

# KIC 005956656

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005956656-01	OBS	1053.01	1.224870	131.982901	189.8	1.894	18.6	21.1	1.11	5553	1.83	2175.96
005956656-02	OBS	1053.02	46.245584	136.460572	434.9	5.084	8.8	10.0	1.11	5553	2.48	17.18

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005956656-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
005956656-02	OBS	PC	0.91	0	0	0	0	NO_COMMENT

**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.

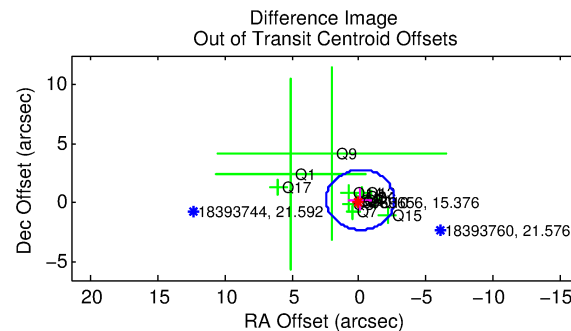
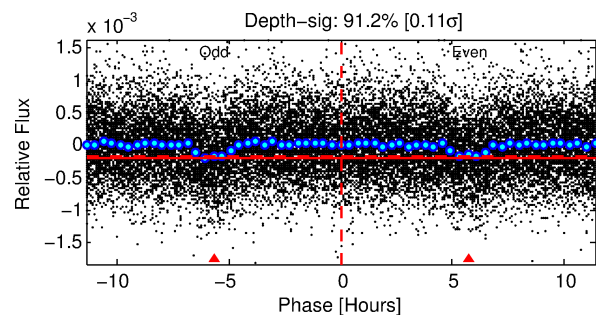
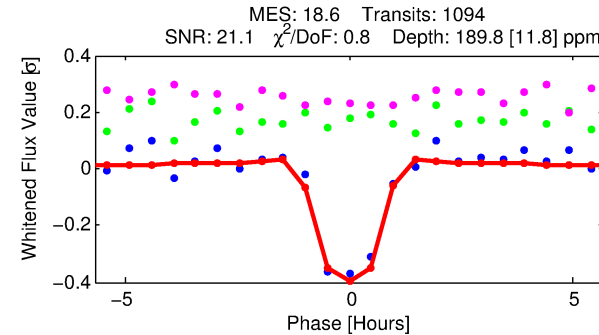
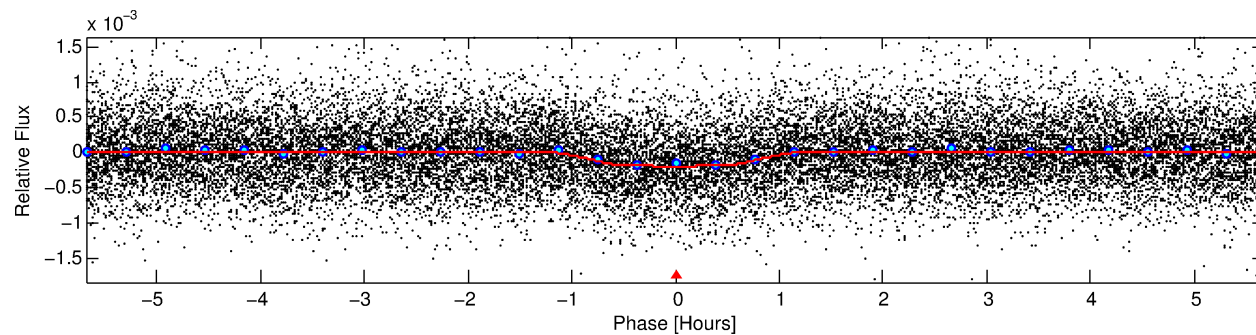
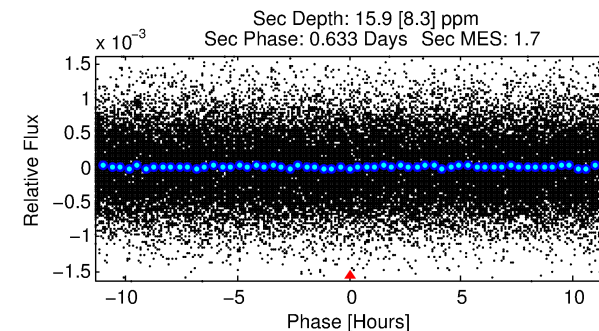
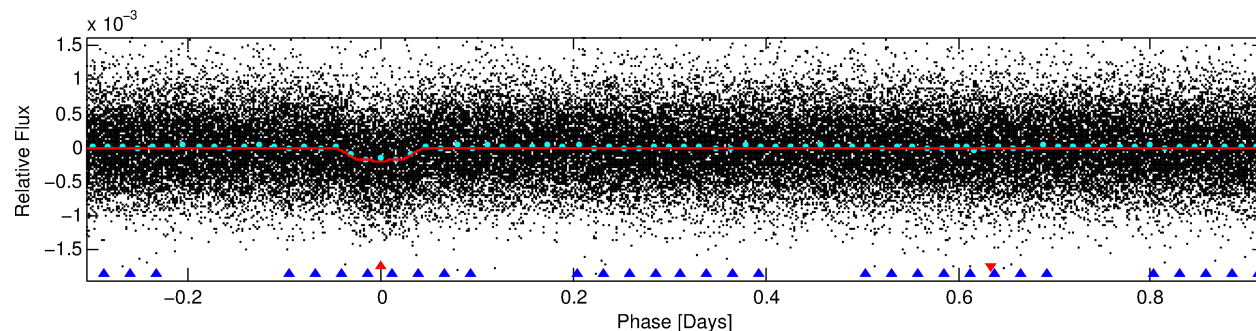
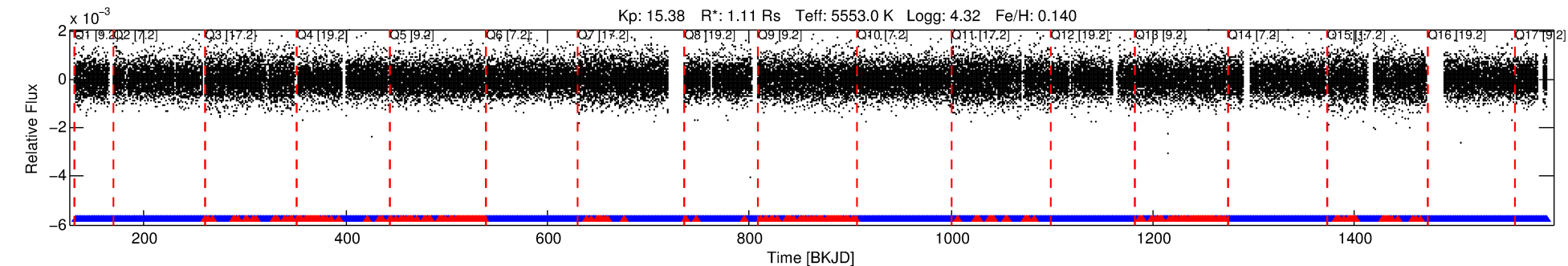
## Ephemeris Match Information For 005956656-01

No Significant Match Found

# DV One-Page Summary

KIC: 5956656 Candidate: 1 of 2 Period: 1.225 d  
KOI: K01053.01 Corr: 0.948

Kp: 15.38 R\*: 1.11 Rs Teff: 5553.0 K Logg: 4.32 Fe/H: 0.140



## DV Fit Results:

Period = 1.22487 [0.00000] d  
Epoch = 131.9829 [0.0012] BKJD  
Rp/R\* = 0.0151 [0.0057]  
a/R\* = 2.52 [3.55]  
b = 0.90 [0.37]  
Seff = 2175.96 [517.08]  
Teff = 1742 [103] K  
Rp = 1.83 [0.74] Re  
a = 0.0219 [0.0031] AU  
Ag = 1.26 [1.19] [0.22σ]  
Teffp = 2851 [654] K [1.67σ]

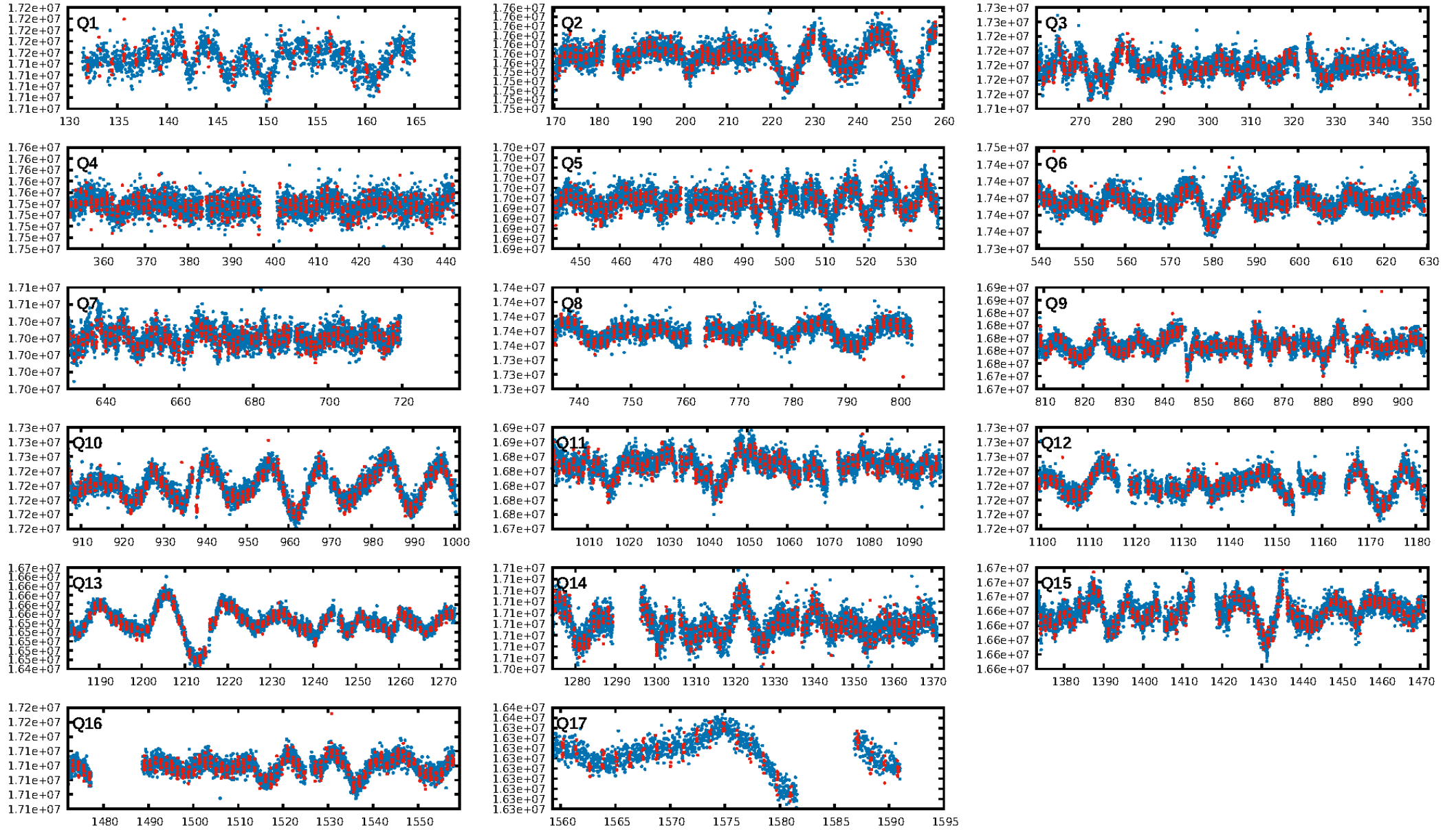
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [199.17σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 1.20e-74  
RollingBand-fgt: 0.78 [818/1045]  
GhostDiagnostic-chr: 4.829  
Centroid-sig: 0.2%  
Centroid-so: 1.453 arcsec [2.03σ]  
OotOffset-rm: 0.296 arcsec [0.35σ]  
KicOffset-rm: 0.379 arcsec [0.45σ]  
OotOffset-st: 4/3/2/4 [13]  
KicOffset-st: 4/3/2/4 [13]  
DiffImageQuality-fgm: 0.77 [10/13]  
DiffImageOverlap-fno: 1.00 [17/17]

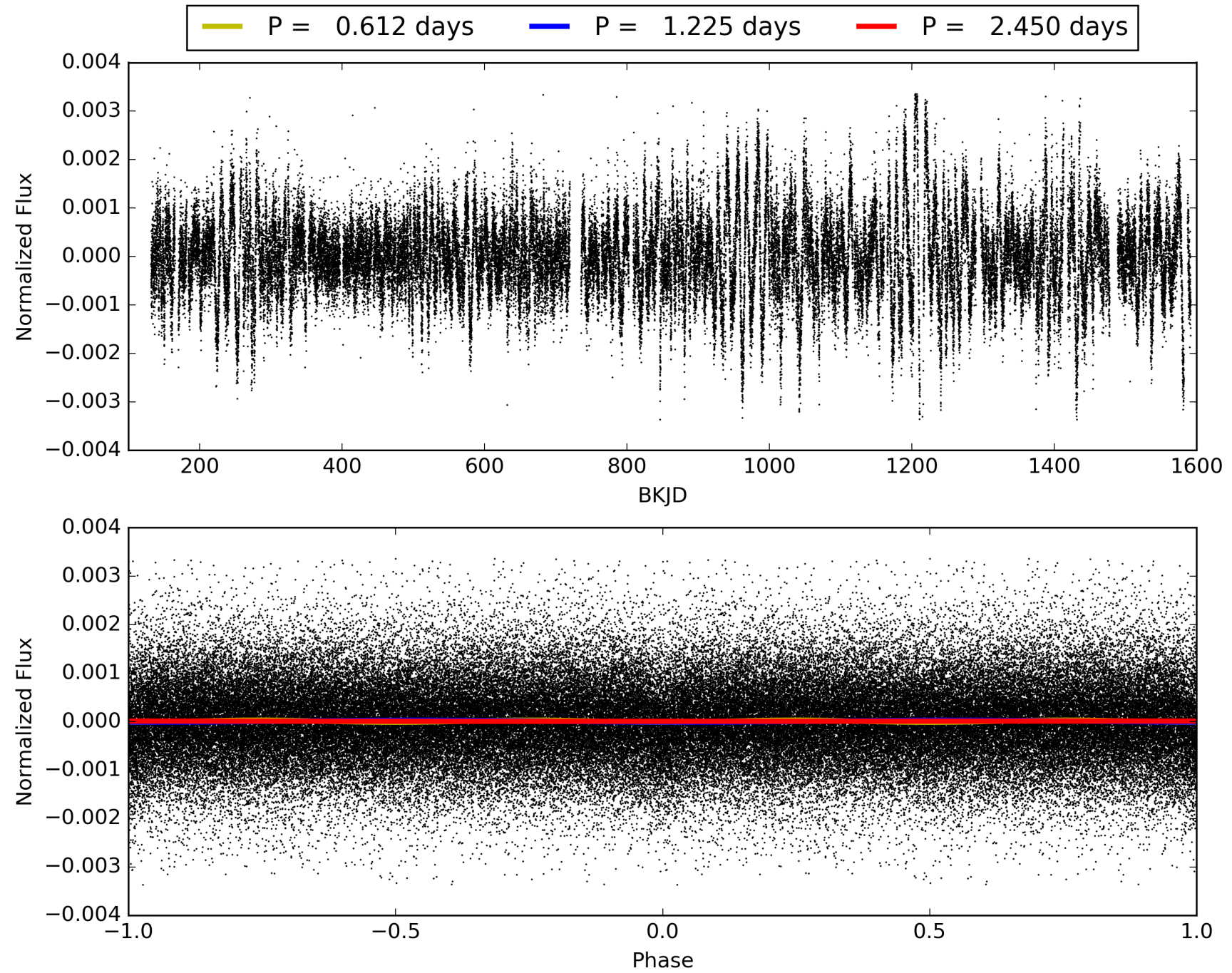
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 22:20:56 Z

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

# TCE 005956656-01, PDC Light Curves



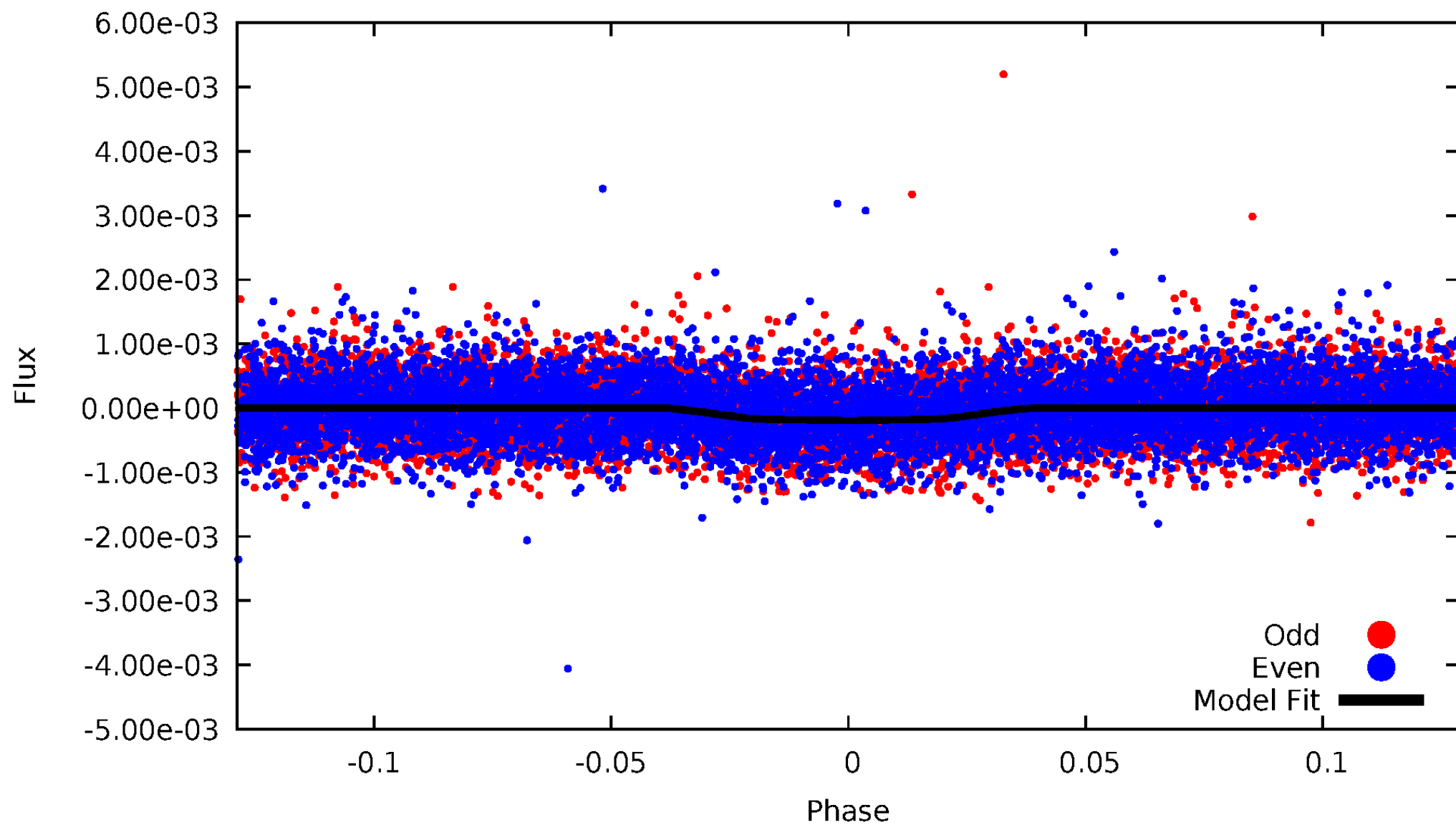
TCE 005956656-01





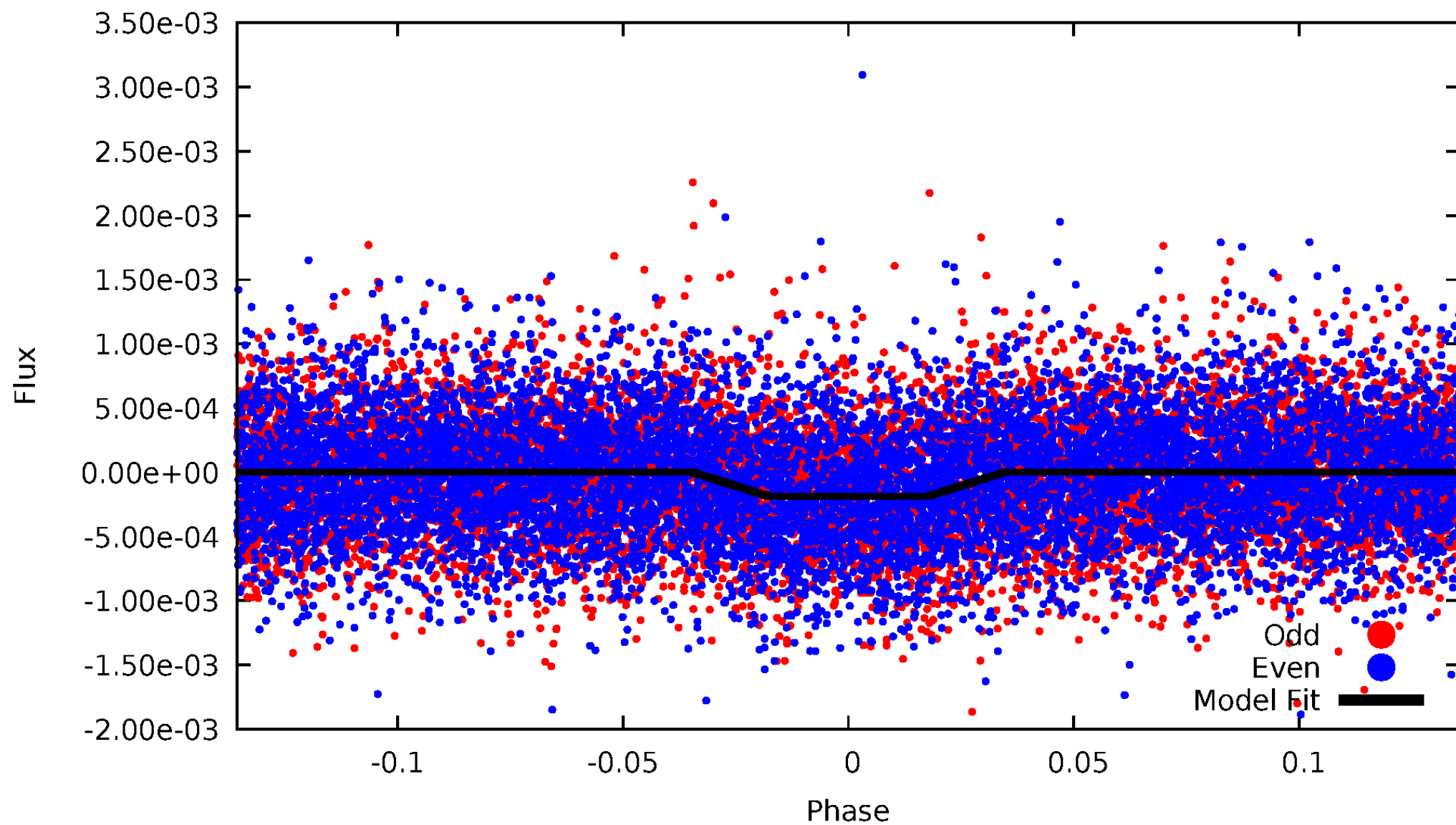
# DV Odd/Even

TCE 005956656-01



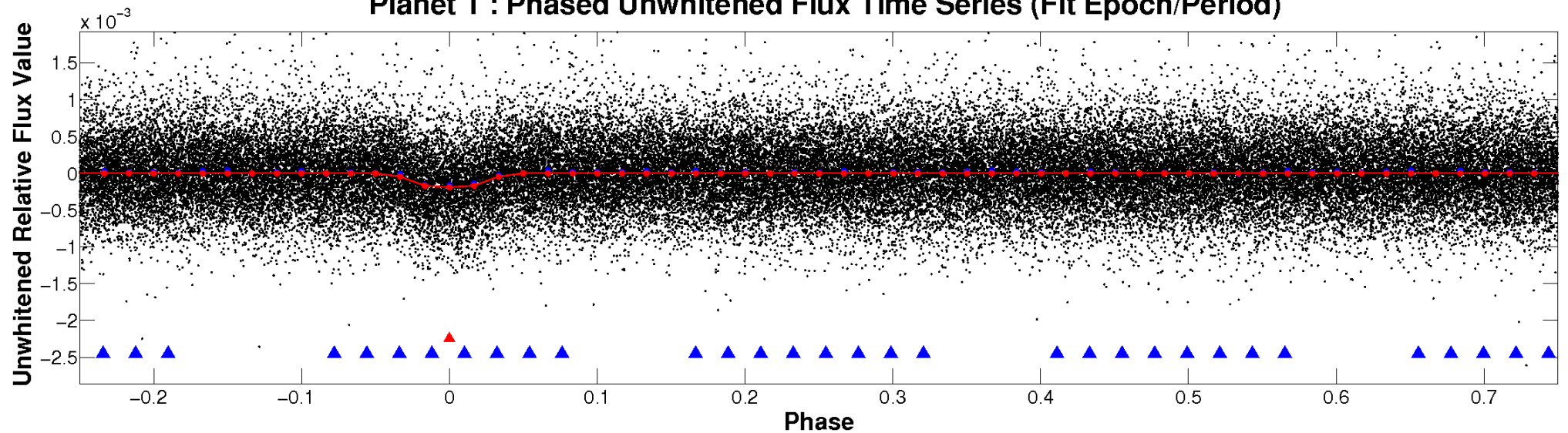
# ALT Odd/Even

TCE 005956656-01

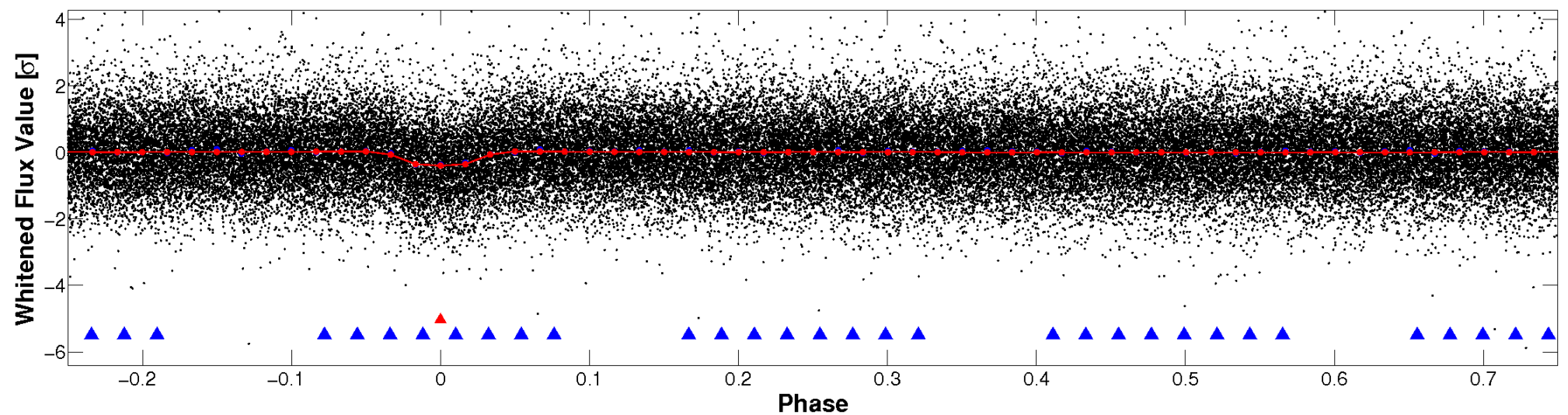


# Non-Whitened Vs. Whitened Light Curve

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

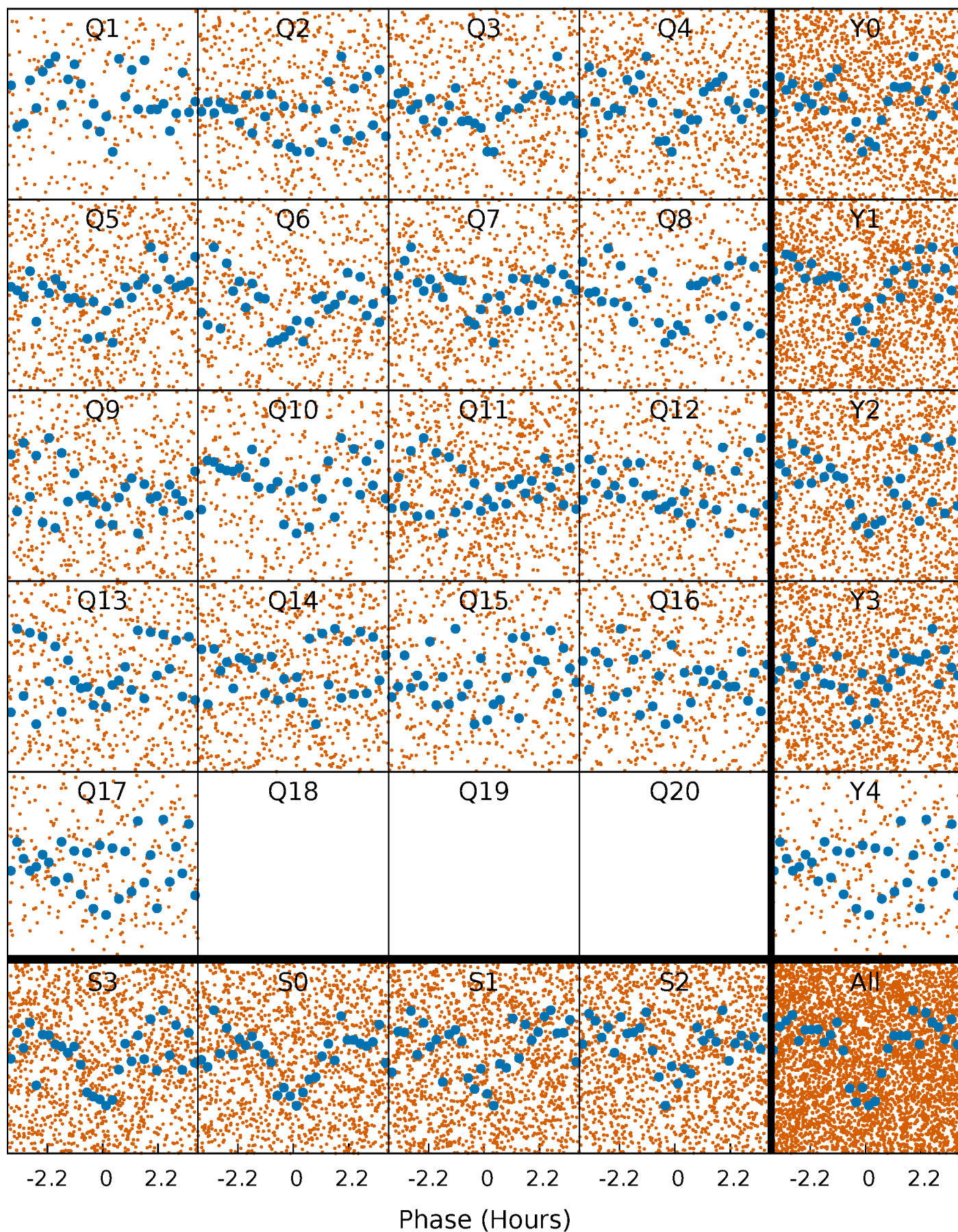


**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

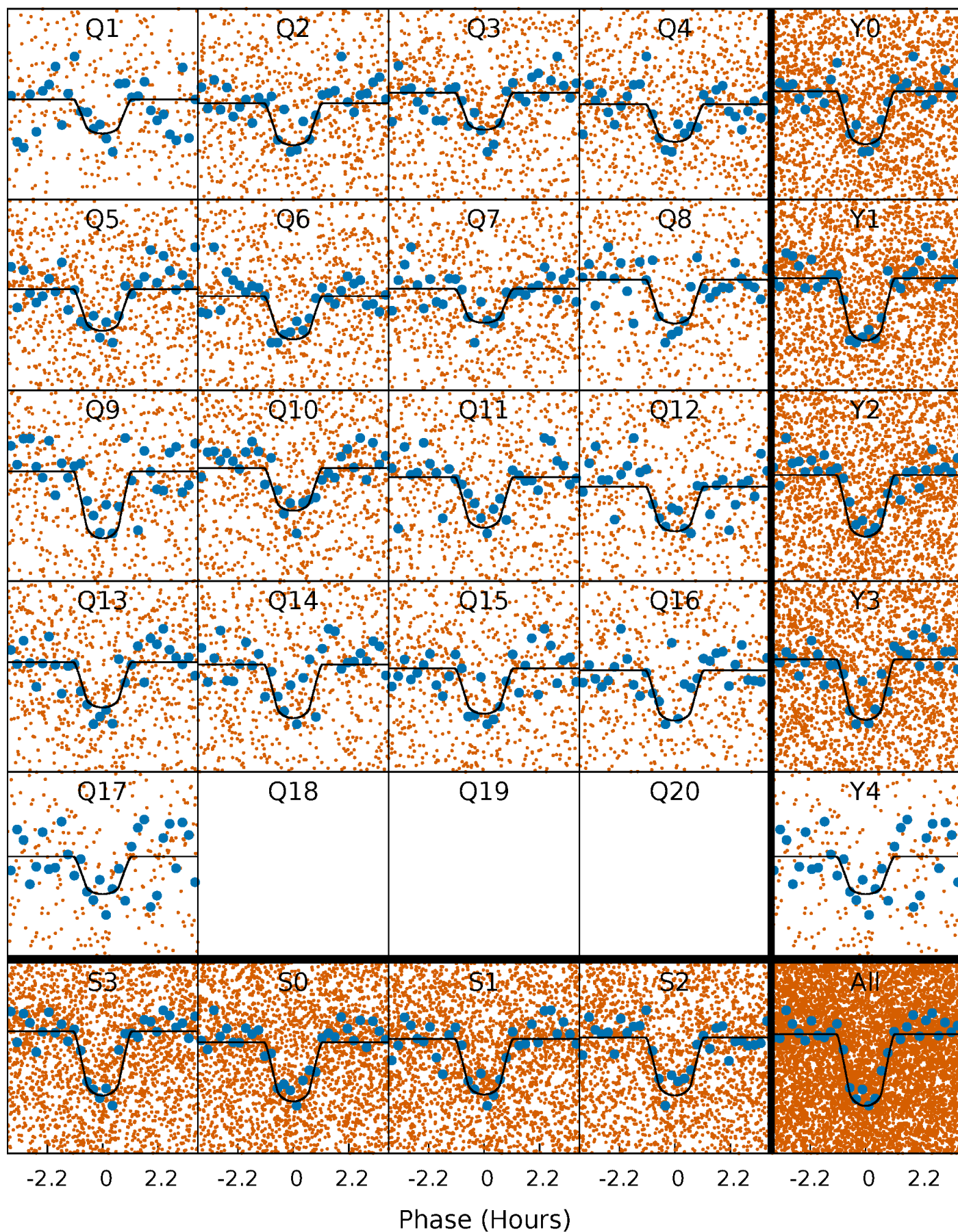
TCE 005956656-01 P= 1.224870 Days  $T_0=131.982901$  (BKJD)





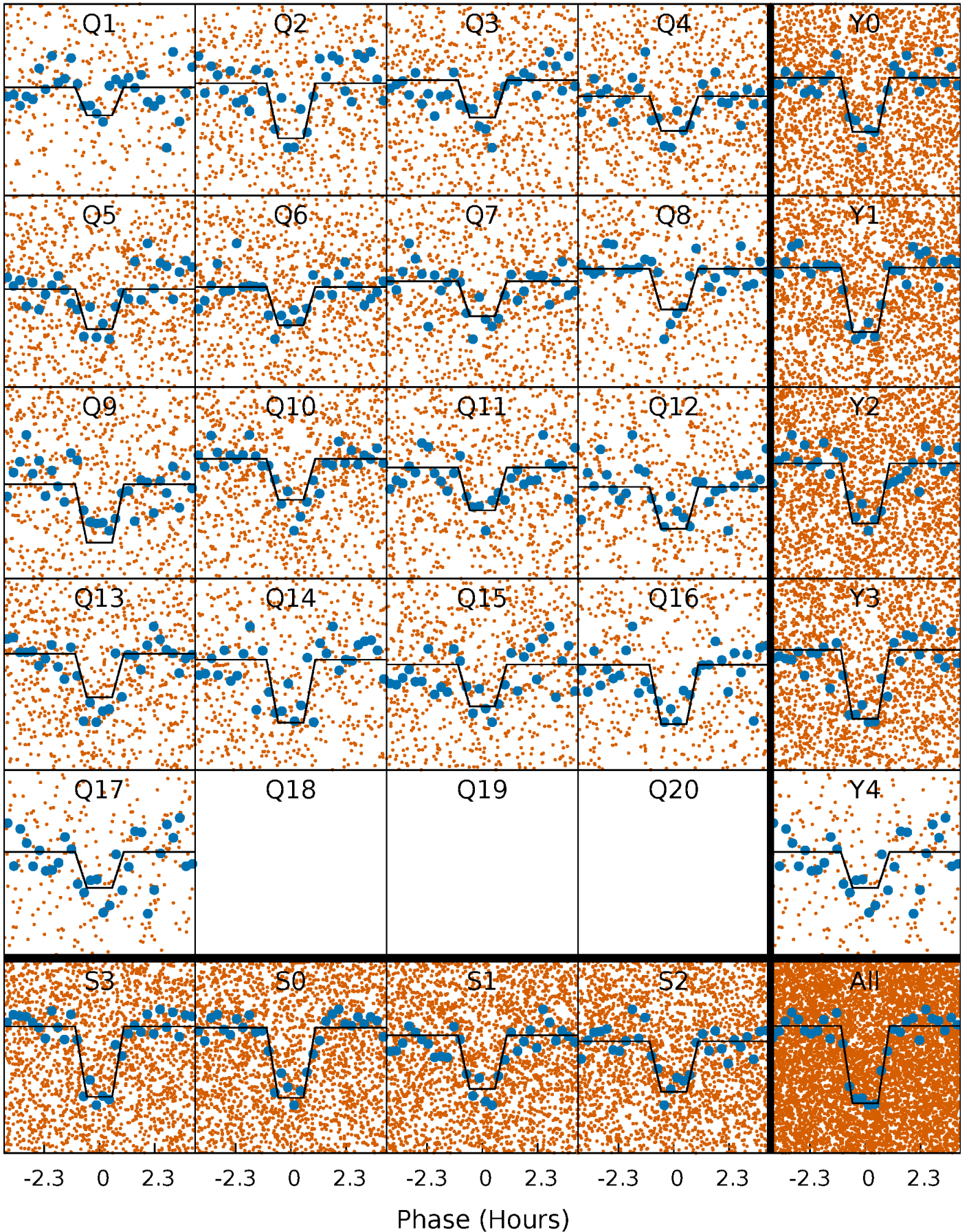
# DV Quarter-Phased Transit Curves

TCE 005956656-01 P= 1.224870 Days  $T_0=131.982901$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

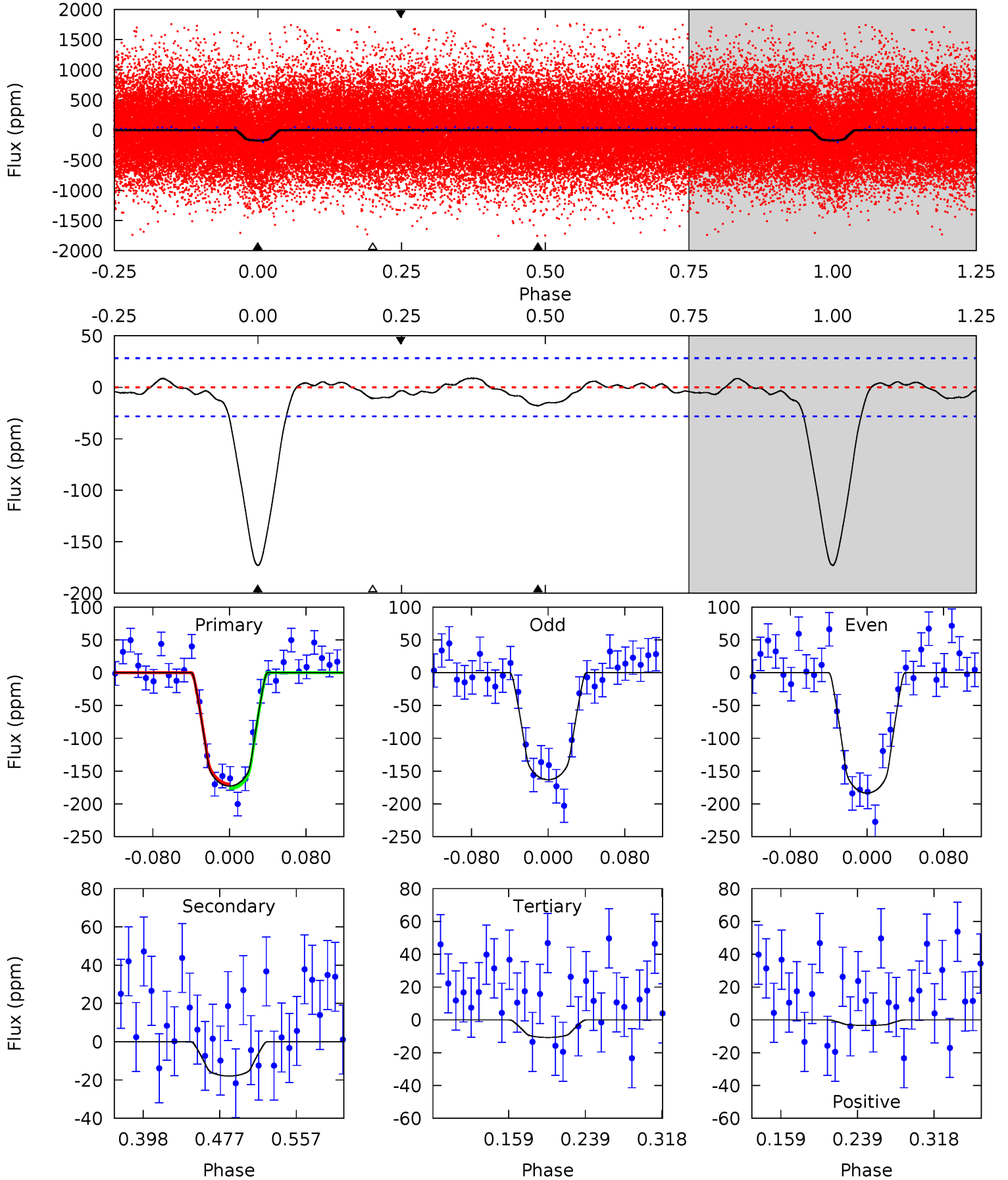
TCE 005956656-01 P= 1.224866 Days  $T_0=131.984525$  (BKJD)



# DV Model-Shift Uniqueness Test

005956656-01, P = 1.224870 Days, E = 130.758031 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
28.2	2.92	1.75	-0.55	4.61	1.75	0.81	26.4	28.8	1.17	3.47	1.66	0.97	0.05	0.56

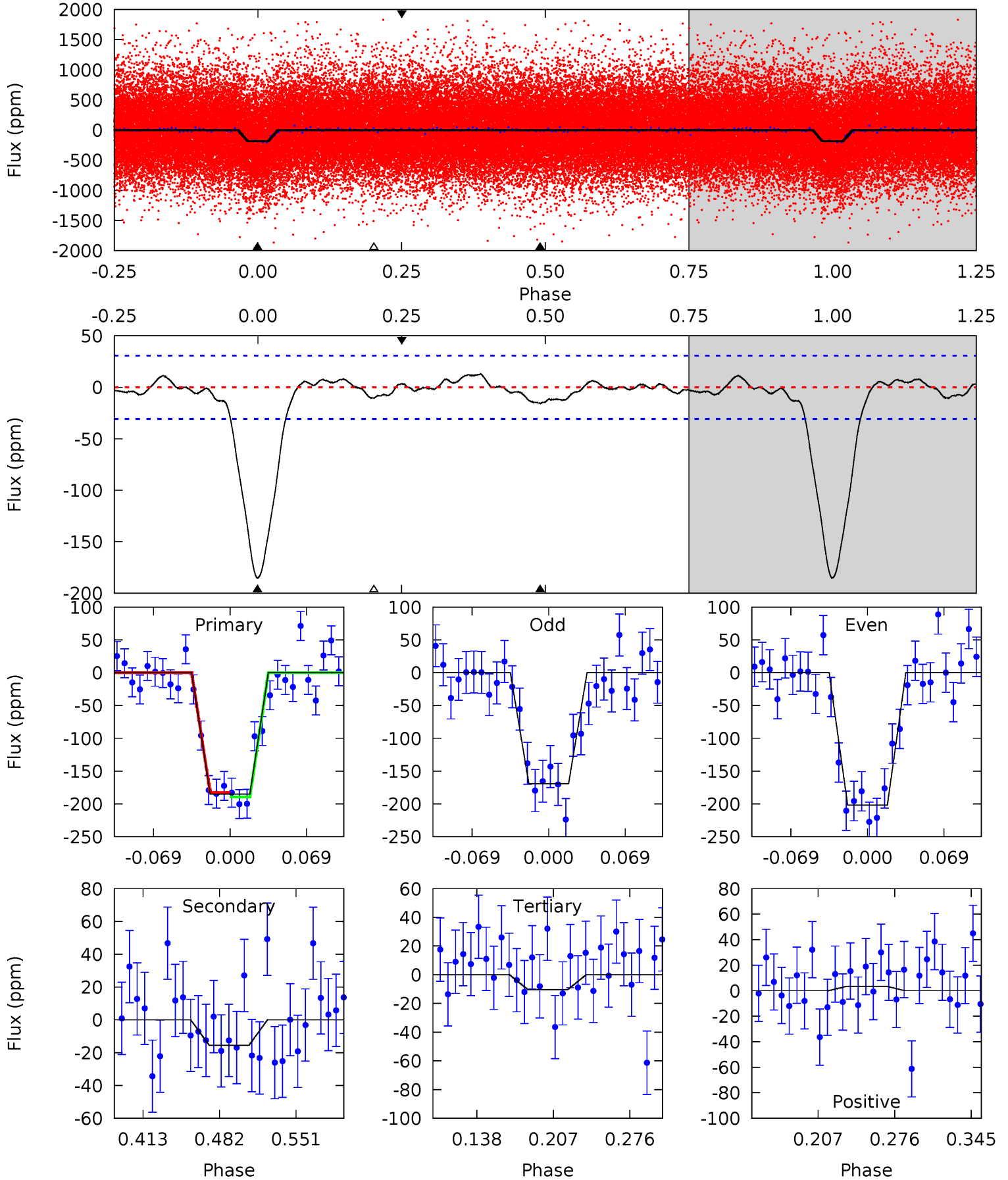




# Alt Model-Shift Uniqueness Test

005956656-01, P = 1.224866 Days, E = 130.759659 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
28.0	2.35	1.57	0.52	4.64	1.82	0.80	26.4	27.5	0.78	1.83	2.46	0.98	0.06	0.51





### Stellar Parameters For KIC 005956656

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5553^{+74}_{-74}$	$4.320^{+0.137}_{-0.100}$	$0.140^{+0.150}_{-0.150}$	$1.107^{+0.161}_{-0.161}$	$0.933^{+0.067}_{-0.043}$	$0.970^{+0.601}_{-0.317}$
	+1%/-1%	+3%/-2%	+107%/-107%	+15%/-15%	+7%/-5%	+62%/-33%
Source	SPE90	SPE90	SPE90	DSEP		

KIC = Kepler Input Catalog; PHO = Photometry; SPE = Spectroscopy; AST = Asteroseismology  
 TRA = Transits; DESP = Dartmouth Models; MULT = Multiple Models

### Secondary Eclipse Parameters for KIC 005956656-01 / KOI 1053.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-18 \pm 6$	$1.83^{+0.70}_{-0.72}$	$2429^{+100}_{-101}$	$3294^{+653}_{-528}$	$1.414^{+2.314}_{-0.792}$
Alt.	$-16 \pm 7$	$1.64^{+0.72}_{-0.66}$	$2427^{+105}_{-105}$	$3309^{+806}_{-586}$	$1.417^{+3.096}_{-0.832}$

$T_{\text{max}}$  = 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

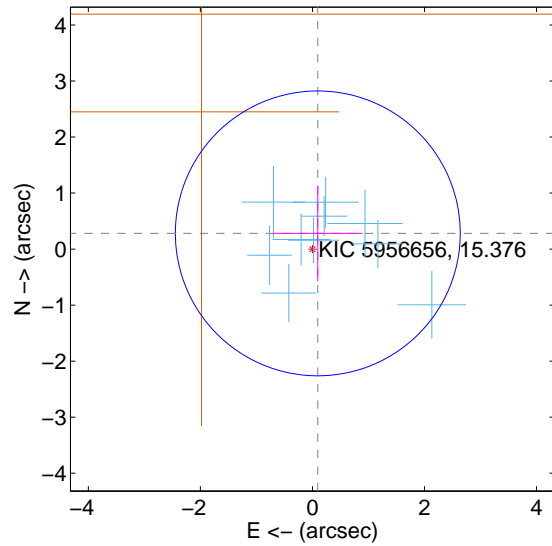
Supplemental centroid analysis for 005956656-01. Kepler magnitude: 15.38. Transit SNR 21.13

There are 10 quarters with good PRF difference image offsets

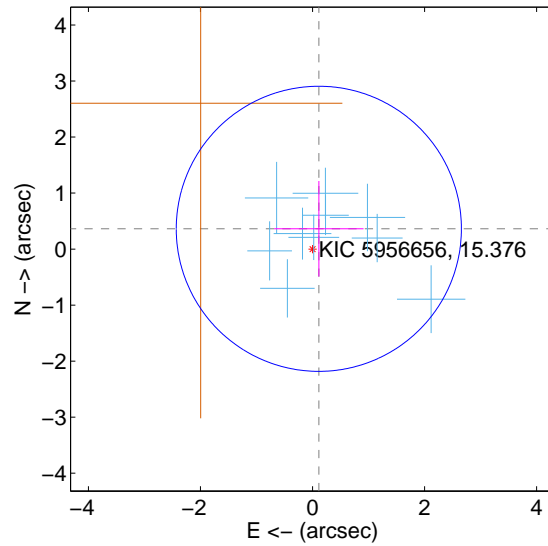
The direct PRF centroid is offset from the target star catalog position by about 0.13 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.296 \pm 0.847$	0.35	$-0.096 \pm 0.799$	$0.280 \pm 0.853$
PRF-fit source offset from KIC position	$0.379 \pm 0.848$	0.45	$-0.113 \pm 0.799$	$0.362 \pm 0.853$
photometric centroid source offset	$1.45 \pm 0.72$	2.03	$-0.86 \pm 0.73$	$1.17 \pm 0.71$

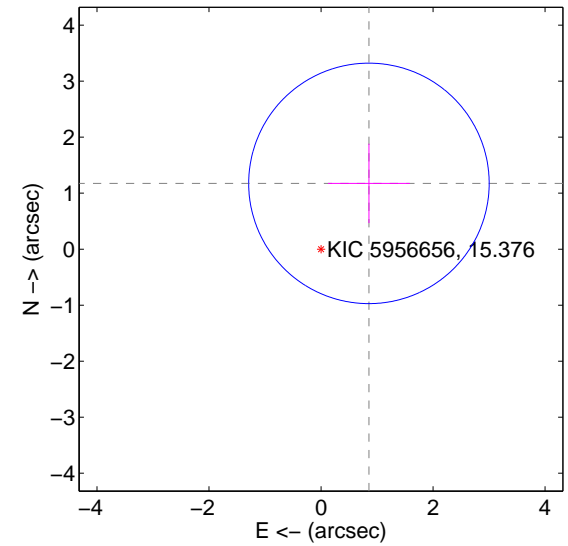
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

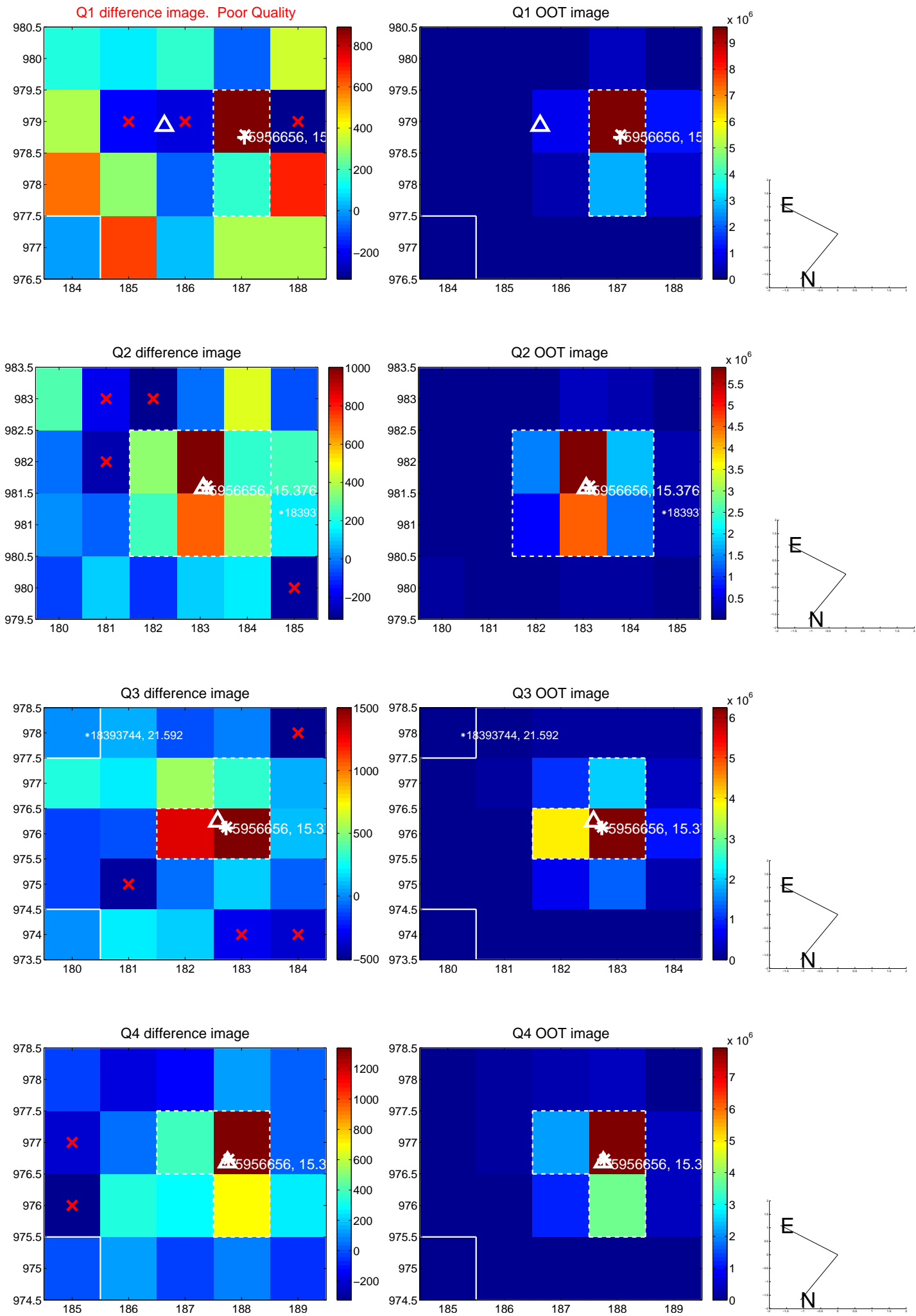


offset from photometric centroids

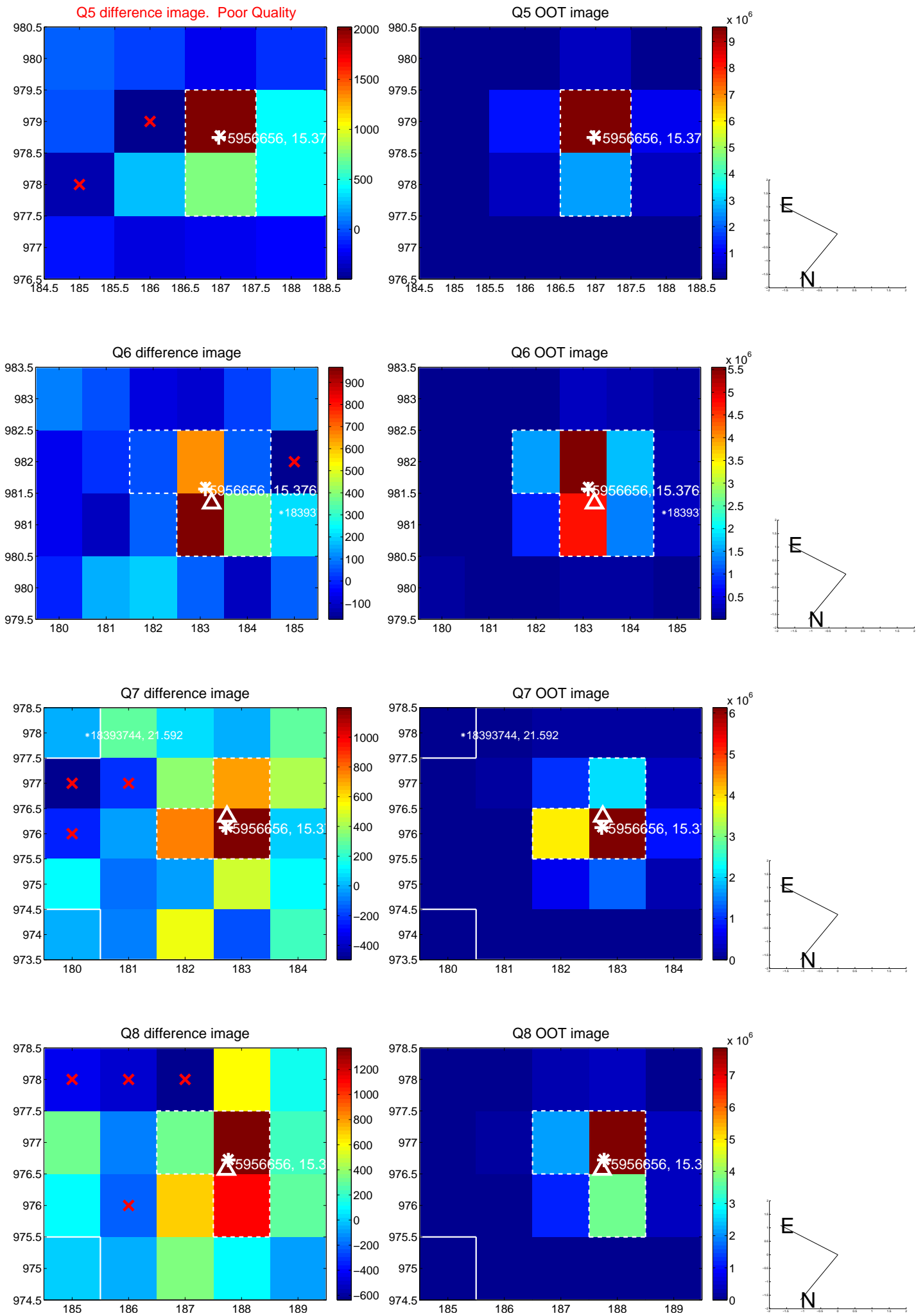


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

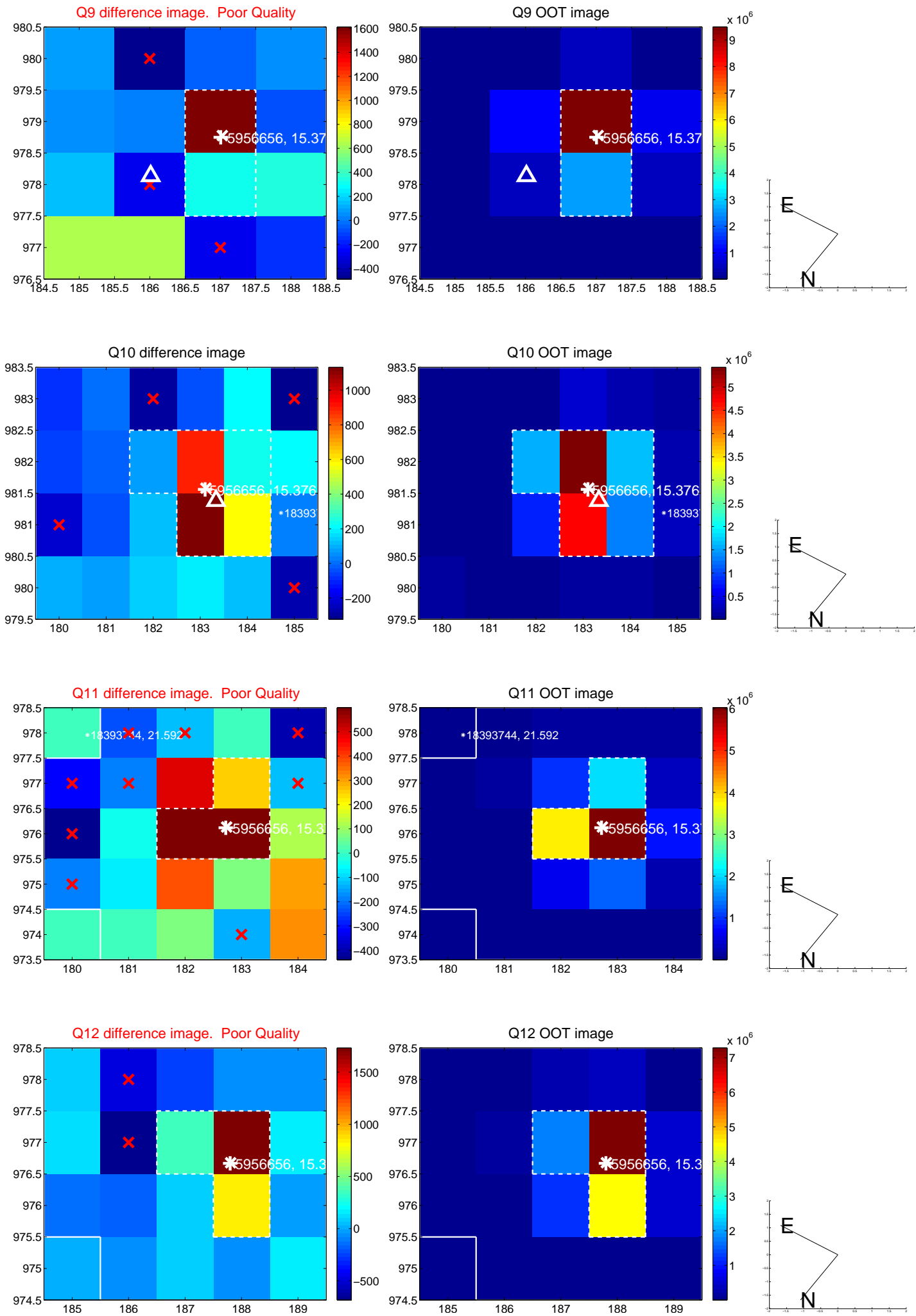


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

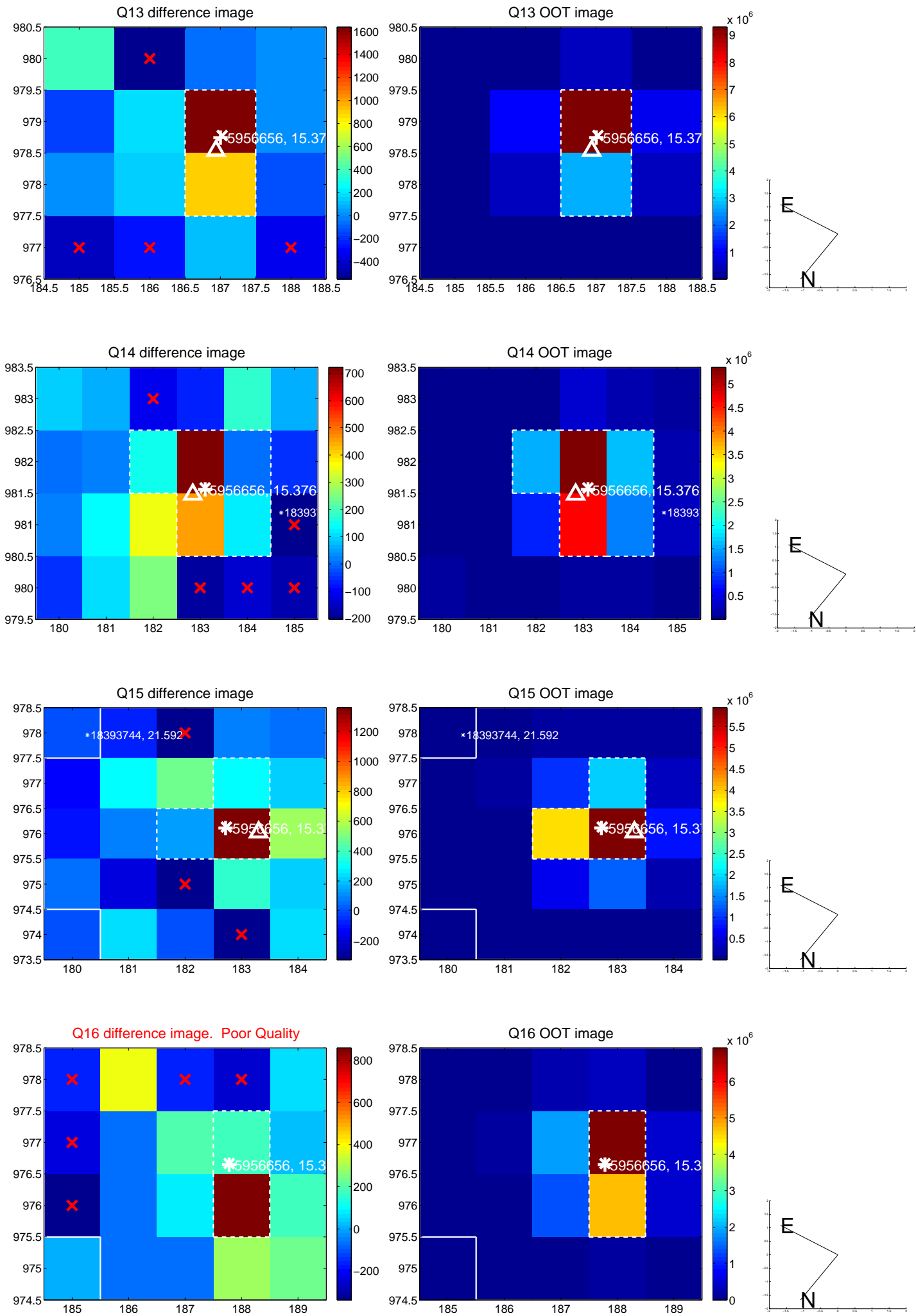




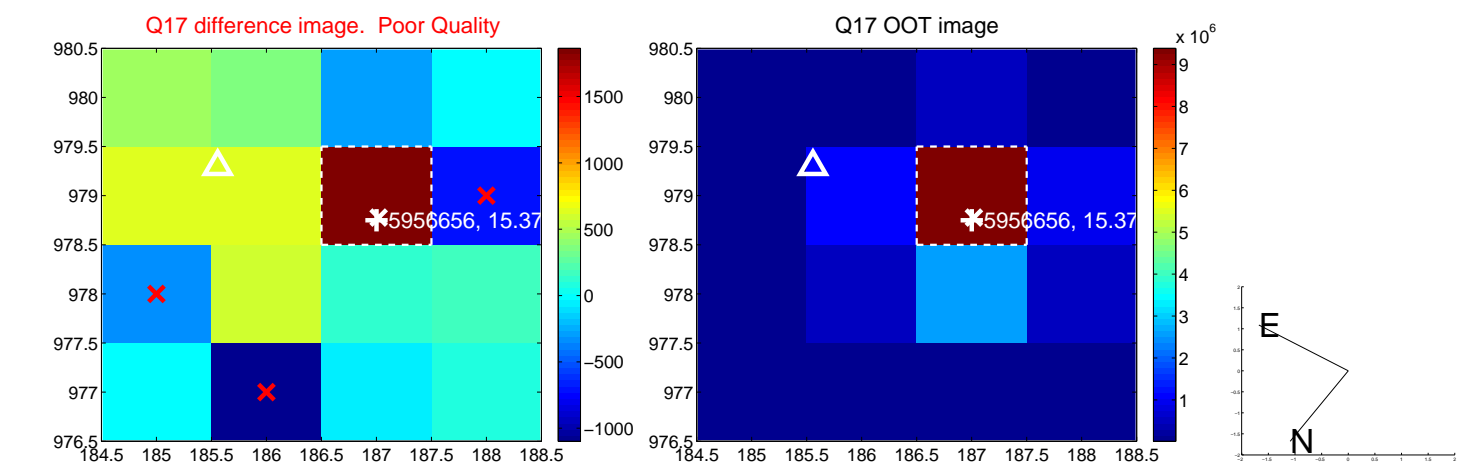
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



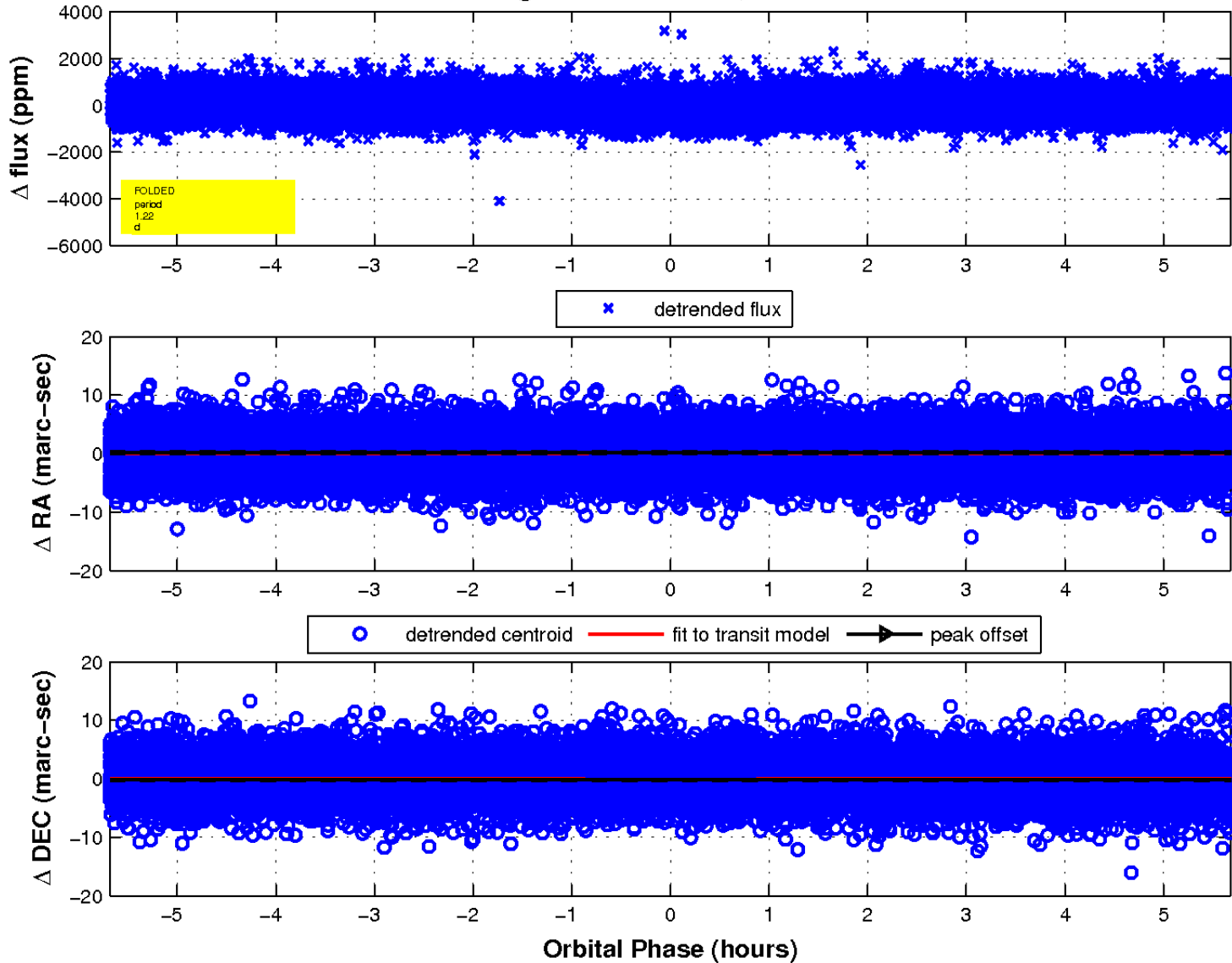
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

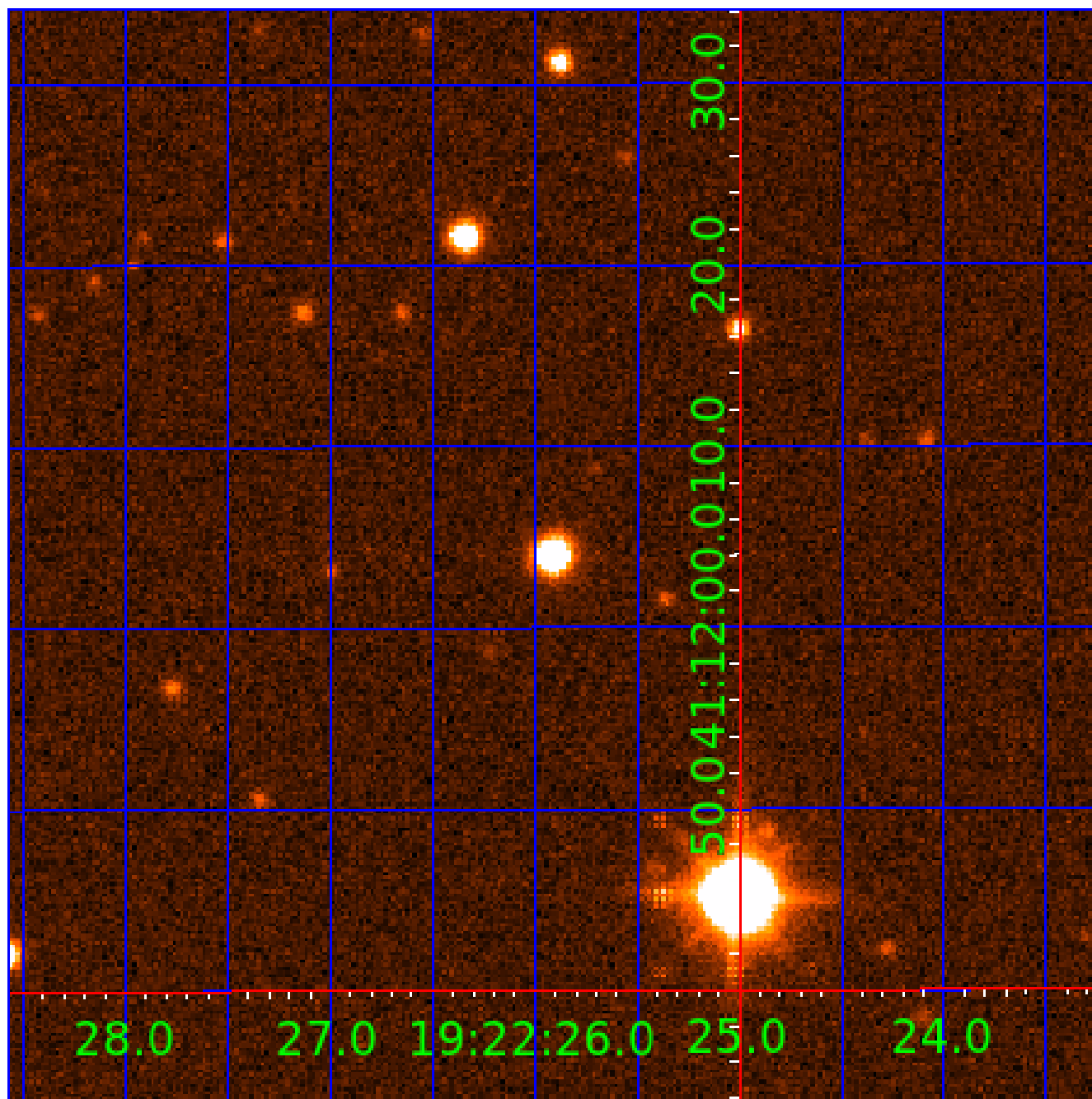


fluxWeightedCentroids, Planet 1 of 2



UKIRT Image

Declination





# KIC 005956656

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005956656-01	OBS	1053.01	1.224870	131.982901	189.8	1.894	18.6	21.1	1.11	5553	1.83	2175.96
005956656-02	OBS	1053.02	46.245584	136.460572	434.9	5.084	8.8	10.0	1.11	5553	2.48	17.18

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005956656-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
005956656-02	OBS	PC	0.91	0	0	0	0	NO_COMMENT

**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.

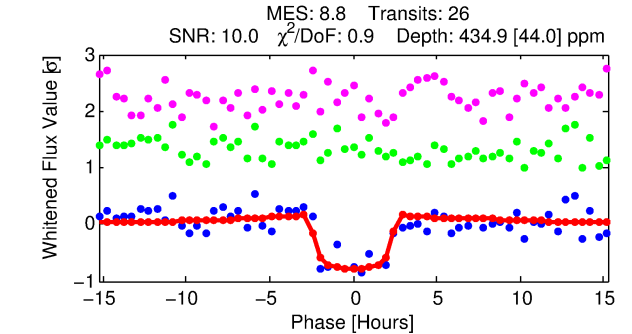
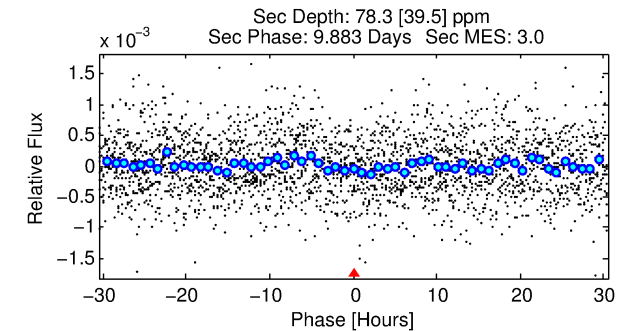
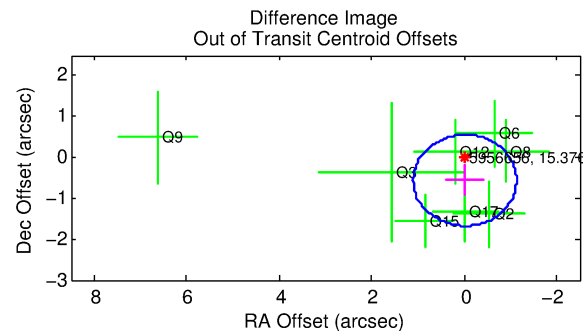
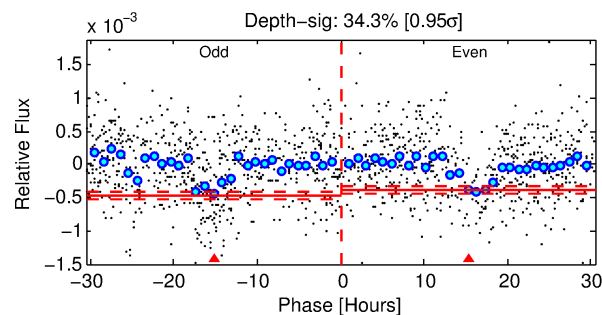
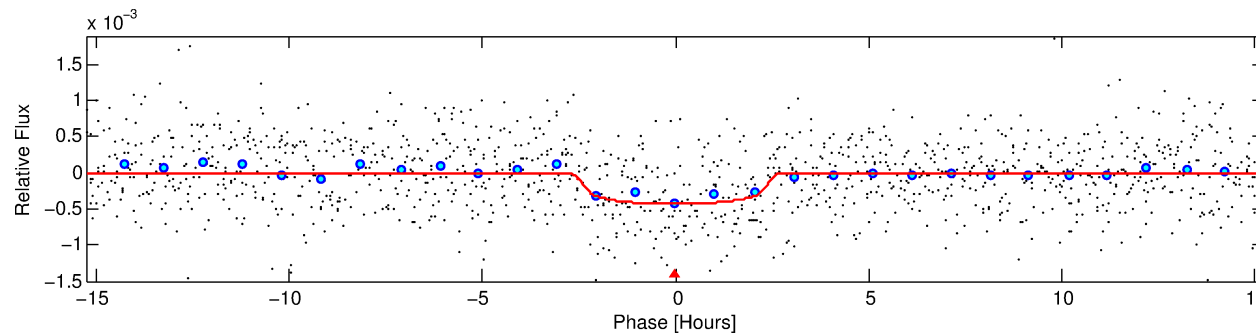
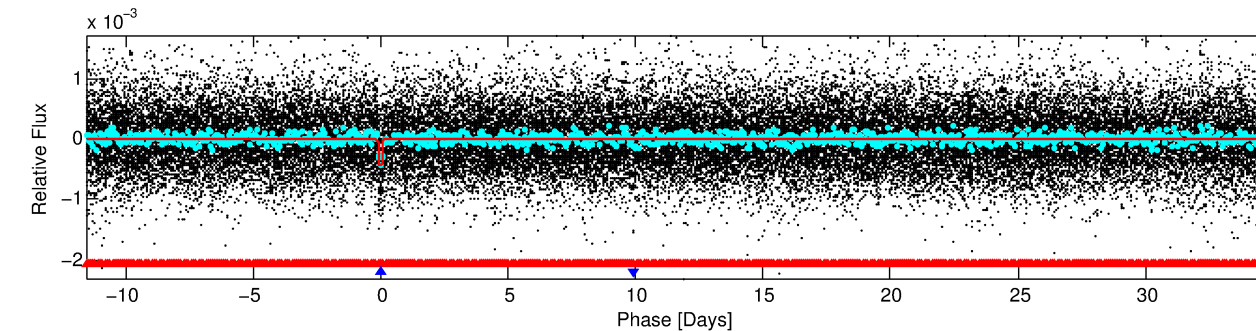
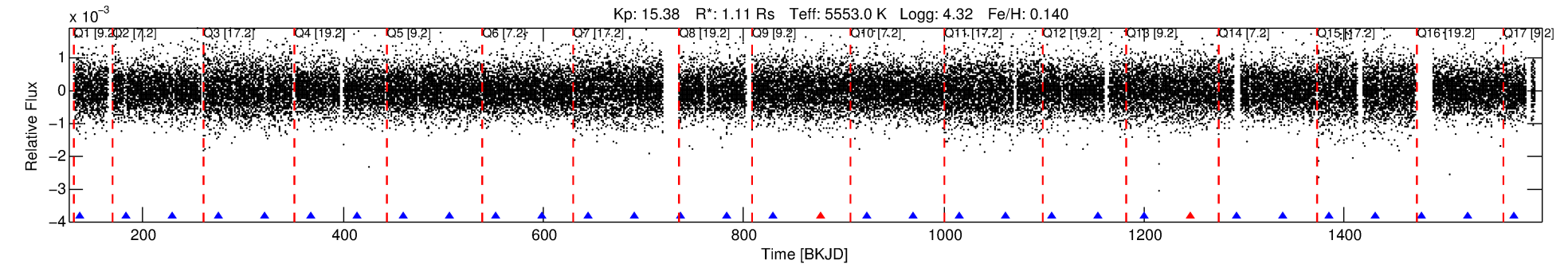
## Ephemeris Match Information For 005956656-02

No Significant Match Found

# DV One-Page Summary

KIC: 5956656 Candidate: 2 of 2 Period: 46.246 d

KOI: K01053.02 Corr: 0.939



## DV Fit Results:

Period = 46.24558 [0.00054] d  
Epoch = 136.4606 [0.0095] BKJD  
Rp/R\* = 0.0205 [0.0189]  
a/R\* = 50.48 [188.89]  
b = 0.72 [2.58]  
Seff = 17.18 [4.08]  
Teq = 519 [31] K  
Rp = 2.48 [2.31] Re  
a = 0.2465 [0.0353] AU  
Ag = 426.41 [820.29] [0.52 $\sigma$ ]  
Teffp = 3647 [1742] K [1.80 $\sigma$ ]

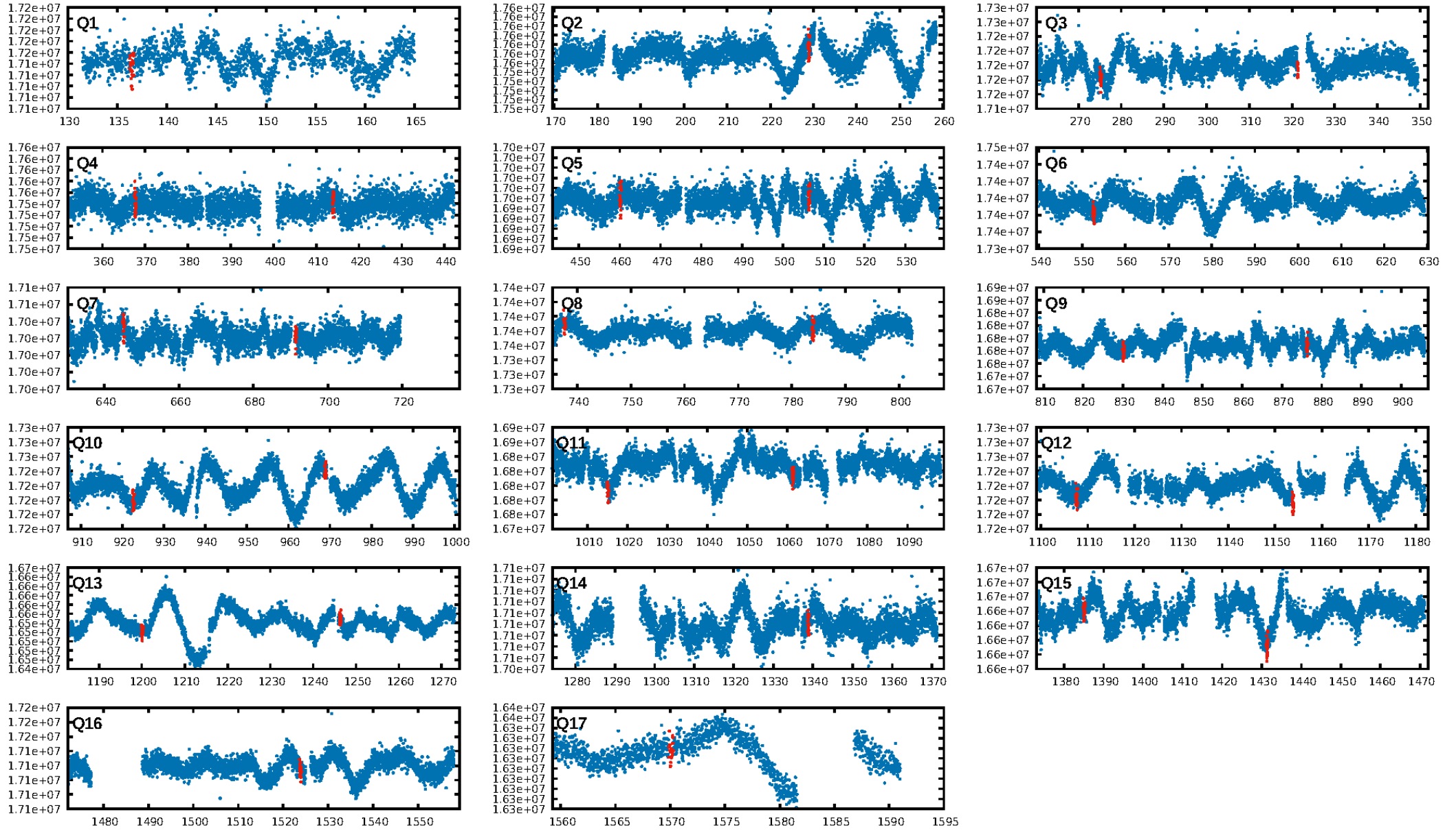
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [199.17 $\sigma$ ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 27.9%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 2.98e-17  
RollingBand-fgt: 0.92 [22/24]  
GhostDiagnostic-chr: 52.28  
Centroid-sig: 0.0%  
Centroid-so: 3.428 arcsec [2.52 $\sigma$ ]  
OotOffset-rm: 0.562 arcsec [1.51 $\sigma$ ]  
KicOffset-rm: 0.478 arcsec [1.31 $\sigma$ ]  
OotOffset-st: 2/2/2/2 [8]  
KicOffset-st: 2/2/2/2 [8]  
DiffImageQuality-fgm: 0.50 [4/8]  
DiffImageOverlap-fno: 0.33 [5/15]

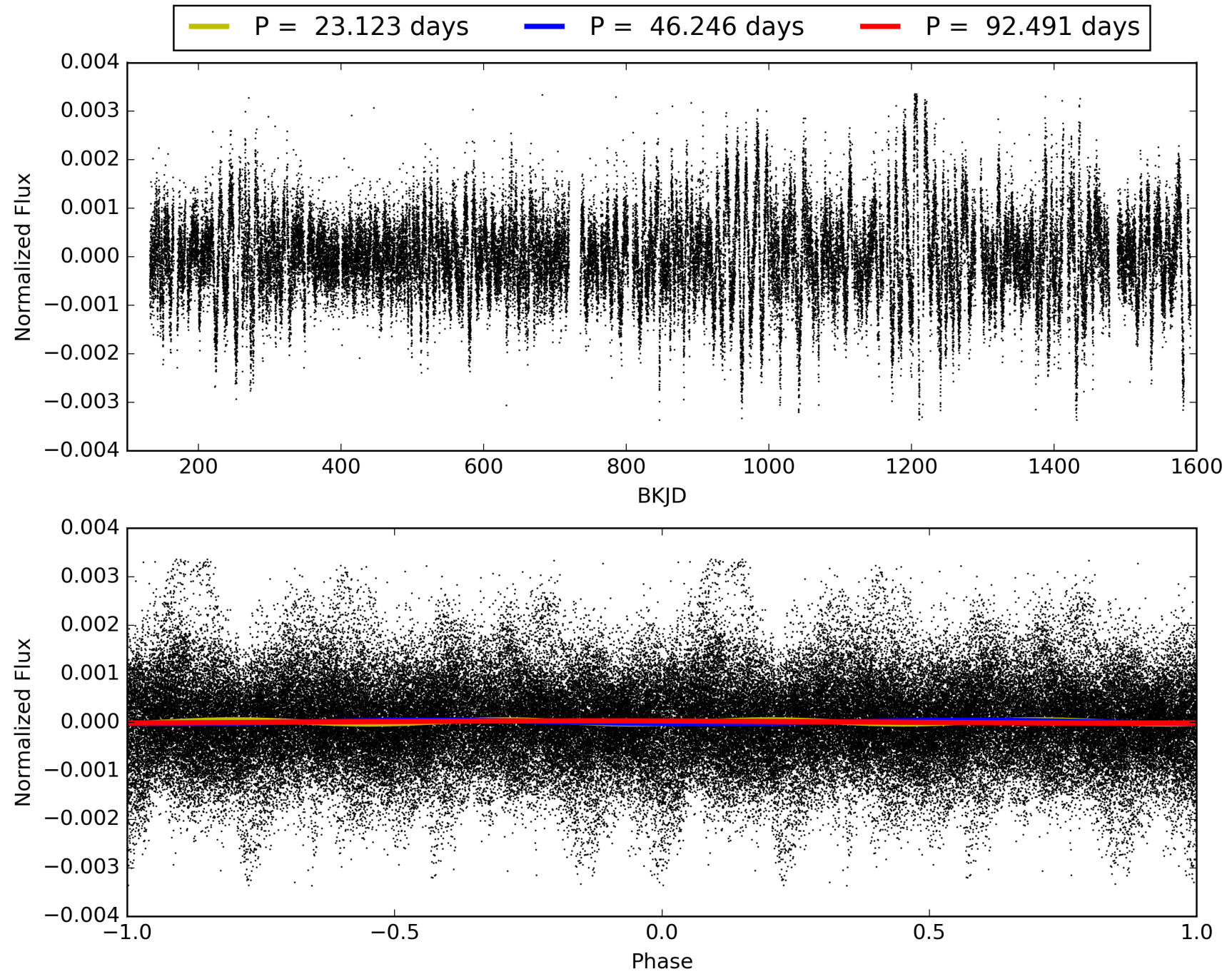
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 22:21:05 Z

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

# TCE 005956656-02, PDC Light Curves



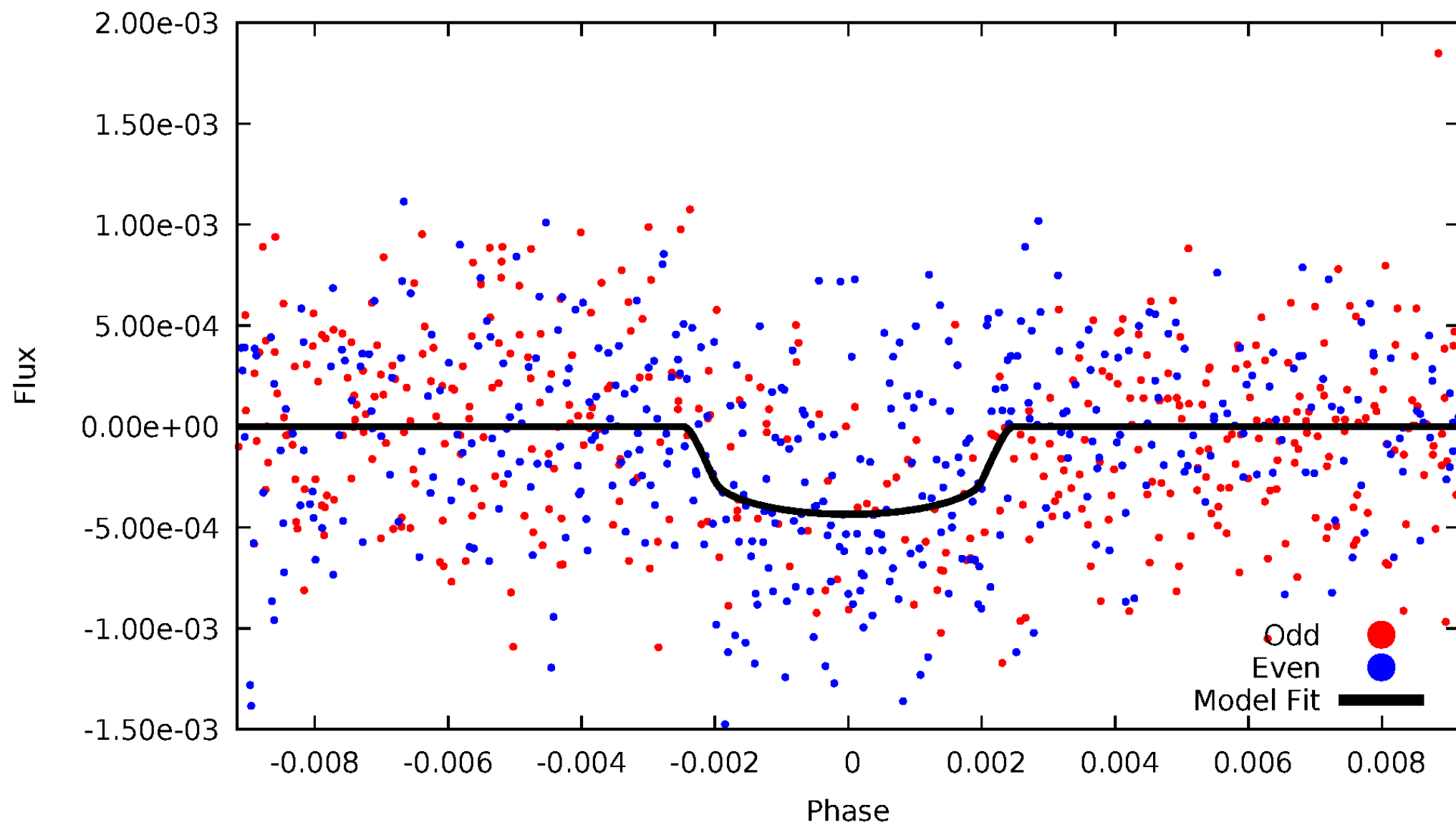
TCE 005956656-02





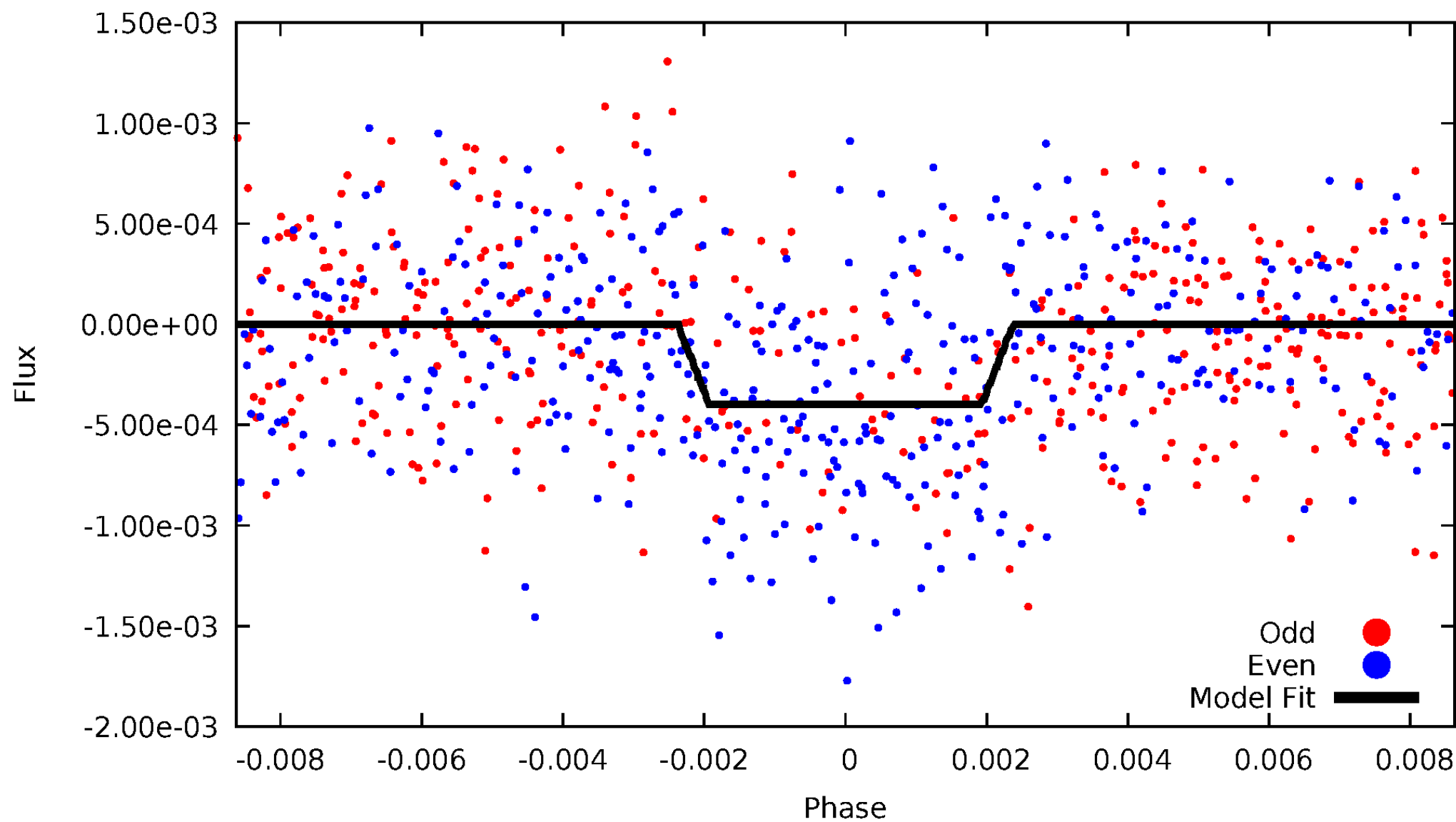
# DV Odd/Even

TCE 005956656-02



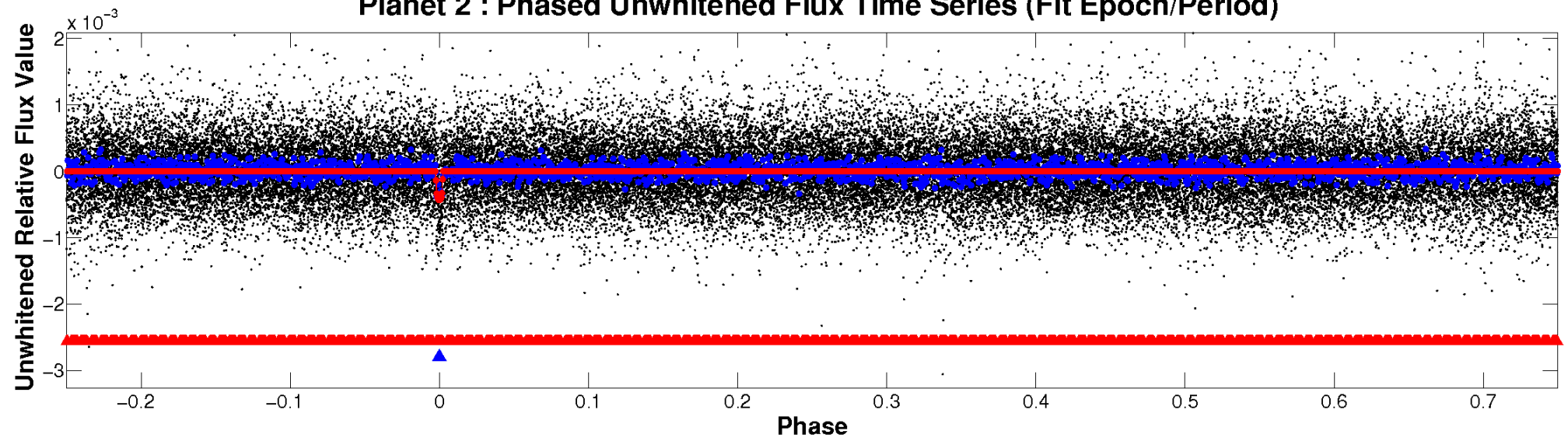
# ALT Odd/Even

TCE 005956656-02

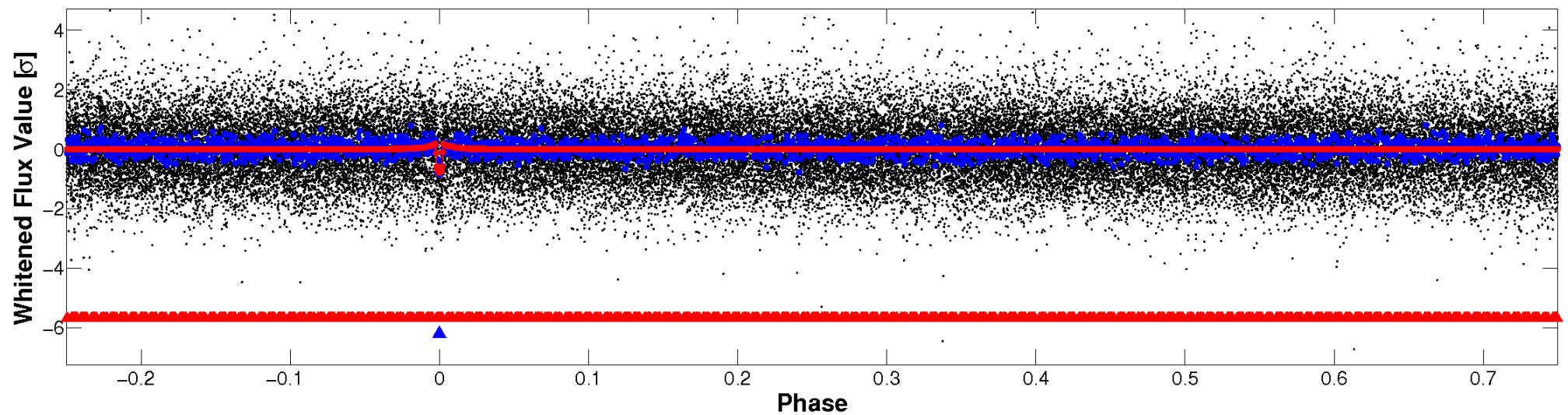


# Non-Whitened Vs. Whitened Light Curve

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

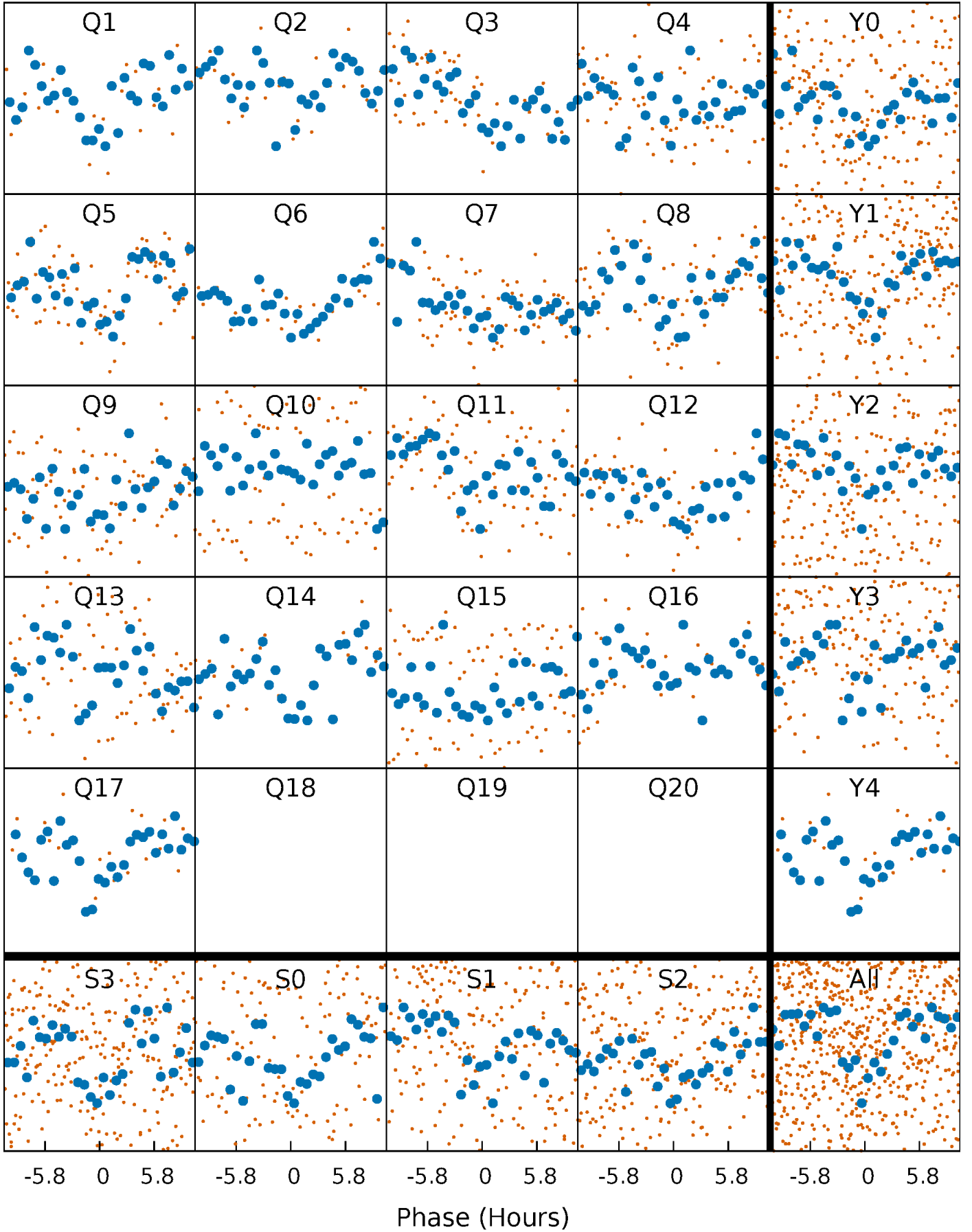


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



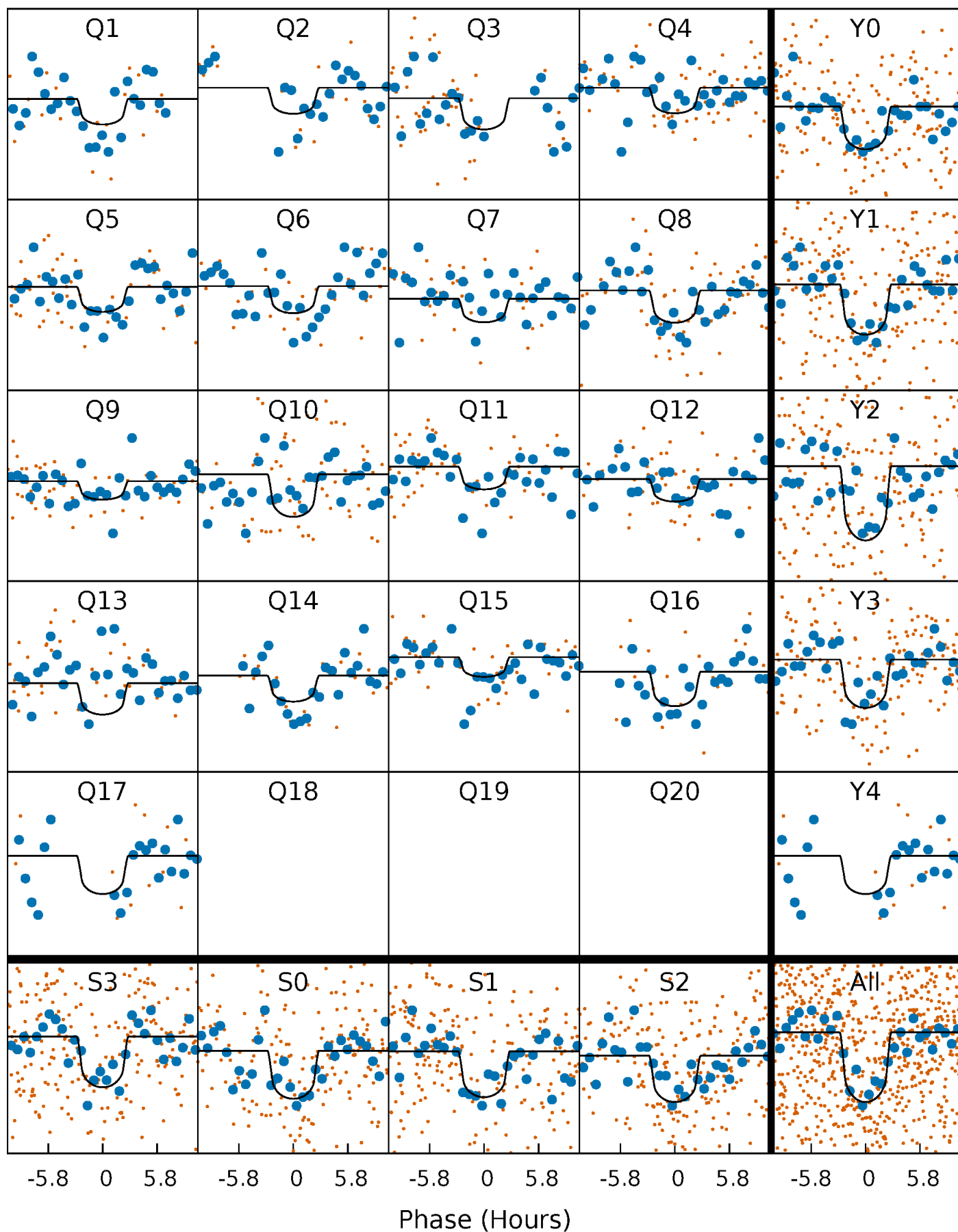
# PDC Quarter-Phased Transit Curves

TCE 005956656-02   P= 46.245584 Days    $T_0=136.460572$  (BKJD)



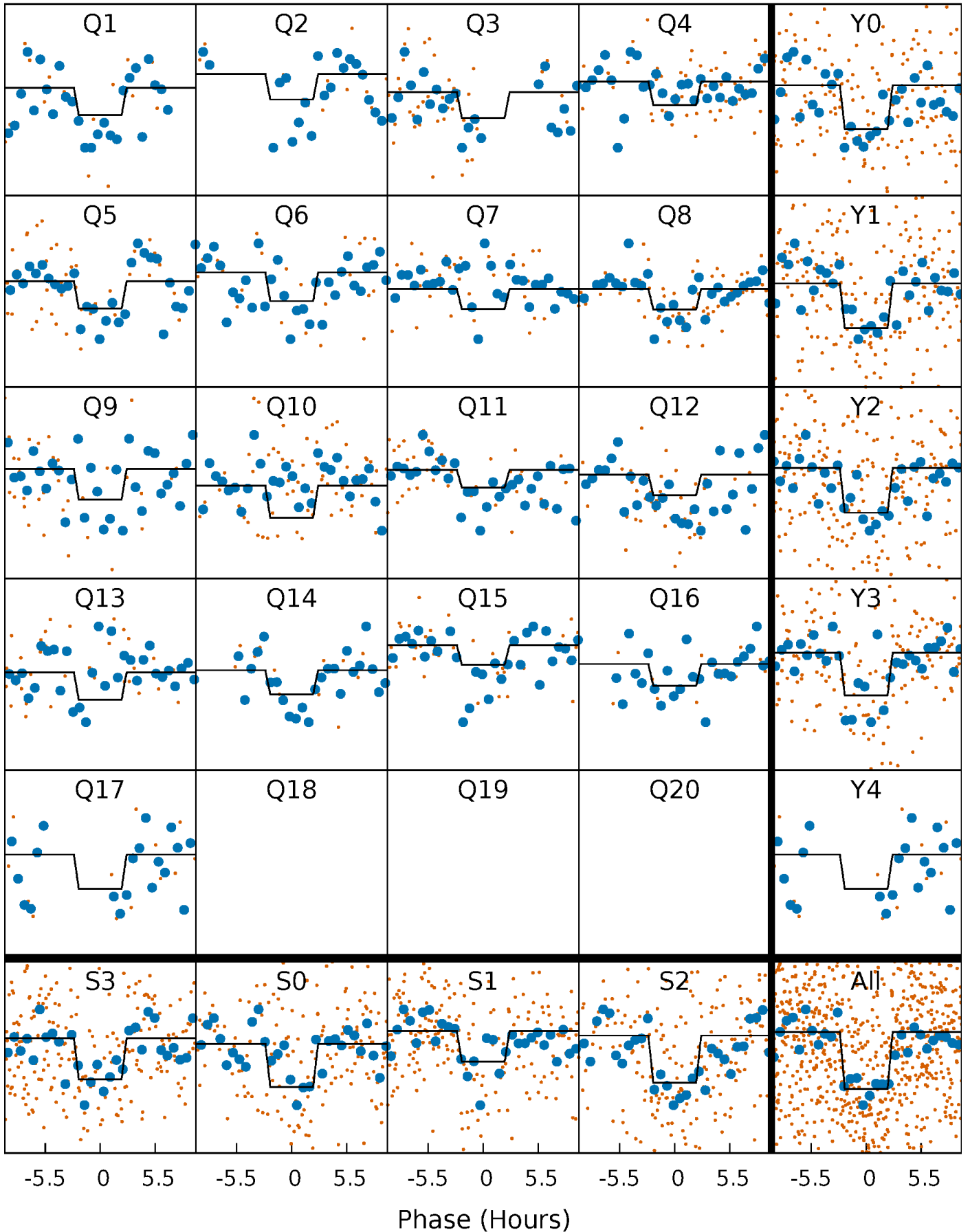
# DV Quarter-Phased Transit Curves

TCE 005956656-02   P= 46.245584 Days    $T_0=136.460572$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 005956656-02 P= 46.245319 Days  $T_0=136.465260$  (BKJD)

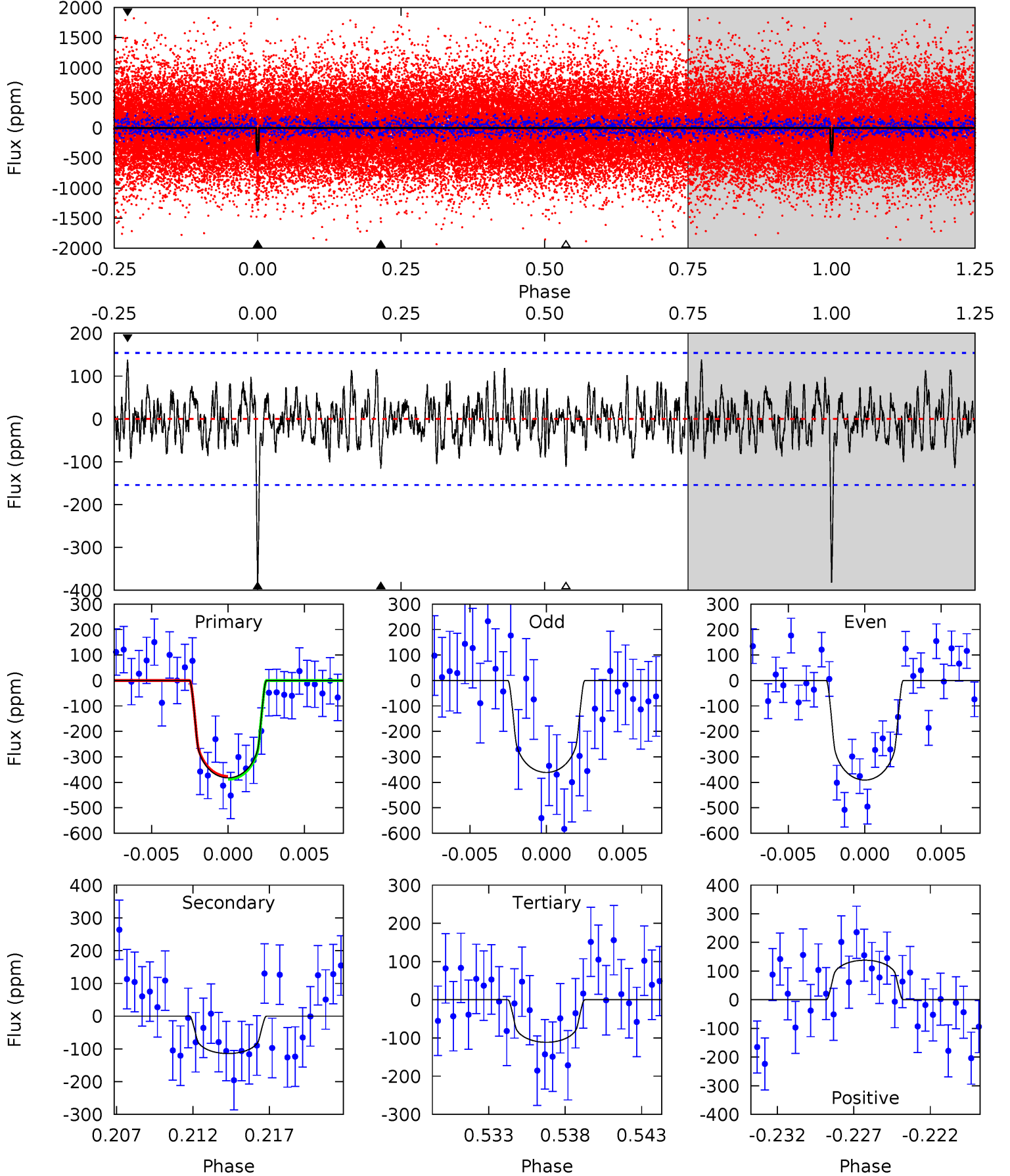




# DV Model-Shift Uniqueness Test

005956656-02, P = 46.245584 Days, E = 90.214988 Days

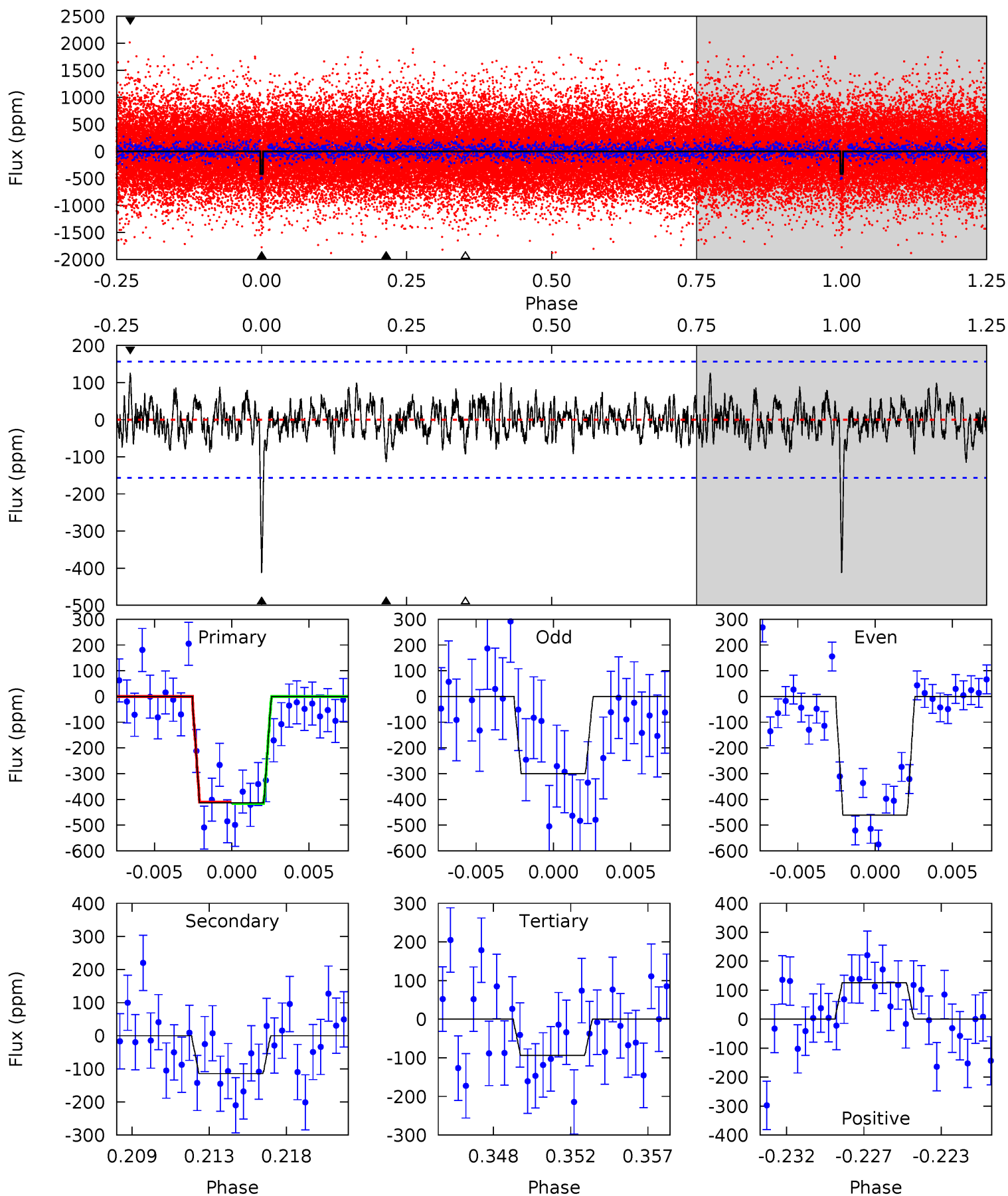
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
12.8	3.82	3.72	4.62	5.16	2.81	1.35	9.07	8.18	0.10	-0.79	0.46	0.88	0.27	0.19



# Alt Model-Shift Uniqueness Test

005956656-02, P = 46.245319 Days, E = 90.219941 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
13.6	3.77	3.08	4.16	5.17	2.83	1.15	10.6	9.47	0.69	-0.39	2.45	1.00	0.23	0.09



### Stellar Parameters For KIC 005956656

	$T_{\text{eff}} (K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5553^{+74}_{-74}$	$4.320^{+0.137}_{-0.100}$	$0.140^{+0.150}_{-0.150}$	$1.107^{+0.161}_{-0.161}$	$0.933^{+0.067}_{-0.043}$	$0.970^{+0.601}_{-0.317}$
	+1%/-1%	+3%/-2%	+107%/-107%	+15%/-15%	+7%/-5%	+62%/-33%
Source	SPE90	SPE90	SPE90	DSEP		

KIC = Kepler Input Catalog; PHO = Photometry; SPE = Spectroscopy; AST = Asteroseismology  
 TRA = Transits; DESP = Dartmouth Models; MULT = Multiple Models

### Secondary Eclipse Parameters for KIC 005956656-02 / KOI 1053.02

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	-114±30	$2.80^{+2.16}_{-1.73}$	$722^{+30}_{-31}$	$4020^{+2063}_{-707}$	$486^{+2760}_{-340}$
Alt.	-114±30	$2.84^{+2.19}_{-1.82}$	$723^{+30}_{-33}$	$4022^{+2180}_{-701}$	$466^{+3152}_{-323}$

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

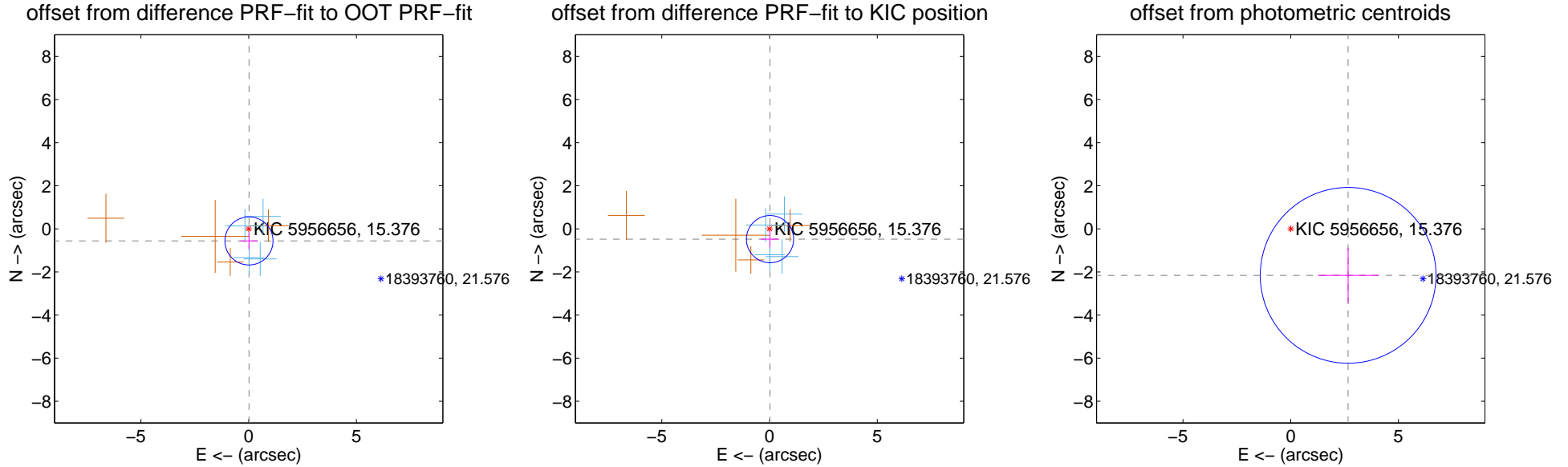
## DV Centroid Data

Supplemental centroid analysis for 005956656-02. Kepler magnitude: 15.38. Transit SNR 9.98

There are 4 quarters with good PRF difference image offsets

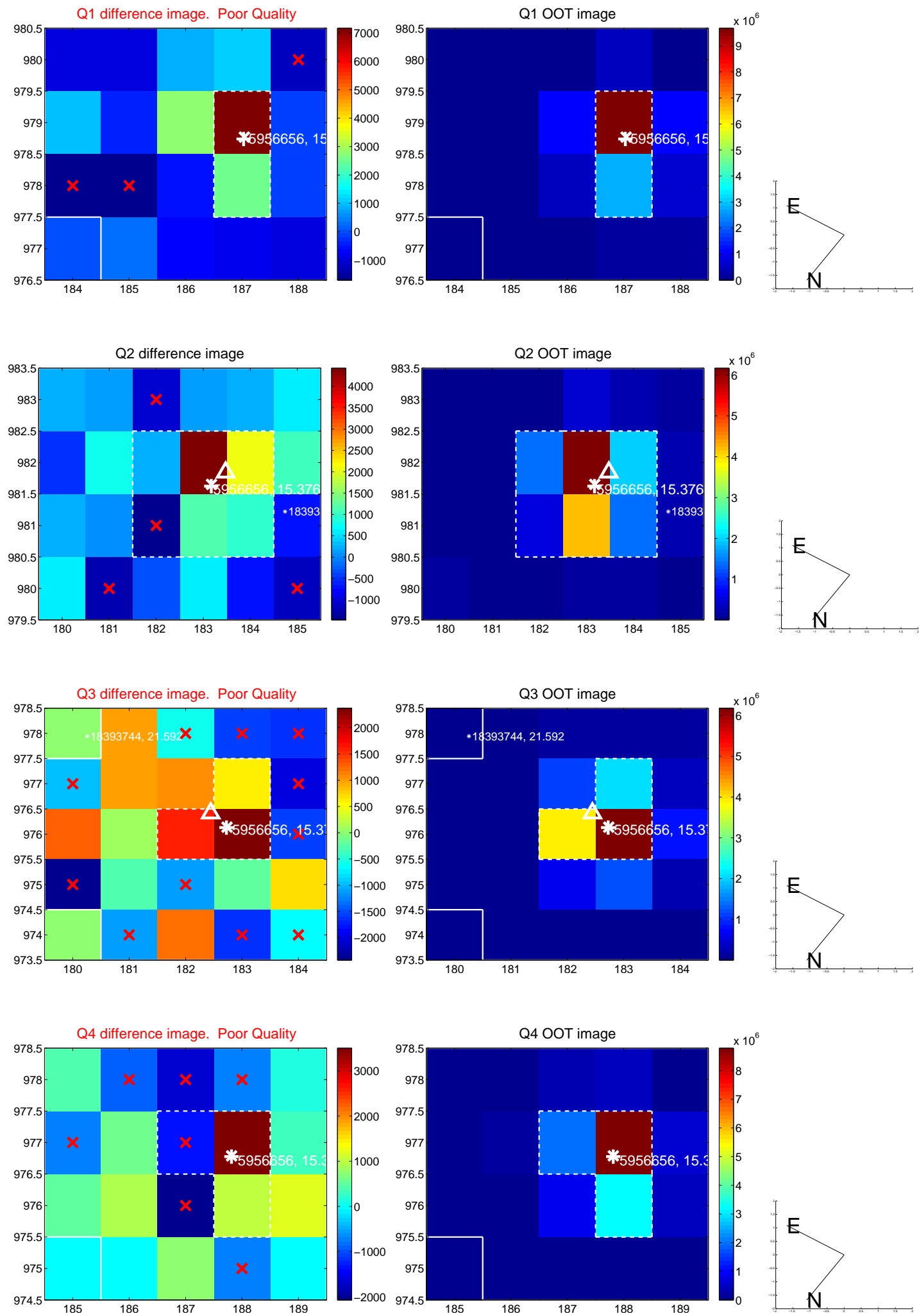
The direct PRF centroid is offset from the target star catalog position by about 0.13 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.562 \pm 0.372$	1.51	$-0.014 \pm 0.406$	$-0.562 \pm 0.372$
PRF-fit source offset from KIC position	$0.478 \pm 0.365$	1.31	$-0.021 \pm 0.414$	$-0.478 \pm 0.365$
photometric centroid source offset	$3.43 \pm 1.36$	2.52	$-2.66 \pm 1.41$	$-2.16 \pm 1.28$



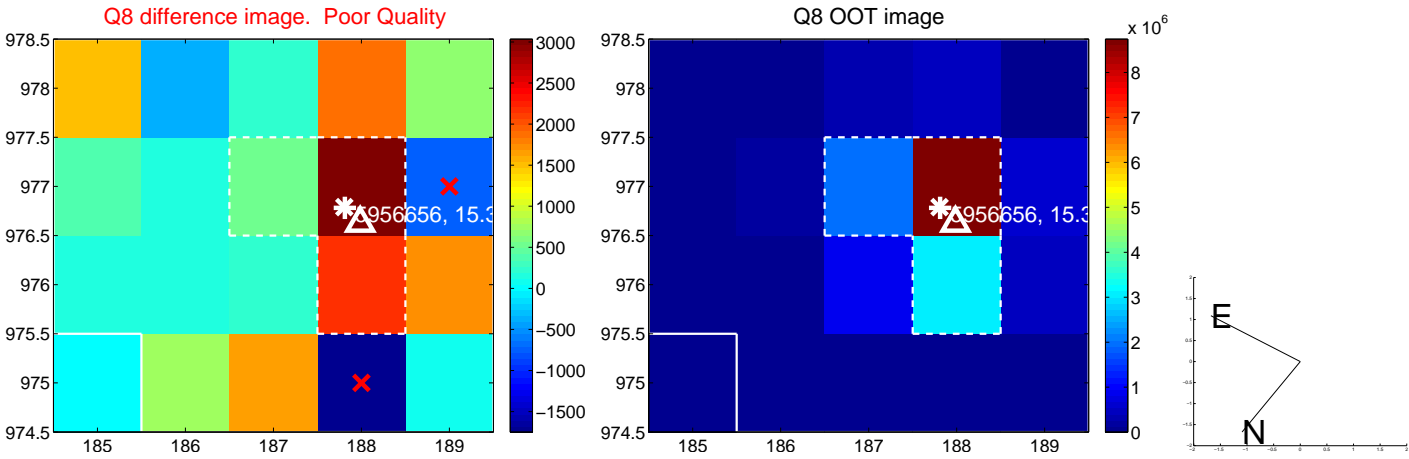
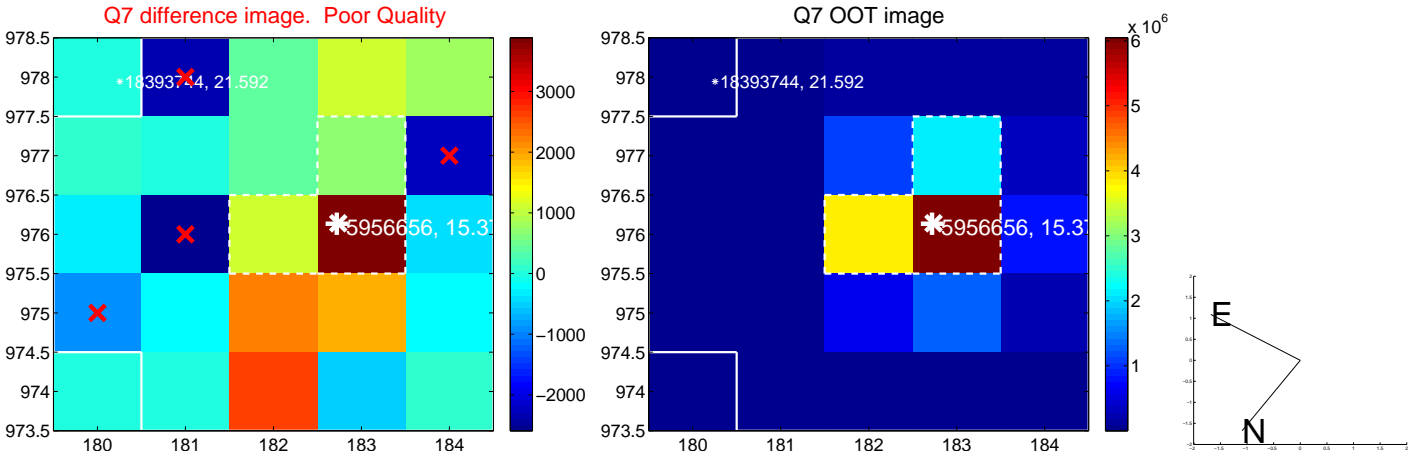
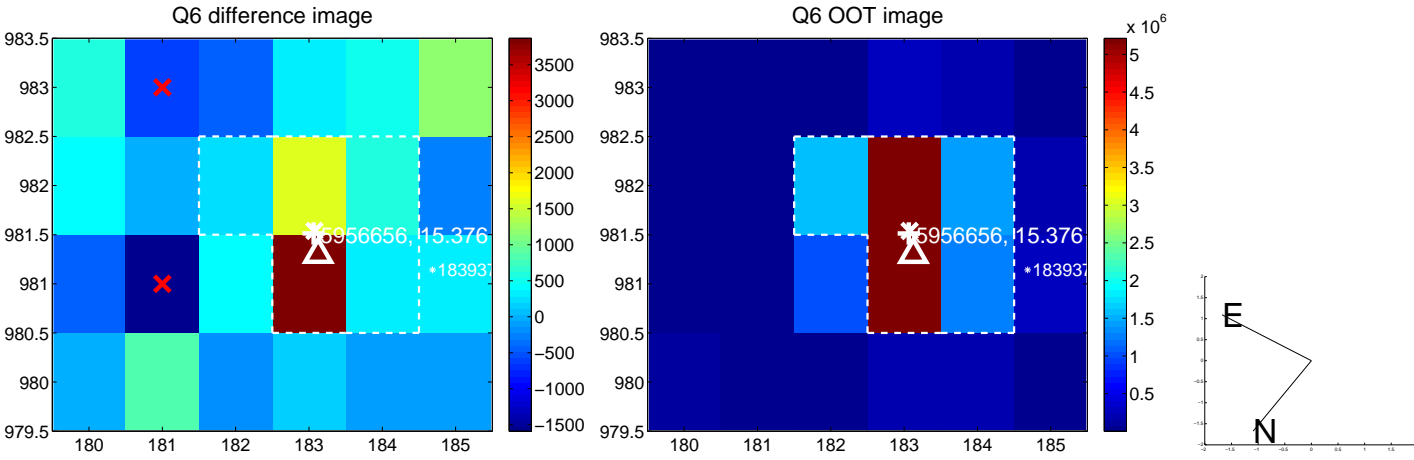
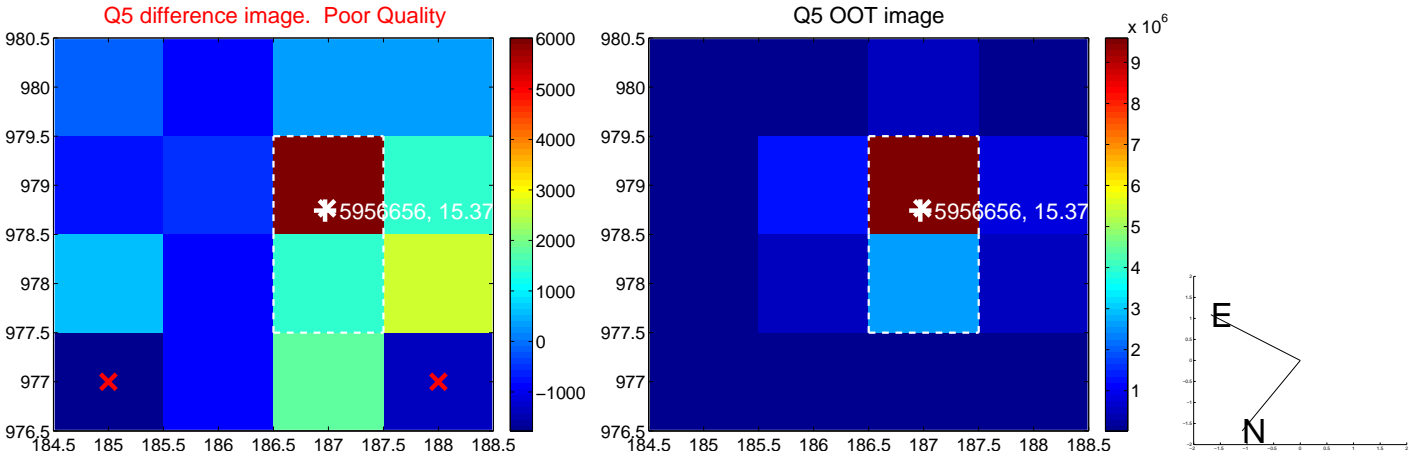
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

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

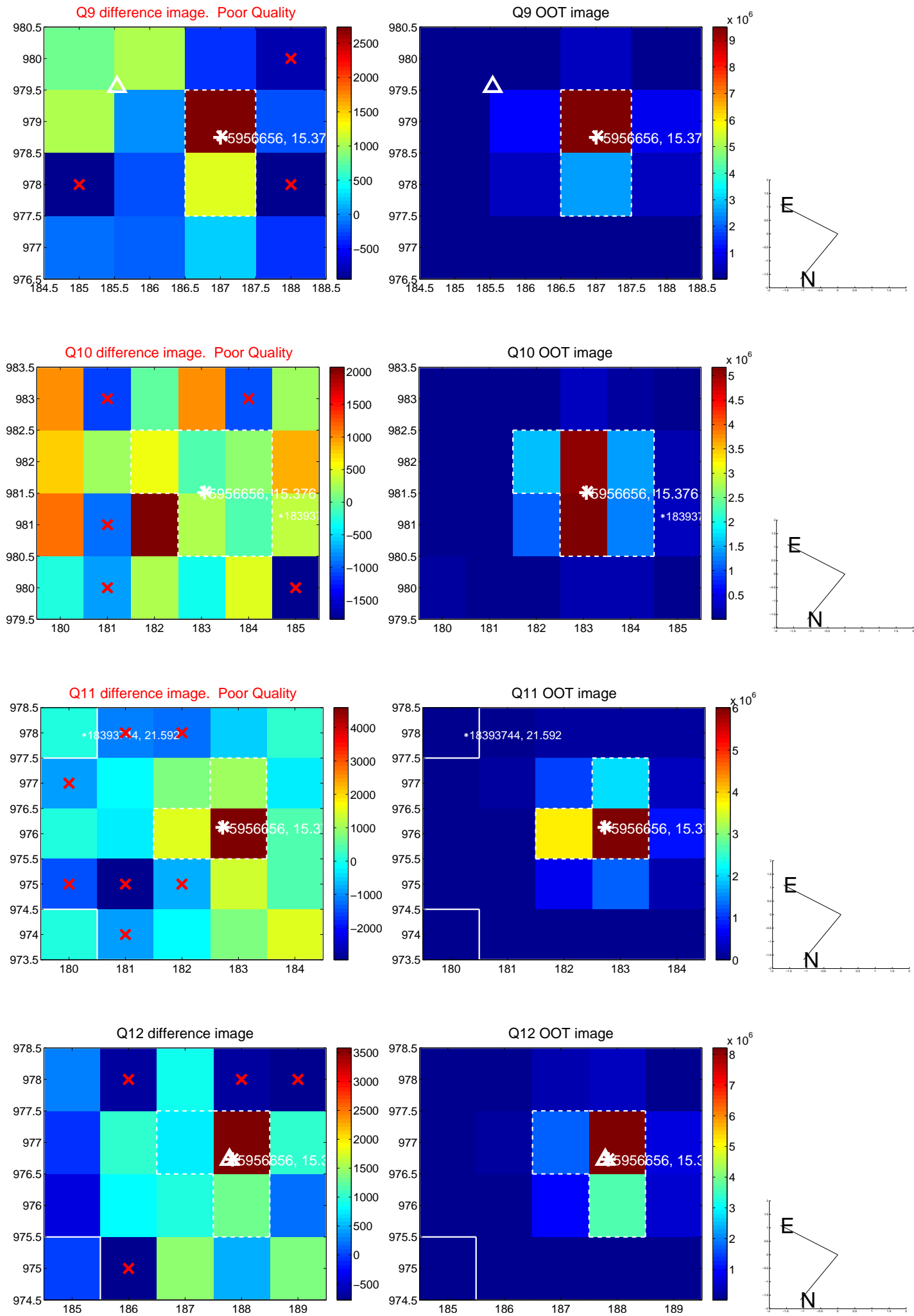




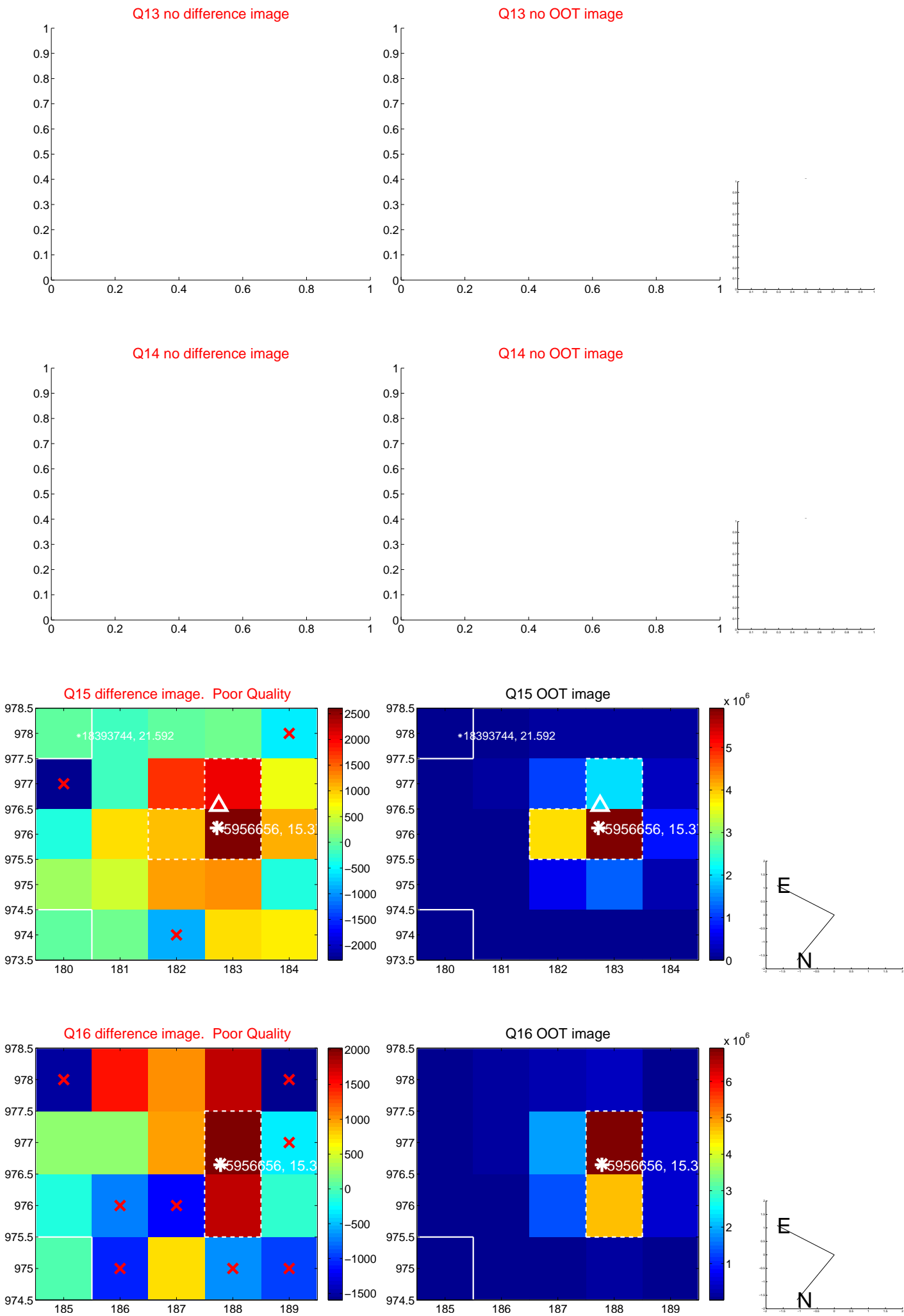
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



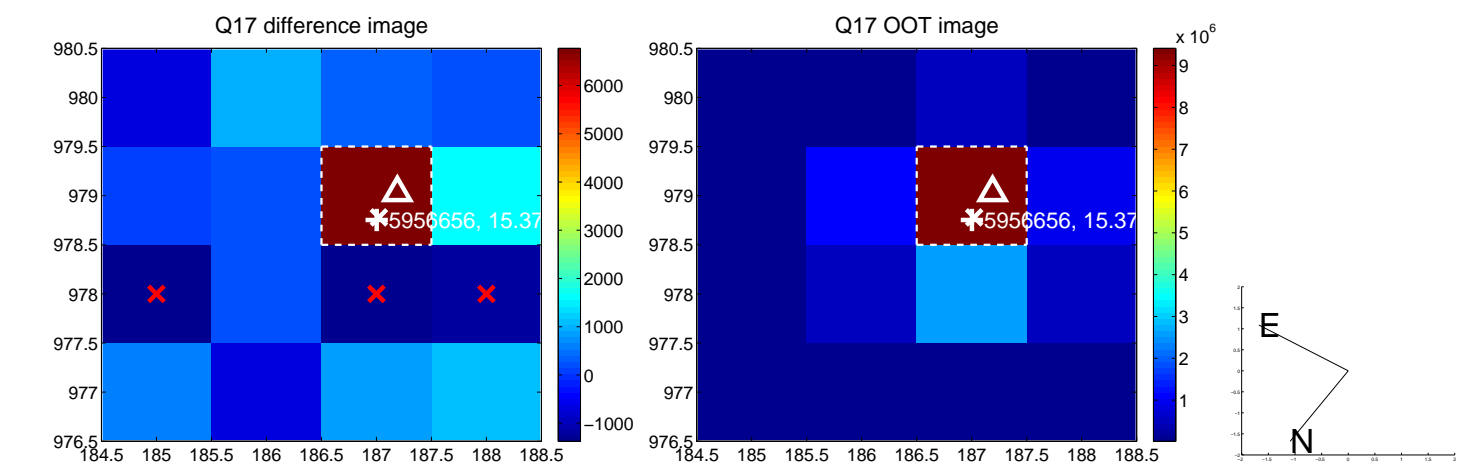
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



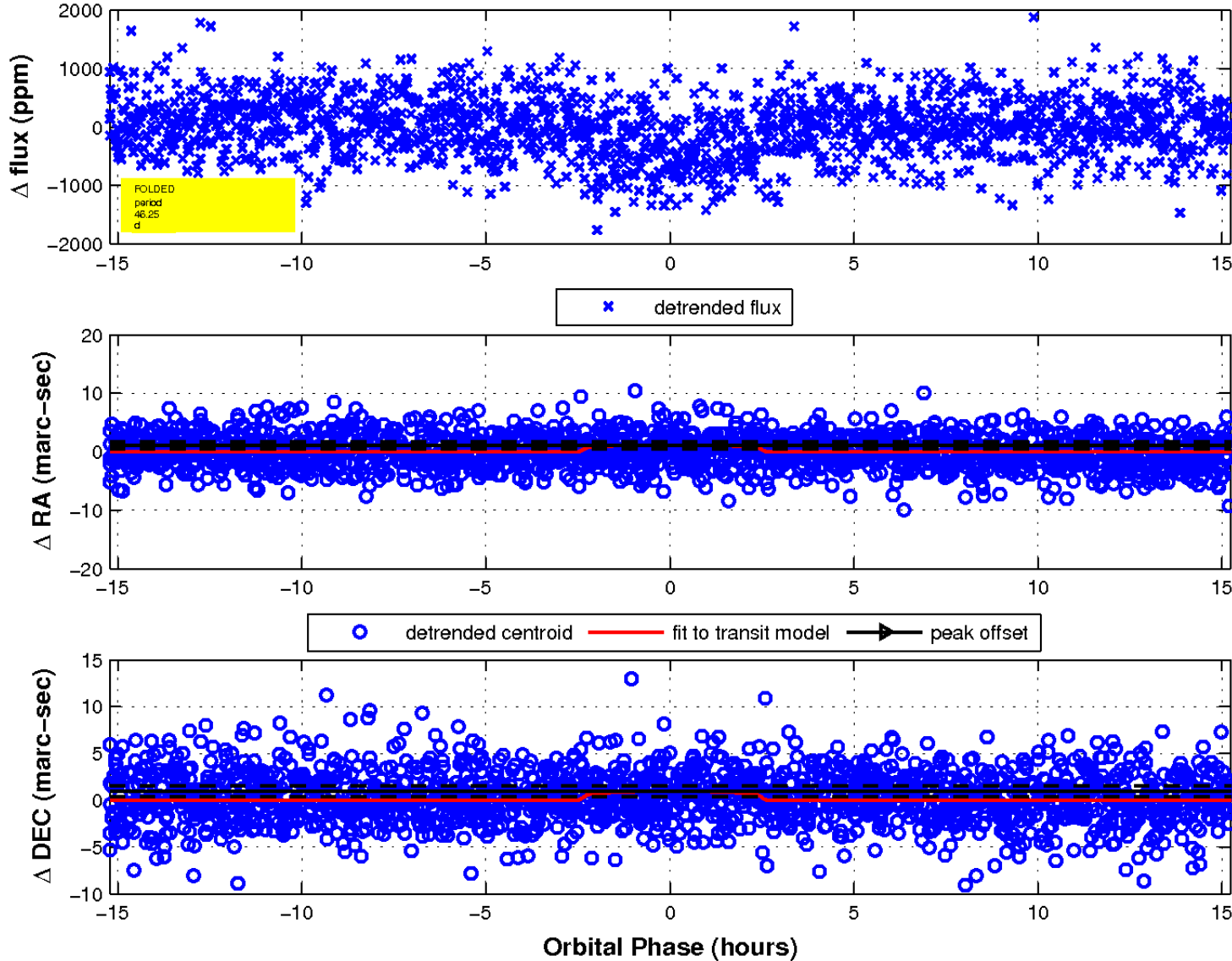
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



fluxWeightedCentroids, Planet 2 of 2



UKIRT Image

Declination

