

# KIC 009141746

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009141746-01	OBS	0929.01	6.491684	135.683391	7128.6	4.365	478.5	476.3	1.11	6123	9.80	301.79
009141746-02	OBS	0929.02	2.851788	132.179581	83.5	3.971	7.5	8.3	1.11	6123	1.15	903.71

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009141746-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
009141746-02	OBS	PC	0.99	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.

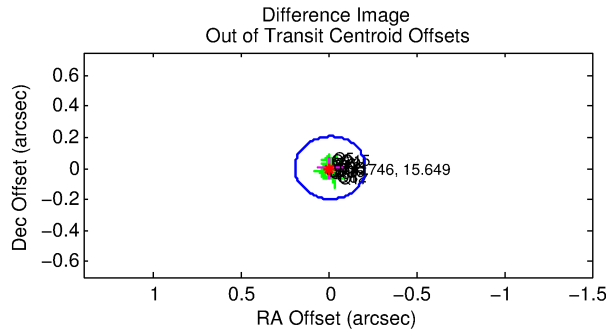
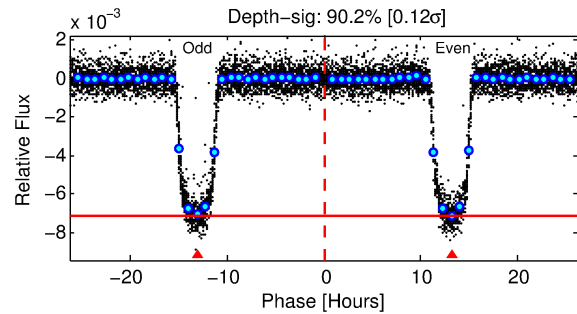
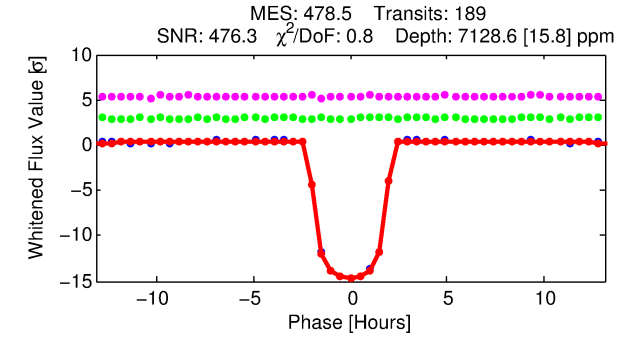
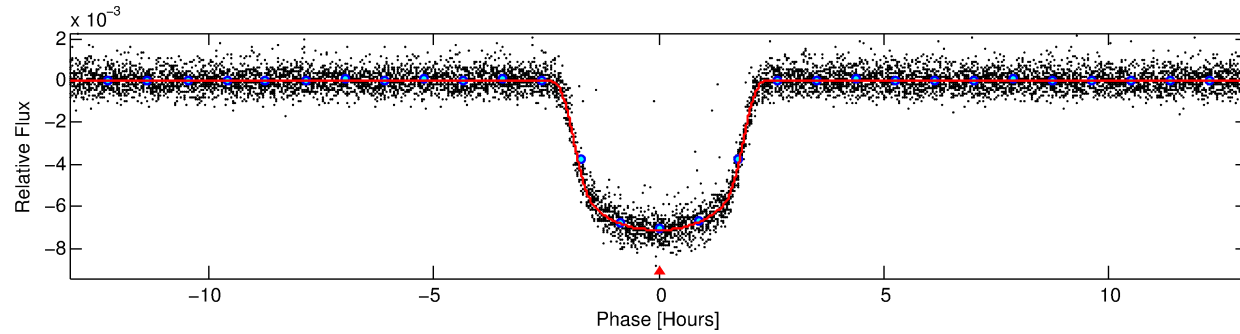
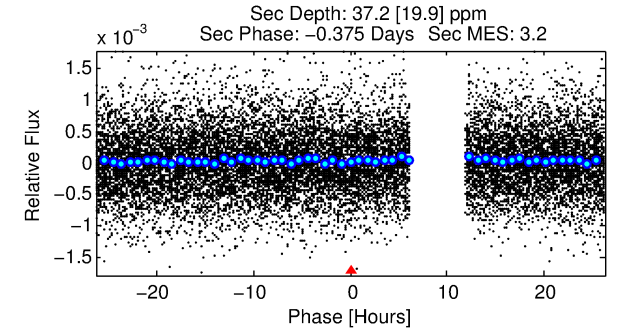
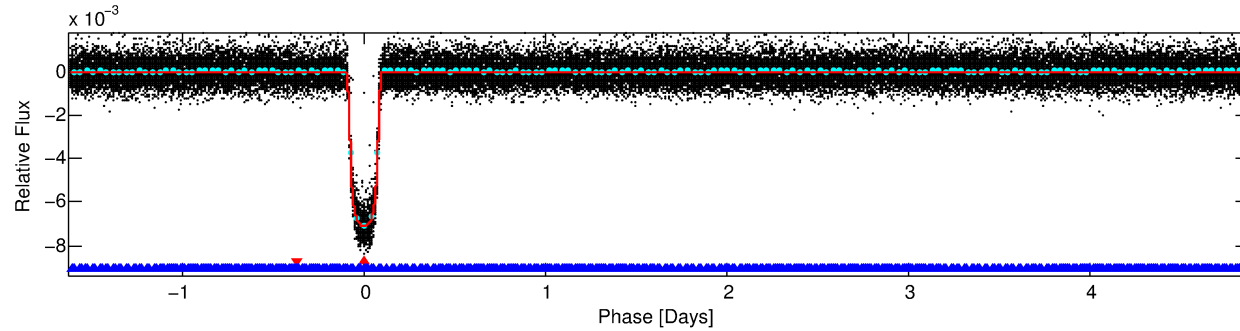
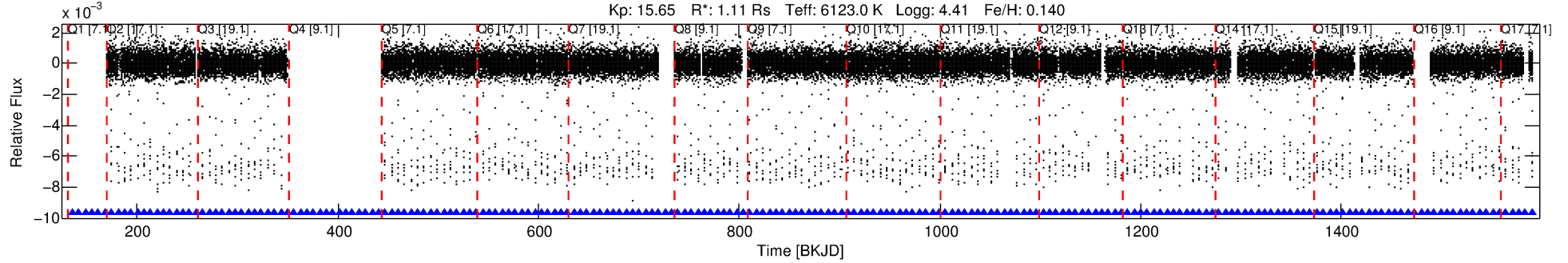
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 009141746-01

No Significant Match Found

# DV One-Page Summary

KIC: 9141746 Candidate: 1 of 2 Period: 6.492 d  
KOI: K00929.01 Corr: 0.994



## DV Fit Results:

Period = 6.49168 [0.00000] d  
Epoch = 135.6834 [0.0002] BKJD  
Rp/R\* = 0.0812 [0.0004]  
a/R\* = 10.08 [0.24]  
b = 0.62 [0.02]  
Seff = 301.79 [132.21]  
Teq = 1063 [116] K  
Rp = 9.81 [3.32] Re  
a = 0.0715 [0.0201] AU  
Ag = 1.09 [0.73] [0.12 $\sigma$ ]  
Teffp = 1679 [235] K [2.35 $\sigma$ ]

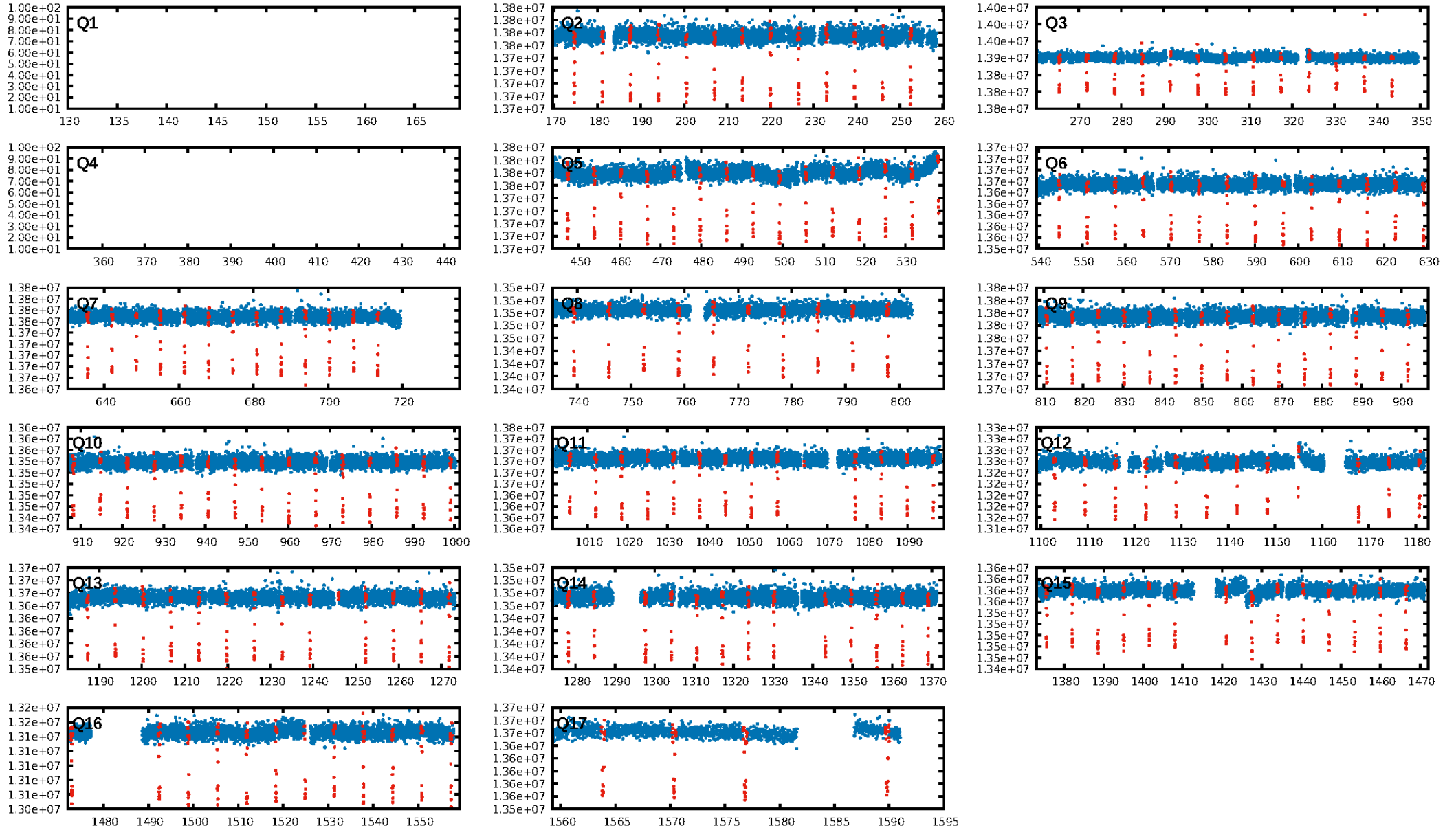
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [14.80 $\sigma$ ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 98.7%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 0.00e+00  
RollingBand-fgt: 1.00 [185/185]  
GhostDiagnostic-chr: 5.388  
Centroid-sig: 0.1%  
Centroid-so: 0.077 arcsec [2.44 $\sigma$ ]  
OotOffset-rm: 0.009 arcsec [0.13 $\sigma$ ]  
KicOffset-rm: 0.065 arcsec [0.96 $\sigma$ ]  
OotOffset-st: 4/4/3/4 [15]  
KicOffset-st: 4/4/3/4 [15]  
DiffImageQuality-fgm: 1.00 [15/15]  
DiffImageOverlap-fno: 1.00 [15/15]

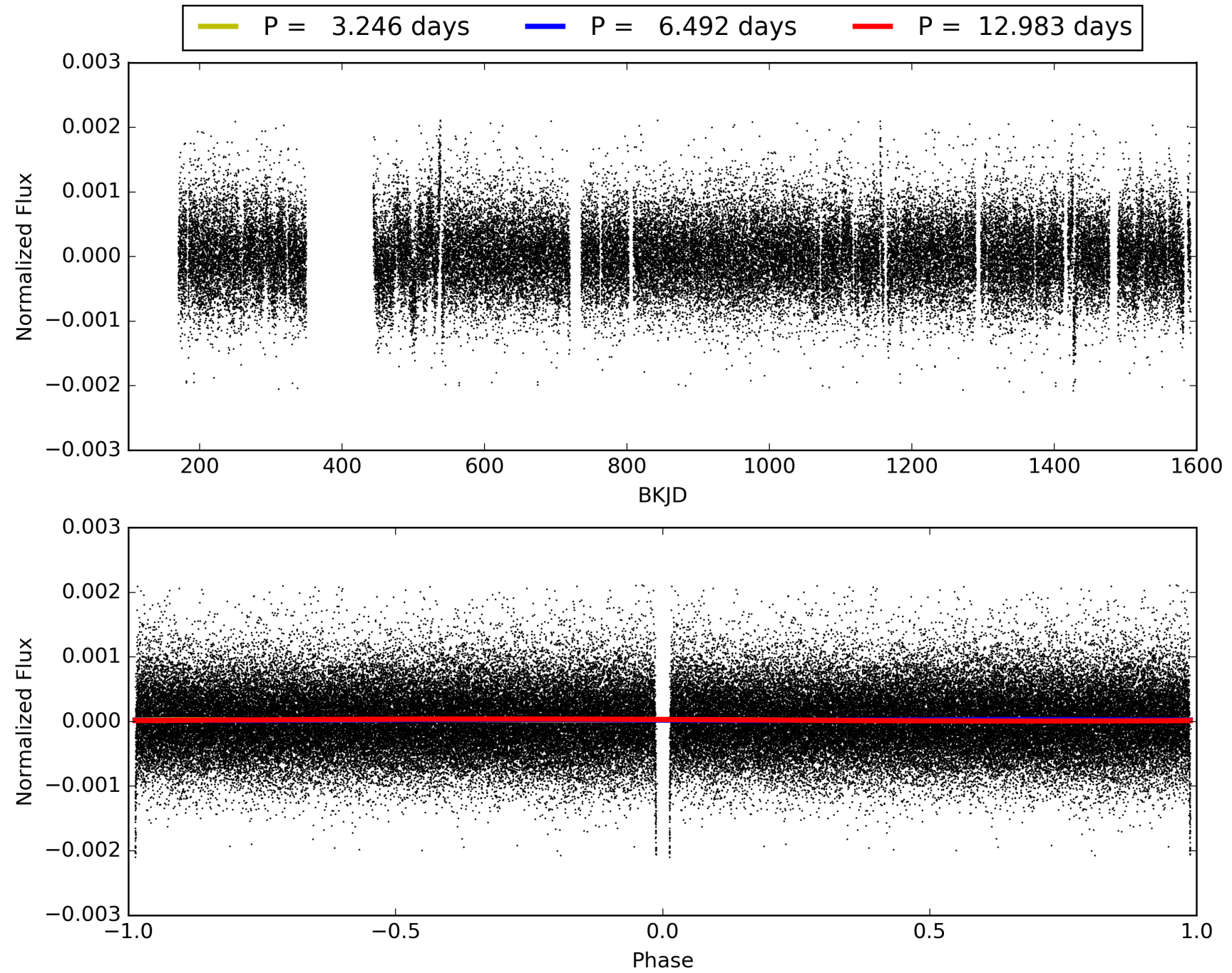
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 08:20:38 Z

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

# TCE 009141746-01, PDC Light Curves

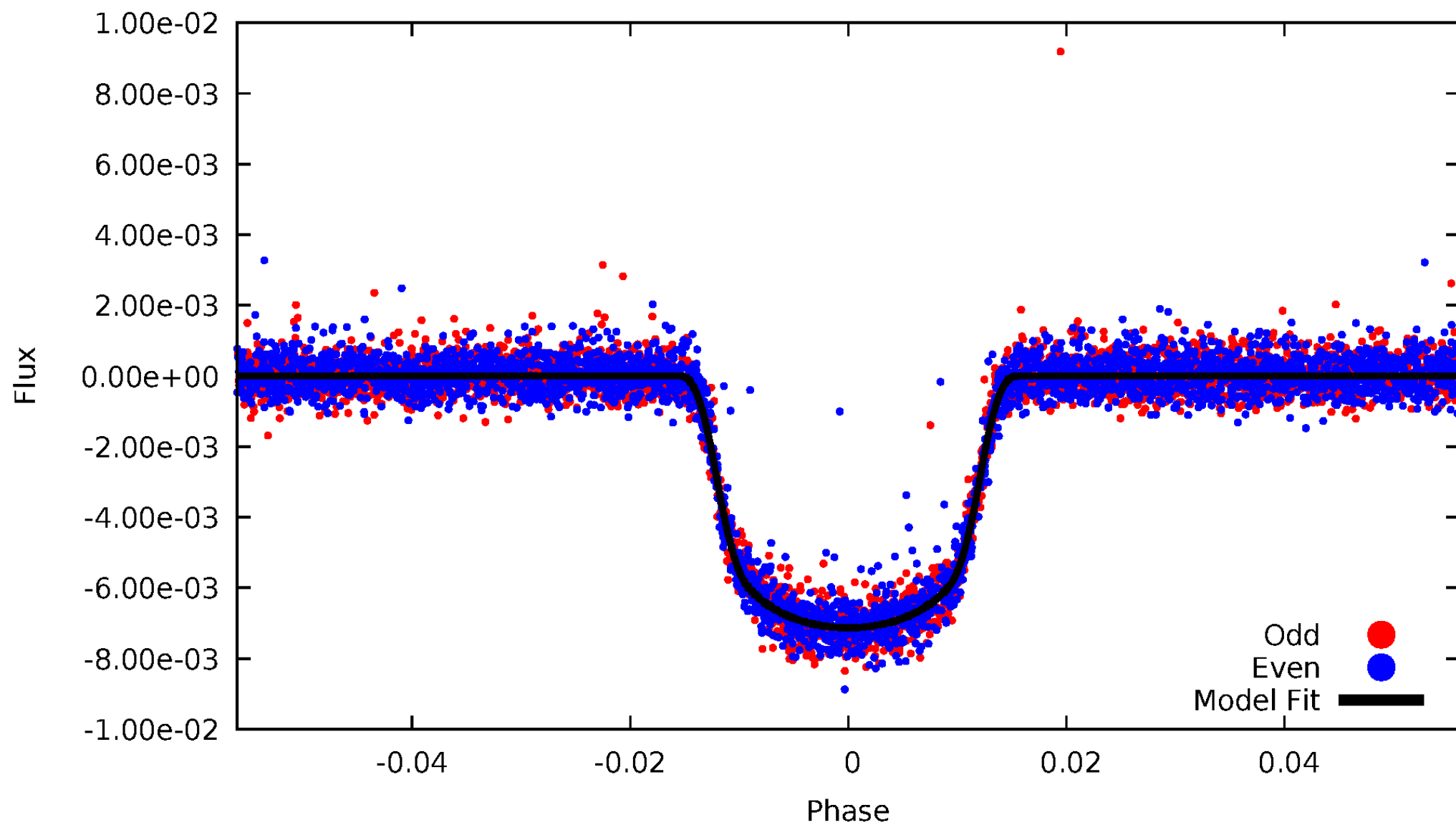


TCE 009141746-01



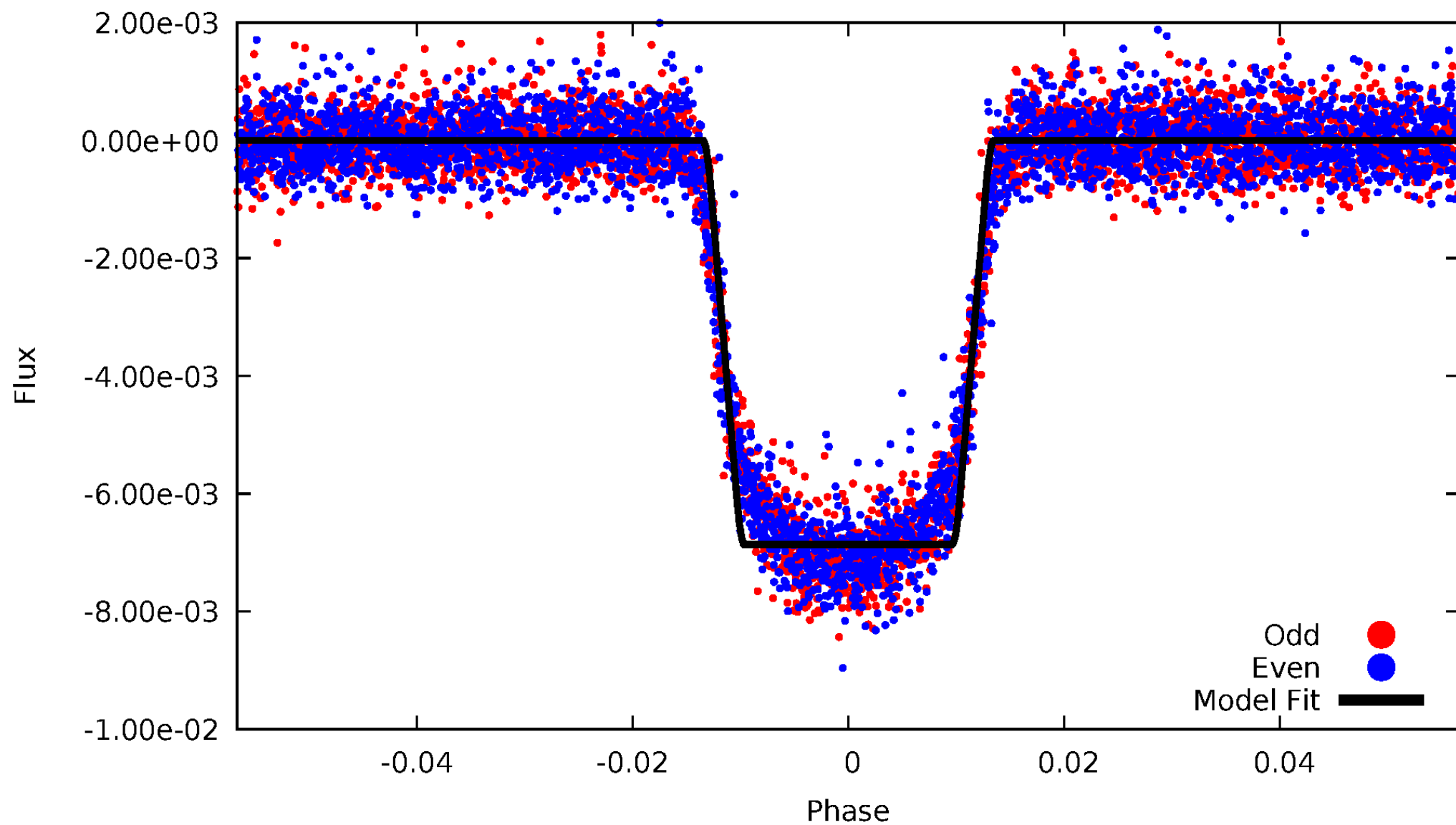
# DV Odd/Even

TCE 009141746-01



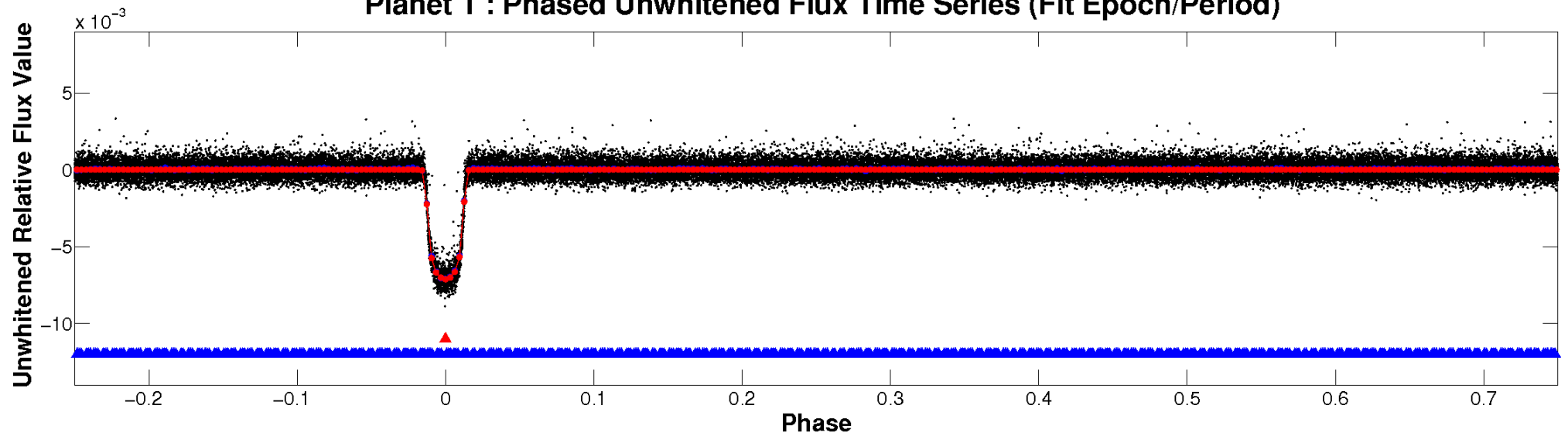
# ALT Odd/Even

TCE 009141746-01

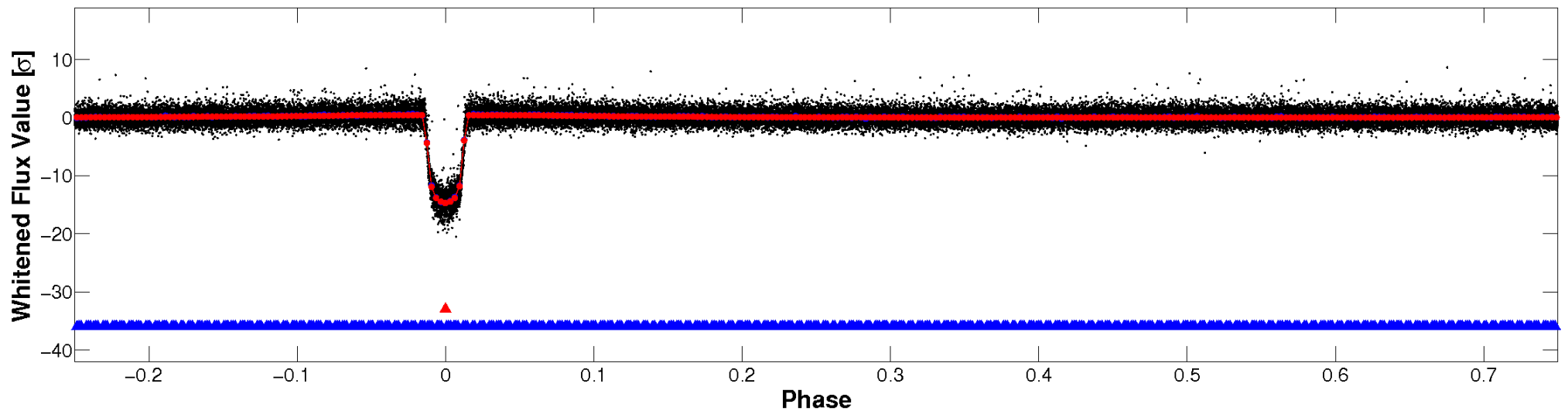


# Non-Whitened Vs. Whitened Light Curve

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



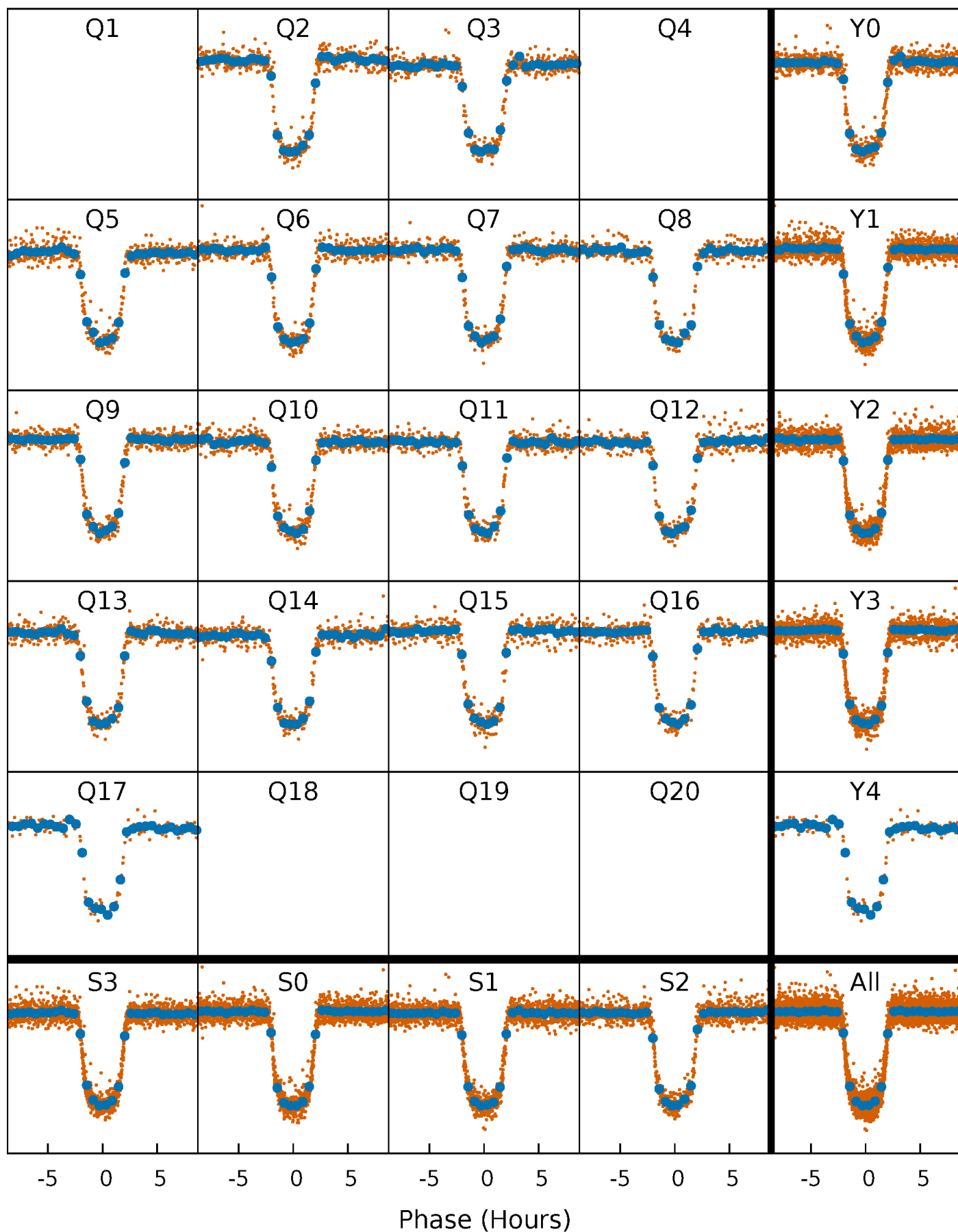
**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**





# PDC Quarter-Phased Transit Curves

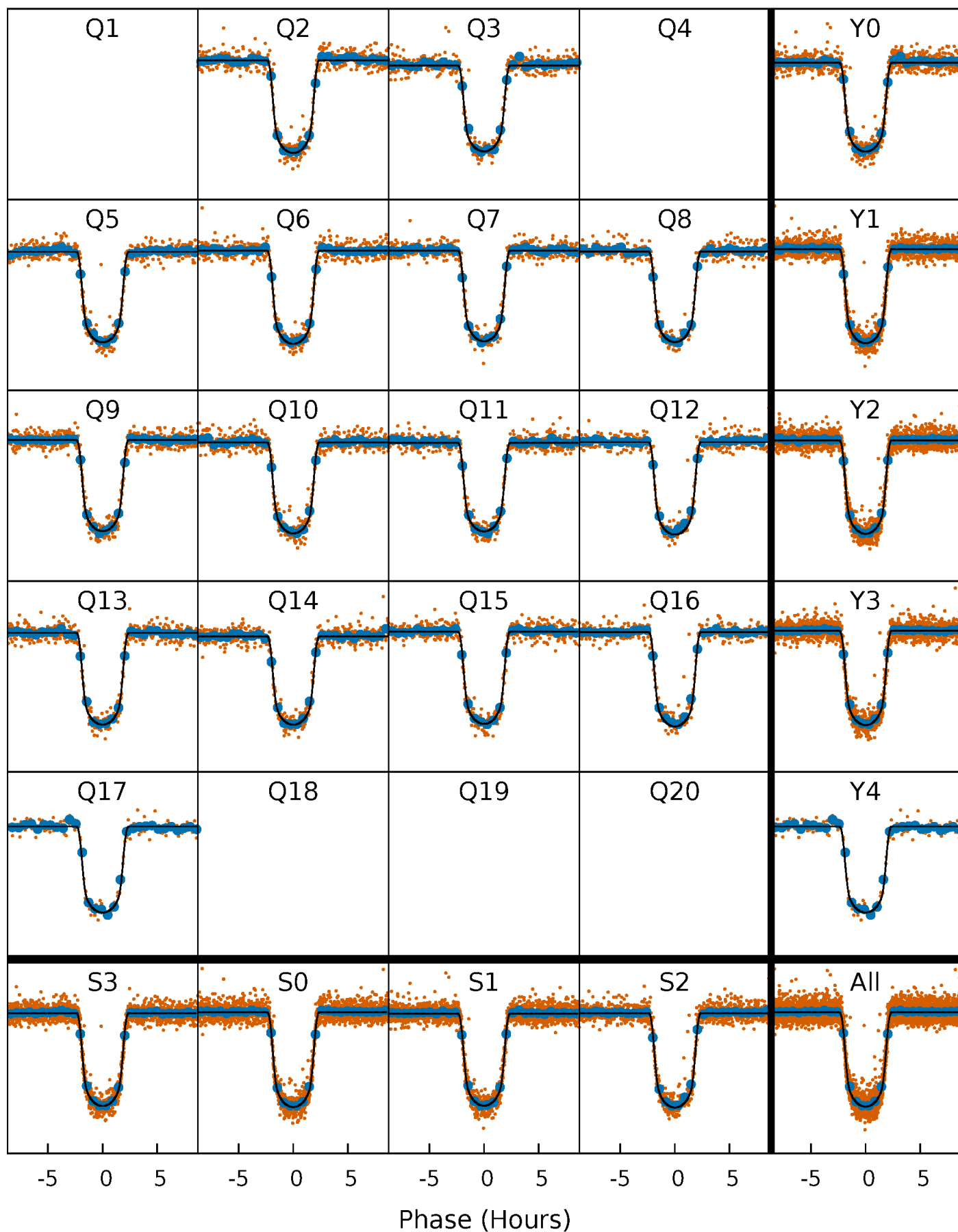
TCE 009141746-01 P= 6.491684 Days  $T_0=135.683391$  (BKJD)





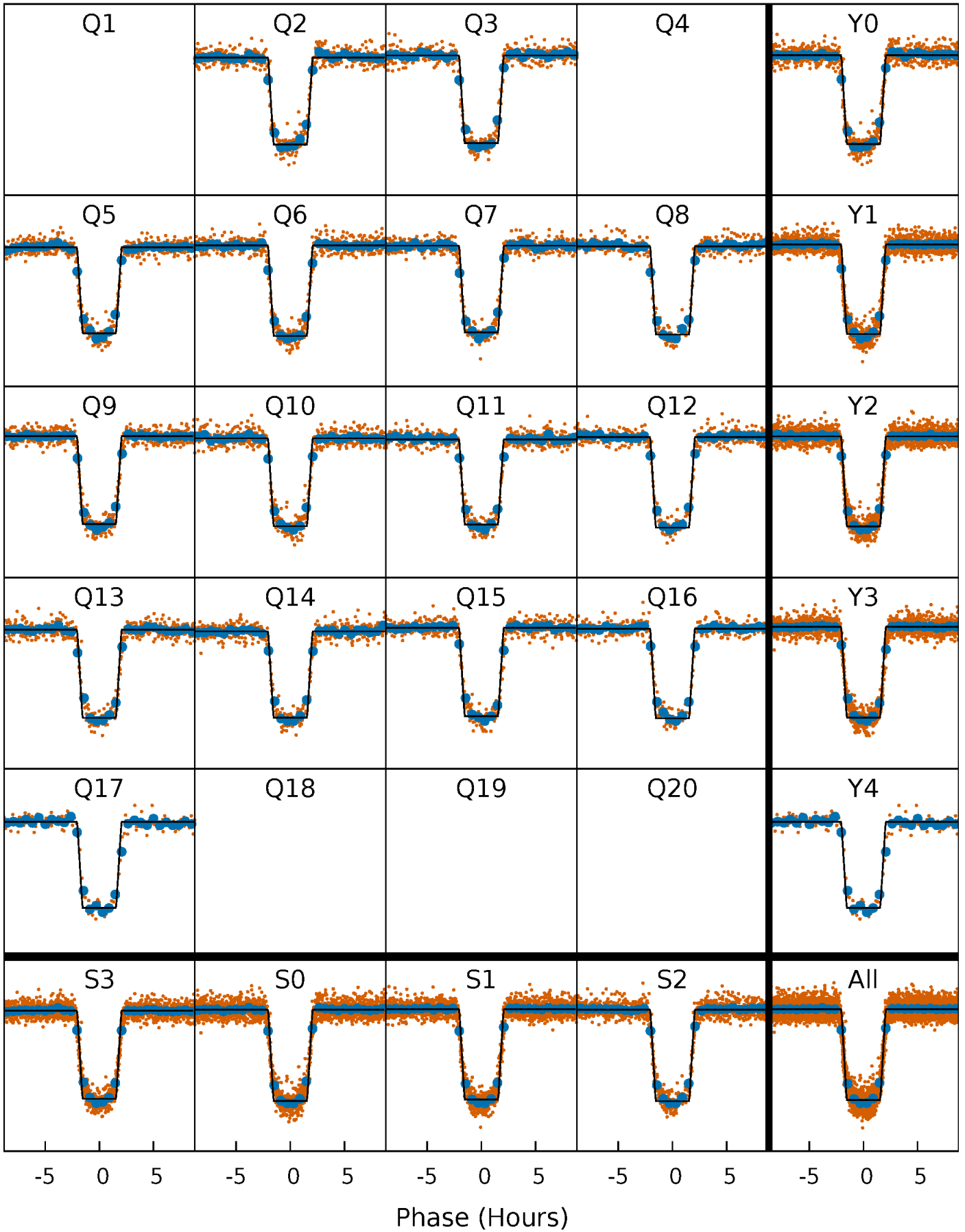
# DV Quarter-Phased Transit Curves

TCE 009141746-01   P= 6.491684 Days    $T_0=135.683391$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

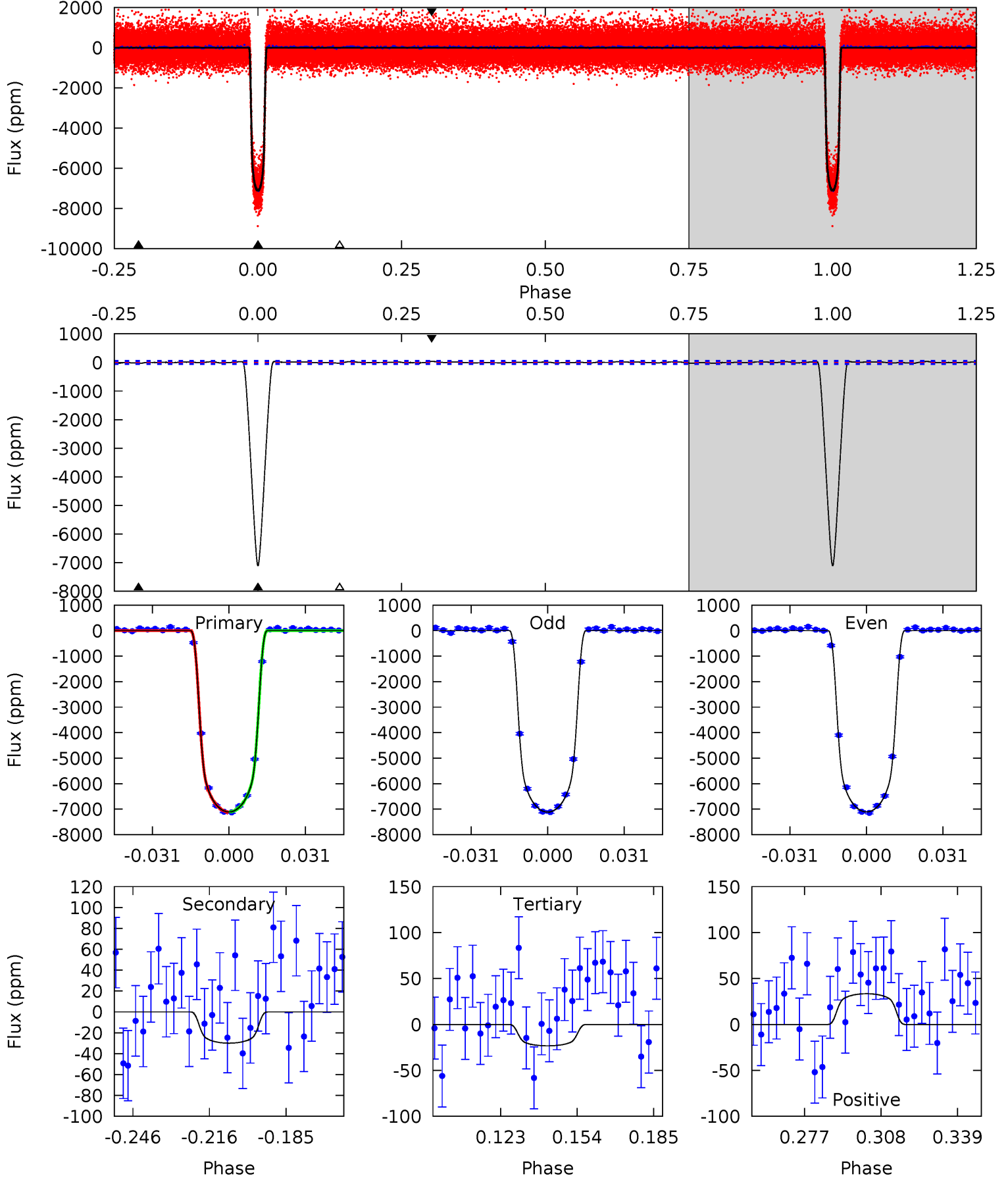
TCE 009141746-01   P= 6.491652 Days    $T_0=135.687264$  (BKJD)



# DV Model-Shift Uniqueness Test

009141746-01, P = 6.491684 Days, E = 135.683391 Days

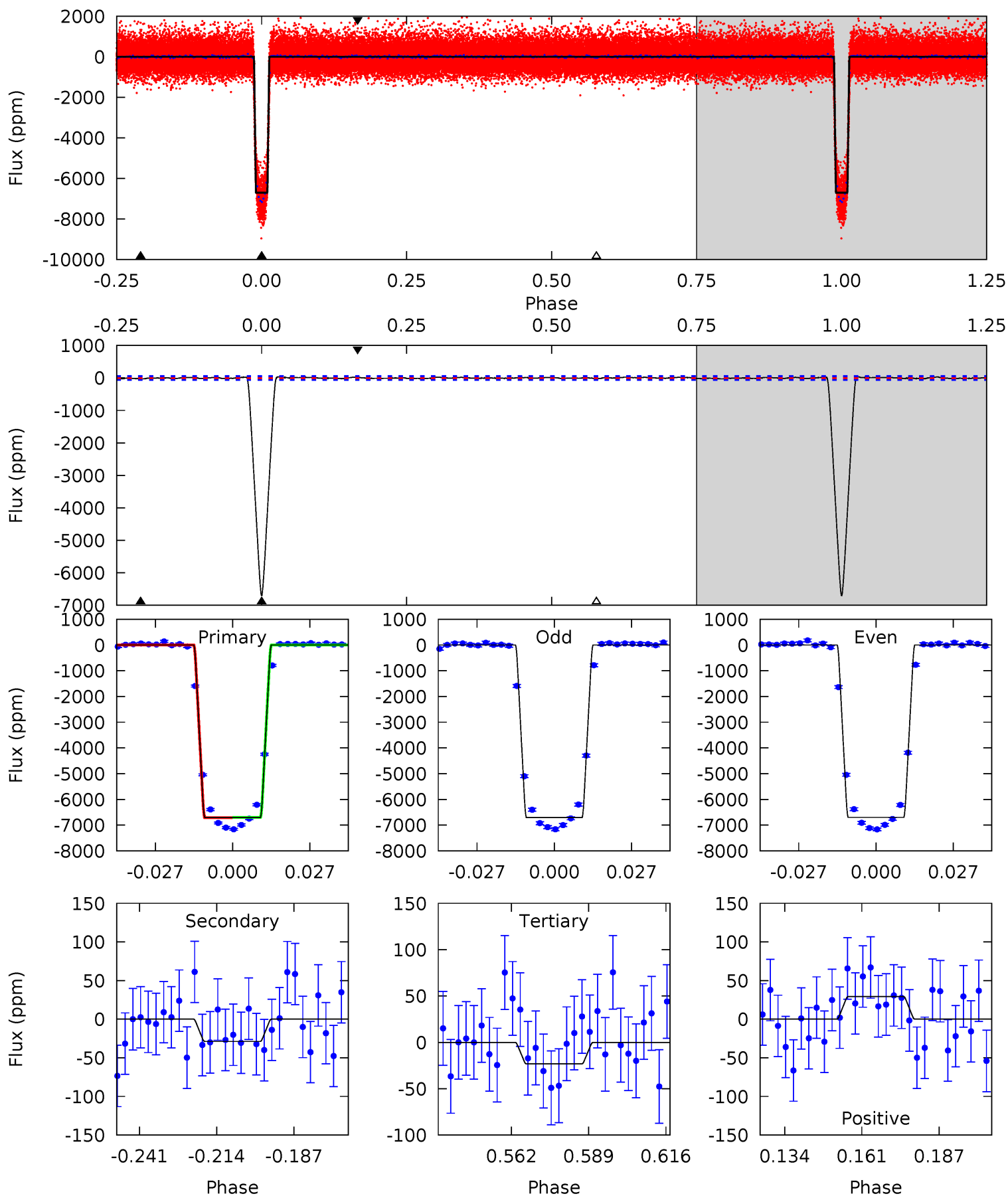
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
640.5	2.70	2.10	3.01	4.81	2.16	1.10	638.4	637.4	0.60	-0.31	0.25	1.00	0.00	0.14



# Alt Model-Shift Uniqueness Test

009141746-01, P = 6.491652 Days, E = 135.687264 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
565.3	2.43	1.96	2.47	4.83	2.21	0.97	563.3	562.8	0.48	-0.04	0.53	1.00	0.00	0.66



### Stellar Parameters For KIC 009141746

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6123^{+193}_{-265}$	$4.413^{+0.072}_{-0.217}$	$0.140^{+0.200}_{-0.300}$	$1.107^{+0.375}_{-0.150}$	$1.159^{+0.164}_{-0.164}$	$1.202^{+0.379}_{-0.677}$
	+3%/-4%	+2%/-5%	+143%/-214%	+34%/-14%	+14%/-14%	+31%/-56%
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 009141746-01 / KOI 0929.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-30 \pm 11$	$10.00^{+1.75}_{-0.83}$	$1509^{+116}_{-86}$	$2307^{+148}_{-232}$	$0.779^{+0.356}_{-0.310}$
Alt.	$-29 \pm 12$	$10.26^{+1.97}_{-0.86}$	$1515^{+126}_{-92}$	$2283^{+149}_{-330}$	$0.722^{+0.345}_{-0.336}$

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

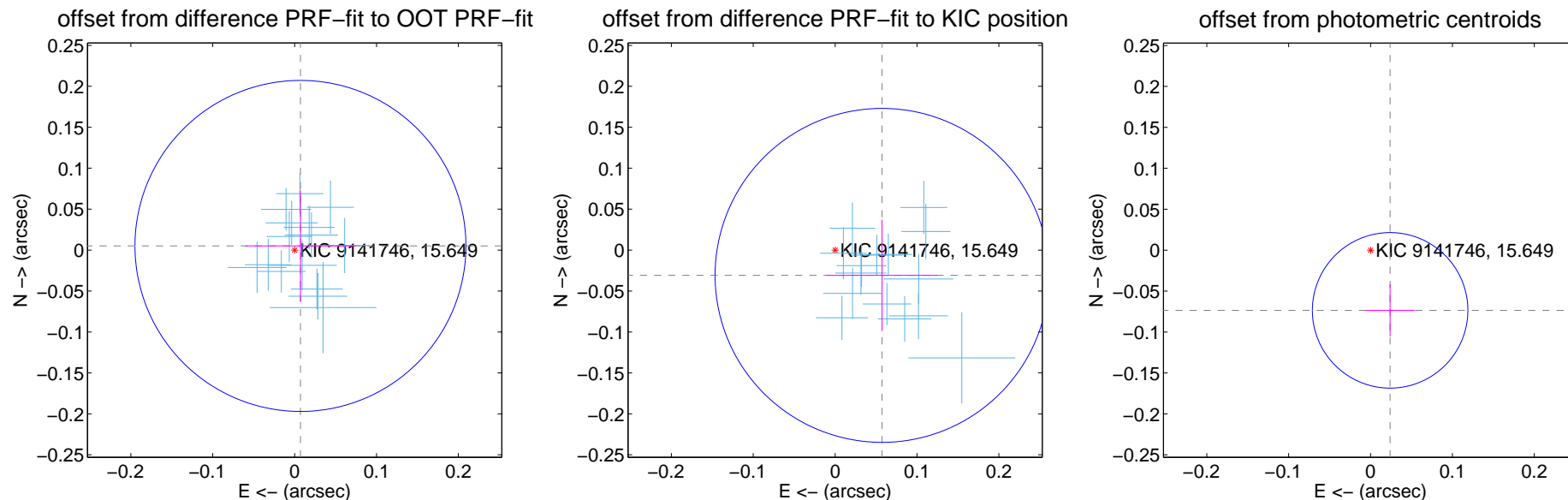
## DV Centroid Data

Supplemental centroid analysis for 009141746-01. Kepler magnitude: 15.65. Transit SNR 476.34

There are 15 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	$0.009 \pm 0.067$	0.13	$-0.007 \pm 0.067$	$0.005 \pm 0.068$
PRF-fit source offset from KIC position	$0.065 \pm 0.068$	0.96	$-0.057 \pm 0.068$	$-0.031 \pm 0.068$
photometric centroid source offset	$0.08 \pm 0.03$	2.44	$-0.02 \pm 0.03$	$-0.07 \pm 0.03$



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.

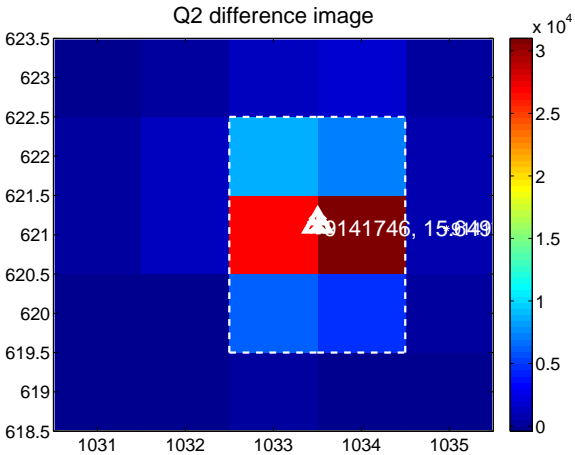
Q1 no difference image



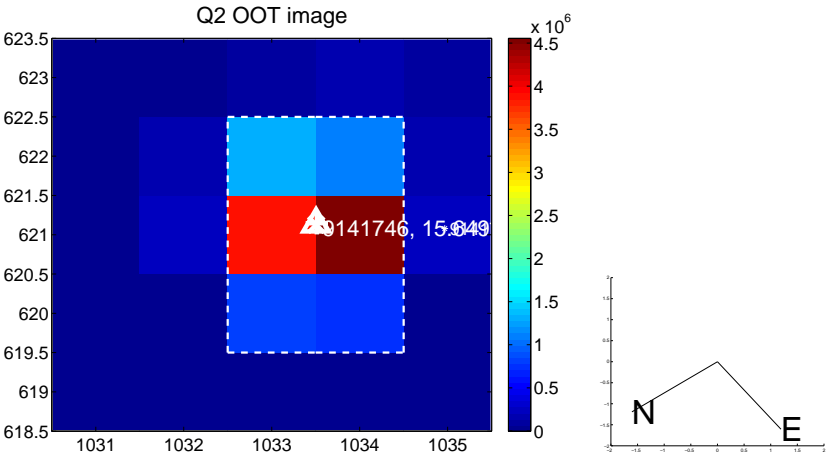
Q1 no OOT image



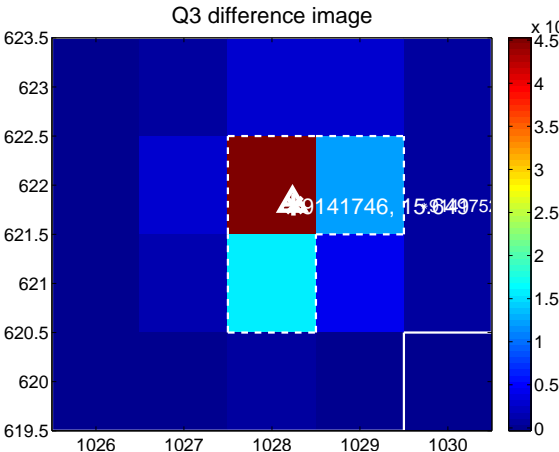
Q2 difference image



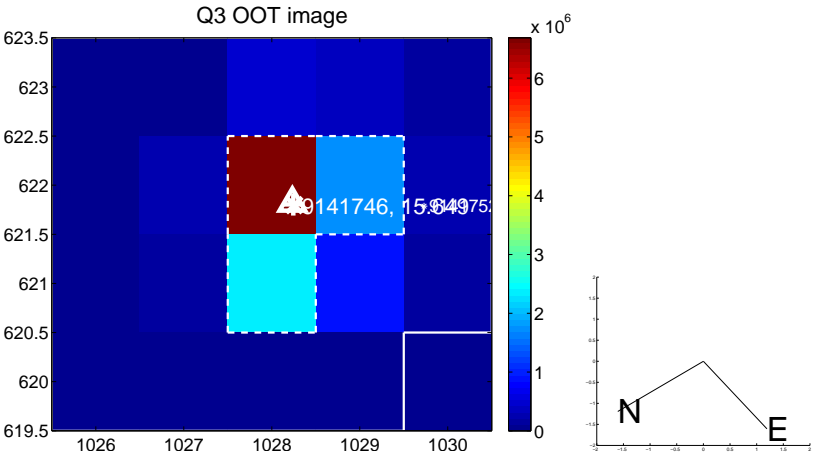
Q2 OOT image



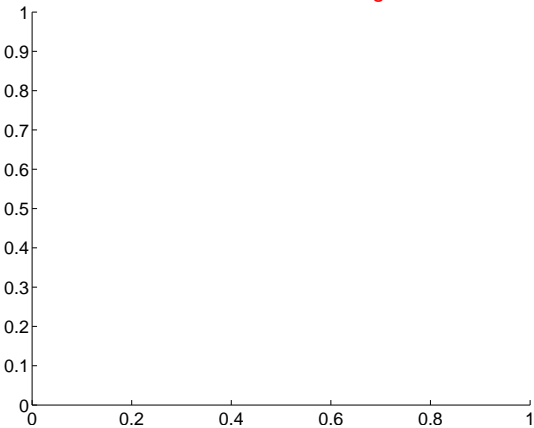
Q3 difference image



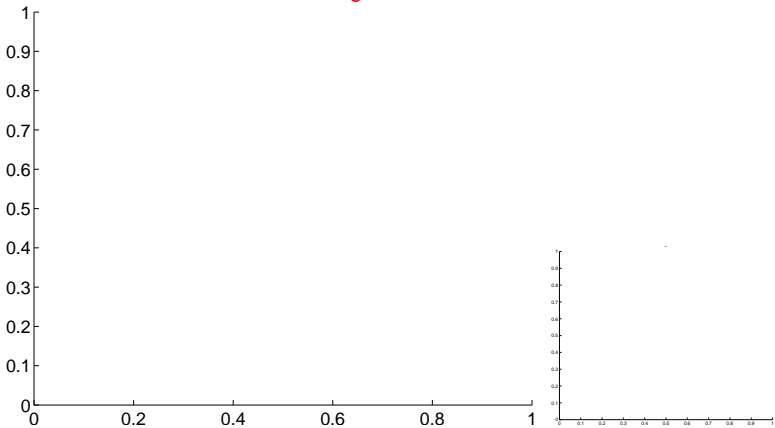
Q3 OOT image



Q4 no difference image

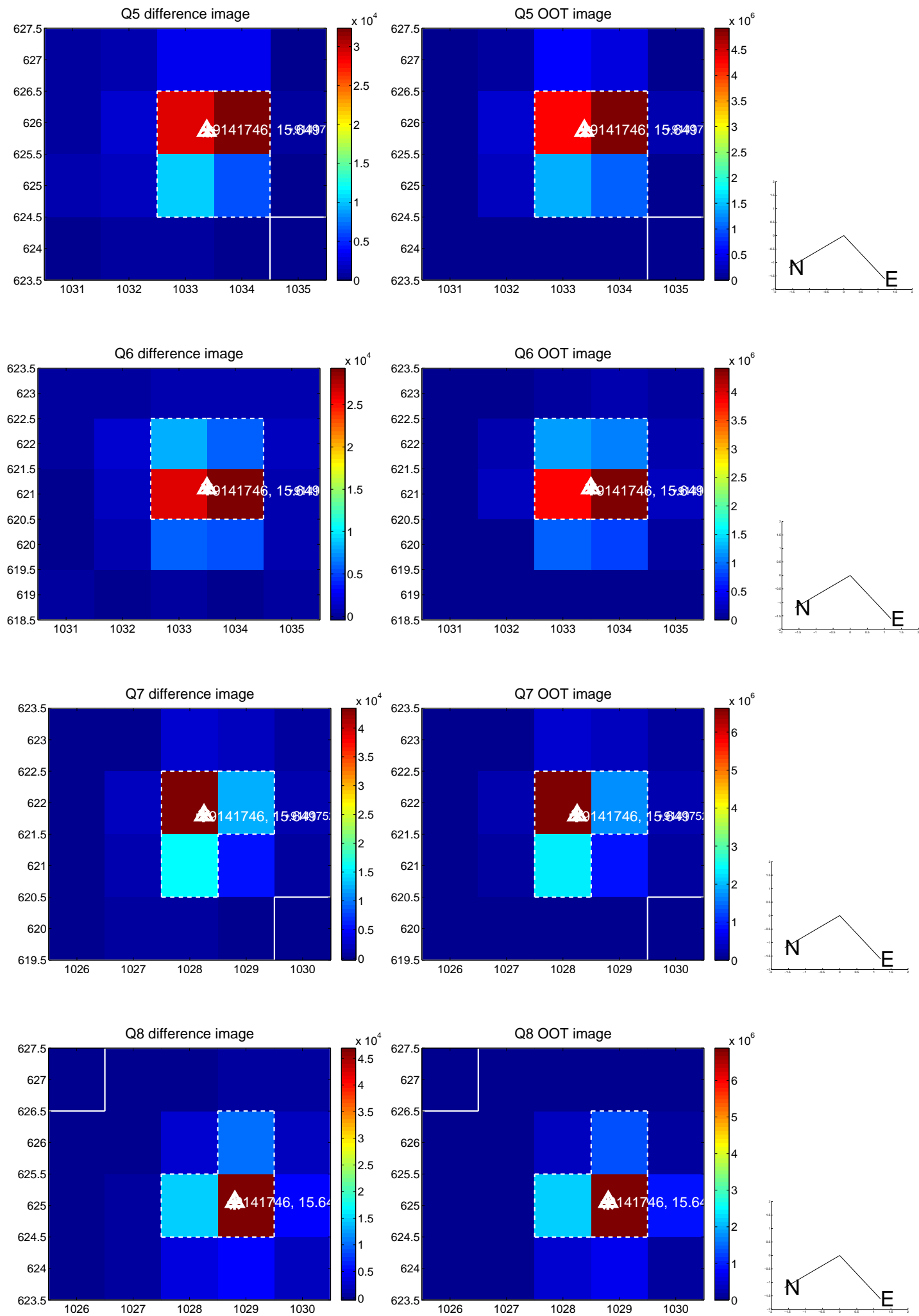


Q4 no OOT image

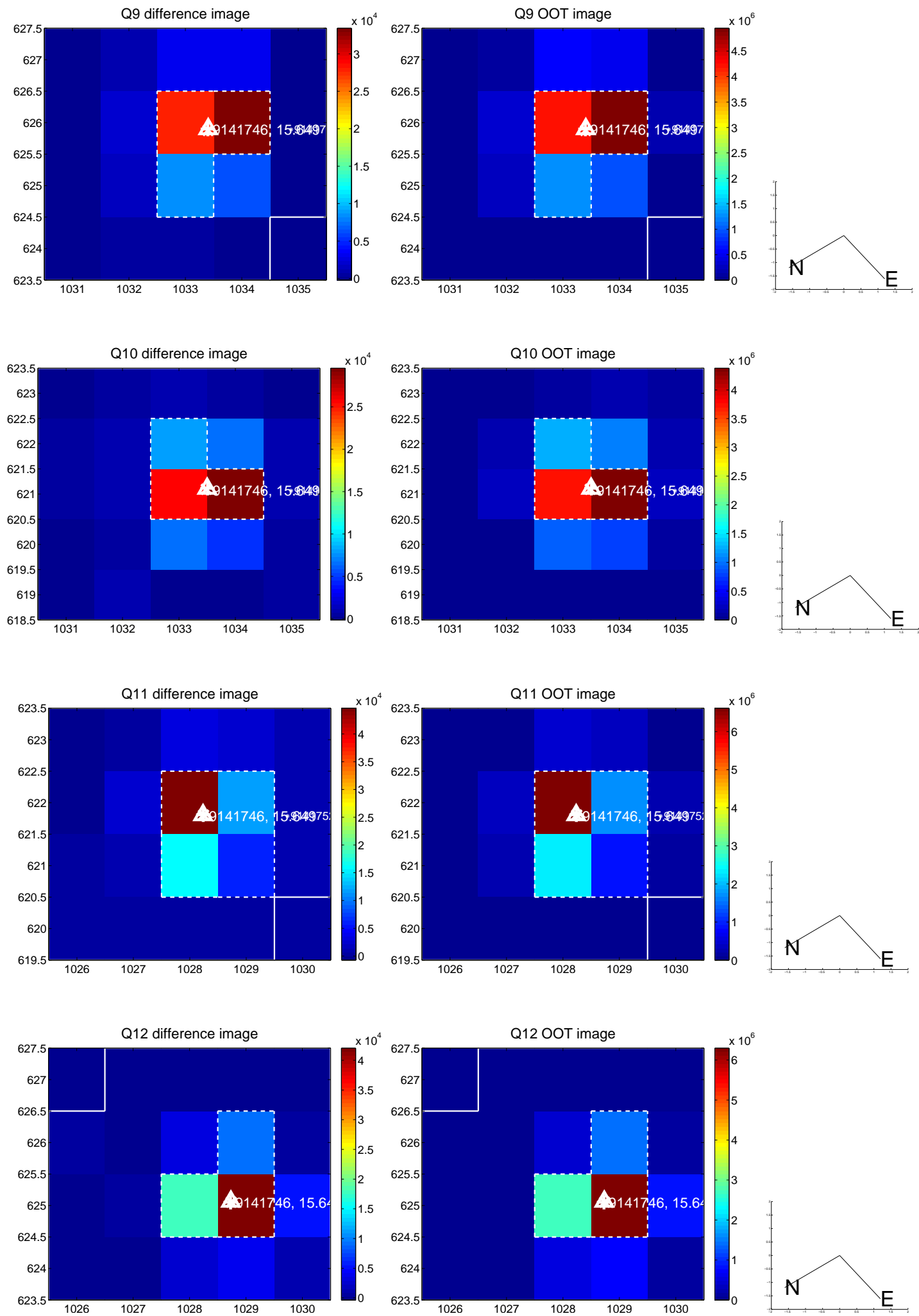




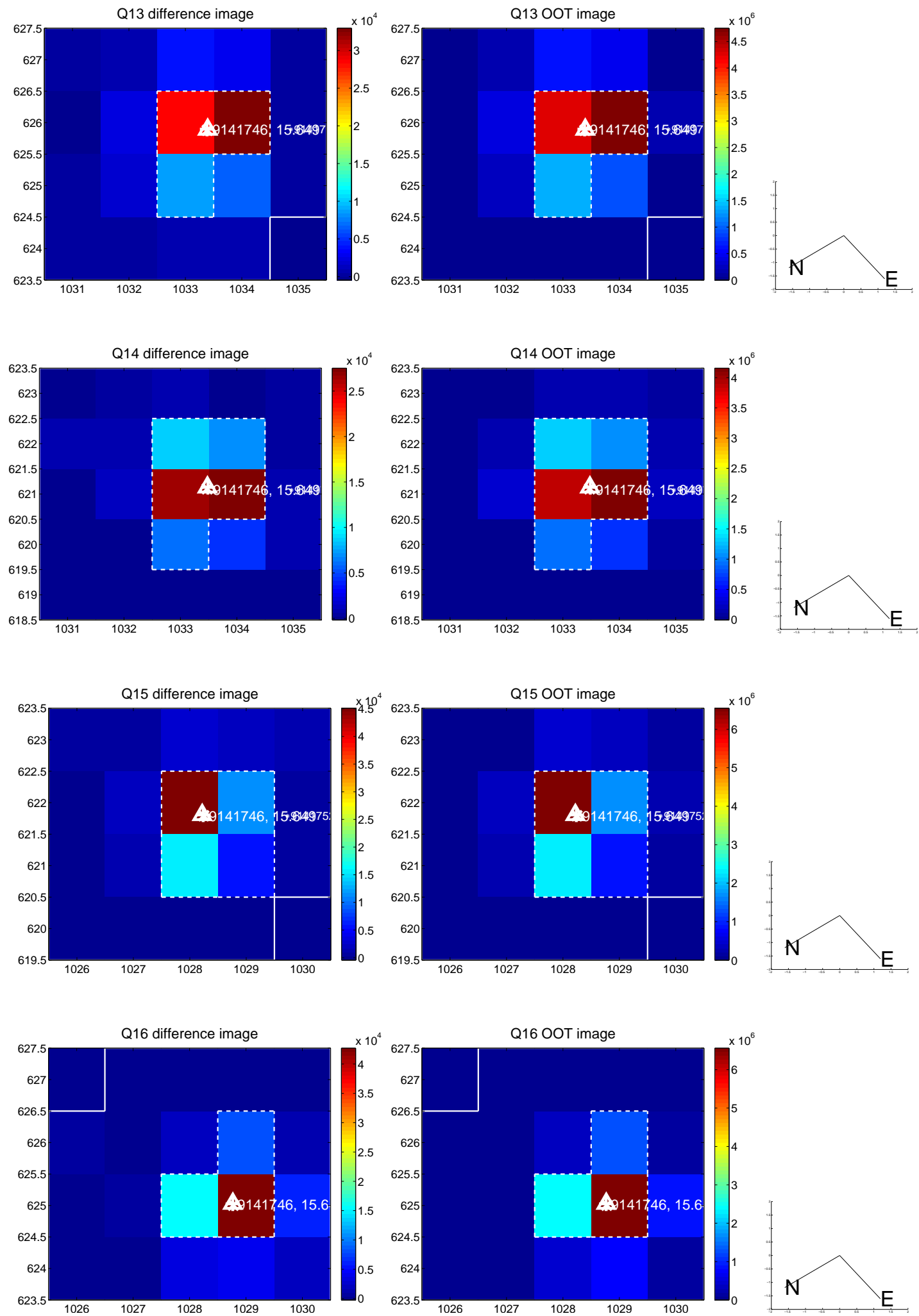
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



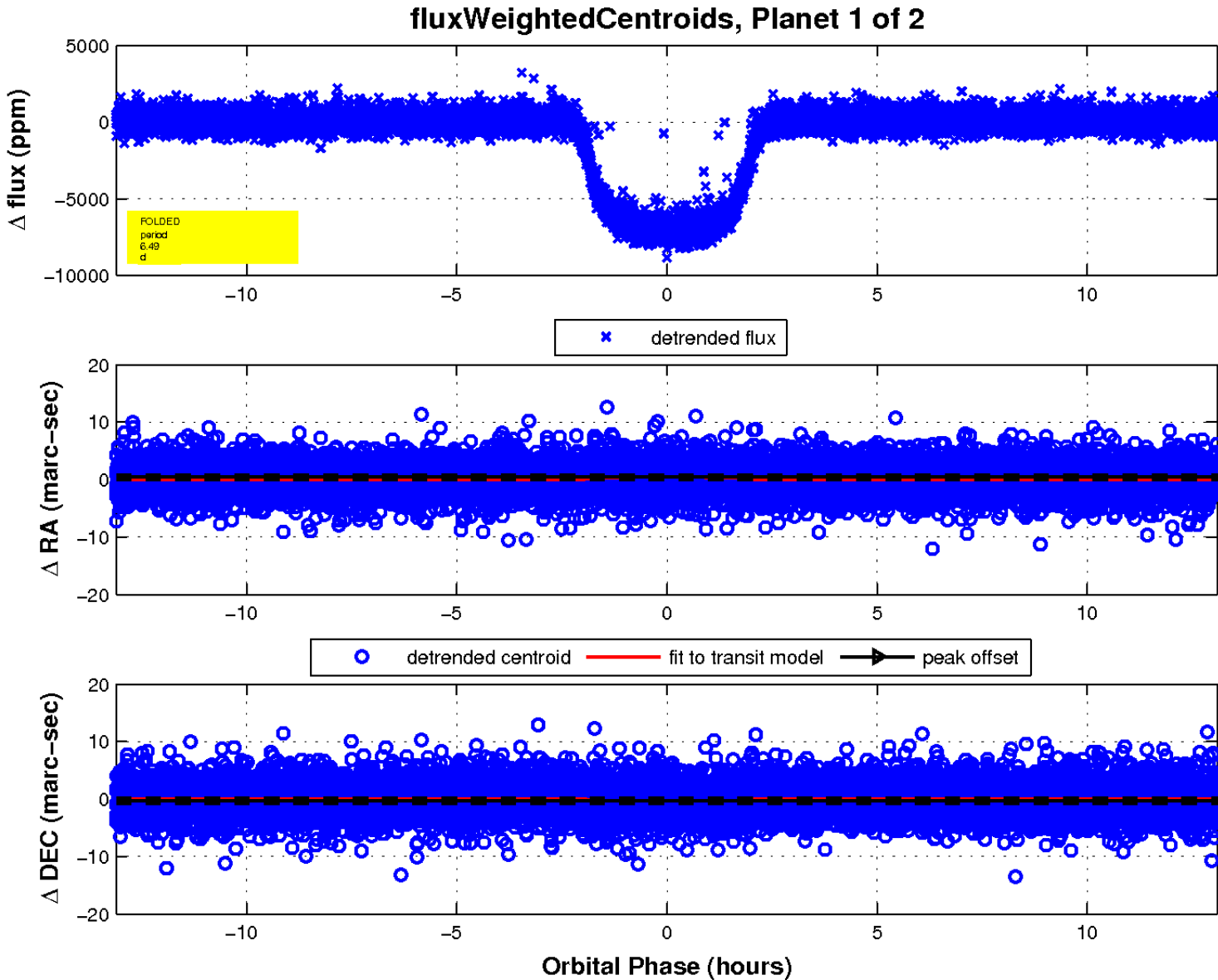
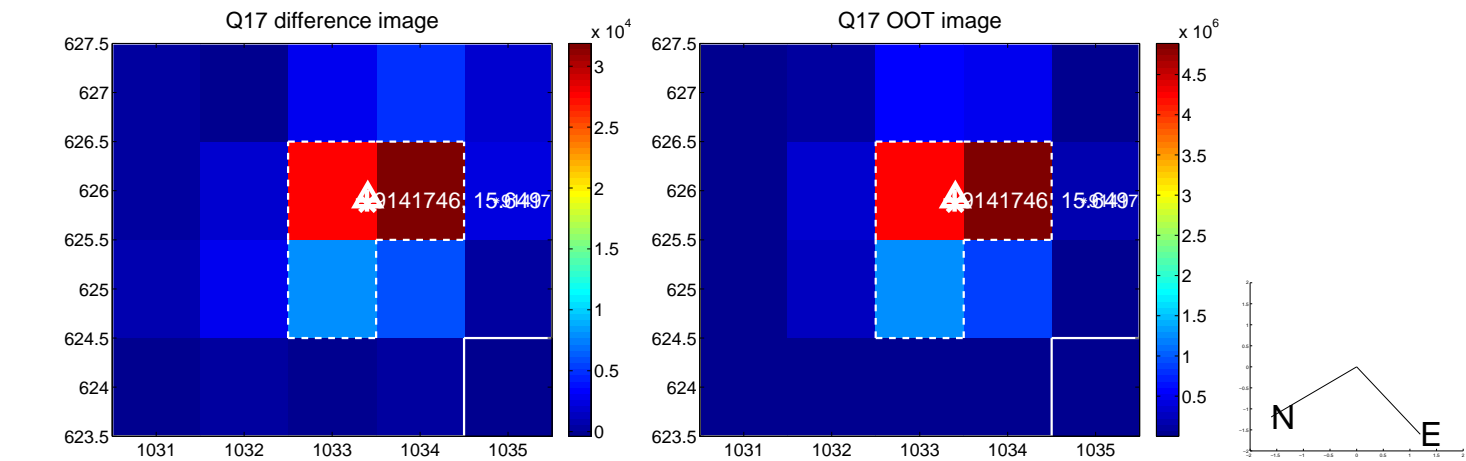
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

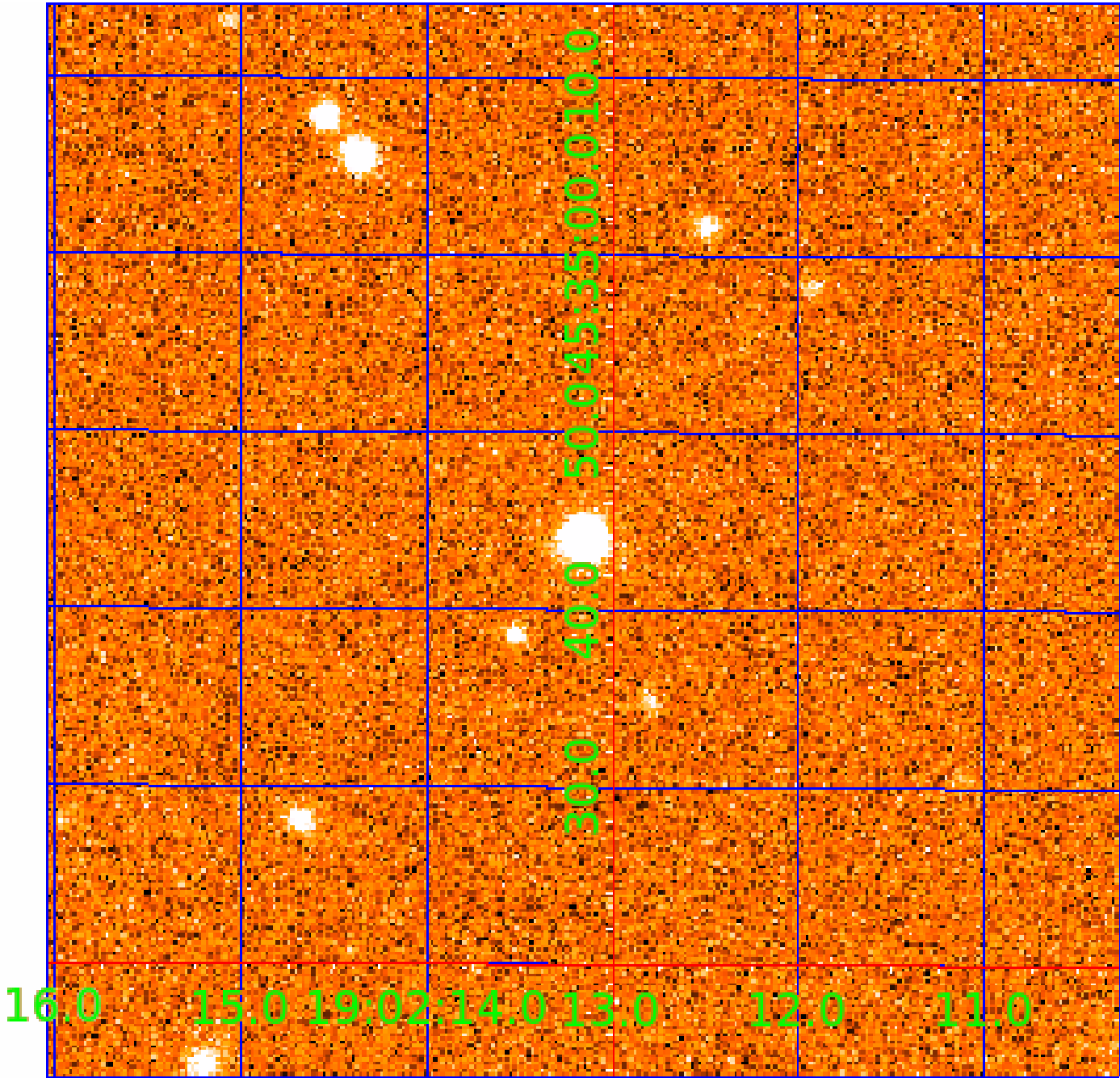


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 009141746

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009141746-01	OBS	0929.01	6.491684	135.683391	7128.6	4.365	478.5	476.3	1.11	6123	9.80	301.79
009141746-02	OBS	0929.02	2.851788	132.179581	83.5	3.971	7.5	8.3	1.11	6123	1.15	903.71

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009141746-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
009141746-02	OBS	PC	0.99	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.

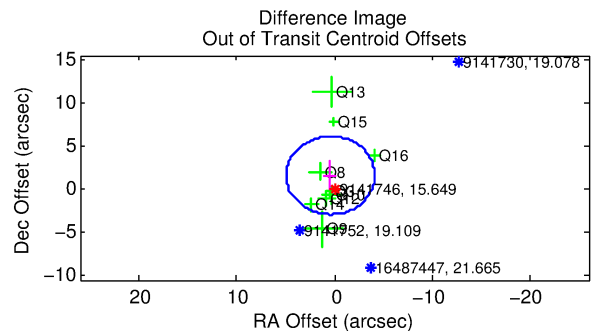
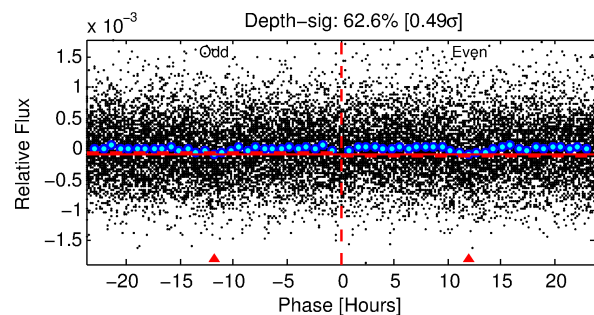
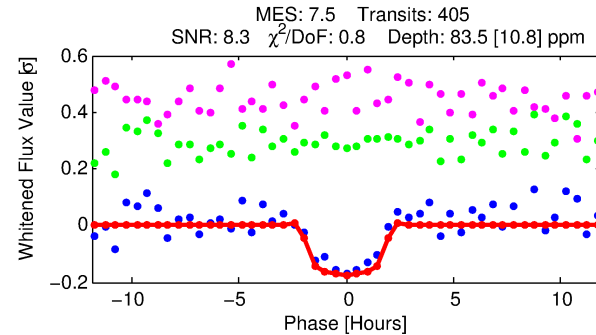
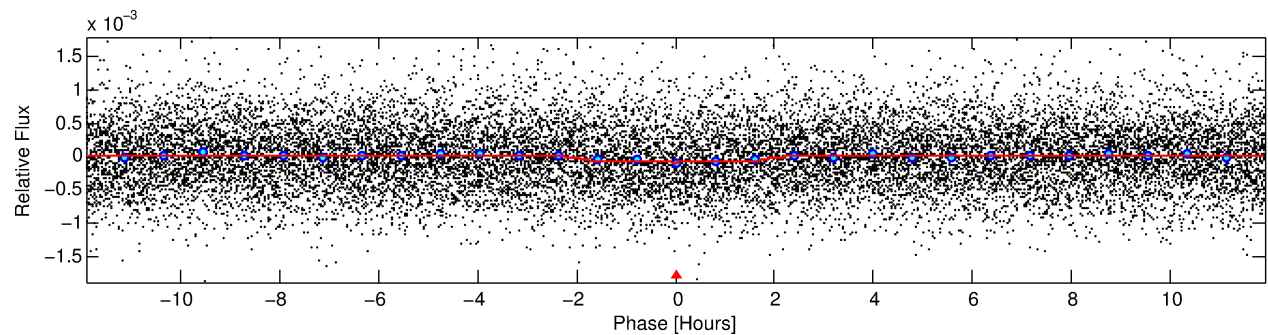
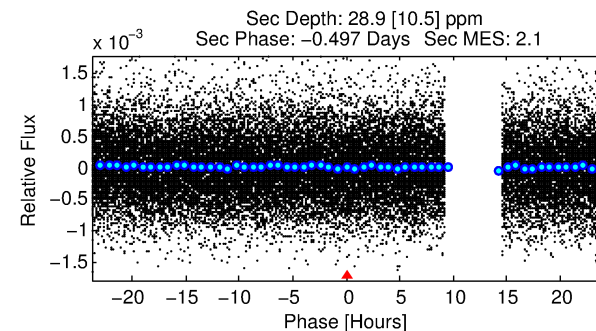
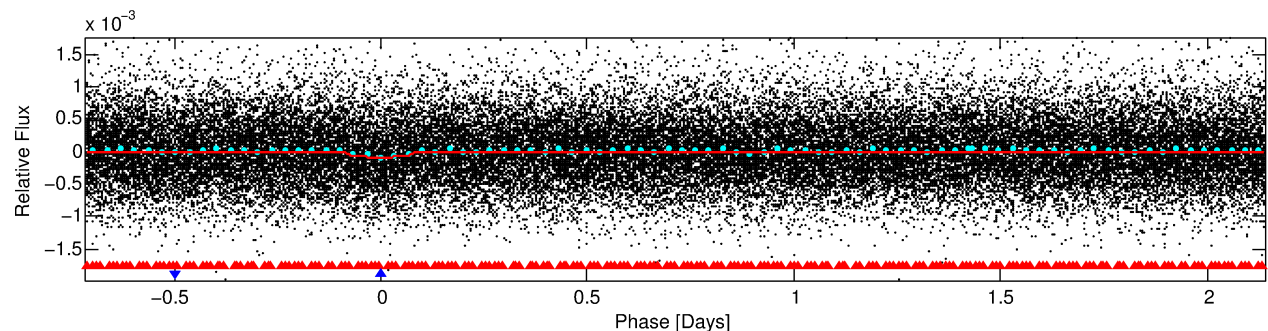
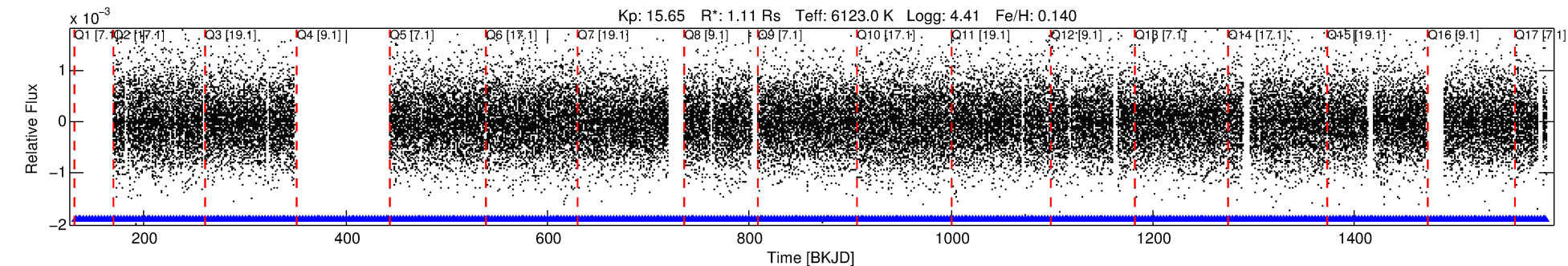
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 009141746-02

No Significant Match Found

# DV One-Page Summary

KIC: 9141746 Candidate: 2 of 2 Period: 2.852 d  
KOI: K00929 Corr: No Ephemeris Match



## DV Fit Results:

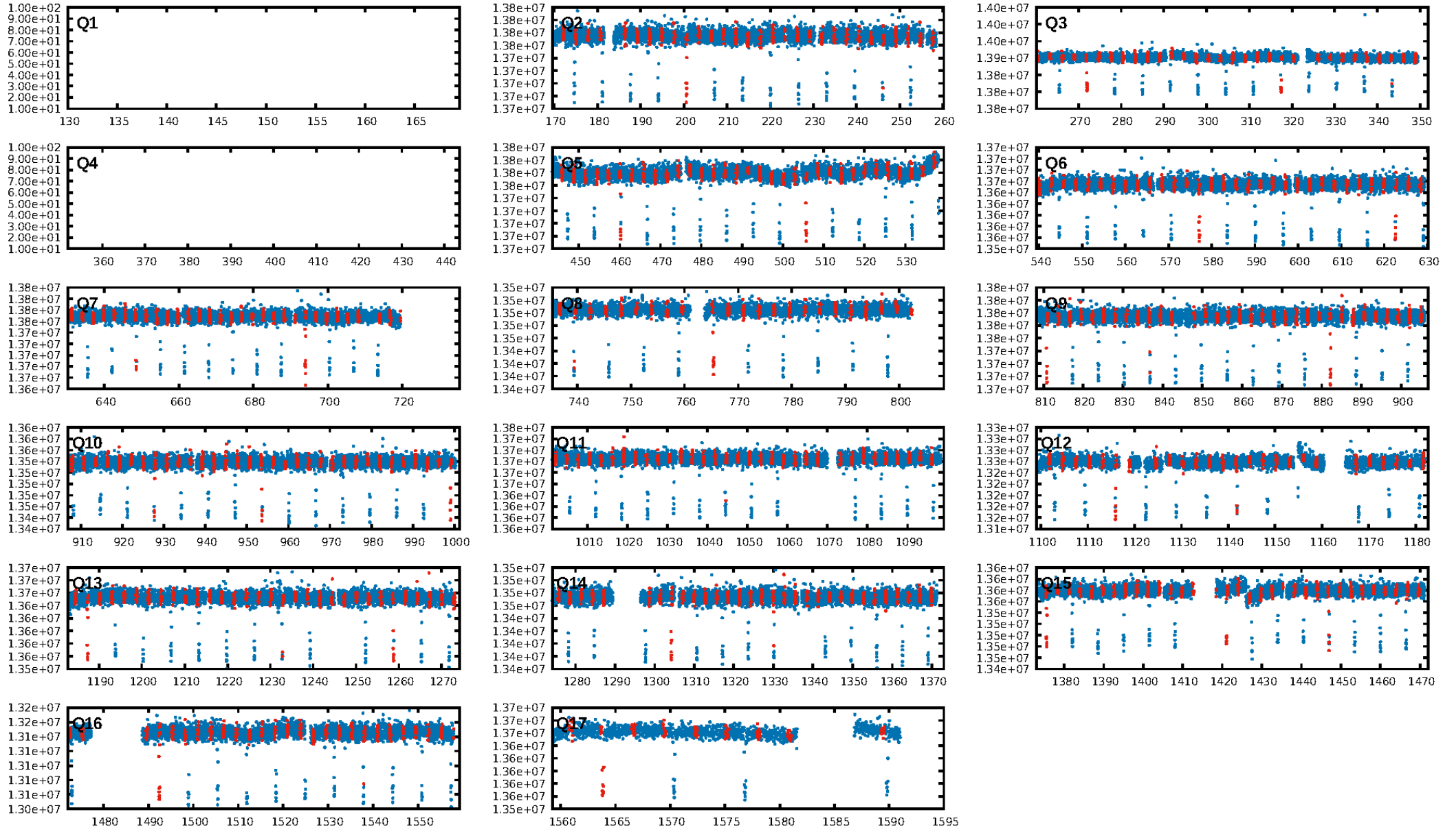
Period = 2.85179 [0.00003] d  
Epoch = 132.1796 [0.0069] BKJD  
Rp/R\* = 0.0095 [0.0068]  
a/R\* = 3.14 [10.05]  
b = 0.85 [1.20]  
Seff = 903.71 [395.91]  
Teff = 1398 [153] K  
Rp = 1.15 [0.91] R<sub>e</sub>  
a = 0.0413 [0.0116] AU  
Ag = 20.55 [31.37] [0.62σ]  
Teffp = 4602 [1706] K [1.87σ]

## DV Diagnostic Results:

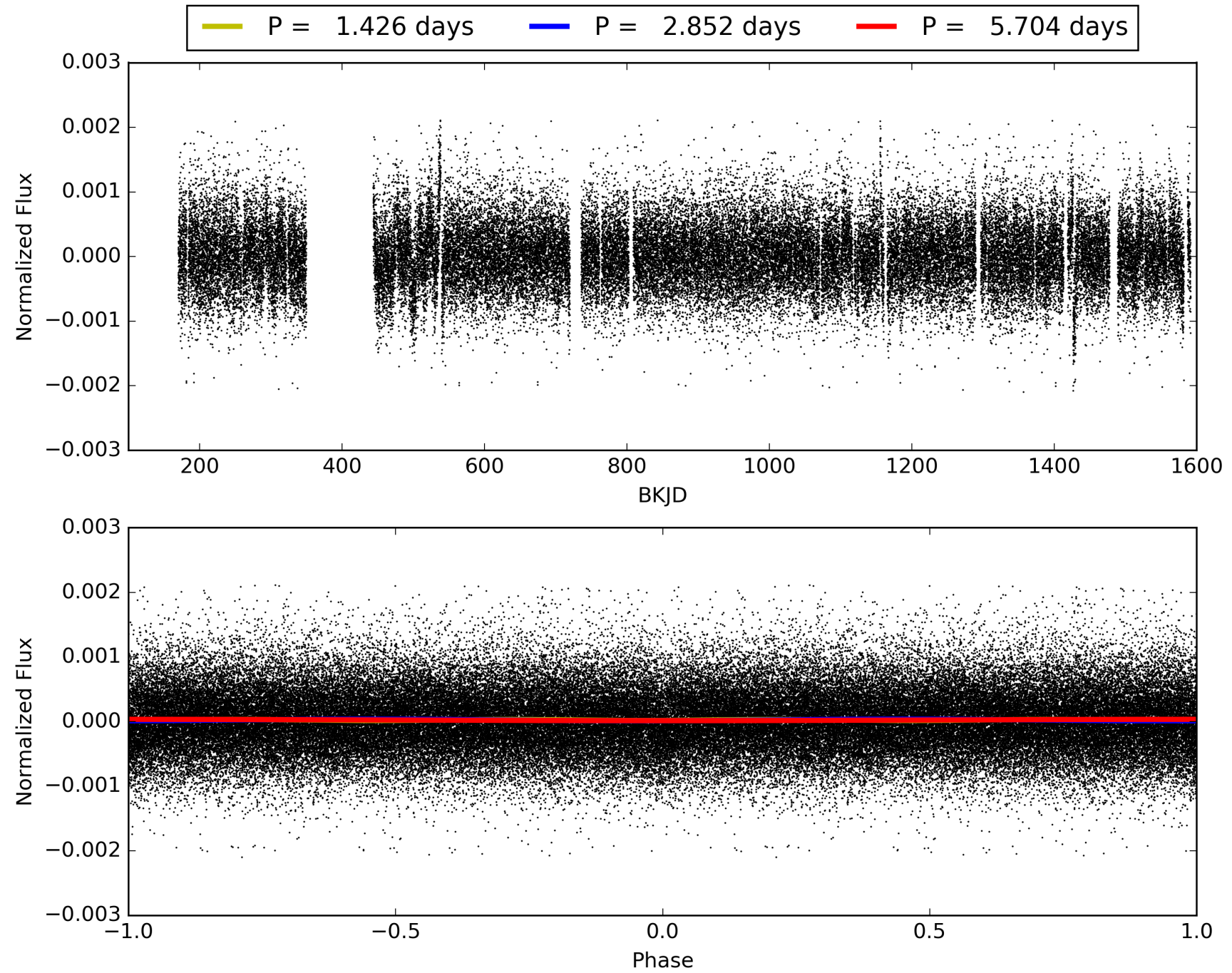
ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [14.80σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 4.76e-15  
RollingBand-fgt: 1.00 [397/397]  
GhostDiagnostic-chr: 6.864  
Centroid-sig: 39.7%  
Centroid-so: 1.440 arcsec [0.82σ]  
OotOffset-rm: 1.655 arcsec [1.10σ]  
KicOffset-rm: 1.628 arcsec [1.08σ]  
OotOffset-st: 2/2/3/2 [9]  
KicOffset-st: 2/2/3/2 [9]  
DiffImageQuality-fgm: 0.33 [3/9]  
DiffImageOverlap-fno: 1.00 [15/15]



# TCE 009141746-02, PDC Light Curves

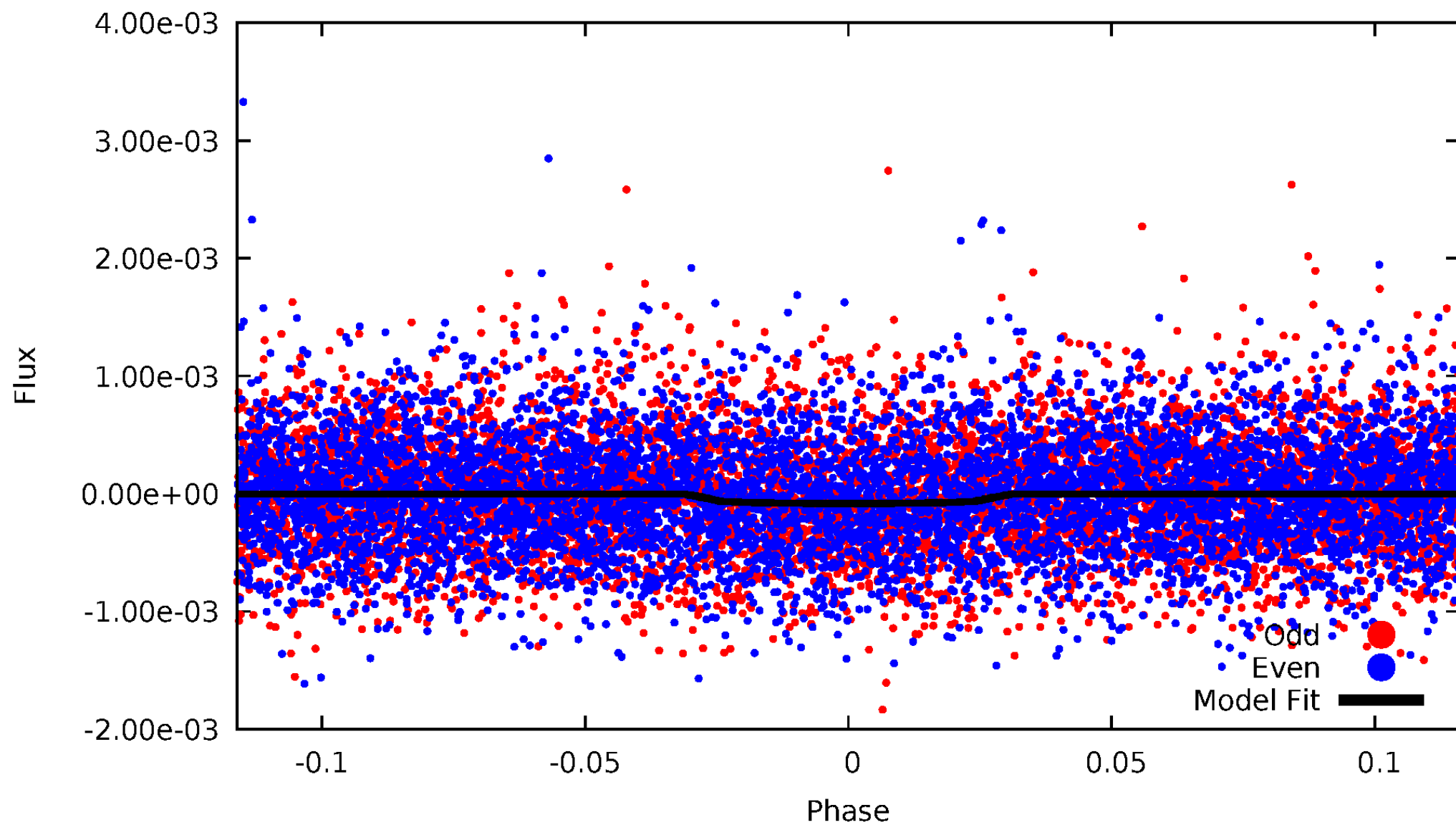


TCE 009141746-02



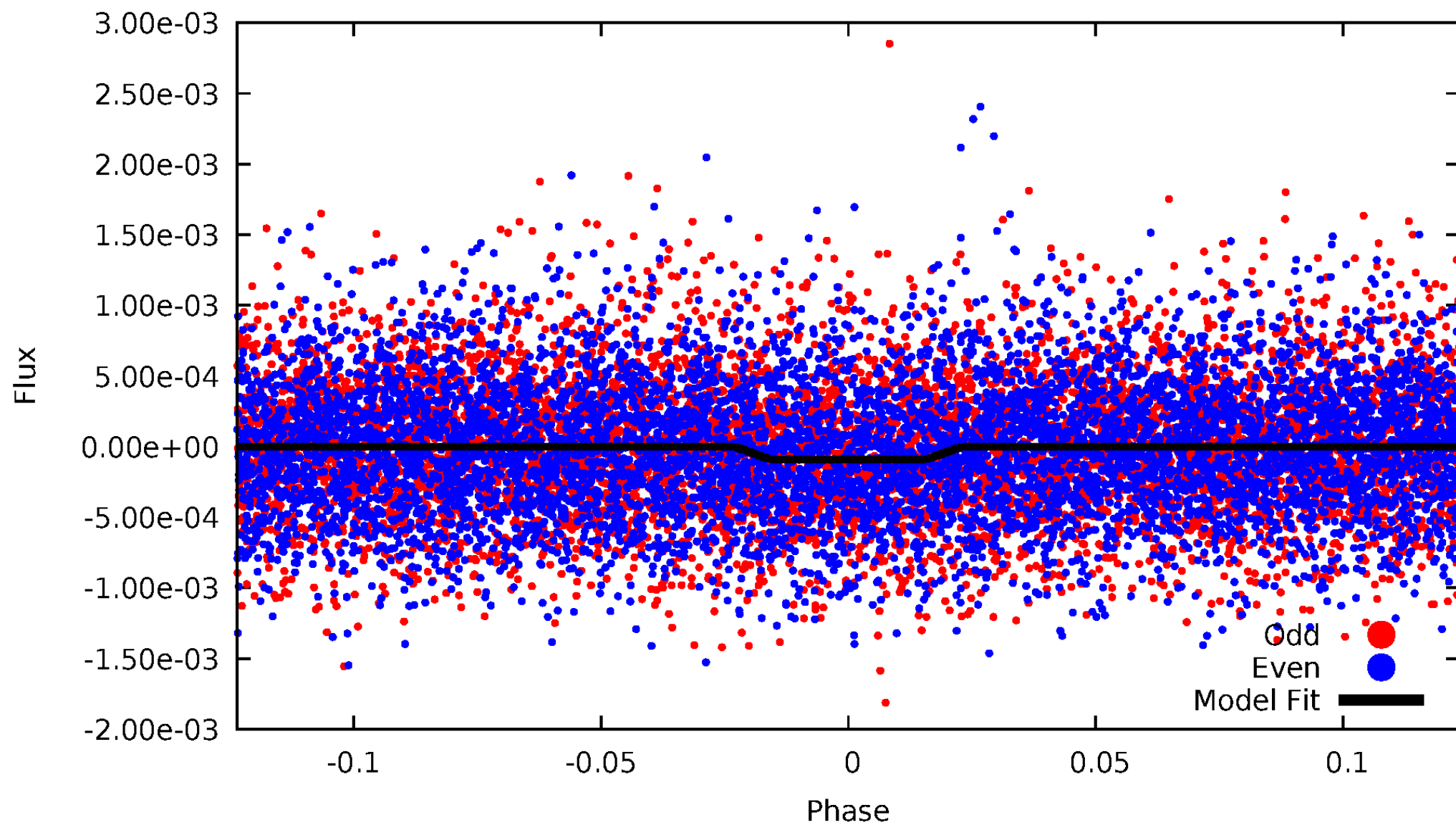
# DV Odd/Even

TCE 009141746-02



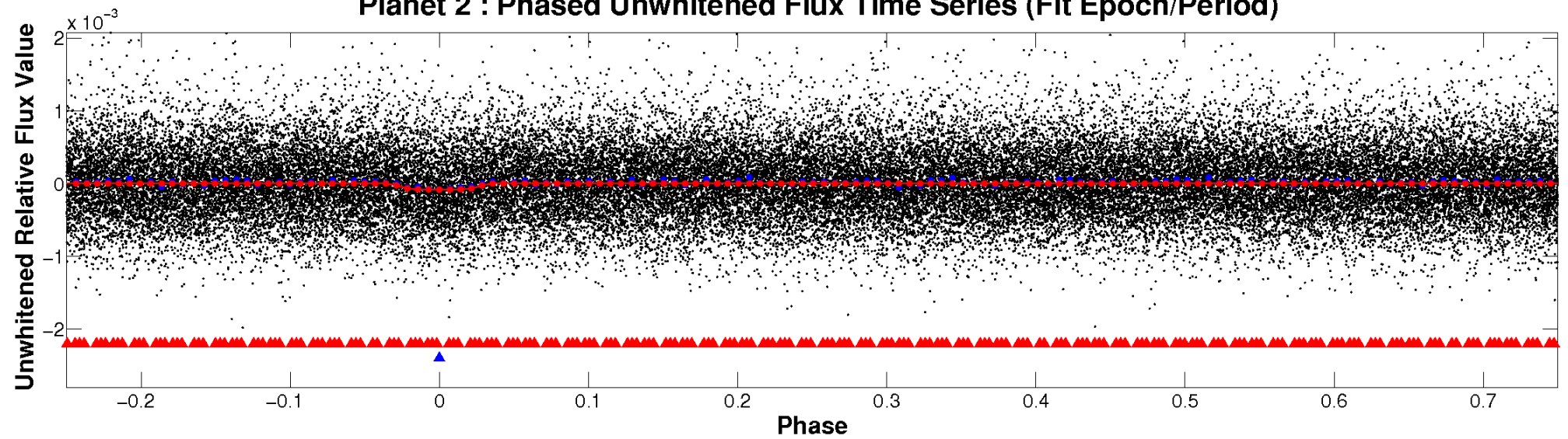
# ALT Odd/Even

TCE 009141746-02

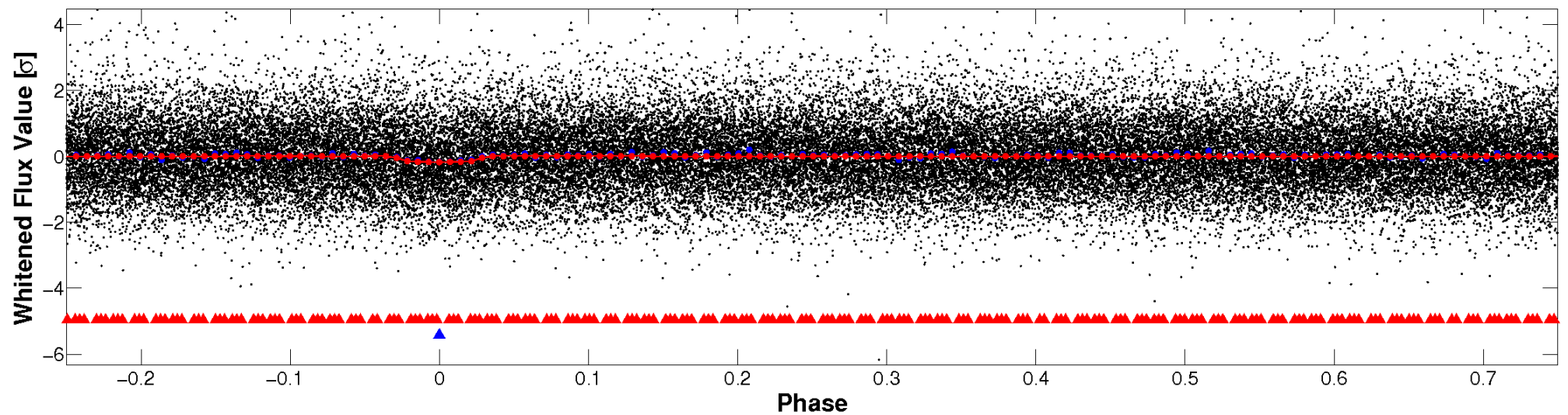


# Non-Whitened Vs. Whitened Light Curve

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



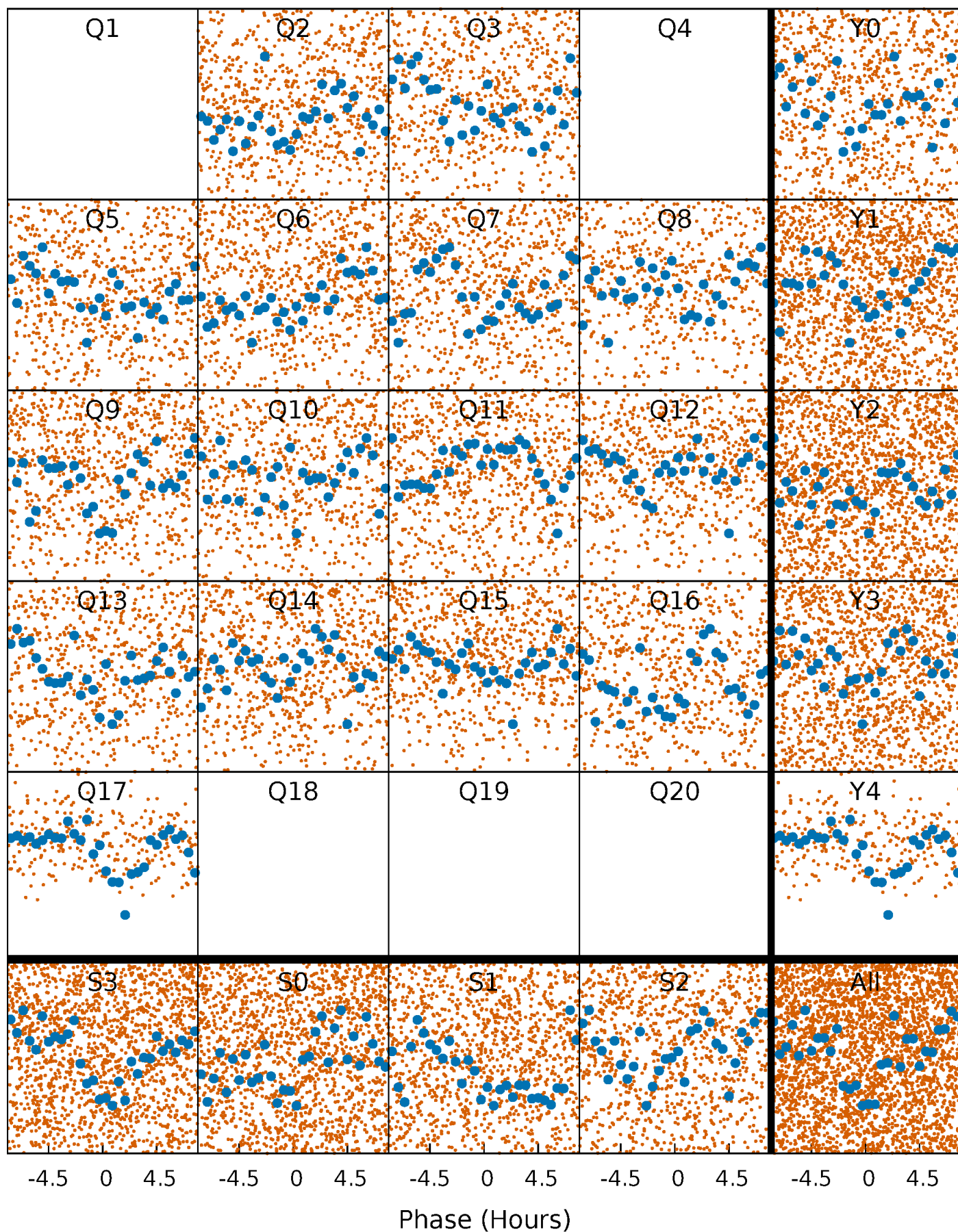
## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)





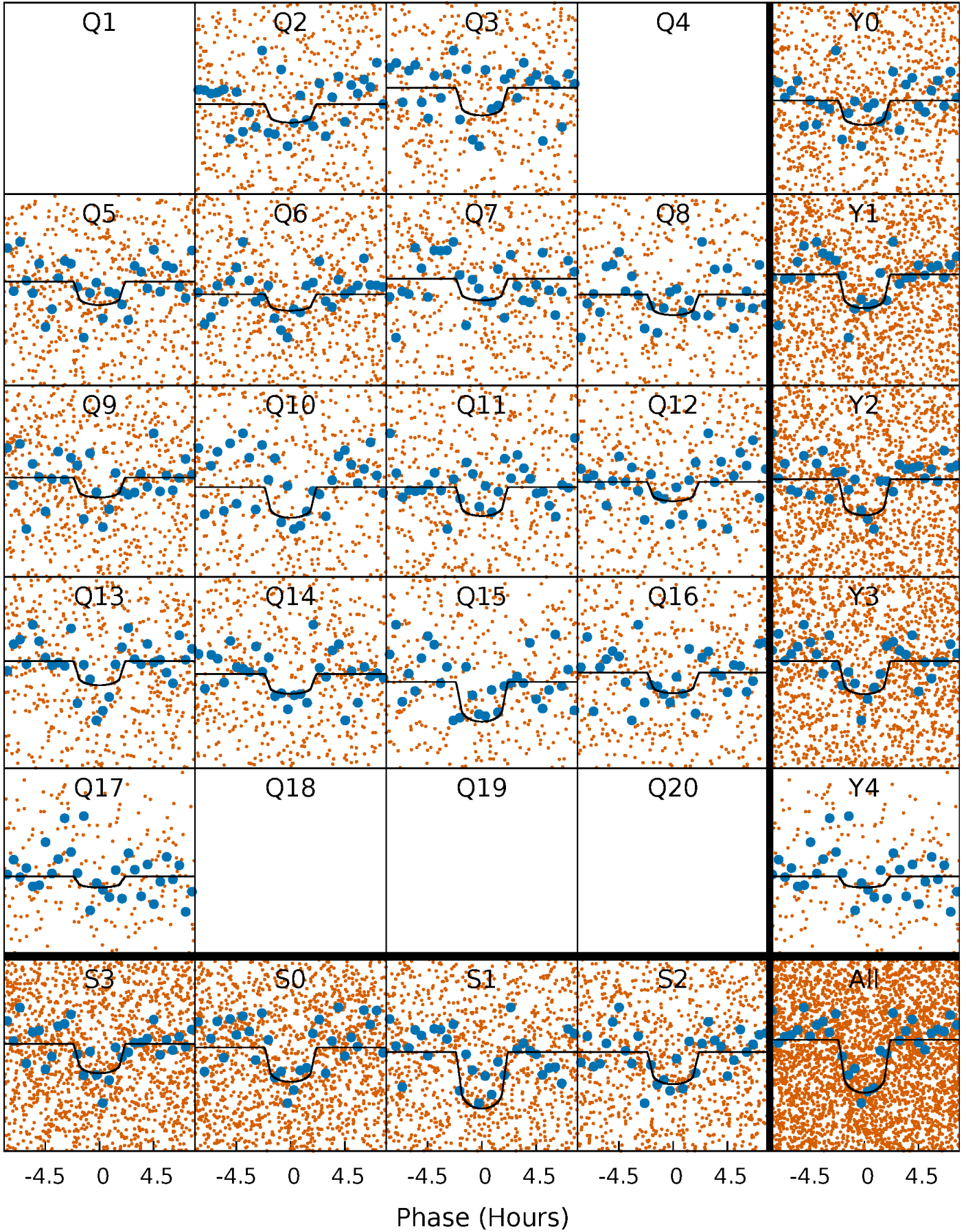
# PDC Quarter-Phased Transit Curves

TCE 009141746-02 P= 2.851788 Days  $T_0=132.179581$  (BKJD)



# DV Quarter-Phased Transit Curves

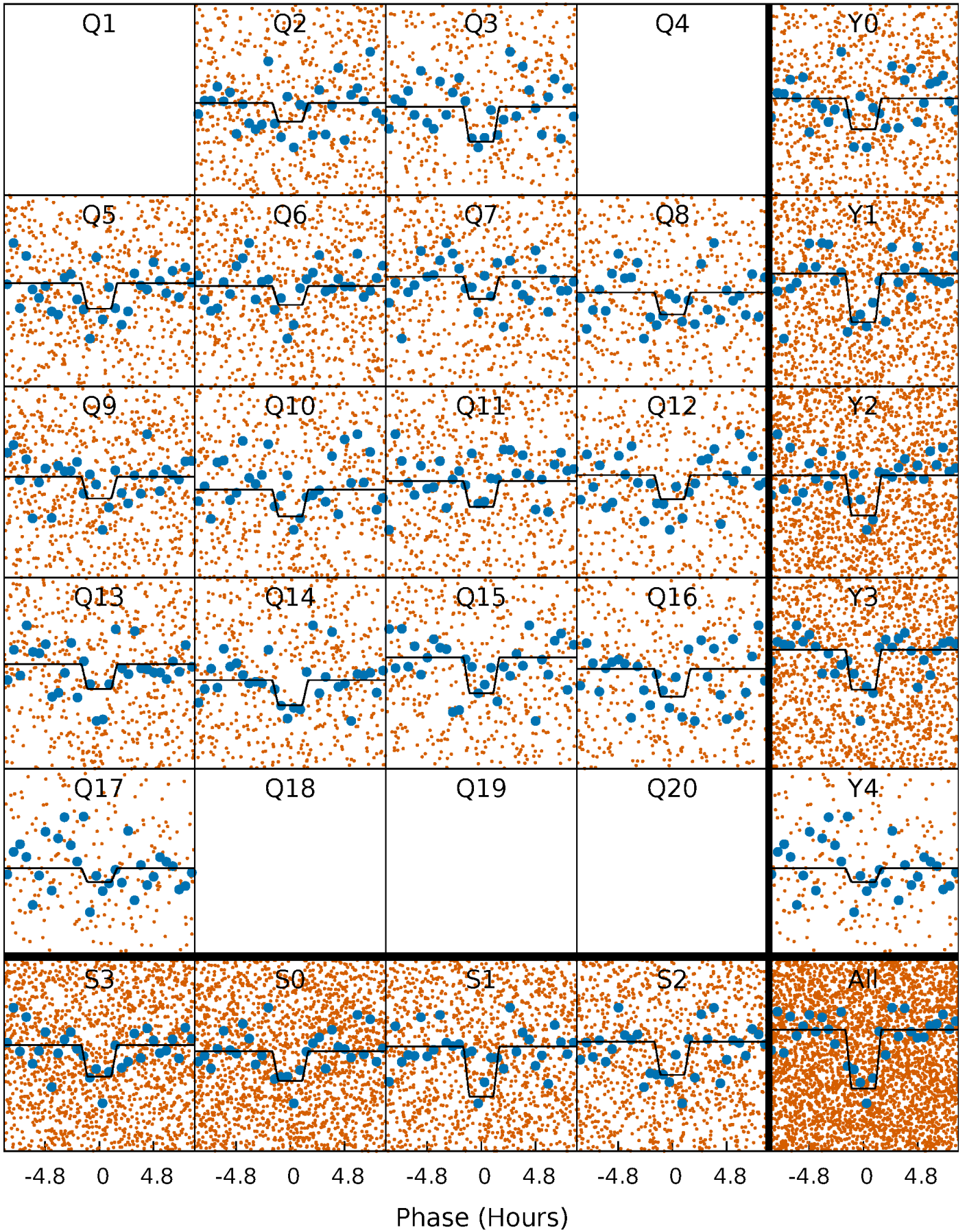
TCE 009141746-02   P= 2.851788 Days    $T_0=132.179581$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

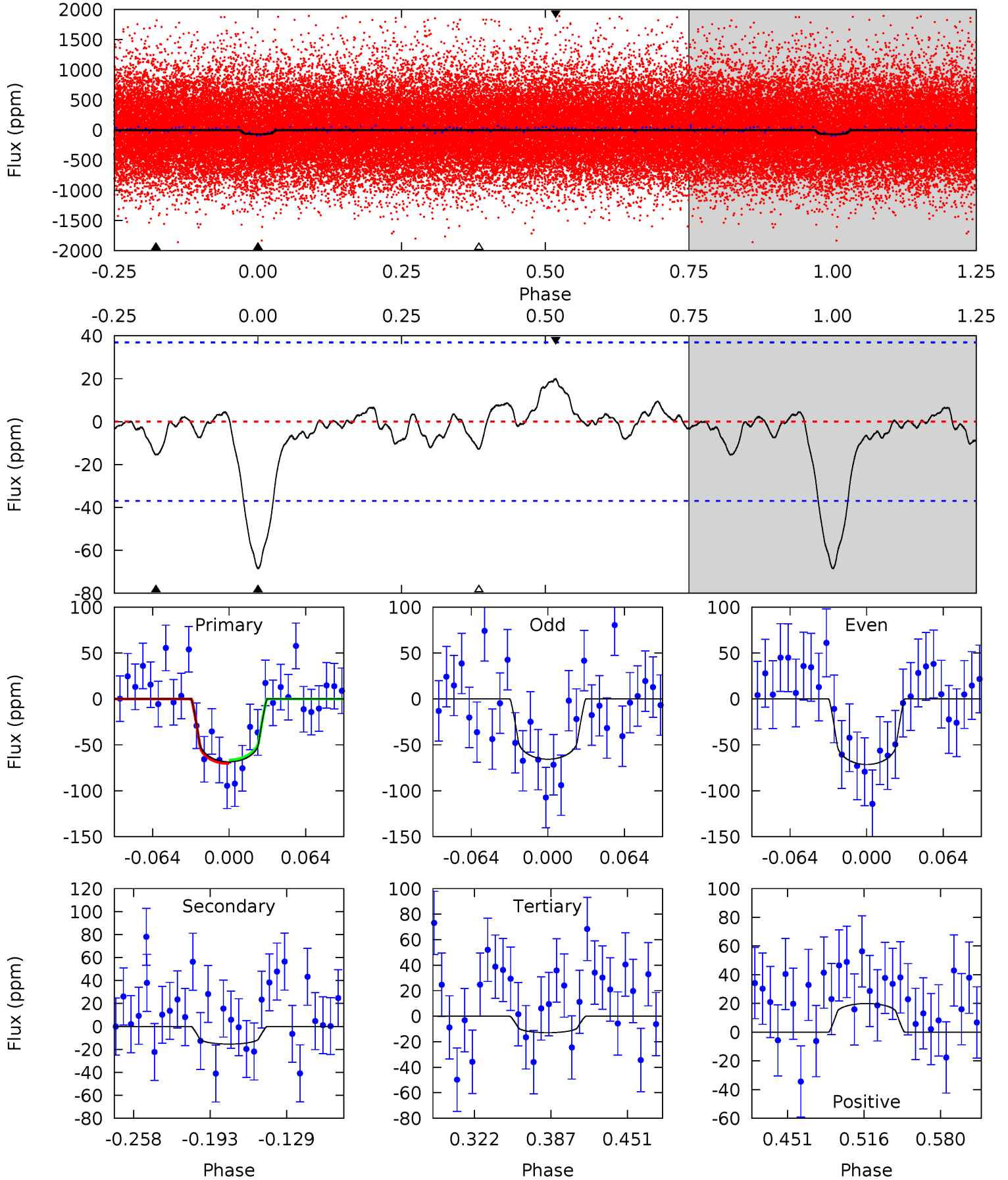
TCE 009141746-02 P= 2.851814 Days  $T_0=132.169291$  (BKJD)



# DV Model-Shift Uniqueness Test

009141746-02, P = 2.851788 Days, E = 132.179581 Days

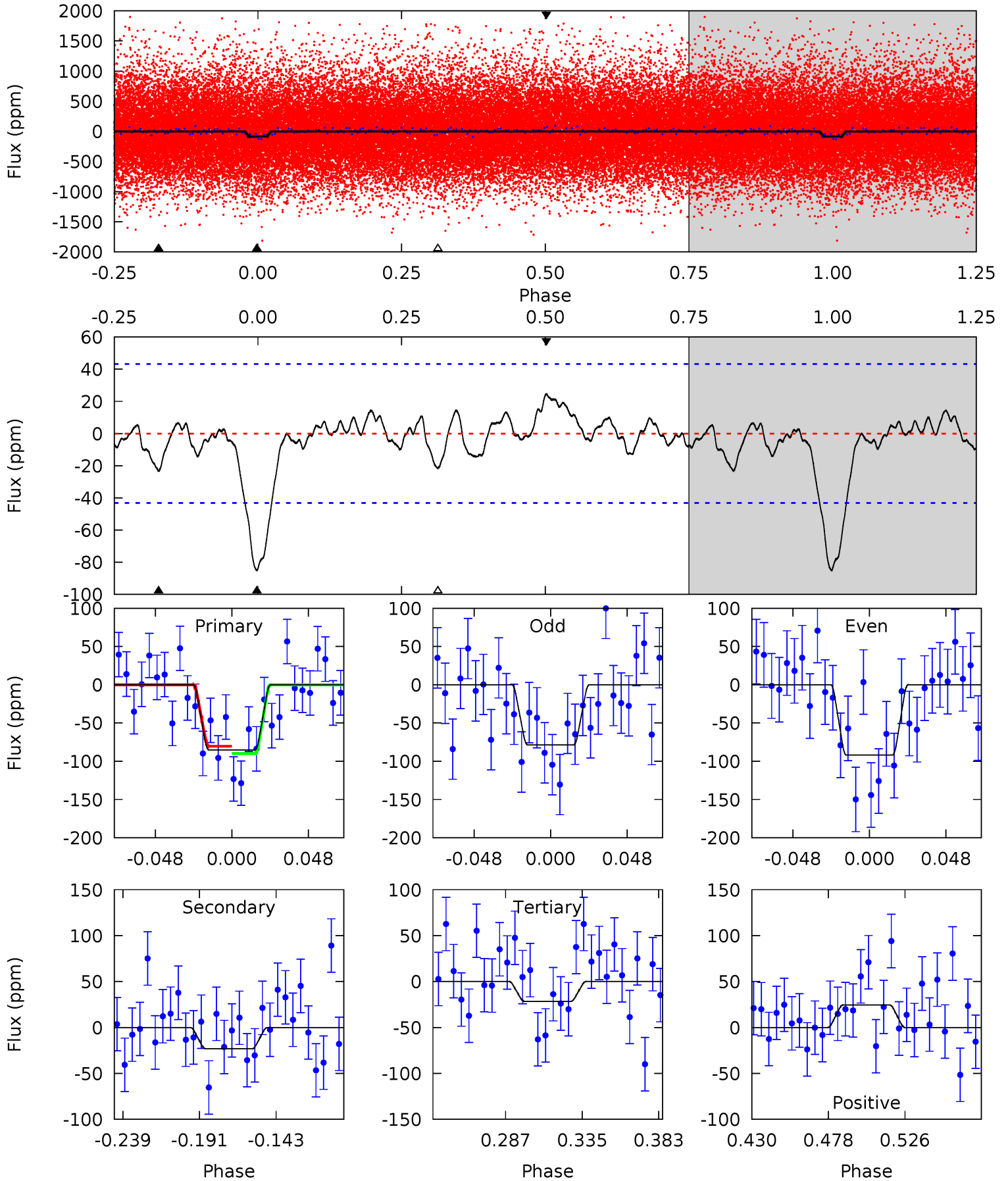
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.64	1.94	1.62	2.52	4.66	1.85	0.83	7.01	6.12	0.32	-0.58	0.36	0.81	0.23	0.22



# Alt Model-Shift Uniqueness Test

009141746-02, P = 2.851814 Days, E = 132.169291 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
9.30	2.54	2.35	2.67	4.72	1.98	0.95	6.94	6.62	0.18	-0.14	0.74	0.78	0.22	0.53



### Stellar Parameters For KIC 009141746

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6123^{+193}_{-265}$	$4.413^{+0.072}_{-0.217}$	$0.140^{+0.200}_{-0.300}$	$1.107^{+0.375}_{-0.150}$	$1.159^{+0.164}_{-0.164}$	$1.202^{+0.379}_{-0.677}$
	+3%/-4%	+2%/-5%	+143%/-214%	+34%/-14%	+14%/-14%	+31%/-56%
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 009141746-02 / KOI 0929.02

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-15 \pm 8$	$1.28^{+0.82}_{-0.70}$	$1985^{+164}_{-112}$	$3973^{+1734}_{-800}$	$7.764^{+33.233}_{-5.603}$
Alt.	$-23 \pm 9$	$1.28^{+0.82}_{-0.74}$	$1996^{+163}_{-115}$	$4360^{+2056}_{-777}$	$12^{+61}_{-8}$

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

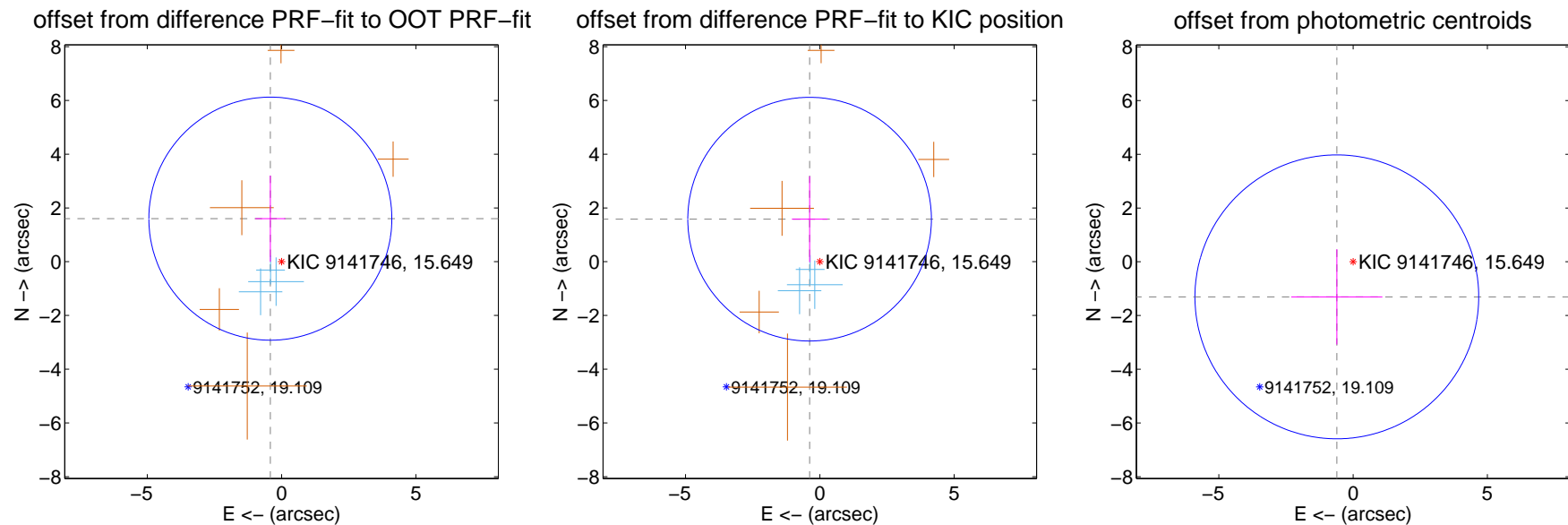
## DV Centroid Data

Supplemental centroid analysis for 009141746-02. Kepler magnitude: 15.65. Transit SNR 8.30

There are 3 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.09 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.655 \pm 1.507$	1.10	$0.418 \pm 0.562$	$1.601 \pm 1.604$
PRF-fit source offset from KIC position	$1.628 \pm 1.511$	1.08	$0.381 \pm 0.661$	$1.582 \pm 1.598$
photometric centroid source offset	$1.44 \pm 1.76$	0.82	$0.61 \pm 1.70$	$-1.31 \pm 1.77$



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.

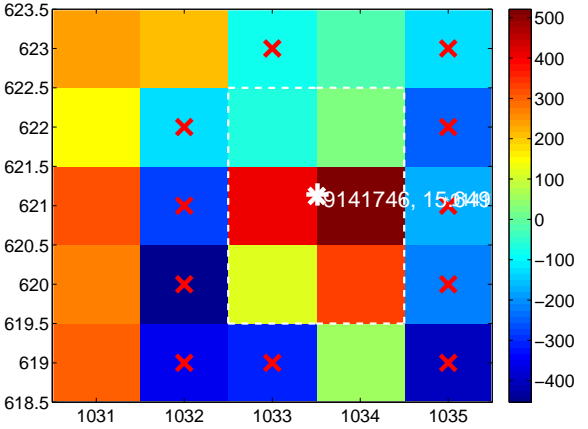
Q1 no difference image



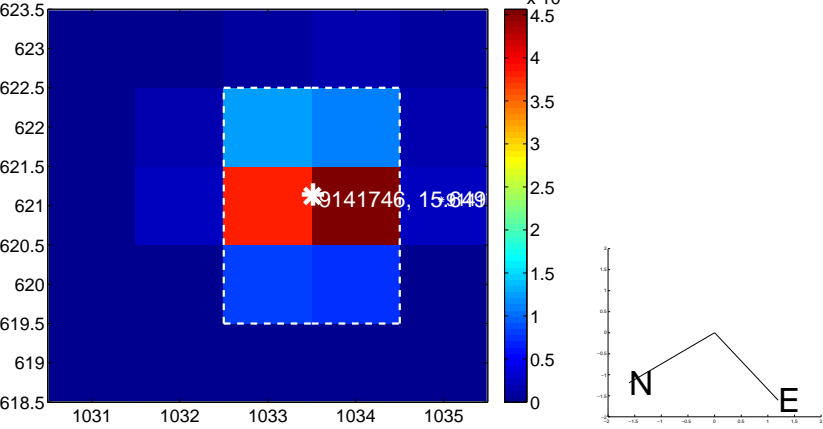
Q1 no OOT image



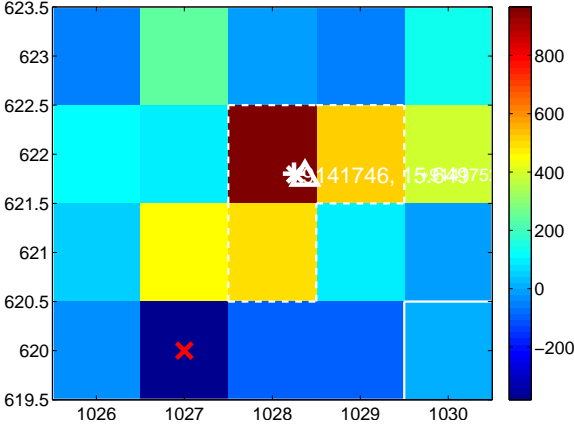
Q2 difference image. Poor Quality



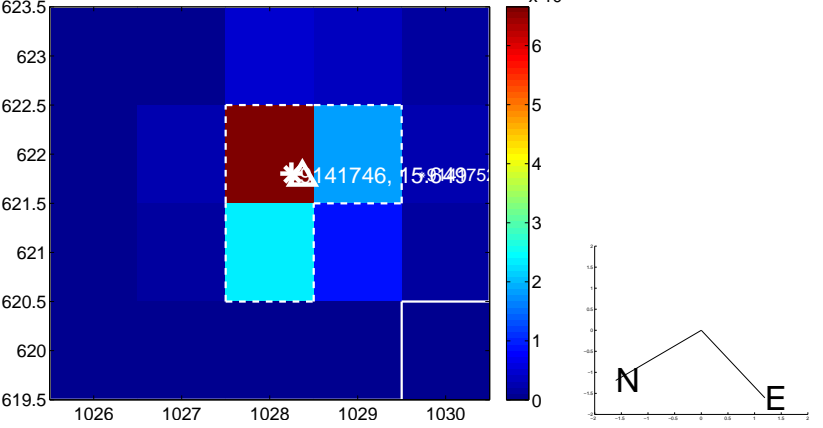
Q2 OOT image



Q3 difference image



Q3 OOT image



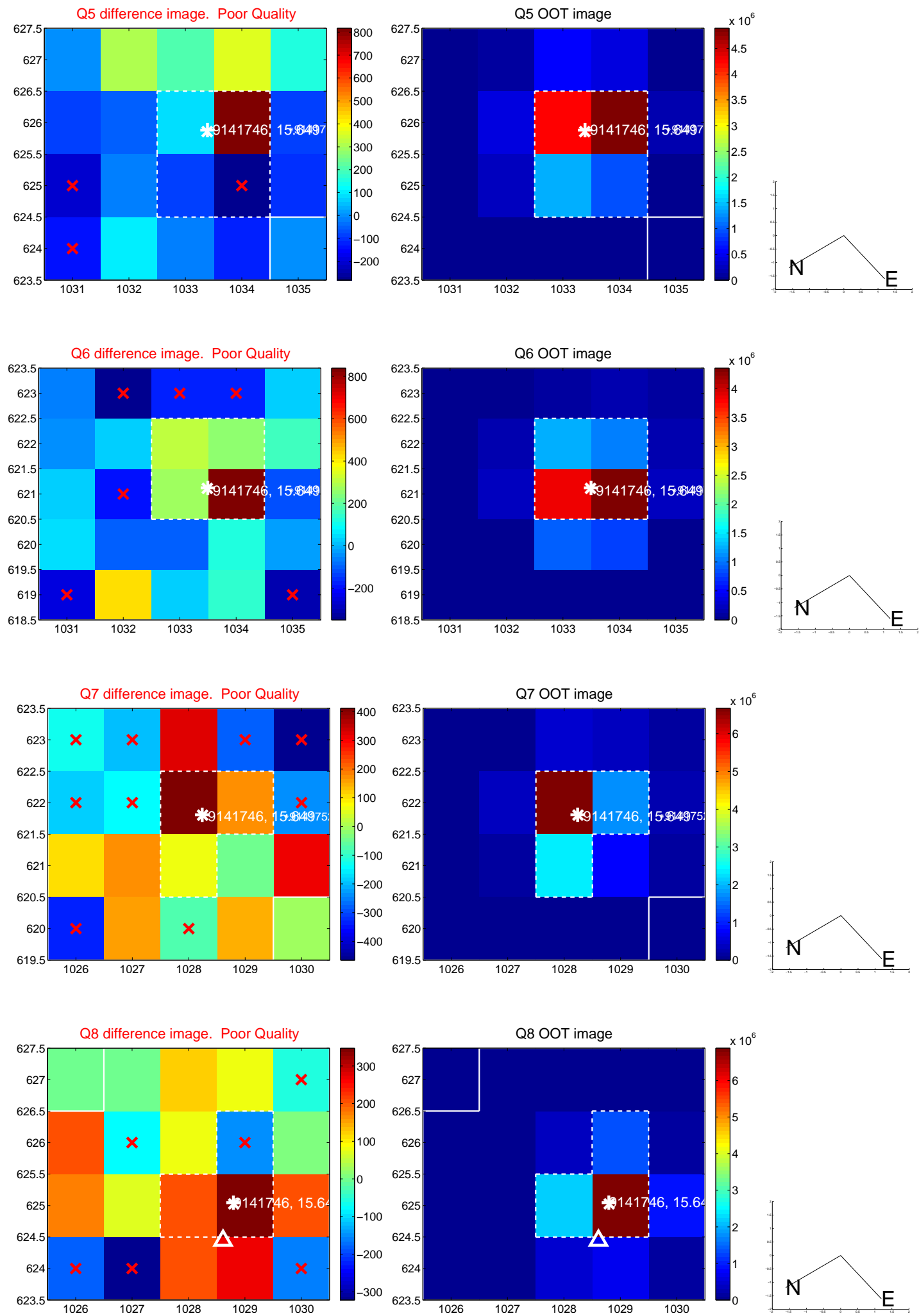
Q4 no difference image



Q4 no OOT image

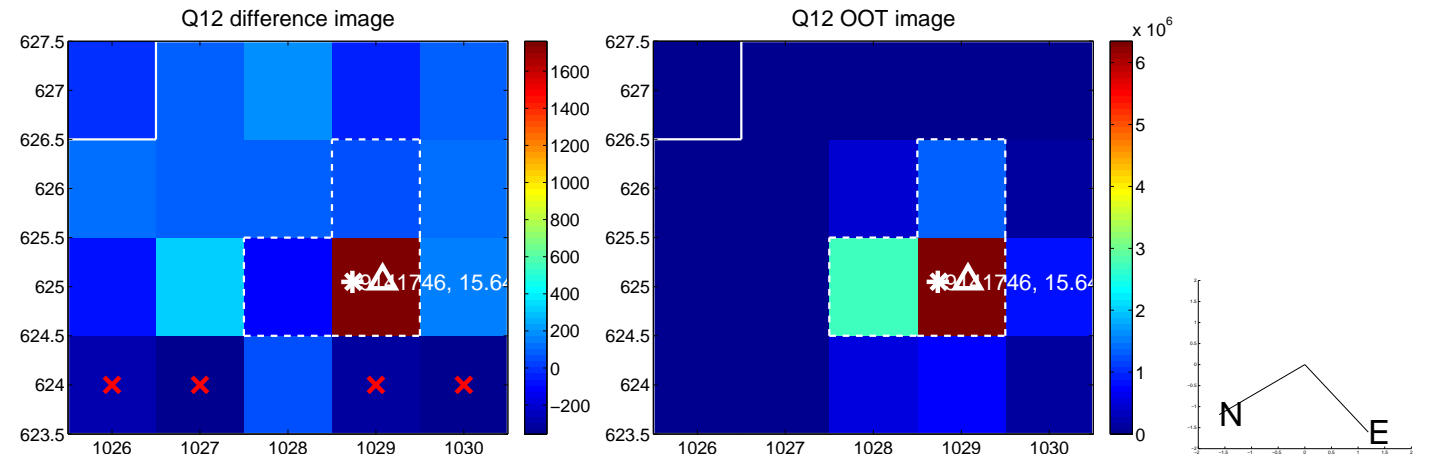
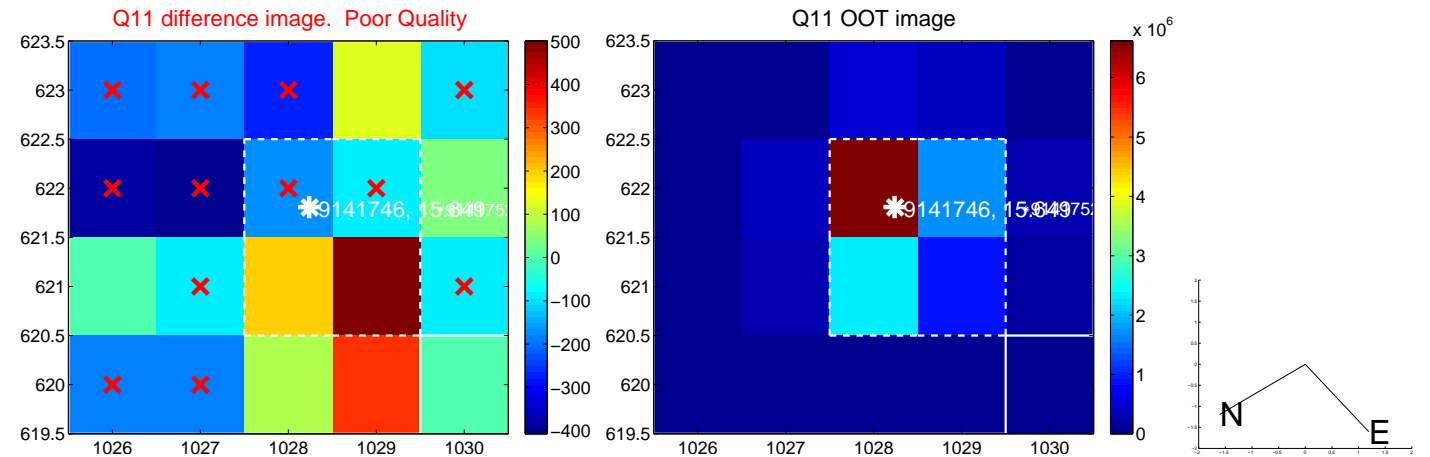
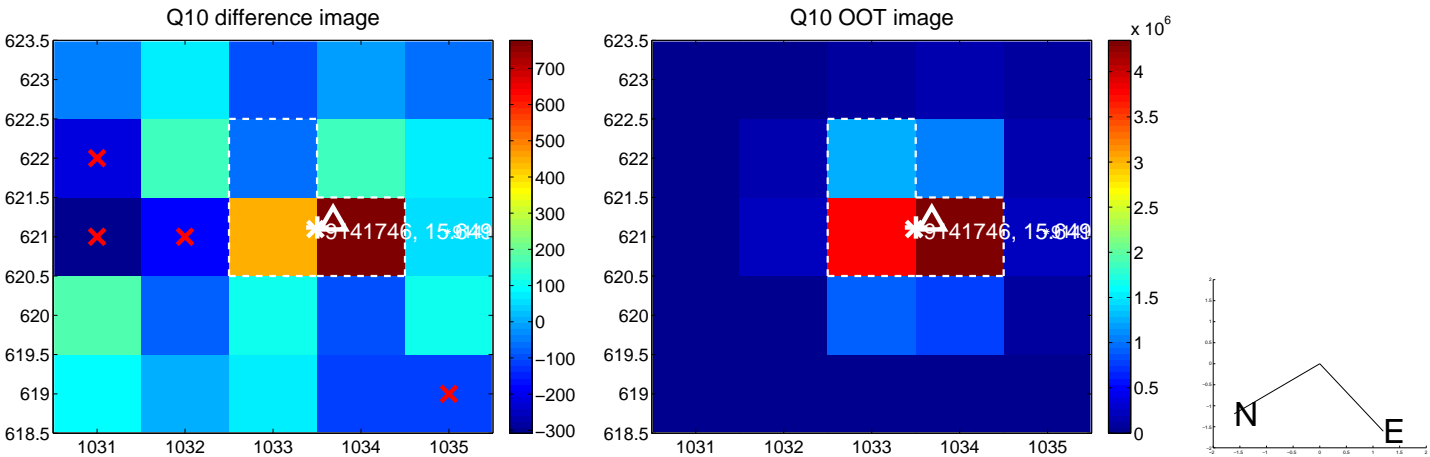
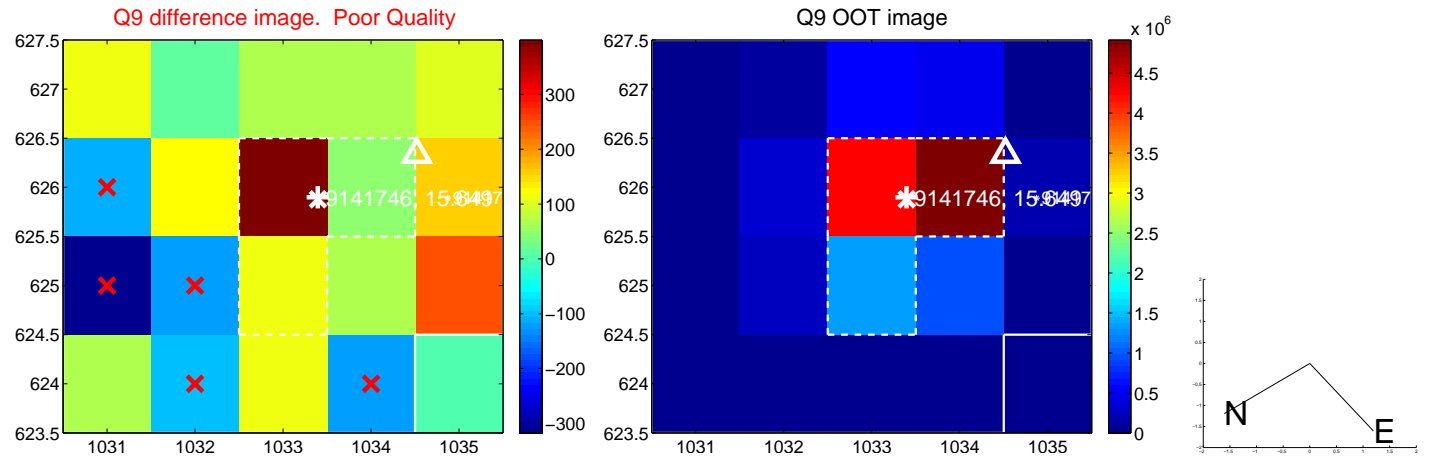


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

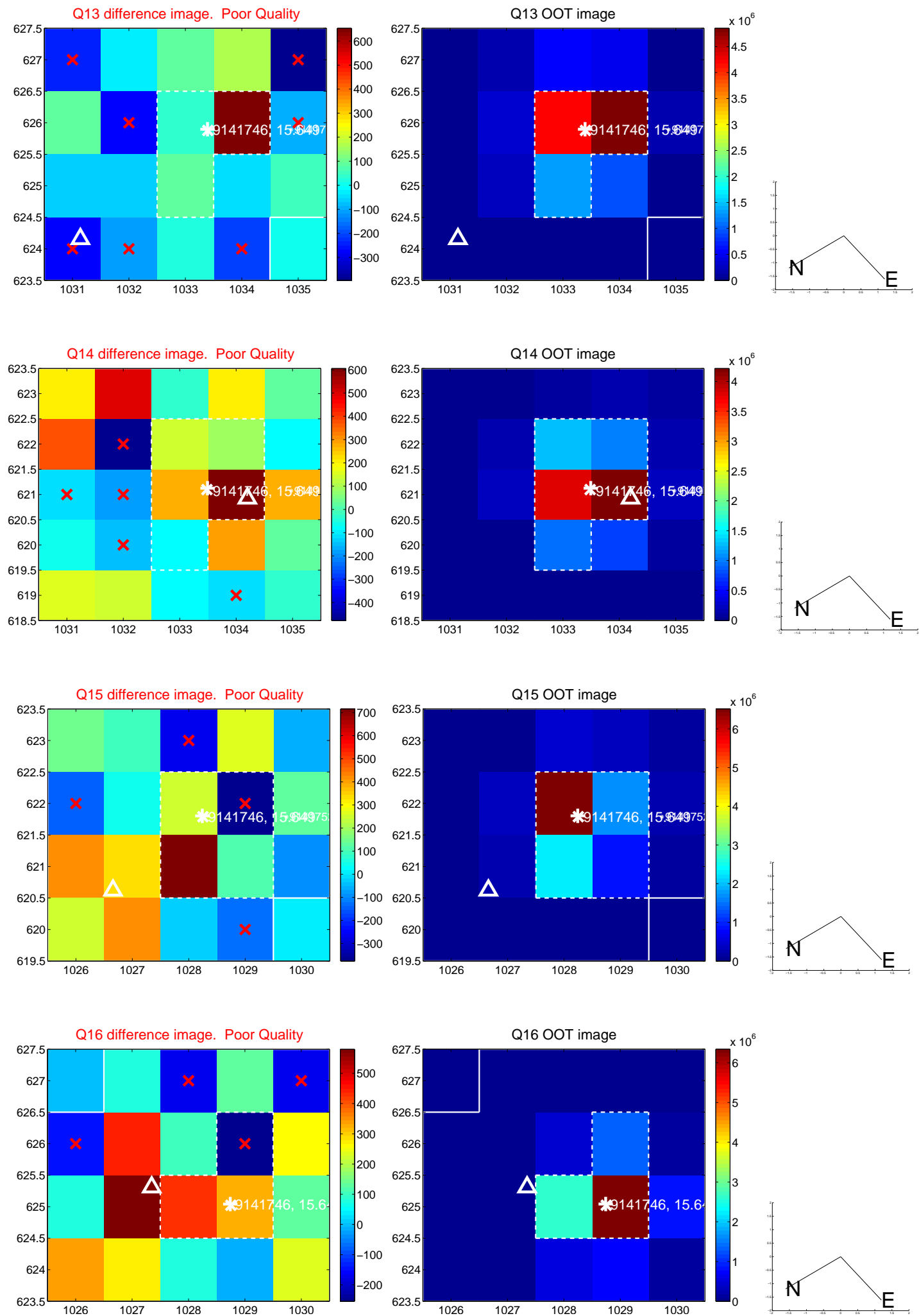




white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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





UKIRT Image

Declination

