

# KIC 005551417

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005551417-01	OBS	No	0.524468	132.031649	5.4	3.962	8.4	4.6	2.22	7022	0.56	49038.30
005551417-02	OBS	No	22.026411	138.001856	324.7	4.219	15.1	23.1	2.22	7022	4.04	335.92

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005551417-01	OBS	FP	0.00	1	0	1	0	SWEET_NTL—LPP_DV—MOD_NONUNIQ_DV—CENT_FEW_DIFFS—HALO_GHOST
005551417-02	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—HALO_GHOST

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

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

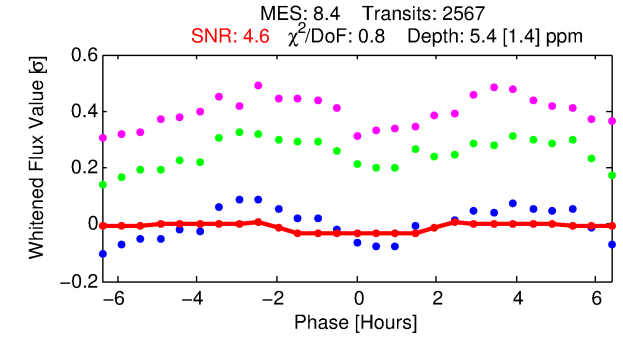
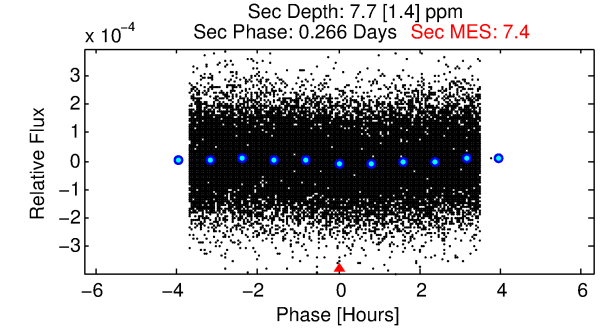
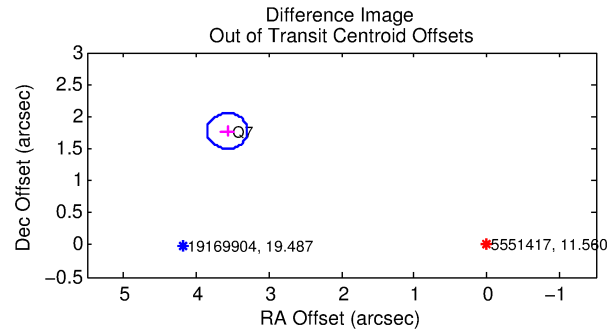
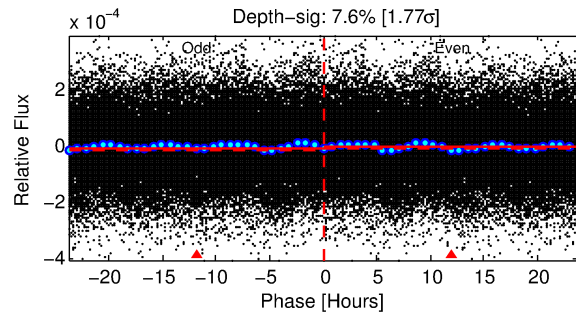
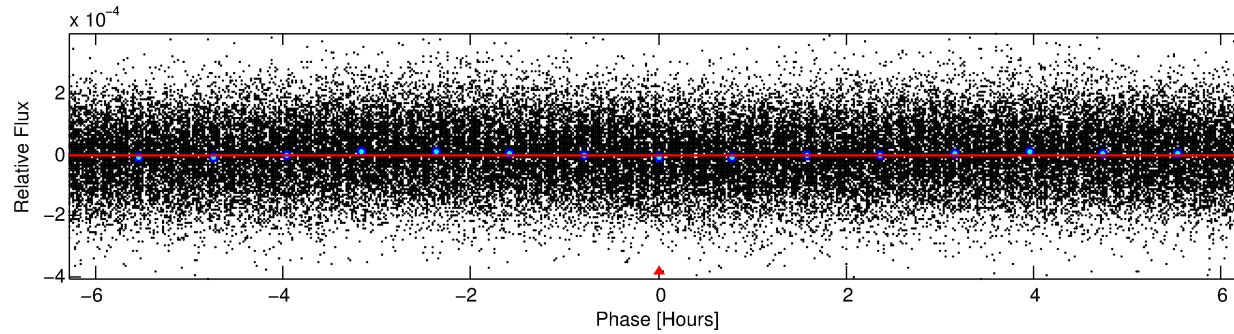
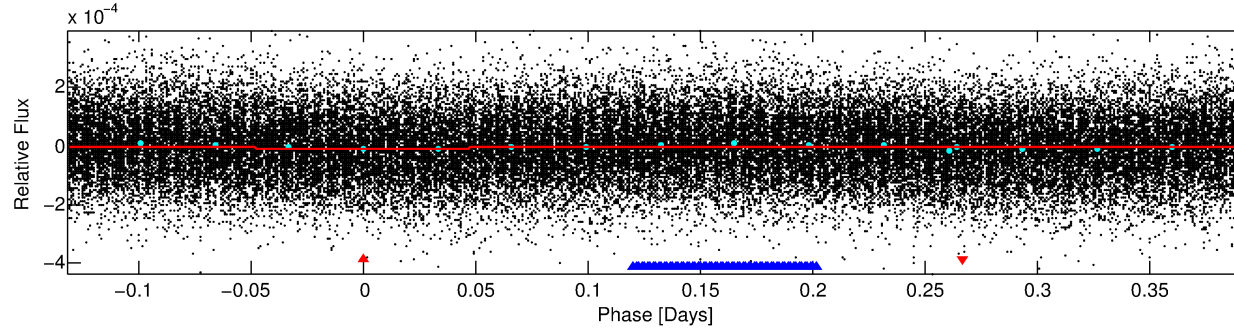
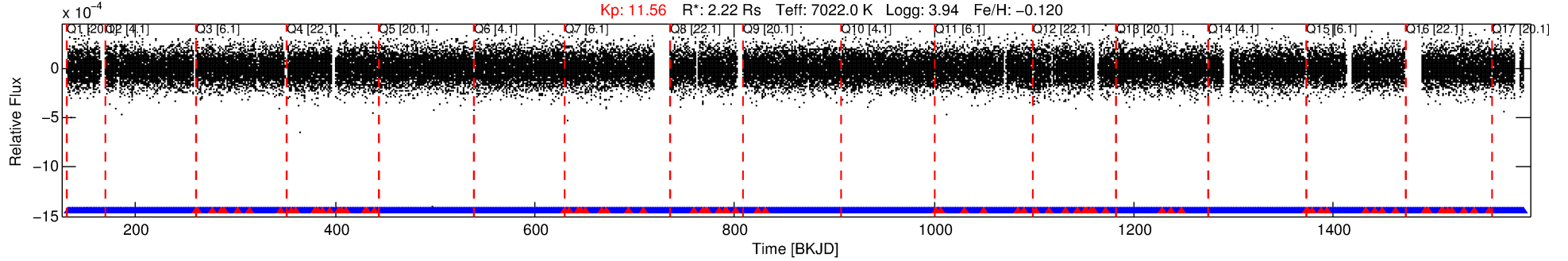
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 005551417-01

No Significant Match Found

# DV One-Page Summary

KIC: 5551417 Candidate: 1 of 2 Period: 0.524 d



## DV Fit Results:

Period = 0.52447 [0.00002] d  
Epoch = 132.0316 [0.0069] BKJD  
Rp/R\* = 0.0023 [0.0015]  
a/R\* = 1.11 [0.75]  
b = 0.70 [2.70]  
Seff = 49038.30 [26088.54]  
Teq = 3795 [505] K  
Rp = 0.56 [0.41] Re  
a = 0.0148 [0.0049] AU  
Ag = 3.02 [4.16] [0.49 $\sigma$ ]  
Teffp = 7736 [2500] K [1.55 $\sigma$ ]

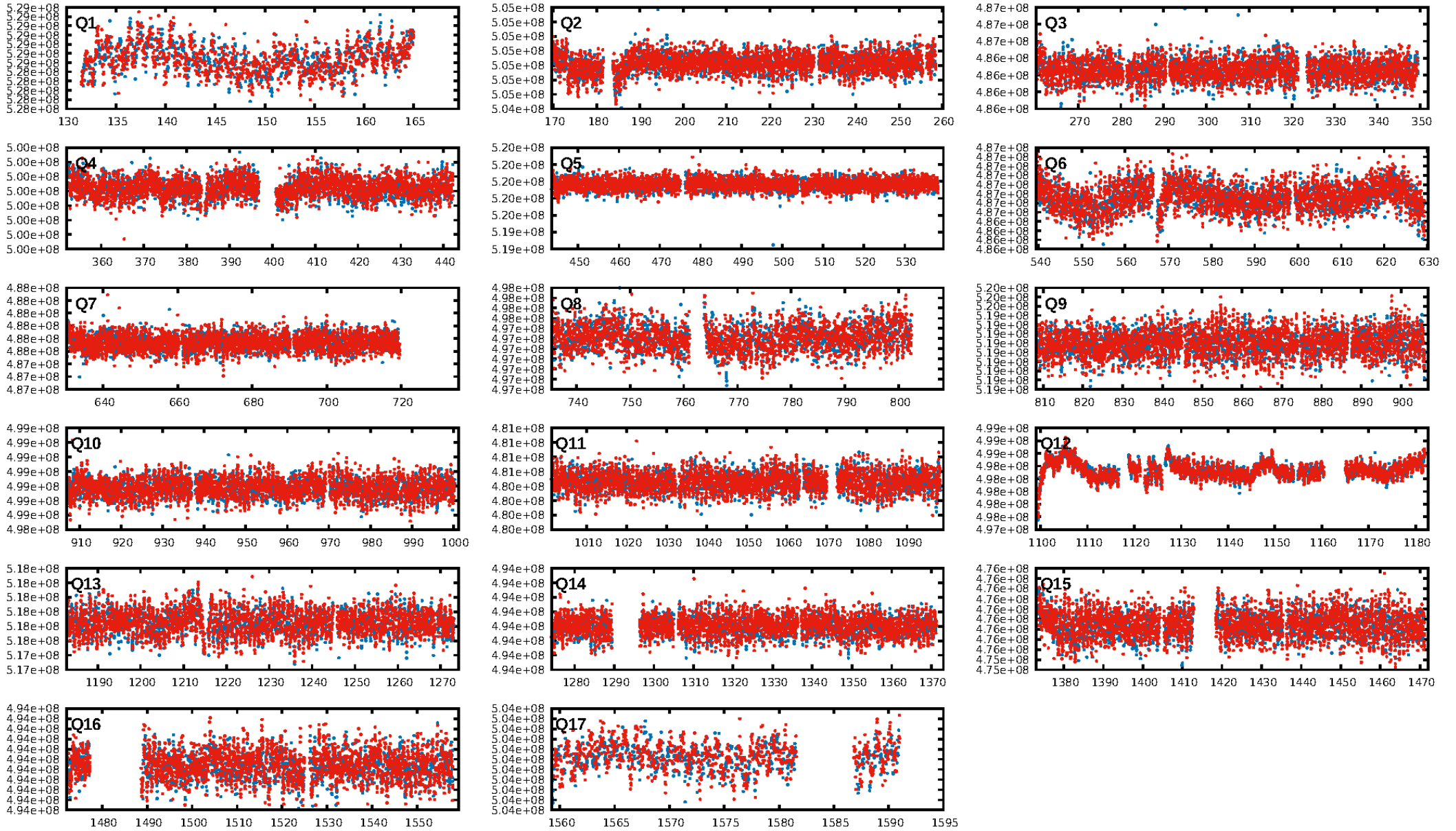
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [89.17 $\sigma$ ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 2.02e-02  
RollingBand-fgt: 0.97 [2374/2451]  
GhostDiagnostic-chr: 0.2451  
Centroid-sig: N/A  
Centroid-so: 0.327 arcsec [0.30 $\sigma$ ]  
OotOffset-rm: 3.986 arcsec [43.12 $\sigma$ ]  
KicOffset-rm: 3.881 arcsec [41.92 $\sigma$ ]  
OotOffset-st: 0/1/0/0 [1]  
KicOffset-st: 0/1/0/0 [1]  
DiffImageQuality-fgm: 0.00 [0/1]  
DiffImageOverlap-fno: 1.00 [17/17]

Software Revision: svn-ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 01:14:50 Z

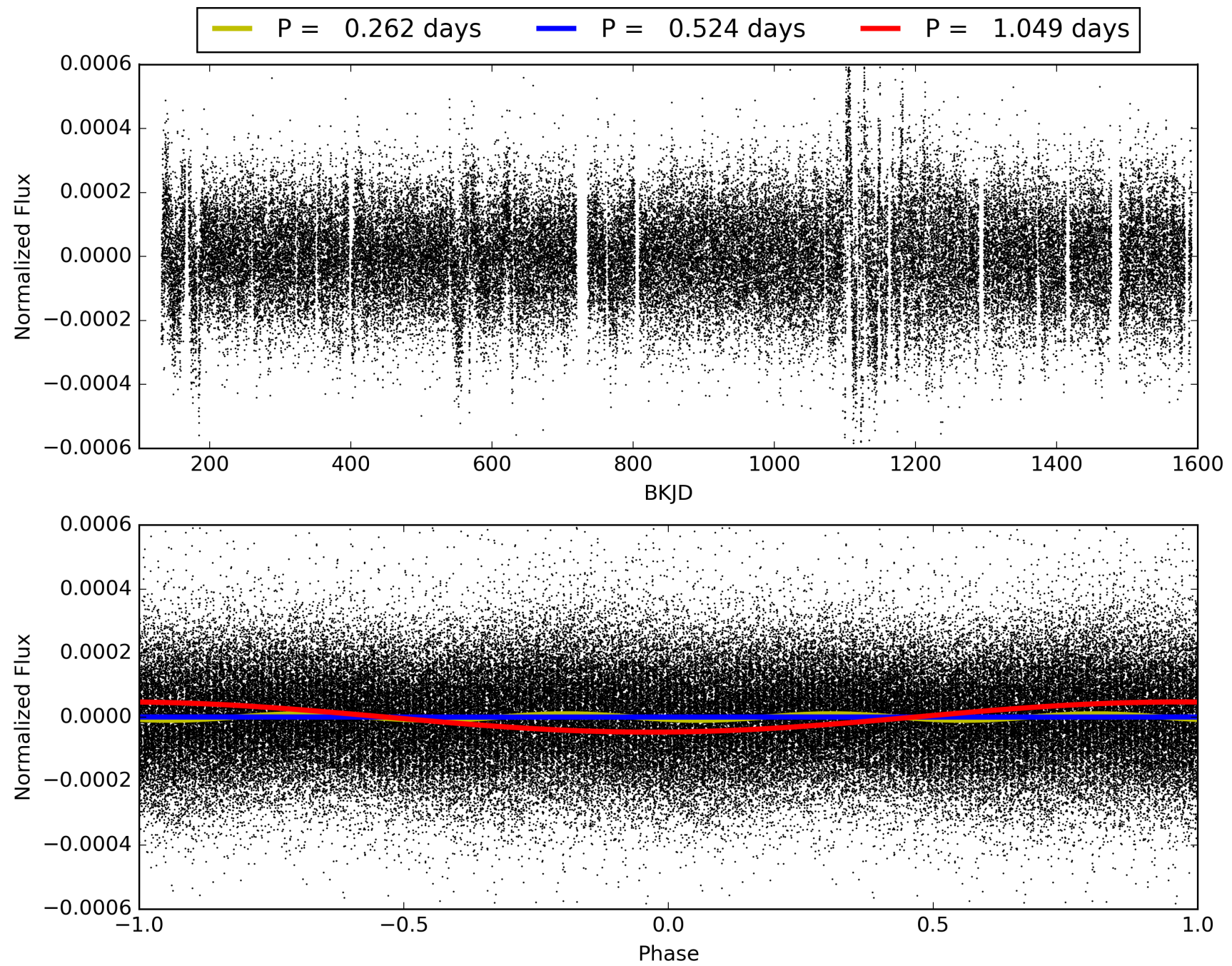
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 005551417-01, PDC Light Curves



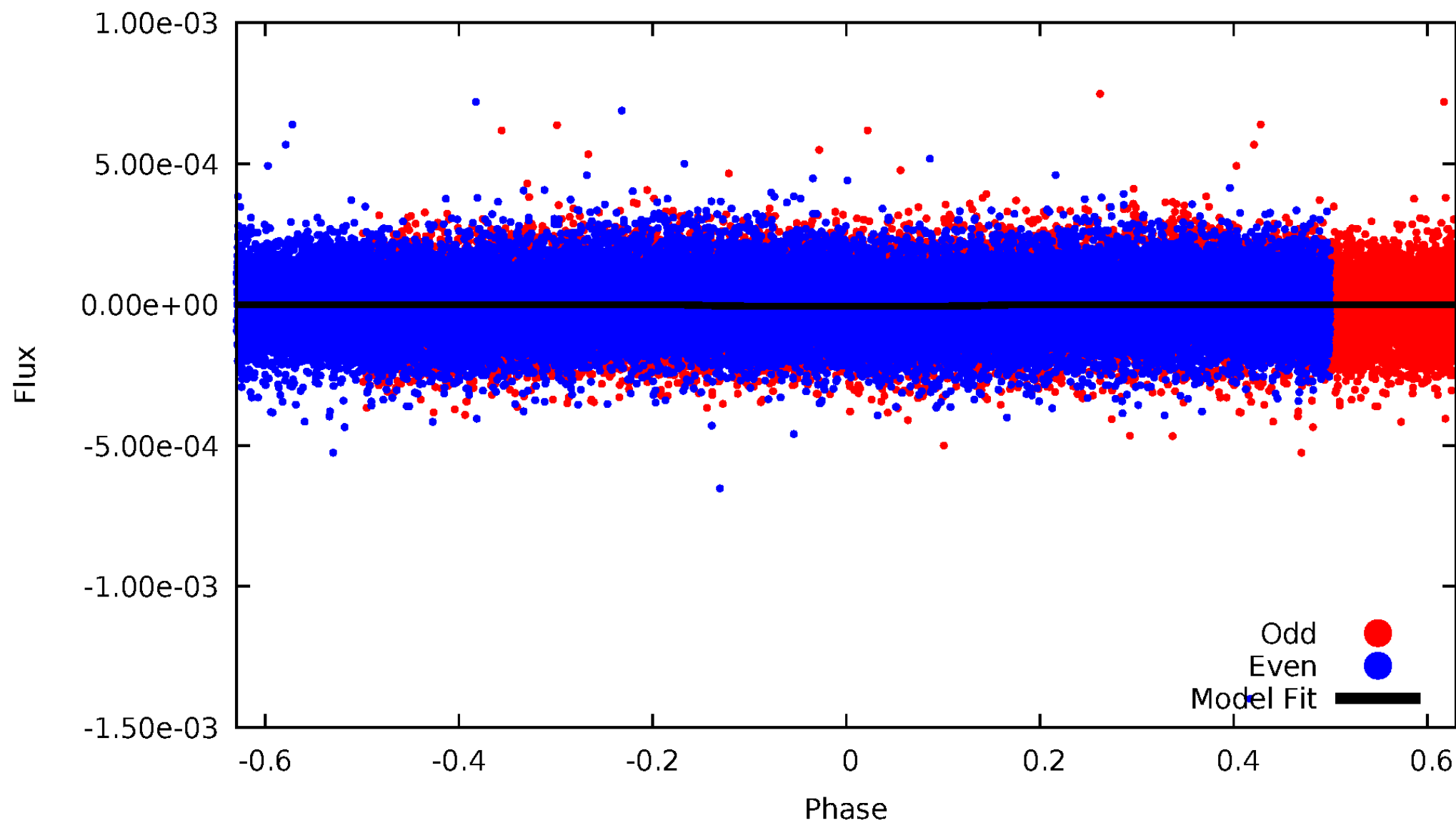


TCE 005551417-01



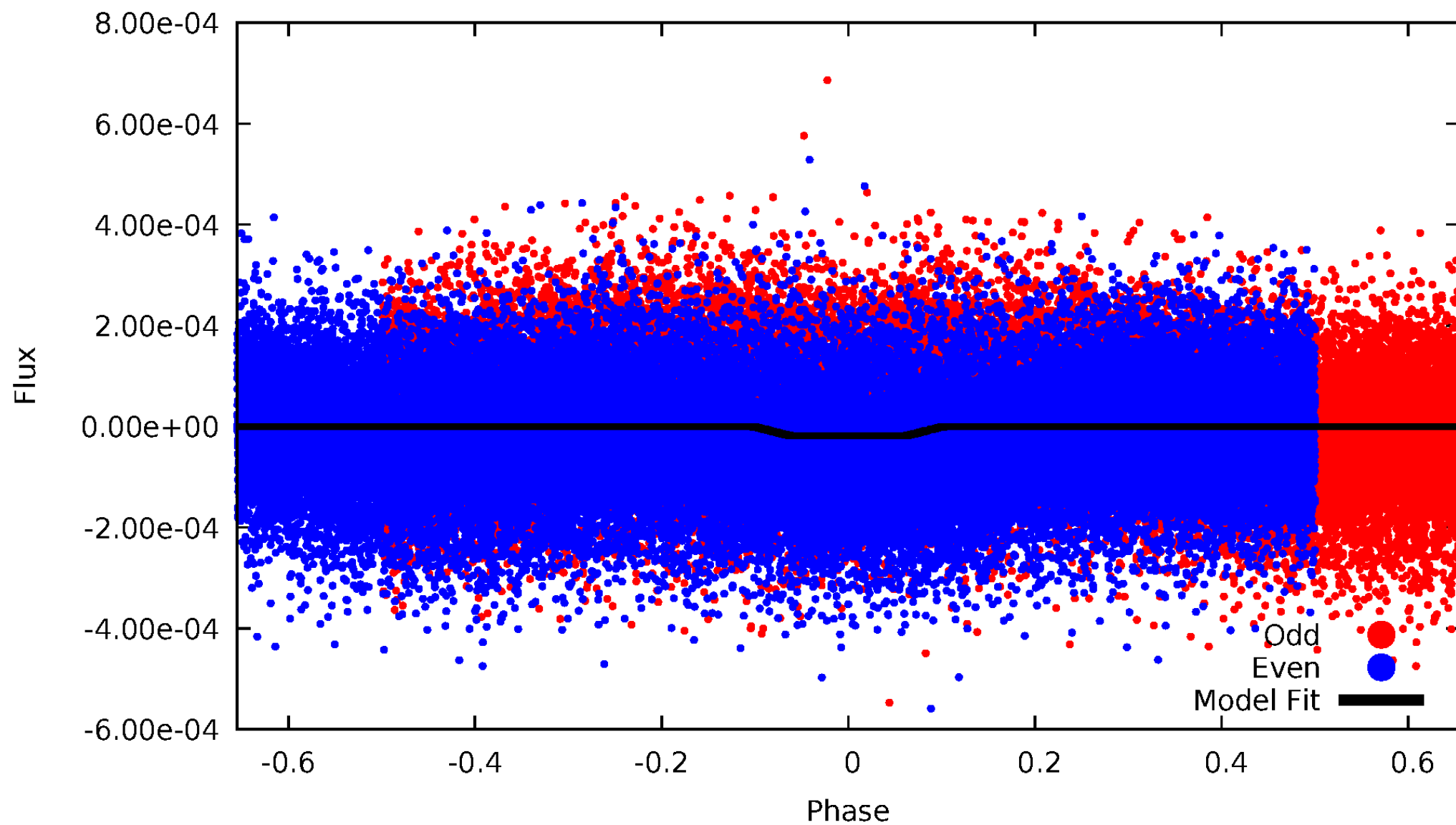
# DV Odd/Even

TCE 005551417-01



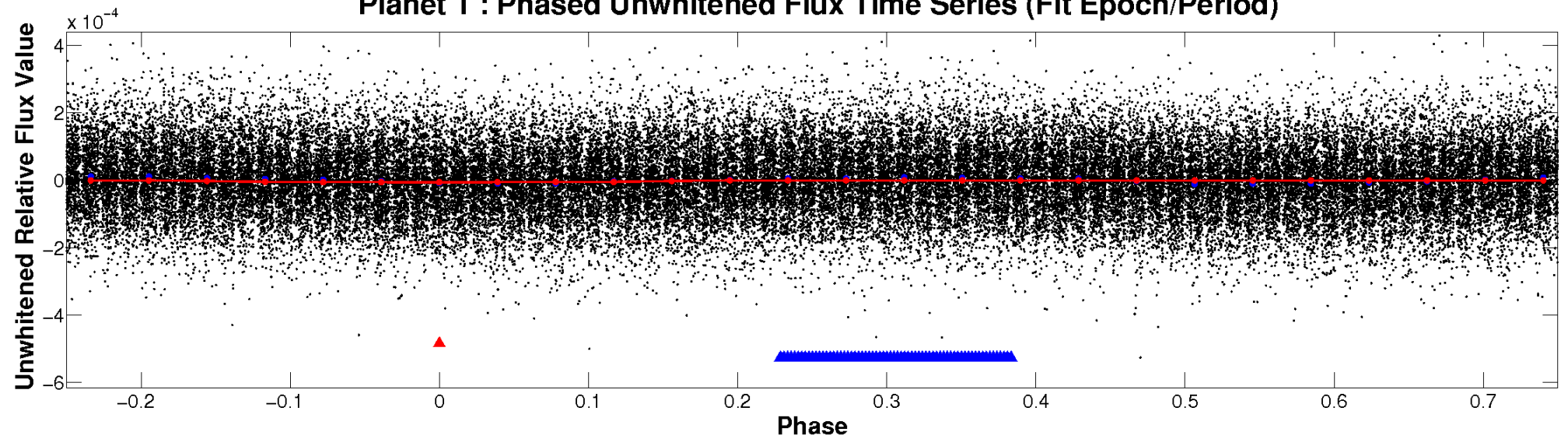
# ALT Odd/Even

TCE 005551417-01

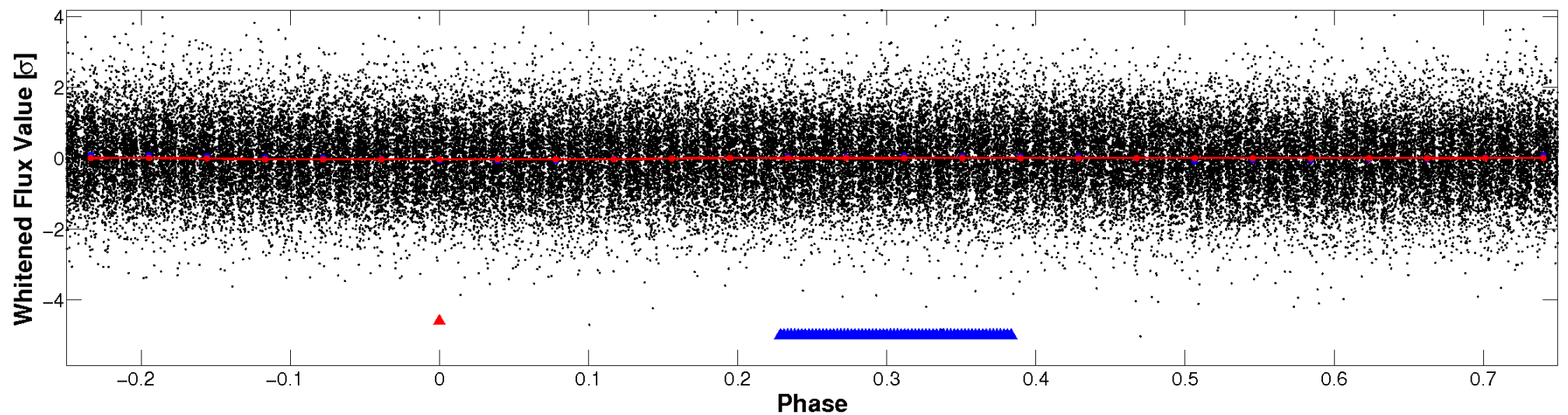


# Non-Whitened Vs. Whitened Light Curve

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



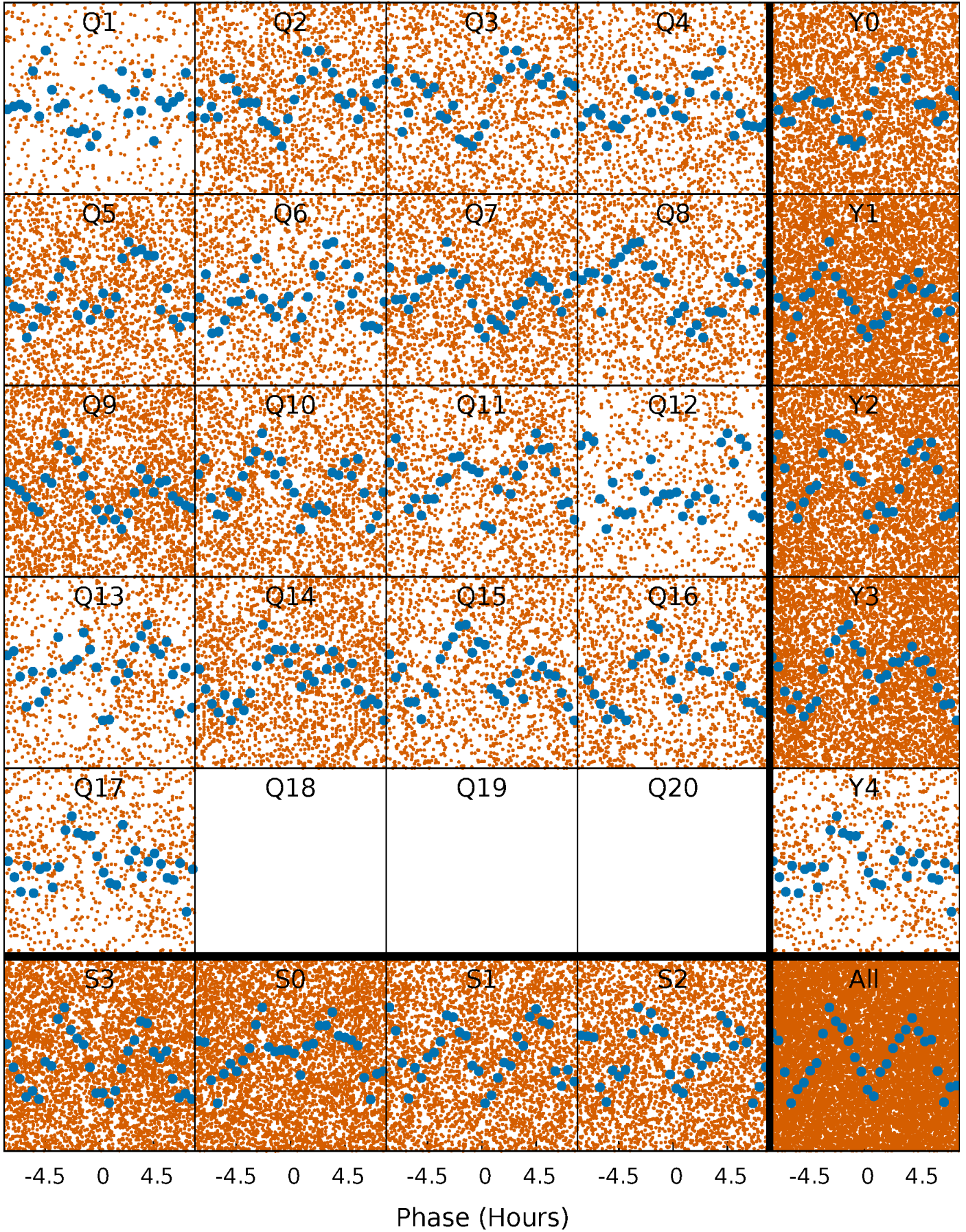
**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**





# PDC Quarter-Phased Transit Curves

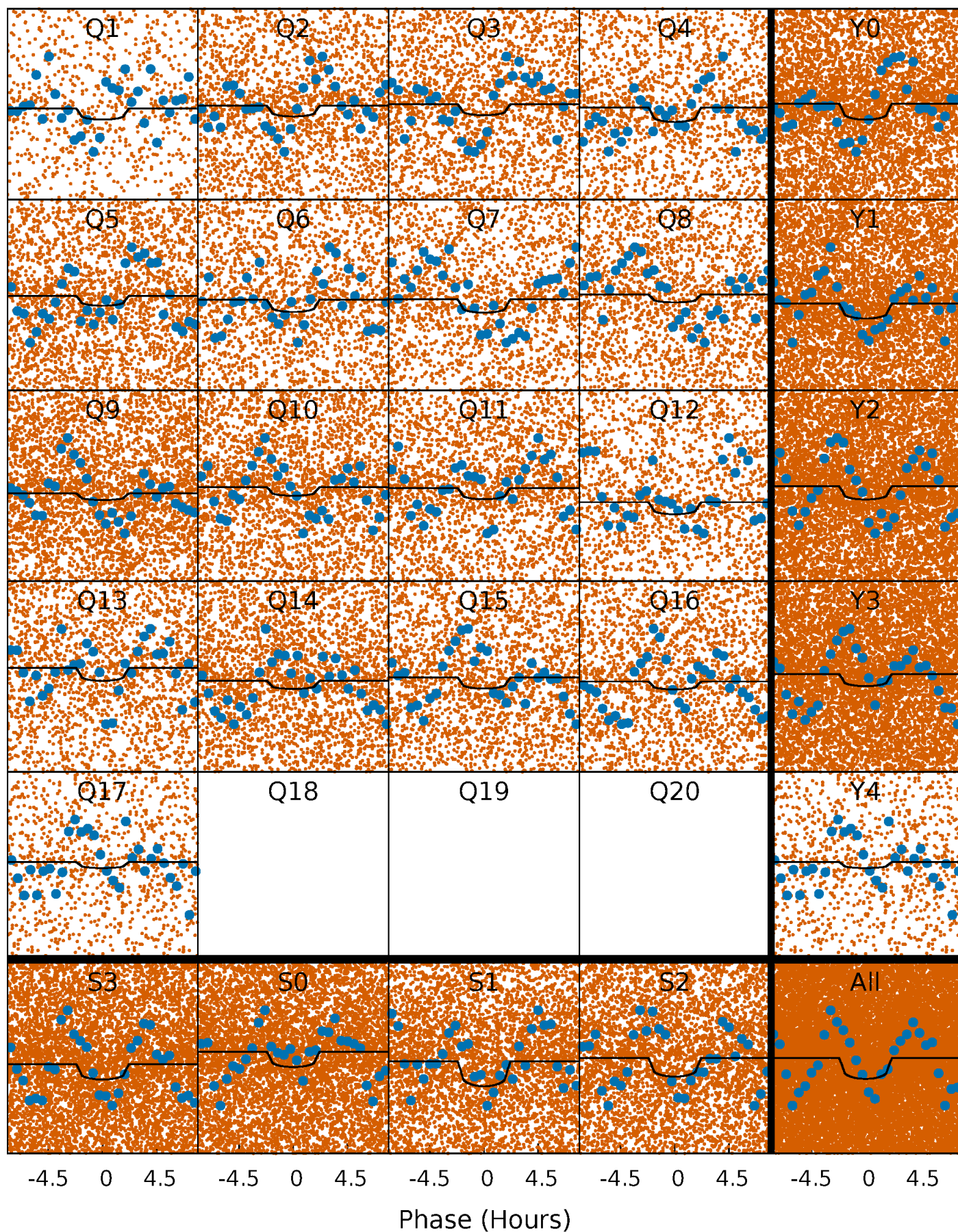
TCE 005551417-01 P= 0.524468 Days  $T_0=132.031649$  (BKJD)





# DV Quarter-Phased Transit Curves

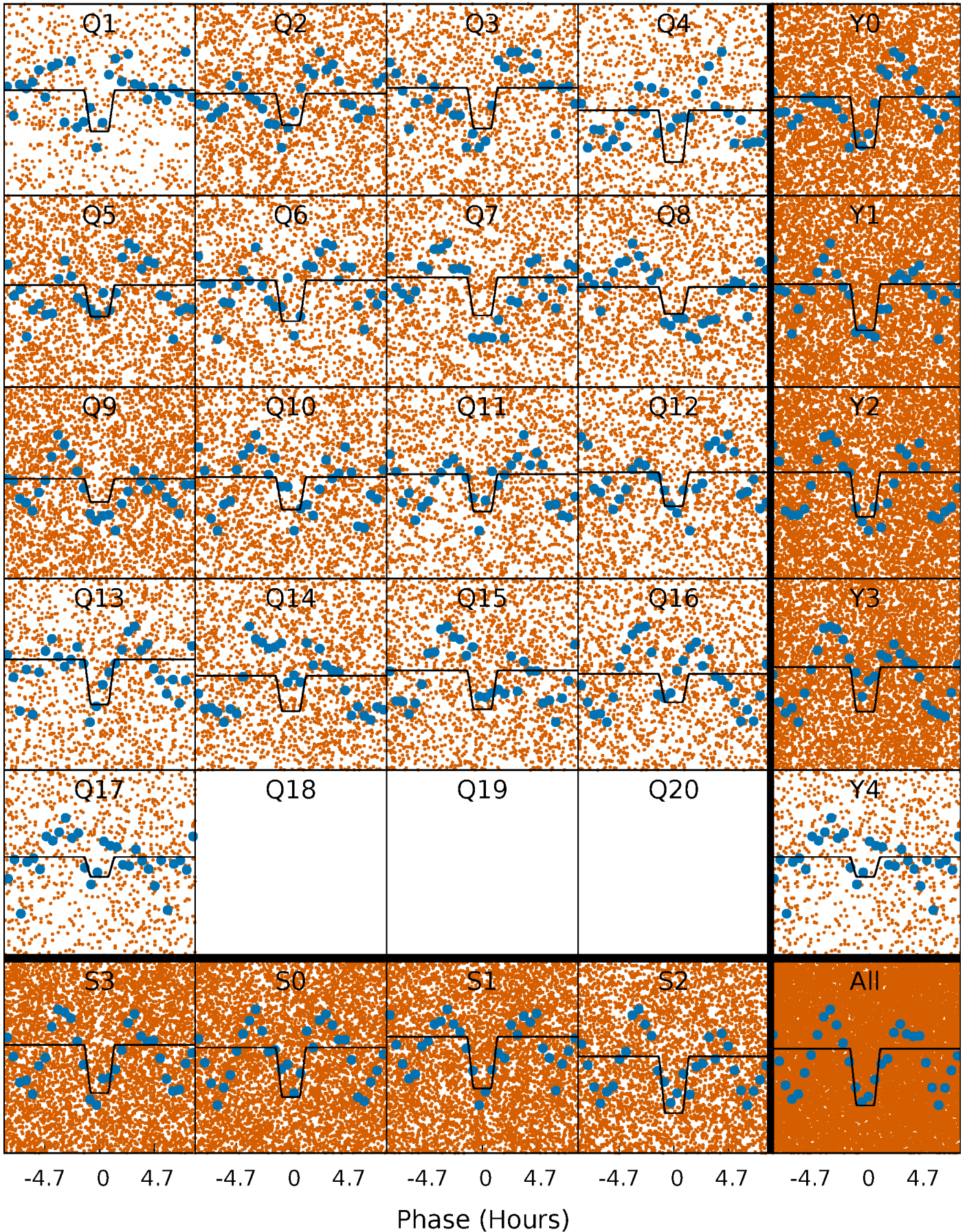
TCE 005551417-01 P= 0.524468 Days  $T_0=132.031649$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

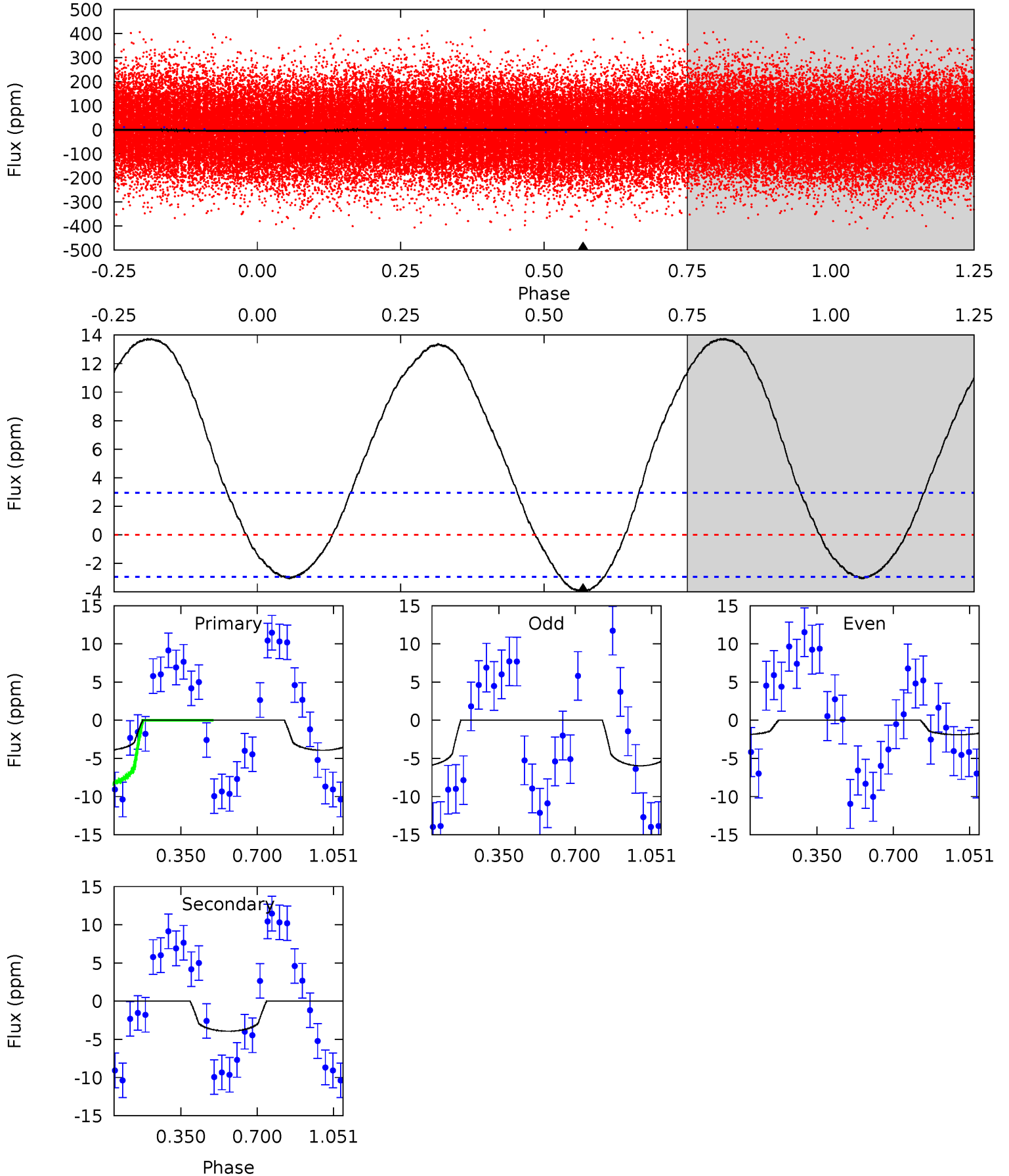
TCE 005551417-01 P= 0.524497 Days  $T_0=132.011839$  (BKJD)



# DV Model-Shift Uniqueness Test

005551417-01, P = 0.524468 Days, E = 131.507181 Days

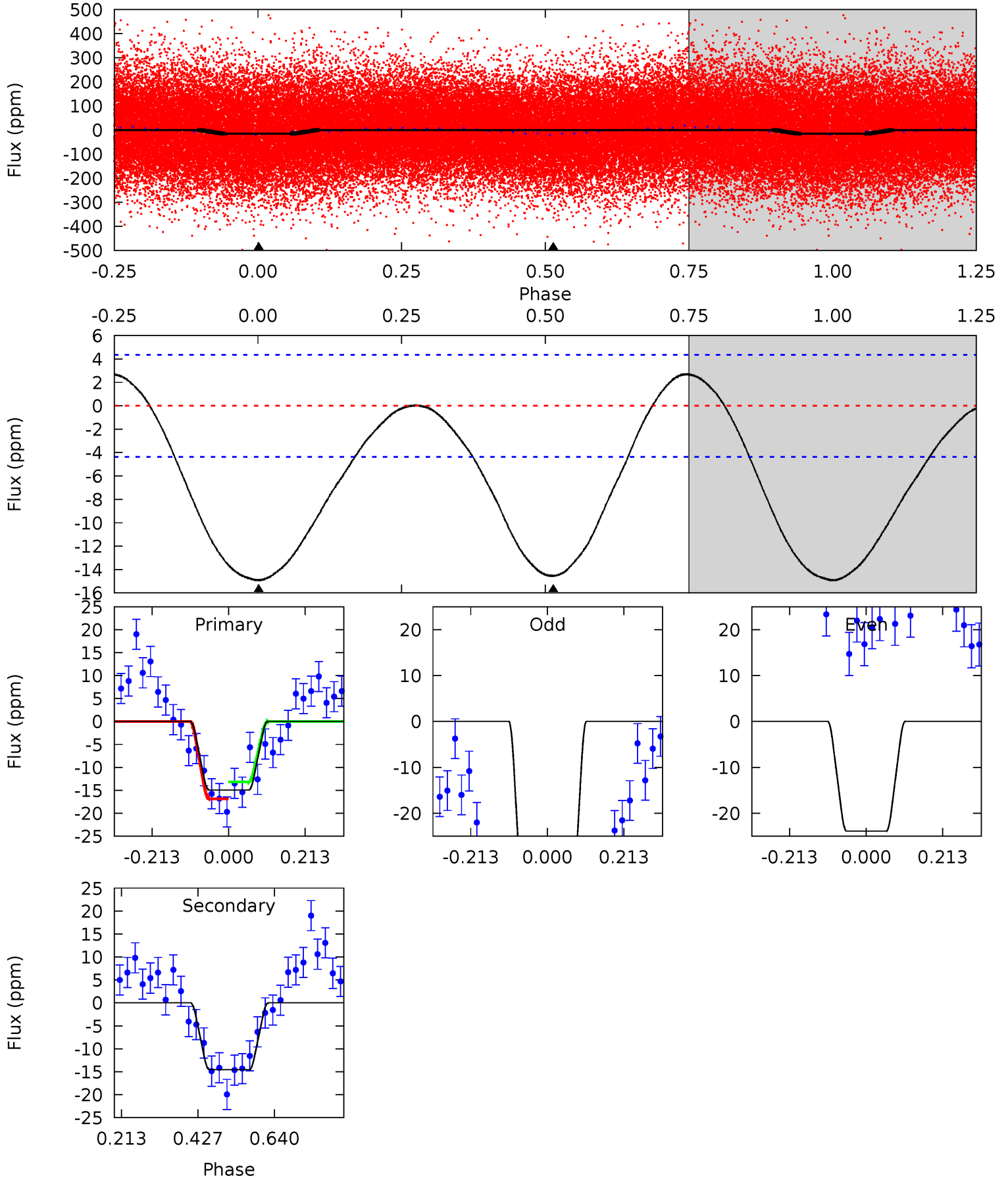
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
5.74	5.74	0	0	4.29	0.93	4.81	5.74	5.74	5.74	5.74	2.93	1.01	0.78	5.74



# Alt Model-Shift Uniqueness Test

005551417-01, P = 0.524497 Days, E = 131.487342 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
15.1	14.7	0	0	4.40	1.24	1.43	15.1	15.1	14.7	14.7	15.4	0.99	0.15	1.74





### Stellar Parameters For KIC 005551417

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$\rho_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$7022^{+197}_{-310}$	$3.942^{+0.286}_{-0.154}$	$-0.120^{+0.250}_{-0.350}$	$2.224^{+0.541}_{-0.811}$	$1.576^{+0.220}_{-0.330}$	$0.202^{+0.445}_{-0.087}$
	+3%/-4%	+7%/-4%	+208%/-292%	+24%/-36%	+14%/-21%	+221%/-43%
Source	PHO54	PHO54	PHO54	DSEP		

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

### Secondary Eclipse Parameters for KIC 005551417-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-4 \pm 1$	$0.55^{+0.35}_{-0.31}$	$5230^{+400}_{-536}$	$5963^{+4192}_{-1617}$	$1.589^{+6.525}_{-1.029}$
Alt.	$-15 \pm 1$	$1.02^{+0.40}_{-0.37}$	$5230^{+384}_{-502}$	$6160^{+1862}_{-1026}$	$1.706^{+2.449}_{-0.803}$

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

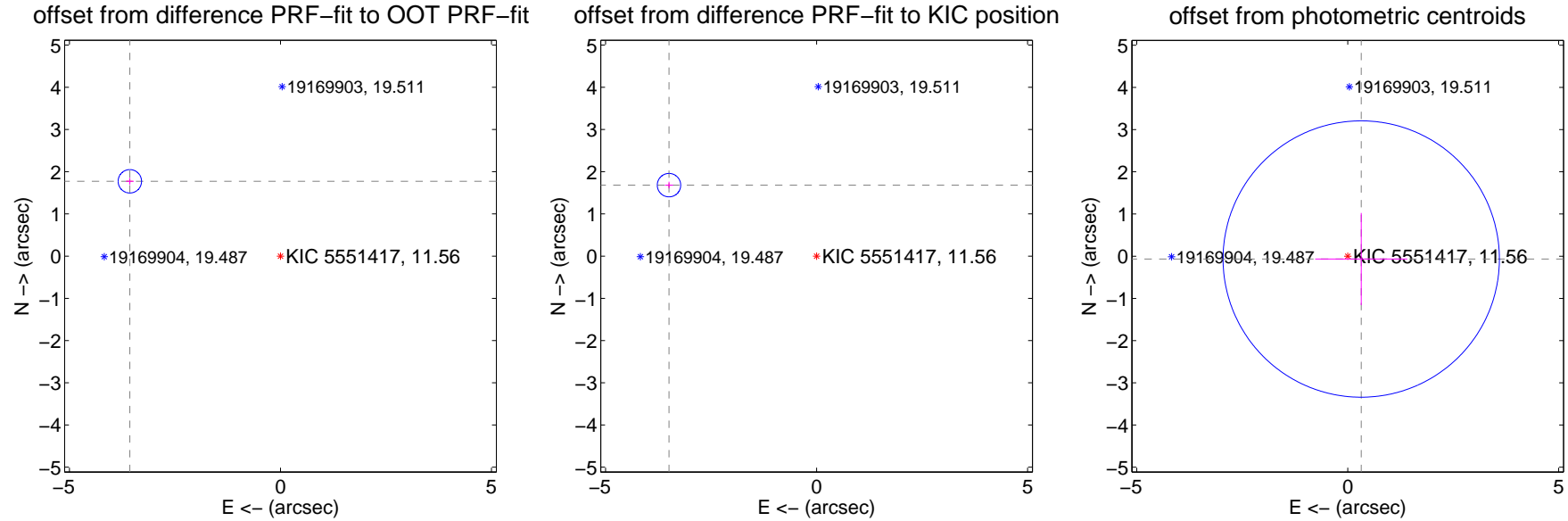
## DV Centroid Data

Supplemental centroid analysis for 005551417-01. **Kepler magnitude: 11.56.** Transit SNR 4.57

**There are 0 quarters with good PRF difference image offsets**

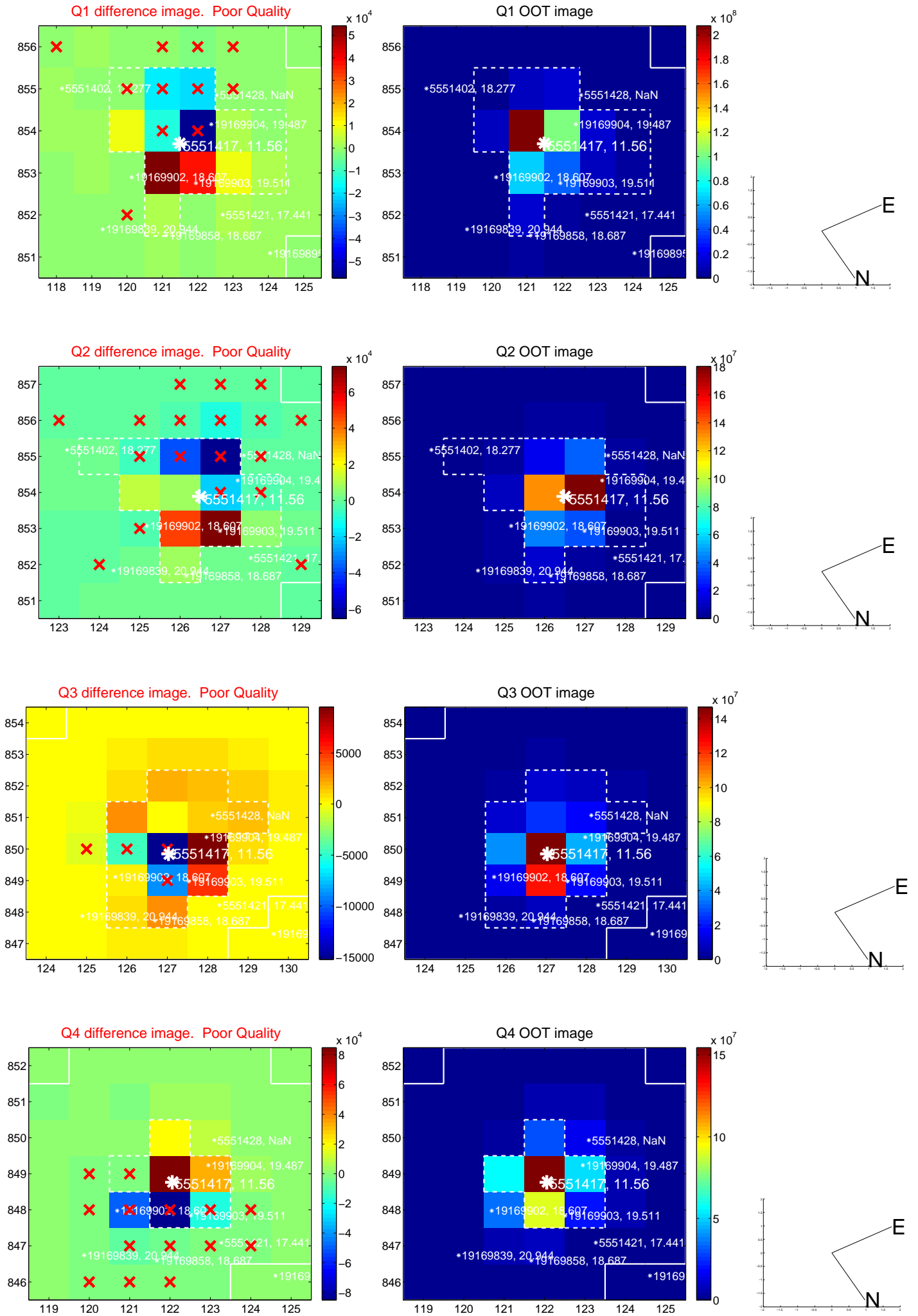
The direct PRF centroid is offset from the target star catalog position by about 0.12 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	<b><math>3.986 \pm 0.092</math></b>	<b>43.12</b>	$3.569 \pm 0.095$	$1.773 \pm 0.081$
PRF-fit source offset from KIC position	<b><math>3.881 \pm 0.093</math></b>	<b>41.92</b>	$3.497 \pm 0.095$	$1.682 \pm 0.081$
photometric centroid source offset	$0.33 \pm 1.09$	0.30	$-0.32 \pm 1.09$	$-0.07 \pm 1.09$

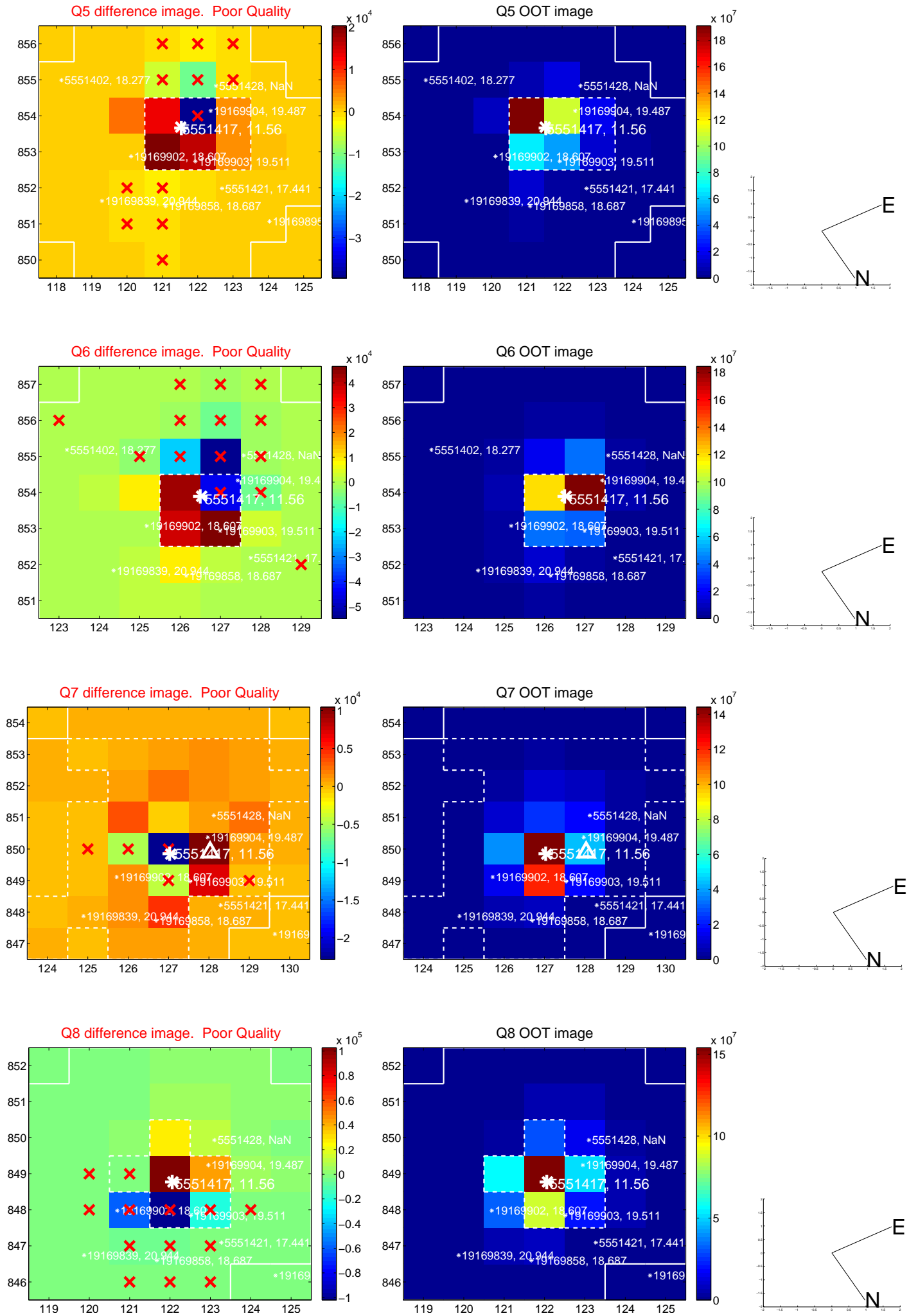


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

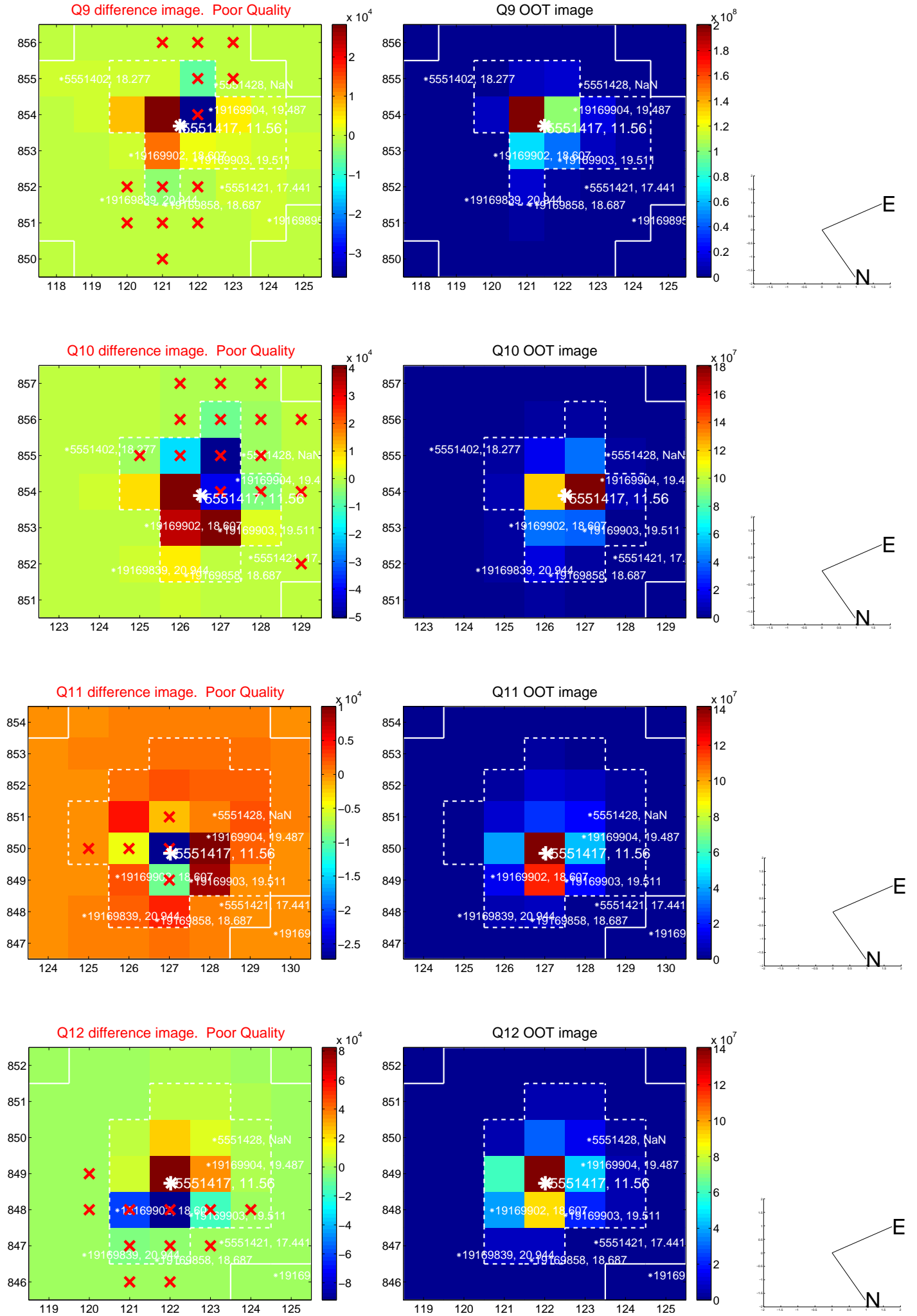


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

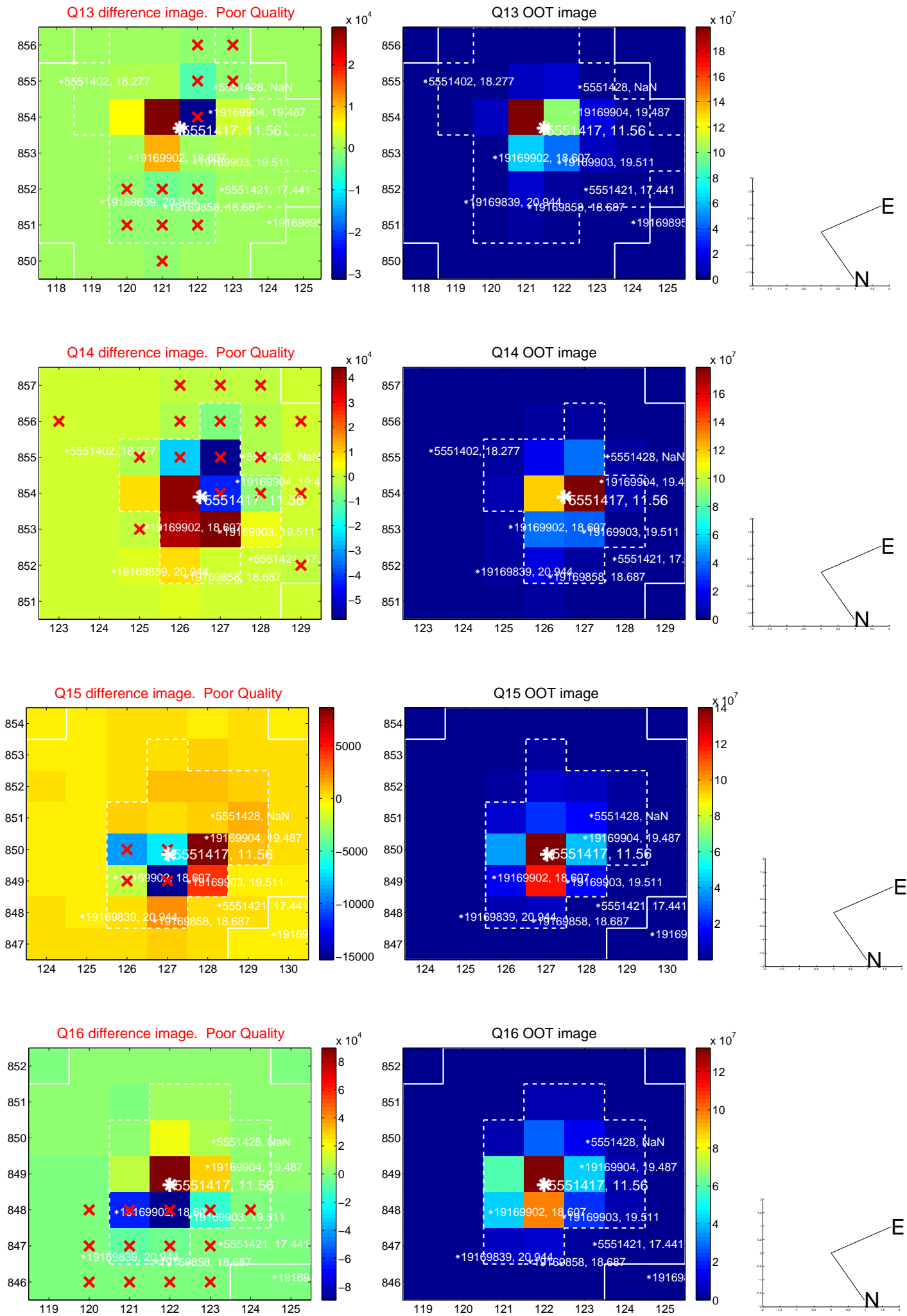




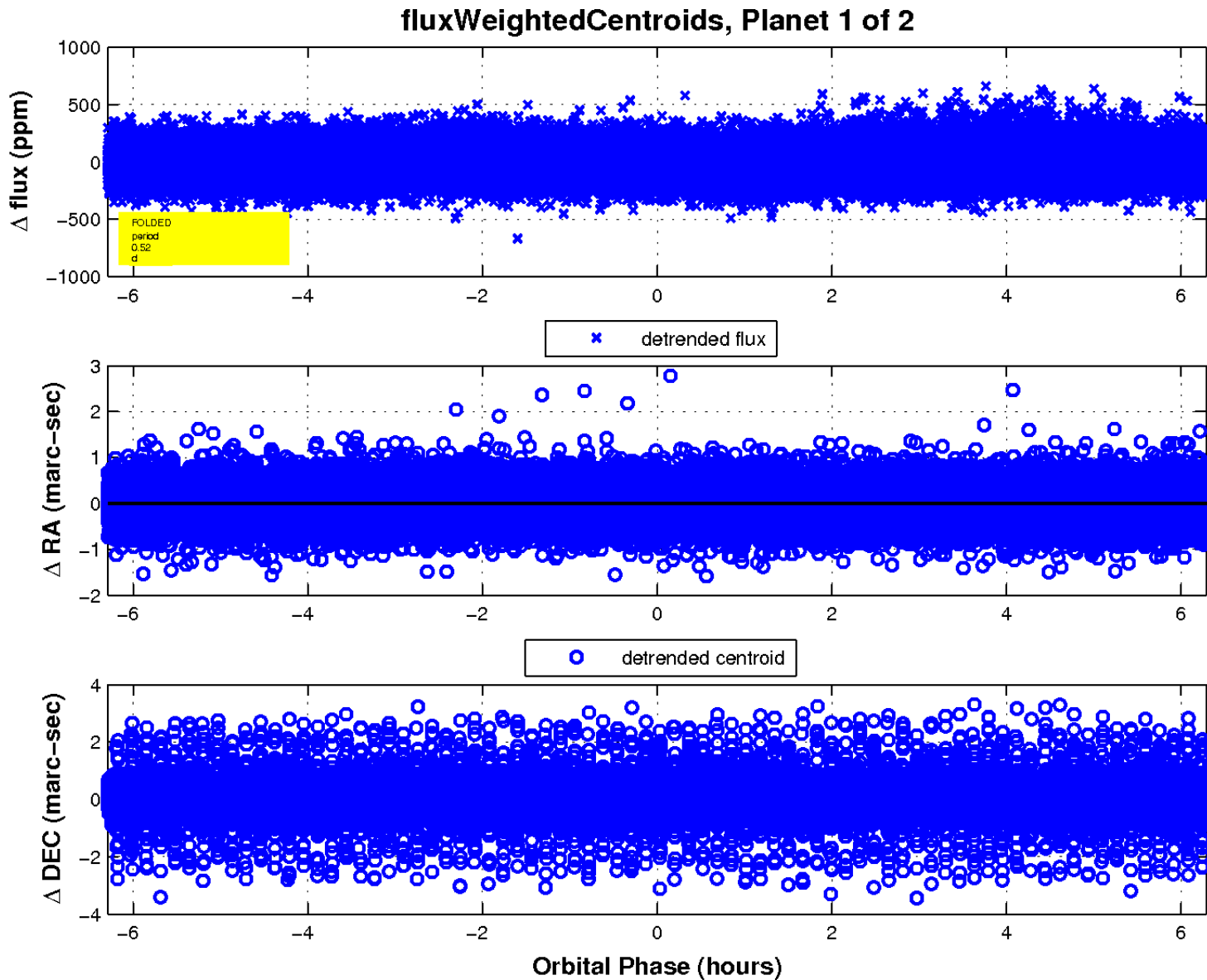
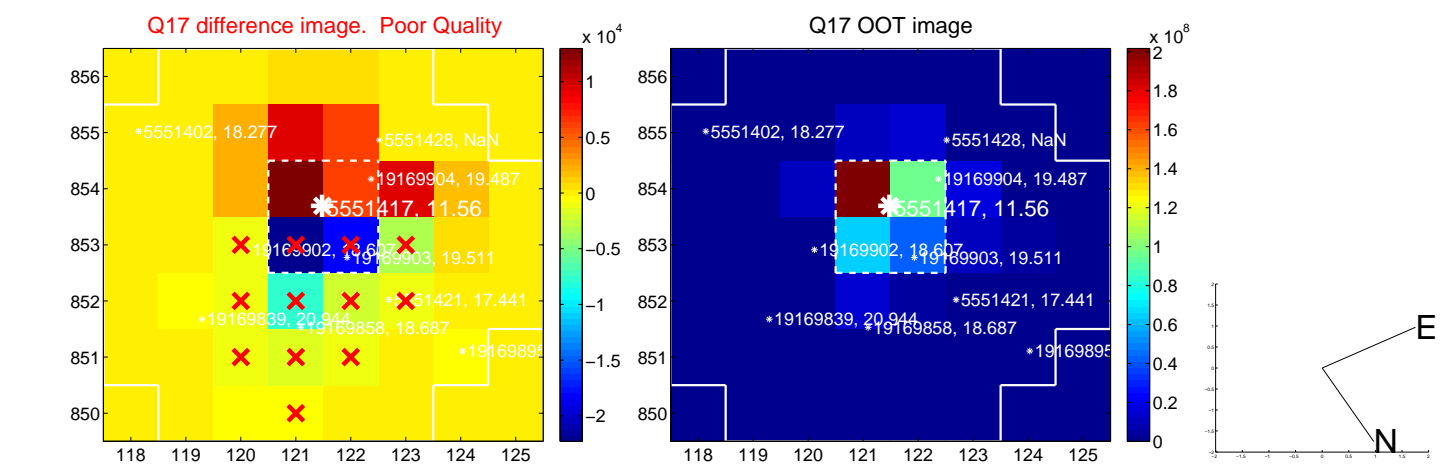
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



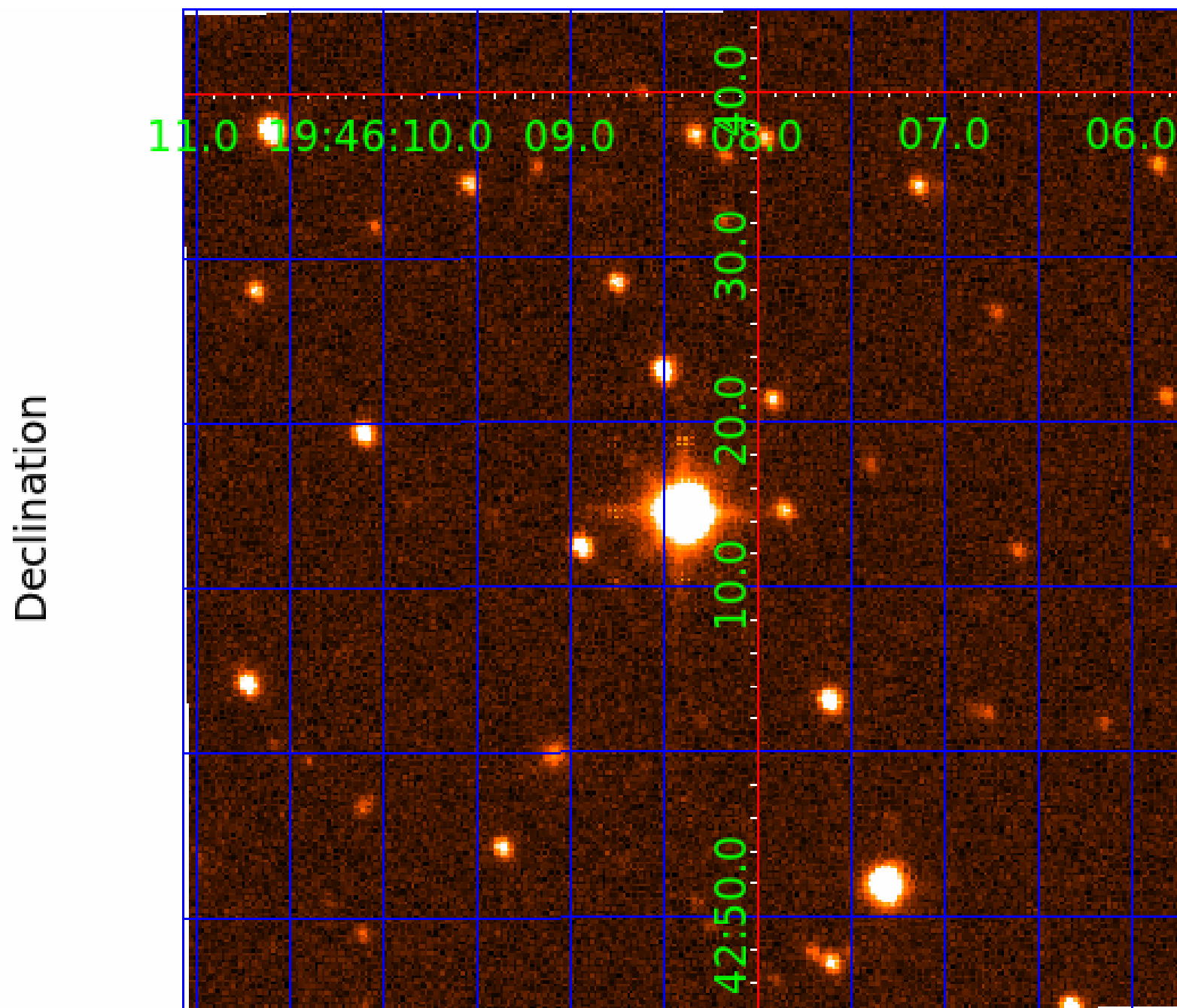
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



UKIRT Image





# KIC 005551417

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005551417-01	OBS	No	0.524468	132.031649	5.4	3.962	8.4	4.6	2.22	7022	0.56	49038.30
005551417-02	OBS	No	22.026411	138.001856	324.7	4.219	15.1	23.1	2.22	7022	4.04	335.92

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005551417-01	OBS	FP	0.00	1	0	1	0	SWEET_NTL—LPP_DV—MOD_NONUNIQ_DV—CENT_FEW_DIFFS—HALO_GHOST
005551417-02	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—HALO_GHOST

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

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

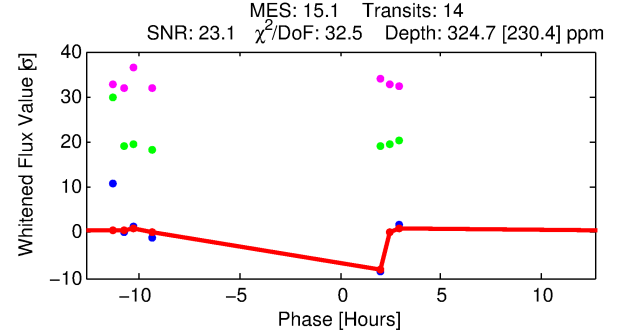
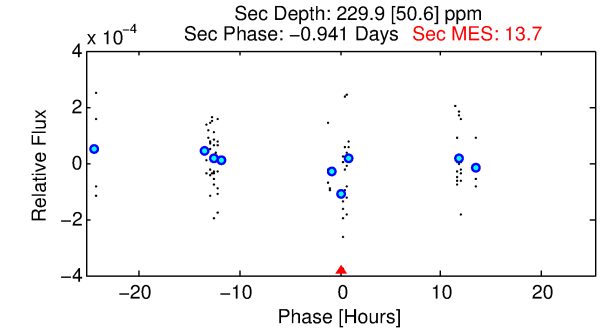
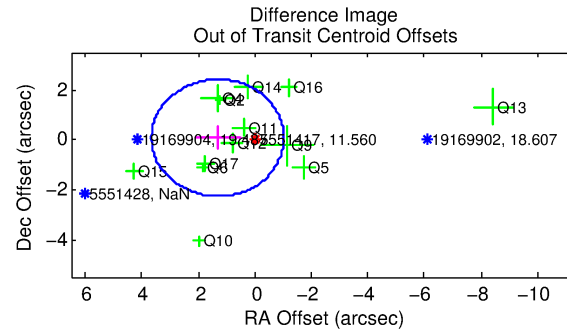
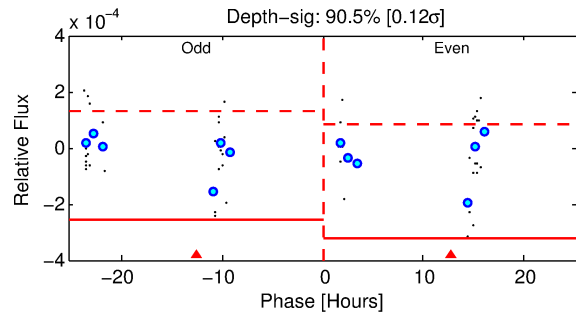
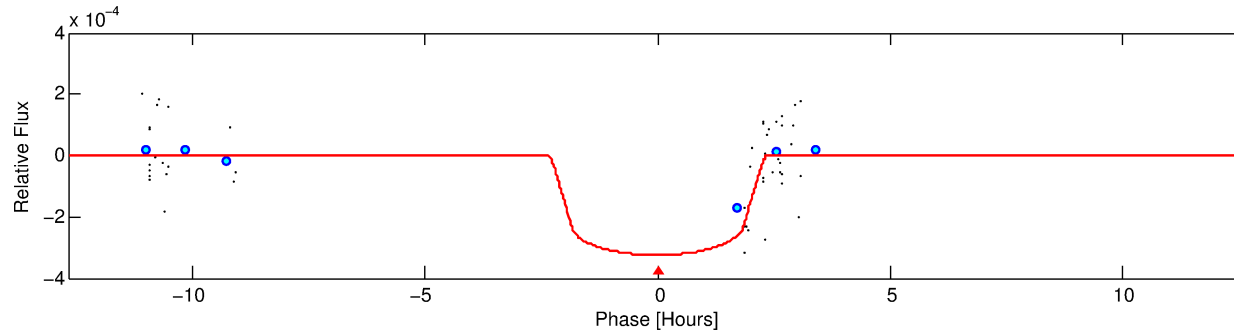
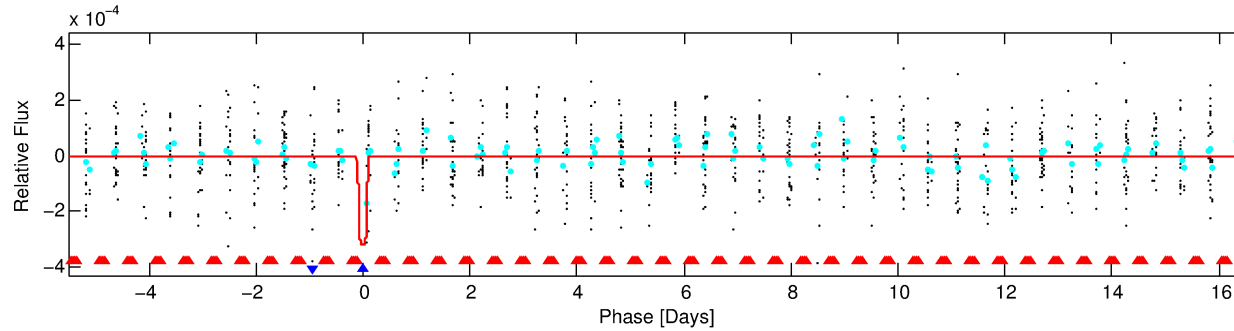
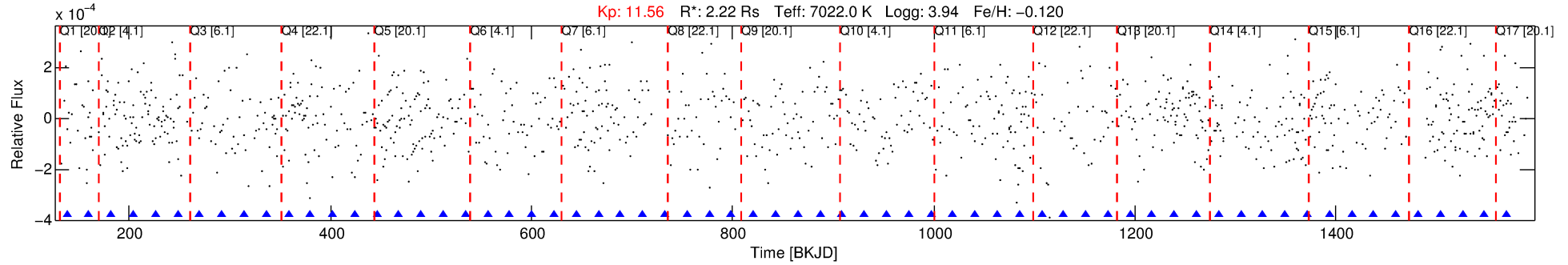
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 005551417-02

No Significant Match Found

# DV One-Page Summary

KIC: 5551417 Candidate: 2 of 2 Period: 22.026 d



## DV Fit Results:

Period = 22.02641 [0.00072] d  
Epoch = 138.0019 [0.0196] BKJD  
Rp/R\* = 0.0167 [0.0260]  
a/R\* = 40.55 [375.62]  
b = 0.01 [1338.32]  
Seff = 335.92 [178.71]  
Teq = 1092 [145] K  
Rp = 4.04 [6.47] Re  
a = 0.1791 [0.0587] AU  
Ag = 248.06 [784.80] [0.31 $\sigma$ ]  
Teffp = 6698 [5239] K [1.07 $\sigma$ ]

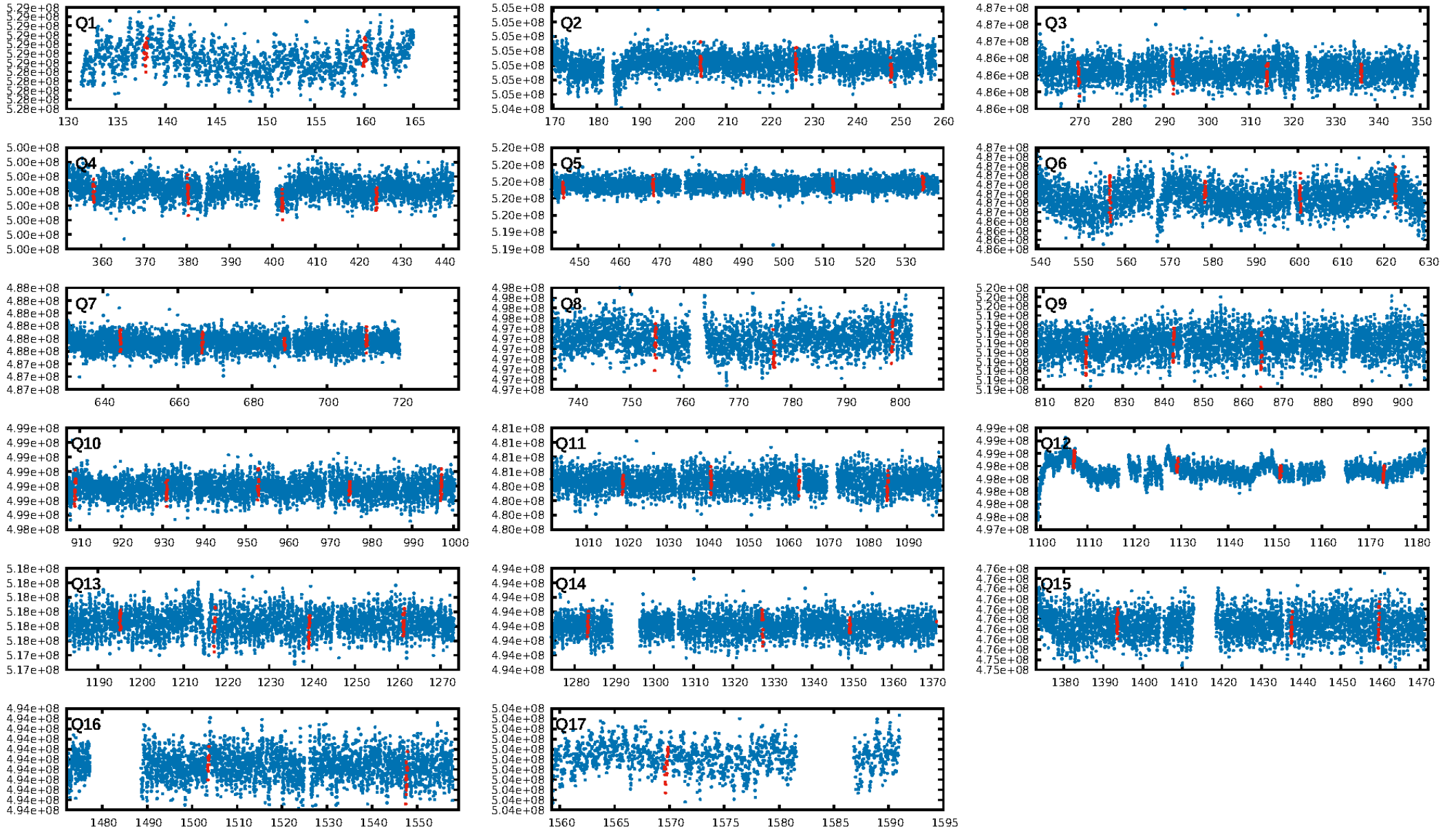
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [89.17 $\sigma$ ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 0.0%  
ModelChiSquareGof-sig: 0.0%  
Bootstrap-pfa: 1.48e-05  
RollingBand-fgt: 1.00 [14/14]  
GhostDiagnostic-chr: 0.1685  
Centroid-sig: N/A  
Centroid-so: 0.209 arcsec [1.68 $\sigma$ ]  
OotOffset-rm: 1.319 arcsec [1.69 $\sigma$ ]  
KicOffset-rm: 1.204 arcsec [1.59 $\sigma$ ]  
OotOffset-st: 4/2/3/4 [13]  
KicOffset-st: 4/2/3/4 [13]  
DiffImageQuality-fgm: 0.54 [7/13]  
DiffImageOverlap-fno: 0.00 [0/17]

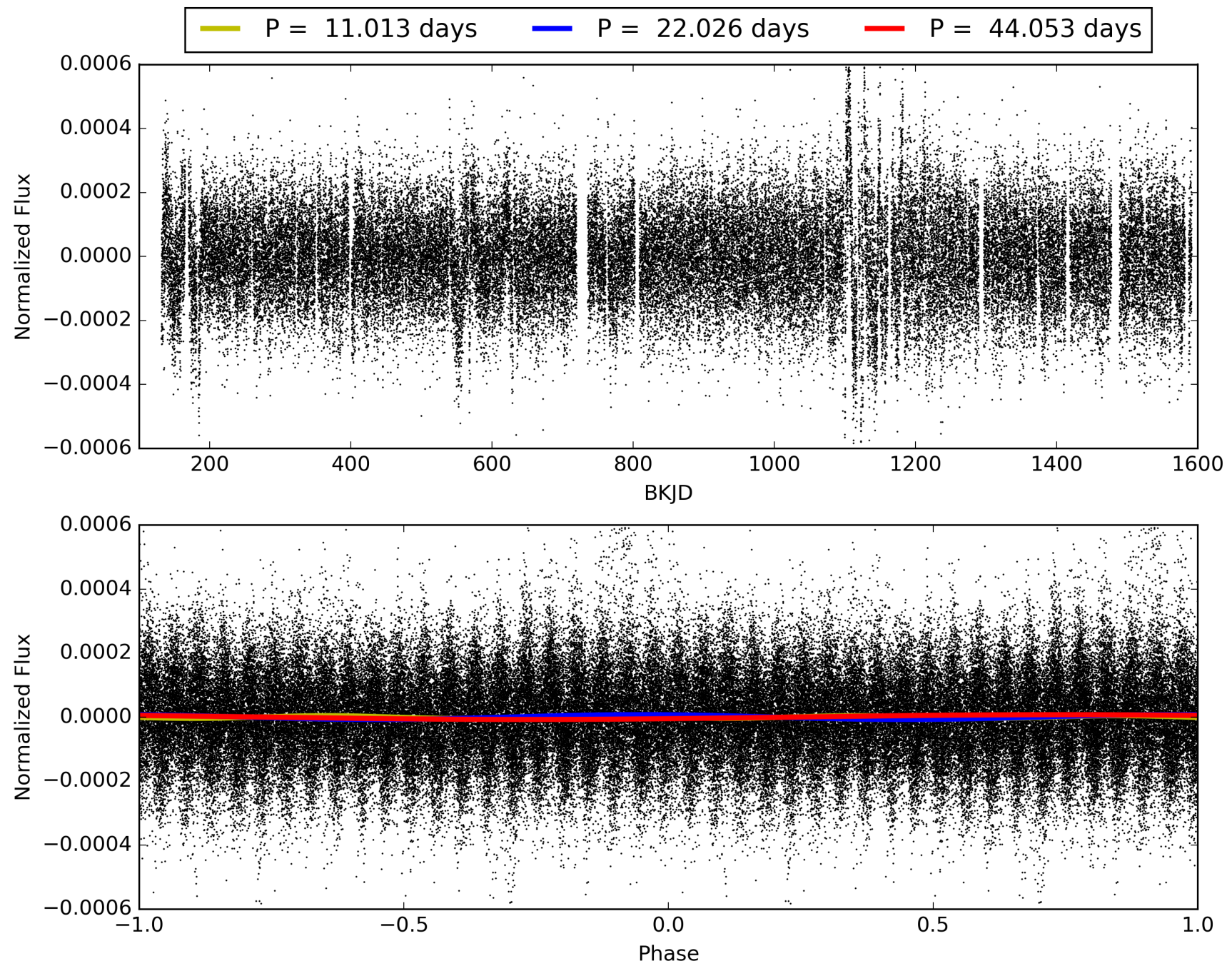
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 01:15:01 Z

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

# TCE 005551417-02, PDC Light Curves



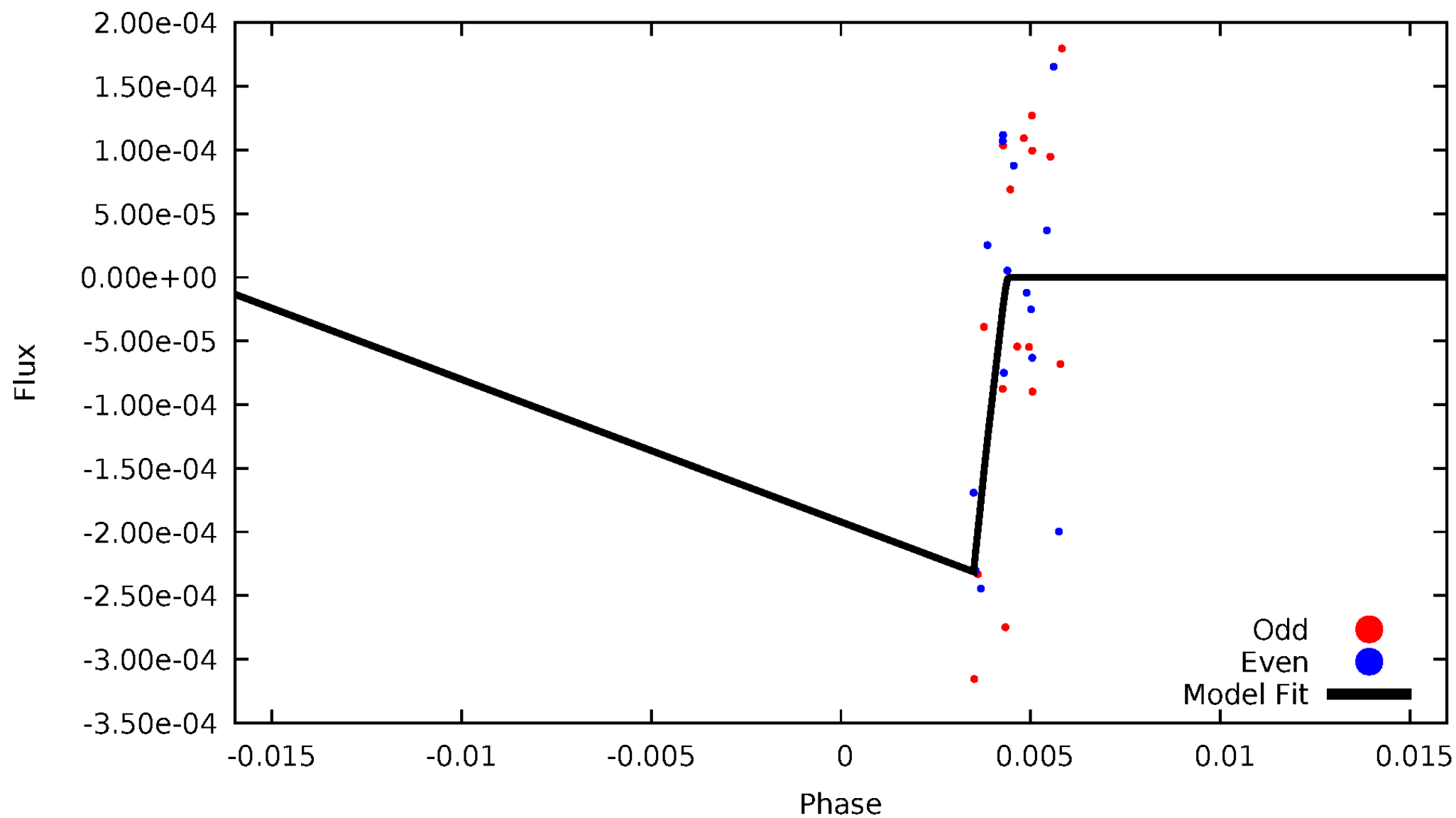
TCE 005551417-02





DV Odd/Even

TCE 005551417-02



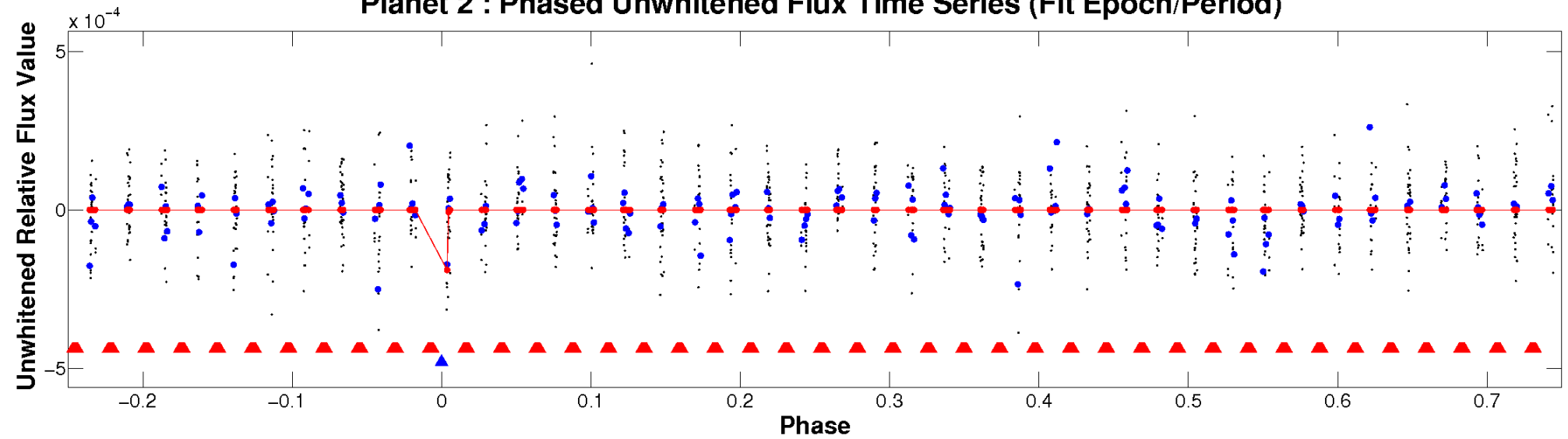


ALT Odd/Even

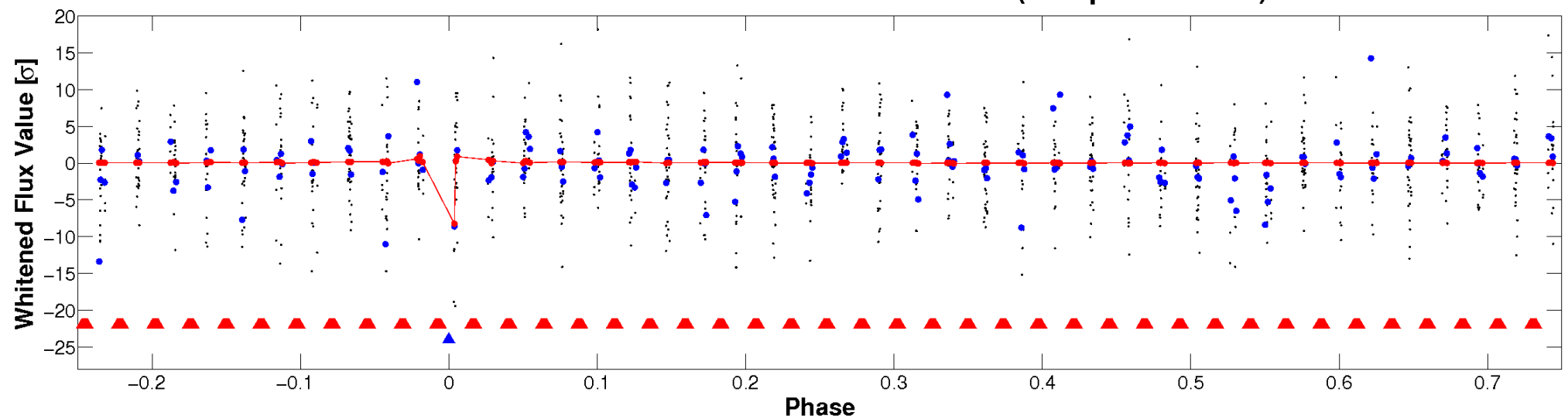
This plot does not exist for this TCE.

# Non-Whitened Vs. Whitened Light Curve

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

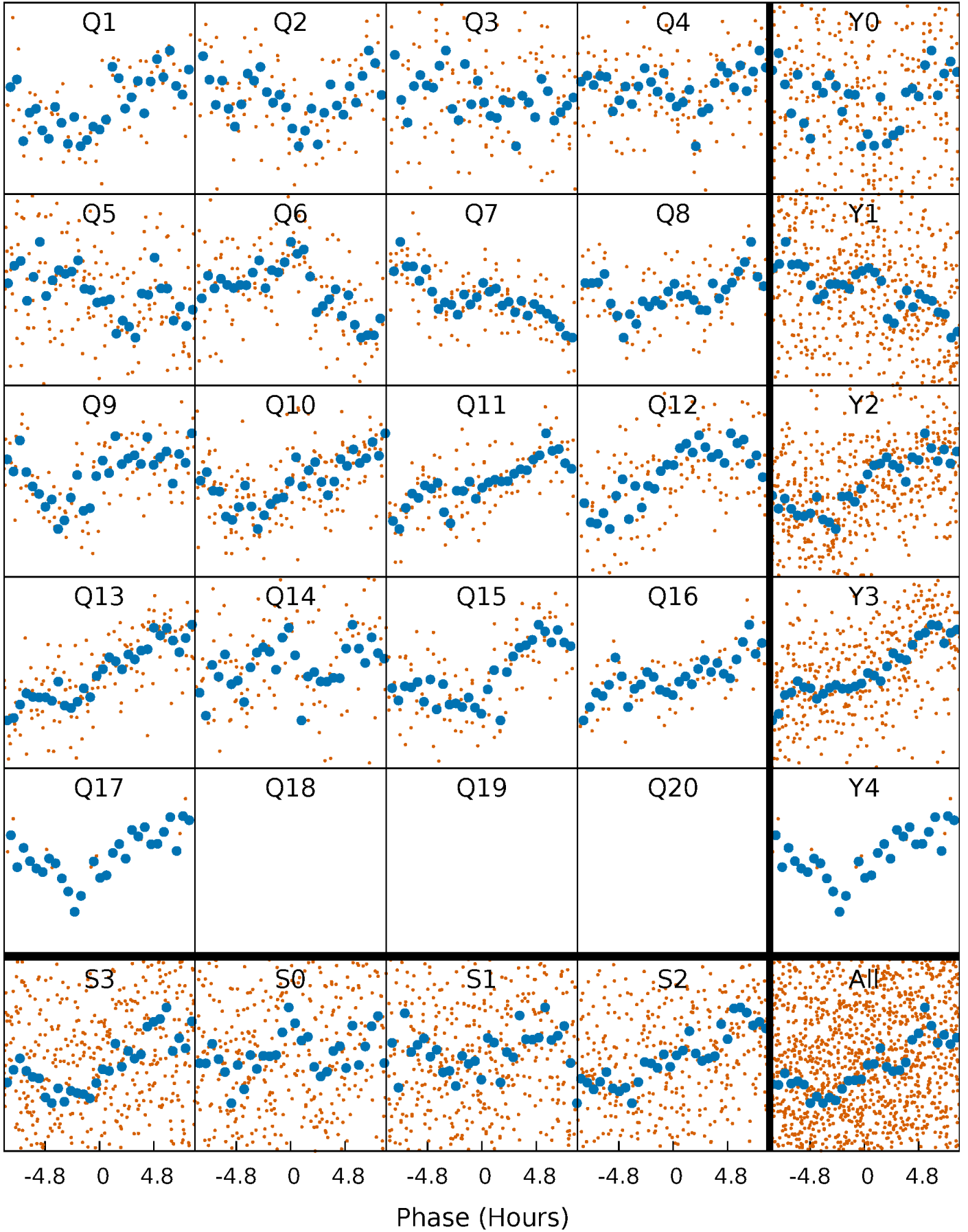


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

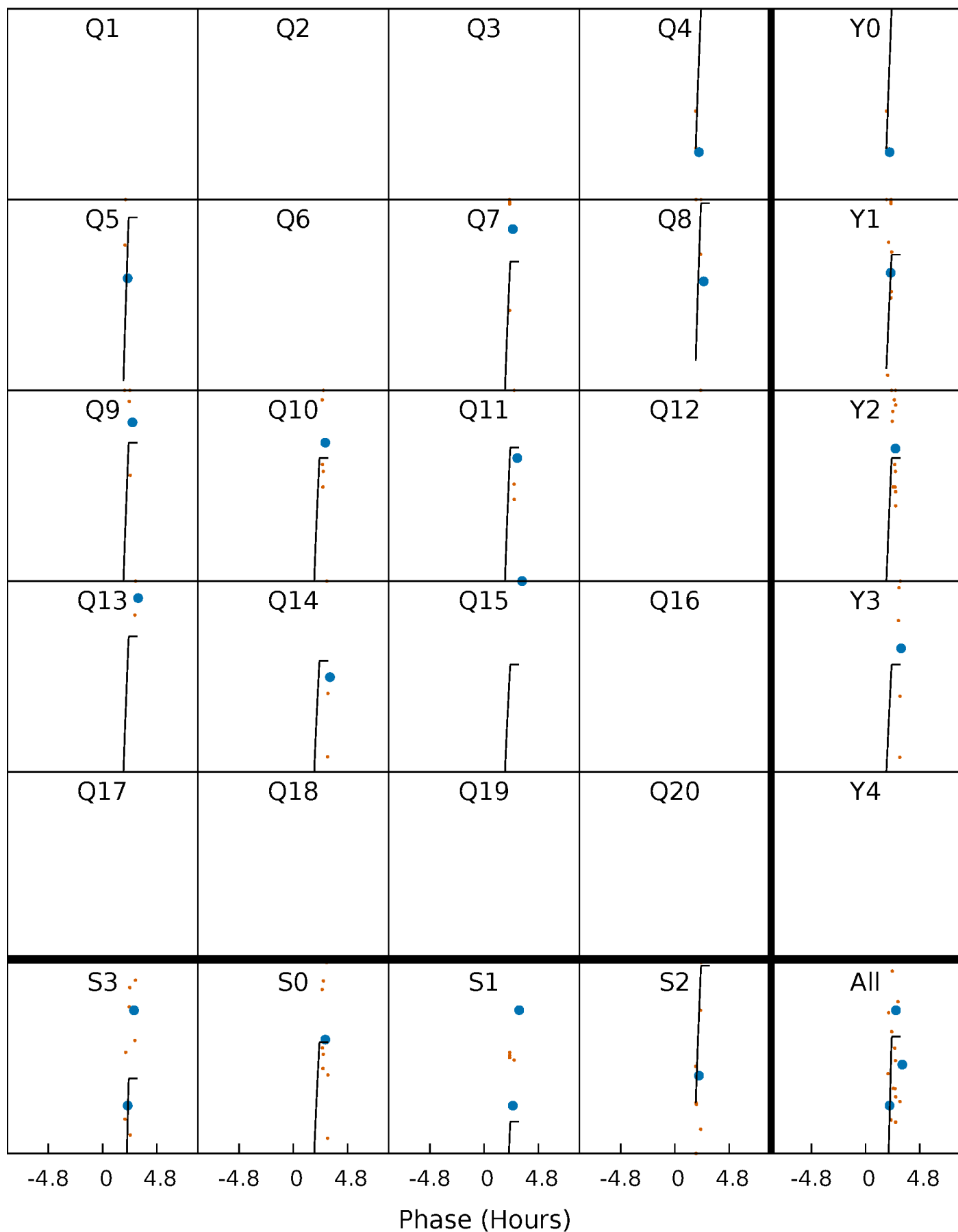
TCE 005551417-02 P= 22.026411 Days  $T_0=138.001856$  (BKJD)





# DV Quarter-Phased Transit Curves

TCE 005551417-02    P= 22.026411 Days     $T_0=138.001856$  (BKJD)

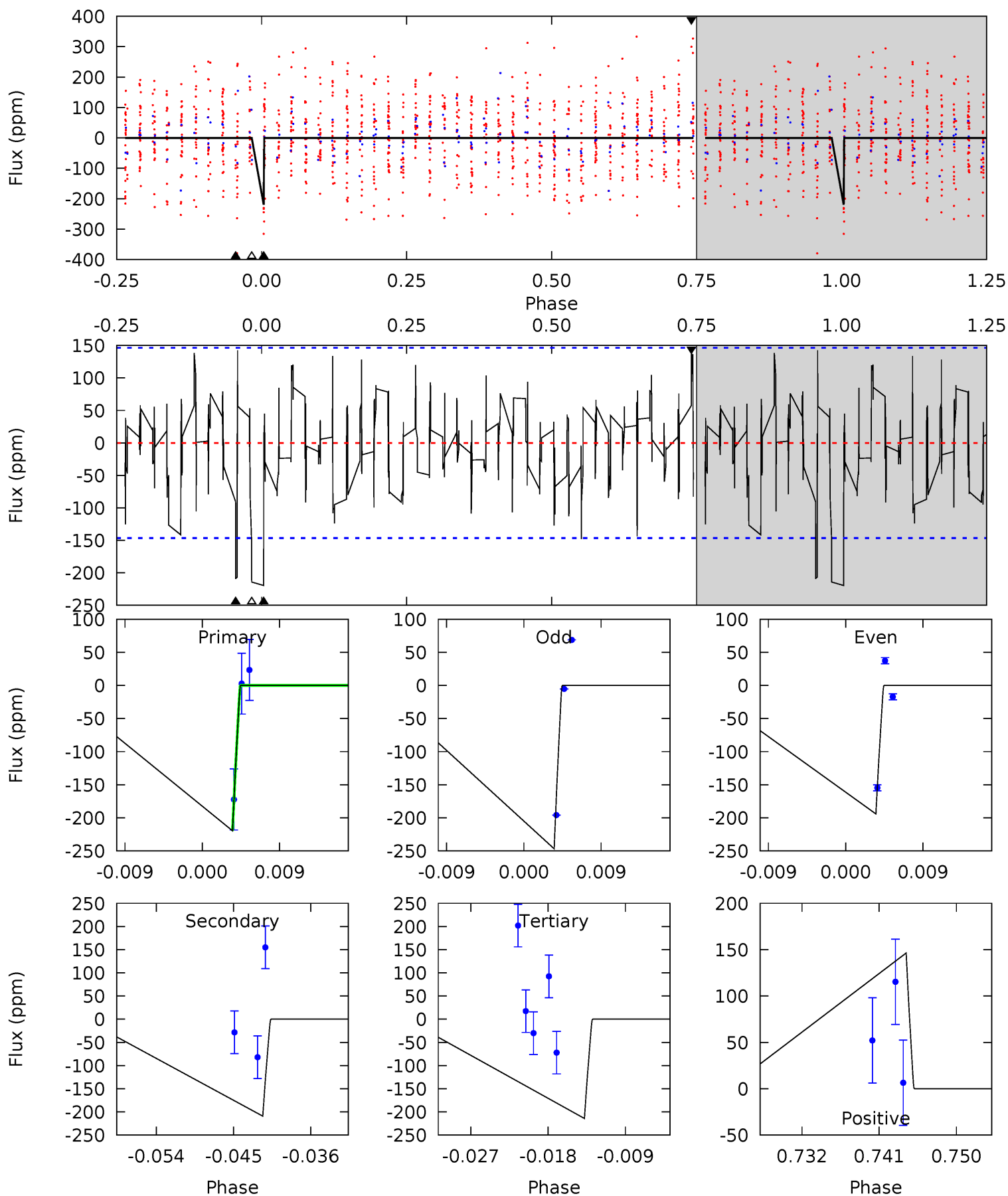


This plot does not exist for this TCE.

# DV Model-Shift Uniqueness Test

005551417-02, P = 22.026411 Days, E = 115.975445 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
7.57	7.21	7.38	5.05	5.05	2.61	1.82	0.19	2.52	-0.17	2.17	0.89	0	0.40	0



## Alt Model-Shift Uniqueness Test

This plot does not exist for this TCE.

### Stellar Parameters For KIC 005551417

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$7022^{+197}_{-310}$	$3.942^{+0.286}_{-0.154}$	$-0.120^{+0.250}_{-0.350}$	$2.224^{+0.541}_{-0.811}$	$1.576^{+0.220}_{-0.330}$	$0.202^{+0.445}_{-0.087}$
	+3%/-4%	+7%/-4%	+208%/-292%	+24%/-36%	+14%/-21%	+221%/-43%
Source	PHO54	PHO54	PHO54	DSEP		

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

### Secondary Eclipse Parameters for KIC 005551417-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-209 \pm 29$	$6.02^{+5.60}_{-4.02}$	$1508^{+117}_{-137}$	$5197^{+4111}_{-1108}$	$100^{+770}_{-73}$
Alt.	N/A	N/A	N/A	N/A	N/A

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



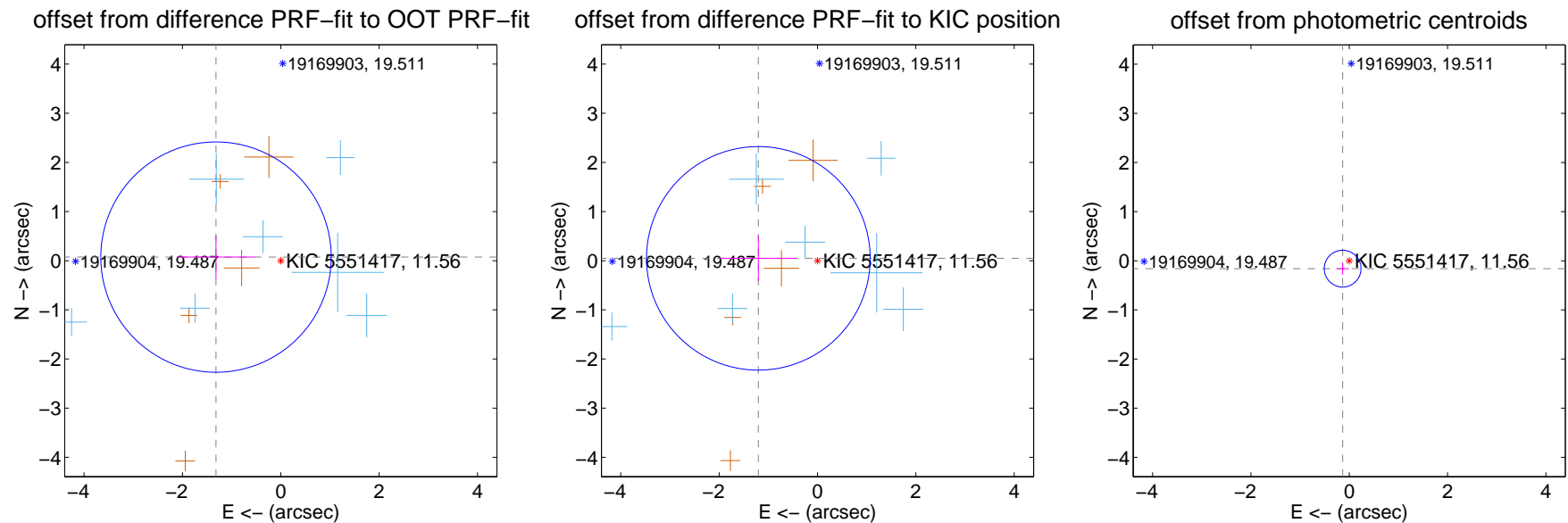
## DV Centroid Data

Supplemental centroid analysis for 005551417-02. **Kepler magnitude: 11.56.** Transit SNR 23.12

There are 7 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.02 arcsec

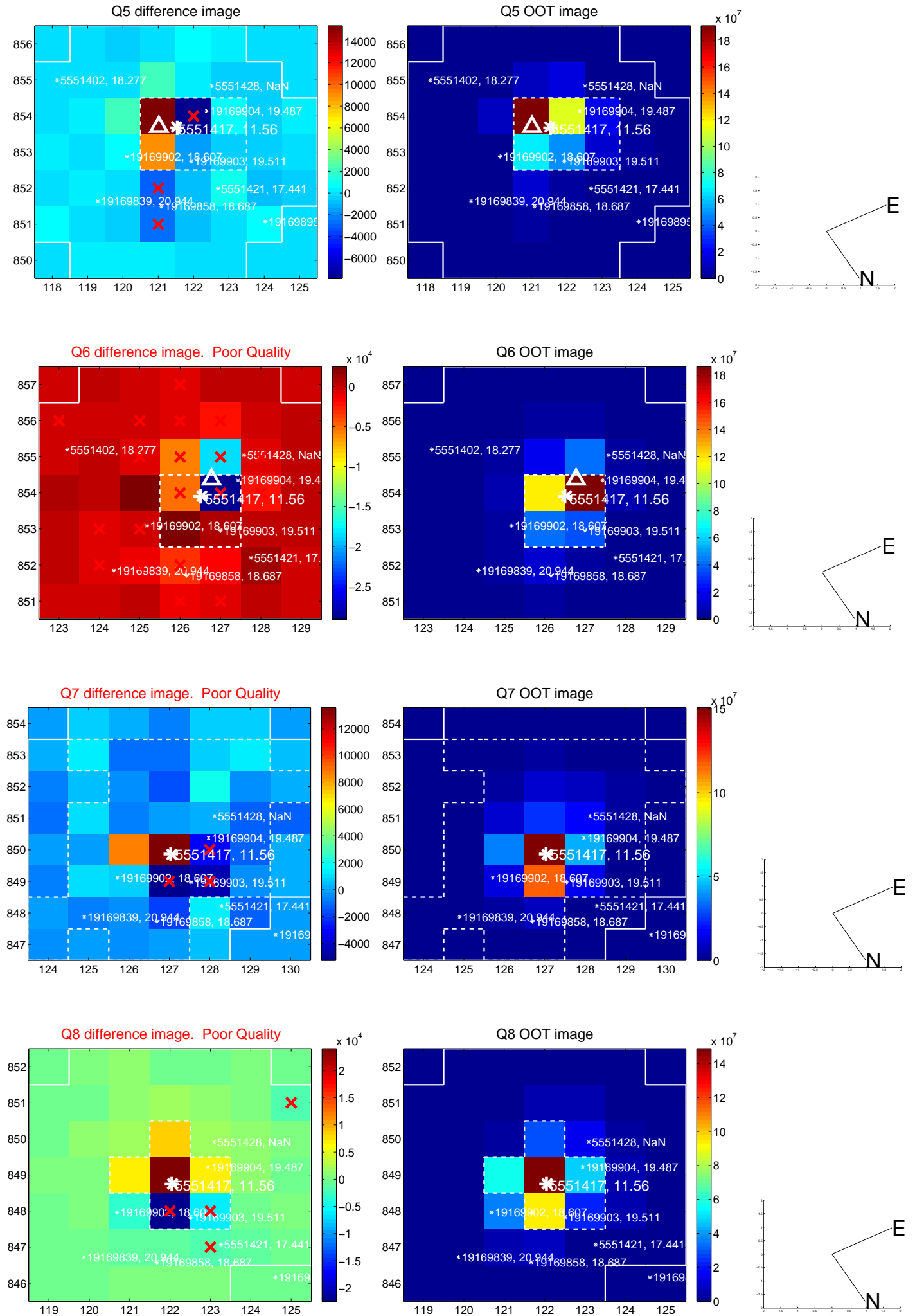
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.319 \pm 0.781$	1.69	$1.317 \pm 0.791$	$0.073 \pm 0.444$
PRF-fit source offset from KIC position	$1.204 \pm 0.758$	1.59	$1.203 \pm 0.768$	$0.048 \pm 0.461$
photometric centroid source offset	$0.21 \pm 0.12$	1.68	$0.13 \pm 0.13$	$-0.16 \pm 0.12$



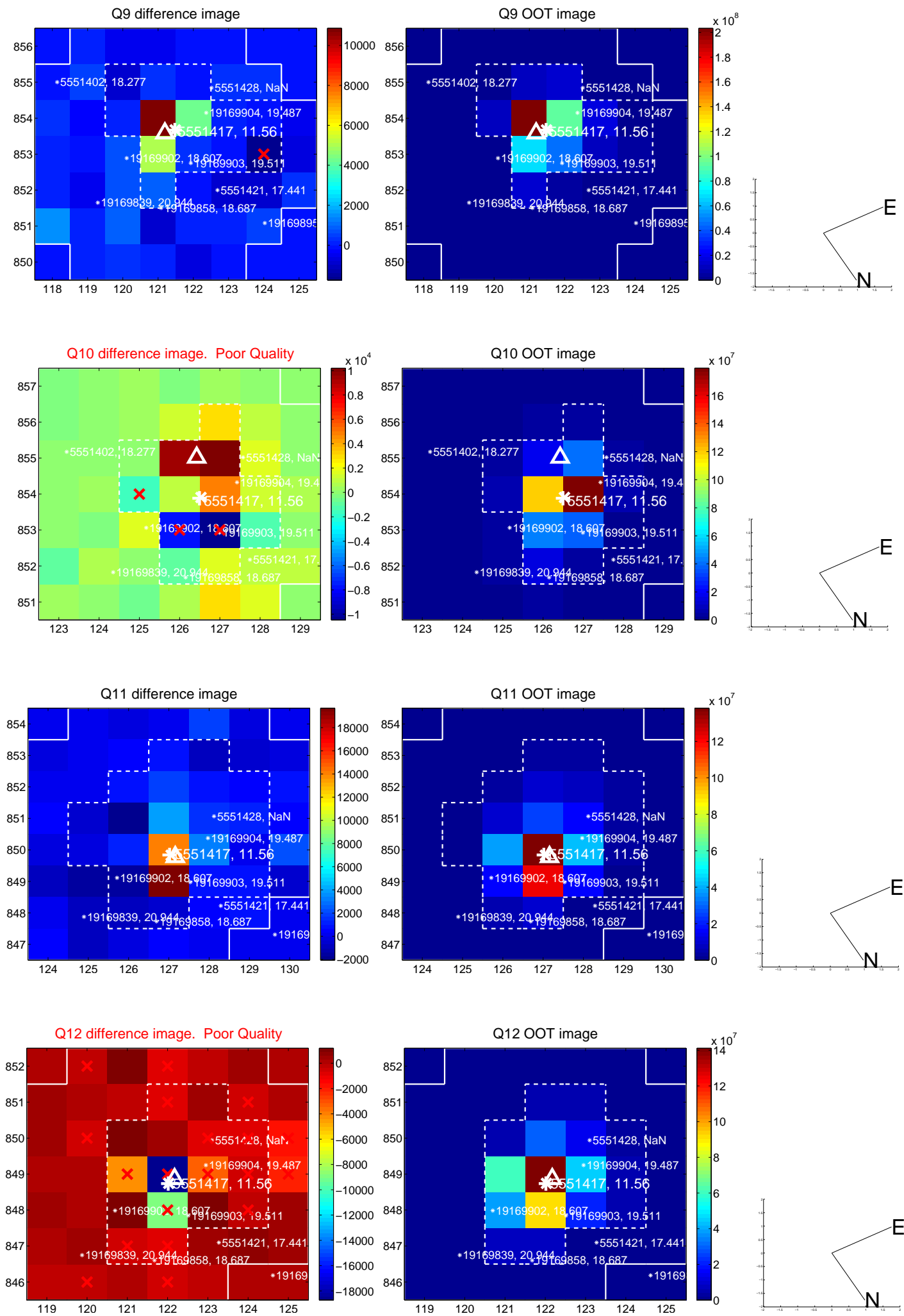
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

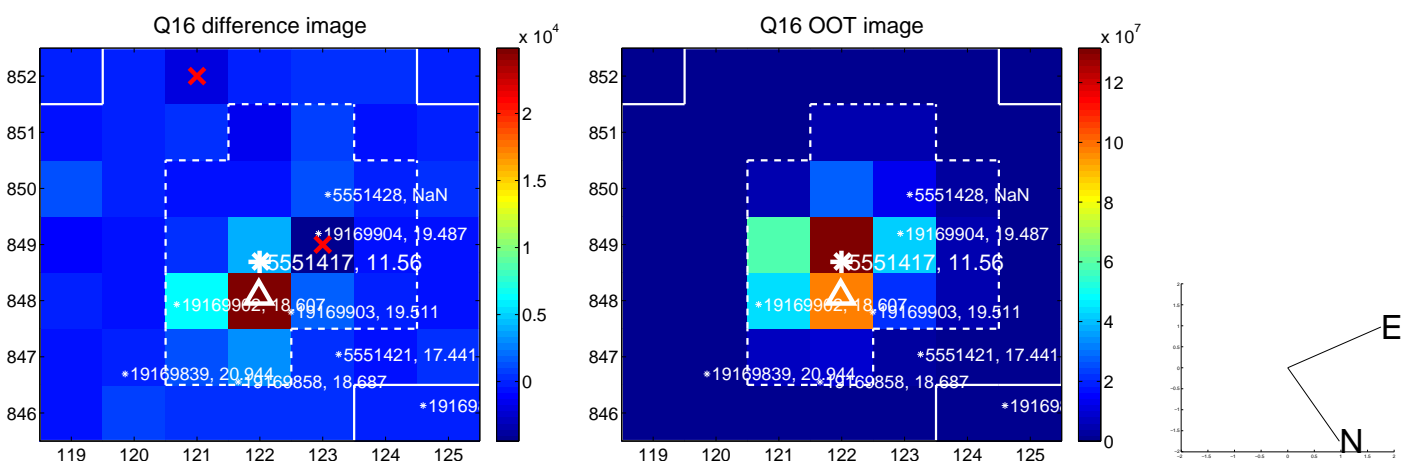
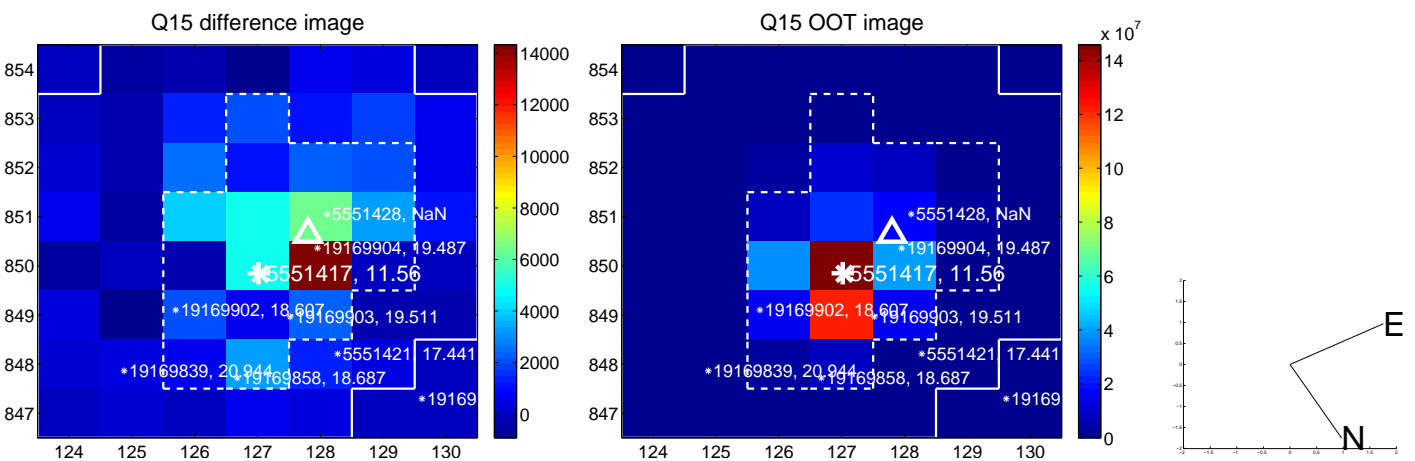
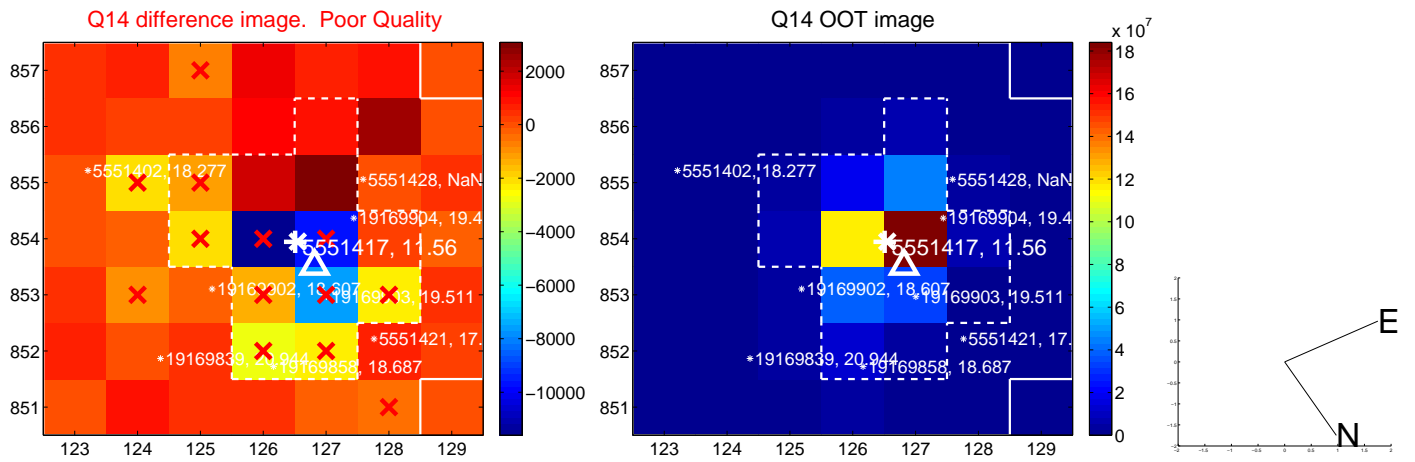
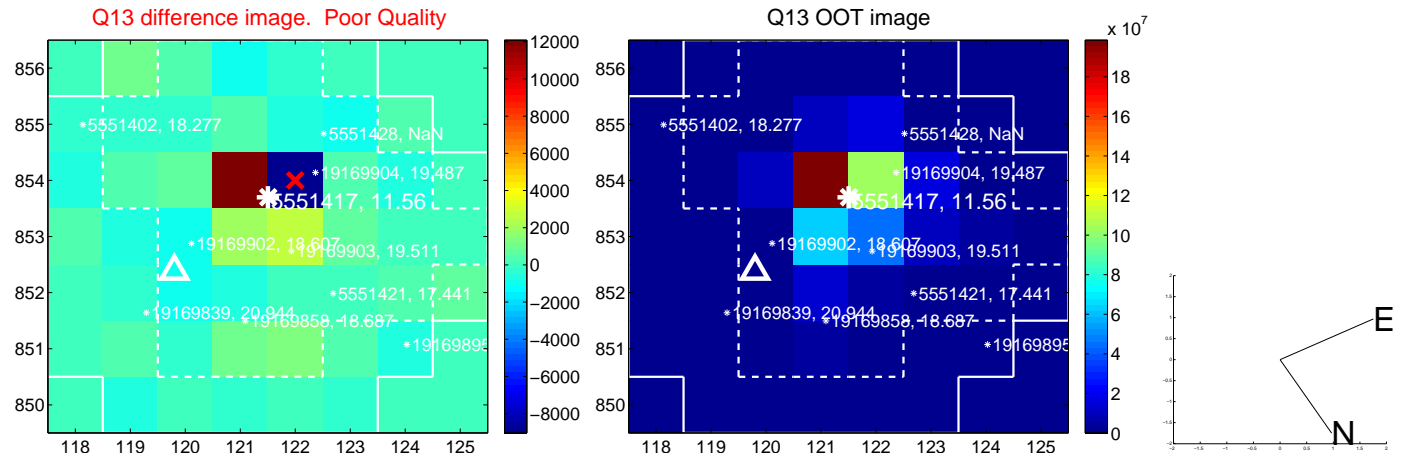


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

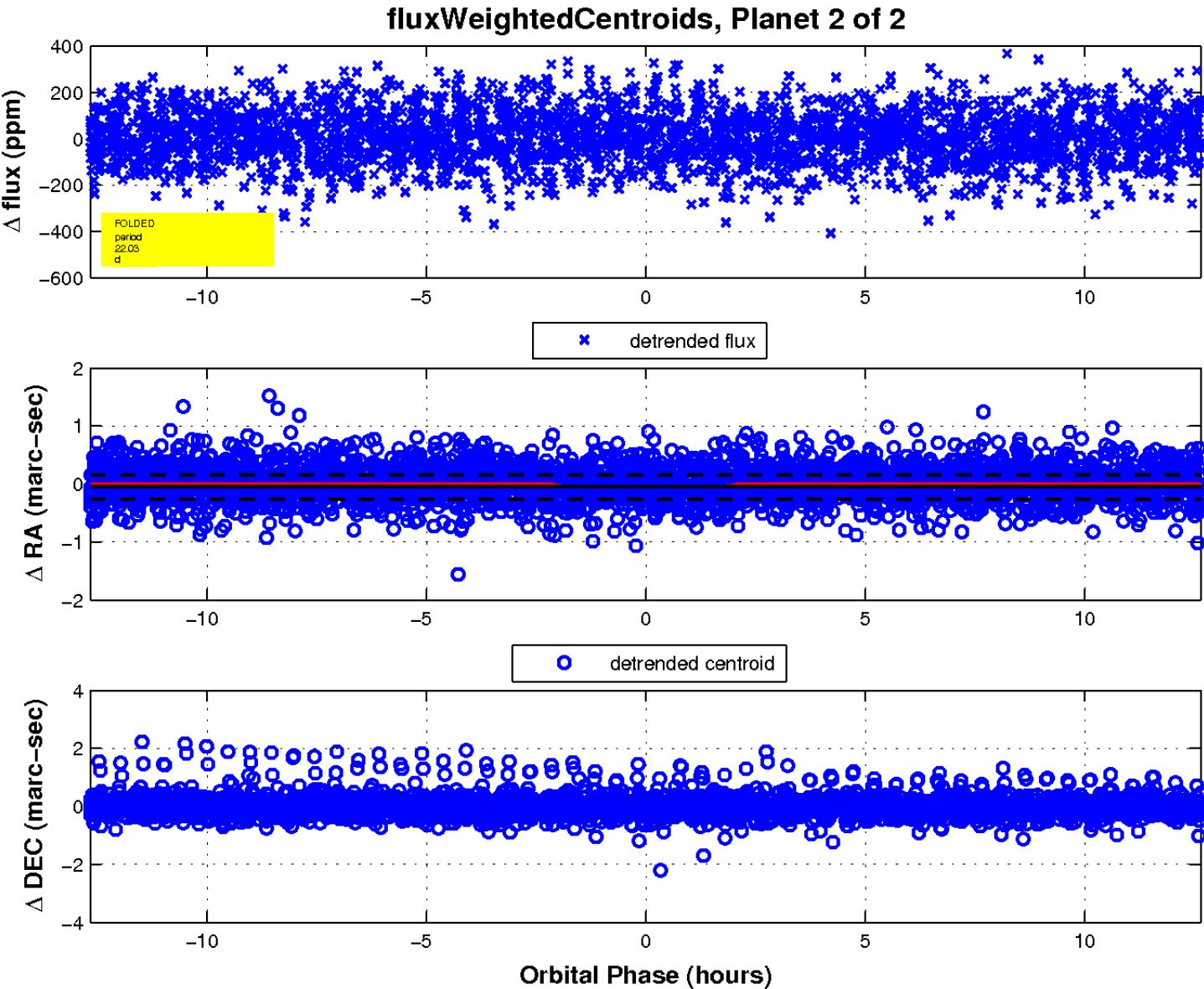
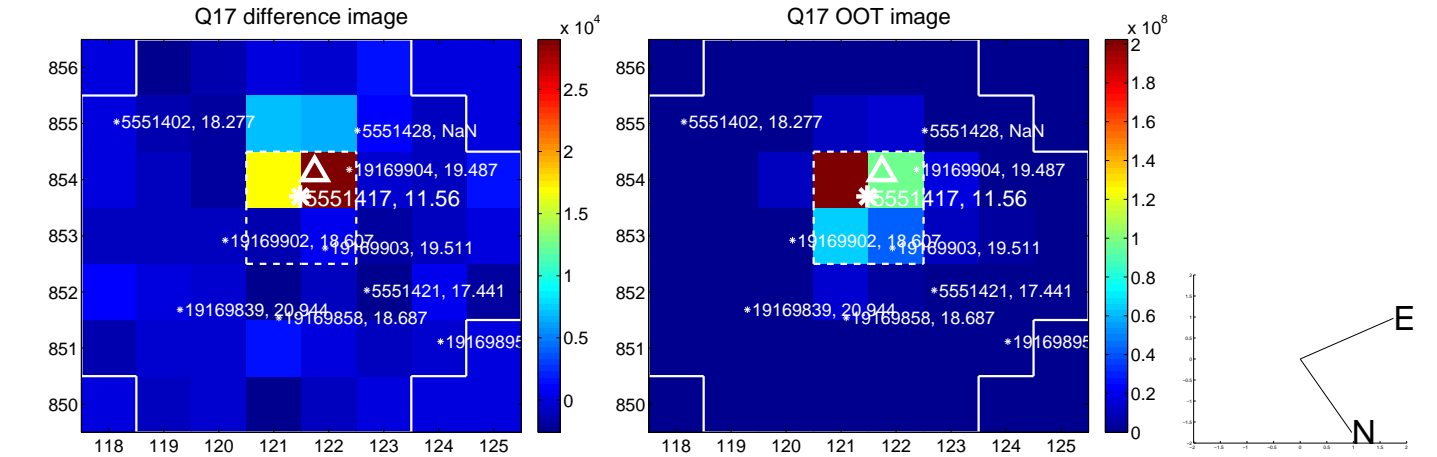




white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



UKIRT Image

