

# KIC 008644288

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008644288-01	OBS	0137.02	14.858912	143.013066	3260.4	3.663	399.4	370.8	1.05	5356	6.45	63.65
008644288-02	OBS	0137.01	7.641560	135.408964	2258.0	3.622	366.3	359.8	1.05	5356	5.51	154.47
008644288-03	OBS	0137.03	3.504711	133.510890	284.7	2.159	50.8	57.4	1.05	5356	2.14	436.74

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008644288-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
008644288-02	OBS	PC	1.00	0	0	0	0	NO_COMMENT
008644288-03	OBS	PC	1.00	0	0	0	0	NO_COMMENT

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

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

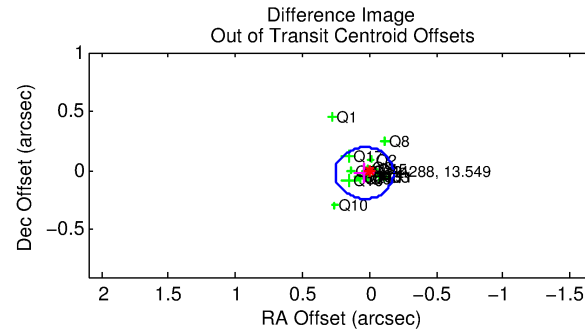
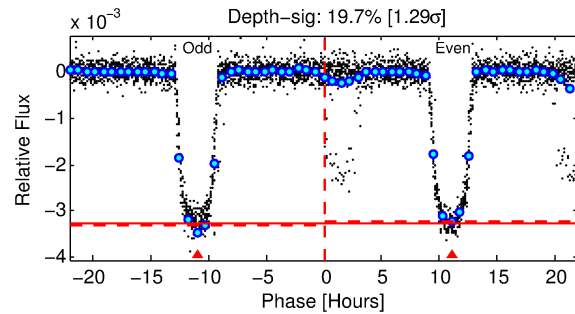
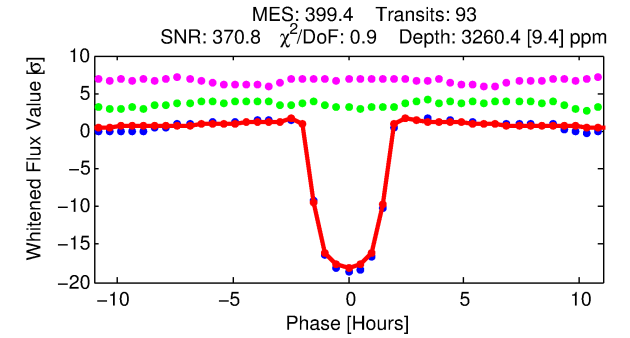
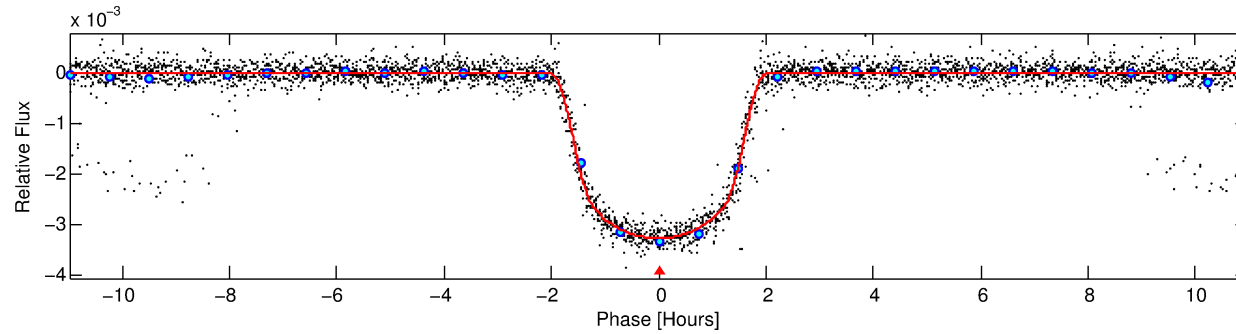
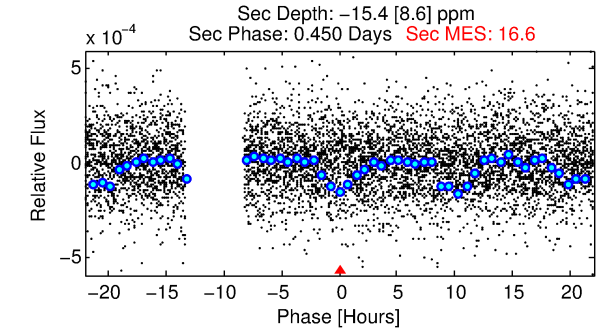
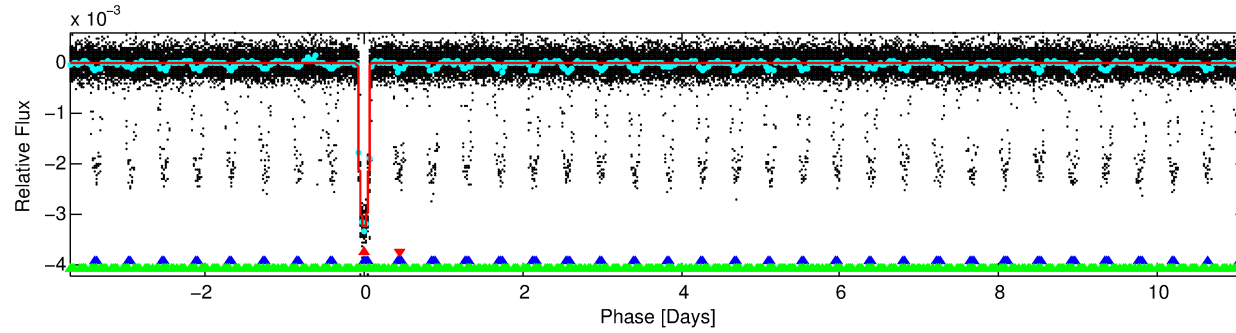
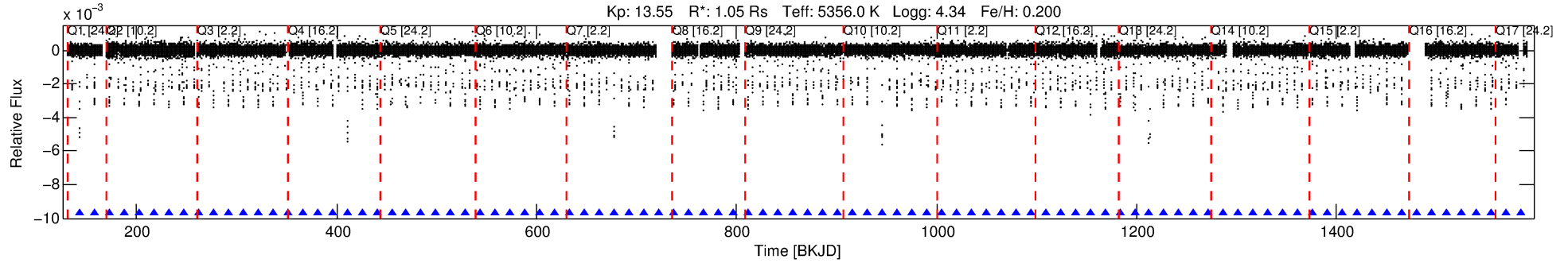
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 008644288-01

No Significant Match Found

# DV One-Page Summary

KIC: 8644288 Candidate: 1 of 3 Period: 14.859 d  
KOI: K00137.02 Name: Kepler-18d Corr: 0.977



## DV Fit Results:

Period = 14.85891 [0.00000] d  
Epoch = 143.0131 [0.0002] BKJD  
Rp/R\* = 0.0560 [0.0007]  
a/R\* = 24.32 [1.13]  
b = 0.71 [0.03]  
Seff = 63.65 [8.78]  
Teff = 720 [25] K  
Rp = 6.45 [0.45] Re  
a = 0.1136 [0.0077] AU  
Ag = N/A  
Teffp = N/A

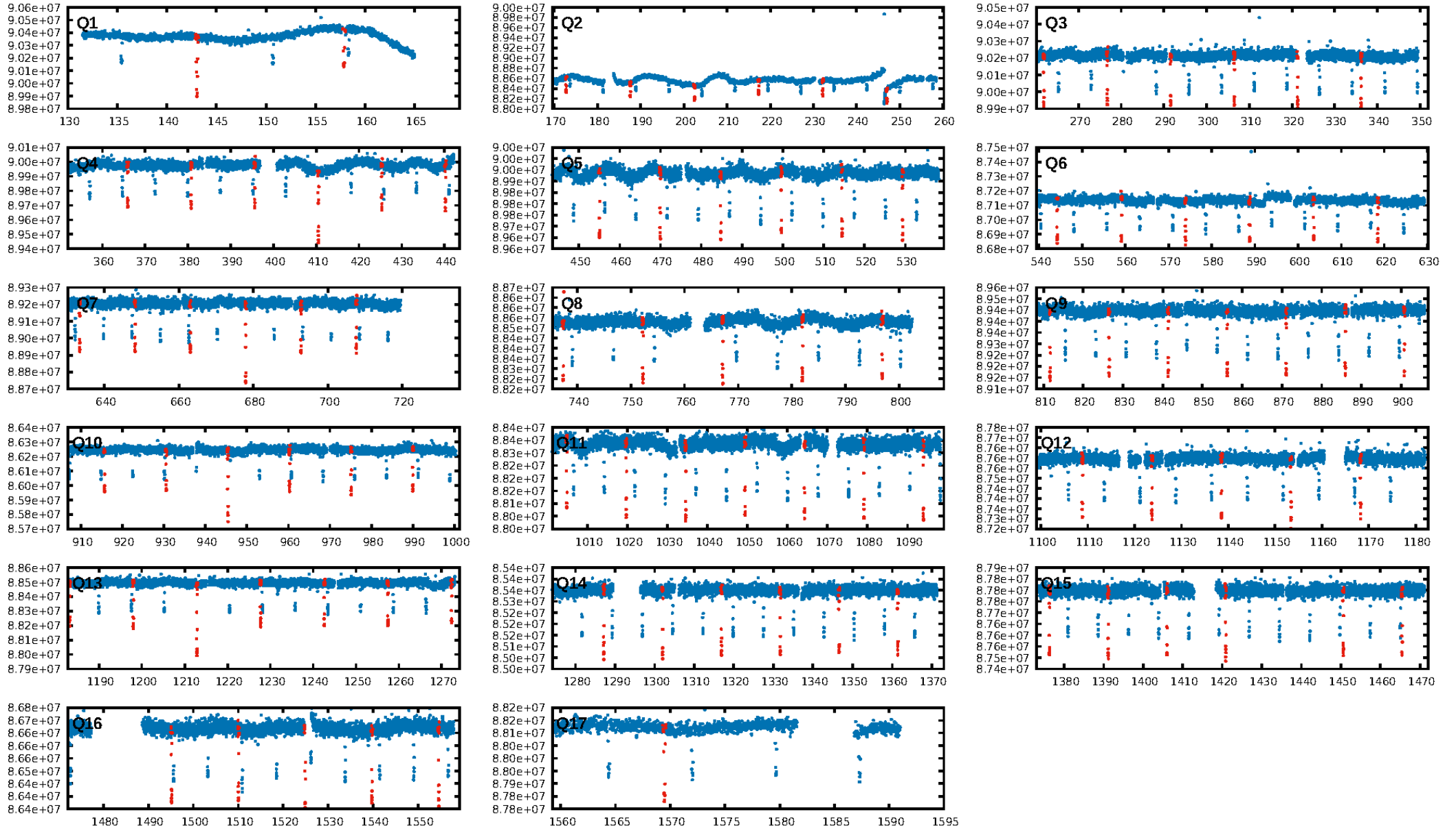
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [33.63 $\sigma$ ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 65.3%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 0.00e+00  
RollingBand-fgt: 1.00 [90/90]  
GhostDiagnostic-chr: 7.298  
Centroid-sig: N/A  
**Centroid-so: 0.149 arcsec [4.40 $\sigma$ ]**  
OotOffset-rm: 0.043 arcsec [0.60 $\sigma$ ]  
KicOffset-rm: 0.159 arcsec [2.01 $\sigma$ ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 1.00 [17/17]  
DiffImageOverlap-fno: 0.94 [16/17]

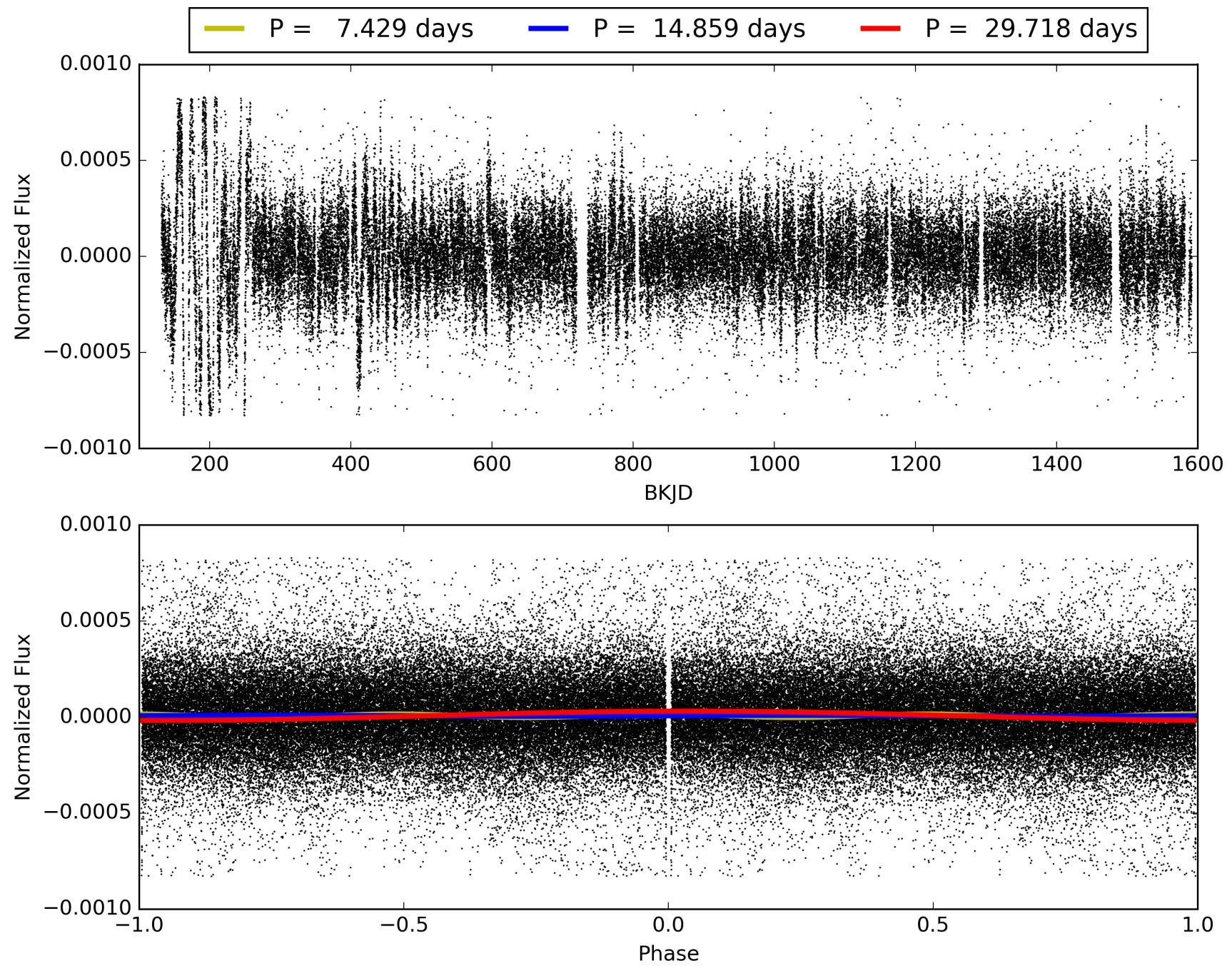
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 12:49:56 Z

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

# TCE 008644288-01, PDC Light Curves

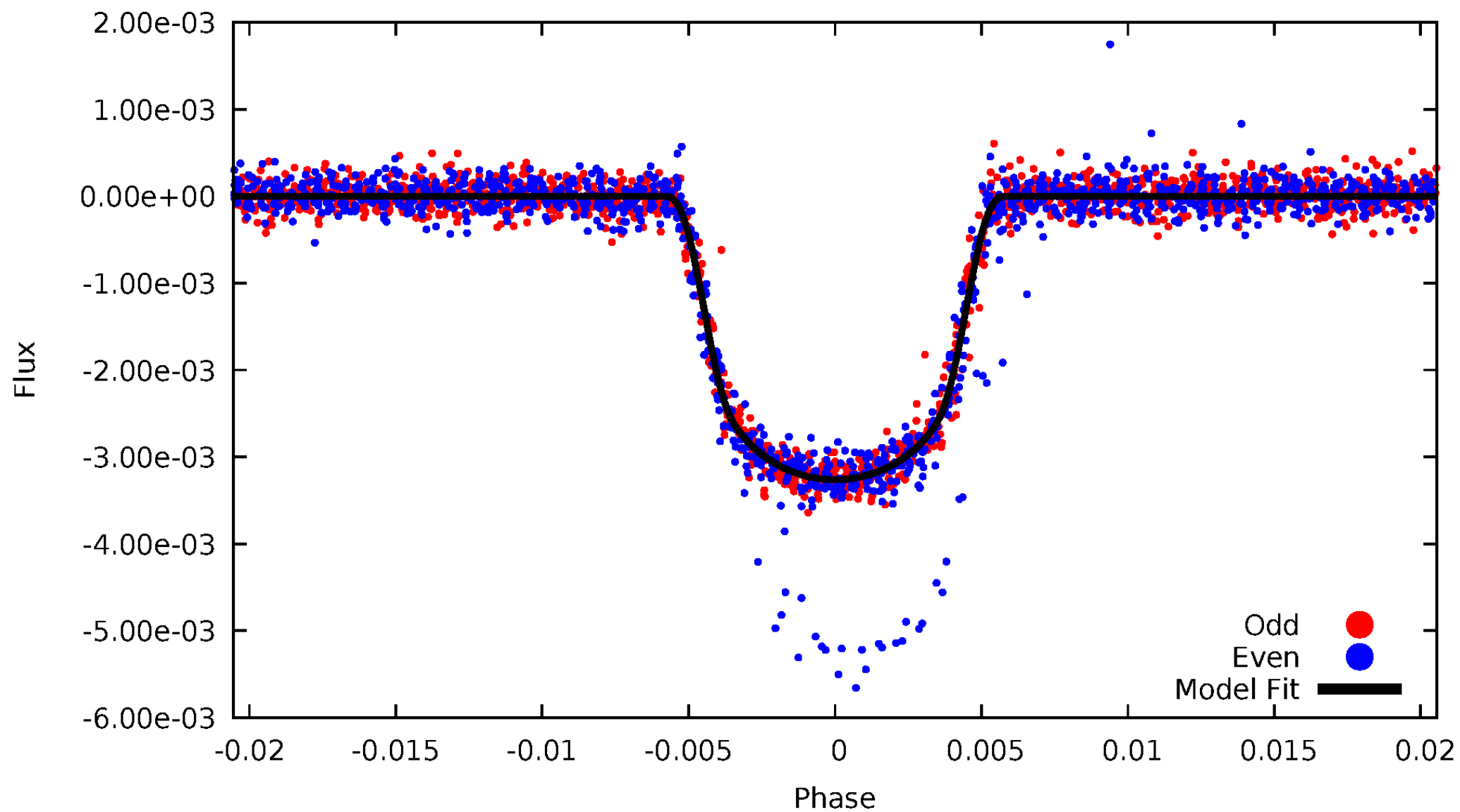


TCE 008644288-01



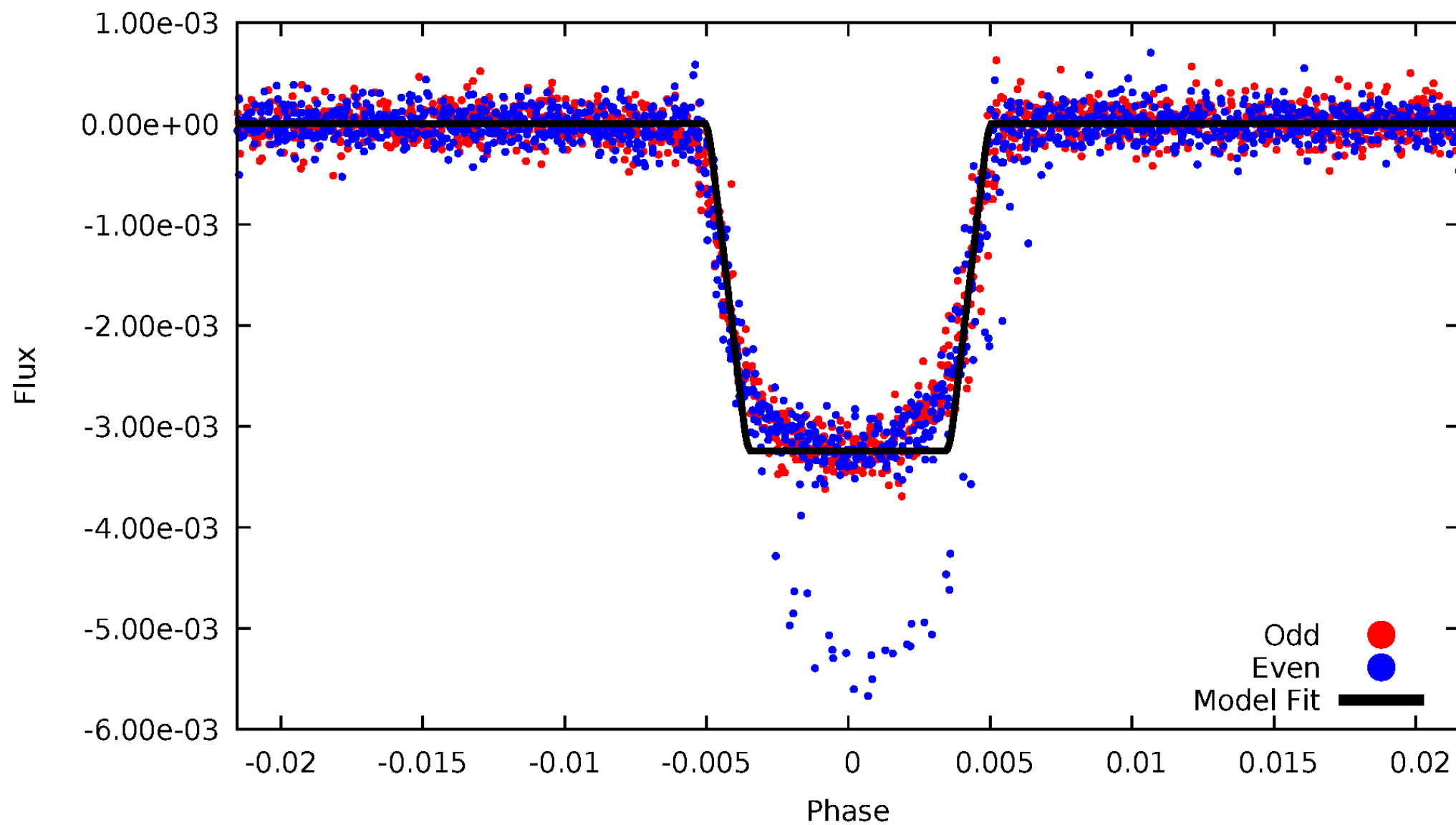
# DV Odd/Even

TCE 008644288-01



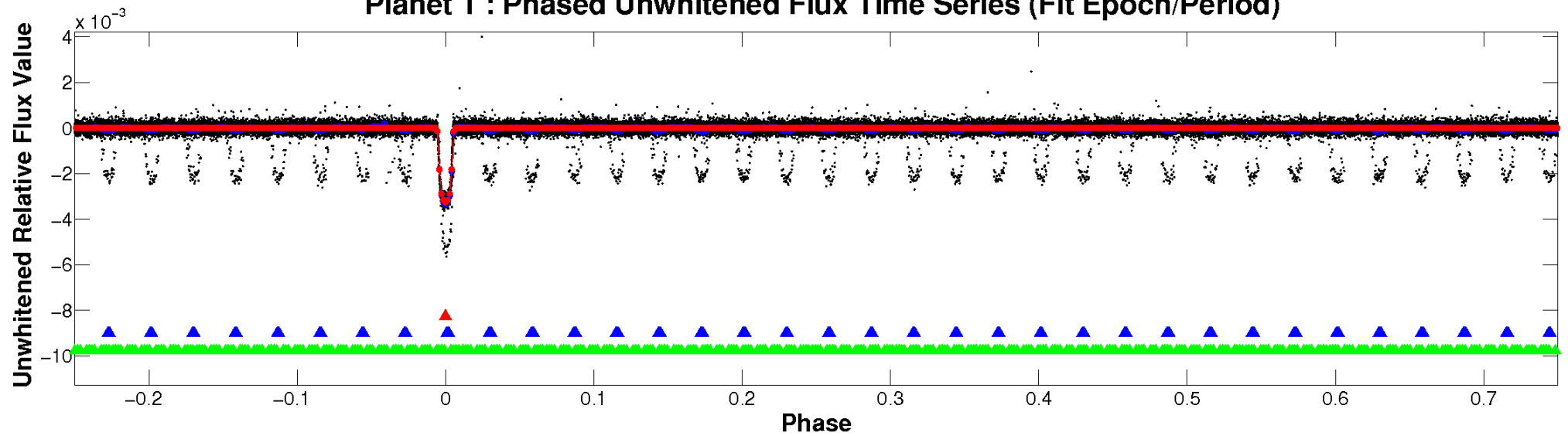
# ALT Odd/Even

TCE 008644288-01

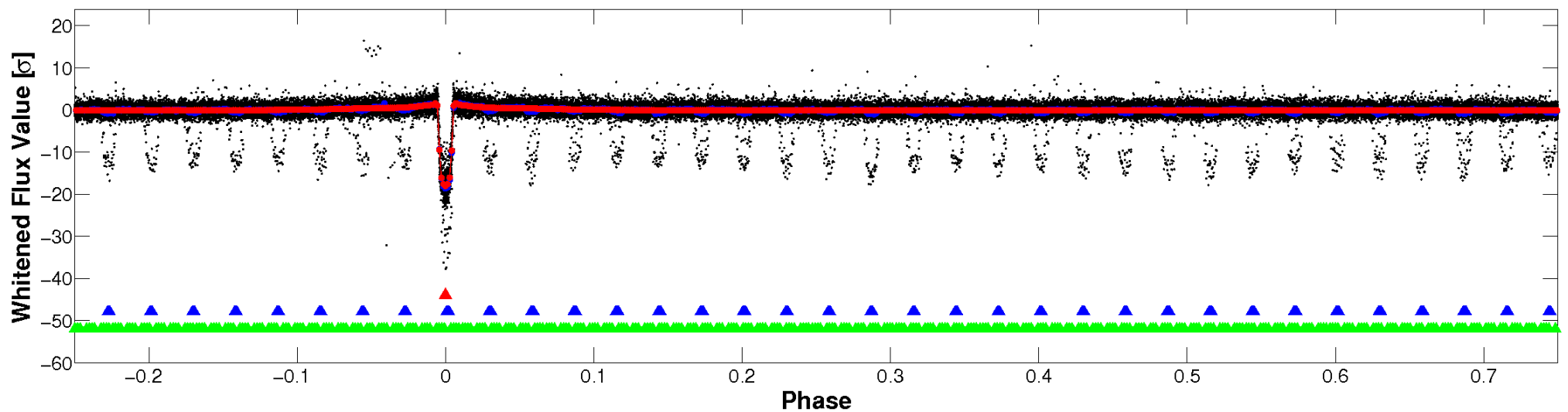


# Non-Whitened Vs. Whitened Light Curve

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



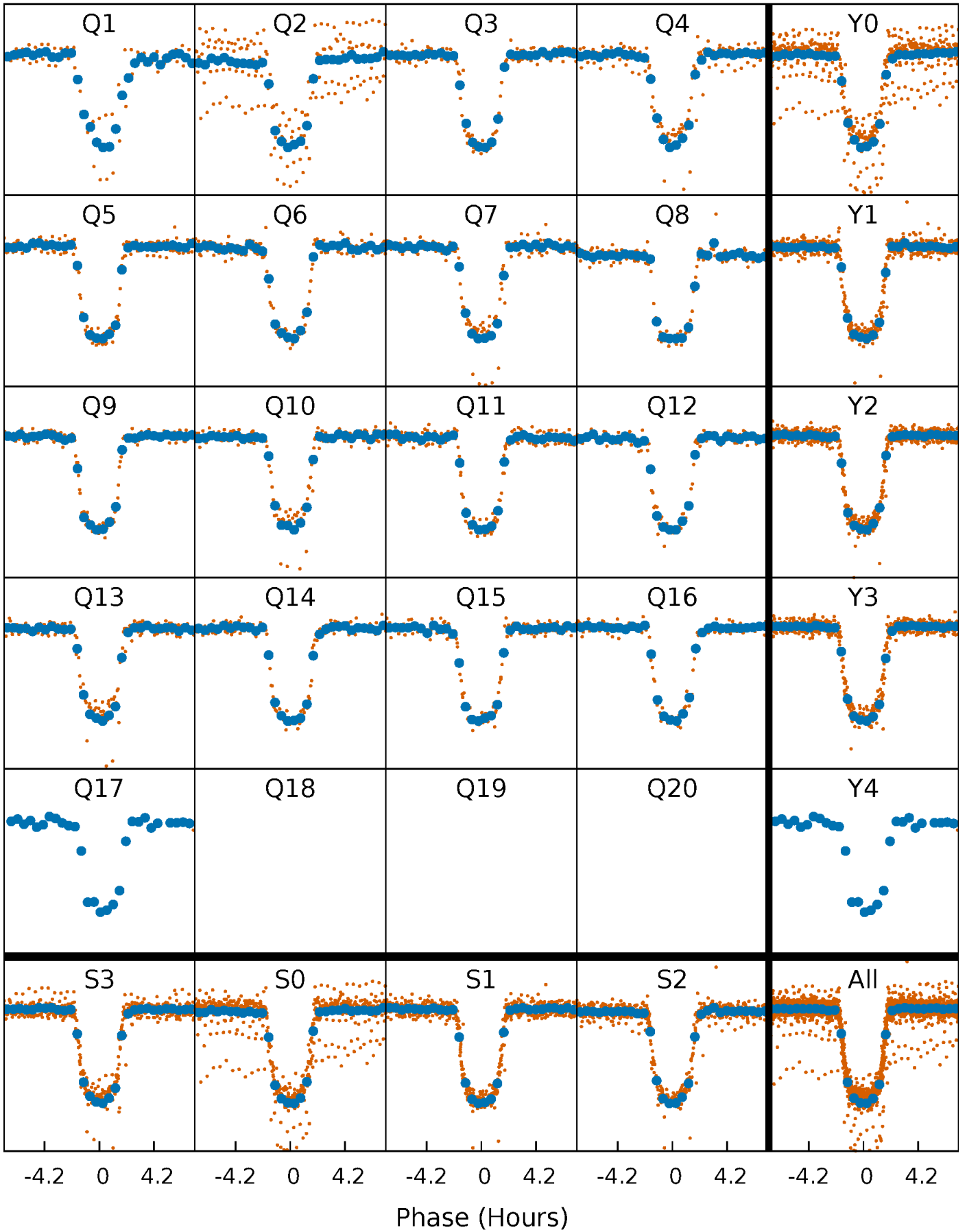
## Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)





# PDC Quarter-Phased Transit Curves

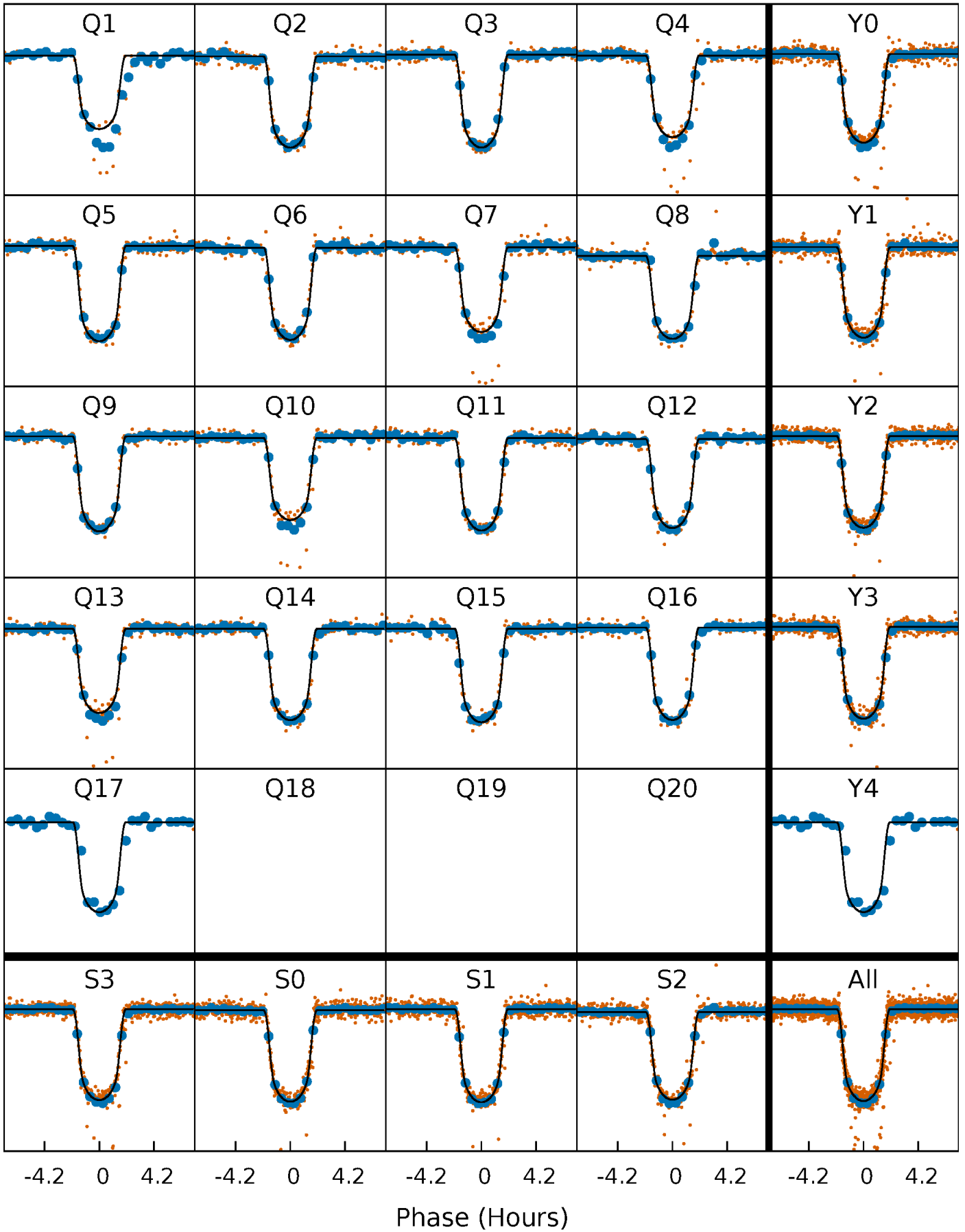
TCE 008644288-01 P= 14.858912 Days  $T_0=143.013066$  (BKJD)





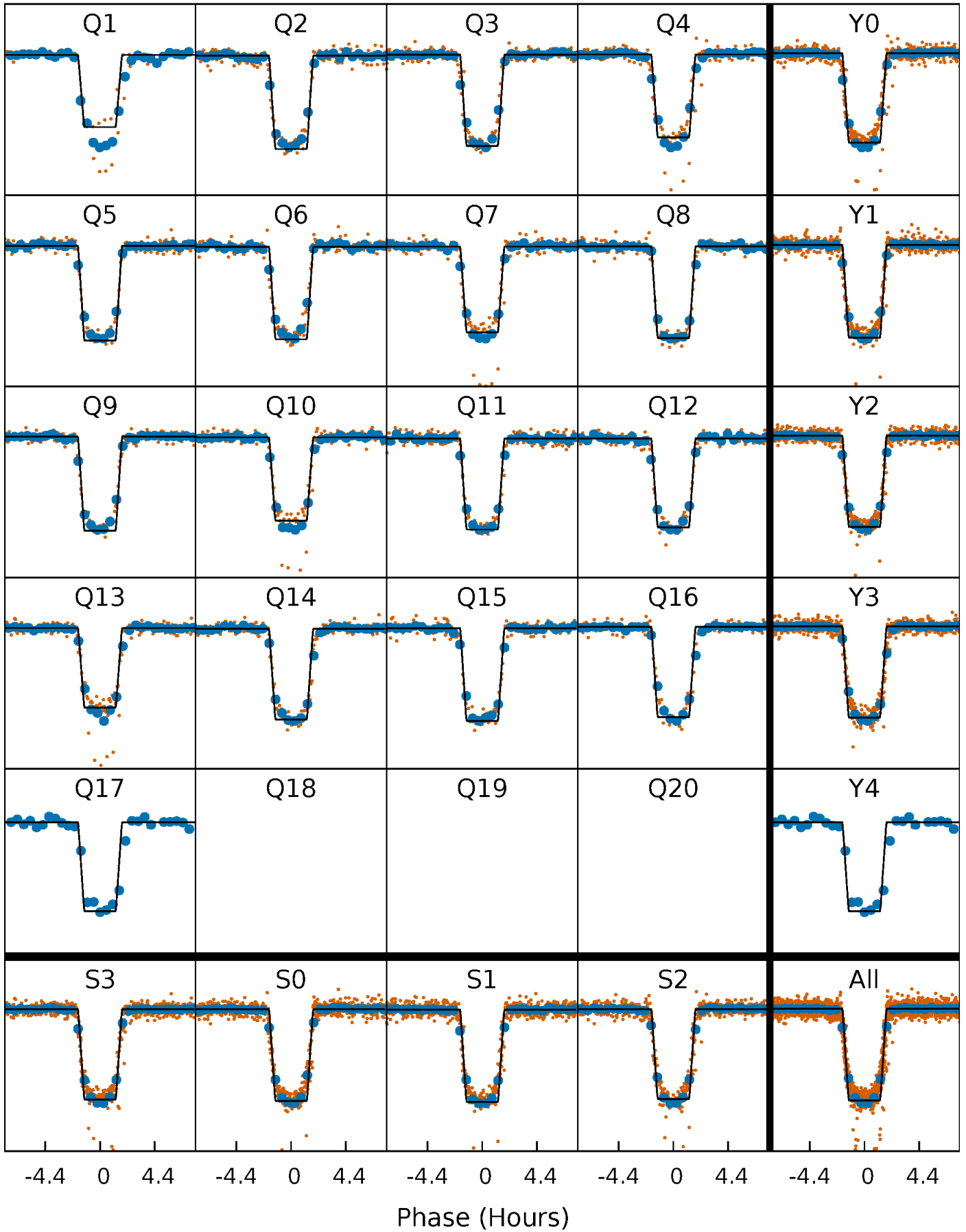
# DV Quarter-Phased Transit Curves

TCE 008644288-01 P= 14.858912 Days  $T_0=143.013066$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

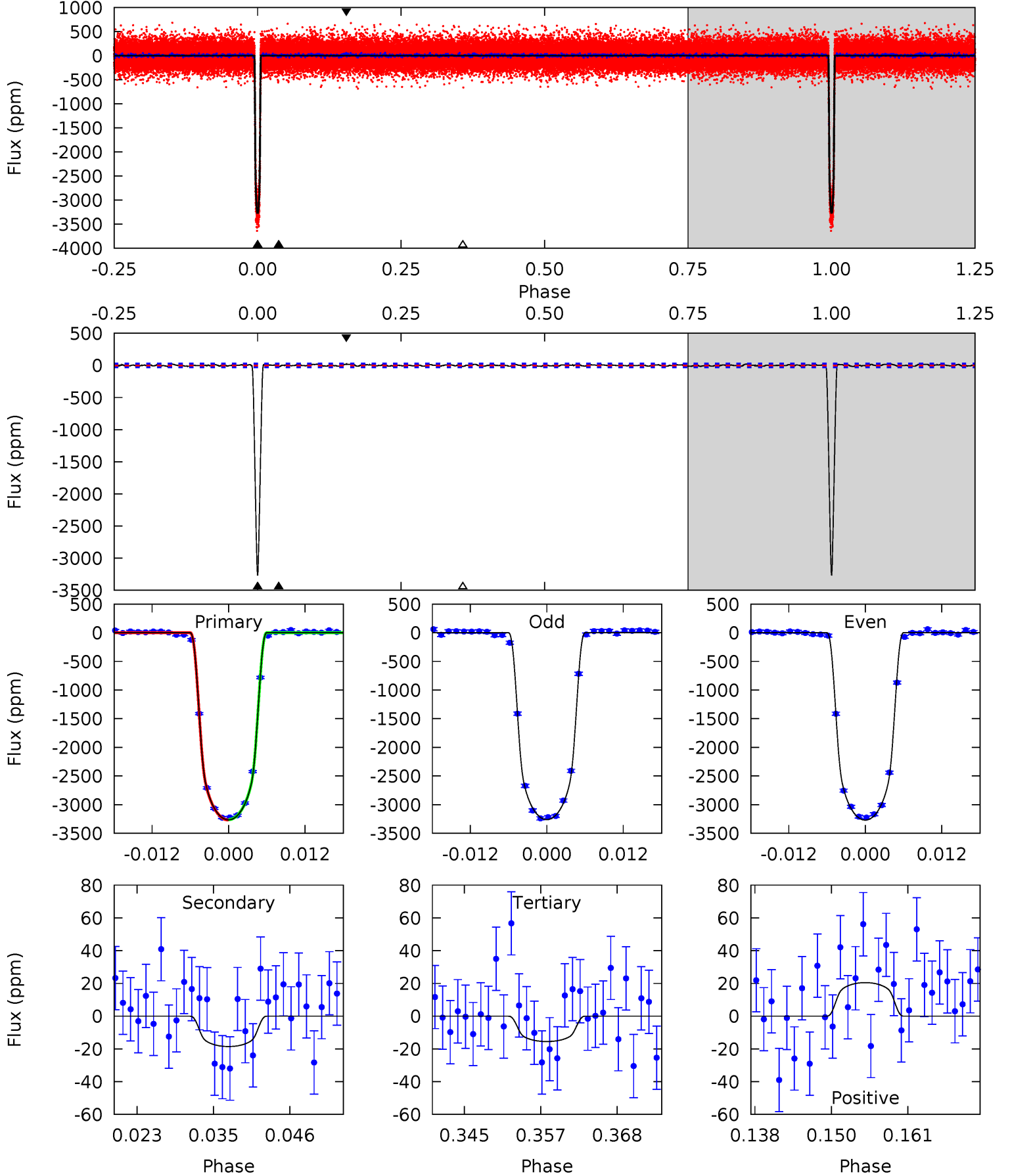
TCE 008644288-01 P= 14.858834 Days  $T_0=143.017531$  (BKJD)



# DV Model-Shift Uniqueness Test

008644288-01, P = 14.858912 Days, E = 128.154154 Days

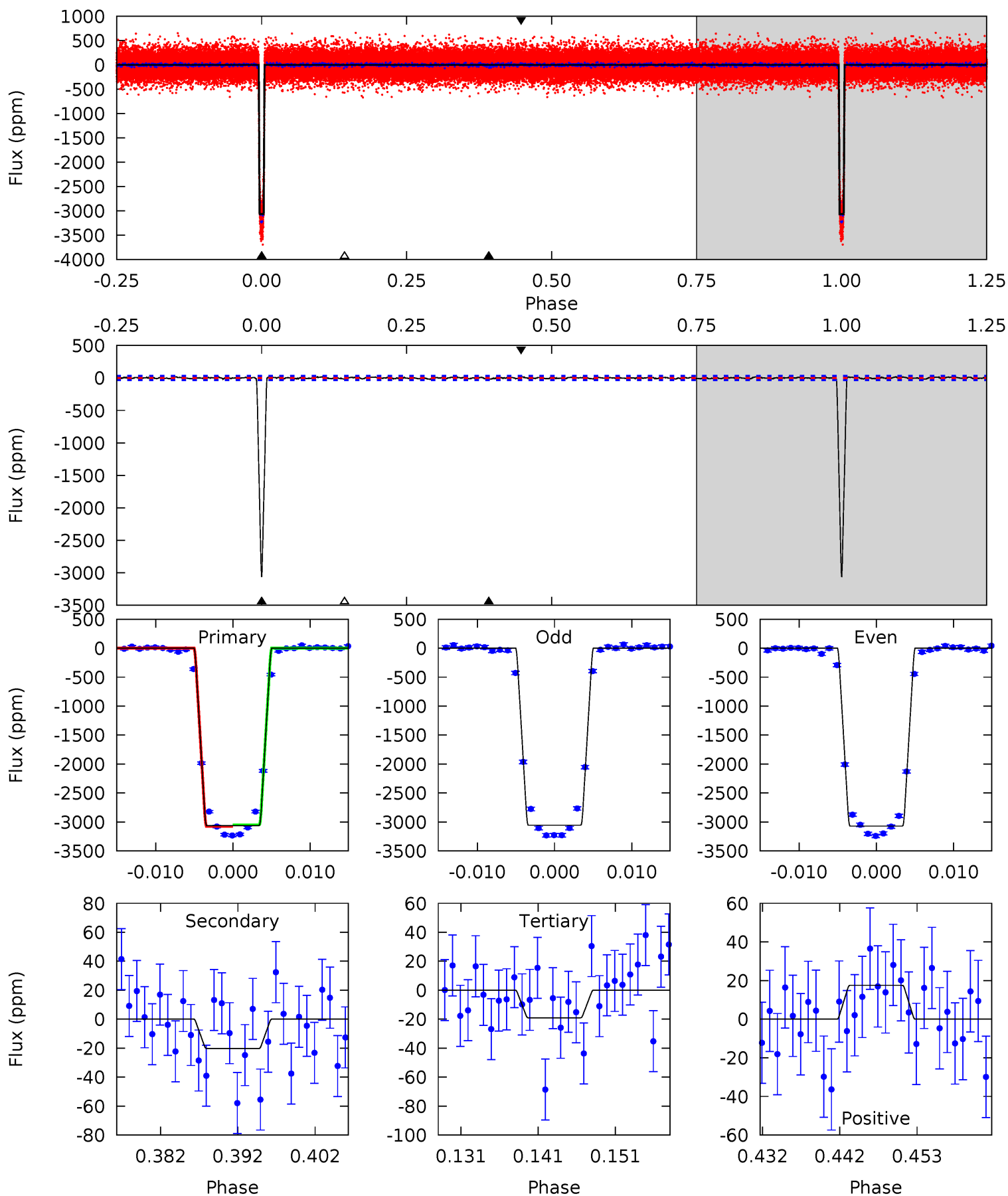
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
561.8	3.20	2.67	3.52	5.00	2.53	1.27	559.2	558.3	0.53	-0.33	0.74	1.03	0.01	0.57



# Alt Model-Shift Uniqueness Test

008644288-01, P = 14.858834 Days, E = 128.158697 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
488.0	3.22	3.03	2.79	5.03	2.57	1.12	484.9	485.2	0.19	0.43	1.22	1.03	0.01	2.08



### Stellar Parameters For KIC 008644288

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5356^{+112}_{-72}$	$4.338^{+0.065}_{-0.040}$	$0.200^{+0.150}_{-0.100}$	$1.055^{+0.065}_{-0.072}$	$0.882^{+0.056}_{-0.025}$	$1.060^{+0.262}_{-0.145}$
	+2%/-1%	+1%/-1%	+75%/-50%	+6%/-7%	+6%/-3%	+25%/-14%
Source	SPE30	TRA30	SPE30	DSEP		

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

### Secondary Eclipse Parameters for KIC 008644288-01 / KOI 0137.02

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-19 \pm 6$	$6.45^{+0.24}_{-0.27}$	$1006^{+27}_{-25}$	$2352^{+86}_{-113}$	$3.253^{+1.008}_{-1.063}$
Alt.	$-20 \pm 6$	$6.55^{+0.24}_{-0.29}$	$1006^{+25}_{-25}$	$2366^{+84}_{-113}$	$3.381^{+1.048}_{-1.049}$

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

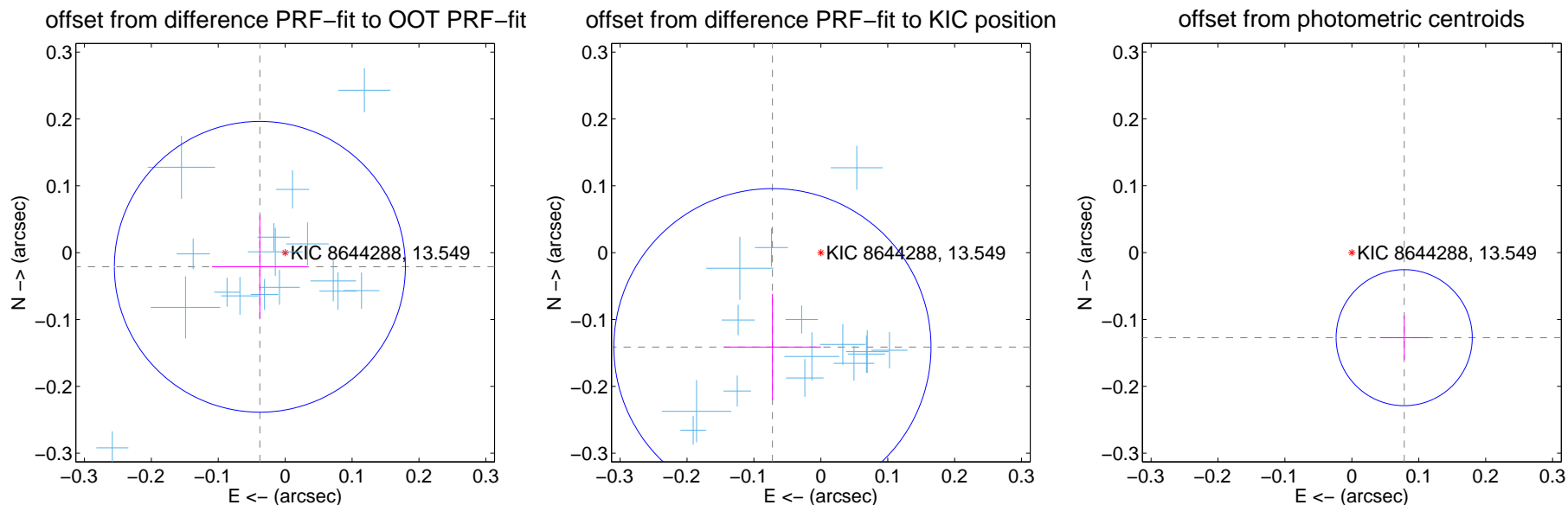
## DV Centroid Data

Supplemental centroid analysis for 008644288-01. Kepler magnitude: 13.55. Transit SNR 370.79

There are 17 quarters with good PRF difference image offsets

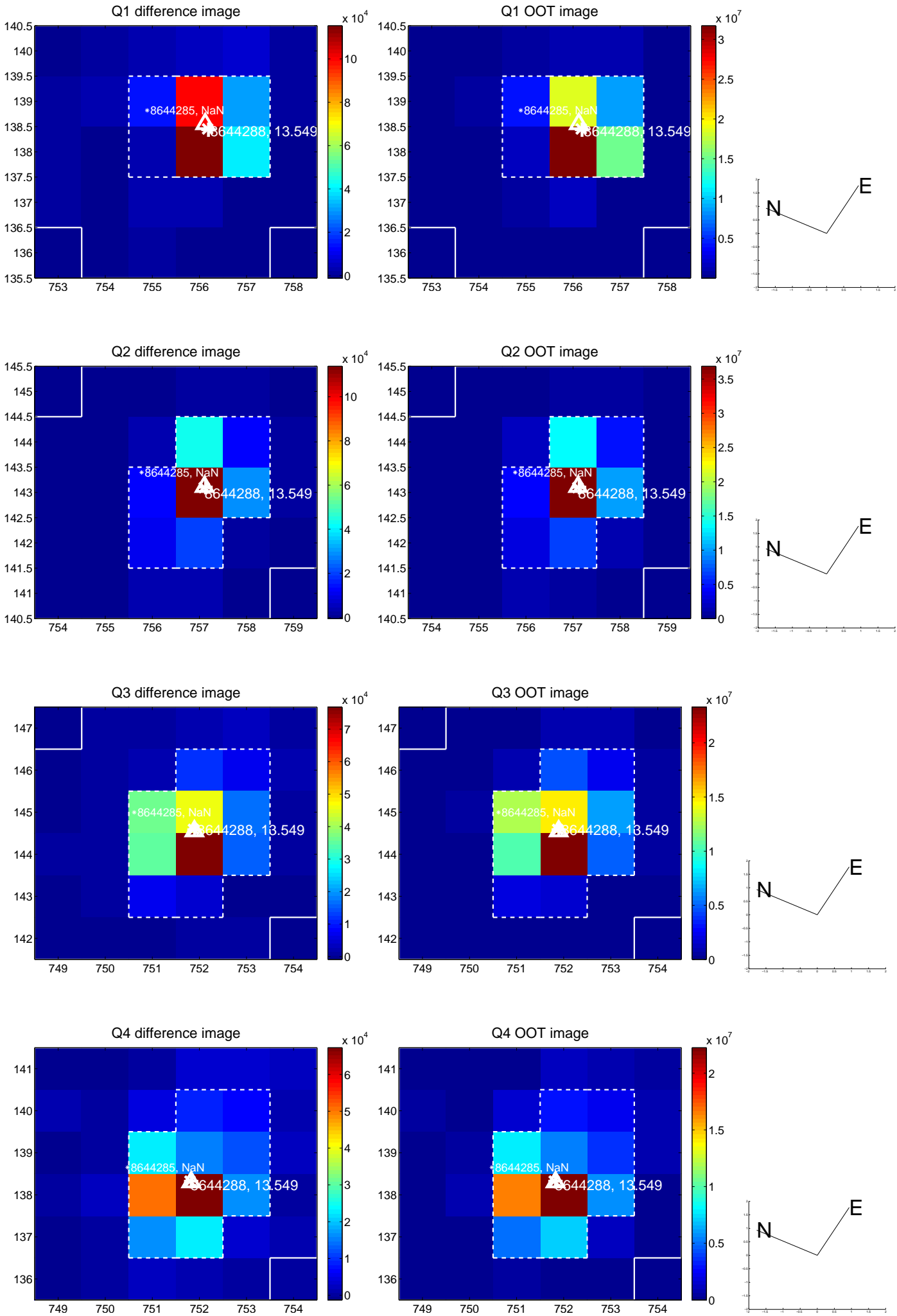
The direct PRF centroid is offset from the target star catalog position by about 0.15 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.043 \pm 0.072$	0.60	$0.038 \pm 0.072$	$-0.021 \pm 0.077$
PRF-fit source offset from KIC position	$0.159 \pm 0.079$	2.01	$0.072 \pm 0.073$	$-0.141 \pm 0.079$
photometric centroid source offset	$0.15 \pm 0.03$	4.40	$-0.08 \pm 0.04$	$-0.13 \pm 0.03$



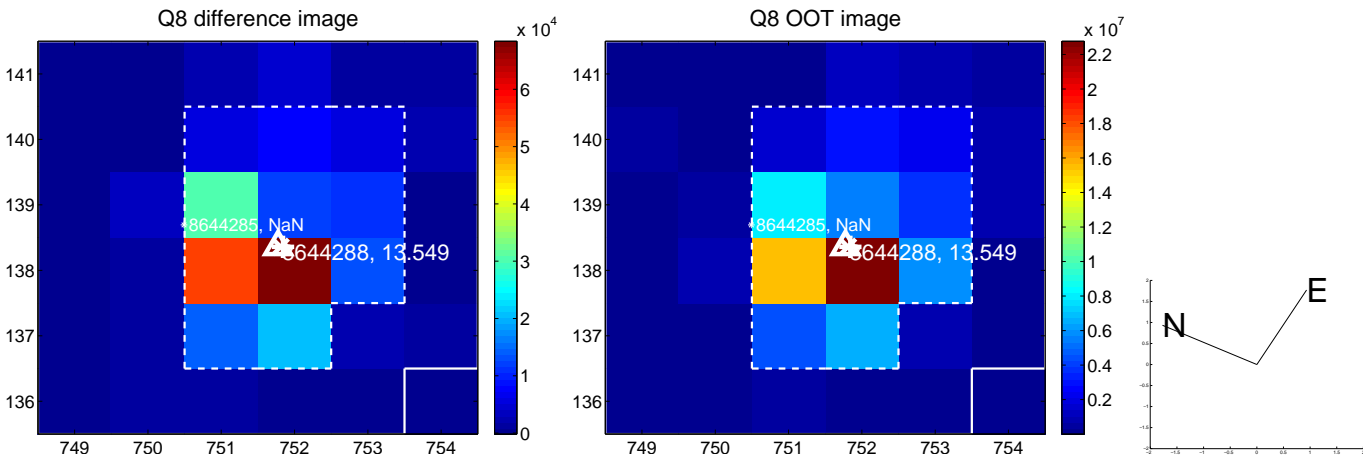
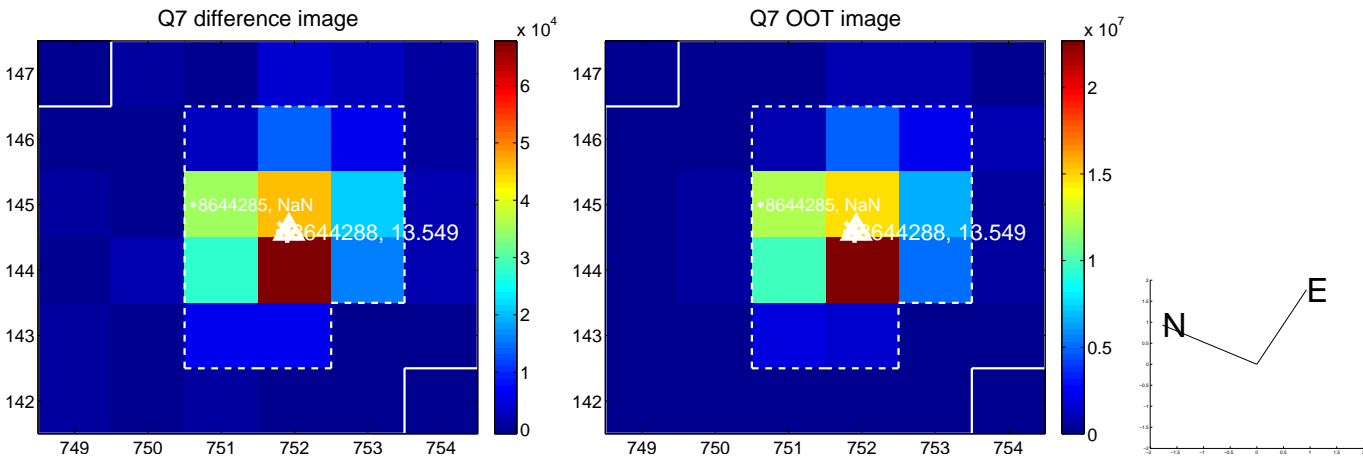
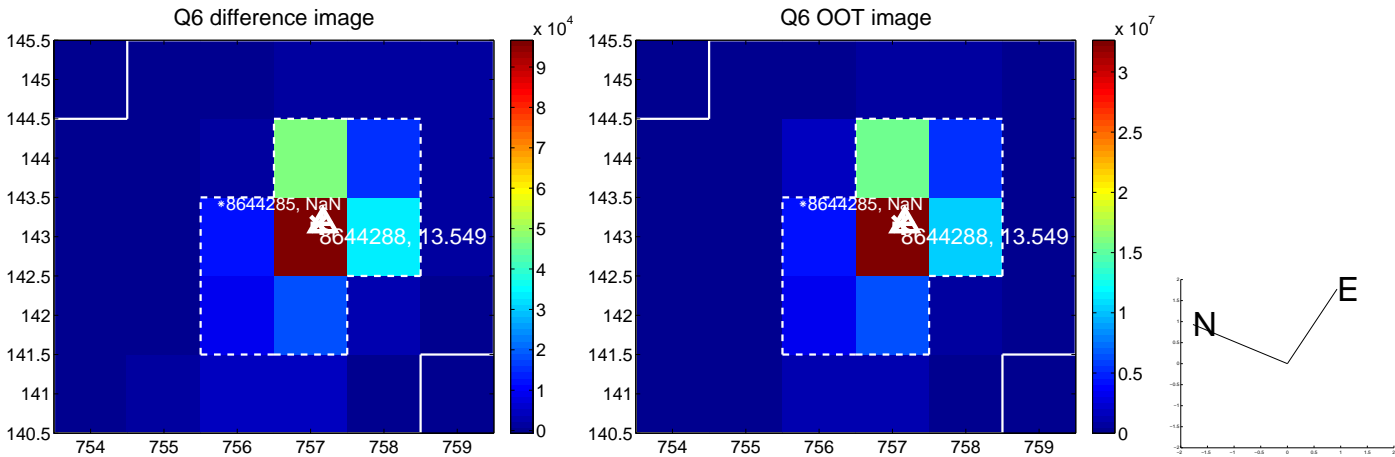
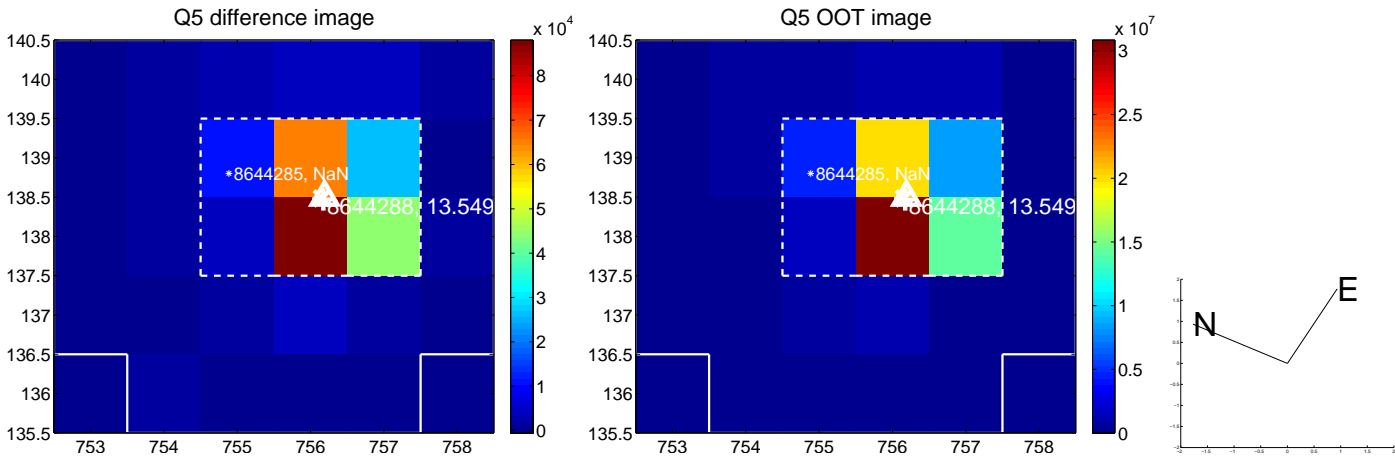
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

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

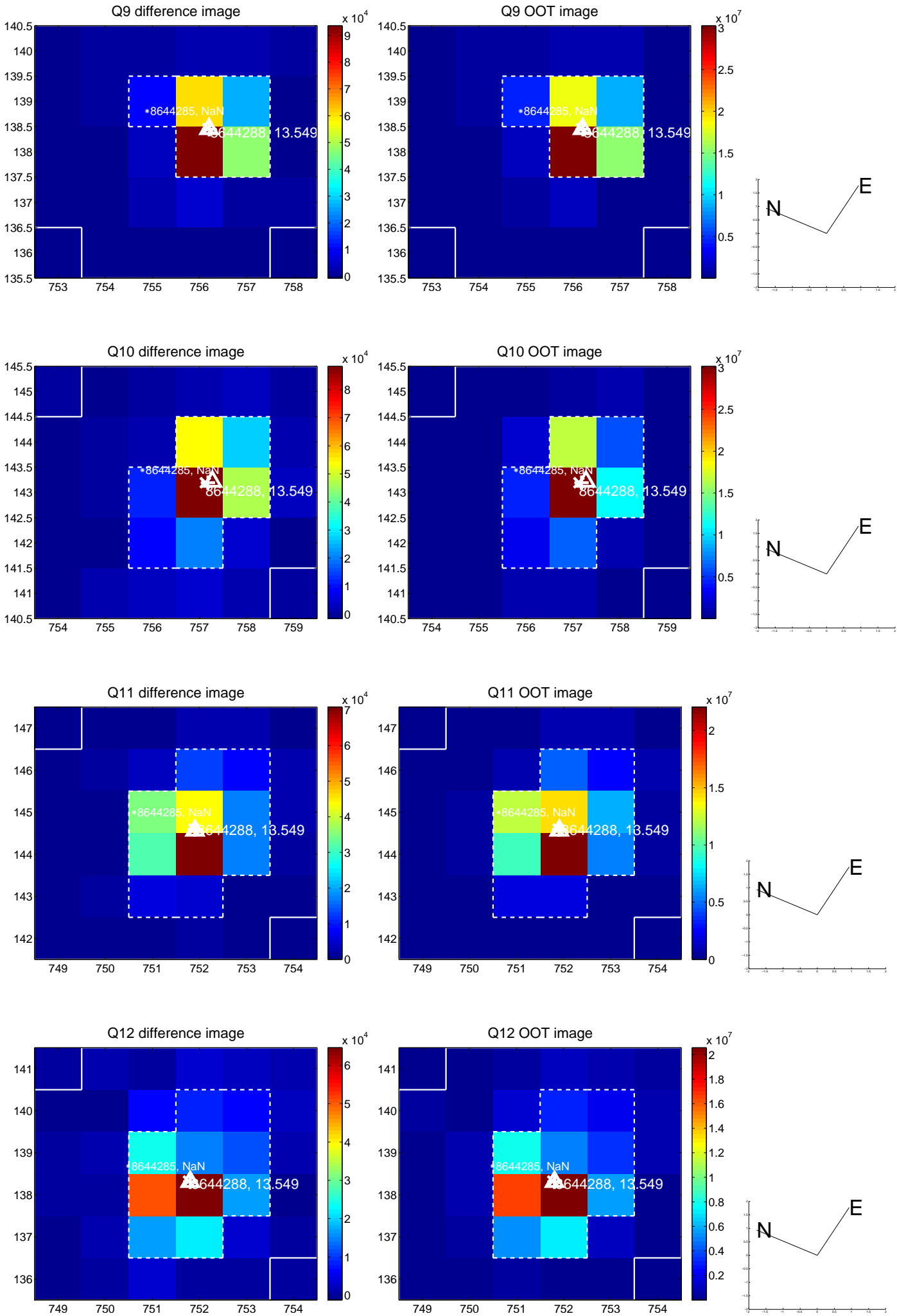




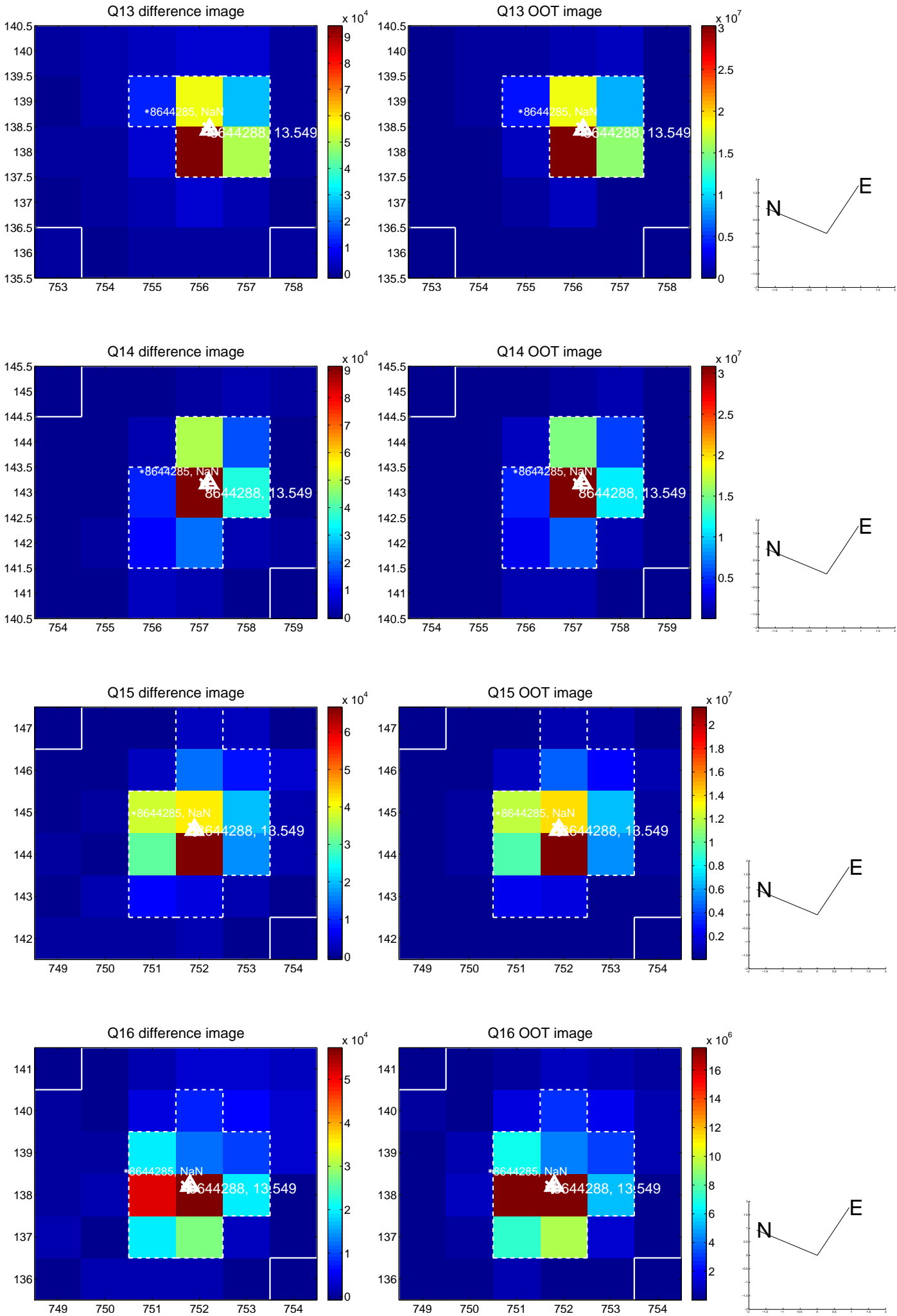
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



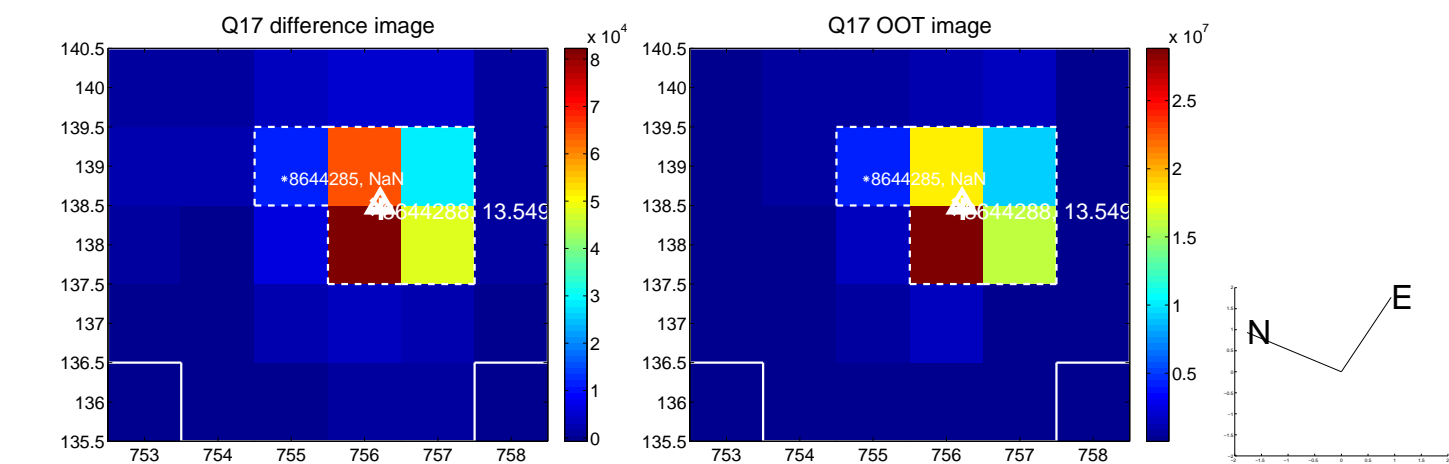
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



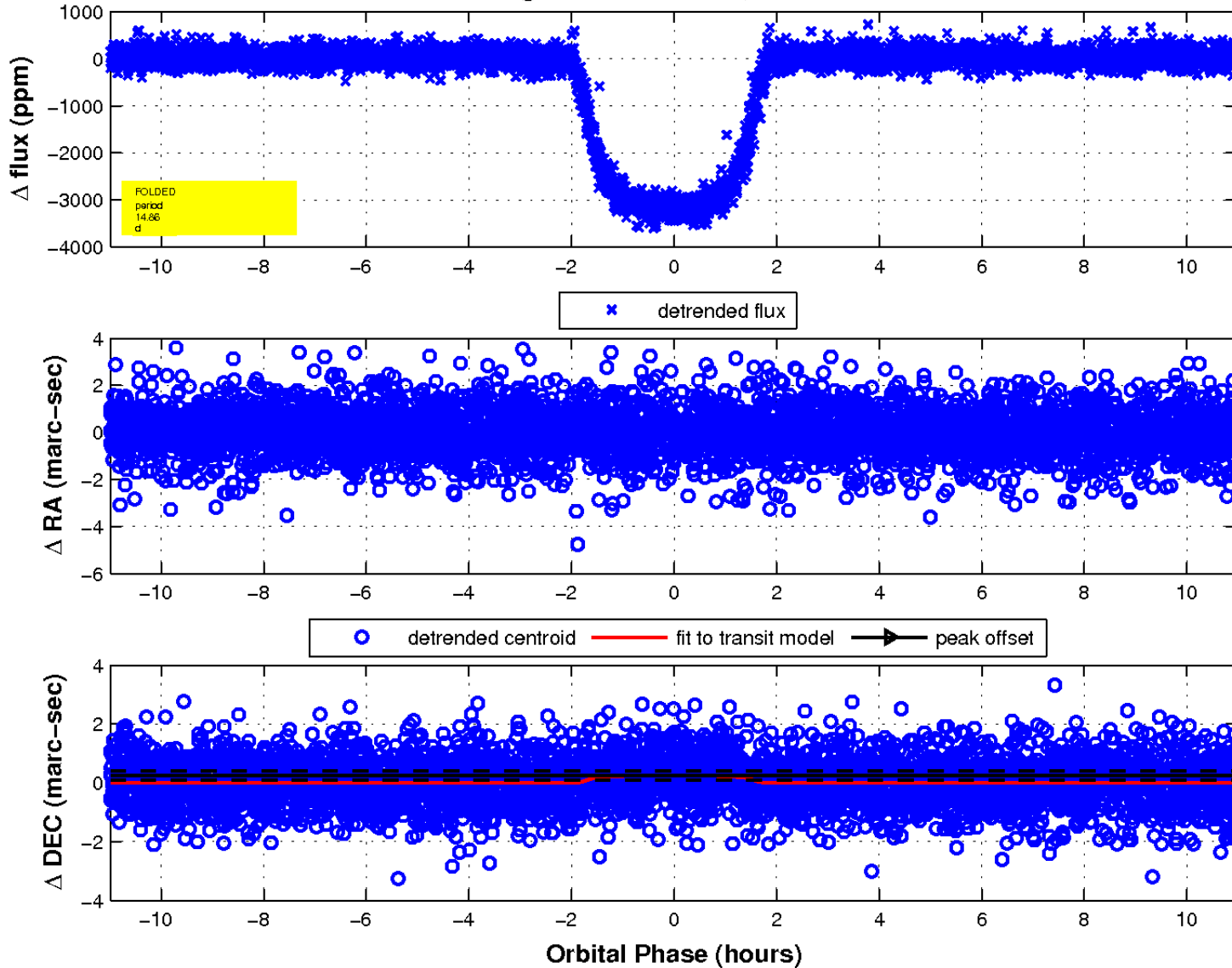
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

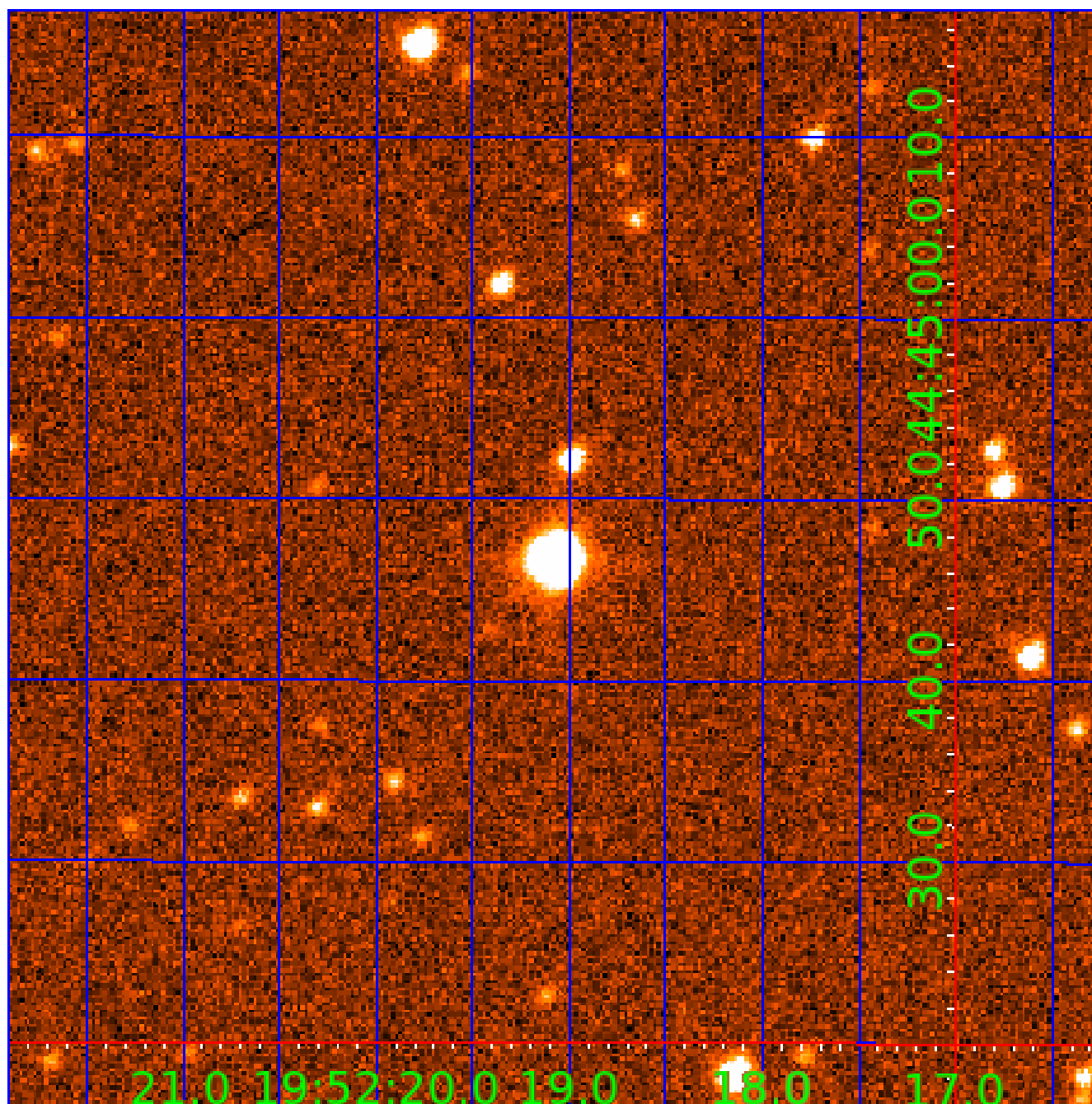


fluxWeightedCentroids, Planet 1 of 3



UKIRT Image

Declination



# KIC 008644288

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008644288-01	OBS	0137.02	14.858912	143.013066	3260.4	3.663	399.4	370.8	1.05	5356	6.45	63.65
008644288-02	OBS	0137.01	7.641560	135.408964	2258.0	3.622	366.3	359.8	1.05	5356	5.51	154.47
008644288-03	OBS	0137.03	3.504711	133.510890	284.7	2.159	50.8	57.4	1.05	5356	2.14	436.74

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008644288-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
008644288-02	OBS	PC	1.00	0	0	0	0	NO_COMMENT
008644288-03	OBS	PC	1.00	0	0	0	0	NO_COMMENT

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

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

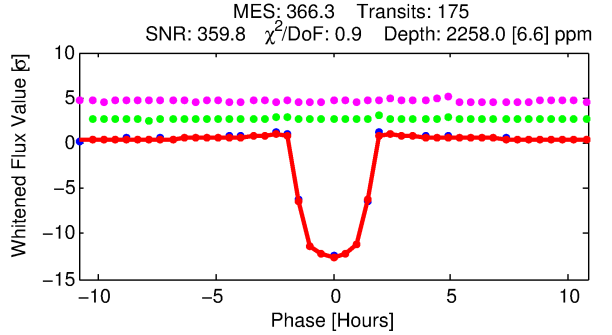
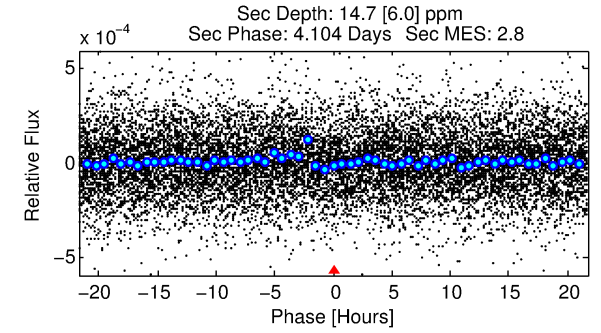
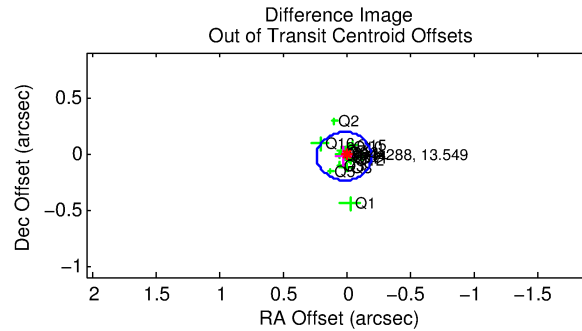
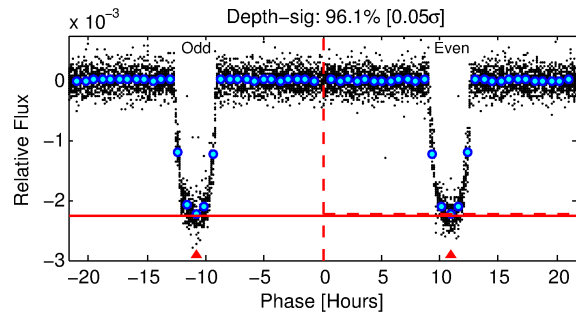
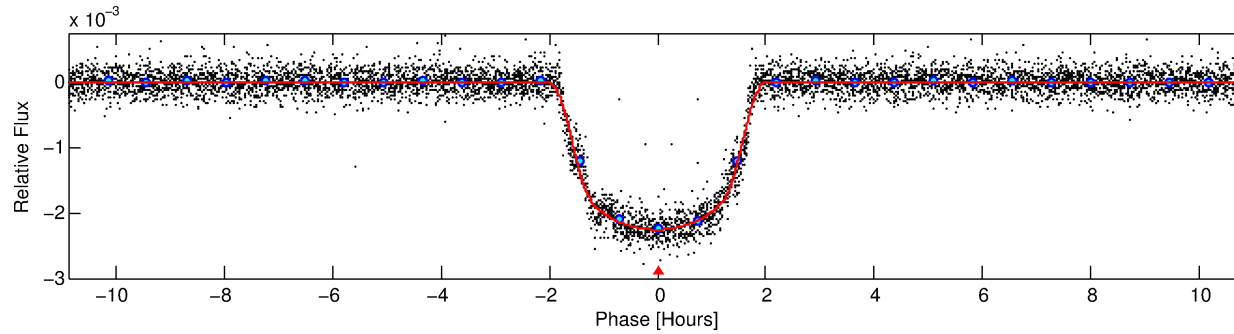
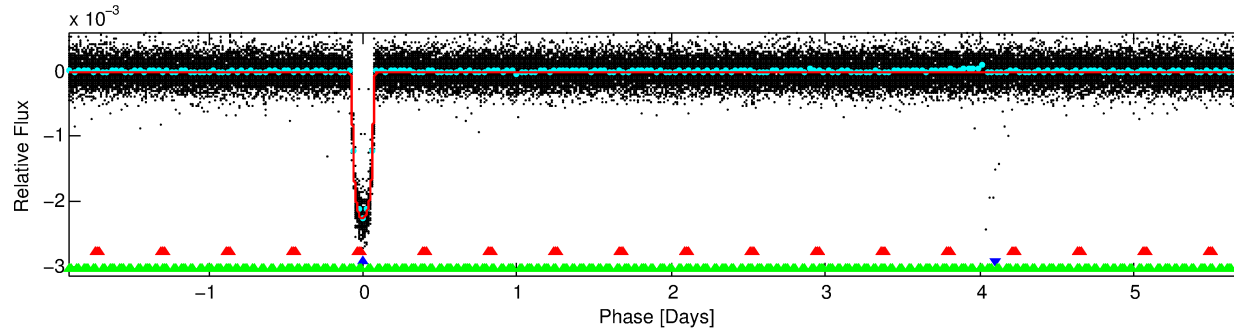
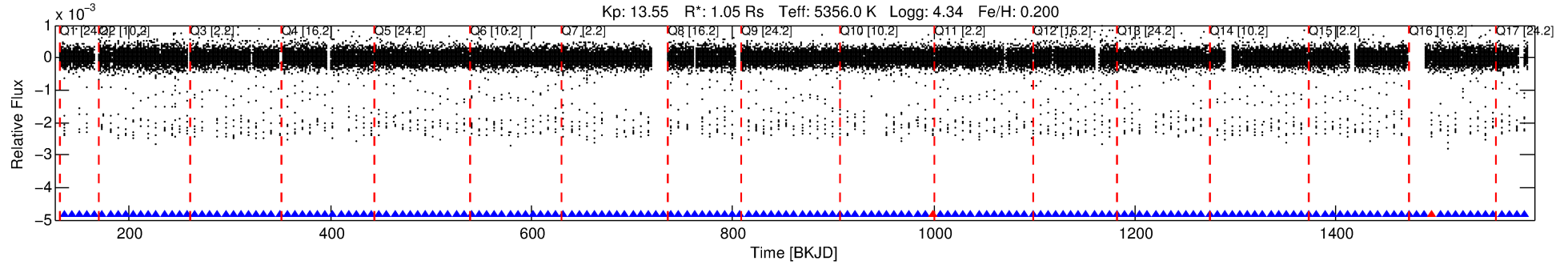
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 008644288-02

No Significant Match Found

# DV One-Page Summary

KIC: 8644288 Candidate: 2 of 3 Period: 7.642 d  
KOI: K00137.01 Name: Kepler-18c Corr: 0.971



## DV Fit Results:

Period = 7.64156 [0.00000] d  
Epoch = 135.4090 [0.0002] BKJD  
Rp/R\* = 0.0478 [0.0006]  
a/R\* = 11.52 [0.52]  
b = 0.77 [0.02]  
Seff = 154.47 [21.30]  
Teq = 899 [31] K  
Rp = 5.51 [0.38] Re  
a = 0.0729 [0.0049] AU  
Ag = 1.42 [0.60] [0.70 $\sigma$ ]  
Teffp = 1516 [158] K [3.83 $\sigma$ ]

## DV Diagnostic Results:

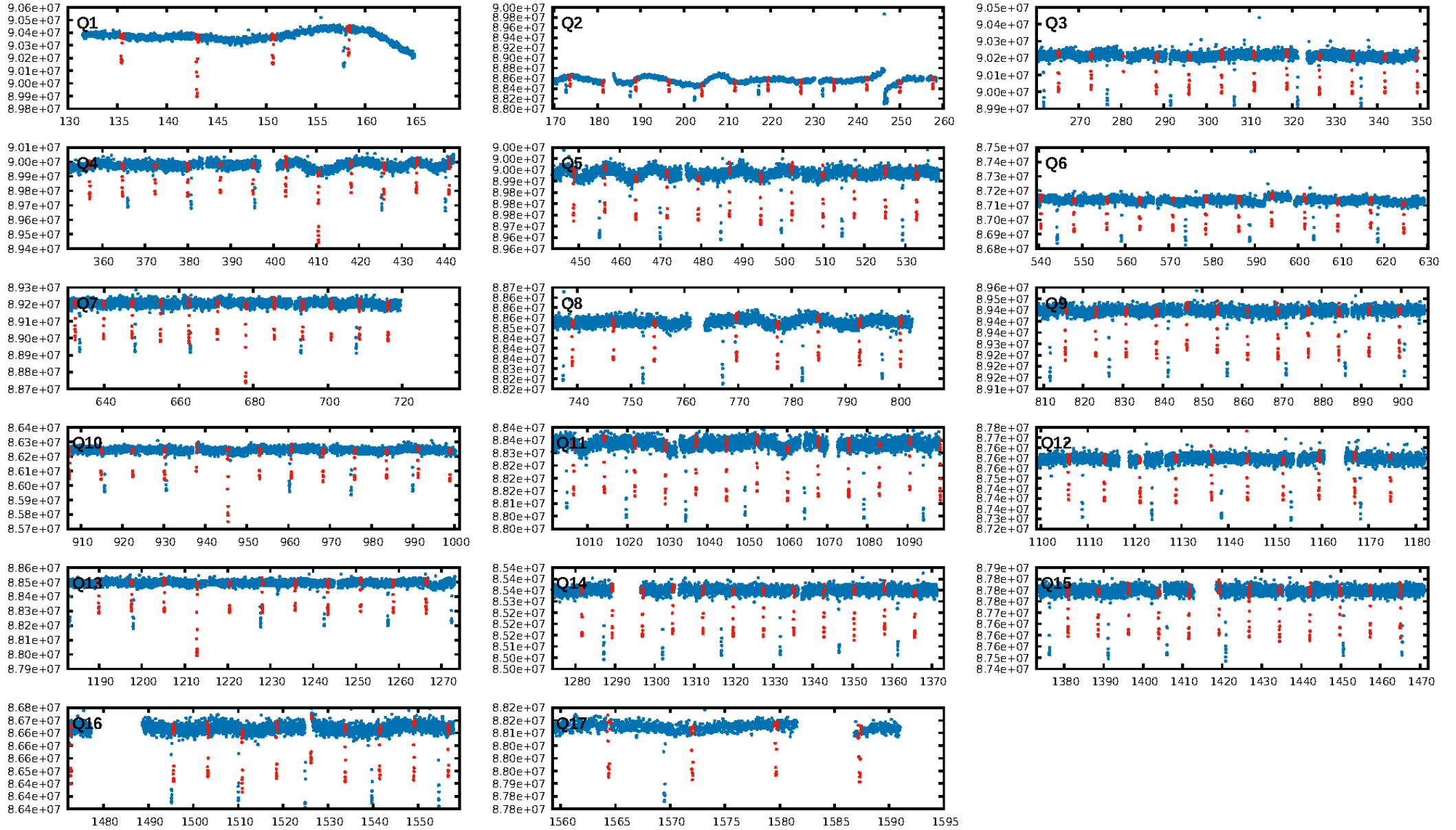
ShortPeriod-sig: 100.0% [23.55 $\sigma$ ]  
LongPeriod-sig: 100.0% [33.63 $\sigma$ ]  
ModelChiSquare2-sig: 99.1%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 0.00e+00  
RollingBand-fgt: 0.99 [166/168]  
GhostDiagnostic-chr: 7.728  
Centroid-sig: N/A  
Centroid-so: 0.171 arcsec [4.70 $\sigma$ ]  
OotOffset-rm: 0.034 arcsec [0.47 $\sigma$ ]  
KicOffset-rm: 0.177 arcsec [2.41 $\sigma$ ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 1.00 [17/17]  
DiffImageOverlap-fno: 1.00 [17/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 12:50:02 Z

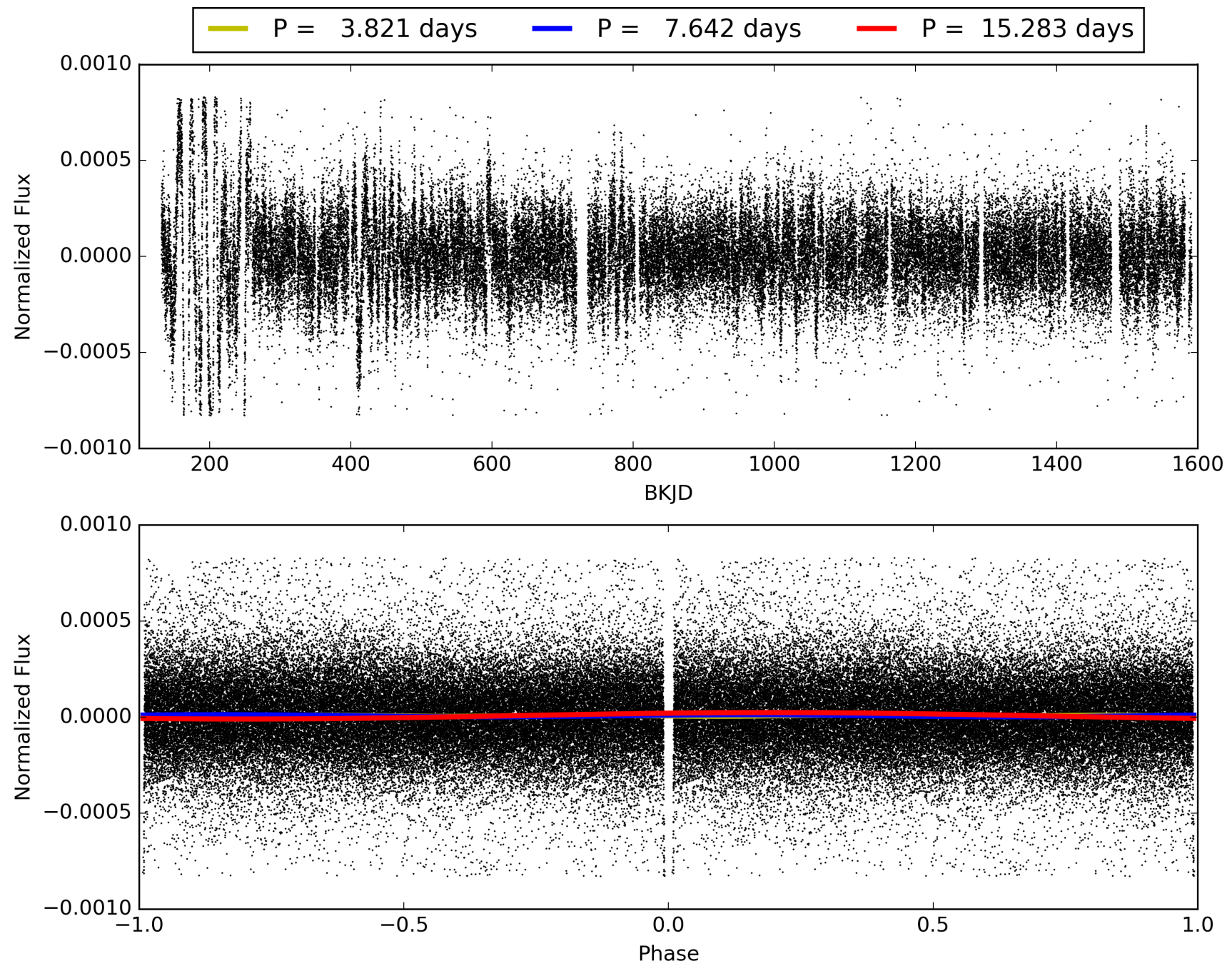
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center



# TCE 008644288-02, PDC Light Curves

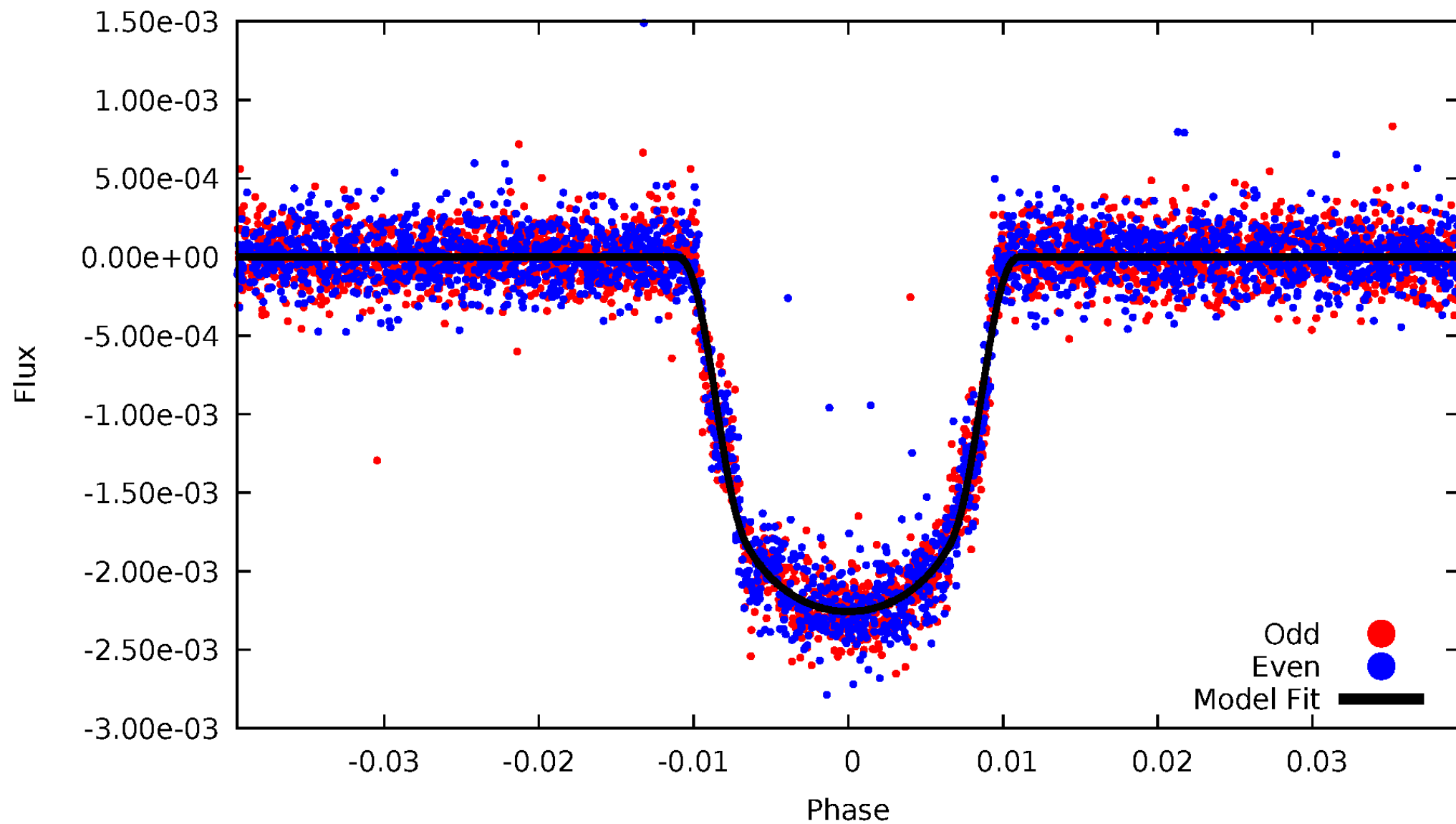


TCE 008644288-02



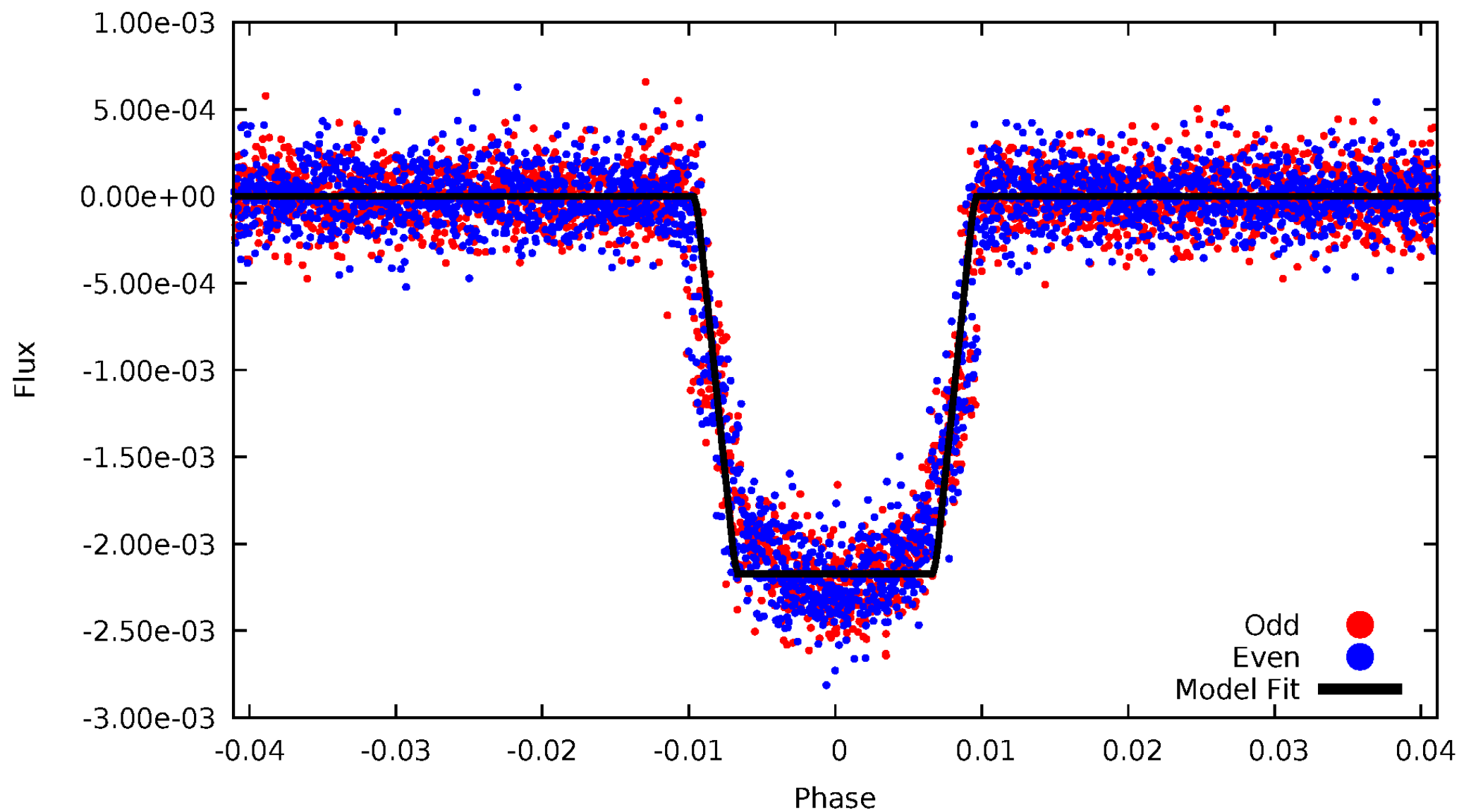
# DV Odd/Even

TCE 008644288-02



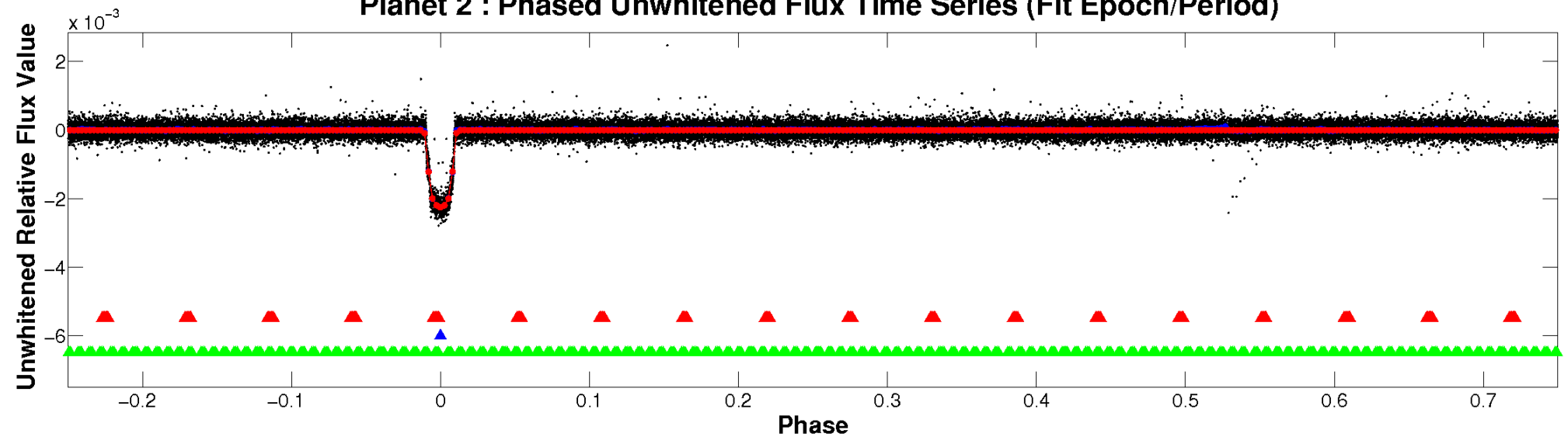
# ALT Odd/Even

TCE 008644288-02

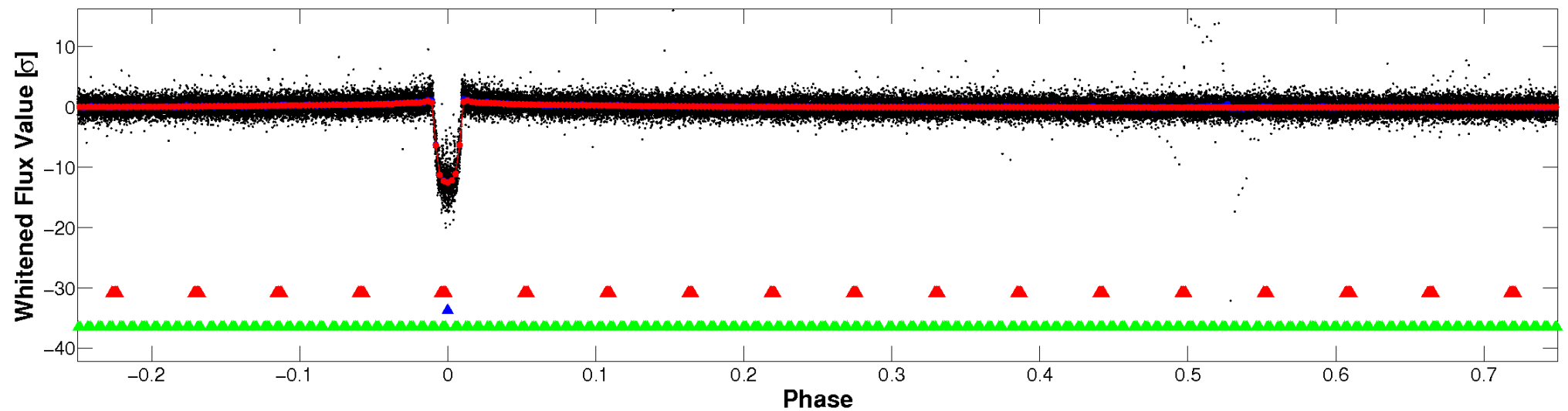


# Non-Whitened Vs. Whitened Light Curve

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

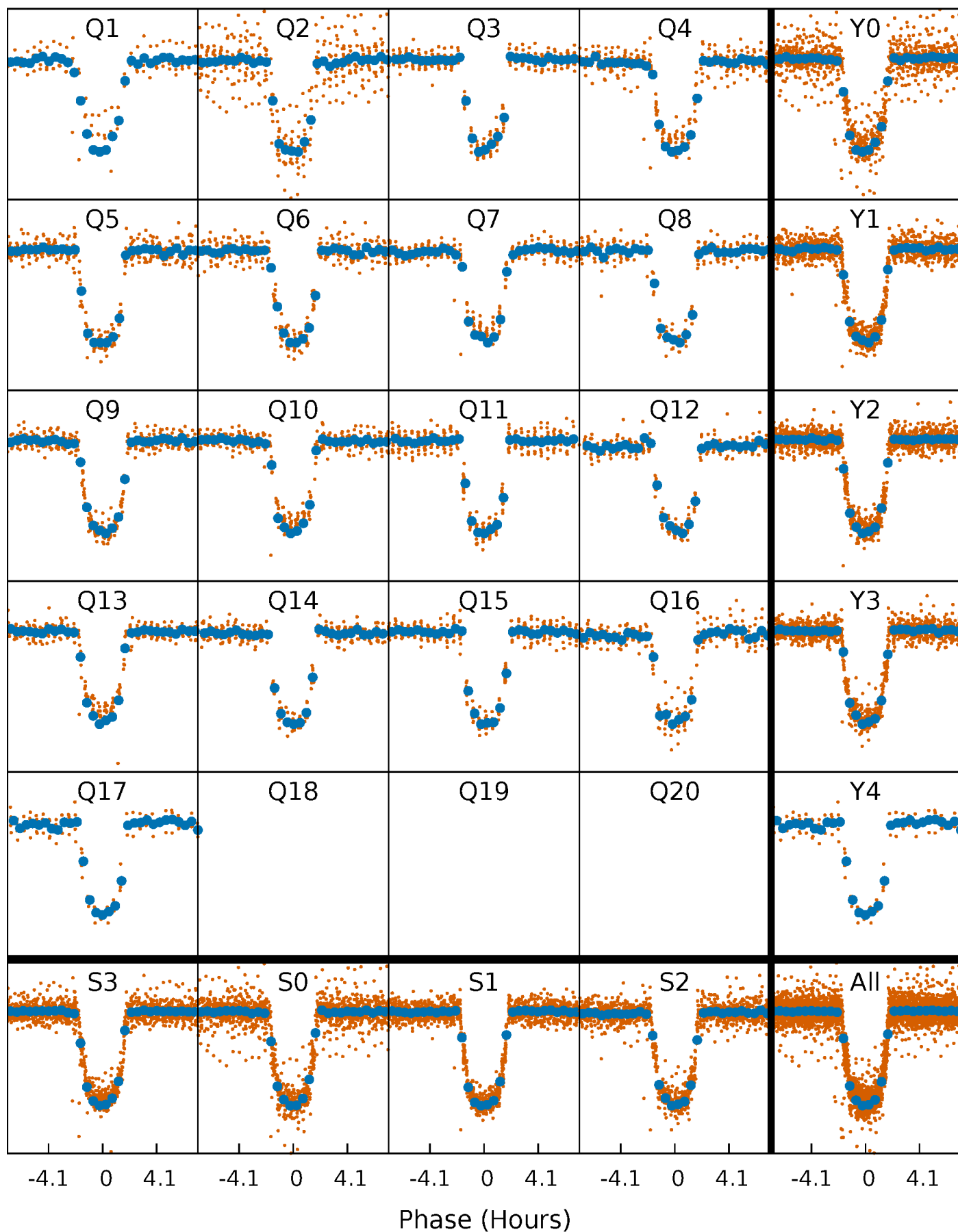


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



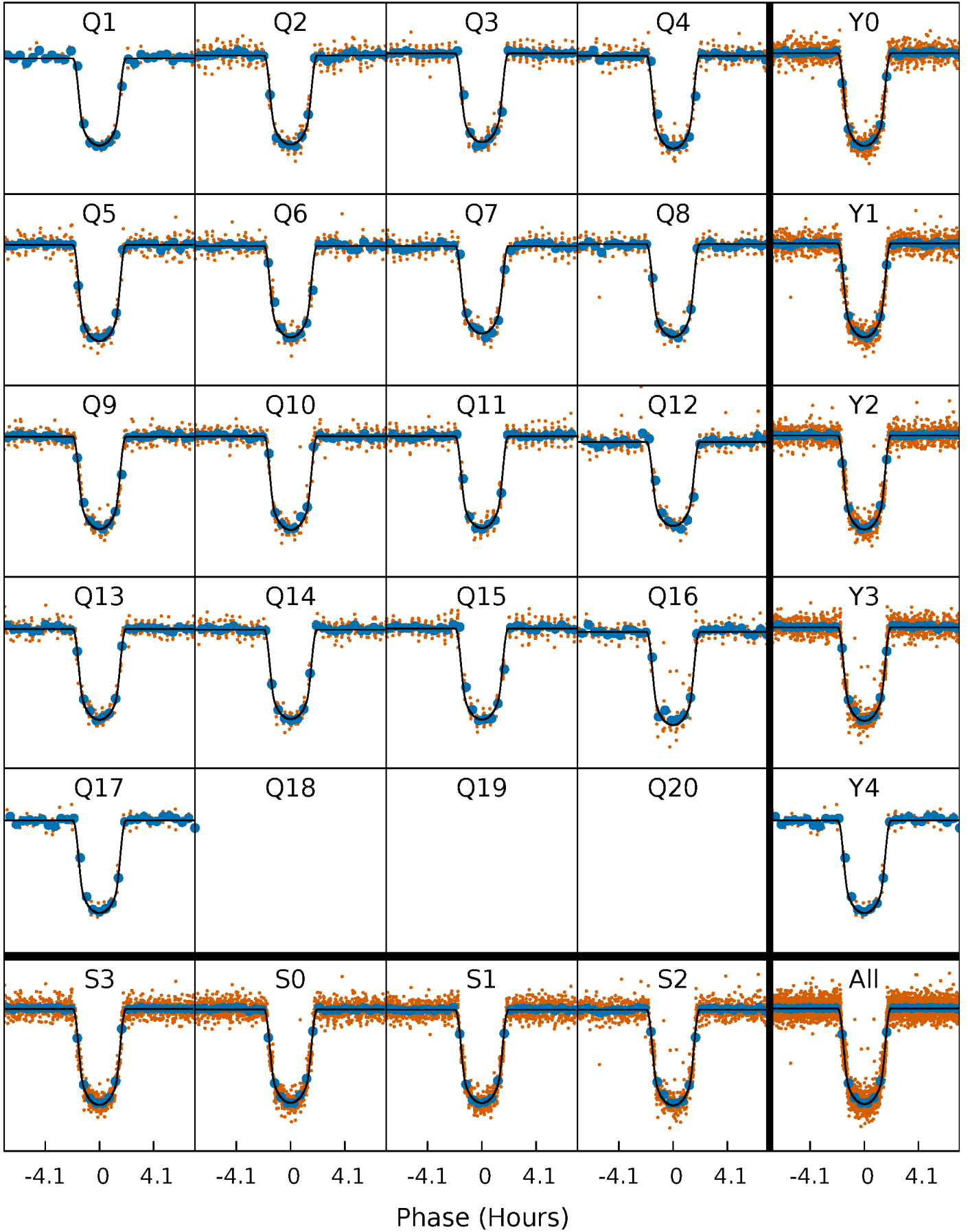
# PDC Quarter-Phased Transit Curves

TCE 008644288-02   P= 7.641560 Days    $T_0=135.408964$  (BKJD)



# DV Quarter-Phased Transit Curves

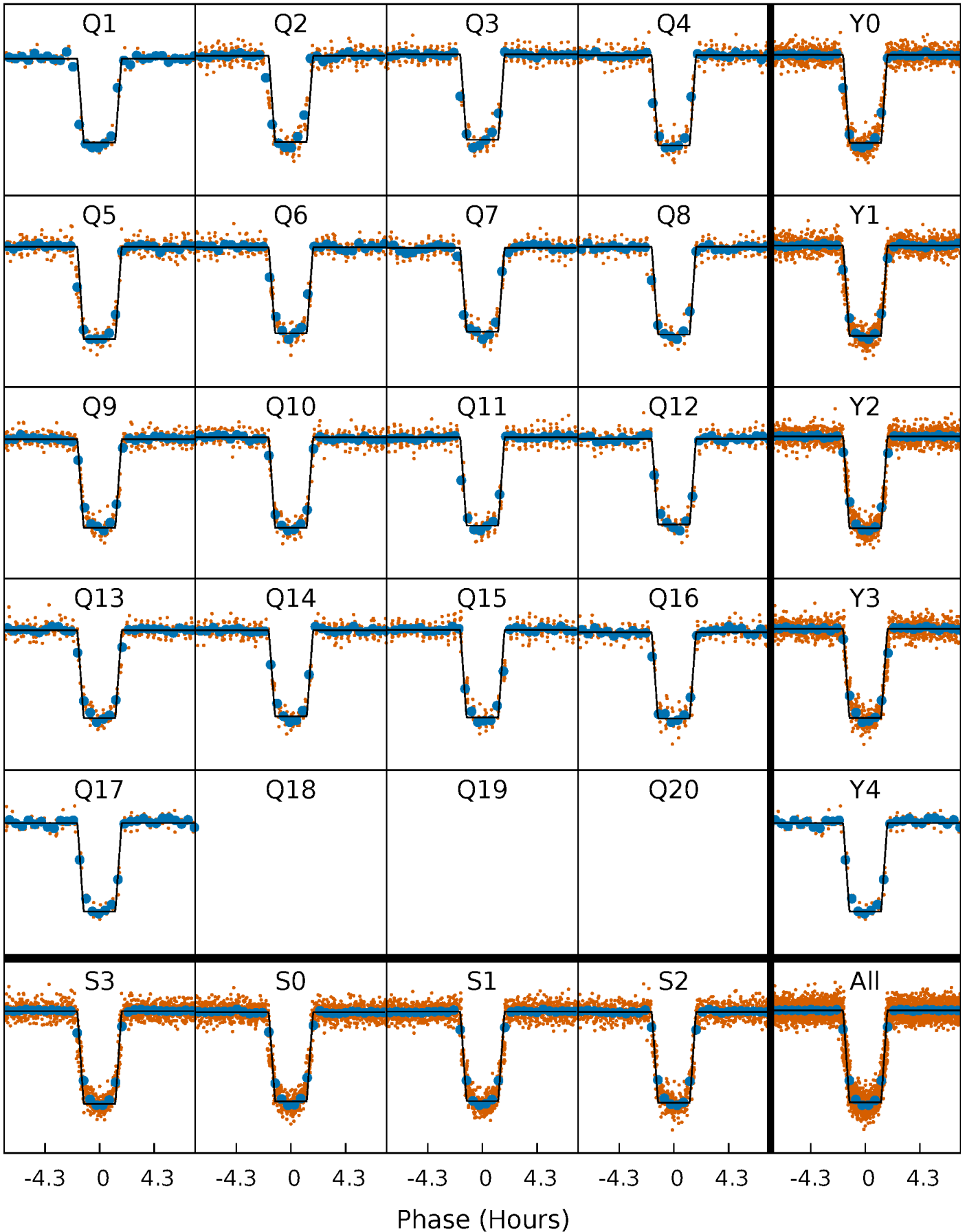
TCE 008644288-02   P= 7.641560 Days    $T_0=135.408964$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

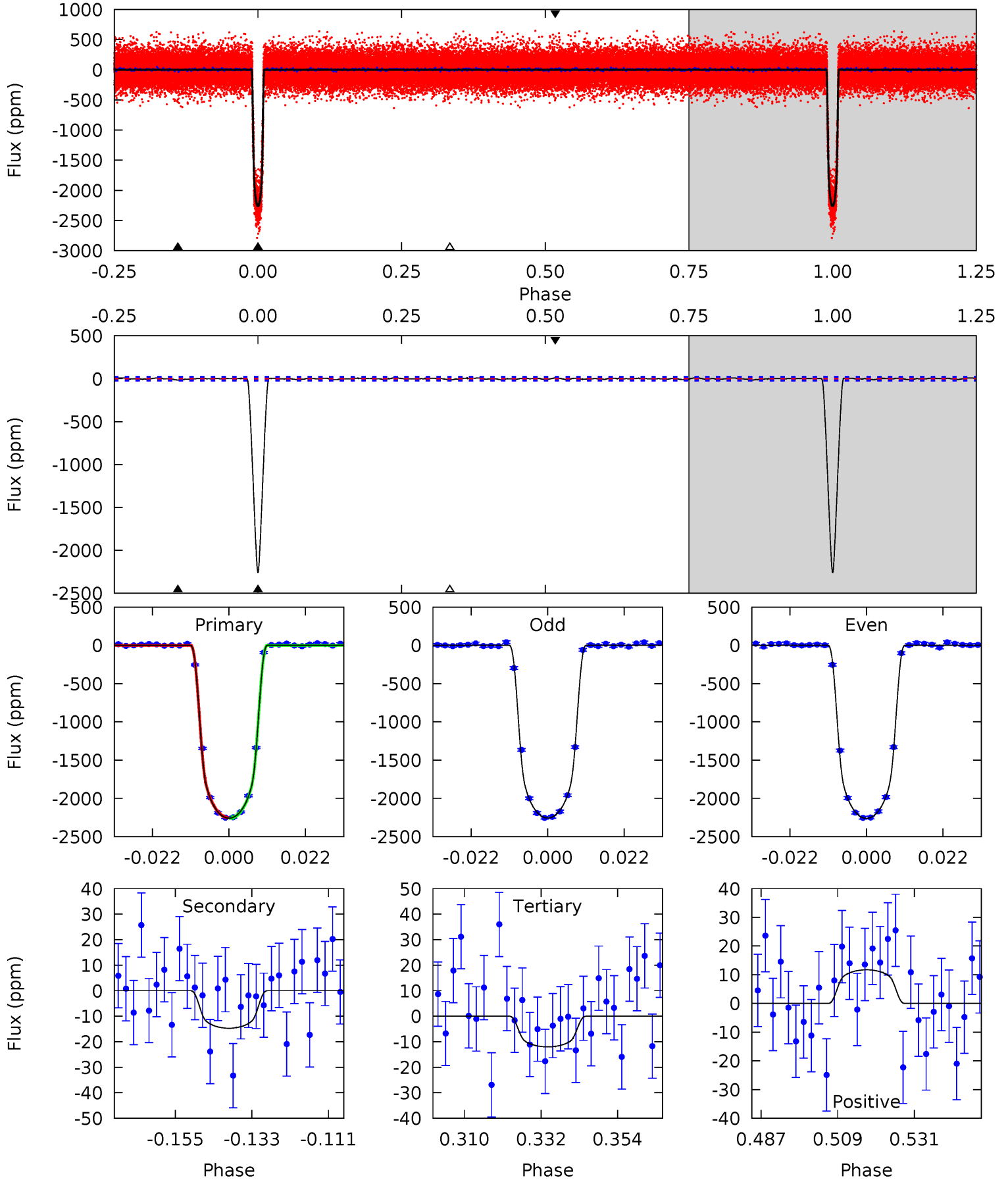
TCE 008644288-02     $P = 7.641492$  Days     $T_0 = 135.415356$  (BKJD)



# DV Model-Shift Uniqueness Test

008644288-02, P = 7.641560 Days, E = 127.767404 Days

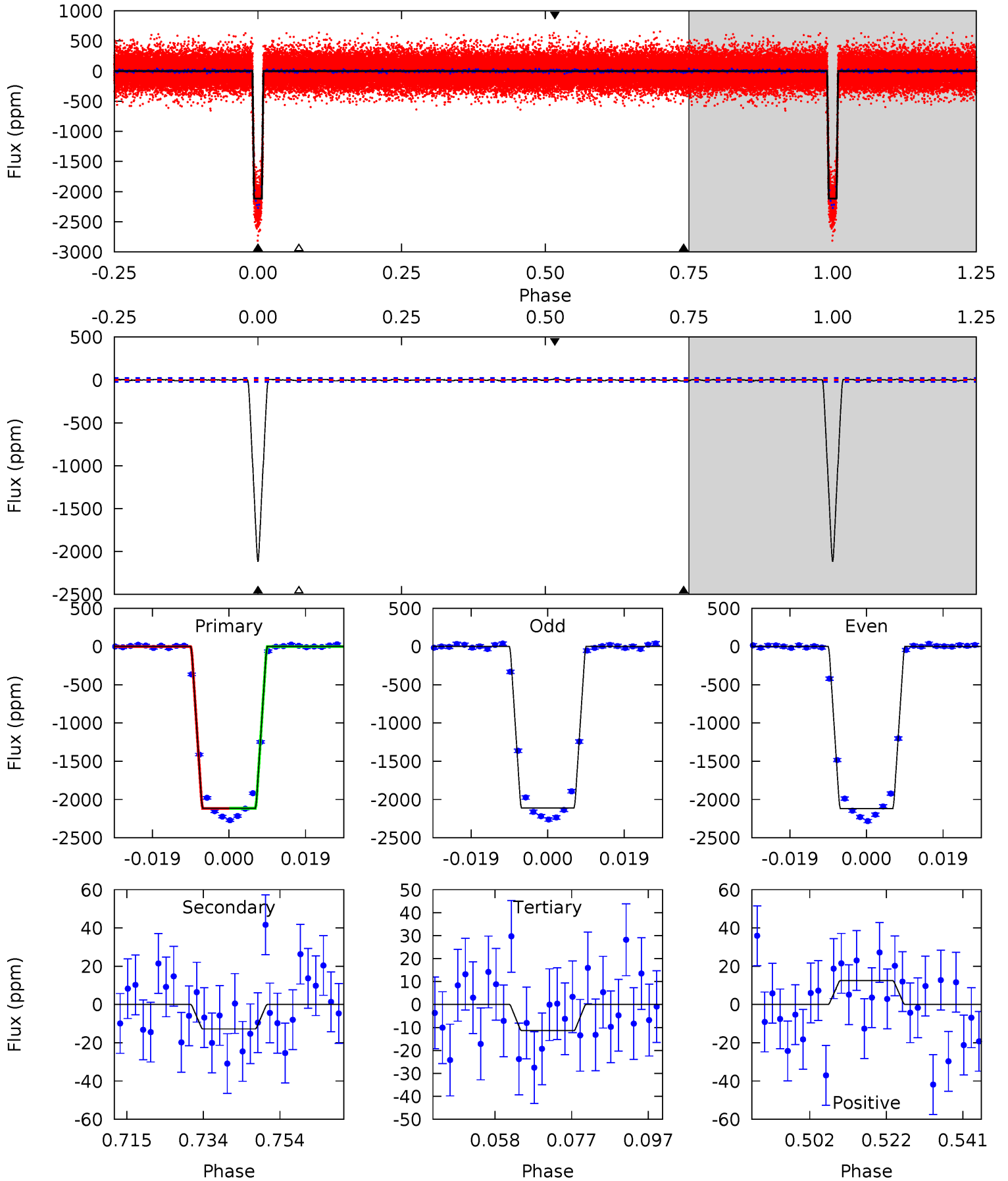
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
542.6	3.54	2.88	2.81	4.87	2.29	1.12	539.7	539.8	0.65	0.72	0.51	0.99	0.01	0.92



# Alt Model-Shift Uniqueness Test

008644288-02, P = 7.641492 Days, E = 127.773864 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
468.4	2.83	2.52	2.76	4.90	2.34	0.94	465.8	465.6	0.31	0.07	0.68	1.00	0.01	0.41



### Stellar Parameters For KIC 008644288

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5356^{+112}_{-72}$	$4.338^{+0.065}_{-0.040}$	$0.200^{+0.150}_{-0.100}$	$1.055^{+0.065}_{-0.072}$	$0.882^{+0.056}_{-0.025}$	$1.060^{+0.262}_{-0.145}$
	+2%/-1%	+1%/-1%	+75%/-50%	+6%/-7%	+6%/-3%	+25%/-14%
Source	SPE30	TRA30	SPE30	DSEP		

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

### Secondary Eclipse Parameters for KIC 008644288-02 / KOI 0137.01

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-15 \pm 4$	$5.50^{+0.20}_{-0.24}$	$1254^{+31}_{-32}$	$2338^{+84}_{-120}$	$1.440^{+0.430}_{-0.413}$
Alt.	$-13 \pm 5$	$5.36^{+0.20}_{-0.23}$	$1252^{+31}_{-29}$	$2310^{+101}_{-149}$	$1.340^{+0.479}_{-0.466}$

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

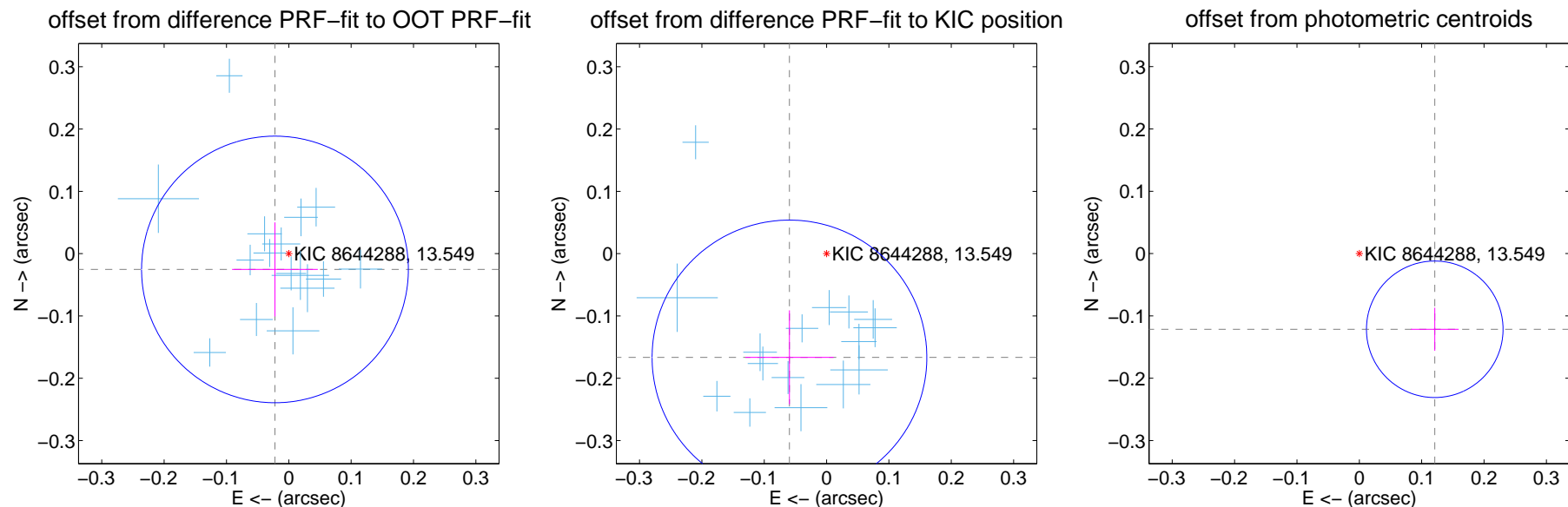
## DV Centroid Data

Supplemental centroid analysis for 008644288-02. Kepler magnitude: 13.55. Transit SNR 359.82

There are 17 quarters with good PRF difference image offsets

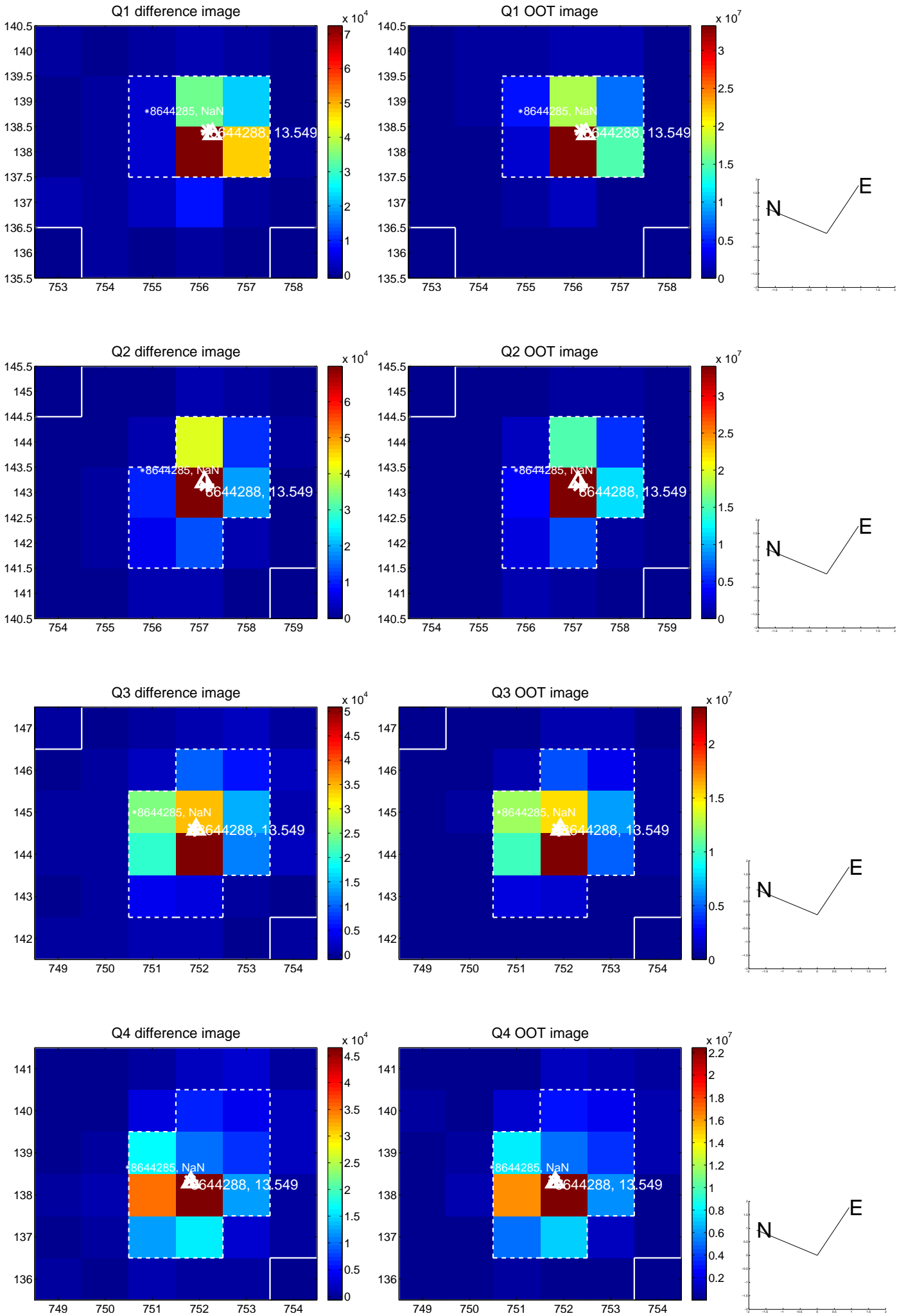
The direct PRF centroid is offset from the target star catalog position by about 0.16 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.034 \pm 0.071$	0.47	$0.022 \pm 0.069$	$-0.025 \pm 0.075$
PRF-fit source offset from KIC position	$0.177 \pm 0.073$	2.41	$0.060 \pm 0.071$	$-0.166 \pm 0.075$
photometric centroid source offset	$0.17 \pm 0.04$	4.70	$-0.12 \pm 0.04$	$-0.12 \pm 0.03$

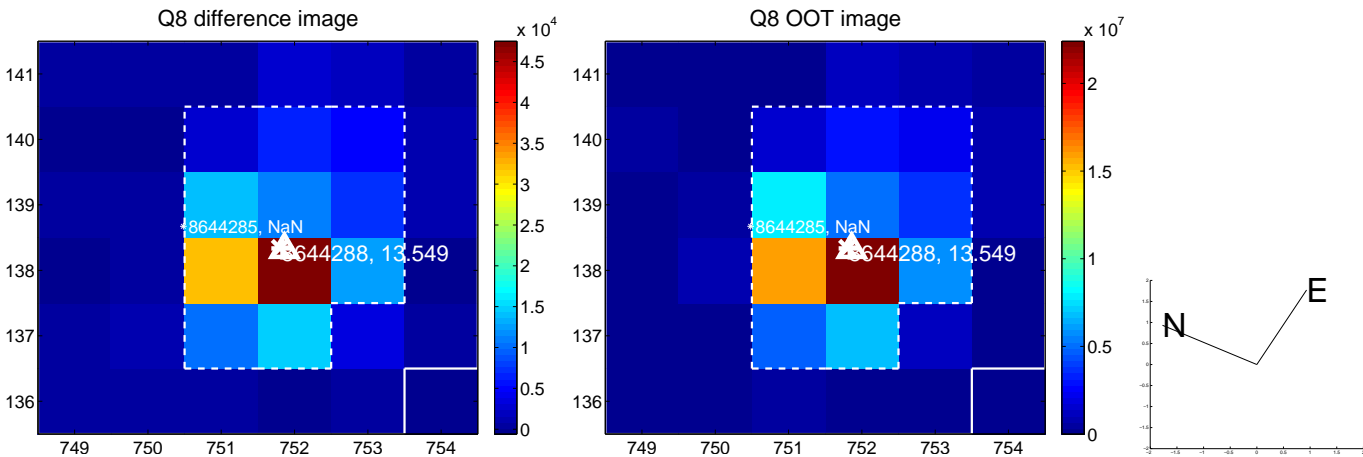
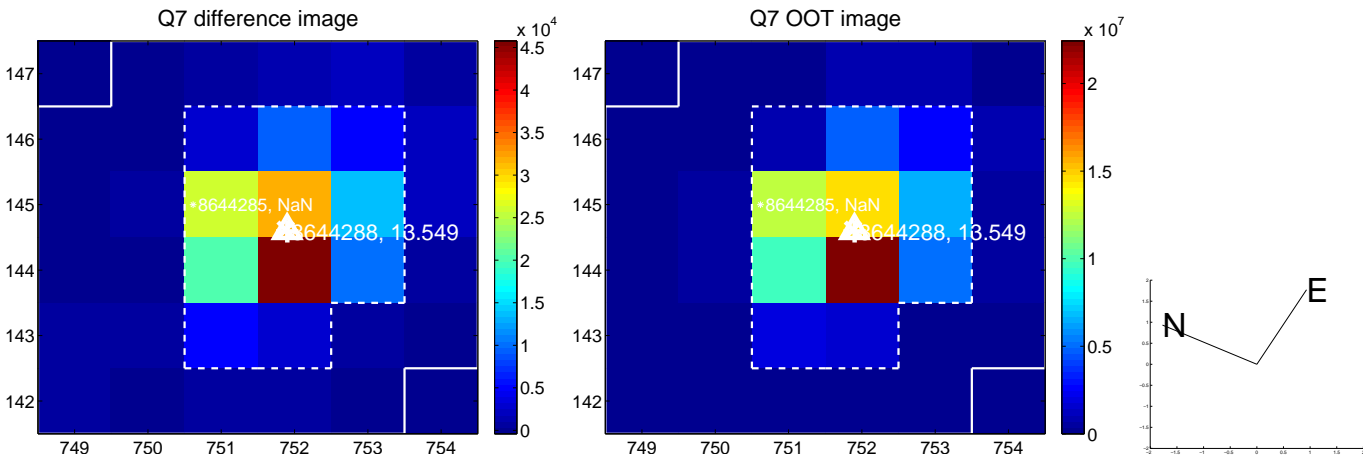
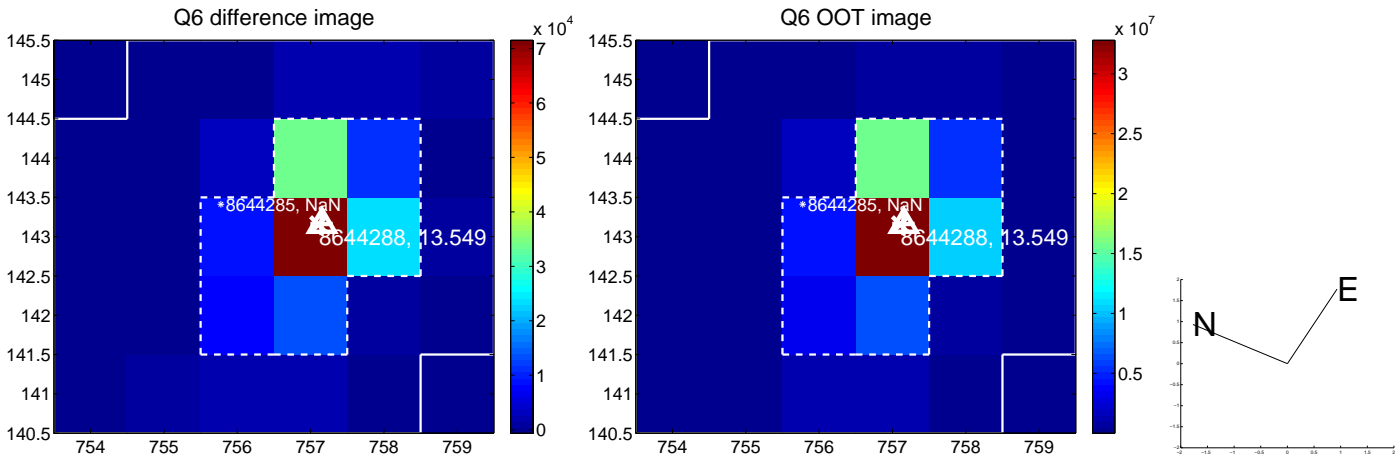
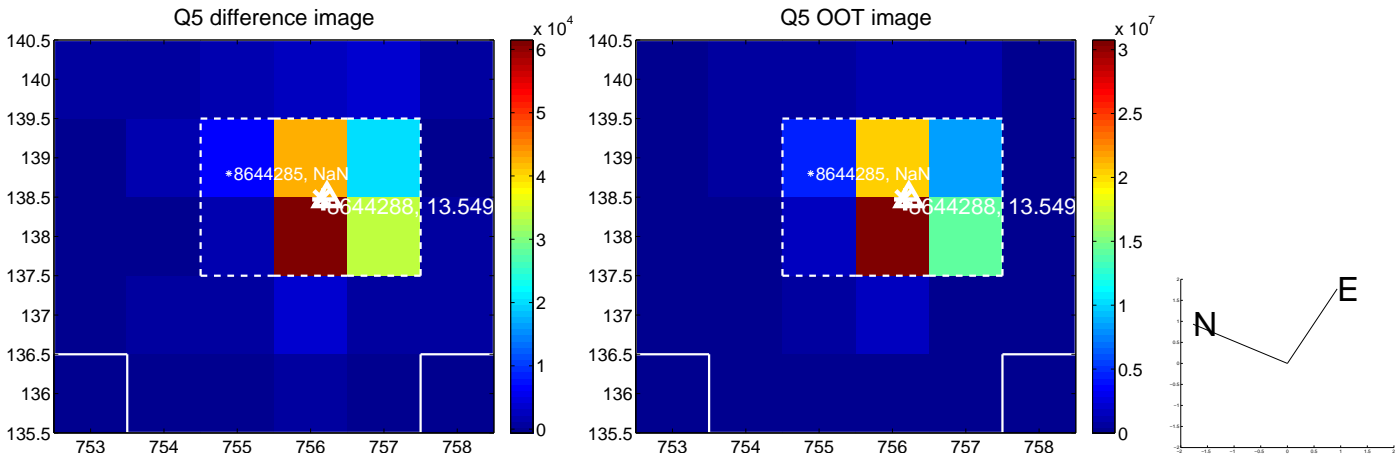


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

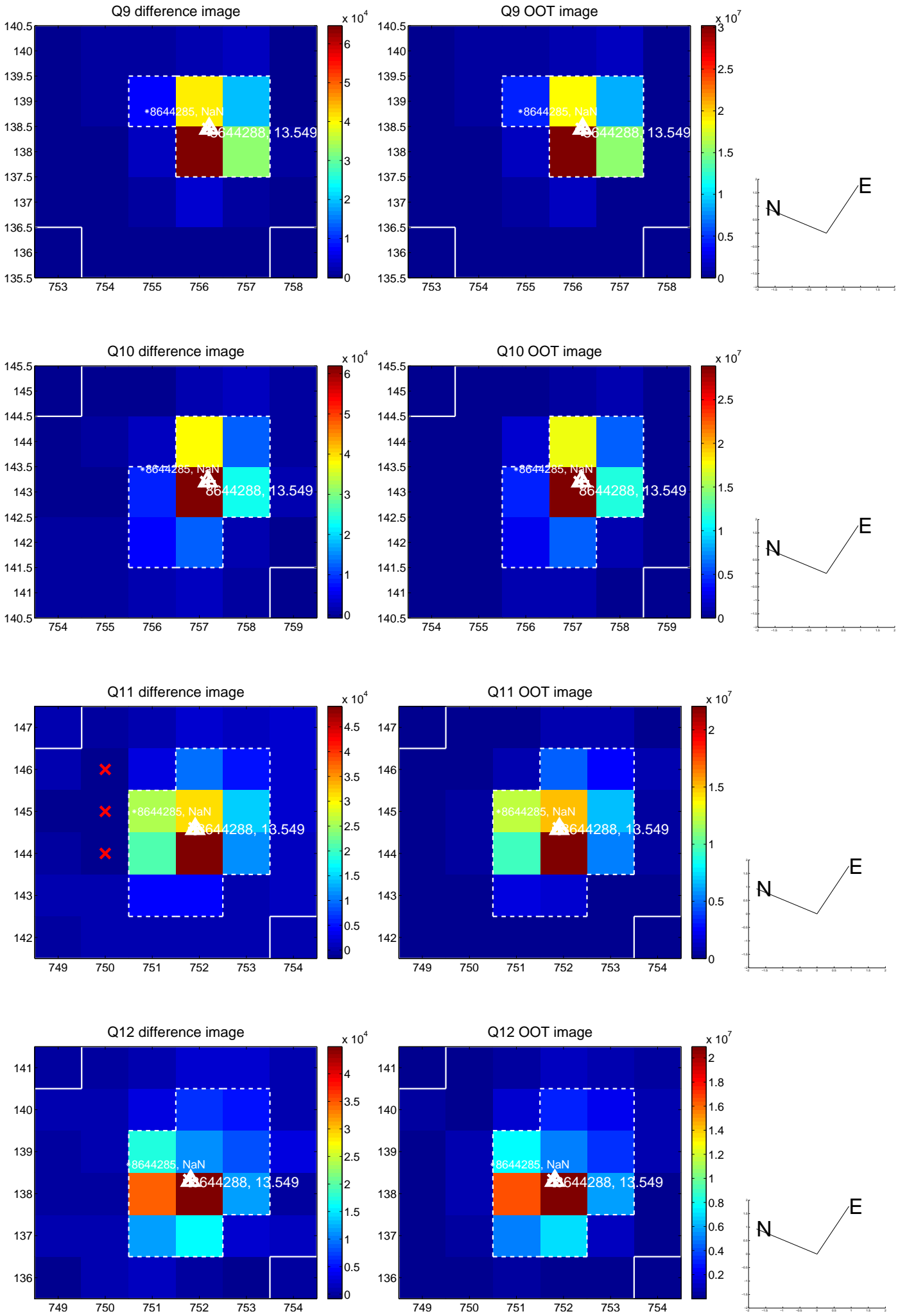


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

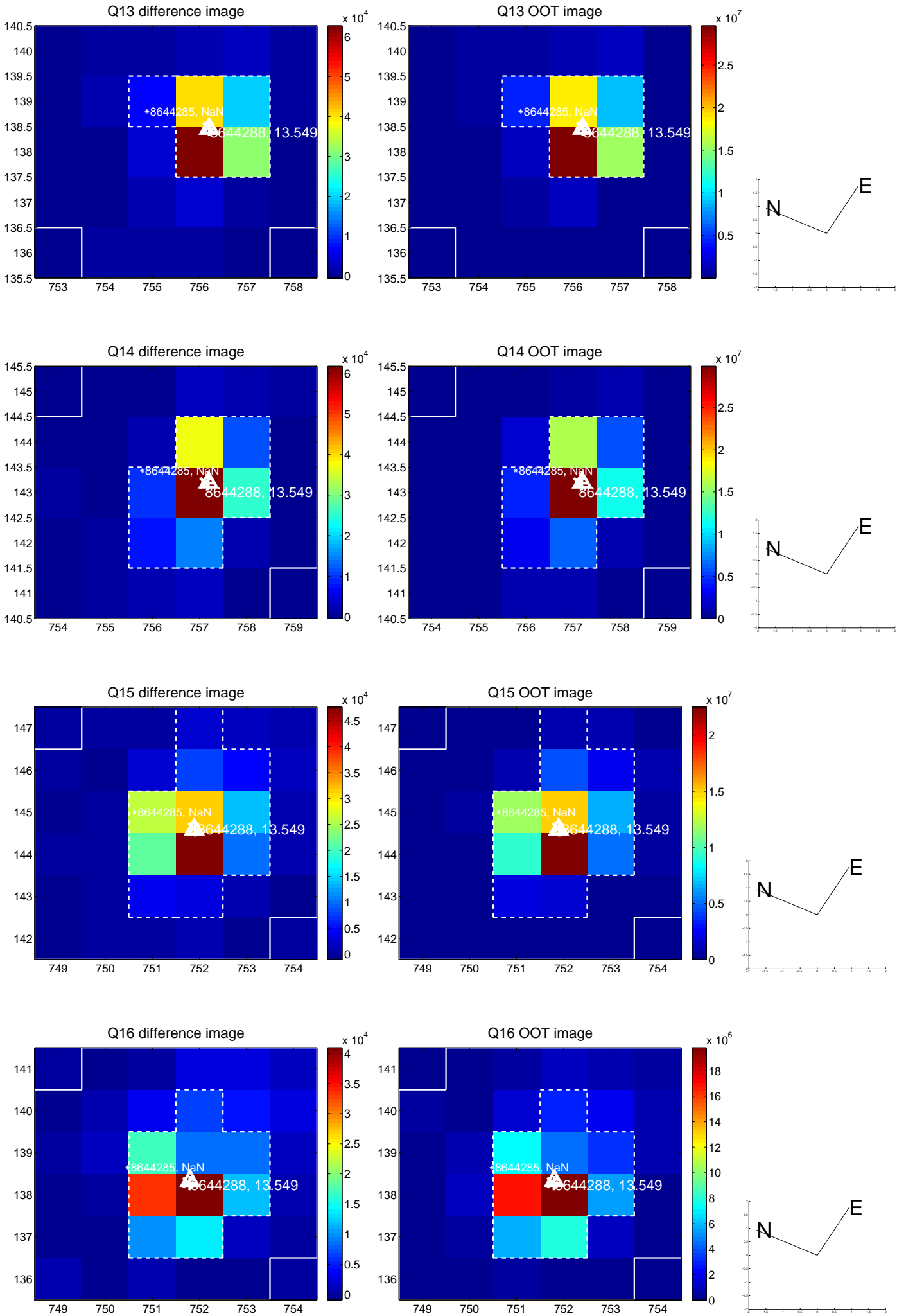




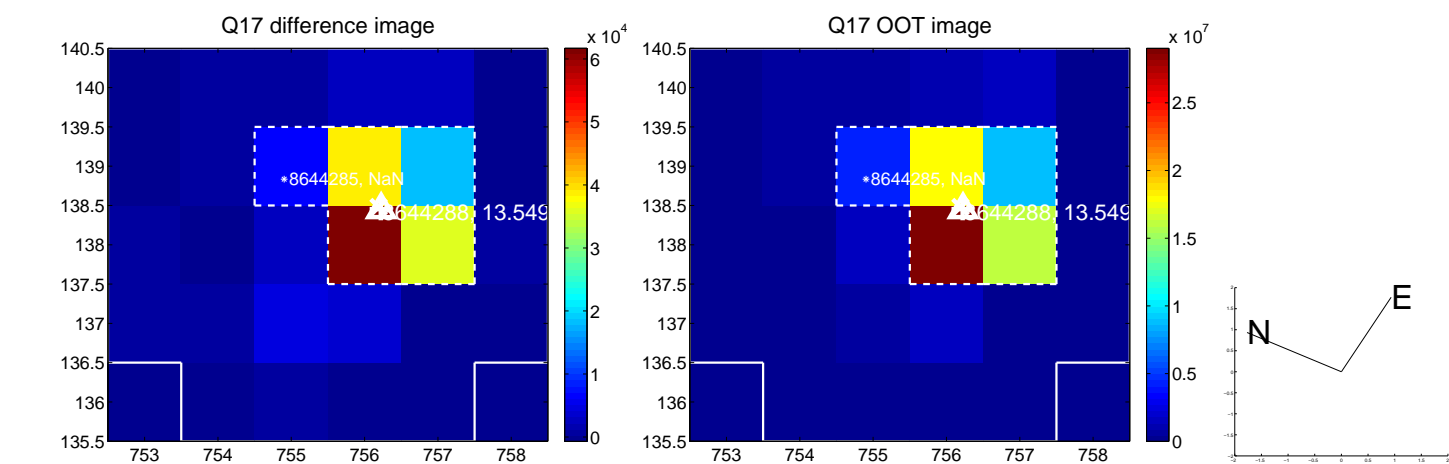
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



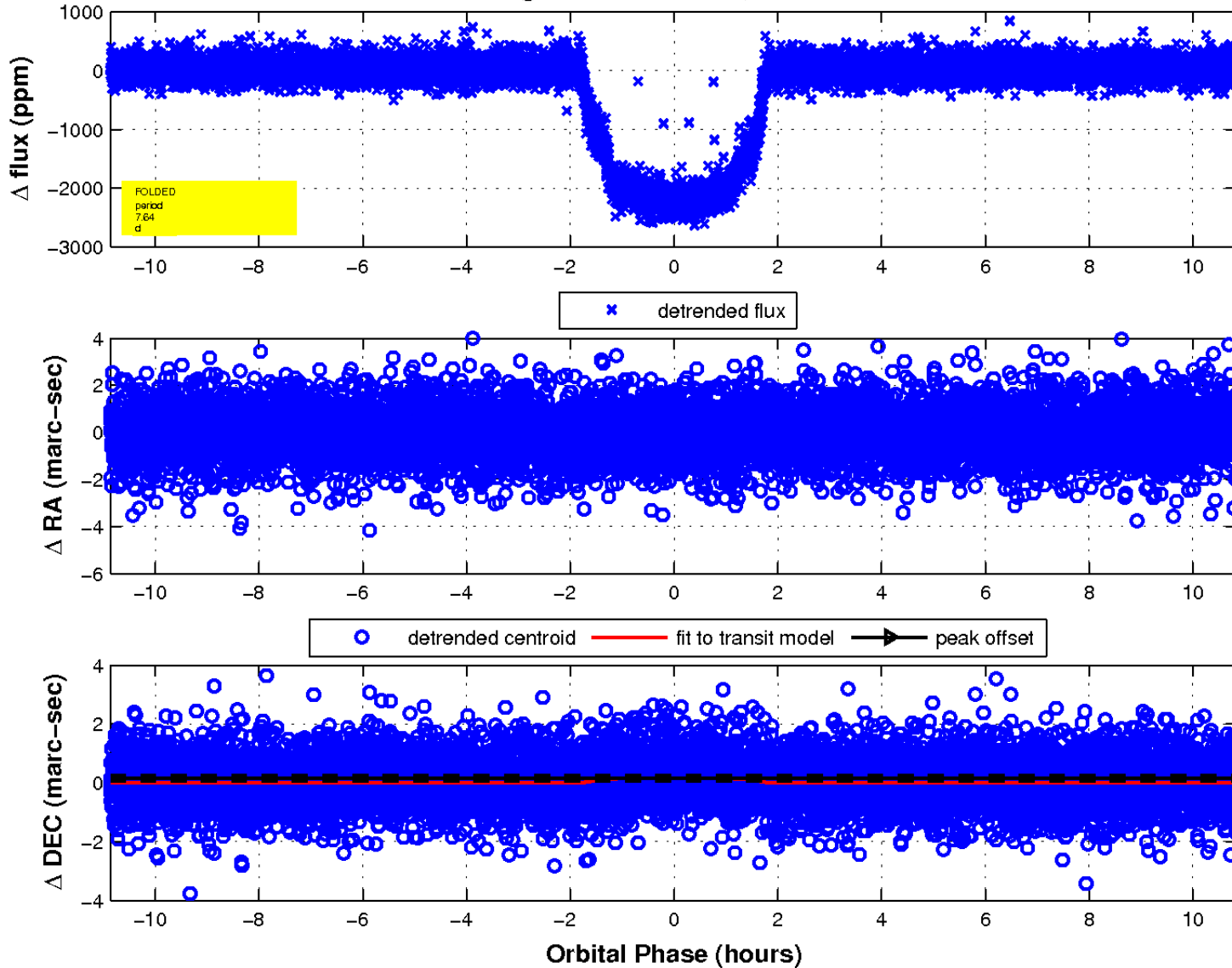
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

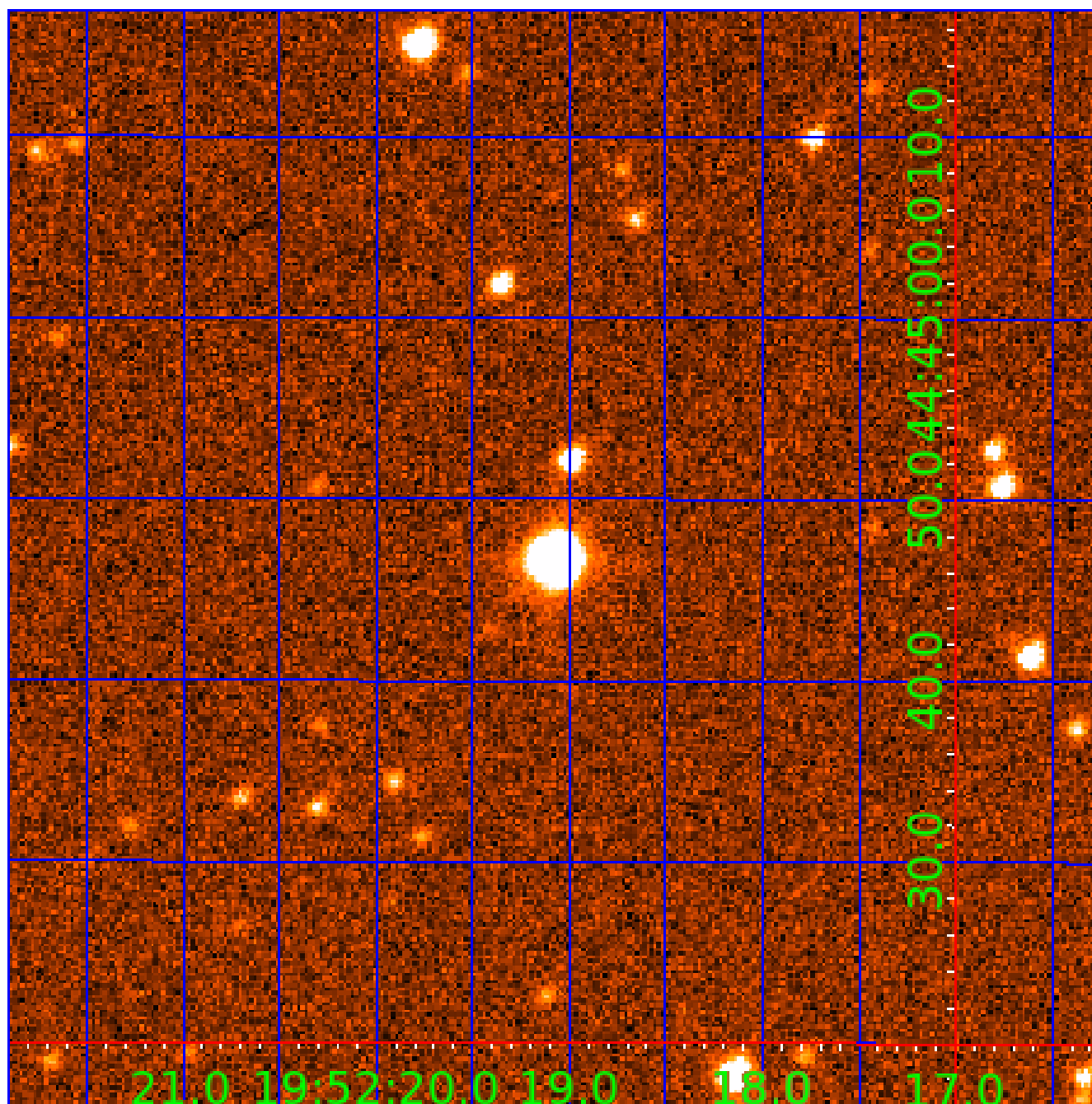


fluxWeightedCentroids, Planet 2 of 3



UKIRT Image

Declination



# KIC 008644288

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008644288-01	OBS	0137.02	14.858912	143.013066	3260.4	3.663	399.4	370.8	1.05	5356	6.45	63.65
008644288-02	OBS	0137.01	7.641560	135.408964	2258.0	3.622	366.3	359.8	1.05	5356	5.51	154.47
008644288-03	OBS	0137.03	3.504711	133.510890	284.7	2.159	50.8	57.4	1.05	5356	2.14	436.74

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008644288-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
008644288-02	OBS	PC	1.00	0	0	0	0	NO_COMMENT
008644288-03	OBS	PC	1.00	0	0	0	0	NO_COMMENT

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

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

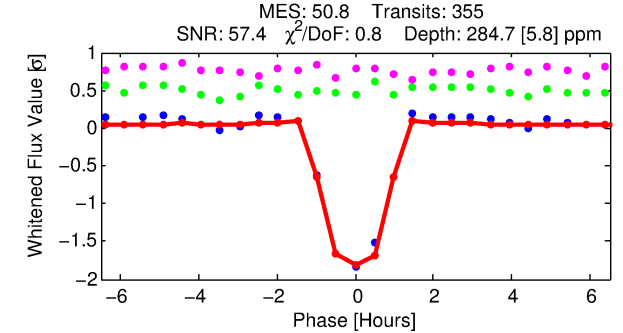
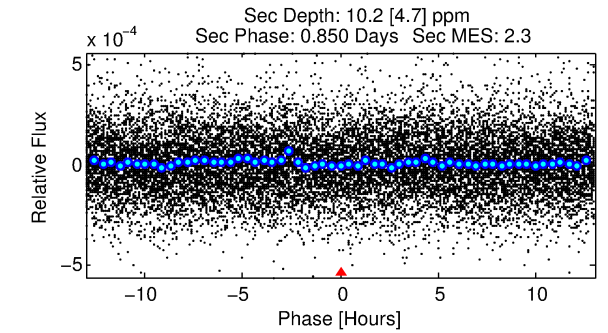
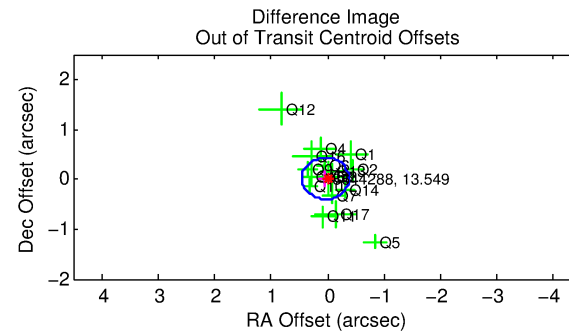
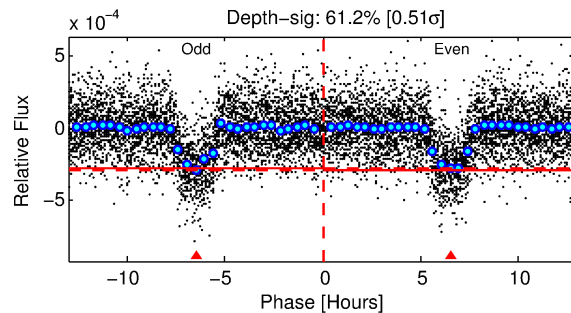
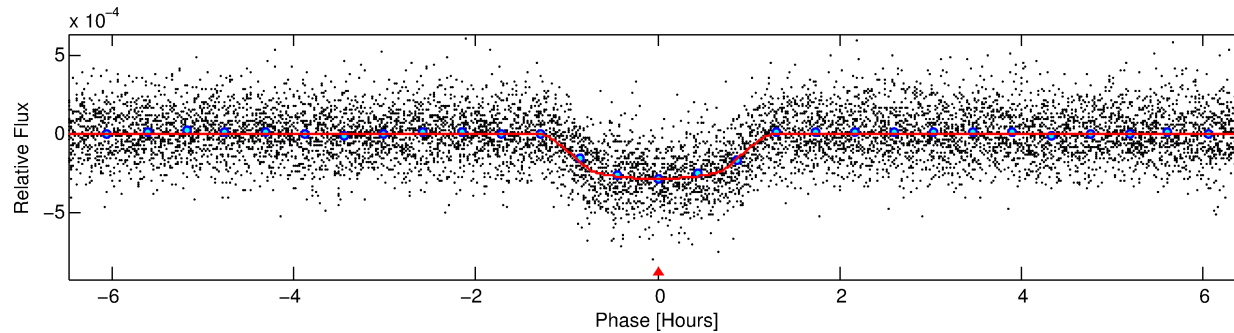
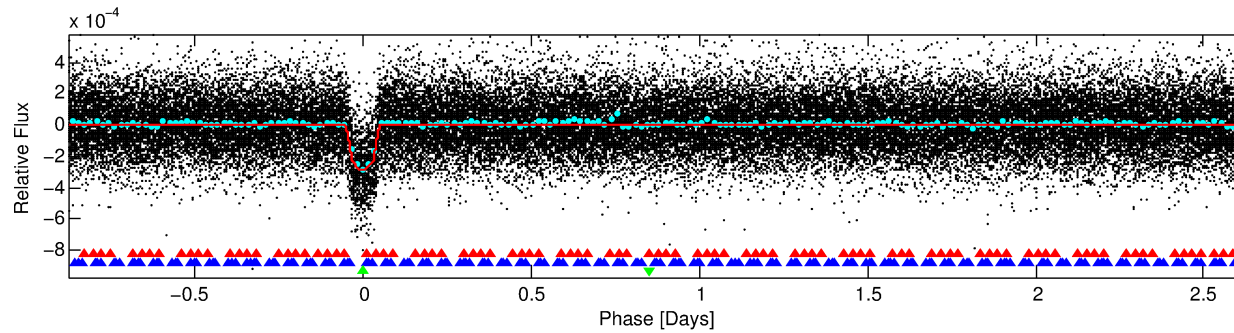
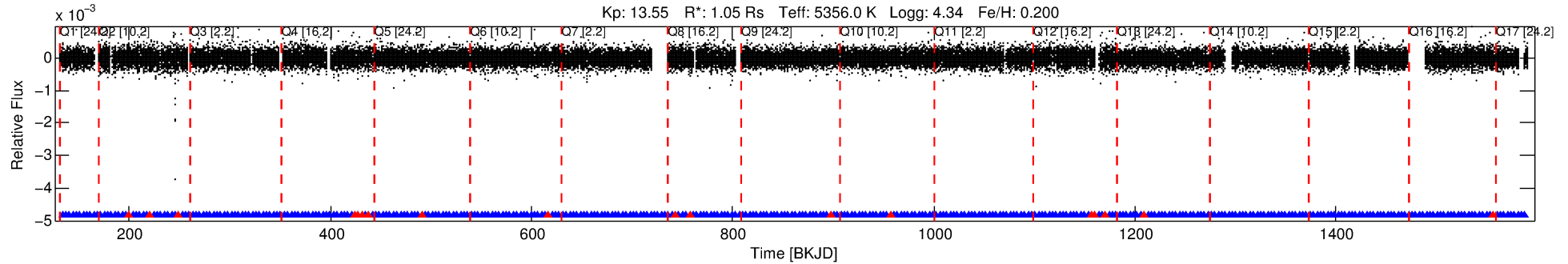
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 008644288-03

No Significant Match Found

# DV One-Page Summary

KIC: 8644288 Candidate: 3 of 3 Period: 3.505 d  
KOI: K00137.03 Name: Kepler-18b Corr: 0.945



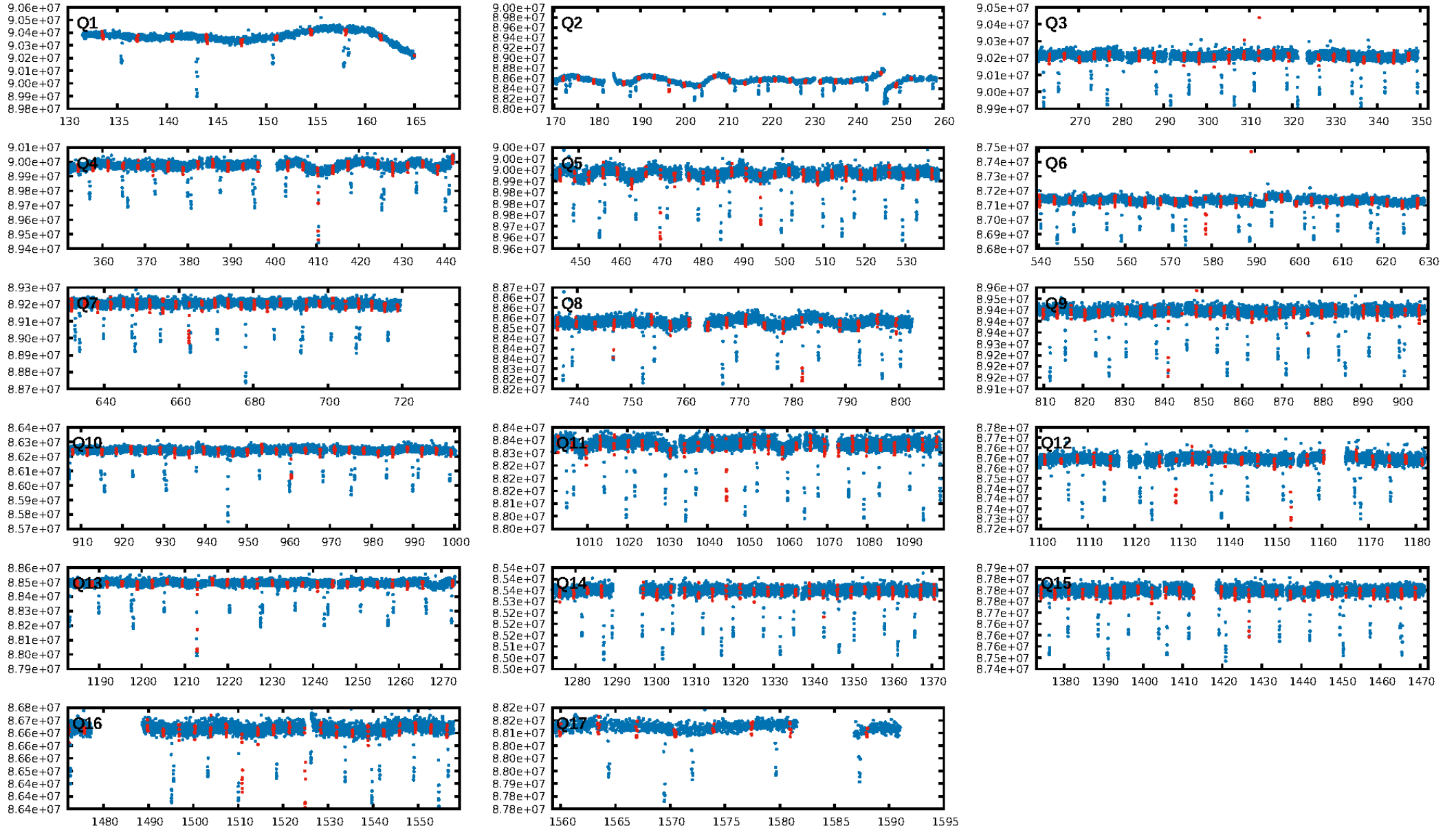
## DV Fit Results:

Period = 3.50471 [0.00000] d  
Epoch = 133.5109 [0.0007] BKJD  
Rp/R\* = 0.0186 [0.0024]  
a/R\* = 6.07 [3.21]  
b = 0.90 [0.12]  
Seff = 436.74 [60.24]  
Teq = 1166 [40] K  
Rp = 2.14 [0.31] Re  
a = 0.0433 [0.0029] AU  
Ag = 2.30 [1.25] [1.04 $\sigma$ ]  
Teffp = 2220 [299] K [3.50 $\sigma$ ]

## DV Diagnostic Results:

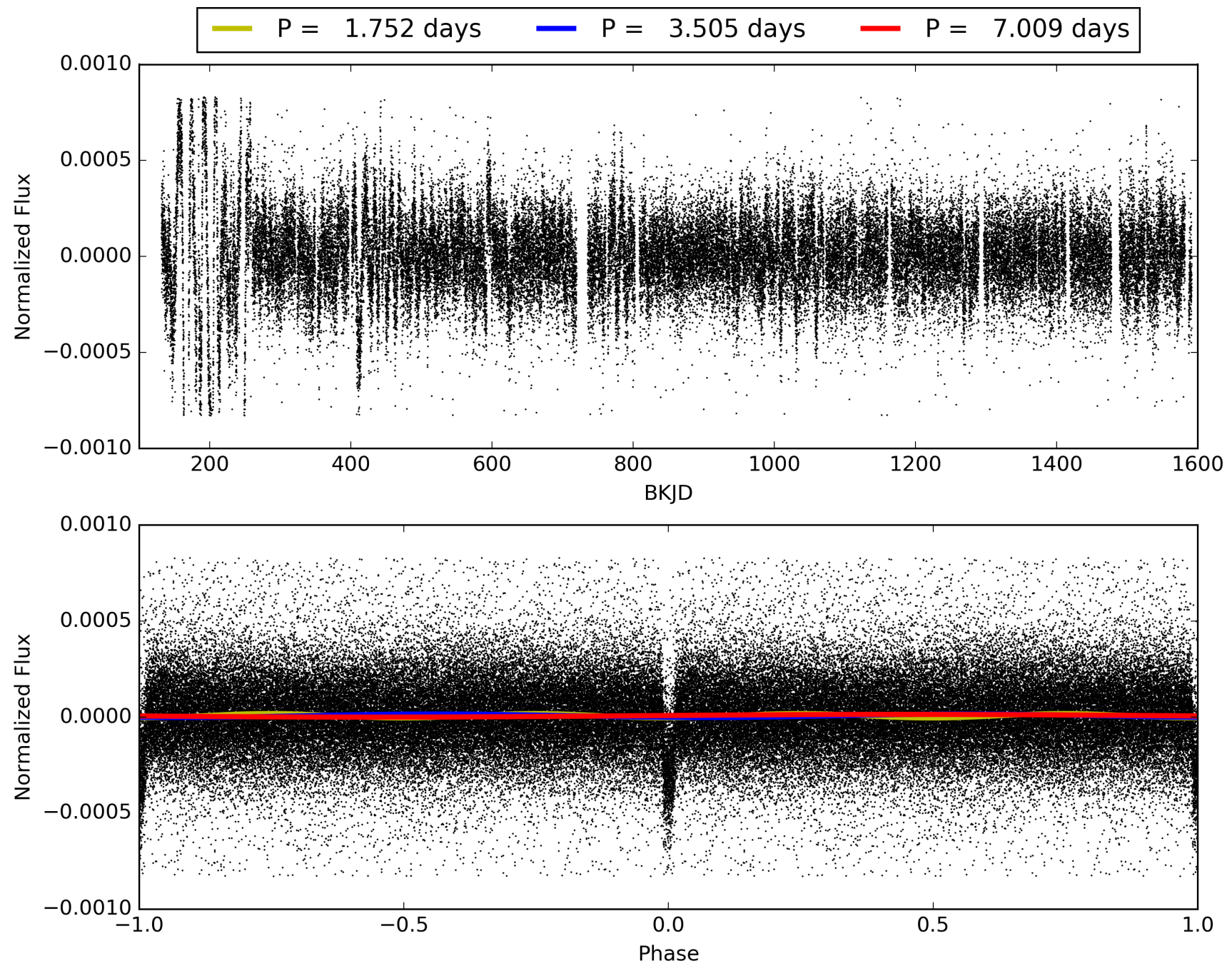
ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [23.55 $\sigma$ ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 0.00e+00  
RollingBand-fgt: 0.95 [321/339]  
GhostDiagnostic-chr: 7.226  
Centroid-sig: N/A  
Centroid-so: 0.406 arcsec [1.69 $\sigma$ ]  
OotOffset-rm: 0.041 arcsec [0.29 $\sigma$ ]  
KicOffset-rm: 0.135 arcsec [1.02 $\sigma$ ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 1.00 [17/17]  
DiffImageOverlap-fno: 1.00 [17/17]

# TCE 008644288-03, PDC Light Curves





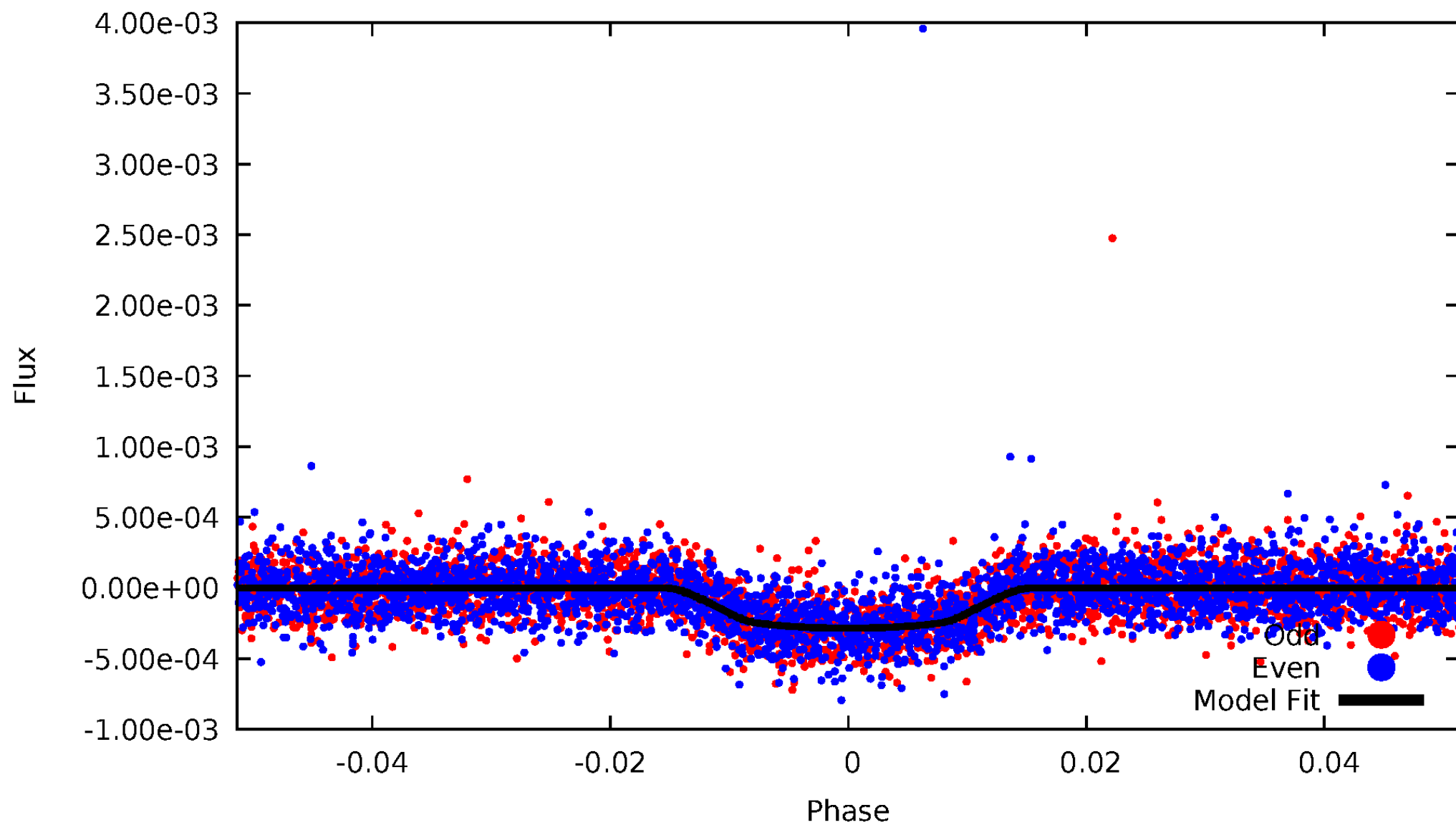
TCE 008644288-03





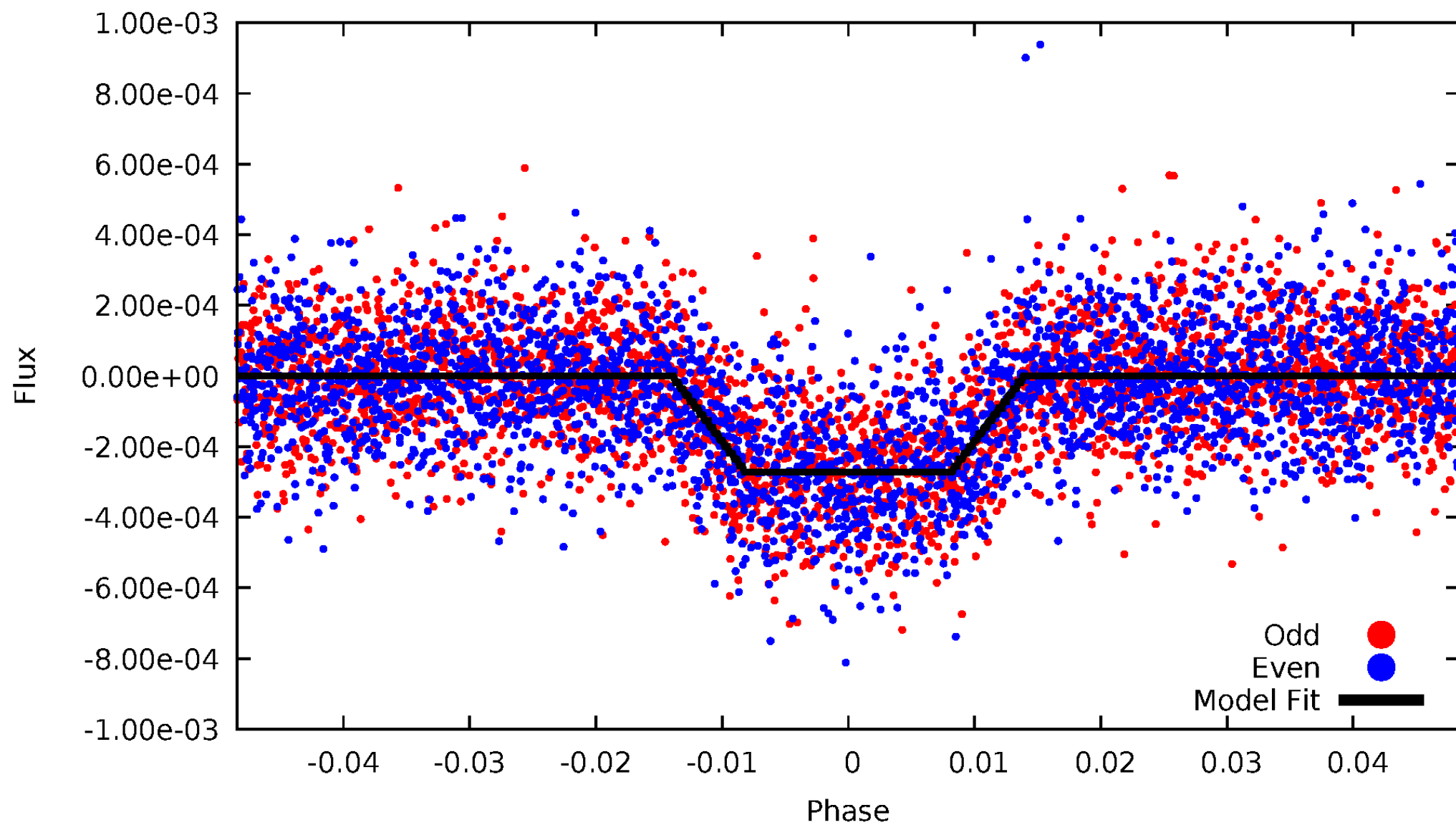
# DV Odd/Even

TCE 008644288-03



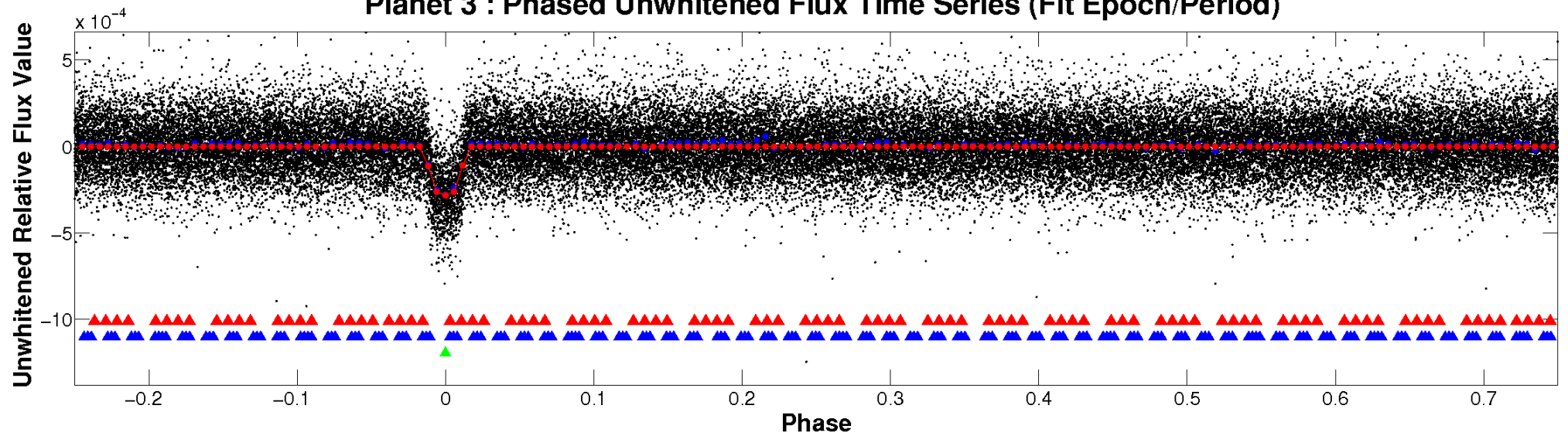
# ALT Odd/Even

TCE 008644288-03

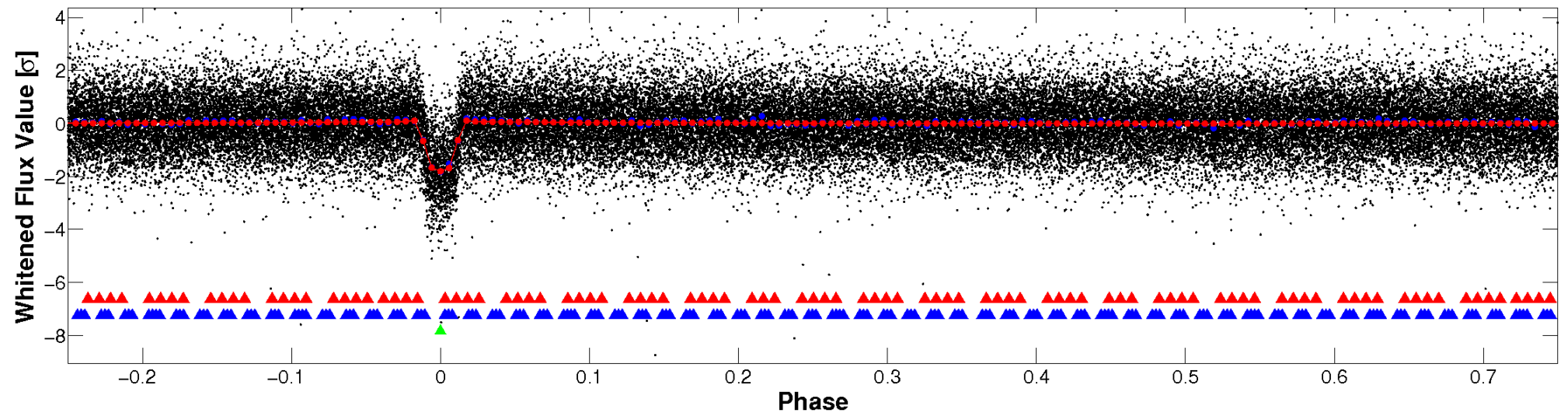


# Non-Whitened Vs. Whitened Light Curve

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

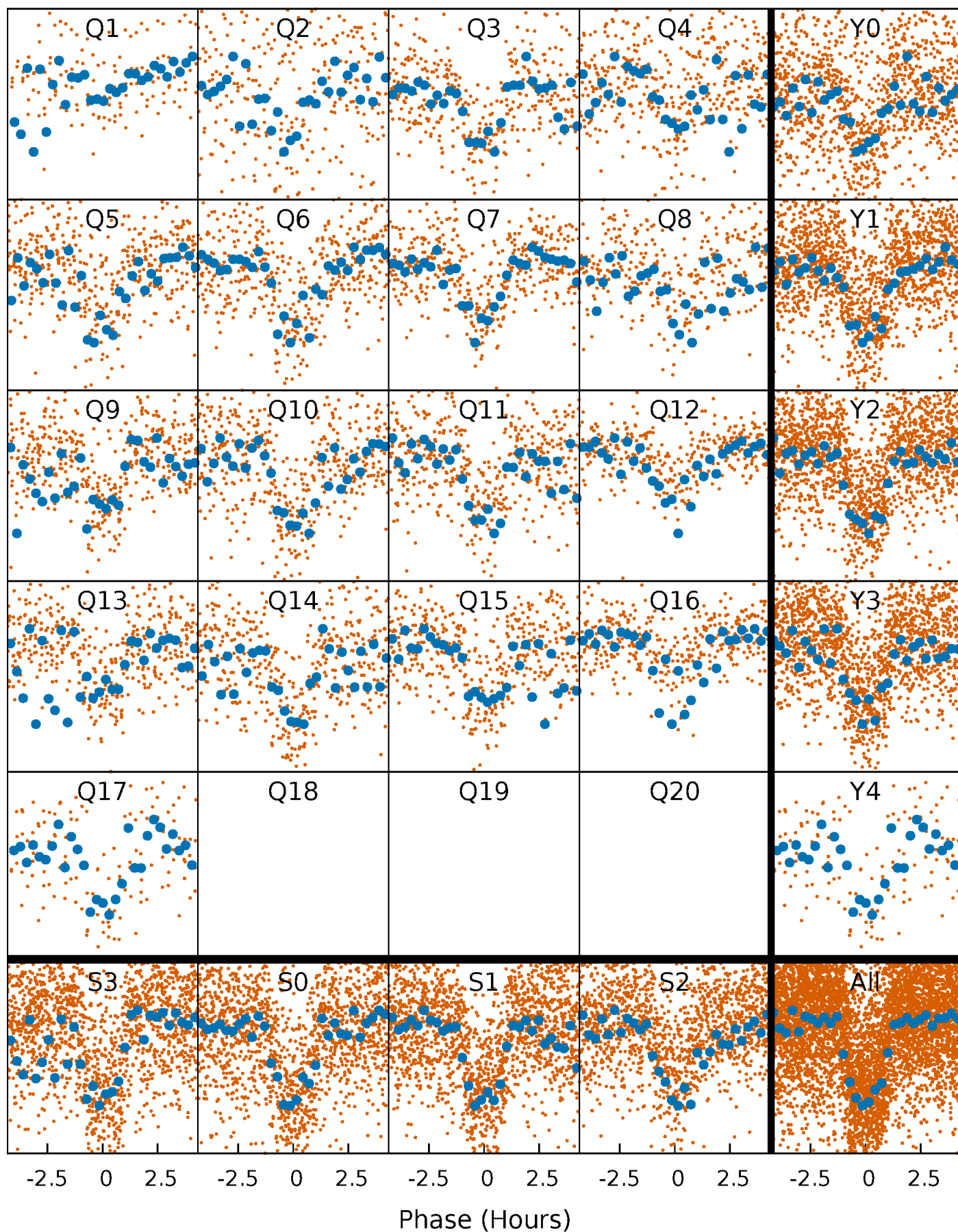


## Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



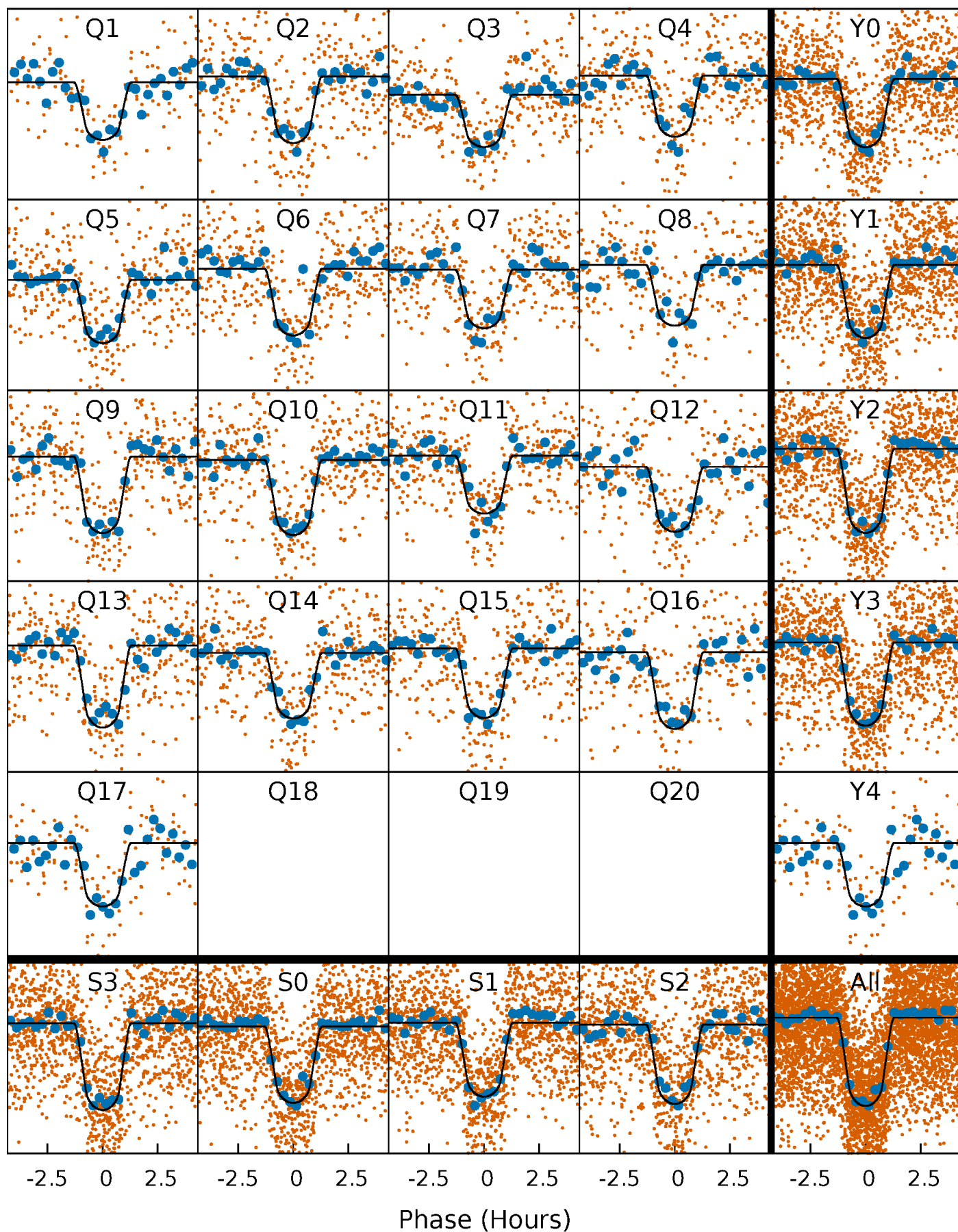
# PDC Quarter-Phased Transit Curves

TCE 008644288-03 P= 3.504711 Days  $T_0=133.510890$  (BKJD)



# DV Quarter-Phased Transit Curves

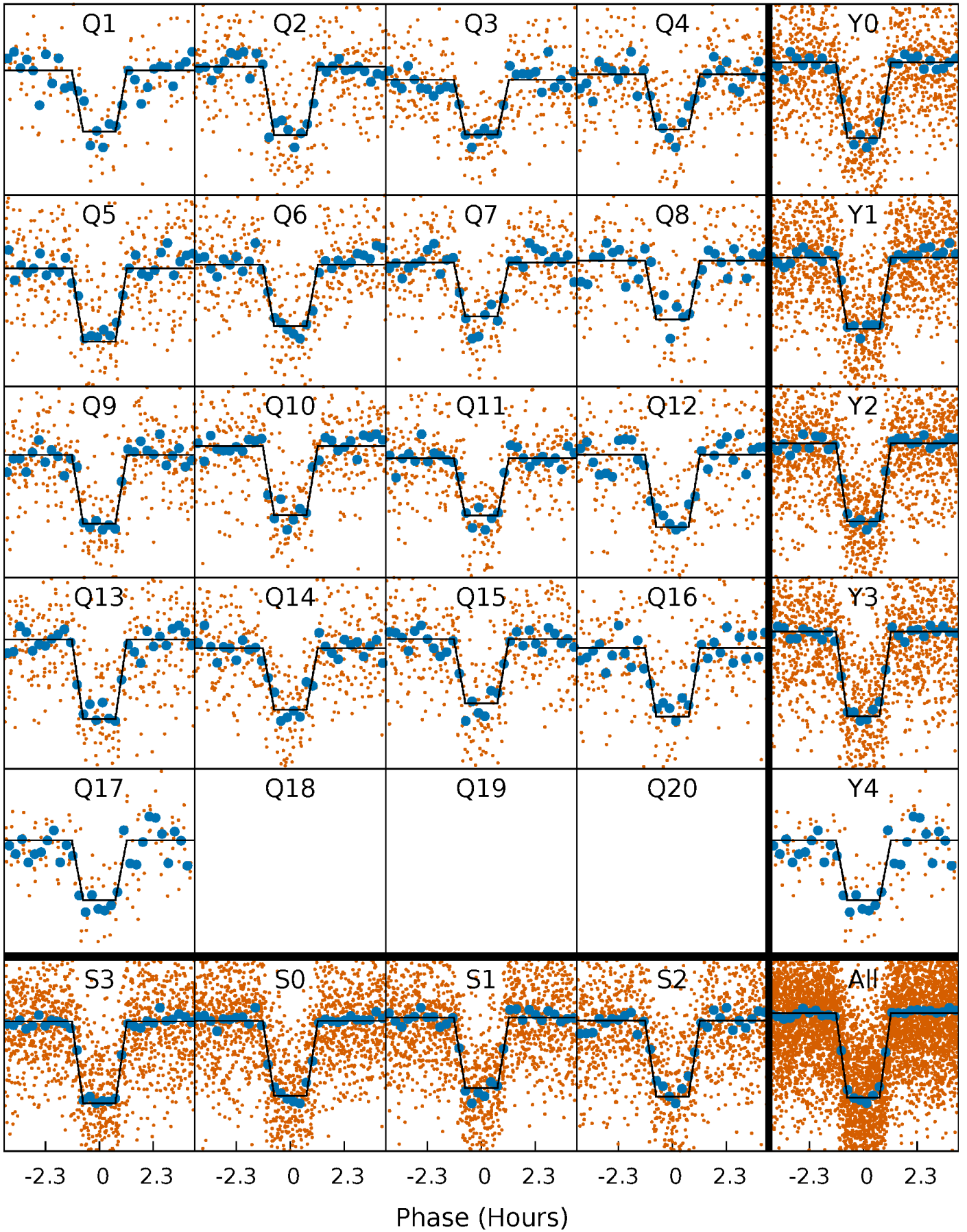
TCE 008644288-03   P= 3.504711 Days    $T_0=133.510890$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

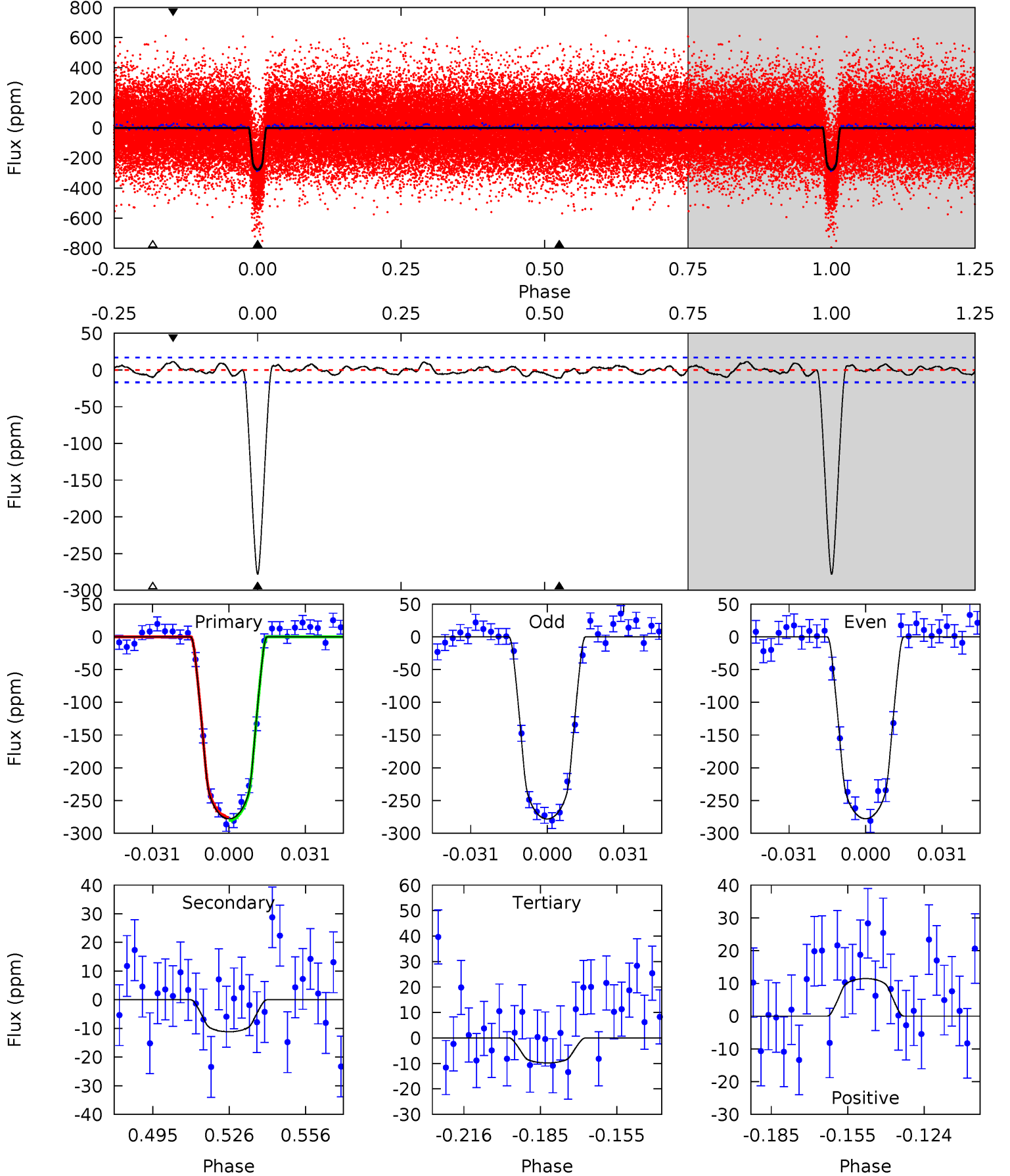
TCE 008644288-03 P= 3.504725 Days  $T_0=133.508617$  (BKJD)



# DV Model-Shift Uniqueness Test

008644288-03, P = 3.504711 Days, E = 130.006179 Days

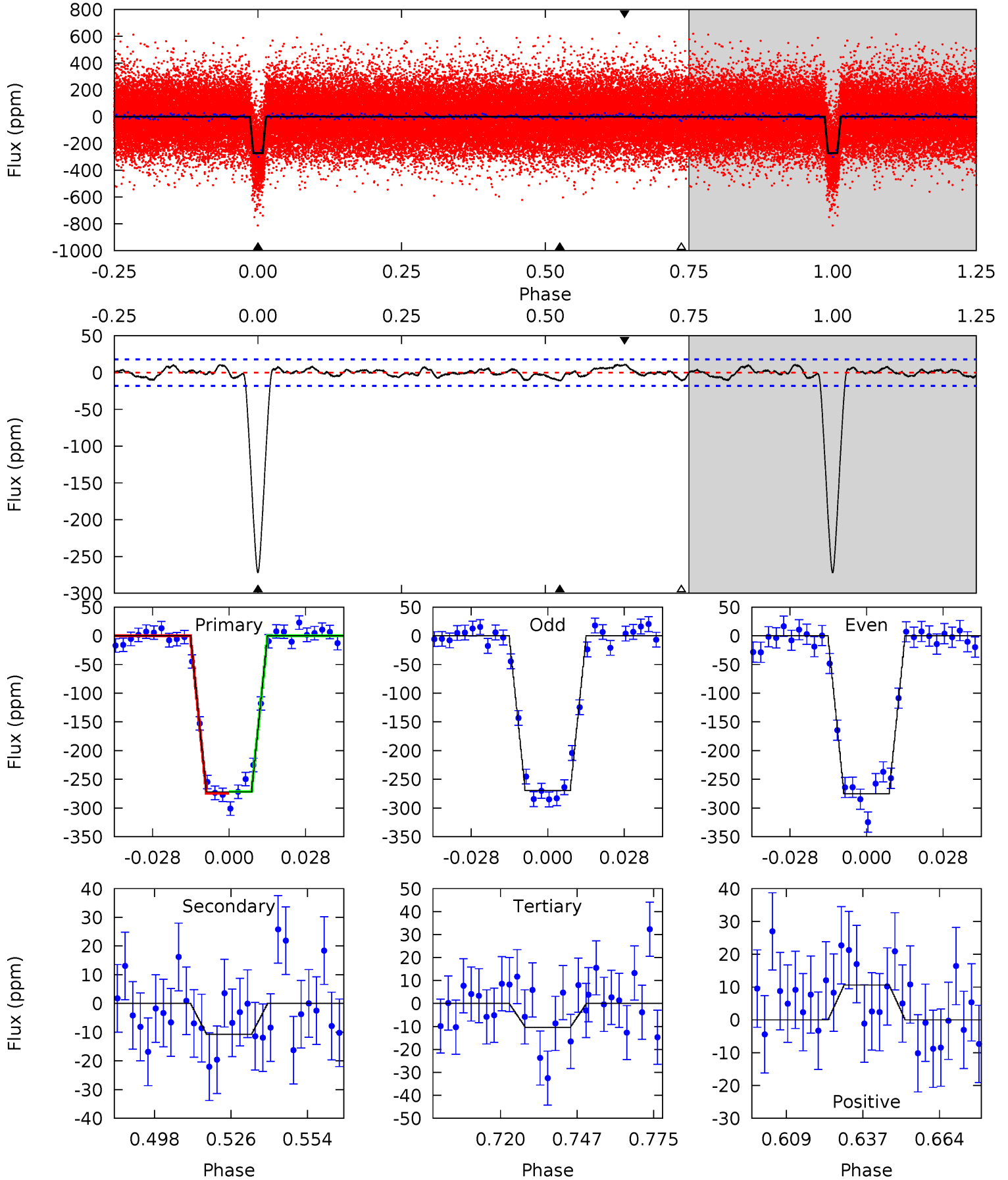
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
79.0	3.18	2.79	3.26	4.81	2.16	1.26	76.3	75.8	0.39	-0.08	0.05	0.99	0.04	0.58



# Alt Model-Shift Uniqueness Test

008644288-03, P = 3.504725 Days, E = 130.003892 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
73.0	2.88	2.79	2.85	4.83	2.20	1.21	70.2	70.1	0.09	0.03	0.75	0.97	0.04	0.45





### Stellar Parameters For KIC 008644288

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5356^{+112}_{-72}$	$4.338^{+0.065}_{-0.040}$	$0.200^{+0.150}_{-0.100}$	$1.055^{+0.065}_{-0.072}$	$0.882^{+0.056}_{-0.025}$	$1.060^{+0.262}_{-0.145}$
	+2%/-1%	+1%/-1%	+75%/-50%	+6%/-7%	+6%/-3%	+25%/-14%
Source	SPE30	TRA30	SPE30	DSEP		

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

### Secondary Eclipse Parameters for KIC 008644288-03 / KOI 0137.03

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-11 \pm 4$	$2.13^{+0.32}_{-0.27}$	$1626^{+43}_{-35}$	$2889^{+184}_{-189}$	$2.484^{+1.207}_{-0.851}$
Alt.	$-11 \pm 4$	$1.88^{+0.32}_{-0.29}$	$1628^{+40}_{-40}$	$2995^{+225}_{-218}$	$3.090^{+1.804}_{-1.166}$

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

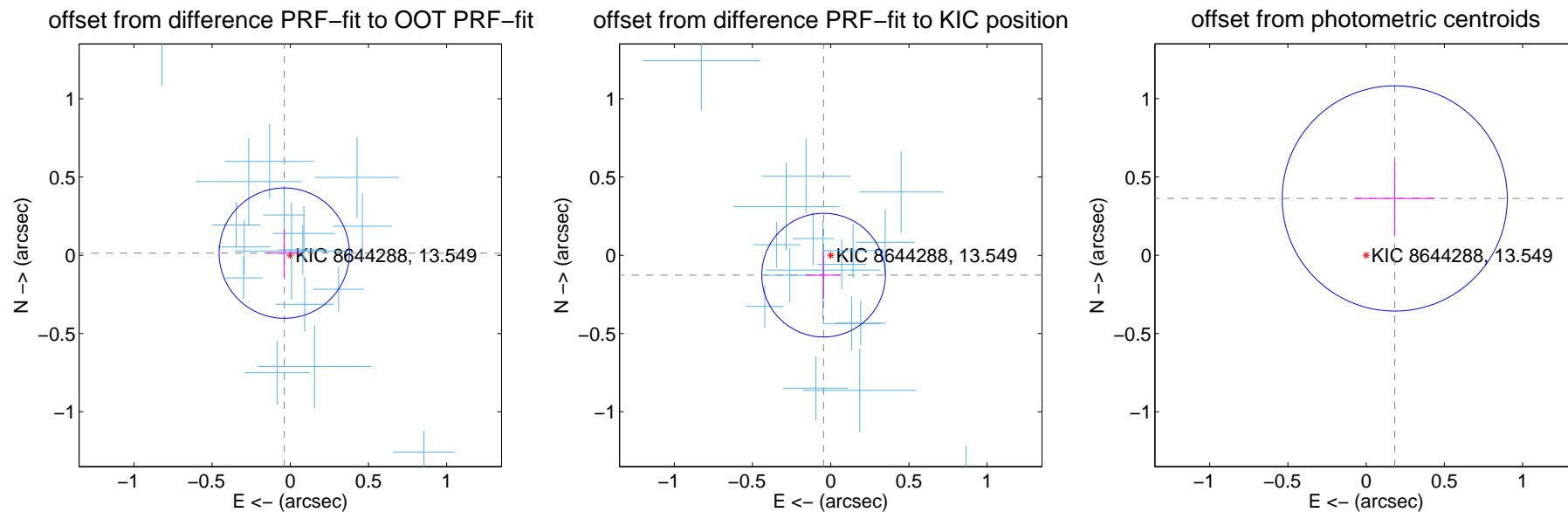
## DV Centroid Data

Supplemental centroid analysis for 008644288-03. Kepler magnitude: 13.55. Transit SNR 57.39

There are 17 quarters with good PRF difference image offsets

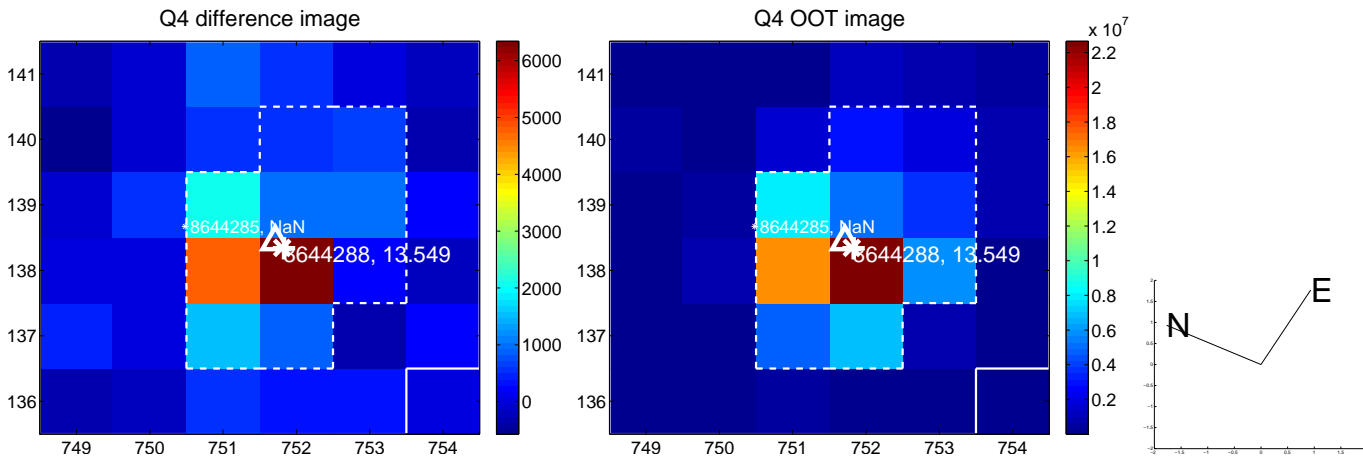
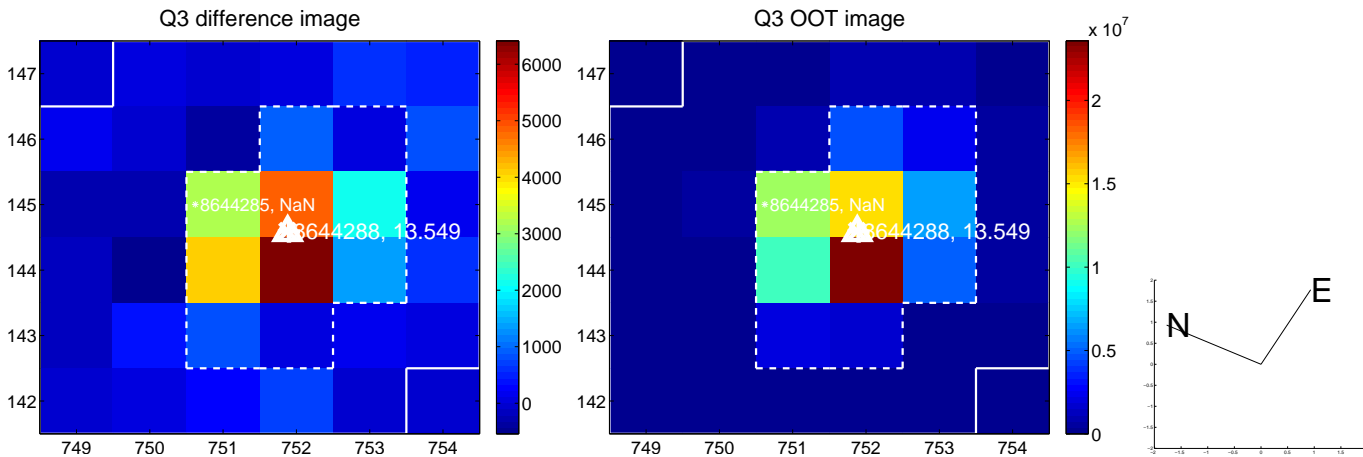
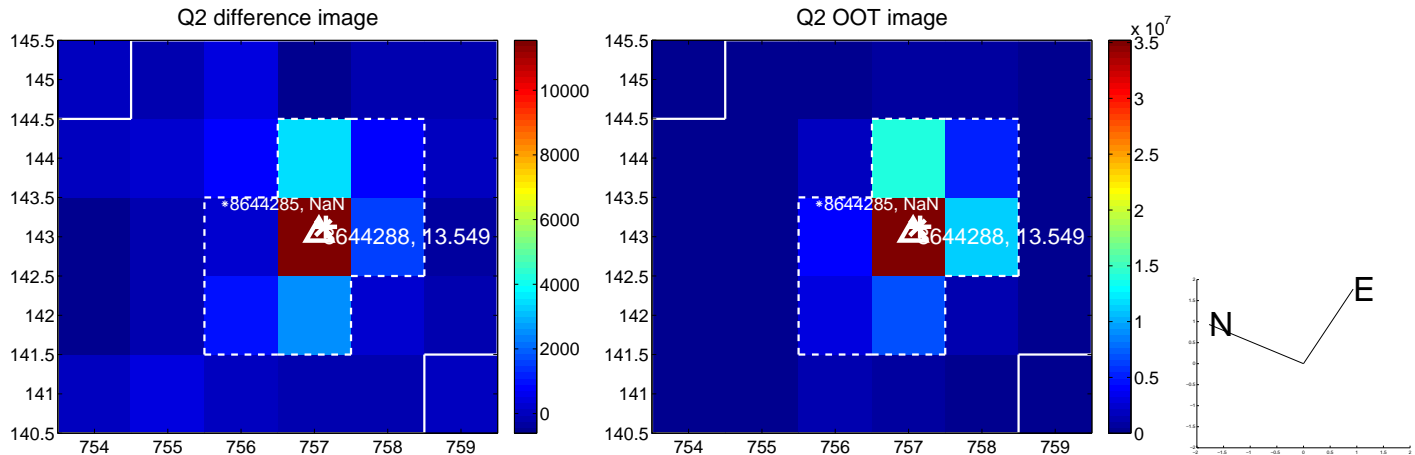
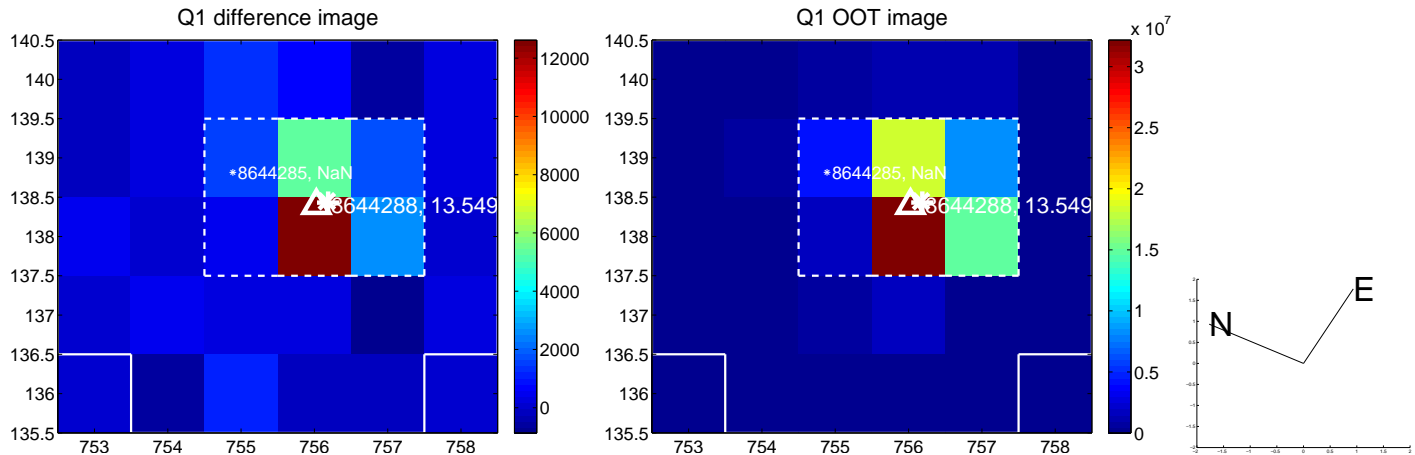
The direct PRF centroid is offset from the target star catalog position by about 0.16 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.041 \pm 0.139$	0.29	$0.038 \pm 0.114$	$0.014 \pm 0.155$
PRF-fit source offset from KIC position	$0.135 \pm 0.132$	1.02	$0.046 \pm 0.110$	$-0.127 \pm 0.152$
photometric centroid source offset	$0.41 \pm 0.24$	1.69	$-0.18 \pm 0.26$	$0.36 \pm 0.24$

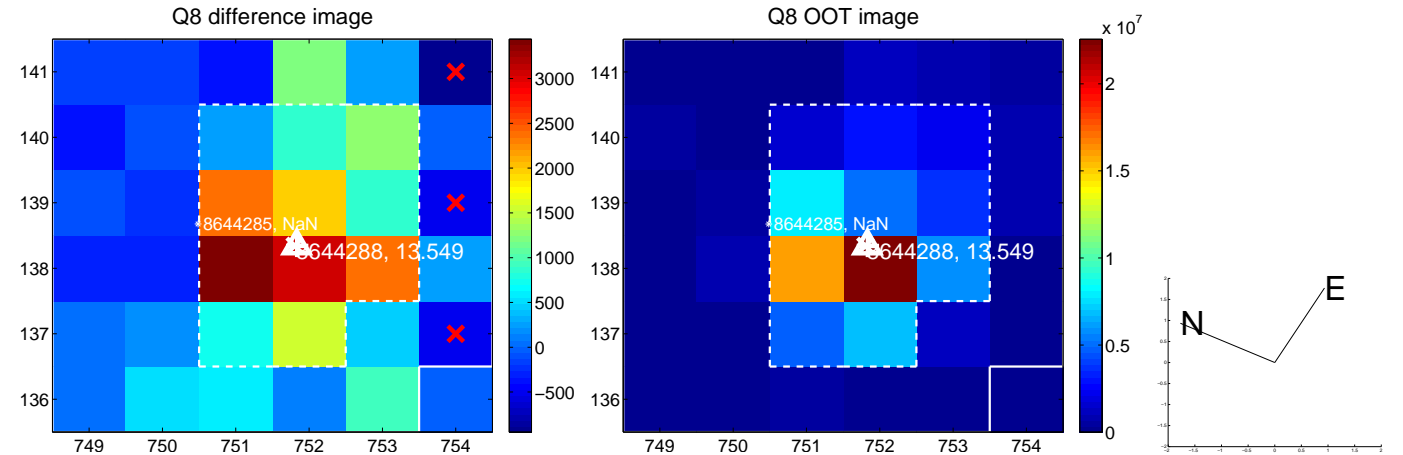
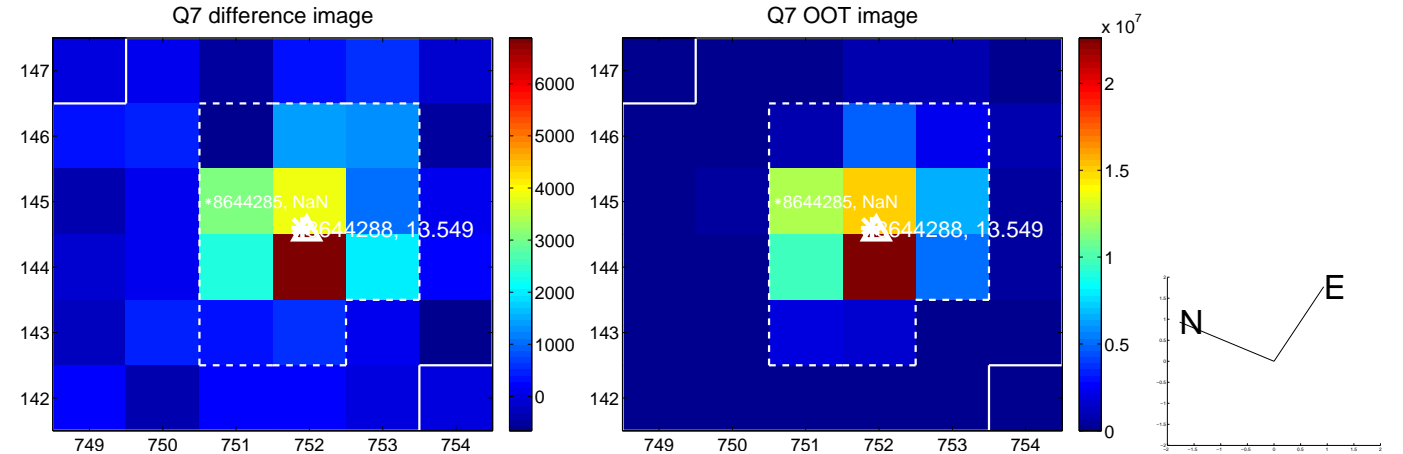
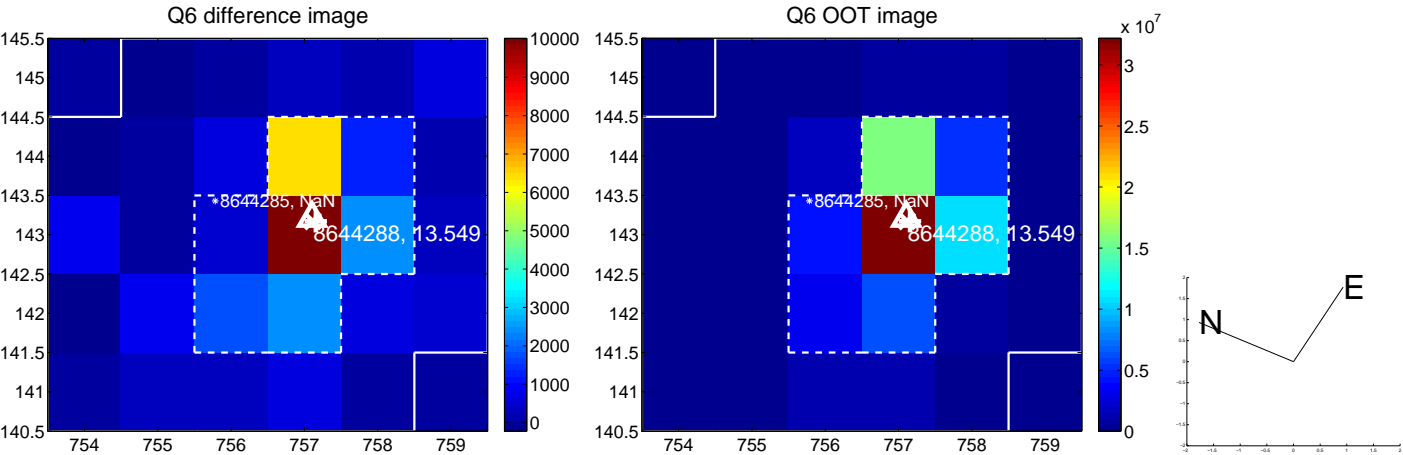
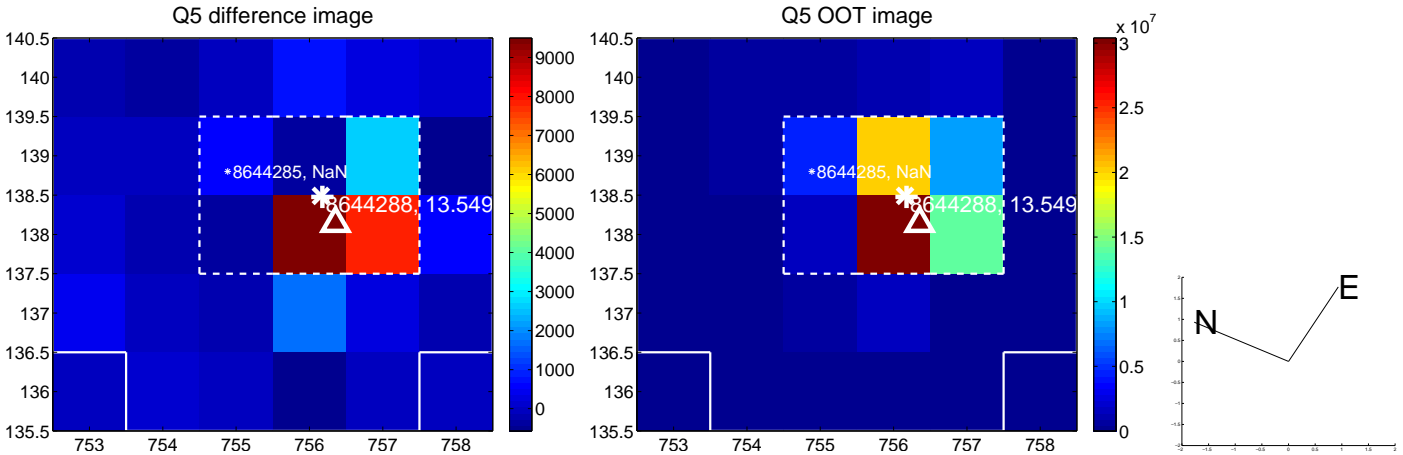


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

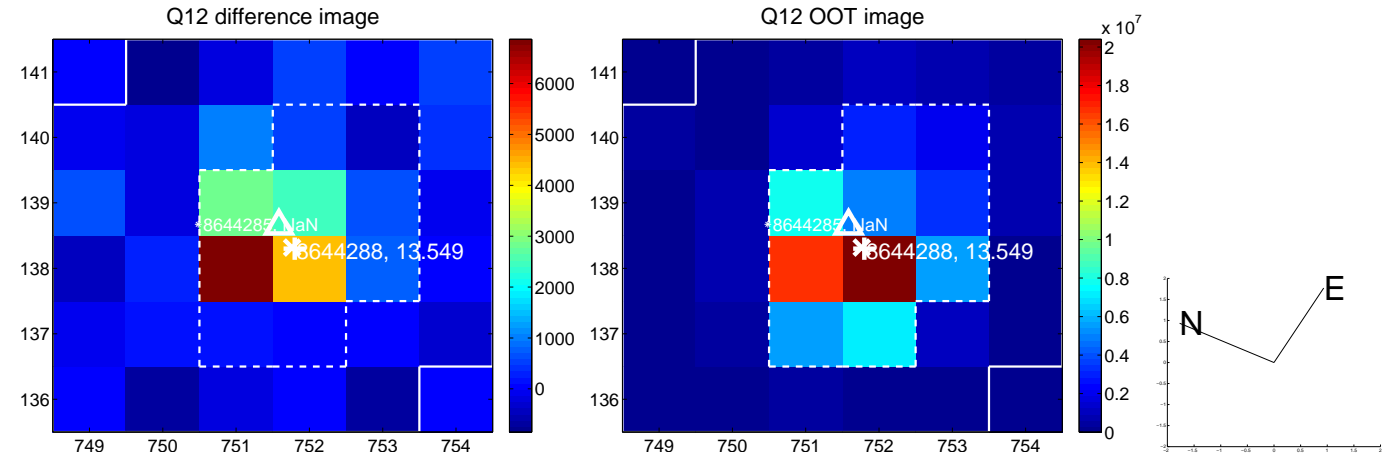
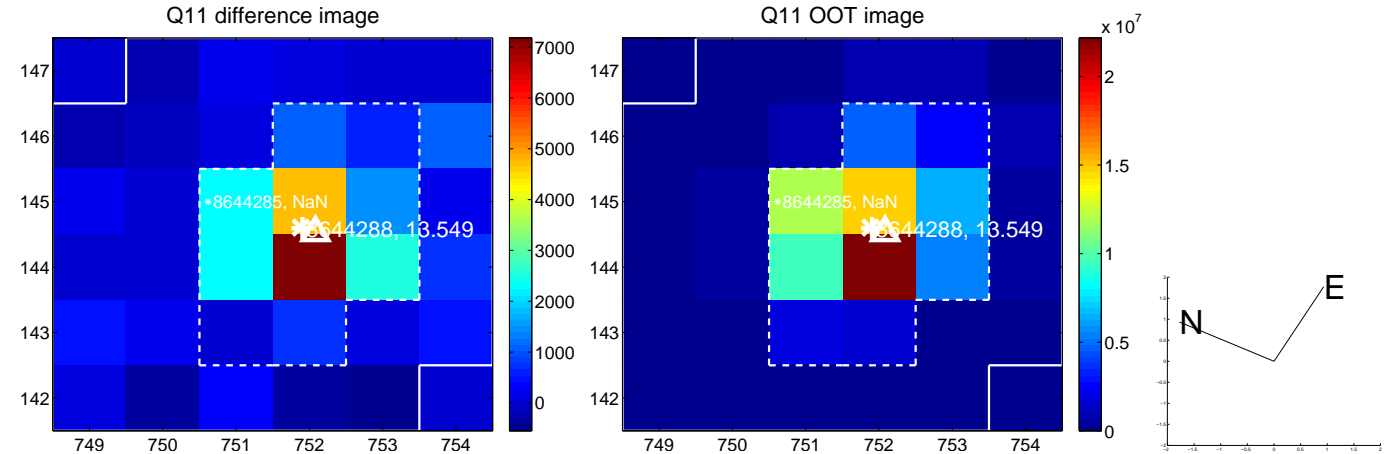
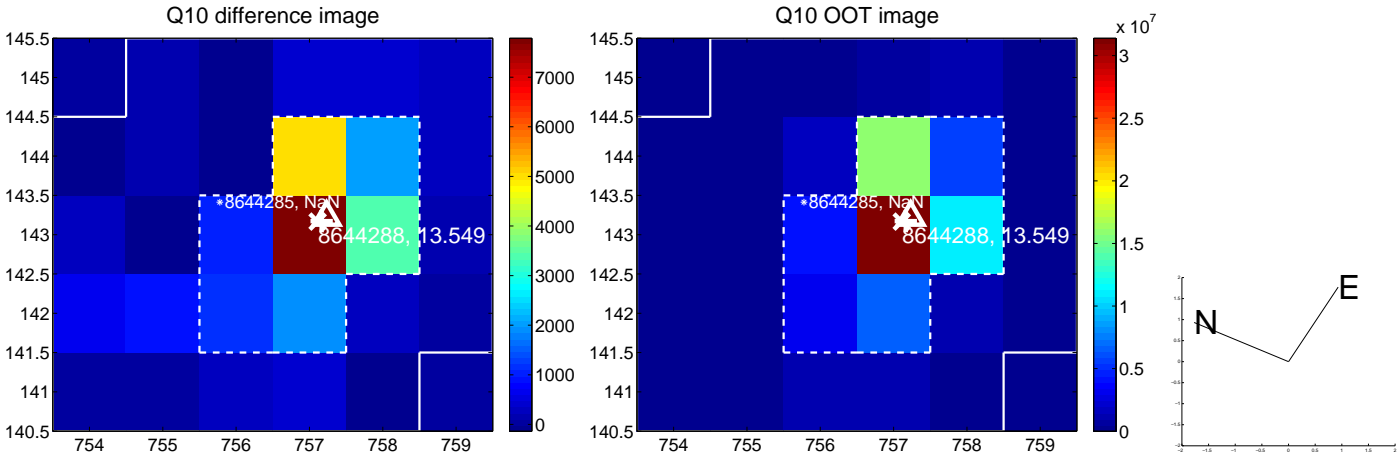
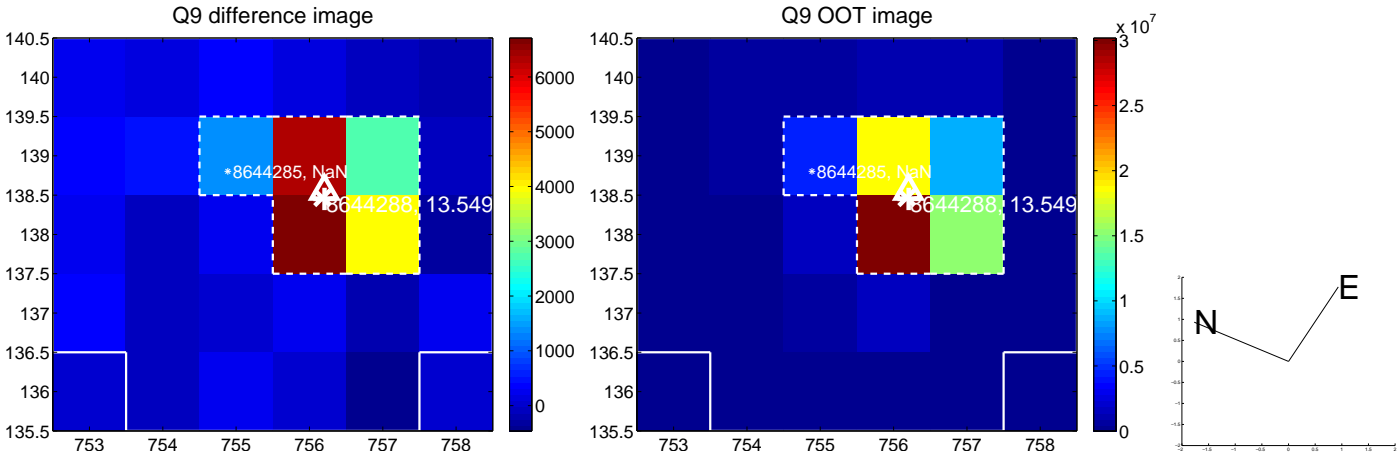
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value



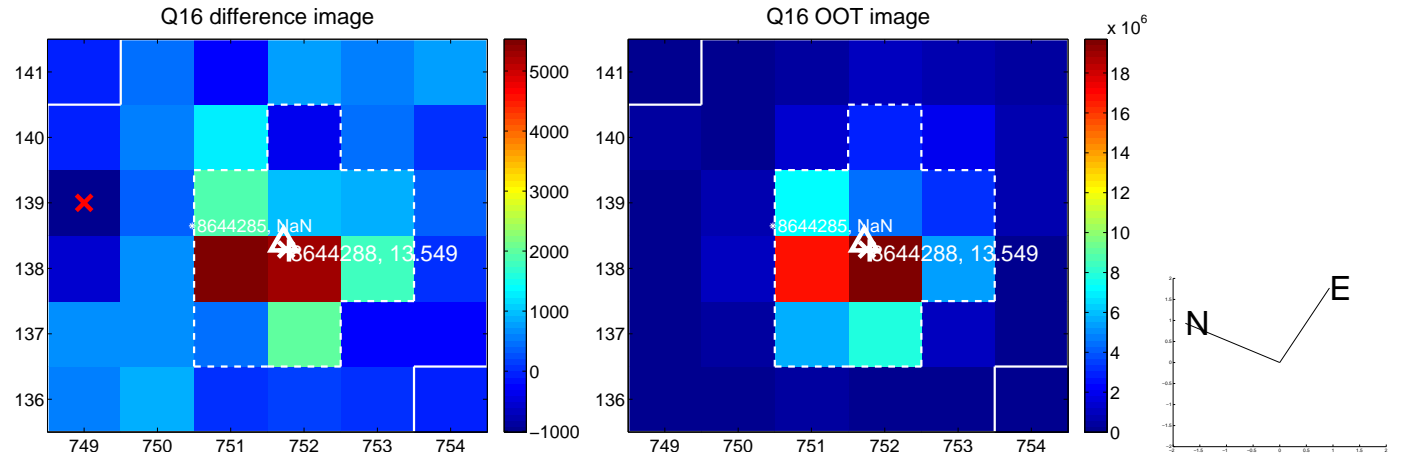
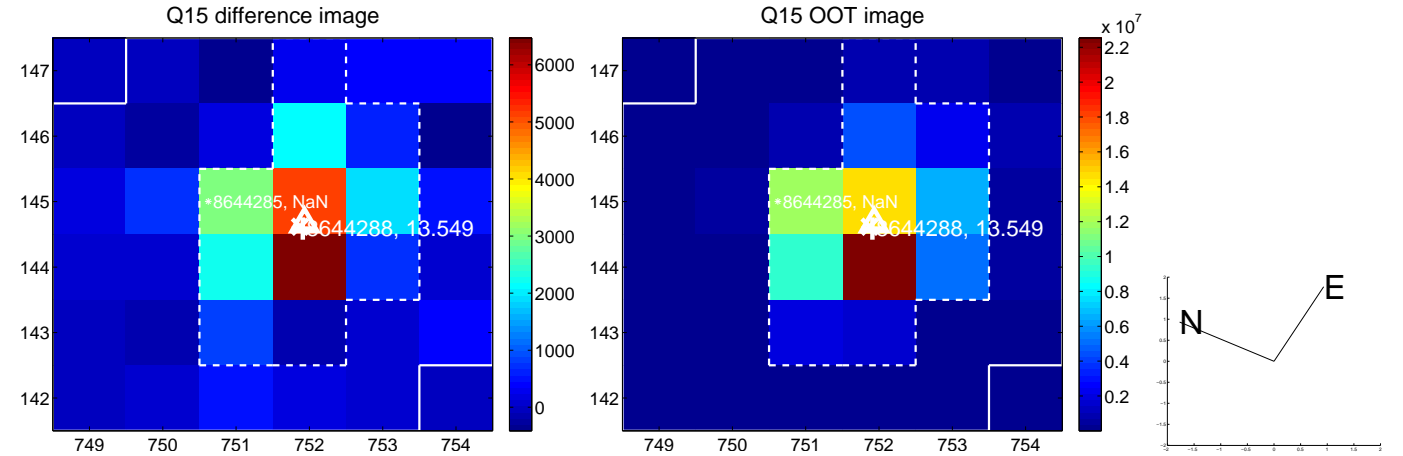
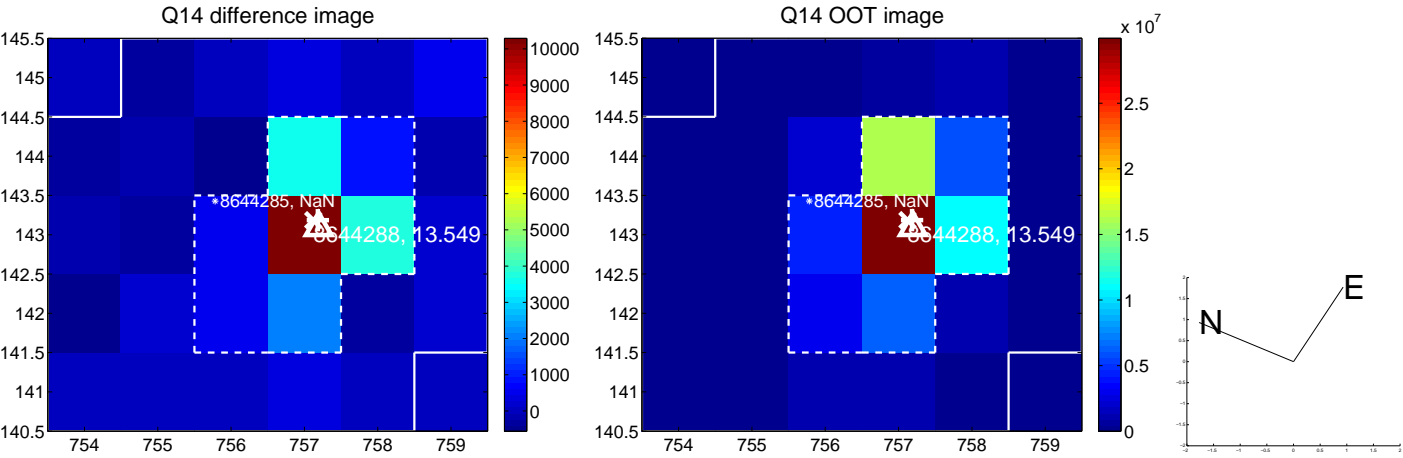
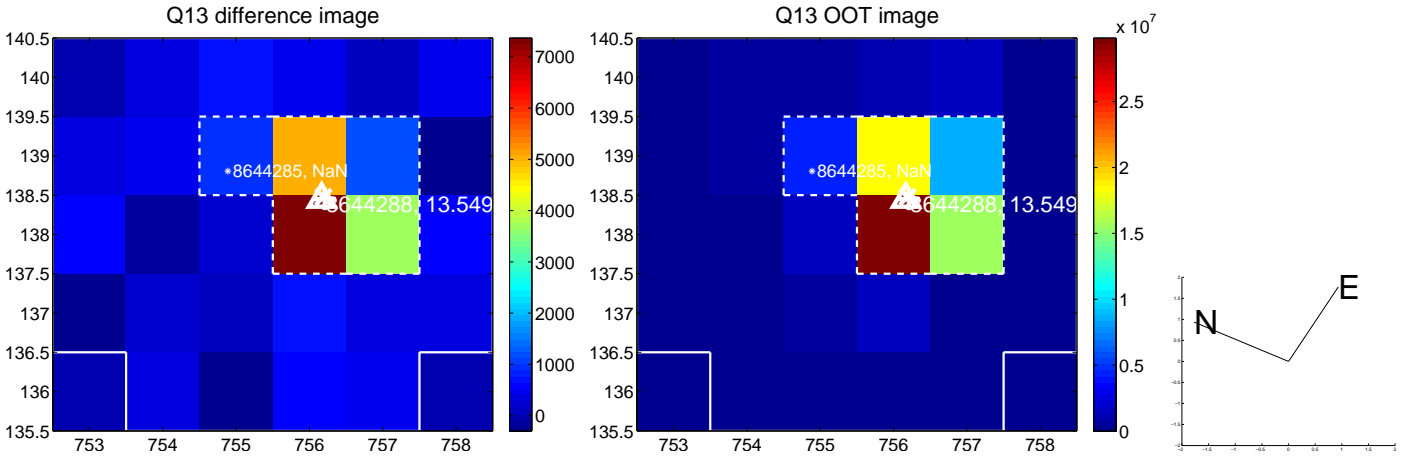
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



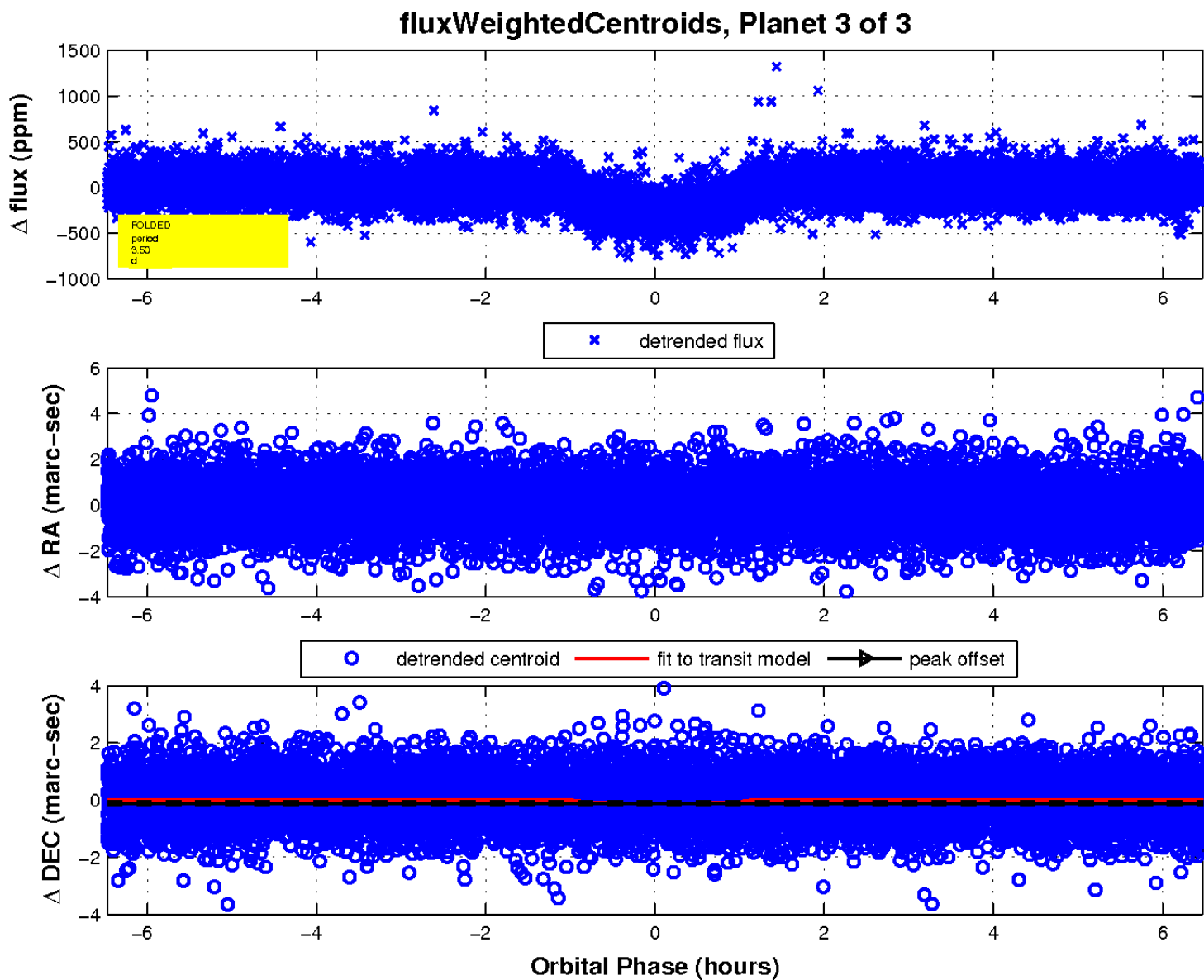
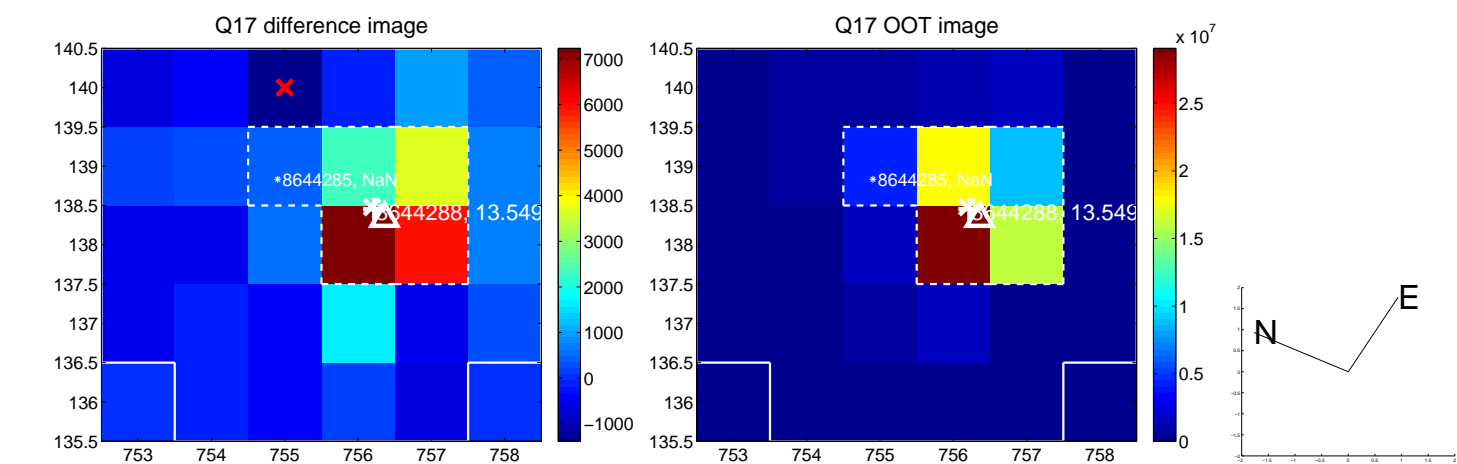
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

