

# KIC 006715331

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
006715331-01	OBS	No	0.928873	132.119851	21.8	5.212	7.9	5.3	8.60	7053	4.30	0.00
006715331-02	OBS	No	126.812494	138.381125	426.5	13.300	9.9	5.5	8.60	7053	20.88	346.72
006715331-03	OBS	No	73.061339	155.485784	600.8	5.597	9.3	8.0	8.60	7053	39.84	723.23
006715331-04	OBS	No	80.681374	150.660758	762.9	11.330	9.6	10.1	8.60	7053	28.37	633.62
006715331-06	OBS	No	49.992478	134.622321	526.8	5.276	8.2	9.0	8.60	7053	37.45	1199.45
006715331-07	OBS	No	197.990545	159.459832	701.4	3.518	8.5	9.1	8.60	7053	27.73	191.43
006715331-08	OBS	No	53.819547	166.532224	564.8	4.939	8.0	8.7	8.60	7053	38.71	1087.10
006715331-09	OBS	No	130.838966	143.185368	112.8	4.500	7.9	-1.0	8.60	7053	9.22	332.56

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
006715331-01	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
006715331-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS
006715331-03	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—HALO_GHOST
006715331-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
006715331-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
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006715331-08	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
006715331-09	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—CENT_NOFITS

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

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

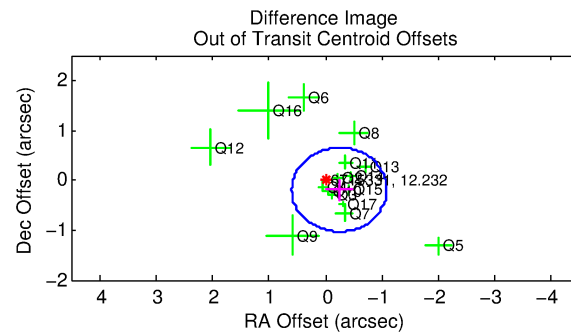
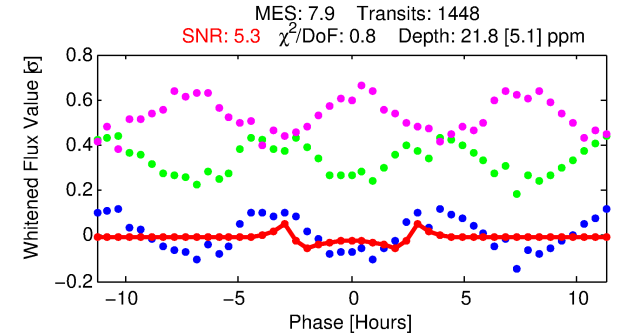
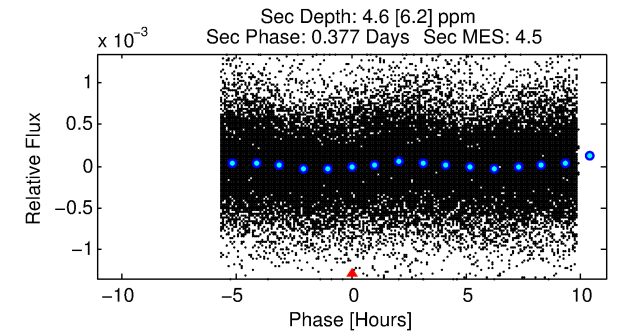
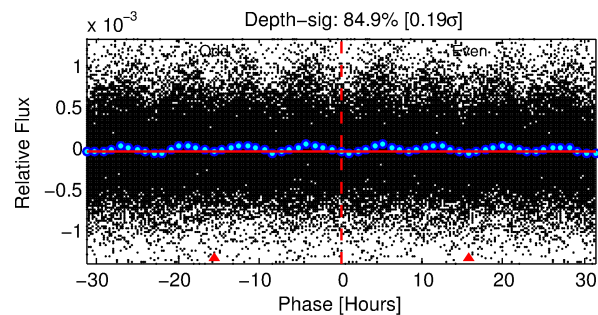
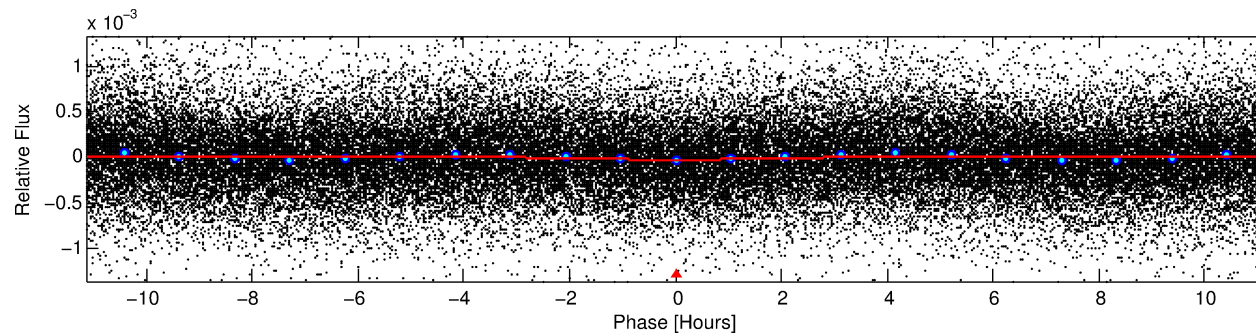
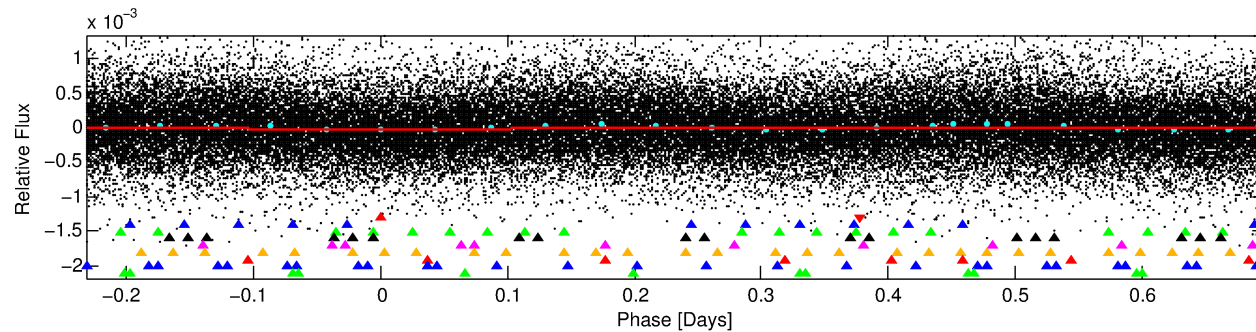
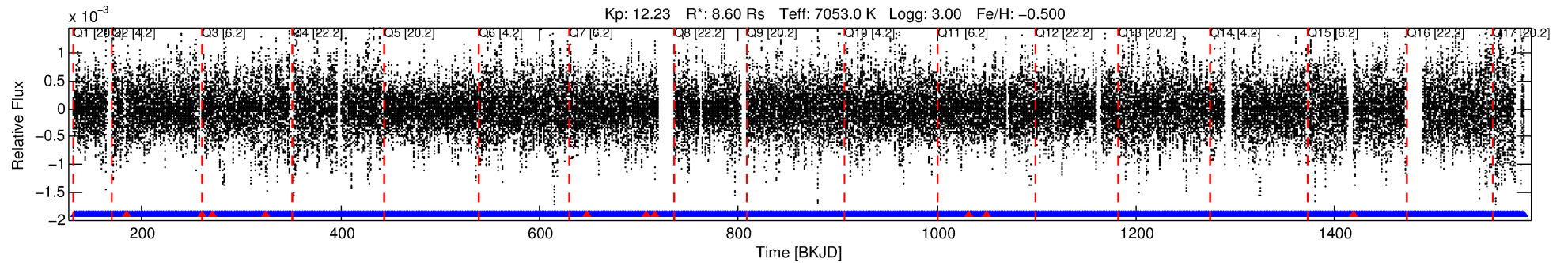
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 006715331-01

No Significant Match Found

# DV One-Page Summary

KIC: 6715331 Candidate: 1 of 9 Period: 0.929 d



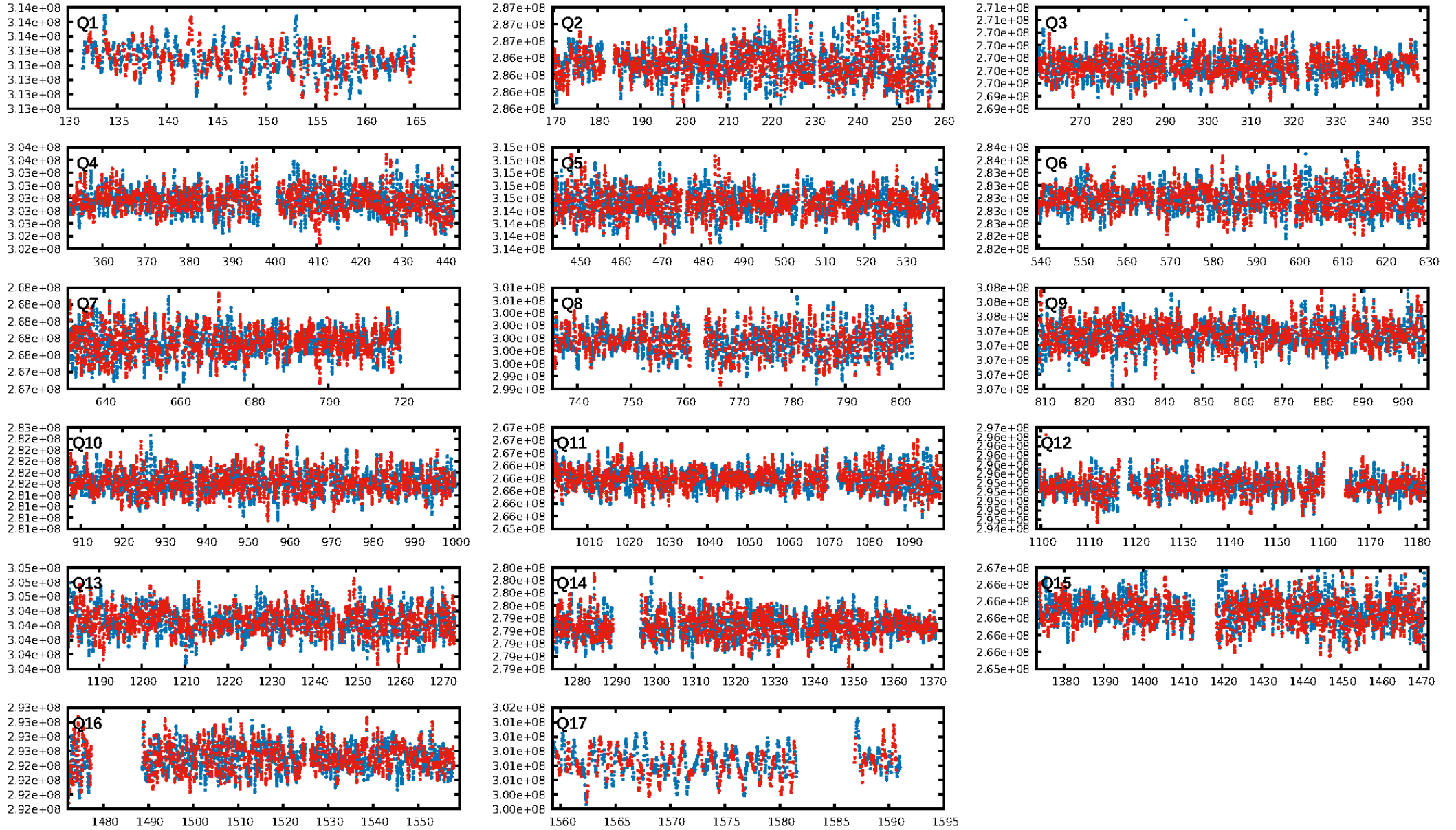
## DV Fit Results:

Period = 0.92887 [0.00002] d  
Epoch = 132.1199 [0.0029] BKJD  
Rp/R\* = 0.0046 [0.0013]  
a/R\* = 1.29 [0.85]  
b = 0.70 [1.25]  
Seff = N/A  
Teq = N/A  
Rp = 4.30 [2.78] Re  
a = N/A  
Ag = N/A  
Teffp = N/A

## DV Diagnostic Results:

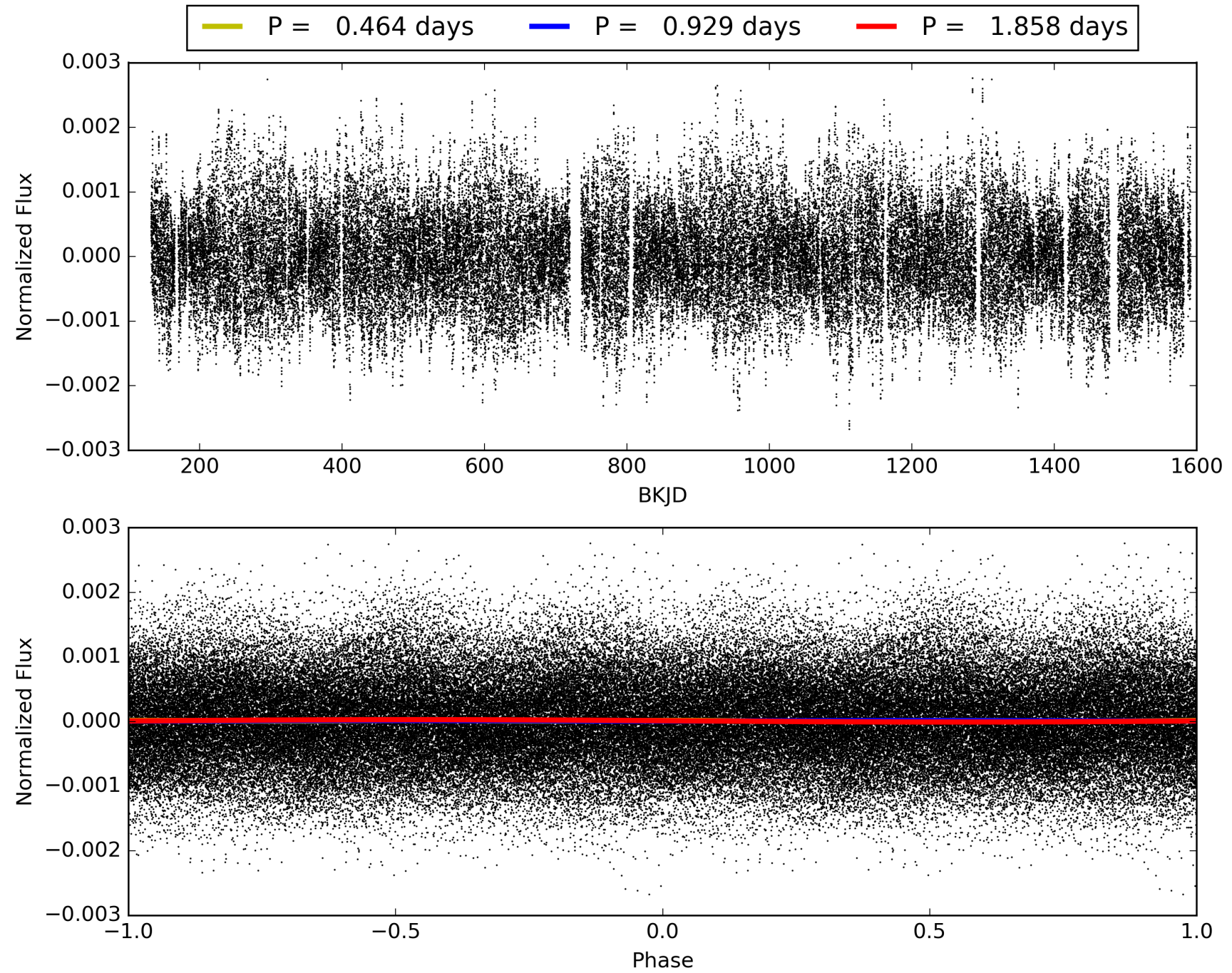
ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [158.77 $\sigma$ ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 0.99 [1373/1383]  
GhostDiagnostic-chr: 4.36  
Centroid-sig: 1.3%  
Centroid-so: 0.947 arcsec [1.54 $\sigma$ ]  
OotOffset-rm: 0.310 arcsec [1.11 $\sigma$ ]  
KicOffset-rm: 0.296 arcsec [1.07 $\sigma$ ]  
OotOffset-st: 4/4/4/4 [16]  
KicOffset-st: 4/4/4/4 [16]  
DiffImageQuality-fgm: 0.50 [8/16]  
DiffImageOverlap-fno: 1.00 [17/17]

# TCE 006715331-01, PDC Light Curves





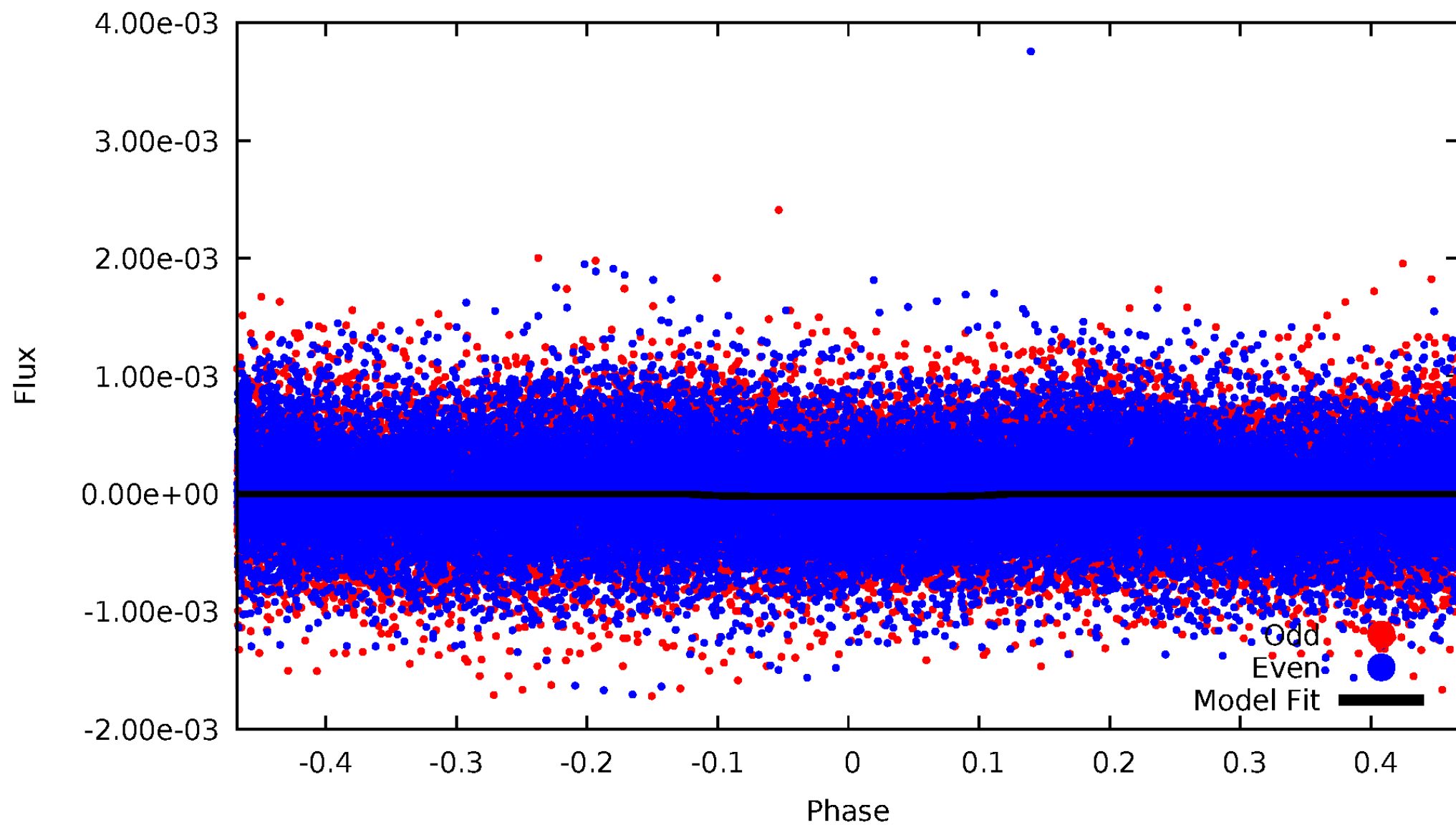
TCE 006715331-01





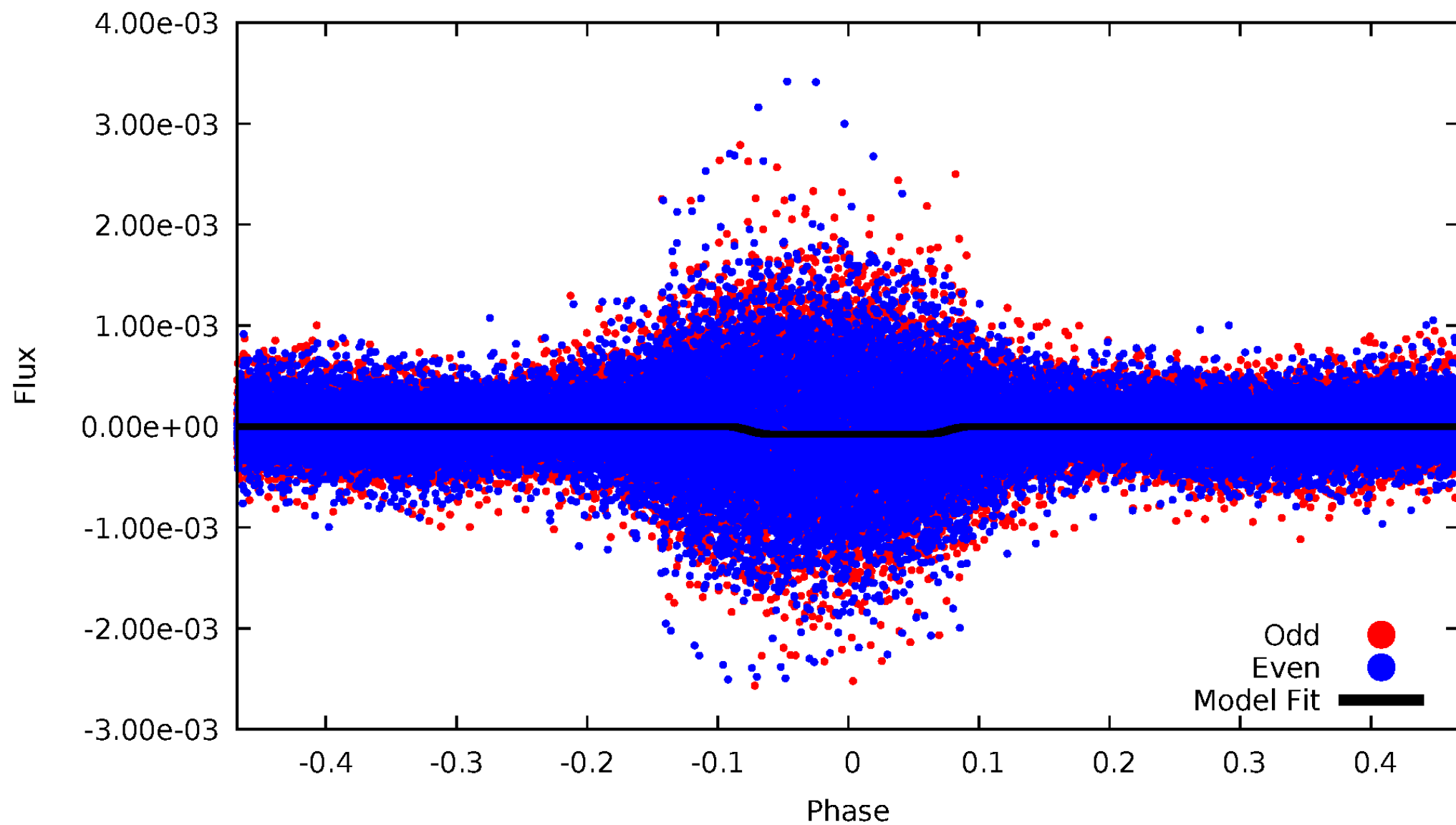
# DV Odd/Even

TCE 006715331-01

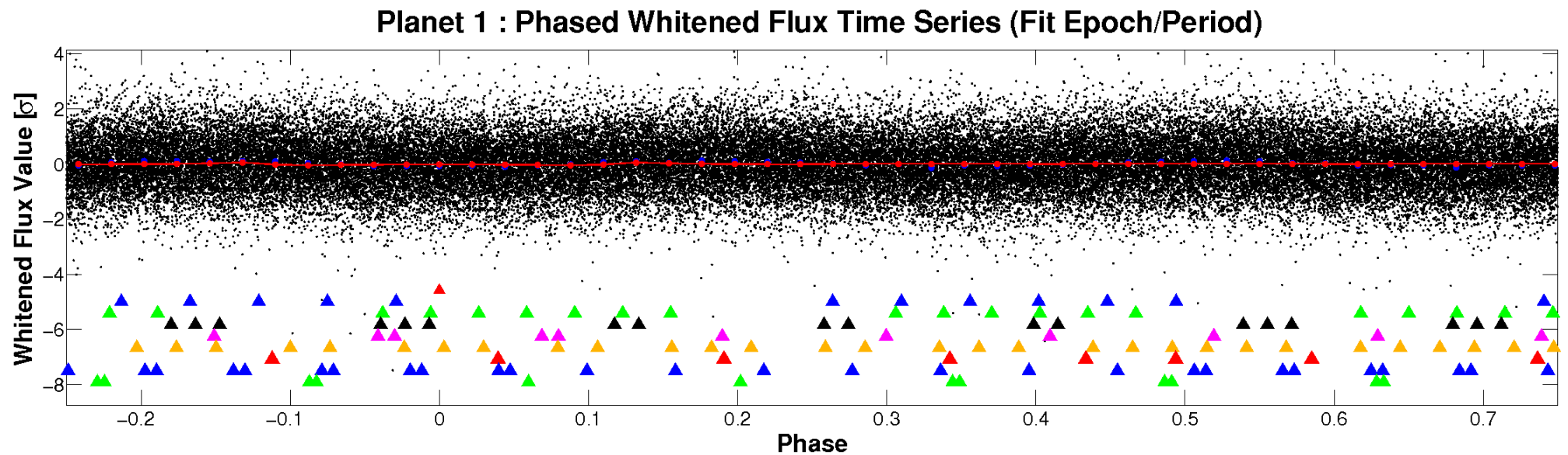
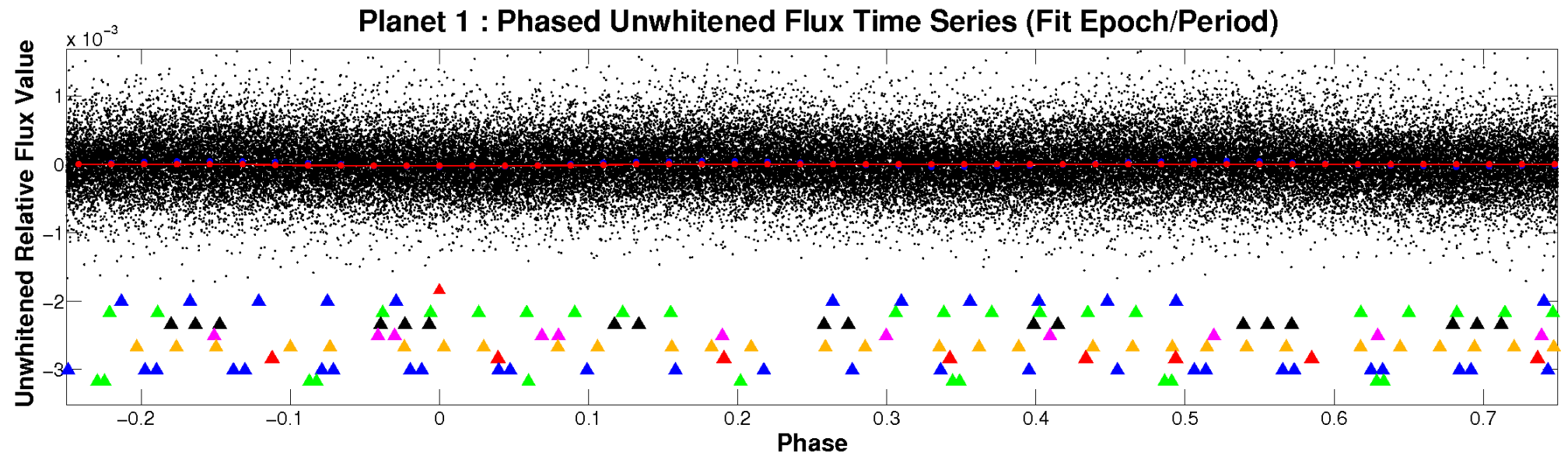


# ALT Odd/Even

TCE 006715331-01



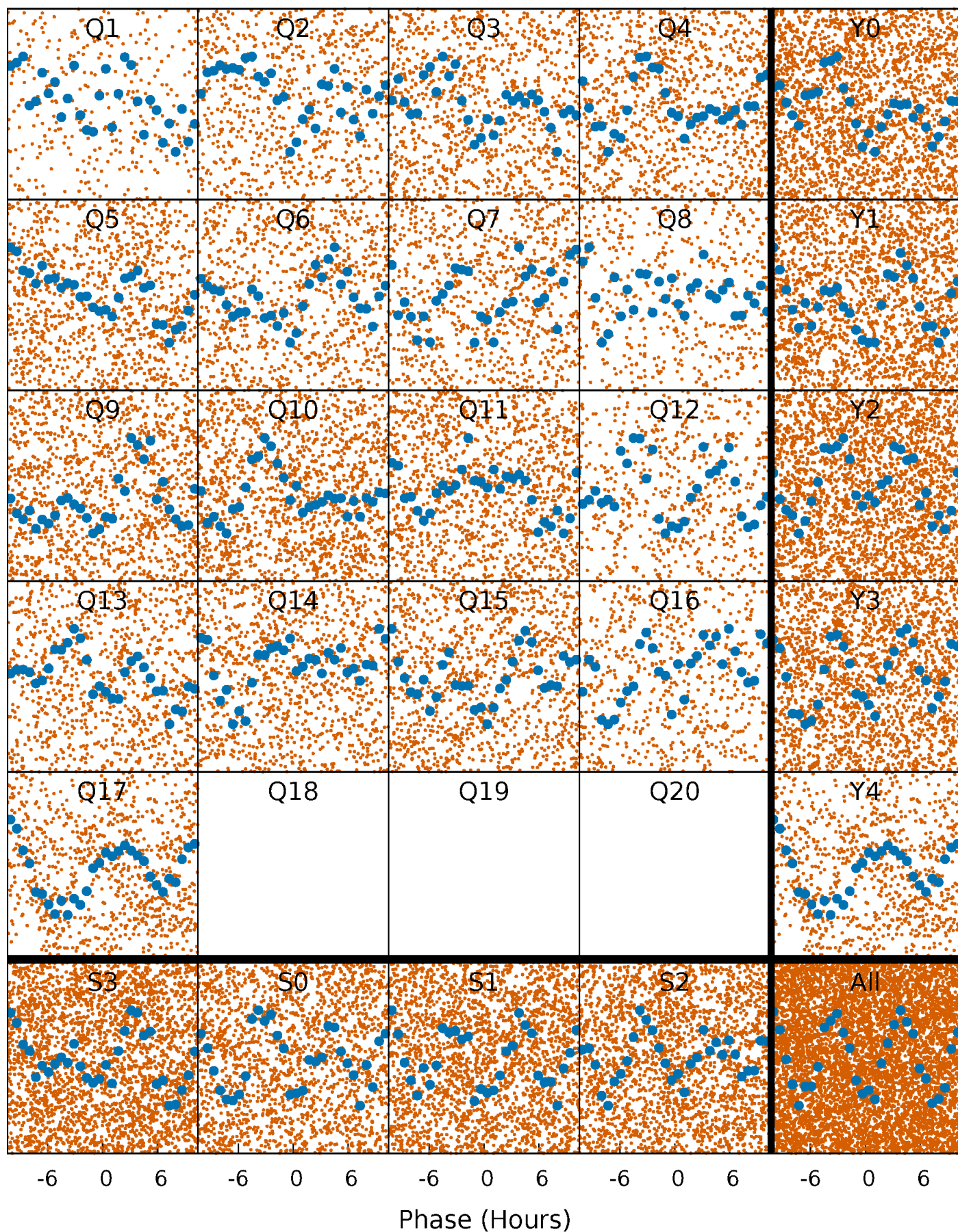
# Non-Whitened Vs. Whitened Light Curve





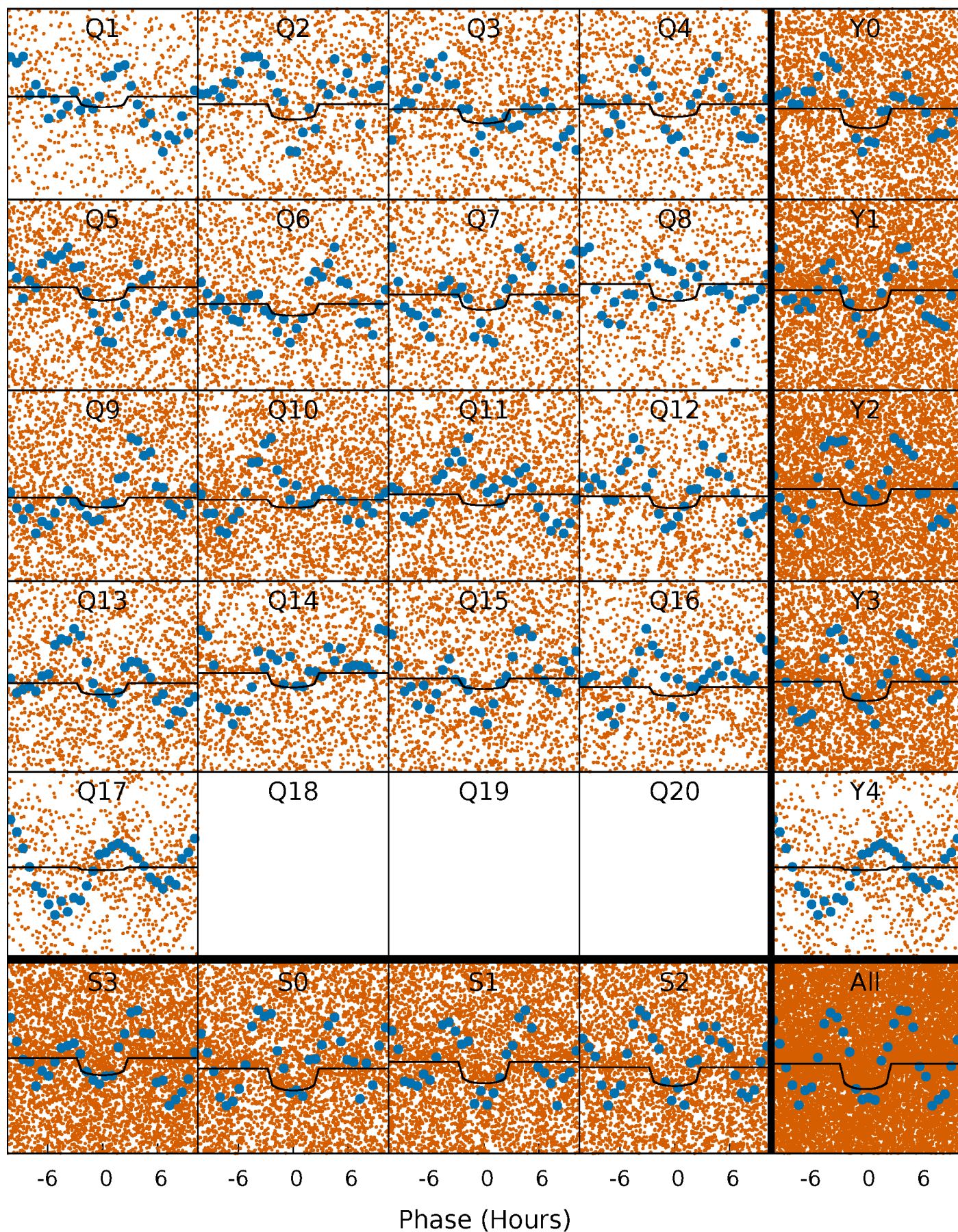
# PDC Quarter-Phased Transit Curves

TCE 006715331-01 P= 0.928873 Days  $T_0=132.119851$  (BKJD)



# DV Quarter-Phased Transit Curves

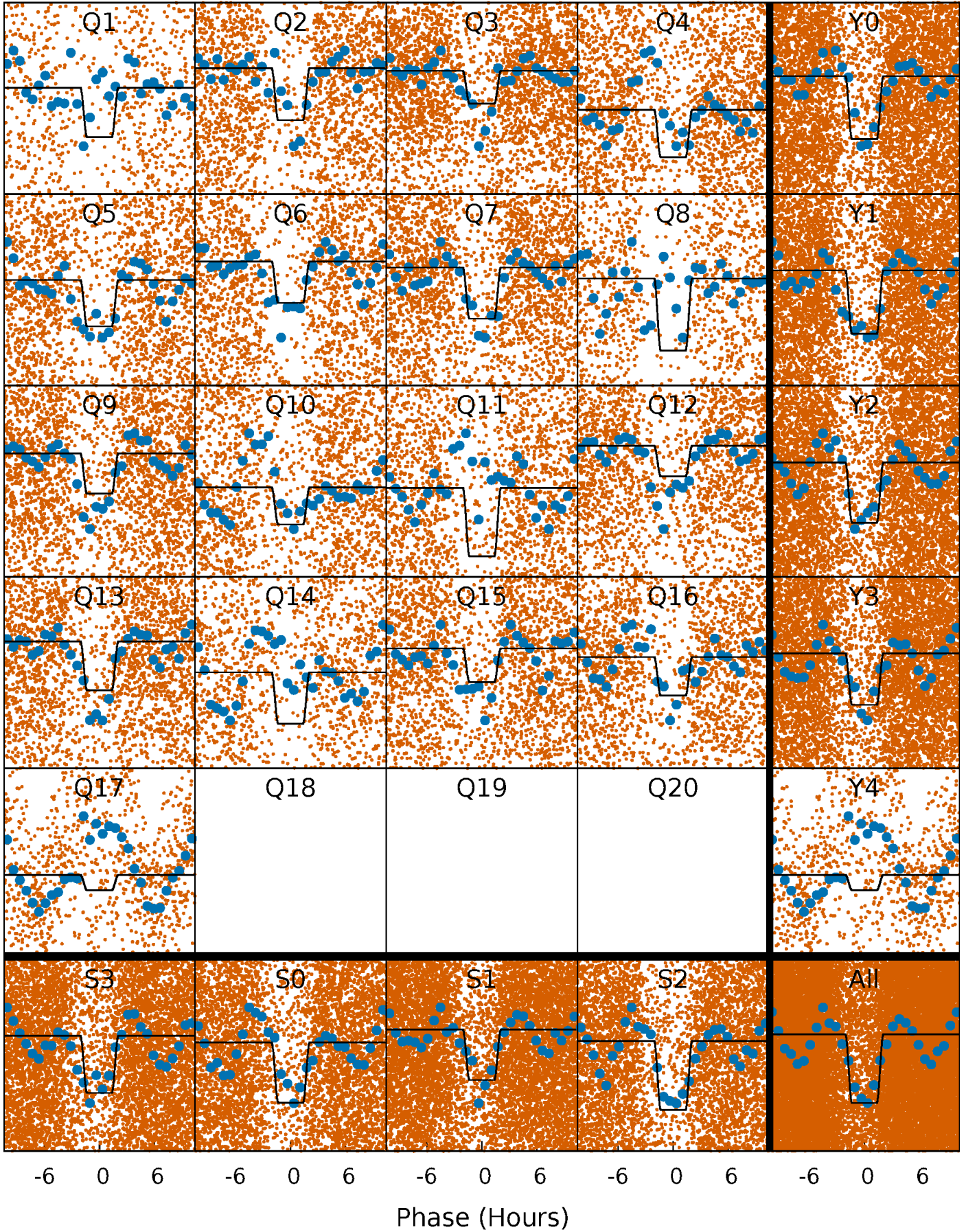
TCE 006715331-01 P= 0.928873 Days  $T_0=132.119851$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

TCE 006715331-01 P= 0.928903 Days  $T_0=132.108485$  (BKJD)

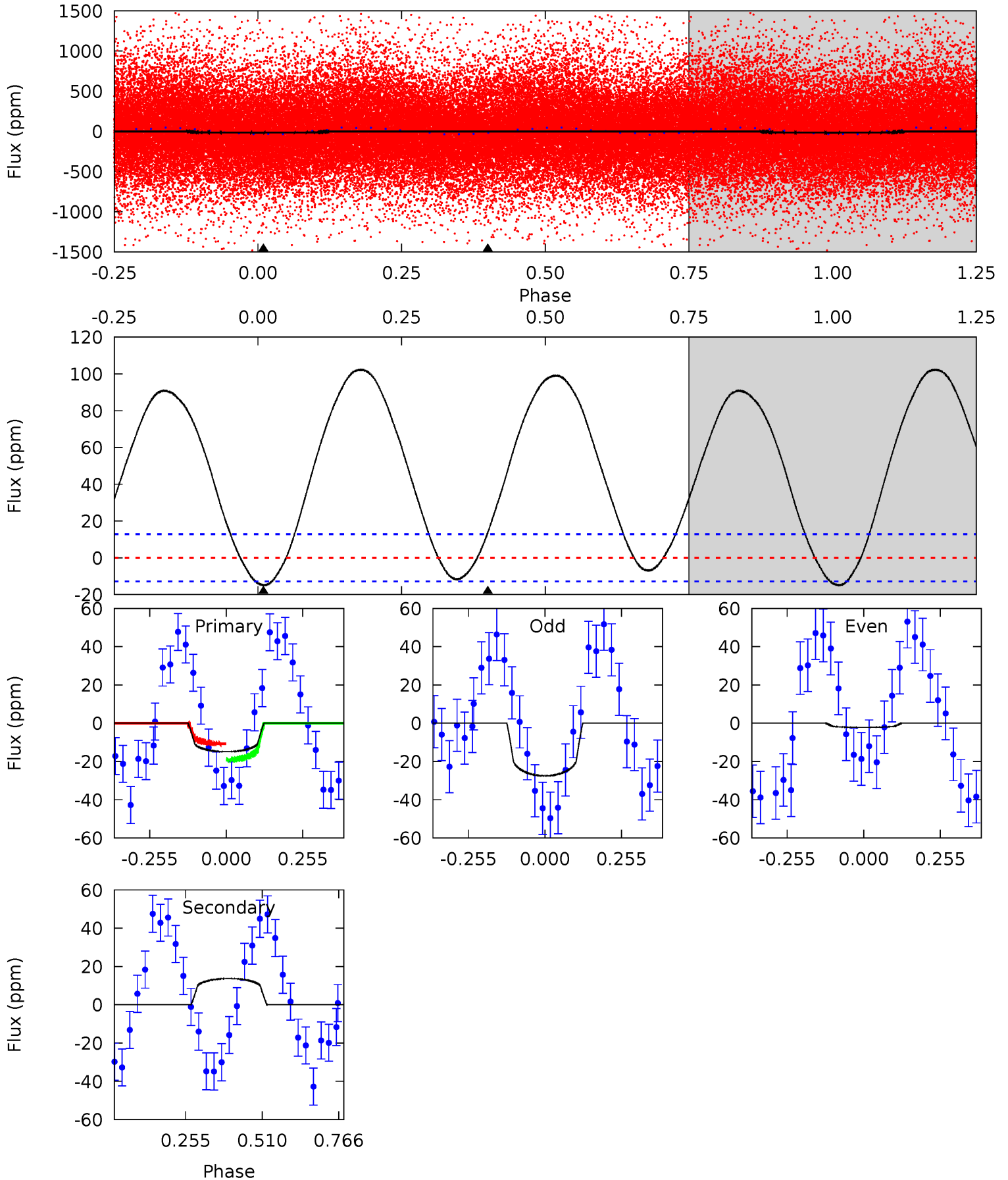




# DV Model-Shift Uniqueness Test

006715331-01, P = 0.928873 Days, E = 131.190978 Days

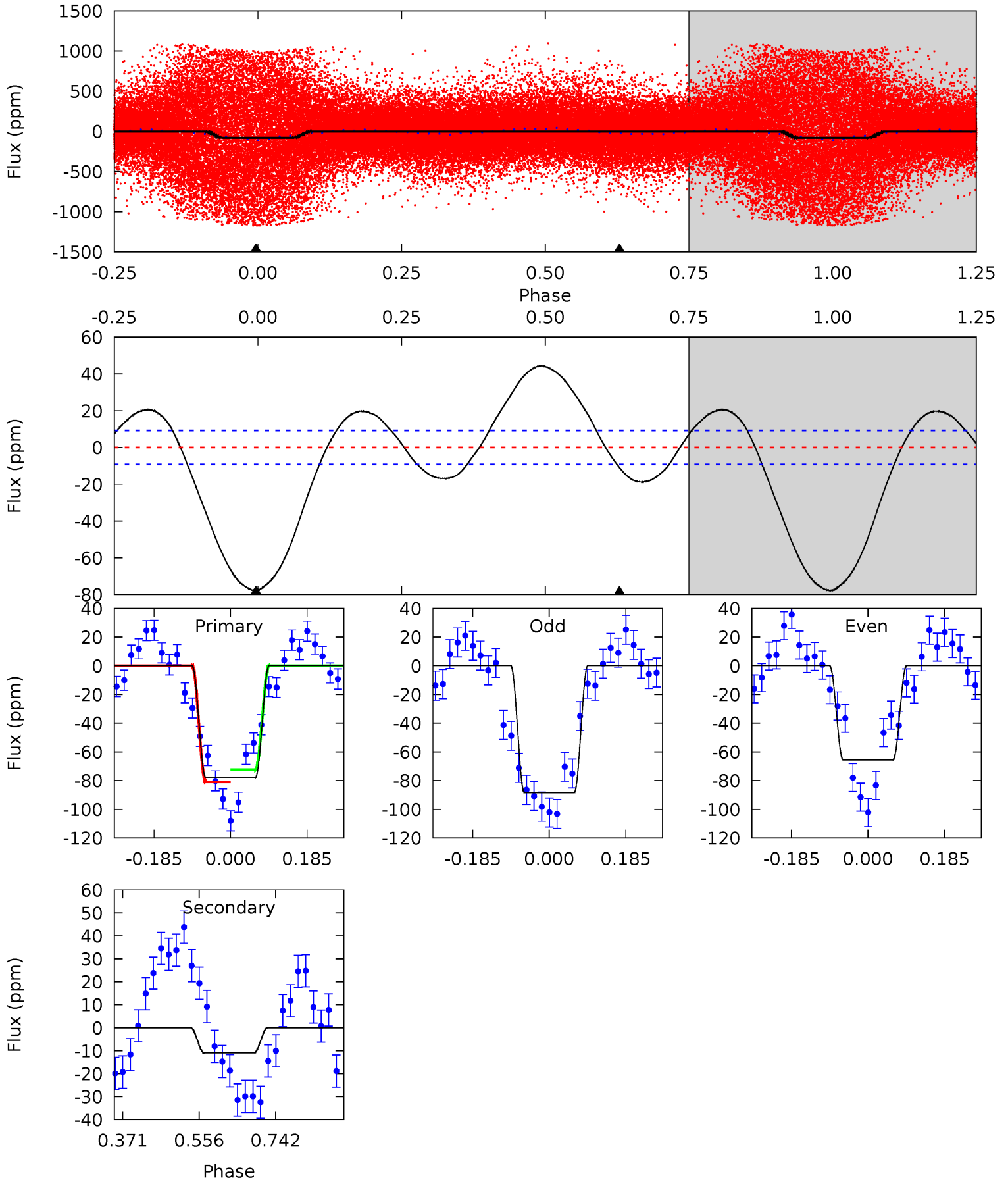
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
5.08	-4.65	0	0	4.36	1.14	4.50	5.08	5.08	-4.65	-4.65	4.37	0.76	0.87	1.47



# Alt Model-Shift Uniqueness Test

006715331-01, P = 0.928903 Days, E = 131.179582 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
37.5	5.28	0	0	4.43	1.32	6.79	37.5	37.5	5.28	5.28	5.47	0.81	0.36	2.02



### Stellar Parameters For KIC 006715331

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$7053^{+170}_{-255}$	$3.000^{+0.595}_{-0.105}$	$-0.500^{+0.500}_{-0.250}$	$8.604^{+1.321}_{-4.954}$	$2.698^{+0.387}_{-0.903}$	$0.006^{+0.048}_{-0.002}$
	+2%/-4%	+20%/-3%	+100%/-50%	+15%/-58%	+14%/-33%	+808%/-31%
Source	PHO1	FLK73	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 006715331-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$14 \pm 3$	$3.67^{+1.71}_{-1.39}$	$7655^{+565}_{-1161}$	$-7606^{+788}_{-1104}$	$-0.357^{+0.187}_{-0.556}$
Alt.	$-11 \pm 2$	$7.44^{+2.14}_{-2.17}$	$7674^{+542}_{-1086}$	$-5820^{+1141}_{-520}$	$0.073^{+0.071}_{-0.027}$

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



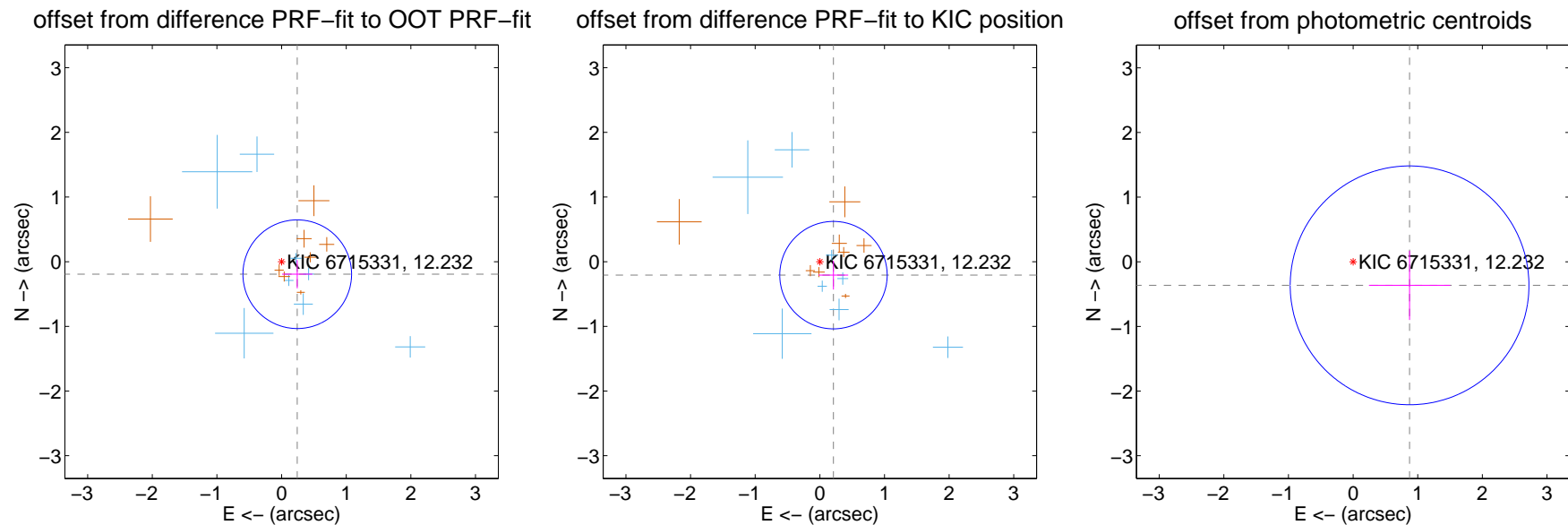
## DV Centroid Data

Supplemental centroid analysis for 006715331-01. Kepler magnitude: 12.23. Transit SNR 5.25

There are 8 quarters with good PRF difference image offsets

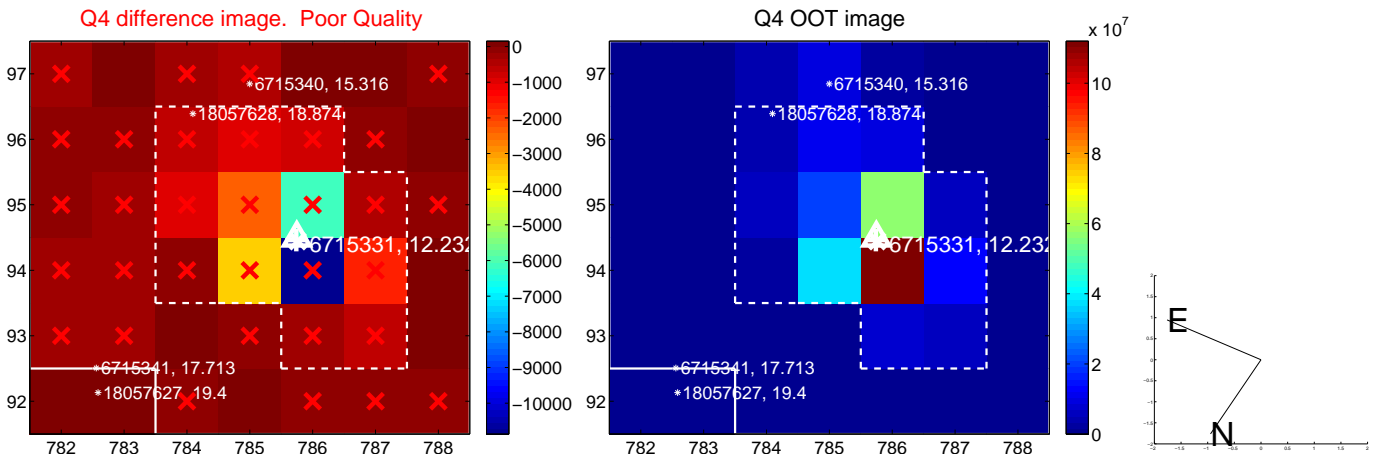
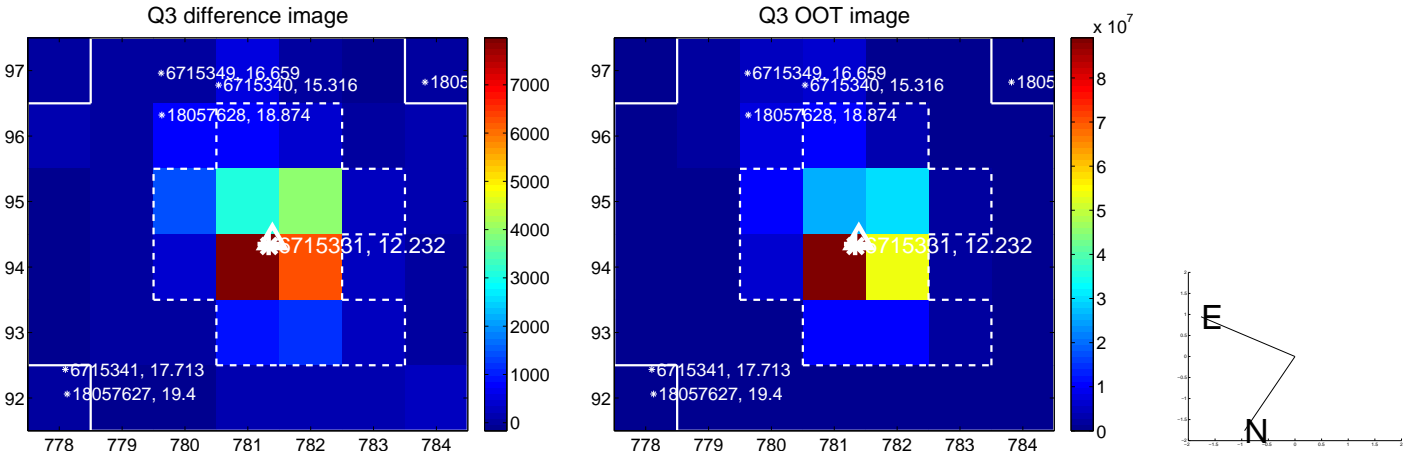
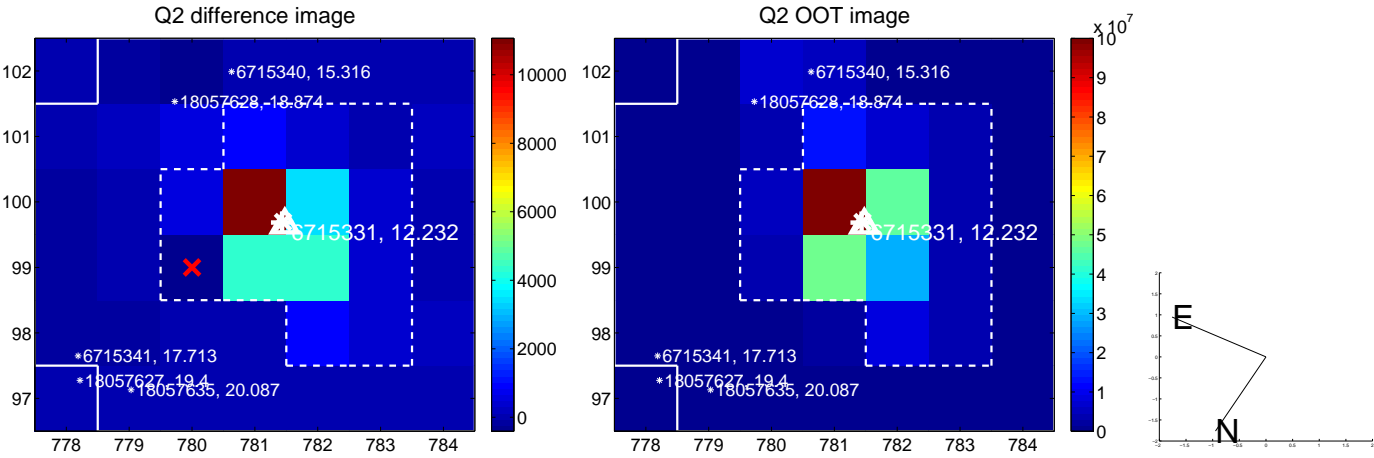
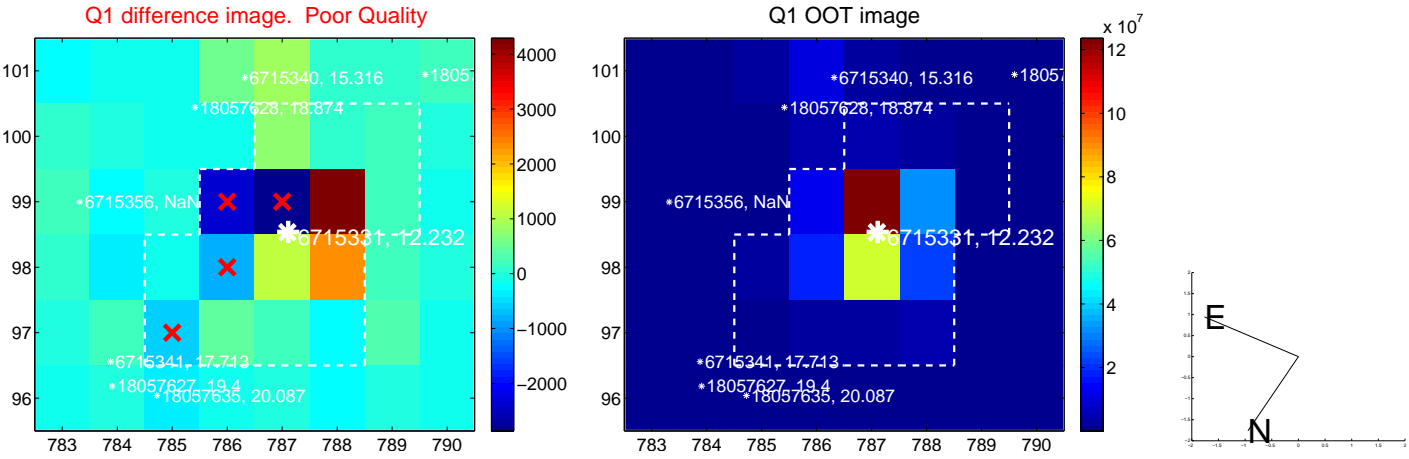
The direct PRF centroid is offset from the target star catalog position by about 0.11 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.310 \pm 0.280$	1.11	$-0.242 \pm 0.235$	$-0.194 \pm 0.218$
PRF-fit source offset from KIC position	$0.296 \pm 0.277$	1.07	$-0.211 \pm 0.228$	$-0.208 \pm 0.223$
photometric centroid source offset	$0.95 \pm 0.62$	1.54	$-0.87 \pm 0.63$	$-0.36 \pm 0.54$

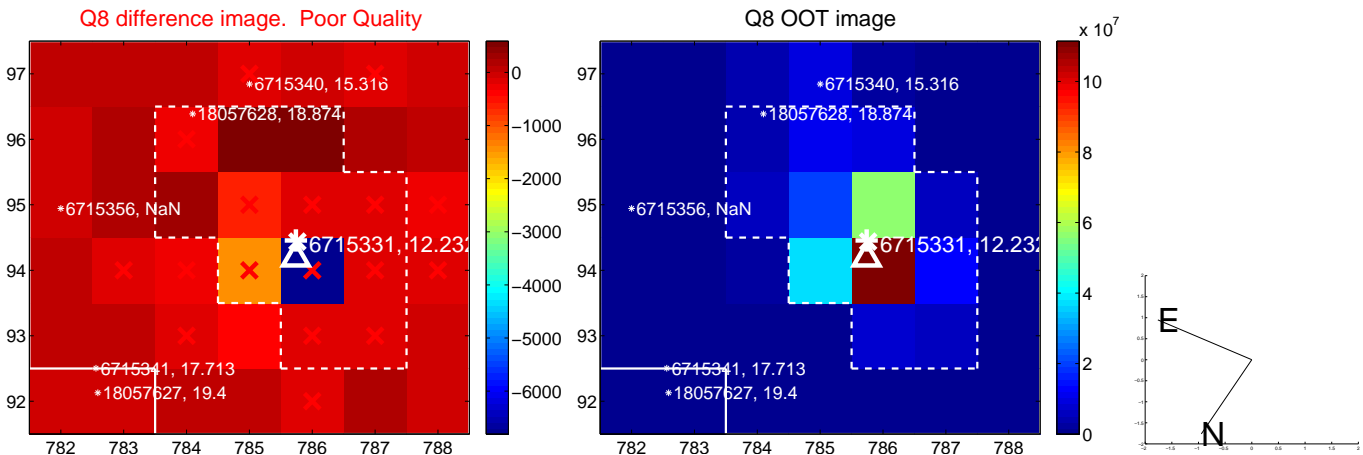
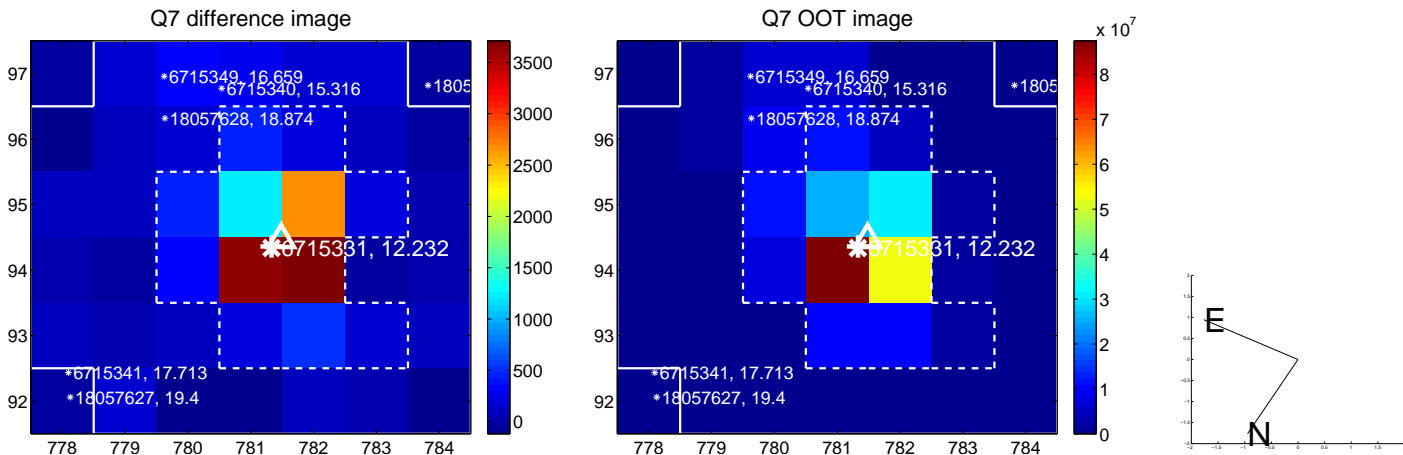
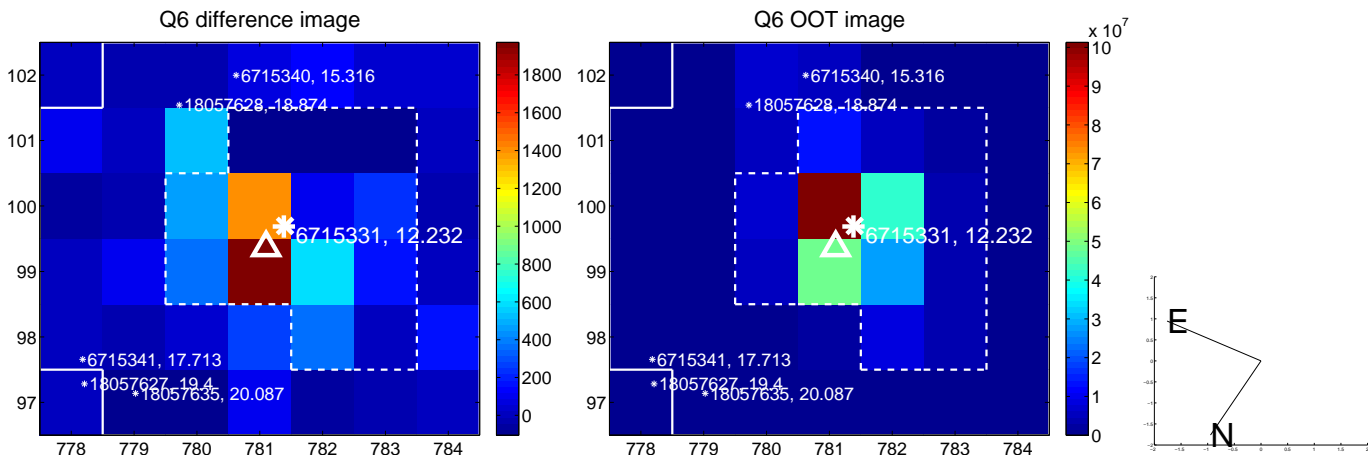
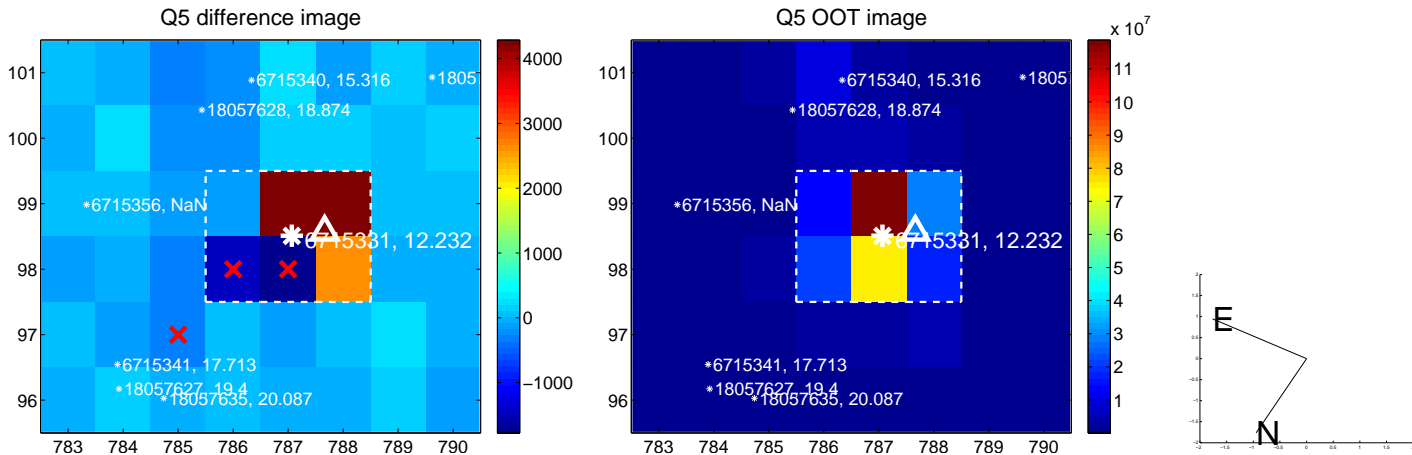


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

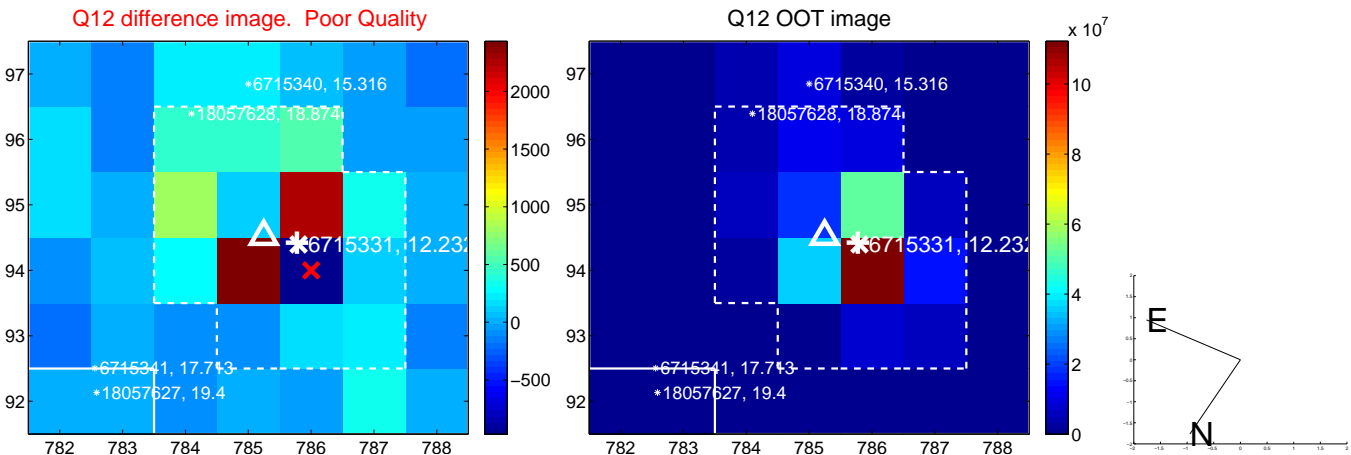
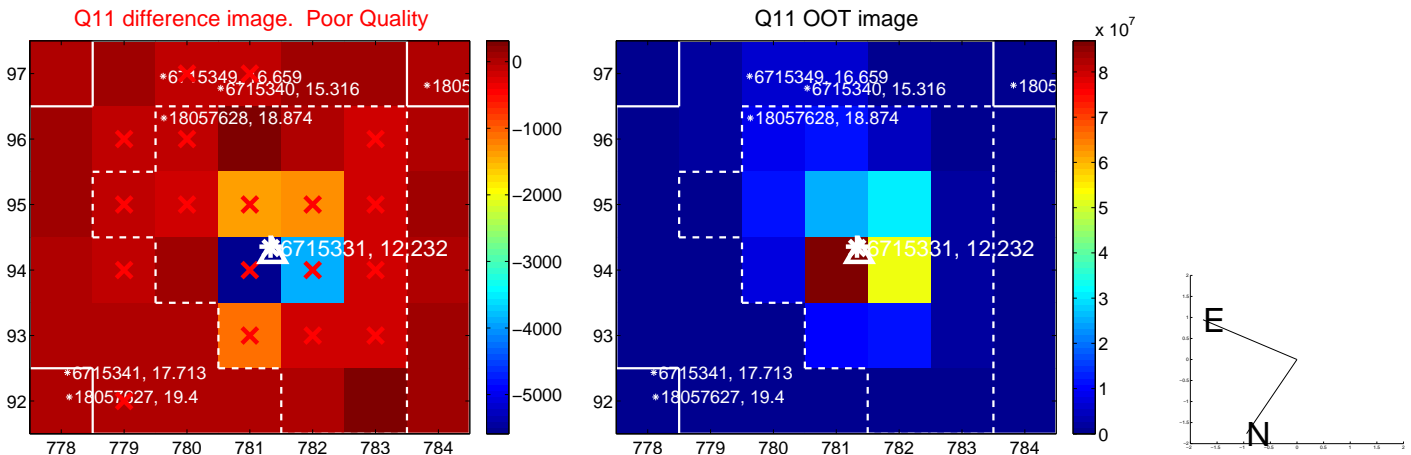
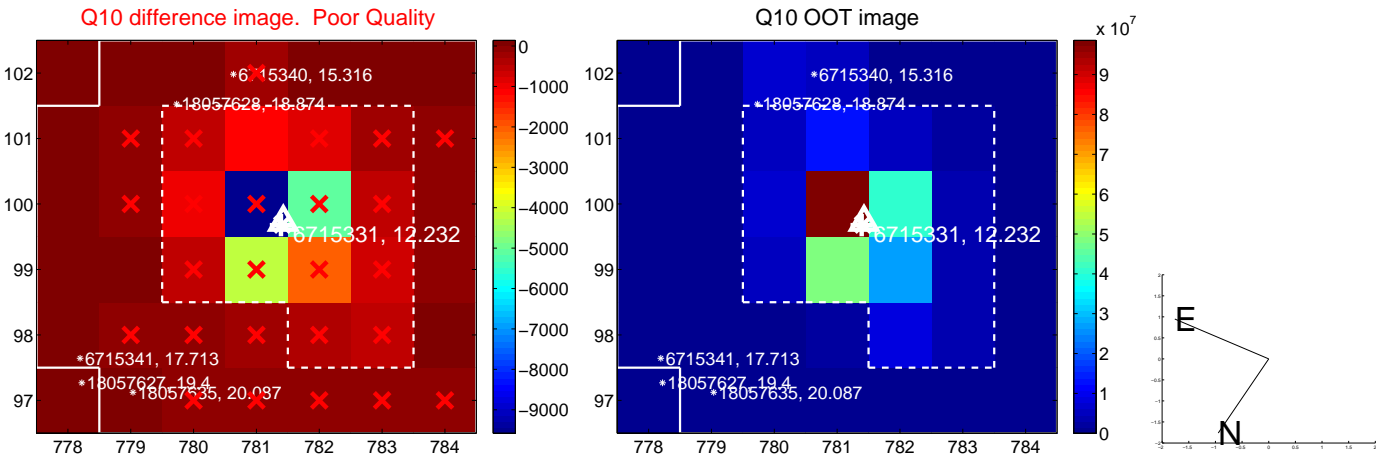
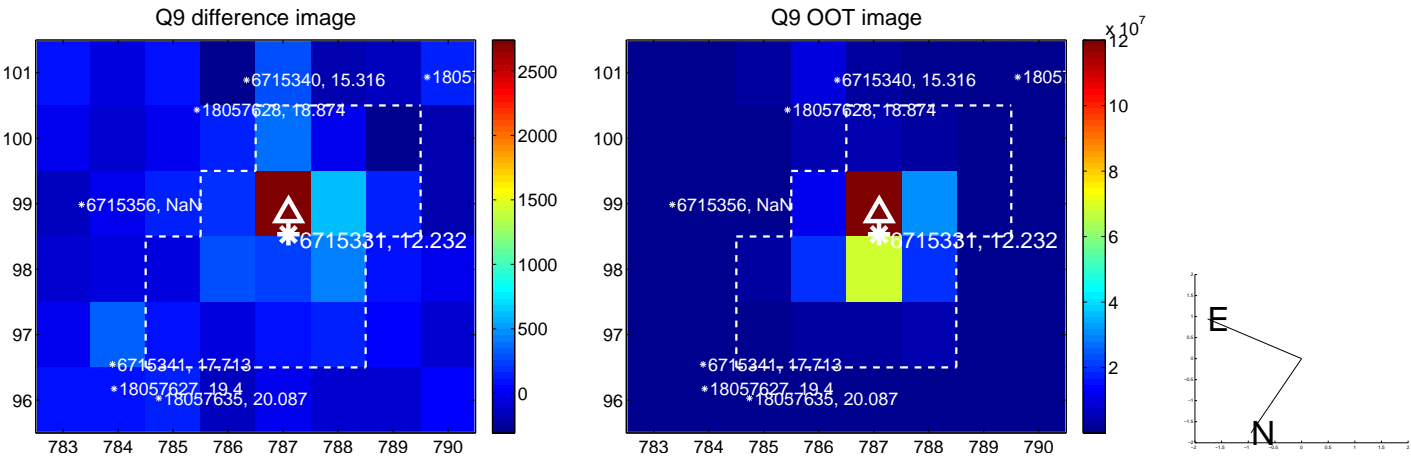


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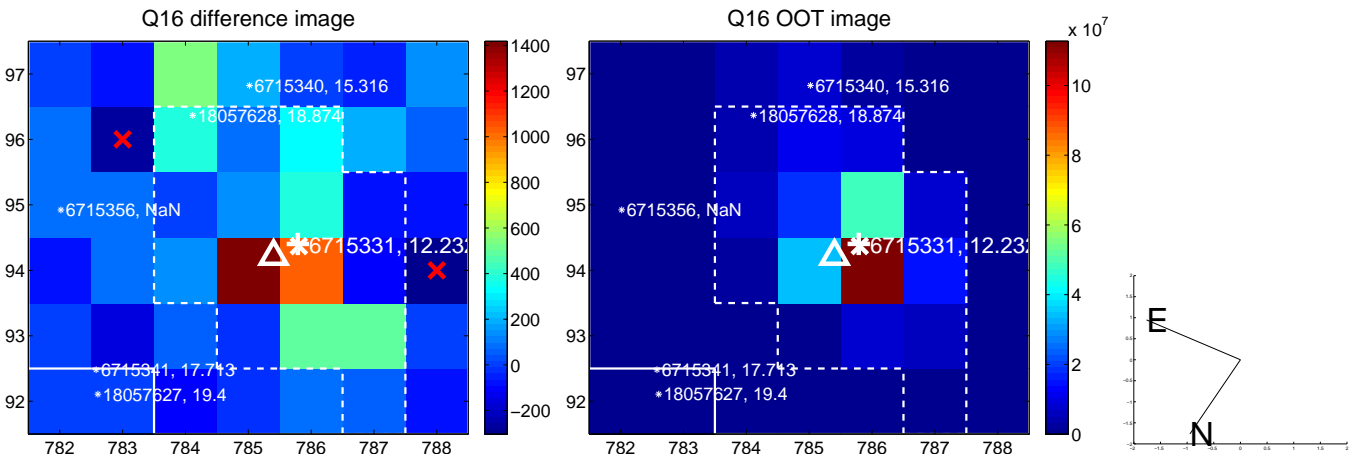
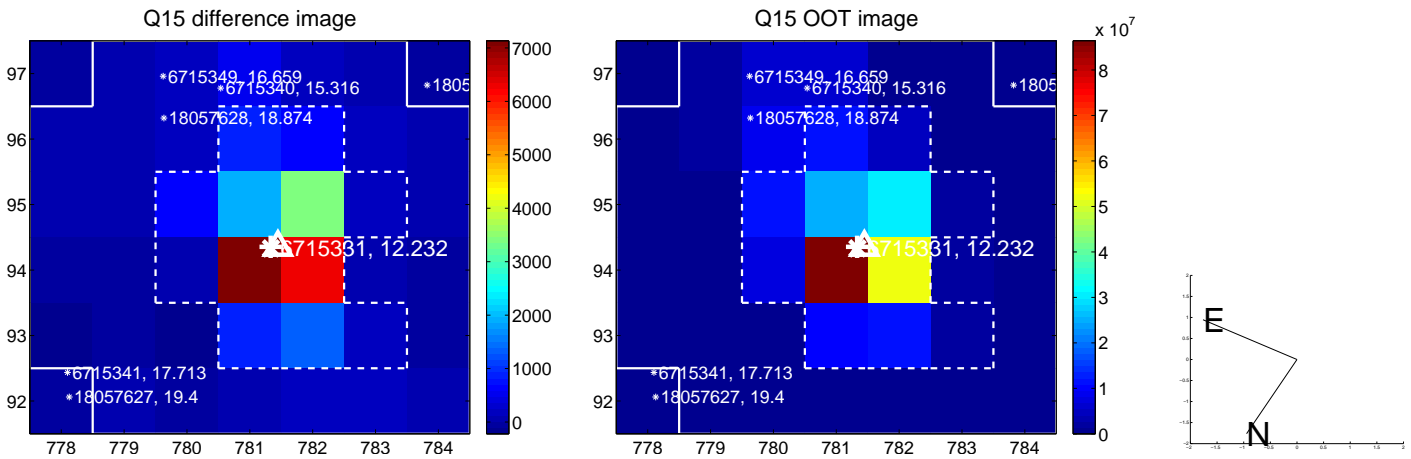
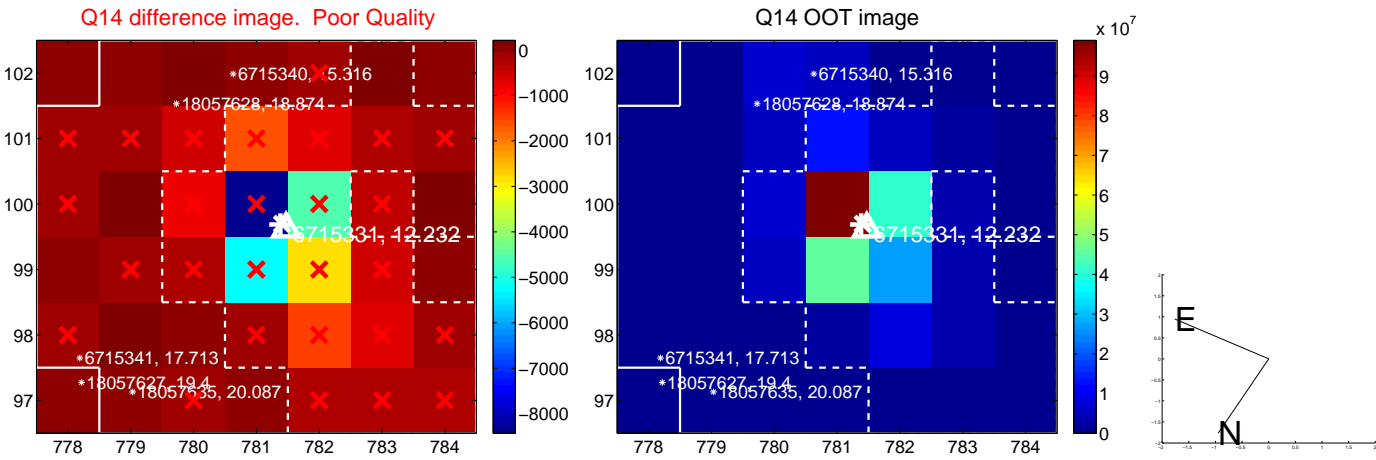
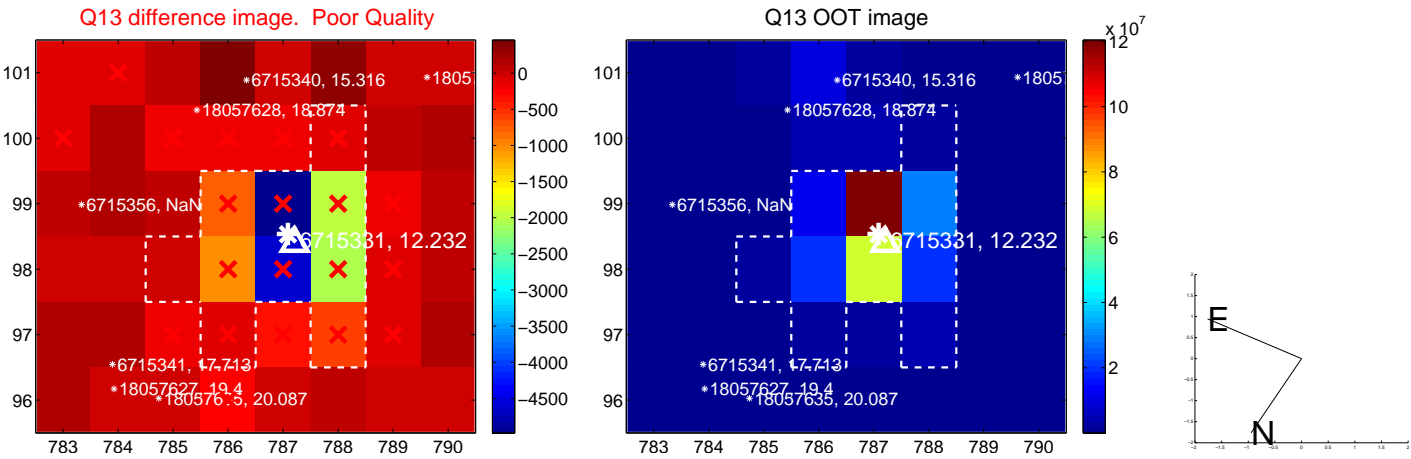




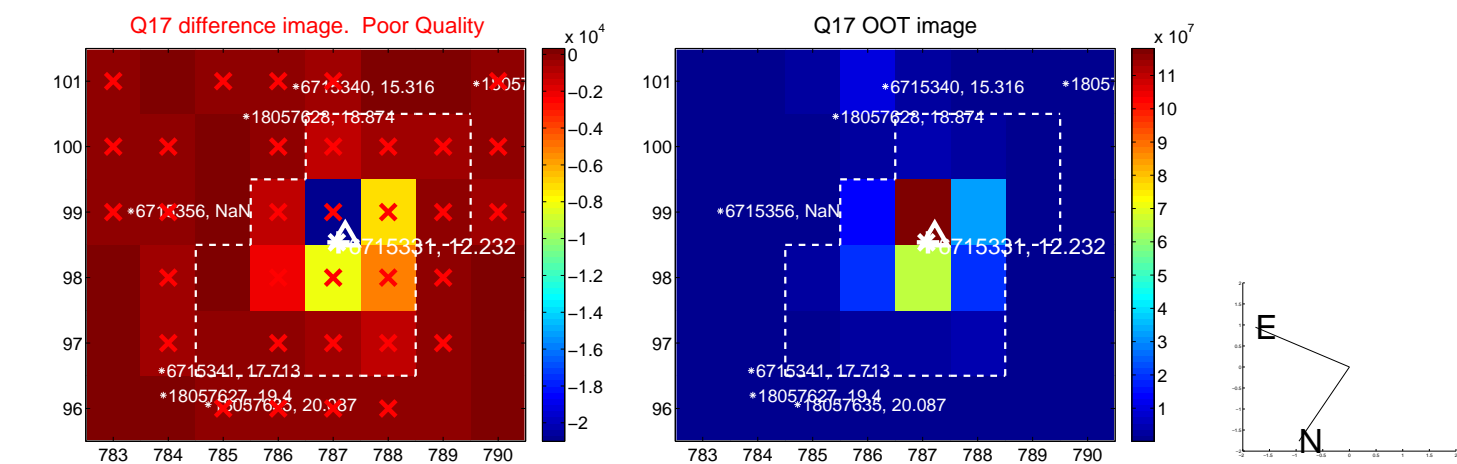
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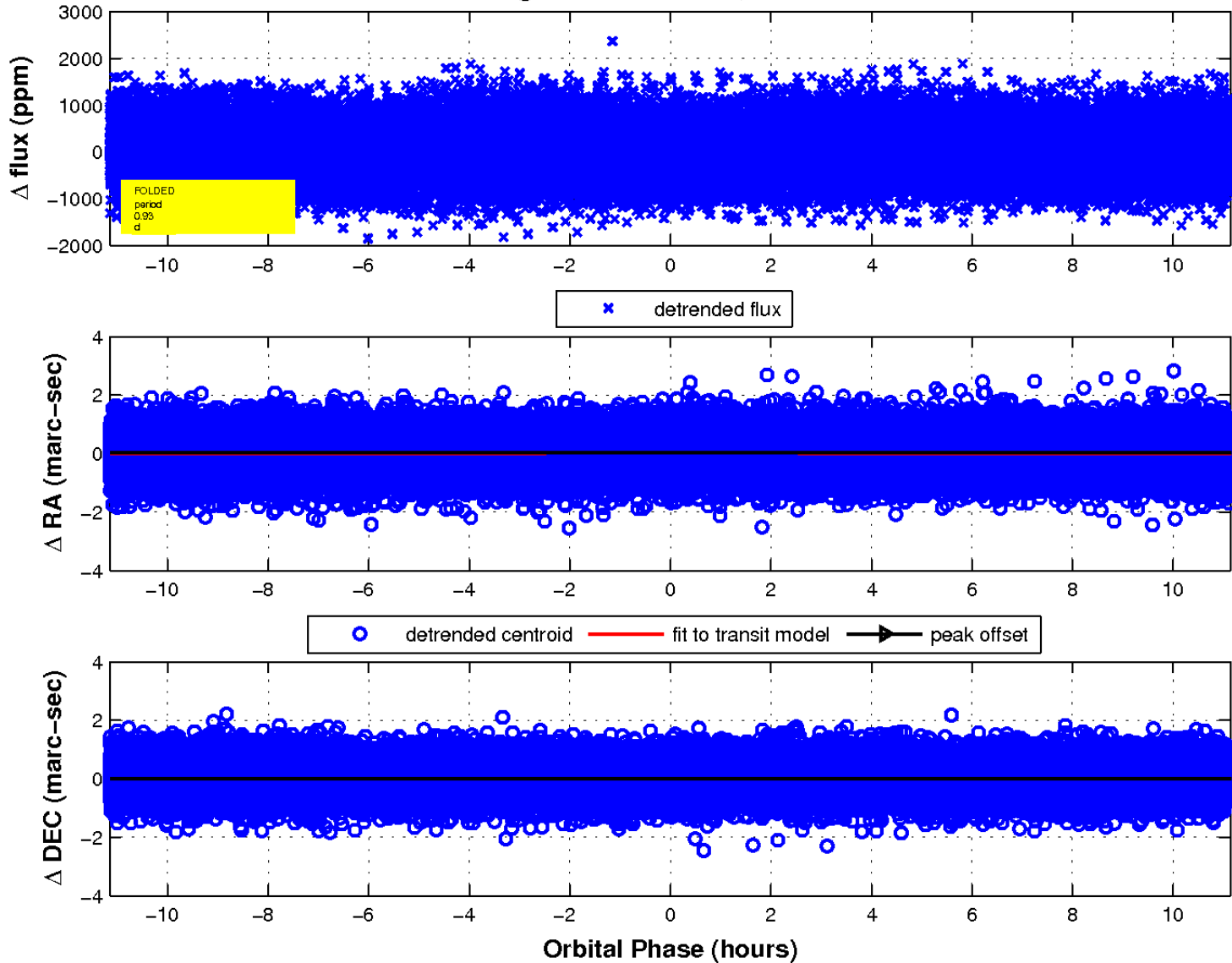
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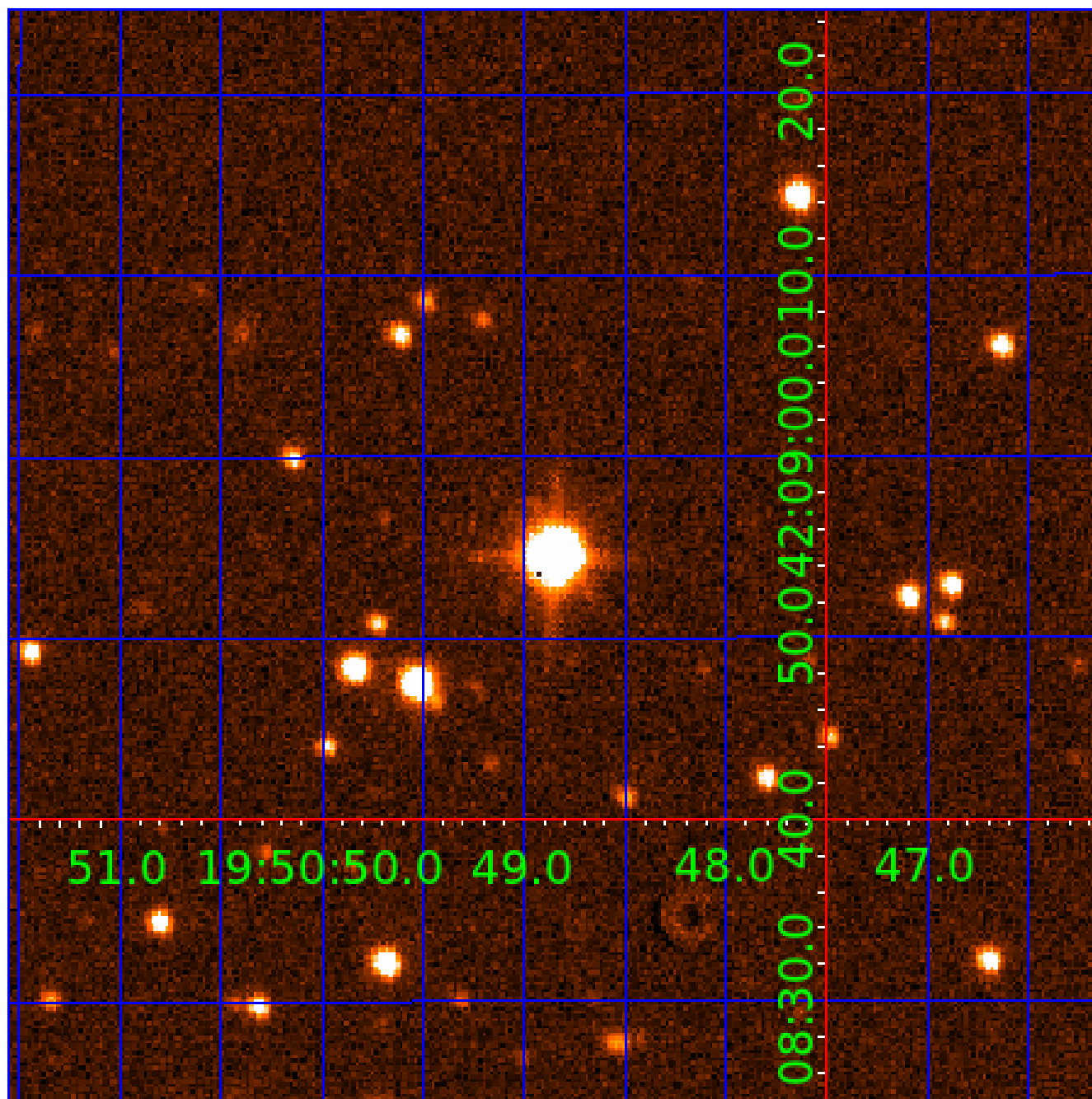


fluxWeightedCentroids, Planet 1 of 9



UKIRT Image

Declination





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006715331-08	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
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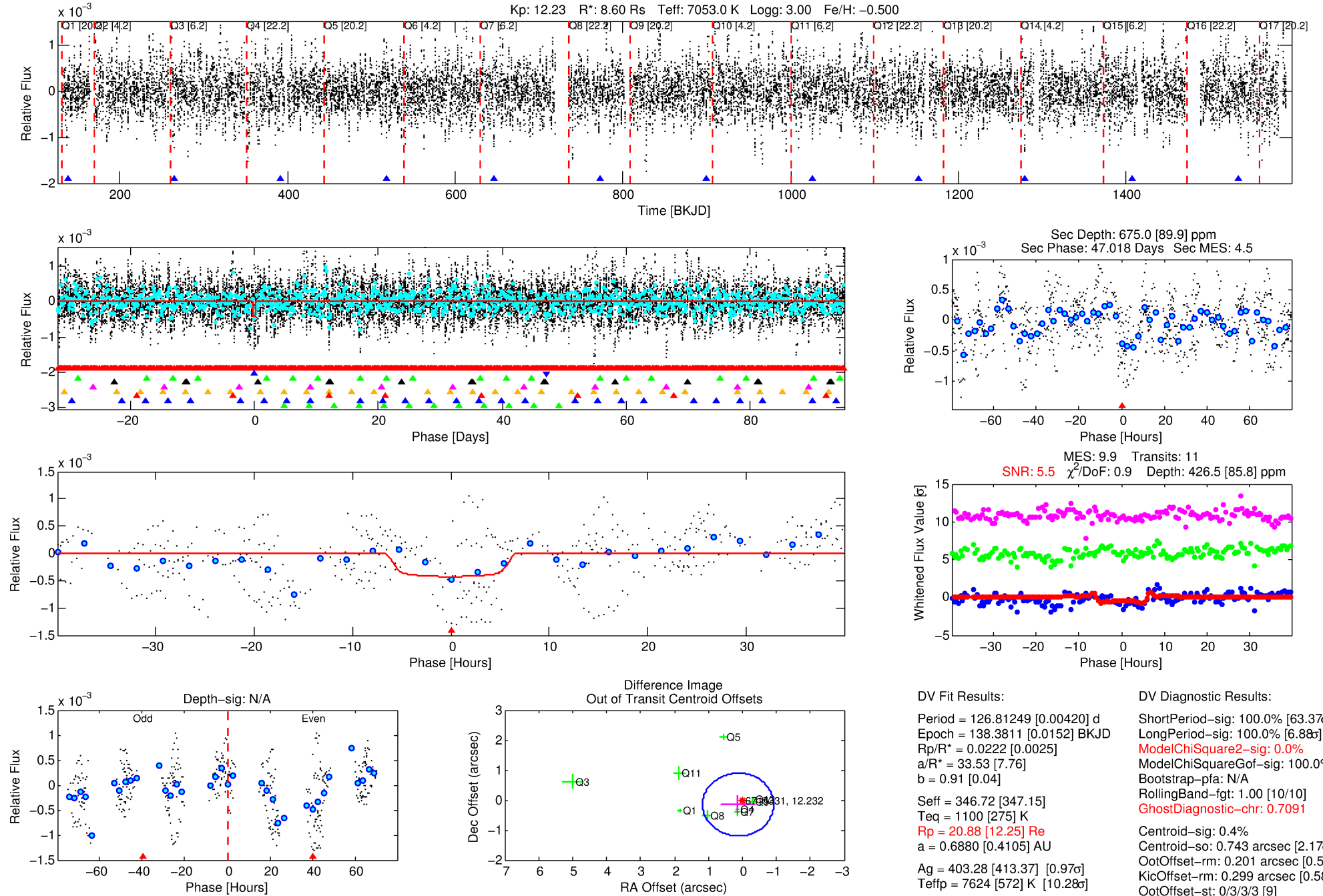
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 006715331-02

No Significant Match Found

# DV One-Page Summary

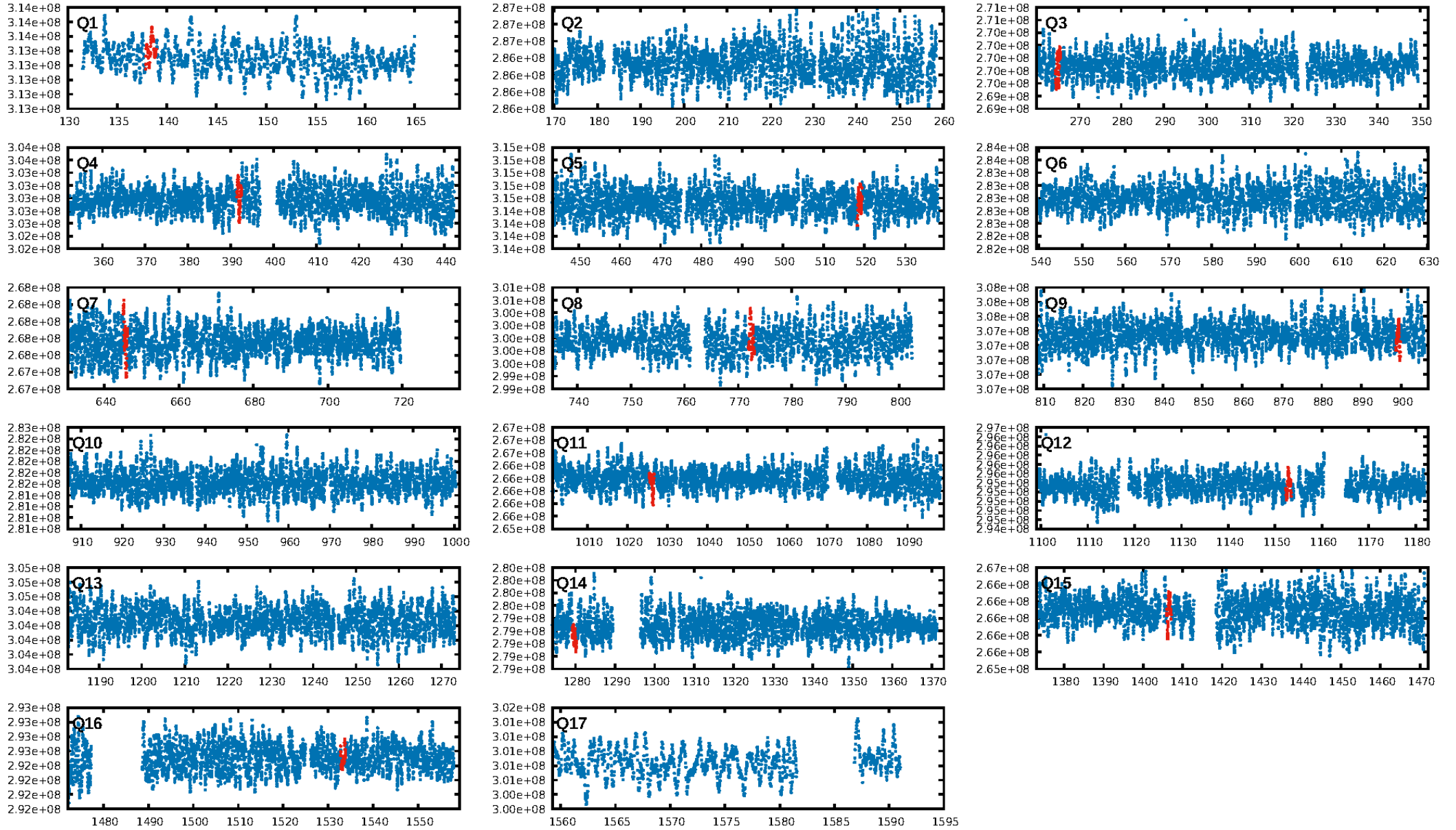
KIC: 6715331 Candidate: 2 of 9 Period: 126.812 d



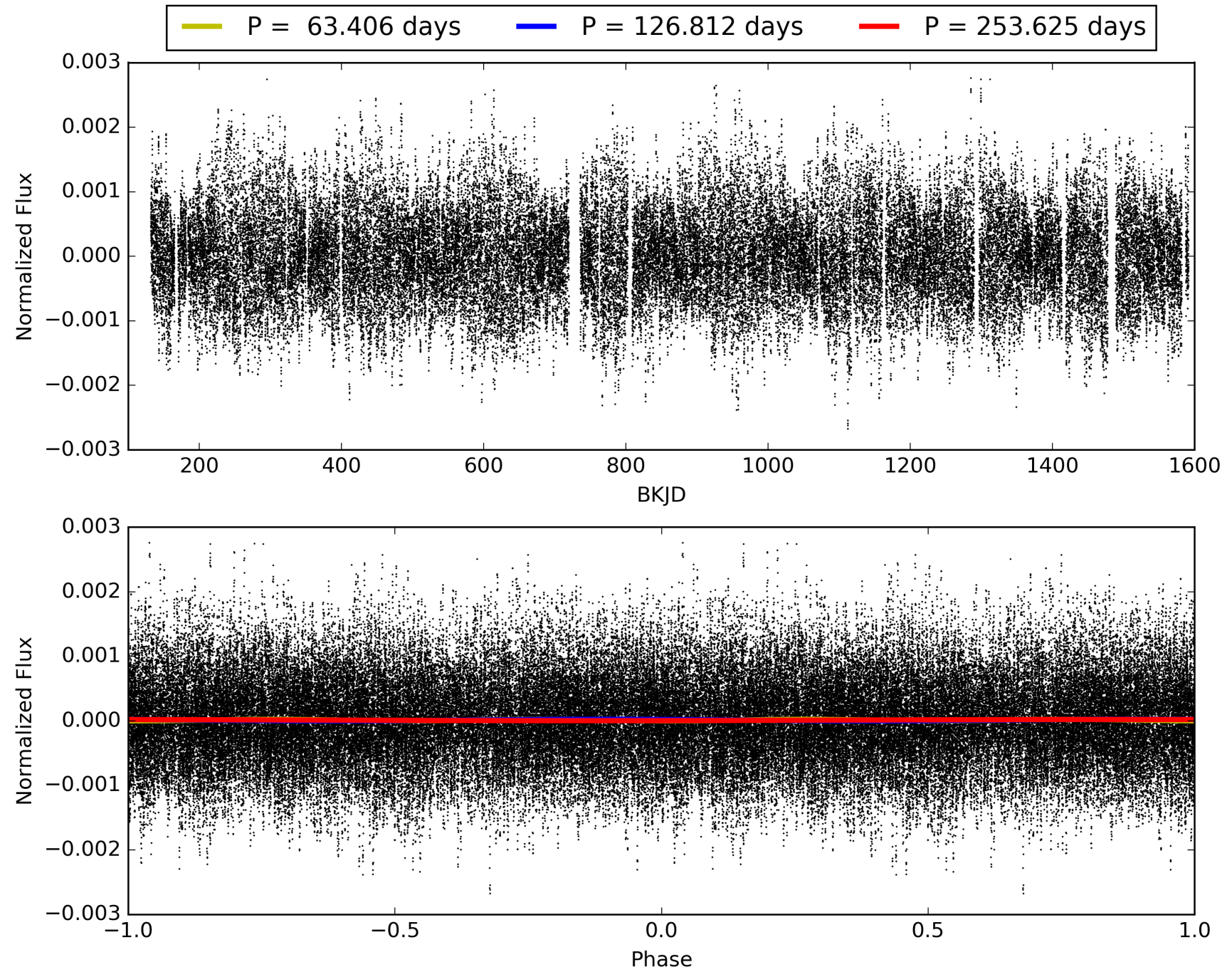
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 05:54:50 Z

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

# TCE 006715331-02, PDC Light Curves



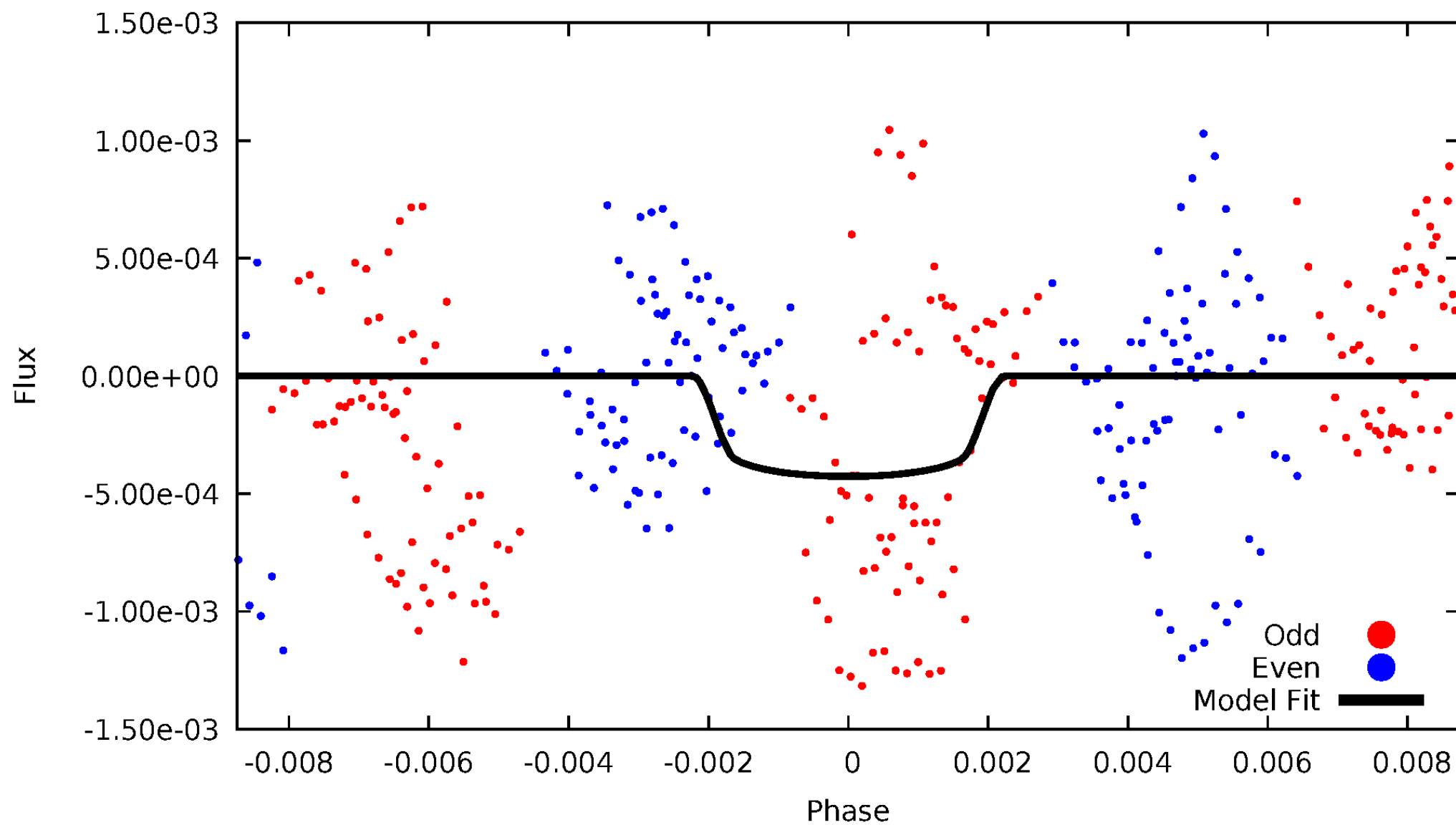
# TCE 006715331-02





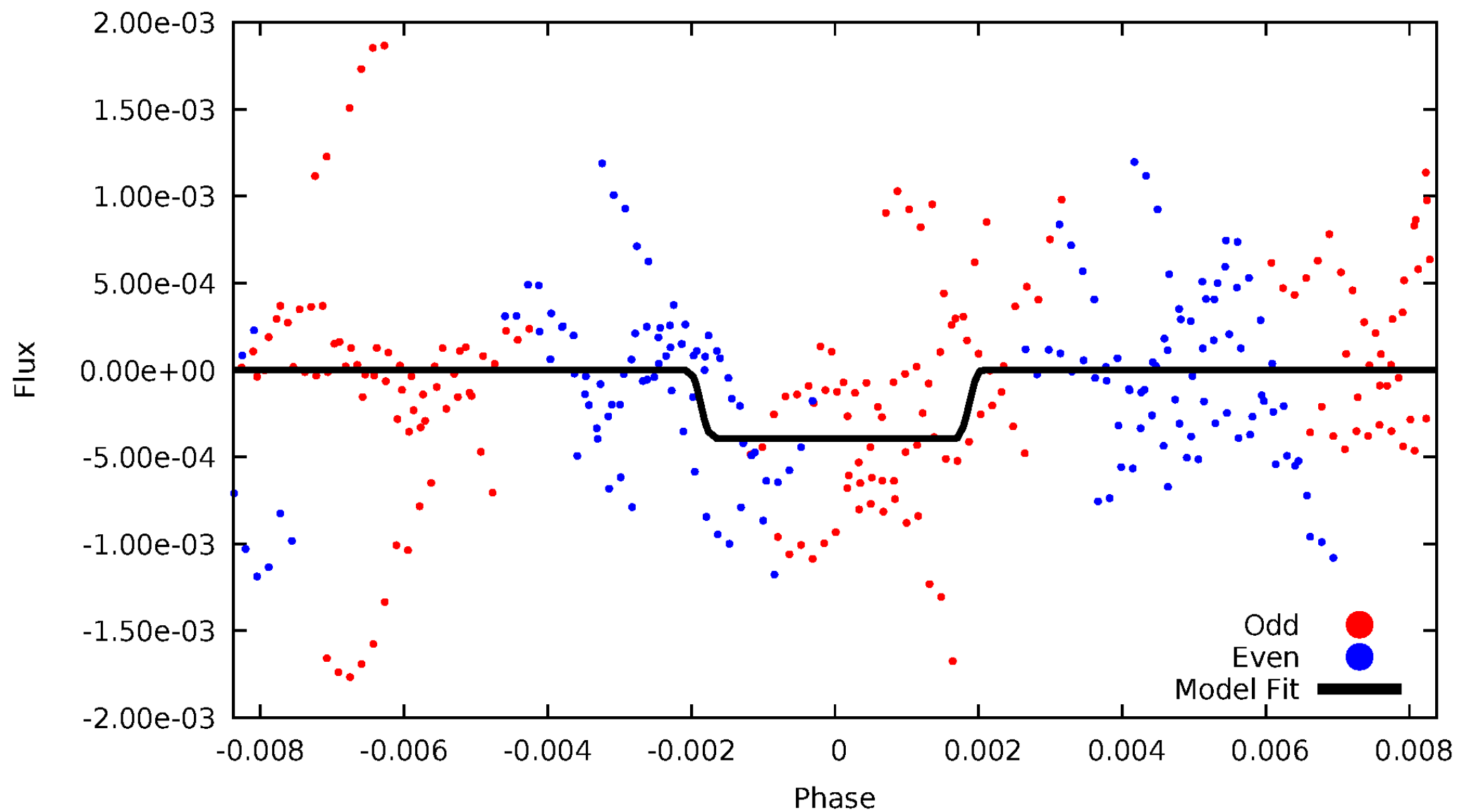
# DV Odd/Even

TCE 006715331-02



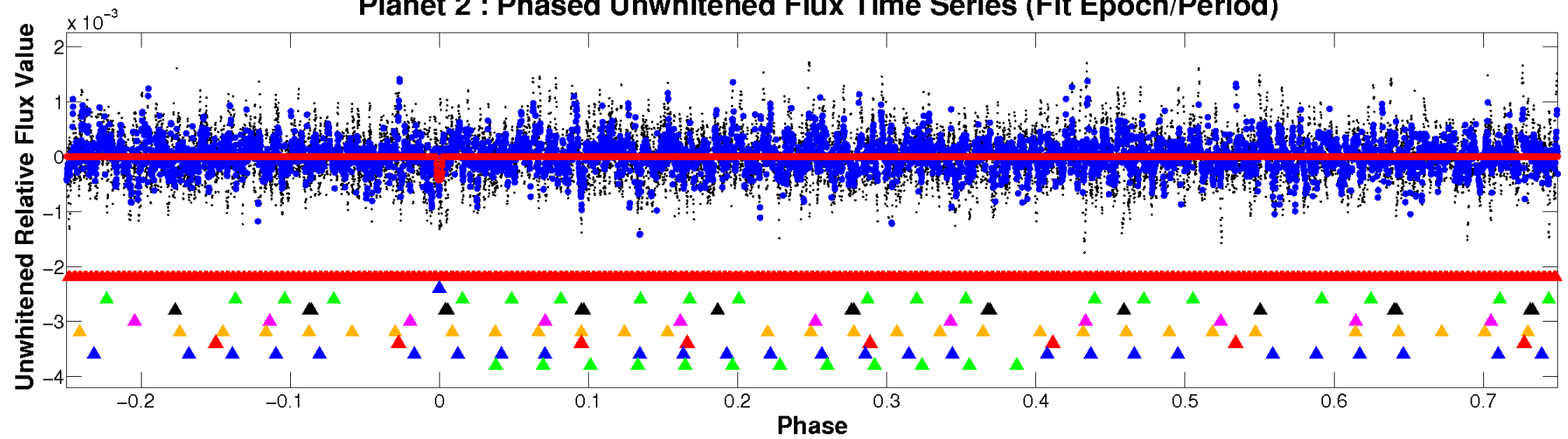
# ALT Odd/Even

TCE 006715331-02

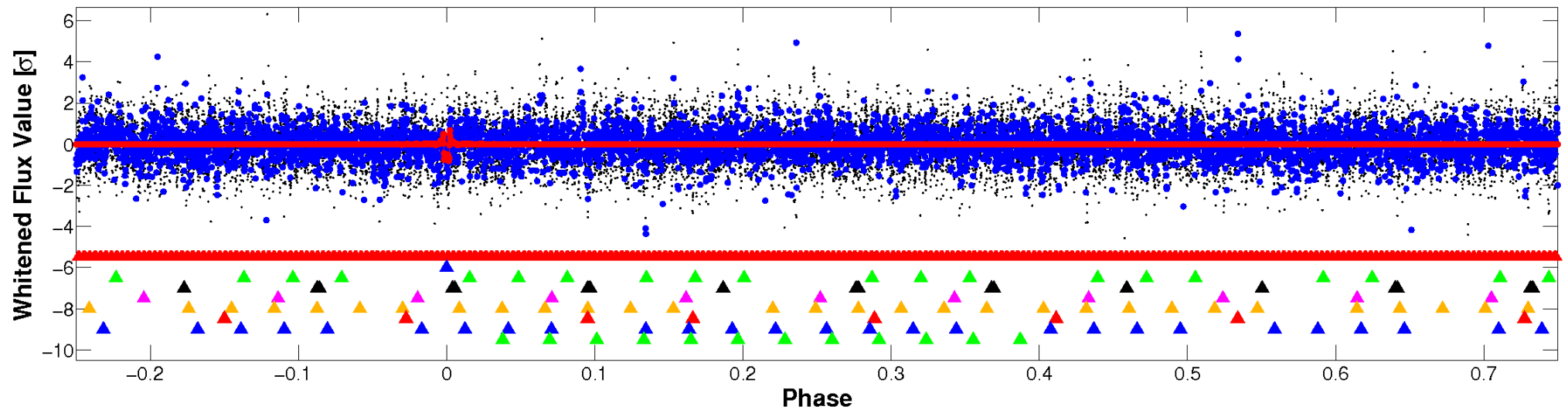


# Non-Whitened Vs. Whitened Light Curve

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

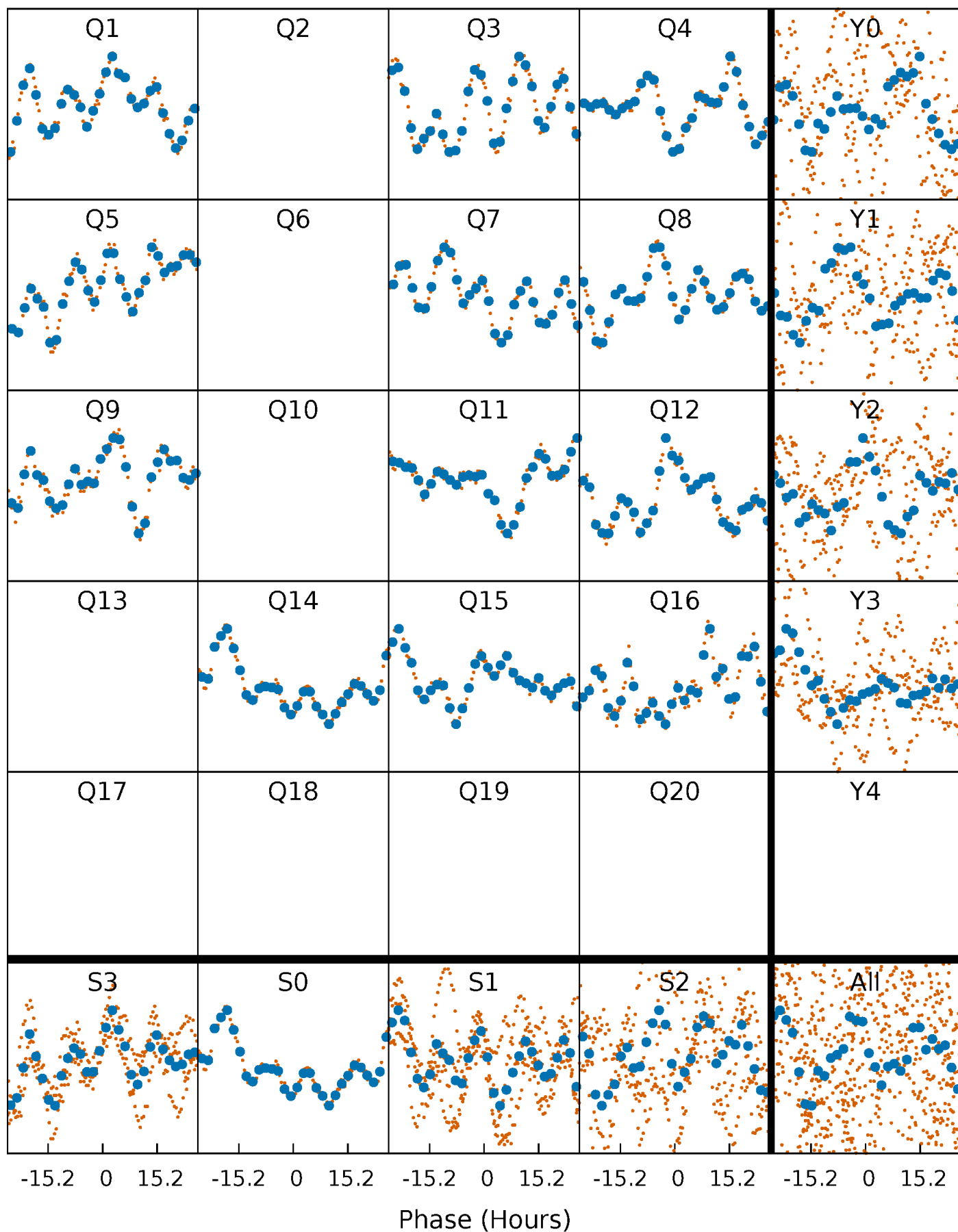


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

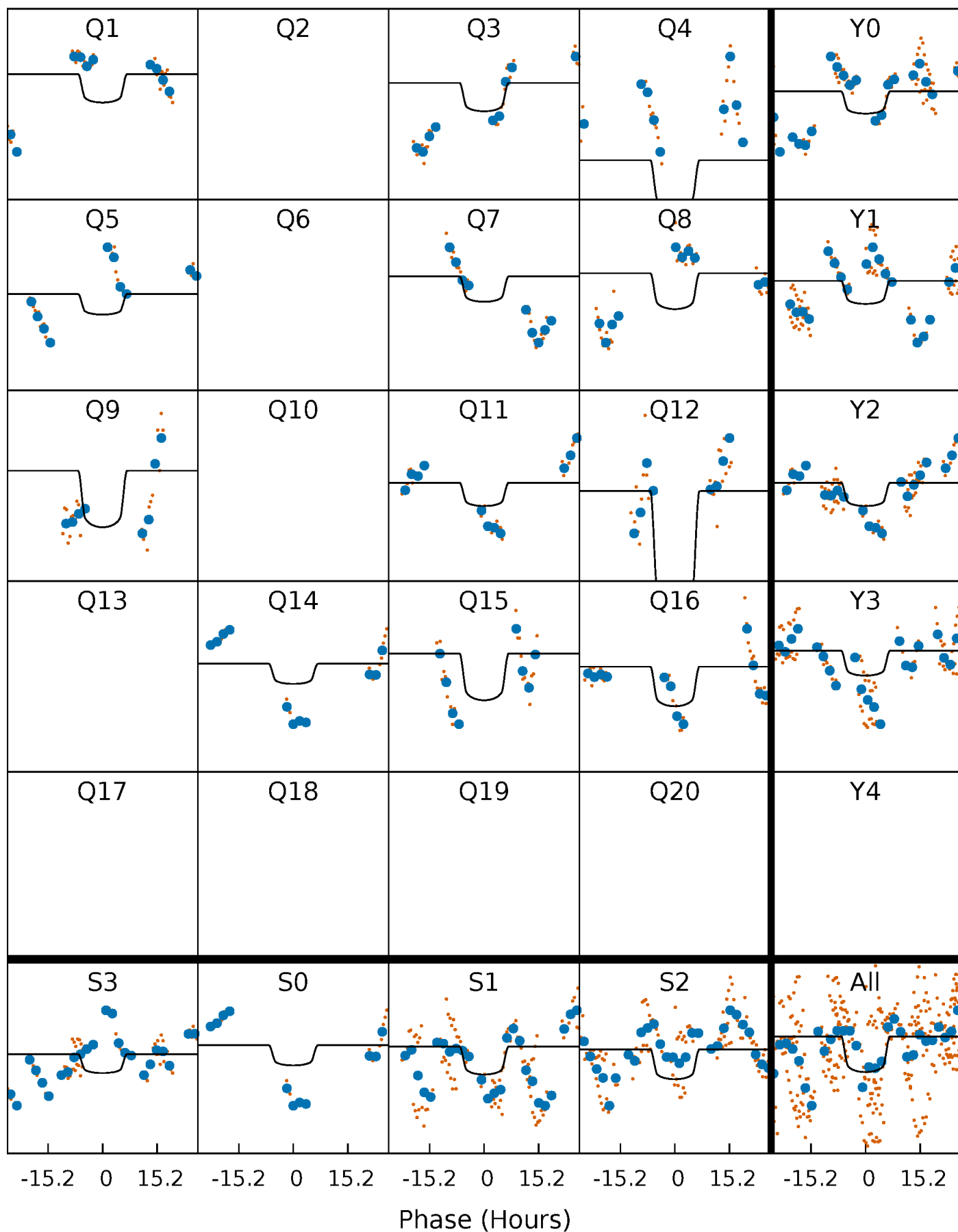
TCE 006715331-02 P=126.812494 Days  $T_0=138.381125$  (BKJD)





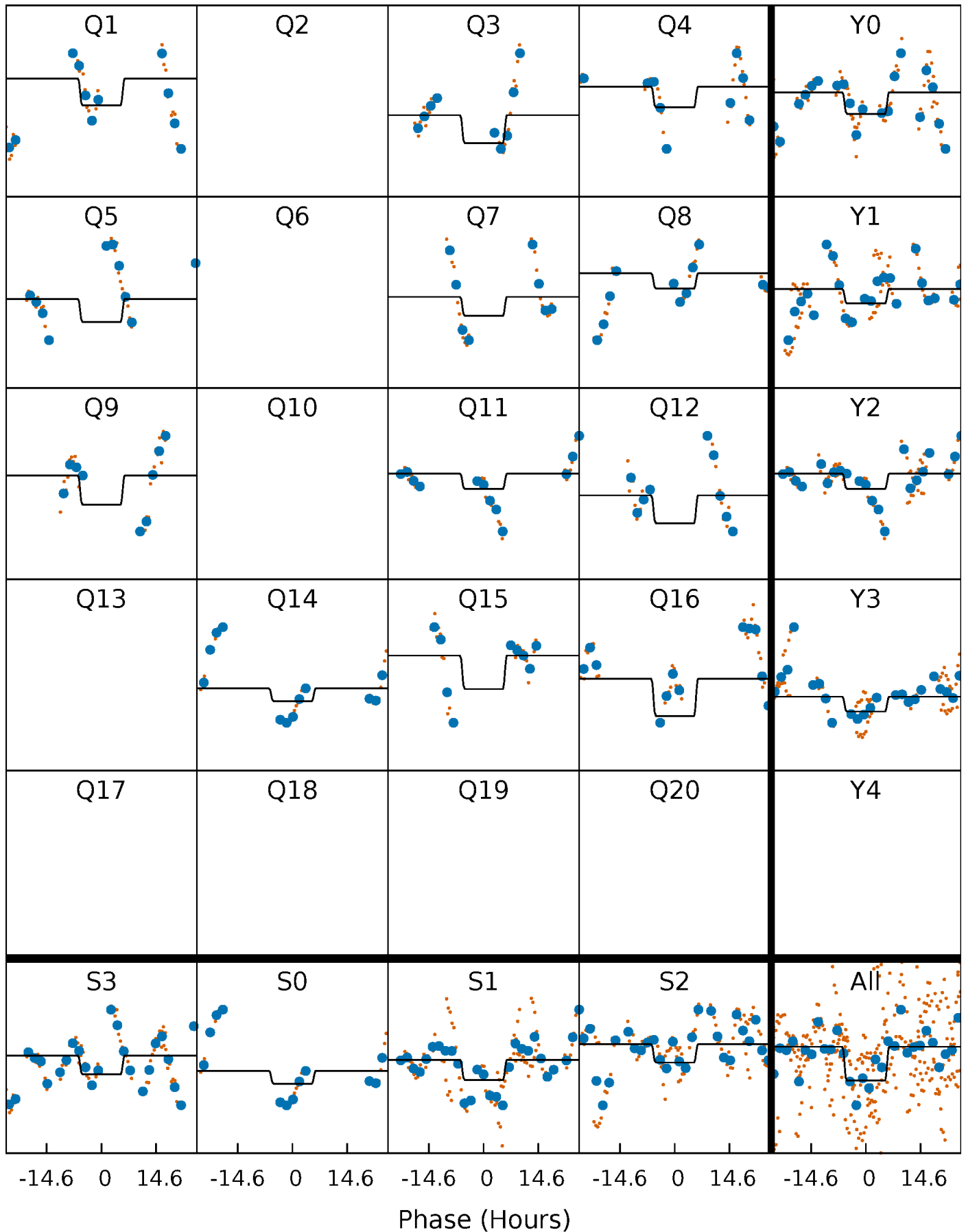
# DV Quarter-Phased Transit Curves

TCE 006715331-02 P=126.812494 Days  $T_0=138.381125$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

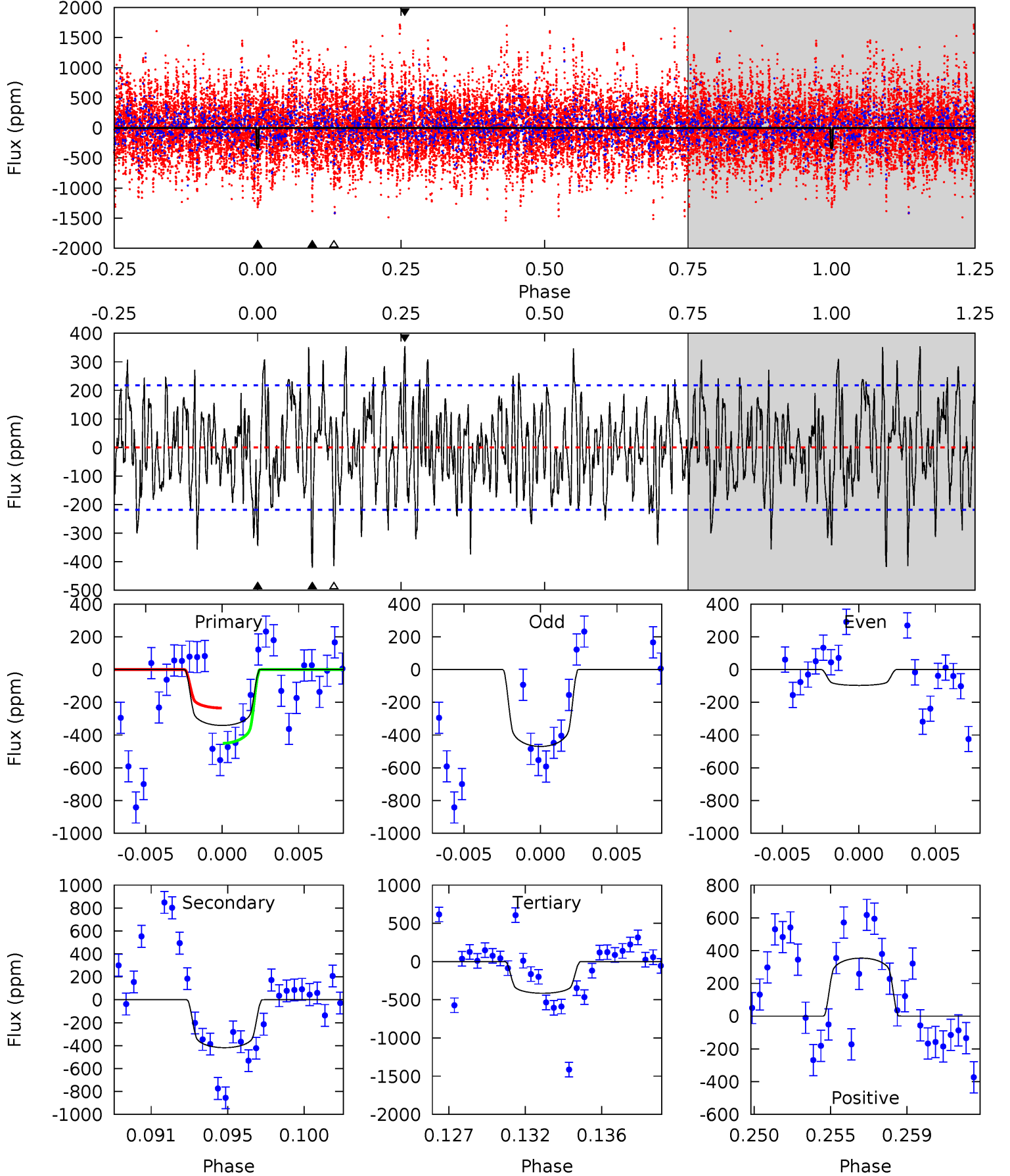
TCE 006715331-02 P=126.822400 Days  $T_0=138.315258$  (BKJD)



# DV Model-Shift Uniqueness Test

006715331-02, P = 126.812494 Days, E = 11.568631 Days

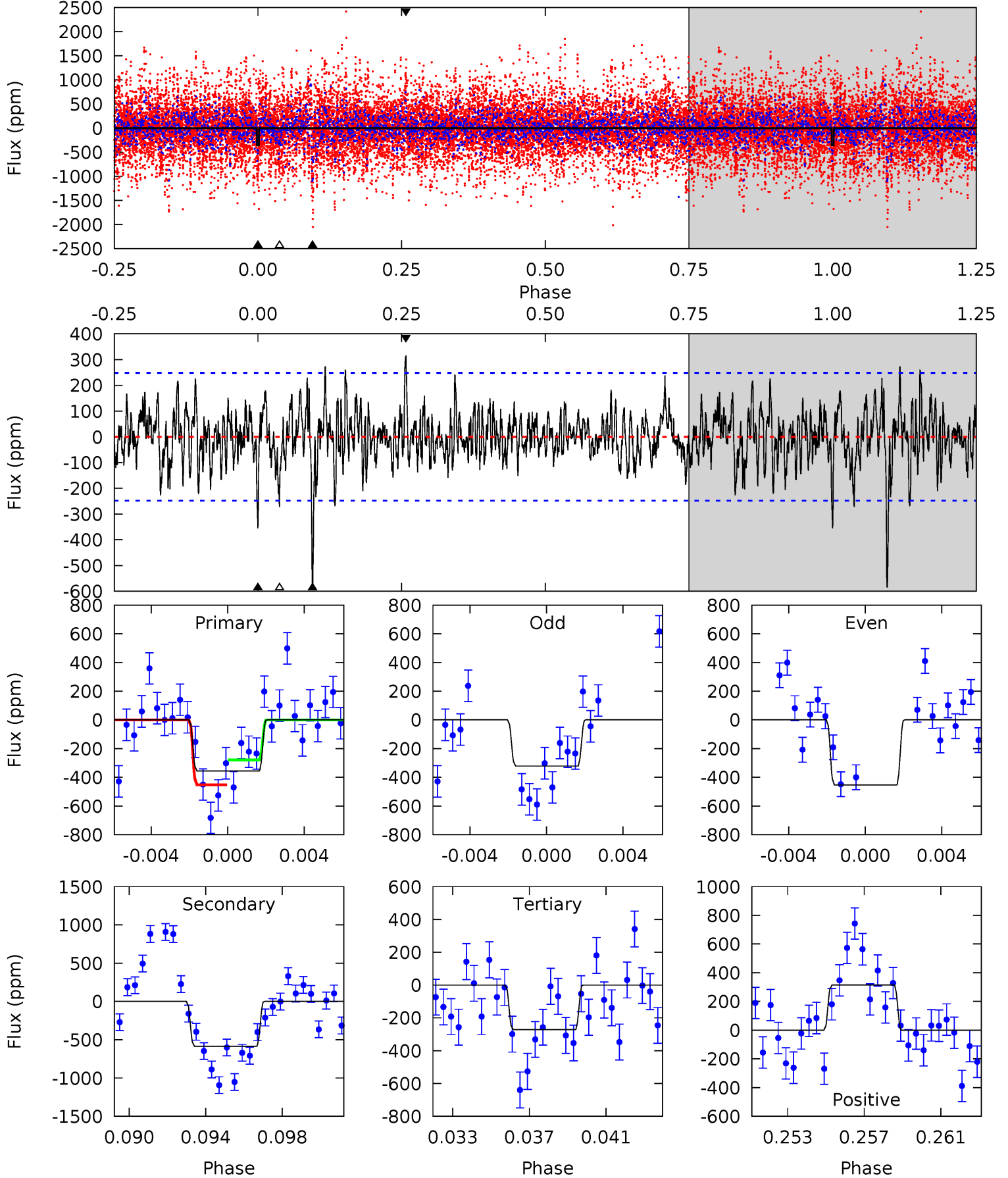
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.11	9.94	9.85	8.42	5.18	2.84	3.03	-1.74	-0.31	0.08	1.52	3.78	0.85	0.46	2.47



# Alt Model-Shift Uniqueness Test

006715331-02, P = 126.822400 Days, E = 11.492858 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
7.43	12.2	5.68	6.59	5.20	2.87	1.71	1.75	0.85	6.54	5.64	1.28	0.89	0.35	1.80





### Stellar Parameters For KIC 006715331

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$7053^{+170}_{-255}$	$3.000^{+0.595}_{-0.105}$	$-0.500^{+0.500}_{-0.250}$	$8.604^{+1.321}_{-4.954}$	$2.698^{+0.387}_{-0.903}$	$0.006^{+0.048}_{-0.002}$
	+2%/-4%	+20%/-3%	+100%/-50%	+15%/-58%	+14%/-33%	+808%/-31%
Source	PHO1	FLK73	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 006715331-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-418 \pm 42$	$18.77^{+4.62}_{-5.42}$	$1477^{+105}_{-216}$	$6675^{+532}_{-456}$	$298^{+253}_{-95}$
Alt.	$-584 \pm 48$	$17.49^{+3.72}_{-5.63}$	$1490^{+105}_{-233}$	$7889^{+775}_{-679}$	$511^{+468}_{-167}$

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

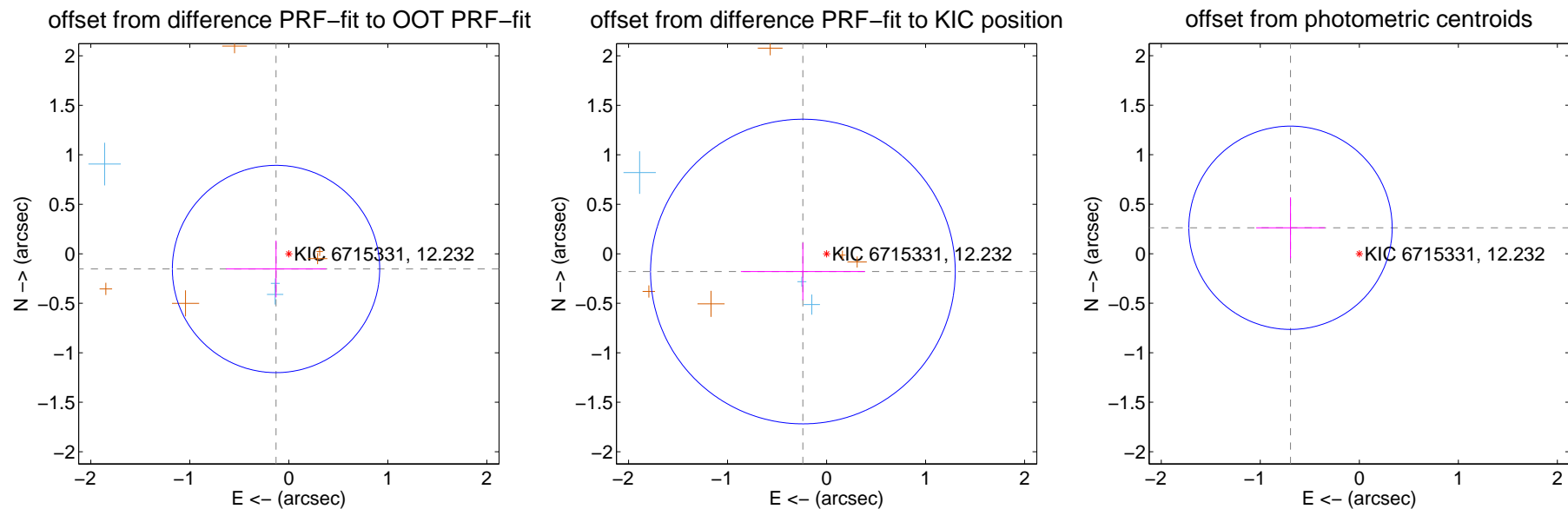
## DV Centroid Data

Supplemental centroid analysis for 006715331-02. Kepler magnitude: 12.23. Transit SNR 5.55

There are 3 quarters with good PRF difference image offsets

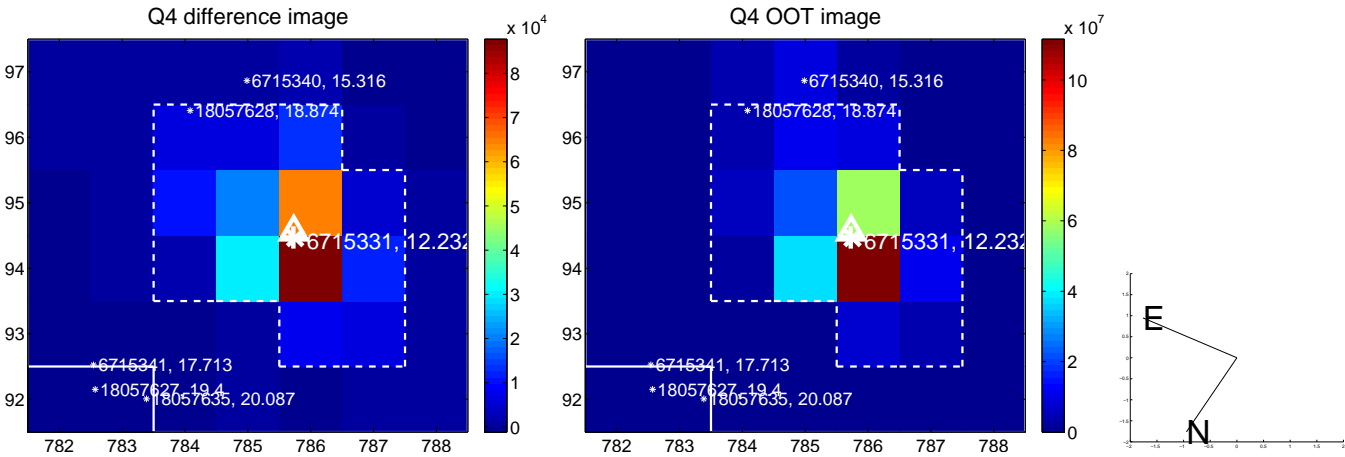
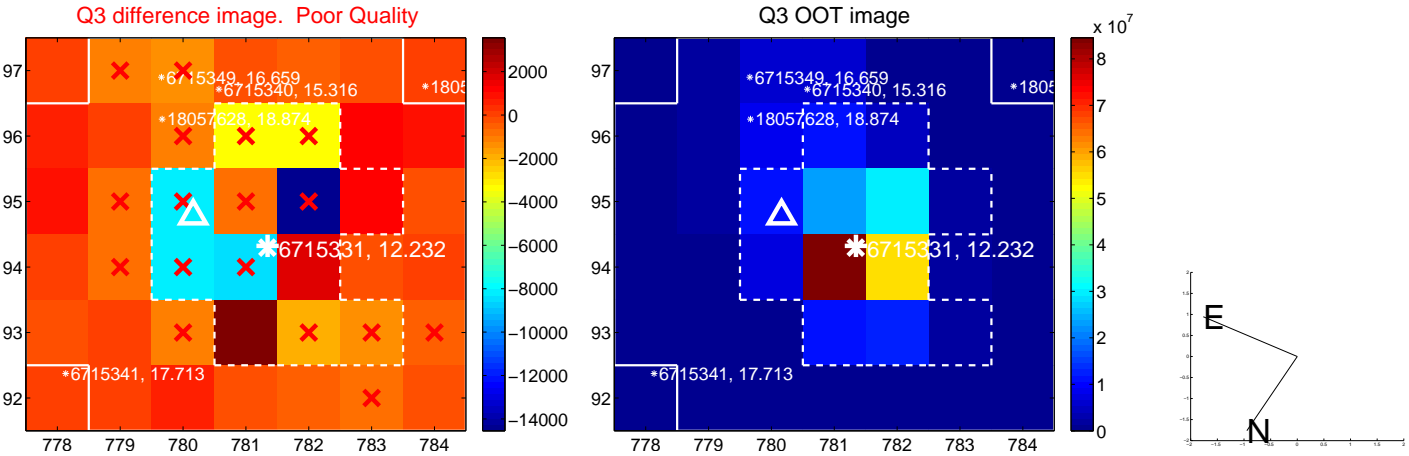
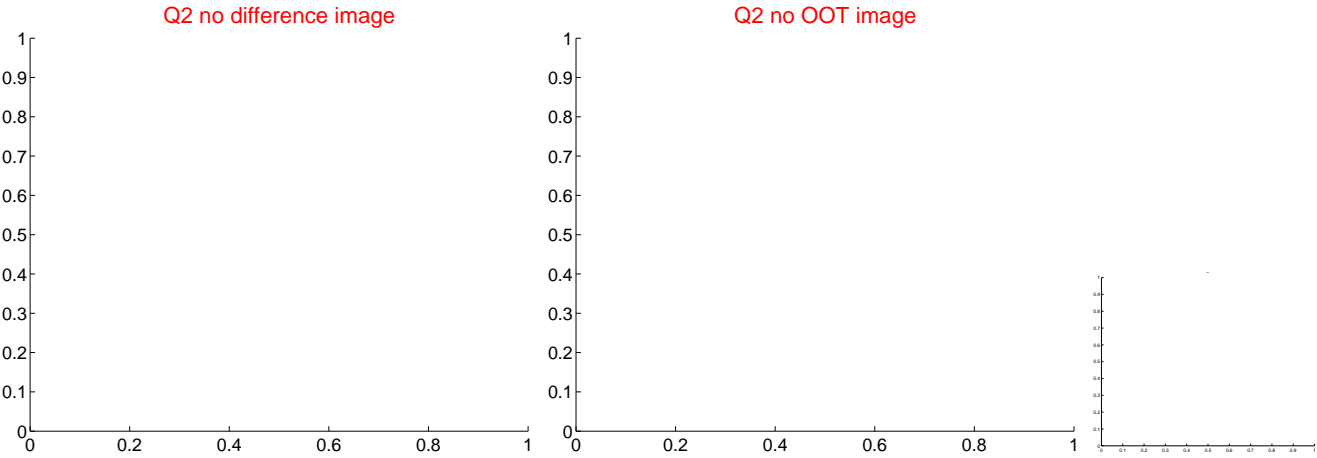
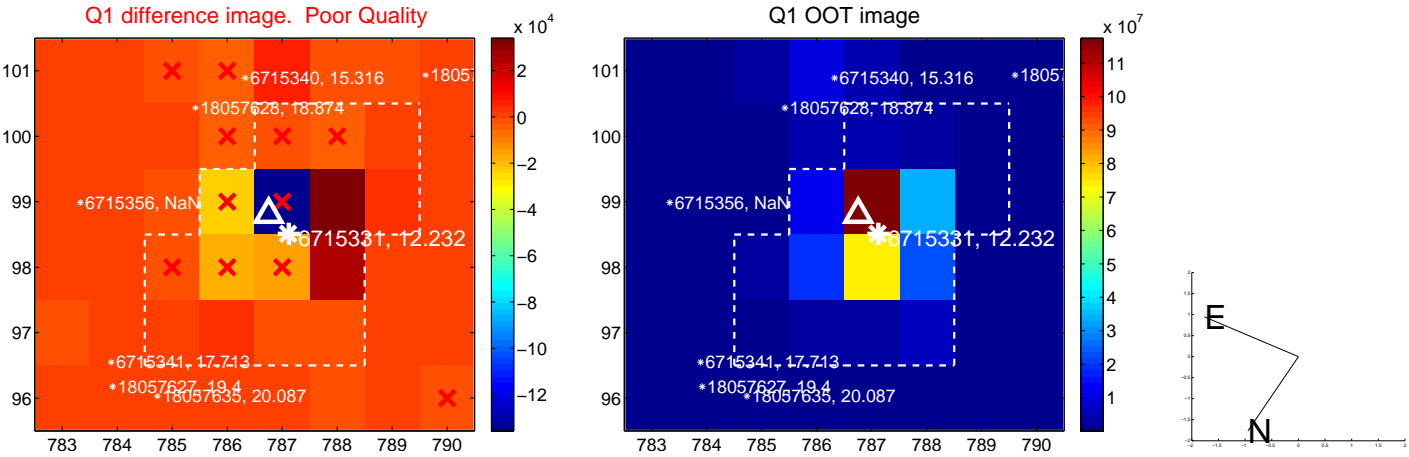
The direct PRF centroid is offset from the target star catalog position by about 0.16 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.201 \pm 0.349$	0.57	$0.129 \pm 0.506$	$-0.154 \pm 0.287$
PRF-fit source offset from KIC position	$0.299 \pm 0.513$	0.58	$0.239 \pm 0.626$	$-0.179 \pm 0.290$
photometric centroid source offset	$0.74 \pm 0.34$	2.17	$0.69 \pm 0.35$	$0.26 \pm 0.31$

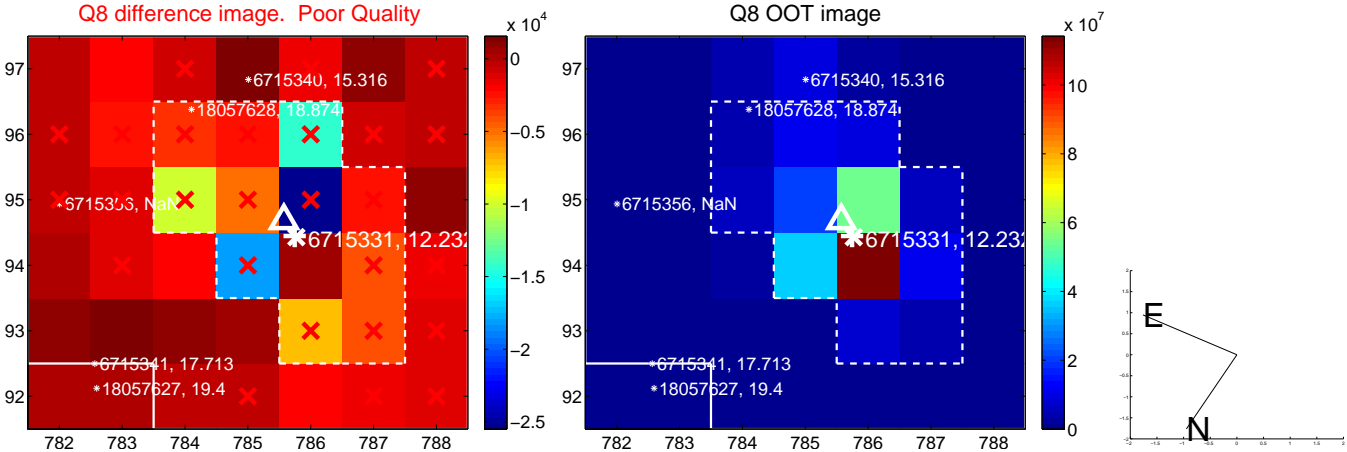
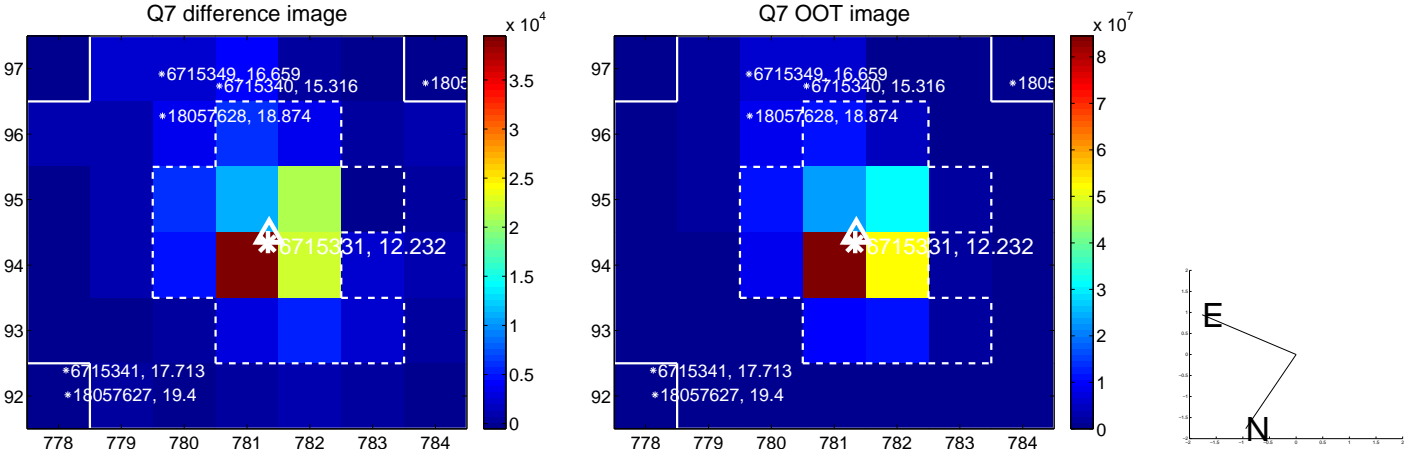
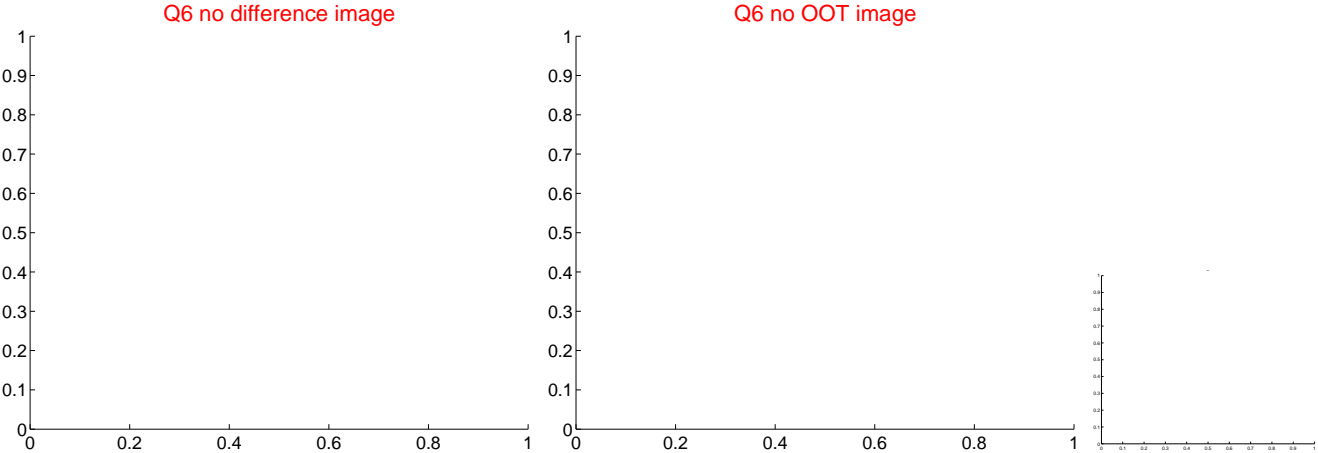
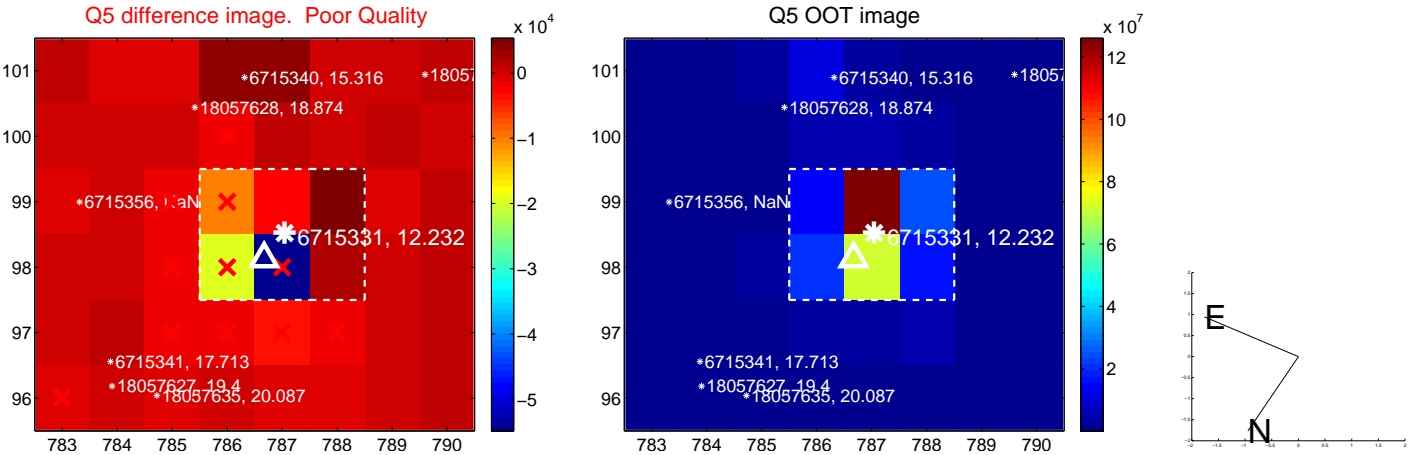


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

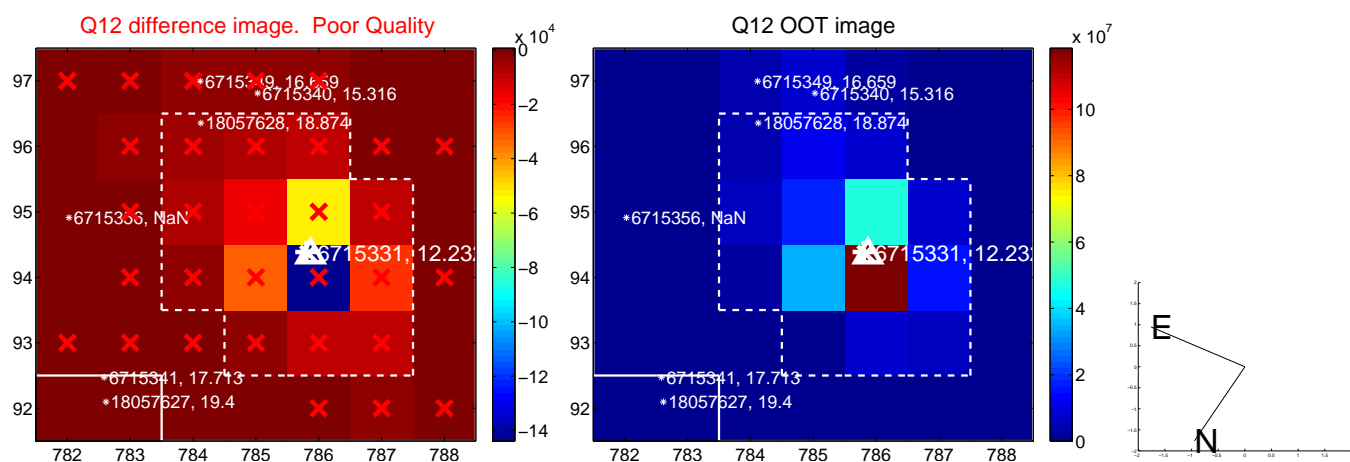
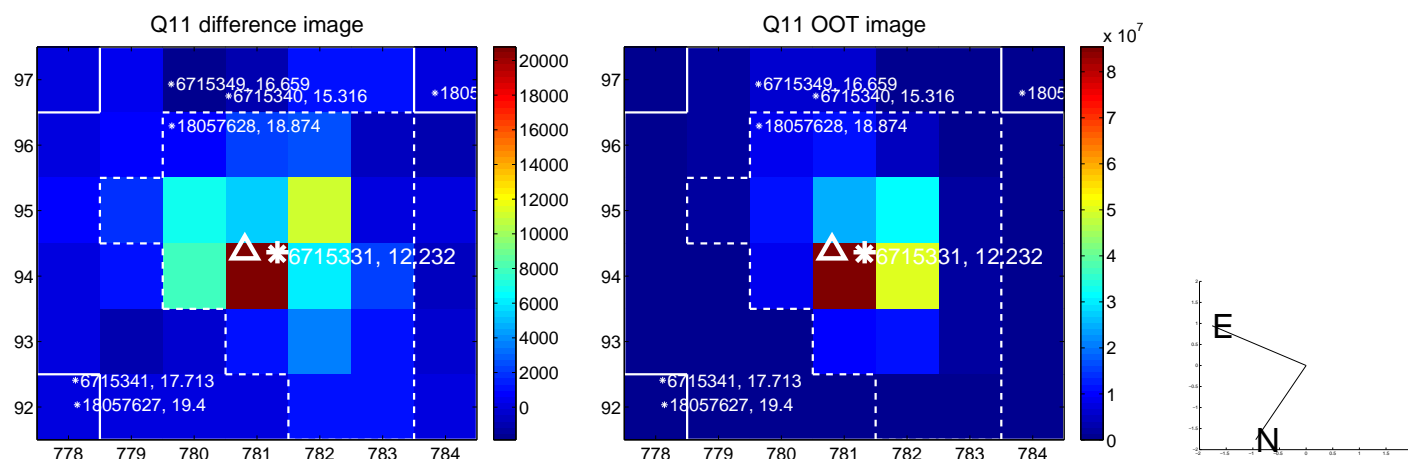
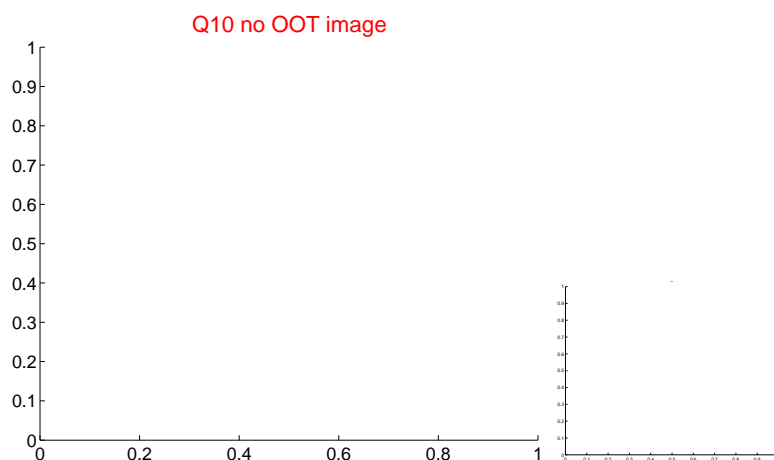
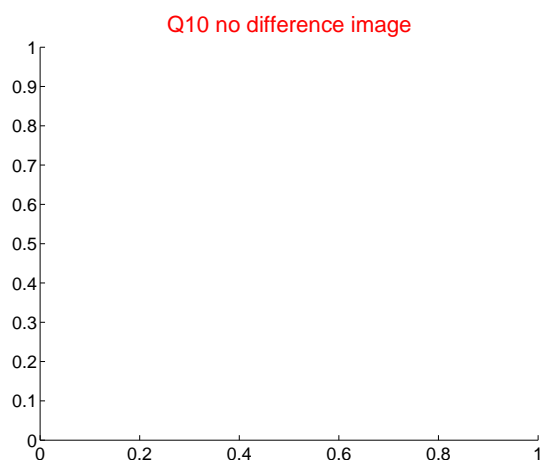
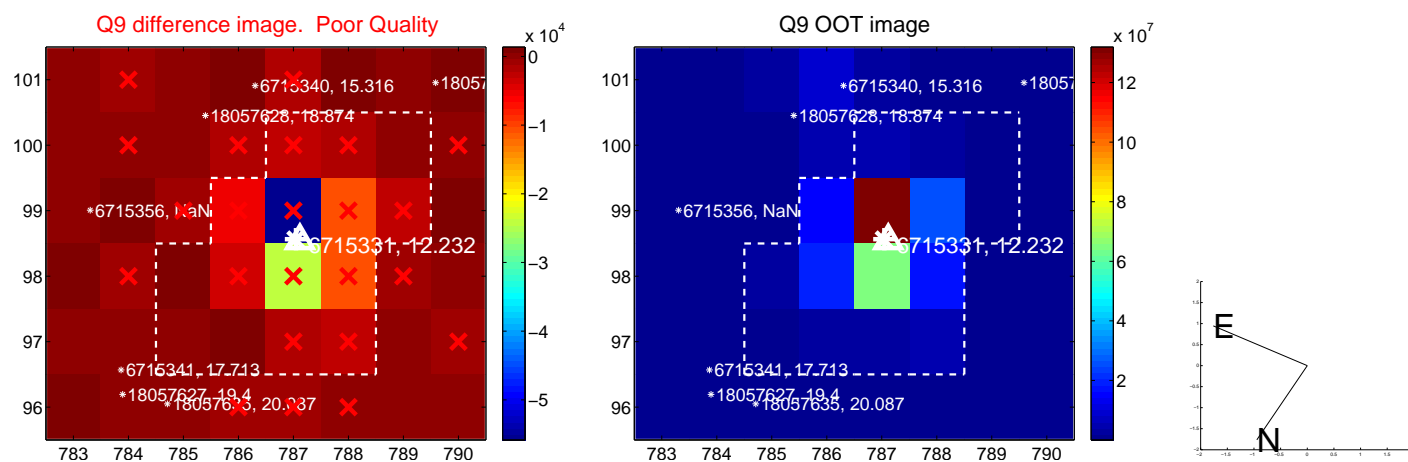
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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.

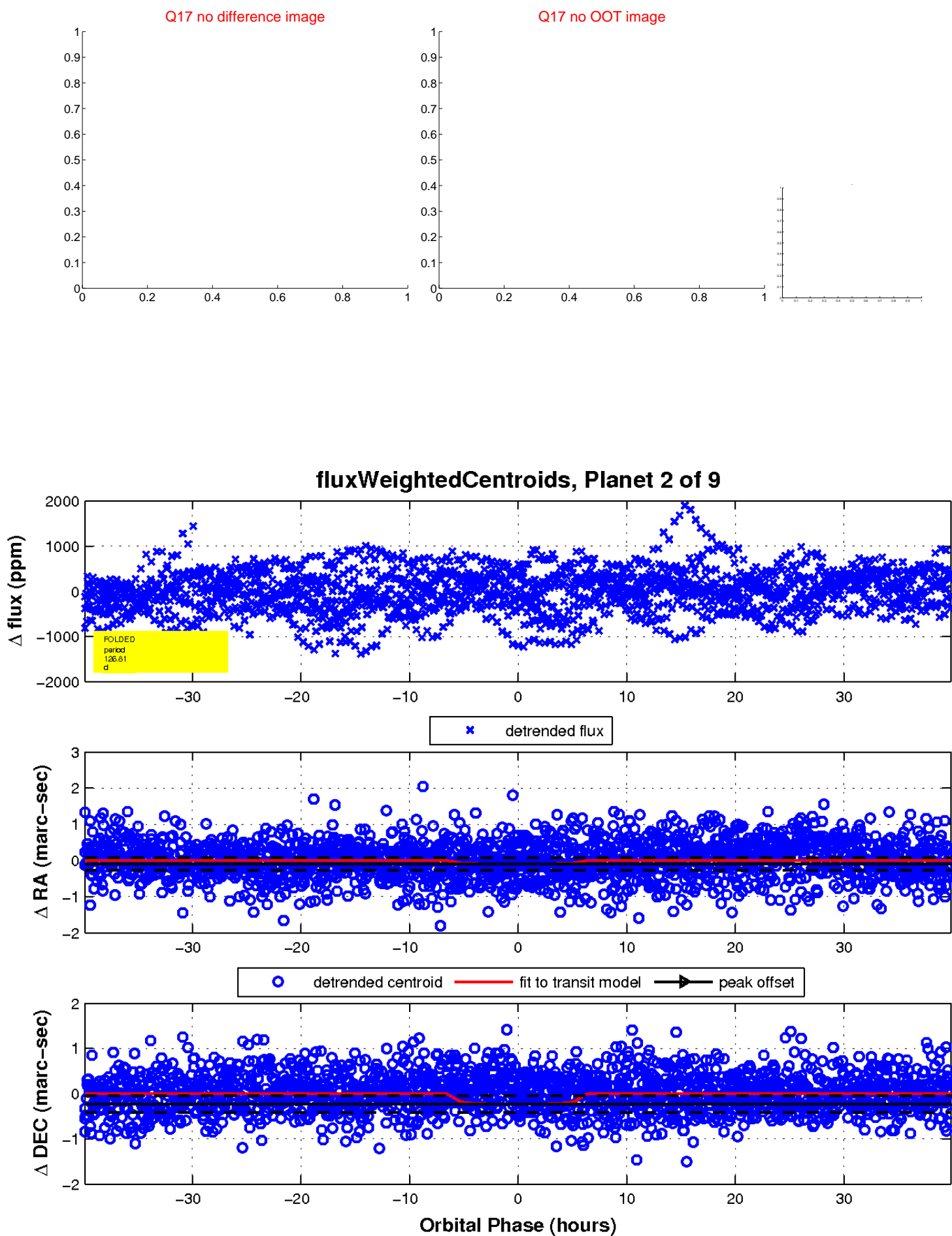




white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

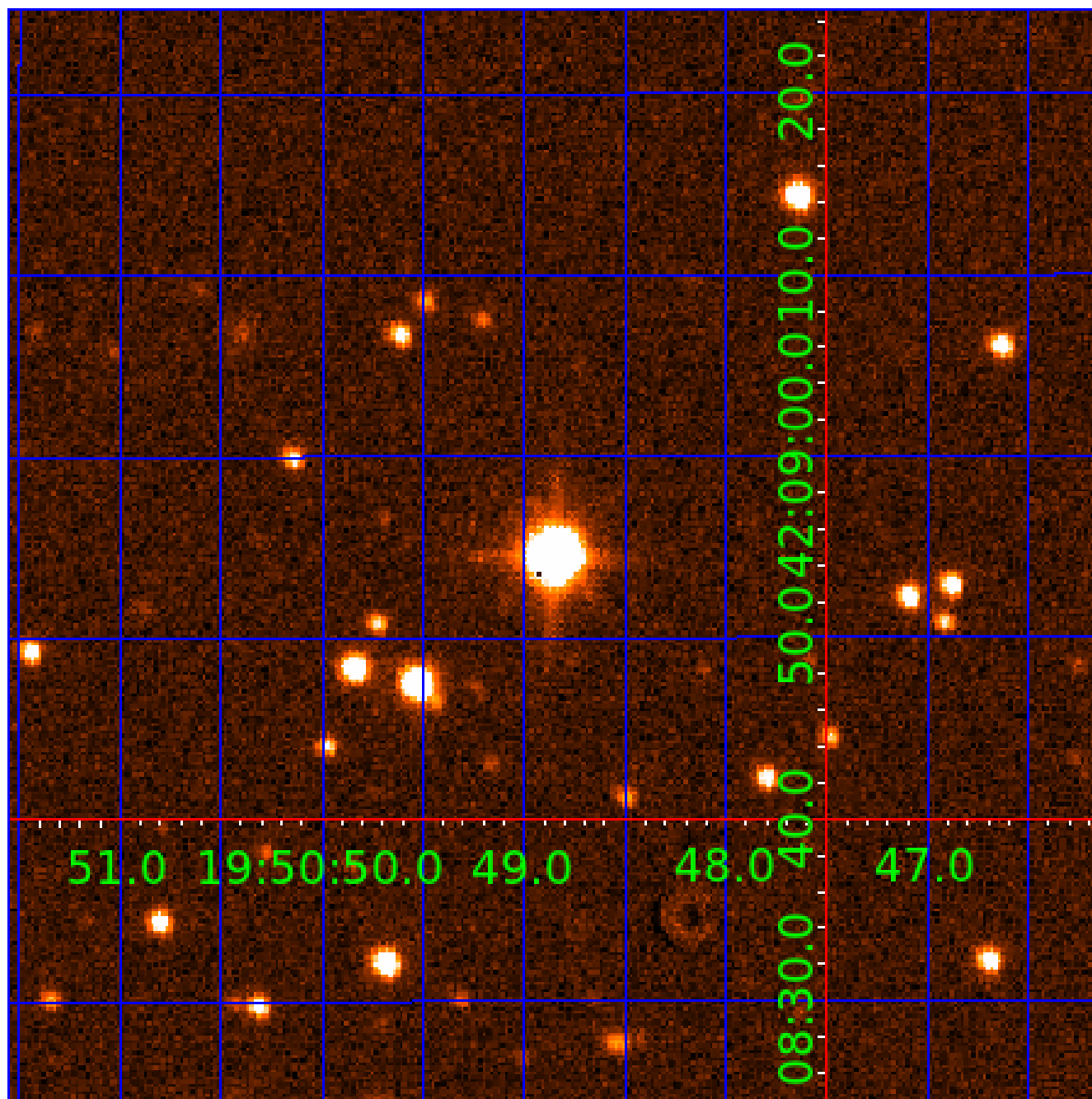


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 006715331

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
006715331-01	OBS	No	0.928873	132.119851	21.8	5.212	7.9	5.3	8.60	7053	4.30	0.00
006715331-02	OBS	No	126.812494	138.381125	426.5	13.300	9.9	5.5	8.60	7053	20.88	346.72
006715331-03	OBS	No	73.061339	155.485784	600.8	5.597	9.3	8.0	8.60	7053	39.84	723.23
006715331-04	OBS	No	80.681374	150.660758	762.9	11.330	9.6	10.1	8.60	7053	28.37	633.62
006715331-06	OBS	No	49.992478	134.622321	526.8	5.276	8.2	9.0	8.60	7053	37.45	1199.45
006715331-07	OBS	No	197.990545	159.459832	701.4	3.518	8.5	9.1	8.60	7053	27.73	191.43
006715331-08	OBS	No	53.819547	166.532224	564.8	4.939	8.0	8.7	8.60	7053	38.71	1087.10
006715331-09	OBS	No	130.838966	143.185368	112.8	4.500	7.9	-1.0	8.60	7053	9.22	332.56

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
006715331-01	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
006715331-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS
006715331-03	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—HALO_GHOST
006715331-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
006715331-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
006715331-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS
006715331-08	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
006715331-09	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—CENT_NOFITS

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

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

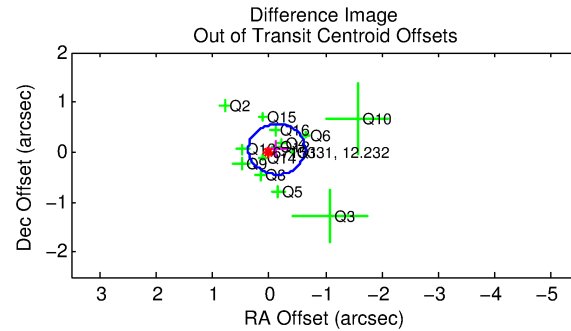
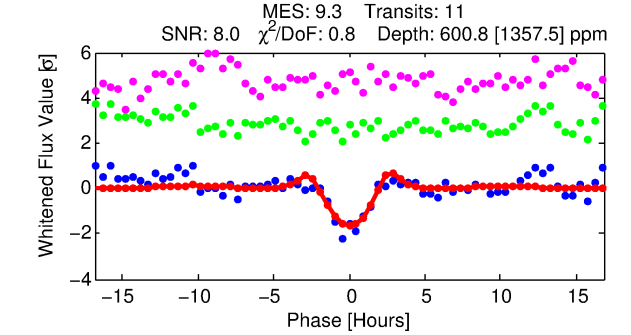
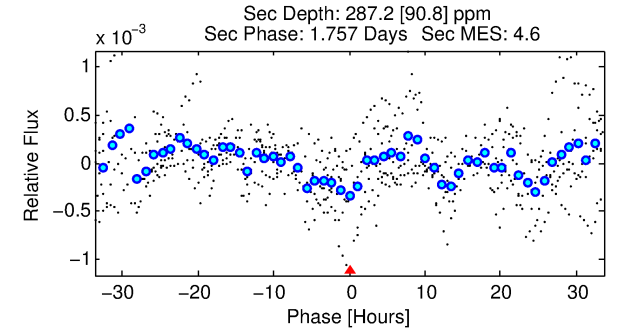
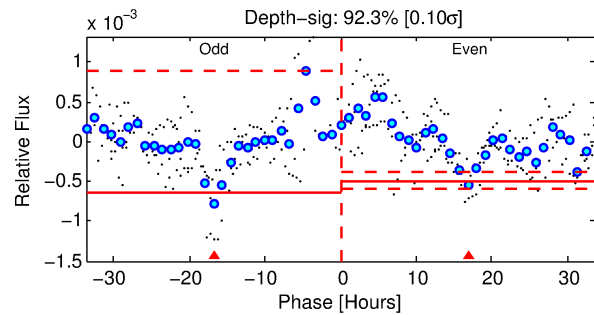
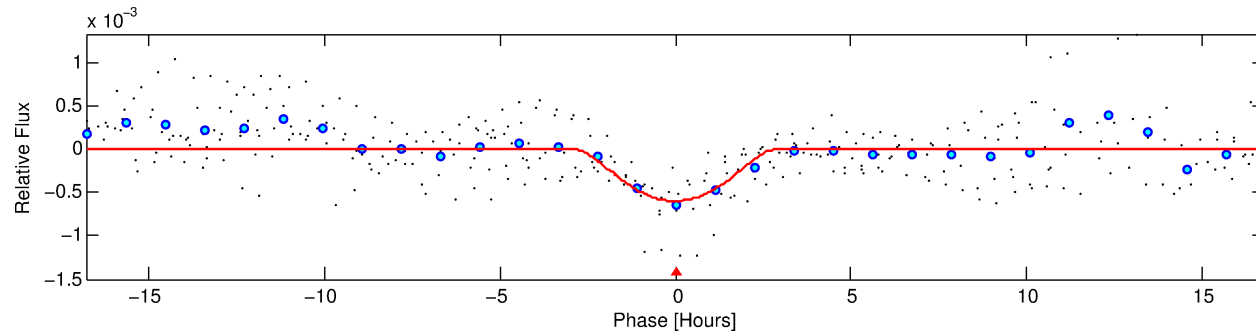
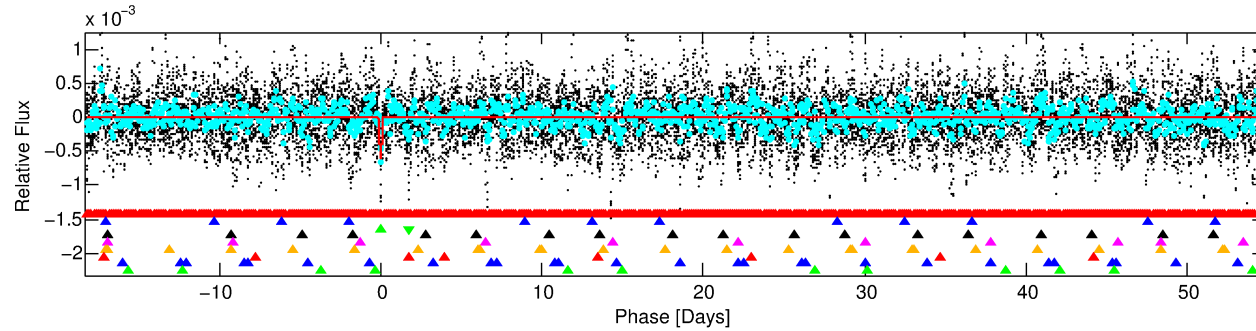
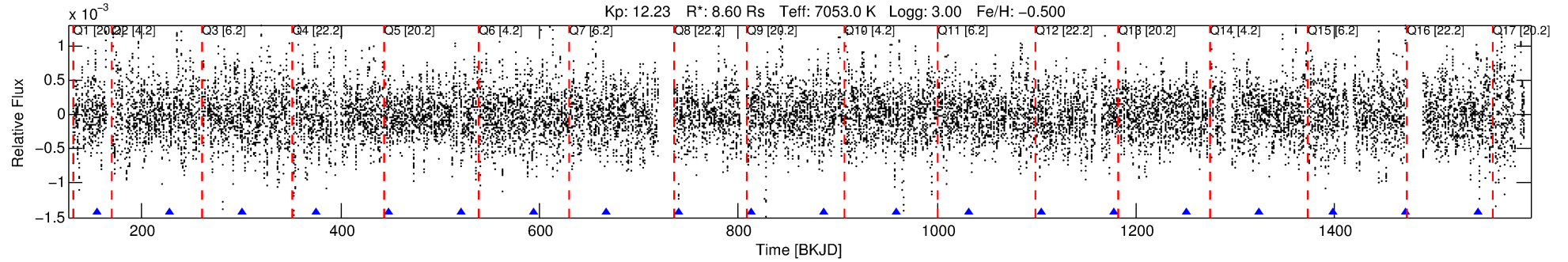
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 006715331-03

No Significant Match Found

# DV One-Page Summary

KIC: 6715331 Candidate: 3 of 9 Period: 73.061 d



## DV Fit Results:

Period = 73.06134 [0.00093] d  
Epoch = 155.4858 [0.0103] BKJD  
Rp/R\* = 0.0424 [0.0791]  
a/R\* = 29.38 [14.00]  
b = 1.00 [0.05]  
Seff = 723.22 [724.12]  
Teq = 1322 [331] K  
Rp = 39.84 [77.77] Re  
a = 0.4764 [0.2842] AU  
Ag = 22.59 [87.48] [0.25 $\sigma$ ]  
Teffp = 4457 [4175] K [0.75 $\sigma$ ]

## DV Diagnostic Results:

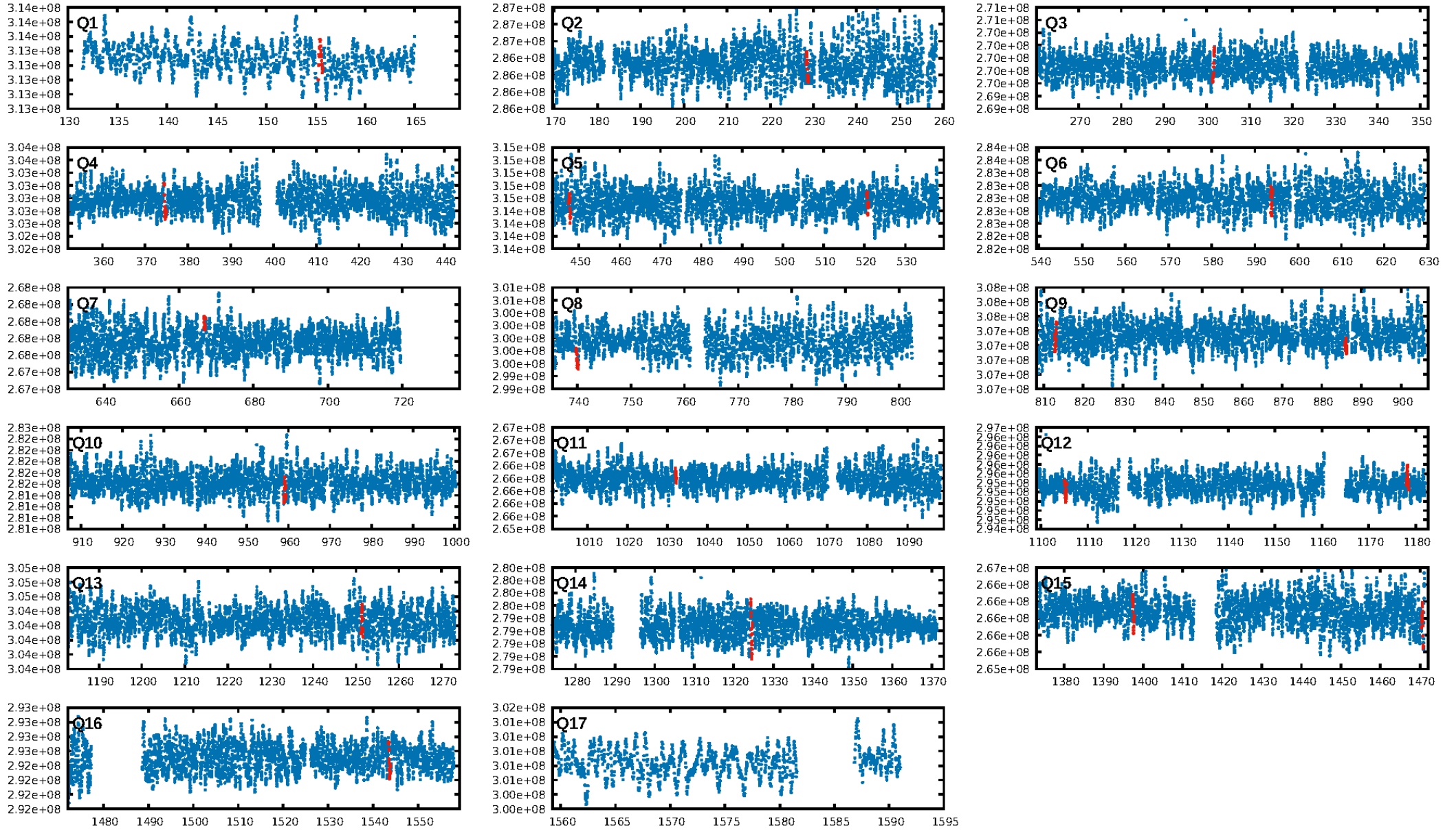
ShortPeriod-sig: 100.0% [61.87 $\sigma$ ]  
LongPeriod-sig: 100.0% [14.47 $\sigma$ ]  
ModelChiSquare2-sig: 6.9%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [11/11]  
GhostDiagnostic-chr: -0.09244  
Centroid-sig: 34.4%  
Centroid-so: 0.335 arcsec [1.25 $\sigma$ ]  
OotOffset-rm: 0.150 arcsec [0.90 $\sigma$ ]  
KicOffset-rm: 0.092 arcsec [0.52 $\sigma$ ]  
OotOffset-st: 4/2/4/4 [14]  
KicOffset-st: 4/2/4/4 [14]  
DiffImageQuality-fgm: 0.64 [9/14]  
DiffImageOverlap-fno: 0.00 [0/15]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 05:54:54 Z

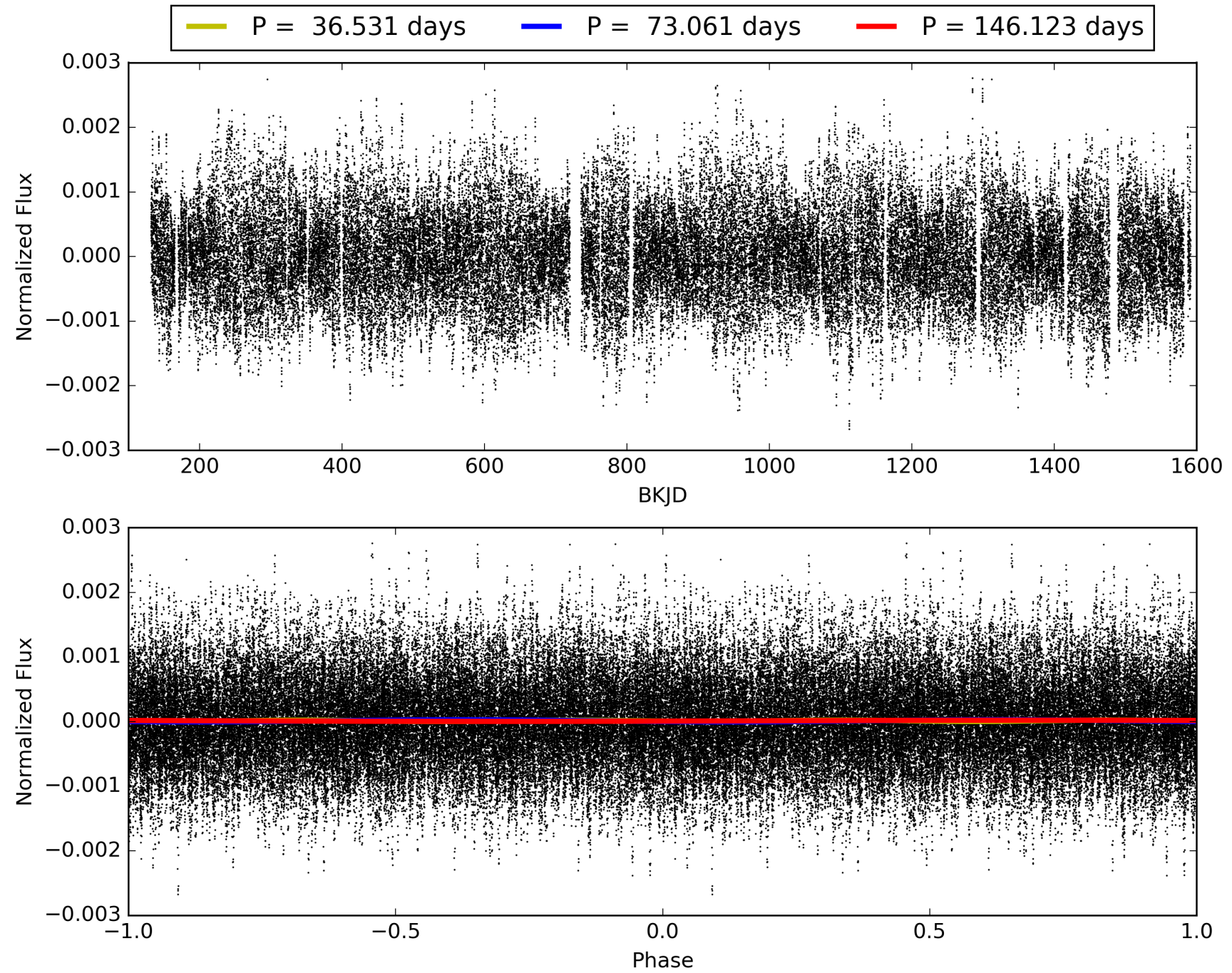
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center



# TCE 006715331-03, PDC Light Curves

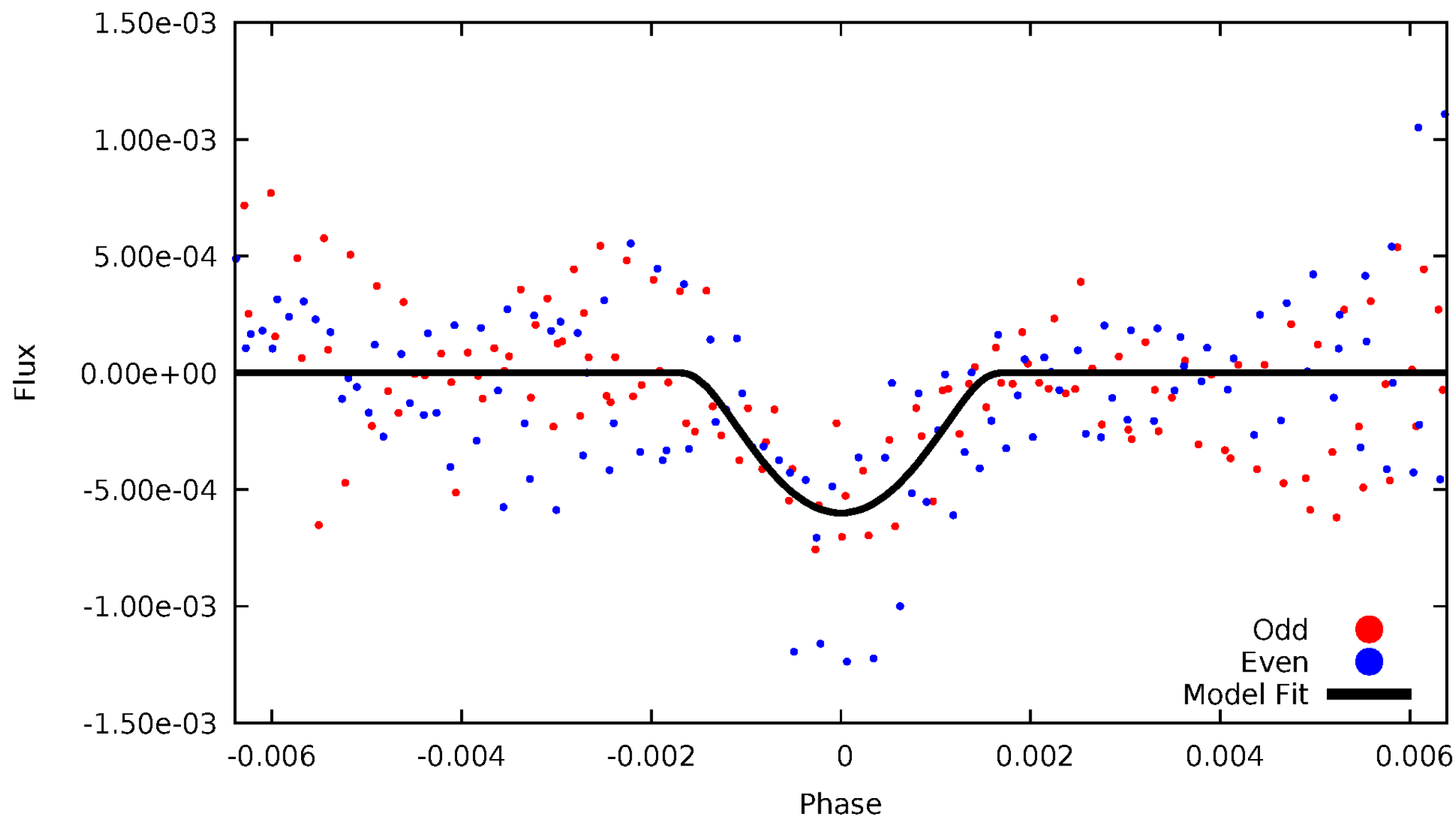


# TCE 006715331-03



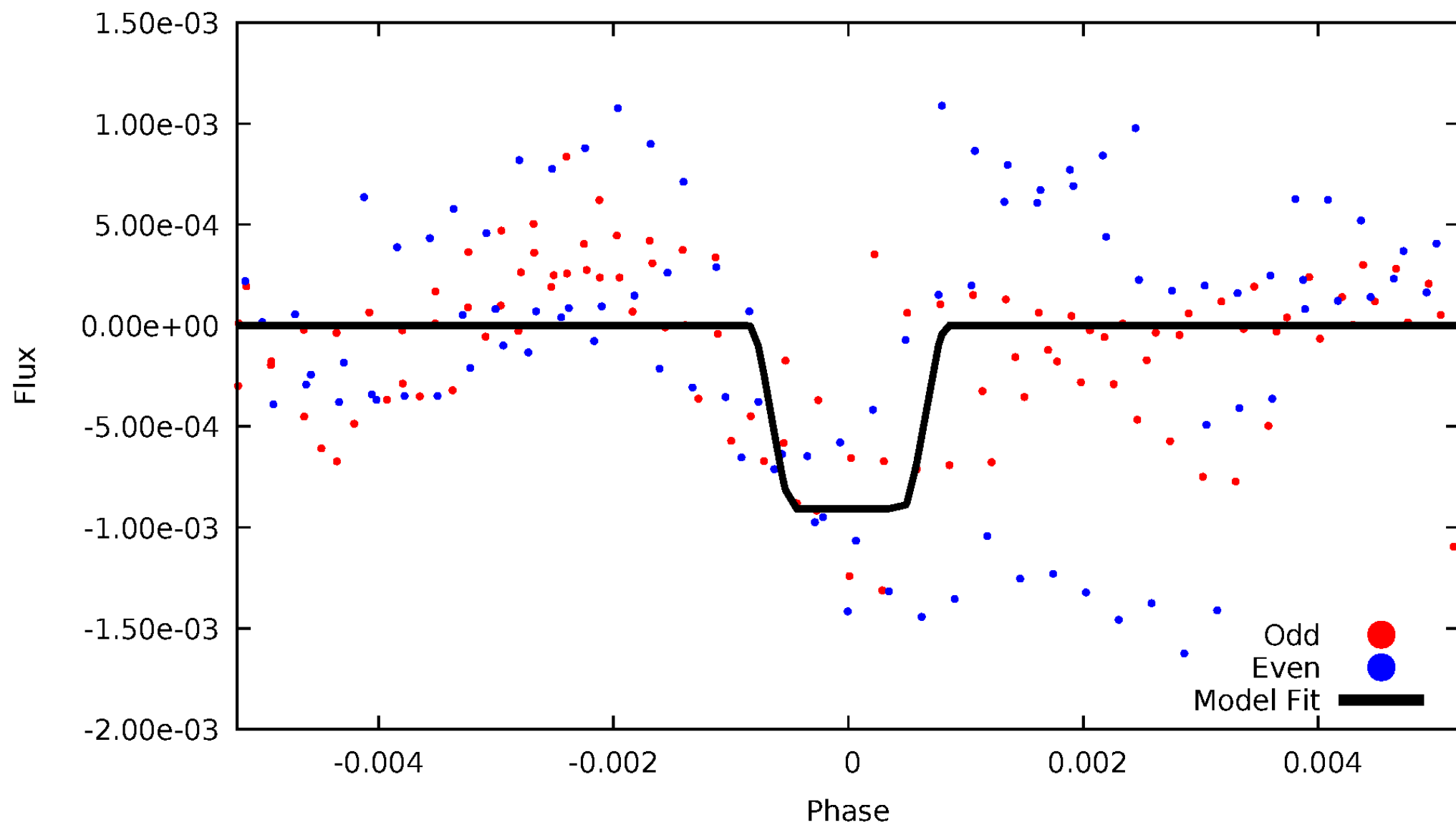
# DV Odd/Even

TCE 006715331-03



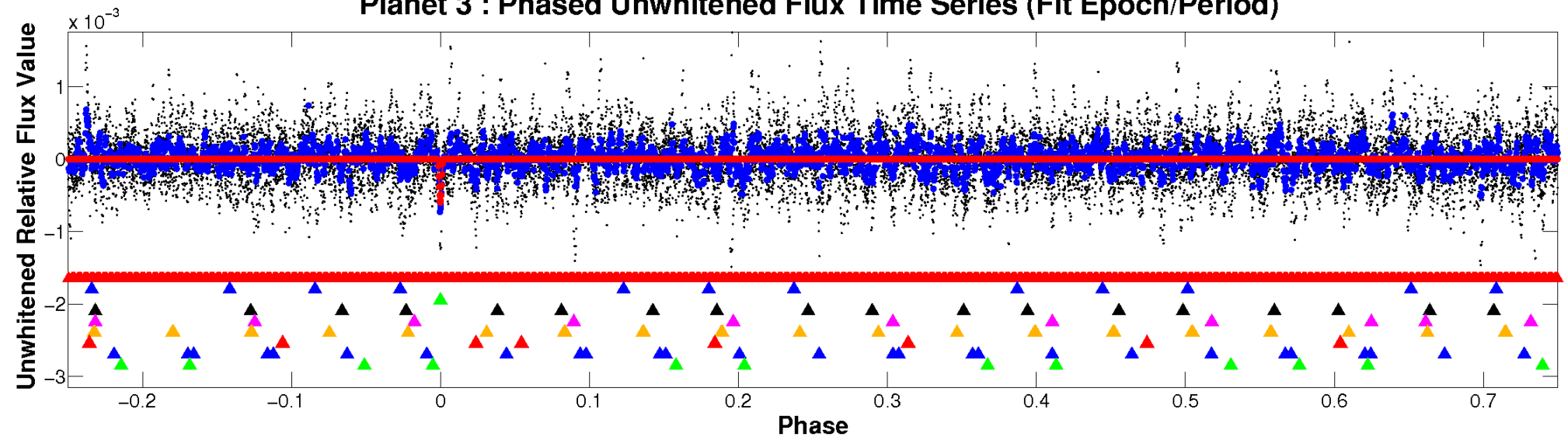
# ALT Odd/Even

TCE 006715331-03

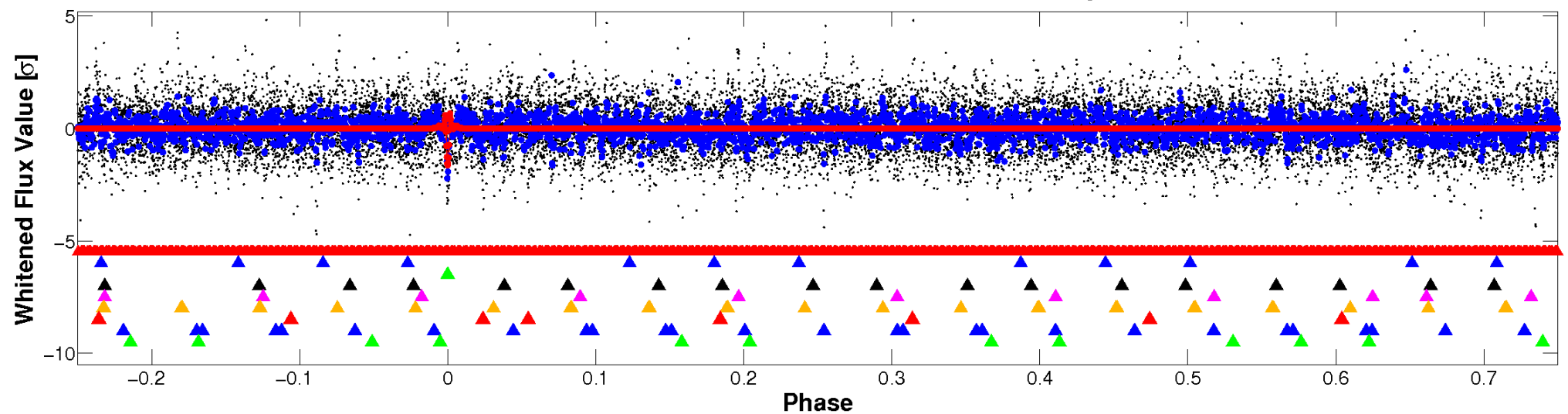


# Non-Whitened Vs. Whitened Light Curve

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



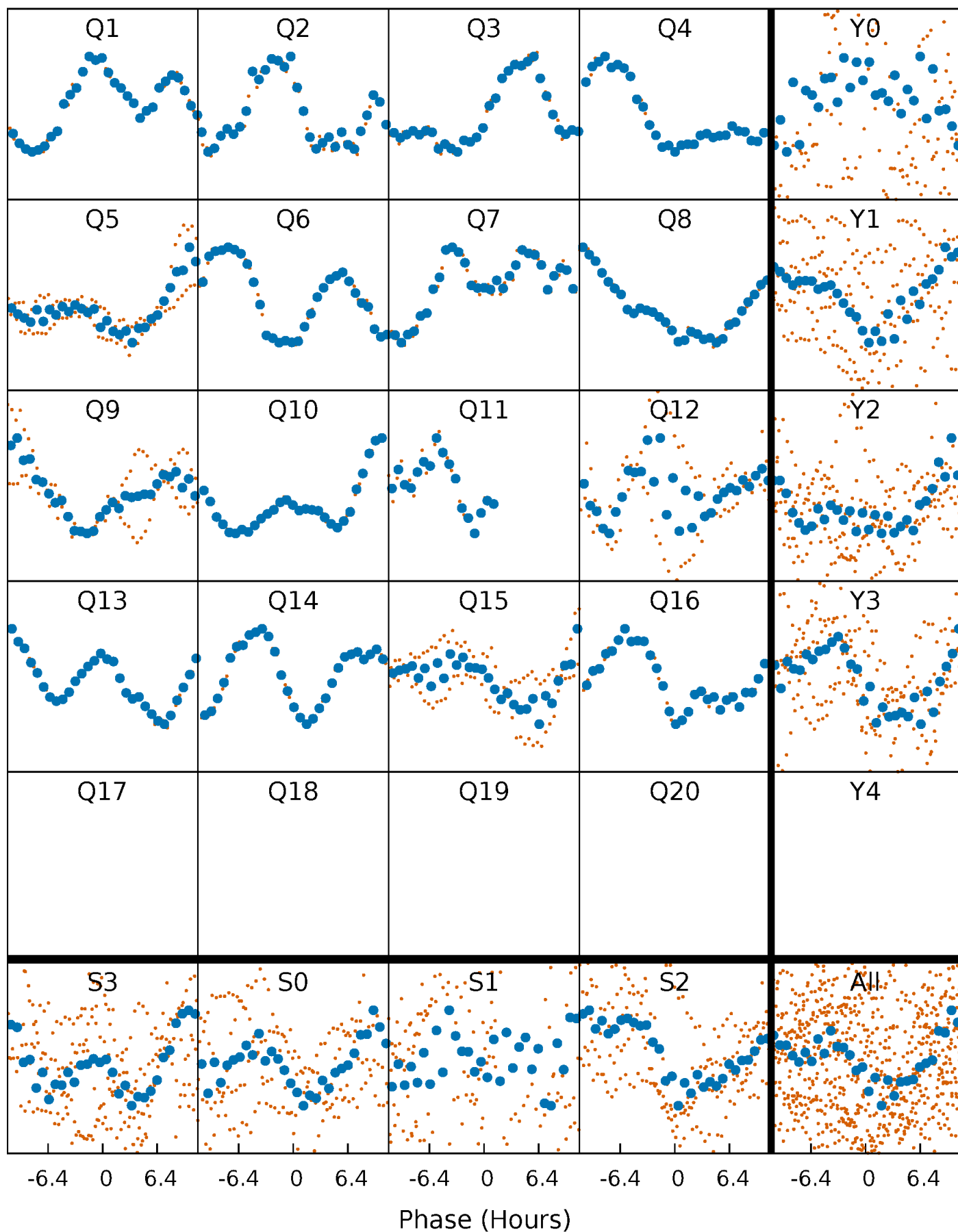
Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)





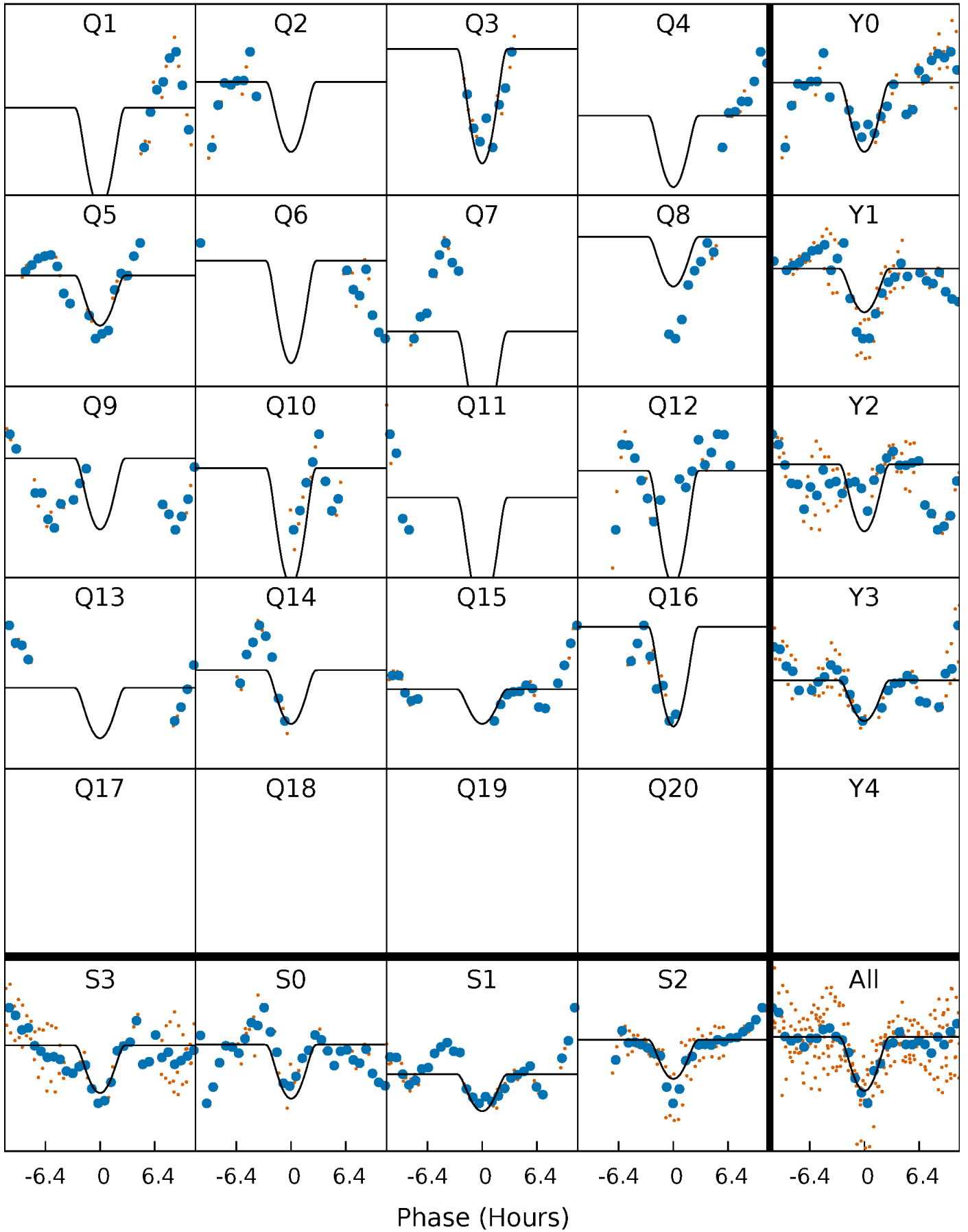
# PDC Quarter-Phased Transit Curves

TCE 006715331-03 P= 73.061339 Days  $T_0=155.485784$  (BKJD)



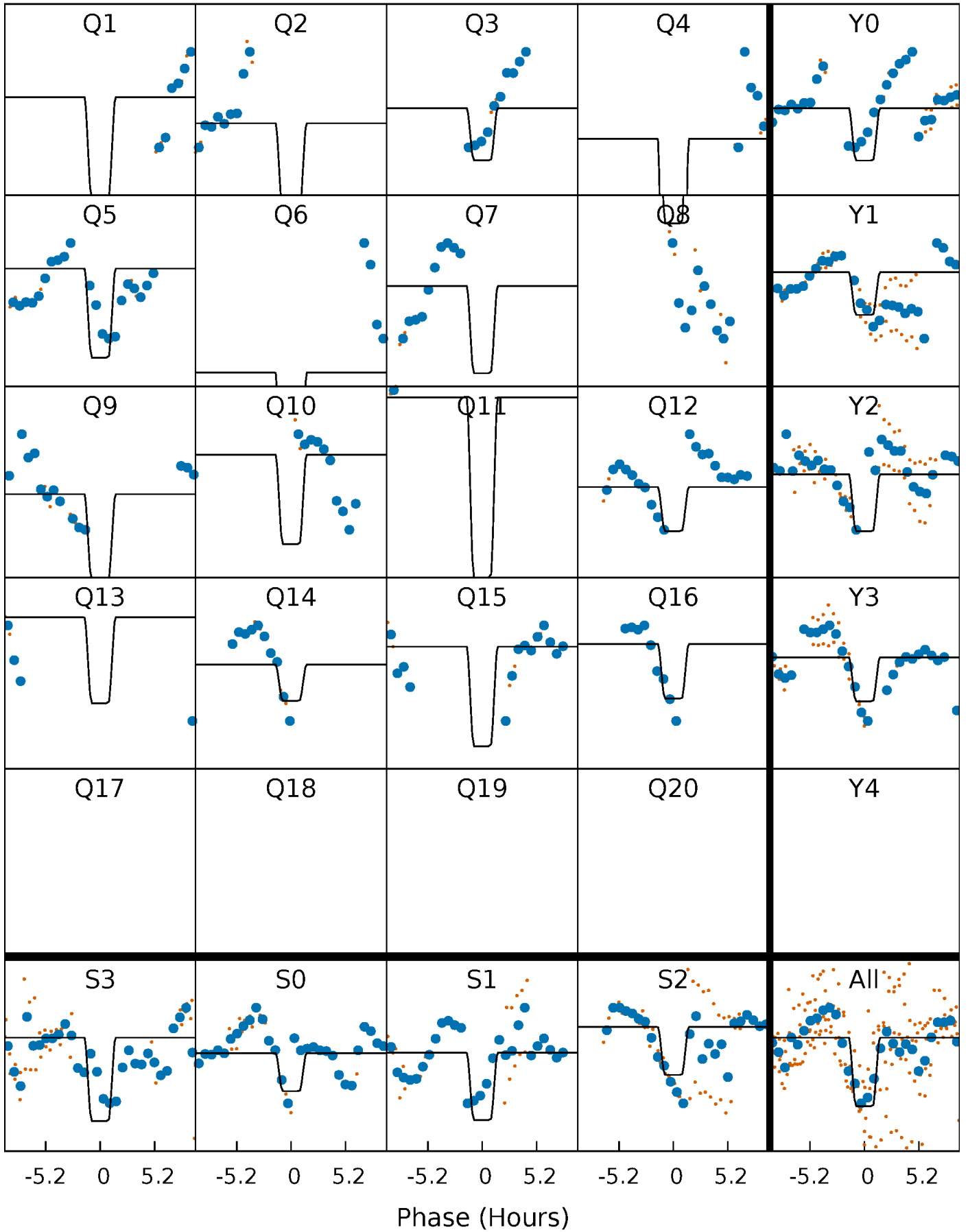
# DV Quarter-Phased Transit Curves

TCE 006715331-03   P= 73.061339 Days    $T_0=155.485784$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

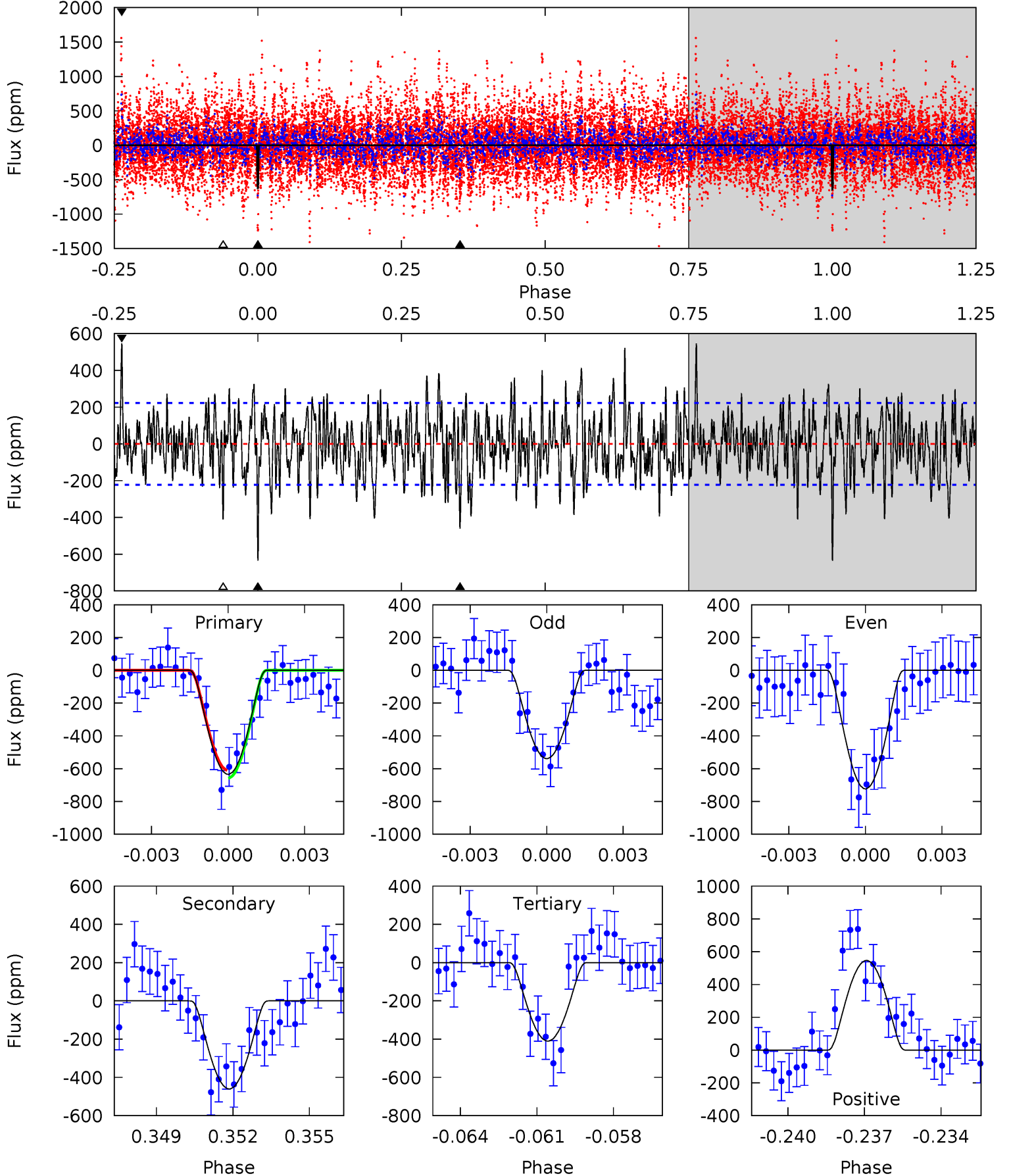
TCE 006715331-03 P= 73.061604 Days  $T_0=155.463178$  (BKJD)



# DV Model-Shift Uniqueness Test

006715331-03, P = 73.061339 Days, E = 82.424445 Days

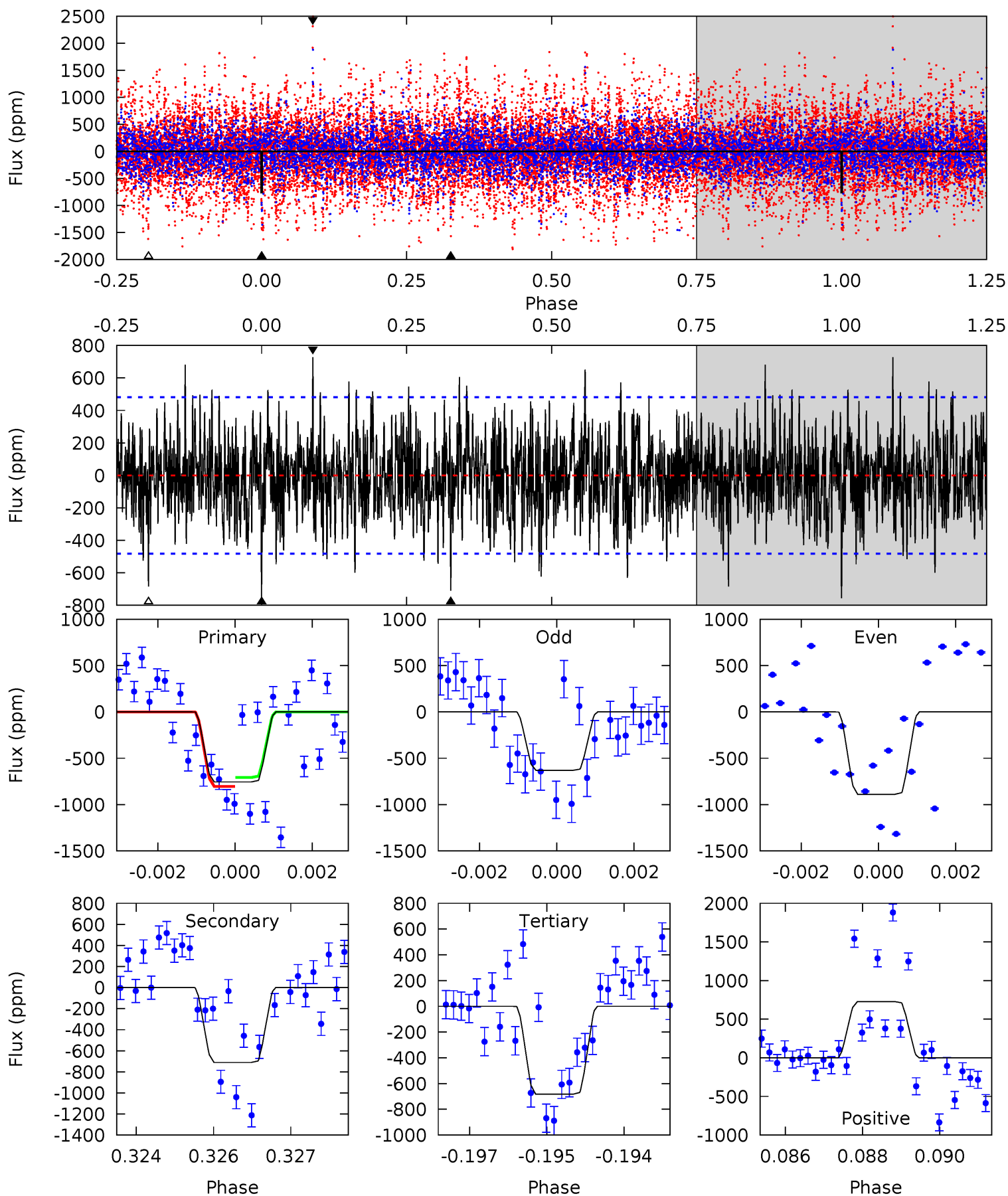
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
14.9	10.8	9.63	12.8	5.23	2.93	3.43	5.27	2.06	1.18	-2.03	2.16	0.38	0.46	0.56



# Alt Model-Shift Uniqueness Test

006715331-03, P = 73.061604 Days, E = 82.401574 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
8.41	7.91	7.60	8.10	5.36	3.15	2.31	0.80	0.31	0.31	-0.19	1.44	0.75	0.49	0.54



### Stellar Parameters For KIC 006715331

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$7053^{+170}_{-255}$	$3.000^{+0.595}_{-0.105}$	$-0.500^{+0.500}_{-0.250}$	$8.604^{+1.321}_{-4.954}$	$2.698^{+0.387}_{-0.903}$	$0.006^{+0.048}_{-0.002}$
	+2%/-4%	+20%/-3%	+100%/-50%	+15%/-58%	+14%/-33%	+808%/-31%
Source	PHO1	FLK73	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 006715331-03 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-460 \pm 43$	$62.32^{+60.74}_{-42.22}$	$1780^{+138}_{-258}$	$3961^{+2369}_{-695}$	$15^{+128}_{-11}$
Alt.	$-711 \pm 90$	$53.08^{+58.00}_{-36.74}$	$1787^{+127}_{-260}$	$4594^{+3440}_{-997}$	$30^{+281}_{-22}$

$T_{max}$  = Theoretical Maximum Planetary Temperature  
 $T_{obs}$  = Observed Planetary Temperature (Assuming  $A=0.3$ )  
 $A_{obs}$  = Observed Albedo (Assuming  $T=0$ )

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



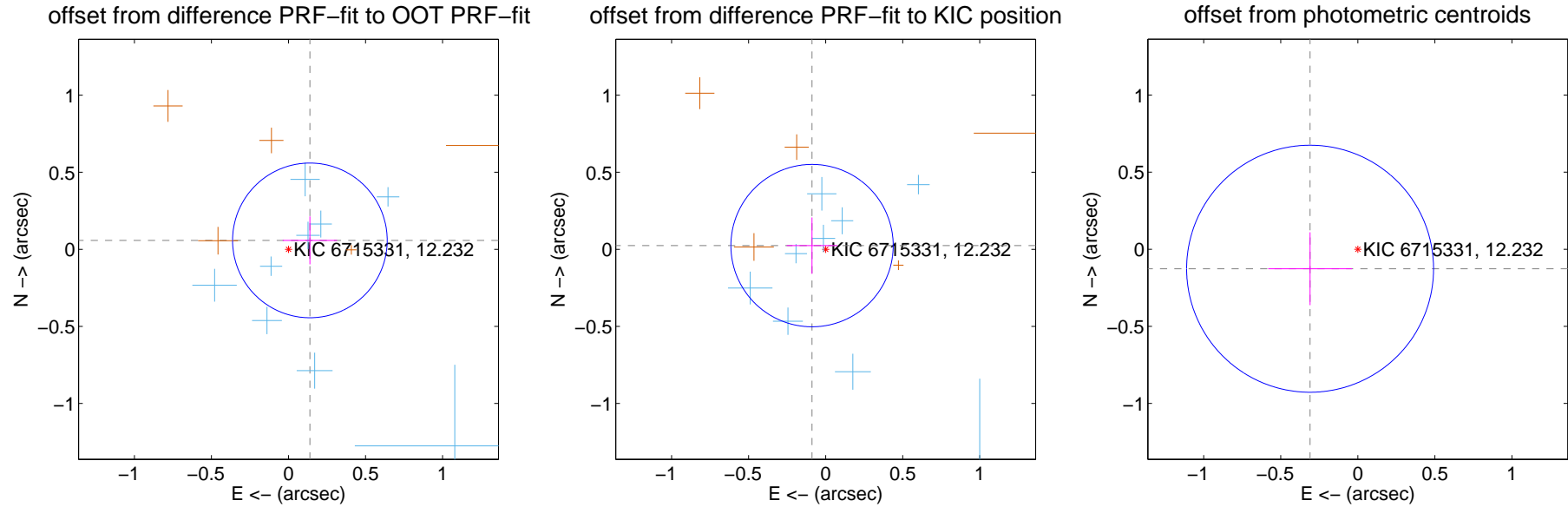
## DV Centroid Data

Supplemental centroid analysis for 006715331-03. Kepler magnitude: 12.23. Transit SNR 7.96

There are 9 quarters with good PRF difference image offsets

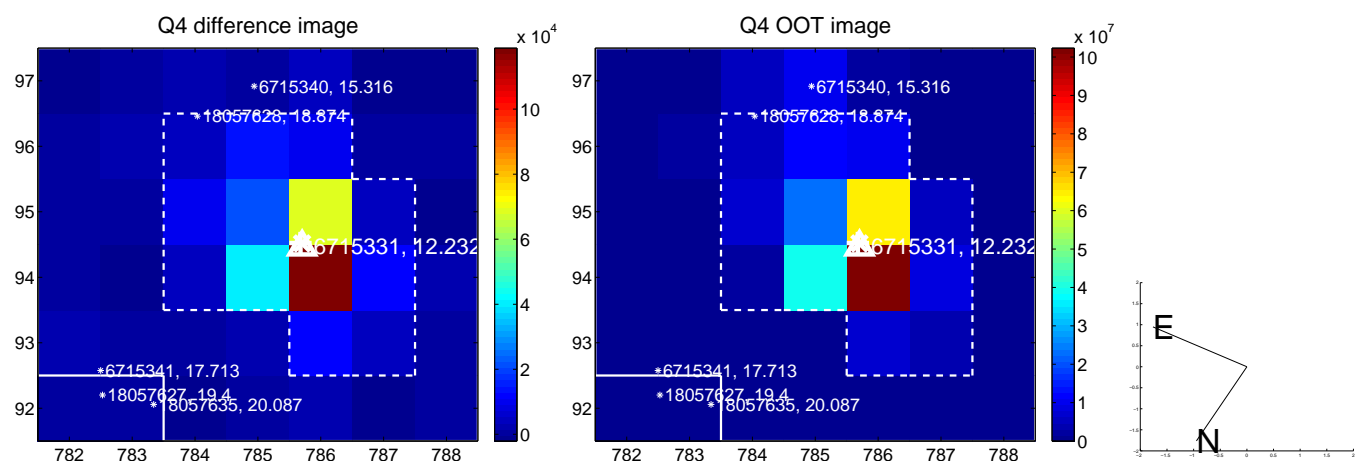
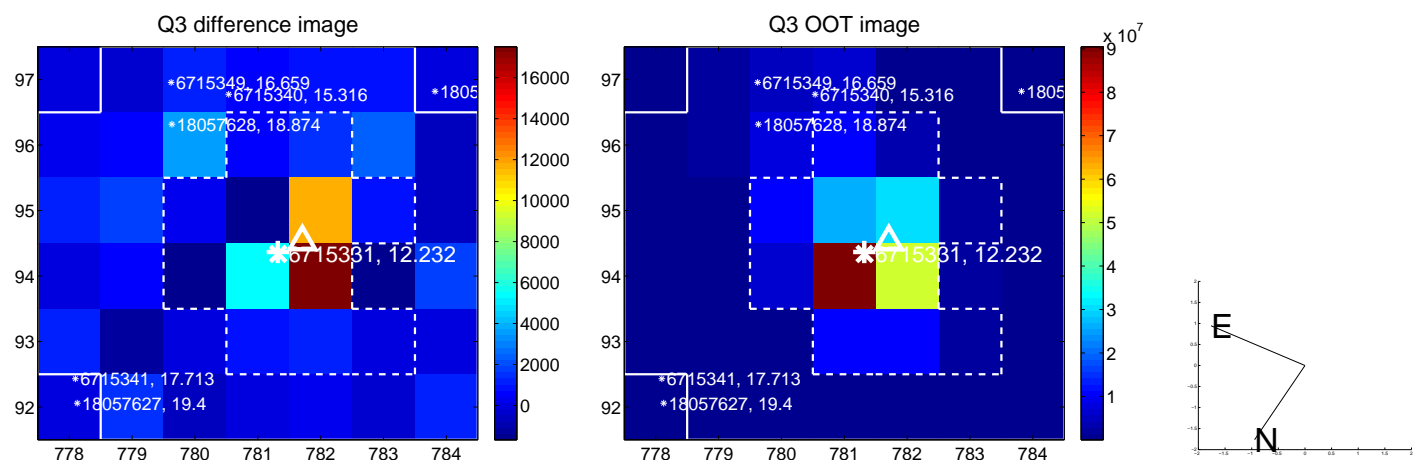
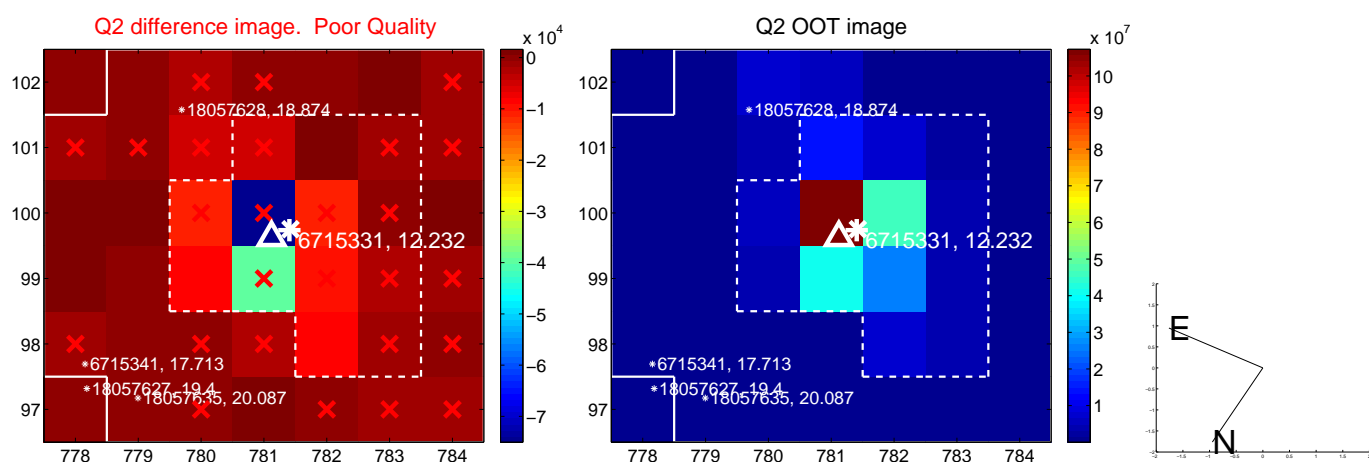
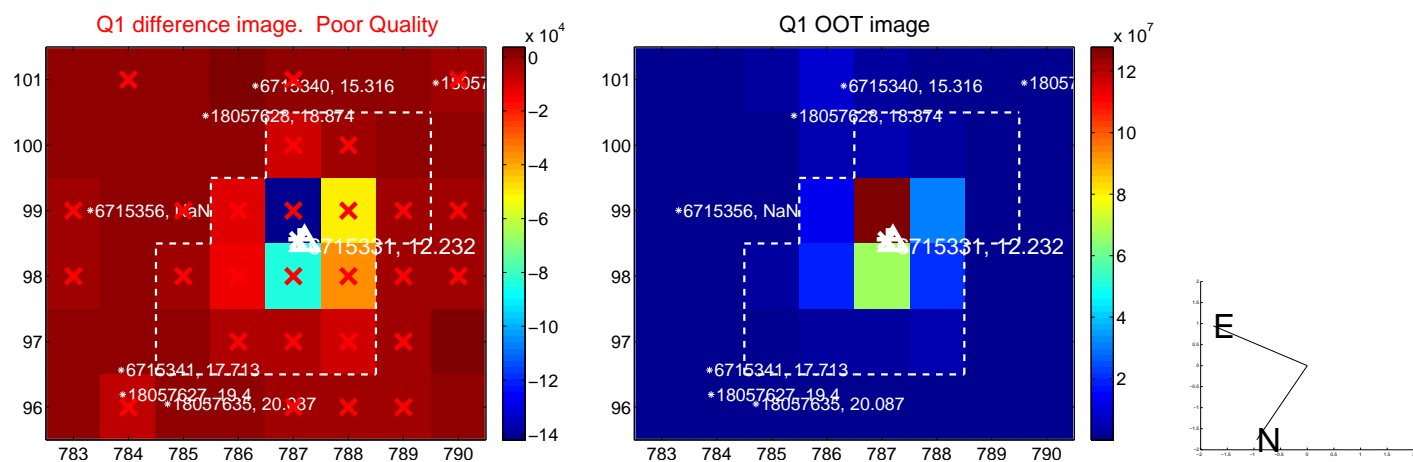
The direct PRF centroid is offset from the target star catalog position by about 0.16 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.150 \pm 0.167$	0.90	$-0.139 \pm 0.176$	$0.058 \pm 0.156$
PRF-fit source offset from KIC position	$0.092 \pm 0.176$	0.52	$0.088 \pm 0.165$	$0.024 \pm 0.183$
photometric centroid source offset	$0.33 \pm 0.27$	1.25	$0.31 \pm 0.27$	$-0.13 \pm 0.24$

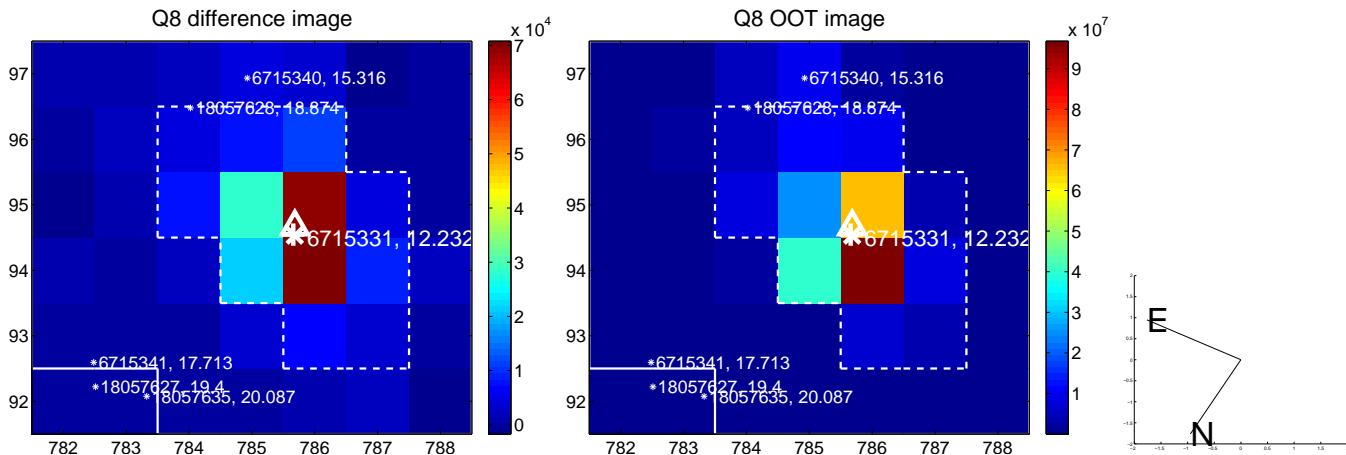
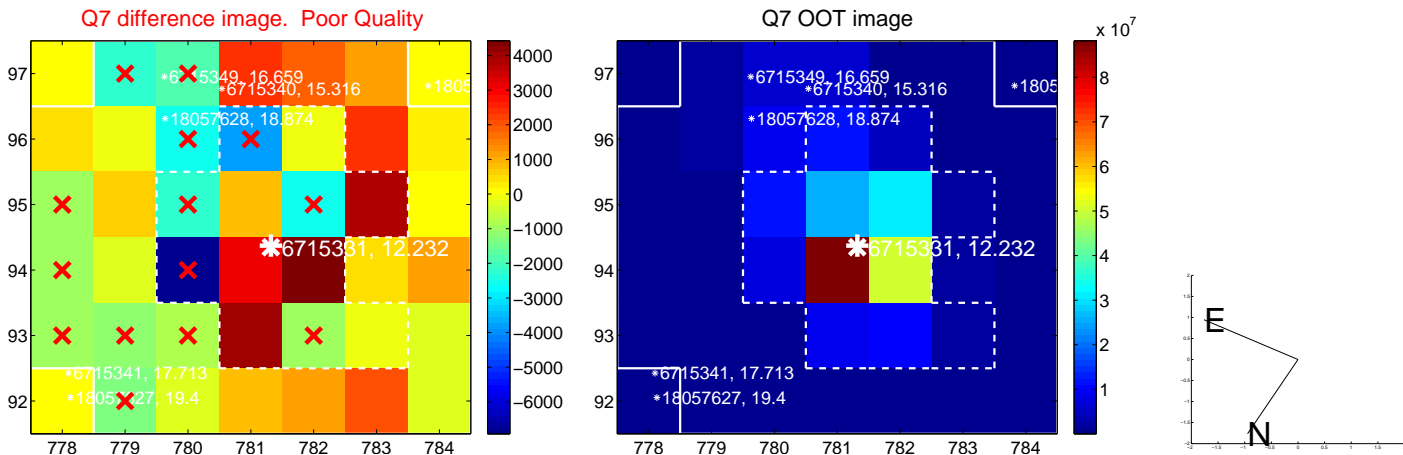
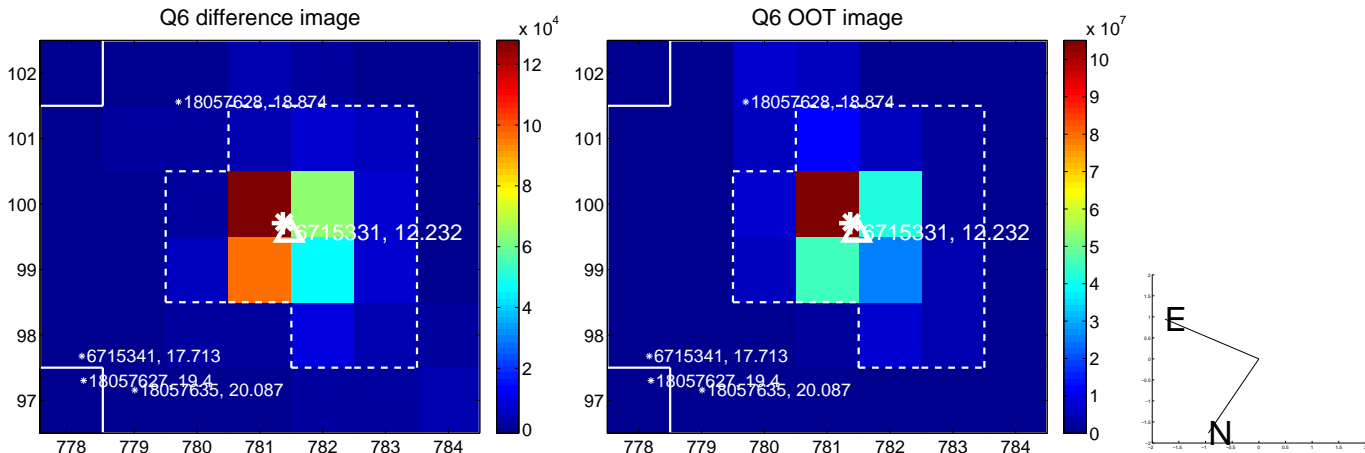
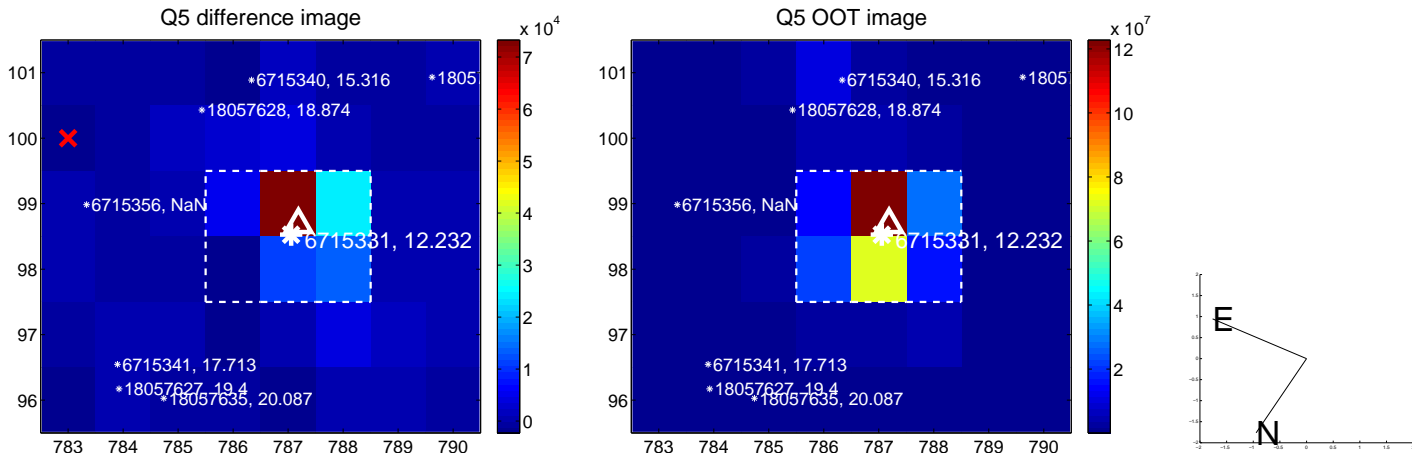


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets**; **Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

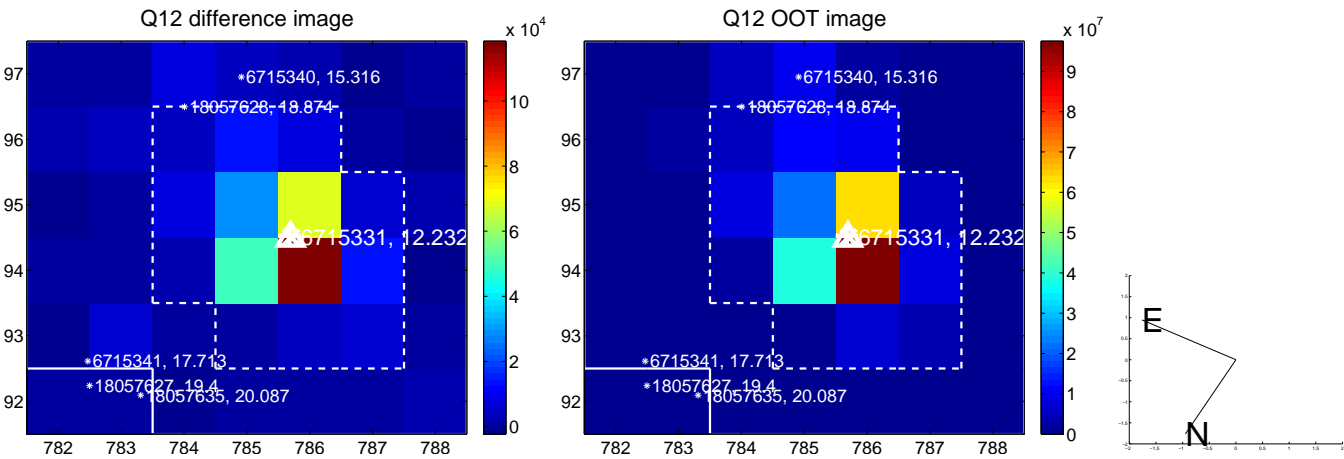
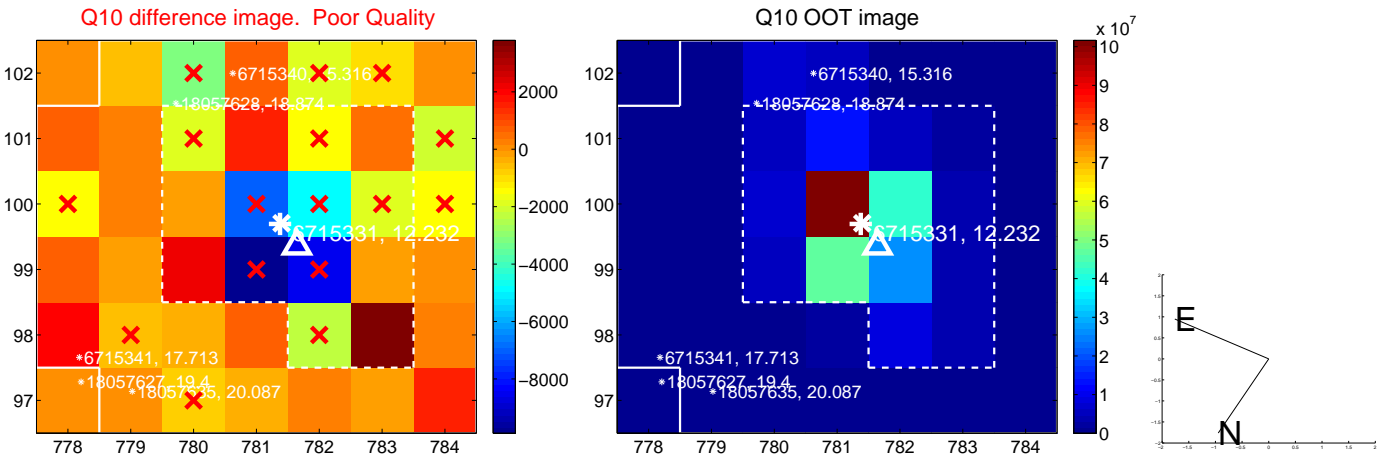
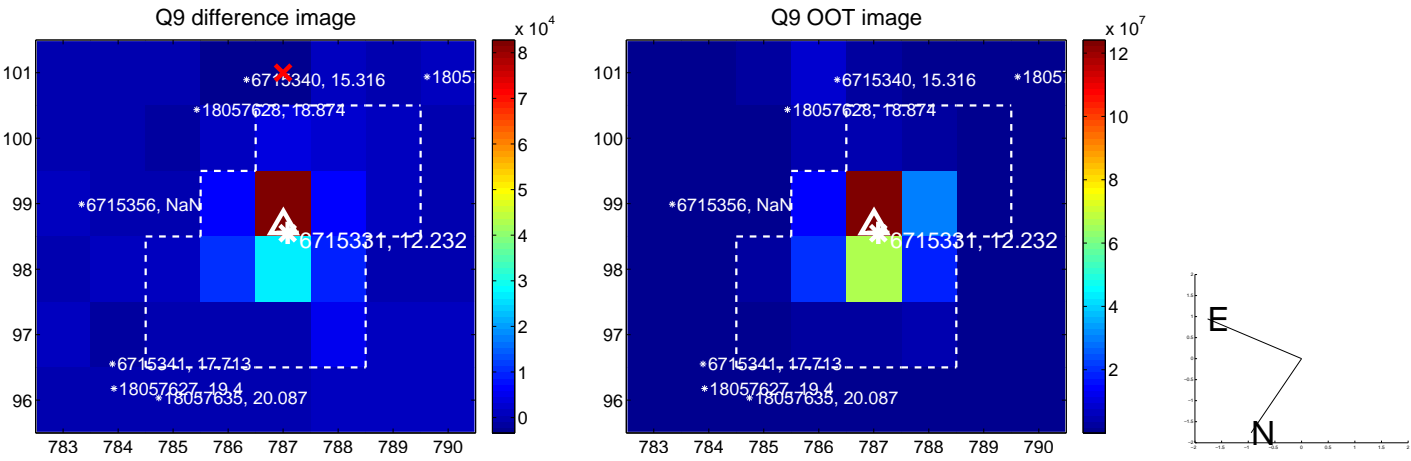
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



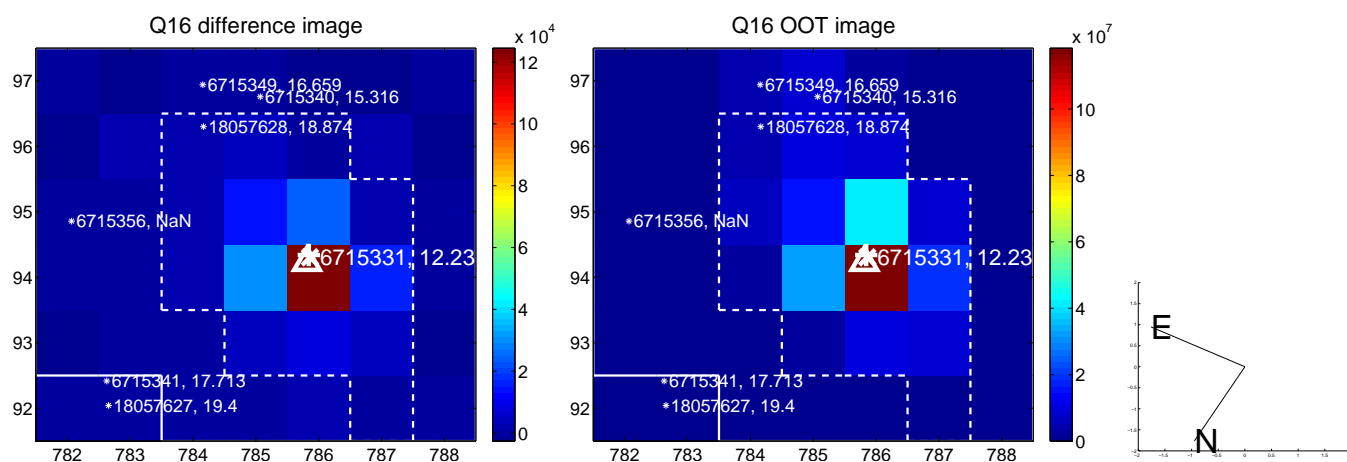
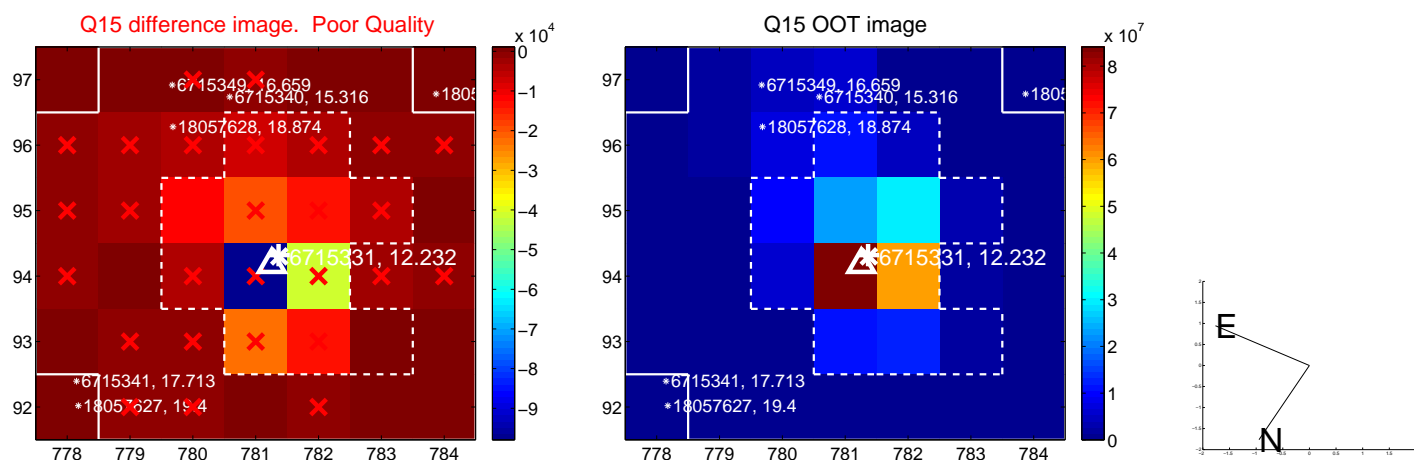
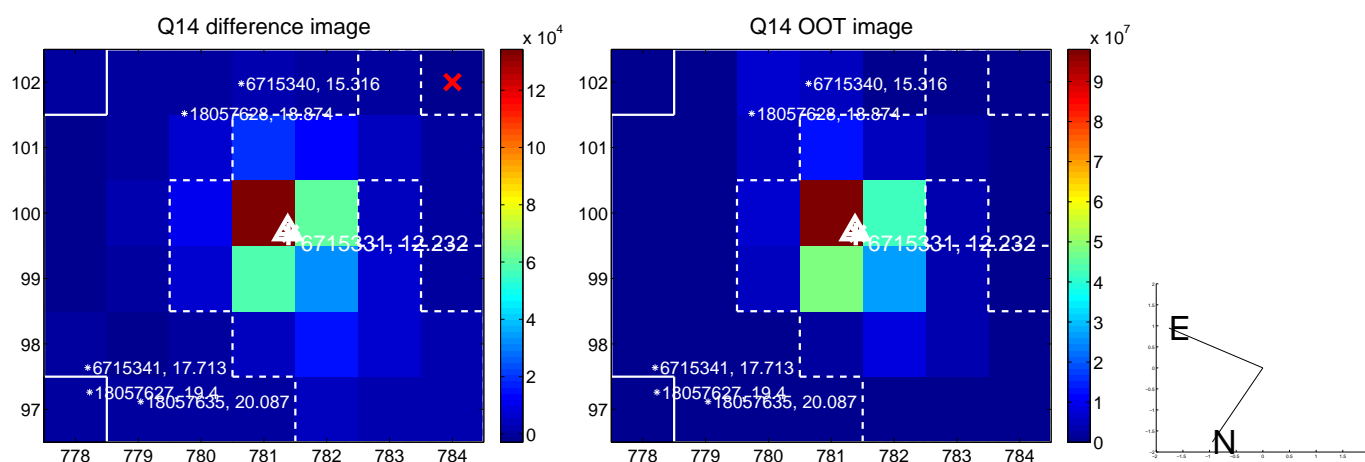
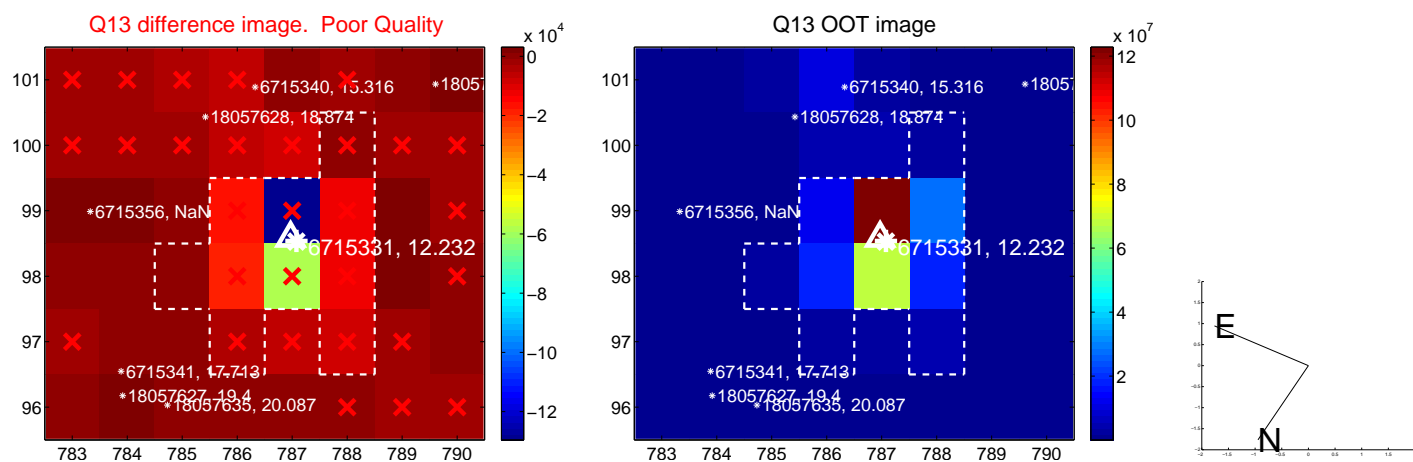
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



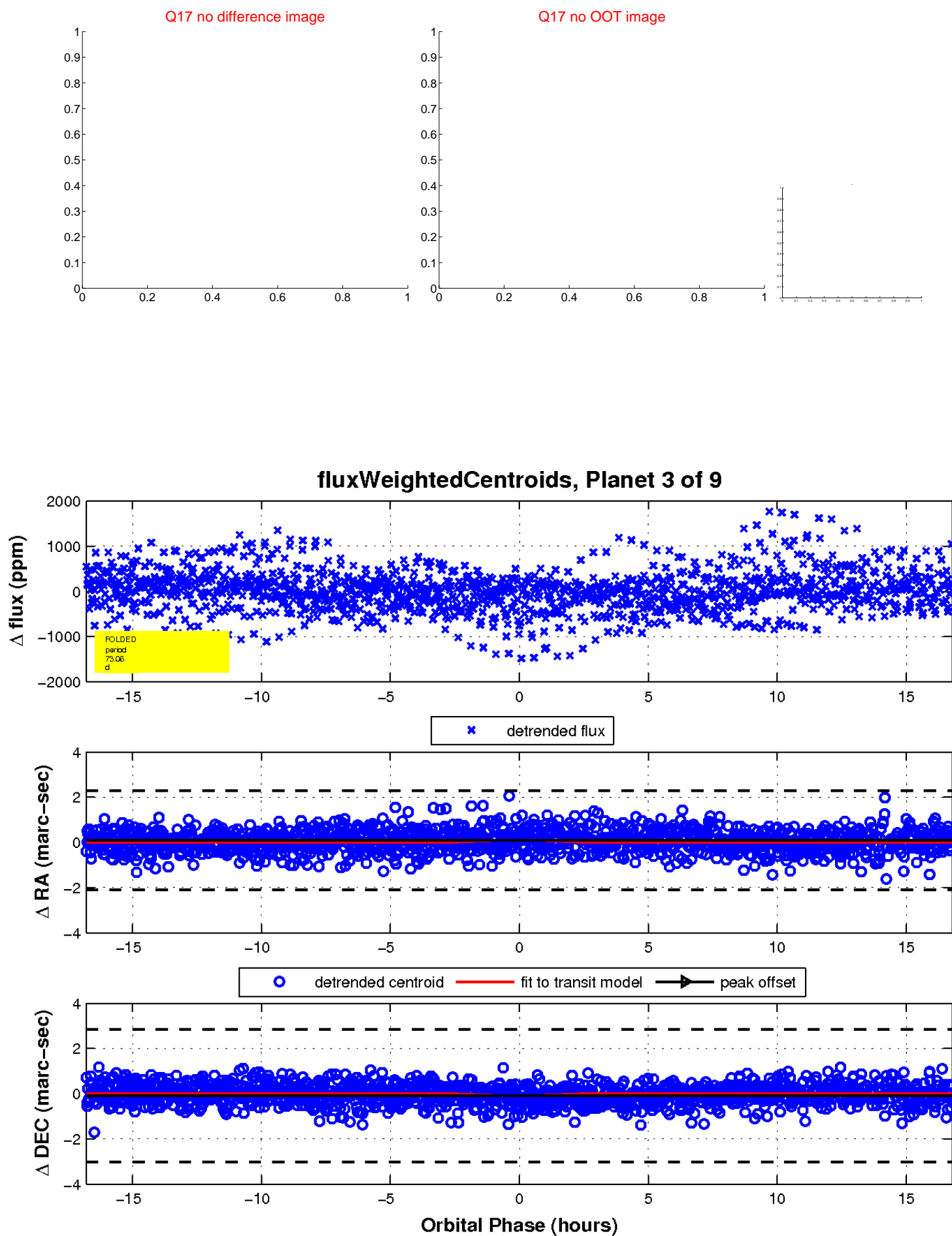
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



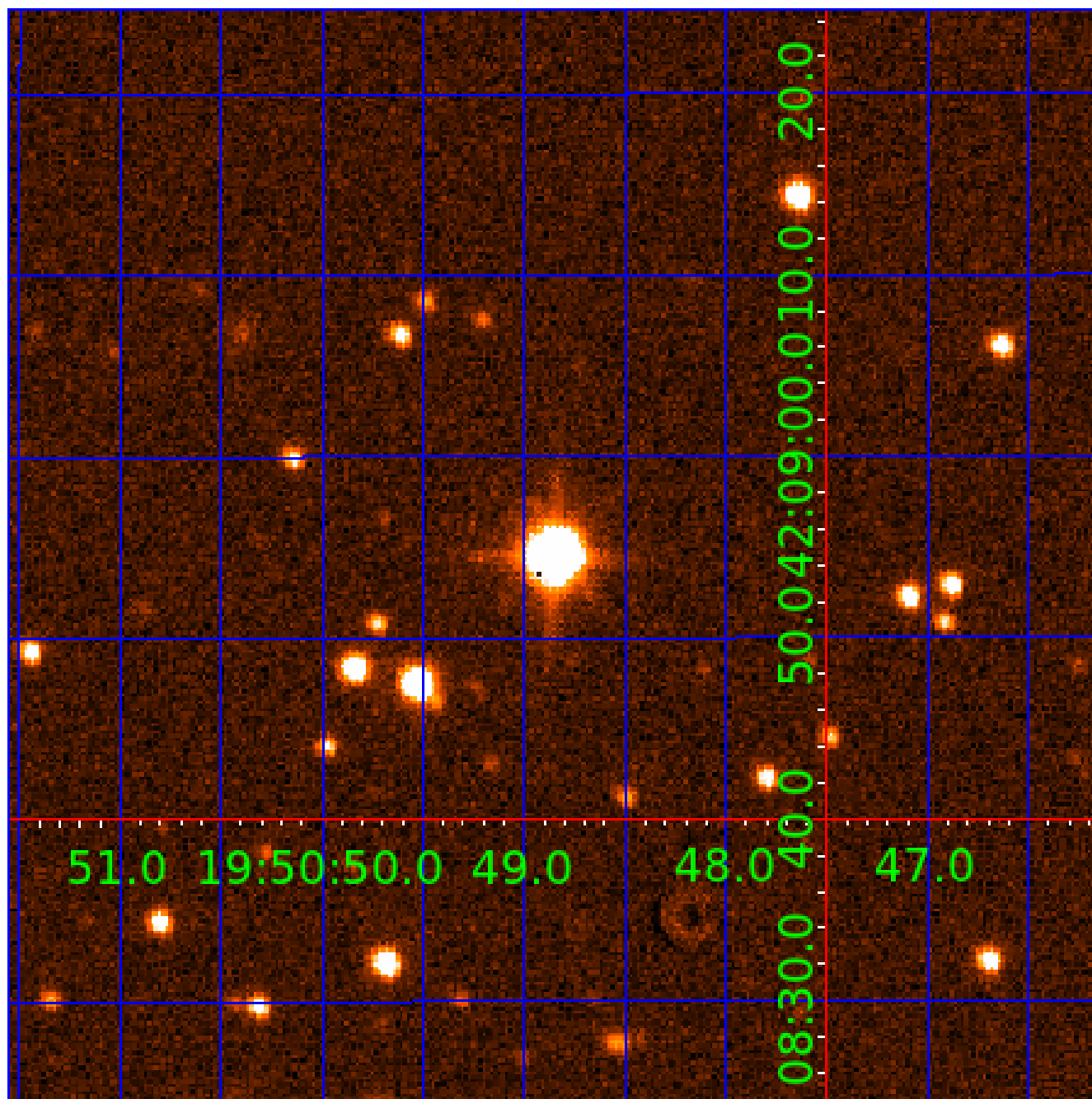
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.





UKIRT Image

Declination



# KIC 006715331

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
006715331-01	OBS	No	0.928873	132.119851	21.8	5.212	7.9	5.3	8.60	7053	4.30	0.00
006715331-02	OBS	No	126.812494	138.381125	426.5	13.300	9.9	5.5	8.60	7053	20.88	346.72
006715331-03	OBS	No	73.061339	155.485784	600.8	5.597	9.3	8.0	8.60	7053	39.84	723.23
006715331-04	OBS	No	80.681374	150.660758	762.9	11.330	9.6	10.1	8.60	7053	28.37	633.62
006715331-06	OBS	No	49.992478	134.622321	526.8	5.276	8.2	9.0	8.60	7053	37.45	1199.45
006715331-07	OBS	No	197.990545	159.459832	701.4	3.518	8.5	9.1	8.60	7053	27.73	191.43
006715331-08	OBS	No	53.819547	166.532224	564.8	4.939	8.0	8.7	8.60	7053	38.71	1087.10
006715331-09	OBS	No	130.838966	143.185368	112.8	4.500	7.9	-1.0	8.60	7053	9.22	332.56

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
006715331-01	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
006715331-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS
006715331-03	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—HALO_GHOST
006715331-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
006715331-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
006715331-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS
006715331-08	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
006715331-09	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—CENT_NOFITS

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

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

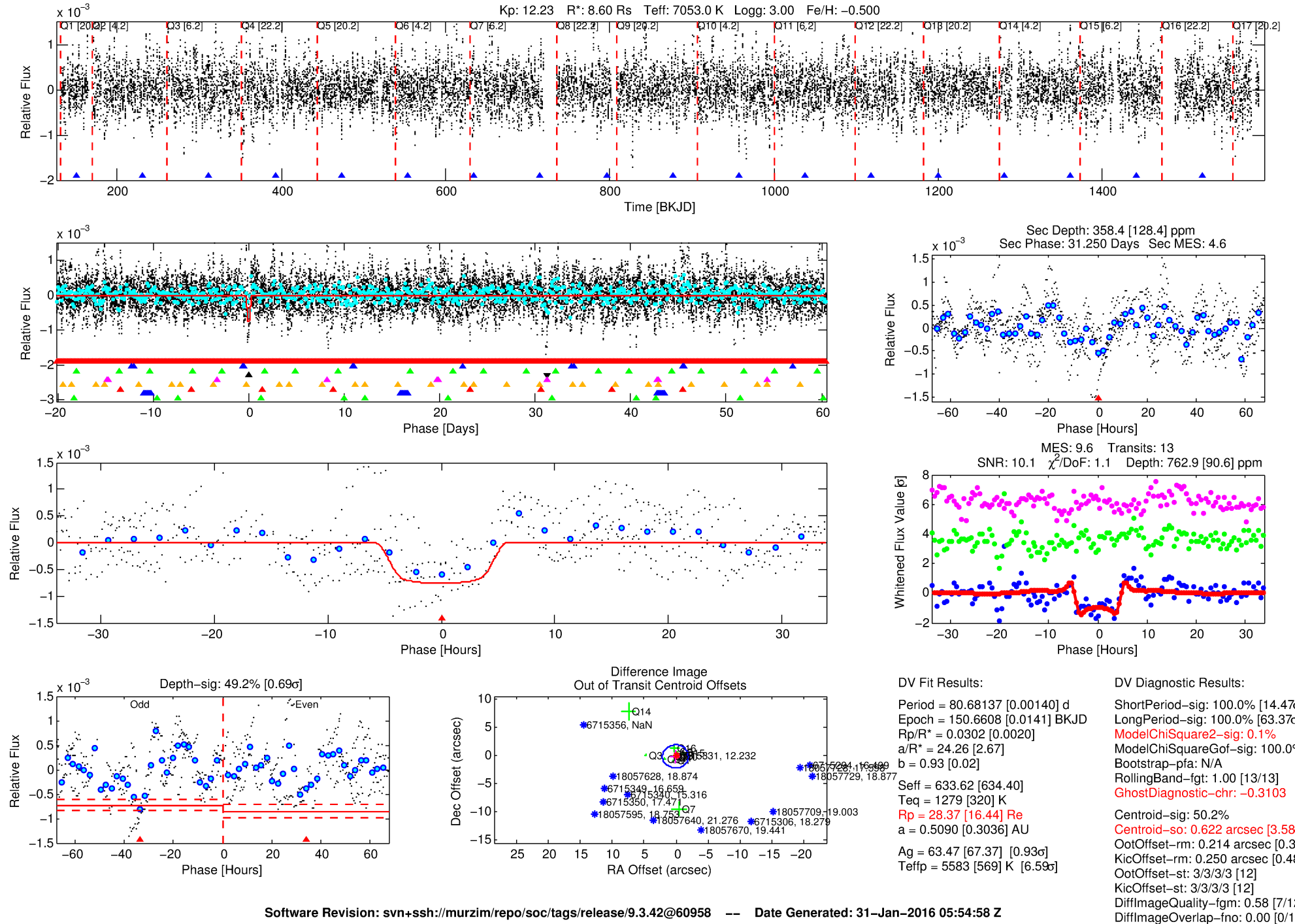
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 006715331-04

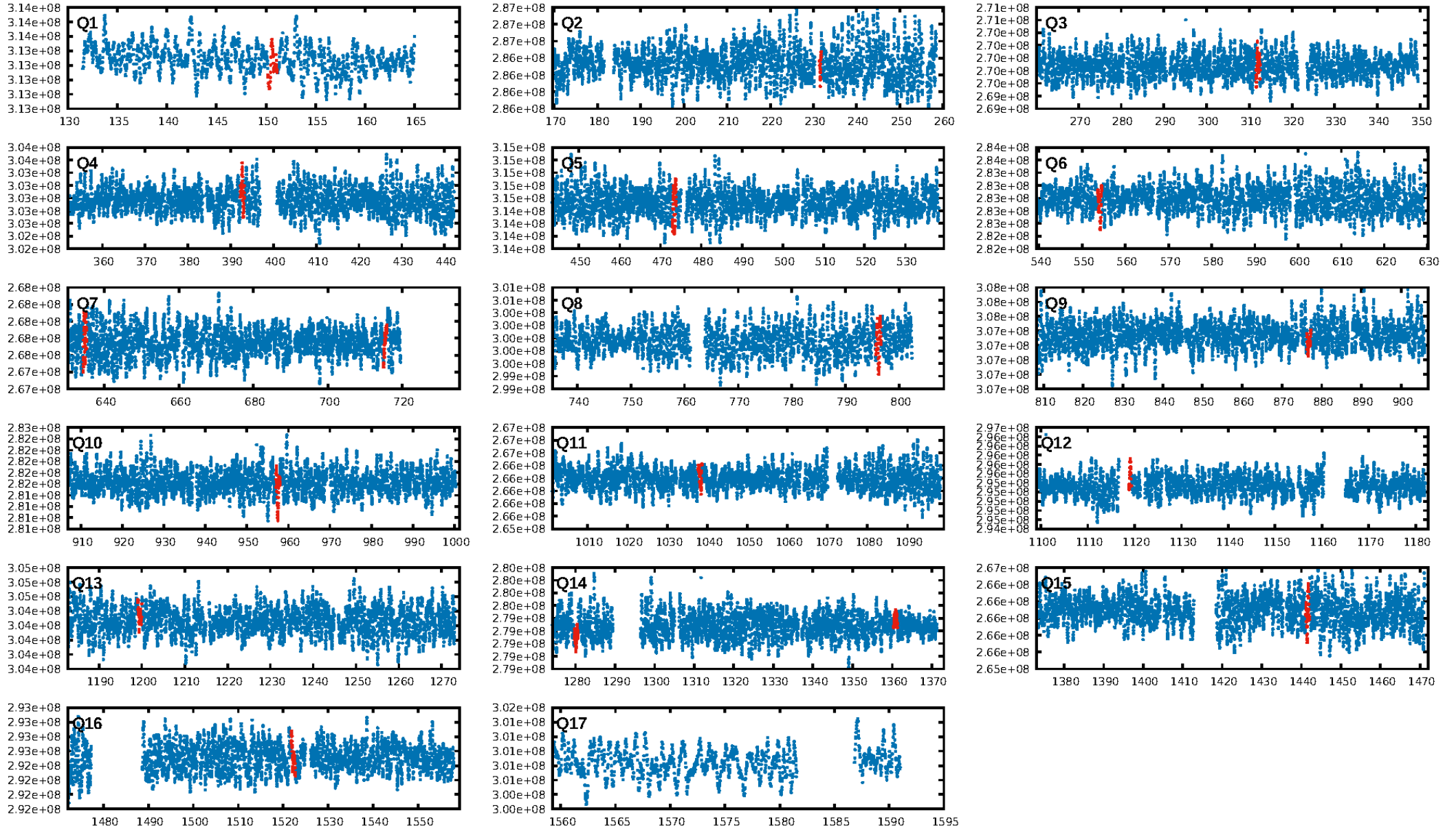
No Significant Match Found

# DV One-Page Summary

KIC: 6715331 Candidate: 4 of 9 Period: 80.681 d

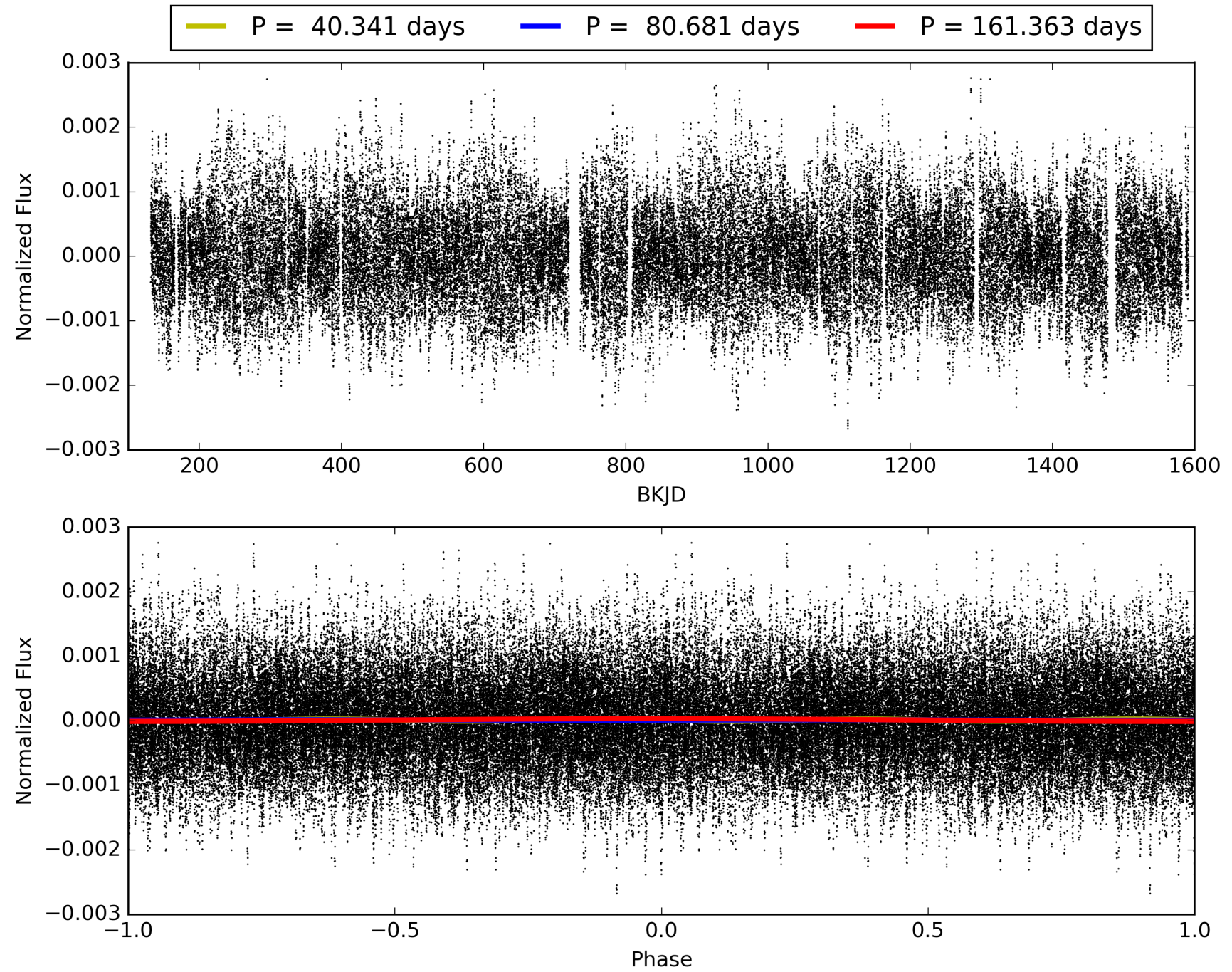


# TCE 006715331-04, PDC Light Curves



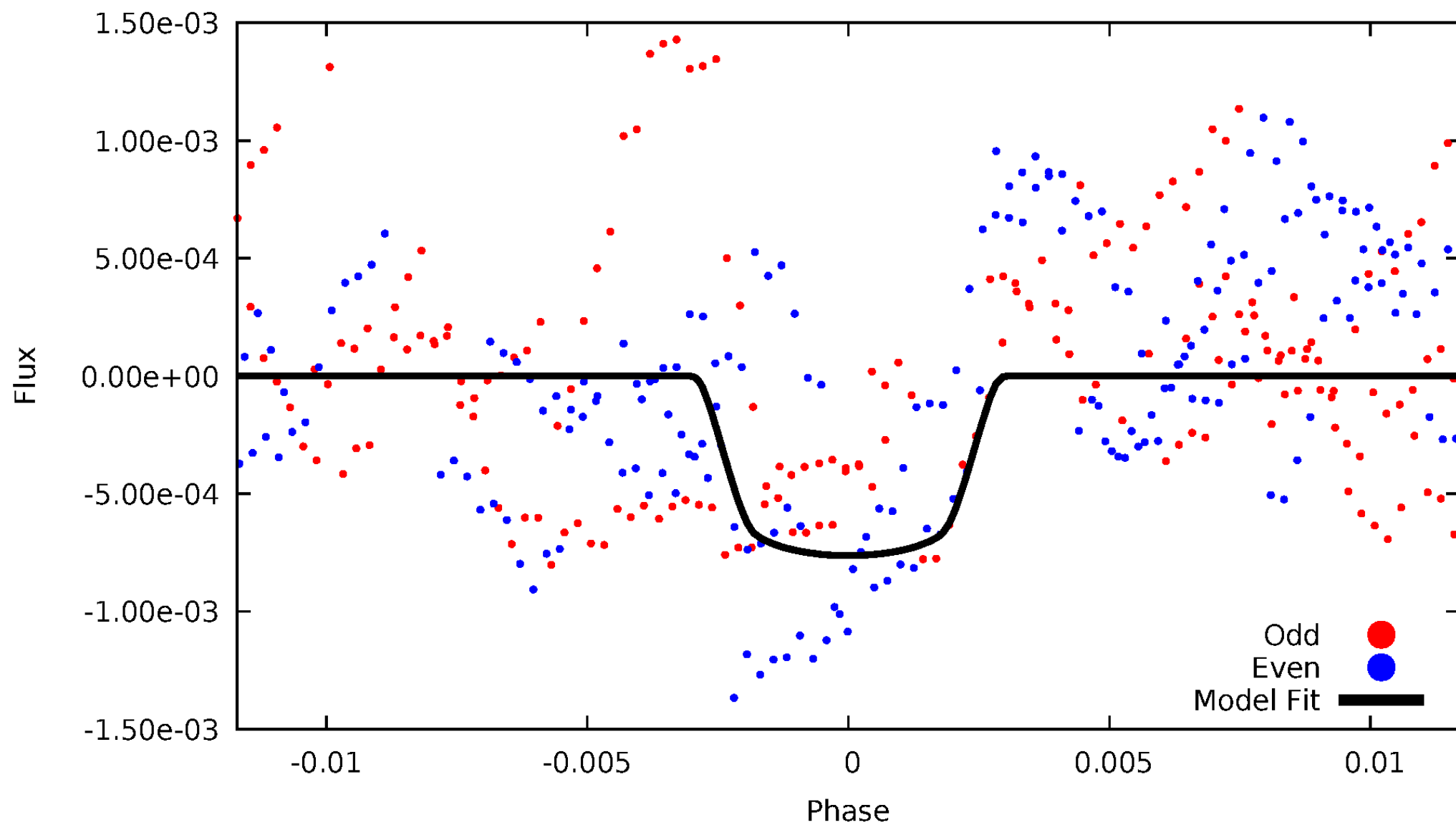


# TCE 006715331-04



# DV Odd/Even

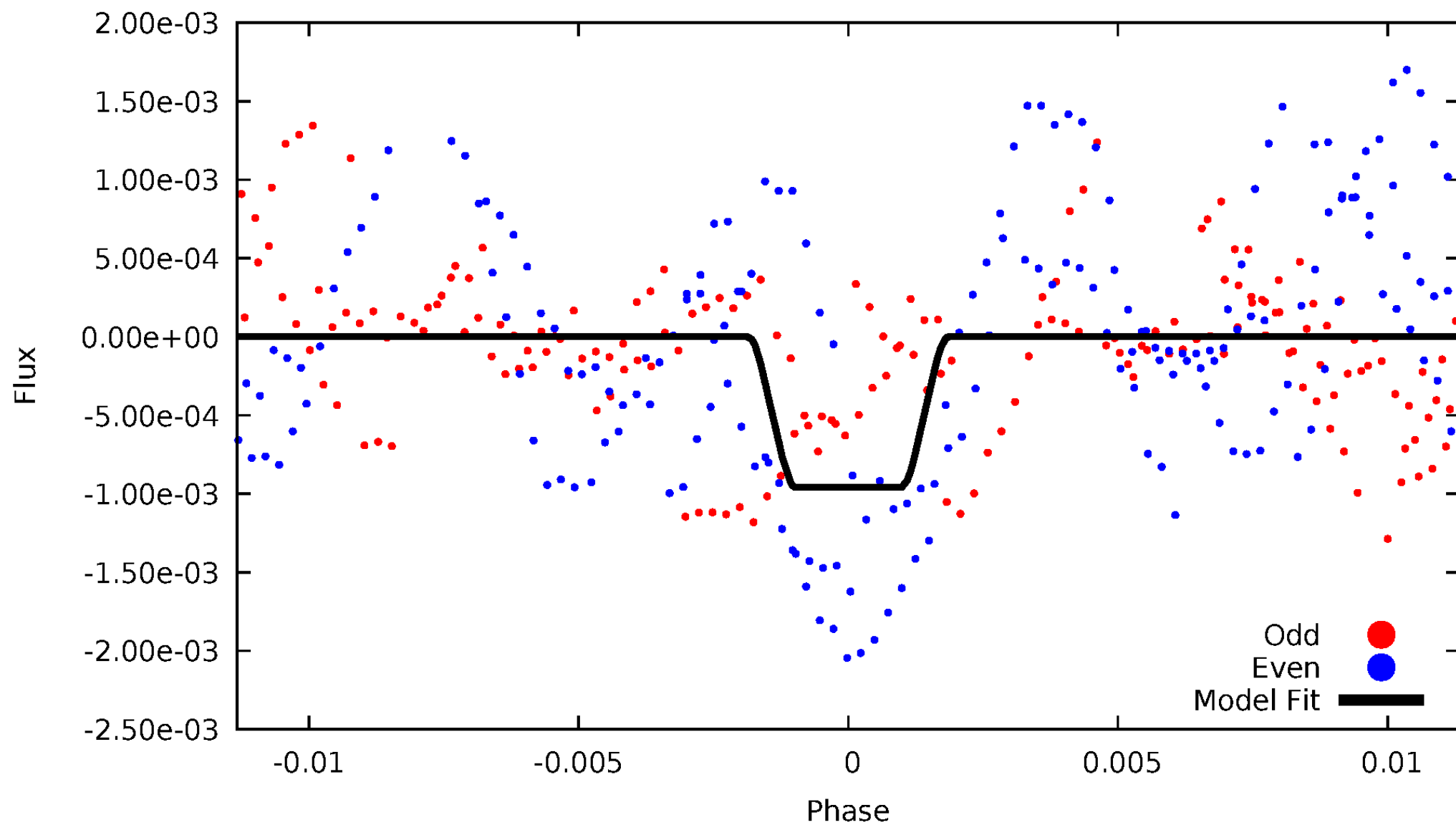
TCE 006715331-04





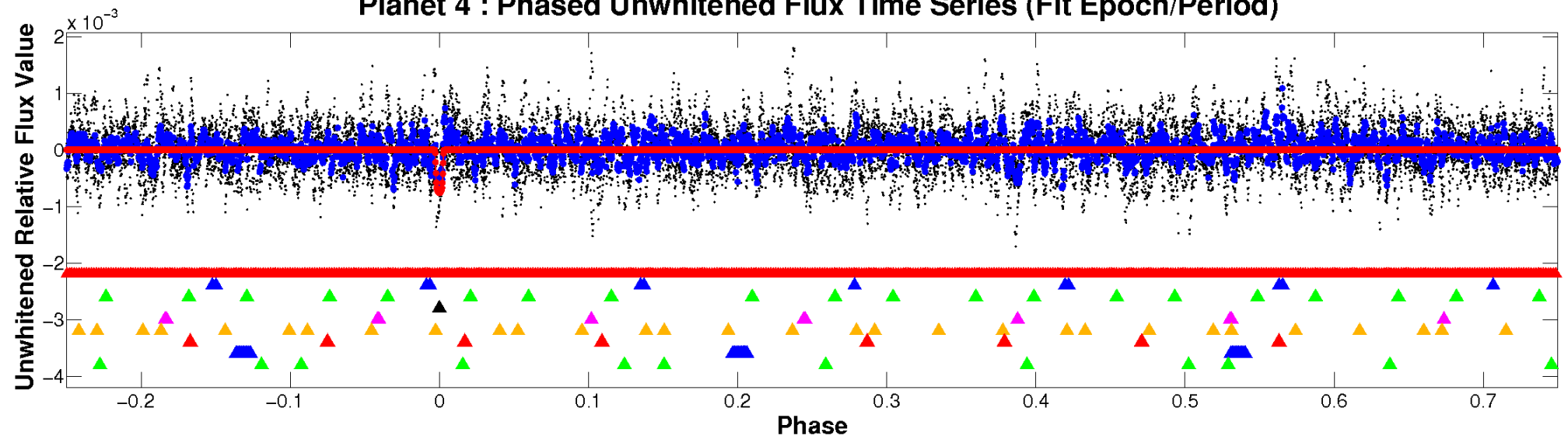
# ALT Odd/Even

TCE 006715331-04

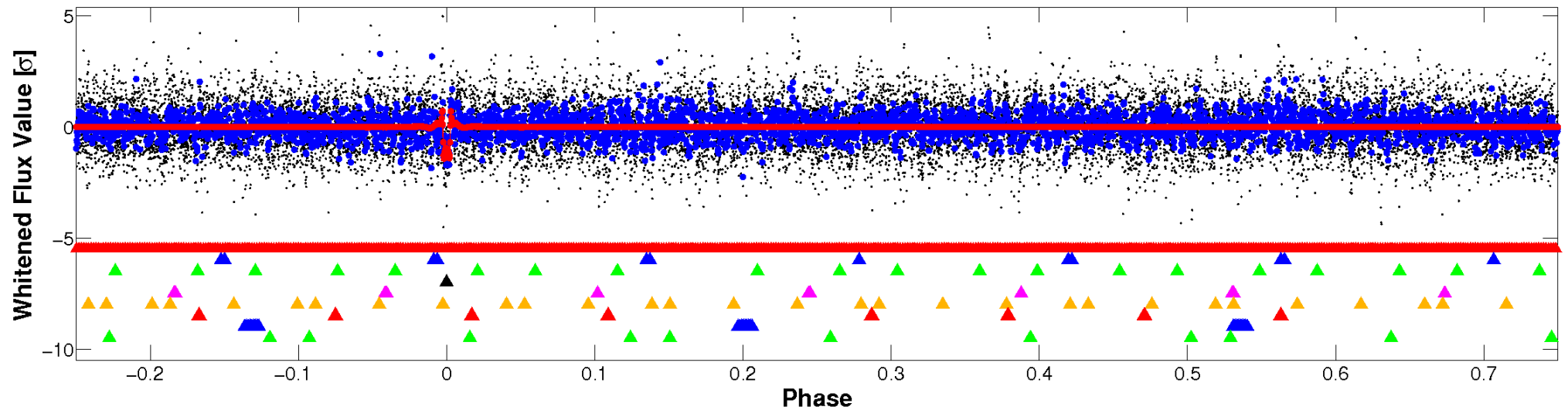


# Non-Whitened Vs. Whitened Light Curve

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

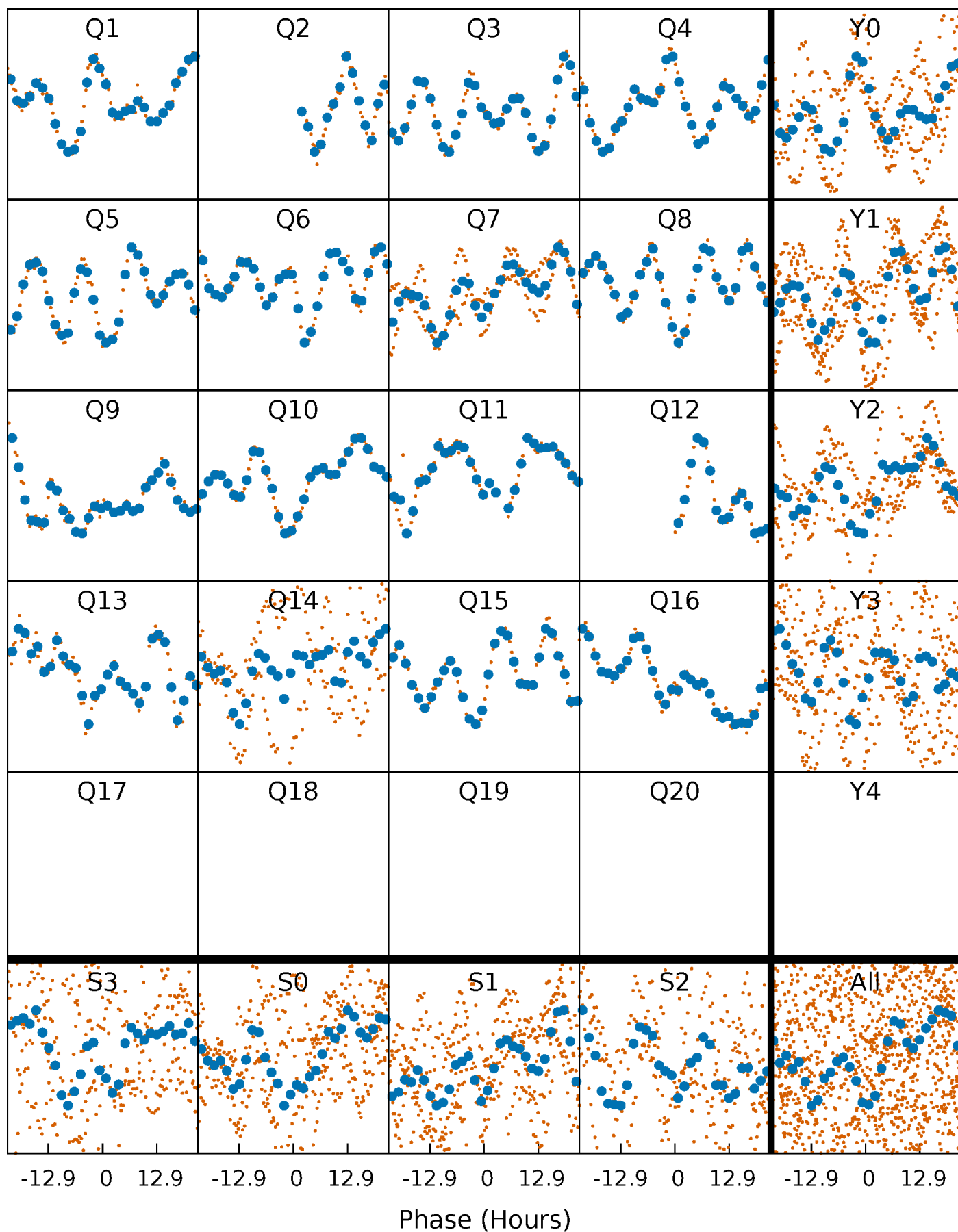


## Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



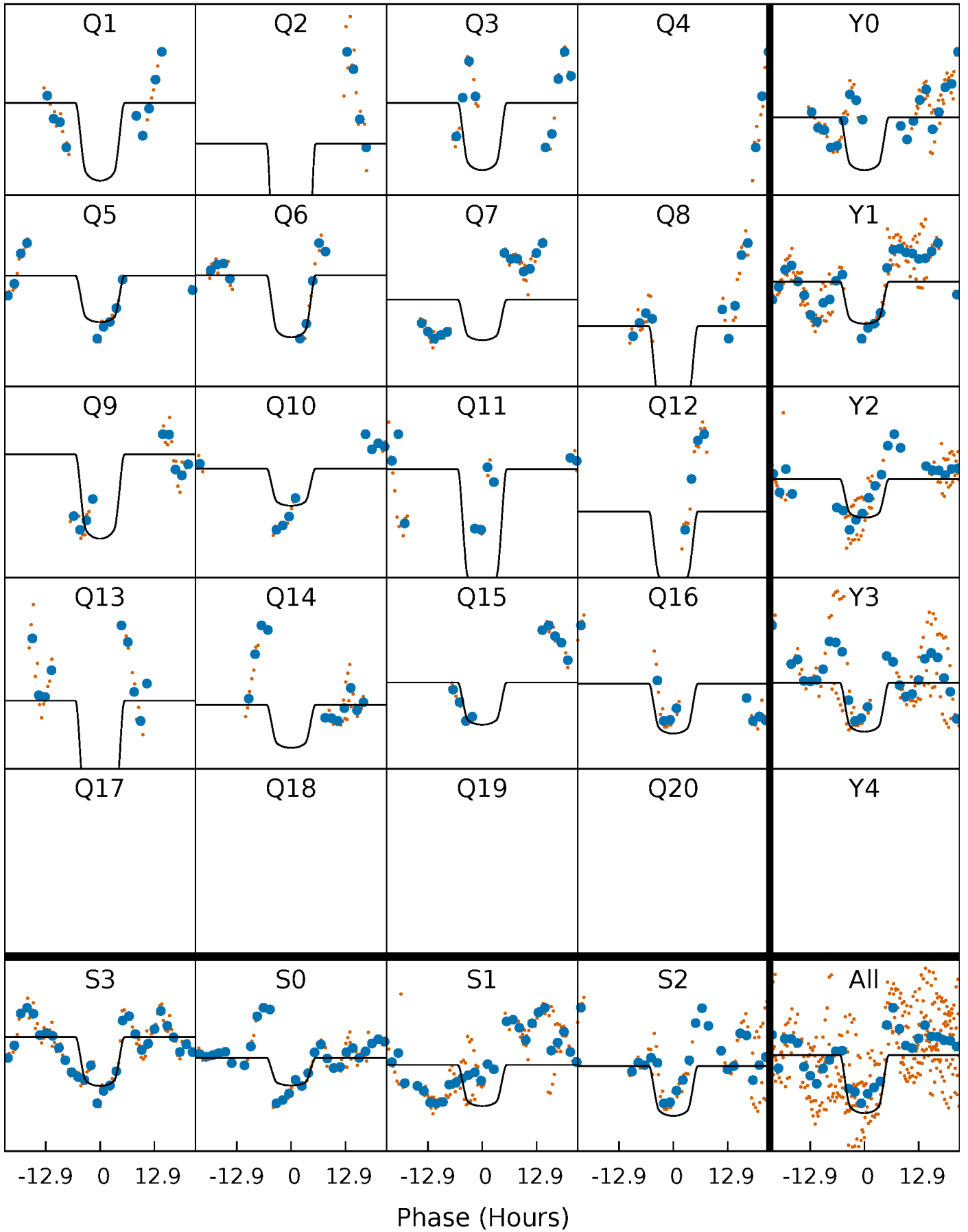
# PDC Quarter-Phased Transit Curves

TCE 006715331-04     $P = 80.681374$  Days     $T_0 = 150.660758$  (BKJD)



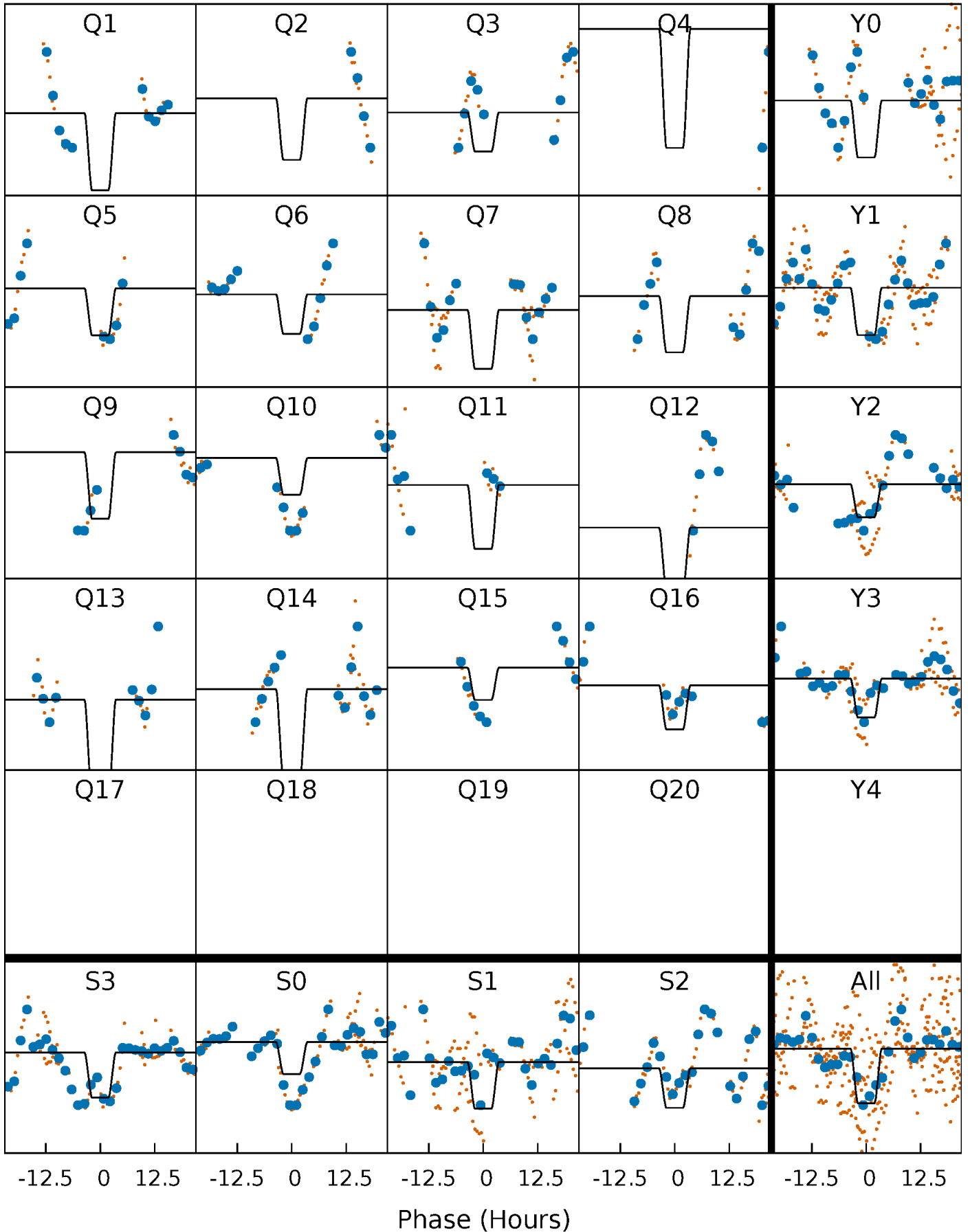
# DV Quarter-Phased Transit Curves

TCE 006715331-04   P= 80.681374 Days    $T_0=150.660758$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

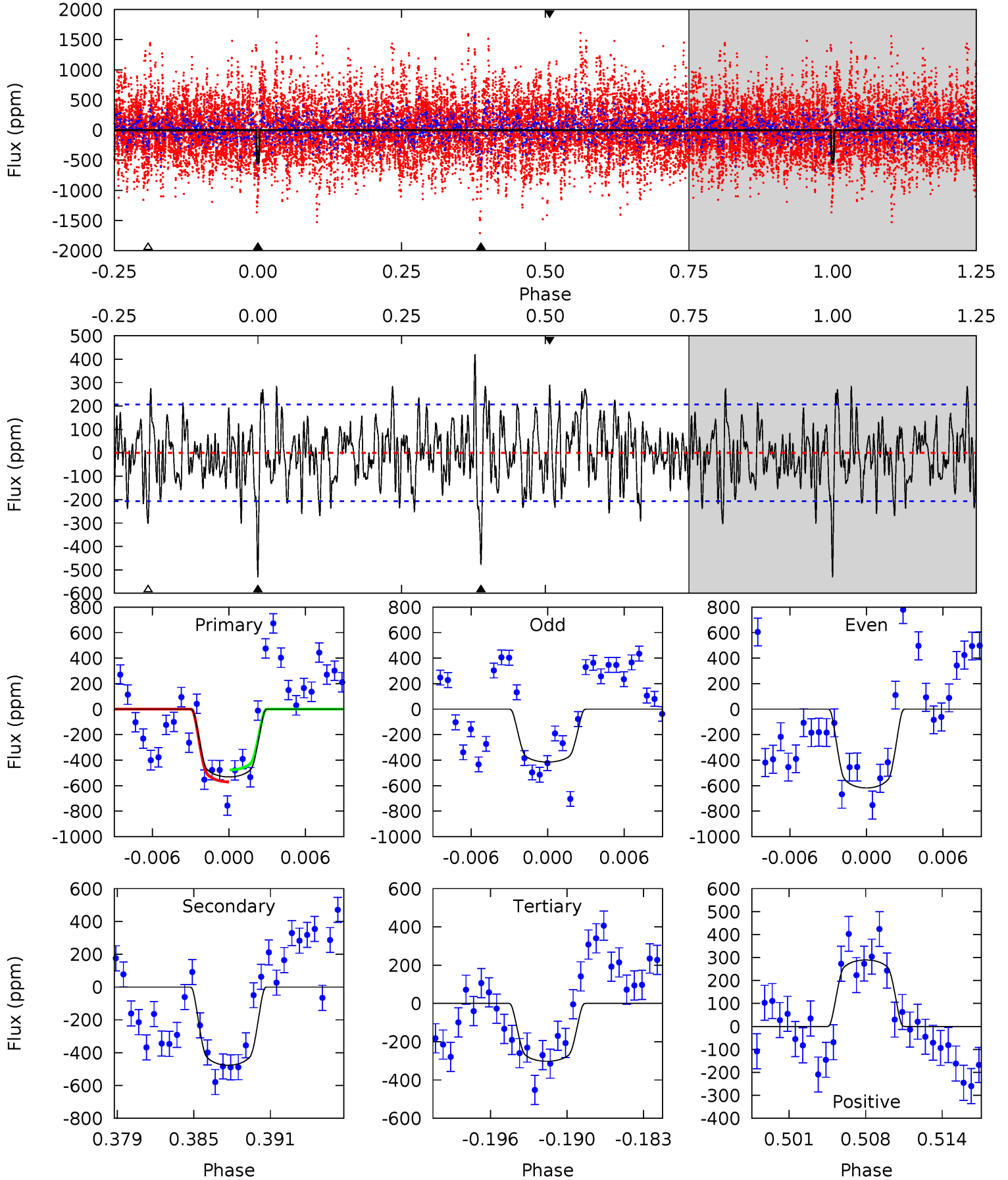
TCE 006715331-04   P= 80.677279 Days    $T_0=150.649228$  (BKJD)



# DV Model-Shift Uniqueness Test

006715331-04, P = 80.681374 Days, E = 69.979384 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
13.2	11.8	7.47	7.16	5.12	2.74	2.69	5.68	5.99	4.32	4.63	2.49	-1.12	0.44	1.14

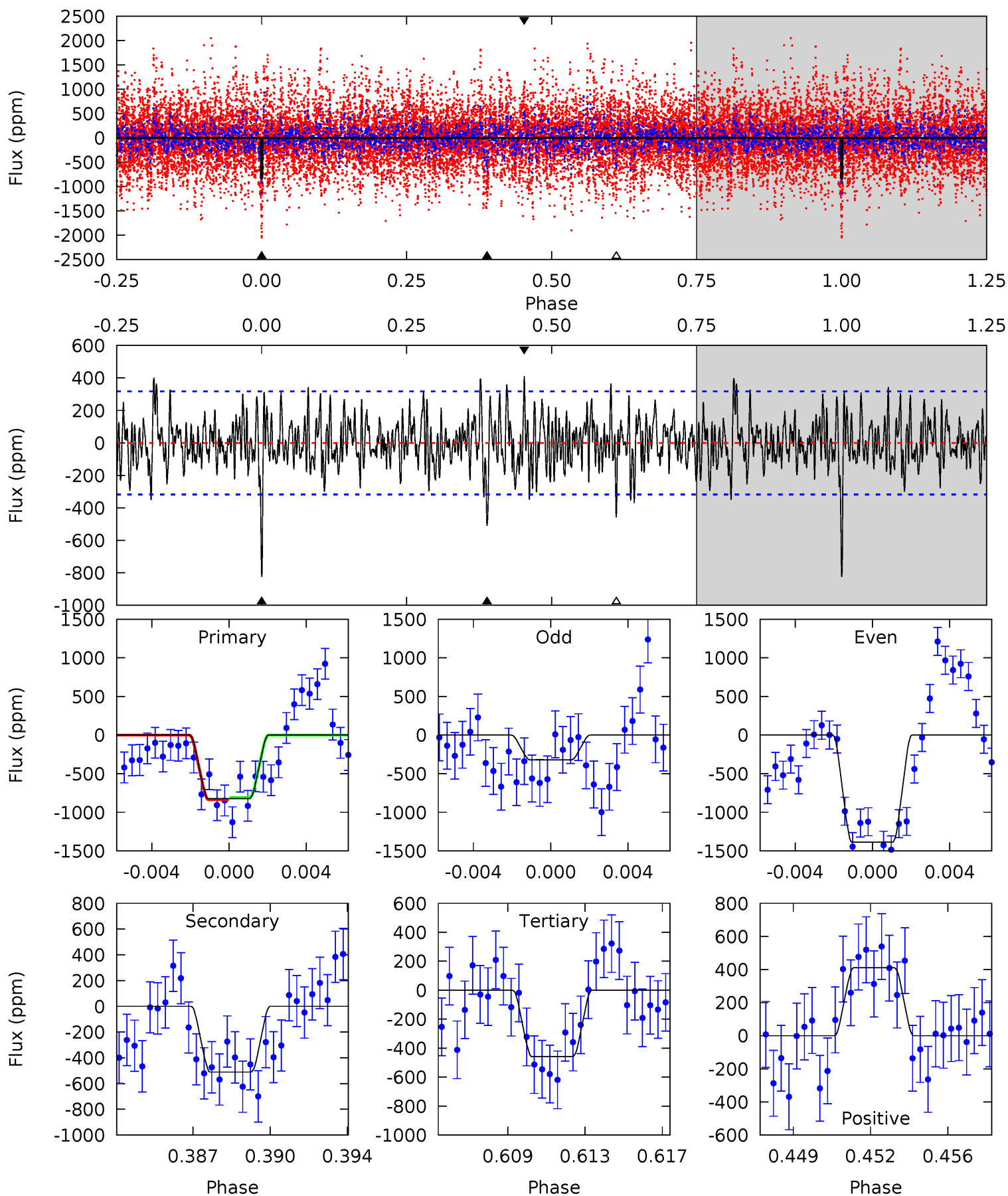




# Alt Model-Shift Uniqueness Test

006715331-04, P = 80.677279 Days, E = 69.971949 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
13.5	8.37	7.52	6.73	5.22	2.91	2.09	5.99	6.79	0.85	1.64	8.54	0.96	0.33	0.20



### Stellar Parameters For KIC 006715331

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$7053^{+170}_{-255}$	$3.000^{+0.595}_{-0.105}$	$-0.500^{+0.500}_{-0.250}$	$8.604^{+1.321}_{-4.954}$	$2.698^{+0.387}_{-0.903}$	$0.006^{+0.048}_{-0.002}$
	+2%/-4%	+20%/-3%	+100%/-50%	+15%/-58%	+14%/-33%	+808%/-31%
Source	PHO1	FLK73	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 006715331-04 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-477 \pm 40$	$26.72^{+4.60}_{-8.09}$	$1719^{+123}_{-255}$	$5918^{+269}_{-268}$	$98^{+85}_{-28}$
Alt.	$-511 \pm 61$	$27.98^{+4.58}_{-7.74}$	$1735^{+122}_{-257}$	$5941^{+317}_{-296}$	$95^{+76}_{-26}$

$T_{max}$  = 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

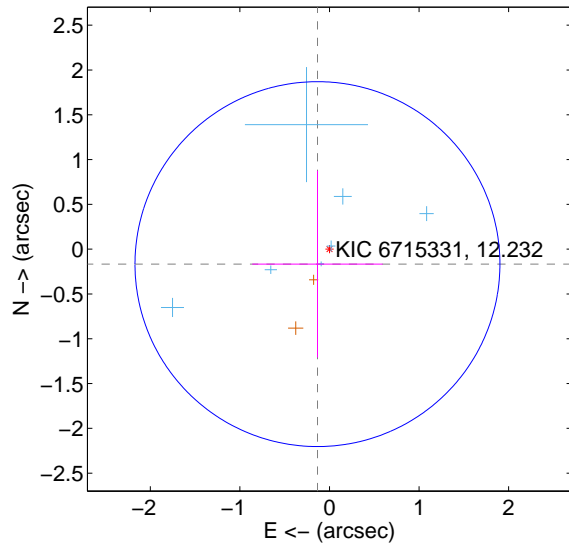
Supplemental centroid analysis for 006715331-04. Kepler magnitude: 12.23. Transit SNR 10.05

There are 7 quarters with good PRF difference image offsets

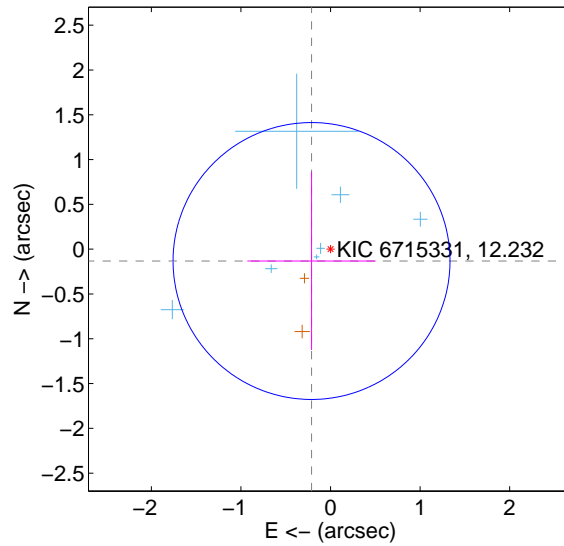
The direct PRF centroid is offset from the target star catalog position by about 0.14 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.214 \pm 0.679$	0.32	$0.134 \pm 0.727$	$-0.167 \pm 1.041$
PRF-fit source offset from KIC position	$0.250 \pm 0.515$	0.48	$0.212 \pm 0.716$	$-0.132 \pm 0.993$
photometric centroid source offset	$0.62 \pm 0.17$	3.58	$0.49 \pm 0.18$	$-0.38 \pm 0.16$

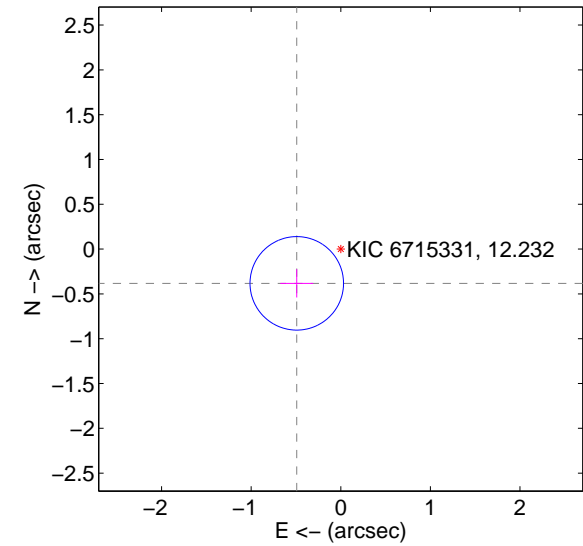
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

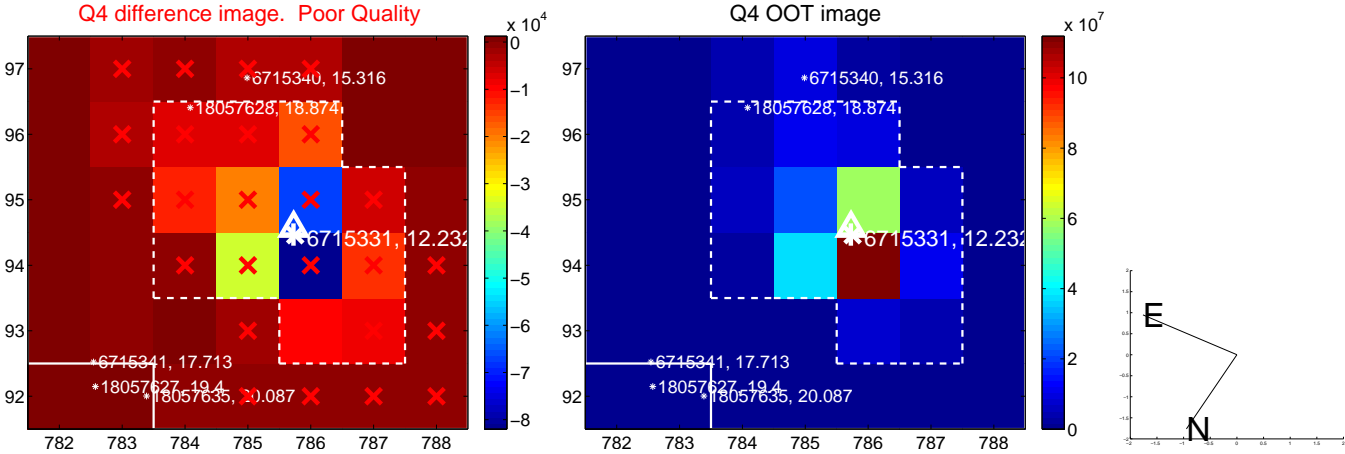
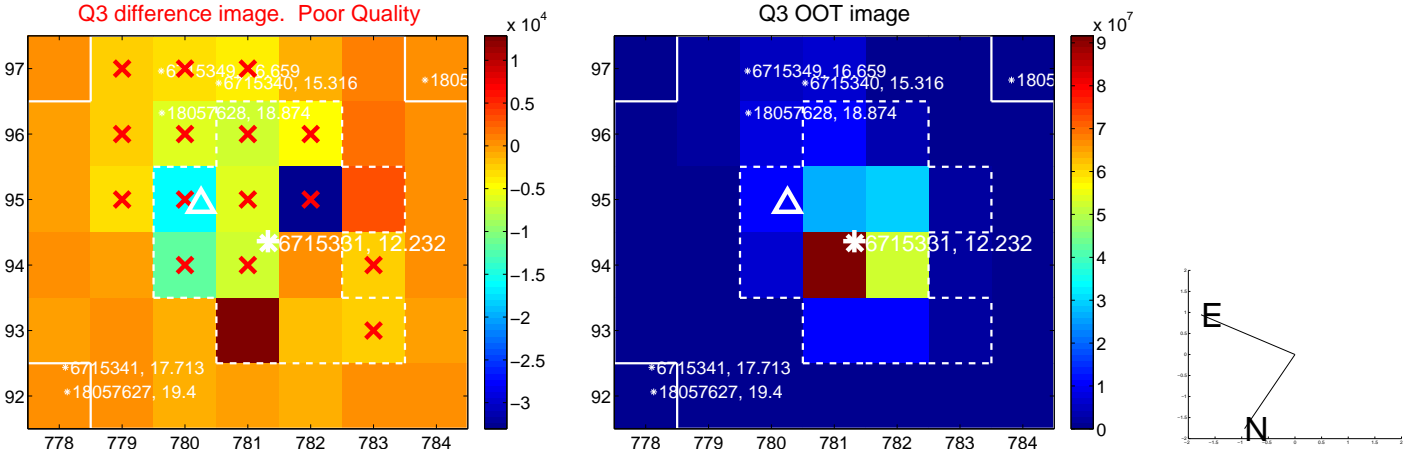
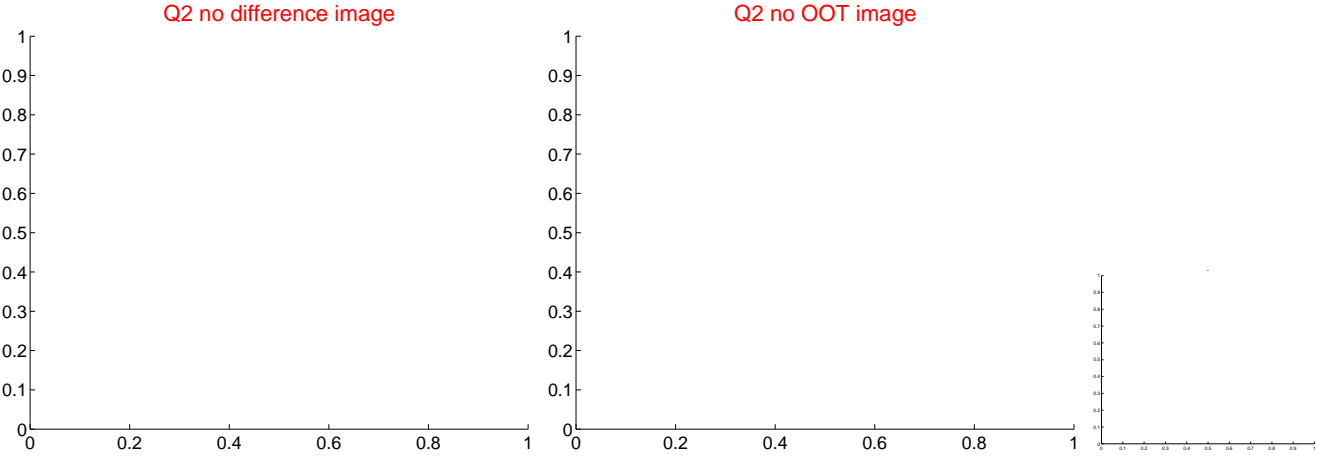
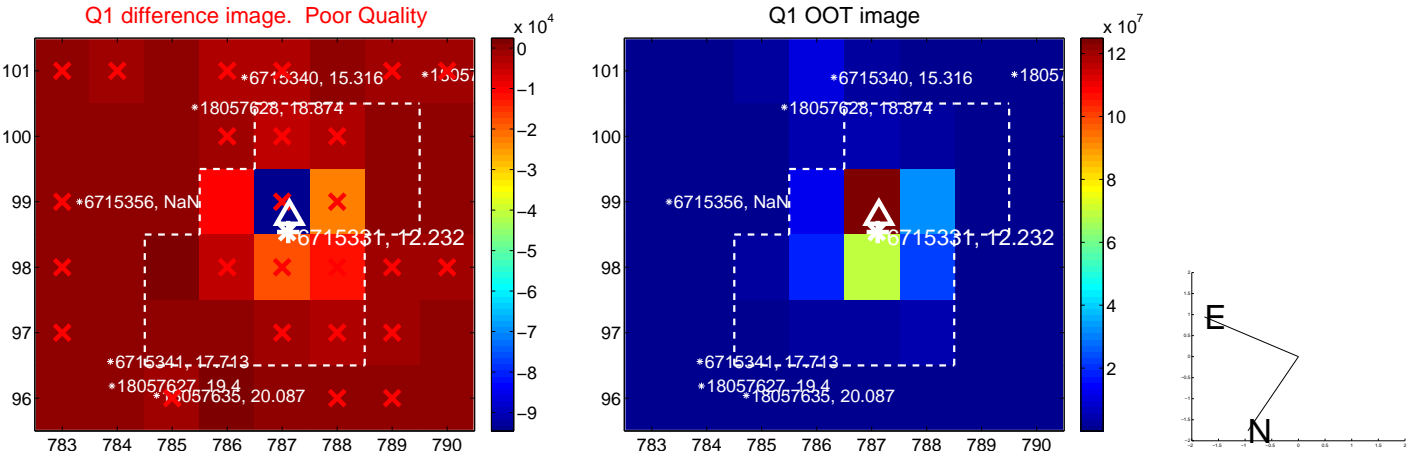


offset from photometric centroids

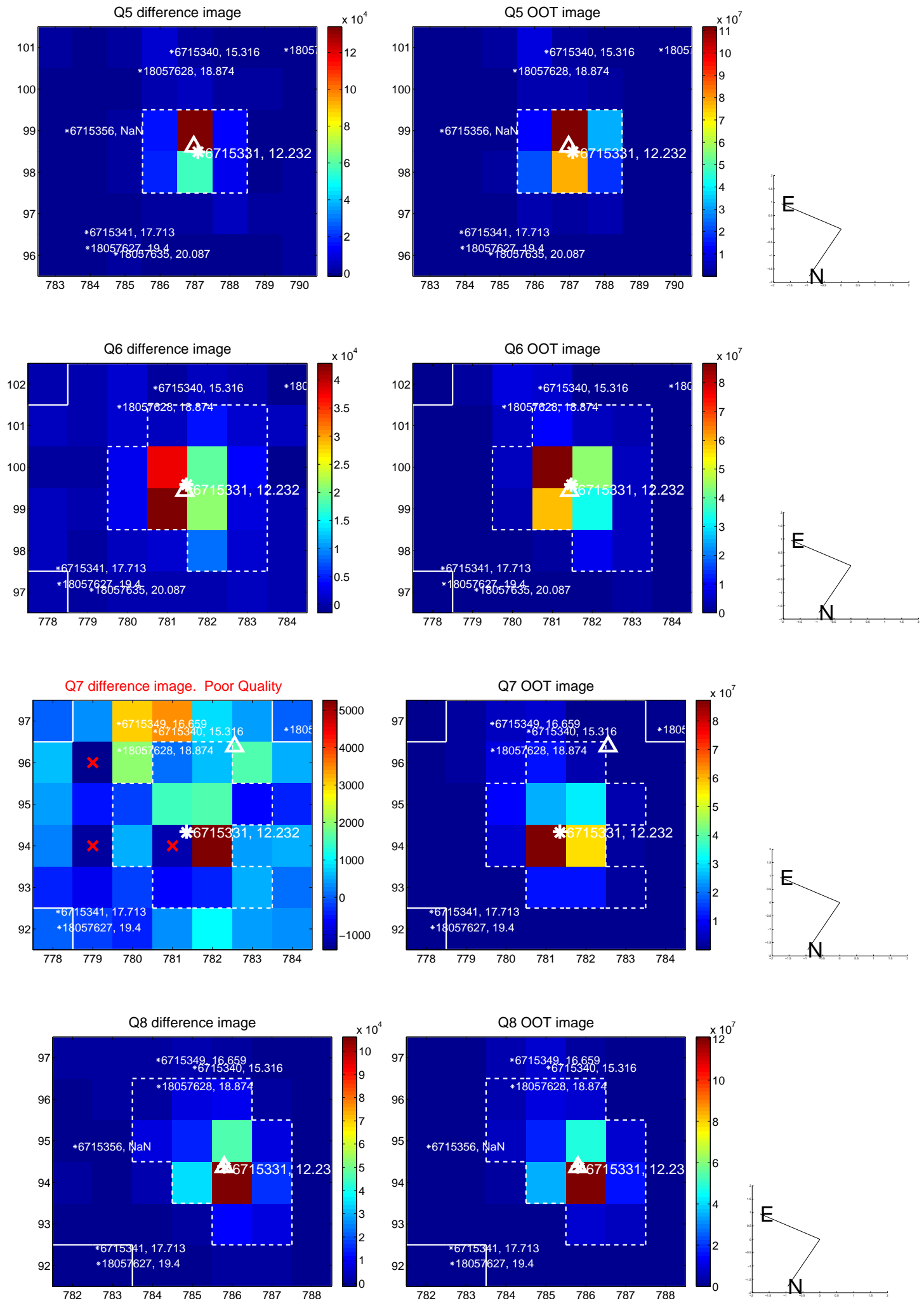


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets**; **Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

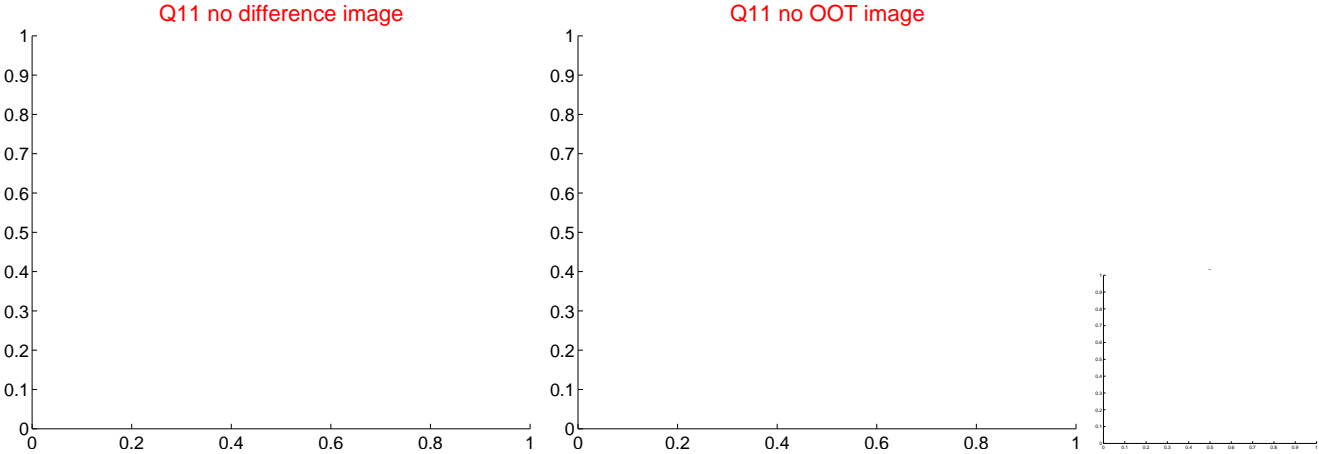
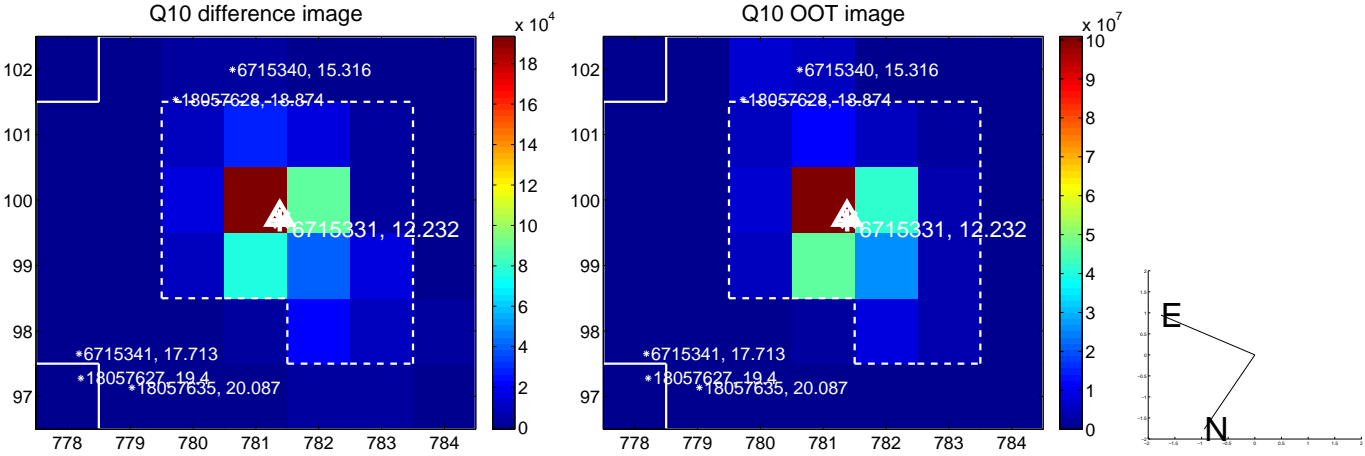
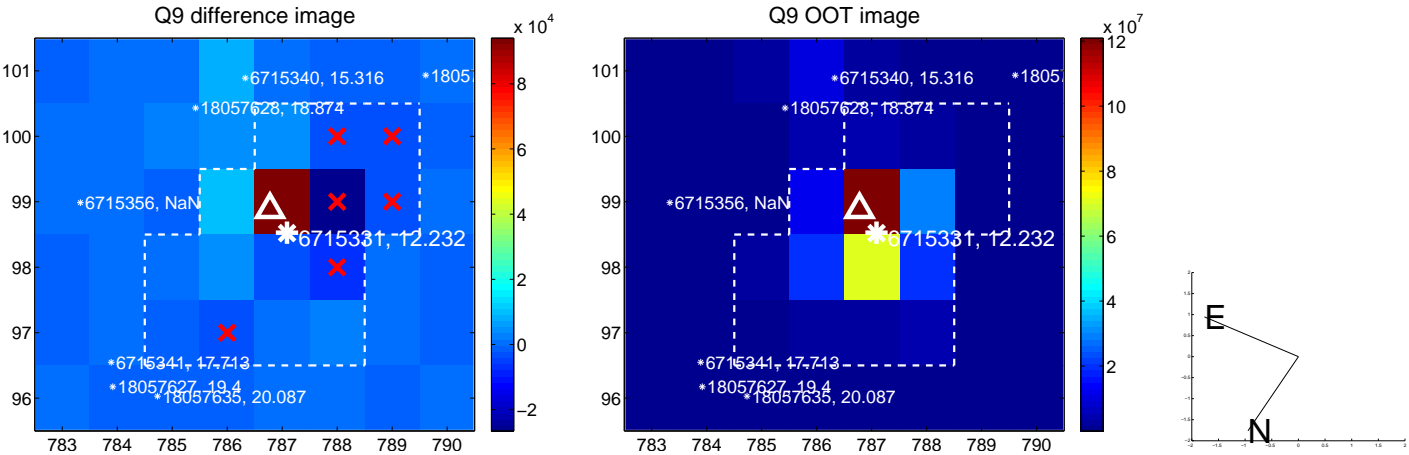
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

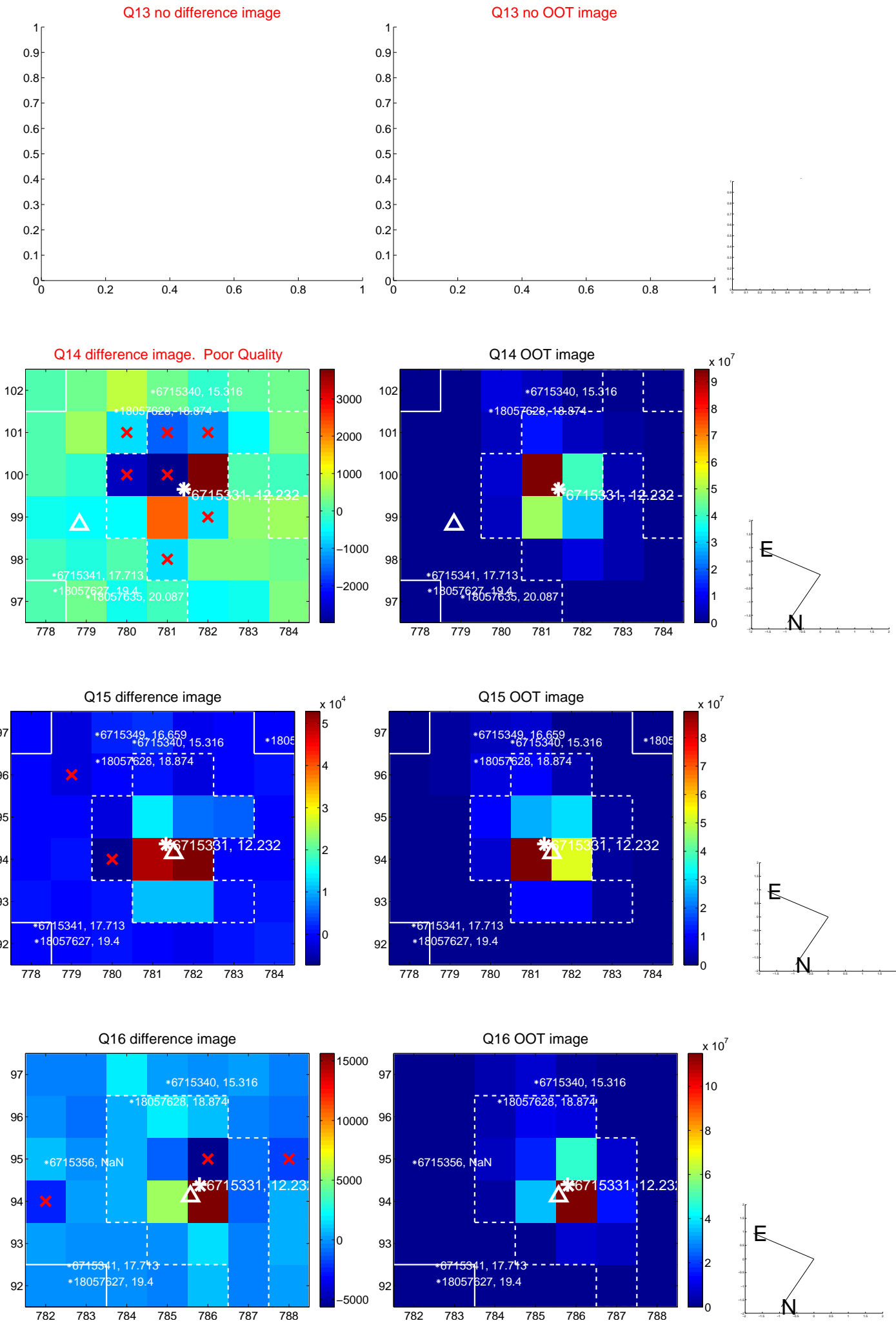


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

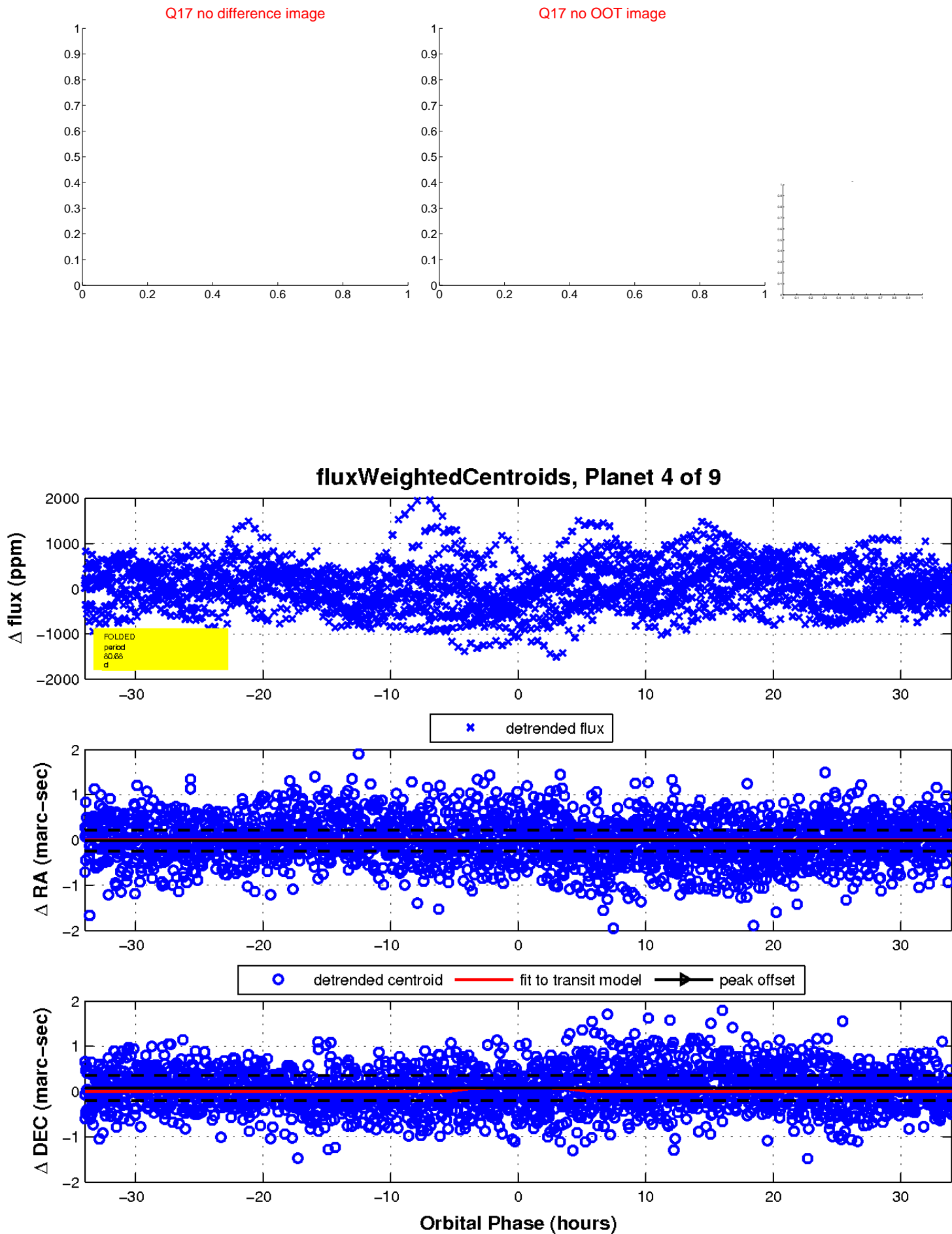




white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

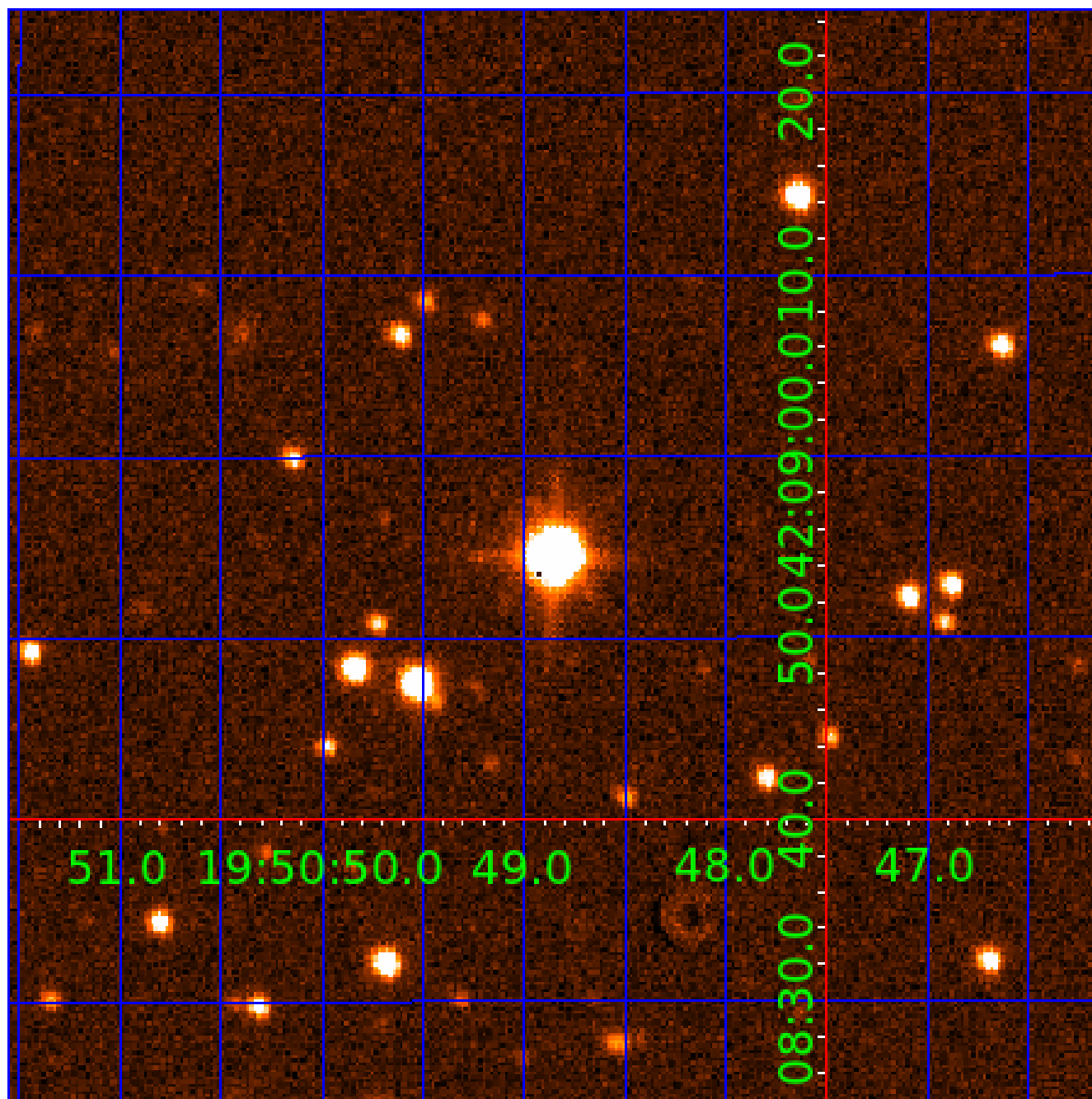


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 006715331

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
006715331-01	OBS	No	0.928873	132.119851	21.8	5.212	7.9	5.3	8.60	7053	4.30	0.00
006715331-02	OBS	No	126.812494	138.381125	426.5	13.300	9.9	5.5	8.60	7053	20.88	346.72
006715331-03	OBS	No	73.061339	155.485784	600.8	5.597	9.3	8.0	8.60	7053	39.84	723.23
006715331-04	OBS	No	80.681374	150.660758	762.9	11.330	9.6	10.1	8.60	7053	28.37	633.62
006715331-06	OBS	No	49.992478	134.622321	526.8	5.276	8.2	9.0	8.60	7053	37.45	1199.45
006715331-07	OBS	No	197.990545	159.459832	701.4	3.518	8.5	9.1	8.60	7053	27.73	191.43
006715331-08	OBS	No	53.819547	166.532224	564.8	4.939	8.0	8.7	8.60	7053	38.71	1087.10
006715331-09	OBS	No	130.838966	143.185368	112.8	4.500	7.9	-1.0	8.60	7053	9.22	332.56

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
006715331-01	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
006715331-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS
006715331-03	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—HALO_GHOST
006715331-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
006715331-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
006715331-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS
006715331-08	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
006715331-09	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—CENT_NOFITS

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

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

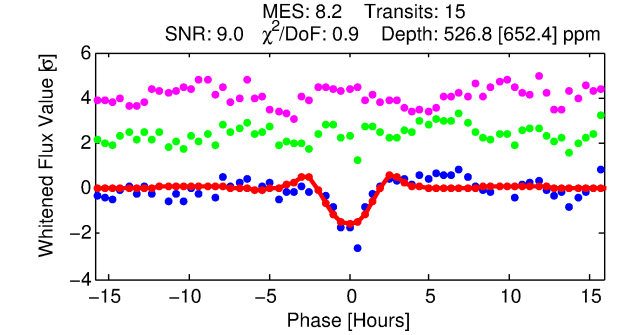
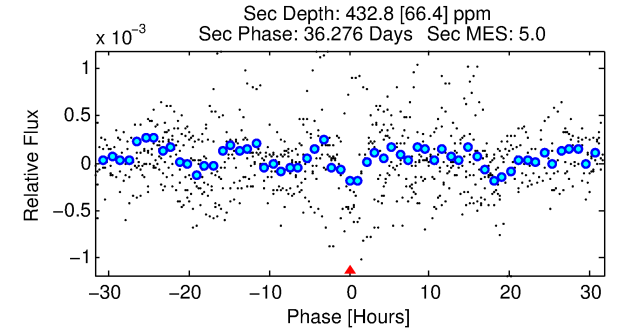
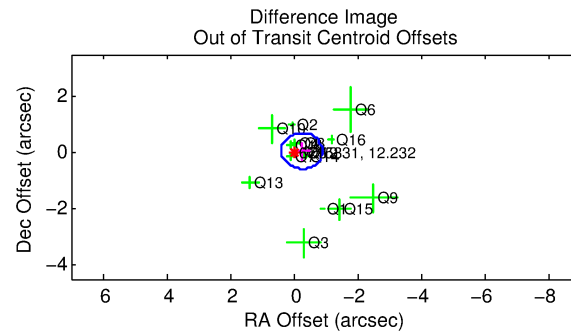
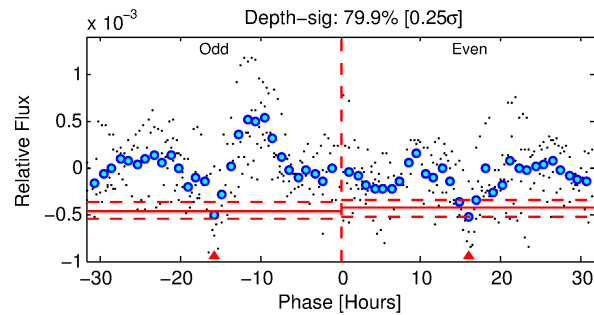
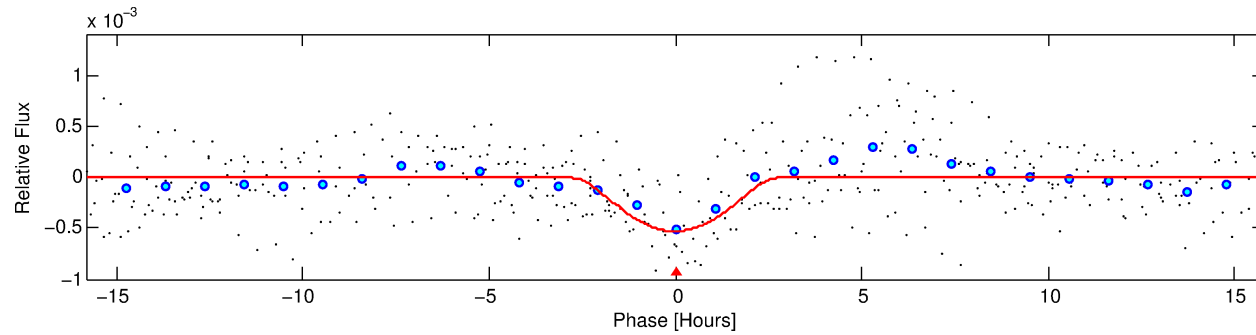
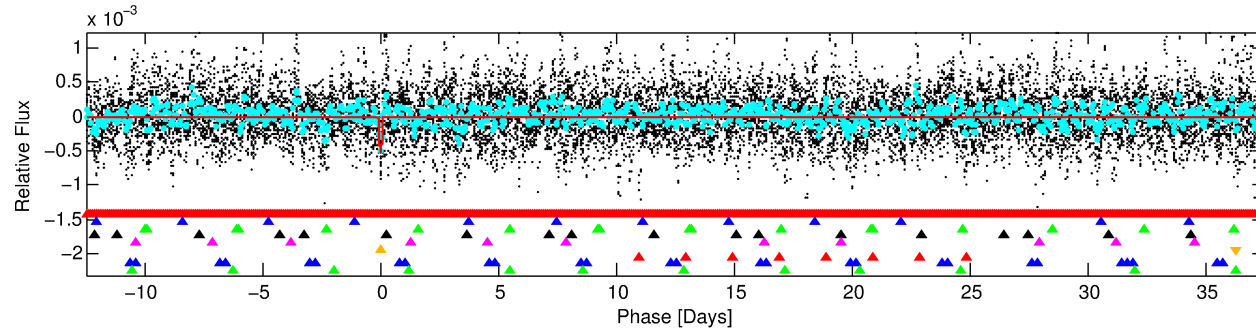
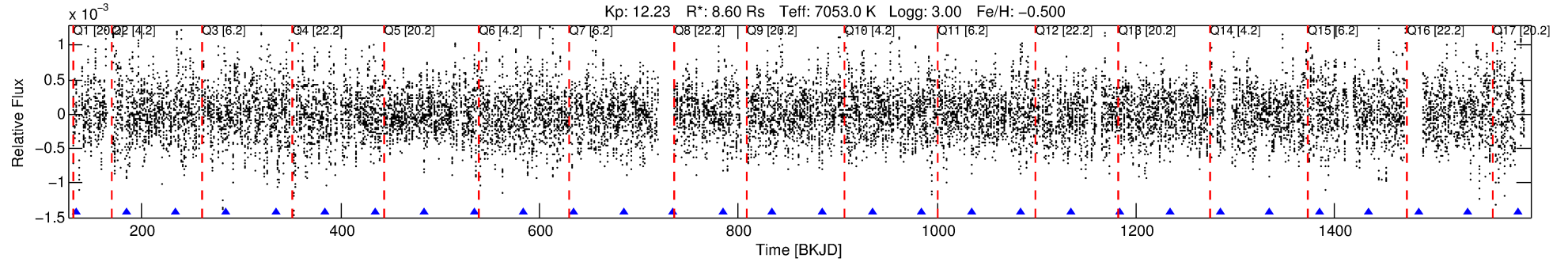
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 006715331-06

No Significant Match Found

# DV One-Page Summary

KIC: 6715331 Candidate: 6 of 9 Period: 49.992 d



## DV Fit Results:

Period = 49.99248 [0.00057] d  
Epoch = 134.6223 [0.0095] BKJD  
Rp/R\* = 0.0399 [0.0751]  
a/R\* = 20.67 [9.99]  
b = 1.00 [0.08]  
Seff = 1199.45 [1200.94]  
Teff = 1501 [376] K  
Rp = 37.44 [73.73] Re  
a = 0.3699 [0.2207] AU  
Ag = 23.24 [90.56] [0.25 $\sigma$ ]  
Teffp = 5094 [4803] K [0.75 $\sigma$ ]

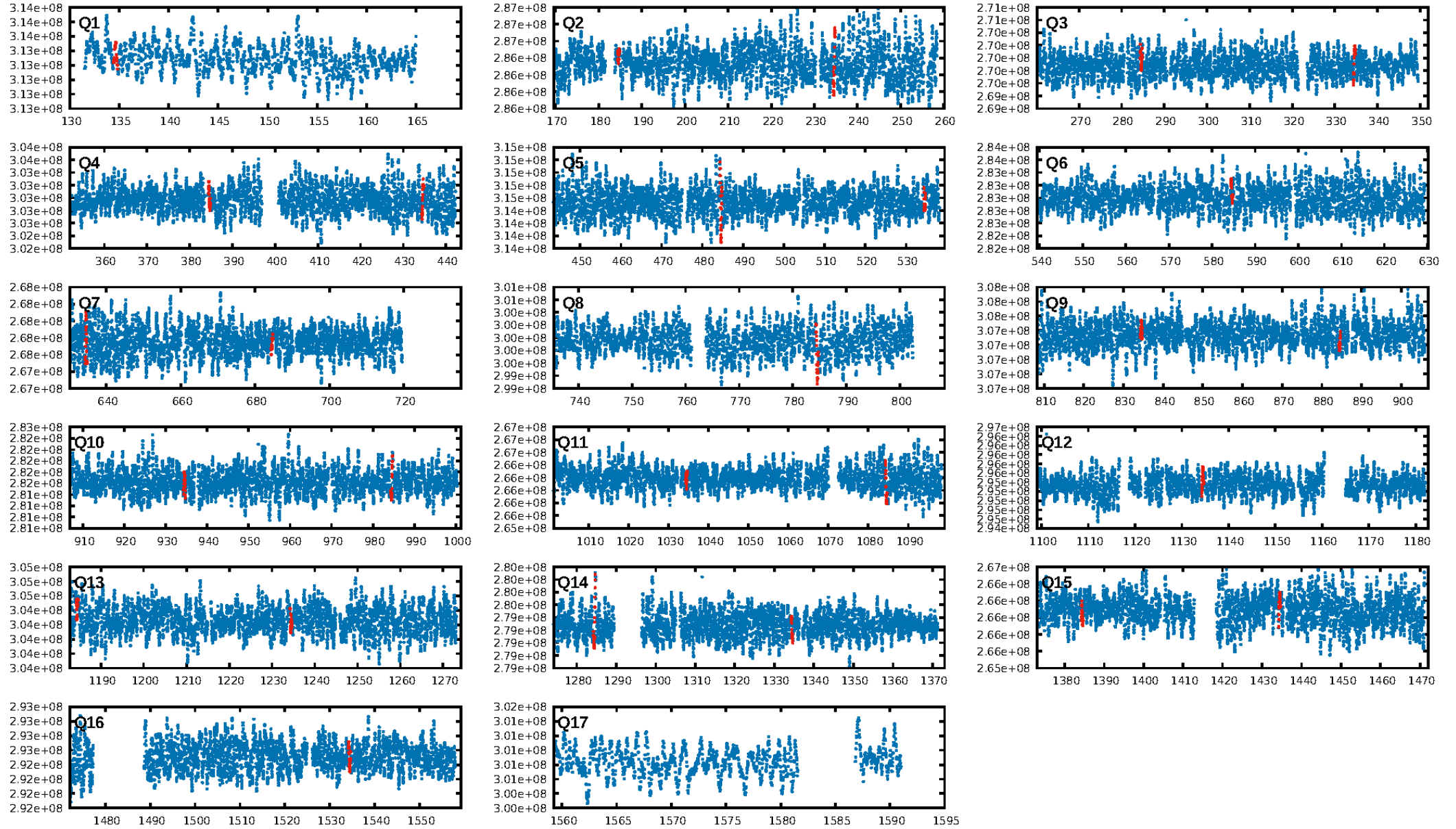
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [158.77 $\sigma$ ]  
LongPeriod-sig: 100.0% [12.71 $\sigma$ ]  
ModelChiSquare2-sig: 24.7%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [14/14]  
GhostDiagnostic-chr: -0.441  
Centroid-sig: 2.1%  
Centroid-so: 0.103 arcsec [0.38 $\sigma$ ]  
OotOffset-rm: 0.263 arcsec [1.24 $\sigma$ ]  
KicOffset-rm: 0.206 arcsec [0.91 $\sigma$ ]  
OotOffset-st: 4/4/4/4 [16]  
KicOffset-st: 4/4/4/4 [16]  
DiffImageQuality-fgm: 0.56 [9/16]  
DiffImageOverlap-fno: 0.00 [0/16]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 05:55:07 Z

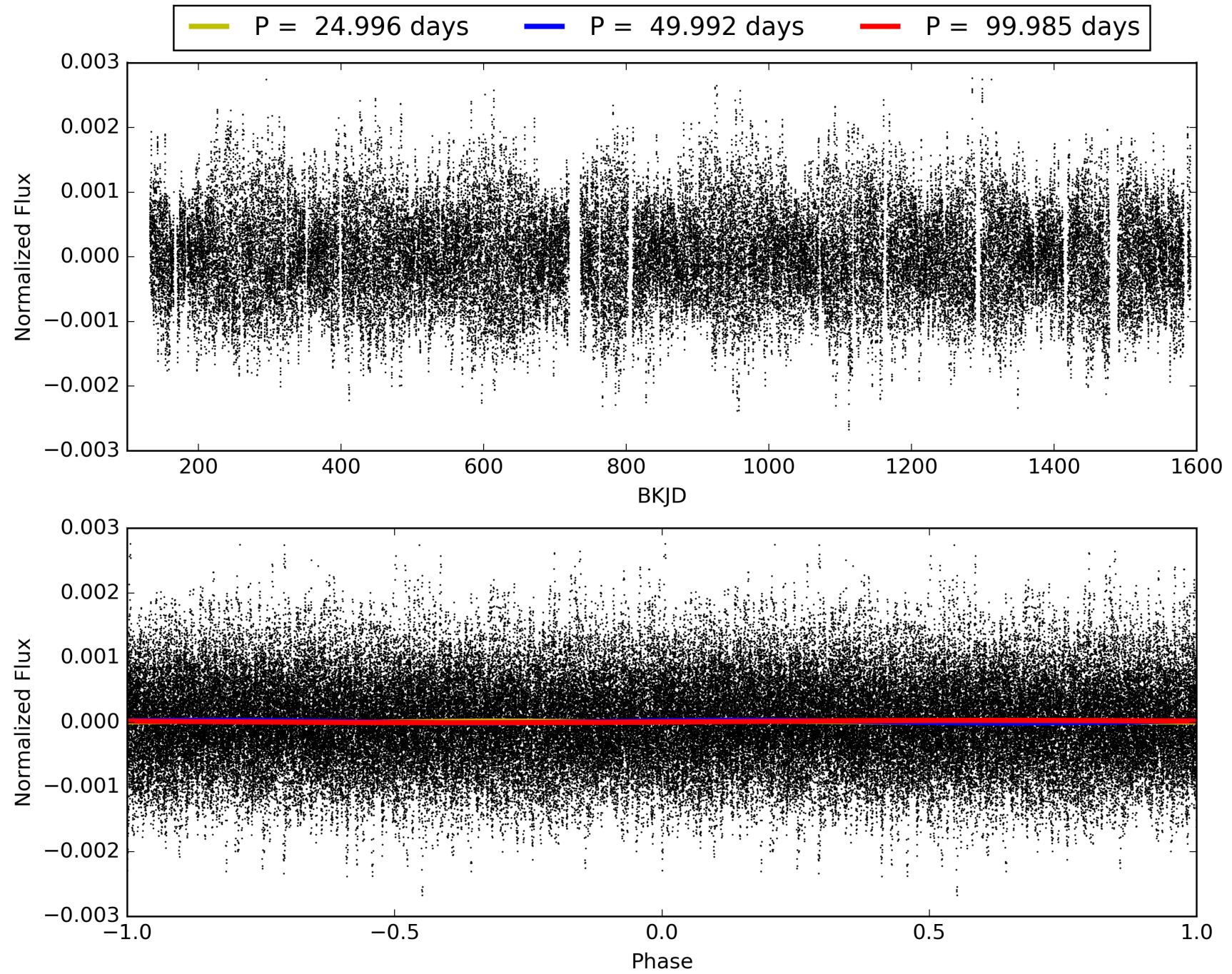
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 006715331-06, PDC Light Curves



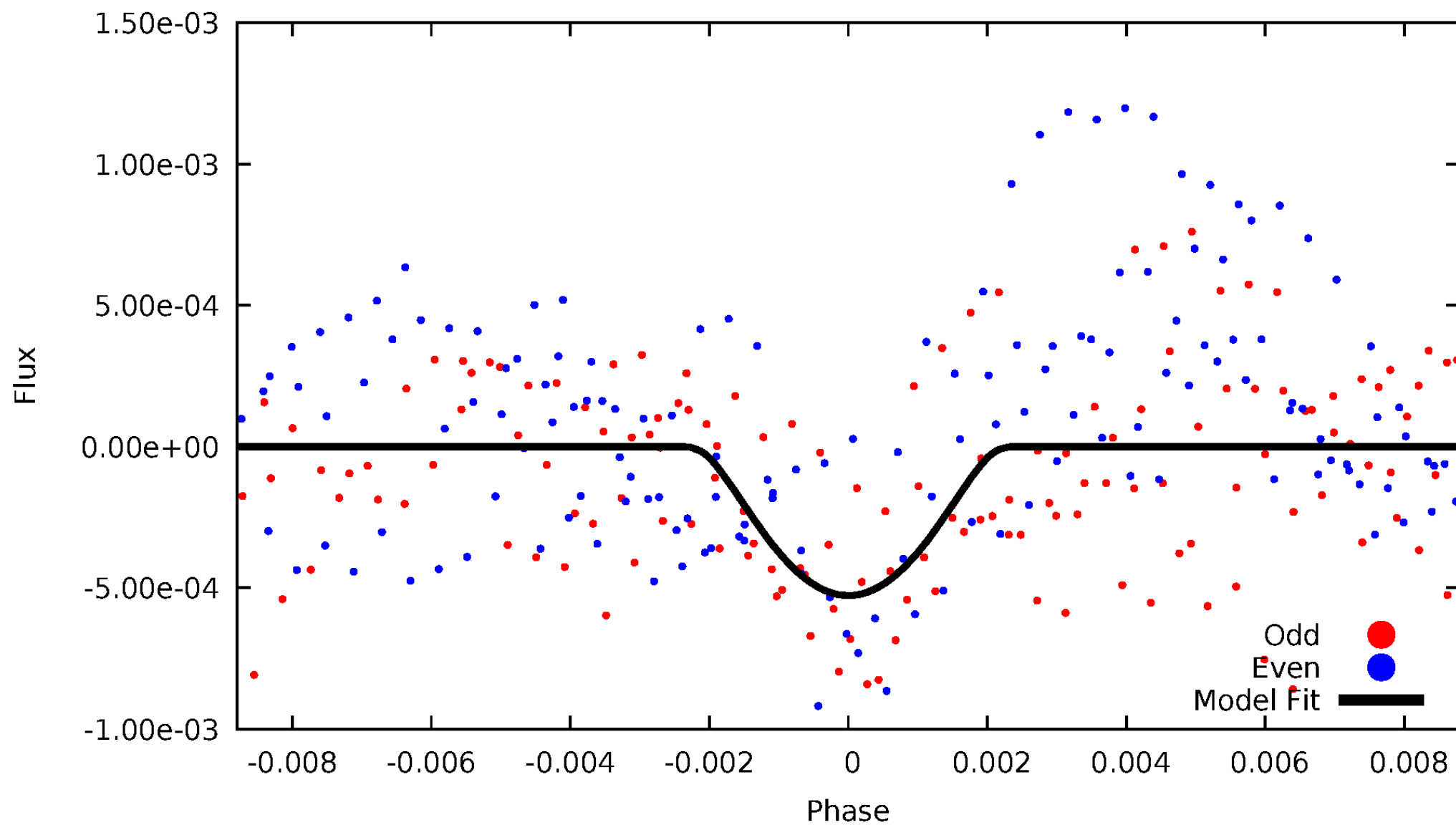


TCE 006715331-06



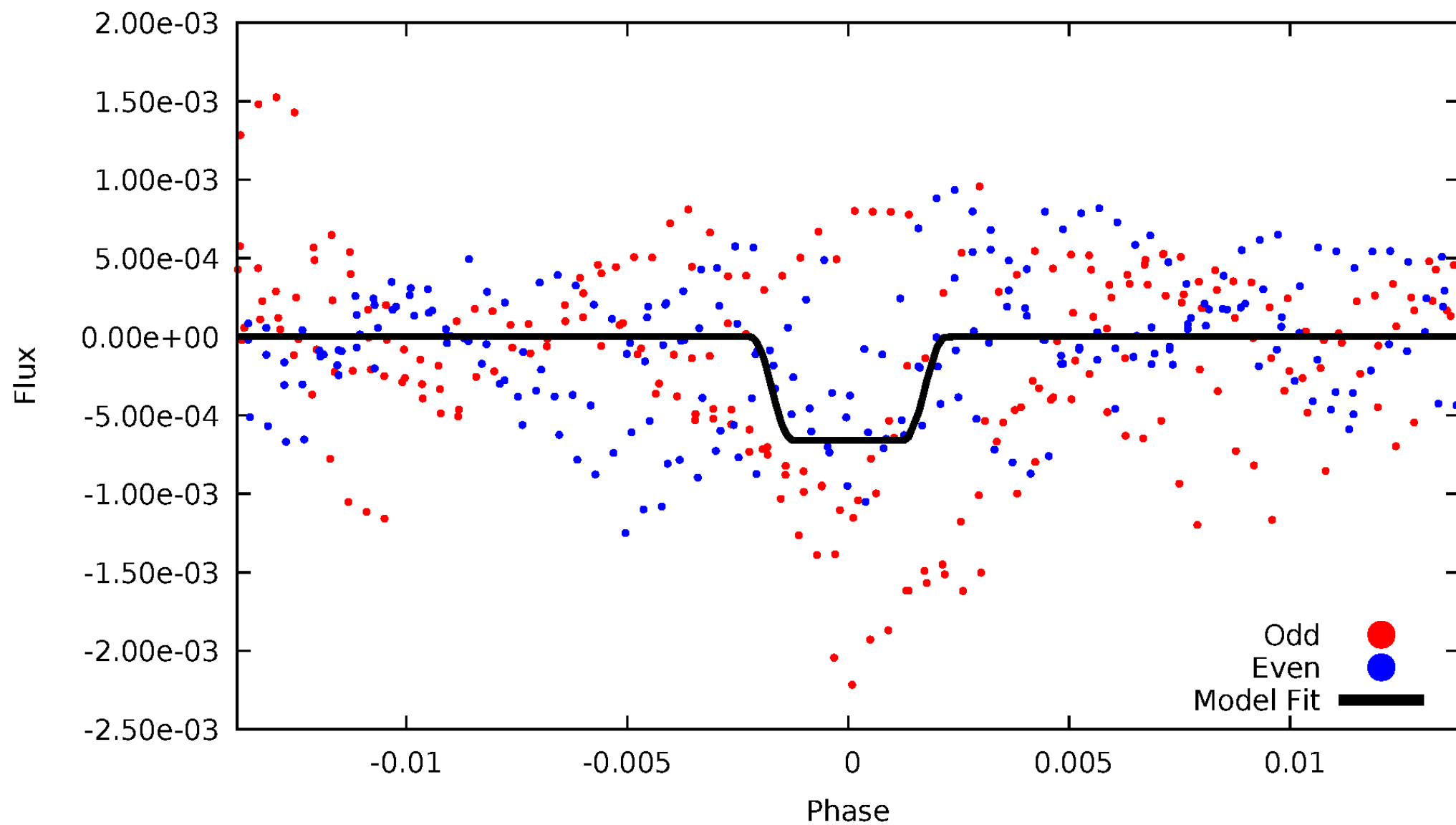
# DV Odd/Even

TCE 006715331-06



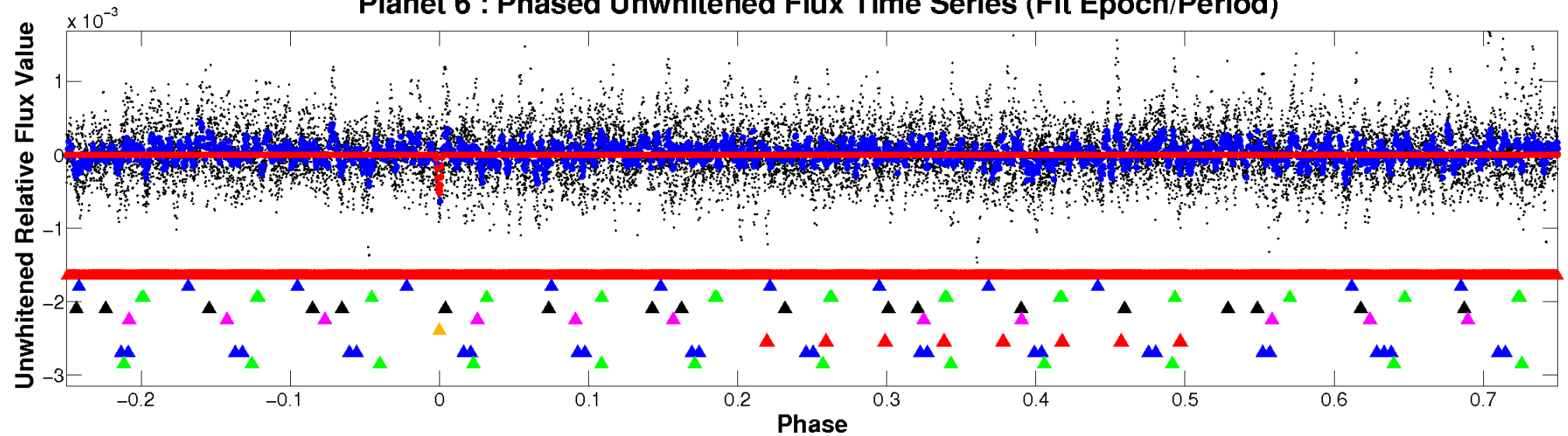
# ALT Odd/Even

TCE 006715331-06

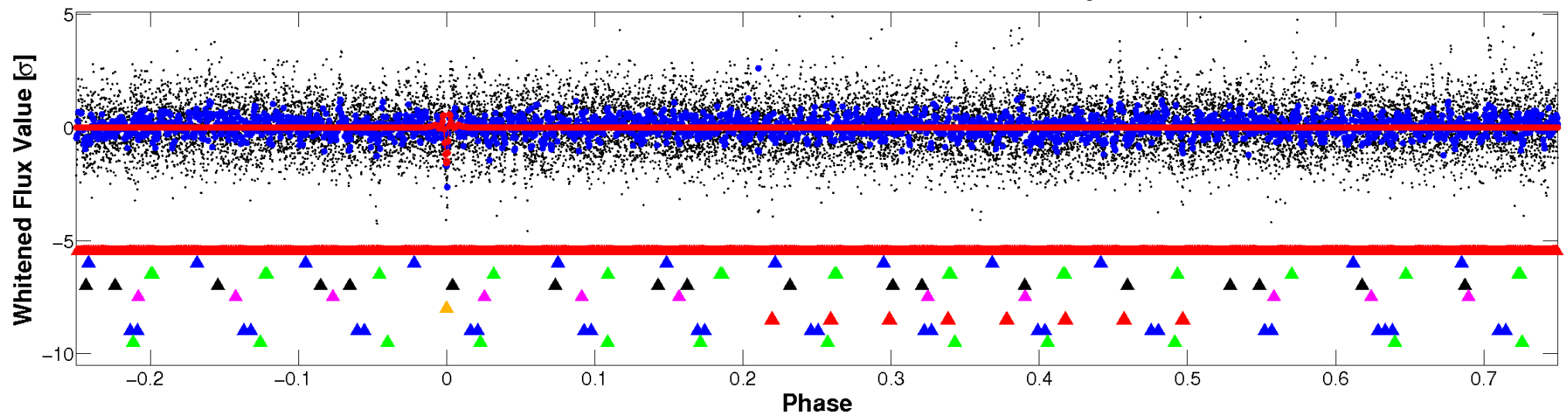


# Non-Whitened Vs. Whitened Light Curve

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

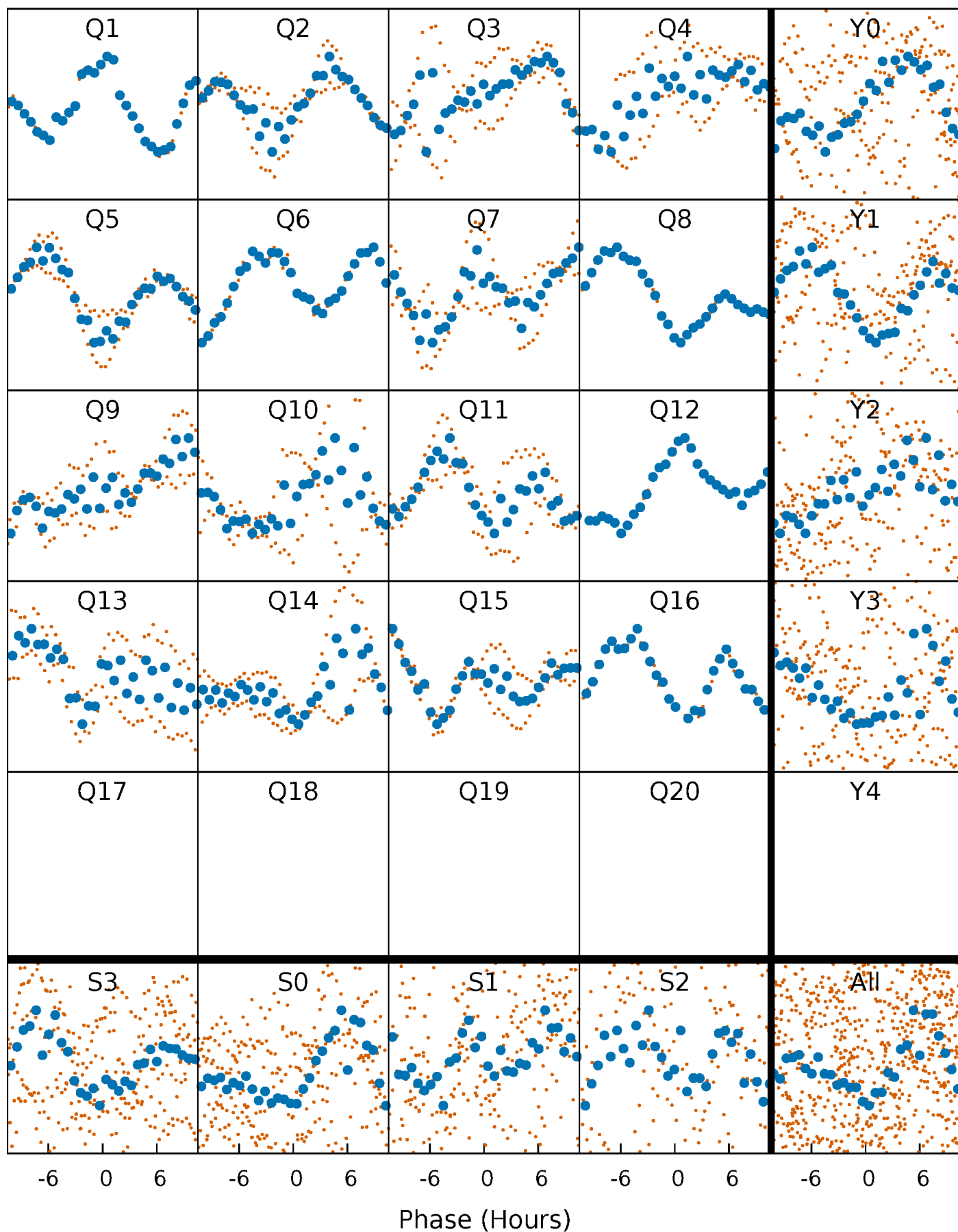


## Planet 6 : Phased Whitened Flux Time Series (Fit Epoch/Period)



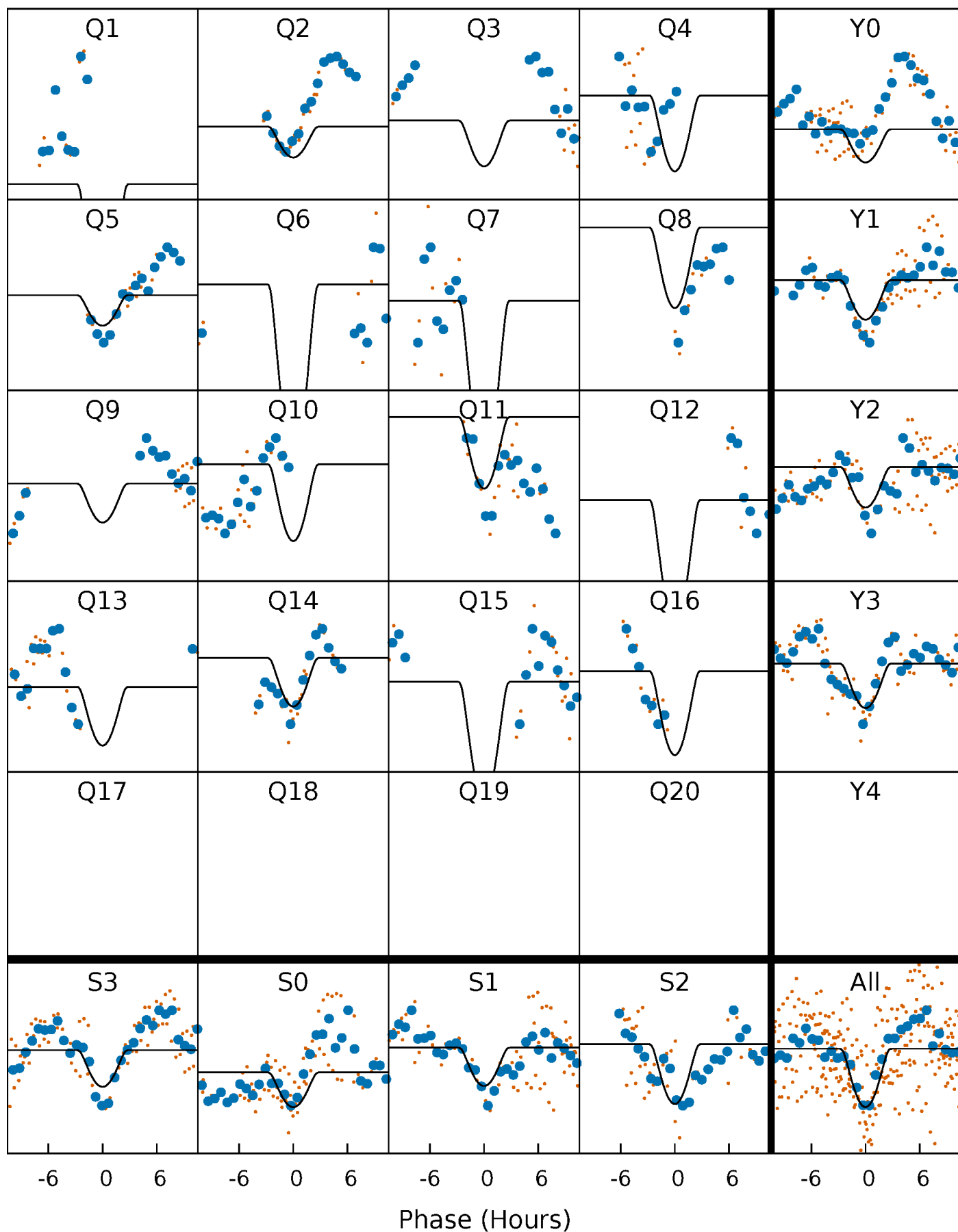
# PDC Quarter-Phased Transit Curves

TCE 006715331-06 P= 49.992478 Days  $T_0=134.622321$  (BKJD)



# DV Quarter-Phased Transit Curves

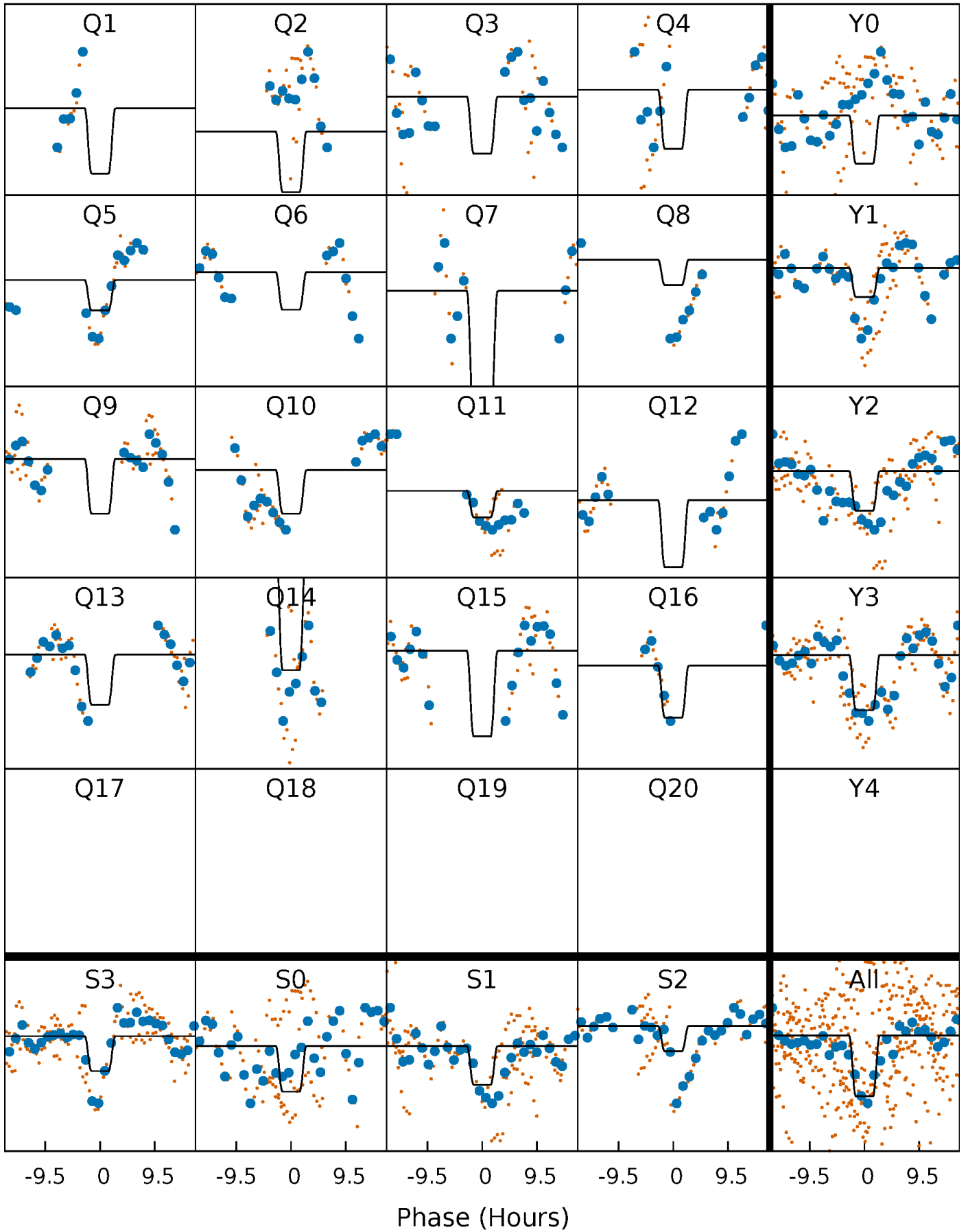
TCE 006715331-06   P= 49.992478 Days    $T_0=134.622321$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

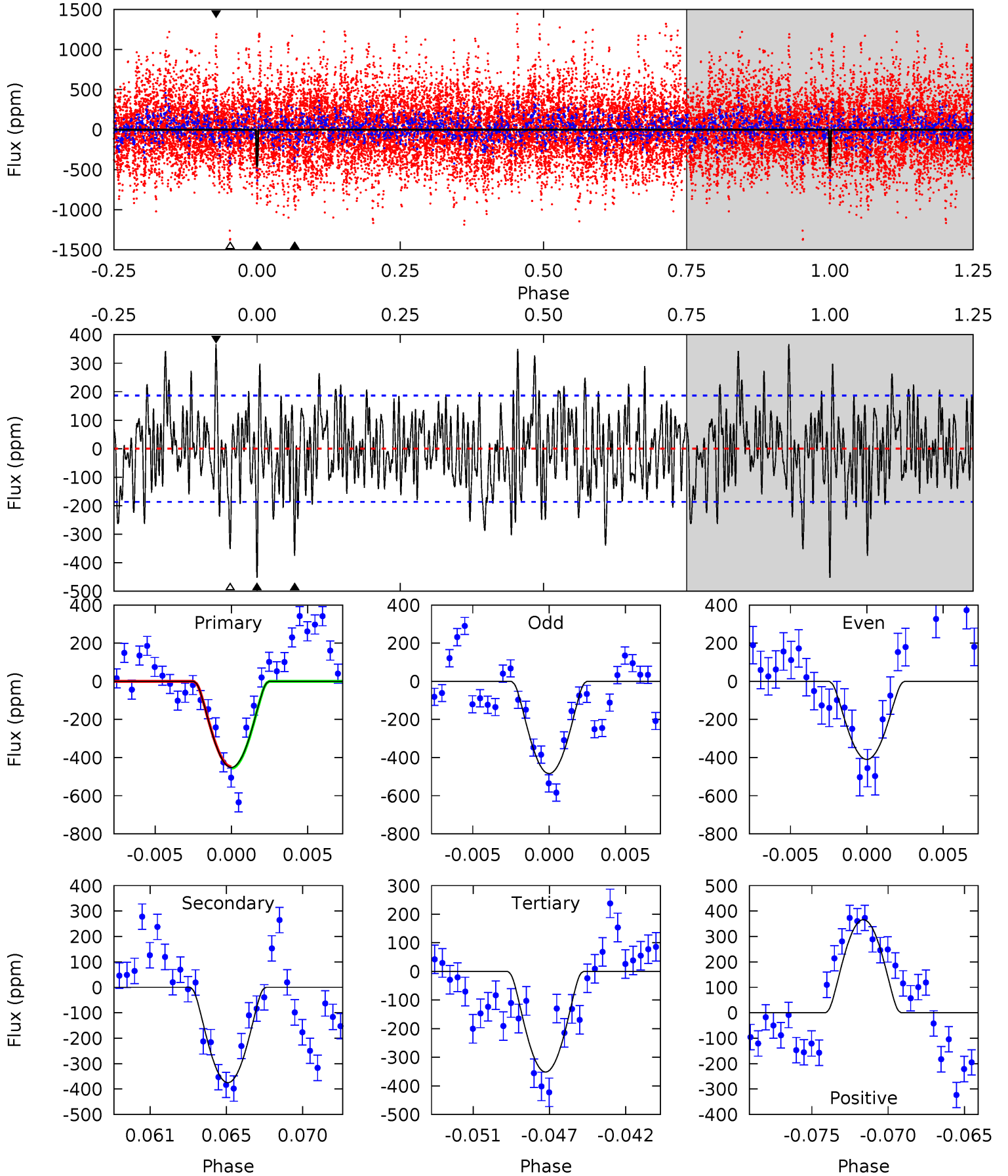
TCE 006715331-06 P= 49.990604 Days  $T_0=134.664172$  (BKJD)



# DV Model-Shift Uniqueness Test

006715331-06, P = 49.992478 Days, E = 84.629843 Days

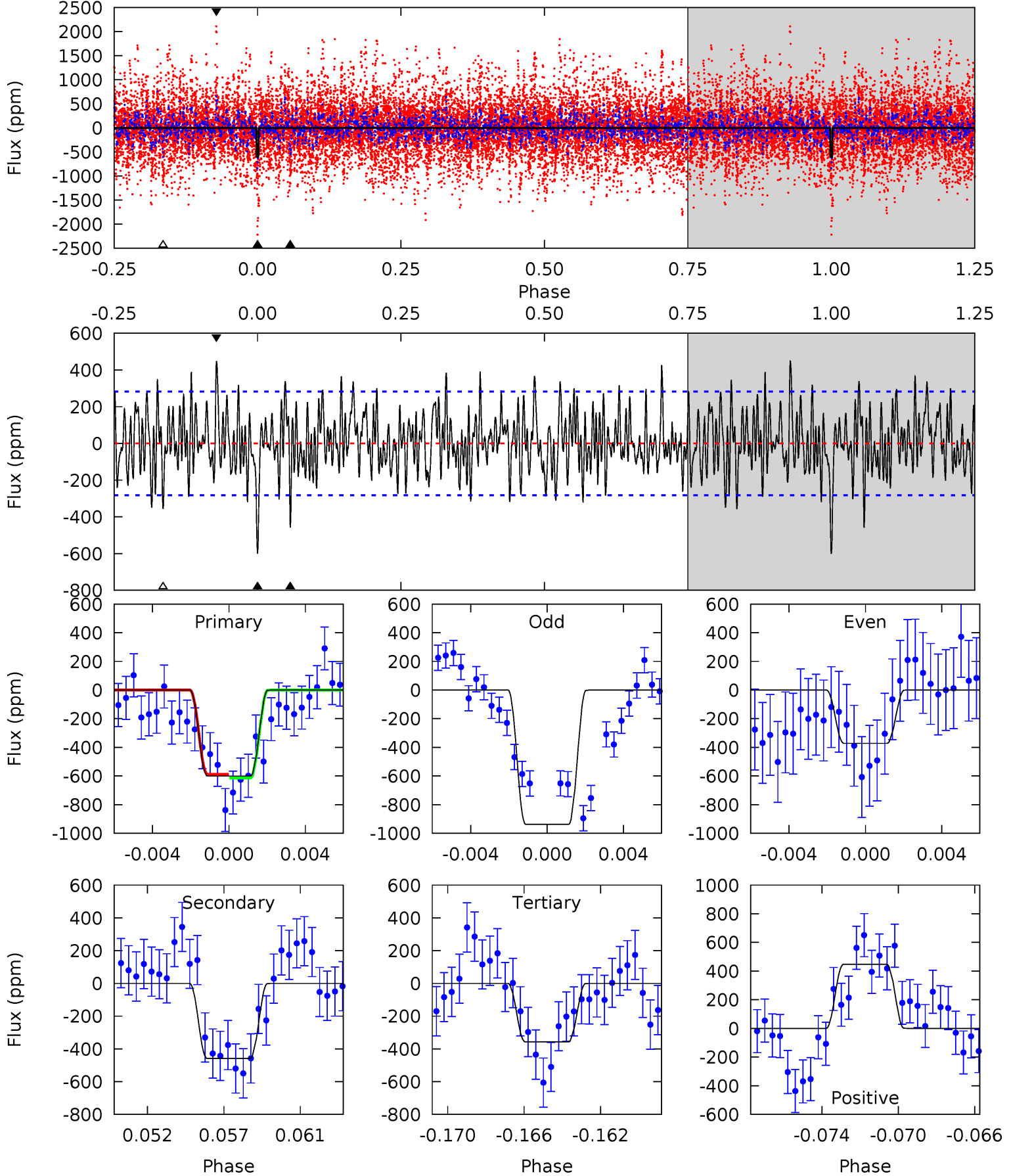
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
12.5	10.4	9.73	10.1	5.17	2.83	3.11	2.78	2.37	0.64	0.24	1.02	0.61	0.45	0.11



# Alt Model-Shift Uniqueness Test

006715331-06, P = 49.990604 Days, E = 84.673568 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
11.0	8.42	6.57	8.23	5.18	2.85	2.51	4.47	2.81	1.85	0.19	5.12	1.09	0.43	0.24



### Stellar Parameters For KIC 006715331

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$7053^{+170}_{-255}$	$3.000^{+0.595}_{-0.105}$	$-0.500^{+0.500}_{-0.250}$	$8.604^{+1.321}_{-4.954}$	$2.698^{+0.387}_{-0.903}$	$0.006^{+0.048}_{-0.002}$
	+2%/-4%	+20%/-3%	+100%/-50%	+15%/-58%	+14%/-33%	+808%/-31%
Source	PHO1	FLK73	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 006715331-06 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-375 \pm 36$	$53.67^{+55.35}_{-37.87}$	$2024^{+158}_{-304}$	$4096^{+2515}_{-882}$	$9.887^{+94.530}_{-7.483}$
Alt.	$-458 \pm 54$	$50.06^{+50.10}_{-35.15}$	$2033^{+148}_{-290}$	$4306^{+3147}_{-895}$	$13^{+143}_{-10}$

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

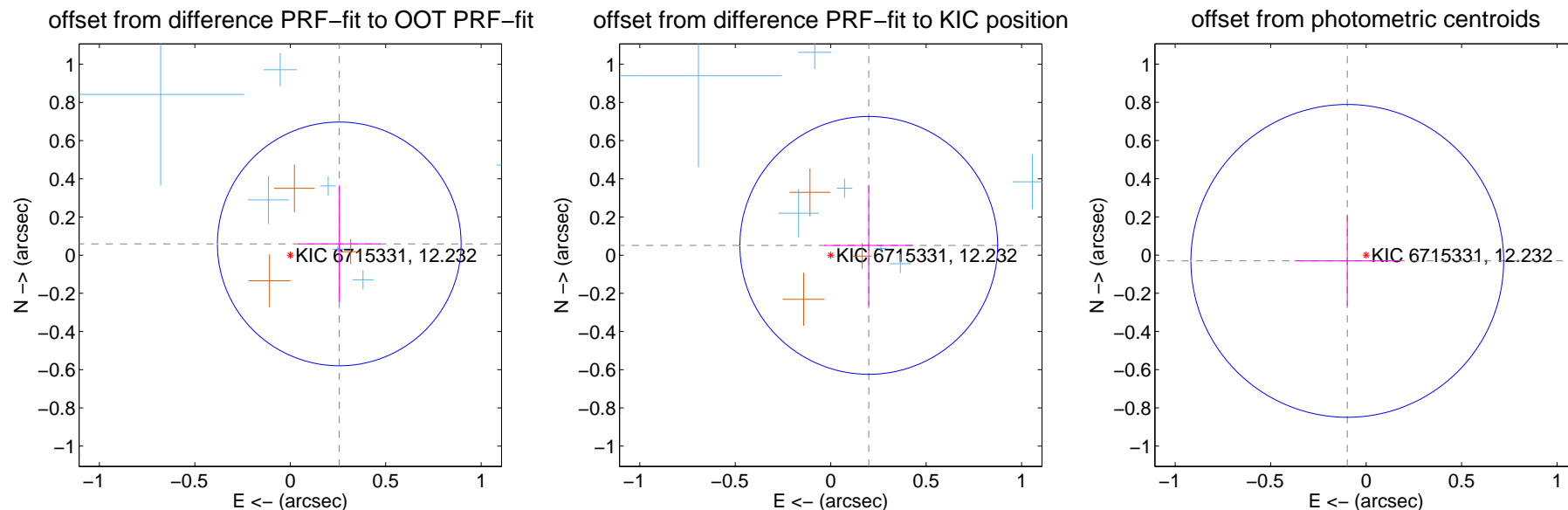
## DV Centroid Data

Supplemental centroid analysis for 006715331-06. Kepler magnitude: 12.23. Transit SNR 8.97

There are 9 quarters with good PRF difference image offsets

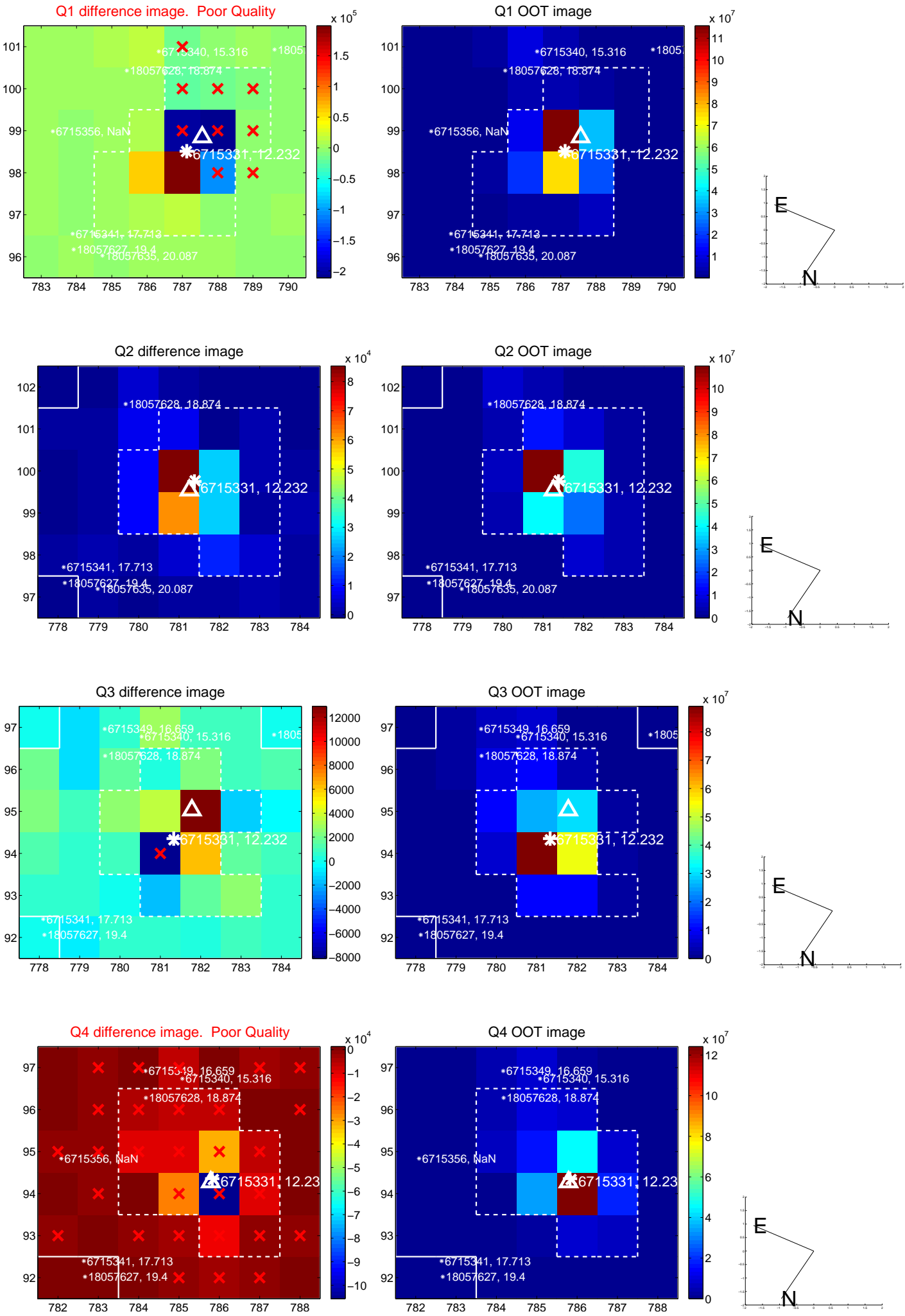
The direct PRF centroid is offset from the target star catalog position by about 0.16 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.263 \pm 0.213$	1.24	$-0.257 \pm 0.217$	$0.059 \pm 0.305$
PRF-fit source offset from KIC position	$0.206 \pm 0.225$	0.91	$-0.199 \pm 0.234$	$0.051 \pm 0.317$
photometric centroid source offset	$0.10 \pm 0.27$	0.38	$0.10 \pm 0.28$	$-0.03 \pm 0.24$



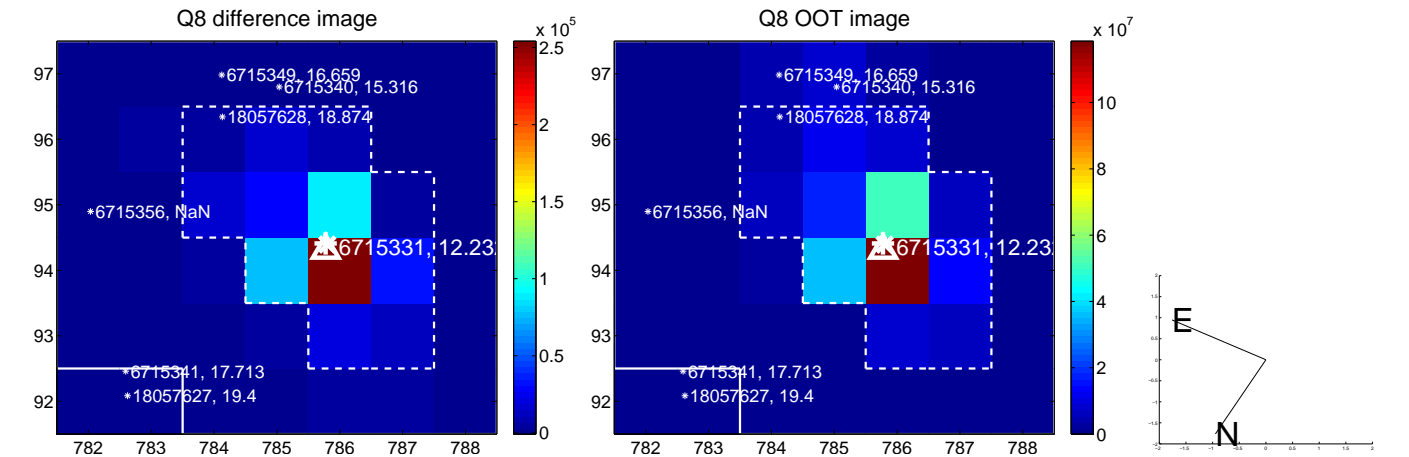
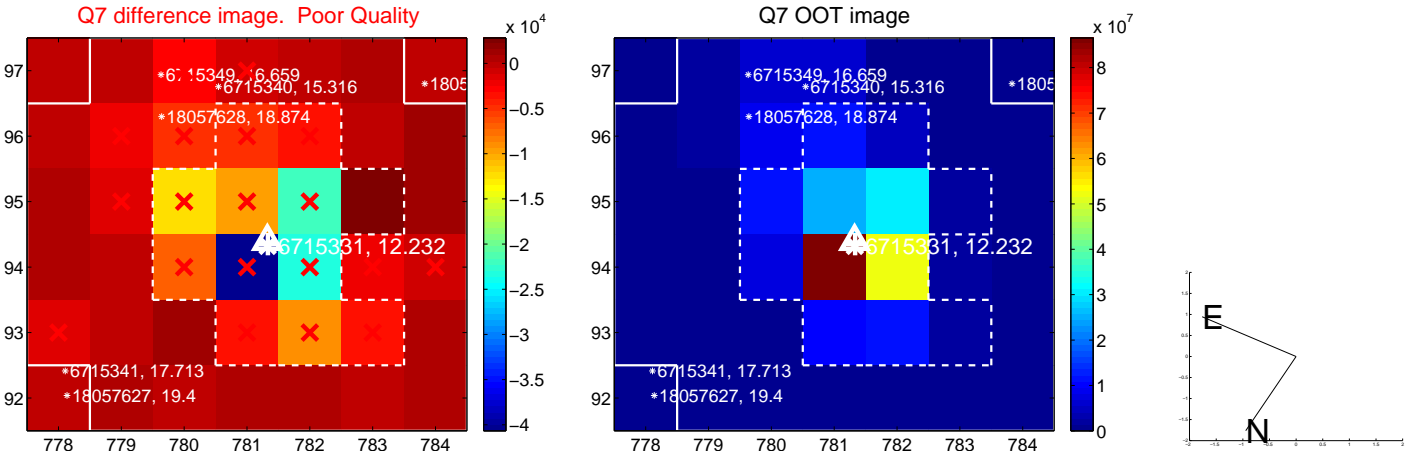
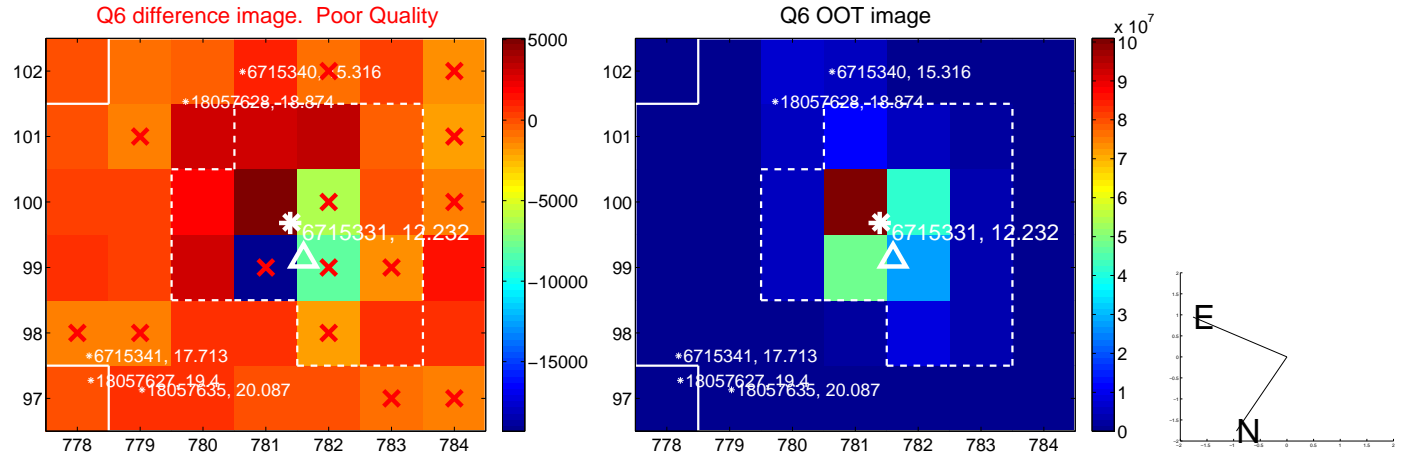
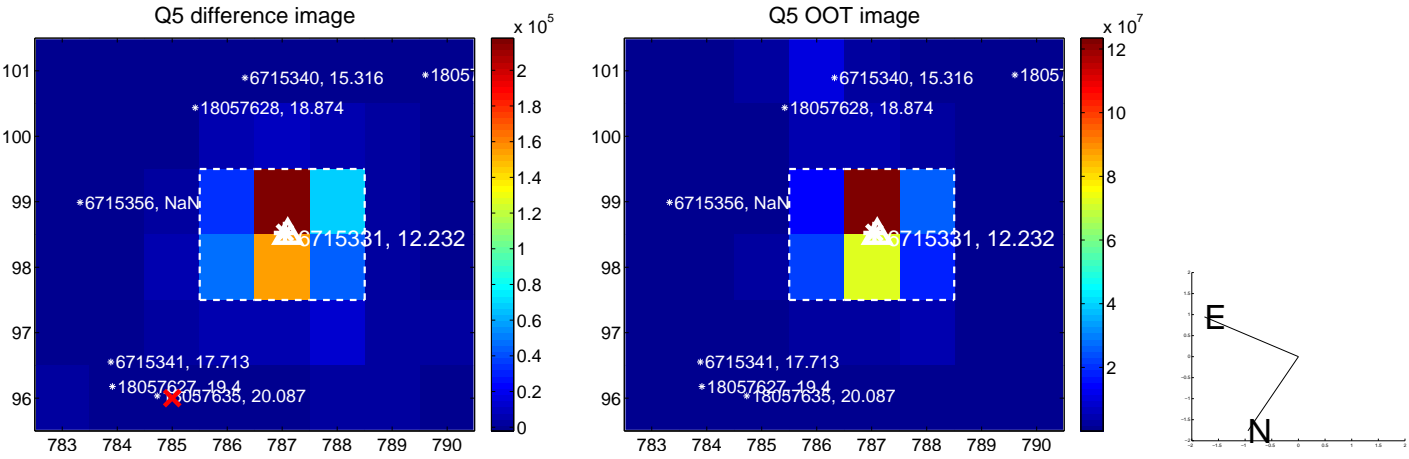
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets**; **Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

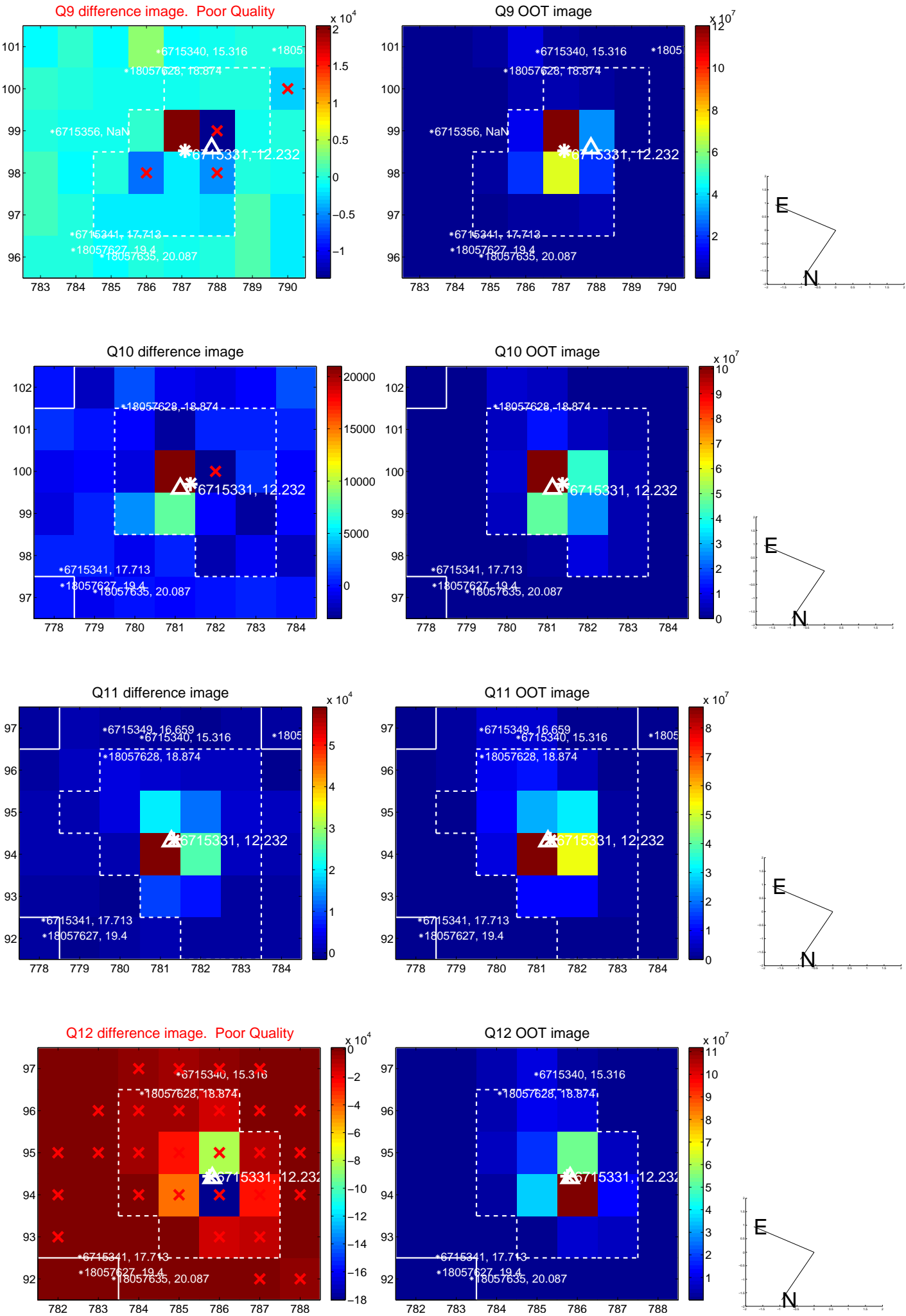




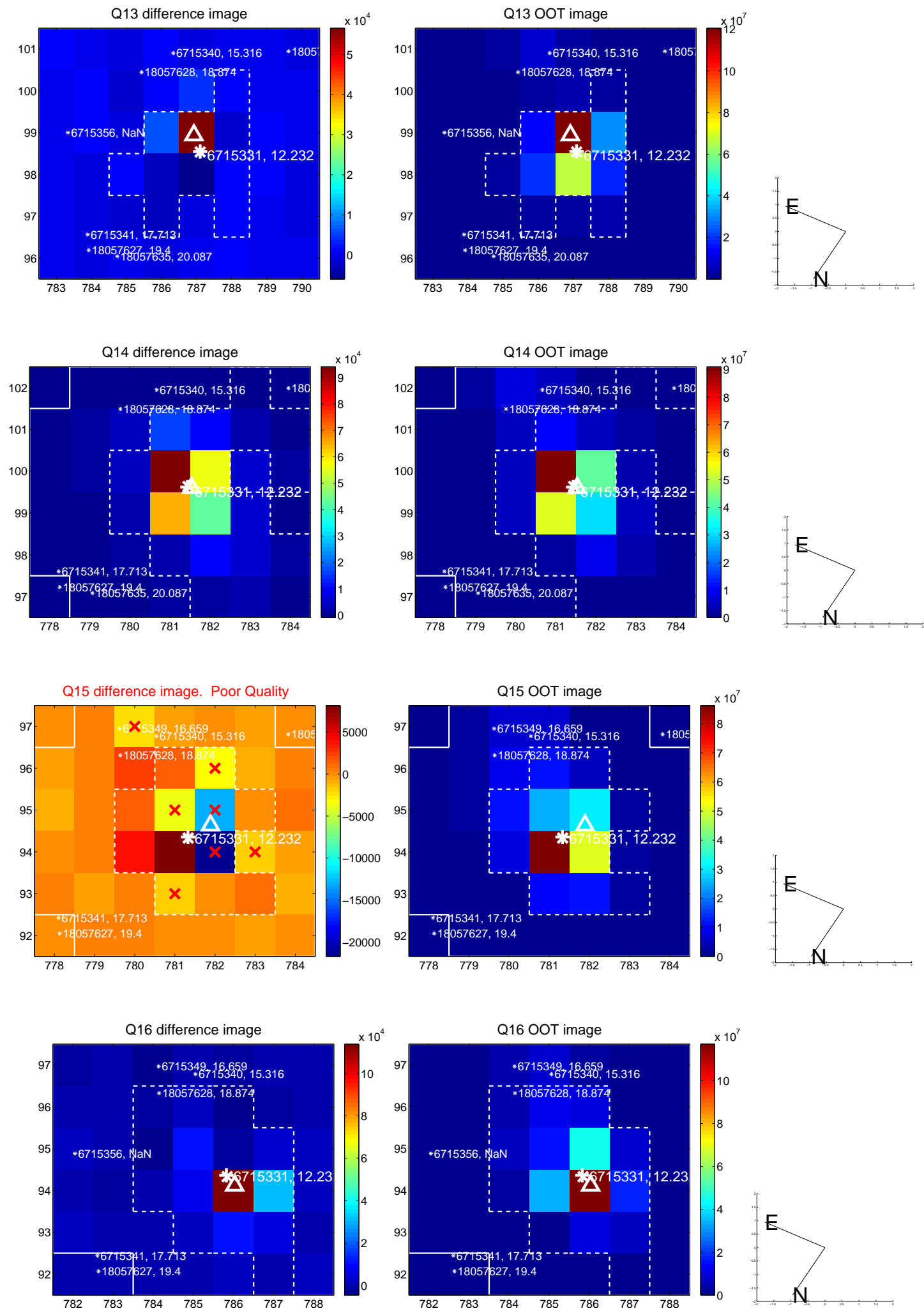
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



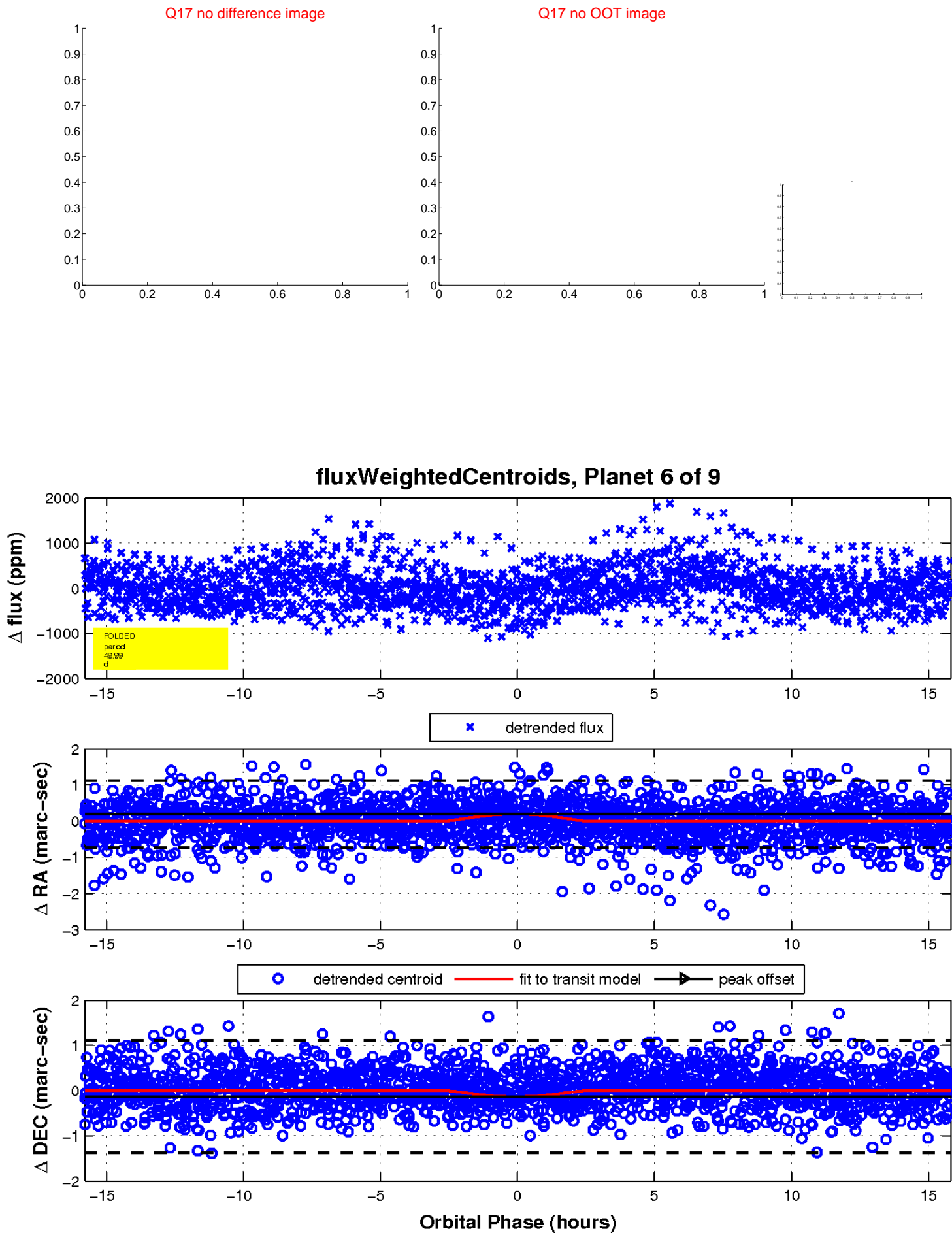
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

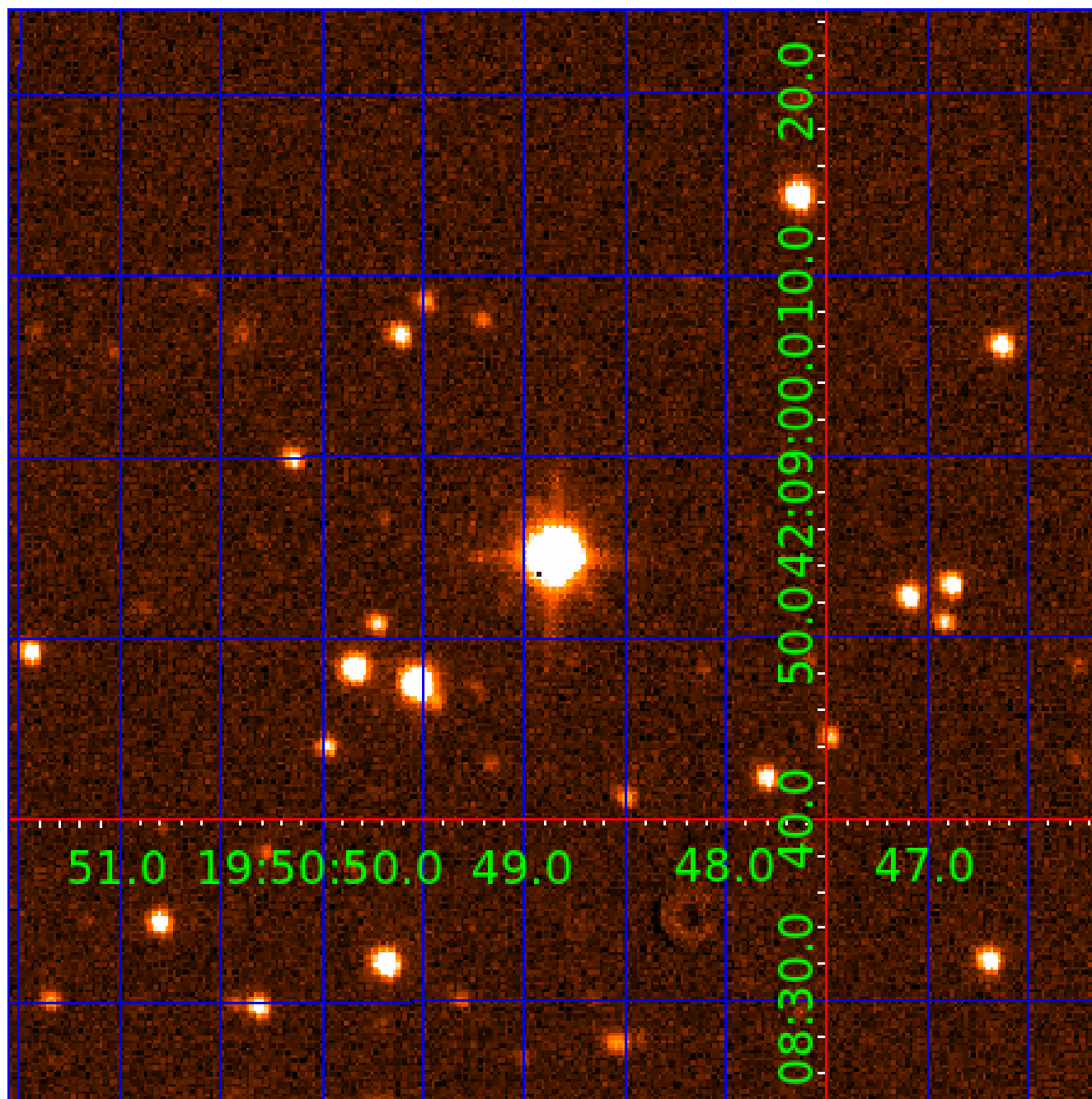


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 006715331

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
006715331-01	OBS	No	0.928873	132.119851	21.8	5.212	7.9	5.3	8.60	7053	4.30	0.00
006715331-02	OBS	No	126.812494	138.381125	426.5	13.300	9.9	5.5	8.60	7053	20.88	346.72
006715331-03	OBS	No	73.061339	155.485784	600.8	5.597	9.3	8.0	8.60	7053	39.84	723.23
006715331-04	OBS	No	80.681374	150.660758	762.9	11.330	9.6	10.1	8.60	7053	28.37	633.62
006715331-06	OBS	No	49.992478	134.622321	526.8	5.276	8.2	9.0	8.60	7053	37.45	1199.45
006715331-07	OBS	No	197.990545	159.459832	701.4	3.518	8.5	9.1	8.60	7053	27.73	191.43
006715331-08	OBS	No	53.819547	166.532224	564.8	4.939	8.0	8.7	8.60	7053	38.71	1087.10
006715331-09	OBS	No	130.838966	143.185368	112.8	4.500	7.9	-1.0	8.60	7053	9.22	332.56

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
006715331-01	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
006715331-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS
006715331-03	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—HALO_GHOST
006715331-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
006715331-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
006715331-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS
006715331-08	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
006715331-09	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—CENT_NOFITS

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

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

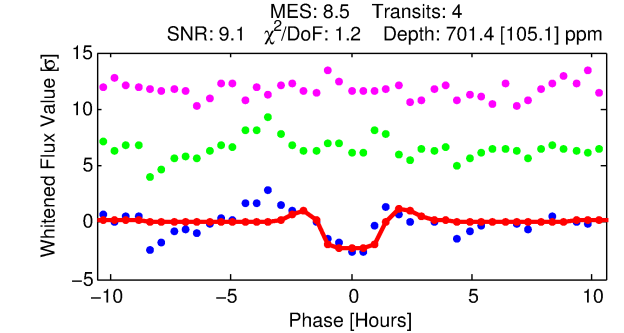
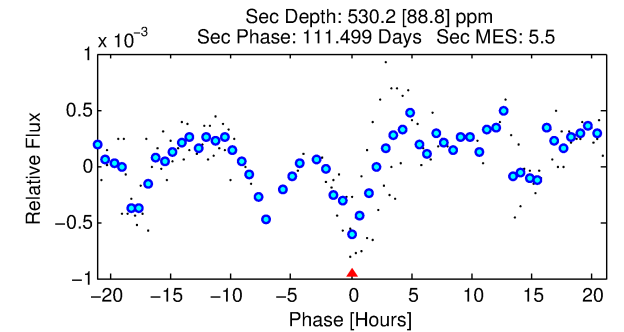
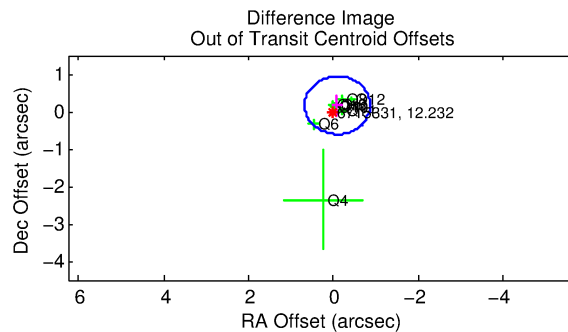
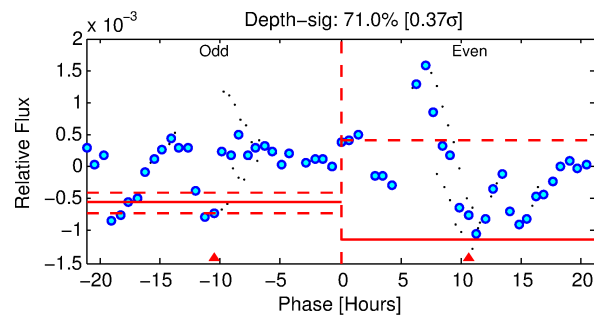
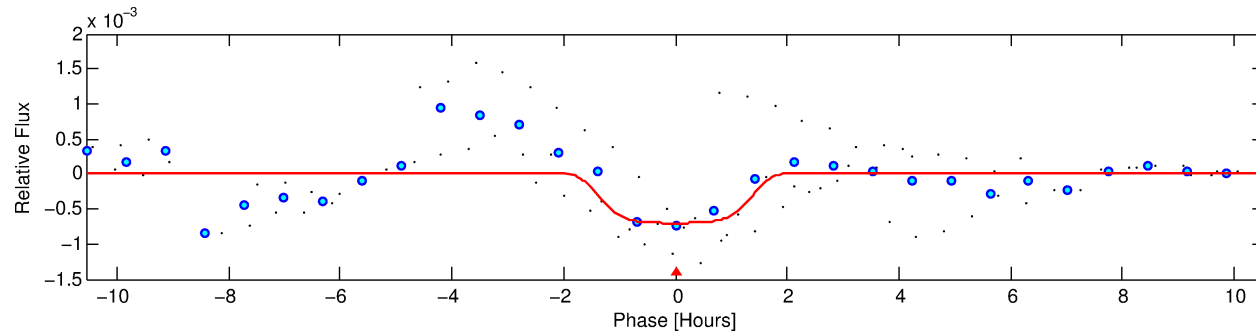
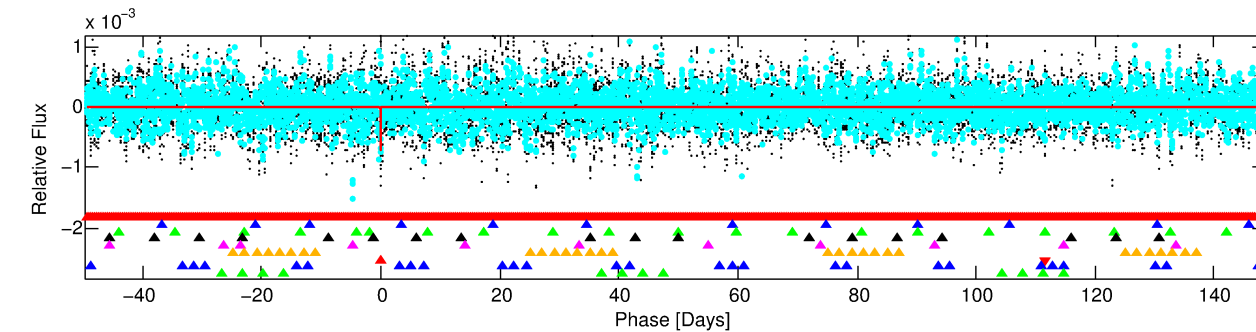
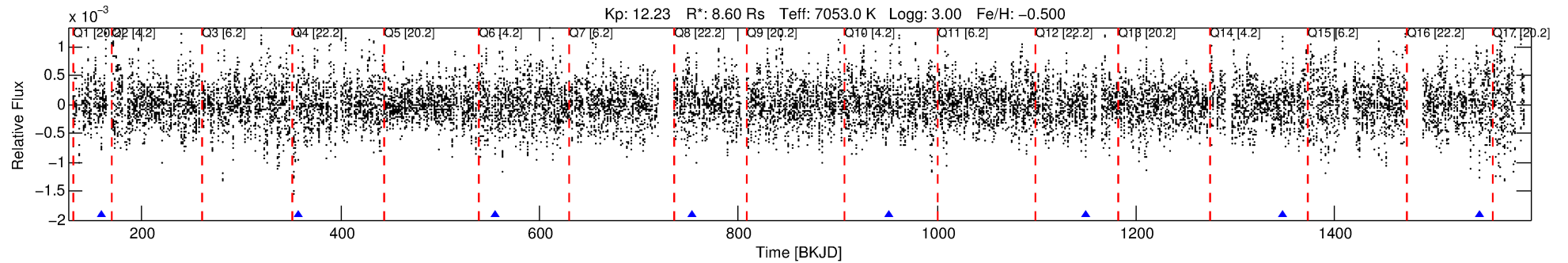
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 006715331-07

No Significant Match Found

# DV One-Page Summary

KIC: 6715331 Candidate: 7 of 9 Period: 197.991 d



## DV Fit Results:

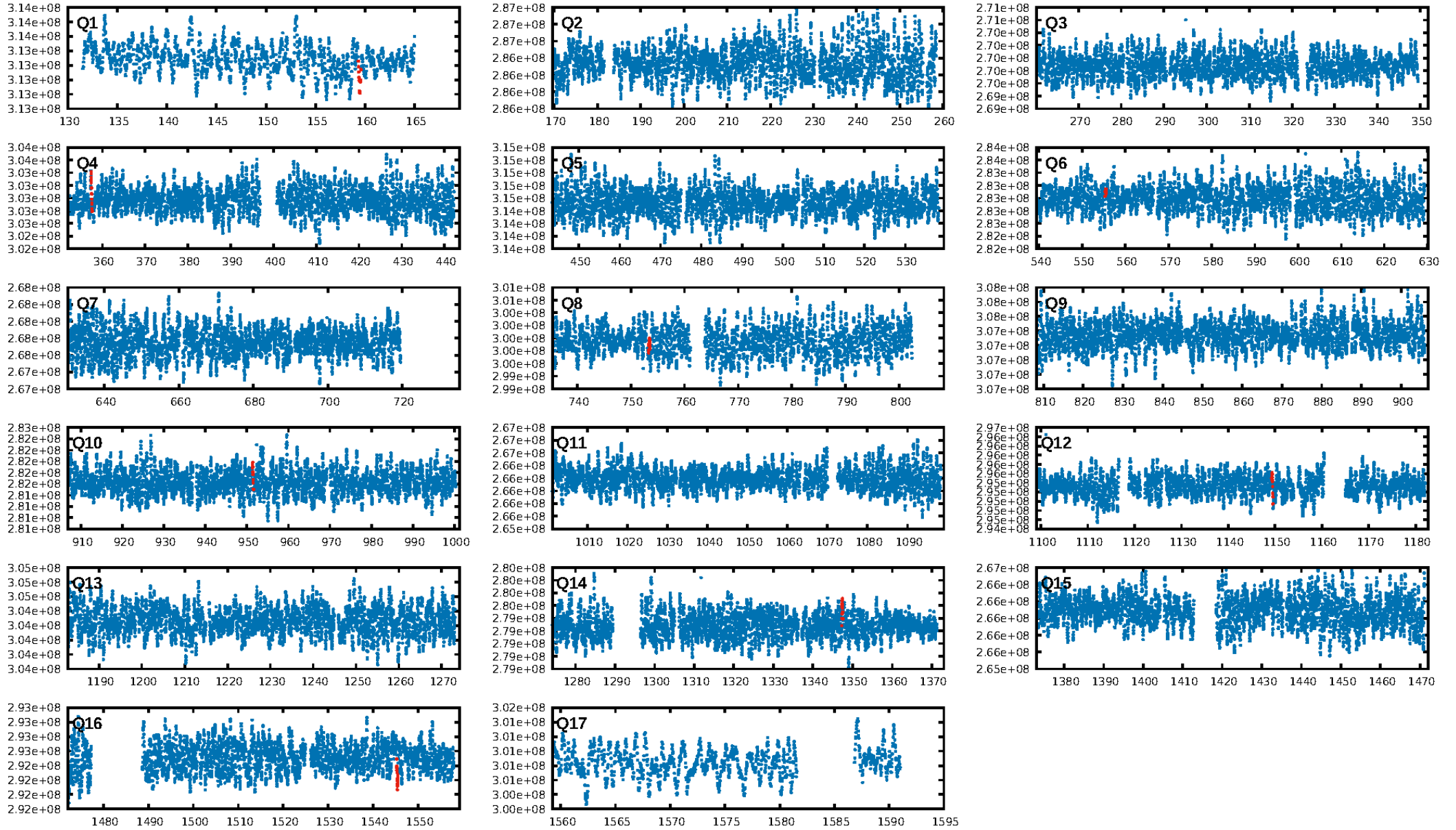
Period = 197.99054 [0.00125] d  
Epoch = 159.4598 [0.0057] BKJD  
Rp/R\* = 0.0295 [0.0032]  
a/R\* = 176.28 [63.33]  
b = 0.94 [0.04]  
Seff = 191.42 [191.66]  
Teq = 948 [237] K  
Rp = 27.73 [16.25] Re  
a = 0.9260 [0.5524] AU  
Ag = 325.23 [334.25] [0.97 $\sigma$ ]  
Teffp = 6228 [481] K [9.84 $\sigma$ ]

## DV Diagnostic Results:

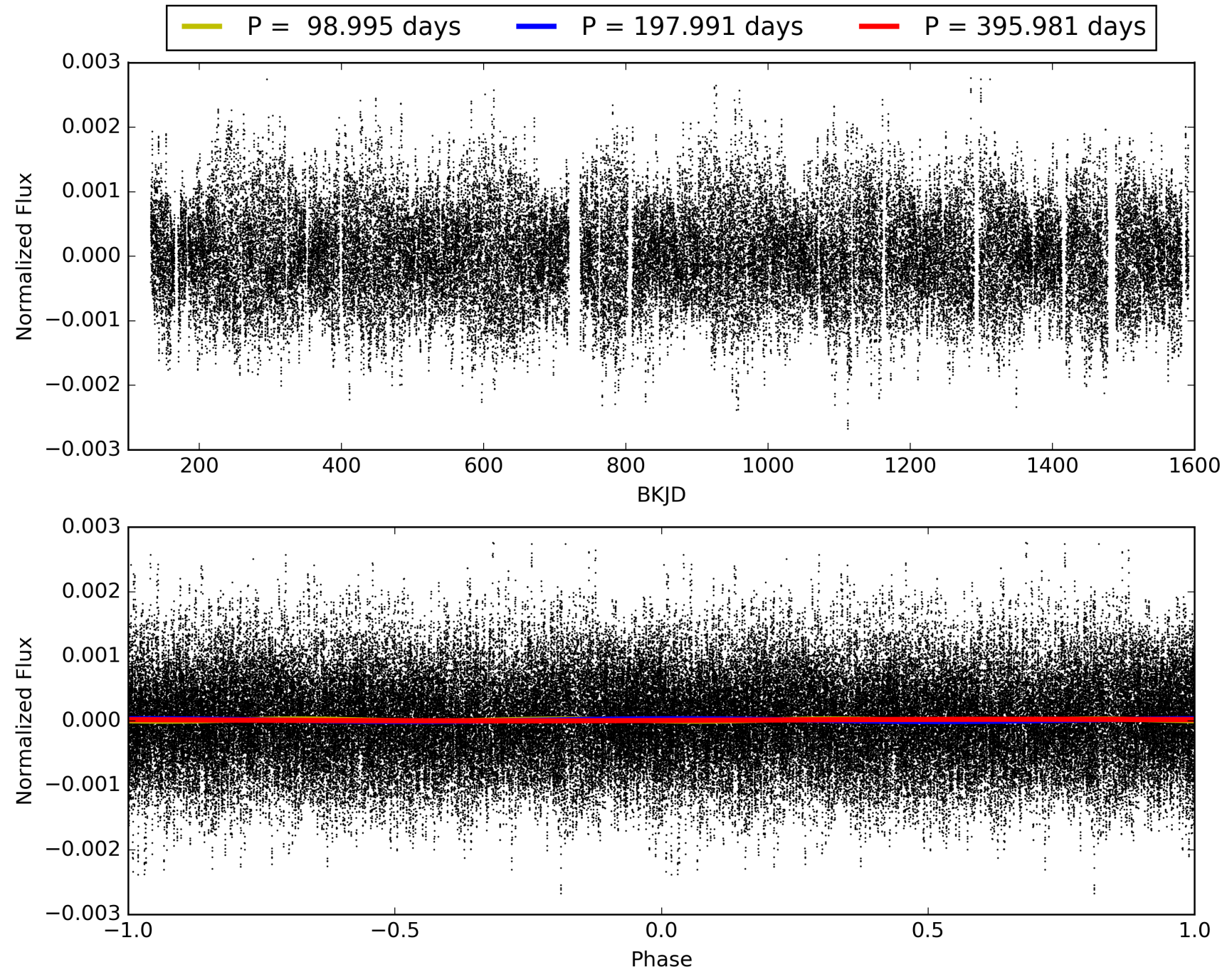
ShortPeriod-sig: 100.0% [117.91 $\sigma$ ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 25.5%  
ModelChiSquareGof-sig: 99.6%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: 0.4869  
Centroid-sig: 17.1%  
Centroid-so: 0.476 arcsec [1.54 $\sigma$ ]  
OotOffset-rm: 0.191 arcsec [0.74 $\sigma$ ]  
KicOffset-rm: 0.173 arcsec [0.61 $\sigma$ ]  
OotOffset-st: 3/0/4/1 [8]  
KicOffset-st: 3/0/4/1 [8]  
DiffImageQuality-fgm: 0.25 [2/8]  
DiffImageOverlap-fno: 0.00 [0/8]



# TCE 006715331-07, PDC Light Curves

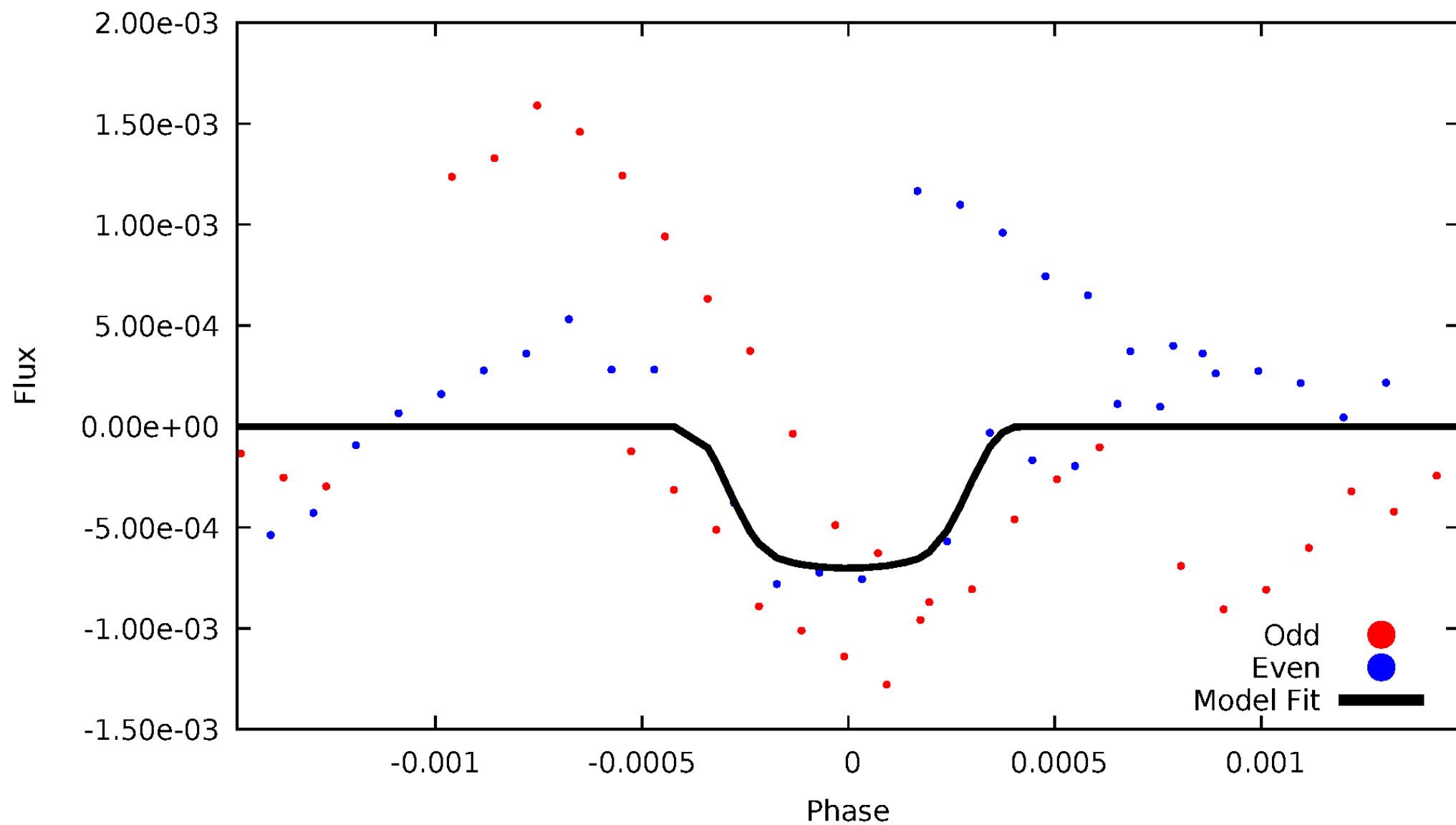


# TCE 006715331-07



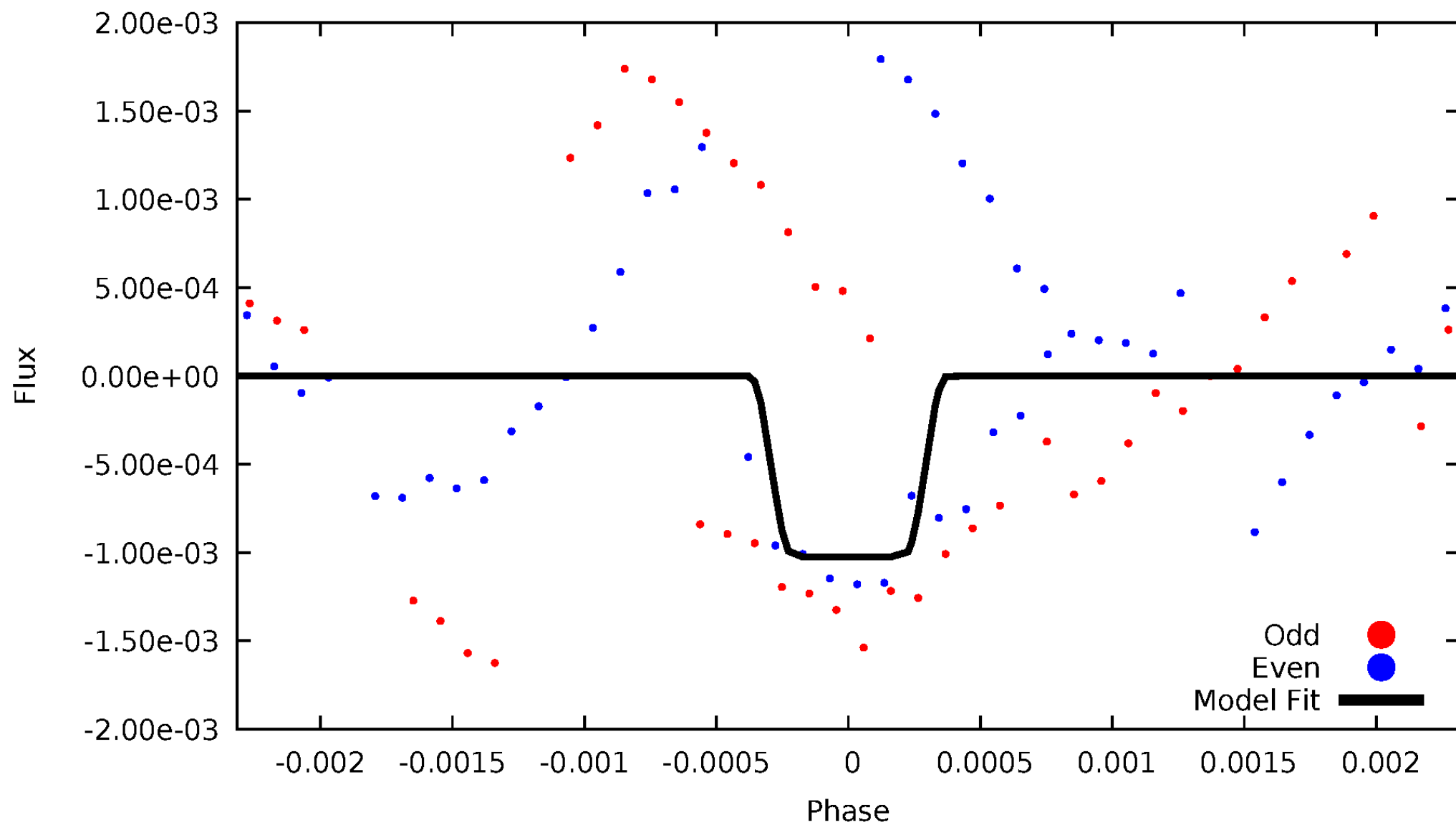
# DV Odd/Even

TCE 006715331-07



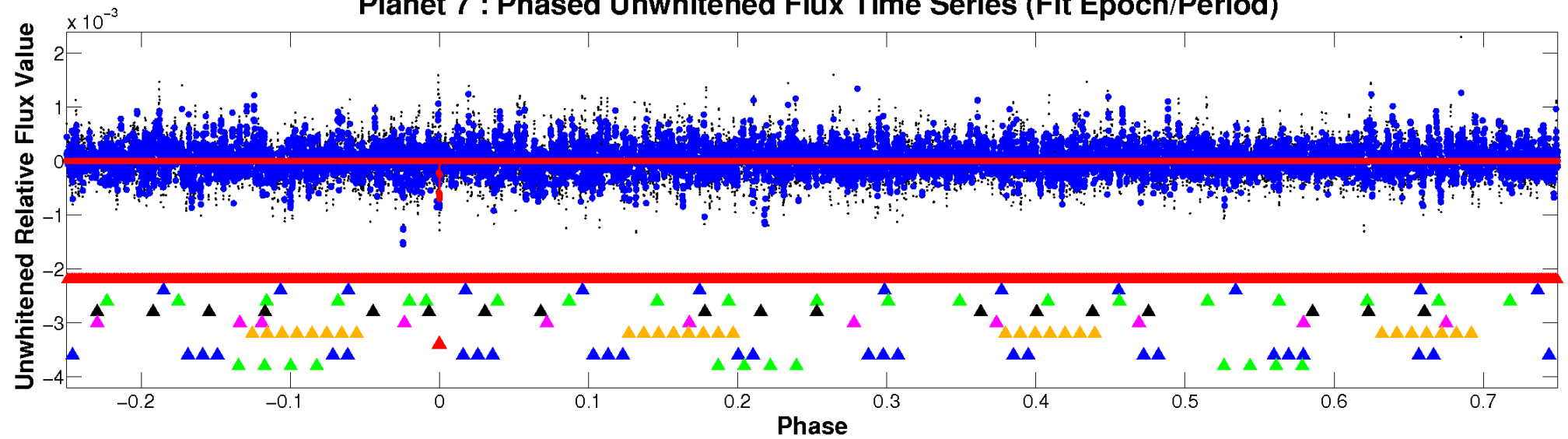
# ALT Odd/Even

TCE 006715331-07

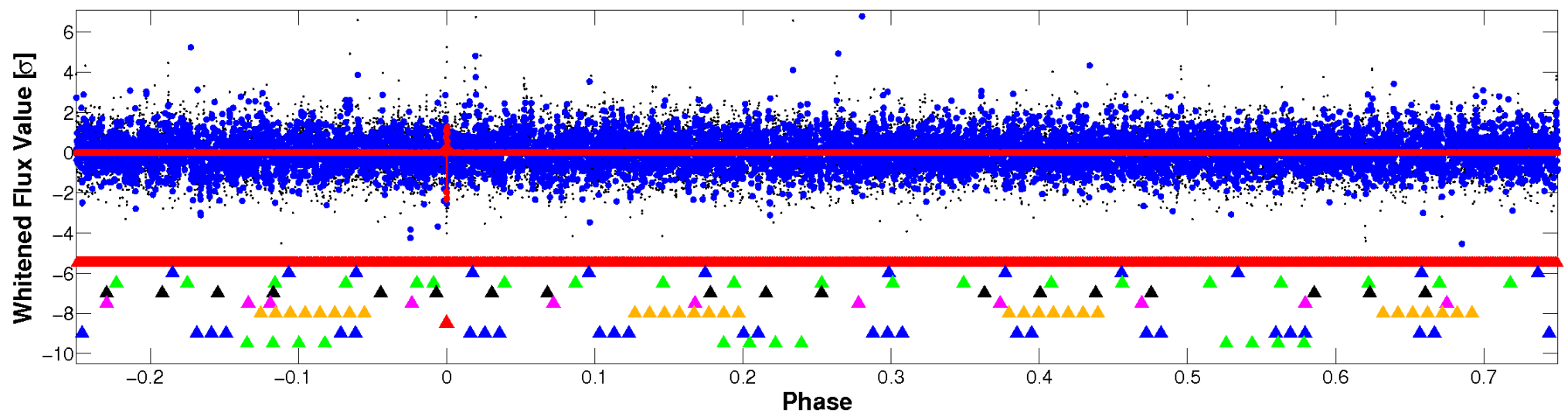


# Non-Whitened Vs. Whitened Light Curve

Planet 7 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

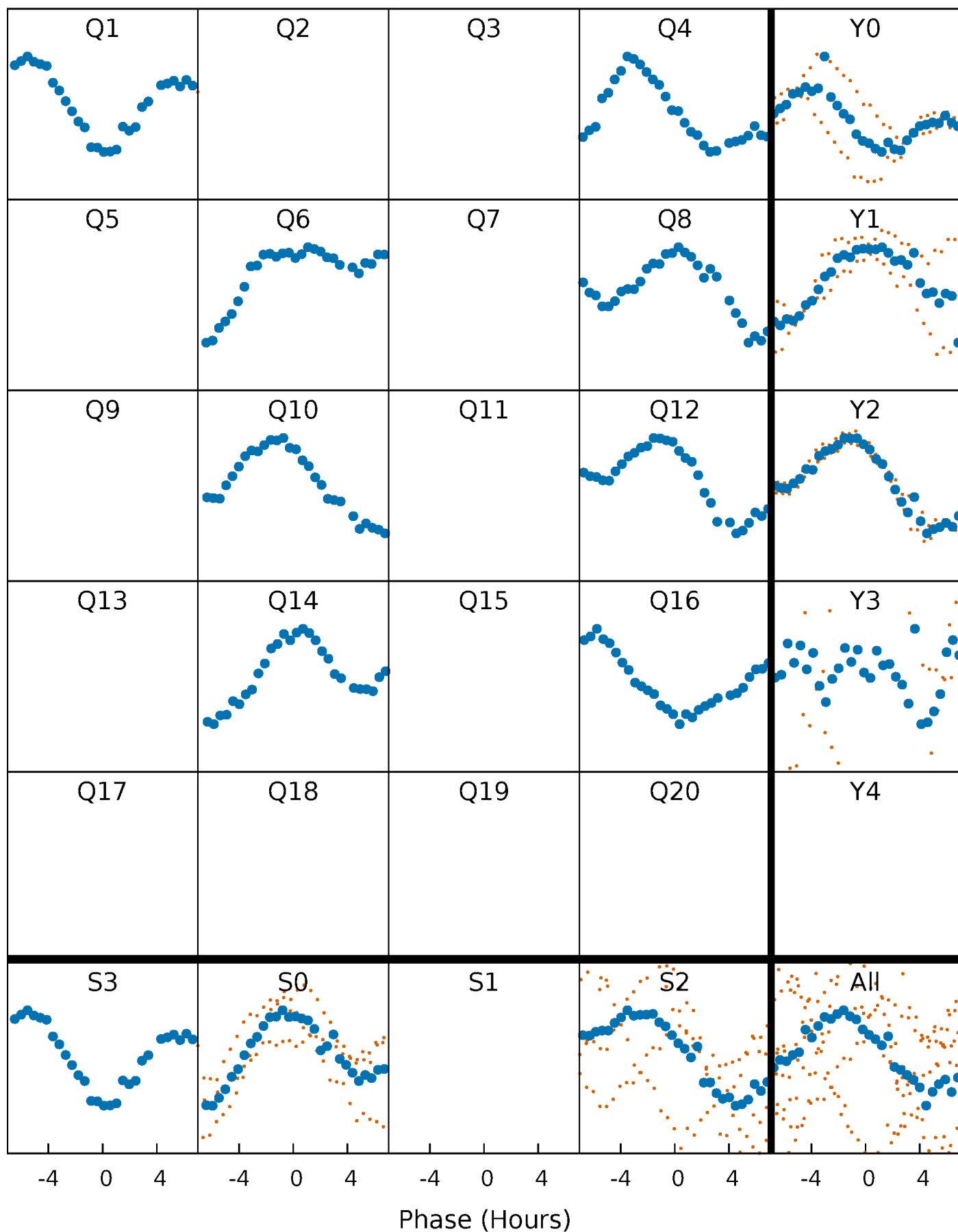


Planet 7 : Phased Whitened Flux Time Series (Fit Epoch/Period)



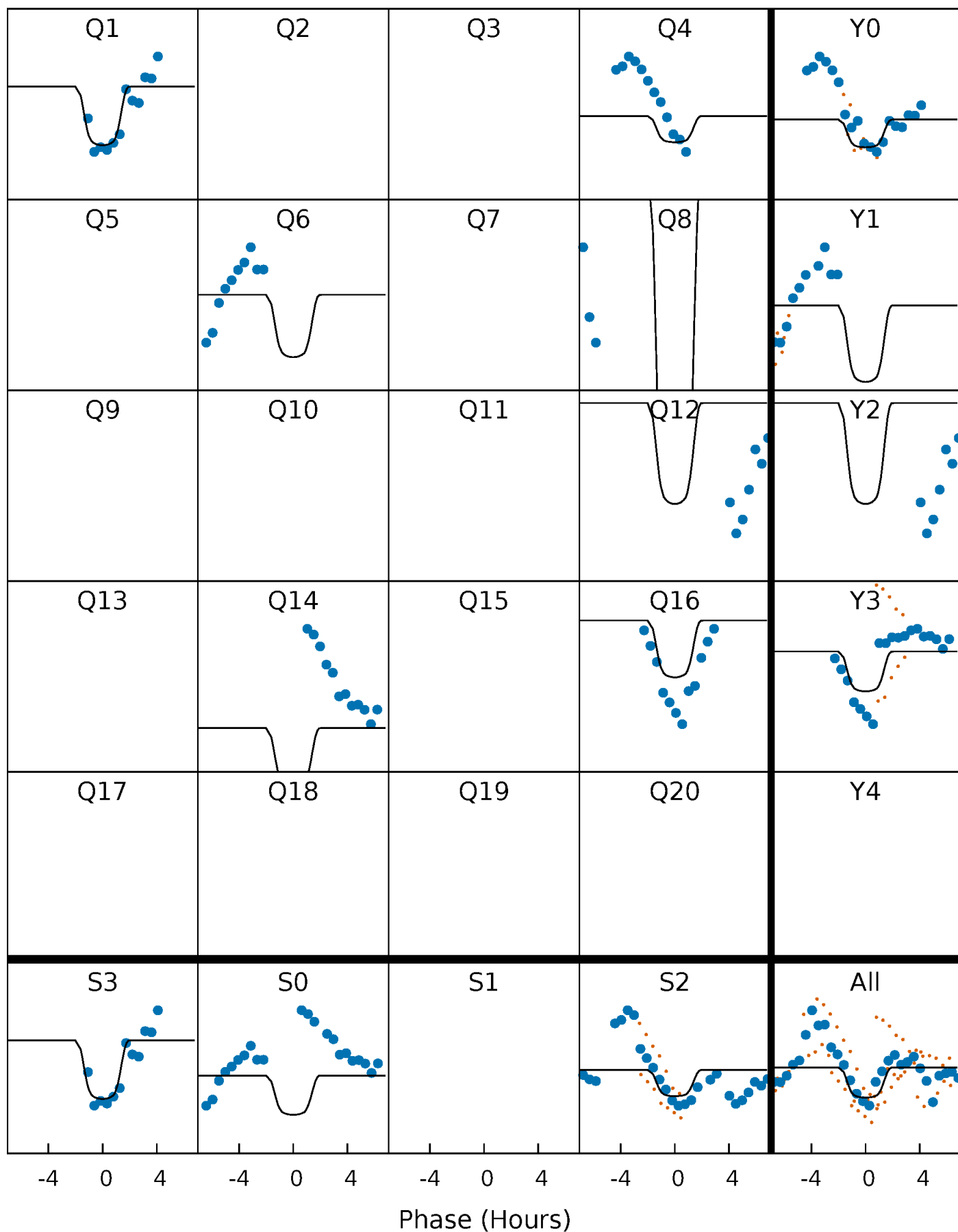
# PDC Quarter-Phased Transit Curves

TCE 006715331-07 P=197.990545 Days  $T_0=159.459832$  (BKJD)



# DV Quarter-Phased Transit Curves

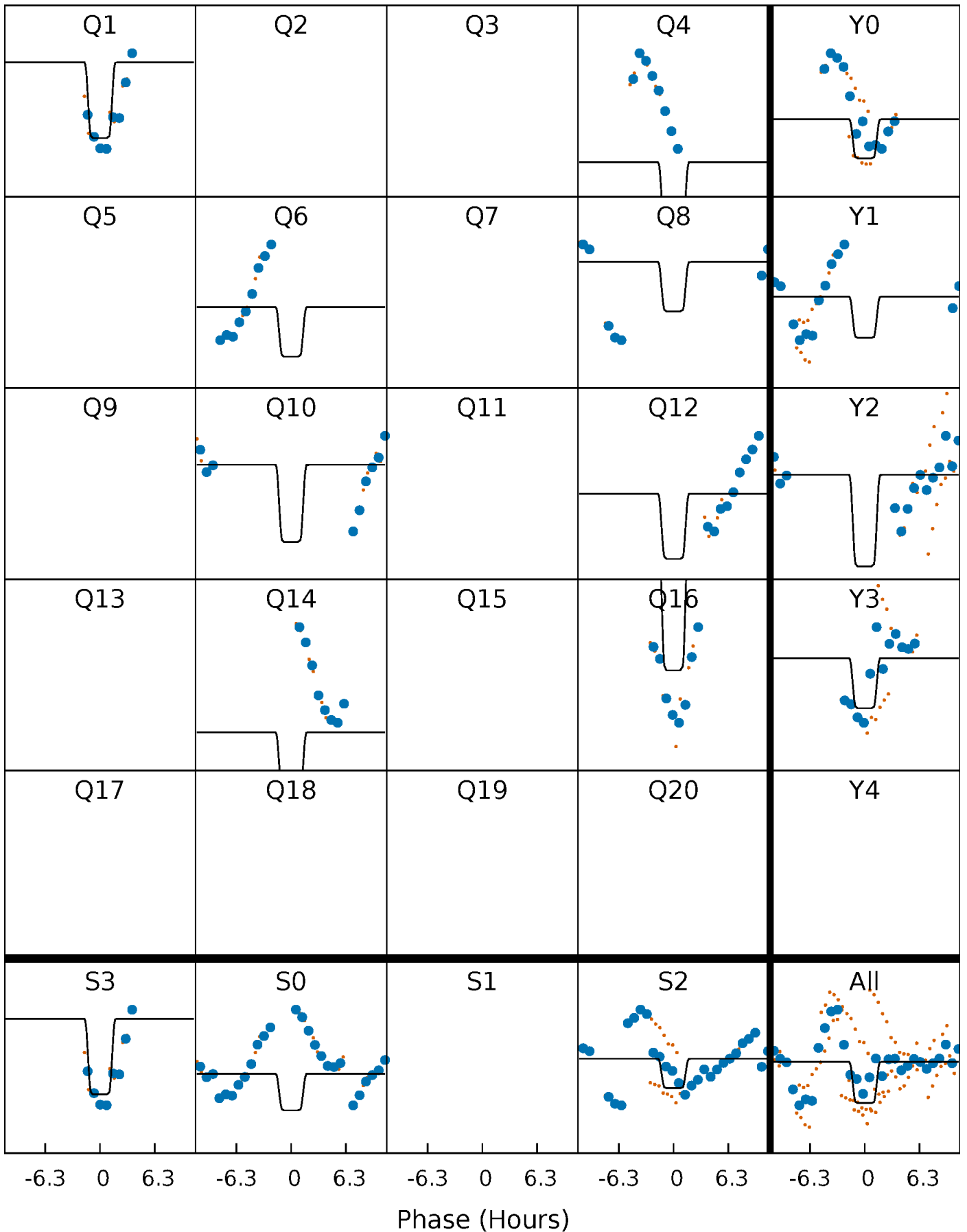
TCE 006715331-07 P=197.990545 Days  $T_0=159.459832$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

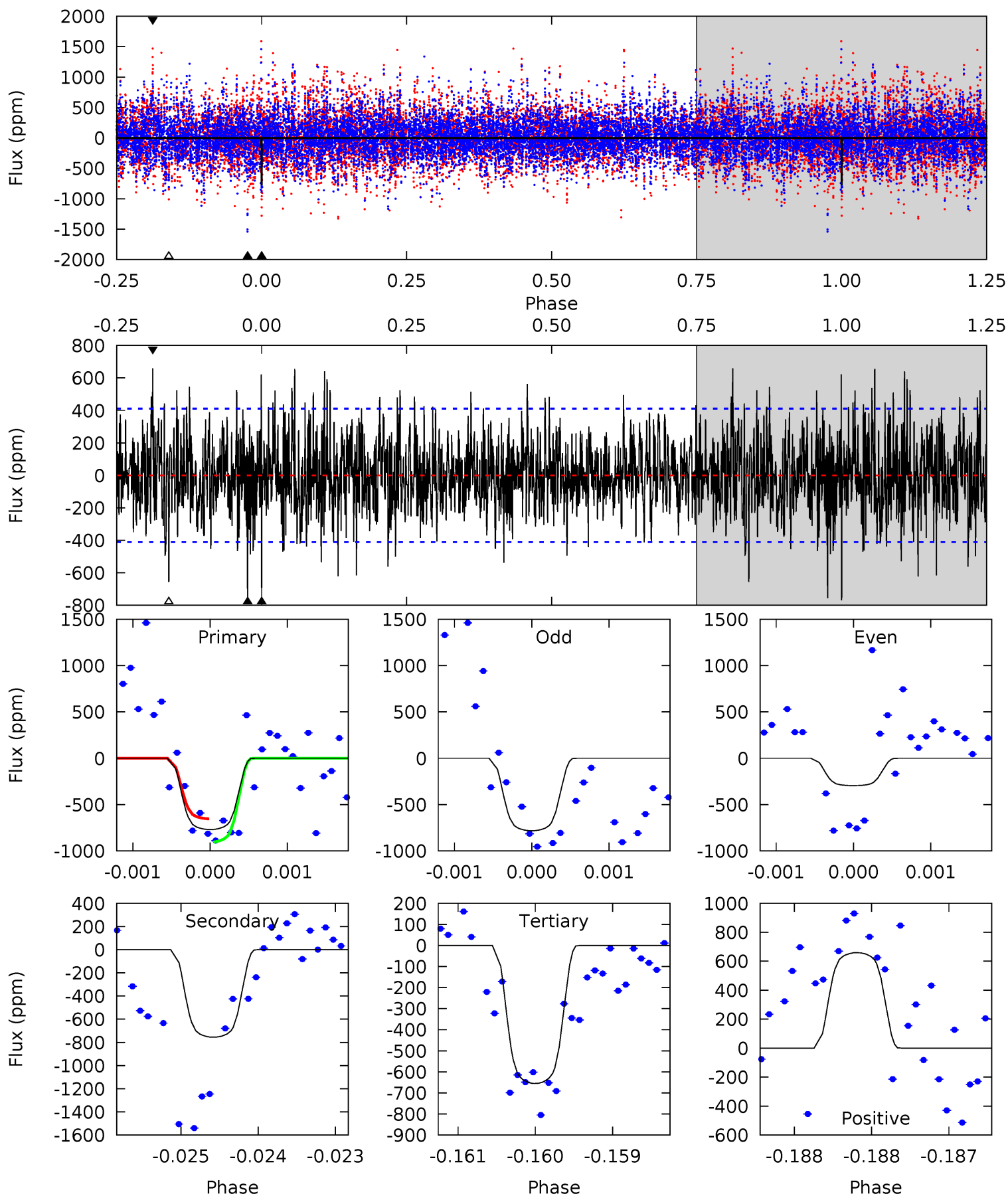
TCE 006715331-07 P=197.988624 Days  $T_0=159.480209$  (BKJD)



# DV Model-Shift Uniqueness Test

006715331-07, P = 197.990545 Days, E = 159.459832 Days

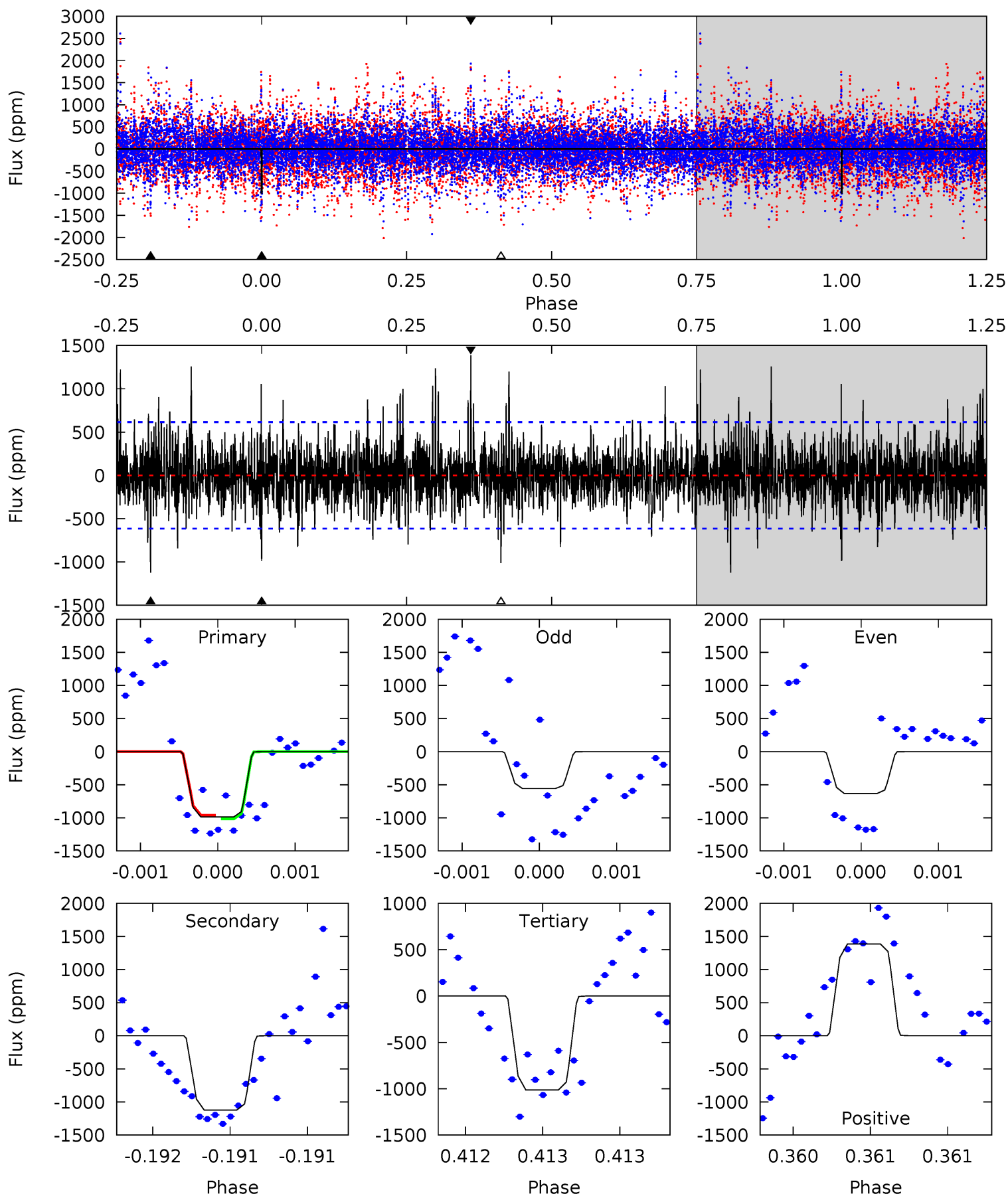
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
10.3	10.1	8.77	8.82	5.50	3.36	2.38	1.53	1.48	1.34	1.29	3.49	0.37	0.46	1.68



# Alt Model-Shift Uniqueness Test

006715331-07, P = 197.988624 Days, E = 159.480209 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
8.83	10.0	9.05	12.4	5.49	3.36	2.23	-0.22	-3.56	0.98	-2.37	0.39	0.07	0.55	0.26



### Stellar Parameters For KIC 006715331

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$7053^{+170}_{-255}$	$3.000^{+0.595}_{-0.105}$	$-0.500^{+0.500}_{-0.250}$	$8.604^{+1.321}_{-4.954}$	$2.698^{+0.387}_{-0.903}$	$0.006^{+0.048}_{-0.002}$
	+2%/-4%	+20%/-3%	+100%/-50%	+15%/-58%	+14%/-33%	+808%/-31%
Source	PHO1	FLK73	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 006715331-07 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-756 \pm 75$	$25.23^{+5.39}_{-7.51}$	$1275^{+92}_{-187}$	$6768^{+505}_{-455}$	$559^{+454}_{-169}$
Alt.	$-1121 \pm 112$	$28.19^{+5.80}_{-7.63}$	$1287^{+90}_{-179}$	$7218^{+545}_{-520}$	$675^{+500}_{-196}$

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

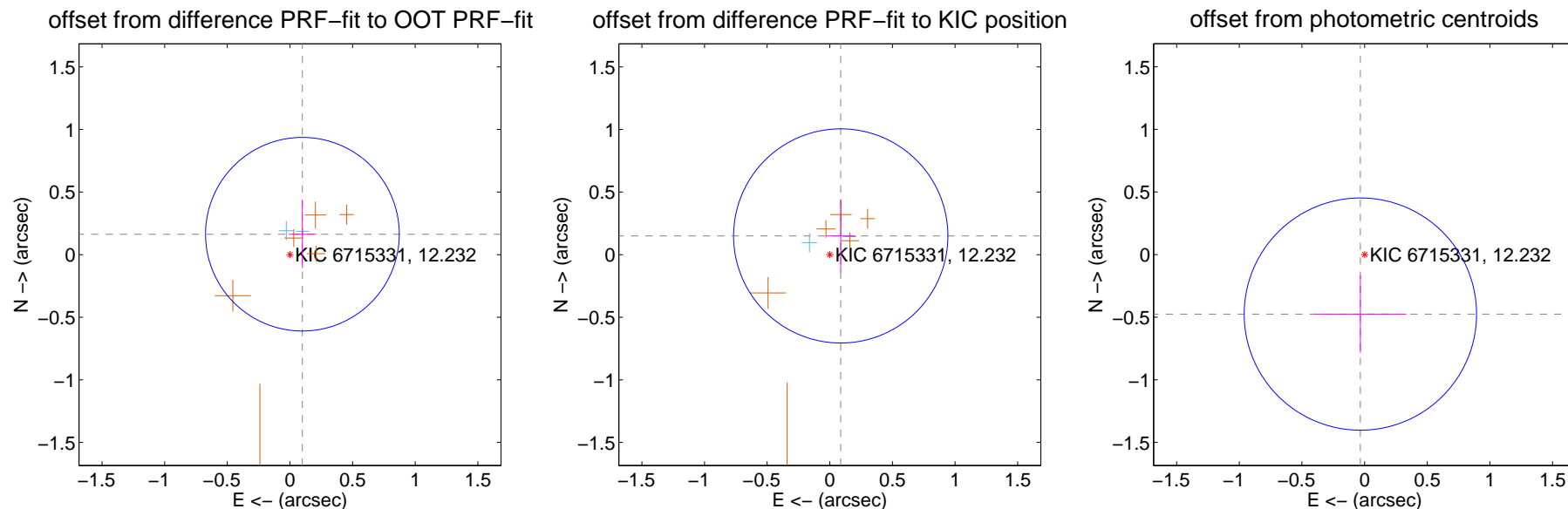
## DV Centroid Data

Supplemental centroid analysis for 006715331-07. Kepler magnitude: 12.23. Transit SNR 9.05

There are 2 quarters with good PRF difference image offsets

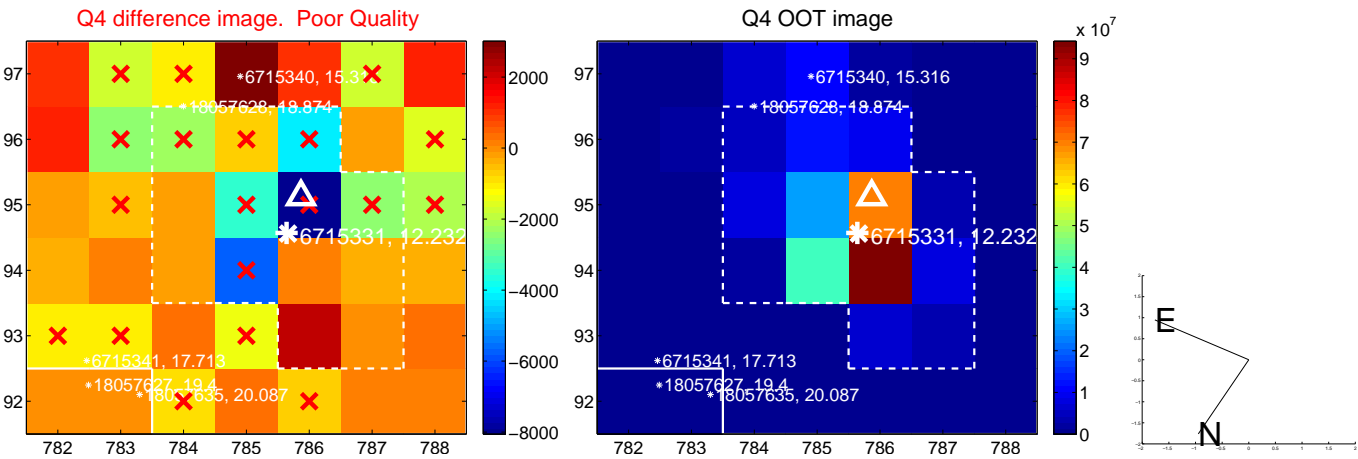
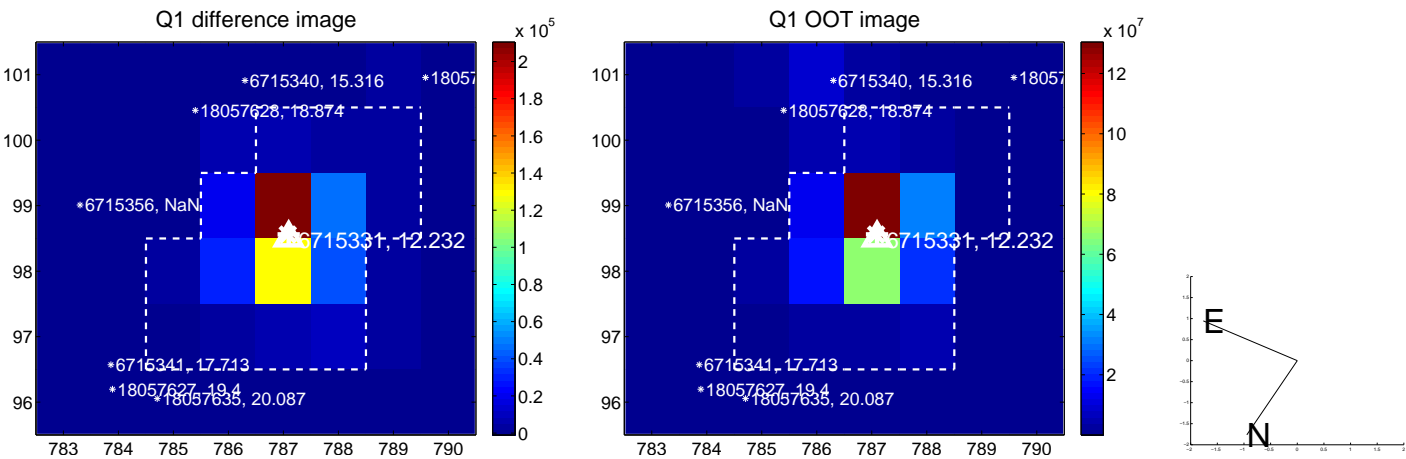
The direct PRF centroid is offset from the target star catalog position by about 0.16 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.191 \pm 0.258$	0.74	$-0.100 \pm 0.110$	$0.163 \pm 0.269$
PRF-fit source offset from KIC position	$0.173 \pm 0.285$	0.61	$-0.087 \pm 0.116$	$0.150 \pm 0.292$
photometric centroid source offset	$0.48 \pm 0.31$	1.54	$0.03 \pm 0.37$	$-0.48 \pm 0.31$



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.

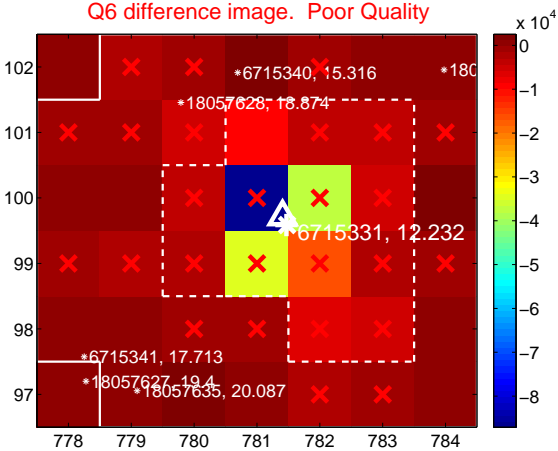
Q5 no difference image



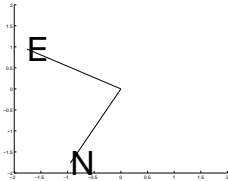
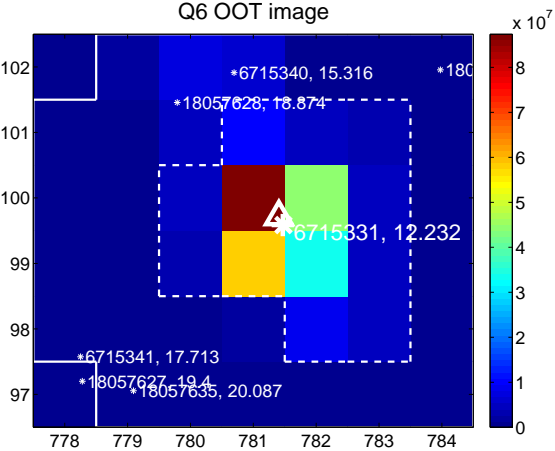
Q5 no OOT image



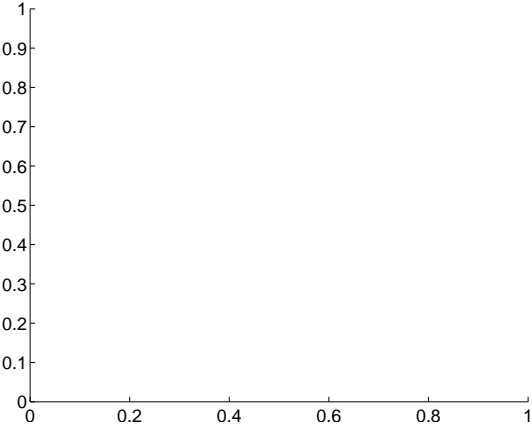
Q6 difference image. Poor Quality



Q6 OOT image



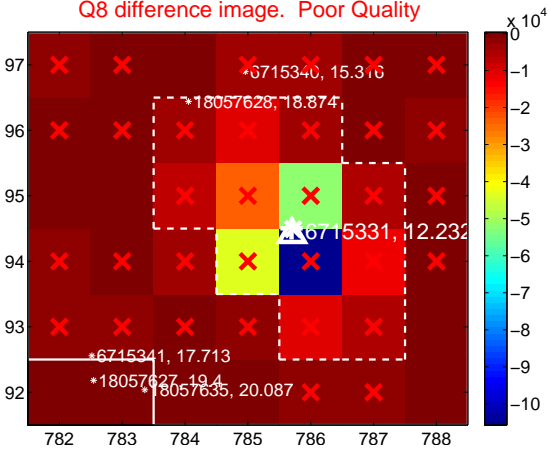
Q7 no difference image



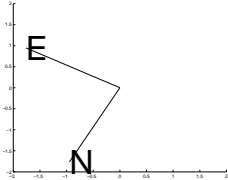
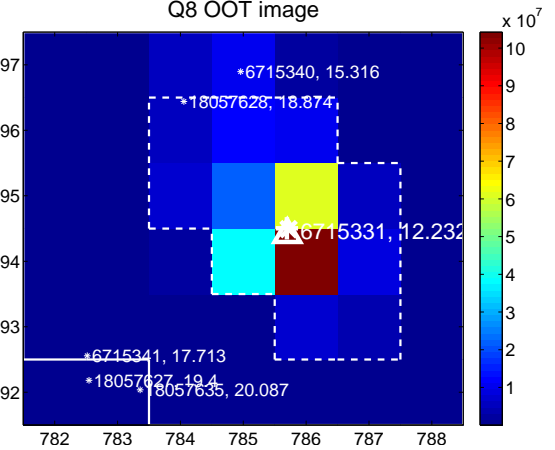
Q7 no OOT image



Q8 difference image. Poor Quality

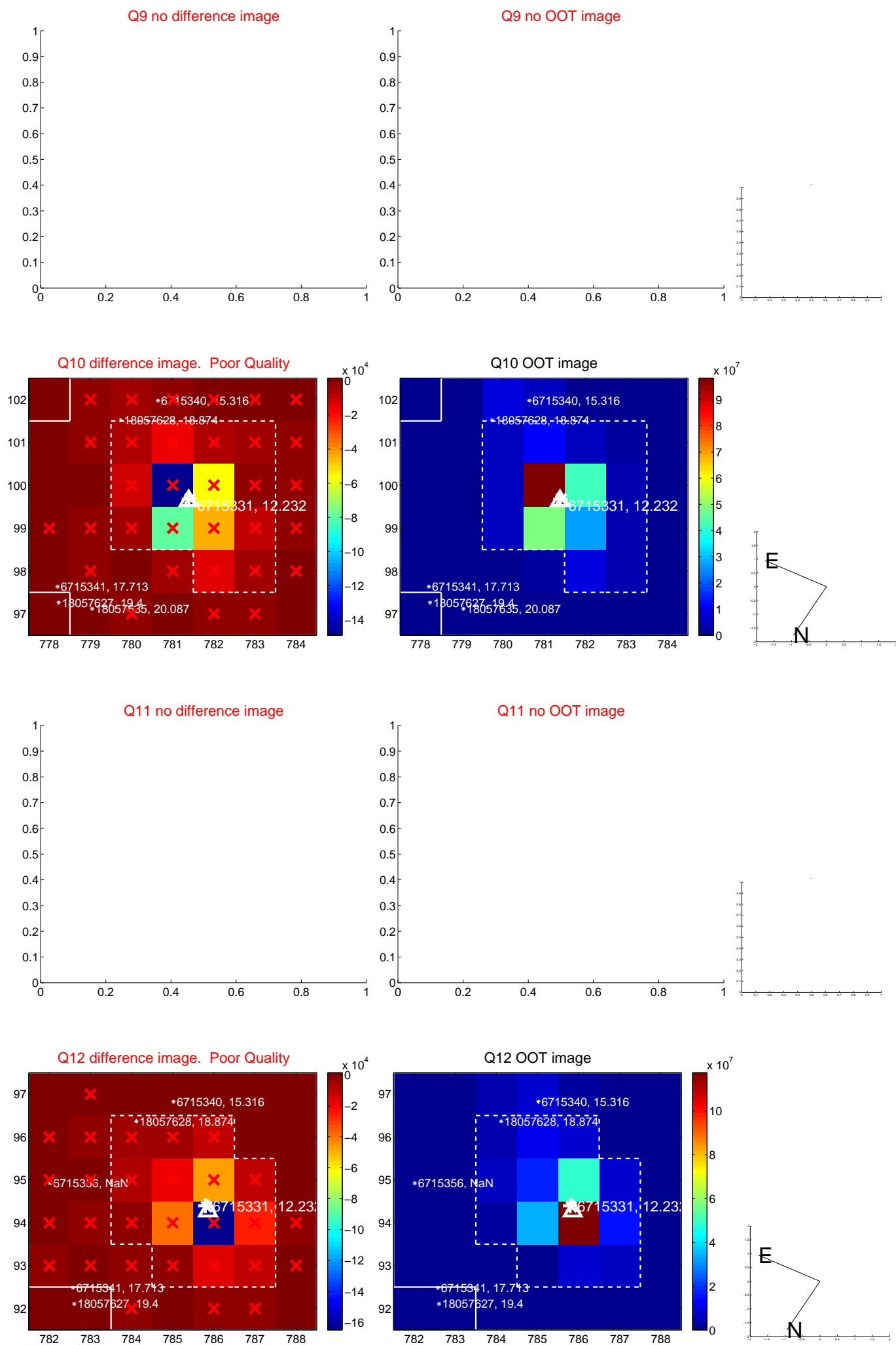


Q8 OOT image

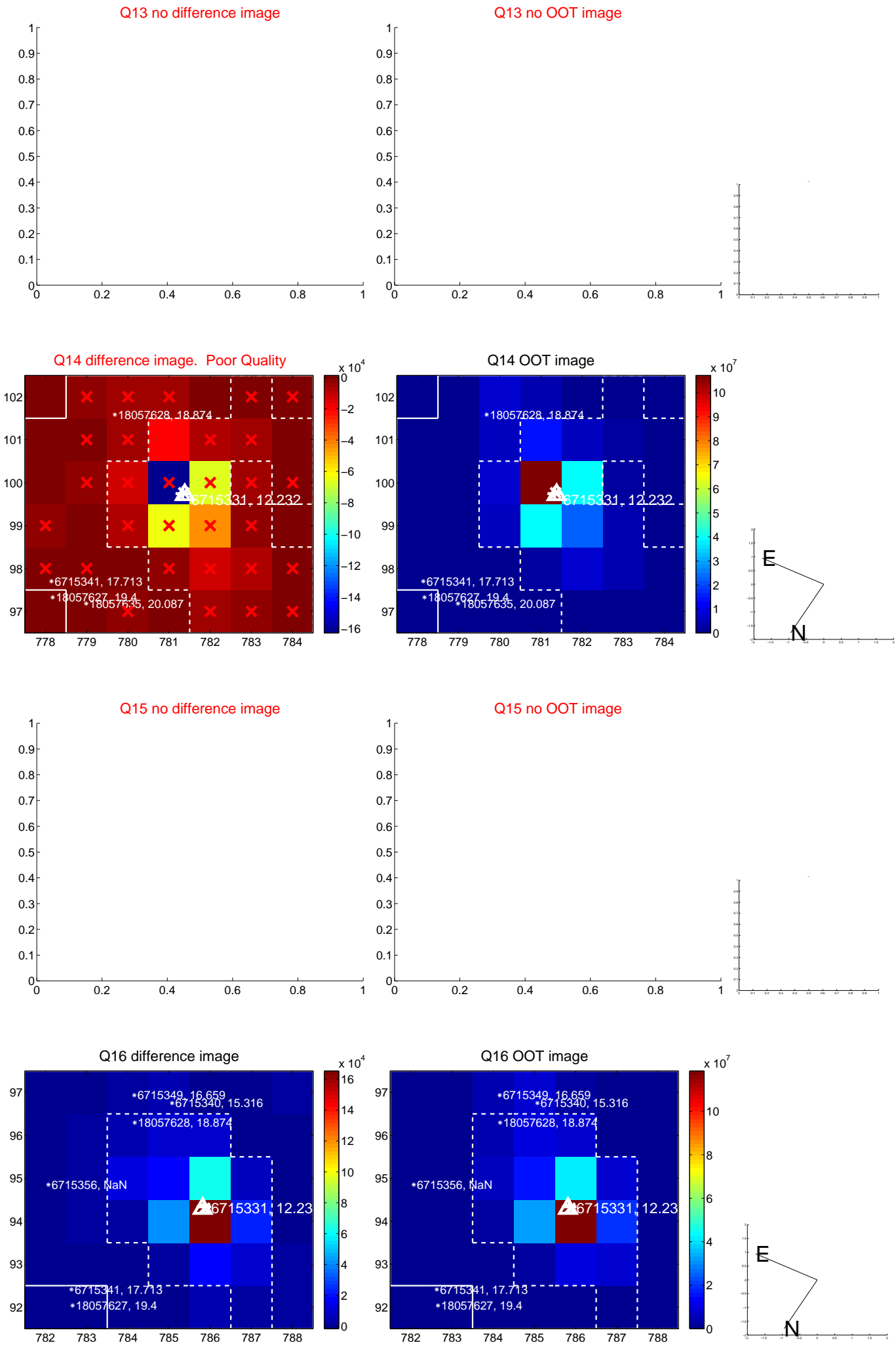




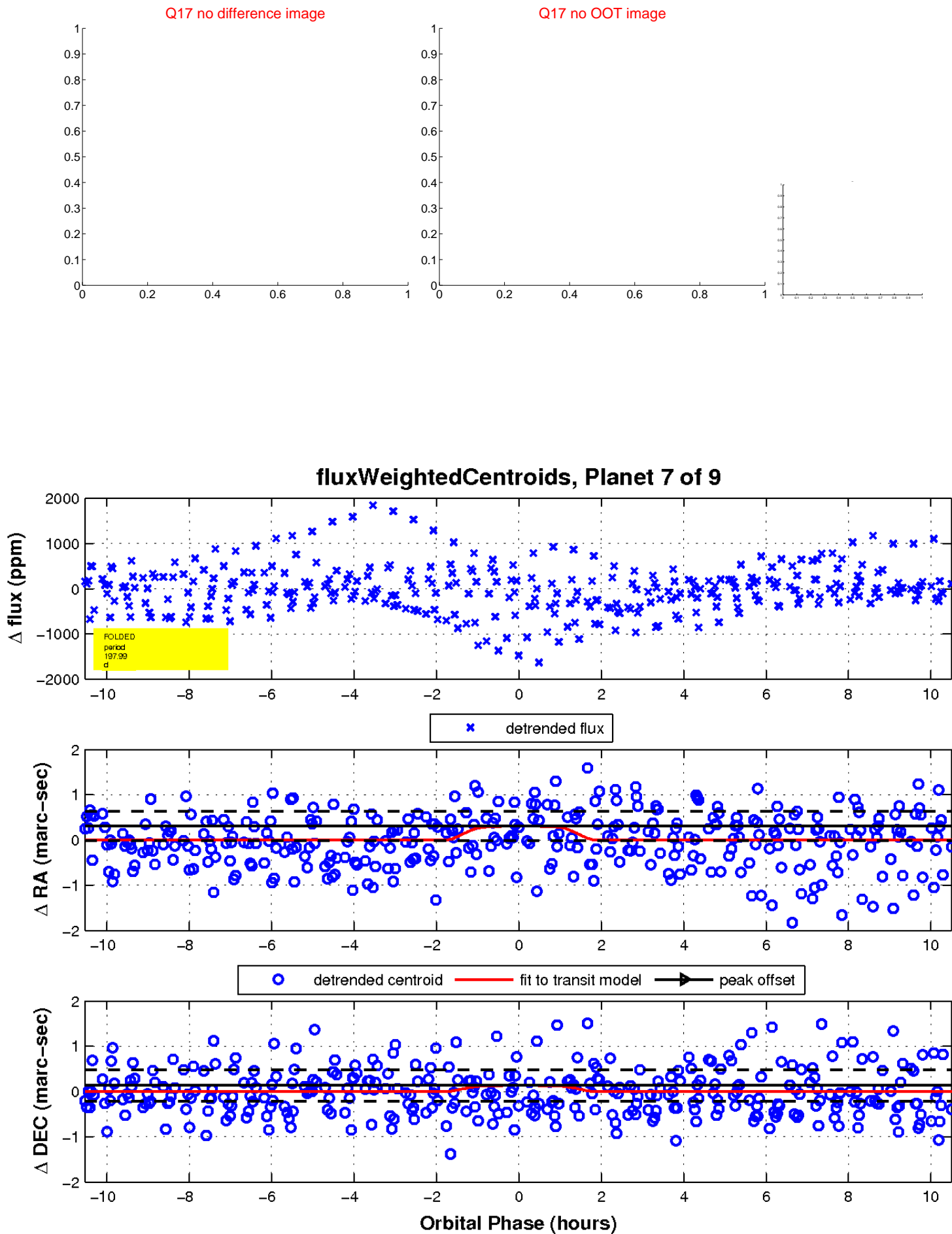
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value



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

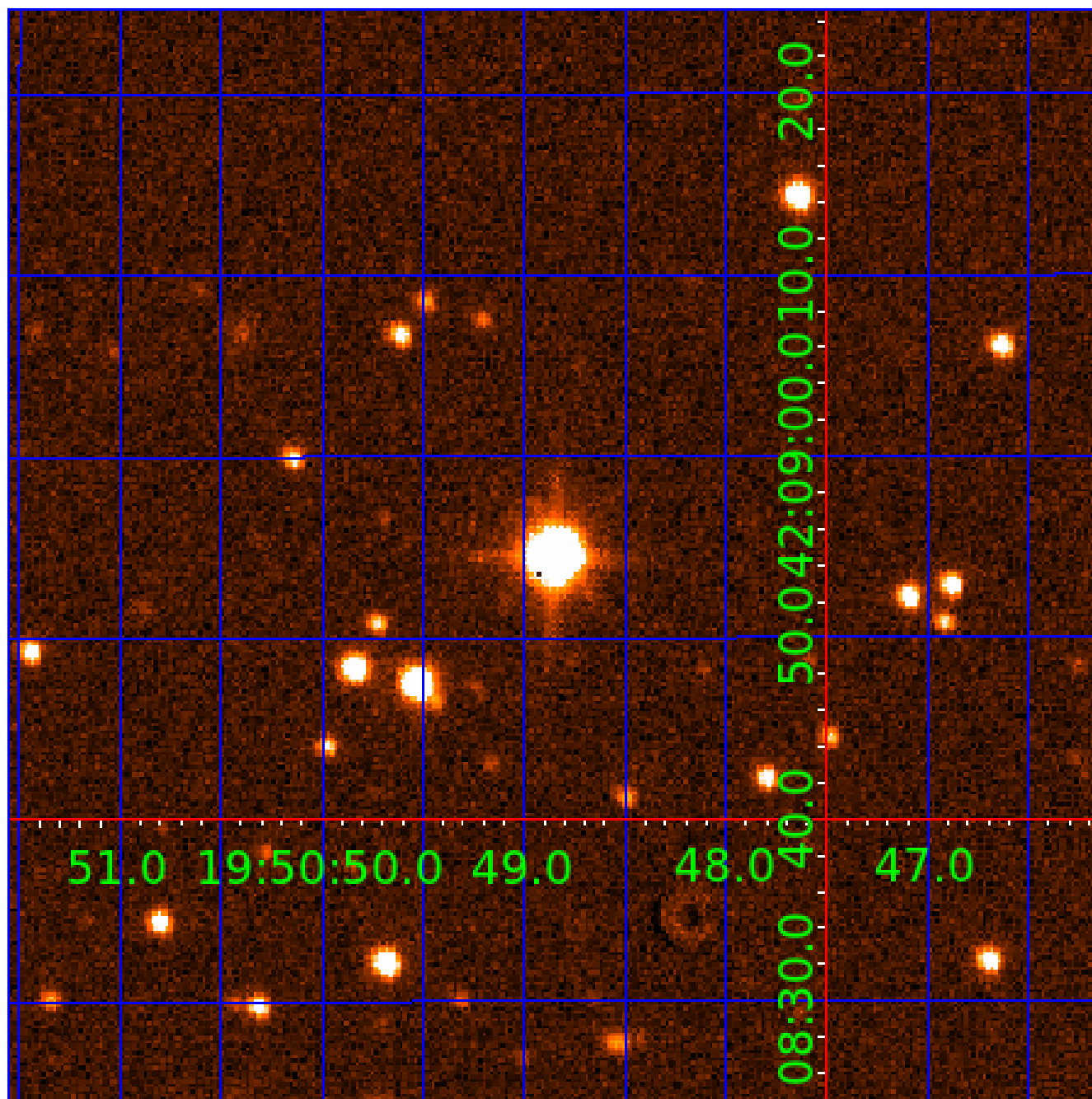


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 006715331

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
006715331-01	OBS	No	0.928873	132.119851	21.8	5.212	7.9	5.3	8.60	7053	4.30	0.00
006715331-02	OBS	No	126.812494	138.381125	426.5	13.300	9.9	5.5	8.60	7053	20.88	346.72
006715331-03	OBS	No	73.061339	155.485784	600.8	5.597	9.3	8.0	8.60	7053	39.84	723.23
006715331-04	OBS	No	80.681374	150.660758	762.9	11.330	9.6	10.1	8.60	7053	28.37	633.62
006715331-06	OBS	No	49.992478	134.622321	526.8	5.276	8.2	9.0	8.60	7053	37.45	1199.45
006715331-07	OBS	No	197.990545	159.459832	701.4	3.518	8.5	9.1	8.60	7053	27.73	191.43
006715331-08	OBS	No	53.819547	166.532224	564.8	4.939	8.0	8.7	8.60	7053	38.71	1087.10
006715331-09	OBS	No	130.838966	143.185368	112.8	4.500	7.9	-1.0	8.60	7053	9.22	332.56

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
006715331-01	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
006715331-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS
006715331-03	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—HALO_GHOST
006715331-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
006715331-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
006715331-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS
006715331-08	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
006715331-09	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—CENT_NOFITS

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

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

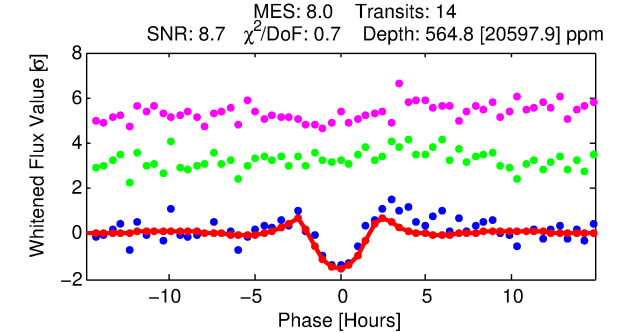
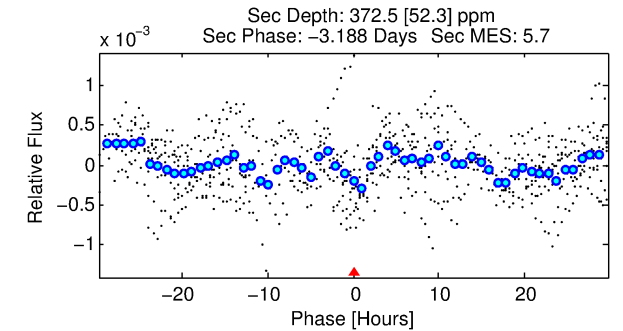
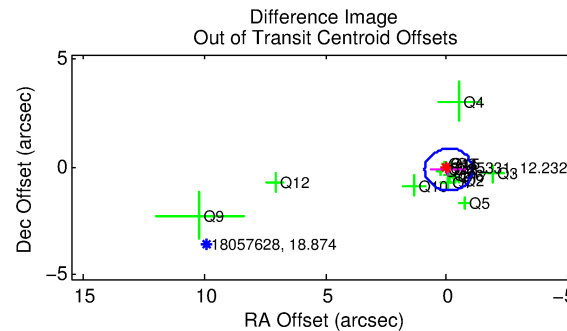
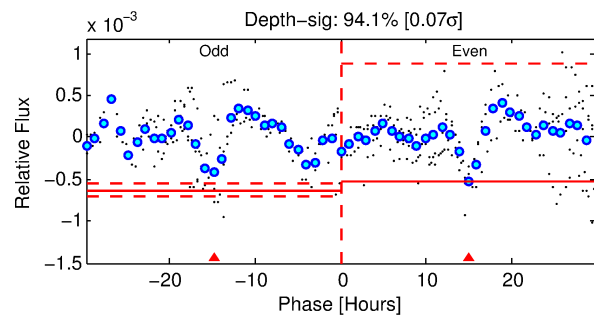
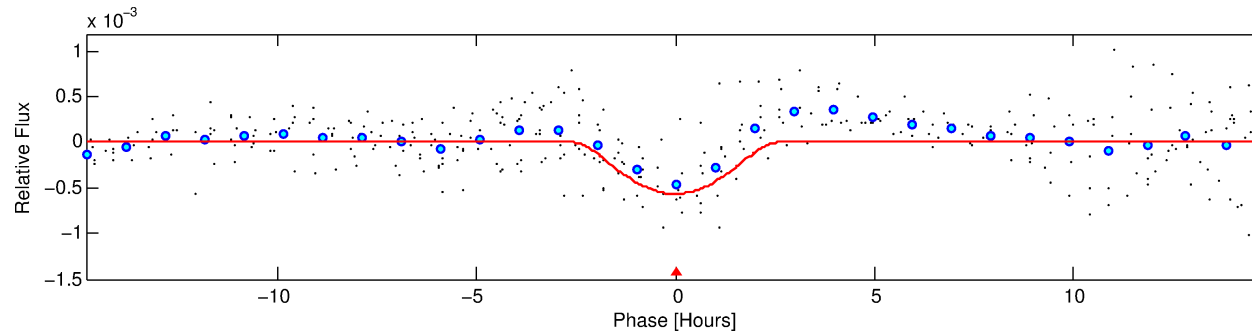
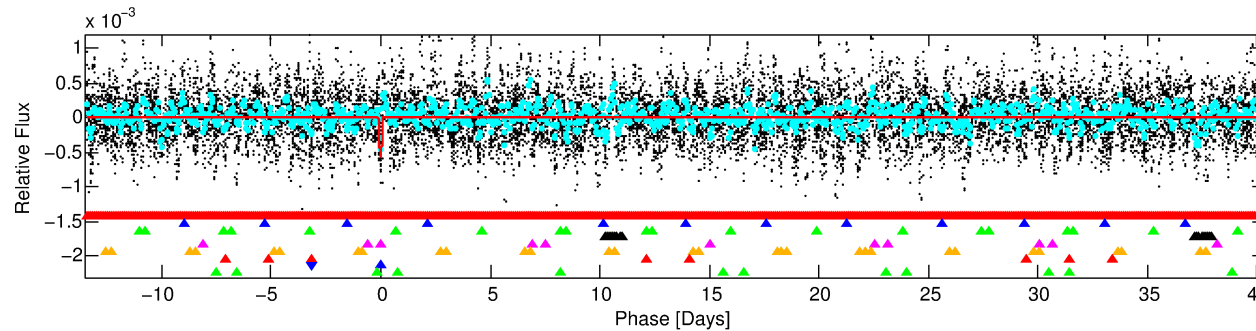
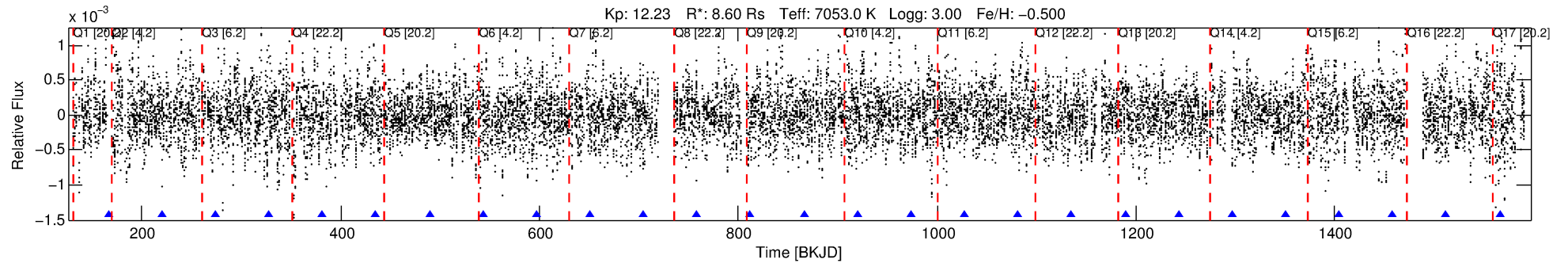
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 006715331-08

No Significant Match Found

# DV One-Page Summary

KIC: 6715331 Candidate: 8 of 9 Period: 53.820 d



## DV Fit Results:

Period = 53.81955 [0.00062] d  
Epoch = 166.5322 [0.0092] BKJD  
Rp/R\* = 0.0412 [0.0730]  
a/R\* = 24.17 [10.97]  
b = 1.00 [1.14]  
Seff = 1087.10 [1088.45]  
Teff = 1464 [366] K  
Rp = 38.71 [72.10] Re  
a = 0.3886 [0.2318] AU  
Ag = 20.65 [76.00] [0.26 $\sigma$ ]  
Teffp = 4826 [4281] K [0.78 $\sigma$ ]

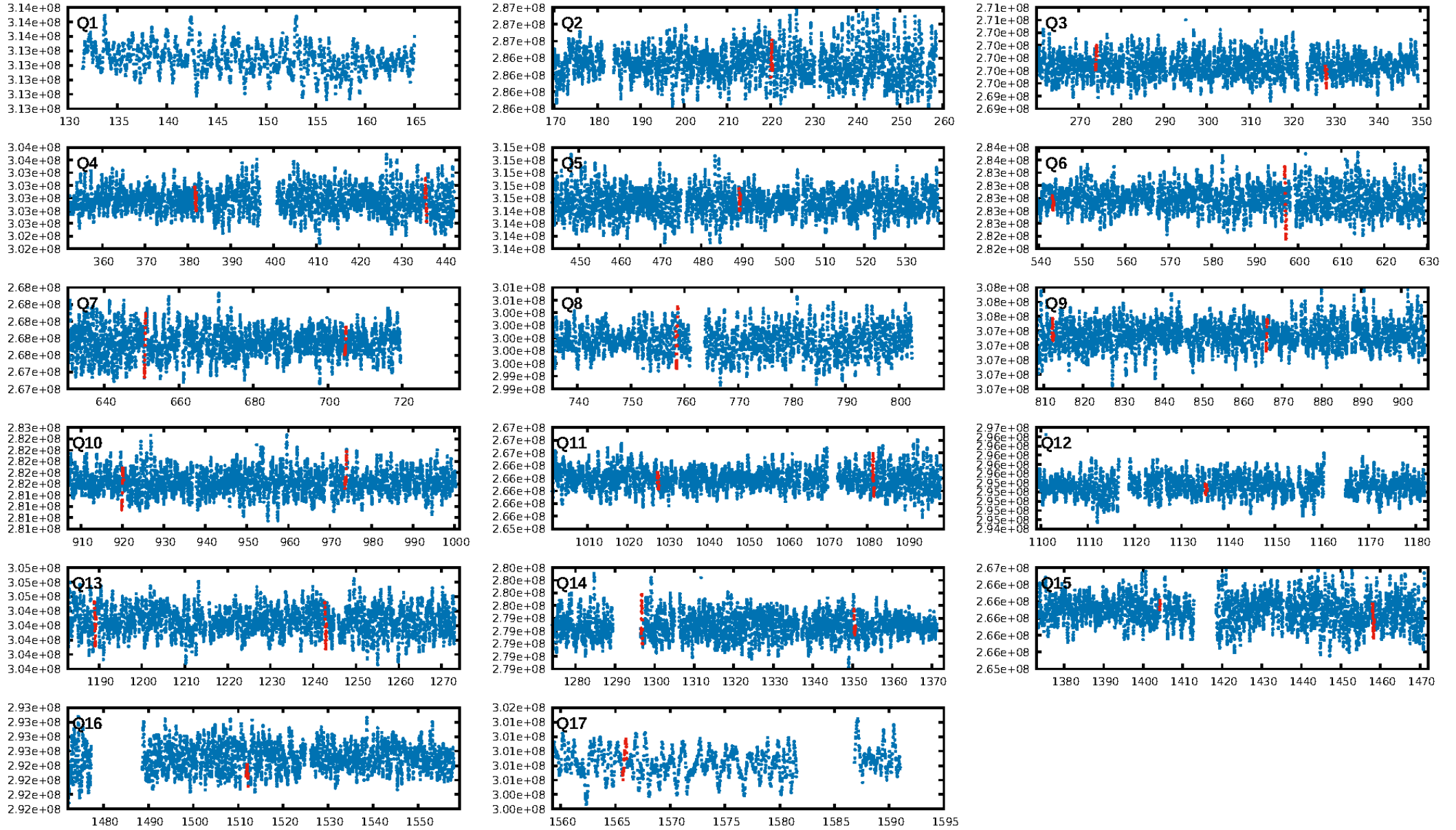
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [12.71 $\sigma$ ]  
LongPeriod-sig: 100.0% [61.87 $\sigma$ ]  
ModelChiSquare2-sig: 19.6%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [13/13]  
GhostDiagnostic-chr: -0.7523  
Centroid-sig: 80.4%  
Centroid-so: 0.666 arcsec [2.47 $\sigma$ ]  
OotOffset-rm: 0.158 arcsec [0.48 $\sigma$ ]  
KicOffset-rm: 0.145 arcsec [0.60 $\sigma$ ]  
OotOffset-st: 4/4/4/4 [16]  
KicOffset-st: 4/4/4/4 [16]  
DiffImageQuality-fgm: 0.56 [9/16]  
DiffImageOverlap-fno: 0.00 [0/16]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 05:55:16 Z

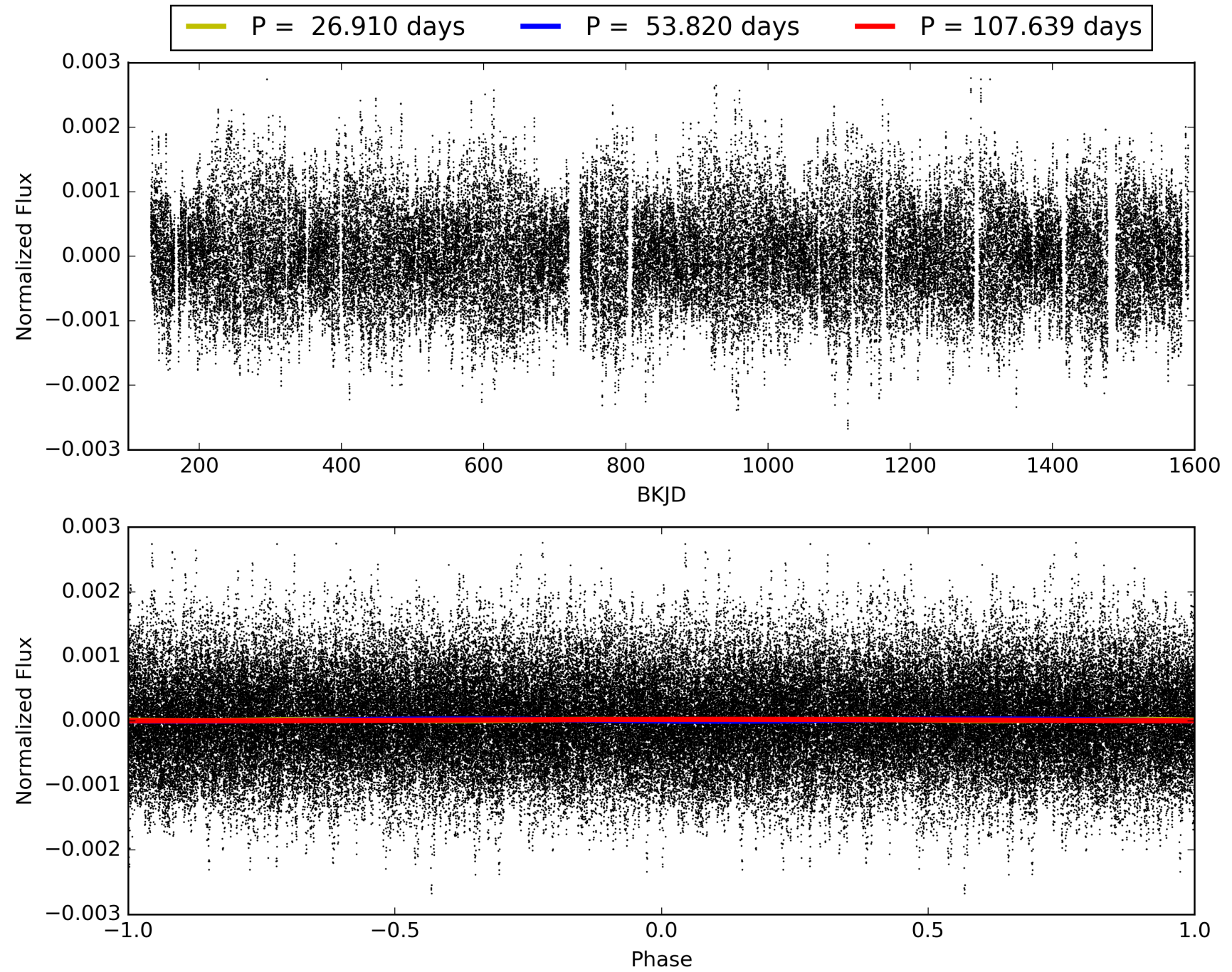
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 006715331-08, PDC Light Curves



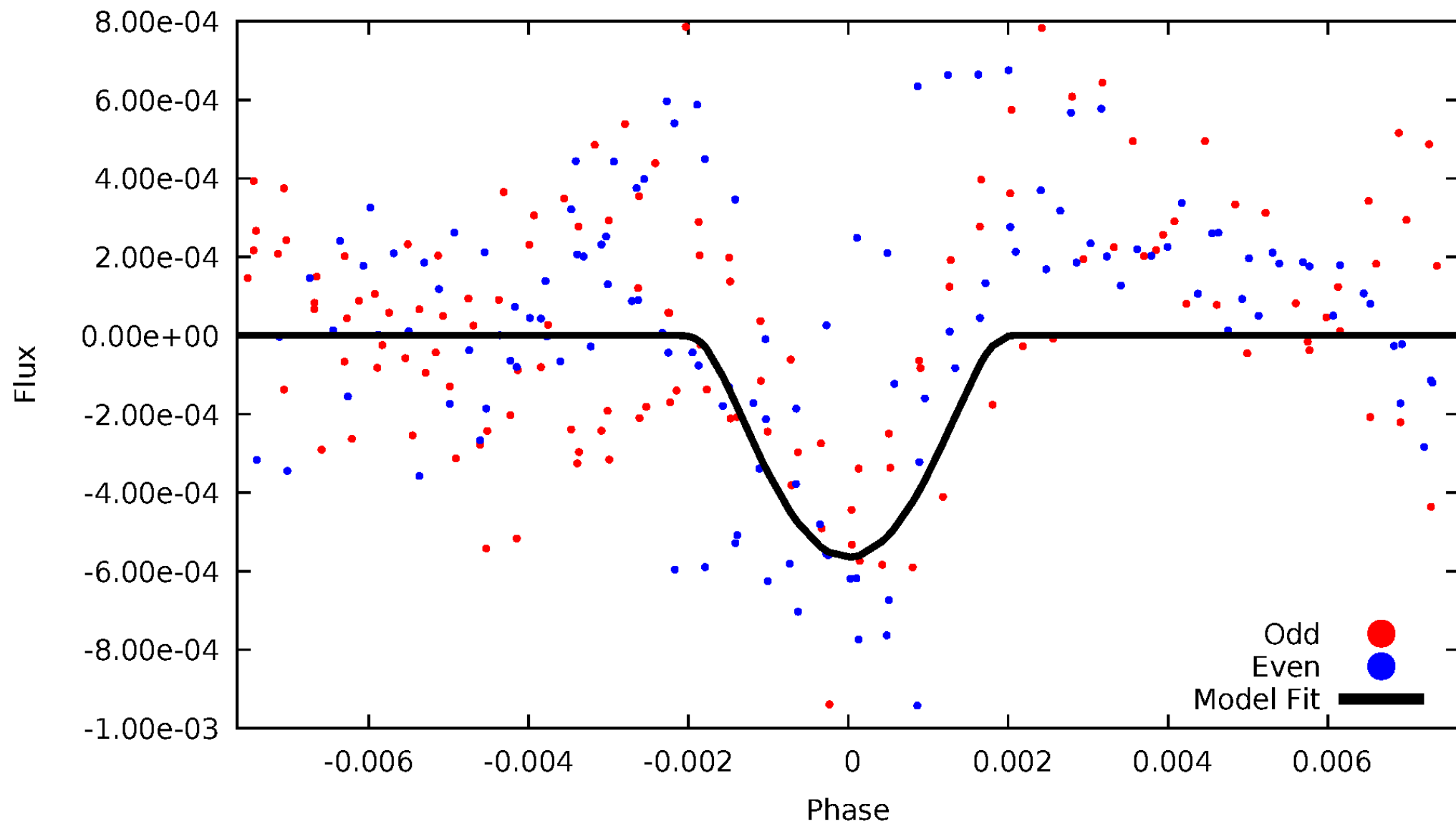


# TCE 006715331-08



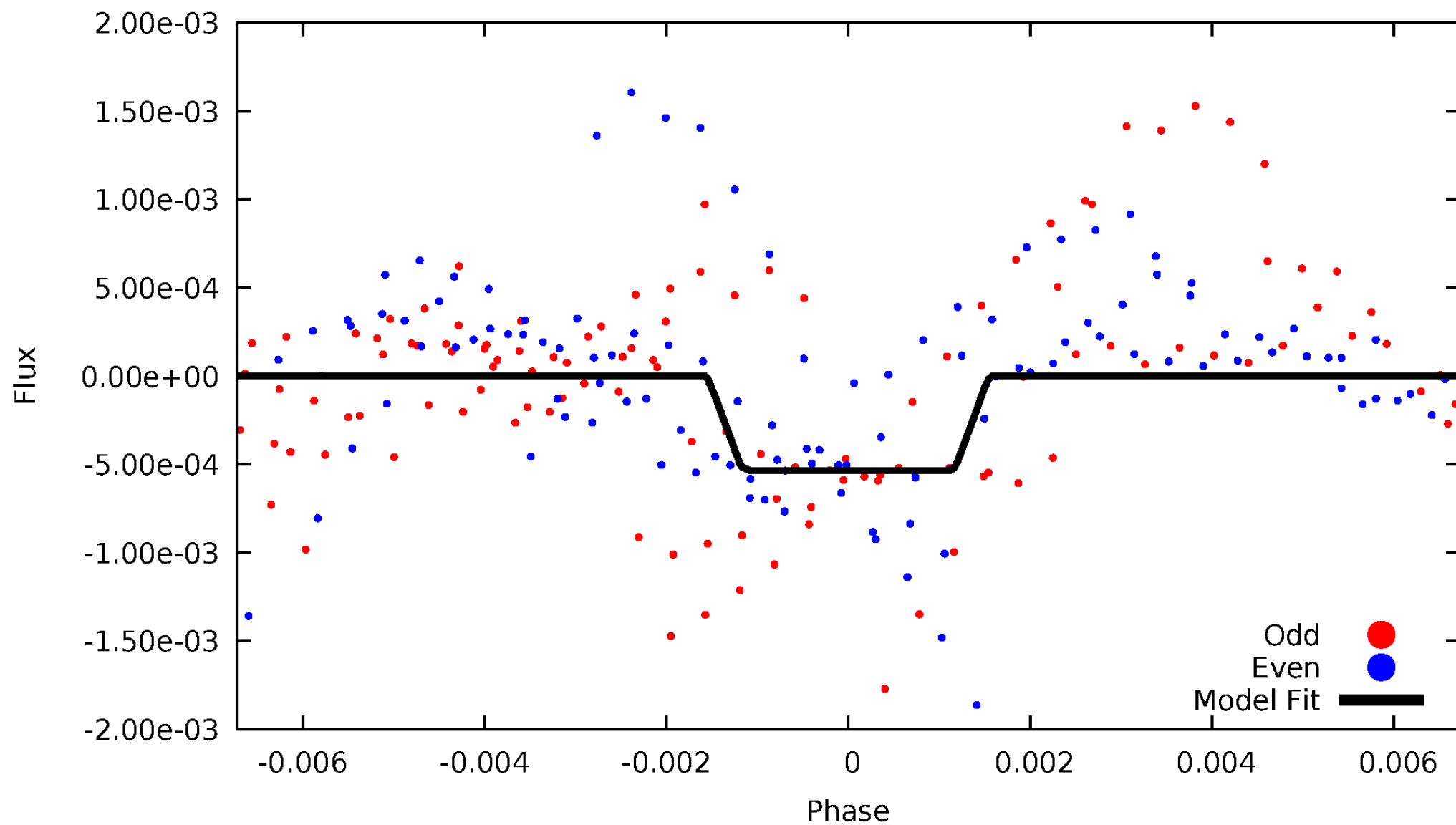
# DV Odd/Even

TCE 006715331-08



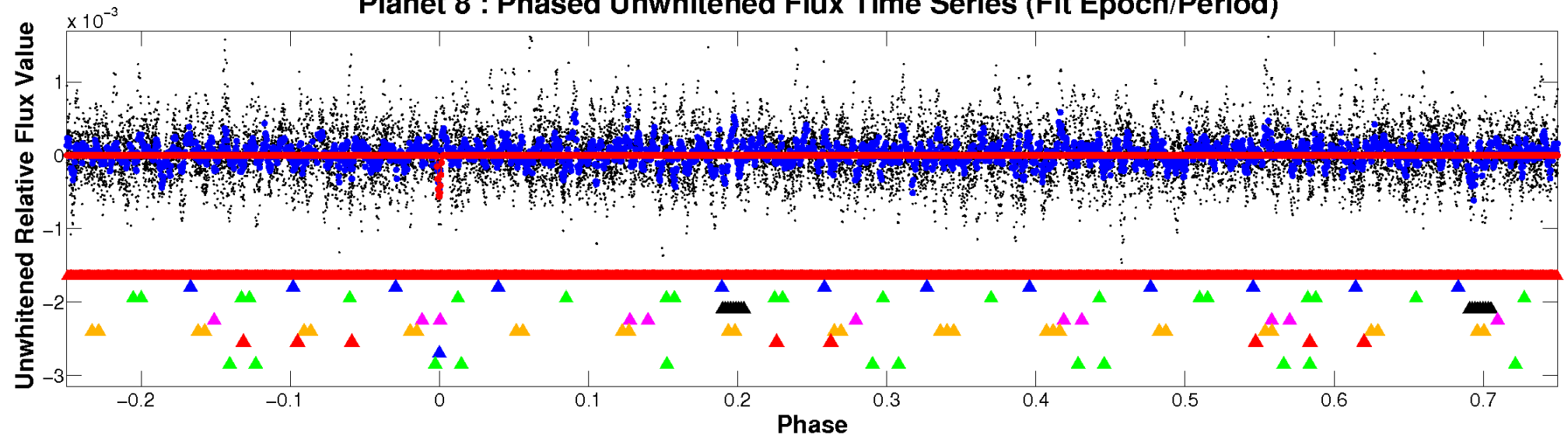
# ALT Odd/Even

TCE 006715331-08

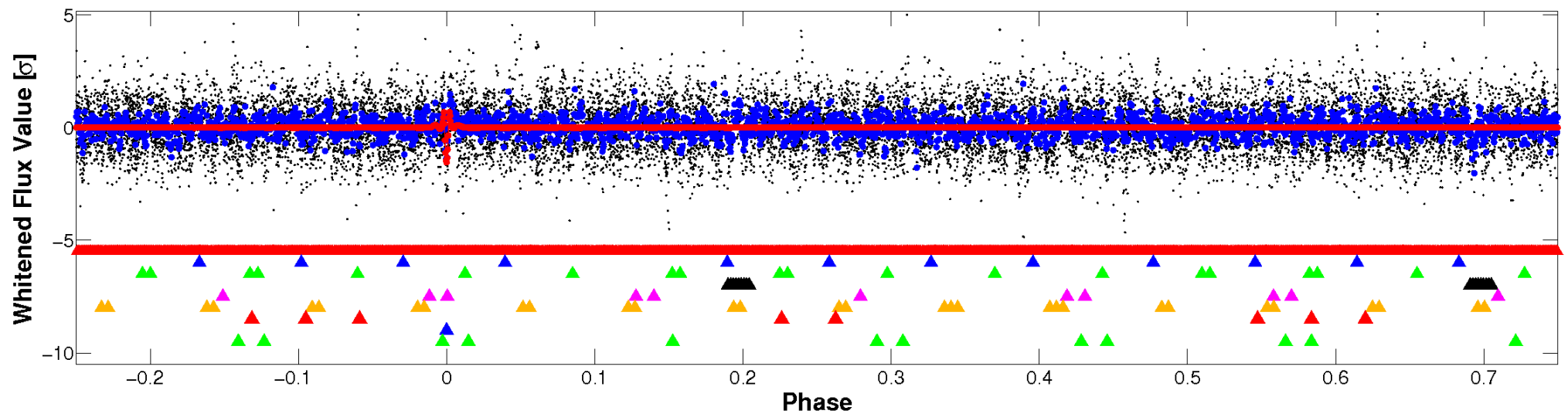


# Non-Whitened Vs. Whitened Light Curve

## Planet 8 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

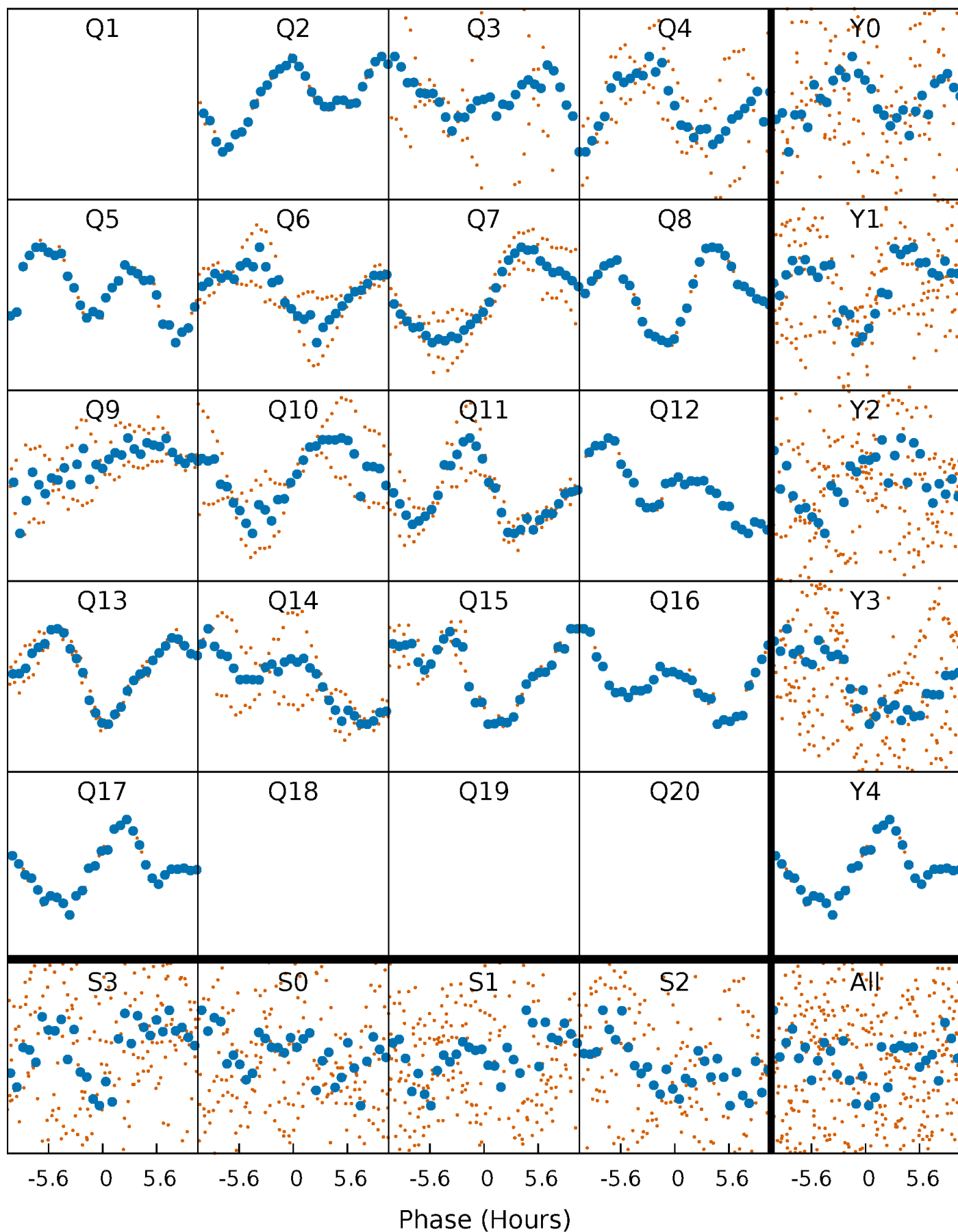


## Planet 8 : Phased Whitened Flux Time Series (Fit Epoch/Period)



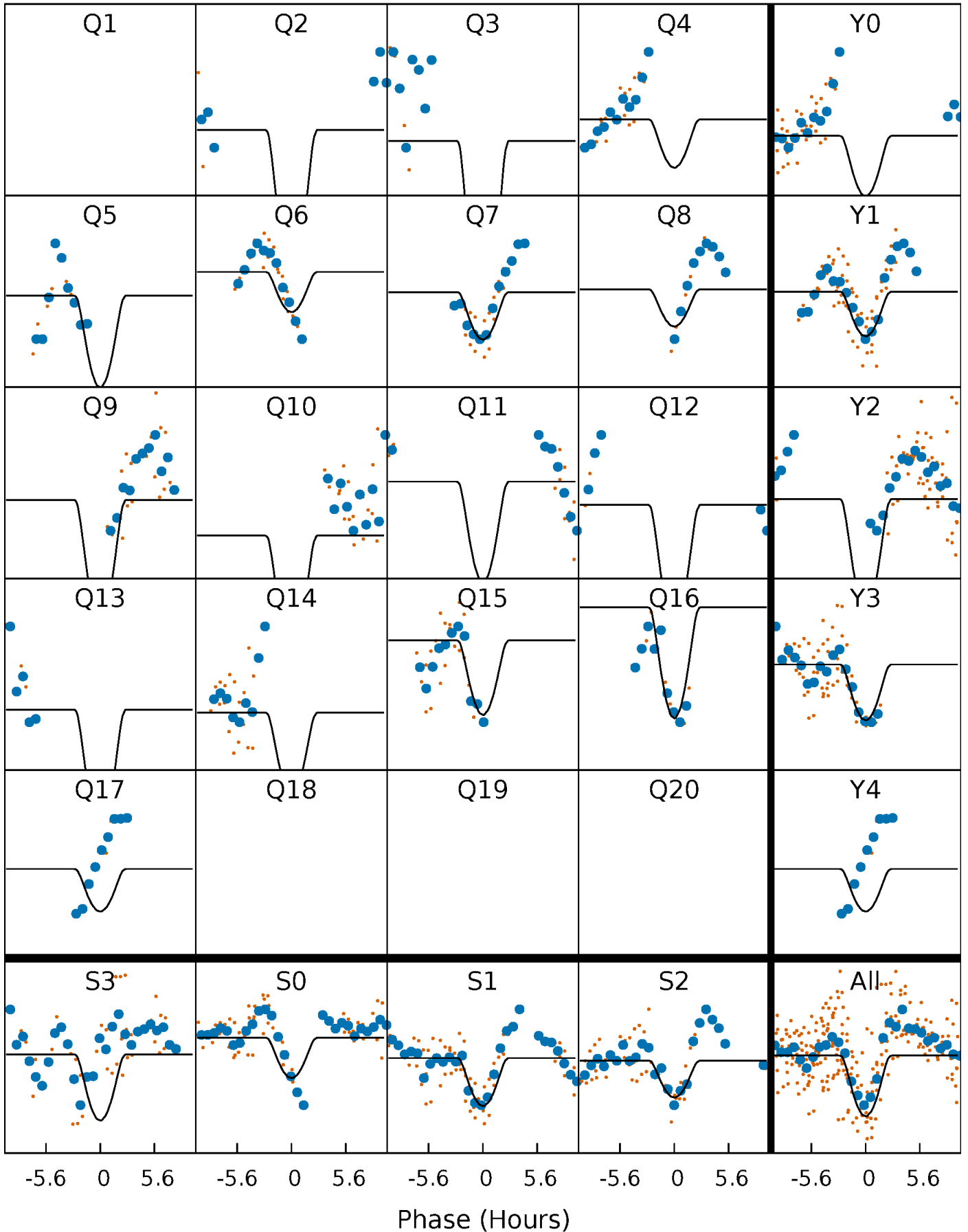
# PDC Quarter-Phased Transit Curves

TCE 006715331-08 P= 53.819547 Days  $T_0=166.532224$  (BKJD)



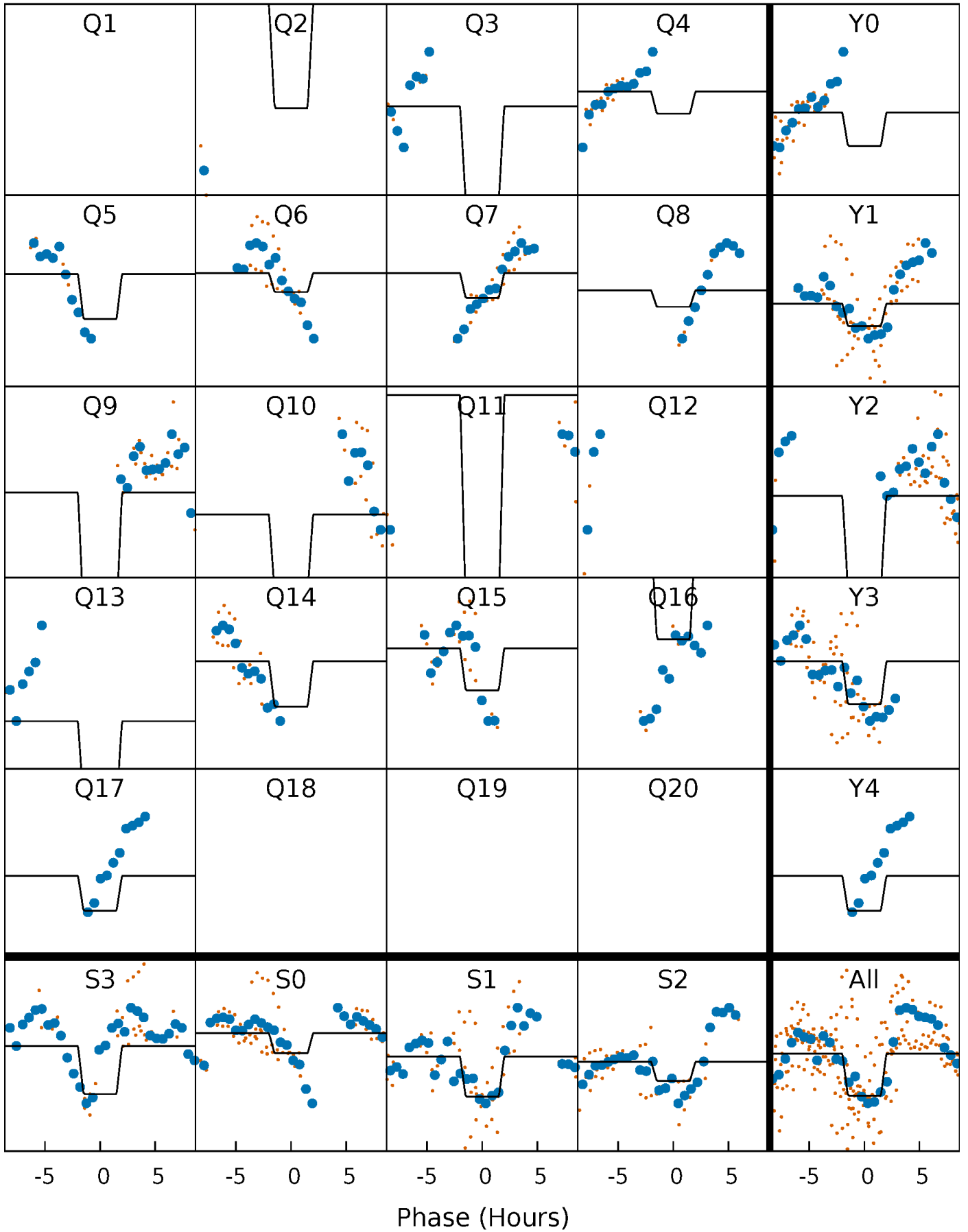
# DV Quarter-Phased Transit Curves

TCE 006715331-08 P= 53.819547 Days  $T_0=166.532224$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 006715331-08 P= 53.817909 Days  $T_0=166.515866$  (BKJD)

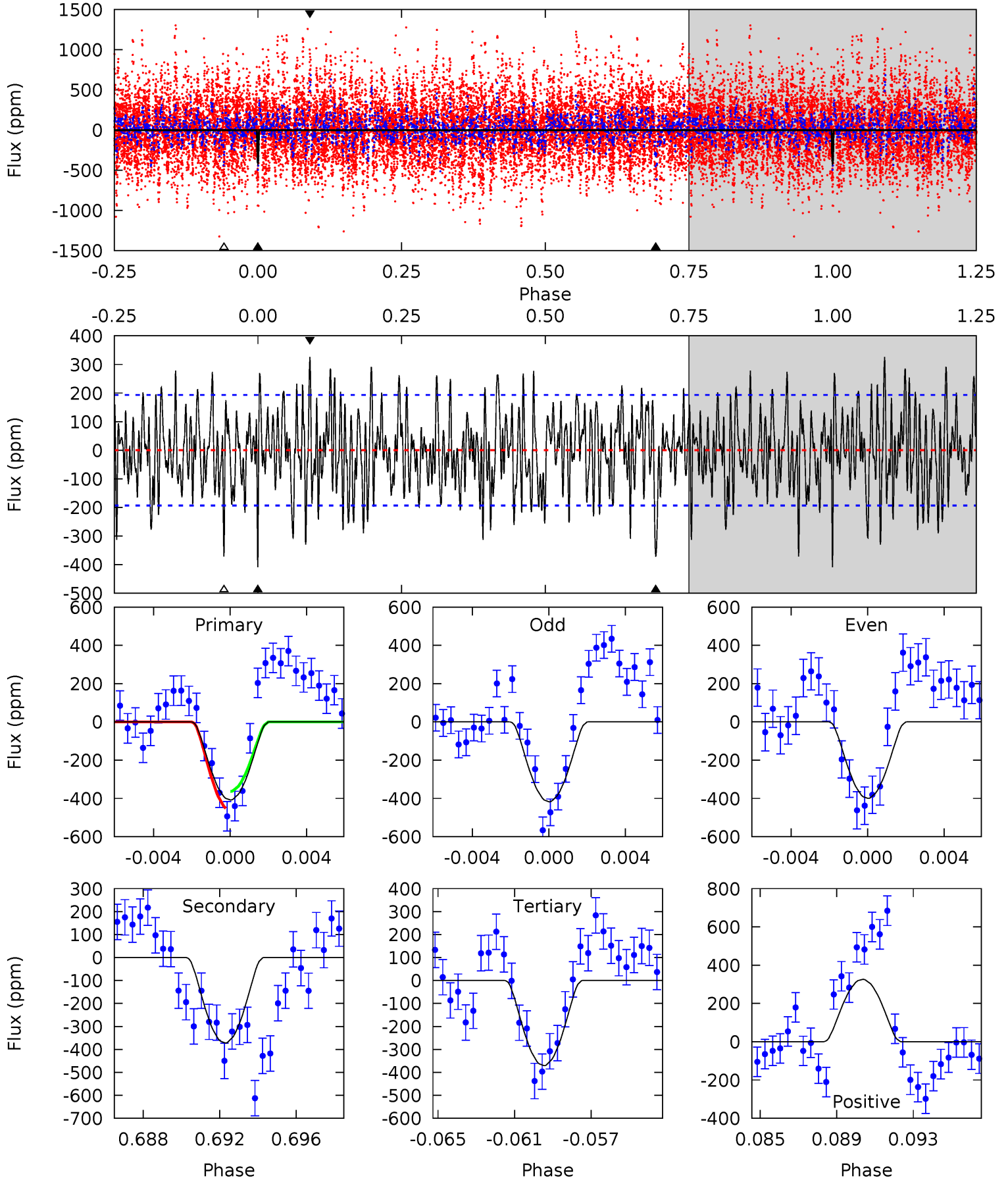




# DV Model-Shift Uniqueness Test

006715331-08, P = 53.819547 Days, E = 112.712677 Days

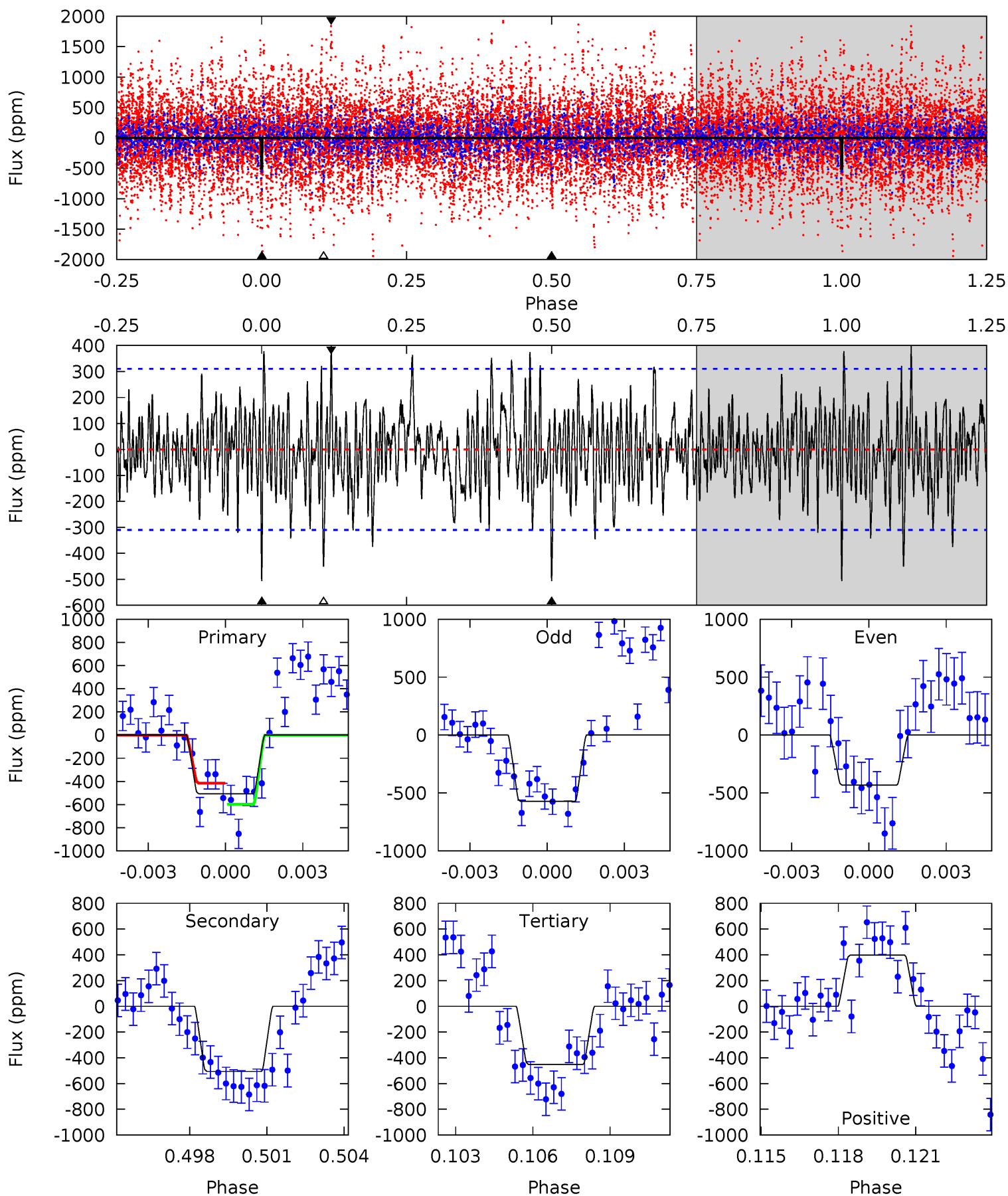
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
11.0	10.0	9.98	8.77	5.20	2.87	3.04	1.00	2.21	0.04	1.24	0.24	0.64	0.44	1.18



# Alt Model-Shift Uniqueness Test

006715331-08, P = 53.817909 Days, E = 112.697957 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
8.57	8.57	7.63	6.72	5.25	2.96	2.11	0.94	1.85	0.94	1.85	1.16	0.88	0.44	1.51



### Stellar Parameters For KIC 006715331

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$7053^{+170}_{-255}$	$3.000^{+0.595}_{-0.105}$	$-0.500^{+0.500}_{-0.250}$	$8.604^{+1.321}_{-4.954}$	$2.698^{+0.387}_{-0.903}$	$0.006^{+0.048}_{-0.002}$
	+2%/-4%	+20%/-3%	+100%/-50%	+15%/-58%	+14%/-33%	+808%/-31%
Source	PHO1	FLK73	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 006715331-08 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-372 \pm 37$	$56.55^{+60.21}_{-38.97}$	$1982^{+144}_{-304}$	$3995^{+2236}_{-819}$	$10^{+92}_{-8}$
Alt.	$-506 \pm 59$	$48.58^{+50.61}_{-33.89}$	$1977^{+154}_{-288}$	$4457^{+3238}_{-919}$	$18^{+177}_{-14}$

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

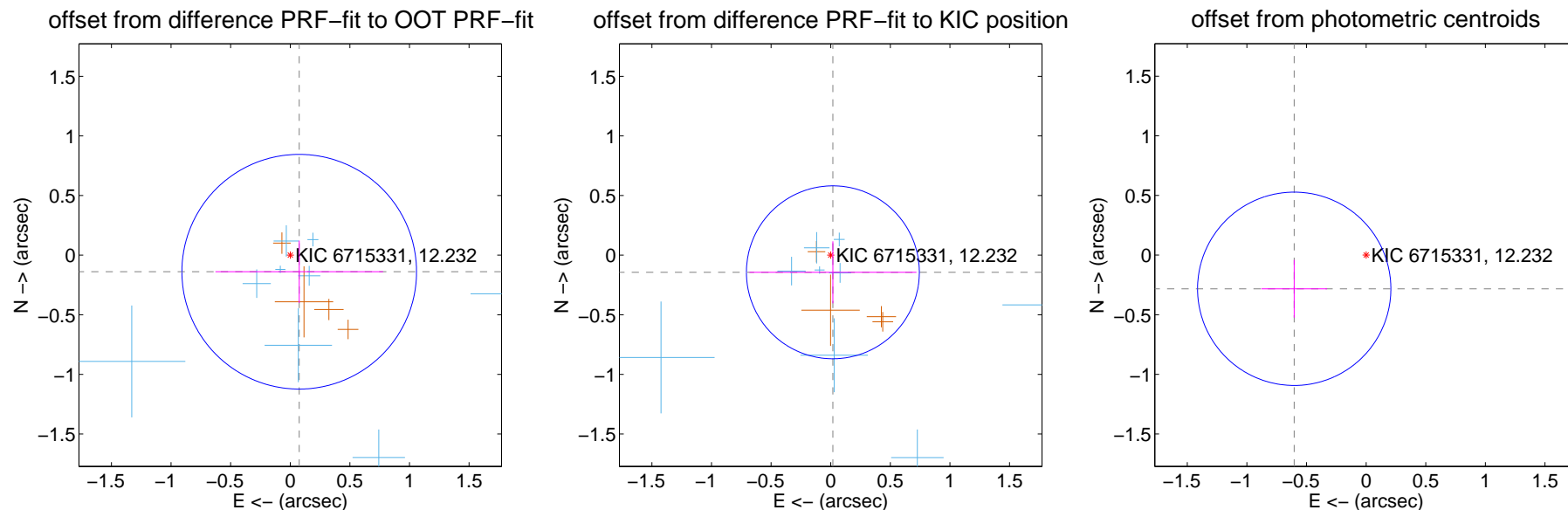
## DV Centroid Data

Supplemental centroid analysis for 006715331-08. Kepler magnitude: 12.23. Transit SNR 8.72

There are 9 quarters with good PRF difference image offsets

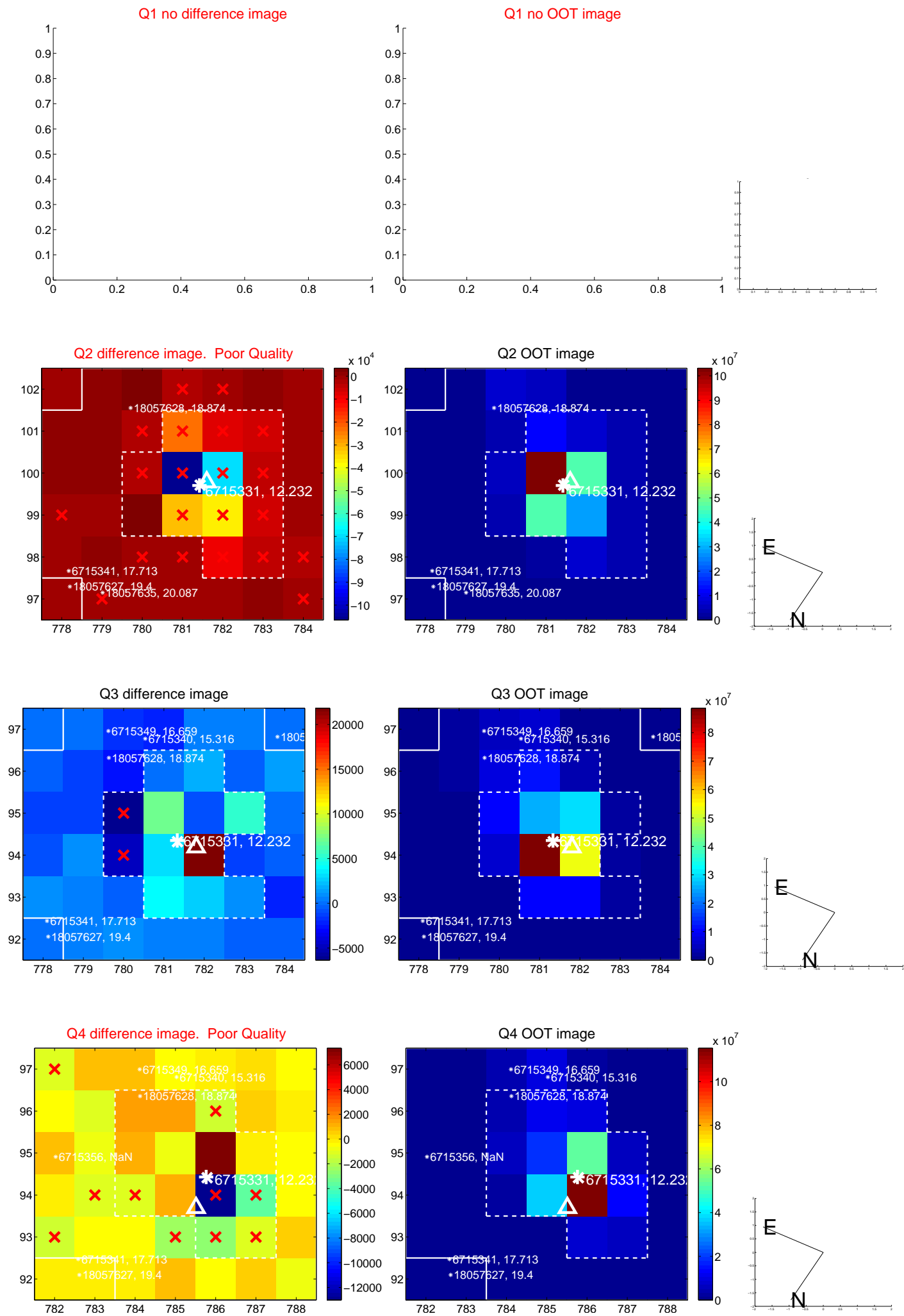
The direct PRF centroid is offset from the target star catalog position by about 0.12 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.158 \pm 0.328$	0.48	$-0.075 \pm 0.703$	$-0.139 \pm 0.261$
PRF-fit source offset from KIC position	$0.145 \pm 0.242$	0.60	$-0.018 \pm 0.701$	$-0.144 \pm 0.260$
photometric centroid source offset	$0.67 \pm 0.27$	2.47	$0.60 \pm 0.28$	$-0.28 \pm 0.24$

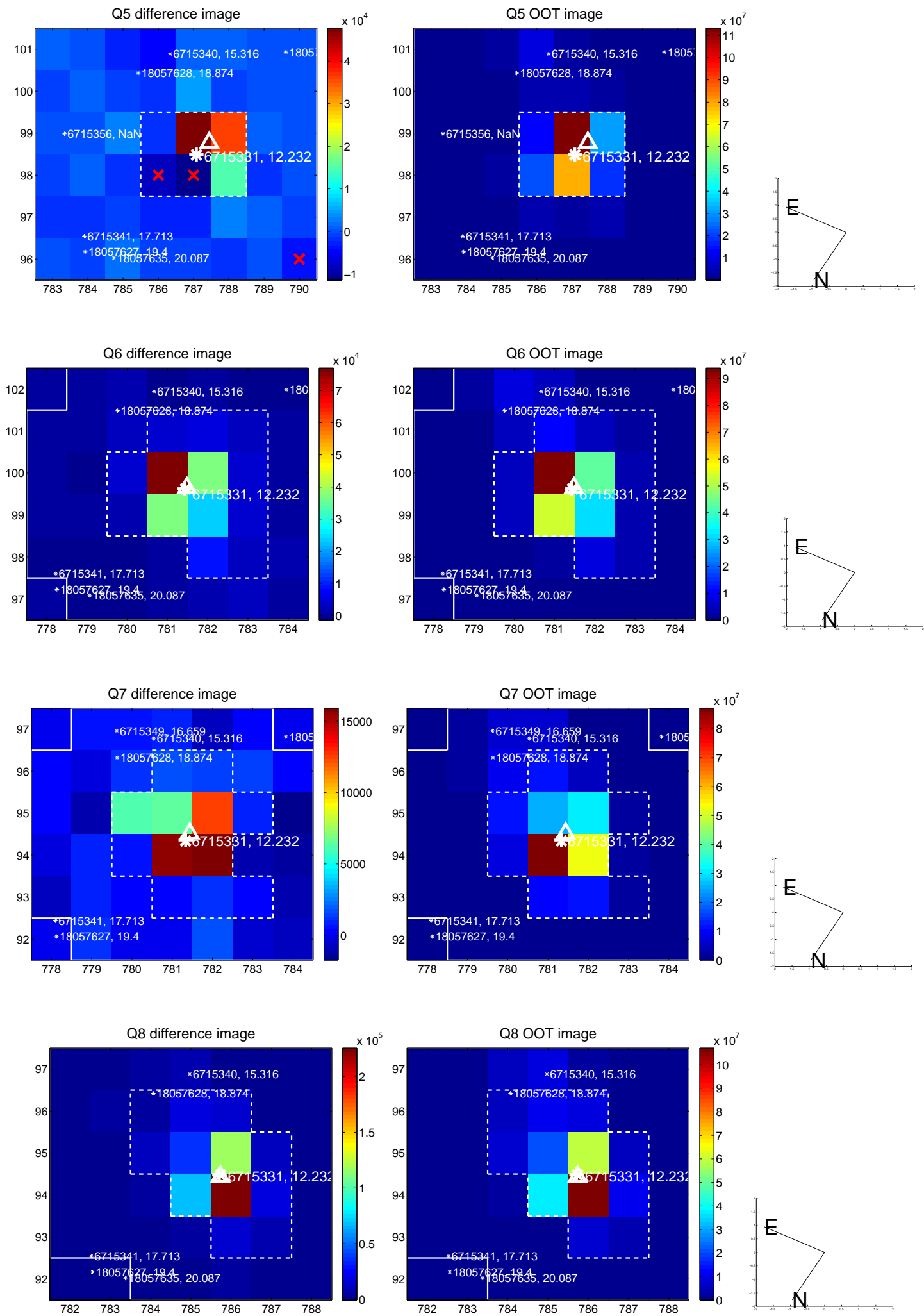


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets**; **Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

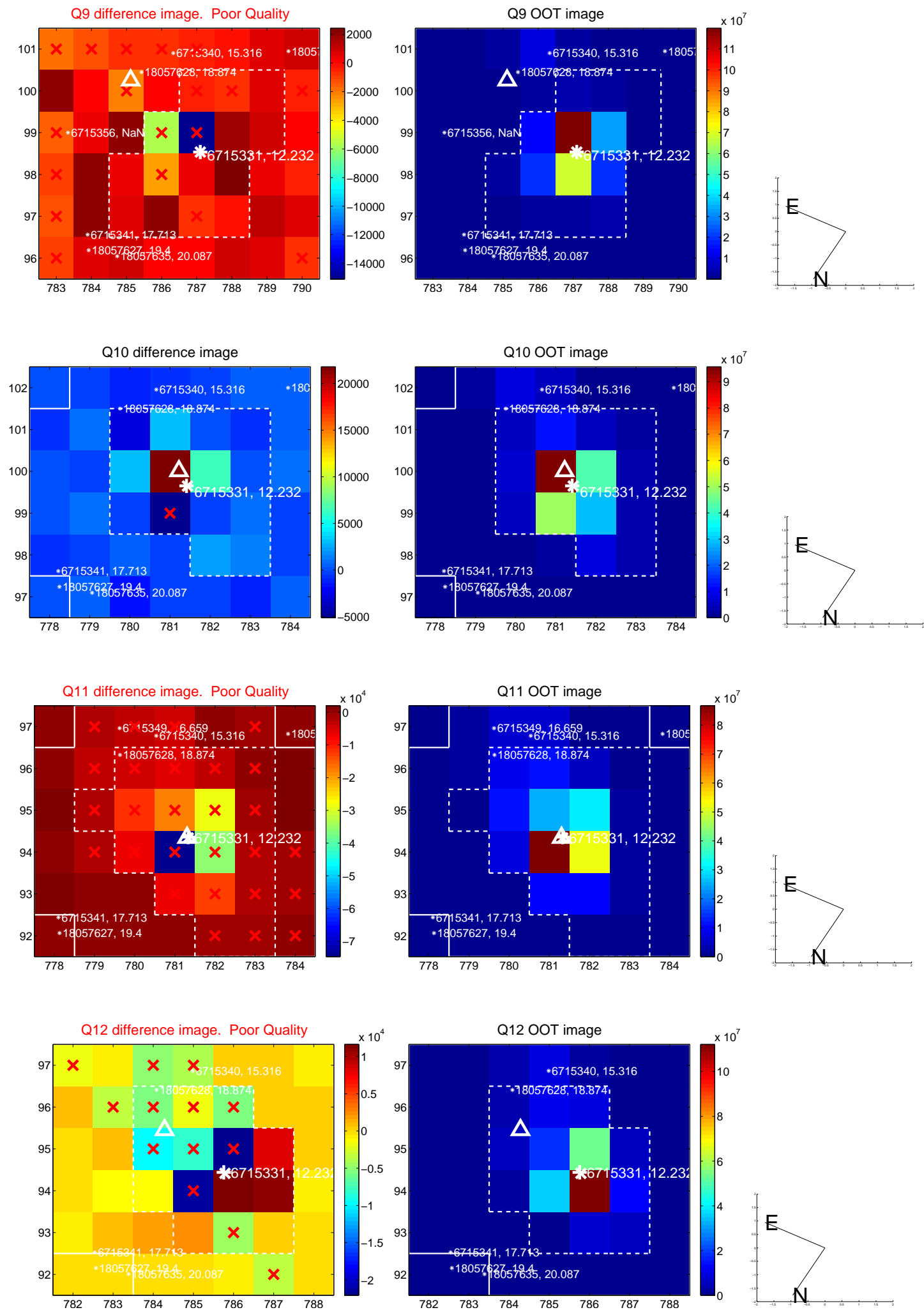
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

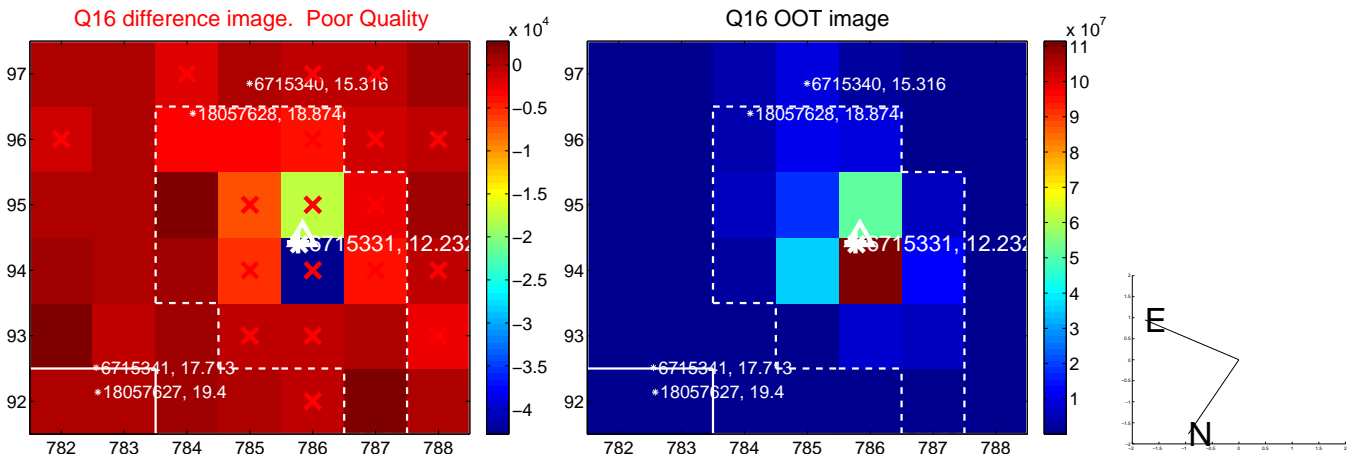
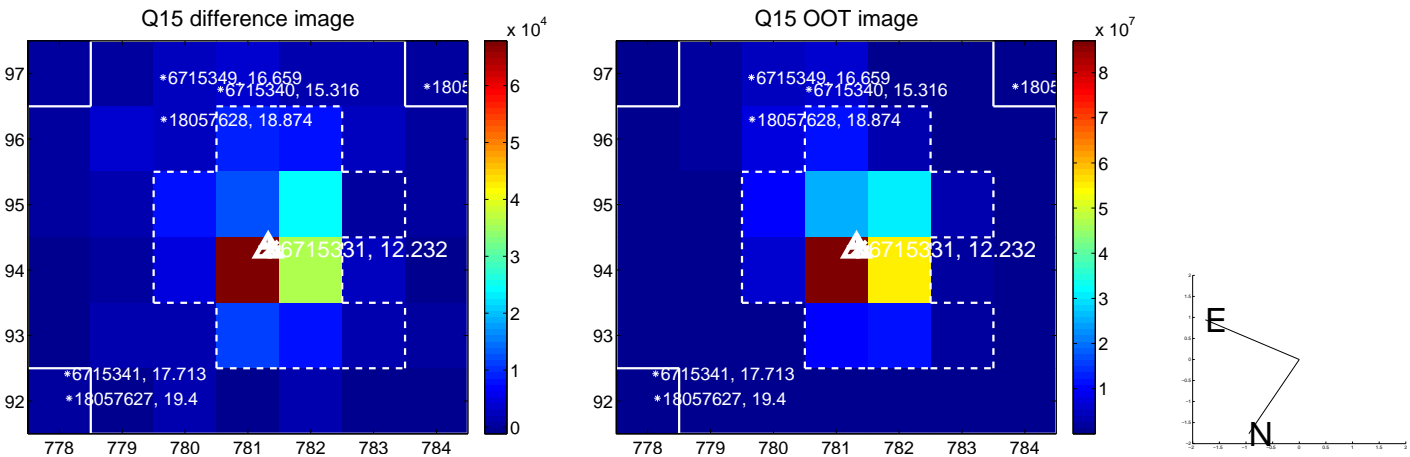
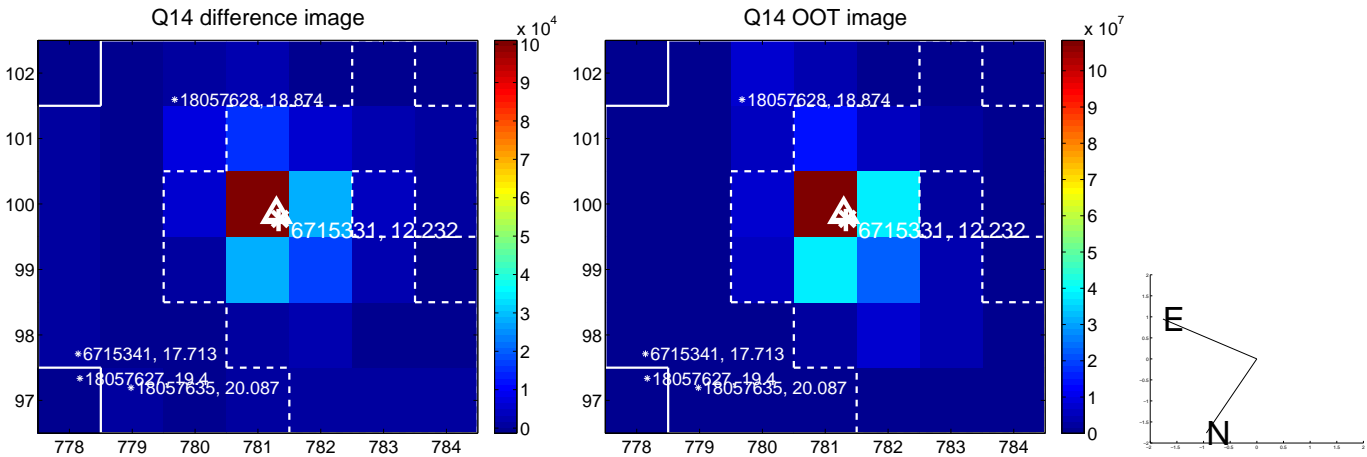
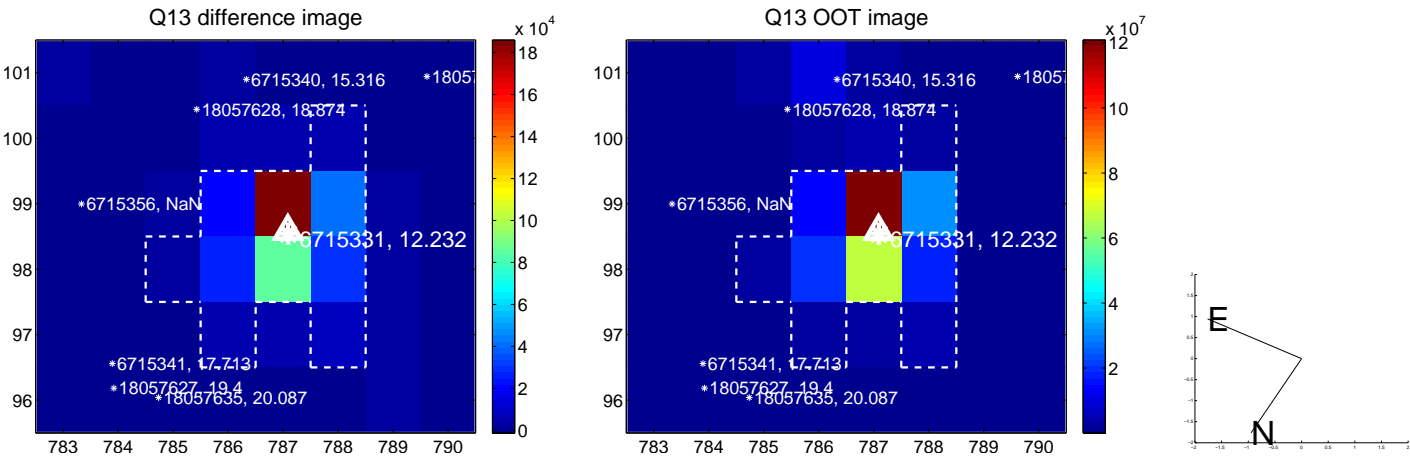


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

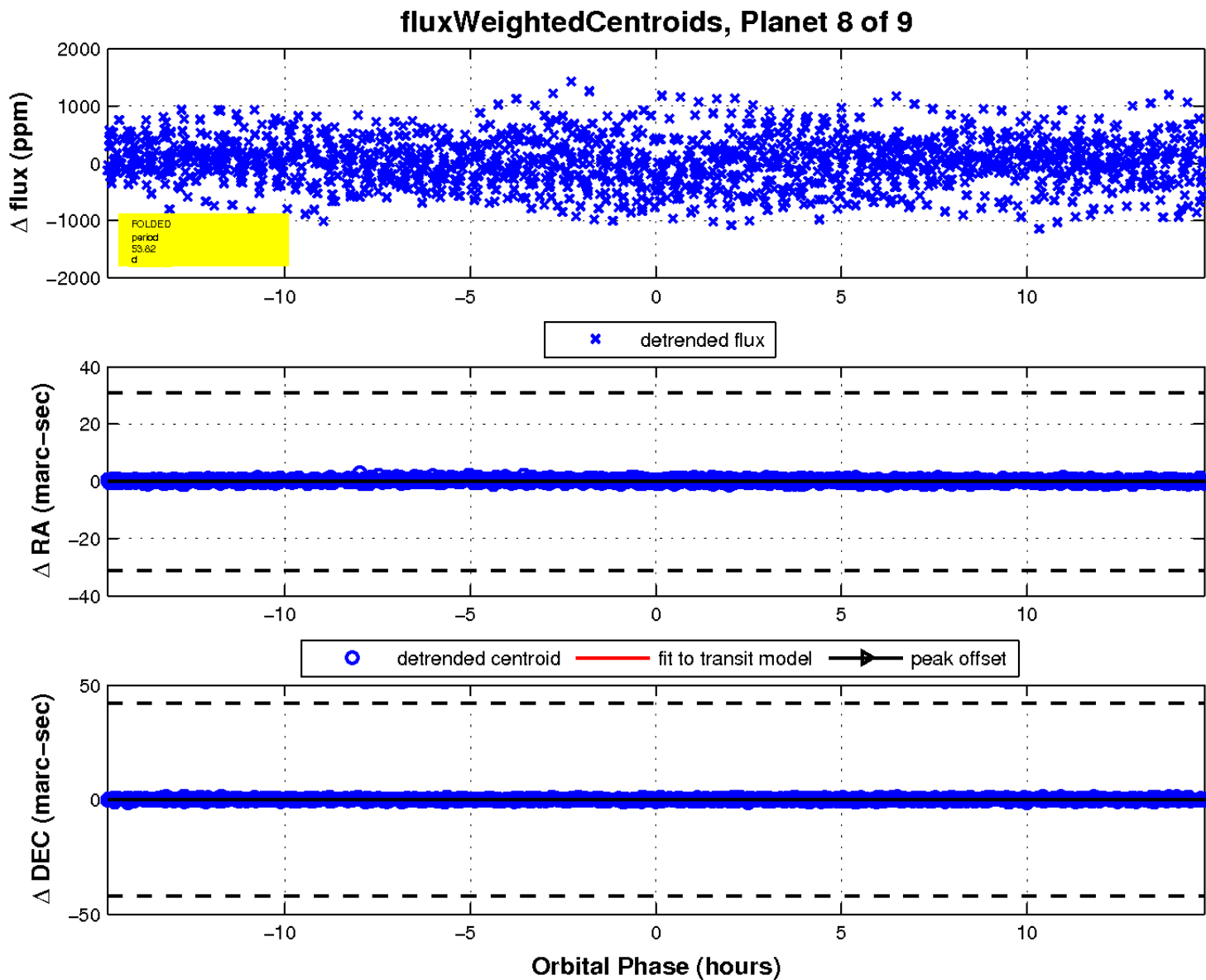
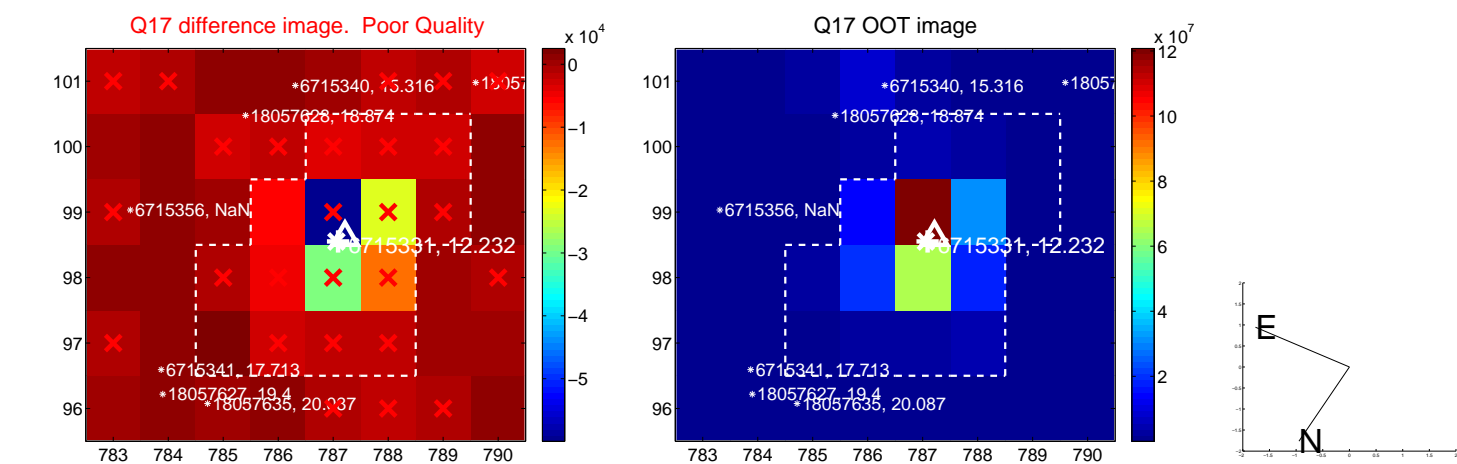




white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

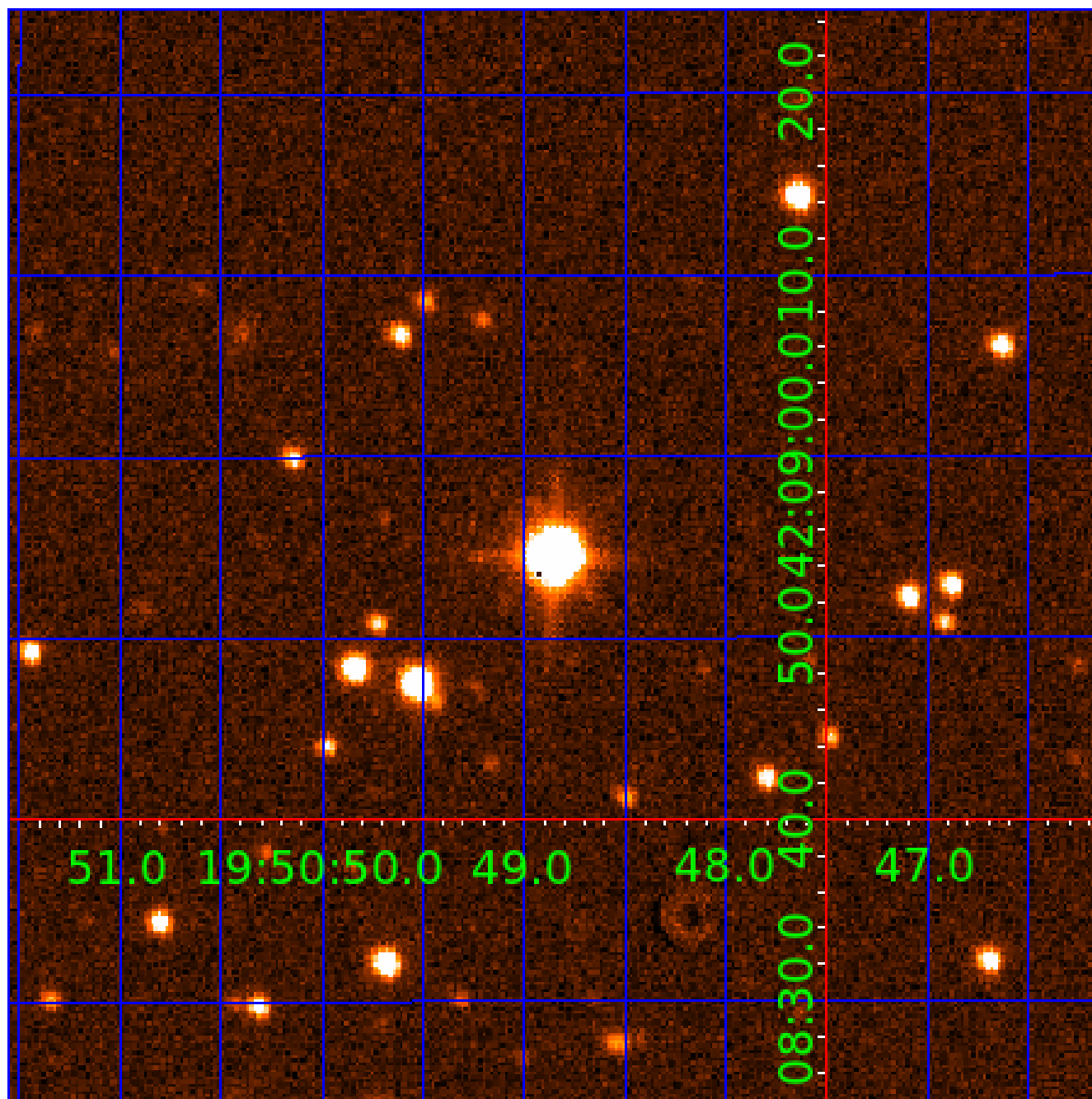


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 006715331

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
006715331-01	OBS	No	0.928873	132.119851	21.8	5.212	7.9	5.3	8.60	7053	4.30	0.00
006715331-02	OBS	No	126.812494	138.381125	426.5	13.300	9.9	5.5	8.60	7053	20.88	346.72
006715331-03	OBS	No	73.061339	155.485784	600.8	5.597	9.3	8.0	8.60	7053	39.84	723.23
006715331-04	OBS	No	80.681374	150.660758	762.9	11.330	9.6	10.1	8.60	7053	28.37	633.62
006715331-06	OBS	No	49.992478	134.622321	526.8	5.276	8.2	9.0	8.60	7053	37.45	1199.45
006715331-07	OBS	No	197.990545	159.459832	701.4	3.518	8.5	9.1	8.60	7053	27.73	191.43
006715331-08	OBS	No	53.819547	166.532224	564.8	4.939	8.0	8.7	8.60	7053	38.71	1087.10
006715331-09	OBS	No	130.838966	143.185368	112.8	4.500	7.9	-1.0	8.60	7053	9.22	332.56

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
006715331-01	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
006715331-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS
006715331-03	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—HALO_GHOST
006715331-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
006715331-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
006715331-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS
006715331-08	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
006715331-09	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—CENT_NOFITS

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

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

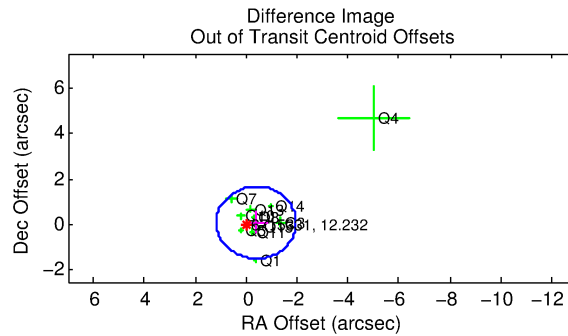
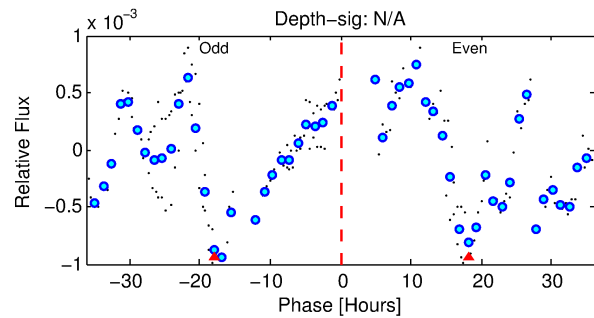
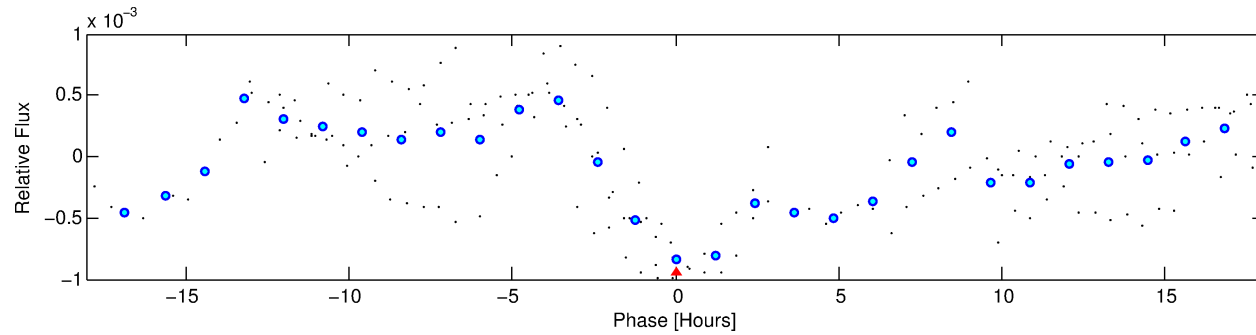
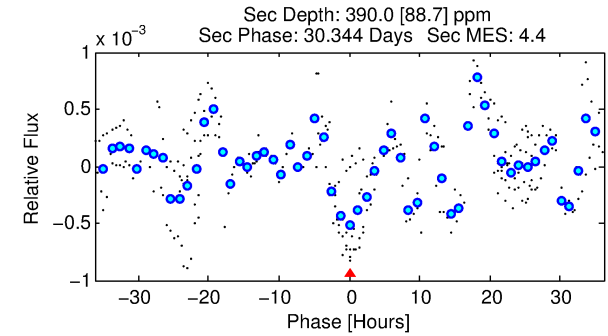
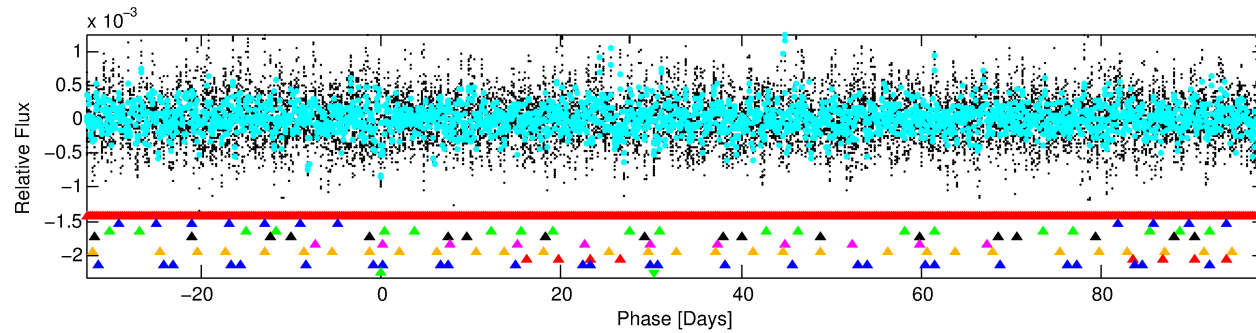
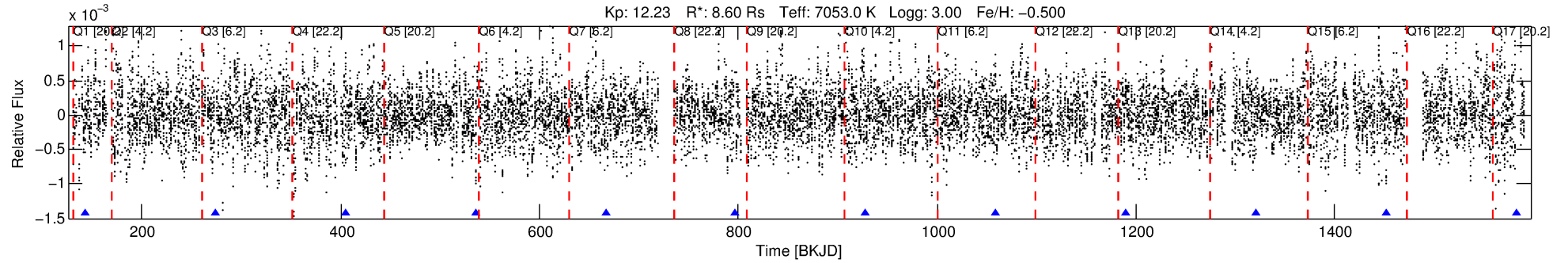
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 006715331-09

No Significant Match Found

# DV One-Page Summary

KIC: 6715331 Candidate: 9 of 9 Period: 130.839 d



## TPS TCE Results:

Period = 130.83897 d  
Epoch = 143.1854 BKJD

DV fit results are unavailable

## DV Diagnostic Results:

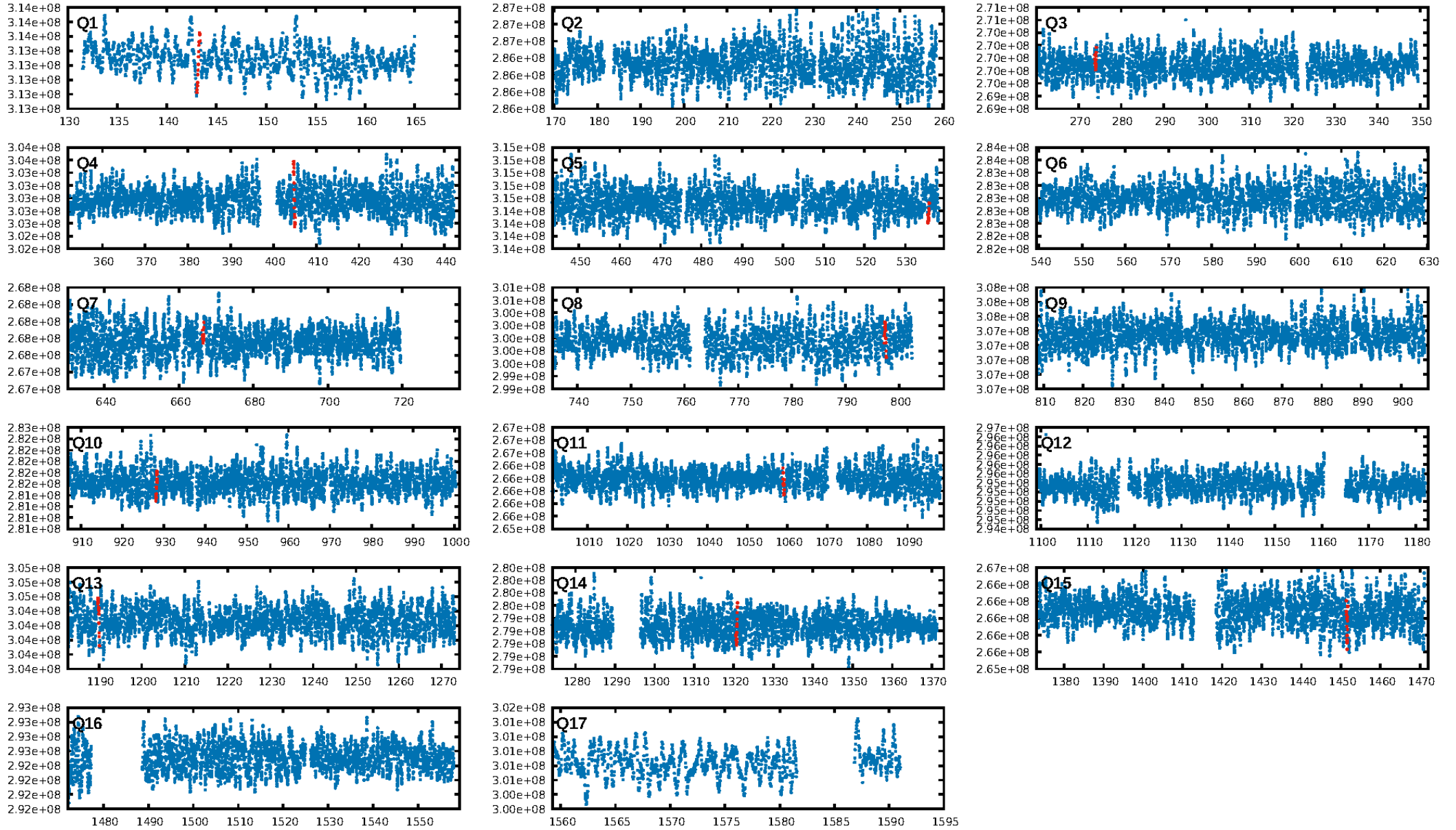
ShortPeriod-sig: 100.0% [6.88 $\sigma$ ]  
LongPeriod-sig: 100.0% [14.36 $\sigma$ ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [4/4]  
GhostDiagnostic-chr: 1.757

Centroid-sig: 1.8%  
Centroid-so: 0.492 arcsec [2.50 $\sigma$ ]  
OotOffset-rm: 0.404 arcsec [0.77 $\sigma$ ]  
KicOffset-rm: 0.361 arcsec [0.62 $\sigma$ ]  
OotOffset-st: 2/4/2/3 [11]  
KicOffset-st: 2/4/2/3 [11]  
DiffImageQuality-fgm: 0.55 [6/11]  
DiffImageOverlap-fno: 0.00 [0/11]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 05:55:20 Z

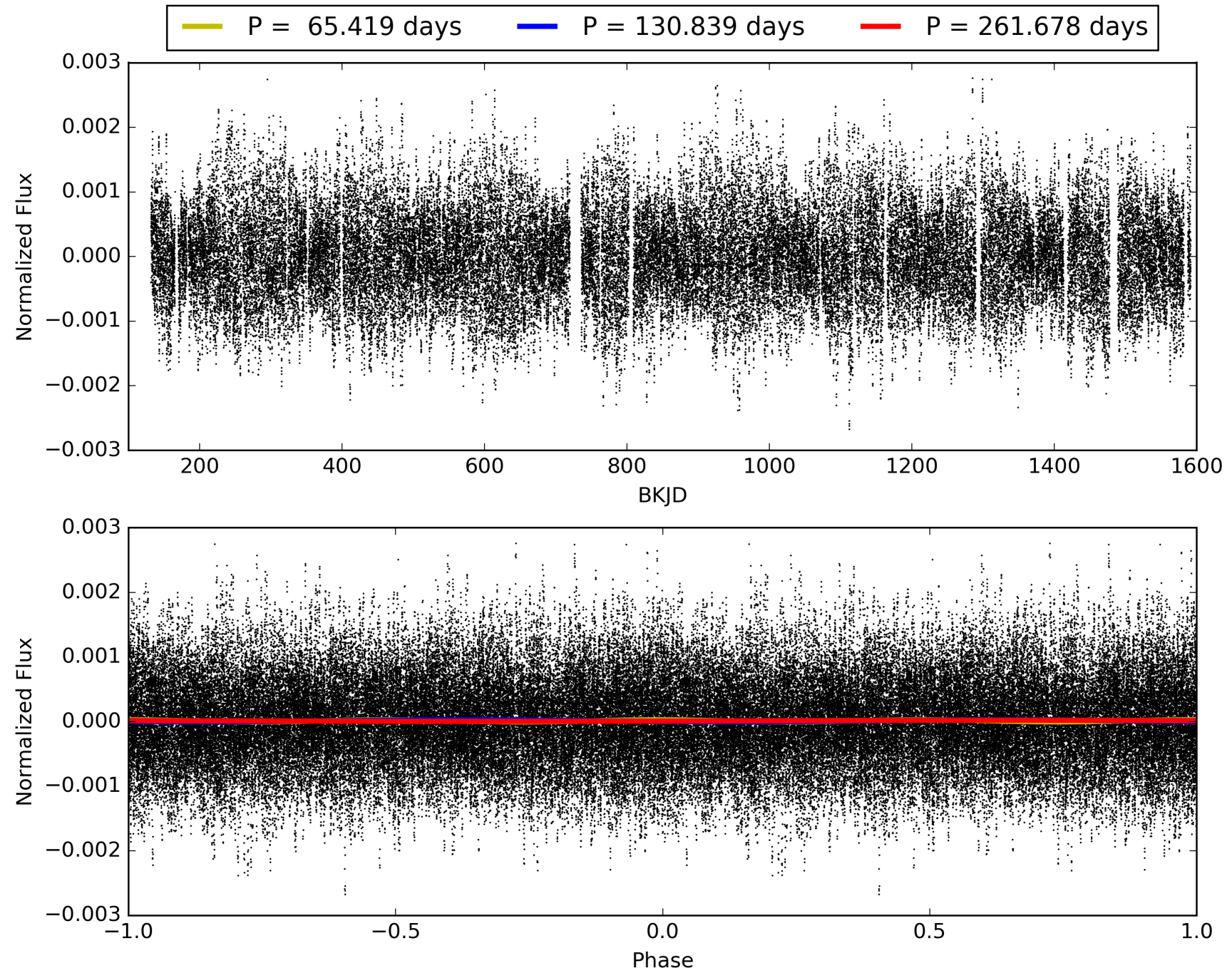
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 006715331-09, PDC Light Curves





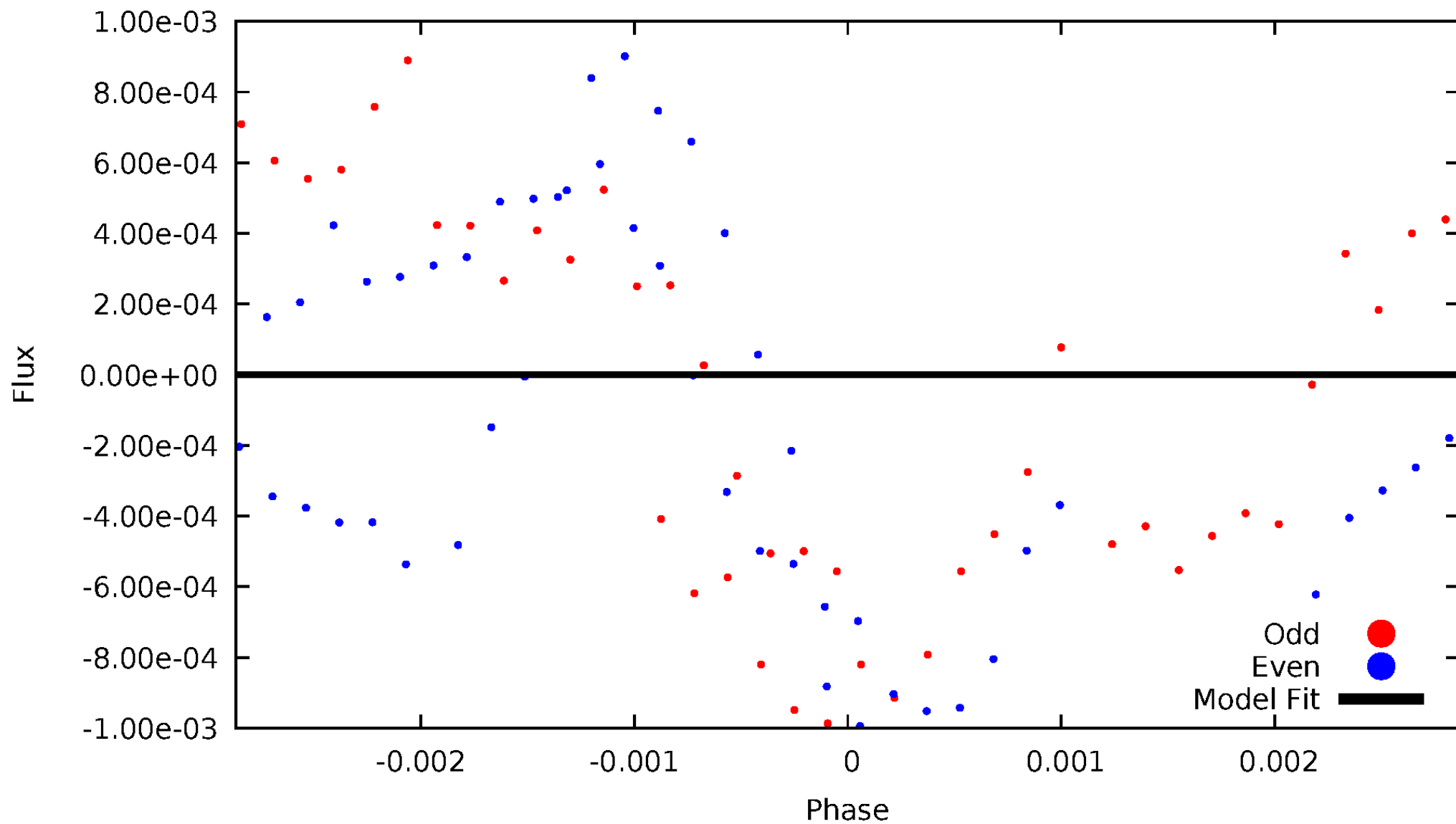
TCE 006715331-09





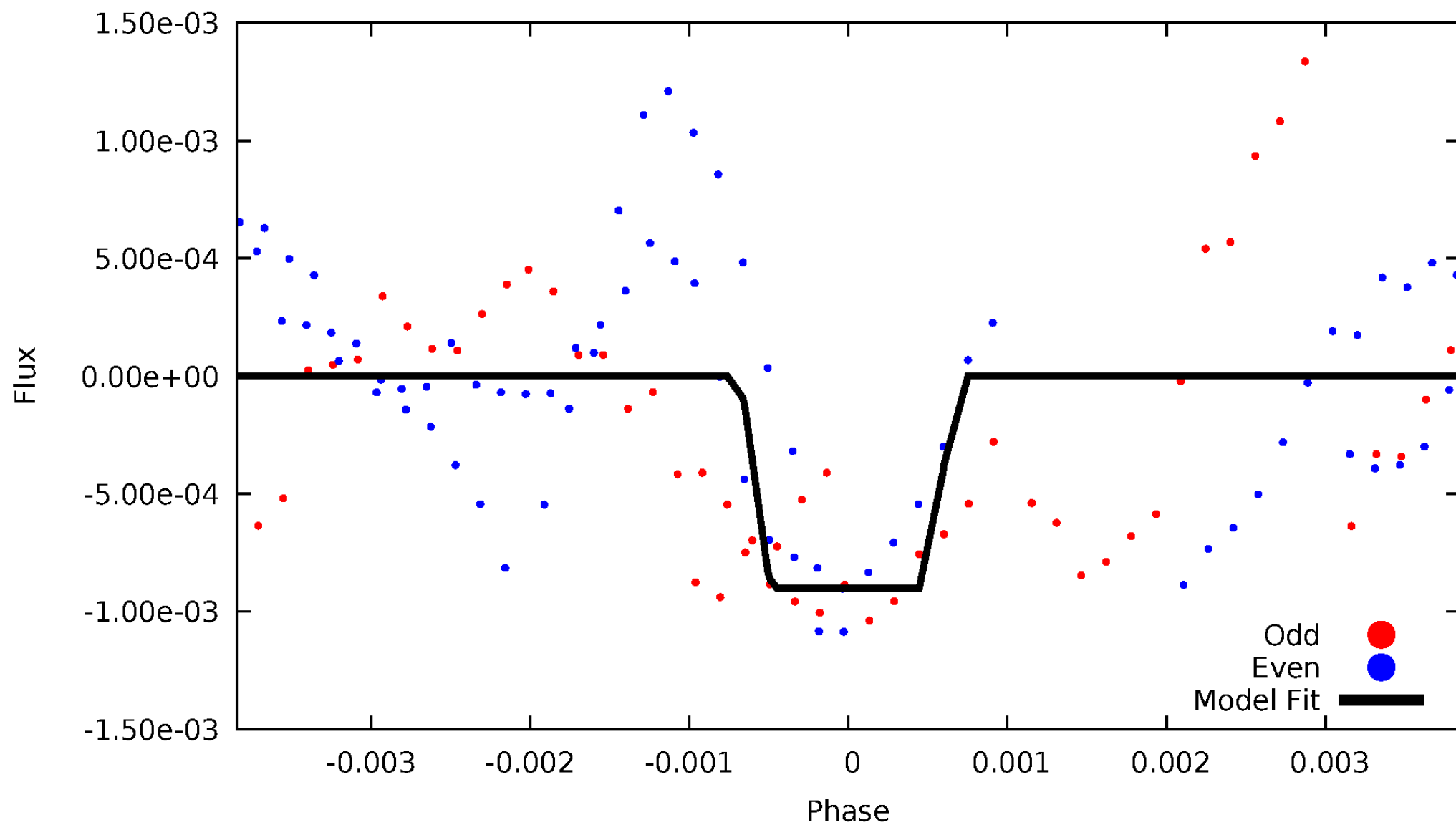
# DV Odd/Even

TCE 006715331-09



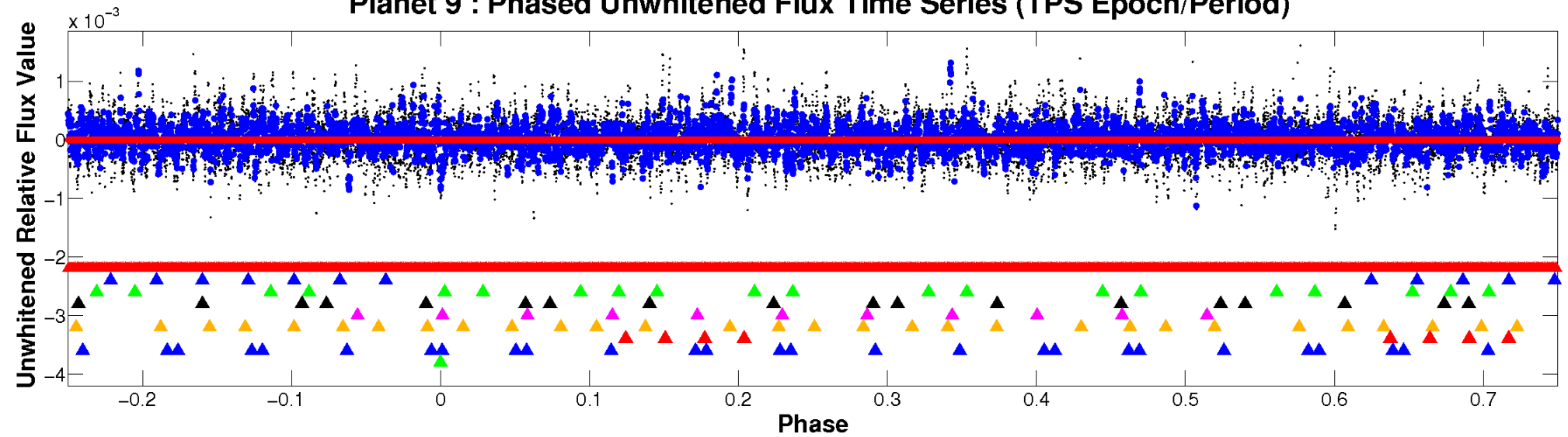
# ALT Odd/Even

TCE 006715331-09



# Non-Whitened Vs. Whitened Light Curve

Planet 9 : Phased Unwhitened Flux Time Series (TPS Epoch/Period)

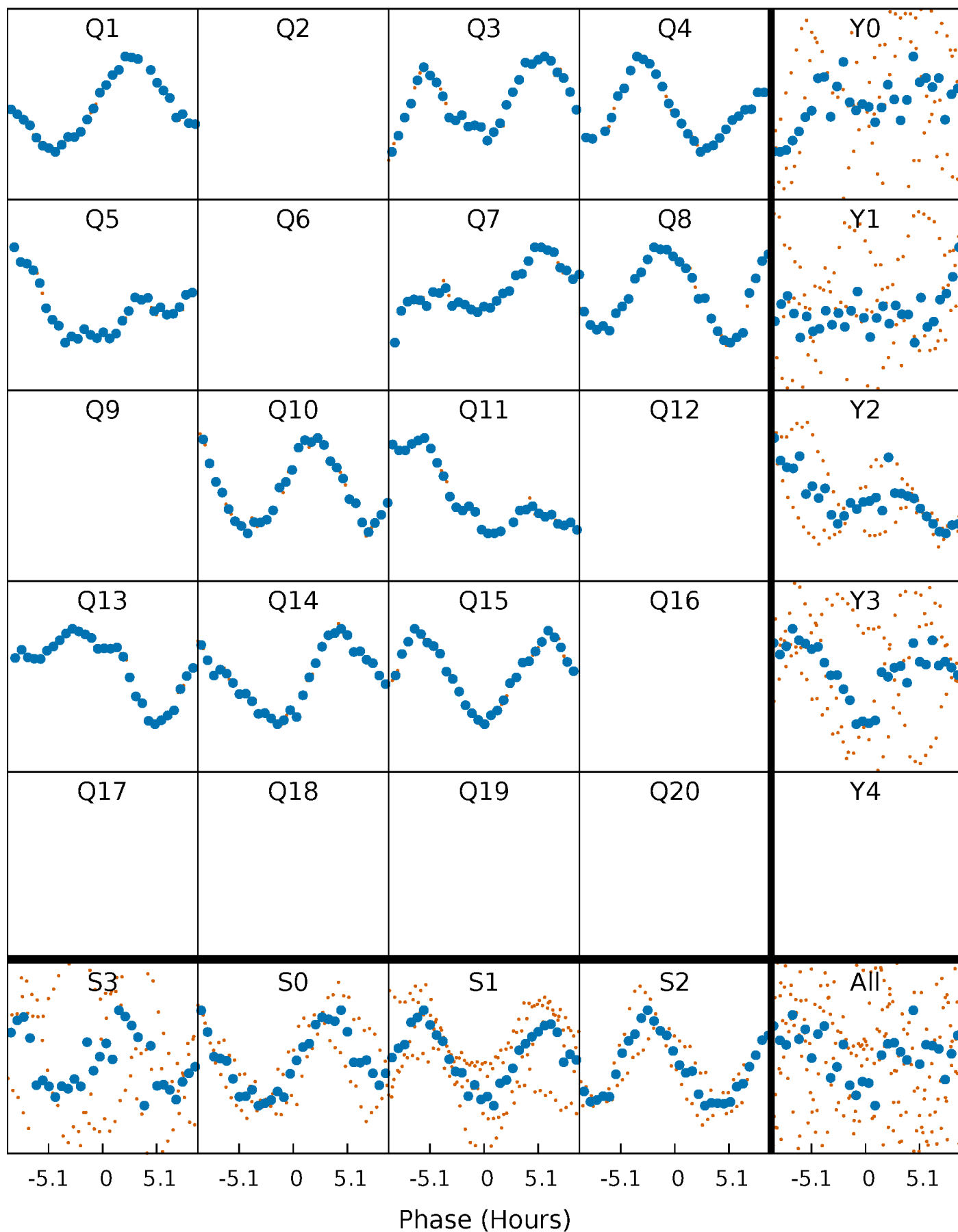


Planet 9 : Phased Whitened Flux Time Series (TPS Epoch/Period)



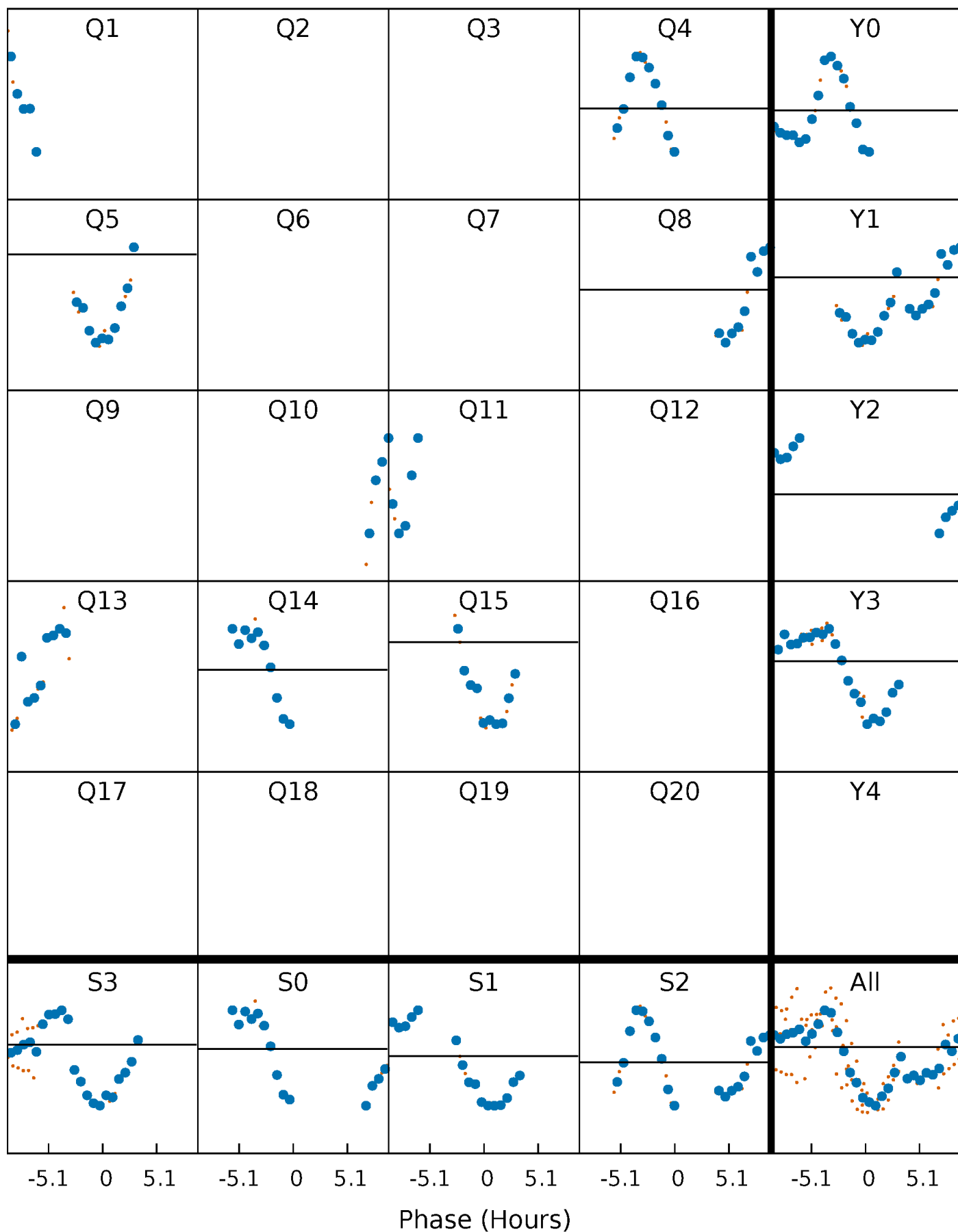
# PDC Quarter-Phased Transit Curves

TCE 006715331-09     $P=130.838966$  Days     $T_0=143.185368$  (BKJD)



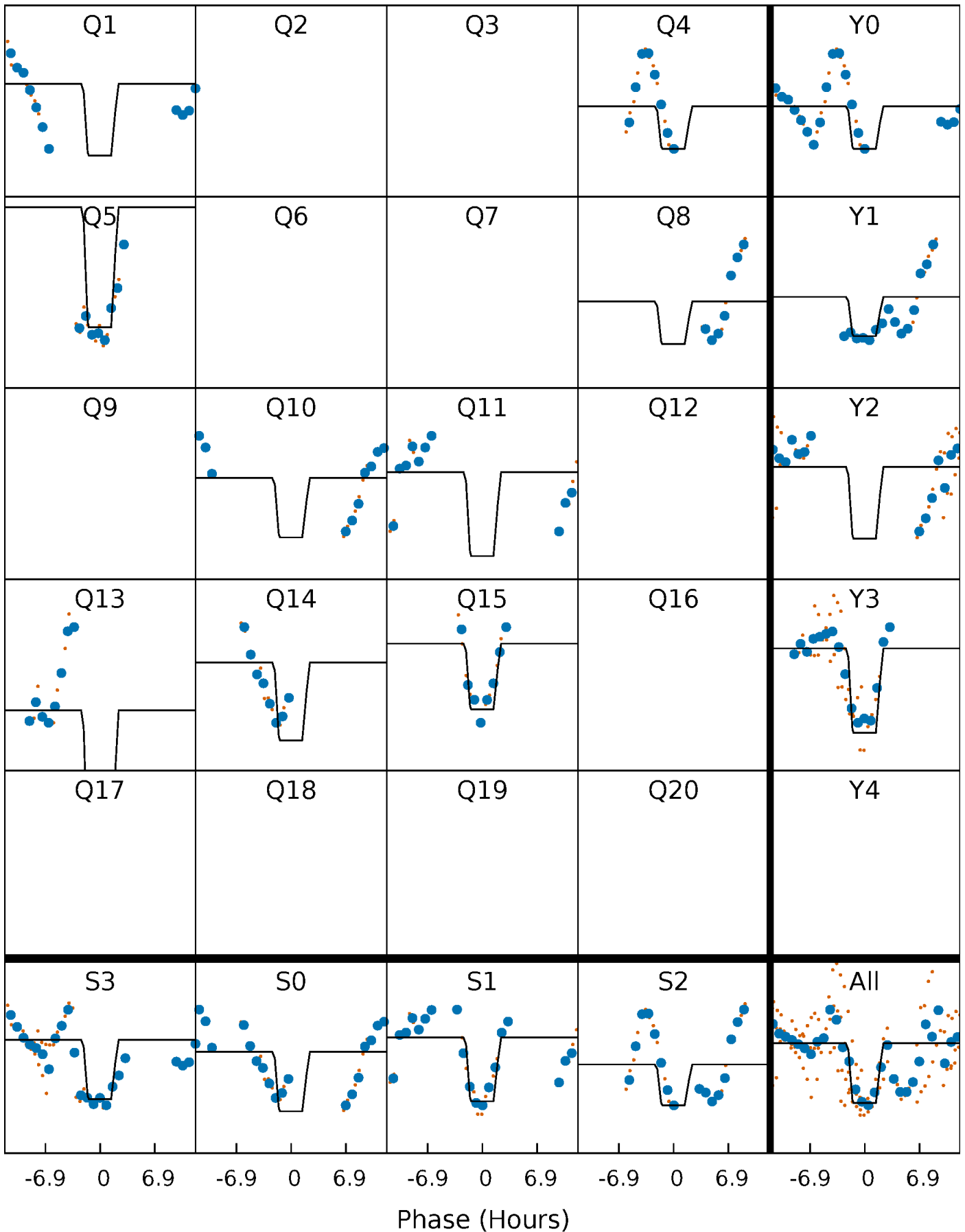
# DV Quarter-Phased Transit Curves

TCE 006715331-09     $P=130.838966$  Days     $T_0=143.185368$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

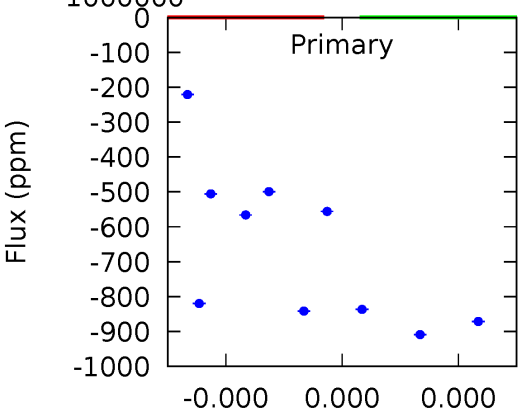
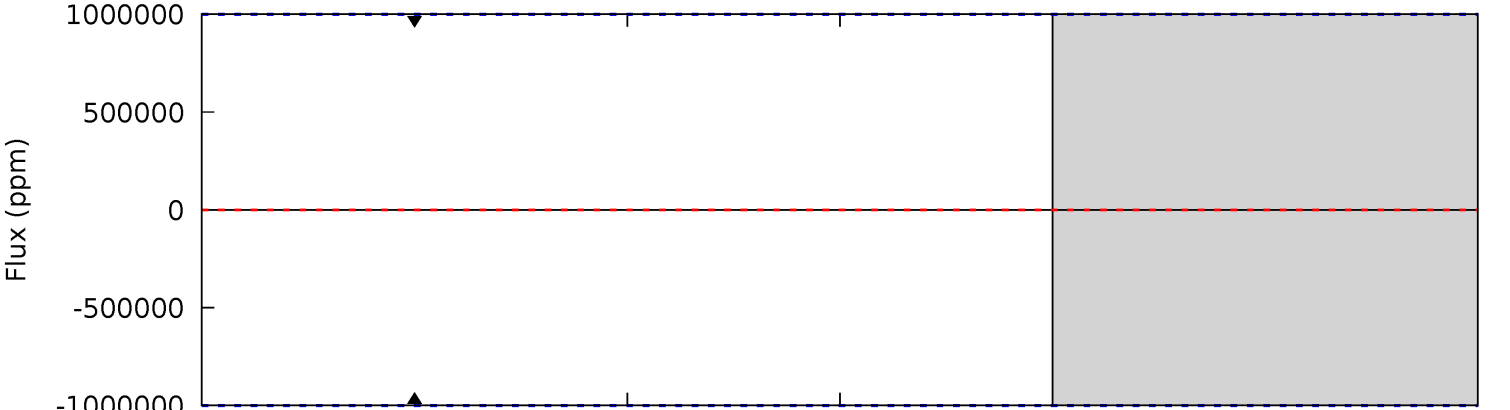
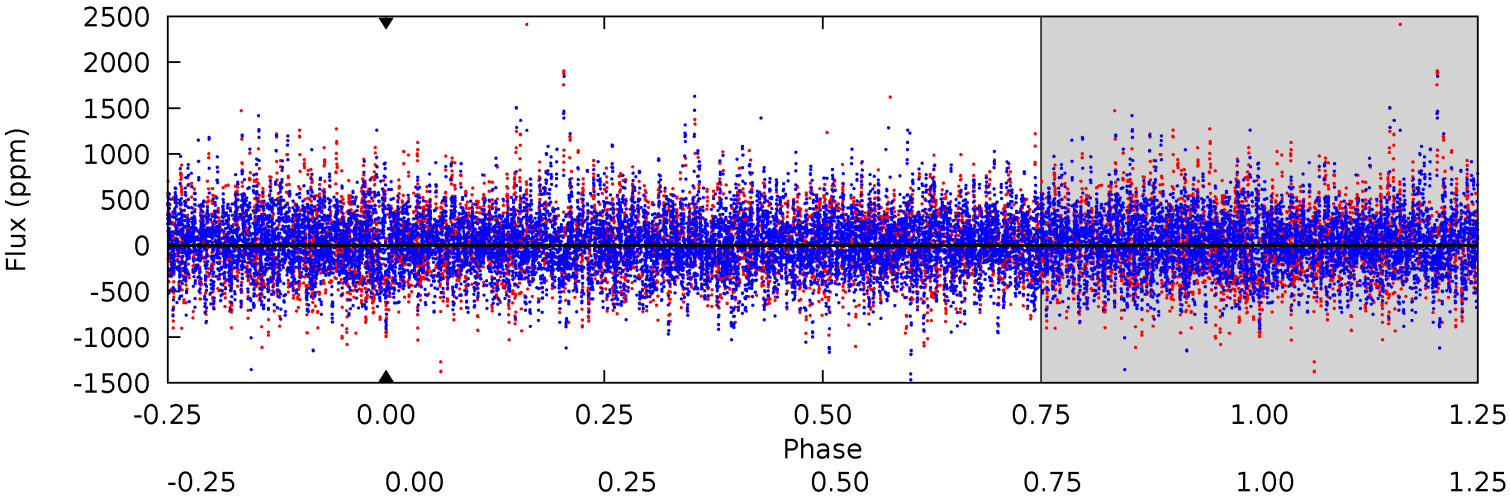
TCE 006715331-09 P=130.838966 Days  $T_0=143.196641$  (BKJD)



# DV Model-Shift Uniqueness Test

006715331-09, P = 130.838966 Days, E = 12.346402 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

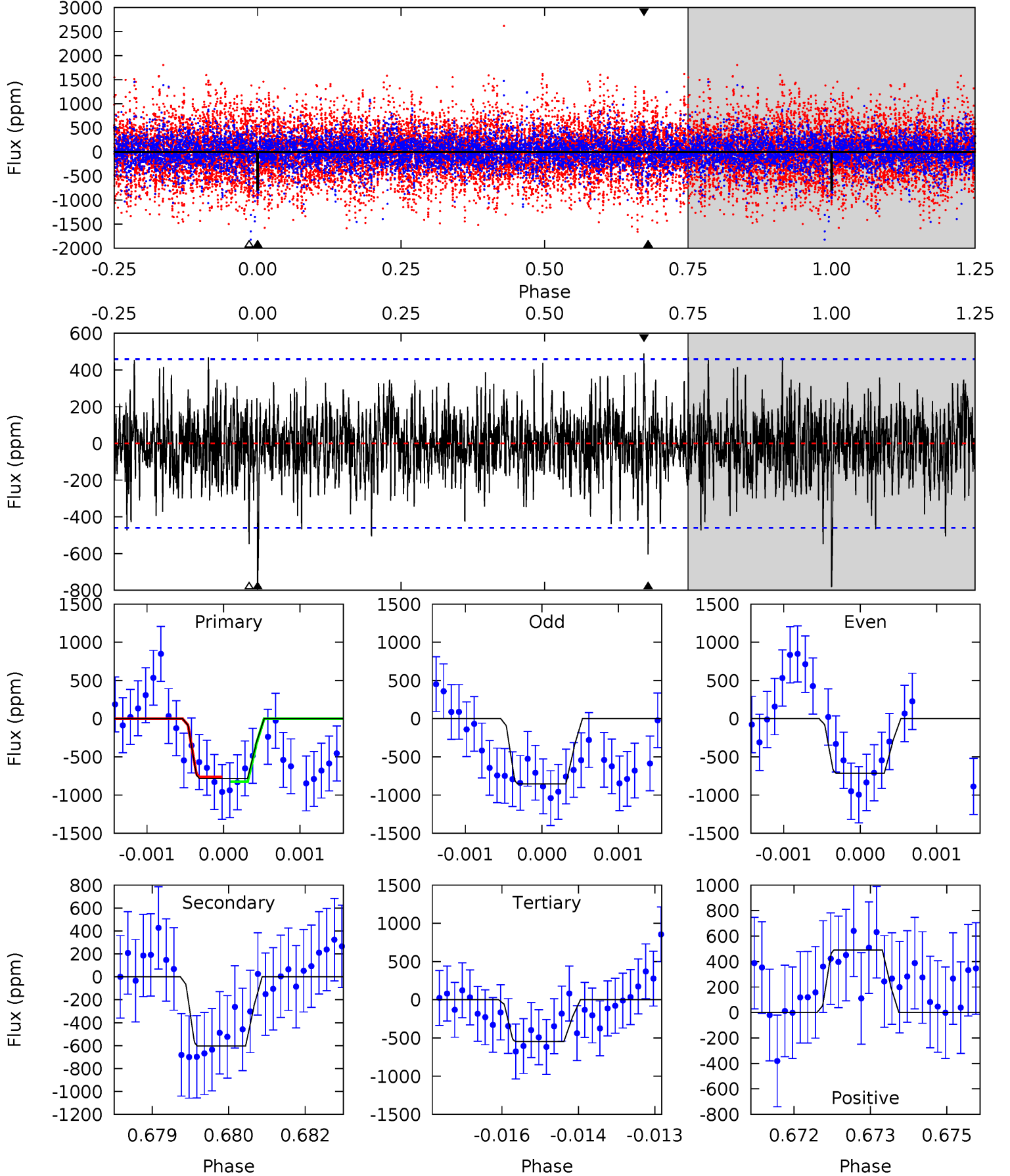




# Alt Model-Shift Uniqueness Test

006715331-09, P = 130.838966 Days, E = 12.357675 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
9.18	7.09	6.43	5.75	5.39	3.19	1.64	2.75	3.43	0.66	1.33	0.81	1.01	0.39	0.33



### Stellar Parameters For KIC 006715331

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$7053^{+170}_{-255}$	$3.000^{+0.595}_{-0.105}$	$-0.500^{+0.500}_{-0.250}$	$8.604^{+1.321}_{-4.954}$	$2.698^{+0.387}_{-0.903}$	$0.006^{+0.048}_{-0.002}$
	+2%/-4%	+20%/-3%	+100%/-50%	+15%/-58%	+14%/-33%	+808%/-31%
Source	PHO1	FLK73	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 006715331-09 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$0 \pm 1000000$	$56.22^{+69.74}_{-38.62}$	$1471^{+111}_{-209}$	$5191^{+34386}_{-42026}$	$106^{+16320}_{-14761}$
Alt.	$-604 \pm 85$	$66.73^{+75.20}_{-46.59}$	$1467^{+113}_{-229}$	$4052^{+2555}_{-819}$	$36^{+333}_{-28}$

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

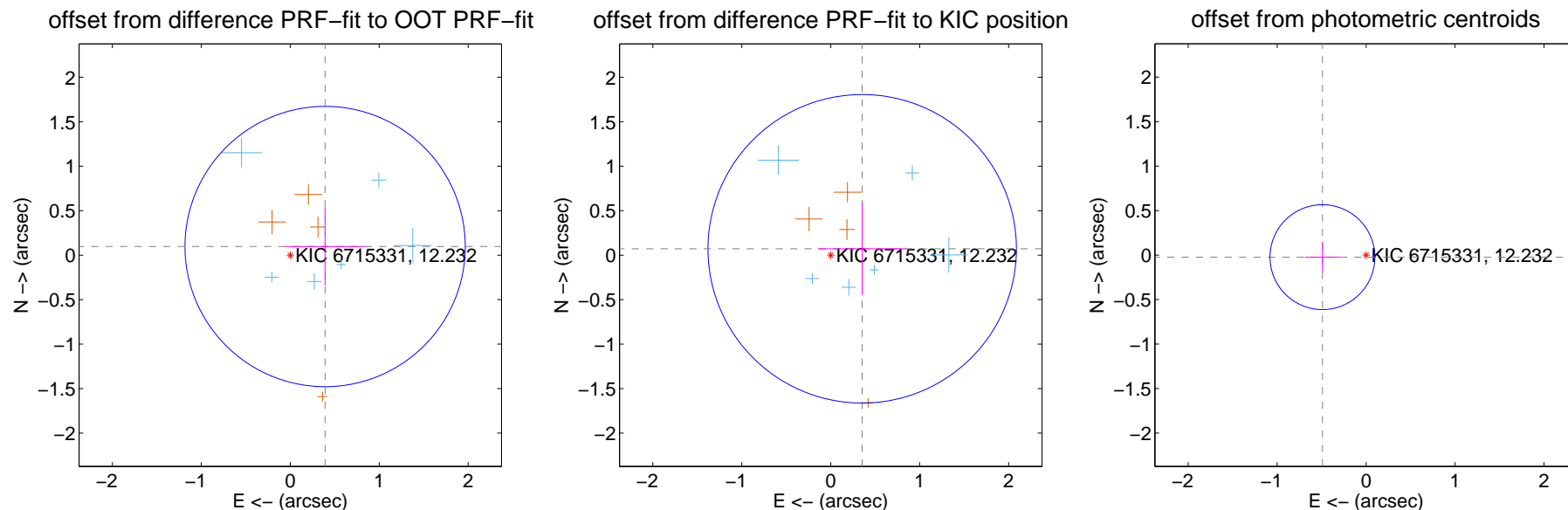
## DV Centroid Data

Supplemental centroid analysis for 006715331-09. Kepler magnitude: 12.23. Transit SNR -1.00

There are 6 quarters with good PRF difference image offsets

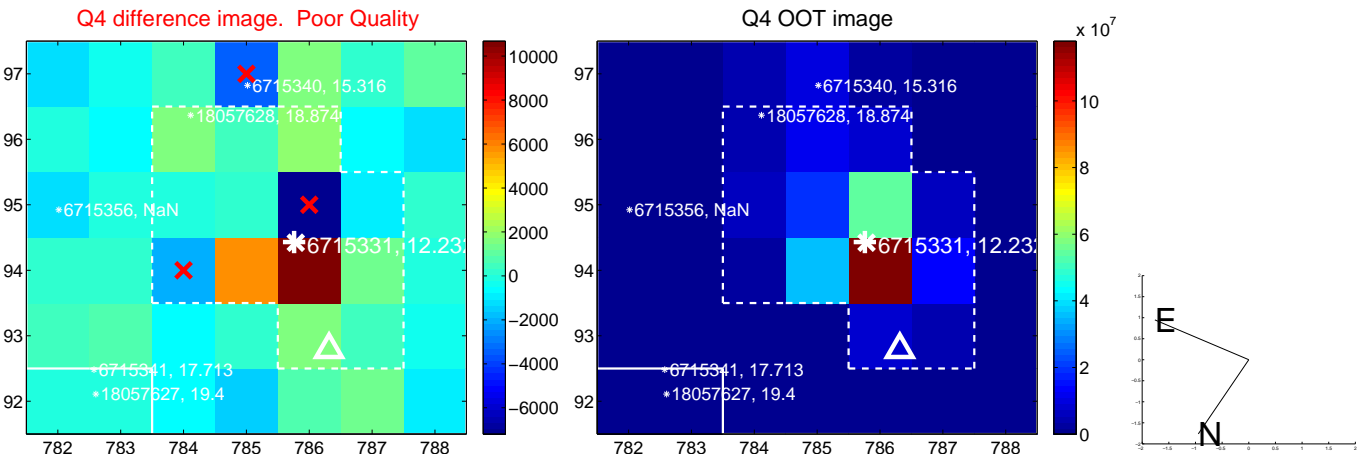
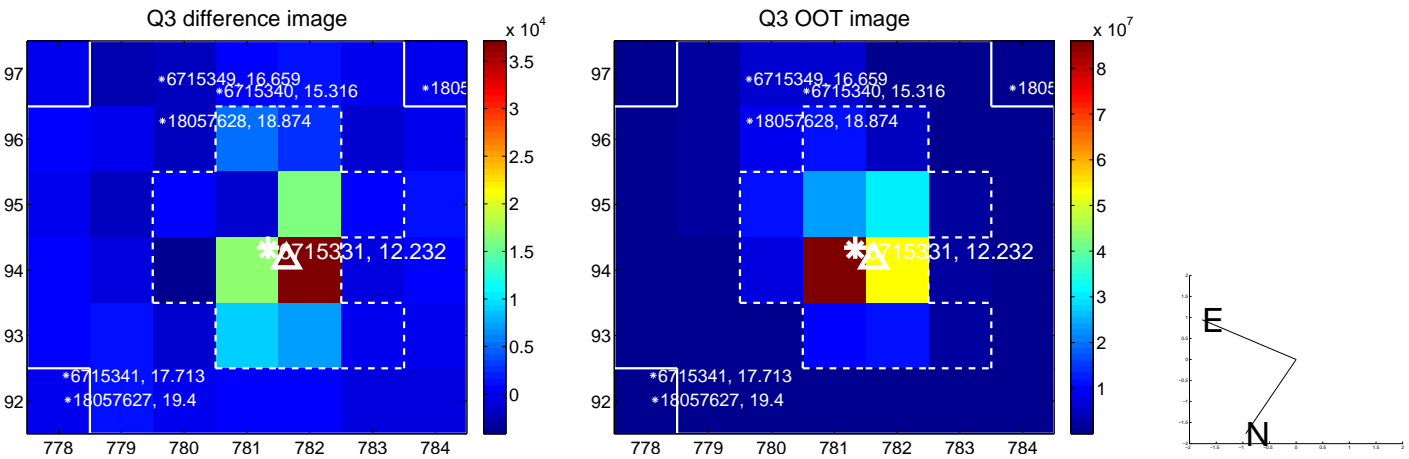
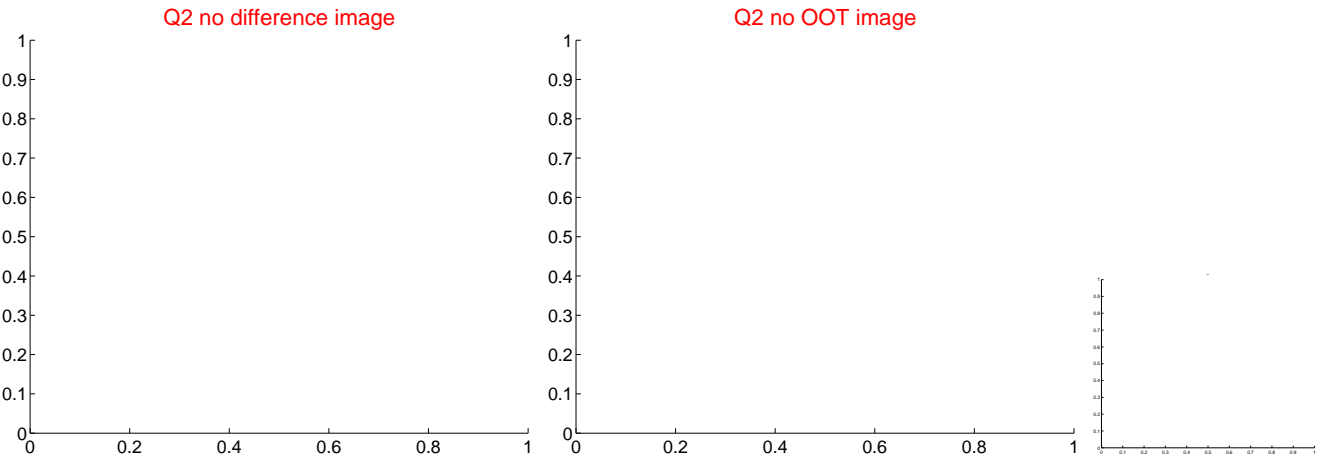
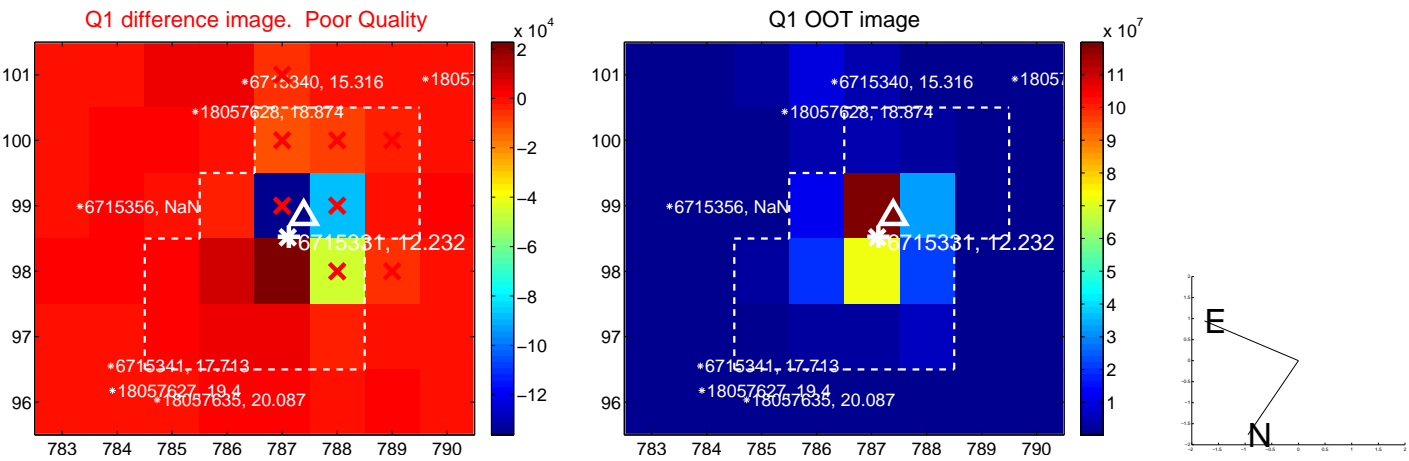
The direct PRF centroid is offset from the target star catalog position by about 0.10 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.404 \pm 0.525$	0.77	$-0.392 \pm 0.453$	$0.097 \pm 0.439$
PRF-fit source offset from KIC position	$0.361 \pm 0.578$	0.62	$-0.354 \pm 0.497$	$0.071 \pm 0.525$
photometric centroid source offset	$0.49 \pm 0.20$	2.50	$0.49 \pm 0.20$	$-0.02 \pm 0.17$

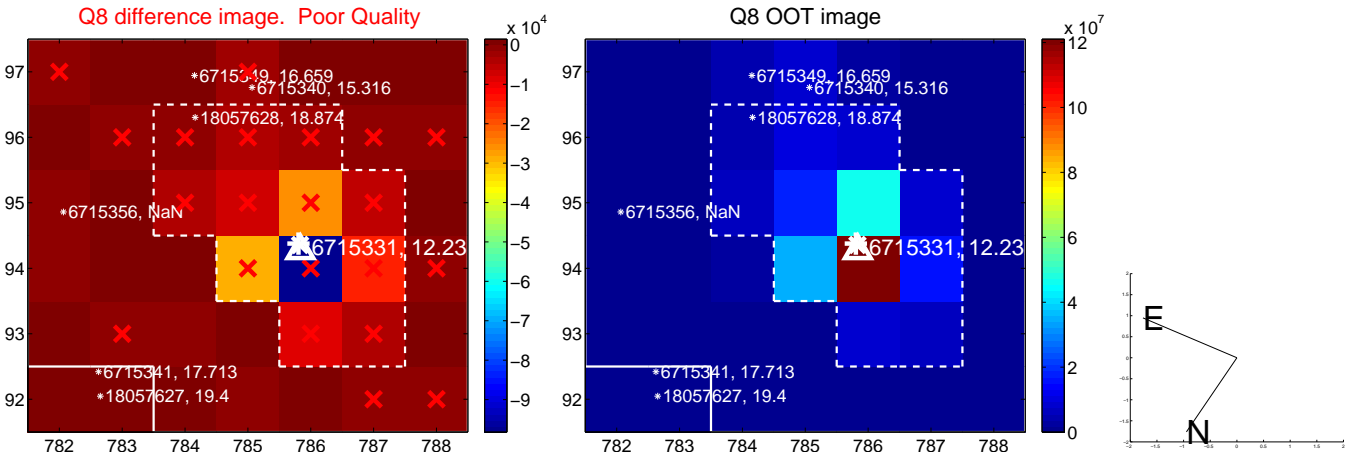
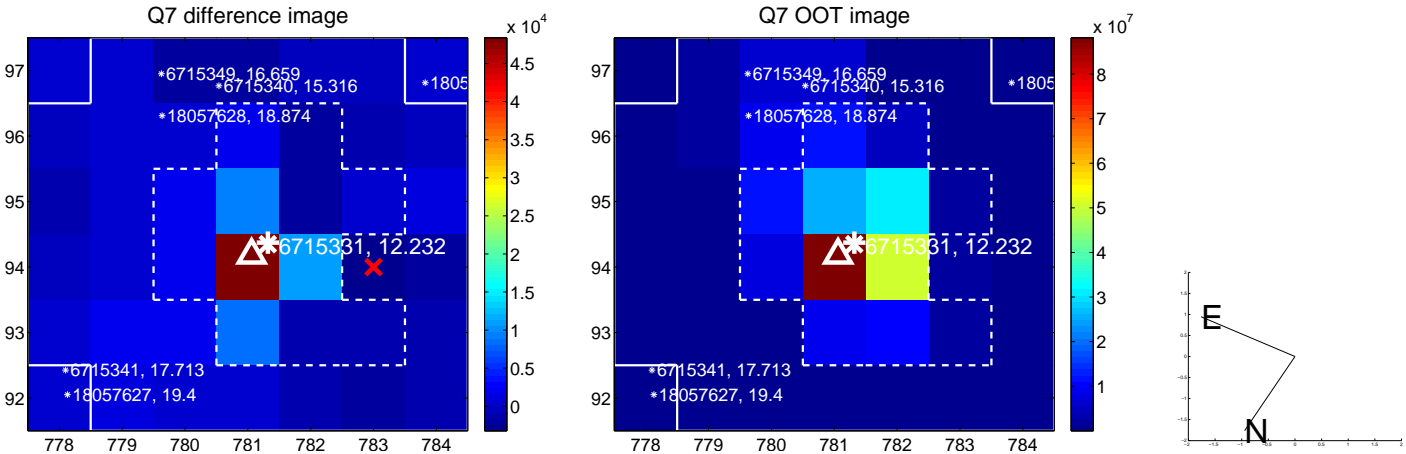
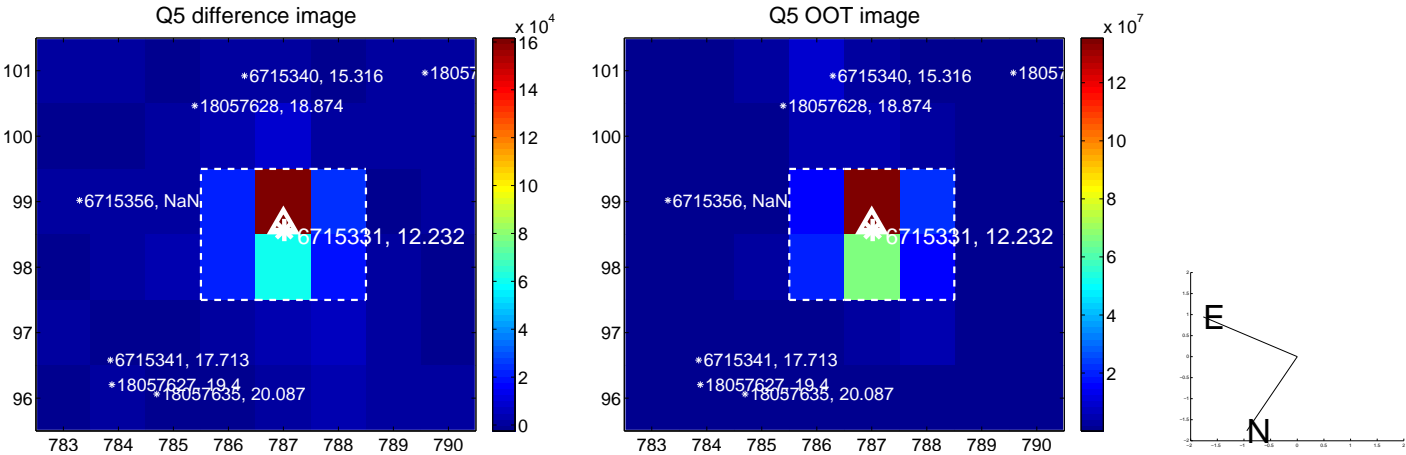


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

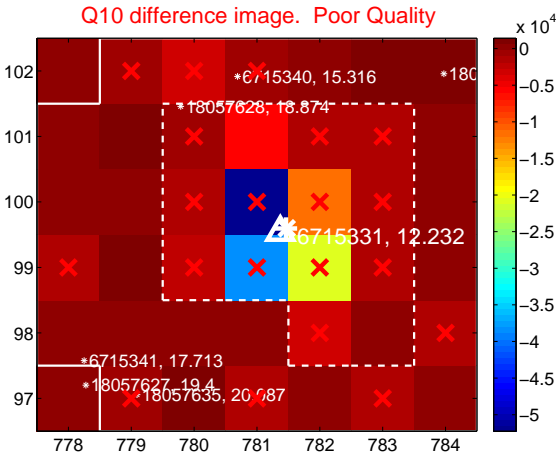
Q9 no difference image



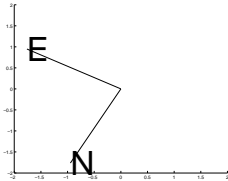
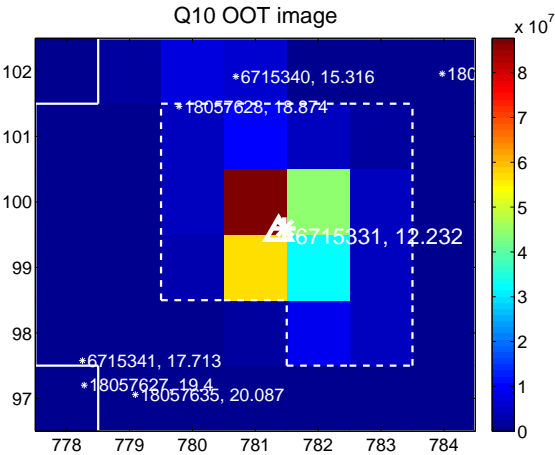
Q9 no OOT image



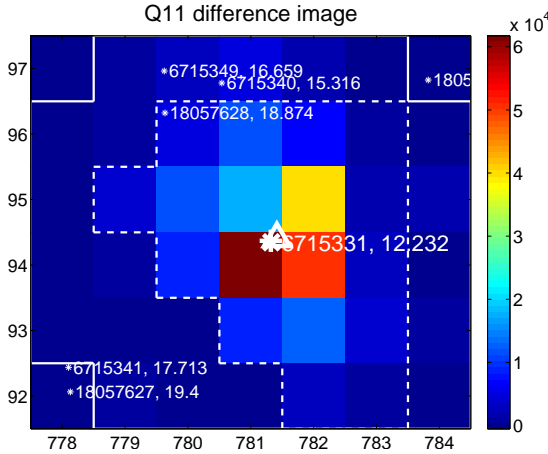
Q10 difference image. Poor Quality



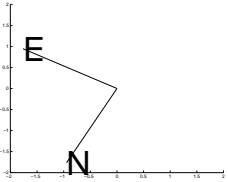
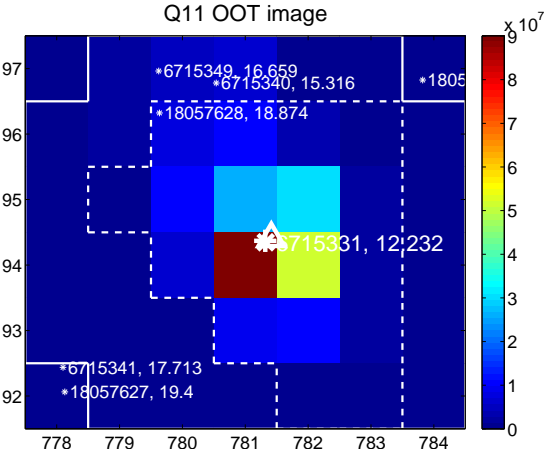
Q10 OOT image



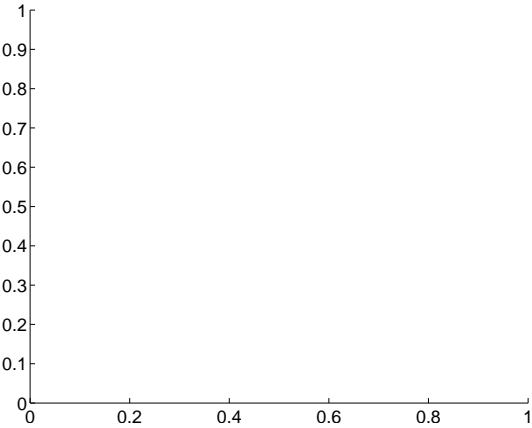
Q11 difference image



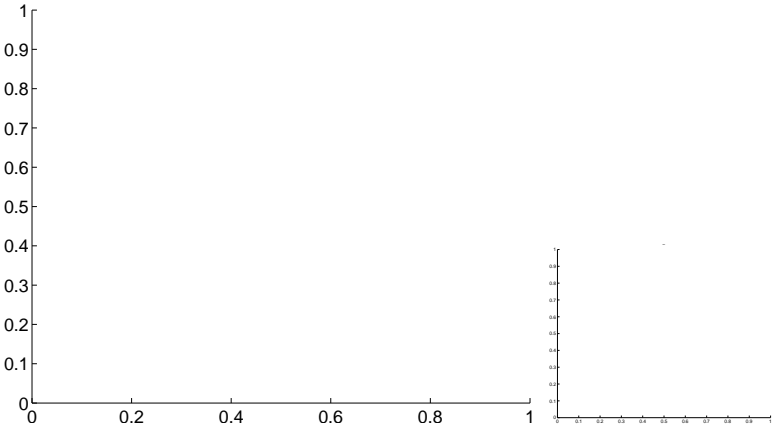
Q11 OOT image



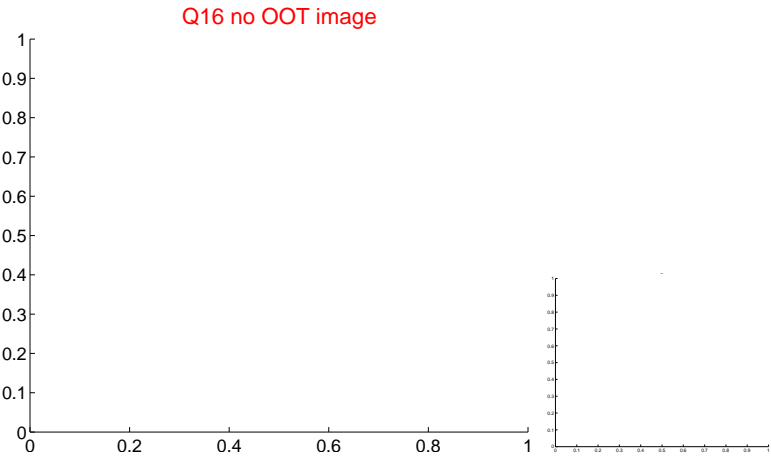
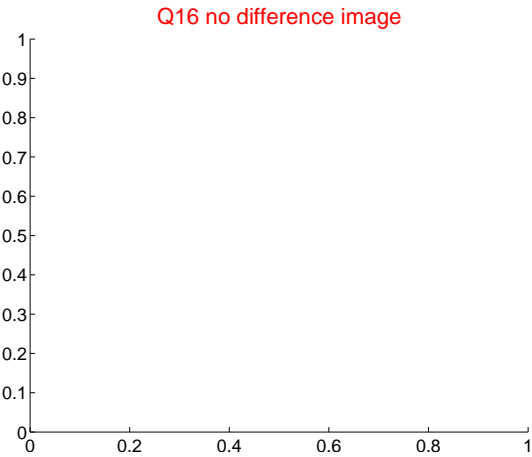
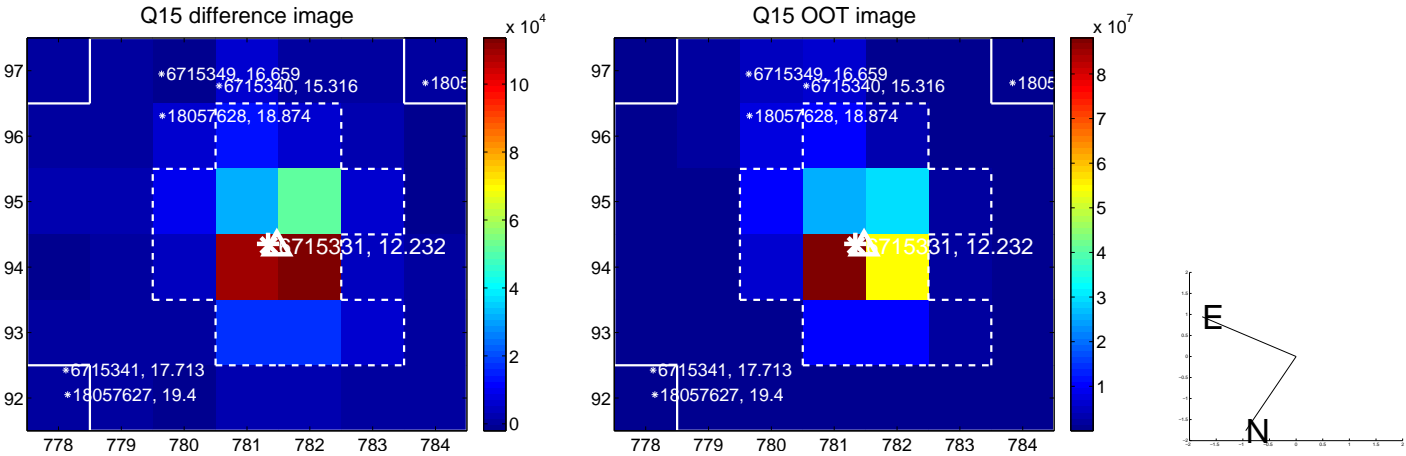
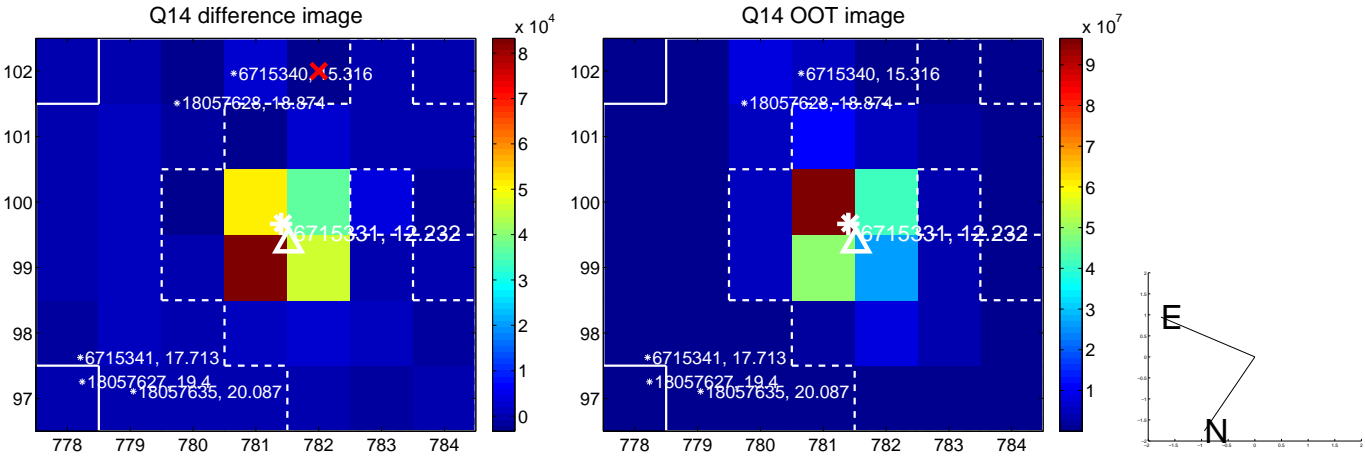
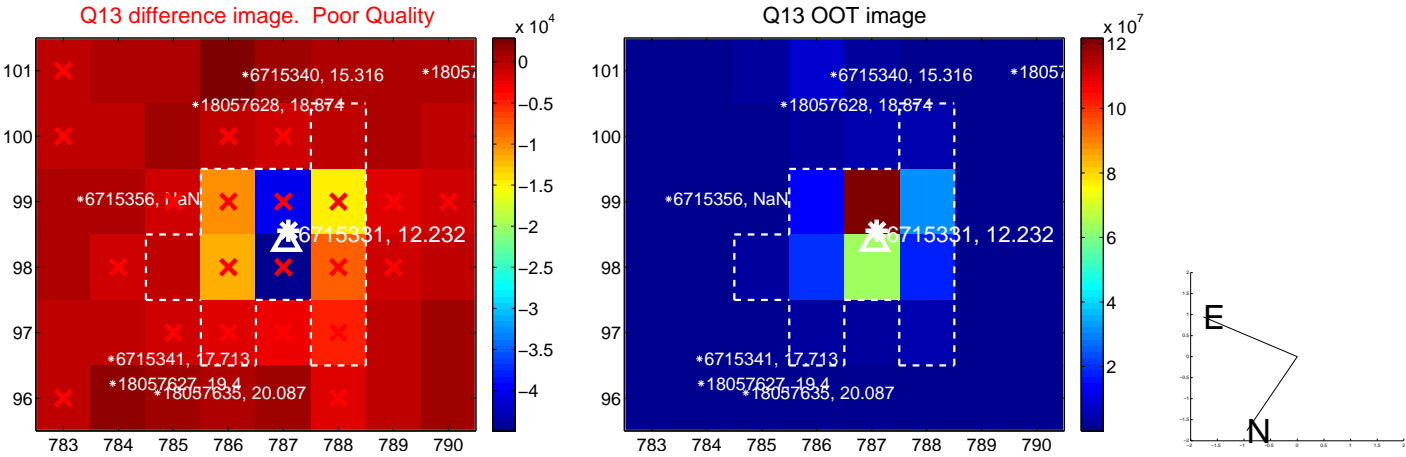
Q12 no difference image



Q12 no OOT image

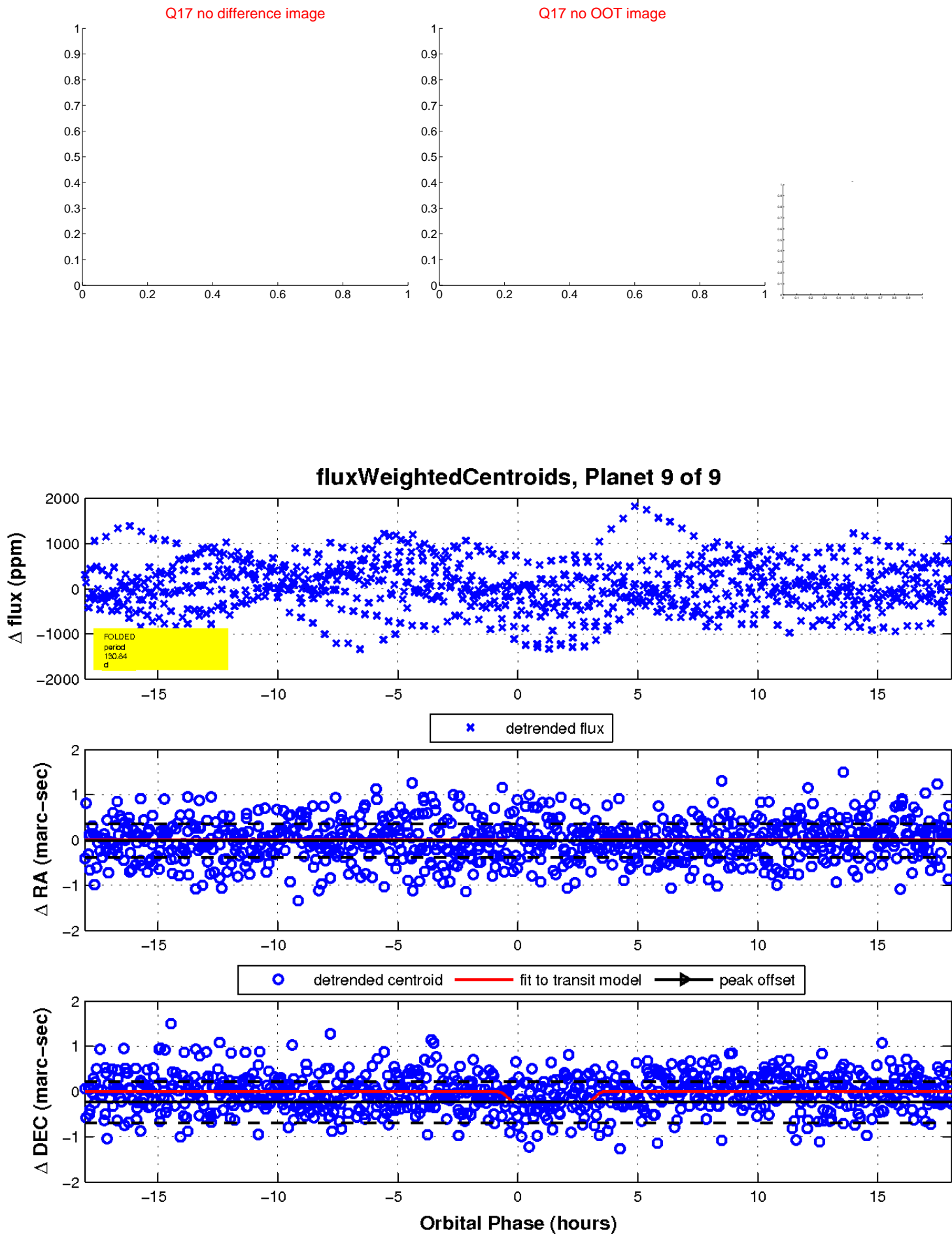


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.





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



UKIRT Image

Declination

