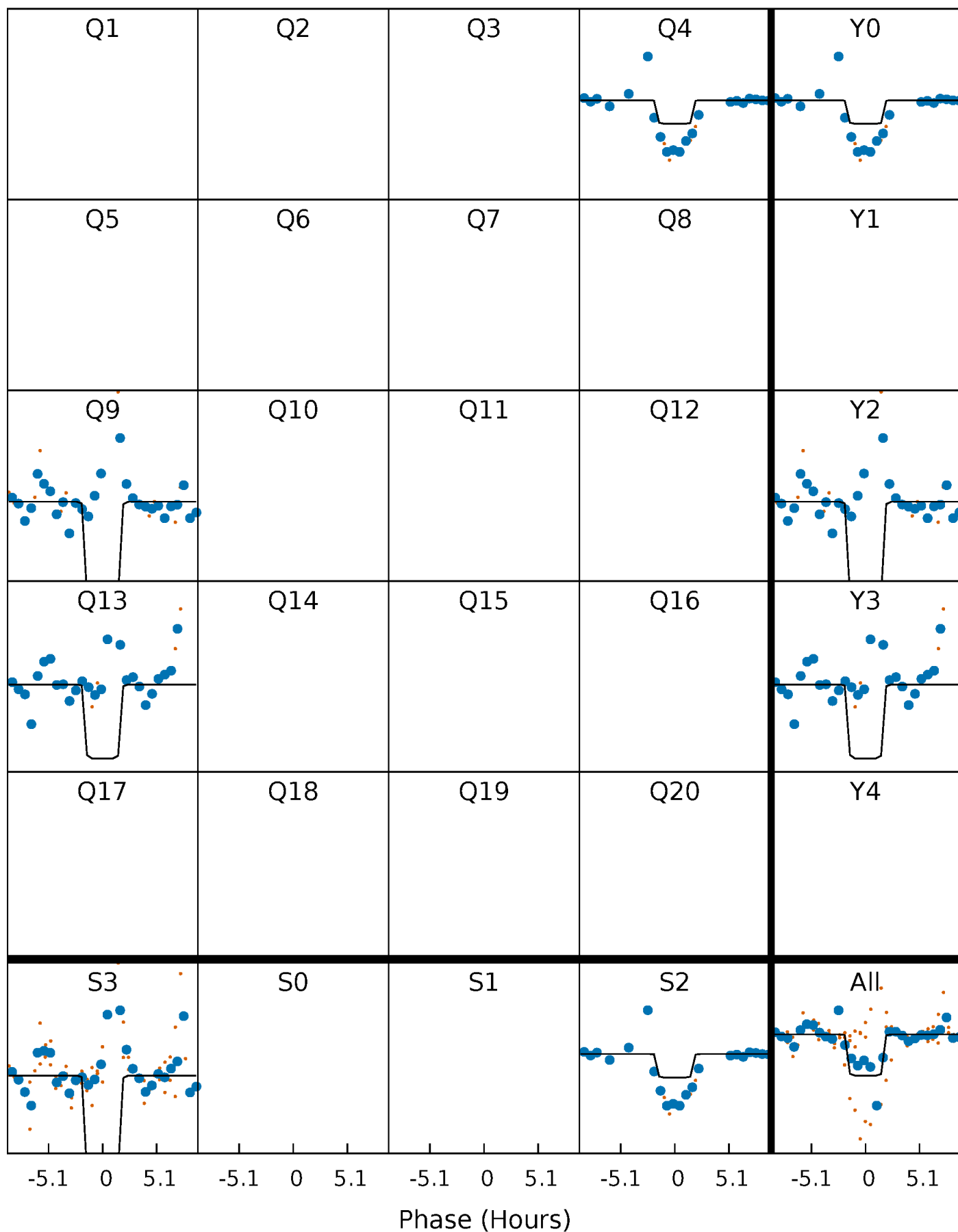
# DV Quarter-Phased Transit Curves

TCE 004569930-06 P=398.271945 Days  $T_0=434.694599$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

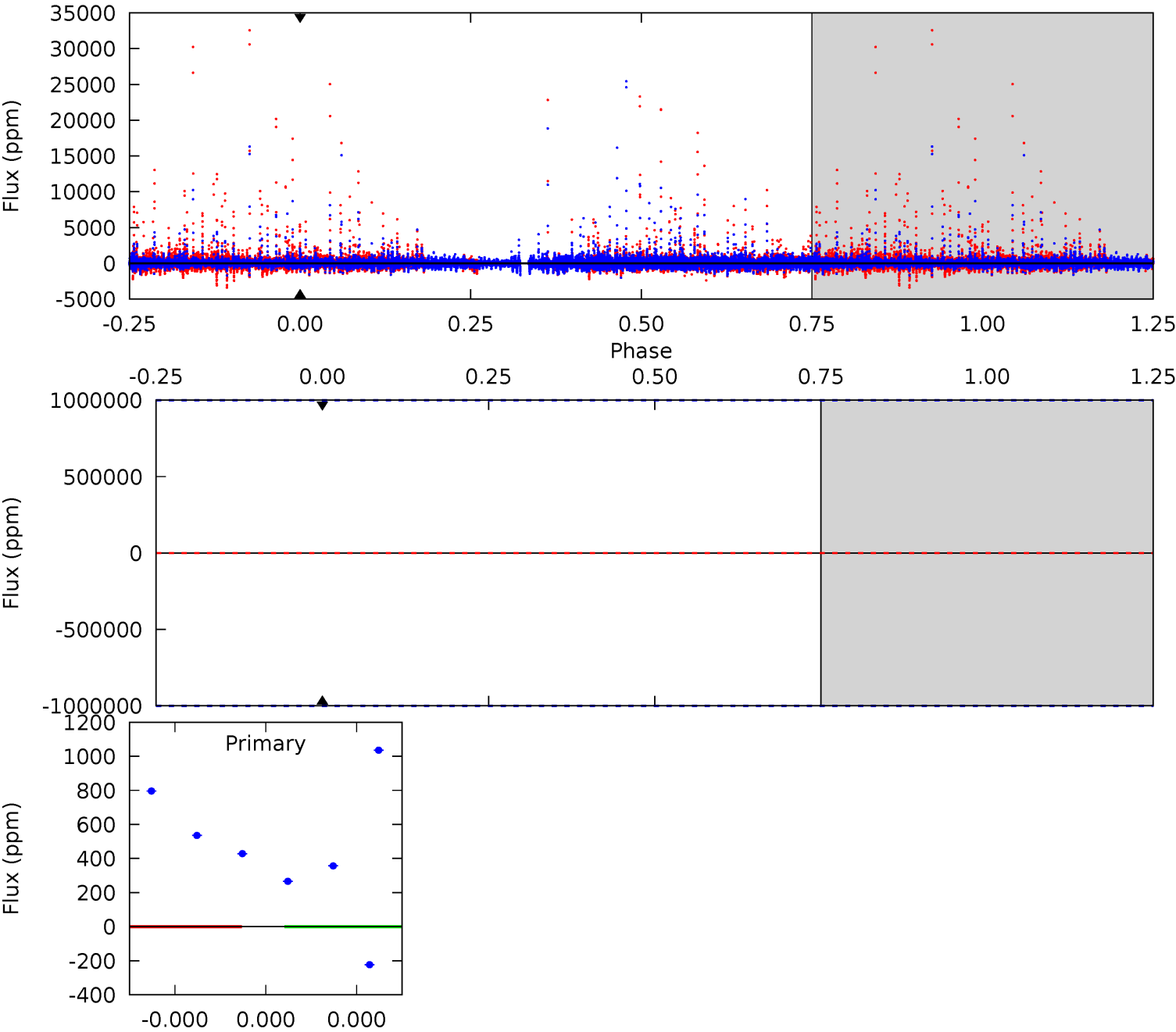
TCE 004569930-06 P=398.271945 Days  $T_0=434.724254$  (BKJD)



# DV Model-Shift Uniqueness Test

004569930-06, P = 398.271945 Days, E = 36.422654 Days

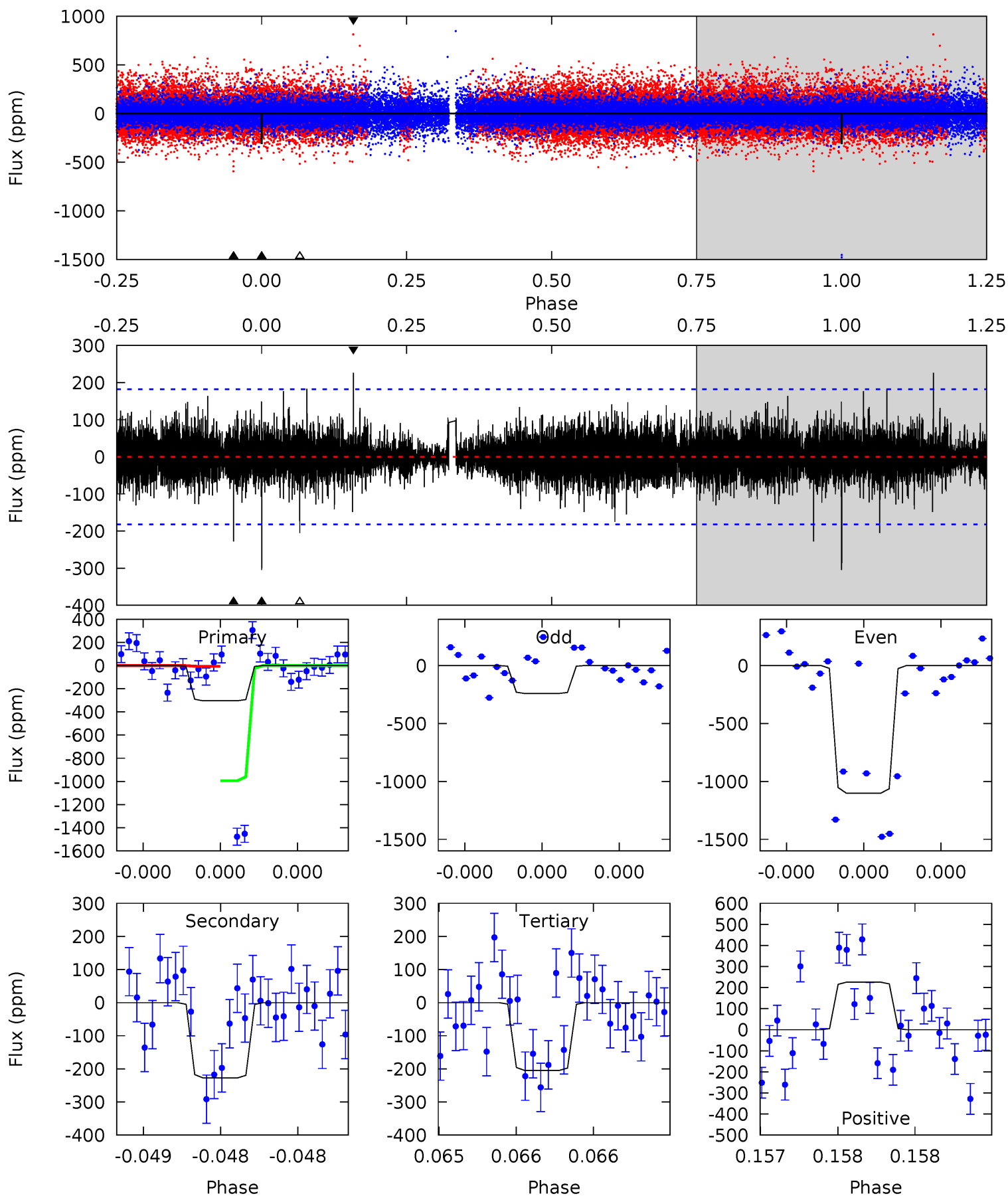
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0	0	0	0	1.00	1.00	1.00	0	0	0	0	0	0	0	0



# Alt Model-Shift Uniqueness Test

004569930-06, P = 398.271945 Days, E = 36.452309 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
9.33	6.98	6.29	6.92	5.59	3.50	1.07	3.04	2.41	0.69	0.06	13.8	-11.3	0.43	14.6





### Stellar Parameters For KIC 004569930

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$6008^{+81}_{-81}$	$3.850^{+0.217}_{-0.093}$	$-0.160^{+0.150}_{-0.150}$	$2.166^{+0.330}_{-0.613}$	$1.211^{+0.125}_{-0.172}$	$0.168^{+0.217}_{-0.050}$
	+1%/-1%	+6%/-2%	+94%/-94%	+15%/-28%	+10%/-14%	+129%/-30%
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 004569930-06 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$0 \pm 1000000$	$17.67^{+17.21}_{-12.27}$	$508^{+23}_{-31}$	$4738^{+20795}_{-24489}$	$4402^{+483942}_{-364404}$
Alt.	$-228 \pm 33$	$18.44^{+19.13}_{-12.81}$	$510^{+22}_{-34}$	$3190^{+1671}_{-569}$	$465^{+4526}_{-356}$

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

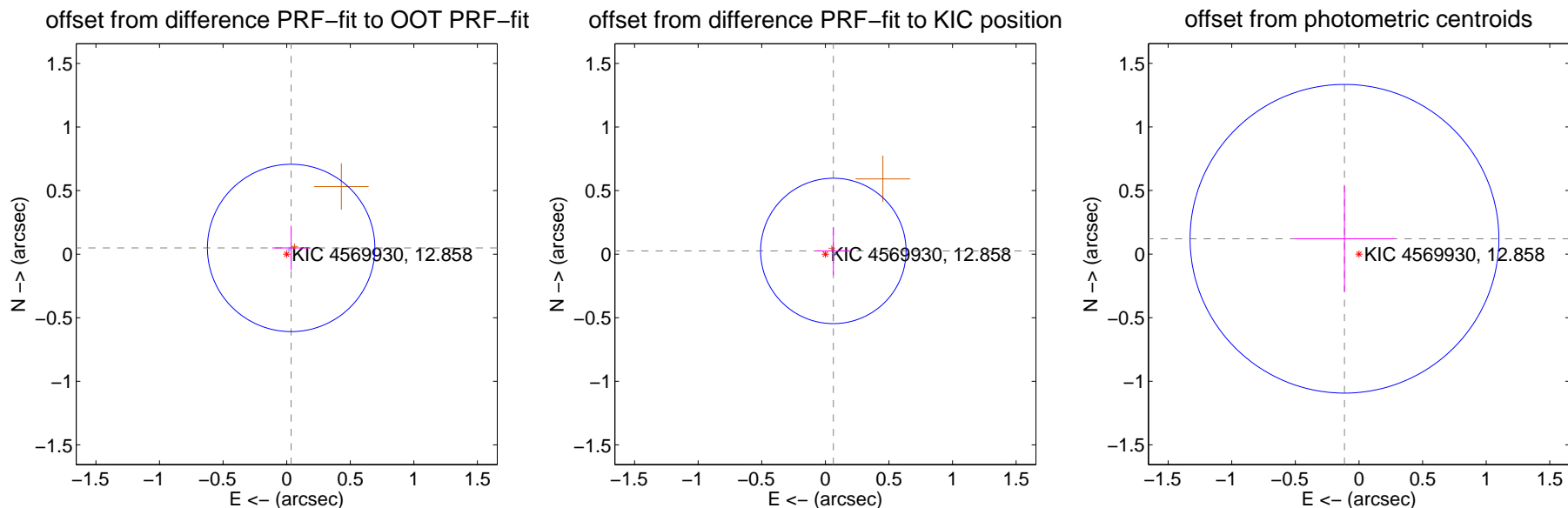
## DV Centroid Data

Supplemental centroid analysis for 004569930-06. Kepler magnitude: 12.86. Transit SNR -1.00

There are 1 quarters with good PRF difference image offsets

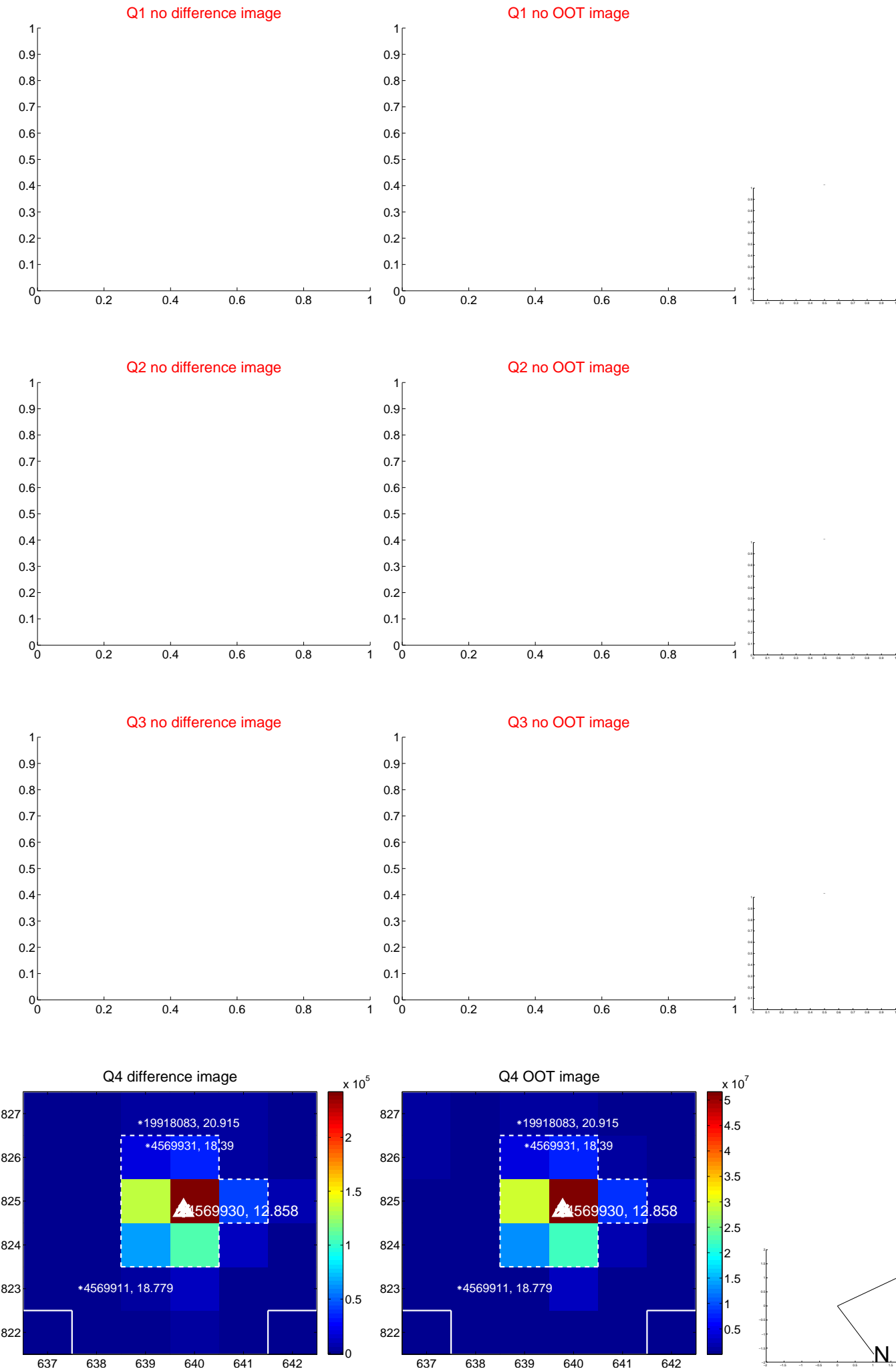
The direct PRF centroid is offset from the target star catalog position by about 0.02 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.060 \pm 0.219$	0.27	$-0.035 \pm 0.148$	$0.049 \pm 0.176$
PRF-fit source offset from KIC position	$0.068 \pm 0.191$	0.36	$-0.063 \pm 0.139$	$0.025 \pm 0.188$
photometric centroid source offset	$0.17 \pm 0.40$	0.41	$0.11 \pm 0.39$	$0.12 \pm 0.42$



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.

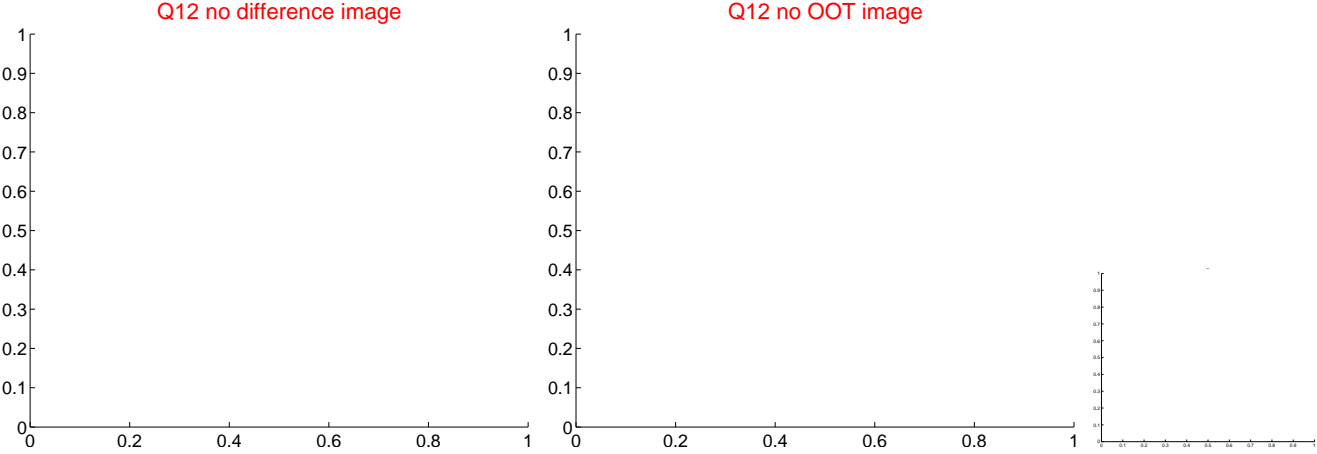
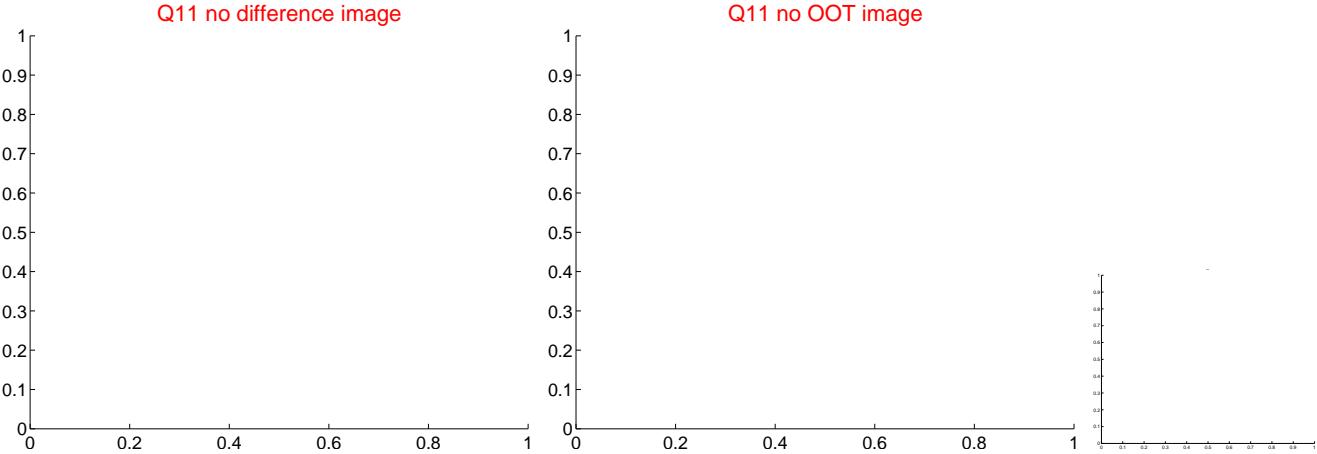
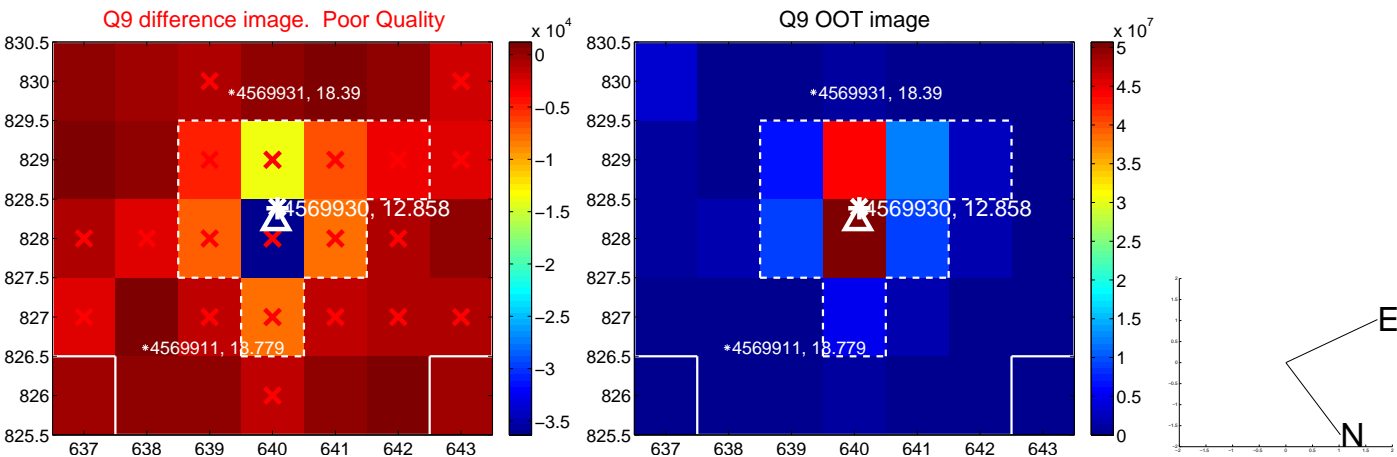
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



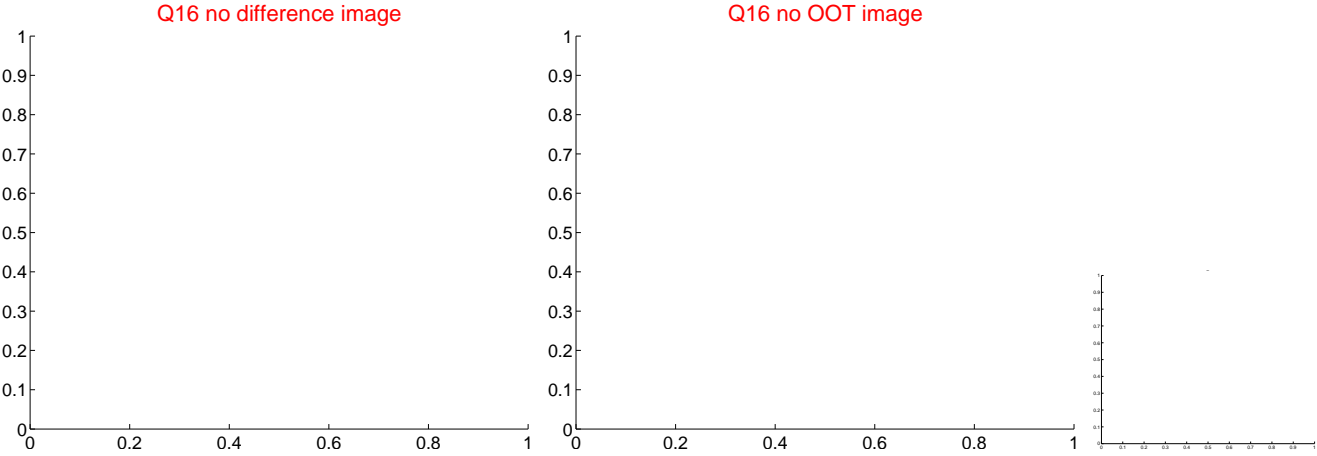
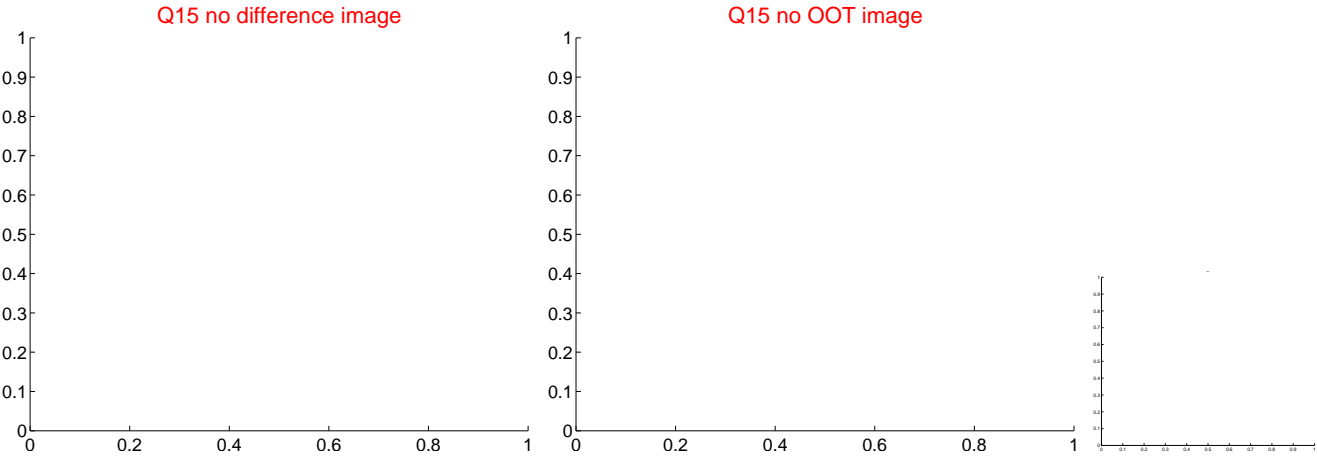
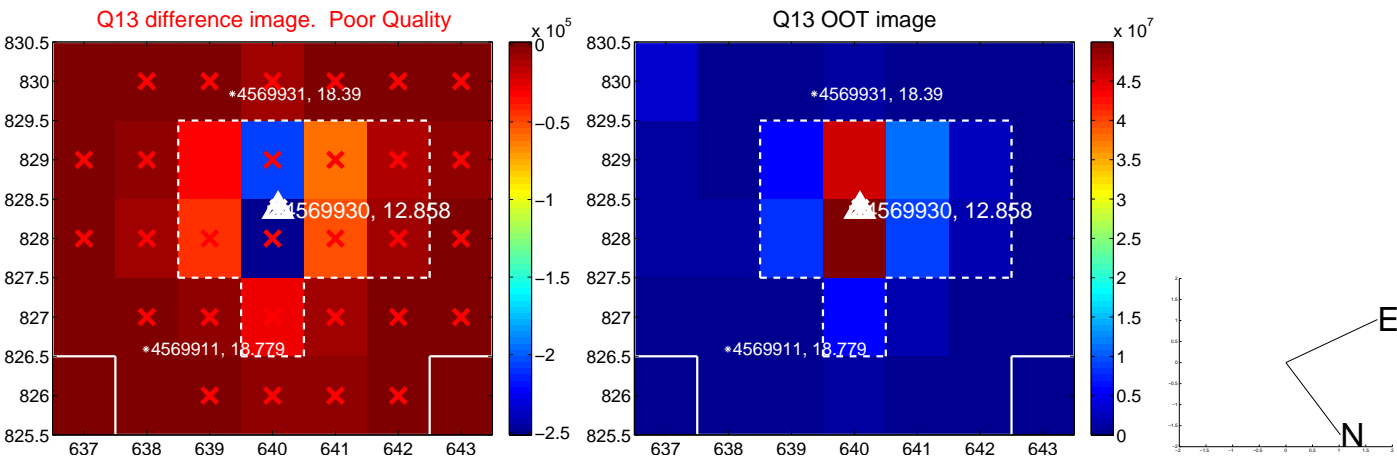
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



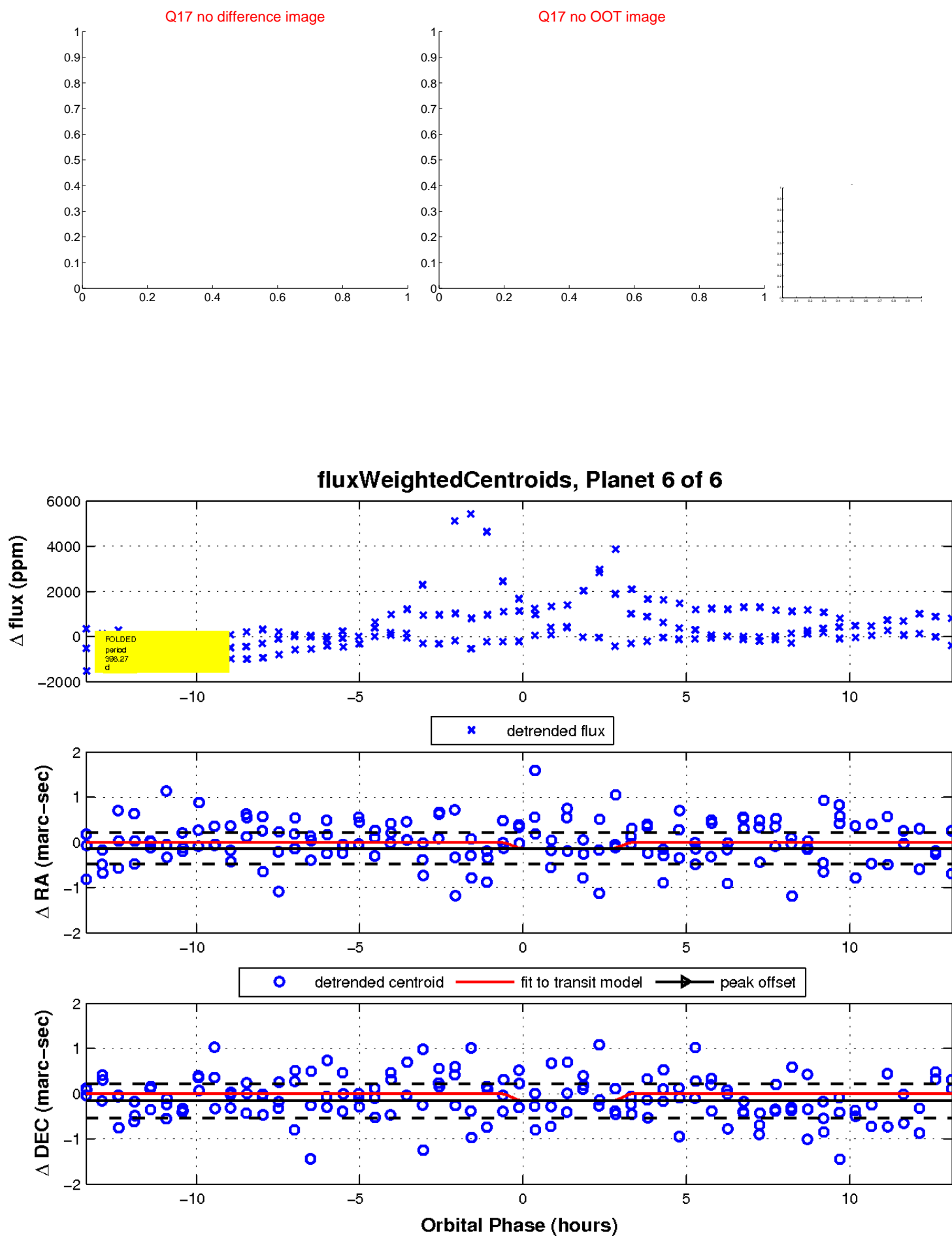
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

