

# KIC 008591404

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008591404-01	OBS	No	2.535737	131.784225	61.6	5.355	8.2	6.5	1.27	6629	1.16	1813.96
008591404-02	OBS	No	2.531272	133.141940	25.2	0.528	11.7	1.3	1.27	6629	1.10	1818.22
008591404-03	OBS	No	2.536278	133.853880	89.5	30.435	10.4	12.7	1.27	6629	1.38	1813.44

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008591404-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_SKYE_ZUMA_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
008591404-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
008591404-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA—LPP_DV—LPP_ALT—SAME_NTL_PERIOD—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.

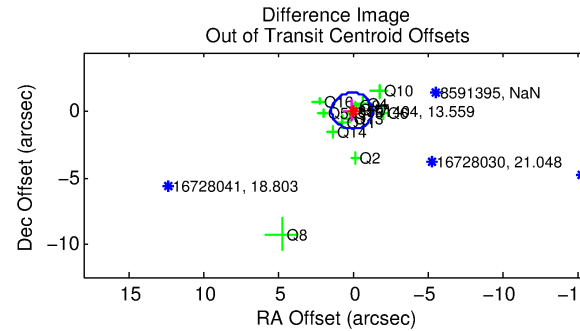
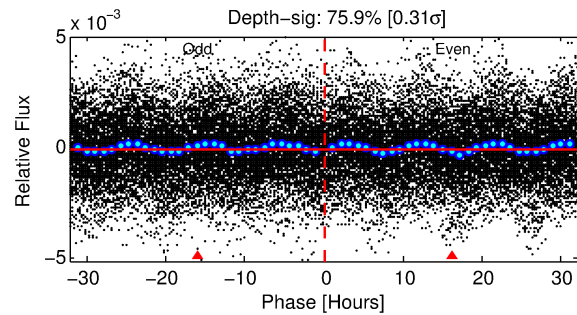
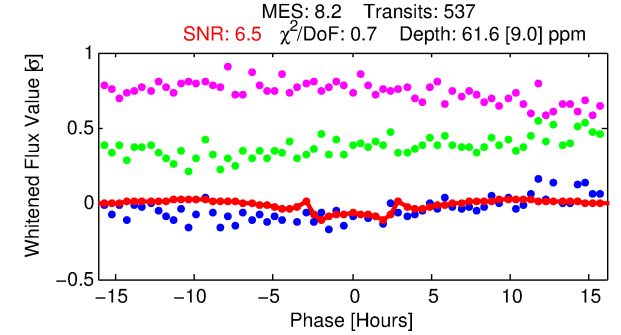
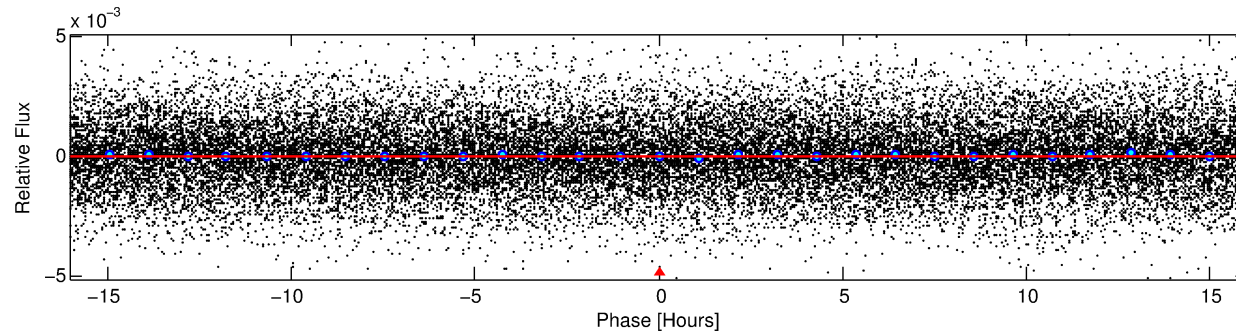
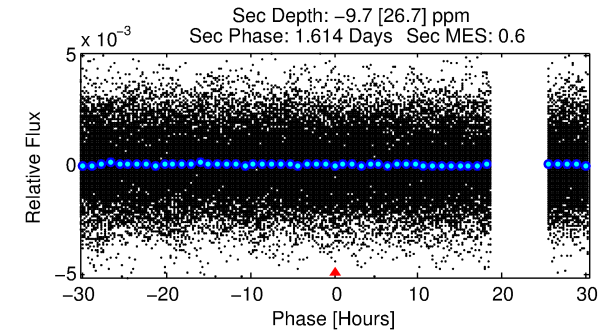
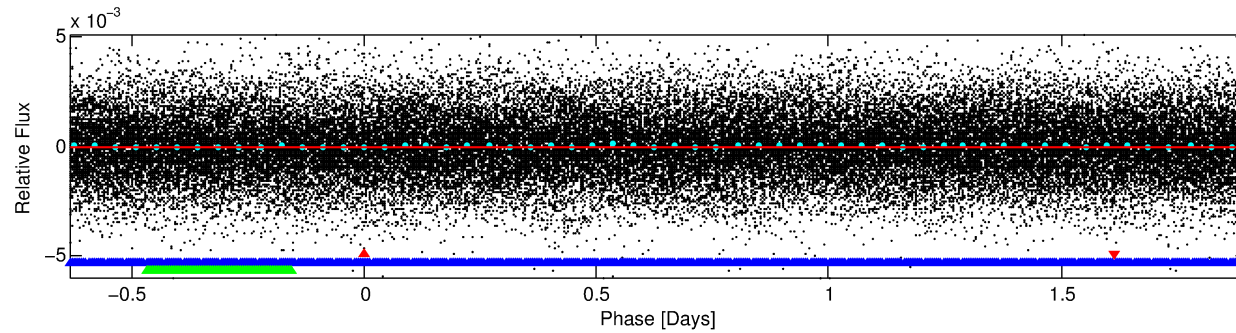
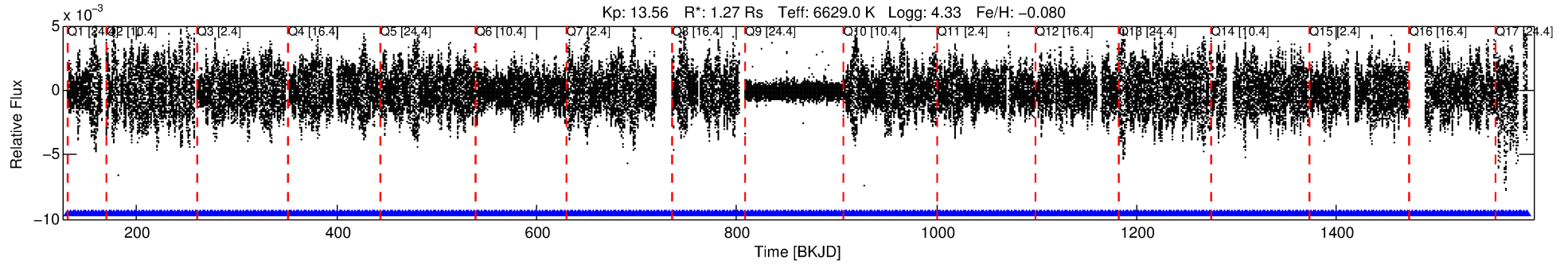
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 008591404-01

No Significant Match Found

# DV One-Page Summary

KIC: 8591404 Candidate: 1 of 3 Period: 2.536 d



## DV Fit Results:

Period = 2.53574 [0.00002] d  
Epoch = 131.7842 [0.0041] BKJD  
Rp/R\* = 0.0084 [0.0020]  
a/R\* = 1.92 [1.87]  
b = 0.90 [0.30]  
Seff = 1813.96 [762.41]  
Teff = 1664 [175] K  
Rp = 1.16 [0.48] Re  
a = 0.0392 [0.0109] AU  
Ag = N/A  
Teffp = N/A

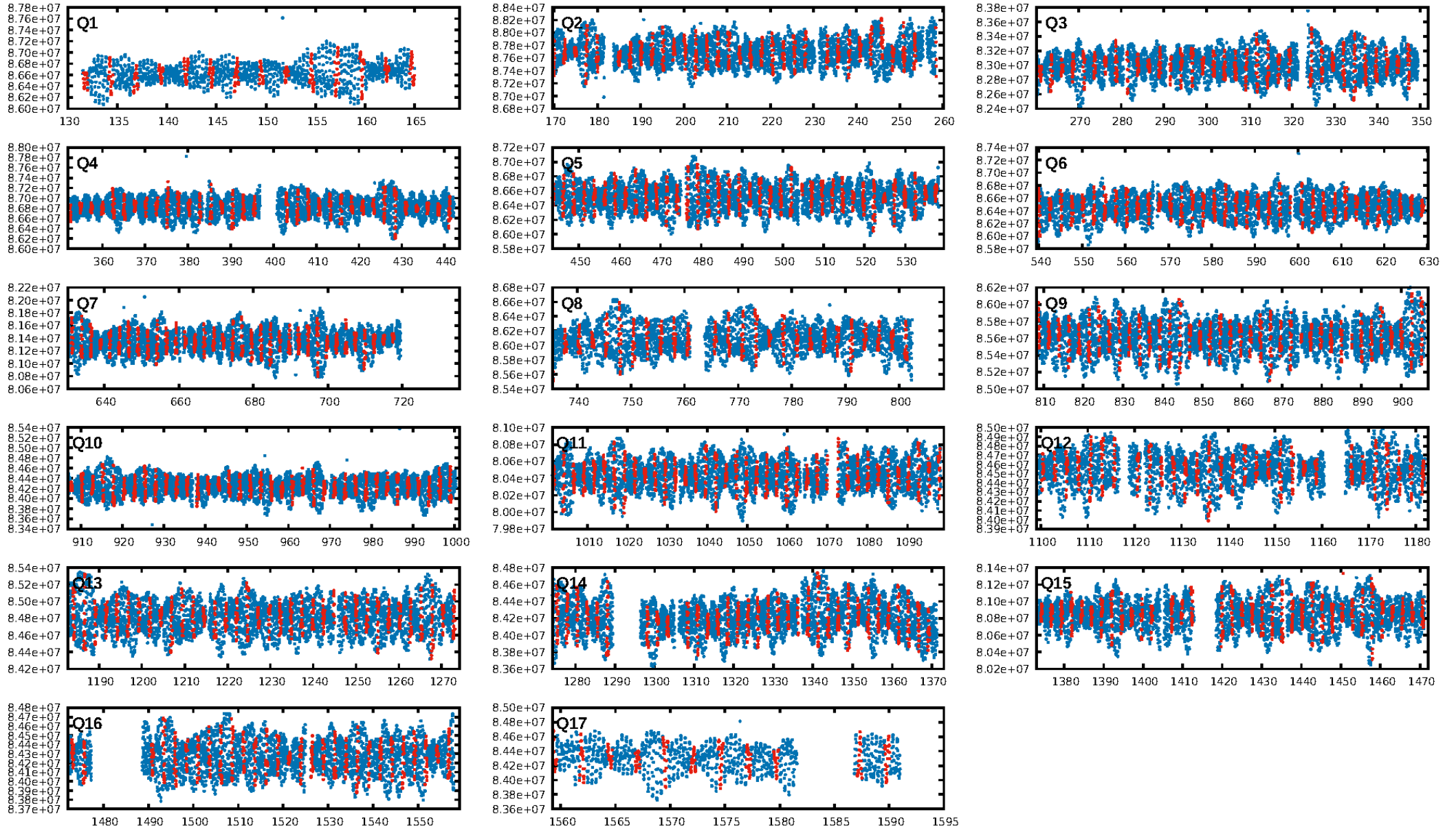
## DV Diagnostic Results:

ShortPeriod-sig: 1.6% [0.02σ]  
LongPeriod-sig: 0.0% [0.00σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [512/512]  
GhostDiagnostic-chr: -1.552  
Centroid-sig: 62.1%  
Centroid-so: 0.182 arcsec [0.21σ]  
OotOffset-rm: 0.088 arcsec [0.19σ]  
OotOffset-st: 4/2/3/4 [13]  
KicOffset-rm: 0.102 arcsec [0.12σ]  
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: 30-Jan-2016 09:34:06 Z

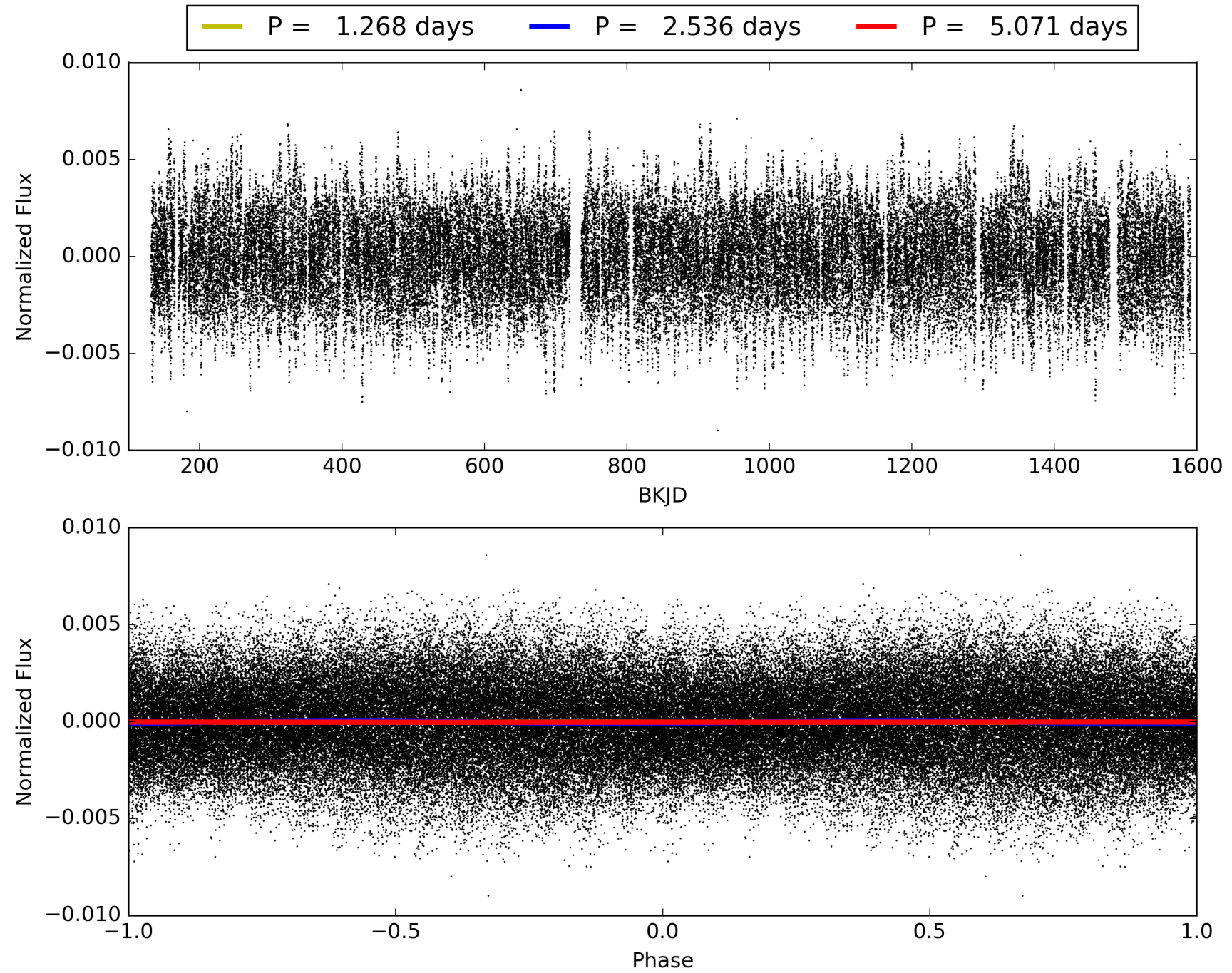
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 00591404-01, PDC Light Curves





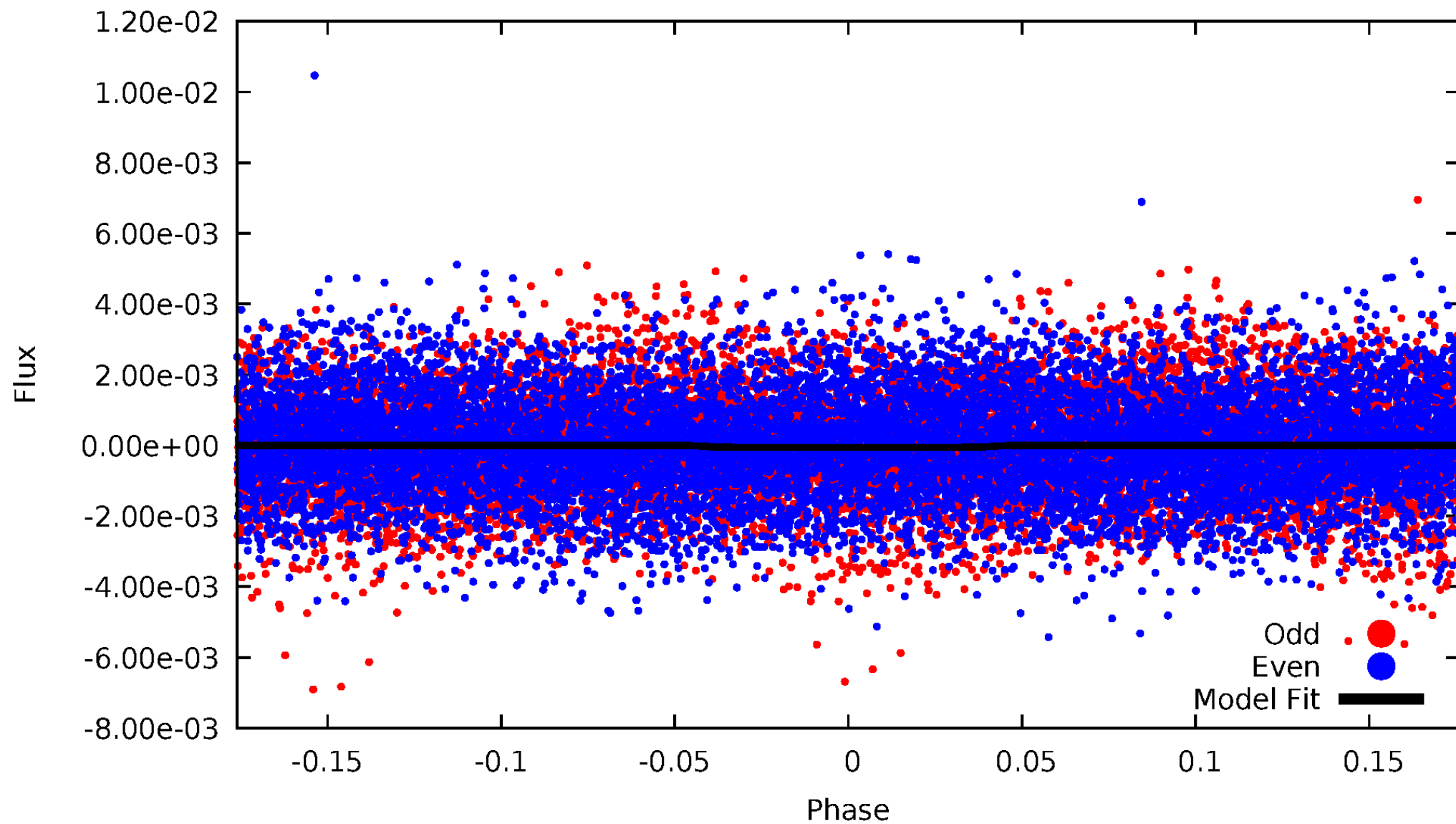
TCE 008591404-01





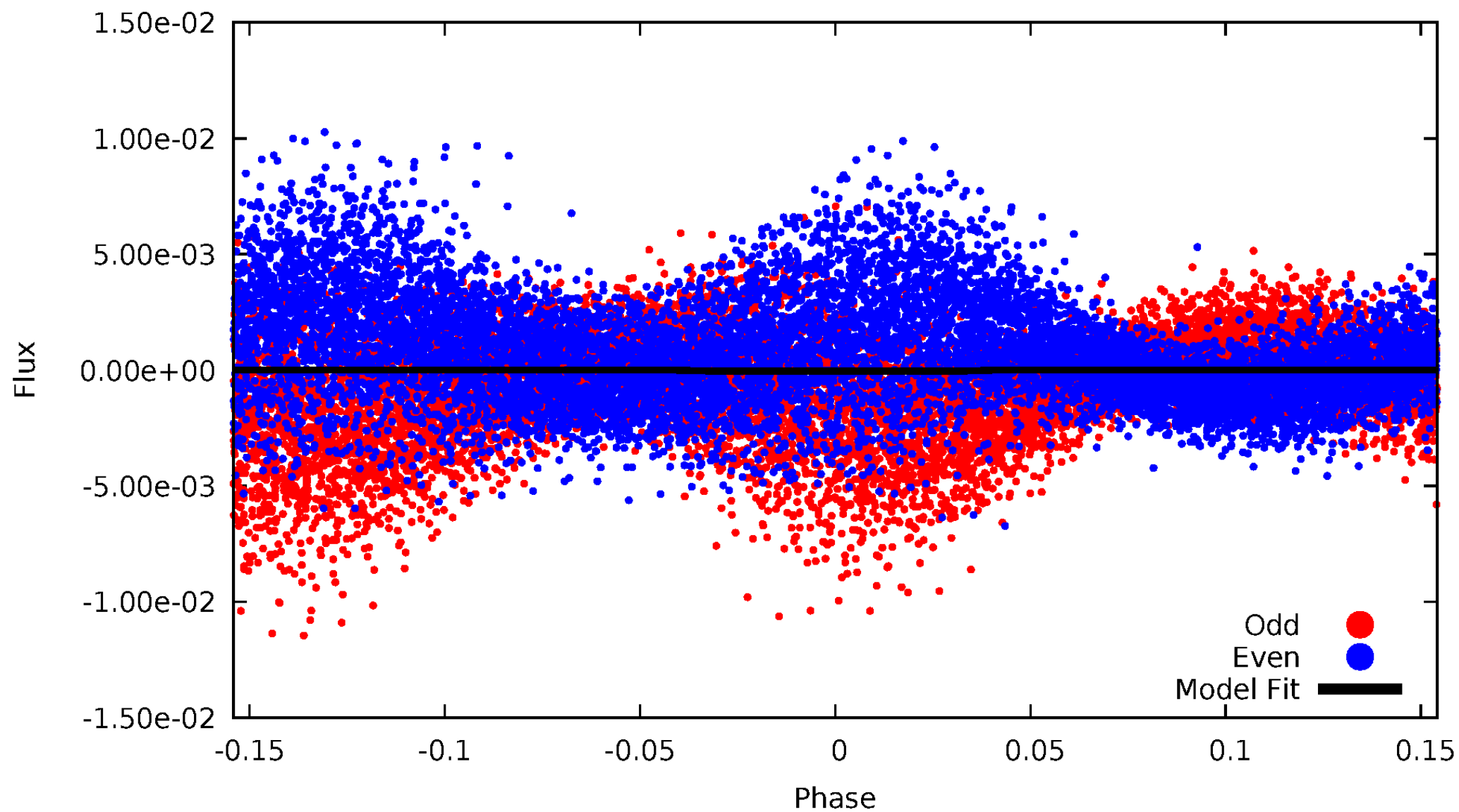
# DV Odd/Even

TCE 008591404-01



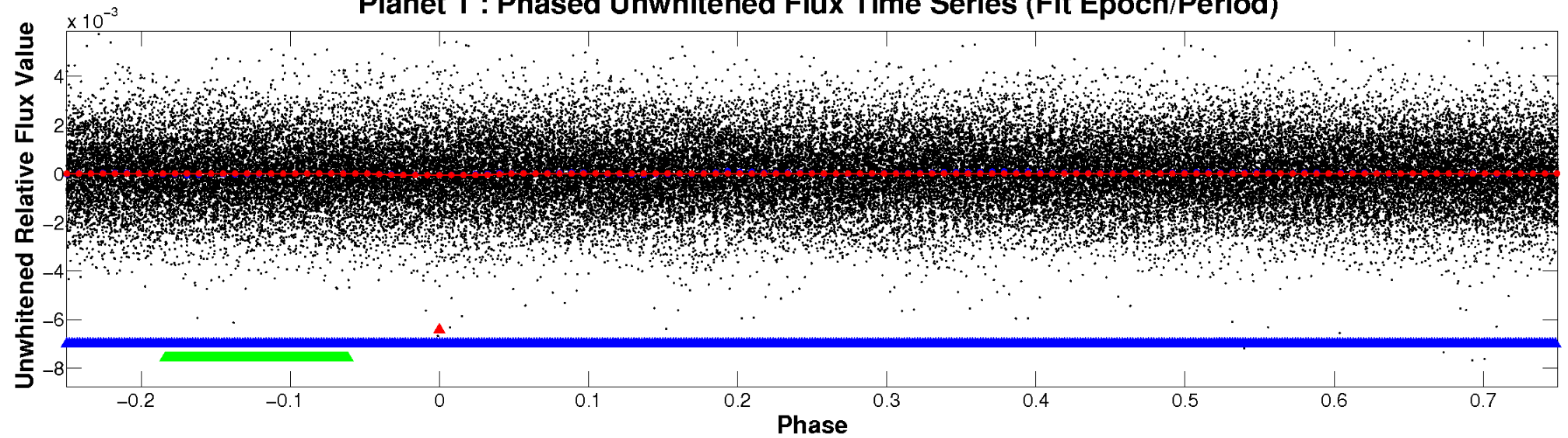
# ALT Odd/Even

TCE 008591404-01

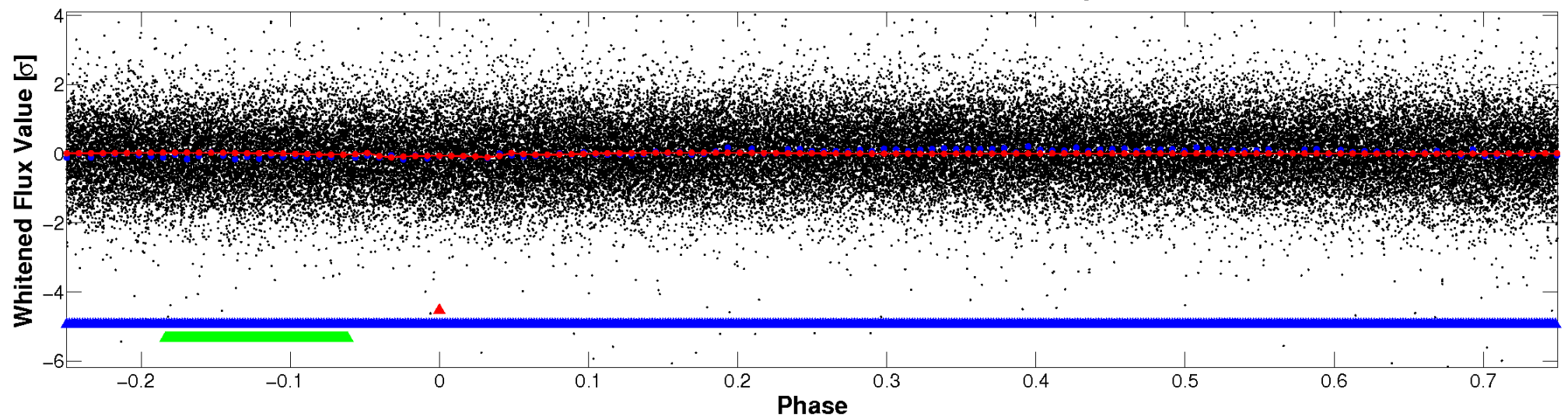


# Non-Whitened Vs. Whitened Light Curve

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



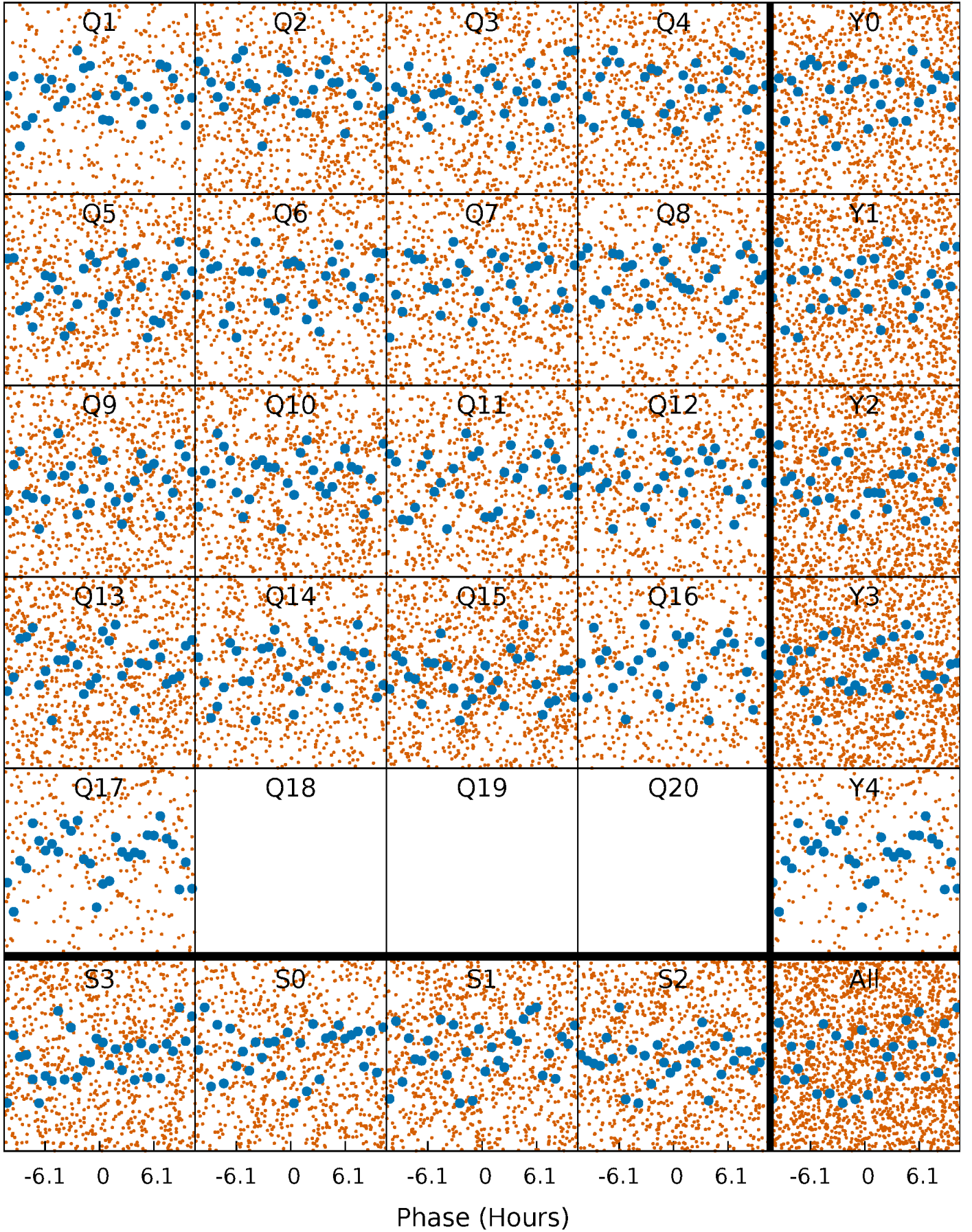
**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**





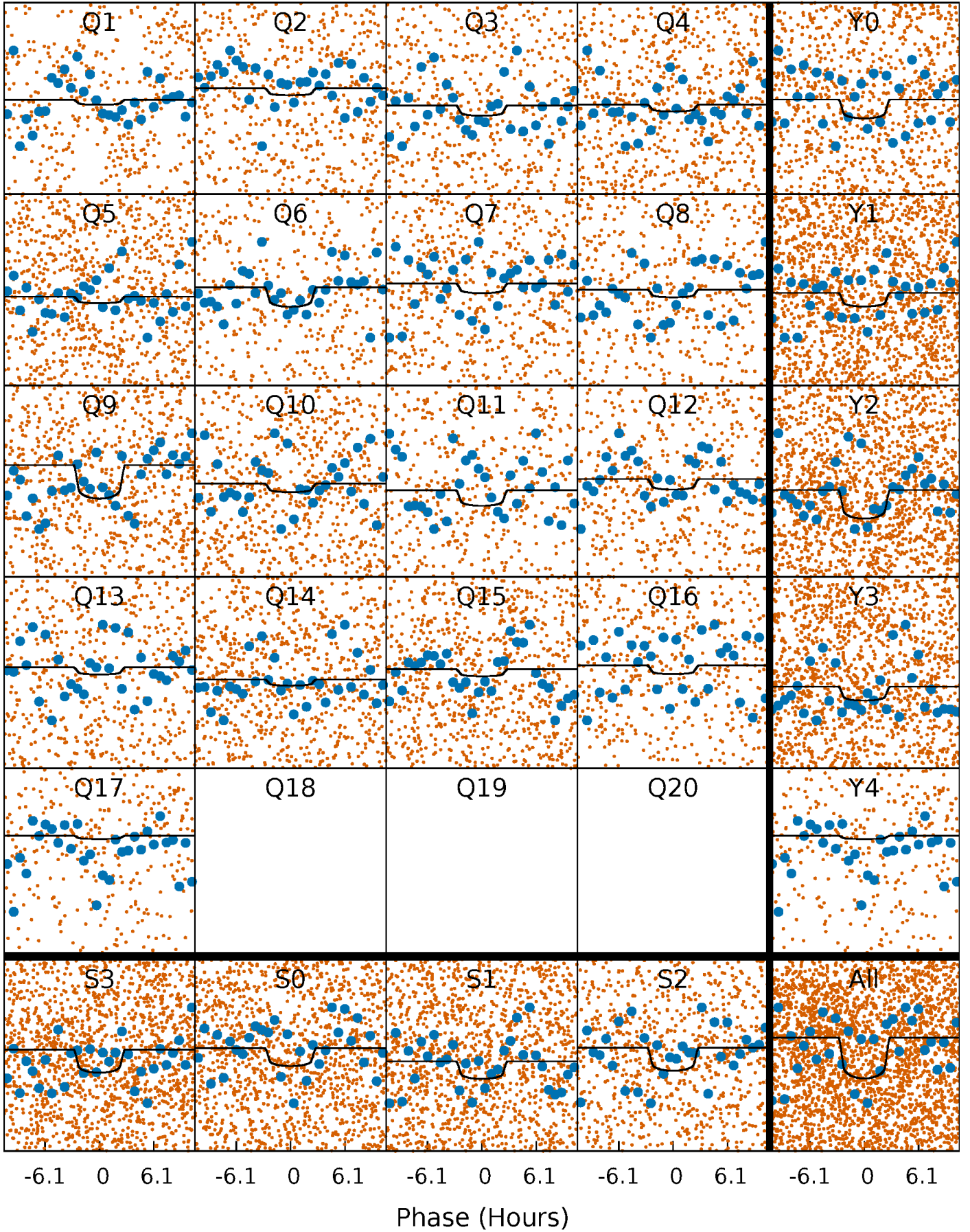
# PDC Quarter-Phased Transit Curves

TCE 008591404-01   P= 2.535737 Days    $T_0=131.784225$  (BKJD)



# DV Quarter-Phased Transit Curves

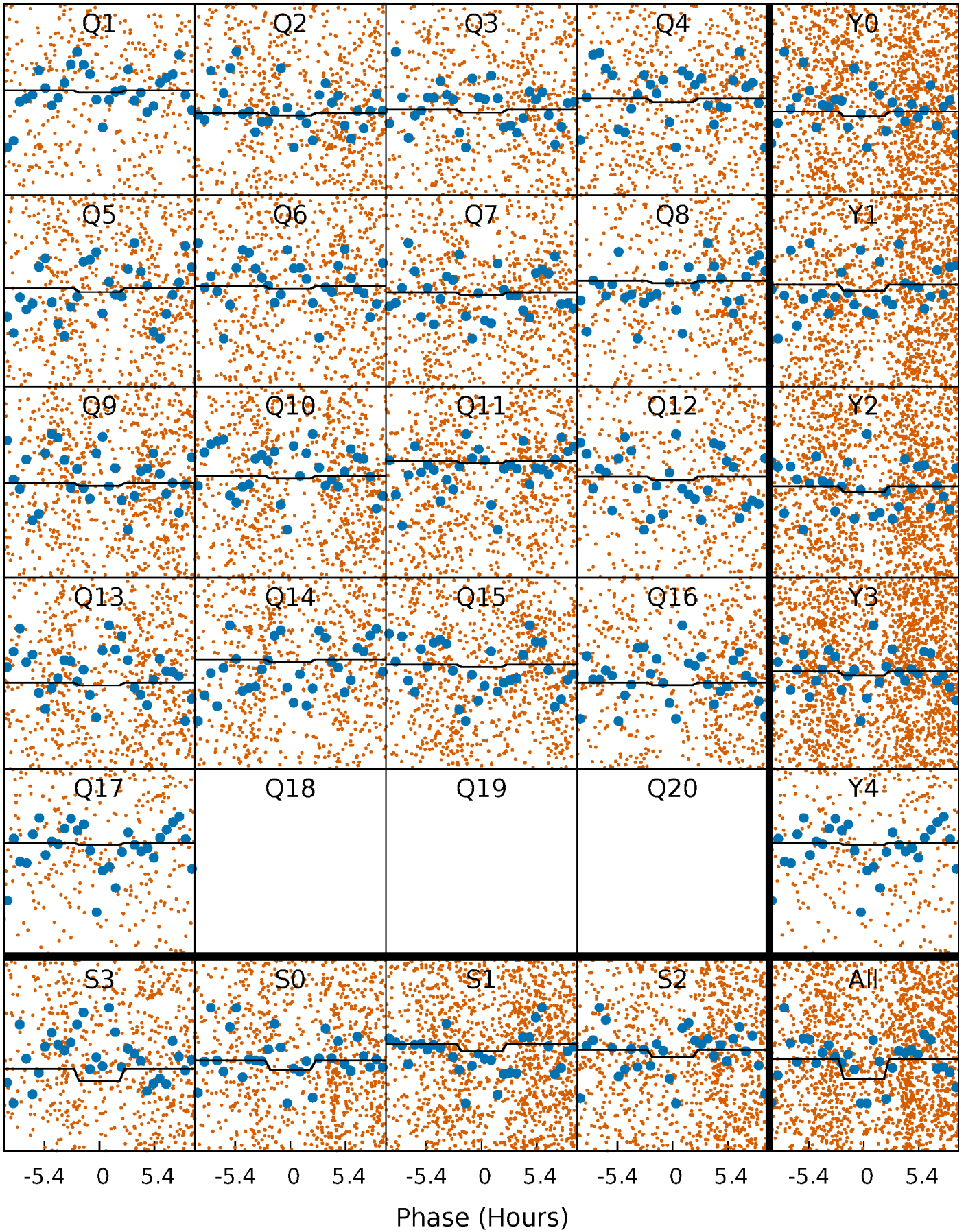
TCE 008591404-01   P= 2.535737 Days    $T_0=131.784225$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

TCE 008591404-01 P= 2.535678 Days  $T_0=131.794168$  (BKJD)

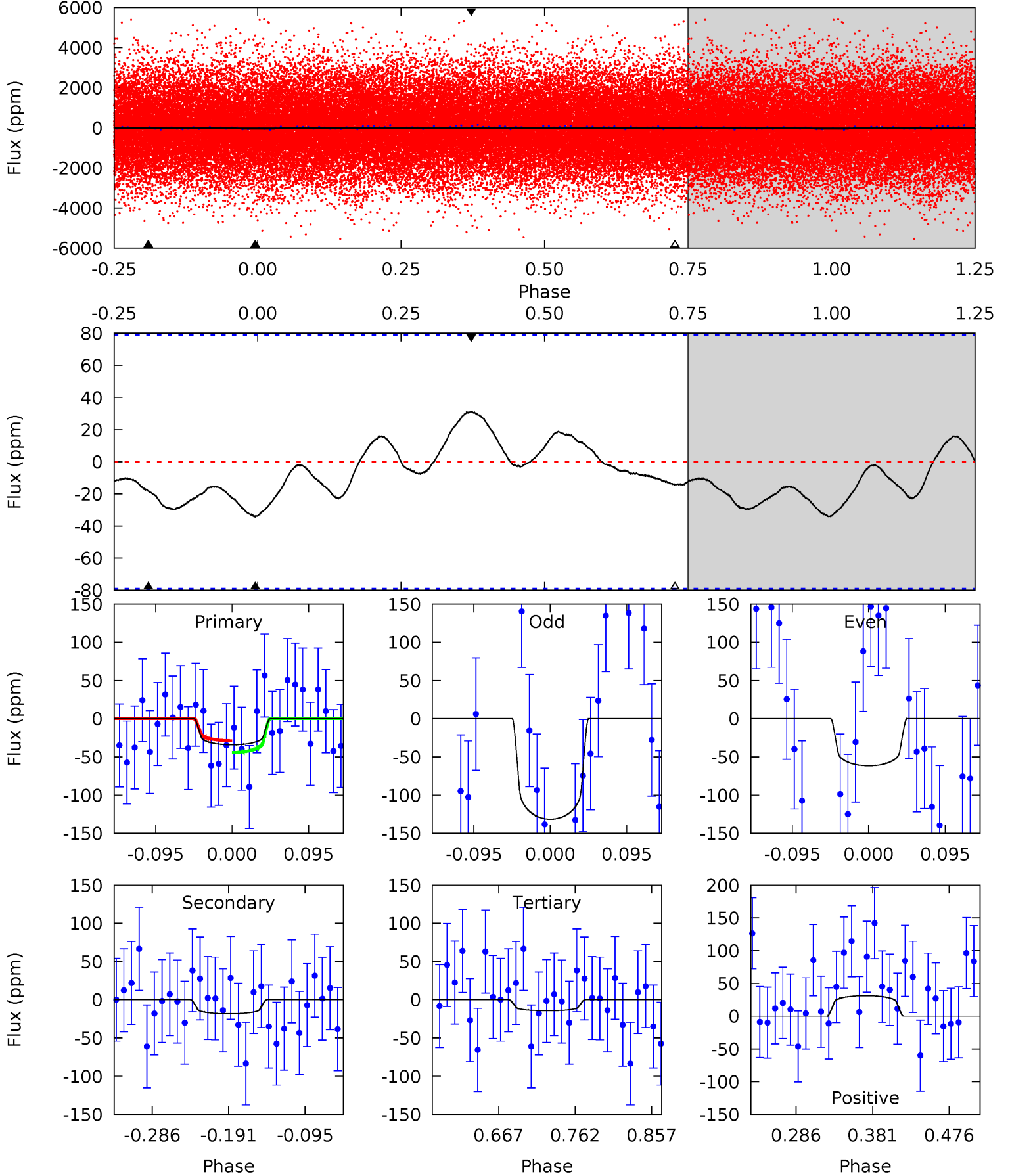




# DV Model-Shift Uniqueness Test

008591404-01, P = 2.535737 Days, E = 129.248488 Days

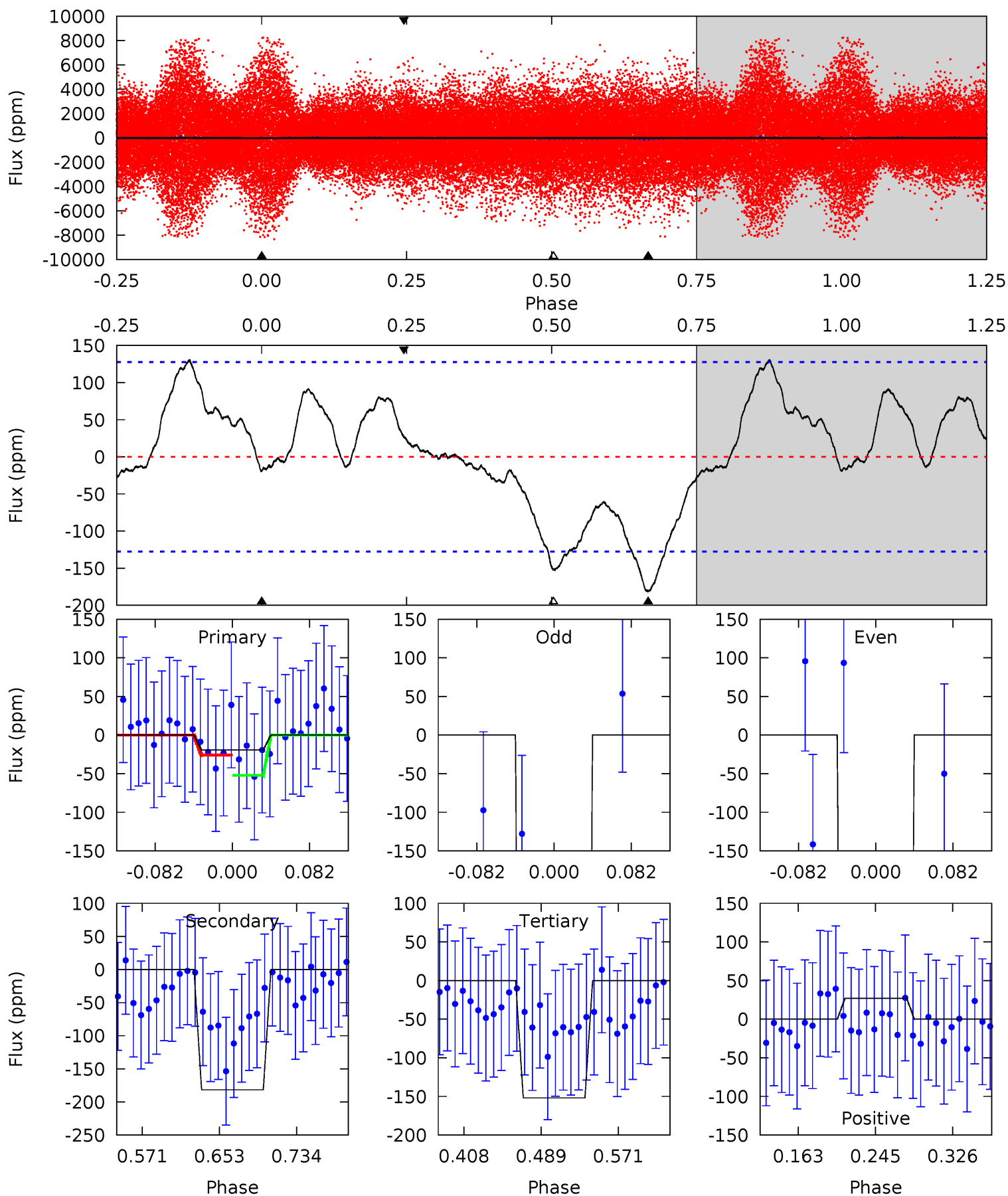
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
1.97	1.05	0.83	1.81	4.57	1.67	0.78	1.14	0.17	0.22	-0.75	2.02	2.66	0.48	0.45



# Alt Model-Shift Uniqueness Test

008591404-01, P = 2.535678 Days, E = 129.258490 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0.70	6.55	5.48	0.98	4.61	1.74	2.44	-4.78	-0.28	1.07	5.57	1.62	1.22	0.42	0.50



### Stellar Parameters For KIC 008591404

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6629^{+161}_{-241}$	$4.327^{+0.070}_{-0.210}$	$-0.080^{+0.250}_{-0.300}$	$1.268^{+0.432}_{-0.154}$	$1.251^{+0.187}_{-0.187}$	$0.864^{+0.322}_{-0.451}$
	+2%/-4%	+2%/-5%	+312%/-375%	+34%/-12%	+15%/-15%	+37%/-52%
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 008591404-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-18 \pm 17$	$1.20^{+0.35}_{-0.28}$	$2357^{+183}_{-129}$	$4719^{+1146}_{-1954}$	$9.807^{+14.923}_{-9.189}$
Alt.	$-182 \pm 28$	$0.93^{+0.34}_{-0.30}$	$2361^{+176}_{-121}$	$10496^{+3606}_{-1926}$	$171^{+201}_{-79}$

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



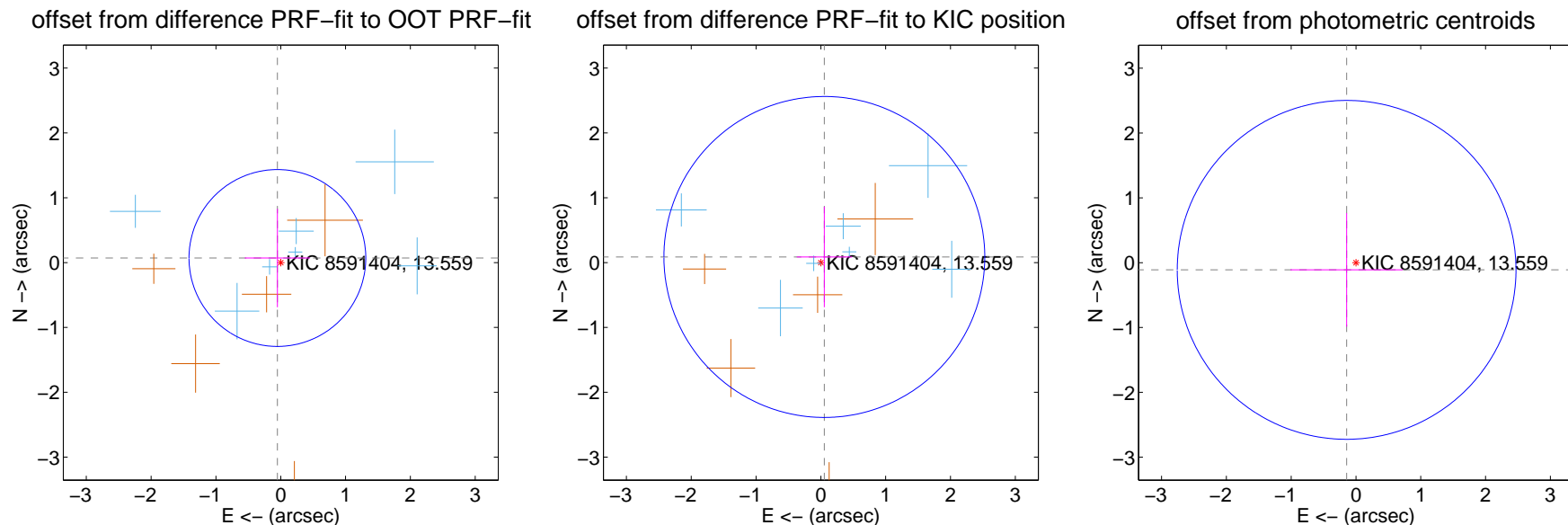
## DV Centroid Data

Supplemental centroid analysis for 008591404-01. Kepler magnitude: 13.56. Transit SNR 6.47

There are 7 quarters with good PRF difference image offsets

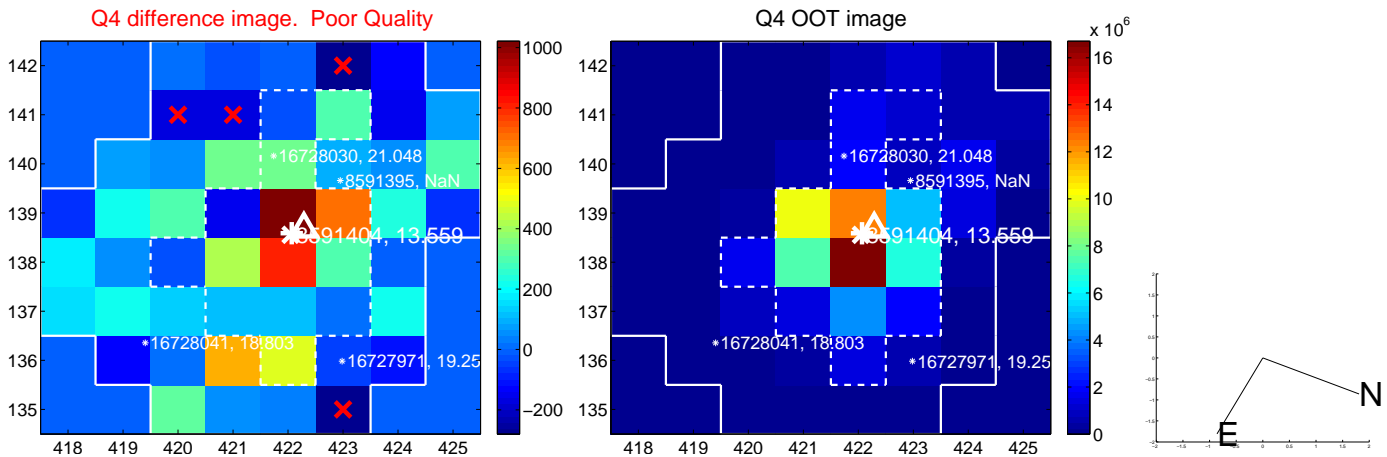
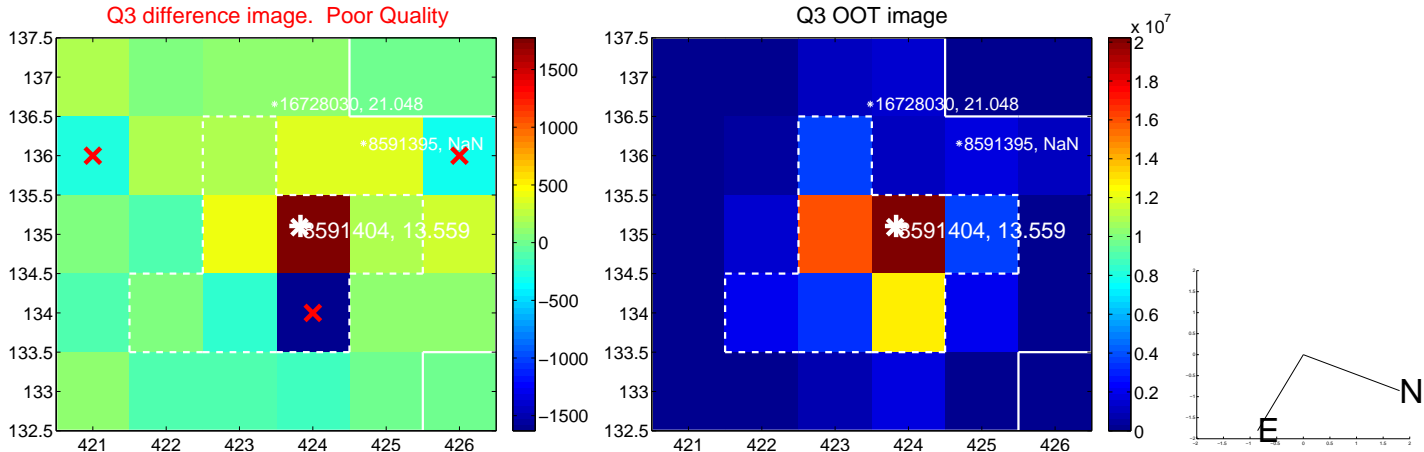
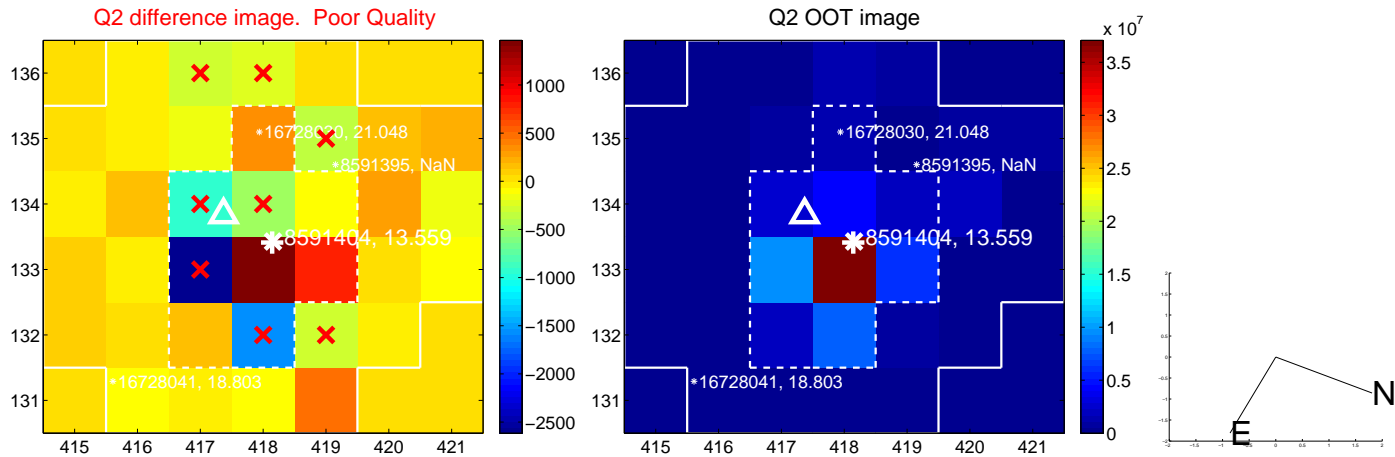
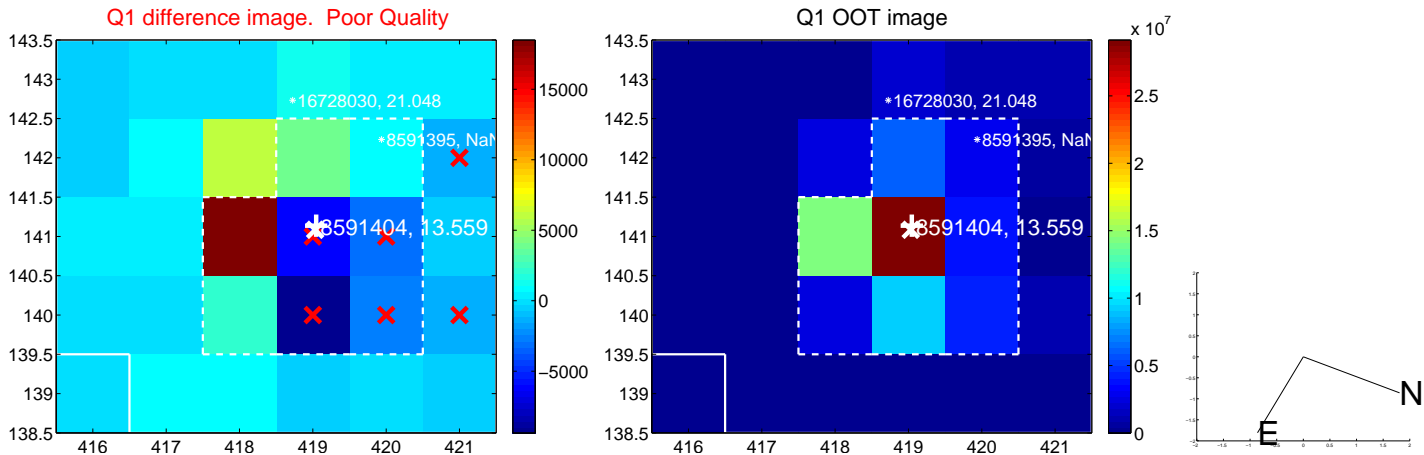
The direct PRF centroid is offset from the target star catalog position by about 0.22 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.088 \pm 0.455$	0.19	$0.052 \pm 0.503$	$0.071 \pm 0.759$
PRF-fit source offset from KIC position	$0.102 \pm 0.825$	0.12	$-0.054 \pm 0.426$	$0.087 \pm 0.775$
photometric centroid source offset	$0.18 \pm 0.87$	0.21	$0.14 \pm 0.87$	$-0.11 \pm 0.88$

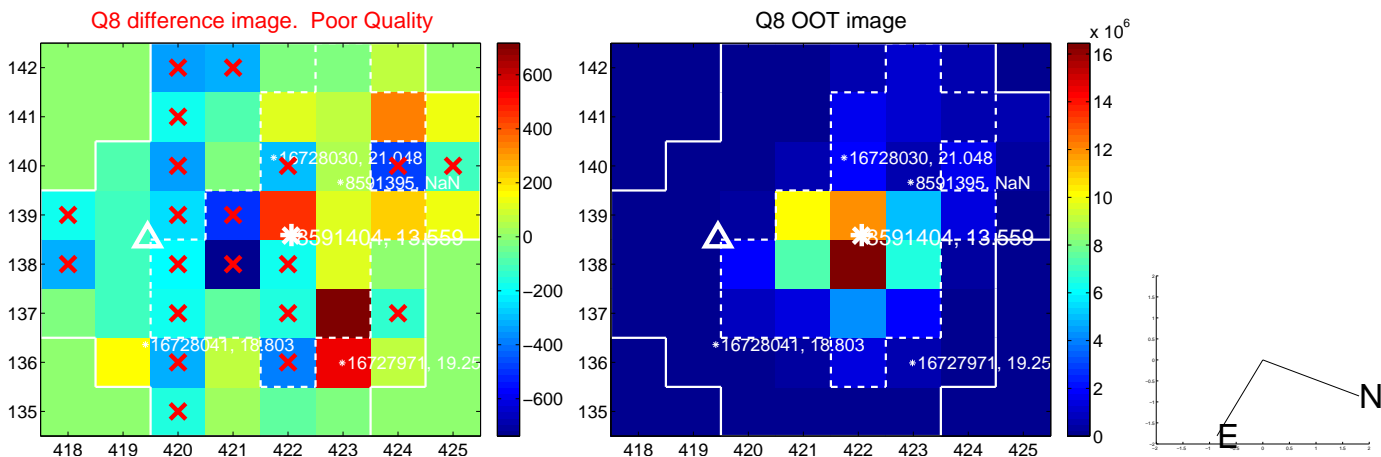
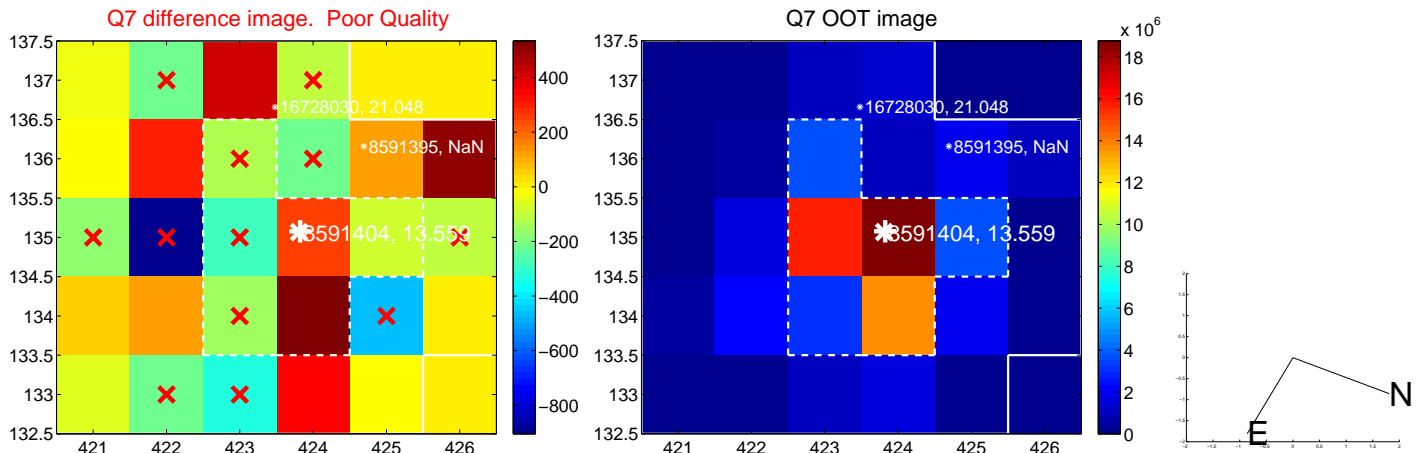
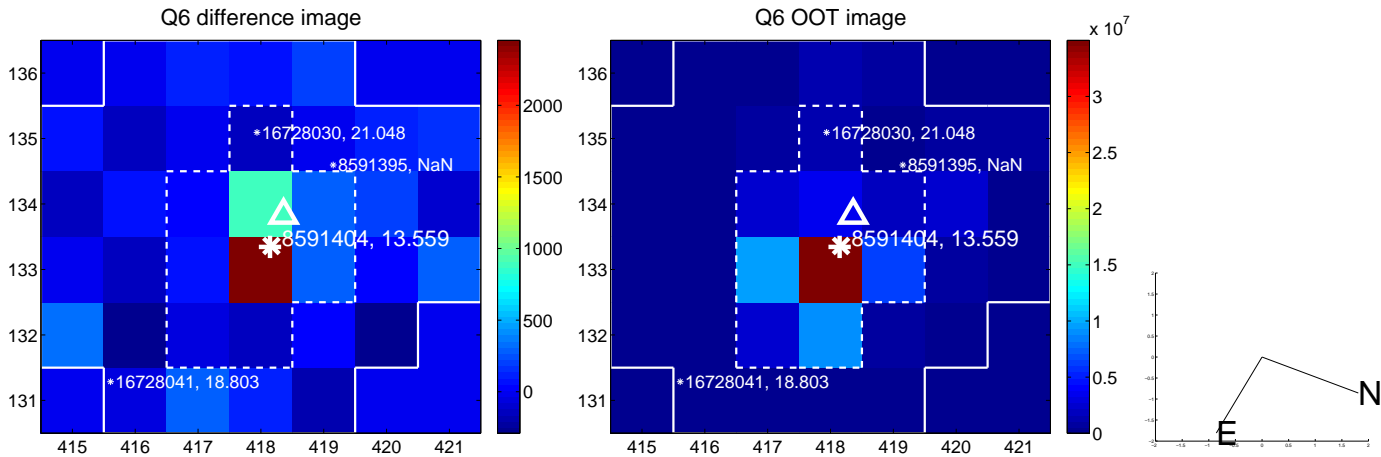
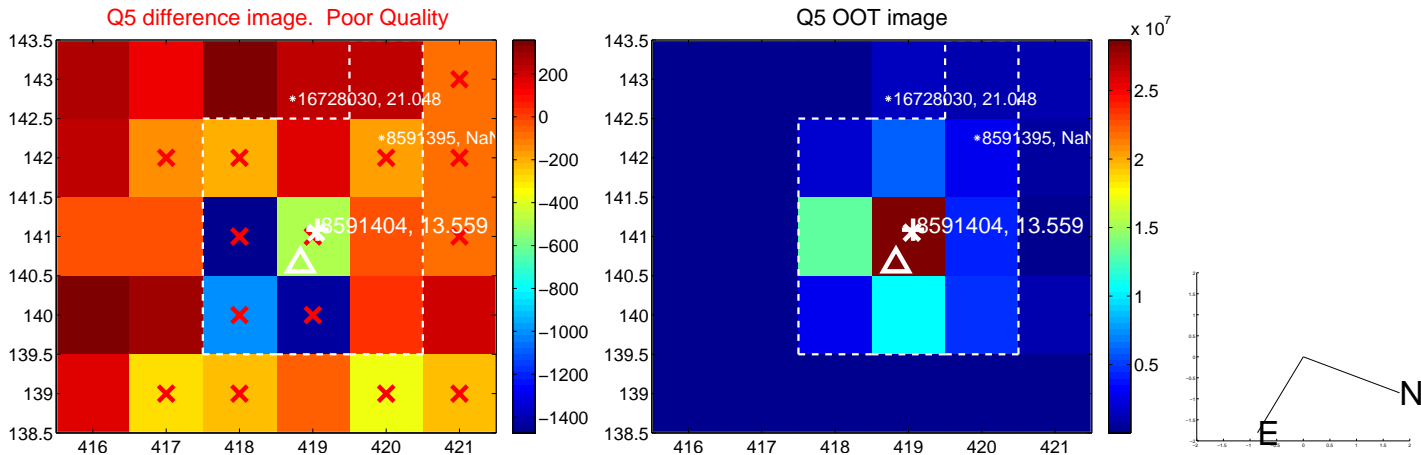


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets**; **Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

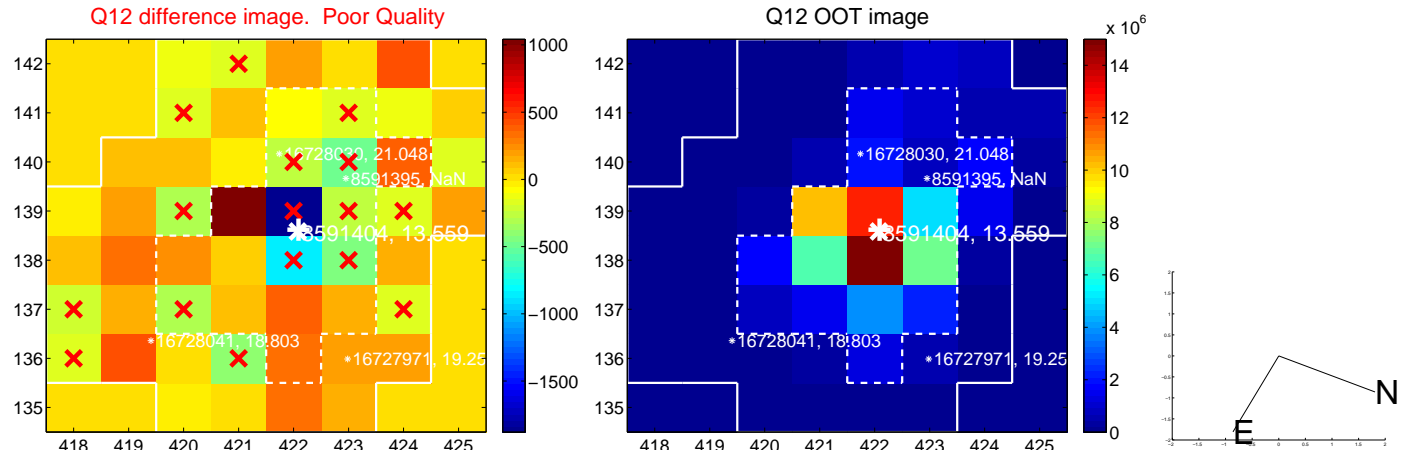
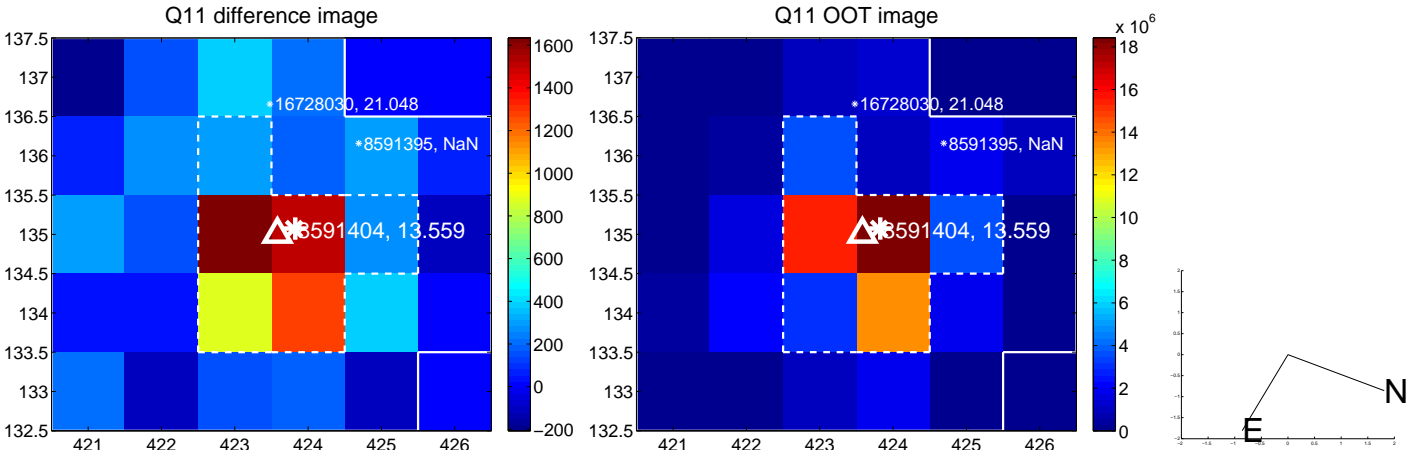
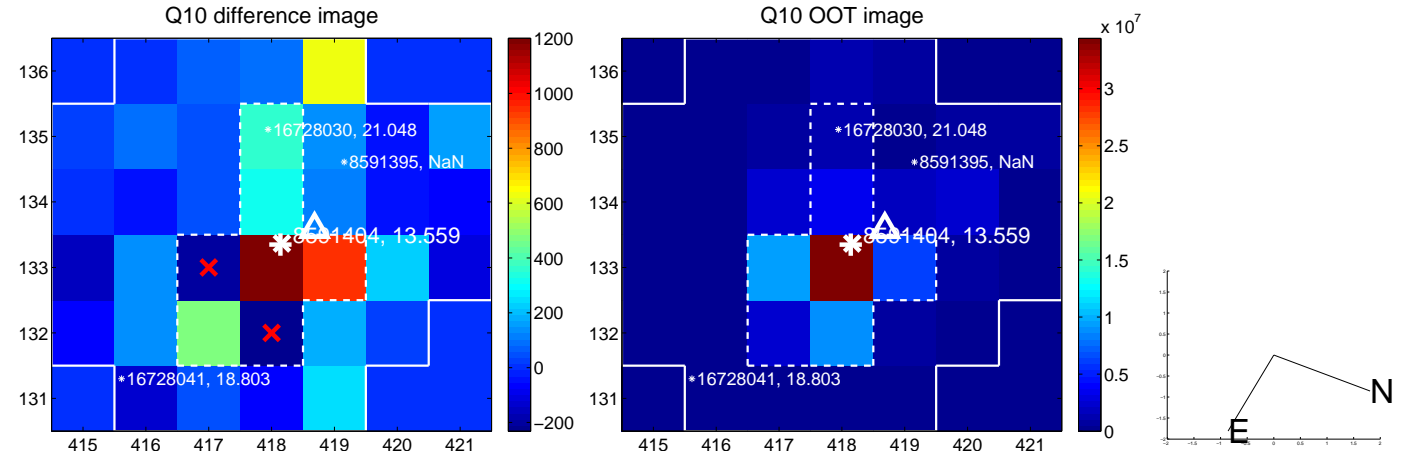
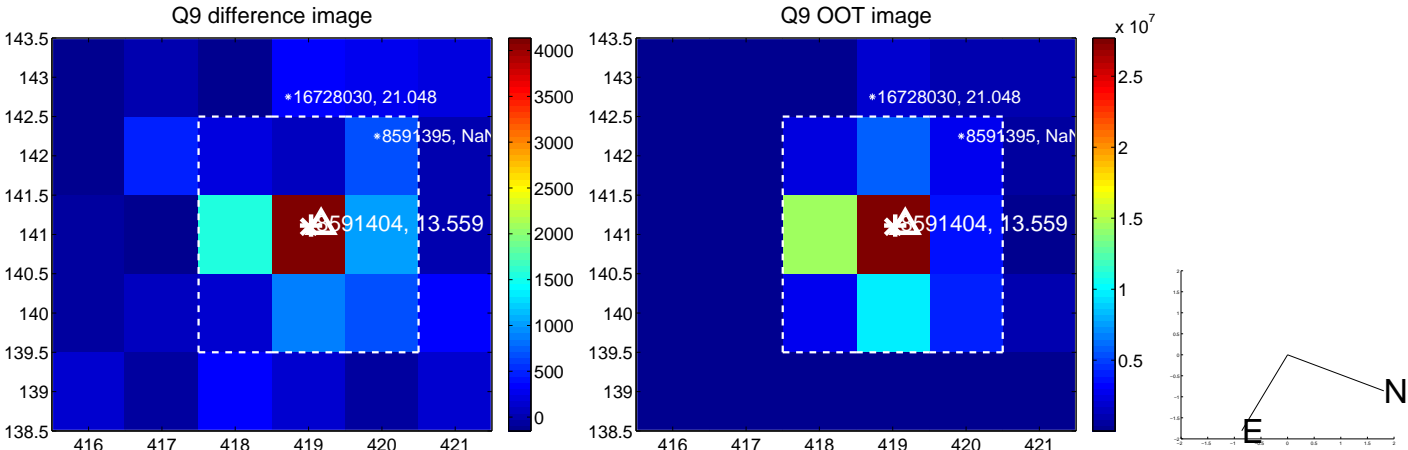


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

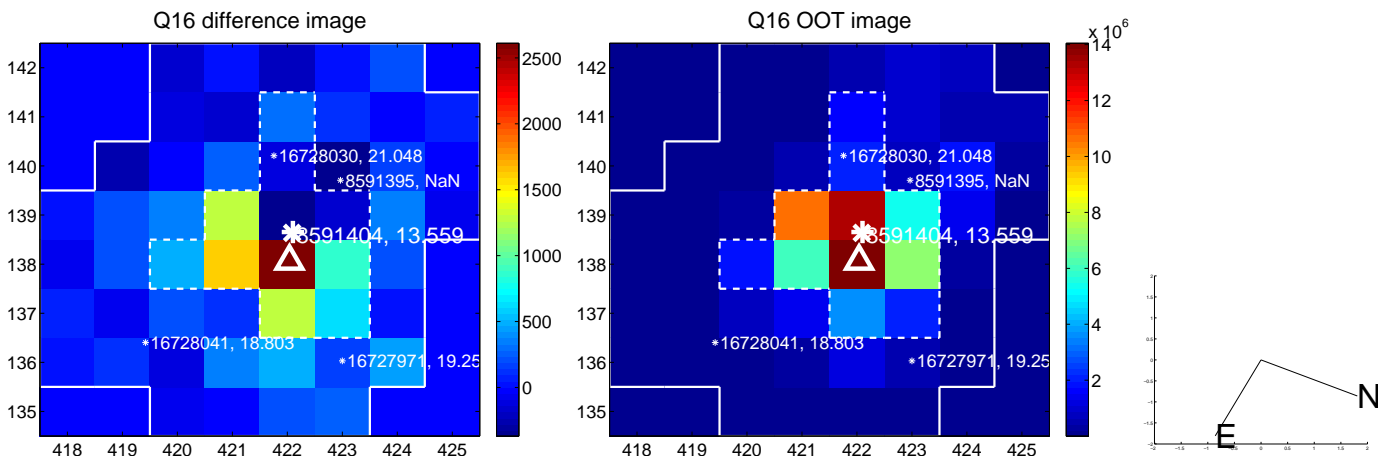
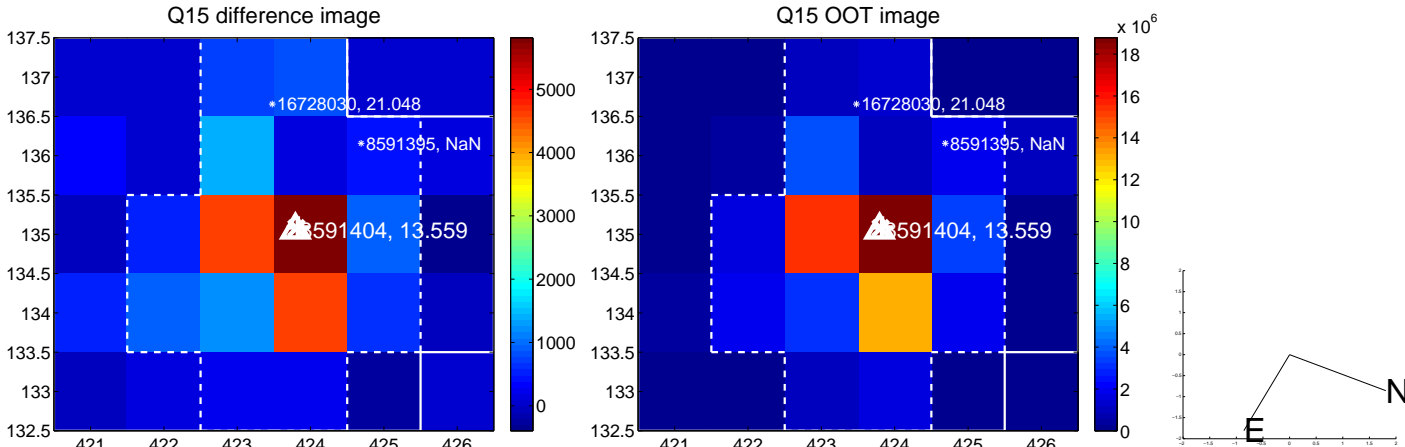
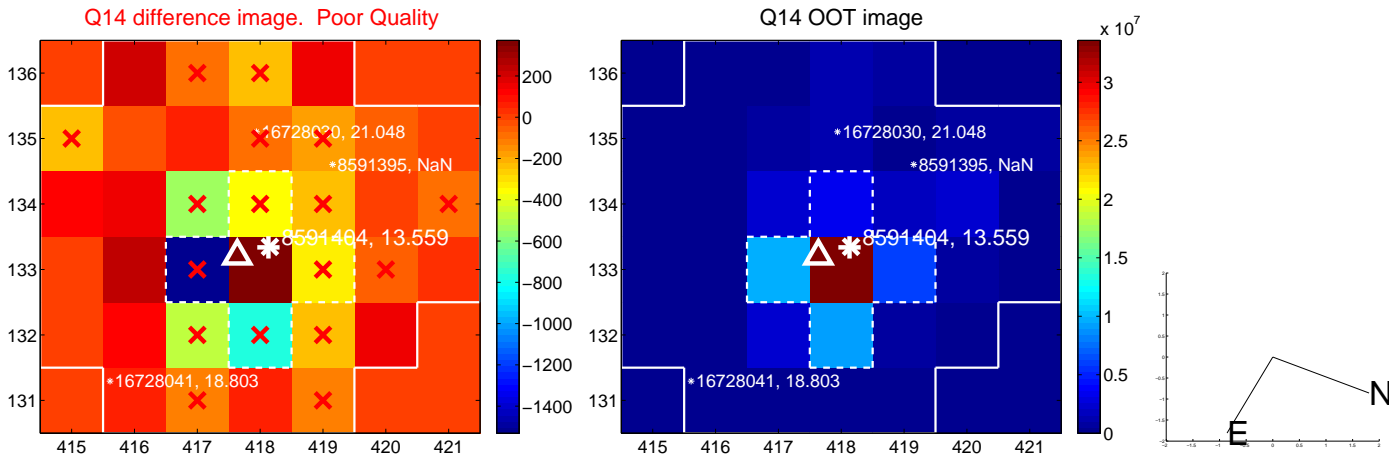
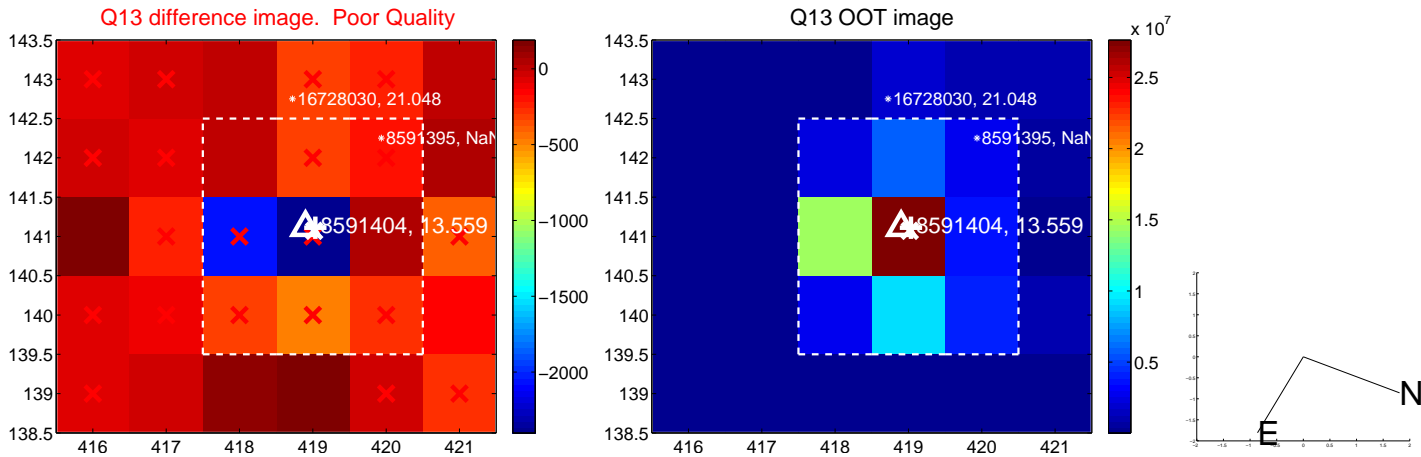




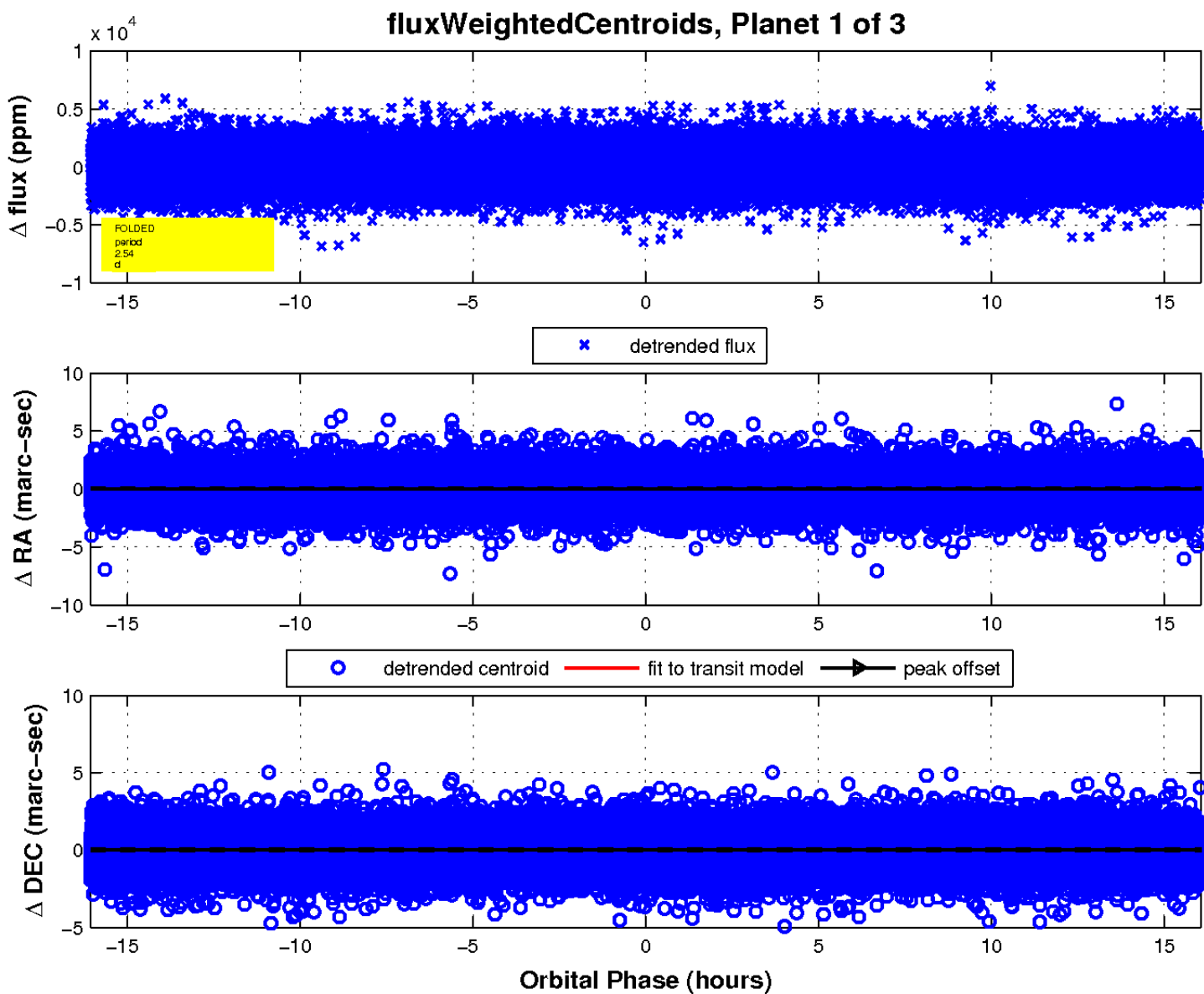
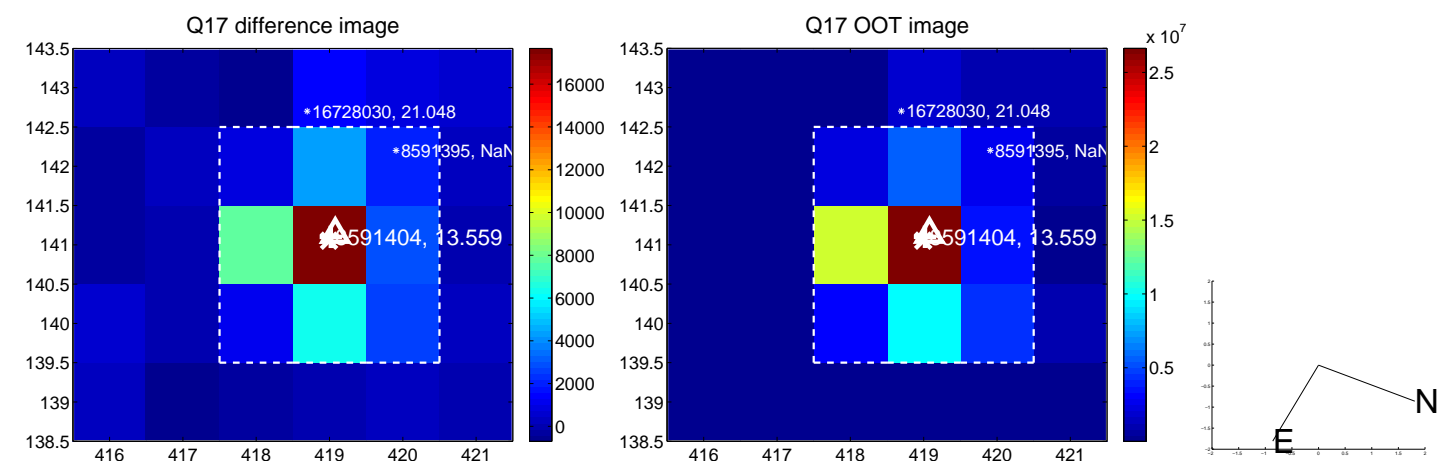
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

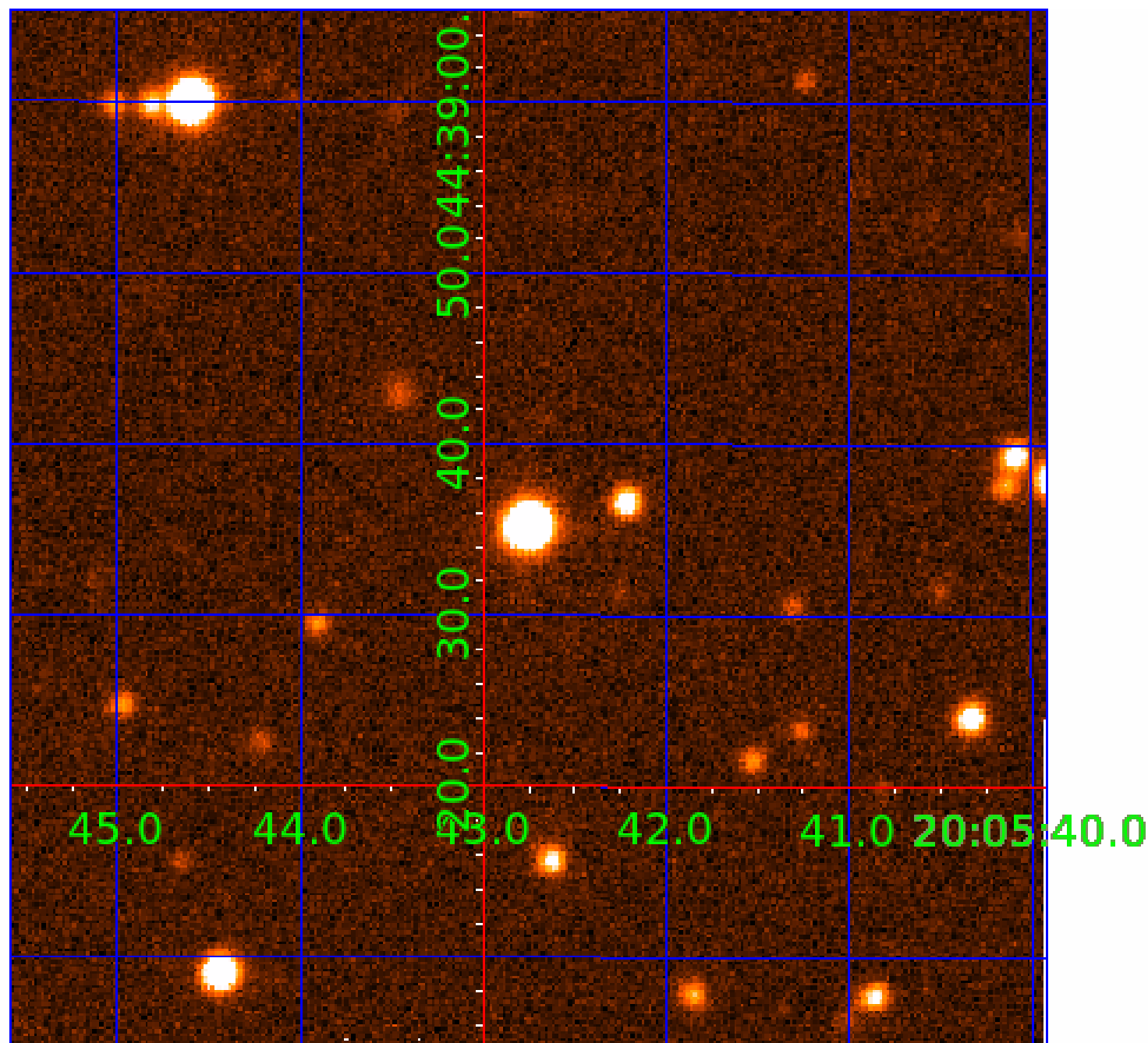


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 008591404

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008591404-01	OBS	No	2.535737	131.784225	61.6	5.355	8.2	6.5	1.27	6629	1.16	1813.96
008591404-02	OBS	No	2.531272	133.141940	25.2	0.528	11.7	1.3	1.27	6629	1.10	1818.22
008591404-03	OBS	No	2.536278	133.853880	89.5	30.435	10.4	12.7	1.27	6629	1.38	1813.44

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008591404-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_SKYE_ZUMA_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
008591404-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
008591404-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA—LPP_DV—LPP_ALT—SAME_NTL_PERIOD—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.

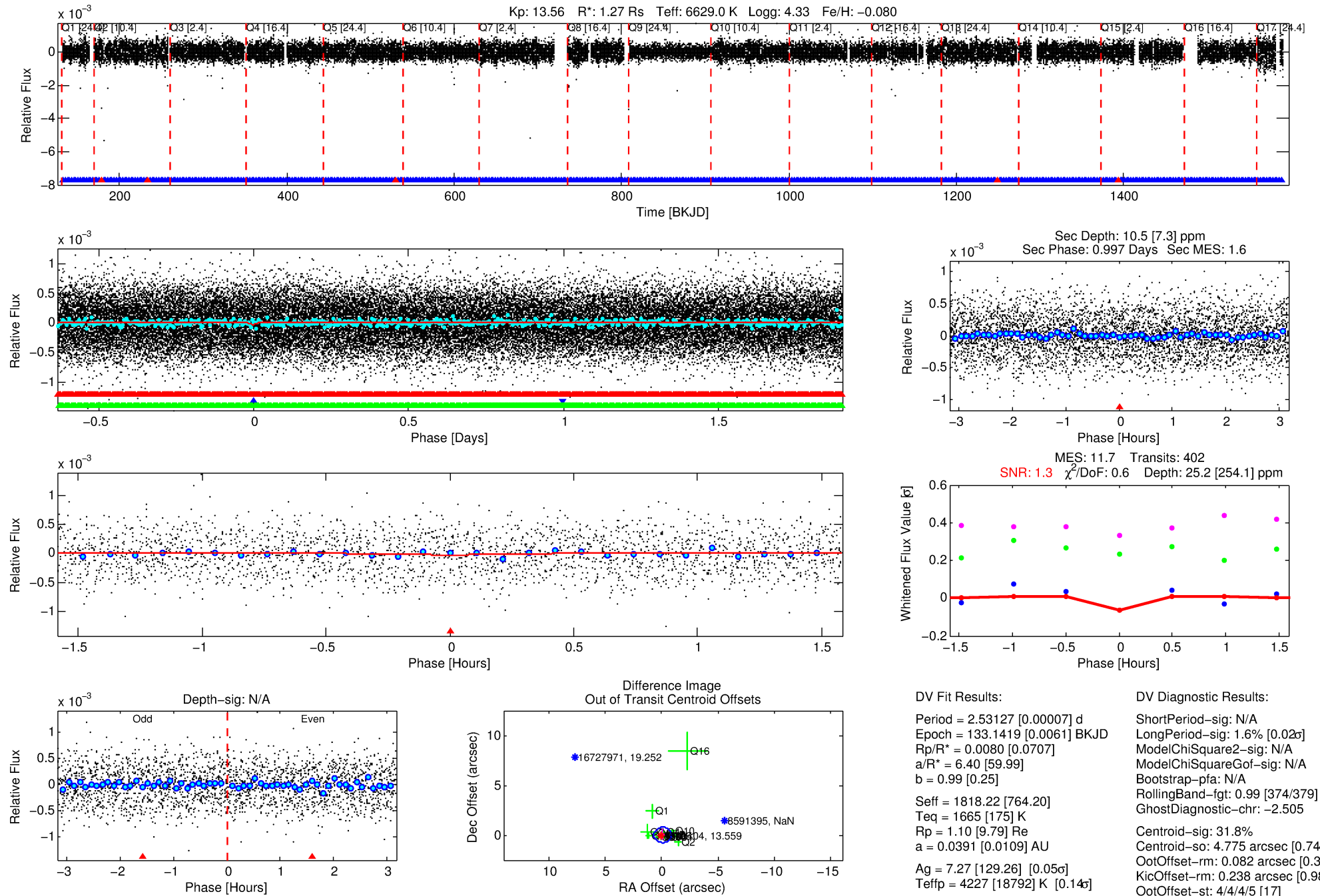
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 008591404-02

No Significant Match Found

# DV One-Page Summary

KIC: 8591404 Candidate: 2 of 3 Period: 2.531 d



## DV Fit Results:

Period = 2.53127 [0.00007] d  
Epoch = 133.1419 [0.0061] BKJD  
Rp/R\* = 0.0080 [0.0707]  
a/R\* = 6.40 [59.99]  
b = 0.99 [0.25]  
Seff = 1818.22 [764.20]  
Teff = 1665 [175] K  
Rp = 1.10 [9.79] Re  
a = 0.0391 [0.0109] AU  
Ag = 7.27 [129.26] [0.05] $\sigma$   
Teffp = 4227 [18792] K [0.14] $\sigma$

## DV Diagnostic Results:

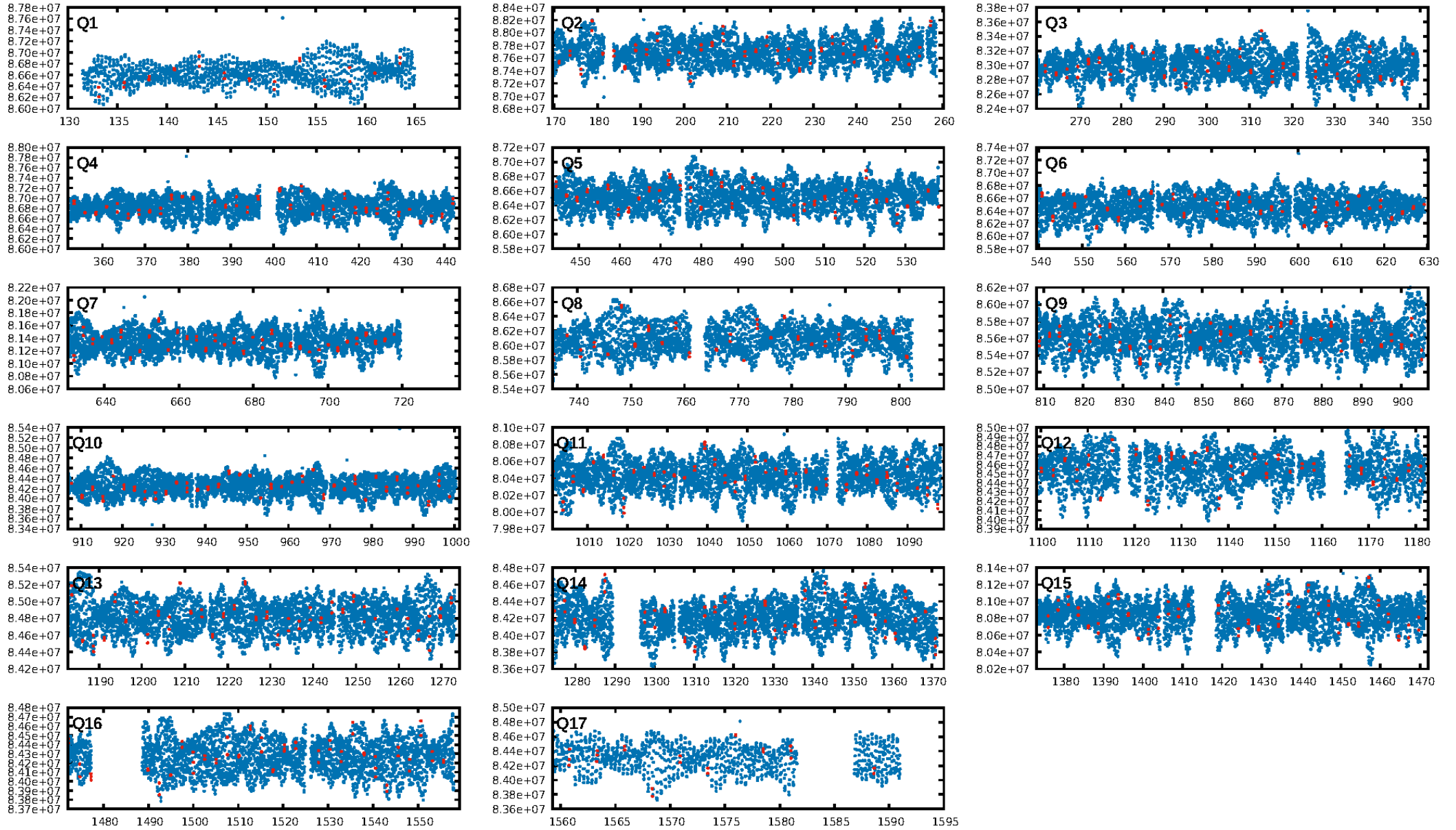
ShortPeriod-sig: N/A  
LongPeriod-sig: 1.6% [0.02 $\sigma$ ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 0.99 [374/379]  
GhostDiagnostic-chr: -2.505  
Centroid-sig: 31.8%  
Centroid-so: 4.775 arcsec [0.74 $\sigma$ ]  
OotOffset-rm: 0.082 arcsec [0.32 $\sigma$ ]  
KicOffset-rm: 0.238 arcsec [0.98 $\sigma$ ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 0.35 [6/17]  
DiffImageOverlap-fno: 0.41 [7/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 09:34:15 Z

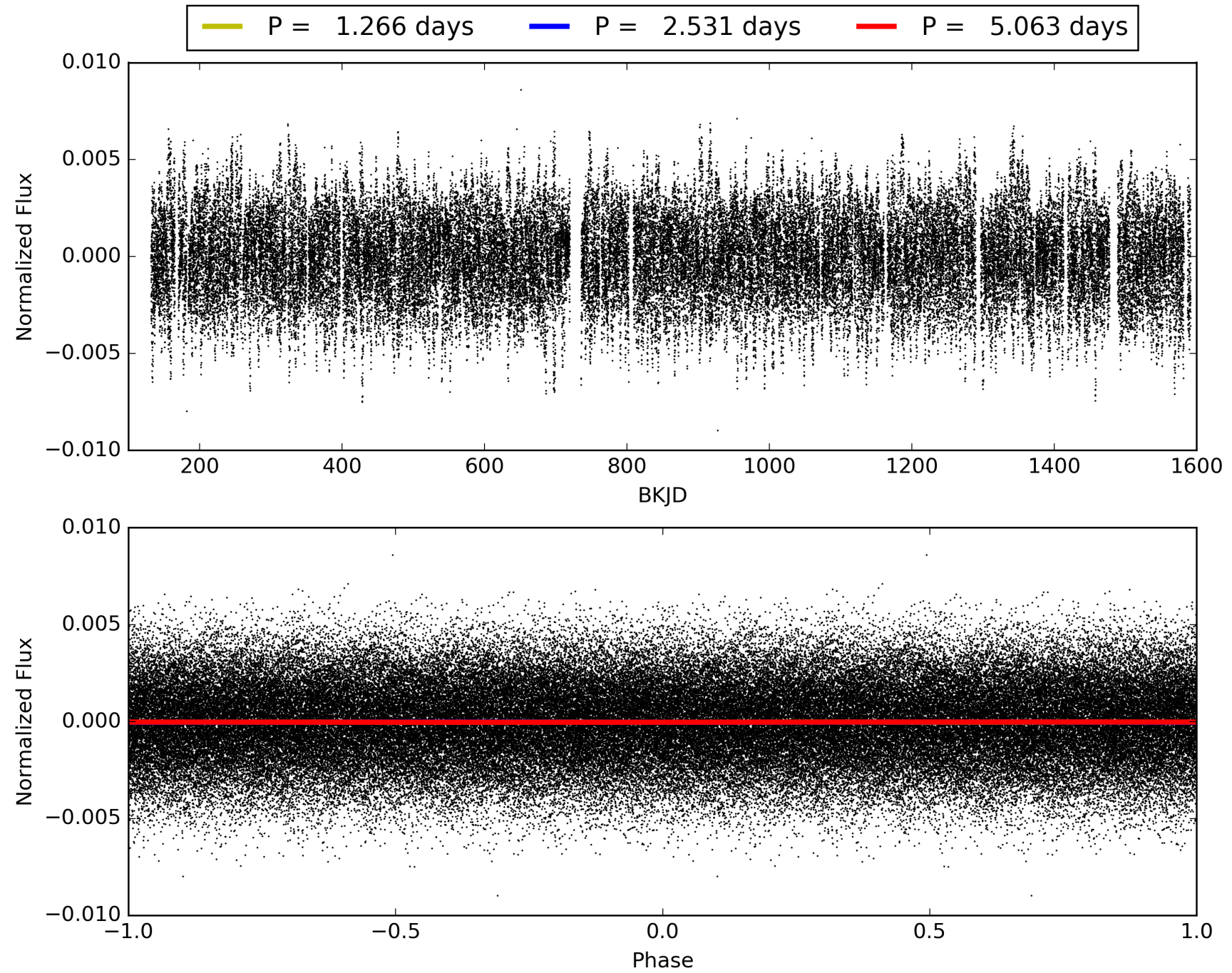
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center



# TCE 008591404-02, PDC Light Curves

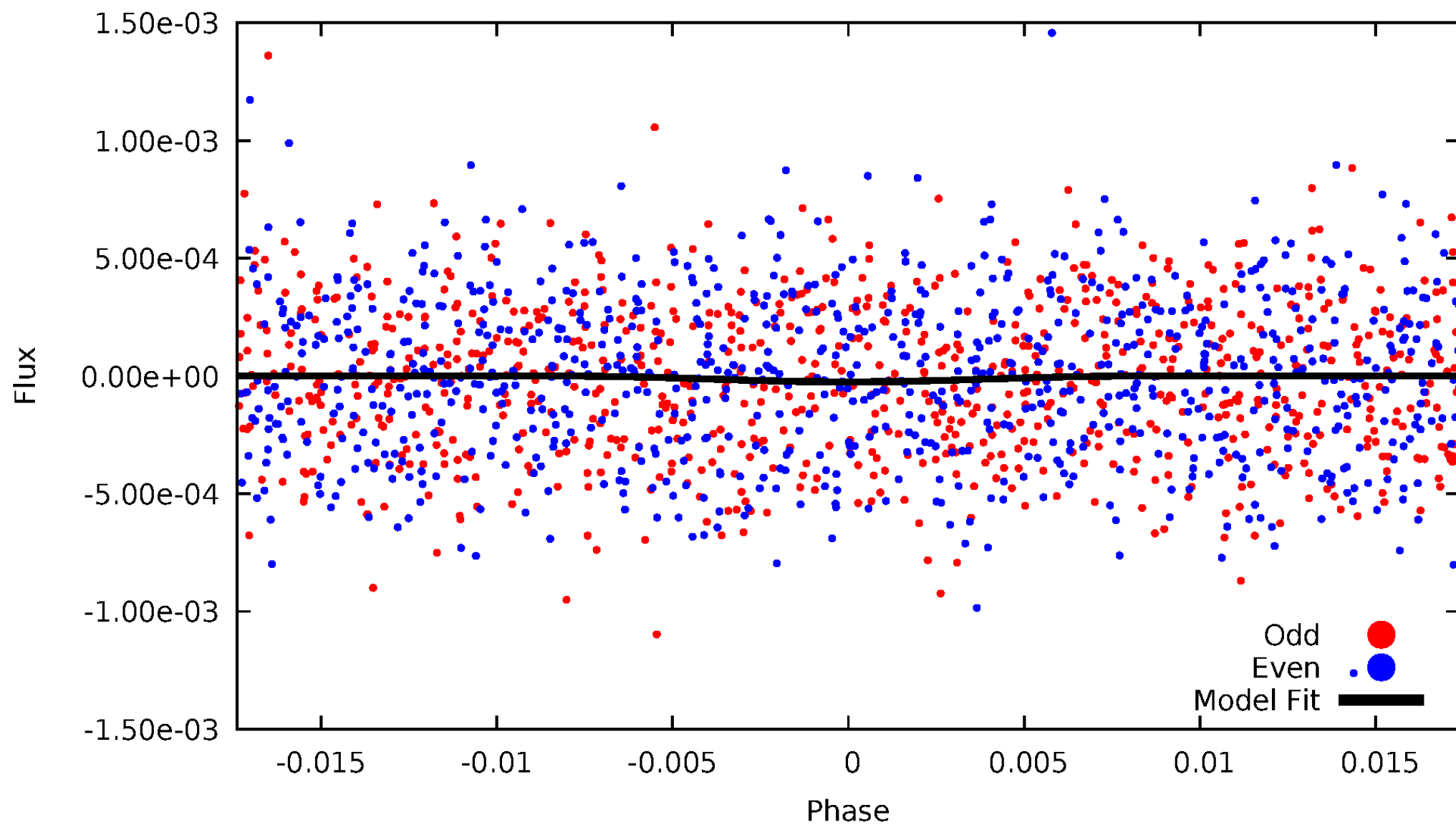


# TCE 008591404-02



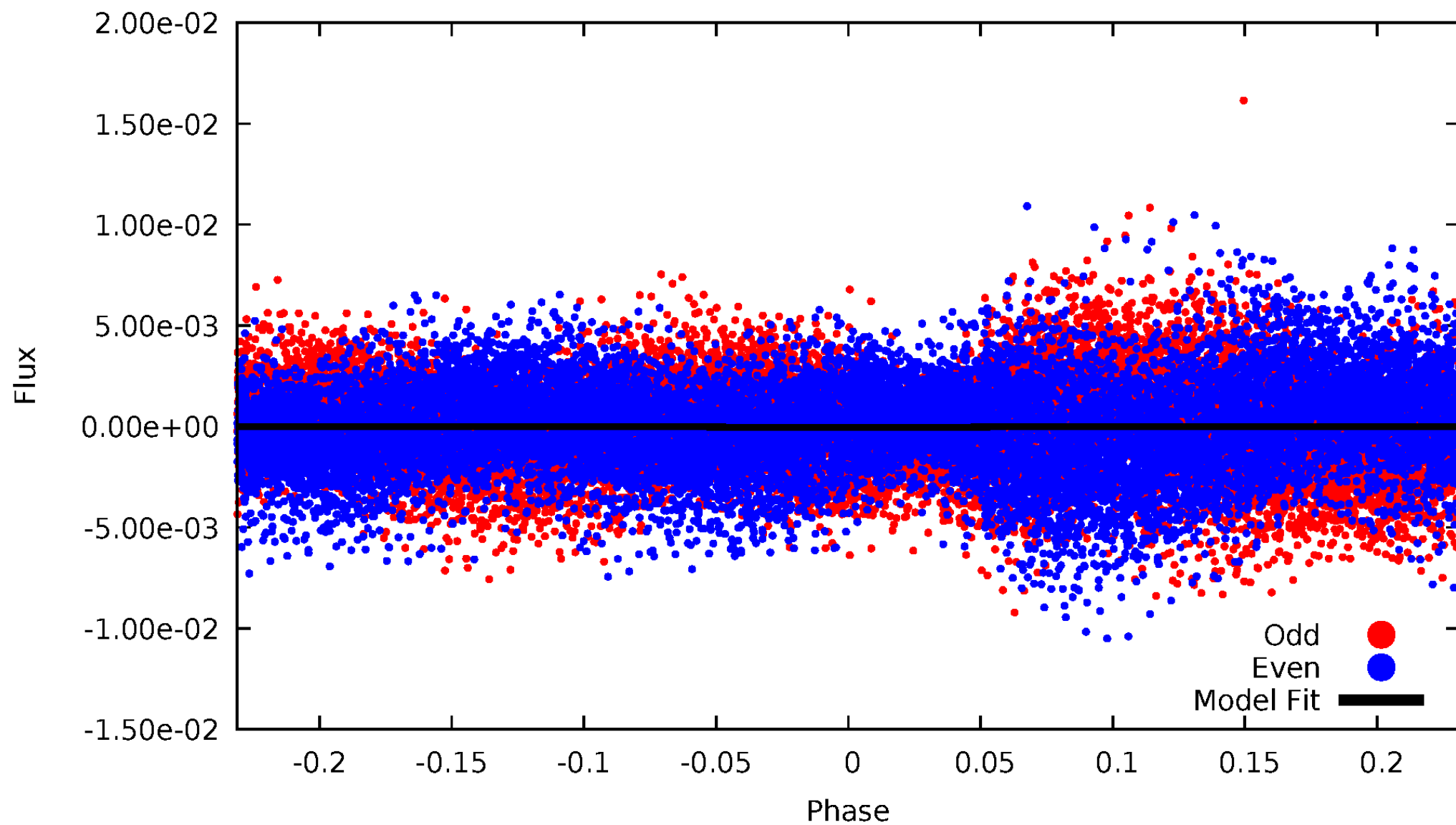
# DV Odd/Even

TCE 008591404-02



# ALT Odd/Even

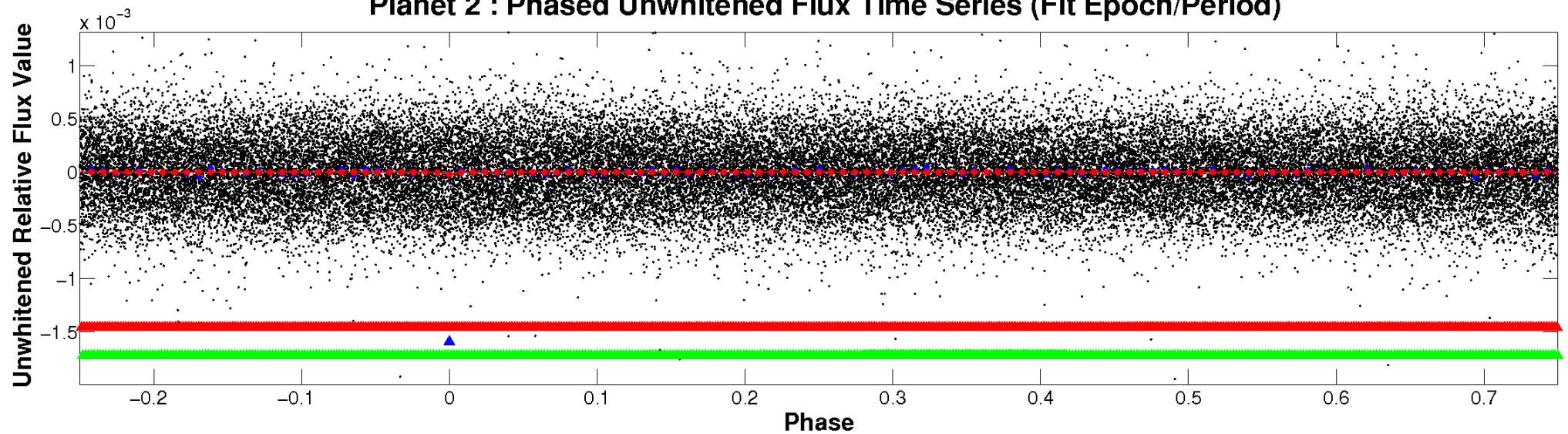
TCE 008591404-02



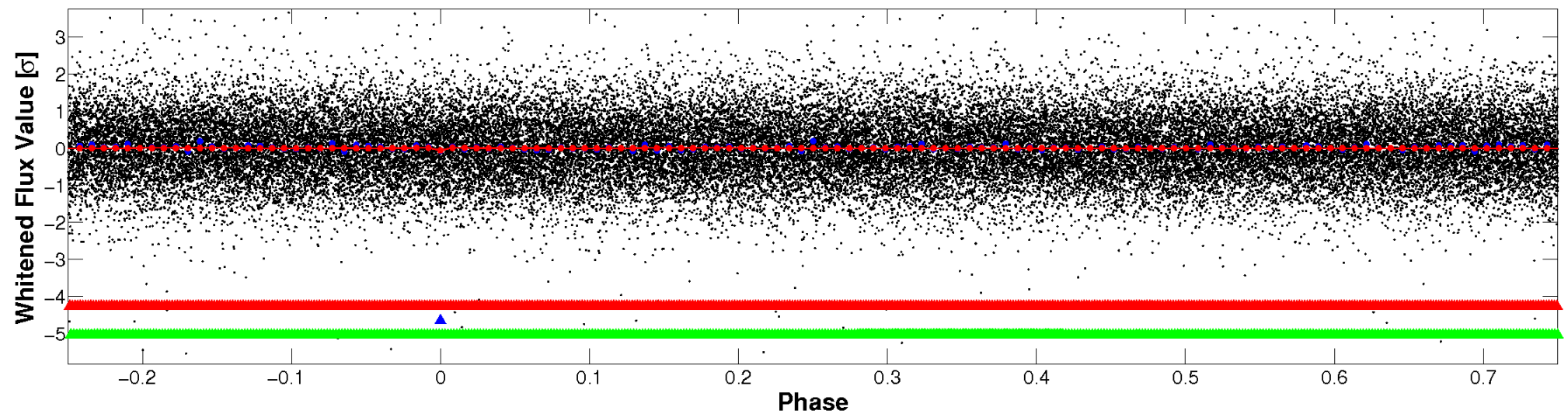


# Non-Whitened Vs. Whitened Light Curve

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

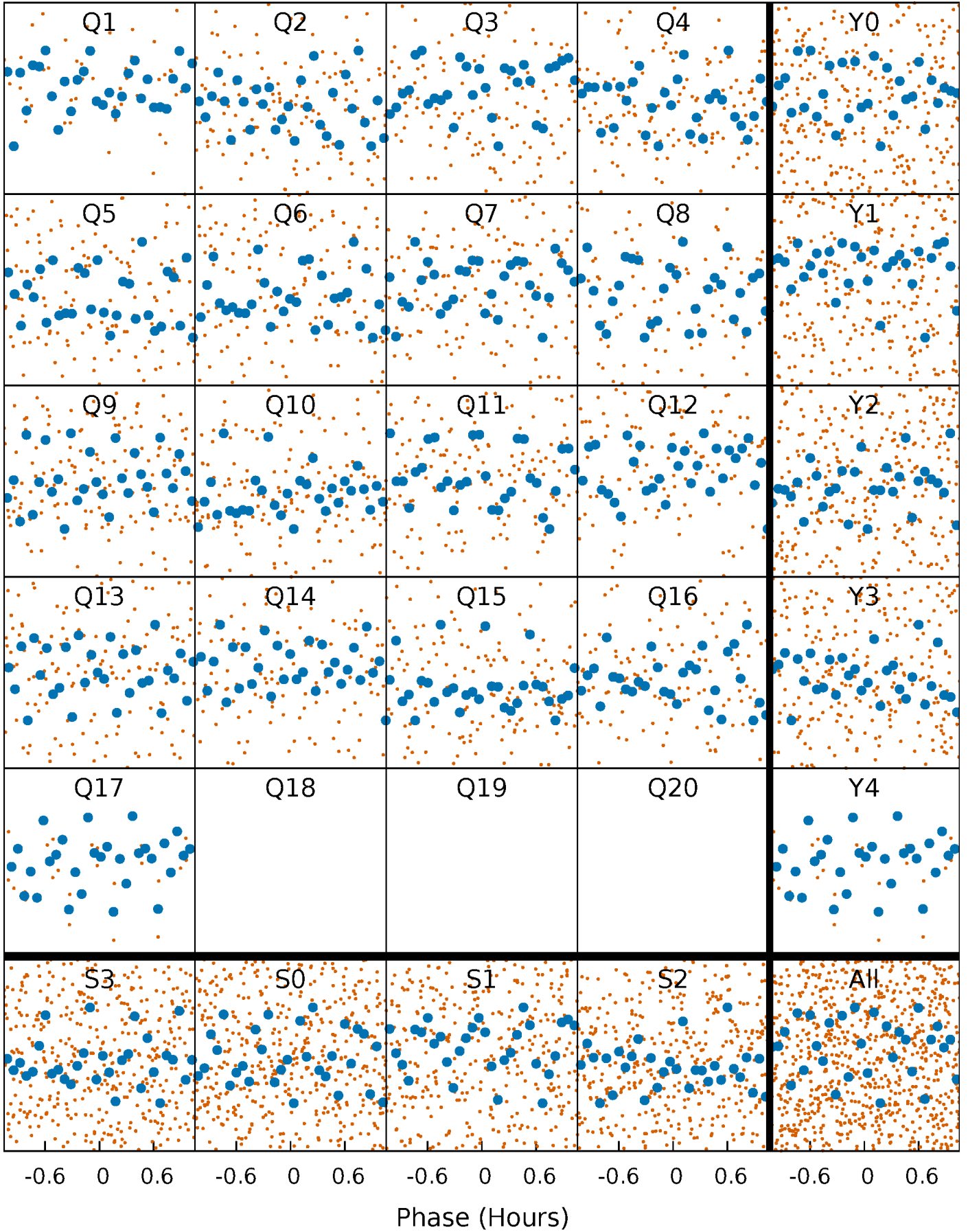


**Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

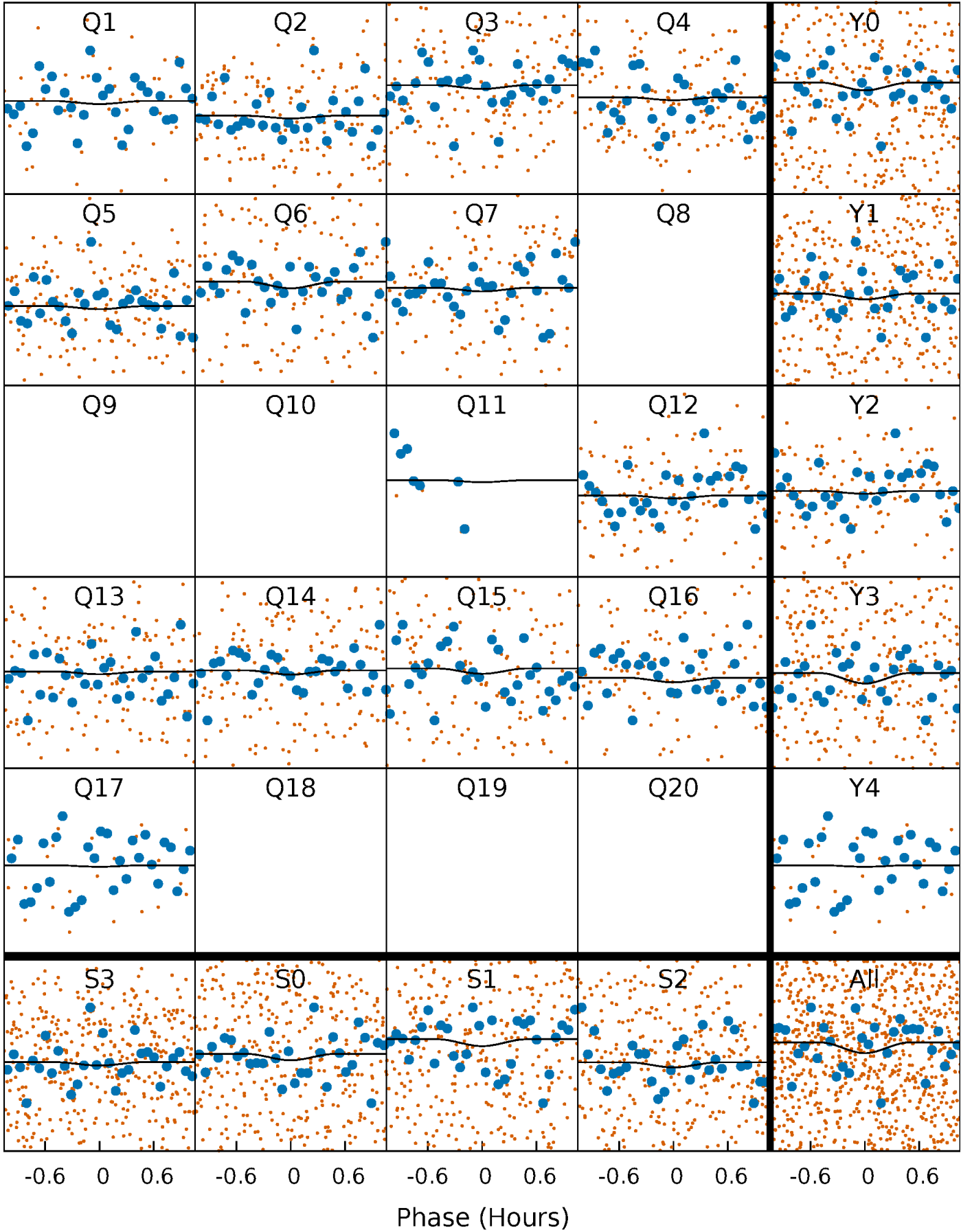
TCE 008591404-02   P= 2.531272 Days    $T_0=133.141940$  (BKJD)





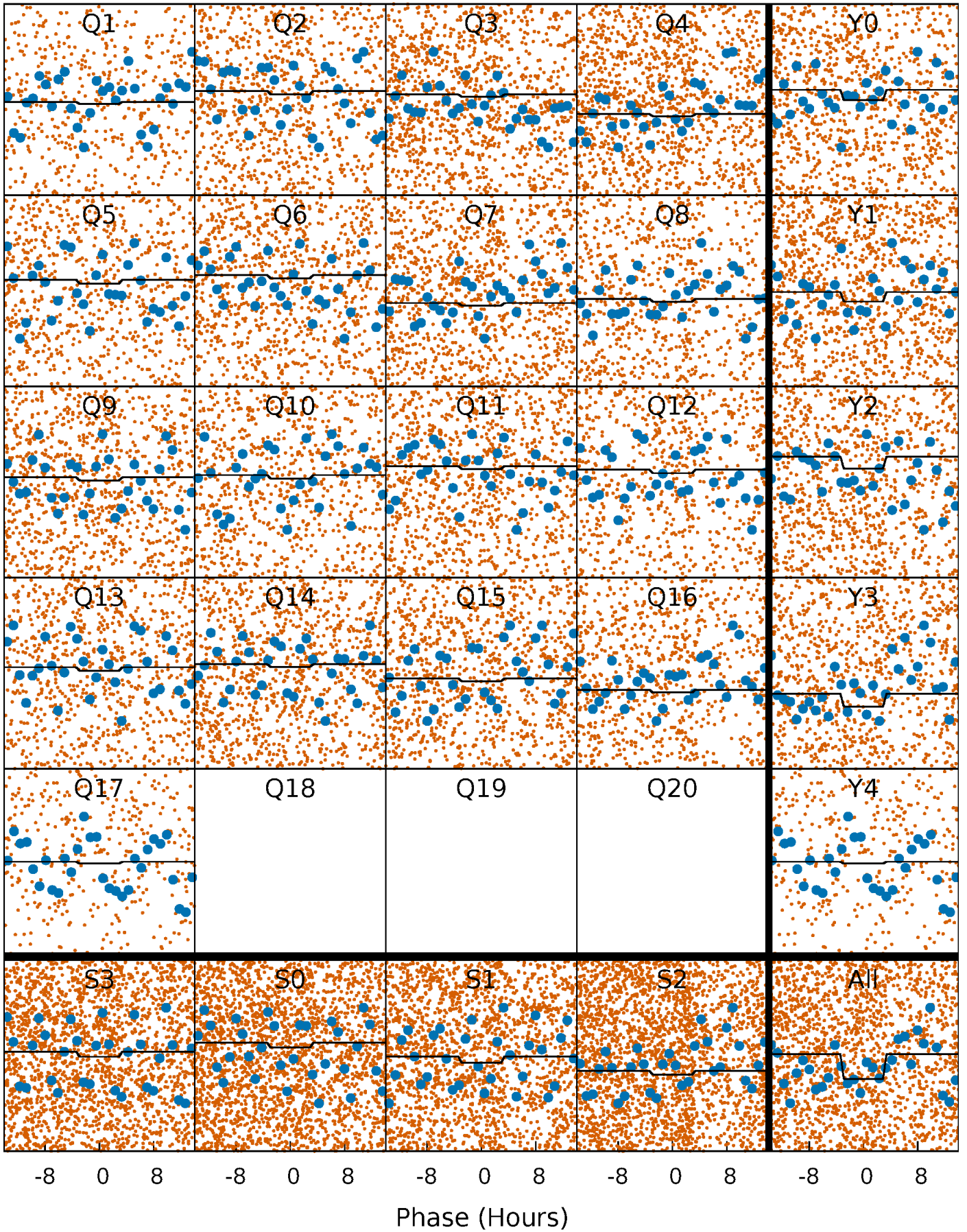
# DV Quarter-Phased Transit Curves

TCE 008591404-02   P= 2.531272 Days    $T_0=133.141940$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

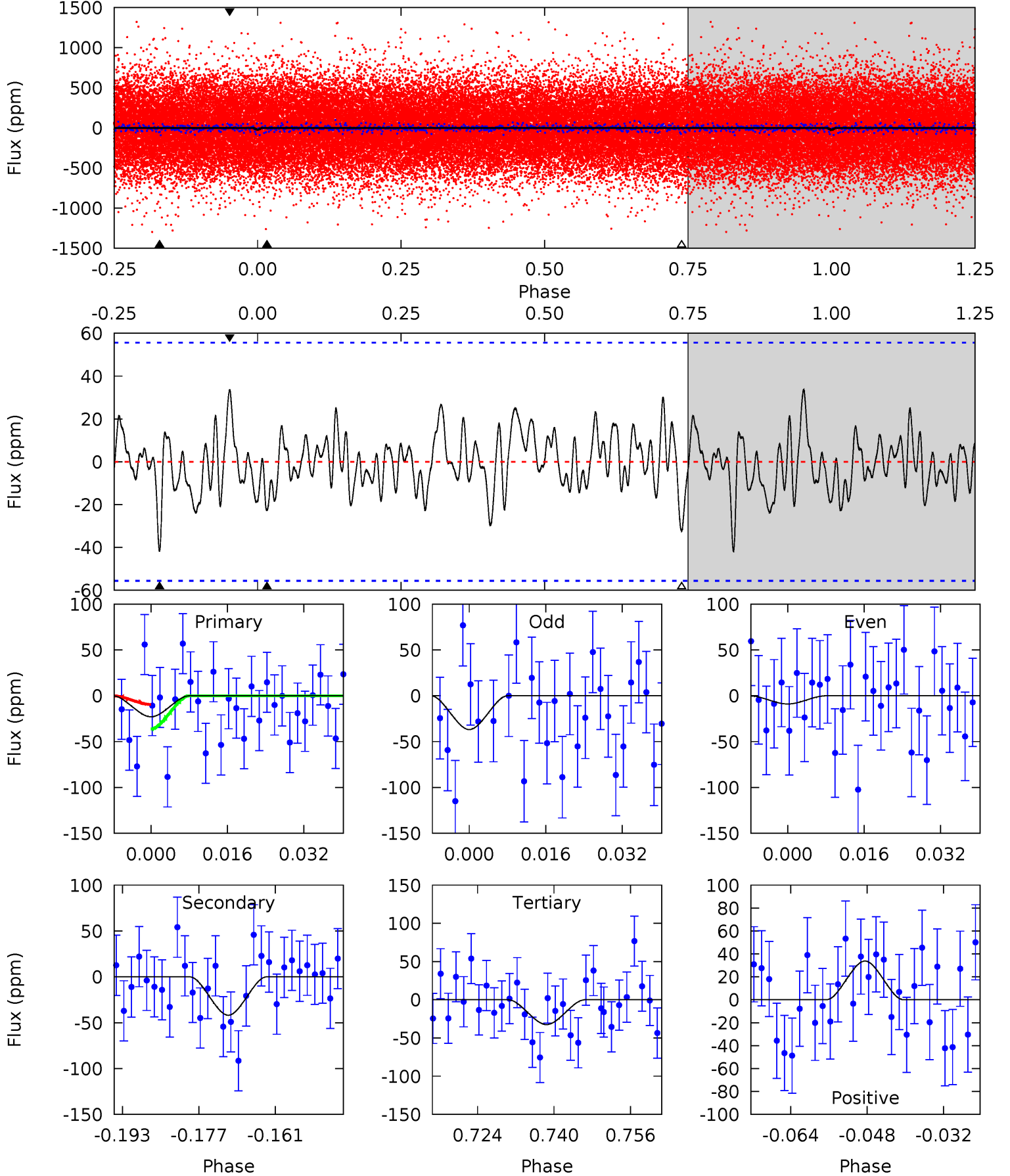
TCE 008591404-02   P= 2.535938 Days    $T_0=133.269532$  (BKJD)



# DV Model-Shift Uniqueness Test

008591404-02, P = 2.531272 Days, E = 130.610668 Days

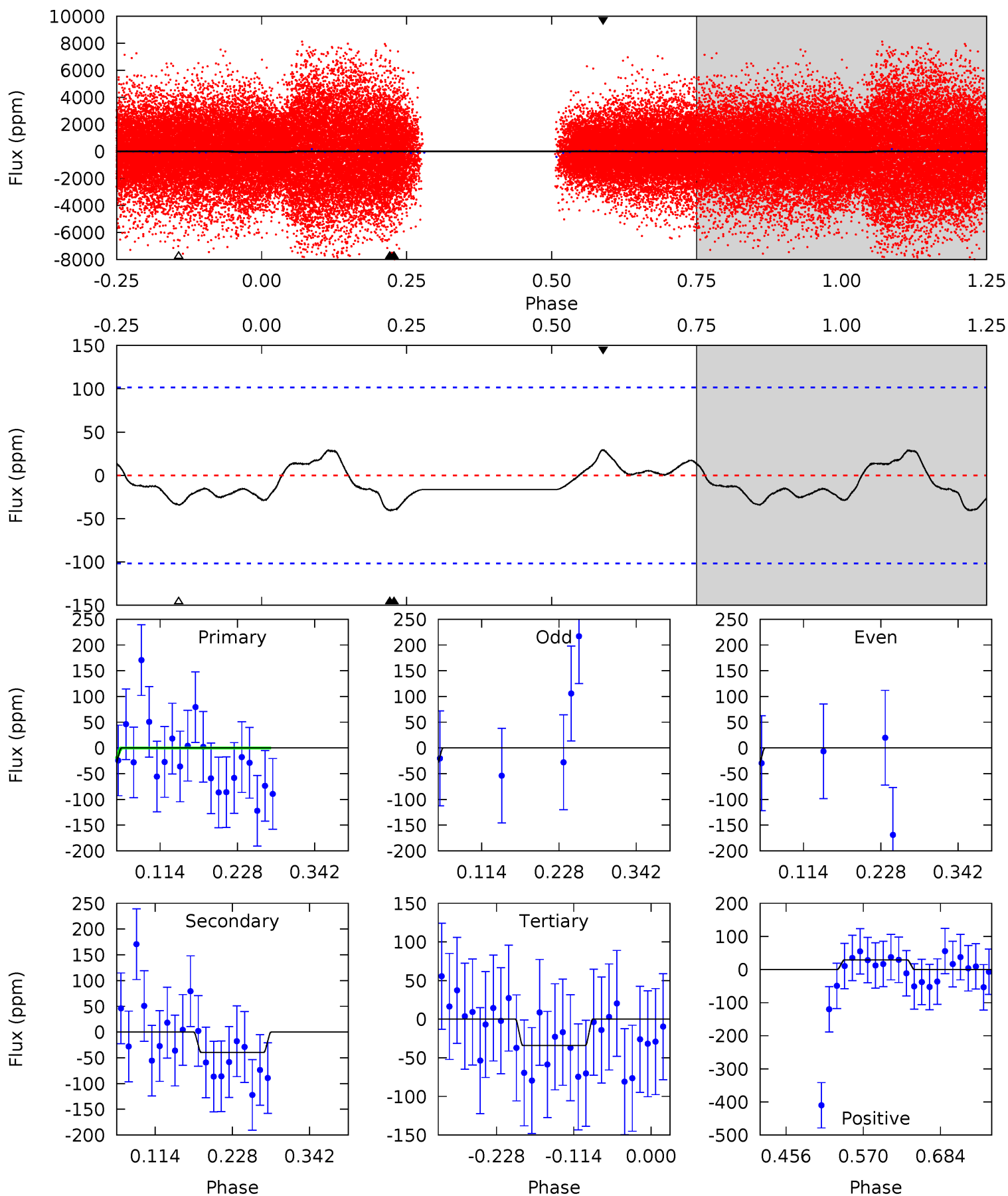
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
2.04	3.72	2.89	3.00	4.93	2.41	1.05	-0.85	-0.96	0.83	0.72	1.24	1.53	0.45	1.19



# Alt Model-Shift Uniqueness Test

008591404-02, P = 2.535938 Days, E = 130.733594 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
1.80	1.76	1.52	1.31	4.54	1.58	0.73	0.28	0.48	0.25	0.45	0.03	-5.06	0.42	0.50



### Stellar Parameters For KIC 008591404

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6629^{+161}_{-241}$	$4.327^{+0.070}_{-0.210}$	$-0.080^{+0.250}_{-0.300}$	$1.268^{+0.432}_{-0.154}$	$1.251^{+0.187}_{-0.187}$	$0.864^{+0.322}_{-0.451}$
	+2%/-4%	+2%/-5%	+312%/-375%	+34%/-12%	+15%/-15%	+37%/-52%
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 008591404-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-42 \pm 11$	$7.19^{+8.64}_{-5.32}$	$2359^{+190}_{-126}$	$2739^{+1885}_{-5278}$	$0.635^{+8.274}_{-0.506}$
Alt.	$-39 \pm 22$	$6.76^{+8.69}_{-4.79}$	$2362^{+193}_{-116}$	$2699^{+1747}_{-5310}$	$0.581^{+6.220}_{-0.492}$

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



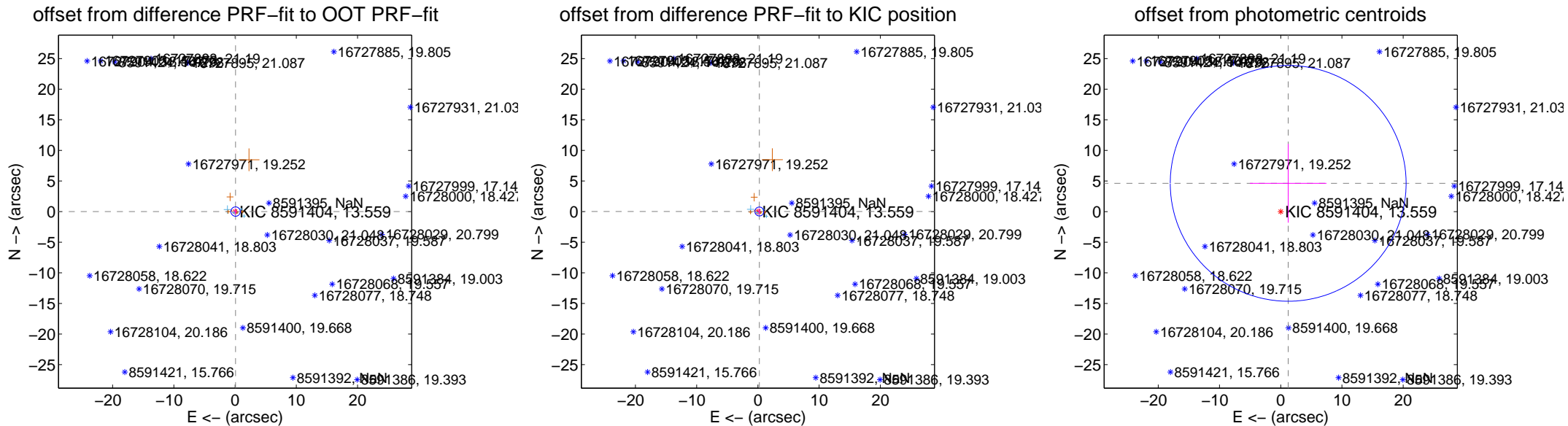
## DV Centroid Data

Supplemental centroid analysis for 008591404-02. Kepler magnitude: 13.56. Transit SNR 1.33

There are 6 quarters with good PRF difference image offsets

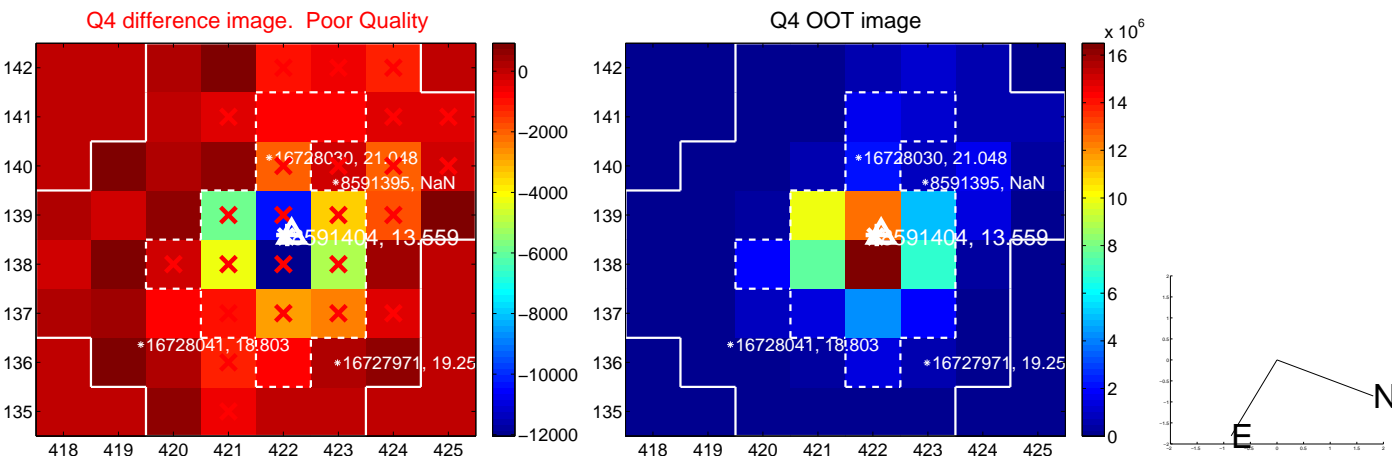
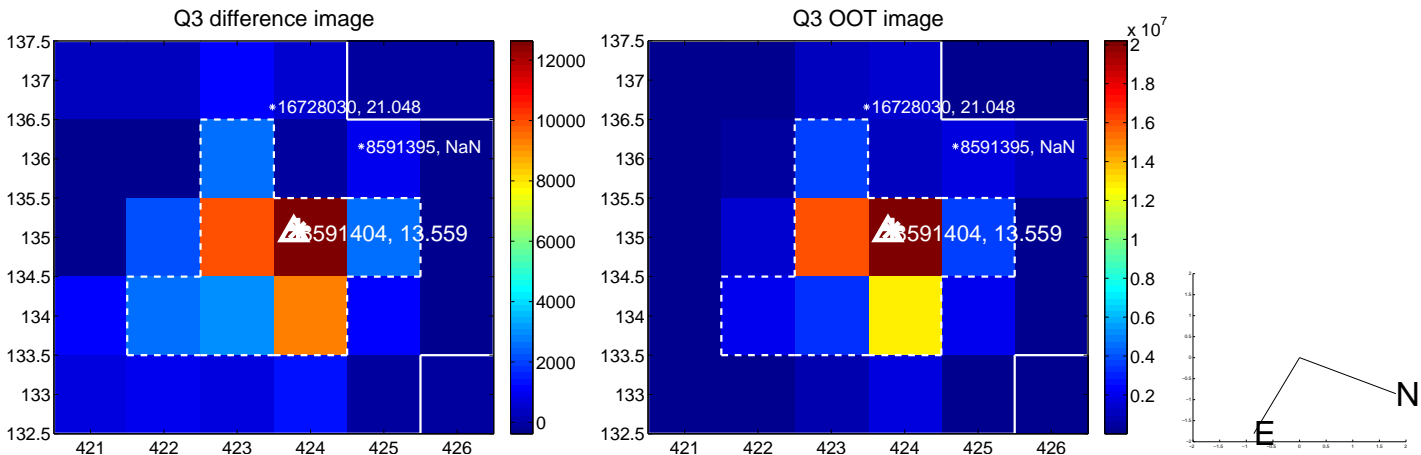
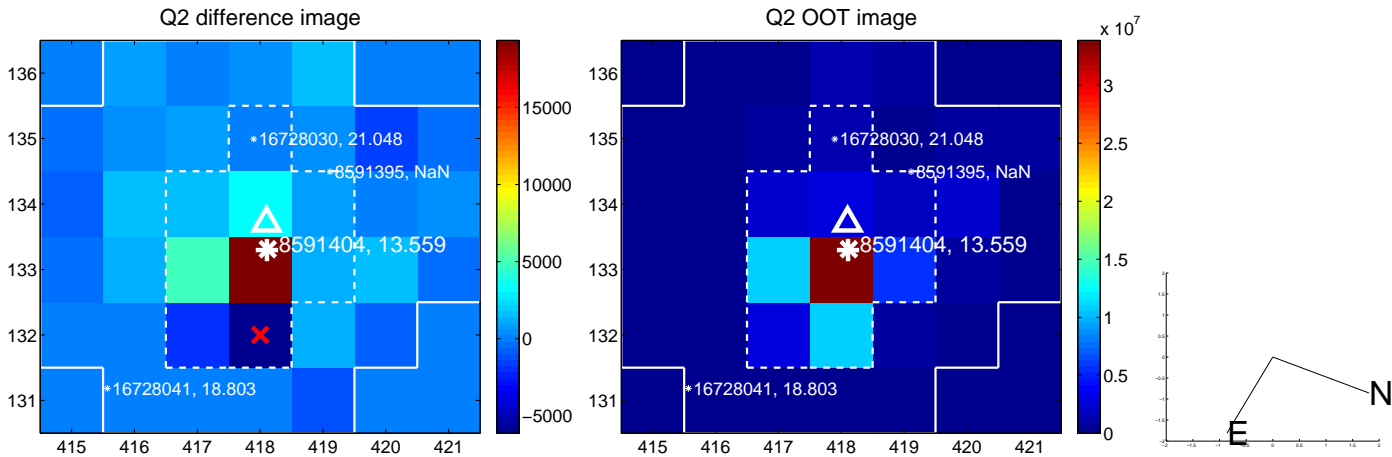
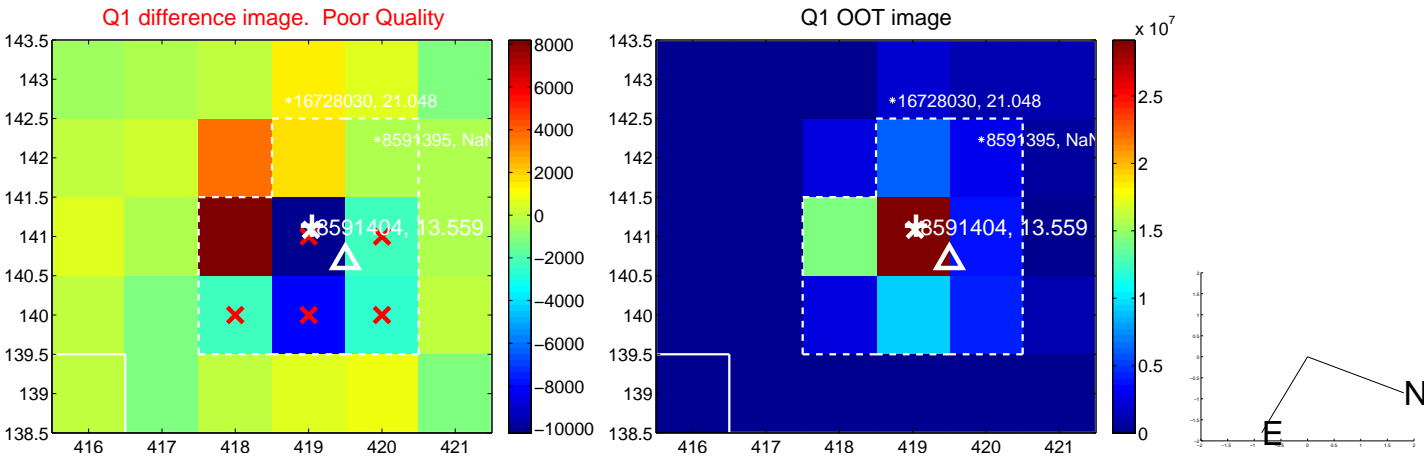
The direct PRF centroid is offset from the target star catalog position by about 0.22 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.082 \pm 0.255$	0.32	$-0.082 \pm 0.230$	$0.008 \pm 0.507$
PRF-fit source offset from KIC position	$0.238 \pm 0.243$	0.98	$-0.237 \pm 0.223$	$0.019 \pm 0.496$
photometric centroid source offset	$4.77 \pm 6.42$	0.74	$-1.22 \pm 6.25$	$4.62 \pm 6.43$

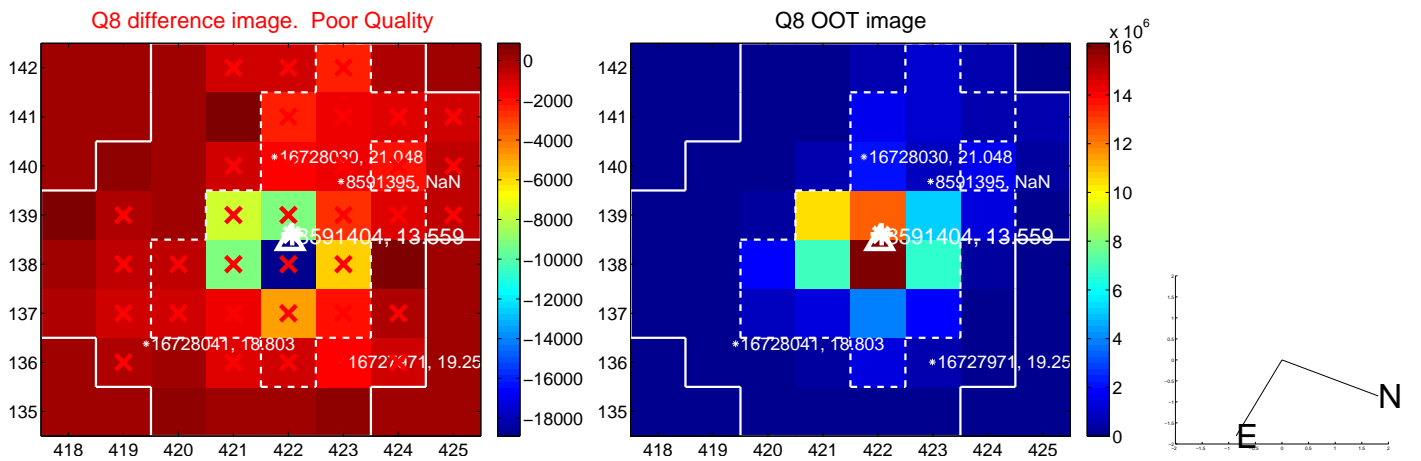
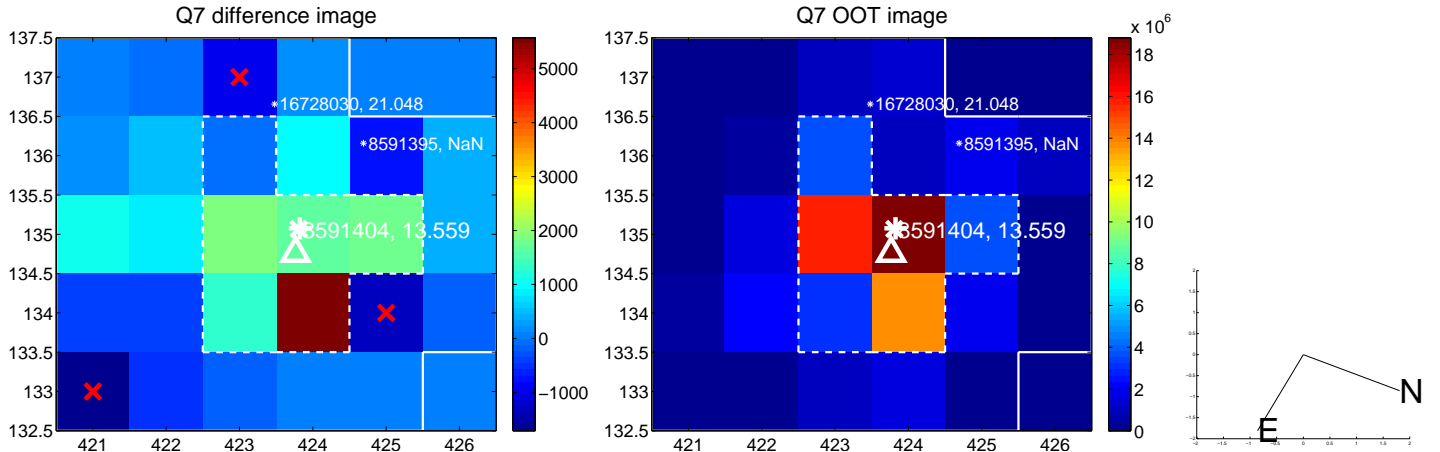
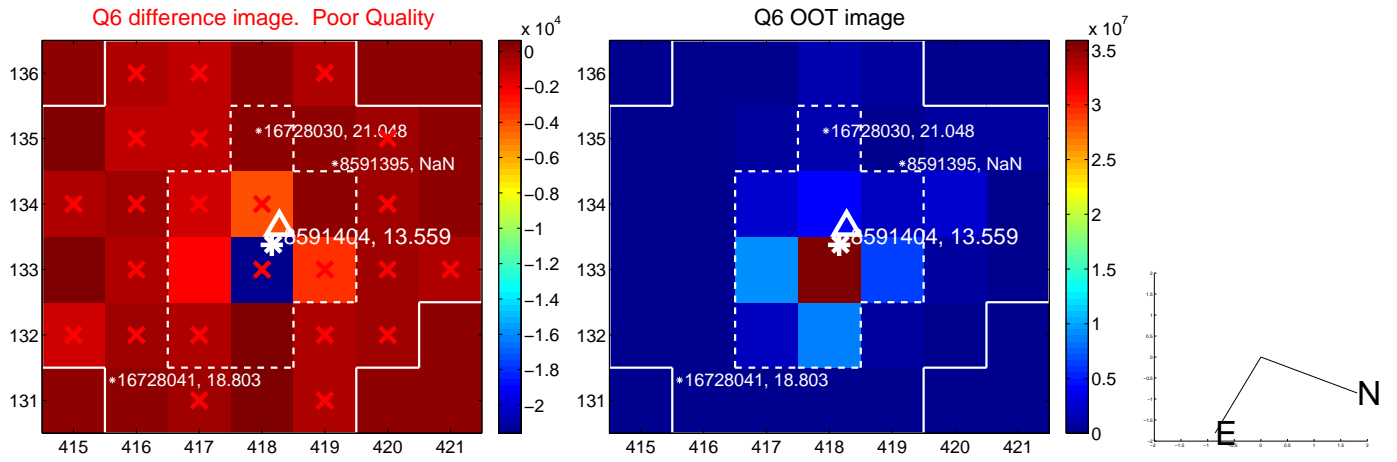
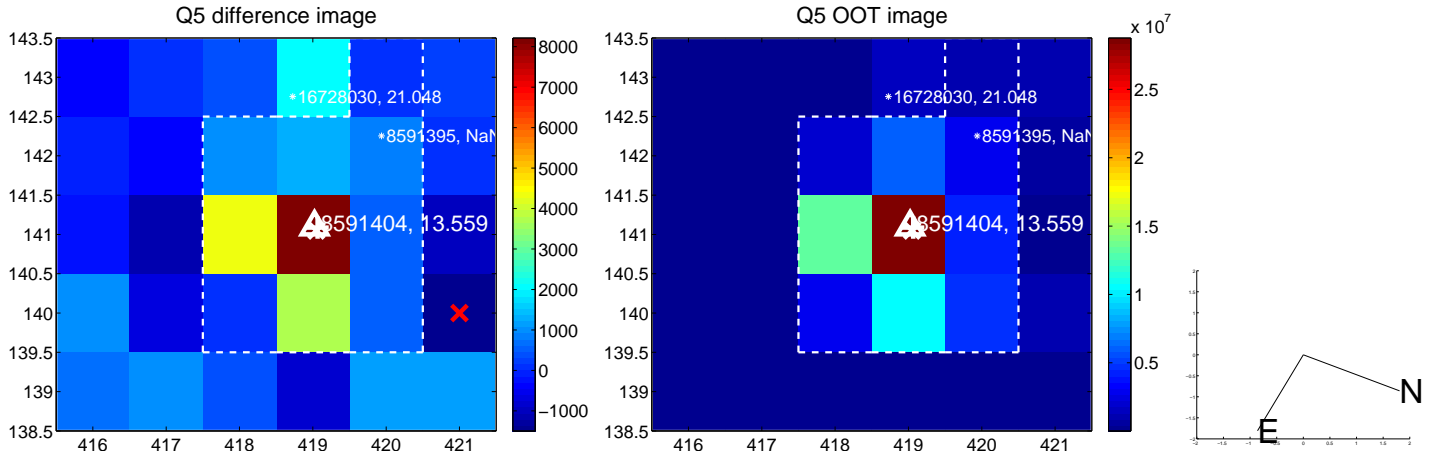


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

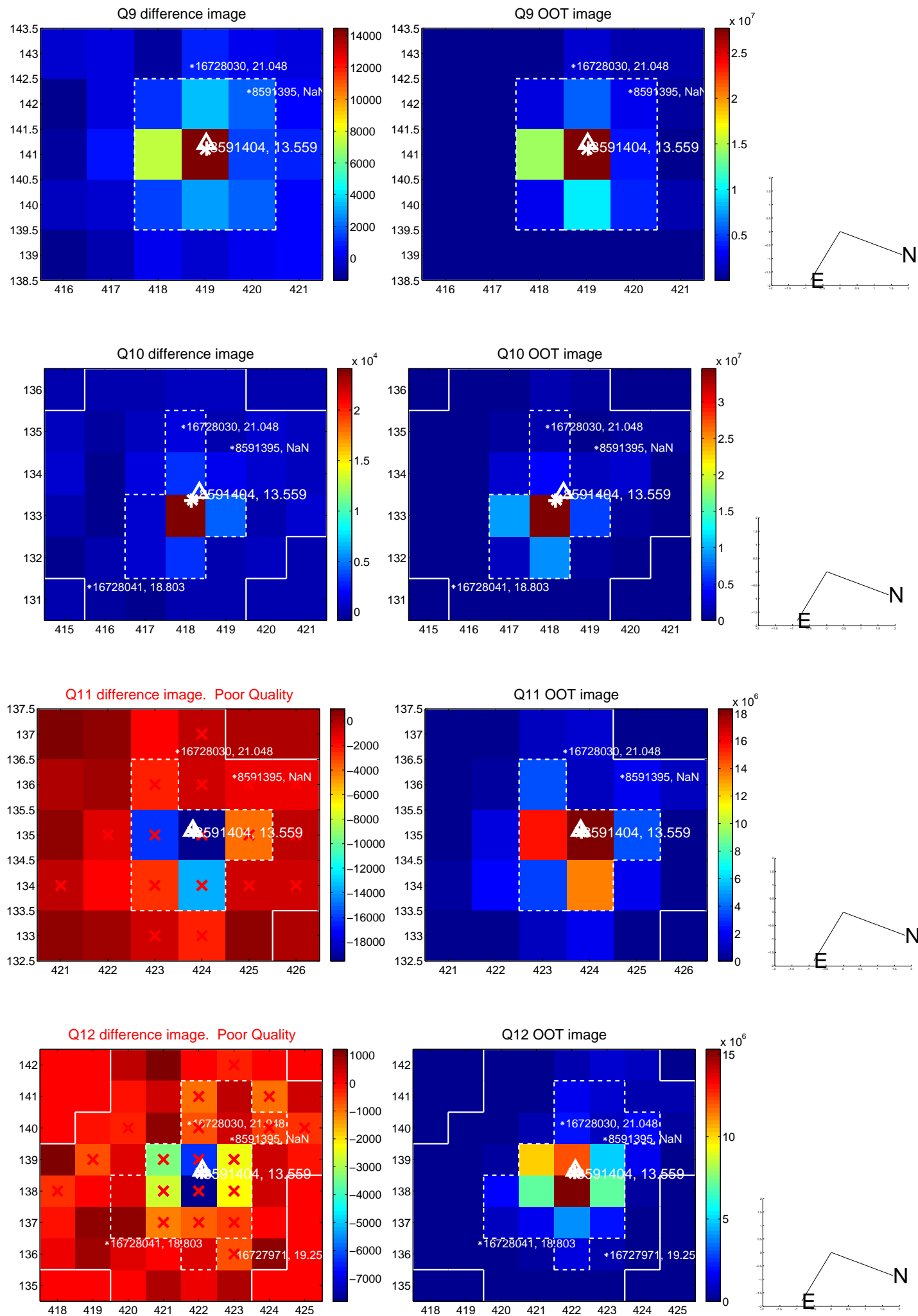
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



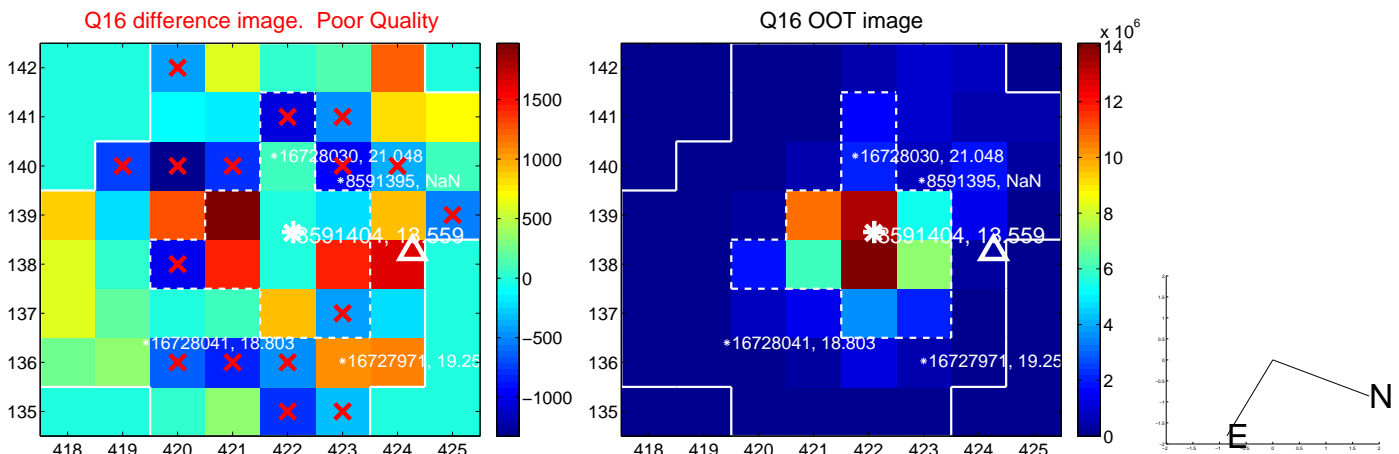
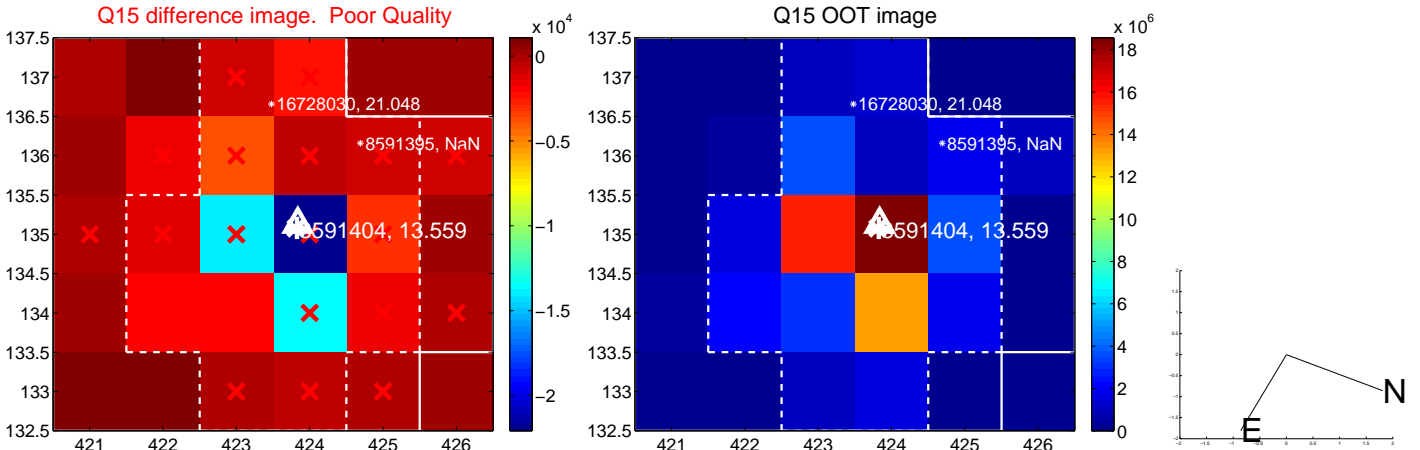
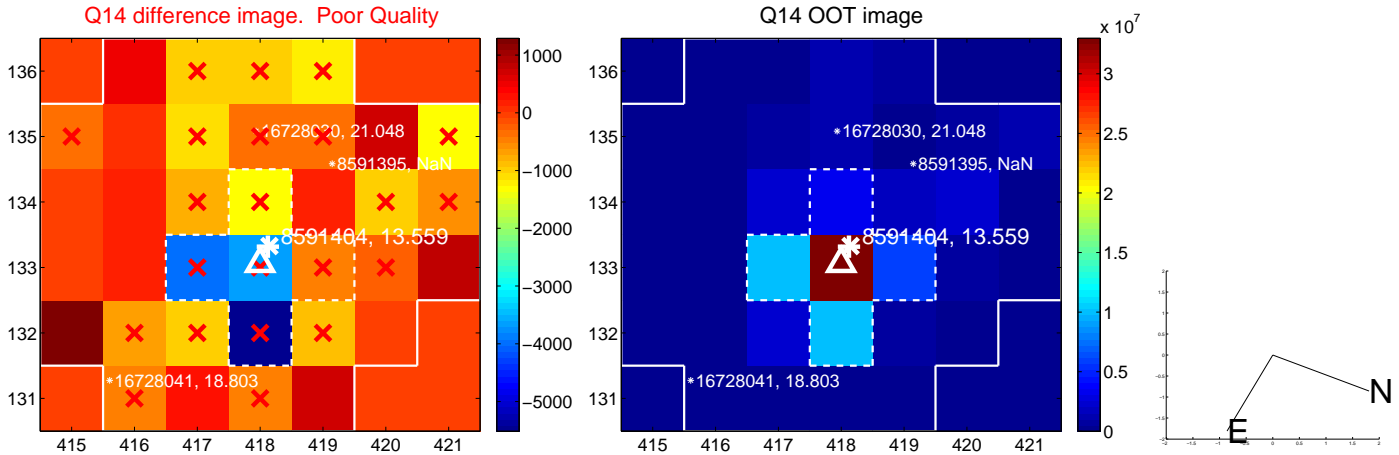
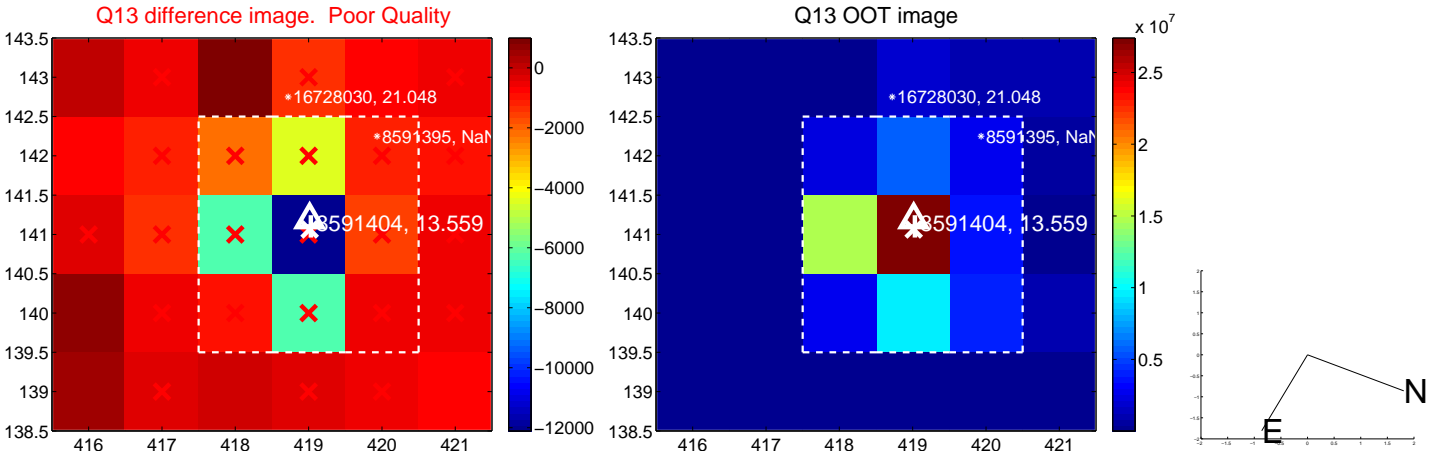
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

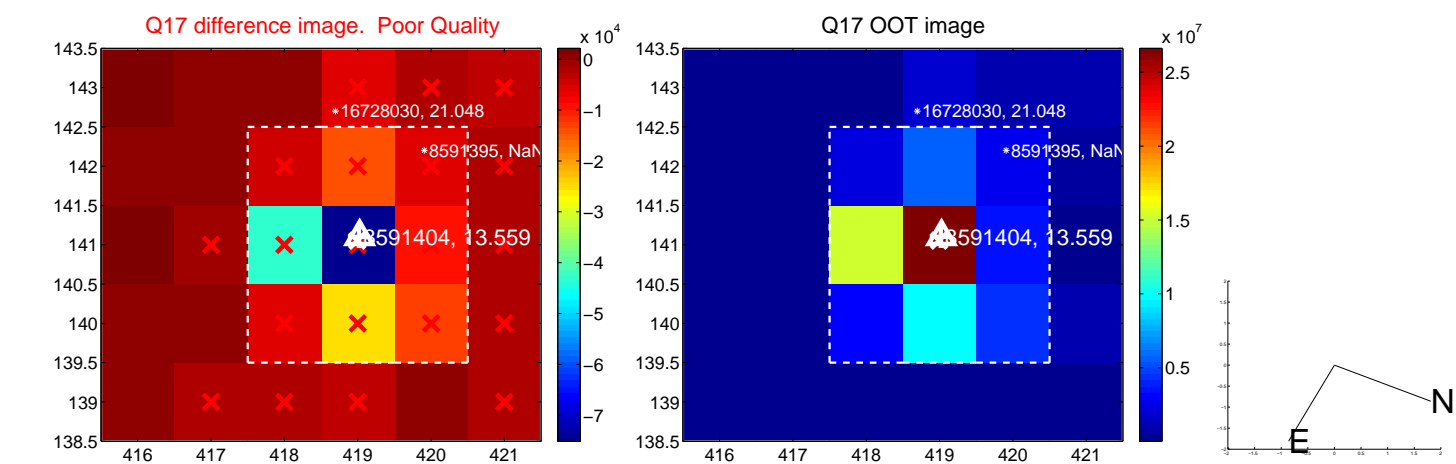


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

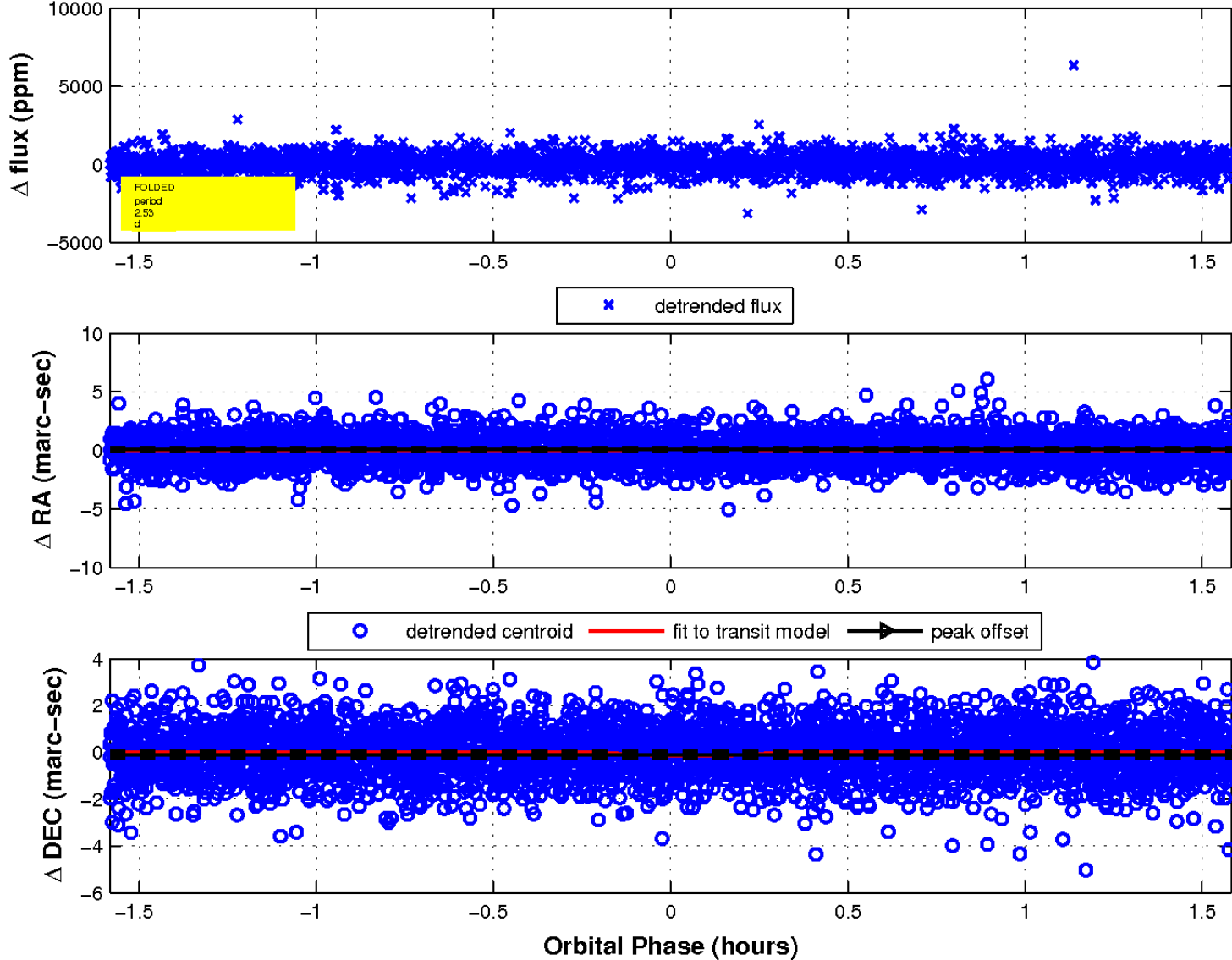




white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

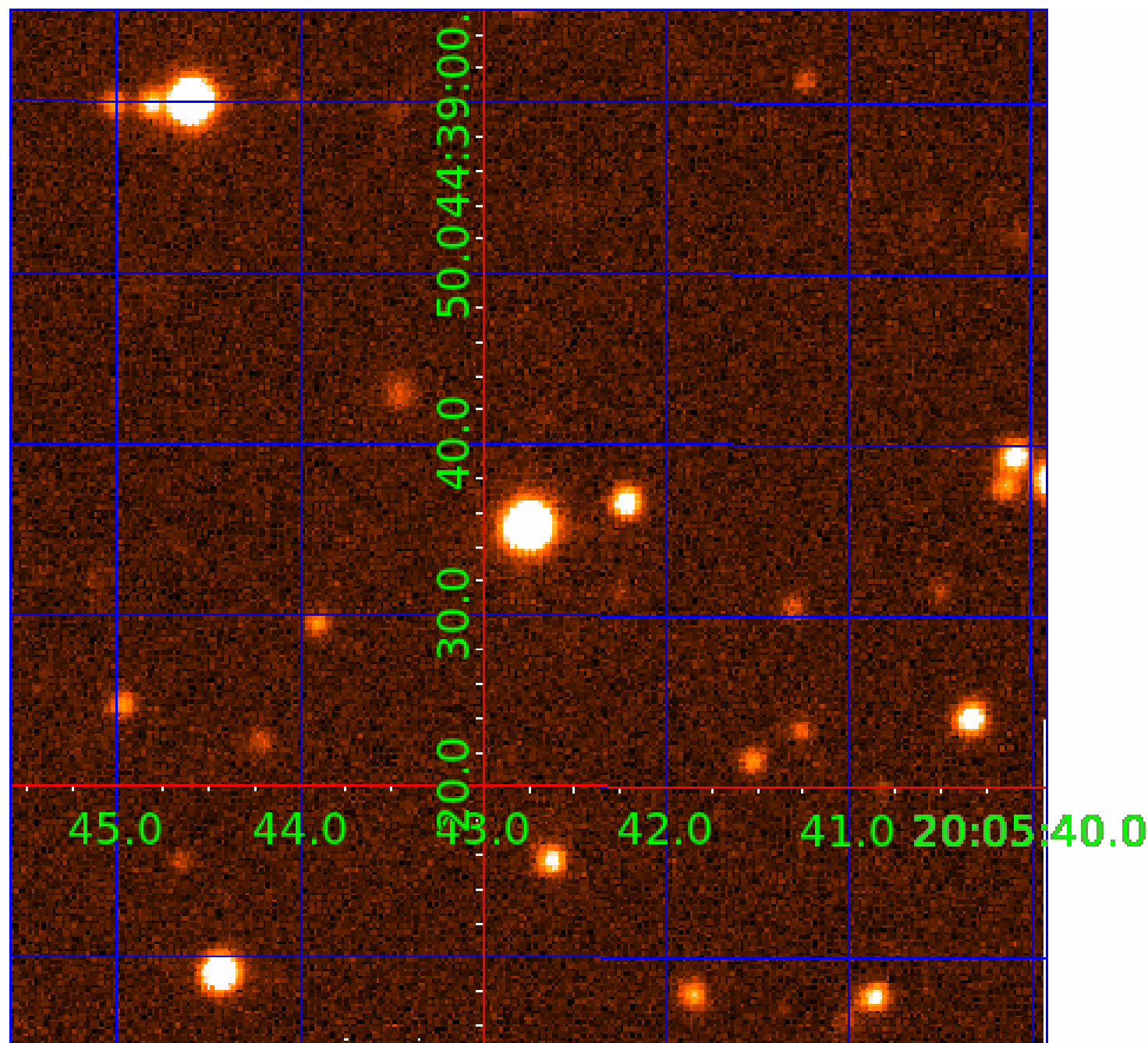


fluxWeightedCentroids, Planet 2 of 3



UKIRT Image

Declination



# KIC 008591404

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008591404-01	OBS	No	2.535737	131.784225	61.6	5.355	8.2	6.5	1.27	6629	1.16	1813.96
008591404-02	OBS	No	2.531272	133.141940	25.2	0.528	11.7	1.3	1.27	6629	1.10	1818.22
008591404-03	OBS	No	2.536278	133.853880	89.5	30.435	10.4	12.7	1.27	6629	1.38	1813.44

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008591404-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_SKYE_ZUMA_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
008591404-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
008591404-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA—LPP_DV—LPP_ALT—SAME_NTL_PERIOD—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.

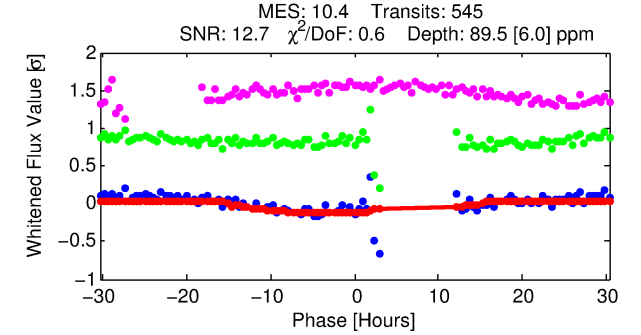
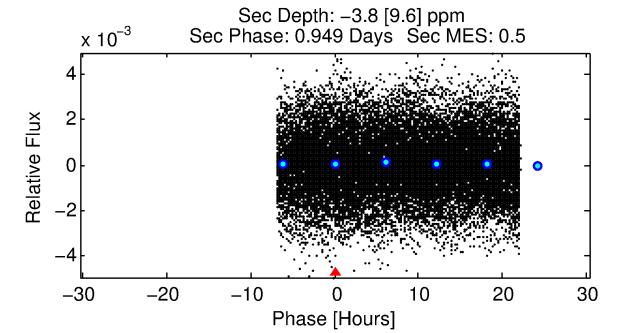
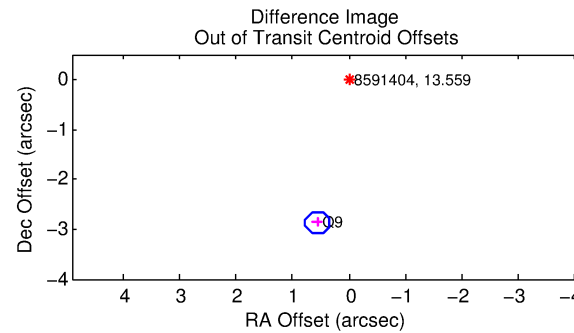
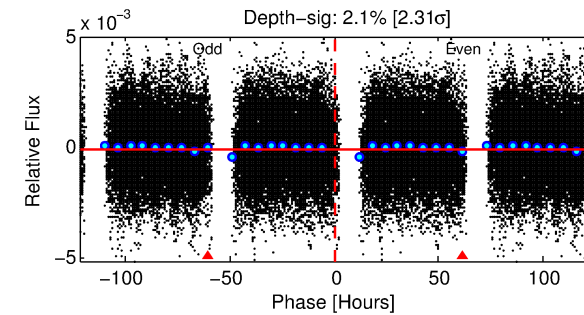
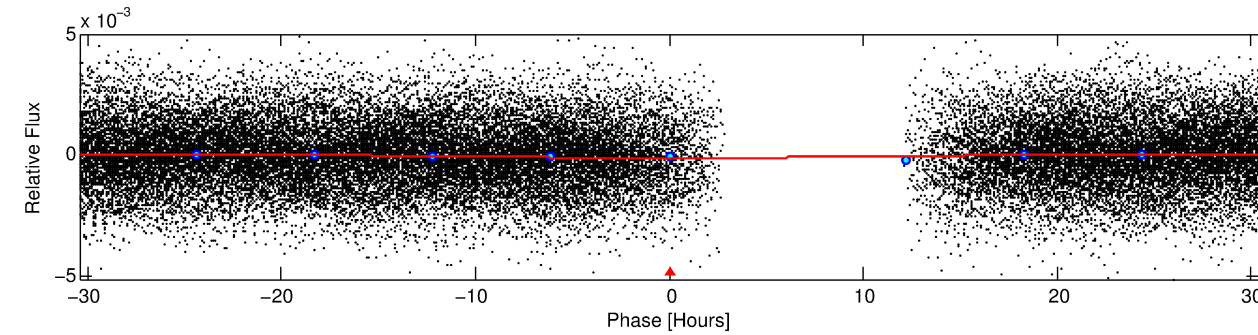
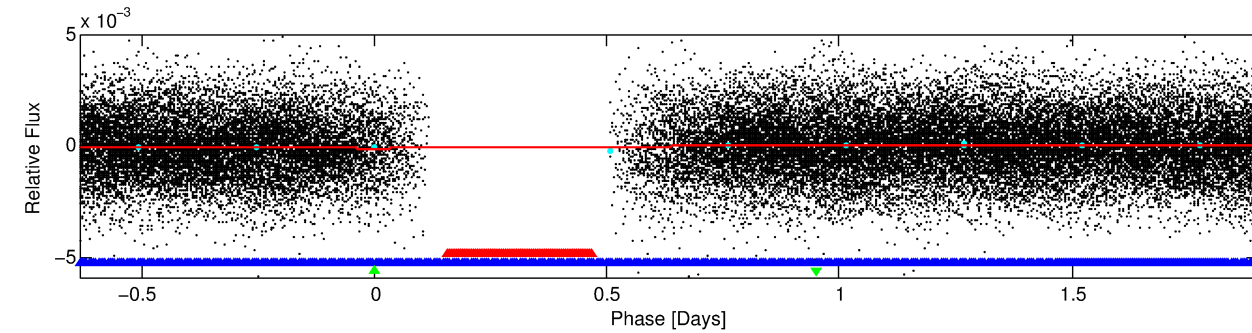
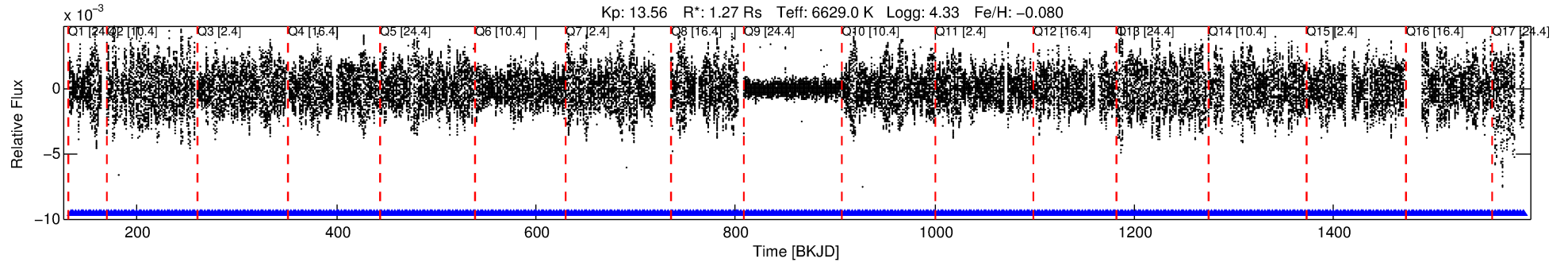
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 008591404-03

No Significant Match Found

# DV One-Page Summary

KIC: 8591404 Candidate: 3 of 3 Period: 2.536 d



## DV Fit Results:

Period = 2.53628 [0.00004] d  
Epoch = 133.8539 [0.0074] BKJD  
Rp/R\* = 0.0100 [0.0009]  
a/R\* = 1.00 [0.00]  
b = 0.88 [0.12]  
Seff = 1813.44 [762.19]  
Teq = 1664 [175] K  
Rp = 1.38 [0.49] Re  
a = 0.0392 [0.0109] AU  
Ag = N/A  
Teffp = N/A

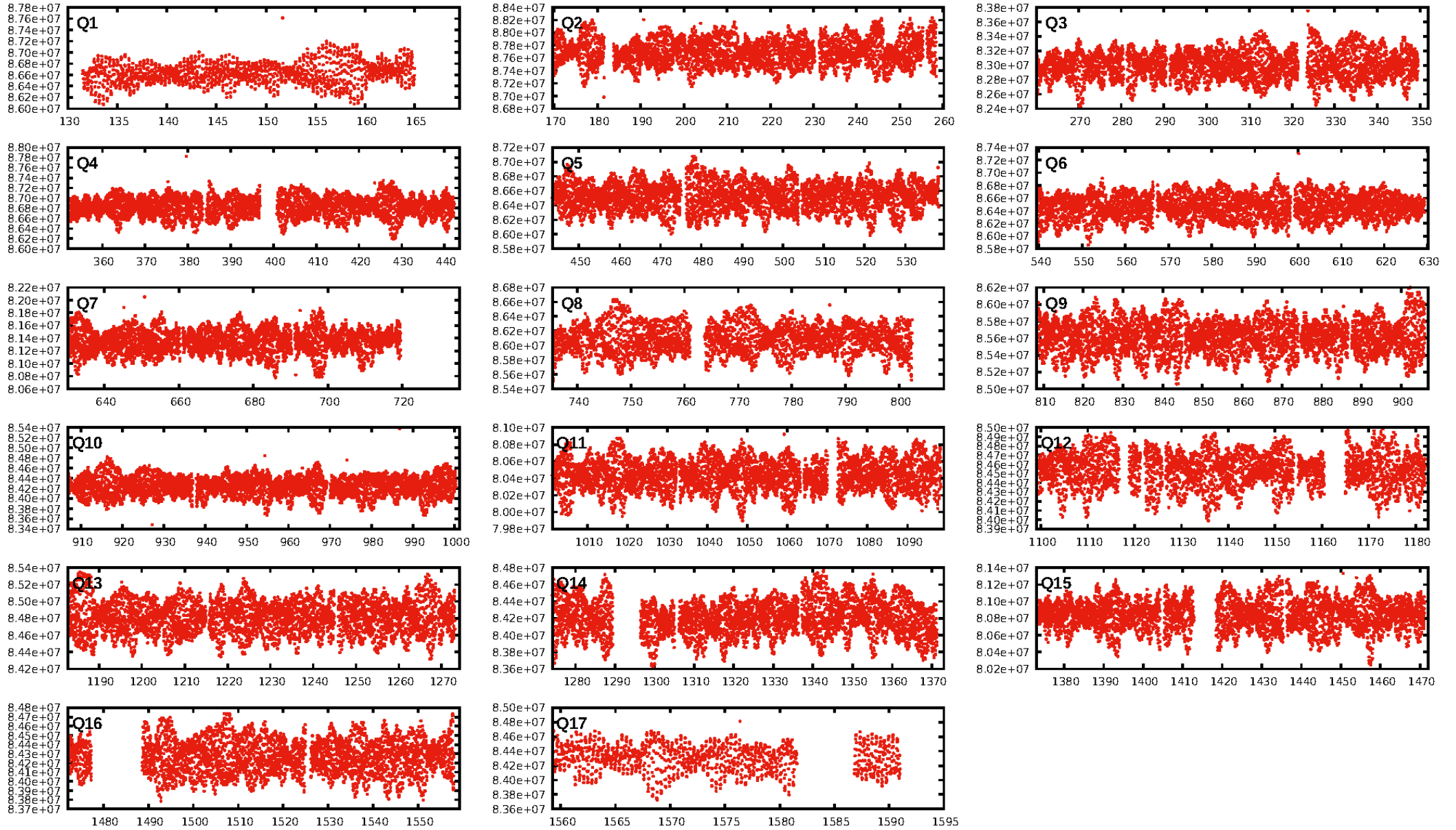
## DV Diagnostic Results:

ShortPeriod-sig: 0.0% [0.00 $\sigma$ ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [520/520]  
GhostDiagnostic-chr: 1.286  
Centroid-sig: 0.0%  
Centroid-so: 1.241 arcsec [4.21 $\sigma$ ]  
OotOffset-rm: 2.926 arcsec [40.32 $\sigma$ ]  
KicOffset-rm: 2.836 arcsec [39.06 $\sigma$ ]  
OotOffset-st: 0/0/0/1 [1]  
KicOffset-st: 0/0/0/1 [1]  
DiffImageQuality-fgm: 0.00 [0/1]  
DiffImageOverlap-fno: 0.00 [0/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 09:34:27 Z

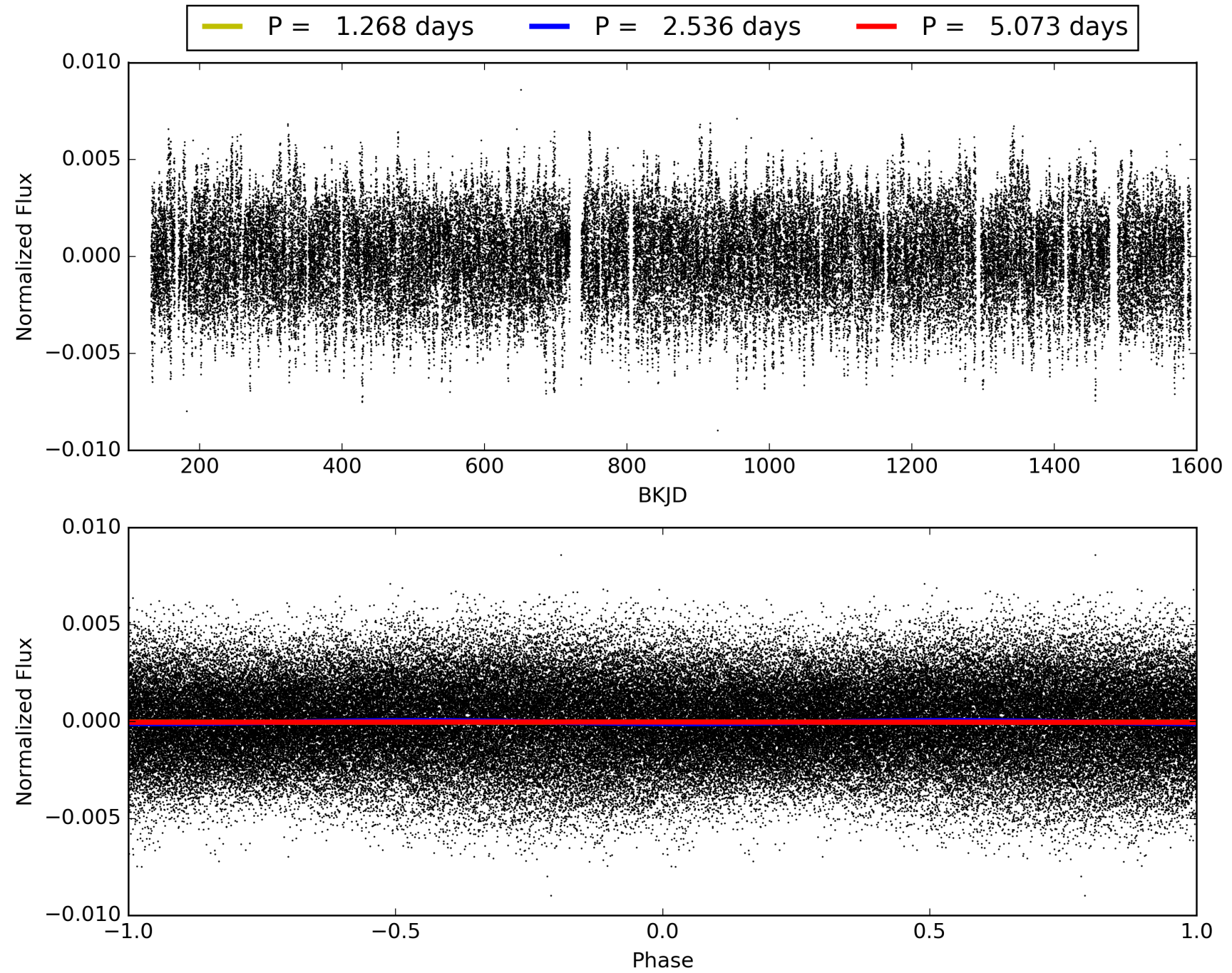
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 008591404-03, PDC Light Curves





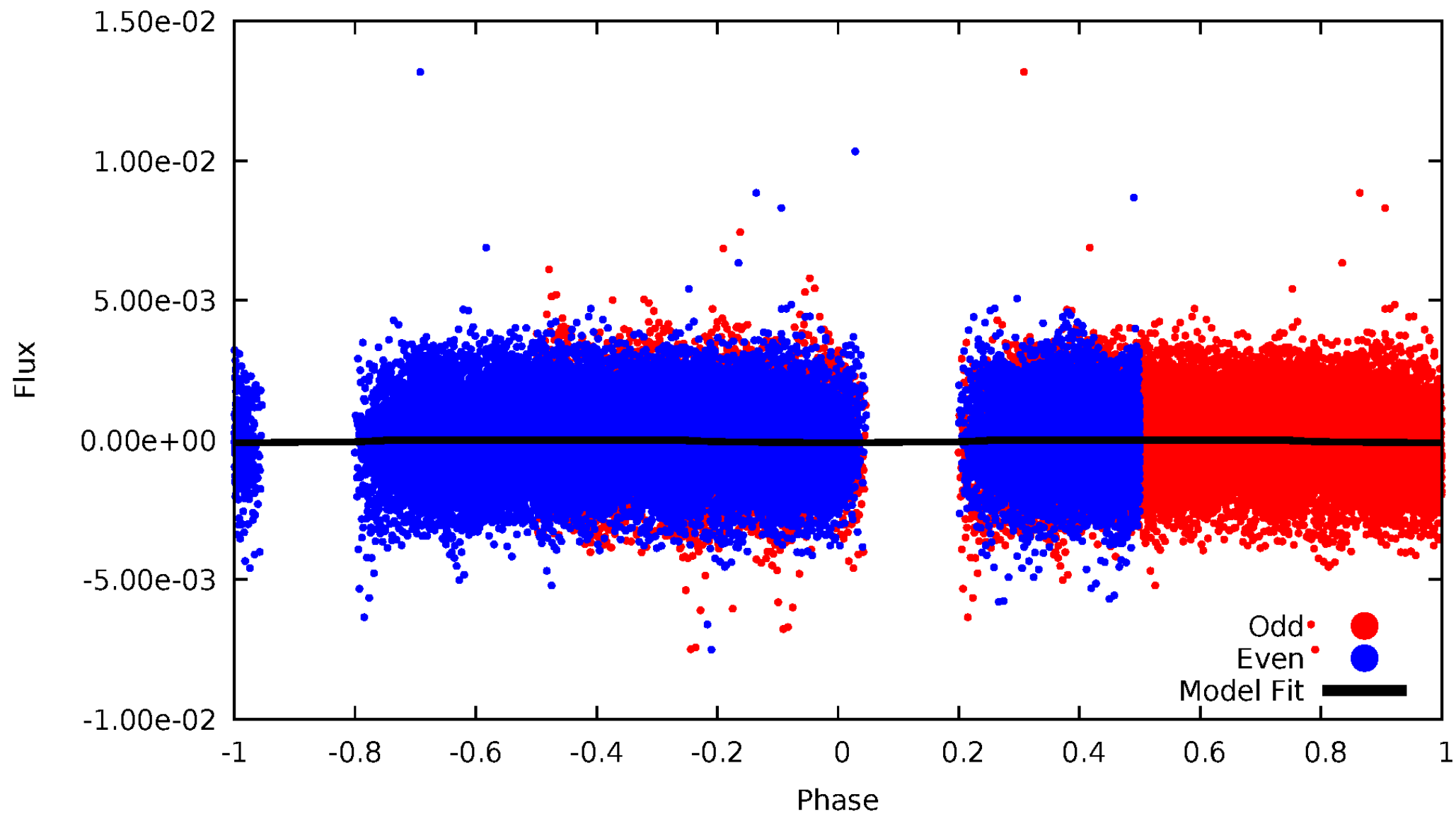
TCE 008591404-03





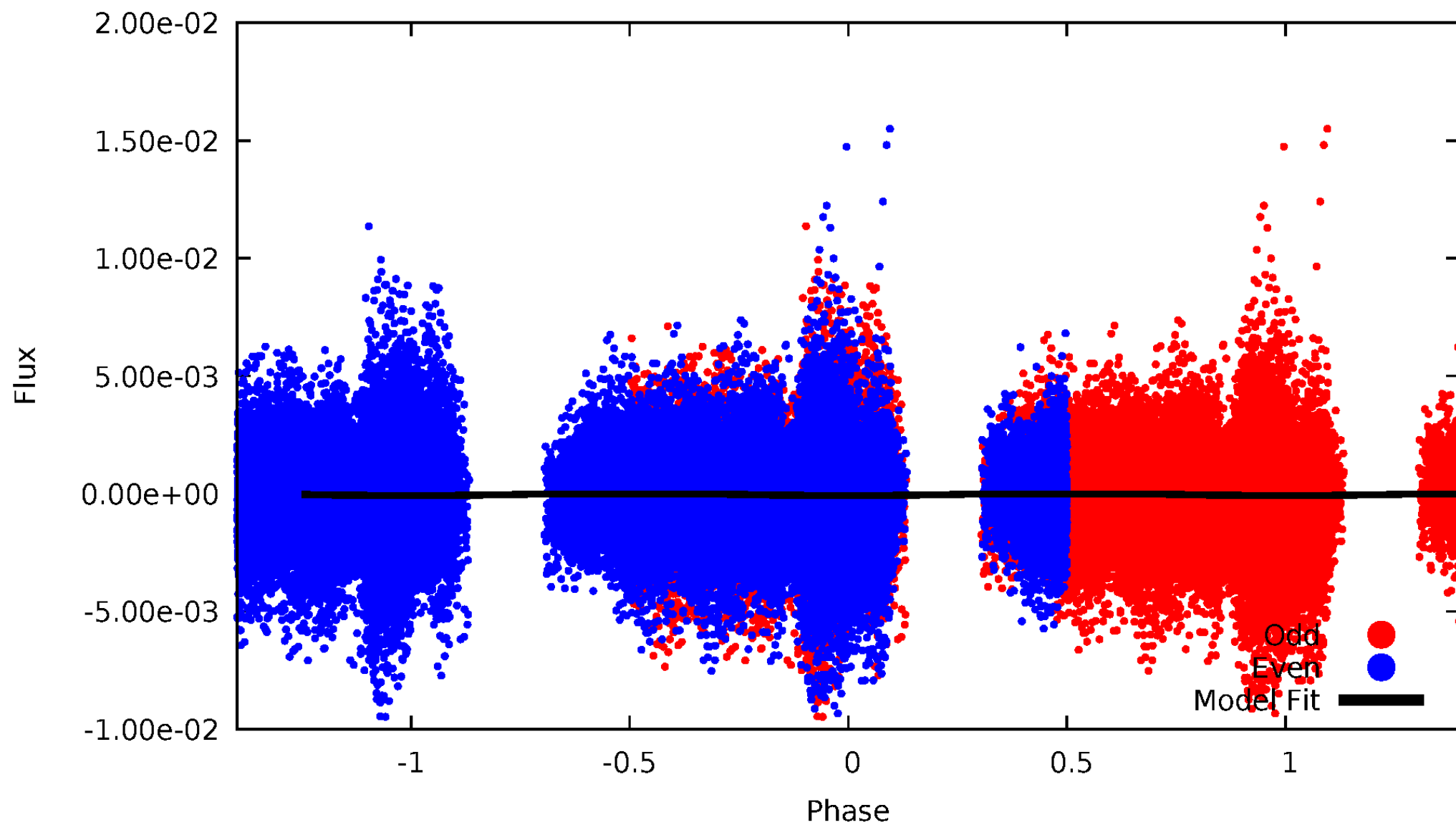
# DV Odd/Even

TCE 008591404-03



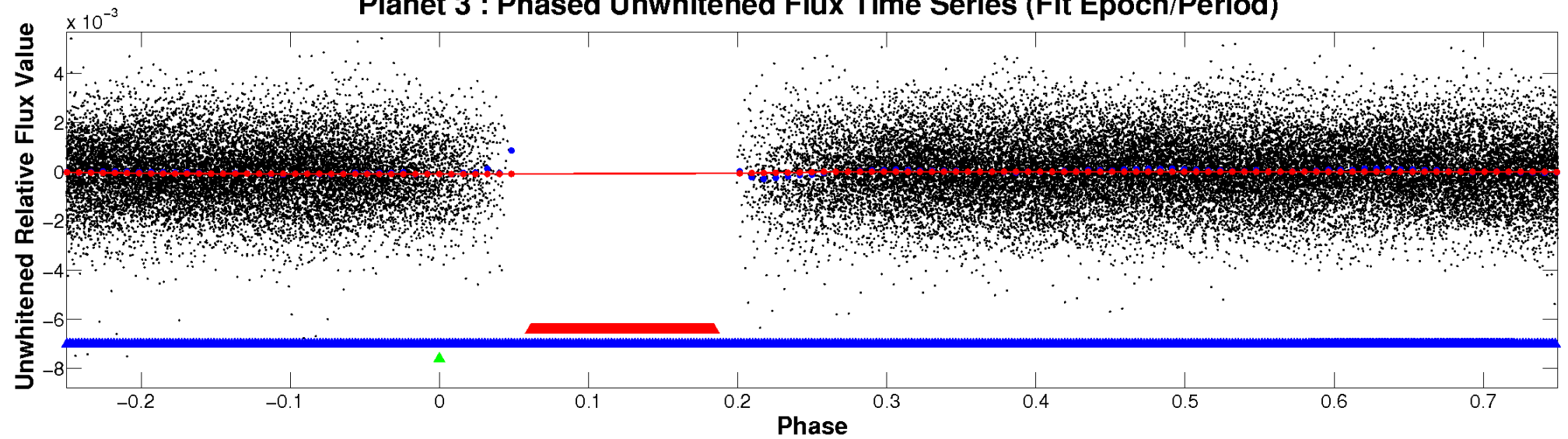
# ALT Odd/Even

TCE 008591404-03

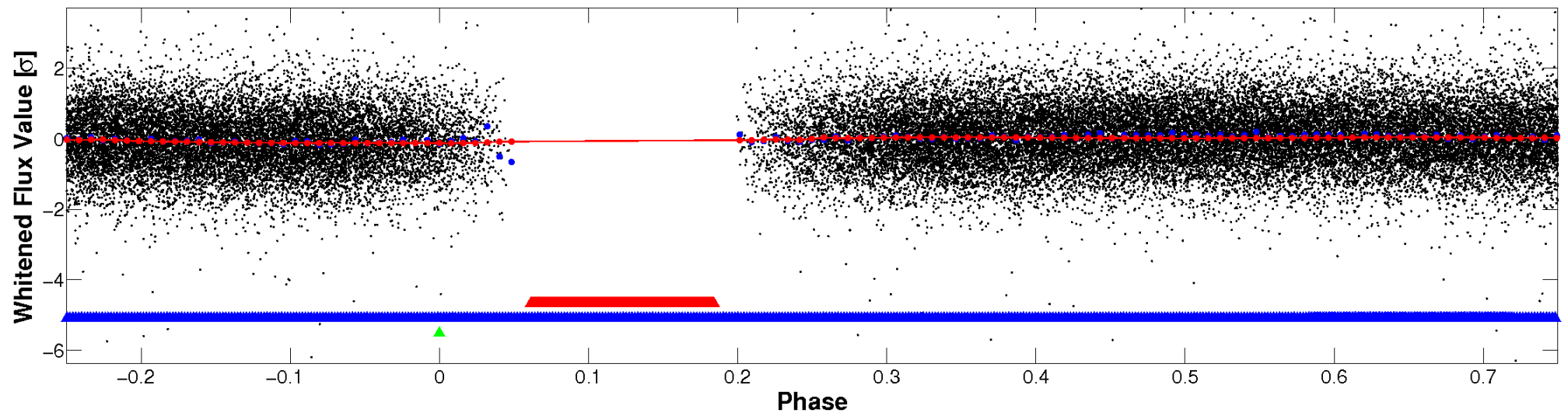


# Non-Whitened Vs. Whitened Light Curve

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

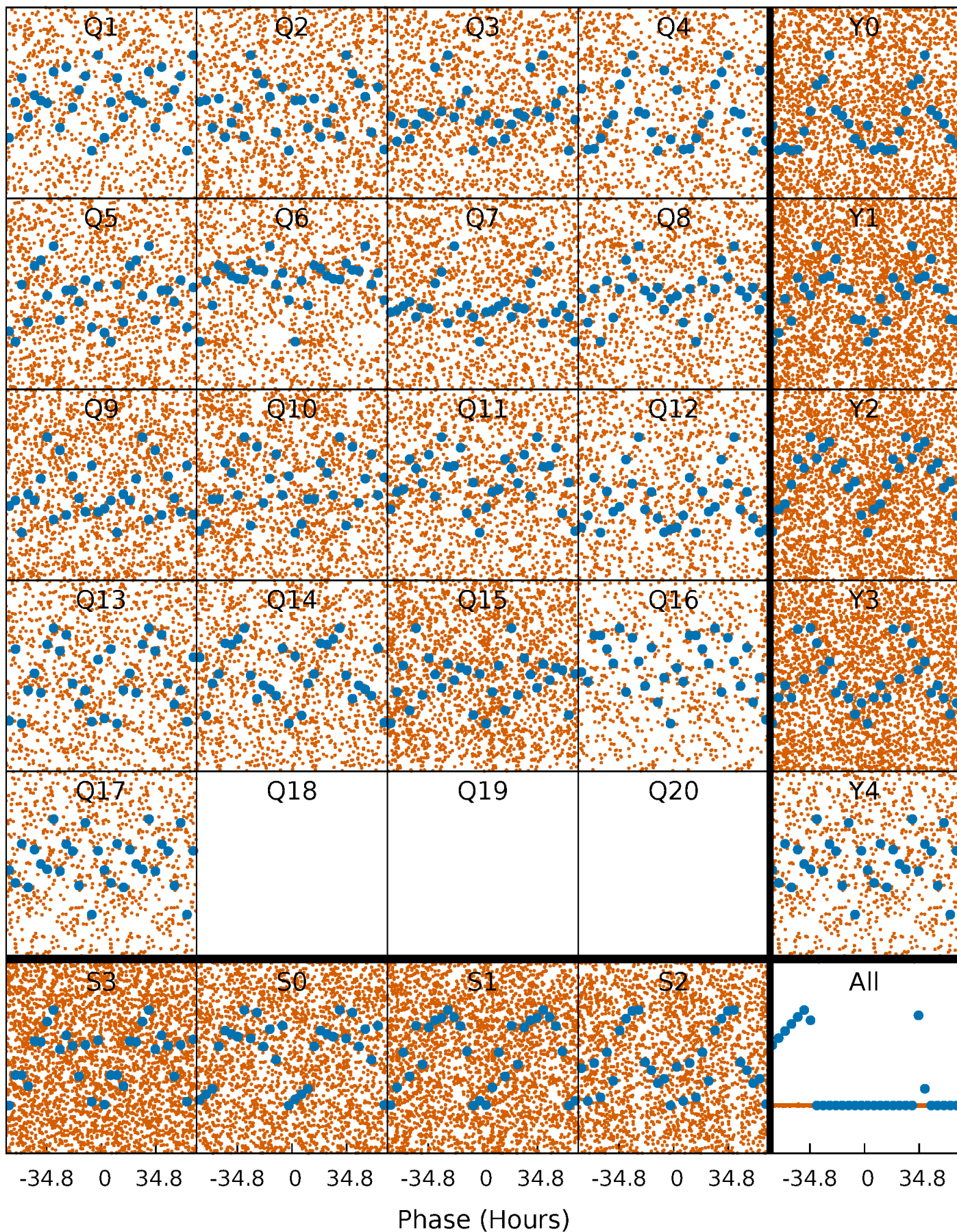


## Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

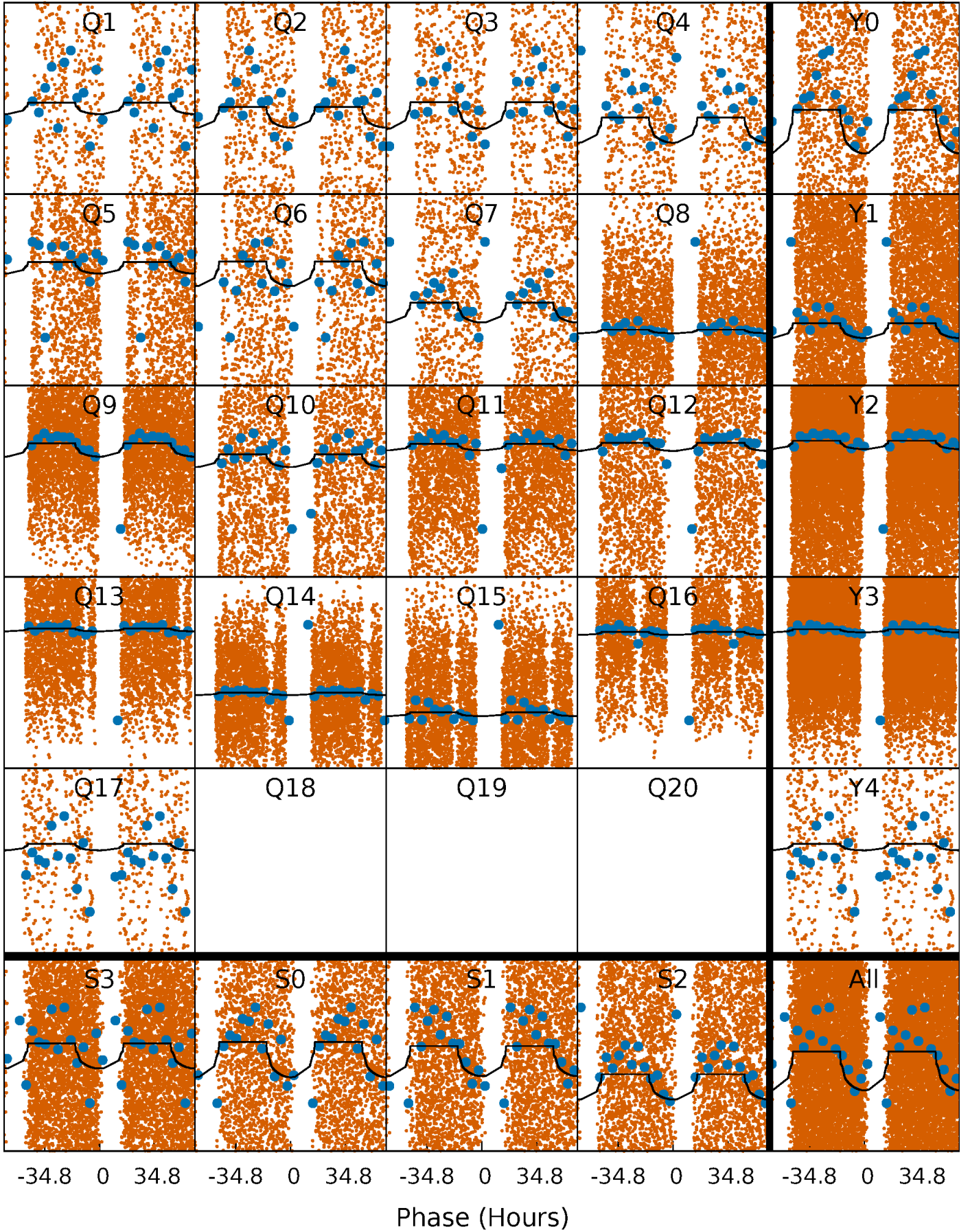
TCE 008591404-03 P= 2.536278 Days  $T_0=133.853880$  (BKJD)





# DV Quarter-Phased Transit Curves

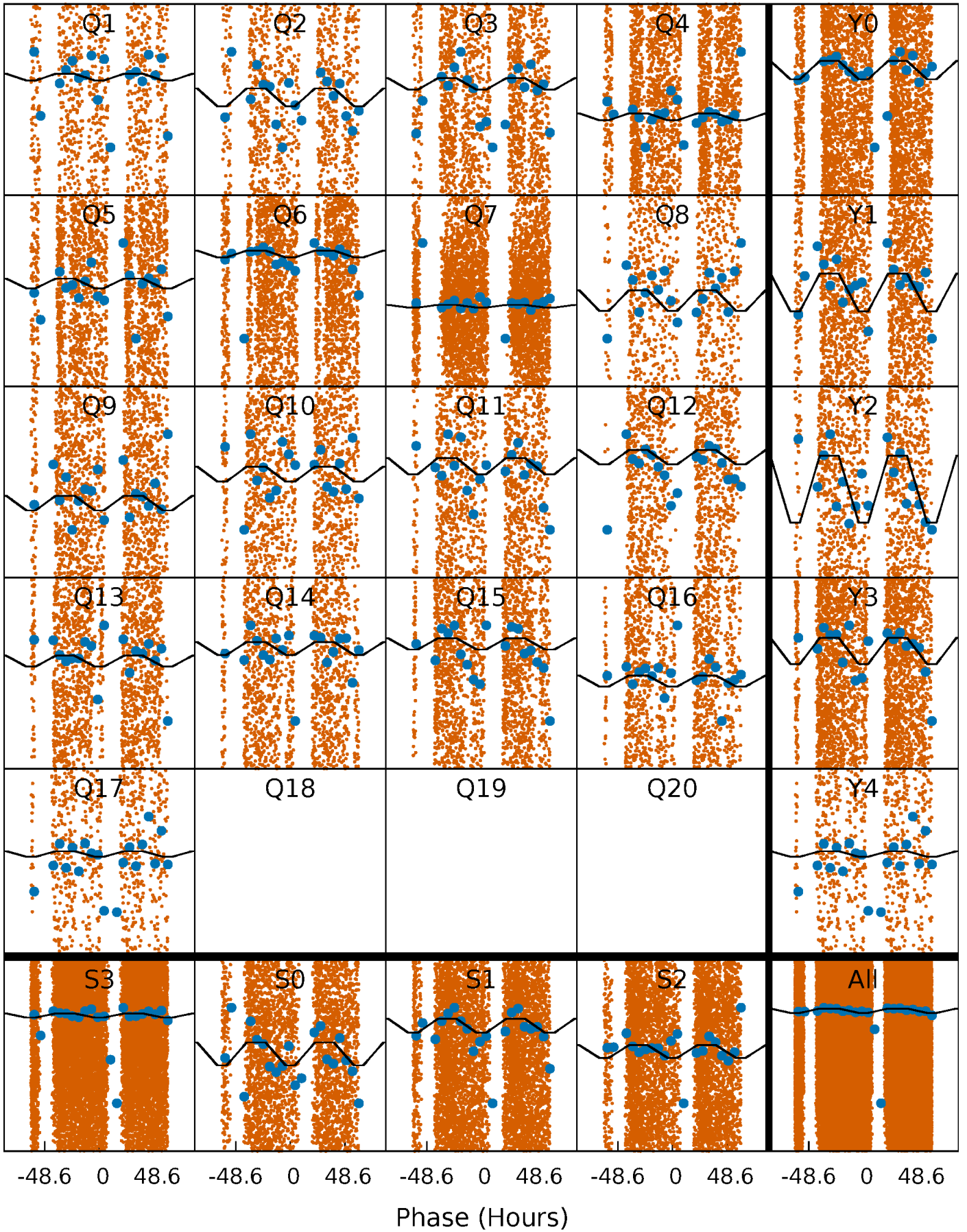
TCE 008591404-03     $P = 2.536278$  Days     $T_0 = 133.853880$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

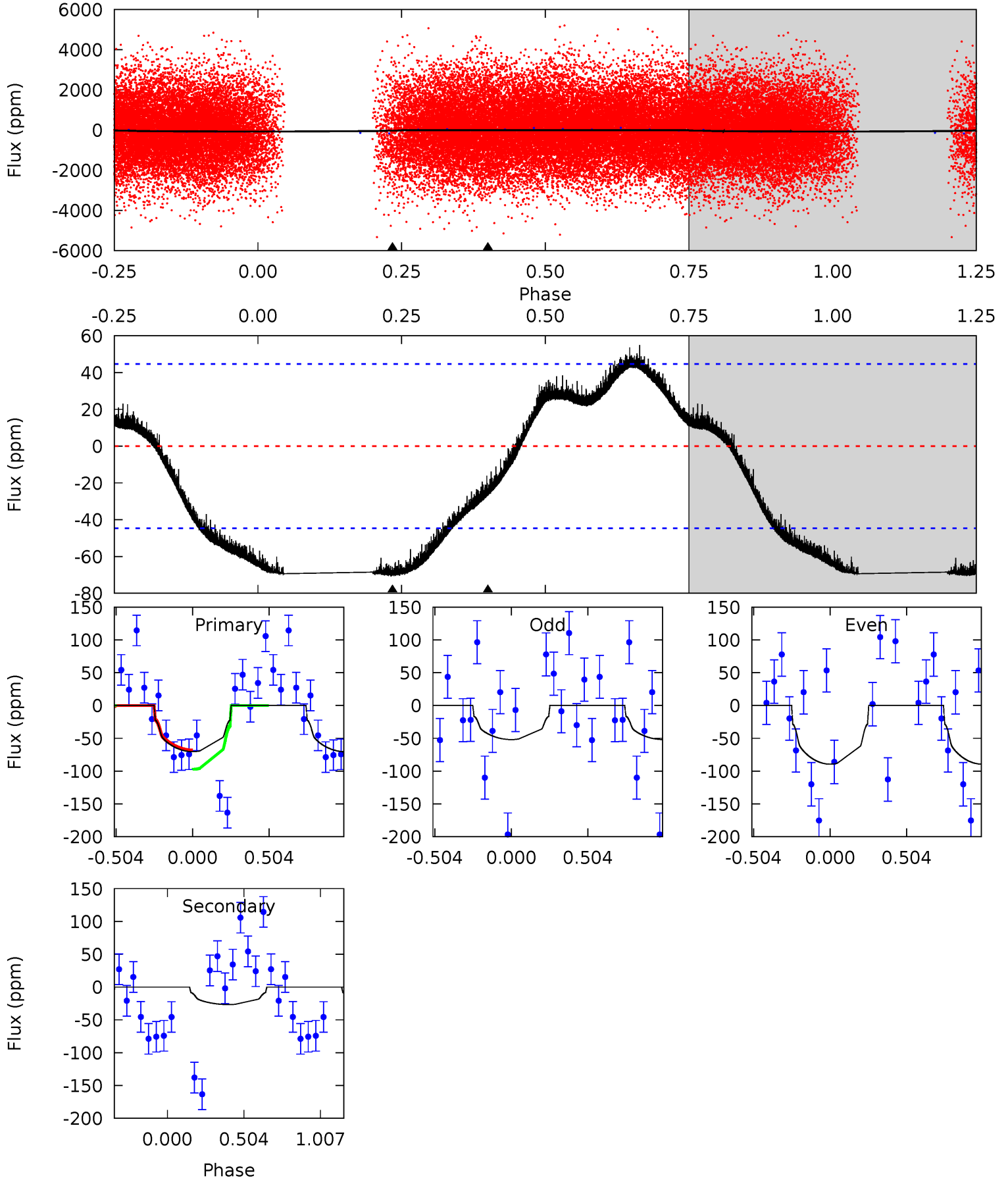
TCE 008591404-03   P= 2.536198 Days    $T_0=133.633334$  (BKJD)



# DV Model-Shift Uniqueness Test

008591404-03, P = 2.536278 Days, E = 131.317602 Days

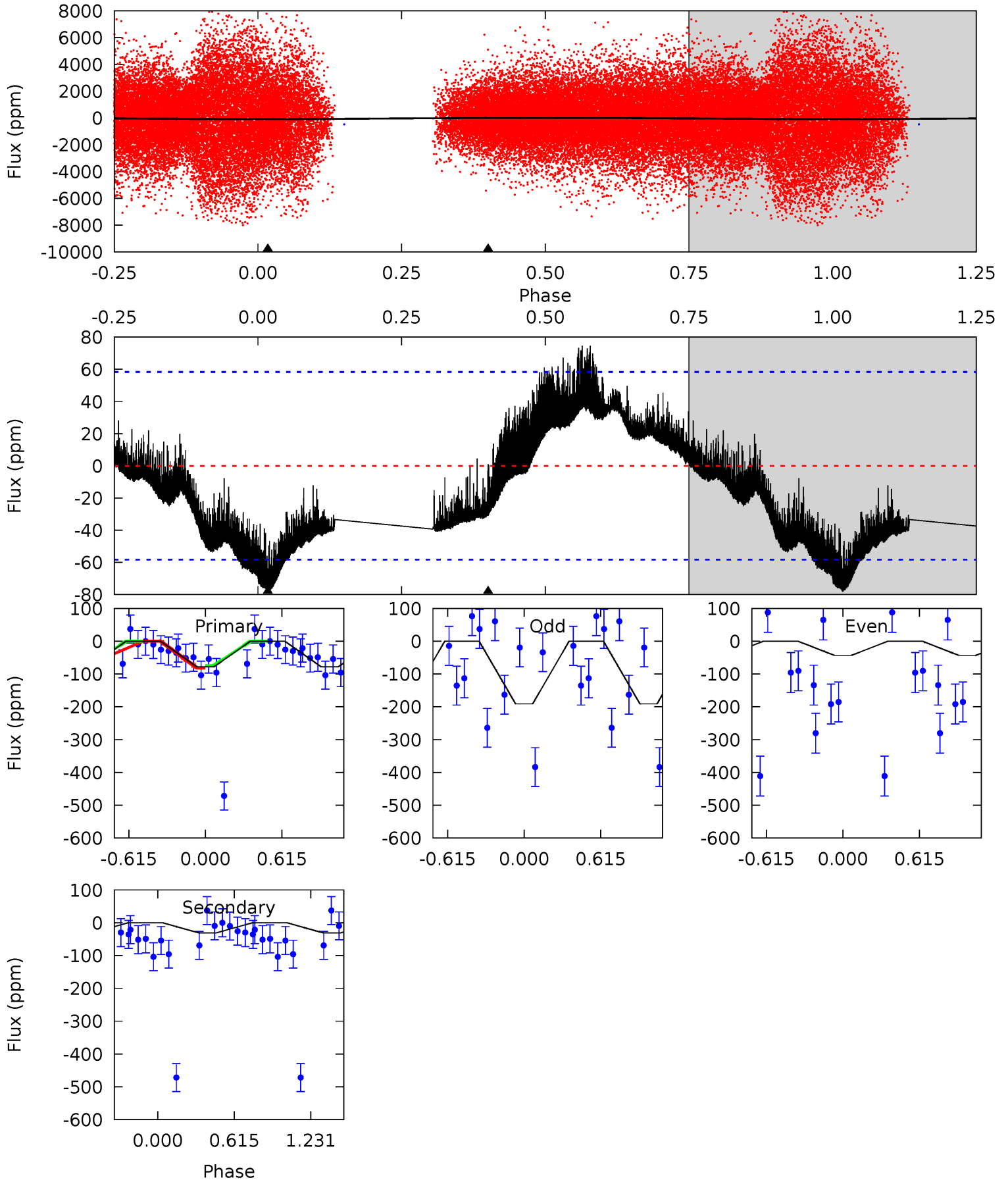
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
6.64	2.52	0	0	4.21	0.67	0.87	6.64	6.64	2.52	2.52	1.73	1.21	0.44	0.77



# Alt Model-Shift Uniqueness Test

008591404-03, P = 2.536198 Days, E = 131.097136 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
5.58	2.22	0	0	4.17	0.50	0.53	5.58	5.58	2.22	2.22	4.59	0.83	0.49	0.27



### Stellar Parameters For KIC 008591404

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6629^{+161}_{-241}$	$4.327^{+0.070}_{-0.210}$	$-0.080^{+0.250}_{-0.300}$	$1.268^{+0.432}_{-0.154}$	$1.251^{+0.187}_{-0.187}$	$0.864^{+0.322}_{-0.451}$
	+2%/-4%	+2%/-5%	+312%/-375%	+34%/-12%	+15%/-15%	+37%/-52%
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 008591404-03 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-27 \pm 11$	$1.42^{+0.28}_{-0.17}$	$2359^{+194}_{-122}$	$4840^{+408}_{-469}$	$11^{+6}_{-5}$
Alt.	$-31 \pm 14$	$1.31^{+0.24}_{-0.19}$	$2371^{+183}_{-135}$	$5161^{+584}_{-645}$	$14^{+9}_{-7}$

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

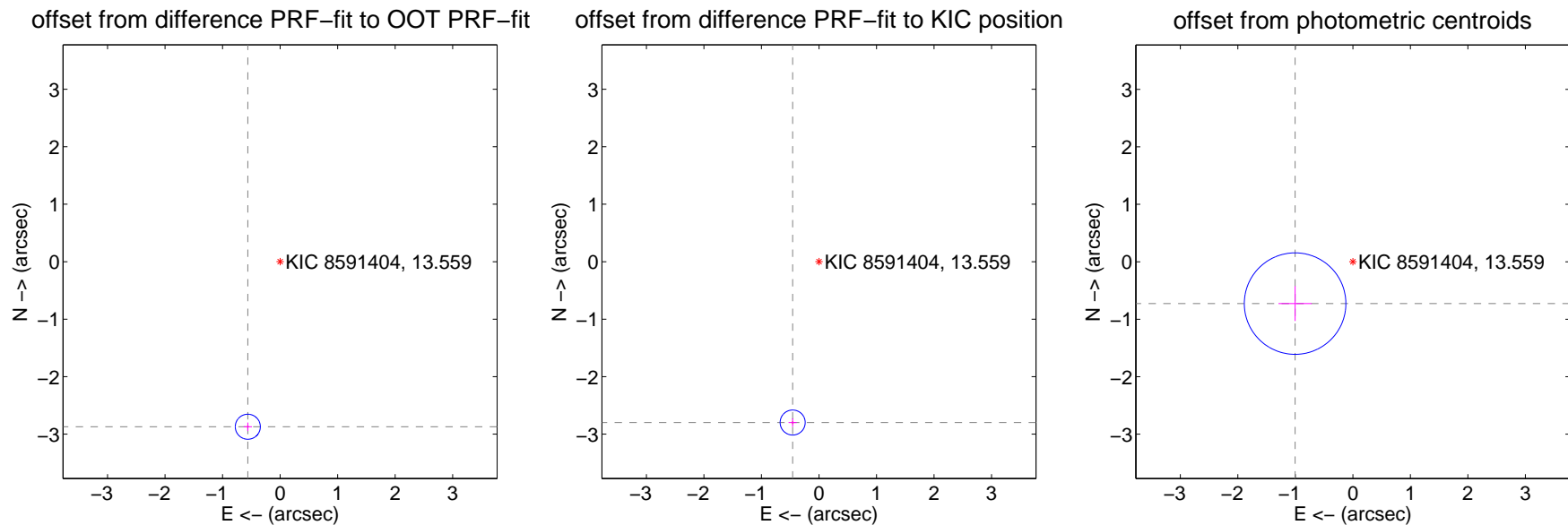
## DV Centroid Data

Supplemental centroid analysis for 008591404-03. Kepler magnitude: 13.56. Transit SNR 12.67

There are 0 quarters with good PRF difference image offsets

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

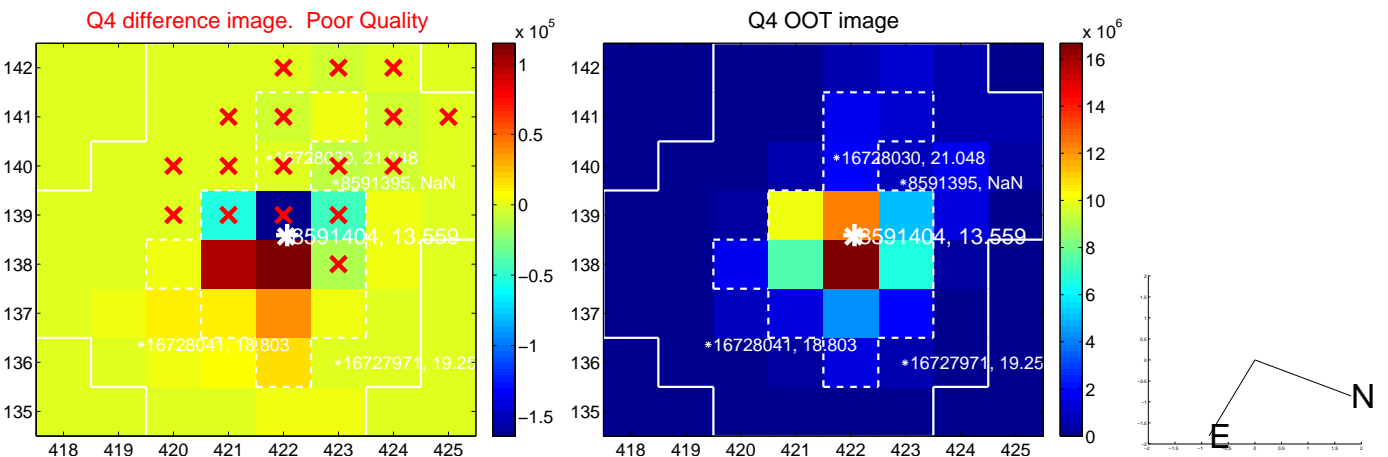
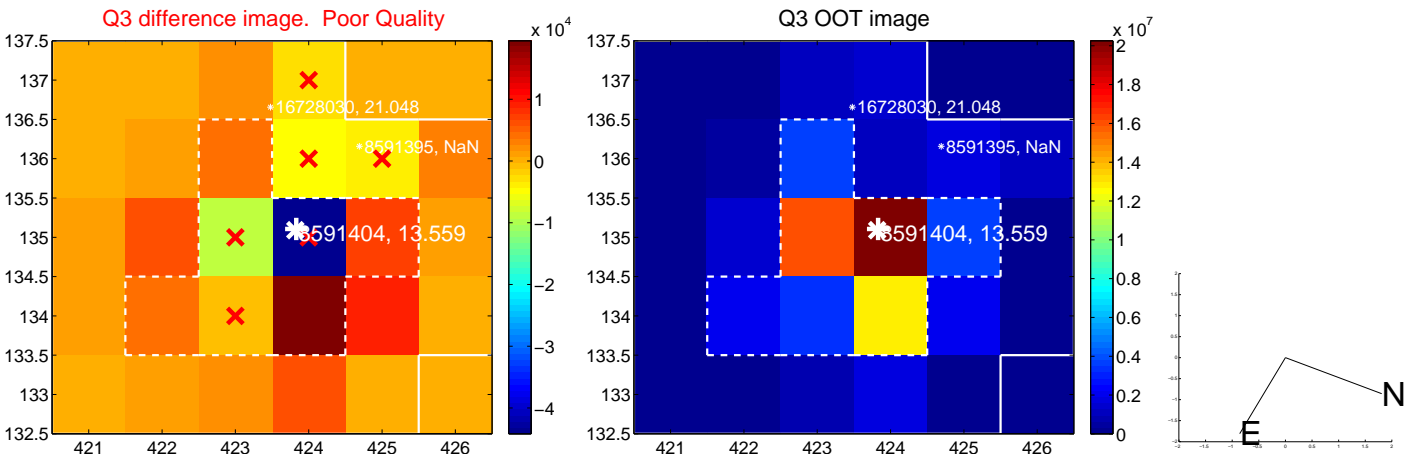
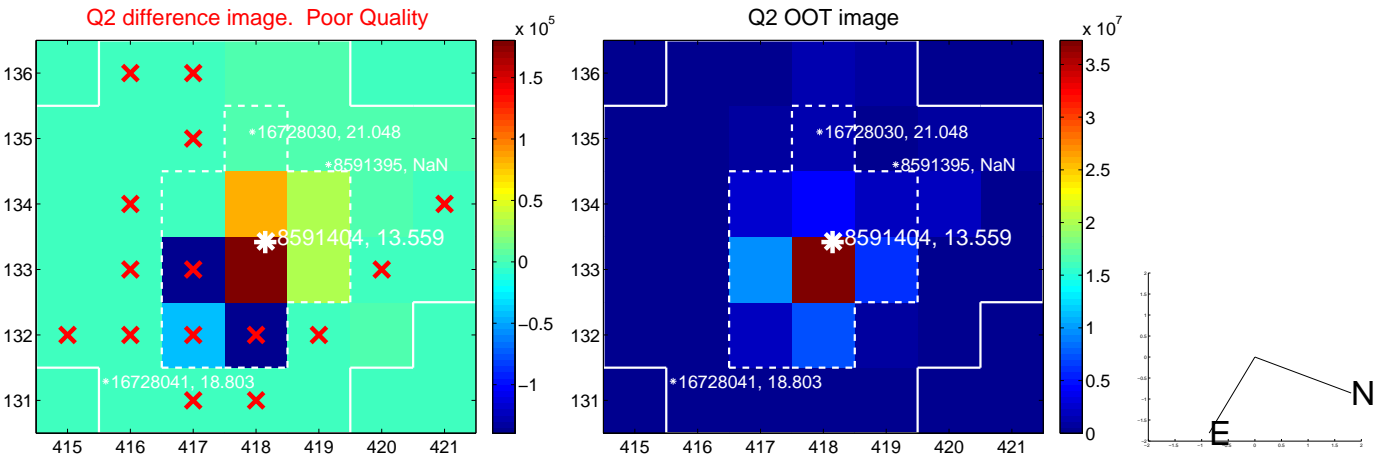
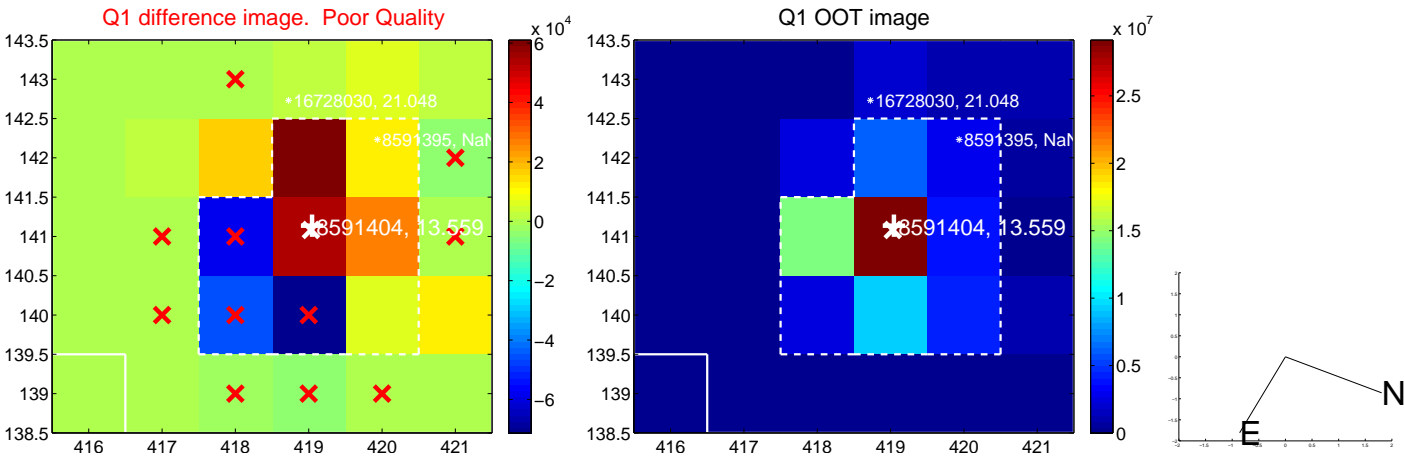
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$2.926 \pm 0.073$	40.32	$0.562 \pm 0.071$	$-2.872 \pm 0.073$
PRF-fit source offset from KIC position	$2.836 \pm 0.073$	39.06	$0.458 \pm 0.071$	$-2.799 \pm 0.073$
photometric centroid source offset	$1.24 \pm 0.29$	4.21	$1.00 \pm 0.29$	$-0.73 \pm 0.30$



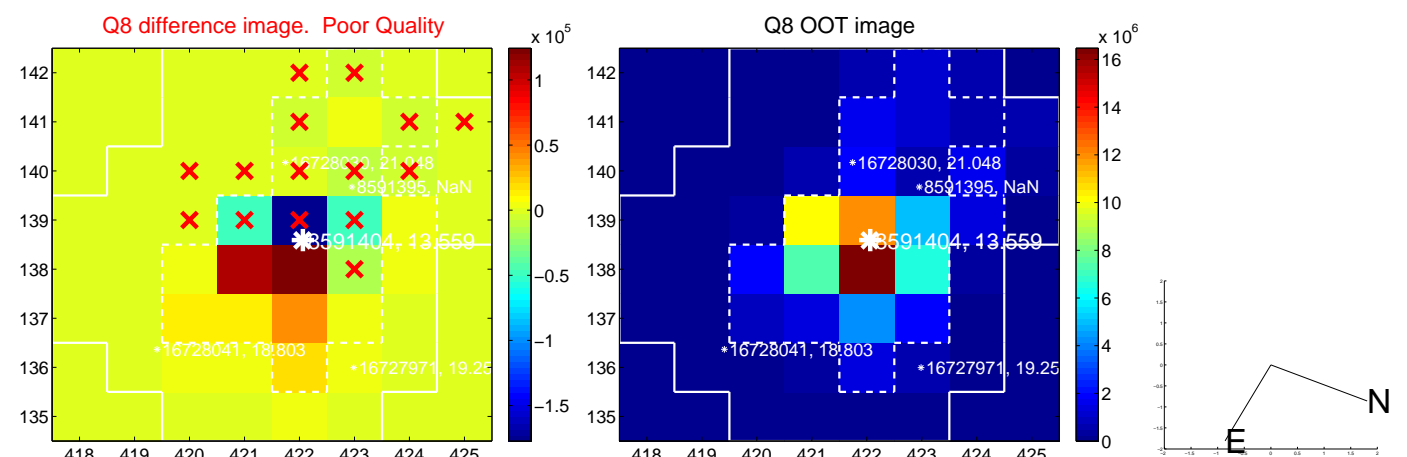
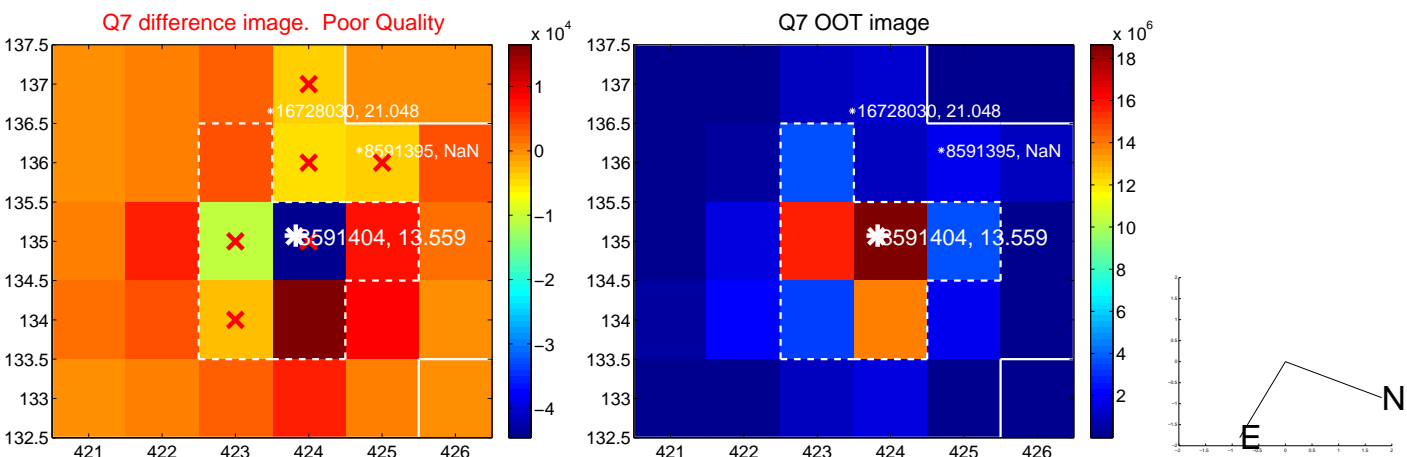
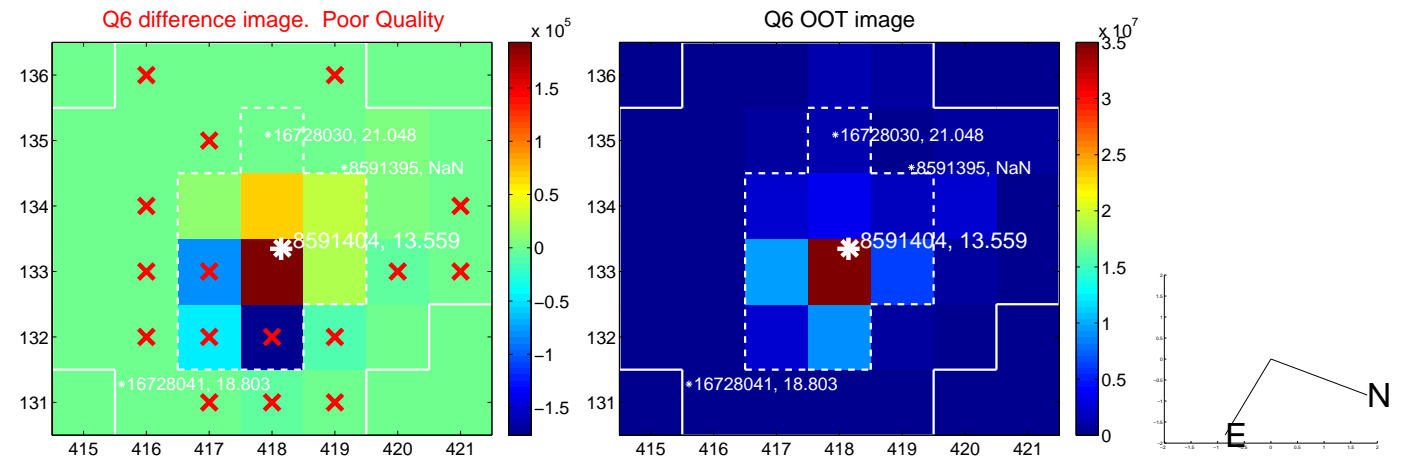
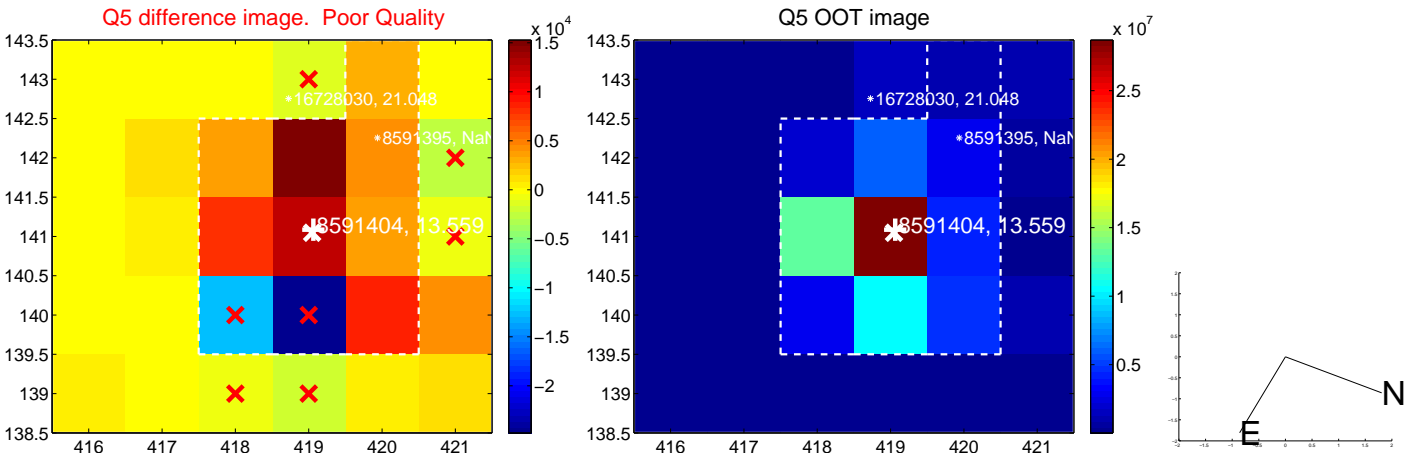
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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



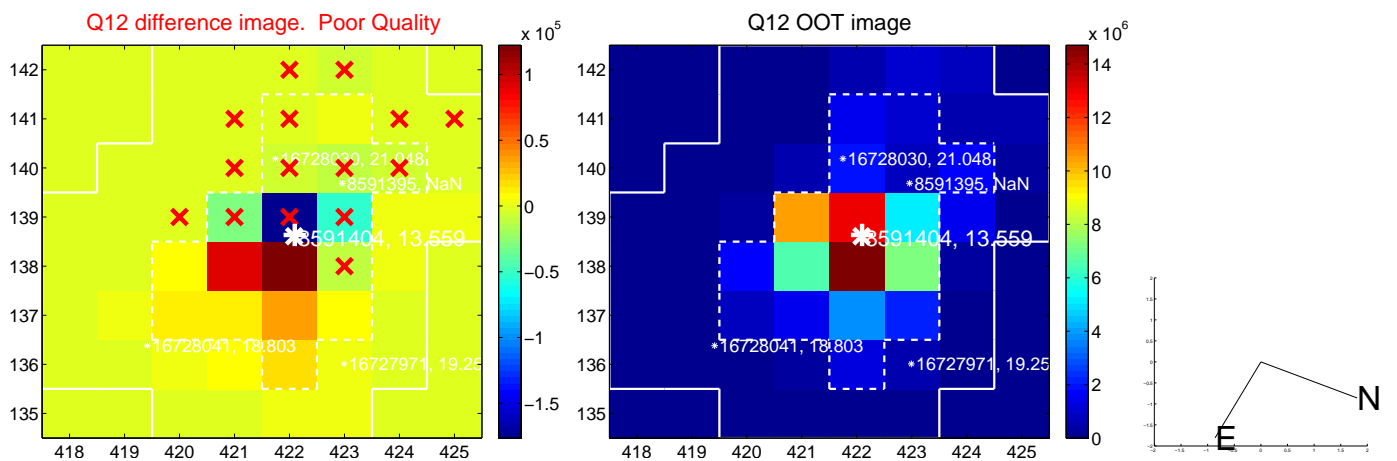
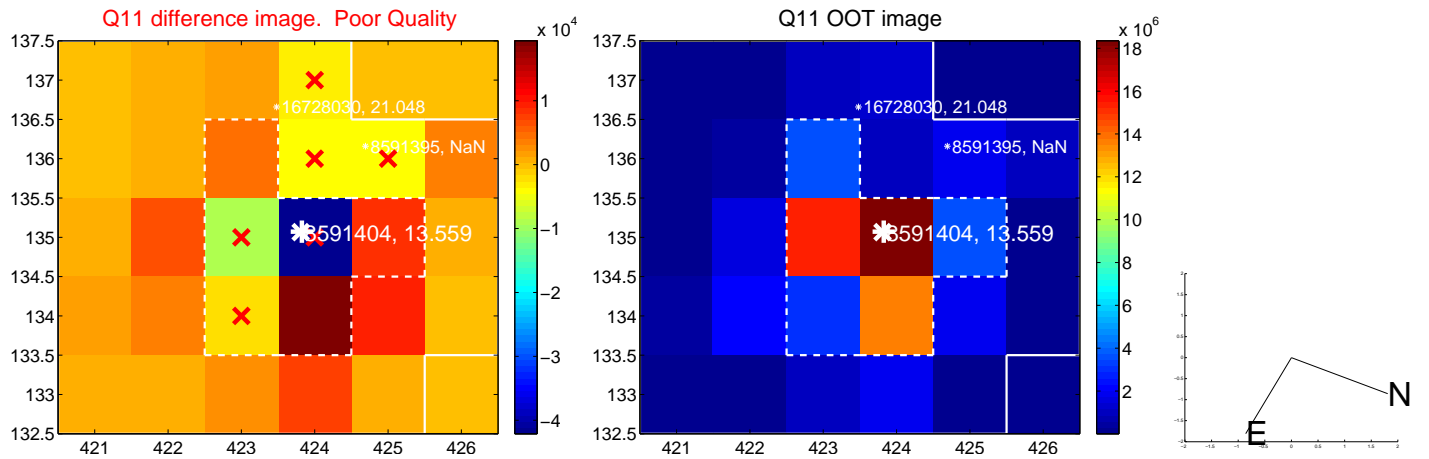
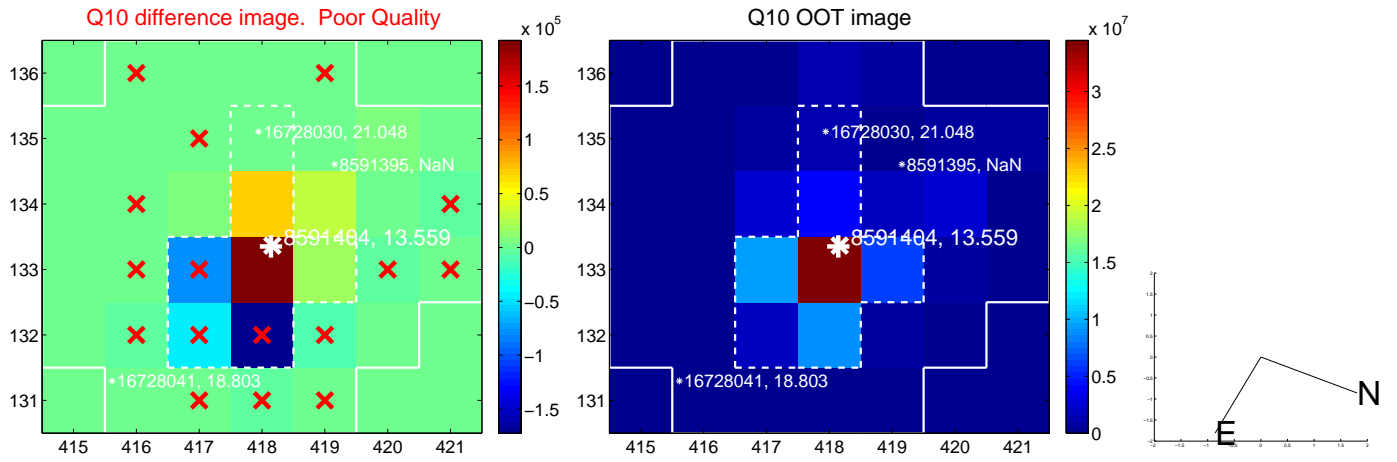
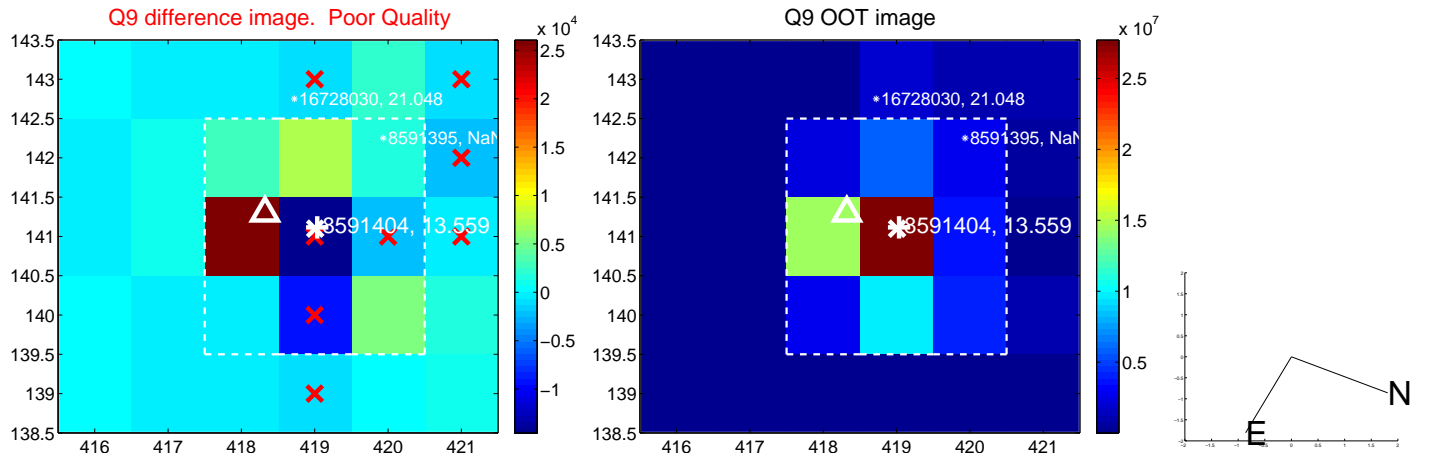
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



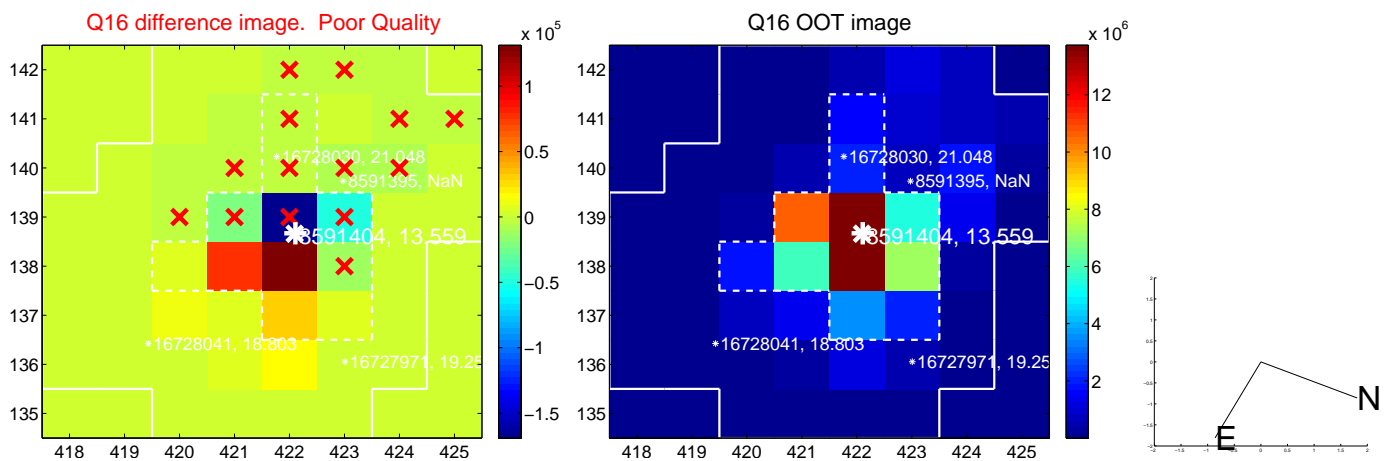
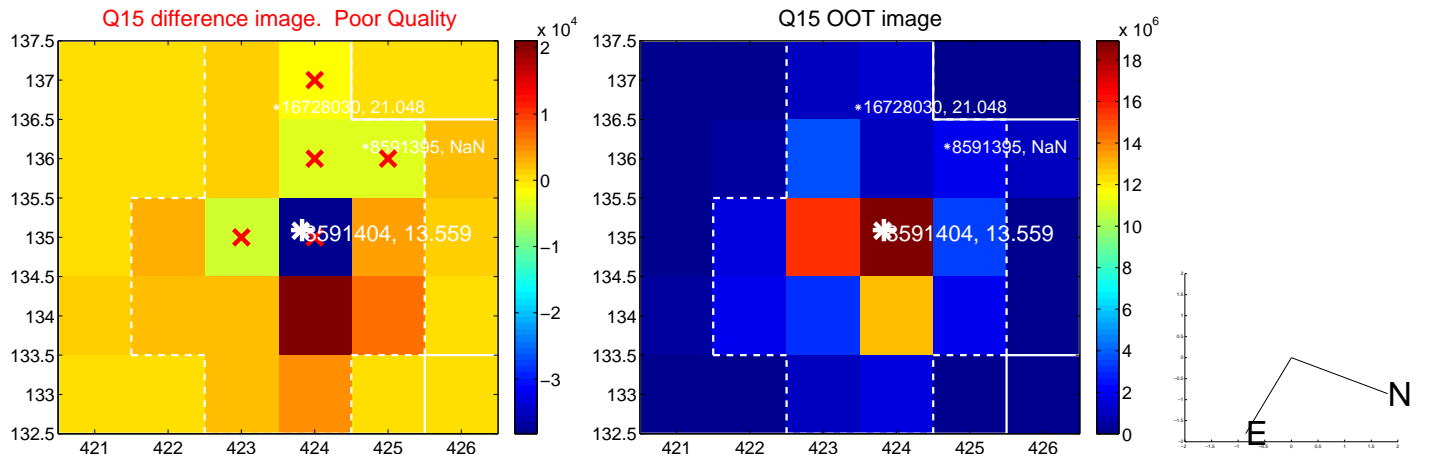
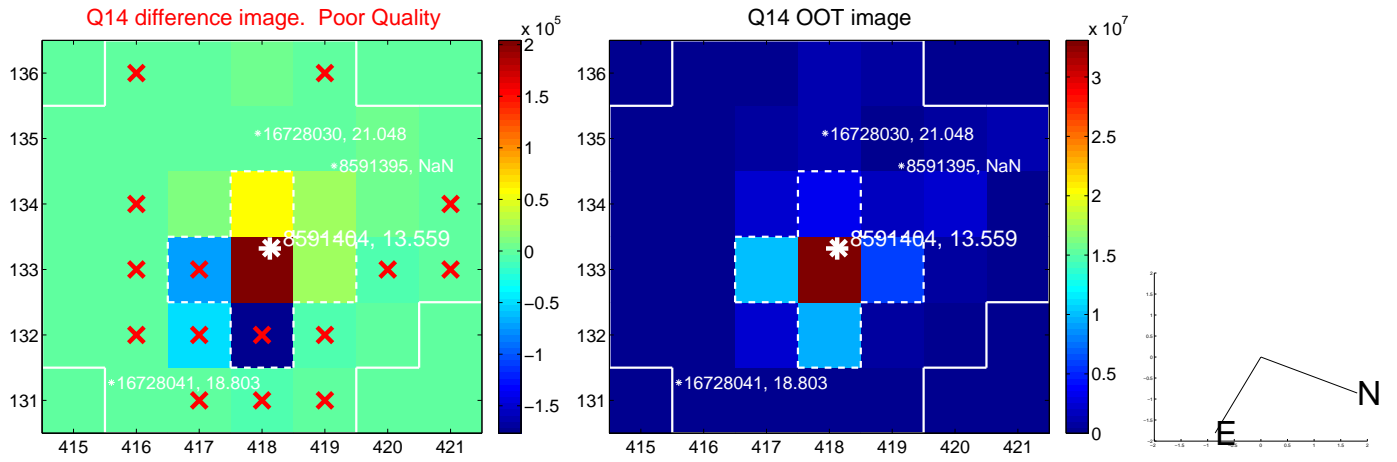
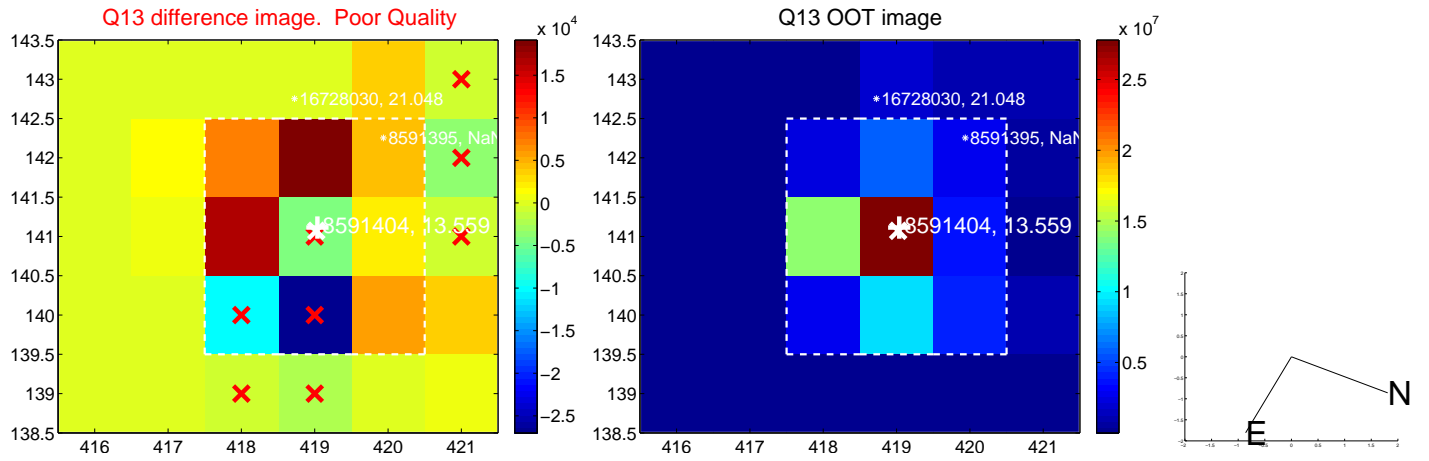
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



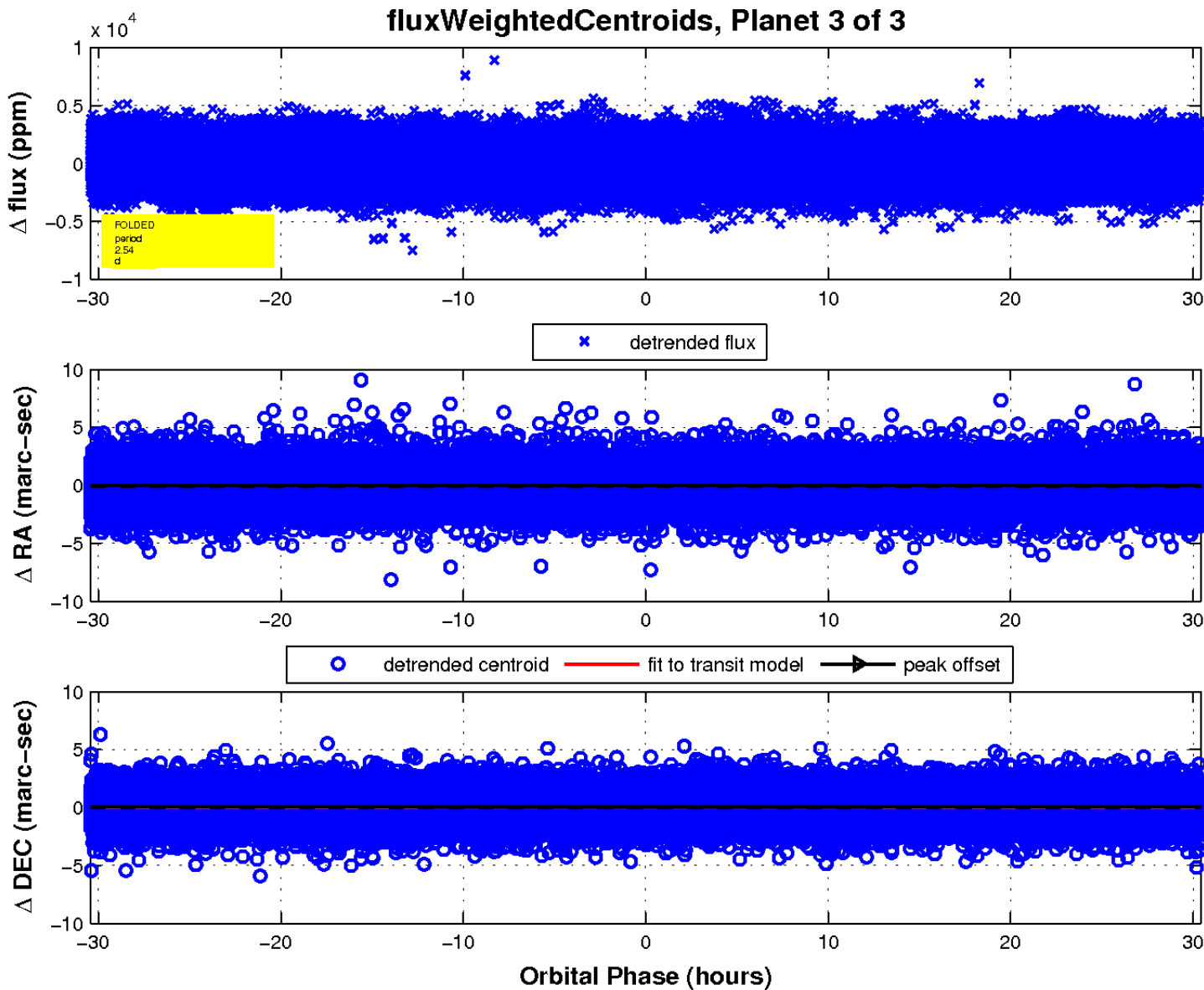
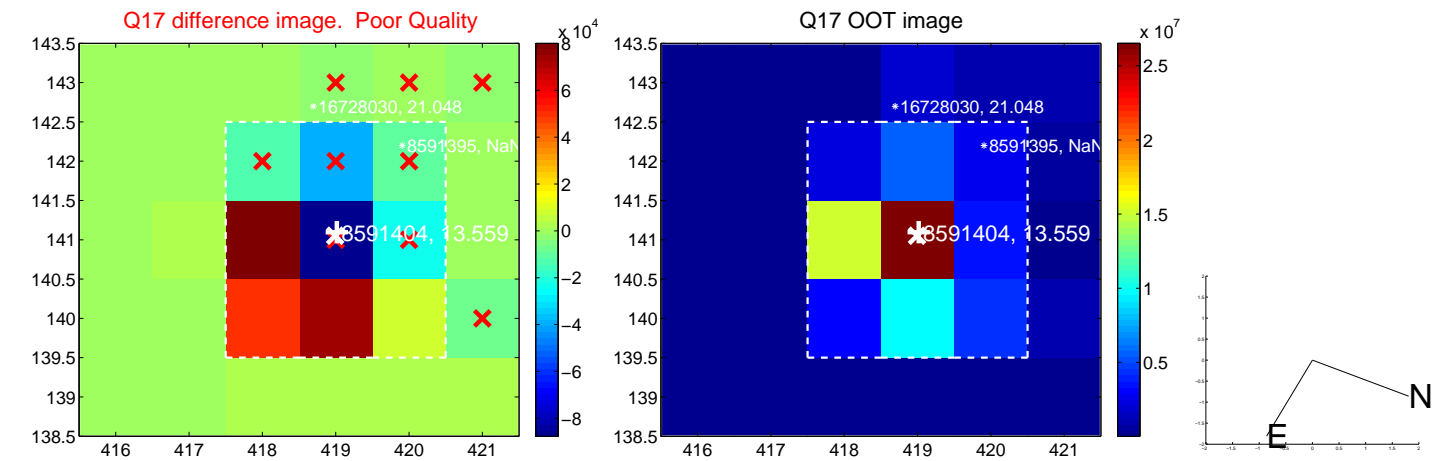
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

