

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005978154-01	OBS	No	0.977344	132.332446	13.4	6.117	8.3	6.7	4.13	6723	1.53	55377.15
005978154-02	OBS	No	124.165564	182.998698	450.9	13.613	12.5	10.5	4.13	6723	9.87	86.71
005978154-03	OBS	No	137.679401	150.489095	291.5	6.419	9.2	10.5	4.13	6723	8.84	75.55
005978154-04	OBS	No	28.453613	148.852296	172.6	3.245	9.8	8.3	4.13	6723	6.38	618.32
005978154-05	OBS	No	33.910761	148.850724	154.0	5.416	8.9	9.0	4.13	6723	5.62	489.34
005978154-06	OBS	No	82.202844	181.537676	292.1	2.328	9.2	9.3	4.13	6723	8.25	150.27
005978154-07	OBS	No	38.342122	163.823144	205.4	2.241	9.0	8.8	4.13	6723	6.69	415.43
005978154-08	OBS	No	93.248607	221.792194	272.4	4.236	8.9	9.2	4.13	6723	7.75	127.02
005978154-09	OBS	No	43.449347	166.082590	271.7	2.358	9.1	8.7	4.13	6723	7.55	351.63
005978154-10	OBS	No	45.084056	162.646790	117.0	6.361	8.6	5.7	4.13	6723	5.05	334.73

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005978154-01	OBS	FP	0.00	1	0	0	0	SWEET_NTL—LPP_DV
005978154-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS
005978154-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
005978154-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
005978154-05	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—HALO_GHOST
005978154-06	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—HALO_GHOST
005978154-07	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
005978154-08	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
005978154-09	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
005978154-10	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT

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

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

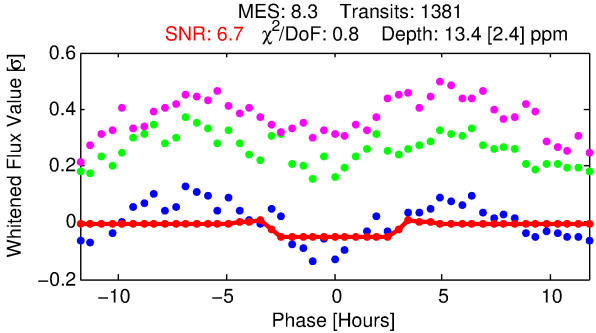
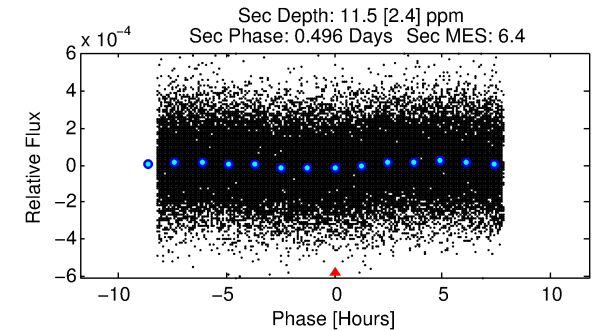
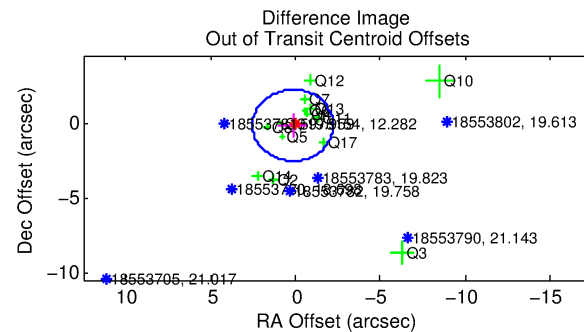
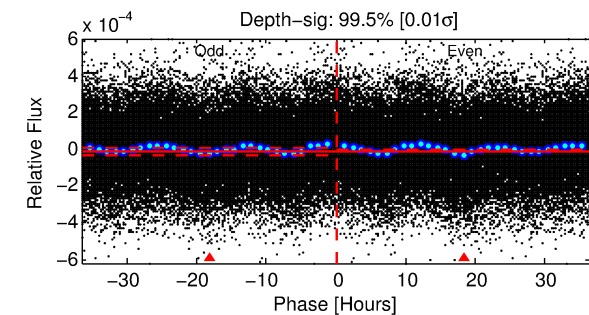
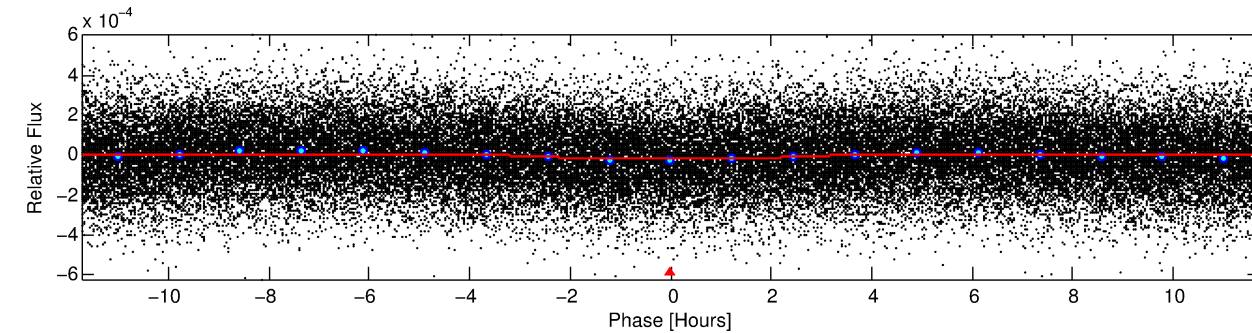
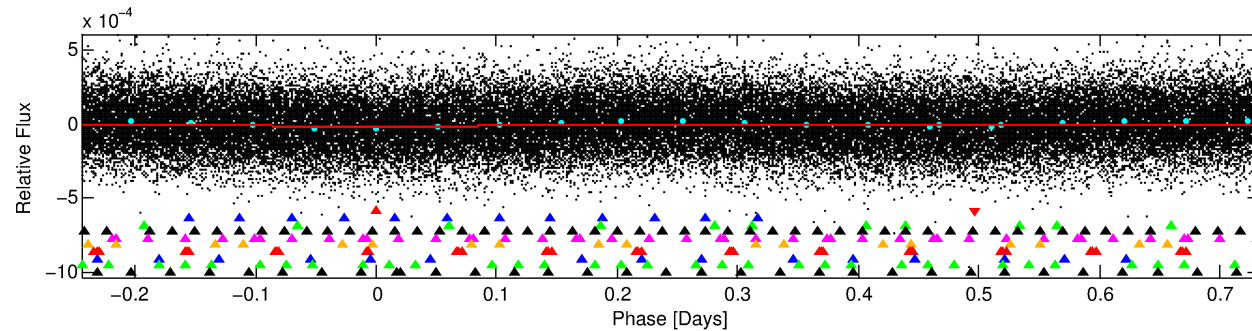
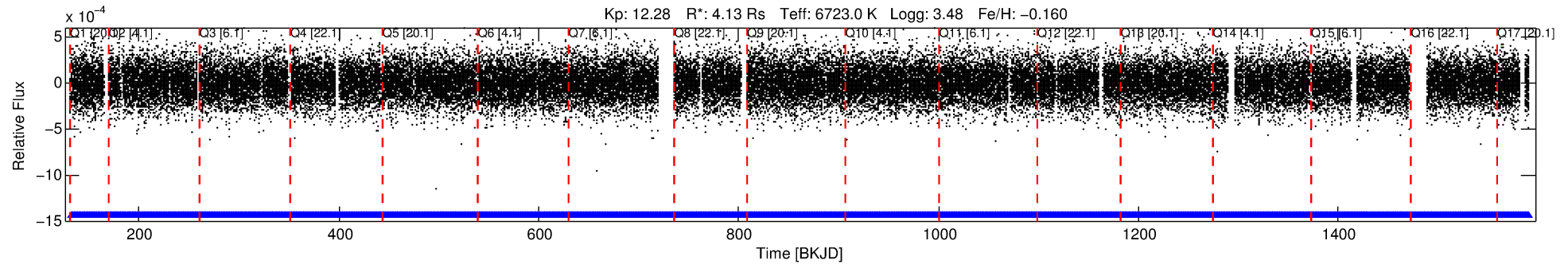
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 005978154-01

No Significant Match Found

# DV One-Page Summary

KIC: 5978154 Candidate: 1 of 10 Period: 0.977 d



## DV Fit Results:

Period = 0.97734 [0.00002] d  
Epoch = 132.3324 [0.0062] BKJD  
Rp/R\* = 0.0034 [0.0030]  
a/R\* = 1.35 [2.95]  
b = 0.28 [16.09]  
Seff = 55377.15 [34739.51]  
Teq = 3912 [613] K  
Rp = 1.53 [1.48] Re  
a = 0.0238 [0.0091] AU  
Ag = 1.52 [2.86] [0.18 $\sigma$ ]  
Teffp = 6720 [2985] K [0.92 $\sigma$ ]

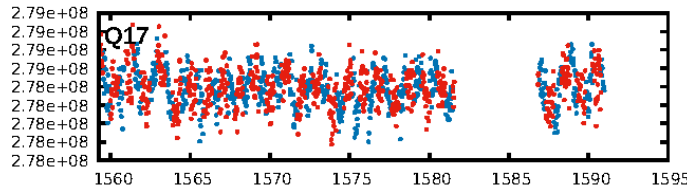
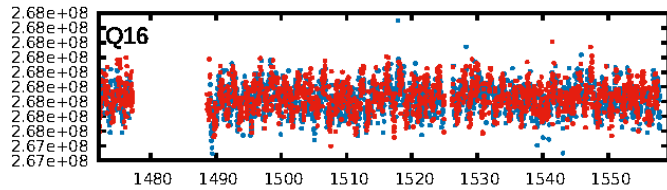
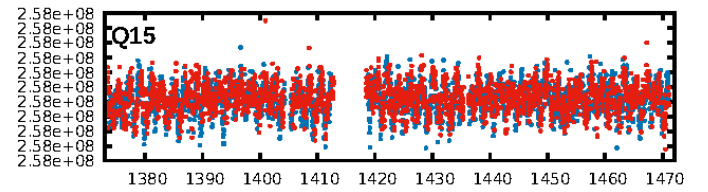
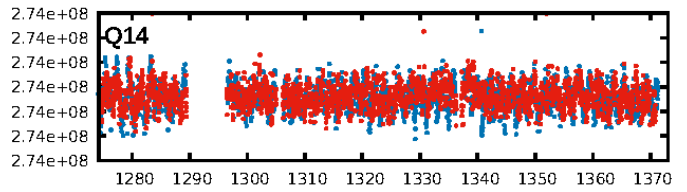
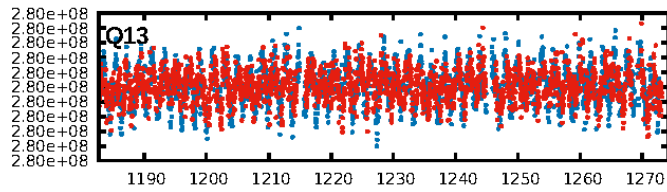
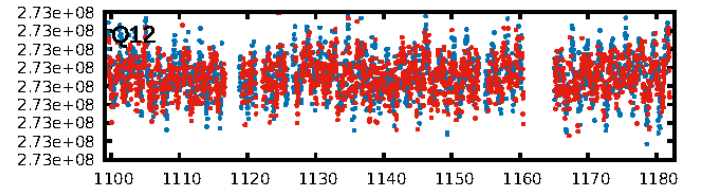
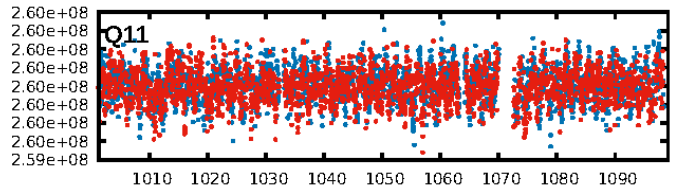
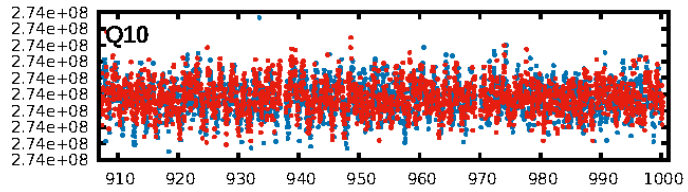
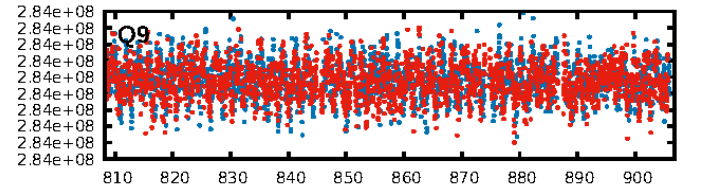
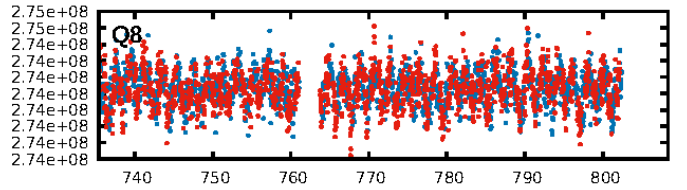
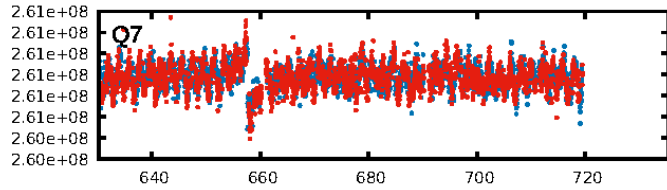
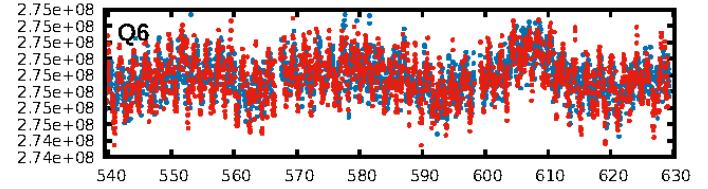
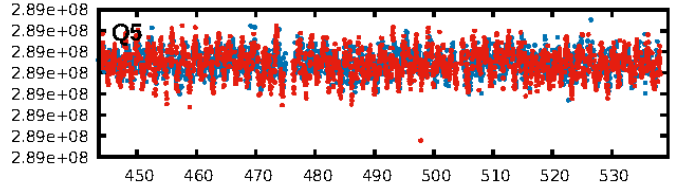
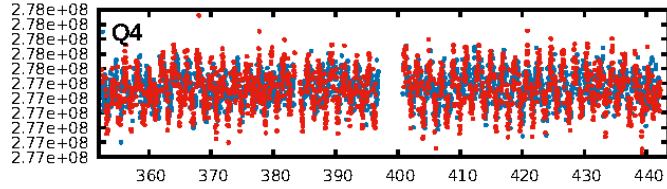
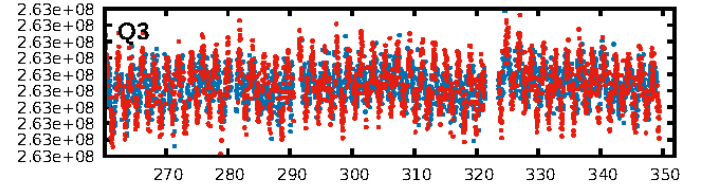
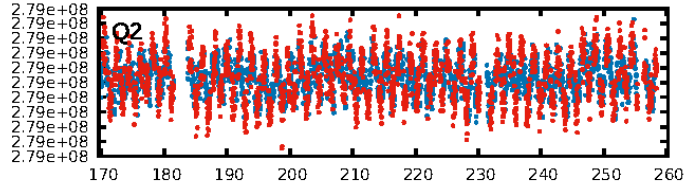
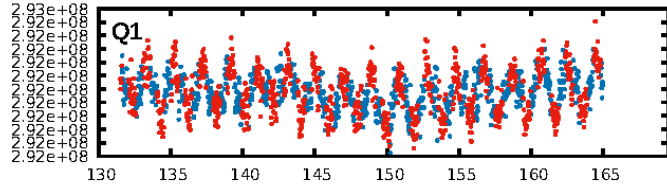
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [95.24 $\sigma$ ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [1320/1320]  
GhostDiagnostic-chr: 1.276  
Centroid-sig: 0.3%  
Centroid-so: 1.229 arcsec [1.64 $\sigma$ ]  
OotOffset-rm: 0.221 arcsec [0.28 $\sigma$ ]  
KicOffset-rm: 0.342 arcsec [0.45 $\sigma$ ]  
OotOffset-st: 4/3/3/4 [14]  
KicOffset-st: 4/3/3/4 [14]  
DiffImageQuality-fgm: 0.71 [10/14]  
DiffImageOverlap-fno: 1.00 [17/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 03-Feb-2016 05:53:42 Z

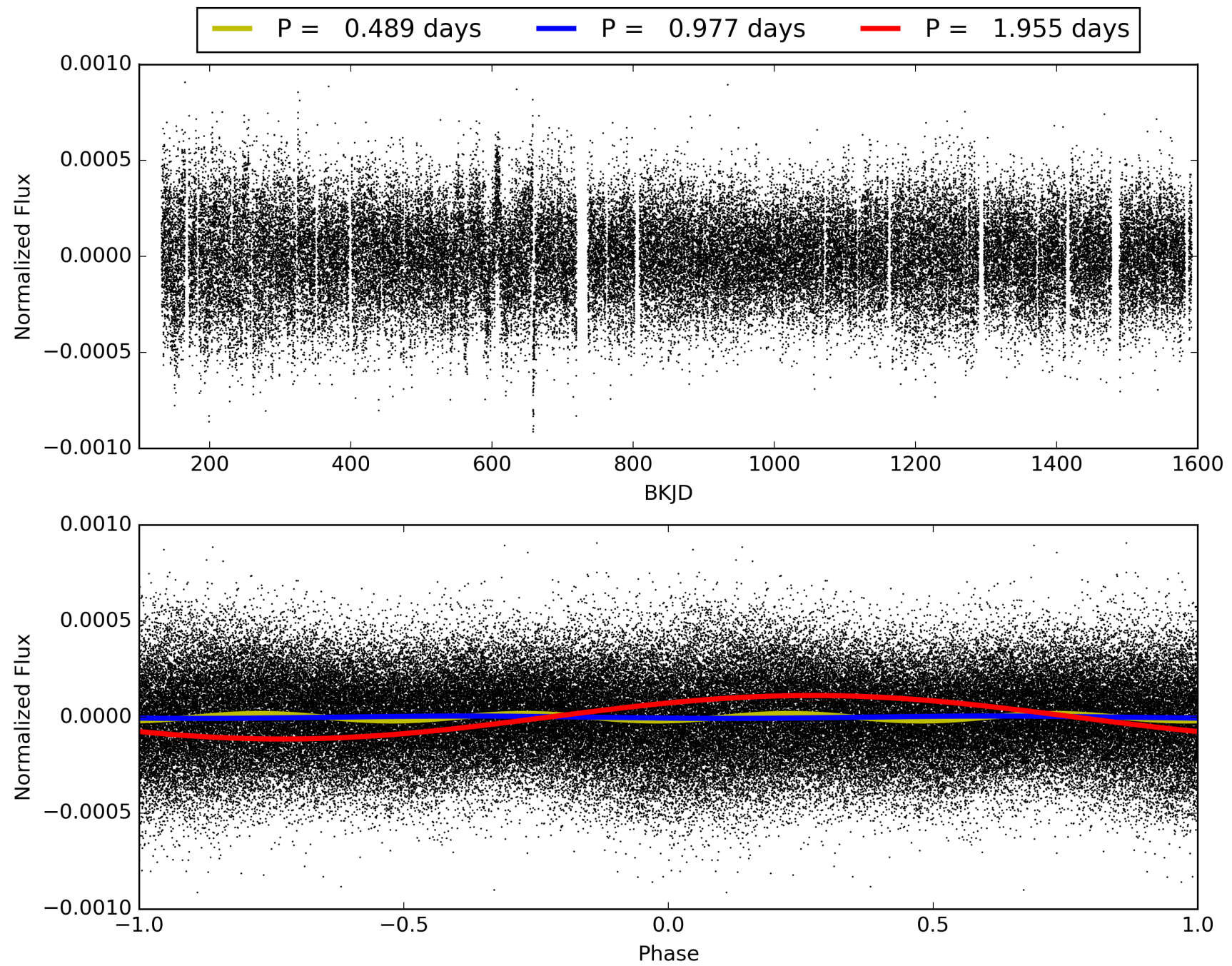
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

## TCE 005978154-01, PDC Light Curves





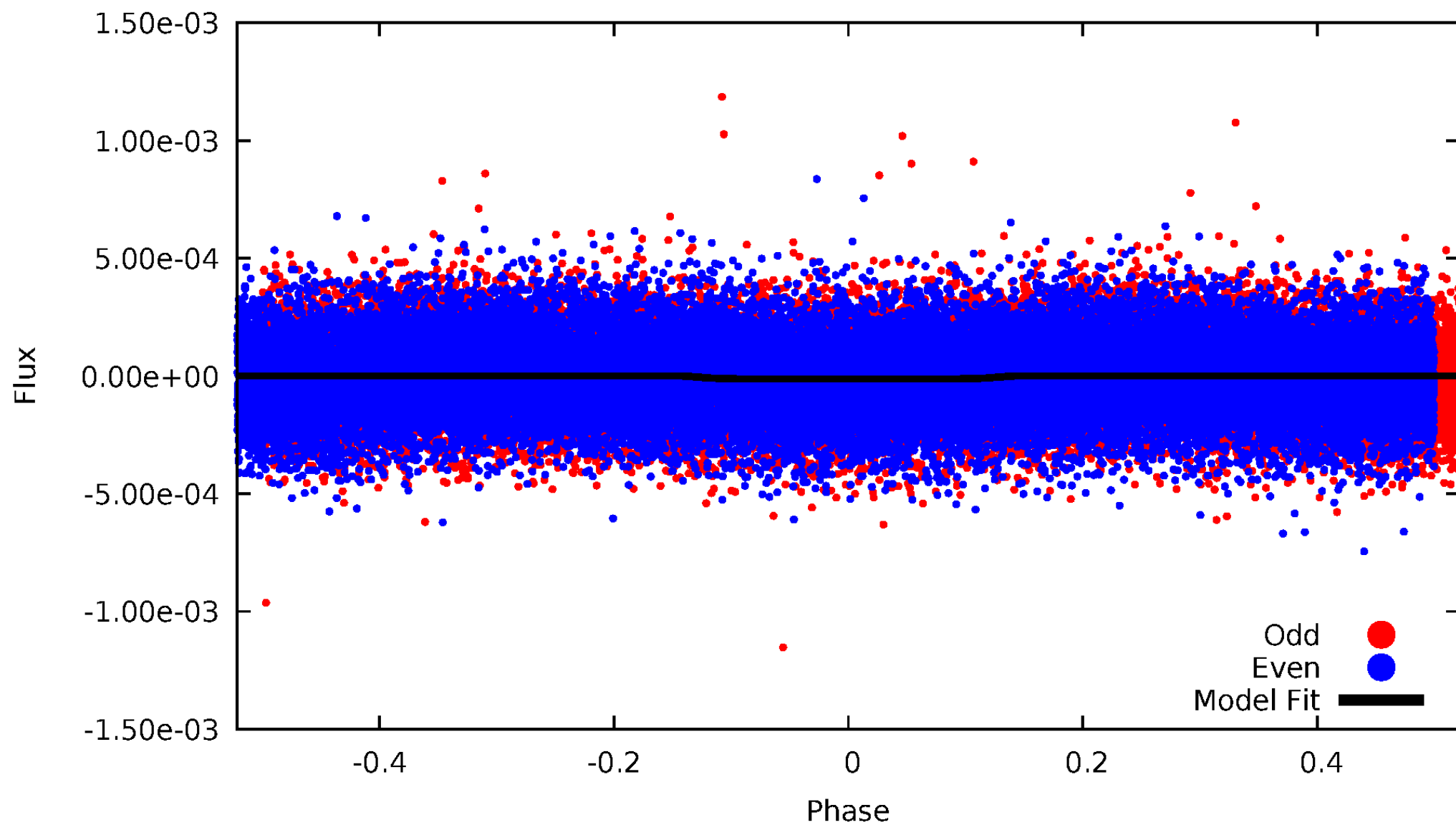
TCE 005978154-01





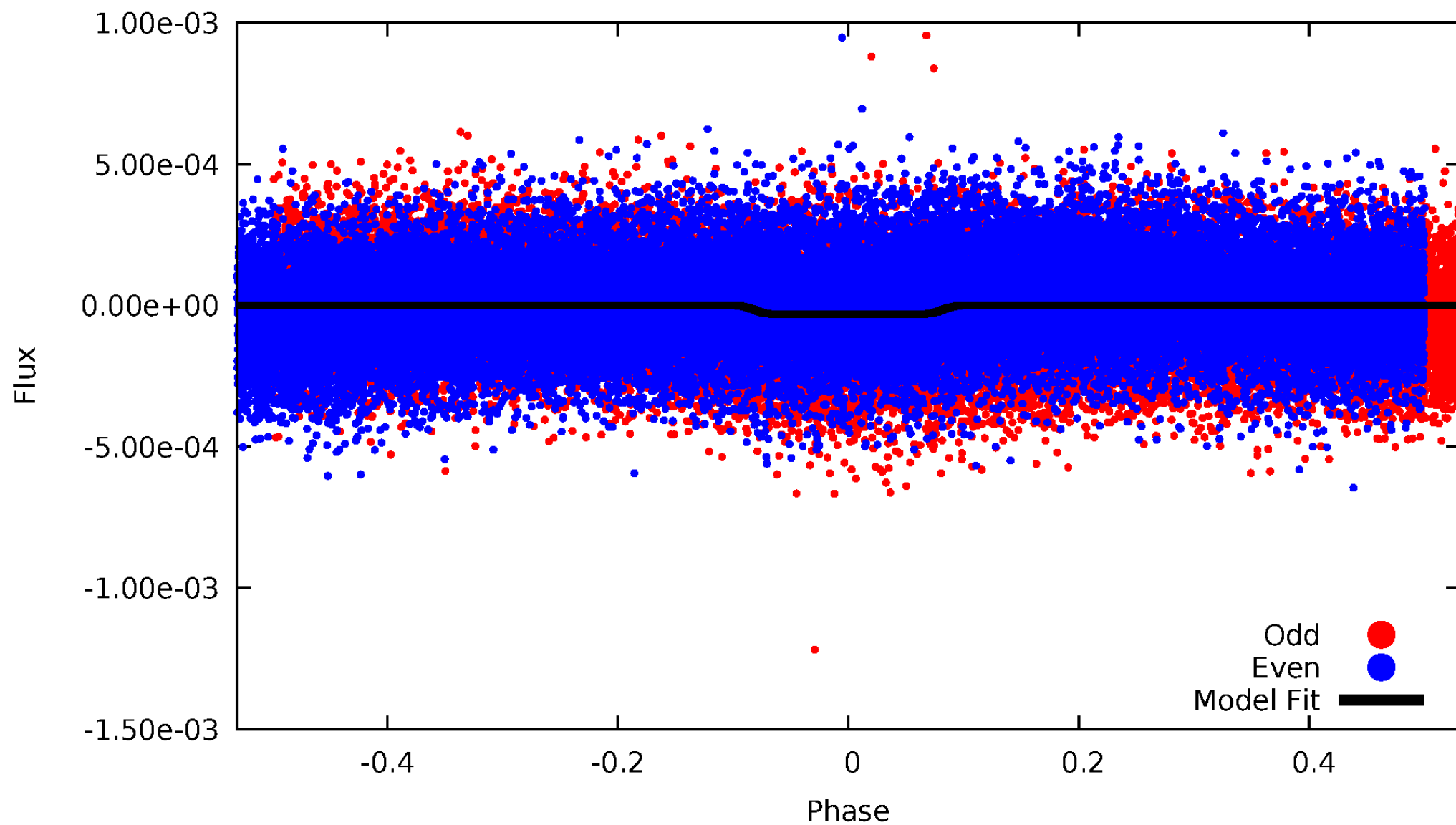
# DV Odd/Even

TCE 005978154-01



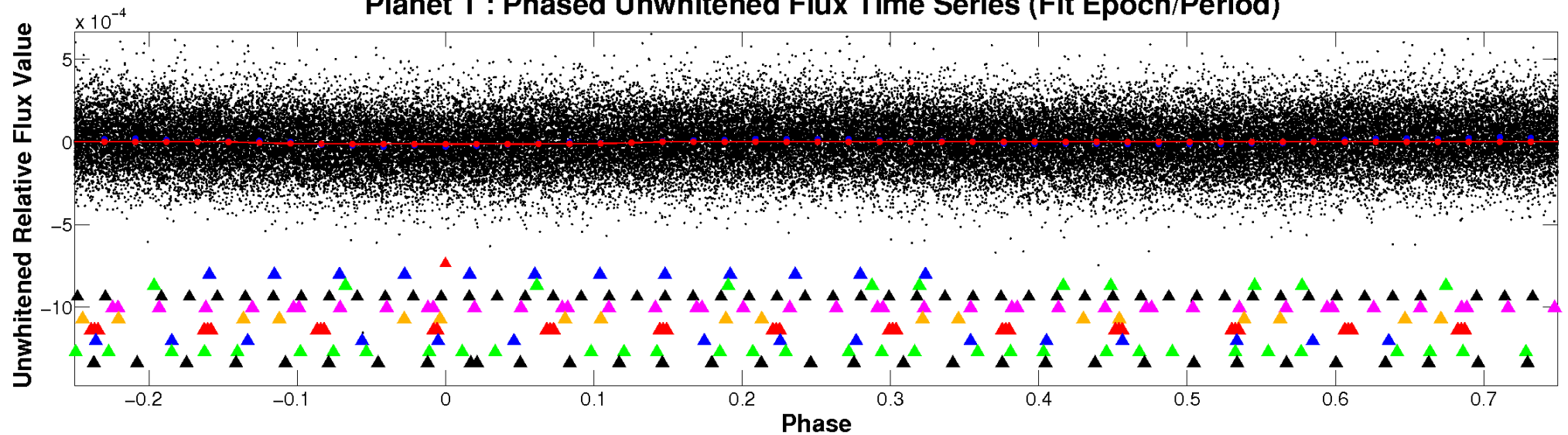
# ALT Odd/Even

TCE 005978154-01

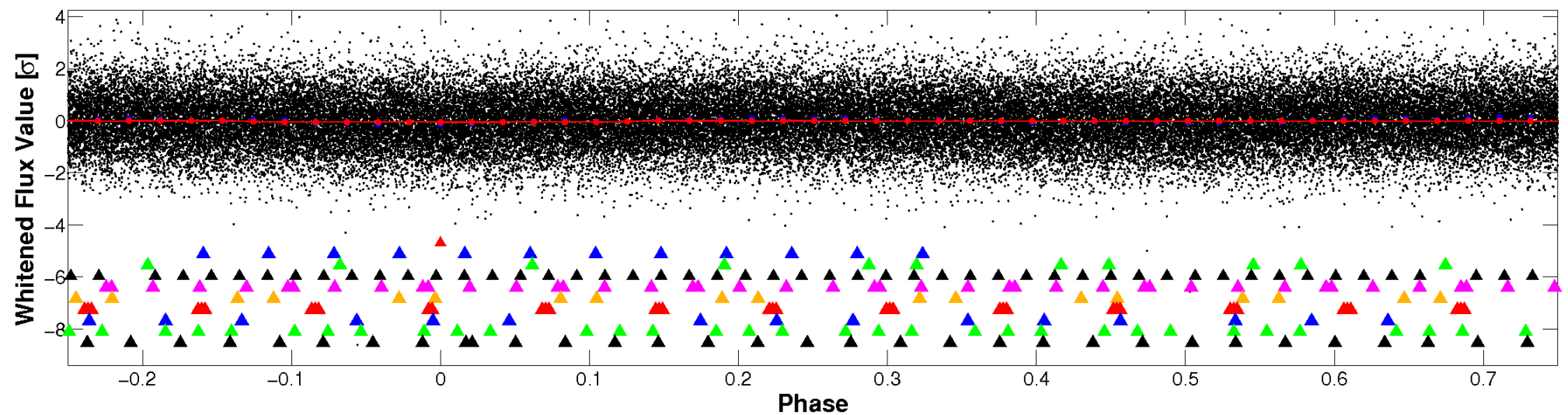


# Non-Whitened Vs. Whitened Light Curve

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



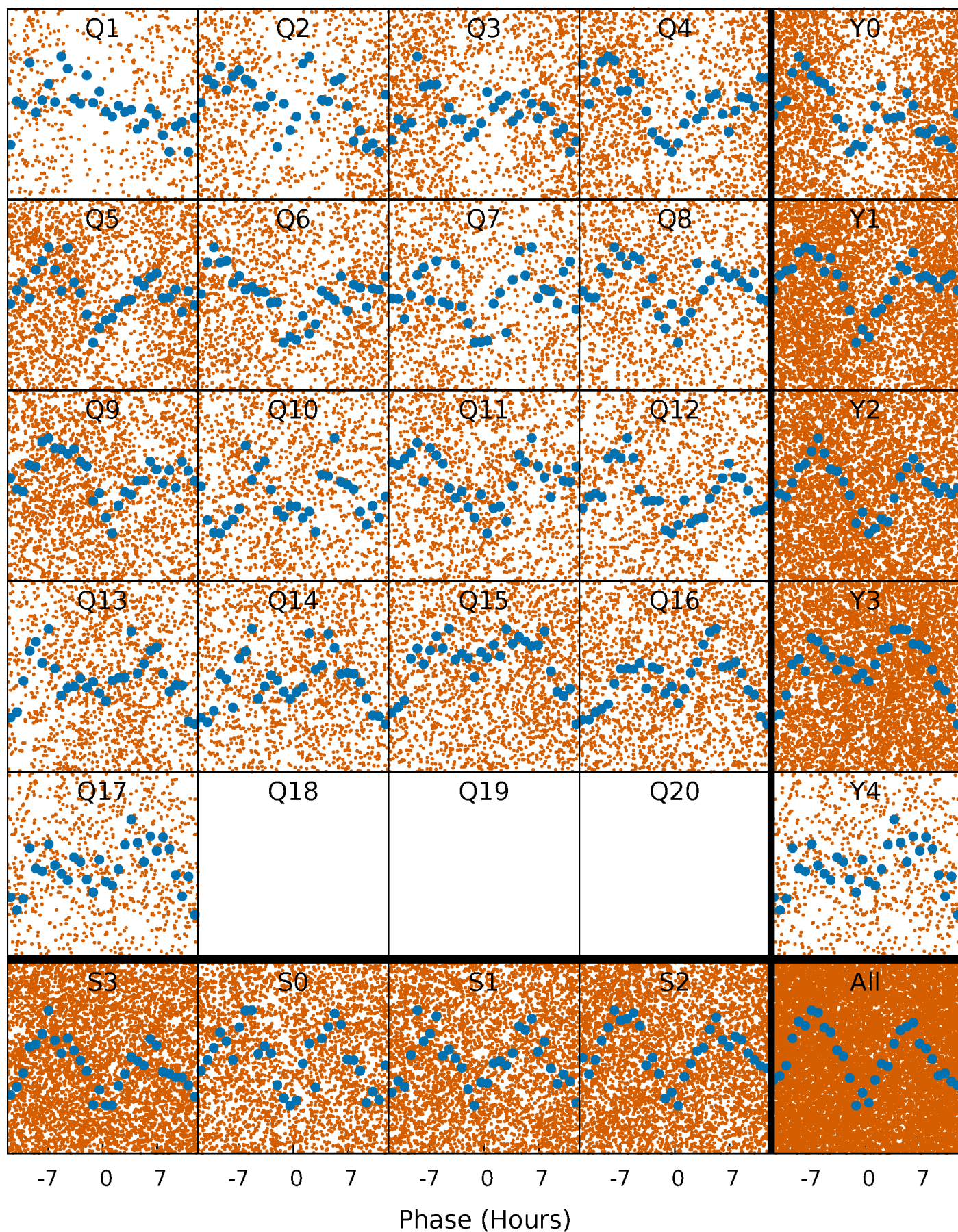
**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**





# PDC Quarter-Phased Transit Curves

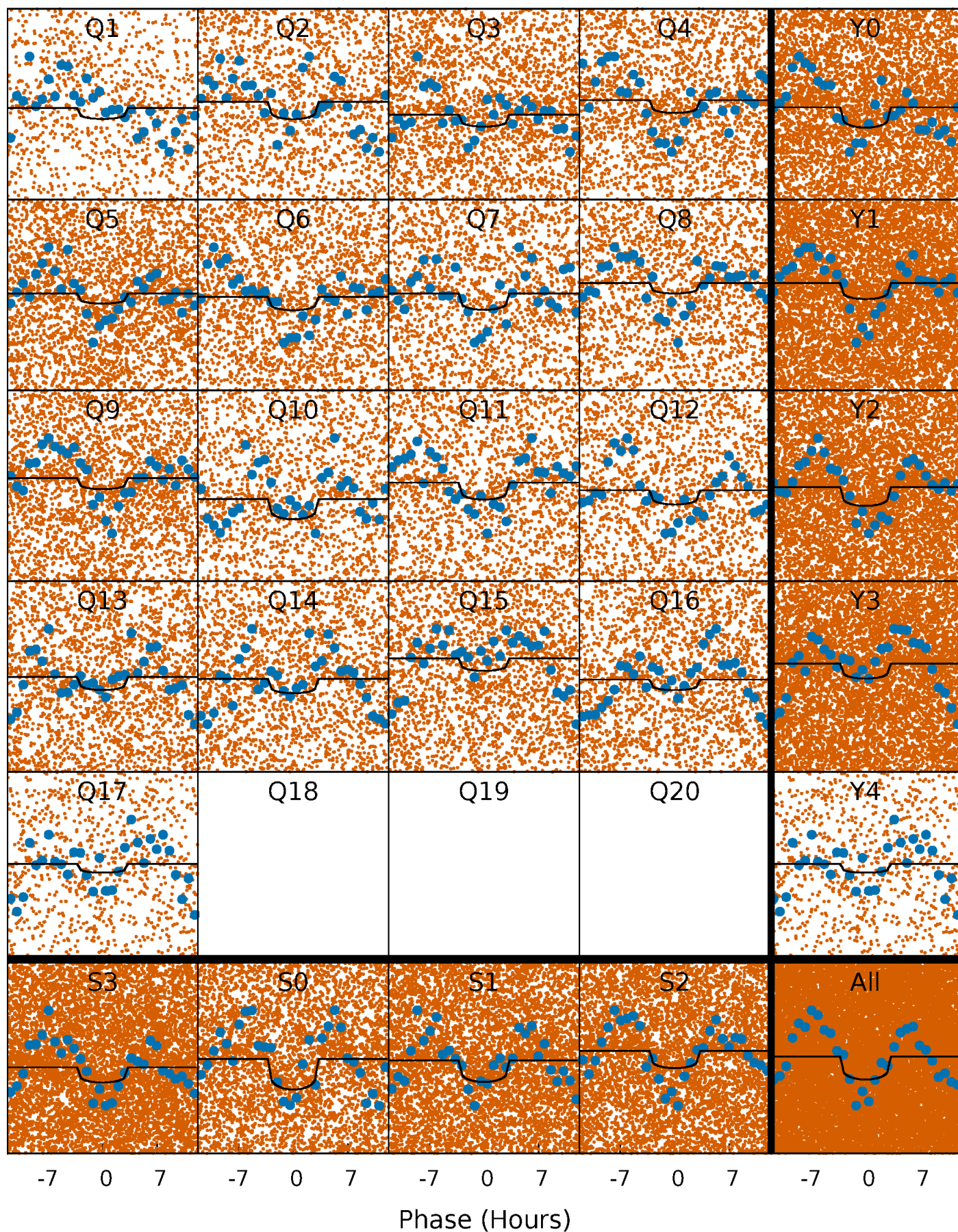
TCE 005978154-01 P= 0.977344 Days  $T_0=132.332446$  (BKJD)





# DV Quarter-Phased Transit Curves

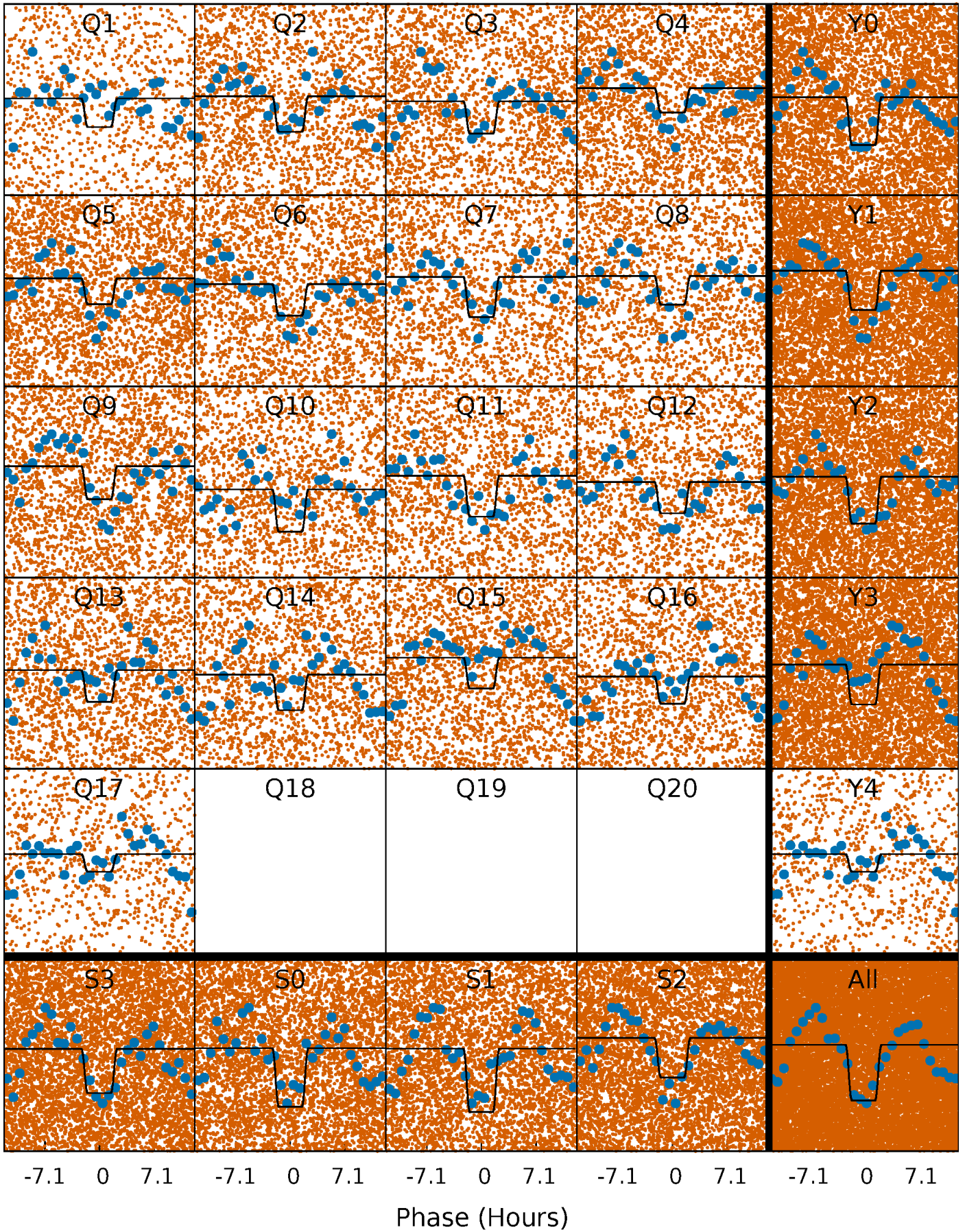
TCE 005978154-01 P= 0.977344 Days  $T_0=132.332446$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

TCE 005978154-01 P= 0.977379 Days  $T_0=132.293269$  (BKJD)

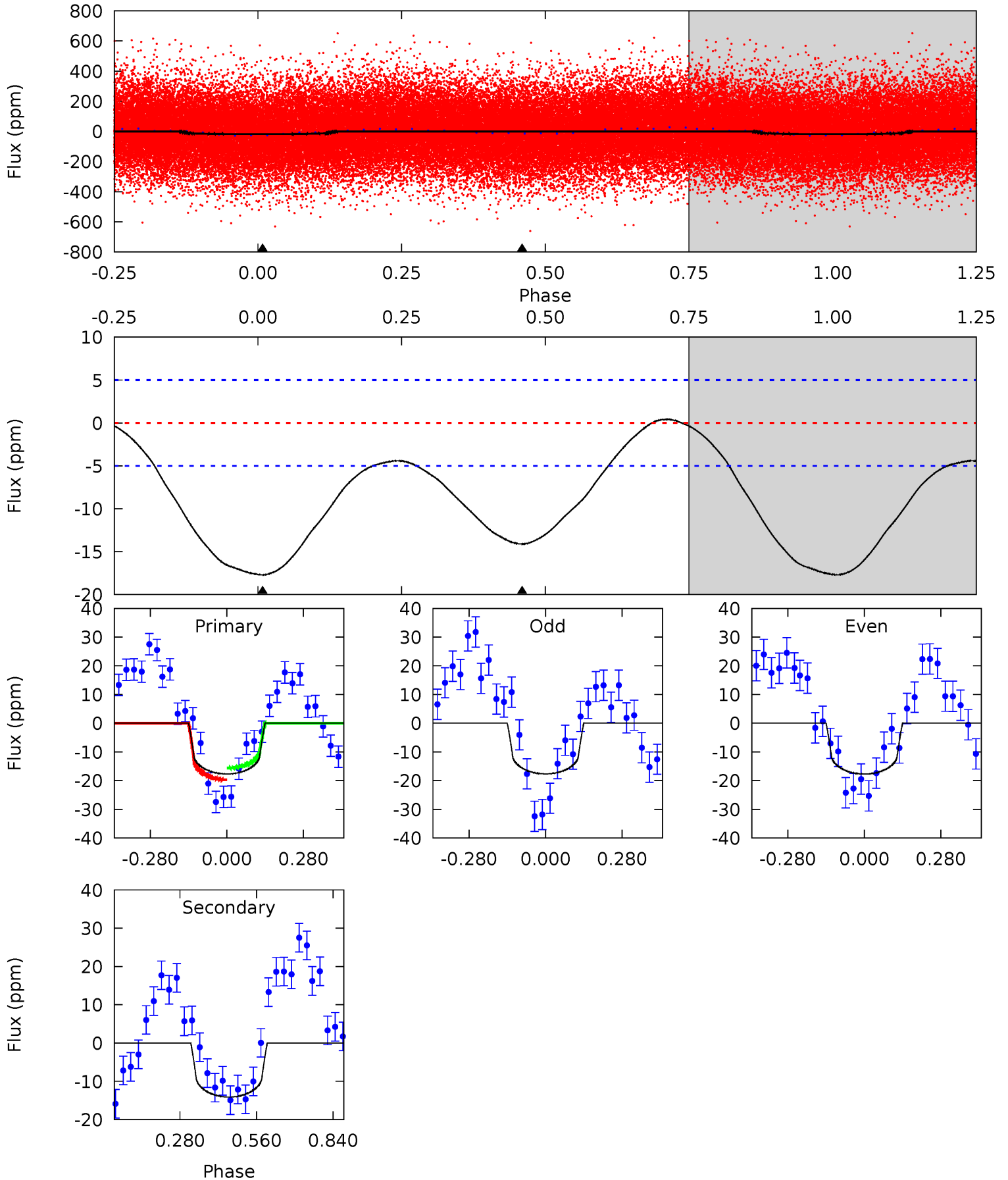




# DV Model-Shift Uniqueness Test

005978154-01, P = 0.977344 Days, E = 131.355102 Days

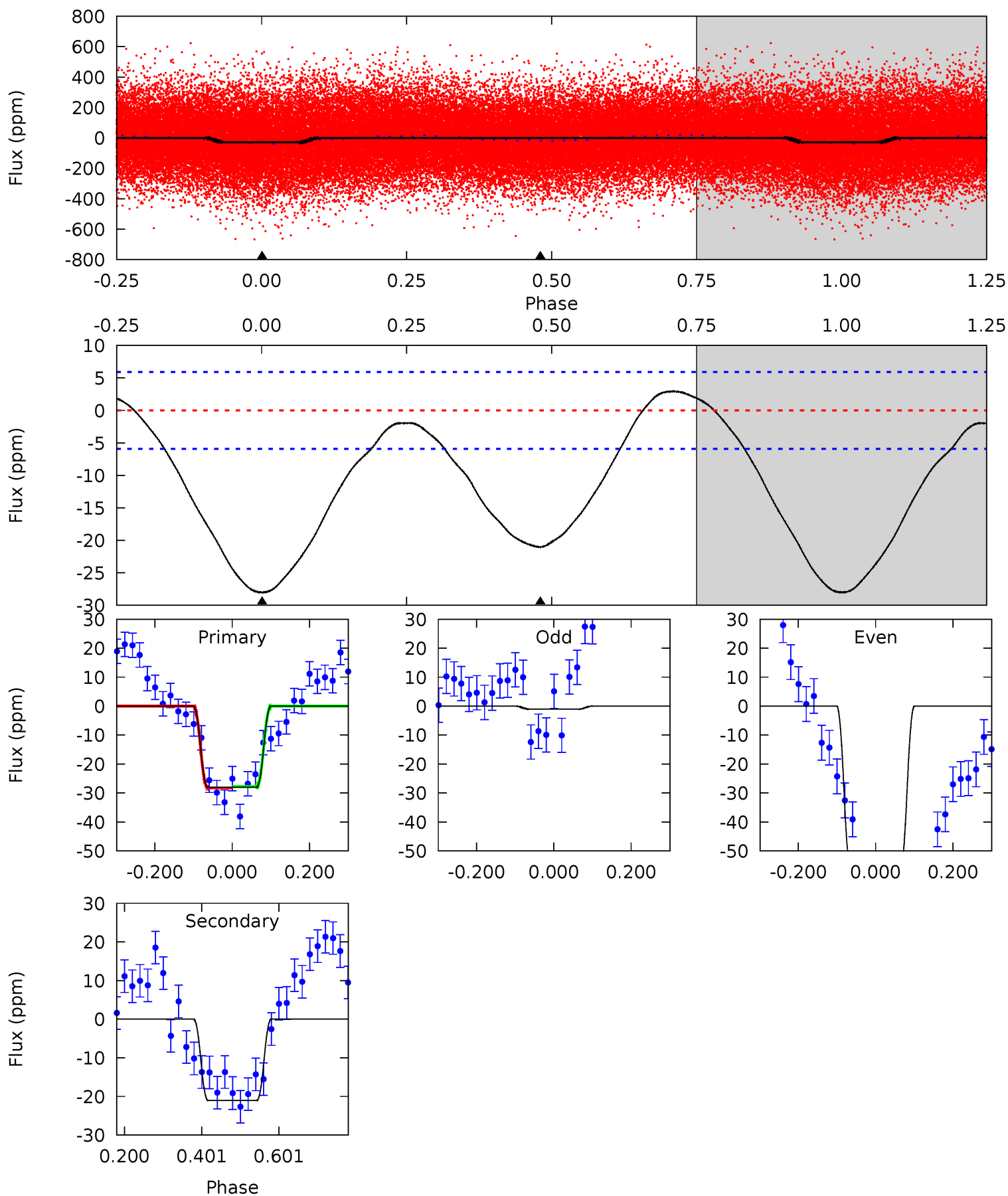
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
15.3	12.2	0	0	4.34	1.08	0.87	15.3	15.3	12.2	12.2	0.02	1.04	0.02	1.78



# Alt Model-Shift Uniqueness Test

005978154-01, P = 0.977379 Days, E = 131.315890 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
20.9	15.7	0	0	4.42	1.28	1.73	20.9	20.9	15.7	15.7	20.8	1.12	0.09	0.18



### Stellar Parameters For KIC 005978154

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$6723^{+202}_{-223}$	$3.478^{+0.360}_{-0.090}$	$-0.160^{+0.300}_{-0.250}$	$4.134^{+0.412}_{-1.647}$	$1.872^{+0.171}_{-0.398}$	$0.037^{+0.107}_{-0.011}$
	+3%/-3%	+10%/-3%	+188%/-156%	+10%/-40%	+9%/-21%	+286%/-29%
Source	PHO1	FLK73	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 005978154-01 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-14 \pm 1$	$1.62^{+1.23}_{-1.01}$	$5363^{+298}_{-466}$	$6173^{+5905}_{-1854}$	$1.605^{+9.986}_{-1.078}$
Alt.	$-21 \pm 1$	$2.31^{+1.32}_{-1.19}$	$5399^{+292}_{-540}$	$5657^{+3375}_{-1521}$	$1.213^{+3.881}_{-0.727}$

$T_{max}$  = 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

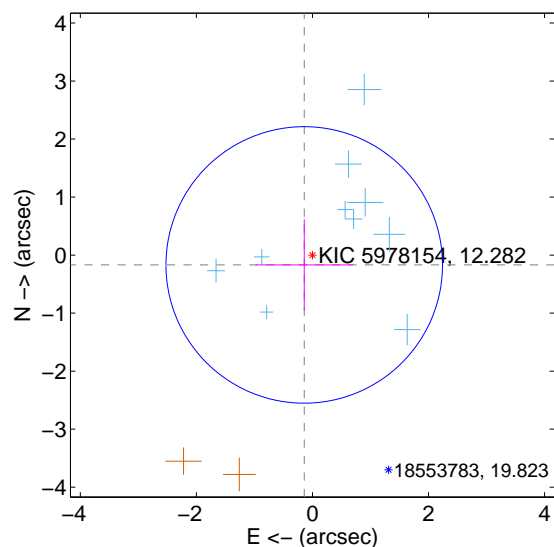
Supplemental centroid analysis for 005978154-01. Kepler magnitude: 12.28. Transit SNR 6.69

There are 10 quarters with good PRF difference image offsets

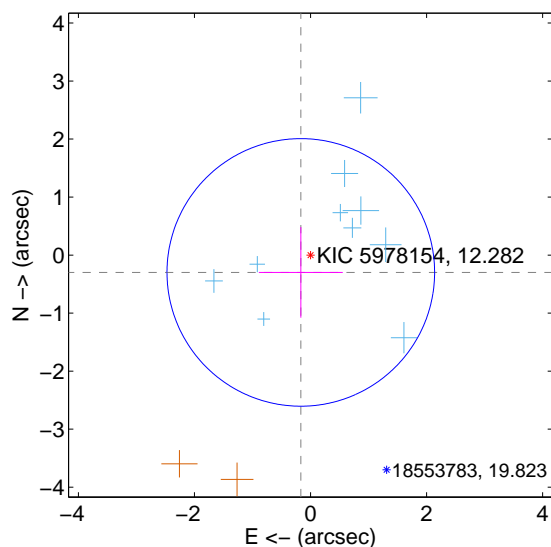
The direct PRF centroid is offset from the target star catalog position by about 0.14 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.221 \pm 0.794$	0.28	$0.142 \pm 0.840$	$-0.169 \pm 0.787$
PRF-fit source offset from KIC position	$0.342 \pm 0.769$	0.45	$0.168 \pm 0.724$	$-0.299 \pm 0.781$
photometric centroid source offset	$1.23 \pm 0.75$	1.64	$0.82 \pm 0.75$	$0.91 \pm 0.75$

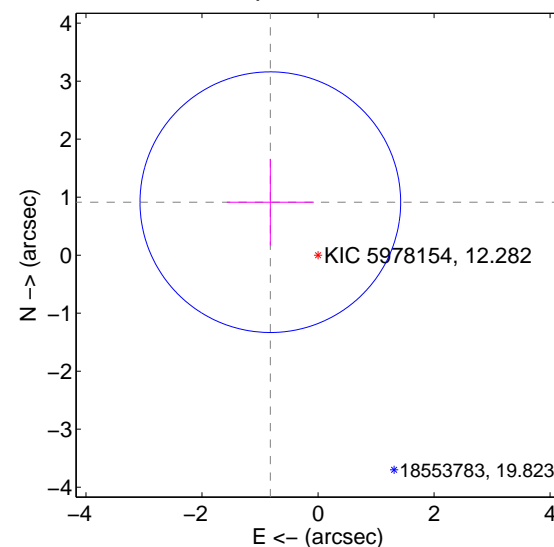
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

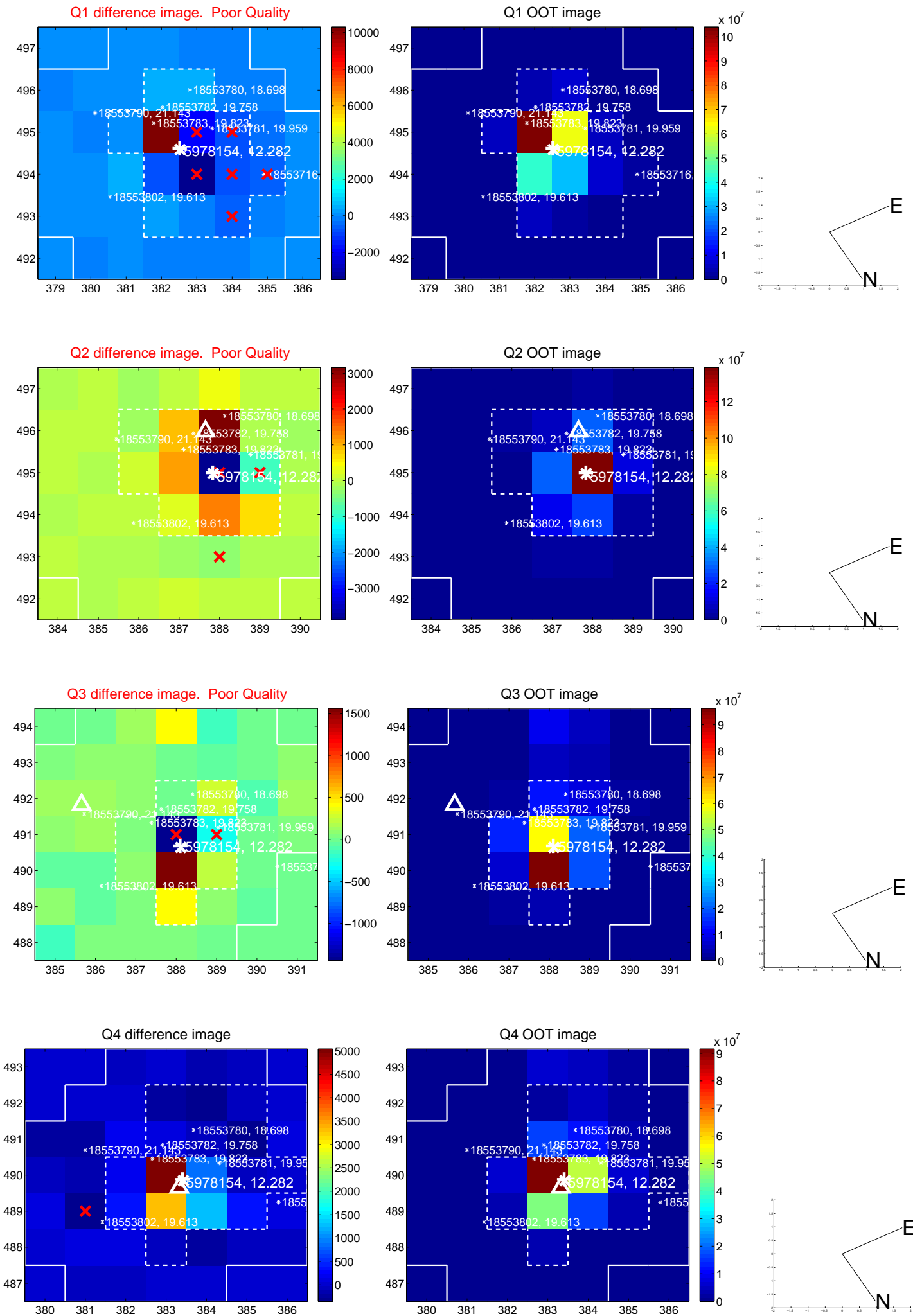


offset from photometric centroids



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.

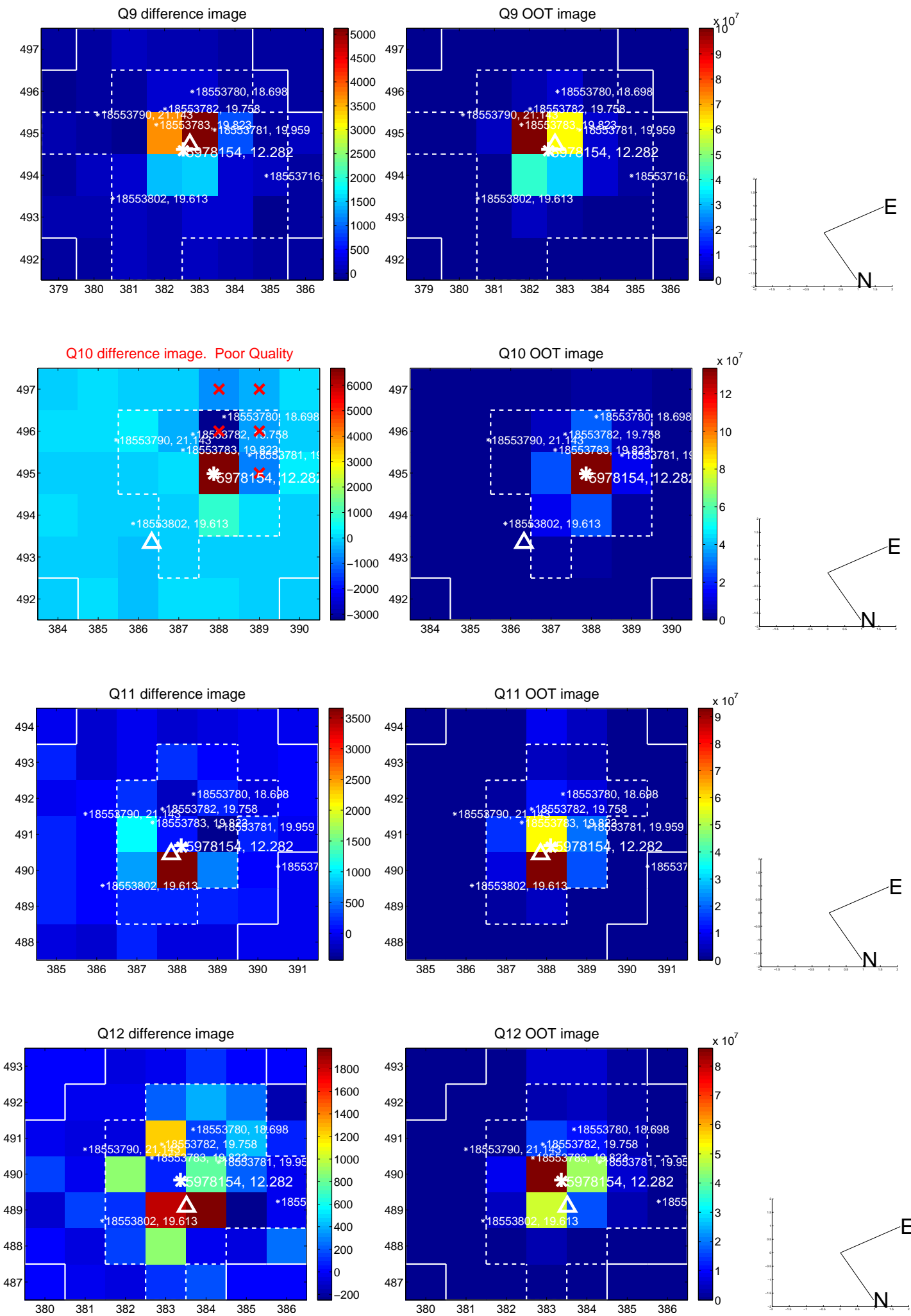
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



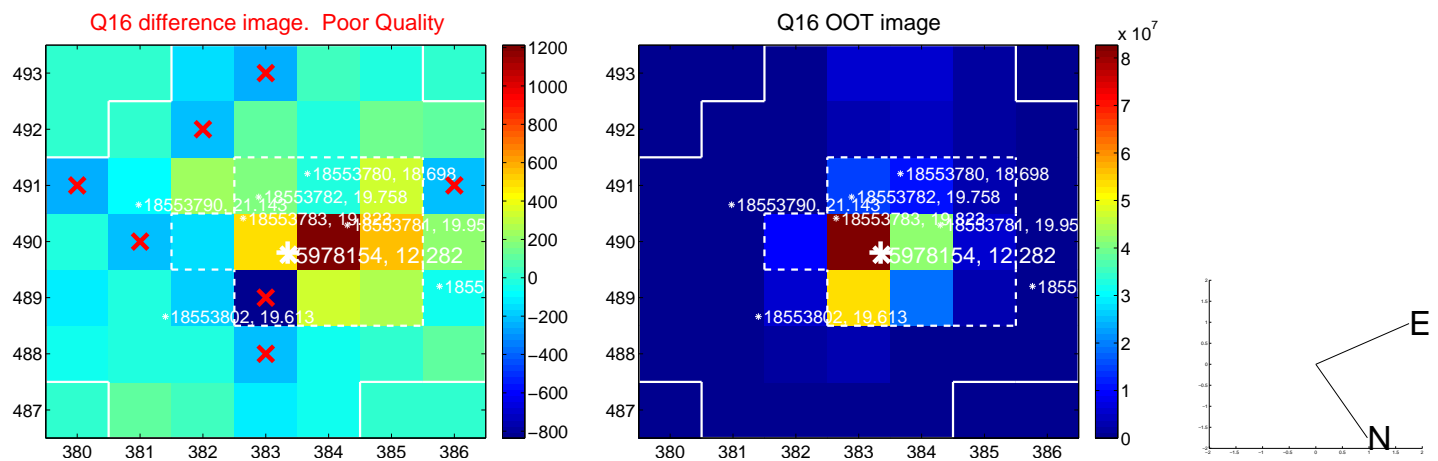
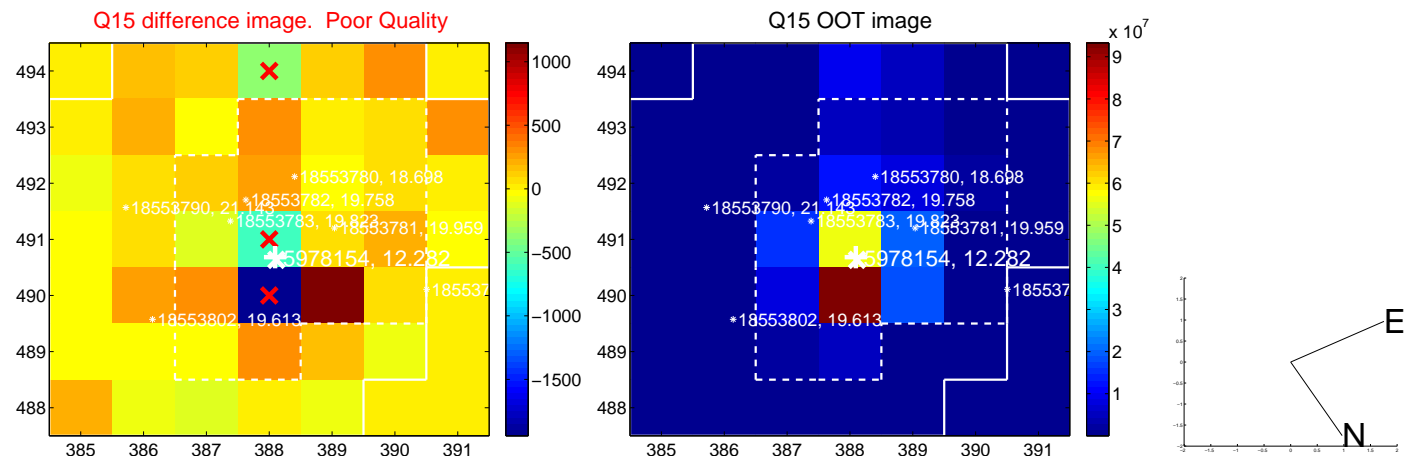
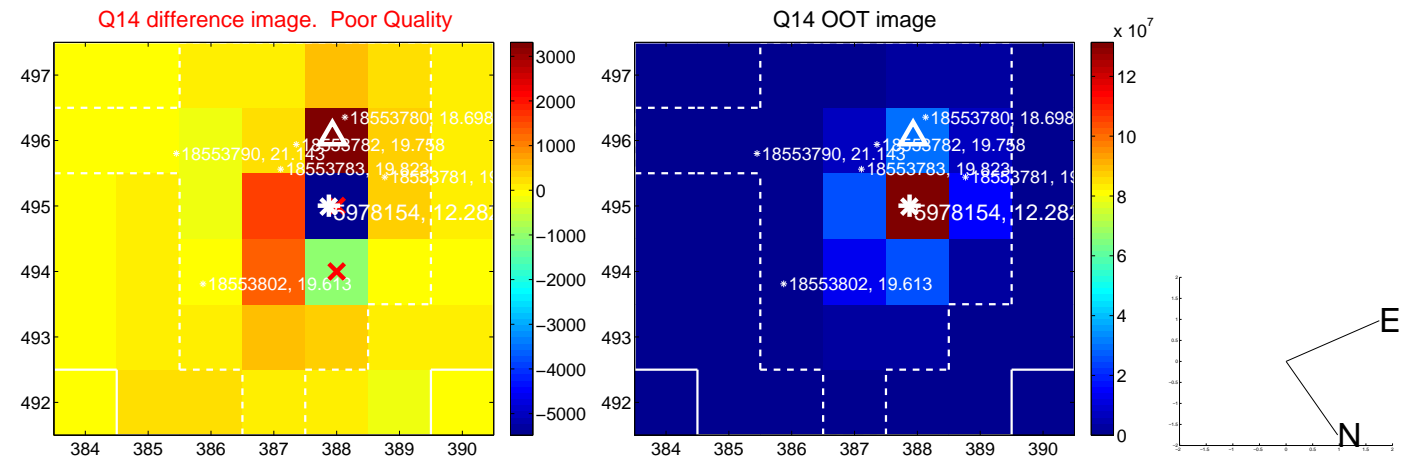
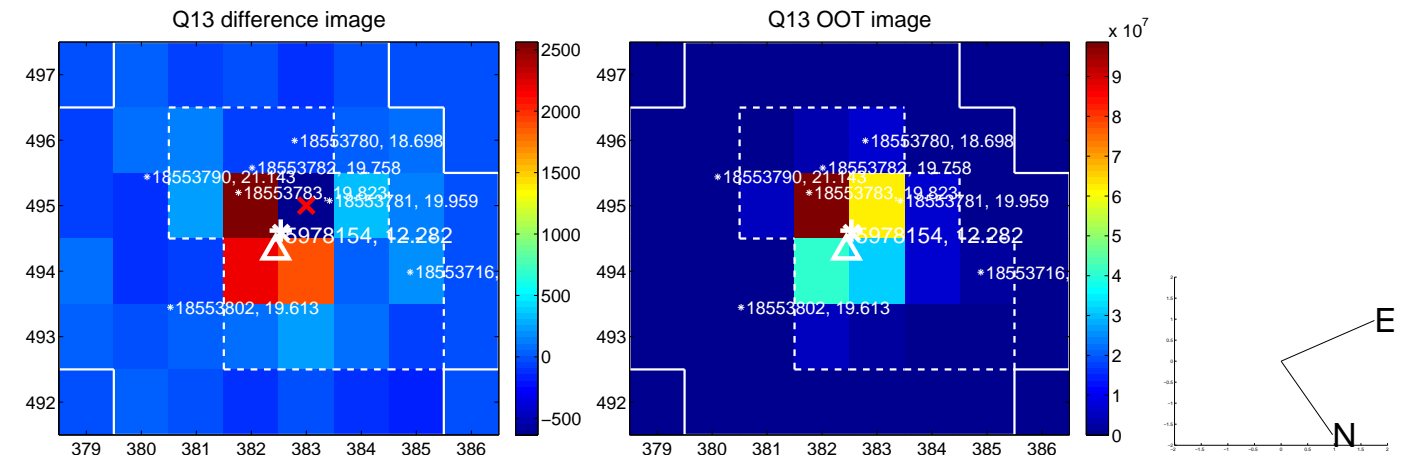




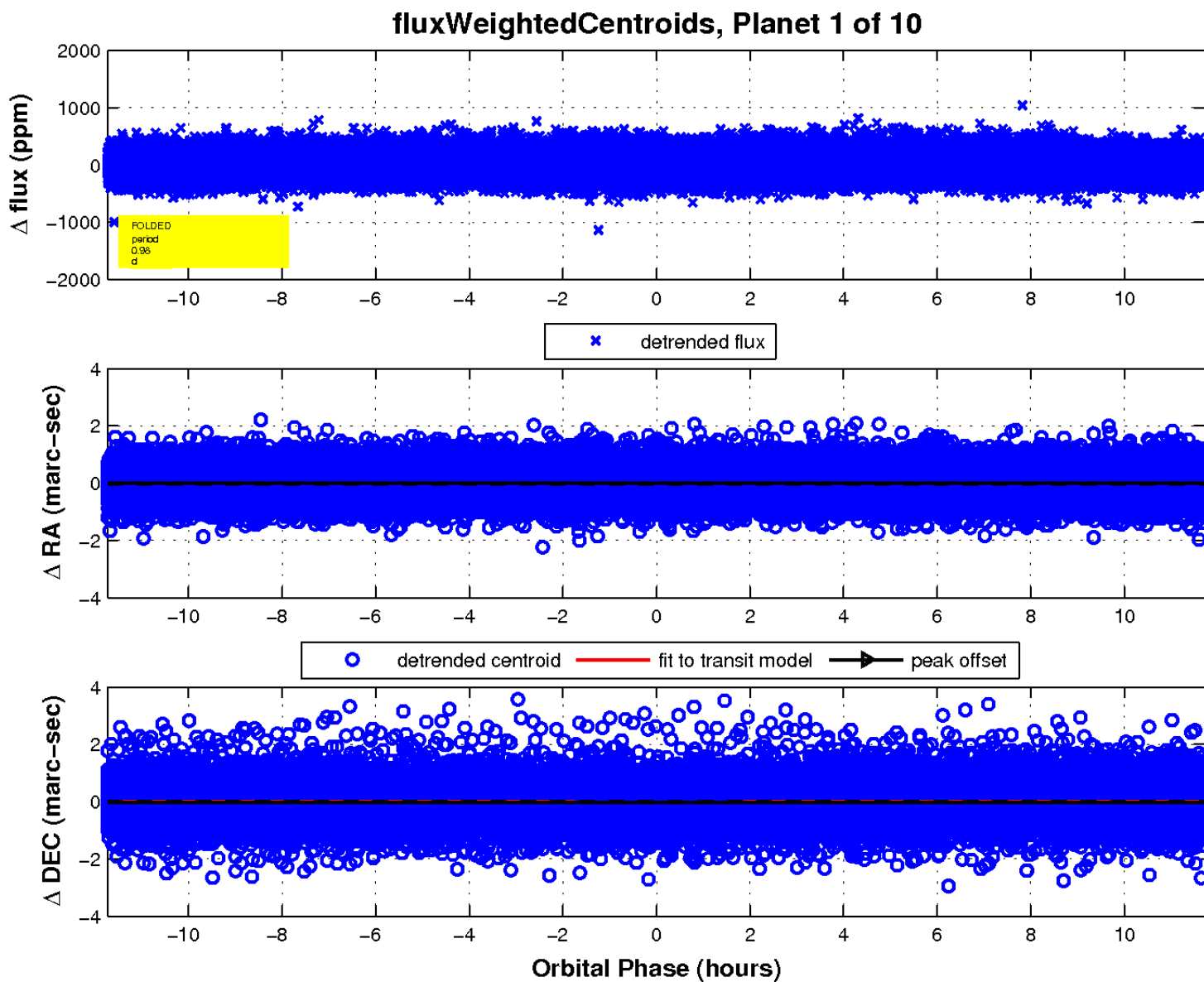
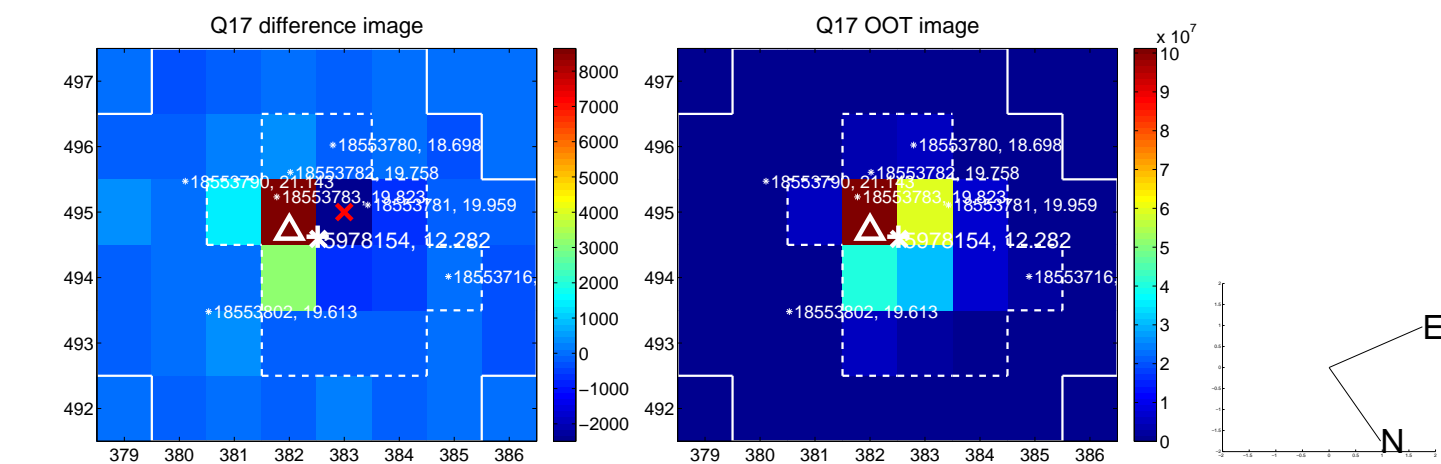
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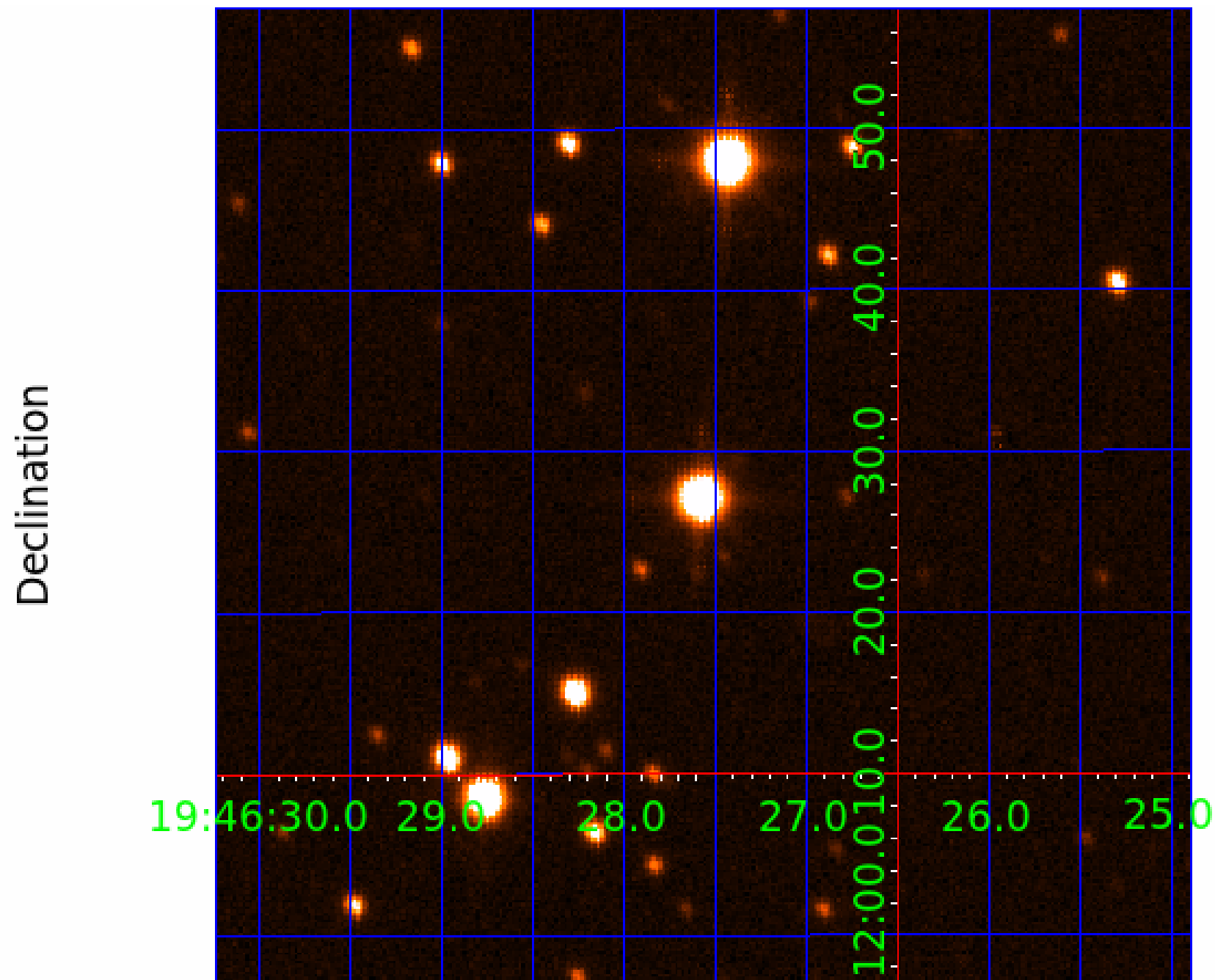


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UKIRT Image



## Q1-17 DR25 TCE Parameters

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## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005978154-01	OBS	FP	0.00	1	0	0	0	SWEET_NTL—LPP_DV
005978154-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT— INCONSISTENT_TRANS
005978154-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
005978154-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
005978154-05	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—HALO_GHOST
005978154-06	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—HALO_GHOST
005978154-07	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
005978154-08	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
005978154-09	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
005978154-10	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT

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

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

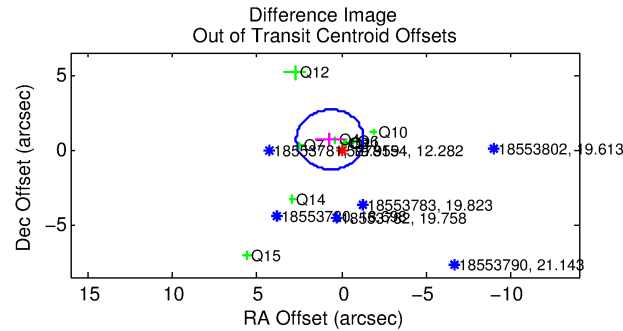
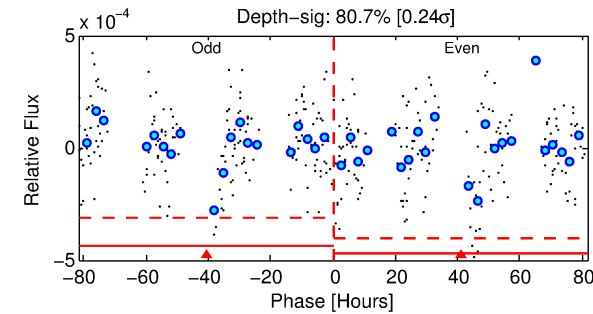
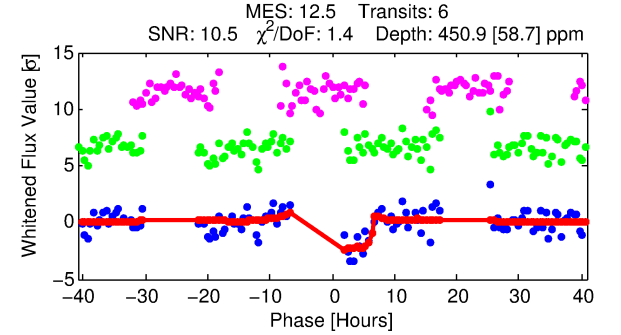
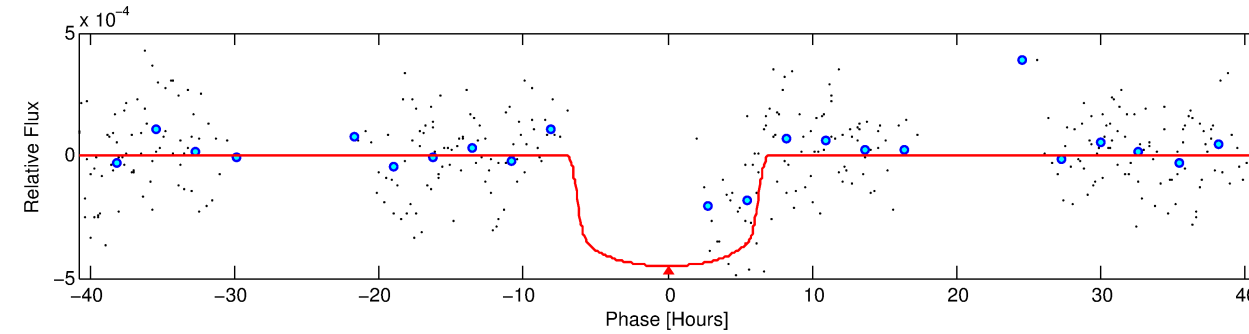
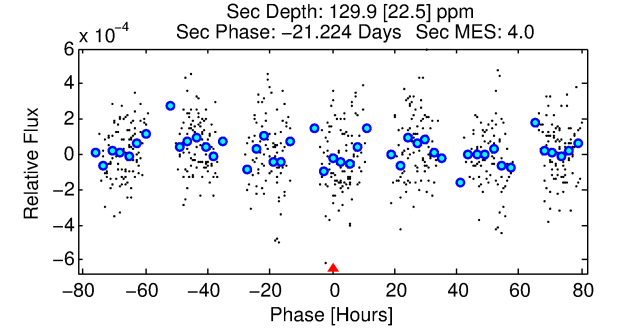
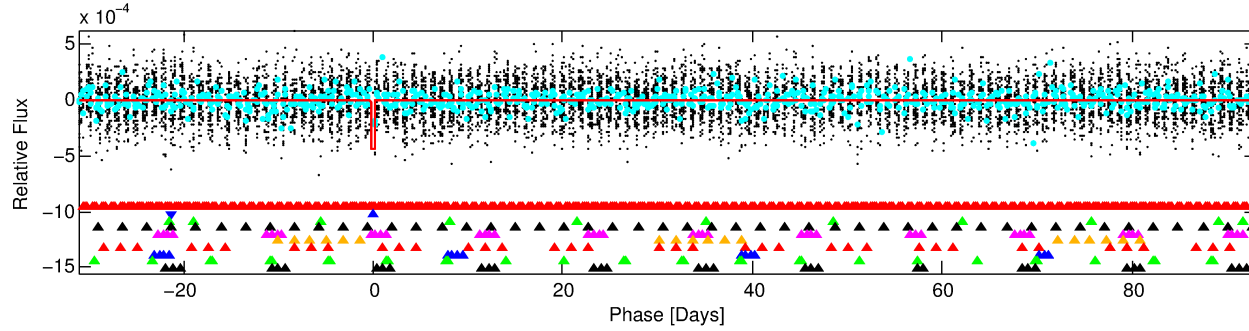
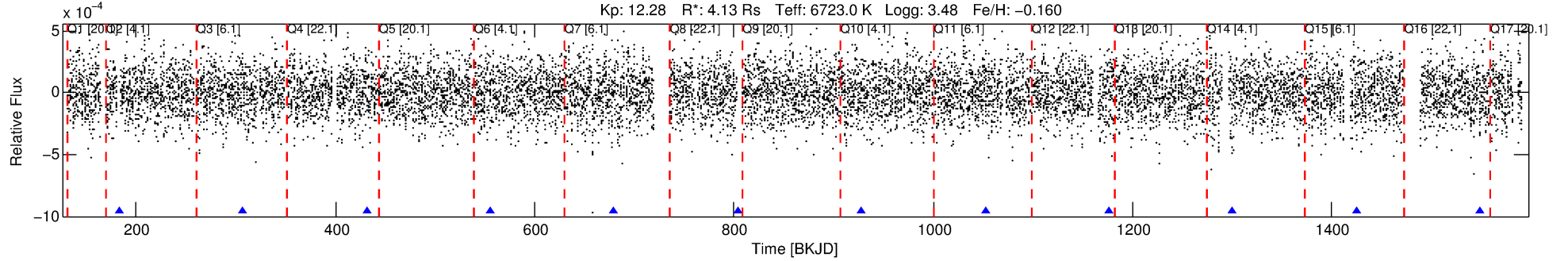
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 005978154-02

No Significant Match Found

# DV One-Page Summary

KIC: 5978154 Candidate: 2 of 10 Period: 124.166 d



## DV Fit Results:

Period = 124.16556 [0.00501] d  
Epoch = 182.9987 [0.0482] BKJD  
Rp/R\* = 0.0219 [0.0024]  
a/R\* = 40.24 [21.62]  
b = 0.84 [0.17]  
Seff = 86.71 [54.39]  
Teff = 778 [122] K  
Rp = 9.87 [4.08] Re  
a = 0.6006 [0.2302] AU  
Ag = 264.81 [178.29] [1.48 $\sigma$ ]  
Teffp = 4853 [374] K [10.36 $\sigma$ ]

## DV Diagnostic Results:

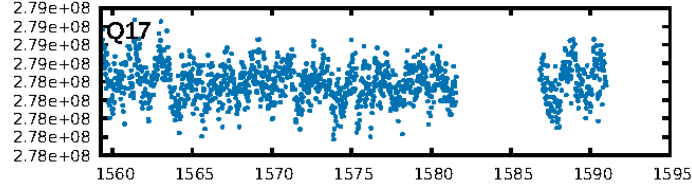
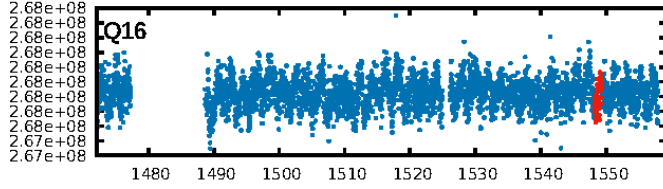
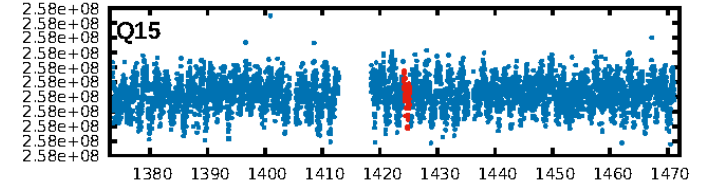
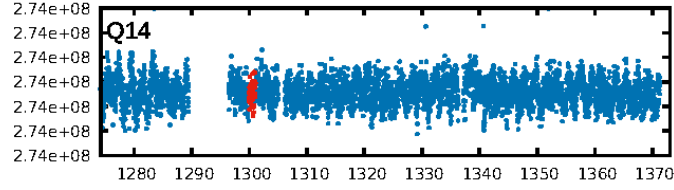
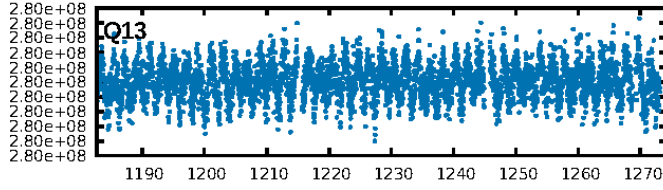
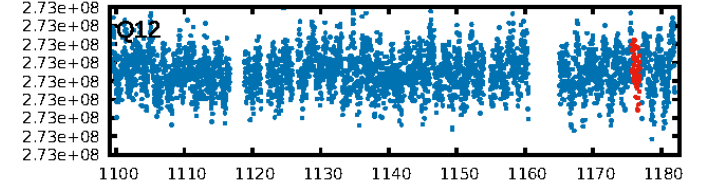
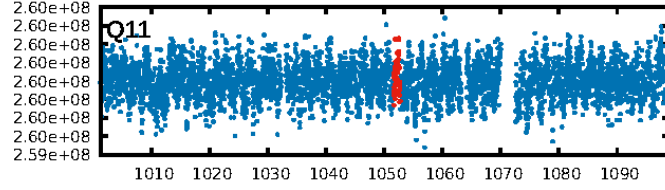
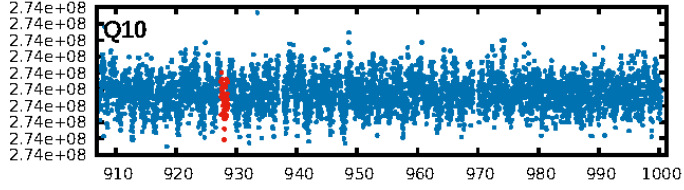
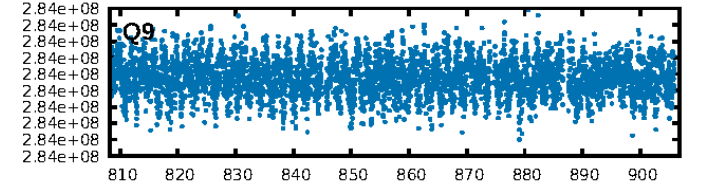
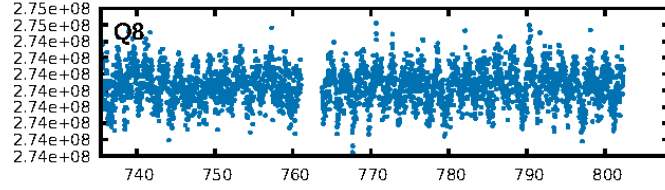
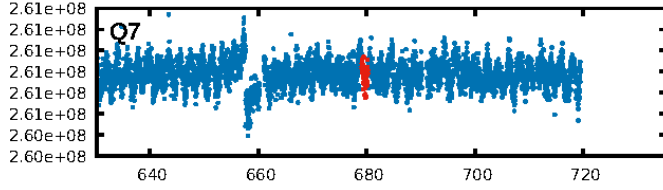
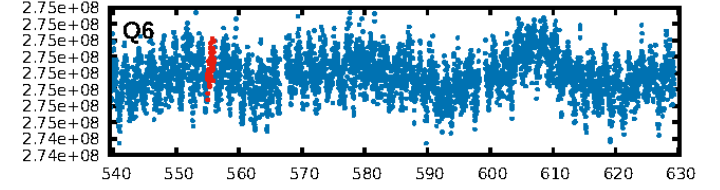
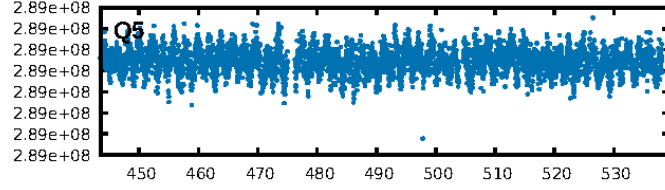
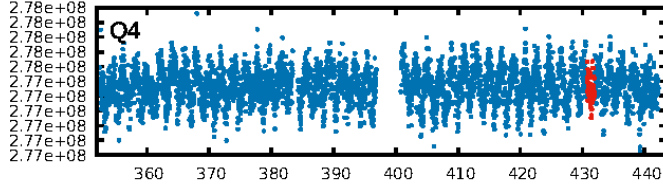
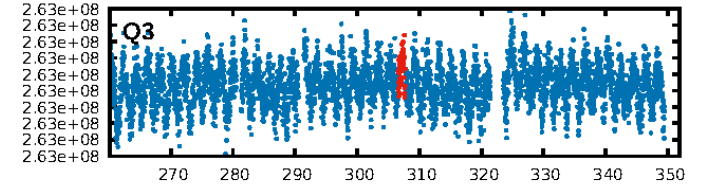
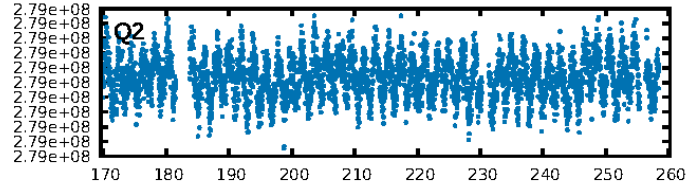
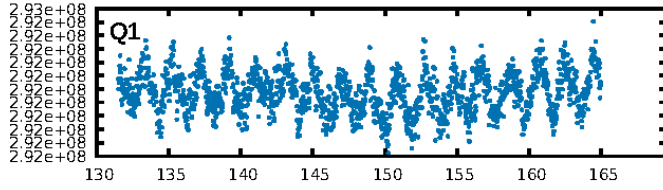
ShortPeriod-sig: 100.0% [52.05 $\sigma$ ]  
LongPeriod-sig: 100.0% [21.55 $\sigma$ ]  
ModelChiSquare2-sig: 31.1%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [6/6]  
GhostDiagnostic-chr: -6.31  
Centroid-sig: 1.0%  
Centroid-so: 0.791 arcsec [3.40 $\sigma$ ]  
OotOffset-rm: 0.962 arcsec [1.45 $\sigma$ ]  
KicOffset-rm: 0.897 arcsec [1.23 $\sigma$ ]  
OotOffset-st: 3/4/2/0 [9]  
KicOffset-st: 3/4/2/0 [9]  
DiffImageQuality-fgm: 0.33 [3/9]  
DiffImageOverlap-fno: 0.00 [0/9]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 03-Feb-2016 05:53:54 Z

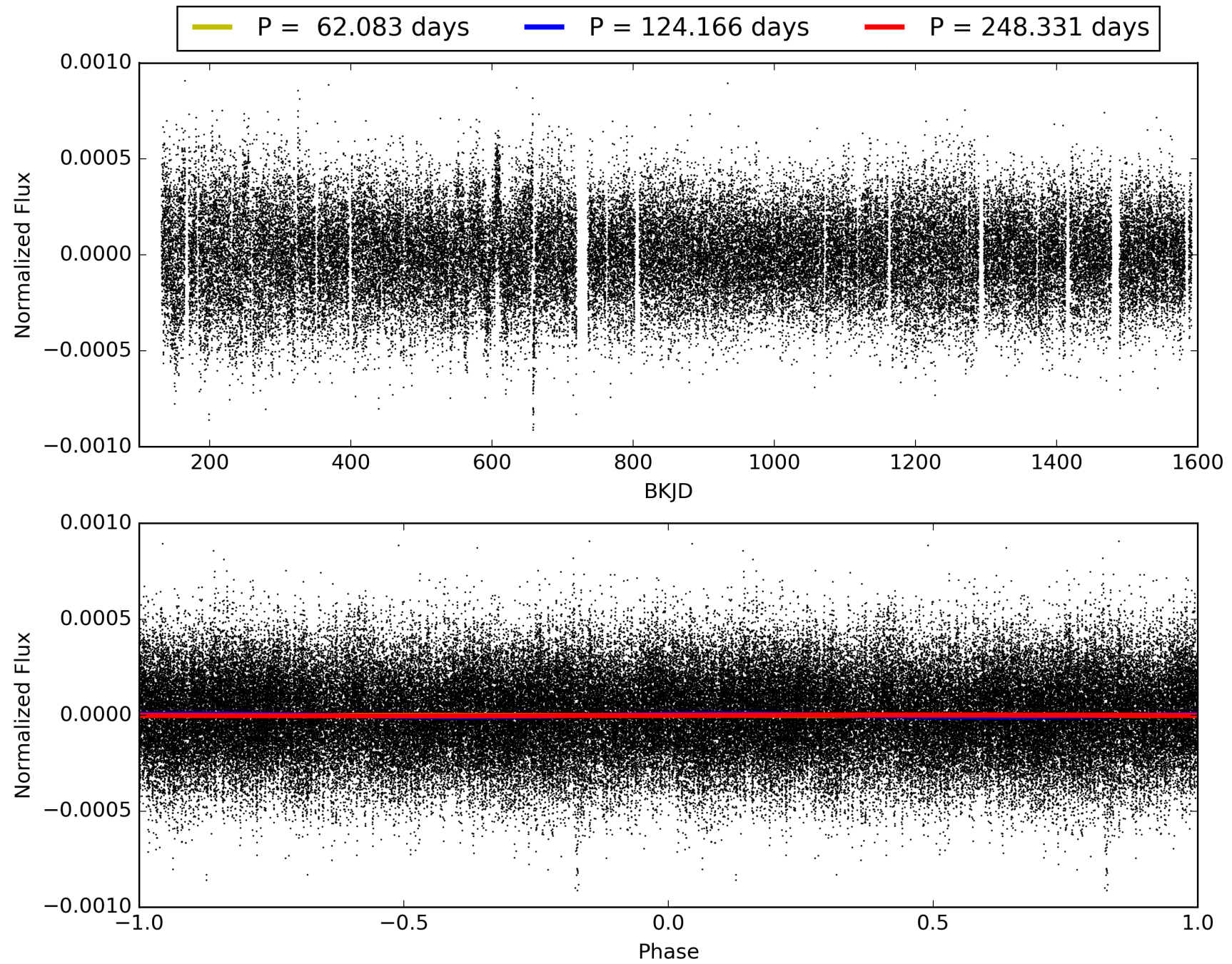
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center



# TCE 005978154-02, PDC Light Curves

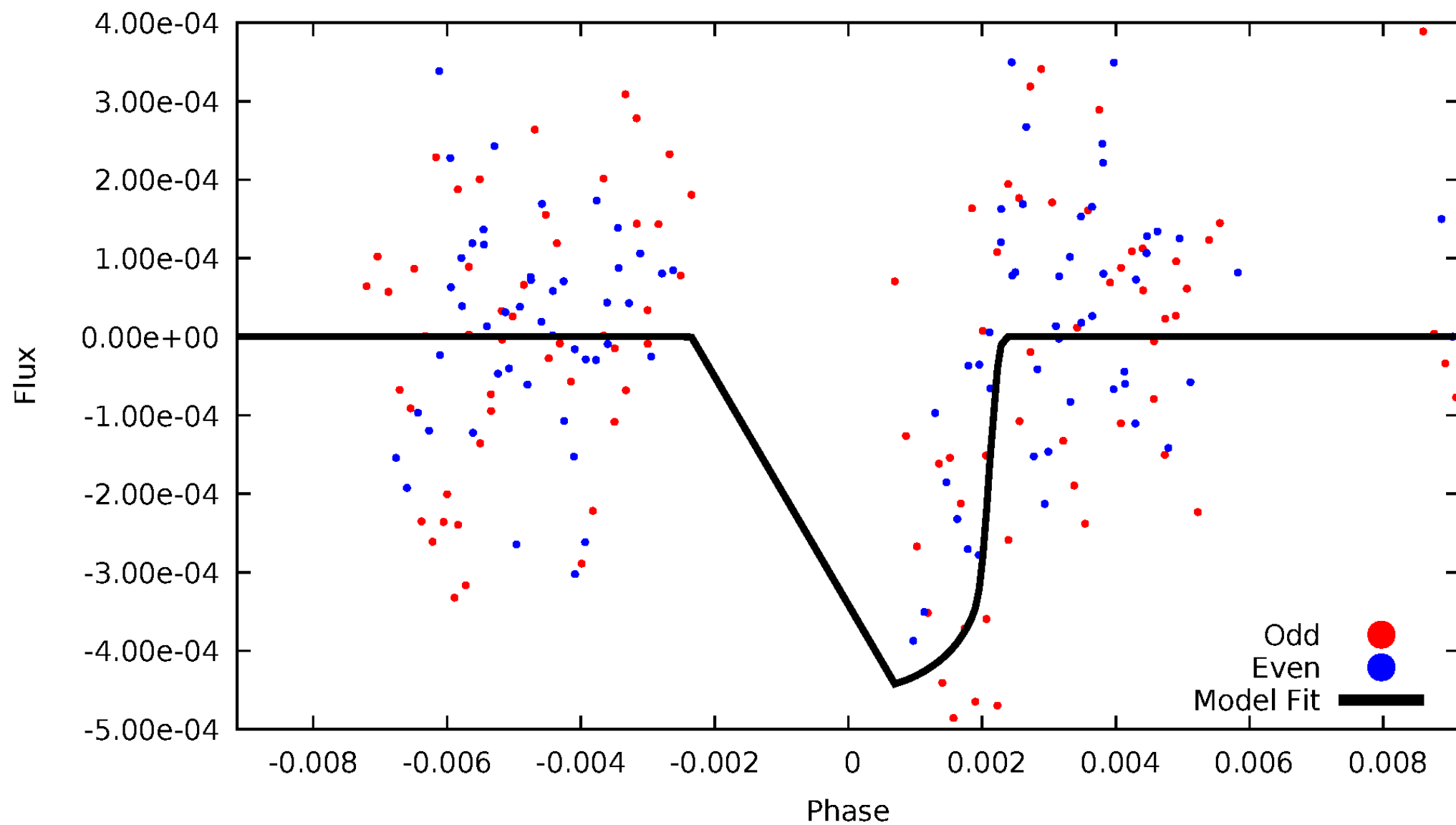


TCE 005978154-02



# DV Odd/Even

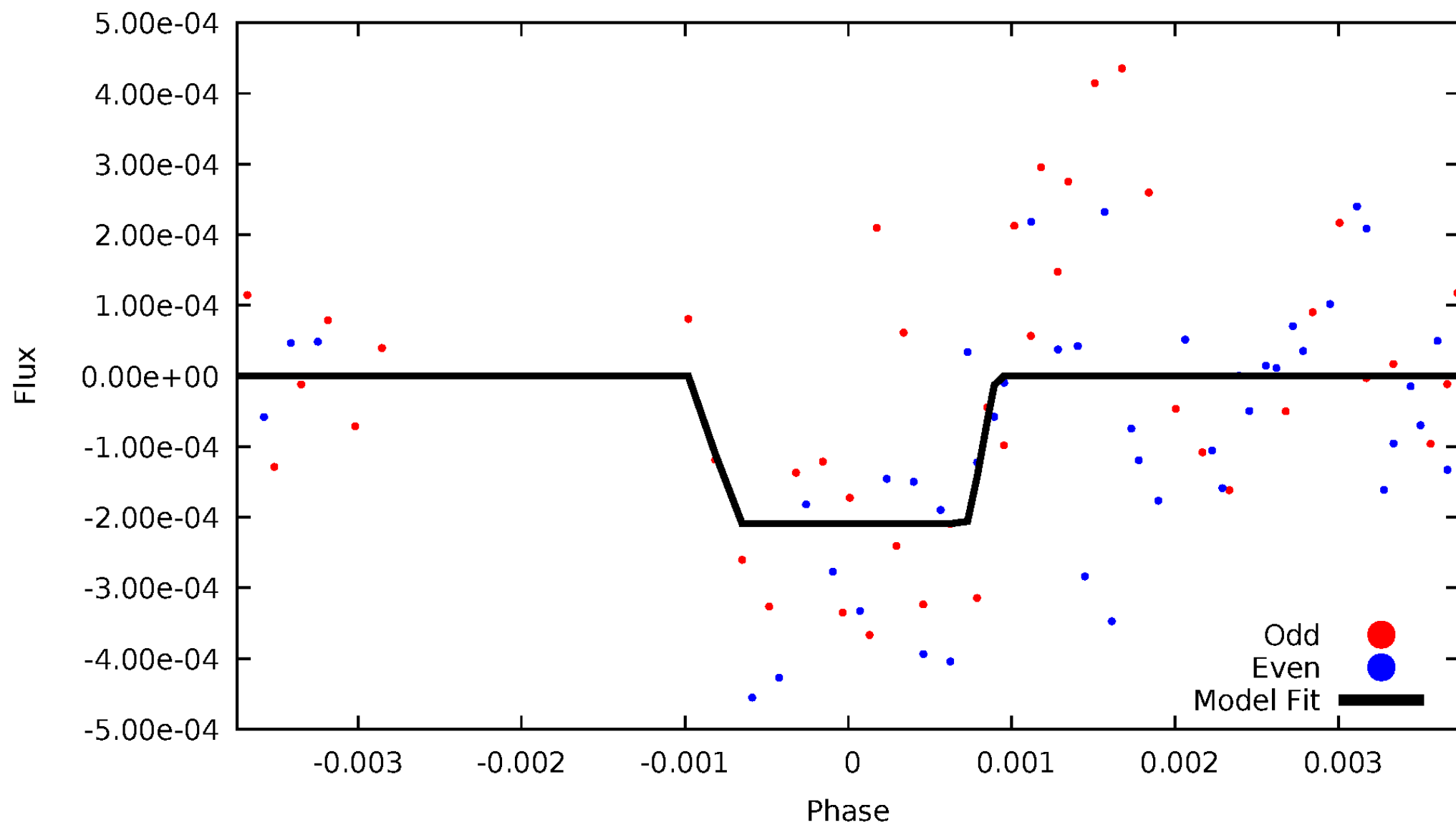
TCE 005978154-02





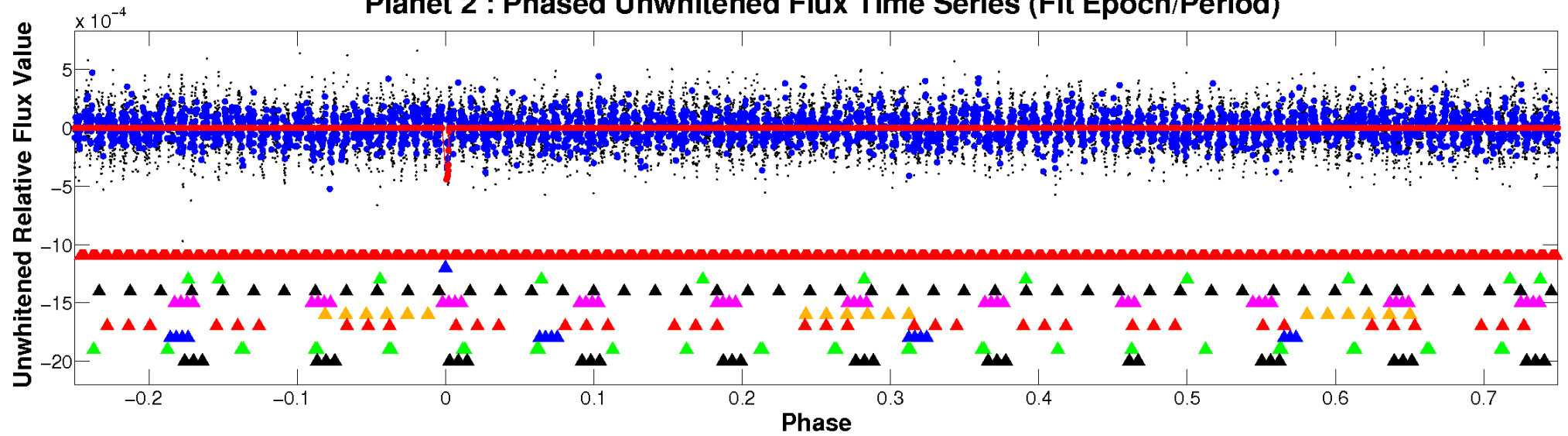
# ALT Odd/Even

TCE 005978154-02

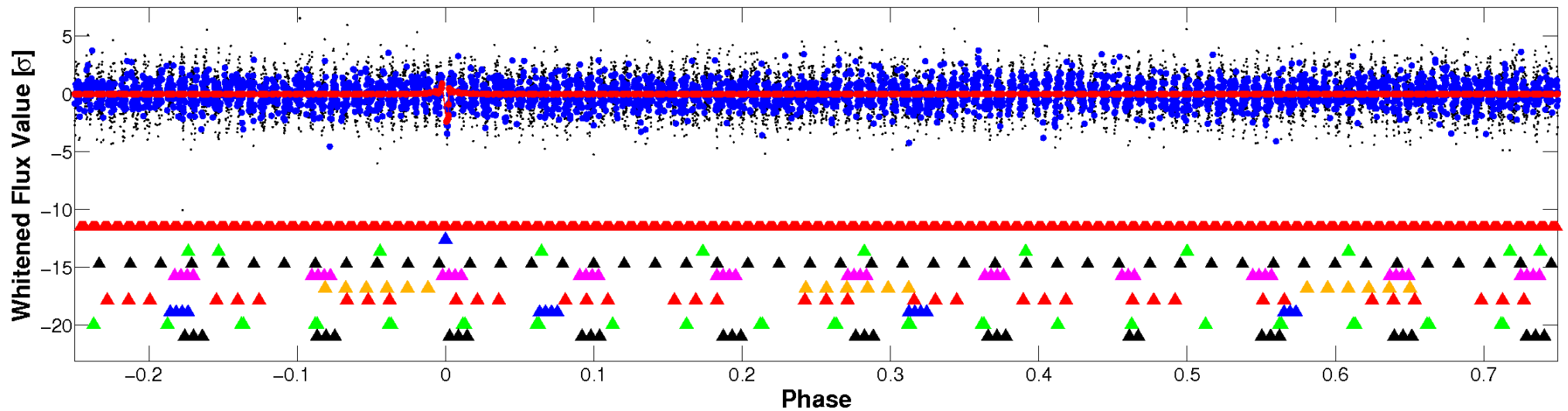


# Non-Whitened Vs. Whitened Light Curve

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

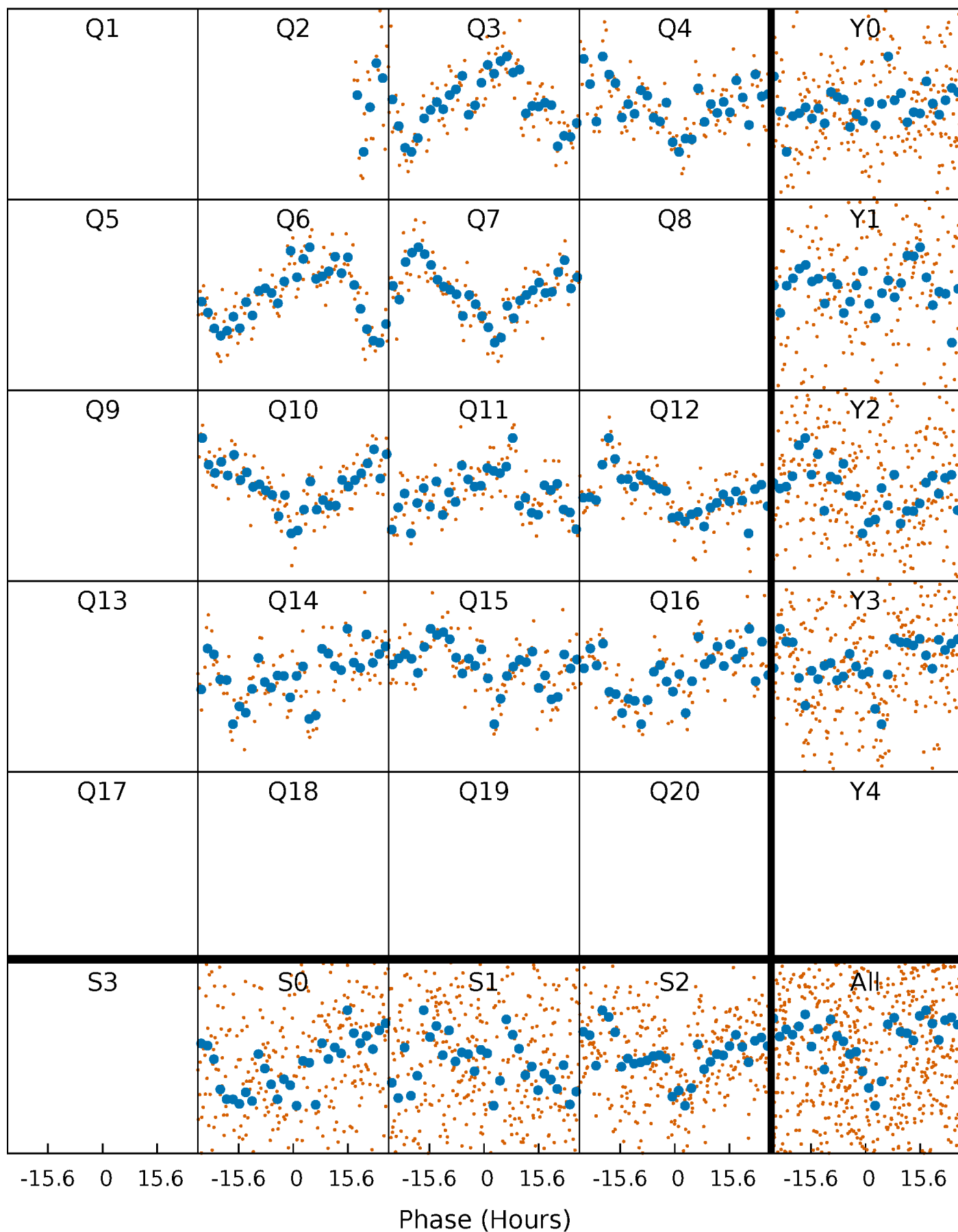


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



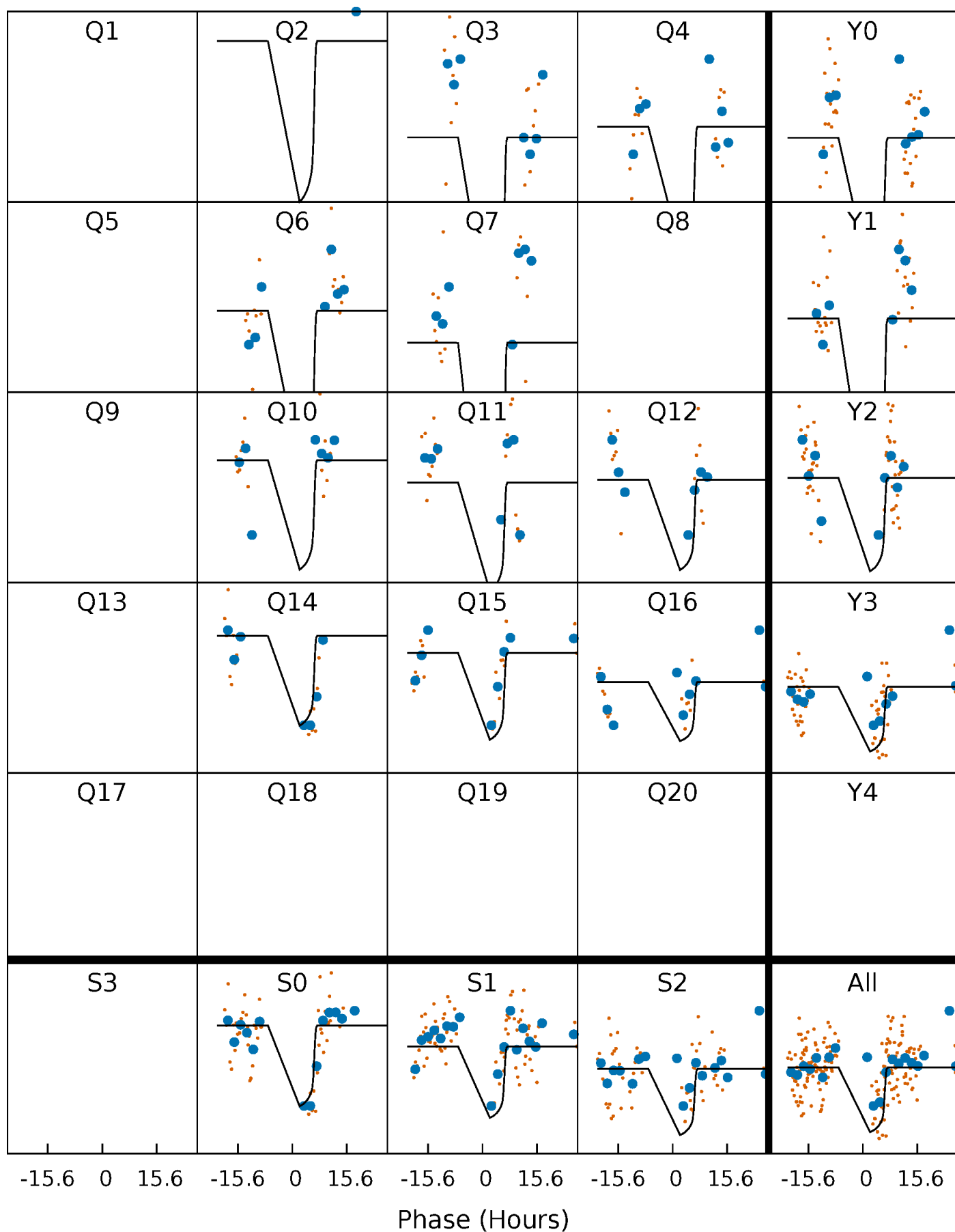
# PDC Quarter-Phased Transit Curves

TCE 005978154-02 P=124.165564 Days  $T_0=182.998698$  (BKJD)



# DV Quarter-Phased Transit Curves

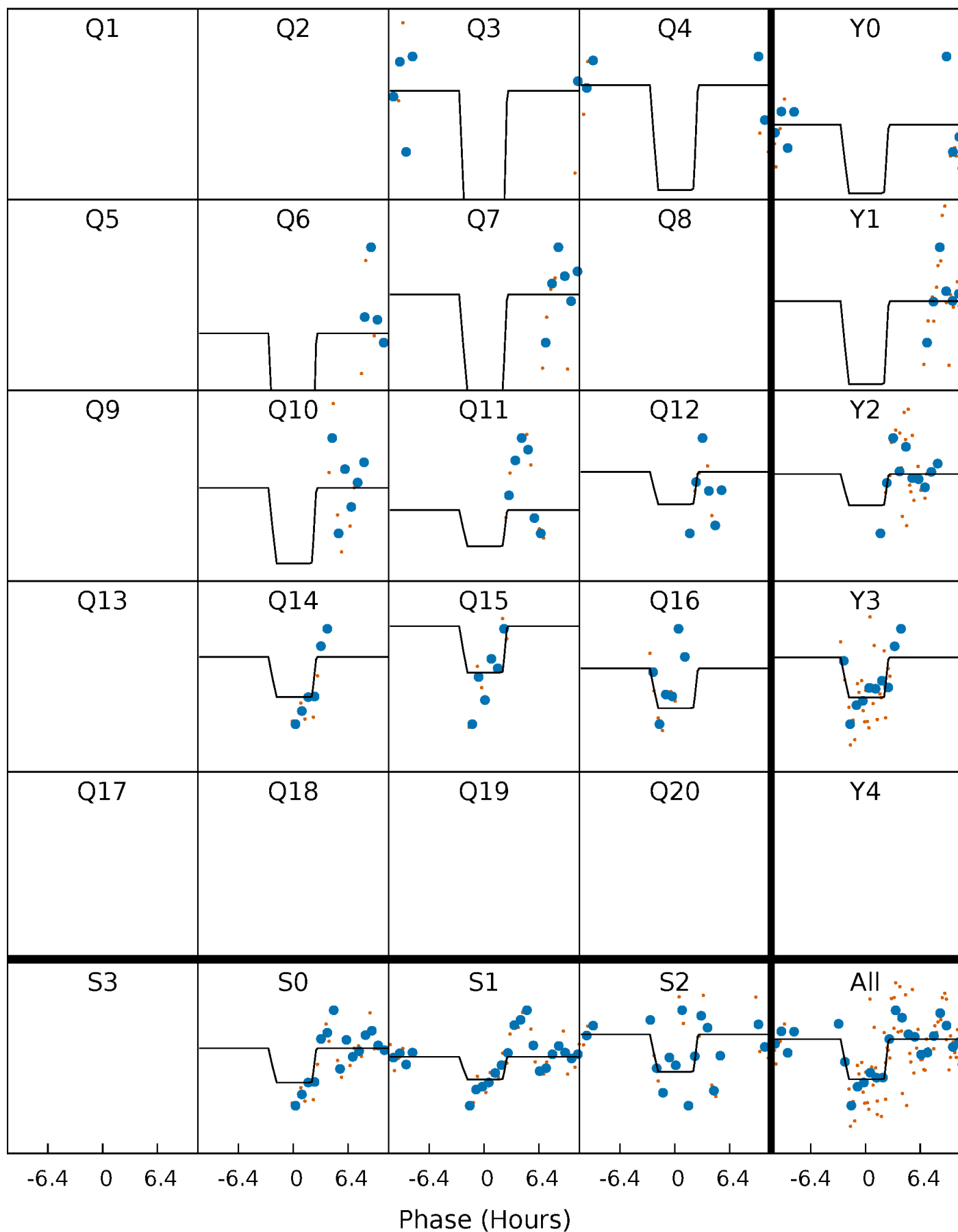
TCE 005978154-02 P=124.165564 Days  $T_0=182.998698$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

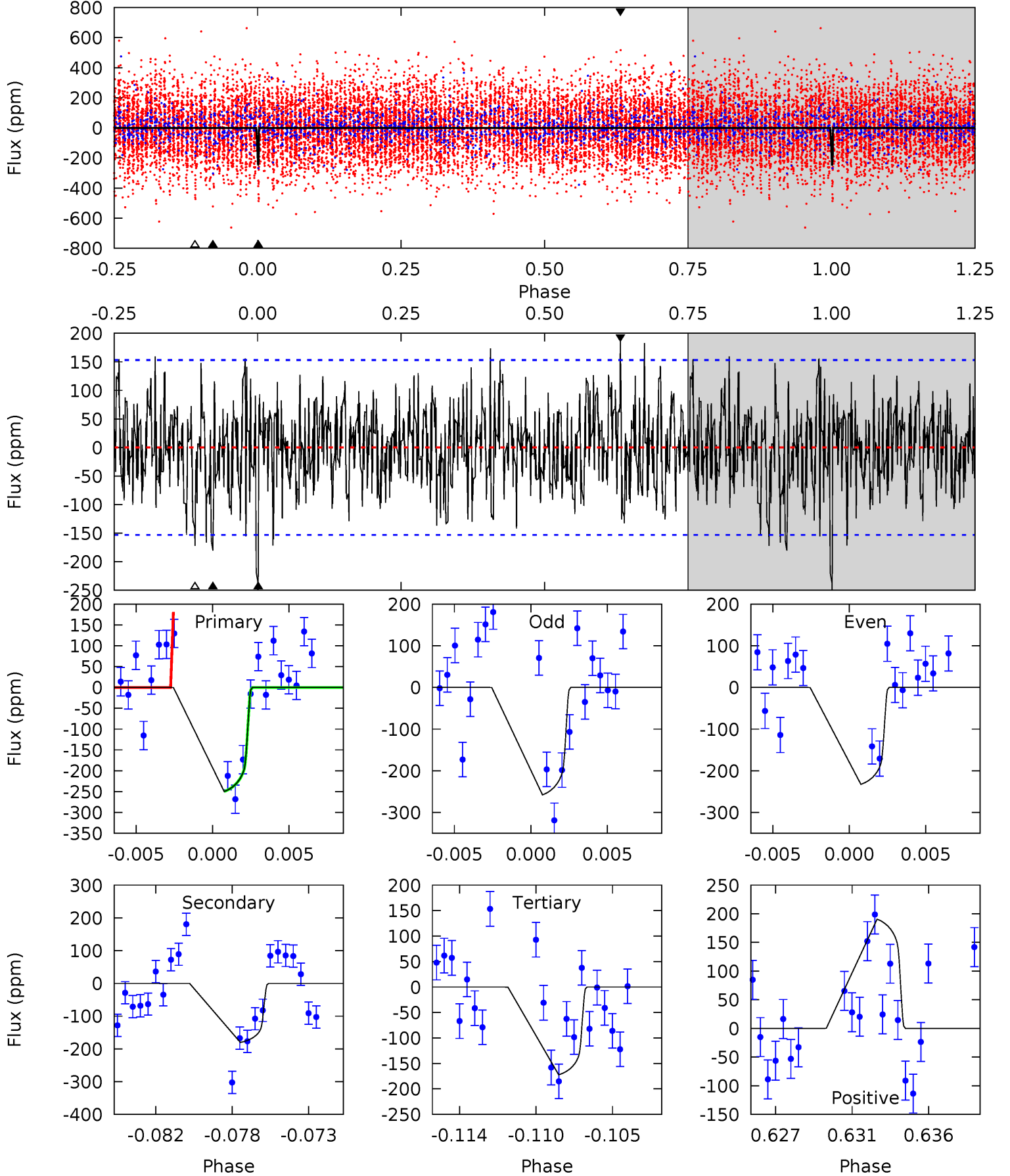
TCE 005978154-02 P=124.180020 Days  $T_0=183.047599$  (BKJD)



# DV Model-Shift Uniqueness Test

005978154-02, P = 124.165564 Days, E = 58.833134 Days

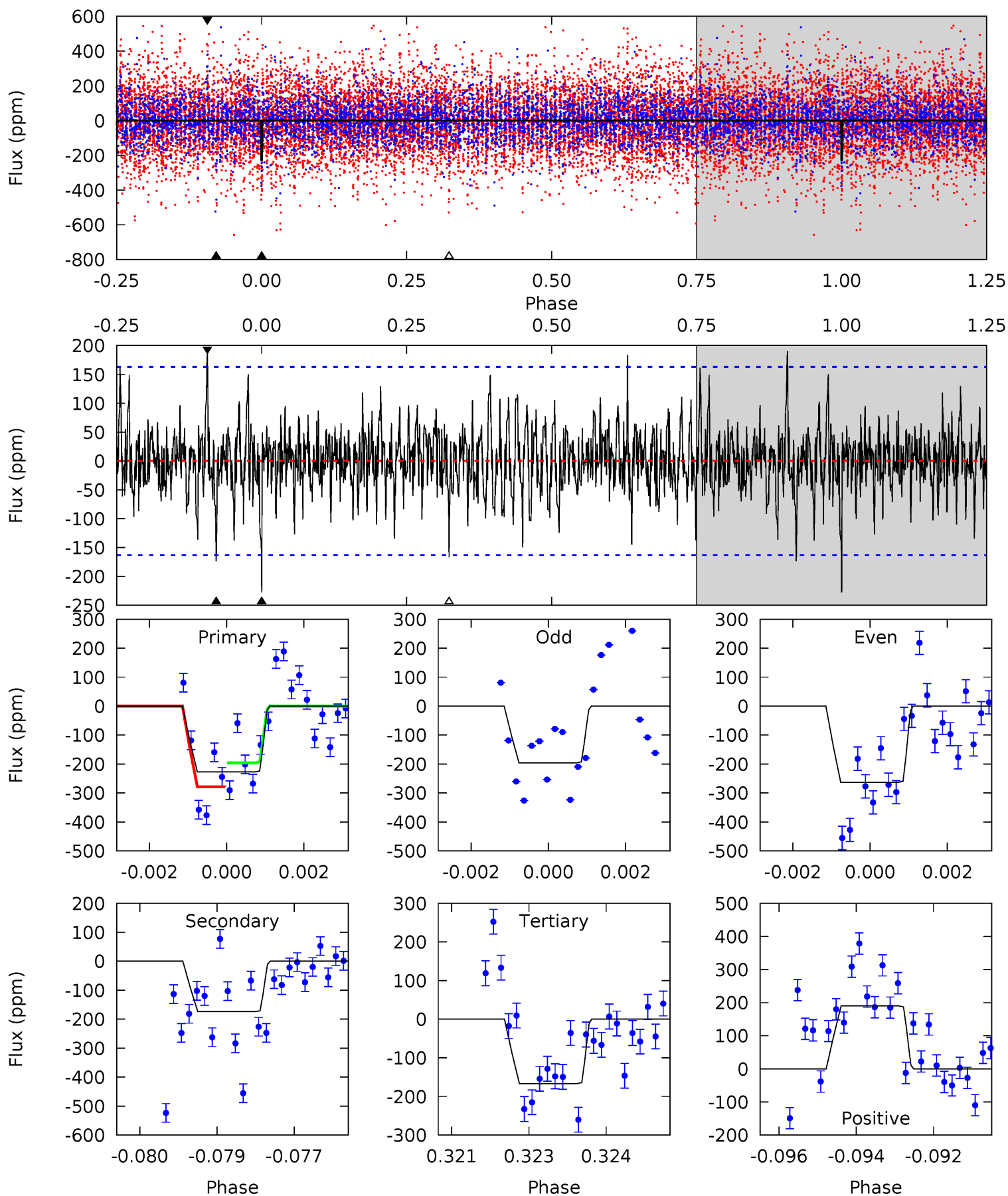
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.45	6.10	5.82	6.44	5.17	2.84	1.85	2.62	2.00	0.27	-0.35	0.42	1.19	0.43	0.00



# Alt Model-Shift Uniqueness Test

005978154-02,  $P = 124.180020$  Days,  $E = 58.867579$  Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
7.48	5.71	5.48	6.25	5.36	3.14	1.42	2.00	1.23	0.23	-0.54	1.11	0.93	0.46	1.28



### Stellar Parameters For KIC 005978154

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$6723^{+202}_{-223}$	$3.478^{+0.360}_{-0.090}$	$-0.160^{+0.300}_{-0.250}$	$4.134^{+0.412}_{-1.647}$	$1.872^{+0.171}_{-0.398}$	$0.037^{+0.107}_{-0.011}$
	+3%/-3%	+10%/-3%	+188%/-156%	+10%/-40%	+9%/-21%	+286%/-29%
Source	PHO1	FLK73	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 005978154-02 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-180 \pm 30$	$9.41^{+1.51}_{-1.85}$	$1072^{+59}_{-97}$	$5300^{+379}_{-330}$	$406^{+197}_{-119}$
Alt.	$-174 \pm 30$	$6.12^{+1.43}_{-1.51}$	$1066^{+67}_{-107}$	$6389^{+713}_{-598}$	$877^{+731}_{-294}$

$T_{\text{max}}$  = 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

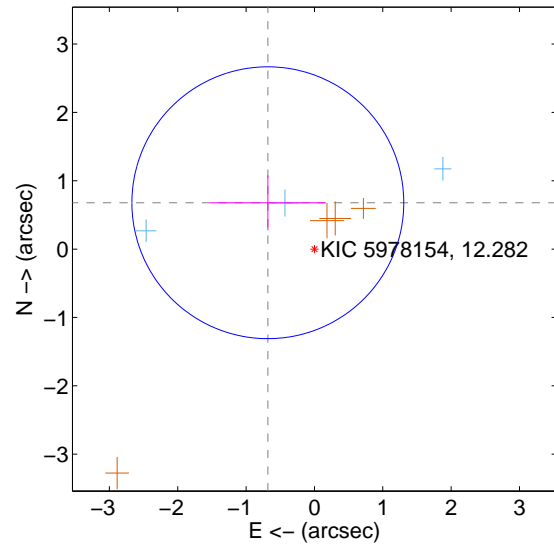
Supplemental centroid analysis for 005978154-02. Kepler magnitude: 12.28. Transit SNR 10.50

There are 3 quarters with good PRF difference image offsets

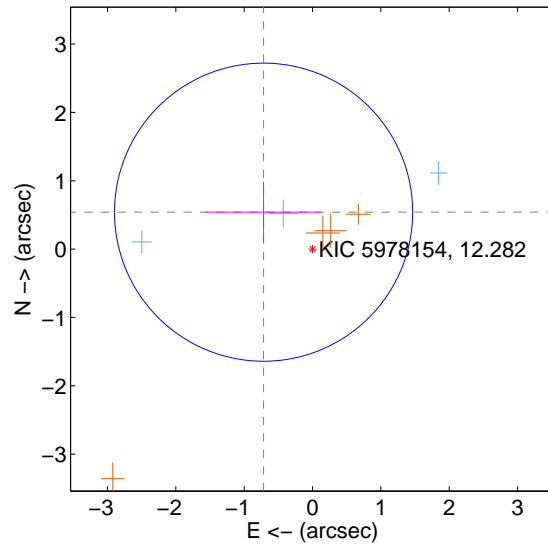
The direct PRF centroid is offset from the target star catalog position by about 0.20 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.962 \pm 0.663$	1.45	$0.682 \pm 0.845$	$0.678 \pm 0.402$
PRF-fit source offset from KIC position	$0.897 \pm 0.727$	1.23	$0.716 \pm 0.847$	$0.540 \pm 0.443$
photometric centroid source offset	$0.79 \pm 0.23$	3.40	$0.34 \pm 0.24$	$-0.71 \pm 0.23$

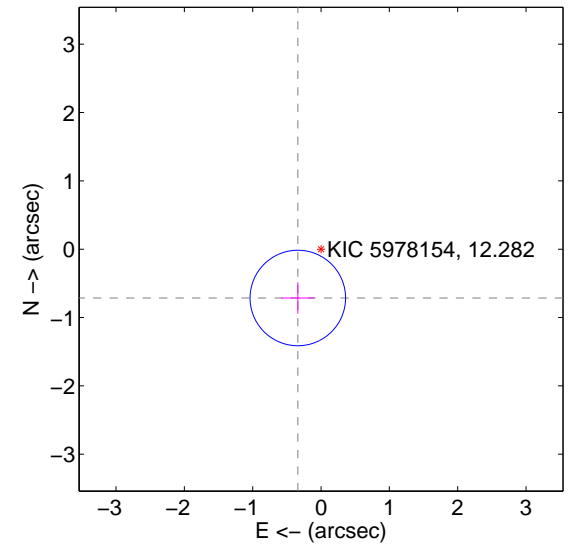
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

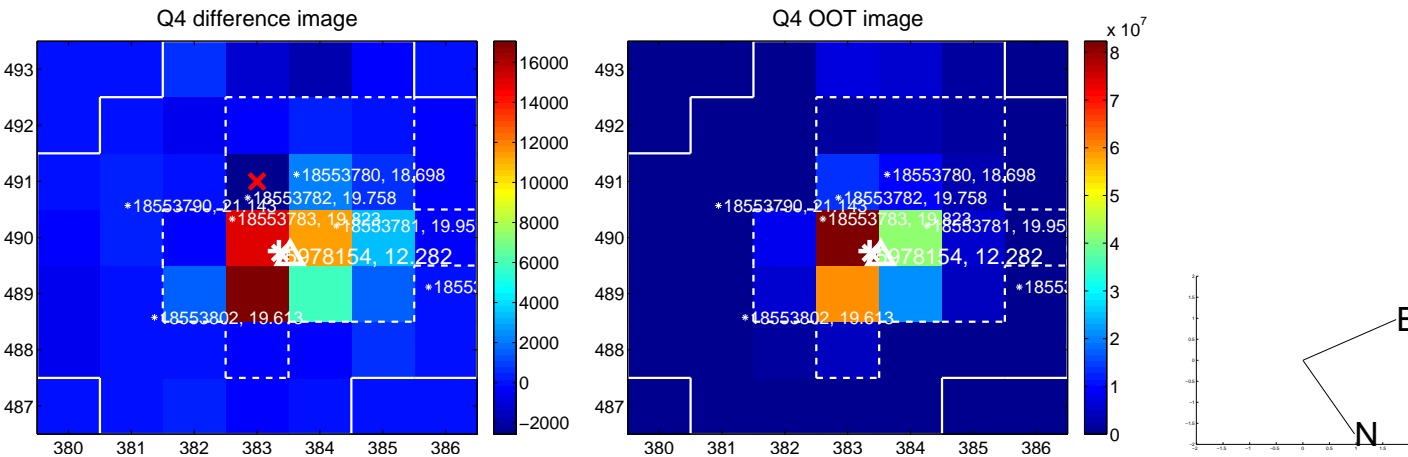
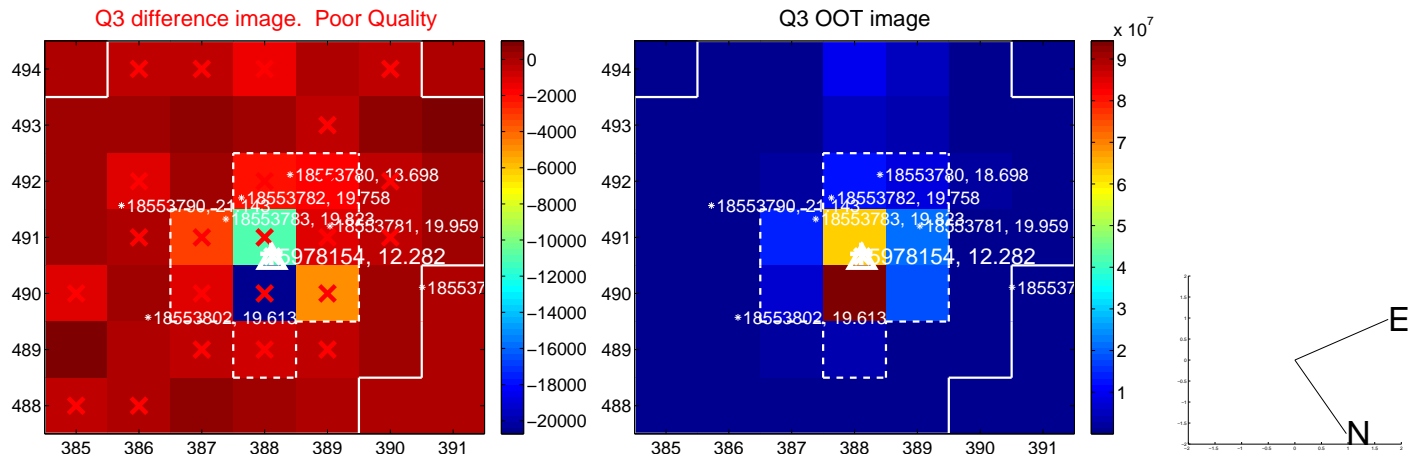
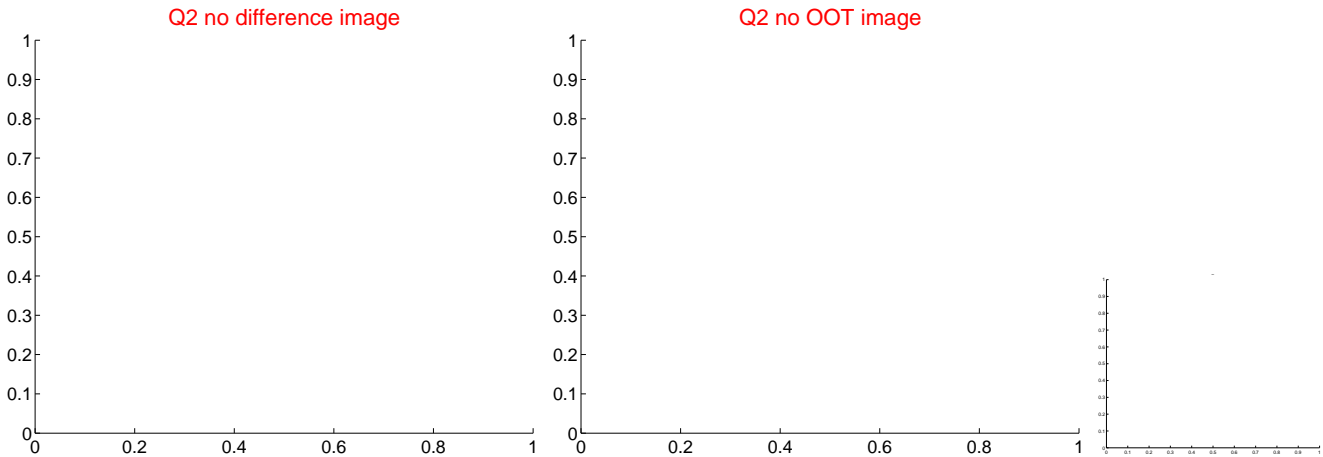
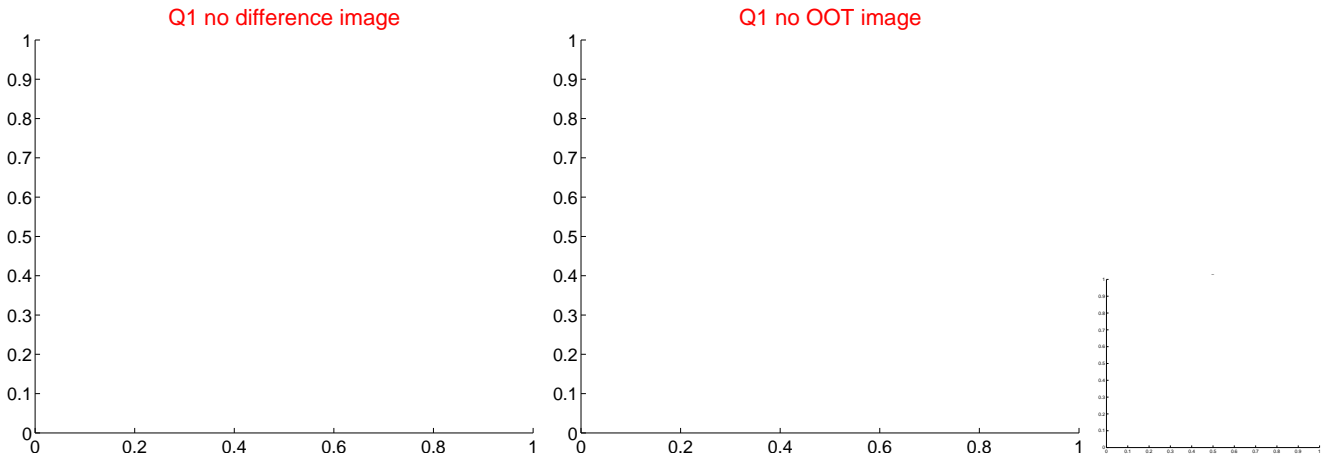


offset from photometric centroids



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.

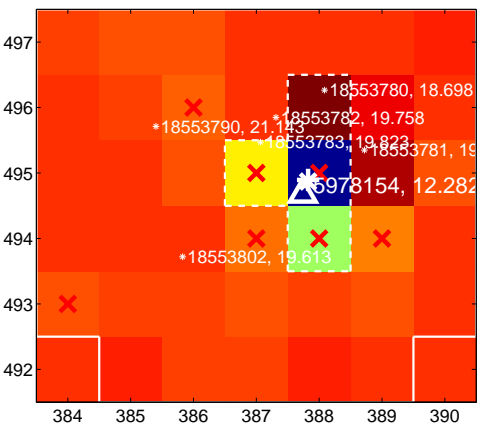
Q5 no difference image



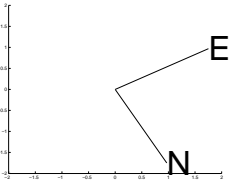
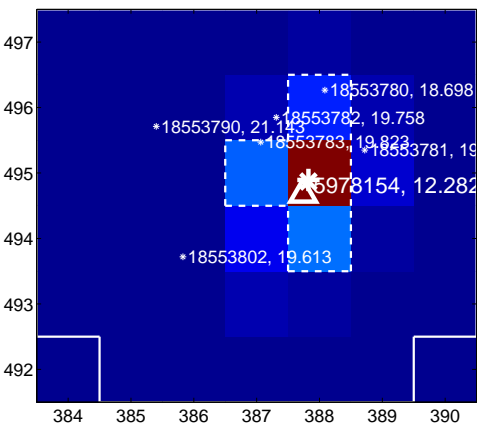
Q5 no OOT image



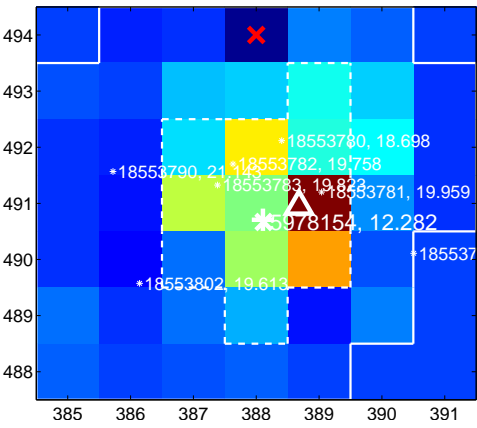
Q6 difference image. Poor Quality



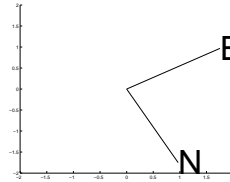
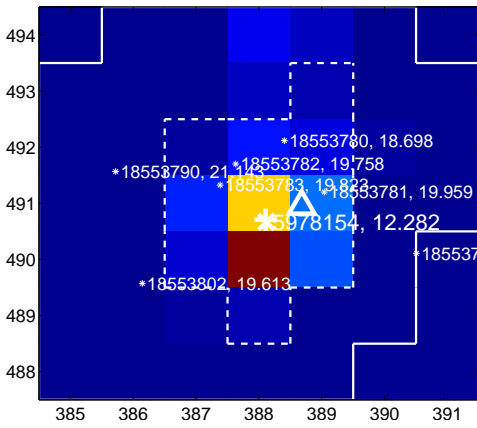
Q6 OOT image



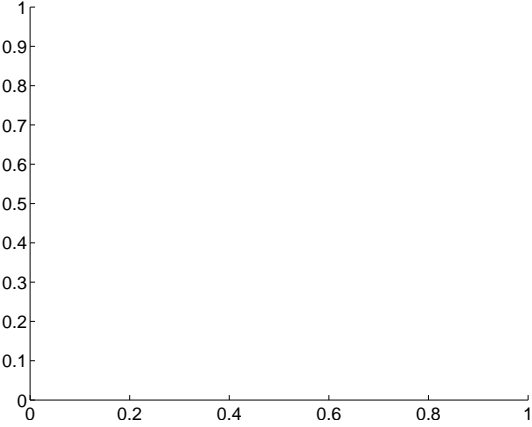
Q7 difference image



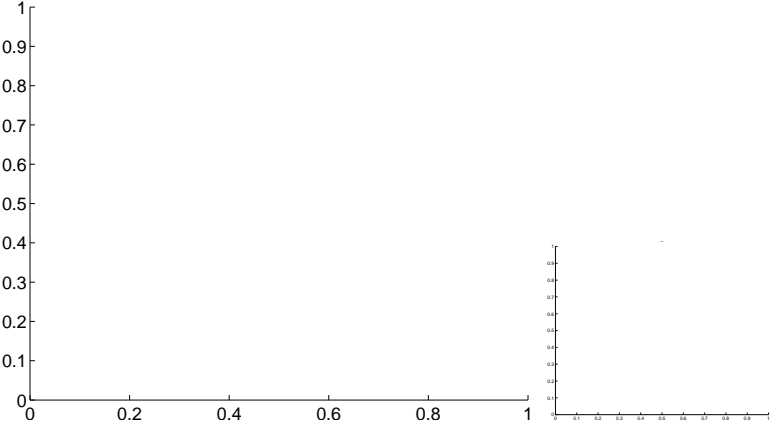
Q7 OOT image



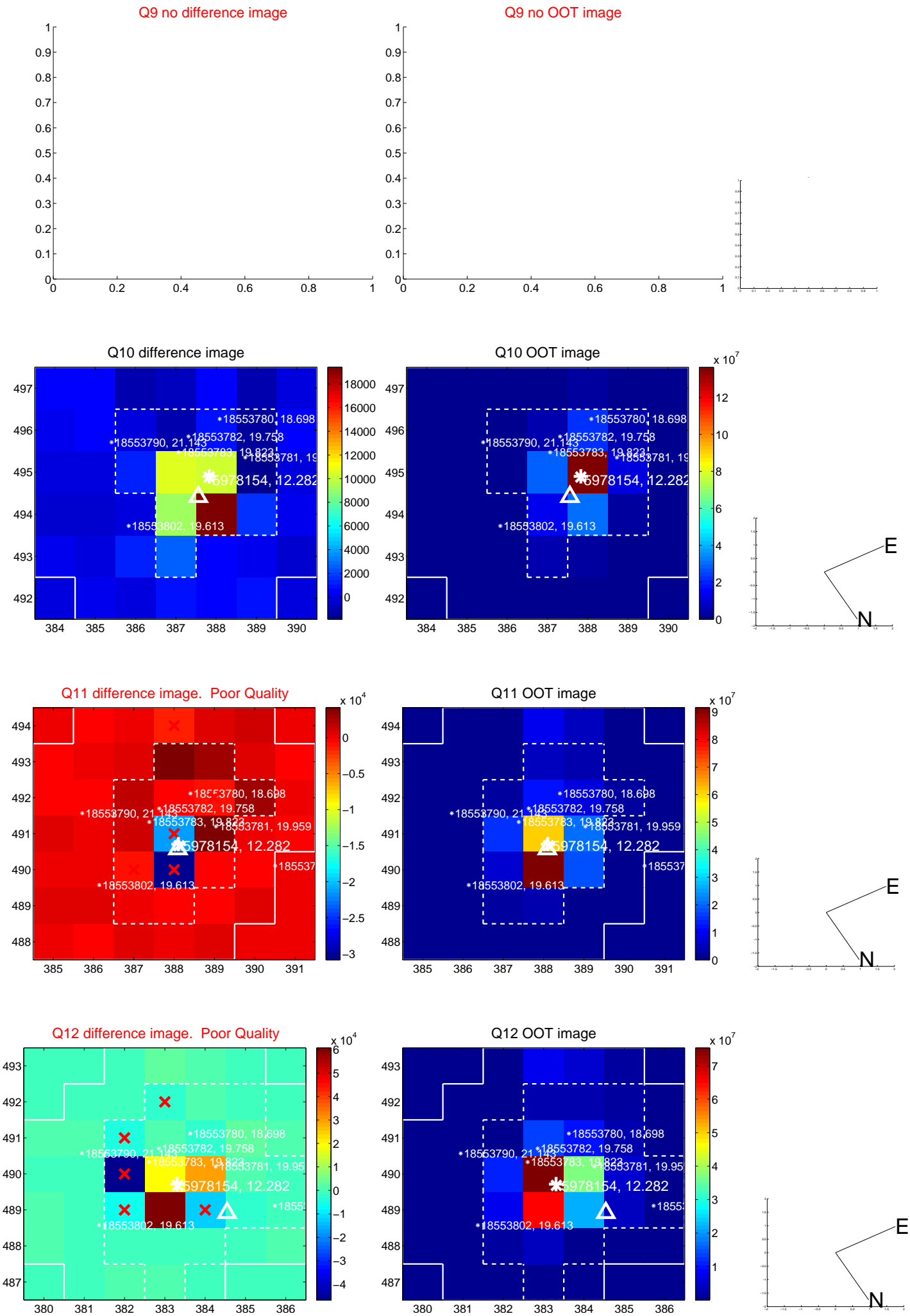
Q8 no difference image



Q8 no OOT image

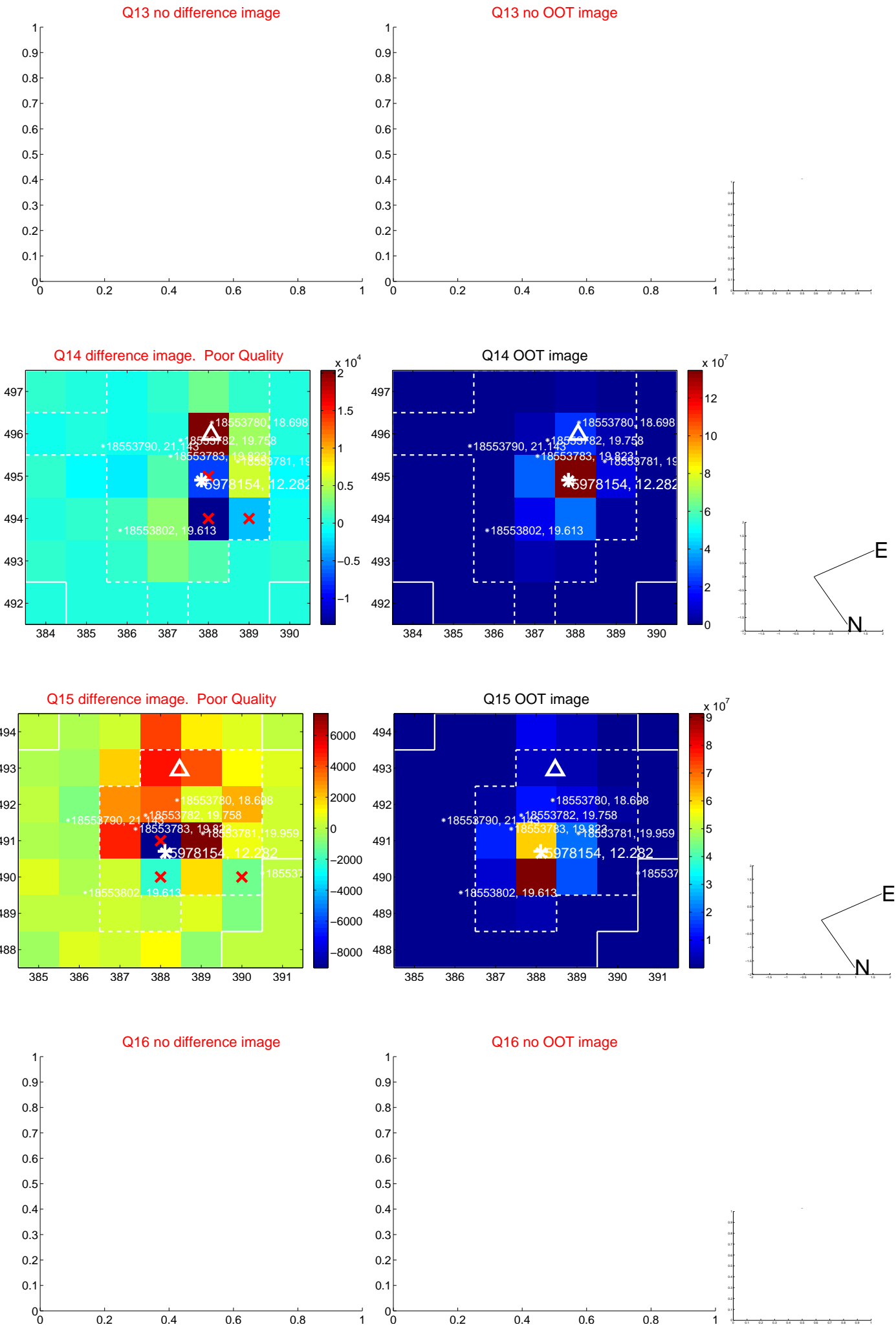


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

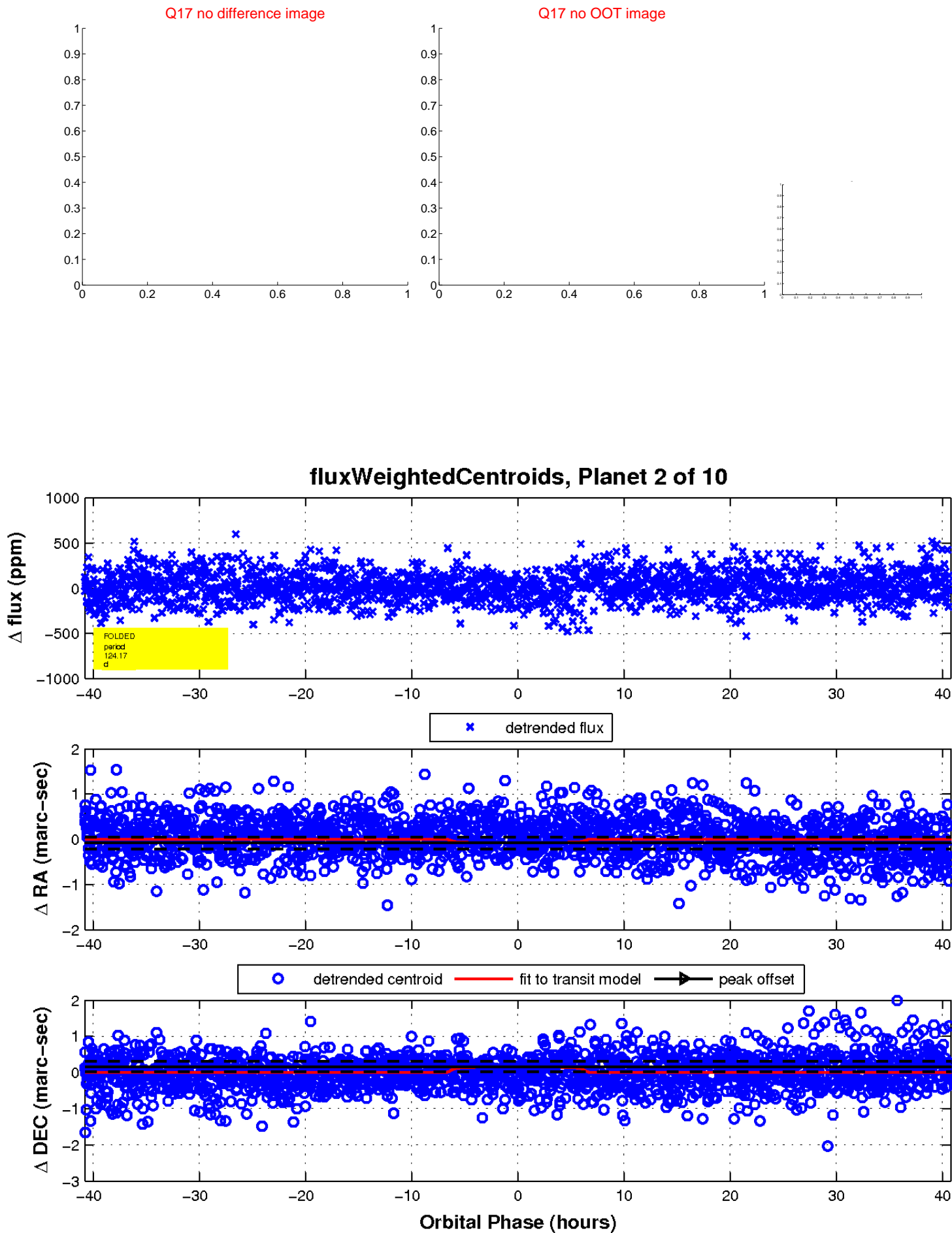




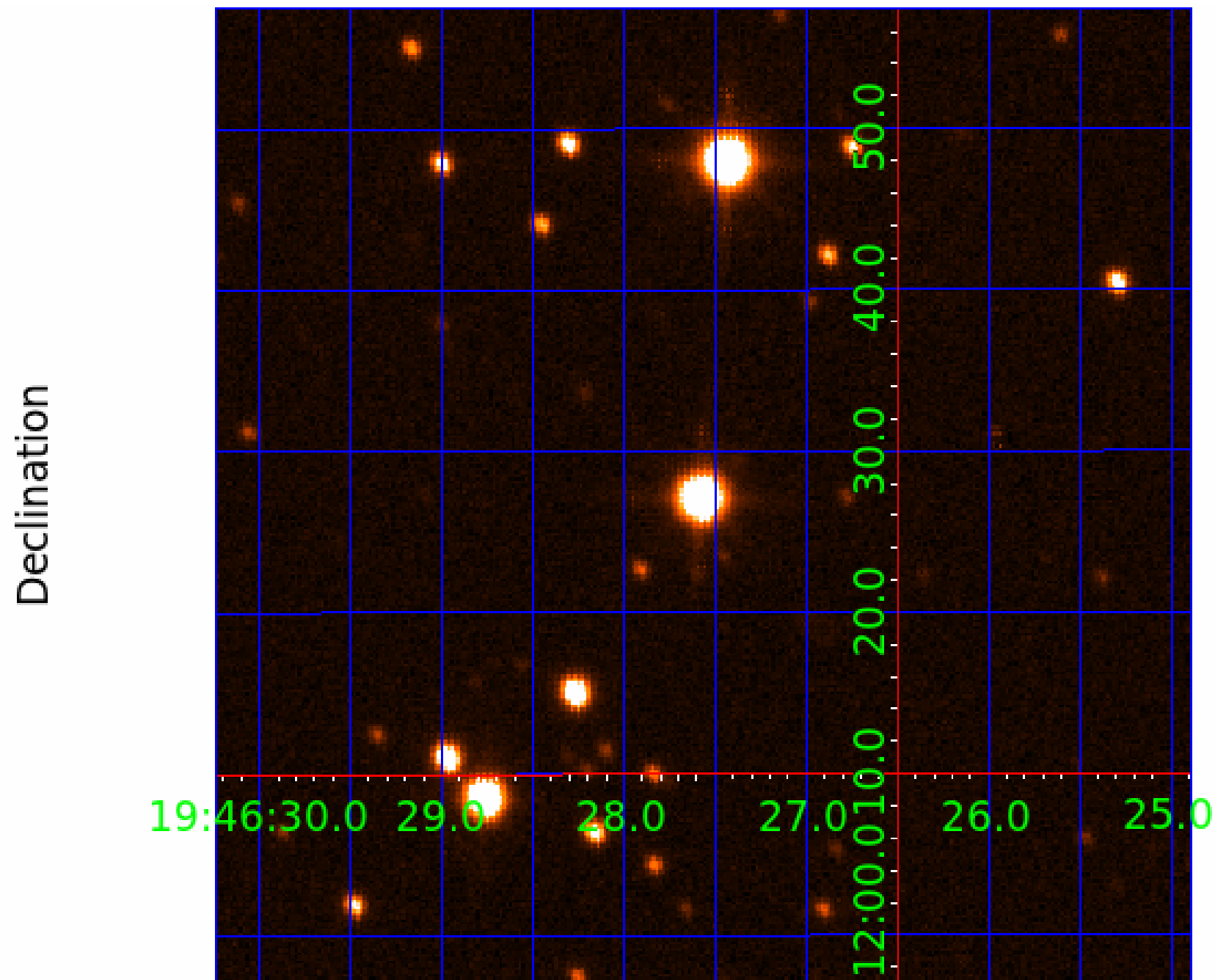
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



UKIRT Image



## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005978154-01	OBS	No	0.977344	132.332446	13.4	6.117	8.3	6.7	4.13	6723	1.53	55377.15
005978154-02	OBS	No	124.165564	182.998698	450.9	13.613	12.5	10.5	4.13	6723	9.87	86.71
005978154-03	OBS	No	137.679401	150.489095	291.5	6.419	9.2	10.5	4.13	6723	8.84	75.55
005978154-04	OBS	No	28.453613	148.852296	172.6	3.245	9.8	8.3	4.13	6723	6.38	618.32
005978154-05	OBS	No	33.910761	148.850724	154.0	5.416	8.9	9.0	4.13	6723	5.62	489.34
005978154-06	OBS	No	82.202844	181.537676	292.1	2.328	9.2	9.3	4.13	6723	8.25	150.27
005978154-07	OBS	No	38.342122	163.823144	205.4	2.241	9.0	8.8	4.13	6723	6.69	415.43
005978154-08	OBS	No	93.248607	221.792194	272.4	4.236	8.9	9.2	4.13	6723	7.75	127.02
005978154-09	OBS	No	43.449347	166.082590	271.7	2.358	9.1	8.7	4.13	6723	7.55	351.63
005978154-10	OBS	No	45.084056	162.646790	117.0	6.361	8.6	5.7	4.13	6723	5.05	334.73

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005978154-01	OBS	FP	0.00	1	0	0	0	SWEET_NTL—LPP_DV
005978154-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS
005978154-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
005978154-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
005978154-05	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—HALO_GHOST
005978154-06	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—HALO_GHOST
005978154-07	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
005978154-08	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
005978154-09	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
005978154-10	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT

**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.

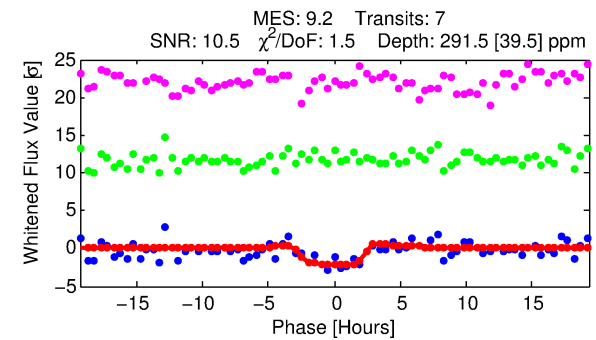
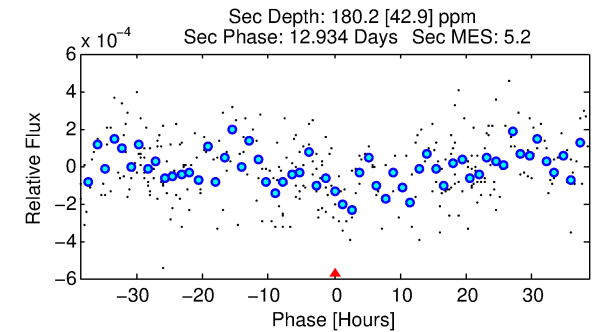
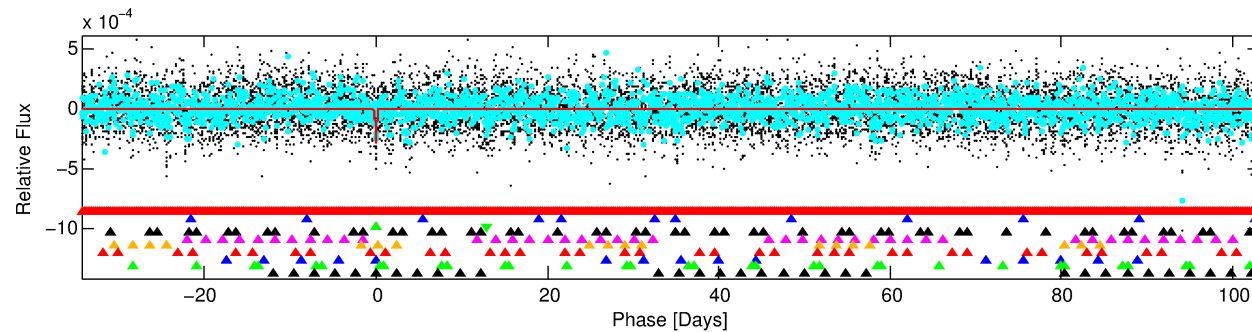
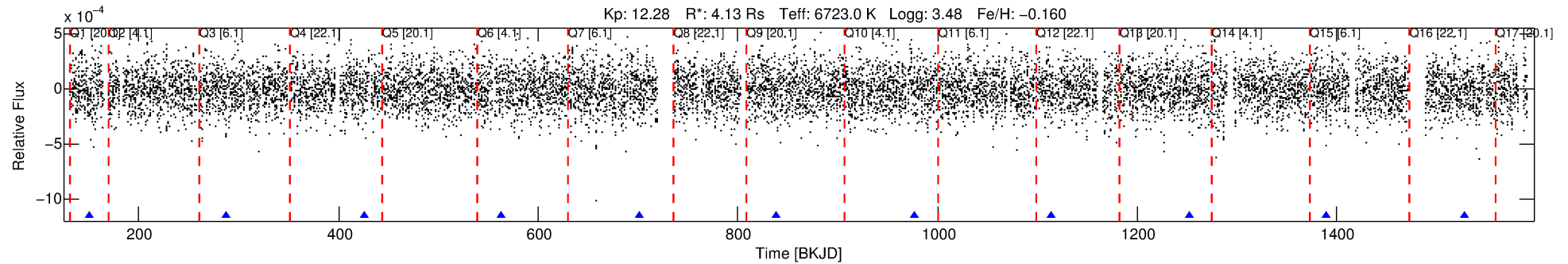
Ephemeris Match Information For 005978154-03

No Significant Match Found



# DV One-Page Summary

KIC: 5978154 Candidate: 3 of 10 Period: 137.679 d

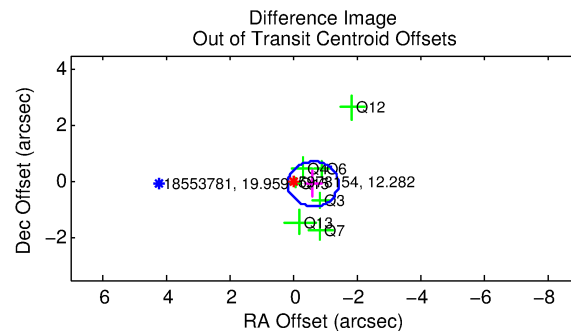
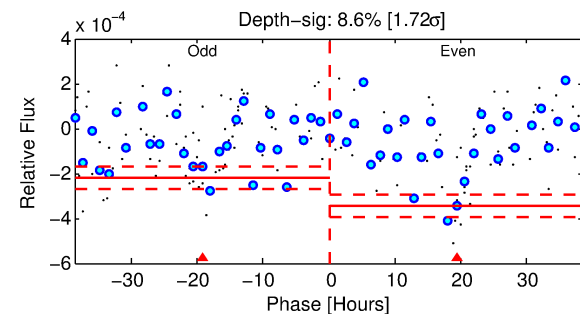
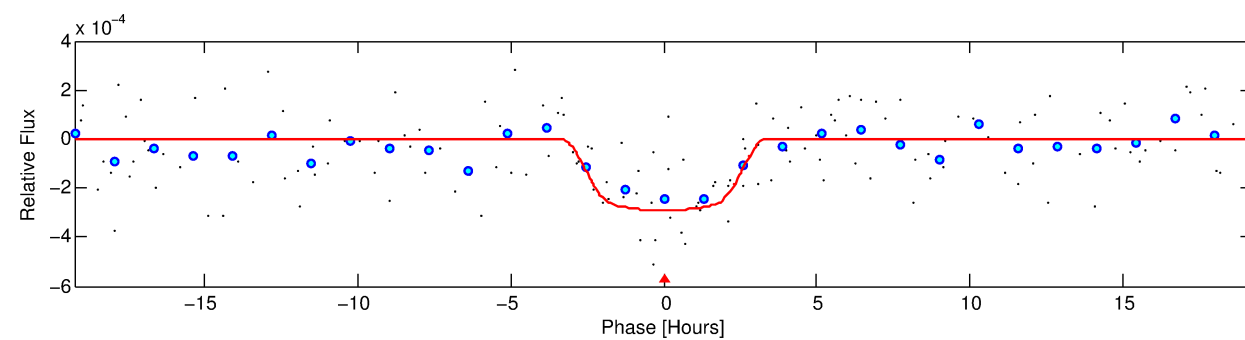


## DV Fit Results:

Period = 137.67940 [0.00202] d  
Epoch = 150.4891 [0.0126] BKJD  
Rp/R\* = 0.0196 [0.0018]  
a/R\* = 56.05 [17.75]  
b = 0.96 [0.03]  
Seff = 75.55 [47.39]  
Teff = 752 [118] K  
Rp = 8.84 [3.62] Re  
a = 0.6435 [0.2466] AU  
Ag = 525.89 [359.84] [1.46σ]  
Teffp = 5566 [461] K [10.11σ]

## DV Diagnostic Results:

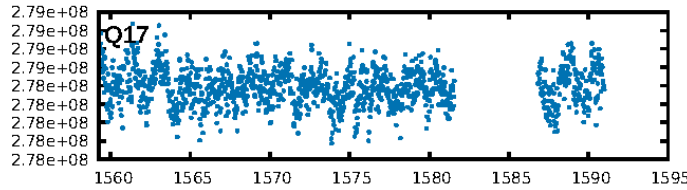
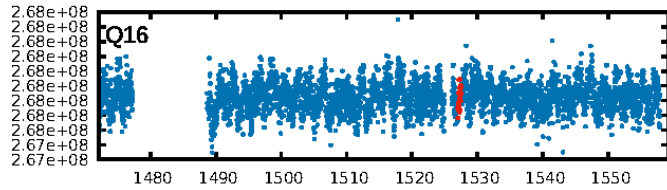
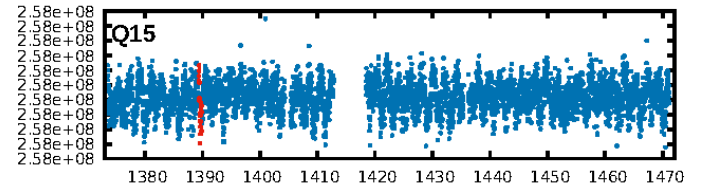
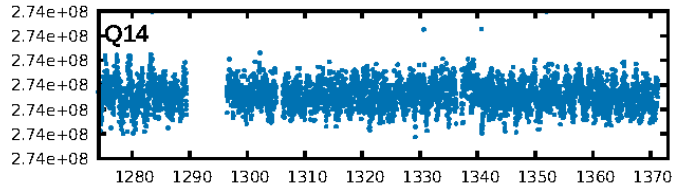
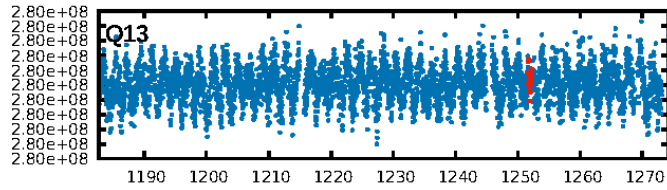
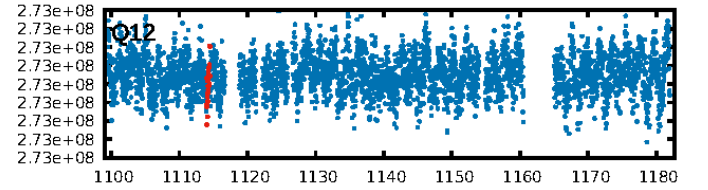
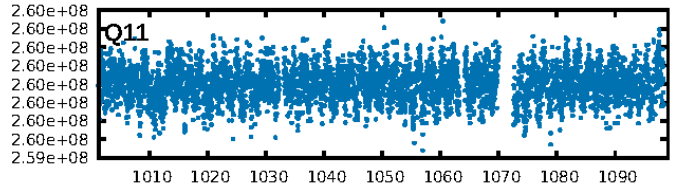
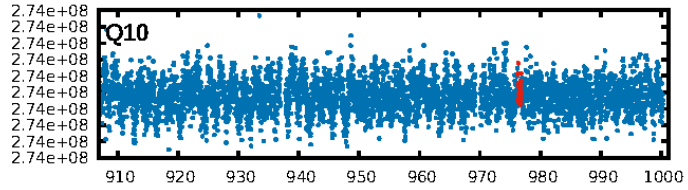
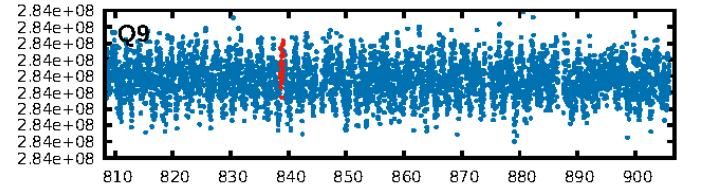
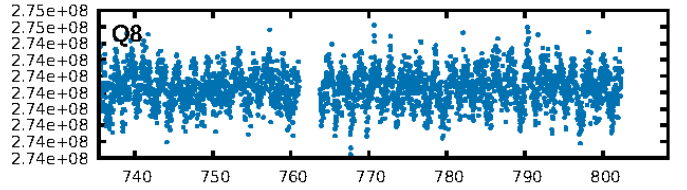
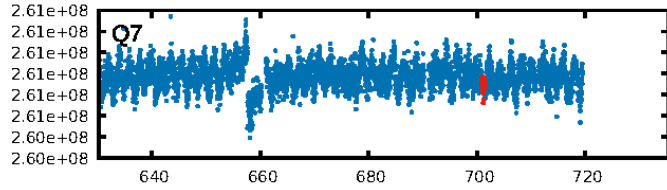
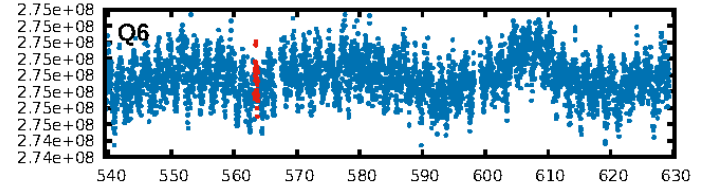
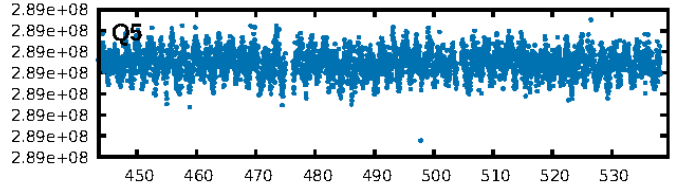
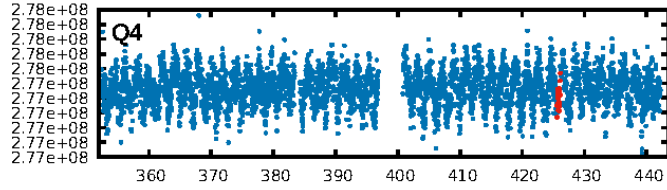
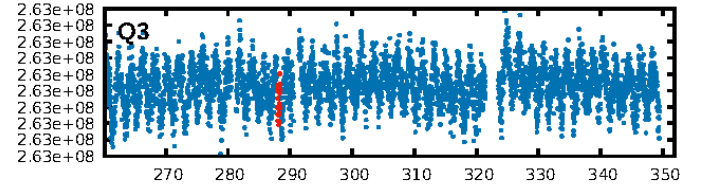
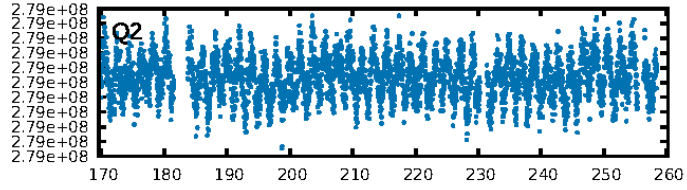
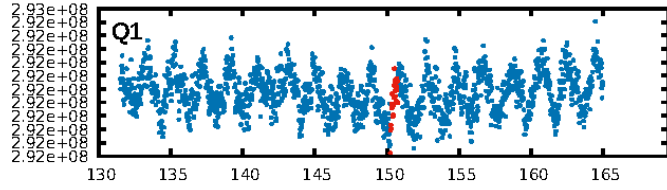
ShortPeriod-sig: 100.0% [21.55σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 30.8%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [6/6]  
GhostDiagnostic-chr: 1.378  
Centroid-sig: 1.9%  
Centroid-so: 1.044 arcsec [2.47σ]  
OotOffset-rm: 0.642 arcsec [2.42σ]  
KicOffset-st: 1/3/2/1 [7]  
KicOffset-st: 1/3/2/1 [7]  
DiffImageQuality-fgm: 0.86 [6/7]  
DiffImageOverlap-fno: 0.00 [0/10]



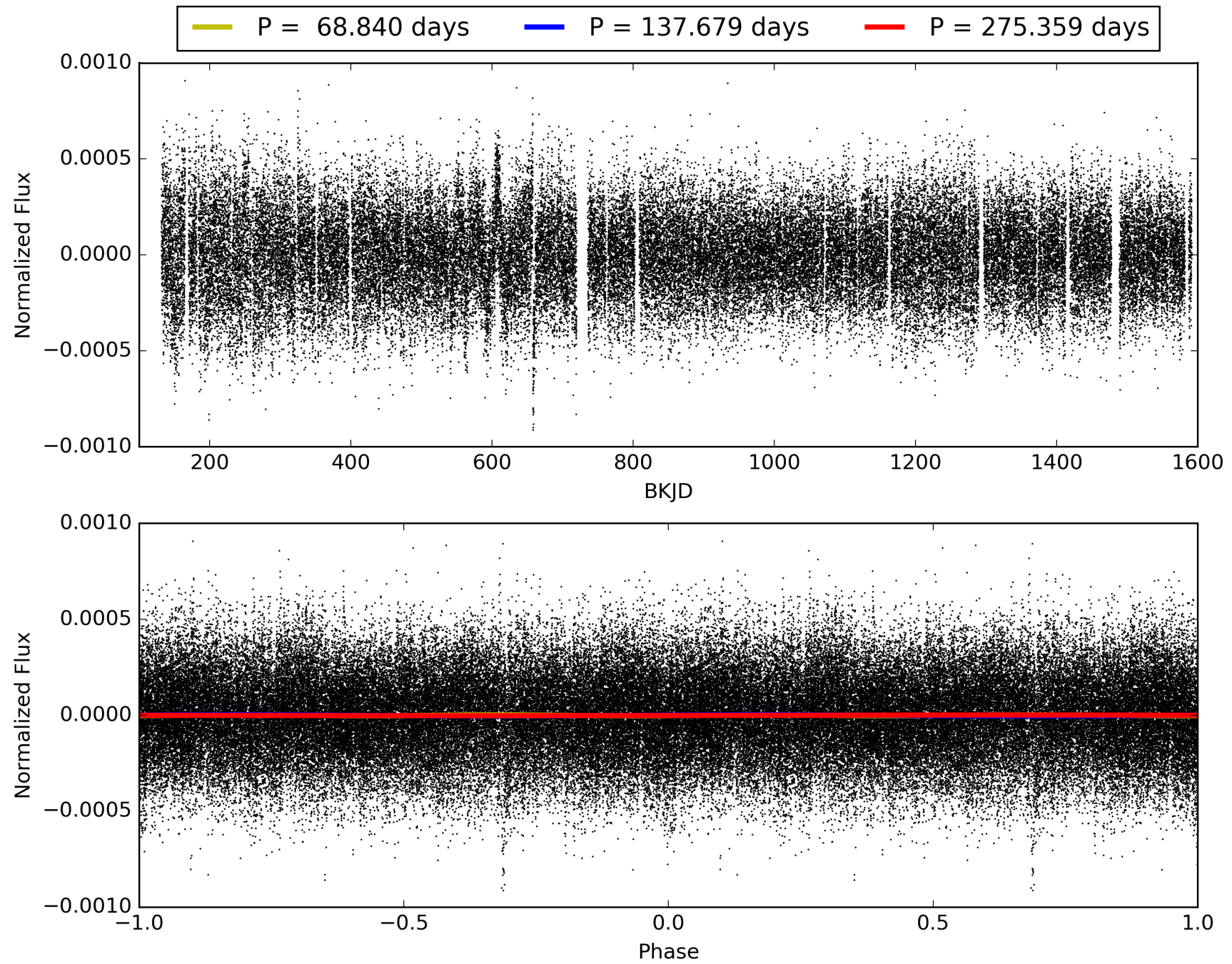
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 03-Feb-2016 05:53:58 Z

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

## TCE 005978154-03, PDC Light Curves

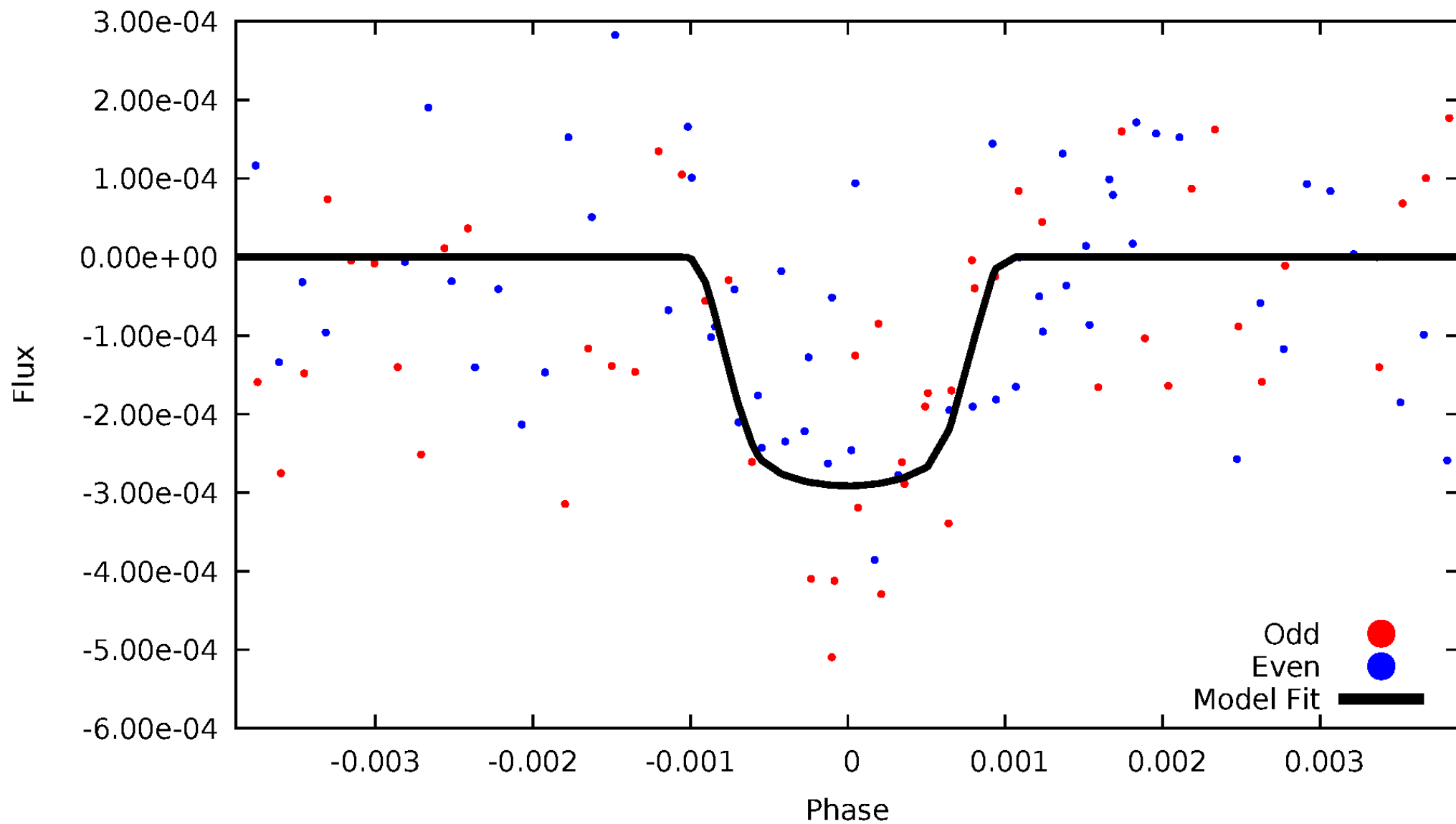


TCE 005978154-03



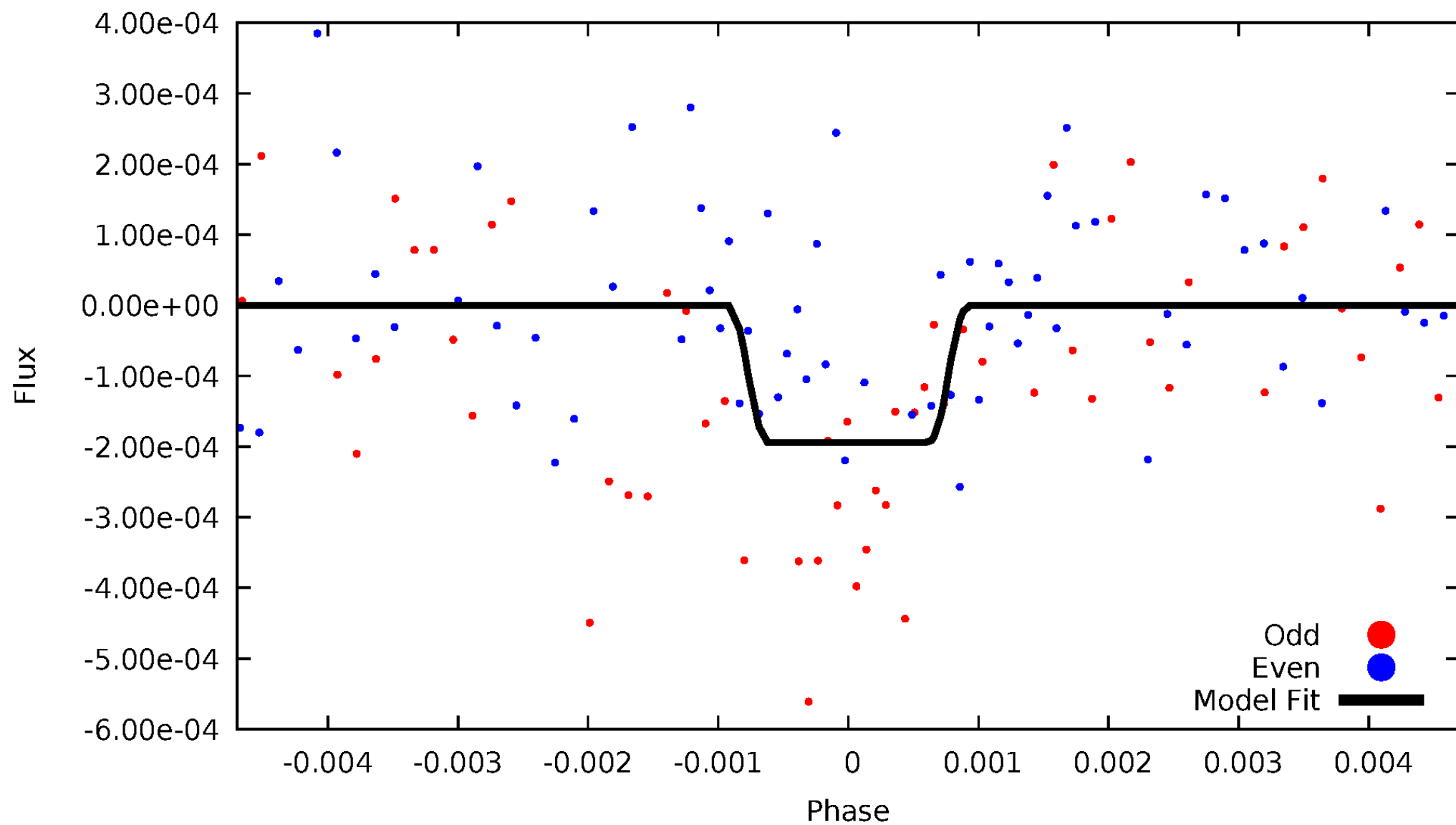
# DV Odd/Even

TCE 005978154-03



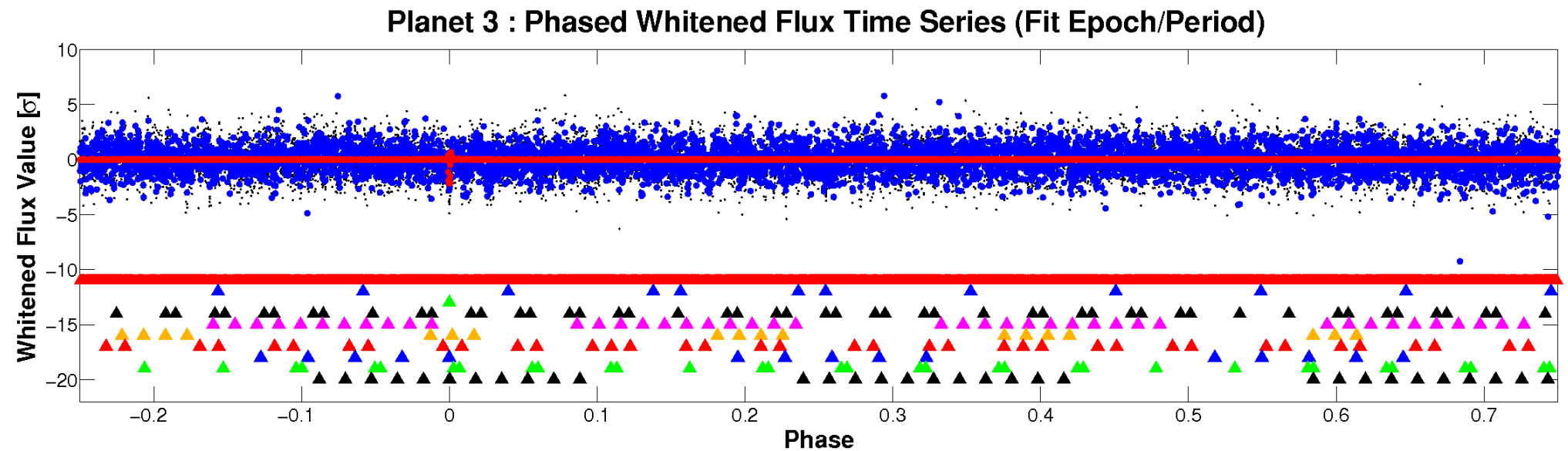
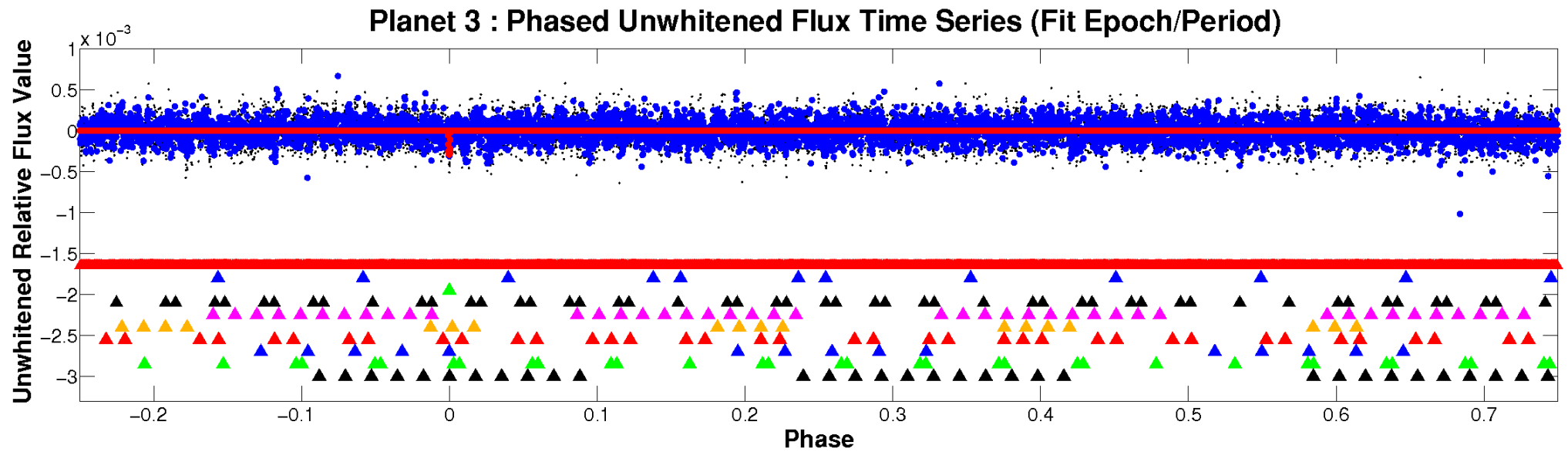
# ALT Odd/Even

TCE 005978154-03



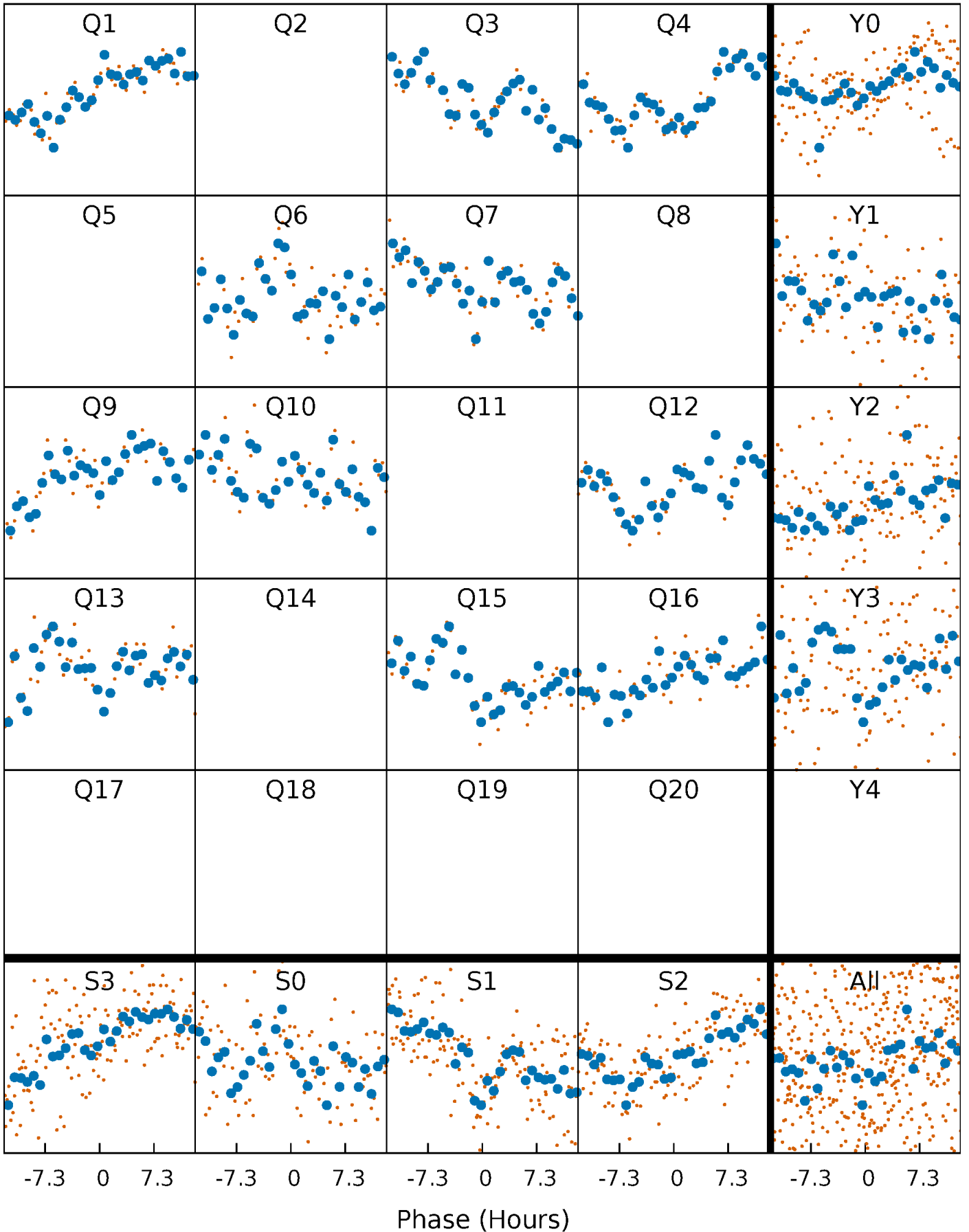


# Non-Whitened Vs. Whitened Light Curve



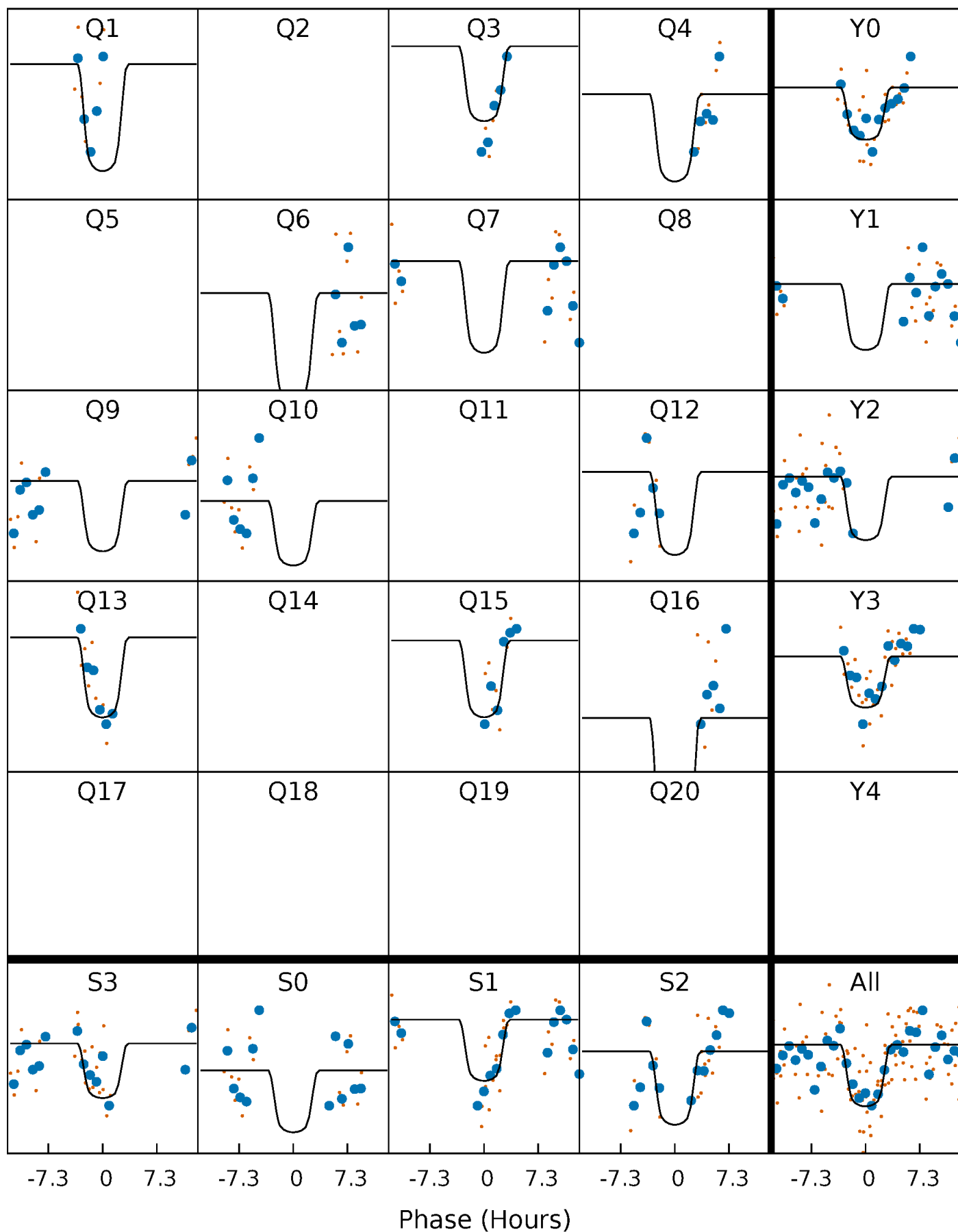
# PDC Quarter-Phased Transit Curves

TCE 005978154-03 P=137.679401 Days  $T_0=150.489095$  (BKJD)



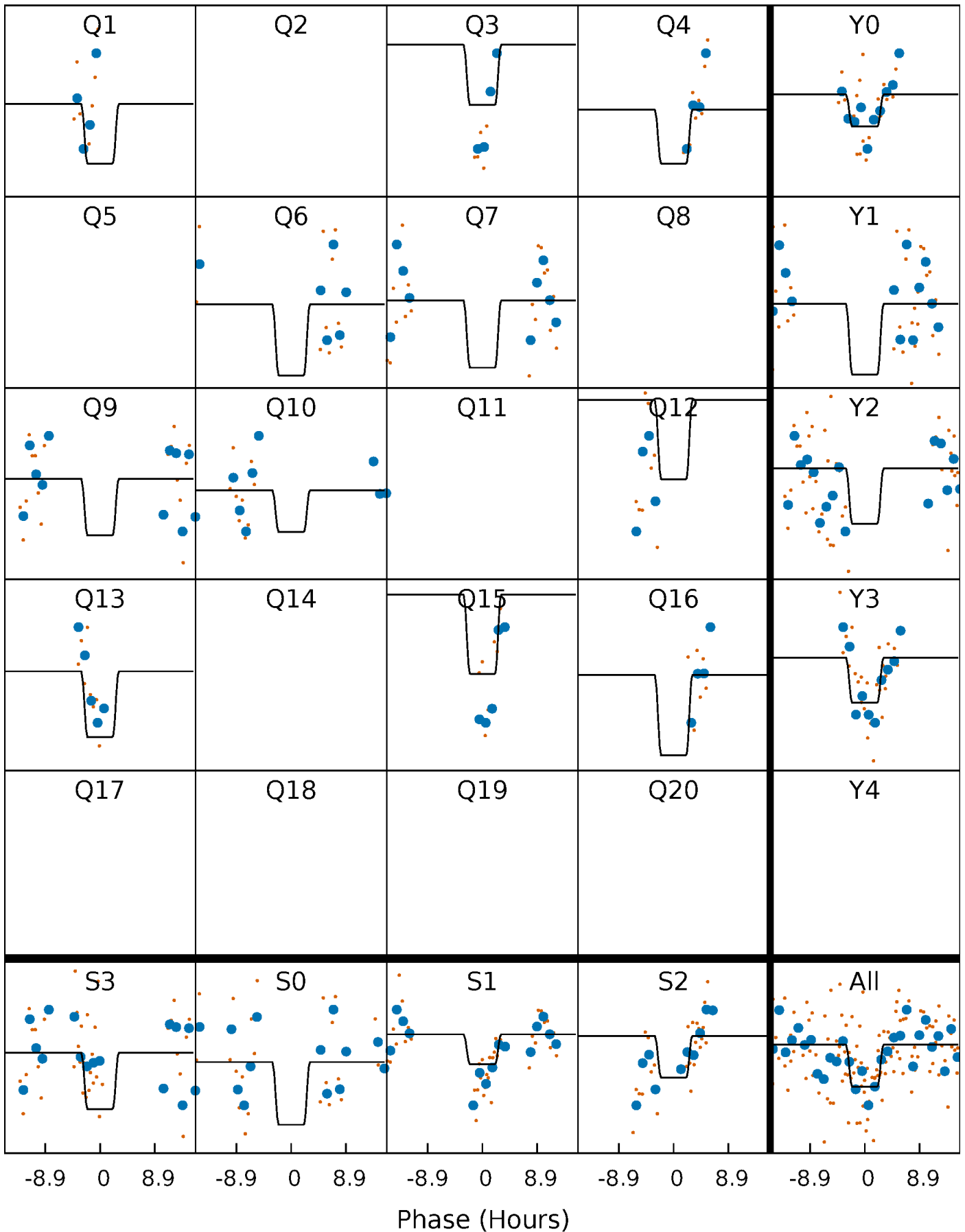
# DV Quarter-Phased Transit Curves

TCE 005978154-03 P=137.679401 Days  $T_0=150.489095$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

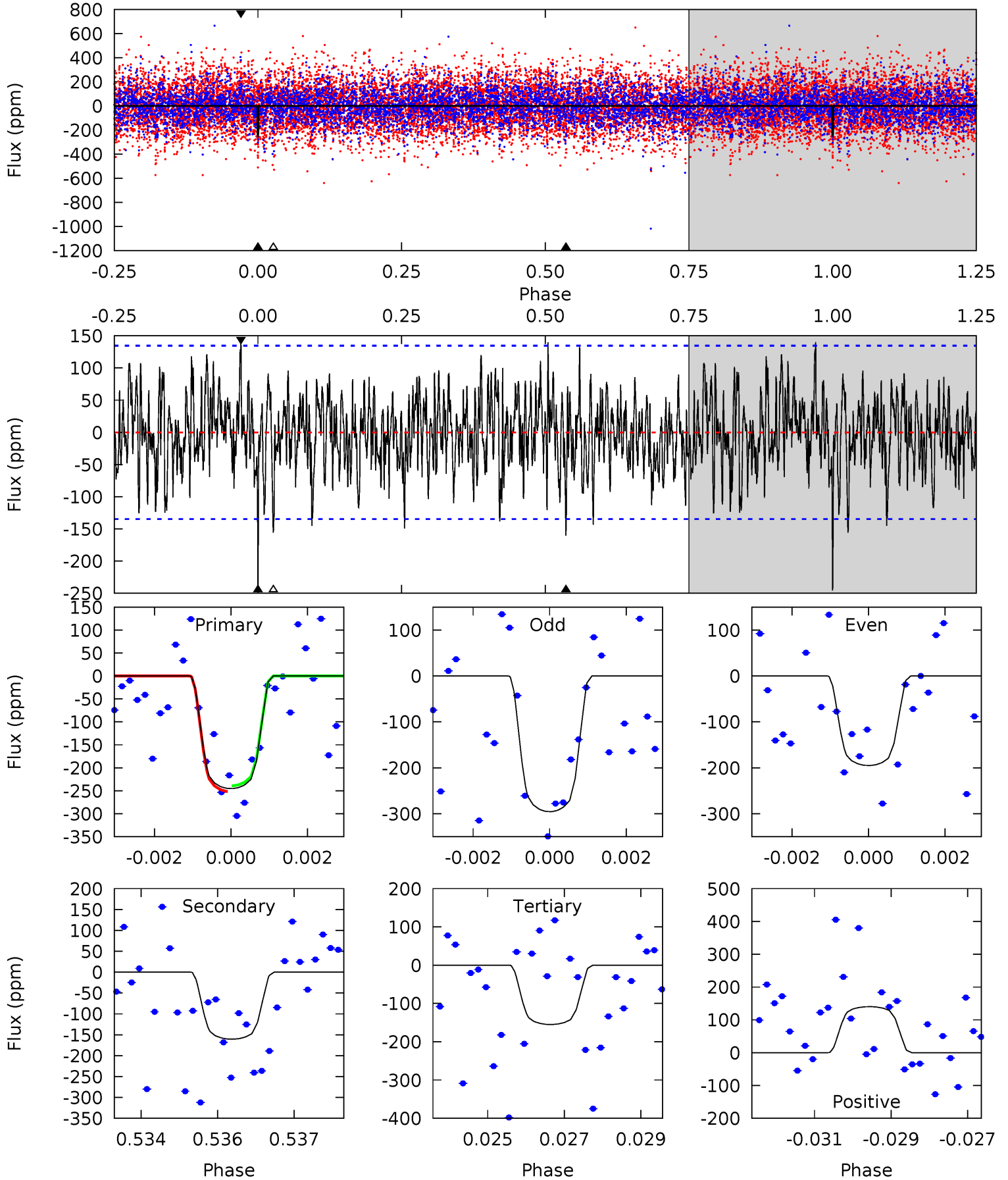
TCE 005978154-03 P=137.680357 Days  $T_0=150.508675$  (BKJD)



# DV Model-Shift Uniqueness Test

005978154-03, P = 137.679401 Days, E = 12.809694 Days

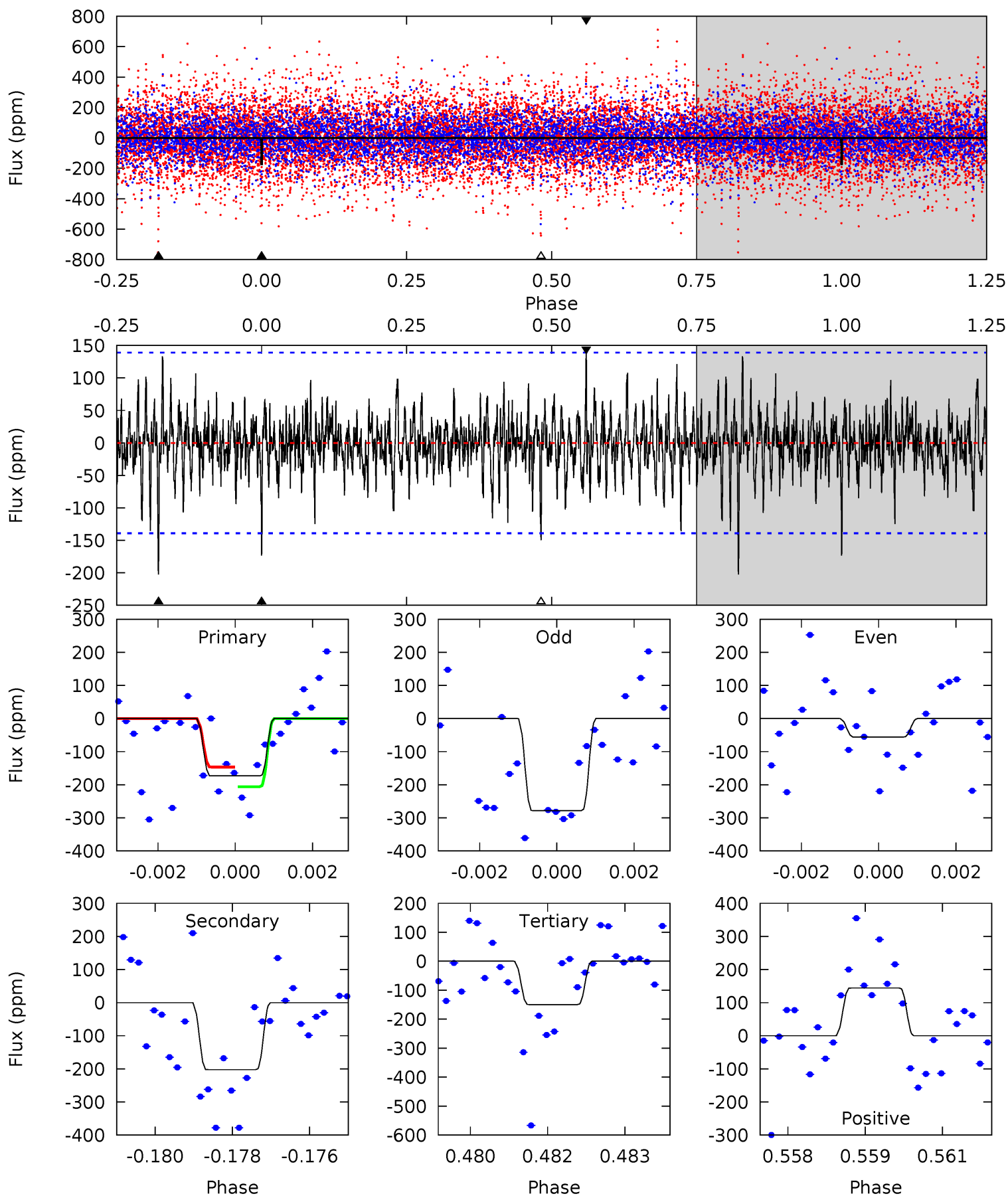
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
9.72	6.36	6.14	5.55	5.33	3.10	1.92	3.58	4.16	0.22	0.80	1.99	1.00	0.36	0.25



# Alt Model-Shift Uniqueness Test

005978154-03, P = 137.680357 Days, E = 12.828318 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
6.66	7.77	5.74	5.54	5.34	3.11	1.45	0.92	1.12	2.03	2.24	4.27	1.07	0.42	1.14





### Stellar Parameters For KIC 005978154

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$6723^{+202}_{-223}$	$3.478^{+0.360}_{-0.090}$	$-0.160^{+0.300}_{-0.250}$	$4.134^{+0.412}_{-1.647}$	$1.872^{+0.171}_{-0.398}$	$0.037^{+0.107}_{-0.011}$
	+3%/-3%	+10%/-3%	+188%/-156%	+10%/-40%	+9%/-21%	+286%/-29%
Source	PHO1	FLK73	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 005978154-03 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-160 \pm 25$	$8.48^{+1.36}_{-1.87}$	$1032^{+59}_{-101}$	$5412^{+375}_{-332}$	$509^{+305}_{-148}$
Alt.	$-202 \pm 26$	$5.92^{+1.11}_{-1.26}$	$1035^{+53}_{-97}$	$6834^{+639}_{-578}$	$1334^{+757}_{-426}$

$T_{max}$  = 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

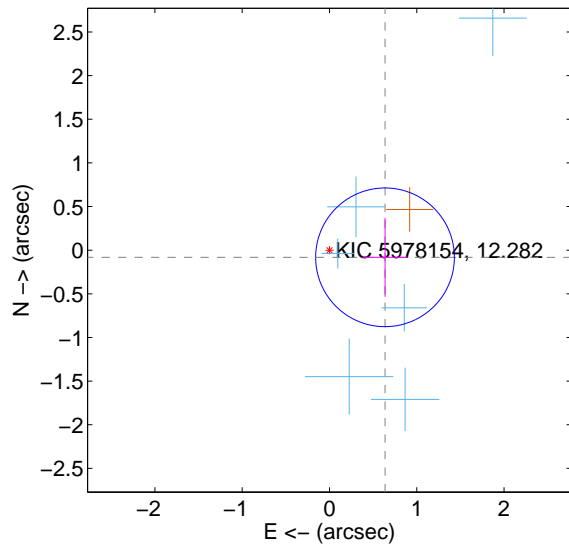
Supplemental centroid analysis for 005978154-03. Kepler magnitude: 12.28. Transit SNR 10.51

There are 6 quarters with good PRF difference image offsets

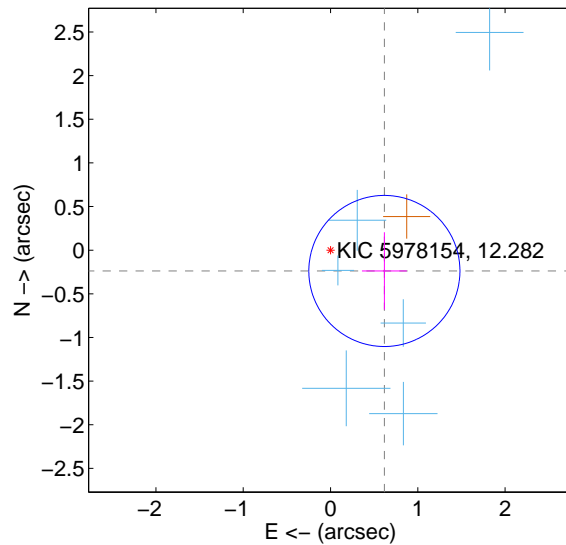
The direct PRF centroid is offset from the target star catalog position by about 0.19 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.642 \pm 0.265$	2.42	$-0.637 \pm 0.261$	$-0.082 \pm 0.453$
PRF-fit source offset from KIC position	$0.662 \pm 0.289$	2.29	$-0.617 \pm 0.258$	$-0.238 \pm 0.443$
photometric centroid source offset	$1.04 \pm 0.42$	2.47	$0.40 \pm 0.43$	$-0.96 \pm 0.42$

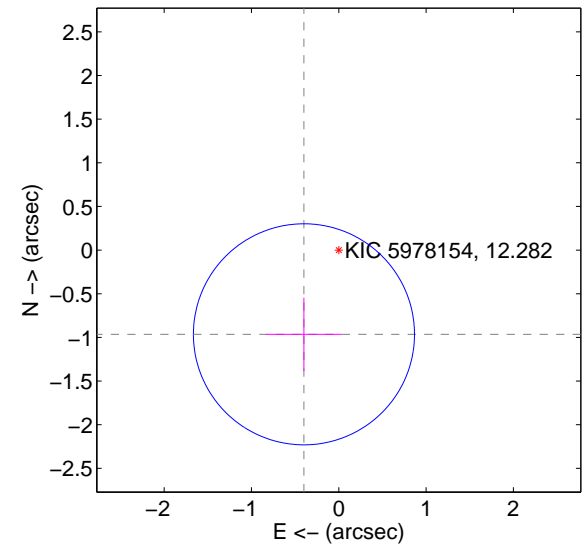
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

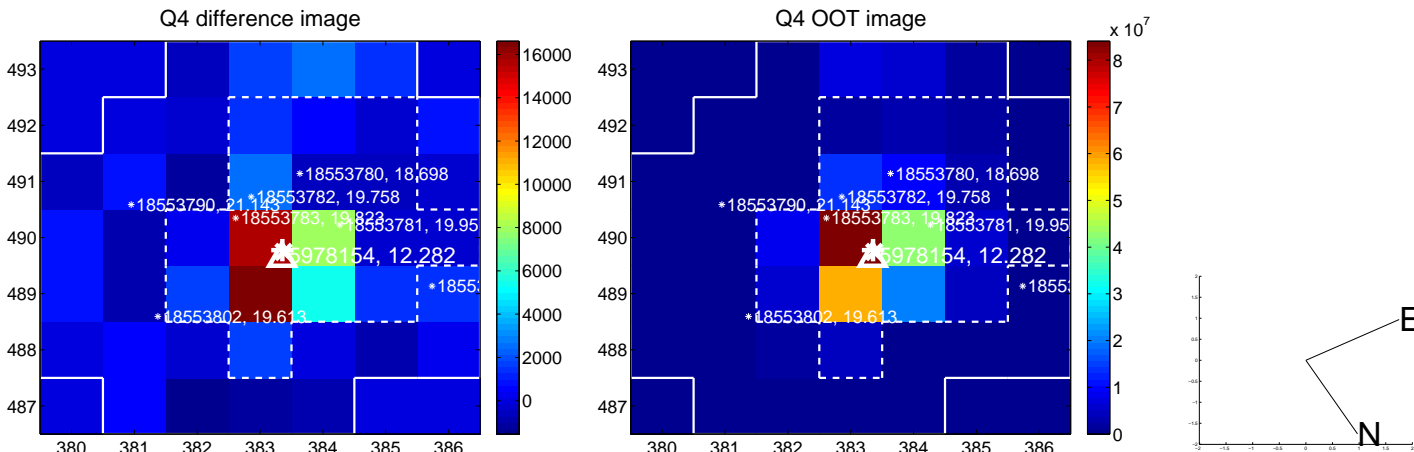
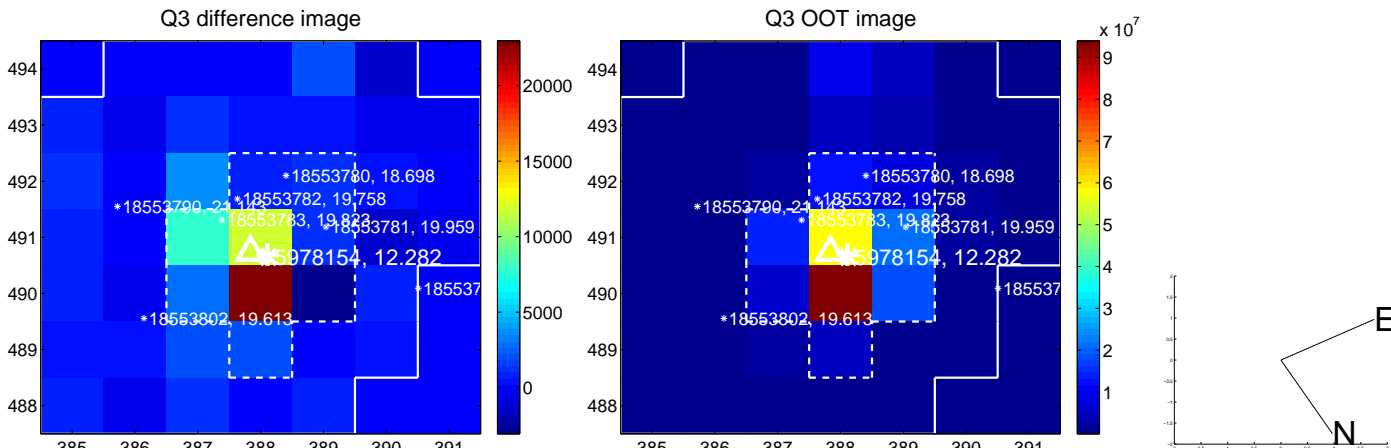
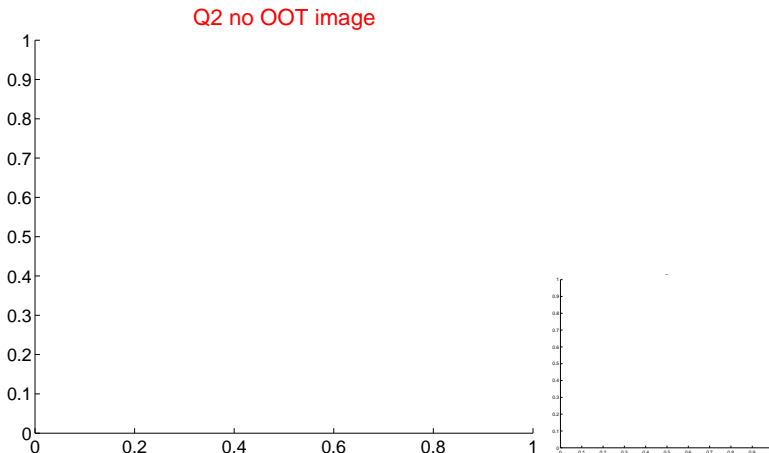
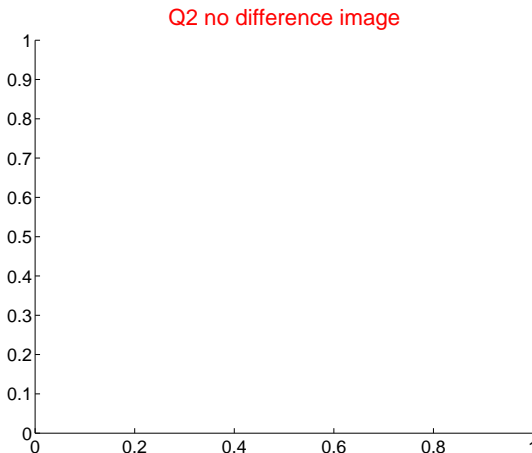
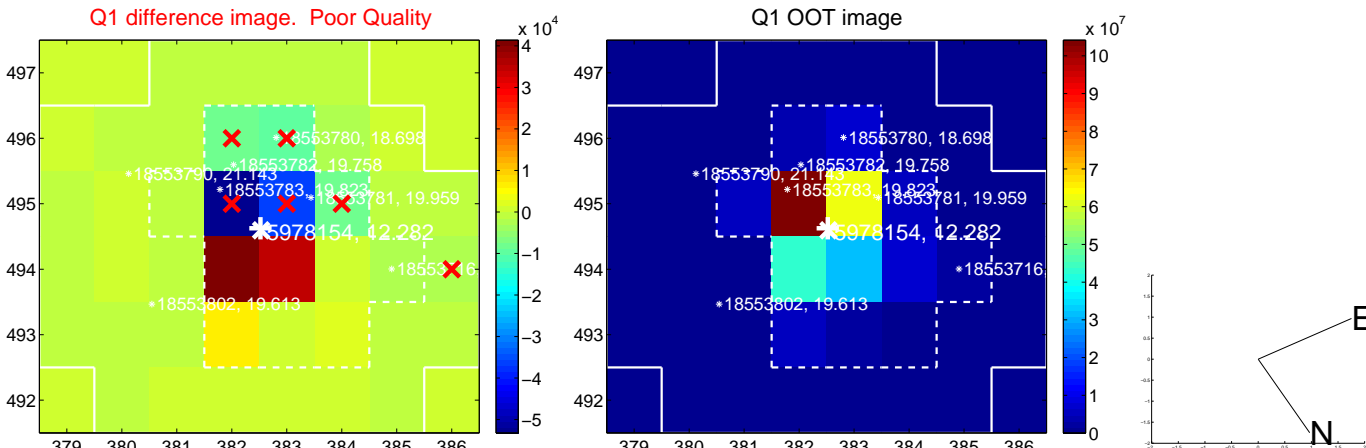


offset from photometric centroids

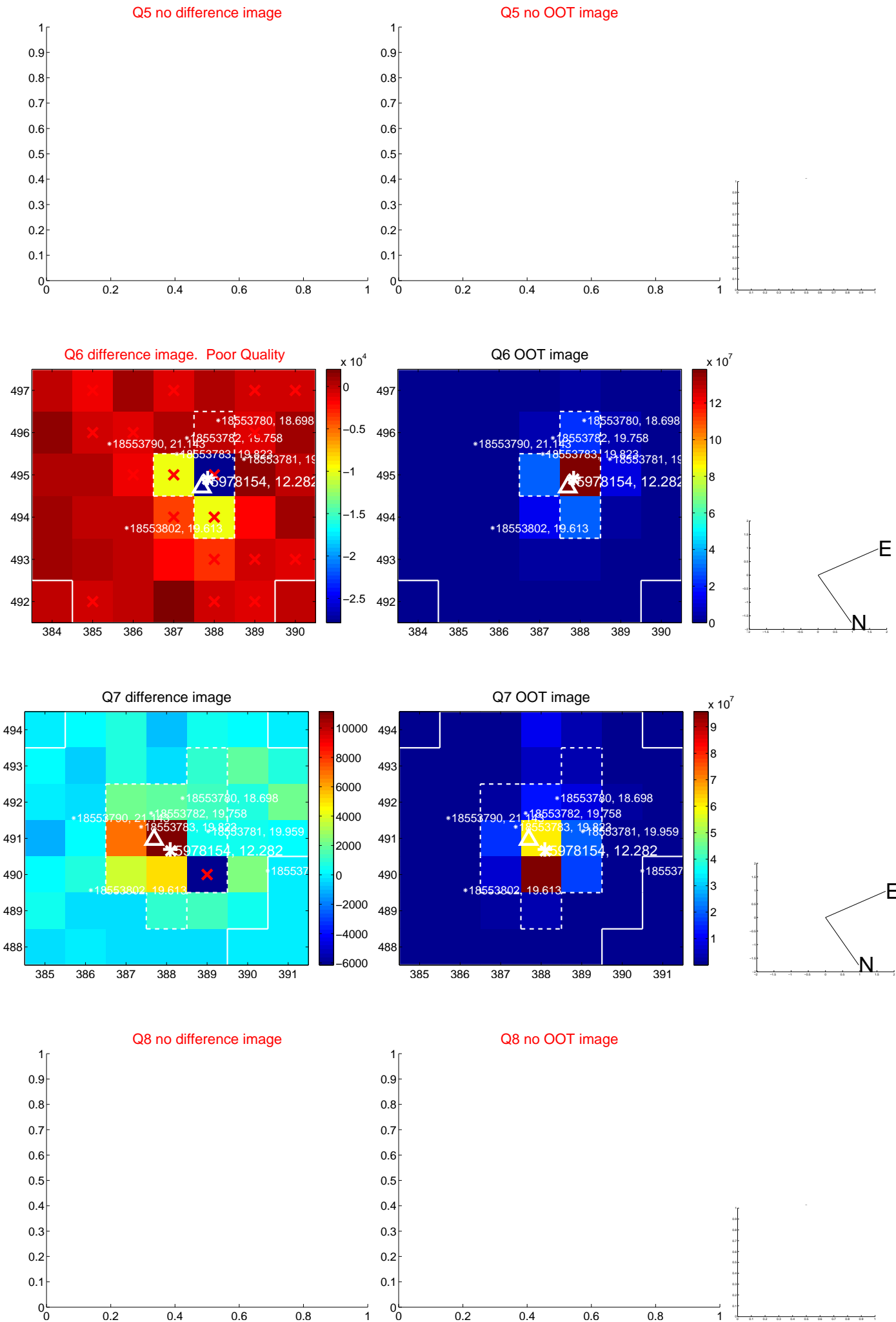


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

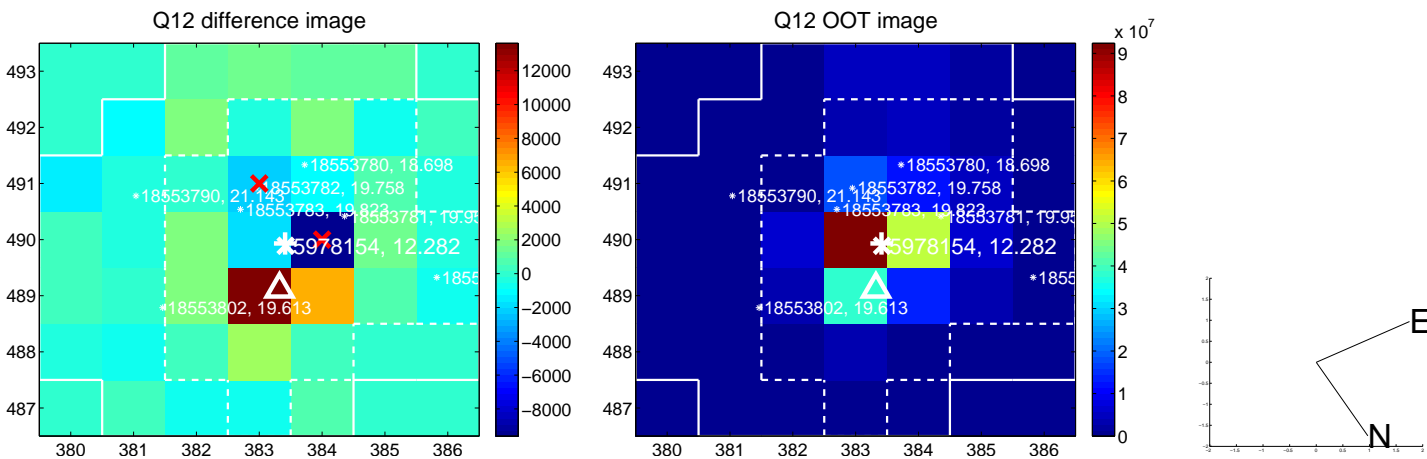
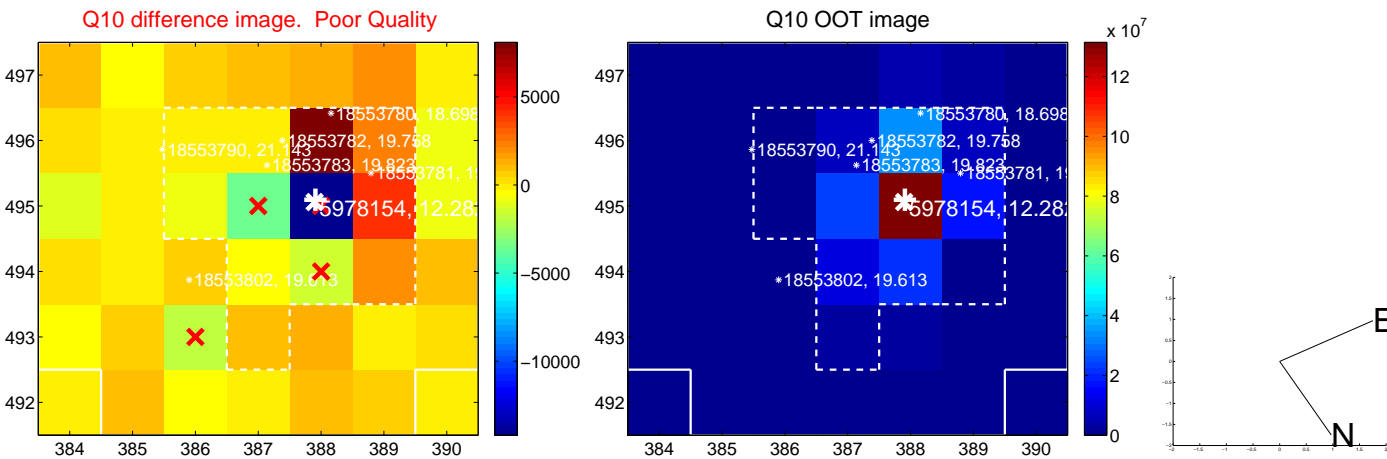
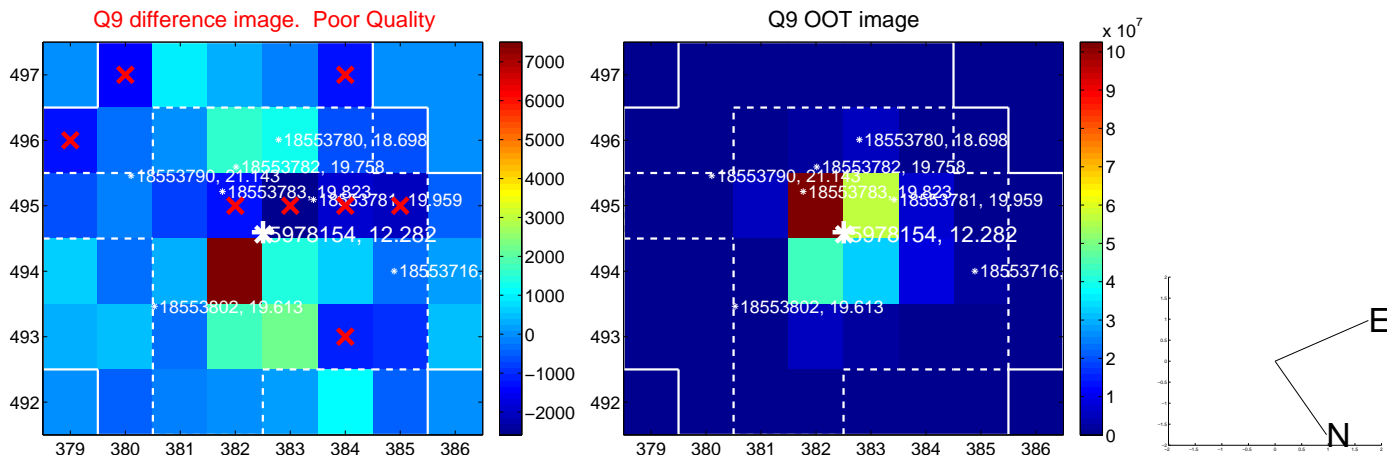
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



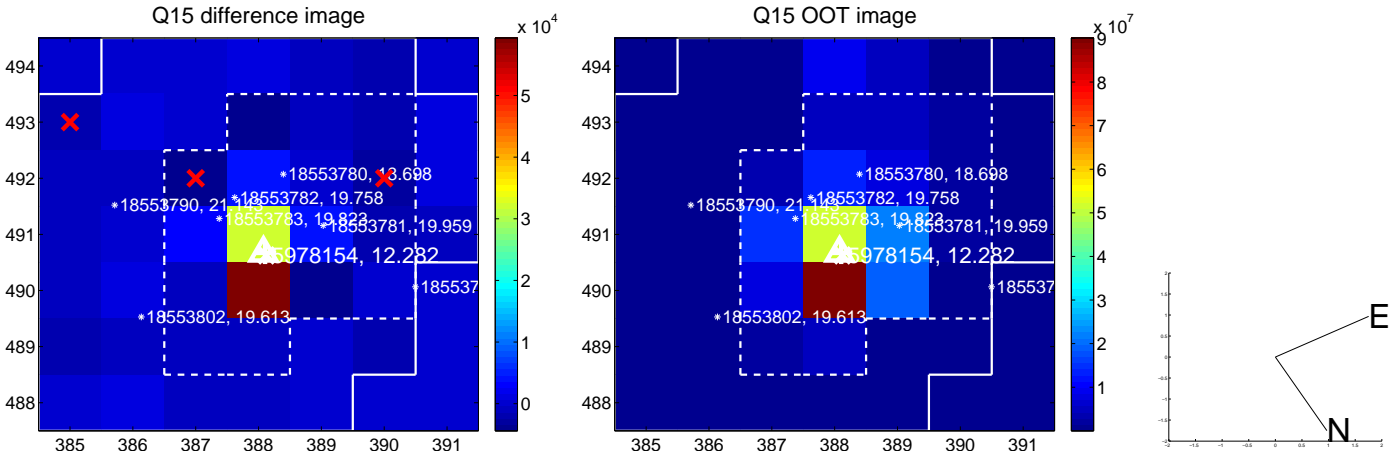
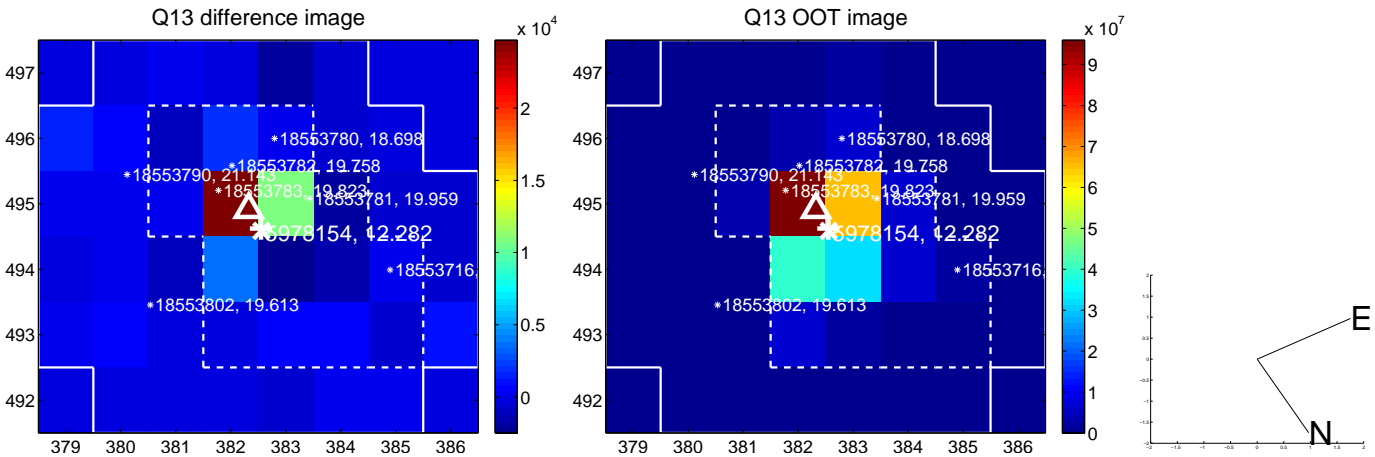
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

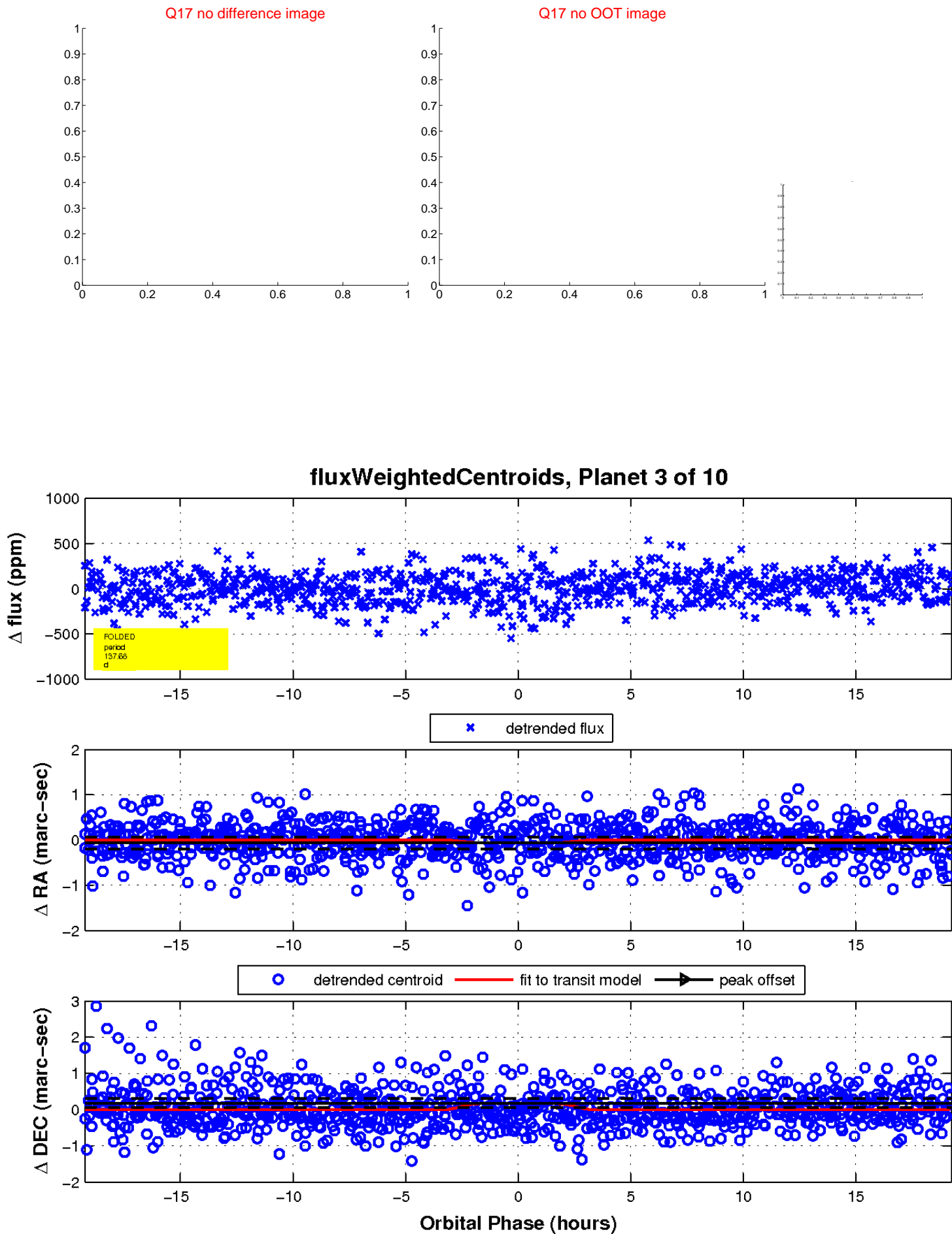


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

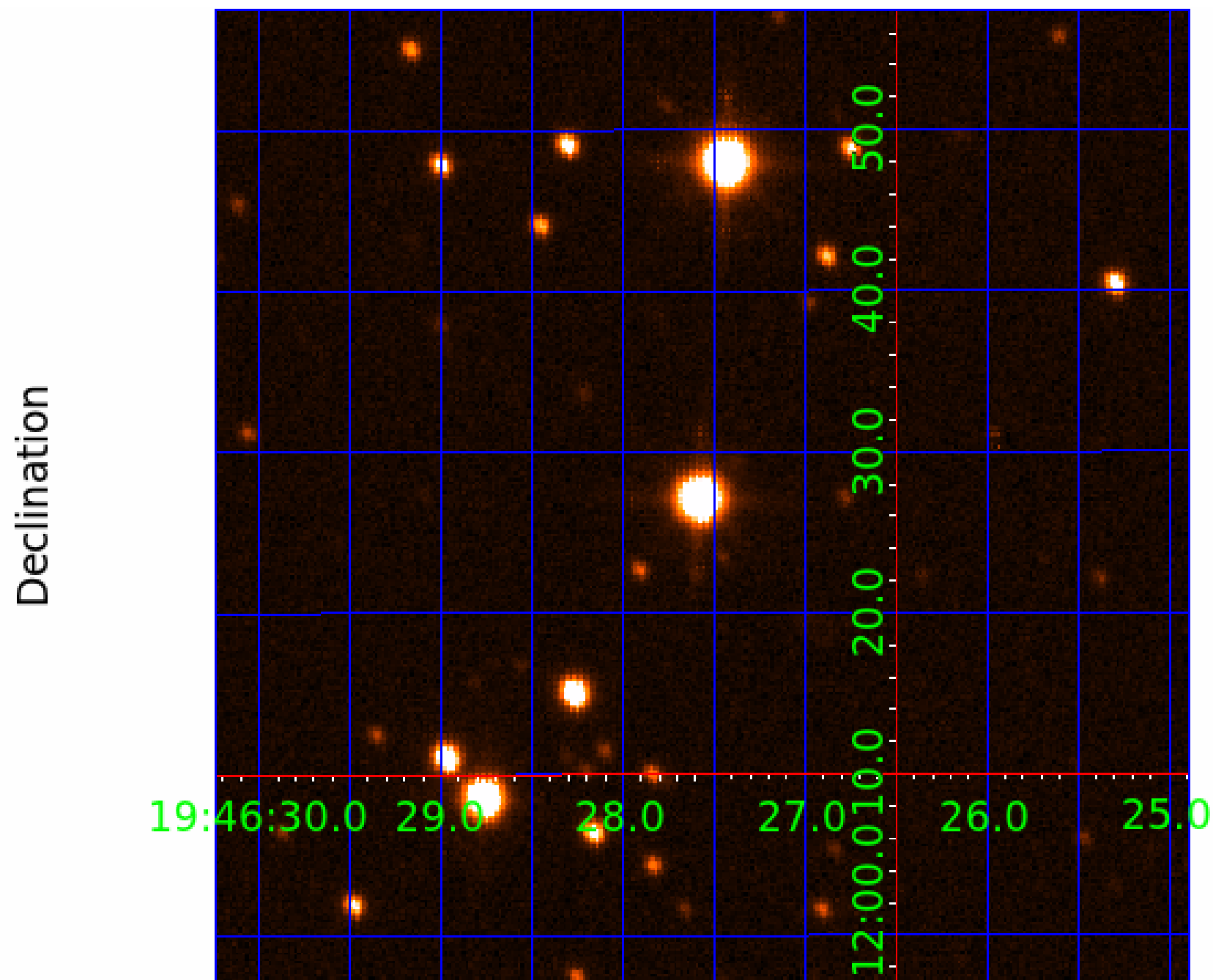




white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image



## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005978154-01	OBS	No	0.977344	132.332446	13.4	6.117	8.3	6.7	4.13	6723	1.53	55377.15
005978154-02	OBS	No	124.165564	182.998698	450.9	13.613	12.5	10.5	4.13	6723	9.87	86.71
005978154-03	OBS	No	137.679401	150.489095	291.5	6.419	9.2	10.5	4.13	6723	8.84	75.55
005978154-04	OBS	No	28.453613	148.852296	172.6	3.245	9.8	8.3	4.13	6723	6.38	618.32
005978154-05	OBS	No	33.910761	148.850724	154.0	5.416	8.9	9.0	4.13	6723	5.62	489.34
005978154-06	OBS	No	82.202844	181.537676	292.1	2.328	9.2	9.3	4.13	6723	8.25	150.27
005978154-07	OBS	No	38.342122	163.823144	205.4	2.241	9.0	8.8	4.13	6723	6.69	415.43
005978154-08	OBS	No	93.248607	221.792194	272.4	4.236	8.9	9.2	4.13	6723	7.75	127.02
005978154-09	OBS	No	43.449347	166.082590	271.7	2.358	9.1	8.7	4.13	6723	7.55	351.63
005978154-10	OBS	No	45.084056	162.646790	117.0	6.361	8.6	5.7	4.13	6723	5.05	334.73

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005978154-01	OBS	FP	0.00	1	0	0	0	SWEET_NTL—LPP_DV
005978154-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS
005978154-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
005978154-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
005978154-05	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—HALO_GHOST
005978154-06	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—HALO_GHOST
005978154-07	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
005978154-08	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
005978154-09	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
005978154-10	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT

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

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

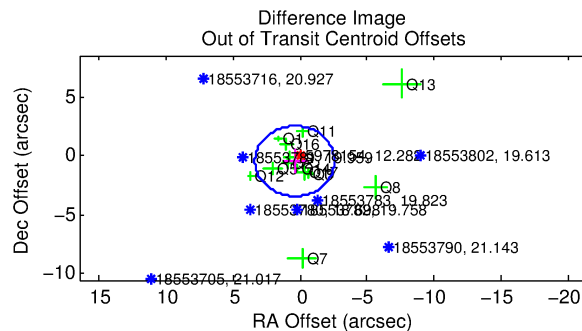
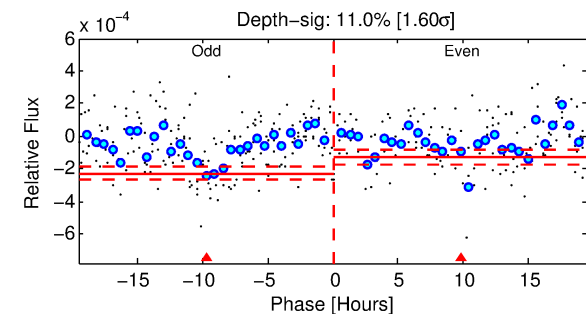
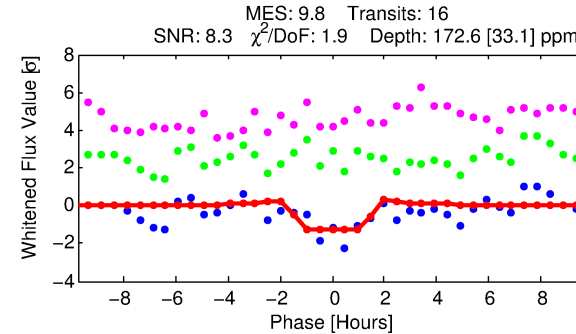
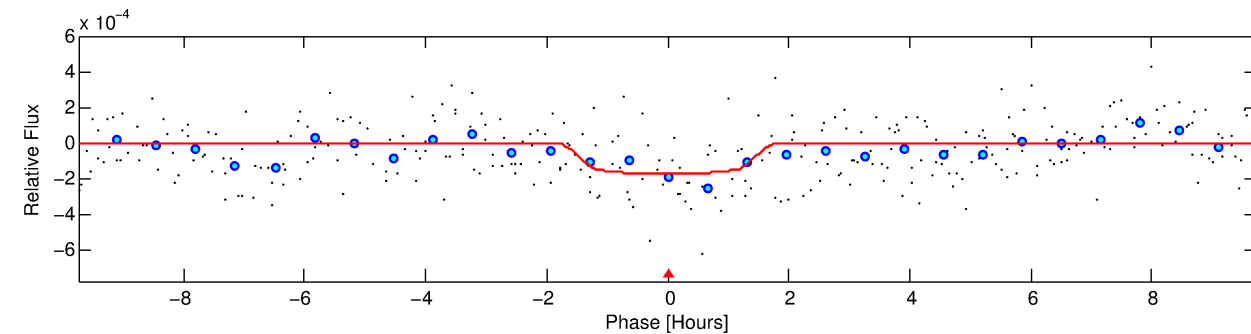
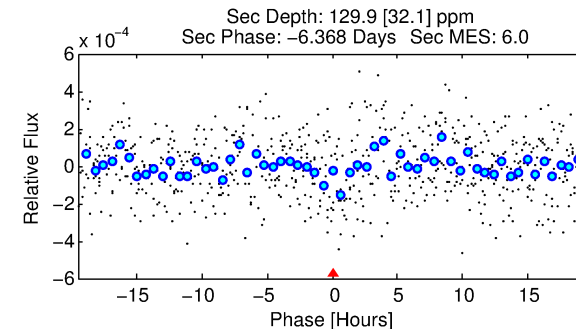
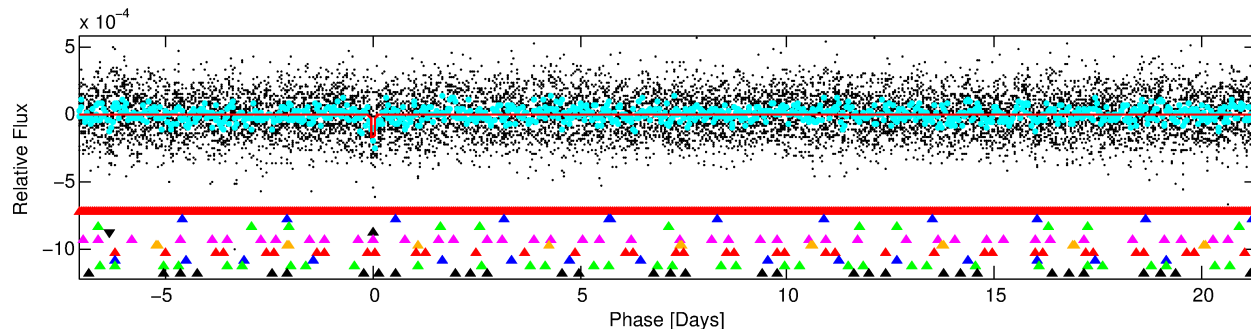
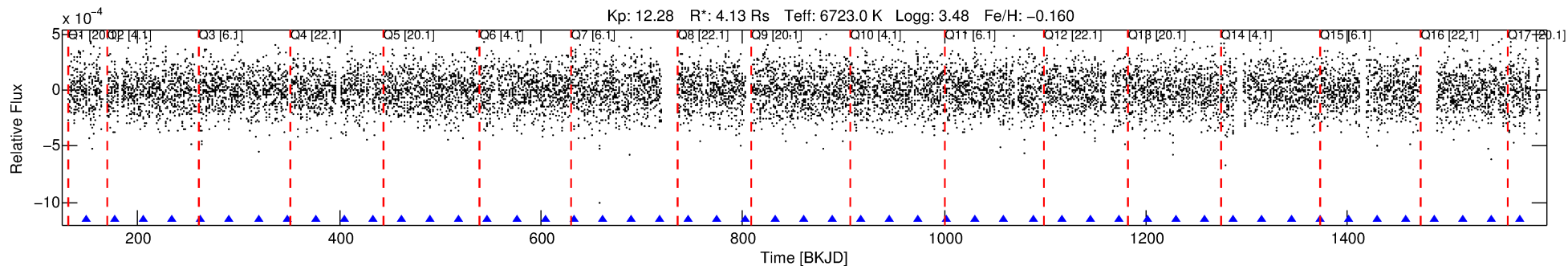
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 005978154-04

No Significant Match Found

# DV One-Page Summary

KIC: 5978154 Candidate: 4 of 10 Period: 28.454 d



## DV Fit Results:

Period = 28.45361 [0.00041] d  
Epoch = 148.8523 [0.0132] BKJD  
Rp/R\* = 0.0141 [0.0072]  
a/R\* = 29.98 [87.98]  
b = 0.91 [0.56]  
Seff = 618.32 [387.89]  
Teq = 1272 [199] K  
Rp = 6.38 [4.14] Re  
a = 0.2249 [0.0862] AU  
Ag = 88.82 [108.26] [0.81σ]  
Teffp = 6035 [1602] K [2.95σ]

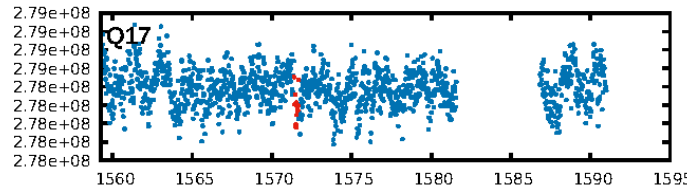
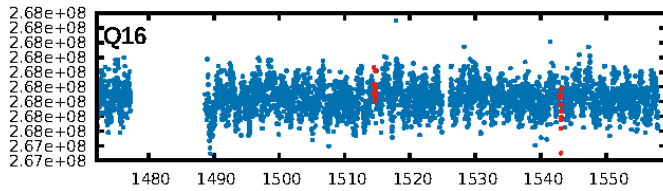
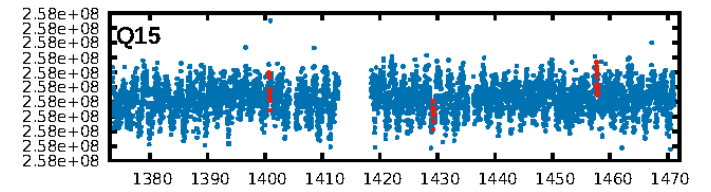
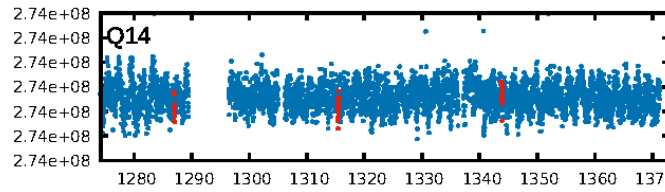
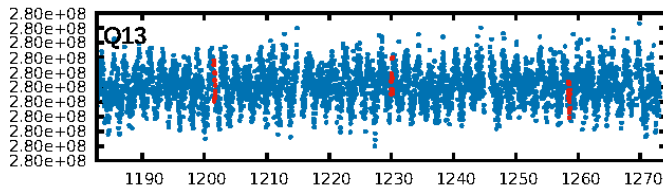
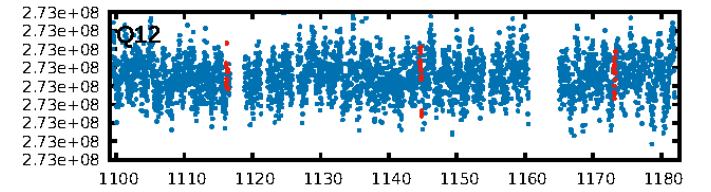
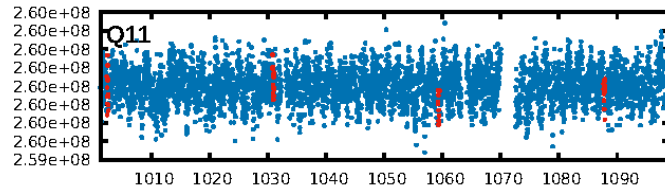
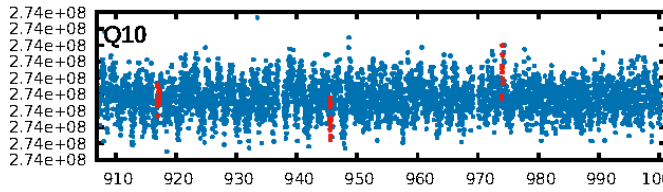
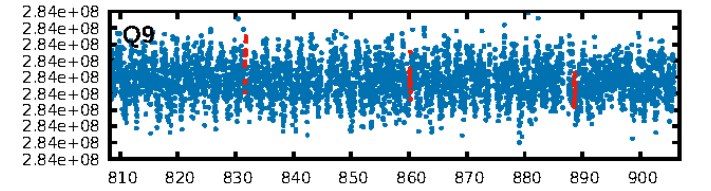
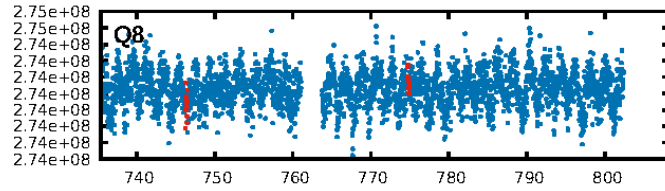
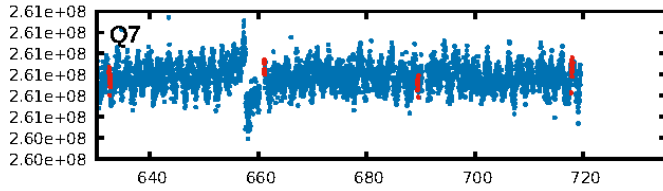
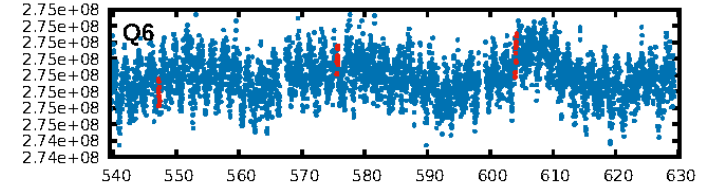
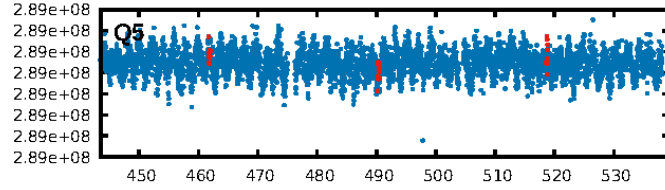
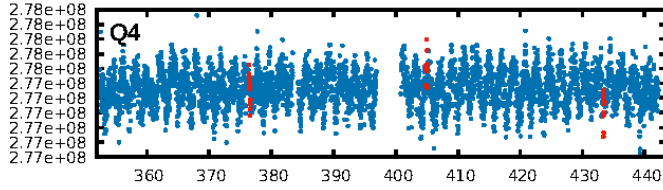
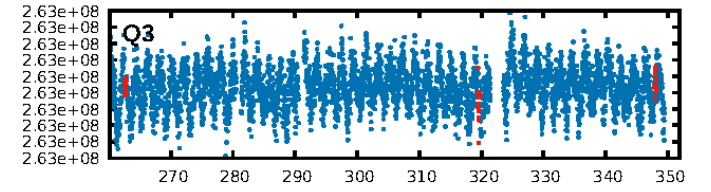
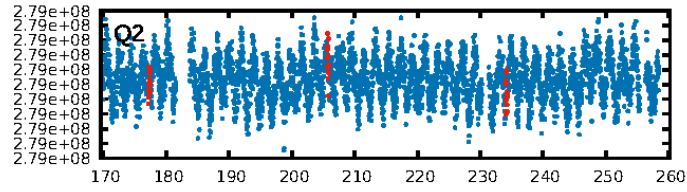
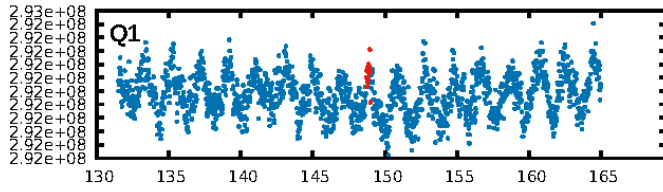
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [95.24σ]  
LongPeriod-sig: 100.0% [20.74σ]  
ModelChiSquare2-sig: 0.0%  
ModelChiSquareGof-sig: 99.2%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [15/15]  
GhostDiagnostic-chr: 29.29  
Centroid-sig: 3.8%  
Centroid-so: 0.702 arcsec [1.60σ]  
OotOffset-rm: 0.612 arcsec [0.62σ]  
KicOffset-rm: 1.104 arcsec [1.08σ]  
OotOffset-st: 2/3/3/5 [13]  
KicOffset-st: 2/3/3/5 [13]  
DiffImageQuality-fgm: 0.38 [5/13]  
DiffImageOverlap-fno: 0.06 [1/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 03-Feb-2016 05:54:02 Z

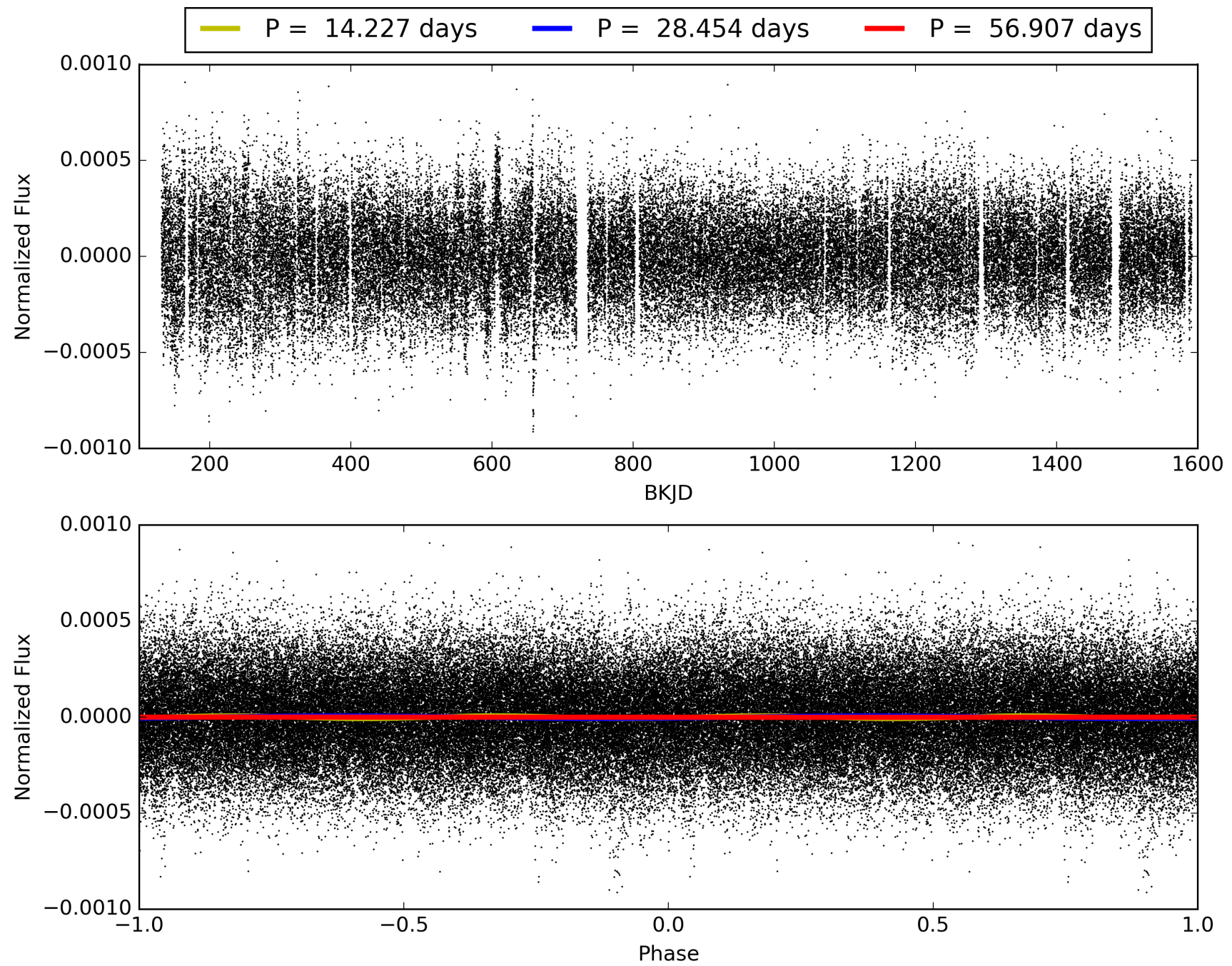
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 005978154-04, PDC Light Curves





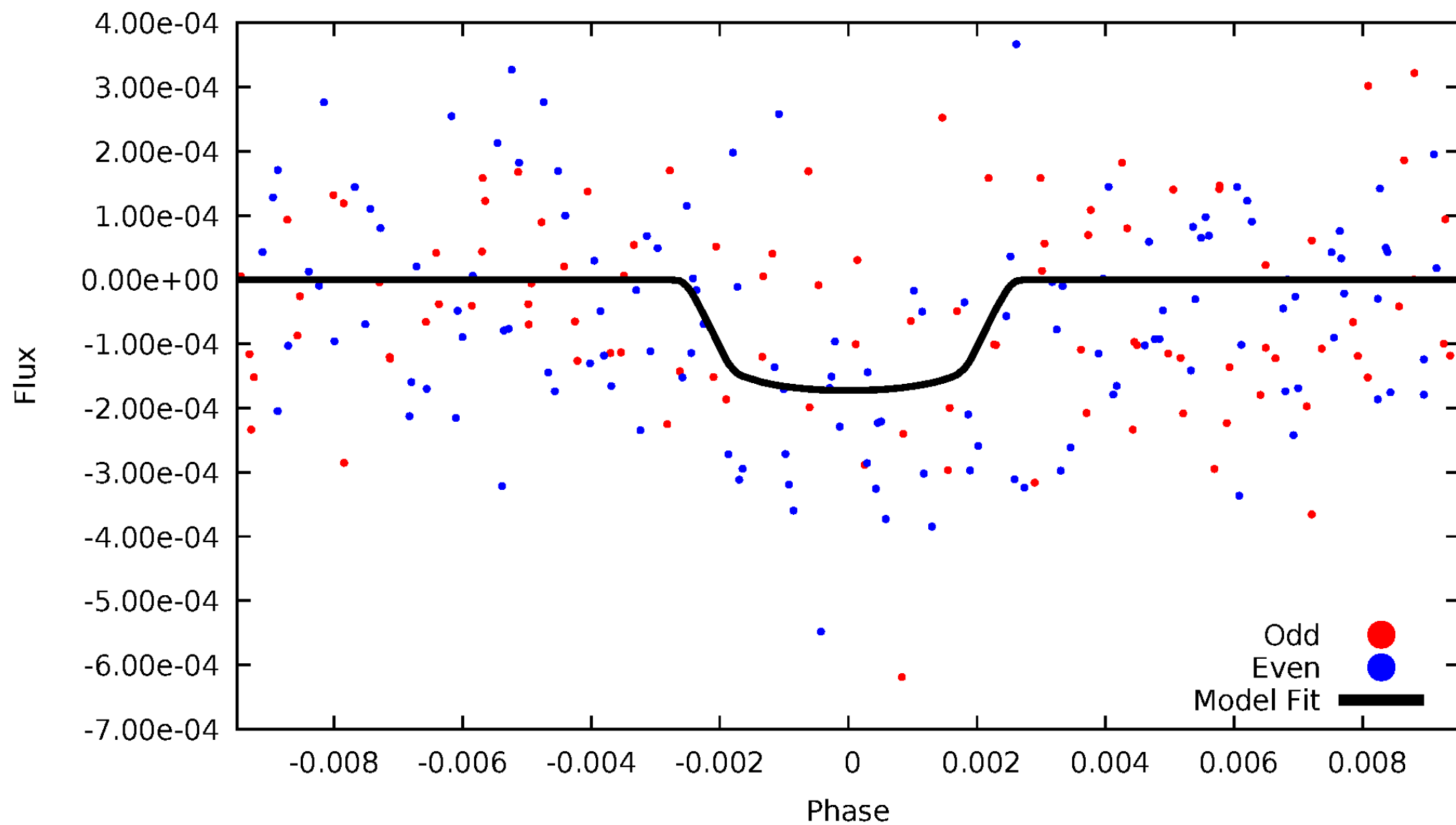
TCE 005978154-04





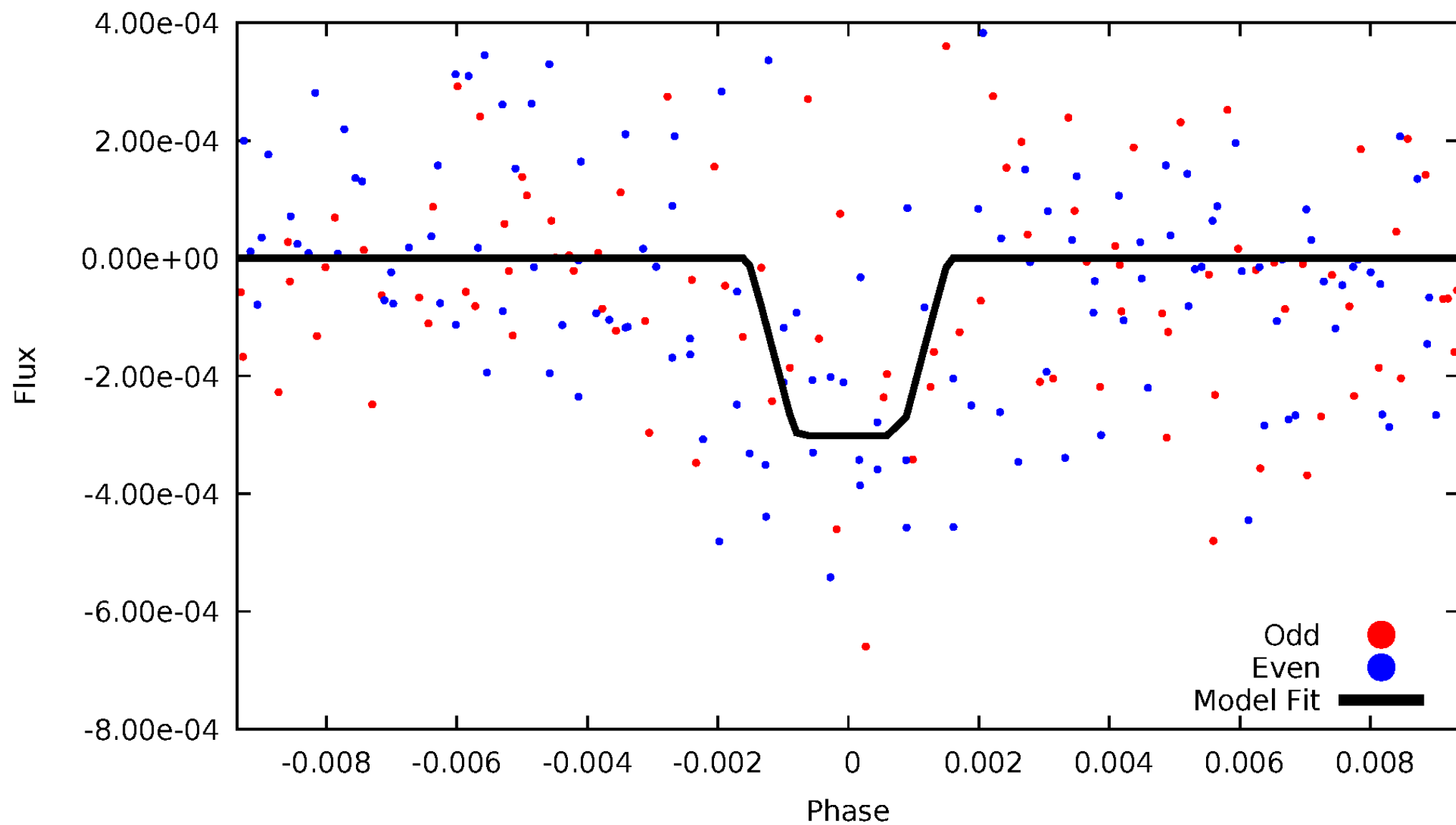
# DV Odd/Even

TCE 005978154-04



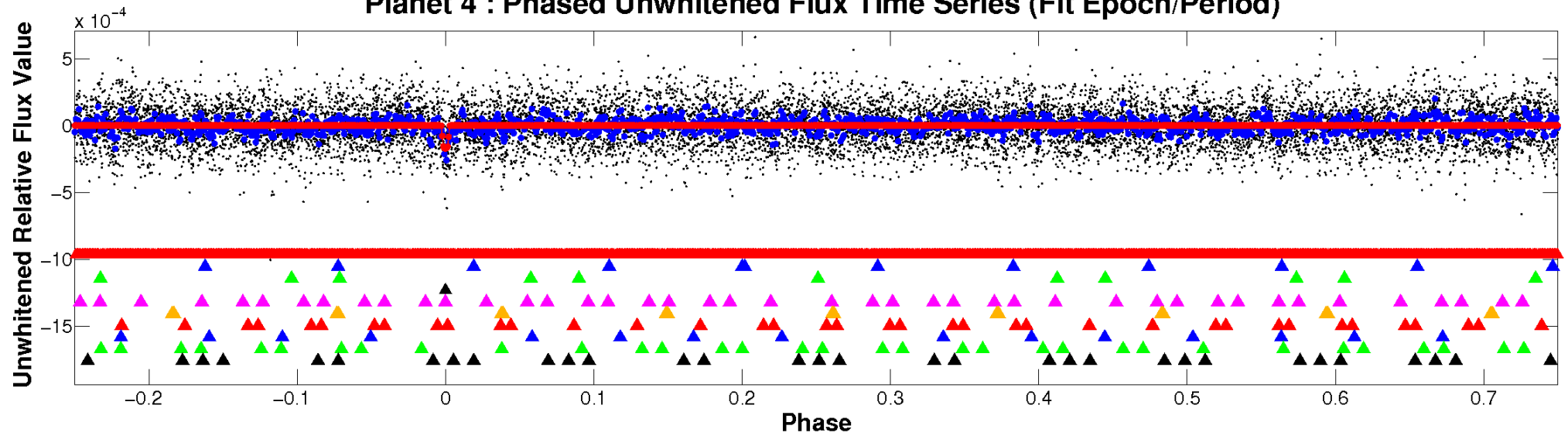
# ALT Odd/Even

TCE 005978154-04

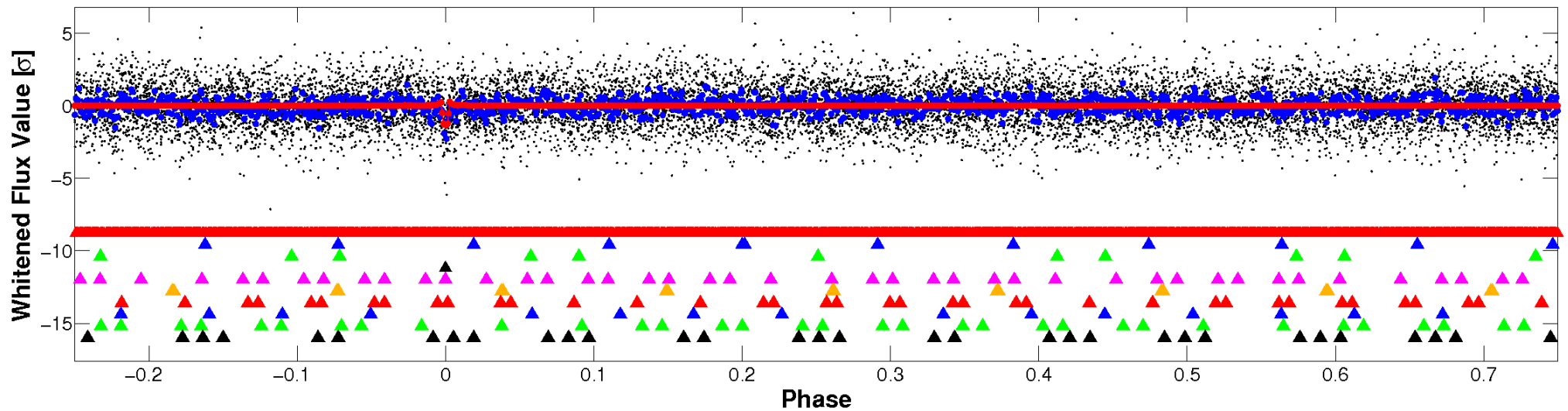


# Non-Whitened Vs. Whitened Light Curve

## Planet 4 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

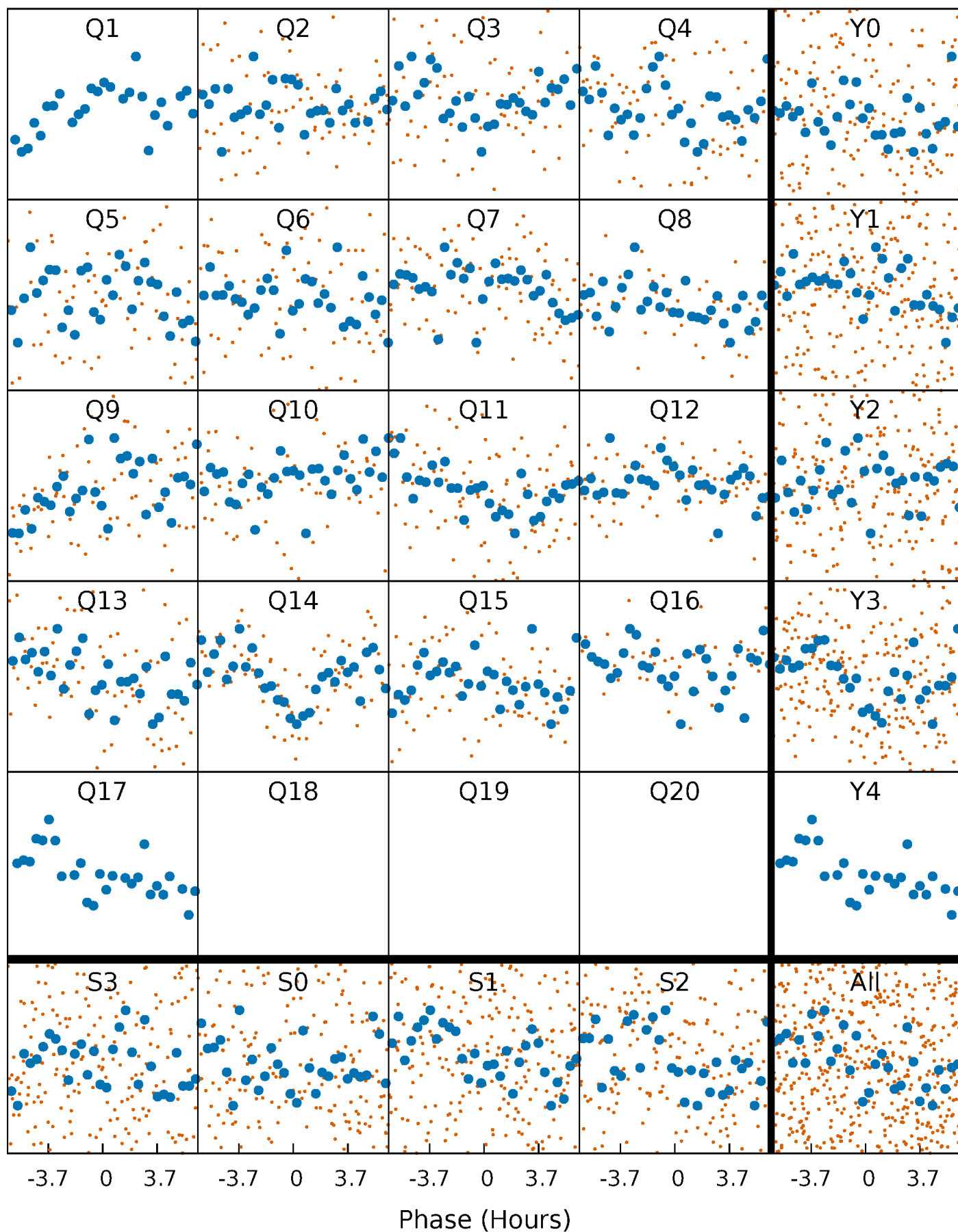


## Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



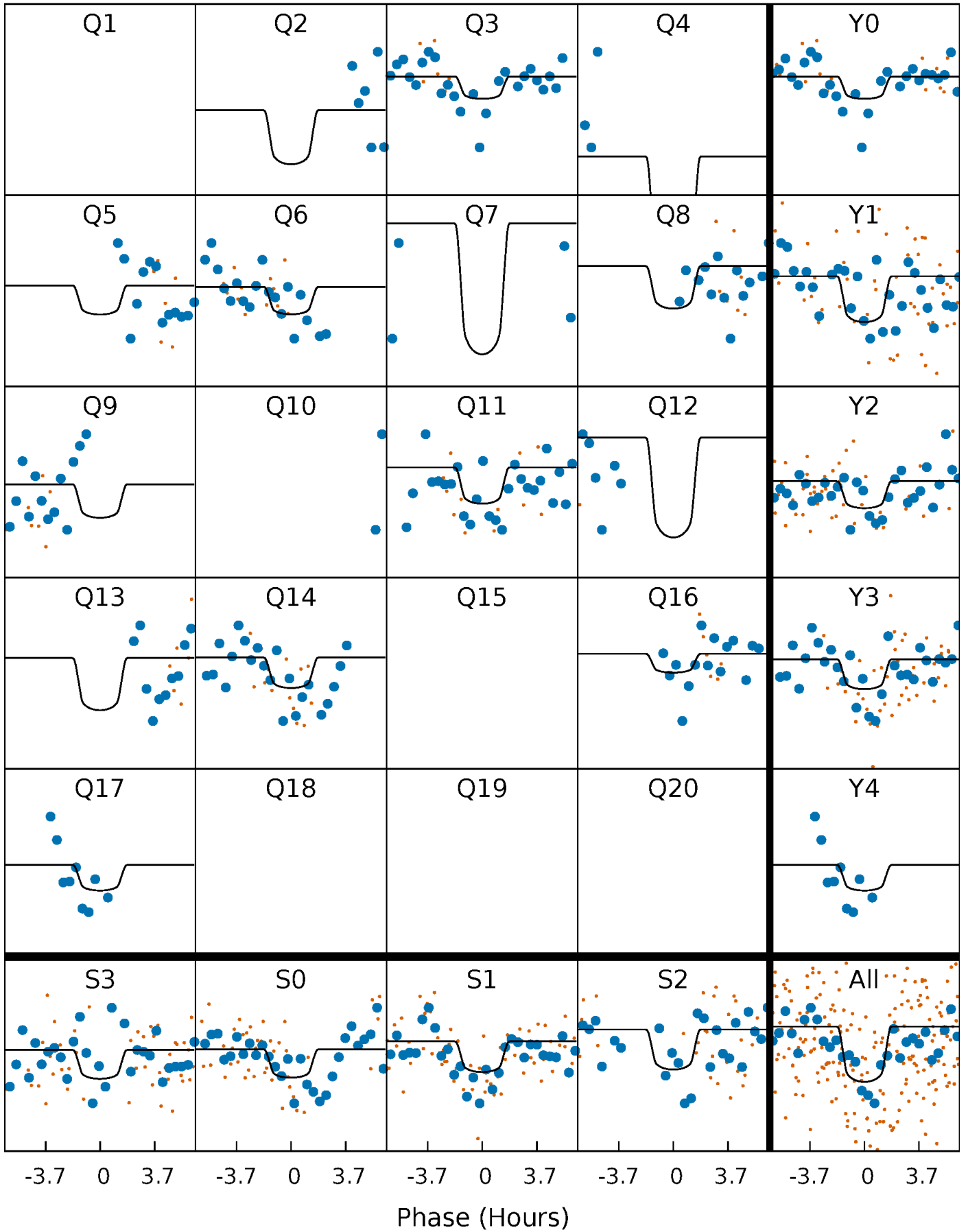
# PDC Quarter-Phased Transit Curves

TCE 005978154-04   P= 28.453613 Days    $T_0=148.852296$  (BKJD)



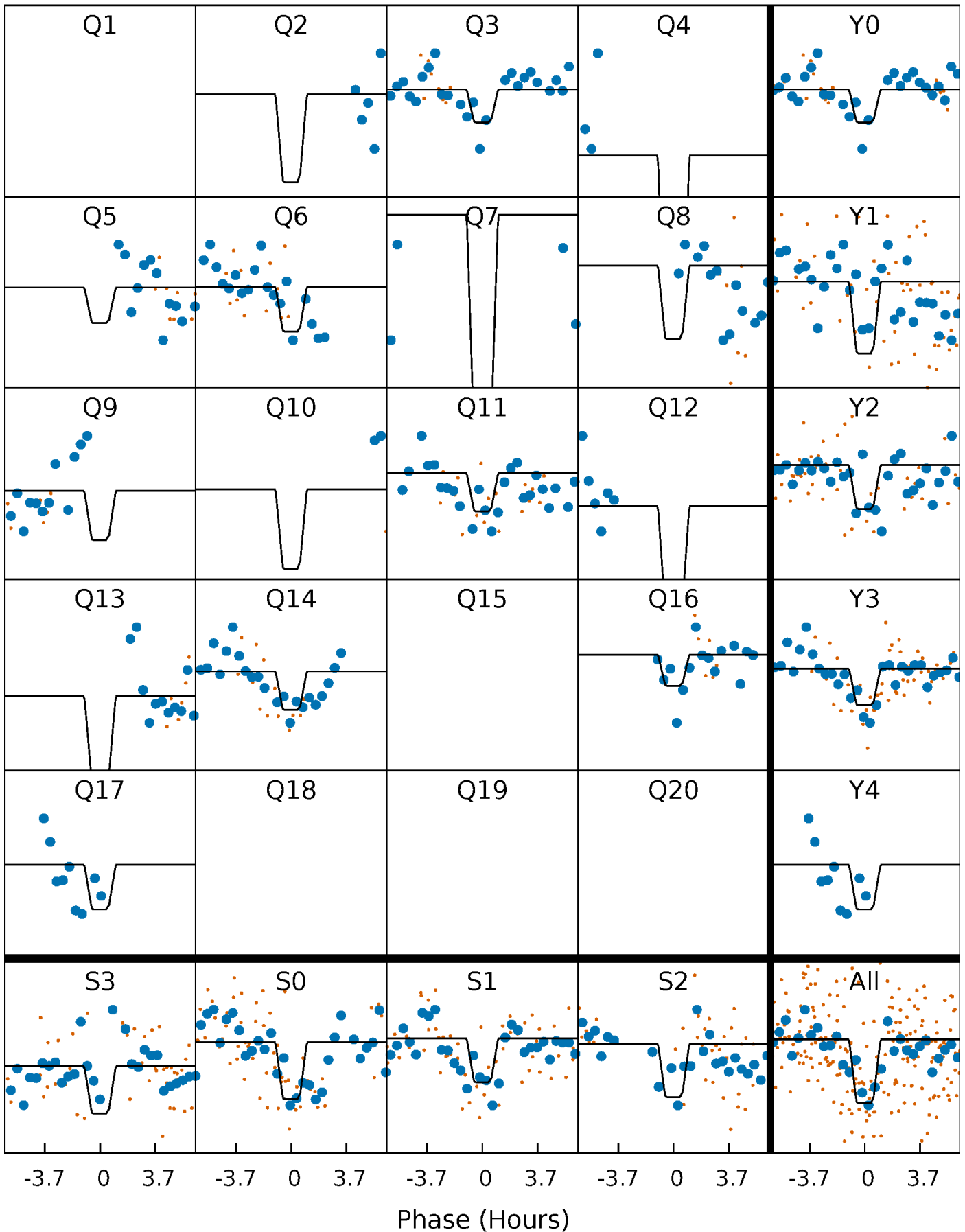
# DV Quarter-Phased Transit Curves

TCE 005978154-04 P= 28.453613 Days  $T_0=148.852296$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 005978154-04   P= 28.454089 Days    $T_0=148.845059$  (BKJD)

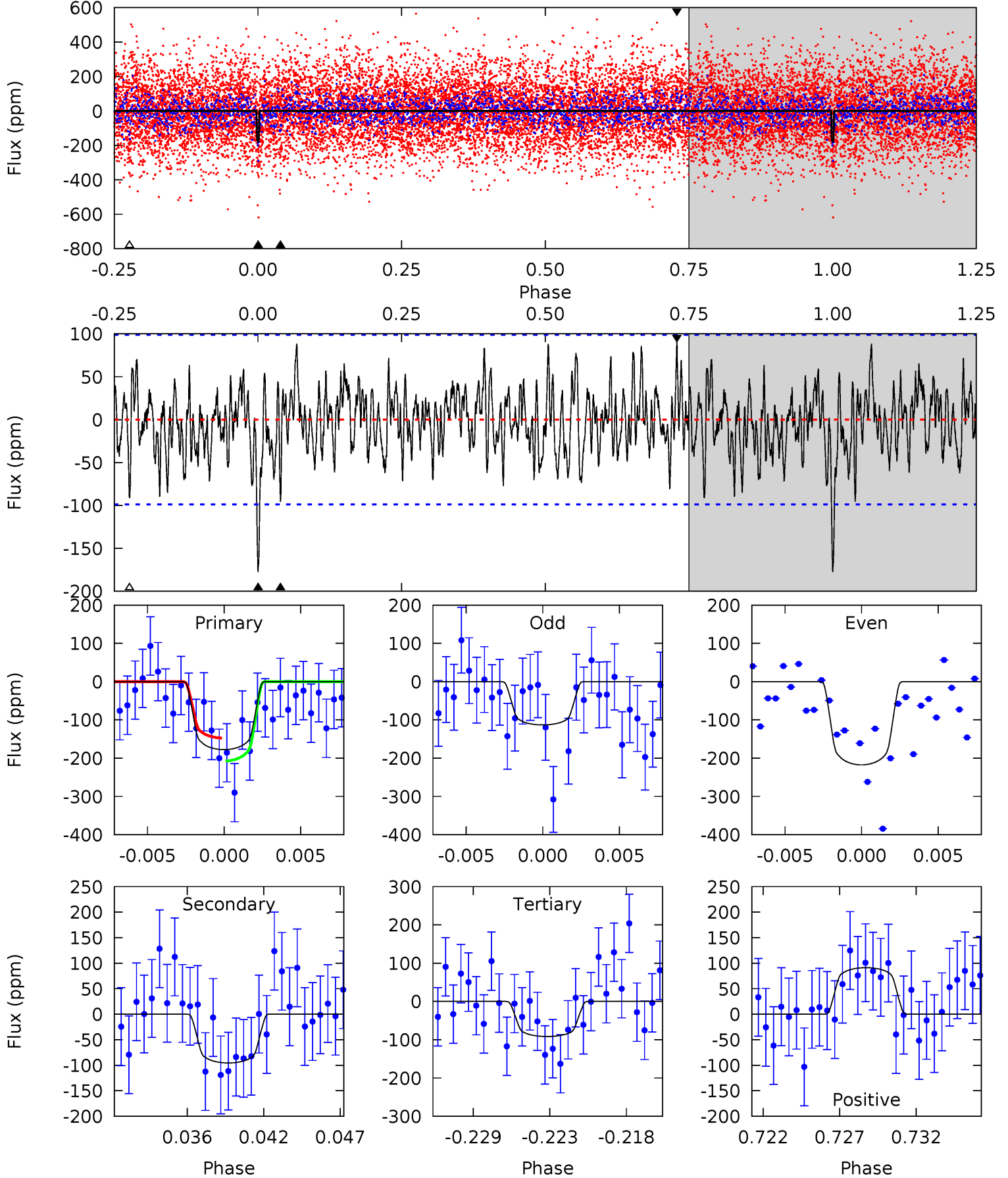




# DV Model-Shift Uniqueness Test

005978154-04, P = 28.453613 Days, E = 120.398683 Days

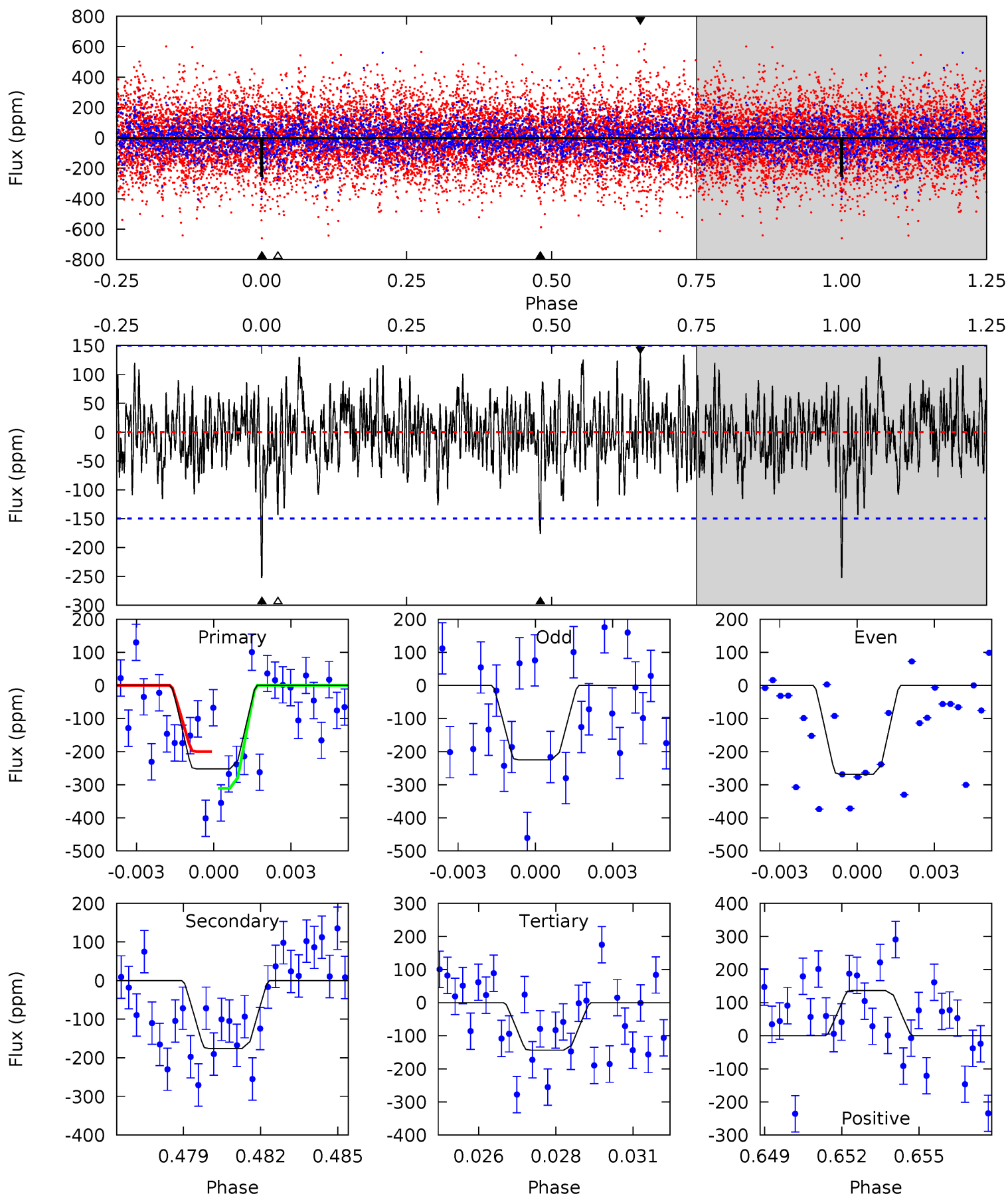
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
9.26	4.97	4.77	4.75	5.15	2.79	1.68	4.49	4.51	0.21	0.22	2.62	0.74	0.34	1.56



# Alt Model-Shift Uniqueness Test

005978154-04, P = 28.454089 Days, E = 120.390970 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
8.87	6.19	5.05	4.81	5.26	2.99	1.58	3.82	4.06	1.14	1.38	0.75	0.71	0.35	1.93



### Stellar Parameters For KIC 005978154

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$6723^{+202}_{-223}$	$3.478^{+0.360}_{-0.090}$	$-0.160^{+0.300}_{-0.250}$	$4.134^{+0.412}_{-1.647}$	$1.872^{+0.171}_{-0.398}$	$0.037^{+0.107}_{-0.011}$
	+3%/-3%	+10%/-3%	+188%/-156%	+10%/-40%	+9%/-21%	+286%/-29%
Source	PHO1	FLK73	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 005978154-04 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-95 \pm 19$	$6.09^{+3.36}_{-3.24}$	$1751^{+97}_{-164}$	$5499^{+2391}_{-885}$	$70^{+246}_{-41}$
Alt.	$-176 \pm 28$	$7.17^{+3.51}_{-3.05}$	$1745^{+103}_{-178}$	$5842^{+1980}_{-893}$	$92^{+201}_{-50}$

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

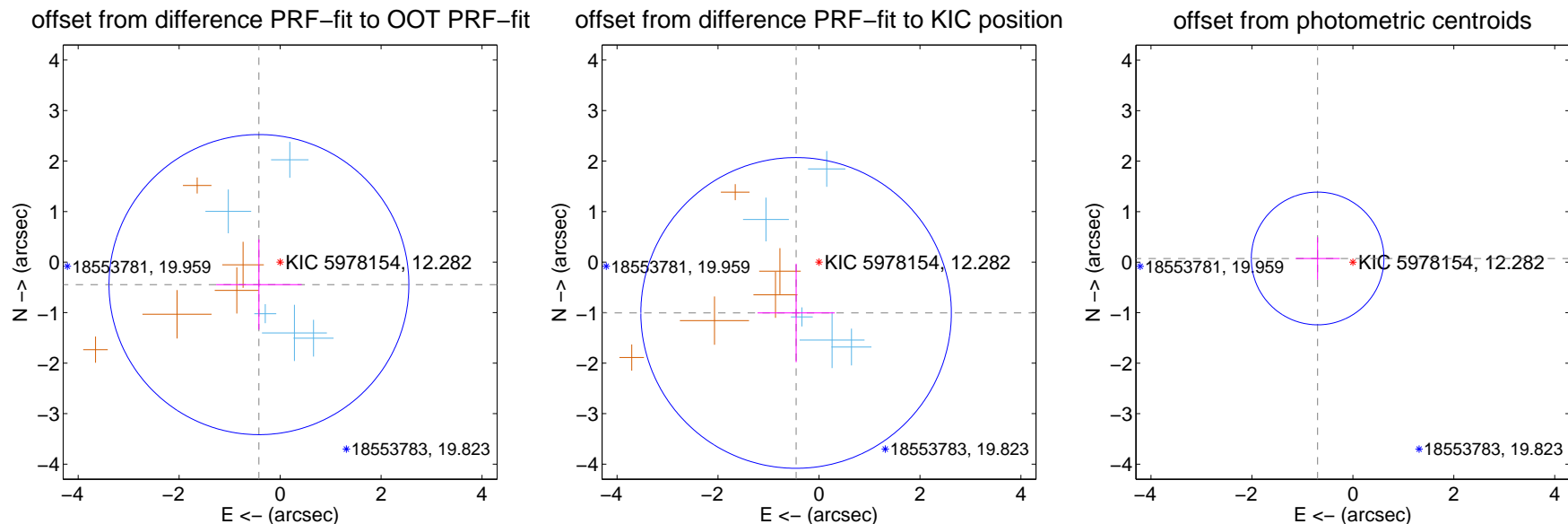
## DV Centroid Data

Supplemental centroid analysis for 005978154-04. Kepler magnitude: 12.28. Transit SNR 8.28

There are 5 quarters with good PRF difference image offsets

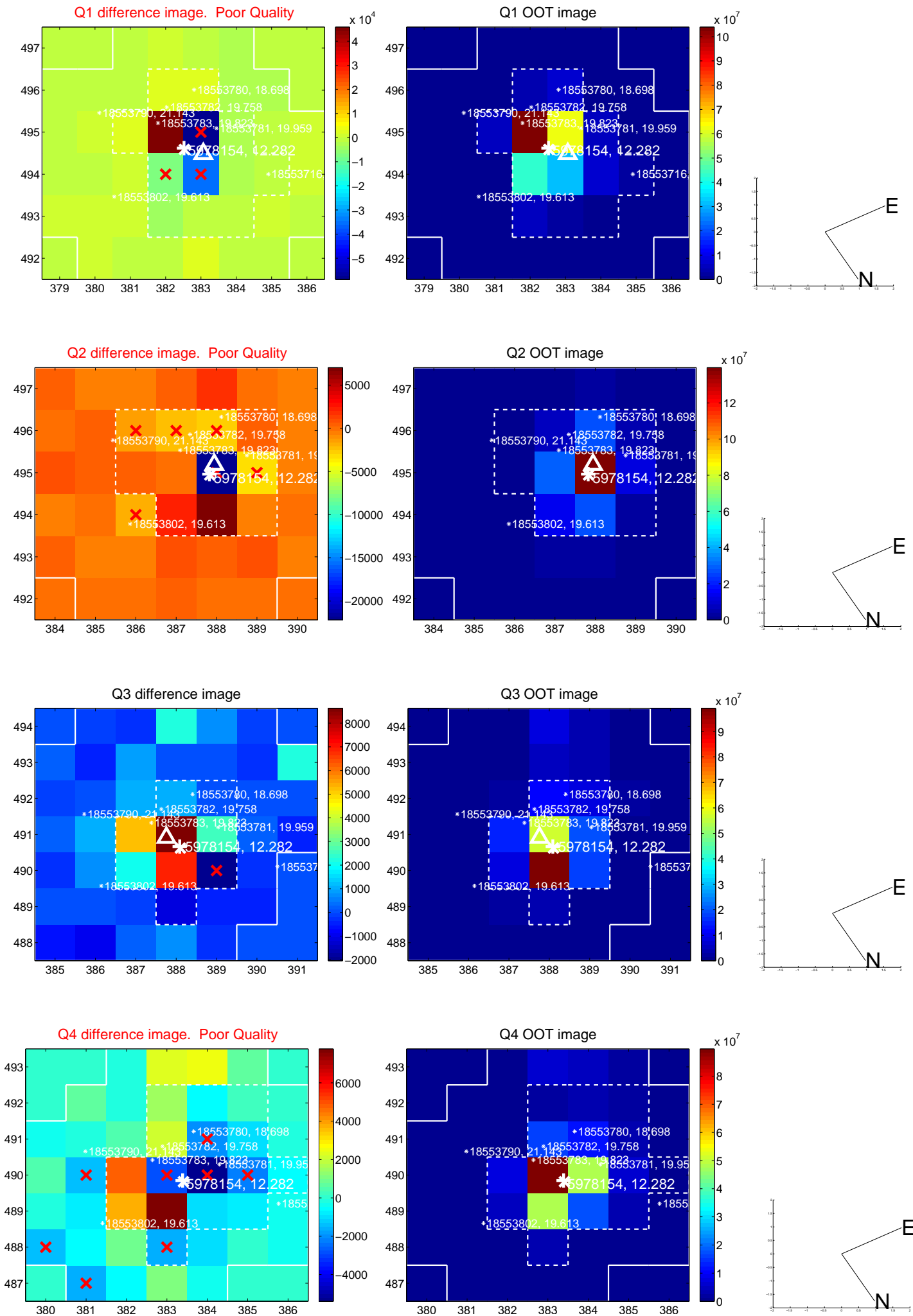
The direct PRF centroid is offset from the target star catalog position by about 0.14 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.612 \pm 0.990$	0.62	$0.419 \pm 0.846$	$-0.446 \pm 0.892$
PRF-fit source offset from KIC position	$1.104 \pm 1.025$	1.08	$0.454 \pm 0.765$	$-1.006 \pm 0.976$
photometric centroid source offset	$0.70 \pm 0.44$	1.60	$0.70 \pm 0.44$	$0.07 \pm 0.42$

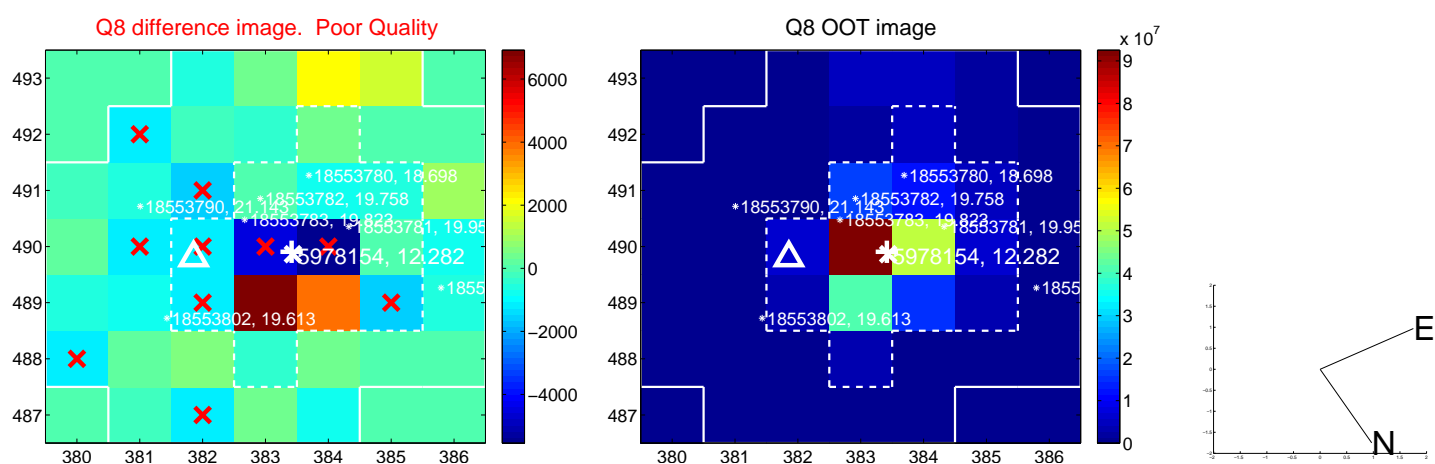
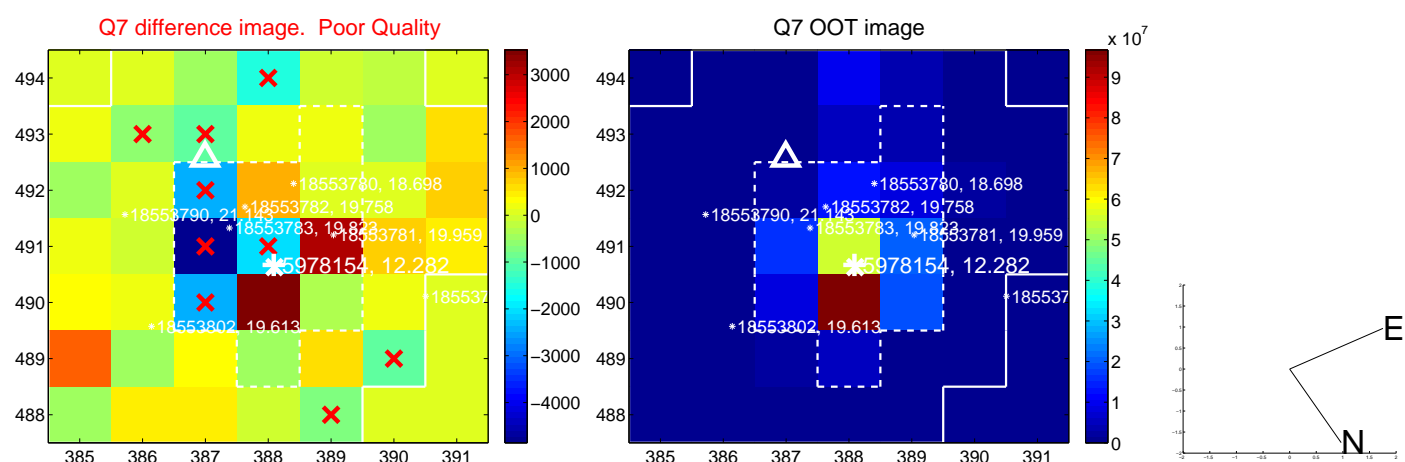
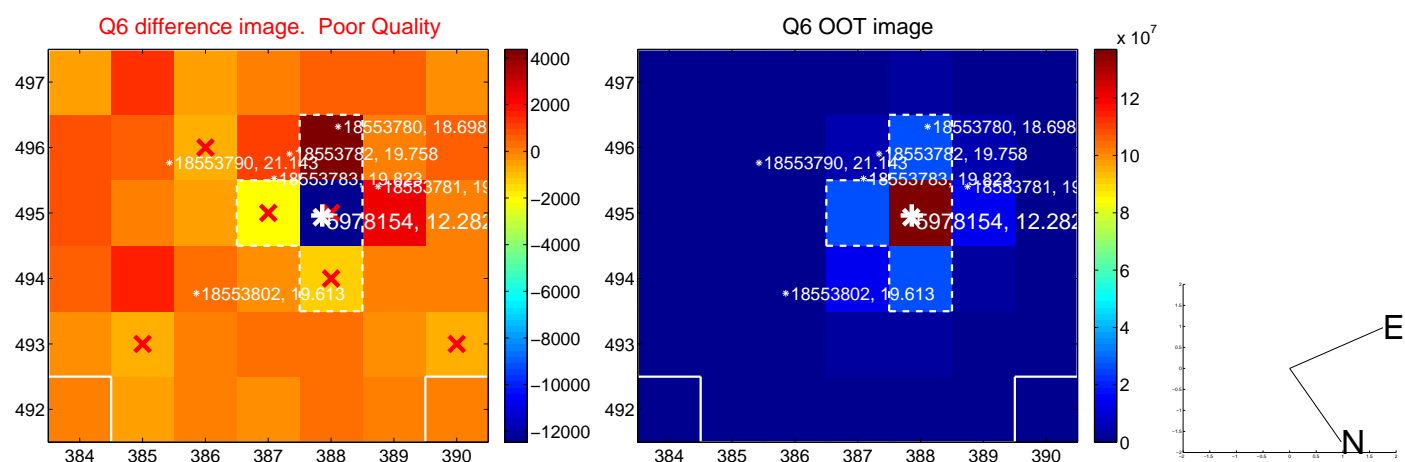
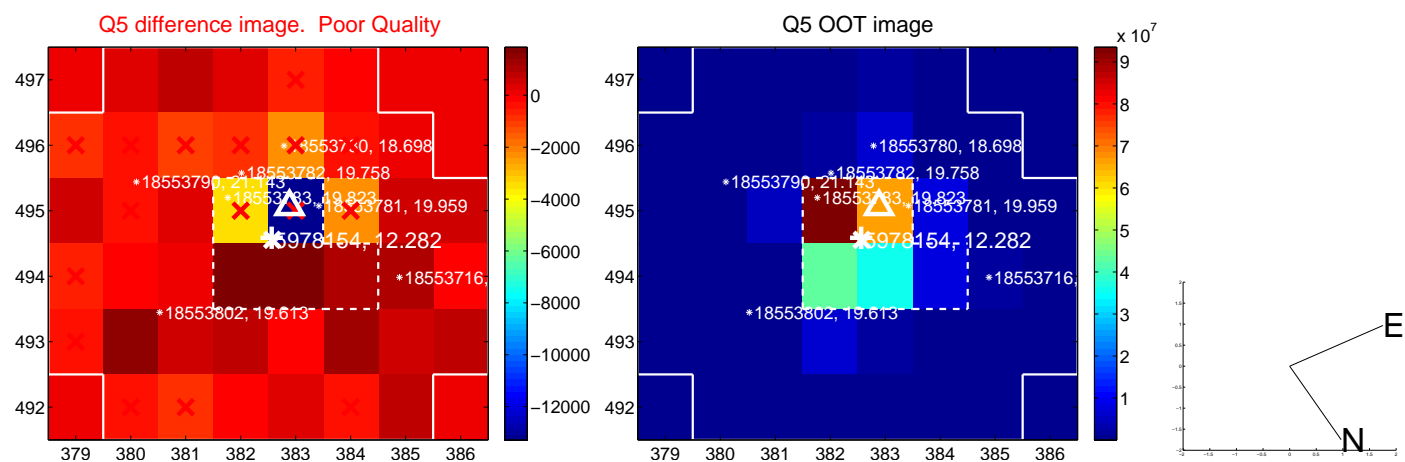


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets**; **Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

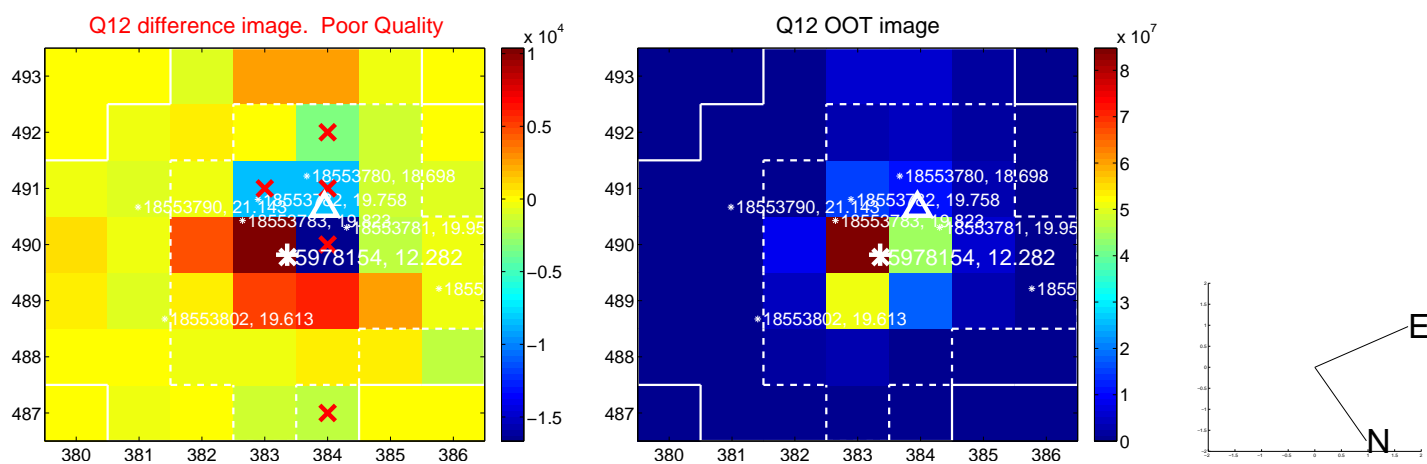
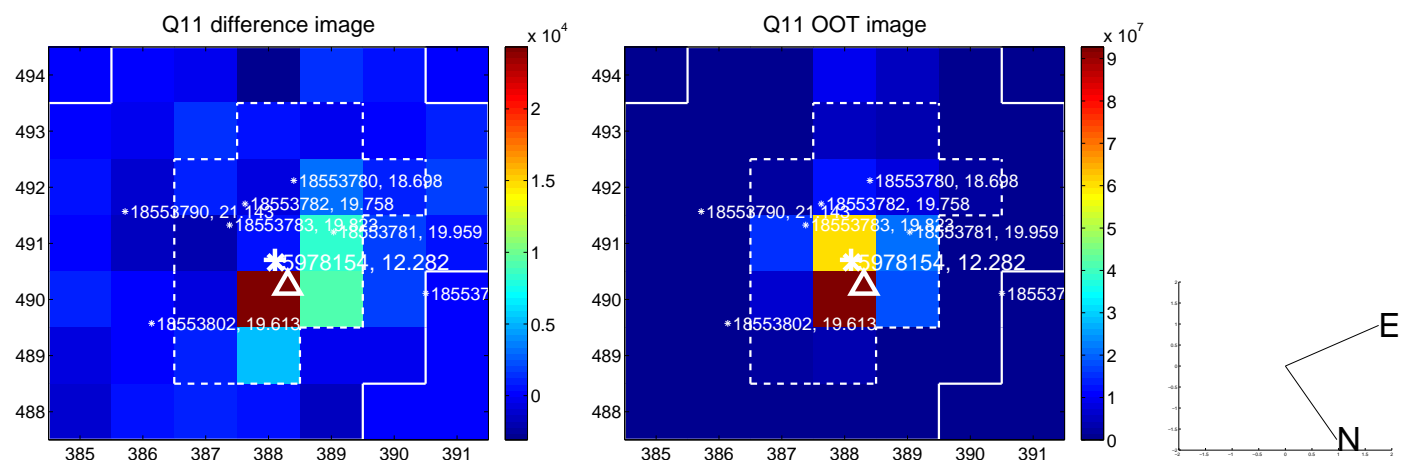
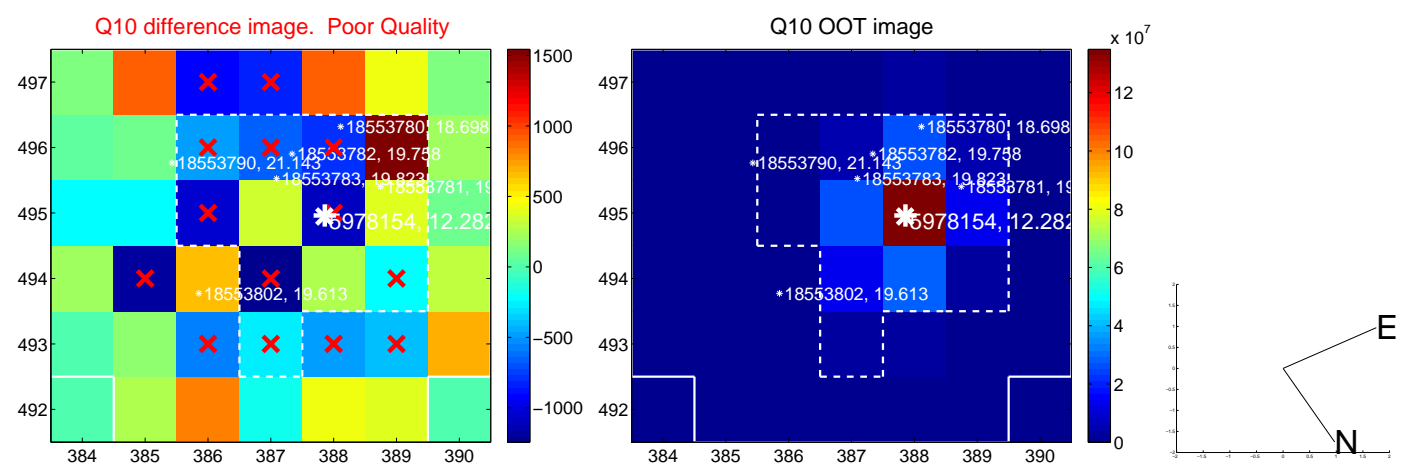
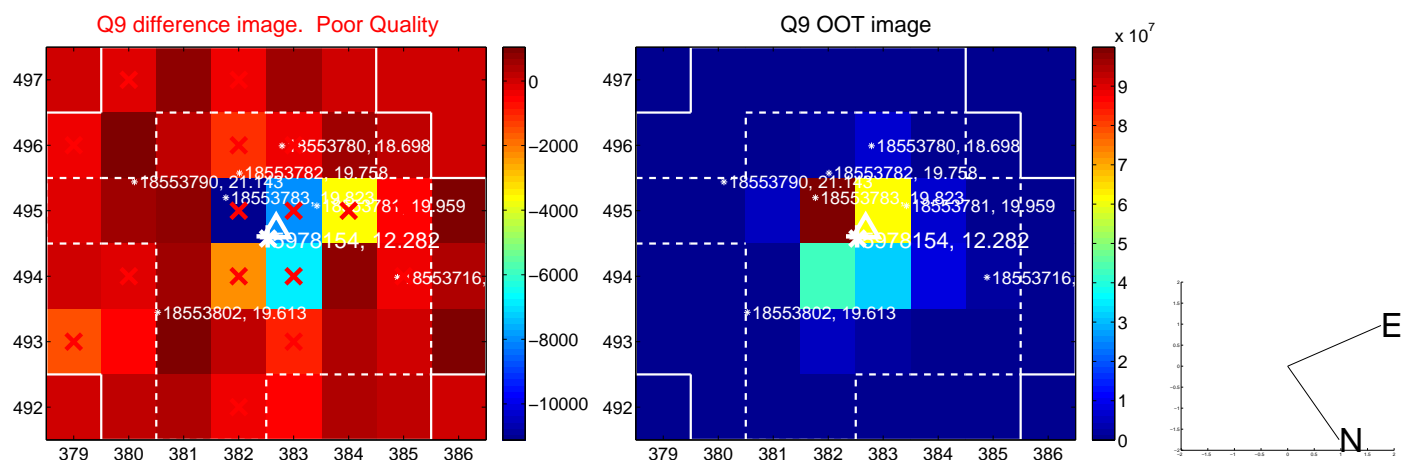


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

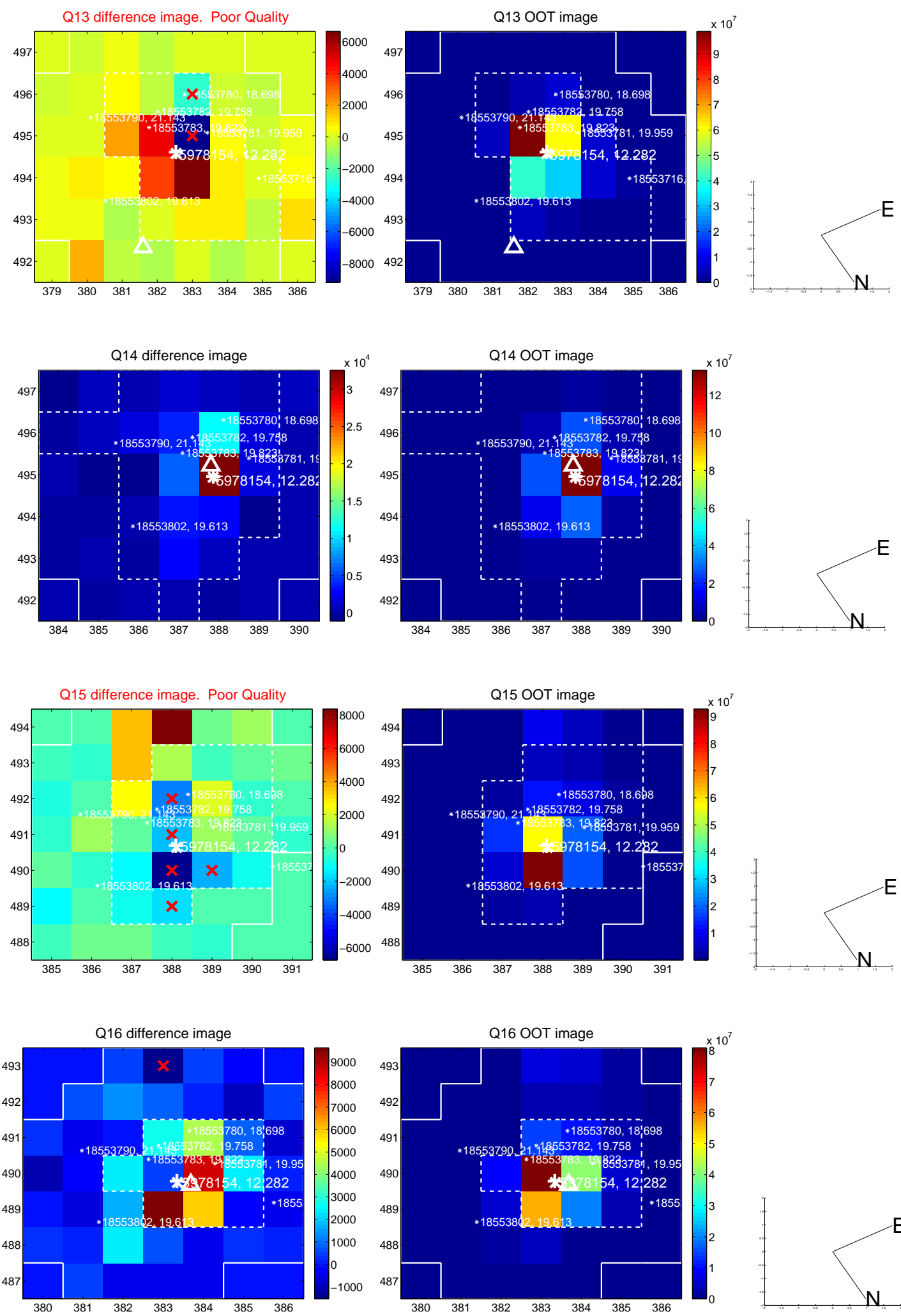




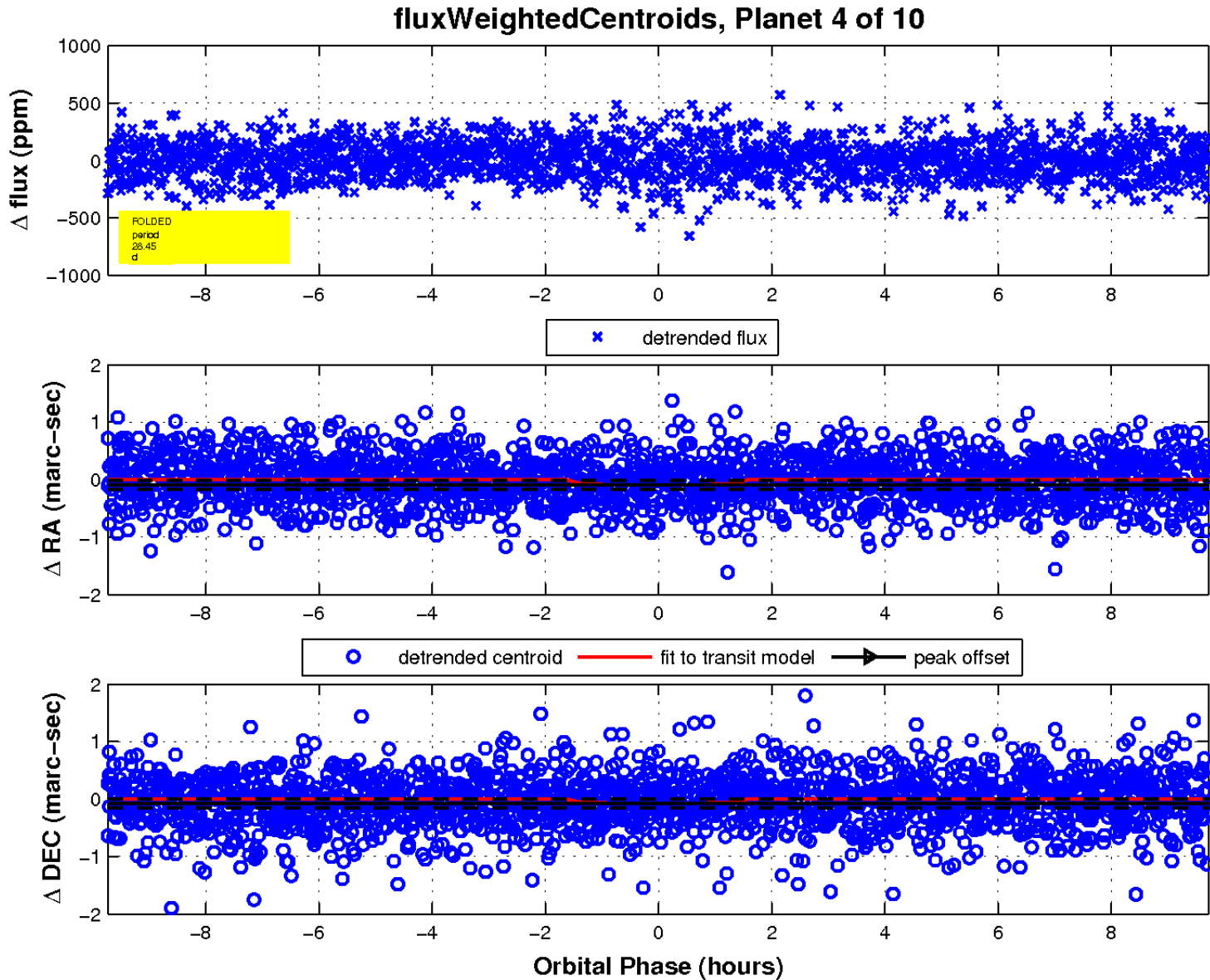
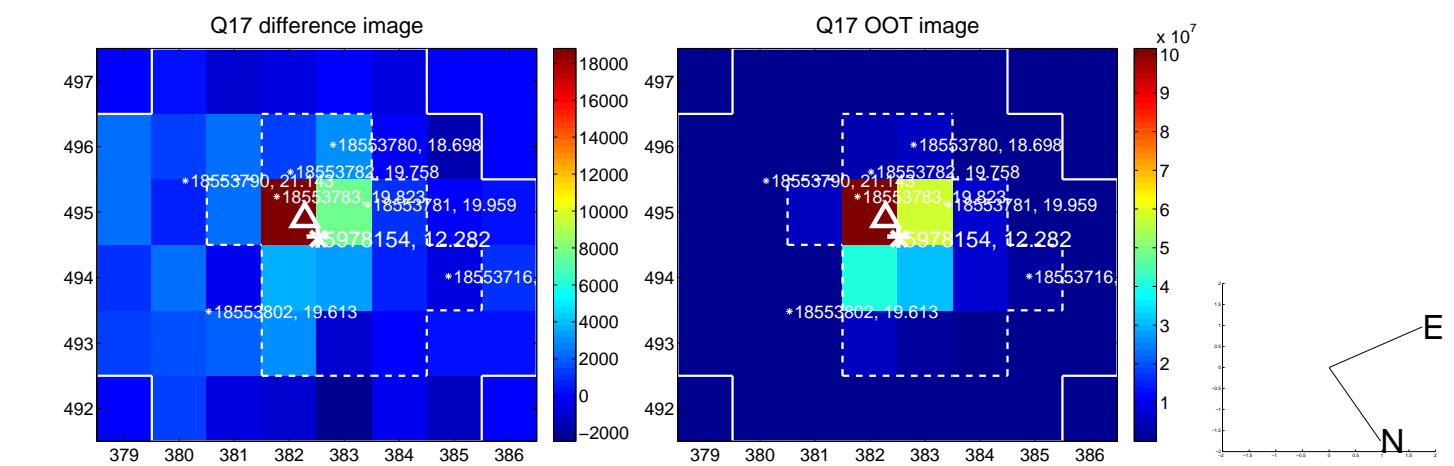
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



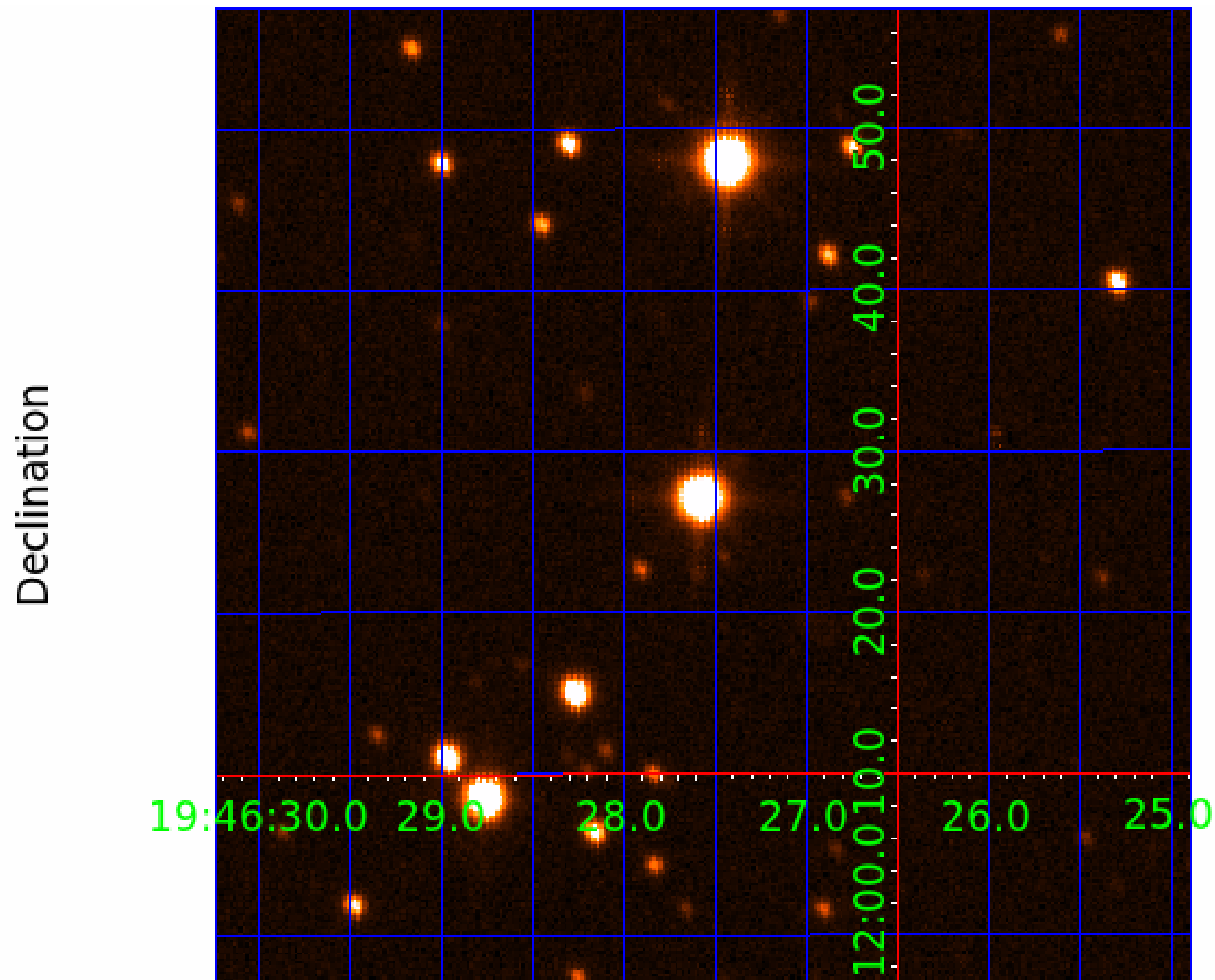
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



UKIRT Image



## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005978154-01	OBS	No	0.977344	132.332446	13.4	6.117	8.3	6.7	4.13	6723	1.53	55377.15
005978154-02	OBS	No	124.165564	182.998698	450.9	13.613	12.5	10.5	4.13	6723	9.87	86.71
005978154-03	OBS	No	137.679401	150.489095	291.5	6.419	9.2	10.5	4.13	6723	8.84	75.55
005978154-04	OBS	No	28.453613	148.852296	172.6	3.245	9.8	8.3	4.13	6723	6.38	618.32
005978154-05	OBS	No	33.910761	148.850724	154.0	5.416	8.9	9.0	4.13	6723	5.62	489.34
005978154-06	OBS	No	82.202844	181.537676	292.1	2.328	9.2	9.3	4.13	6723	8.25	150.27
005978154-07	OBS	No	38.342122	163.823144	205.4	2.241	9.0	8.8	4.13	6723	6.69	415.43
005978154-08	OBS	No	93.248607	221.792194	272.4	4.236	8.9	9.2	4.13	6723	7.75	127.02
005978154-09	OBS	No	43.449347	166.082590	271.7	2.358	9.1	8.7	4.13	6723	7.55	351.63
005978154-10	OBS	No	45.084056	162.646790	117.0	6.361	8.6	5.7	4.13	6723	5.05	334.73

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005978154-01	OBS	FP	0.00	1	0	0	0	SWEET_NTL—LPP_DV
005978154-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS
005978154-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
005978154-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
005978154-05	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—HALO_GHOST
005978154-06	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—HALO_GHOST
005978154-07	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
005978154-08	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
005978154-09	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
005978154-10	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT

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

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

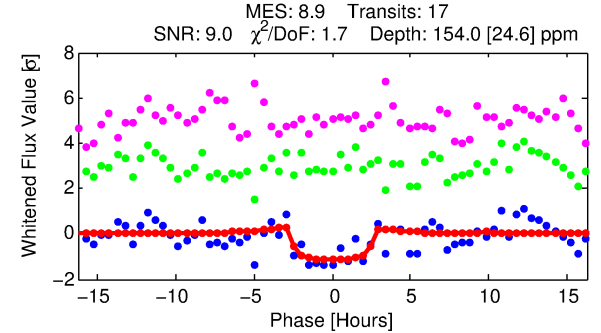
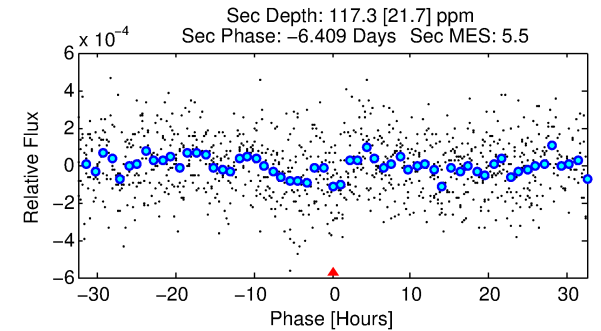
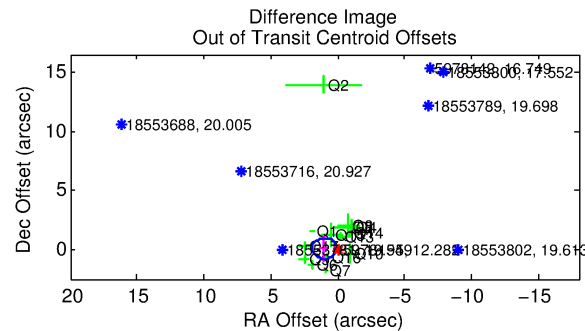
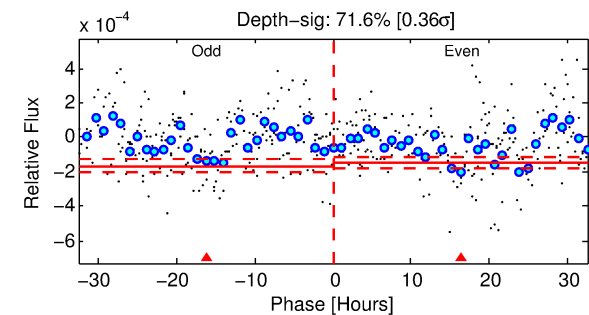
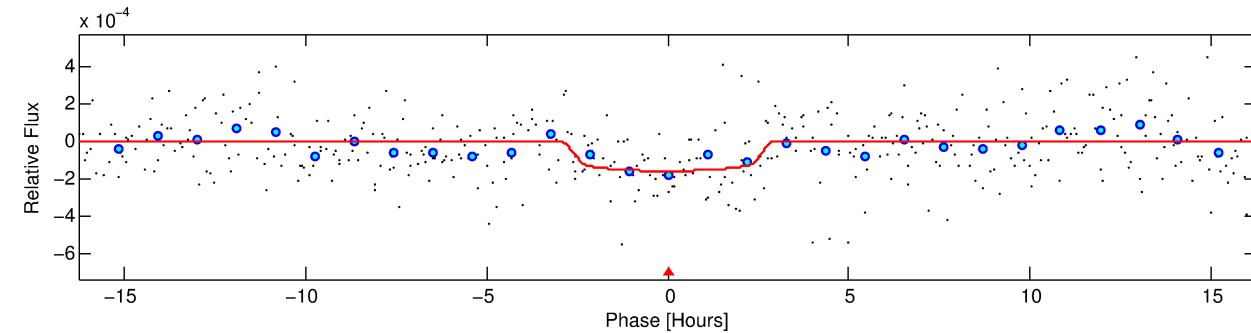
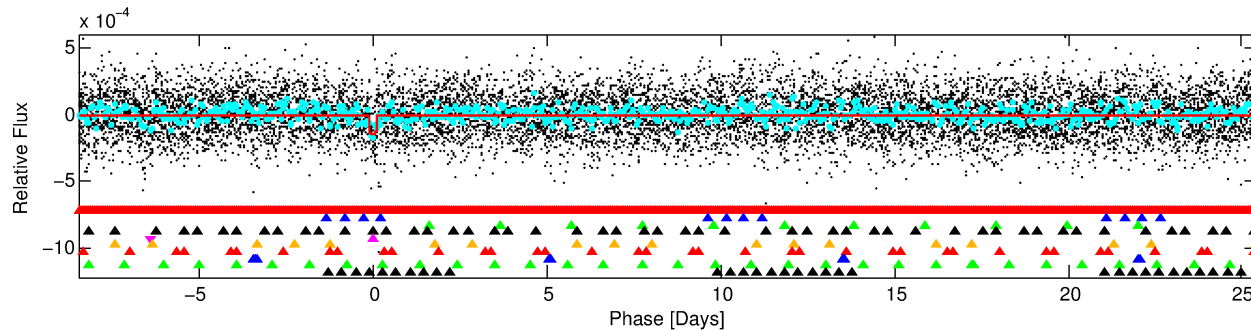
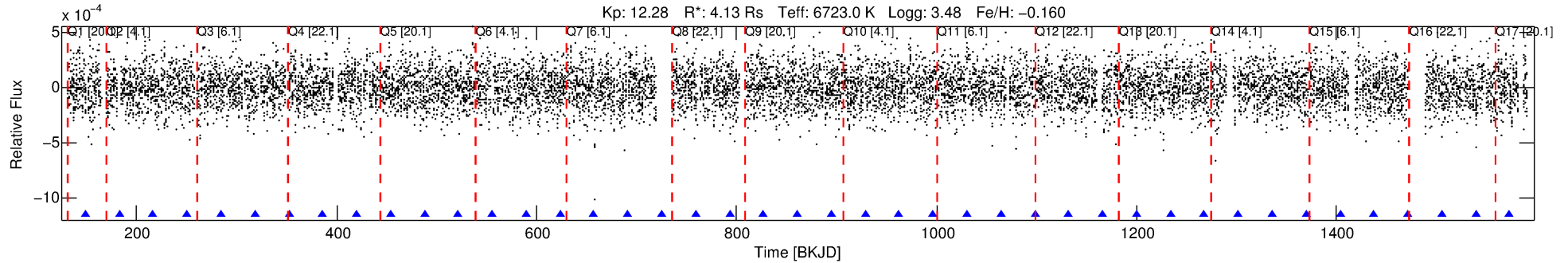
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 005978154-05

No Significant Match Found

# DV One-Page Summary

KIC: 5978154 Candidate: 5 of 10 Period: 33.911 d



## DV Fit Results:

Period = 33.91076 [0.00055] d  
Epoch = 148.8507 [0.0135] BKJD  
Rp/R\* = 0.0125 [0.0095]  
a/R\* = 31.01 [136.91]  
b = 0.78 [2.25]  
Seff = 489.34 [306.98]  
Teq = 1199 [188] K  
Rp = 5.62 [4.83] Re  
a = 0.2528 [0.0969] AU  
Ag = 130.76 [216.41] [0.60 $\sigma$ ]  
Teffp = 6270 [2419] K [2.09 $\sigma$ ]

## DV Diagnostic Results:

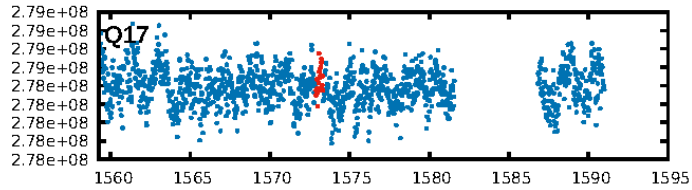
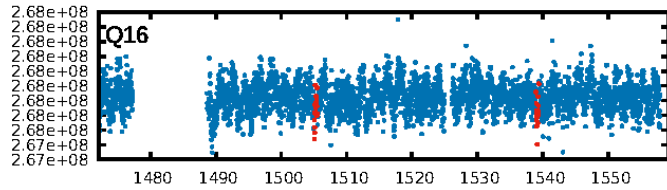
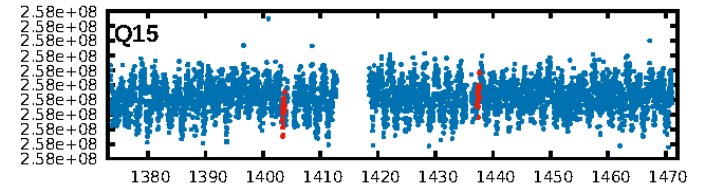
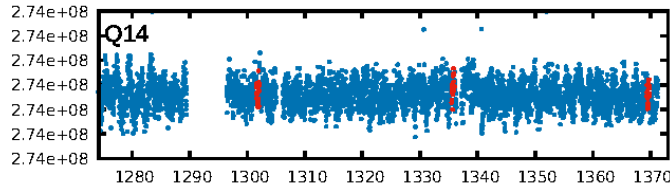
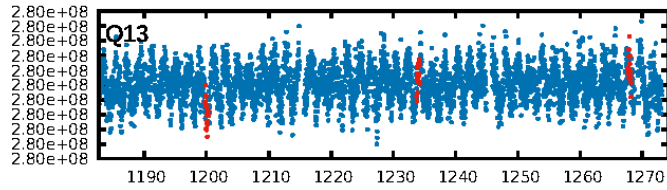
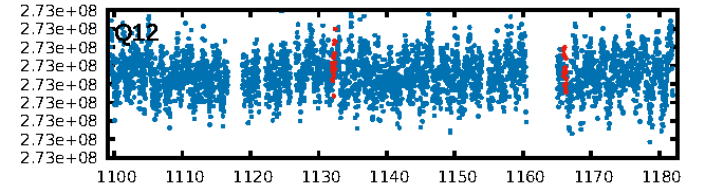
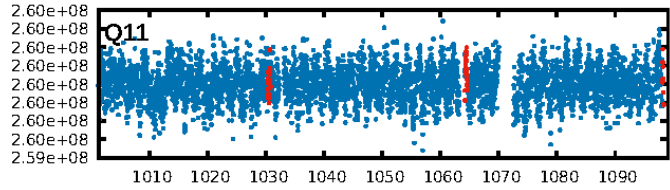
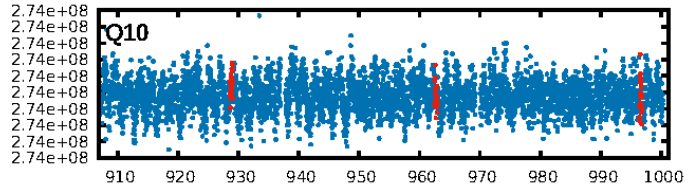
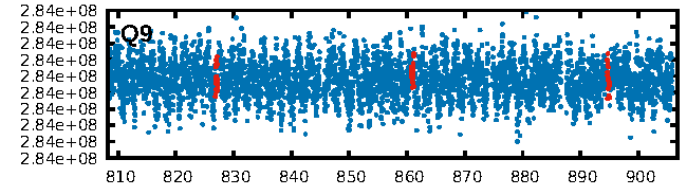
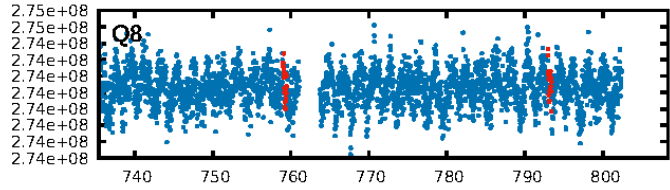
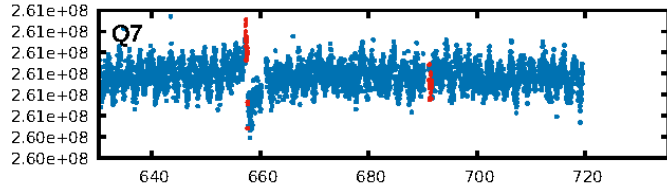
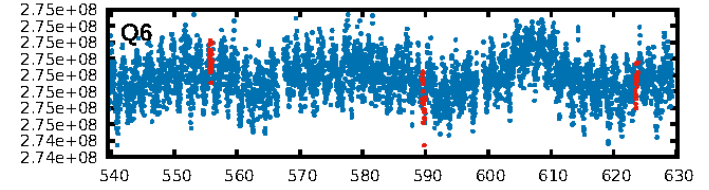
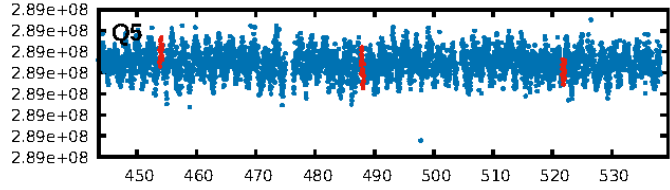
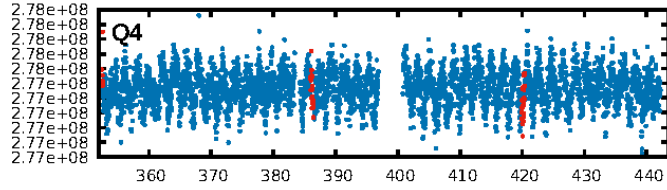
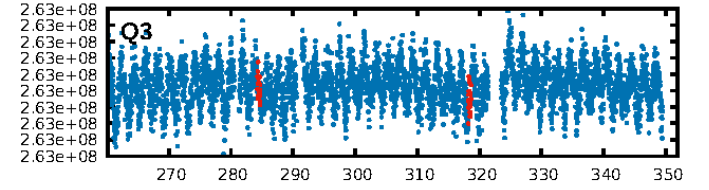
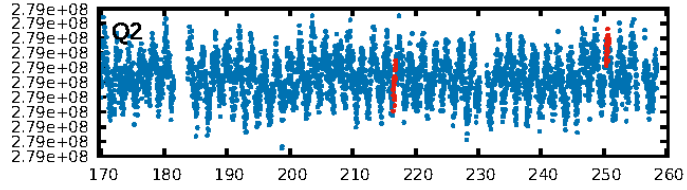
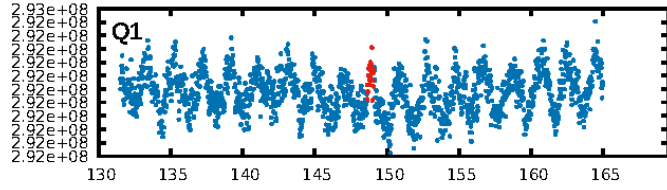
ShortPeriod-sig: 100.0% [20.74 $\sigma$ ]  
LongPeriod-sig: 100.0% [18.14 $\sigma$ ]  
ModelChiSquare2-sig: 0.2%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [17/17]  
GhostDiagnostic-chr: -0.0002089  
Centroid-sig: 60.9%  
Centroid-so: 0.160 arcsec [0.38 $\sigma$ ]  
OotOffset-rm: 1.050 arcsec [3.56 $\sigma$ ]  
KicOffset-rm: 1.081 arcsec [2.93 $\sigma$ ]  
OotOffset-st: 4/3/3/4 [14]  
KicOffset-st: 4/3/3/4 [14]  
DiffImageQuality-fgm: 0.43 [6/14]  
DiffImageOverlap-fno: 0.00 [0/16]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 03-Feb-2016 05:54:06 Z

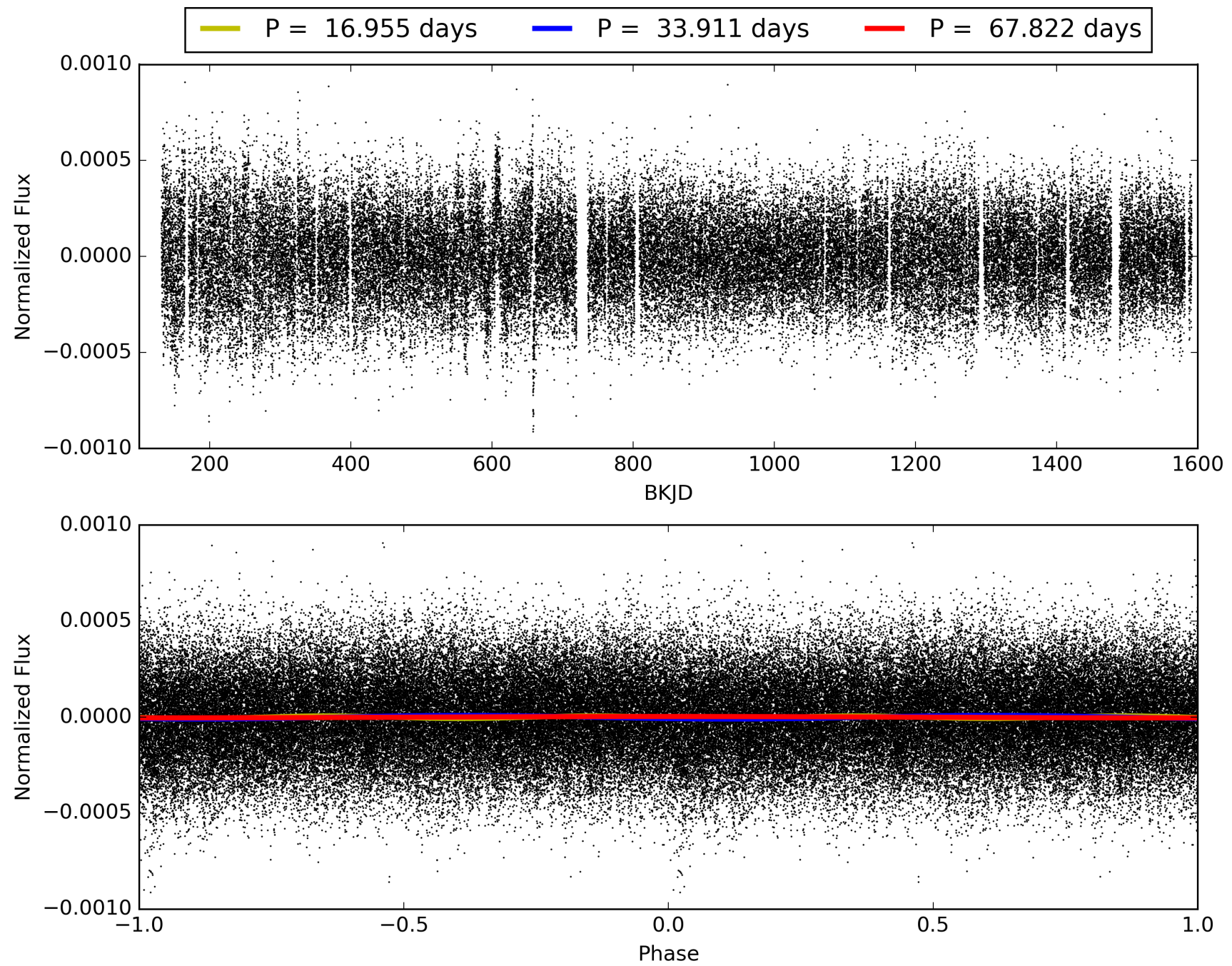
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center



## TCE 005978154-05, PDC Light Curves

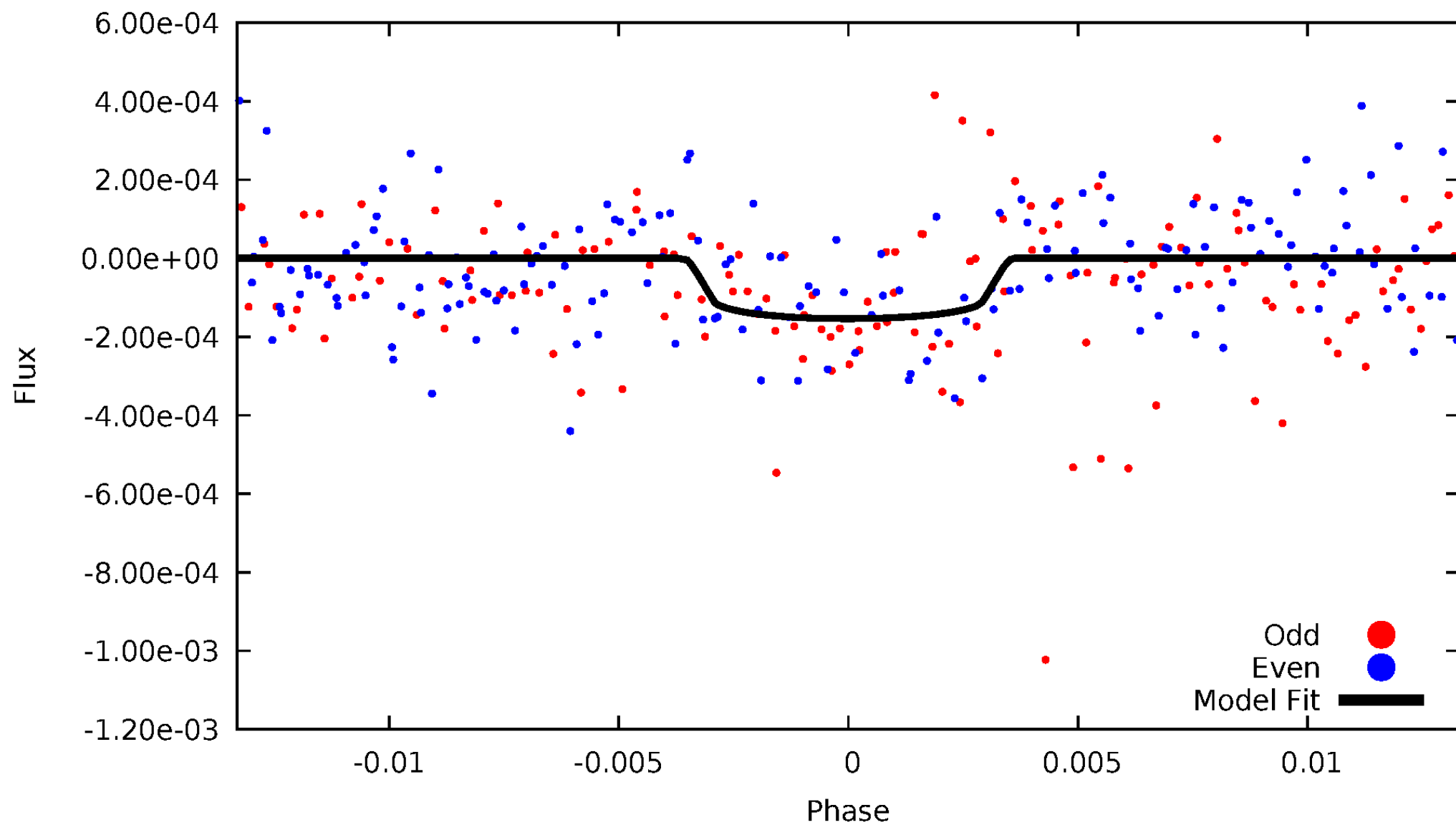


TCE 005978154-05



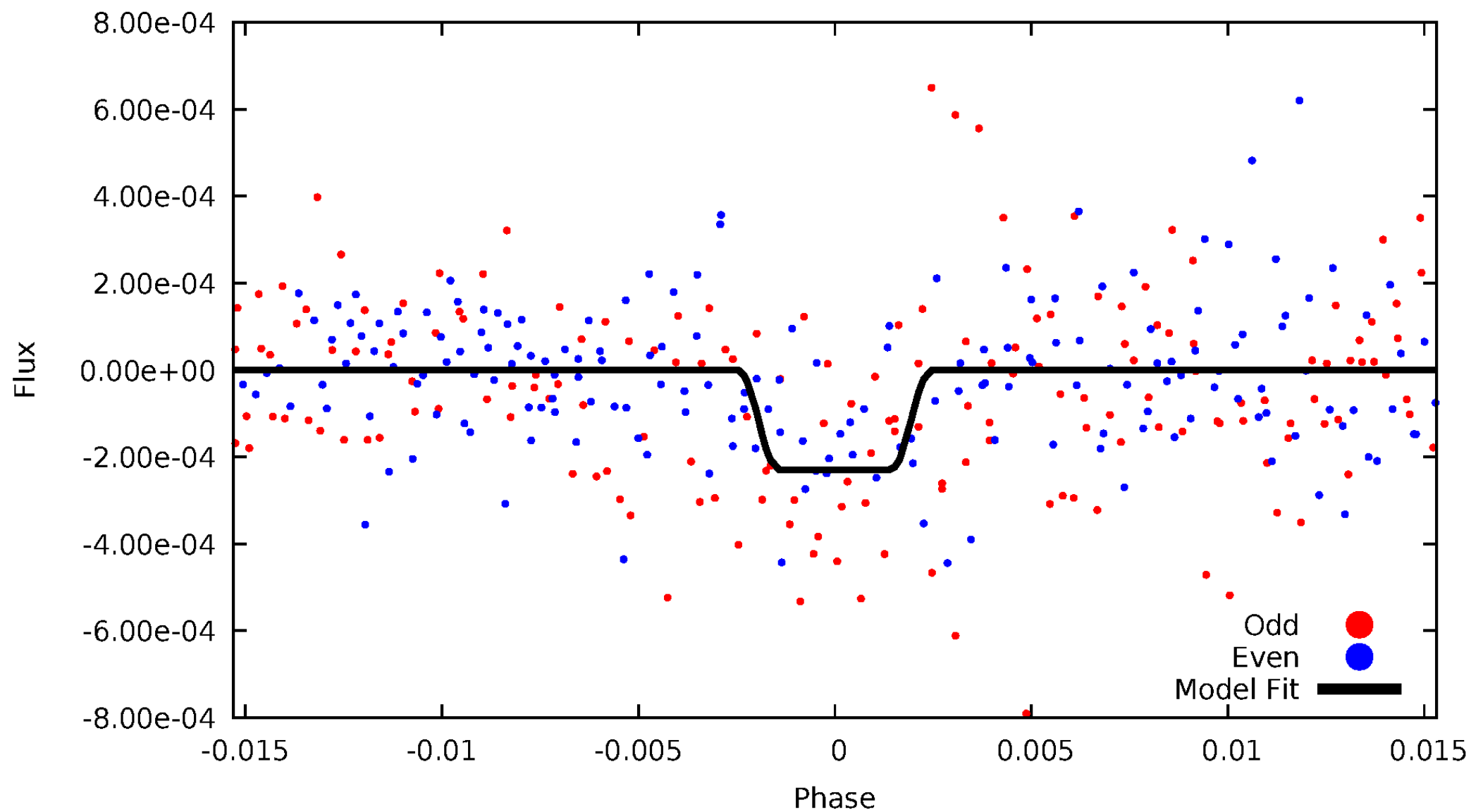
# DV Odd/Even

TCE 005978154-05



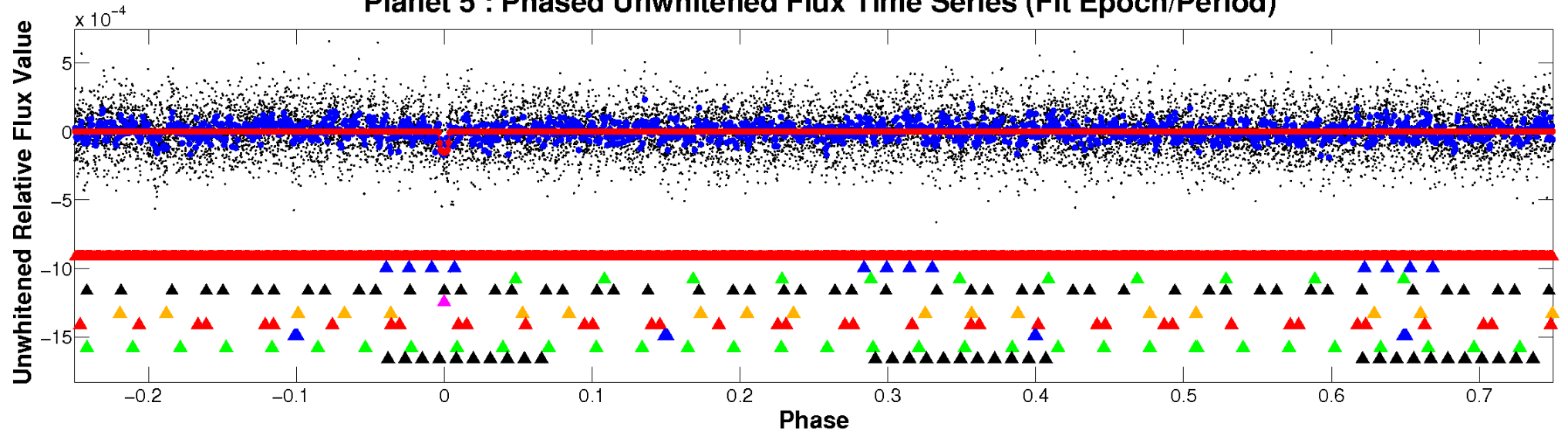
# ALT Odd/Even

TCE 005978154-05

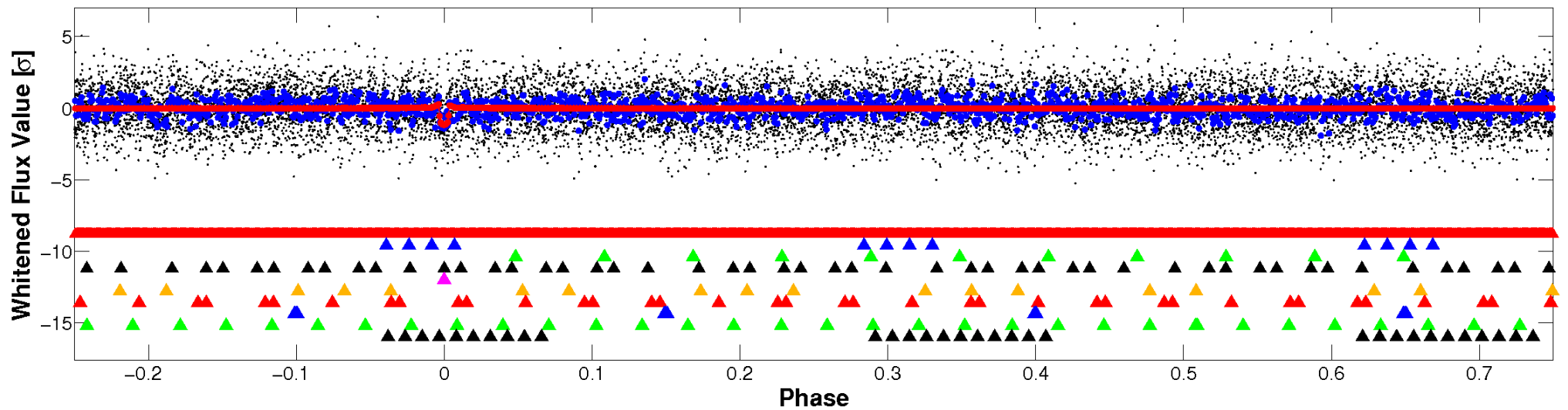


### Non-Whitened Vs. Whitened Light Curve

### Planet 5 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

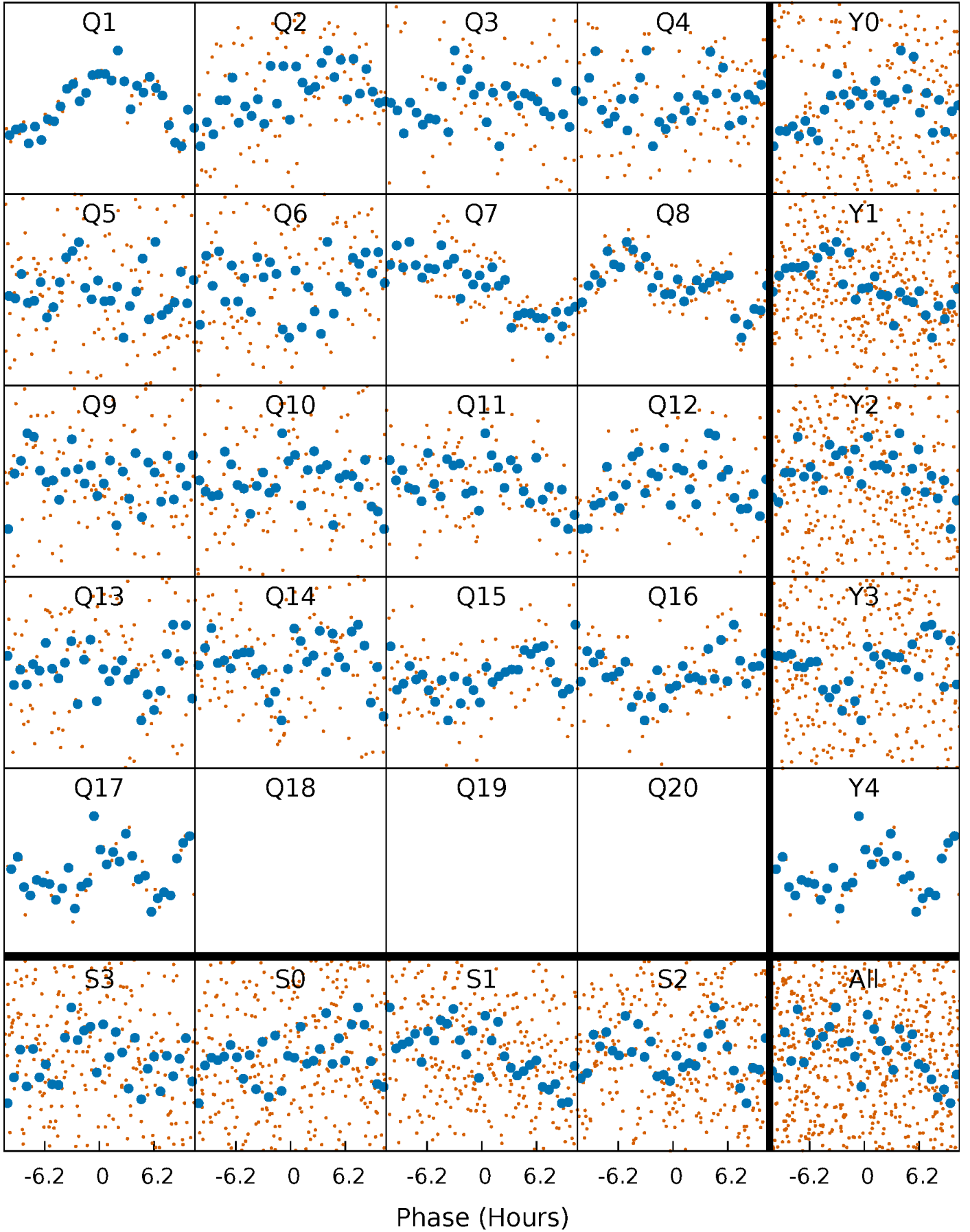


### Planet 5 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

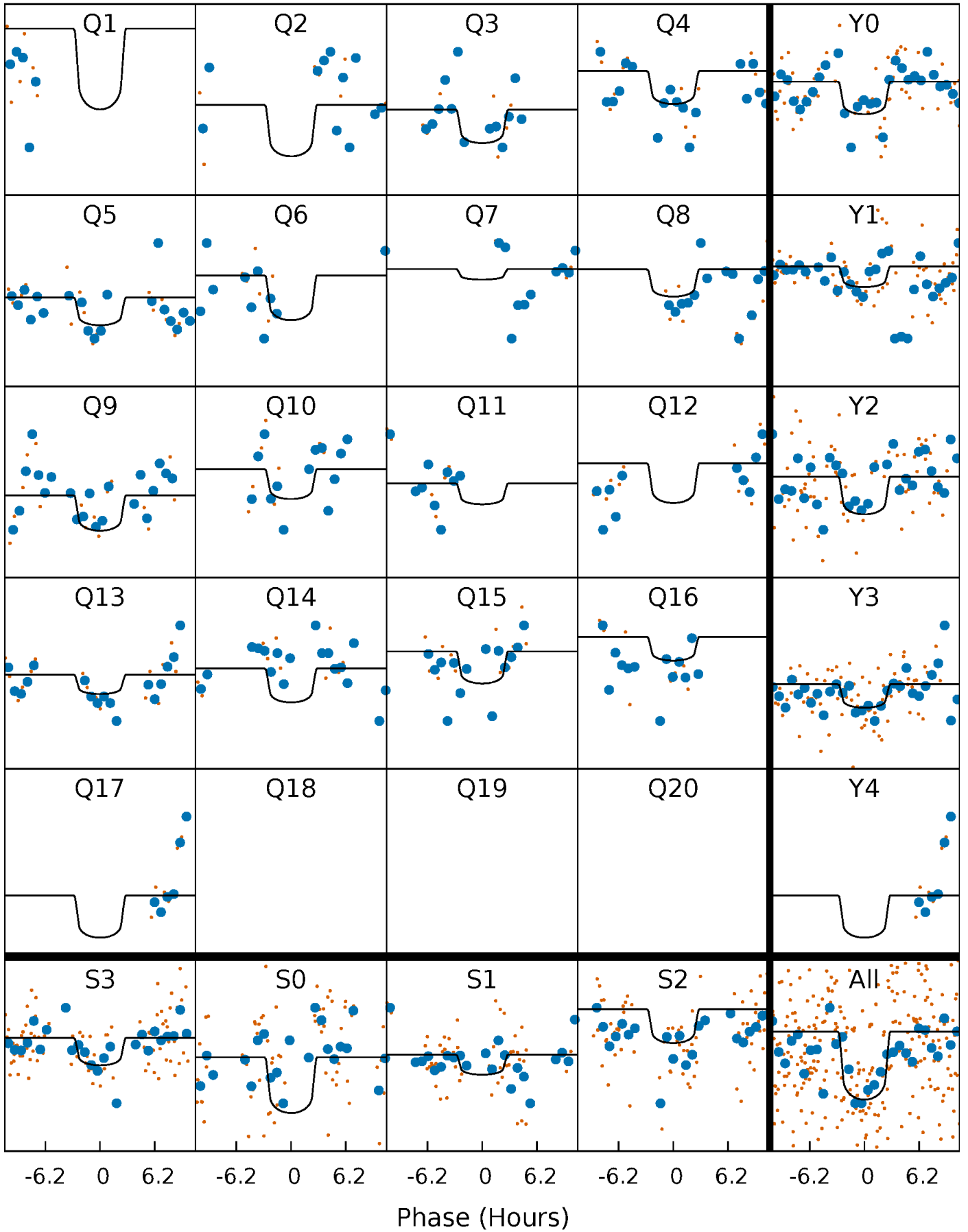
TCE 005978154-05     $P = 33.910761$  Days     $T_0 = 148.850724$  (BKJD)





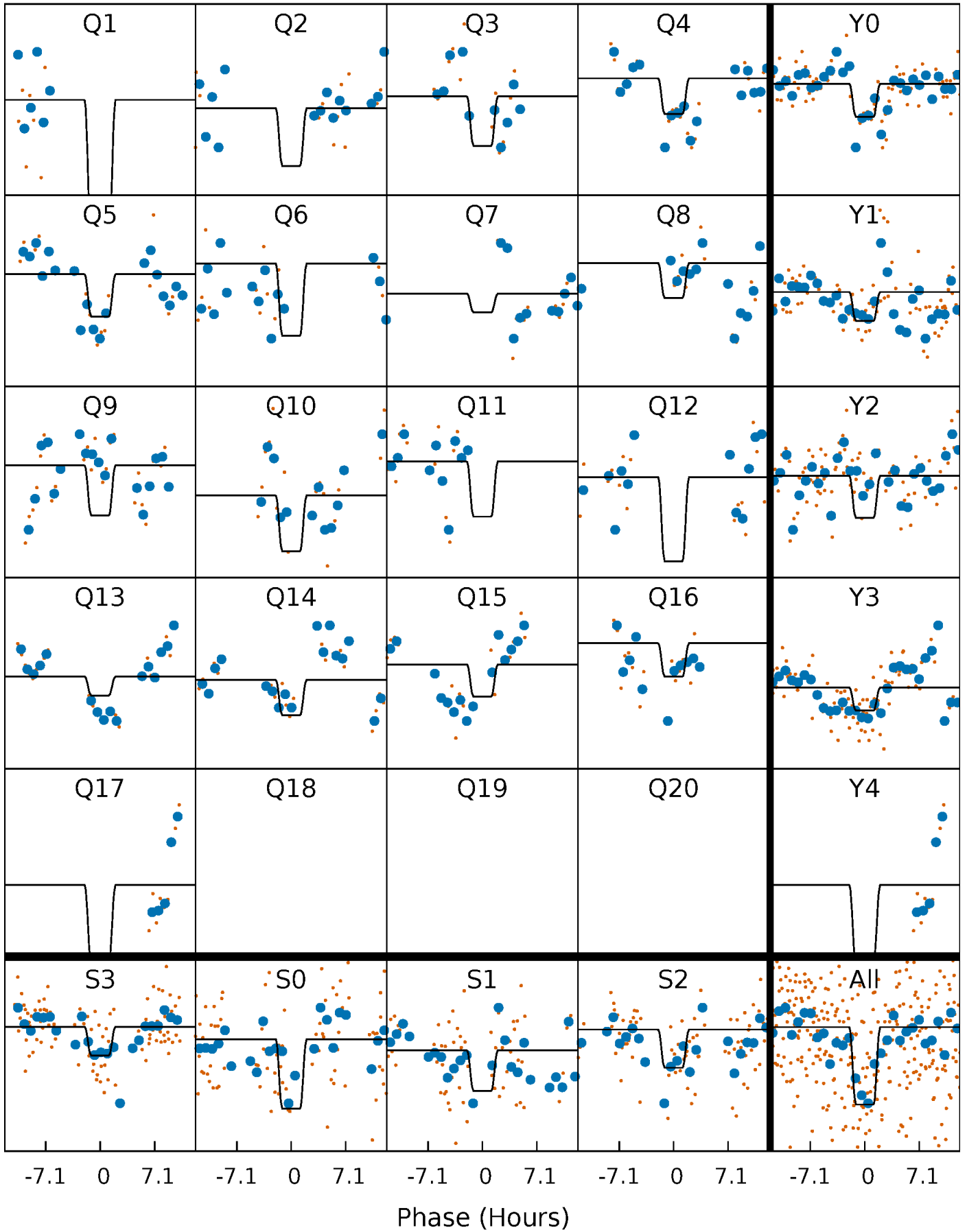
# DV Quarter-Phased Transit Curves

TCE 005978154-05 P= 33.910761 Days  $T_0=148.850724$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

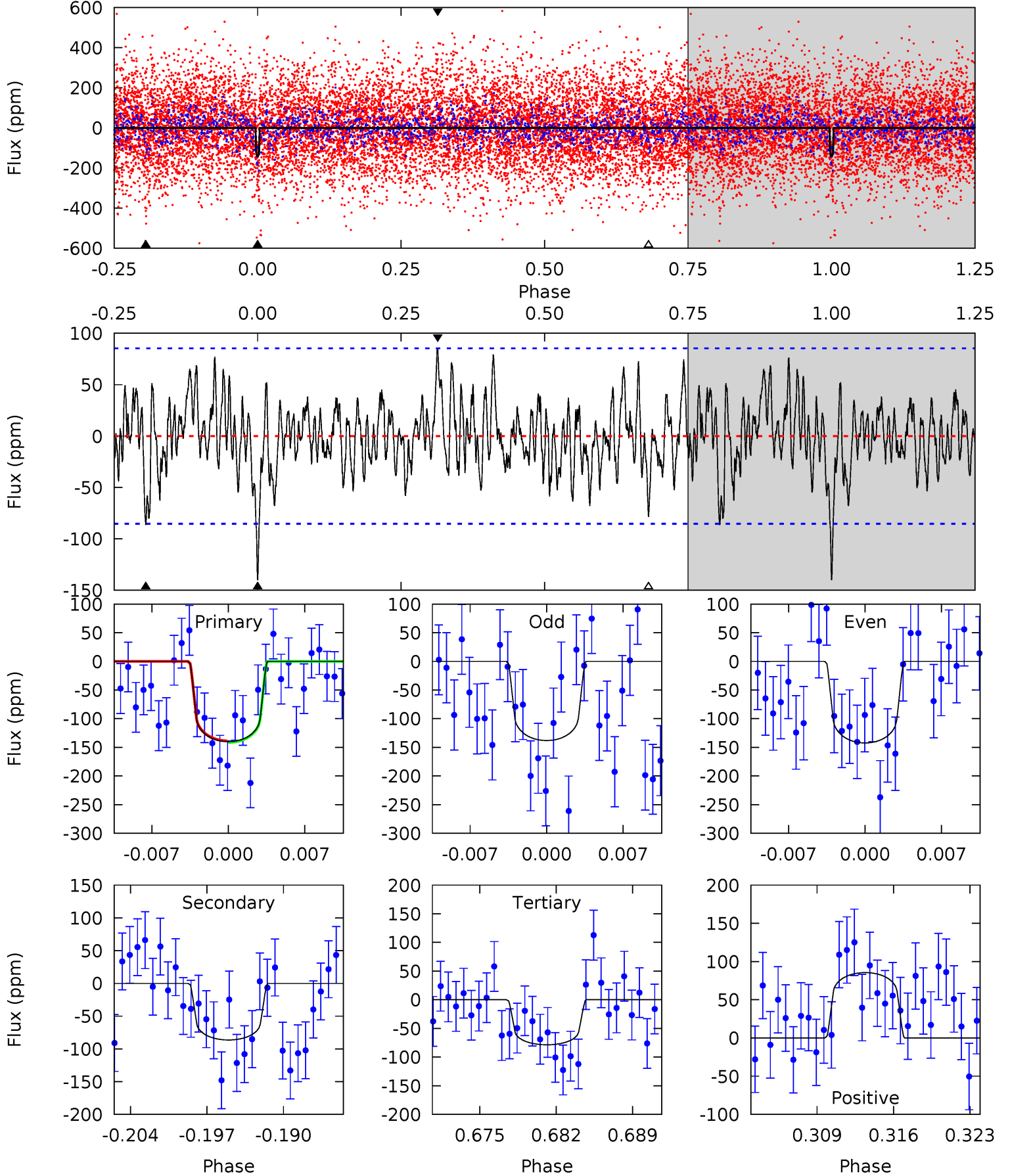
TCE 005978154-05   P= 33.910625 Days    $T_0=148.833236$  (BKJD)



# DV Model-Shift Uniqueness Test

005978154-05, P = 33.910761 Days, E = 114.939963 Days

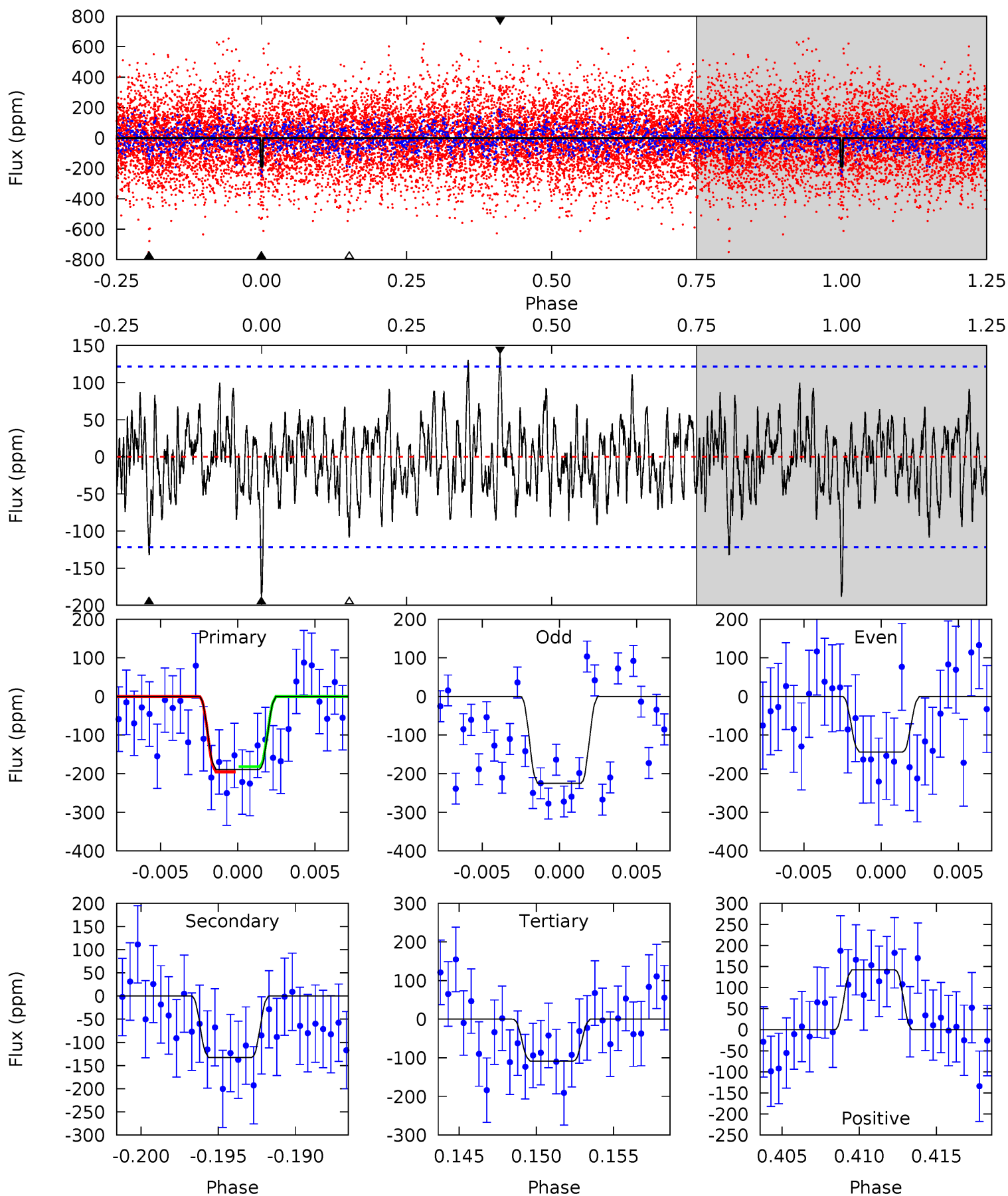
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.36	5.15	4.69	5.10	5.09	2.70	1.69	3.67	3.25	0.47	0.05	0.13	0.68	0.38	0.07



# Alt Model-Shift Uniqueness Test

005978154-05, P = 33.910625 Days, E = 114.922611 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
8.01	5.61	4.60	6.02	5.16	2.81	1.66	3.41	1.99	1.01	-0.41	1.73	1.29	0.43	0.28



### Stellar Parameters For KIC 005978154

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$6723^{+202}_{-223}$	$3.478^{+0.360}_{-0.090}$	$-0.160^{+0.300}_{-0.250}$	$4.134^{+0.412}_{-1.647}$	$1.872^{+0.171}_{-0.398}$	$0.037^{+0.107}_{-0.011}$
	+3%/-3%	+10%/-3%	+188%/-156%	+10%/-40%	+9%/-21%	+286%/-29%
Source	PHO1	FLK73	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 005978154-05 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-86 \pm 17$	$5.48^{+4.09}_{-3.15}$	$1630^{+102}_{-170}$	$5558^{+3172}_{-1151}$	$101^{+436}_{-70}$
Alt.	$-132 \pm 24$	$6.21^{+4.09}_{-3.40}$	$1654^{+94}_{-158}$	$5873^{+3468}_{-1177}$	$117^{+454}_{-74}$

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

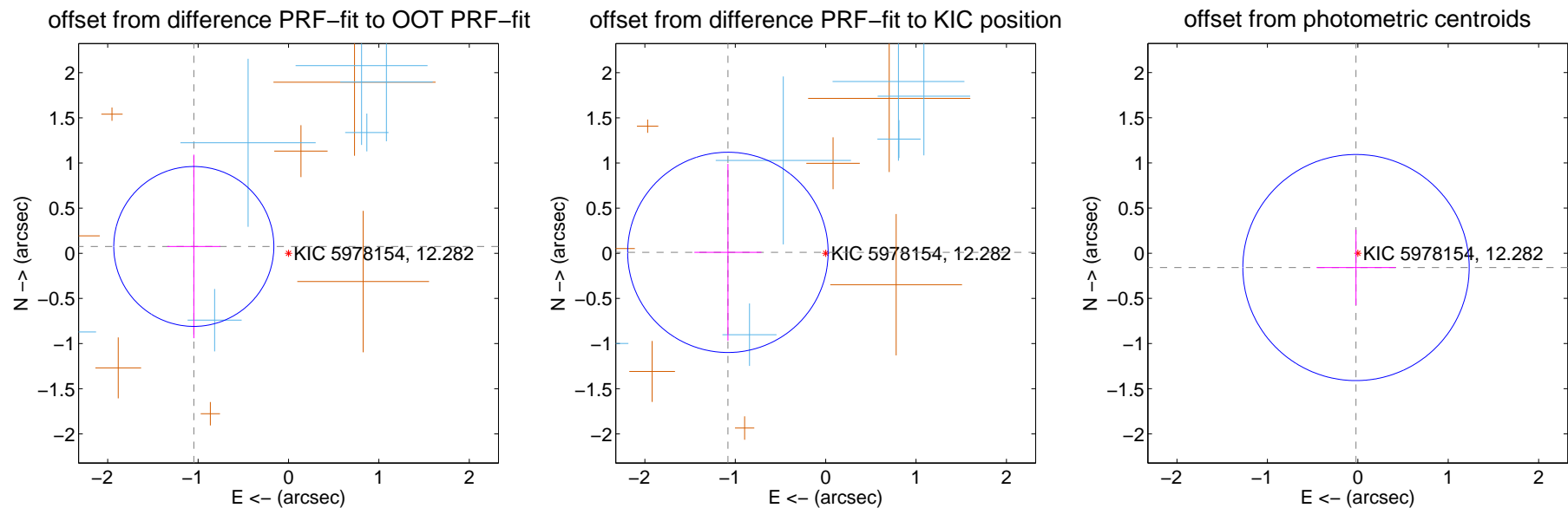
## DV Centroid Data

Supplemental centroid analysis for 005978154-05. Kepler magnitude: 12.28. Transit SNR 8.98

There are 6 quarters with good PRF difference image offsets

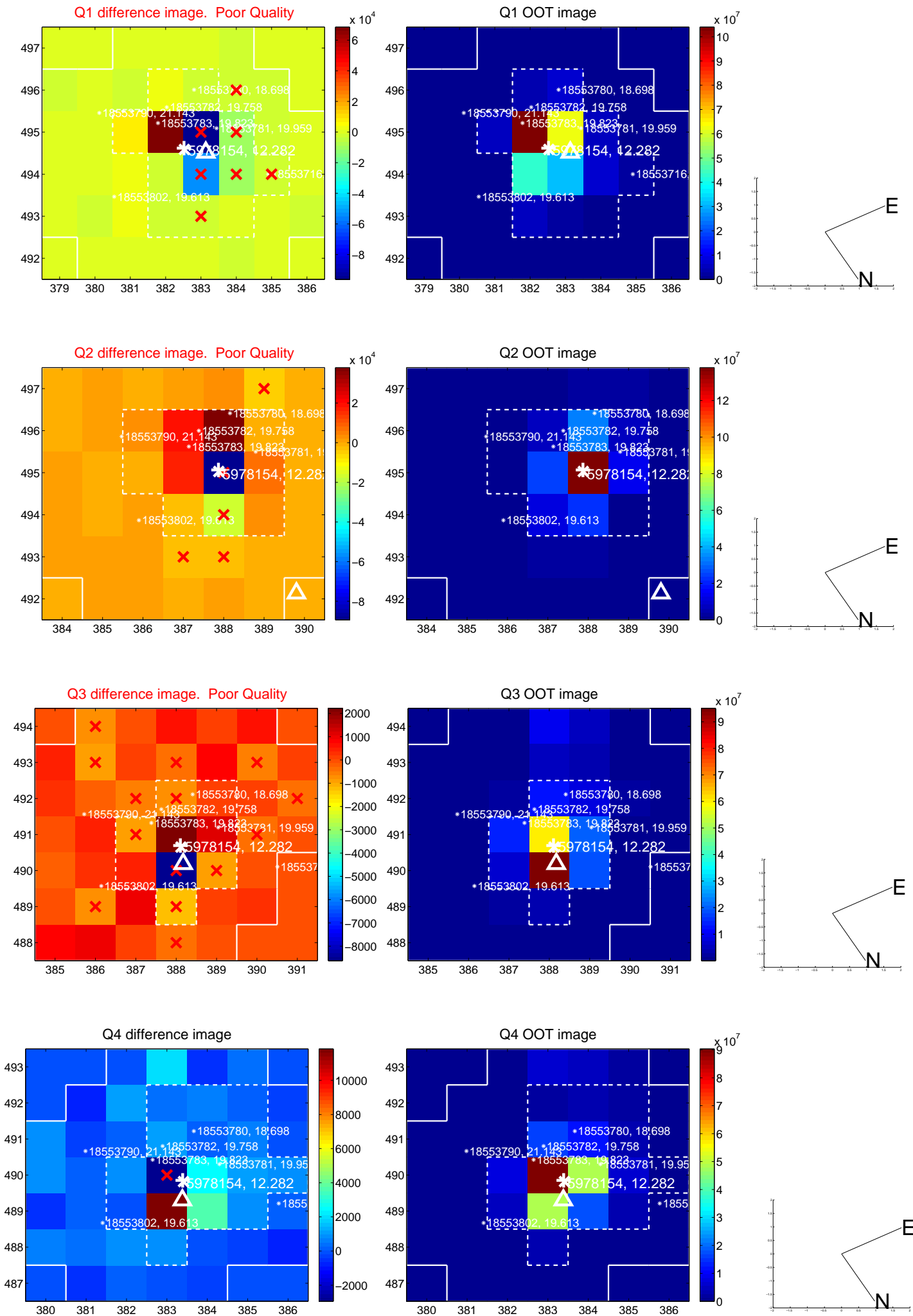
The direct PRF centroid is offset from the target star catalog position by about 0.14 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.050 \pm 0.295$	$3.56$	$1.047 \pm 0.294$	$0.076 \pm 1.016$
PRF-fit source offset from KIC position	$1.081 \pm 0.370$	$2.93$	$1.081 \pm 0.371$	$0.010 \pm 0.979$
photometric centroid source offset	$0.16 \pm 0.42$	$0.38$	$0.02 \pm 0.44$	$-0.16 \pm 0.42$



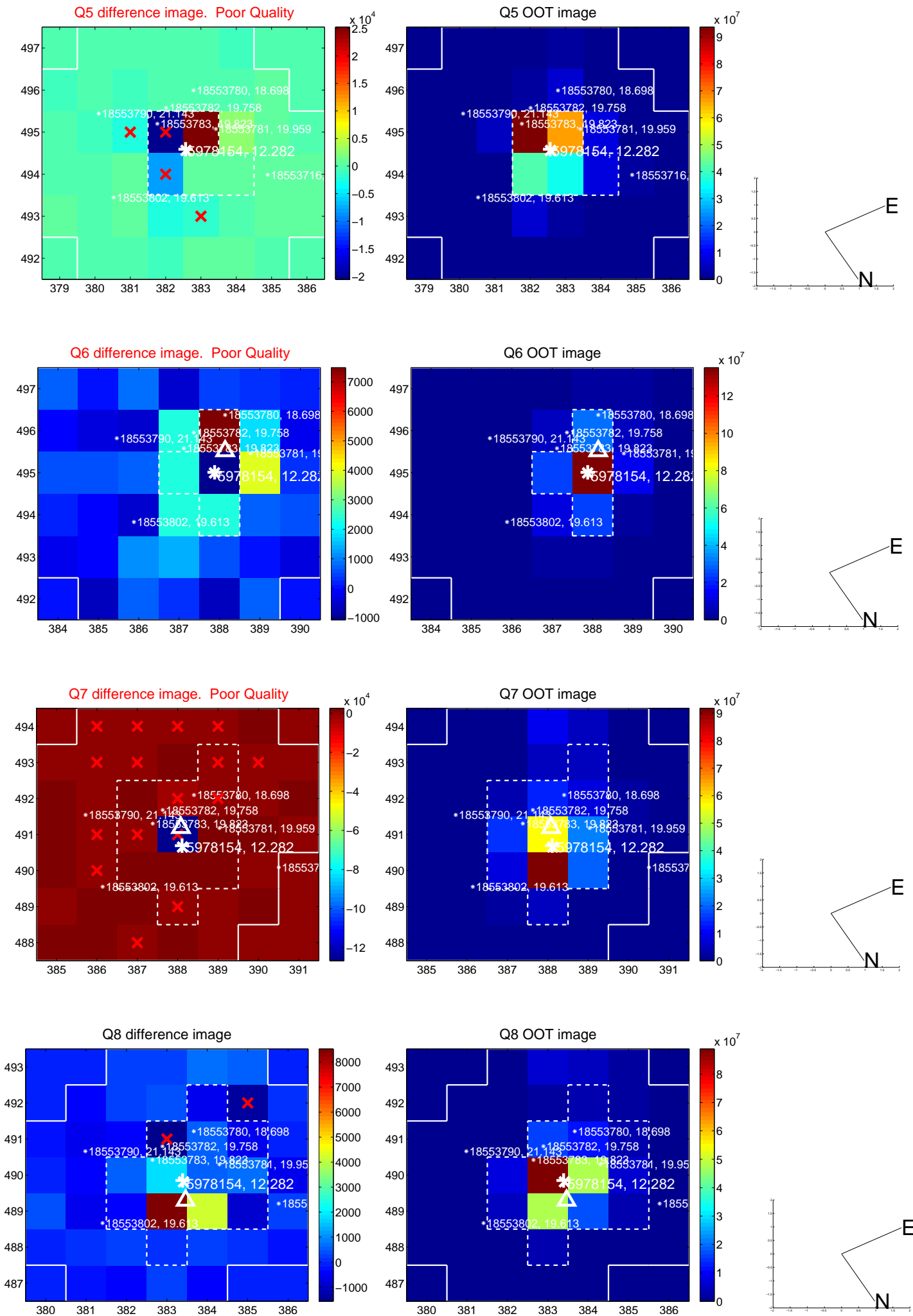
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

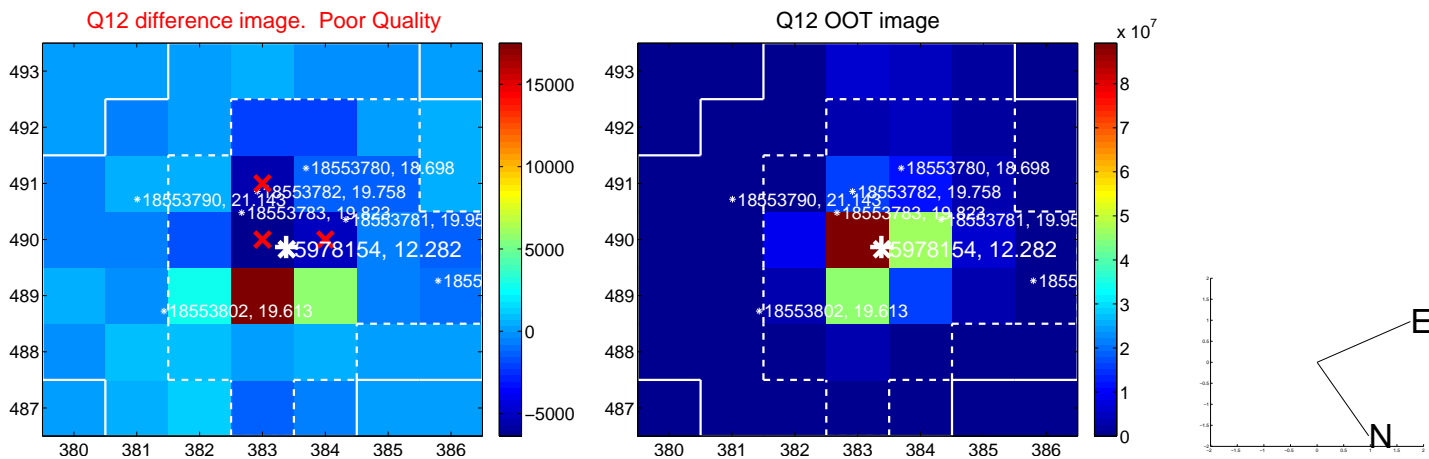
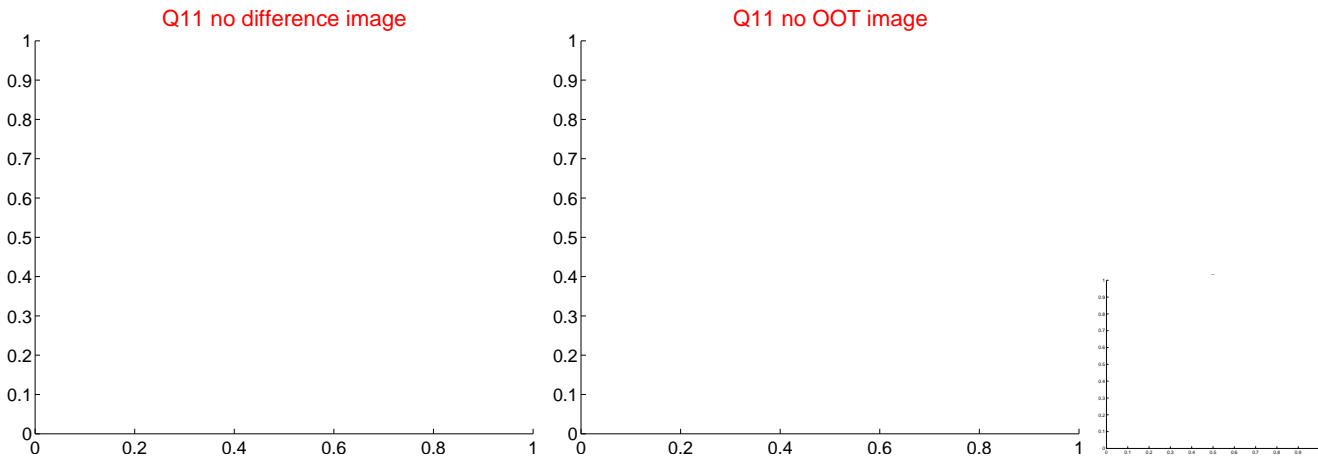
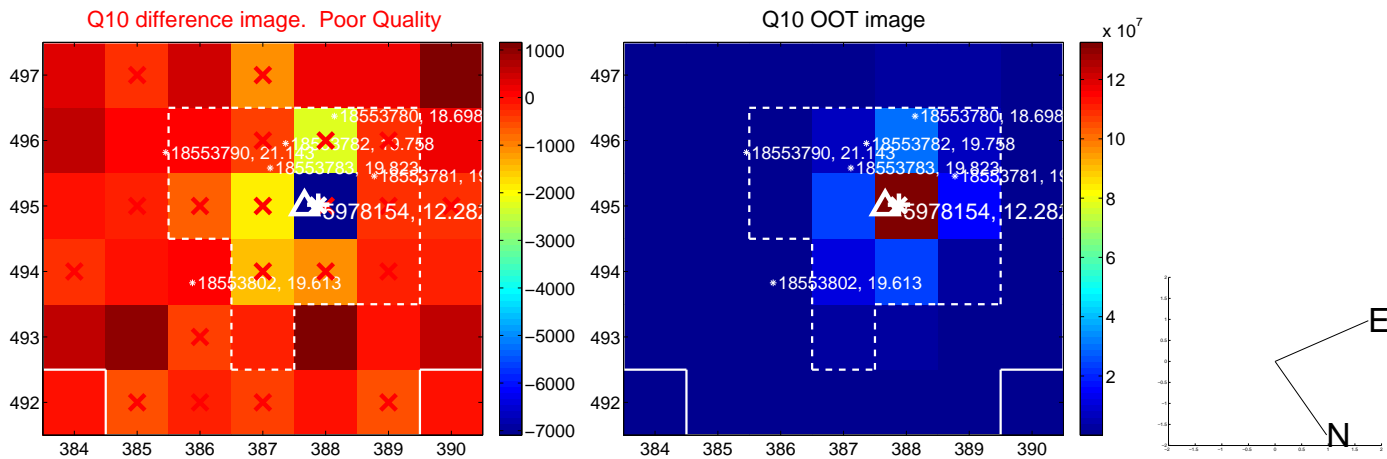
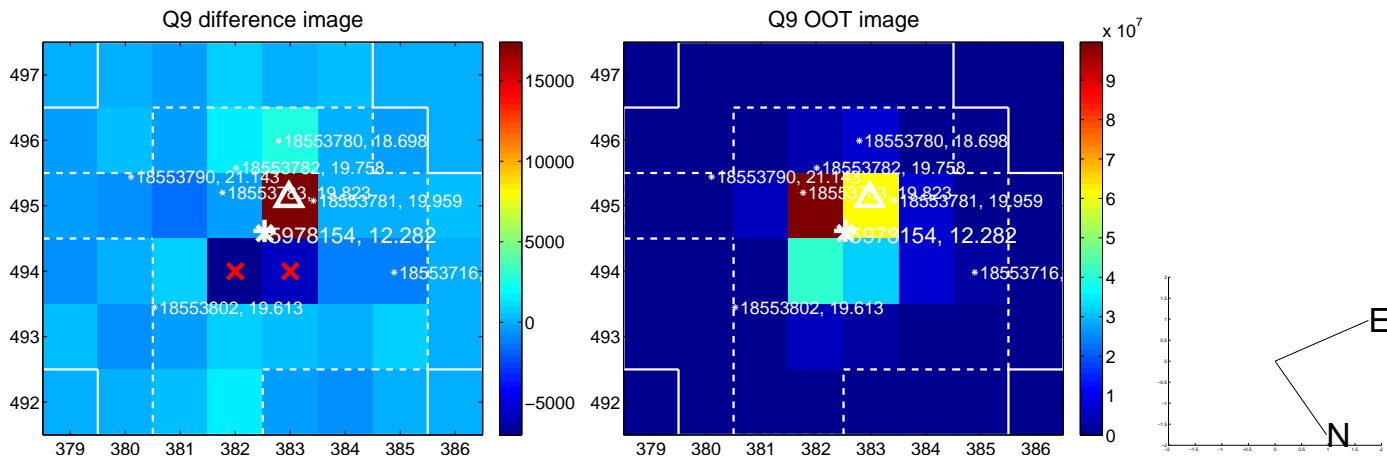




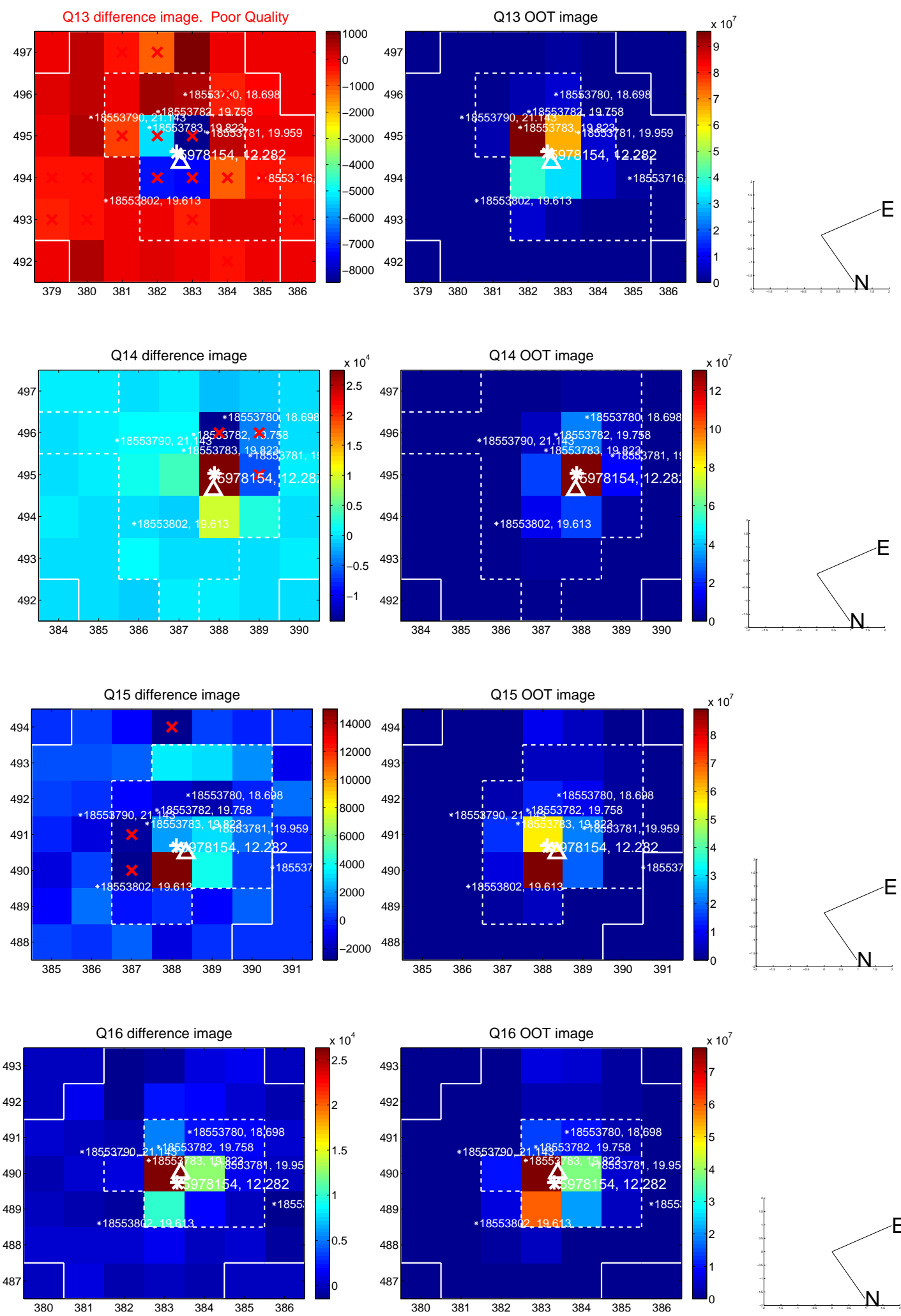
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



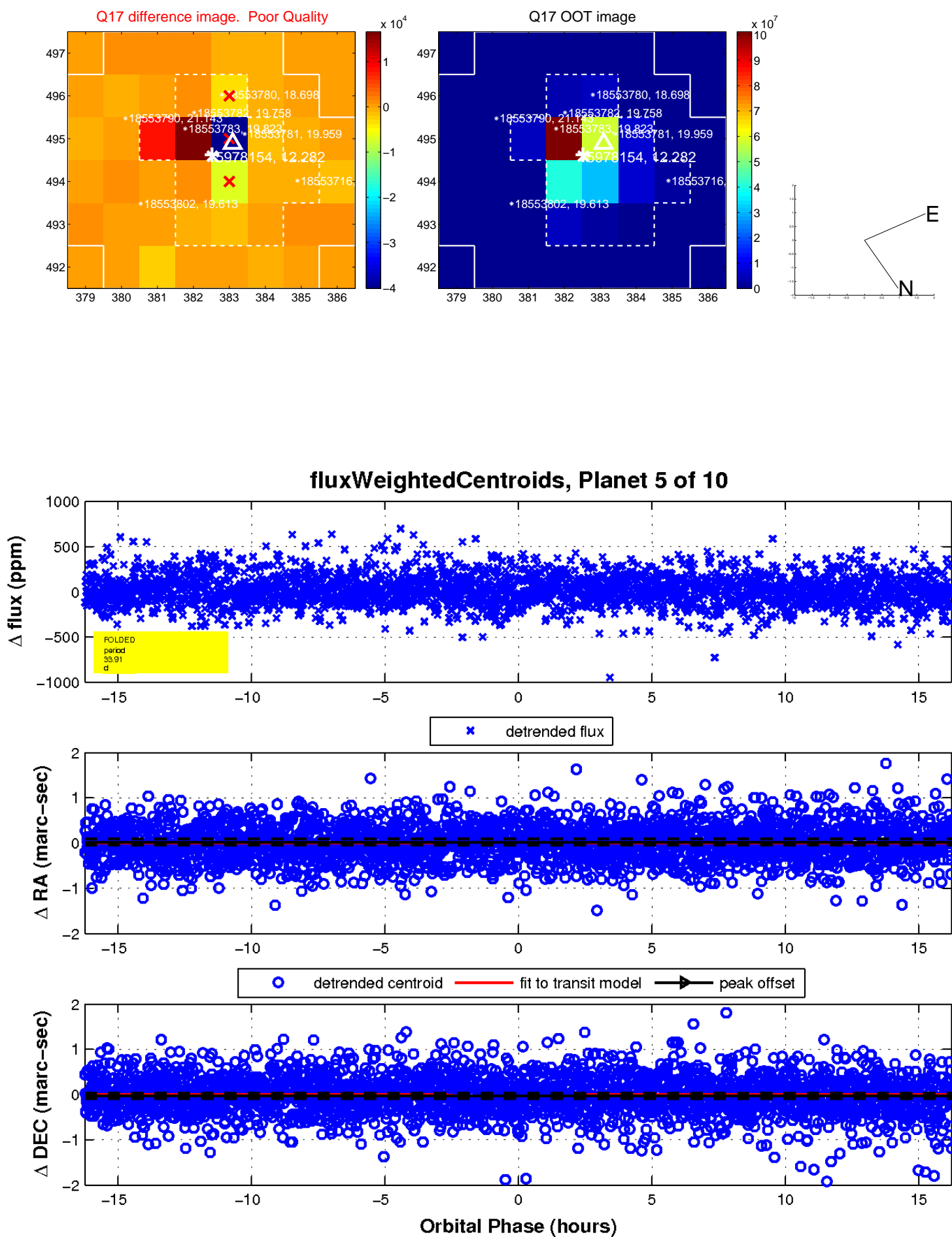
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



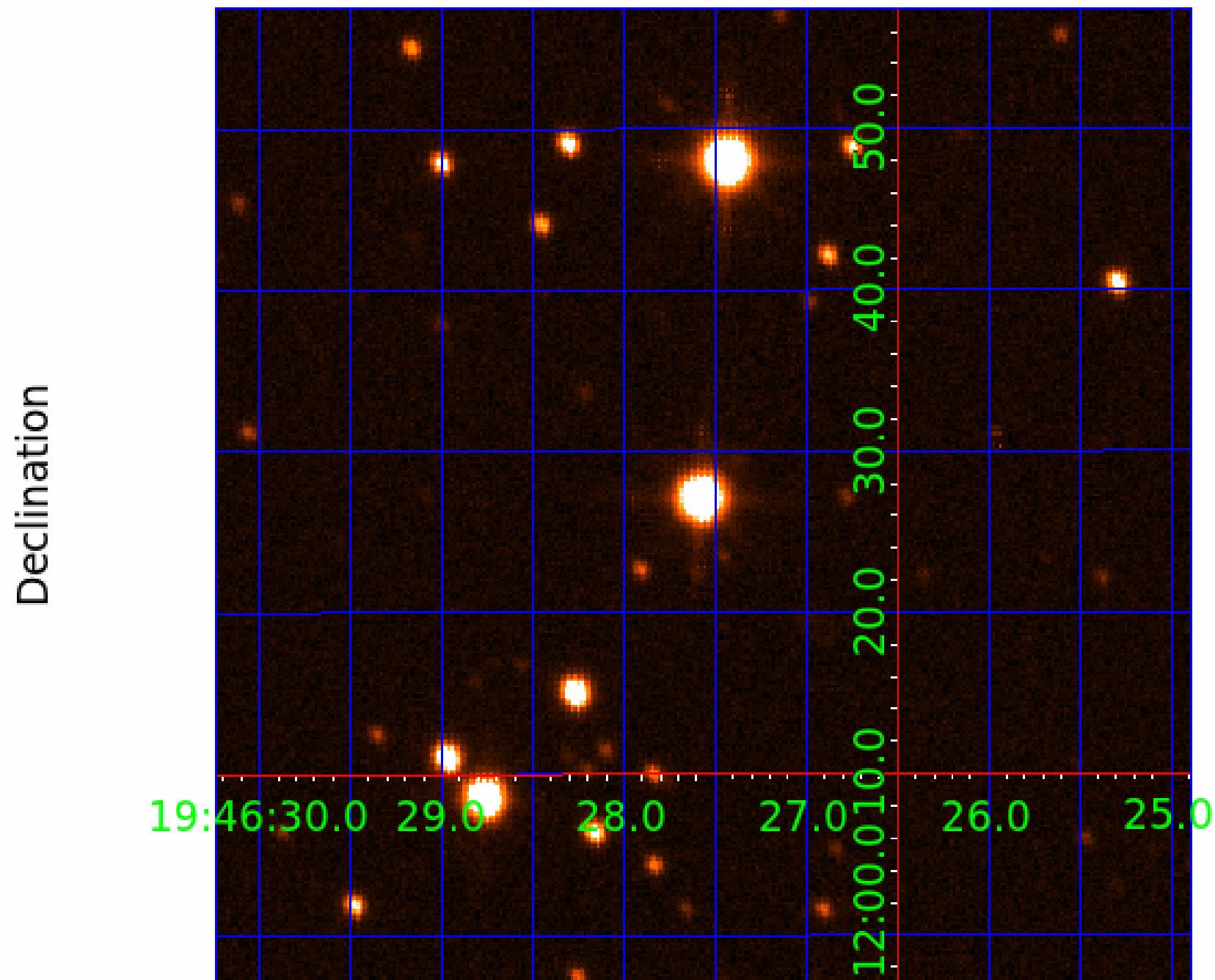
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



UKIRT Image



## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005978154-01	OBS	No	0.977344	132.332446	13.4	6.117	8.3	6.7	4.13	6723	1.53	55377.15
005978154-02	OBS	No	124.165564	182.998698	450.9	13.613	12.5	10.5	4.13	6723	9.87	86.71
005978154-03	OBS	No	137.679401	150.489095	291.5	6.419	9.2	10.5	4.13	6723	8.84	75.55
005978154-04	OBS	No	28.453613	148.852296	172.6	3.245	9.8	8.3	4.13	6723	6.38	618.32
005978154-05	OBS	No	33.910761	148.850724	154.0	5.416	8.9	9.0	4.13	6723	5.62	489.34
005978154-06	OBS	No	82.202844	181.537676	292.1	2.328	9.2	9.3	4.13	6723	8.25	150.27
005978154-07	OBS	No	38.342122	163.823144	205.4	2.241	9.0	8.8	4.13	6723	6.69	415.43
005978154-08	OBS	No	93.248607	221.792194	272.4	4.236	8.9	9.2	4.13	6723	7.75	127.02
005978154-09	OBS	No	43.449347	166.082590	271.7	2.358	9.1	8.7	4.13	6723	7.55	351.63
005978154-10	OBS	No	45.084056	162.646790	117.0	6.361	8.6	5.7	4.13	6723	5.05	334.73

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005978154-01	OBS	FP	0.00	1	0	0	0	SWEET_NTL—LPP_DV
005978154-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS
005978154-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
005978154-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
005978154-05	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—HALO_GHOST
005978154-06	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—HALO_GHOST
005978154-07	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
005978154-08	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
005978154-09	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
005978154-10	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT

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

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

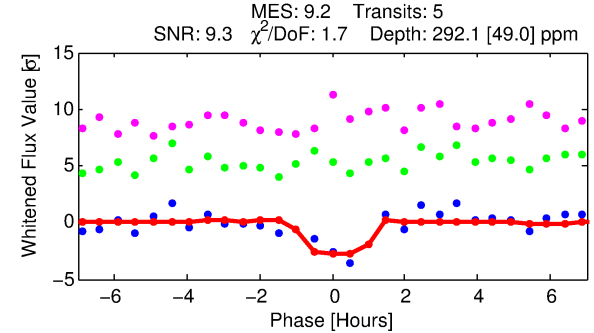
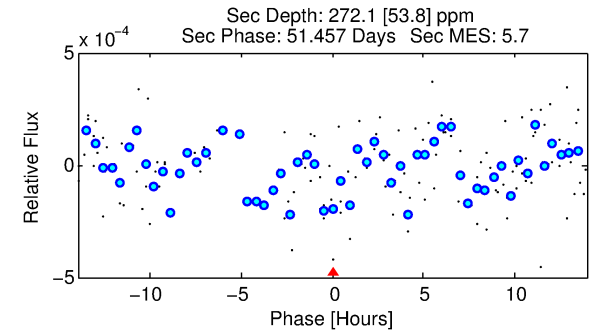
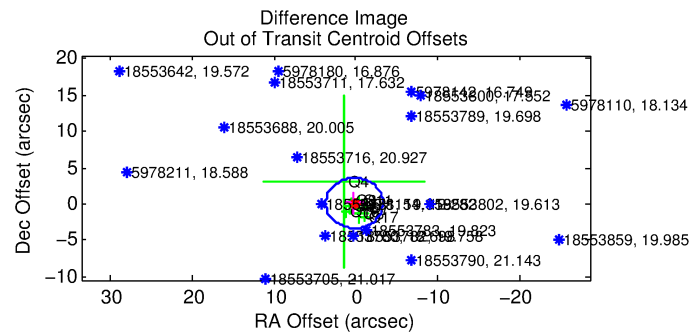
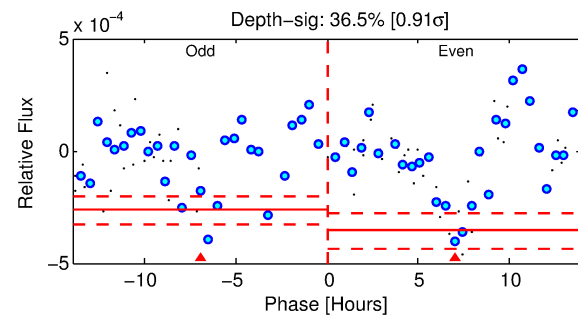
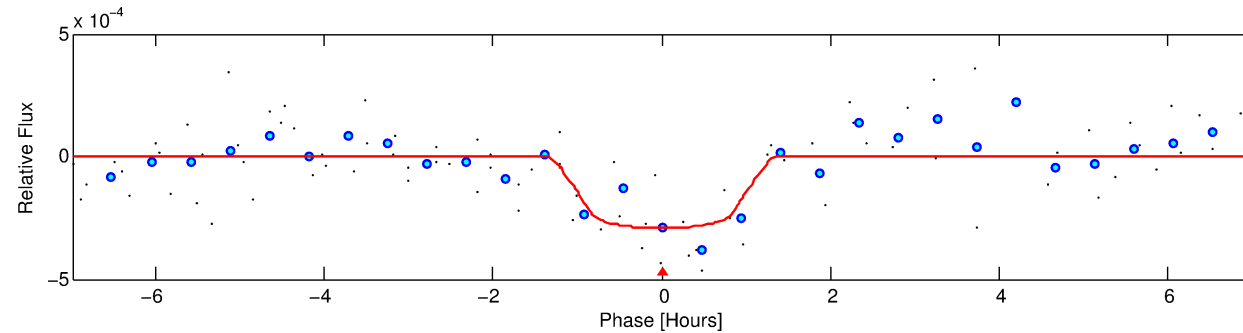
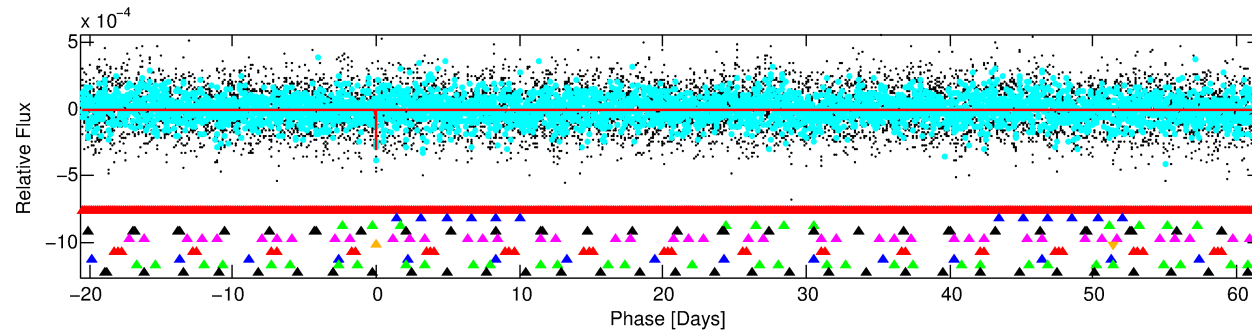
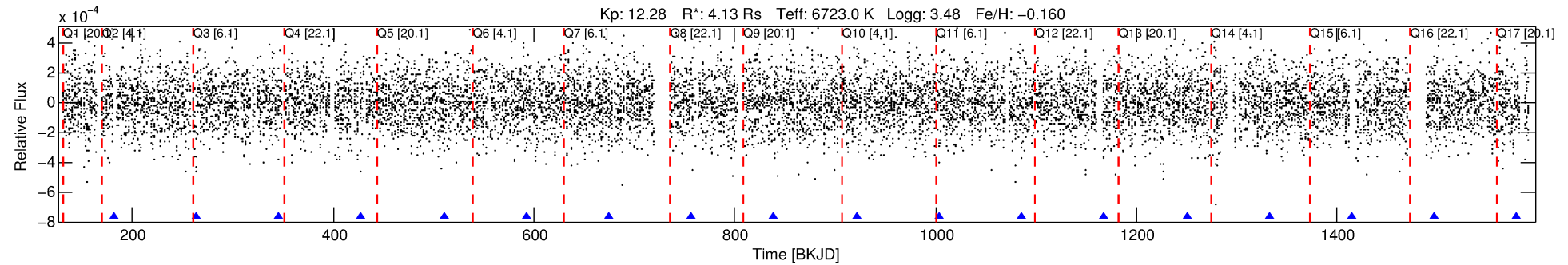
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 005978154-06

No Significant Match Found

# DV One-Page Summary

KIC: 5978154 Candidate: 6 of 10 Period: 82.203 d



## DV Fit Results:

Period = 82.20284 [0.00096] d  
Epoch = 181.5377 [0.0073] BKJD  
Rp/R\* = 0.0183 [0.0110]  
a/R\* = 127.33 [445.22]  
b = 0.90 [0.73]  
Seff = 150.27 [94.27]  
Teq = 893 [140] K  
Rp = 8.25 [5.95] Re  
a = 0.4562 [0.1749] AU  
Ag = 457.52 [624.30] [0.73 $\sigma$ ]  
Teffp = 6384 [1957] K [2.80 $\sigma$ ]

## DV Diagnostic Results:

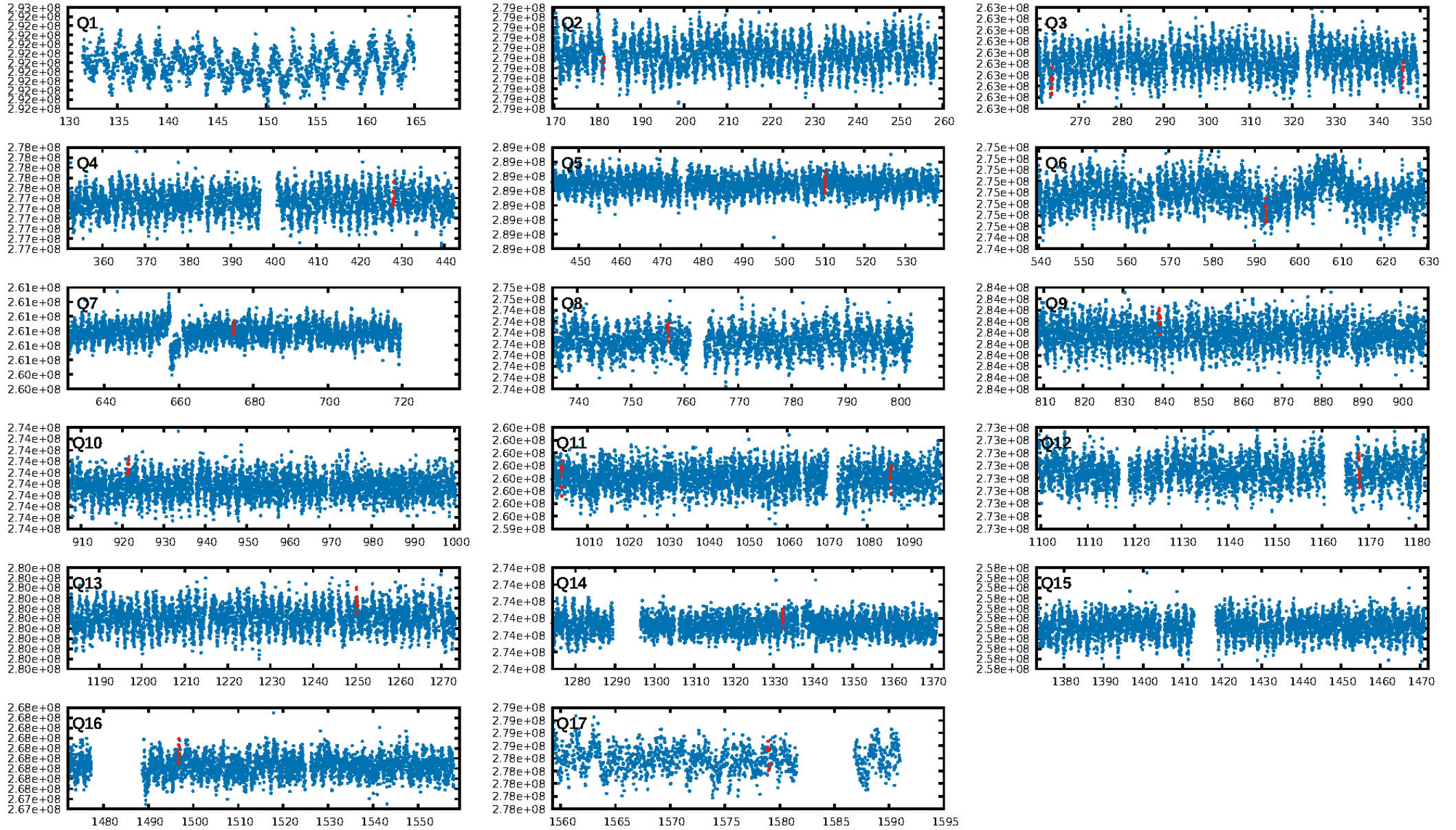
ShortPeriod-sig: 100.0% [131.52 $\sigma$ ]  
LongPeriod-sig: 100.0% [54.85 $\sigma$ ]  
ModelChiSquare2-sig: 35.9%  
ModelChiSquareGof-sig: 77.2%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [5/5]  
GhostDiagnostic-chr: 0.008172  
Centroid-sig: 26.7%  
Centroid-so: 0.843 arcsec [1.74 $\sigma$ ]  
OotOffset-rm: 0.252 arcsec [0.22 $\sigma$ ]  
KicOffset-rm: 0.262 arcsec [0.23 $\sigma$ ]  
OotOffset-st: 1/3/3/2 [9]  
KicOffset-st: 1/3/3/2 [9]  
DiffImageQuality-fgm: 0.56 [5/9]  
DiffImageOverlap-fno: 0.14 [2/14]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 03-Feb-2016 05:54:11 Z

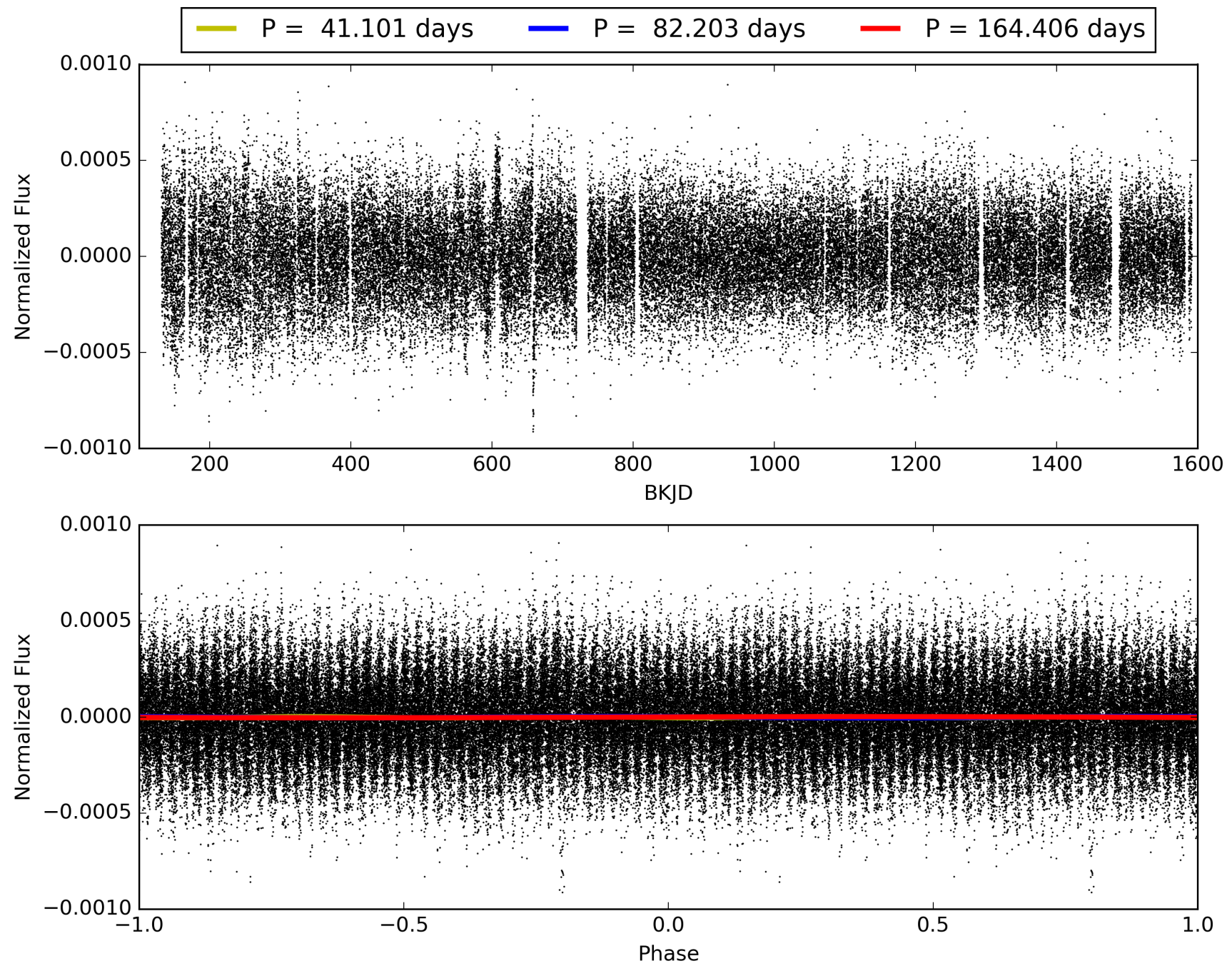
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center



# TCE 005978154-06, PDC Light Curves

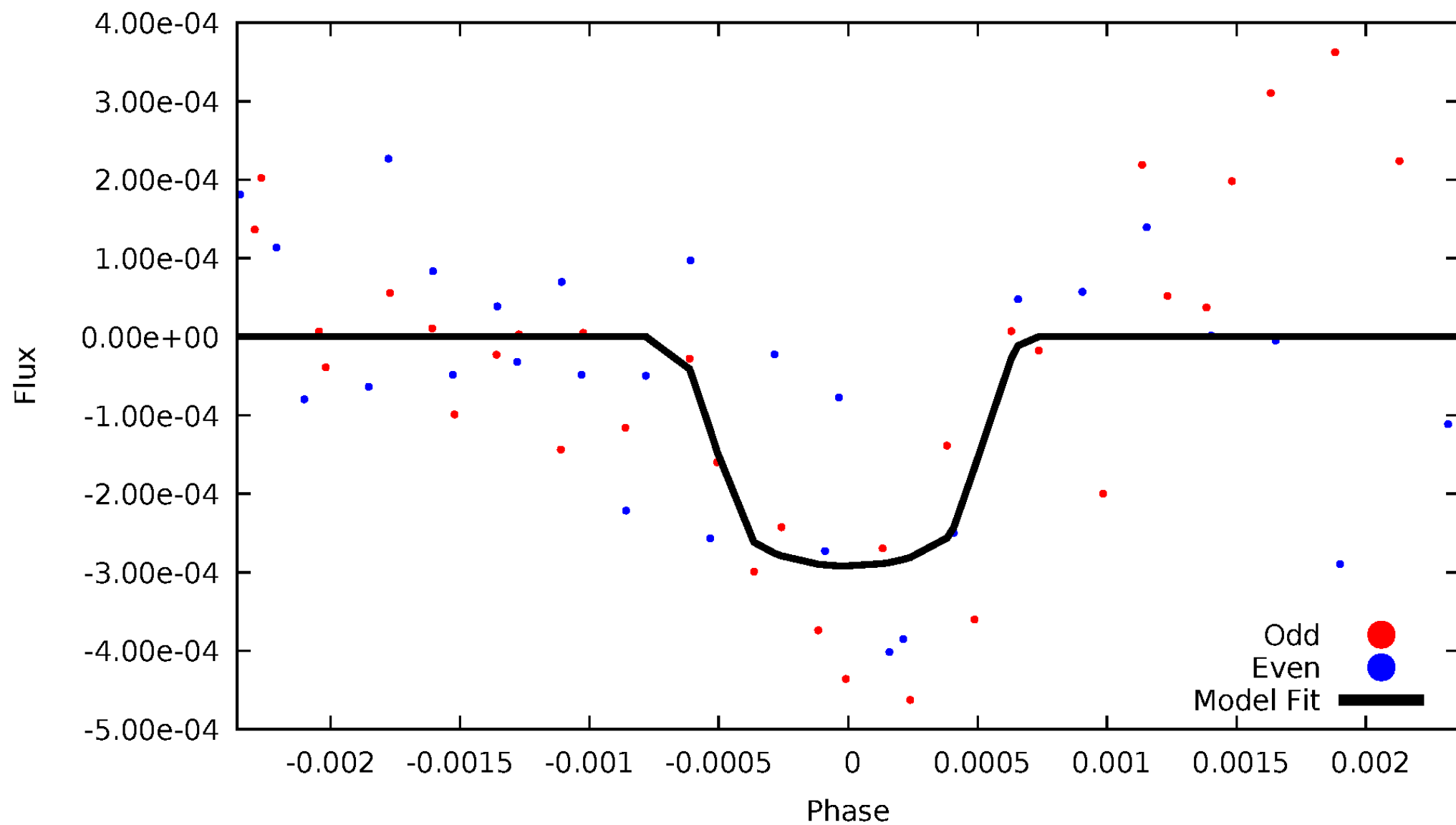


TCE 005978154-06



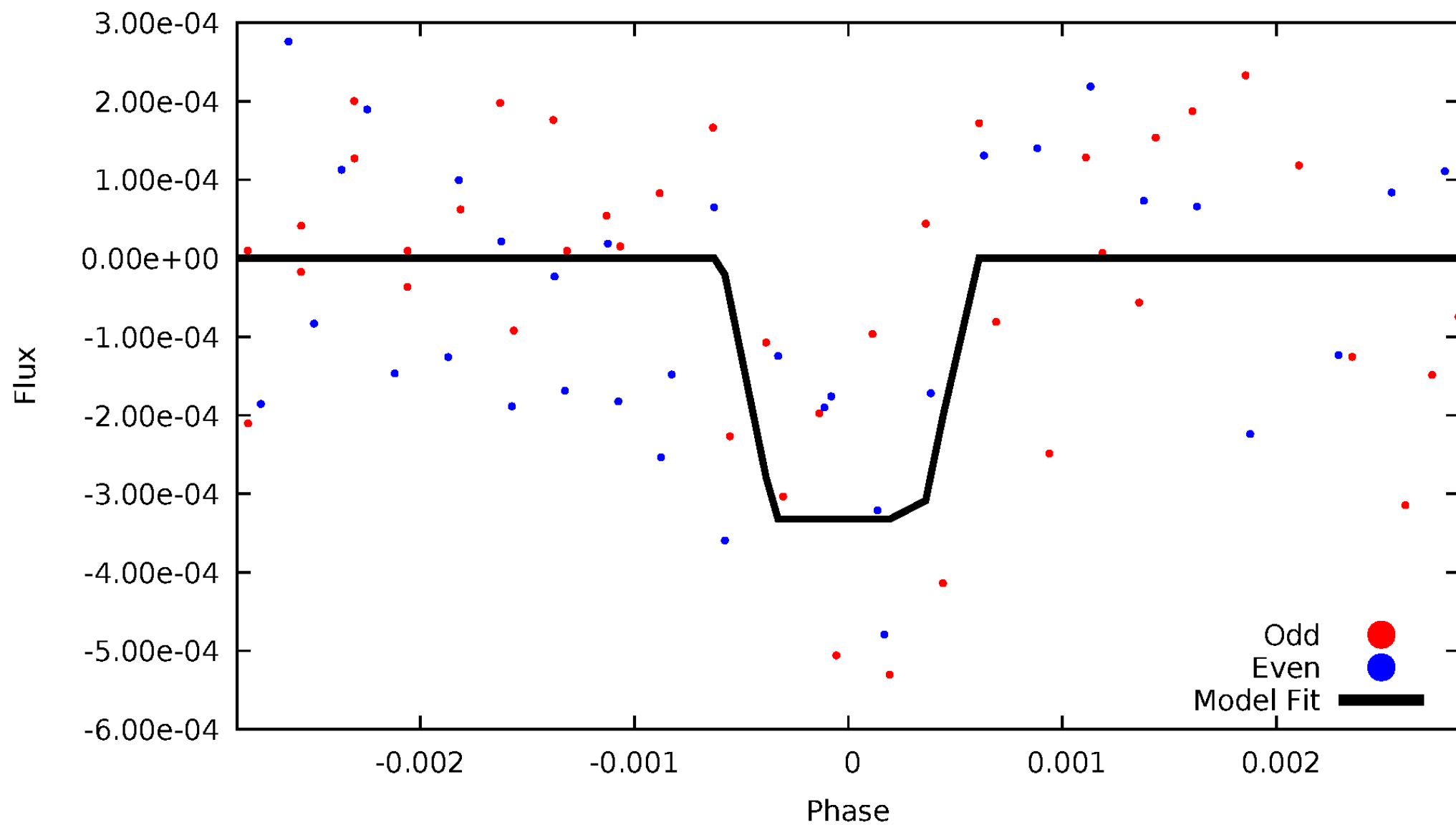
# DV Odd/Even

TCE 005978154-06



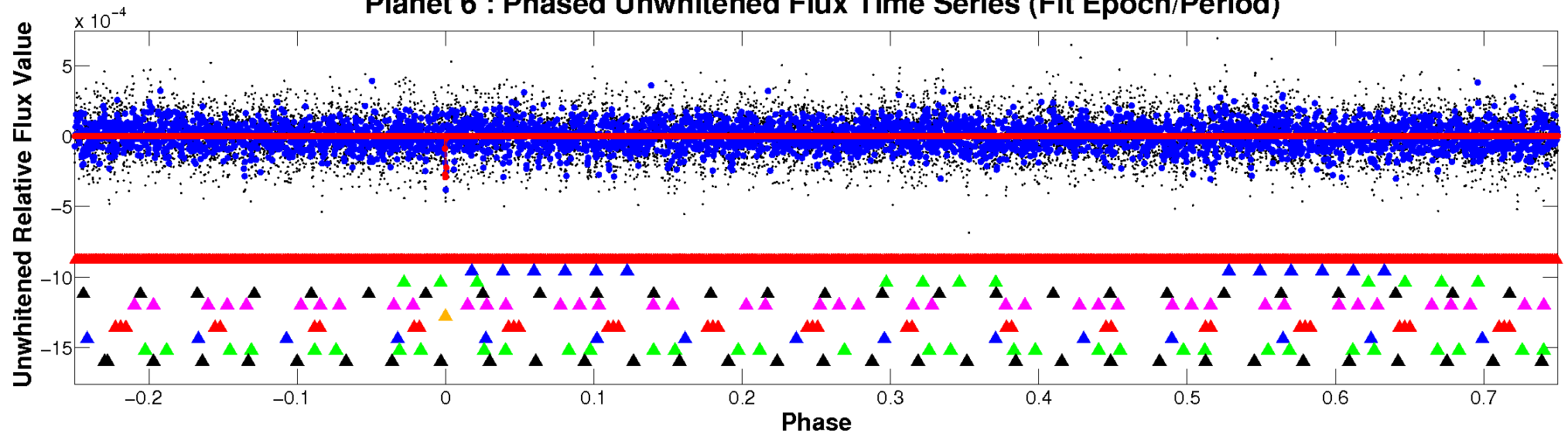
# ALT Odd/Even

TCE 005978154-06

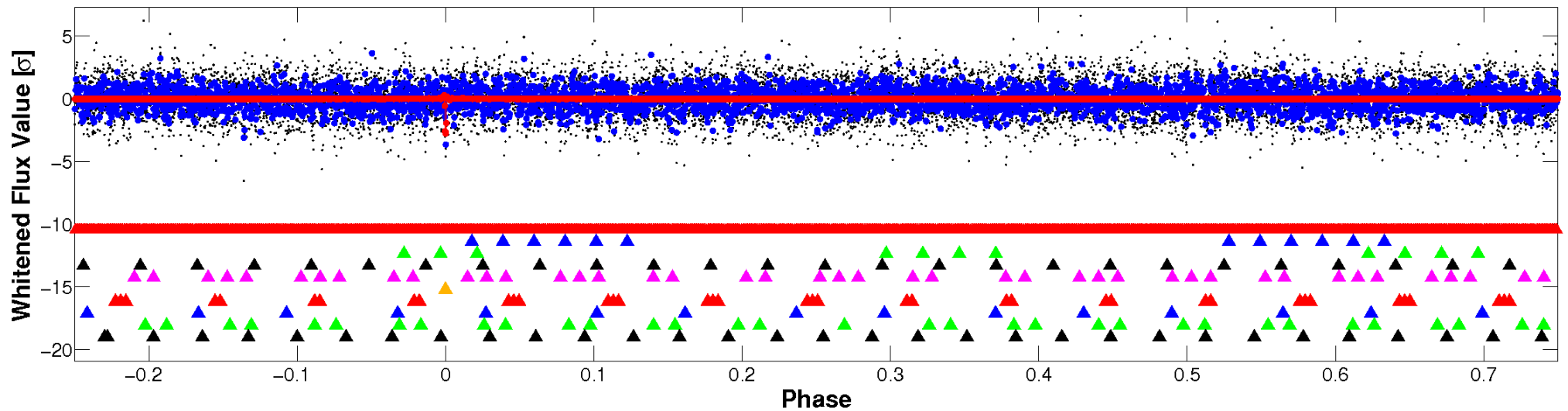


# Non-Whitened Vs. Whitened Light Curve

## Planet 6 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

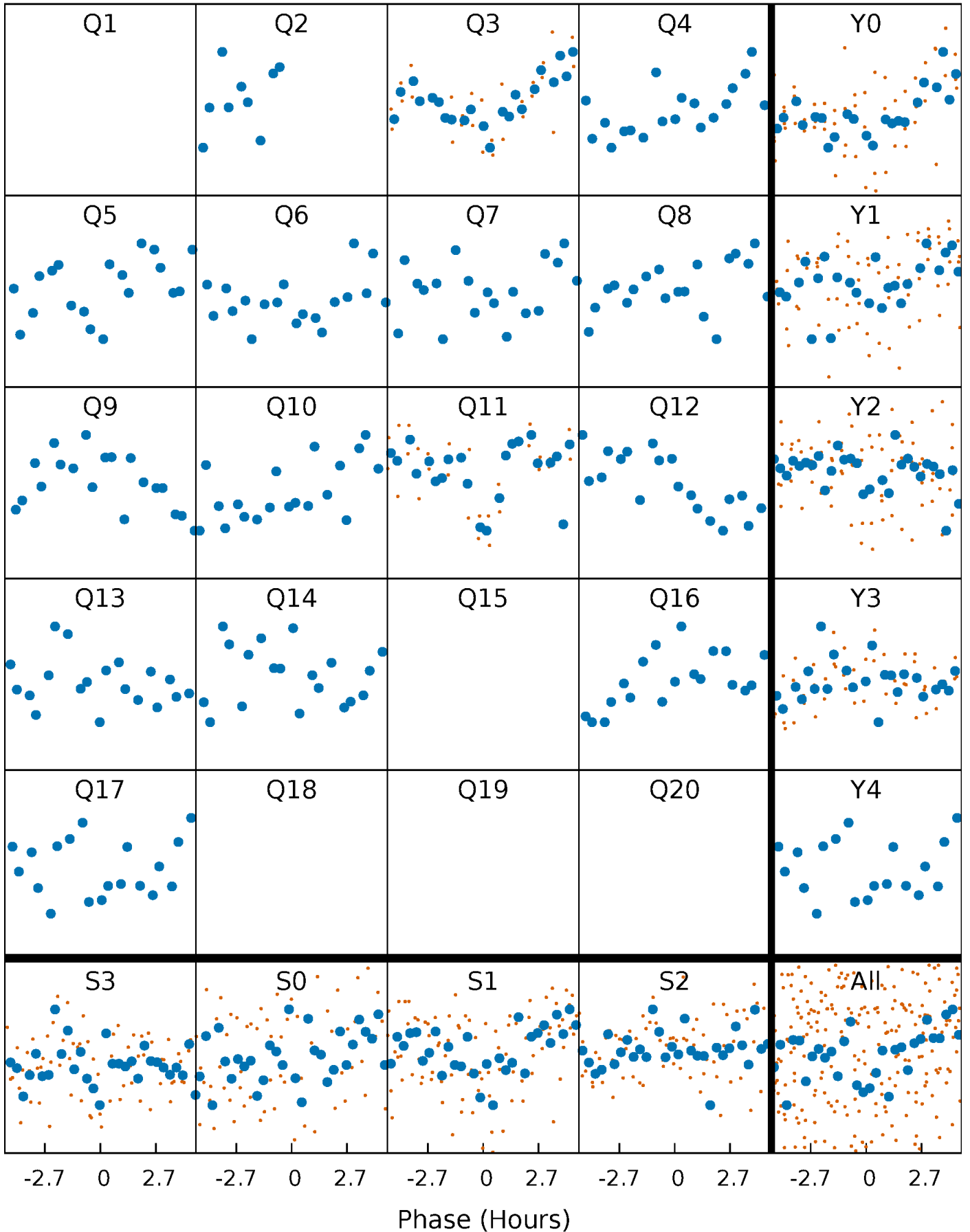


## Planet 6 : Phased Whitened Flux Time Series (Fit Epoch/Period)



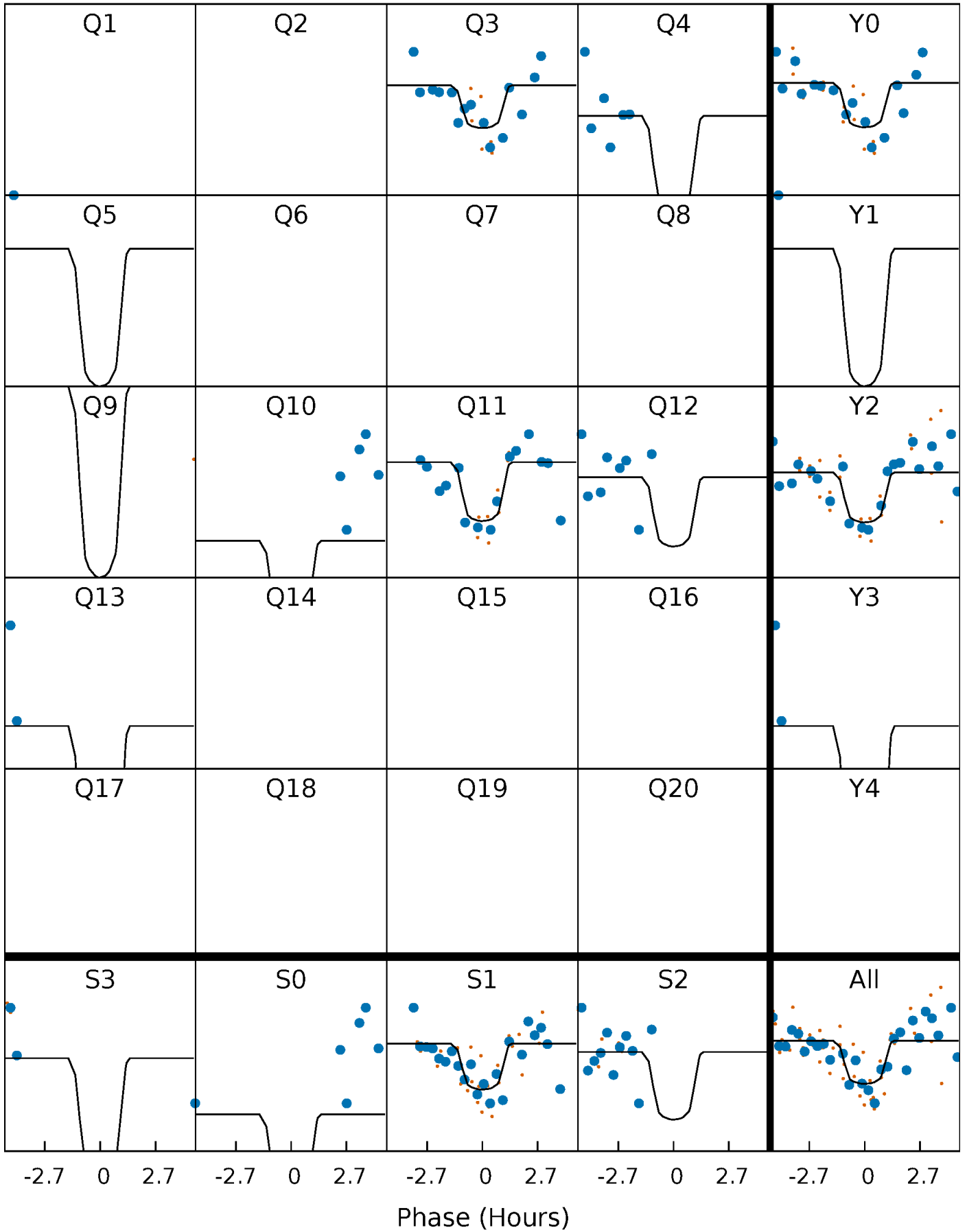
# PDC Quarter-Phased Transit Curves

TCE 005978154-06   P= 82.202844 Days    $T_0=181.537676$  (BKJD)



# DV Quarter-Phased Transit Curves

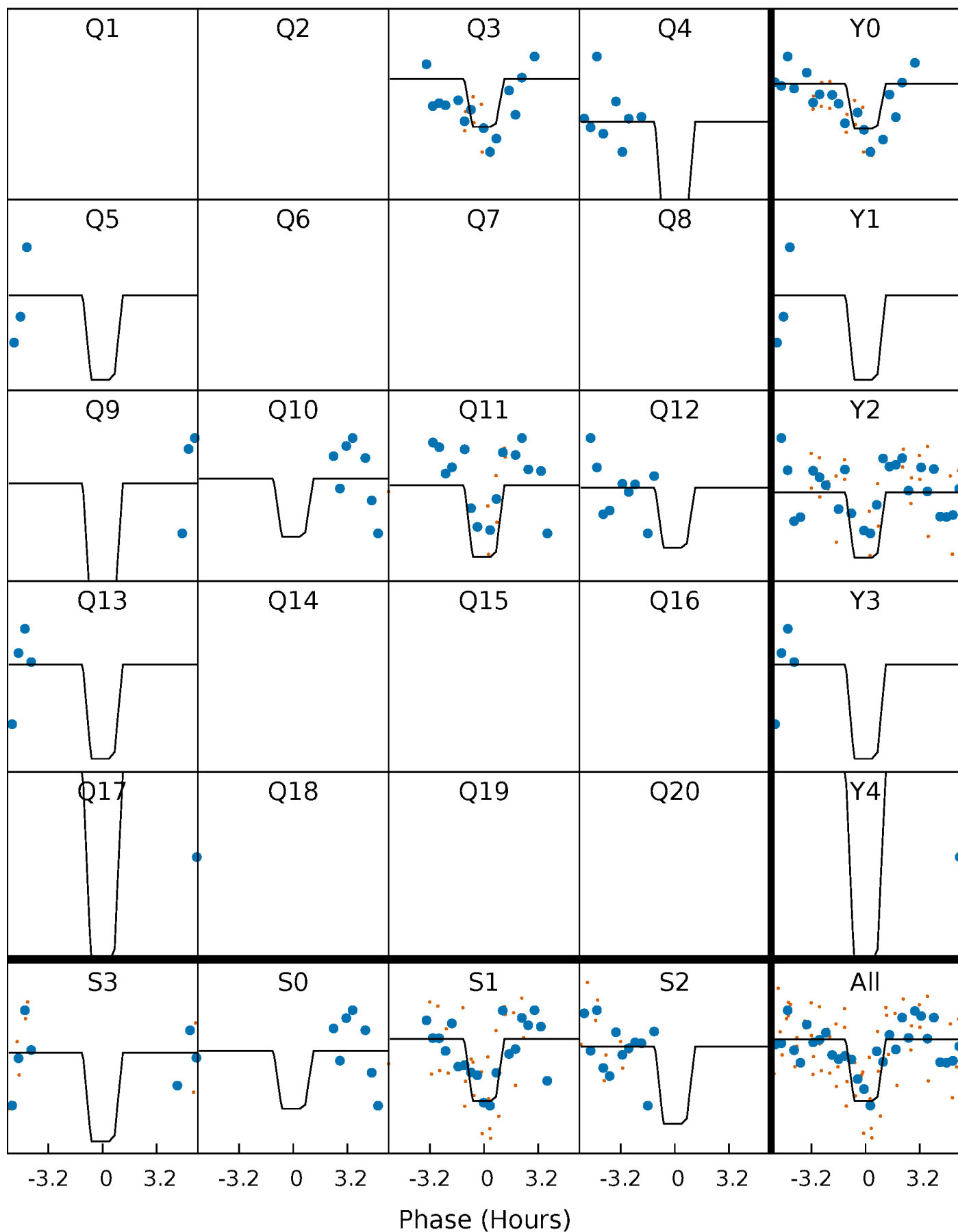
TCE 005978154-06 P= 82.202844 Days  $T_0=181.537676$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

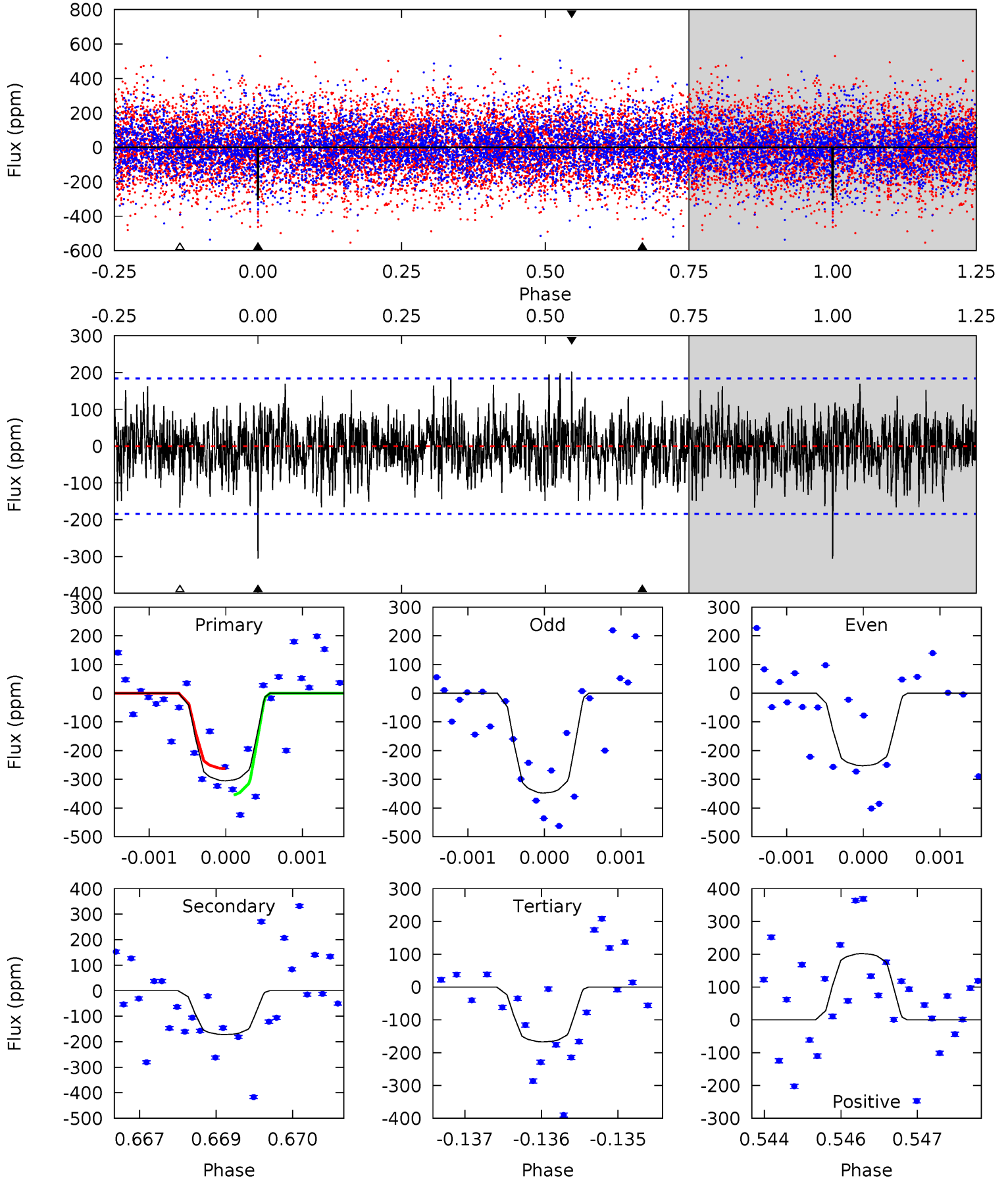
TCE 005978154-06 P= 82.202624 Days  $T_0=181.541679$  (BKJD)



# DV Model-Shift Uniqueness Test

005978154-06, P = 82.202844 Days, E = 99.334832 Days

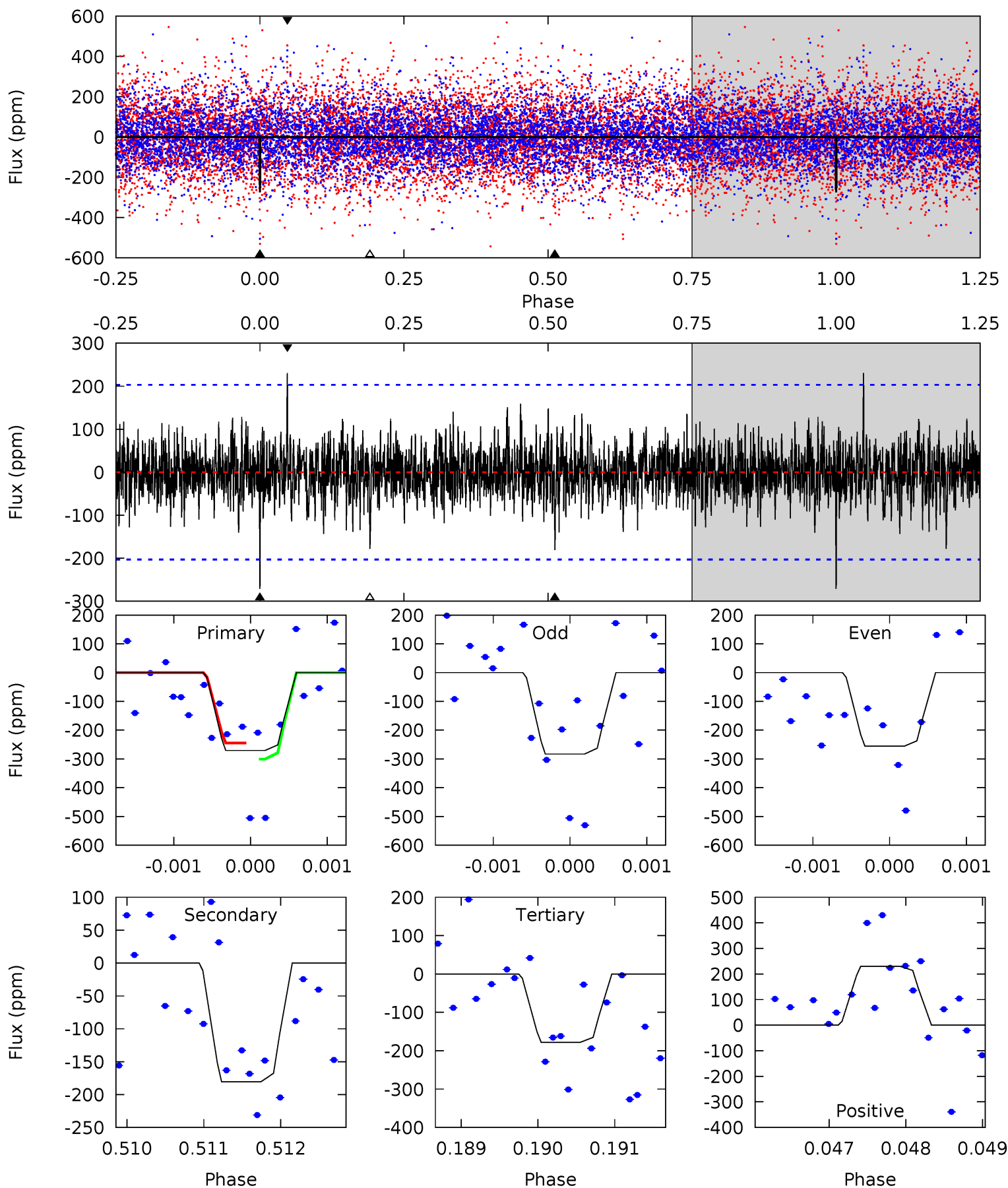
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.98	5.06	4.92	5.94	5.41	3.22	1.59	4.06	3.04	0.14	-0.88	1.39	0.99	0.40	1.34



# Alt Model-Shift Uniqueness Test

005978154-06, P = 82.202624 Days, E = 99.339055 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
7.26	4.84	4.77	6.18	5.45	3.29	1.23	2.49	1.08	0.07	-1.34	0.36	1.06	0.46	0.75



### Stellar Parameters For KIC 005978154

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$6723^{+202}_{-223}$	$3.478^{+0.360}_{-0.090}$	$-0.160^{+0.300}_{-0.250}$	$4.134^{+0.412}_{-1.647}$	$1.872^{+0.171}_{-0.398}$	$0.037^{+0.107}_{-0.011}$
	+3%/-3%	+10%/-3%	+188%/-156%	+10%/-40%	+9%/-21%	+286%/-29%
Source	PHO1	FLK73	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 005978154-06 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-172 \pm 34$	$8.18^{+4.62}_{-4.22}$	$1229^{+69}_{-117}$	$5531^{+2410}_{-997}$	$294^{+949}_{-181}$
Alt.	$-181 \pm 37$	$8.04^{+4.96}_{-4.42}$	$1229^{+70}_{-110}$	$5680^{+2679}_{-1090}$	$318^{+1082}_{-200}$

$T_{max}$  = 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

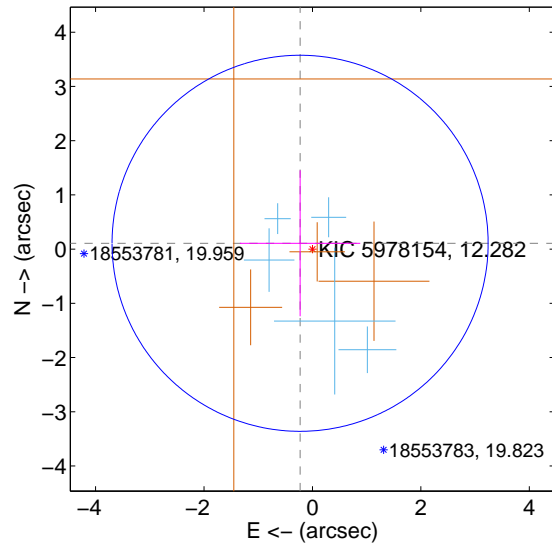
Supplemental centroid analysis for 005978154-06. Kepler magnitude: 12.28. Transit SNR 9.34

There are 5 quarters with good PRF difference image offsets

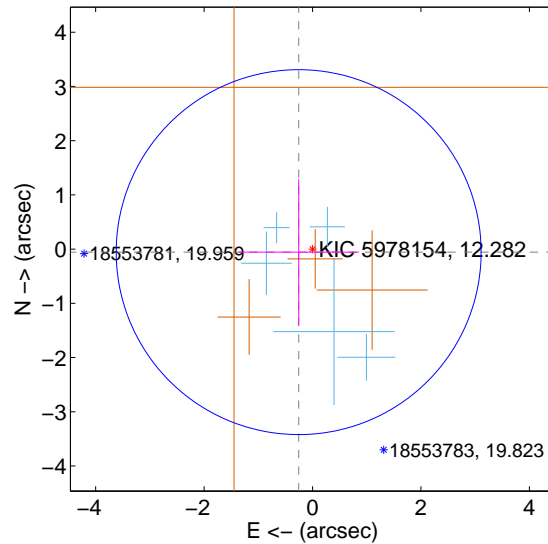
The direct PRF centroid is offset from the target star catalog position by about 0.14 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.252 \pm 1.156$	0.22	$0.228 \pm 1.110$	$0.107 \pm 1.345$
PRF-fit source offset from KIC position	$0.262 \pm 1.122$	0.23	$0.256 \pm 1.110$	$-0.056 \pm 1.345$
photometric centroid source offset	$0.84 \pm 0.49$	1.74	$0.68 \pm 0.49$	$-0.50 \pm 0.48$

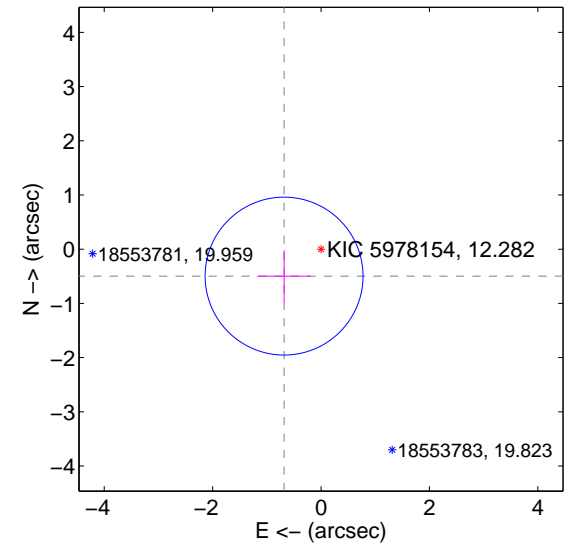
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

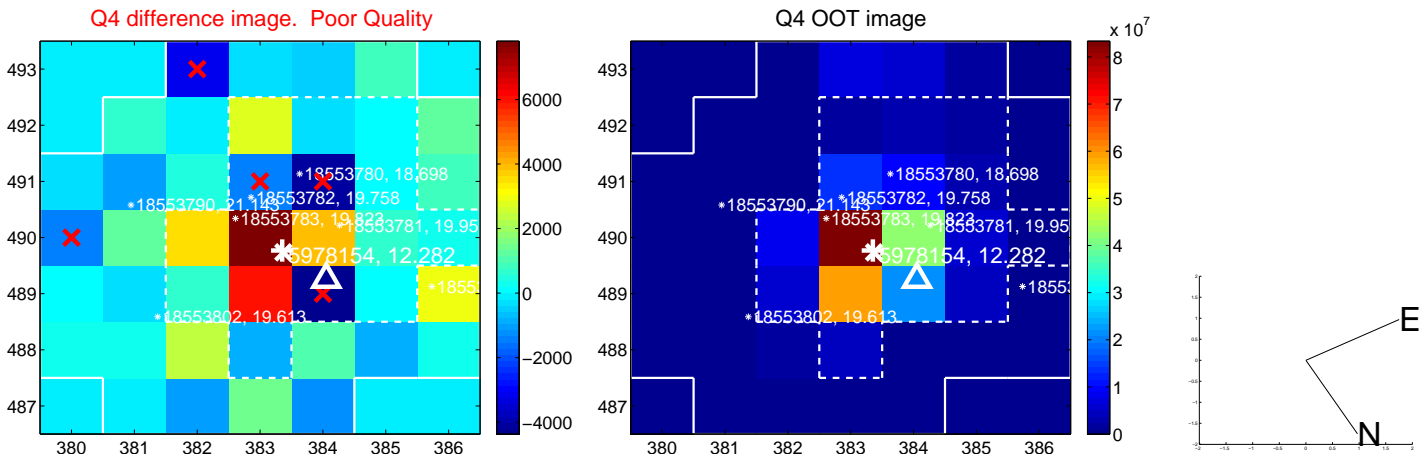
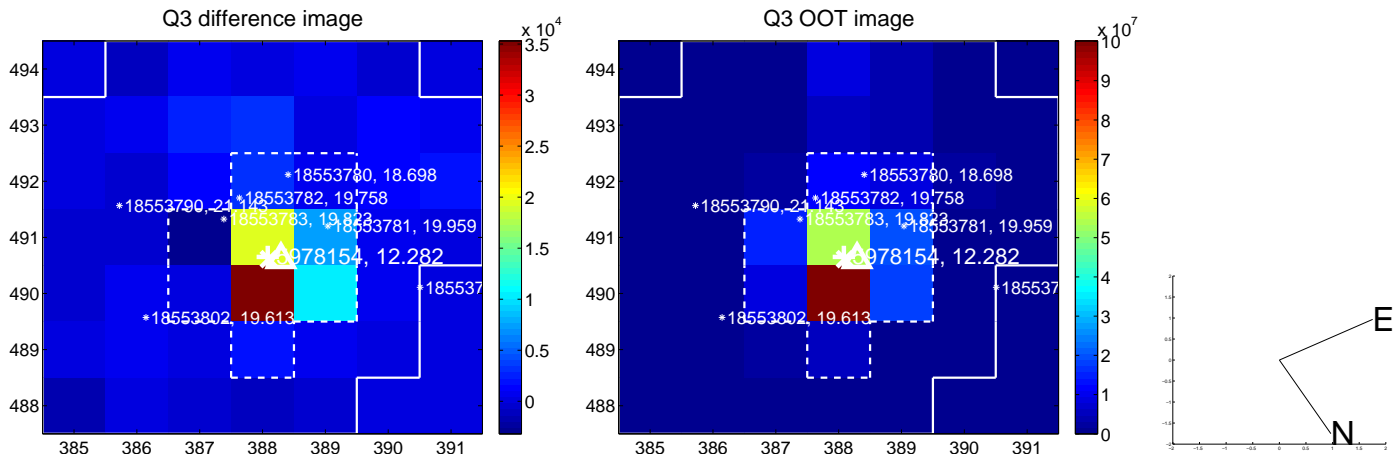
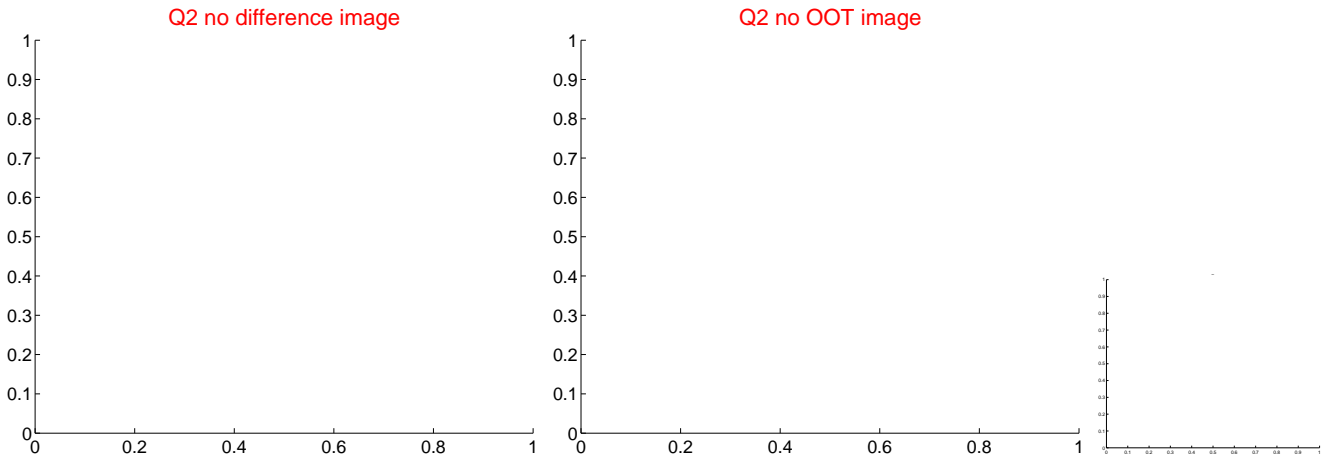
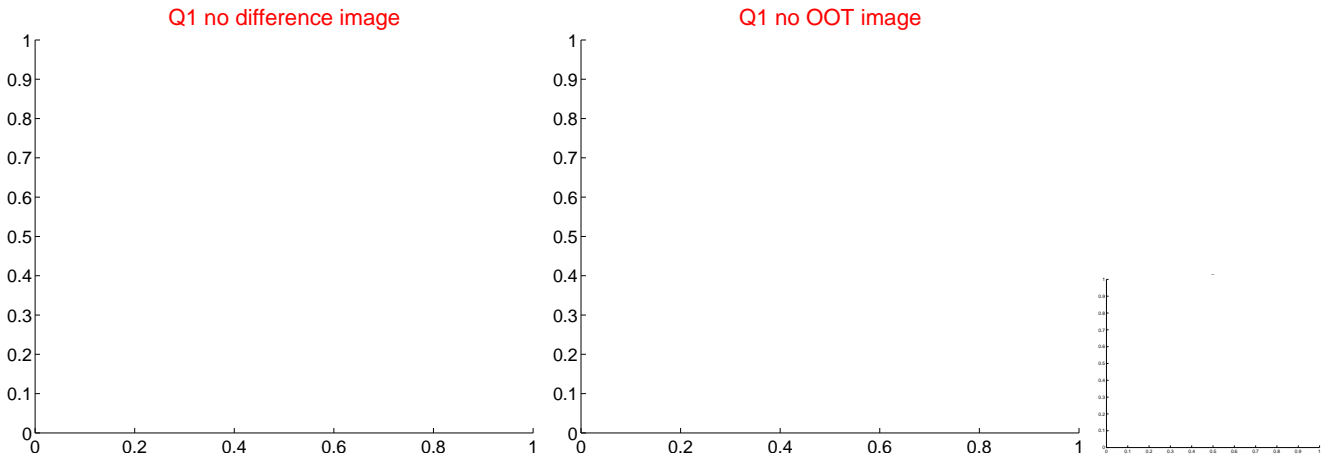


offset from photometric centroids

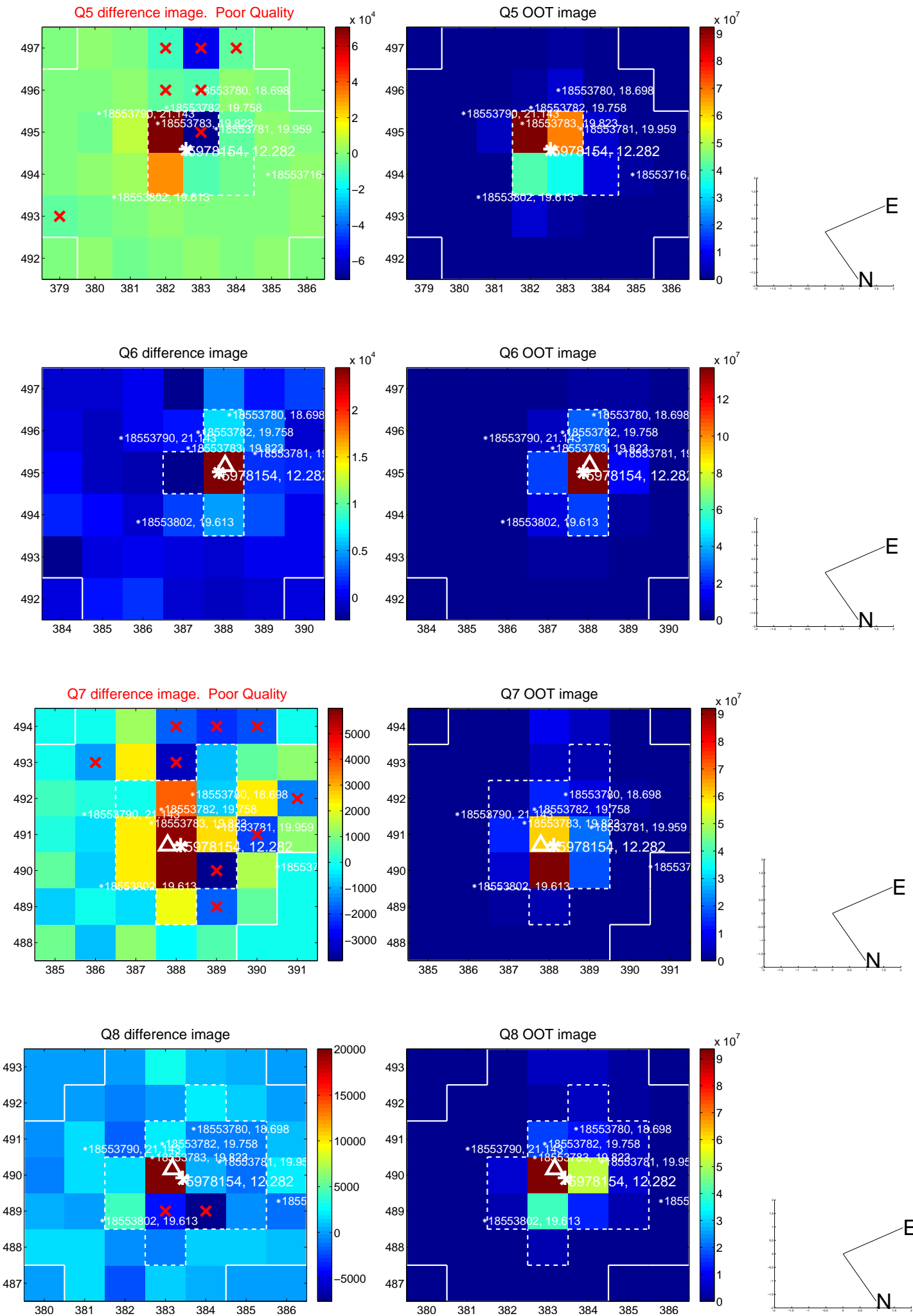


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

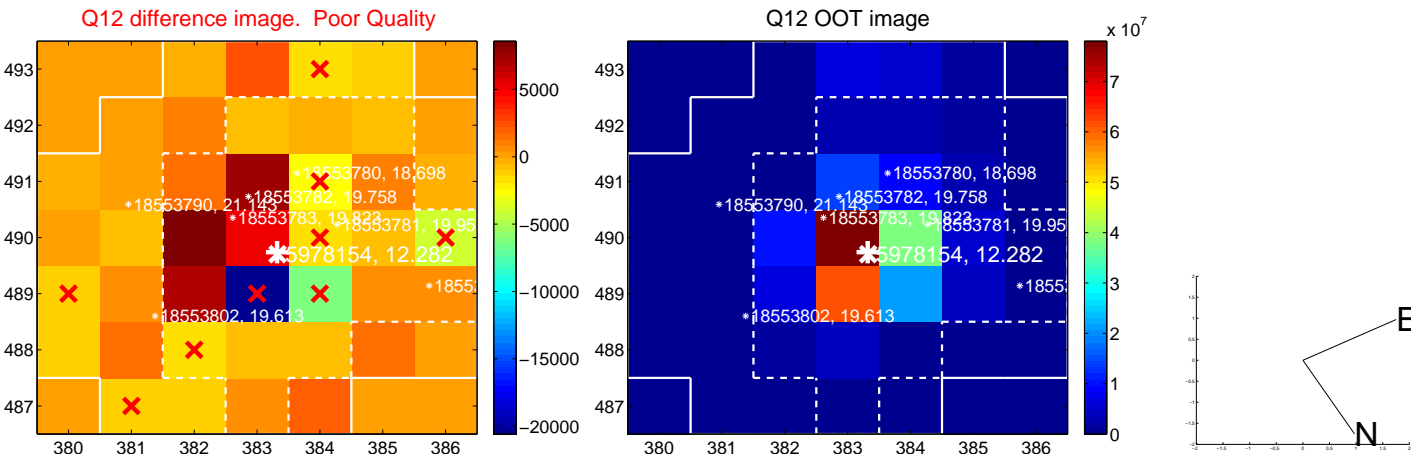
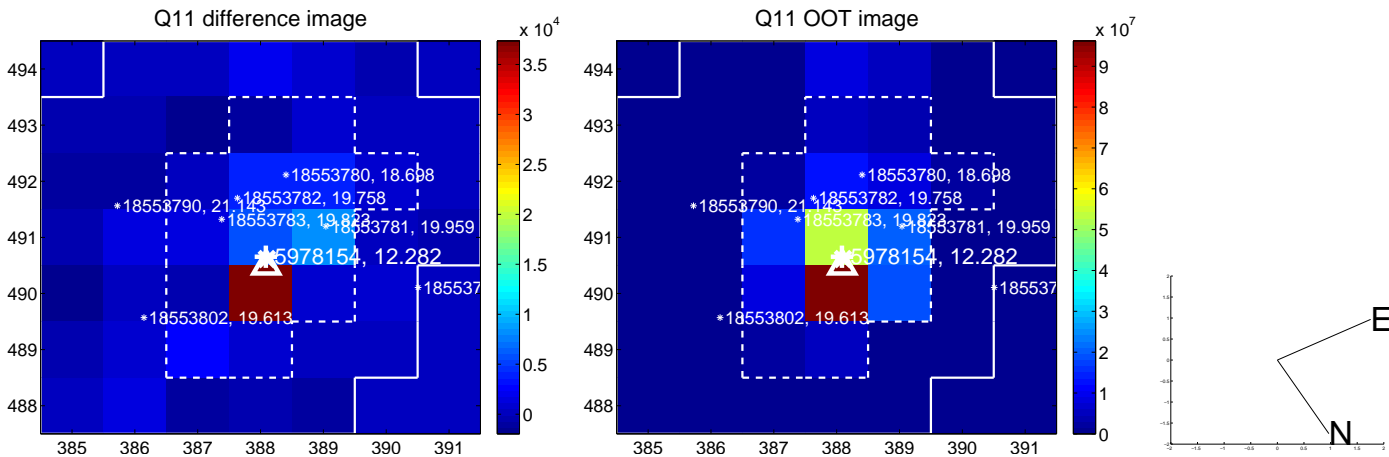
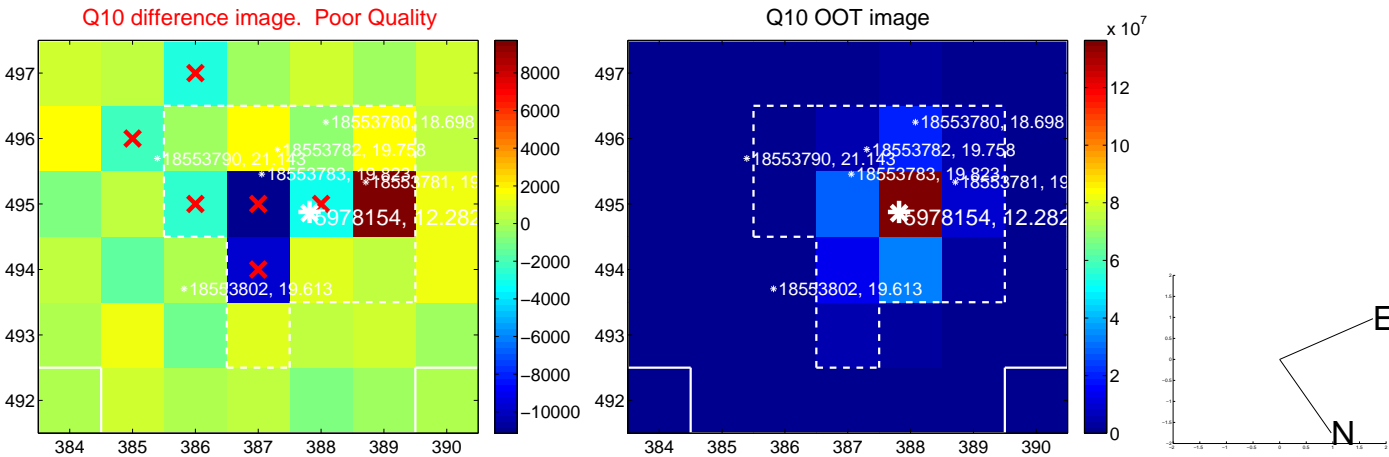
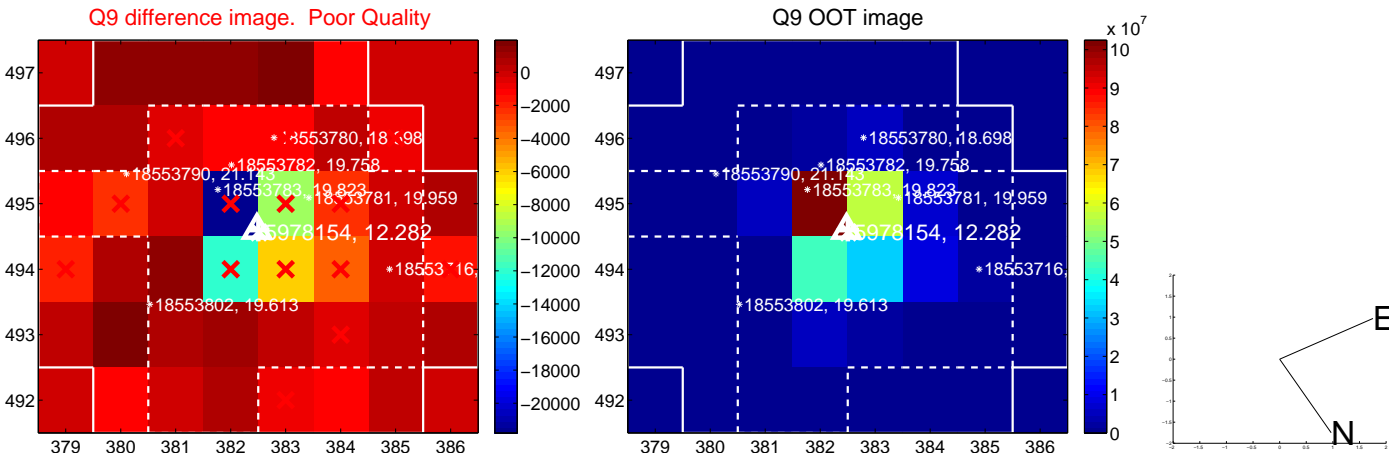


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

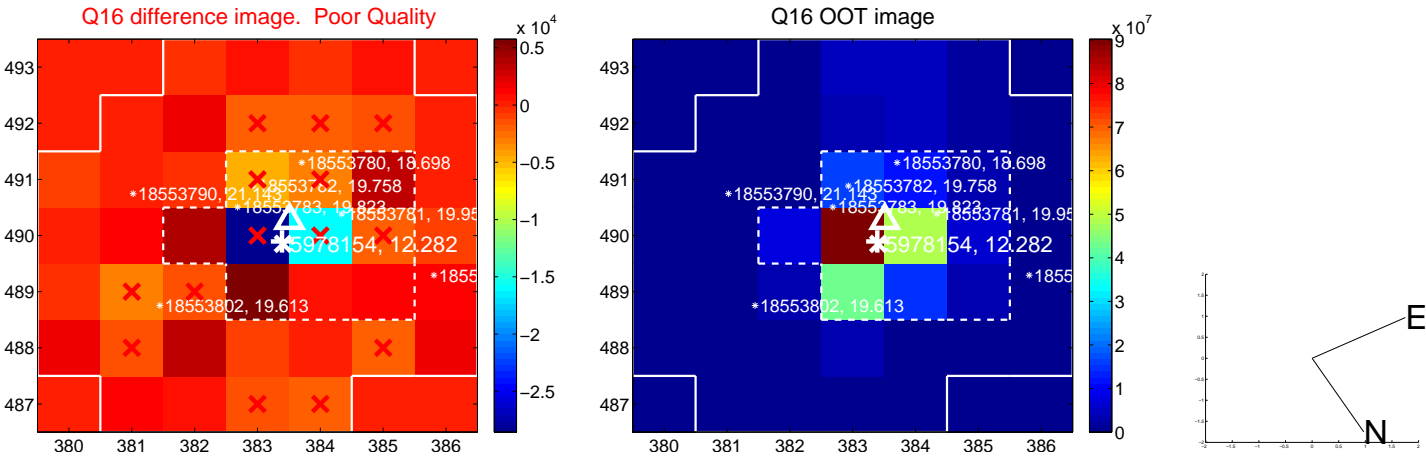
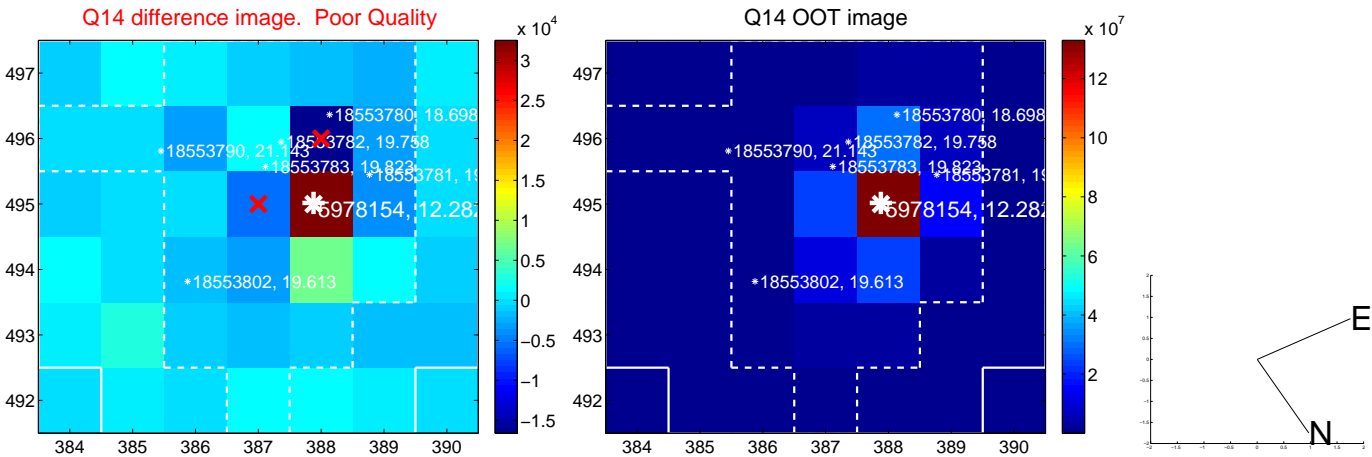
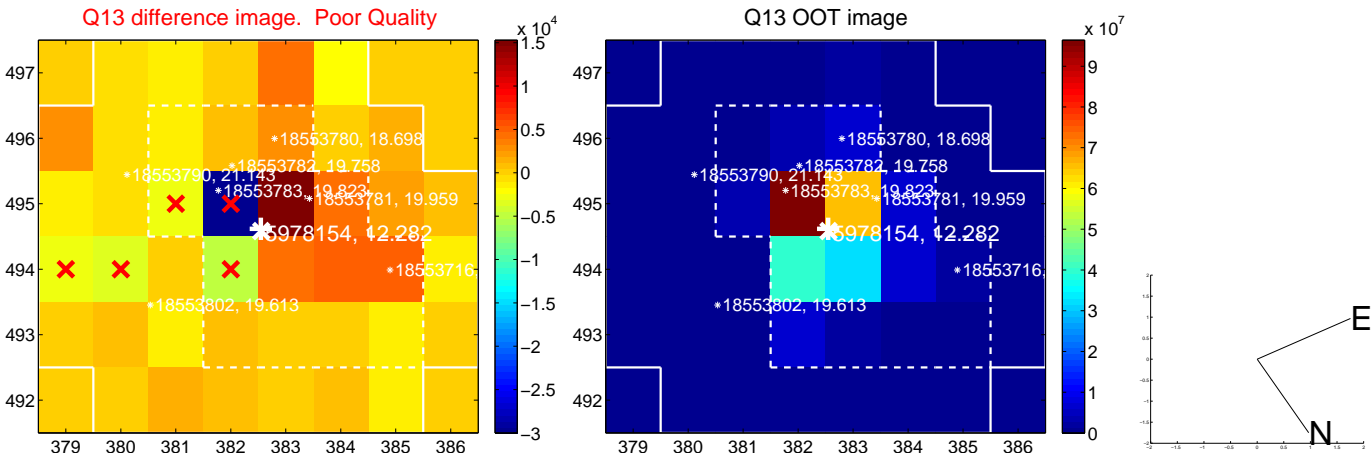




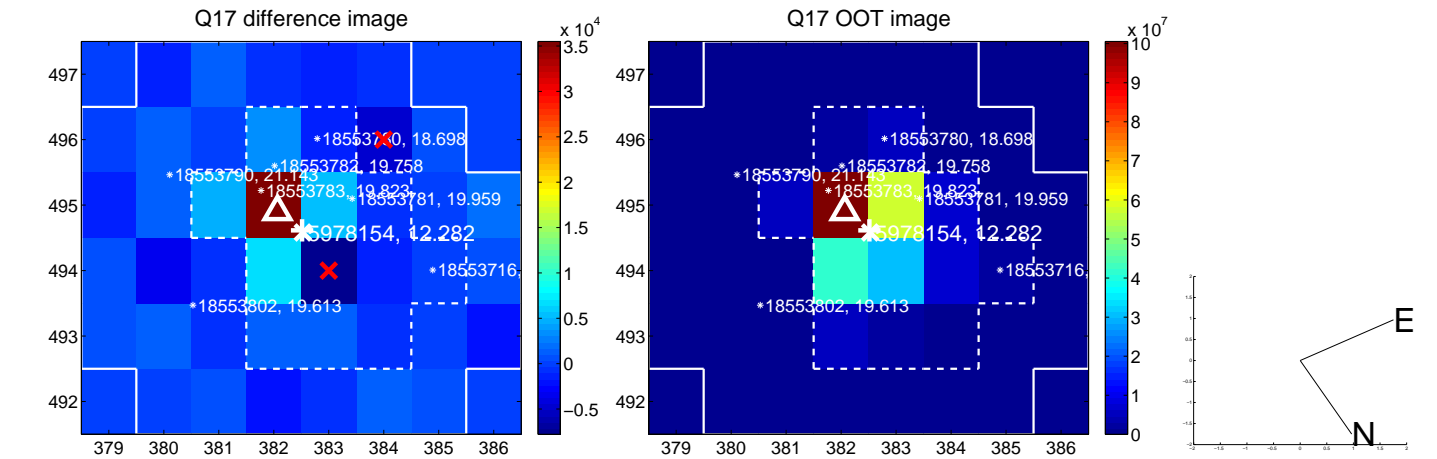
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



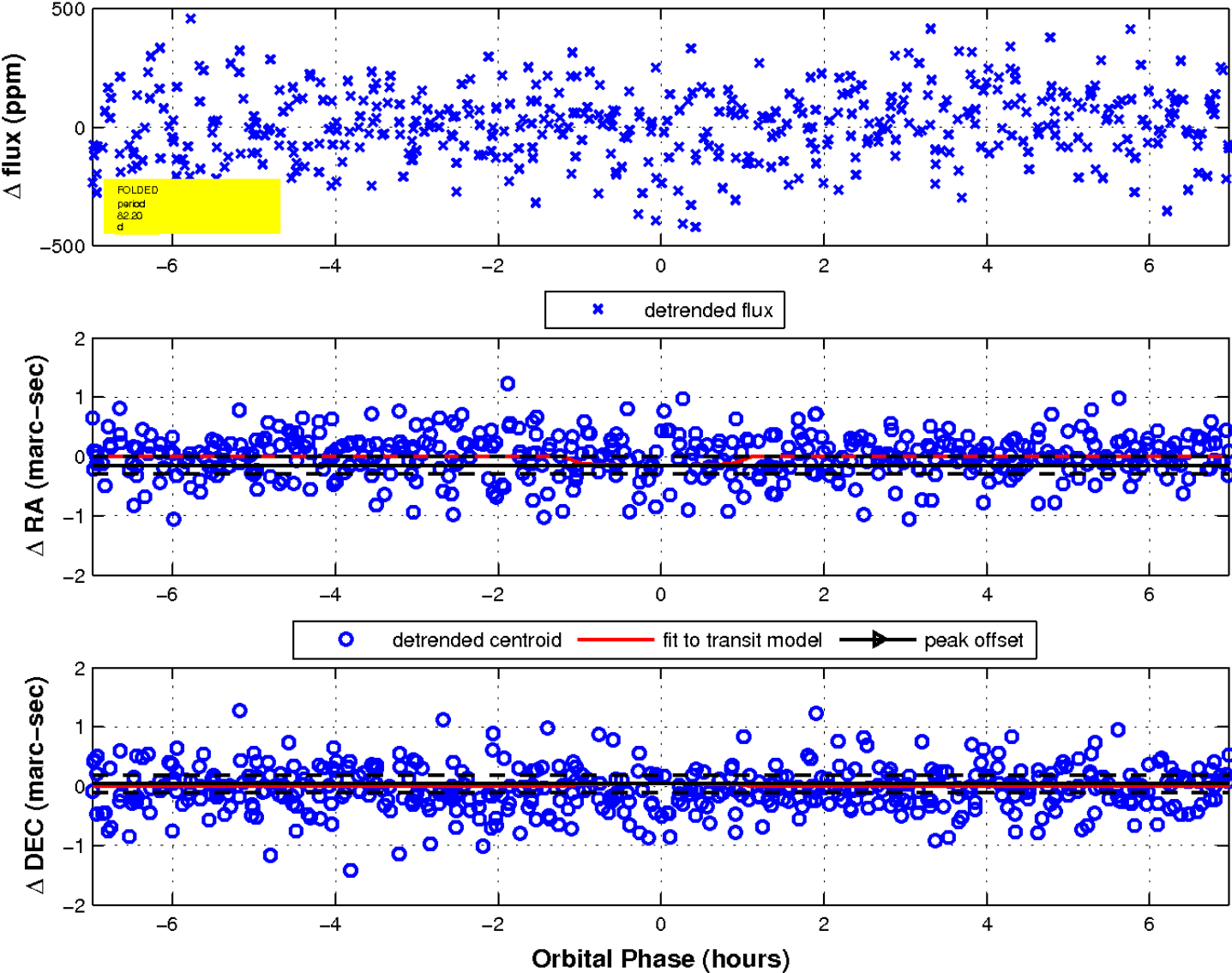
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



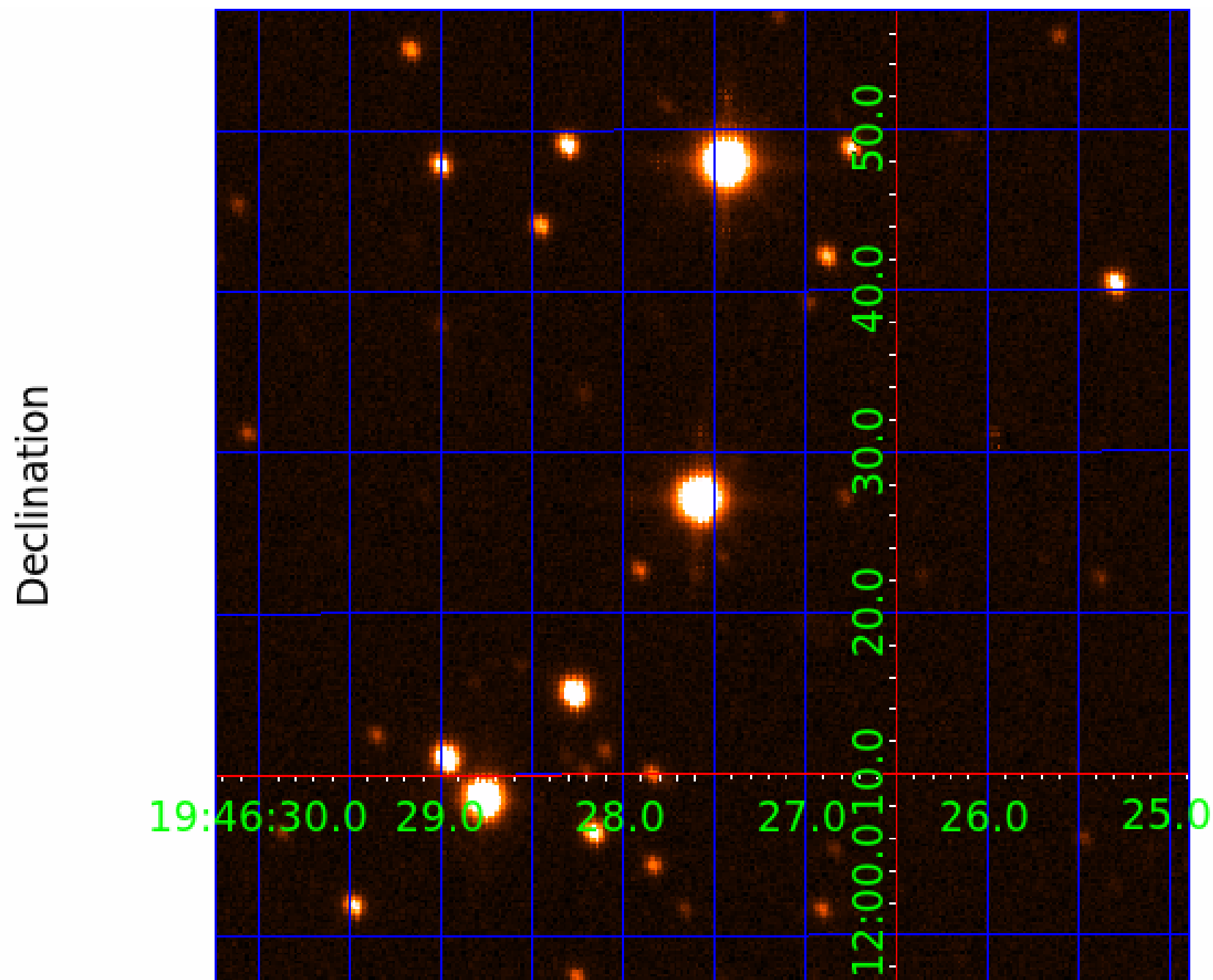
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\Delta$ : difference centroid. red  $\times$ : large negative pixel value.



fluxWeightedCentroids, Planet 6 of 10



UKIRT Image



## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005978154-01	OBS	No	0.977344	132.332446	13.4	6.117	8.3	6.7	4.13	6723	1.53	55377.15
005978154-02	OBS	No	124.165564	182.998698	450.9	13.613	12.5	10.5	4.13	6723	9.87	86.71
005978154-03	OBS	No	137.679401	150.489095	291.5	6.419	9.2	10.5	4.13	6723	8.84	75.55
005978154-04	OBS	No	28.453613	148.852296	172.6	3.245	9.8	8.3	4.13	6723	6.38	618.32
005978154-05	OBS	No	33.910761	148.850724	154.0	5.416	8.9	9.0	4.13	6723	5.62	489.34
005978154-06	OBS	No	82.202844	181.537676	292.1	2.328	9.2	9.3	4.13	6723	8.25	150.27
005978154-07	OBS	No	38.342122	163.823144	205.4	2.241	9.0	8.8	4.13	6723	6.69	415.43
005978154-08	OBS	No	93.248607	221.792194	272.4	4.236	8.9	9.2	4.13	6723	7.75	127.02
005978154-09	OBS	No	43.449347	166.082590	271.7	2.358	9.1	8.7	4.13	6723	7.55	351.63
005978154-10	OBS	No	45.084056	162.646790	117.0	6.361	8.6	5.7	4.13	6723	5.05	334.73

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005978154-01	OBS	FP	0.00	1	0	0	0	SWEET_NTL—LPP_DV
005978154-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS
005978154-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
005978154-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
005978154-05	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—HALO_GHOST
005978154-06	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—HALO_GHOST
005978154-07	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
005978154-08	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
005978154-09	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
005978154-10	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT

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

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

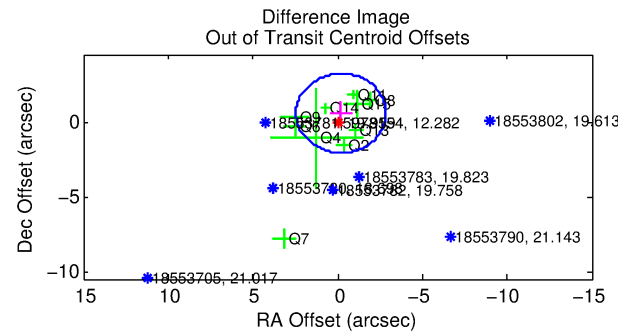
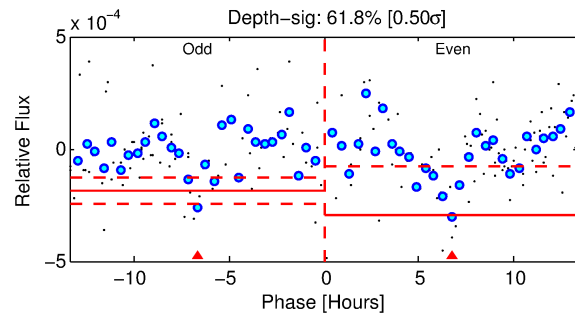
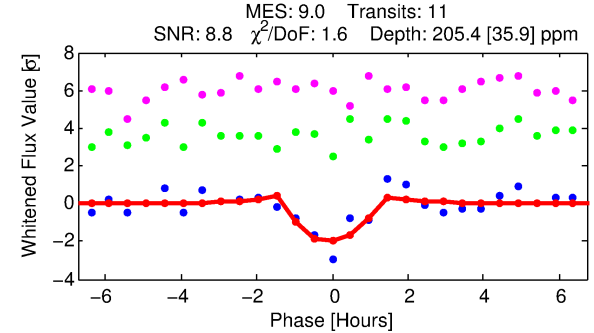
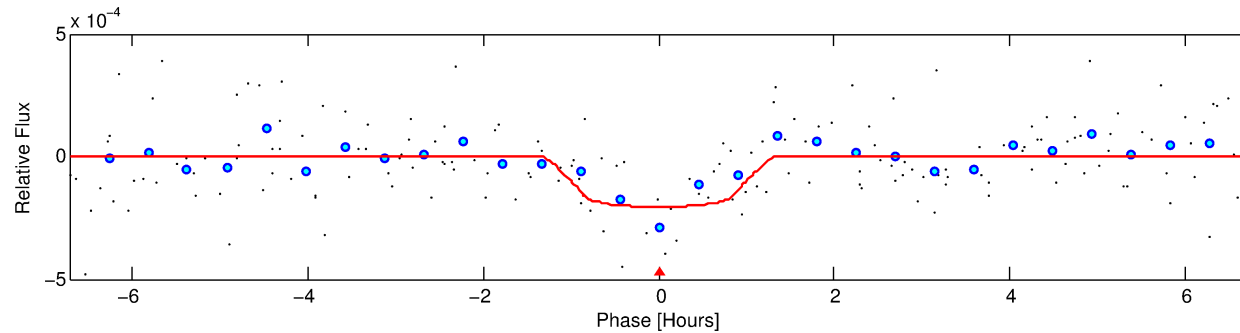
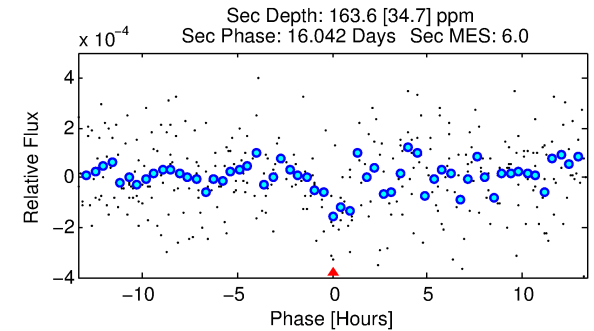
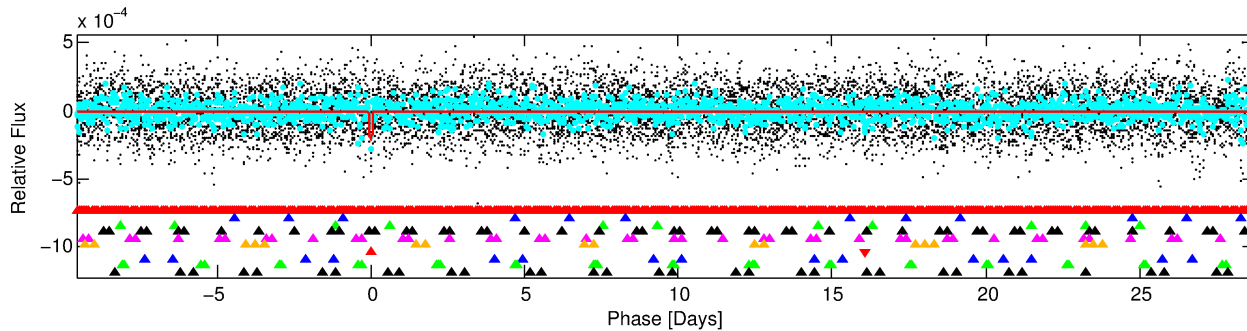
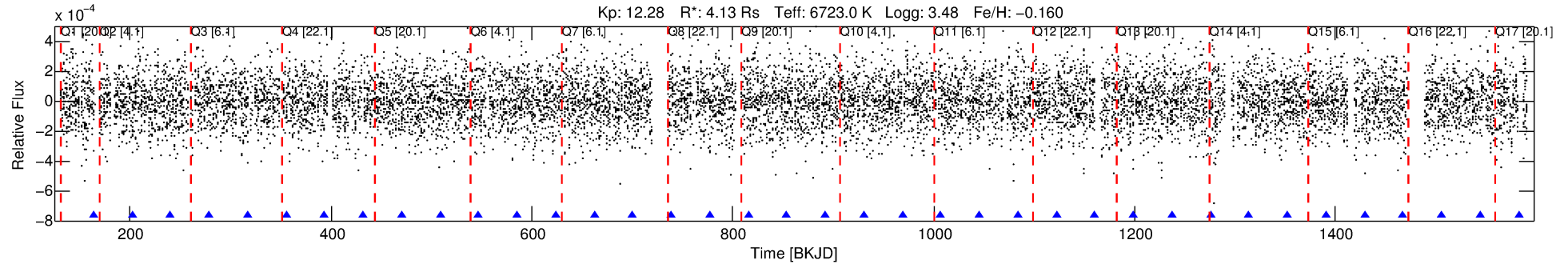
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 005978154-07

No Significant Match Found

# DV One-Page Summary

KIC: 5978154 Candidate: 7 of 10 Period: 38.342 d



## DV Fit Results:

Period = 38.34212 [0.00036] d  
Epoch = 163.8231 [0.0085] BKJD  
Rp/R\* = 0.0148 [0.0149]  
a/R\* = 72.71 [426.24]  
b = 0.85 [1.95]  
Seff = 415.42 [260.61]  
Teff = 1151 [181] K  
Rp = 6.69 [7.23] Re  
a = 0.2744 [0.1052] AU  
Ag = 151.53 [320.06] [0.47σ]  
Teffp = 6245 [3162] K [1.61σ]

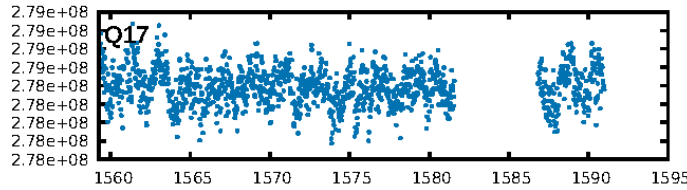
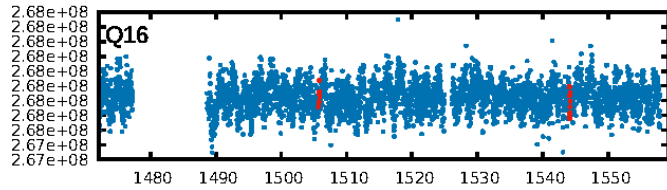
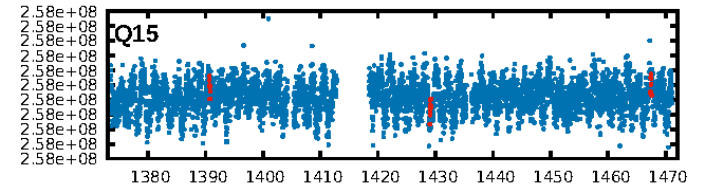
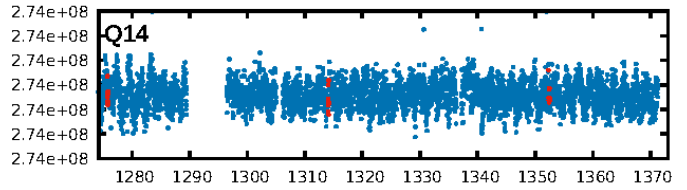
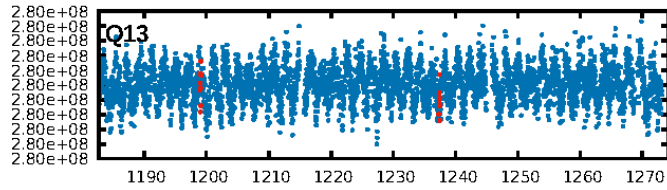
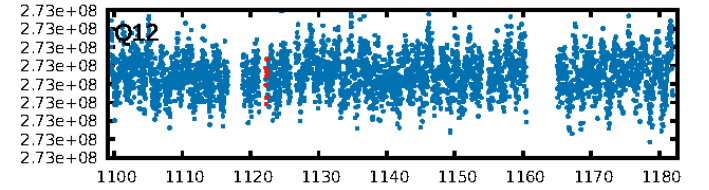
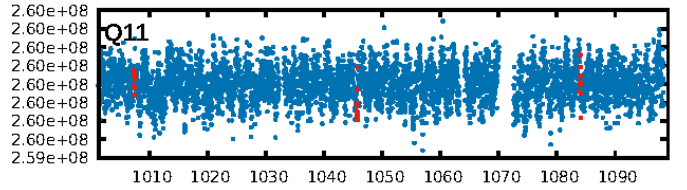
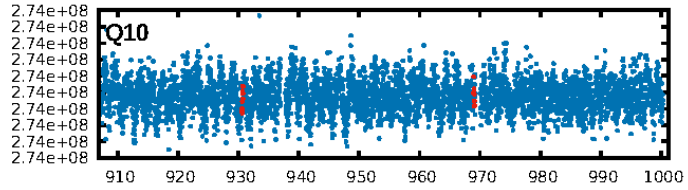
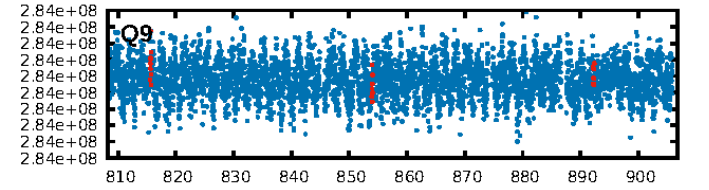
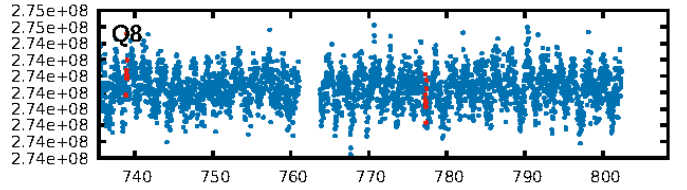
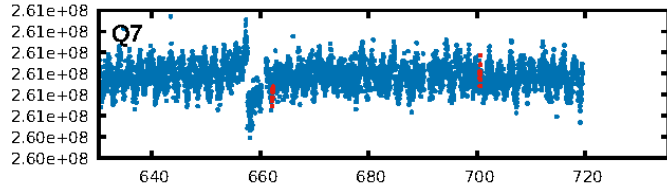
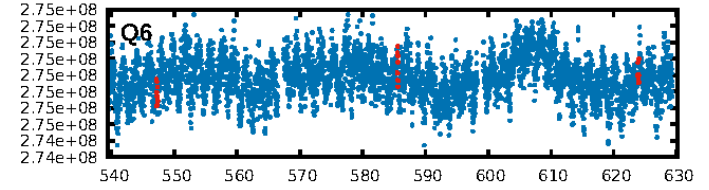
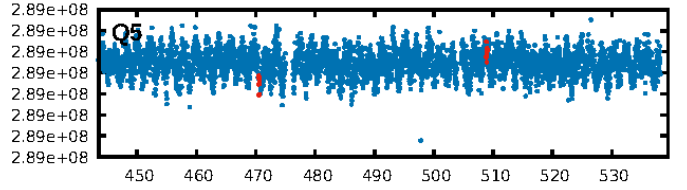
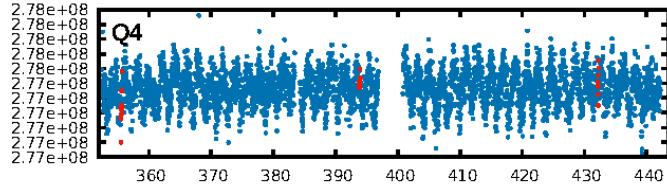
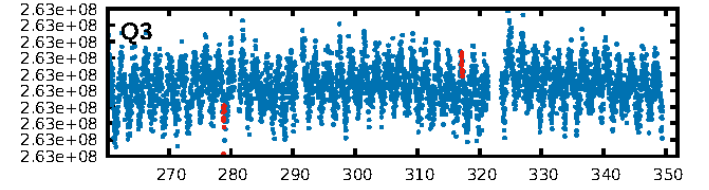
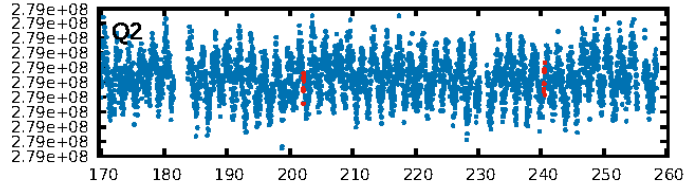
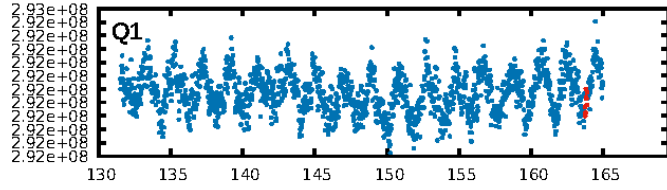
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [18.14σ]  
LongPeriod-sig: 100.0% [37.67σ]  
ModelChiSquare2-sig: 7.6%  
ModelChiSquareGof-sig: 93.1%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [11/11]  
GhostDiagnostic-chr: -2.37  
Centroid-sig: 5.4%  
Centroid-so: 0.996 arcsec [2.19σ]  
OotOffset-rm: 0.596 arcsec [0.68σ]  
KicOffset-rm: 0.502 arcsec [0.57σ]  
OotOffset-st: 3/3/2/2 [10]  
KicOffset-st: 3/3/2/2 [10]  
DiffImageQuality-fgm: 0.50 [5/10]  
DiffImageOverlap-fno: 0.33 [5/15]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 03-Feb-2016 05:54:15 Z

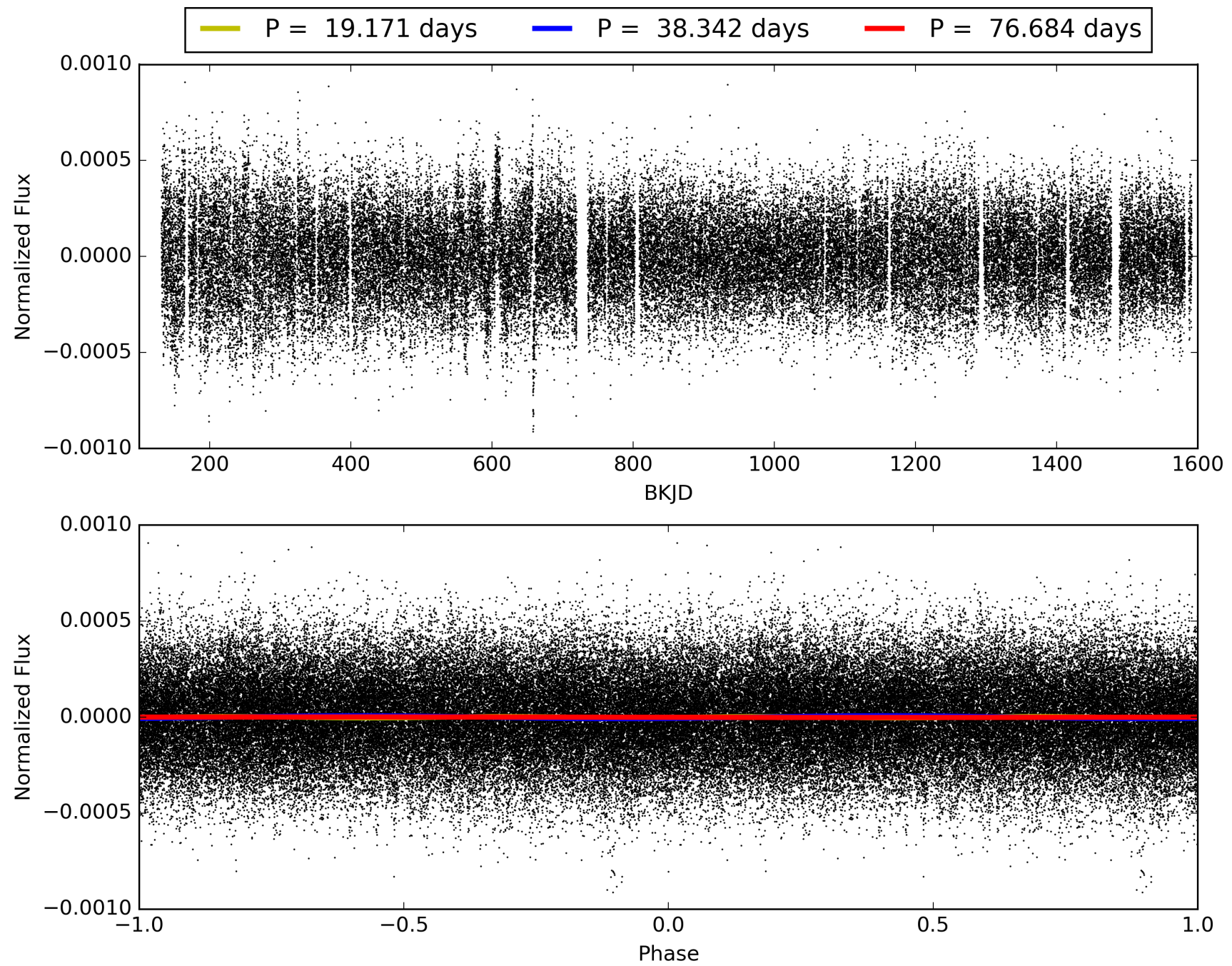
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

## TCE 005978154-07, PDC Light Curves



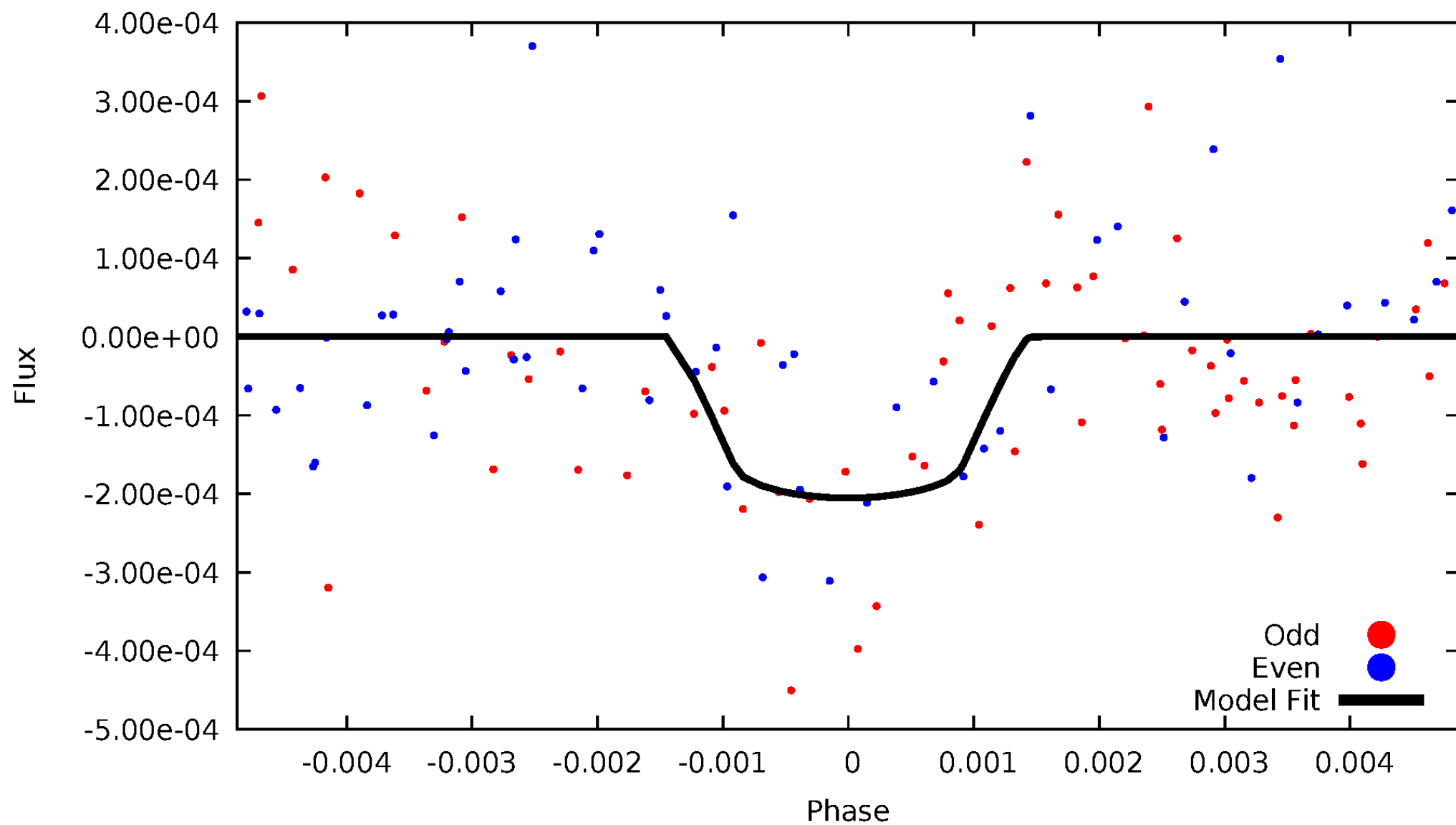


TCE 005978154-07



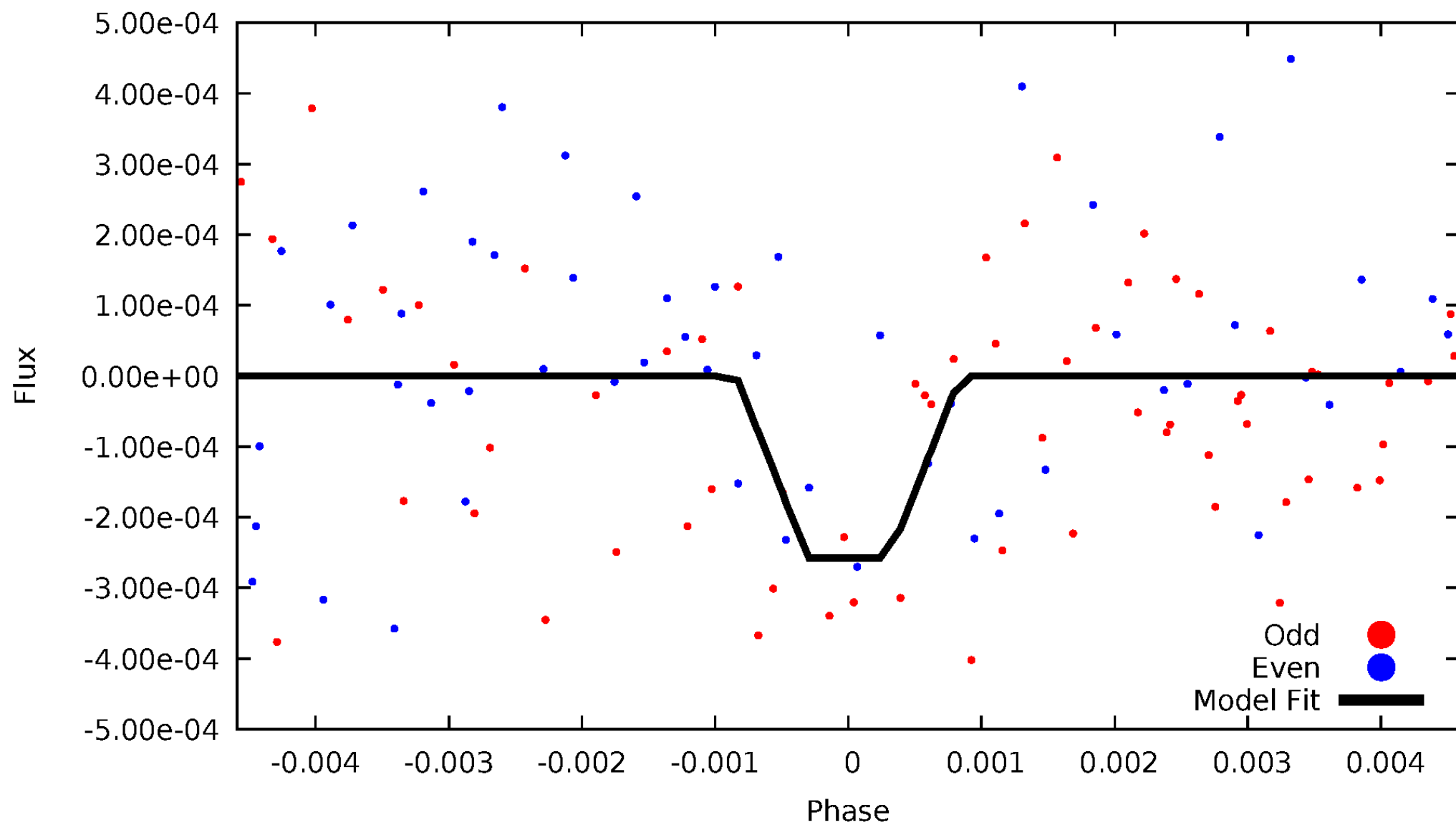
# DV Odd/Even

TCE 005978154-07

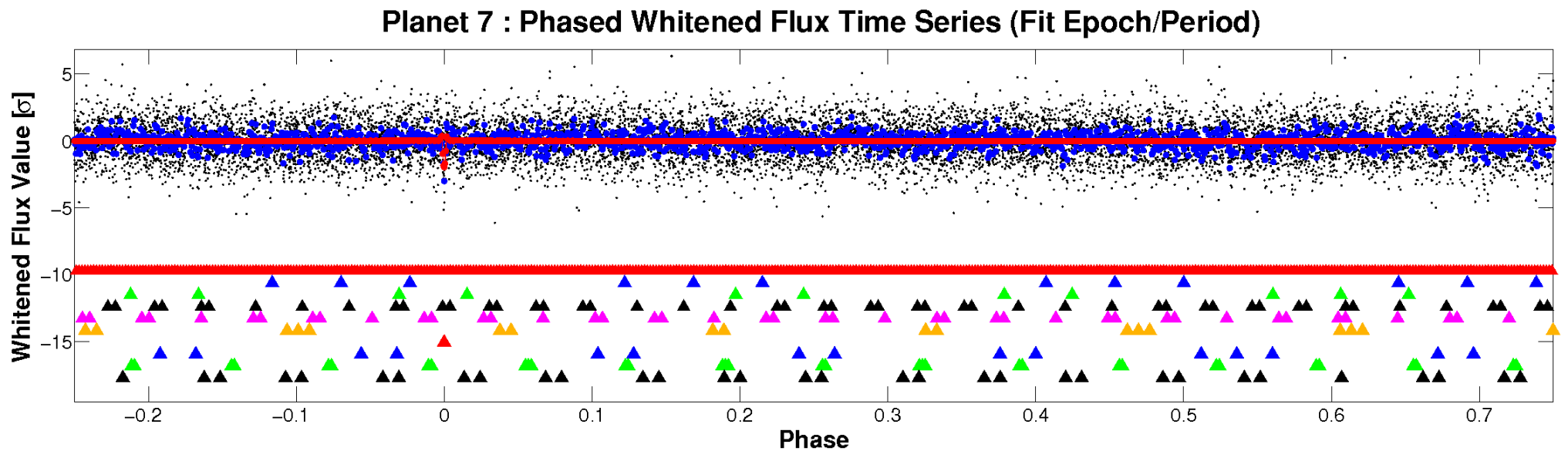
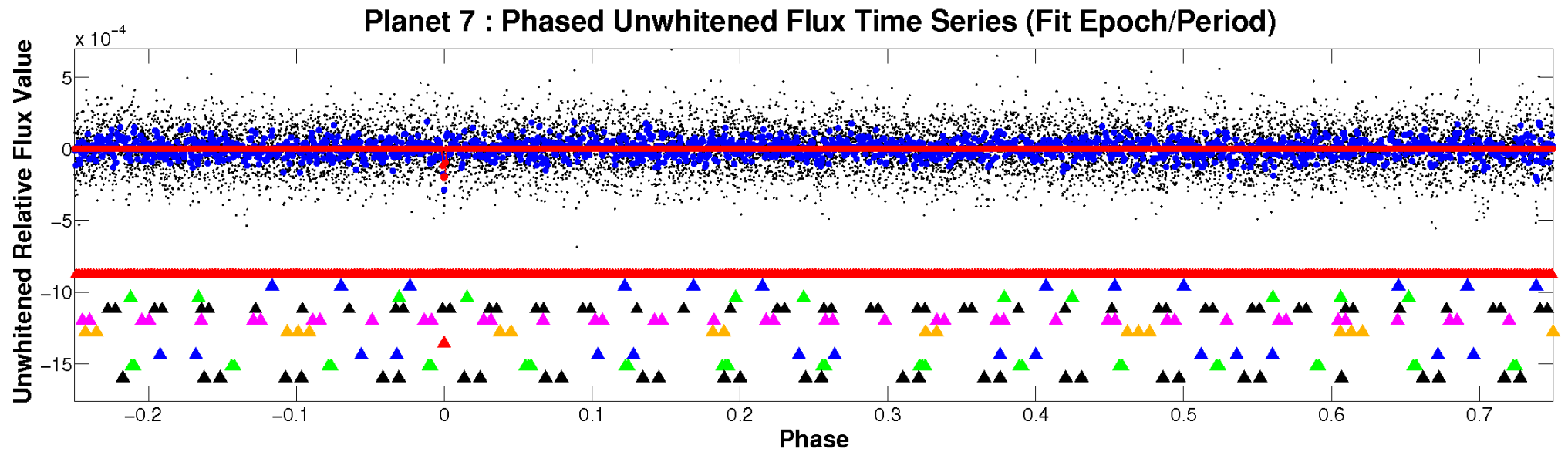


# ALT Odd/Even

TCE 005978154-07

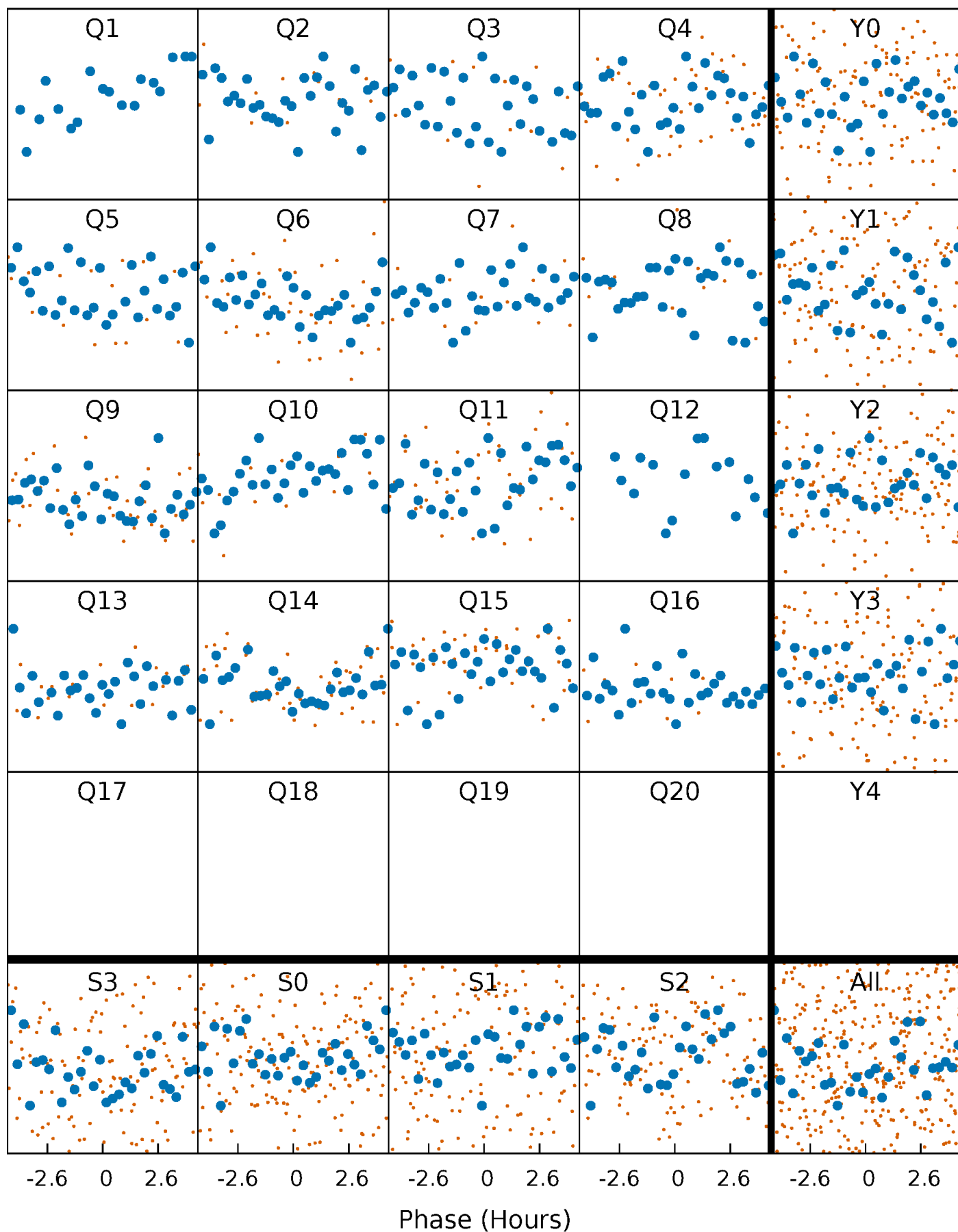


# Non-Whitened Vs. Whitened Light Curve



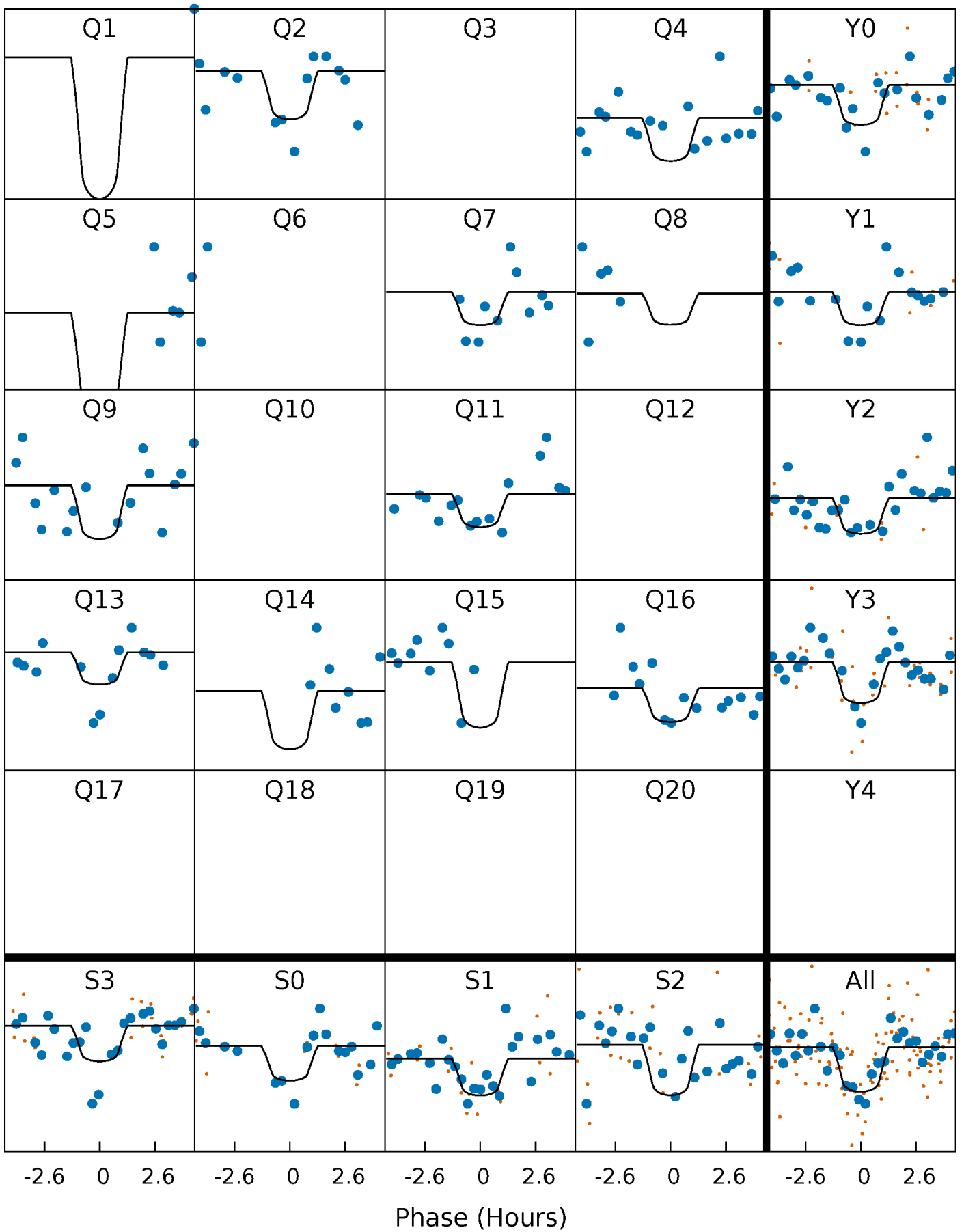
# PDC Quarter-Phased Transit Curves

TCE 005978154-07 P= 38.342122 Days  $T_0=163.823145$  (BKJD)



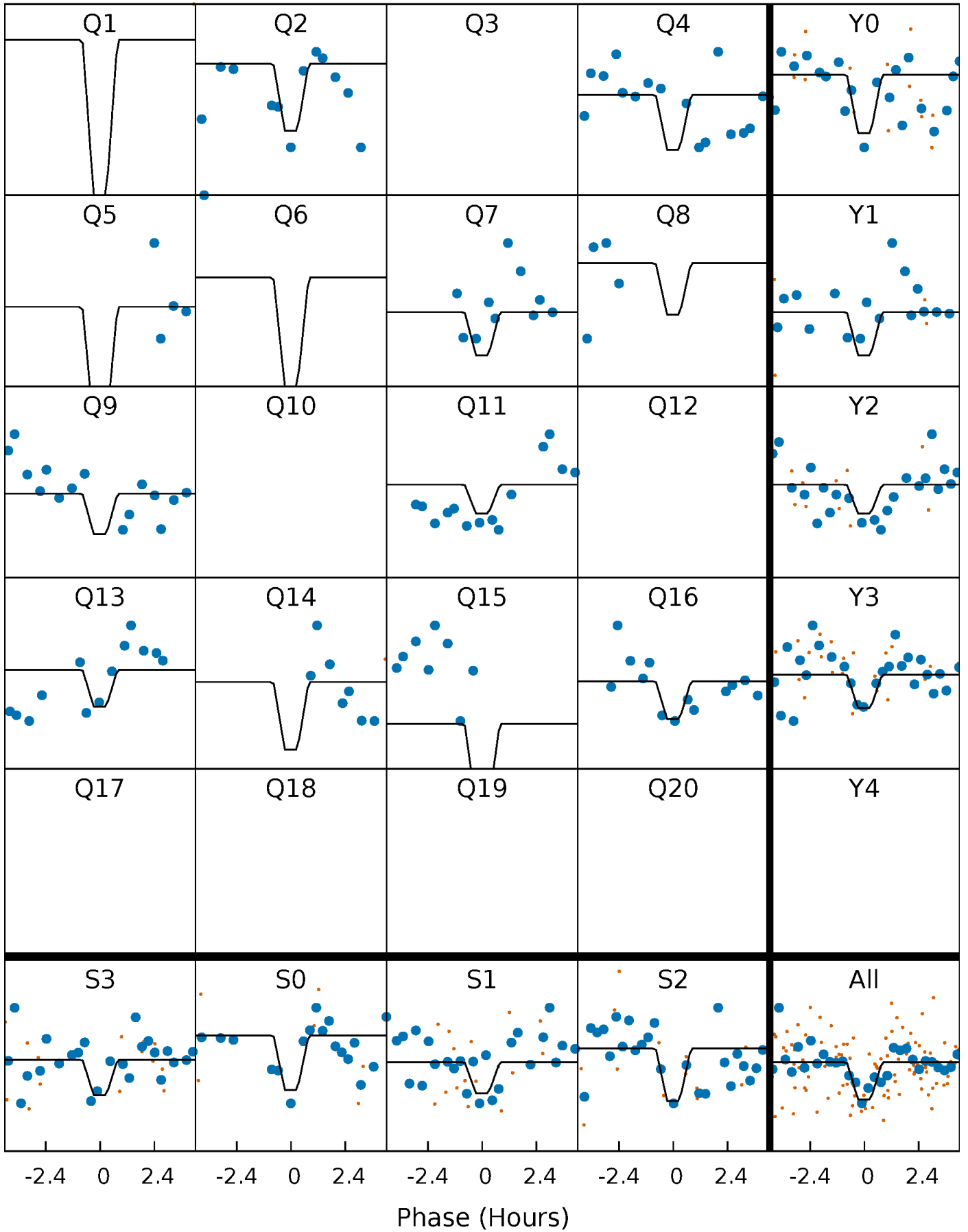
# DV Quarter-Phased Transit Curves

TCE 005978154-07 P= 38.342122 Days  $T_0=163.823145$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 005978154-07 P= 38.342009 Days  $T_0=163.830312$  (BKJD)

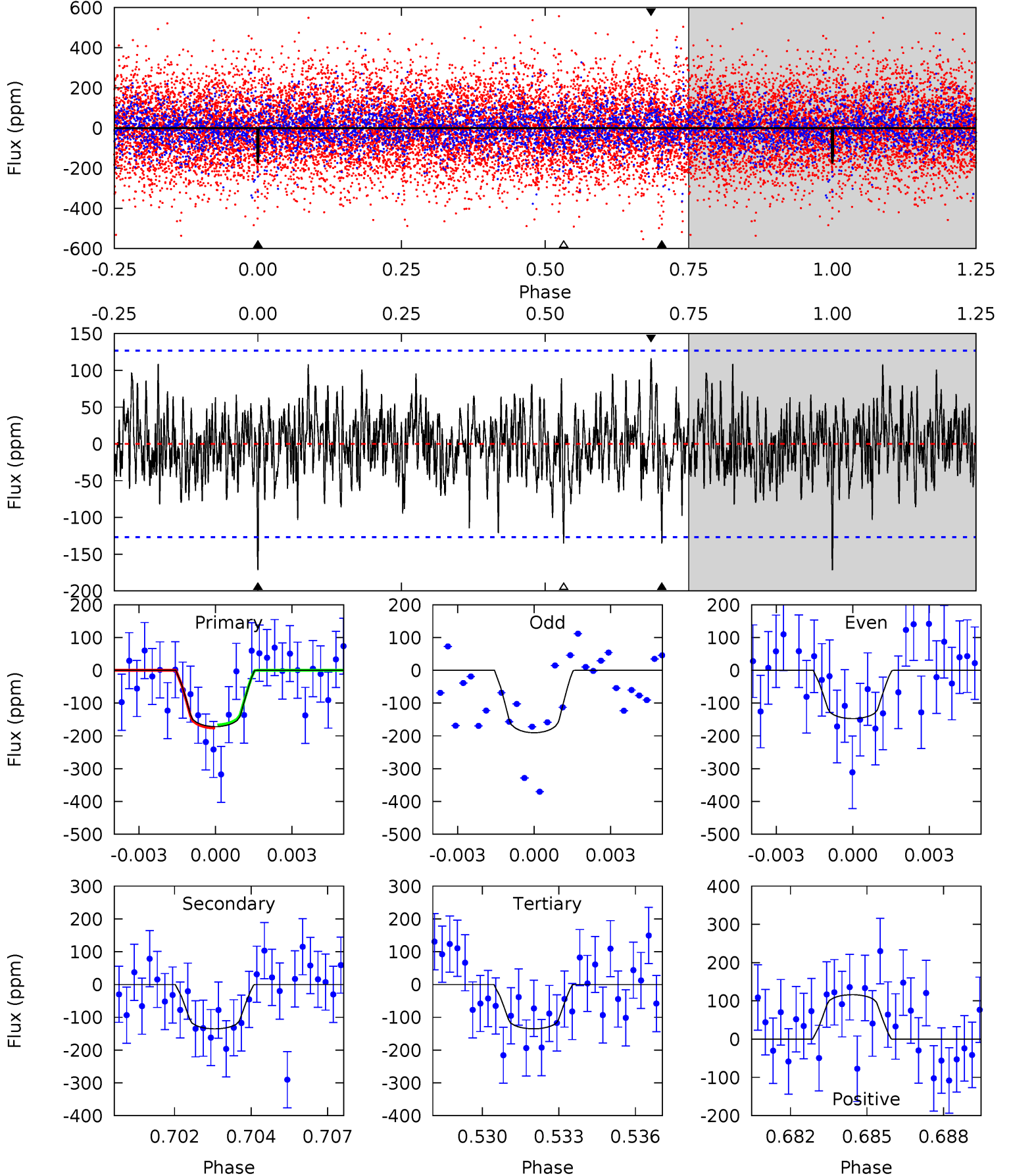




# DV Model-Shift Uniqueness Test

005978154-07, P = 38.342122 Days, E = 125.481023 Days

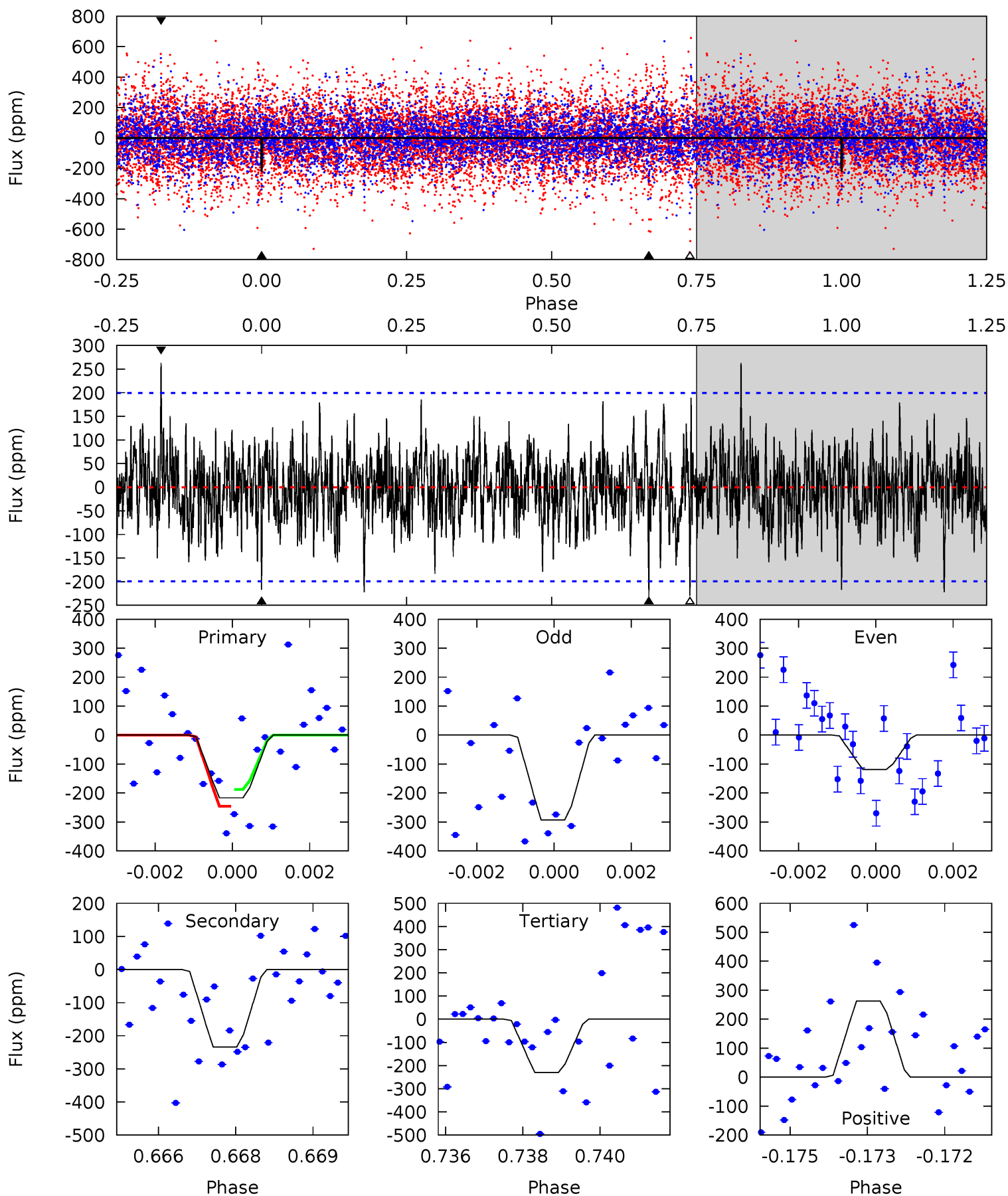
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
7.13	5.62	5.61	4.82	5.26	2.99	1.49	1.52	2.31	0.01	0.80	0.89	1.09	0.40	0.20



# Alt Model-Shift Uniqueness Test

005978154-07, P = 38.342009 Days, E = 125.488303 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
5.82	6.28	6.17	7.05	5.35	3.13	1.59	-0.35	-1.23	0.11	-0.77	2.34	0.94	0.53	0.79



### Stellar Parameters For KIC 005978154

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$6723^{+202}_{-223}$	$3.478^{+0.360}_{-0.090}$	$-0.160^{+0.300}_{-0.250}$	$4.134^{+0.412}_{-1.647}$	$1.872^{+0.171}_{-0.398}$	$0.037^{+0.107}_{-0.011}$
	+3%/-3%	+10%/-3%	+188%/-156%	+10%/-40%	+9%/-21%	+286%/-29%
Source	PHO1	FLK73	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 005978154-07 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-135 \pm 24$	$7.11^{+6.77}_{-4.50}$	$1572^{+97}_{-159}$	$5532^{+4213}_{-1302}$	$110^{+756}_{-82}$
Alt.	$-234 \pm 37$	$7.84^{+5.95}_{-4.94}$	$1589^{+85}_{-155}$	$6048^{+5323}_{-1386}$	$157^{+973}_{-108}$

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

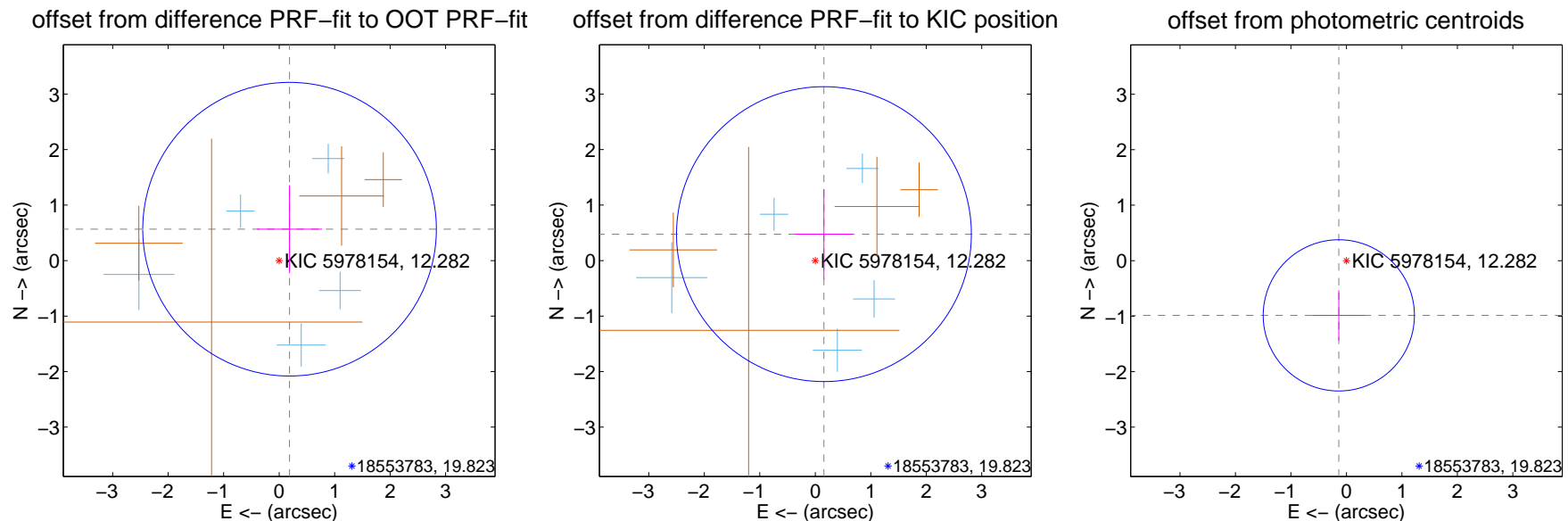
## DV Centroid Data

Supplemental centroid analysis for 005978154-07. Kepler magnitude: 12.28. Transit SNR 8.76

There are 5 quarters with good PRF difference image offsets

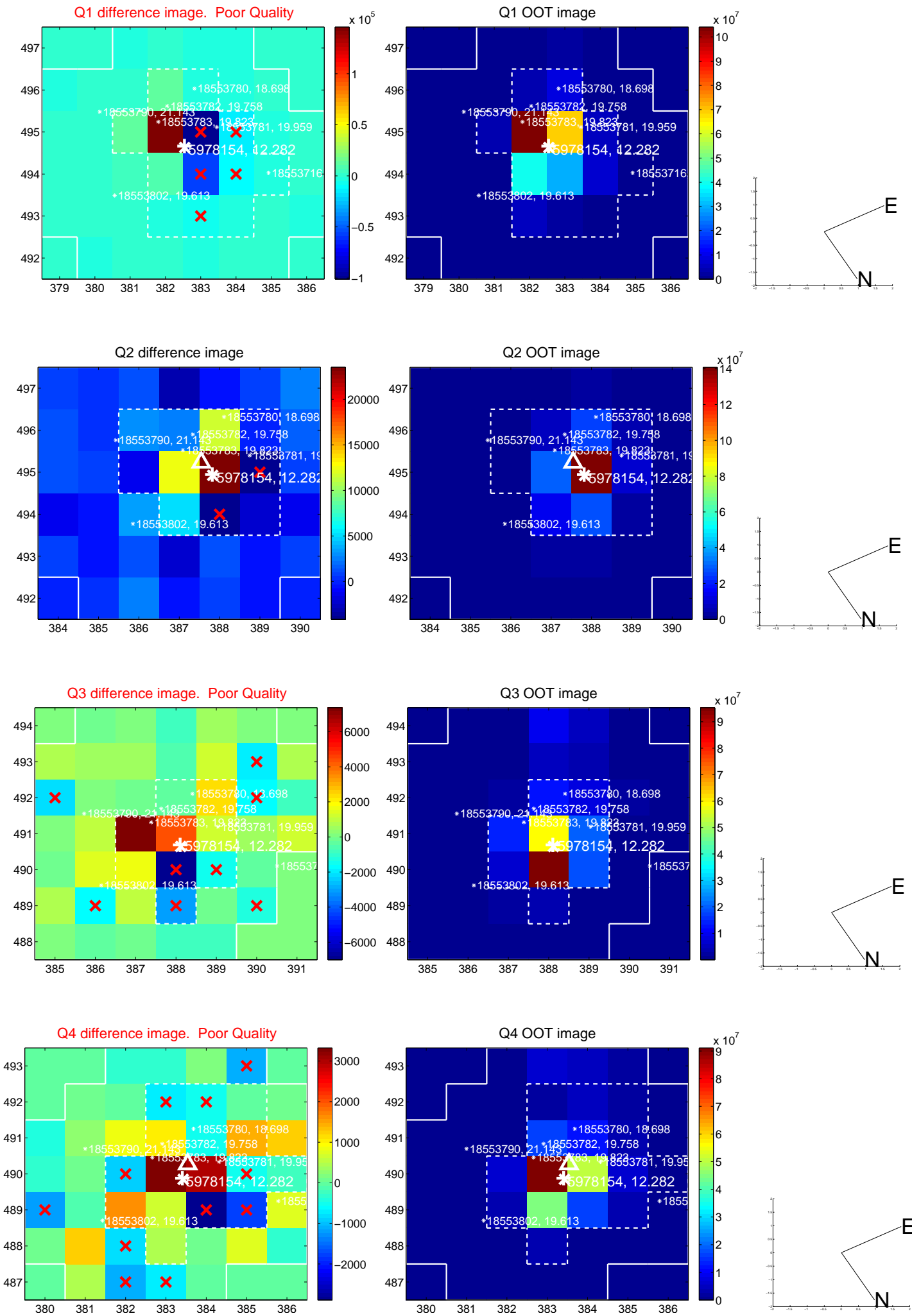
The direct PRF centroid is offset from the target star catalog position by about 0.19 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.596 \pm 0.882$	0.68	$-0.188 \pm 0.586$	$0.566 \pm 0.793$
PRF-fit source offset from KIC position	$0.502 \pm 0.886$	0.57	$-0.156 \pm 0.522$	$0.477 \pm 0.814$
photometric centroid source offset	$1.00 \pm 0.45$	2.19	$0.14 \pm 0.48$	$-0.99 \pm 0.45$

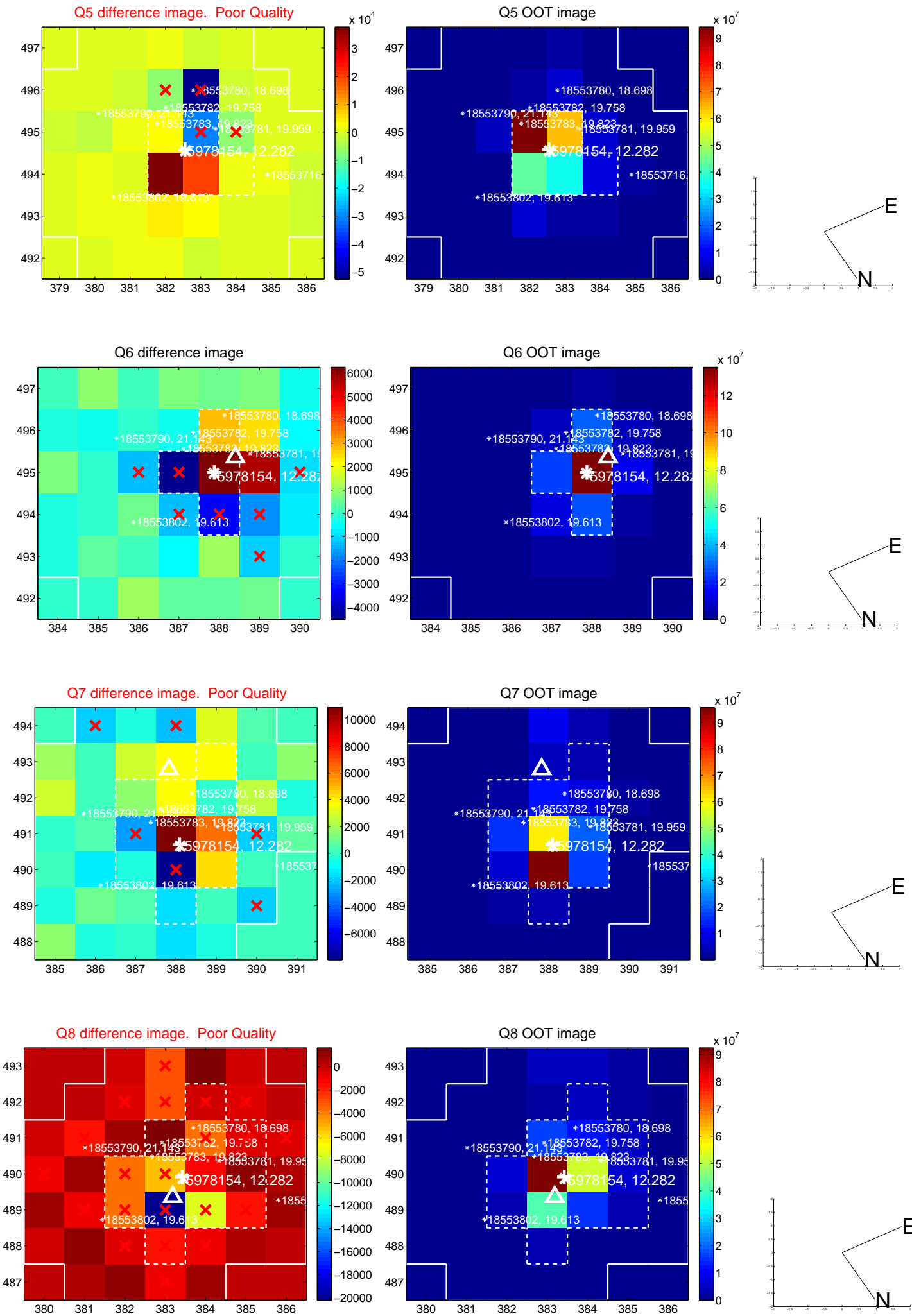


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets**; **Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

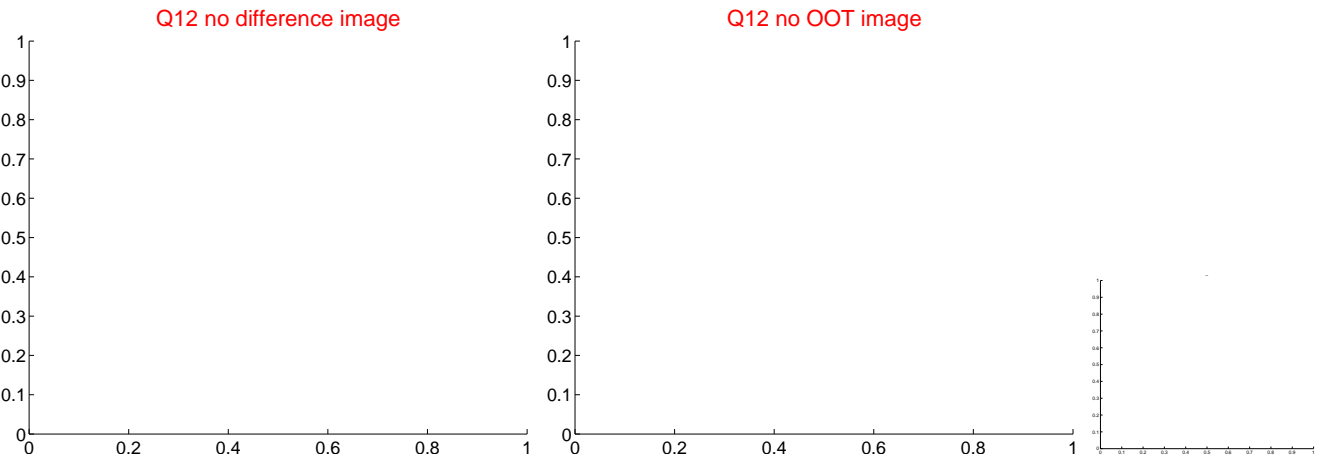
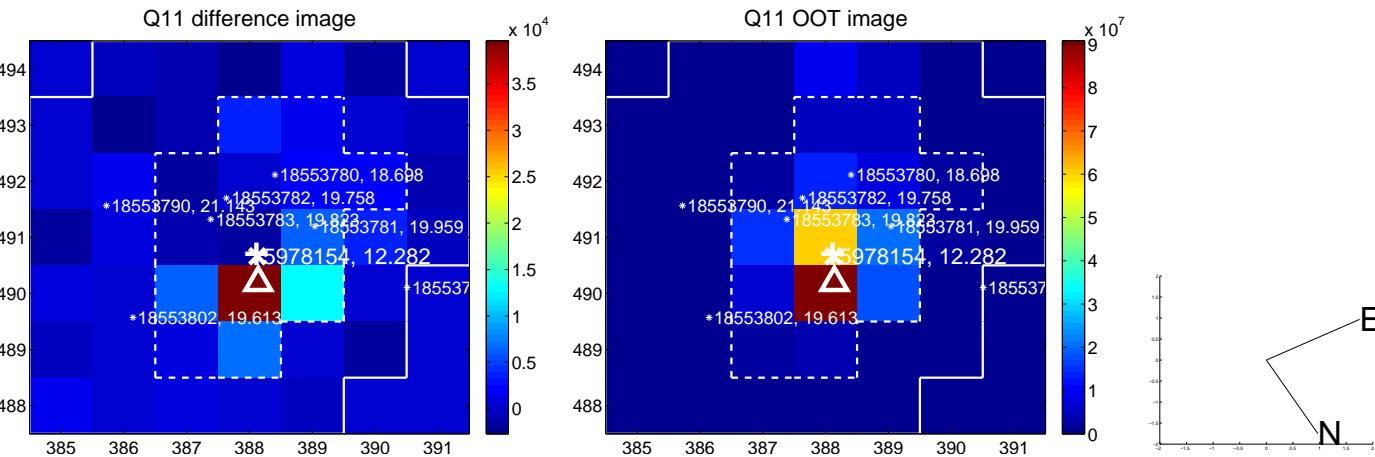
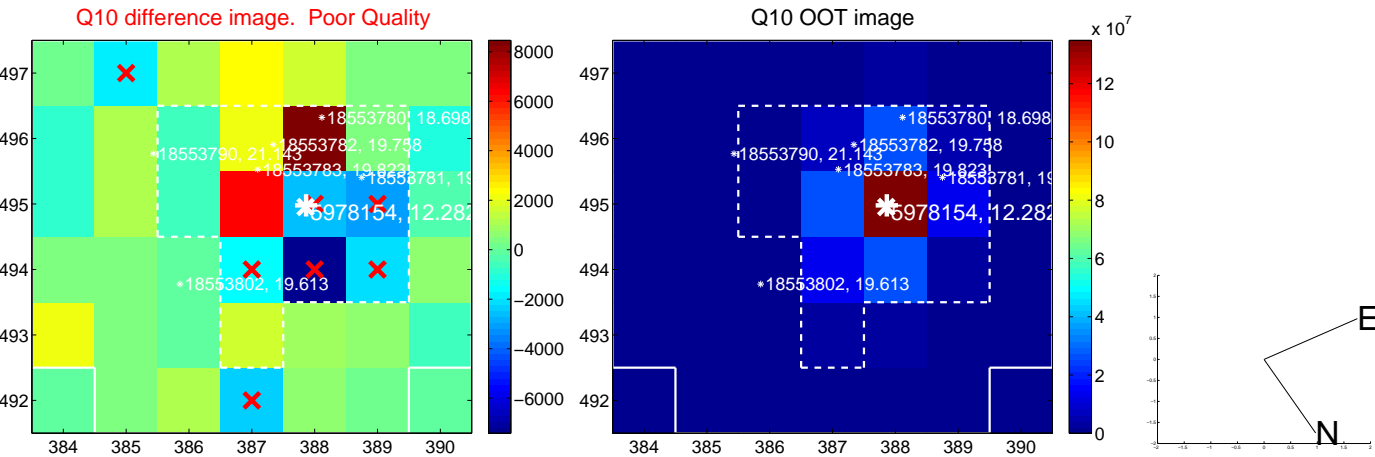
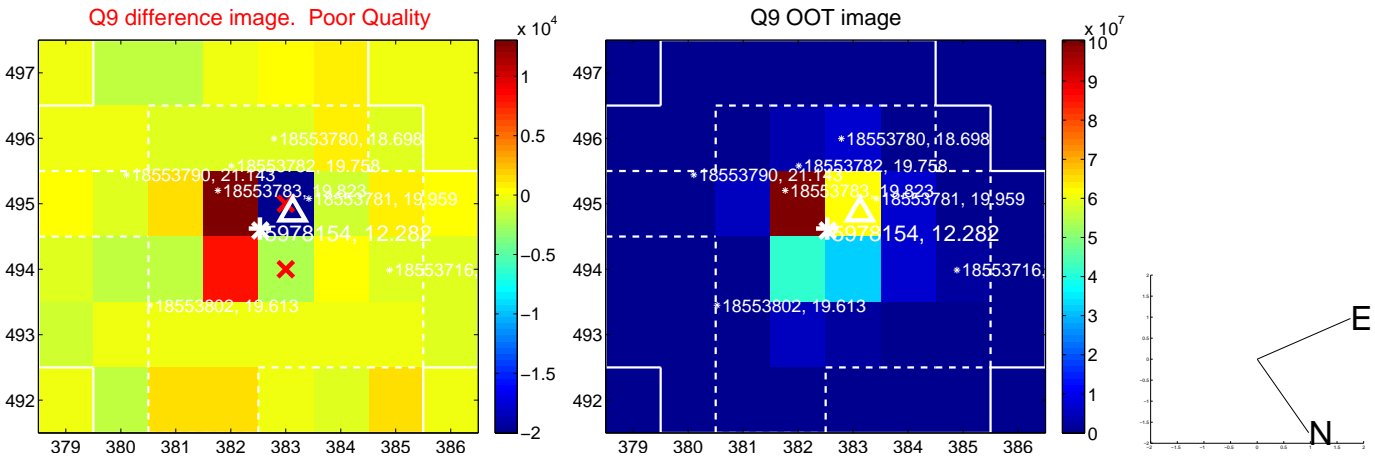
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

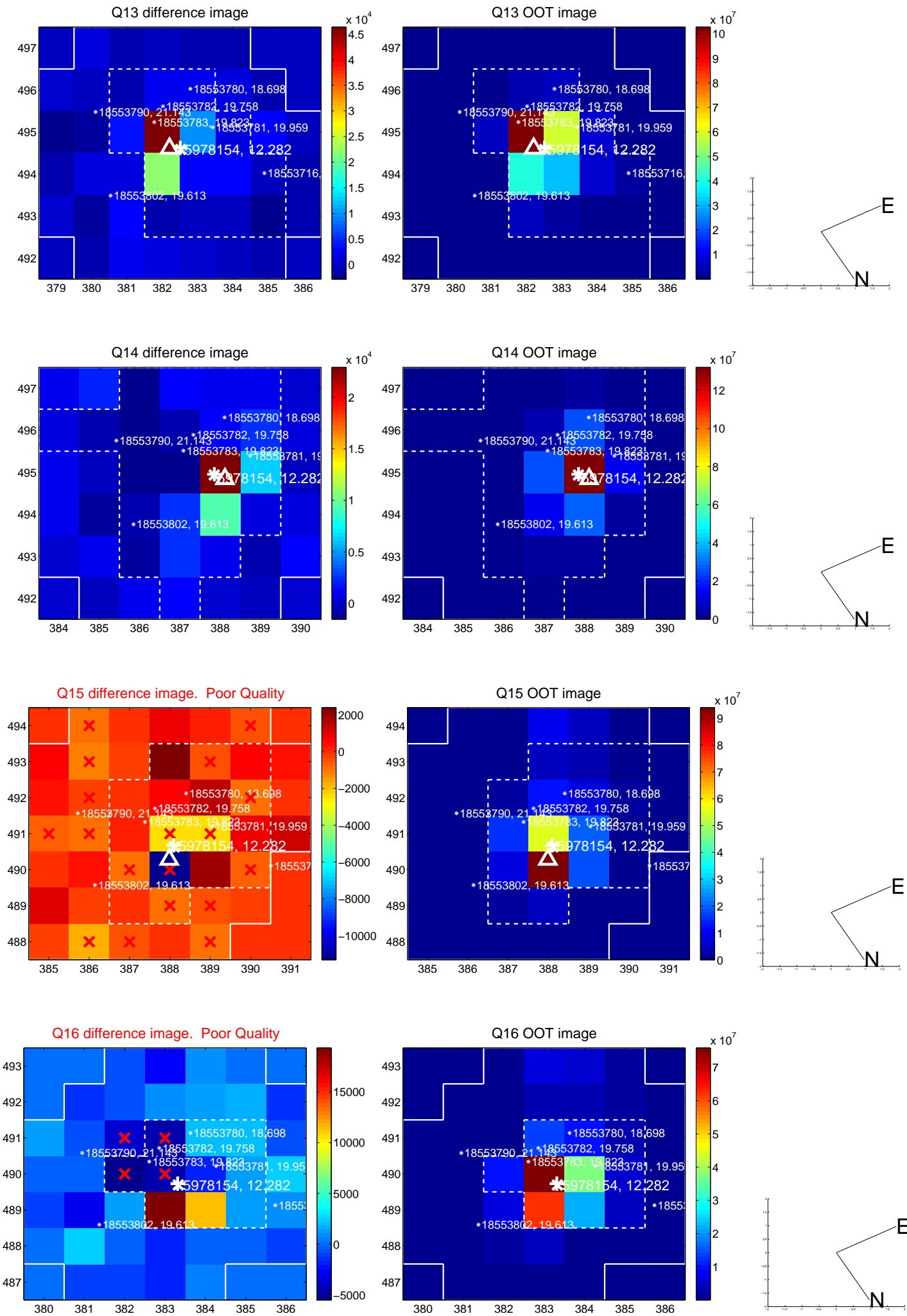


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

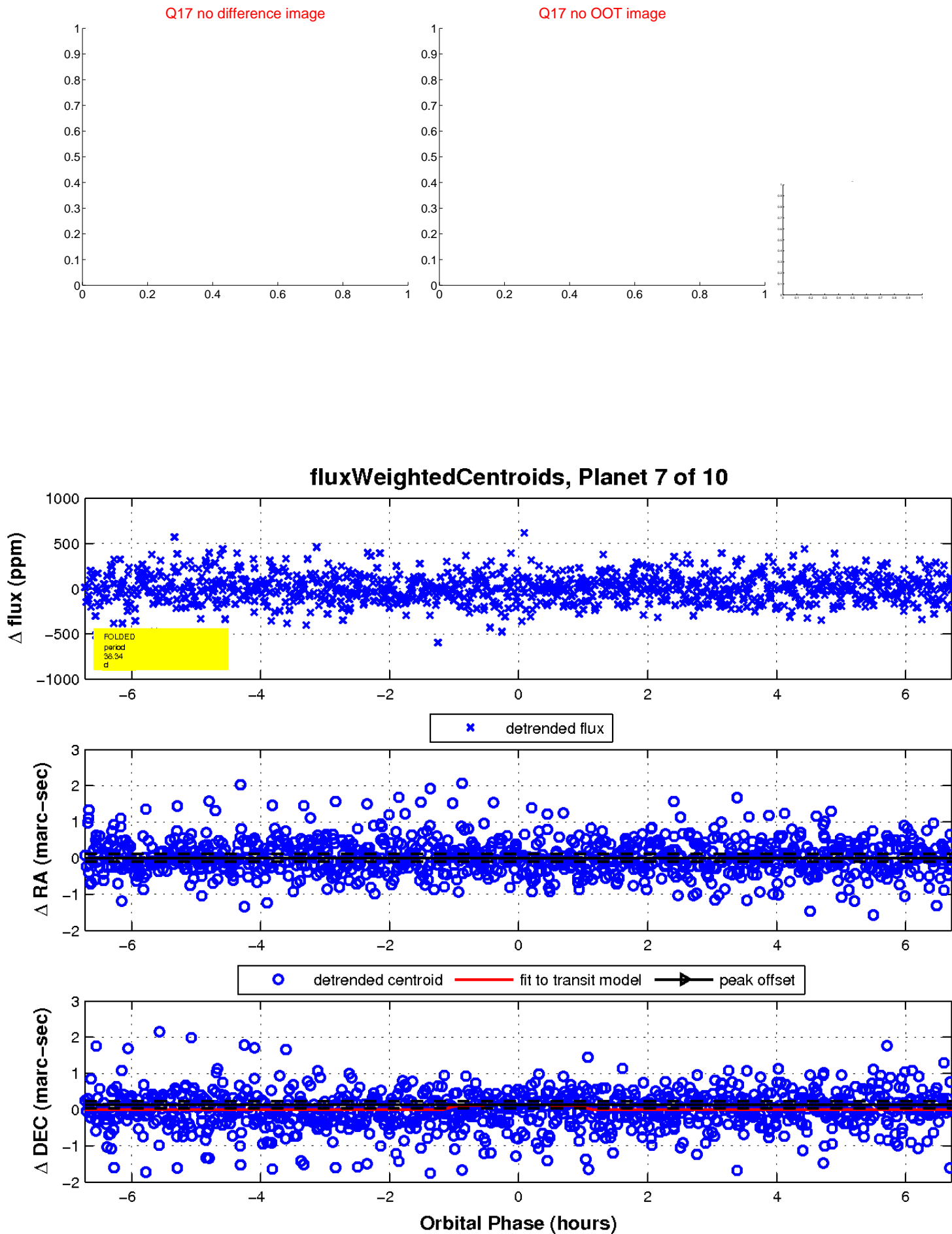




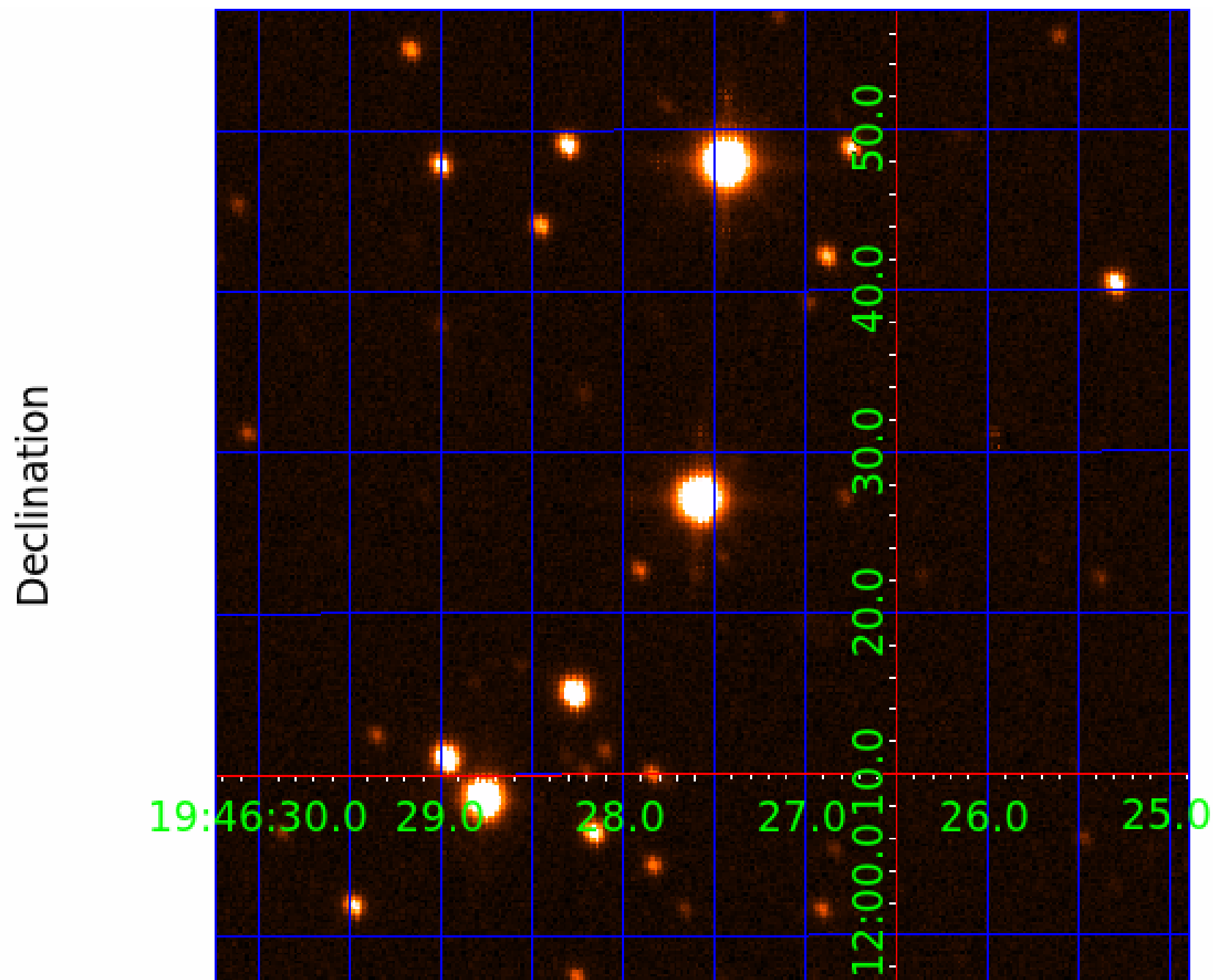
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



UKIRT Image



## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005978154-01	OBS	No	0.977344	132.332446	13.4	6.117	8.3	6.7	4.13	6723	1.53	55377.15
005978154-02	OBS	No	124.165564	182.998698	450.9	13.613	12.5	10.5	4.13	6723	9.87	86.71
005978154-03	OBS	No	137.679401	150.489095	291.5	6.419	9.2	10.5	4.13	6723	8.84	75.55
005978154-04	OBS	No	28.453613	148.852296	172.6	3.245	9.8	8.3	4.13	6723	6.38	618.32
005978154-05	OBS	No	33.910761	148.850724	154.0	5.416	8.9	9.0	4.13	6723	5.62	489.34
005978154-06	OBS	No	82.202844	181.537676	292.1	2.328	9.2	9.3	4.13	6723	8.25	150.27
005978154-07	OBS	No	38.342122	163.823144	205.4	2.241	9.0	8.8	4.13	6723	6.69	415.43
005978154-08	OBS	No	93.248607	221.792194	272.4	4.236	8.9	9.2	4.13	6723	7.75	127.02
005978154-09	OBS	No	43.449347	166.082590	271.7	2.358	9.1	8.7	4.13	6723	7.55	351.63
005978154-10	OBS	No	45.084056	162.646790	117.0	6.361	8.6	5.7	4.13	6723	5.05	334.73

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005978154-01	OBS	FP	0.00	1	0	0	0	SWEET_NTL—LPP_DV
005978154-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS
005978154-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
005978154-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
005978154-05	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—HALO_GHOST
005978154-06	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—HALO_GHOST
005978154-07	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
005978154-08	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
005978154-09	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
005978154-10	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT

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

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

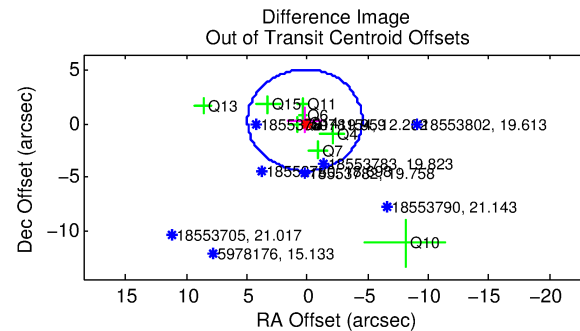
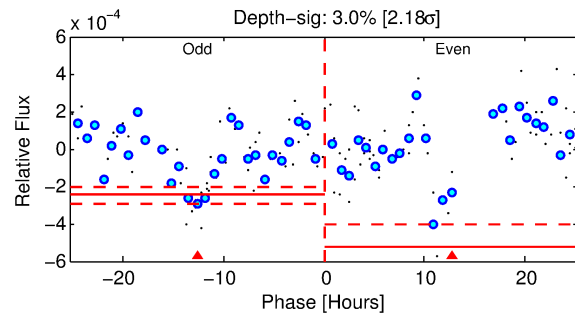
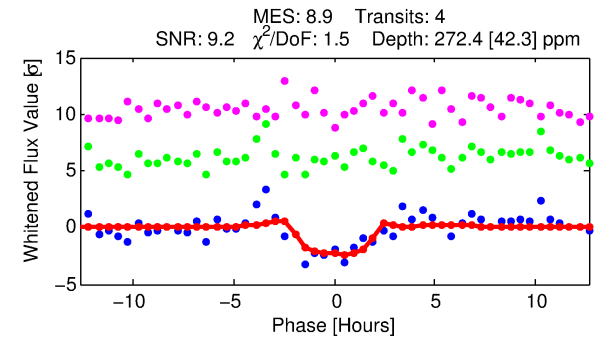
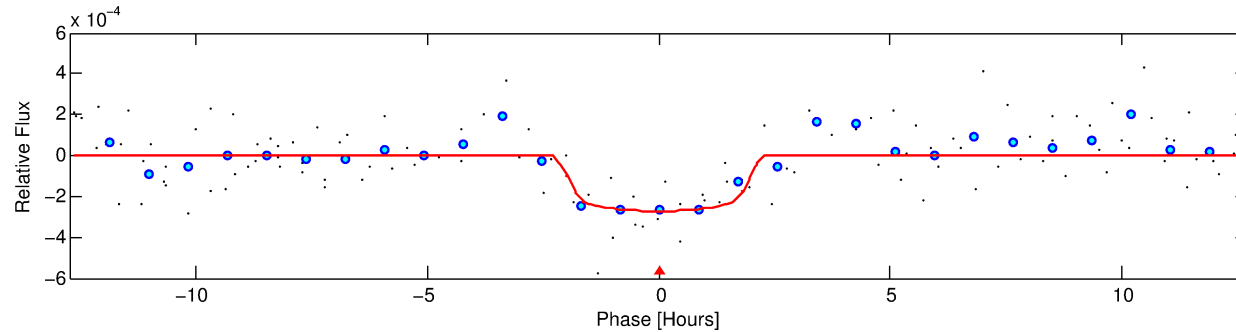
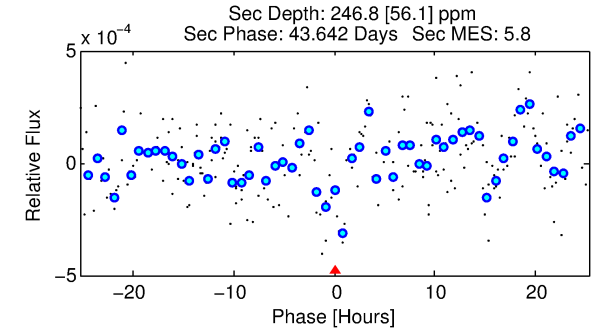
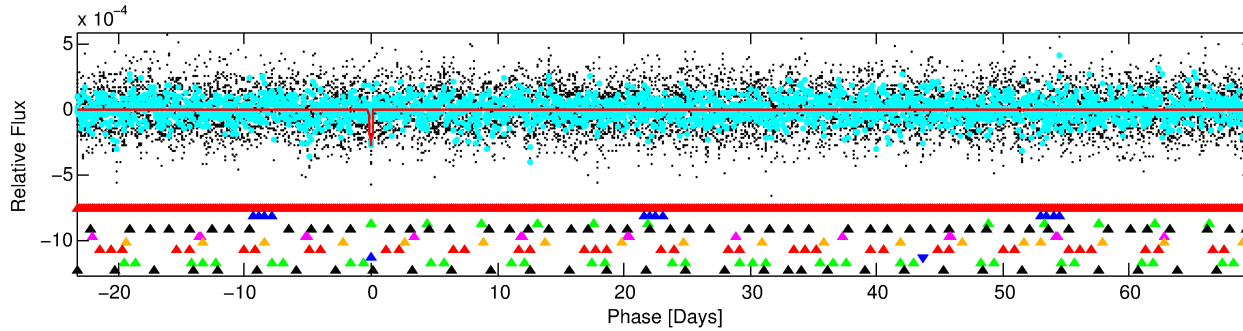
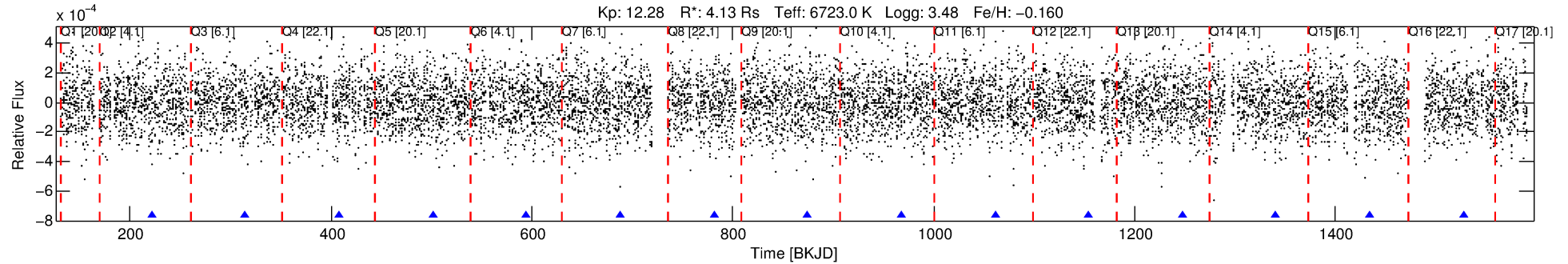
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 005978154-08

No Significant Match Found

# DV One-Page Summary

KIC: 5978154 Candidate: 8 of 10 Period: 93.249 d



## DV Fit Results:

Period = 93.24861 [0.00203] d  
Epoch = 221.7922 [0.0127] BKJD  
Rp/R\* = 0.0172 [0.0129]  
a/R\* = 90.77 [404.64]  
b = 0.86 [1.32]  
Seff = 127.02 [79.68]  
Teq = 856 [134] K  
Rp = 7.75 [6.60] Re  
a = 0.4963 [0.1902] AU  
Ag = 556.60 [913.61] [0.61σ]  
Teffp = 6429 [2456] K [2.27σ]

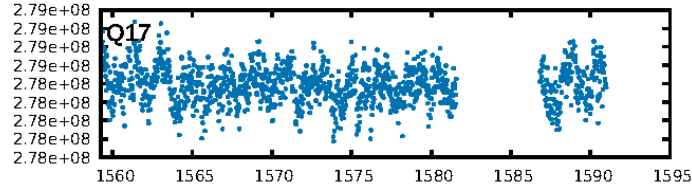
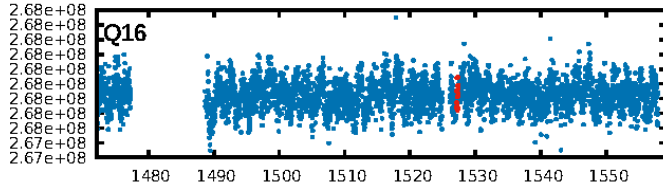
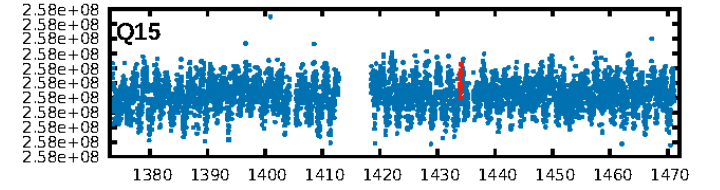
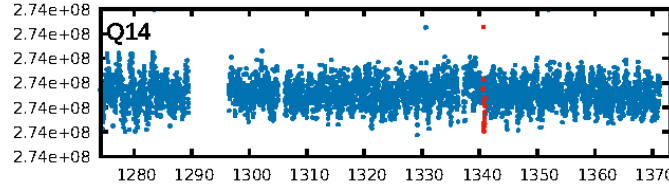
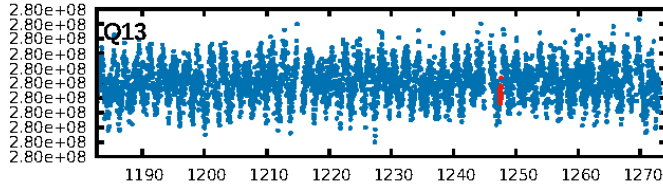
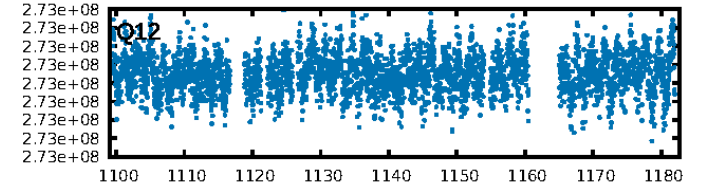
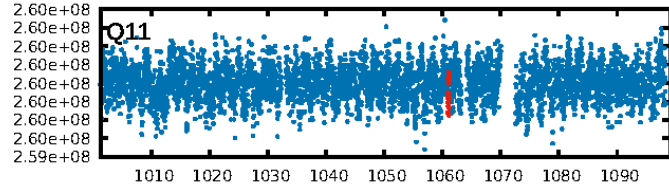
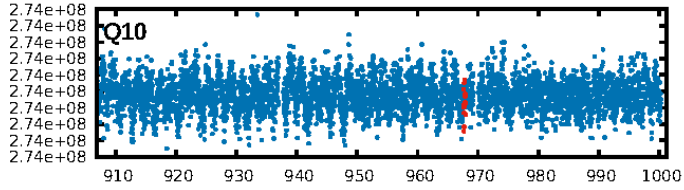
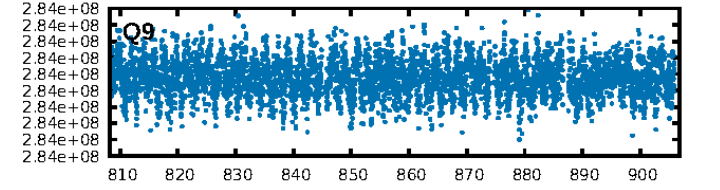
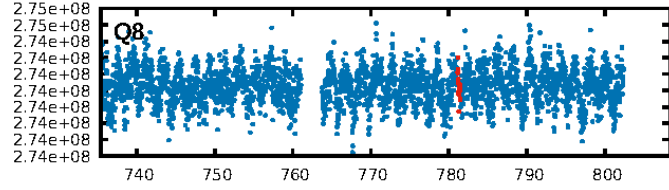
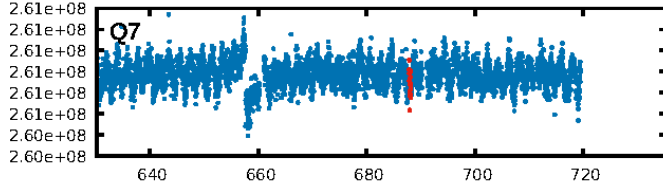
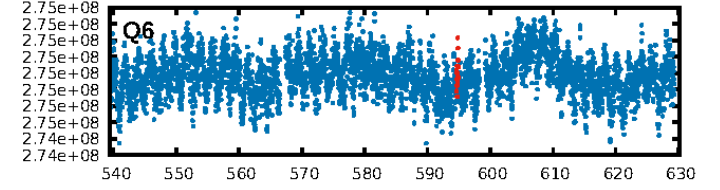
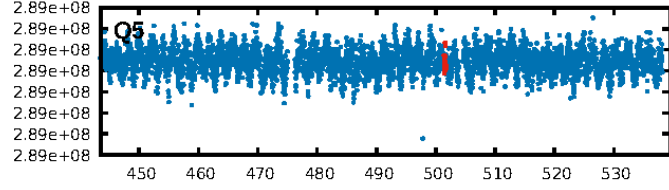
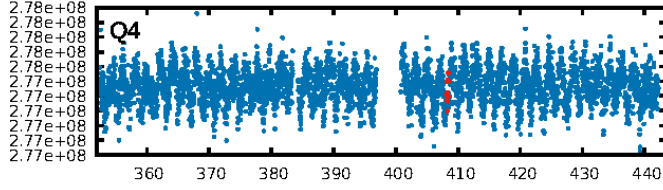
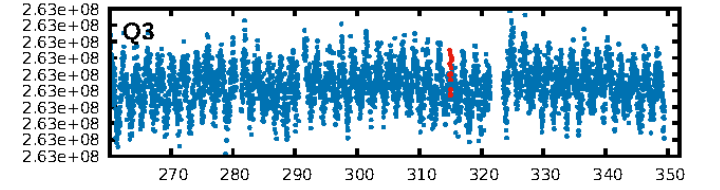
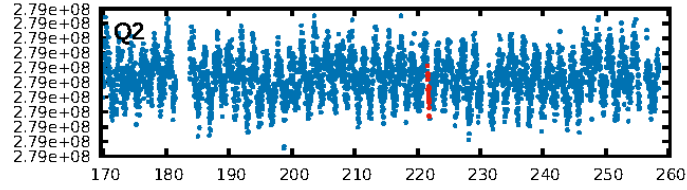
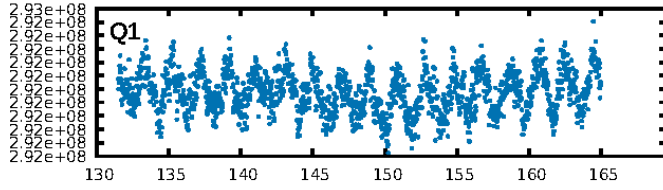
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [54.85σ]  
LongPeriod-sig: 100.0% [52.05σ]  
ModelChiSquare2-sig: 52.4%  
ModelChiSquareGof-sig: 99.7%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [4/4]  
GhostDiagnostic-chr: -1.862  
Centroid-sig: 92.8%  
Centroid-so: 0.305 arcsec [0.68σ]  
OotOffset-rm: 0.405 arcsec [0.26σ]  
KicOffset-rm: 0.356 arcsec [0.20σ]  
OotOffset-st: 3/3/2/1 [9]  
KicOffset-st: 3/3/2/1 [9]  
DiffImageQuality-fgm: 0.44 [4/9]  
DiffImageOverlap-fno: 0.00 [0/12]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 03-Feb-2016 05:54:19 Z

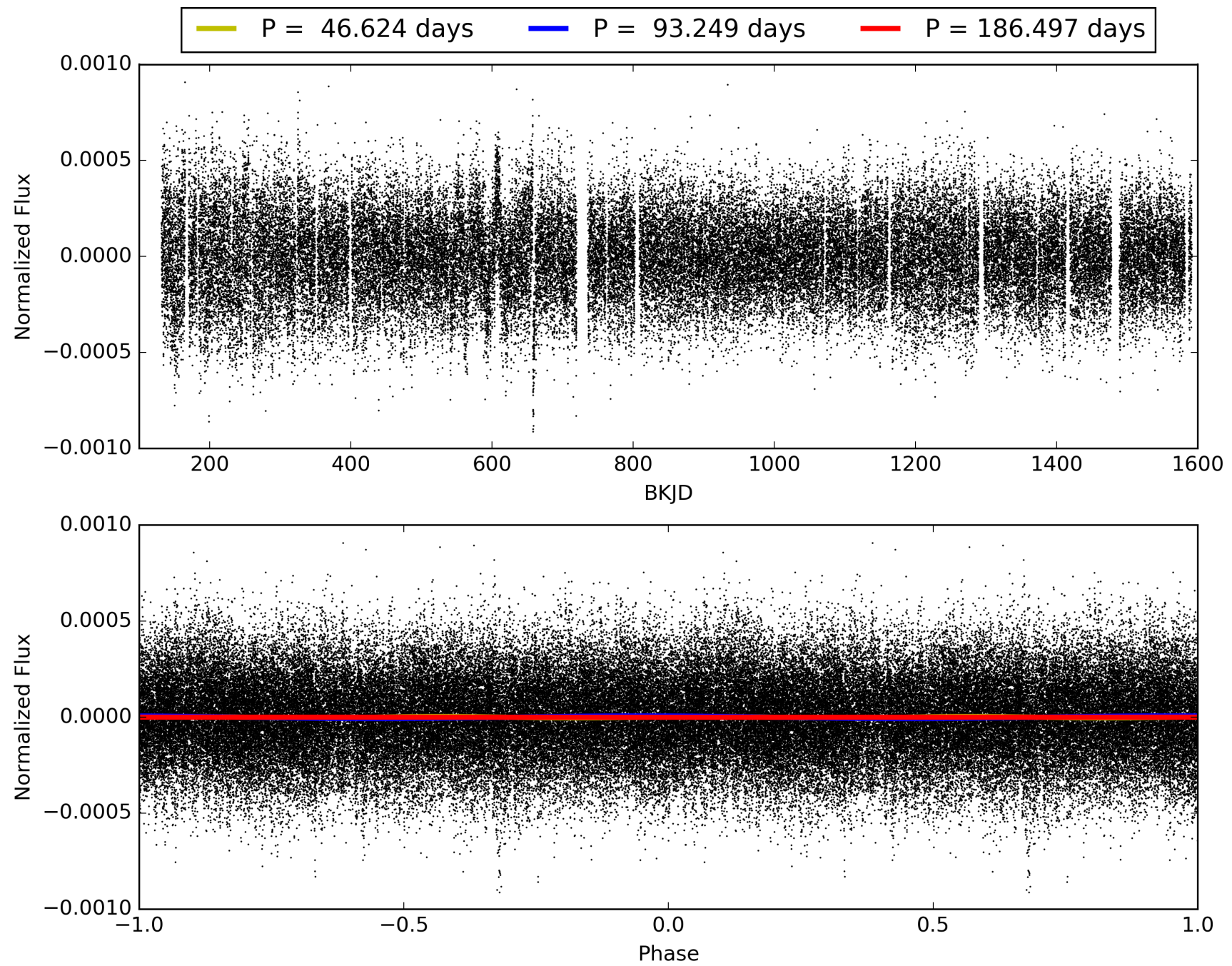
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 005978154-08, PDC Light Curves





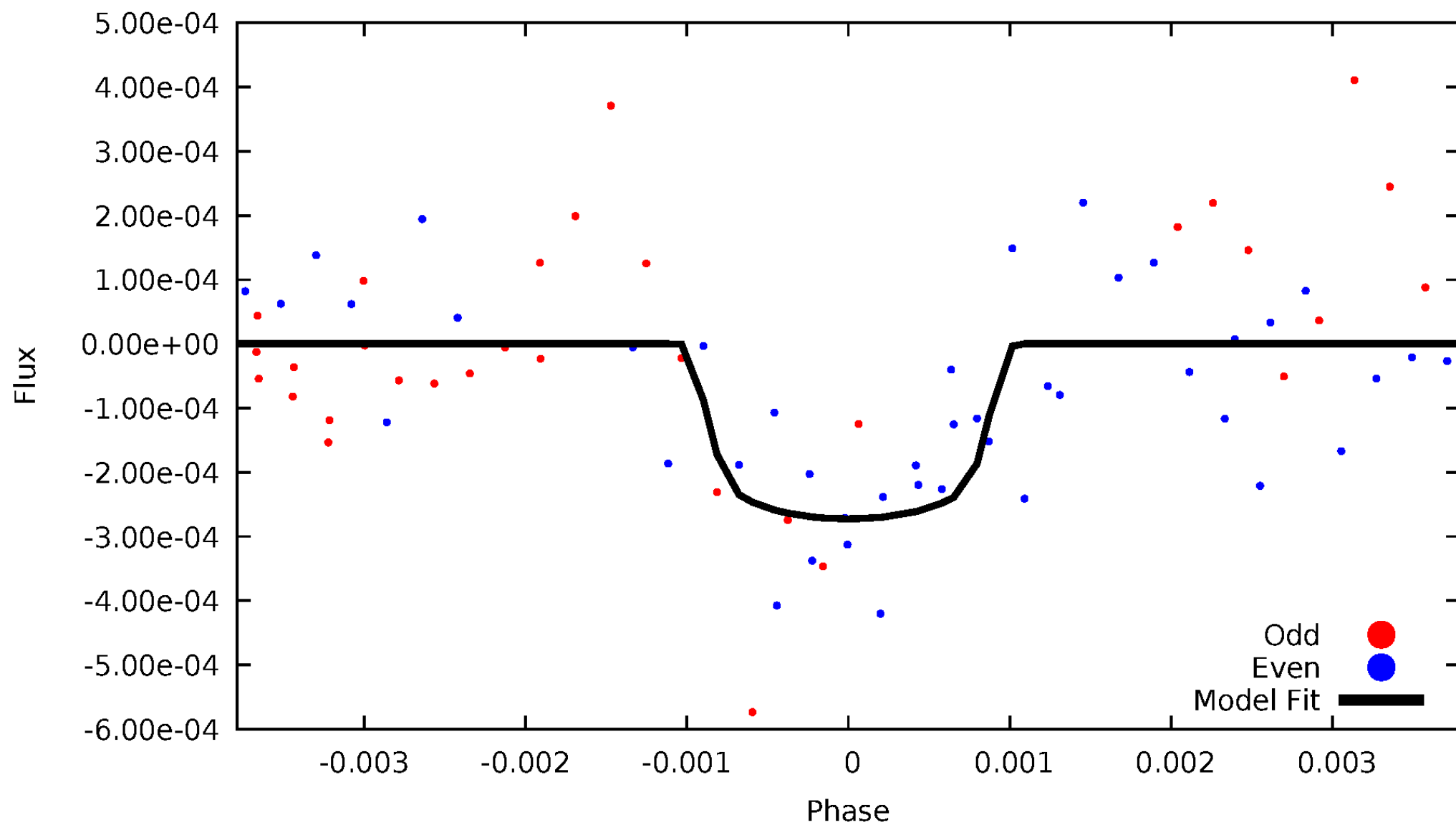
TCE 005978154-08





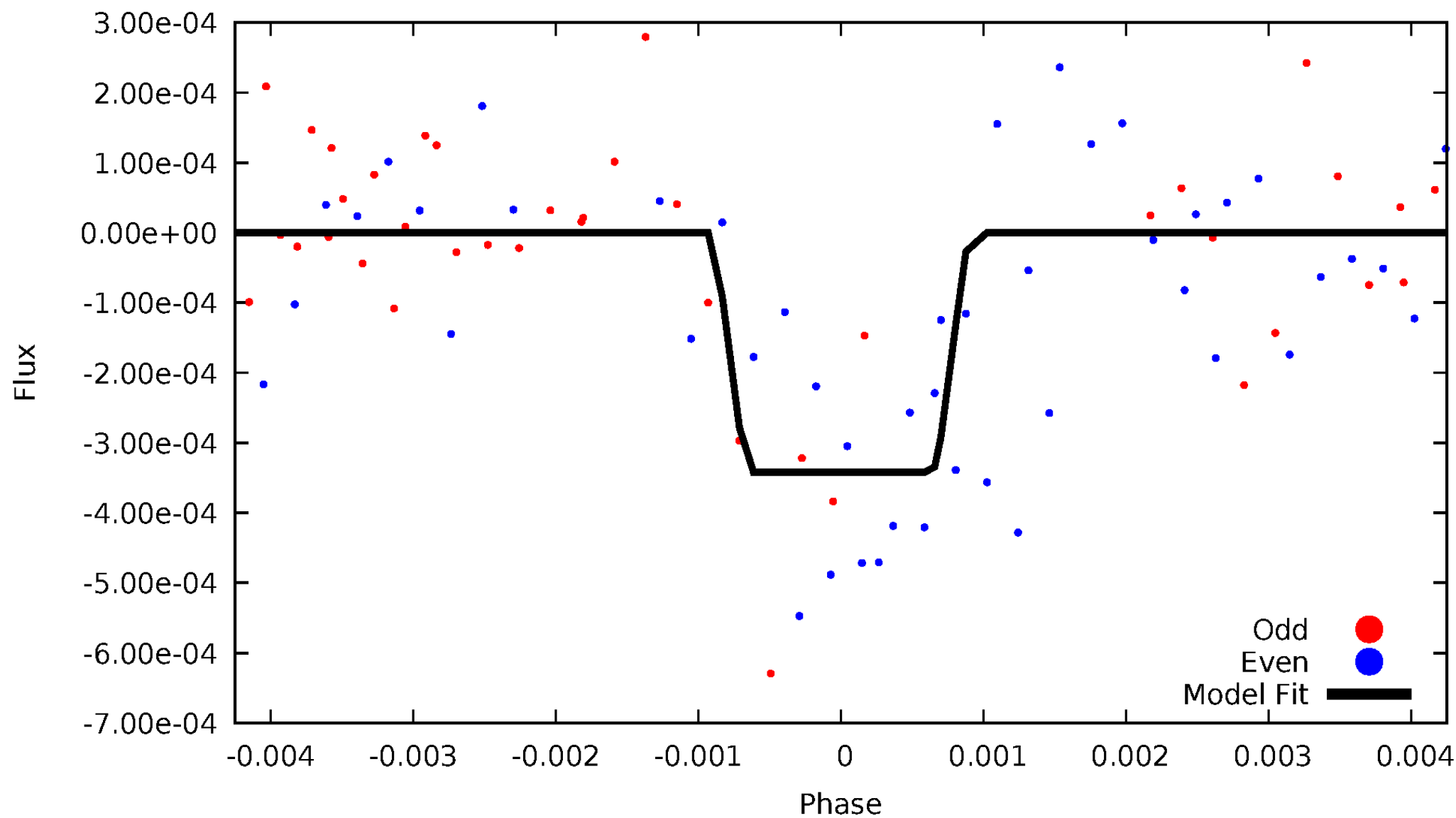
# DV Odd/Even

TCE 005978154-08



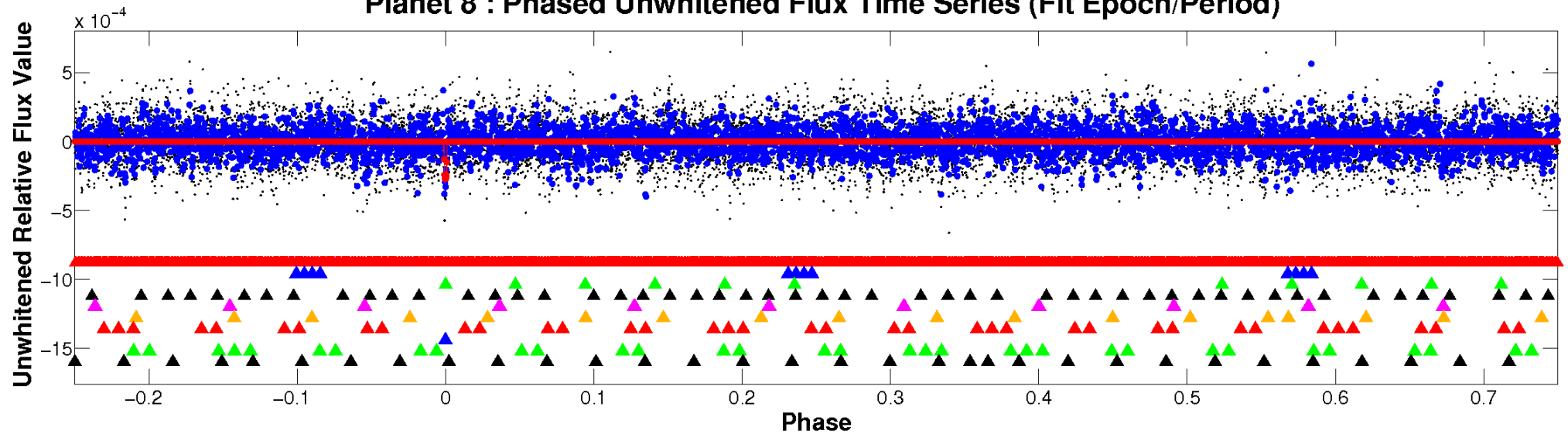
# ALT Odd/Even

TCE 005978154-08

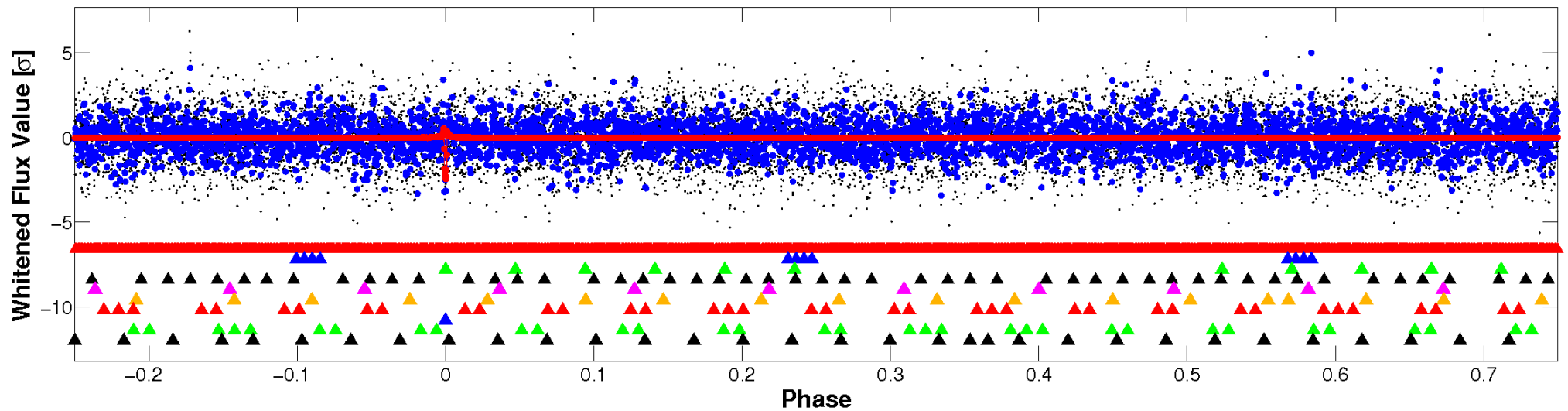


# Non-Whitened Vs. Whitened Light Curve

## Planet 8 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

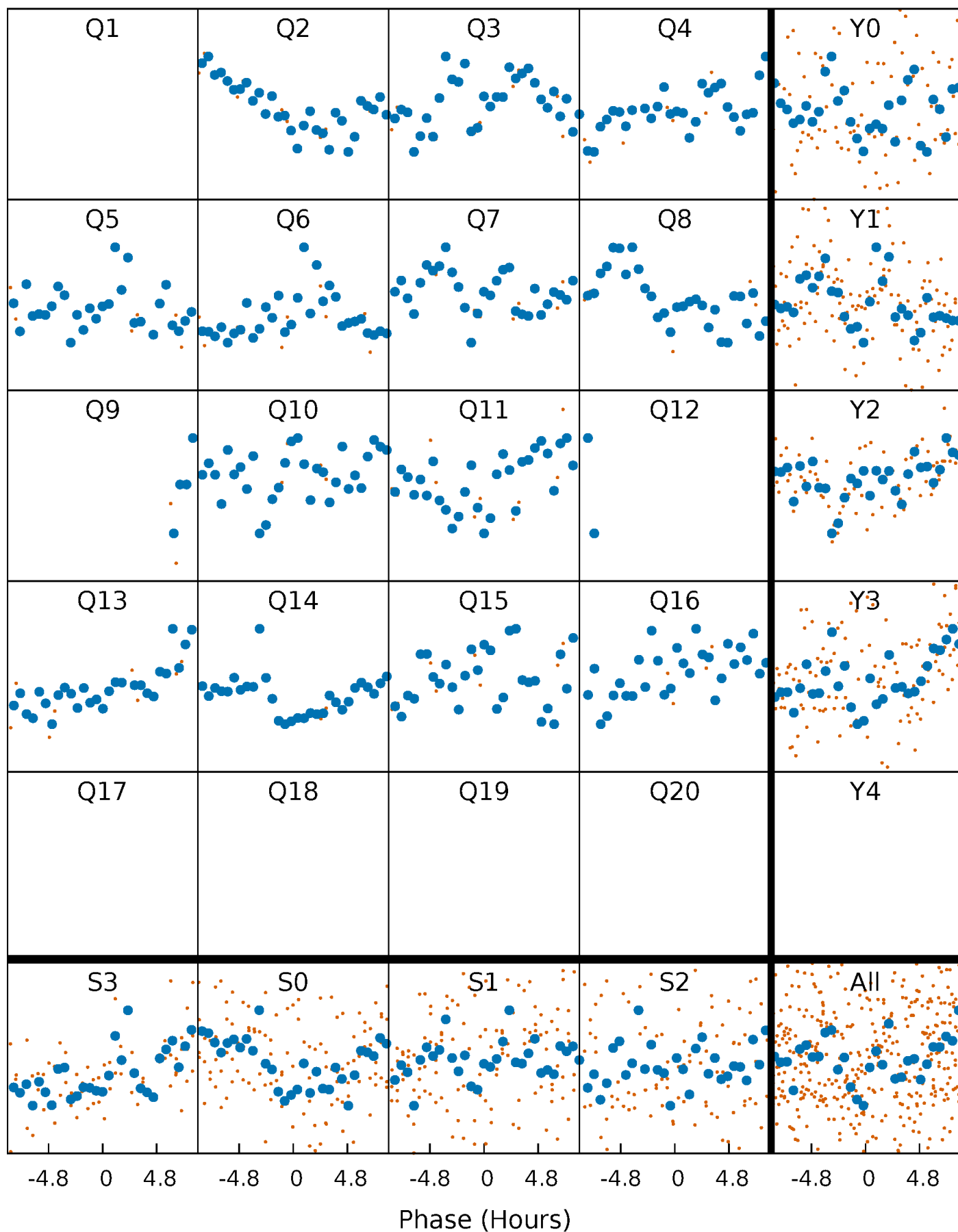


## Planet 8 : Phased Whitened Flux Time Series (Fit Epoch/Period)



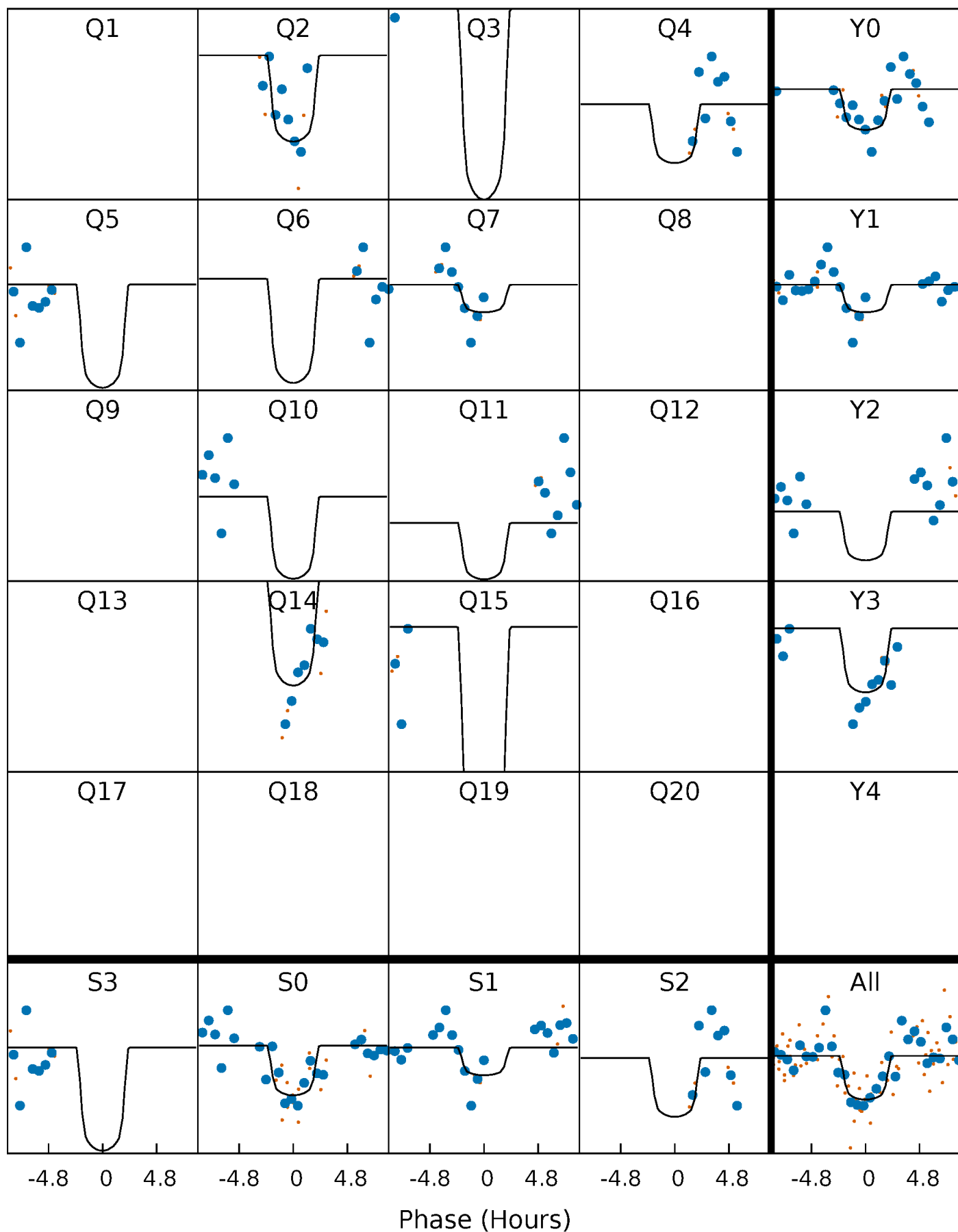
# PDC Quarter-Phased Transit Curves

TCE 005978154-08 P= 93.248607 Days  $T_0=221.792194$  (BKJD)



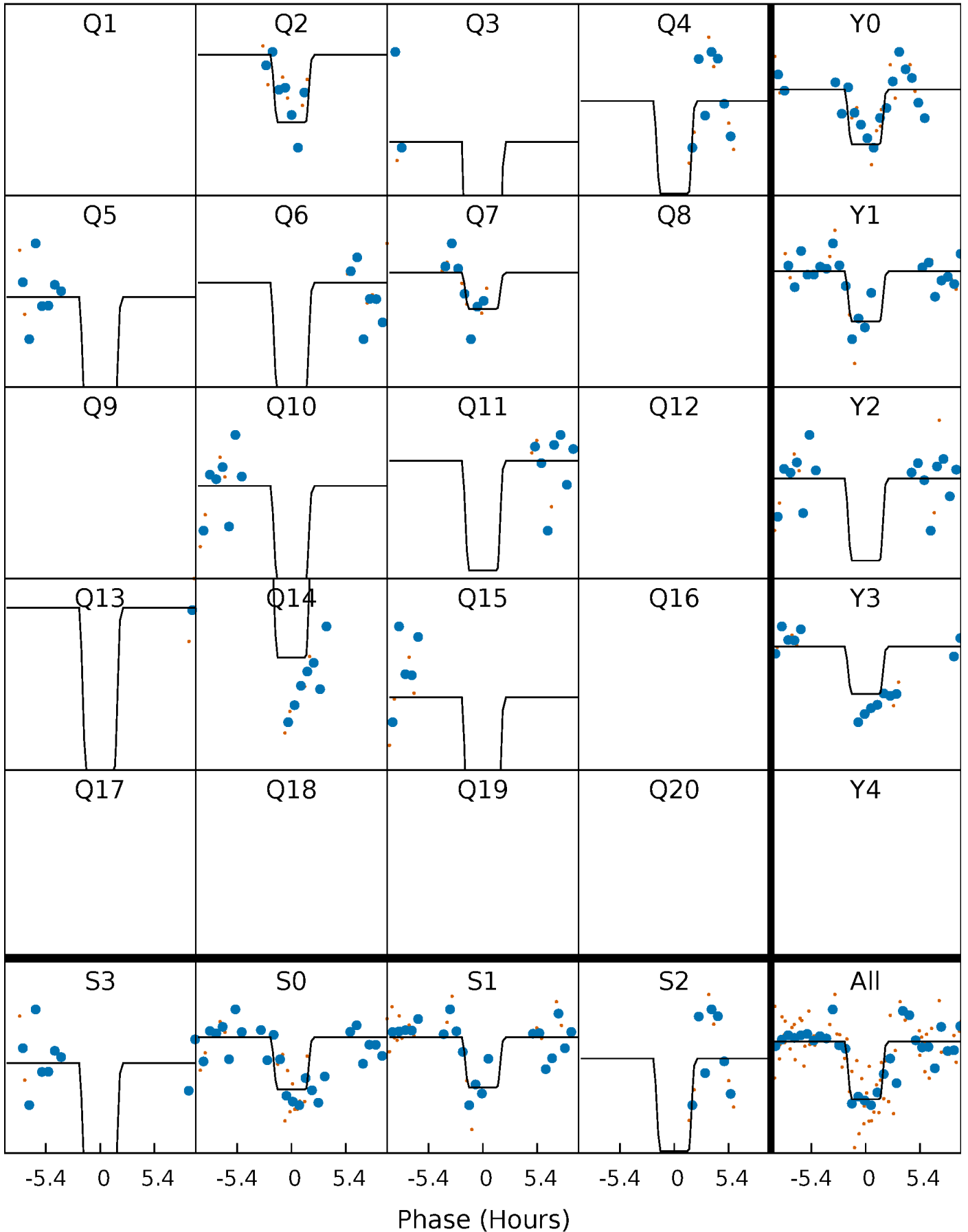
# DV Quarter-Phased Transit Curves

TCE 005978154-08 P= 93.248607 Days  $T_0=221.792194$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

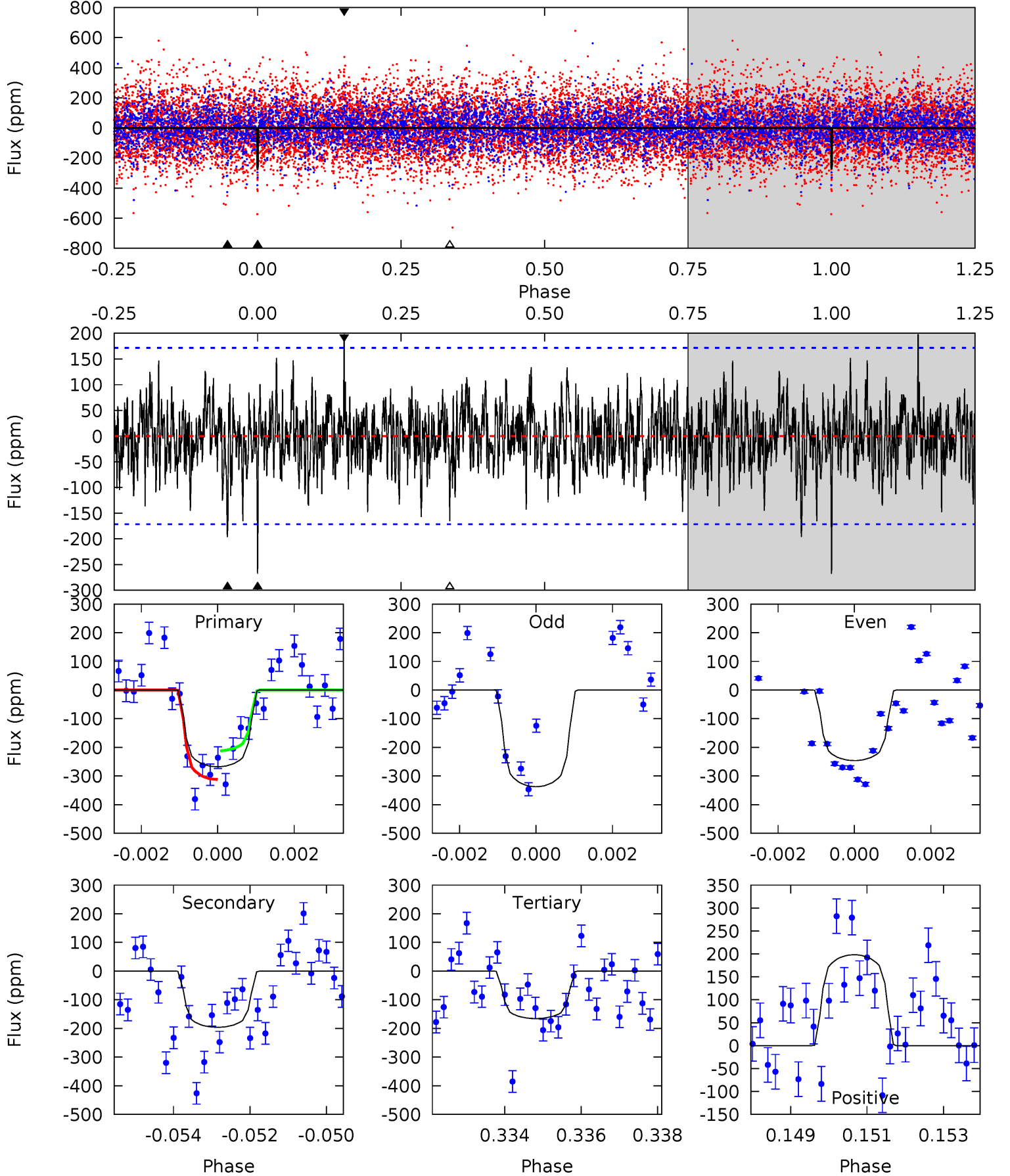
TCE 005978154-08 P= 93.247931 Days  $T_0=221.786086$  (BKJD)



# DV Model-Shift Uniqueness Test

005978154-08, P = 93.248607 Days, E = 128.543587 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
8.32	6.09	5.15	6.16	5.33	3.09	1.51	3.18	2.16	0.95	-0.06	1.19	1.04	0.43	1.55

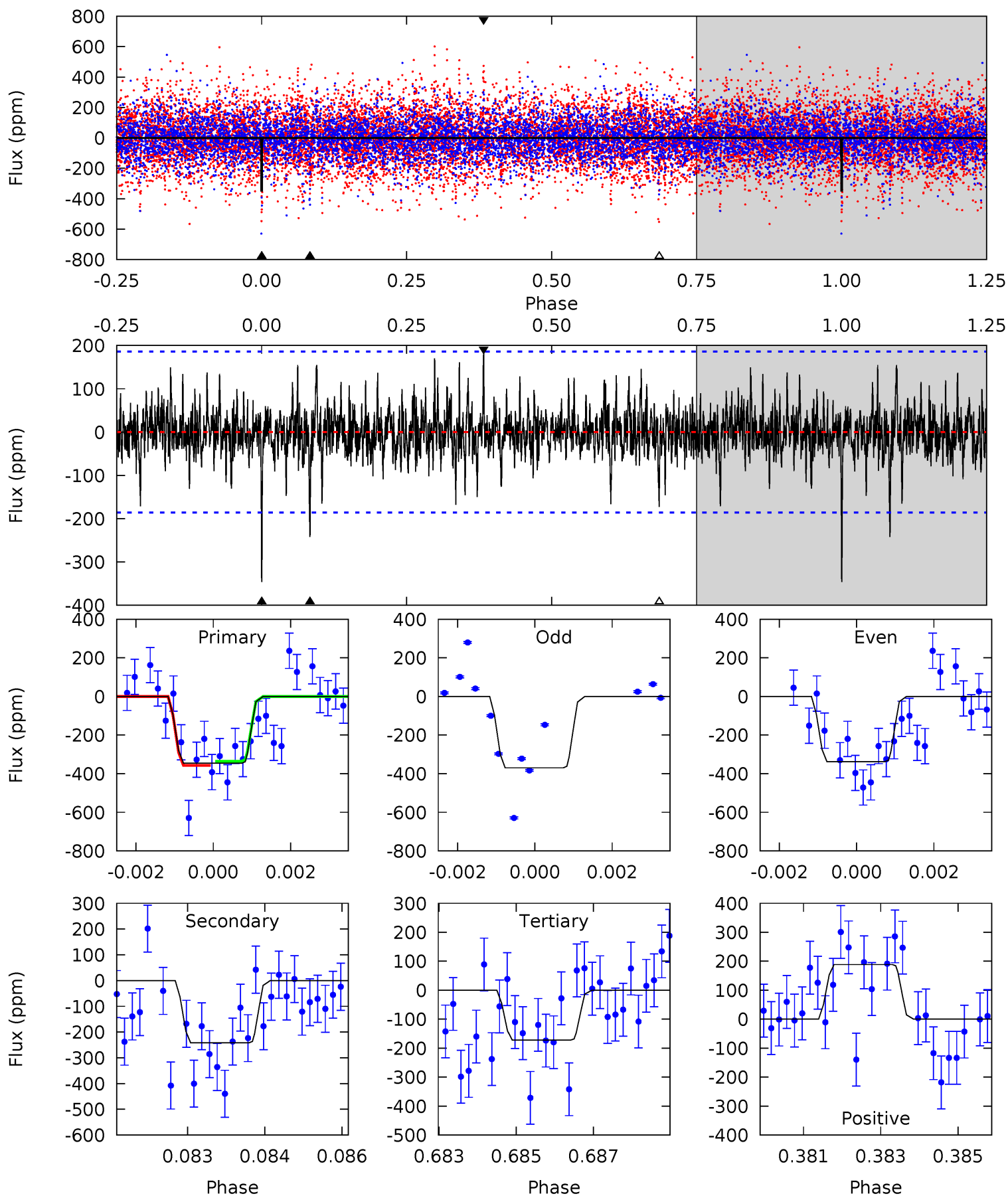




# Alt Model-Shift Uniqueness Test

005978154-08, P = 93.247931 Days, E = 128.538155 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
9.99	6.99	4.97	5.45	5.37	3.16	1.28	5.02	4.54	2.02	1.54	0.39	1.09	0.35	0.32



### Stellar Parameters For KIC 005978154

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$6723^{+202}_{-223}$	$3.478^{+0.360}_{-0.090}$	$-0.160^{+0.300}_{-0.250}$	$4.134^{+0.412}_{-1.647}$	$1.872^{+0.171}_{-0.398}$	$0.037^{+0.107}_{-0.011}$
	+3%/-3%	+10%/-3%	+188%/-156%	+10%/-40%	+9%/-21%	+286%/-29%
Source	PHO1	FLK73	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 005978154-08 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-196 \pm 32$	$7.53^{+5.45}_{-4.04}$	$1176^{+70}_{-100}$	$5831^{+3510}_{-1145}$	$448^{+1844}_{-292}$
Alt.	$-242 \pm 35$	$7.63^{+5.32}_{-4.34}$	$1175^{+64}_{-110}$	$6117^{+3983}_{-1261}$	$548^{+2240}_{-363}$

$T_{max}$  = 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

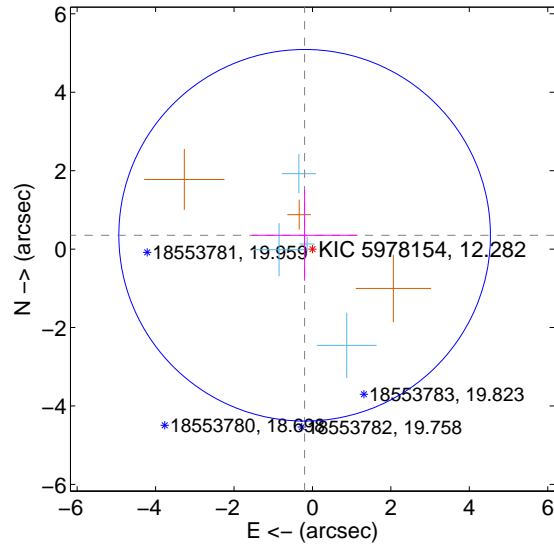
Supplemental centroid analysis for 005978154-08. Kepler magnitude: 12.28. Transit SNR 9.20

There are 4 quarters with good PRF difference image offsets

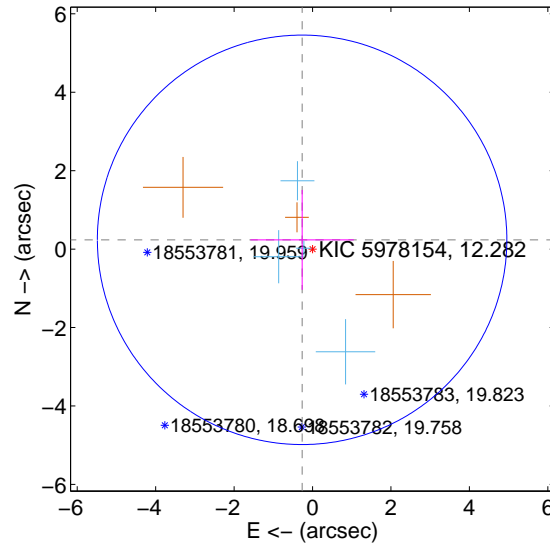
The direct PRF centroid is offset from the target star catalog position by about 0.20 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.405 \pm 1.579$	0.26	$0.199 \pm 1.346$	$0.353 \pm 1.159$
PRF-fit source offset from KIC position	$0.356 \pm 1.740$	0.20	$0.266 \pm 1.319$	$0.236 \pm 1.273$
photometric centroid source offset	$0.30 \pm 0.45$	0.68	$0.14 \pm 0.46$	$-0.27 \pm 0.44$

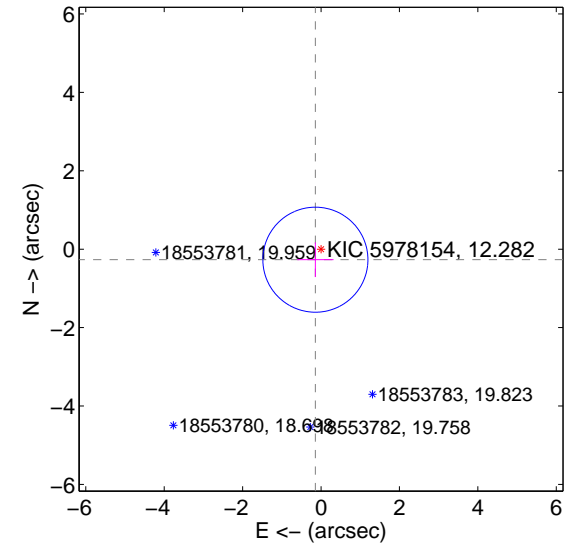
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

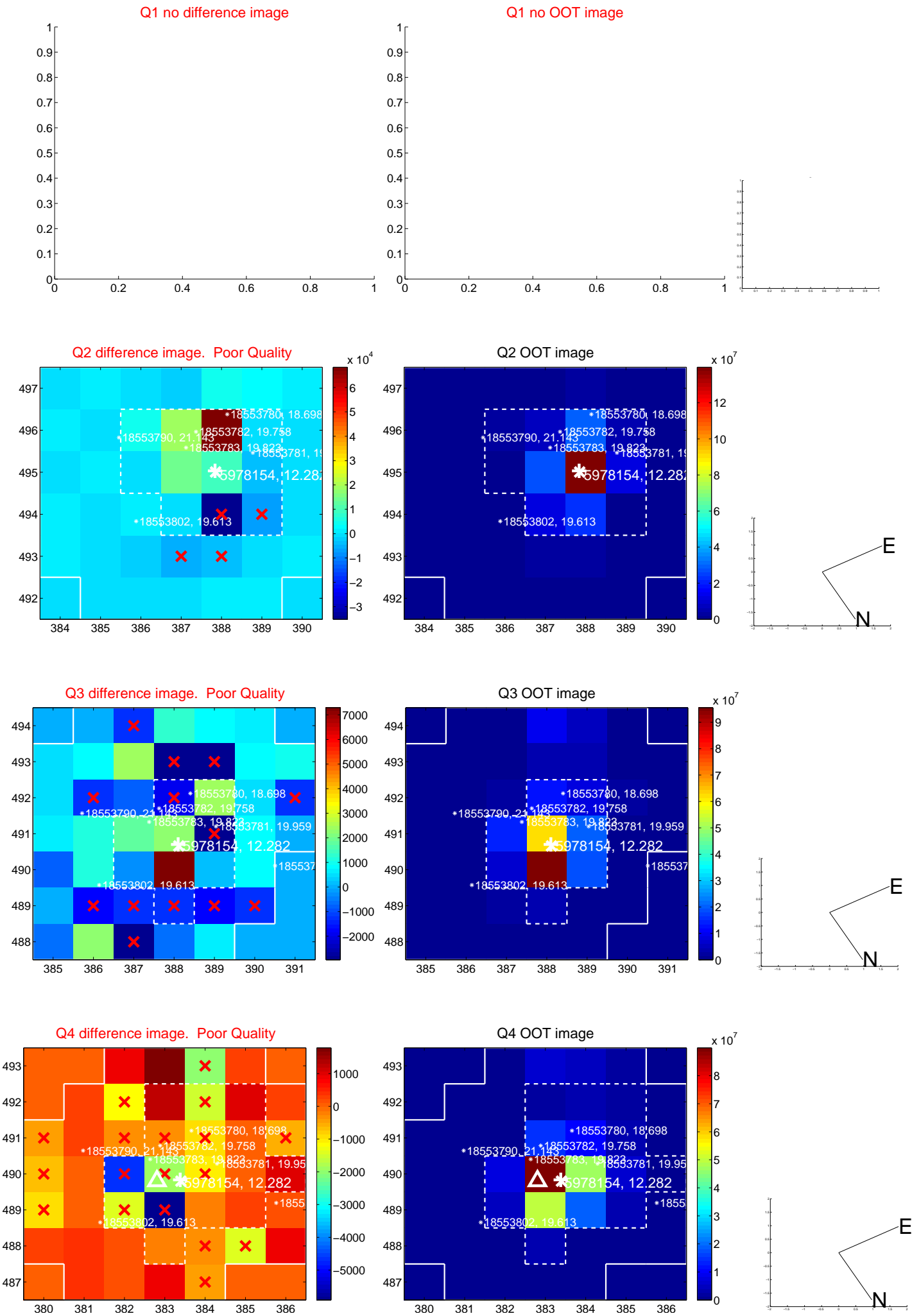


offset from photometric centroids

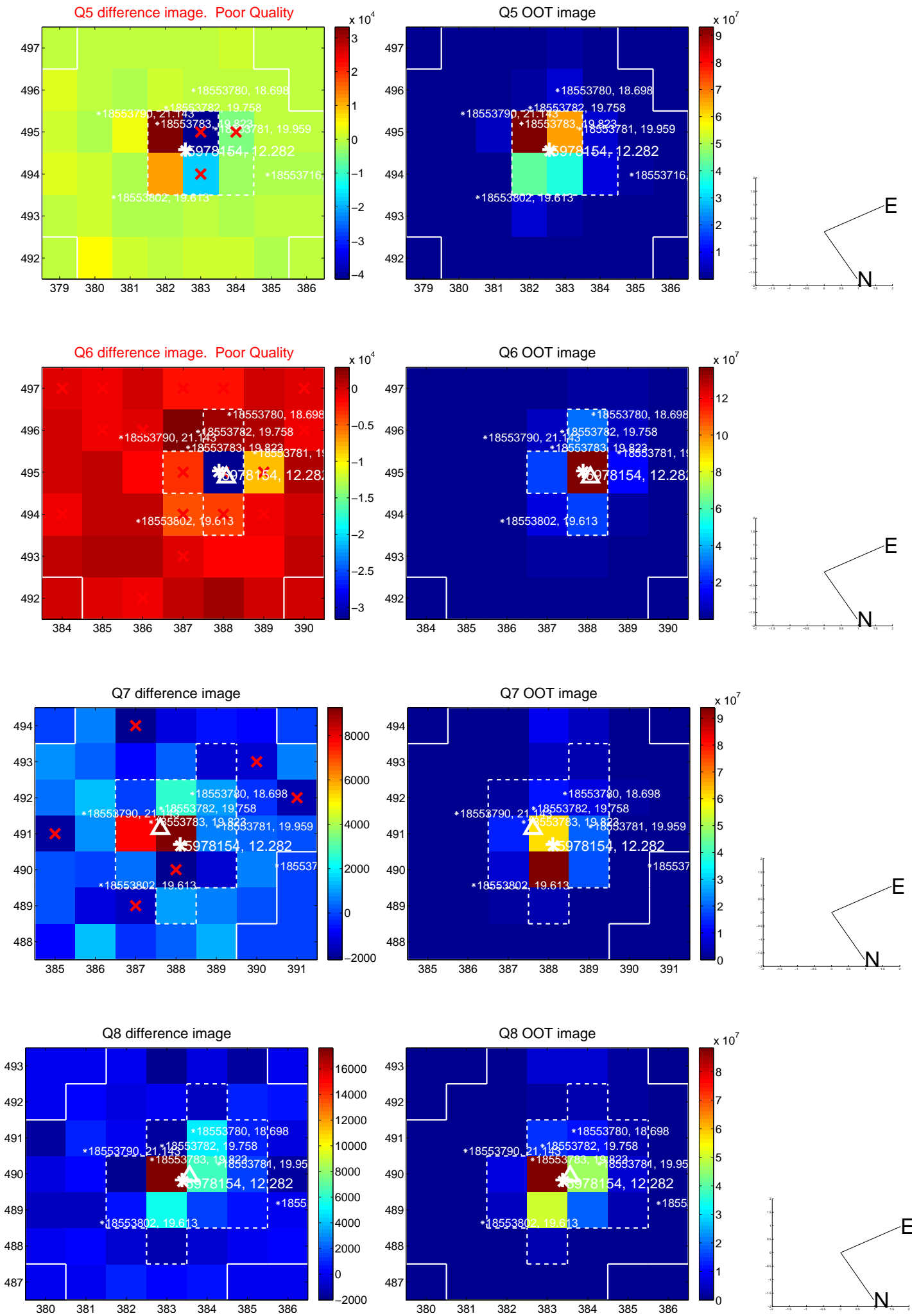


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

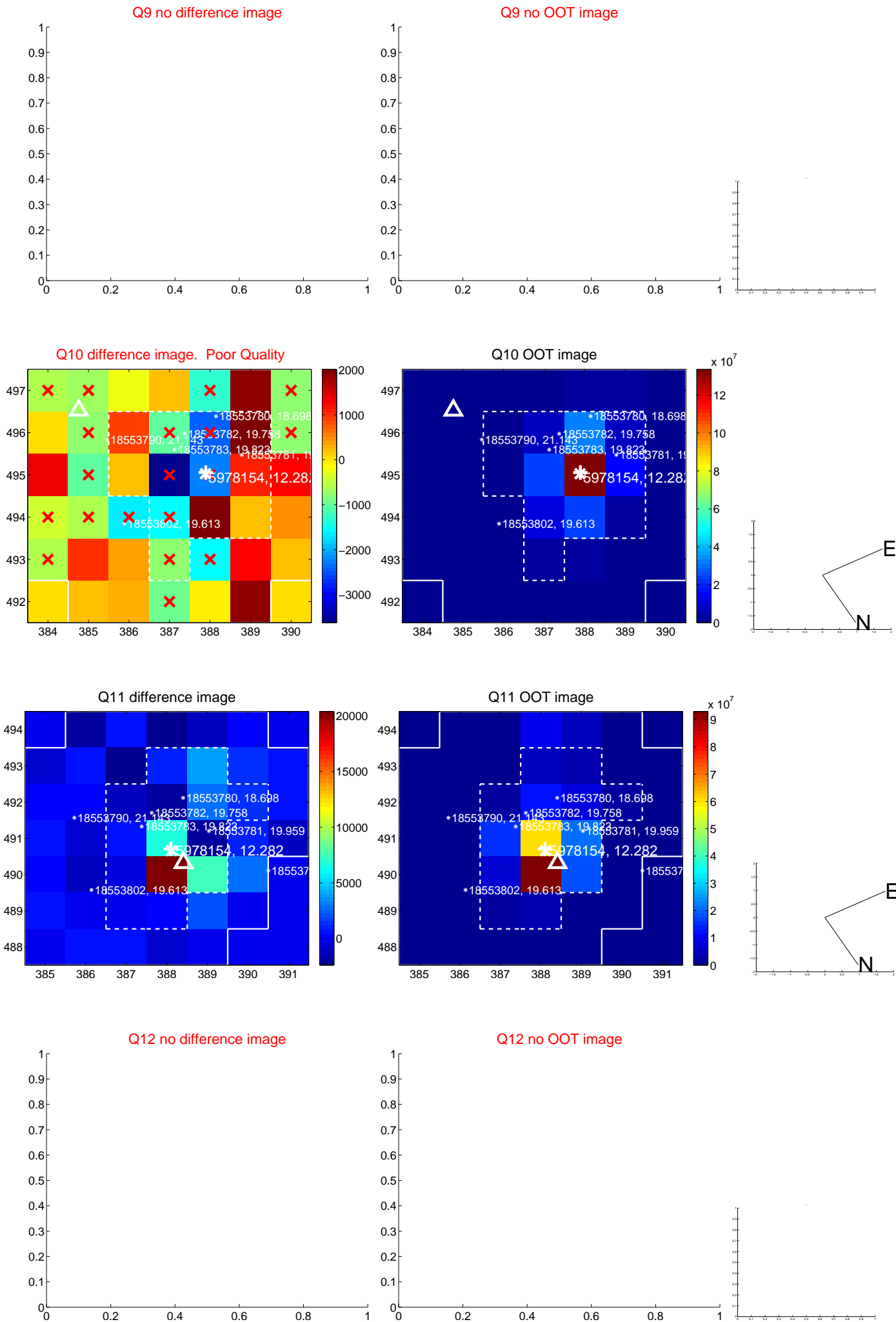
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



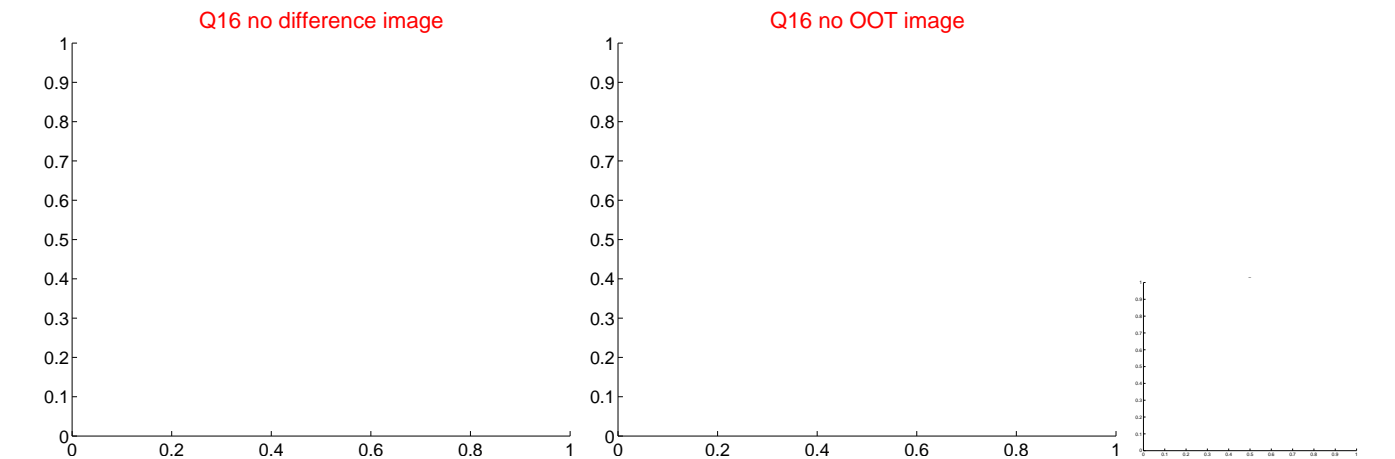
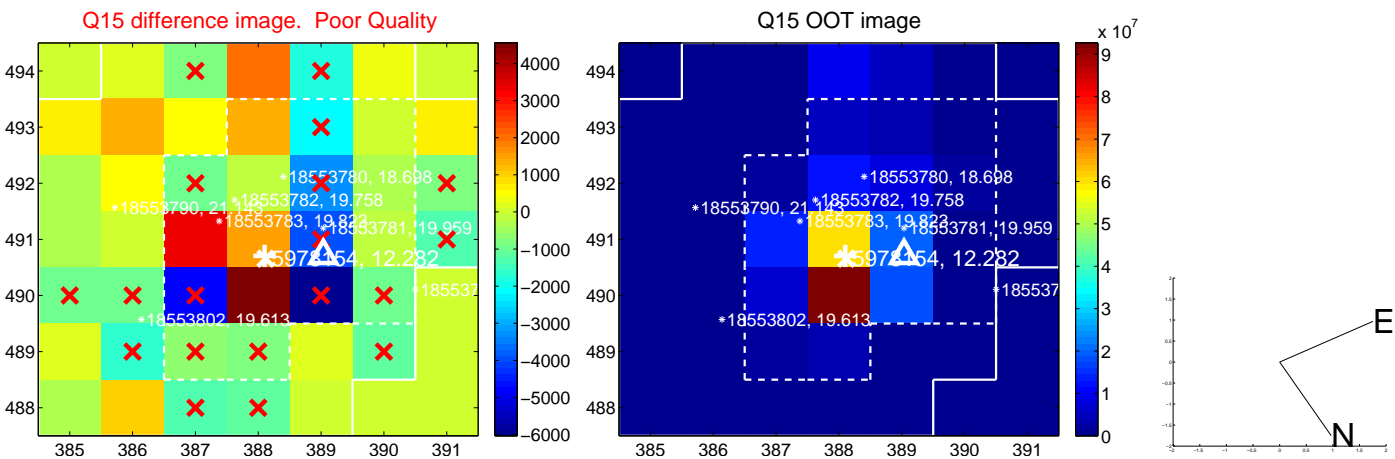
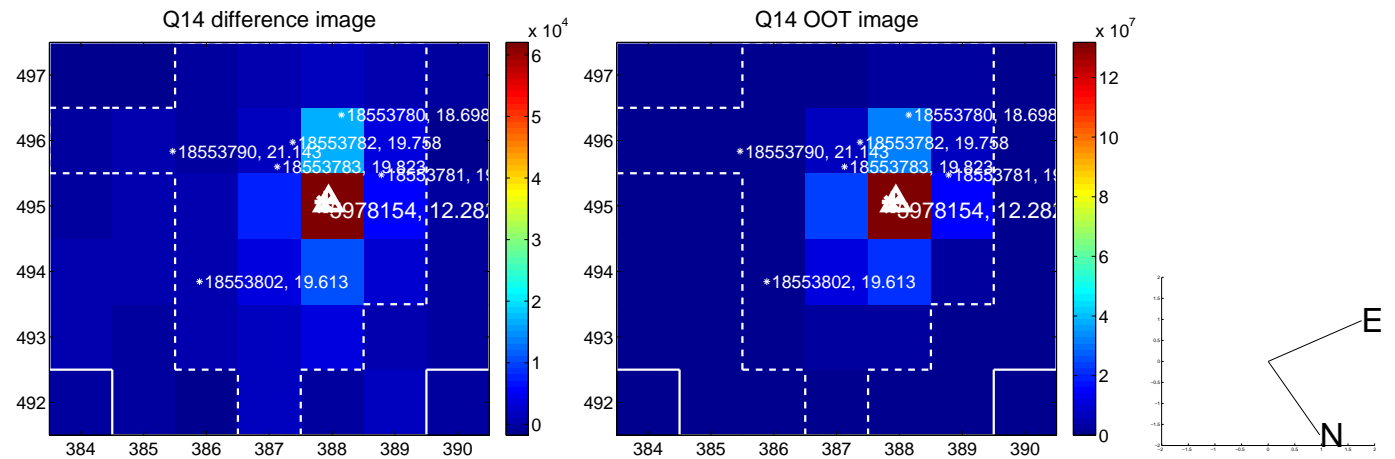
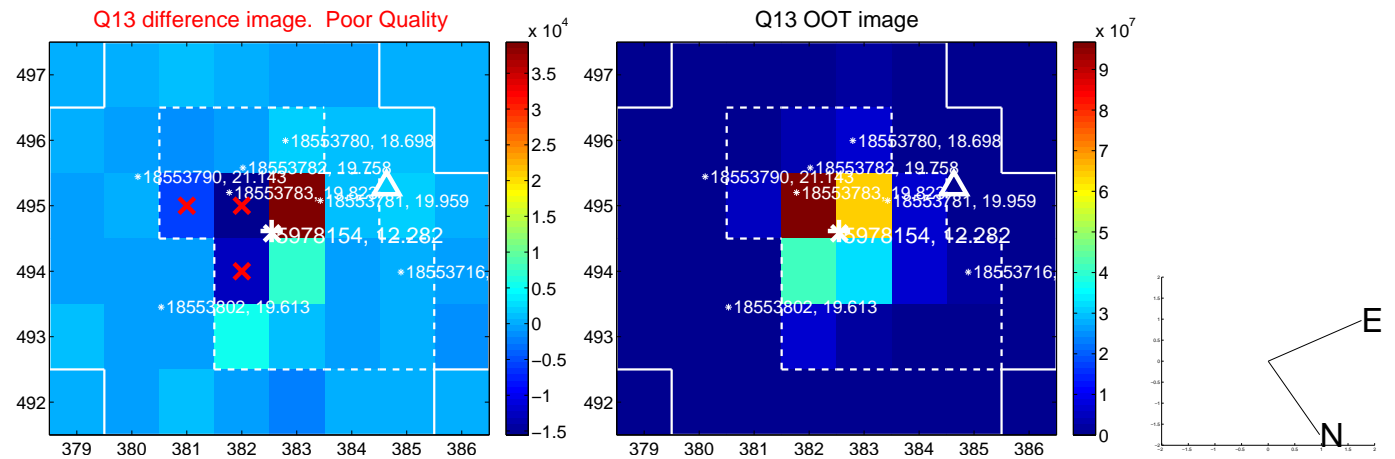
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

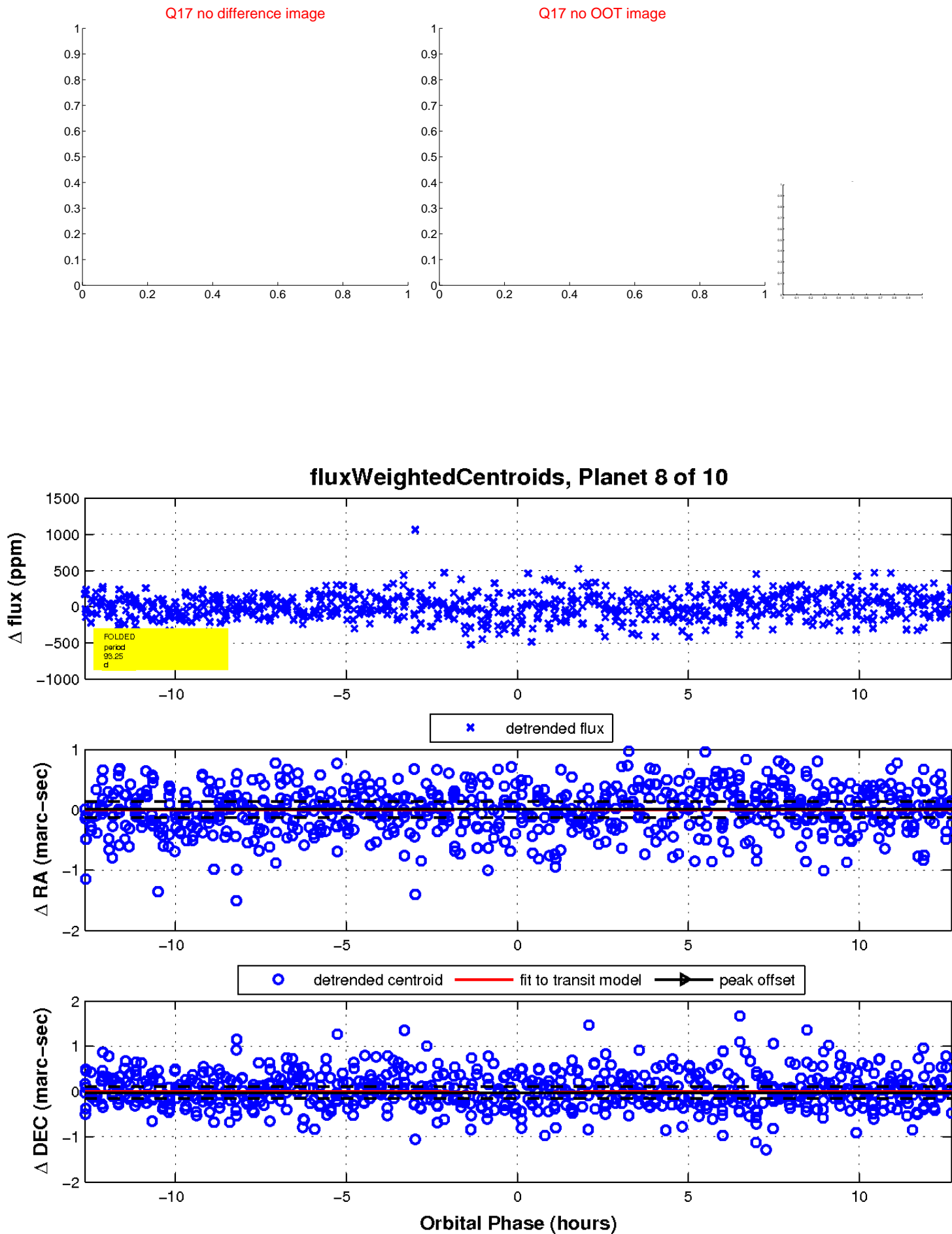


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

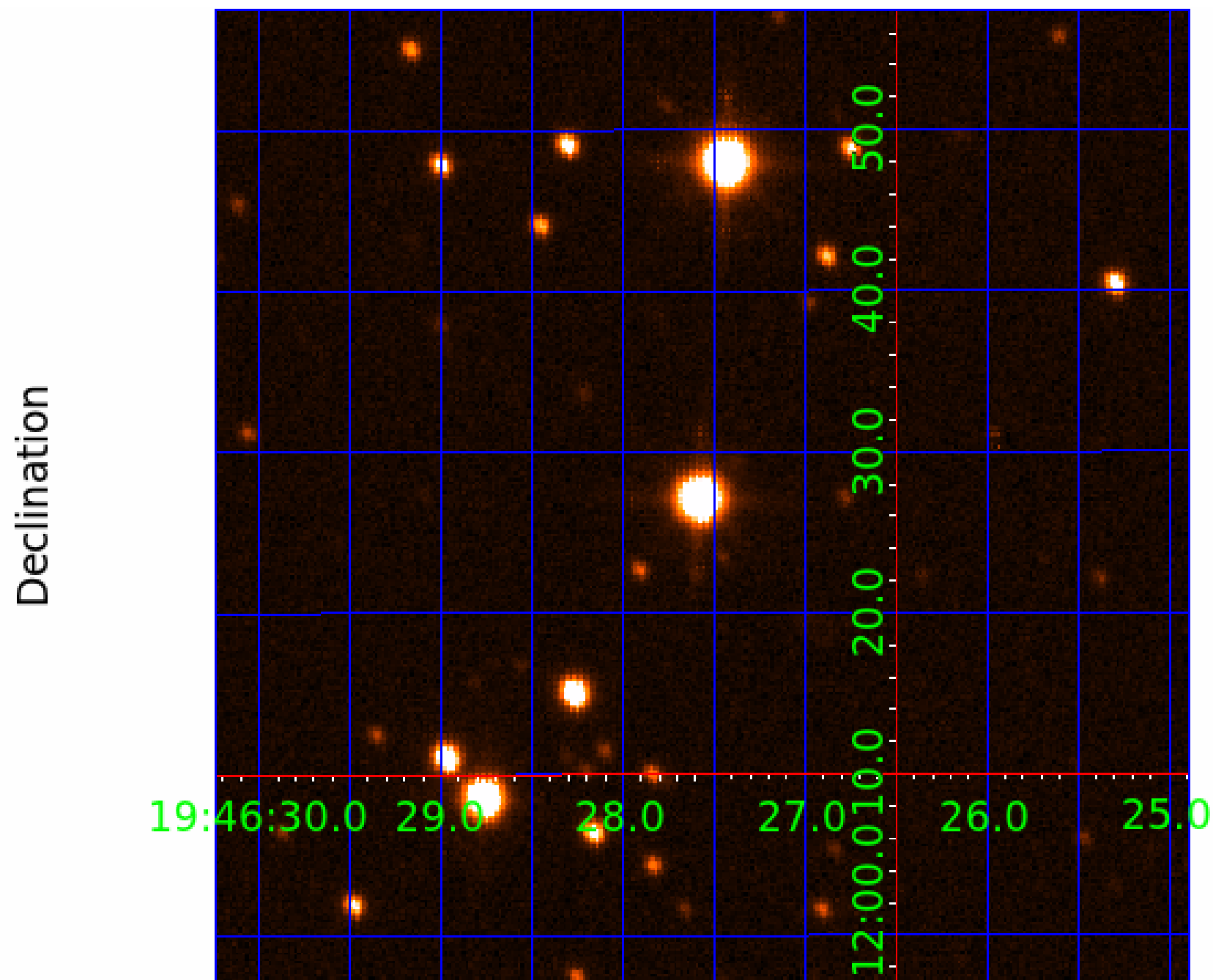




white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image



## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005978154-01	OBS	No	0.977344	132.332446	13.4	6.117	8.3	6.7	4.13	6723	1.53	55377.15
005978154-02	OBS	No	124.165564	182.998698	450.9	13.613	12.5	10.5	4.13	6723	9.87	86.71
005978154-03	OBS	No	137.679401	150.489095	291.5	6.419	9.2	10.5	4.13	6723	8.84	75.55
005978154-04	OBS	No	28.453613	148.852296	172.6	3.245	9.8	8.3	4.13	6723	6.38	618.32
005978154-05	OBS	No	33.910761	148.850724	154.0	5.416	8.9	9.0	4.13	6723	5.62	489.34
005978154-06	OBS	No	82.202844	181.537676	292.1	2.328	9.2	9.3	4.13	6723	8.25	150.27
005978154-07	OBS	No	38.342122	163.823144	205.4	2.241	9.0	8.8	4.13	6723	6.69	415.43
005978154-08	OBS	No	93.248607	221.792194	272.4	4.236	8.9	9.2	4.13	6723	7.75	127.02
005978154-09	OBS	No	43.449347	166.082590	271.7	2.358	9.1	8.7	4.13	6723	7.55	351.63
005978154-10	OBS	No	45.084056	162.646790	117.0	6.361	8.6	5.7	4.13	6723	5.05	334.73

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005978154-01	OBS	FP	0.00	1	0	0	0	SWEET_NTL—LPP_DV
005978154-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS
005978154-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
005978154-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
005978154-05	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—HALO_GHOST
005978154-06	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—HALO_GHOST
005978154-07	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
005978154-08	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
005978154-09	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
005978154-10	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT

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

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

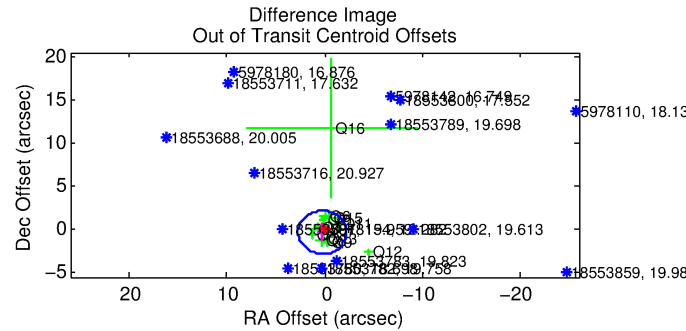
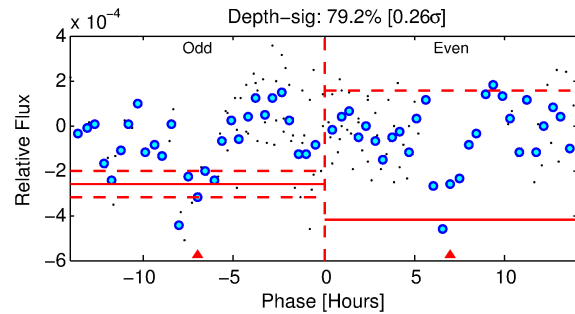
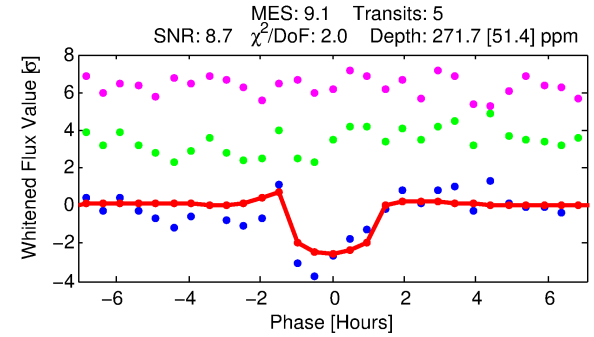
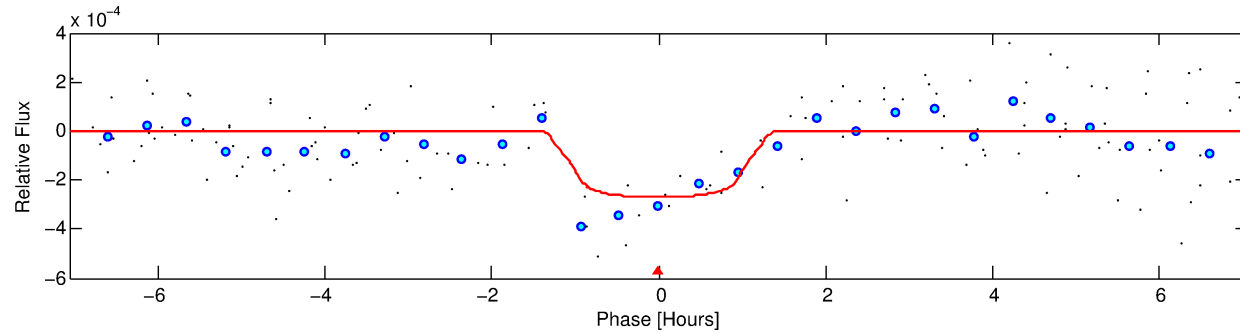
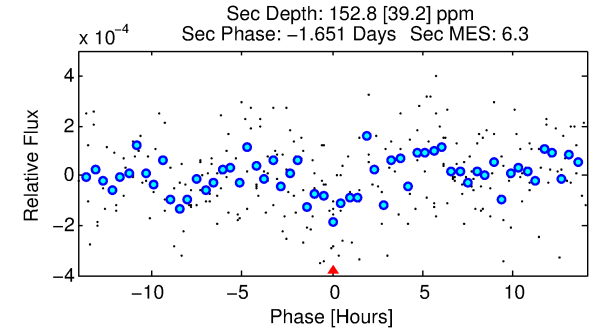
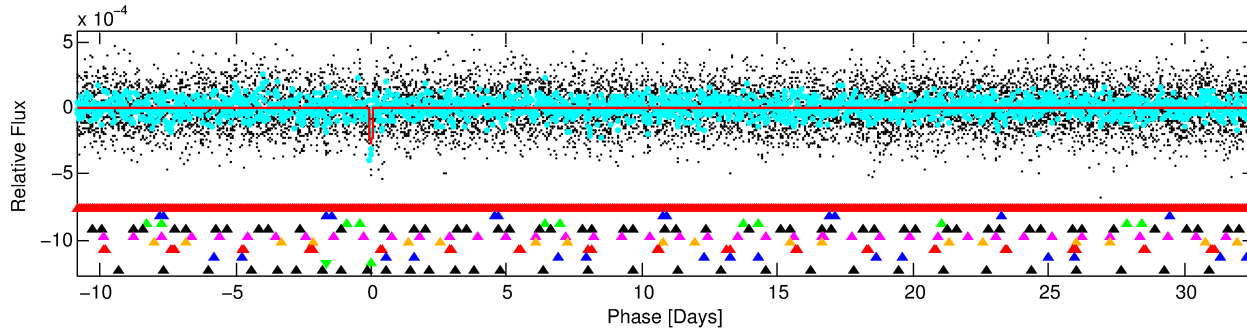
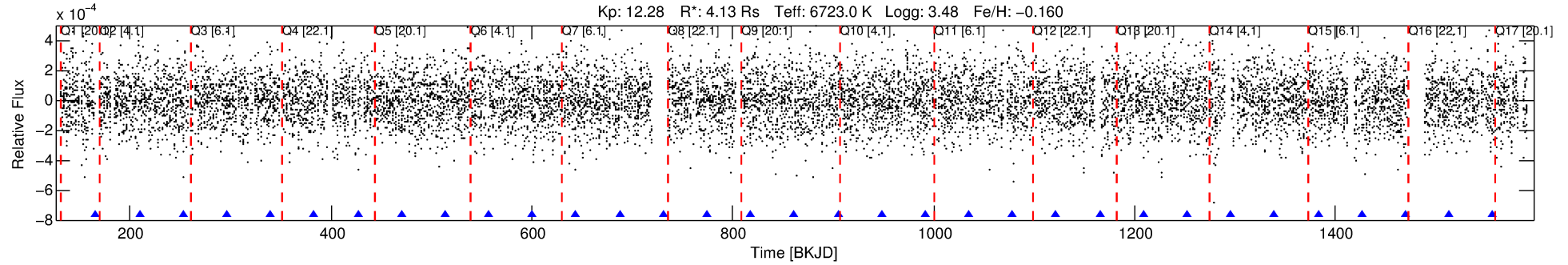
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 005978154-09

No Significant Match Found

# DV One-Page Summary

KIC: 5978154 Candidate: 9 of 10 Period: 43.449 d



## DV Fit Results:

Period = 43.44935 [0.00086] d  
Epoch = 166.0826 [0.0125] BKJD  
Rp/R\* = 0.0167 [0.0177]  
a/R\* = 87.16 [525.84]  
b = 0.81 [2.64]  
Seff = 351.63 [220.58]  
Teq = 1104 [173] K  
Rp = 7.55 [8.54] Re  
a = 0.2983 [0.1143] AU  
Ag = 131.26 [291.30] [0.45σ]  
Teff = 5779 [3087] K [1.51σ]

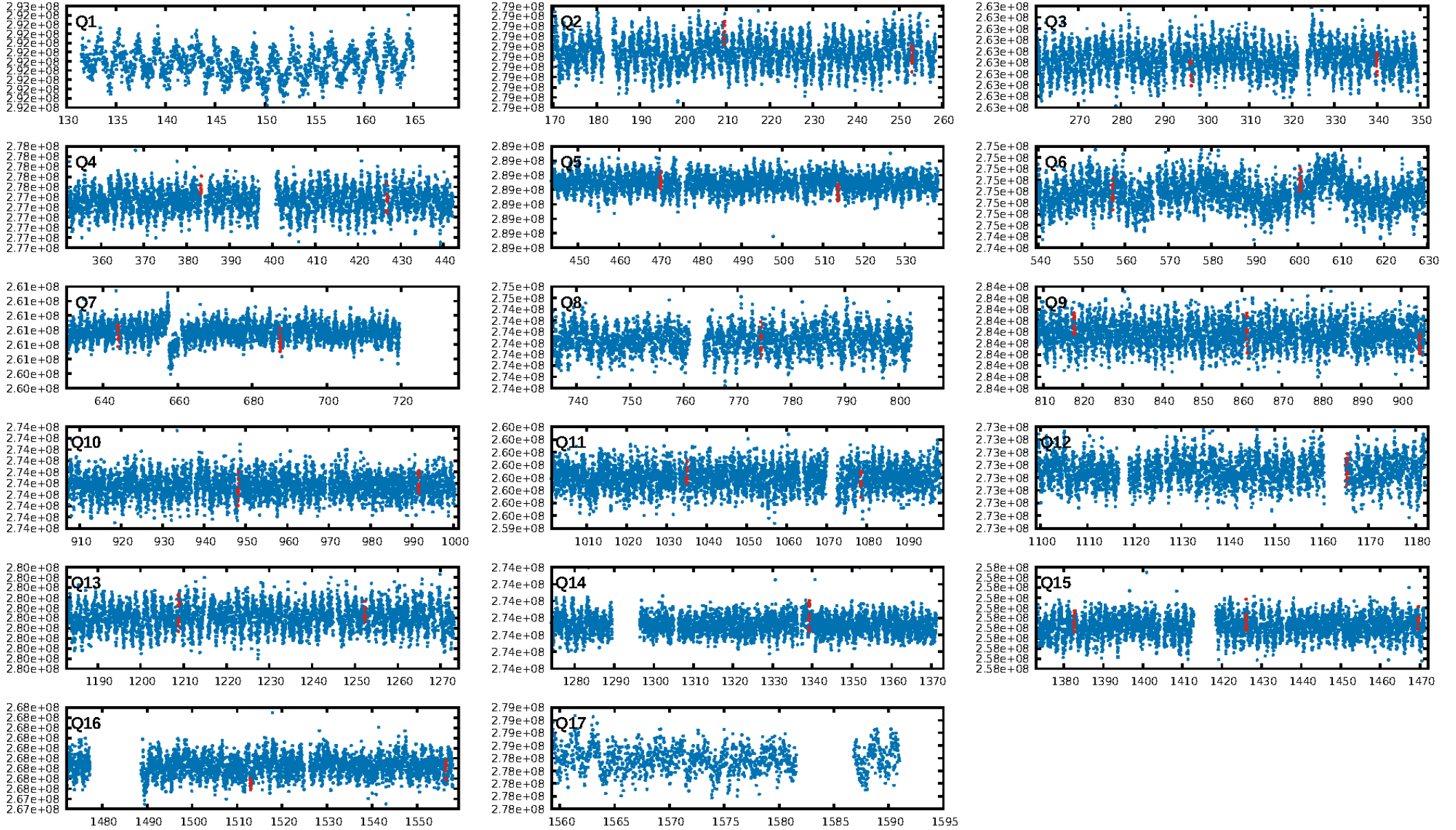
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [37.67σ]  
LongPeriod-sig: 100.0% [5.78σ]  
ModelChiSquare2-sig: 70.3%  
ModelChiSquareGof-sig: 99.1%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [5/5]  
GhostDiagnostic-chr: -1.269  
Centroid-sig: 36.1%  
Centroid-so: 0.527 arcsec [1.32σ]  
OotOffset-rm: 0.423 arcsec [0.51σ]  
OotOffset-st: 2/4/4/2 [12]  
KicOffset-rm: 0.561 arcsec [0.60σ]  
KicOffset-st: 2/4/4/2 [12]  
DiffImageQuality-fgm: 0.67 [8/12]  
DiffImageOverlap-fno: 0.07 [1/15]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 03-Feb-2016 05:54:23 Z

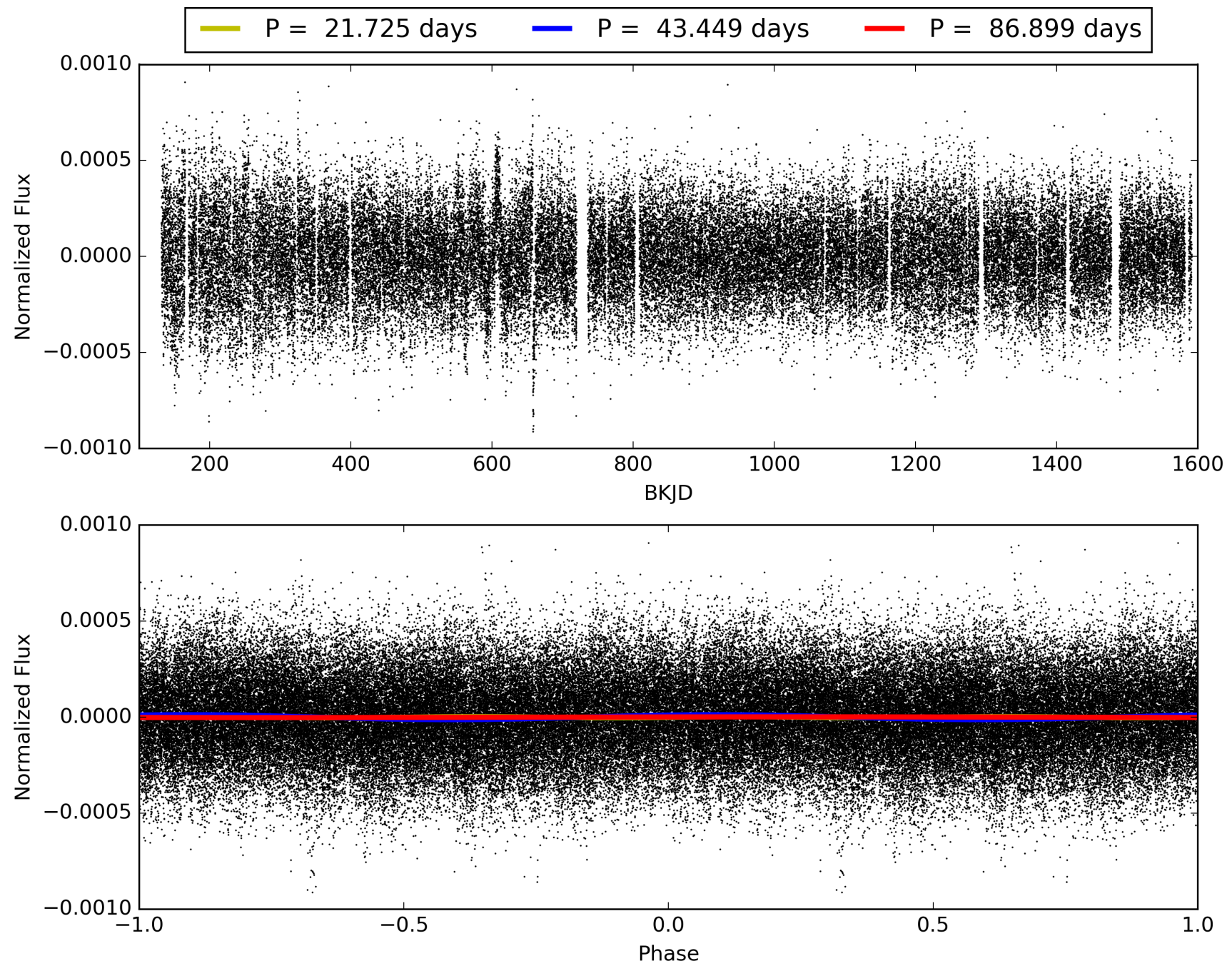
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 005978154-09, PDC Light Curves



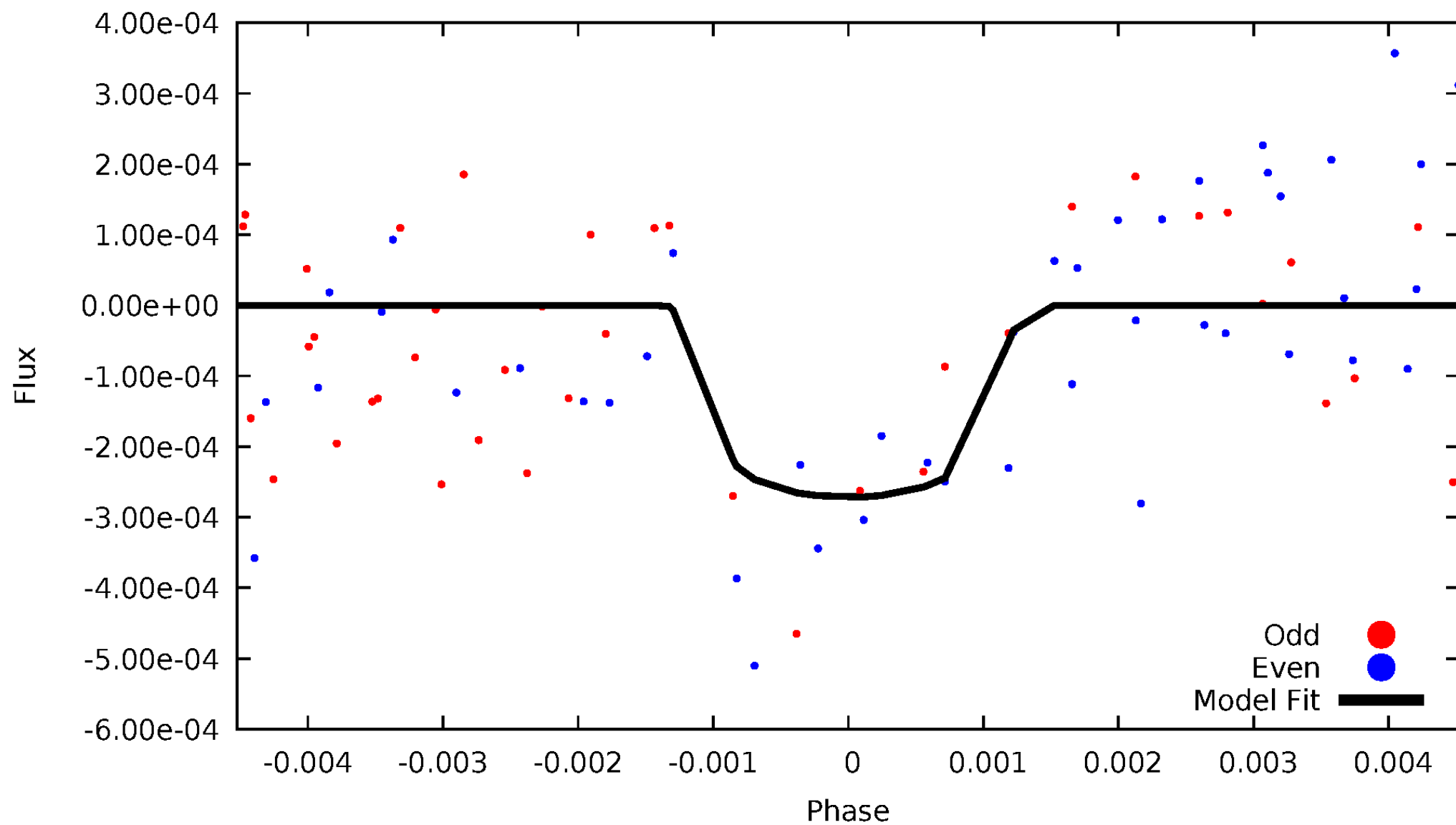


TCE 005978154-09



# DV Odd/Even

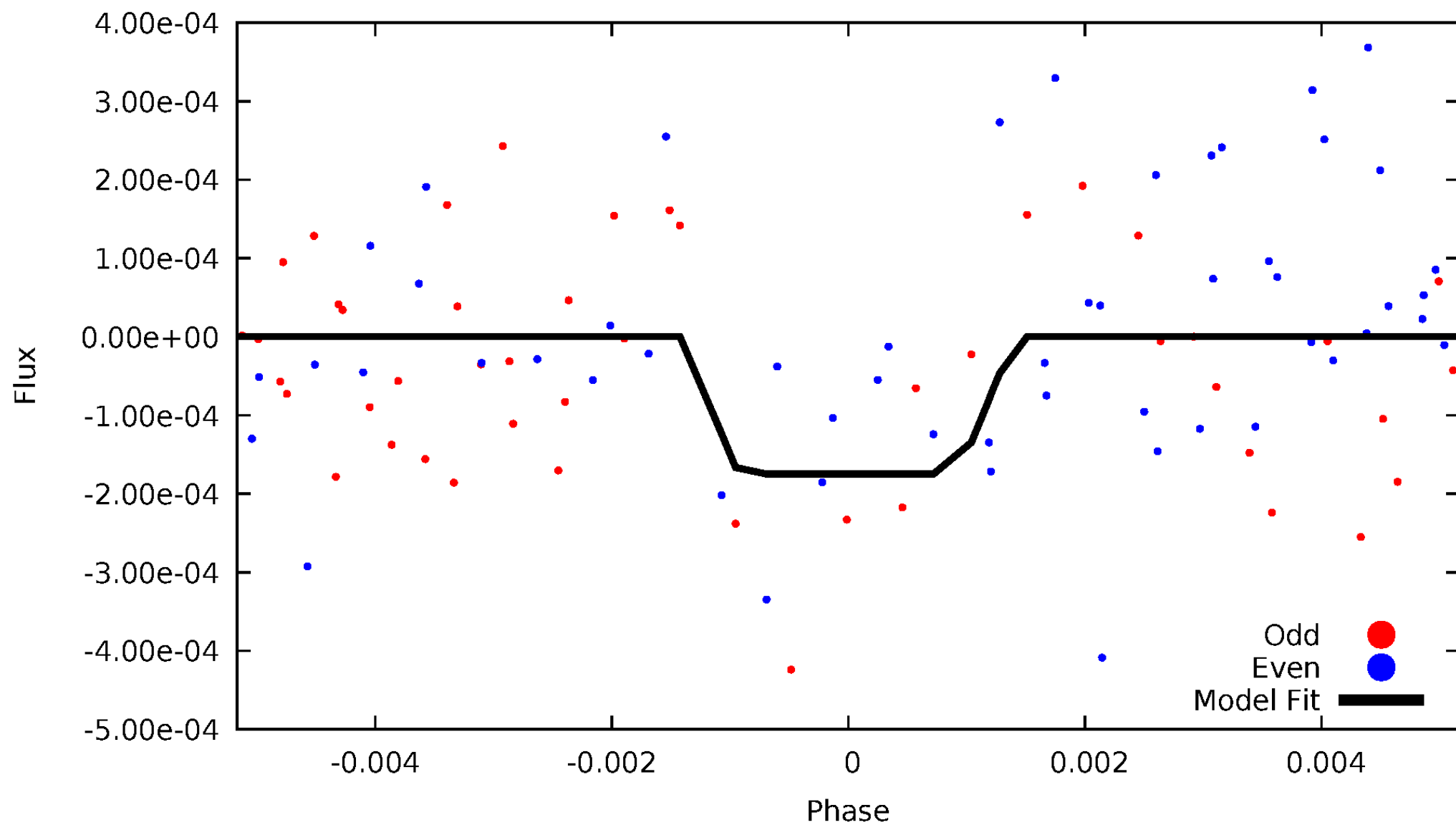
TCE 005978154-09



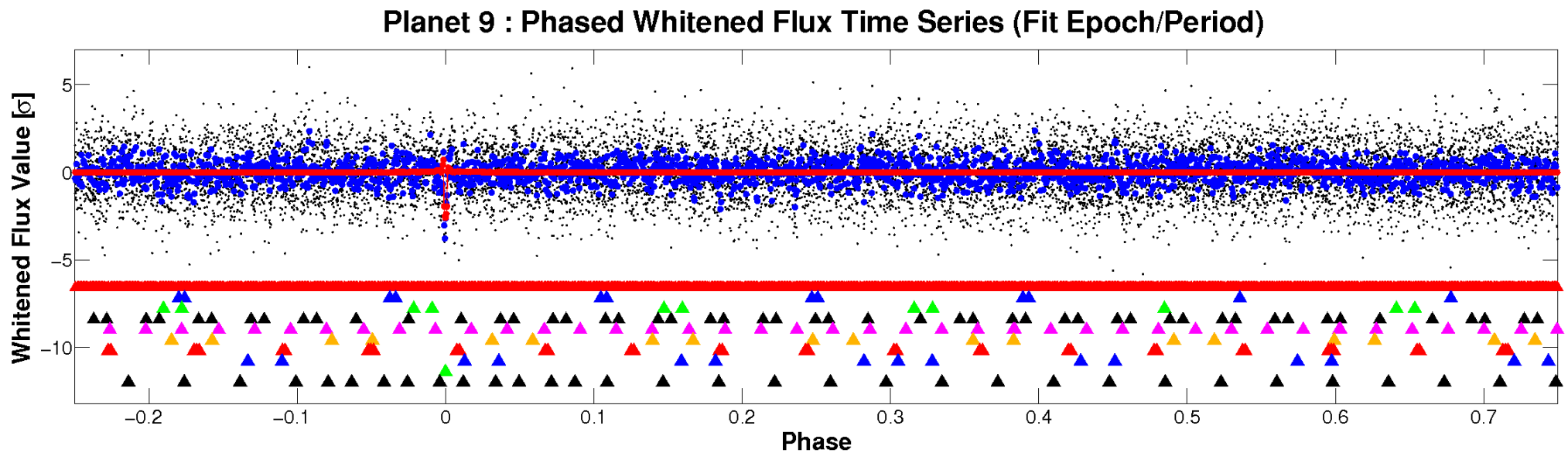
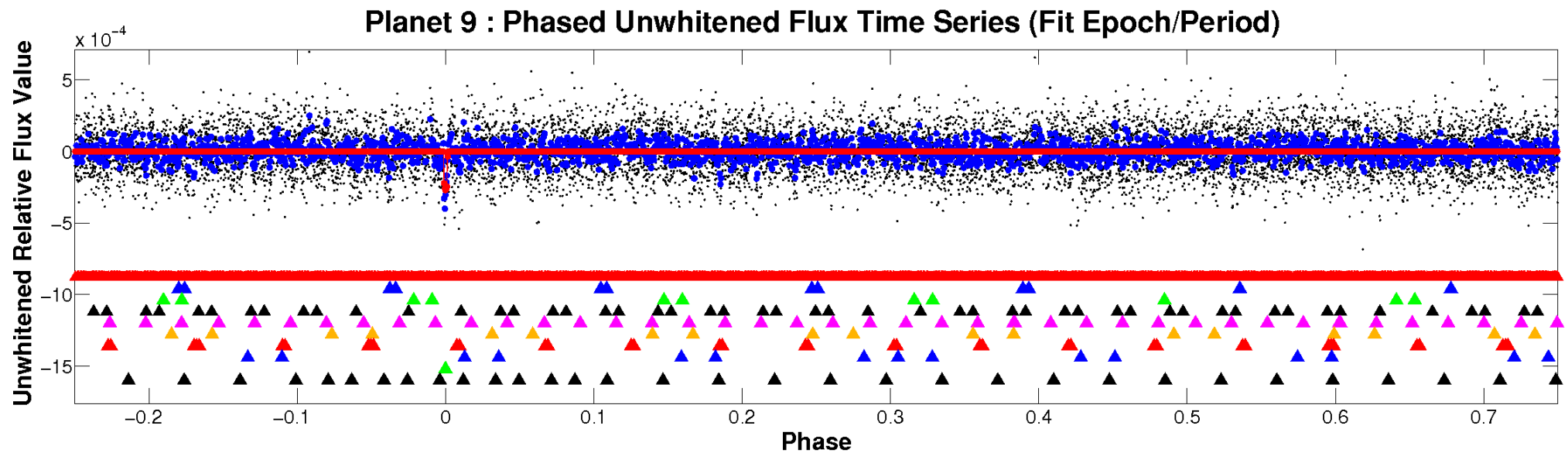


# ALT Odd/Even

TCE 005978154-09

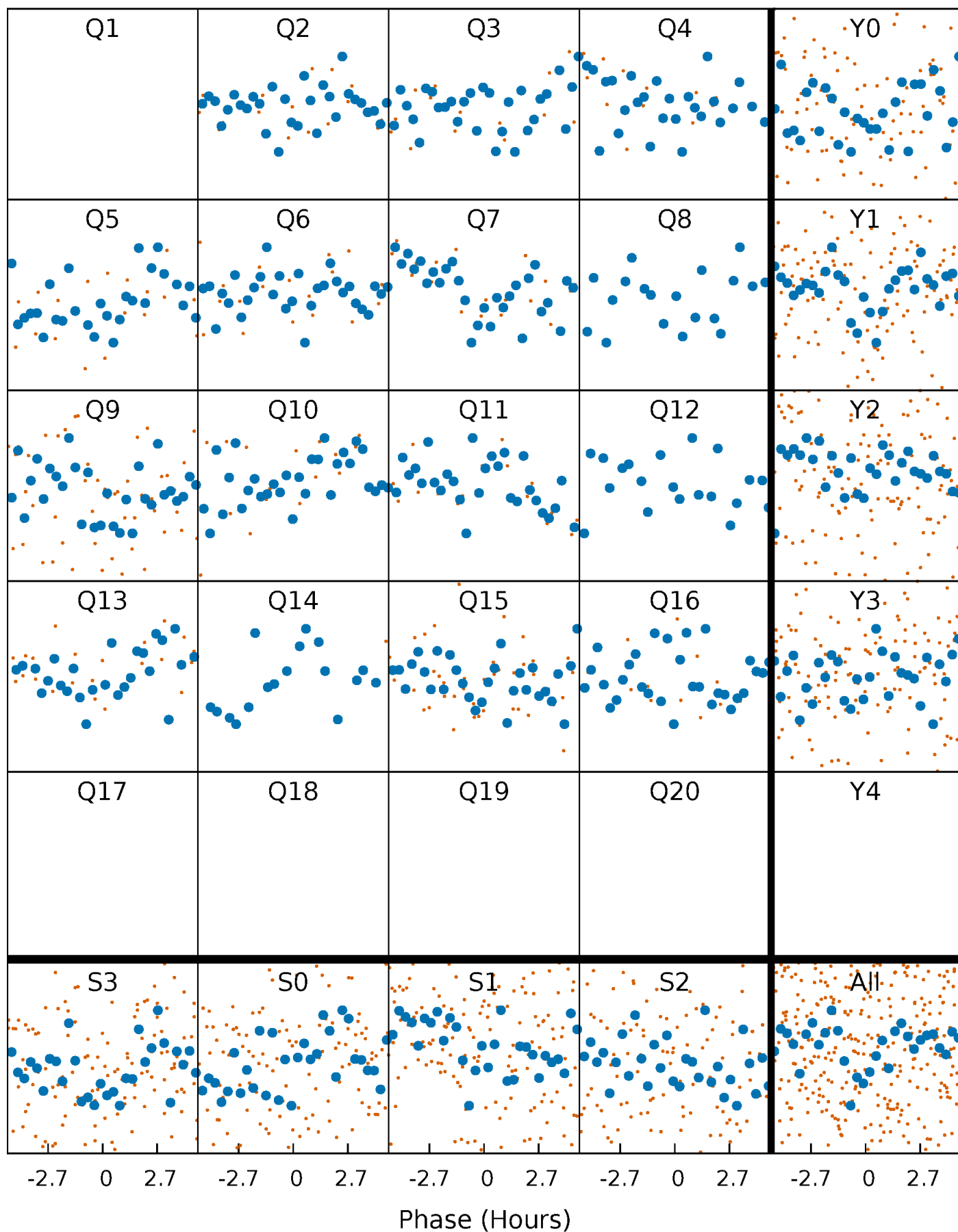


# Non-Whitened Vs. Whitened Light Curve



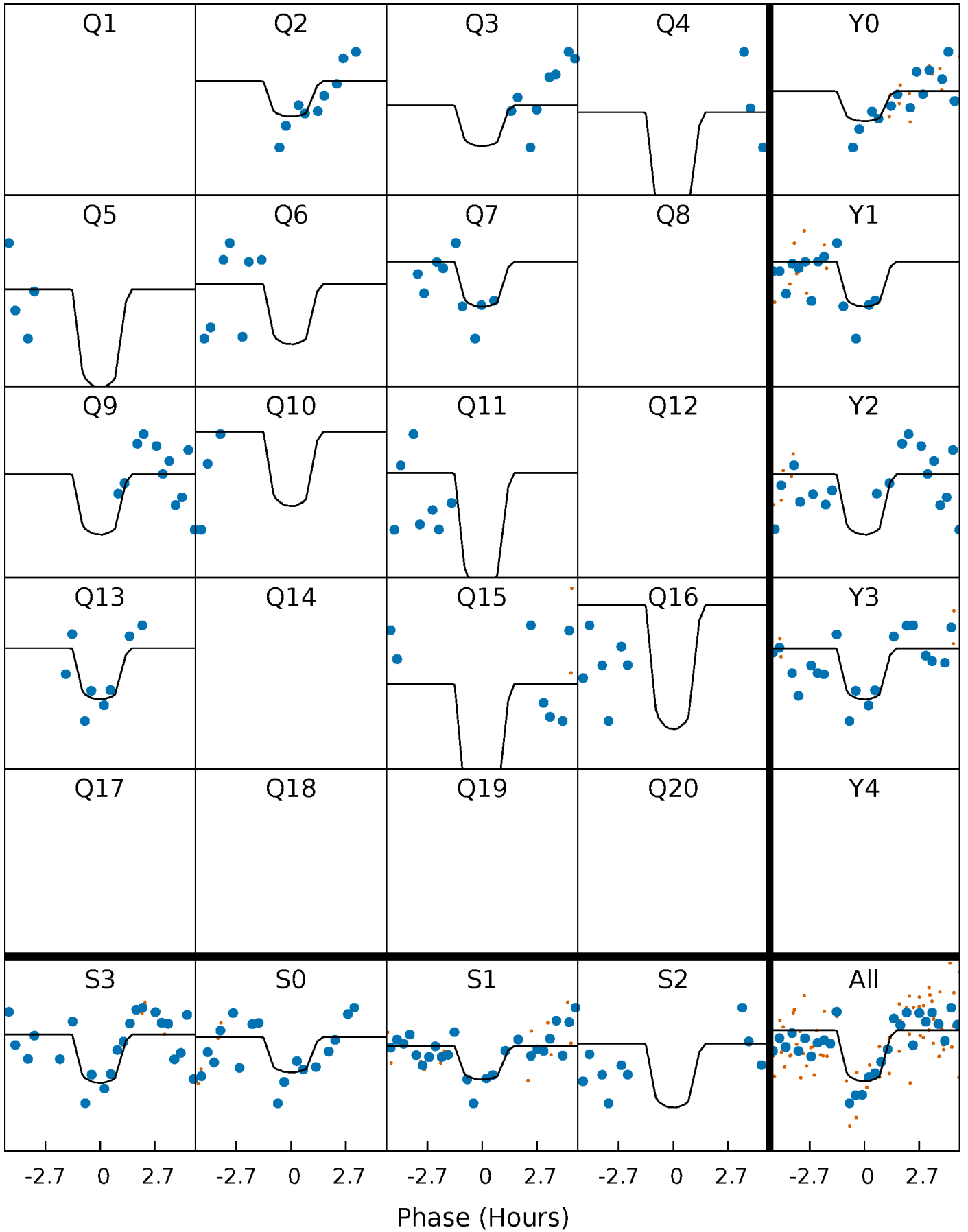
# PDC Quarter-Phased Transit Curves

TCE 005978154-09   P= 43.449347 Days    $T_0=166.082590$  (BKJD)



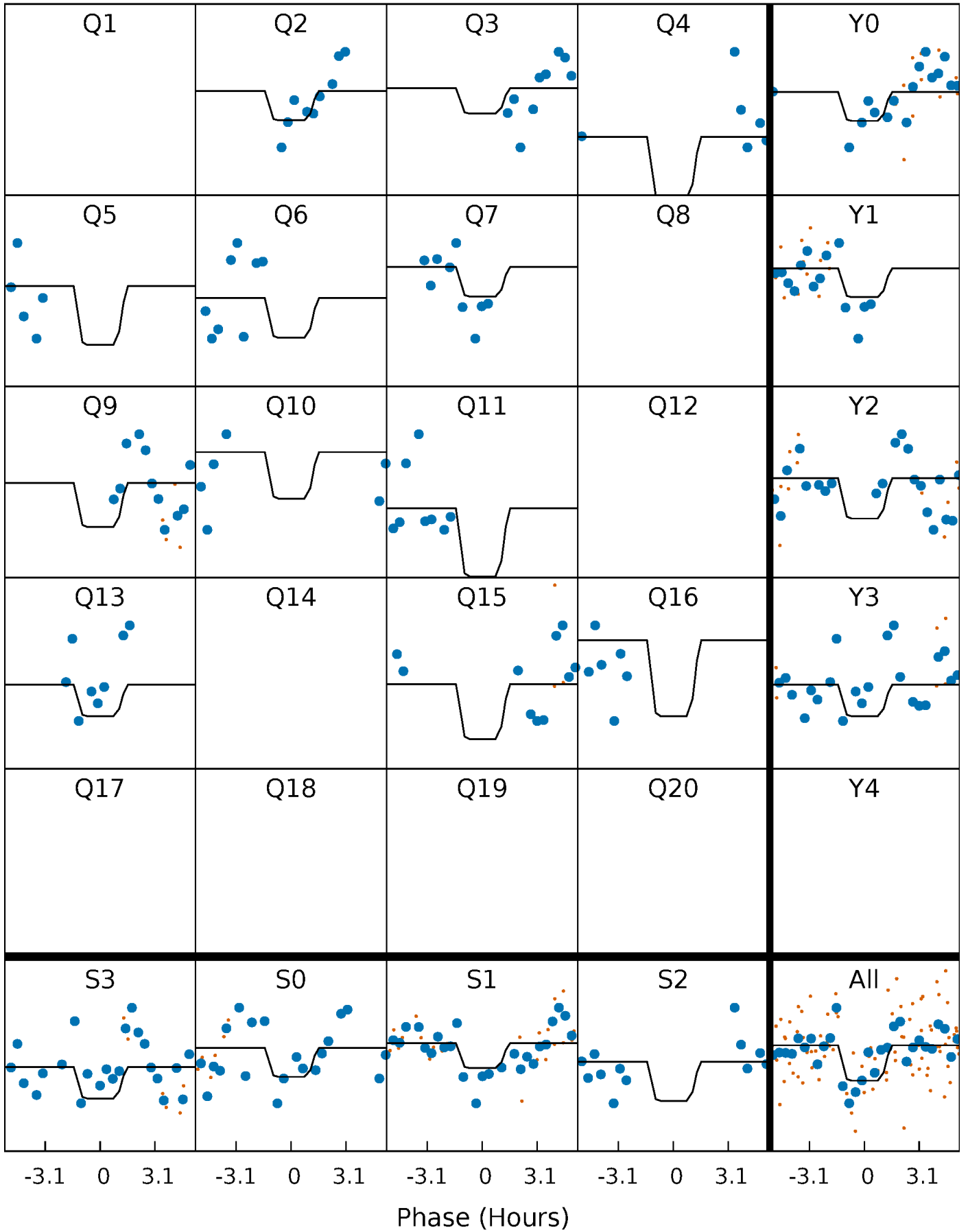
# DV Quarter-Phased Transit Curves

TCE 005978154-09 P= 43.449347 Days  $T_0=166.082590$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

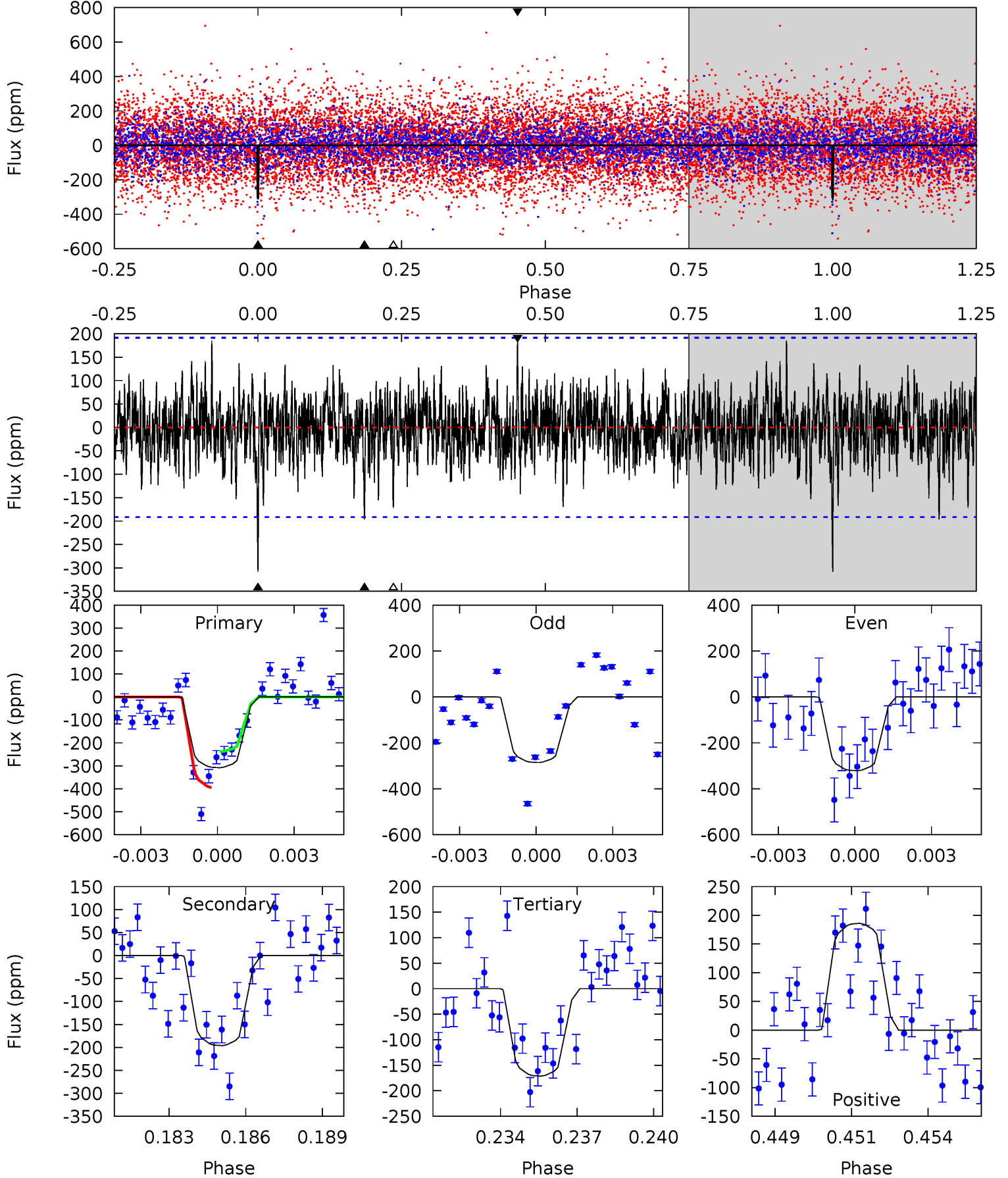
TCE 005978154-09   P= 43.449838 Days    $T_0=166.081466$  (BKJD)



# DV Model-Shift Uniqueness Test

005978154-09, P = 43.449347 Days, E = 122.633243 Days

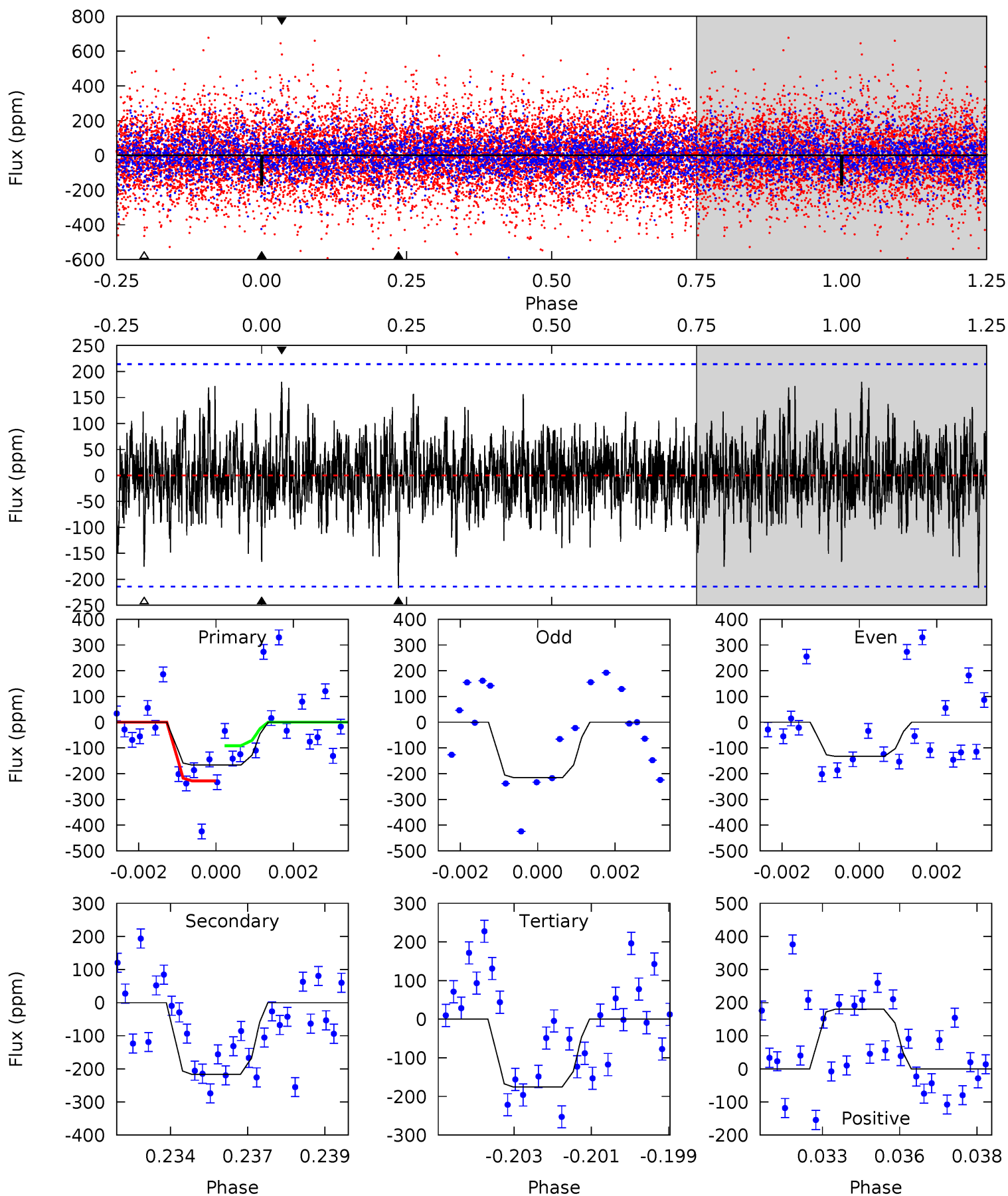
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.47	5.39	4.71	5.11	5.26	2.99	1.34	3.76	3.36	0.68	0.28	0.48	0.86	0.38	2.09



# Alt Model-Shift Uniqueness Test

005978154-09, P = 43.449838 Days, E = 122.631628 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
4.13	5.37	4.35	4.46	5.31	3.06	1.19	-0.22	-0.33	1.02	0.91	0.98	1.19	0.45	1.68





### Stellar Parameters For KIC 005978154

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$6723^{+202}_{-223}$	$3.478^{+0.360}_{-0.090}$	$-0.160^{+0.300}_{-0.250}$	$4.134^{+0.412}_{-1.647}$	$1.872^{+0.171}_{-0.398}$	$0.037^{+0.107}_{-0.011}$
	+3%/-3%	+10%/-3%	+188%/-156%	+10%/-40%	+9%/-21%	+286%/-29%
Source	PHO1	FLK73	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 005978154-09 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-196 \pm 36$	$8.64^{+6.62}_{-5.50}$	$1519^{+79}_{-152}$	$5520^{+4238}_{-1180}$	$124^{+927}_{-84}$
Alt.	$-217 \pm 40$	$7.41^{+6.78}_{-4.69}$	$1517^{+85}_{-153}$	$6101^{+5052}_{-1503}$	$189^{+1210}_{-138}$

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

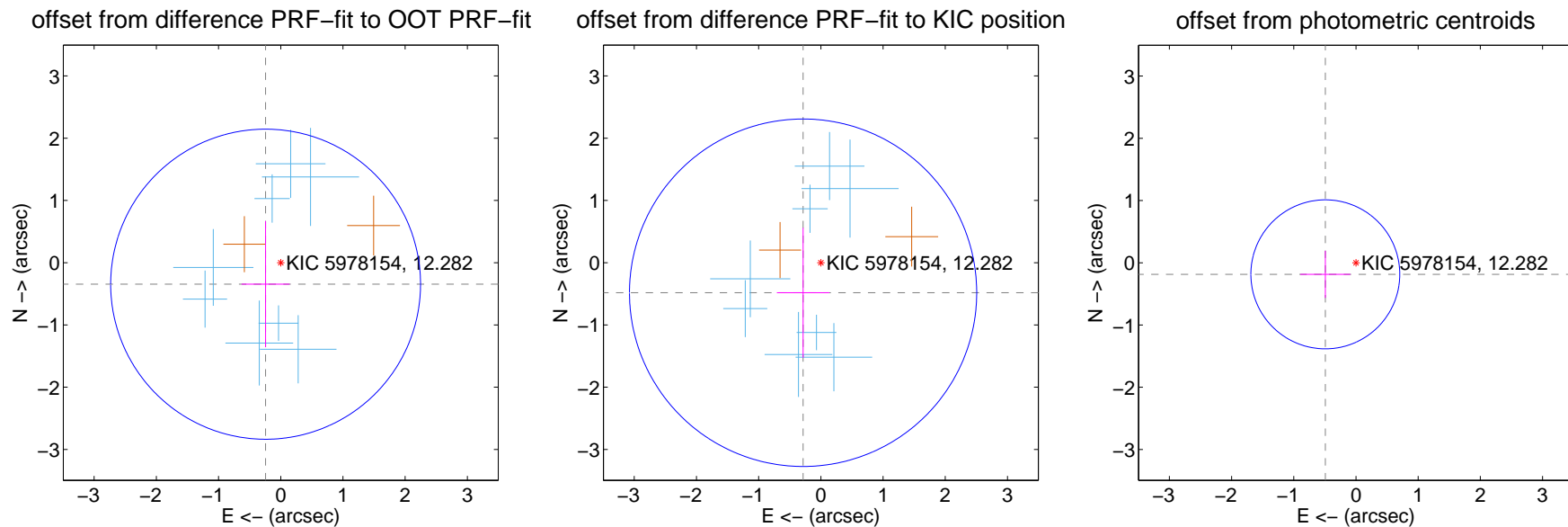
## DV Centroid Data

Supplemental centroid analysis for 005978154-09. Kepler magnitude: 12.28. Transit SNR 8.68

There are 8 quarters with good PRF difference image offsets

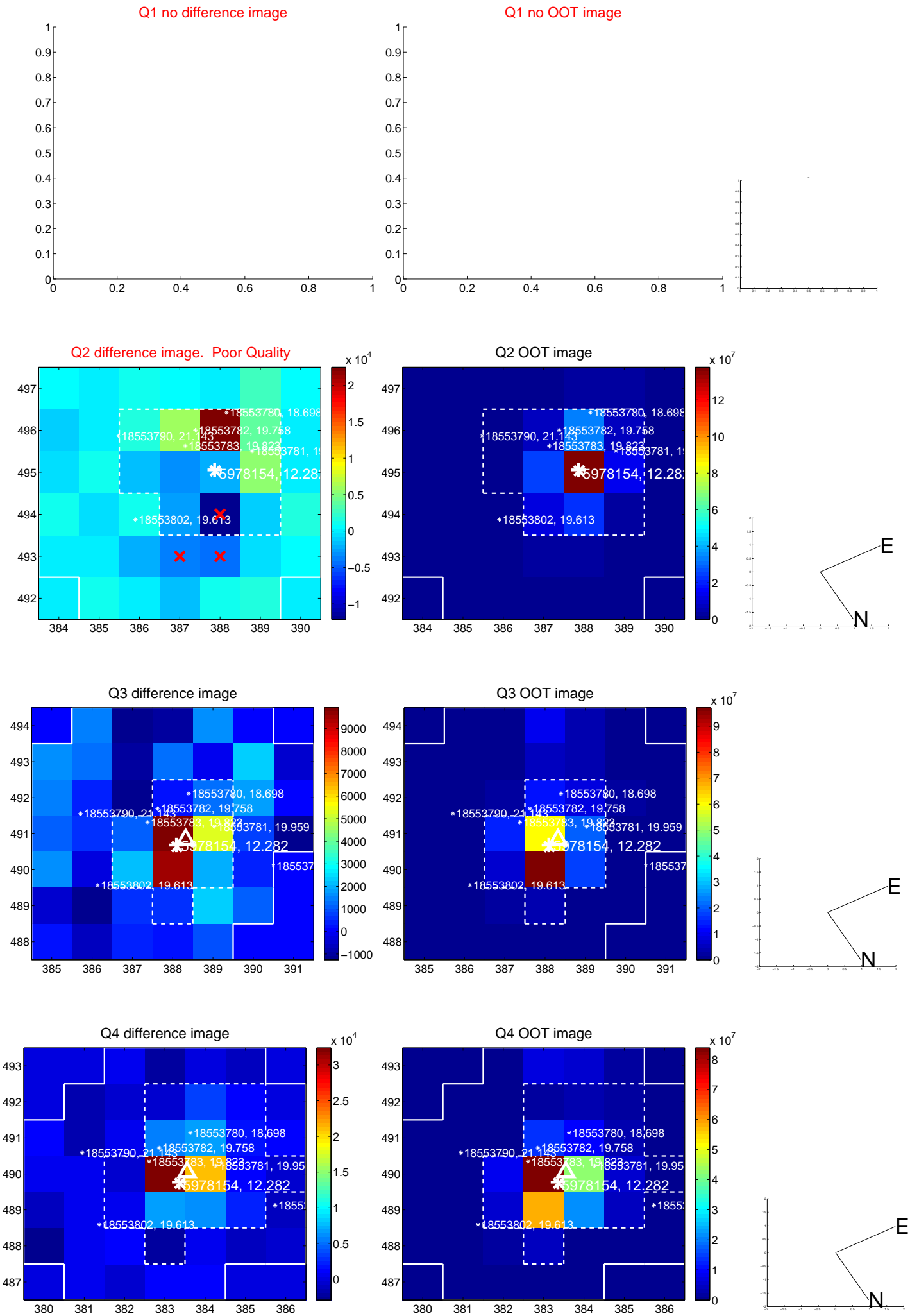
The direct PRF centroid is offset from the target star catalog position by about 0.16 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.423 \pm 0.830$	0.51	$0.244 \pm 0.386$	$-0.346 \pm 1.013$
PRF-fit source offset from KIC position	$0.561 \pm 0.930$	0.60	$0.286 \pm 0.422$	$-0.483 \pm 1.044$
photometric centroid source offset	$0.53 \pm 0.40$	1.32	$0.49 \pm 0.40$	$-0.19 \pm 0.38$

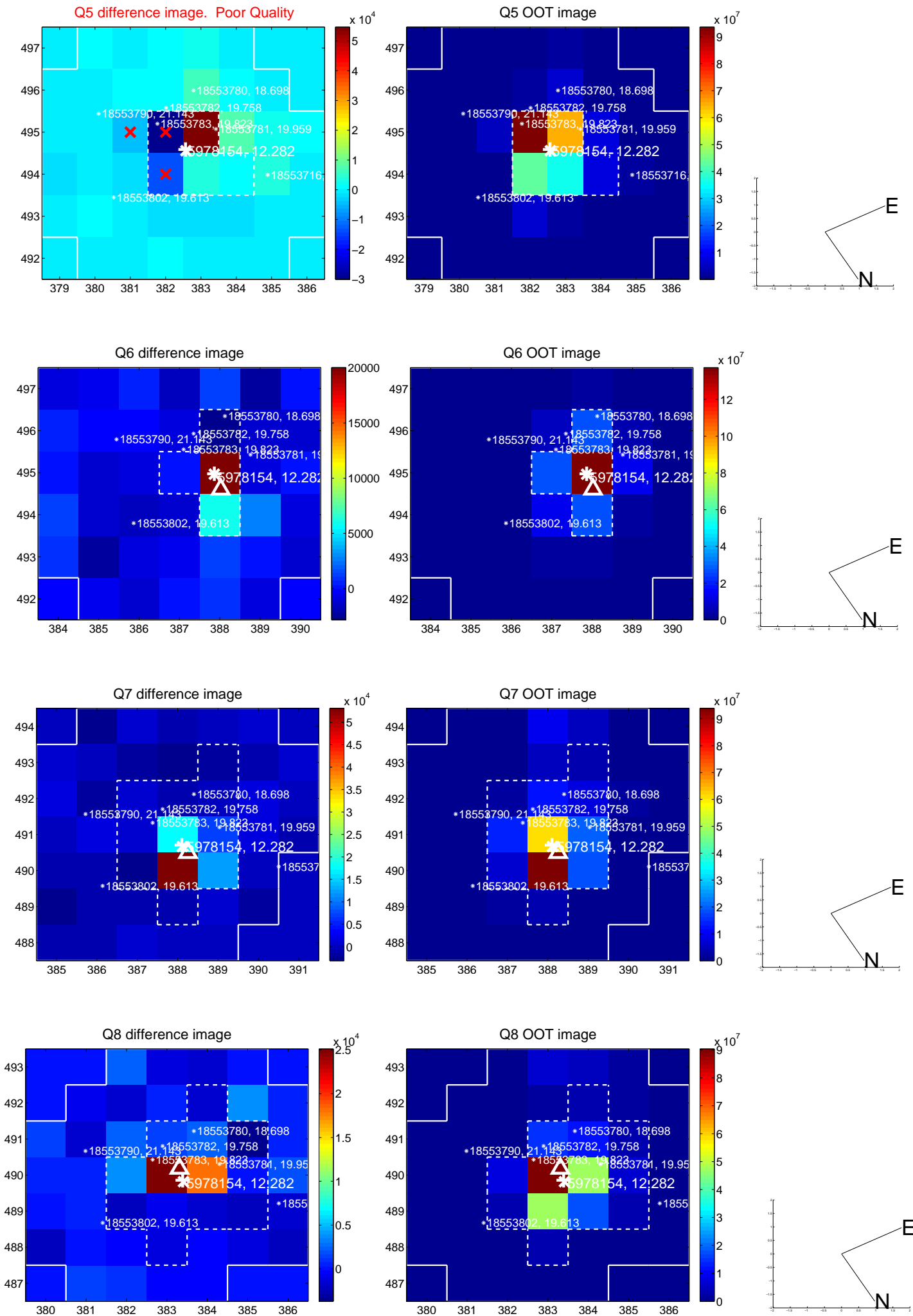


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

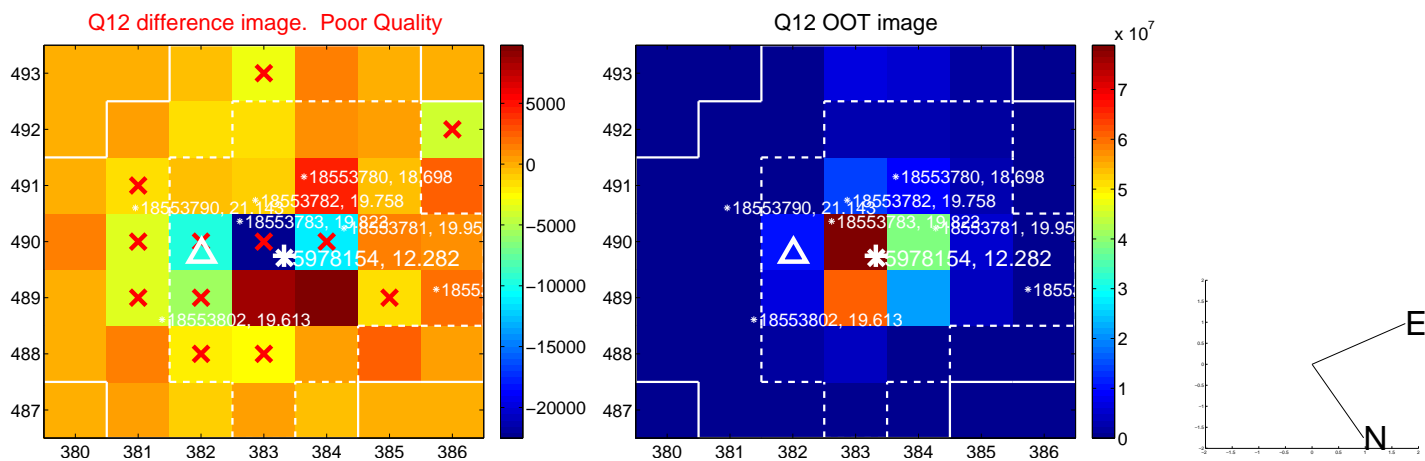
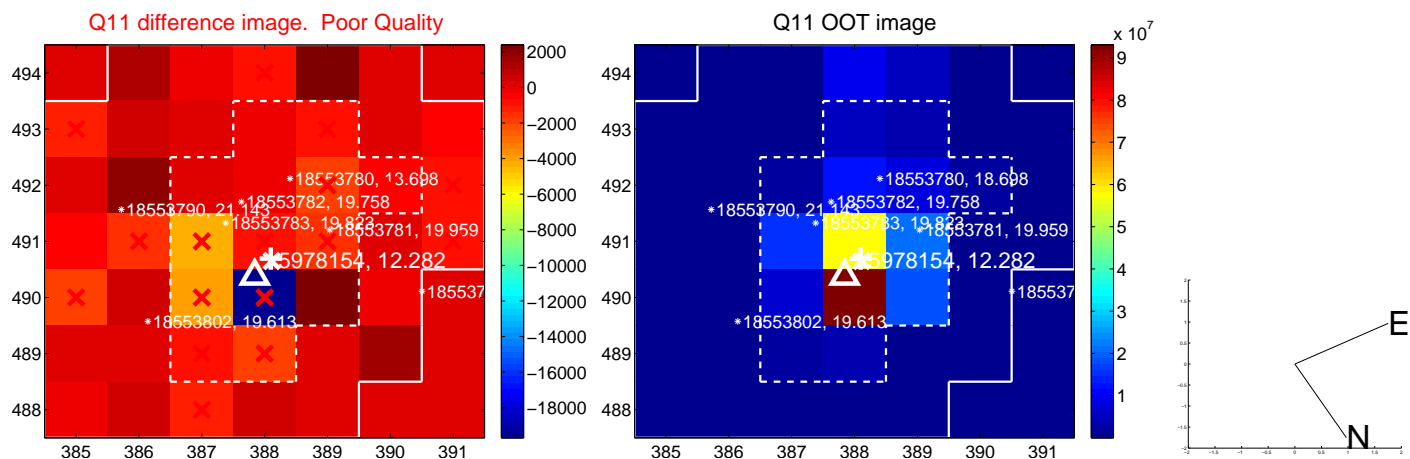
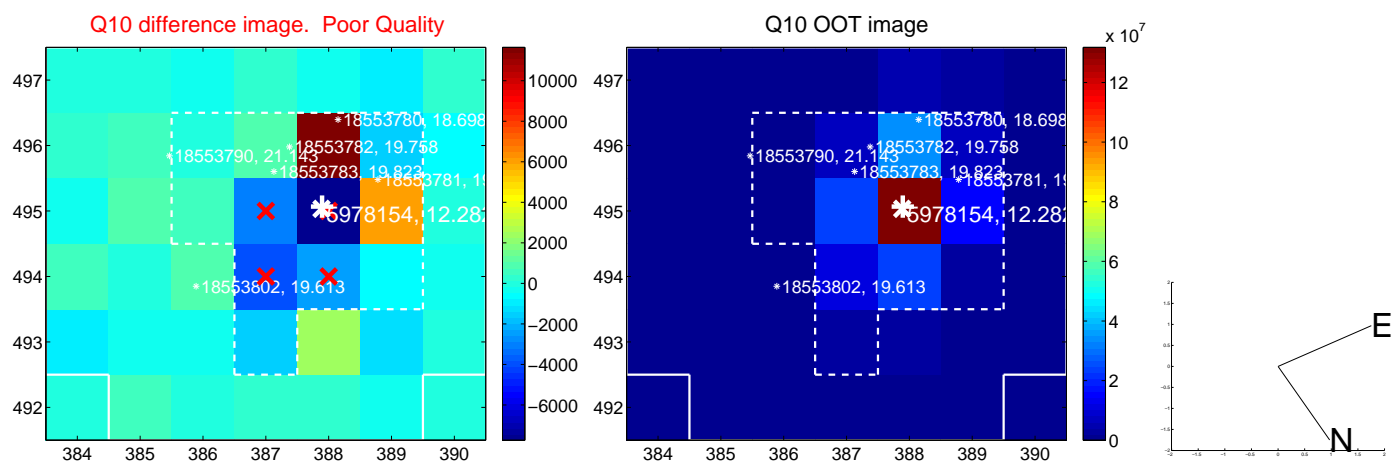
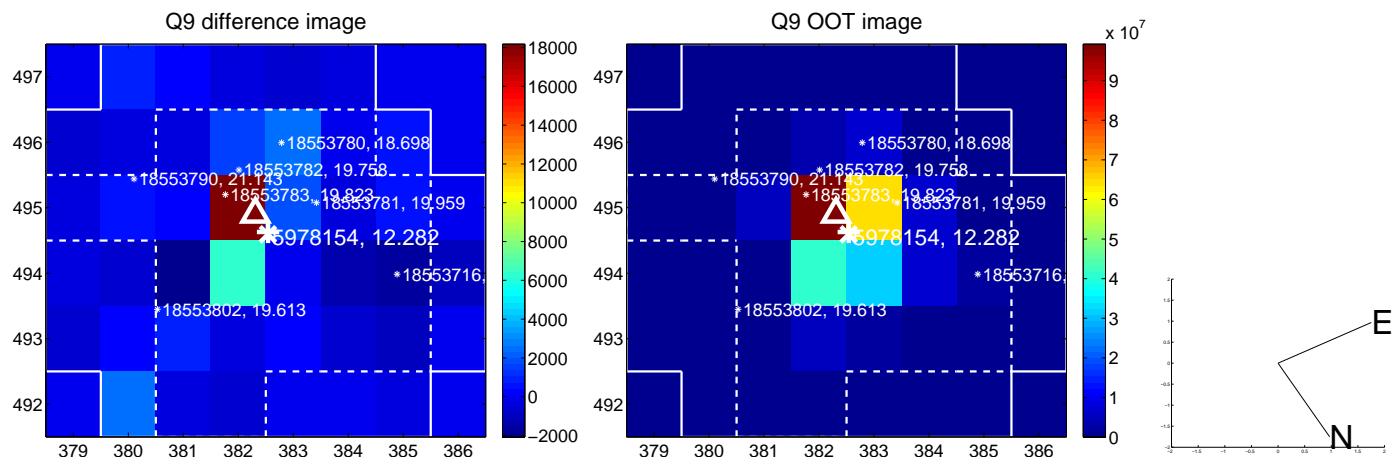
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



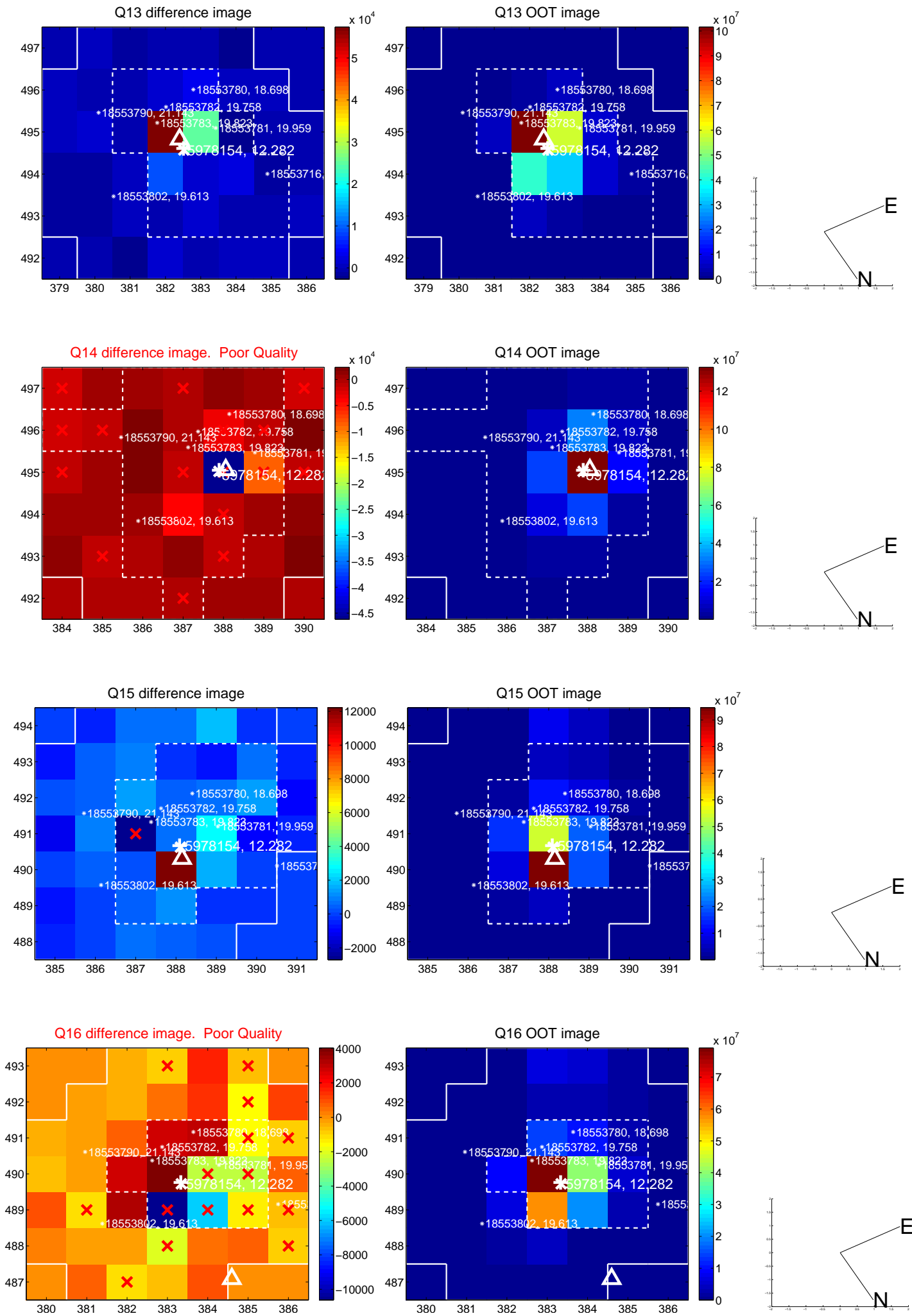
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



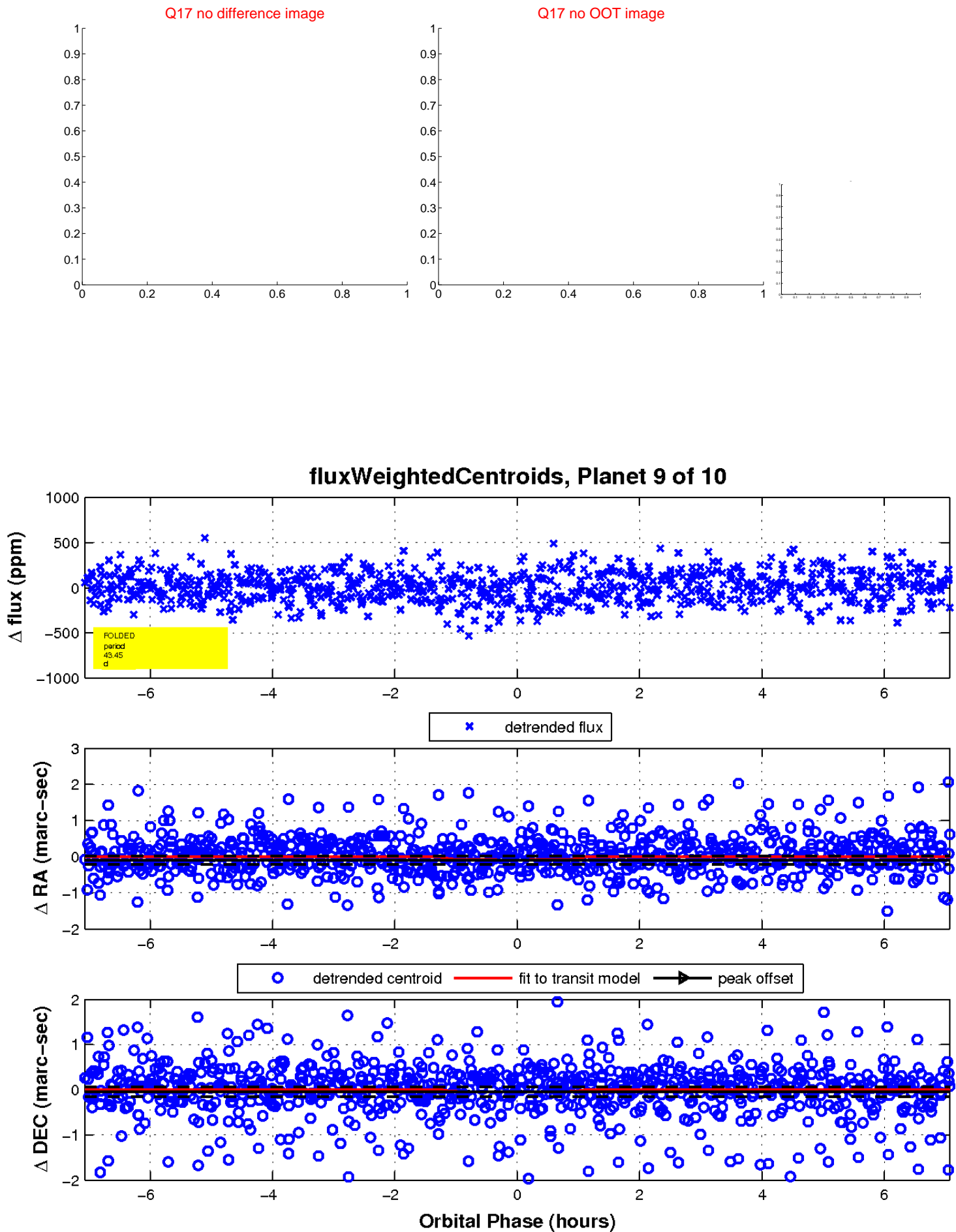
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

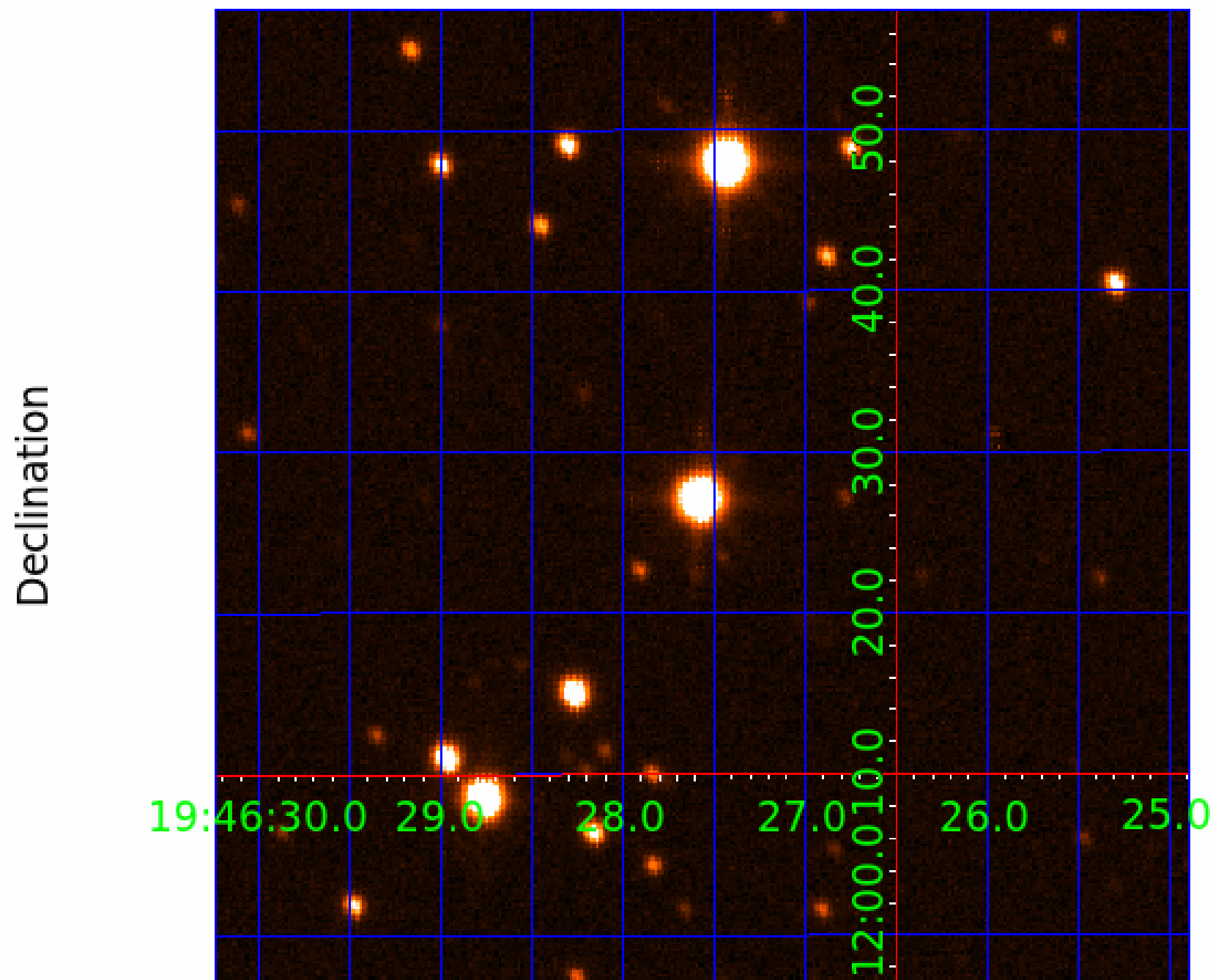


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.





UKIRT Image



## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005978154-01	OBS	No	0.977344	132.332446	13.4	6.117	8.3	6.7	4.13	6723	1.53	55377.15
005978154-02	OBS	No	124.165564	182.998698	450.9	13.613	12.5	10.5	4.13	6723	9.87	86.71
005978154-03	OBS	No	137.679401	150.489095	291.5	6.419	9.2	10.5	4.13	6723	8.84	75.55
005978154-04	OBS	No	28.453613	148.852296	172.6	3.245	9.8	8.3	4.13	6723	6.38	618.32
005978154-05	OBS	No	33.910761	148.850724	154.0	5.416	8.9	9.0	4.13	6723	5.62	489.34
005978154-06	OBS	No	82.202844	181.537676	292.1	2.328	9.2	9.3	4.13	6723	8.25	150.27
005978154-07	OBS	No	38.342122	163.823144	205.4	2.241	9.0	8.8	4.13	6723	6.69	415.43
005978154-08	OBS	No	93.248607	221.792194	272.4	4.236	8.9	9.2	4.13	6723	7.75	127.02
005978154-09	OBS	No	43.449347	166.082590	271.7	2.358	9.1	8.7	4.13	6723	7.55	351.63
005978154-10	OBS	No	45.084056	162.646790	117.0	6.361	8.6	5.7	4.13	6723	5.05	334.73

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005978154-01	OBS	FP	0.00	1	0	0	0	SWEET_NTL—LPP_DV
005978154-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS
005978154-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
005978154-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
005978154-05	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—HALO_GHOST
005978154-06	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—HALO_GHOST
005978154-07	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
005978154-08	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
005978154-09	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
005978154-10	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT

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

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

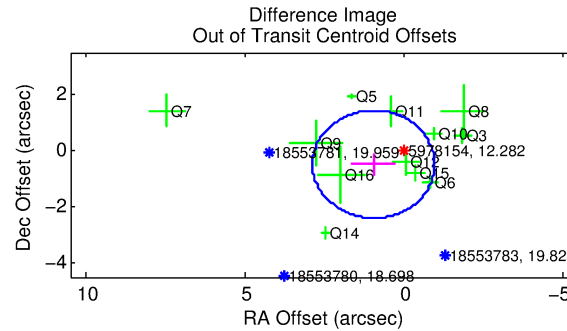
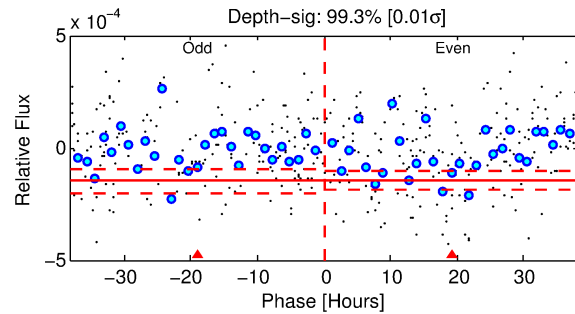
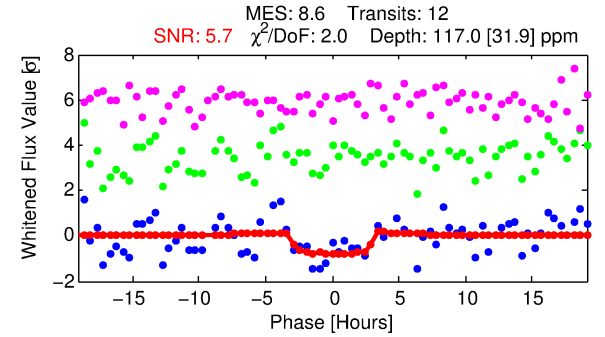
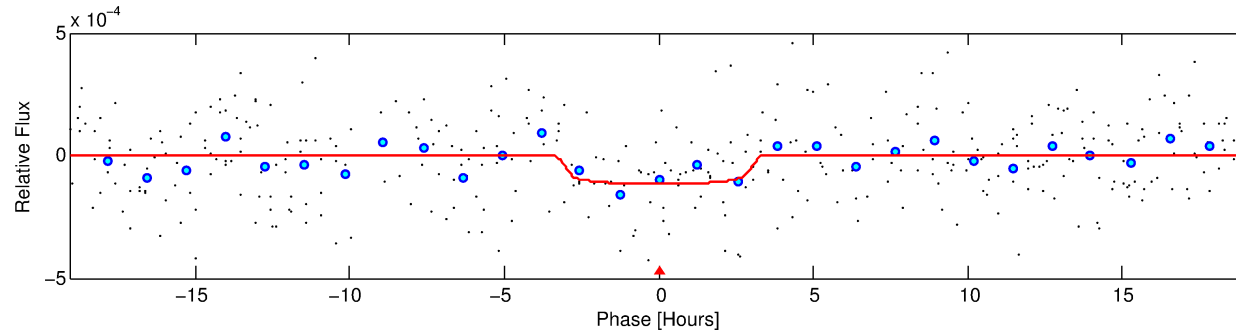
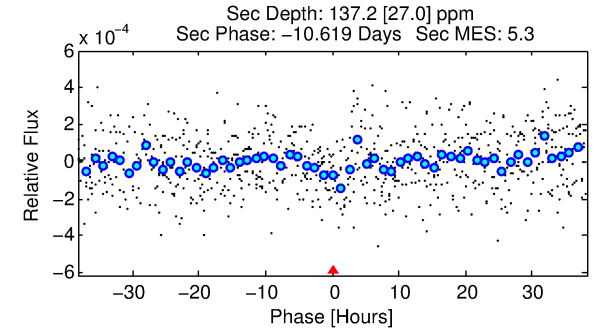
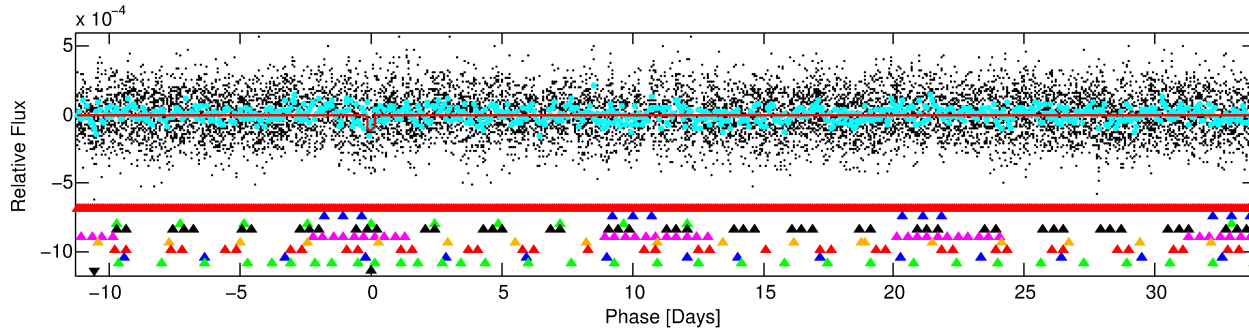
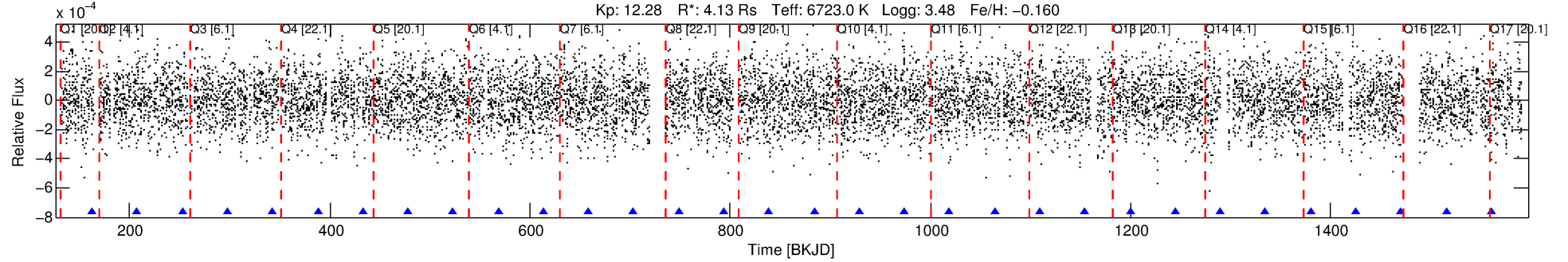
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 005978154-10

No Significant Match Found

# DV One-Page Summary

KIC: 5978154 Candidate: 10 of 10 Period: 45.084 d



## DV Fit Results:

Period = 45.08406 [0.00198] d  
Epoch = 162.6468 [0.0252] BKJD  
Rp/R\* = 0.0112 [0.0071]  
a/R\* = 29.42 [106.21]  
b = 0.85 [1.16]  
Seff = 334.73 [209.99]  
Teq = 1091 [171] K  
Rp = 5.05 [3.79] Re  
a = 0.3057 [0.1172] AU  
Ag = 276.21 [393.36] [0.70σ]  
Teffp = 6875 [2221] K [2.60σ]

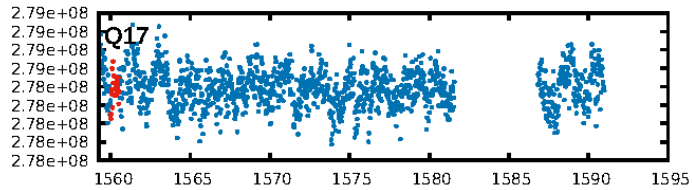
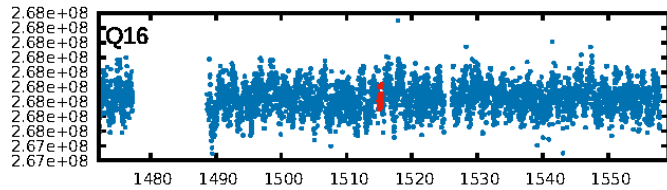
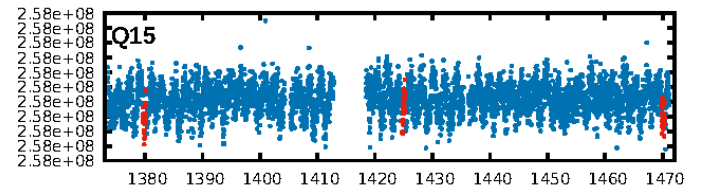
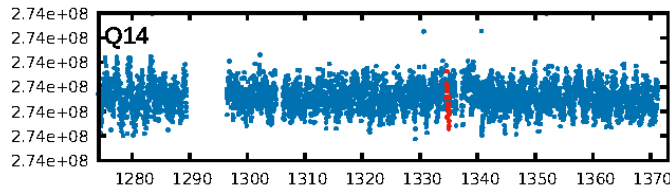
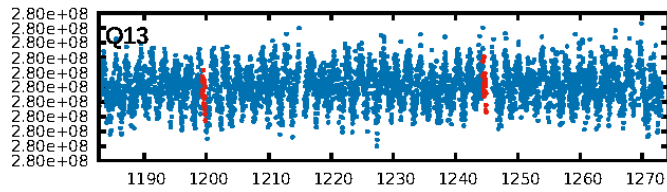
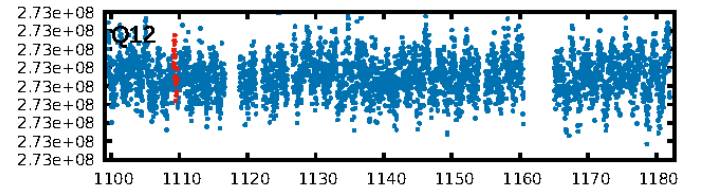
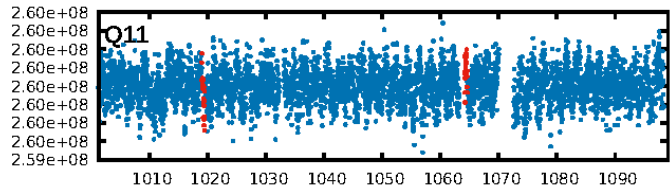
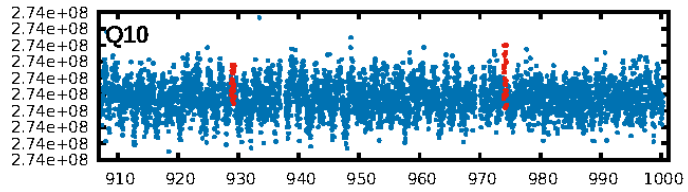
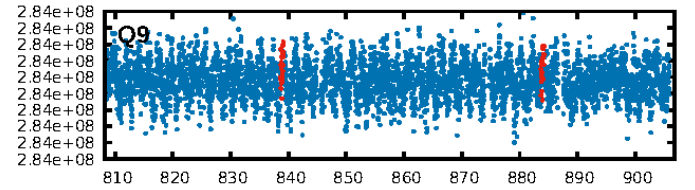
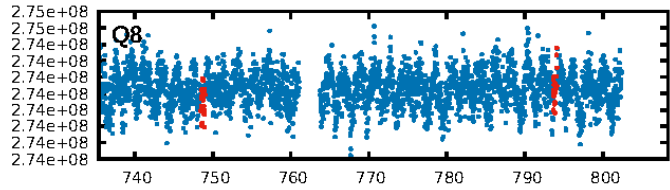
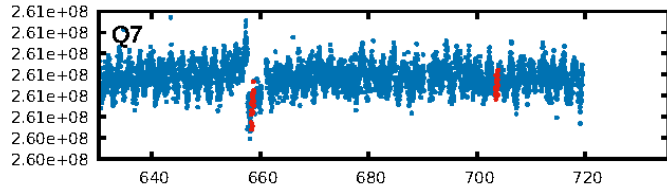
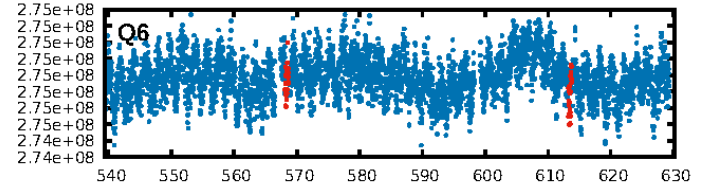
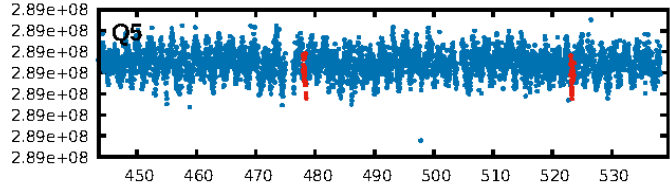
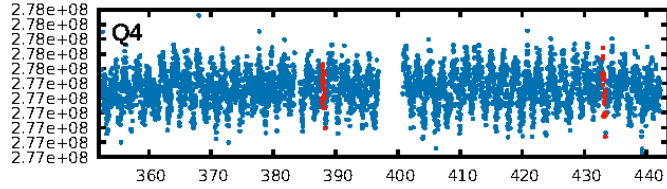
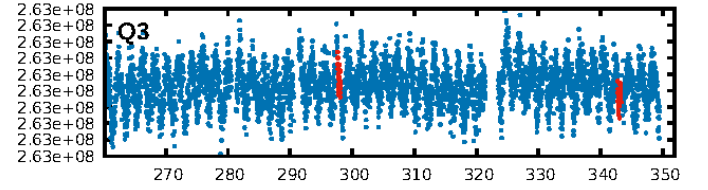
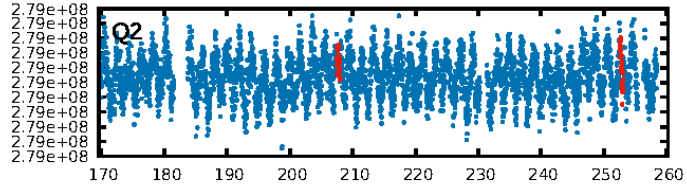
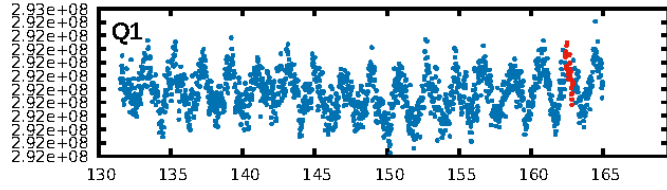
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [5.78σ]  
LongPeriod-sig: 100.0% [131.52σ]  
ModelChiSquare2-sig: 0.1%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [12/12]  
GhostDiagnostic-chr: 1.164  
Centroid-sig: 2.1%  
Centroid-so: 0.703 arcsec [1.14σ]  
OotOffset-rm: 1.079 arcsec [1.69σ]  
KicOffset-rm: 1.173 arcsec [1.79σ]  
OotOffset-st: 3/4/3/2 [12]  
KicOffset-st: 3/4/3/2 [12]  
DiffImageQuality-fgm: 0.33 [4/12]  
DiffImageOverlap-fno: 0.00 [0/15]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 03-Feb-2016 05:54:27 Z

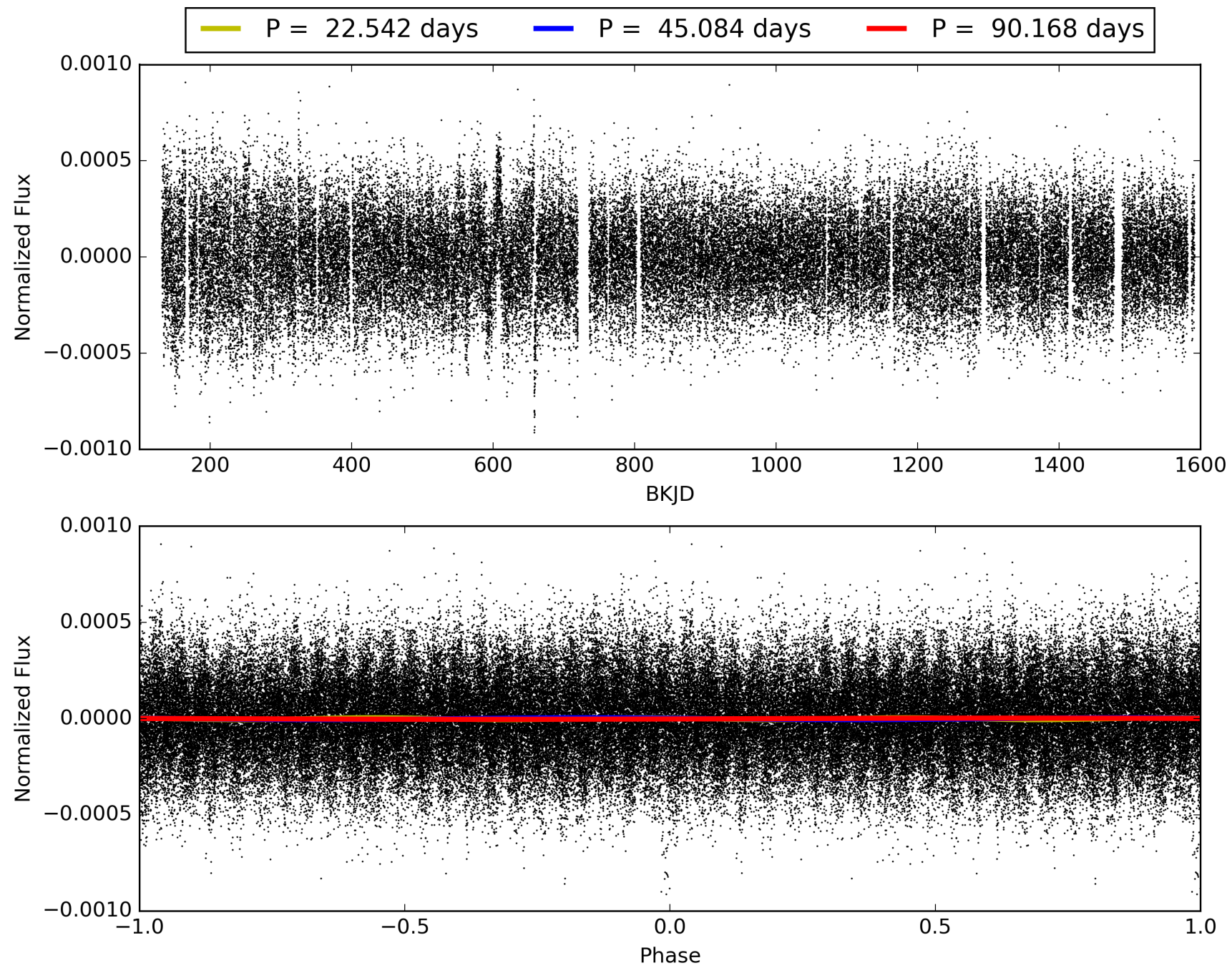
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

## TCE 005978154-10, PDC Light Curves



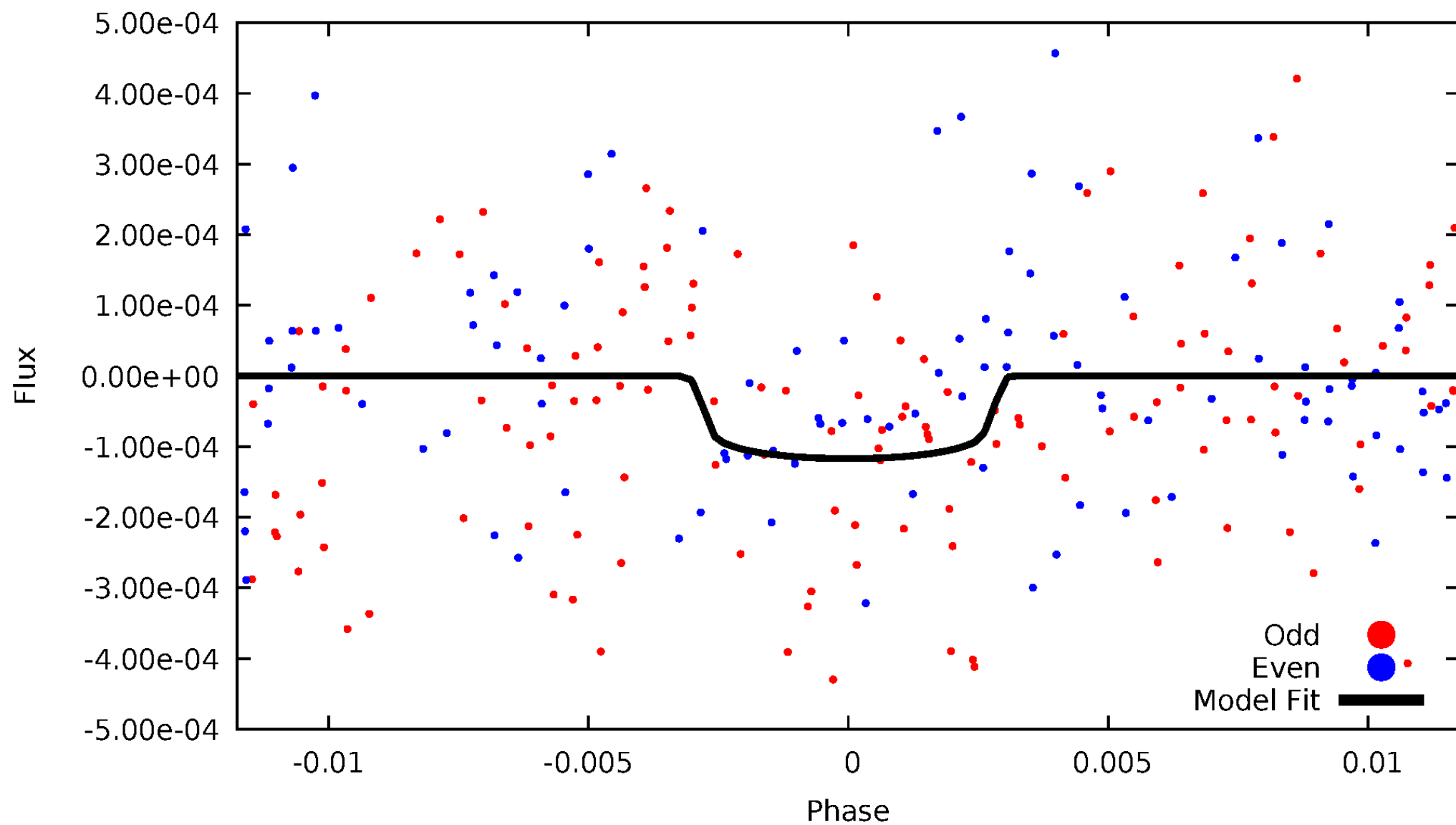


# TCE 005978154-10



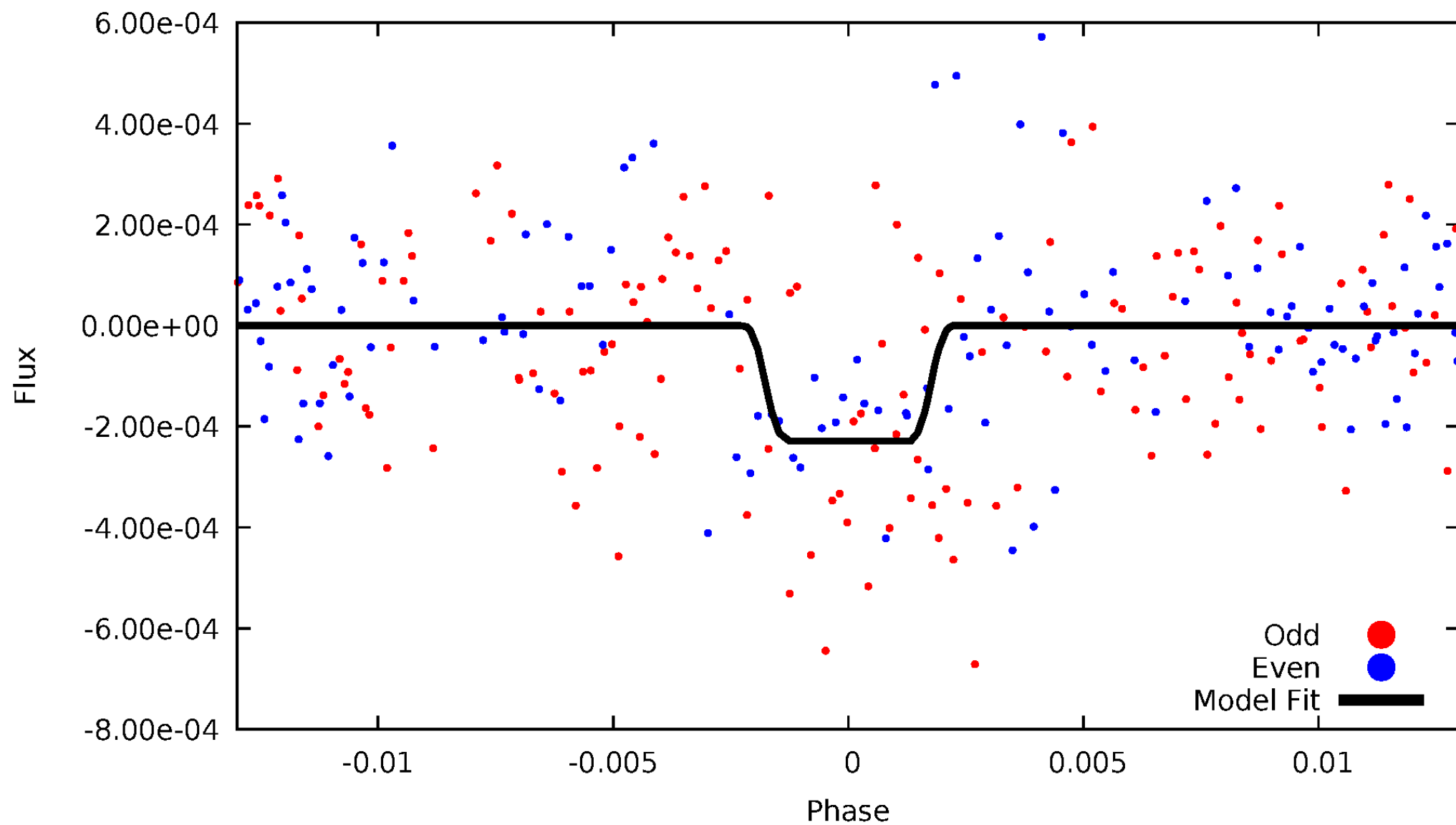
# DV Odd/Even

TCE 005978154-10



# ALT Odd/Even

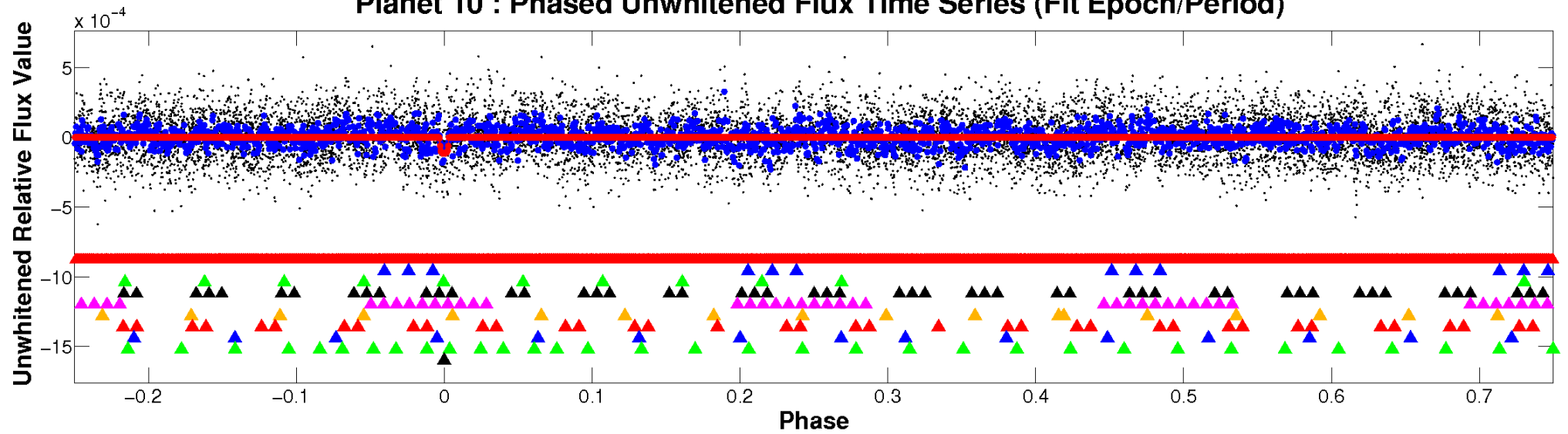
TCE 005978154-10



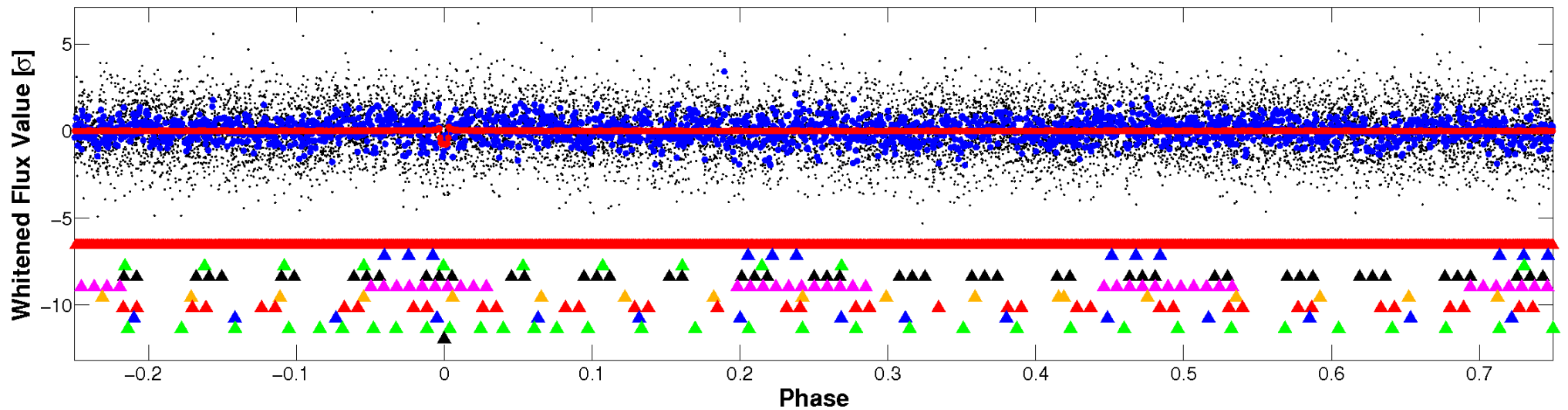


# Non-Whitened Vs. Whitened Light Curve

Planet 10 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

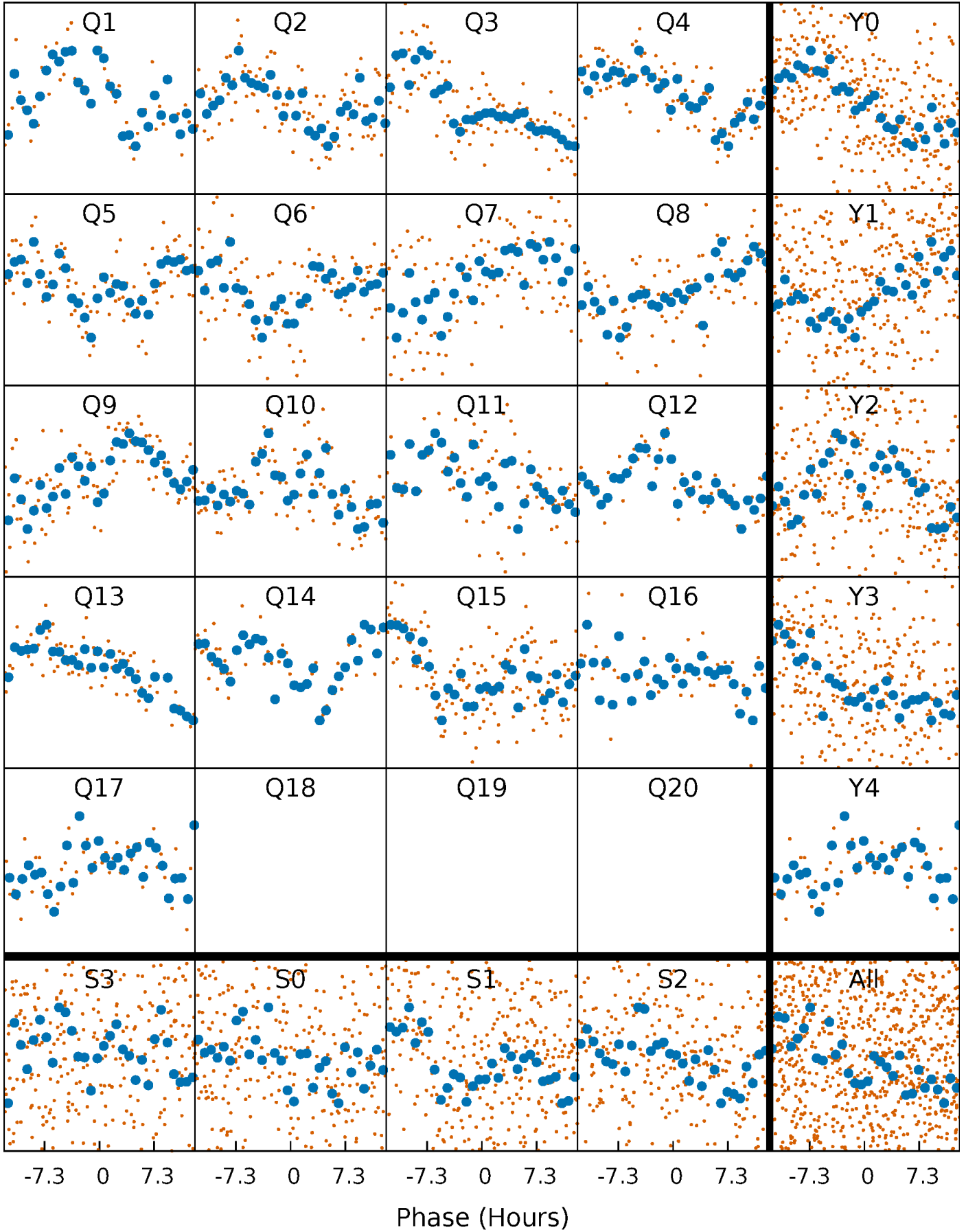


Planet 10 : Phased Whitened Flux Time Series (Fit Epoch/Period)



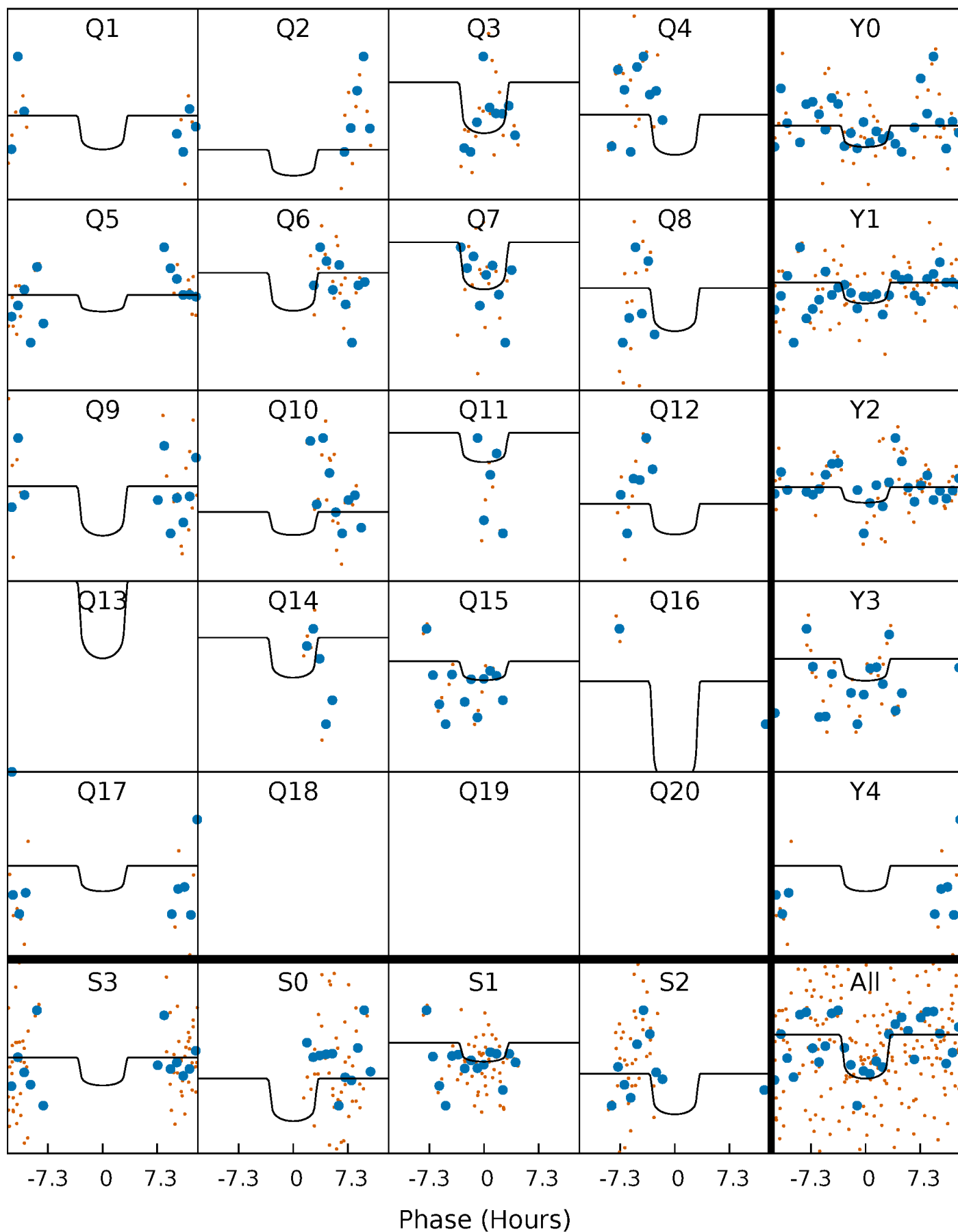
# PDC Quarter-Phased Transit Curves

TCE 005978154-10   P= 45.084056 Days    $T_0=162.646790$  (BKJD)



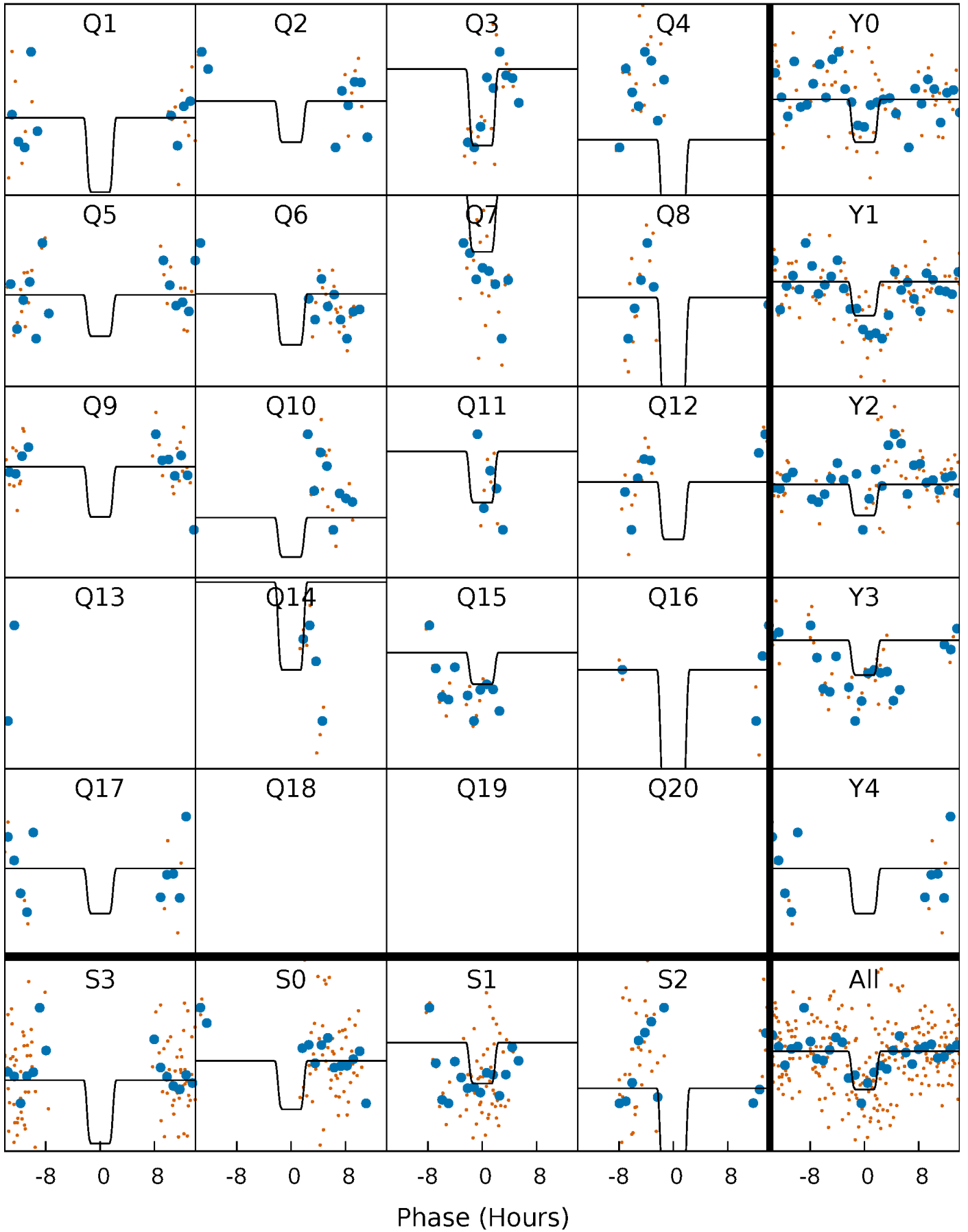
# DV Quarter-Phased Transit Curves

TCE 005978154-10 P= 45.084056 Days  $T_0=162.646790$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

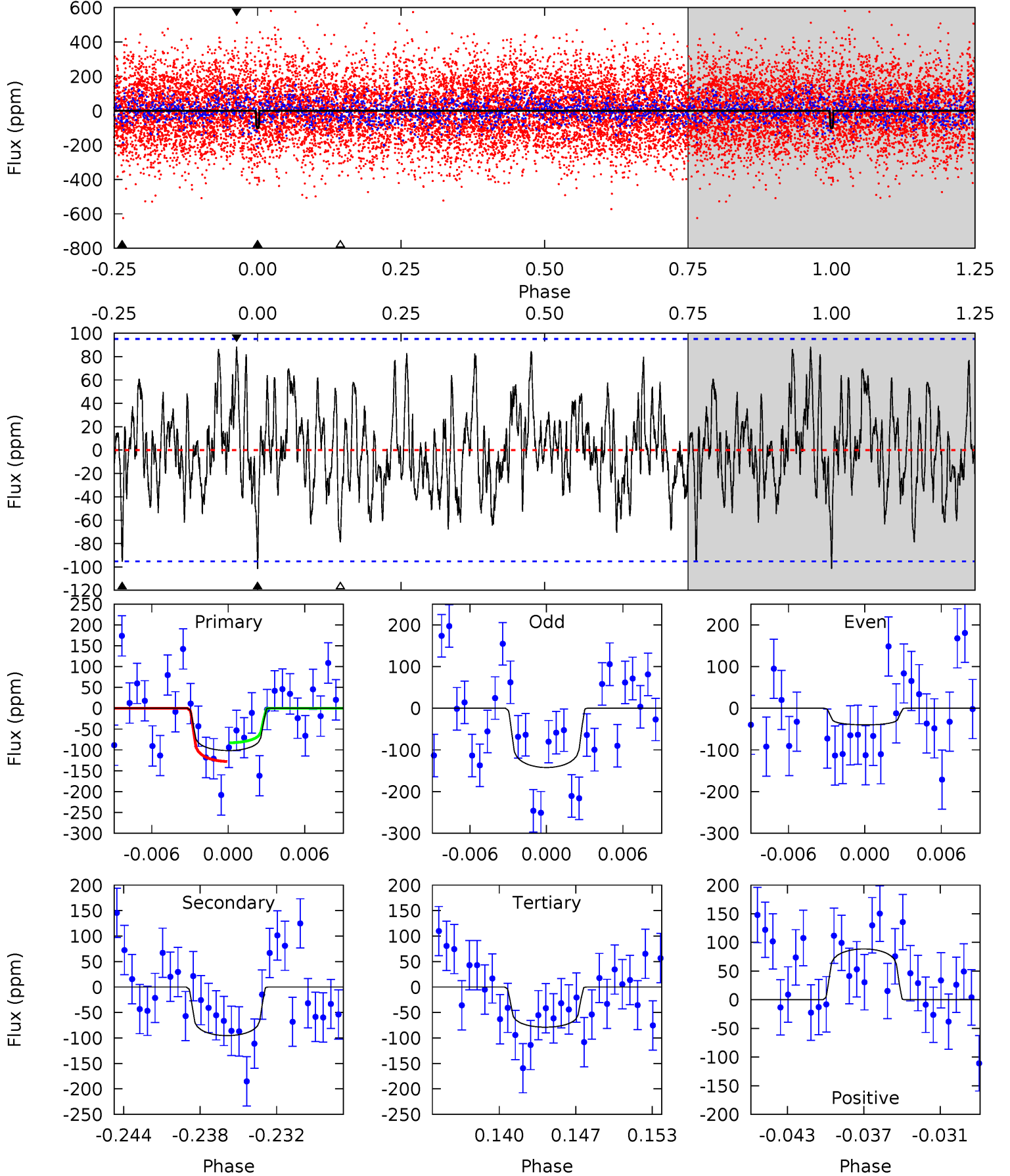
TCE 005978154-10   P= 45.085119 Days    $T_0=162.621796$  (BKJD)



# DV Model-Shift Uniqueness Test

005978154-10,  $P = 45.084056$  Days,  $E = 117.562734$  Days

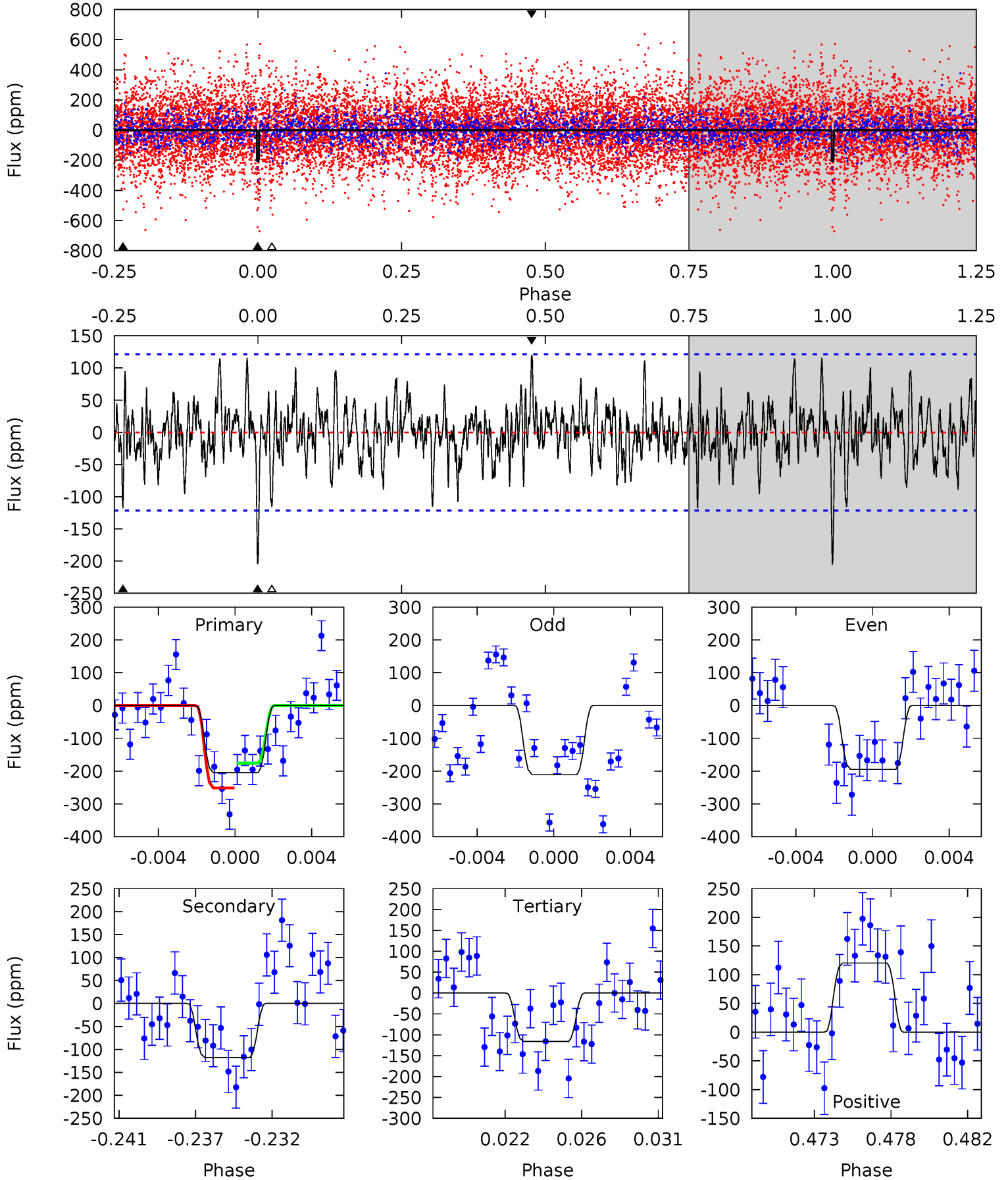
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
5.46	5.13	4.24	4.77	5.12	2.74	1.66	1.22	0.70	0.89	0.36	2.73	1.46	0.47	1.19



# Alt Model-Shift Uniqueness Test

005978154-10, P = 45.085119 Days, E = 117.536677 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
8.73	5.03	4.96	5.14	5.18	2.85	1.47	3.78	3.60	0.08	-0.10	0.33	0.81	0.37	1.59



### Stellar Parameters For KIC 005978154

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$6723^{+202}_{-223}$	$3.478^{+0.360}_{-0.090}$	$-0.160^{+0.300}_{-0.250}$	$4.134^{+0.412}_{-1.647}$	$1.872^{+0.171}_{-0.398}$	$0.037^{+0.107}_{-0.011}$
	+3%/-3%	+10%/-3%	+188%/-156%	+10%/-40%	+9%/-21%	+286%/-29%
Source	PHO1	FLK73	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 005978154-10 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-95 \pm 19$	$4.77^{+3.23}_{-2.51}$	$1506^{+81}_{-148}$	$6057^{+3525}_{-1147}$	$209^{+725}_{-136}$
Alt.	$-118 \pm 23$	$6.18^{+3.31}_{-2.87}$	$1492^{+85}_{-146}$	$5671^{+2166}_{-933}$	$154^{+376}_{-91}$

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



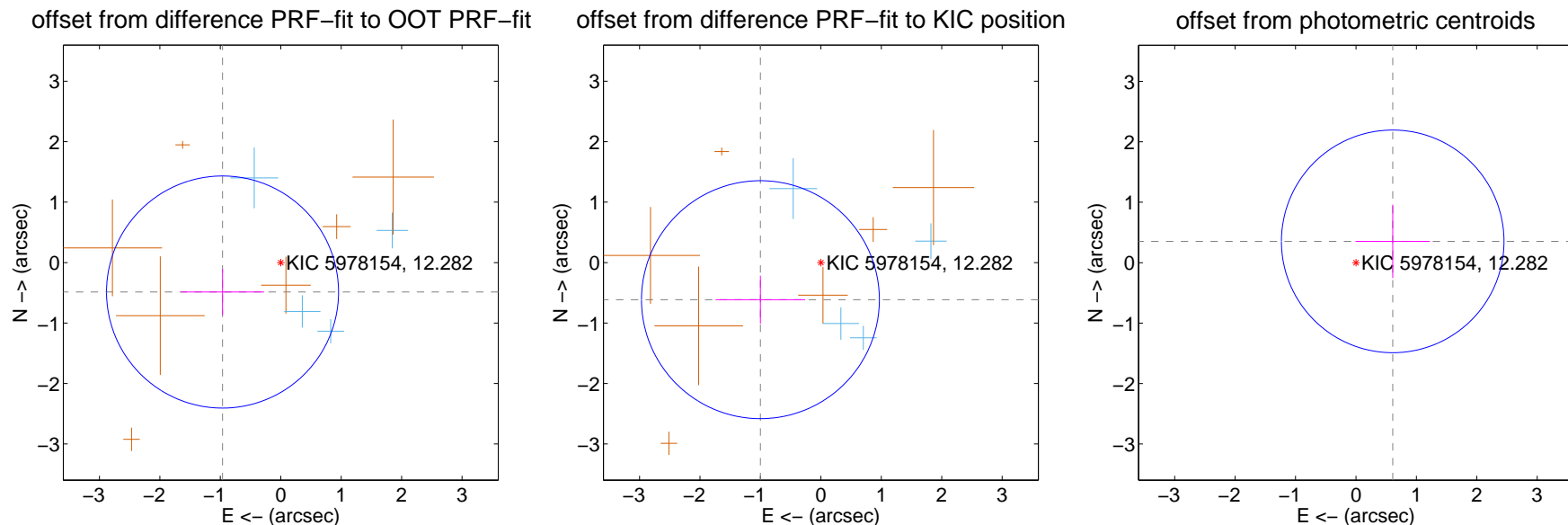
## DV Centroid Data

Supplemental centroid analysis for 005978154-10. Kepler magnitude: 12.28. Transit SNR 5.73

There are 4 quarters with good PRF difference image offsets

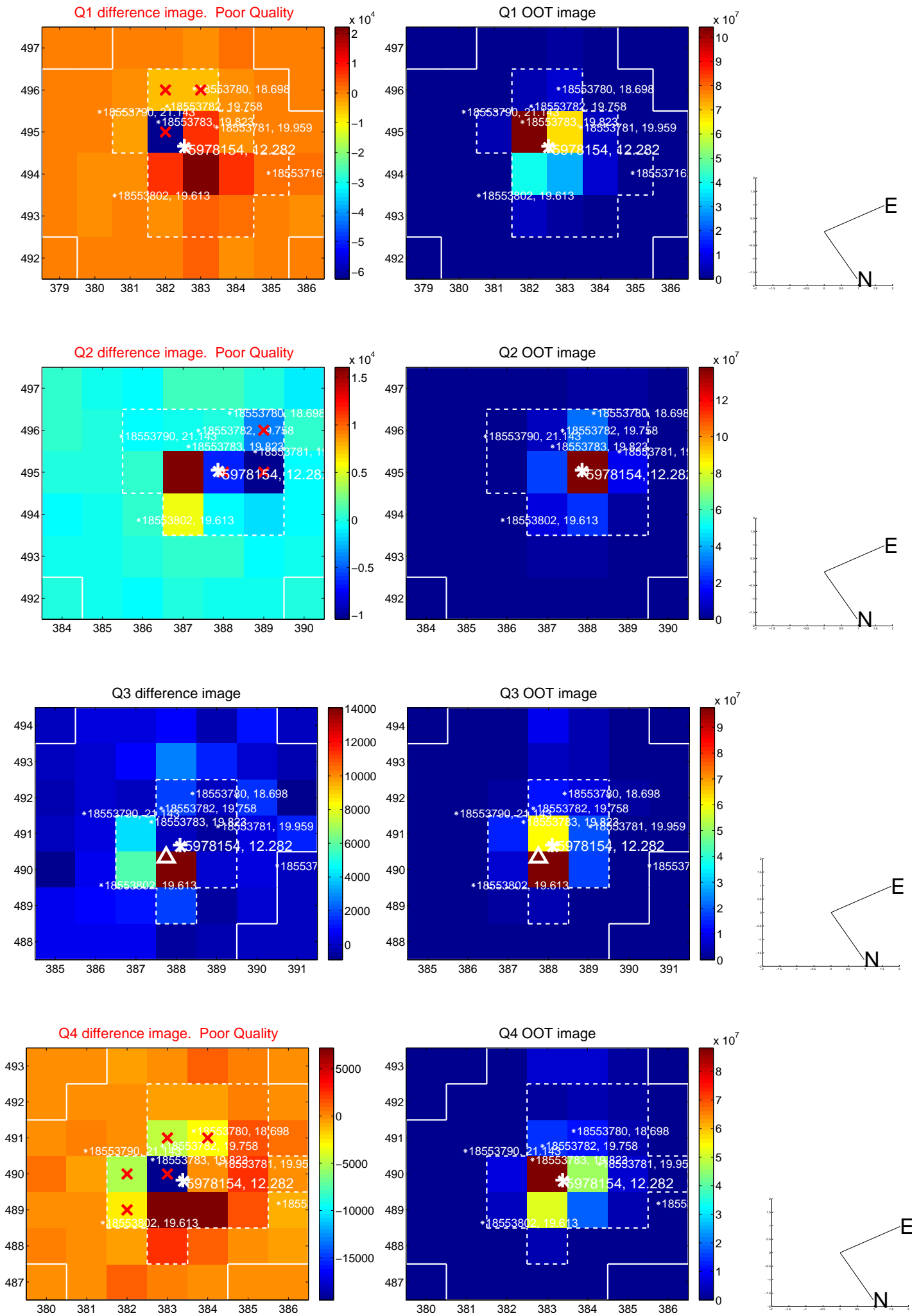
The direct PRF centroid is offset from the target star catalog position by about 0.17 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.079 \pm 0.640$	1.69	$0.963 \pm 0.689$	$-0.487 \pm 0.380$
PRF-fit source offset from KIC position	$1.173 \pm 0.656$	1.79	$1.000 \pm 0.741$	$-0.614 \pm 0.397$
photometric centroid source offset	$0.70 \pm 0.61$	1.14	$-0.61 \pm 0.62$	$0.35 \pm 0.61$

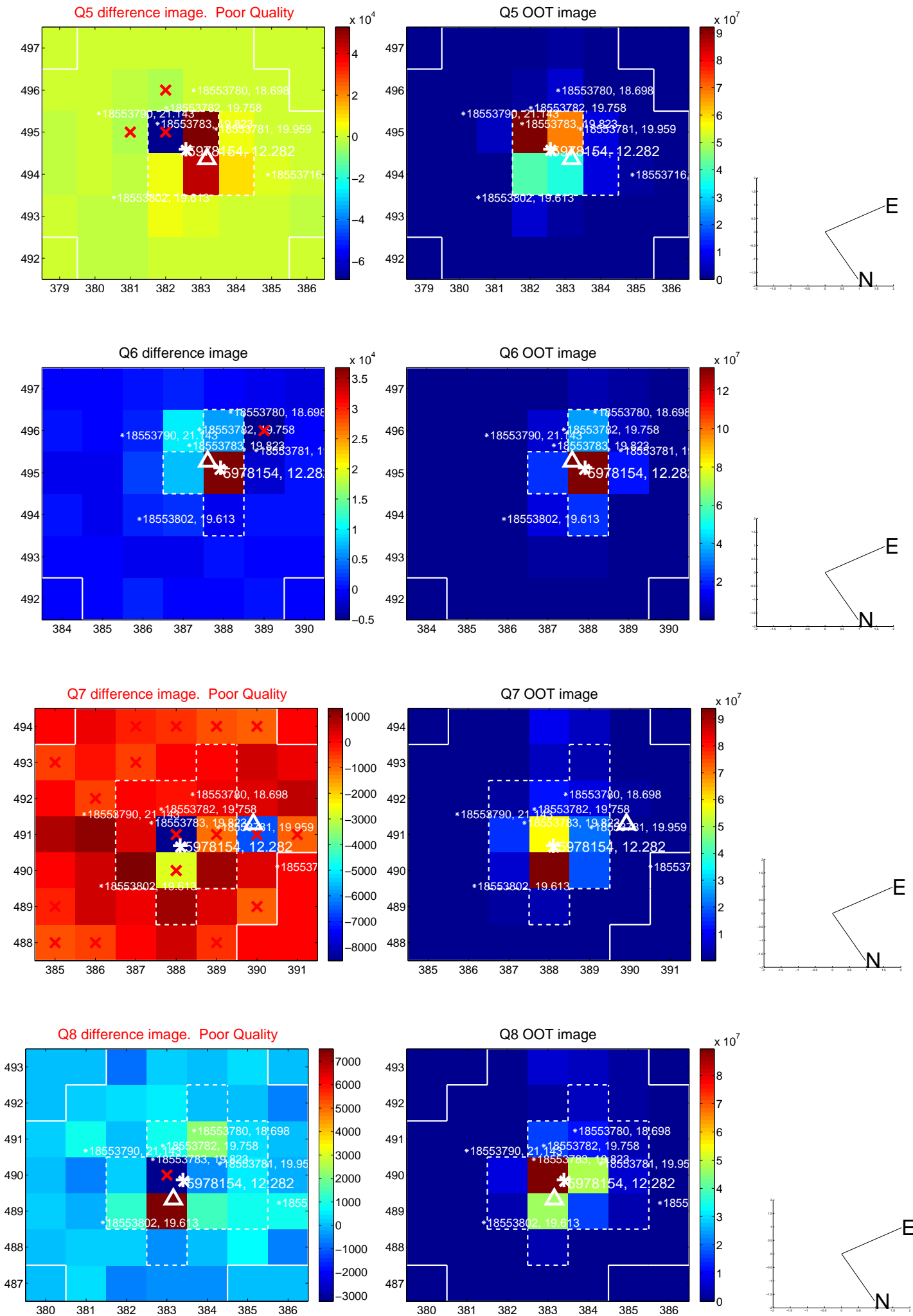


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets**; **Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

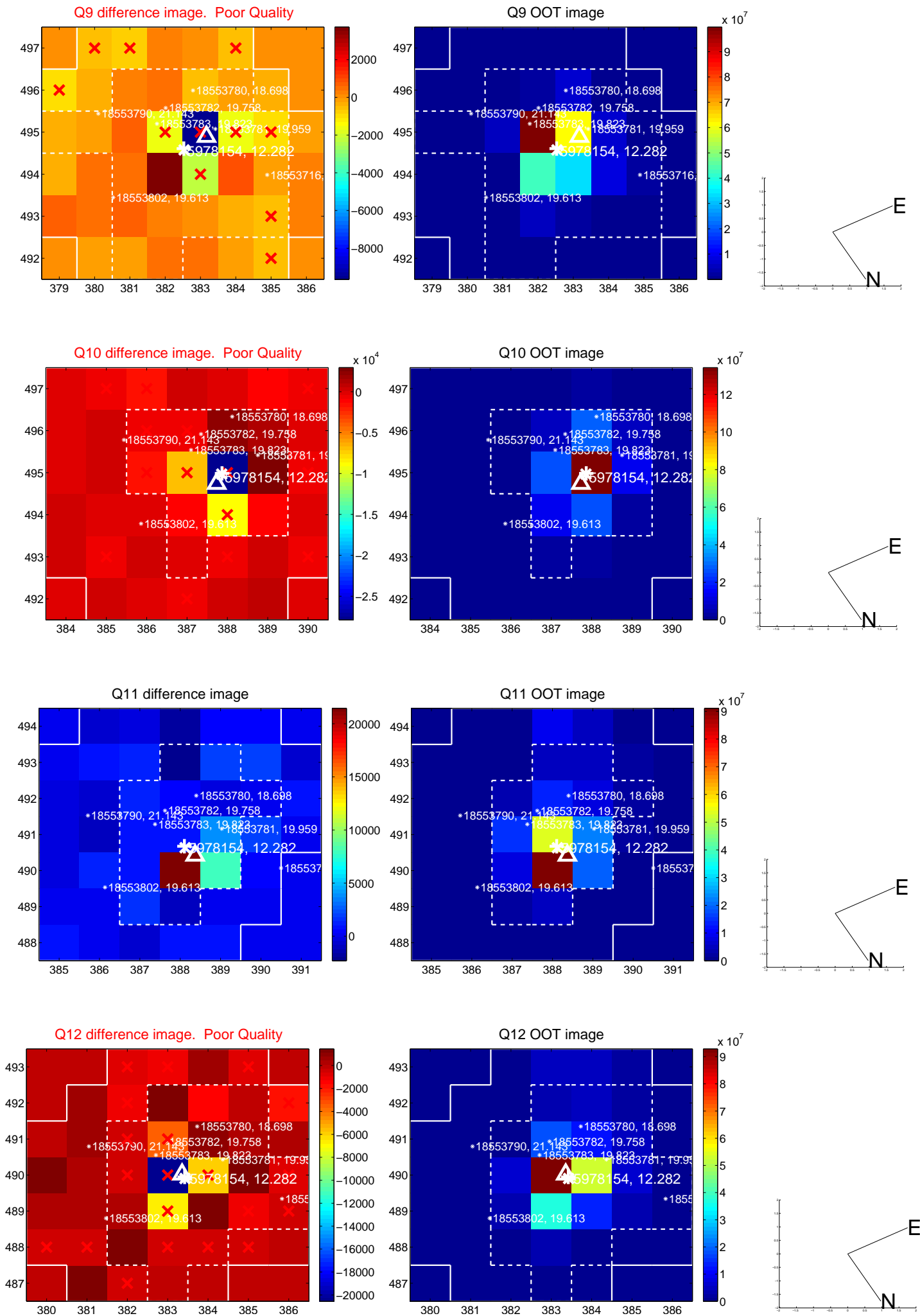
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



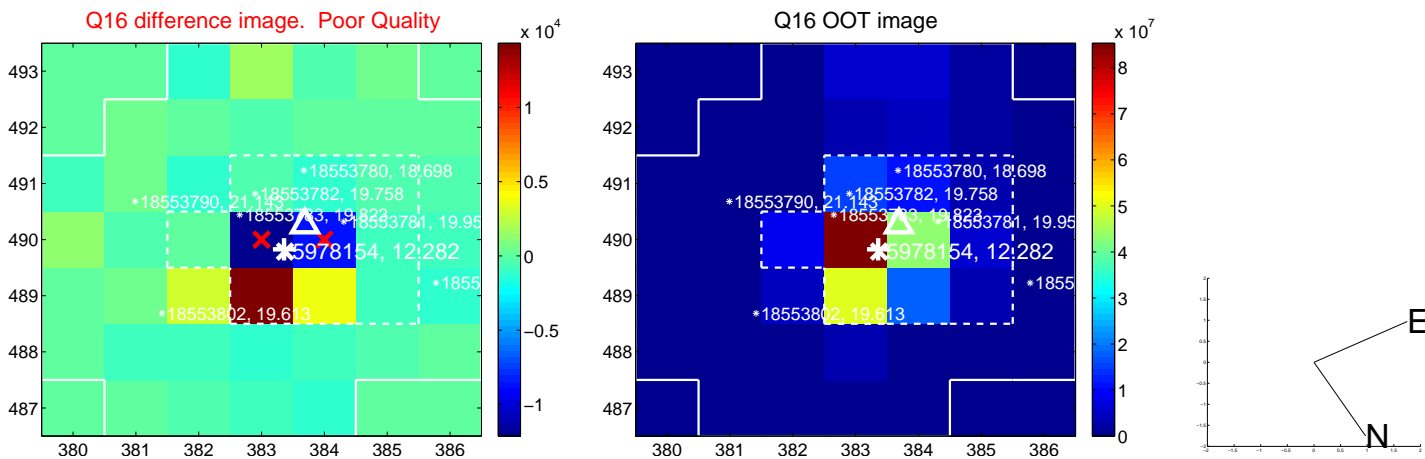
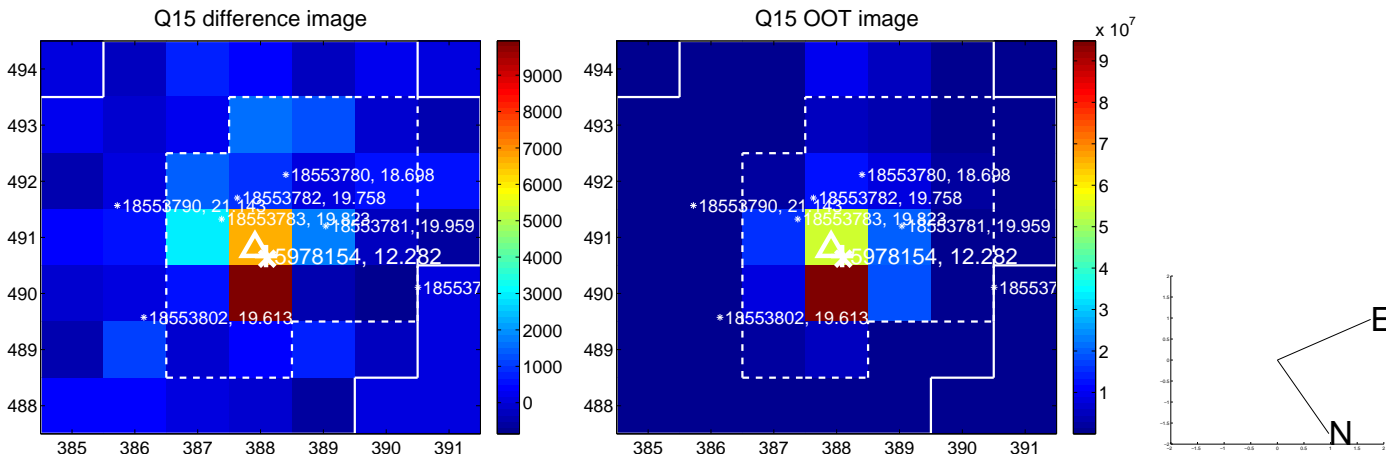
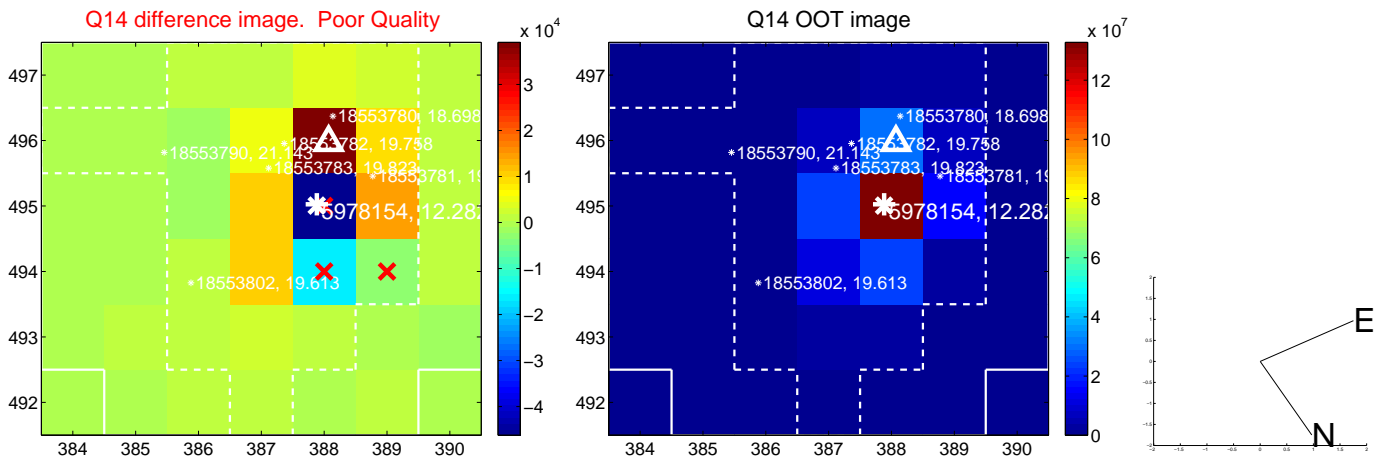
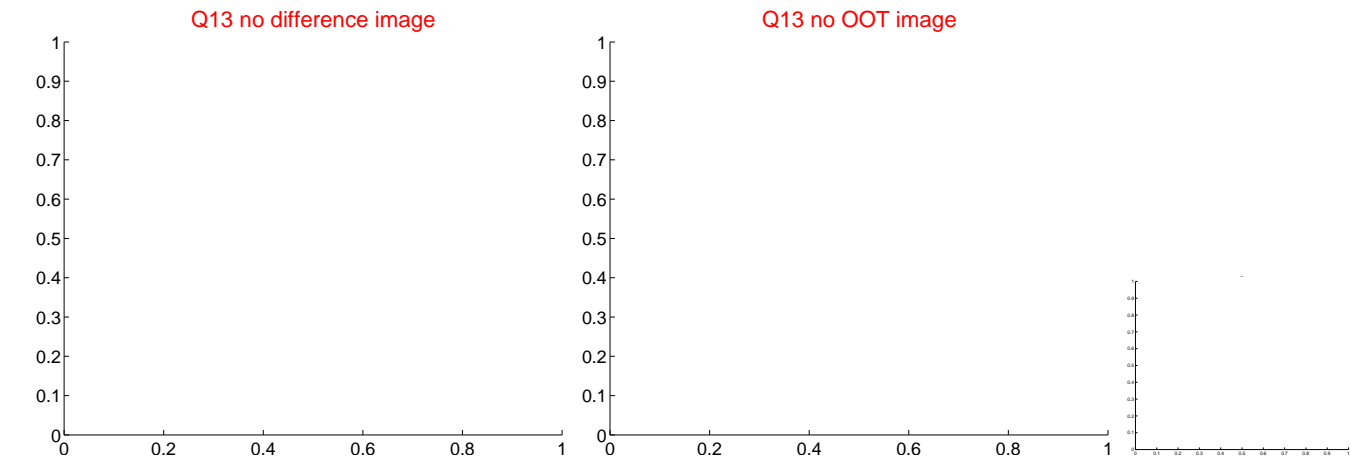
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



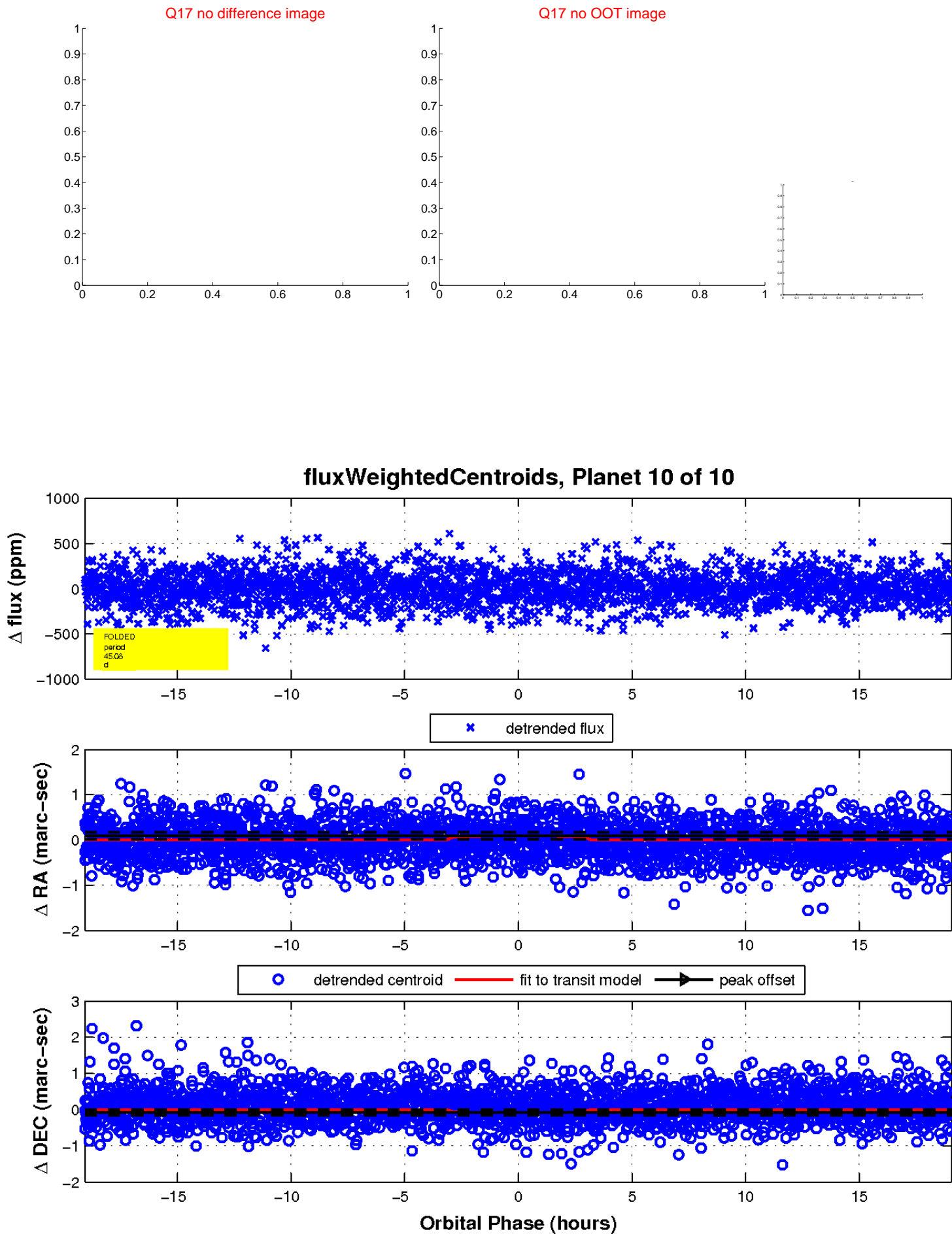
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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.



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