

# KIC 009570305

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009570305-01	OBS	No	483.669658	462.948434	1699.8	30.350	12.7	8.4	0.79	5349	3.24	0.39
009570305-02	OBS	No	529.463829	514.641731	1505.1	31.930	17.6	7.2	0.79	5349	3.30	0.34
009570305-03	OBS	No	569.843941	138.102414	1906.2	7.101	11.6	10.6	0.79	5349	3.47	0.31

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009570305-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_SKYE—LPP_DV—MOD_NONUNIQ_DV—MOD_POS_DV—CENT_FEW_DIFFS
009570305-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE_ZUMA—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009570305-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_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.

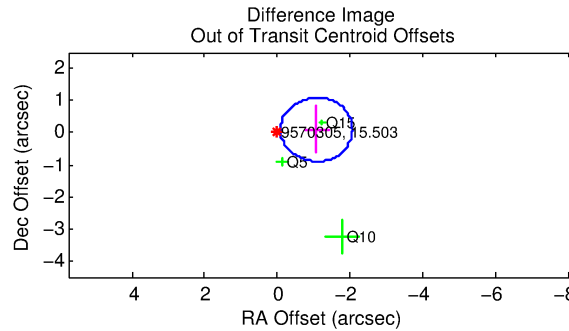
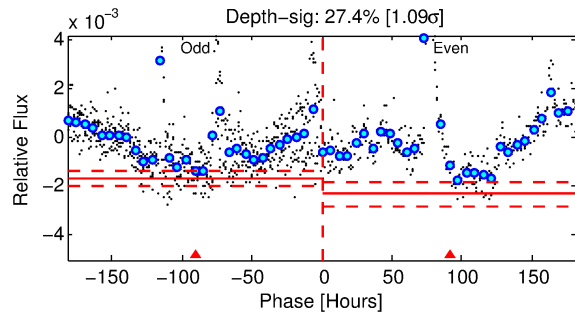
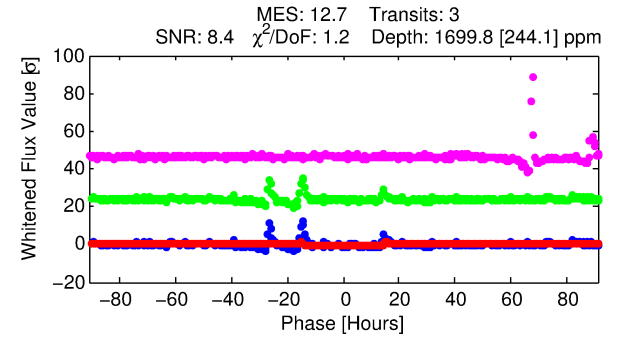
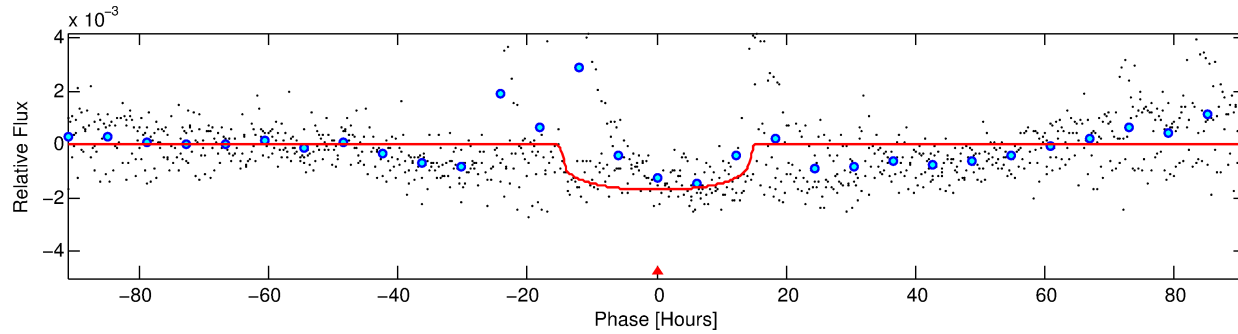
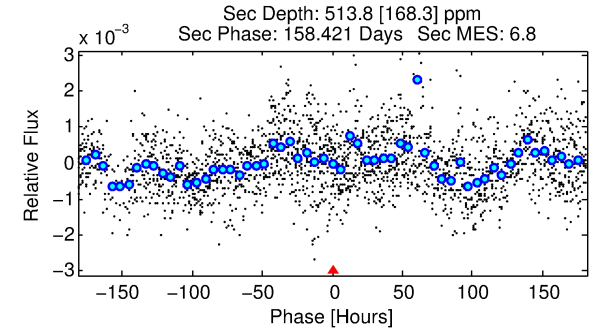
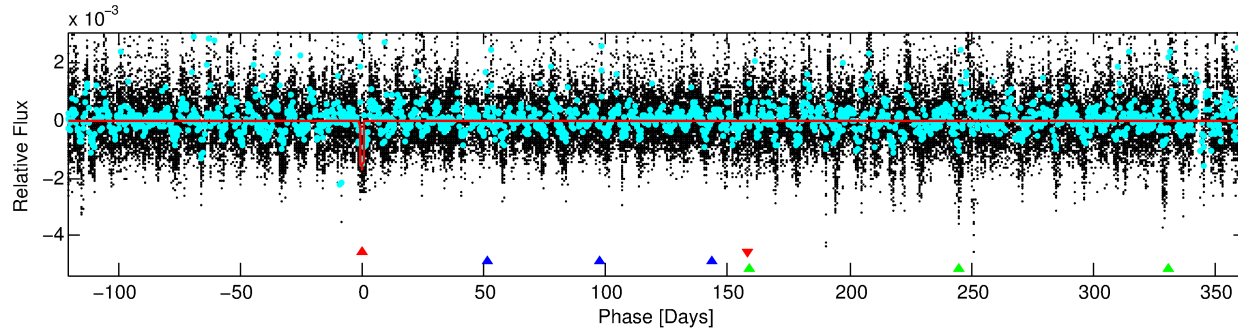
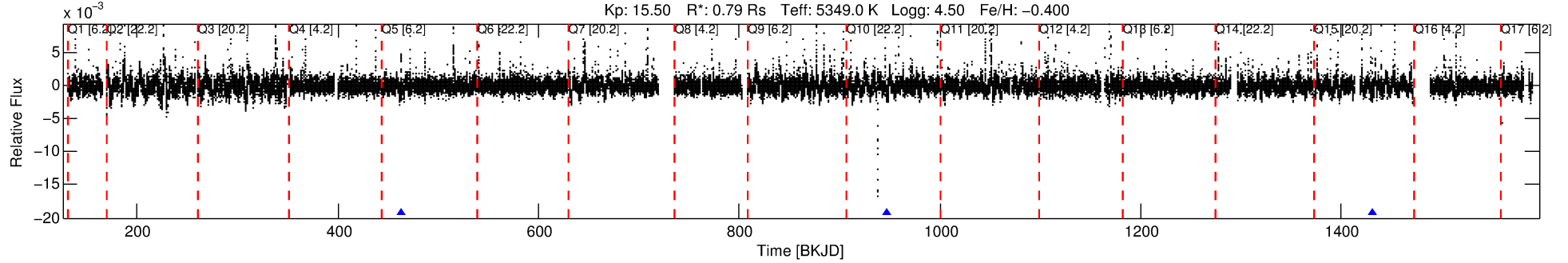
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 009570305-01

No Significant Match Found

# DV One-Page Summary

KIC: 9570305 Candidate: 1 of 3 Period: 483.670 d



## DV Fit Results:

Period = 483.66966 [0.01277] d  
Epoch = 462.9484 [0.0178] BKJD  
Rp/R\* = 0.0375 [0.0058]  
a/R\* = 121.11 [62.75]  
b = 0.29 [1.61]  
Seff = 0.39 [0.09]  
Teq = 201 [11] K  
Rp = 3.24 [0.67] Re  
a = 1.0851 [0.1327] AU  
Ag = 31783.79 [15432.44] [2.06 $\sigma$ ]  
Teffp = 4157 [484] K [8.16 $\sigma$ ]

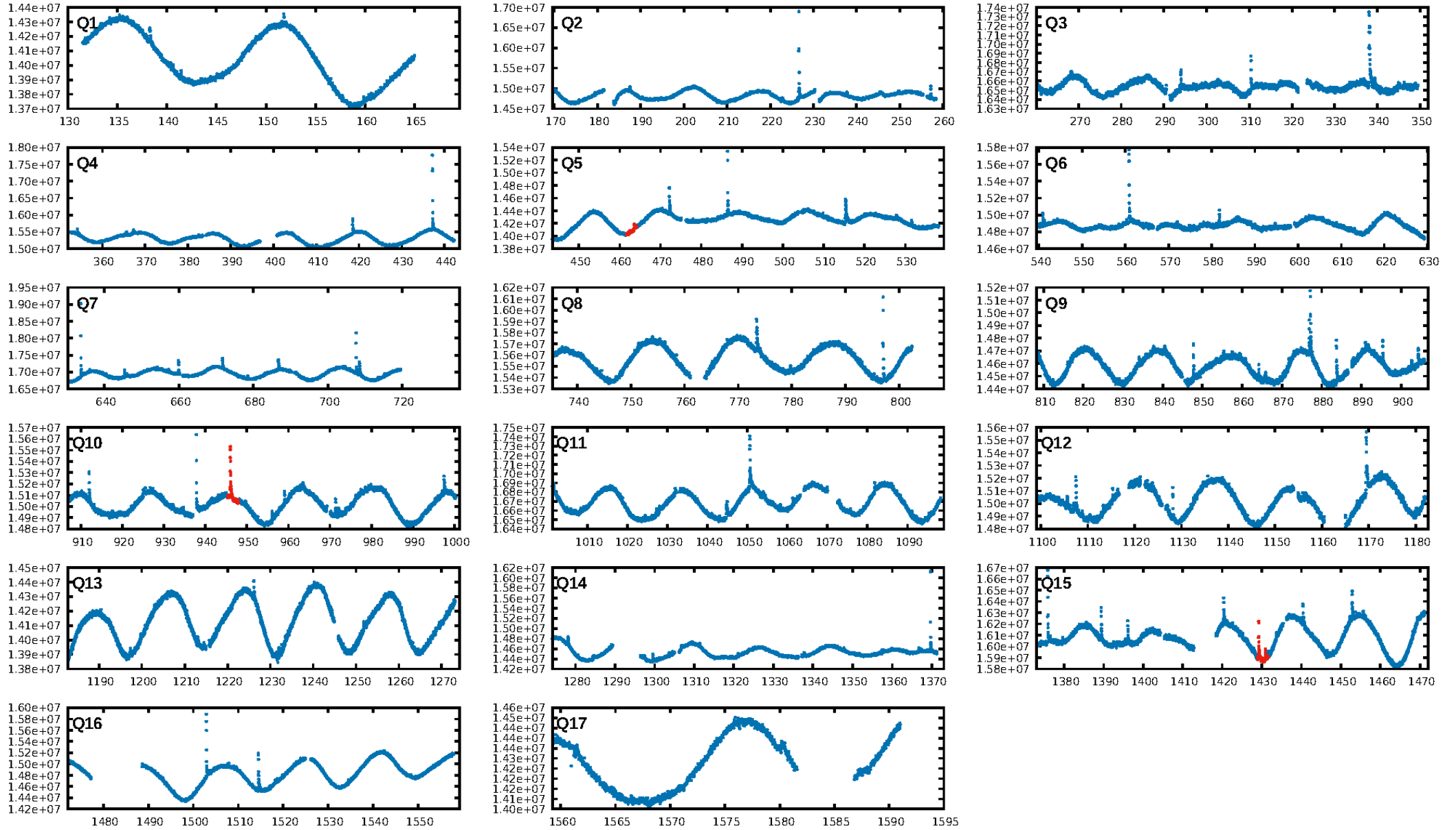
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [24.95 $\sigma$ ]  
ModelChiSquare2-sig: 22.2%  
ModelChiSquareGof-sig: 99.3%  
**Bootstrap-pfa: 2.87e-12**  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: -8.229  
Centroid-sig: 92.8%  
Centroid-so: 0.364 arcsec [0.63 $\sigma$ ]  
**OotOffset-rm: 1.086 arcsec [3.29 $\sigma$ ]**  
**KicOffset-rm: 1.109 arcsec [3.28 $\sigma$ ]**  
OotOffset-st: 1/1/0/1 [3]  
KicOffset-st: 1/1/0/1 [3]  
DiffImageQuality-fgm: 0.67 [2/3]  
DiffImageOverlap-fno: 1.00 [3/3]

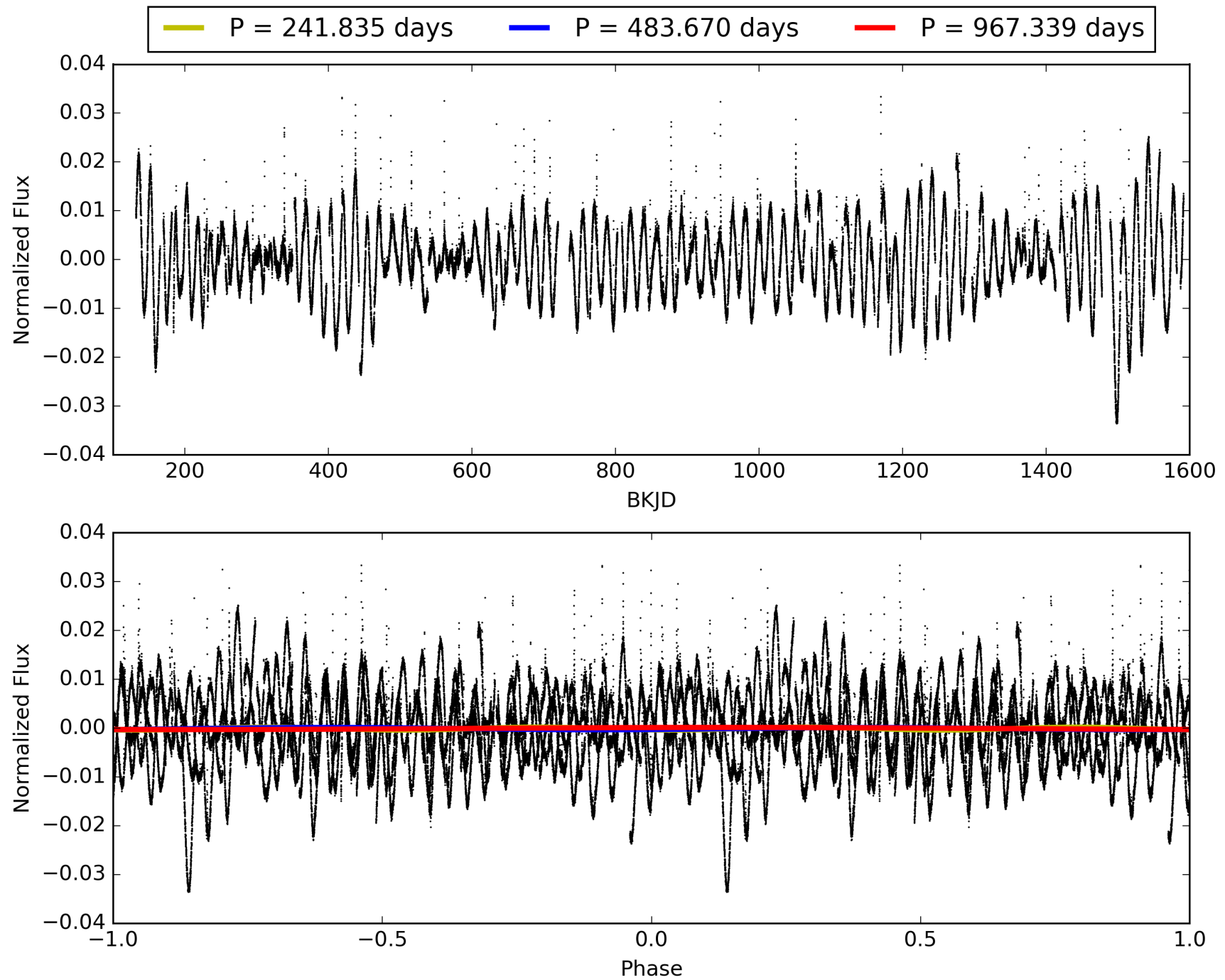
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 14:50:05 Z

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

# TCE 009570305-01, PDC Light Curves

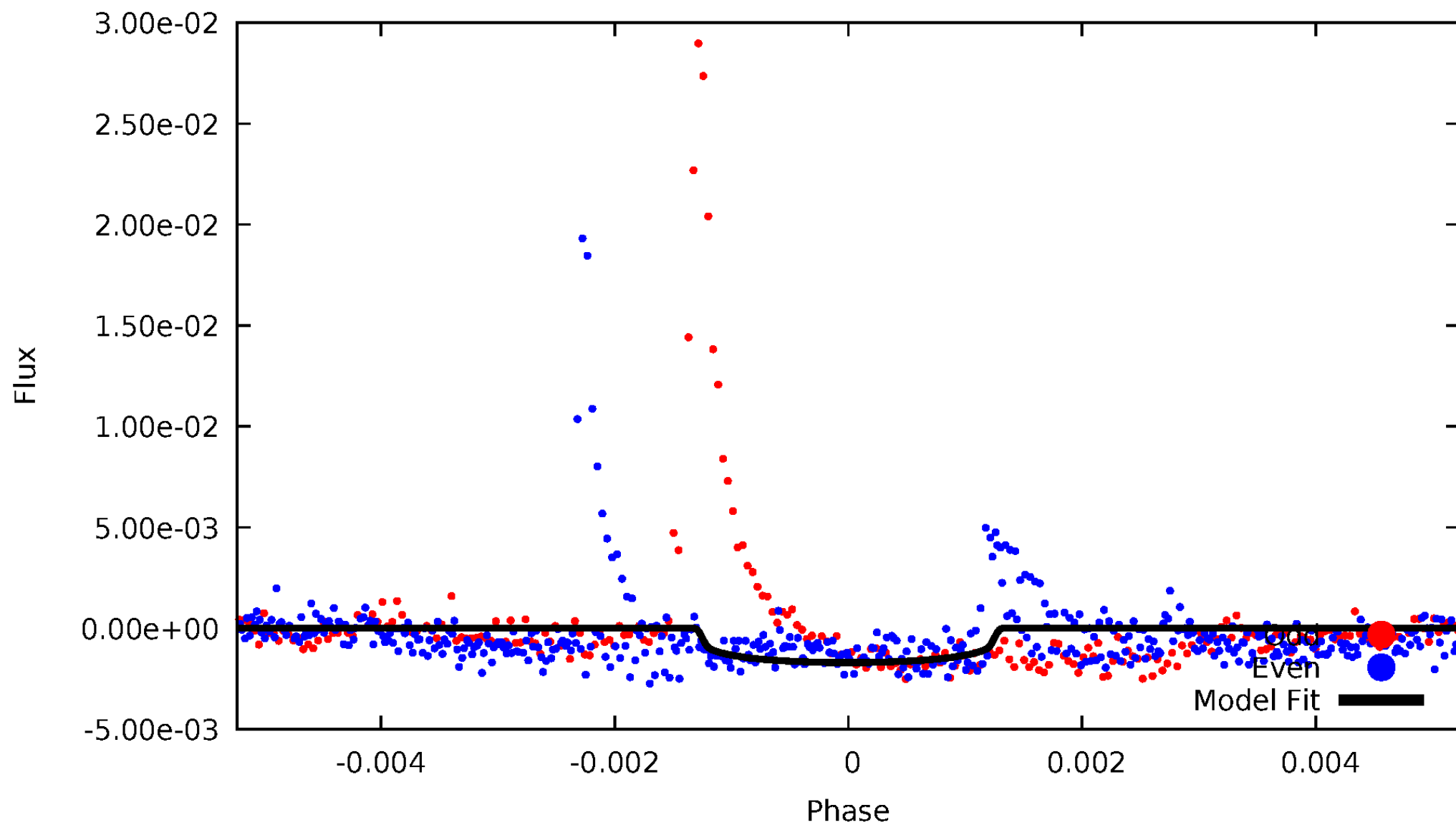


TCE 009570305-01



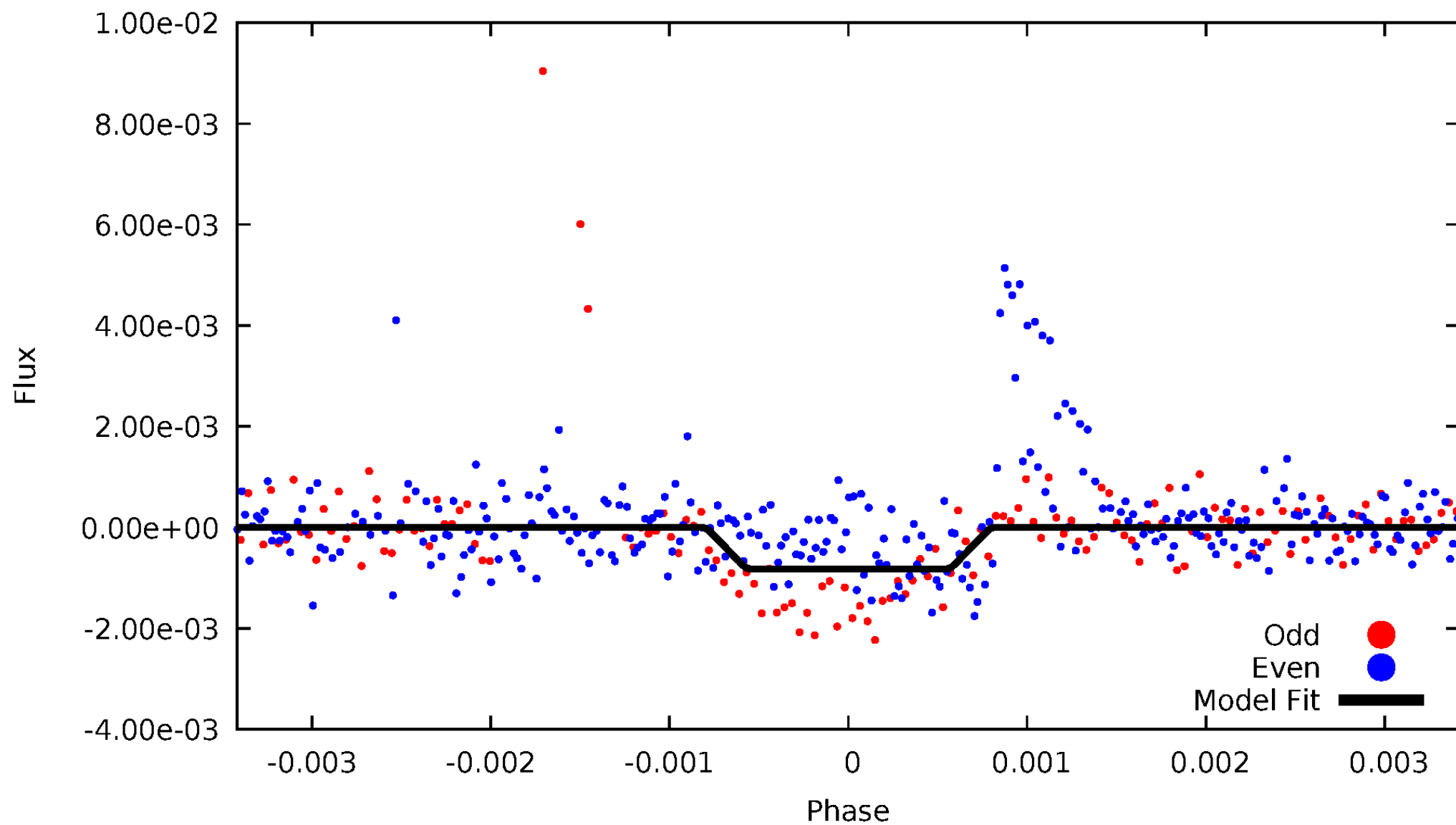
# DV Odd/Even

TCE 009570305-01



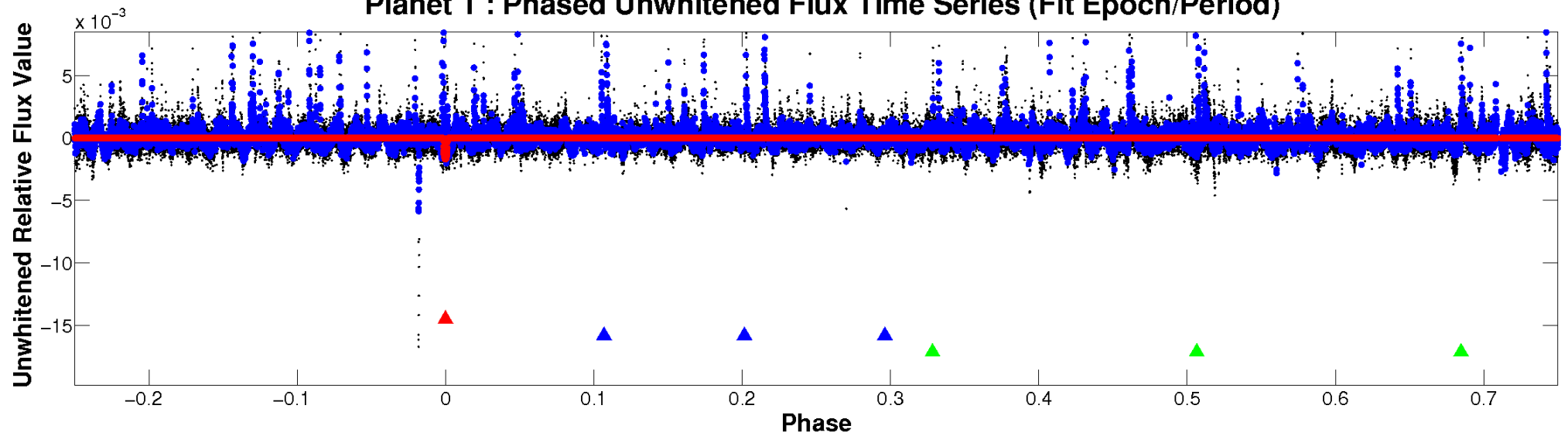
# ALT Odd/Even

TCE 009570305-01

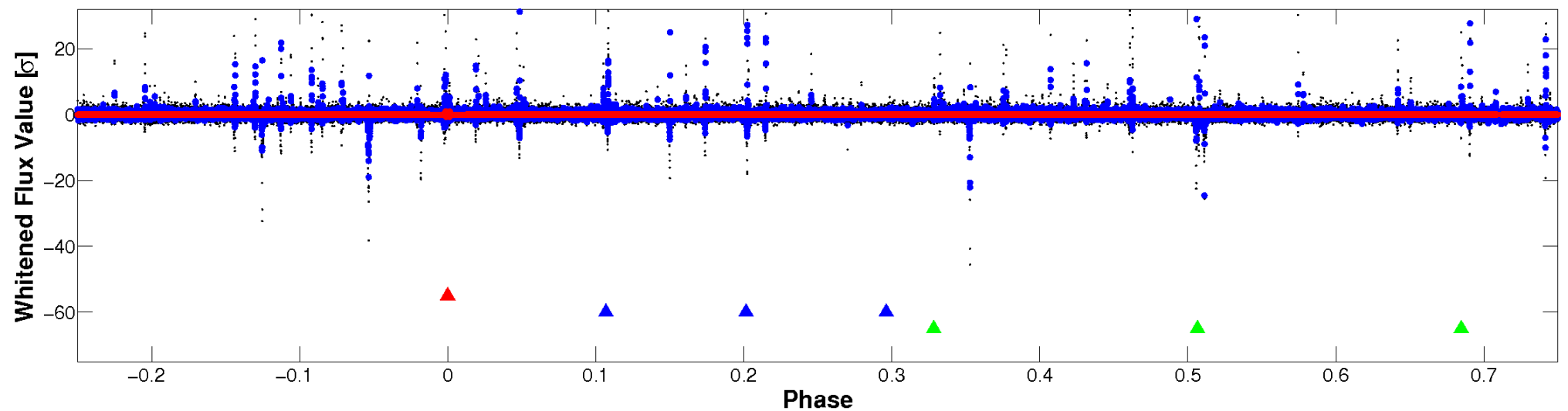


# Non-Whitened Vs. Whitened Light Curve

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

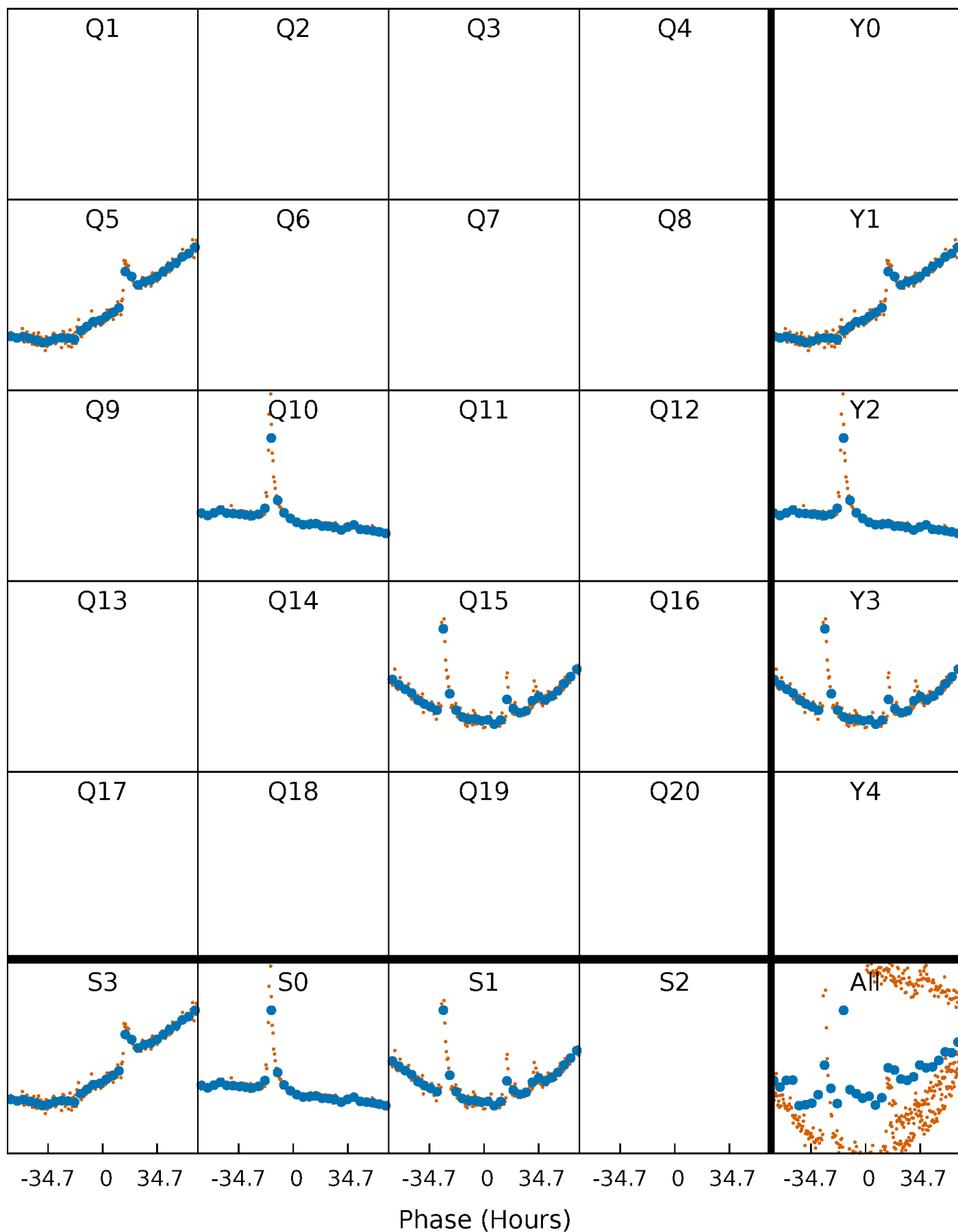


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

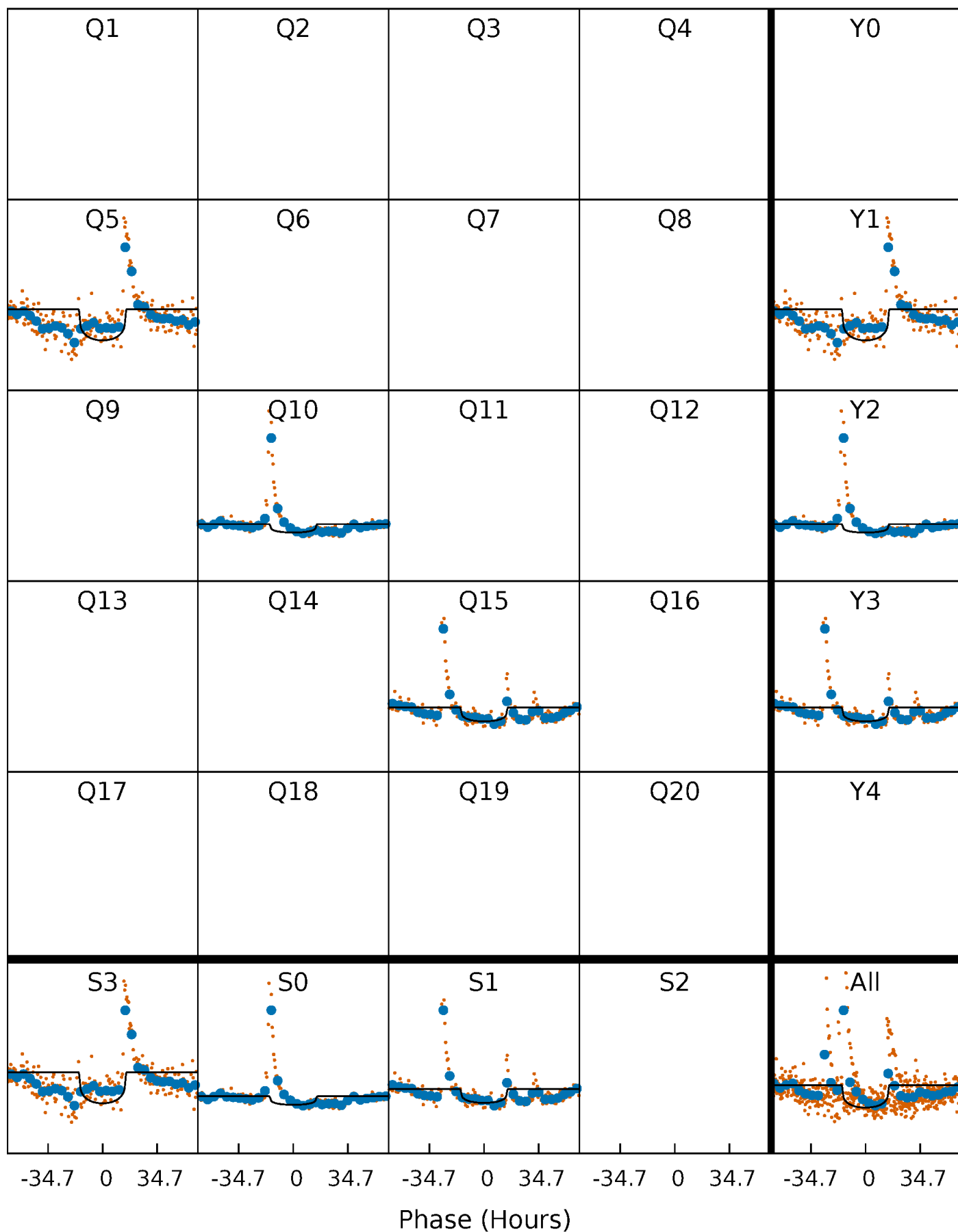
TCE 009570305-01 P=483.669658 Days  $T_0=462.948434$  (BKJD)





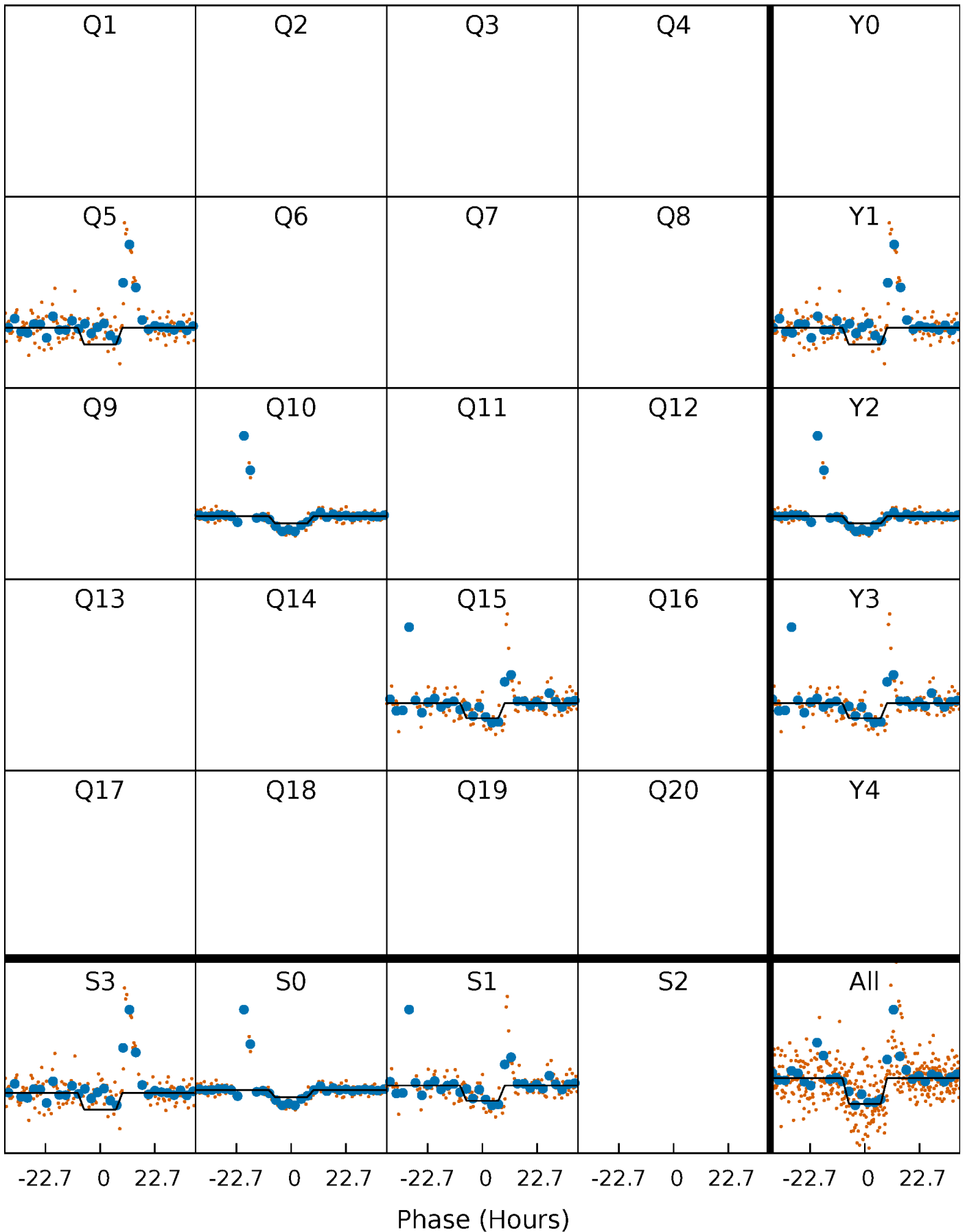
# DV Quarter-Phased Transit Curves

TCE 009570305-01     $P=483.669658$  Days     $T_0=462.948434$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

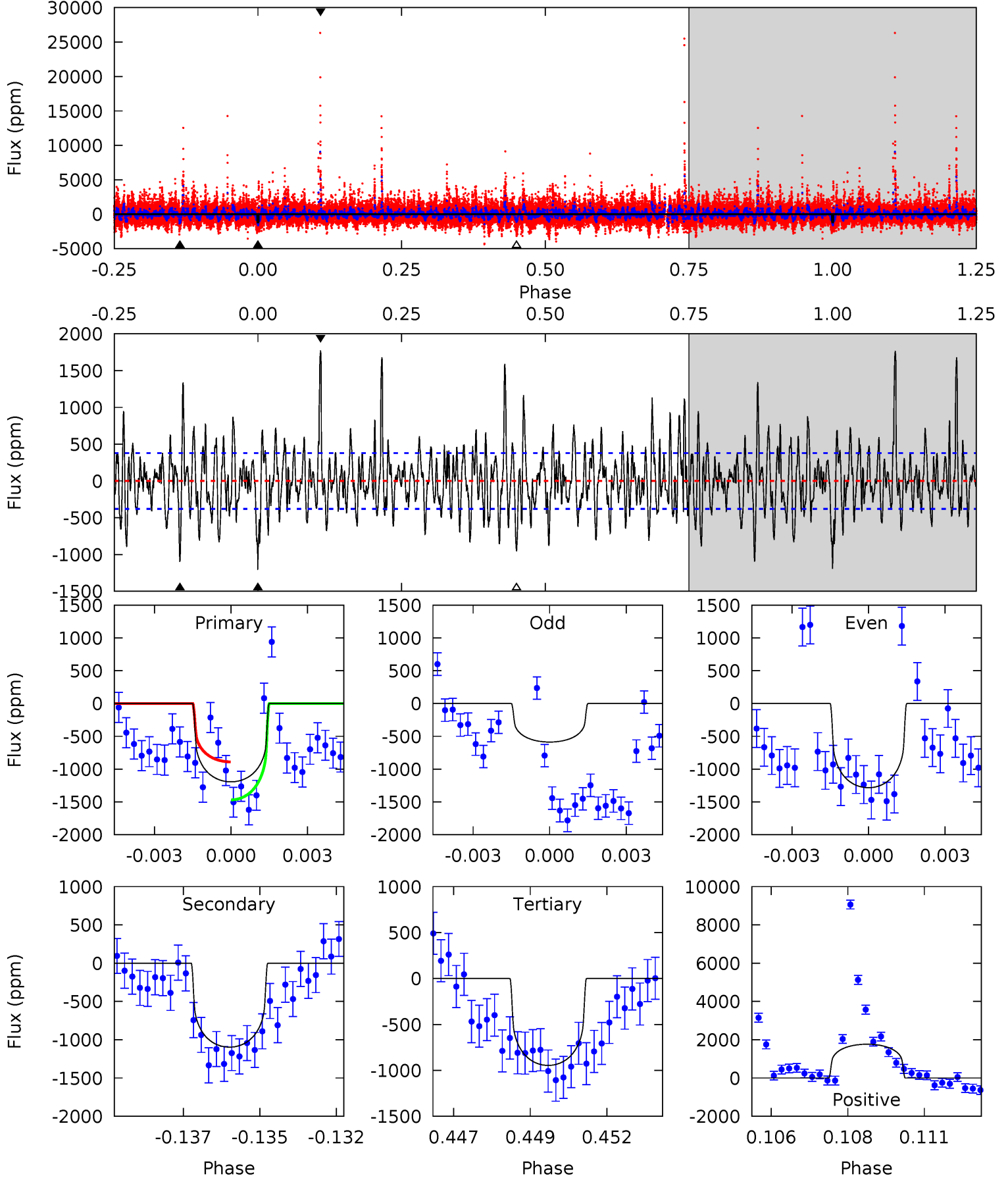
TCE 009570305-01 P=483.689610 Days  $T_0=463.093564$  (BKJD)



# DV Model-Shift Uniqueness Test

009570305-01, P = 483.669658 Days, E = 462.948434 Days

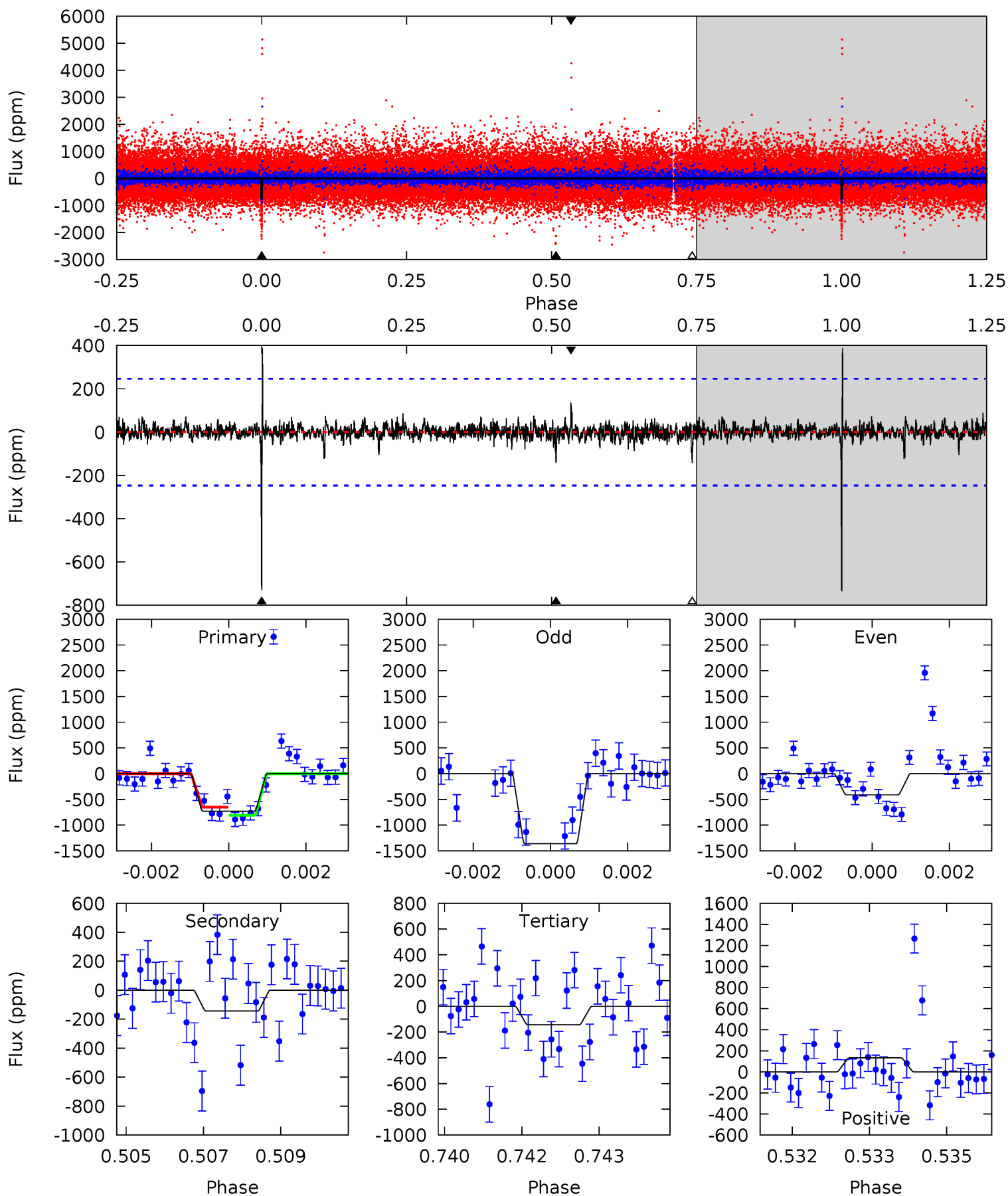
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
16.6	15.3	13.2	24.5	5.28	3.01	5.09	3.45	-7.95	2.10	-9.30	3.18	0.71	0.60	4.01



# Alt Model-Shift Uniqueness Test

009570305-01, P = 483.689610 Days, E = 463.093564 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
15.9	3.12	3.11	2.88	5.36	3.15	0.48	12.8	13.0	0.01	0.23	9.55	1.03	0.35	1.67



### Stellar Parameters For KIC 009570305

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5349^{+169}_{-169}$	$4.505^{+0.105}_{-0.095}$	$-0.400^{+0.350}_{-0.300}$	$0.790^{+0.109}_{-0.109}$	$0.728^{+0.107}_{-0.046}$	$2.081^{+0.900}_{-0.577}$
	+3%/-3%	+2%/-2%	+87%/-75%	+14%/-14%	+15%/-6%	+43%/-28%
Source	PHO1	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 009570305-01 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-1097 \pm 72$	$3.26^{+0.56}_{-0.51}$	$281^{+14}_{-13}$	$5066^{+439}_{-318}$	$68326^{+29788}_{-17894}$
Alt.	$-143 \pm 46$	$2.49^{+0.55}_{-0.52}$	$280^{+14}_{-13}$	$3811^{+357}_{-344}$	$15190^{+10461}_{-6594}$

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

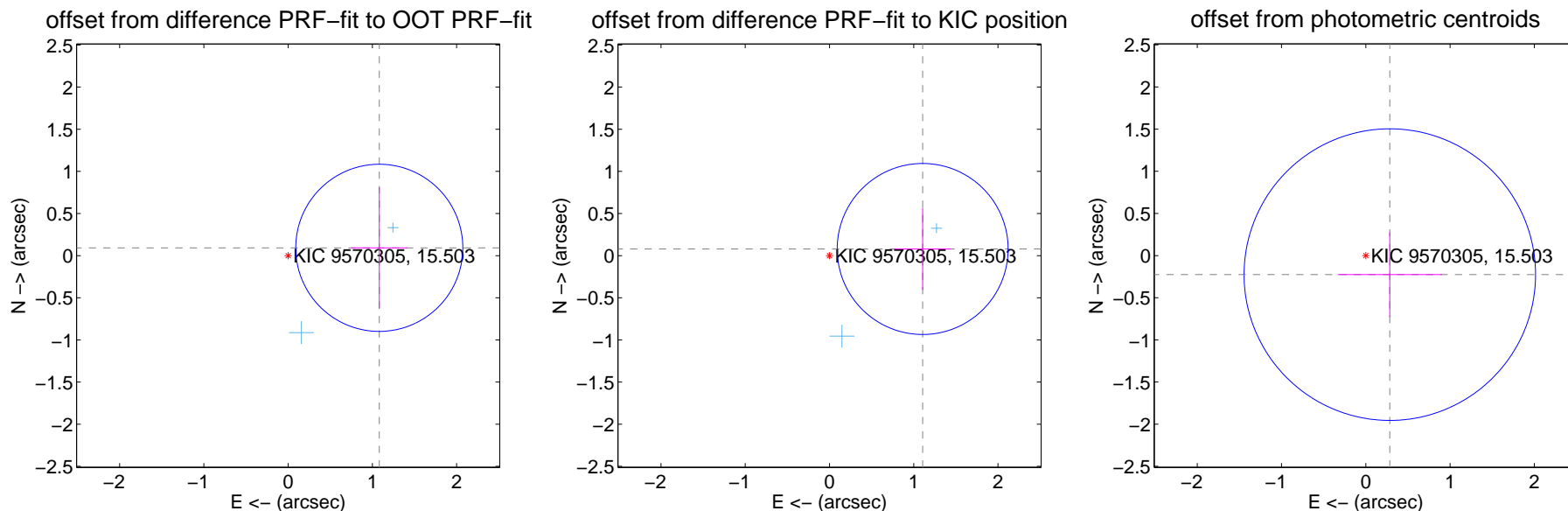
## DV Centroid Data

Supplemental centroid analysis for 009570305-01. Kepler magnitude: 15.50. Transit SNR 8.40

There are 2 quarters with good PRF difference image offsets

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

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.086 \pm 0.331$	3.29	$-1.082 \pm 0.333$	$0.093 \pm 0.719$
PRF-fit source offset from KIC position	$1.109 \pm 0.338$	3.28	$-1.106 \pm 0.337$	$0.079 \pm 0.486$
photometric centroid source offset	$0.36 \pm 0.58$	0.63	$-0.29 \pm 0.62$	$-0.23 \pm 0.50$

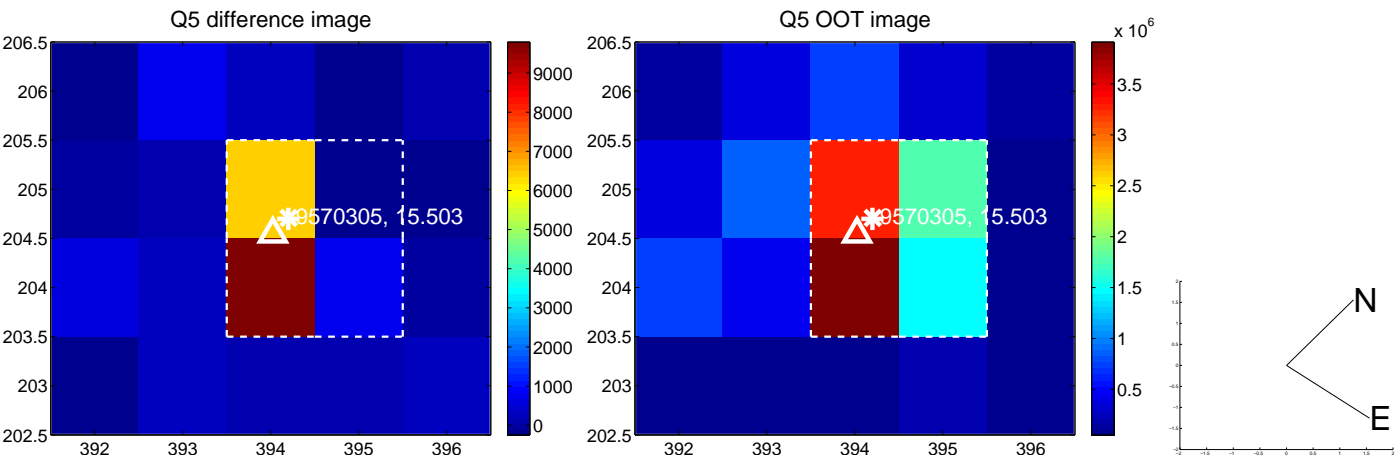


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

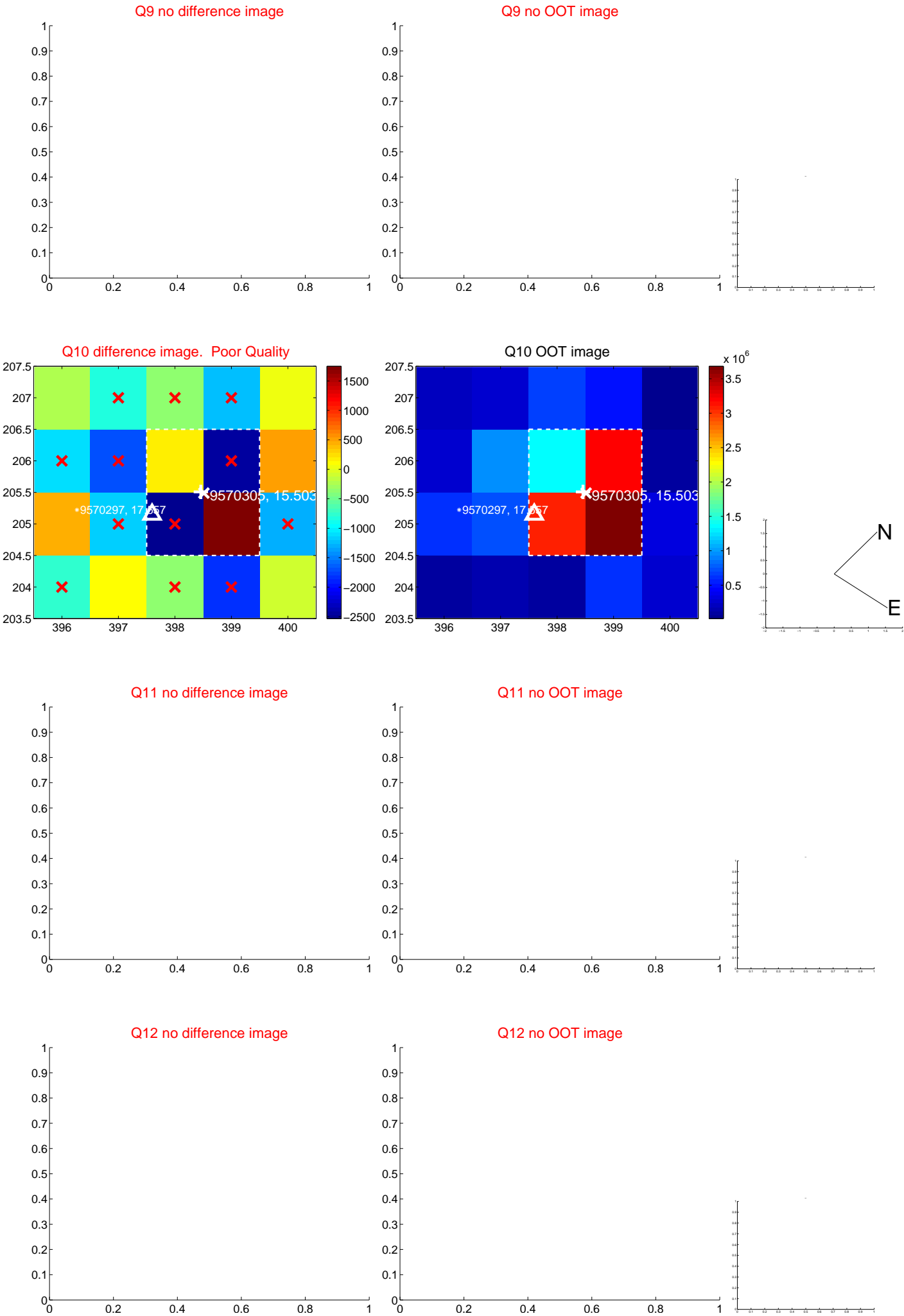


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

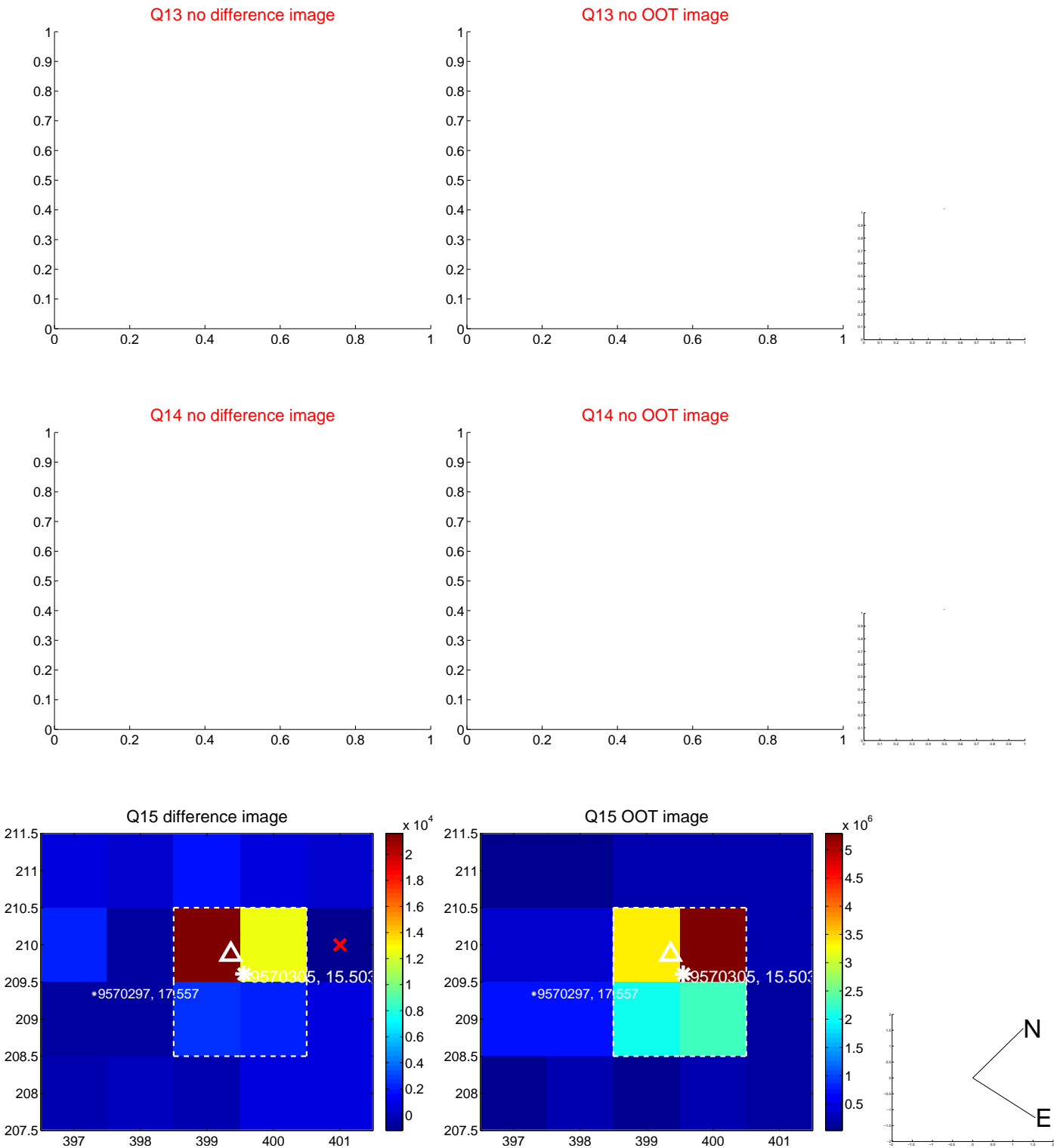




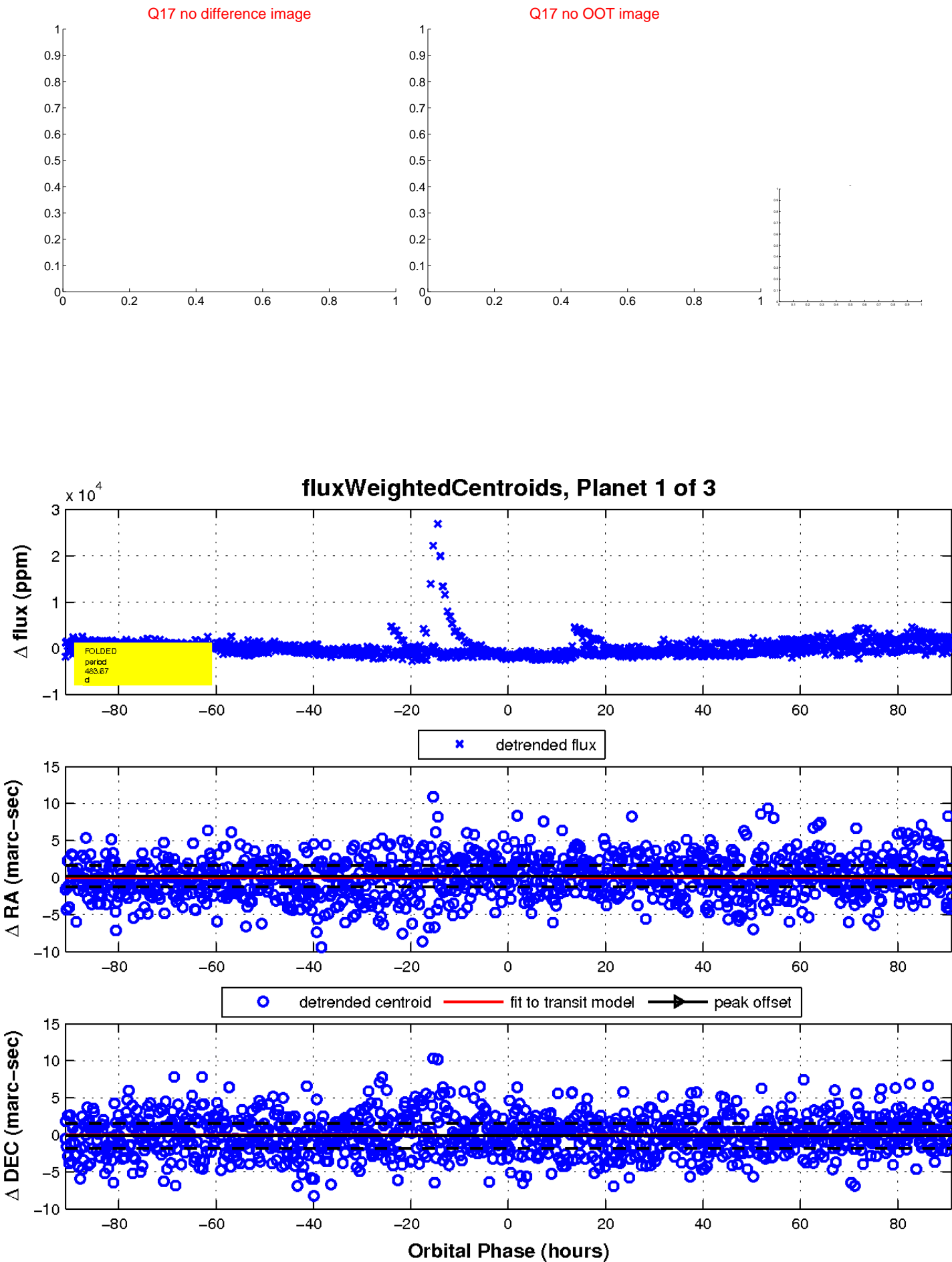
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

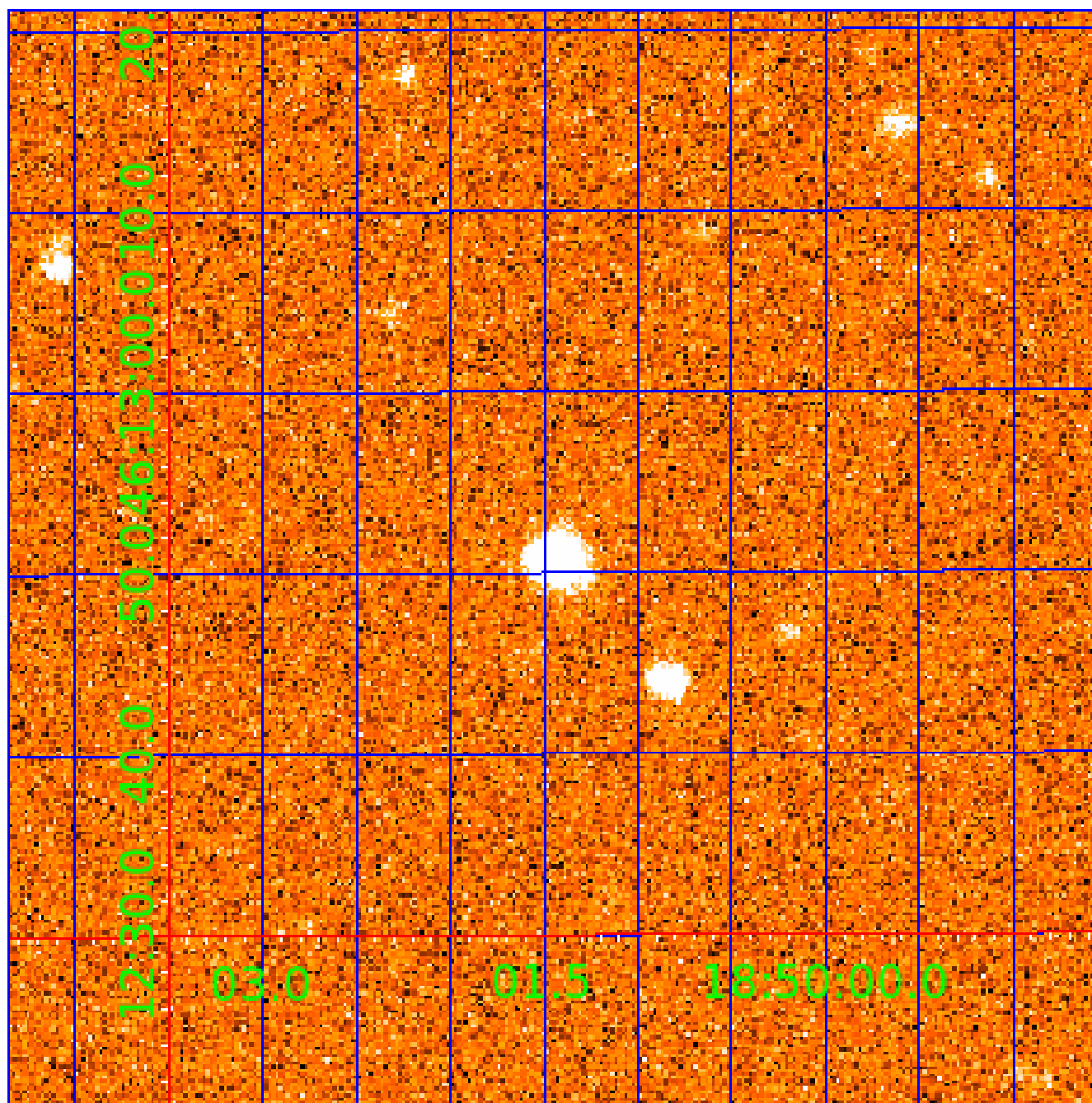


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



# UKIRT Image

Declination



# KIC 009570305

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009570305-01	OBS	No	483.669658	462.948434	1699.8	30.350	12.7	8.4	0.79	5349	3.24	0.39
009570305-02	OBS	No	529.463829	514.641731	1505.1	31.930	17.6	7.2	0.79	5349	3.30	0.34
009570305-03	OBS	No	569.843941	138.102414	1906.2	7.101	11.6	10.6	0.79	5349	3.47	0.31

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009570305-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_SKYE—LPP_DV—MOD_NONUNIQ_DV—MOD_POS_DV—CENT_FEW_DIFFS
009570305-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE_ZUMA—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009570305-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_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.

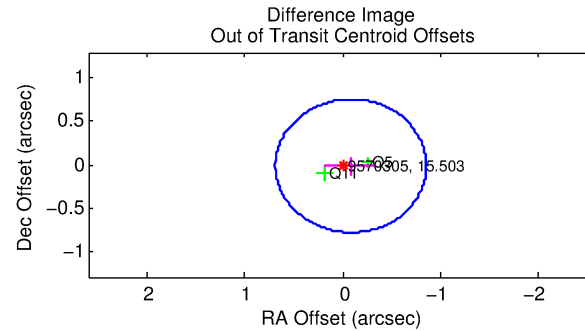
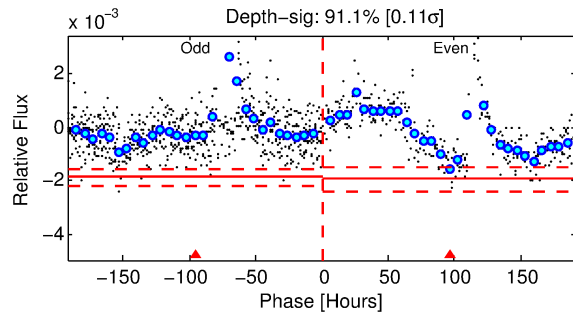
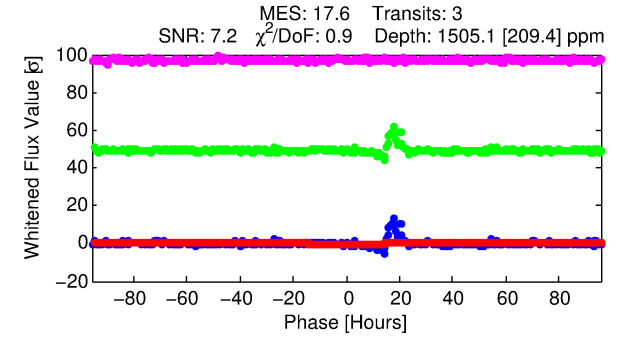
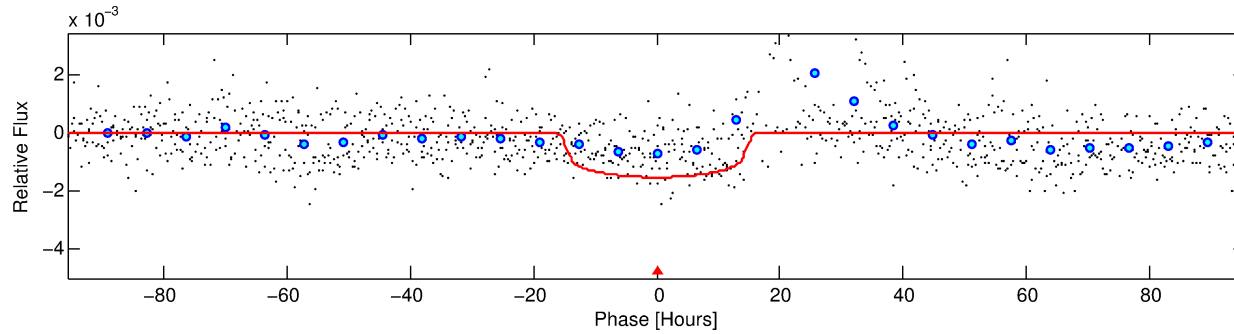
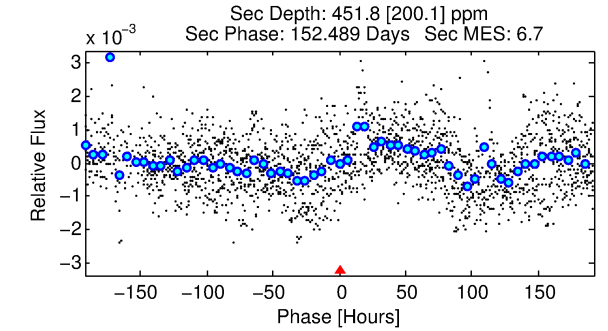
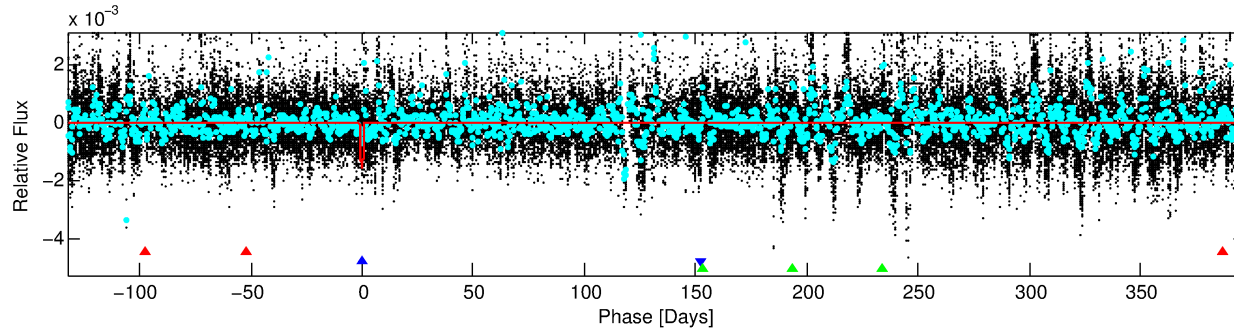
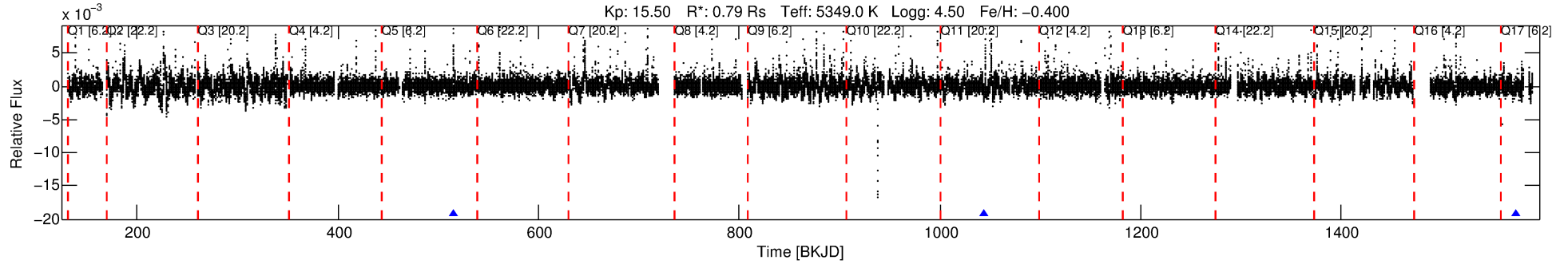
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 009570305-02

No Significant Match Found

# DV One-Page Summary

KIC: 9570305 Candidate: 2 of 3 Period: 529.464 d



## DV Fit Results:

Period = 529.46383 [0.01827] d  
Epoch = 514.6417 [0.0209] BKJD  
Rp/R\* = 0.0383 [0.0039]  
a/R\* = 94.00 [25.19]  
b = 0.73 [0.18]  
Seff = 0.34 [0.08]  
Teq = 195 [11] K  
Rp = 3.30 [0.57] Re  
a = 1.1526 [0.1410] AU  
Ag = 30332.89 [15818.69] [1.92 $\sigma$ ]  
Teffp = 3986 [502] K [7.55 $\sigma$ ]

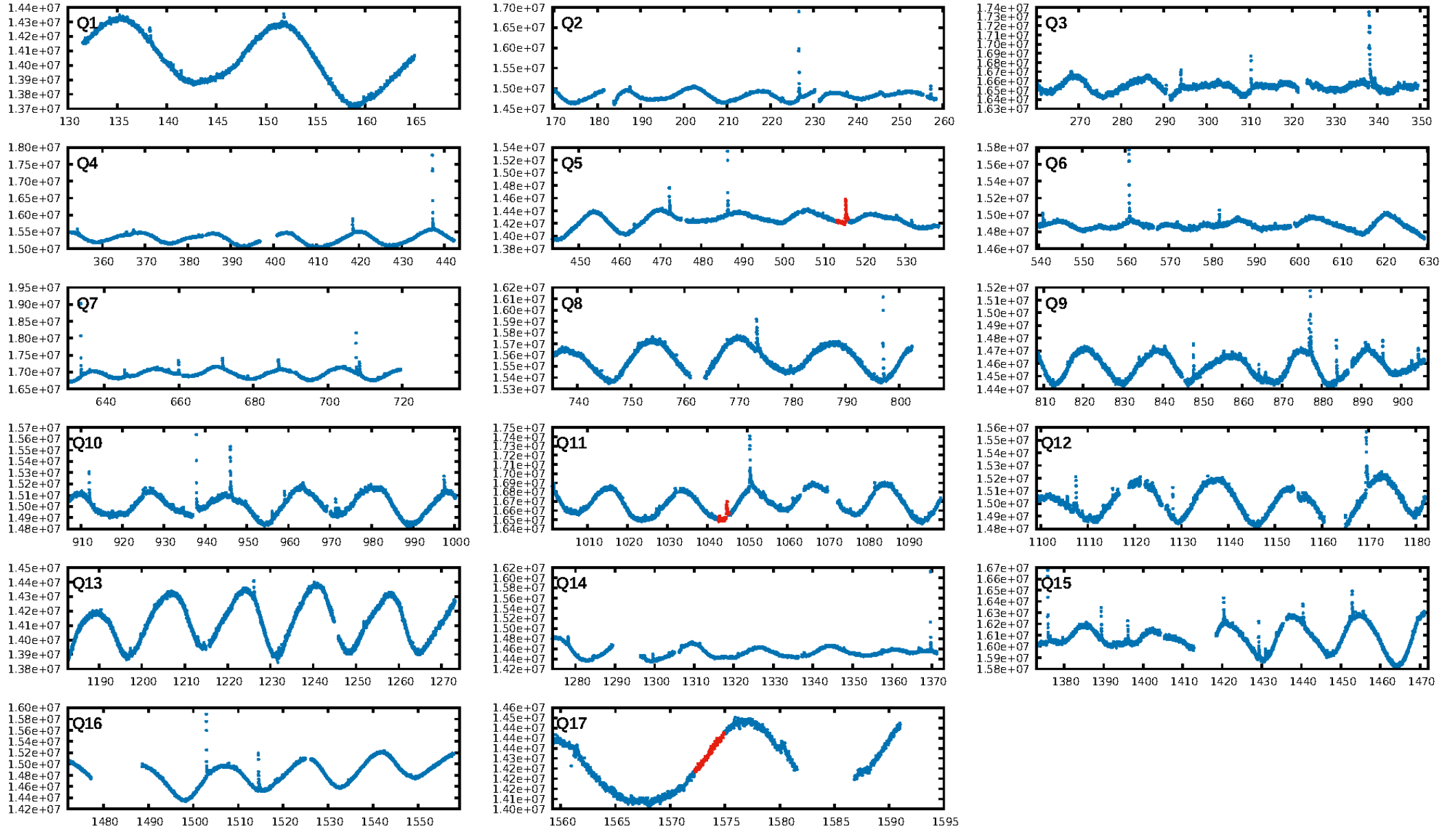
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [24.95 $\sigma$ ]  
LongPeriod-sig: 100.0% [29.63 $\sigma$ ]  
ModelChiSquare2-sig: 0.5%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 1.35e-19  
RollingBand-fgt: 1.00 [2/2]  
GhostDiagnostic-chr: 7.927  
Centroid-sig: 41.6%  
Centroid-so: 0.554 arcsec [0.86 $\sigma$ ]  
OotOffset-rm: 0.084 arcsec [0.33 $\sigma$ ]  
OotOffset-st: 0/1/0/1 [2]  
KicOffset-rm: 0.026 arcsec [0.16 $\sigma$ ]  
KicOffset-st: 0/1/0/1 [2]  
DiffImageQuality-fgm: 1.00 [2/2]  
DiffImageOverlap-fno: 1.00 [3/3]

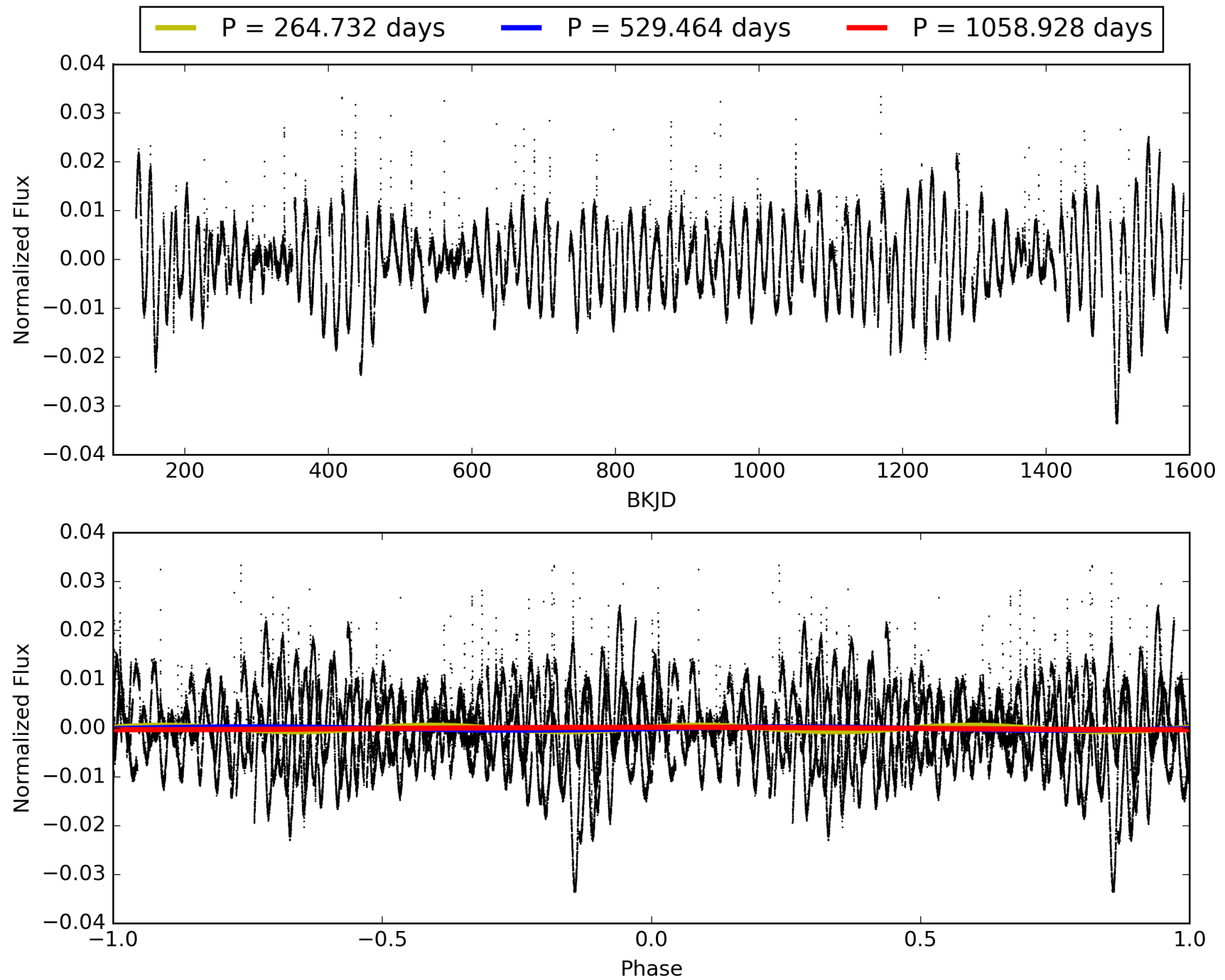
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 14:50:14 Z

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

# TCE 009570305-02, PDC Light Curves



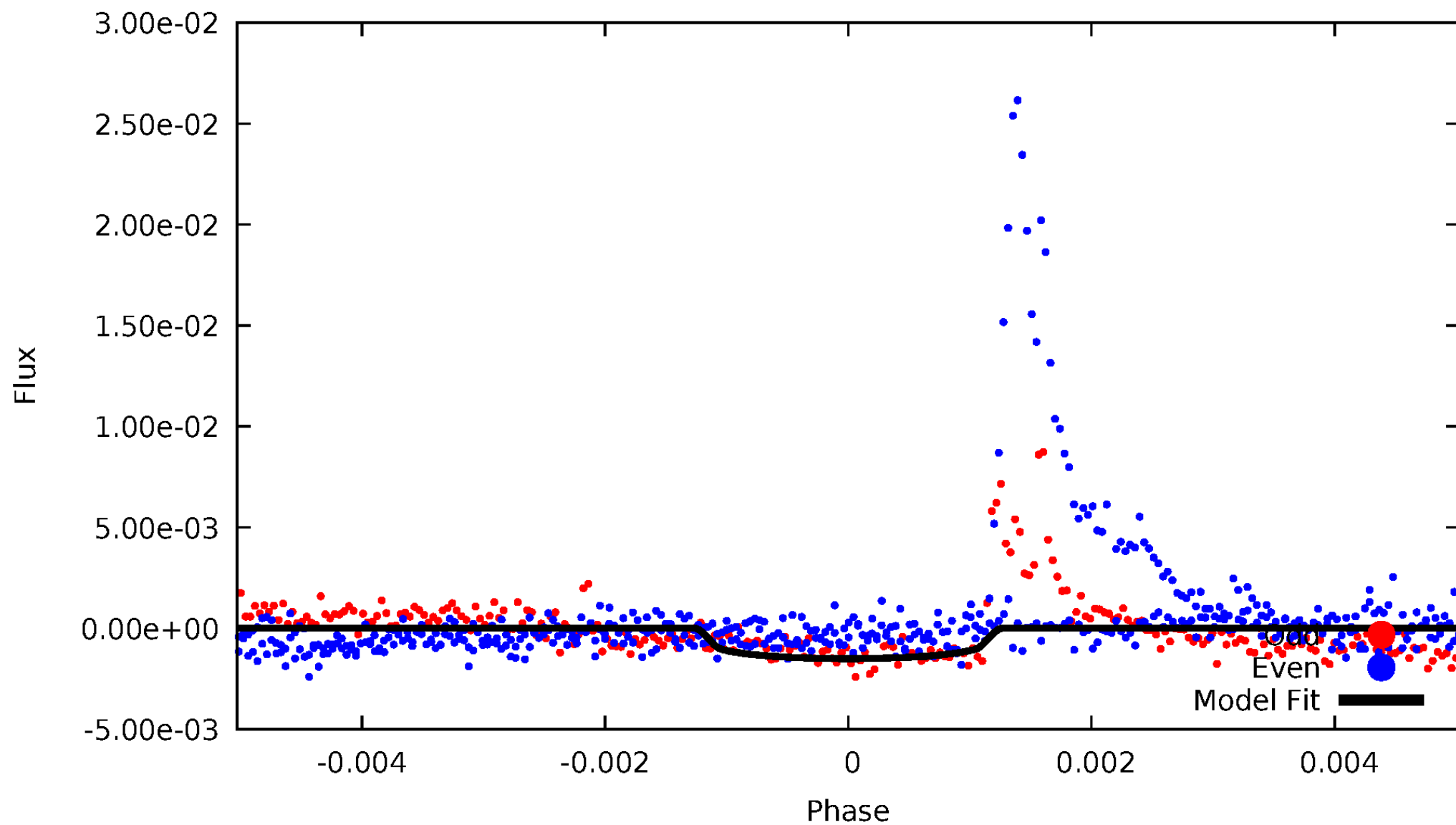
# TCE 009570305-02





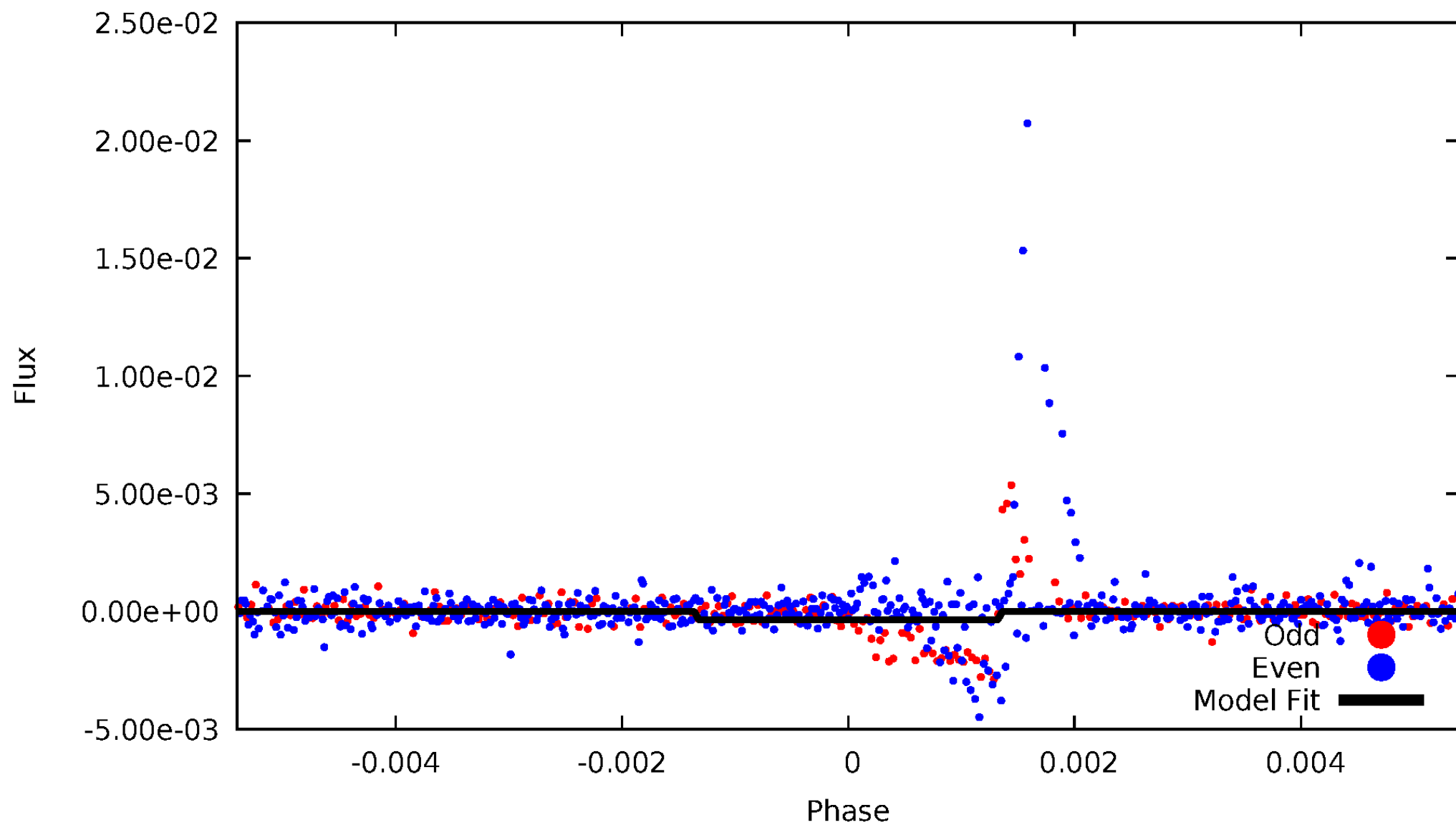
# DV Odd/Even

TCE 009570305-02



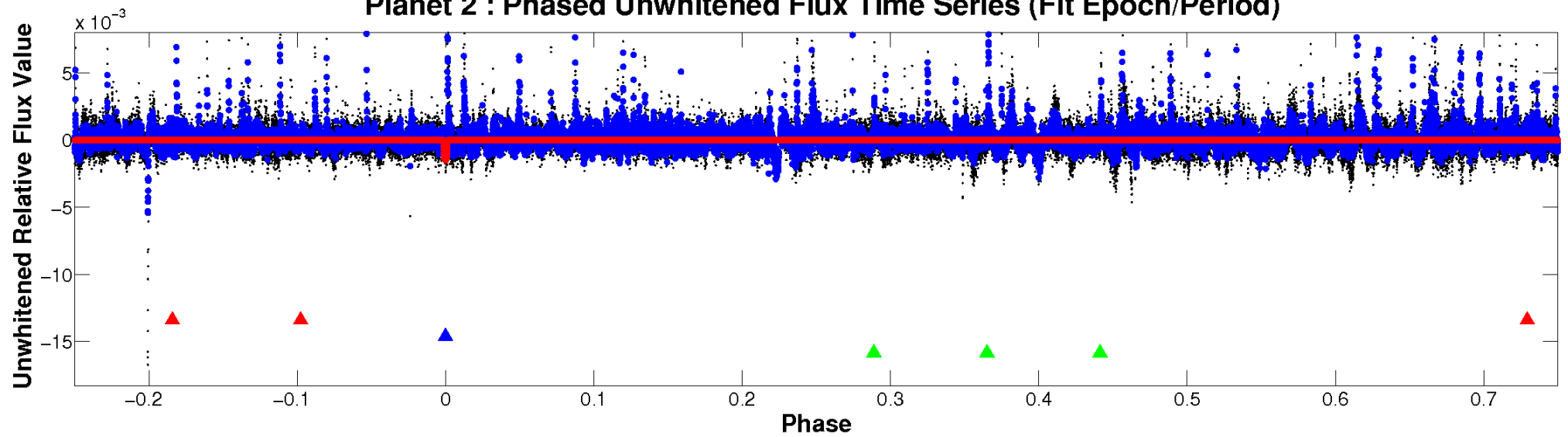
# ALT Odd/Even

TCE 009570305-02

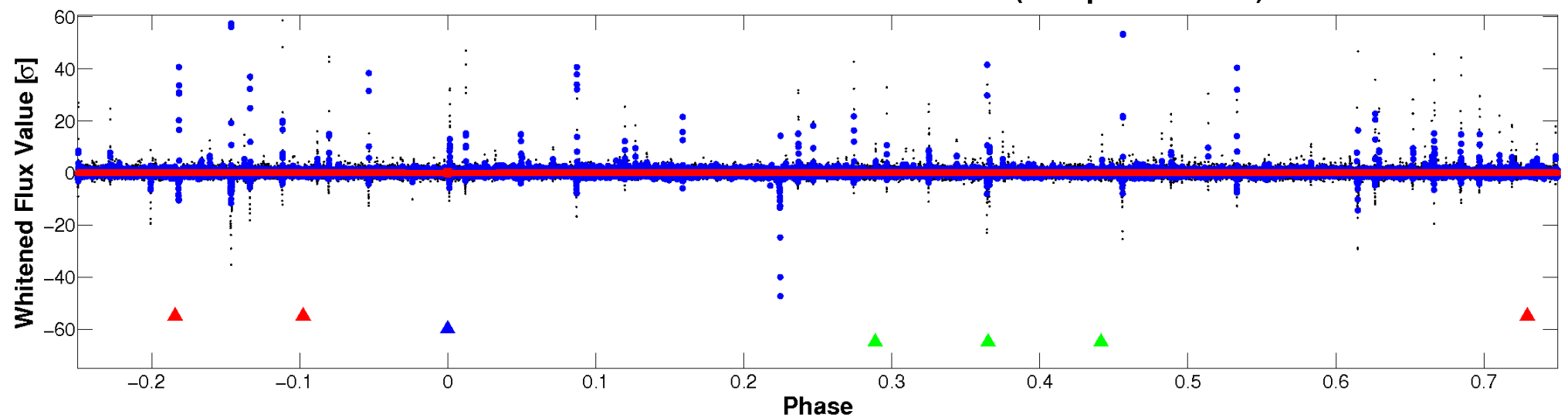


# Non-Whitened Vs. Whitened Light Curve

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

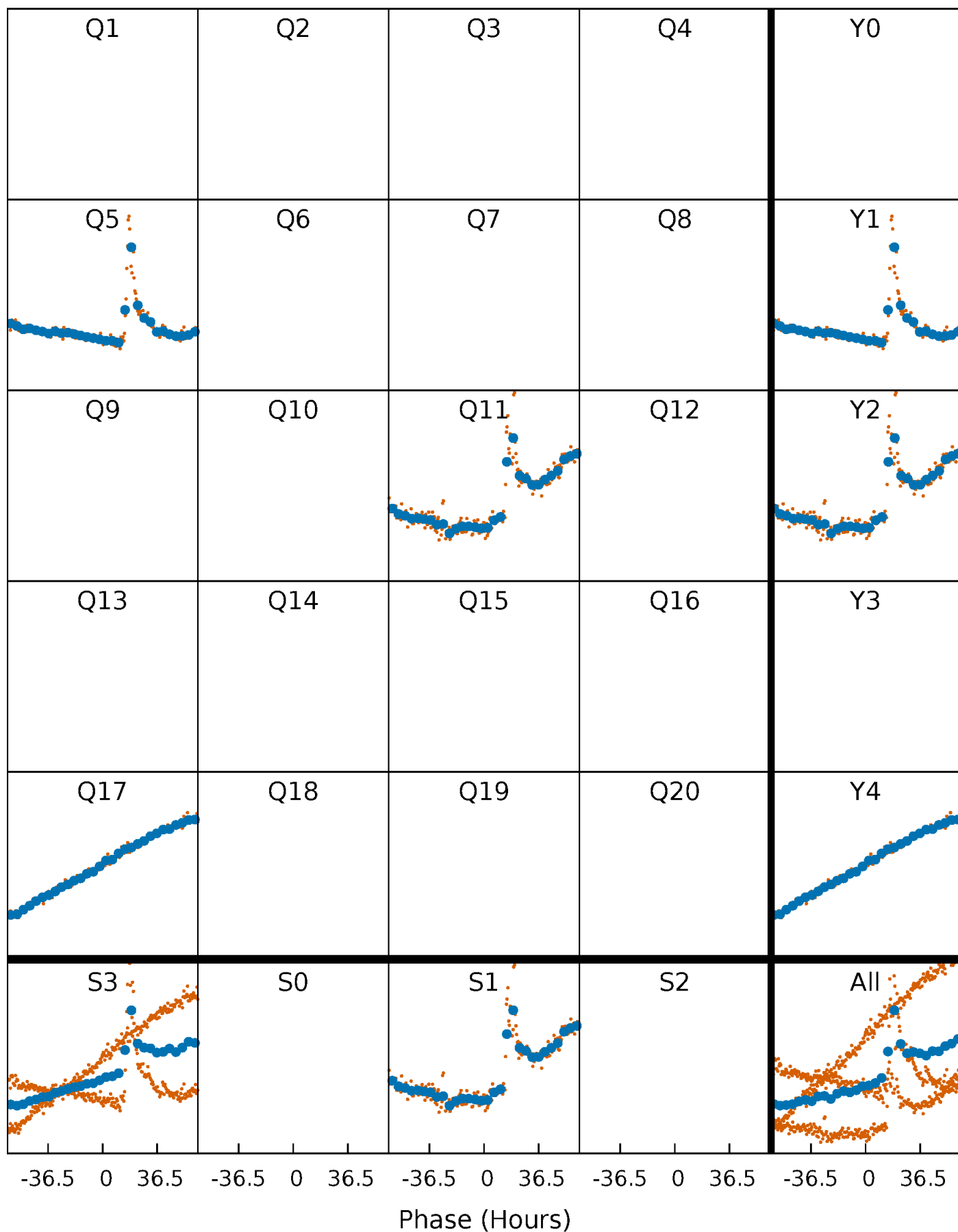


**Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



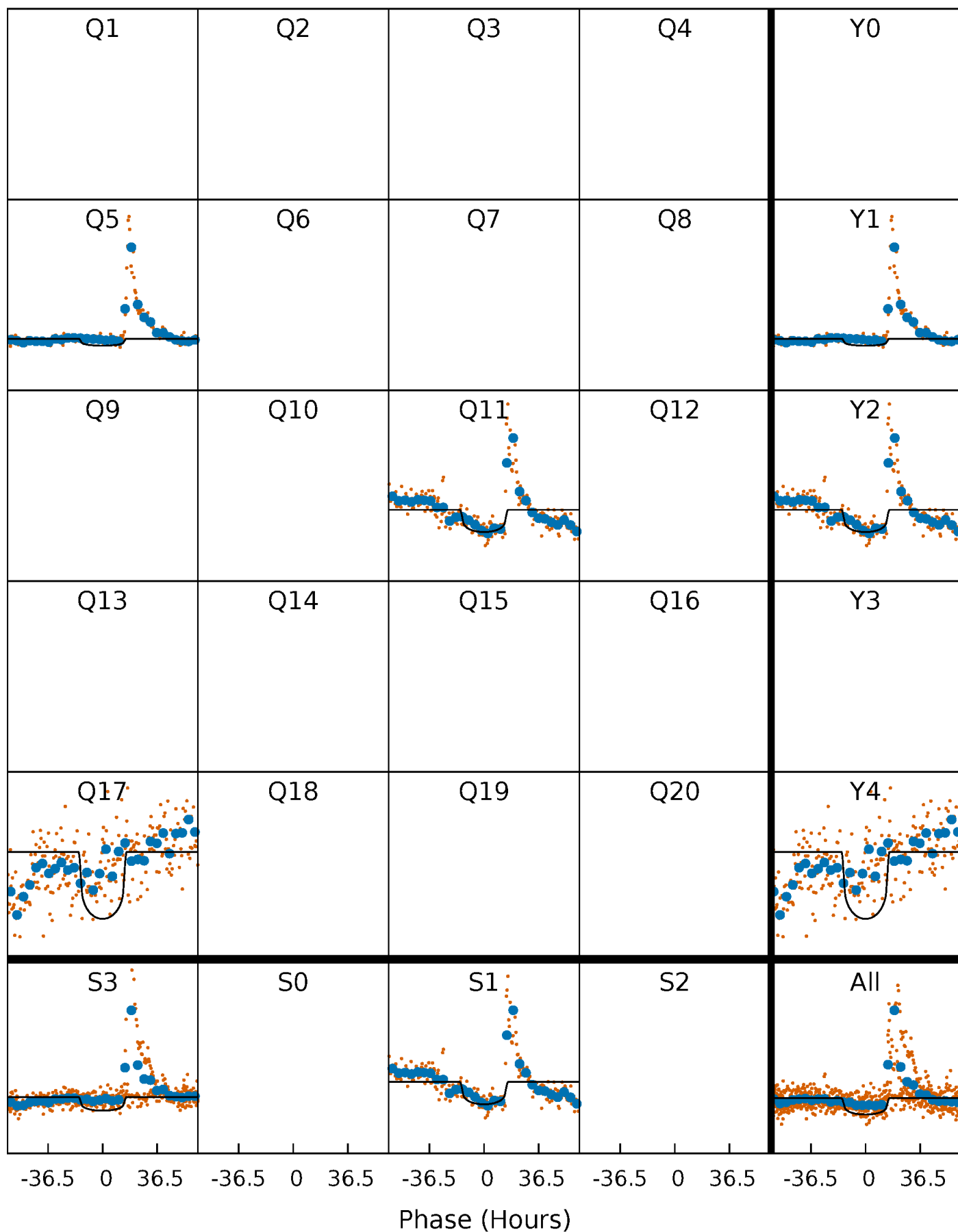
# PDC Quarter-Phased Transit Curves

TCE 009570305-02     $P=529.463829$  Days     $T_0=514.641731$  (BKJD)



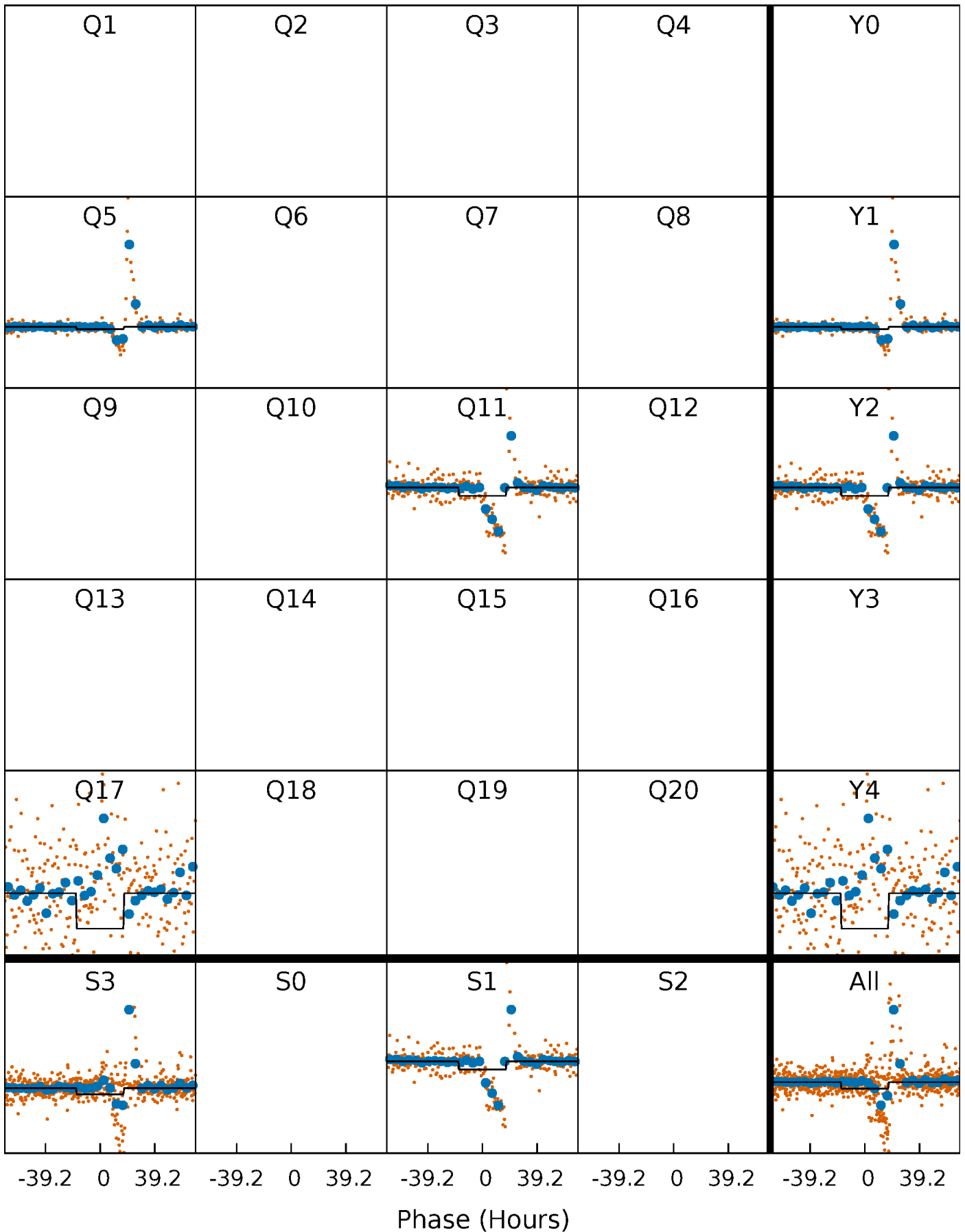
# DV Quarter-Phased Transit Curves

TCE 009570305-02     $P=529.463829$  Days     $T_0=514.641731$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

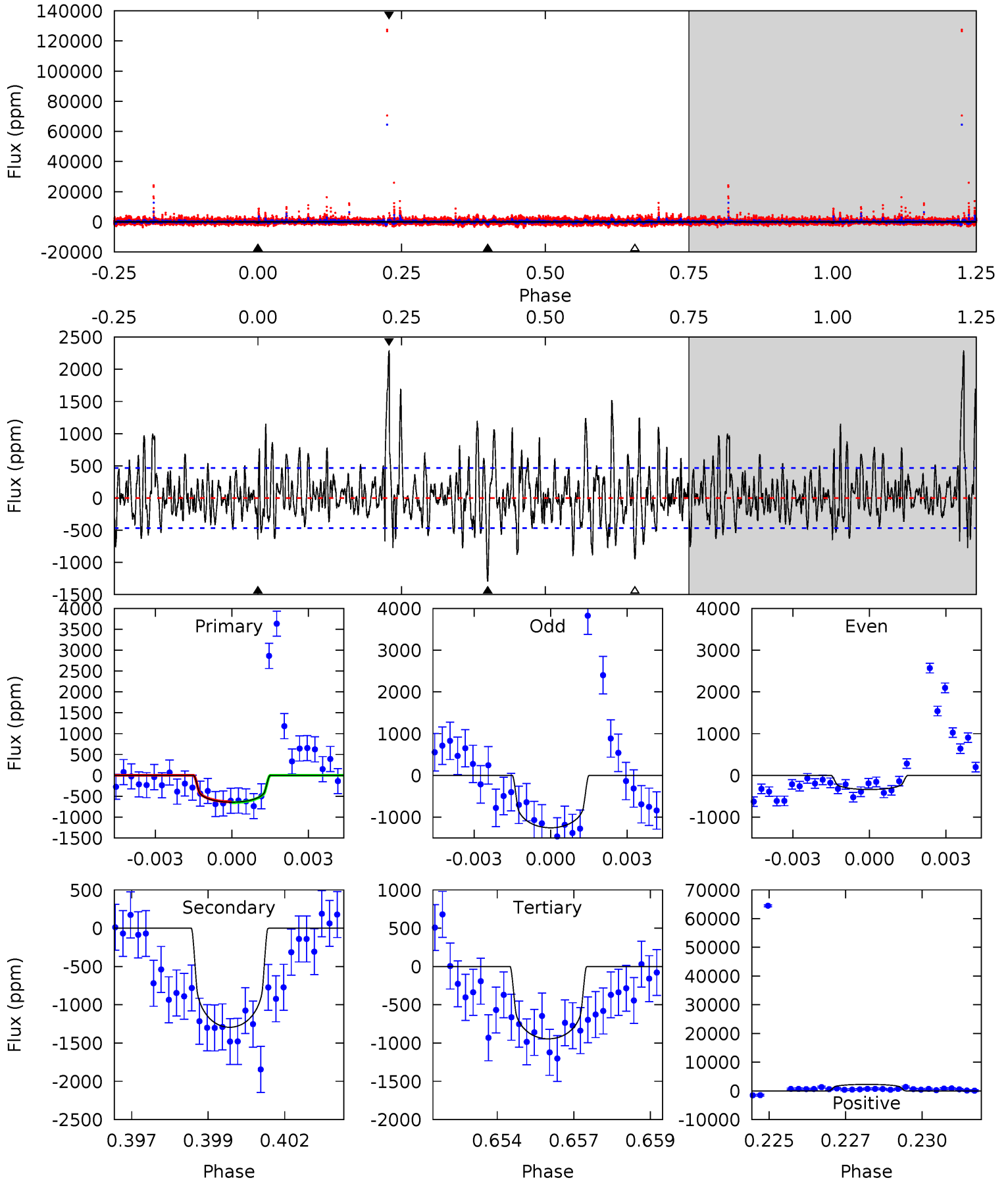
TCE 009570305-02     $P=529.488029$  Days     $T_0=514.520223$  (BKJD)



# DV Model-Shift Uniqueness Test

009570305-02, P = 529.463829 Days, E = 514.641731 Days

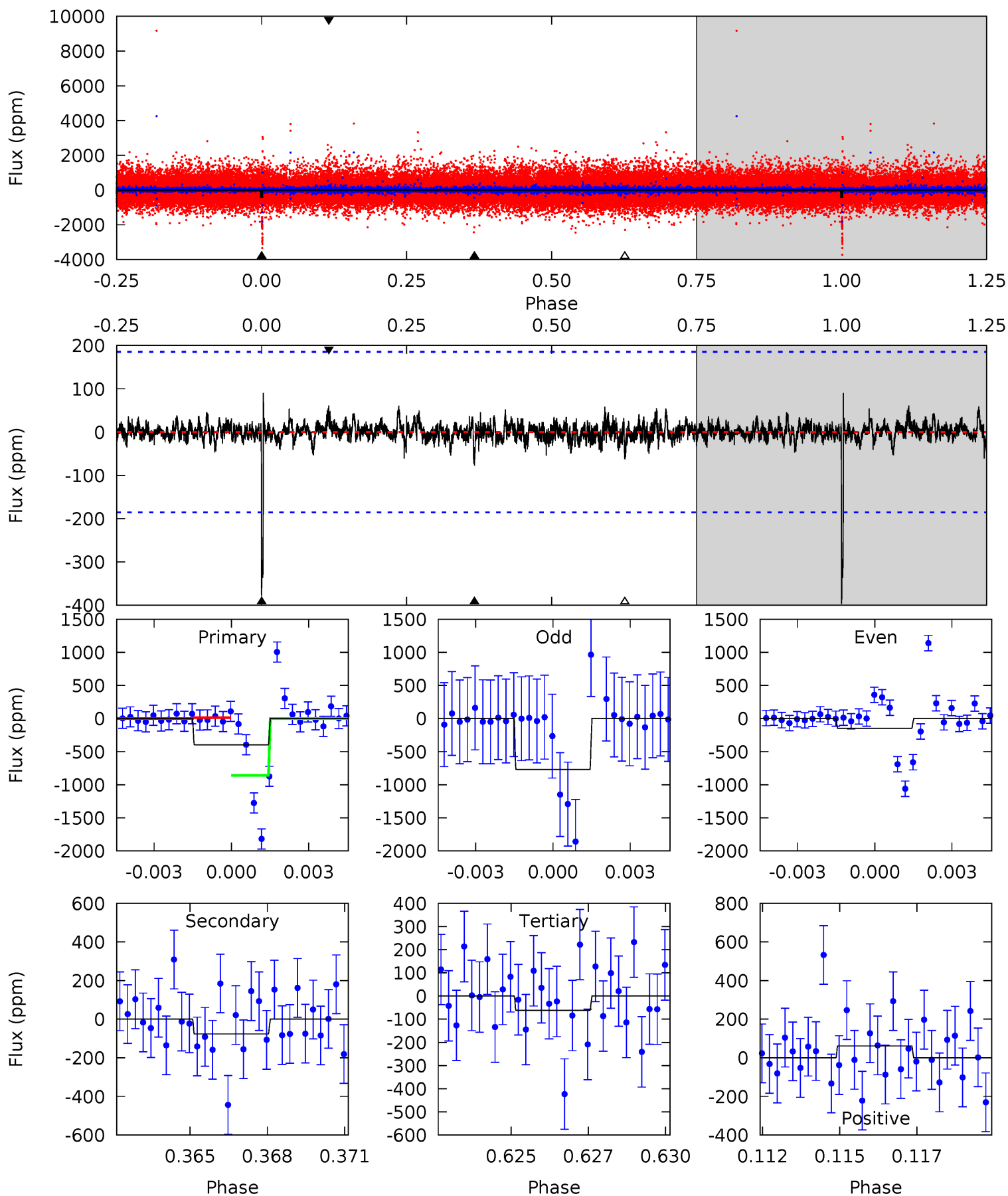
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
7.27	14.6	10.7	25.8	5.28	3.02	4.17	-3.43	-18.6	3.94	-11.2	4.44	1.40	0.64	0.10



# Alt Model-Shift Uniqueness Test

009570305-02, P = 529.488029 Days, E = 514.520223 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
11.3	2.17	1.77	1.75	5.27	3.00	0.43	9.52	9.53	0.41	0.43	8.44	0.63	0.19	12.0





### Stellar Parameters For KIC 009570305

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5349^{+169}_{-169}$	$4.505^{+0.105}_{-0.095}$	$-0.400^{+0.350}_{-0.300}$	$0.790^{+0.109}_{-0.109}$	$0.728^{+0.107}_{-0.046}$	$2.081^{+0.900}_{-0.577}$
	+3%/-3%	+2%/-2%	+87%/-75%	+14%/-14%	+15%/-6%	+43%/-28%
Source	PHO1	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 009570305-02 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-1294 \pm 88$	$3.31^{+0.47}_{-0.38}$	$273^{+13}_{-14}$	$5205^{+289}_{-261}$	$86881^{+25993}_{-17950}$
Alt.	$-76 \pm 35$	$1.64^{+0.39}_{-0.36}$	$272^{+14}_{-14}$	$3931^{+490}_{-443}$	$21324^{+17757}_{-11223}$

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

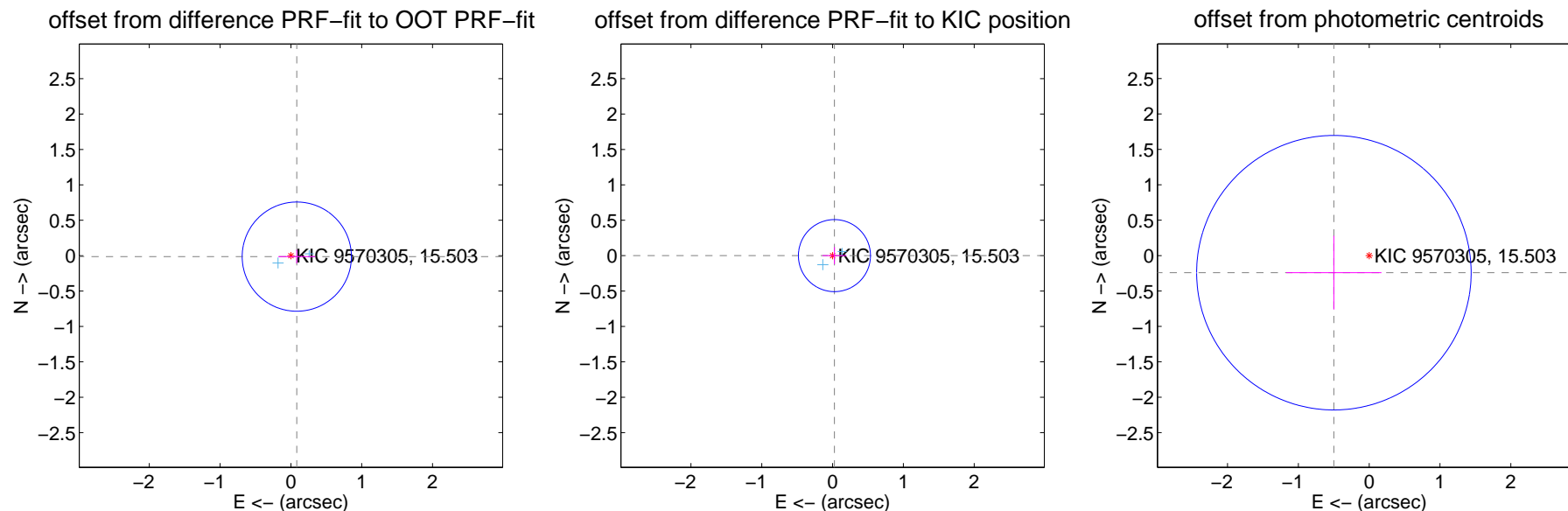
## DV Centroid Data

Supplemental centroid analysis for 009570305-02. Kepler magnitude: 15.50. Transit SNR 7.25

There are 2 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.05 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.084 \pm 0.257$	0.33	$-0.083 \pm 0.260$	$-0.014 \pm 0.096$
PRF-fit source offset from KIC position	$0.026 \pm 0.170$	0.16	$-0.026 \pm 0.170$	$0.001 \pm 0.120$
photometric centroid source offset	$0.55 \pm 0.65$	0.86	$0.50 \pm 0.67$	$-0.24 \pm 0.52$

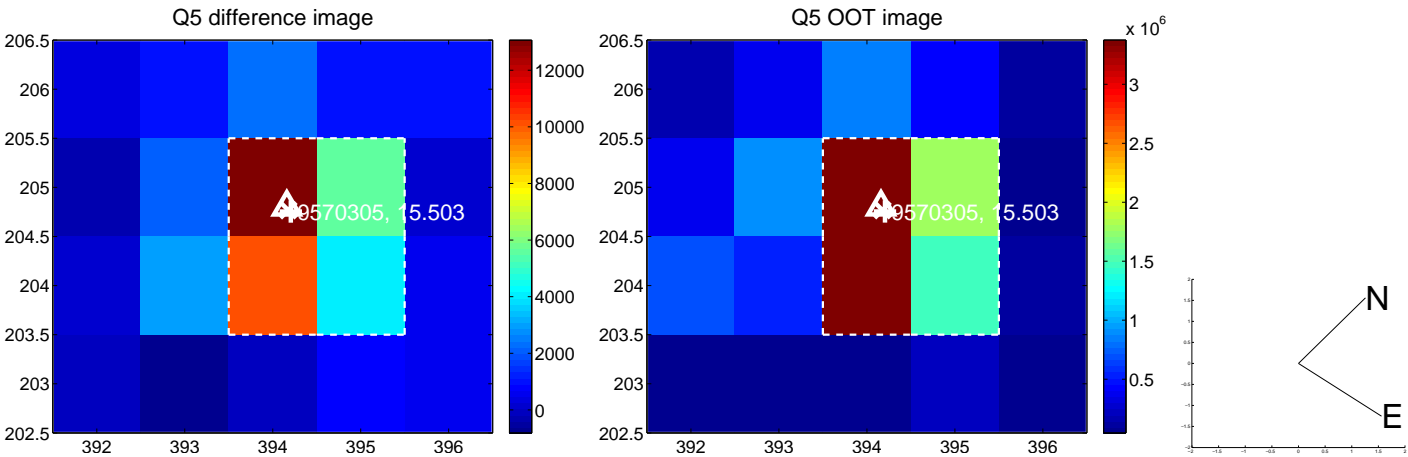


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

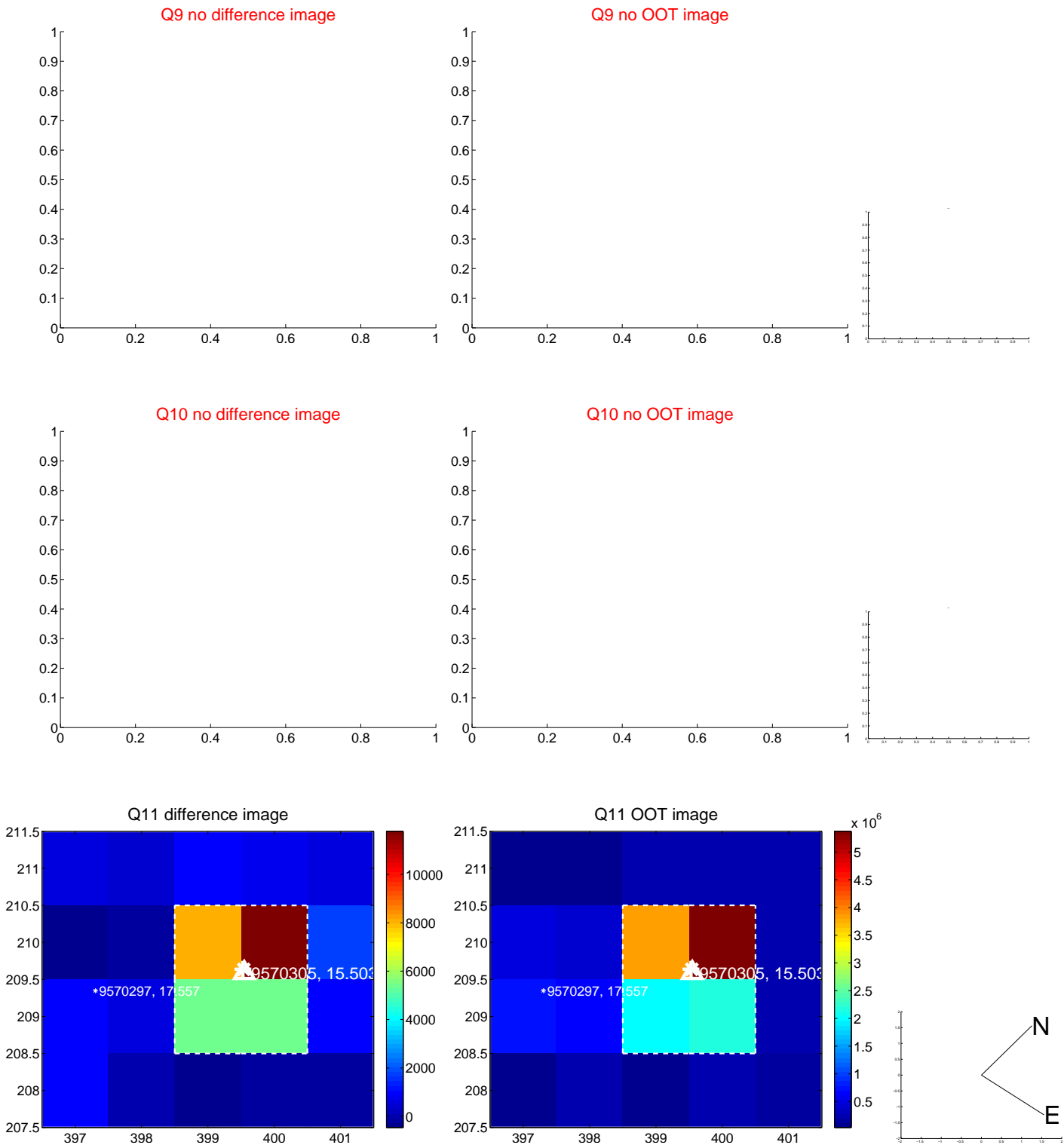
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



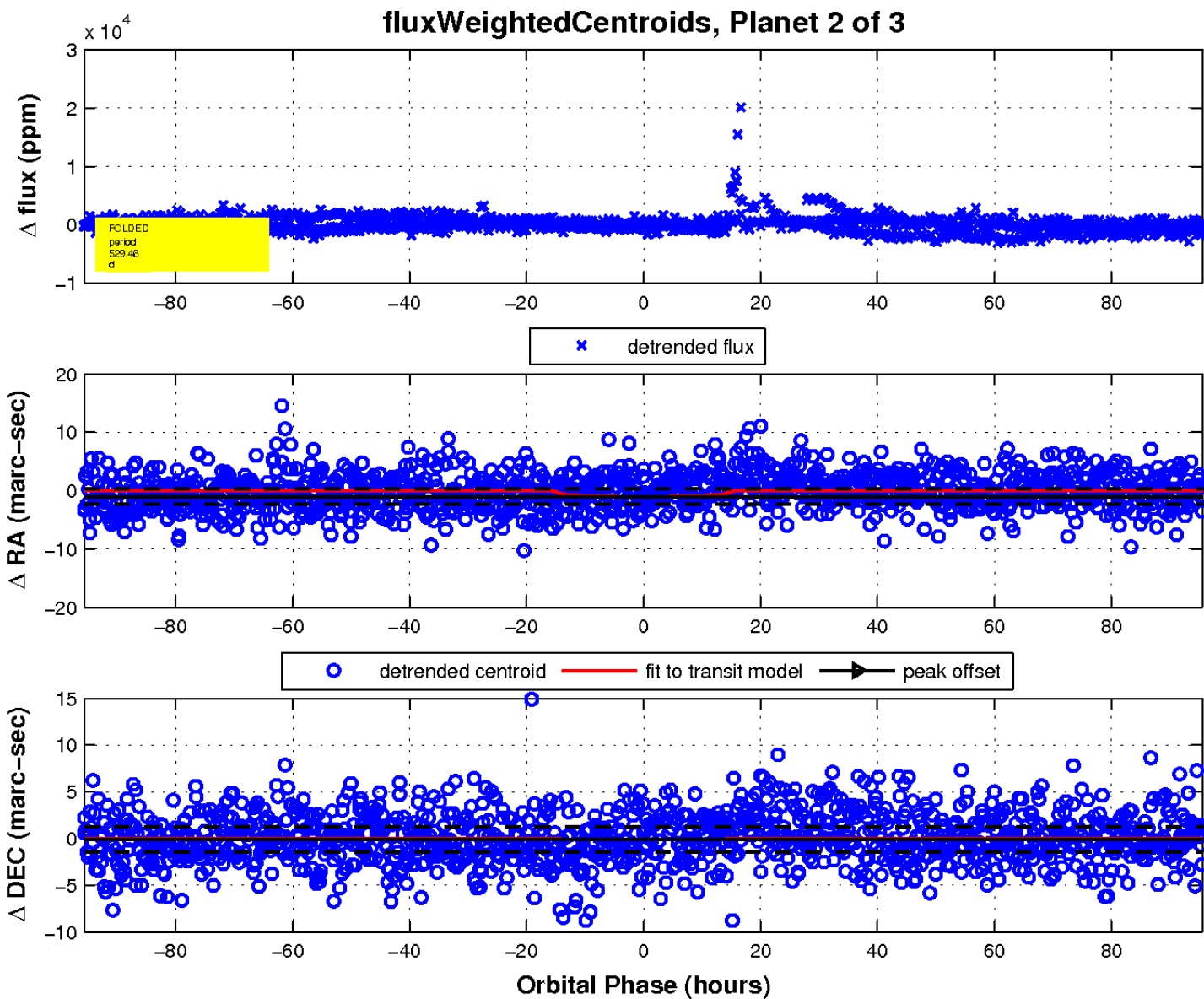
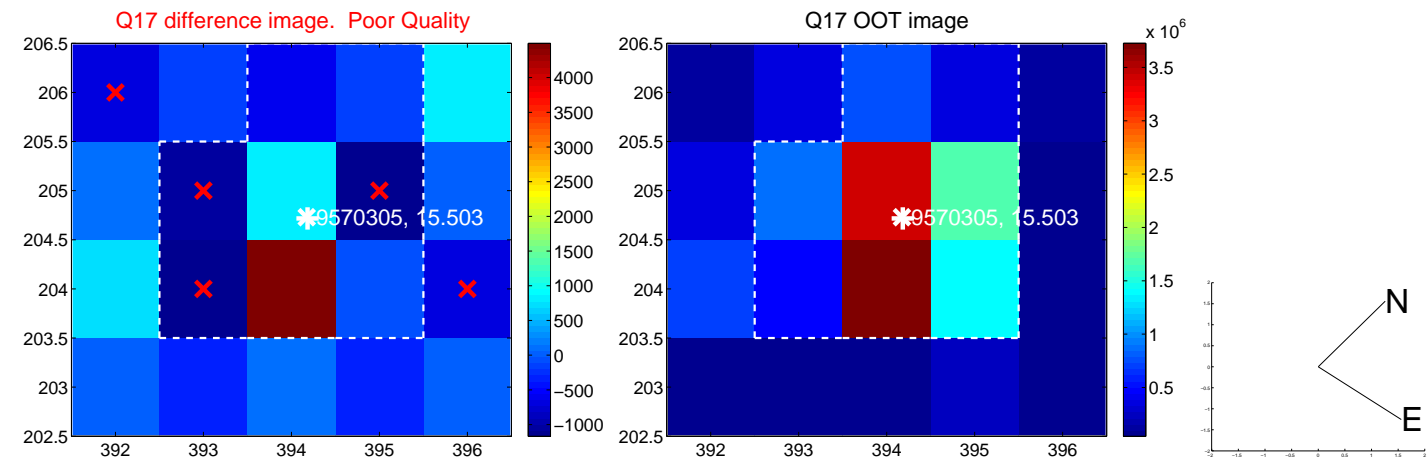
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

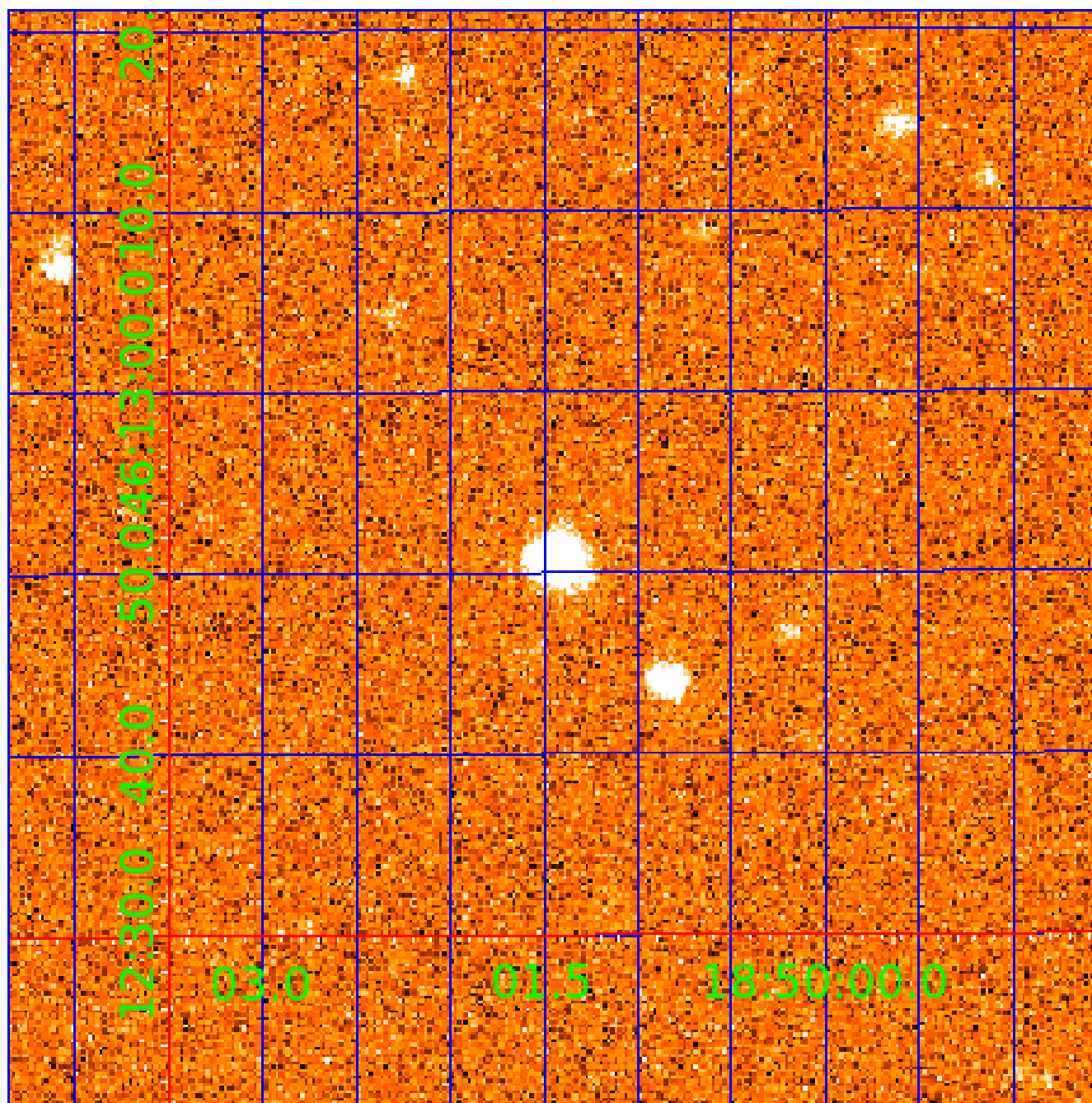


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



# UKIRT Image

Declination





# KIC 009570305

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009570305-01	OBS	No	483.669658	462.948434	1699.8	30.350	12.7	8.4	0.79	5349	3.24	0.39
009570305-02	OBS	No	529.463829	514.641731	1505.1	31.930	17.6	7.2	0.79	5349	3.30	0.34
009570305-03	OBS	No	569.843941	138.102414	1906.2	7.101	11.6	10.6	0.79	5349	3.47	0.31

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009570305-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_SKYE—LPP_DV—MOD_NONUNIQ_DV—MOD_POS_DV—CENT_FEW_DIFFS
009570305-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE_ZUMA—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009570305-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_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.

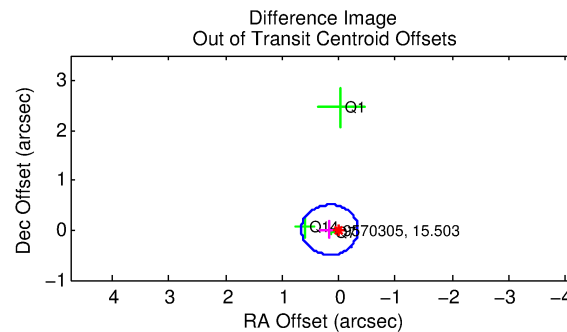
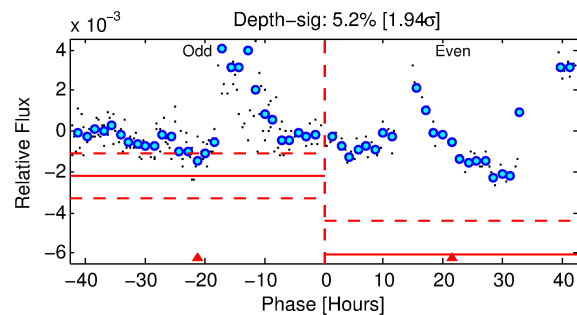
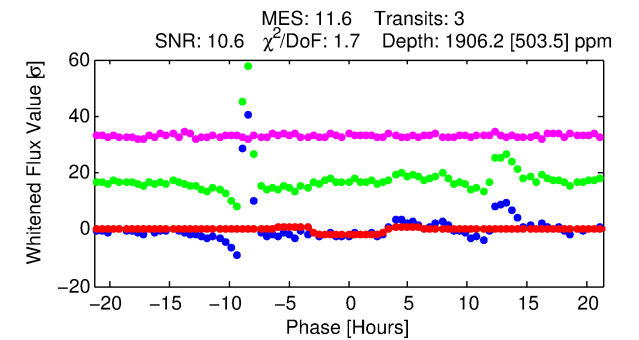
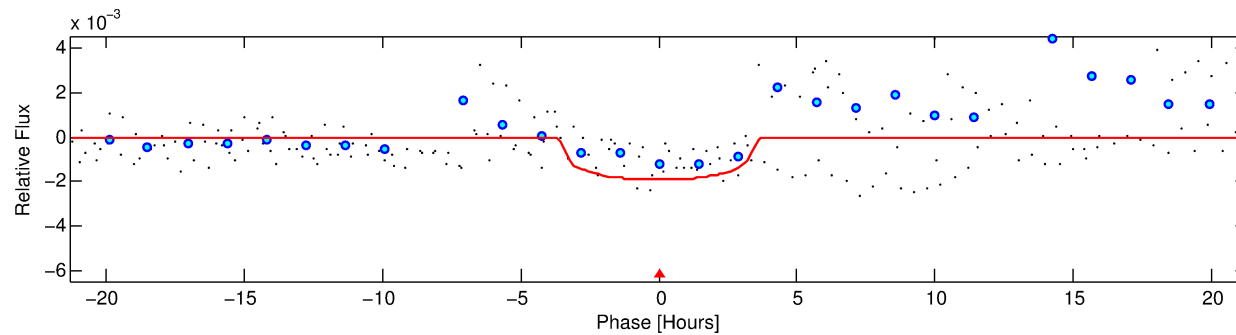
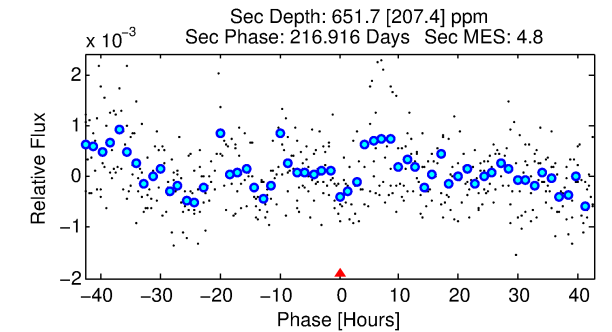
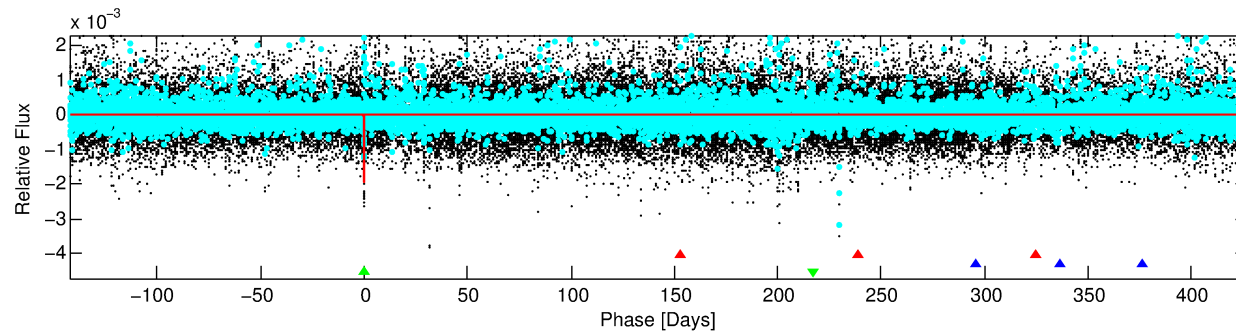
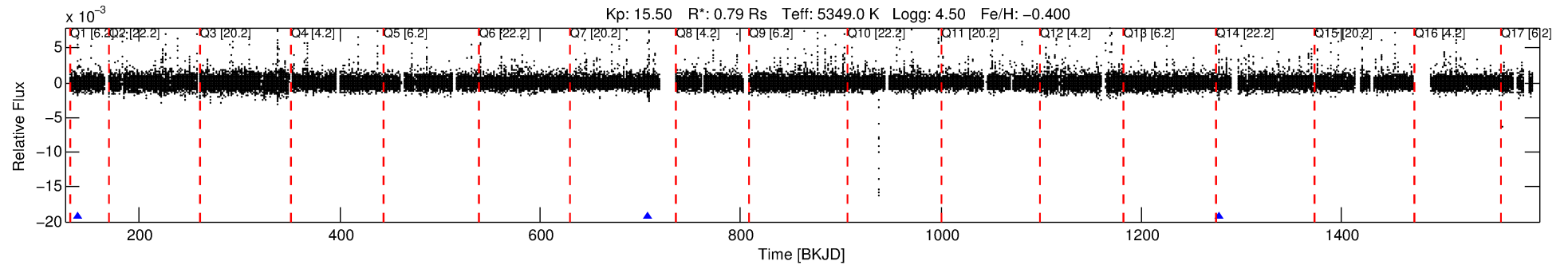
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 009570305-03

No Significant Match Found

# DV One-Page Summary

KIC: 9570305 Candidate: 3 of 3 Period: 569.844 d



## DV Fit Results:

Period = 569.84394 [0.01489] d  
Epoch = 138.1024 [0.0191] BKJD  
Rp/R\* = 0.0402 [0.0507]  
a/R\* = 585.39 [2918.70]  
b = 0.41 [10.09]  
Seff = 0.31 [0.07]  
Teq = 191 [11] K  
Rp = 3.47 [4.39] Re  
a = 1.2105 [0.1480] AU  
Ag = 43676.94 [111154.80] [0.39 $\sigma$ ]  
Teffp = 4261 [2707] K [1.50 $\sigma$ ]

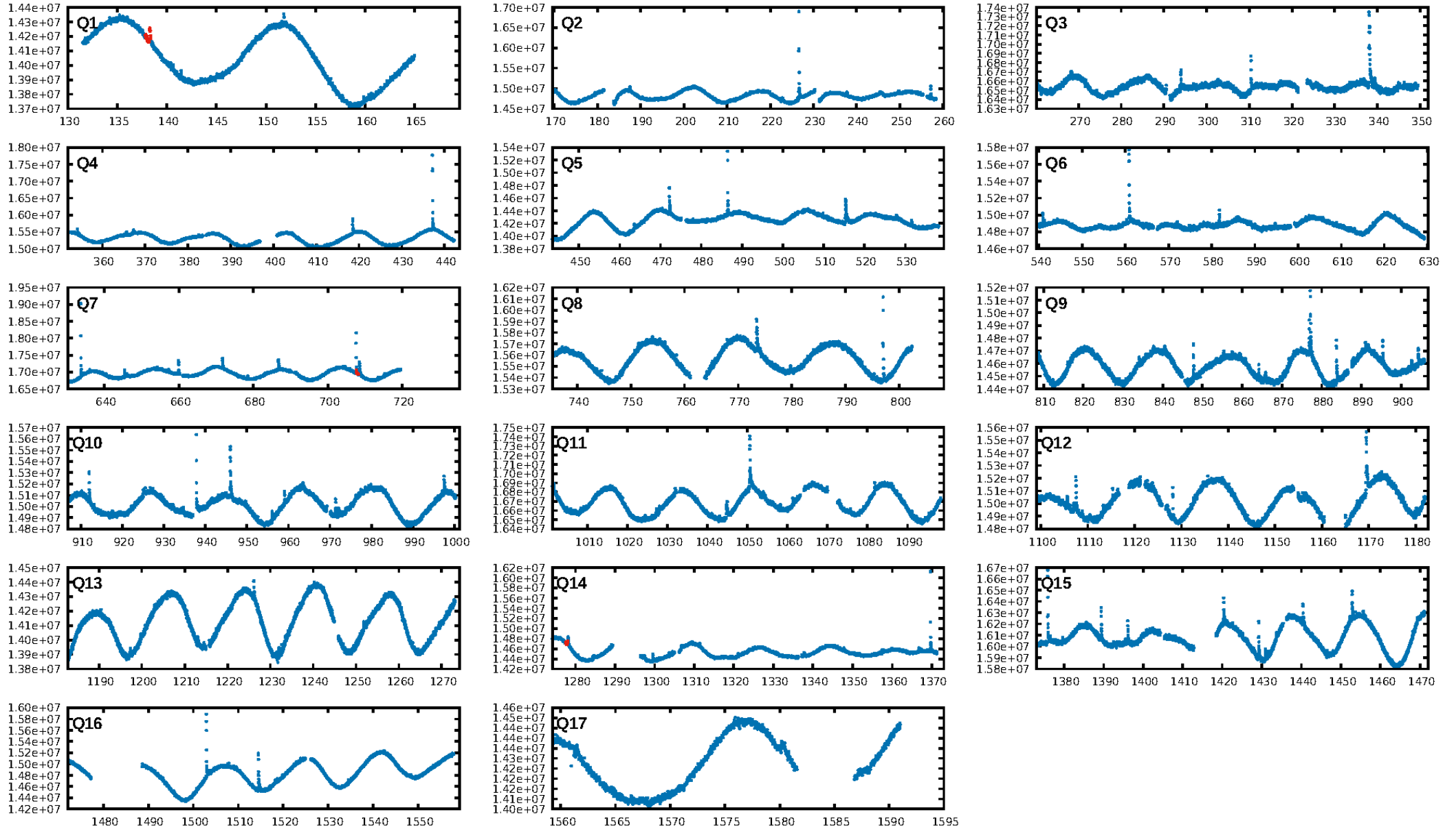
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [29.63 $\sigma$ ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 12.1%  
ModelChiSquareGof-sig: 60.5%  
Bootstrap-pfa: 4.85e-14  
RollingBand-fgt: 1.00 [2/2]  
GhostDiagnostic-chr: 4.774  
Centroid-sig: 38.5%  
Centroid-so: 0.233 arcsec [0.34 $\sigma$ ]  
OotOffset-rm: 0.162 arcsec [0.97 $\sigma$ ]  
OotOffset-st: 1/1/0/1 [3]  
KicOffset-rm: 0.151 arcsec [0.40 $\sigma$ ]  
KicOffset-st: 1/1/0/1 [3]  
DiffImageQuality-fgm: 1.00 [3/3]  
DiffImageOverlap-fno: 1.00 [3/3]

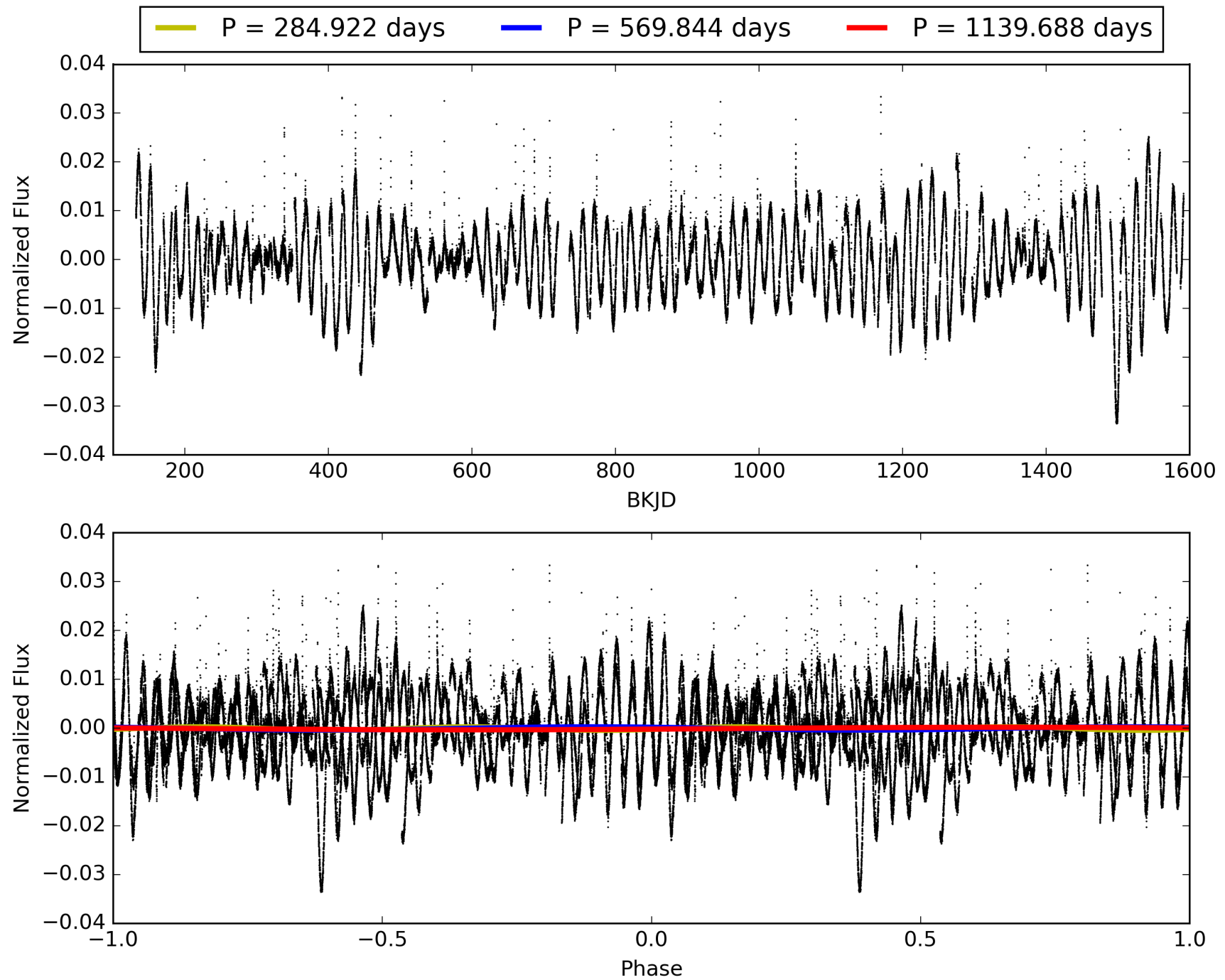
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 14:50:27 Z

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

# TCE 009570305-03, PDC Light Curves

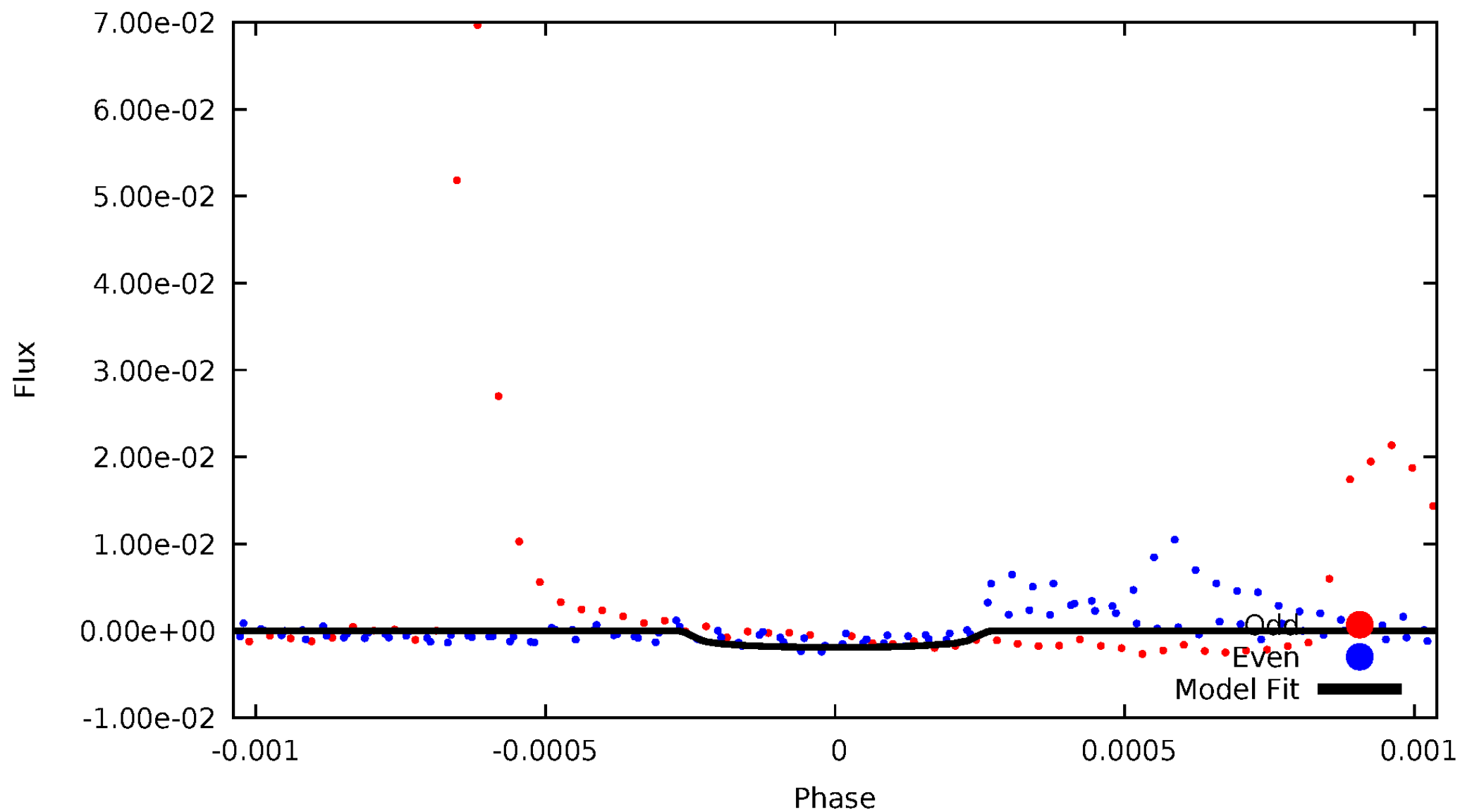


TCE 009570305-03



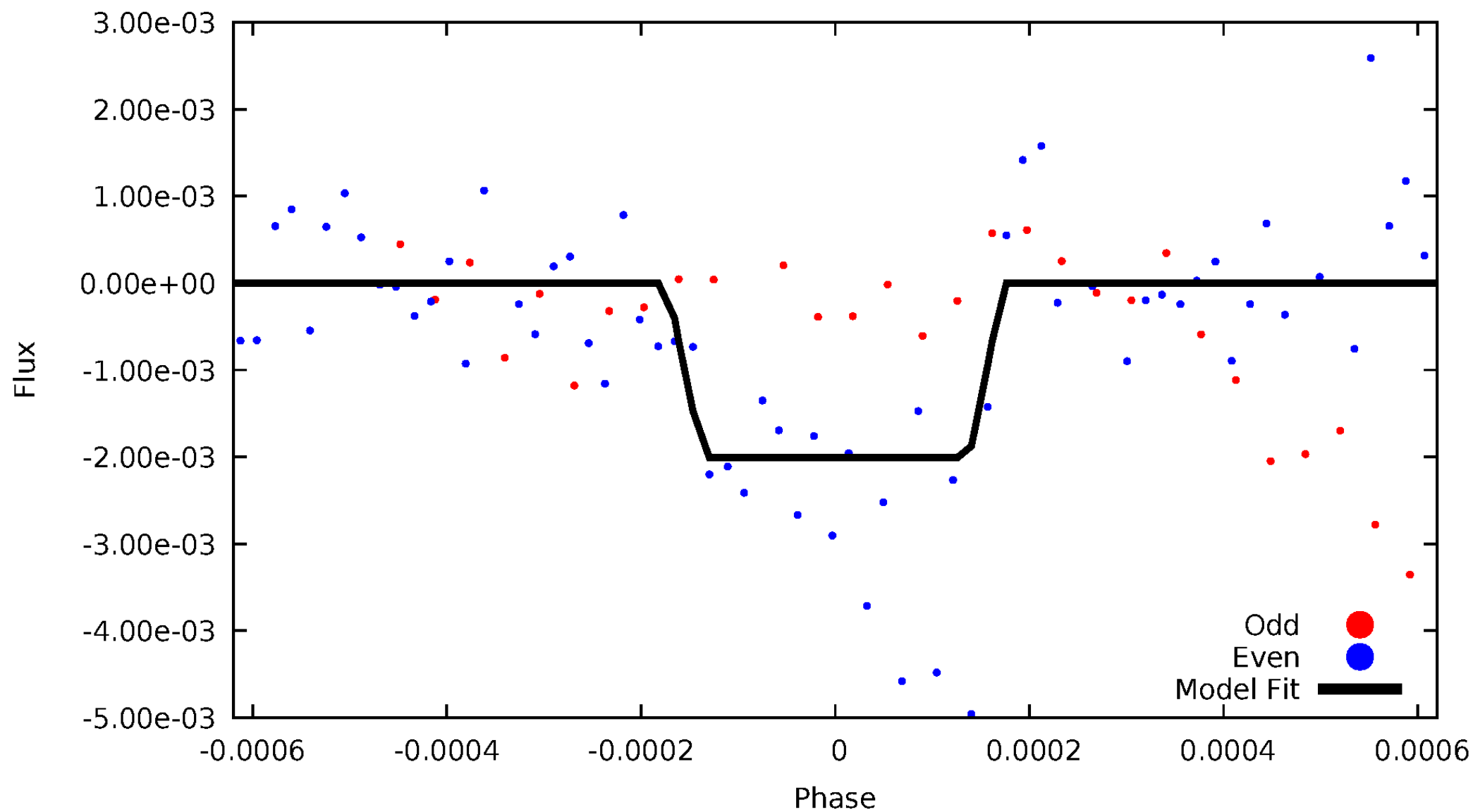
# DV Odd/Even

TCE 009570305-03



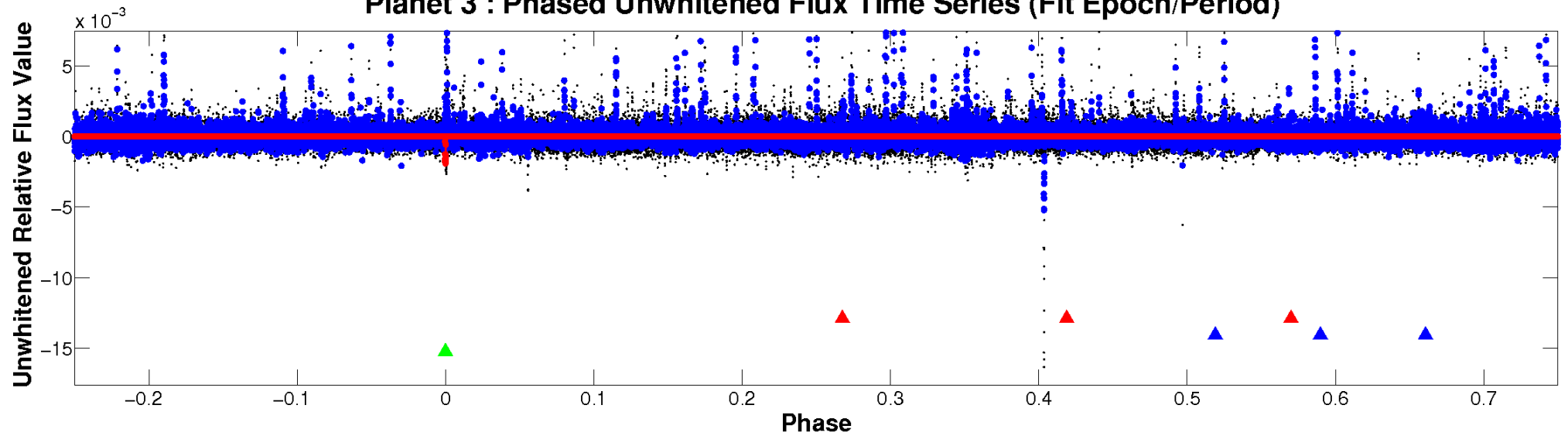
# ALT Odd/Even

TCE 009570305-03

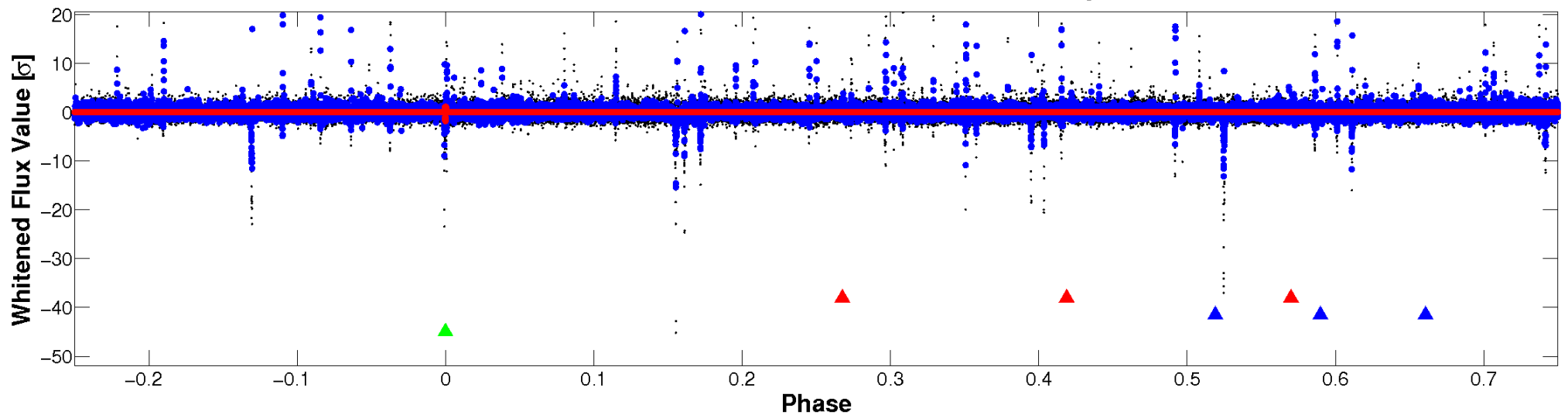


# Non-Whitened Vs. Whitened Light Curve

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

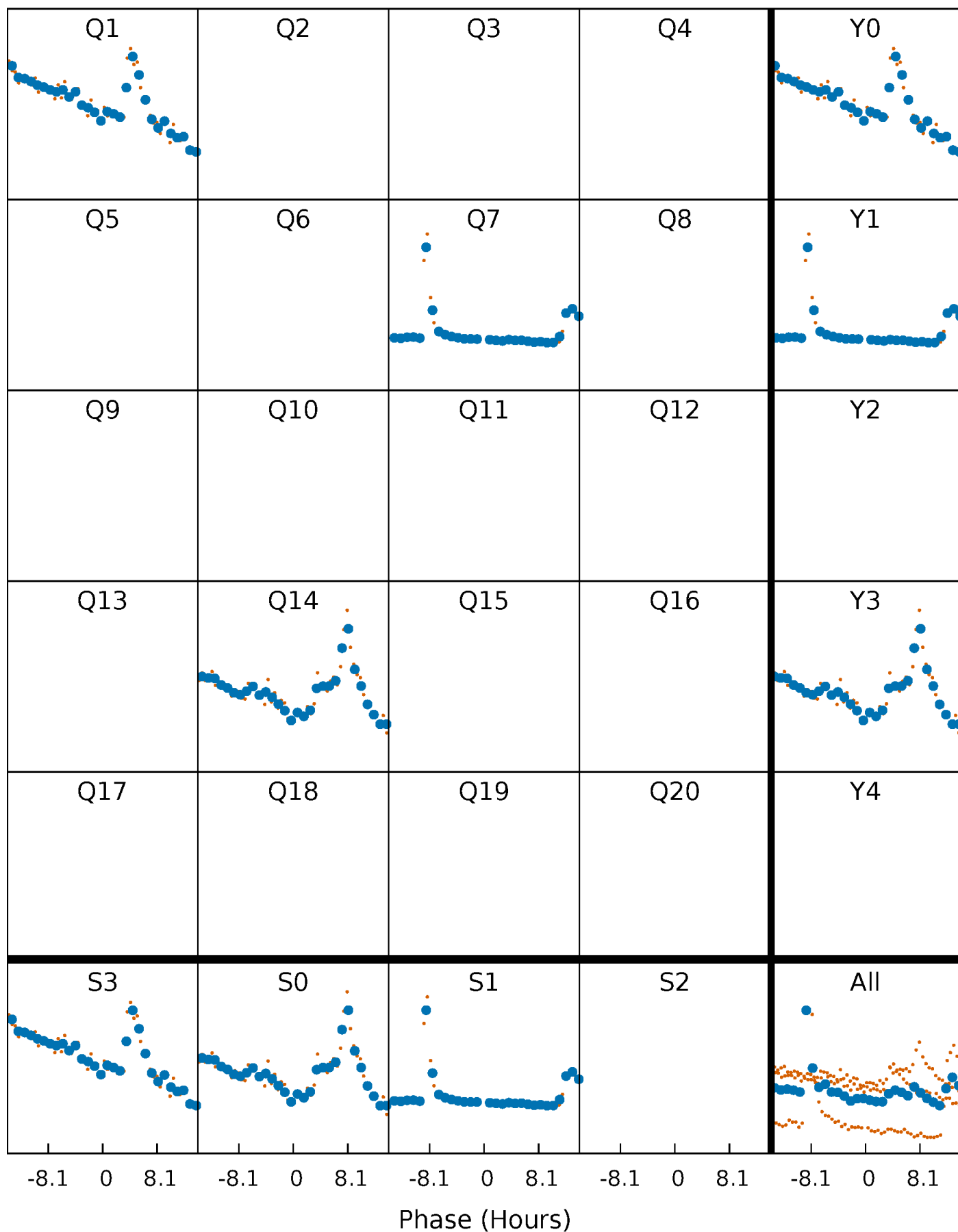


**Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

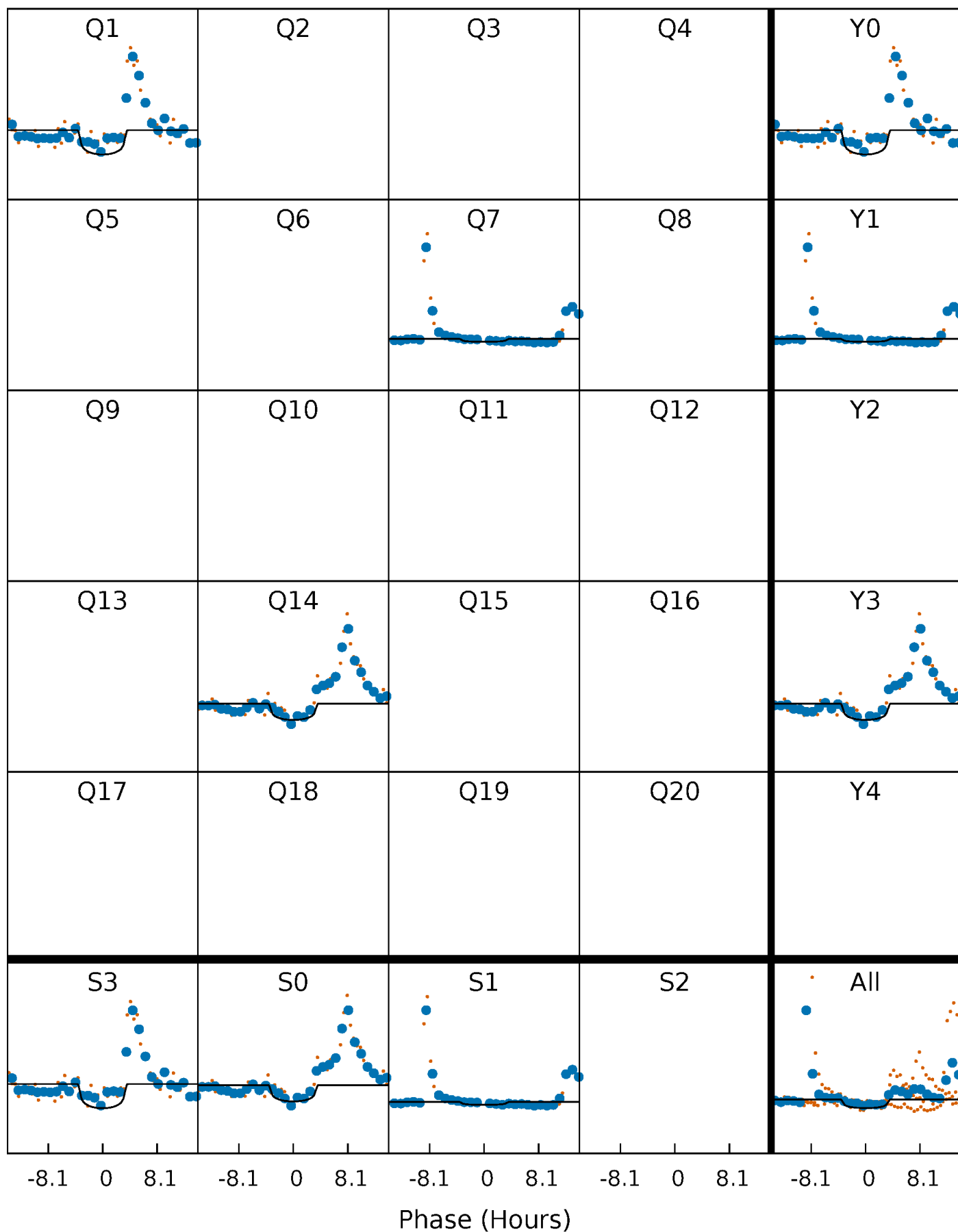
TCE 009570305-03     $P=569.843941$  Days     $T_0=138.102414$  (BKJD)





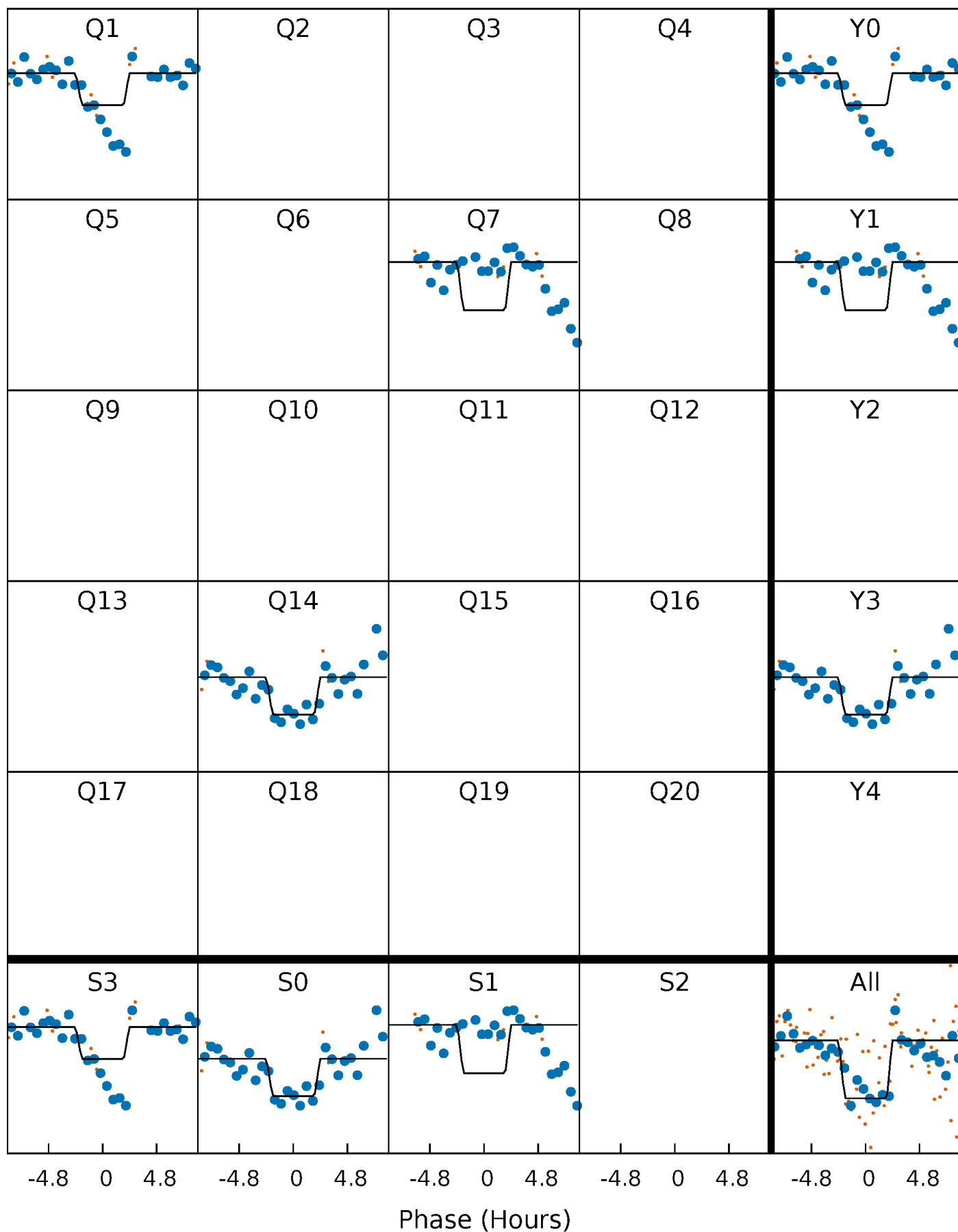
# DV Quarter-Phased Transit Curves

TCE 009570305-03 P=569.843941 Days  $T_0=138.102414$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

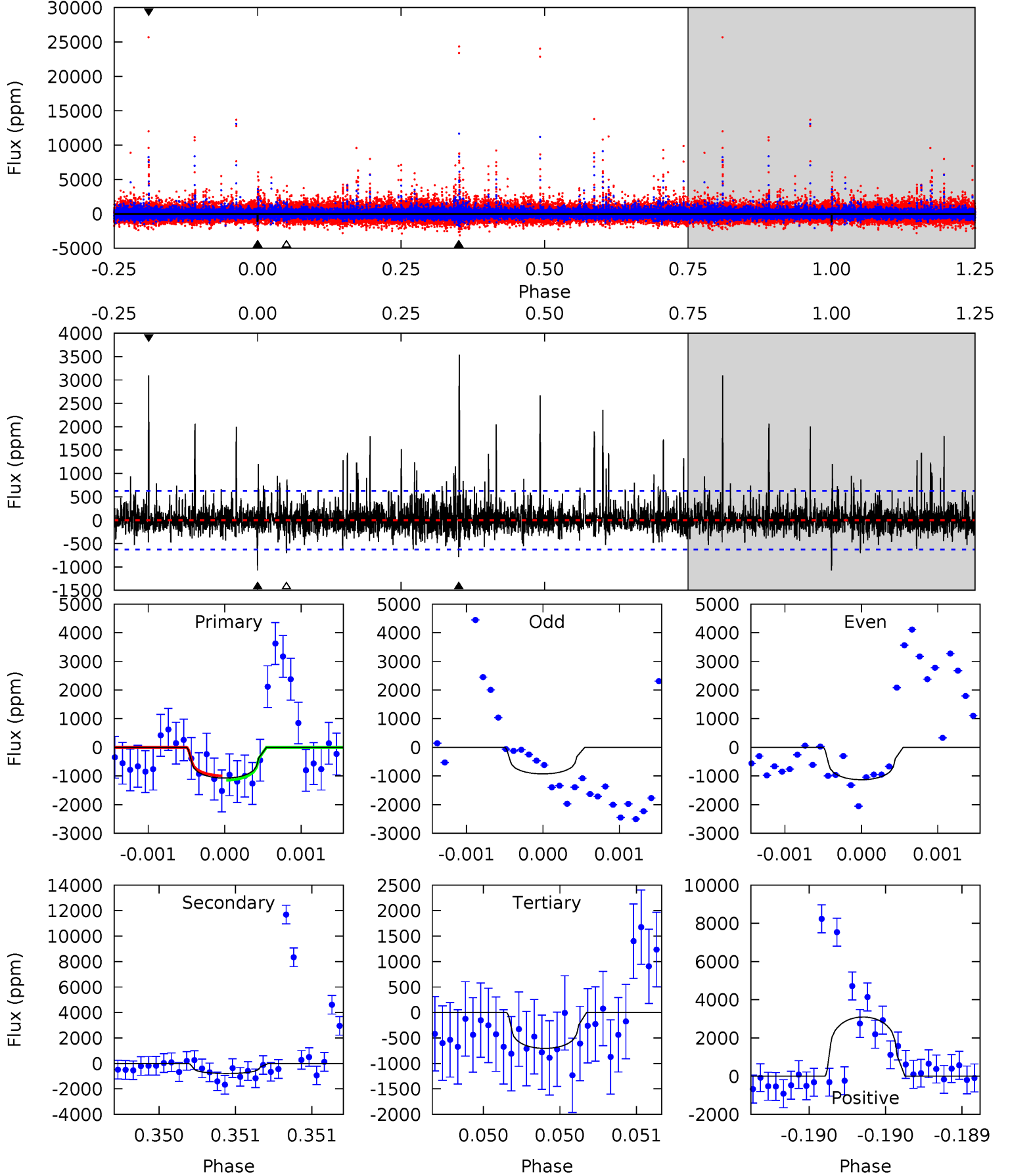
TCE 009570305-03 P=569.837499 Days  $T_0=138.155584$  (BKJD)



# DV Model-Shift Uniqueness Test

009570305-03, P = 569.843941 Days, E = 138.102414 Days

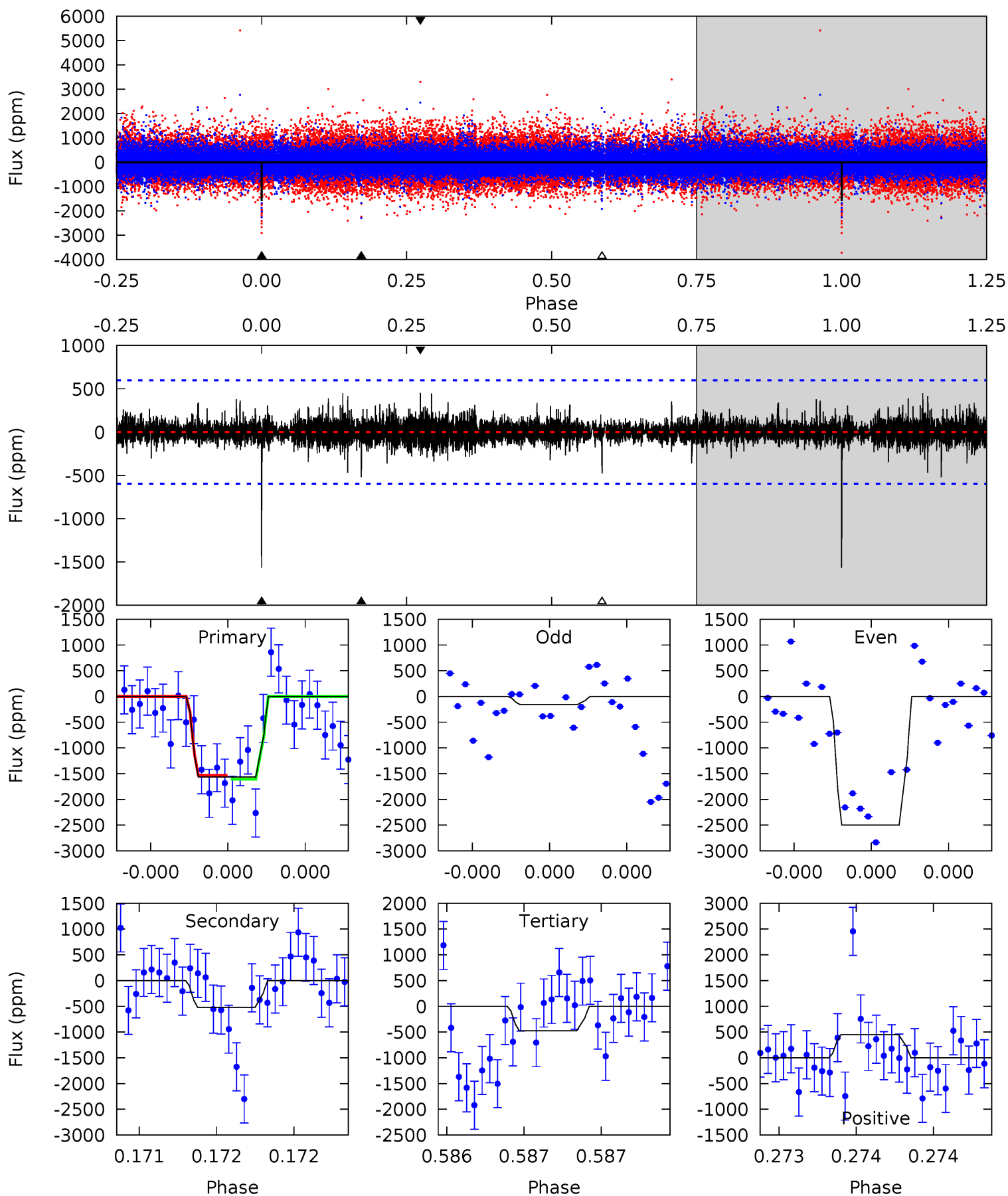
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
9.53	7.01	6.25	27.5	5.56	3.46	2.36	3.28	-17.9	0.76	-20.4	0.40	1.14	0.77	0.68



# Alt Model-Shift Uniqueness Test

009570305-03, P = 569.837499 Days, E = 138.155584 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
14.8	4.91	4.48	4.25	5.64	3.58	0.74	10.3	10.5	0.43	0.65	10.6	0.88	0.22	0.37



### Stellar Parameters For KIC 009570305

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5349^{+169}_{-169}$	$4.505^{+0.105}_{-0.095}$	$-0.400^{+0.350}_{-0.300}$	$0.790^{+0.109}_{-0.109}$	$0.728^{+0.107}_{-0.046}$	$2.081^{+0.900}_{-0.577}$
	+3%/-3%	+2%/-2%	+87%/-75%	+14%/-14%	+15%/-6%	+43%/-28%
Source	PHO1	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 009570305-03 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-790 \pm 113$	$4.79^{+3.65}_{-3.04}$	$266^{+14}_{-14}$	$4083^{+2207}_{-730}$	$27913^{+184252}_{-19195}$
Alt.	$-519 \pm 106$	$4.90^{+4.02}_{-3.07}$	$267^{+13}_{-12}$	$3799^{+1717}_{-672}$	$17857^{+110440}_{-12614}$

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

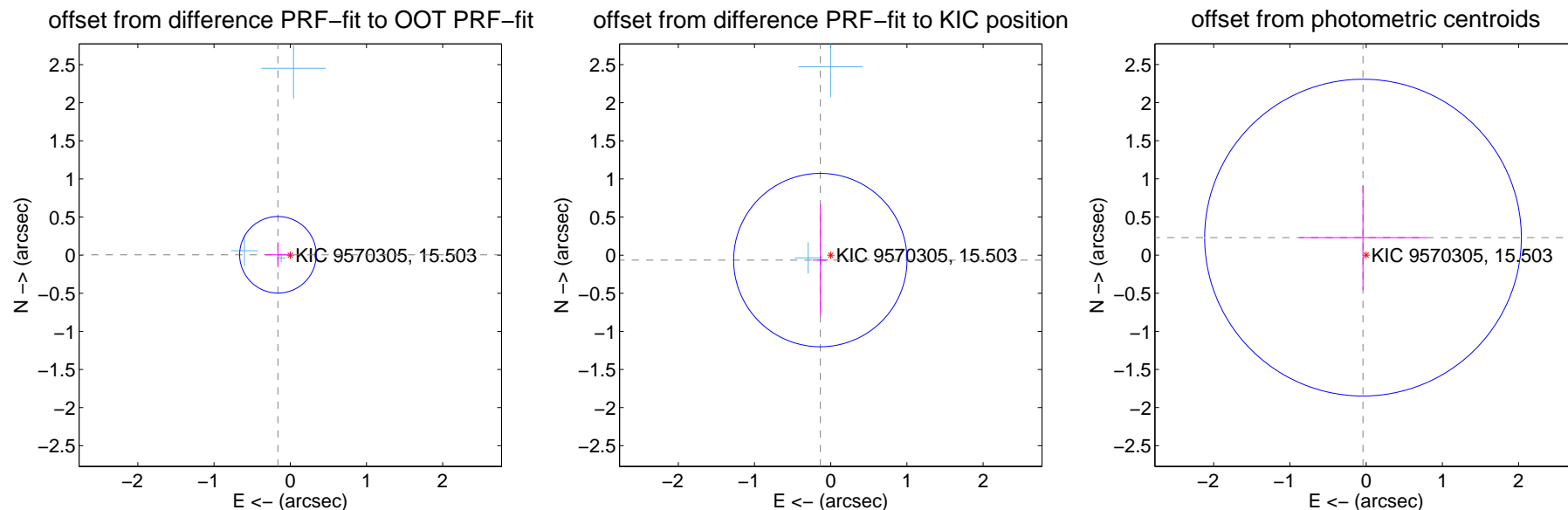
## DV Centroid Data

Supplemental centroid analysis for 009570305-03. Kepler magnitude: 15.50. Transit SNR 10.63

There are 3 quarters with good PRF difference image offsets

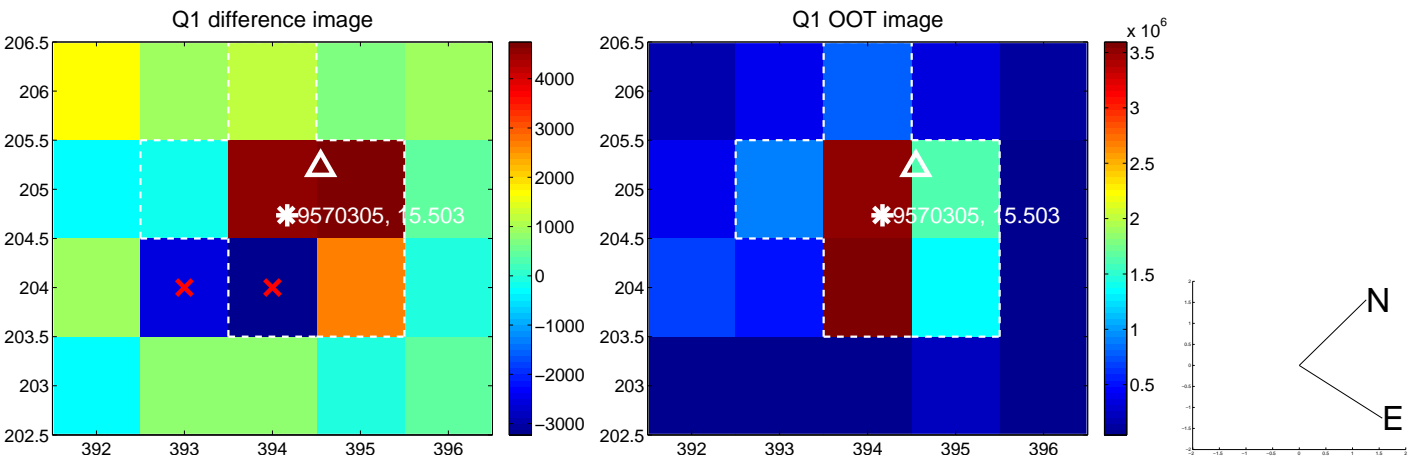
The direct PRF centroid is offset from the target star catalog position by about 0.32 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.162 \pm 0.167$	0.97	$0.162 \pm 0.167$	$0.005 \pm 0.164$
PRF-fit source offset from KIC position	$0.151 \pm 0.379$	0.40	$0.136 \pm 0.101$	$-0.064 \pm 0.730$
photometric centroid source offset	$0.23 \pm 0.69$	0.34	$0.04 \pm 0.83$	$0.23 \pm 0.69$

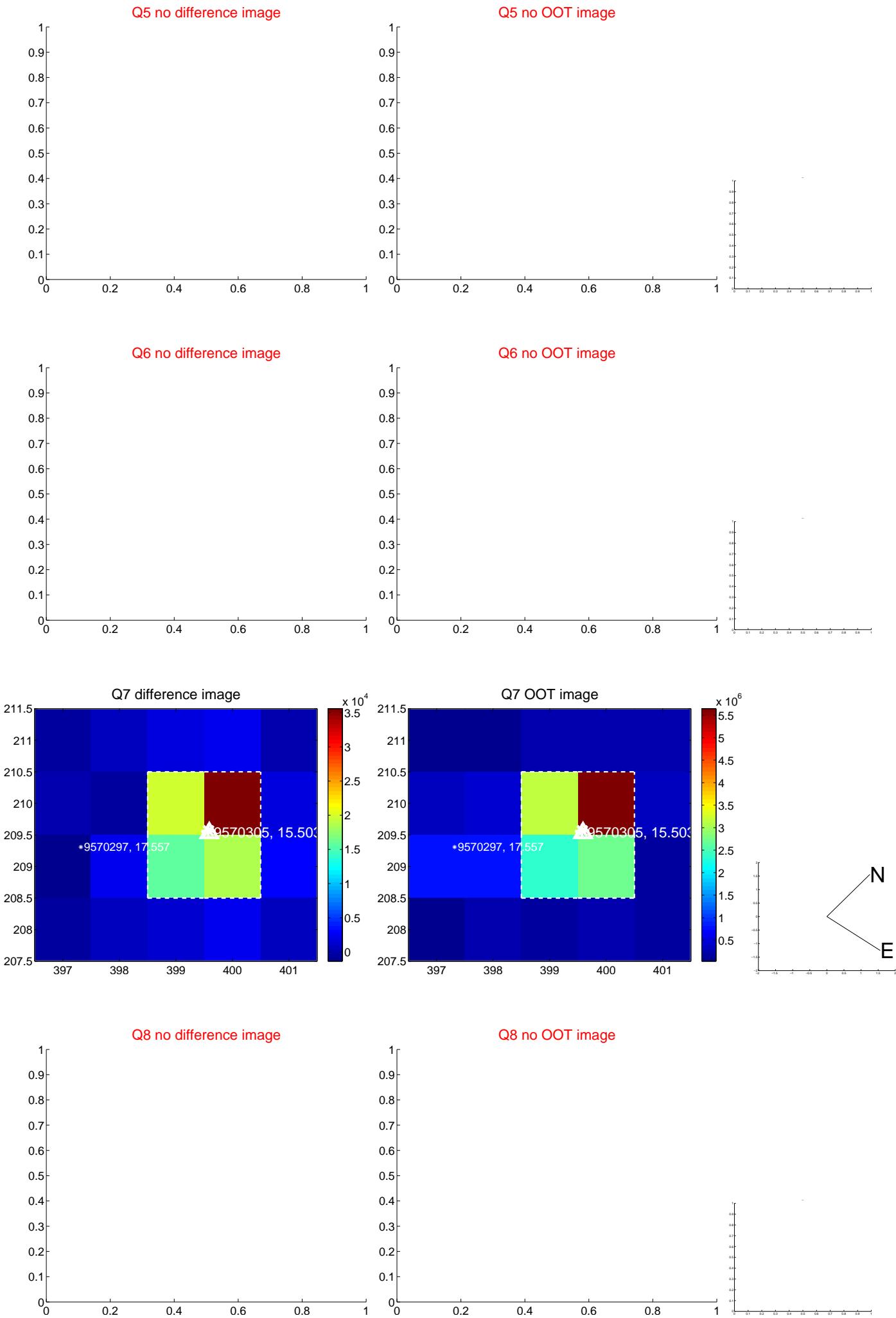


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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



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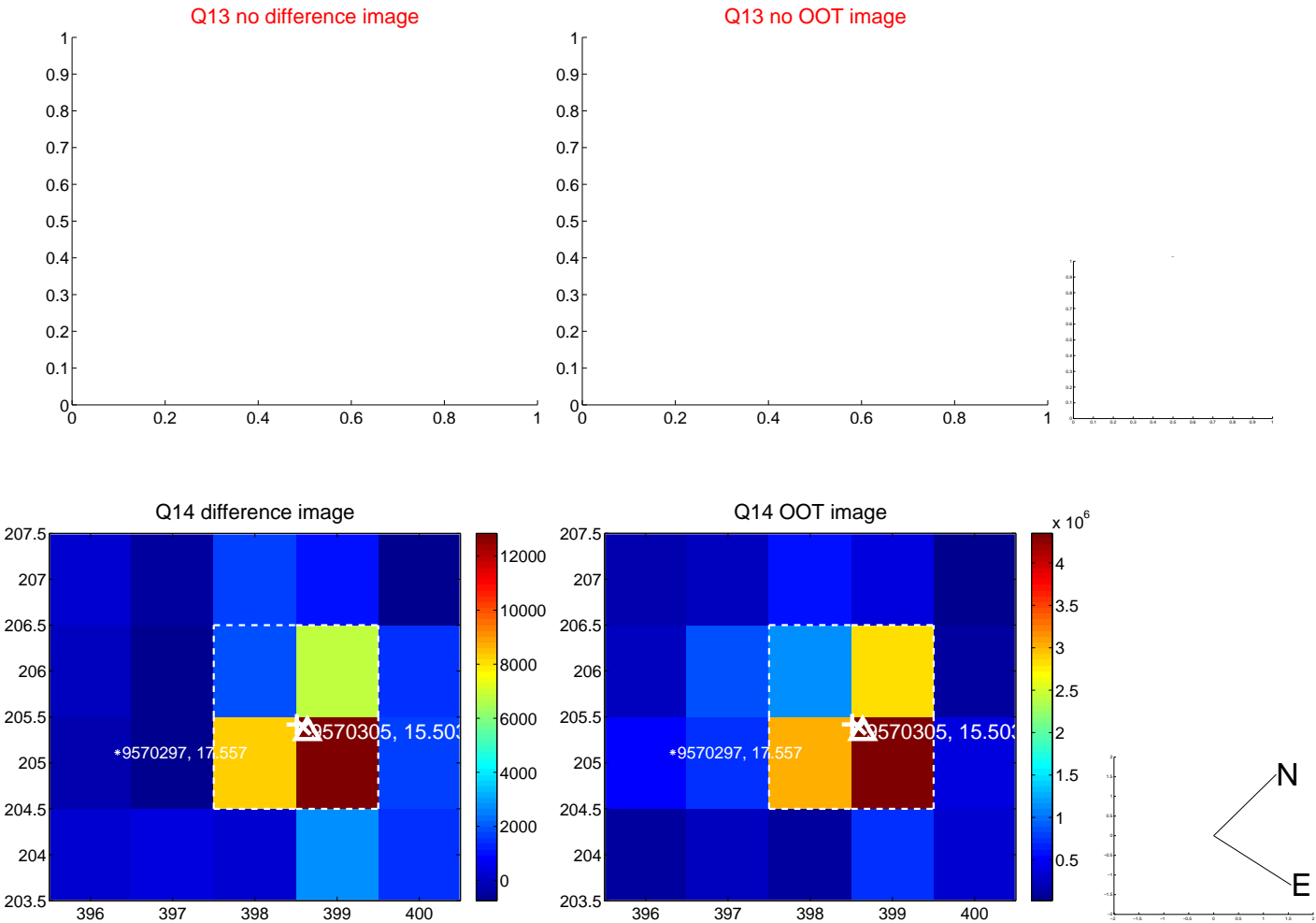




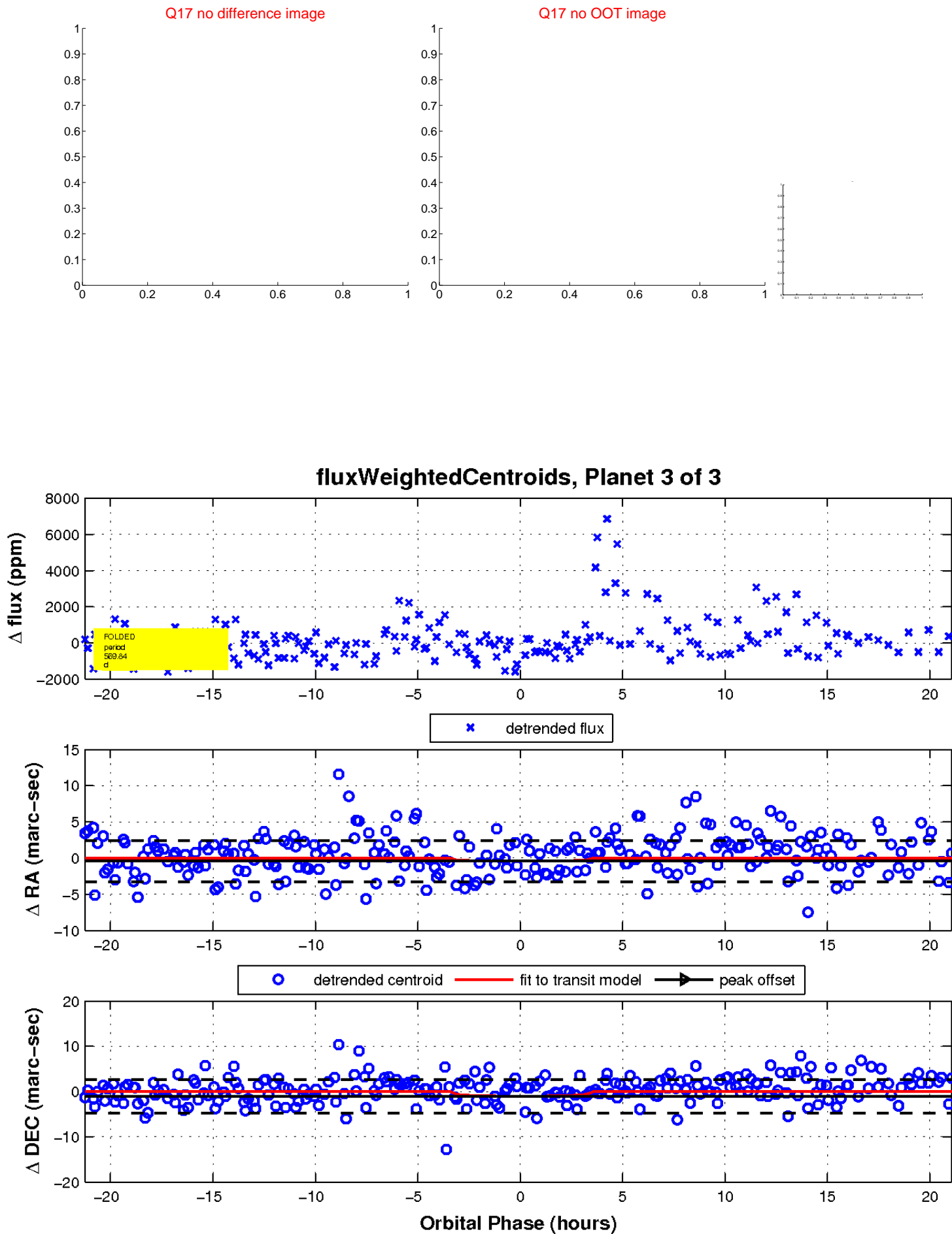
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# UKIRT Image

Declination

