

# KIC 007031880

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
007031880-01	OBS	No	0.566741	131.856473	18.9	3.534	12.5	4.2	1.10	6268	0.50	8314.30
007031880-02	OBS	No	32.484757	160.792781	746.0	1.403	7.9	9.4	1.10	6268	3.43	37.62

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
007031880-01	OBS	FP	0.00	1	0	1	1	LPP_DV—MOD_NONUNIQ_ALT—HALO_GHOST—EPHEM_MATCH
007031880-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_FEW_DIFFS

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

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

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

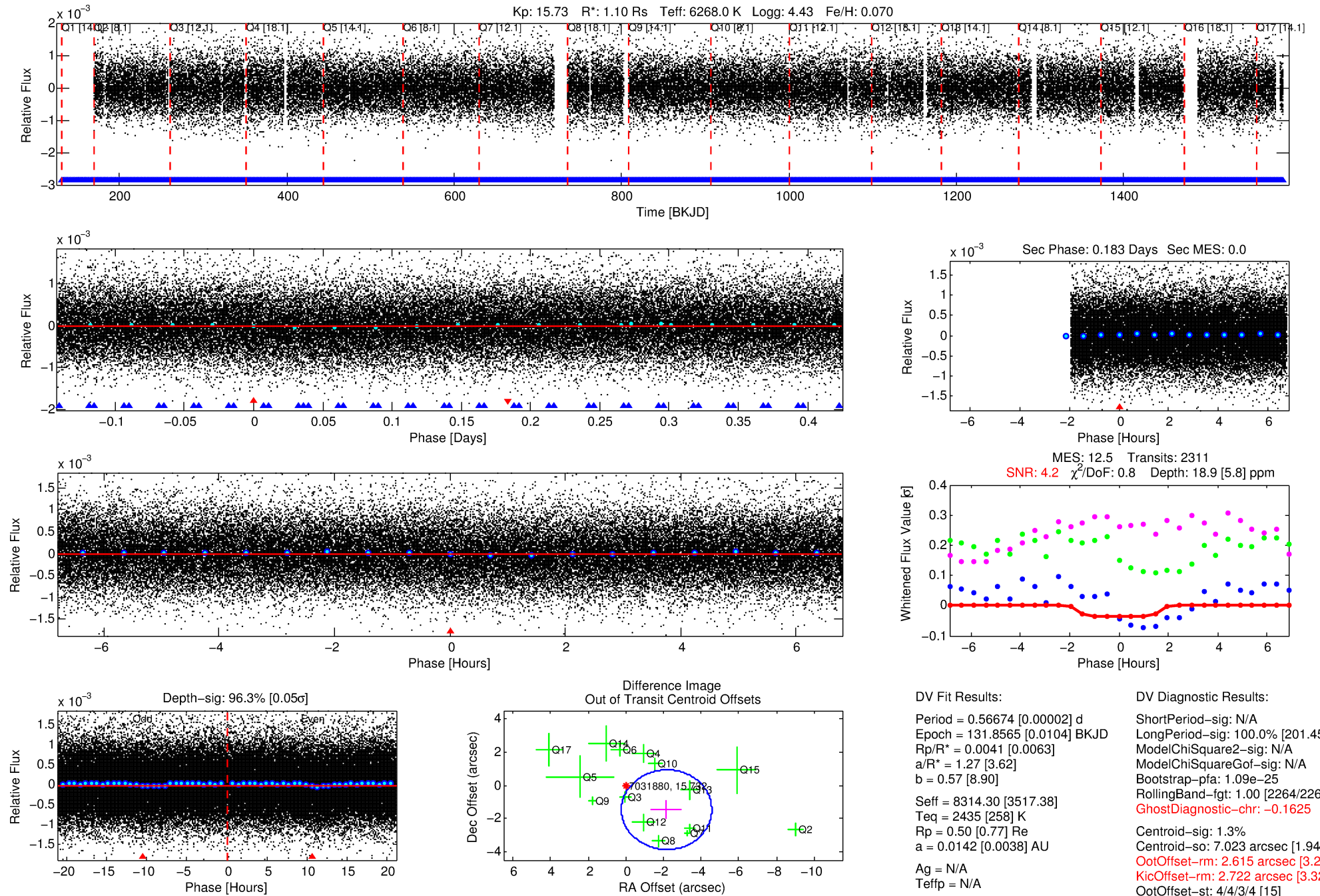
## Ephemeris Match Information For 007031880-01

TCE (1)	KIC	Parent (2)	Parent KIC	$P_1:P_2$	Dist ( $''$ )	$\Delta$ Row	$\Delta$ Col	$m_2$	$m_1$	$D_2/D_1$	Mechanism	Flag	$\sigma_P$	$\sigma_T$
007031880-01	7031880	RR-Lyr-pri	7198959	1:1	756.8	100	-162	7.86	15.73	32805.00	Direct-PRF	0	1.28	22.63

**Notes:**  $P_1:P_2$  is the period ratio. Dist is the distance in arcseconds.  $\Delta$ Row and  $\Delta$ Col are the number of pixels apart in row and column.  $m_2$  and  $m_1$  are the magnitudes of the parent and child.  $D_2/D_1$  is the parent's transit depth divided by the child's.  $\sigma_P$  and  $\sigma_T$  are the significance of the match in period and epoch. For a match to be considered significant  $\sigma_P < 5.0$  and  $\sigma_T < 5.0$ . Matches which have  $\sigma_P$  and  $\sigma_T$  very close to this cutoff should receive extra scrutiny, especially if the period ratio is very large.

# DV One-Page Summary

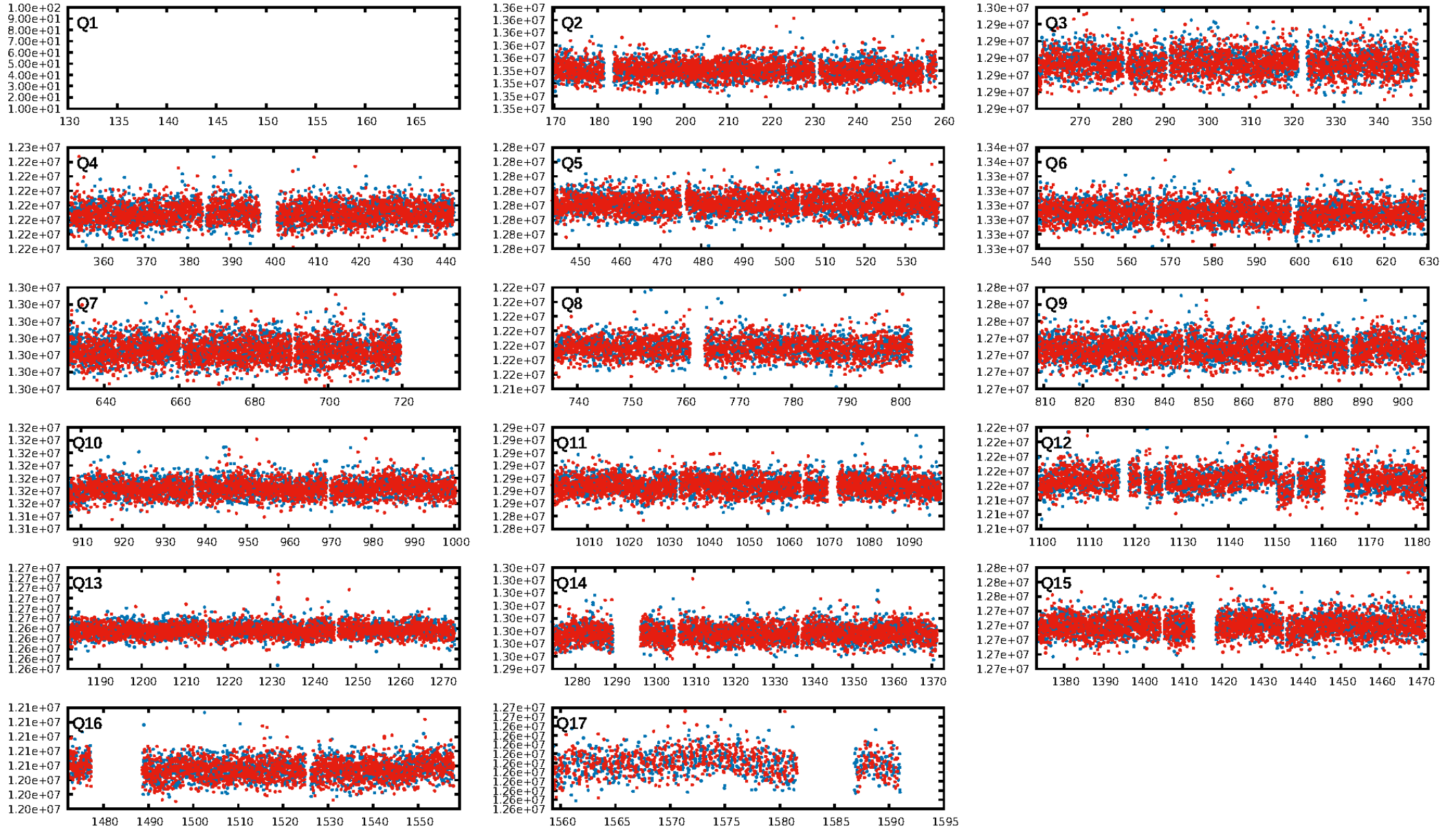
KIC: 7031880 Candidate: 1 of 2 Period: 0.567 d



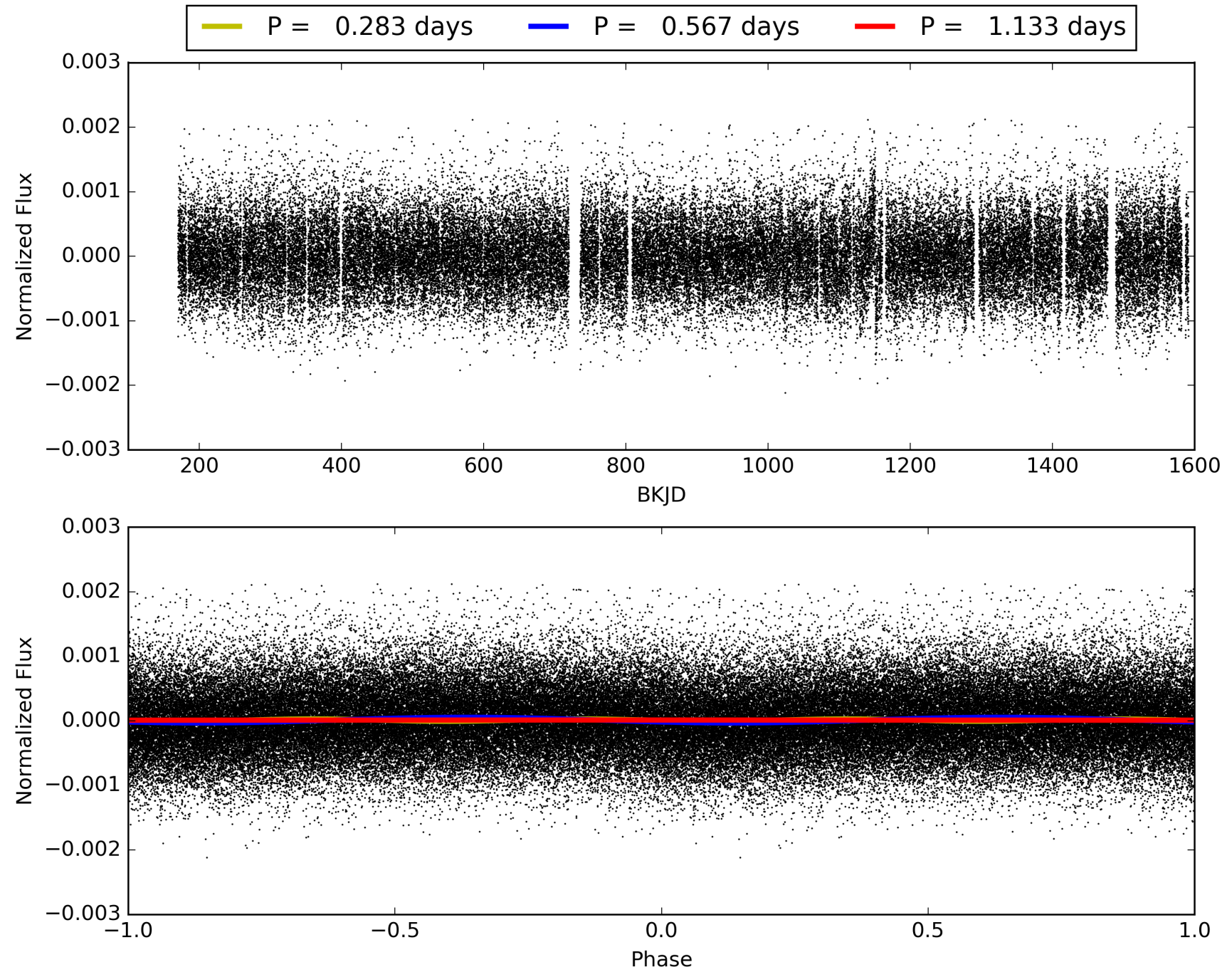
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 12:52:55 Z

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

# TCE 007031880-01, PDC Light Curves



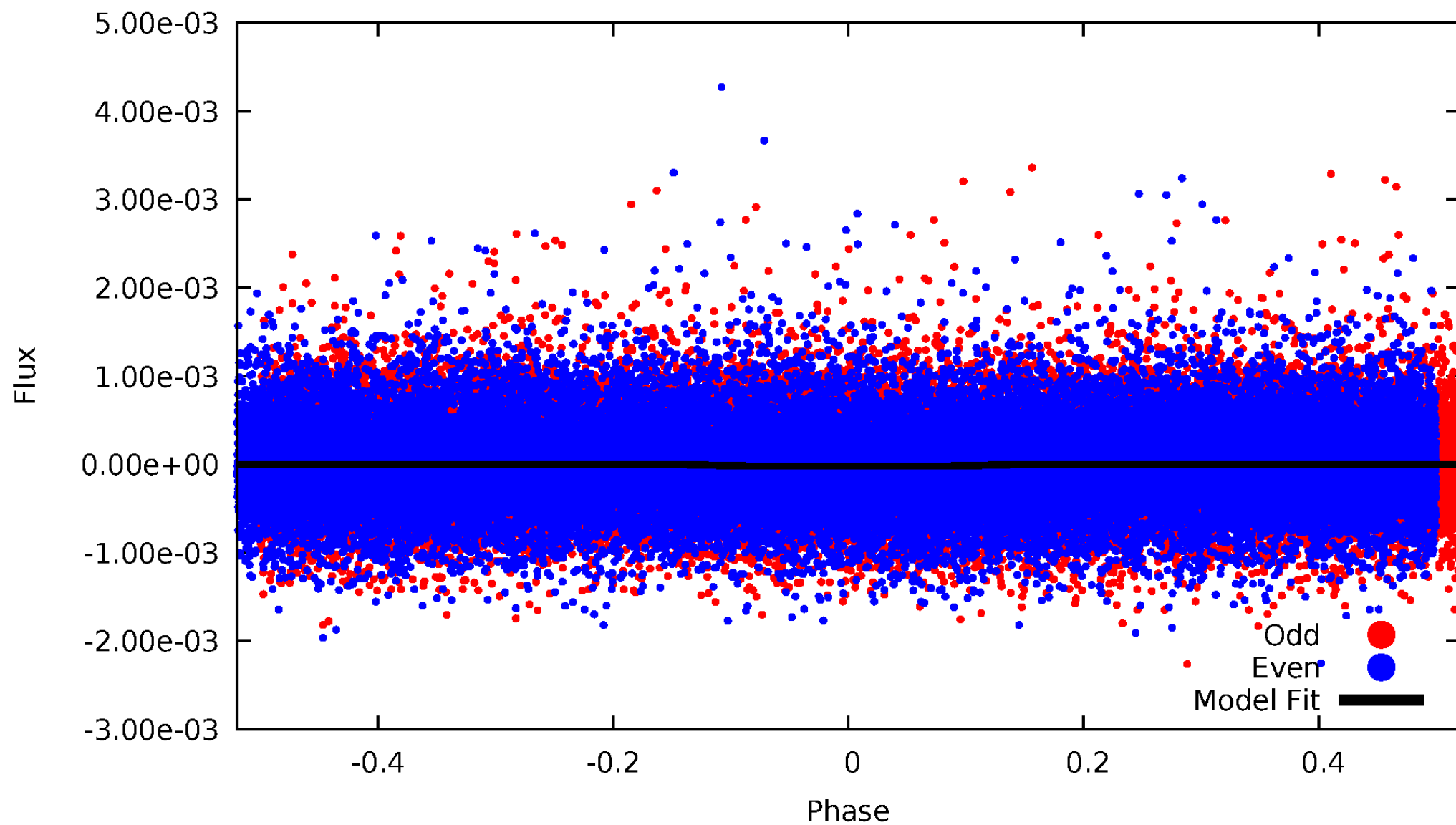
# TCE 007031880-01





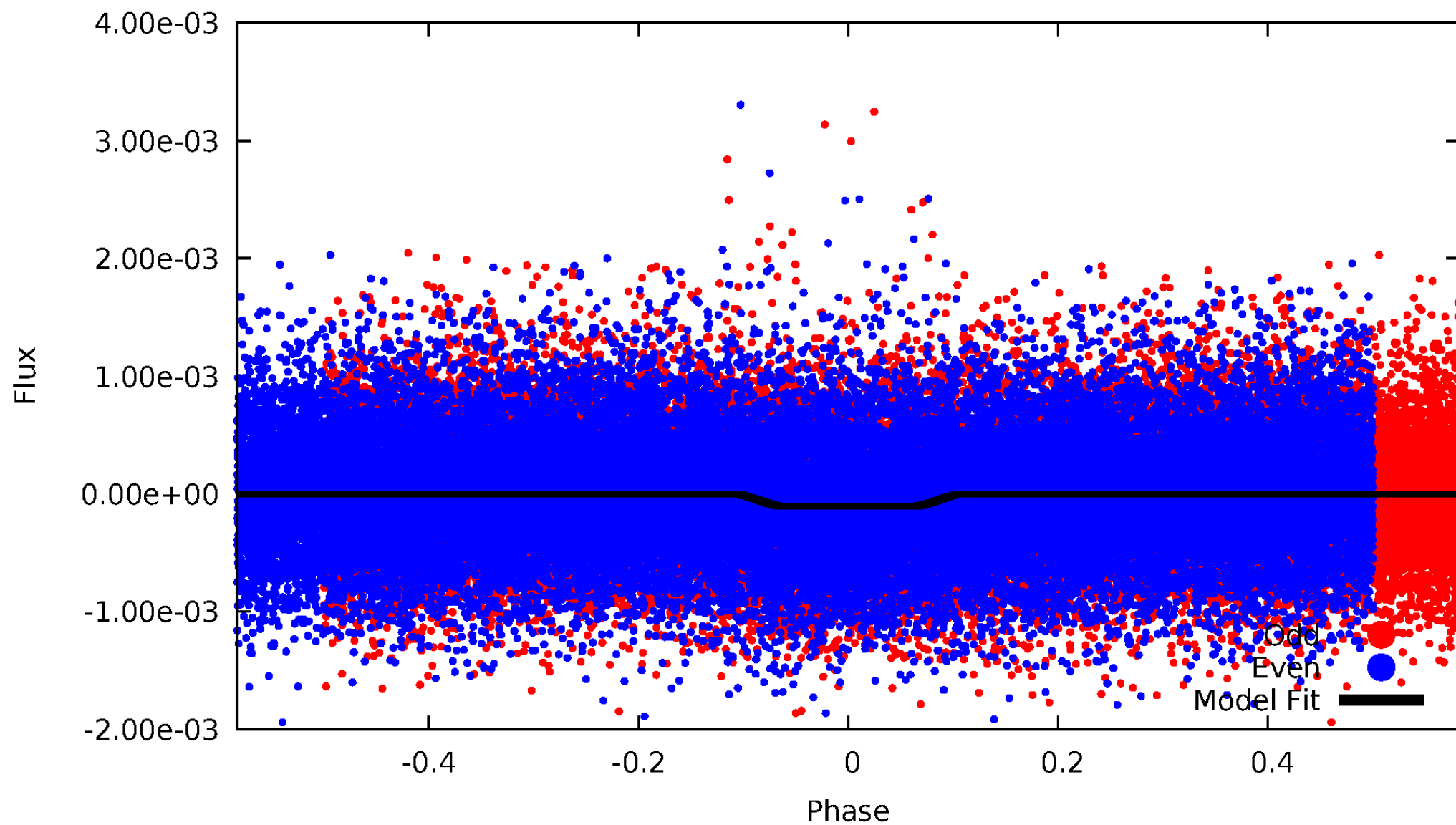
# DV Odd/Even

TCE 007031880-01

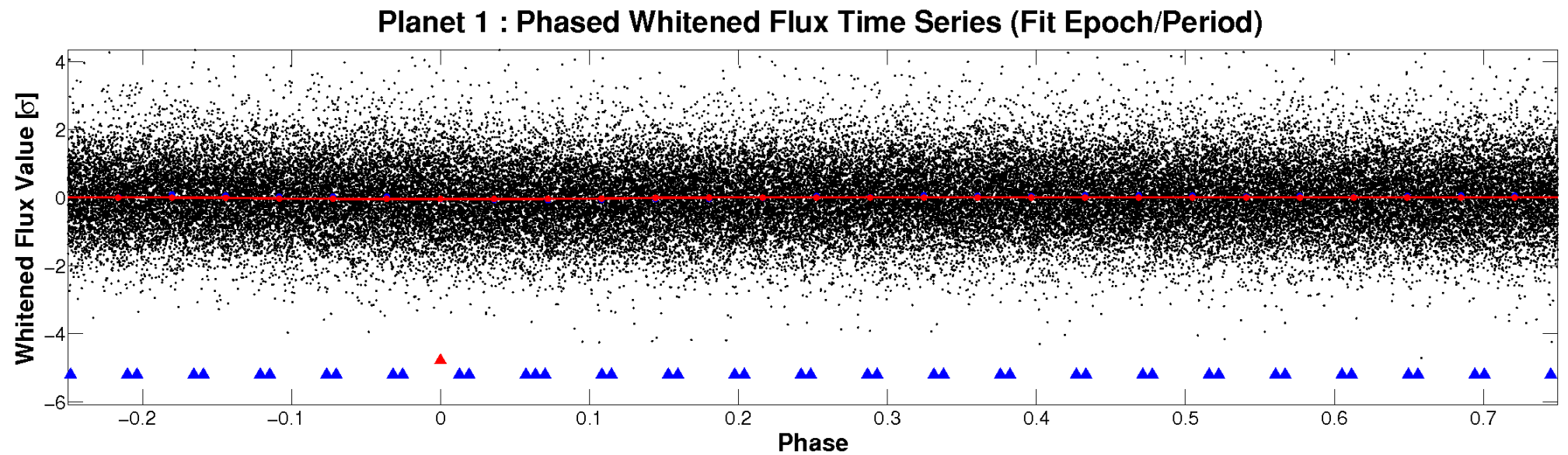
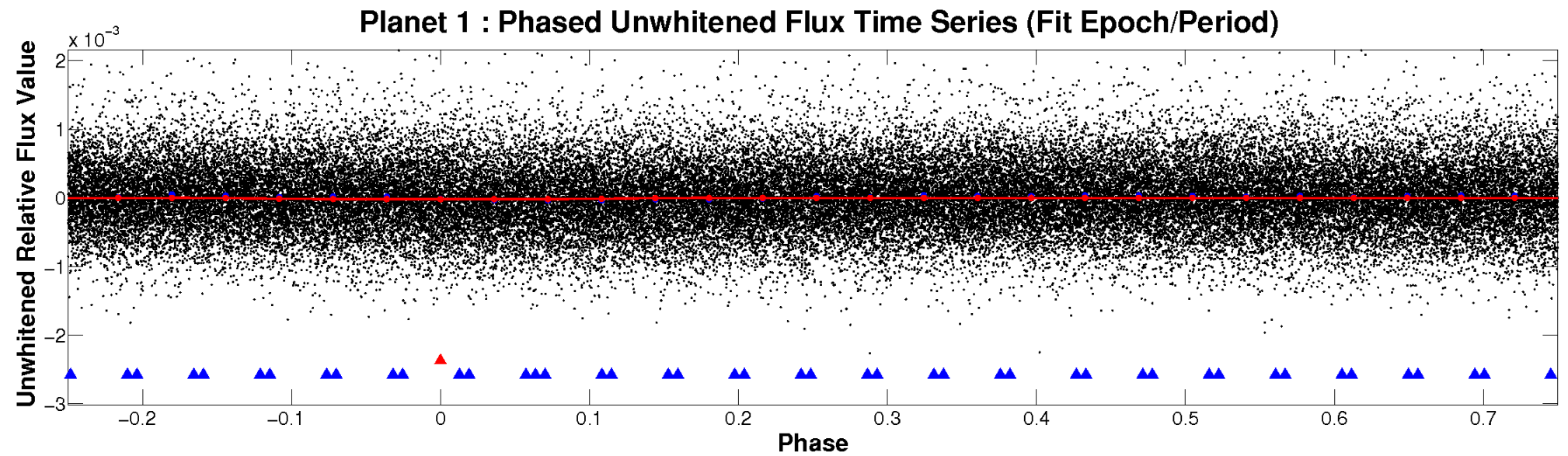


# ALT Odd/Even

TCE 007031880-01

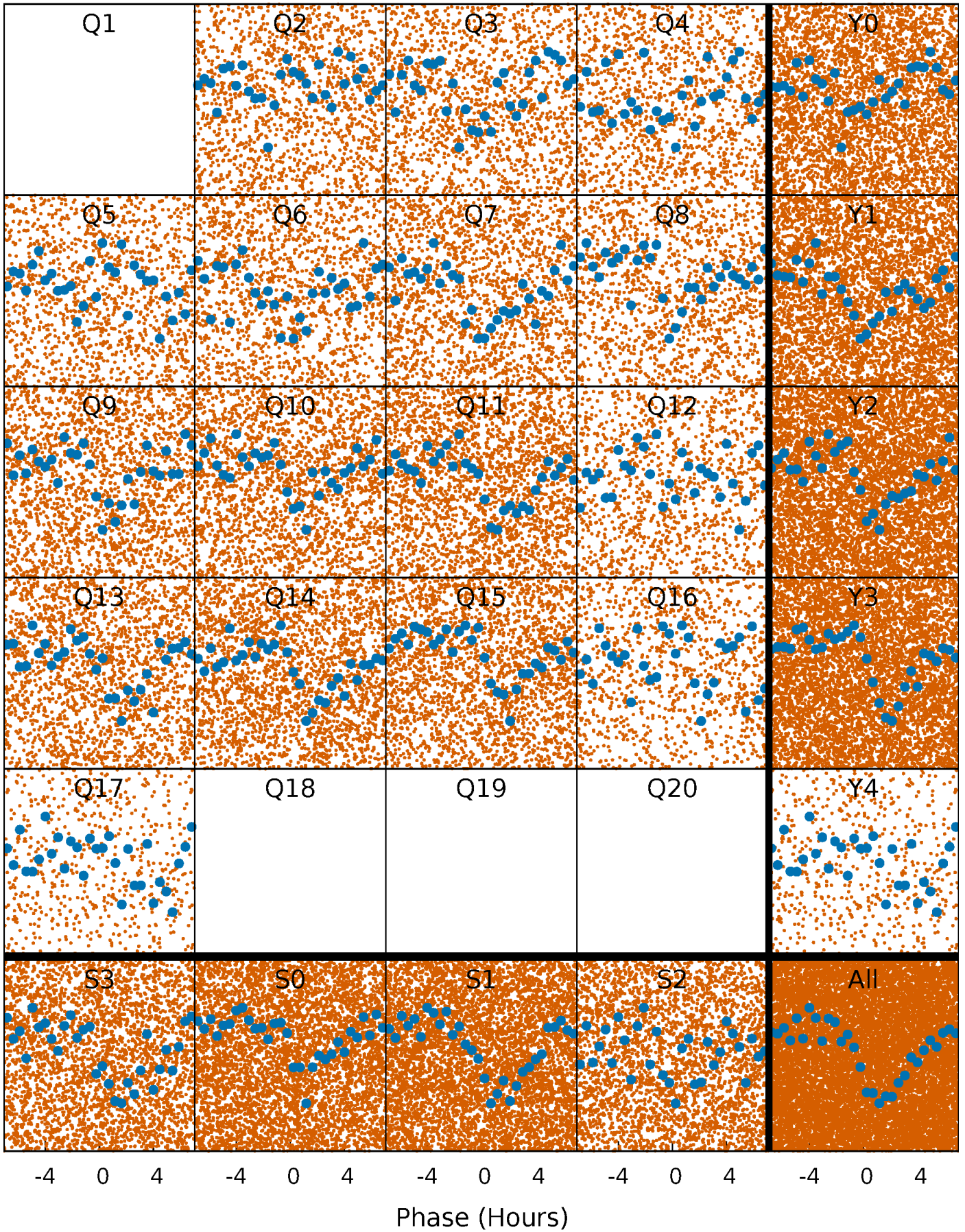


# Non-Whitened Vs. Whitened Light Curve



# PDC Quarter-Phased Transit Curves

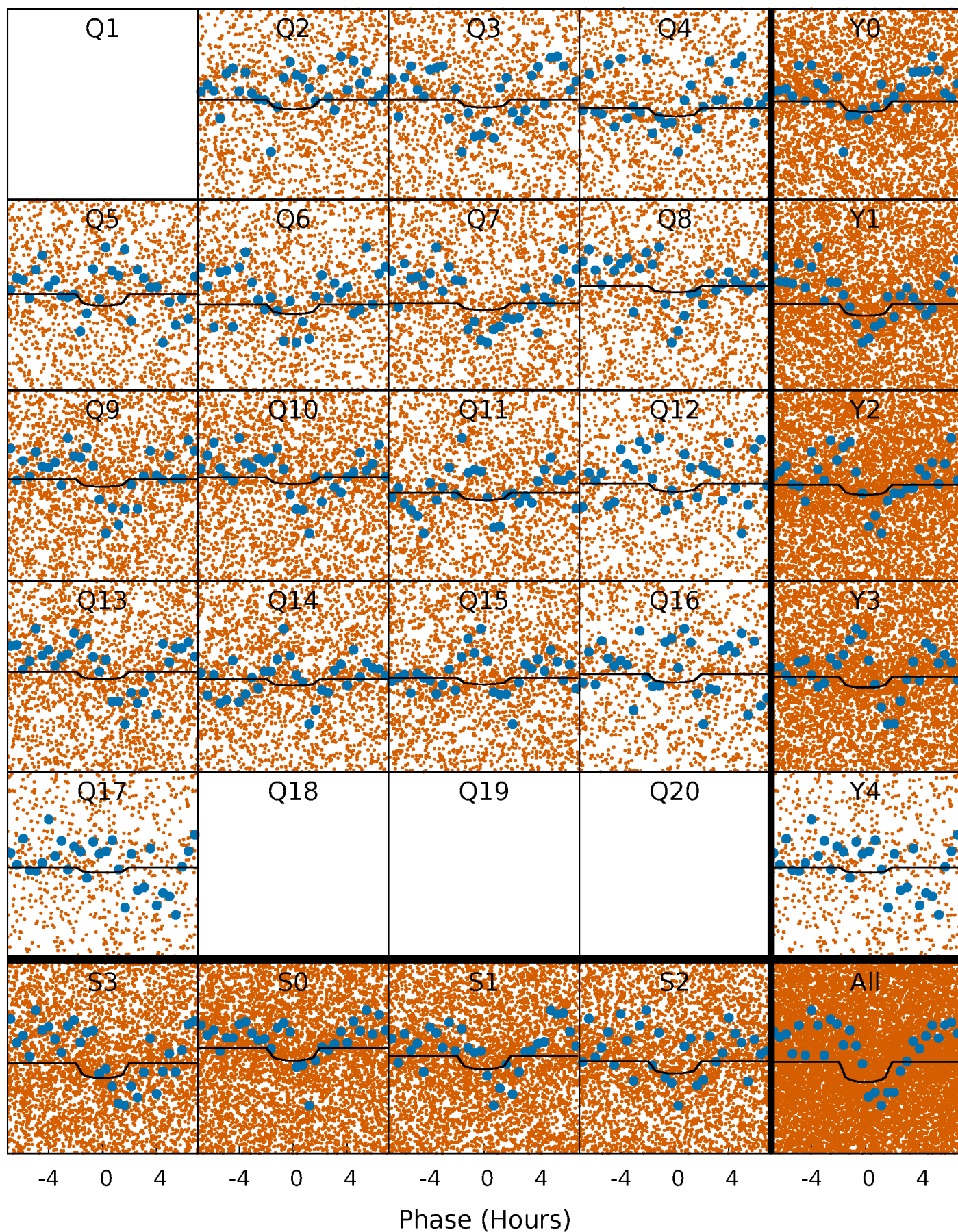
TCE 007031880-01 P= 0.566741 Days  $T_0=131.856473$  (BKJD)





# DV Quarter-Phased Transit Curves

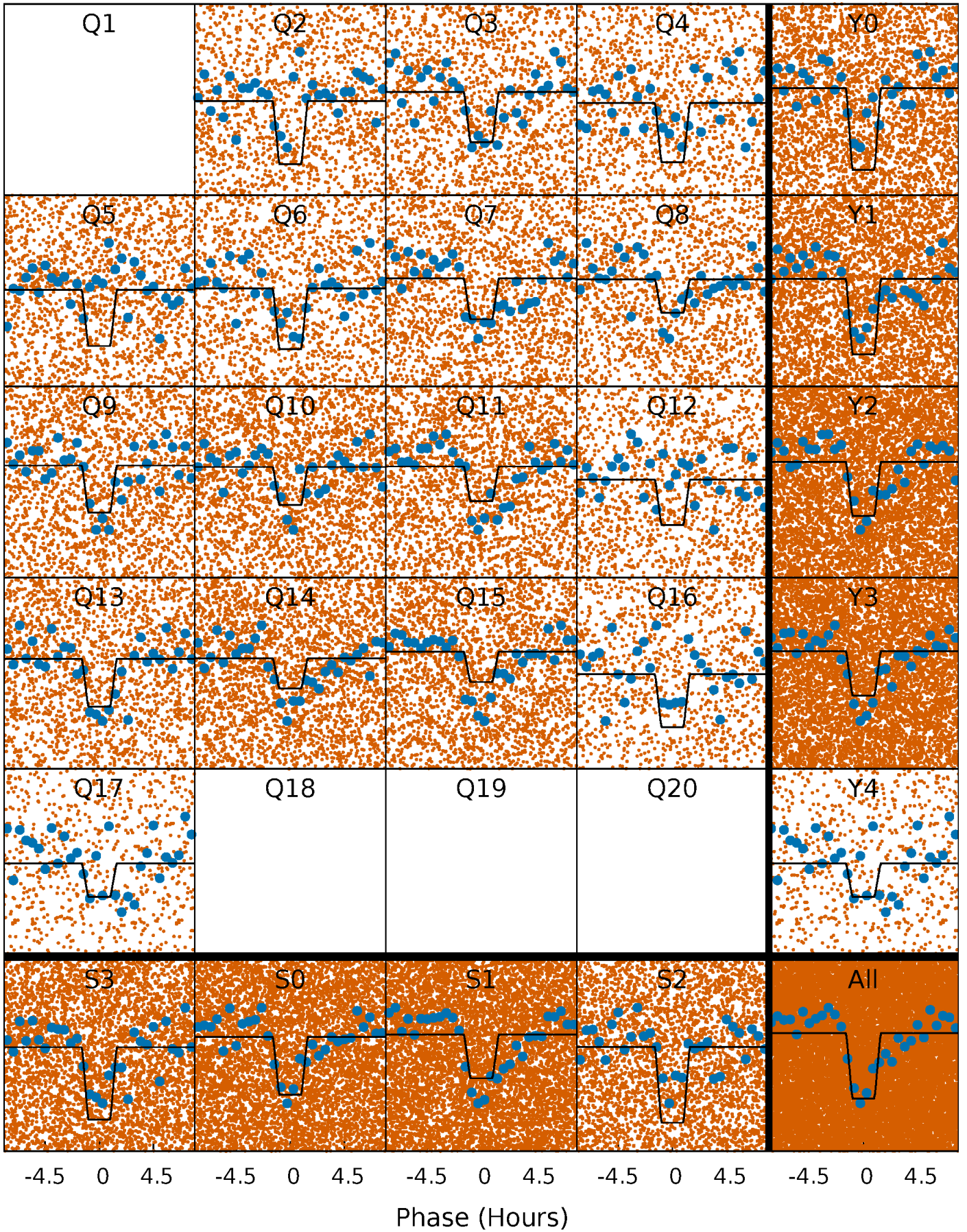
TCE 007031880-01 P= 0.566741 Days  $T_0=131.856473$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

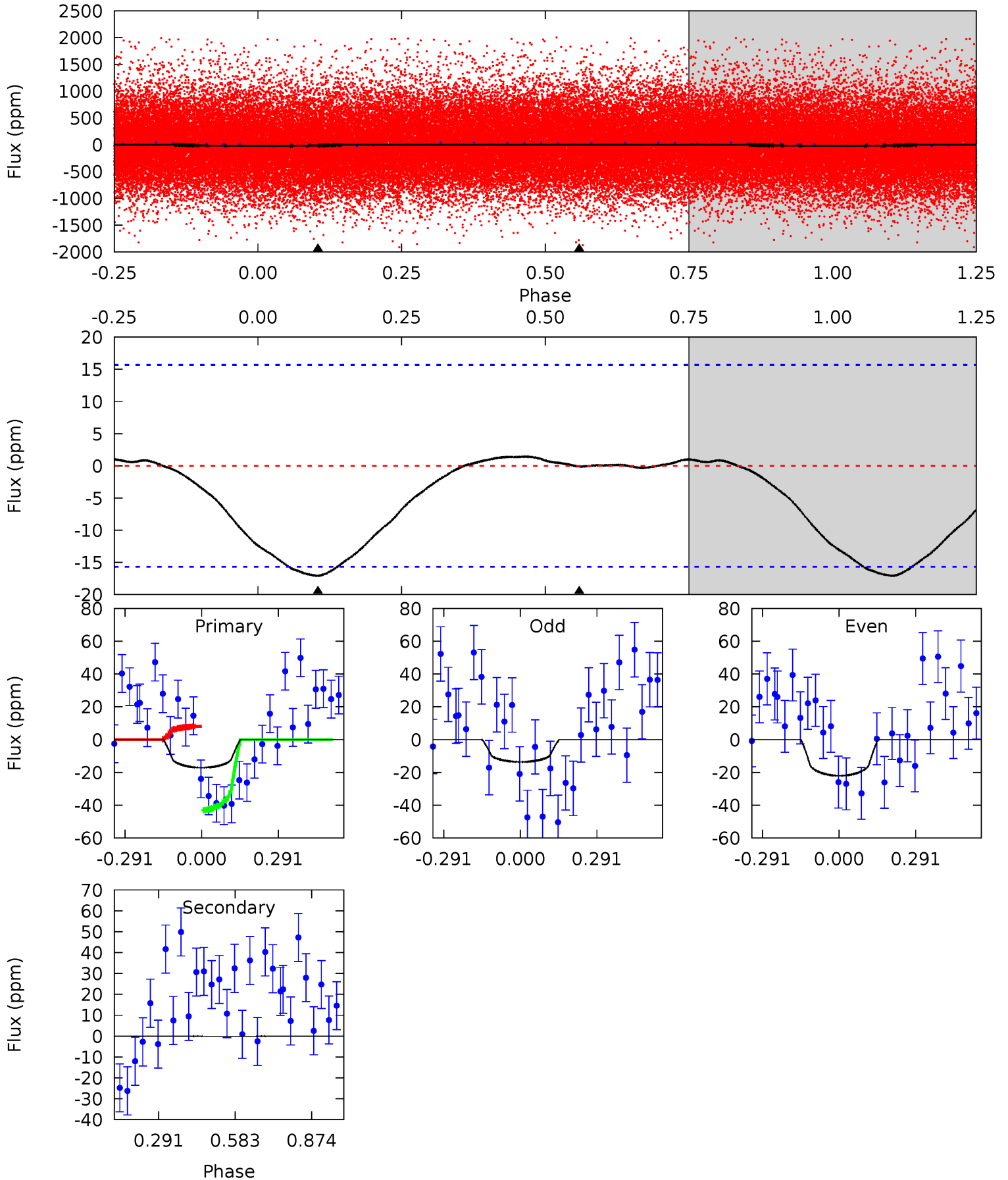
TCE 007031880-01 P= 0.566801 Days  $T_0=131.807012$  (BKJD)



# DV Model-Shift Uniqueness Test

007031880-01, P = 0.566741 Days, E = 131.856473 Days

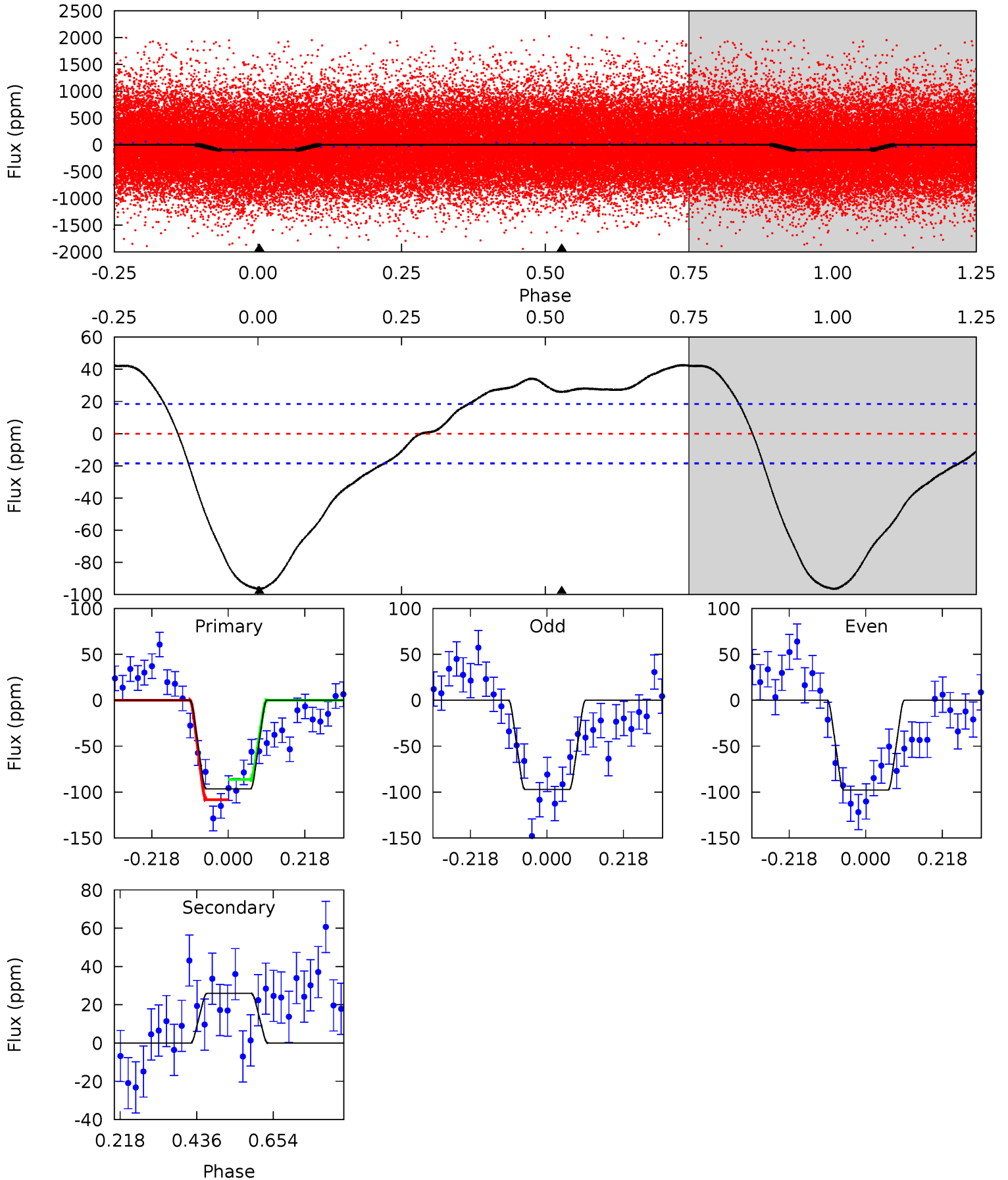
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
4.73	0.04	0	0	4.34	1.06	0.24	4.73	4.73	0.04	0.04	1.17	0.65	0.08	4.73



# Alt Model-Shift Uniqueness Test

007031880-01, P = 0.566801 Days, E = 131.807012 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
23.0	-6.18	0	0	4.40	1.23	5.43	23.0	23.0	-6.18	-6.18	0.05	0.97	0.31	2.60





### Stellar Parameters For KIC 007031880

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6268^{+174}_{-239}$	$4.429^{+0.054}_{-0.216}$	$0.070^{+0.200}_{-0.350}$	$1.100^{+0.353}_{-0.118}$	$1.188^{+0.152}_{-0.169}$	$1.257^{+0.361}_{-0.667}$
	+3%/-4%	+1%/-5%	+286%/-500%	+32%/-11%	+13%/-14%	+29%/-53%
Source	PHO1	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 007031880-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-0 \pm 4$	$0.81^{+0.72}_{-0.54}$	$3473^{+264}_{-181}$	$-3330^{+7315}_{-932}$	$0.023^{+1.072}_{-0.890}$
Alt.	$26 \pm 4$	$1.36^{+0.75}_{-0.73}$	$3472^{+241}_{-162}$	$-4655^{+594}_{-1688}$	$-1.447^{+0.824}_{-5.725}$

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

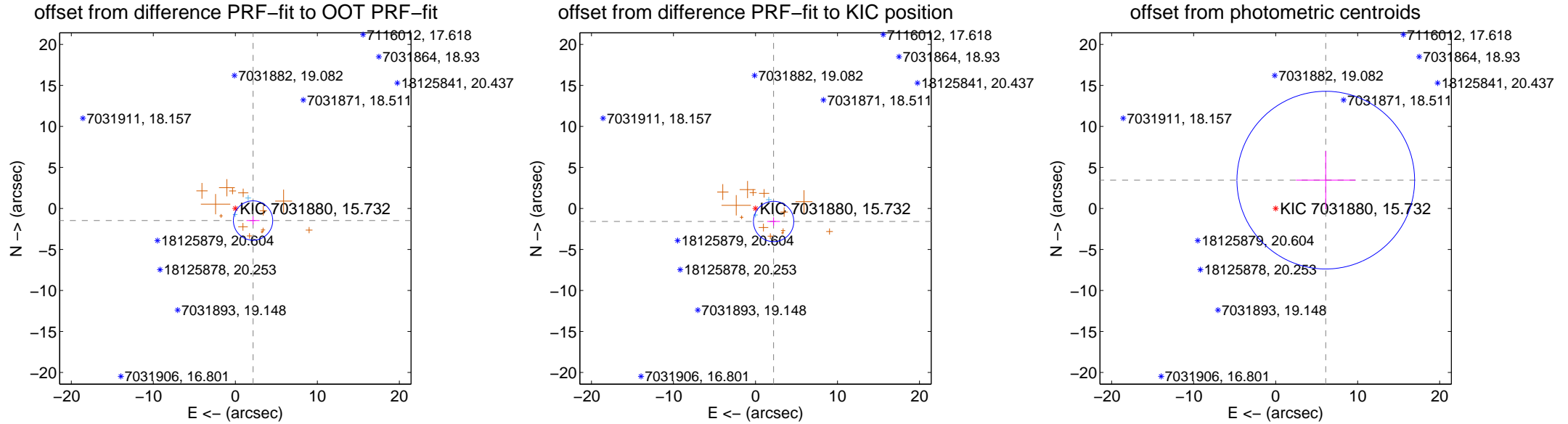
## DV Centroid Data

Supplemental centroid analysis for 007031880-01. Kepler magnitude: 15.73. Transit SNR 4.15

There are 2 quarters with good PRF difference image offsets

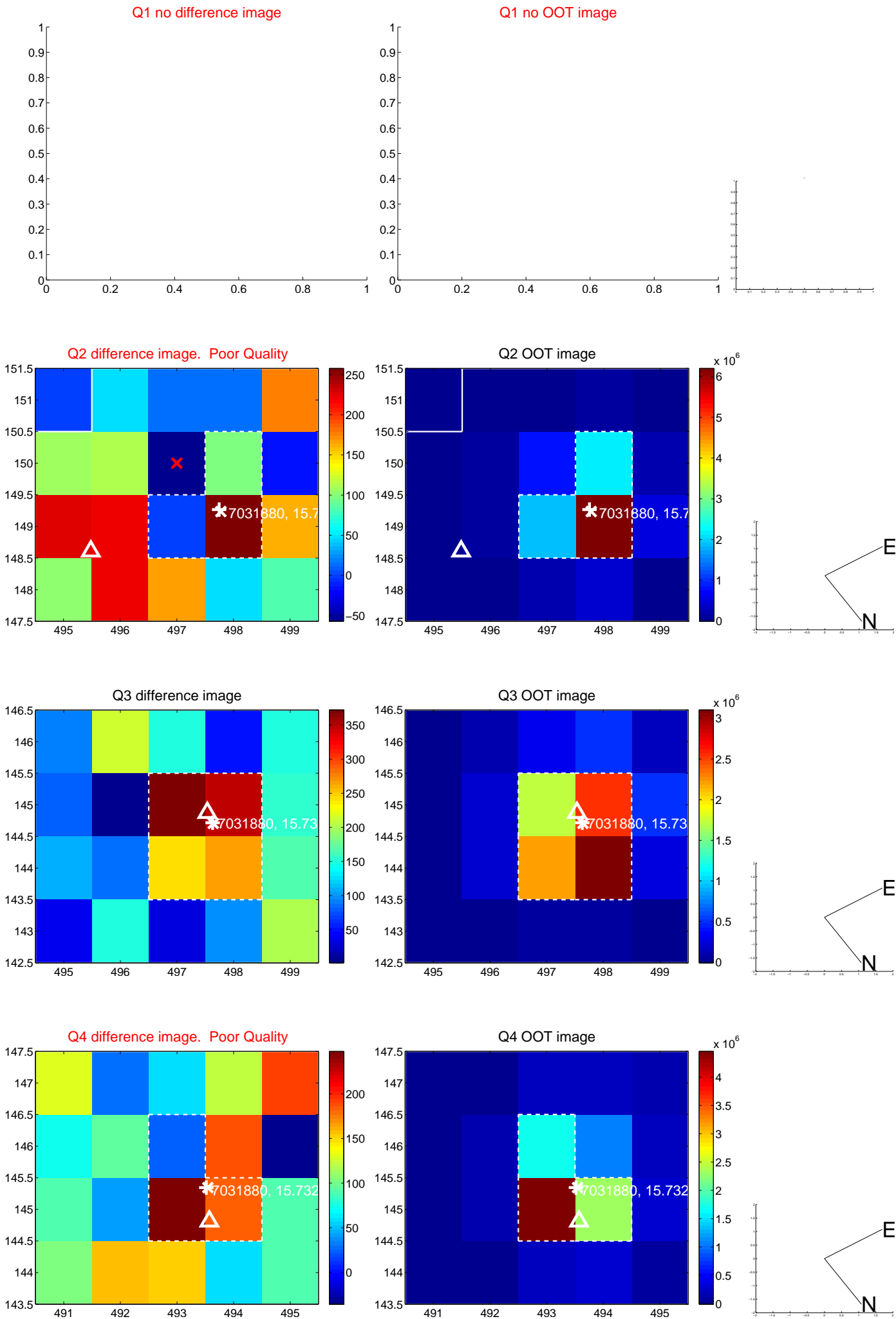
The direct PRF centroid is offset from the target star catalog position by about 0.16 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$2.615 \pm 0.800$	$3.27$	$-2.162 \pm 0.798$	$-1.472 \pm 0.500$
PRF-fit source offset from KIC position	$2.722 \pm 0.820$	$3.32$	$-2.210 \pm 0.788$	$-1.589 \pm 0.511$
photometric centroid source offset	$7.02 \pm 3.61$	1.94	$-6.12 \pm 3.63$	$3.45 \pm 3.55$

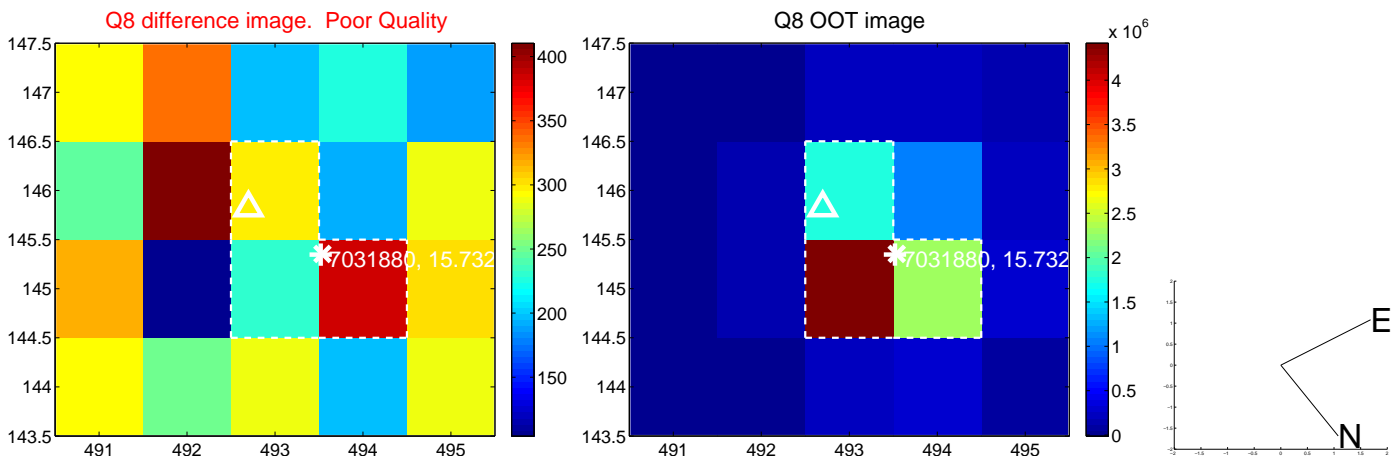
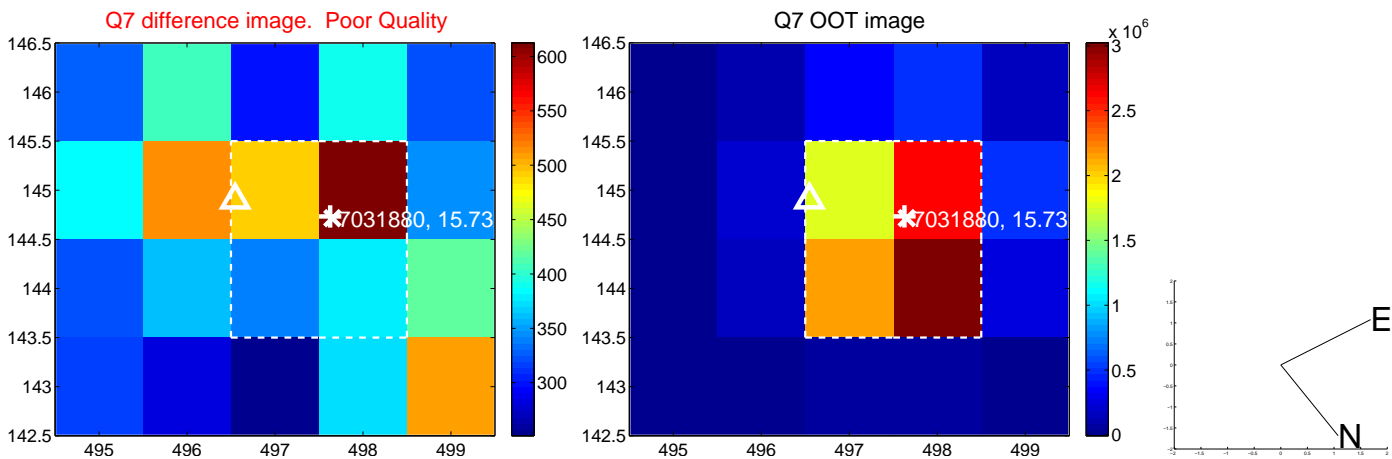
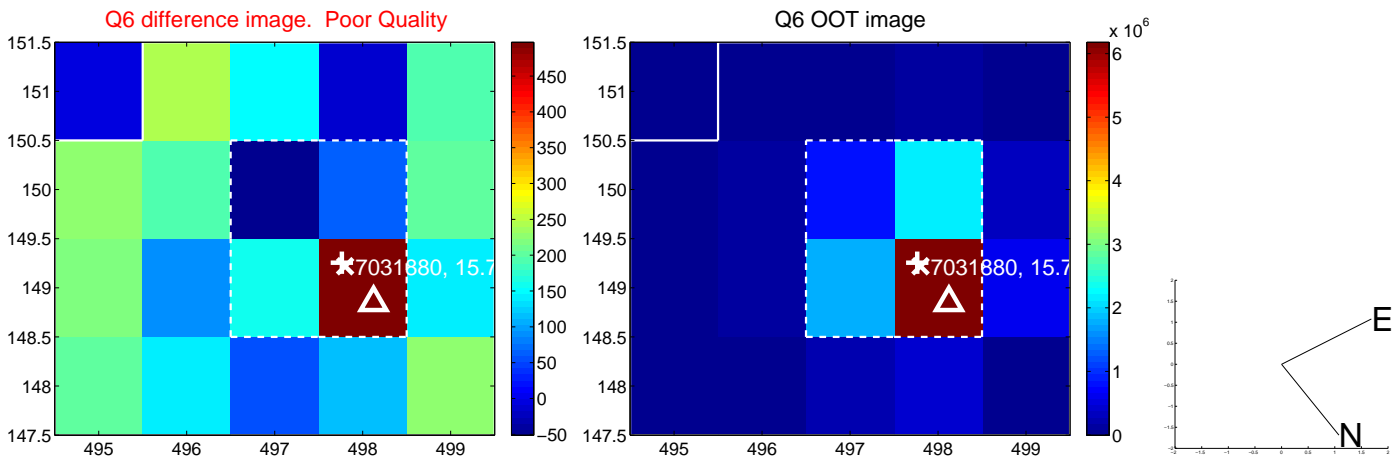
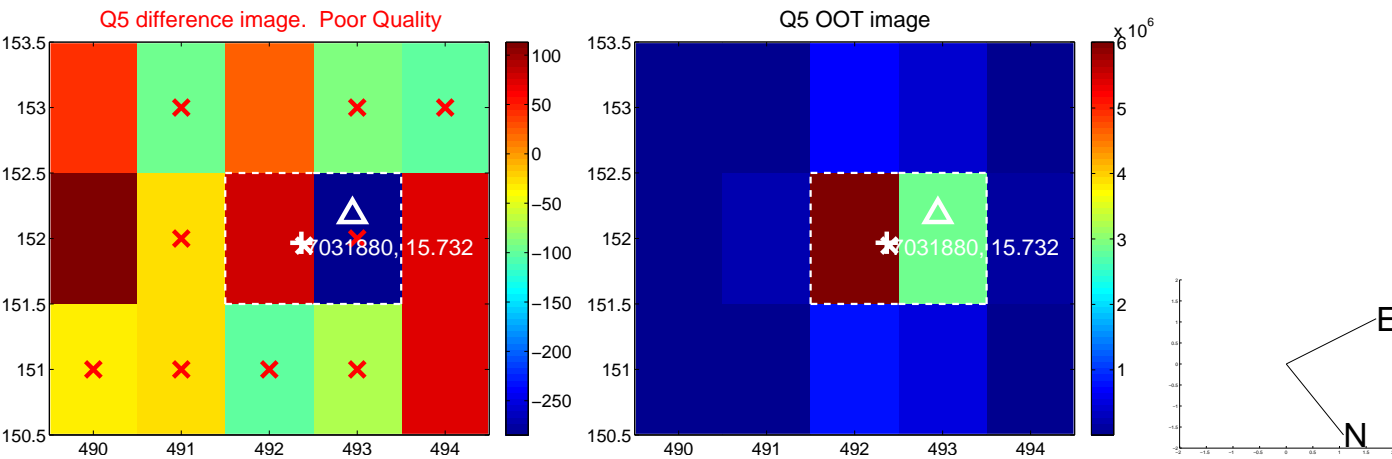


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

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

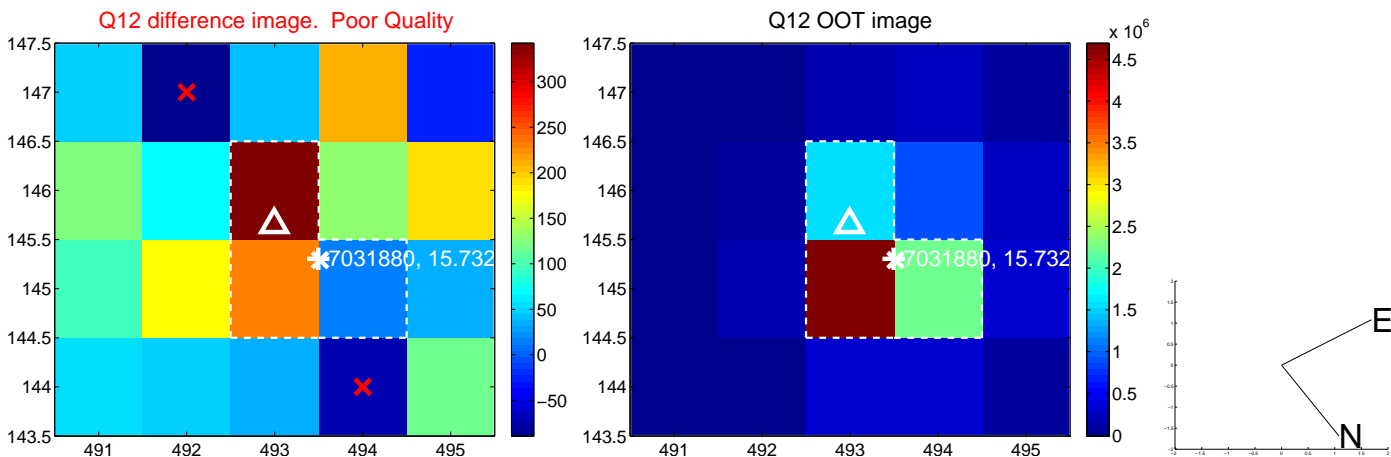
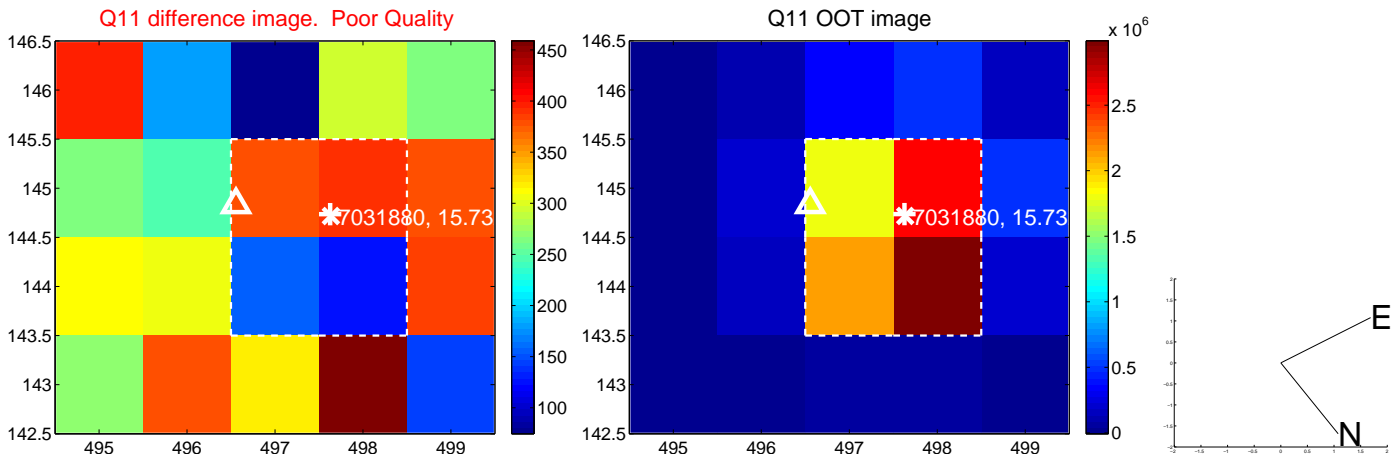
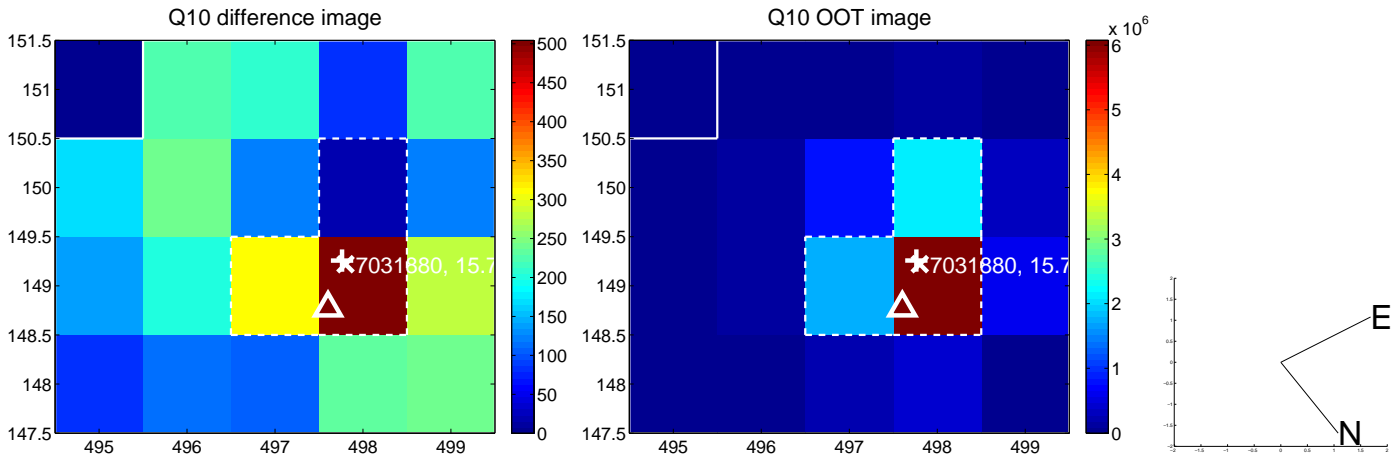
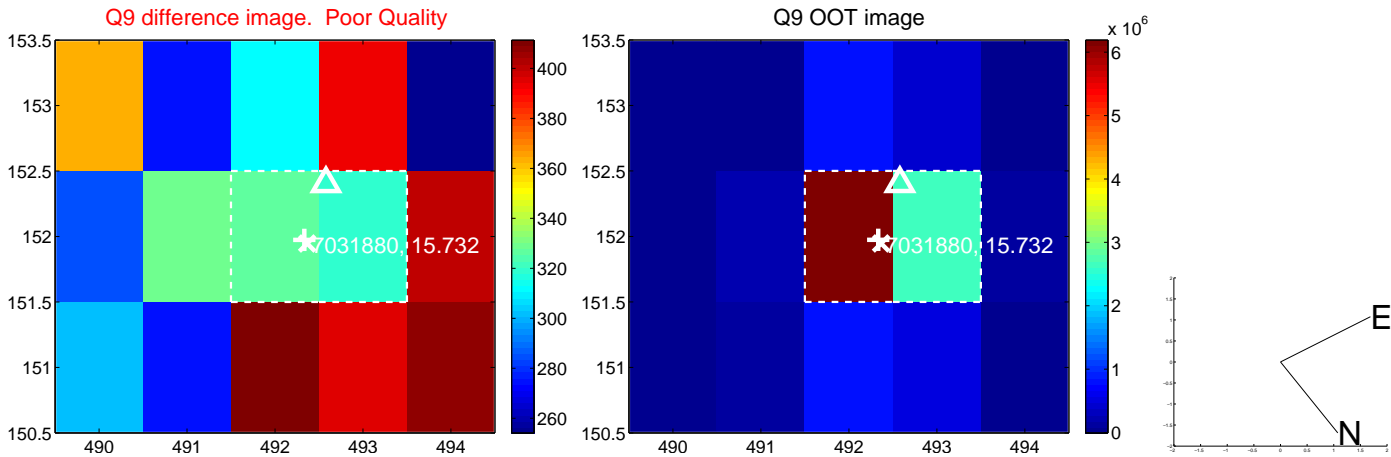


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

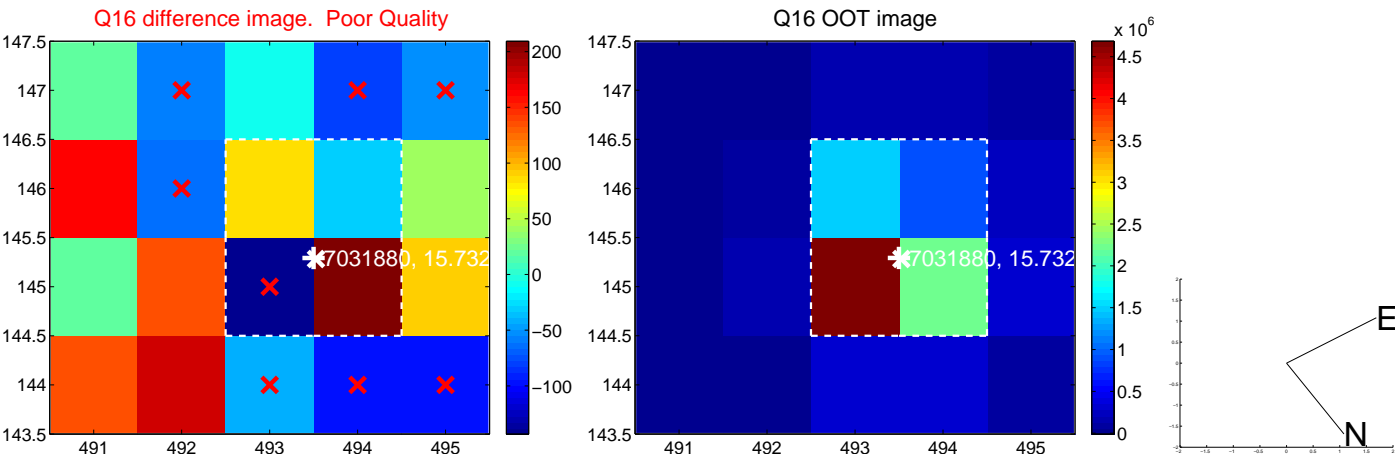
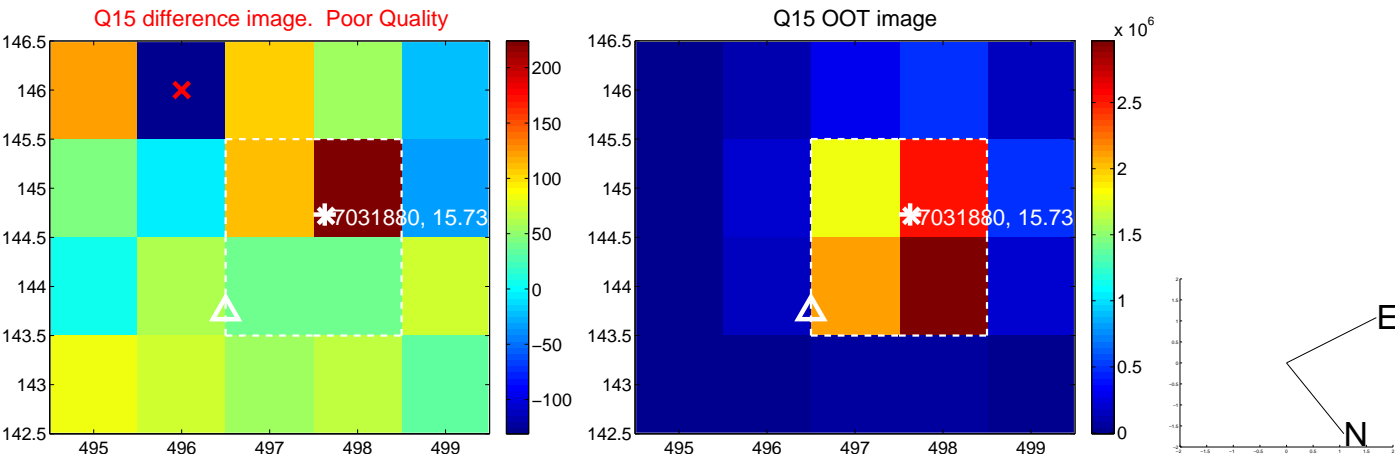
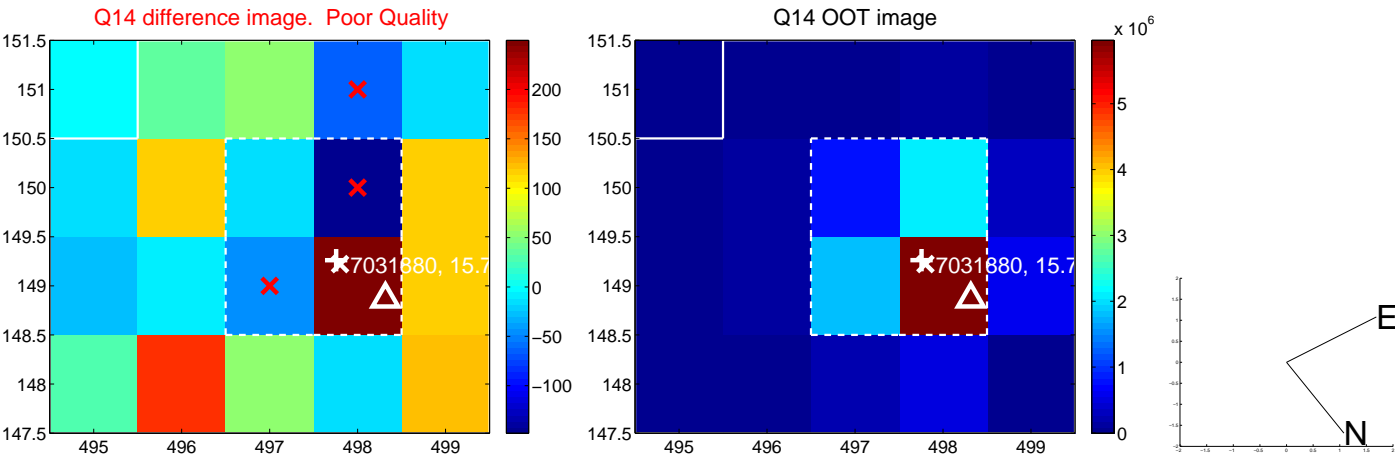
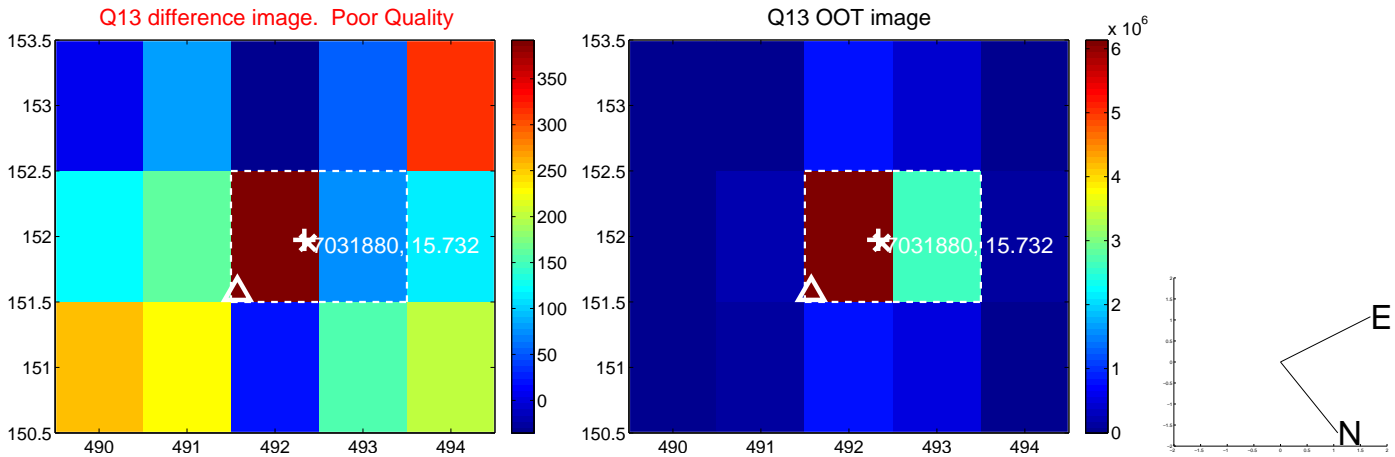




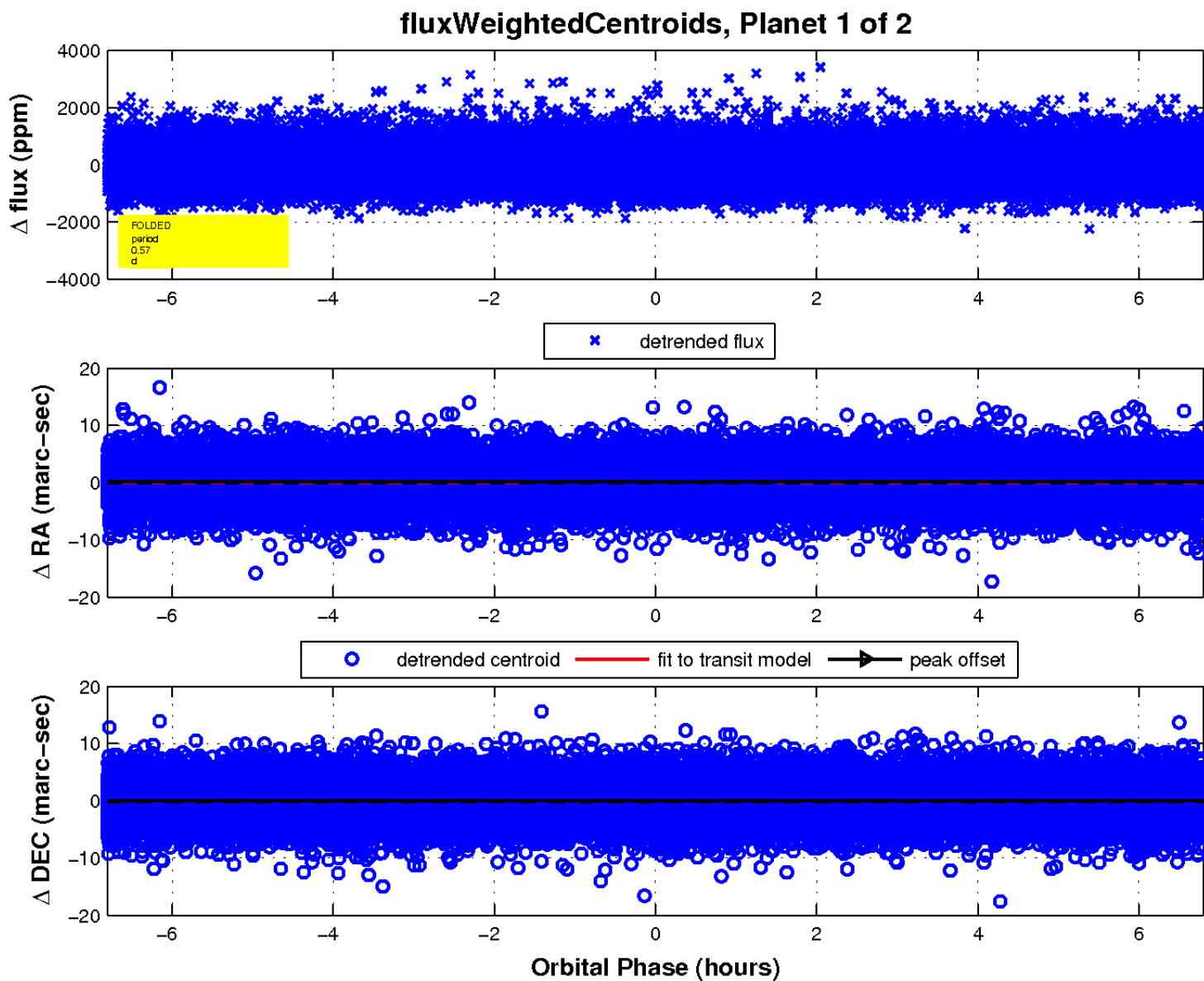
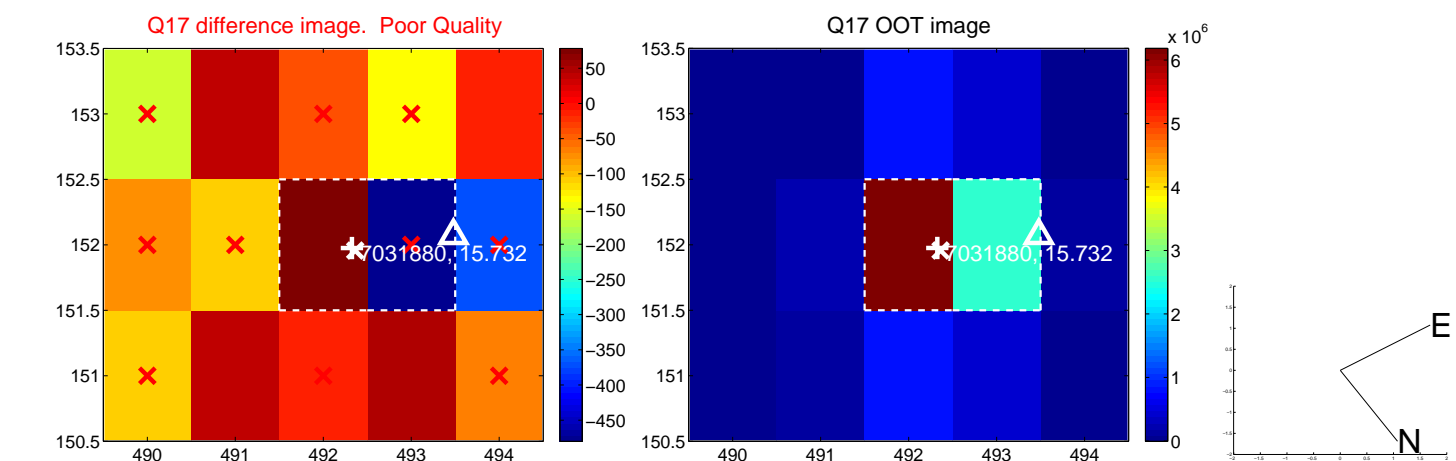
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

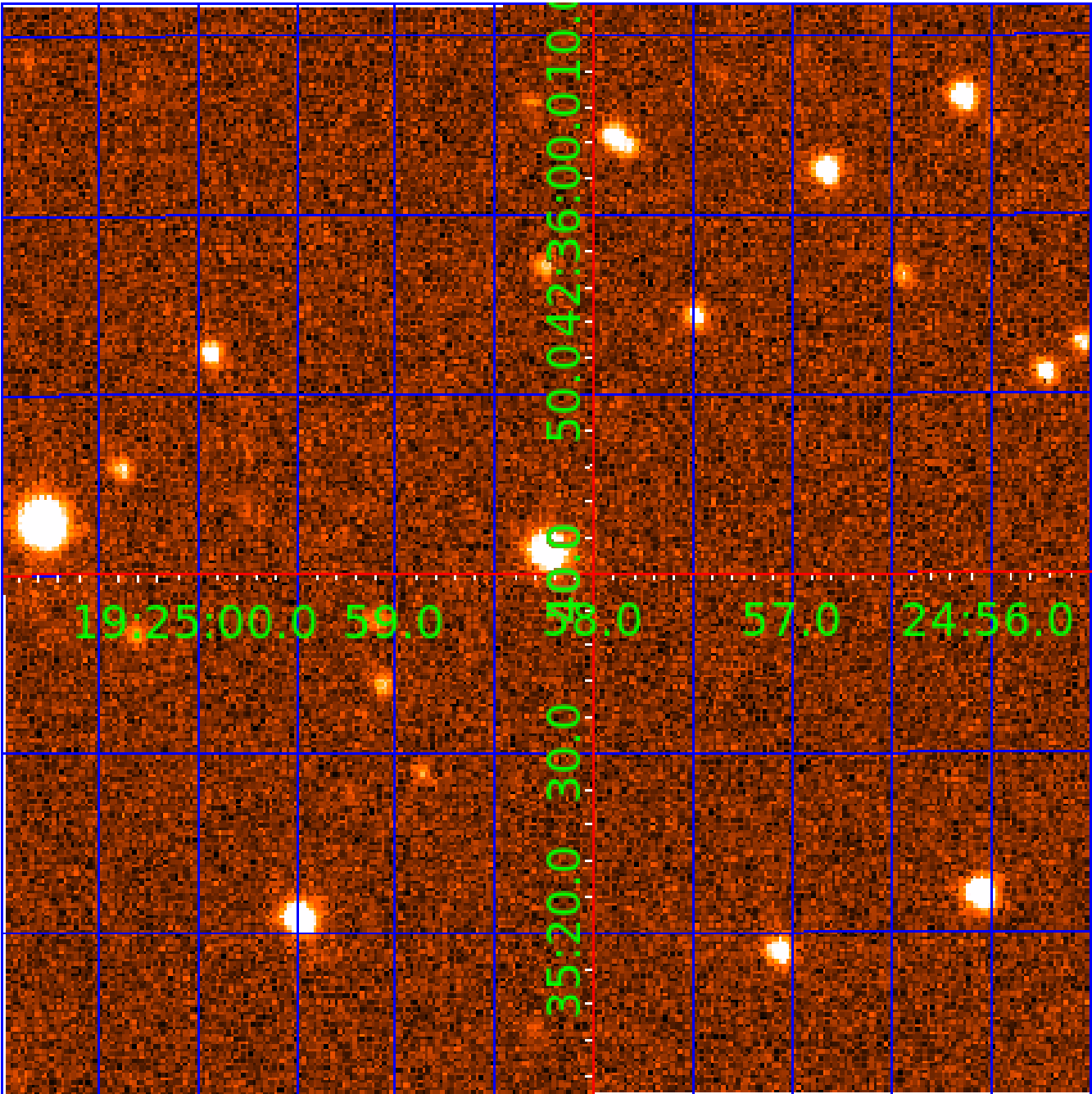


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination





# KIC 007031880

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
007031880-01	OBS	No	0.566741	131.856473	18.9	3.534	12.5	4.2	1.10	6268	0.50	8314.30
007031880-02	OBS	No	32.484757	160.792781	746.0	1.403	7.9	9.4	1.10	6268	3.43	37.62

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
007031880-01	OBS	FP	0.00	1	0	1	1	LPP_DV—MOD_NONUNIQ_ALT—HALO_GHOST—EPHEM_MATCH
007031880-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_FEW_DIFFS

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

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

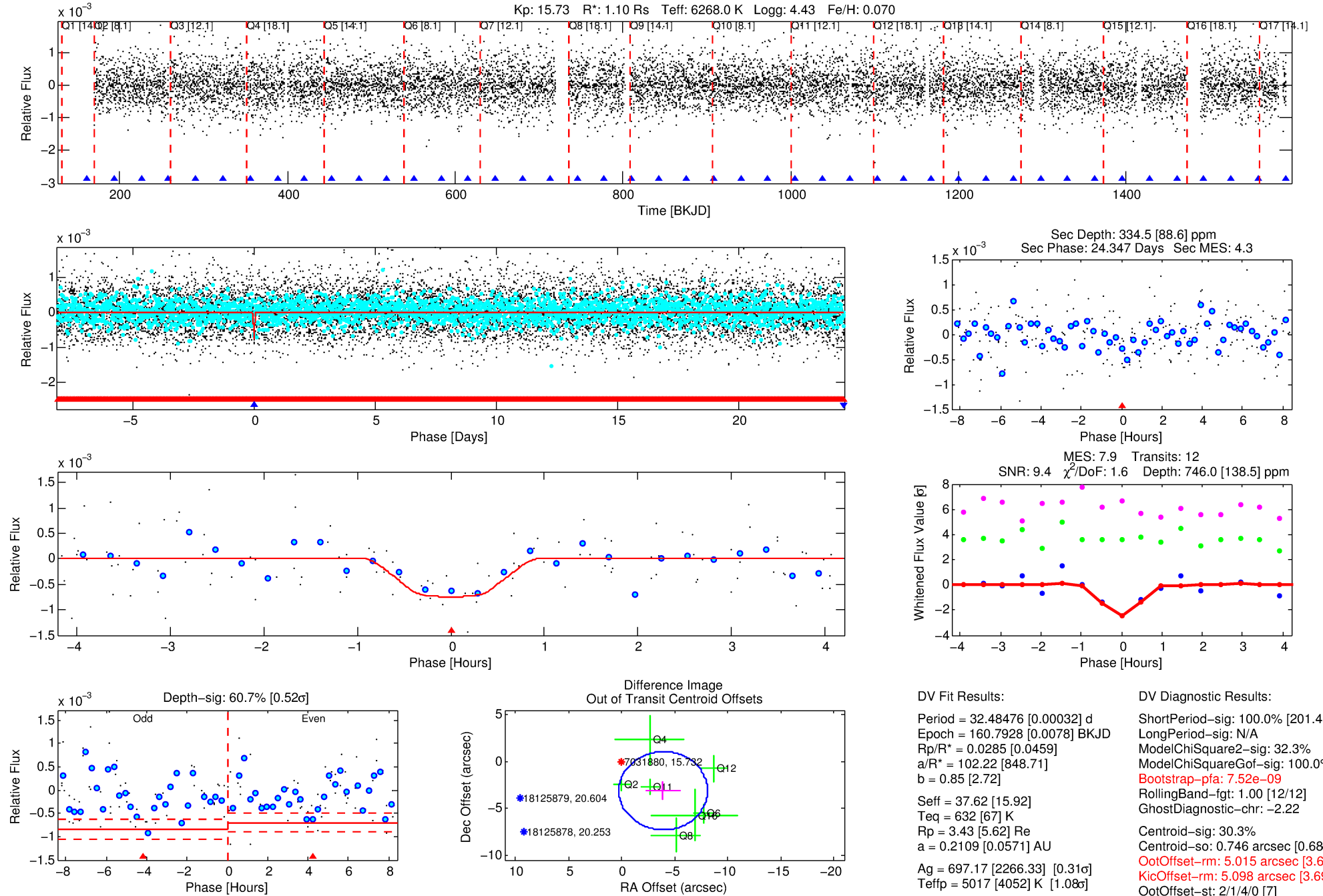
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 007031880-02

No Significant Match Found

# DV One-Page Summary

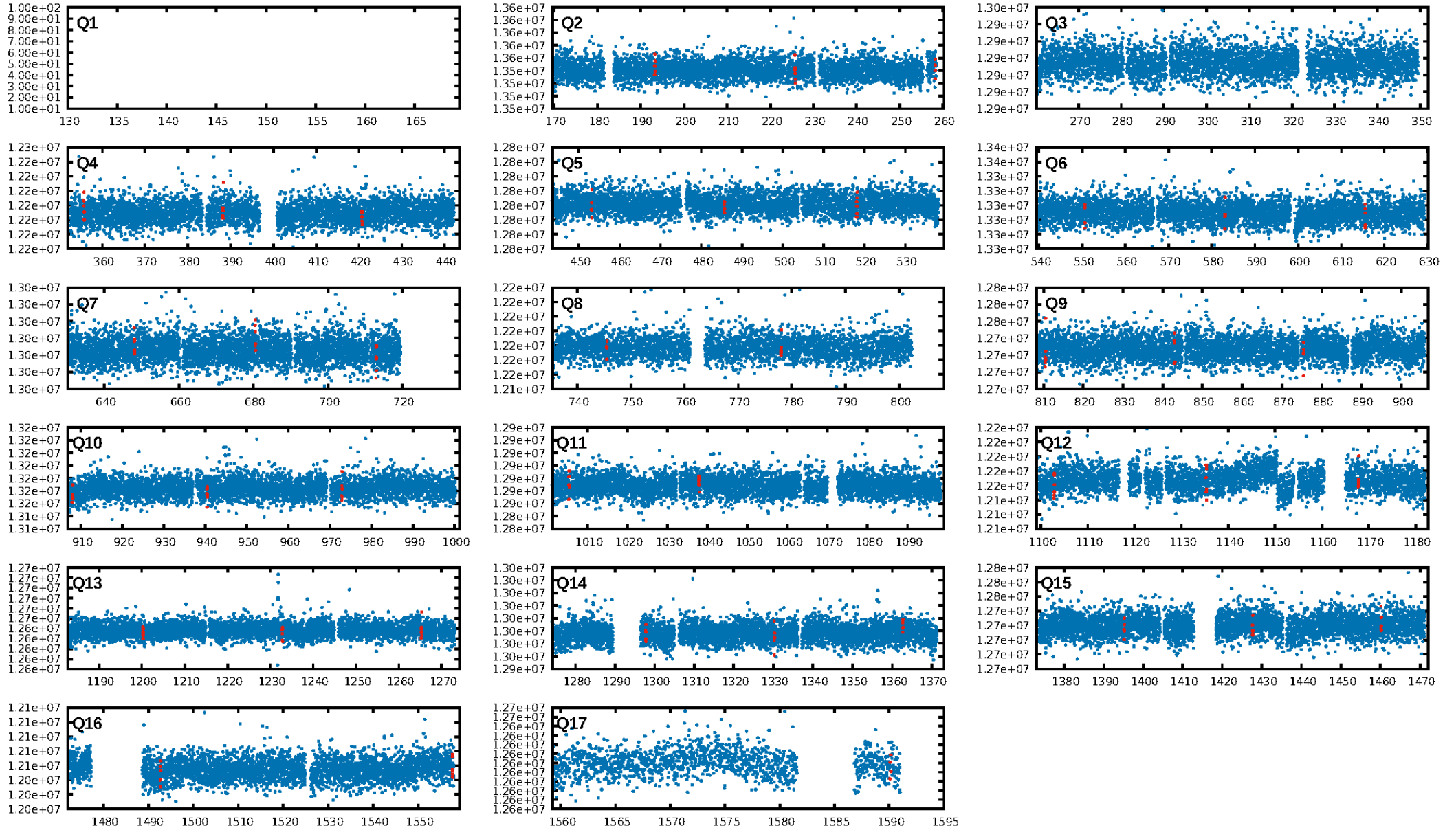
KIC: 7031880 Candidate: 2 of 2 Period: 32.485 d



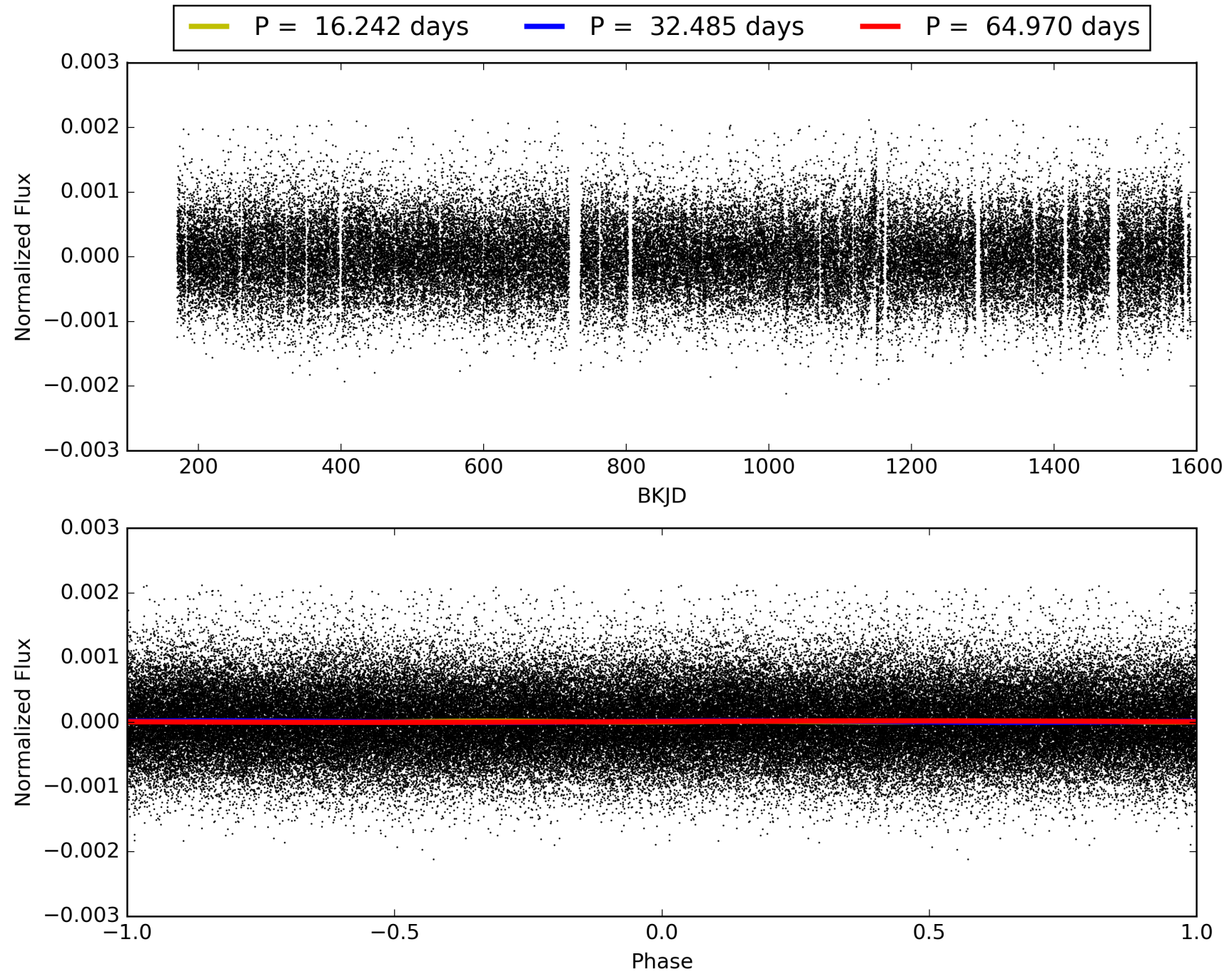
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 12:53:06 Z

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

# TCE 007031880-02, PDC Light Curves

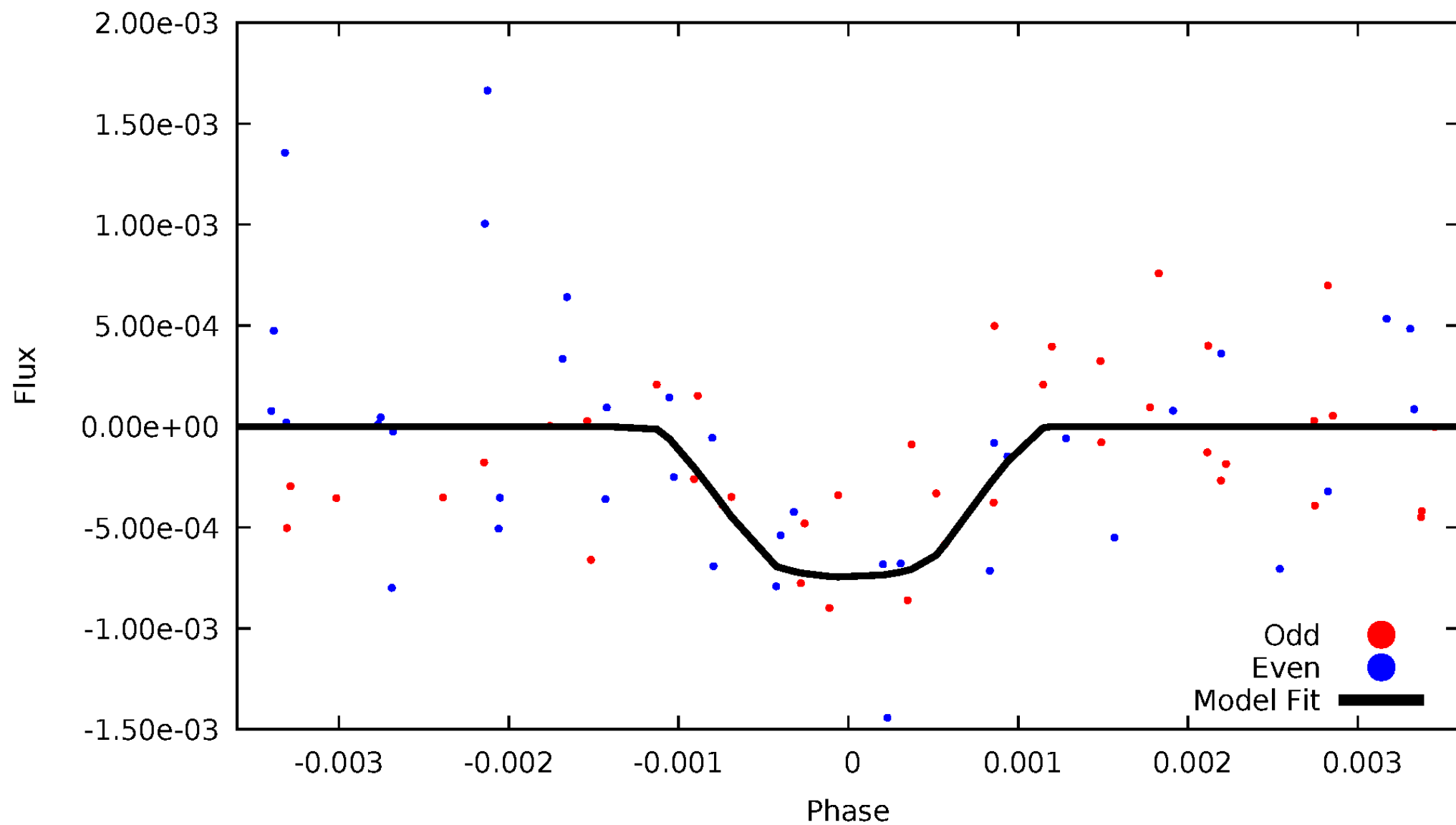


TCE 007031880-02



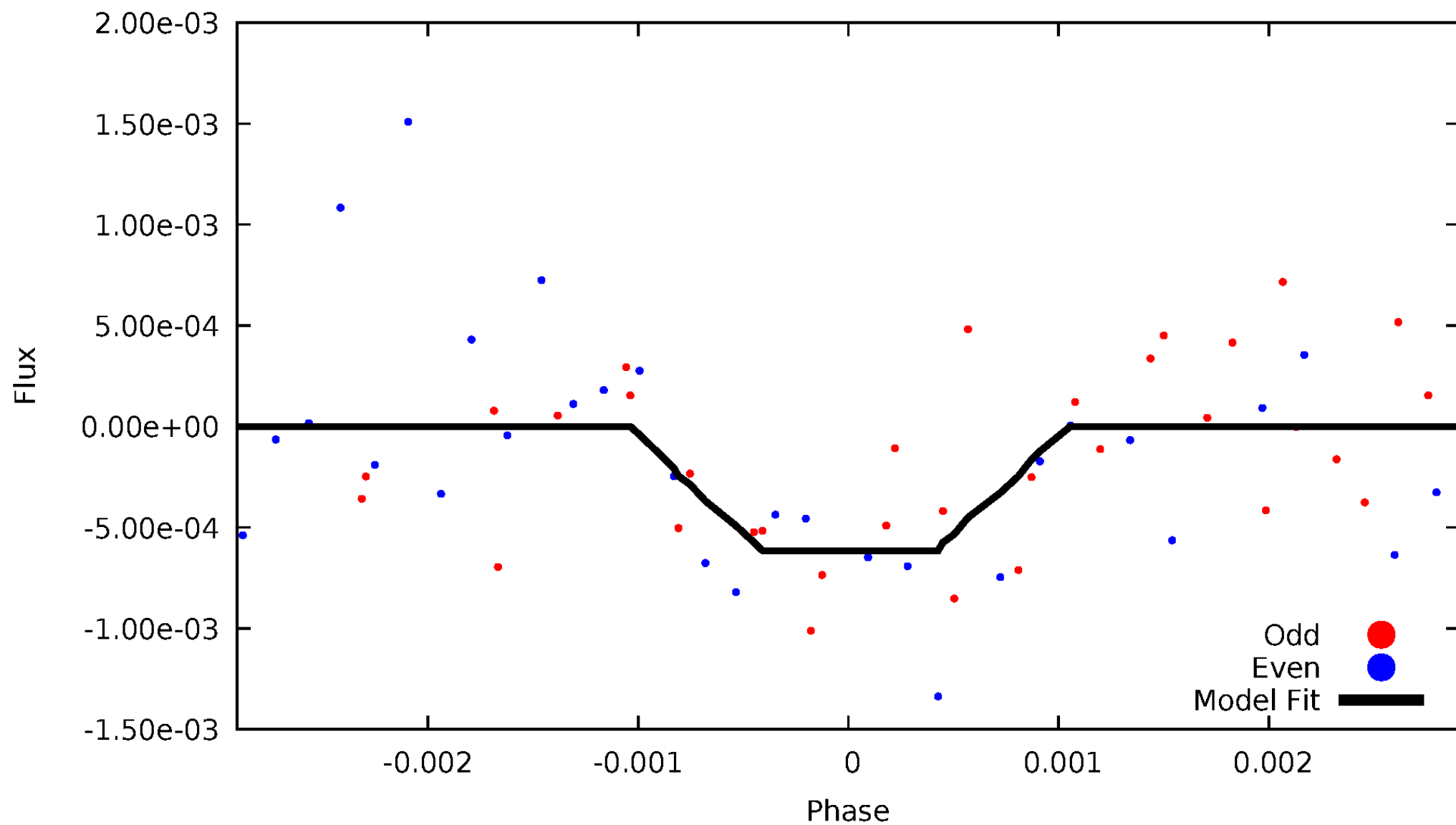
# DV Odd/Even

TCE 007031880-02



# ALT Odd/Even

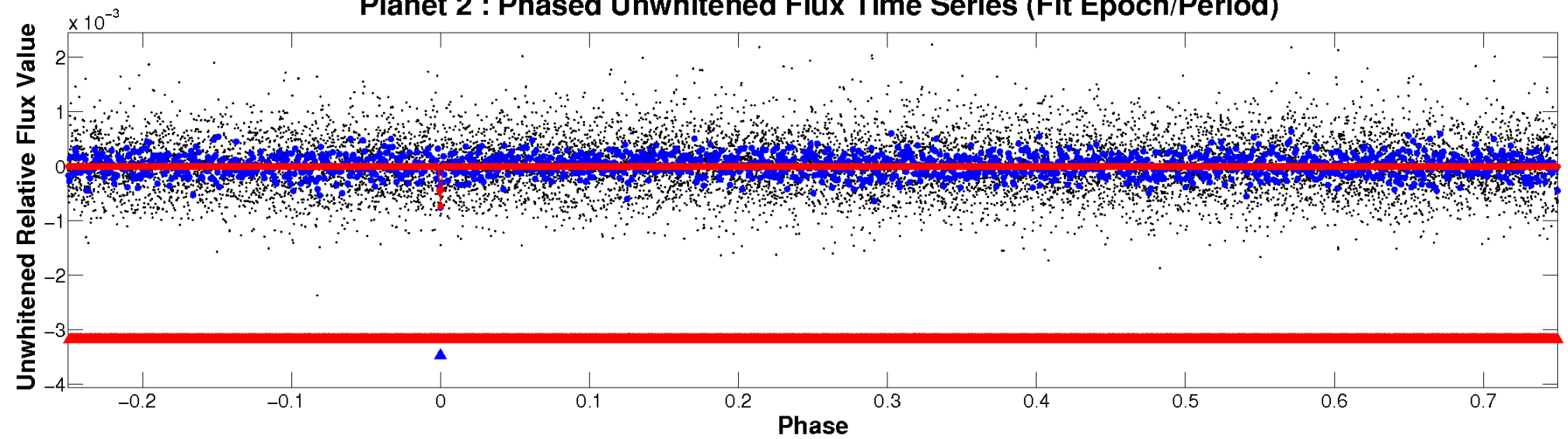
TCE 007031880-02



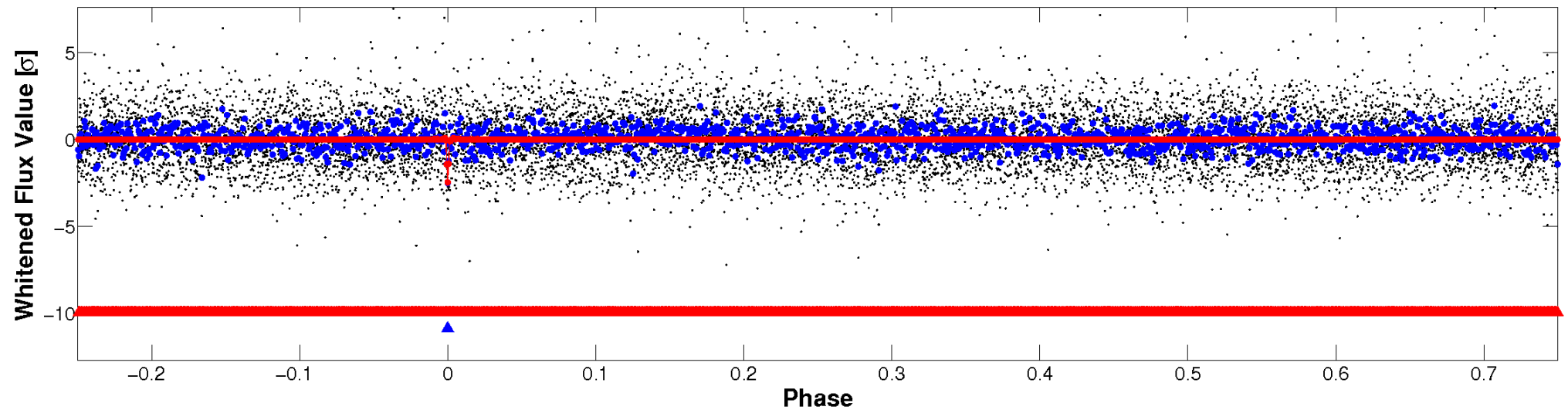


# Non-Whitened Vs. Whitened Light Curve

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

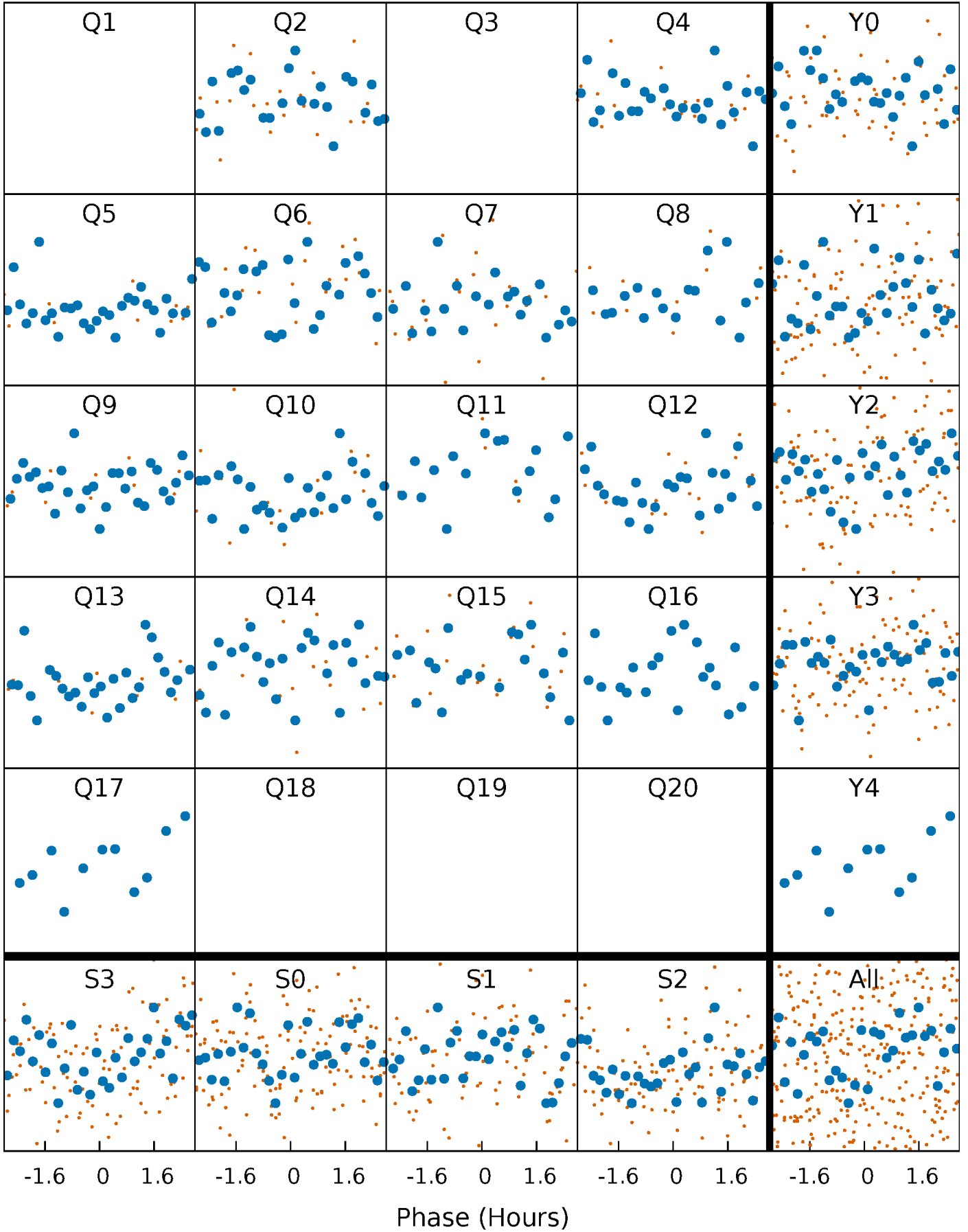


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



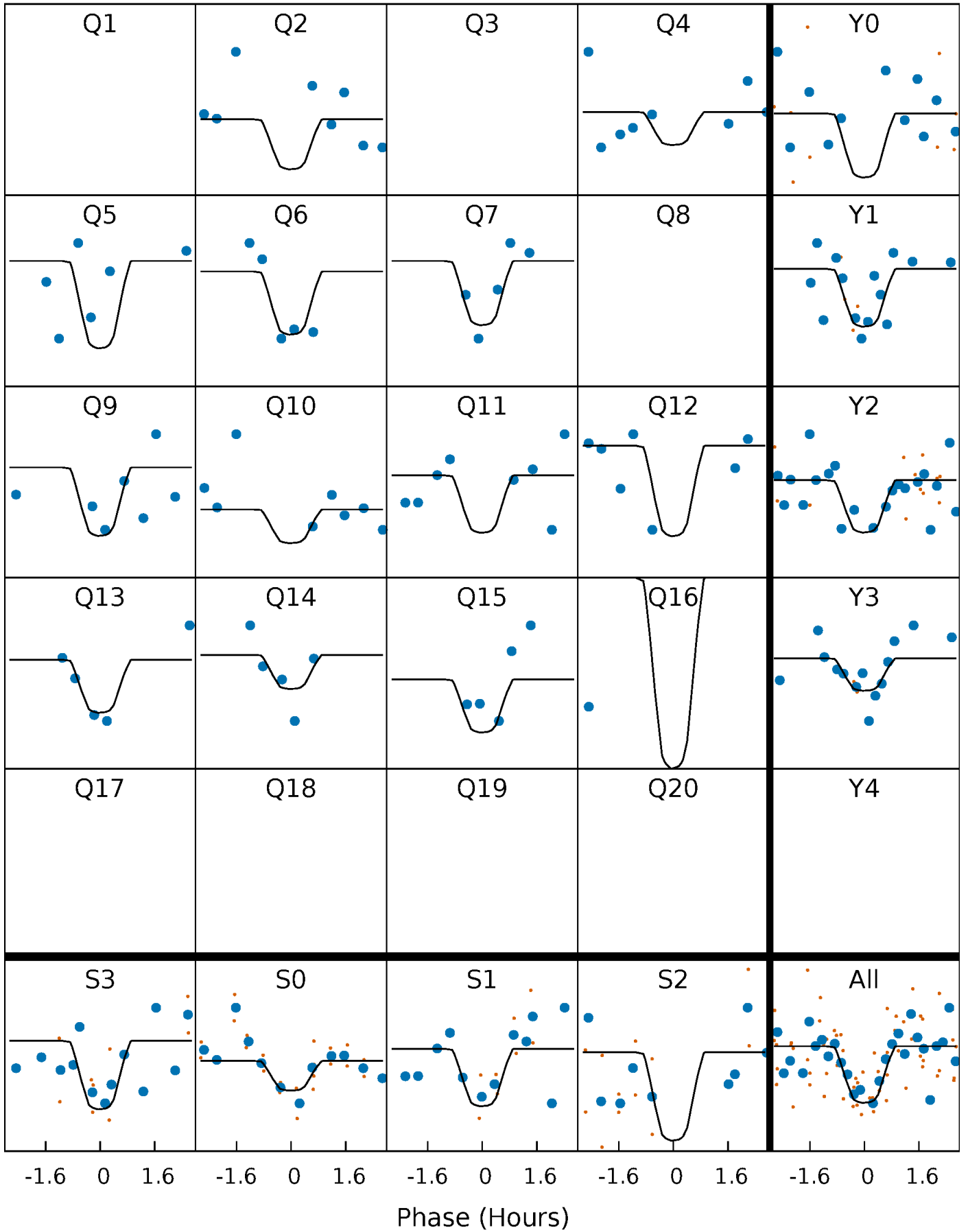
# PDC Quarter-Phased Transit Curves

TCE 007031880-02 P= 32.484757 Days  $T_0=160.792781$  (BKJD)



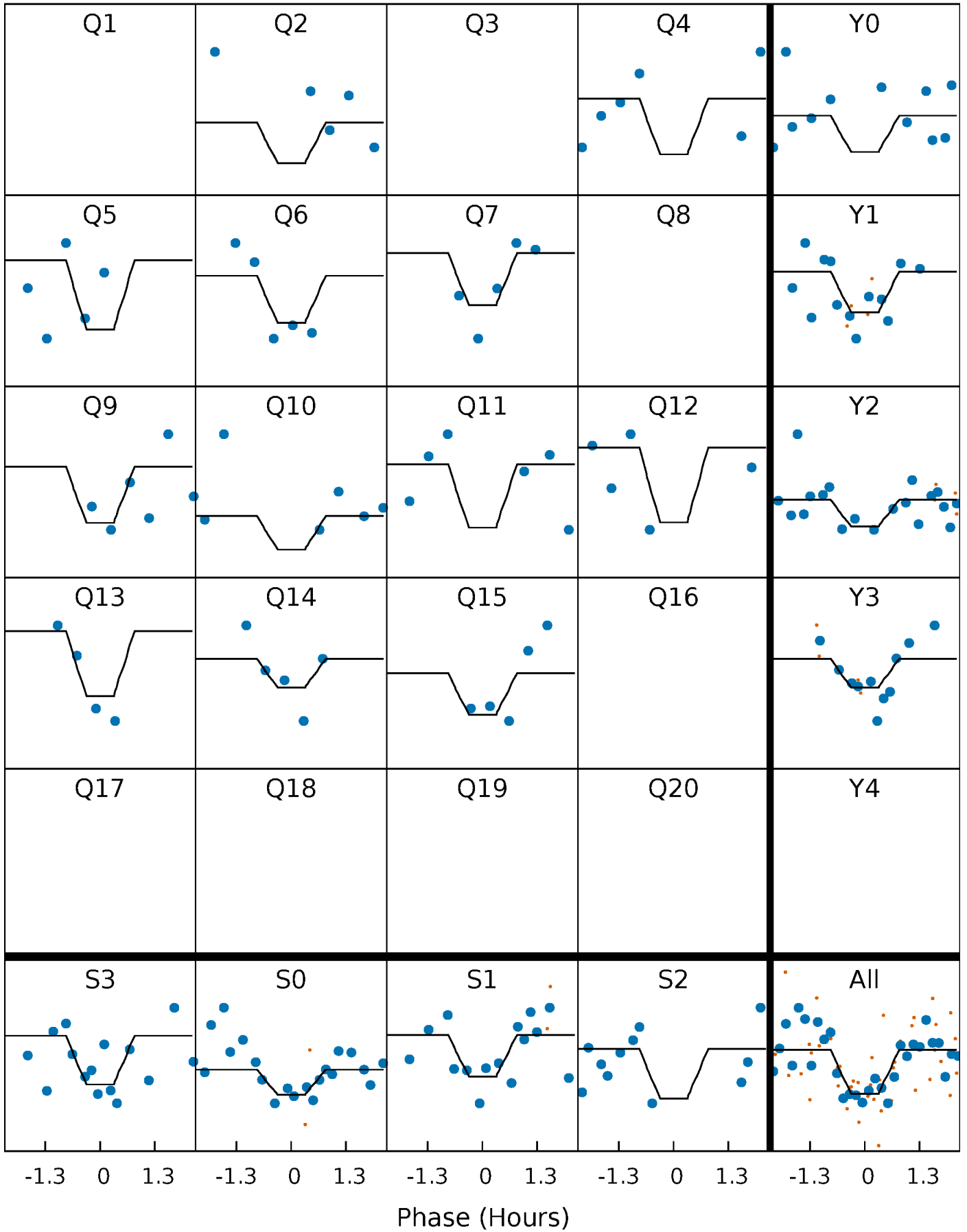
# DV Quarter-Phased Transit Curves

TCE 007031880-02 P= 32.484757 Days  $T_0=160.792781$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

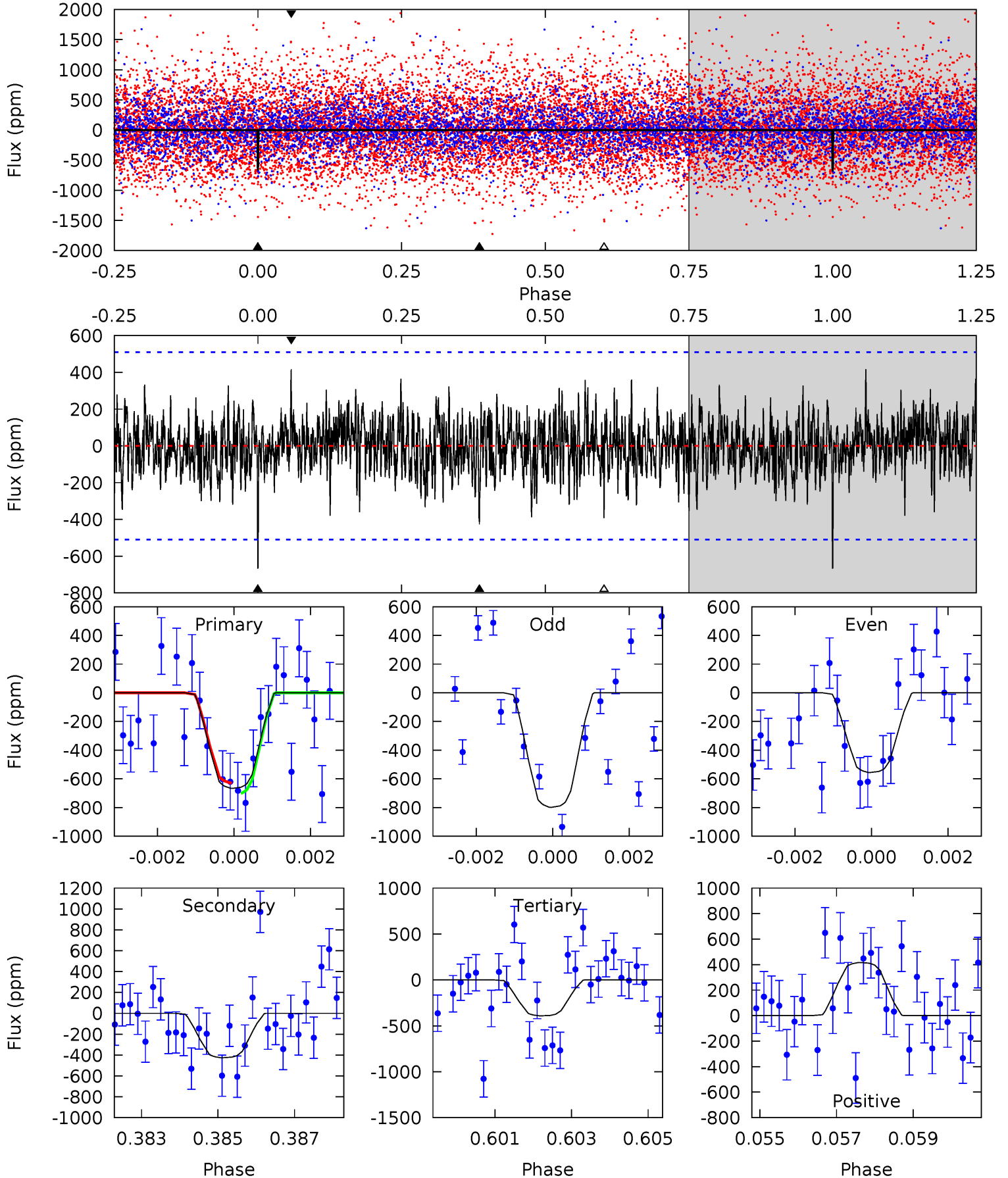
TCE 007031880-02 P= 32.484304 Days  $T_0=160.802676$  (BKJD)



# DV Model-Shift Uniqueness Test

007031880-02, P = 32.484757 Days, E = 160.792781 Days

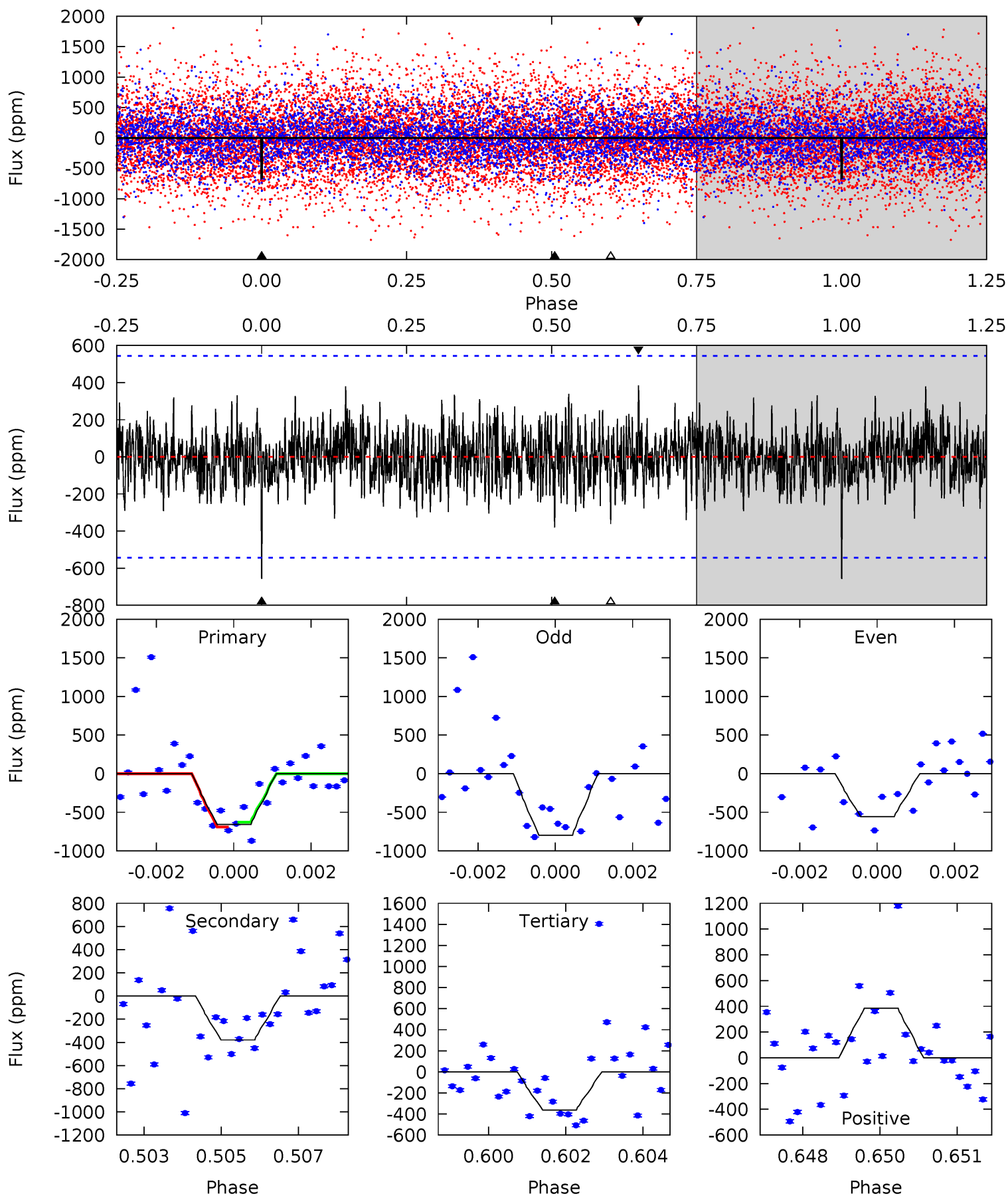
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
6.94	4.44	4.08	4.34	5.31	3.06	1.26	2.87	2.60	0.36	0.10	1.29	0.98	0.38	0.38



# Alt Model-Shift Uniqueness Test

007031880-02, P = 32.484304 Days, E = 160.802676 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
6.46	3.72	3.55	3.78	5.34	3.10	1.15	2.91	2.68	0.18	-0.05	1.17	0.88	0.37	0.31





### Stellar Parameters For KIC 007031880

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6268^{+174}_{-239}$	$4.429^{+0.054}_{-0.216}$	$0.070^{+0.200}_{-0.350}$	$1.100^{+0.353}_{-0.118}$	$1.188^{+0.152}_{-0.169}$	$1.257^{+0.361}_{-0.667}$
	+3%/-4%	+1%/-5%	+286%/-500%	+32%/-11%	+13%/-14%	+29%/-53%
Source	PHO1	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 007031880-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-426 \pm 96$	$5.53^{+4.94}_{-3.69}$	$902^{+69}_{-50}$	$4497^{+3059}_{-935}$	$329^{+2692}_{-238}$
Alt.	$-380 \pm 102$	$5.27^{+4.75}_{-3.49}$	$899^{+62}_{-47}$	$4445^{+2987}_{-934}$	$328^{+2403}_{-242}$

$T_{max}$  = 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

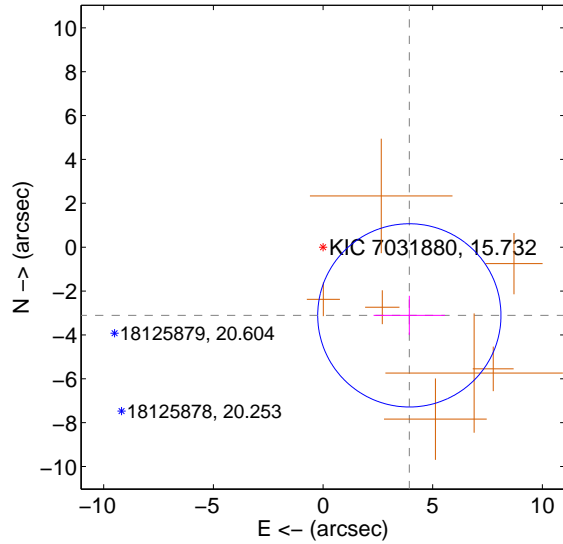
Supplemental centroid analysis for 007031880-02. Kepler magnitude: 15.73. Transit SNR 9.41

There are 0 quarters with good PRF difference image offsets

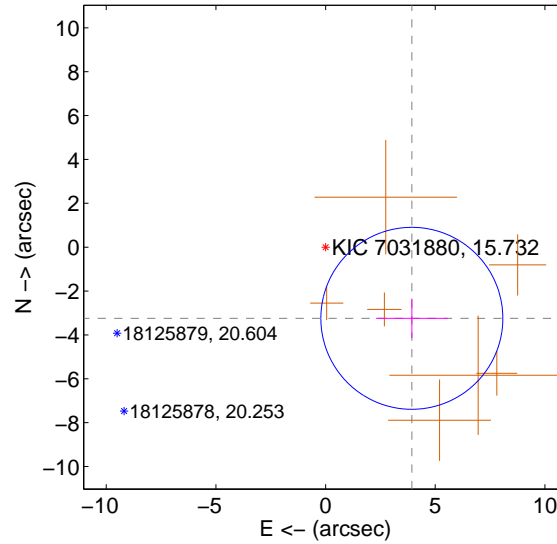
The direct PRF centroid is offset from the target star catalog position by about 0.12 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$5.015 \pm 1.392$	3.60	$-3.934 \pm 1.628$	$-3.109 \pm 0.894$
PRF-fit source offset from KIC position	$5.098 \pm 1.383$	3.69	$-3.933 \pm 1.633$	$-3.244 \pm 0.896$
photometric centroid source offset	$0.75 \pm 1.10$	0.68	$-0.03 \pm 1.14$	$-0.74 \pm 1.10$

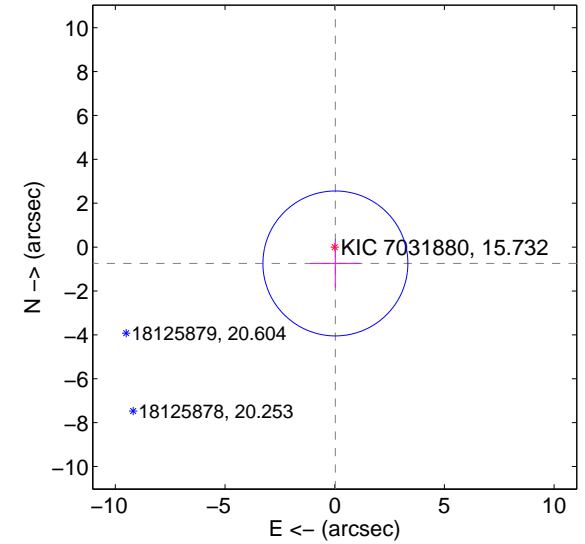
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

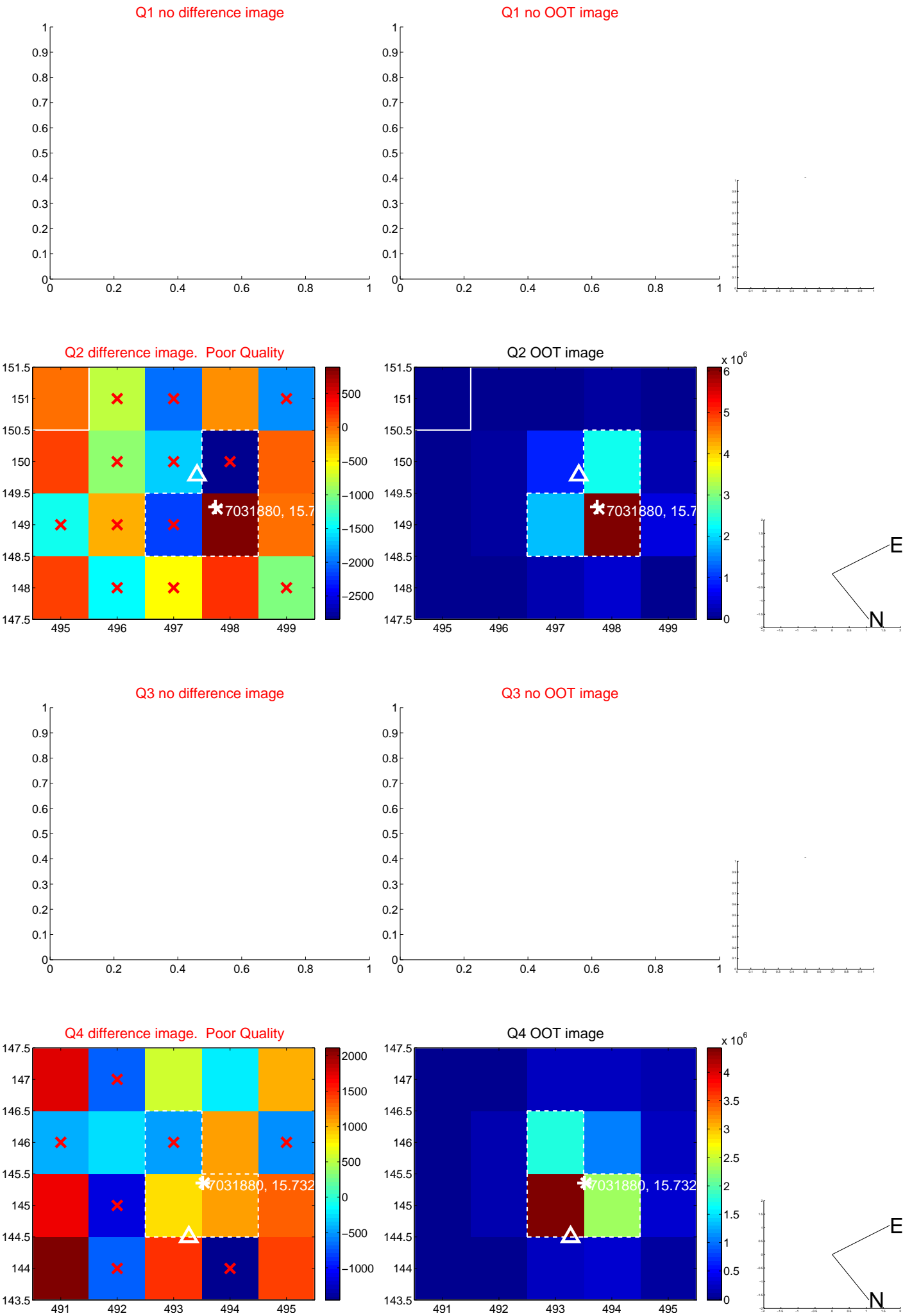


offset from photometric centroids

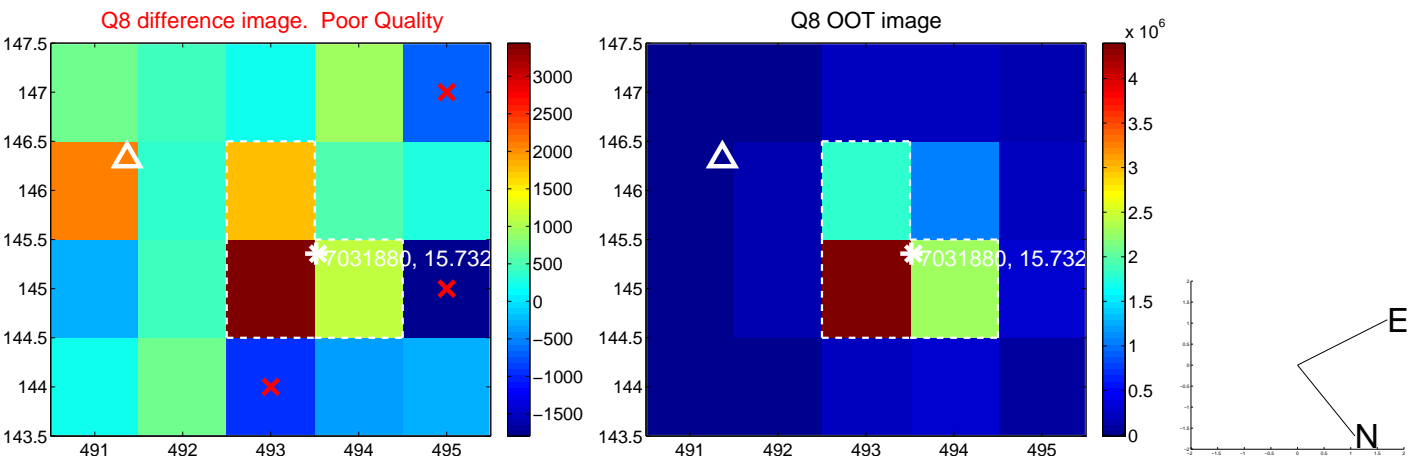
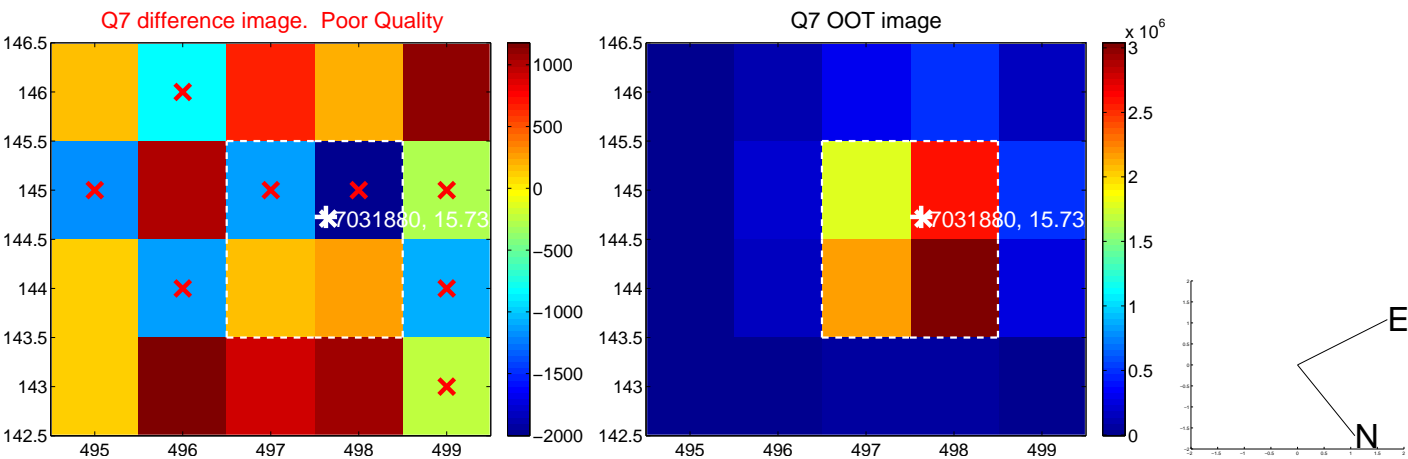
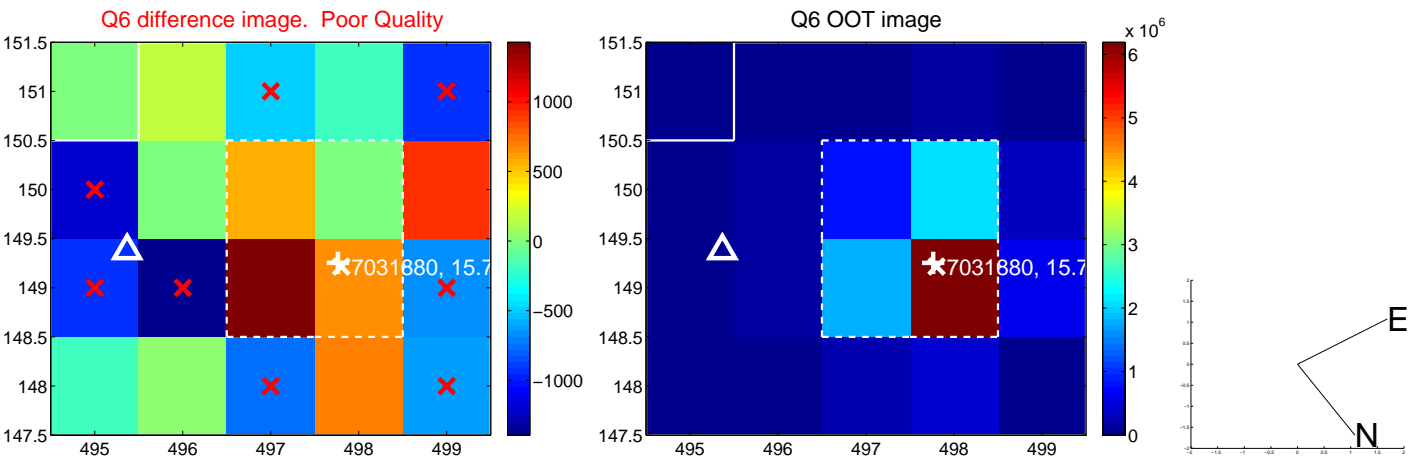
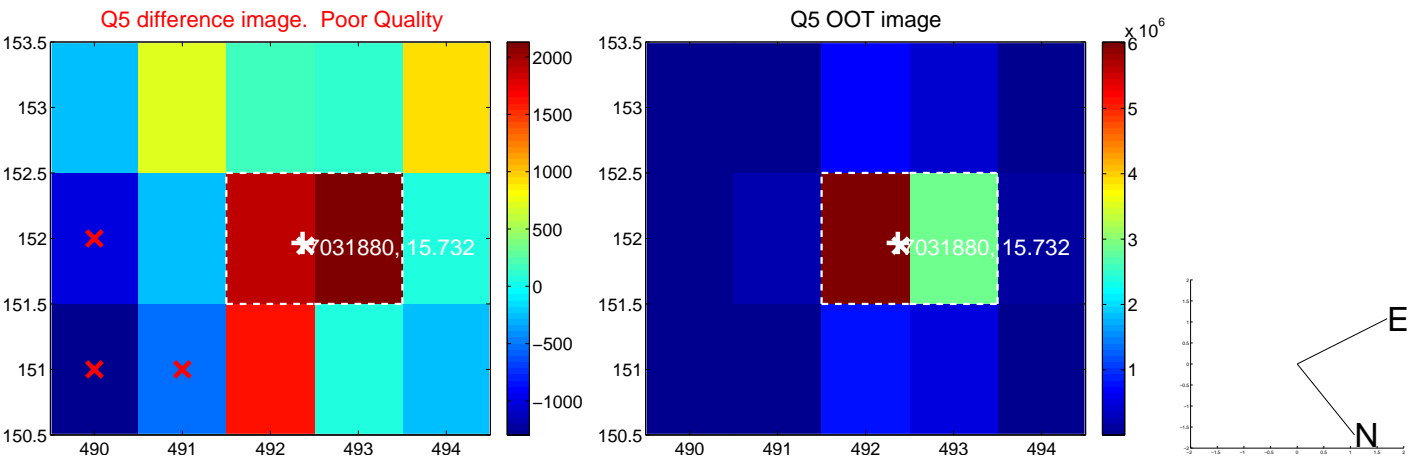


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

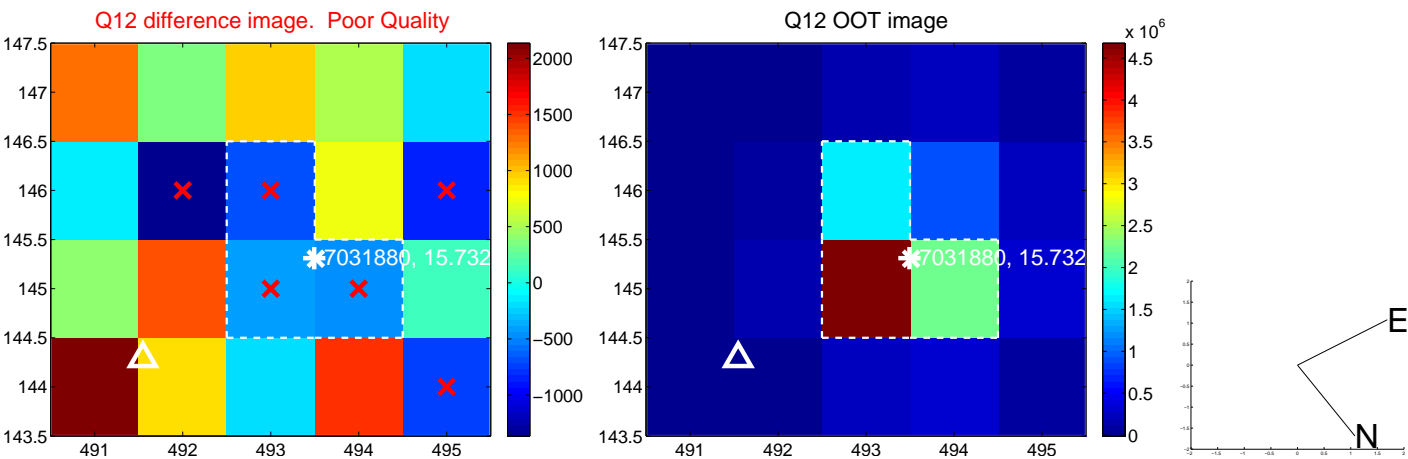
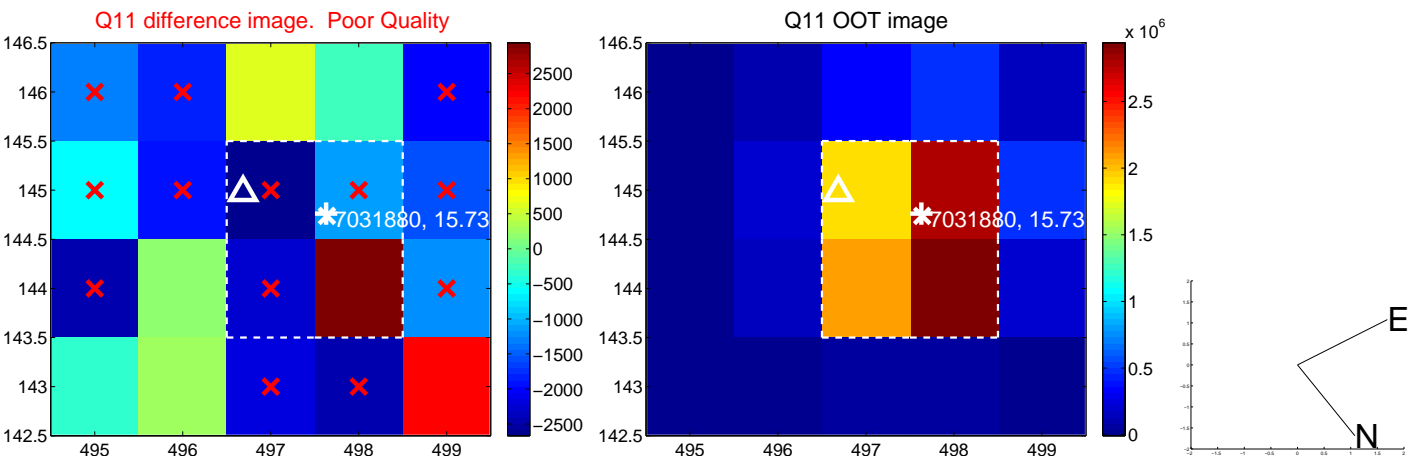
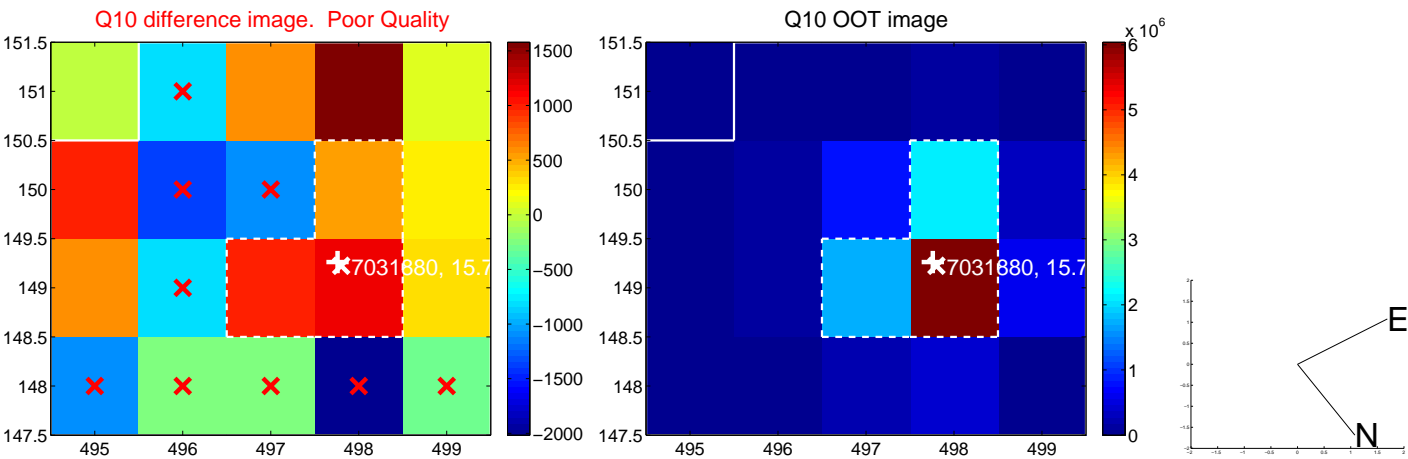
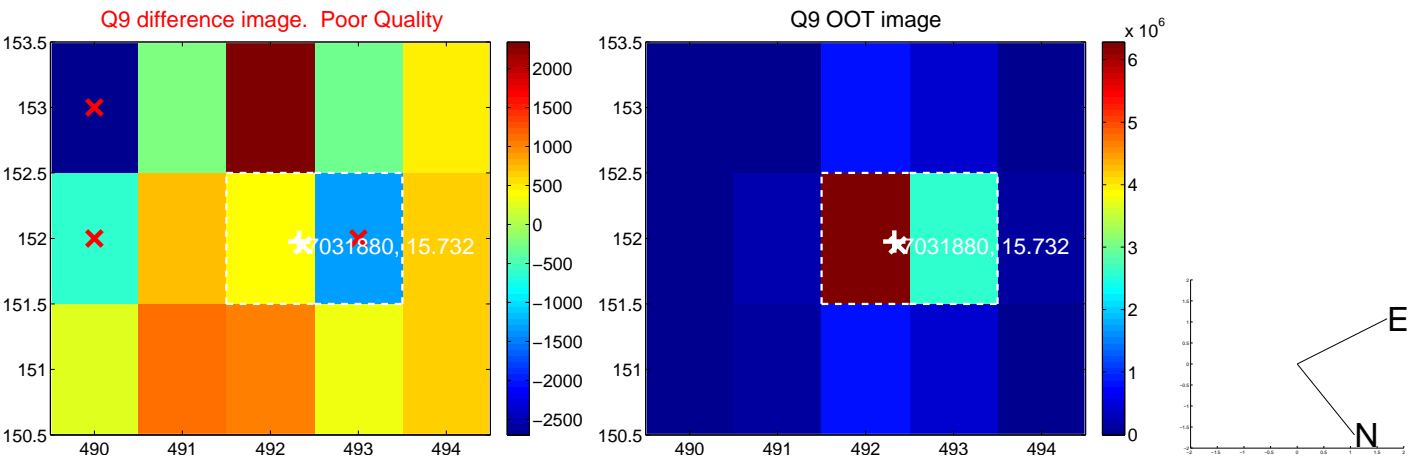
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



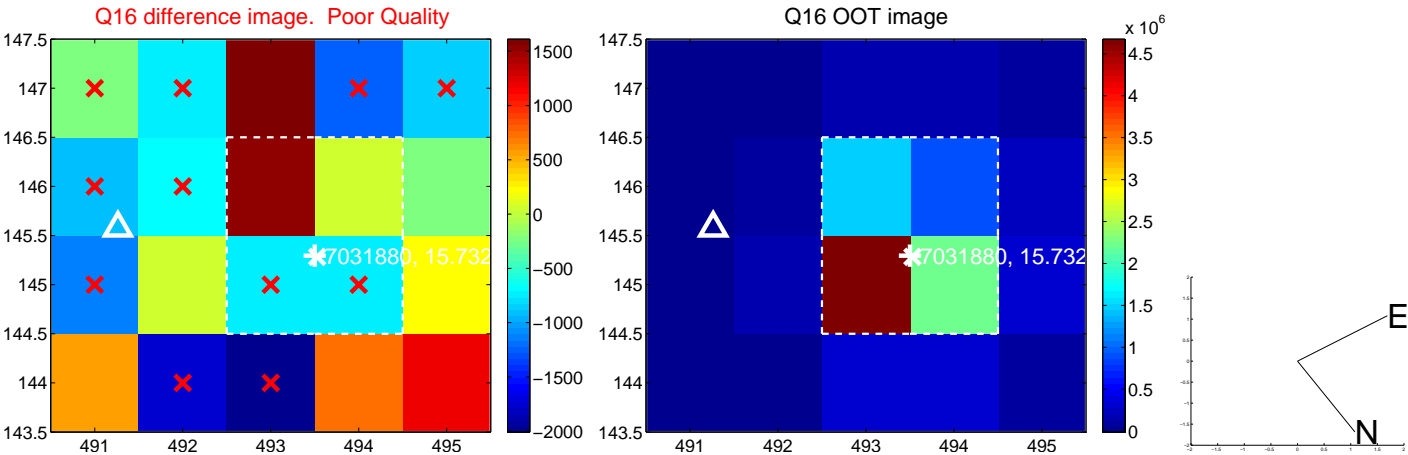
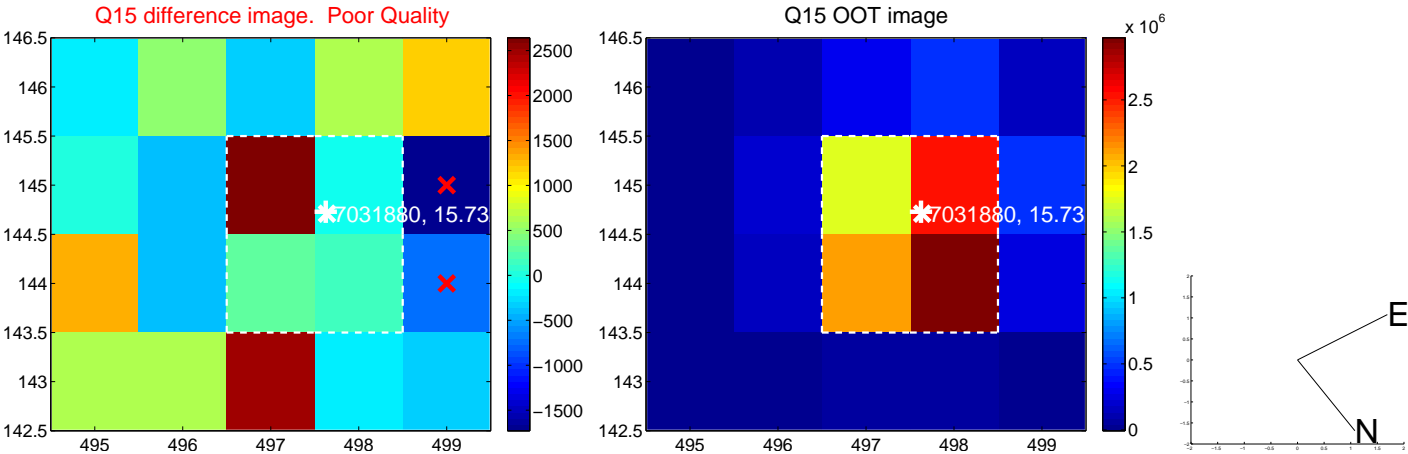
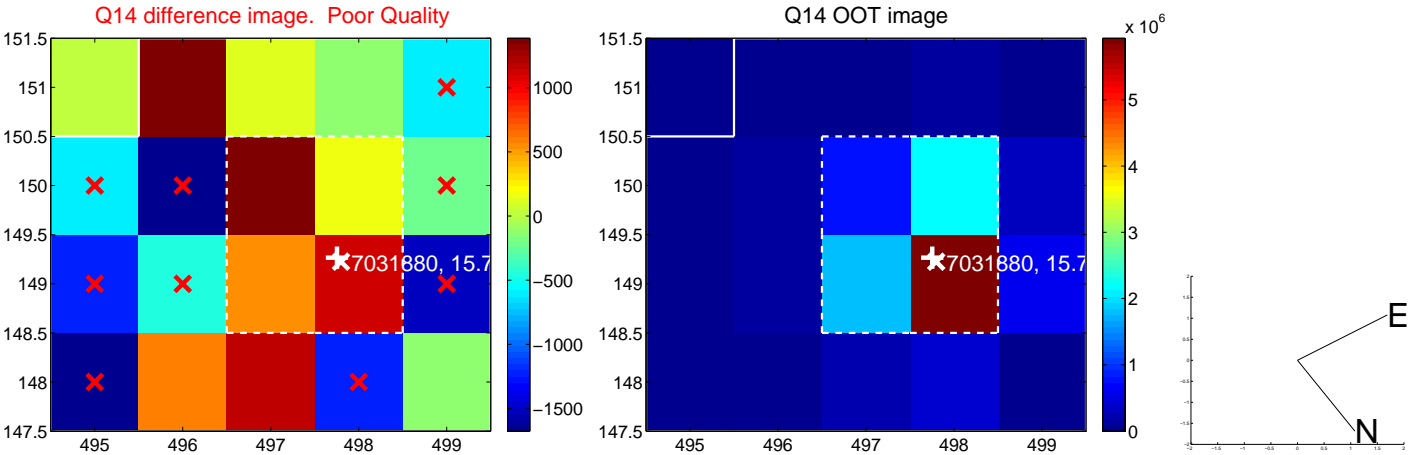
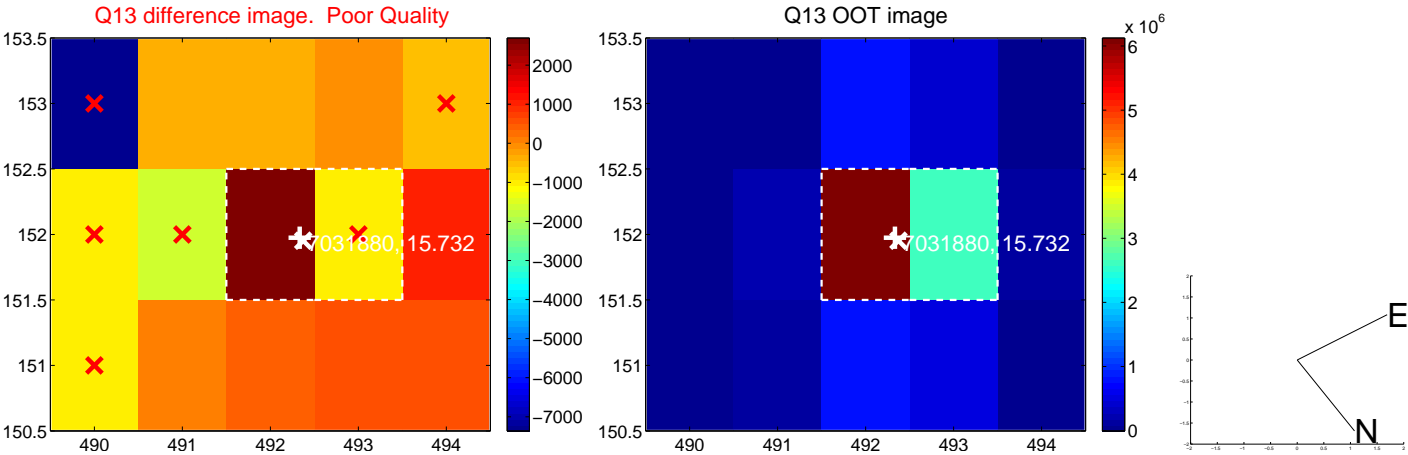
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

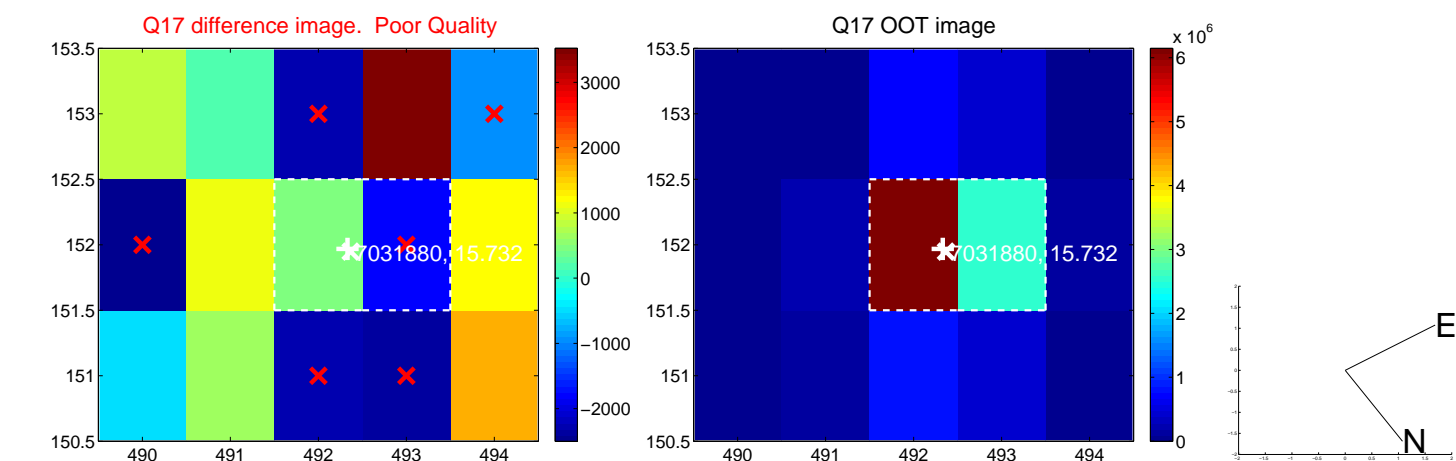


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

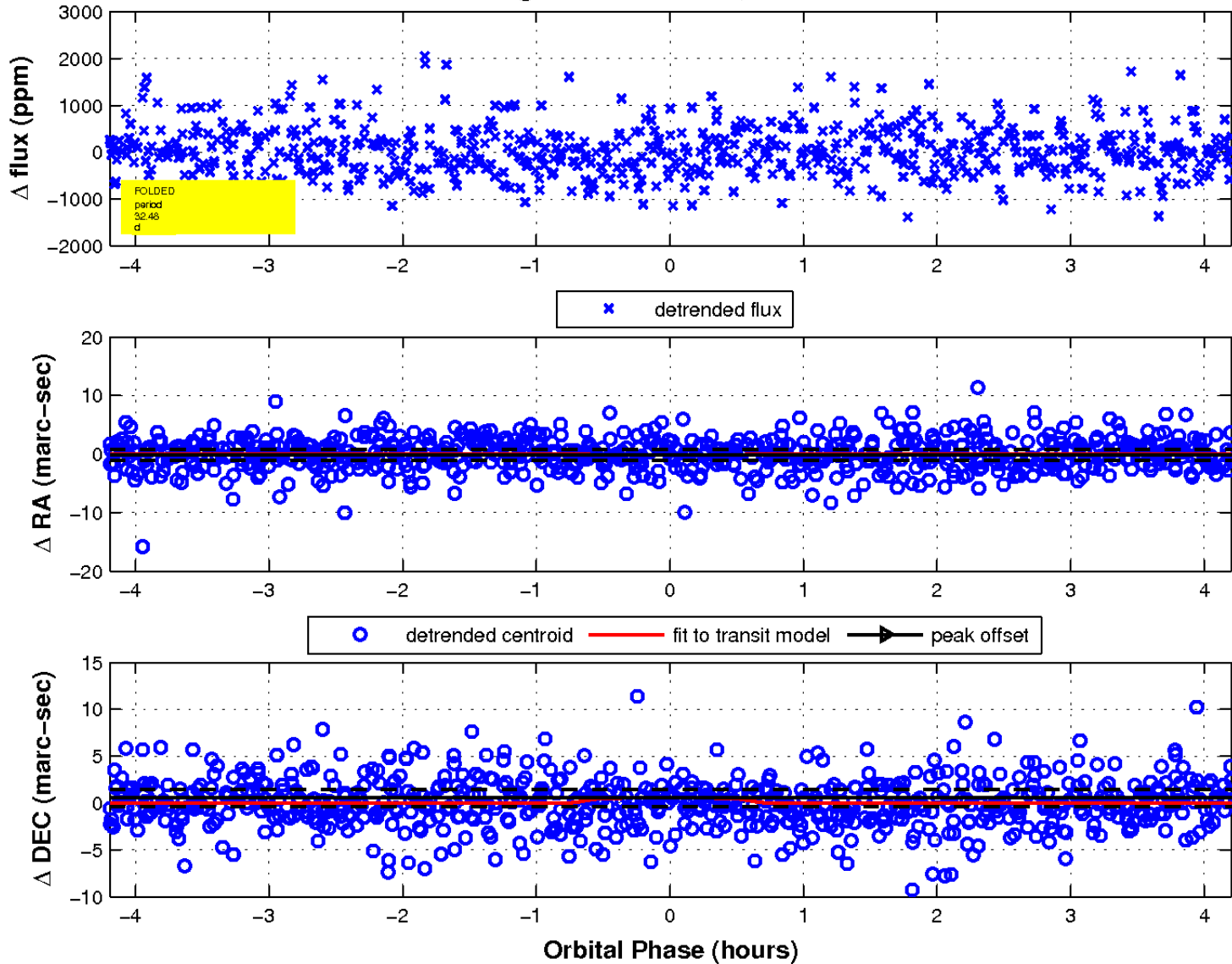




white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



fluxWeightedCentroids, Planet 2 of 2



UKIRT Image

