

# KIC 007959867

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
007959867-01	OBS	No	2.781471	133.526728	98.0	15.206	10.6	9.4	2.86	8697	3.11	16042.78
007959867-02	OBS	No	1.880356	131.910955	164.6	22.564	12.3	12.4	2.86	8697	6.90	27039.11

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
007959867-01	OBS	FP	0.00	1	0	0	0	LPP_DV—CENT_SATURATED
007959867-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—CENT_SATURATED

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

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

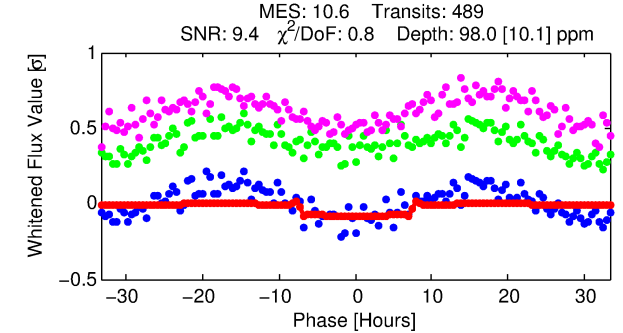
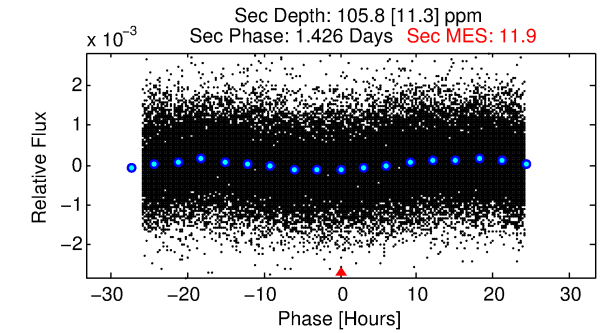
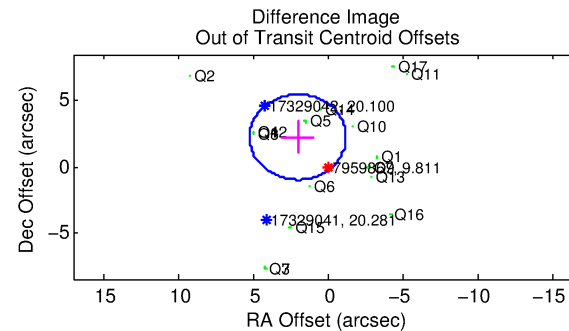
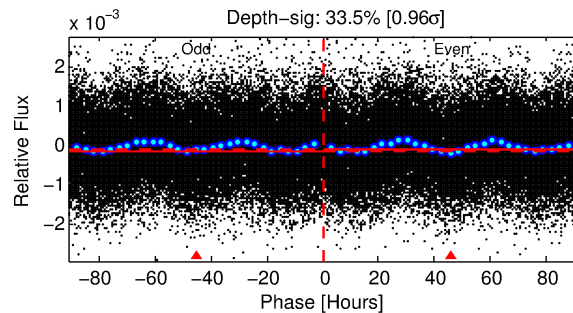
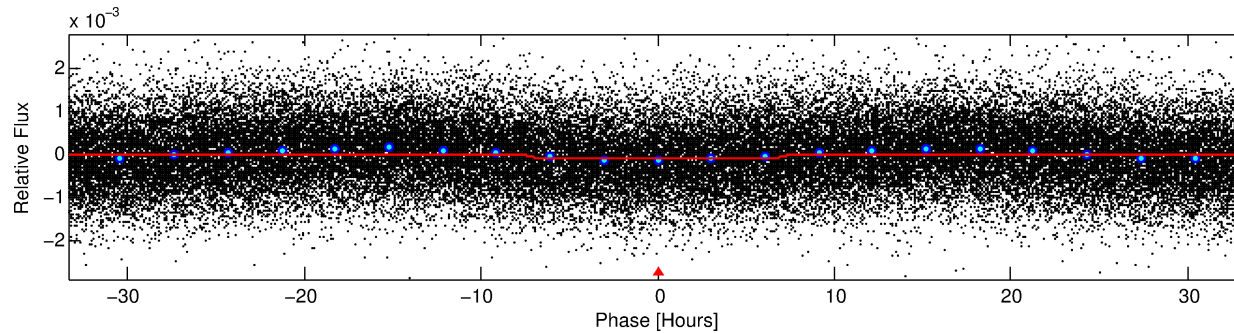
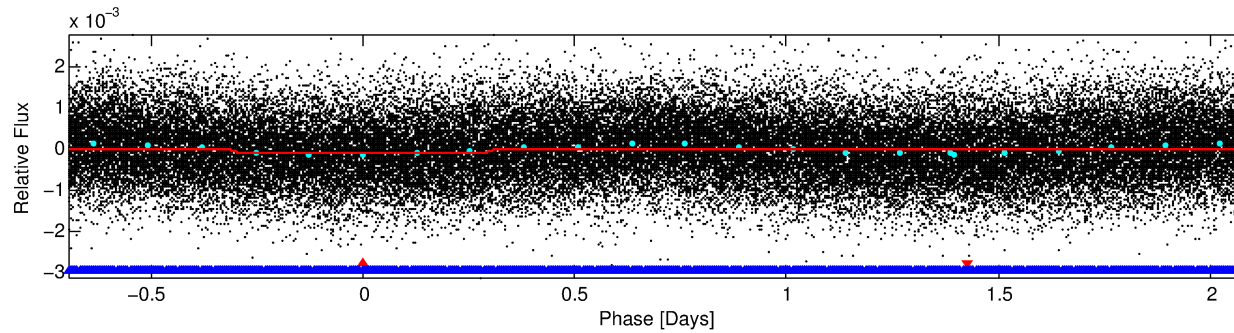
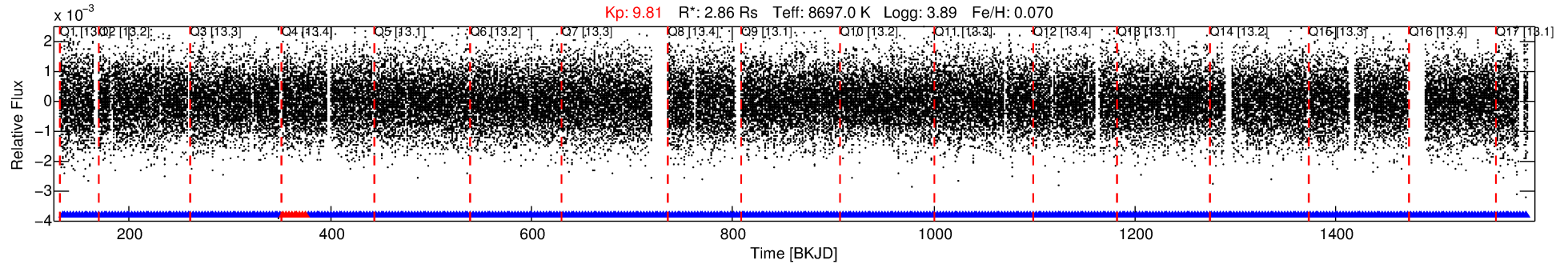
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 007959867-01

No Significant Match Found

# DV One-Page Summary

KIC: 7959867 Candidate: 1 of 2 Period: 2.781 d



## DV Fit Results:

Period = 2.78147 [0.00004] d  
Epoch = 133.5267 [0.0074] BKJD  
 $R_p/R^*$  = 0.0100 [0.0014]  
 $a/R^*$  = 1.24 [0.38]  
 $b$  = 0.79 [0.42]  
 $S_{\text{eff}}$  = 16042.78 [9316.47]  
 $T_{\text{eq}}$  = 2870 [417] K  
 $R_p$  = 3.11 [1.38]  $R_e$   
 $a$  = 0.0511 [0.0187] AU  
 $A_g$  = 15.71 [9.87] [1.49 $\sigma$ ]  
 $T_{\text{eff}}$  = 8834 [791] K [6.67 $\sigma$ ]

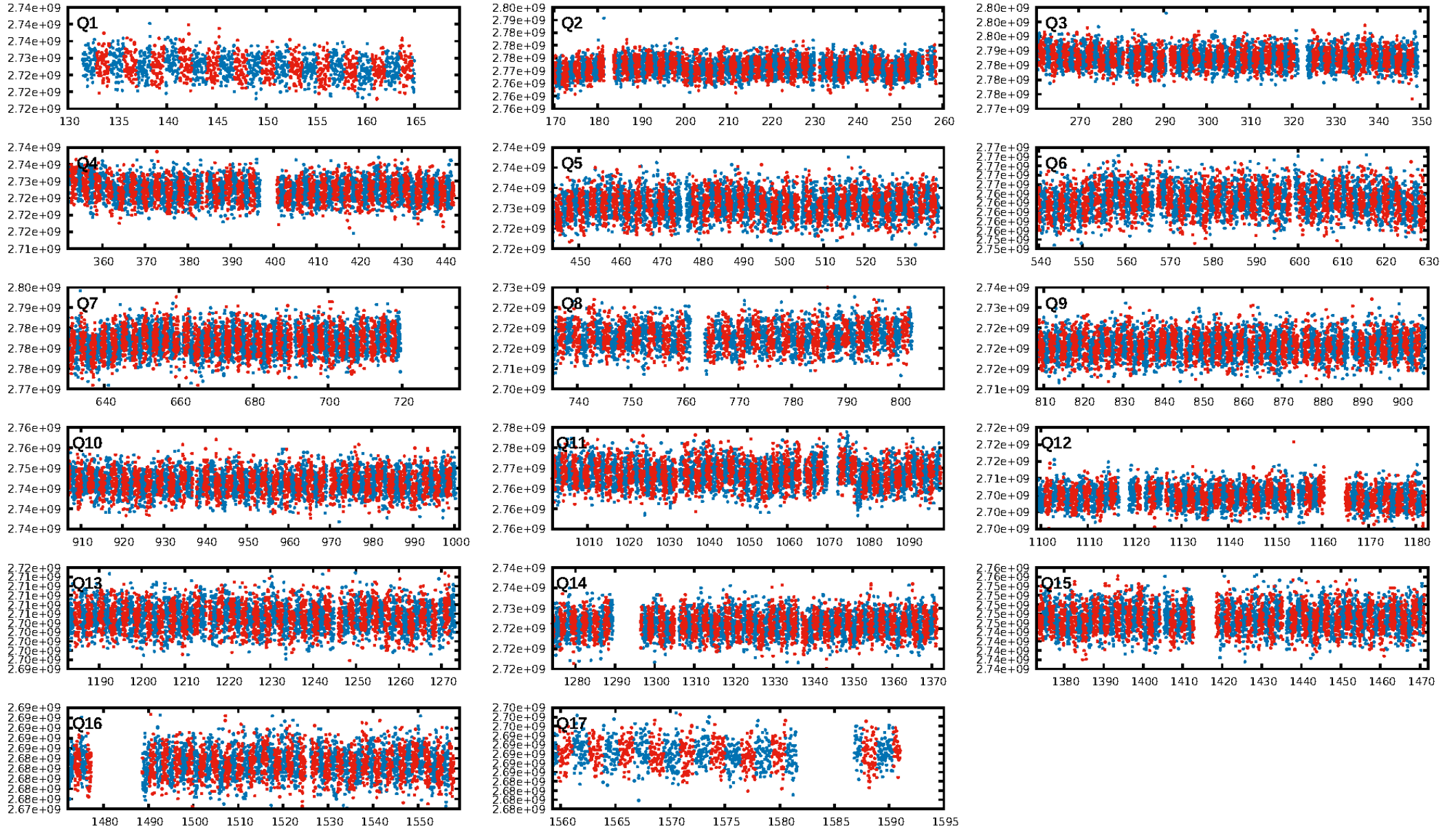
## DV Diagnostic Results:

ShortPeriod-sig: 57.3% [0.79 $\sigma$ ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 0.98 [458/467]  
GhostDiagnostic-chr: N/A  
Centroid-sig: 0.0%  
Centroid-so: 1.058 arcsec [3.58 $\sigma$ ]  
OotOffset-rm: 2.990 arcsec [2.78 $\sigma$ ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-rm: 2.301 arcsec [2.15 $\sigma$ ]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 0.06 [1/17]  
DiffImageOverlap-fno: 0.00 [0/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 06:31:01 Z

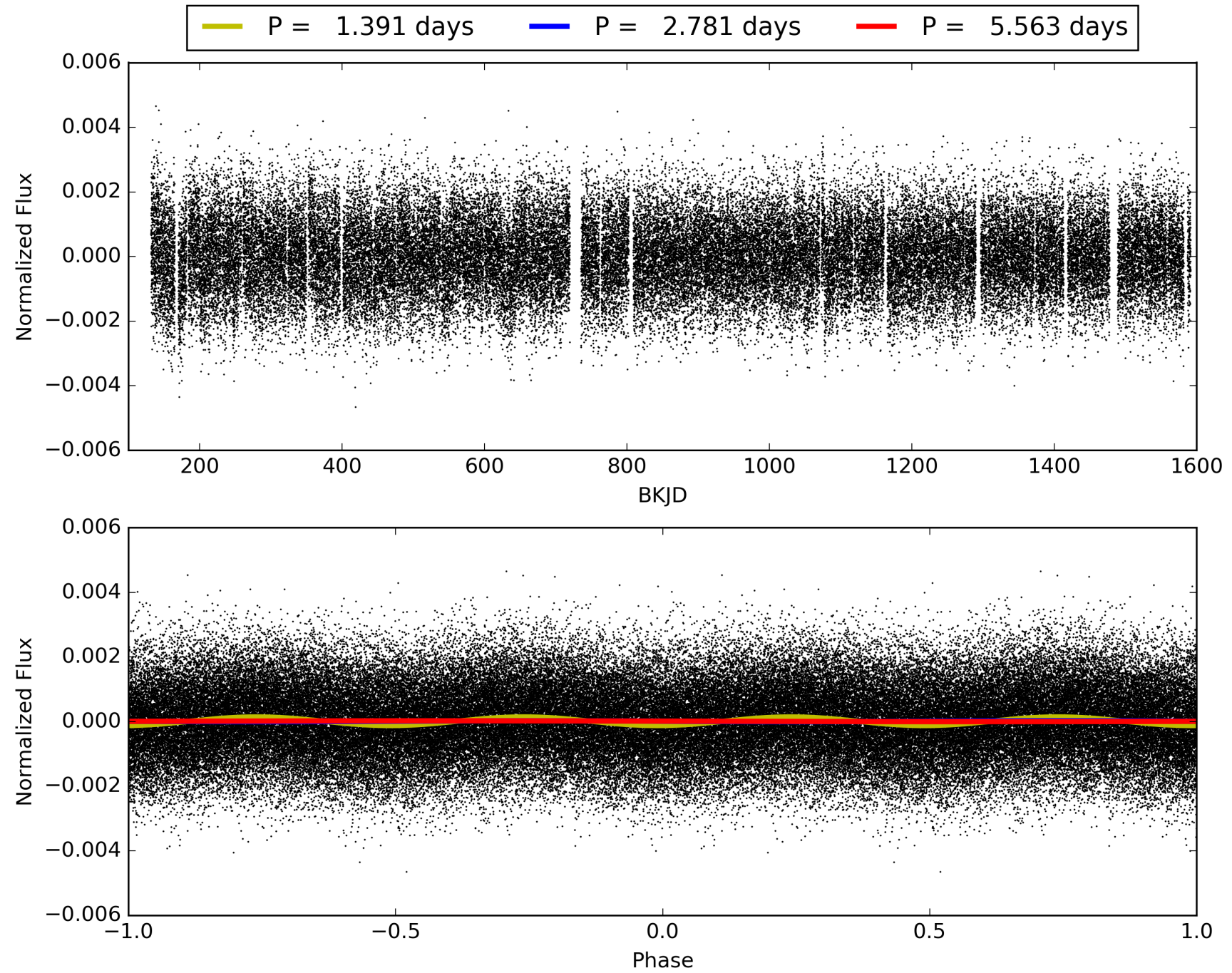
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 007959867-01, PDC Light Curves



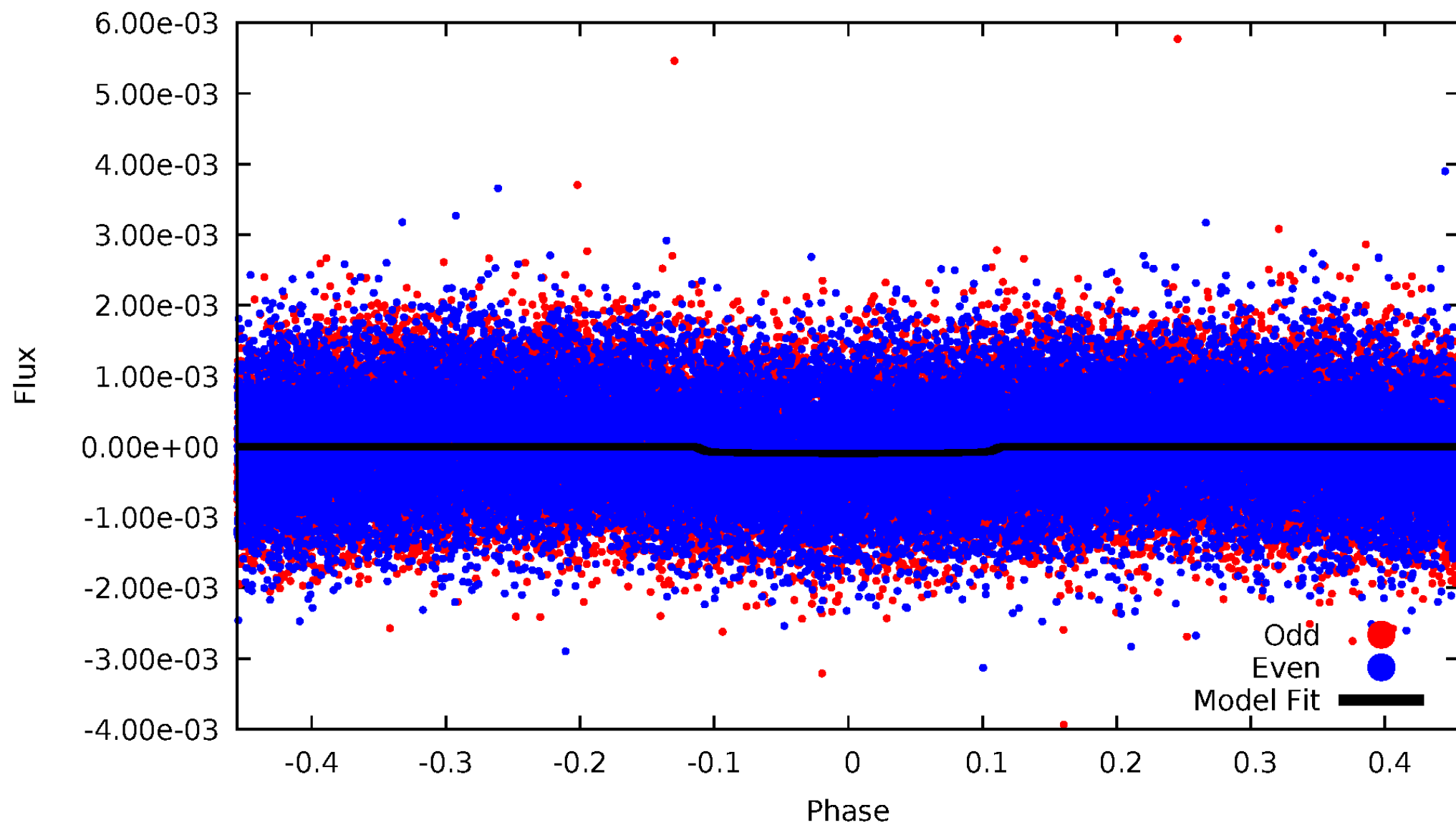


TCE 007959867-01



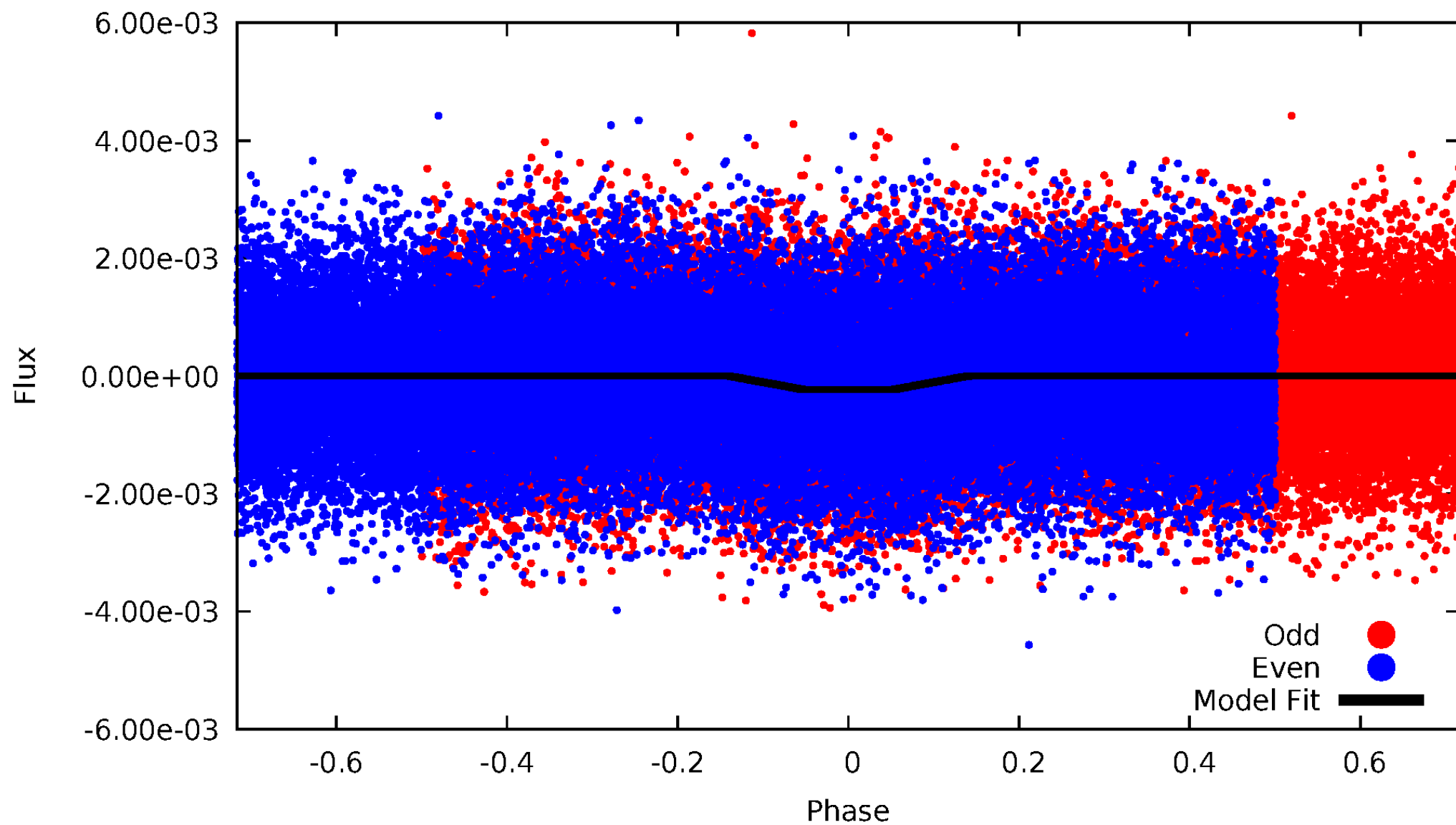
# DV Odd/Even

TCE 007959867-01



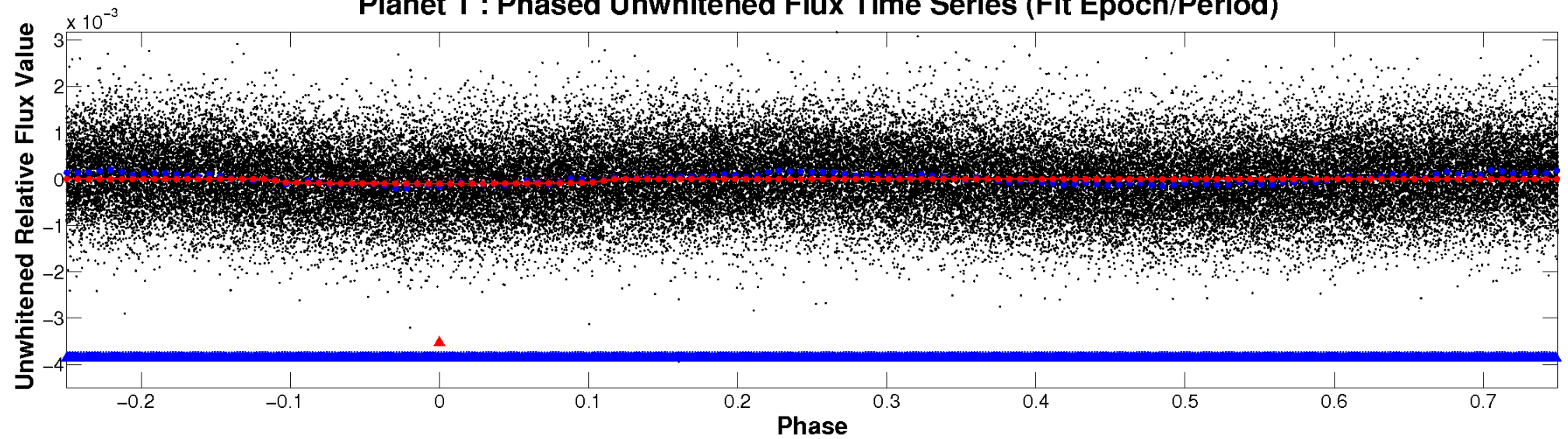
# ALT Odd/Even

TCE 007959867-01

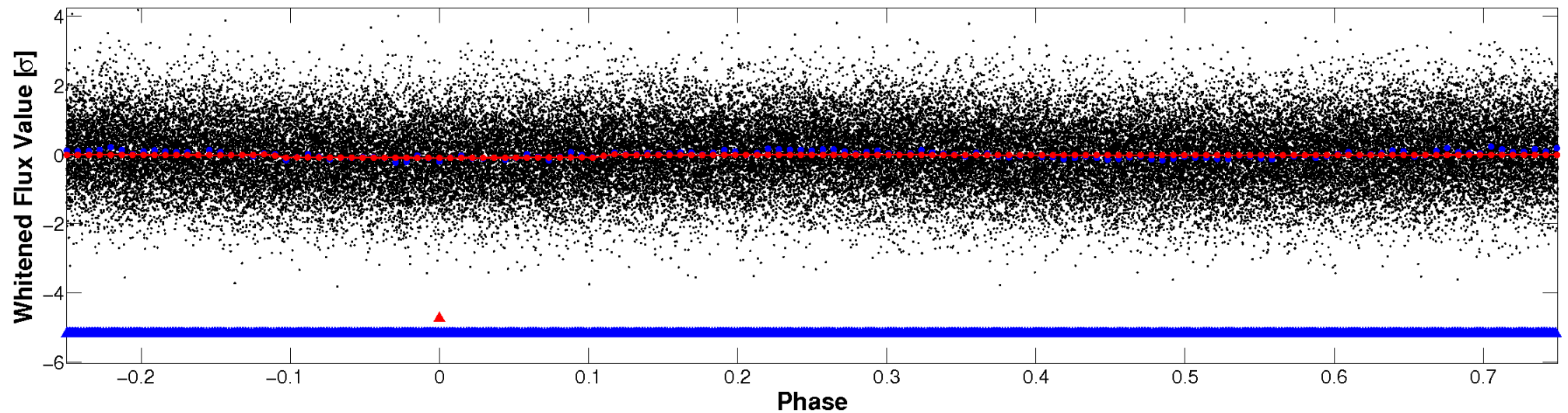


# Non-Whitened Vs. Whitened Light Curve

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



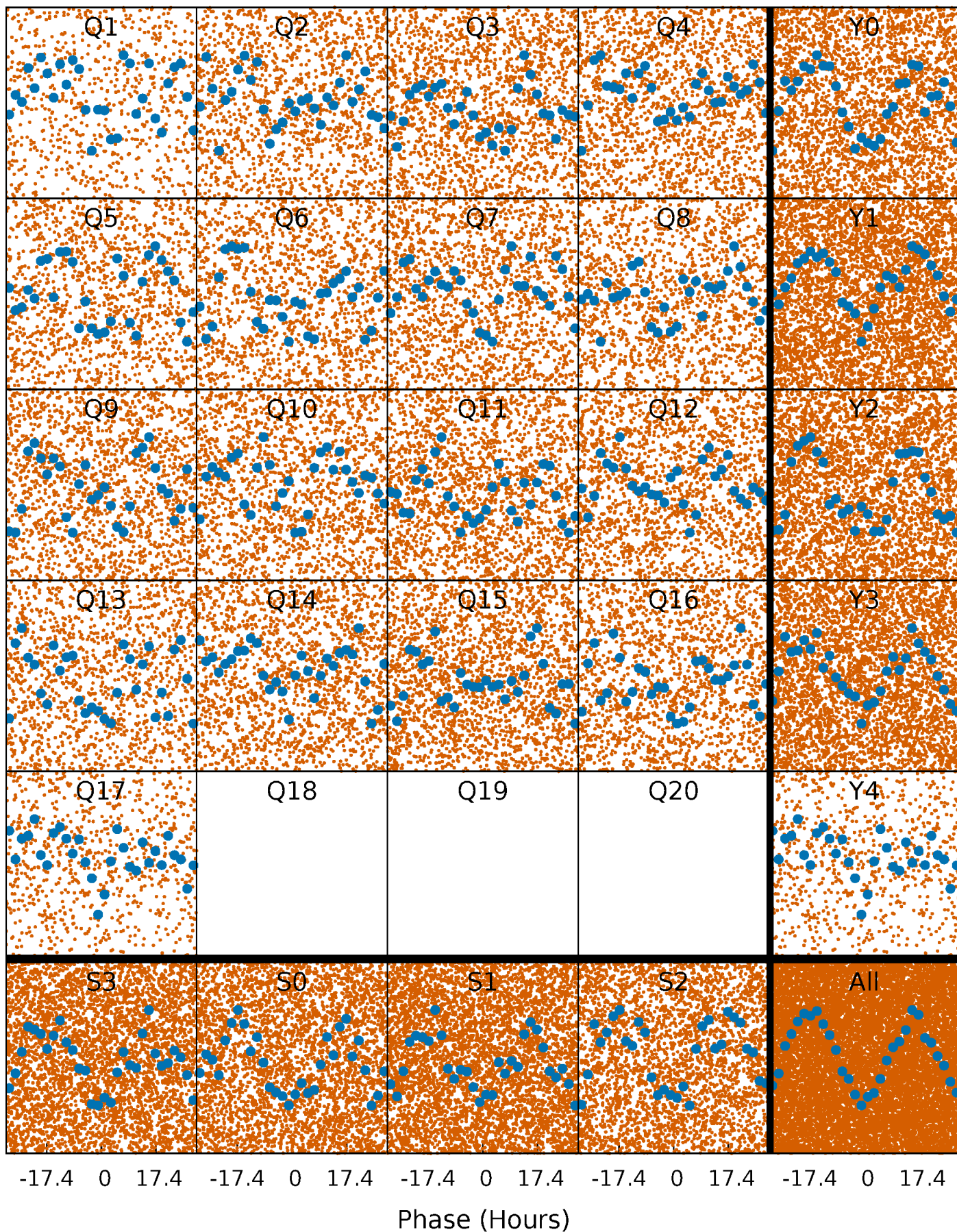
Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)





# PDC Quarter-Phased Transit Curves

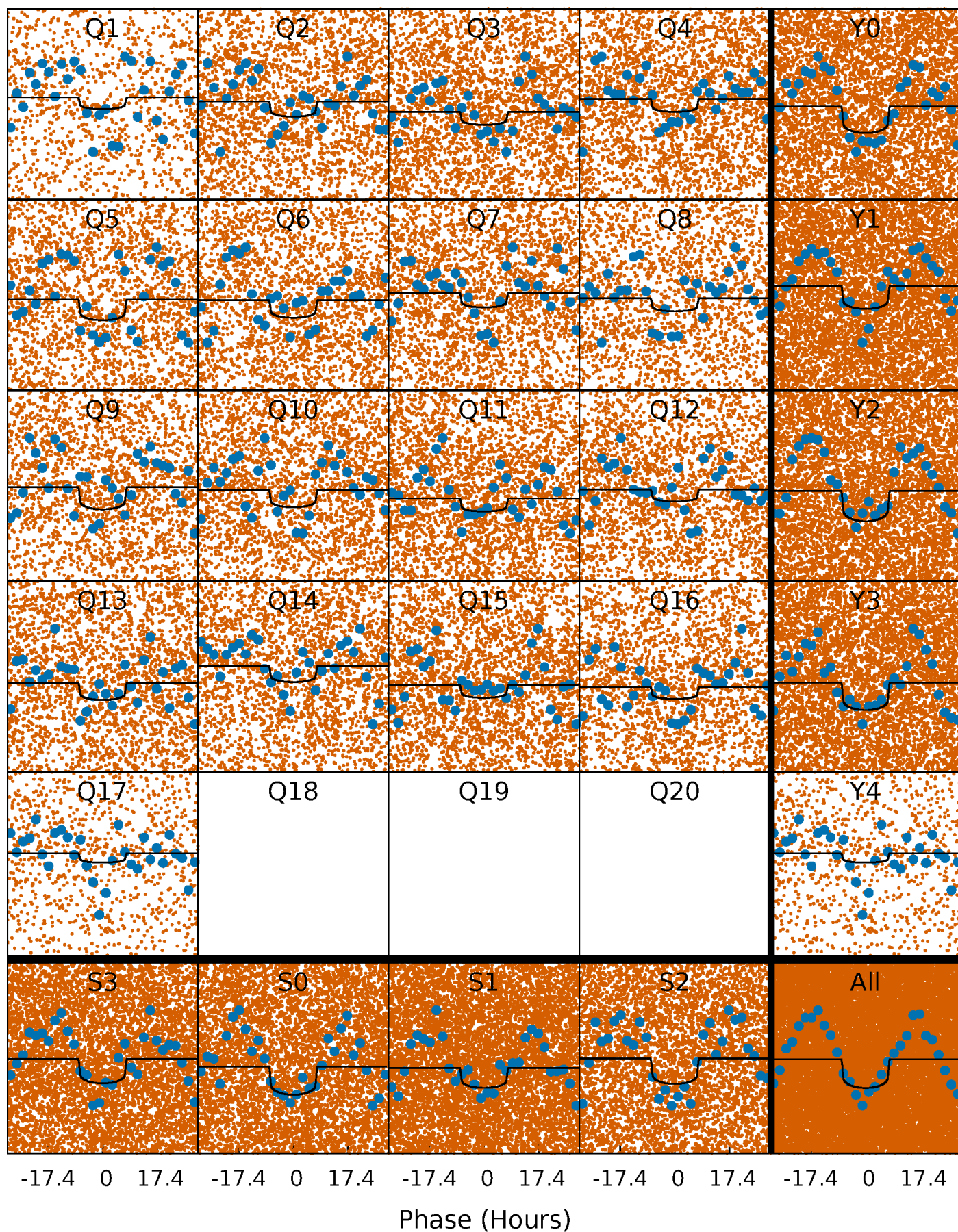
TCE 007959867-01 P= 2.781471 Days  $T_0=133.526728$  (BKJD)





# DV Quarter-Phased Transit Curves

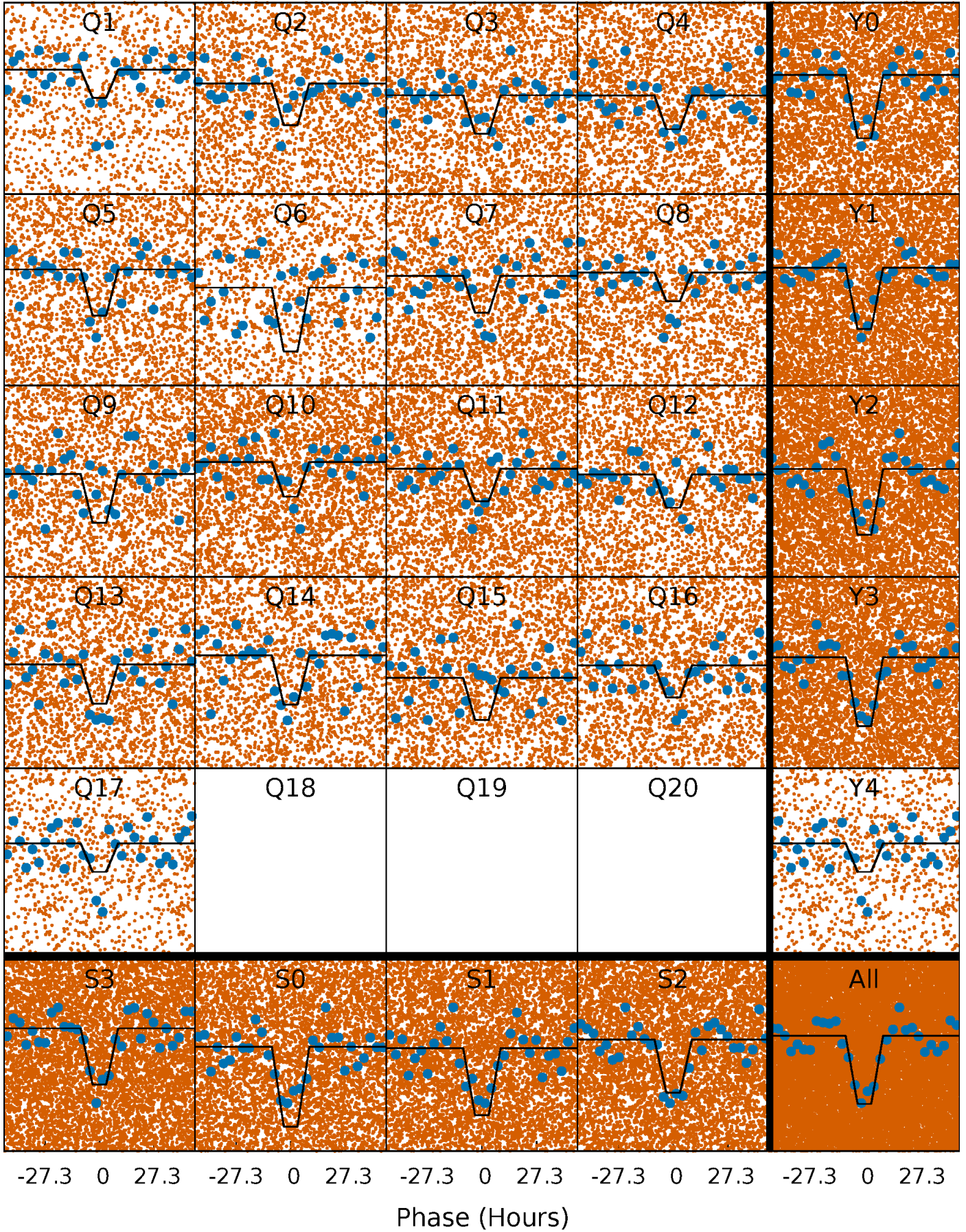
TCE 007959867-01 P= 2.781471 Days  $T_0=133.526728$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

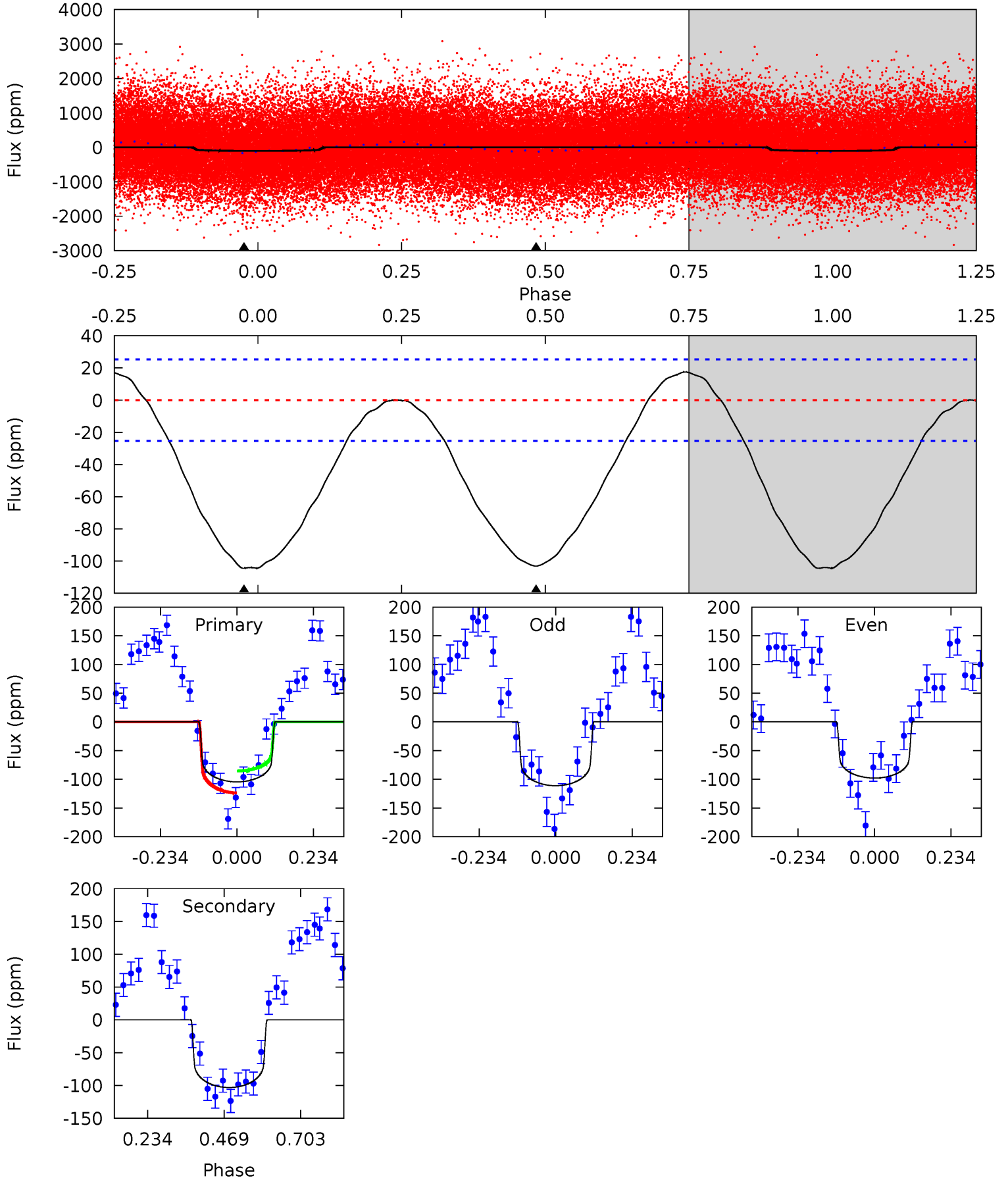
TCE 007959867-01 P= 2.781451 Days  $T_0=133.487263$  (BKJD)



# DV Model-Shift Uniqueness Test

007959867-01, P = 2.781471 Days, E = 130.745257 Days

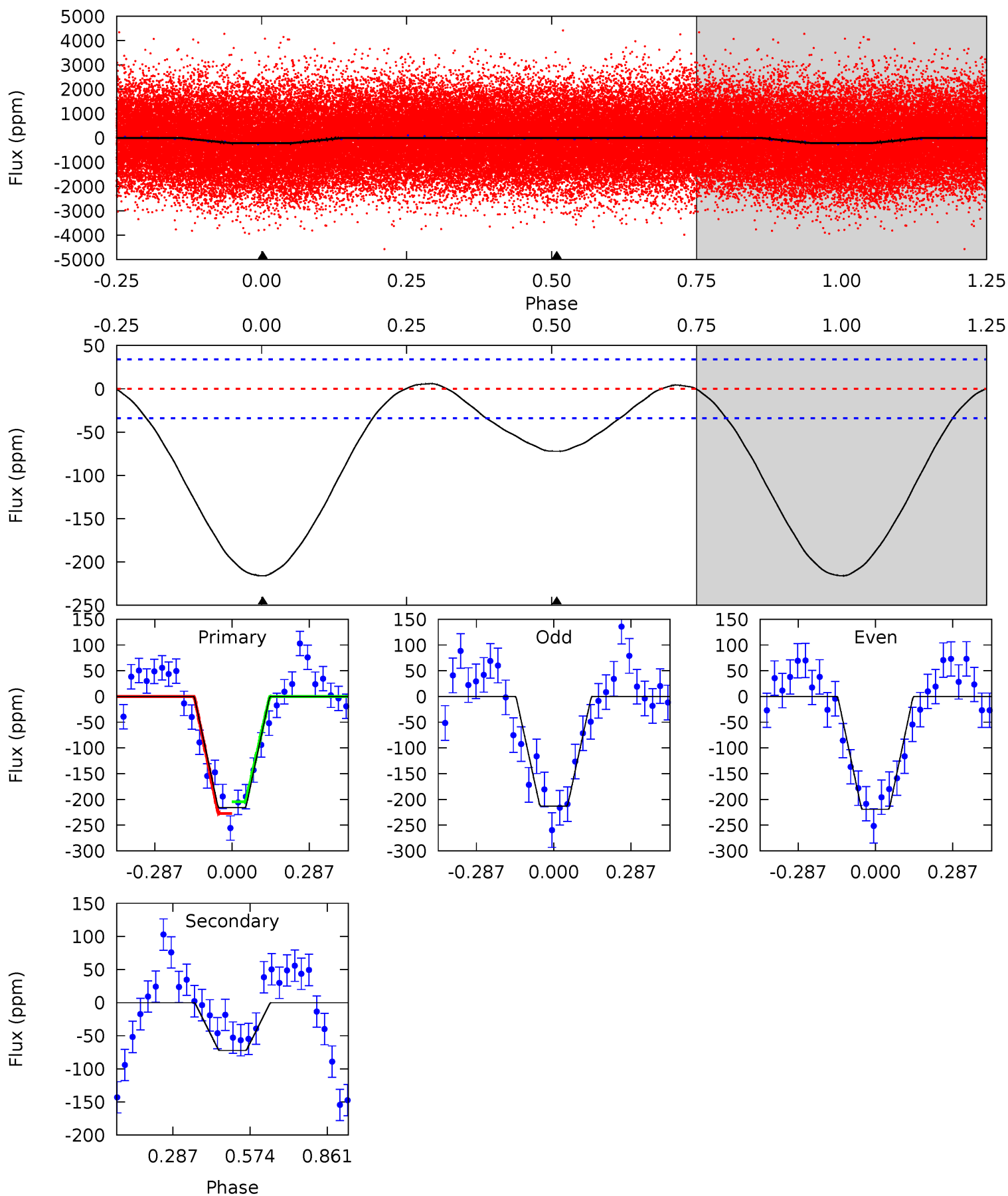
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
18.1	17.8	0	0	4.38	1.19	1.52	18.1	18.1	17.8	17.8	1.16	0.93	0.14	3.28



# Alt Model-Shift Uniqueness Test

007959867-01, P = 2.781451 Days, E = 130.705812 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
27.6	9.23	0	0	4.34	1.06	0.70	27.6	27.6	9.23	9.23	0.40	0.84	0.03	1.42





### Stellar Parameters For KIC 007959867

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$8697^{+239}_{-410}$	$3.887^{+0.308}_{-0.132}$	$0.070^{+0.250}_{-0.600}$	$2.857^{+0.798}_{-1.198}$	$2.295^{+0.307}_{-0.716}$	$0.139^{+0.336}_{-0.056}$
	+3%/-5%	+8%/-3%	+357%/-857%	+28%/-42%	+13%/-31%	+242%/-41%
Source	KIC0	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 007959867-01 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-103 \pm 6$	$2.94^{+0.68}_{-0.75}$	$3920^{+288}_{-395}$	$8729^{+1015}_{-854}$	$17^{+12}_{-5}$
Alt.	$-72 \pm 8$	$4.56^{+0.97}_{-1.04}$	$3921^{+327}_{-428}$	$6063^{+425}_{-360}$	$4.926^{+2.971}_{-1.537}$

$T_{\text{max}}$  = 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

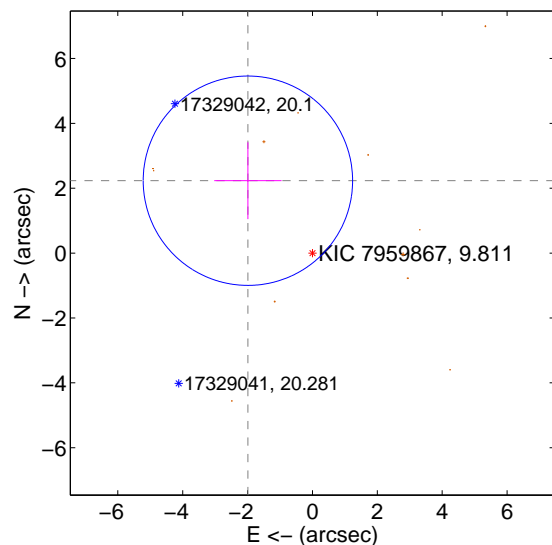
Supplemental centroid analysis for 007959867-01. **Kepler magnitude: 9.81.** Transit SNR 9.37

**There are 1 quarters with good PRF difference image offsets**

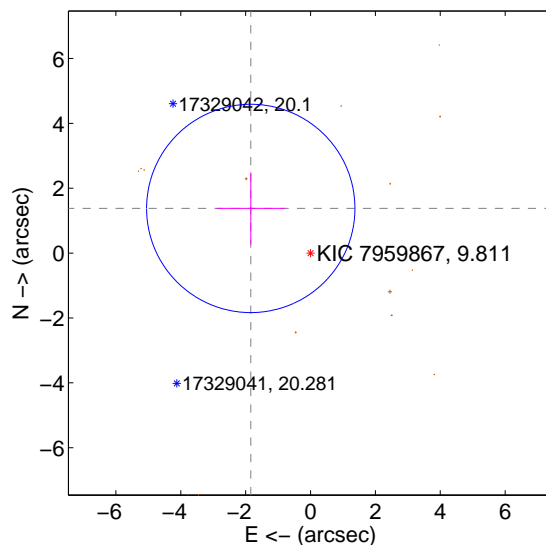
The direct PRF centroid is offset from the target star catalog position by about 1.19 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$2.990 \pm 1.076$	2.78	$1.990 \pm 1.039$	$2.232 \pm 1.185$
PRF-fit source offset from KIC position	$2.301 \pm 1.071$	2.15	$1.843 \pm 1.047$	$1.377 \pm 1.112$
photometric centroid source offset	$1.06 \pm 0.30$	<b>3.58</b>	$-0.16 \pm 0.27$	$-1.05 \pm 0.30$

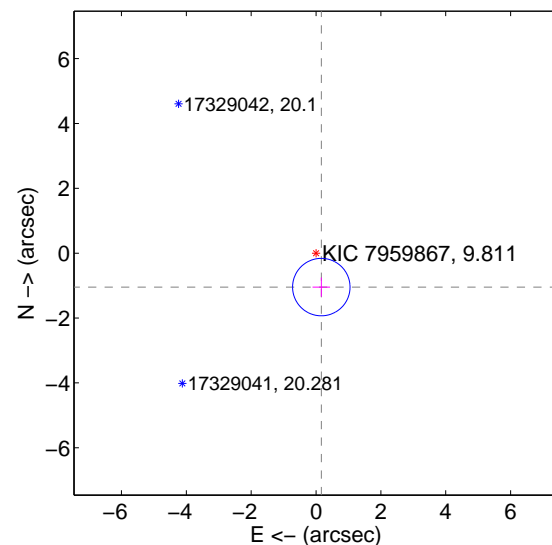
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

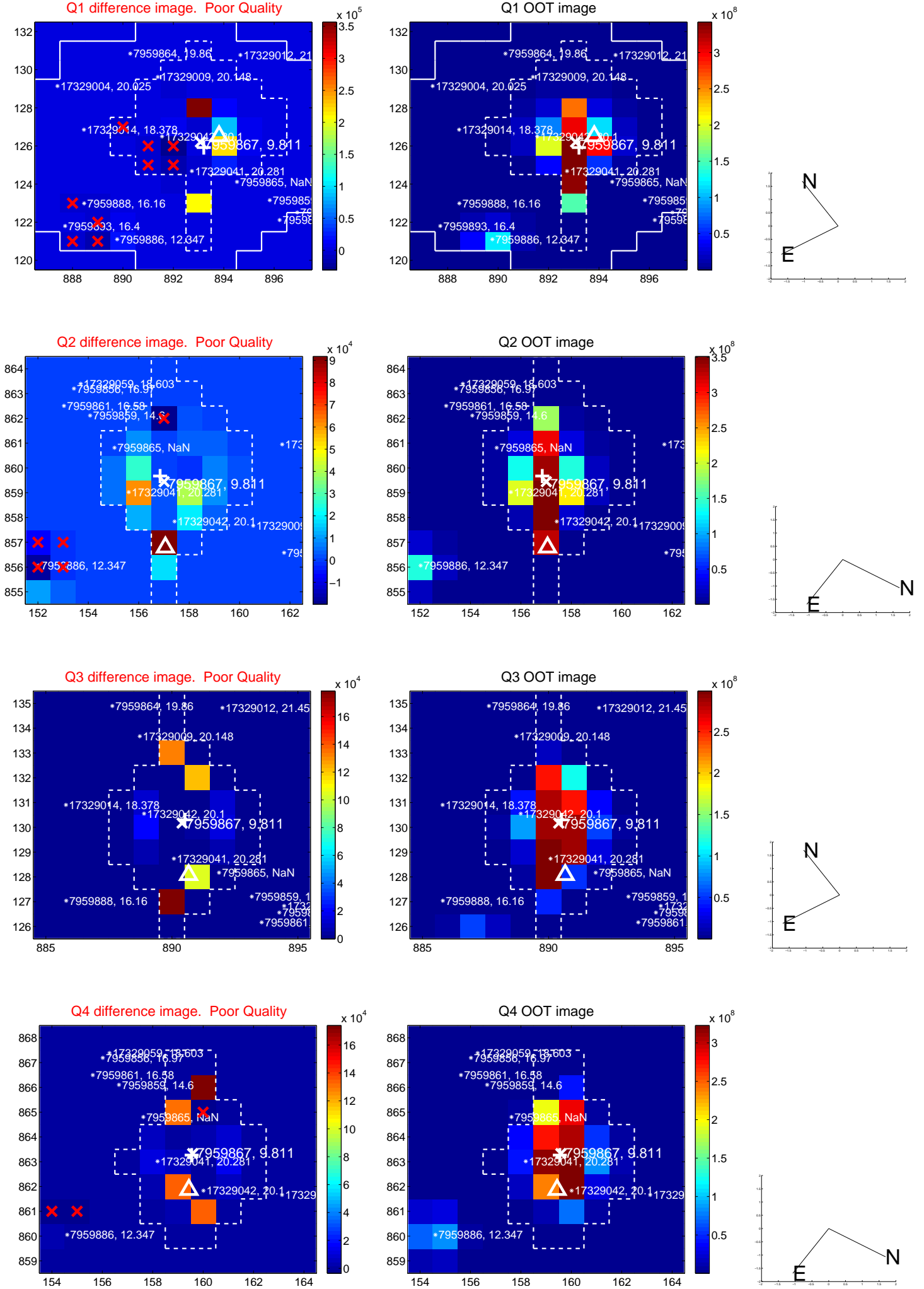


offset from photometric centroids

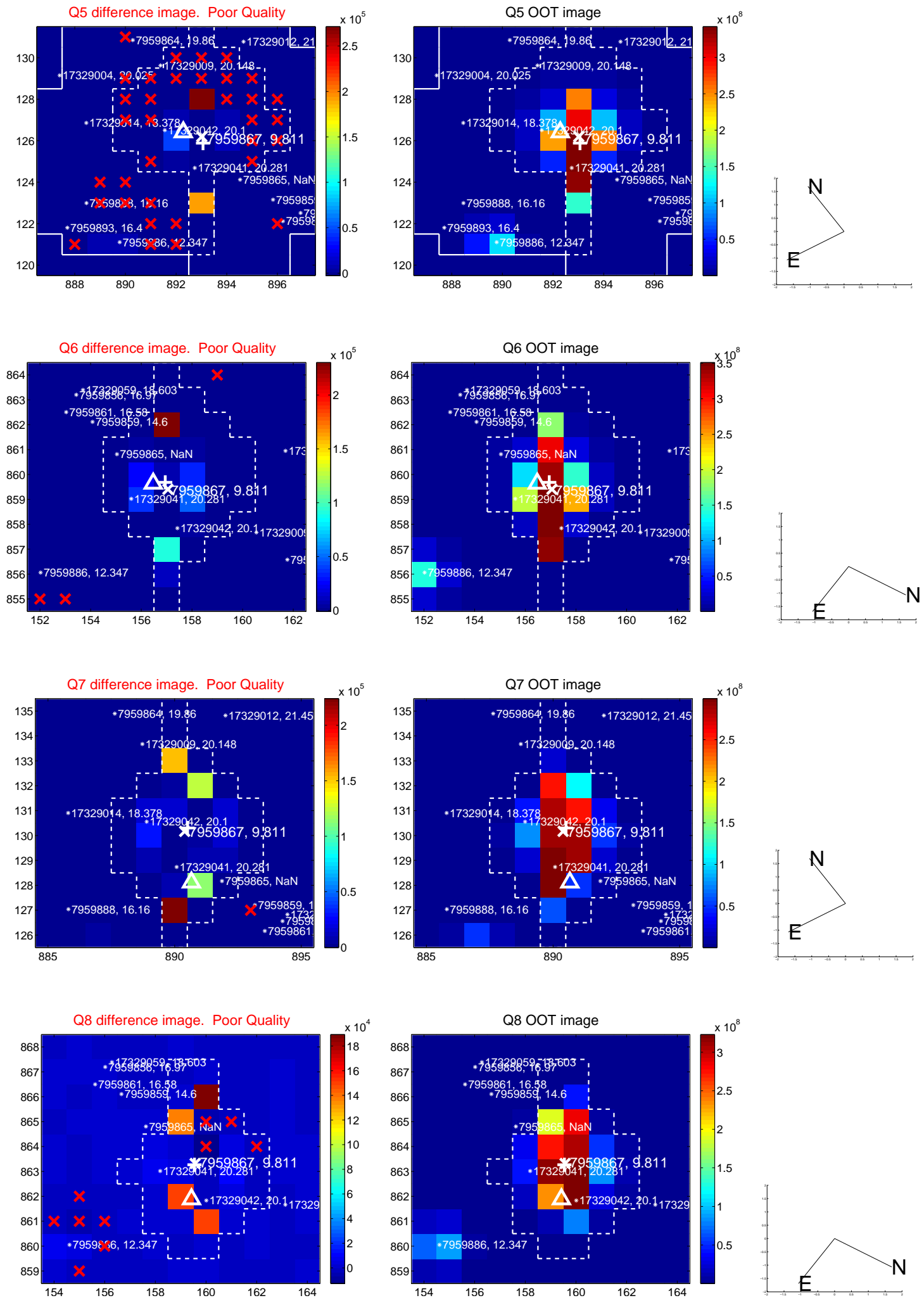


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

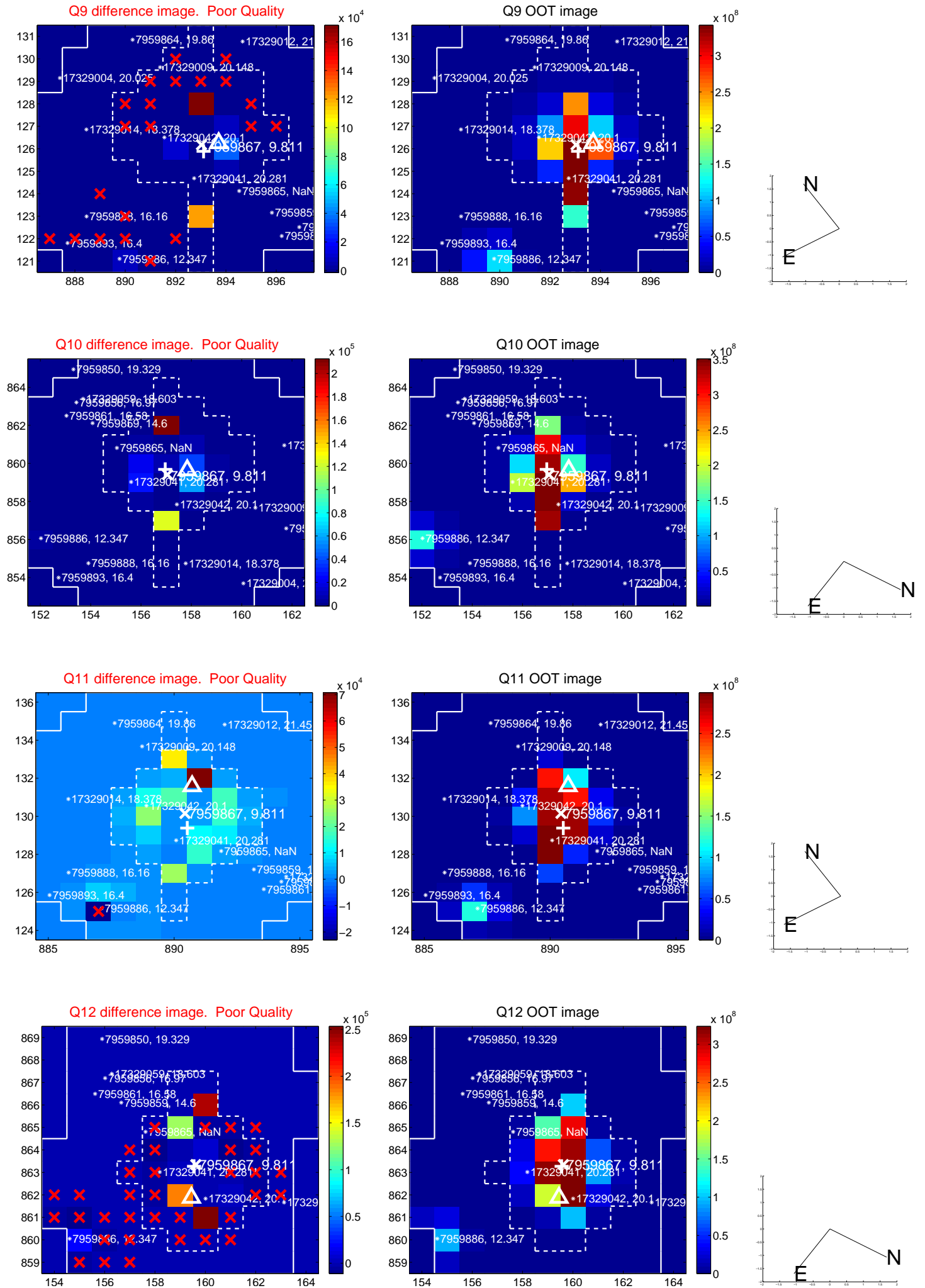


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

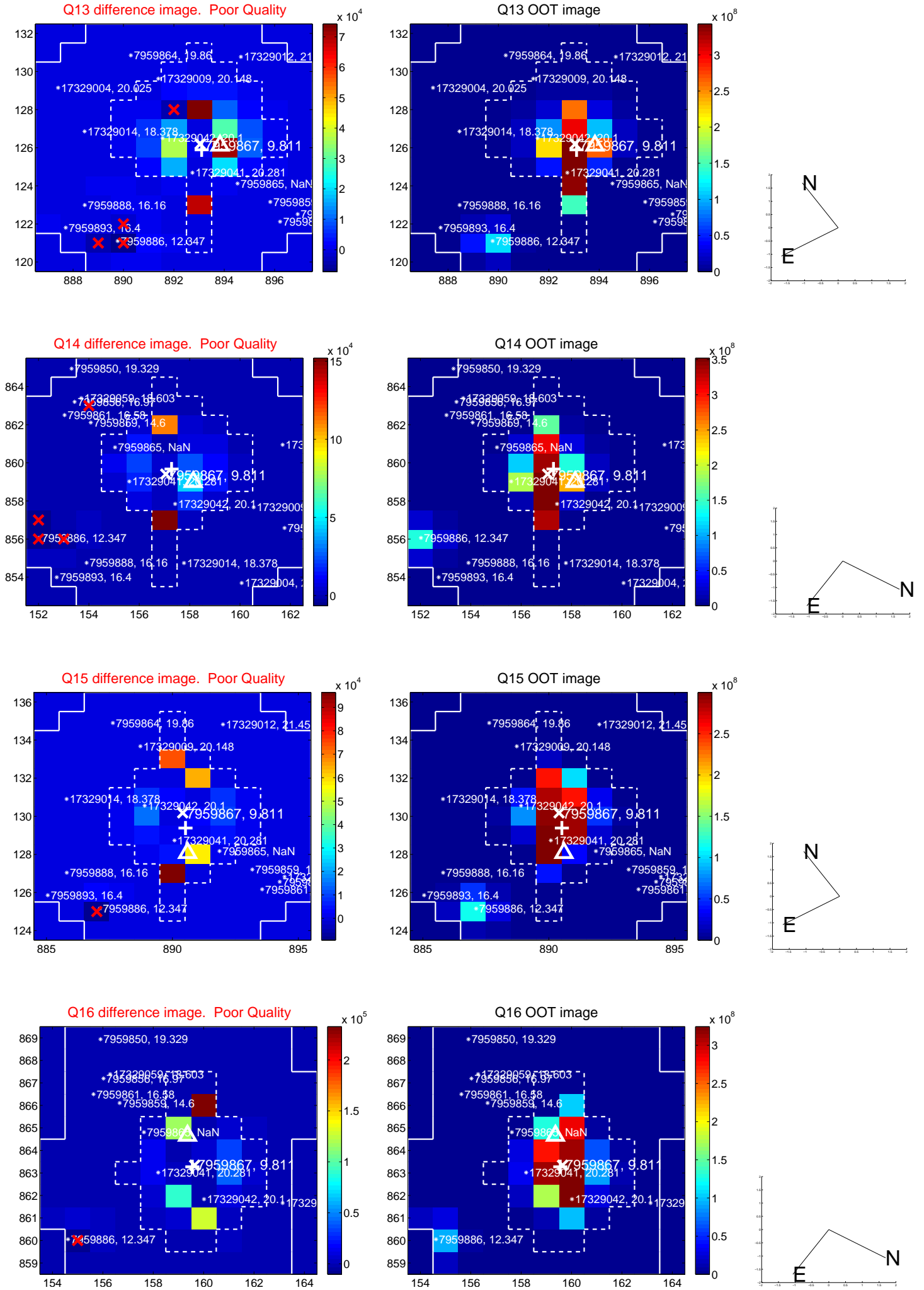




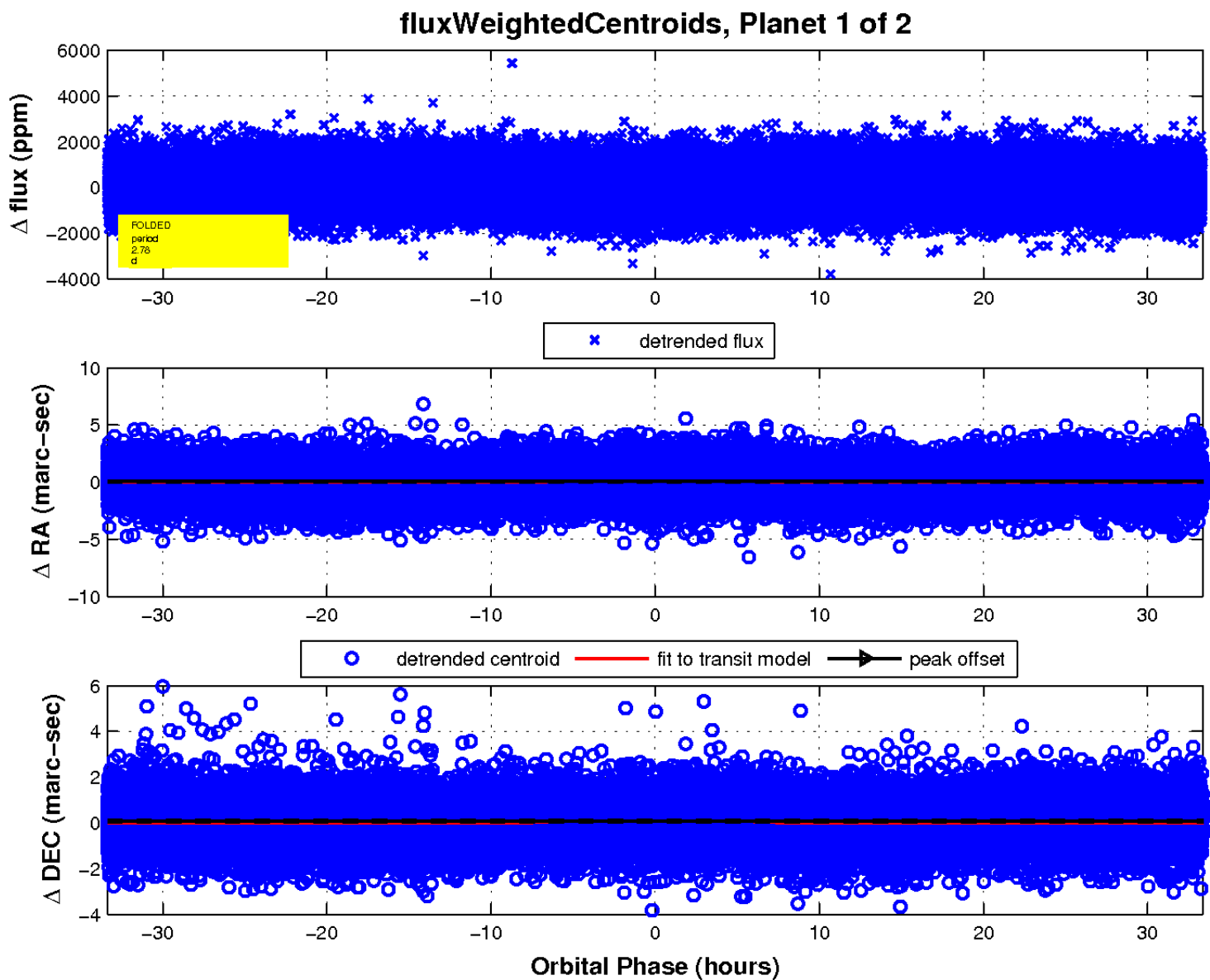
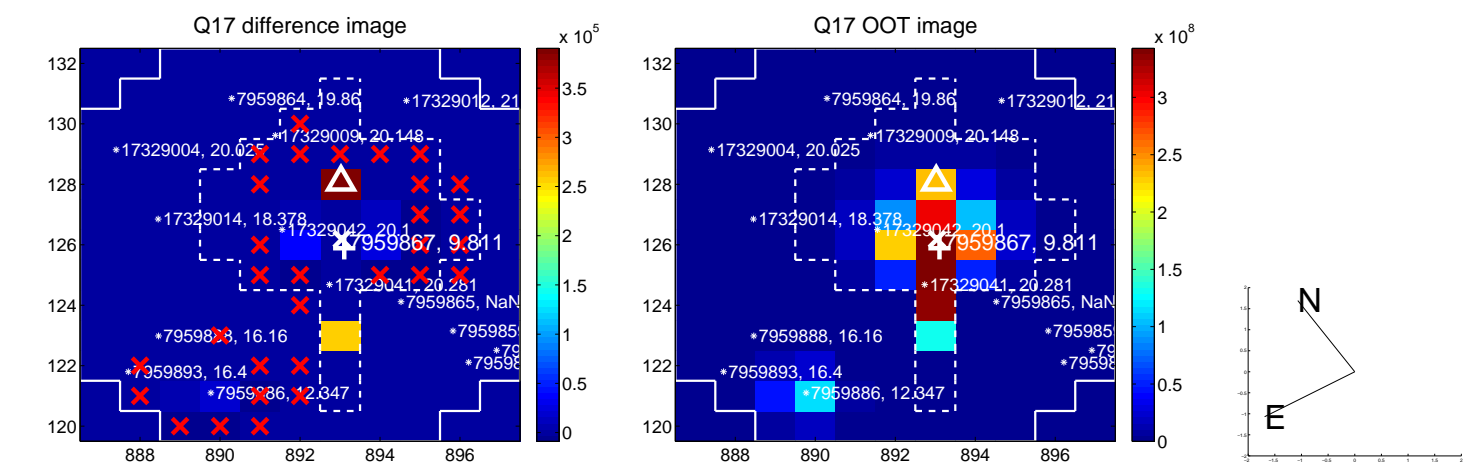
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

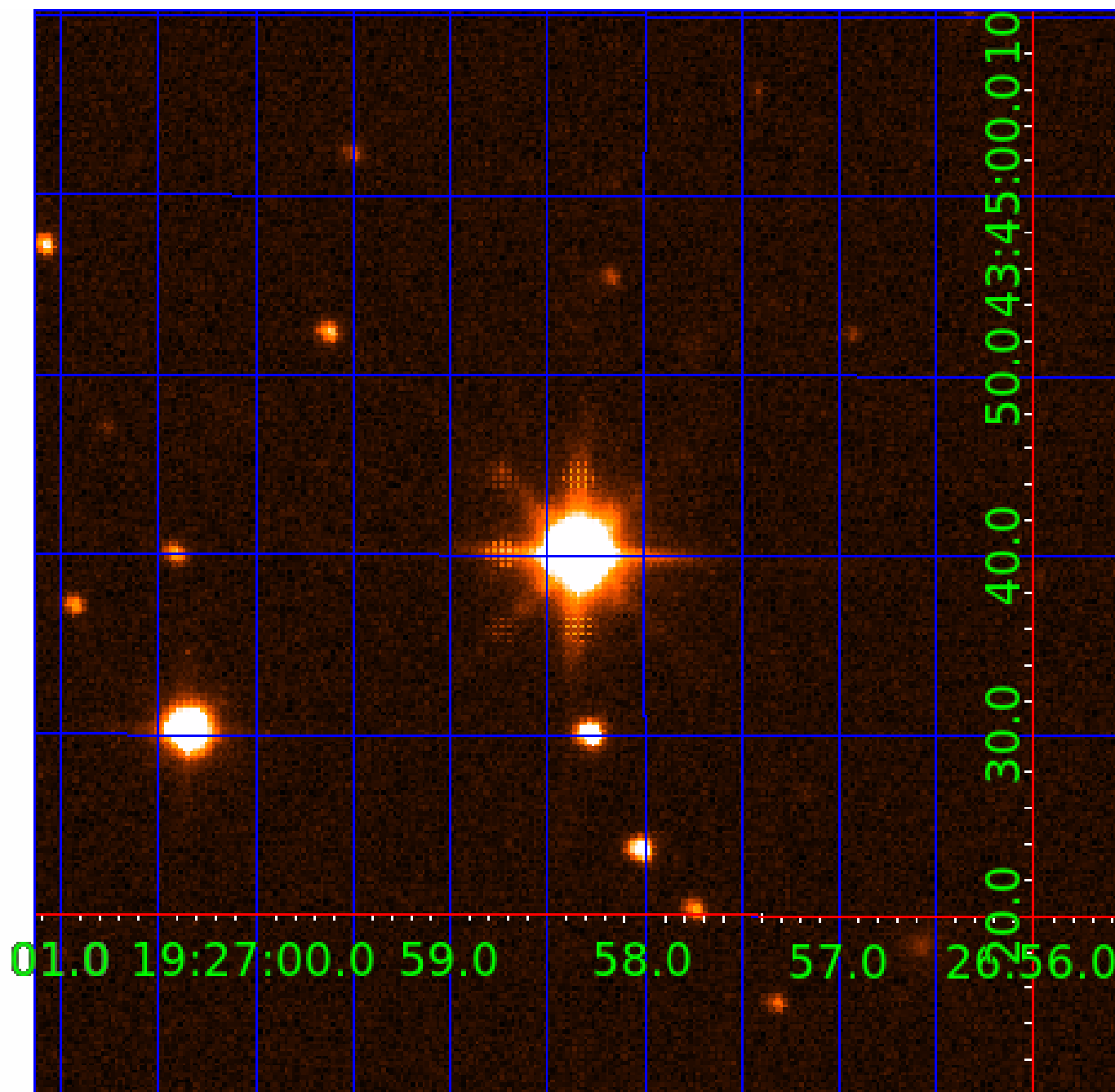


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination





# KIC 007959867

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
007959867-01	OBS	No	2.781471	133.526728	98.0	15.206	10.6	9.4	2.86	8697	3.11	16042.78
007959867-02	OBS	No	1.880356	131.910955	164.6	22.564	12.3	12.4	2.86	8697	6.90	27039.11

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
007959867-01	OBS	FP	0.00	1	0	0	0	LPP_DV—CENT_SATURATED
007959867-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—CENT_SATURATED

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

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

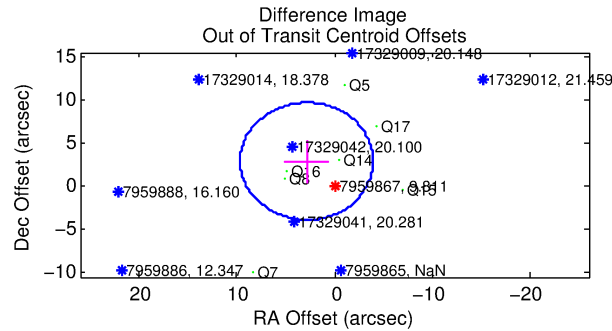
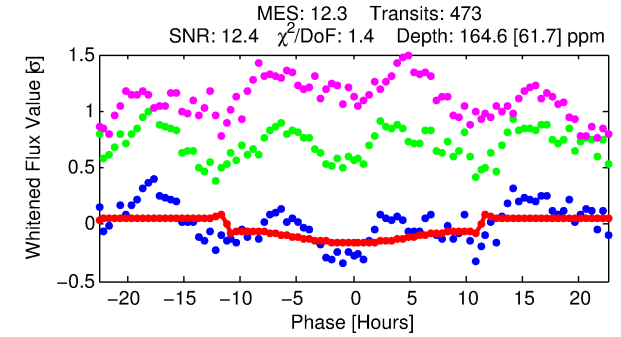
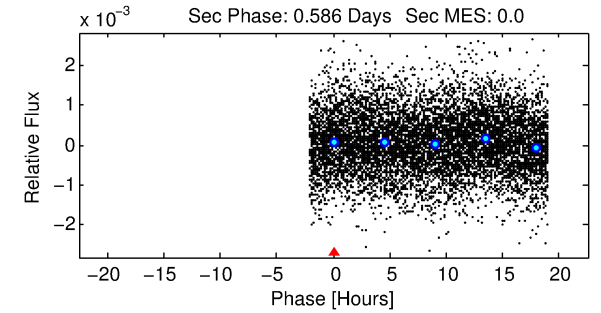
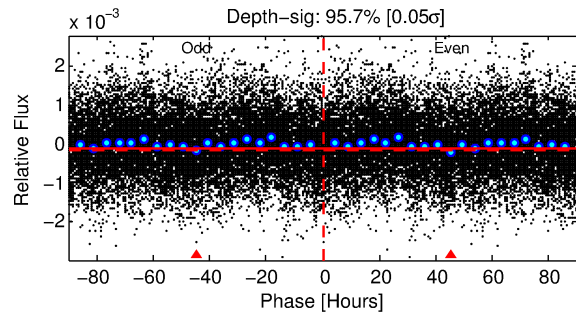
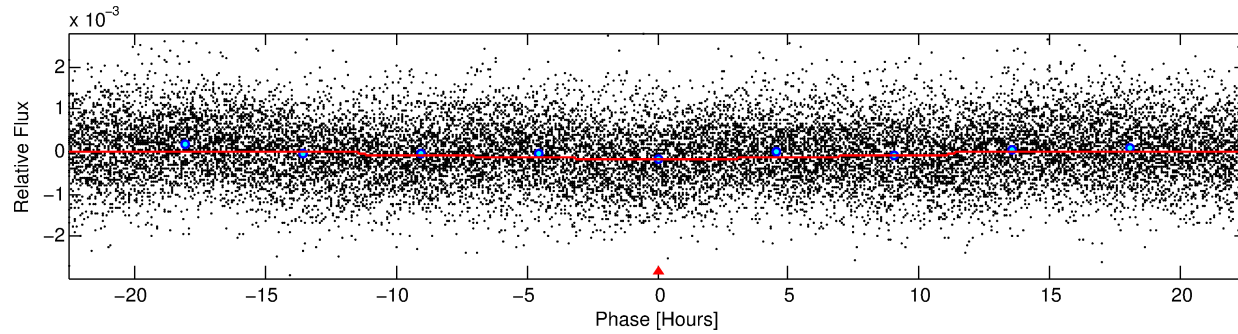
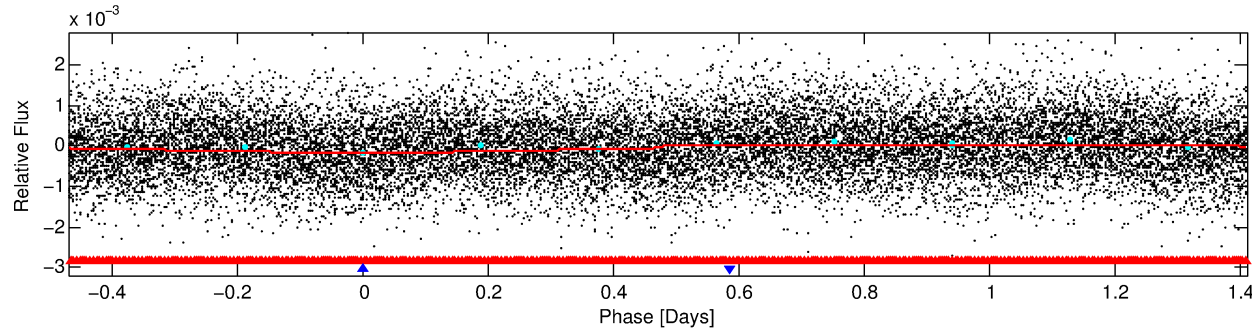
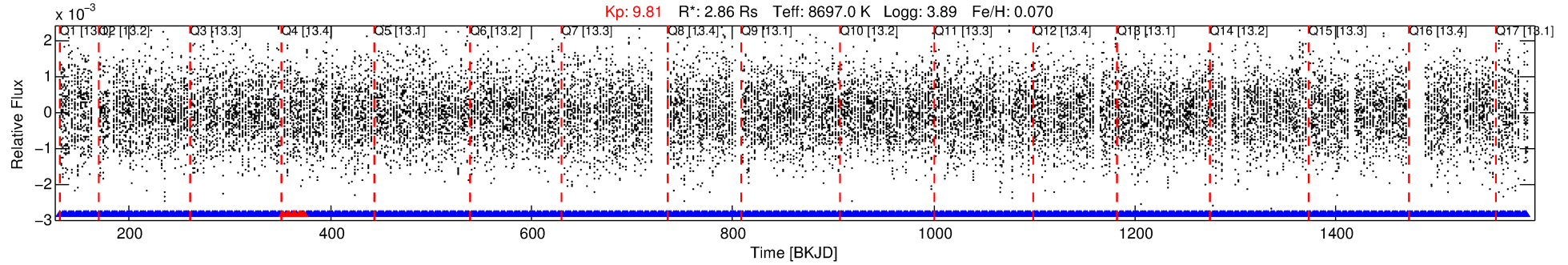
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 007959867-02

No Significant Match Found

# DV One-Page Summary

KIC: 7959867 Candidate: 2 of 2 Period: 1.880 d



## DV Fit Results:

Period = 1.88036 [0.00004] d  
Epoch = 131.9110 [0.0082] BKJD  
 $R_p/R^* = 0.0221$  [0.1504]  
 $a/R^* = 1.01$  [0.19]  
 $b = 1.00$  [0.23]  
 $\text{Seff} = 27039.11$  [15702.32]  
 $T_{\text{eq}} = 3270$  [475] K  
 $R_p = 6.90$  [46.99] Re  
 $a = 0.0393$  [0.0144] AU  
 $A_g = \text{N/A}$   
 $T_{\text{eff}} = \text{N/A}$

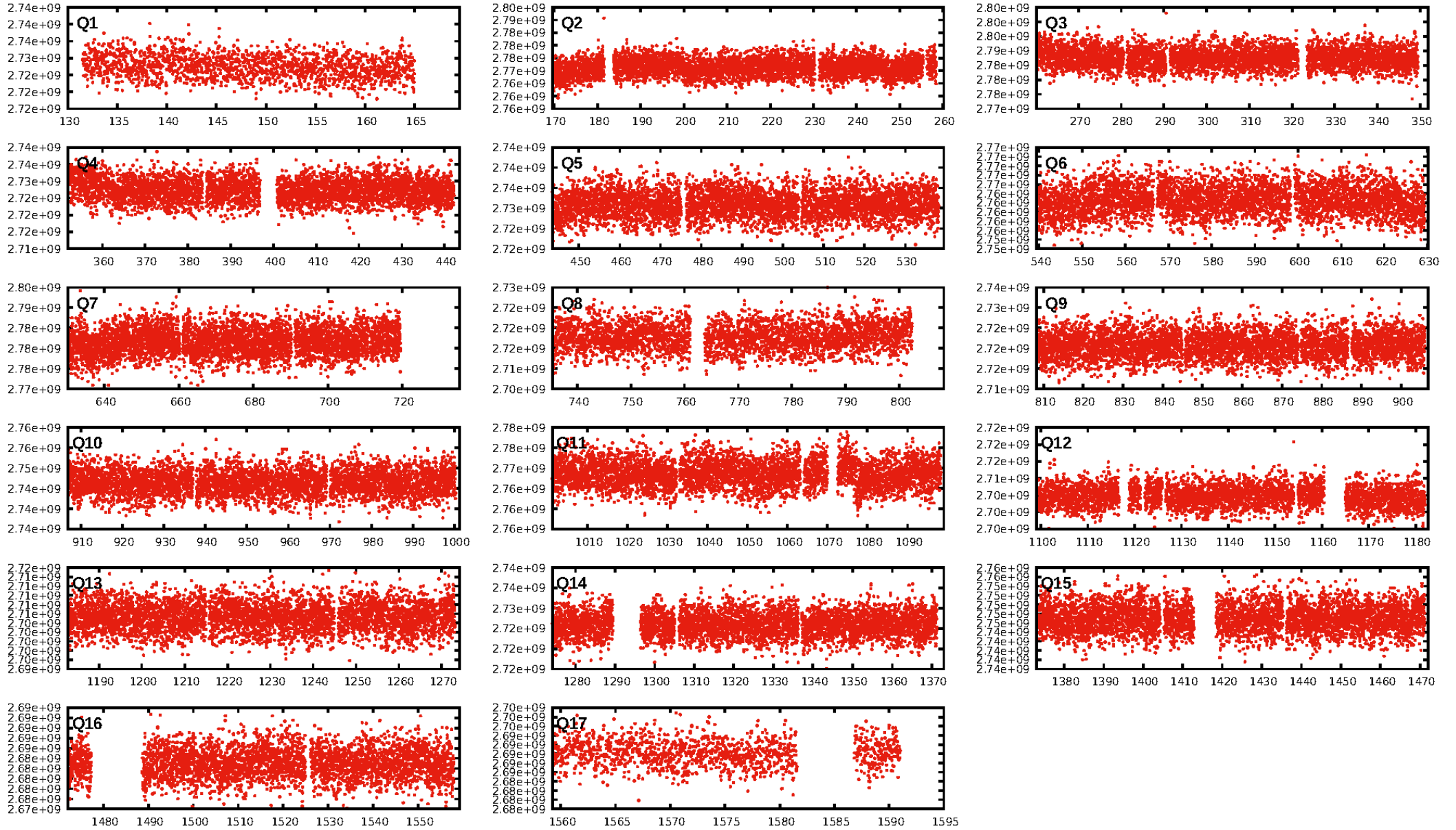
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 57.3% [0.79 $\sigma$ ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 0.98 [443/451]  
GhostDiagnostic-chr: N/A  
Centroid-sig: 0.3%  
Centroid-so: 0.671 arcsec [5.46 $\sigma$ ]  
OotOffset-rm: 4.067 arcsec [1.80 $\sigma$ ]  
KicOffset-rm: 3.788 arcsec [1.86 $\sigma$ ]  
OotOffset-st: 1/2/2/2 [7]  
KicOffset-st: 1/2/2/2 [7]  
DiffImageQuality-fgm: 0.14 [1/7]  
DiffImageOverlap-fno: 0.82 [14/17]

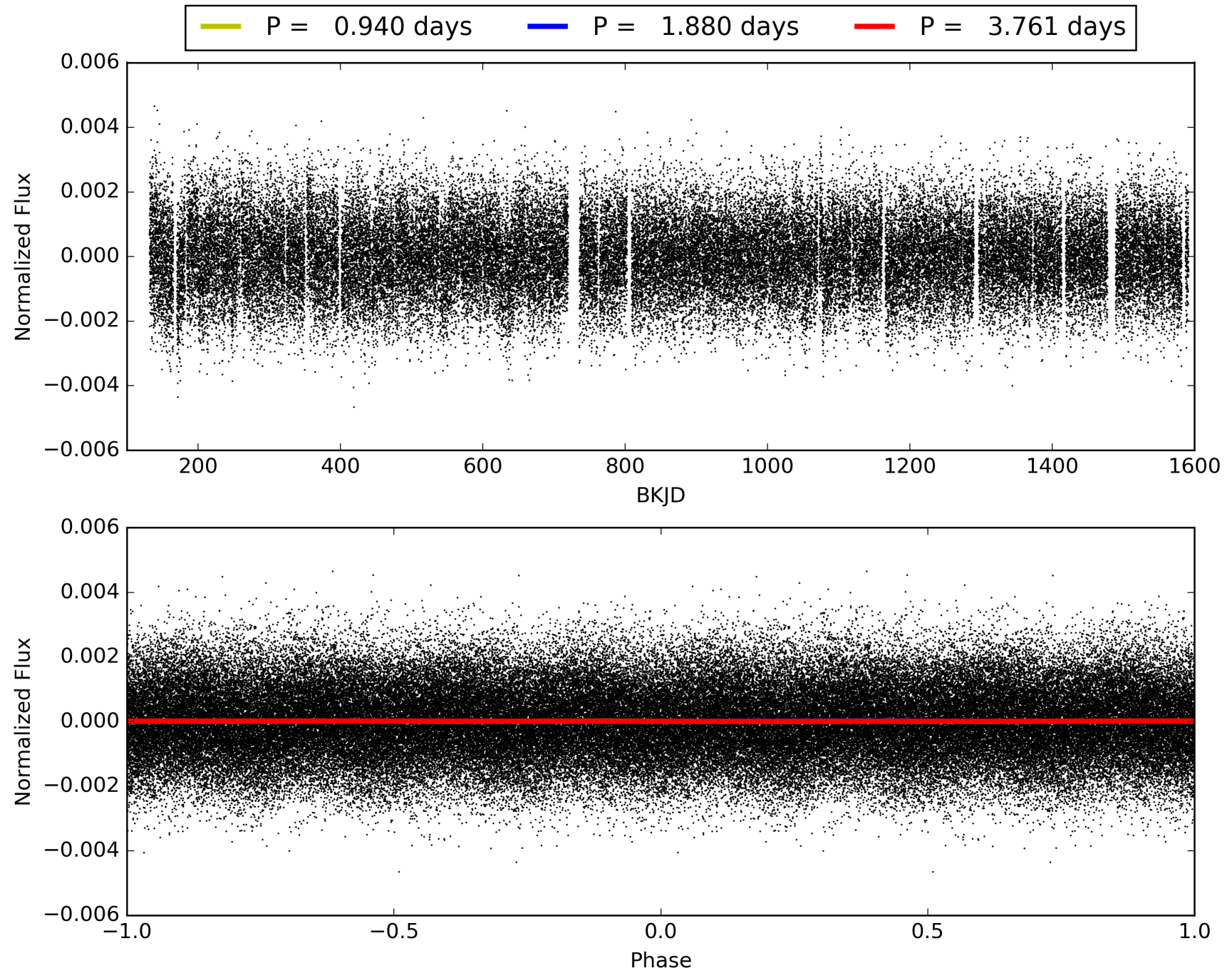
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 06:31:18 Z

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

# TCE 007959867-02, PDC Light Curves



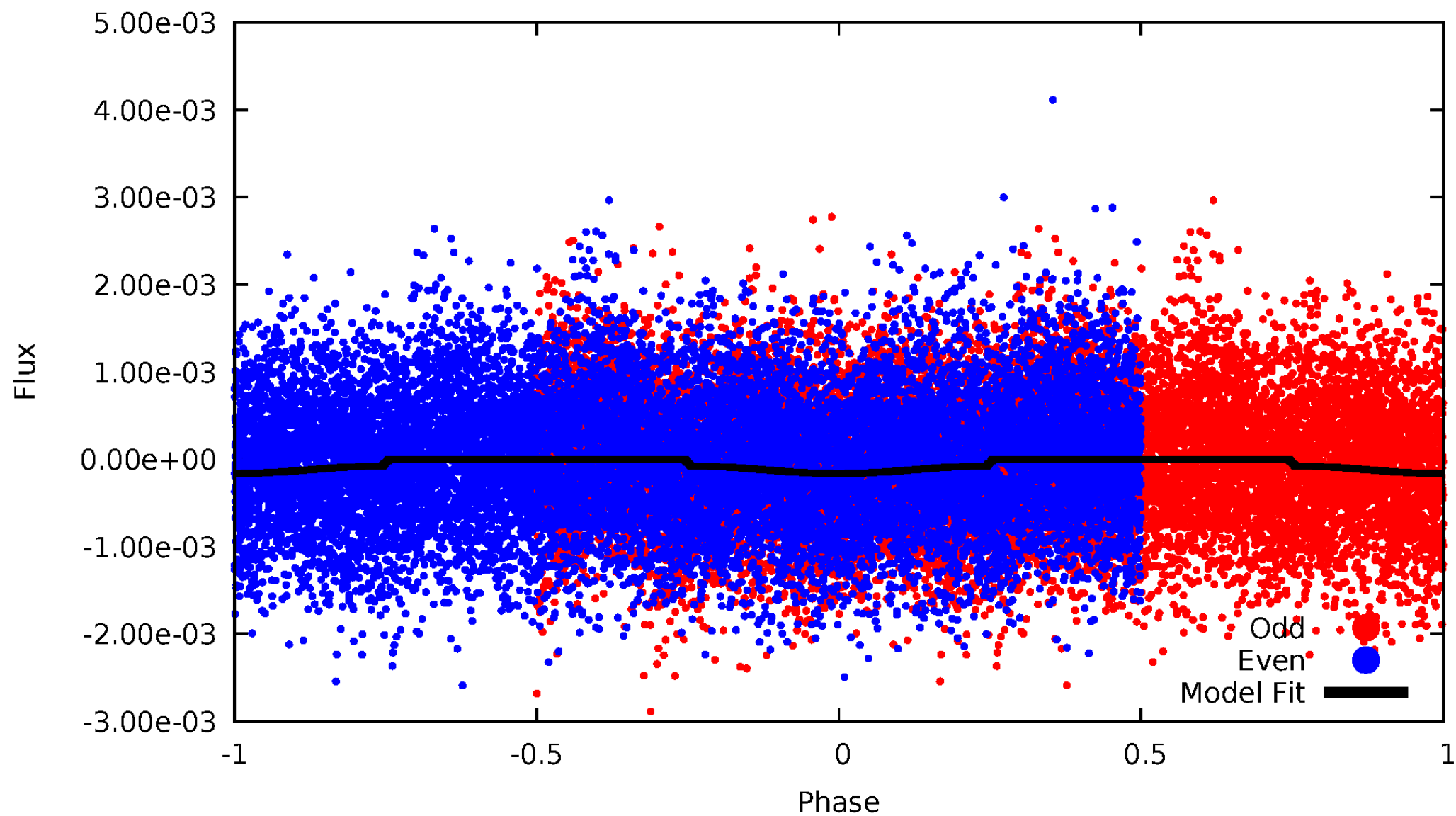
# TCE 007959867-02





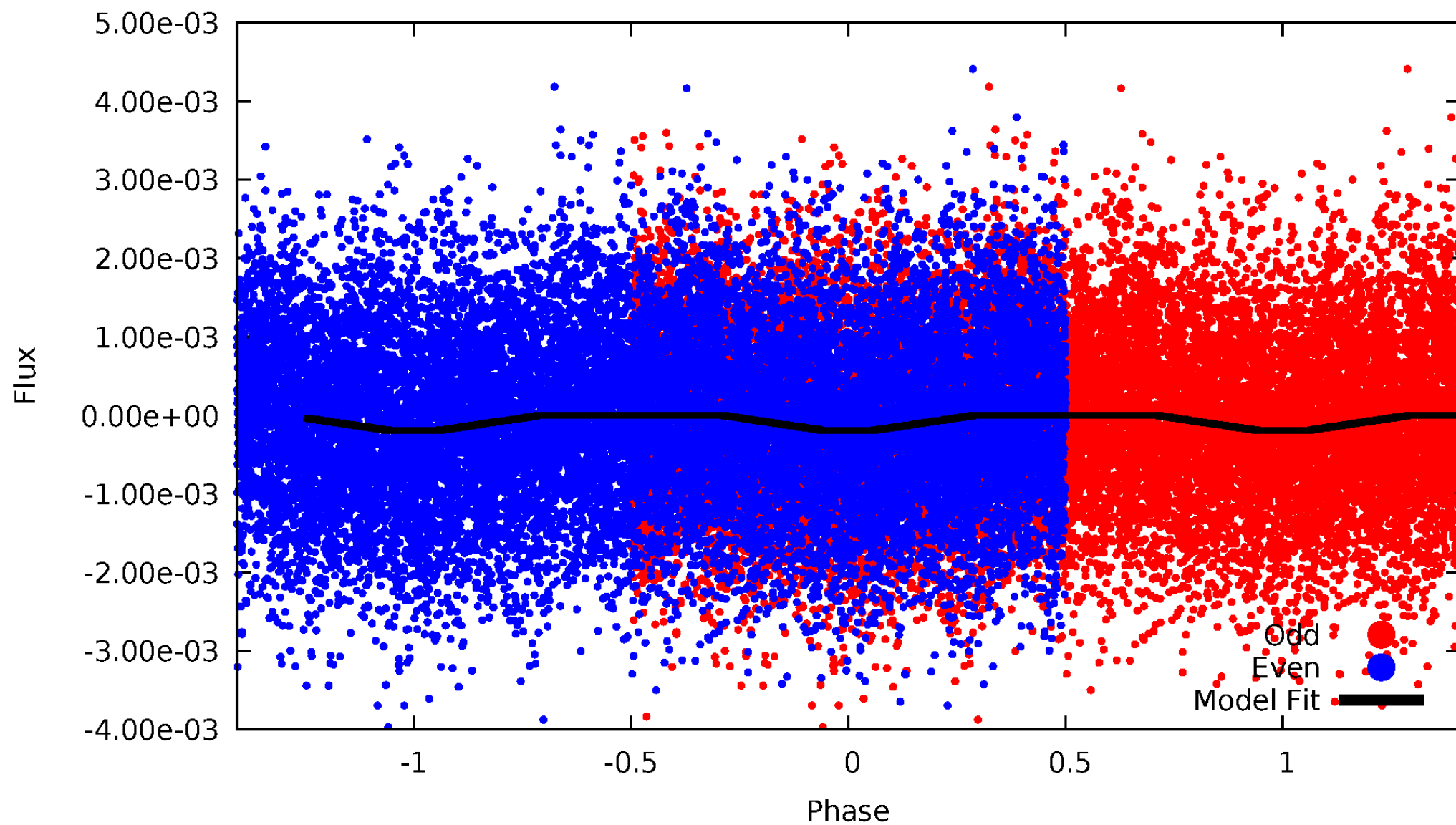
# DV Odd/Even

TCE 007959867-02



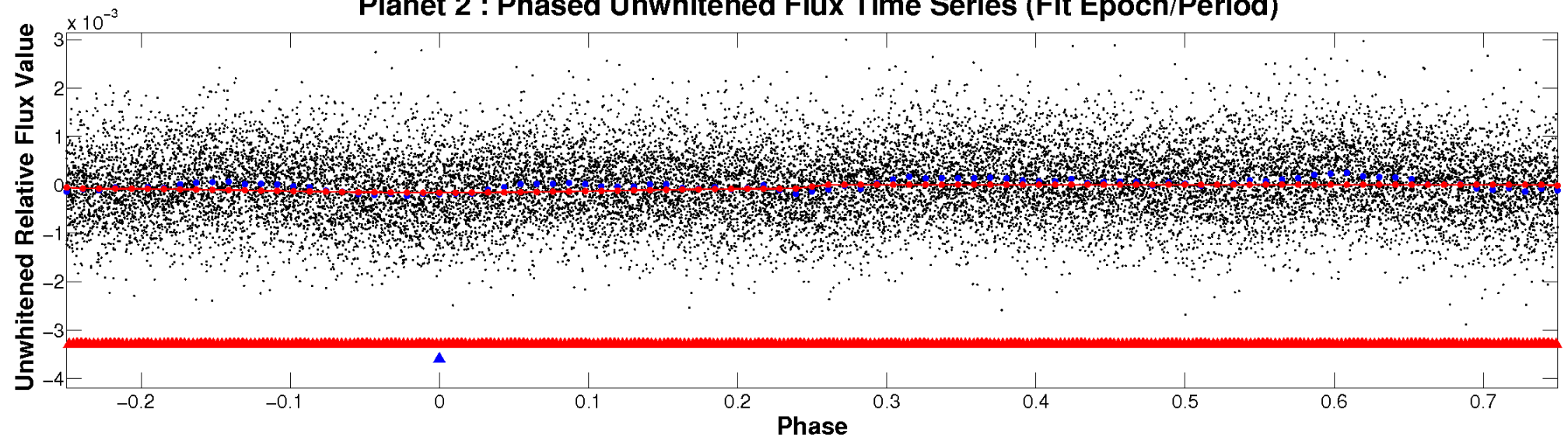
# ALT Odd/Even

TCE 007959867-02

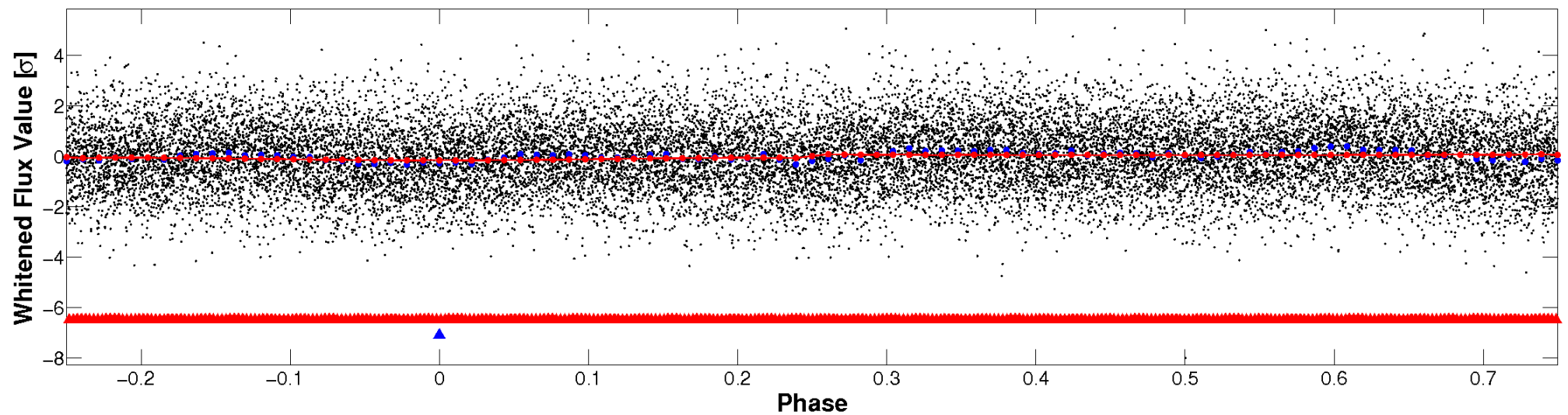


# Non-Whitened Vs. Whitened Light Curve

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

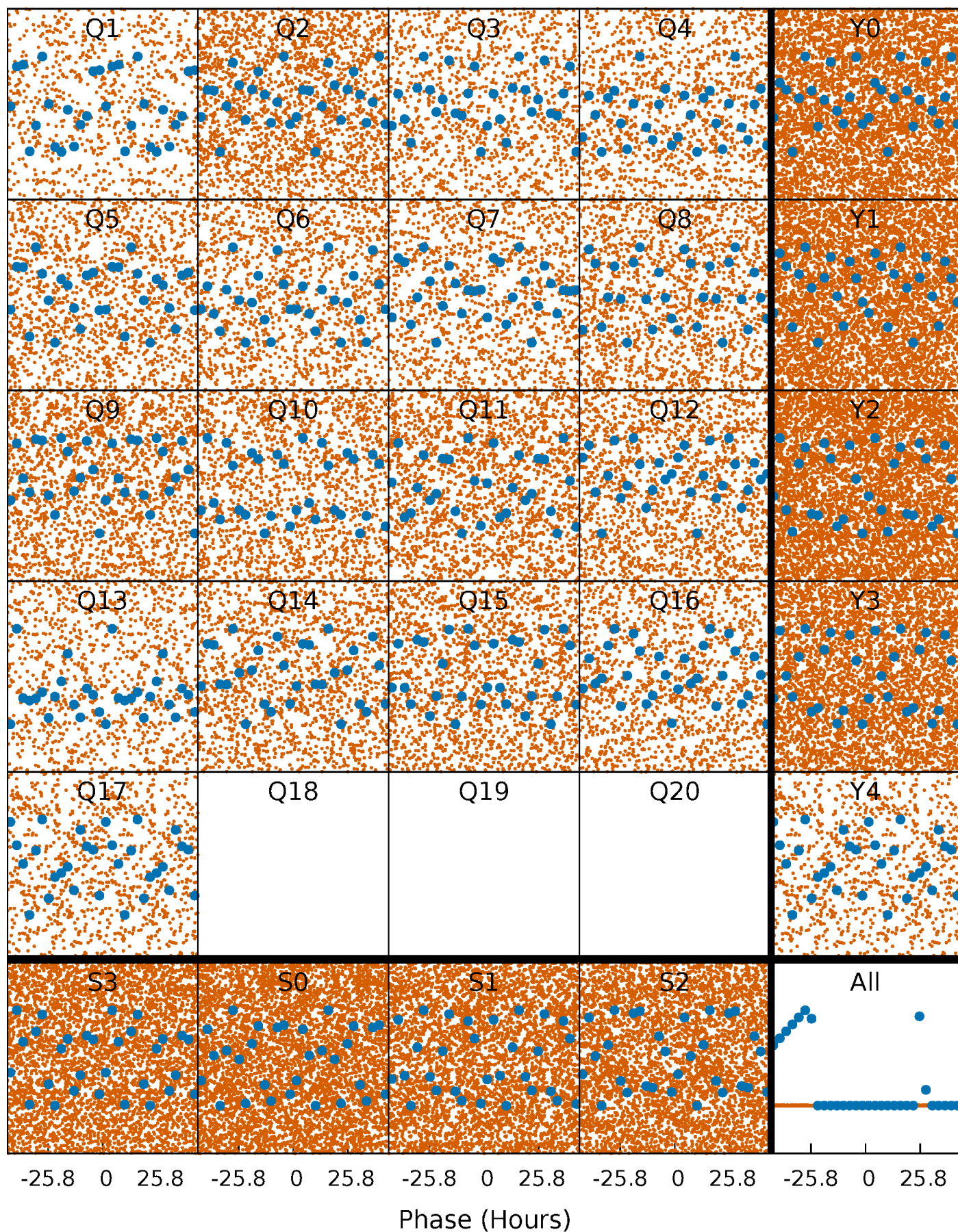


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

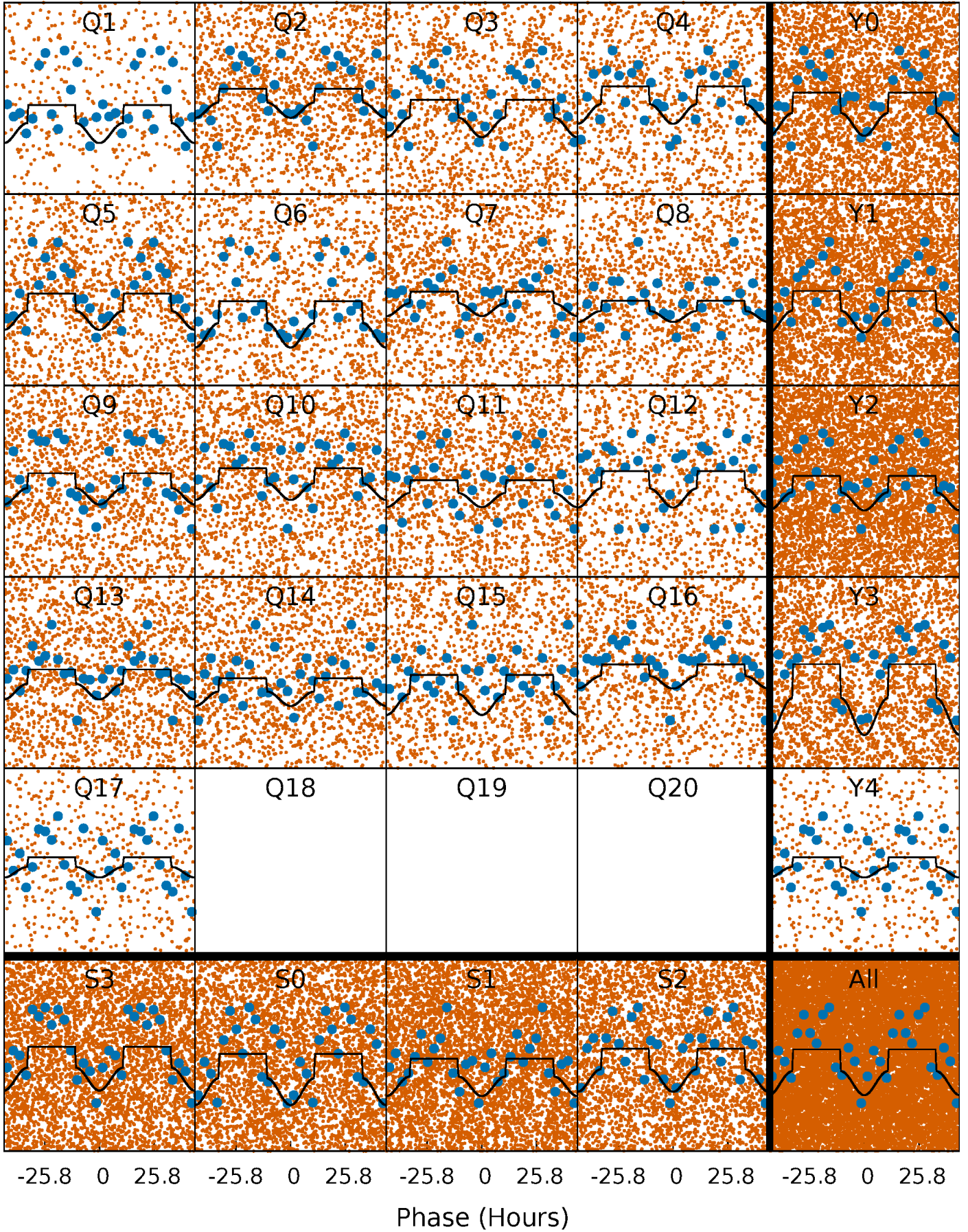
TCE 007959867-02   P= 1.880356 Days    $T_0=131.910955$  (BKJD)





# DV Quarter-Phased Transit Curves

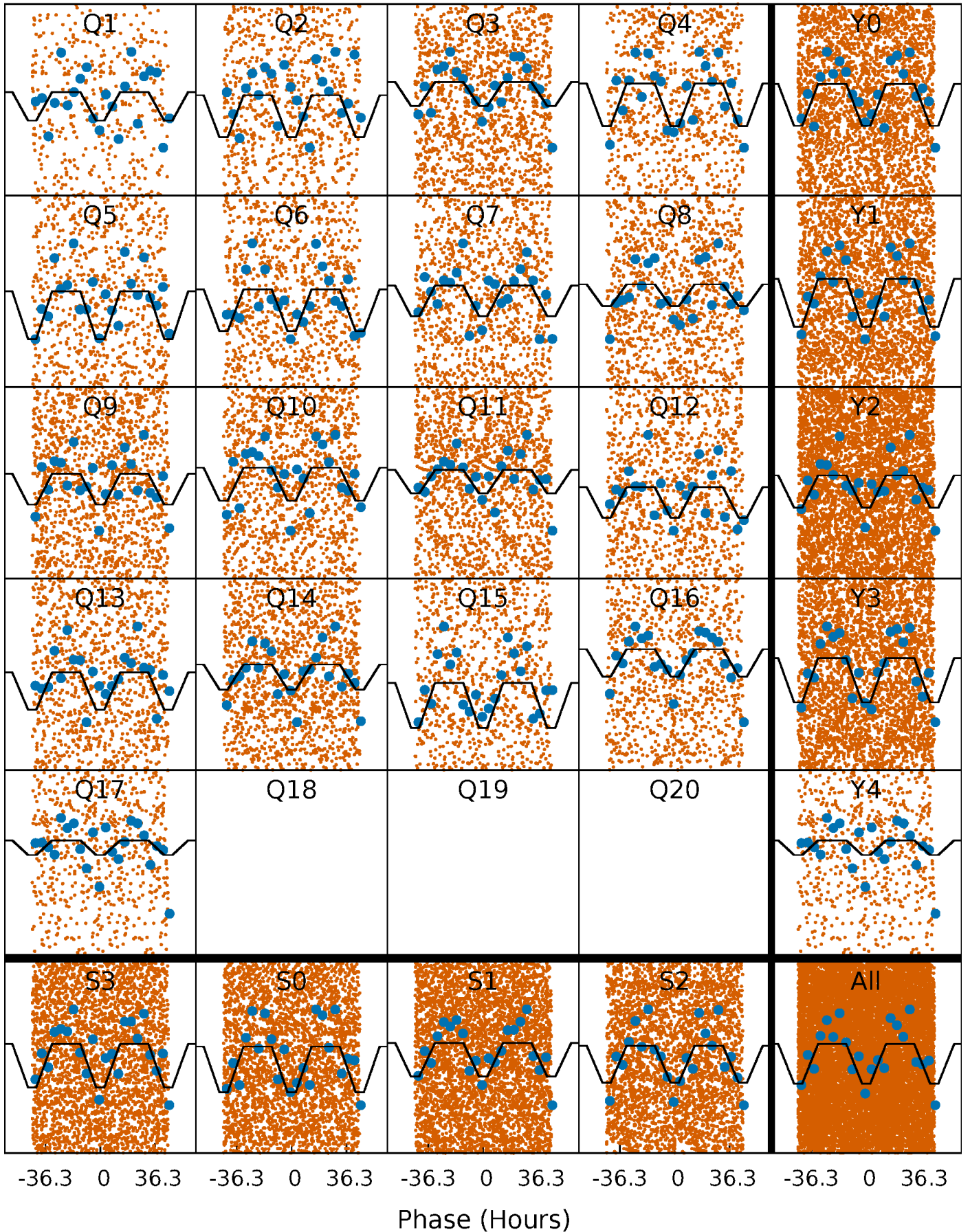
TCE 007959867-02   P= 1.880356 Days    $T_0=131.910955$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

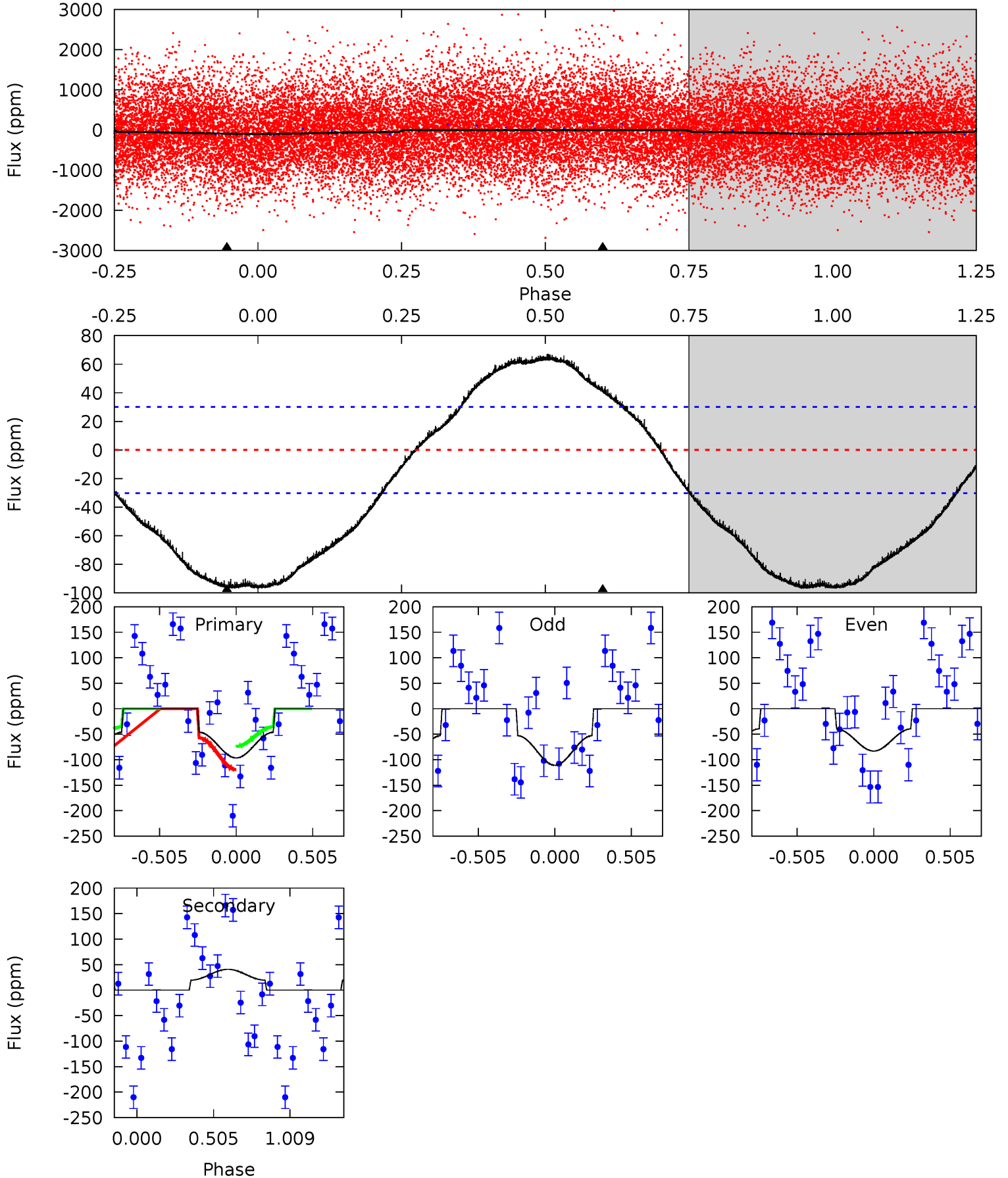
TCE 007959867-02     $P = 1.880322$  Days     $T_0 = 131.866858$  (BKJD)



# DV Model-Shift Uniqueness Test

007959867-02, P = 1.880356 Days, E = 130.030599 Days

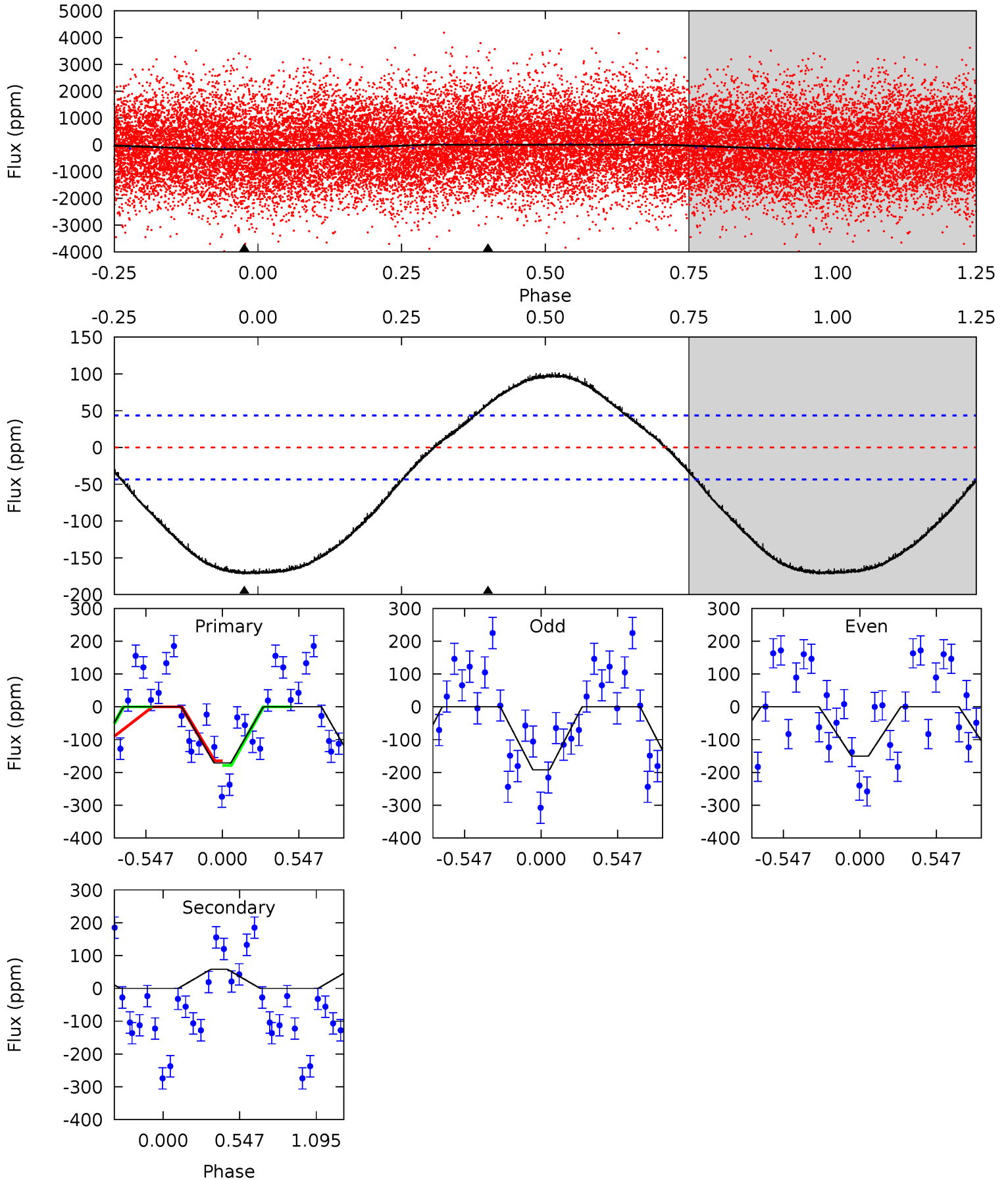
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
13.5	-5.70	0	0	4.21	0.67	1.71	13.5	13.5	-5.70	-5.70	1.96	1.55	0.41	3.12



# Alt Model-Shift Uniqueness Test

007959867-02, P = 1.880322 Days, E = 129.986536 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
16.5	-5.58	0	0	4.19	0.60	2.18	16.5	16.5	-5.58	-5.58	2.02	1.46	0.37	0.67



### Stellar Parameters For KIC 007959867

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$8697^{+239}_{-410}$	$3.887^{+0.308}_{-0.132}$	$0.070^{+0.250}_{-0.600}$	$2.857^{+0.798}_{-1.198}$	$2.295^{+0.307}_{-0.716}$	$0.139^{+0.336}_{-0.056}$
	+3%/-5%	+8%/-3%	+357%/-857%	+28%/-42%	+13%/-31%	+242%/-41%
Source	KIC0	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 007959867-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$41 \pm 7$	$32.42^{+35.29}_{-24.00}$	$4466^{+375}_{-483}$	$-4025^{+286}_{-594}$	$-0.032^{+0.025}_{-0.507}$
Alt.	$58 \pm 10$	$30.62^{+35.04}_{-21.58}$	$4462^{+351}_{-434}$	$-4036^{+288}_{-680}$	$-0.049^{+0.038}_{-0.519}$

$T_{\text{max}}$  = 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

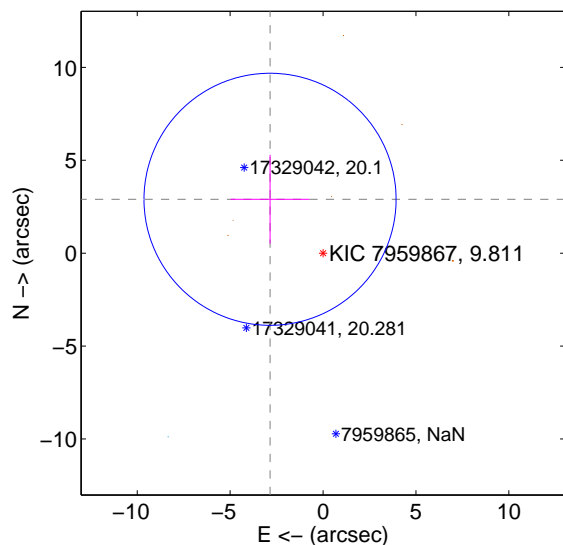
Supplemental centroid analysis for 007959867-02. **Kepler magnitude: 9.81.** Transit SNR 12.37

**There are 1 quarters with good PRF difference image offsets**

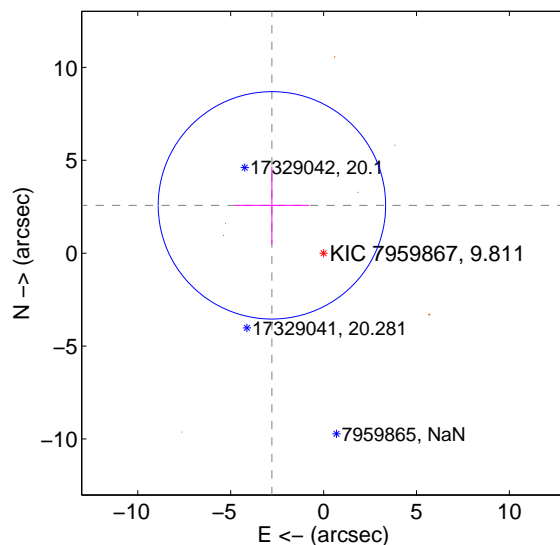
The direct PRF centroid is offset from the target star catalog position by about 1.19 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$4.067 \pm 2.261$	1.80	$2.852 \pm 2.122$	$2.900 \pm 2.388$
PRF-fit source offset from KIC position	$3.788 \pm 2.040$	1.86	$2.779 \pm 1.991$	$2.574 \pm 2.094$
photometric centroid source offset	<b><math>0.67 \pm 0.12</math></b>	<b>5.46</b>	$0.35 \pm 0.12$	$-0.57 \pm 0.13$

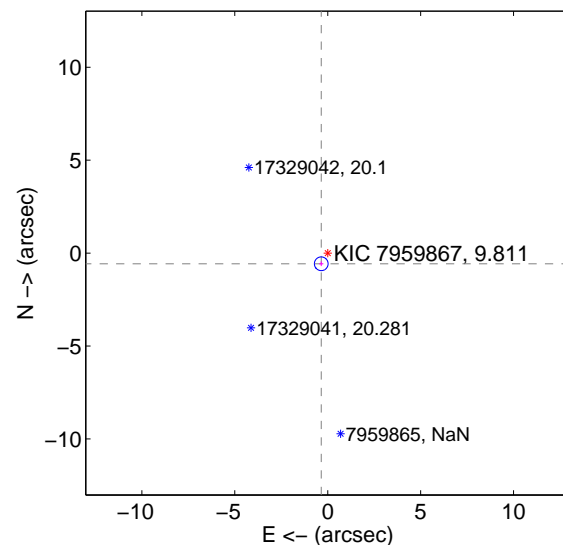
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position



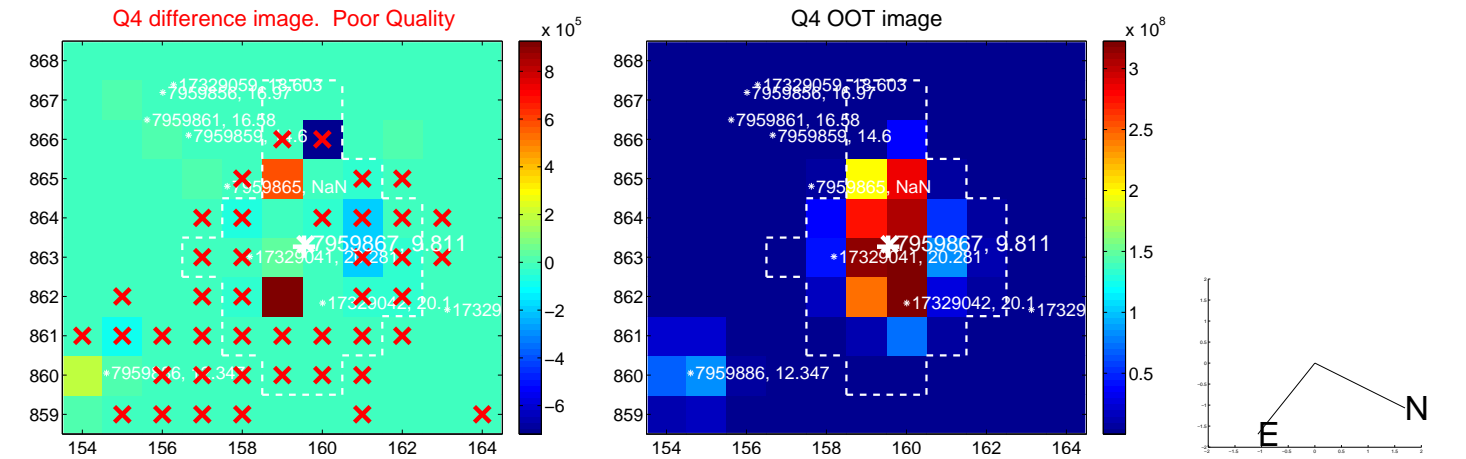
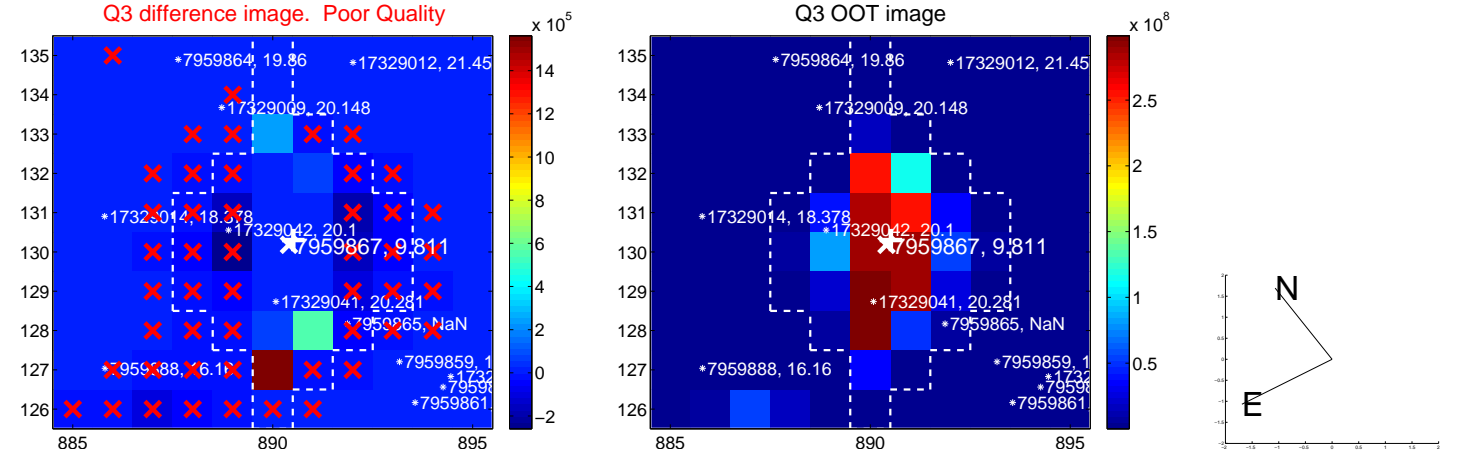
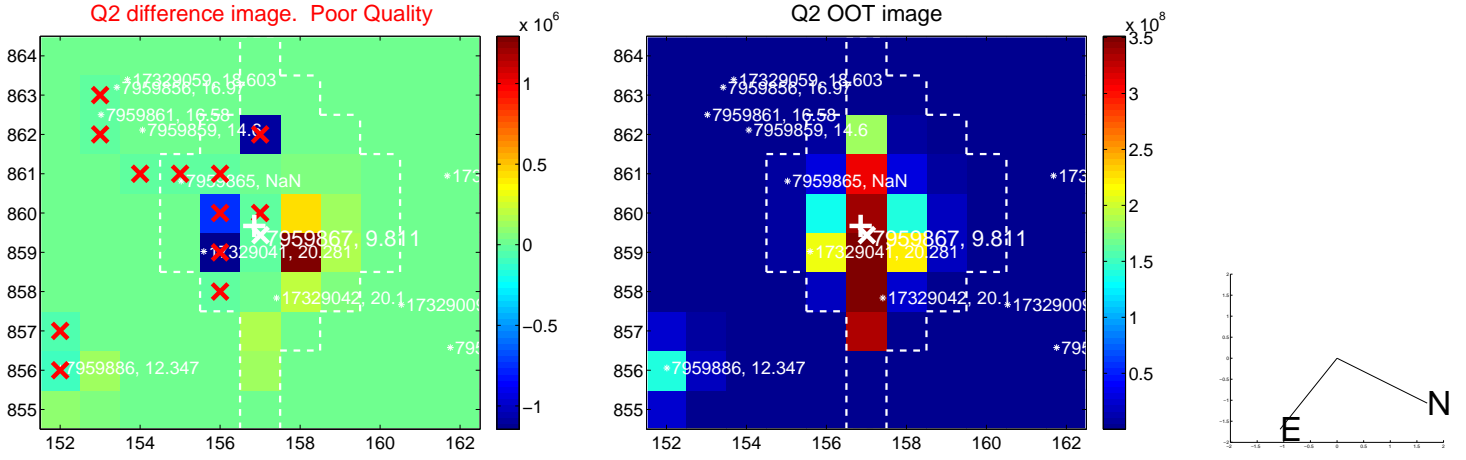
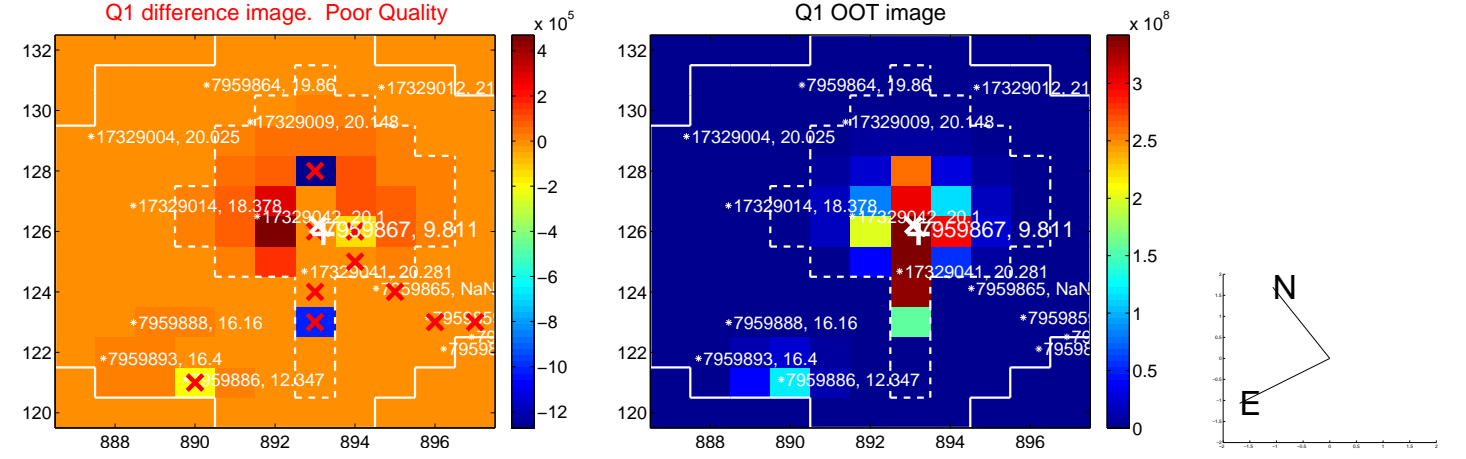
offset from photometric centroids



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.

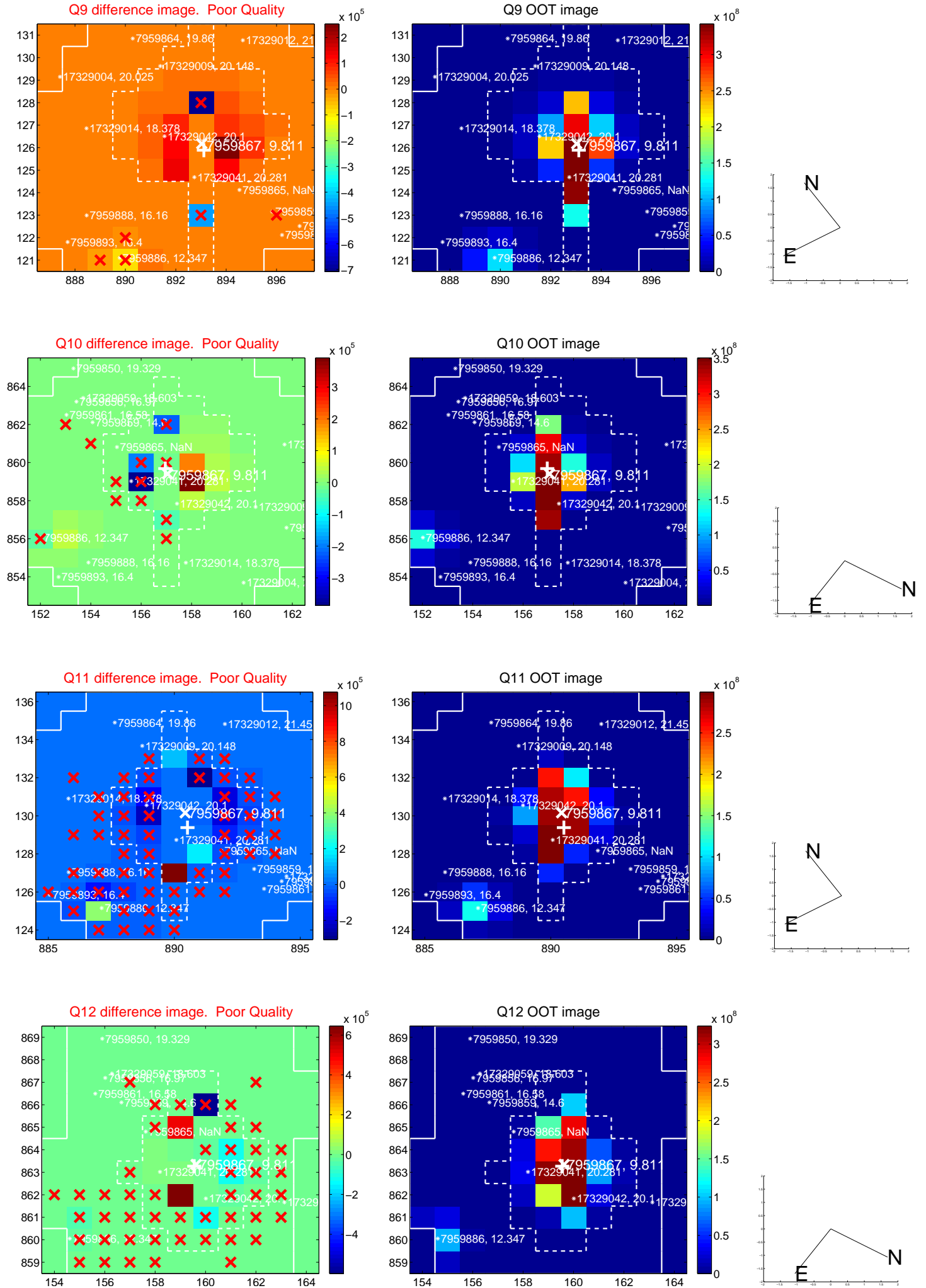


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

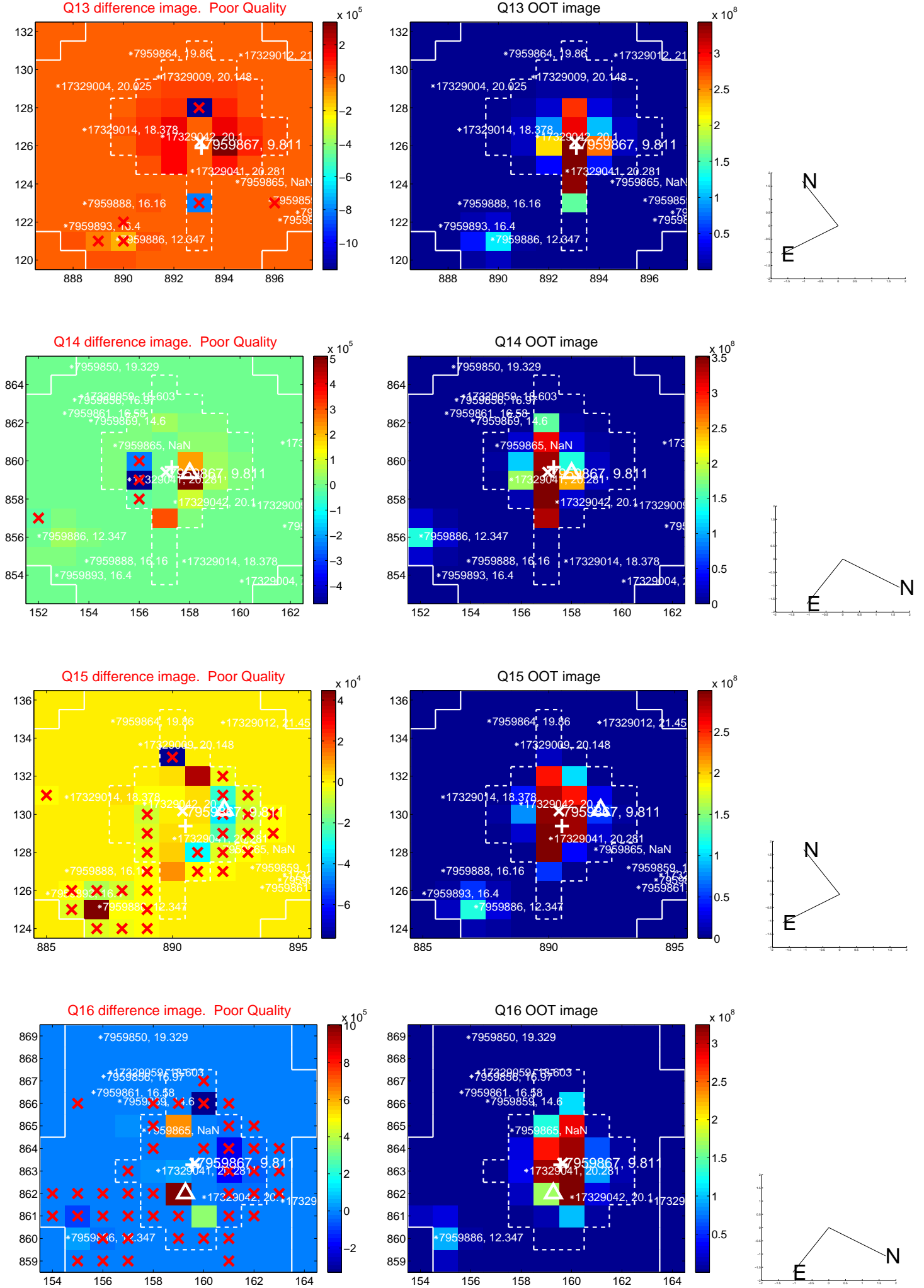




white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

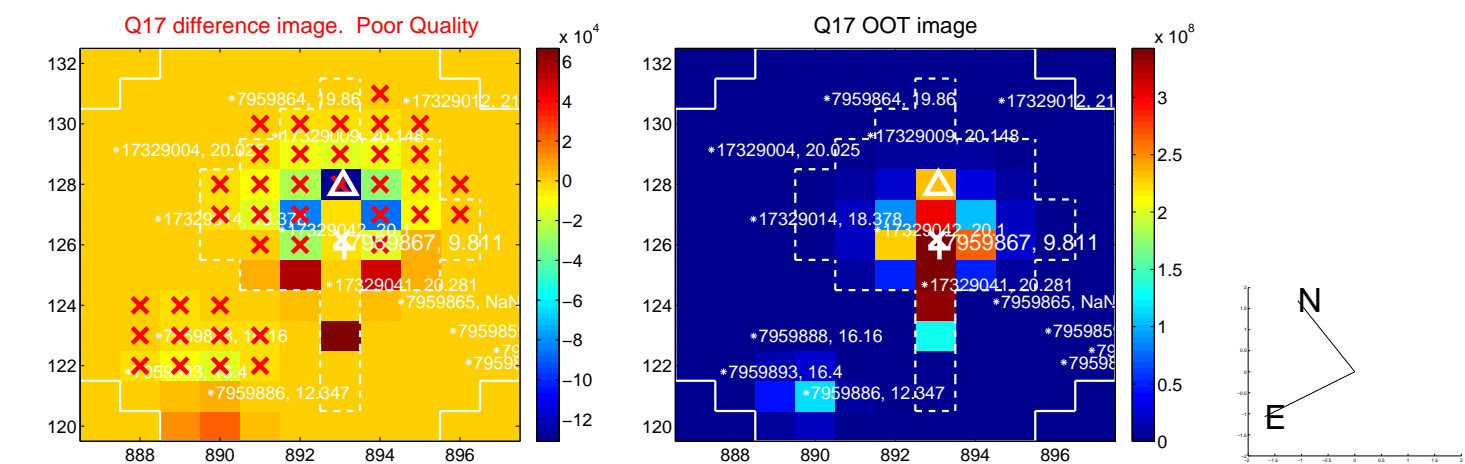


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

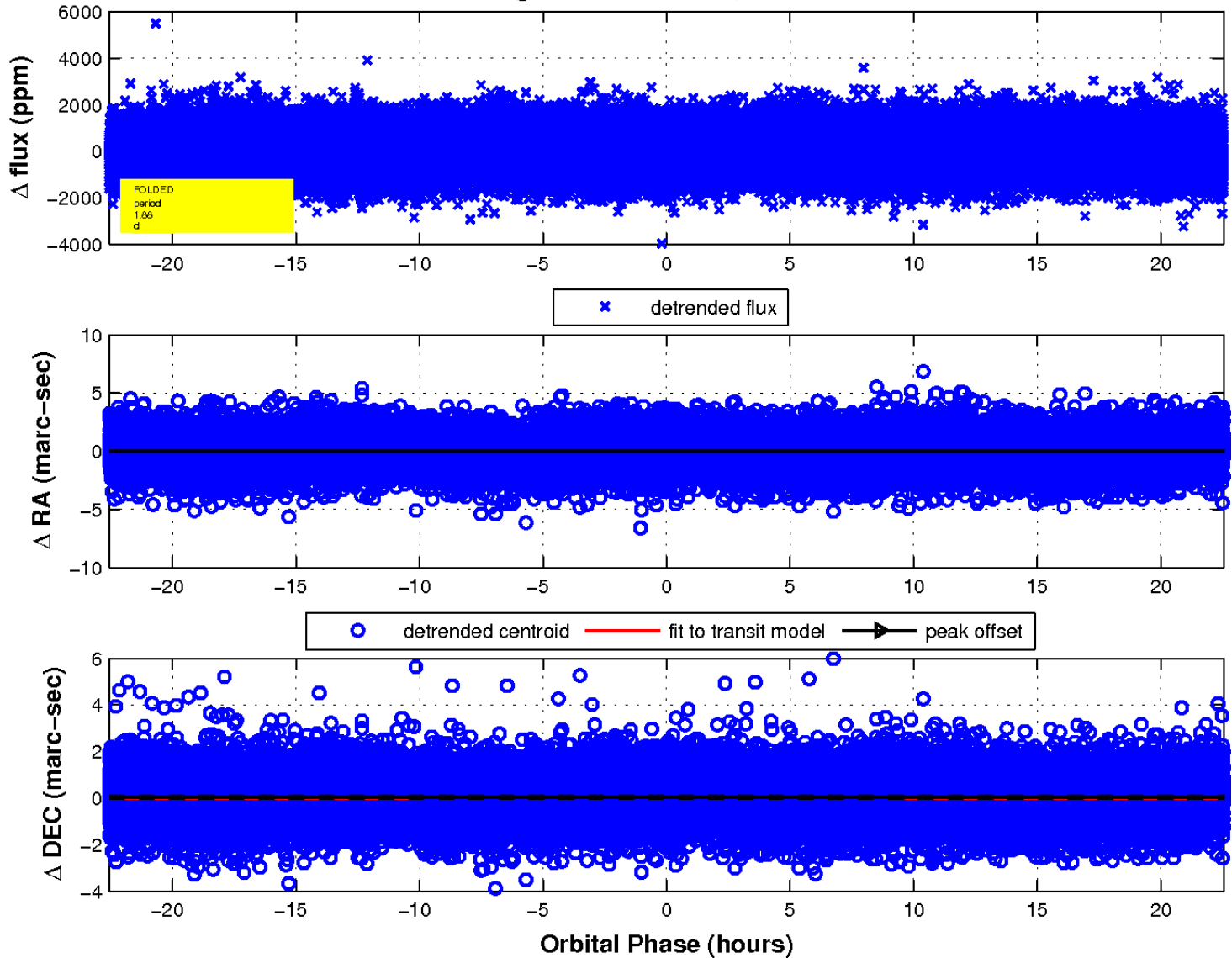




white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



fluxWeightedCentroids, Planet 2 of 2



UKIRT Image

Declination

