

# KIC 004850499

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
004850499-01	OBS	No	360.640718	171.840162	3329.5	3.834	12.0	4.6	0.82	5445	4.95	0.57
004850499-02	OBS	No	372.992592	142.840198	6905.9	16.714	9.2	8.8	0.82	5445	6.92	0.55
004850499-03	OBS	No	366.363596	161.616850	10193.7	5.513	15.8	12.9	0.82	5445	10.25	0.56
004850499-04	OBS	No	371.664837	140.940538	5162.5	13.322	8.4	7.4	0.82	5445	5.79	0.55

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004850499-01	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST
004850499-02	OBS	FP	0.00	1	0	0	0	LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_MEAS
004850499-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_FEW_DIFFS
004850499-04	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS

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

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

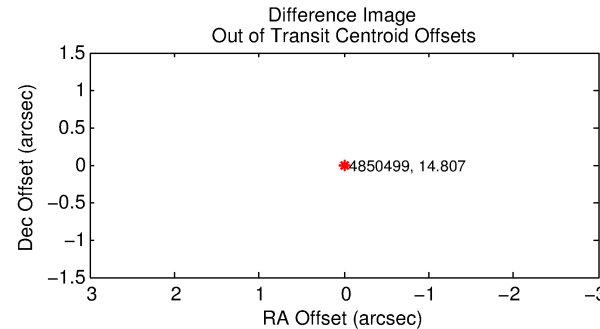
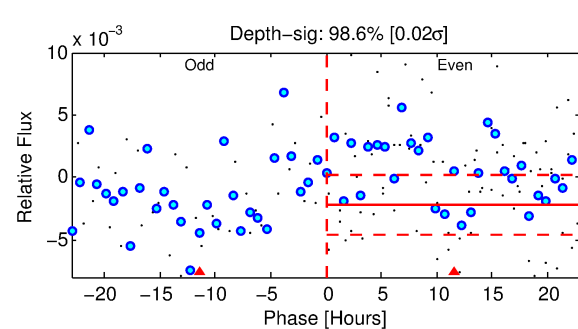
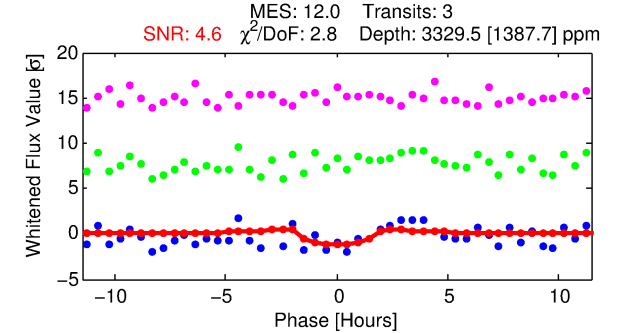
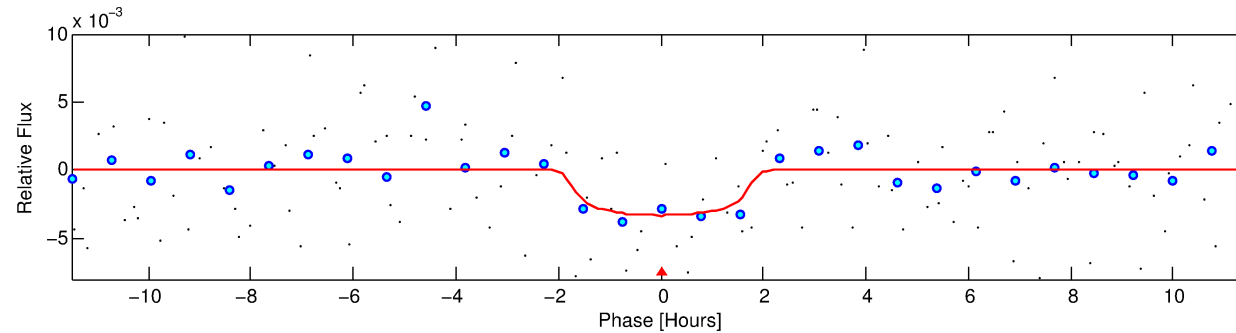
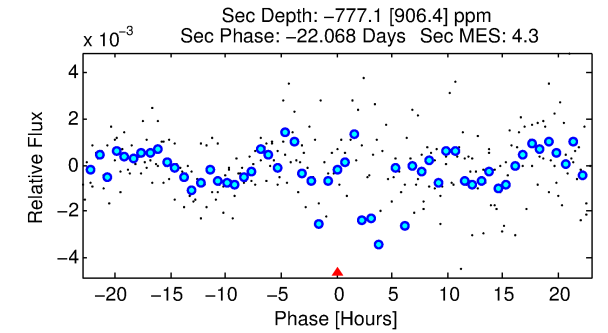
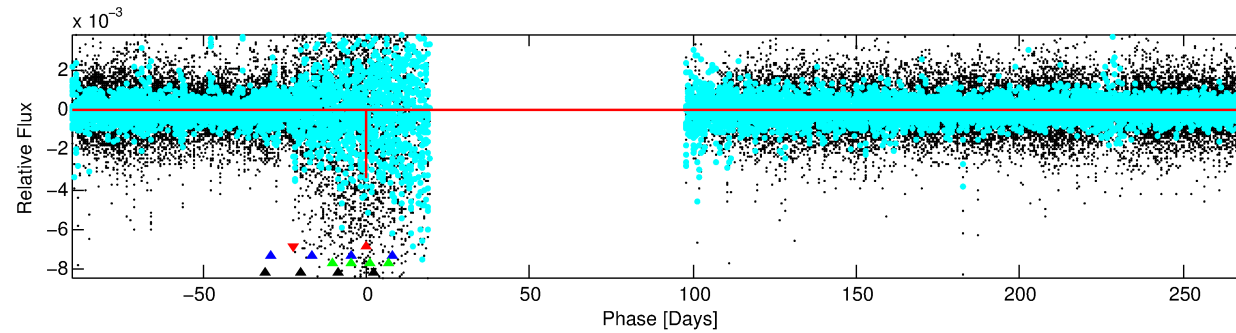
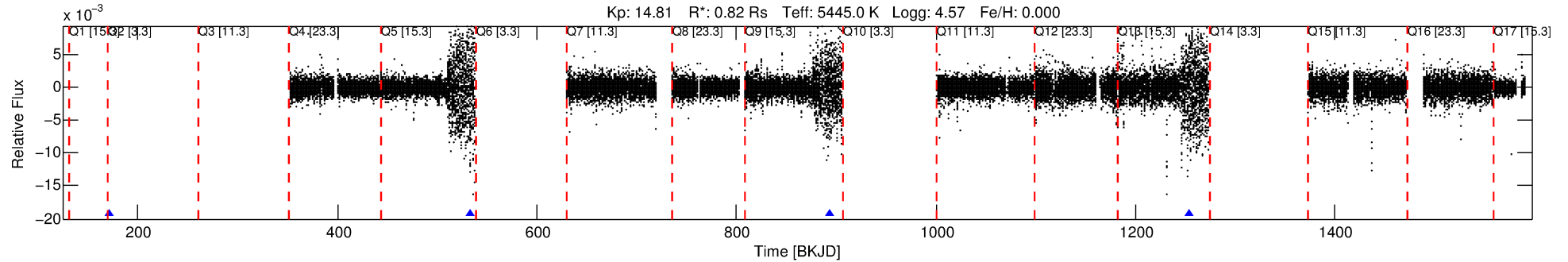
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 004850499-01

No Significant Match Found

# DV One-Page Summary

KIC: 4850499 Candidate: 1 of 4 Period: 360.641 d



## DV Fit Results:

Period = 360.64072 [0.01863] d  
Epoch = 171.8402 [0.0408] BKJD  
Rp/R\* = 0.0551 [0.1250]  
a/R\* = 613.65 [5263.15]  
b = 0.62 [8.67]  
Seff = 0.57 [0.17]  
Teq = 222 [16] K  
Rp = 4.95 [11.27] Re  
a = 0.9623 [0.1731] AU  
Ag = N/A  
Teffp = N/A

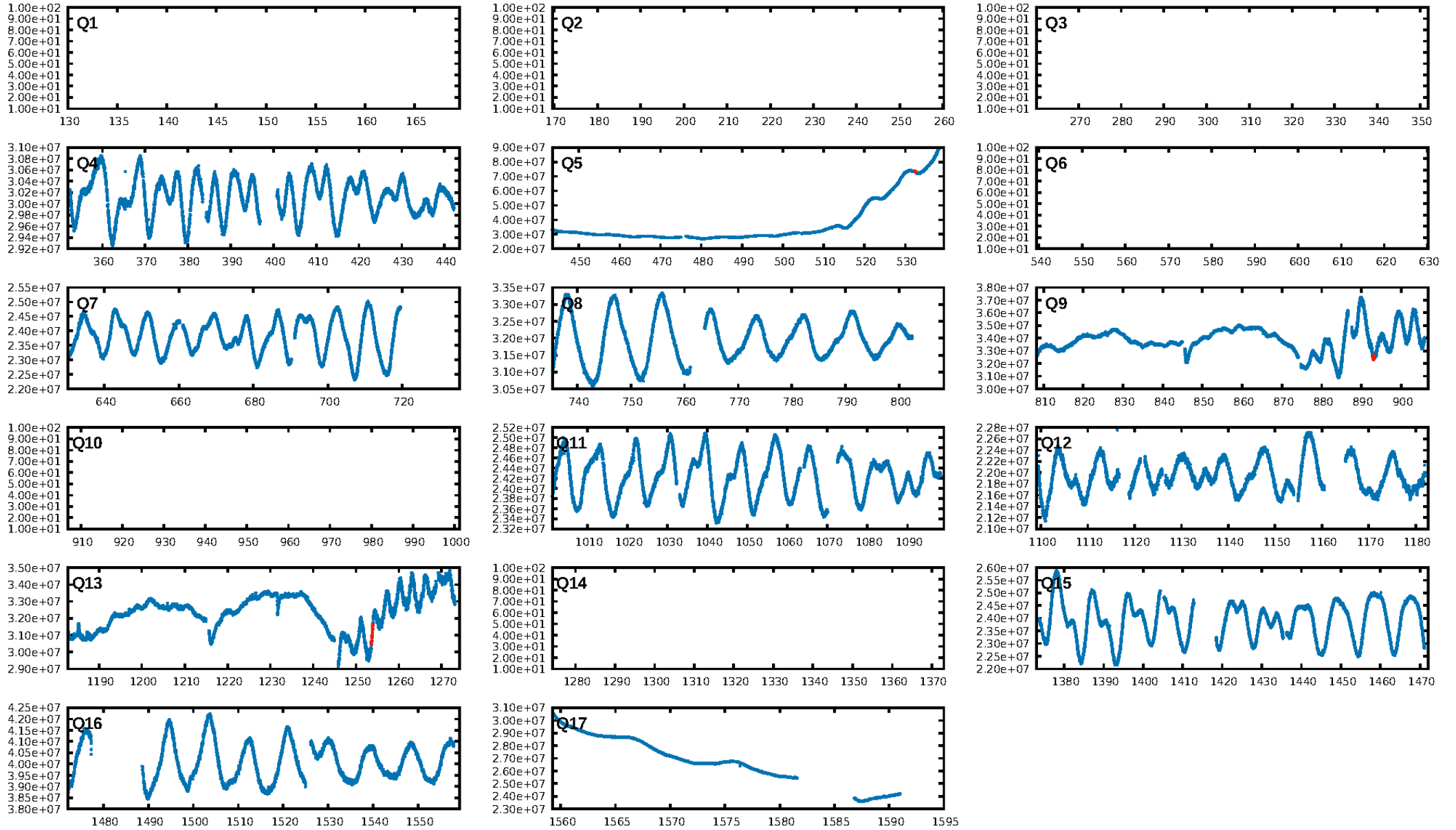
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [20.45σ]  
ModelChiSquare2-sig: 29.3%  
ModelChiSquareGof-sig: 36.4%  
Bootstrap-pfa: 4.31e-13  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: -0.1385  
Centroid-sig: 7.3%  
Centroid-so: 3.488 arcsec [29.72σ]  
OotOffset-rm: N/A  
OotOffset-st: 0/0/0 [0]  
KicOffset-rm: 1.887 arcsec [12.97σ]  
KicOffset-st: 0/0/0 [3]  
DiffImageQuality-fgm: 1.00 [3/3]  
DiffImageOverlap-fno: 1.00 [3/3]

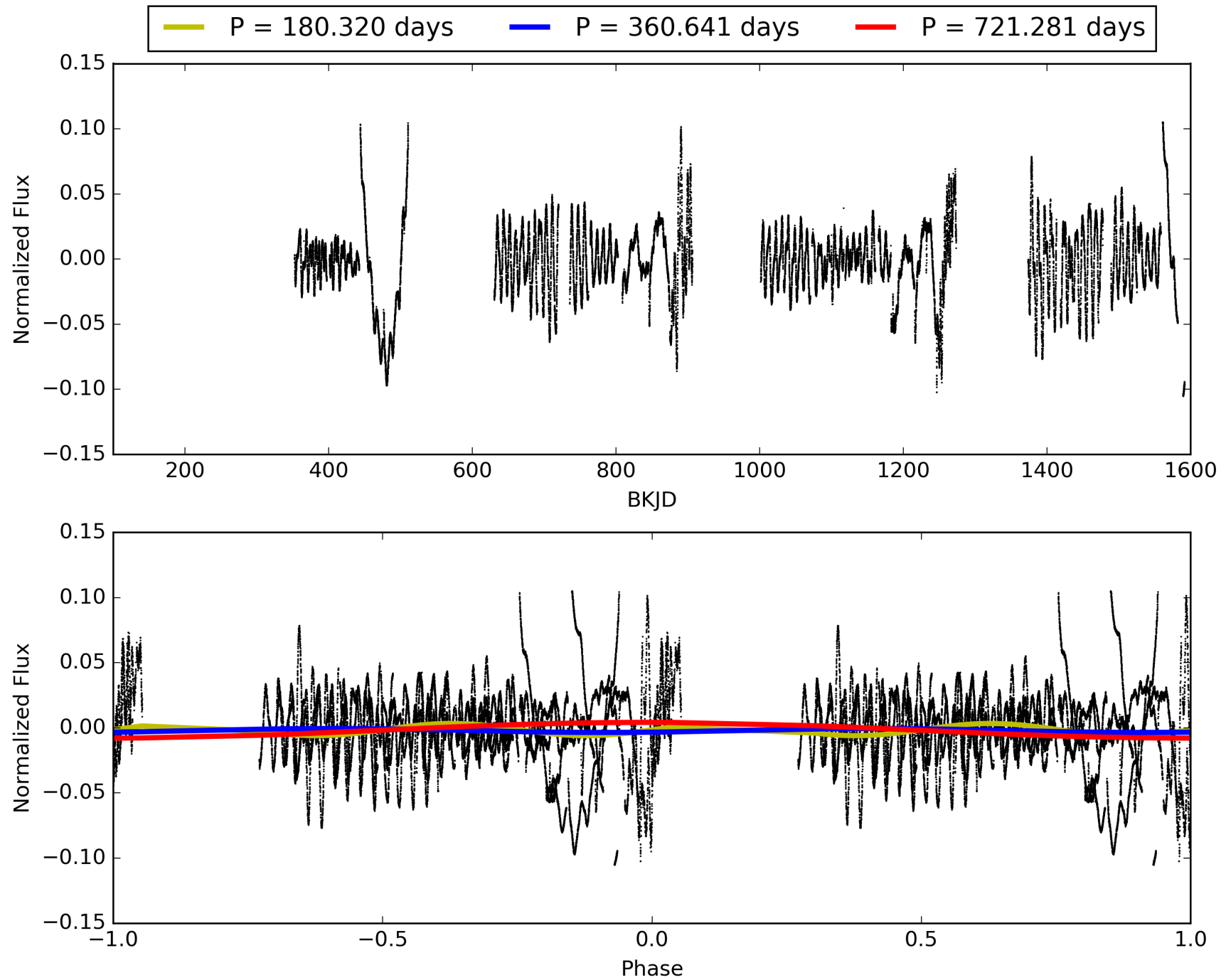
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 23:12:49 Z

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

# TCE 004850499-01, PDC Light Curves

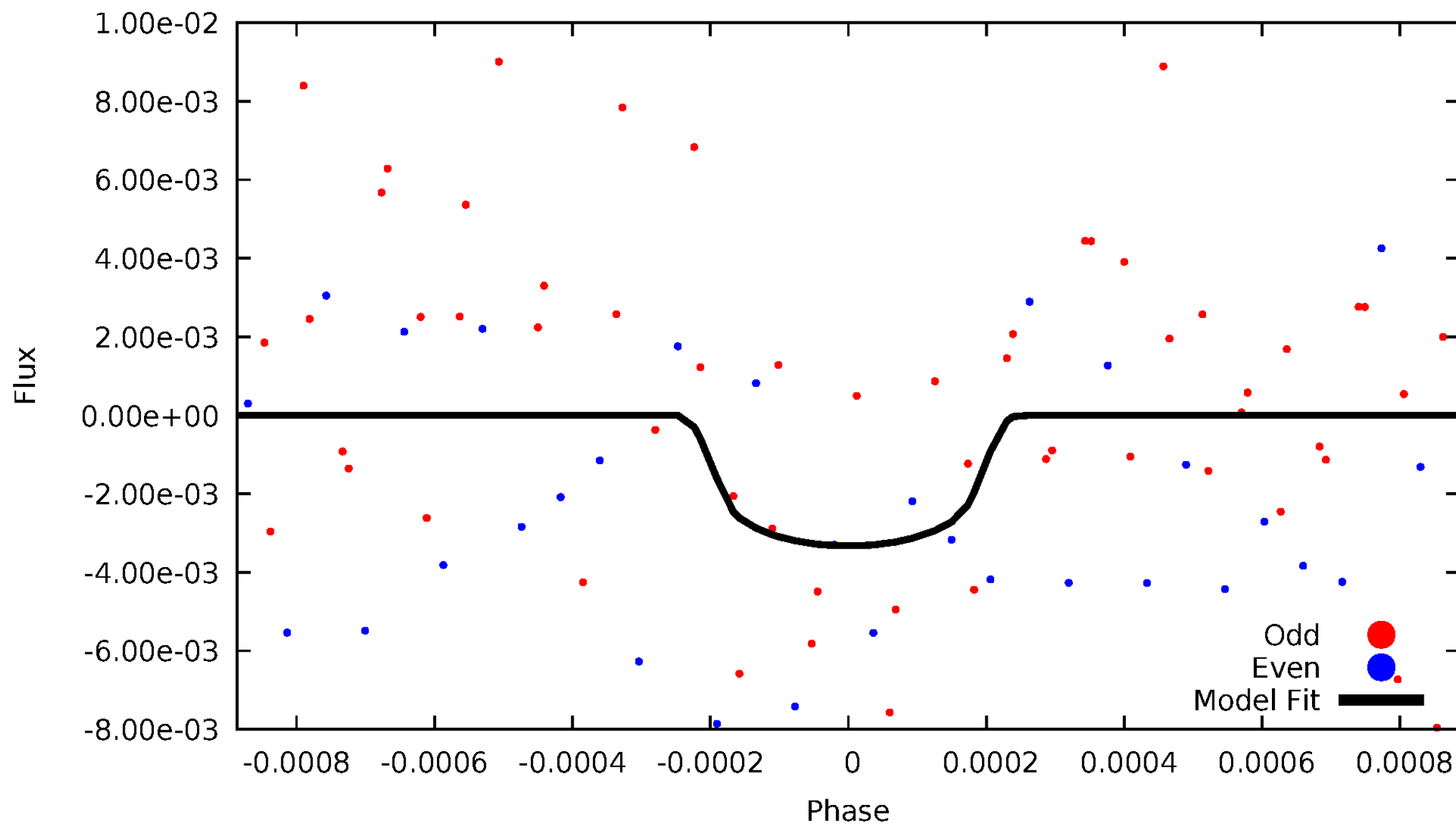


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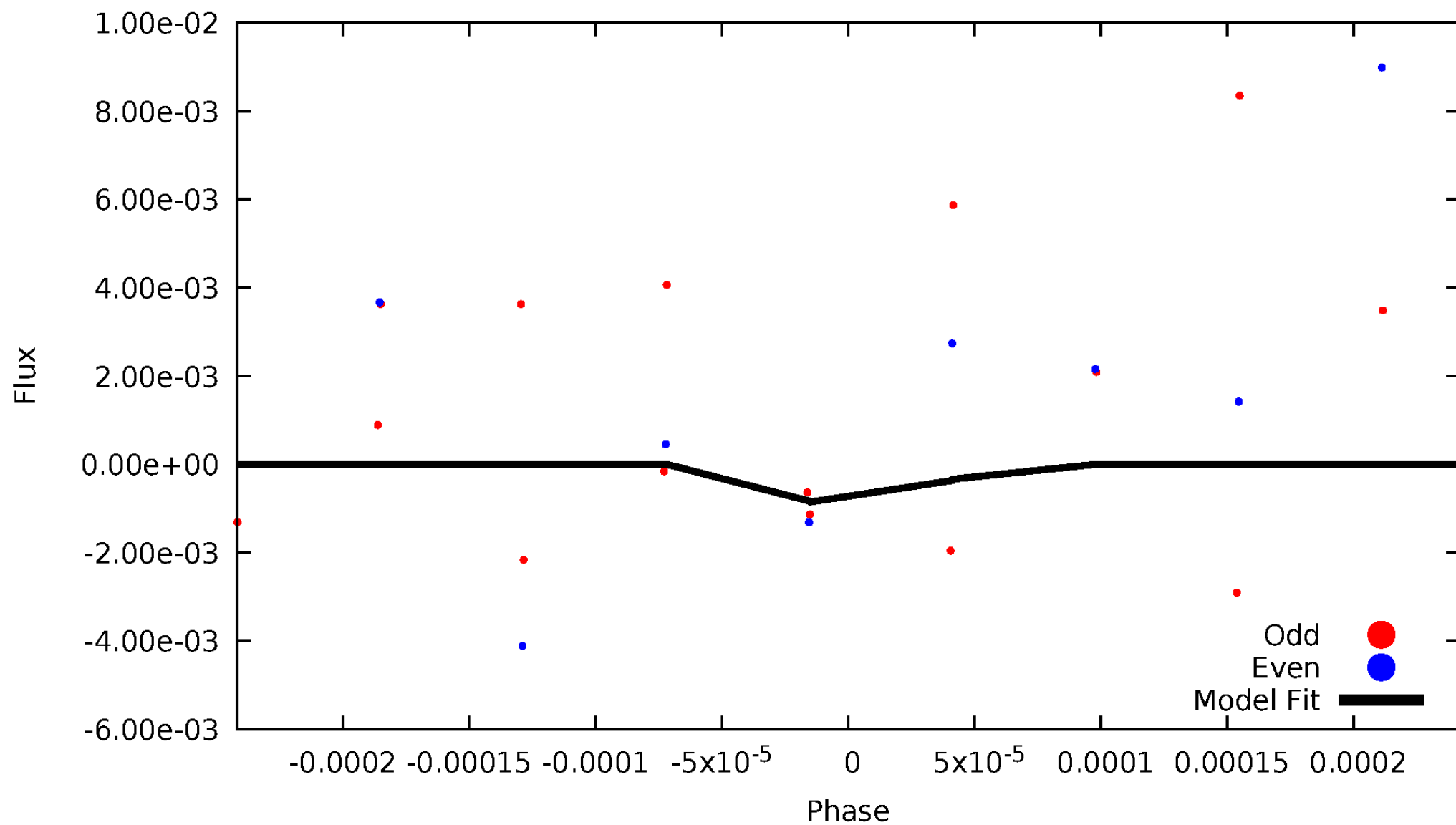
# DV Odd/Even

TCE 004850499-01



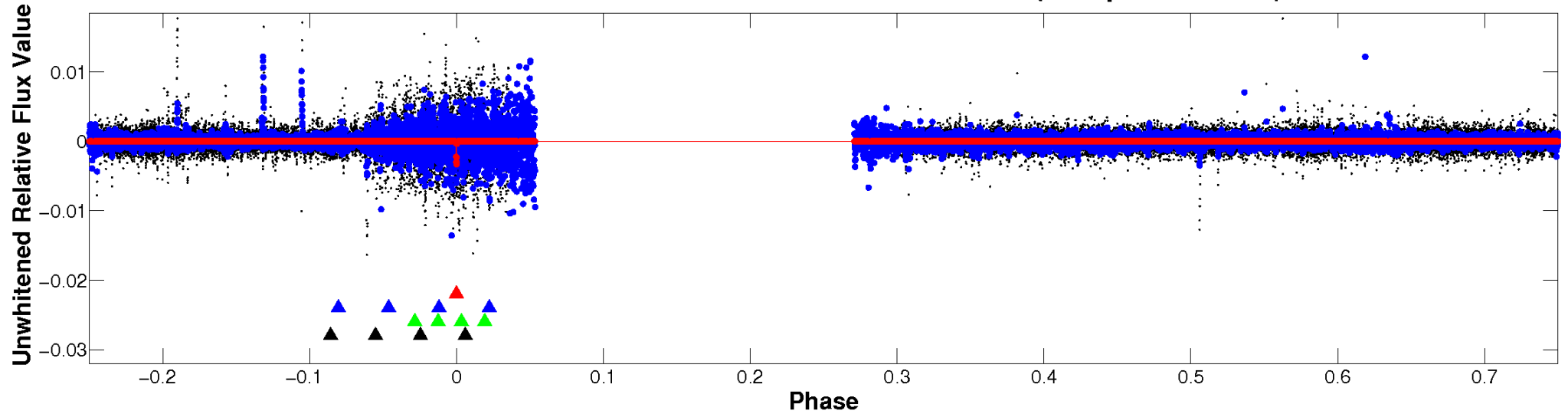
# ALT Odd/Even

TCE 004850499-01

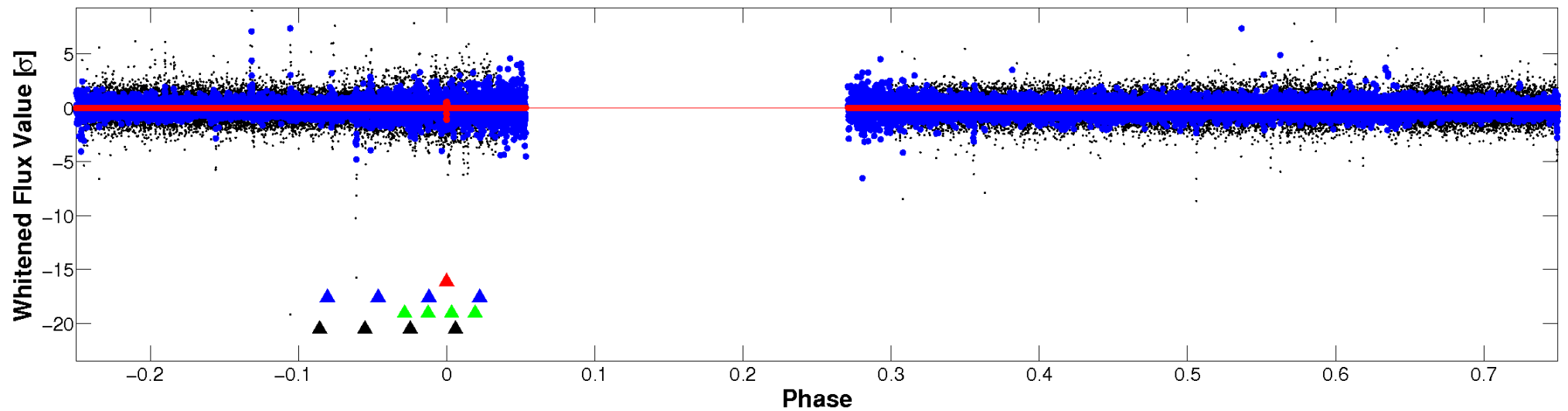


# Non-Whitened Vs. Whitened Light Curve

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

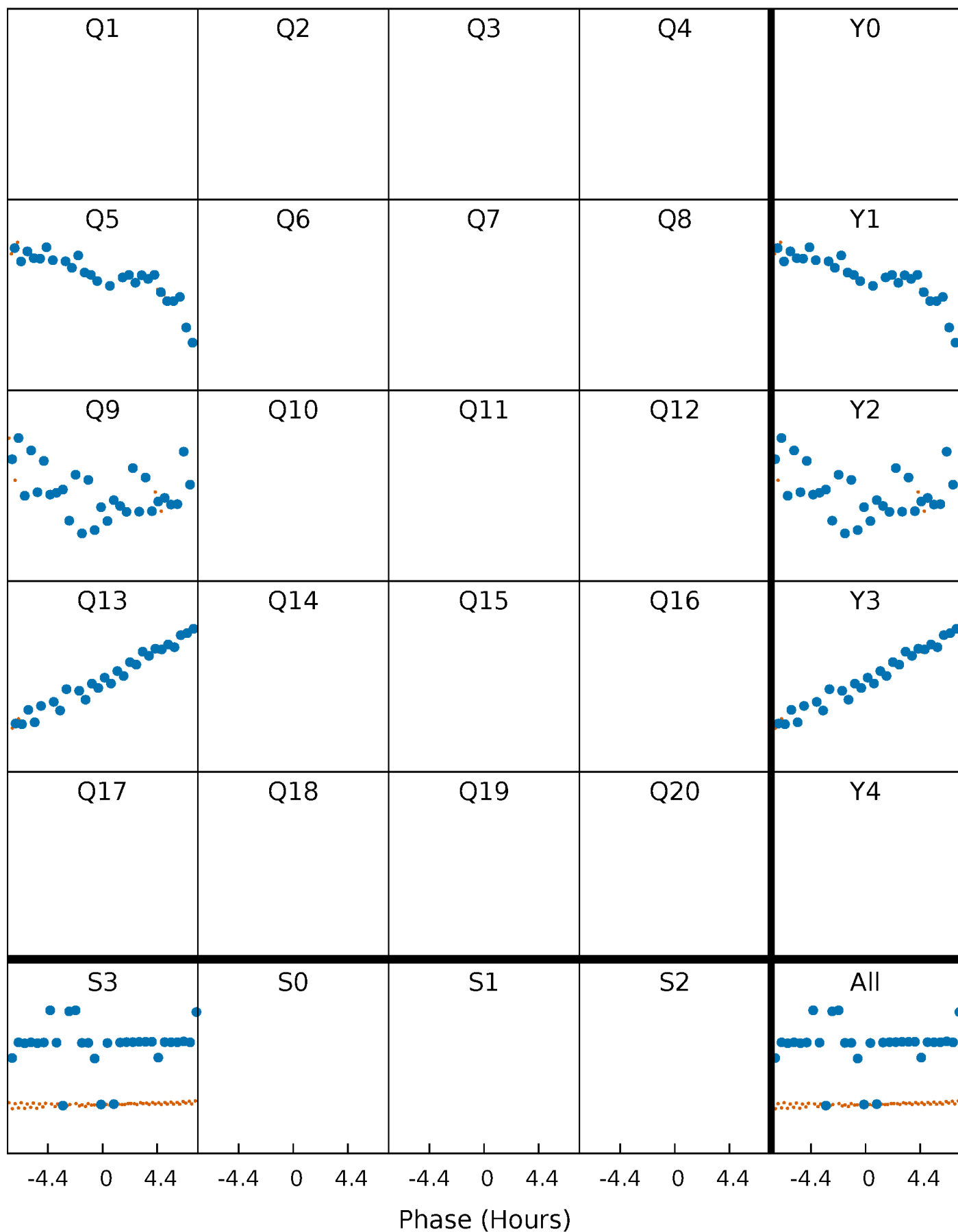


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

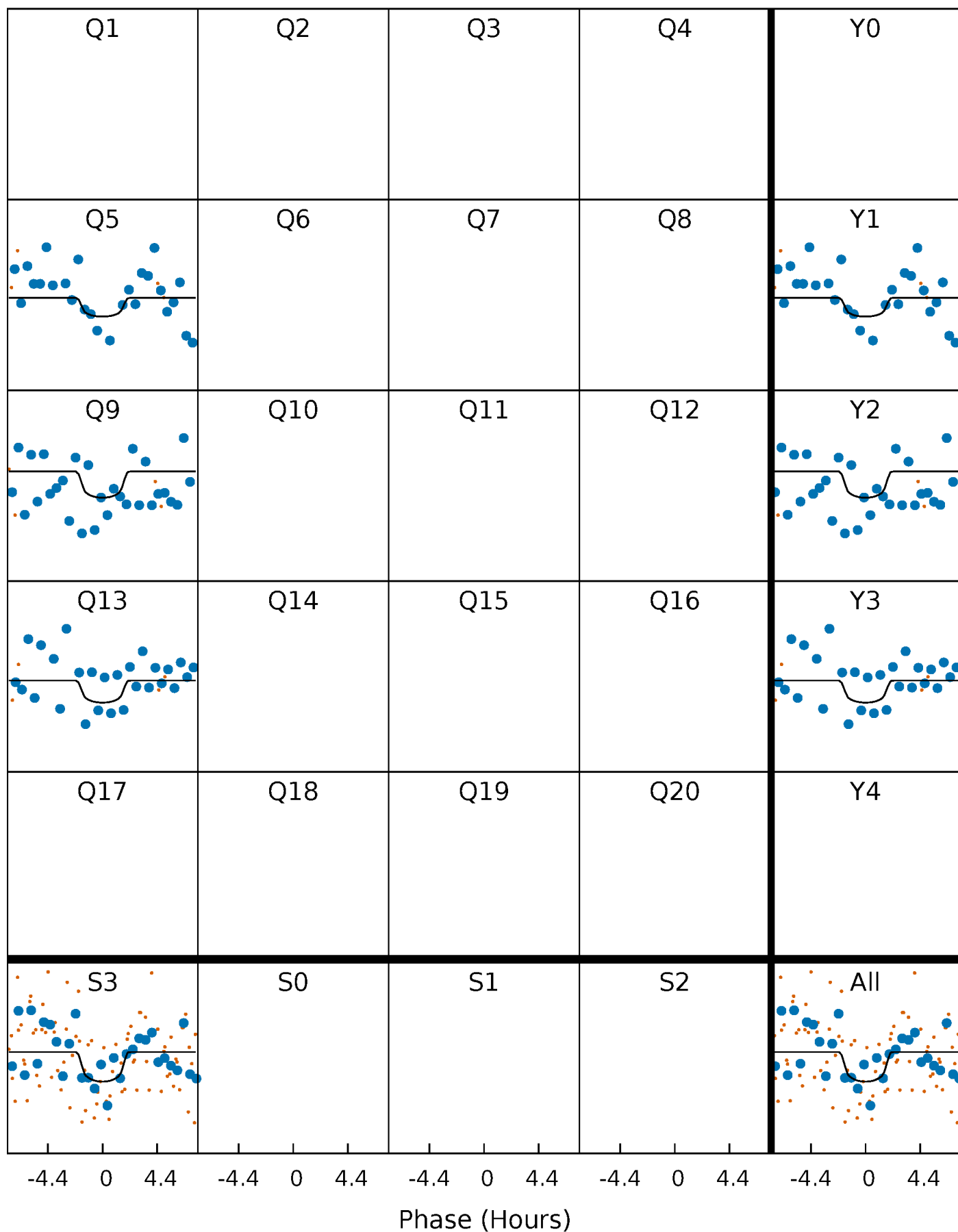
TCE 004850499-01     $P=360.640718$  Days     $T_0=171.840162$  (BKJD)





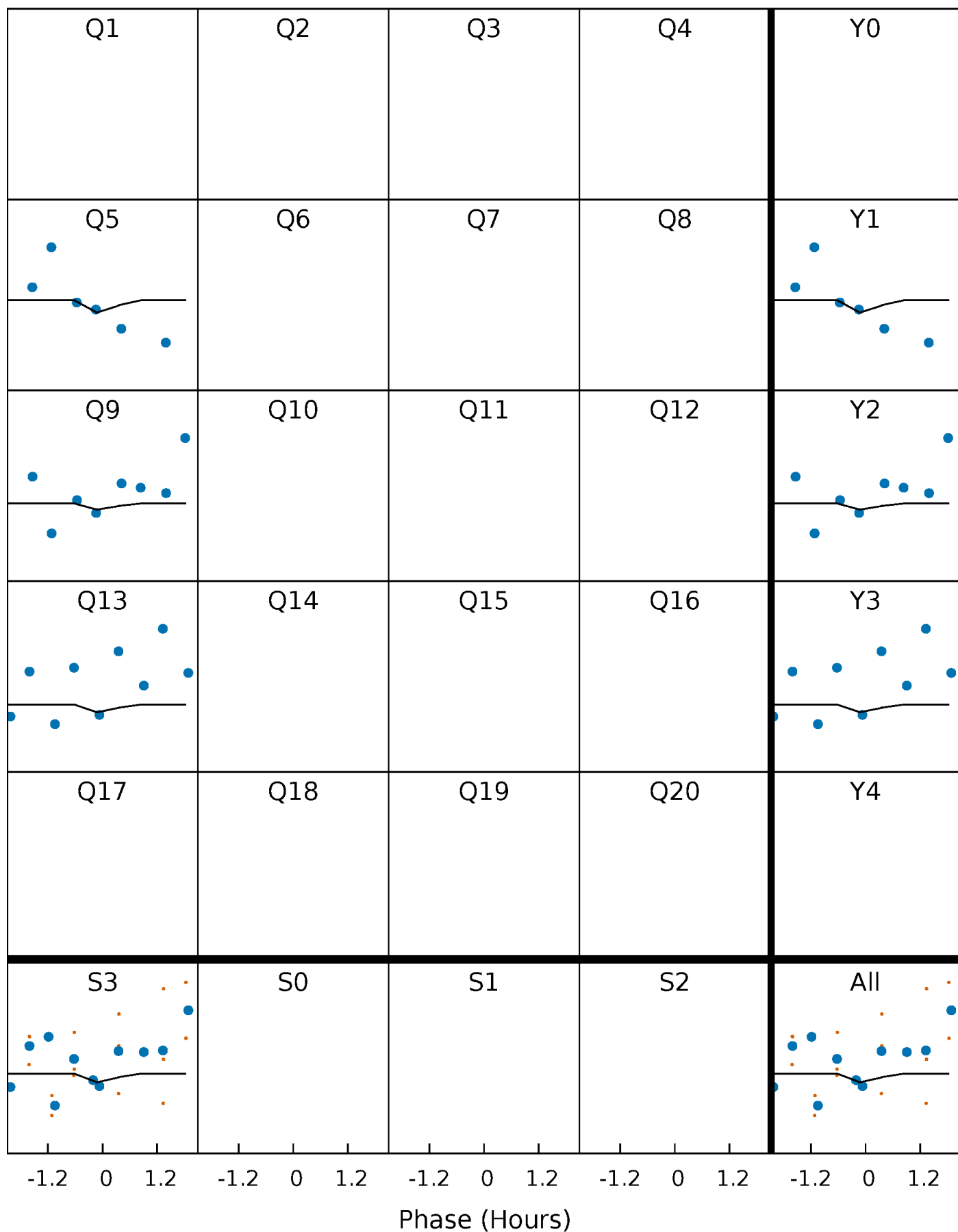
# DV Quarter-Phased Transit Curves

TCE 004850499-01     $P=360.640718$  Days     $T_0=171.840162$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

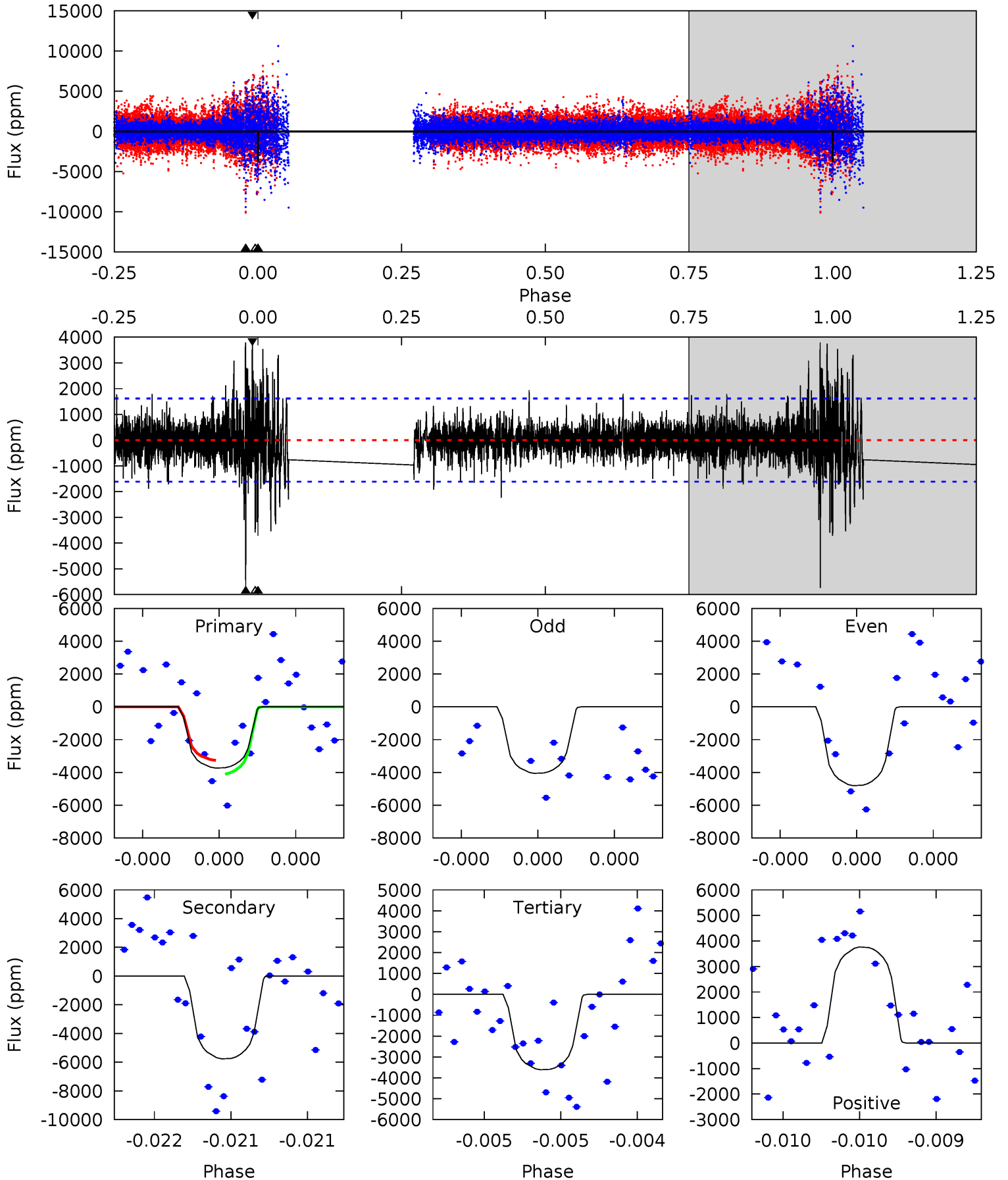
TCE 004850499-01 P=360.693201 Days  $T_0=171.753868$  (BKJD)



# DV Model-Shift Uniqueness Test

004850499-01, P = 360.640718 Days, E = 171.840162 Days

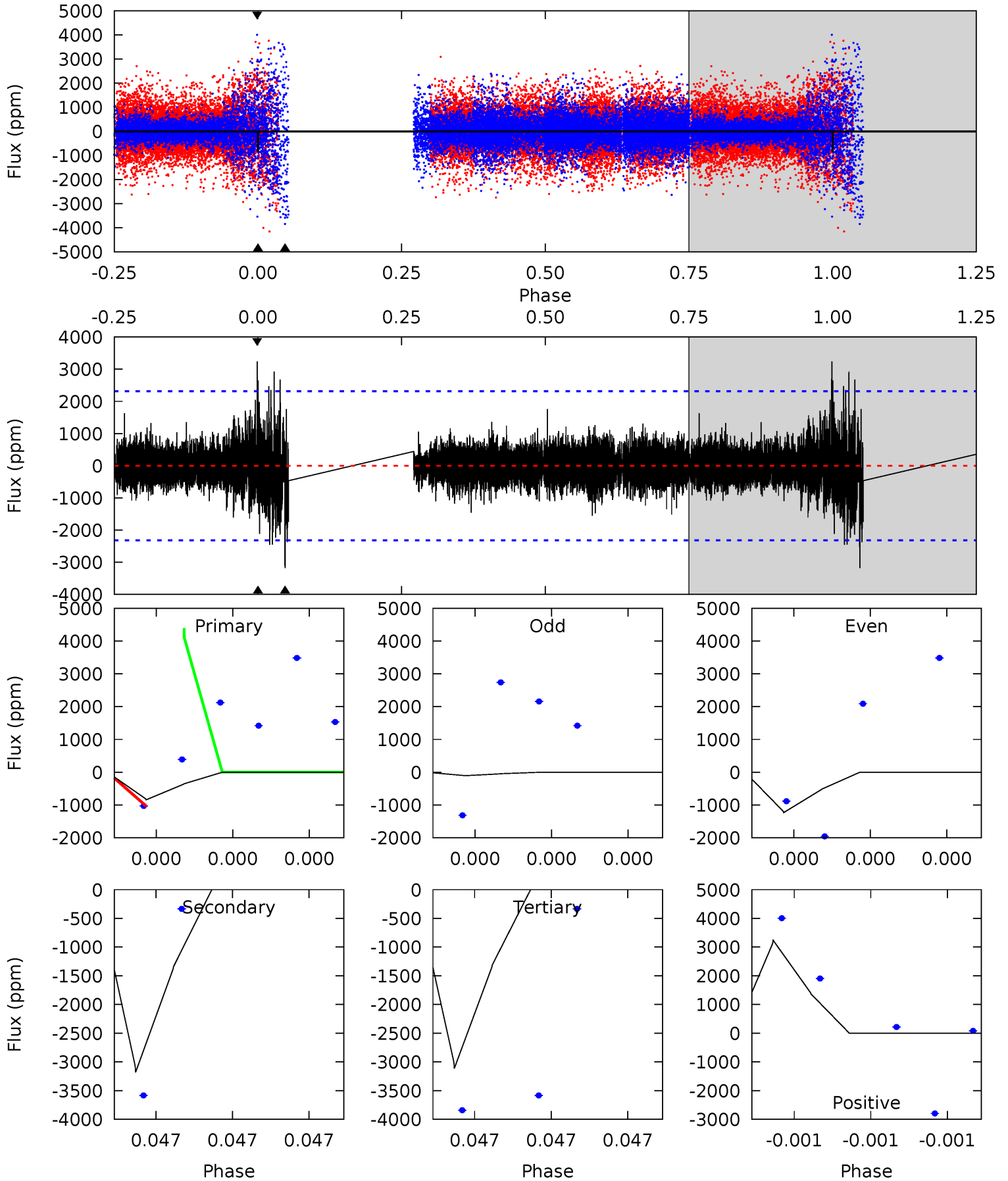
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
12.9	19.9	12.4	13.0	5.59	3.50	1.77	0.42	-0.10	7.42	6.91	1.13	0.87	0.40	1.42



# Alt Model-Shift Uniqueness Test

004850499-01, P = 360.693201 Days, E = 171.753868 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
2.12	7.99	7.82	8.15	5.83	3.86	0.90	-5.71	-6.03	0.17	-0.15	1.38	1.25	0.50	3.92



### Stellar Parameters For KIC 004850499

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5445^{+180}_{-180}$	$4.569^{+0.034}_{-0.144}$	$0.000^{+0.250}_{-0.300}$	$0.822^{+0.175}_{-0.075}$	$0.918^{+0.073}_{-0.110}$	$2.326^{+0.438}_{-0.940}$
	+3%/-3%	+1%/-3%	+inf%/-inf%	+21%/-9%	+8%/-12%	+19%/-40%
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 004850499-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-5736 \pm 289$	$9.83^{+9.71}_{-6.76}$	$316^{+18}_{-14}$	$4707^{+3895}_{-1045}$	$29745^{+279628}_{-22542}$
Alt.	$-3181 \pm 398$	$8.76^{+9.95}_{-5.95}$	$317^{+17}_{-14}$	$4383^{+3083}_{-976}$	$20562^{+189450}_{-16125}$

$T_{\text{max}}$  = Theoretical Maximum Planetary Temperature

$T_{\text{obs}}$  = Observed Planetary Temperature (Assuming  $A=0.3$ )

$A_{\text{obs}}$  = Observed Albedo (Assuming  $T=0$ )

If a secondary eclipse is present, the system is likely an EB if  $T_{\text{obs}} \gg T_{\text{max}}$  AND  $A_{\text{obs}} \gg 1.0$

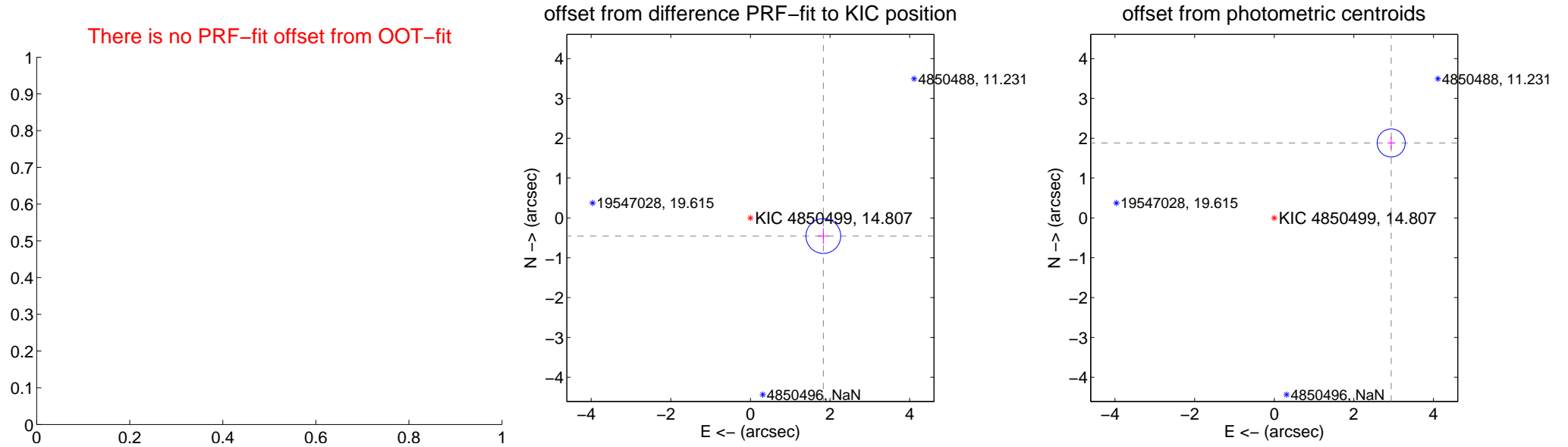
## DV Centroid Data

Supplemental centroid analysis for 004850499-01. Kepler magnitude: 14.81. Transit SNR 4.61

There are 3 quarters with good PRF difference image offsets

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

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	—	—	—	—
PRF-fit source offset from KIC position	$1.887 \pm 0.145$	12.97	$-1.831 \pm 0.142$	$-0.454 \pm 0.199$
photometric centroid source offset	$3.49 \pm 0.12$	29.72	$-2.94 \pm 0.10$	$1.88 \pm 0.16$

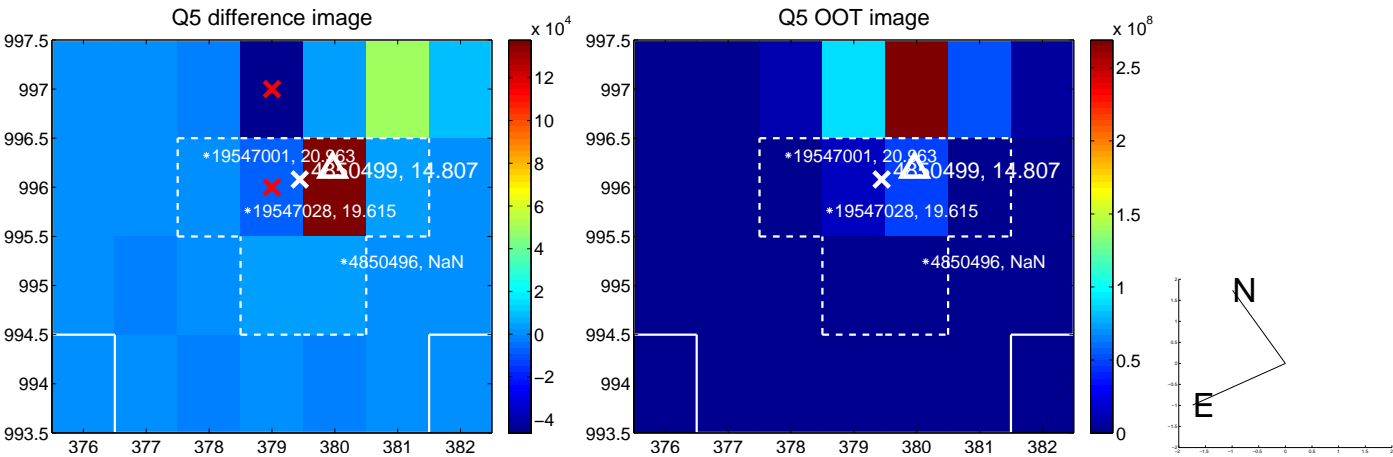


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

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

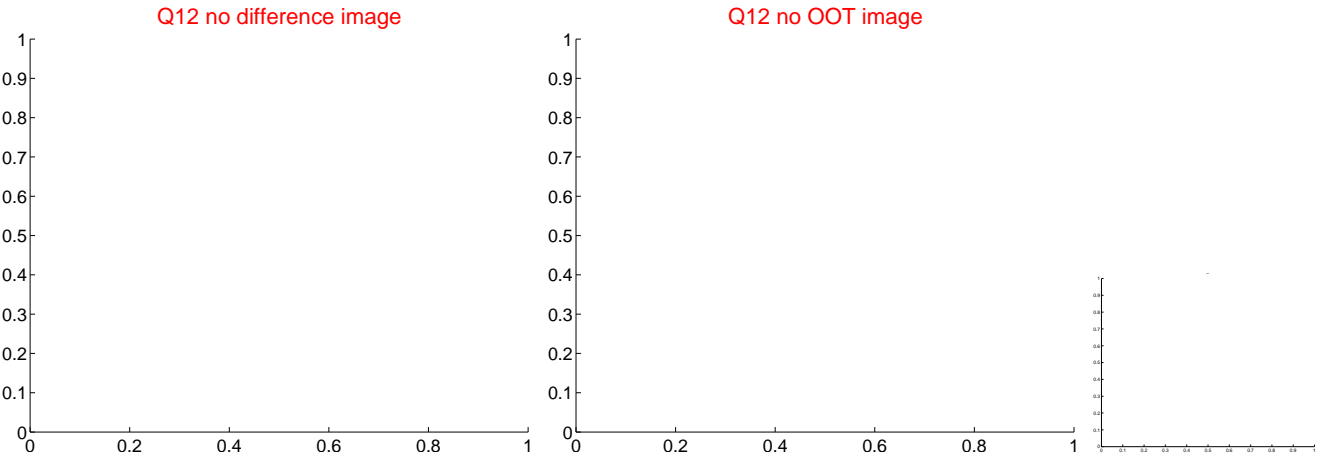
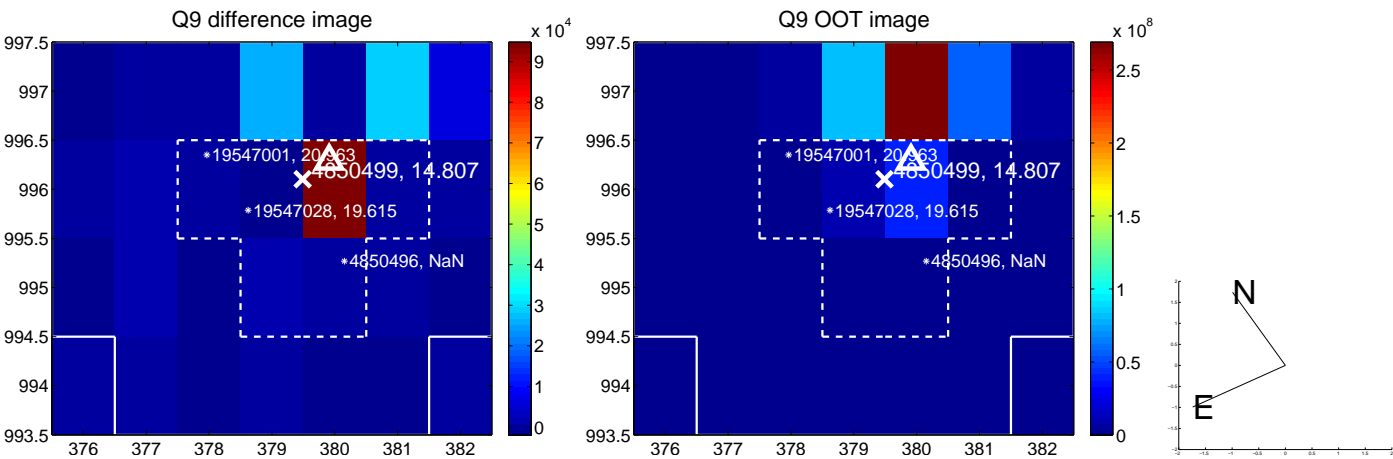


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

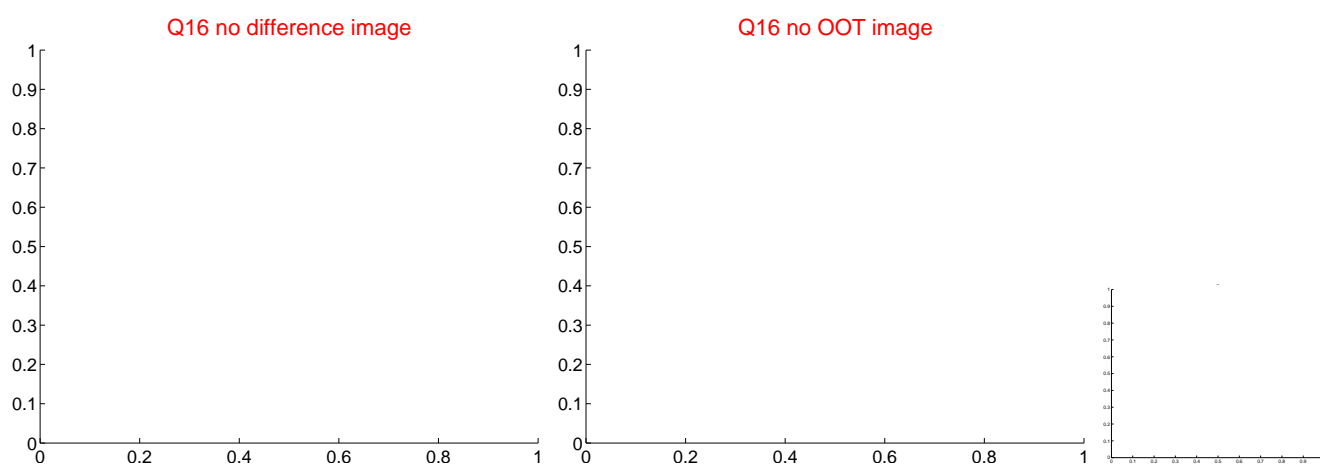
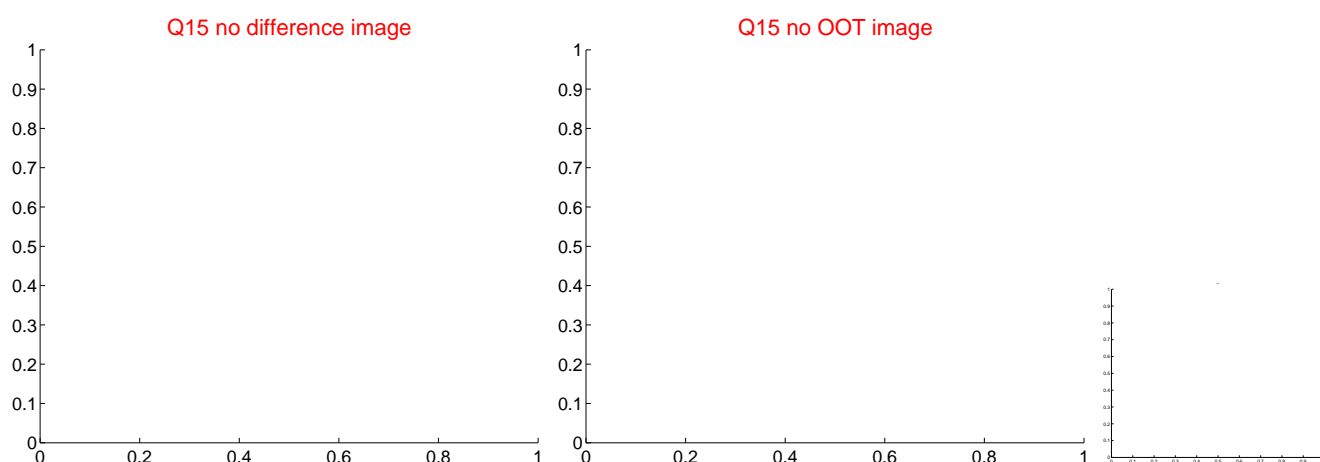
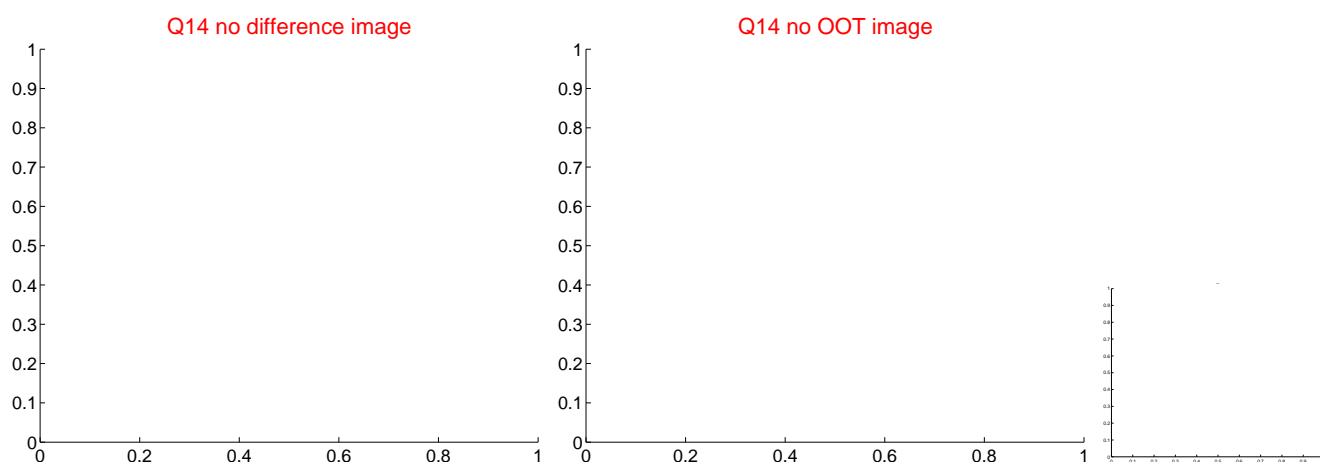
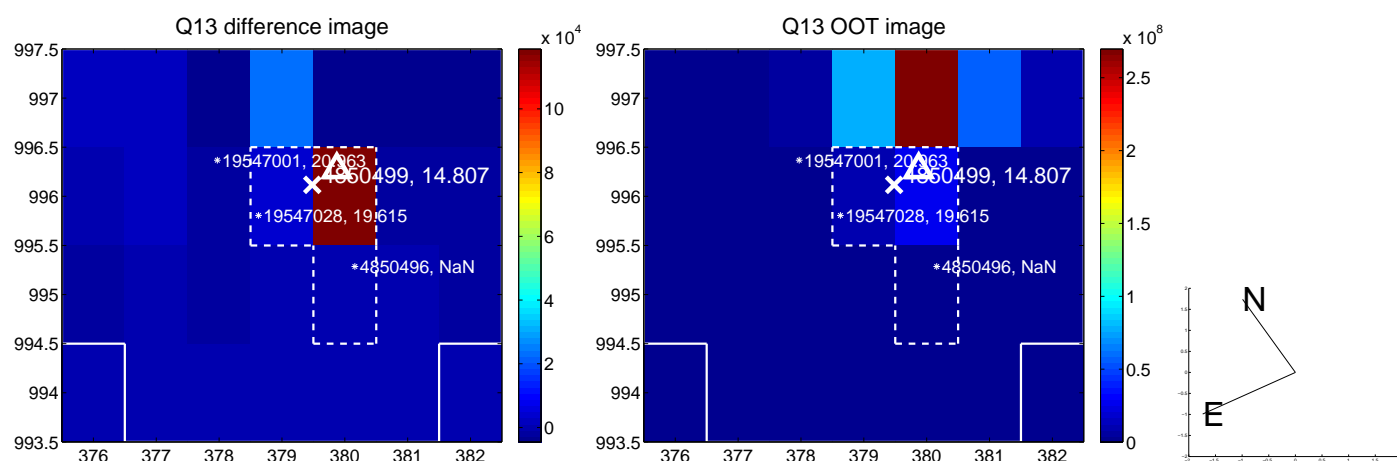




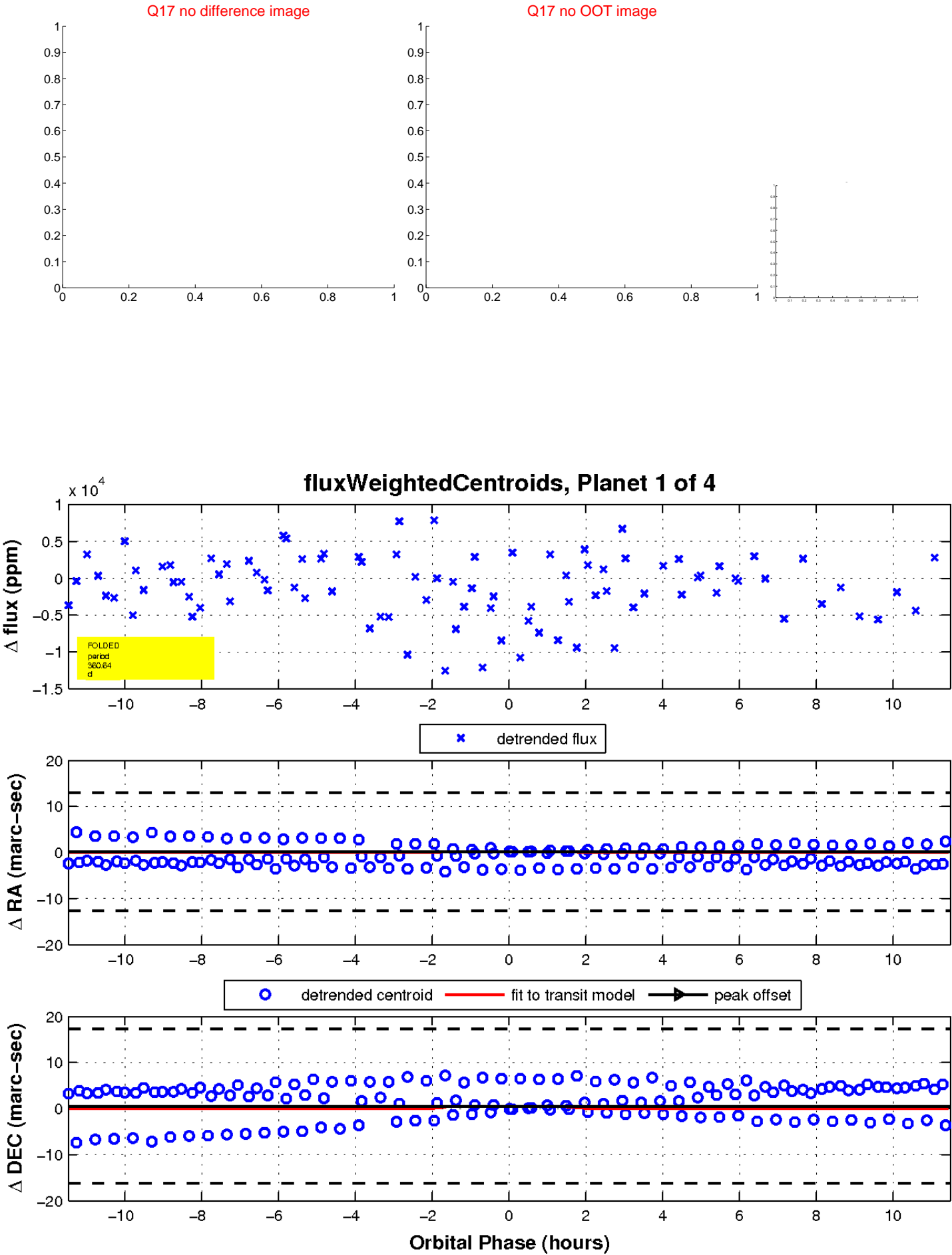
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

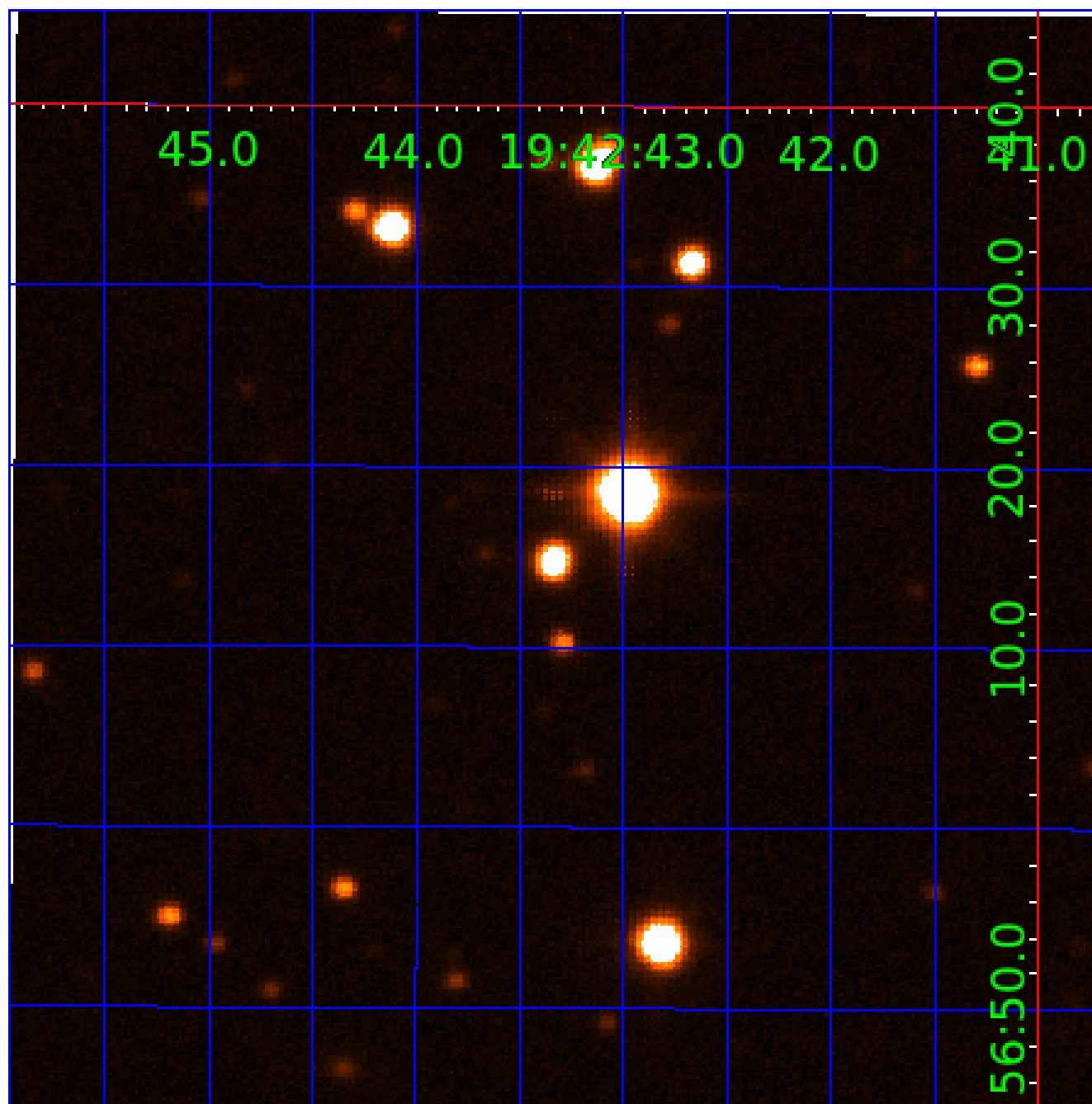


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 004850499

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
004850499-01	OBS	No	360.640718	171.840162	3329.5	3.834	12.0	4.6	0.82	5445	4.95	0.57
004850499-02	OBS	No	372.992592	142.840198	6905.9	16.714	9.2	8.8	0.82	5445	6.92	0.55
004850499-03	OBS	No	366.363596	161.616850	10193.7	5.513	15.8	12.9	0.82	5445	10.25	0.56
004850499-04	OBS	No	371.664837	140.940538	5162.5	13.322	8.4	7.4	0.82	5445	5.79	0.55

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004850499-01	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST
004850499-02	OBS	FP	0.00	1	0	0	0	LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_MEAS
004850499-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_FEW_DIFFS
004850499-04	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS

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

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

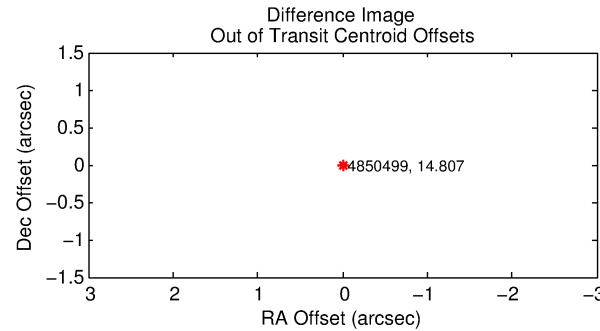
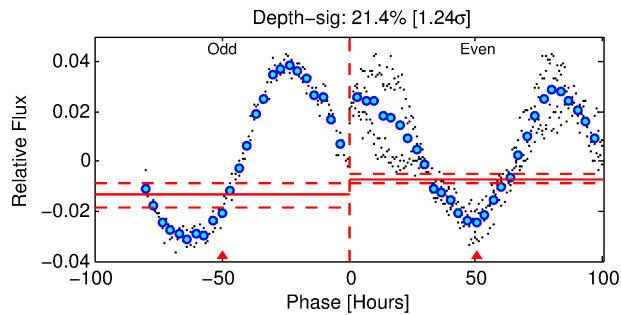
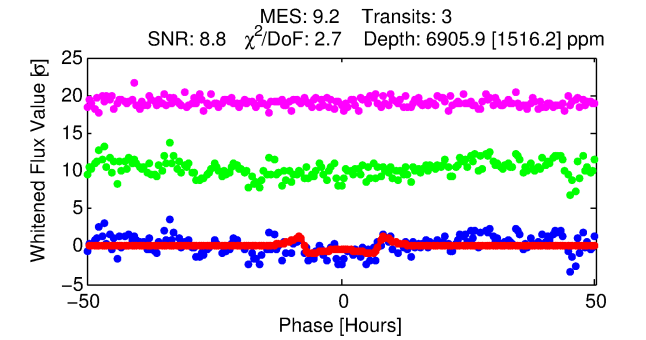
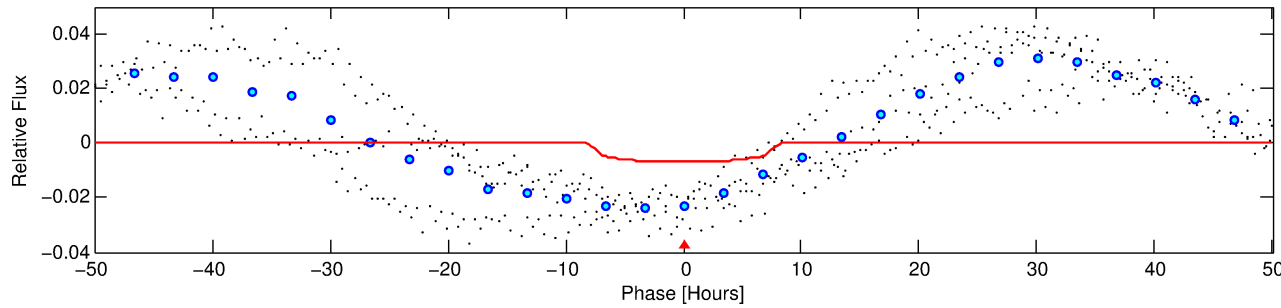
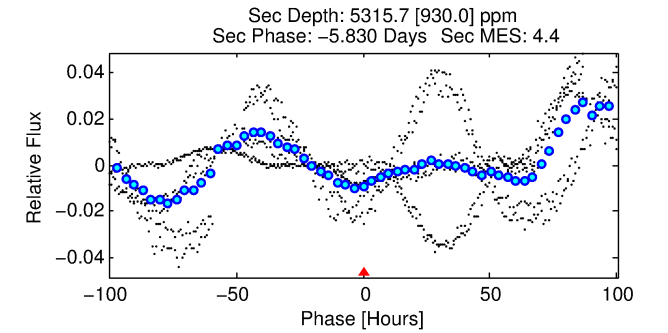
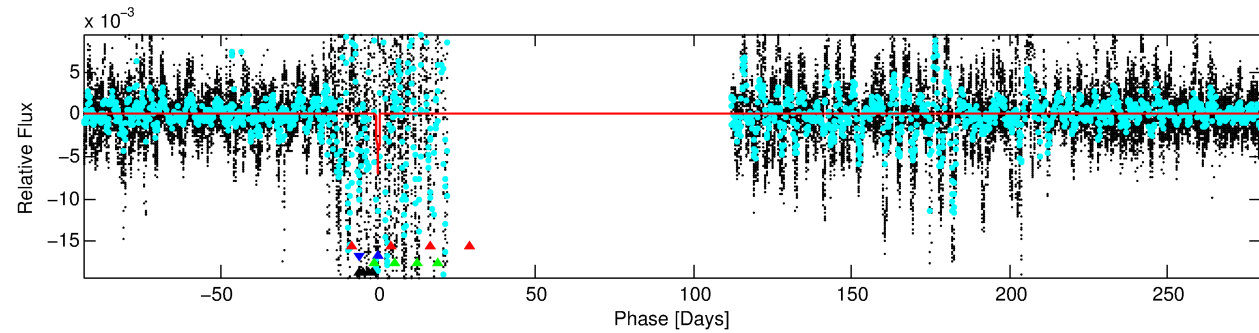
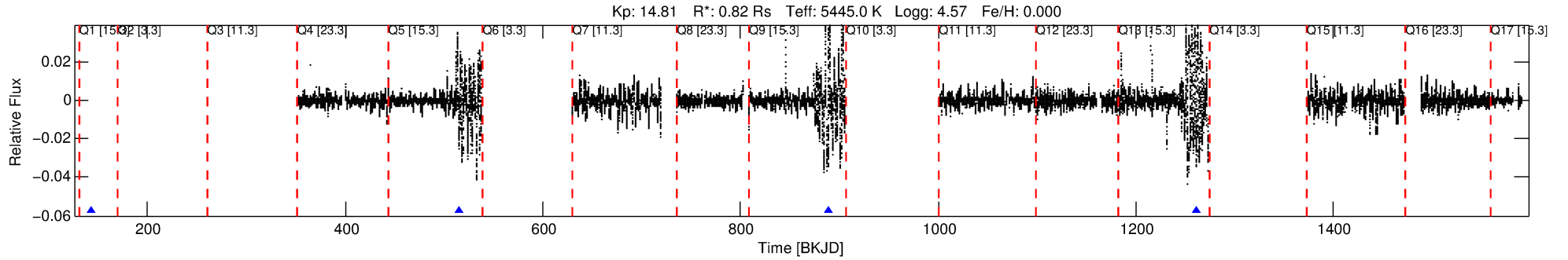
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 004850499-02

No Significant Match Found

# DV One-Page Summary

KIC: 4850499 Candidate: 2 of 4 Period: 372.993 d



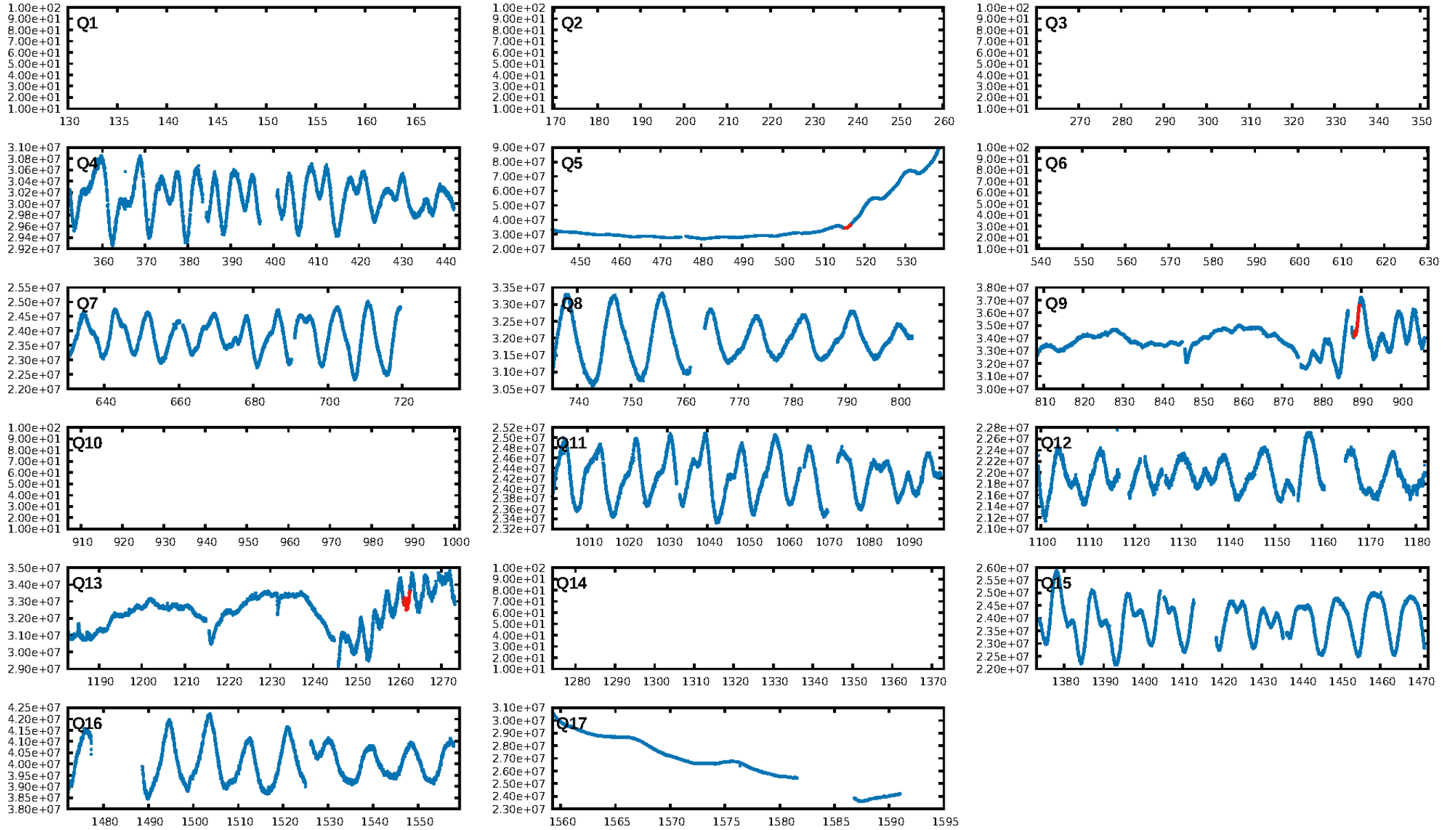
## DV Fit Results:

Period = 372.99259 [0.01411] d  
Epoch = 142.8402 [0.0296] BKJD  
Rp/R\* = 0.0771 [0.0154]  
a/R\* = 164.56 [86.72]  
b = 0.48 [0.86]  
Seff = 0.55 [0.16]  
Teq = 220 [16] K  
Rp = 6.92 [2.02] Re  
a = 0.9842 [0.1770] AU  
Ag = 59193.22 [30146.05] [1.96σ]  
Teffp = 5294 [603] K [8.41σ]

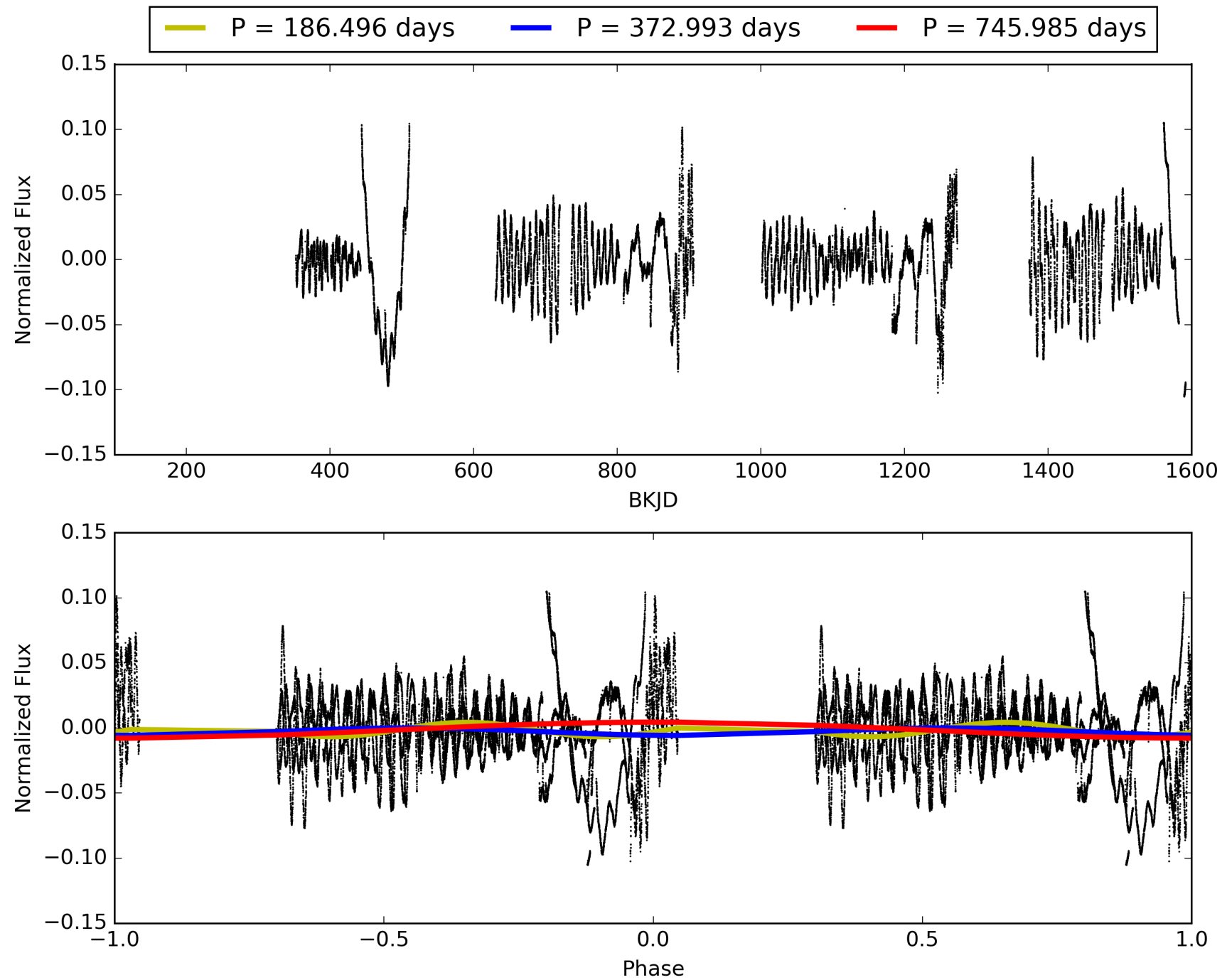
## DV Diagnostic Results:

ShortPeriod-sig: 86.4% [1.49σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 17.8%  
ModelChiSquareGof-sig: 0.2%  
Bootstrap-pfa: 2.12e-08  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: -0.3899  
Centroid-sig: 87.3%  
Centroid-so: 3.552 arcsec [44.68σ]  
OotOffset-rm: N/A  
KicOffset-rm: 2.487 arcsec [4.10σ]  
OotOffset-st: 0/0/0/0 [0]  
KicOffset-st: 0/0/0/3 [3]  
DiffImageQuality-fgm: 1.00 [3/3]  
DiffImageOverlap-fno: 0.67 [2/3]

# TCE 004850499-02, PDC Light Curves



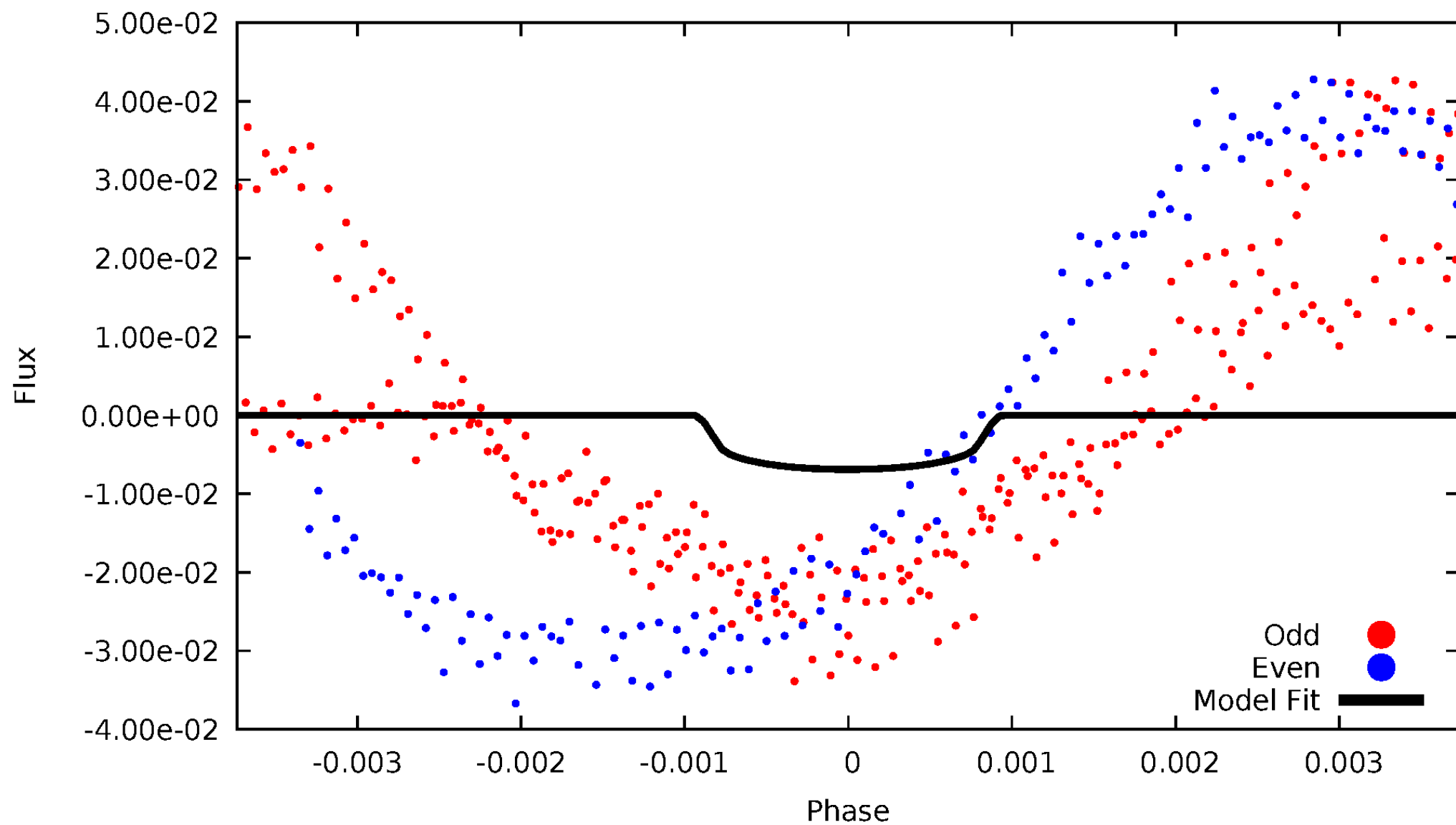
TCE 004850499-02





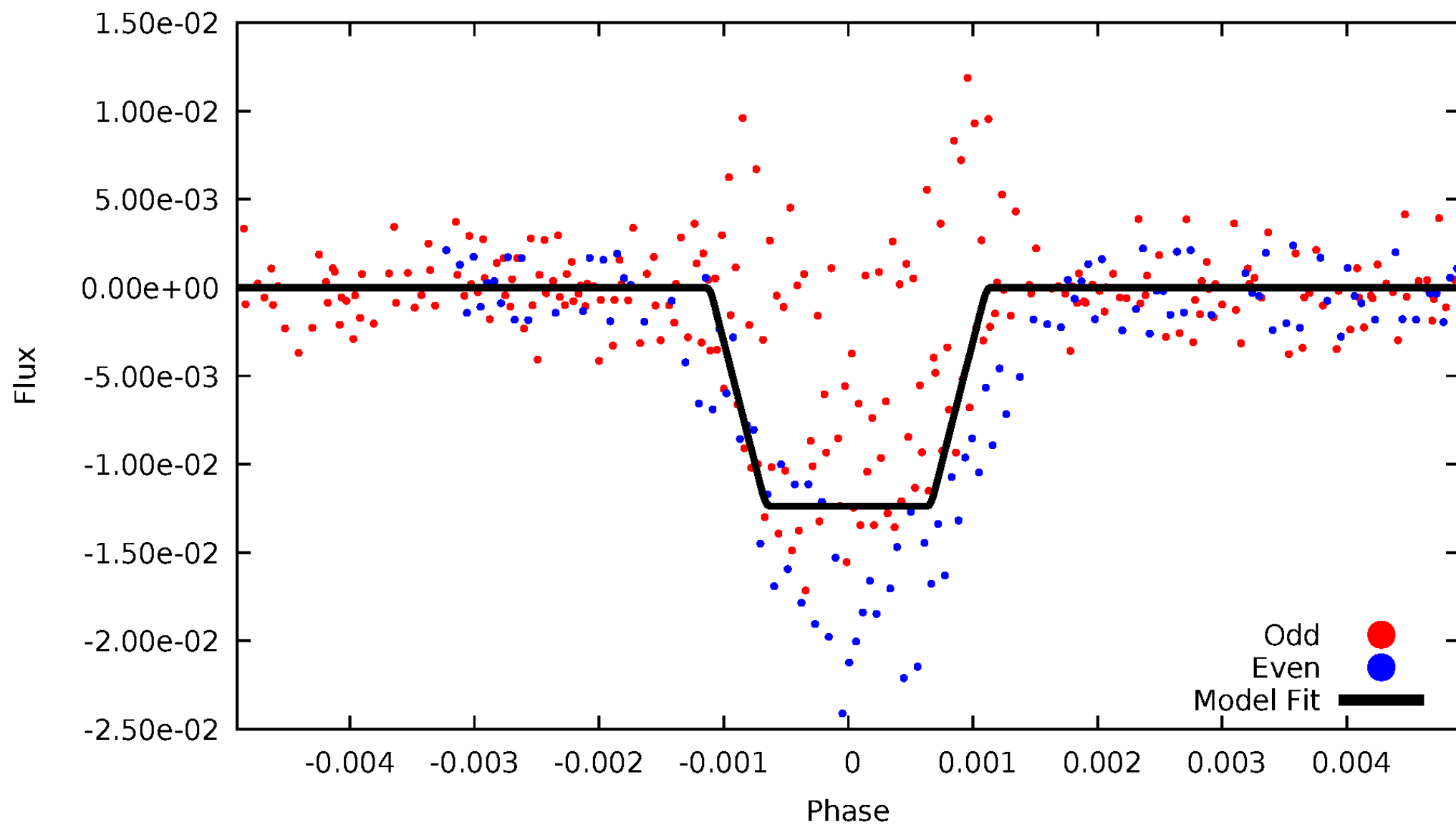
# DV Odd/Even

TCE 004850499-02



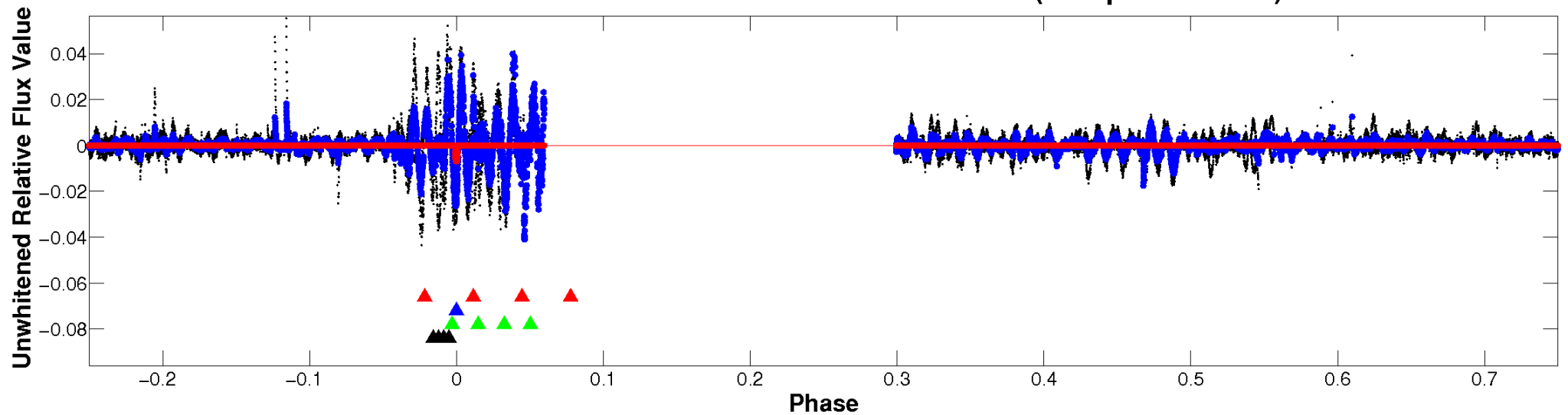
# ALT Odd/Even

TCE 004850499-02

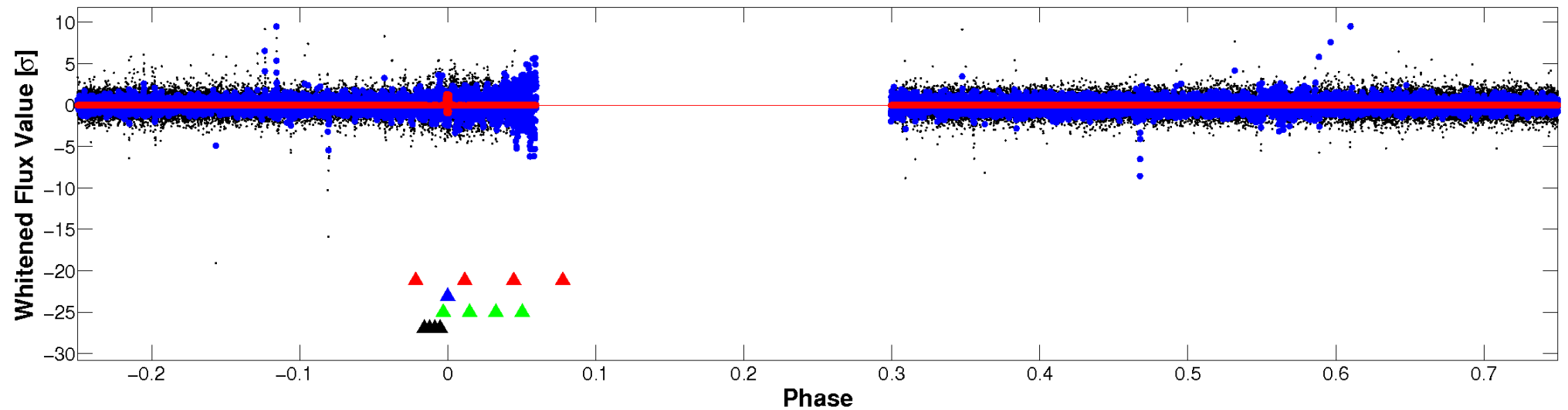


# Non-Whitened Vs. Whitened Light Curve

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

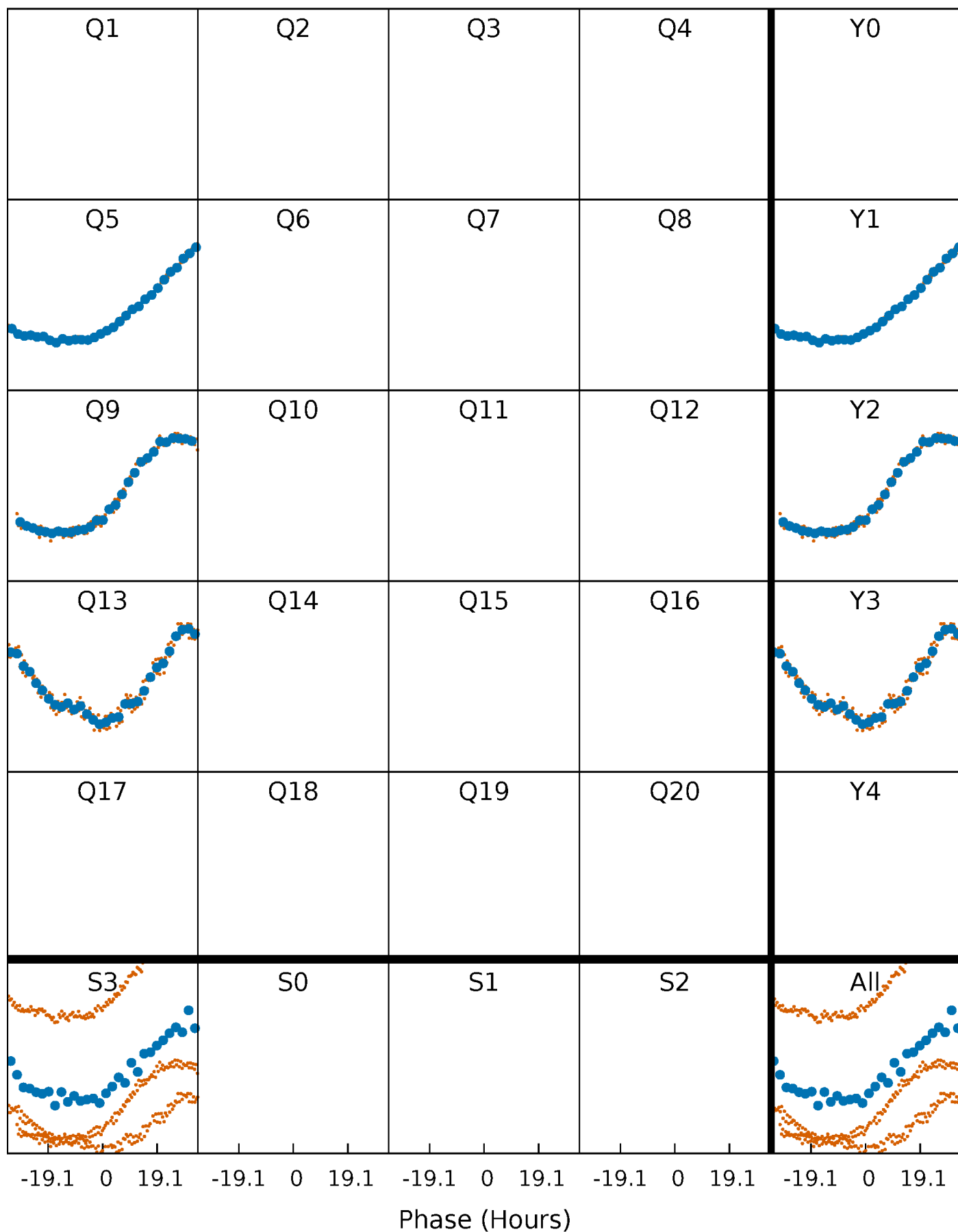


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



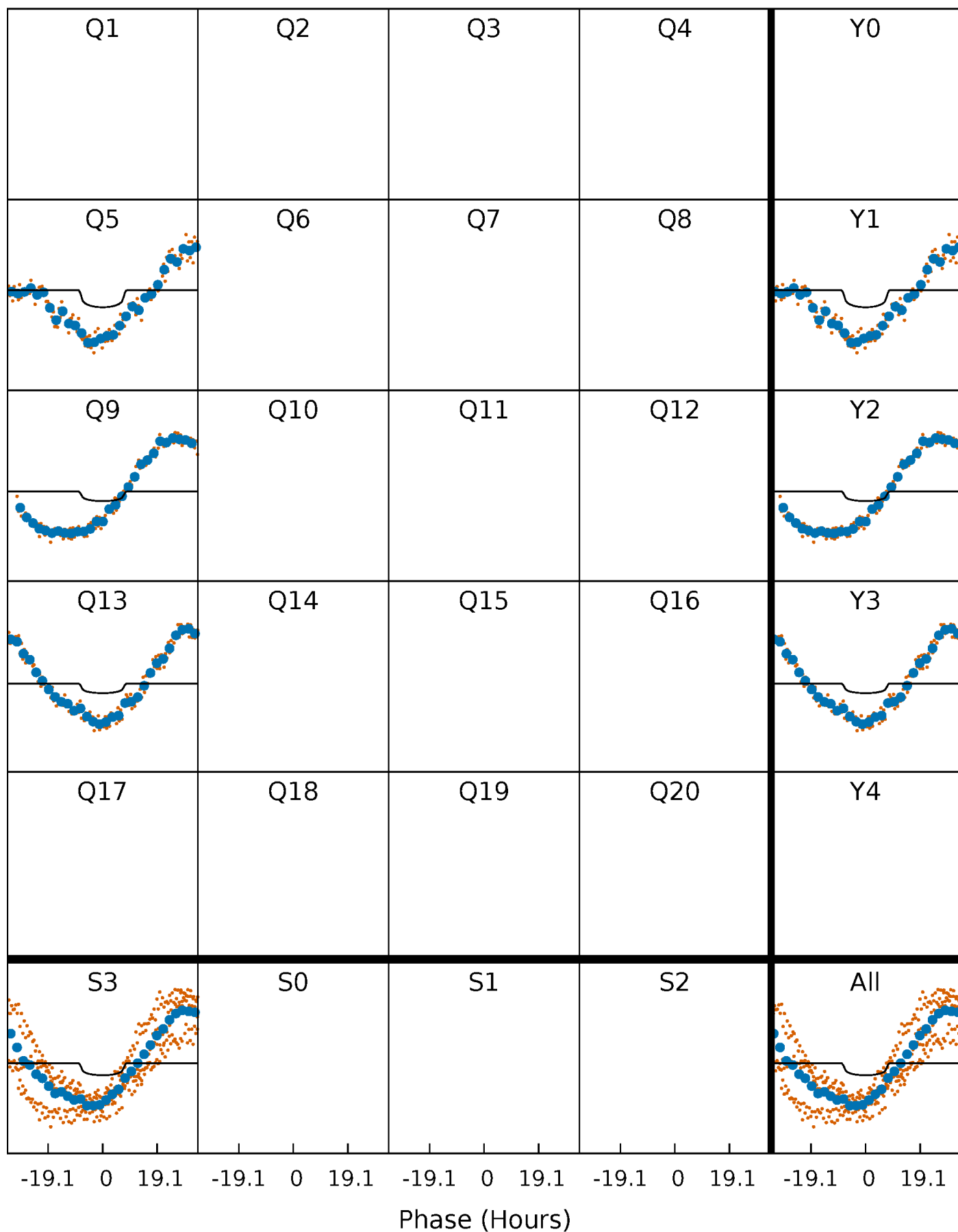
# PDC Quarter-Phased Transit Curves

TCE 004850499-02     $P=372.992592$  Days     $T_0=142.840198$  (BKJD)



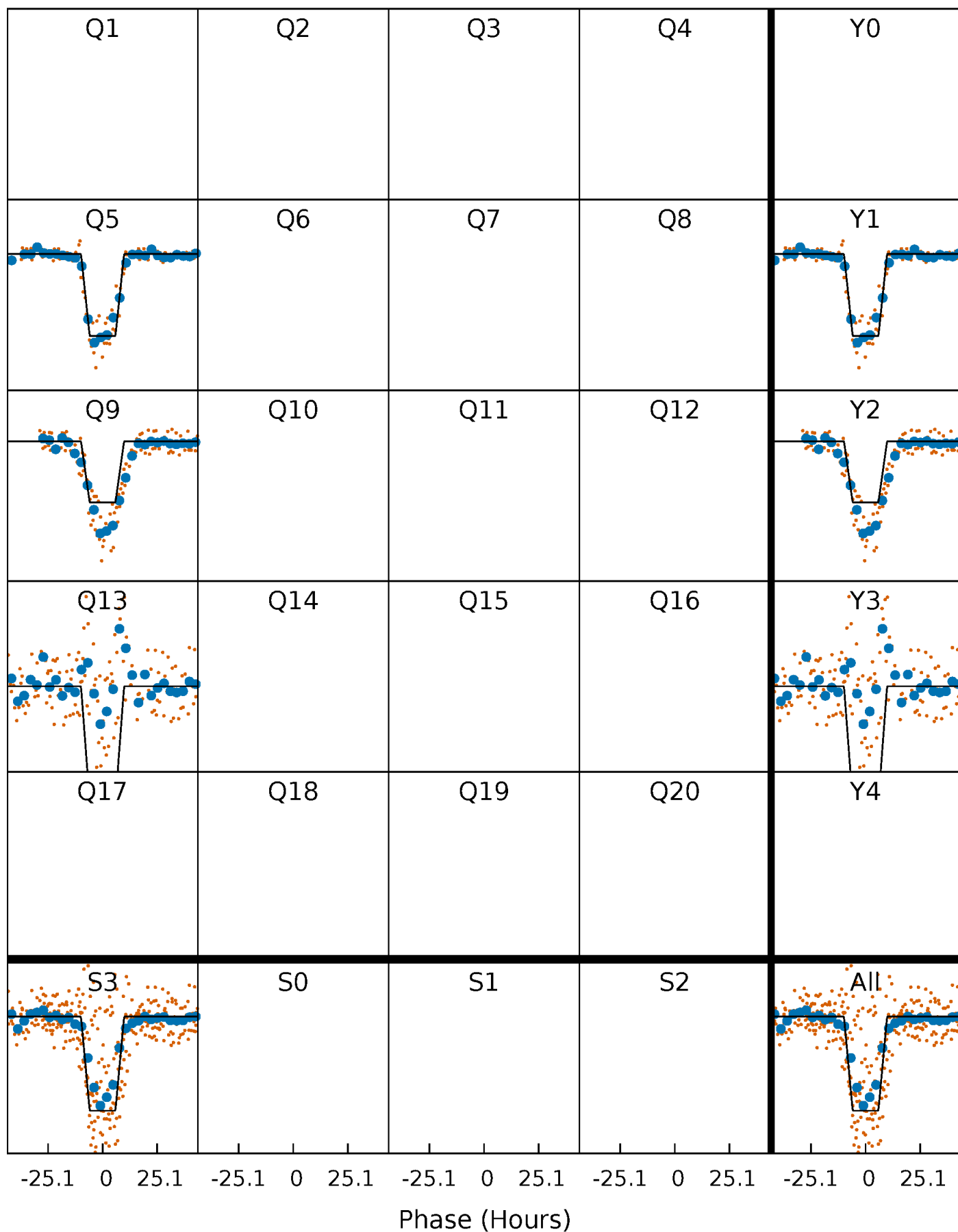
# DV Quarter-Phased Transit Curves

TCE 004850499-02     $P=372.992592$  Days     $T_0=142.840198$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

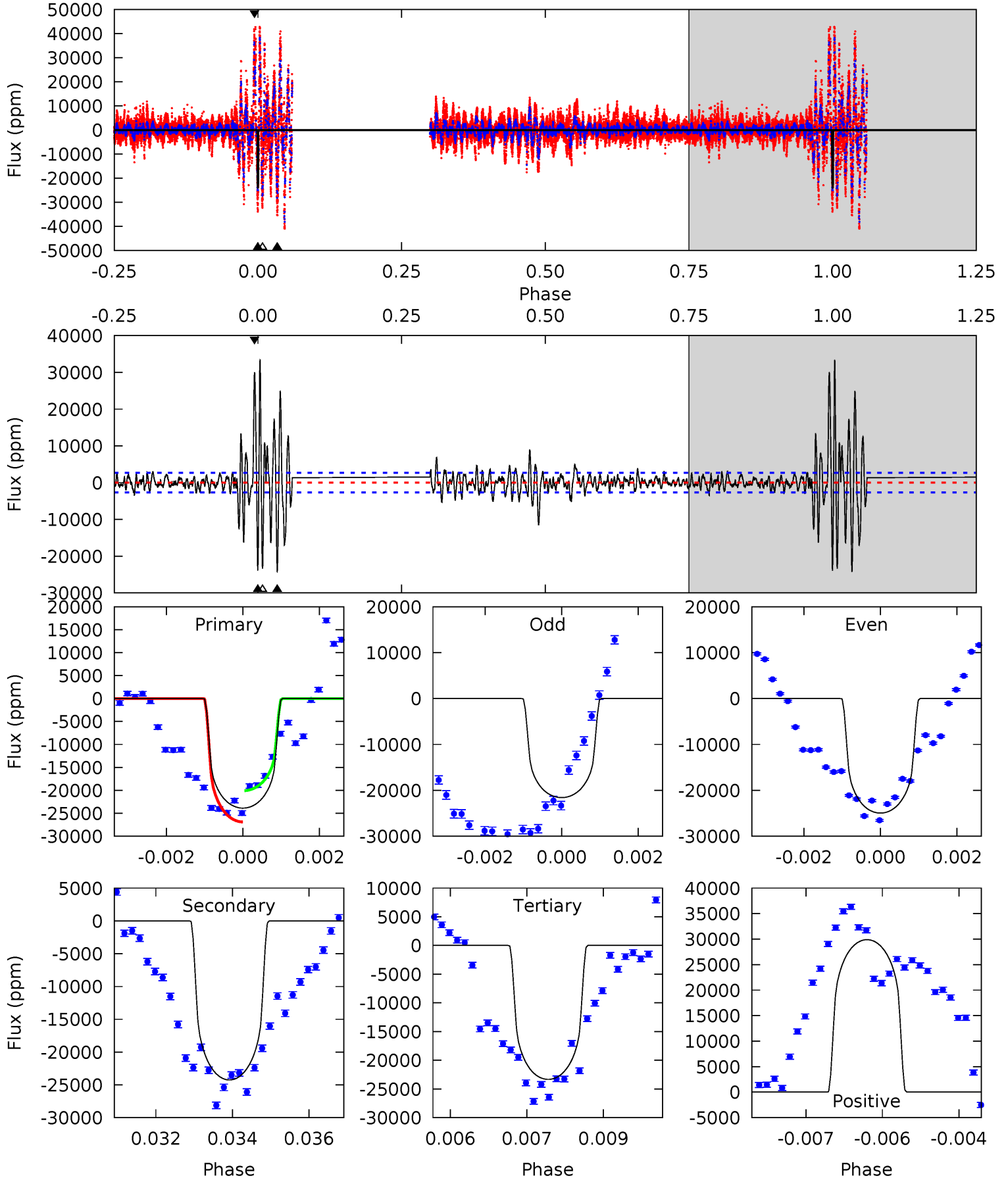
TCE 004850499-02     $P=372.987393$  Days     $T_0=142.845452$  (BKJD)



# DV Model-Shift Uniqueness Test

004850499-02, P = 372.992592 Days, E = 142.840198 Days

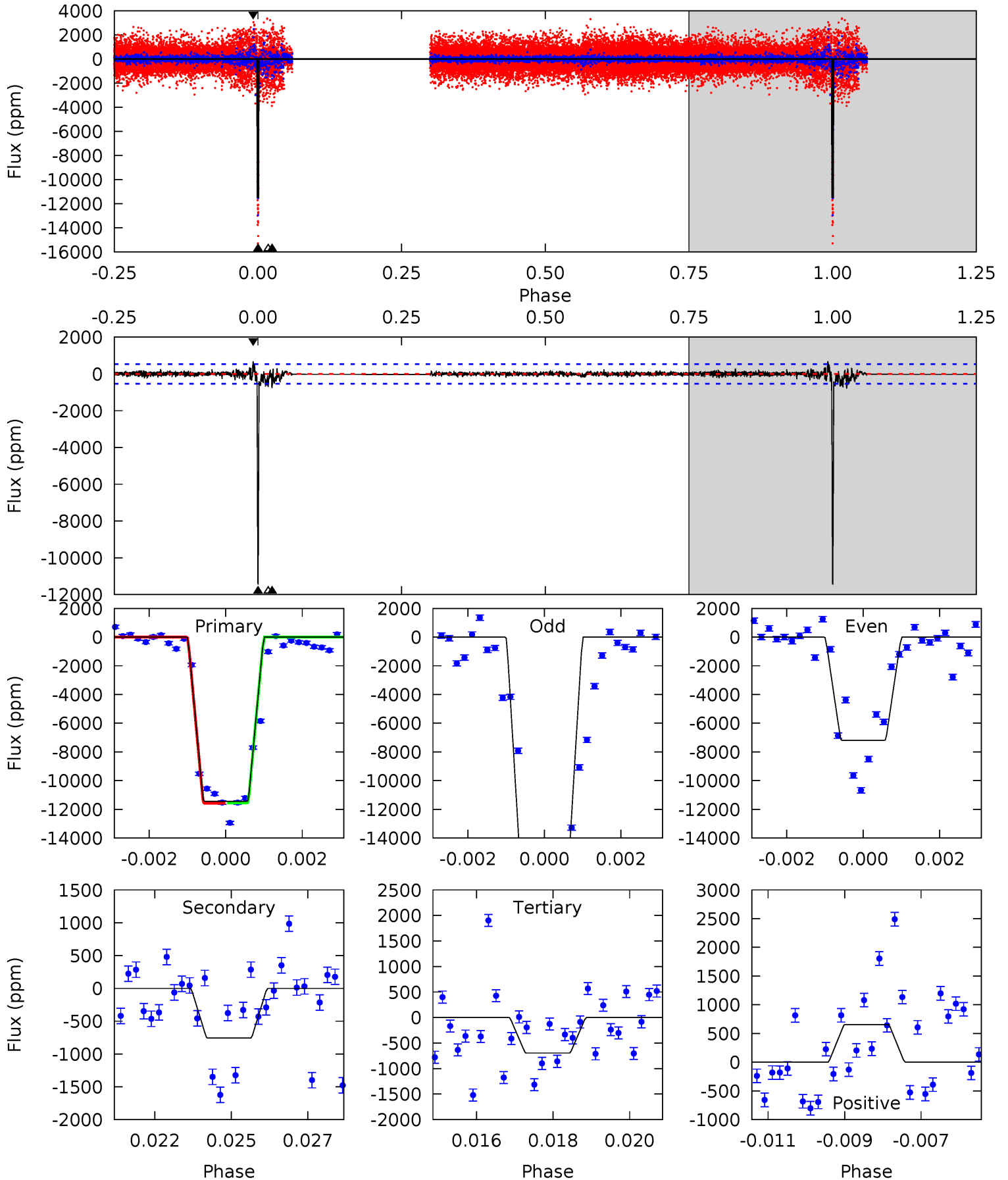
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
47.9	48.7	46.8	60.0	5.34	3.11	7.29	1.10	-12.1	1.84	-11.3	2.95	1.11	0.58	6.01



# Alt Model-Shift Uniqueness Test

004850499-02, P = 372.987393 Days, E = 142.845452 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
113.4	7.50	6.90	6.50	5.31	3.06	0.77	106.5	106.9	0.60	1.00	53.7	0.81	0.05	0.16





### Stellar Parameters For KIC 004850499

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5445^{+180}_{-180}$	$4.569^{+0.034}_{-0.144}$	$0.000^{+0.250}_{-0.300}$	$0.822^{+0.175}_{-0.075}$	$0.918^{+0.073}_{-0.110}$	$2.326^{+0.438}_{-0.940}$
	+3%/-3%	+1%/-3%	+inf%/-inf%	+21%/-9%	+8%/-12%	+19%/-40%
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 004850499-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-24253 \pm 498$	$7.21^{+1.61}_{-1.56}$	$312^{+17}_{-12}$	$7899^{+1334}_{-793}$	$249334^{+161181}_{-82861}$
Alt.	$-757 \pm 101$	$10.26^{+1.78}_{-1.64}$	$313^{+17}_{-14}$	$3270^{+183}_{-159}$	$3771^{+1662}_{-1145}$

$T_{\text{max}}$  = Theoretical Maximum Planetary Temperature

$T_{\text{obs}}$  = Observed Planetary Temperature (Assuming  $A=0.3$ )

$A_{\text{obs}}$  = Observed Albedo (Assuming  $T=0$ )

If a secondary eclipse is present, the system is likely an EB if  $T_{\text{obs}} \gg T_{\text{max}}$  AND  $A_{\text{obs}} \gg 1.0$

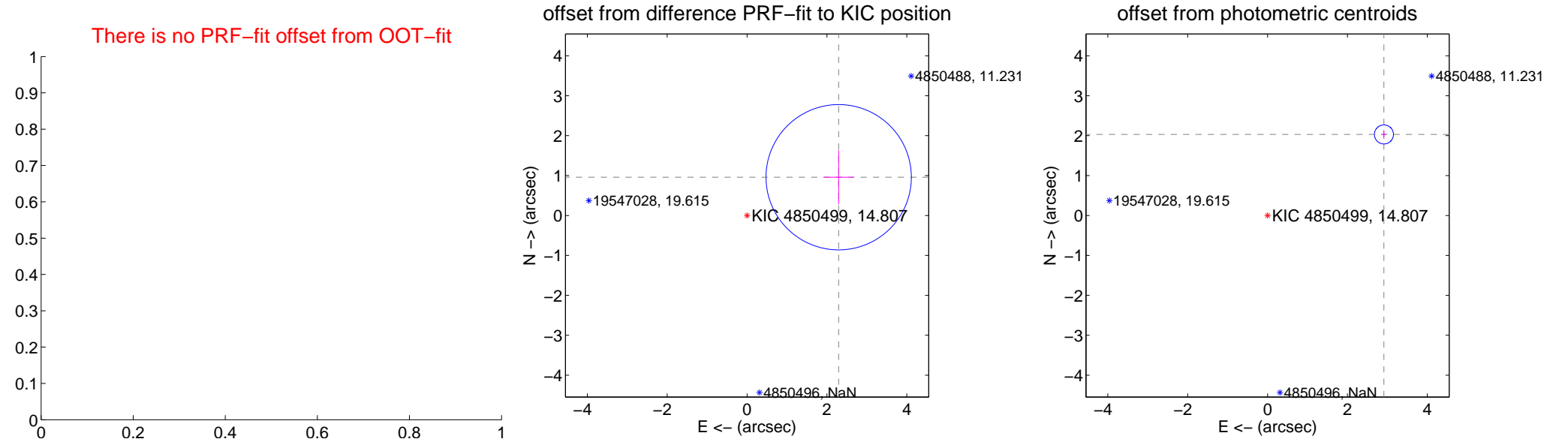
## DV Centroid Data

Supplemental centroid analysis for 004850499-02. Kepler magnitude: 14.81. Transit SNR 8.84

There are 3 quarters with good PRF difference image offsets

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

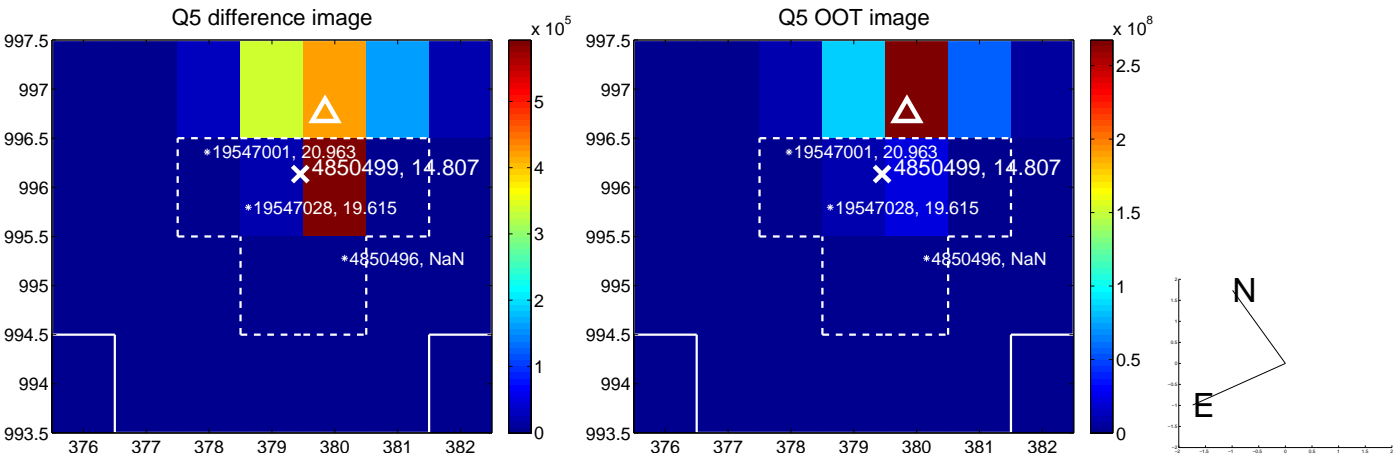
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	—	—	—	—
PRF-fit source offset from KIC position	$2.487 \pm 0.607$	4.10	$-2.295 \pm 0.378$	$0.959 \pm 0.677$
photometric centroid source offset	$3.55 \pm 0.08$	44.67	$-2.91 \pm 0.06$	$2.03 \pm 0.11$



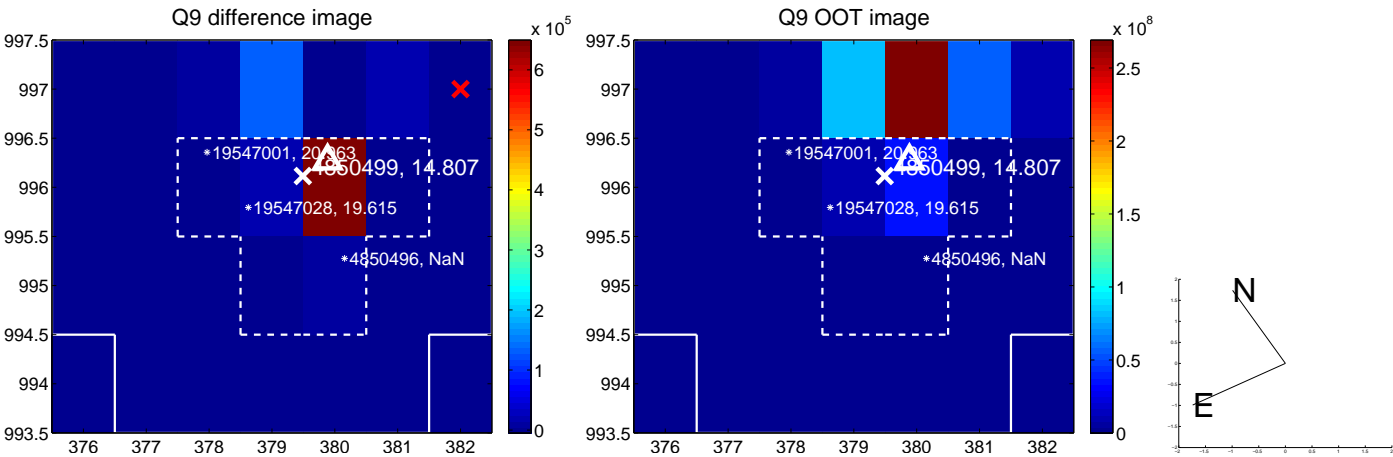
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



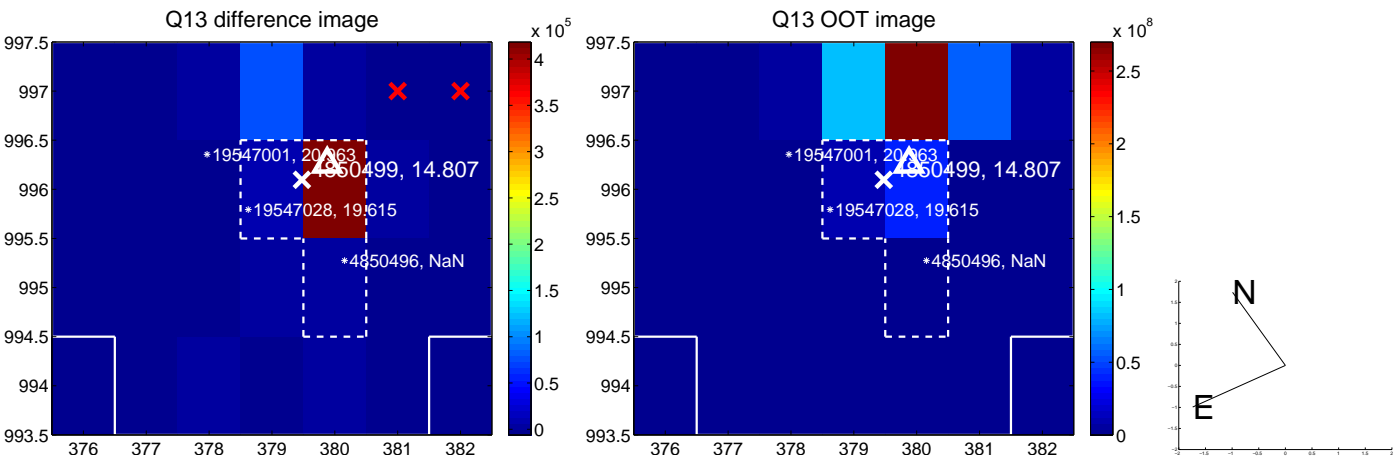
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



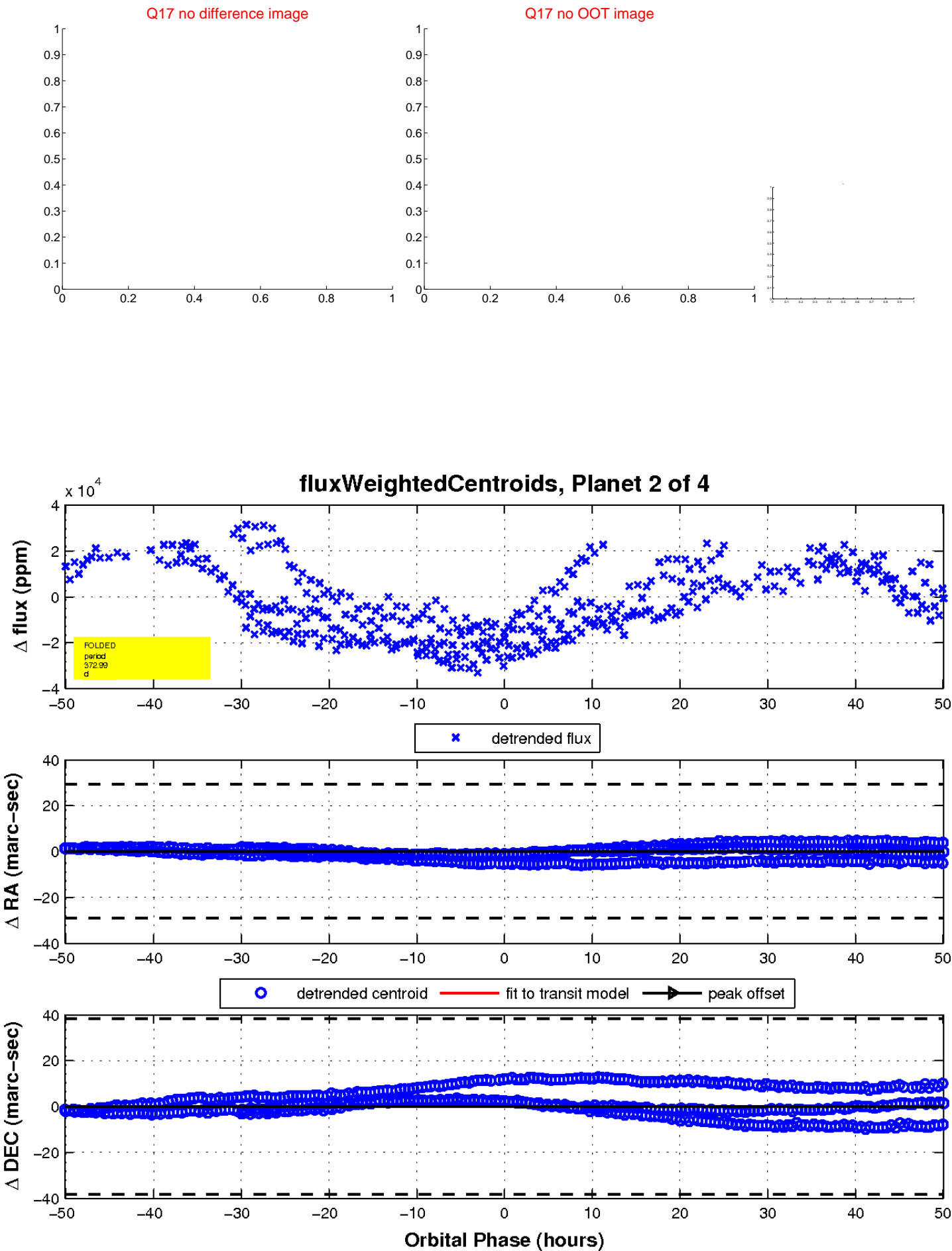
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

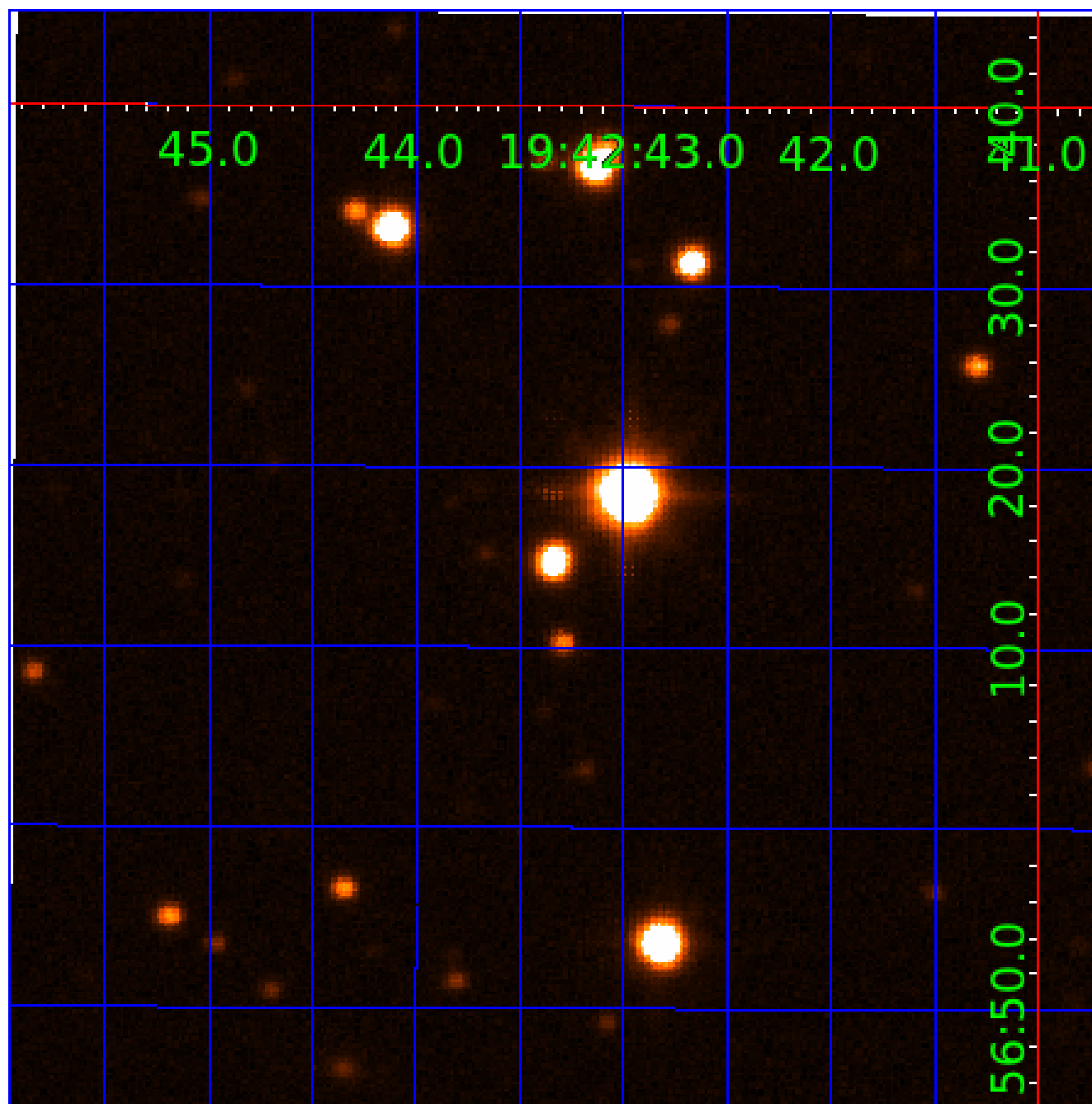


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination





# KIC 004850499

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
004850499-01	OBS	No	360.640718	171.840162	3329.5	3.834	12.0	4.6	0.82	5445	4.95	0.57
004850499-02	OBS	No	372.992592	142.840198	6905.9	16.714	9.2	8.8	0.82	5445	6.92	0.55
004850499-03	OBS	No	366.363596	161.616850	10193.7	5.513	15.8	12.9	0.82	5445	10.25	0.56
004850499-04	OBS	No	371.664837	140.940538	5162.5	13.322	8.4	7.4	0.82	5445	5.79	0.55

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004850499-01	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST
004850499-02	OBS	FP	0.00	1	0	0	0	LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_MEAS
004850499-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_FEW_DIFFS
004850499-04	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS

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

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

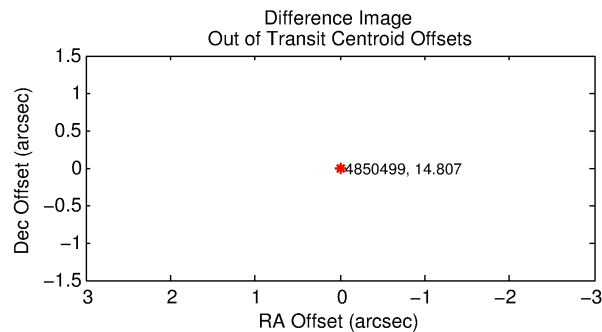
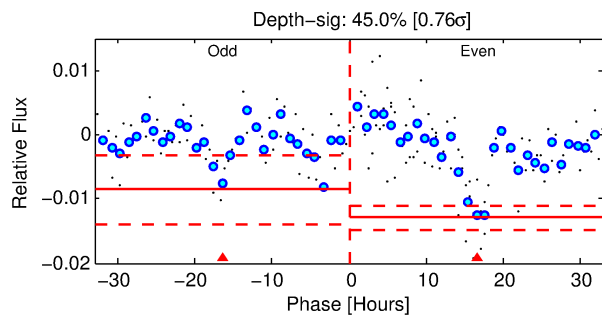
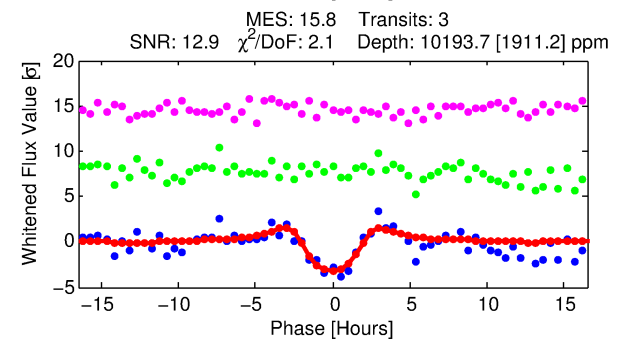
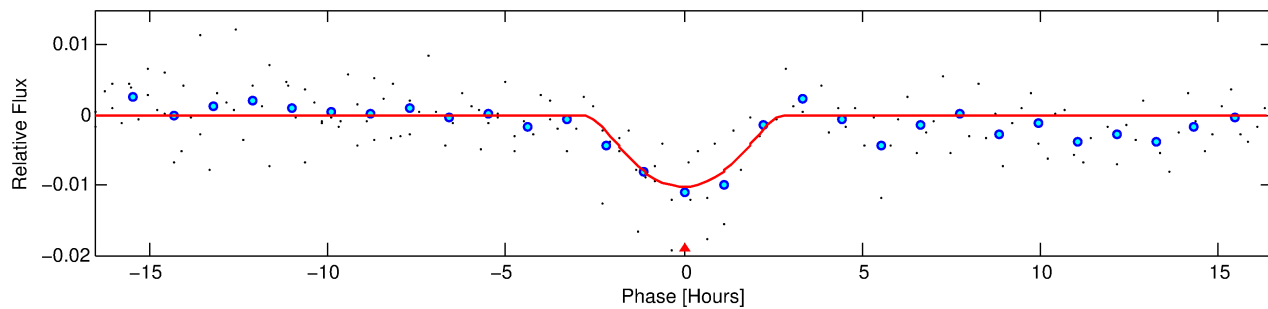
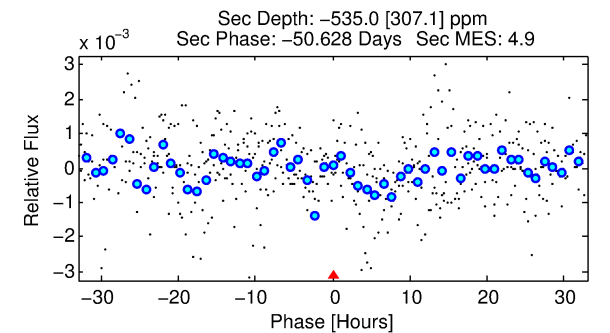
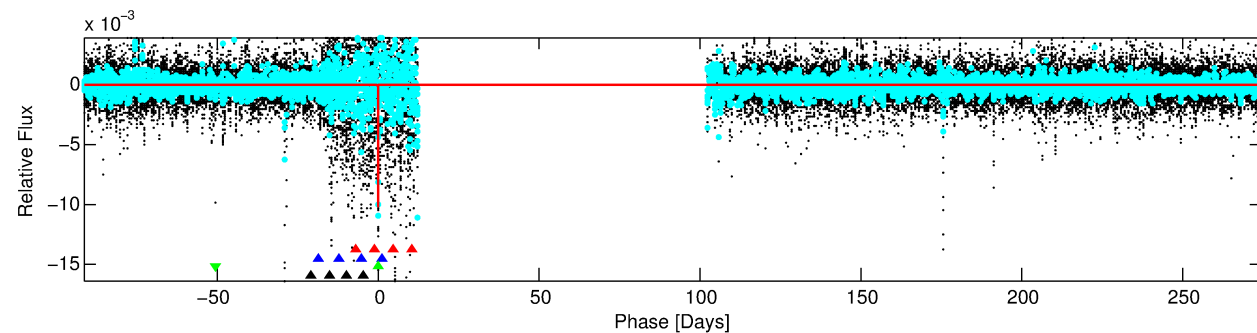
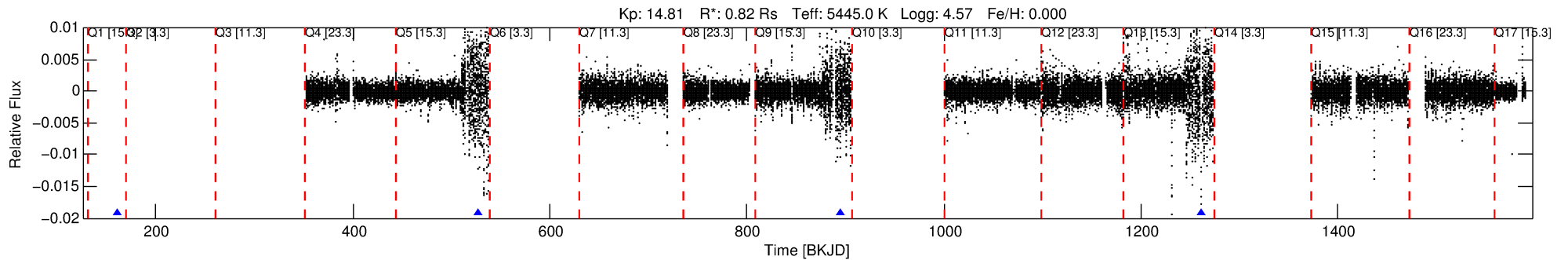
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 004850499-03

No Significant Match Found

# DV One-Page Summary

KIC: 4850499 Candidate: 3 of 4 Period: 366.364 d



## DV Fit Results:

Period = 366.36360 [0.00937] d  
Epoch = 161.6169 [0.0195] BKJD  
Rp/R\* = 0.1142 [0.0463]  
a/R\* = 333.83 [95.82]  
b = 0.90 [0.13]  
Seff = 0.56 [0.17]  
Teq = 221 [16] K  
Rp = 10.25 [4.69] Re  
a = 0.9725 [0.1749] AU  
Ag = N/A  
Teffp = N/A

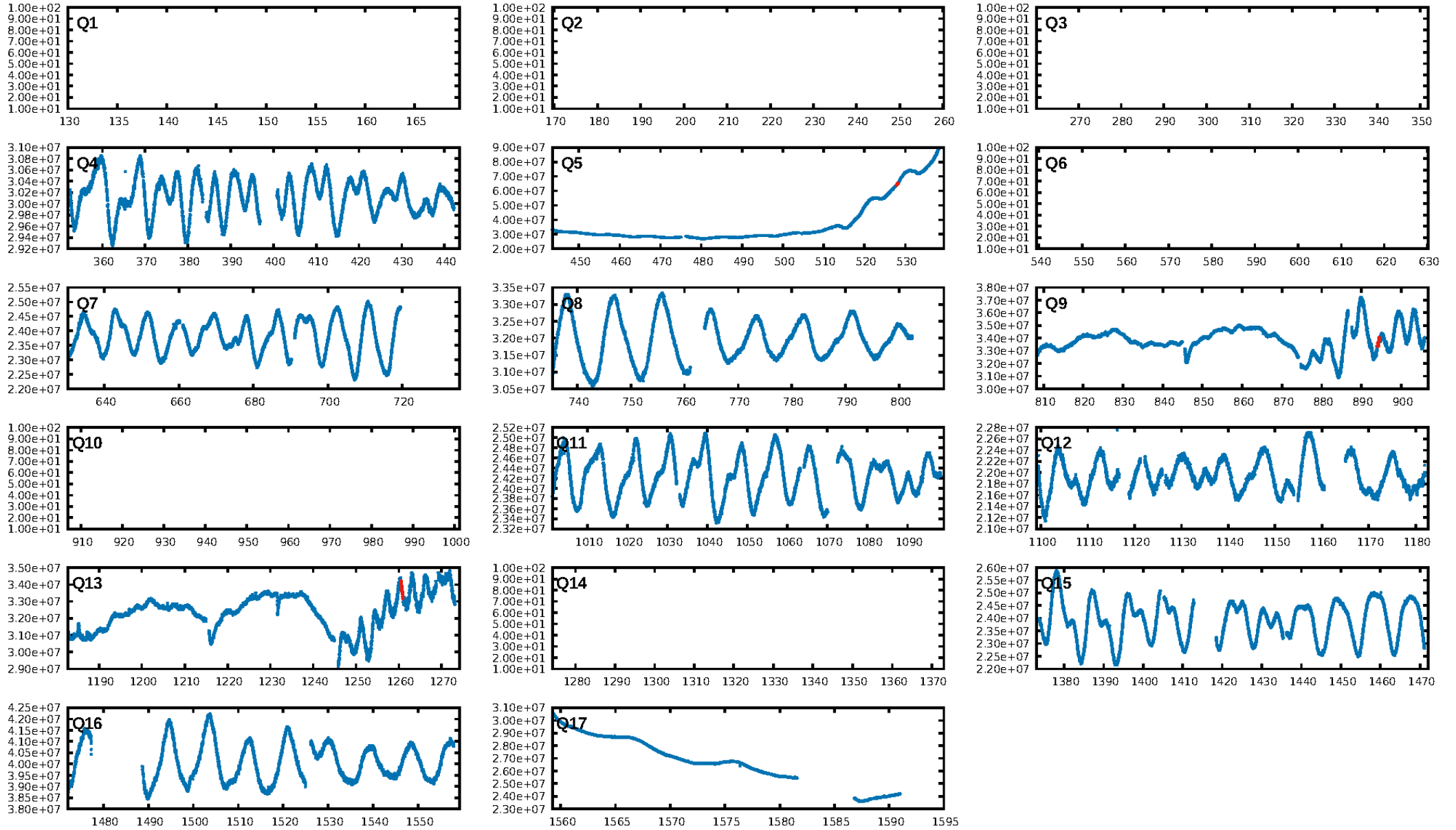
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [20.45σ]  
LongPeriod-sig: 100.0% [8.82σ]  
ModelChiSquare2-sig: 3.9%  
ModelChiSquareGof-sig: 8.5%  
Bootstrap-pfa: 6.78e-18  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: -2.331  
Centroid-sig: 24.6%  
Centroid-so: 3.496 arcsec [79.59σ]  
OotOffset-rm: N/A  
KicOffset-rm: 1.991 arcsec [11.37σ]  
OotOffset-st: 0/0/0/0 [0]  
KicOffset-st: 0/0/0/2 [2]  
DiffImageQuality-fgm: 0.50 [1/2]  
DiffImageOverlap-fno: 1.00 [3/3]

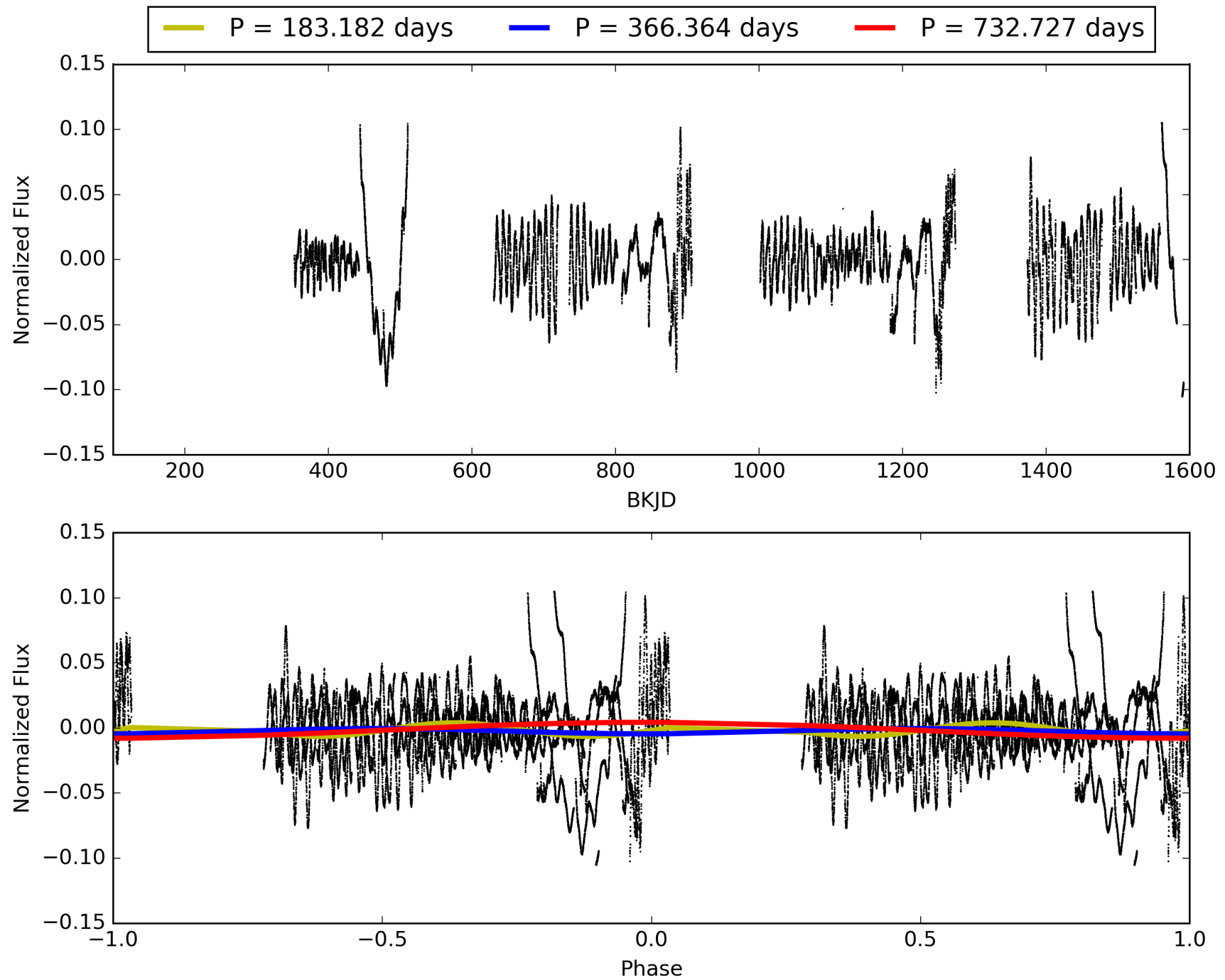
Software Revision: svn-ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 23:13:04 Z

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

# TCE 004850499-03, PDC Light Curves

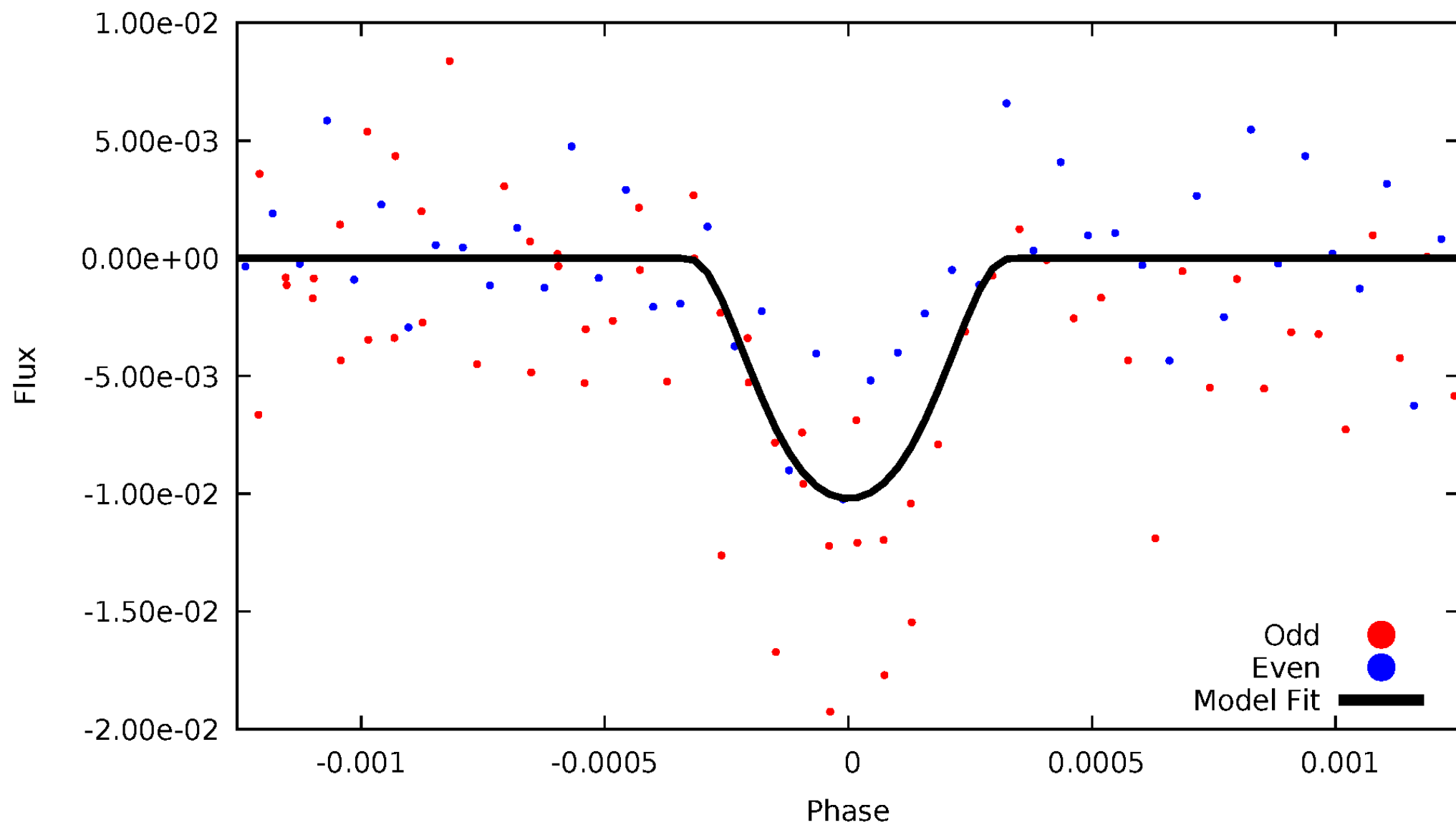


# TCE 004850499-03



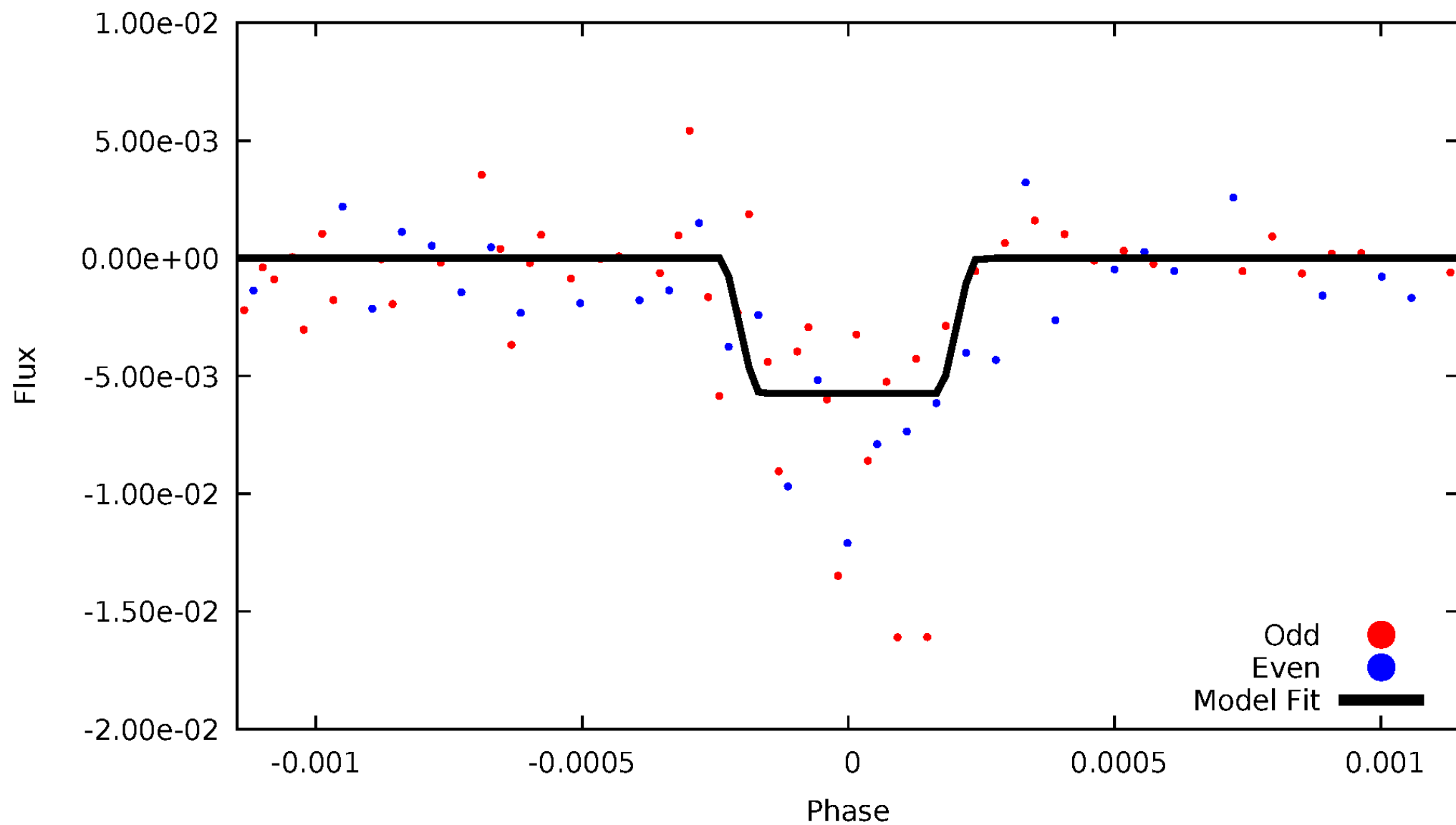
# DV Odd/Even

TCE 004850499-03



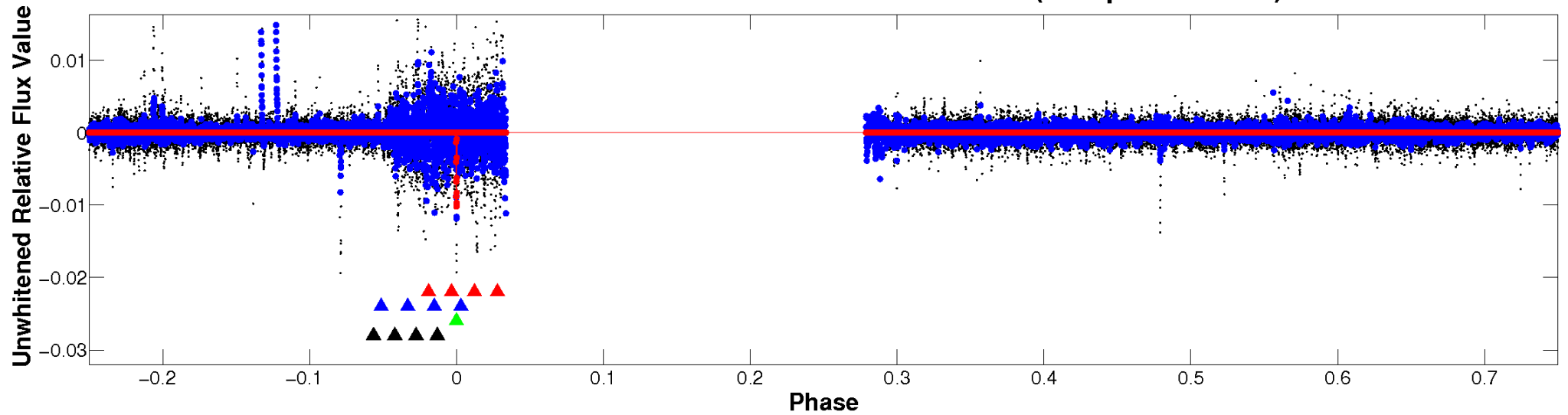
# ALT Odd/Even

TCE 004850499-03

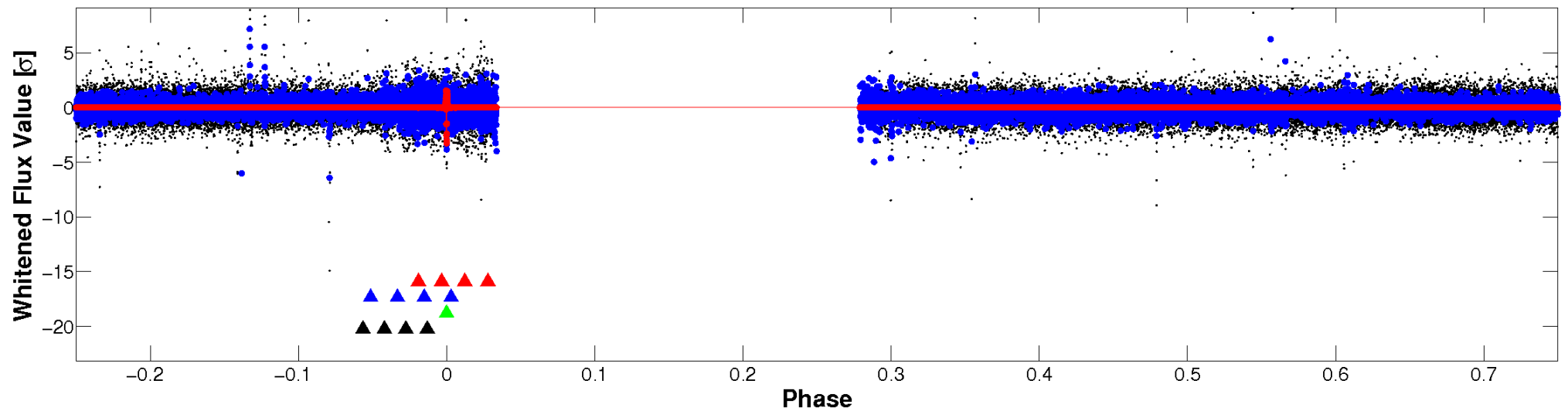


# Non-Whitened Vs. Whitened Light Curve

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

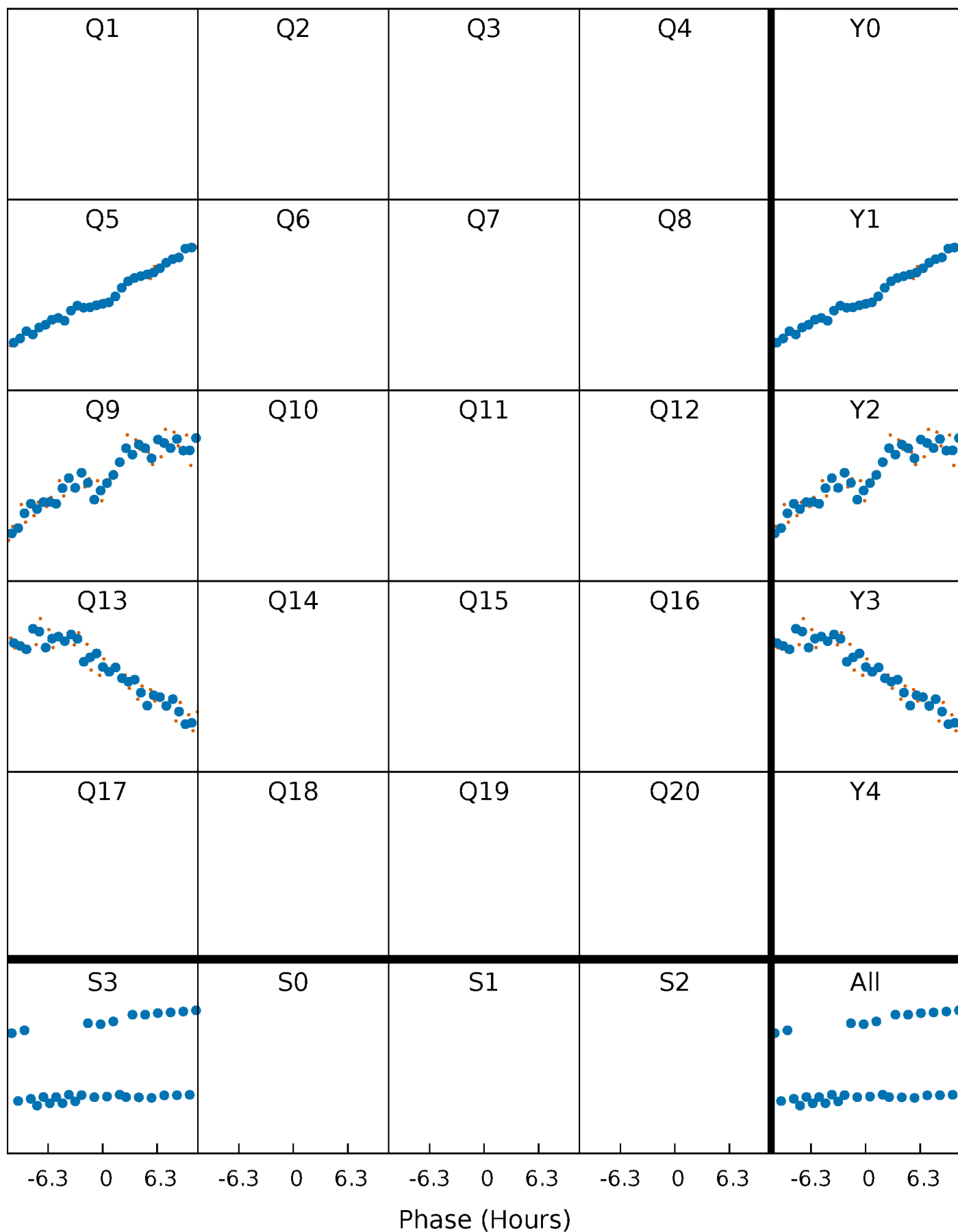


## Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

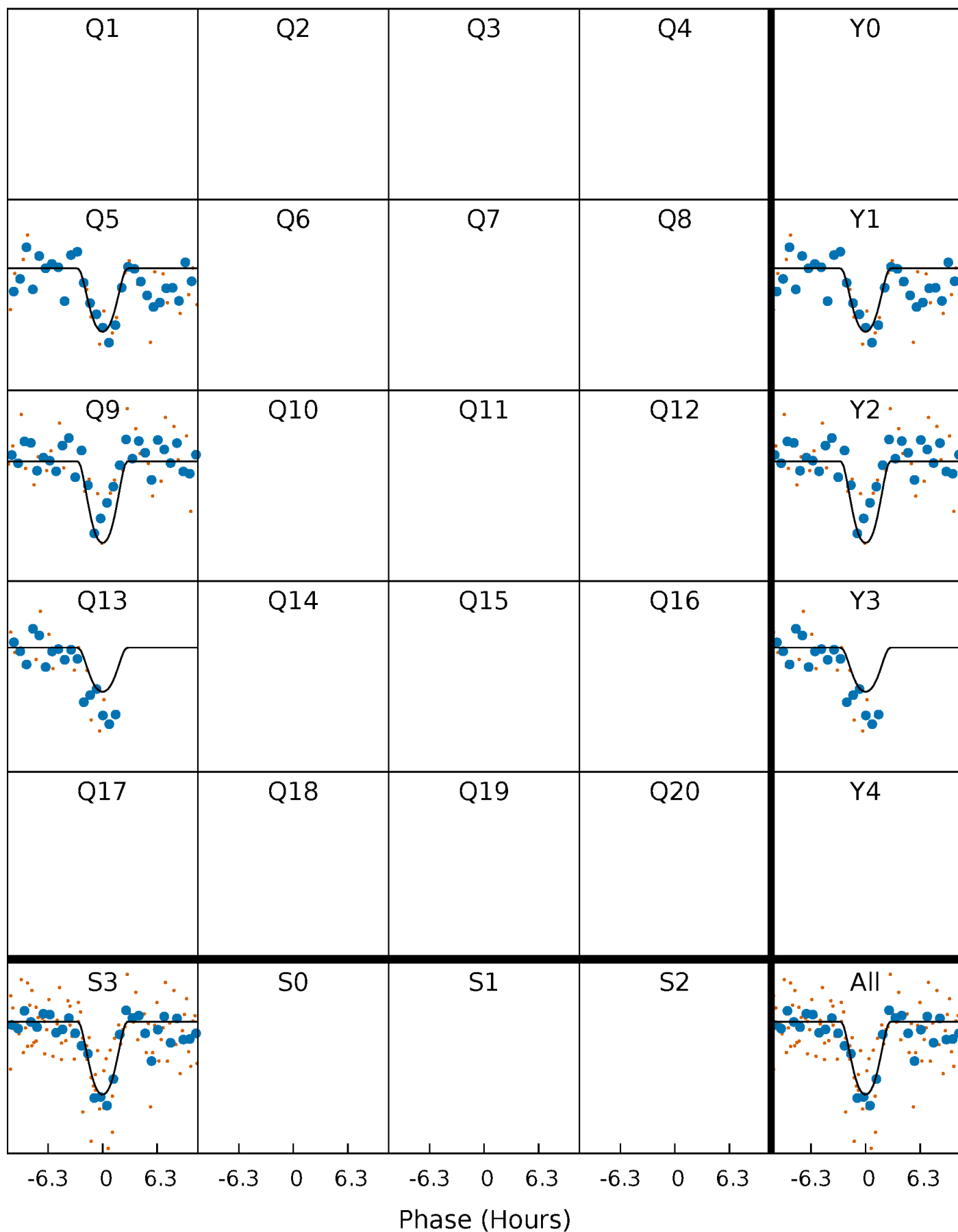
TCE 004850499-03     $P=366.363596$  Days     $T_0=161.616850$  (BKJD)





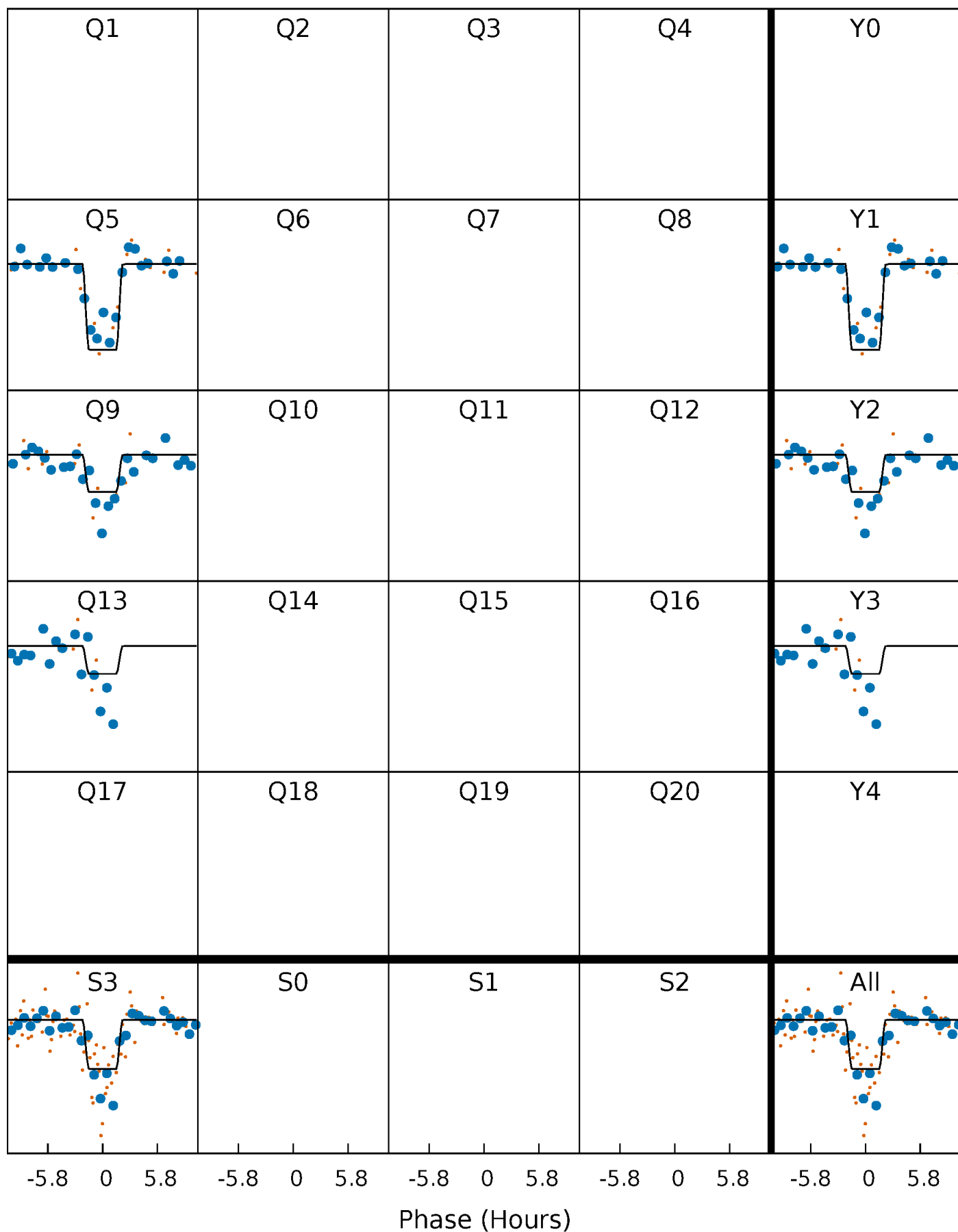
# DV Quarter-Phased Transit Curves

TCE 004850499-03     $P=366.363596$  Days     $T_0=161.616850$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

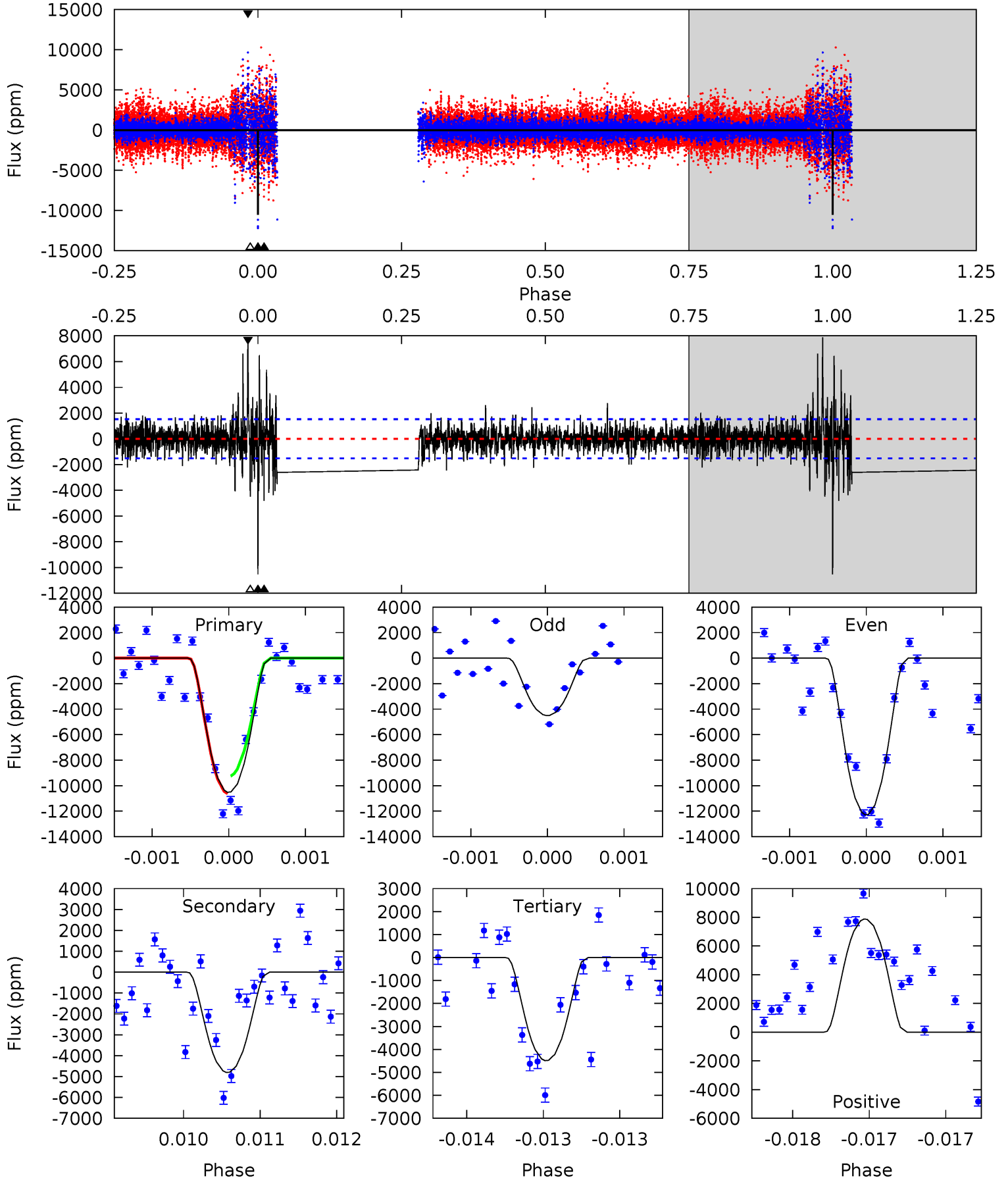
TCE 004850499-03     $P=366.360108$  Days     $T_0=161.620719$  (BKJD)



# DV Model-Shift Uniqueness Test

004850499-03, P = 366.363596 Days, E = 161.616850 Days

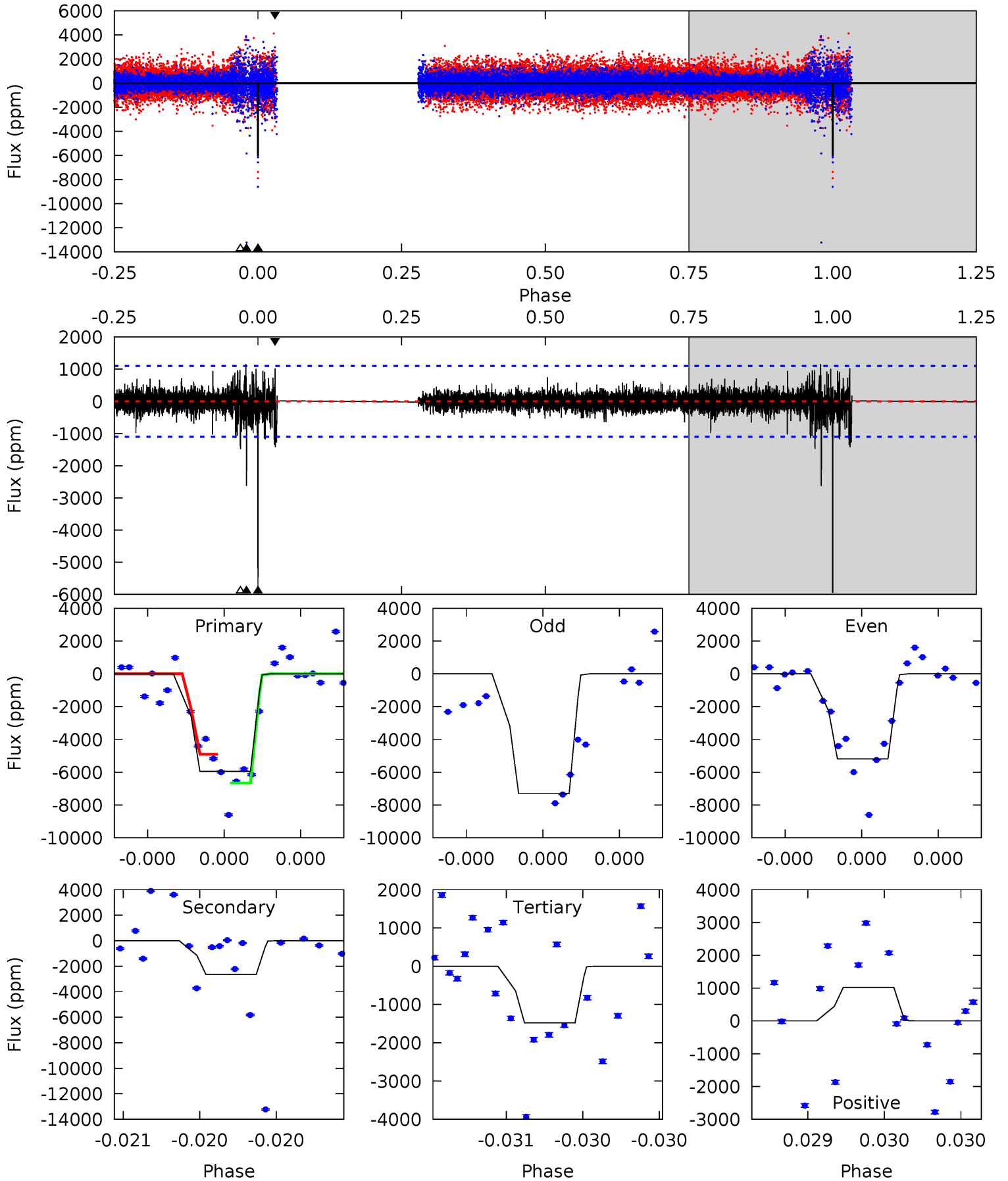
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
38.3	17.5	16.4	28.7	5.53	3.41	2.62	21.9	9.60	1.15	-11.2	13.2	1.06	0.43	2.49



# Alt Model-Shift Uniqueness Test

004850499-03, P = 366.360108 Days, E = 161.620719 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
30.1	13.3	7.49	5.17	5.58	3.49	0.90	22.6	25.0	5.81	8.14	5.29	0.97	0.16	0



### Stellar Parameters For KIC 004850499

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5445^{+180}_{-180}$	$4.569^{+0.034}_{-0.144}$	$0.000^{+0.250}_{-0.300}$	$0.822^{+0.175}_{-0.075}$	$0.918^{+0.073}_{-0.110}$	$2.326^{+0.438}_{-0.940}$
	+3%/-3%	+1%/-3%	+inf%/-inf%	+21%/-9%	+8%/-12%	+19%/-40%
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 004850499-03 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-4805 \pm 275$	$10.51^{+4.60}_{-4.28}$	$315^{+18}_{-14}$	$4434^{+1029}_{-521}$	$21989^{+40446}_{-11343}$
Alt.	$-2628 \pm 198$	$7.36^{+4.20}_{-3.91}$	$314^{+18}_{-14}$	$4542^{+1836}_{-683}$	$25218^{+92986}_{-15212}$

$T_{\text{max}}$  = Theoretical Maximum Planetary Temperature

$T_{\text{obs}}$  = Observed Planetary Temperature (Assuming  $A=0.3$ )

$A_{\text{obs}}$  = Observed Albedo (Assuming  $T=0$ )

If a secondary eclipse is present, the system is likely an EB if  $T_{\text{obs}} \gg T_{\text{max}}$  AND  $A_{\text{obs}} \gg 1.0$

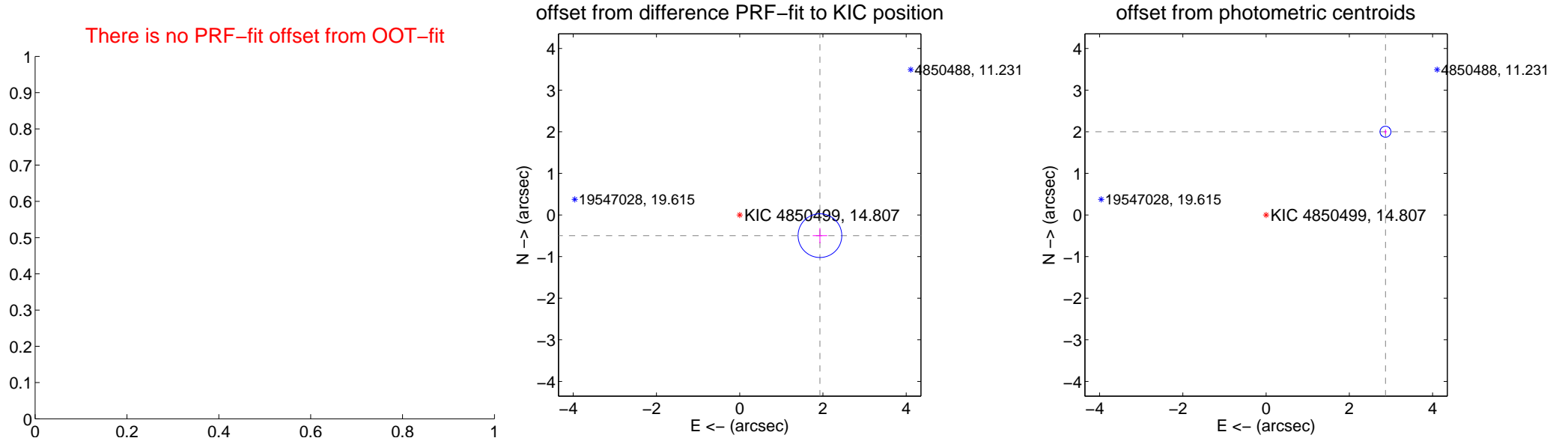
## DV Centroid Data

Supplemental centroid analysis for 004850499-03. Kepler magnitude: 14.81. Transit SNR 12.90

There are 1 quarters with good PRF difference image offsets

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

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	—	—	—	—
PRF-fit source offset from KIC position	$1.991 \pm 0.175$	11.37	$-1.928 \pm 0.174$	$-0.497 \pm 0.183$
photometric centroid source offset	$3.50 \pm 0.04$	79.59	$-2.87 \pm 0.03$	$2.00 \pm 0.06$

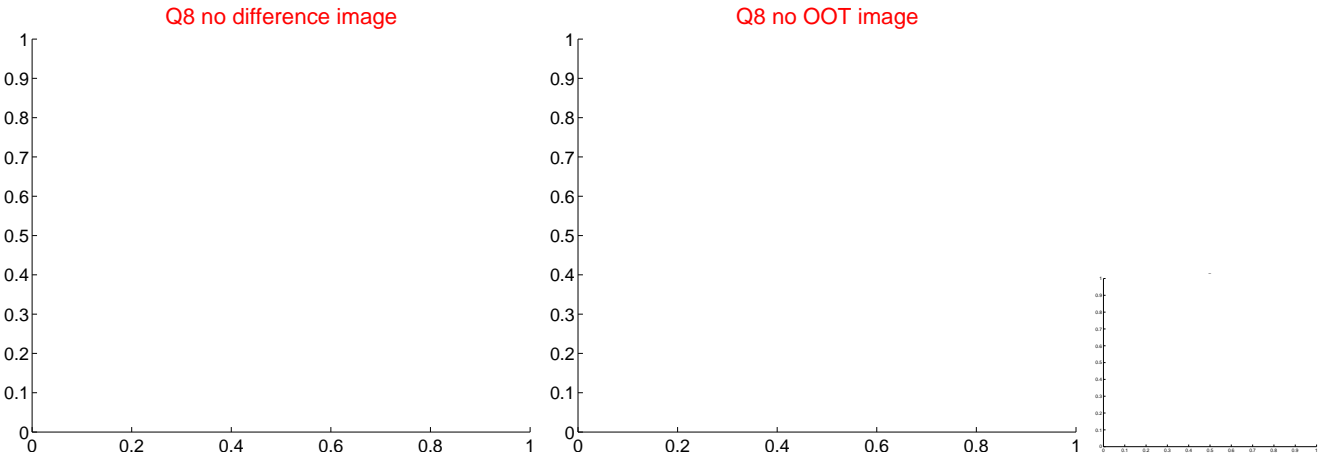
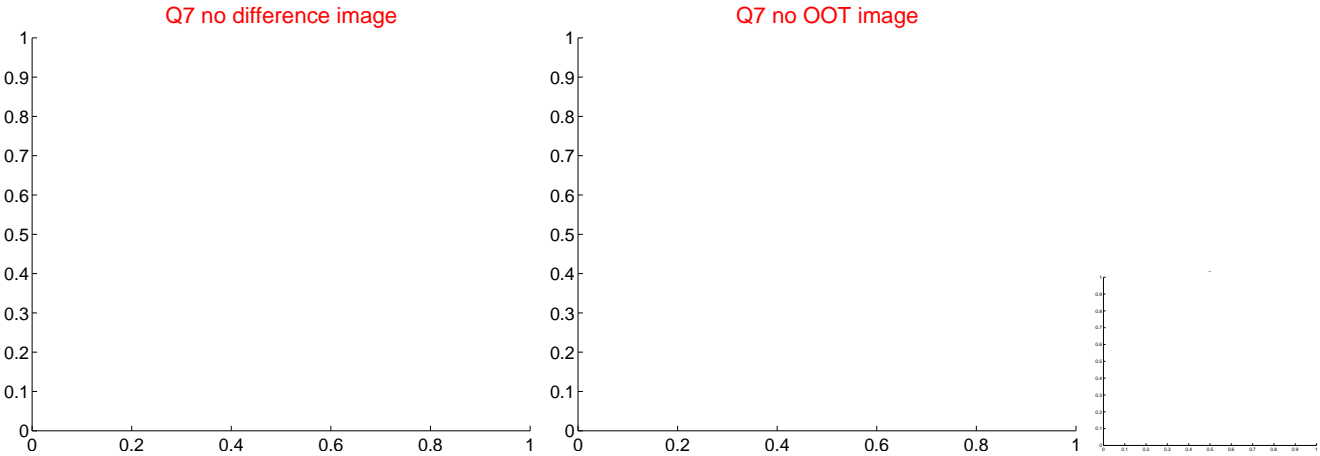
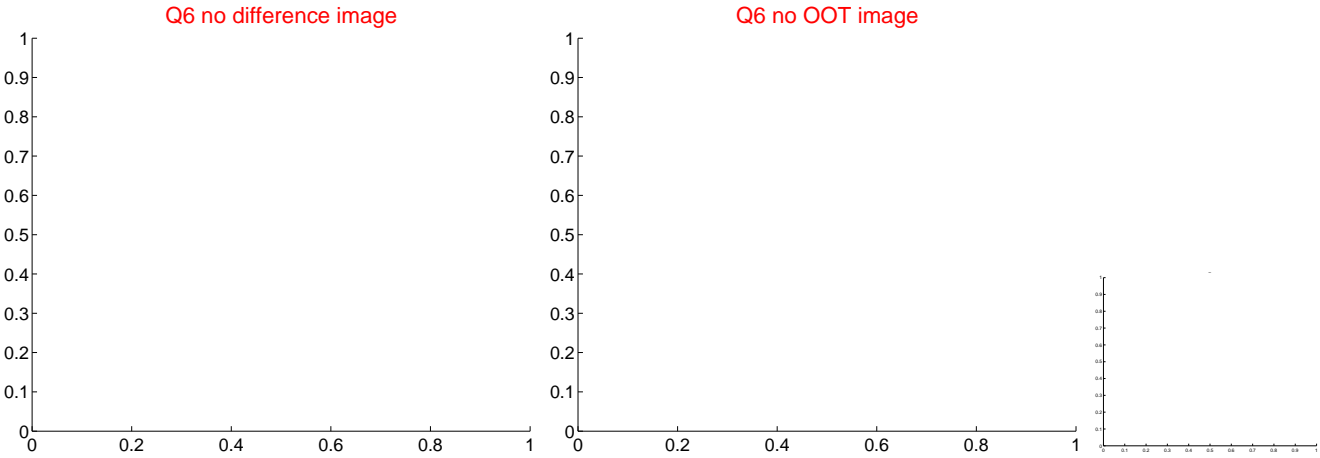
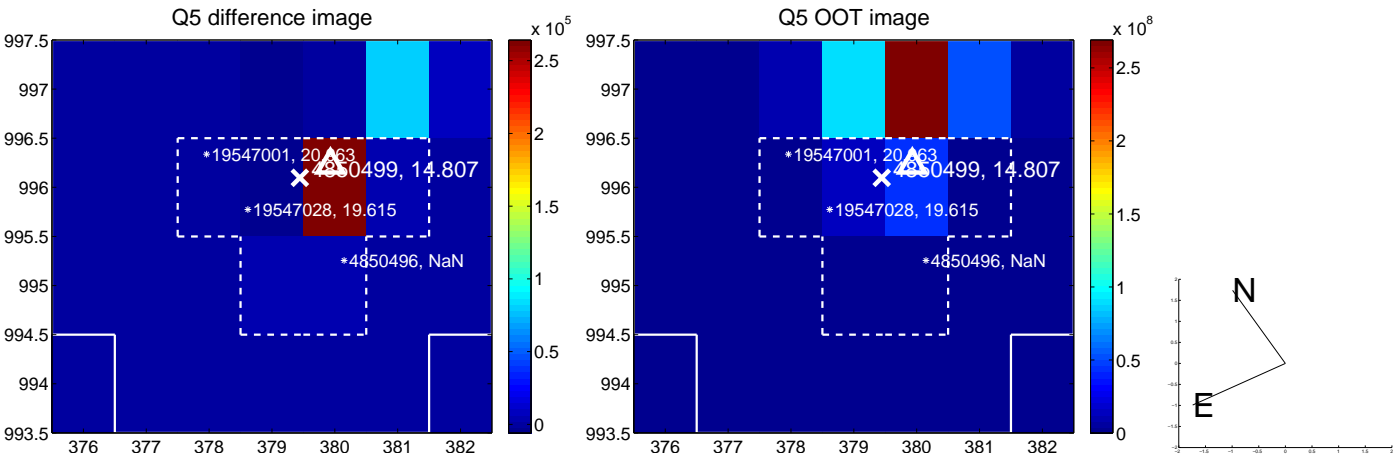


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

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

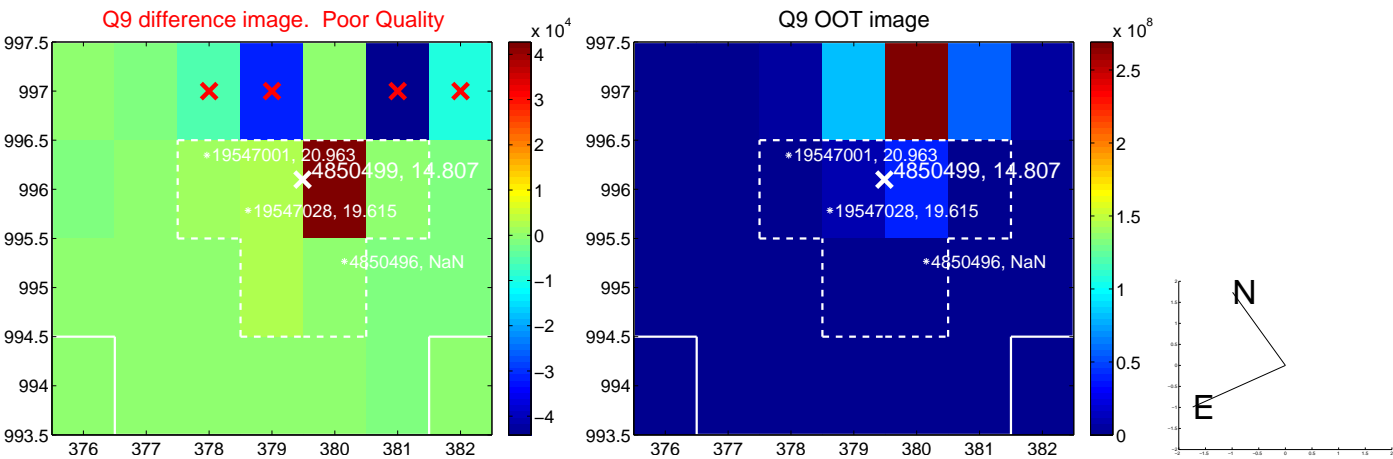


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

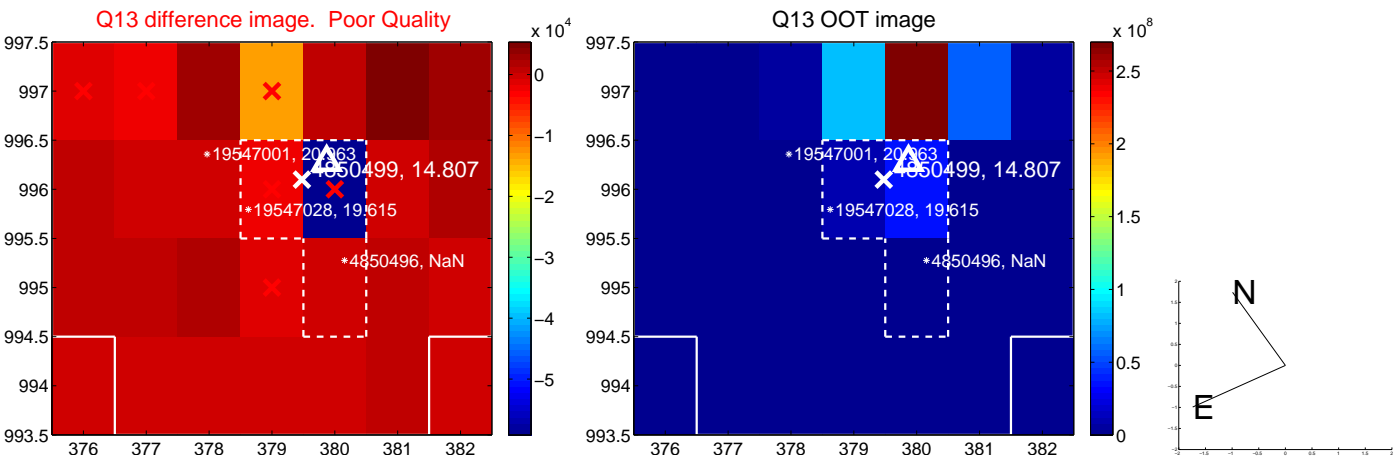




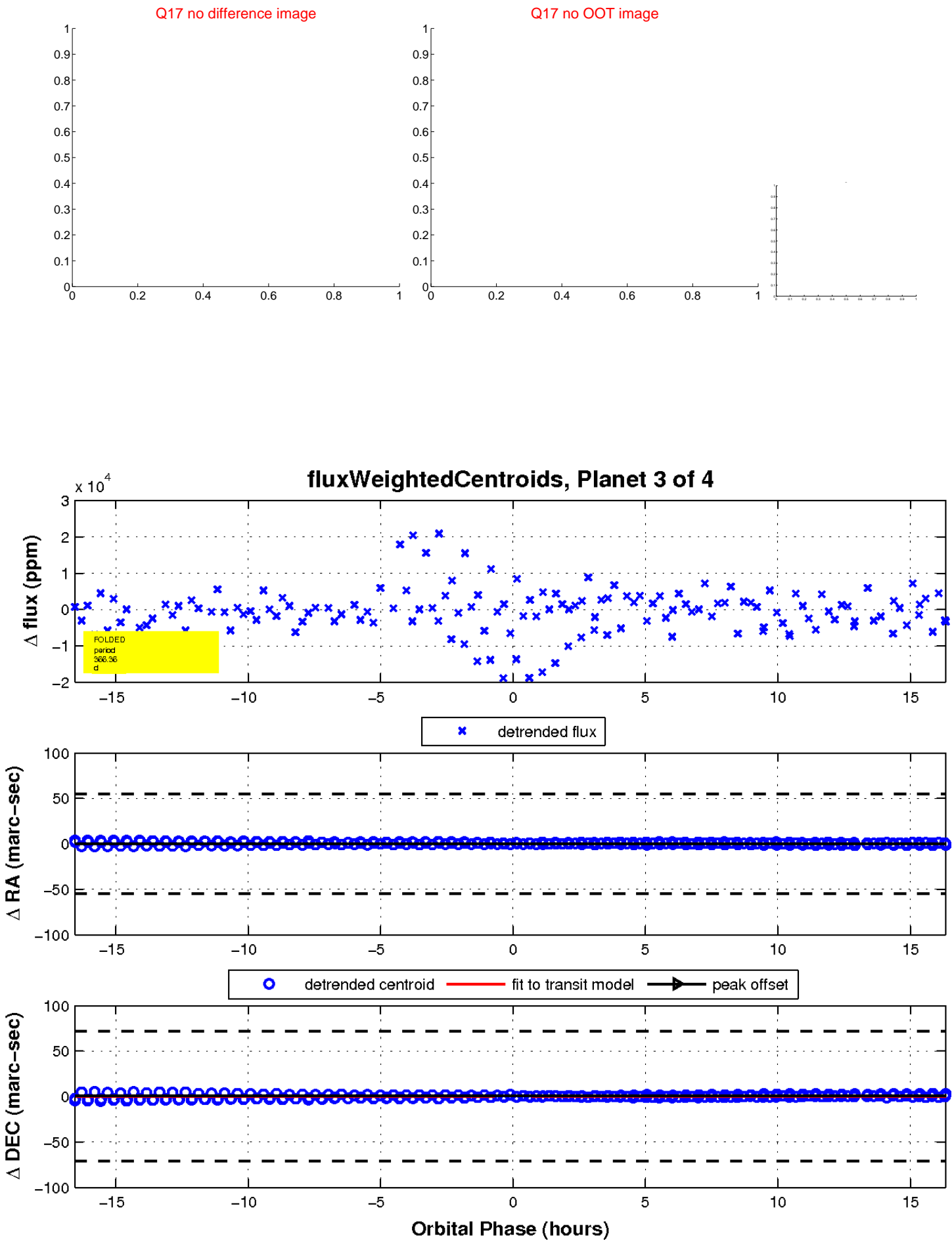
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

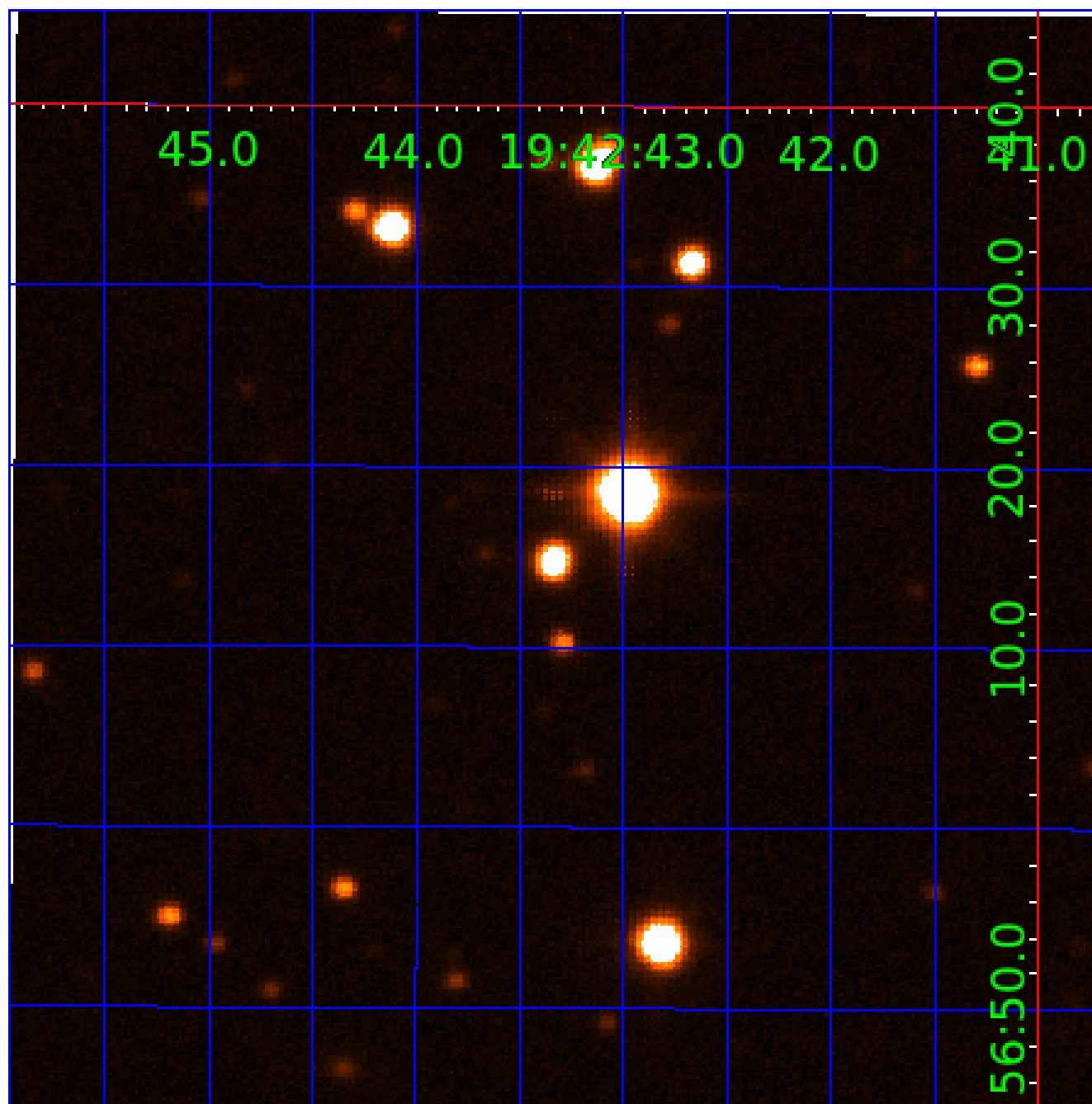


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 004850499

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
004850499-01	OBS	No	360.640718	171.840162	3329.5	3.834	12.0	4.6	0.82	5445	4.95	0.57
004850499-02	OBS	No	372.992592	142.840198	6905.9	16.714	9.2	8.8	0.82	5445	6.92	0.55
004850499-03	OBS	No	366.363596	161.616850	10193.7	5.513	15.8	12.9	0.82	5445	10.25	0.56
004850499-04	OBS	No	371.664837	140.940538	5162.5	13.322	8.4	7.4	0.82	5445	5.79	0.55

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004850499-01	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST
004850499-02	OBS	FP	0.00	1	0	0	0	LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_MEAS
004850499-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_FEW_DIFFS
004850499-04	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS

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

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

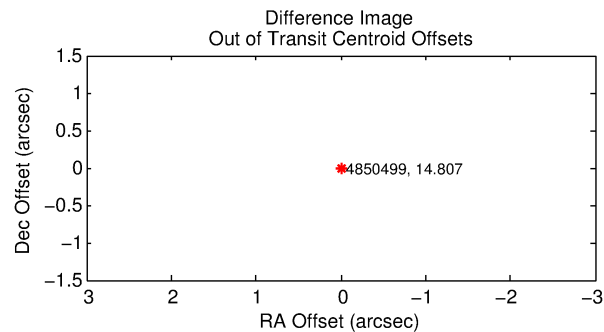
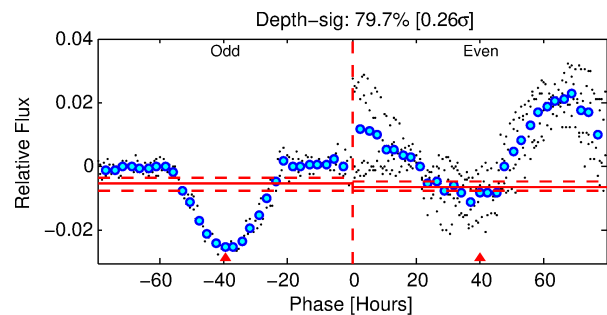
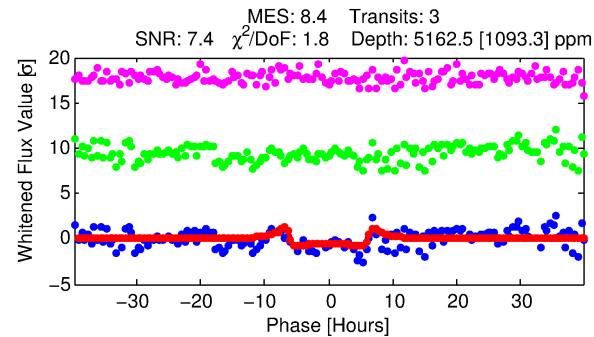
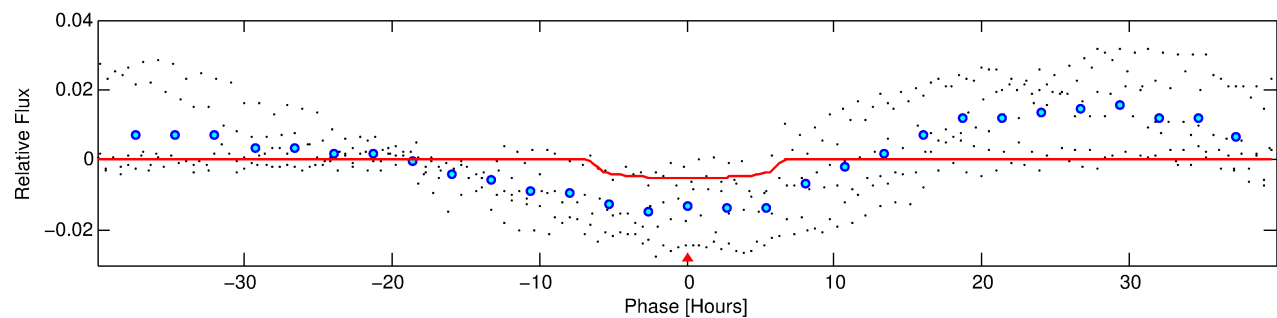
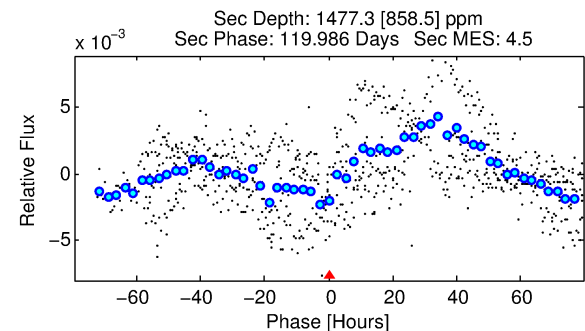
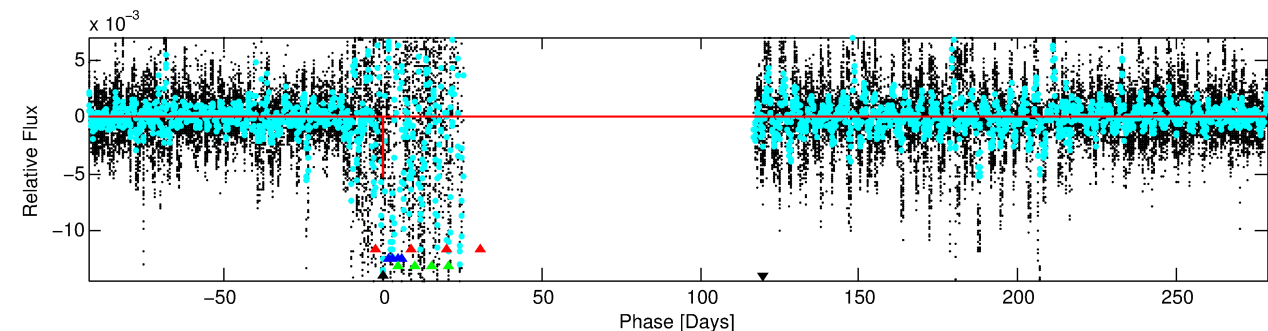
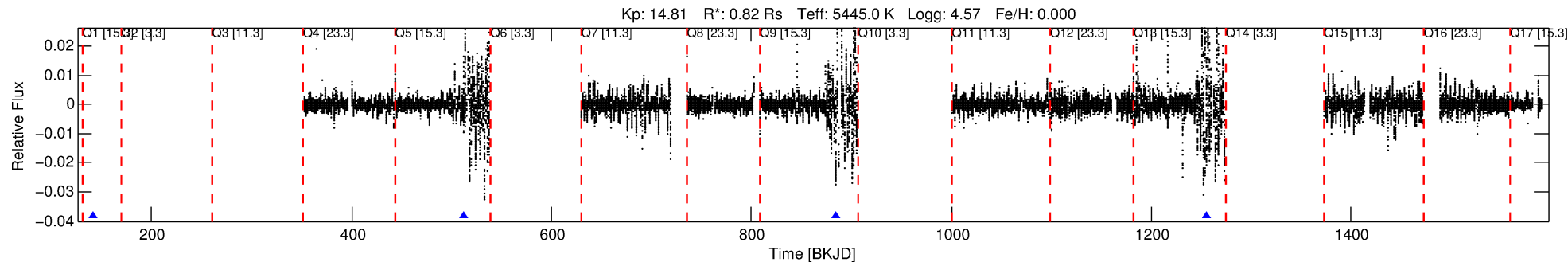
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 004850499-04

No Significant Match Found

# DV One-Page Summary

KIC: 4850499 Candidate: 4 of 4 Period: 371.665 d



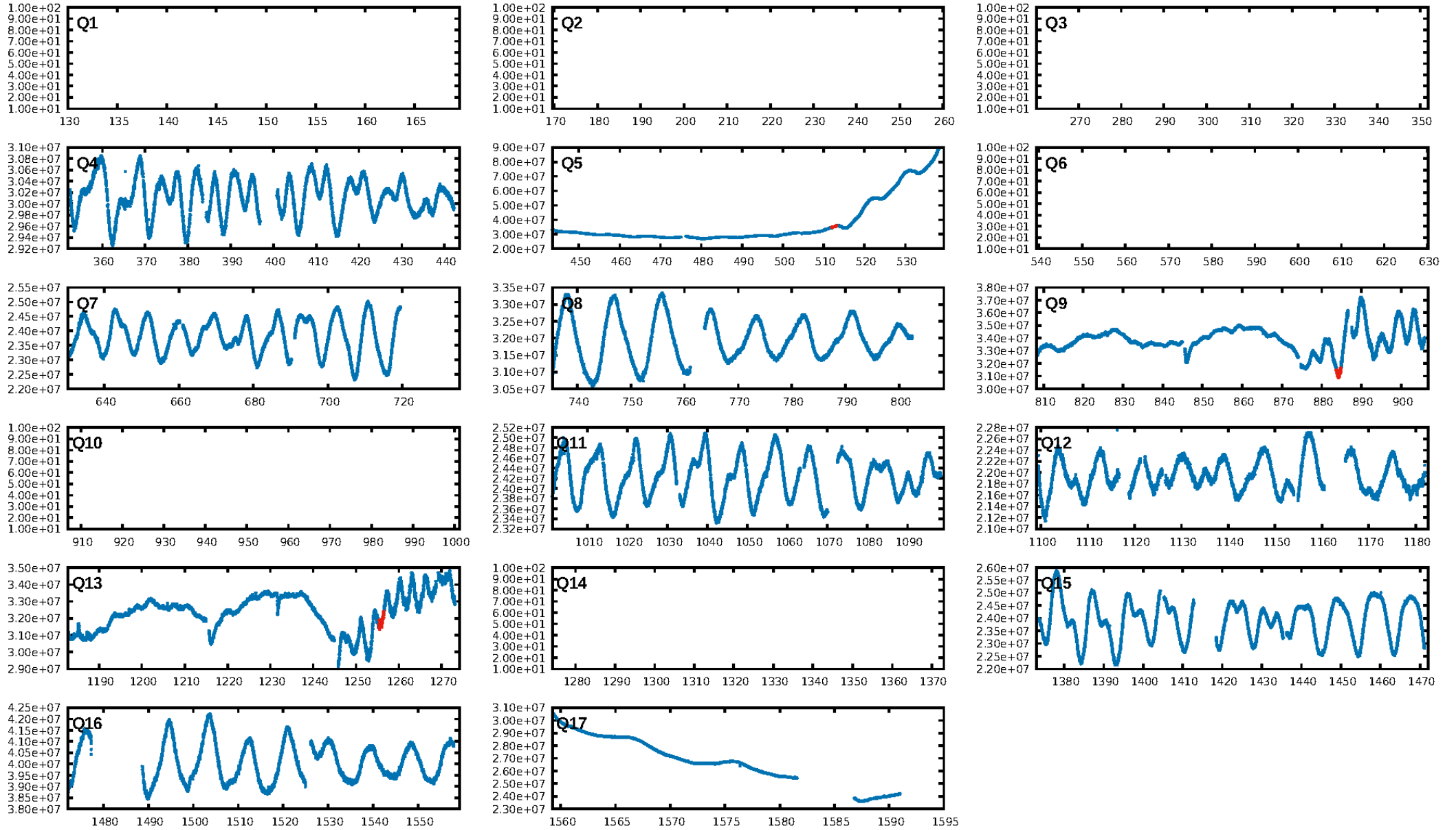
## DV Fit Results:

Period = 371.66484 [0.01135] d  
Epoch = 140.9405 [0.0226] BKJD  
Rp/R\* = 0.0645 [0.0258]  
a/R\* = 226.76 [311.51]  
b = 0.03 [40.36]  
Seff = 0.55 [0.16]  
Teq = 220 [16] K  
Rp = 5.79 [2.62] Re  
a = 0.9819 [0.1766] AU  
Ag = 23382.47 [23925.50] [0.98 $\sigma$ ]  
Teffp = 4202 [1048] K [3.80 $\sigma$ ]

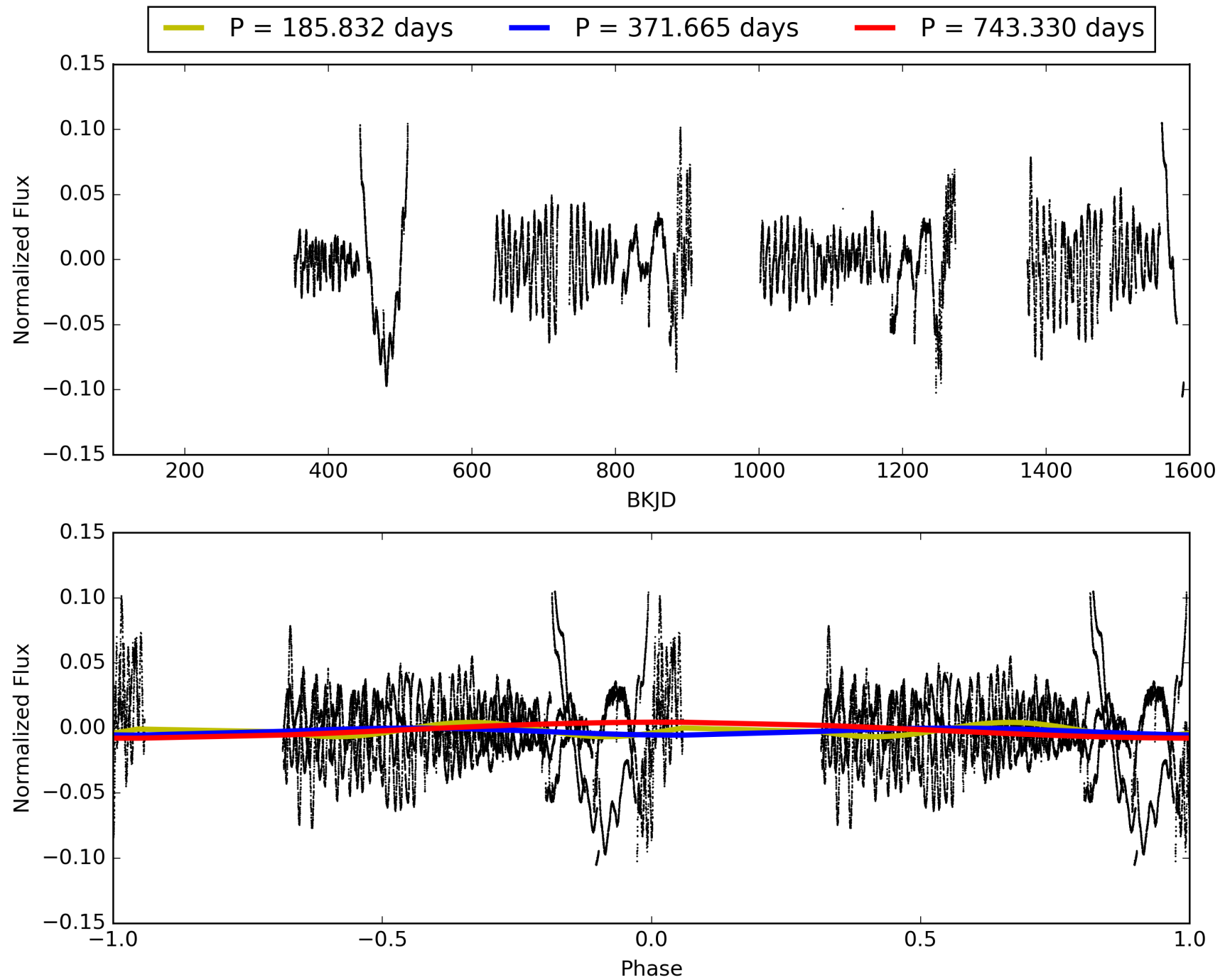
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [8.82 $\sigma$ ]  
LongPeriod-sig: 86.4% [1.49 $\sigma$ ]  
ModelChiSquare2-sig: 36.5%  
ModelChiSquareGoF-sig: 60.6%  
**Bootstrap-pfa: 3.45e-08**  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: 1.01  
Centroid-sig: 36.5%  
**Centroid-so: 3.467 arcsec [36.18 $\sigma$ ]**  
OotOffset-rm: N/A  
**KicOffset-rm: 1.726 arcsec [24.80 $\sigma$ ]**  
OotOffset-st: 0/0/0 [0]  
KicOffset-st: 0/0/2 [2]  
DiffImageQuality-fgm: 1.00 [2/2]  
DiffImageOverlap-fno: 1.00 [3/3]

# TCE 004850499-04, PDC Light Curves



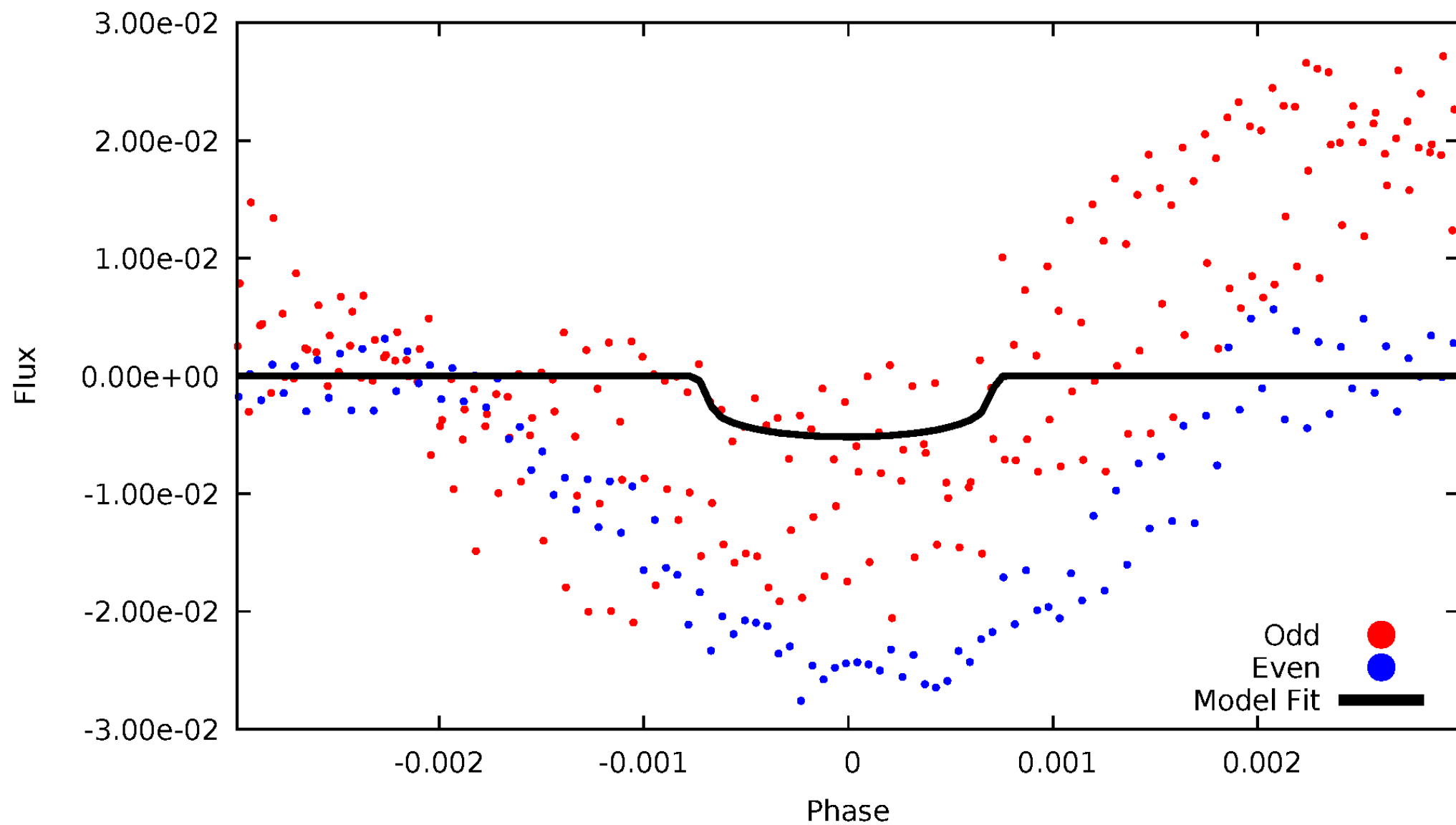
TCE 004850499-04





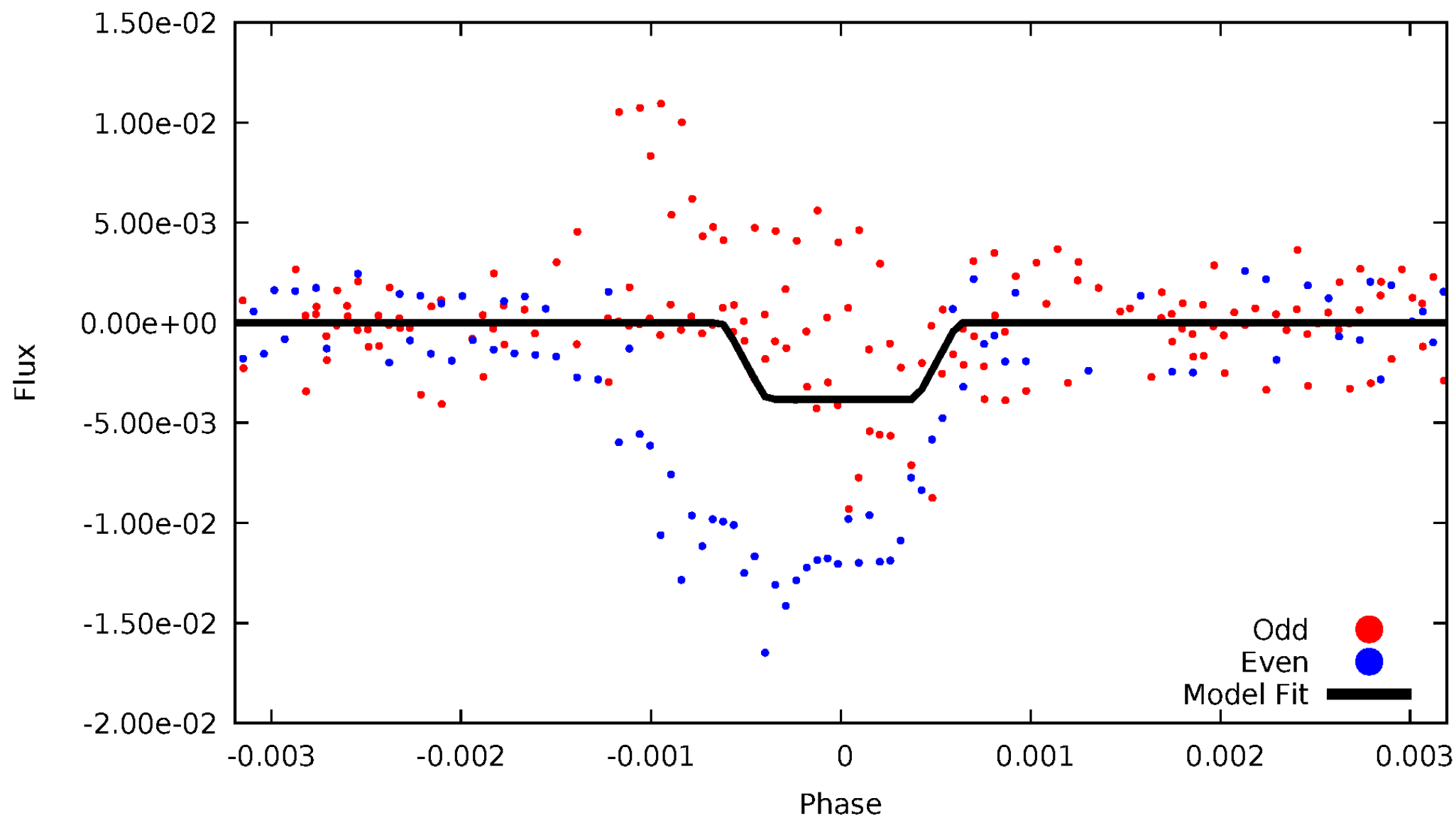
# DV Odd/Even

TCE 004850499-04



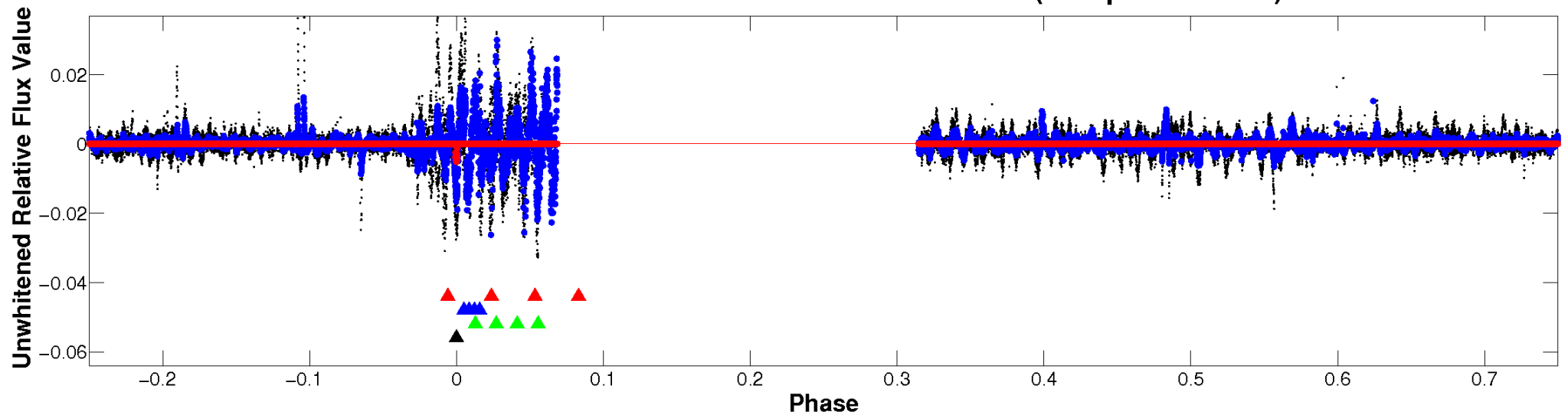
# ALT Odd/Even

TCE 004850499-04

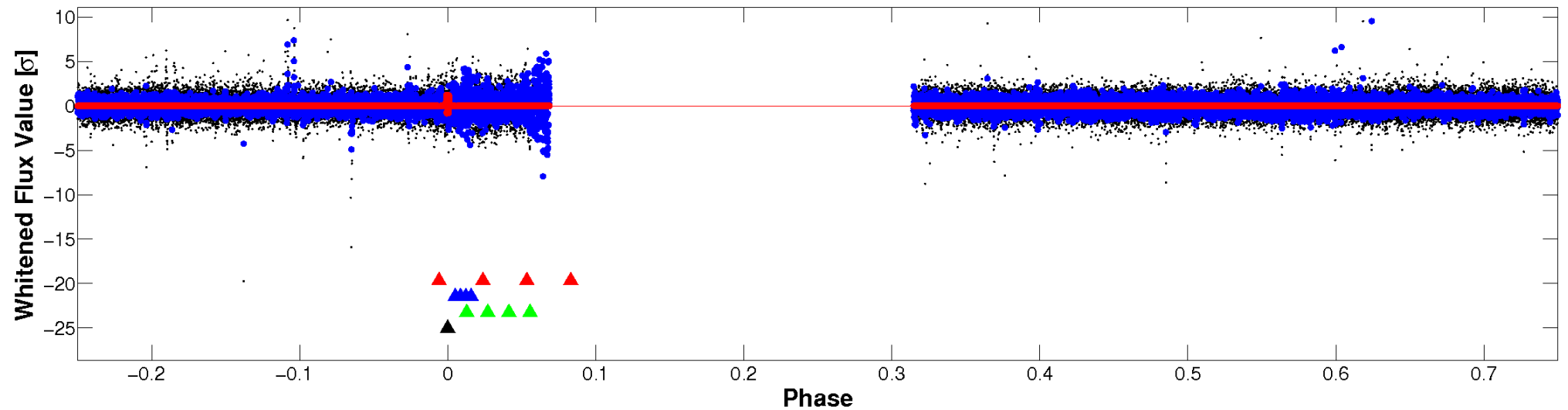


# Non-Whitened Vs. Whitened Light Curve

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

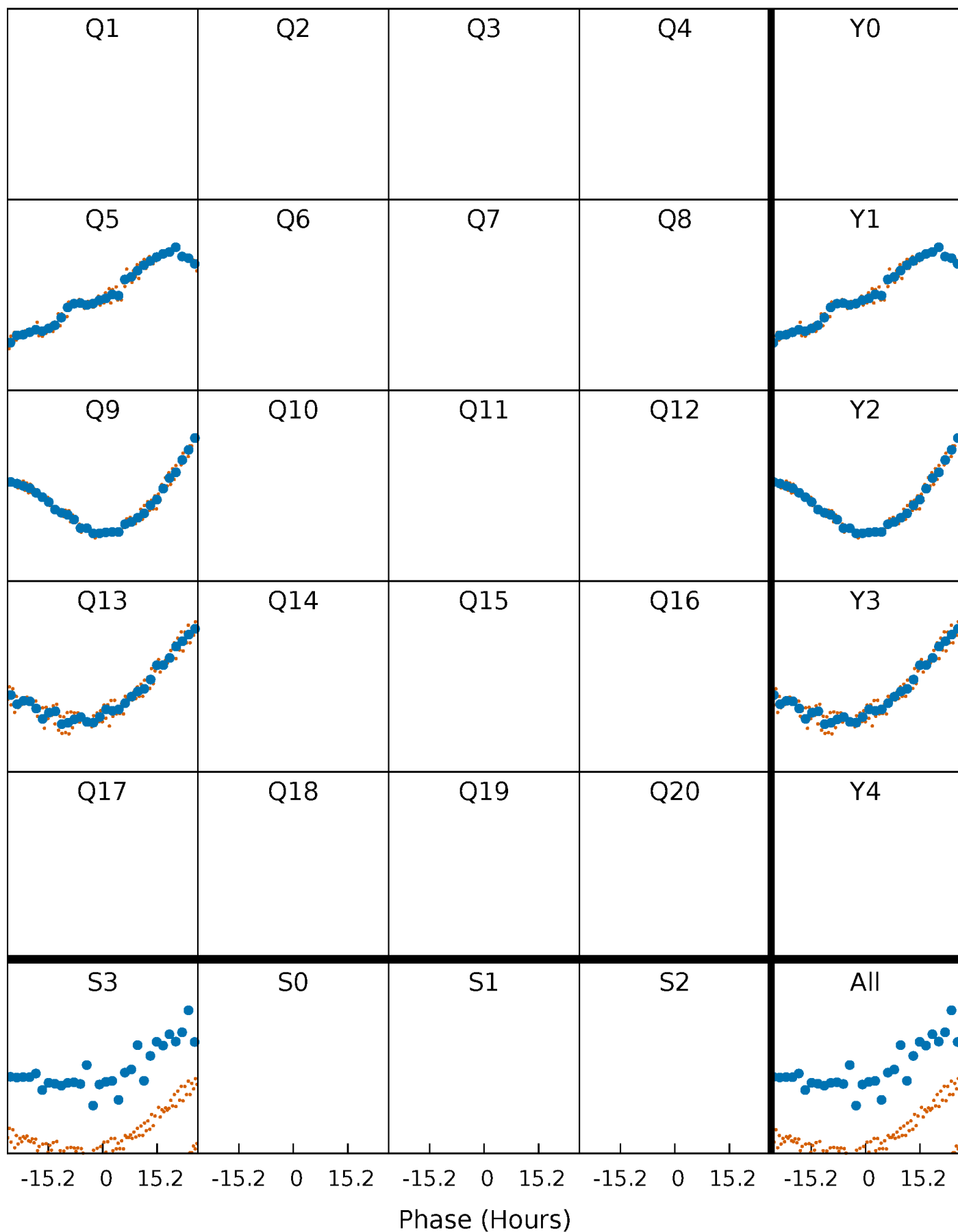


## Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



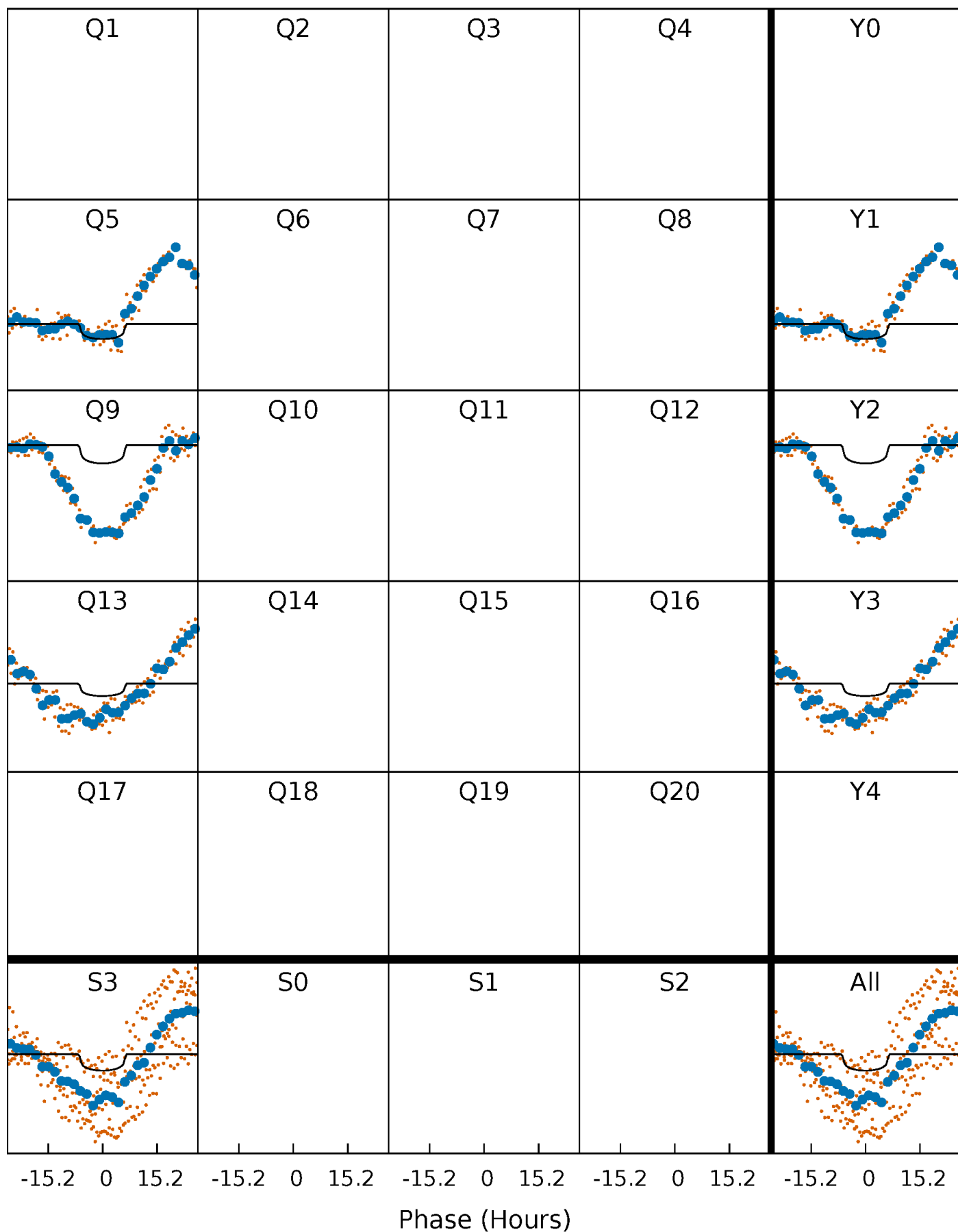
# PDC Quarter-Phased Transit Curves

TCE 004850499-04     $P=371.664837$  Days     $T_0=140.940538$  (BKJD)



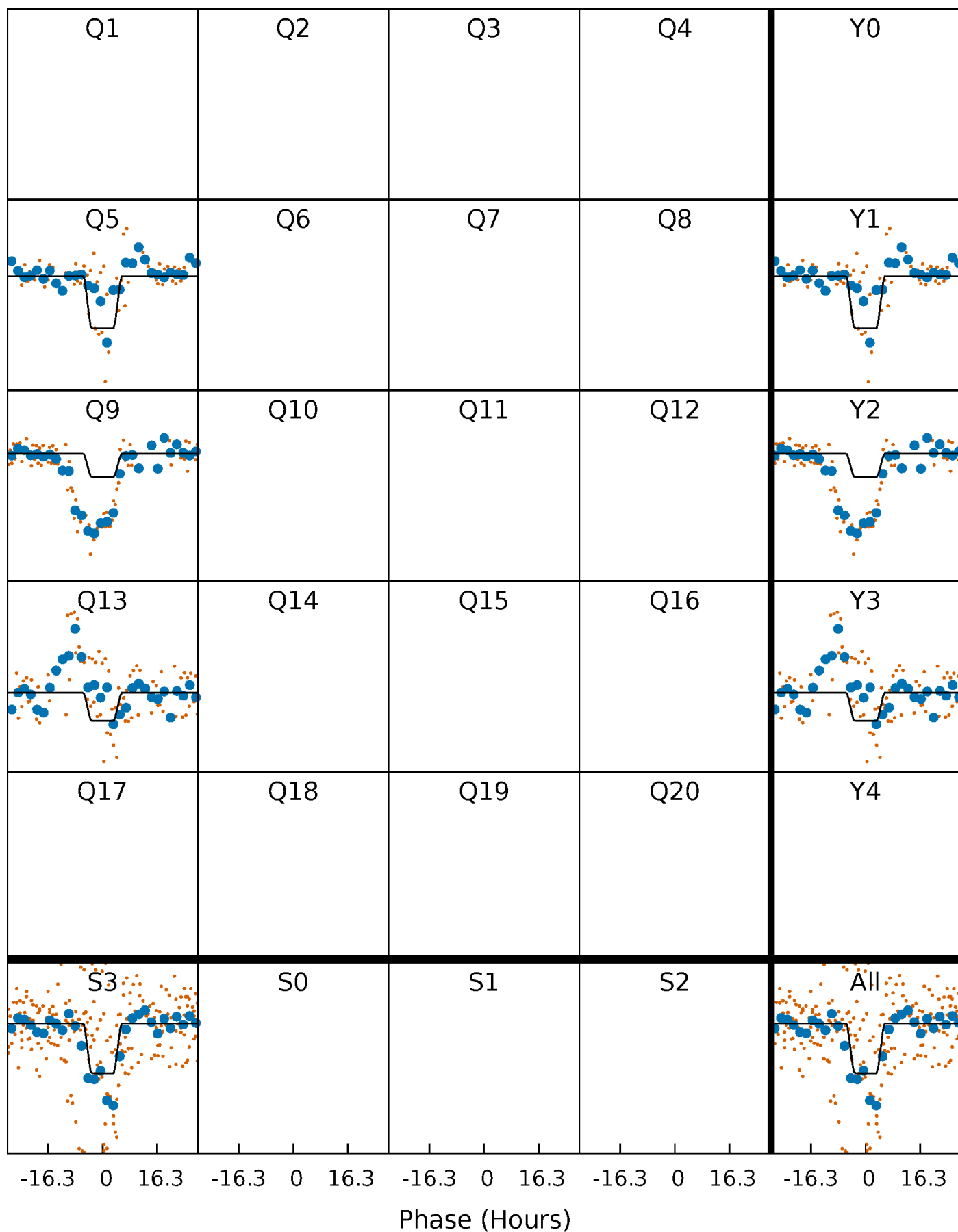
# DV Quarter-Phased Transit Curves

TCE 004850499-04     $P=371.664837$  Days     $T_0=140.940538$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

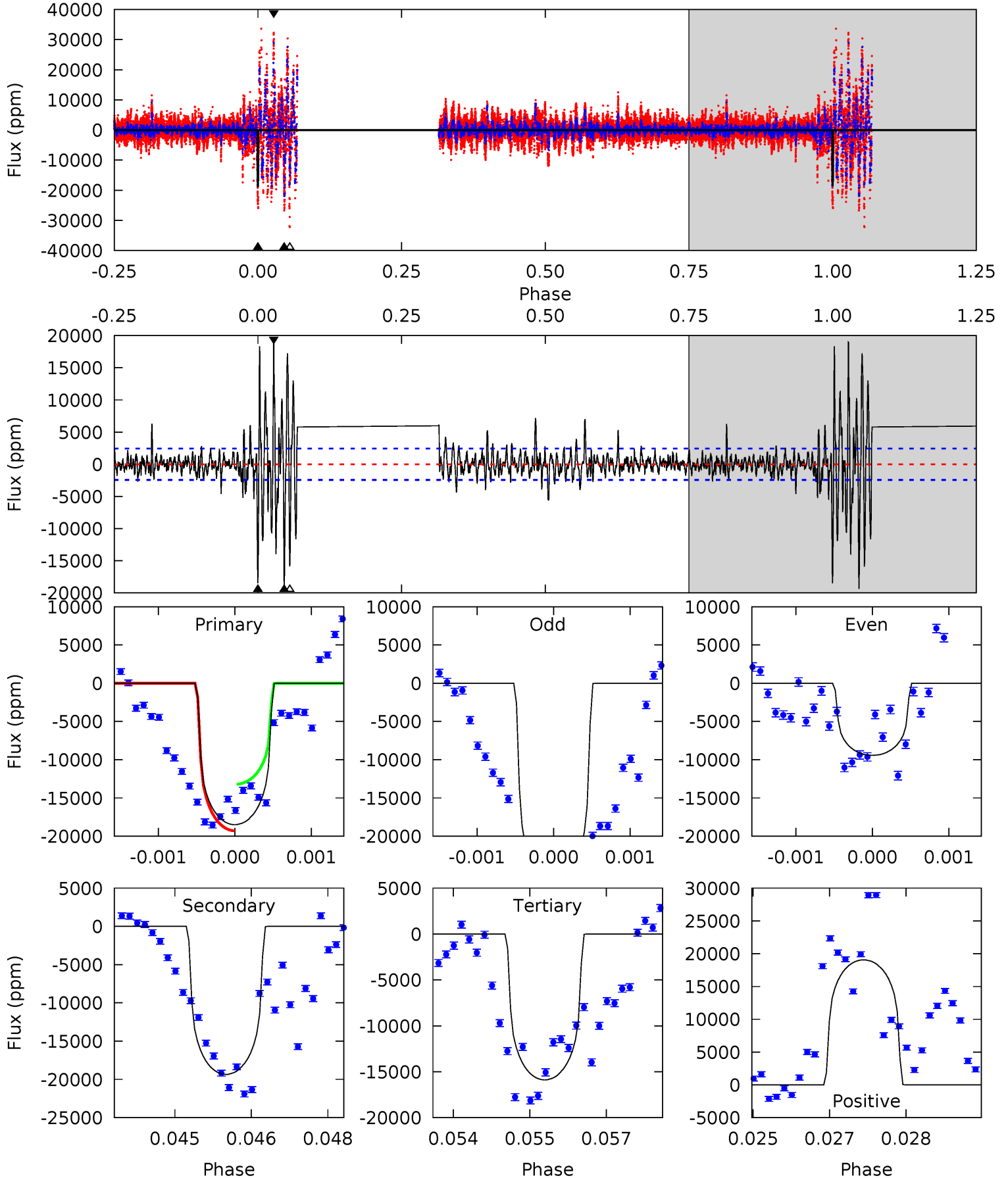
TCE 004850499-04     $P=371.666023$  Days     $T_0=141.000933$  (BKJD)



# DV Model-Shift Uniqueness Test

004850499-04, P = 371.664837 Days, E = 140.940538 Days

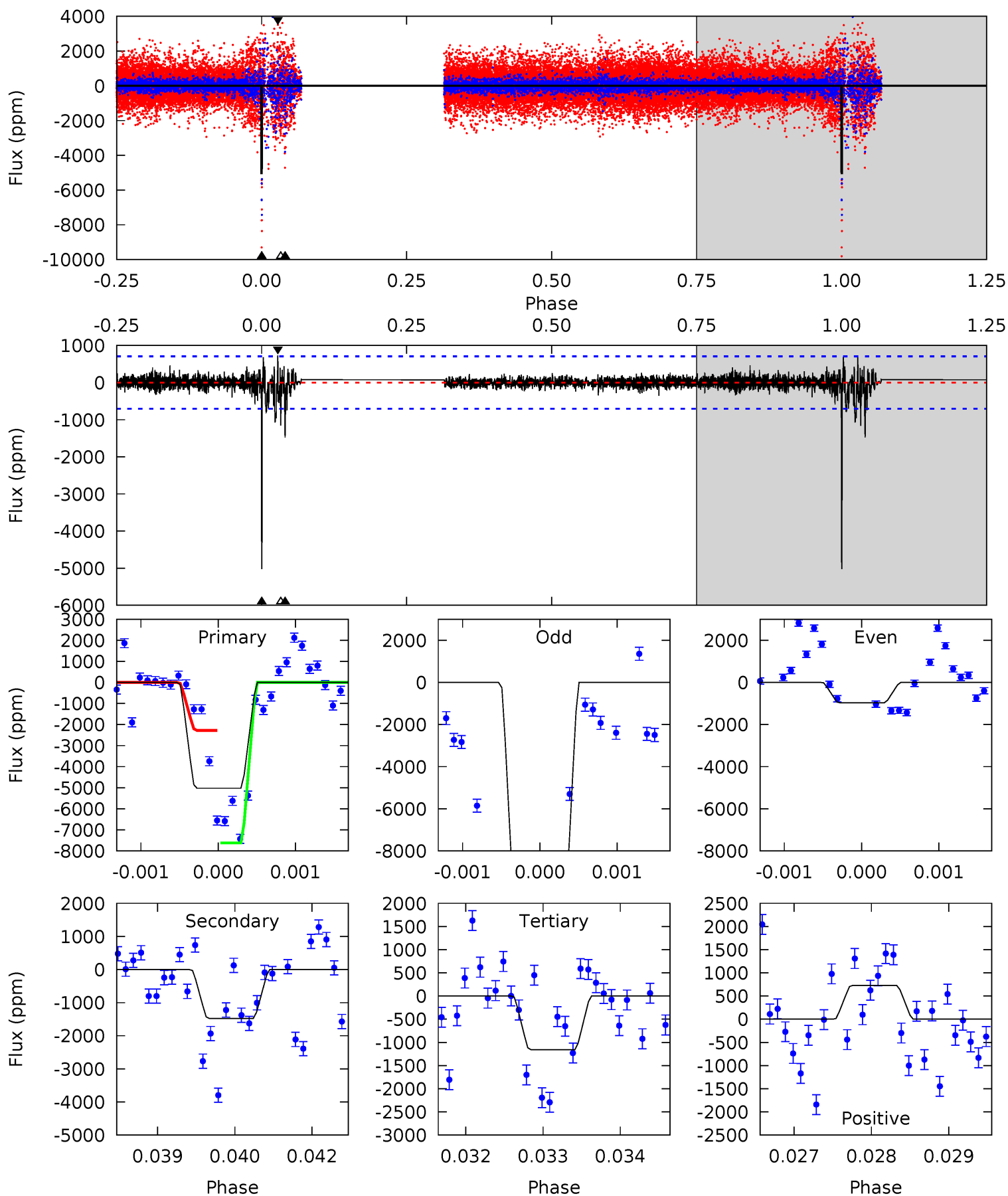
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
40.8	42.7	35.0	42.0	5.38	3.18	4.58	5.74	-1.24	7.62	0.64	20.6	1.01	0.50	6.19



# Alt Model-Shift Uniqueness Test

004850499-04, P = 371.666023 Days, E = 141.000933 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
38.5	11.3	8.88	5.59	5.41	3.22	0.80	29.6	32.9	2.45	5.74	45.9	2.46	0.13	0





### Stellar Parameters For KIC 004850499

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5445^{+180}_{-180}$	$4.569^{+0.034}_{-0.144}$	$0.000^{+0.250}_{-0.300}$	$0.822^{+0.175}_{-0.075}$	$0.918^{+0.073}_{-0.110}$	$2.326^{+0.438}_{-0.940}$
	+3%/-3%	+1%/-3%	+inf%/-inf%	+21%/-9%	+8%/-12%	+19%/-40%
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 004850499-04 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-19351 \pm 454$	$6.10^{+2.31}_{-2.27}$	$313^{+17}_{-14}$	$8151^{+3398}_{-1411}$	$279221^{+433638}_{-133410}$
Alt.	$-1478 \pm 130$	$5.61^{+2.82}_{-2.30}$	$314^{+17}_{-14}$	$4489^{+1160}_{-593}$	$24371^{+46480}_{-13320}$

$T_{\text{max}}$  = Theoretical Maximum Planetary Temperature

$T_{\text{obs}}$  = Observed Planetary Temperature (Assuming  $A=0.3$ )

$A_{\text{obs}}$  = Observed Albedo (Assuming  $T=0$ )

If a secondary eclipse is present, the system is likely an EB if  $T_{\text{obs}} \gg T_{\text{max}}$  AND  $A_{\text{obs}} \gg 1.0$

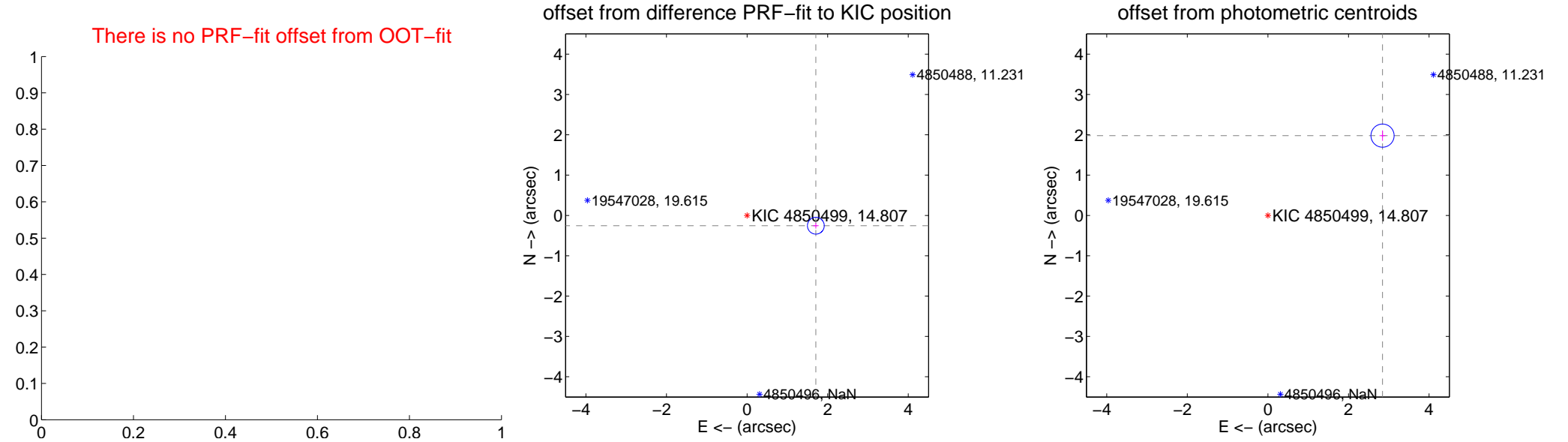
## DV Centroid Data

Supplemental centroid analysis for 004850499-04. Kepler magnitude: 14.81. Transit SNR 7.40

There are 2 quarters with good PRF difference image offsets

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

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	—	—	—	—
PRF-fit source offset from KIC position	$1.726 \pm 0.070$	24.80	$-1.707 \pm 0.070$	$-0.254 \pm 0.070$
photometric centroid source offset	$3.47 \pm 0.10$	36.18	$-2.85 \pm 0.07$	$1.98 \pm 0.13$

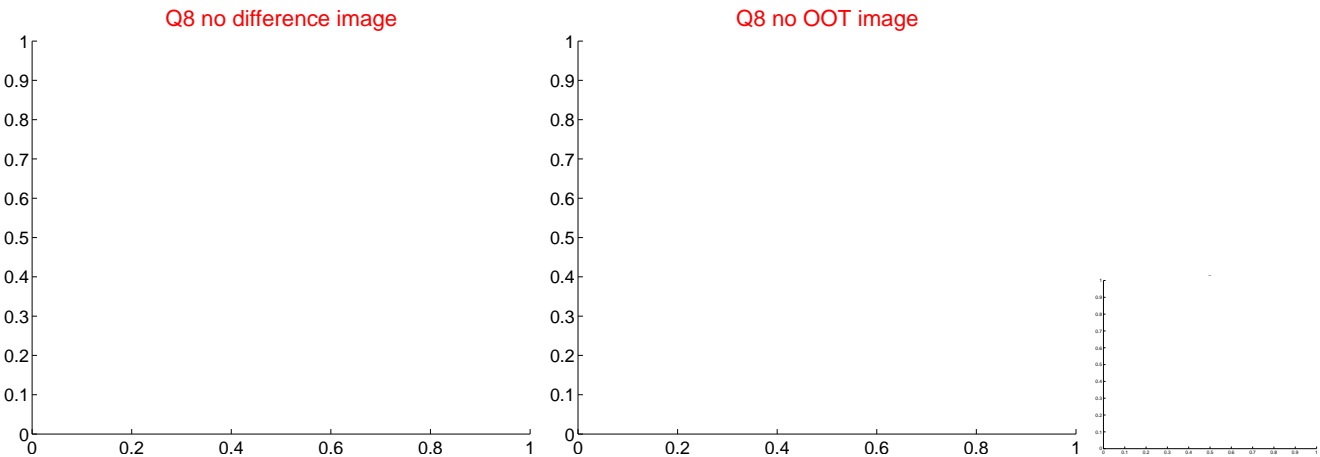
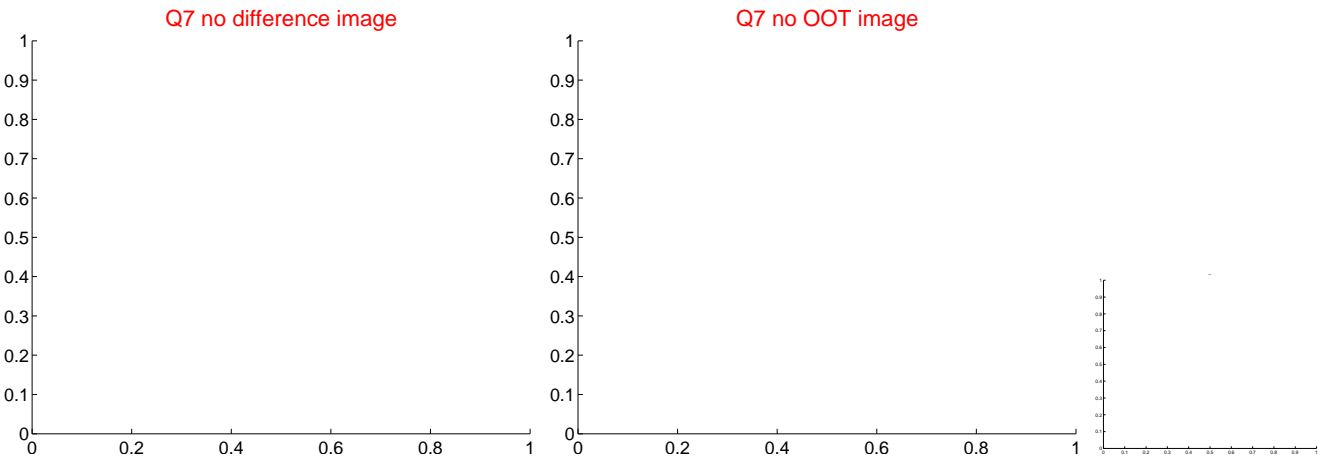
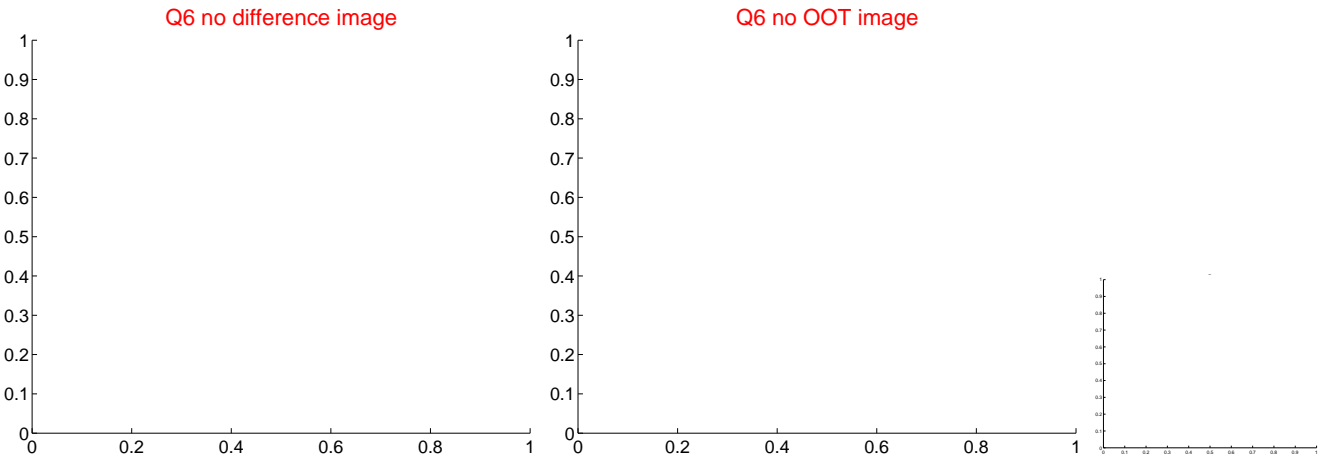
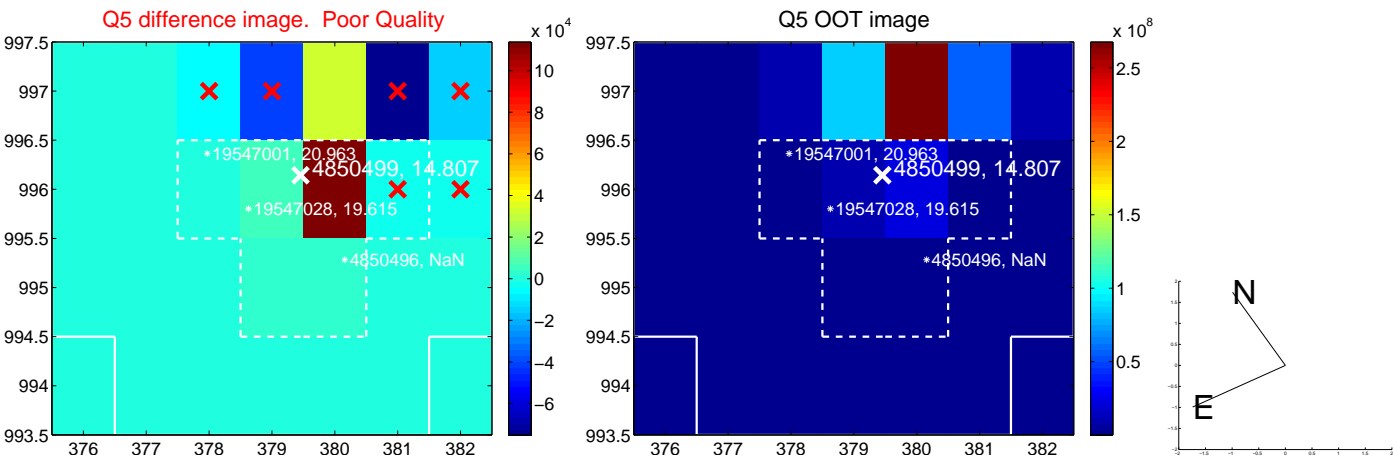


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

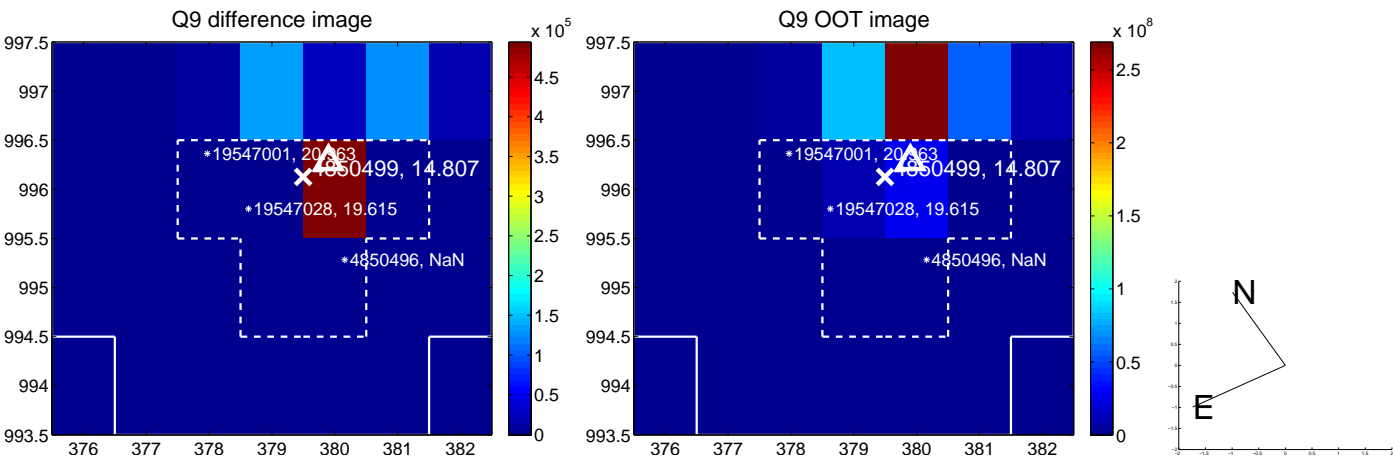
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



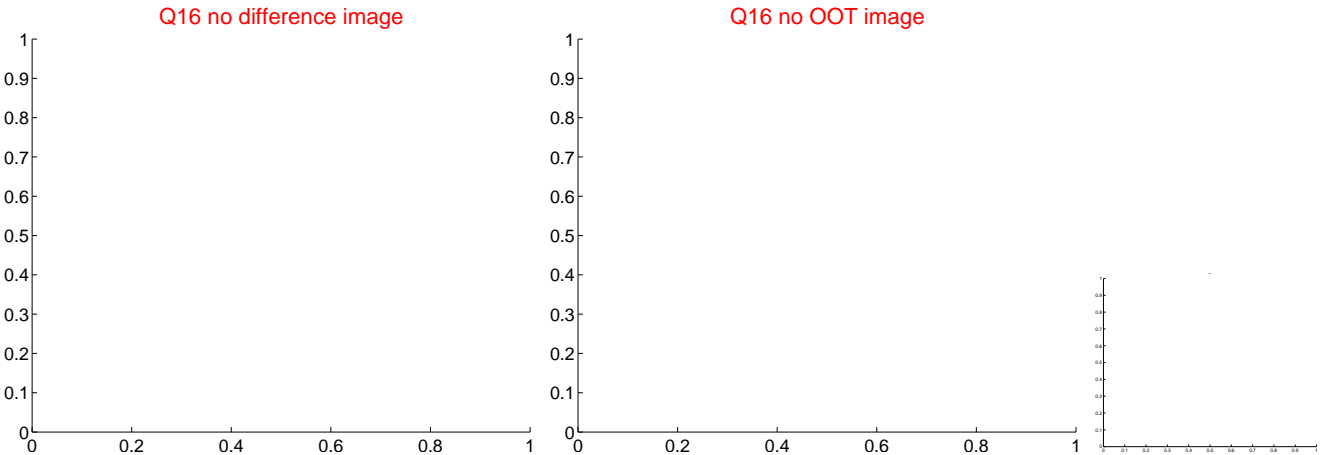
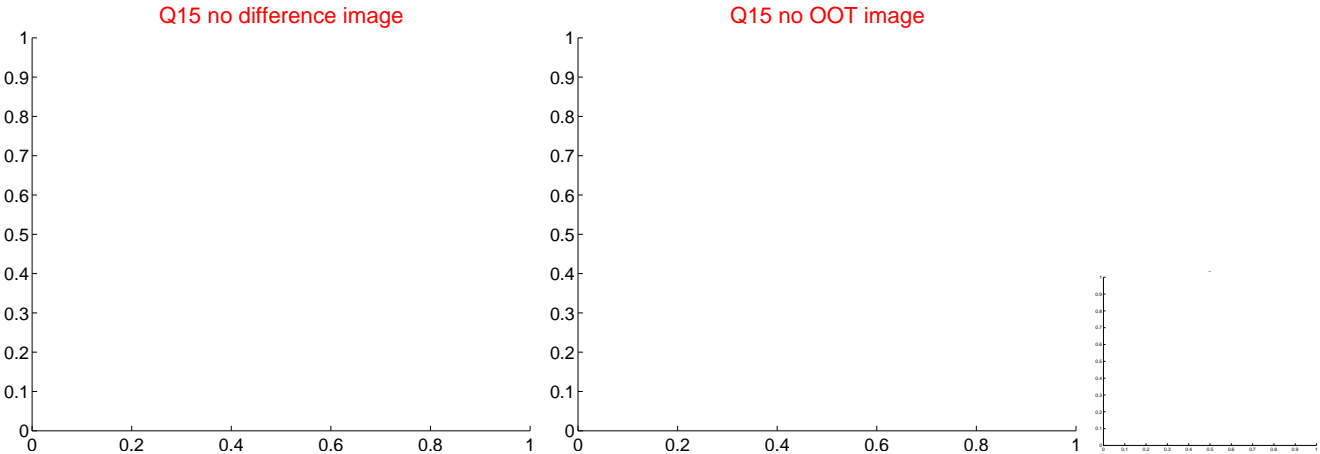
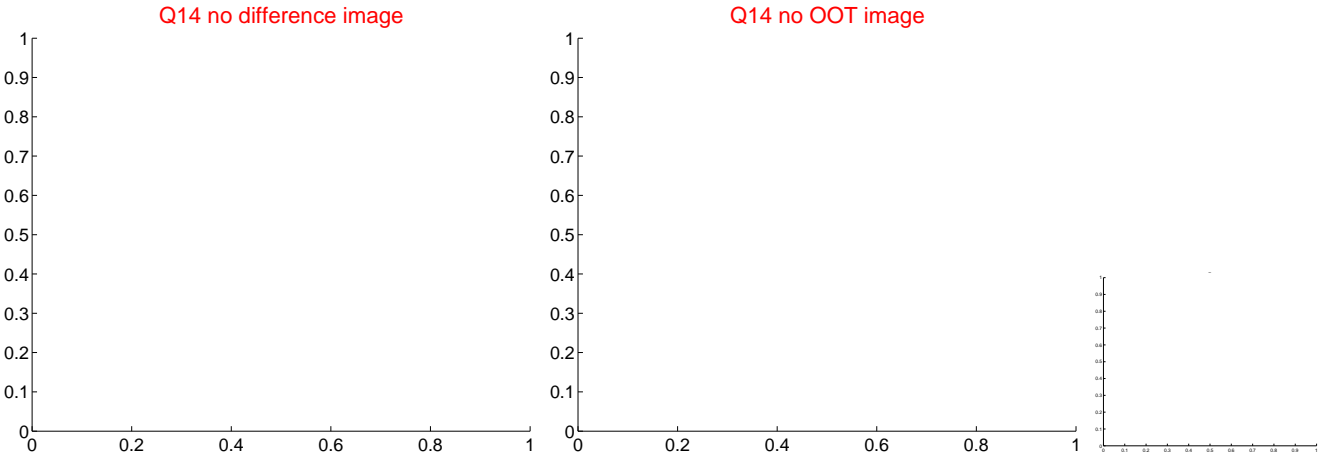
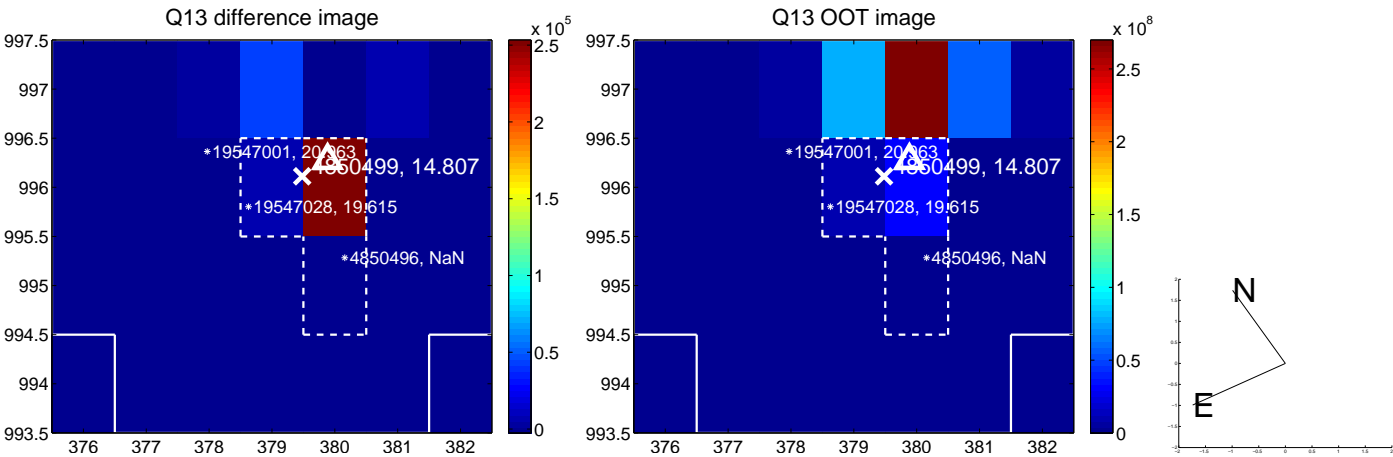
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



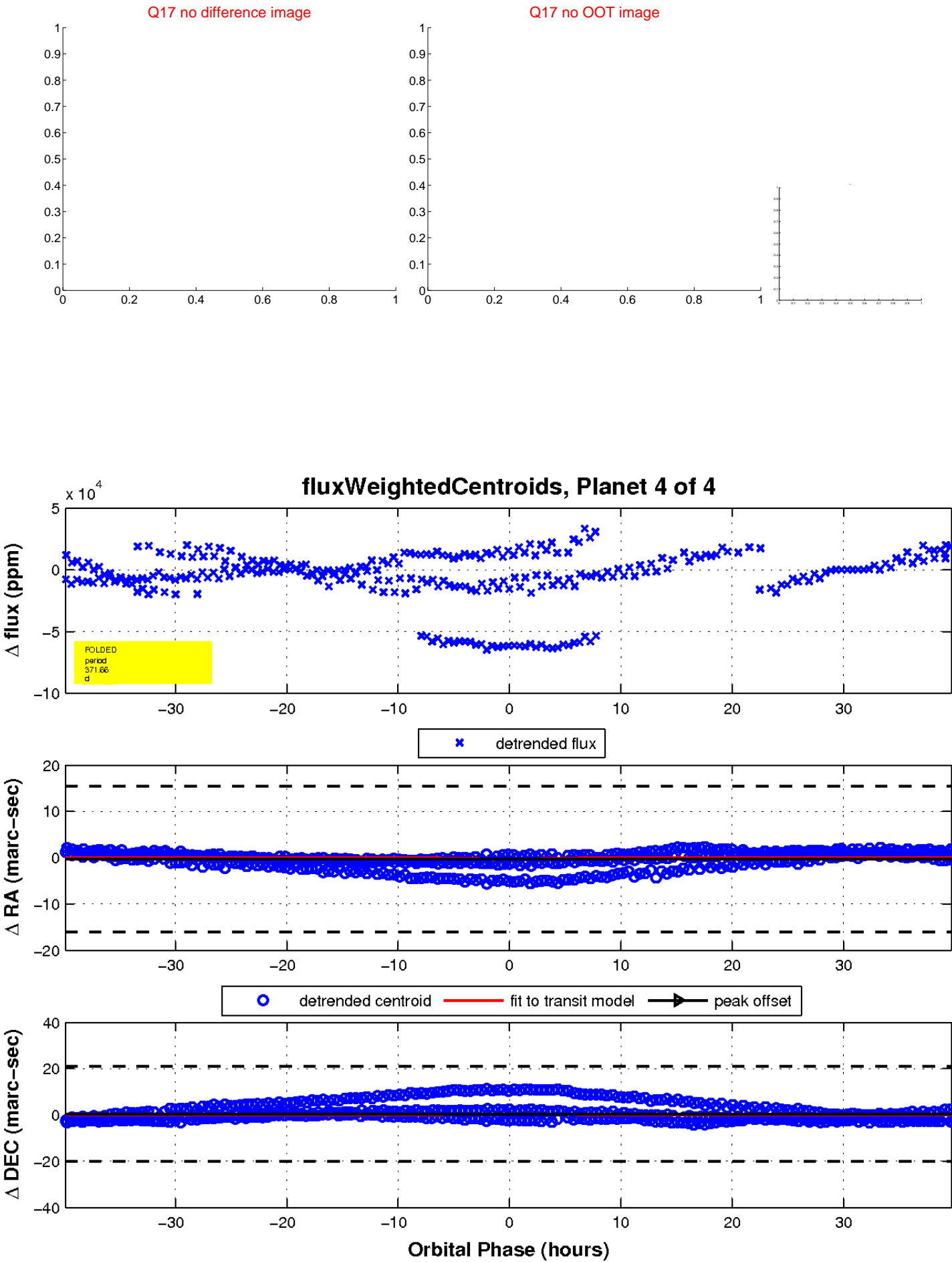
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



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



UKIRT Image

Declination

