

# KIC 003656913

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
003656913-01	OBS	No	5.363334	135.581368	10.2	11.018	11.6	12.5	2.53	8132	0.93	4336.95
003656913-03	OBS	No	5.362921	133.787117	4.7	11.752	7.6	6.3	2.53	8132	0.65	4337.40

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
003656913-01	OBS	FP	0.00	1	0	0	0	LPP_DV—CENT_SATURATED
003656913-03	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—SAME_NTL_PERIOD—CENT_SATURATED

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

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

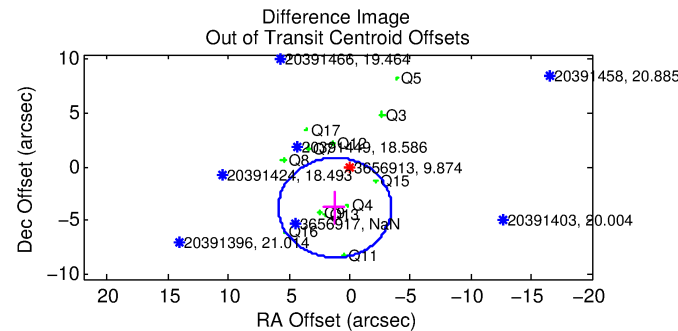
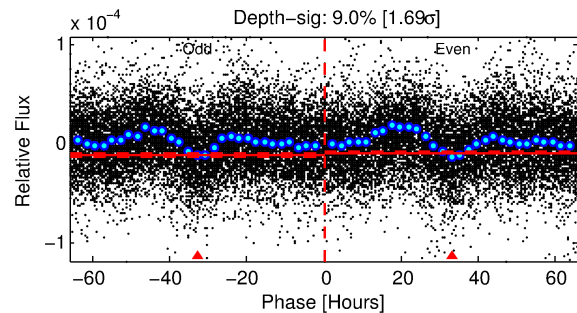
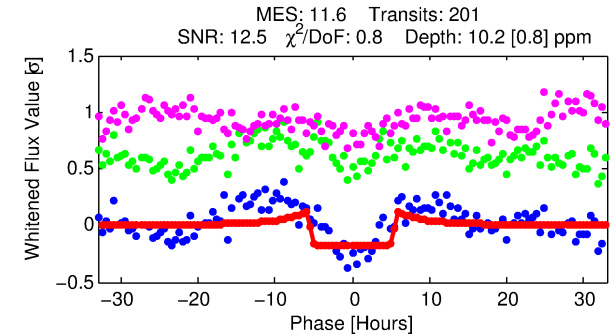
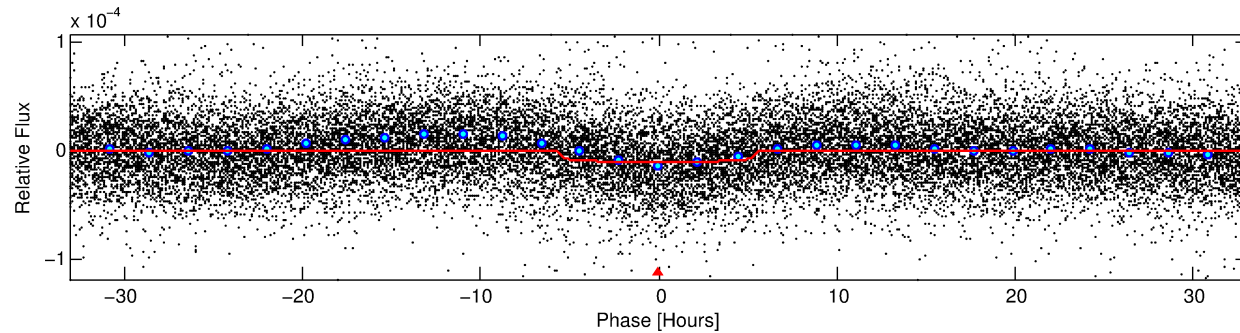
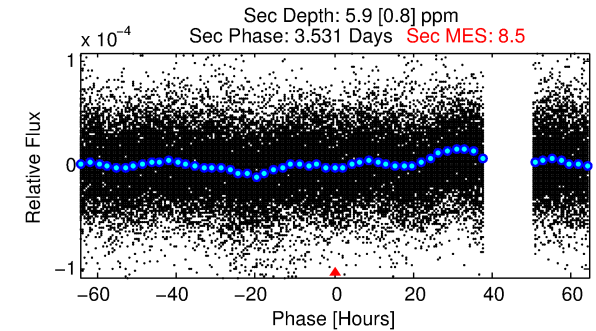
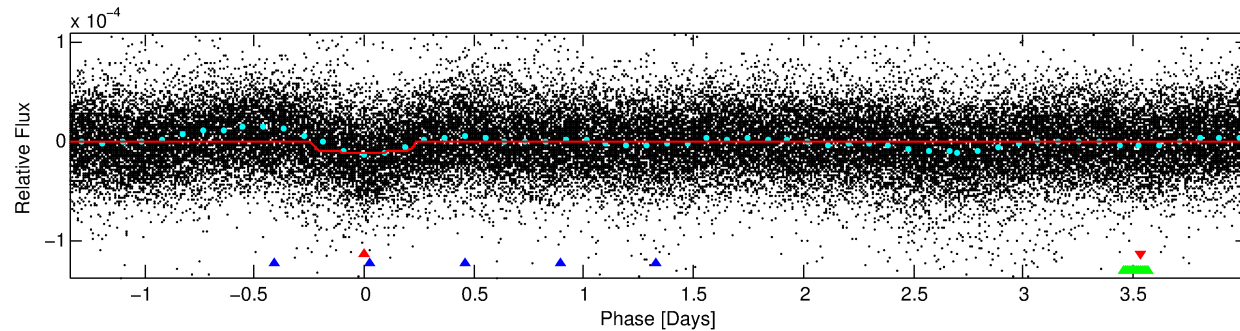
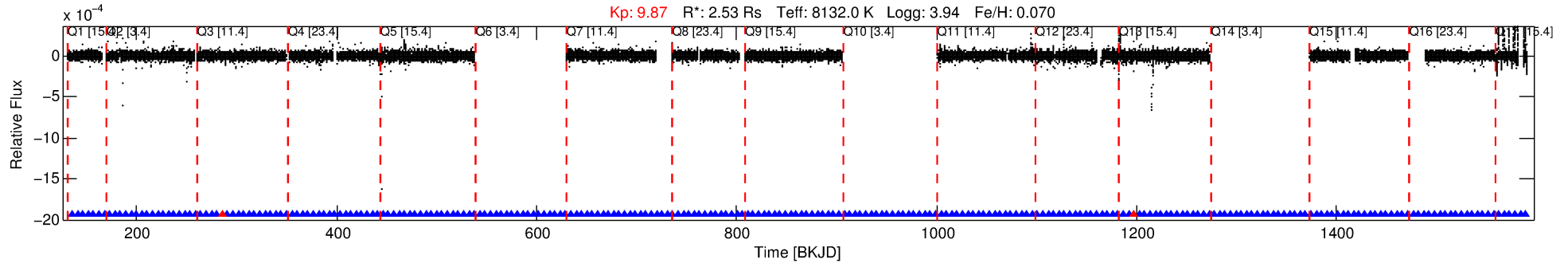
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 003656913-01

No Significant Match Found

# DV One-Page Summary

KIC: 3656913 Candidate: 1 of 3 Period: 5.363 d



## DV Fit Results:

Period = 5.36333 [0.00004] d  
Epoch = 135.5814 [0.0054] BKJD  
Rp/R\* = 0.0034 [0.0003]  
a/R\* = 2.03 [0.72]  
b = 0.88 [0.12]  
Seff = 4336.95 [2007.23]  
Teq = 2069 [239] K  
Rp = 0.93 [0.31] Re  
a = 0.0760 [0.0214] AU  
Ag = 22.02 [10.57] [1.99σ]  
Teffp = 6930 [493] K [8.87σ]

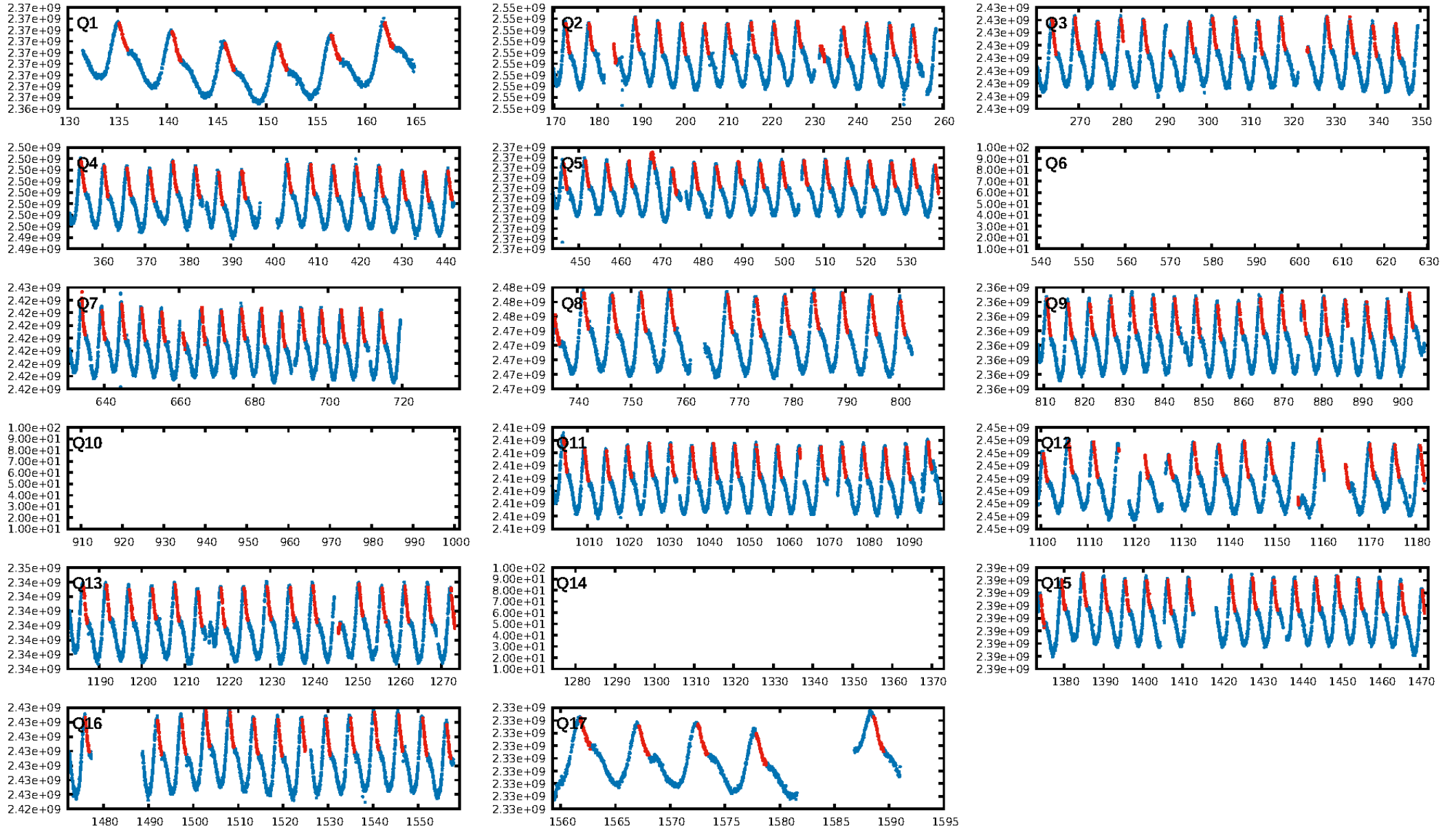
## DV Diagnostic Results:

ShortPeriod-sig: 0.0% [0.00σ]  
LongPeriod-sig: 100.0% [480.36σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 9.77e-21  
RollingBand-fgt: 0.99 [188/190]  
GhostDiagnostic-chr: N/A  
Centroid-sig: 6.0%  
Centroid-so: 2.815 arcsec [1.19σ]  
OotOffset-rm: 4.038 arcsec [2.60σ]  
KicOffset-rm: 4.356 arcsec [3.29σ]  
OotOffset-st: 0/4/4/4 [12]  
KicOffset-st: 0/4/4/4 [12]  
DiffImageQuality-fgm: 0.33 [4/12]  
DiffImageOverlap-fno: 1.00 [14/14]

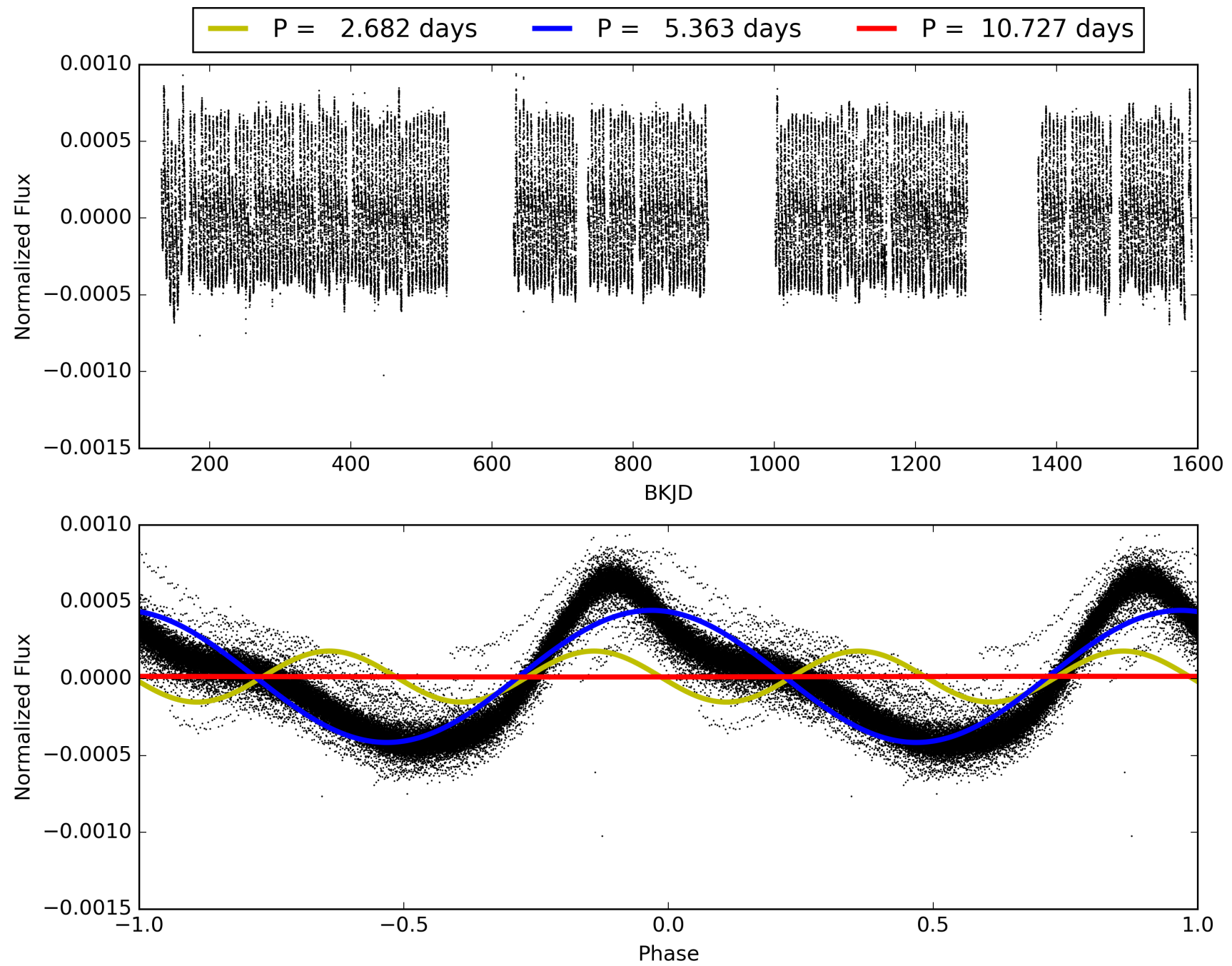
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 21:10:24 Z

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

# TCE 003656913-01, PDC Light Curves

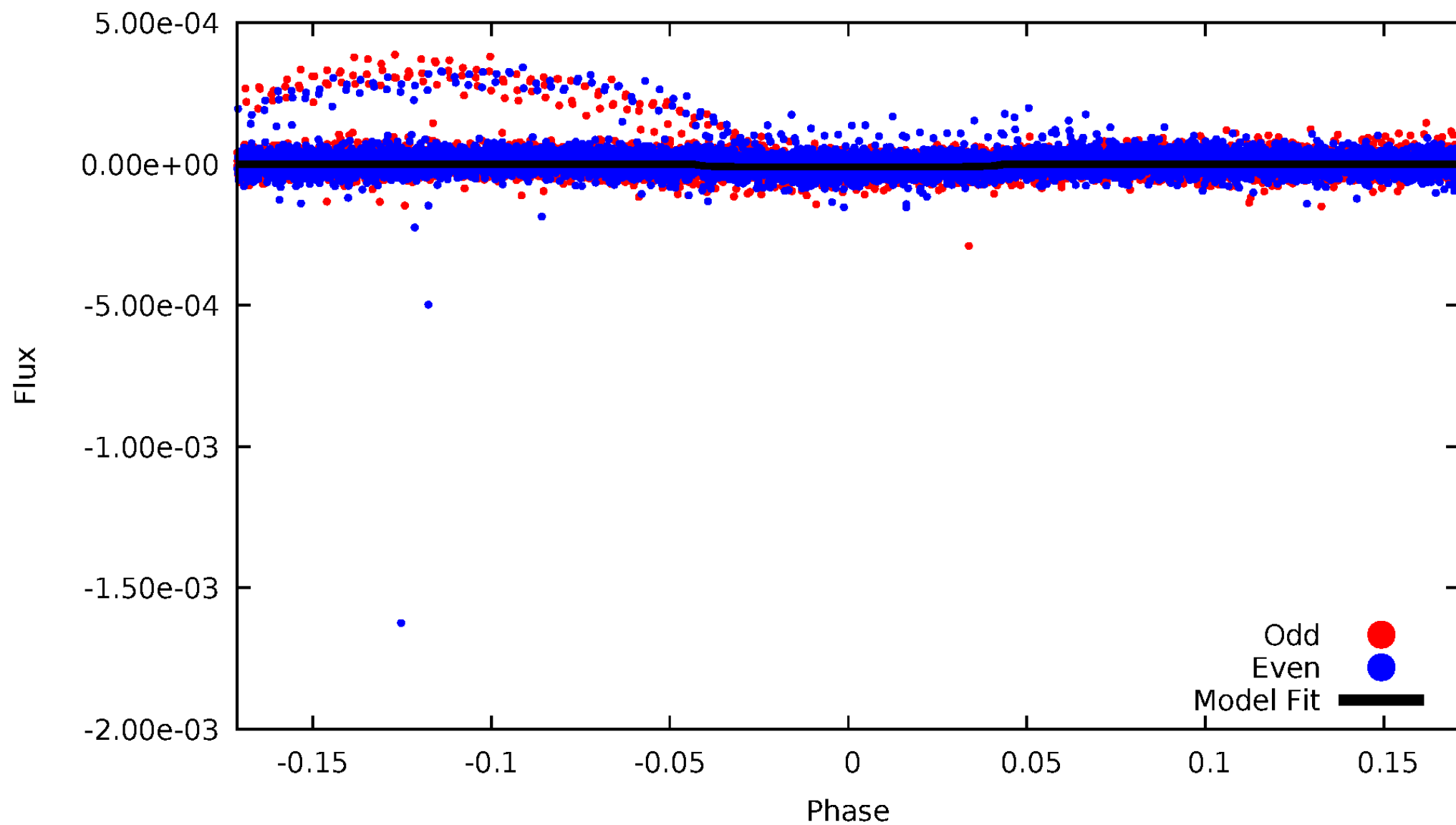


# TCE 003656913-01



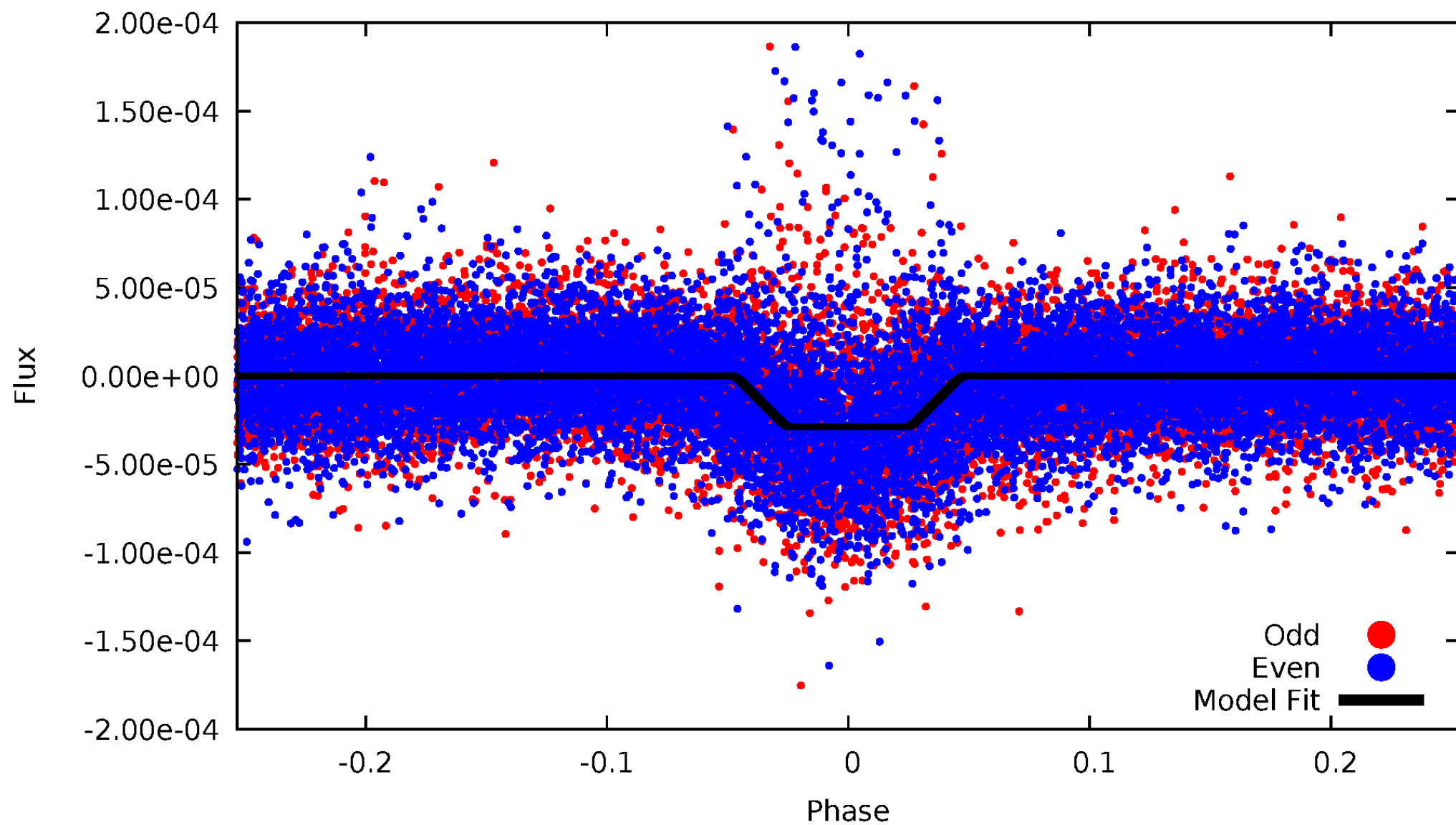
DV Odd/Even

TCE 003656913-01



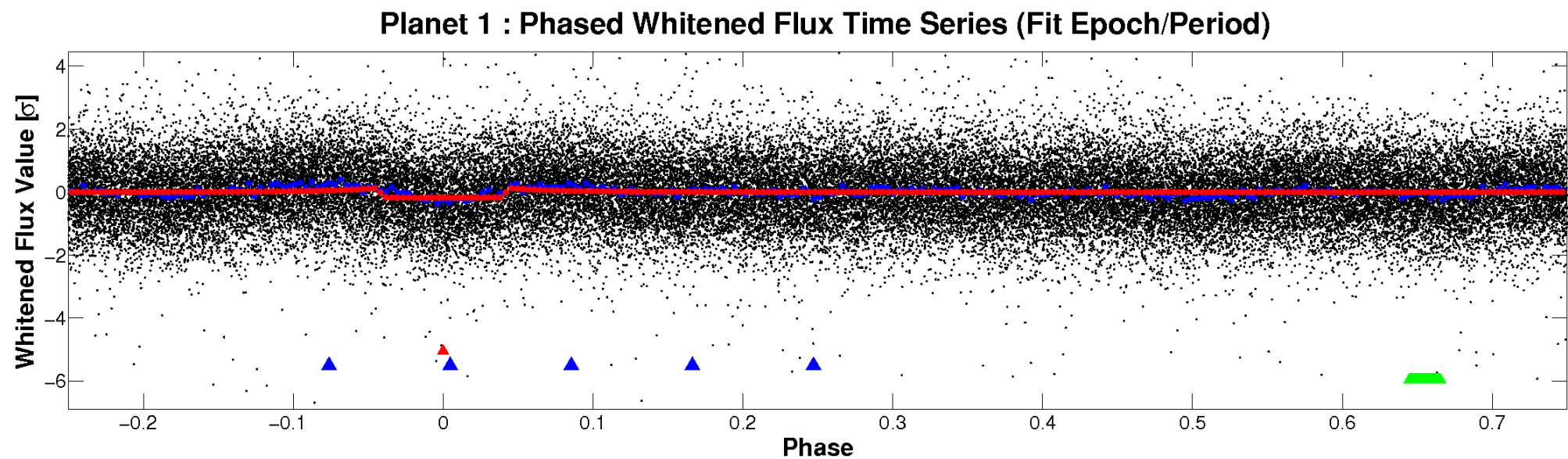
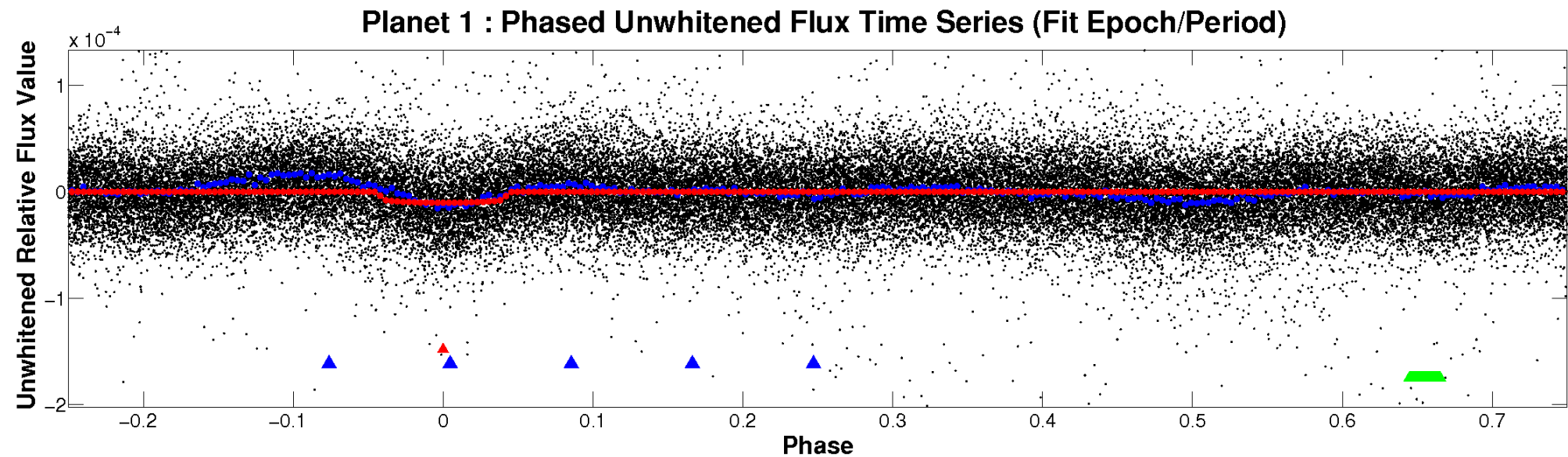
# ALT Odd/Even

TCE 003656913-01



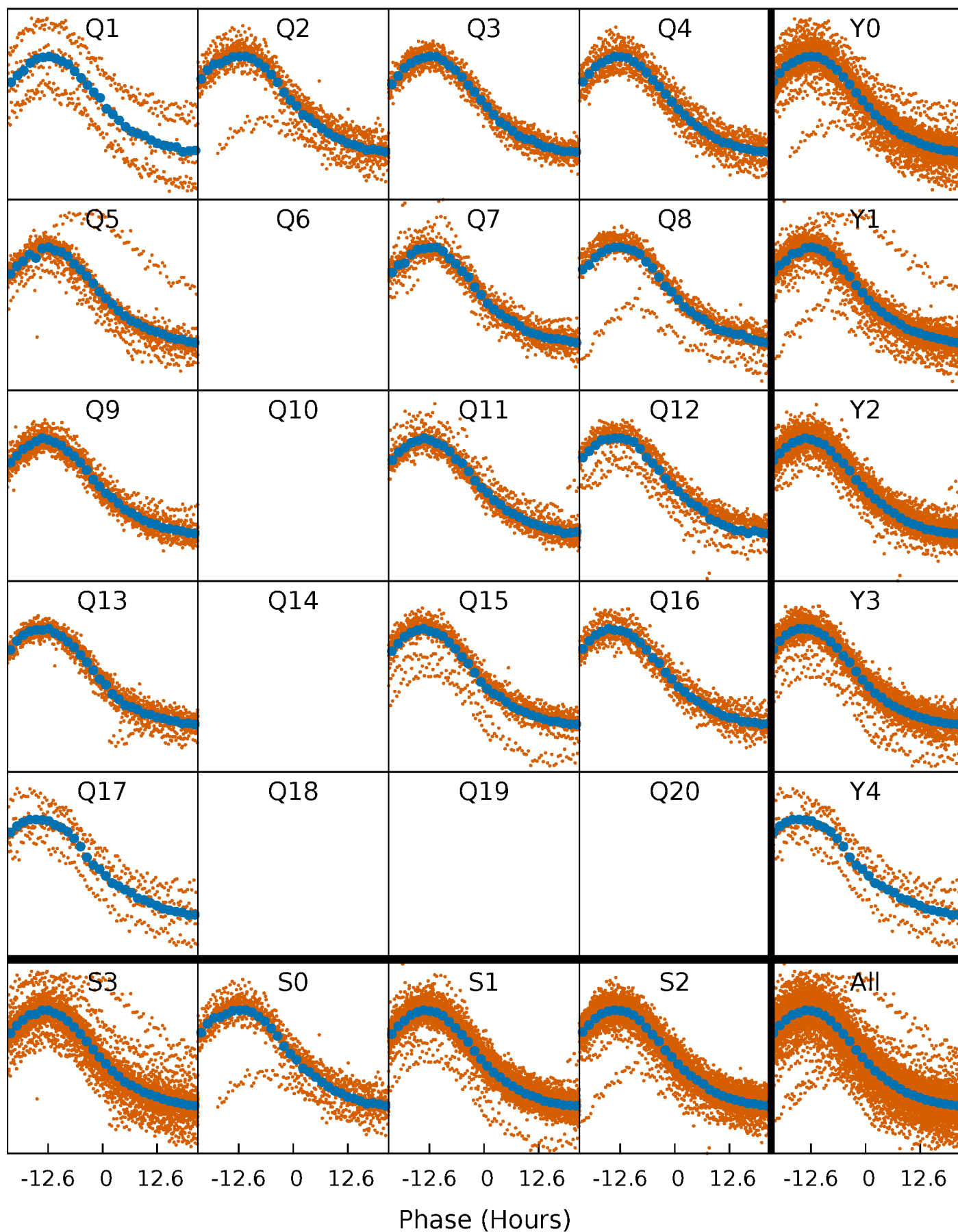


# Non-Whitened Vs. Whitened Light Curve



# PDC Quarter-Phased Transit Curves

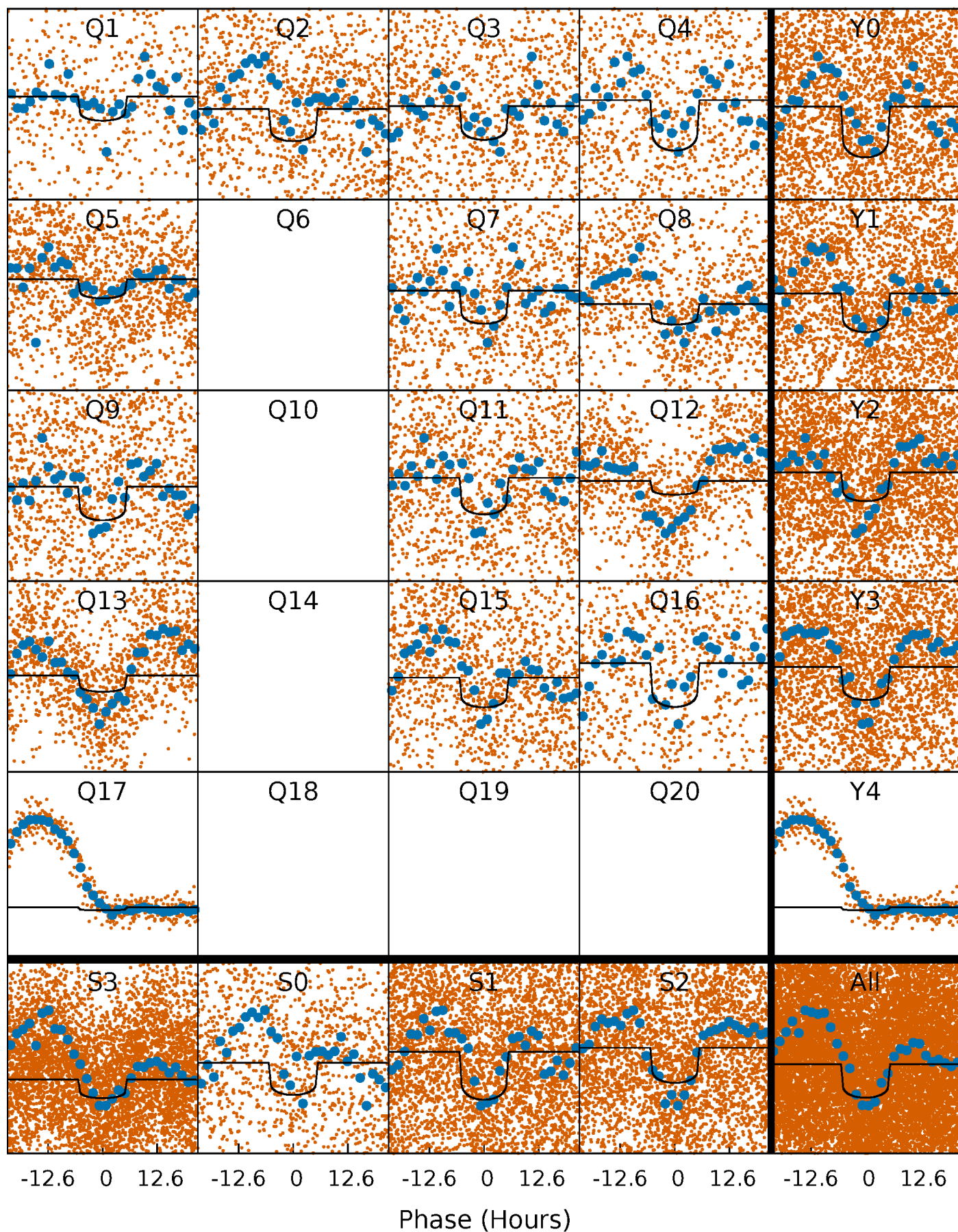
TCE 003656913-01 P= 5.363334 Days  $T_0=135.581368$  (BKJD)





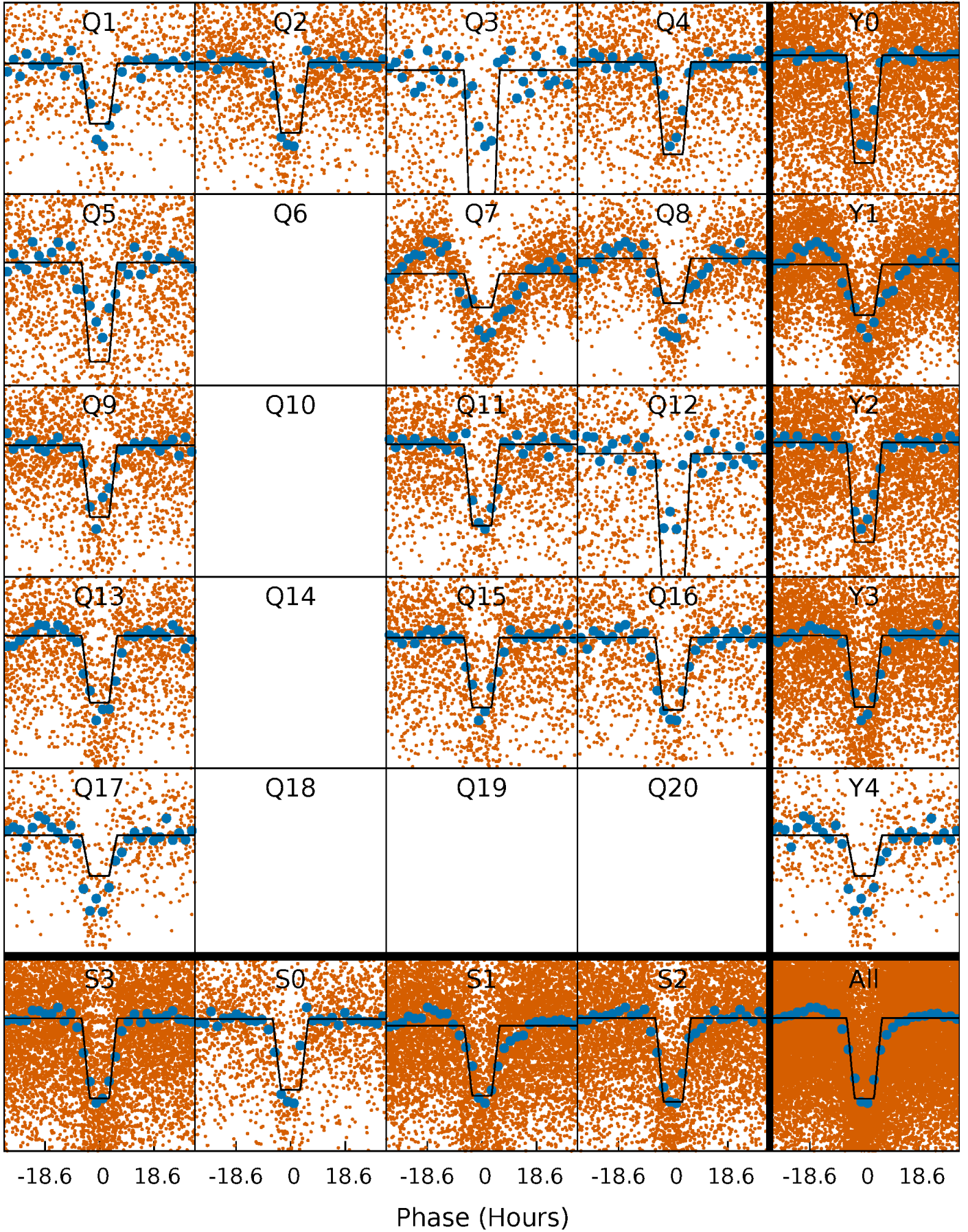
# DV Quarter-Phased Transit Curves

TCE 003656913-01 P= 5.363334 Days  $T_0=135.581368$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

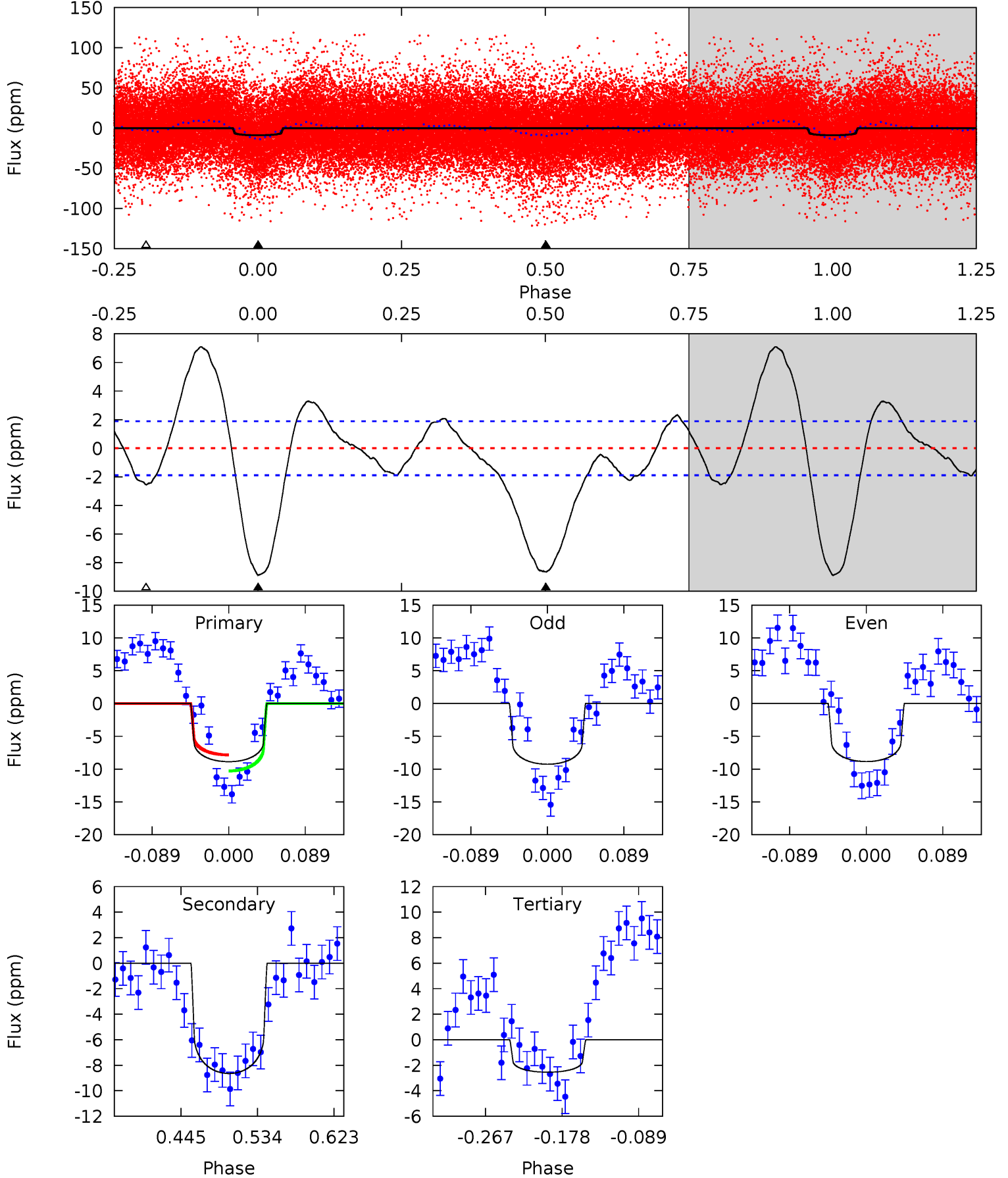
TCE 003656913-01 P= 5.363253 Days  $T_0=135.633610$  (BKJD)



# DV Model-Shift Uniqueness Test

003656913-01, P = 5.363334 Days, E = 130.218034 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
21.5	21.0	6.18	0	4.59	1.70	5.18	15.4	21.5	14.8	21.0	0.49	1.11	0.44	2.97

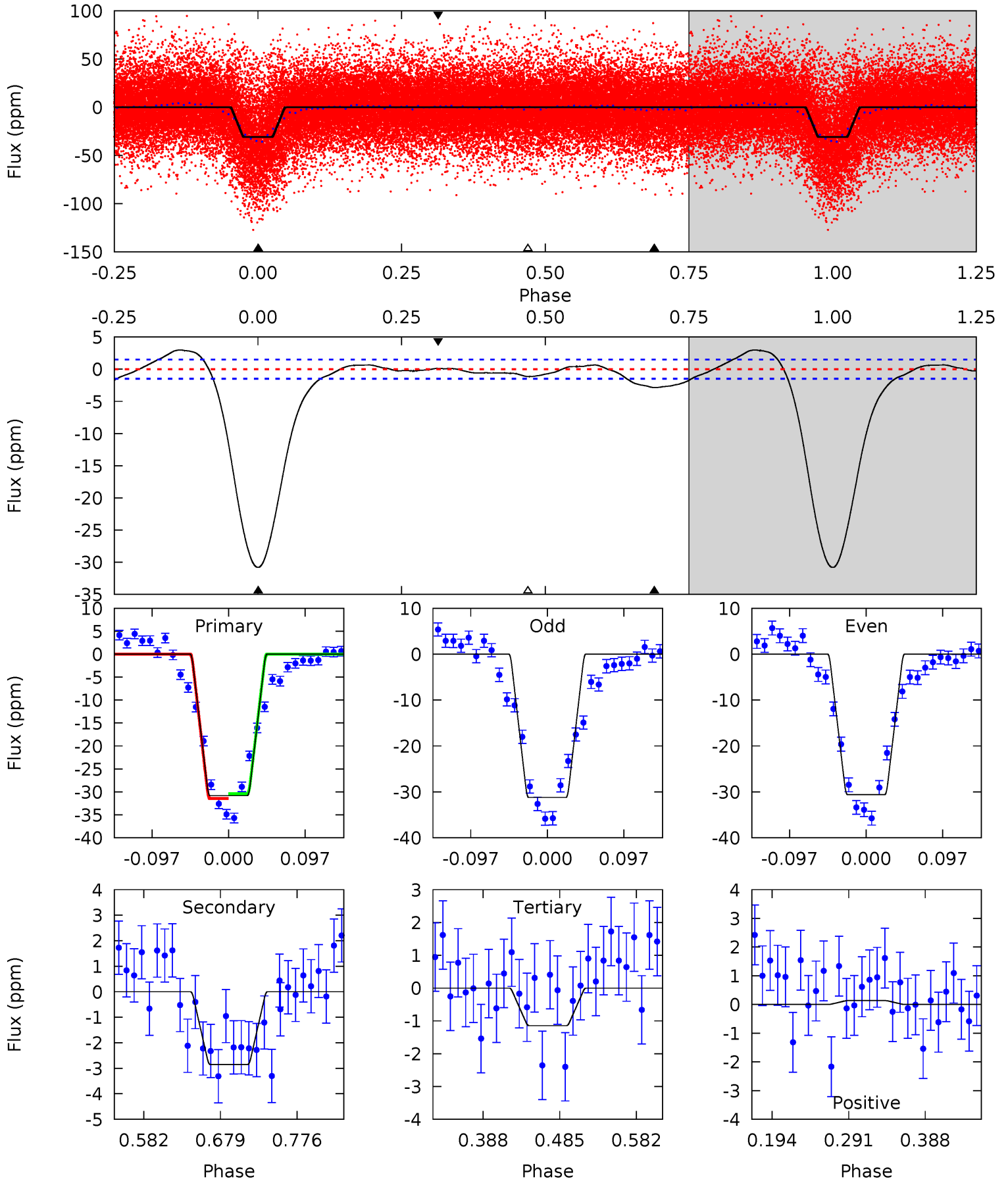




# Alt Model-Shift Uniqueness Test

003656913-01, P = 5.363253 Days, E = 130.270357 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
94.7	8.77	3.52	0.41	4.57	1.66	3.26	91.2	94.3	5.26	8.36	0.99	0.83	0.09	1.58



### Stellar Parameters For KIC 003656913

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$8132^{+224}_{-365}$	$3.941^{+0.241}_{-0.130}$	$0.070^{+0.250}_{-0.450}$	$2.530^{+0.537}_{-0.806}$	$2.036^{+0.304}_{-0.456}$	$0.177^{+0.271}_{-0.071}$
	+3%/-4%	+6%/-3%	+357%/-643%	+21%/-32%	+15%/-22%	+153%/-40%
Source	KIC0	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 003656913-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-9 \pm 0$	$0.91^{+0.15}_{-0.17}$	$2854^{+189}_{-239}$	$7456^{+478}_{-430}$	$33^{+14}_{-8}$
Alt.	$-3 \pm 0$	$1.46^{+0.20}_{-0.27}$	$2839^{+201}_{-244}$	$4517^{+179}_{-183}$	$4.289^{+1.938}_{-1.064}$

$T_{\text{max}}$  = 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

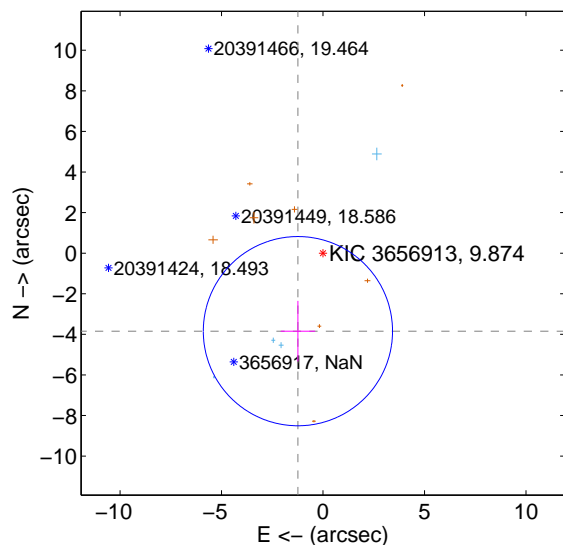
Supplemental centroid analysis for 003656913-01. **Kepler magnitude: 9.87.** Transit SNR 12.46

There are 4 quarters with good PRF difference image offsets

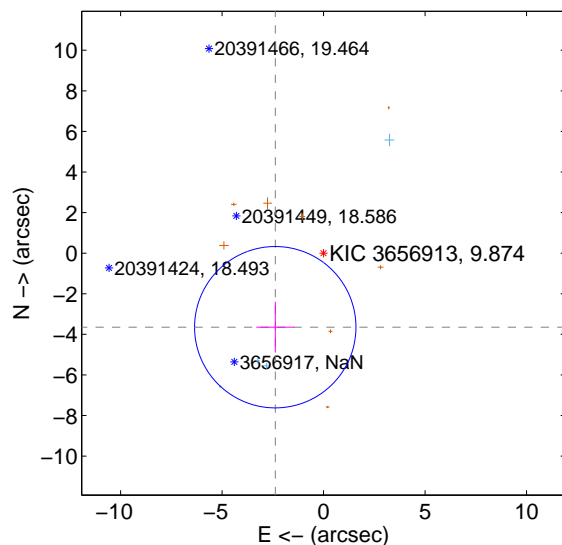
The direct PRF centroid is offset from the target star catalog position by about 1.30 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$4.038 \pm 1.554$	2.60	$1.238 \pm 0.849$	$-3.843 \pm 1.491$
PRF-fit source offset from KIC position	<b><math>4.356 \pm 1.325</math></b>	<b>3.29</b>	$2.381 \pm 0.933$	$-3.648 \pm 1.253$
photometric centroid source offset	$2.82 \pm 2.37$	1.19	$1.44 \pm 1.86$	$2.42 \pm 2.53$

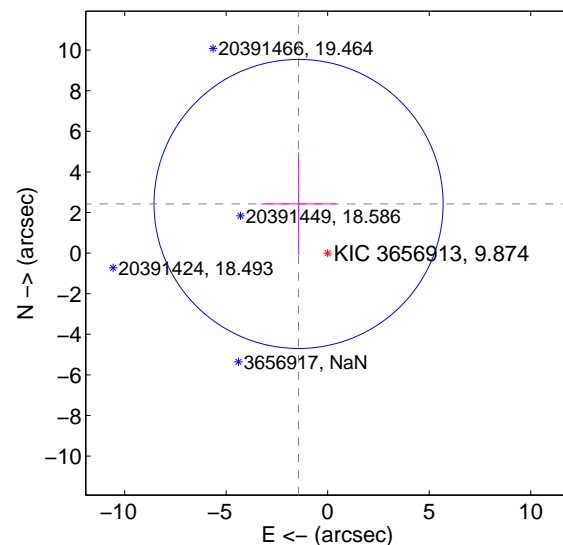
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position



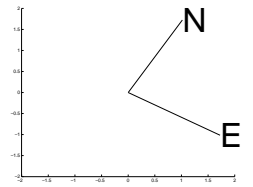
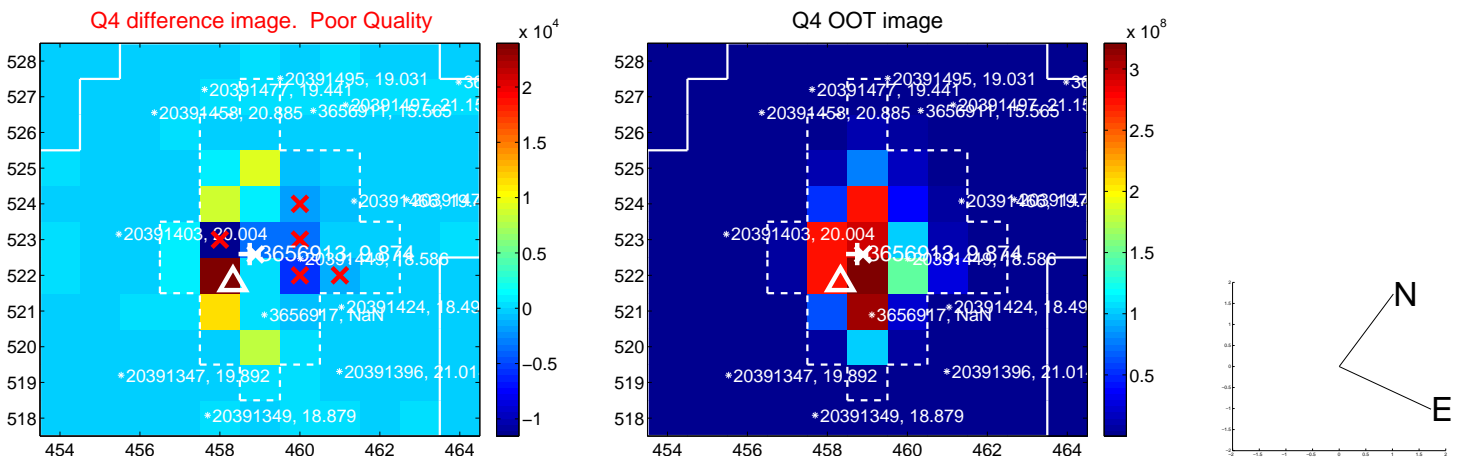
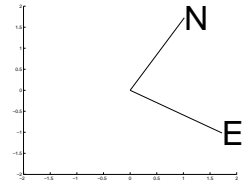
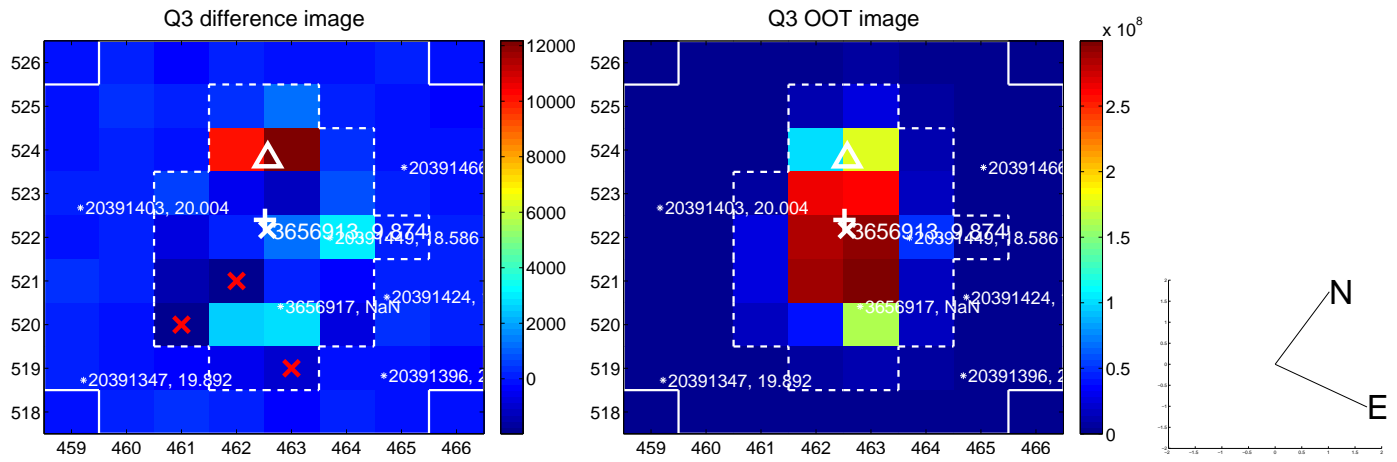
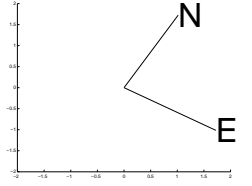
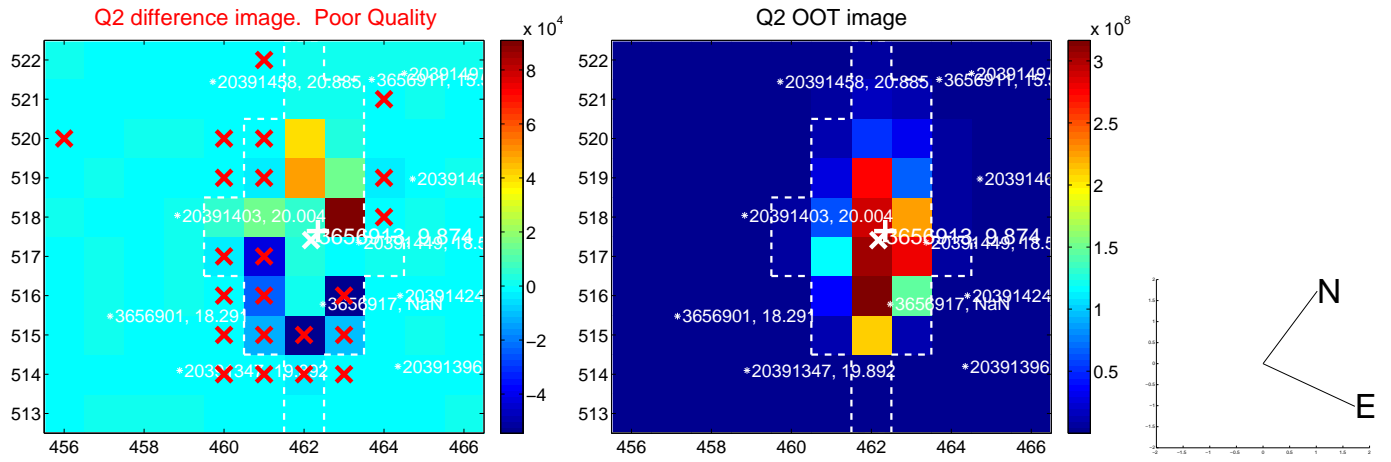
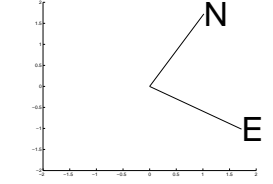
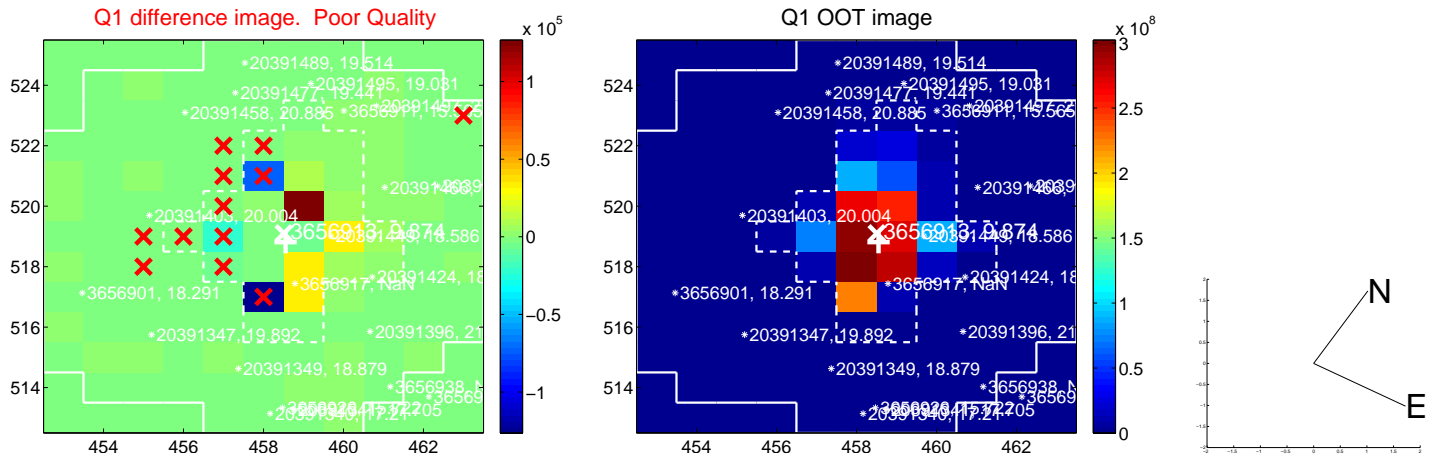
offset from photometric centroids



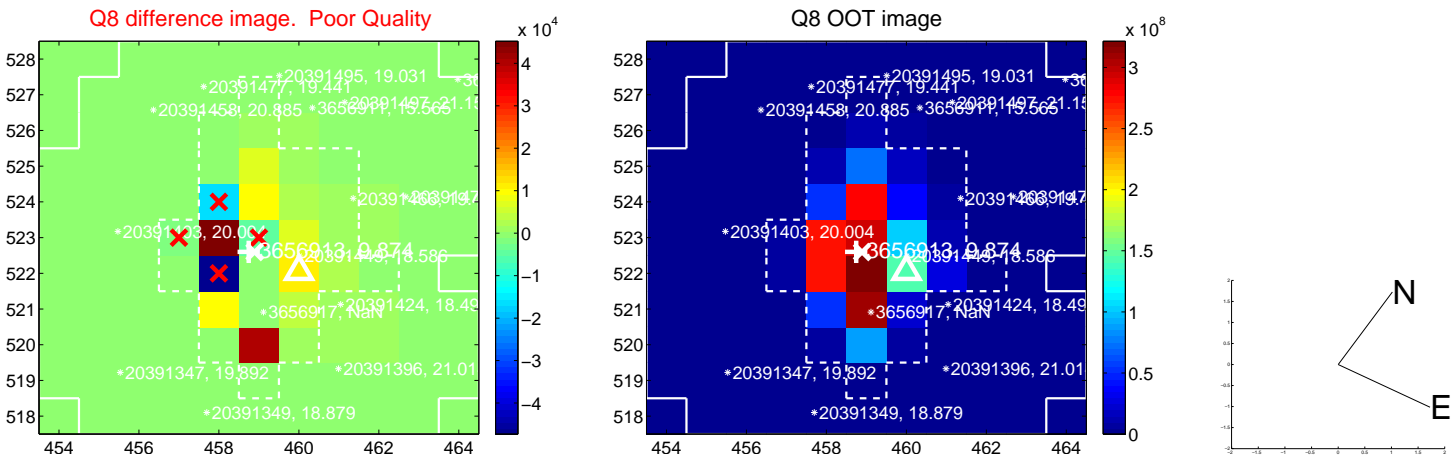
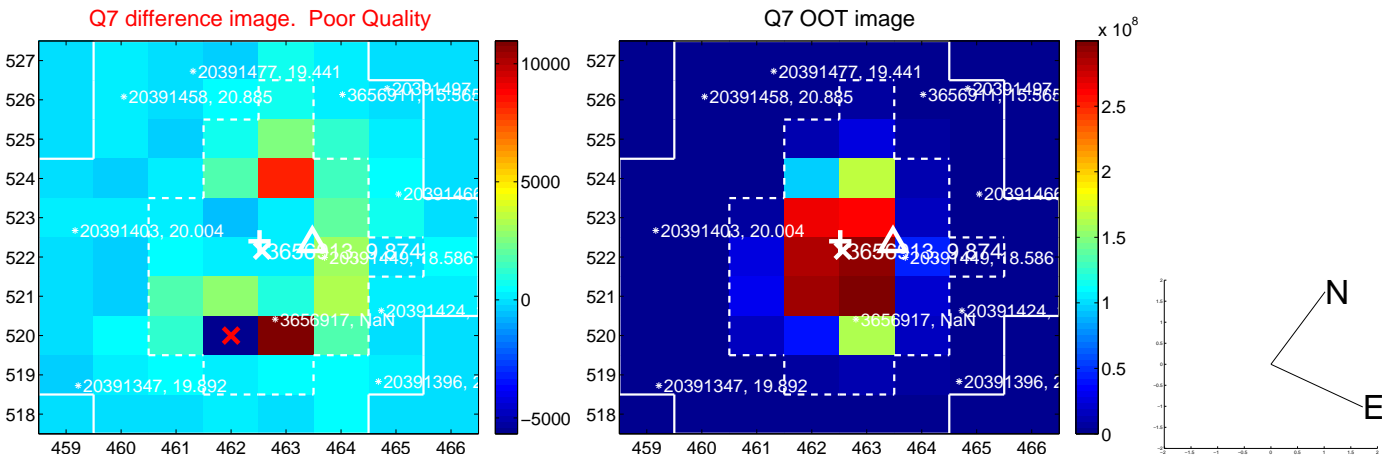
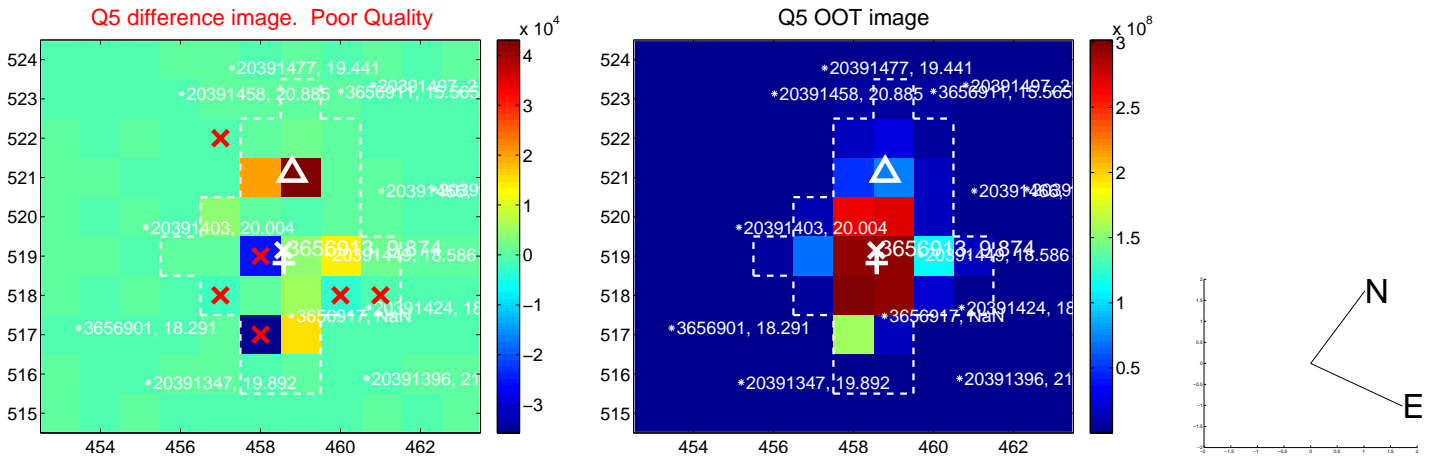
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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



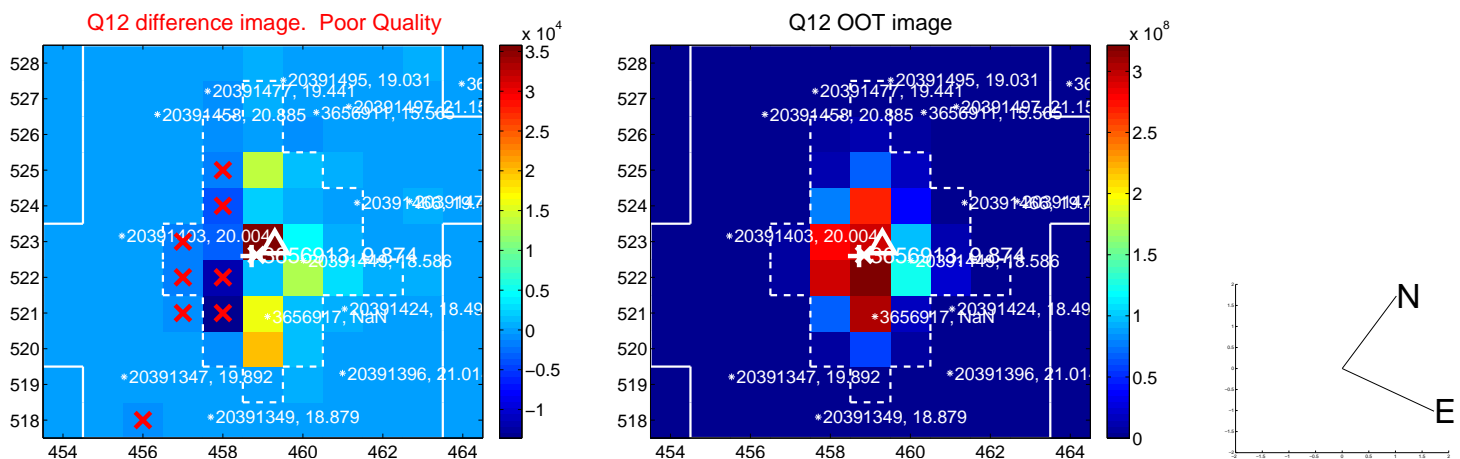
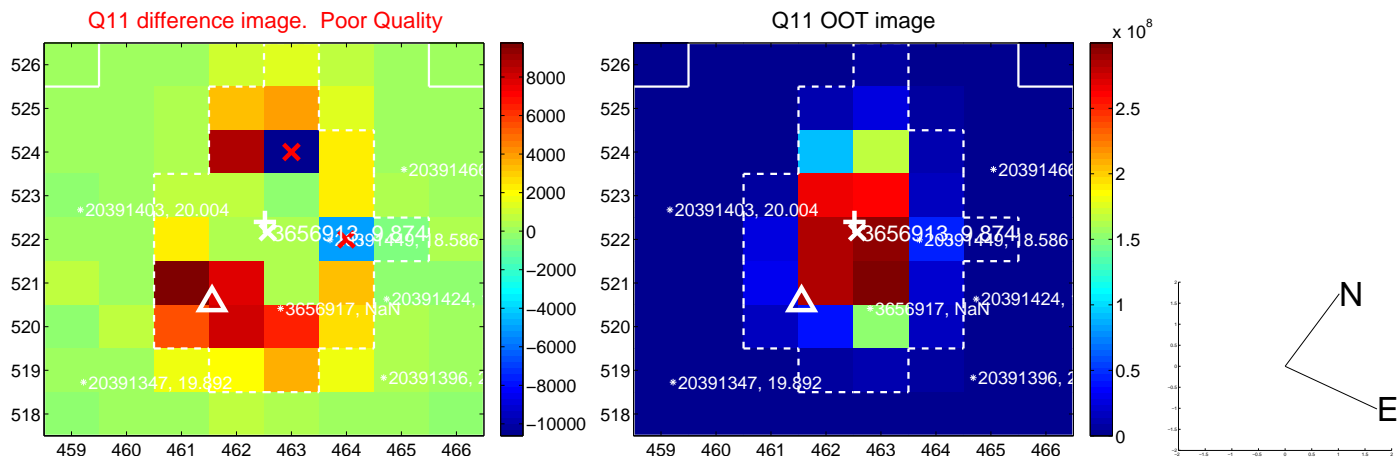
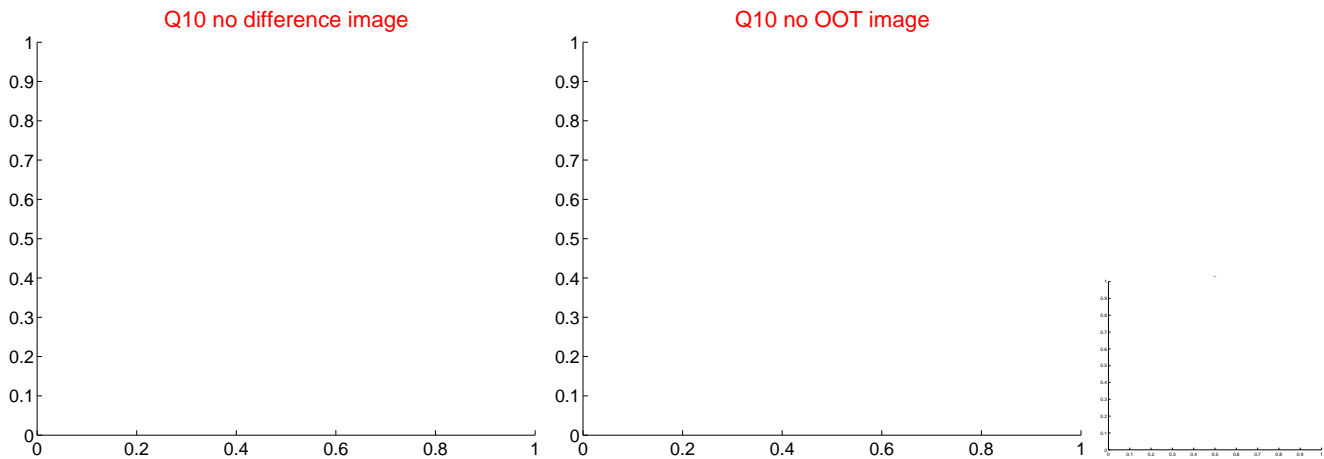
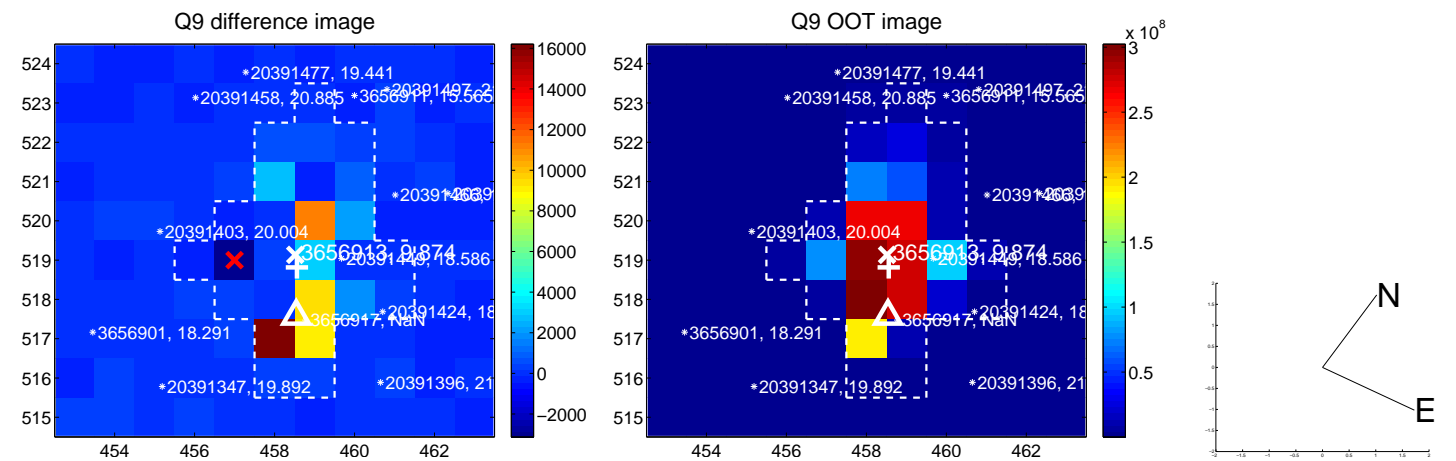
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



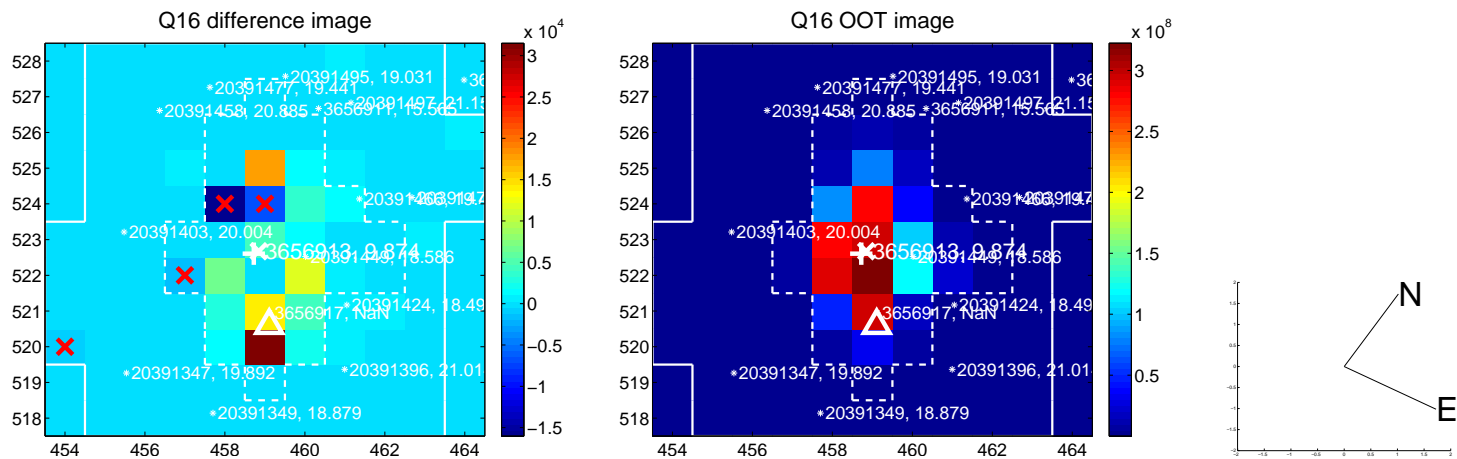
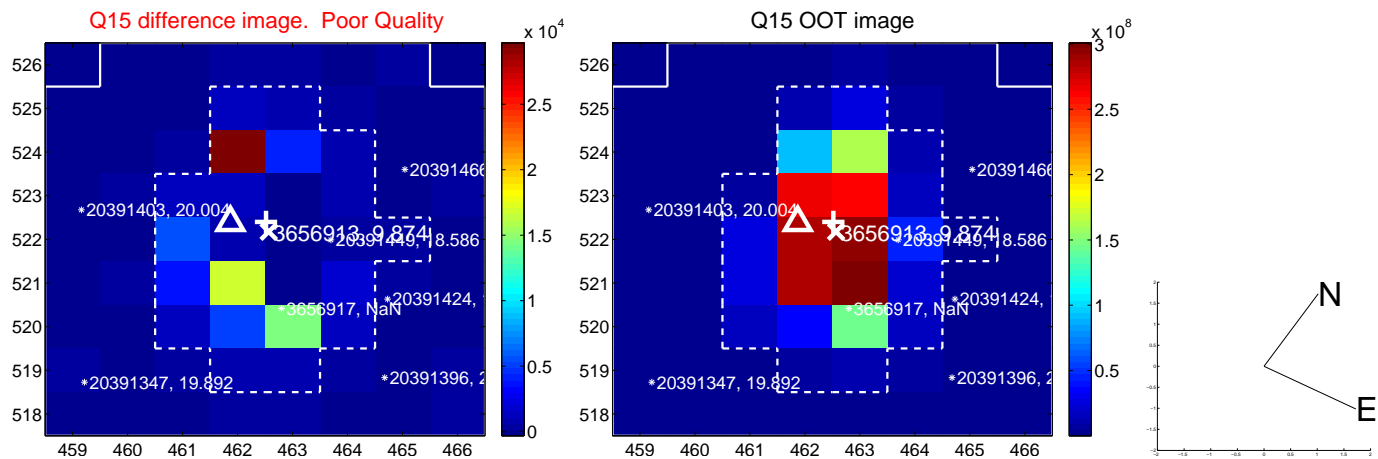
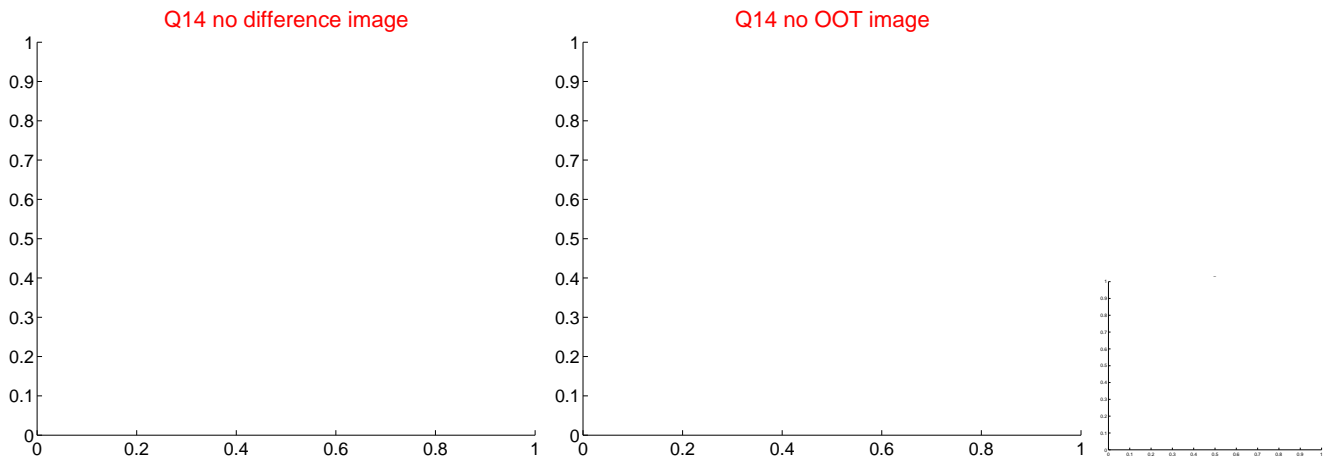
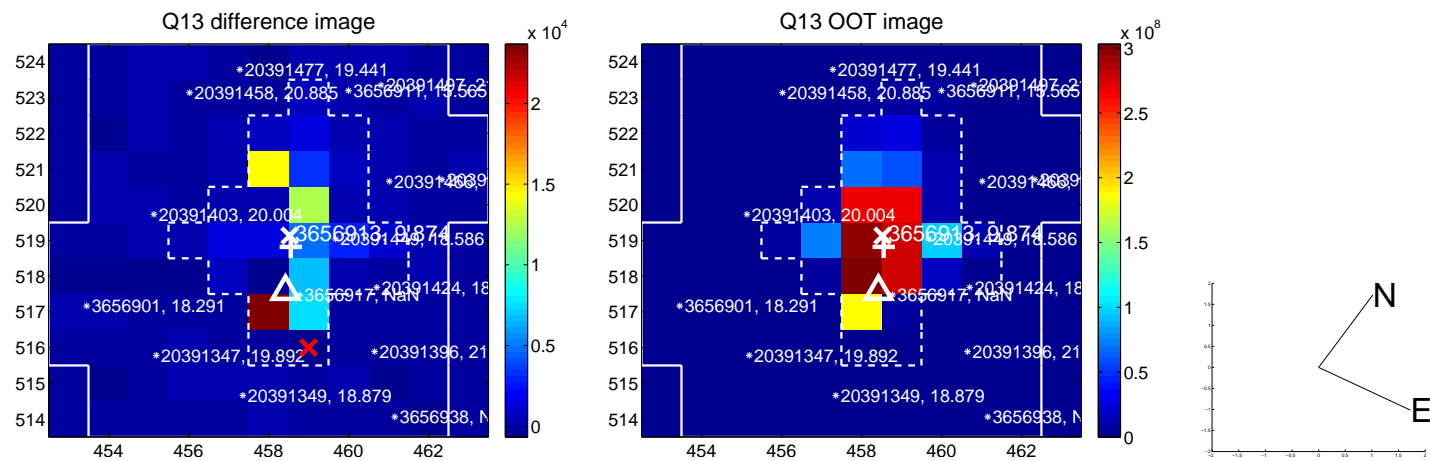
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



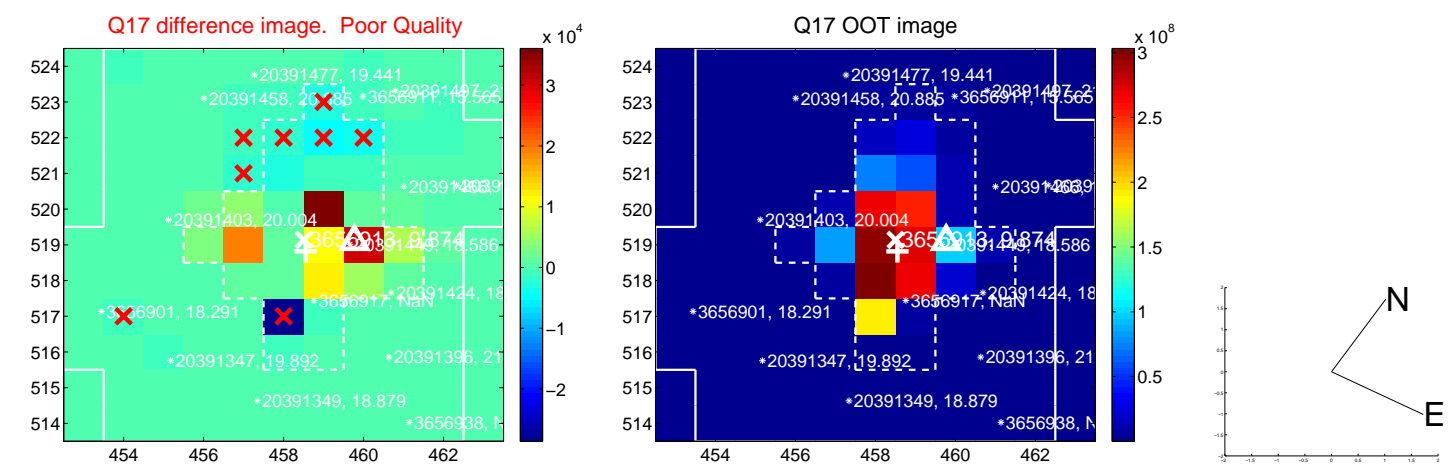
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



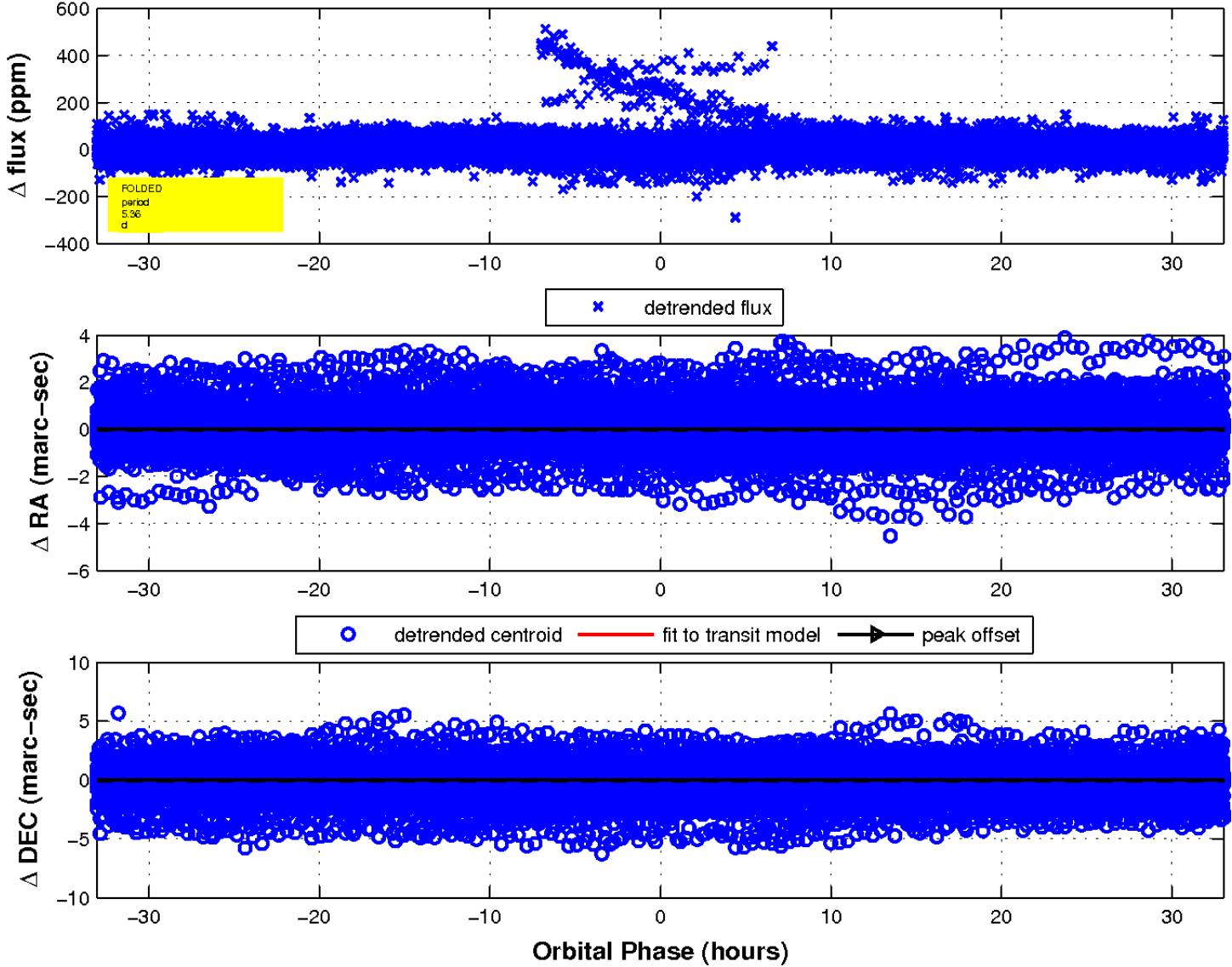
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



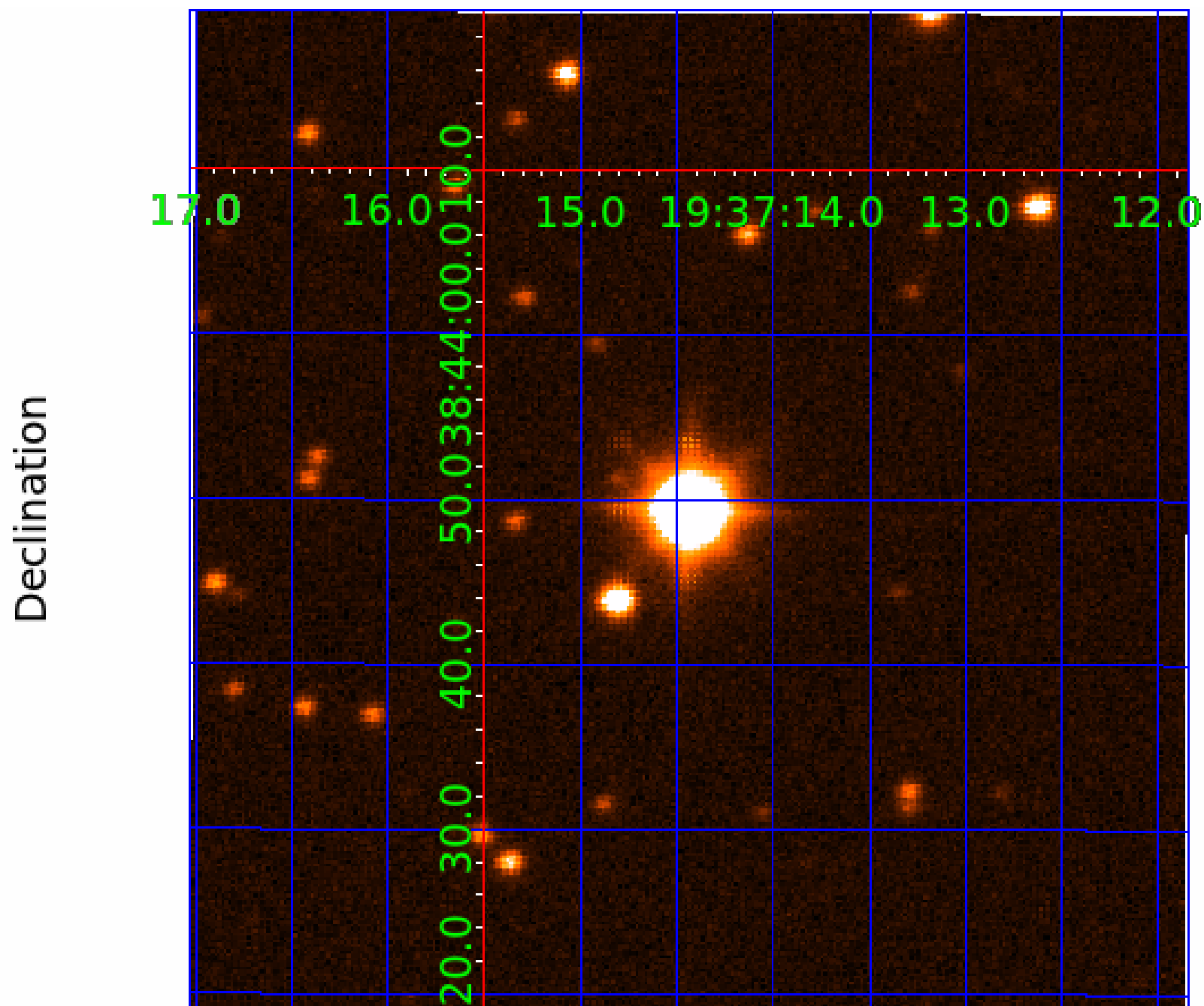
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



fluxWeightedCentroids, Planet 1 of 3



UKIRT Image





# KIC 003656913

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
003656913-01	OBS	No	5.363334	135.581368	10.2	11.018	11.6	12.5	2.53	8132	0.93	4336.95
003656913-03	OBS	No	5.362921	133.787117	4.7	11.752	7.6	6.3	2.53	8132	0.65	4337.40

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
003656913-01	OBS	FP	0.00	1	0	0	0	LPP_DV—CENT_SATURATED
003656913-03	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—SAME_NTL_PERIOD—CENT_SATURATED

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

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

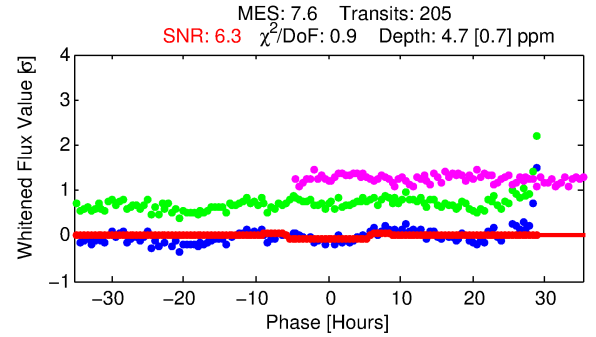
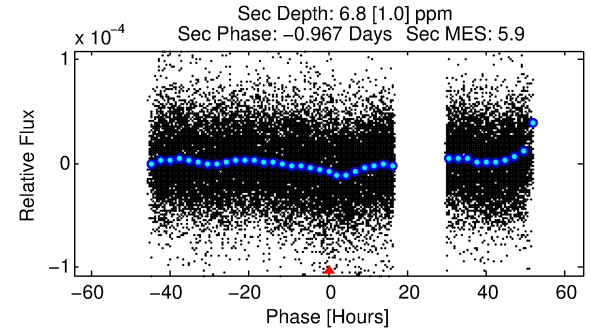
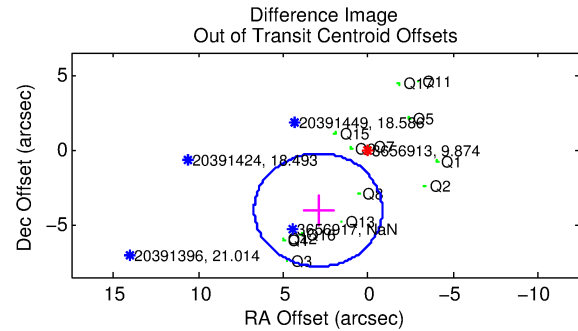
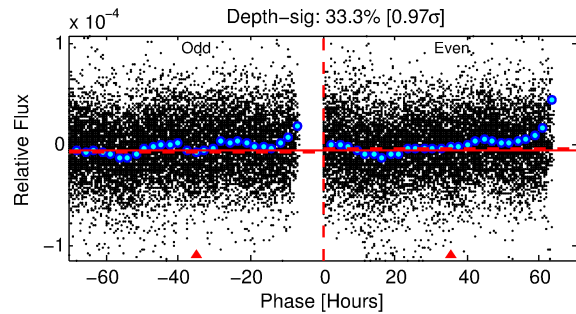
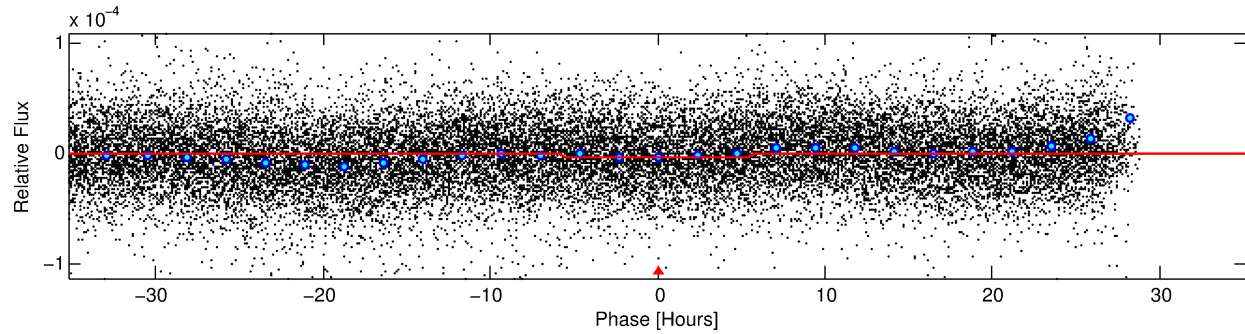
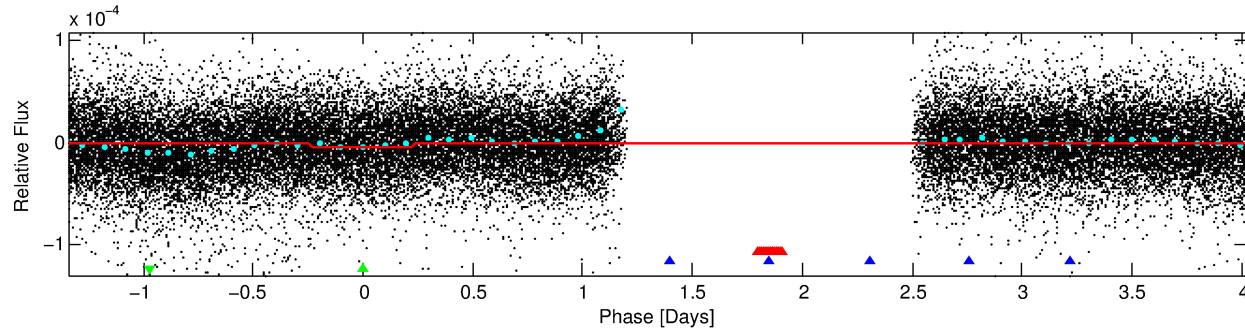
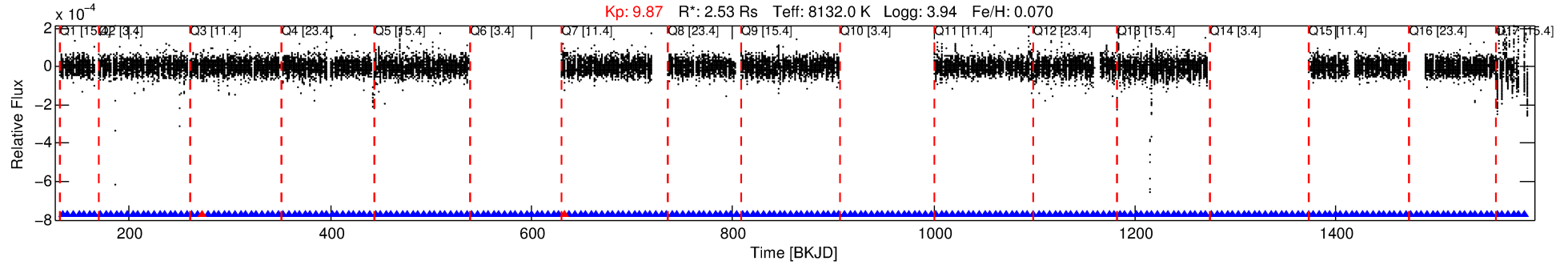
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 003656913-03

No Significant Match Found

# DV One-Page Summary

KIC: 3656913 Candidate: 3 of 3 Period: 5.363 d



## DV Fit Results:

Period = 5.36292 [0.00009] d  
Epoch = 133.7871 [0.0115] BKJD  
Rp/R\* = 0.0023 [0.0003]  
a/R\* = 1.73 [0.83]  
b = 0.91 [0.13]  
Seff = 4337.39 [2007.44]  
Teff = 2069 [239] K  
Rp = 0.65 [0.22] Re  
a = 0.0760 [0.0214] AU  
Ag = 52.22 [27.59] [1.86 $\sigma$ ]  
Teffp = 8601 [774] K [8.06 $\sigma$ ]

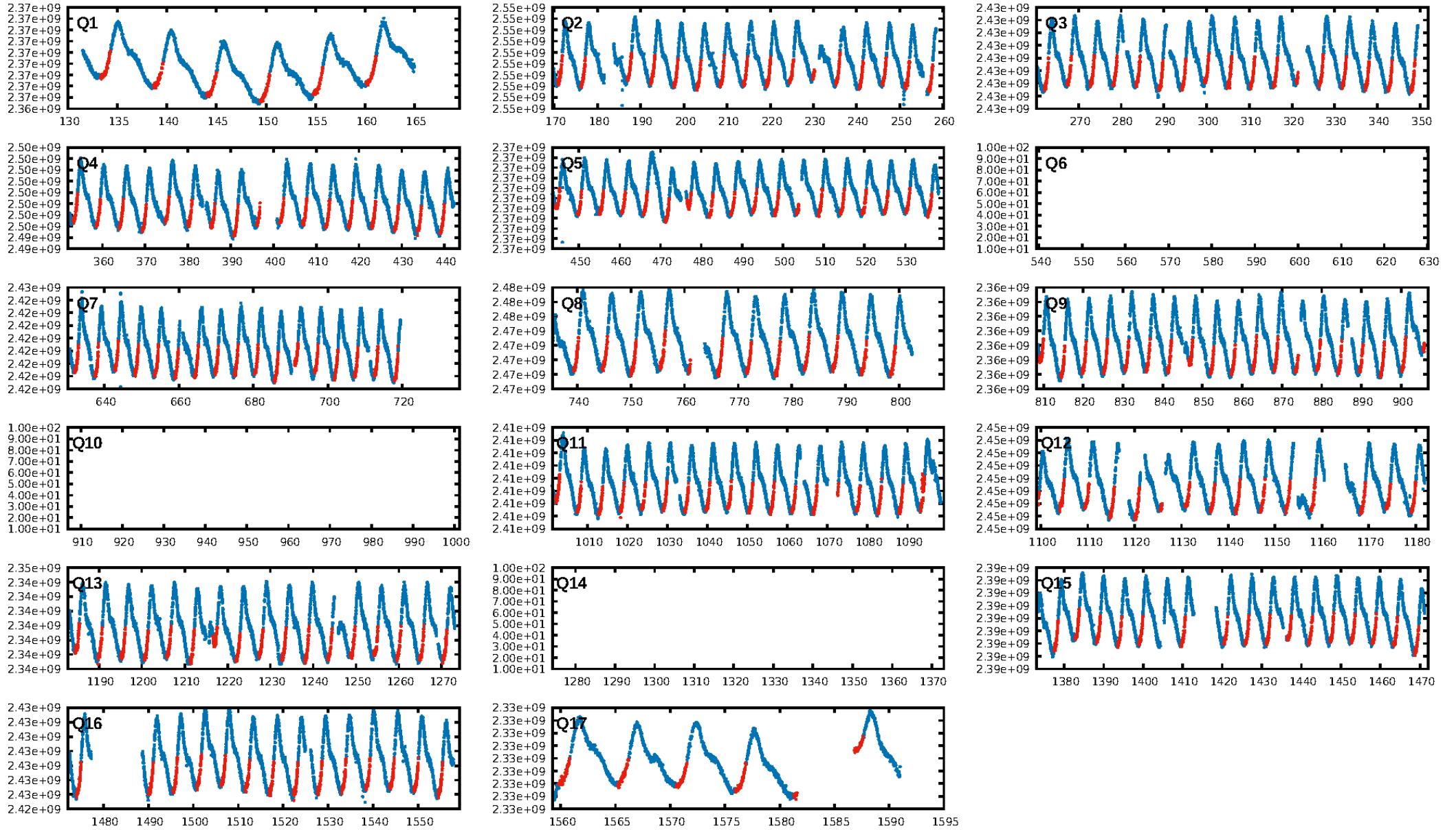
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 0.0% [0.00 $\sigma$ ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 8.43e-10  
RollingBand-fgt: 0.99 [191/193]  
GhostDiagnostic-chr: N/A  
Centroid-sig: N/A  
Centroid-so: N/A  
OotOffset-rm: 4.980 arcsec [3.96 $\sigma$ ]  
KicOffset-rm: 5.062 arcsec [4.59 $\sigma$ ]  
OotOffset-st: 1/4/4/5 [14]  
KicOffset-st: 1/4/4/5 [14]  
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DiffImageOverlap-fno: 1.00 [14/14]

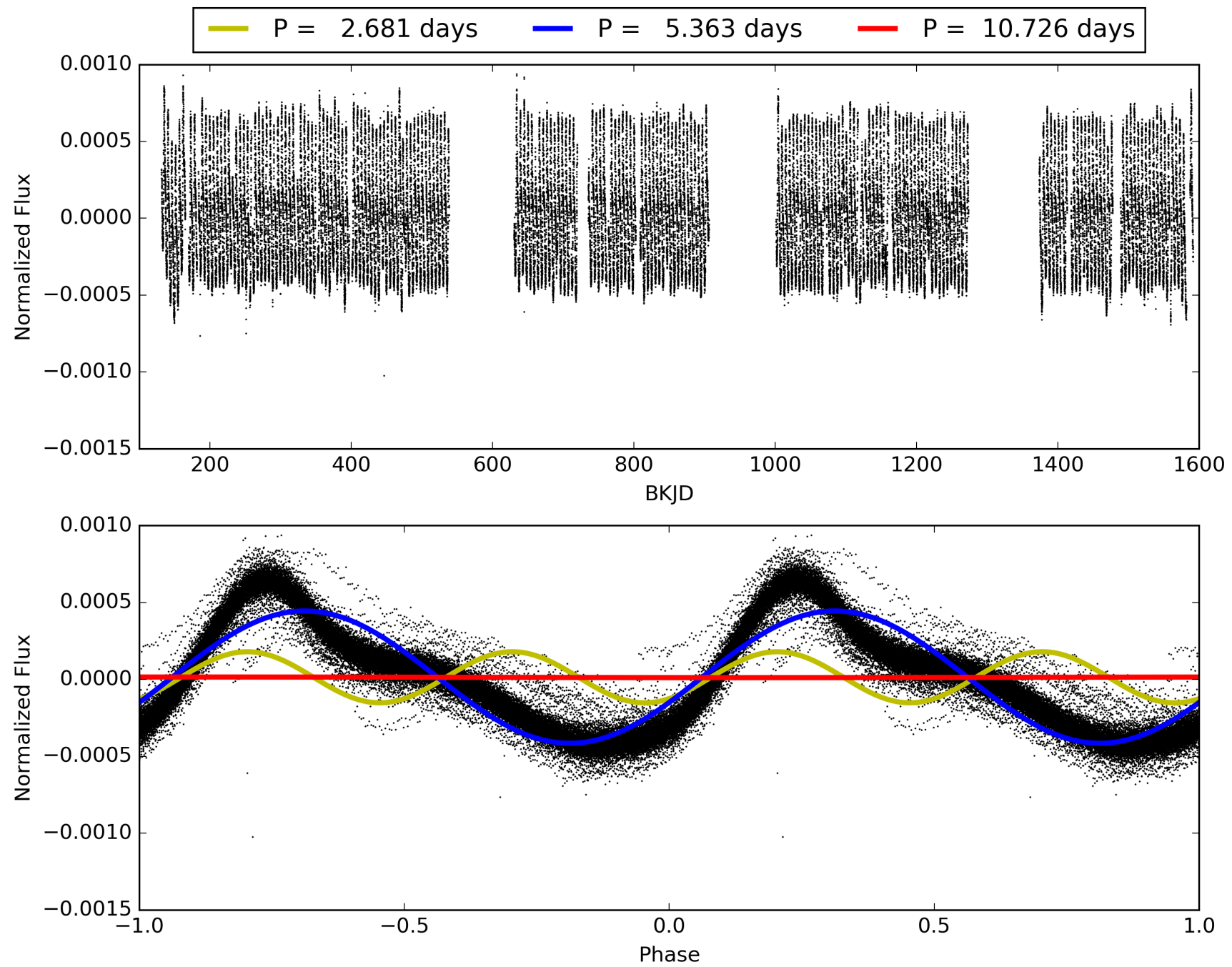
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 21:10:39 Z

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

# TCE 003656913-03, PDC Light Curves

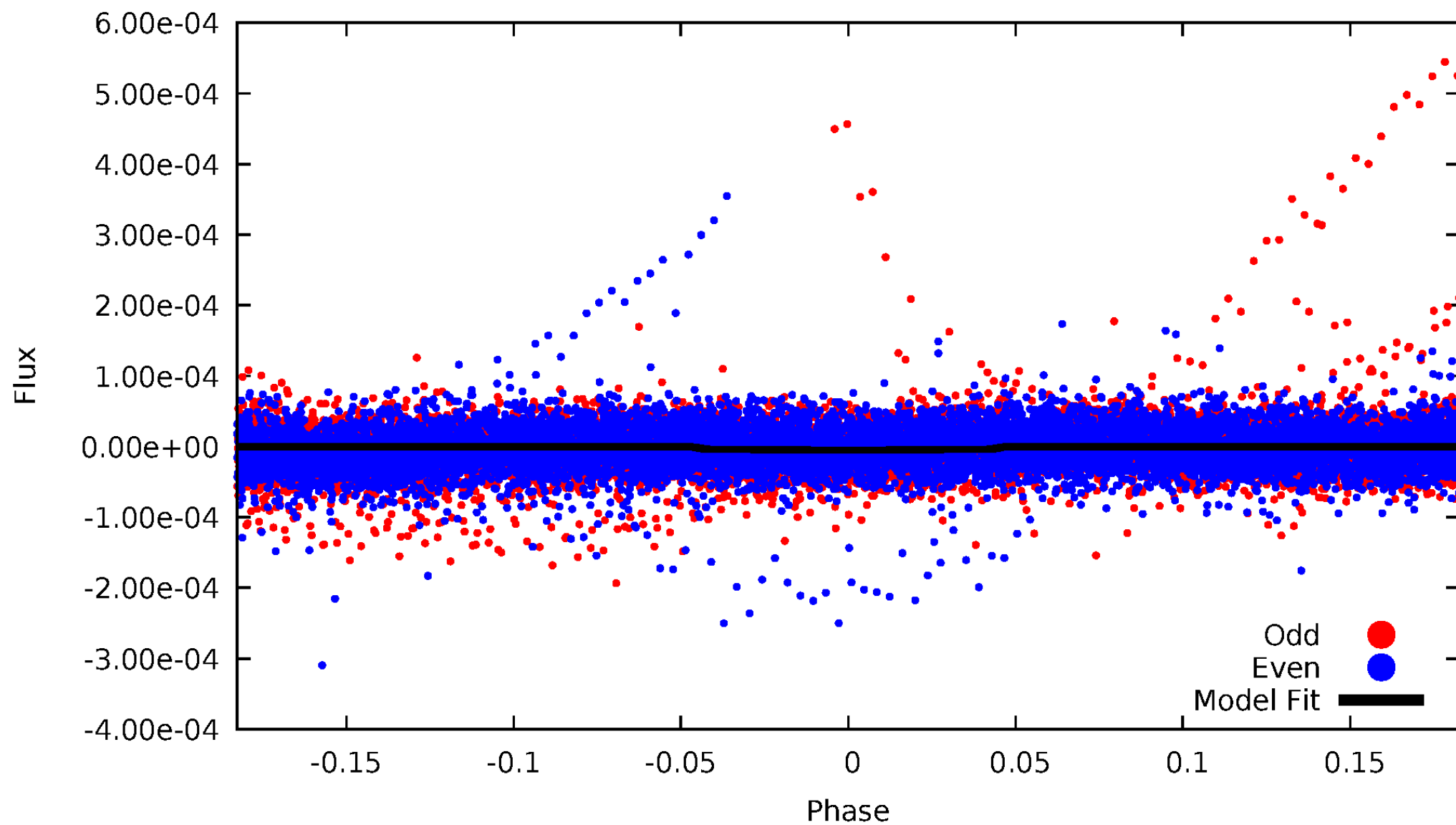


# TCE 003656913-03



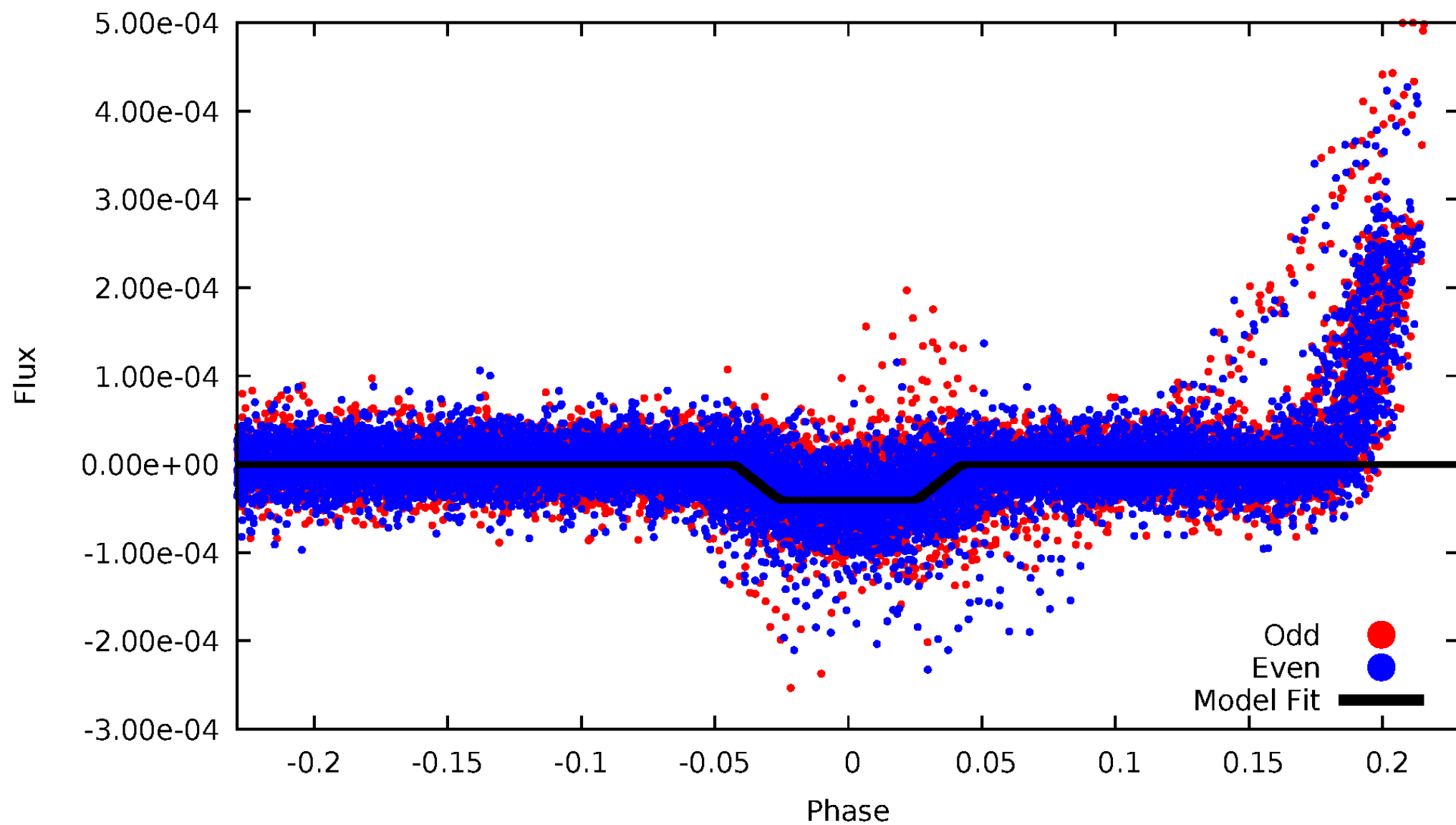
# DV Odd/Even

TCE 003656913-03



# ALT Odd/Even

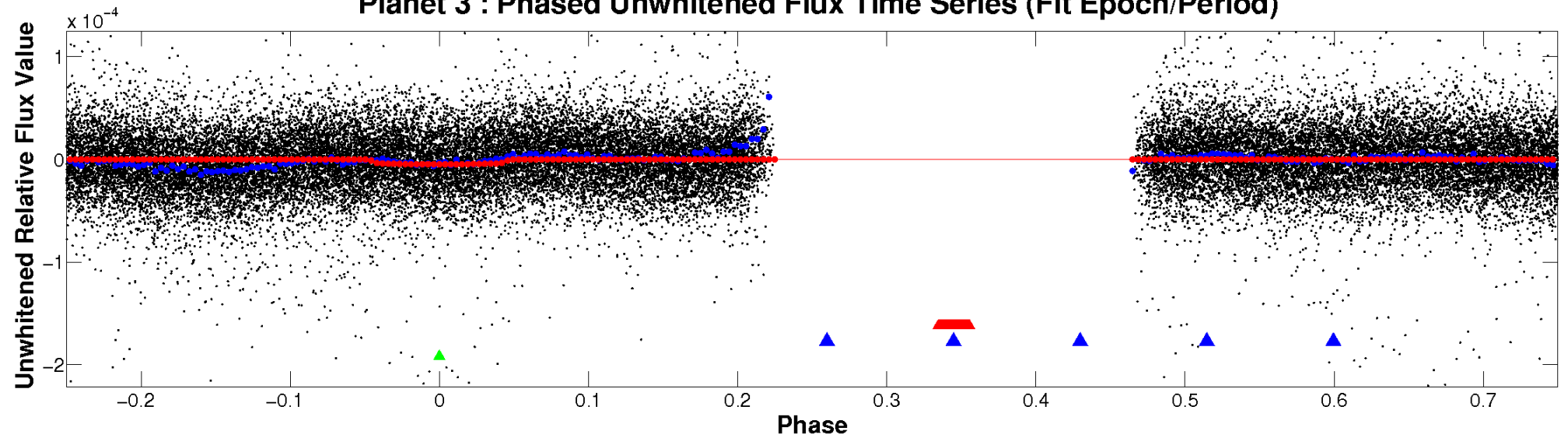
TCE 003656913-03



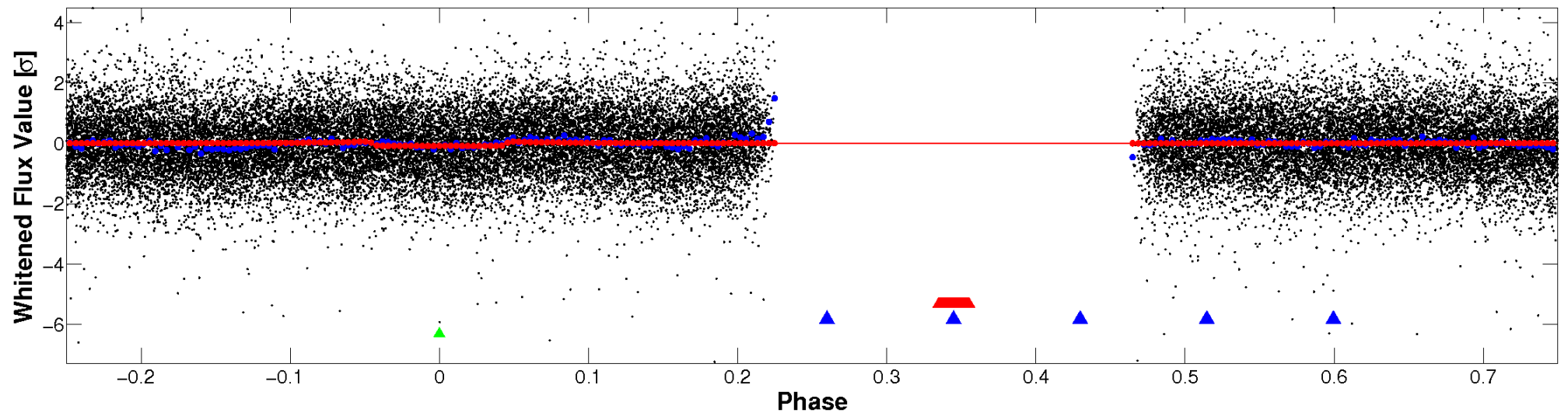


# Non-Whitened Vs. Whitened Light Curve

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

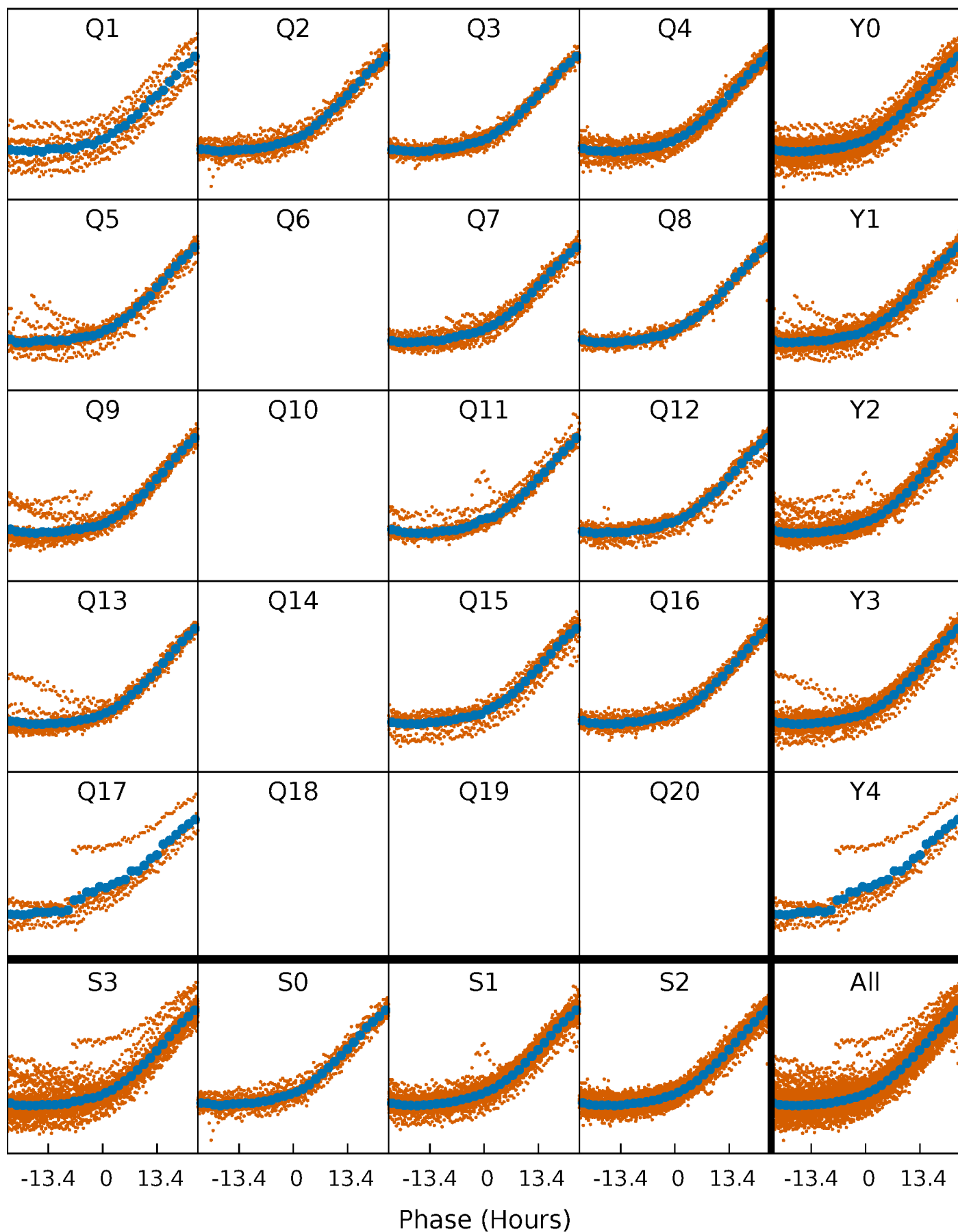


## Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



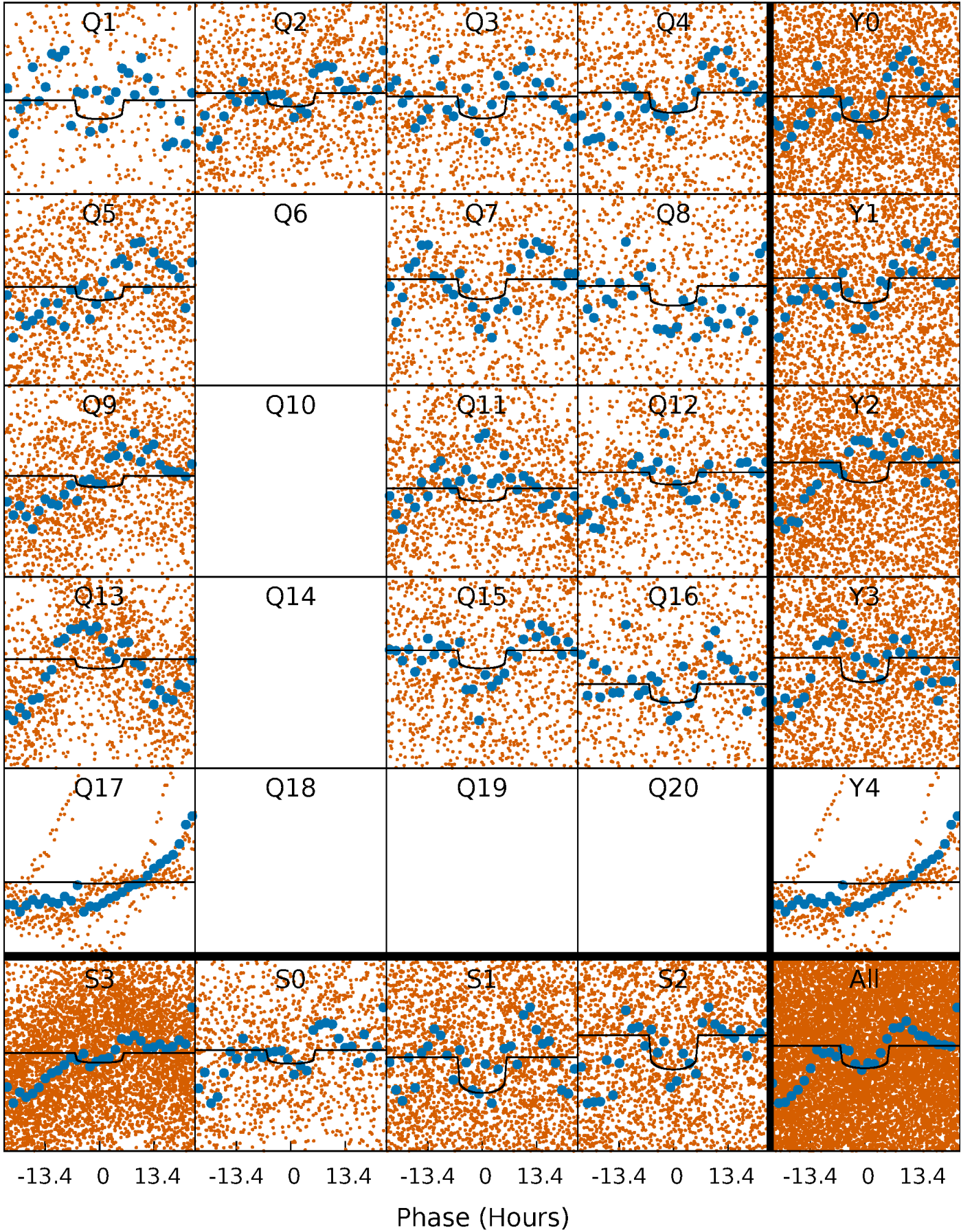
## PDC Quarter-Phased Transit Curves

TCE 003656913-03   P= 5.362921 Days    $T_0=133.787117$  (BKJD)



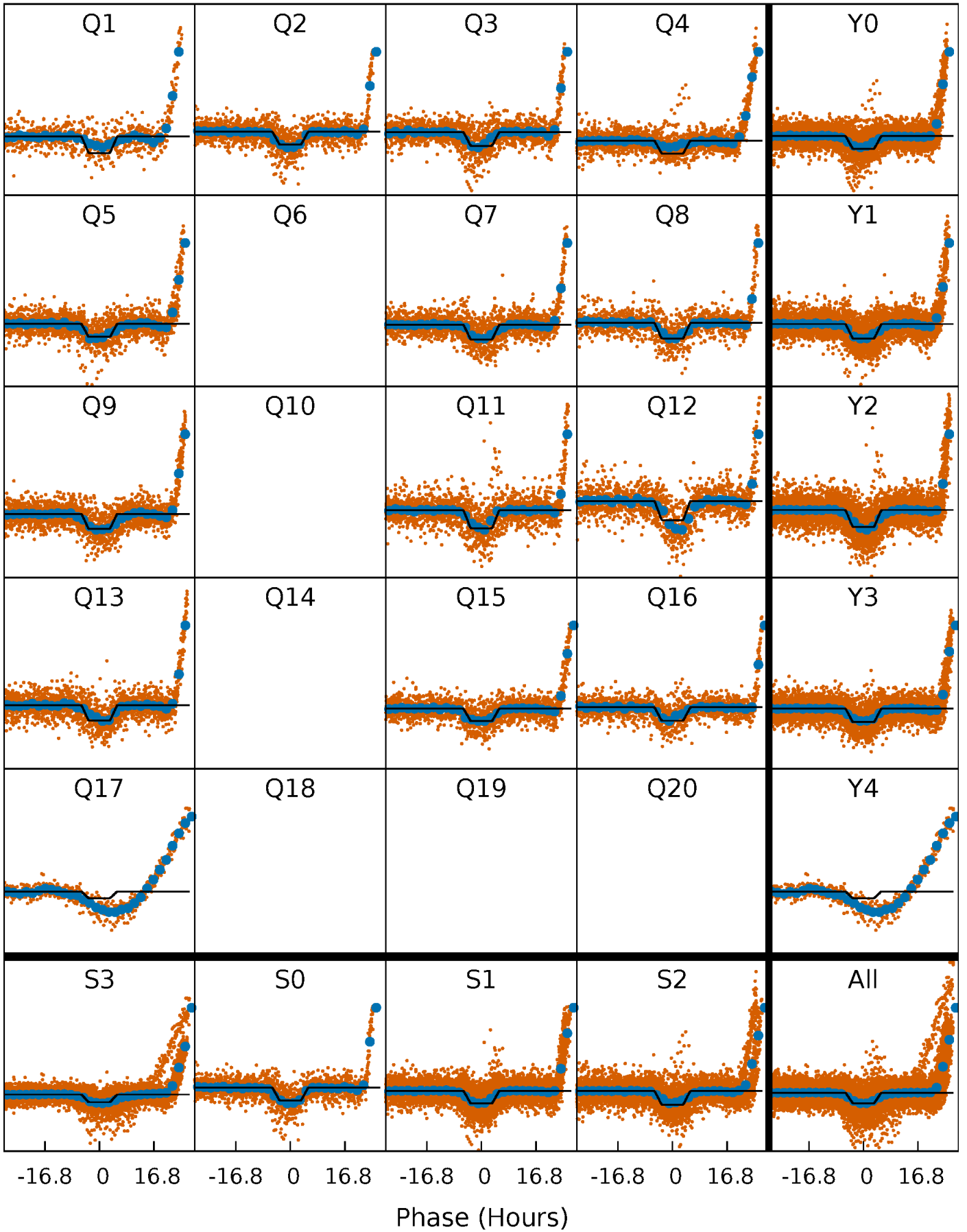
# DV Quarter-Phased Transit Curves

TCE 003656913-03 P= 5.362921 Days  $T_0=133.787117$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

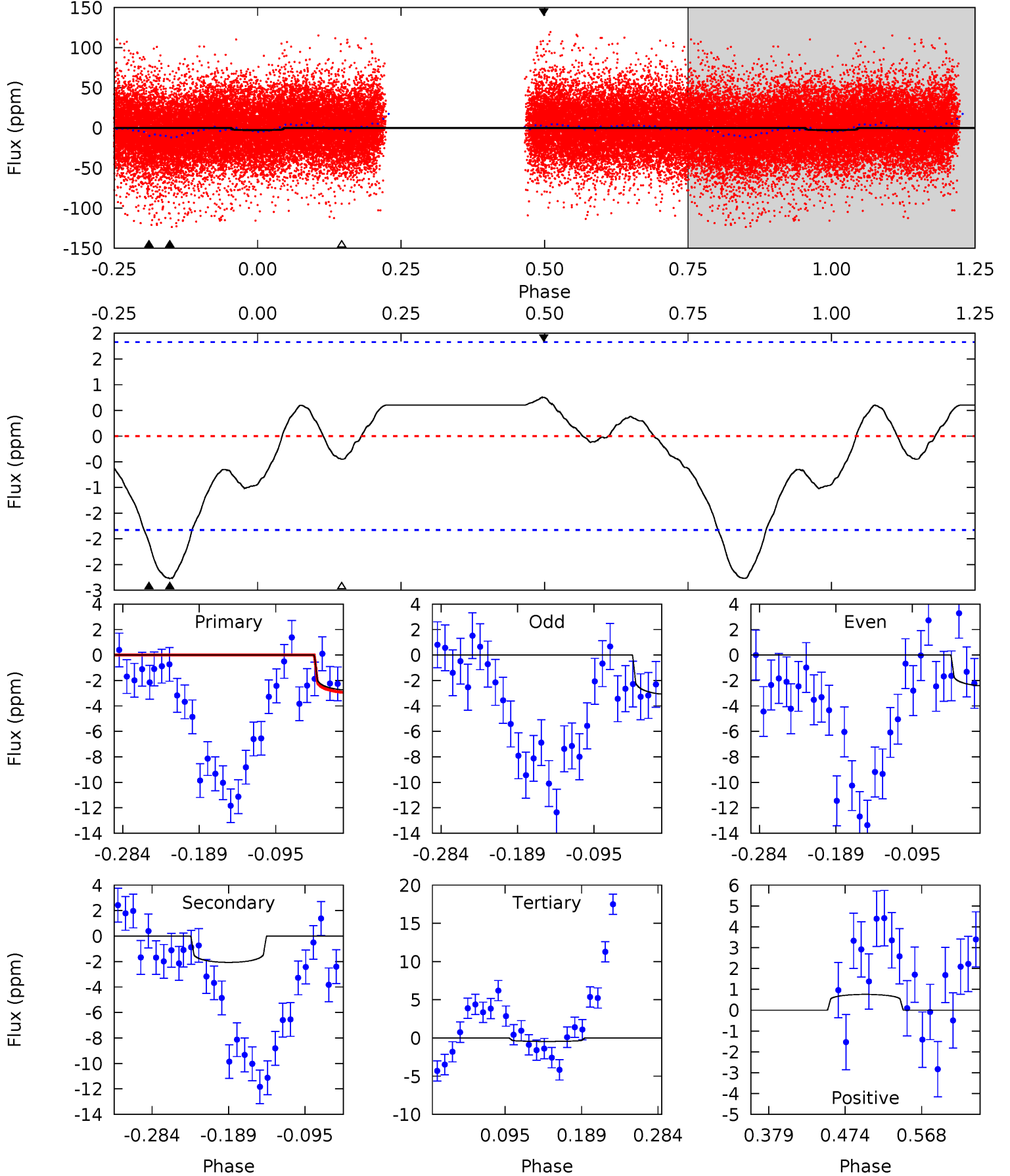
TCE 003656913-03 P= 5.362978 Days  $T_0=133.821525$  (BKJD)



# DV Model-Shift Uniqueness Test

003656913-03, P = 5.362921 Days, E = 128.424196 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
6.93	5.18	1.13	1.89	4.58	1.67	1.19	5.80	5.04	4.05	3.29	0.84	0.05	0.21	0.49

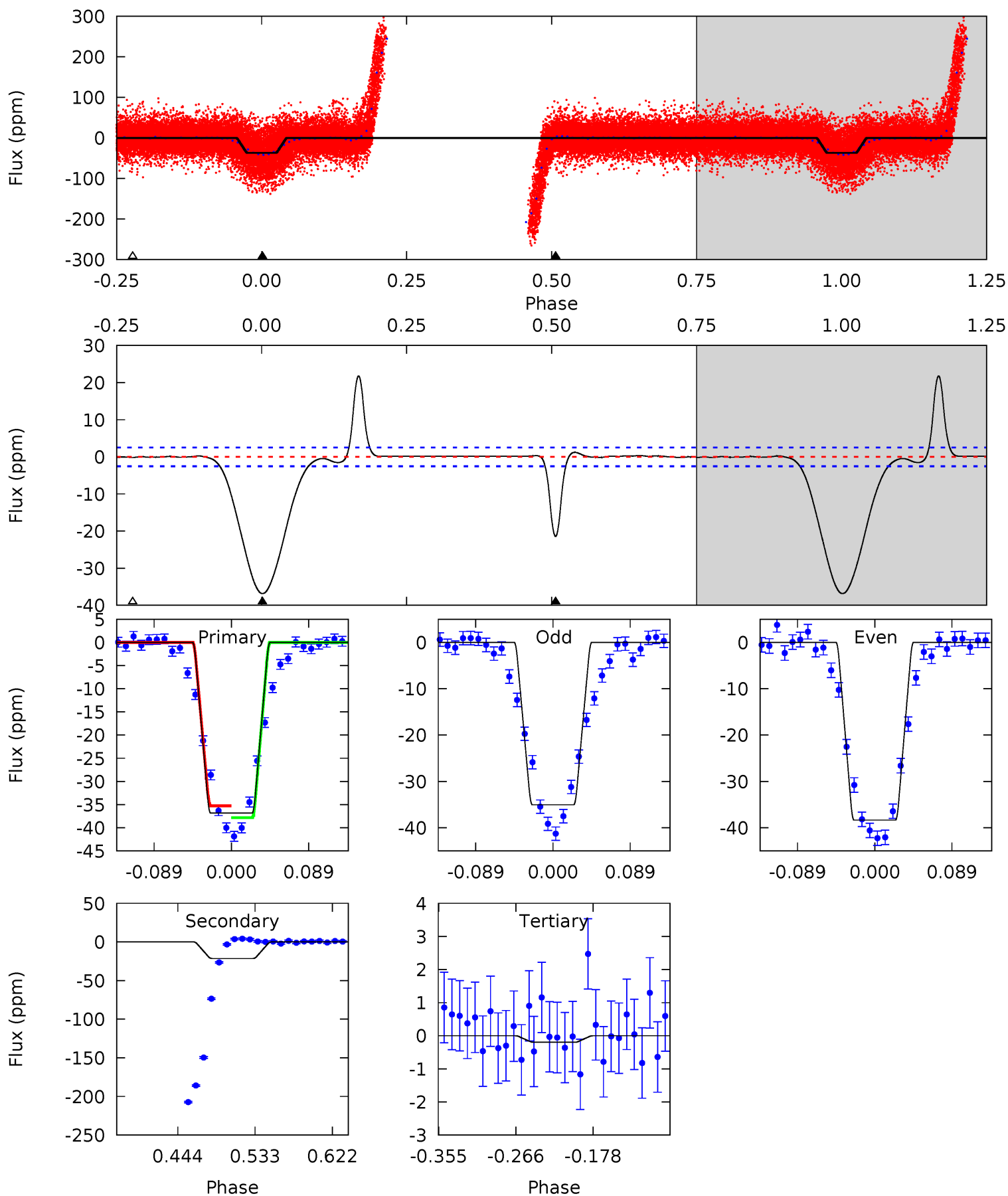




# Alt Model-Shift Uniqueness Test

003656913-03, P = 5.362978 Days, E = 128.458547 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
66.6	38.8	0.36	0	4.59	1.70	7.26	66.2	66.6	38.4	38.8	3.02	1.05	0.37	1.79





### Stellar Parameters For KIC 003656913

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$8132^{+224}_{-365}$	$3.941^{+0.241}_{-0.130}$	$0.070^{+0.250}_{-0.450}$	$2.530^{+0.537}_{-0.806}$	$2.036^{+0.304}_{-0.456}$	$0.177^{+0.271}_{-0.071}$
	+3%/-4%	+6%/-3%	+357%/-643%	+21%/-32%	+15%/-22%	+153%/-40%
Source	KIC0	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 003656913-03 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-2 \pm 0$	$0.63^{+0.12}_{-0.13}$	$2839^{+206}_{-244}$	$6106^{+621}_{-497}$	$16^{+10}_{-6}$
Alt.	$-21 \pm 1$	$1.72^{+0.27}_{-0.28}$	$2841^{+188}_{-221}$	$6710^{+281}_{-284}$	$23^{+8}_{-5}$

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

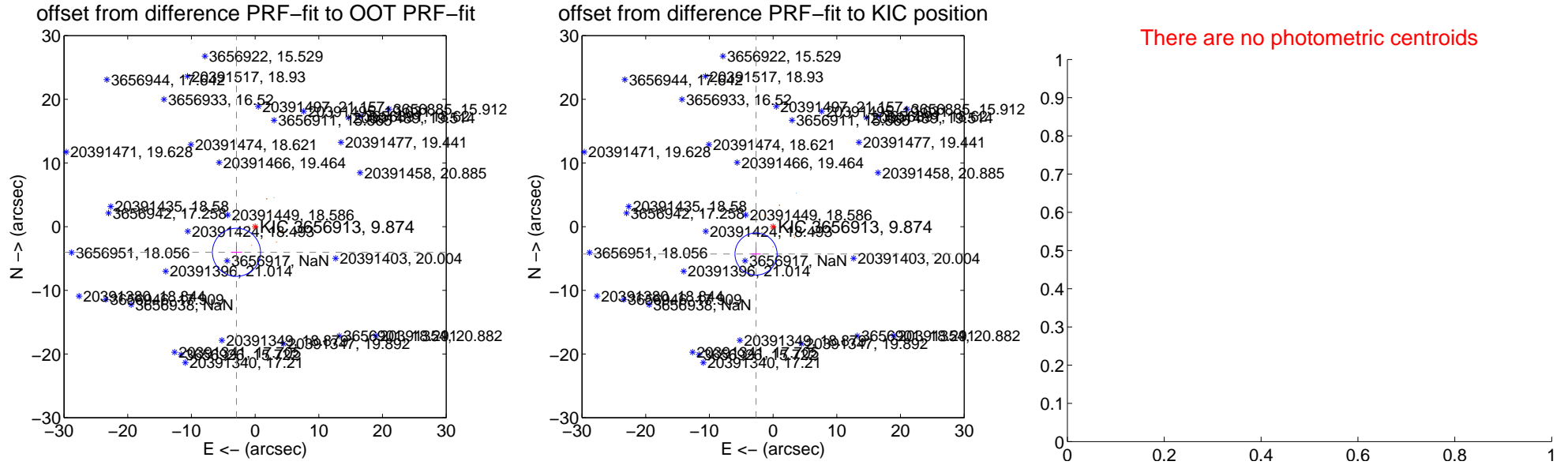
# DV Centroid Data

Supplemental centroid analysis for 003656913-03. **Kepler magnitude: 9.87.** Transit SNR 6.35

**There are 3 quarters with good PRF difference image offsets**

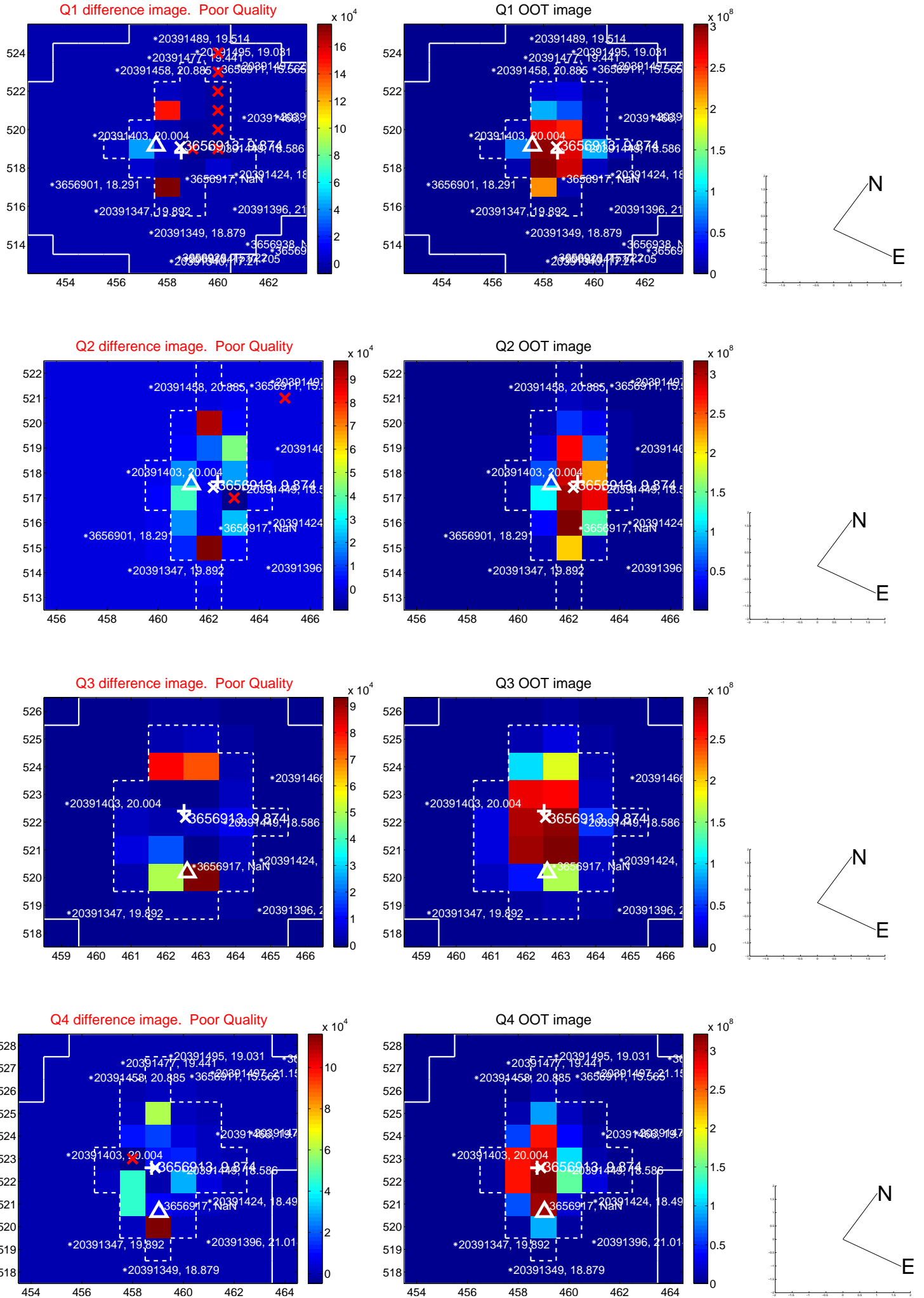
The direct PRF centroid is offset from the target star catalog position by about 1.29 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	<b>4.980 <math>\pm</math> 1.259</b>	<b>3.96</b>	2.928 $\pm$ 0.870	-4.028 $\pm$ 1.025
PRF-fit source offset from KIC position	<b>5.062 <math>\pm</math> 1.102</b>	<b>4.59</b>	2.679 $\pm$ 0.724	-4.295 $\pm$ 0.937
photometric centroid source offset	—	—	—	—

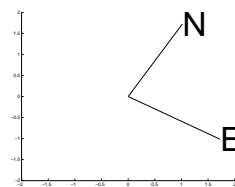
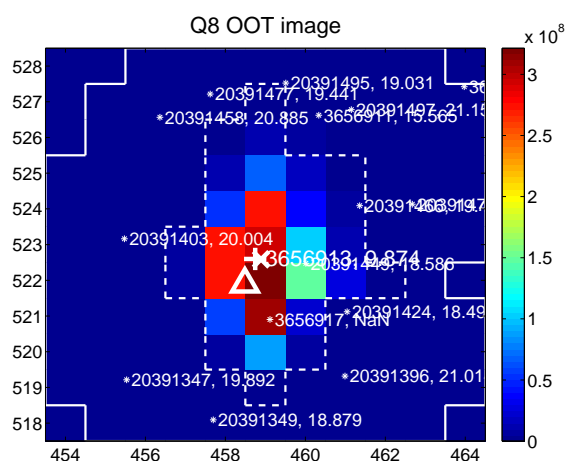
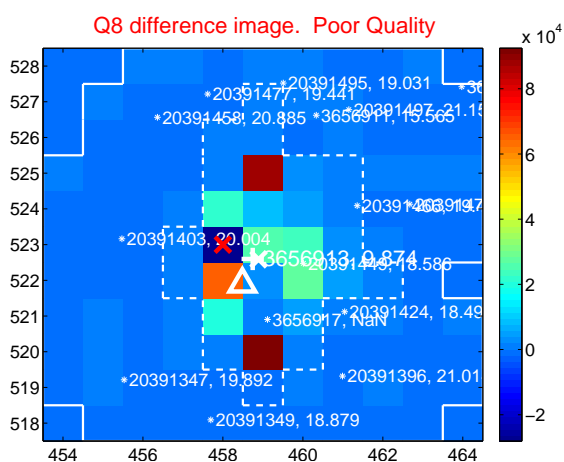
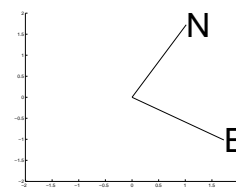
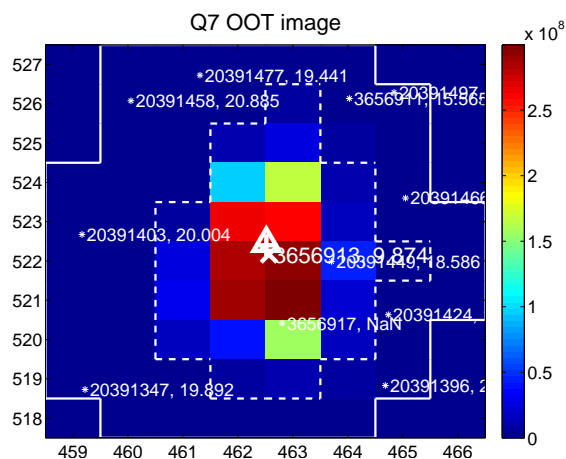
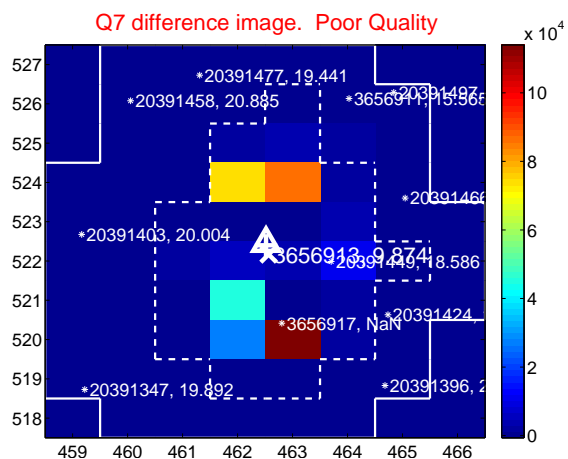
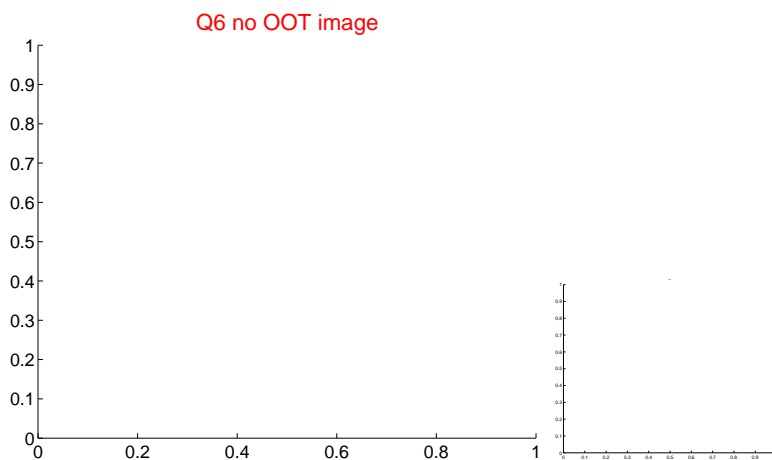
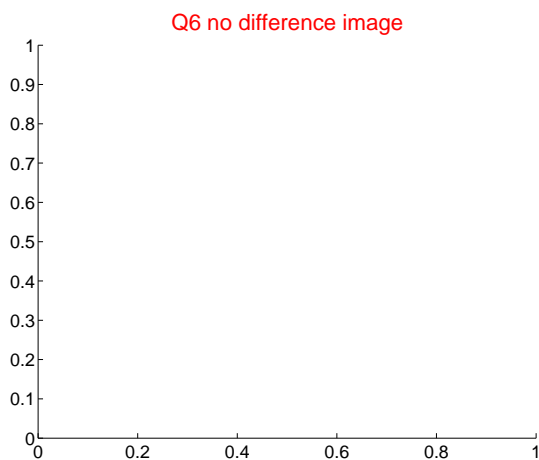
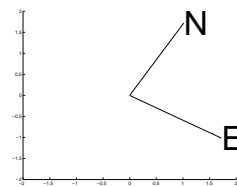
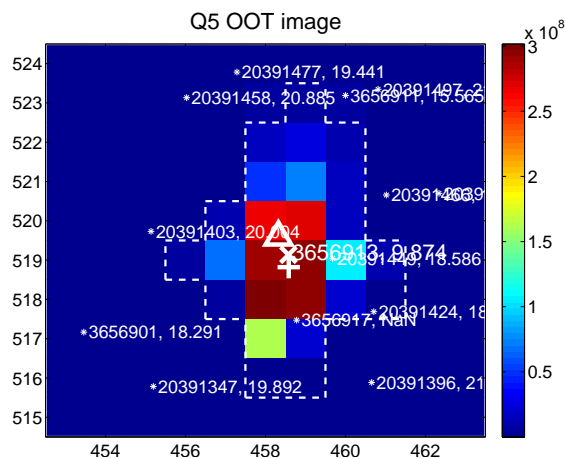
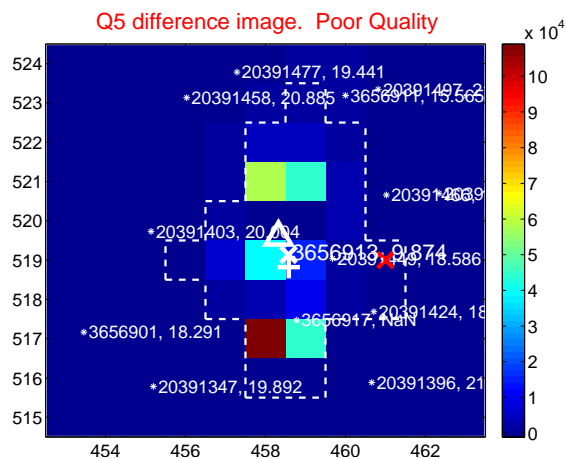


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

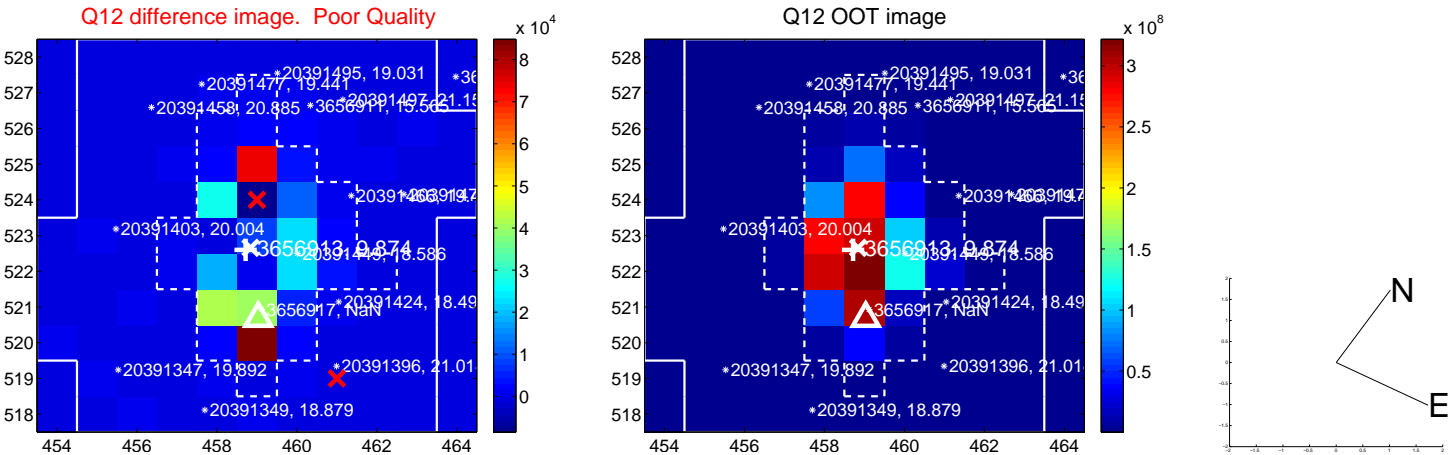
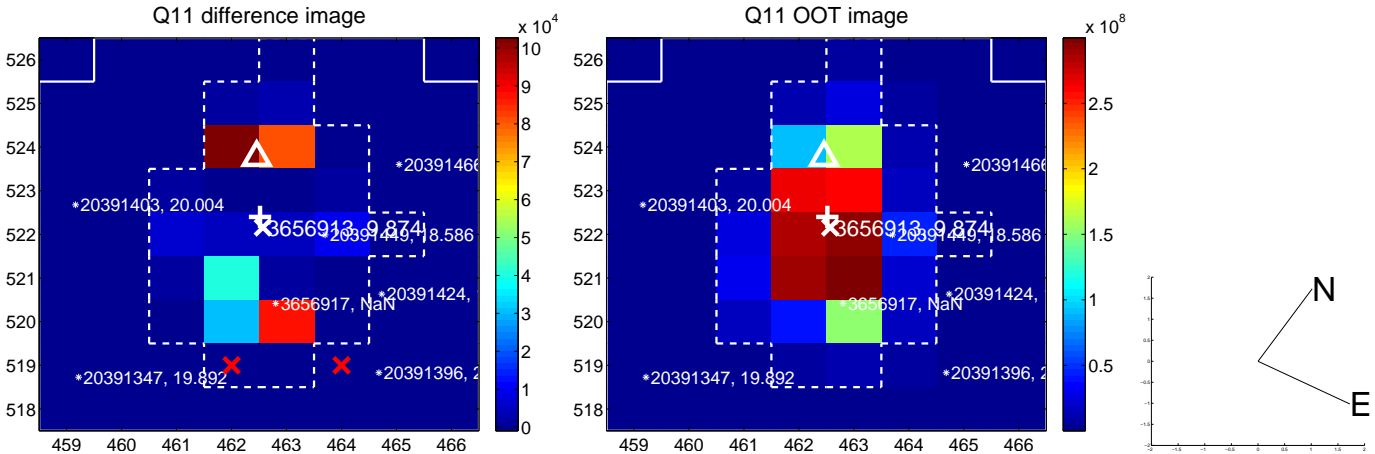
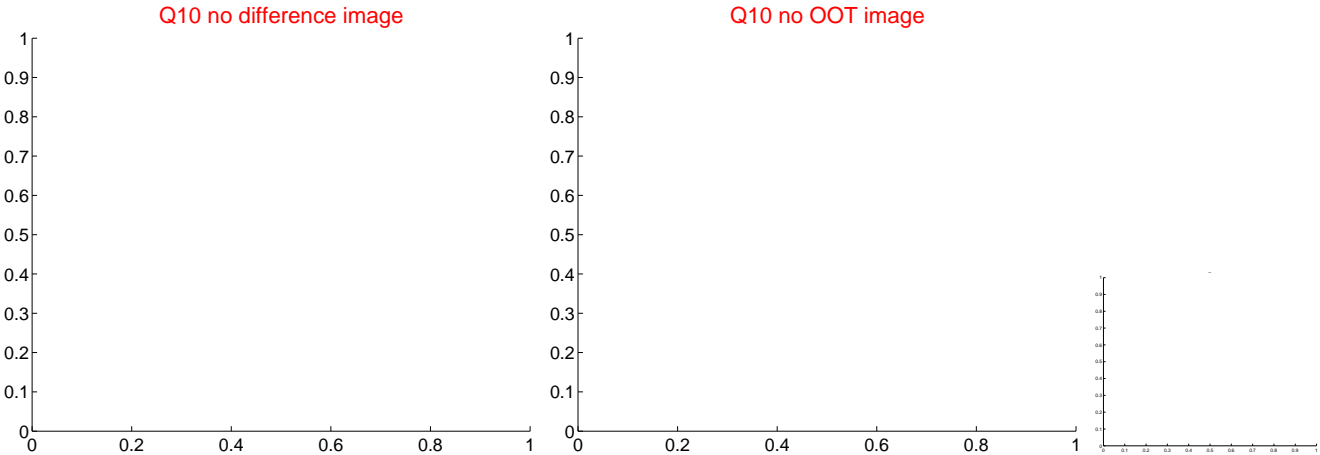
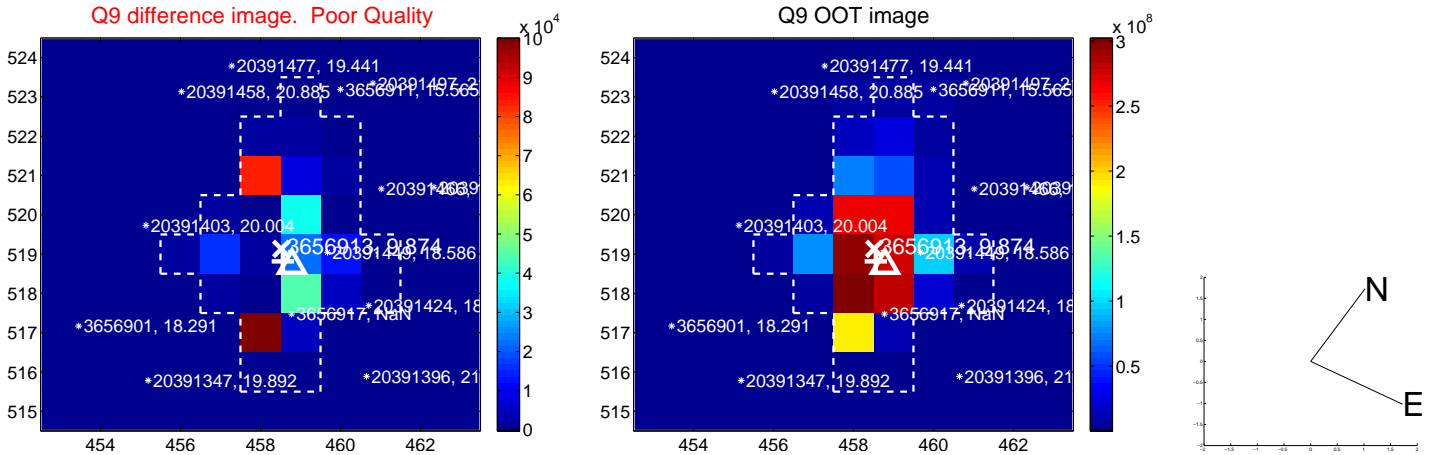
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



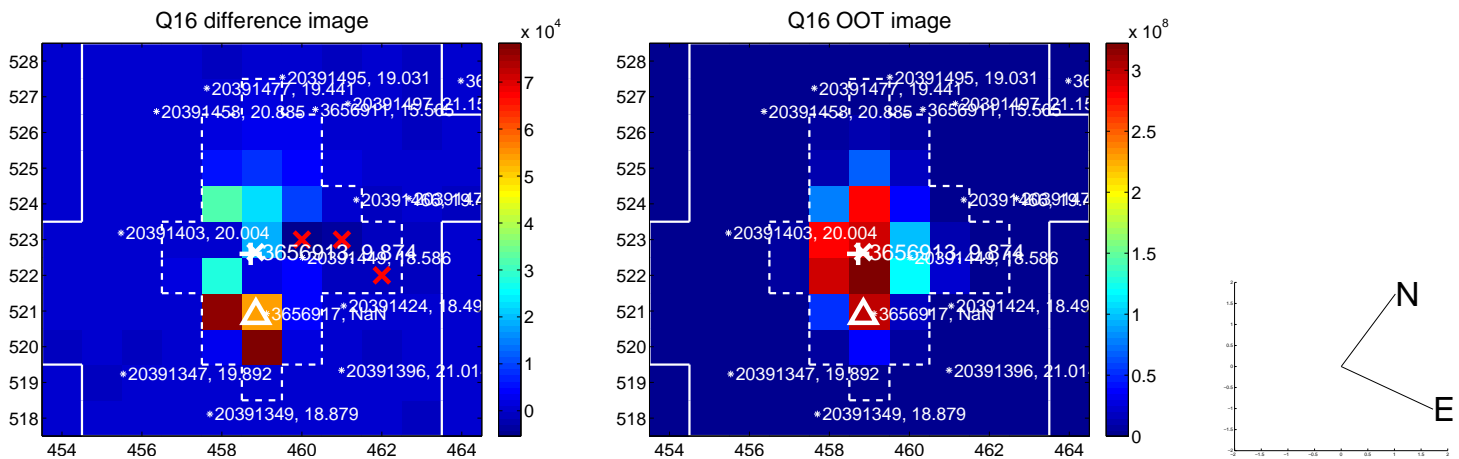
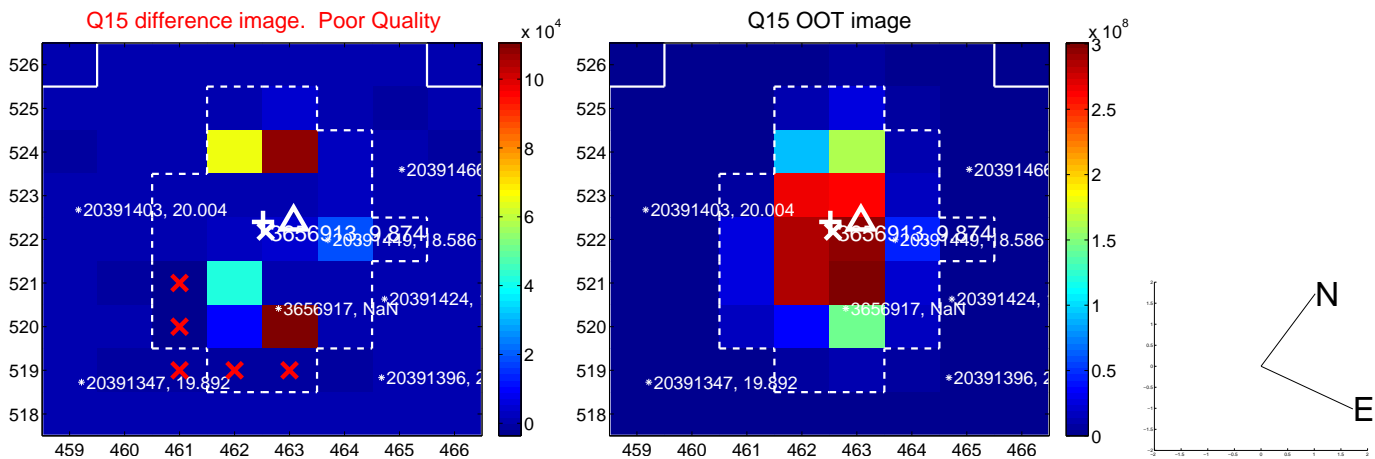
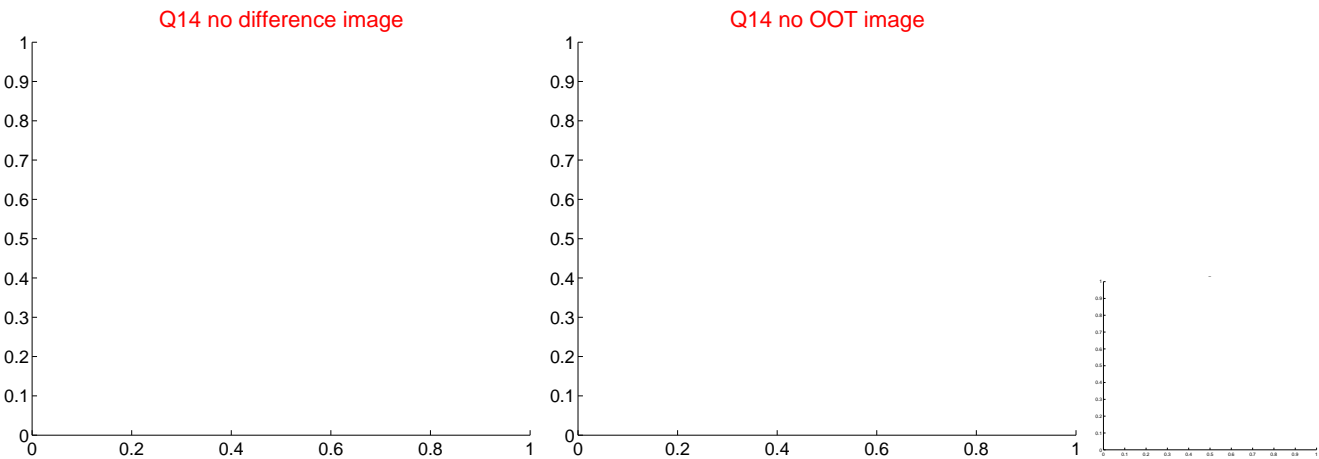
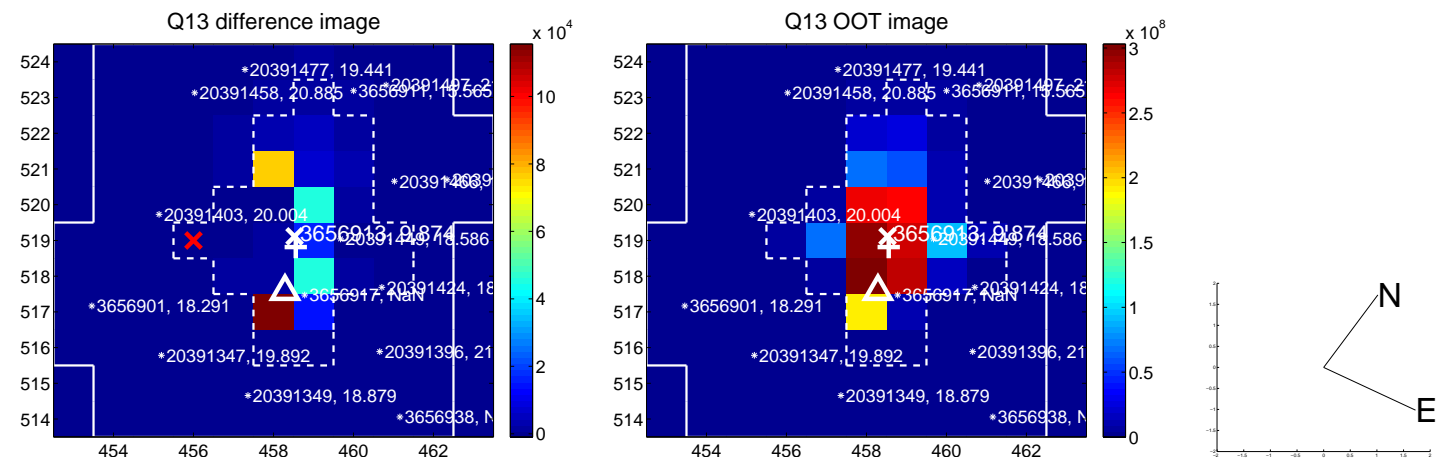
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

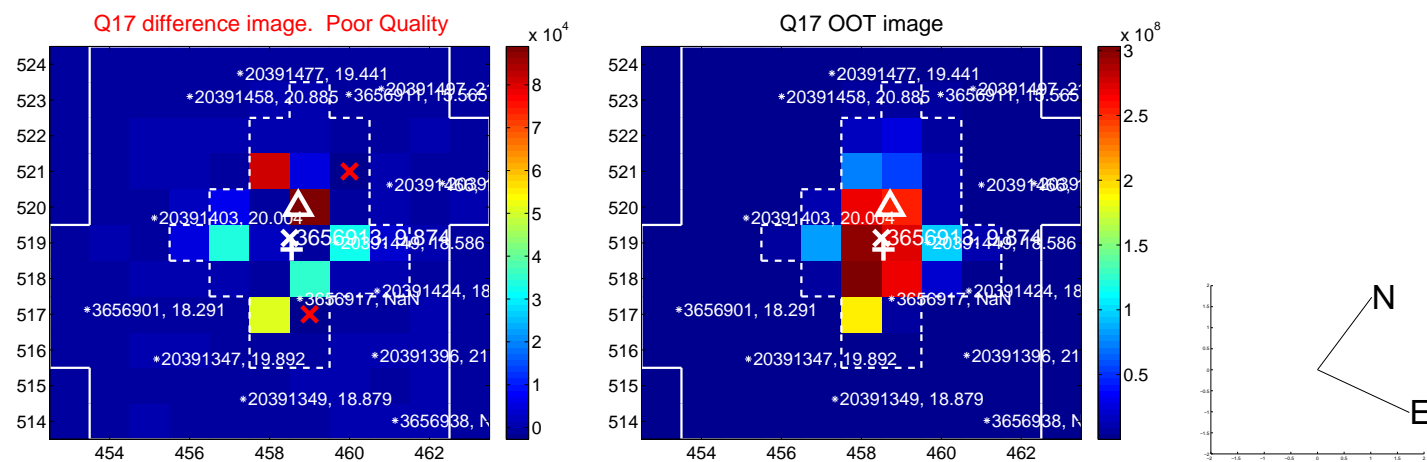


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.





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



folded centroid time series figure for this object.

UKIRT Image

