

KIC 009489590

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})
009489590-01	OBS	No	0.652924	131.924147	36.6	2.646	16.2	15.1	1.90	7384	1.32	32095.30
009489590-02	OBS	No	0.652912	131.818561	54.2	7.647	10.4	12.9	1.90	7384	1.42	32096.12

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009489590-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED
009489590-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—SAME_NTL_PERIOD—CENT_SATURATED

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

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

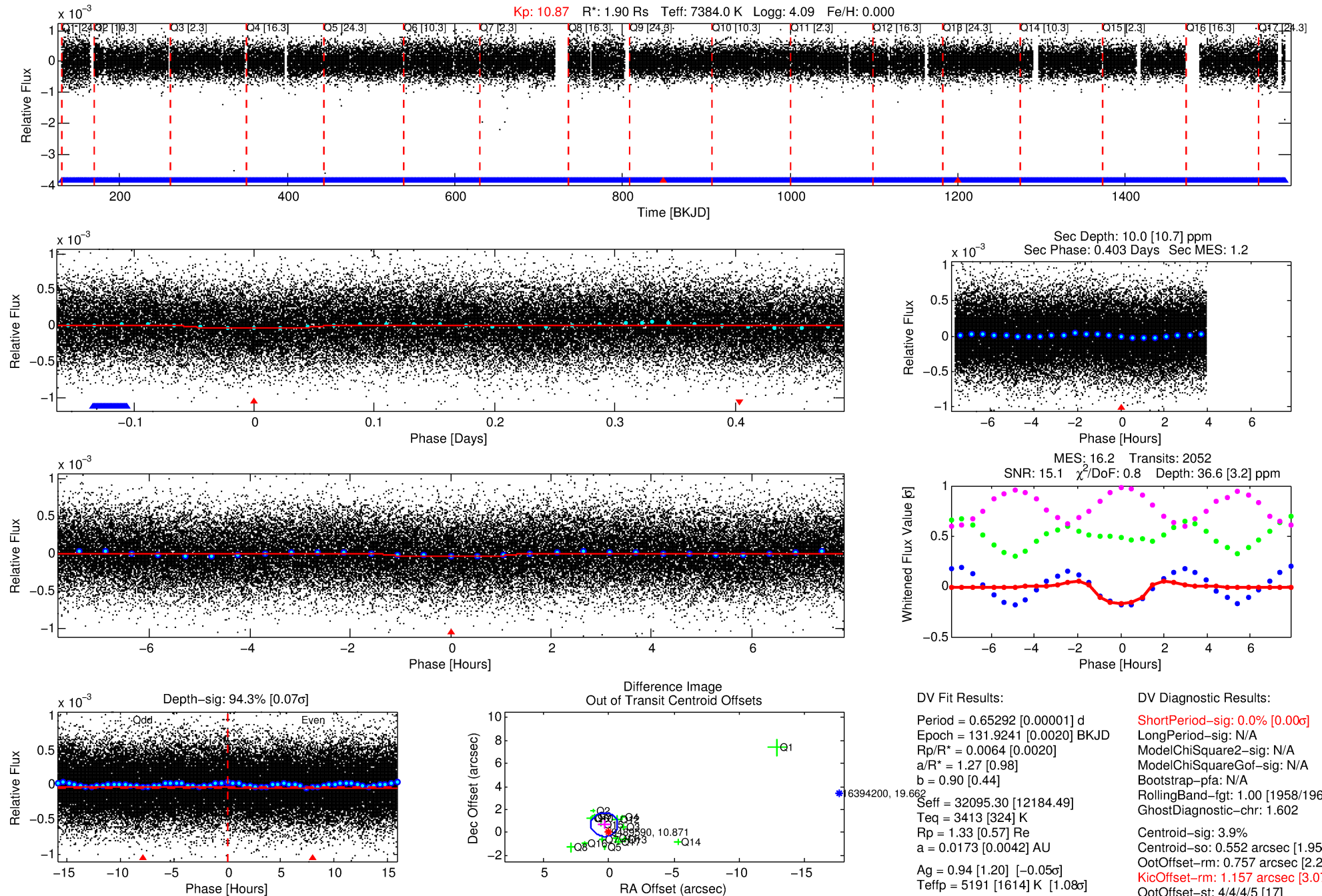
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009489590-01

No Significant Match Found

DV One-Page Summary

KIC: 9489590 Candidate: 1 of 2 Period: 0.653 d



DV Fit Results:

Period = 0.65292 [0.00001] d
Epoch = 131.9241 [0.0020] BKJD
Rp/R* = 0.0064 [0.0020]
a/R* = 1.27 [0.98]
b = 0.90 [0.44]
Seff = 32095.30 [12184.49]
Teq = 3413 [324] K
Rp = 1.33 [0.57] Re
a = 0.0173 [0.0042] AU
Ag = 0.94 [1.20] [-0.05σ]
Teffp = 5191 [1614] K [1.08σ]

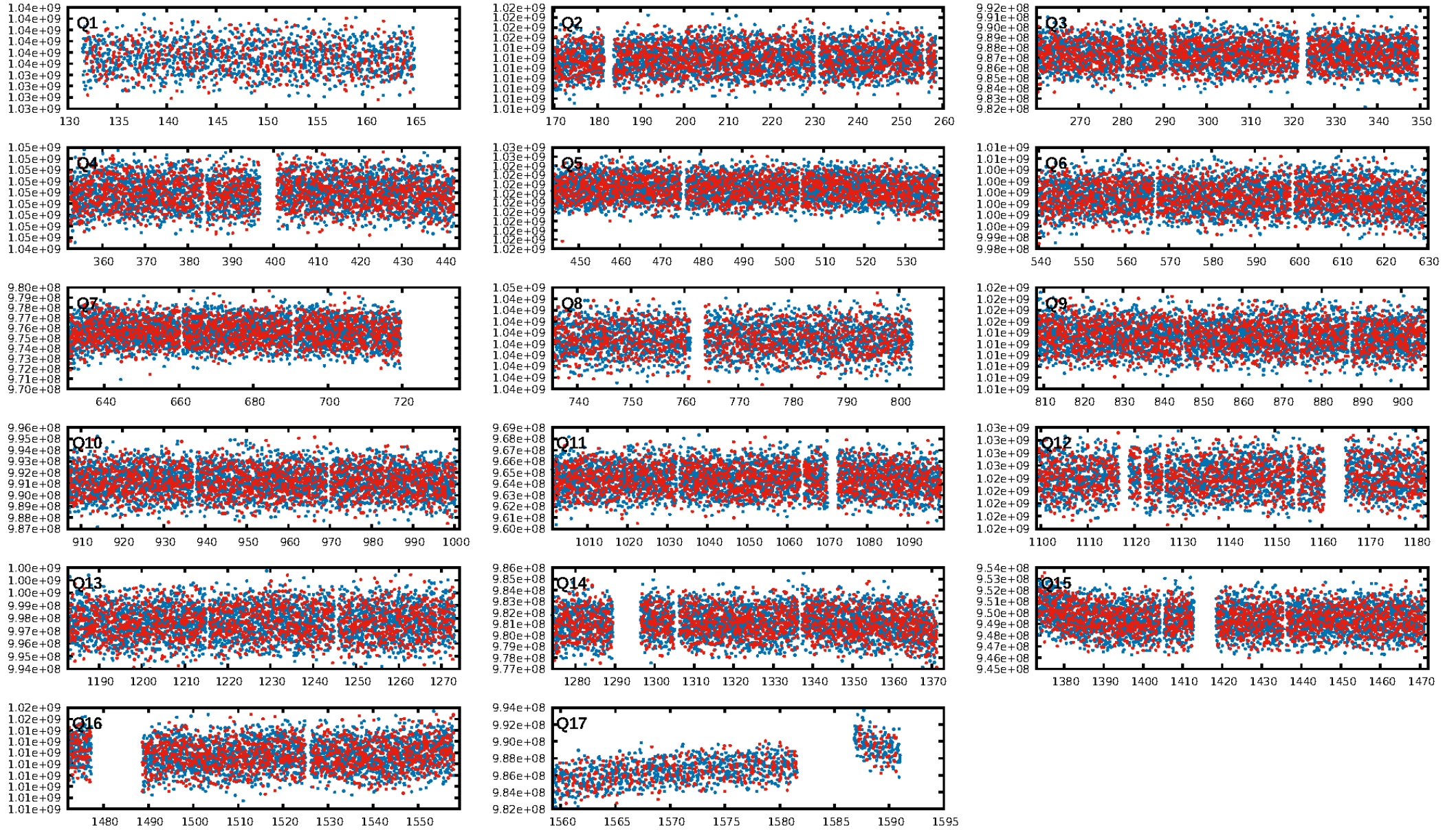
DV Diagnostic Results:

ShortPeriod-sig: 0.0% [0.00σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: N/A
RollingBand-fgt: 1.00 [1958/1960]
GhostDiagnostic-chr: 1.602
Centroid-sig: 3.9%
Centroid-so: 0.552 arcsec [1.95σ]
OotOffset-rm: 0.757 arcsec [2.22σ]
KicOffset-rm: 1.157 arcsec [3.07σ]
OotOffset-st: 4/4/4/5 [17]
KicOffset-st: 4/4/4/5 [17]
DiffImageQuality-fgm: 0.65 [11/17]
DiffImageOverlap-fno: 0.00 [0/17]

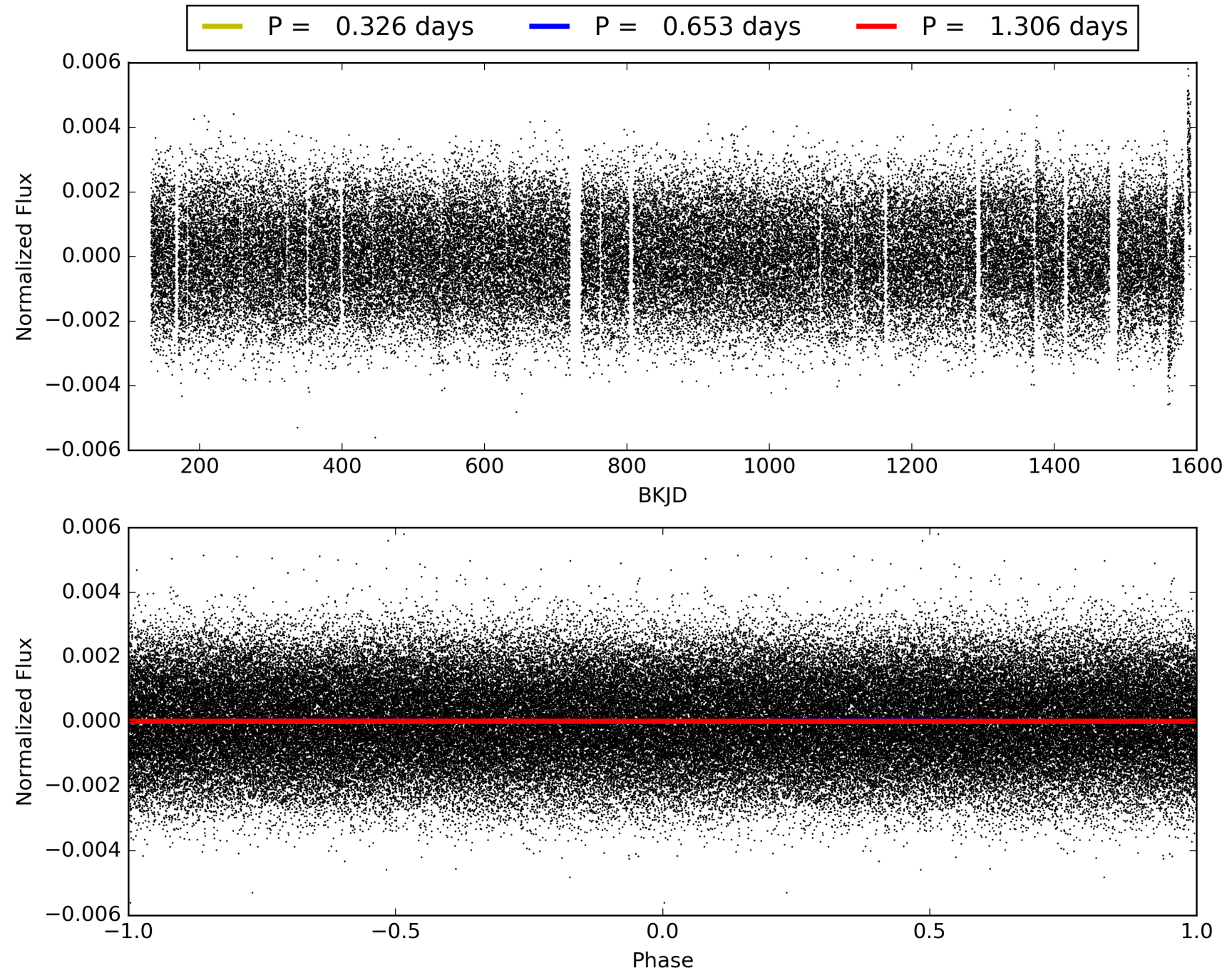
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 17:30:12 Z

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

TCE 009489590-01, PDC Light Curves

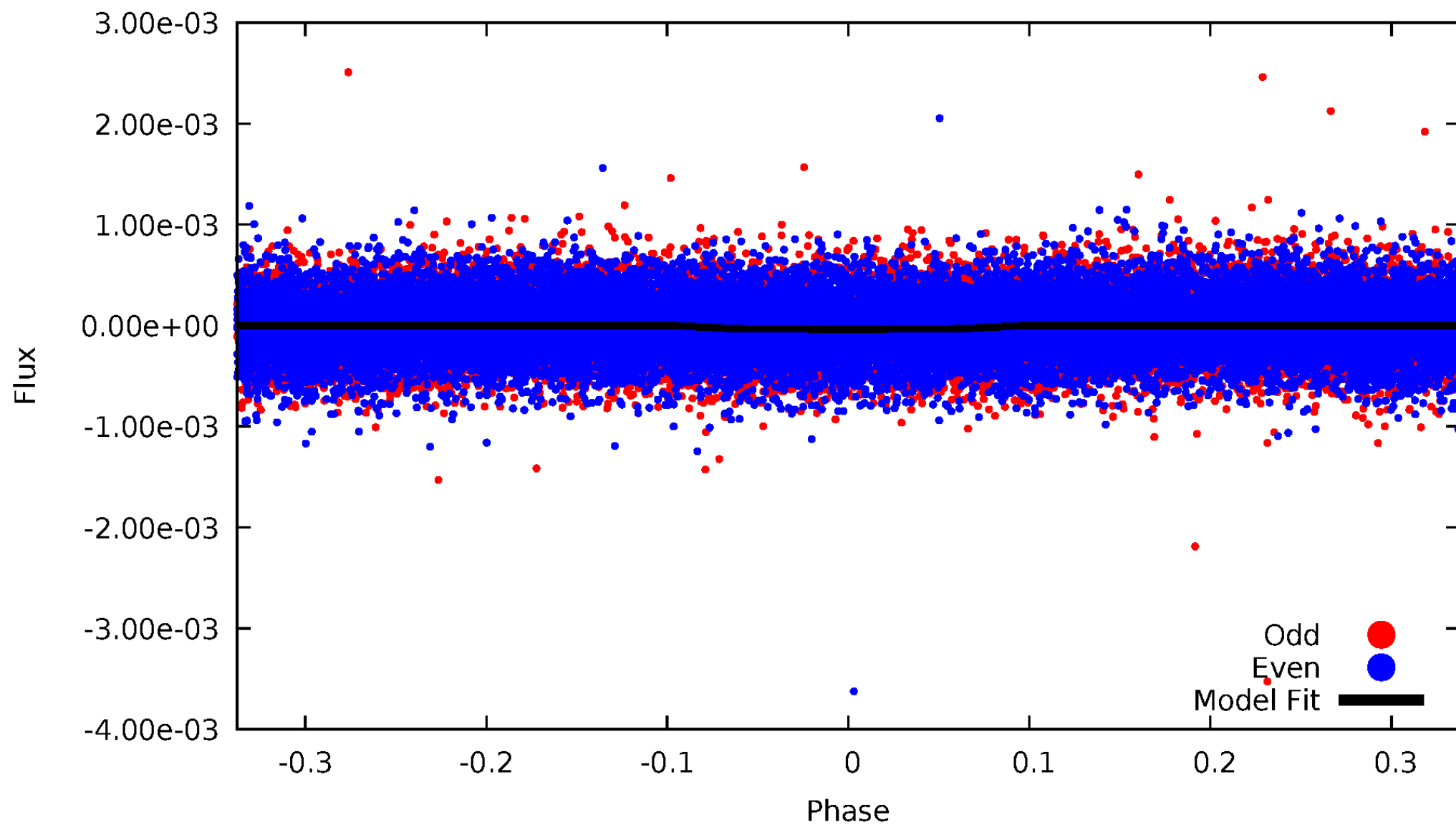


TCE 009489590-01



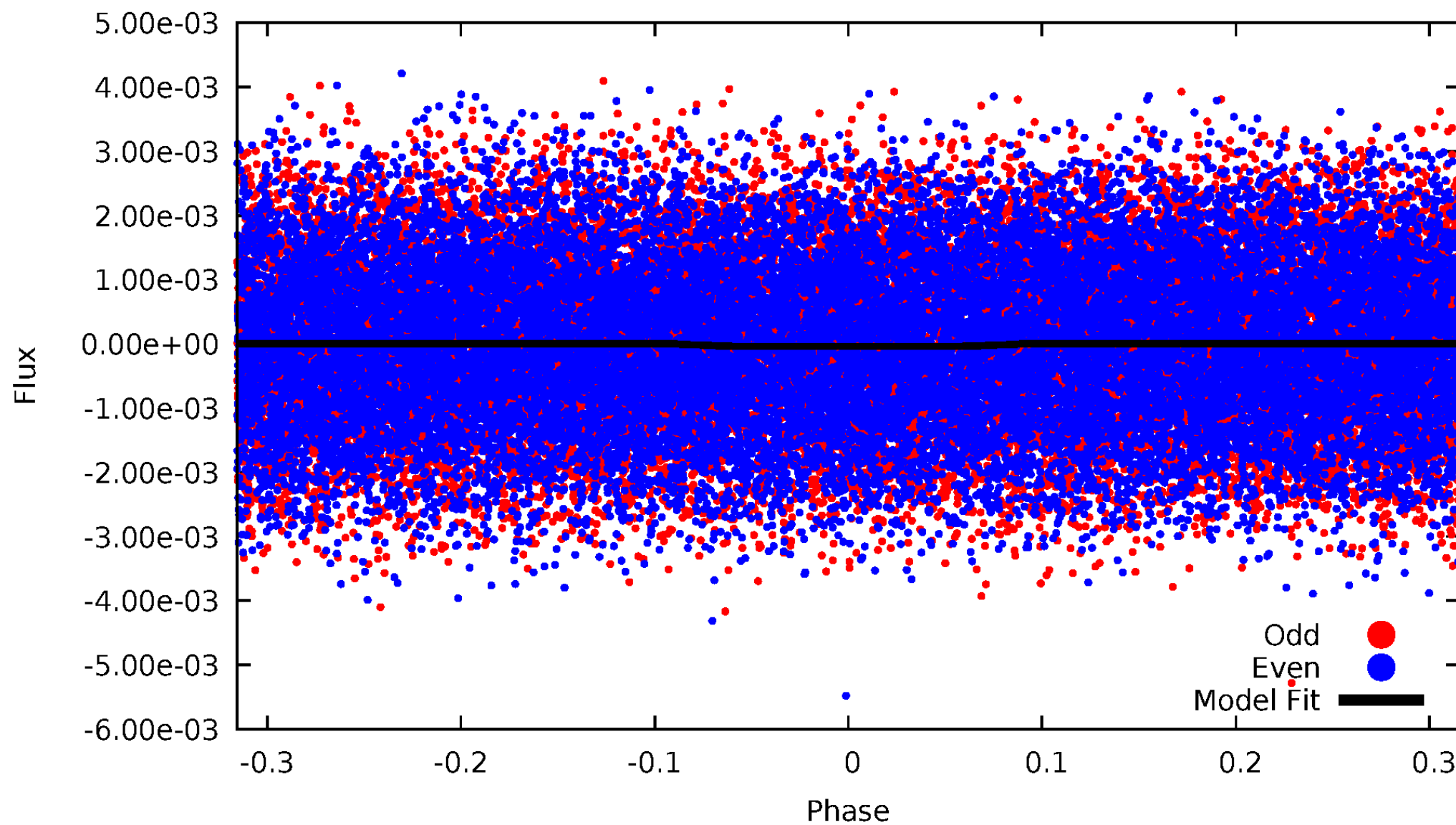
DV Odd/Even

TCE 009489590-01



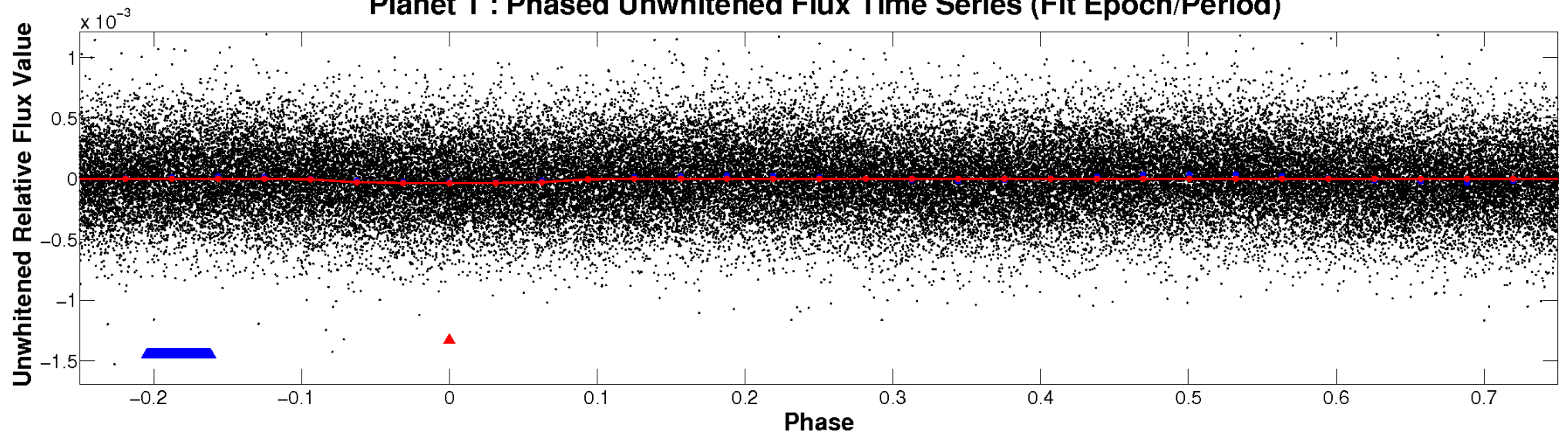
ALT Odd/Even

TCE 009489590-01

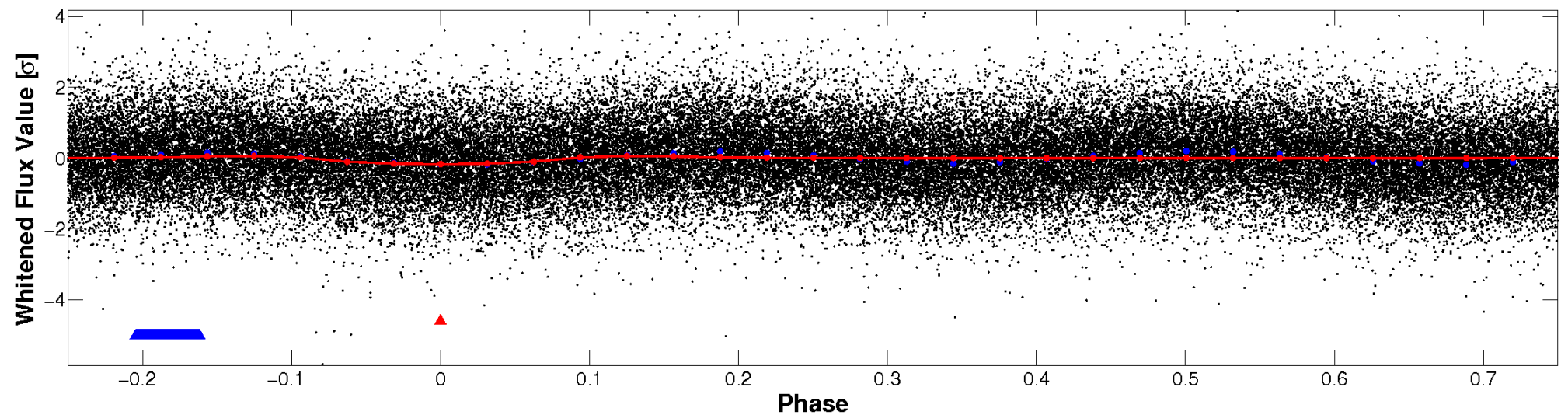


Non-Whitened Vs. Whitened Light Curve

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

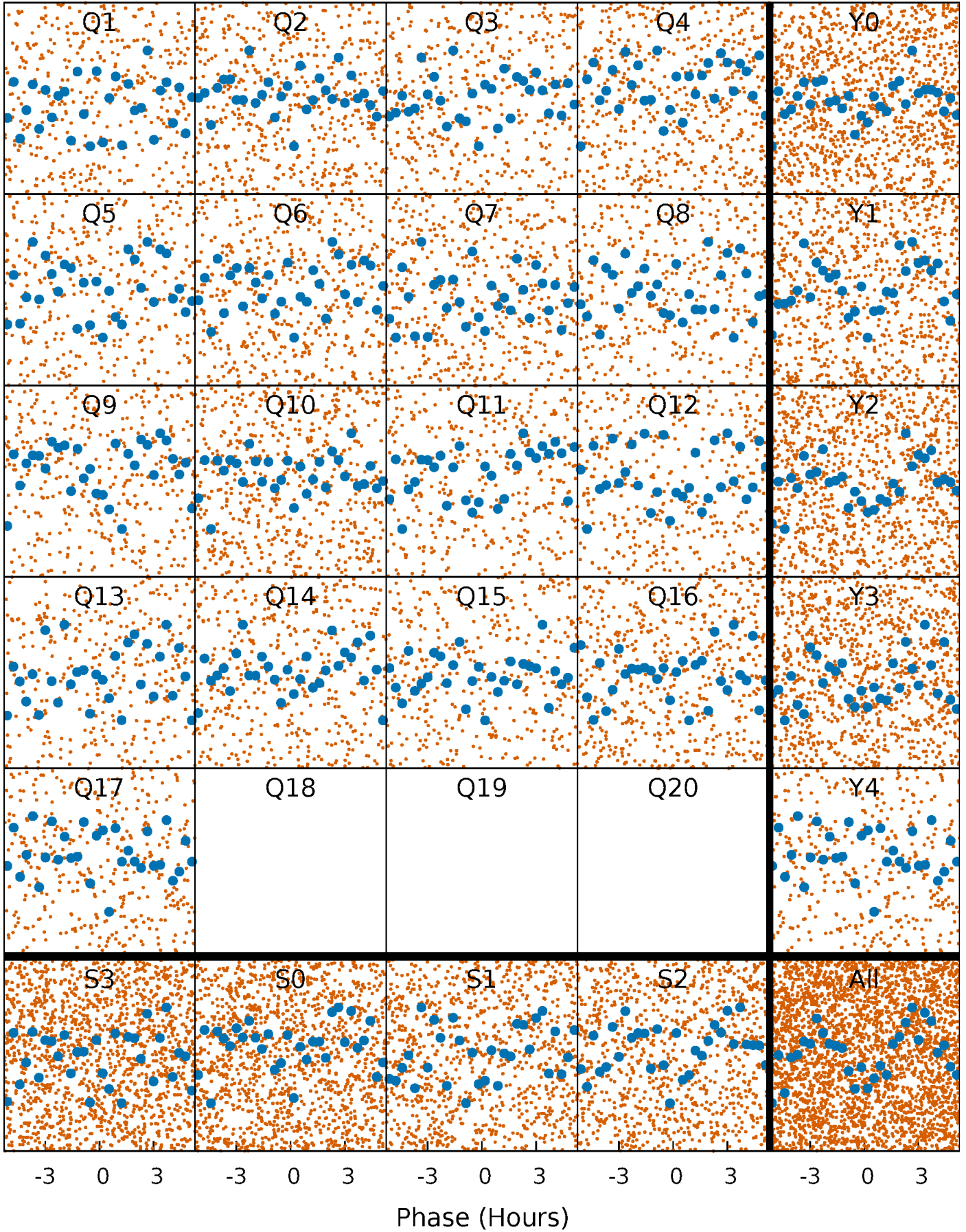


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



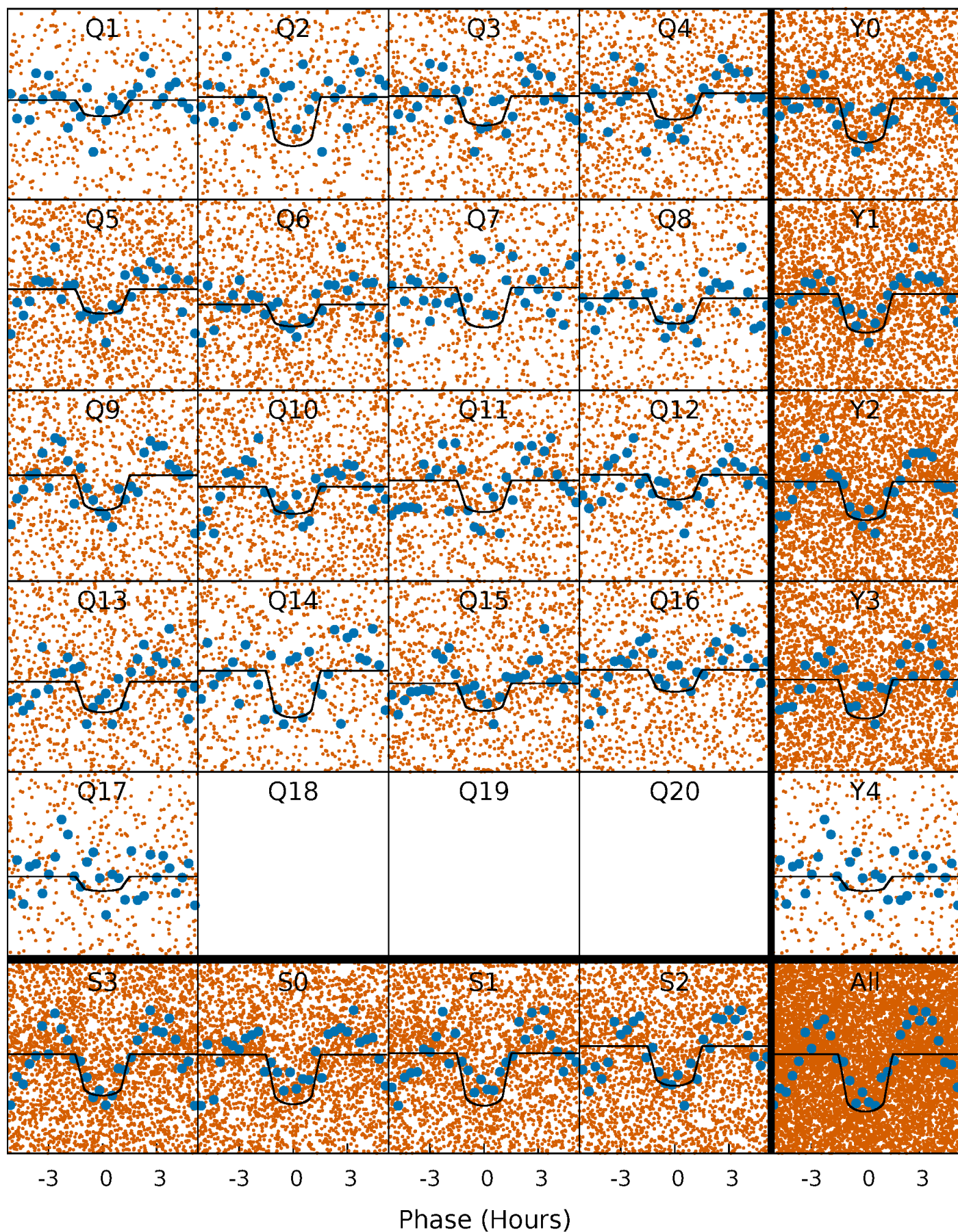
PDC Quarter-Phased Transit Curves

TCE 009489590-01 P= 0.652924 Days $T_0=131.924147$ (BKJD)



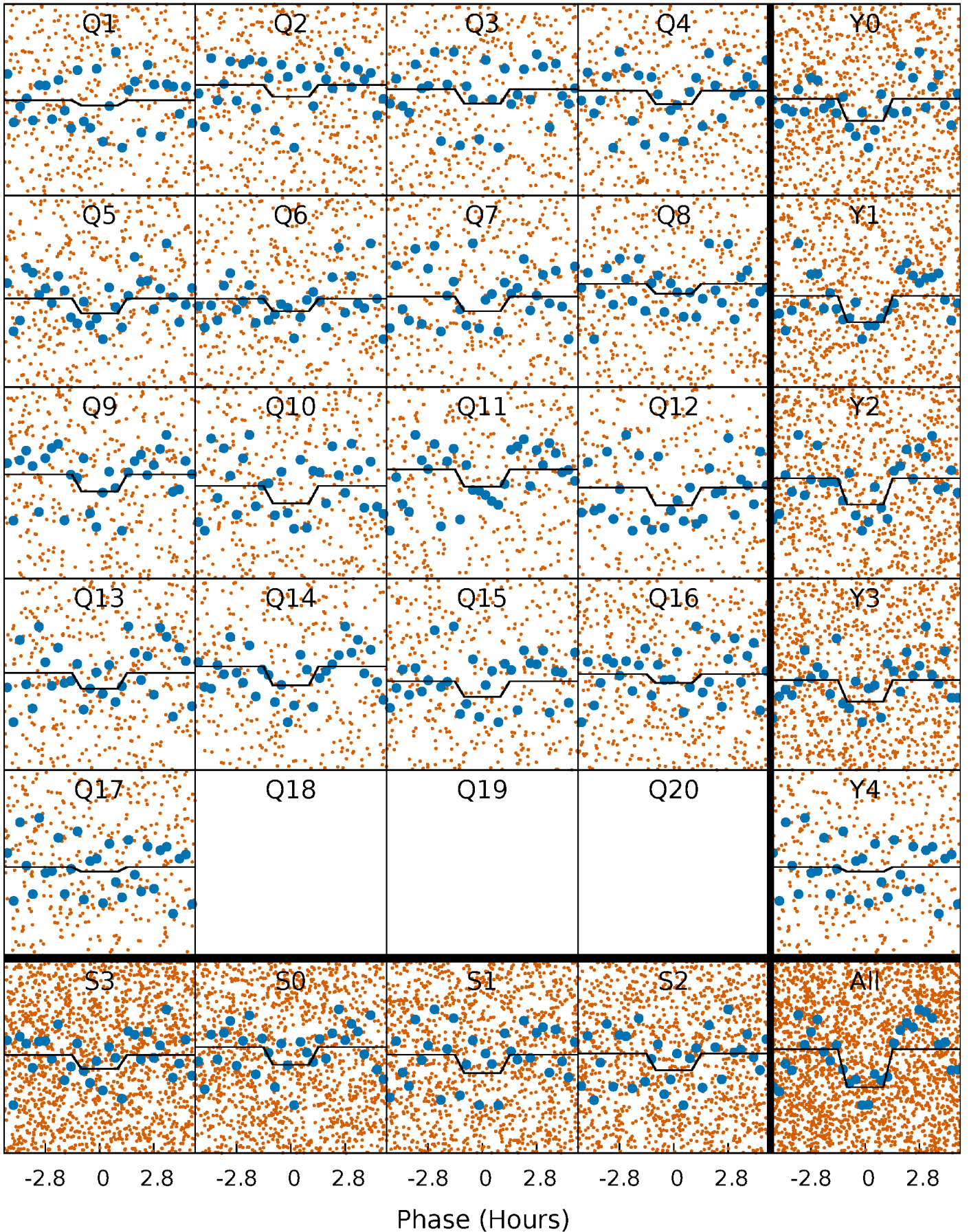
DV Quarter-Phased Transit Curves

TCE 009489590-01 P= 0.652924 Days $T_0=131.924147$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

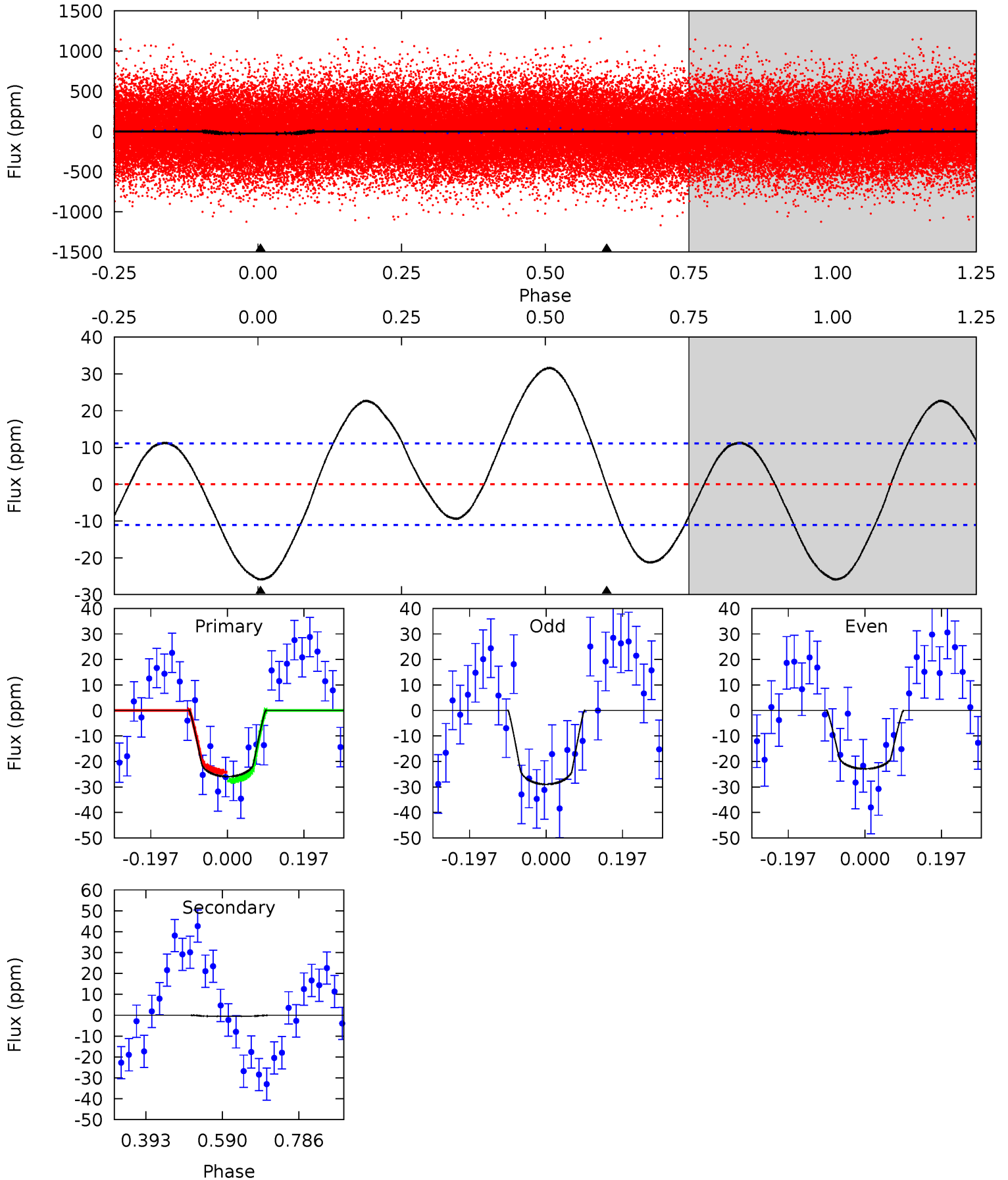
TCE 009489590-01 P= 0.652930 Days $T_0=131.923959$ (BKJD)



DV Model-Shift Uniqueness Test

009489590-01, P = 0.652924 Days, E = 131.271223 Days

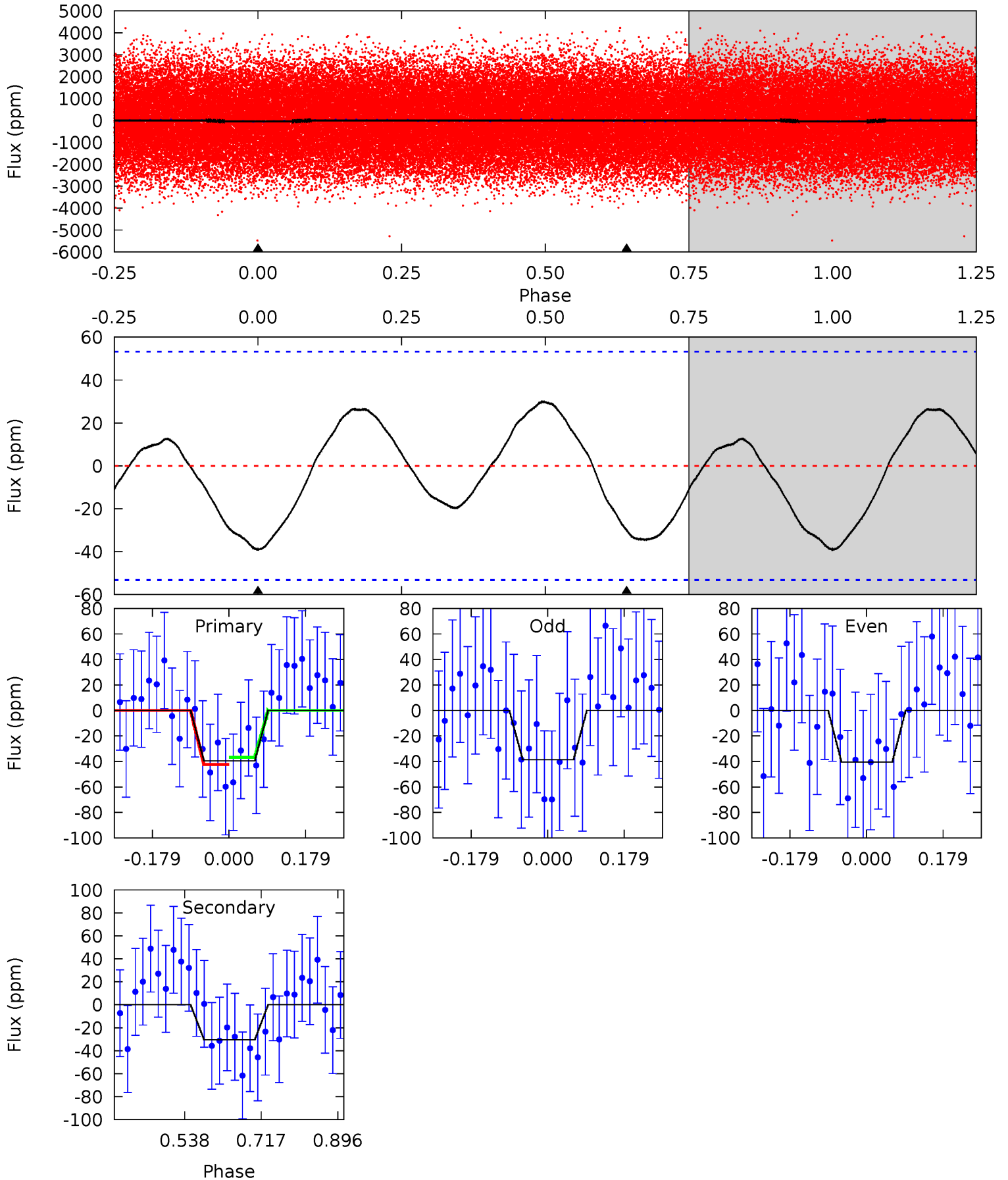
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
10.3	0.20	0	0	4.42	1.29	3.95	10.3	10.3	0.20	0.20	1.22	1.11	0.55	0.68



Alt Model-Shift Uniqueness Test

009489590-01, P = 0.652930 Days, E = 131.271029 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
3.30	2.53	0	0	4.44	1.34	1.24	3.30	3.30	2.53	2.53	0.08	1.03	0.43	0.23



Stellar Parameters For KIC 009489590

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	7384^{+207}_{-326}	$4.090^{+0.144}_{-0.176}$	$0.000^{+0.200}_{-0.350}$	$1.898^{+0.569}_{-0.426}$	$1.617^{+0.200}_{-0.266}$	$0.333^{+0.245}_{-0.164}$
	+3%/-4%	+4%/-4%	+inf%/-inf%	+30%/-22%	+12%/-16%	+74%/-49%
Source	KIC0	KIC0	KIC0	DSEP		

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

Secondary Eclipse Parameters for KIC 009489590-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-0 ± 3	$1.33^{+0.46}_{-0.44}$	4779^{+366}_{-324}	-4000^{+6673}_{-597}	$0.051^{+0.266}_{-0.211}$
Alt.	-30 ± 12	$1.28^{+0.48}_{-0.40}$	4772^{+344}_{-325}	6635^{+1940}_{-1287}	$2.908^{+3.649}_{-1.583}$

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

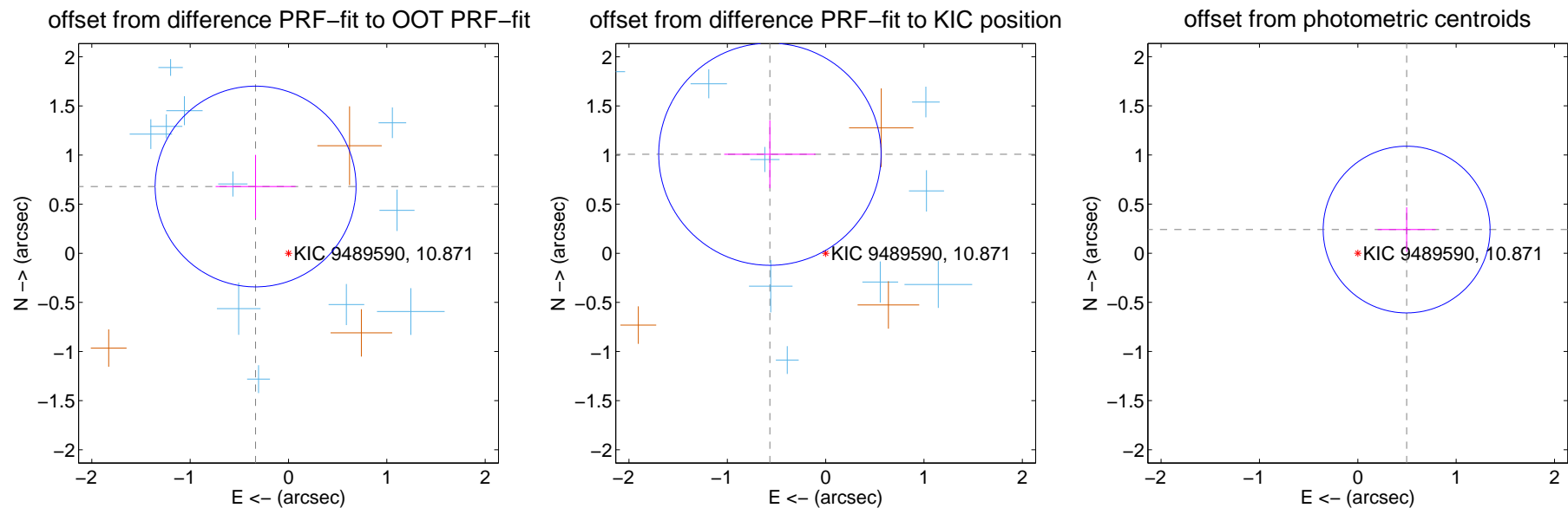
DV Centroid Data

Supplemental centroid analysis for 009489590-01. **Kepler magnitude: 10.87.** Transit SNR 15.13

There are 11 quarters with good PRF difference image offsets

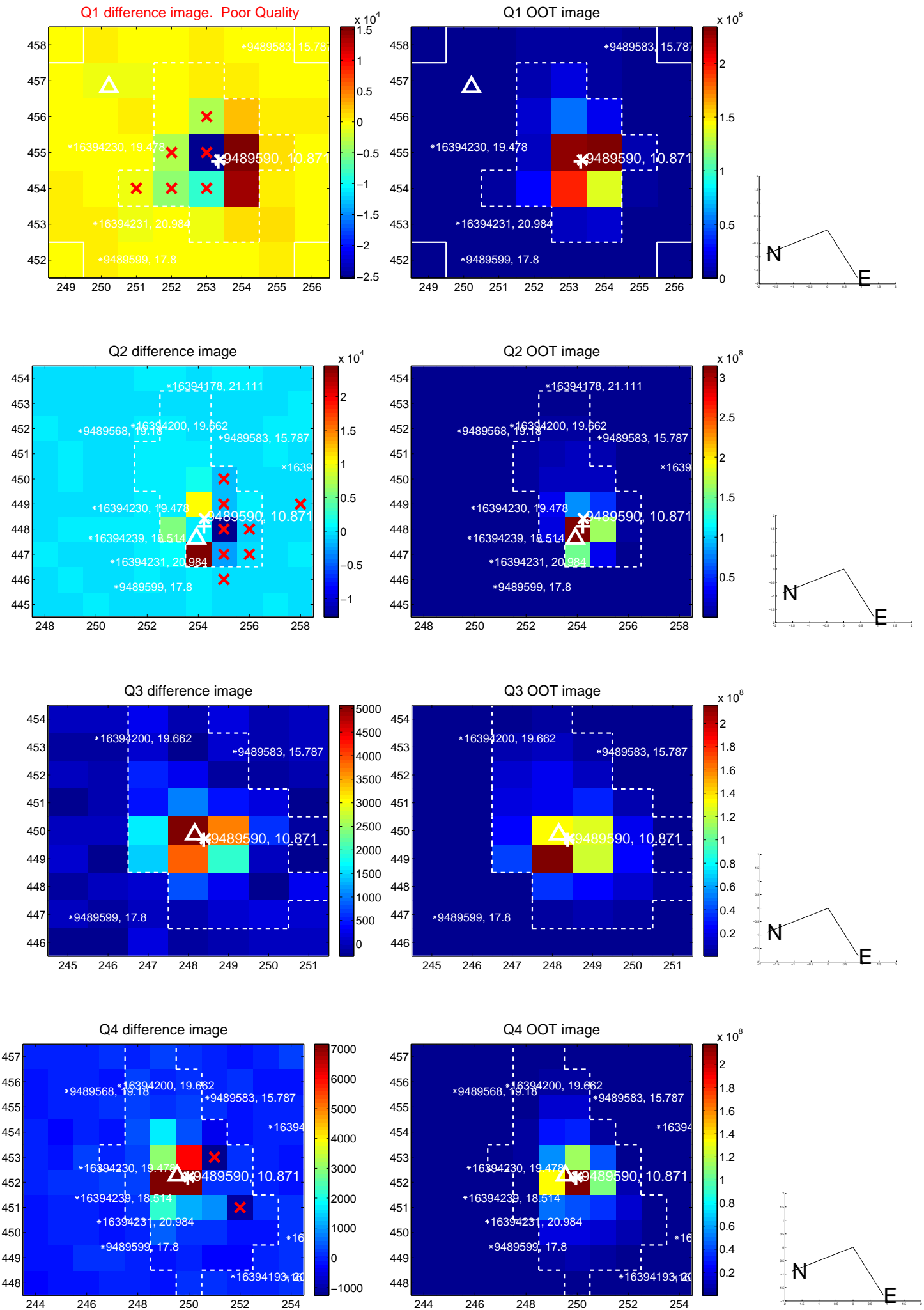
The direct PRF centroid is offset from the target star catalog position by about 0.30 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.757 ± 0.340	2.22	0.335 ± 0.407	0.680 ± 0.322
PRF-fit source offset from KIC position	1.157 ± 0.377	3.07	0.567 ± 0.465	1.008 ± 0.344
photometric centroid source offset	0.55 ± 0.28	1.95	-0.50 ± 0.29	0.24 ± 0.23

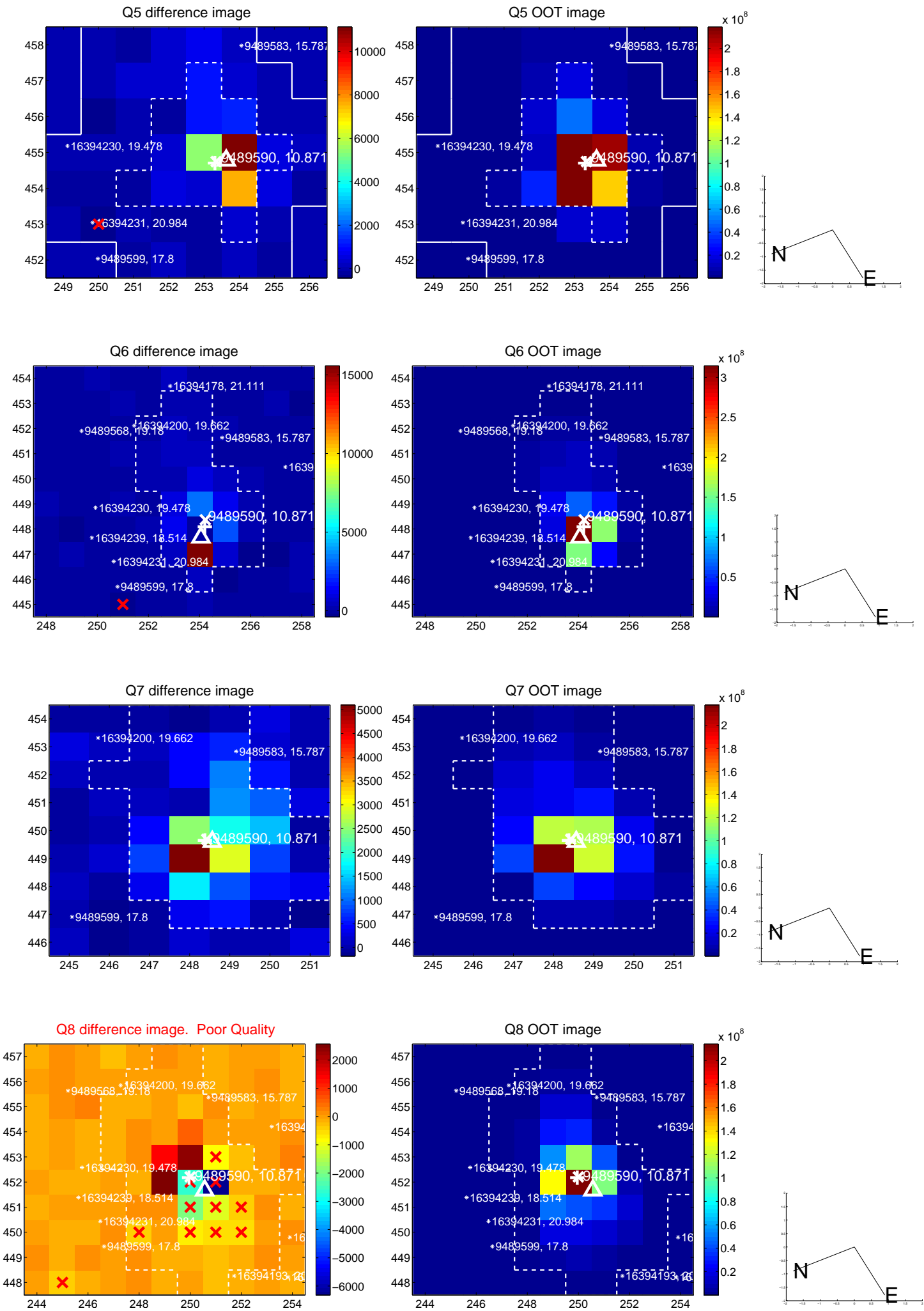


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

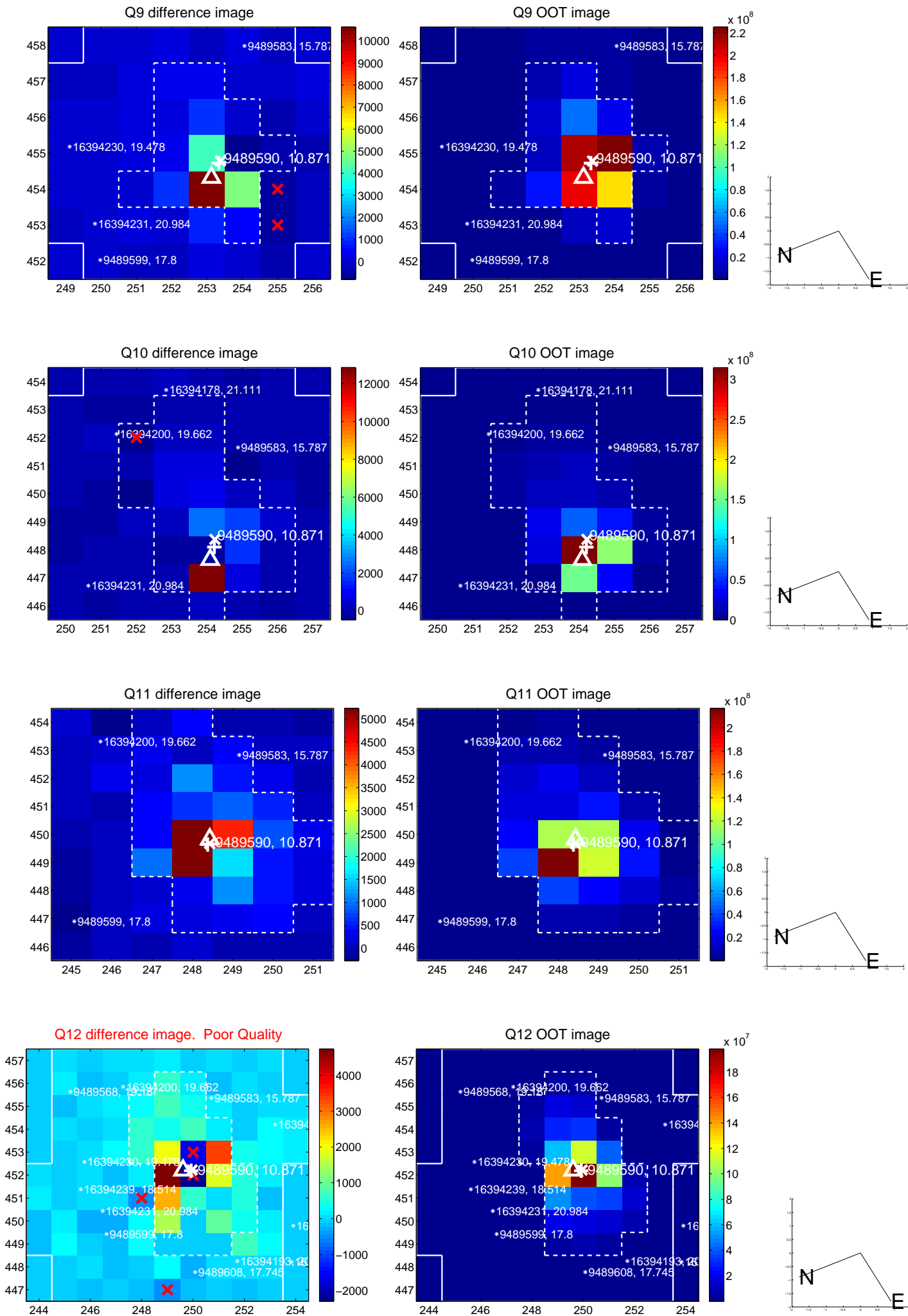
white \times : KIC target position; $+$: OOT centroid; Δ : difference centroid. red \times : large negative pixel value.



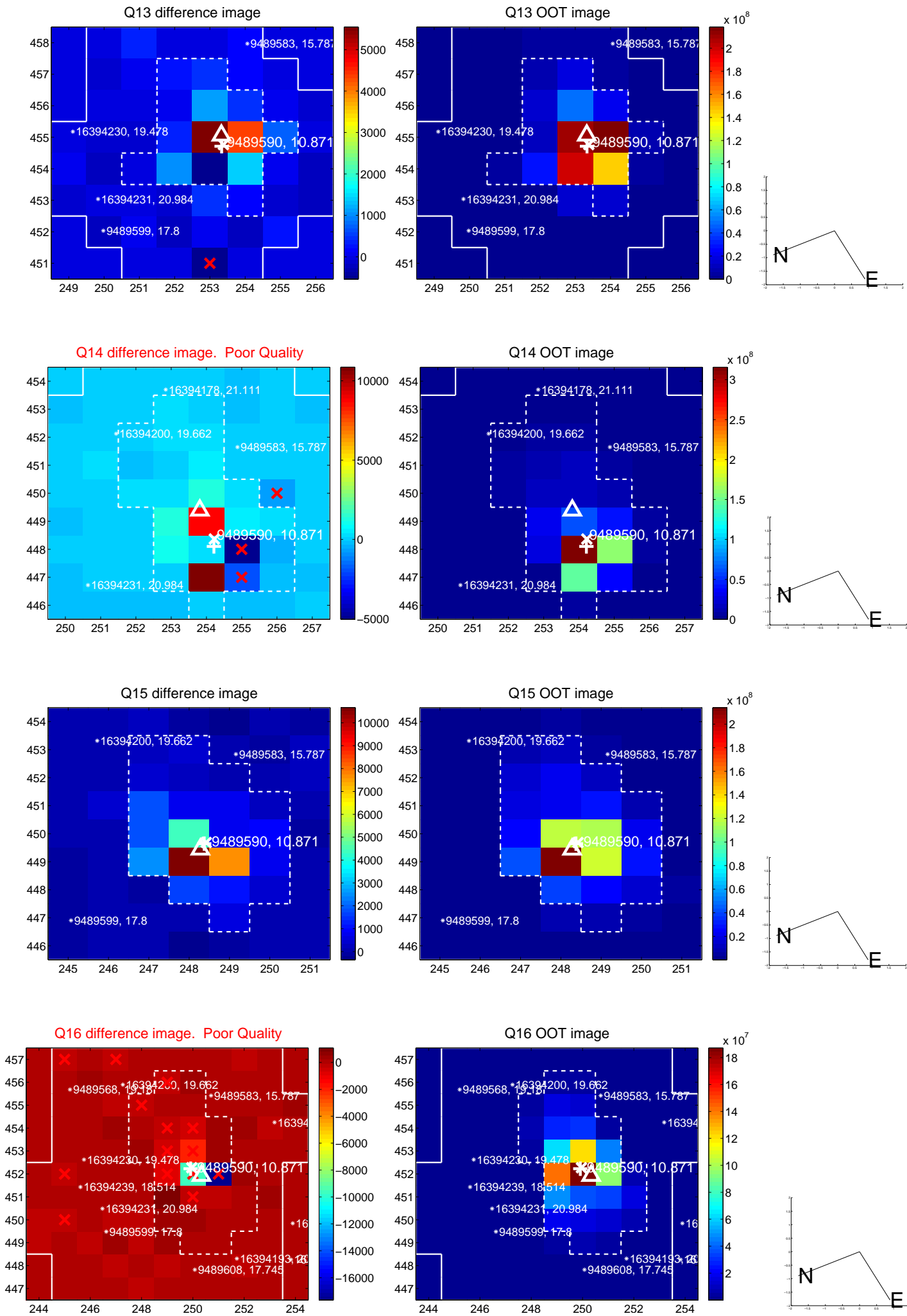
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



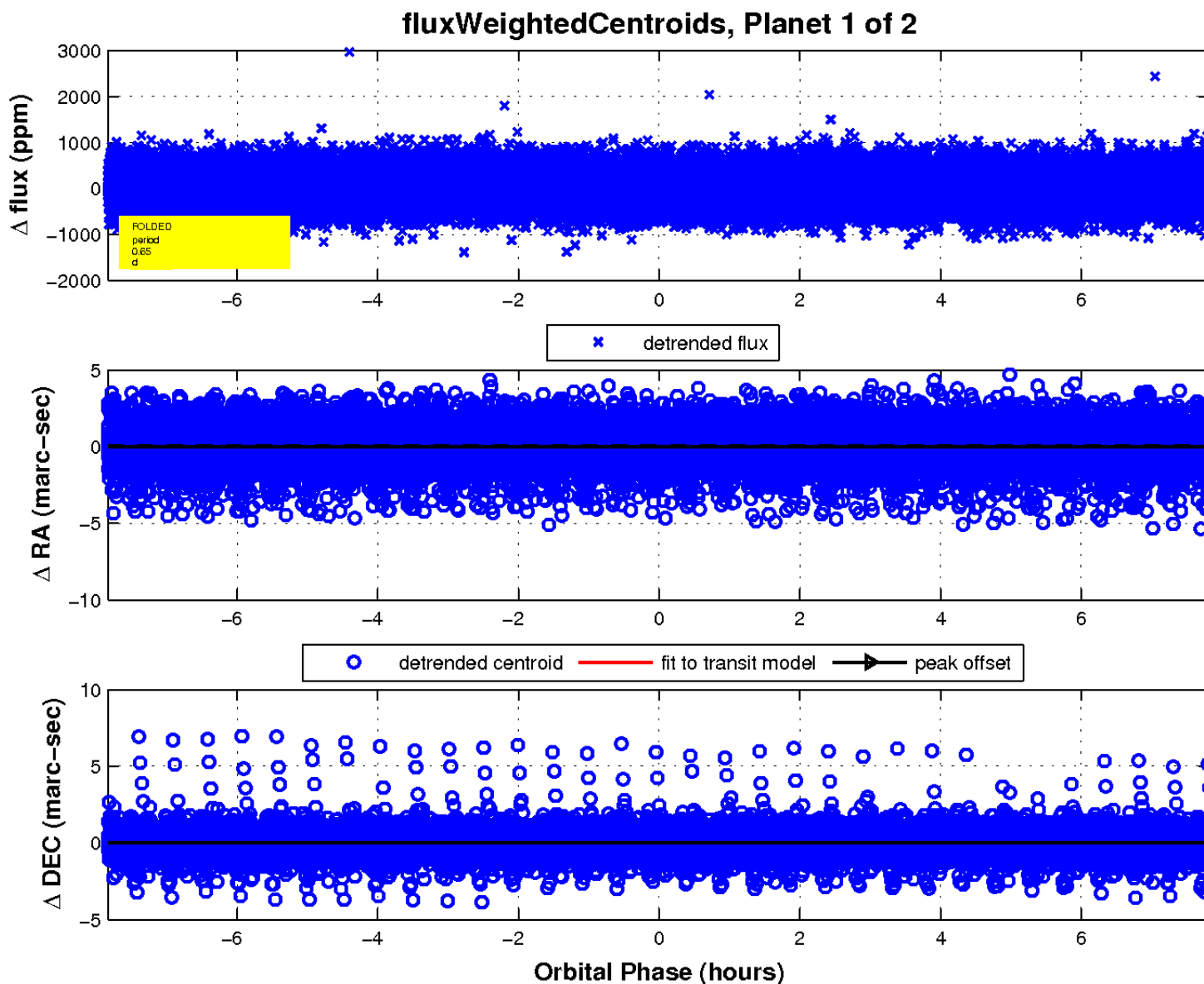
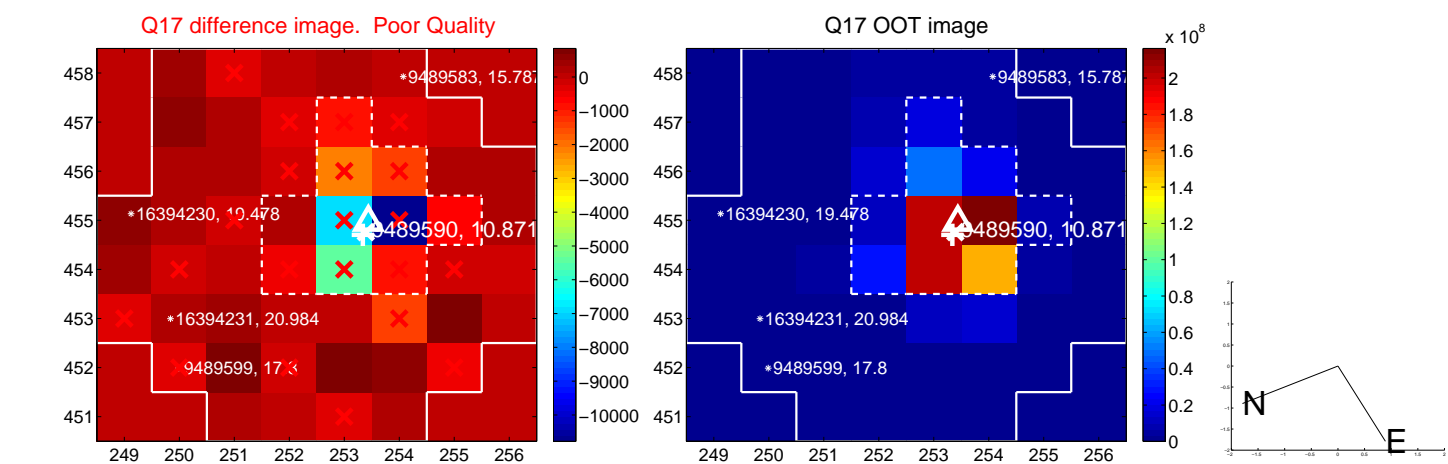
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

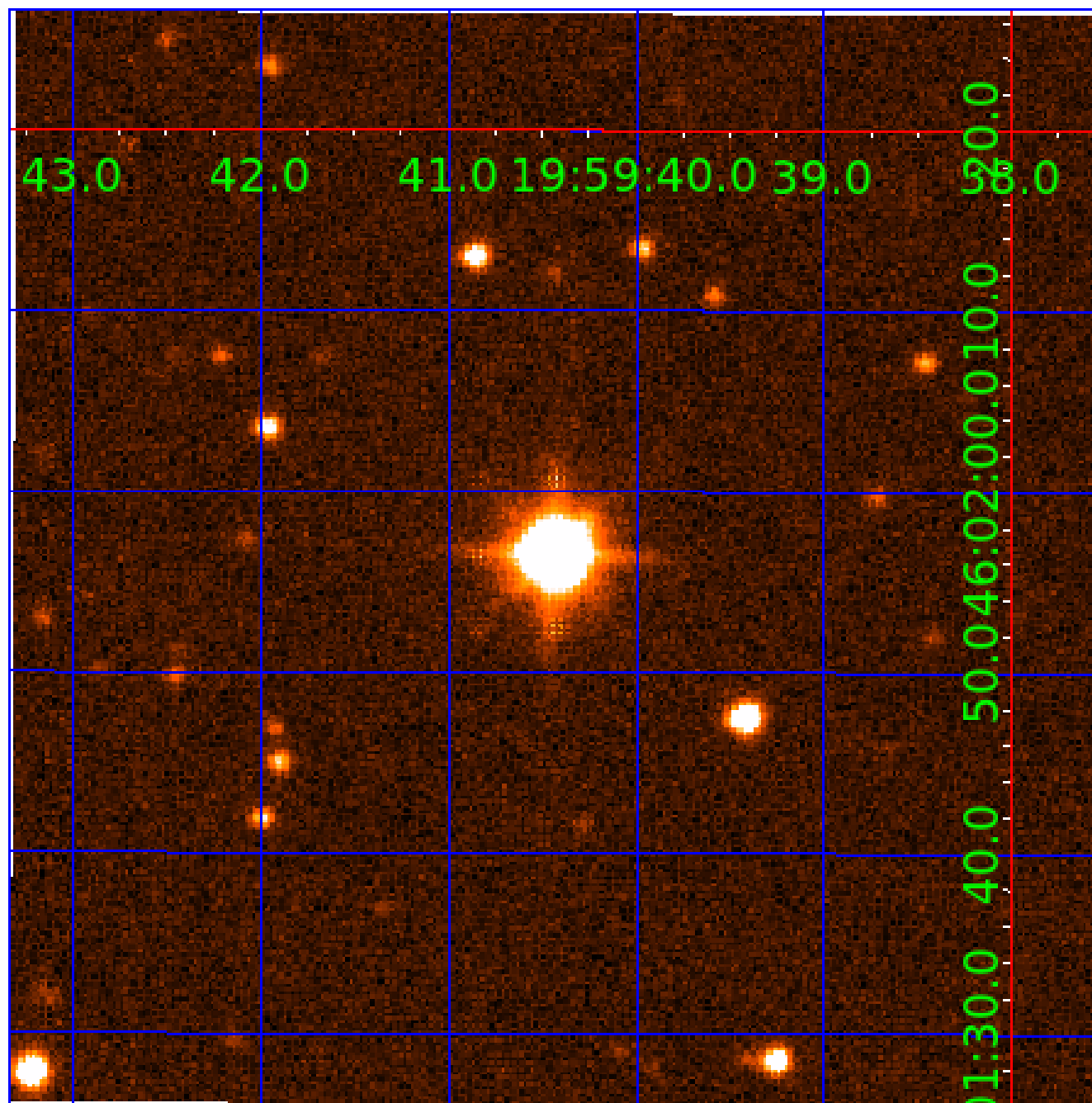


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 009489590

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})
009489590-01	OBS	No	0.652924	131.924147	36.6	2.646	16.2	15.1	1.90	7384	1.32	32095.30
009489590-02	OBS	No	0.652912	131.818561	54.2	7.647	10.4	12.9	1.90	7384	1.42	32096.12

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009489590-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED
009489590-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—SAME_NTL_PERIOD—CENT_SATURATED

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

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

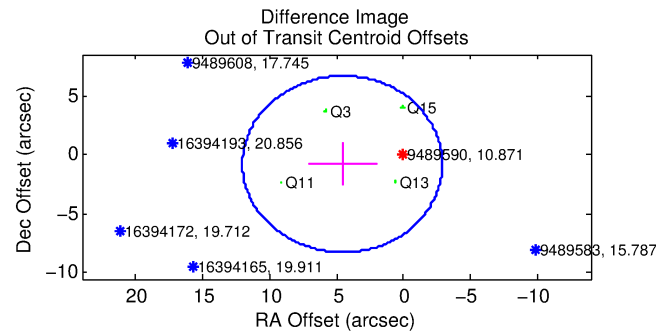
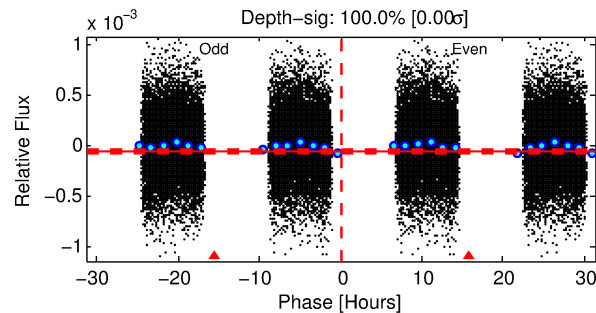
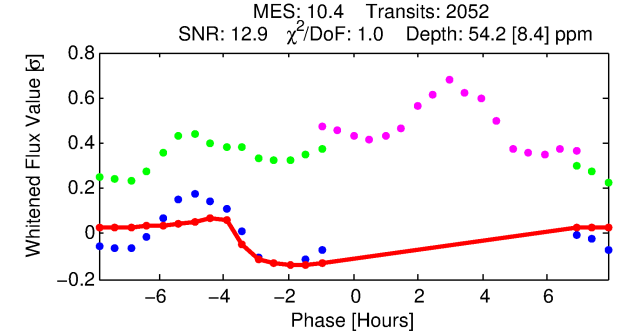
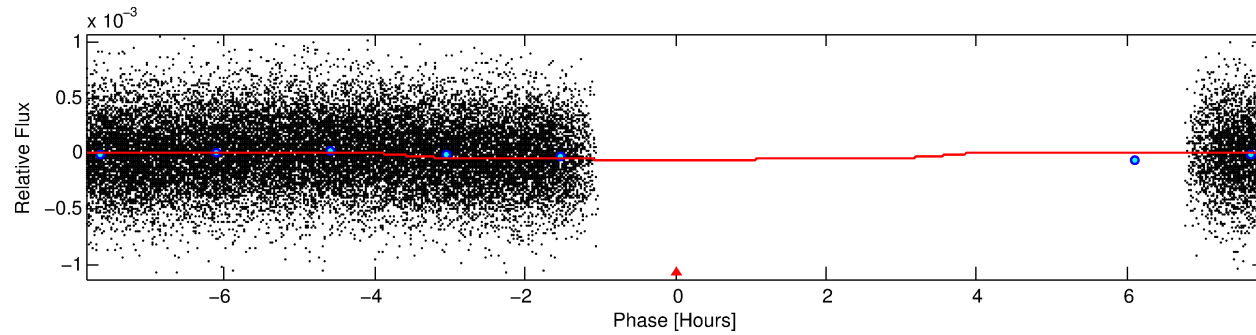
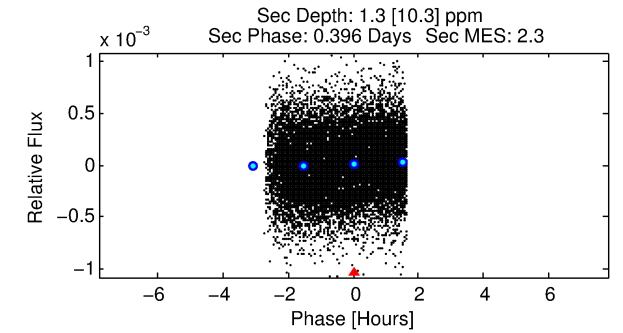
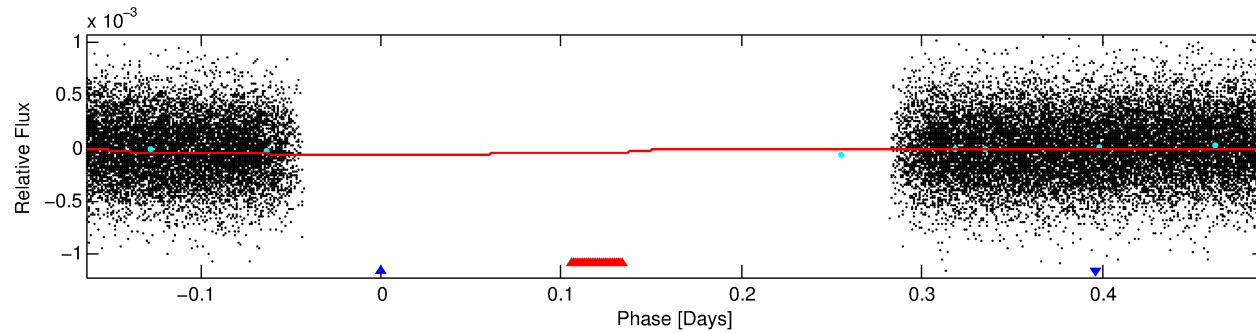
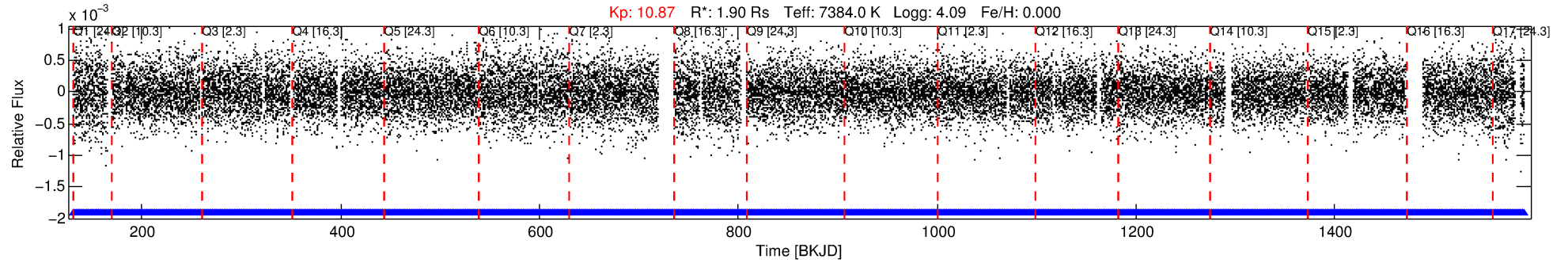
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009489590-02

No Significant Match Found

DV One-Page Summary

KIC: 9489590 Candidate: 2 of 2 Period: 0.653 d



DV Fit Results:

Period = 0.65291 [0.00001] d
Epoch = 131.8186 [0.0133] BKJD
 $R_p/R^* = 0.0068$ [0.0026]
 $a/R^* = 1.01$ [0.03]
 $b = 0.10$ [23.61]
 $\text{Seff} = 32096.12$ [12184.80]
 $T_{\text{eq}} = 3413$ [324] K
 $R_p = 1.42$ [0.69] R_e
 $a = 0.0173$ [0.0042] AU
 $A_g = 0.11$ [0.85] $[-1.05\sigma]$
 $T_{\text{eff}} = 3018$ [5991] K $[-0.07\sigma]$

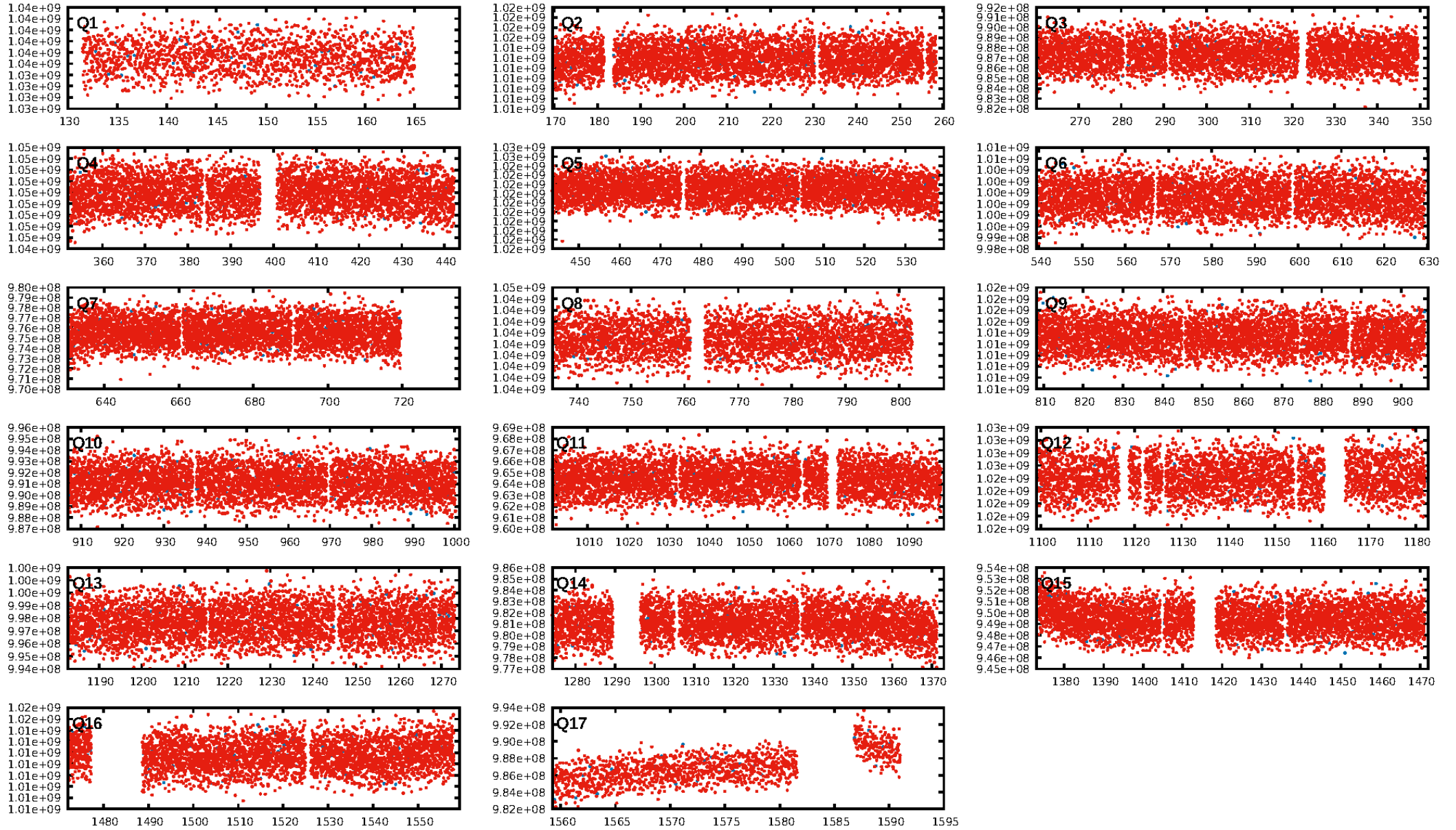
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 0.0% [0.00 σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: N/A
RollingBand-fgt: 1.00 [1959/1959]
GhostDiagnostic-chr: 1.308
Centroid-sig: 71.5%
Centroid-so: 0.177 arcsec [1.50 σ]
OotOffset-rm: 4.621 arcsec [1.86 σ]
KicOffset-rm: 4.658 arcsec [1.88 σ]
OotOffset-st: 0/3/0/1 [4]
KicOffset-st: 0/3/0/1 [4]
DiffImageQuality-fgm: 0.25 [1/4]
DiffImageOverlap-fno: 0.00 [0/17]

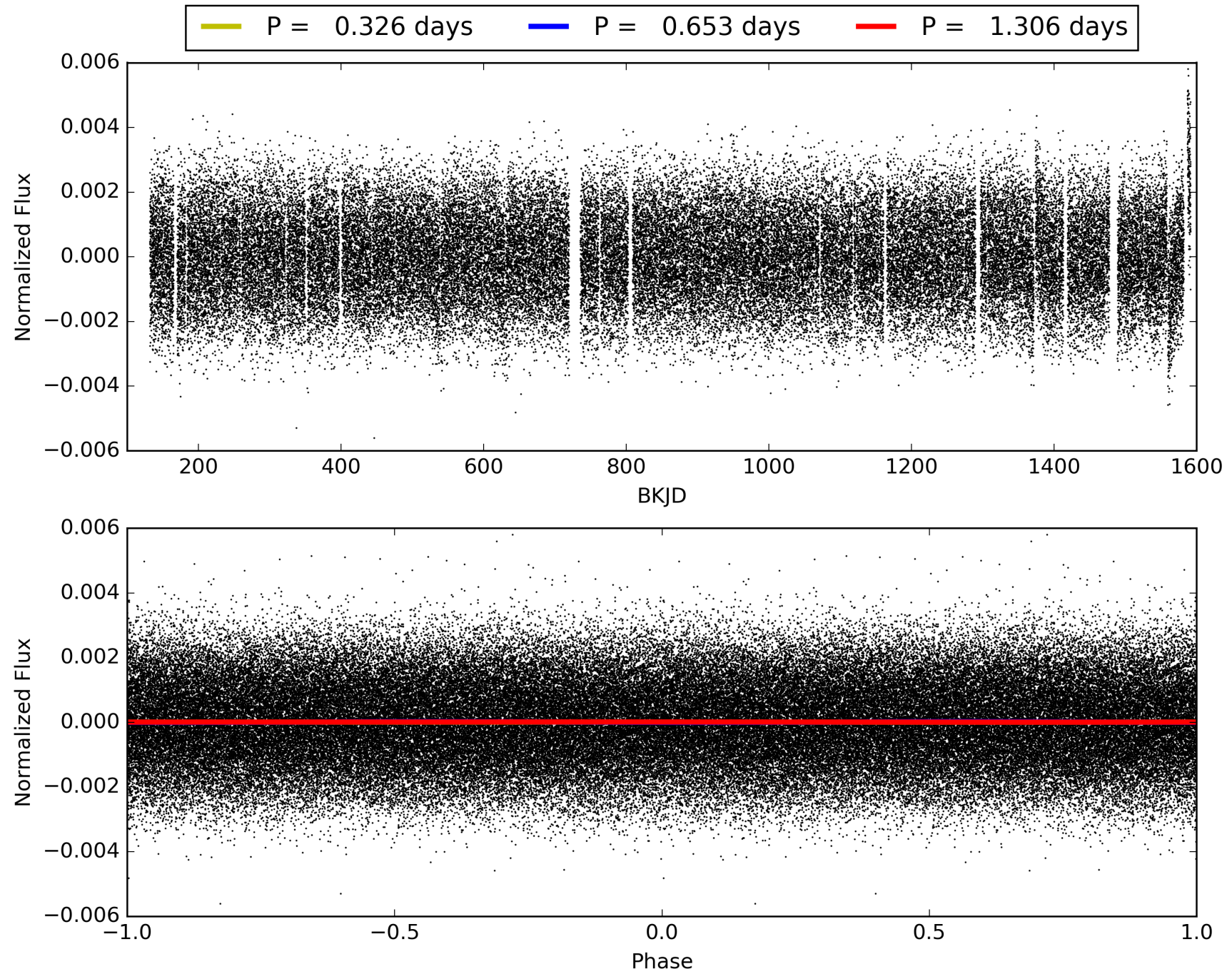
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 17:30:29 Z

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

TCE 009489590-02, PDC Light Curves

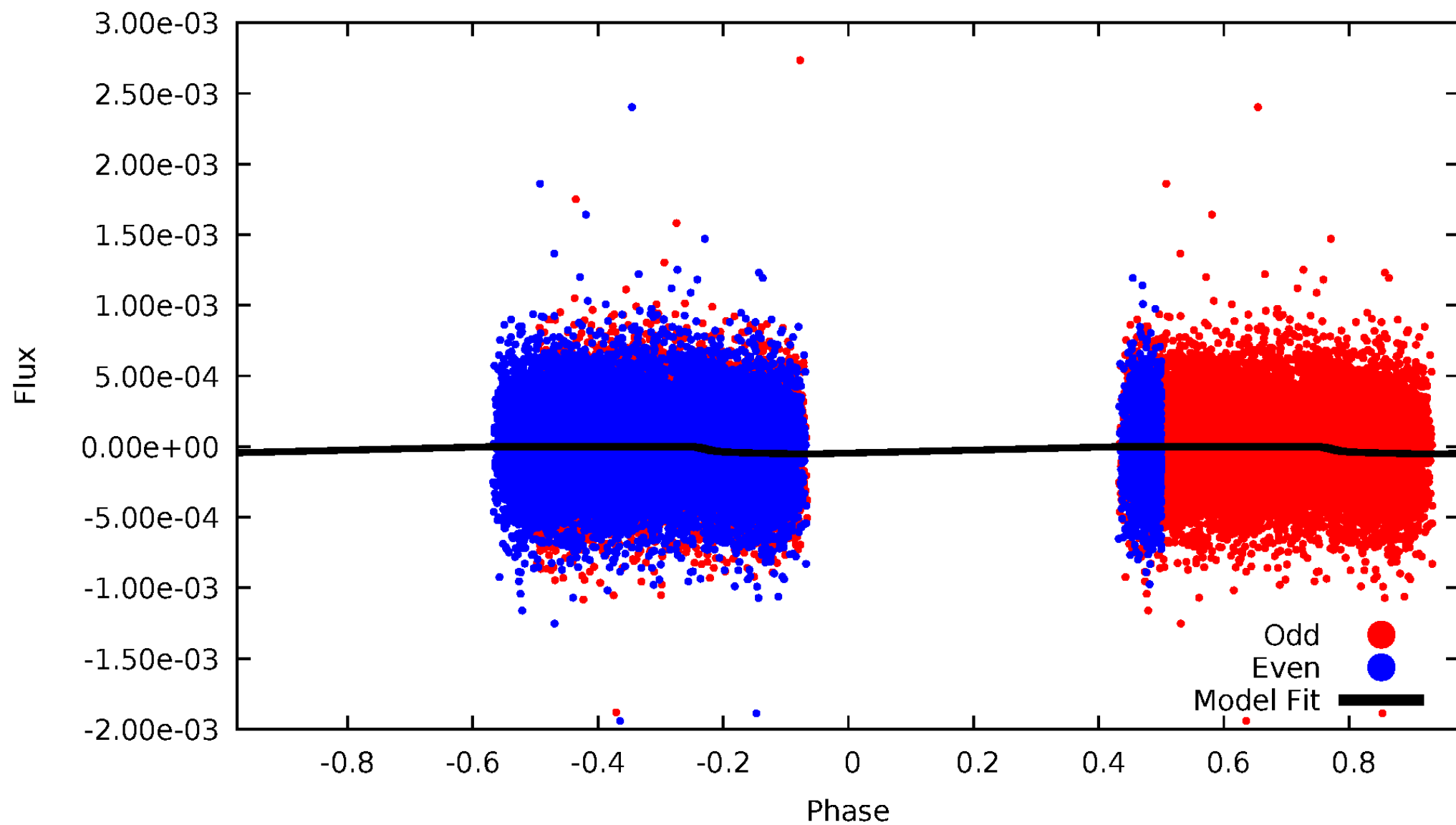


TCE 009489590-02



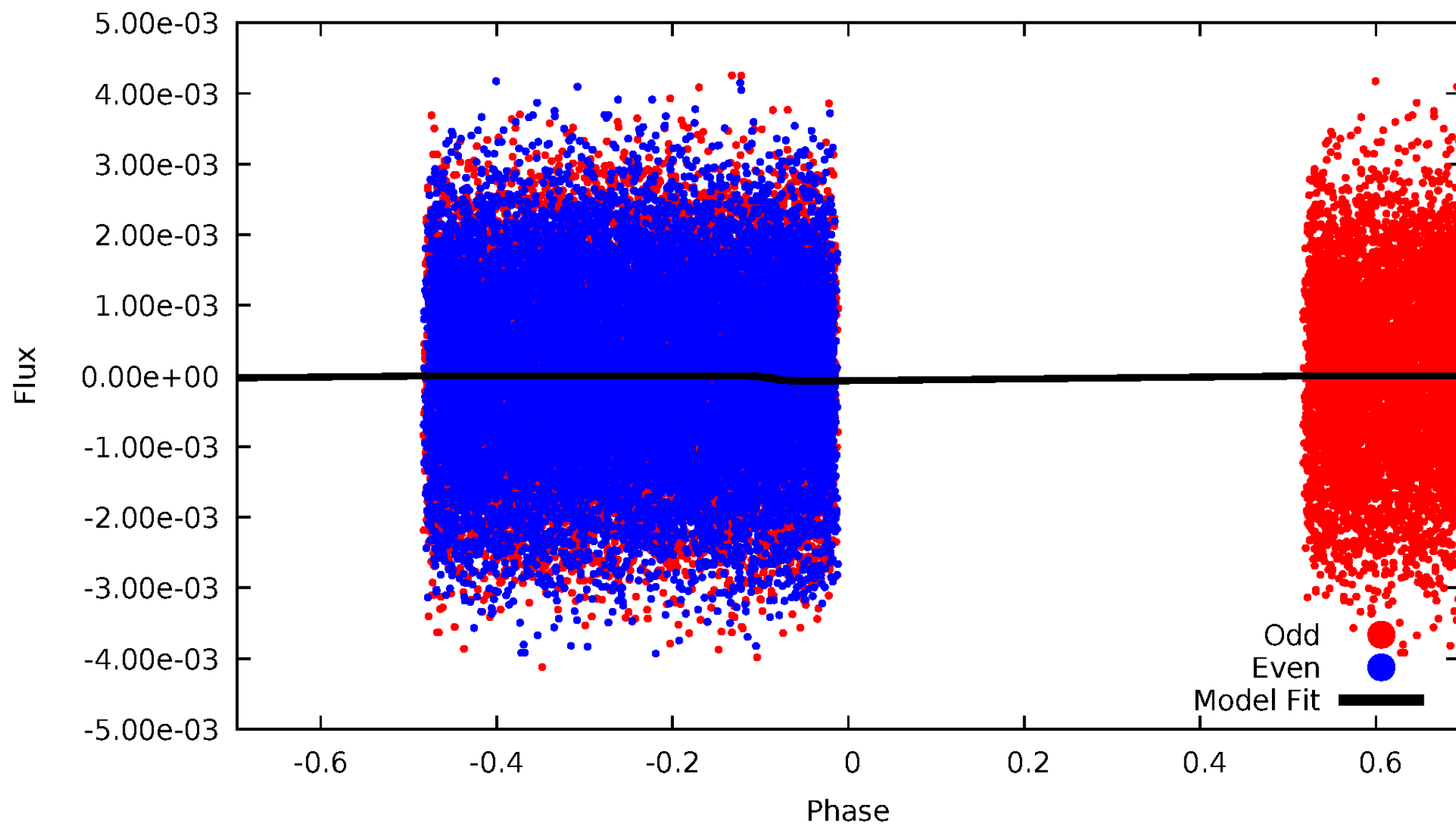
DV Odd/Even

TCE 009489590-02



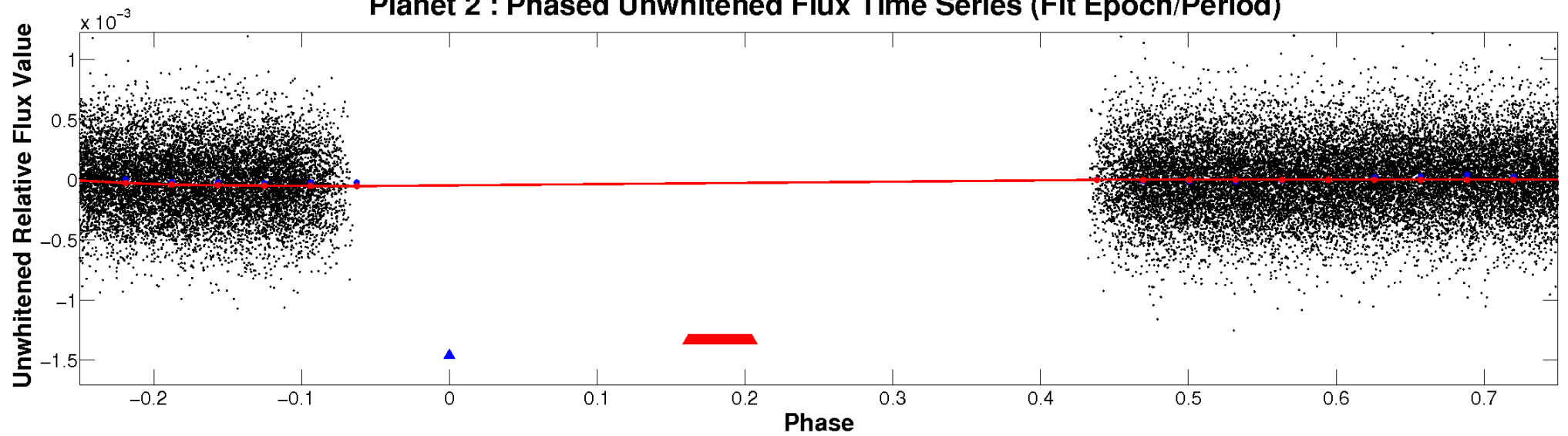
ALT Odd/Even

TCE 009489590-02

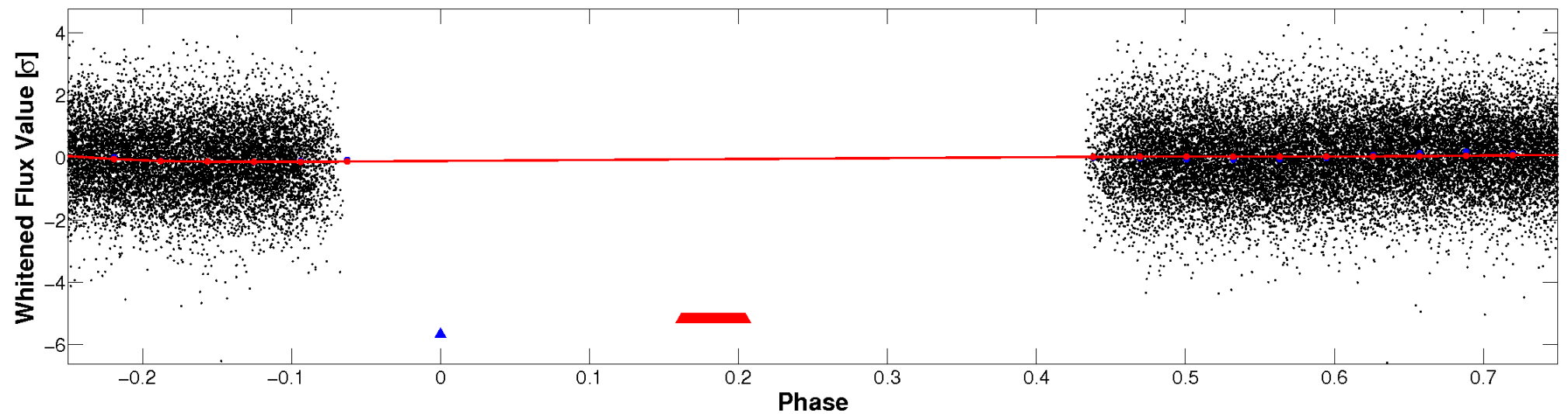


Non-Whitened Vs. Whitened Light Curve

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

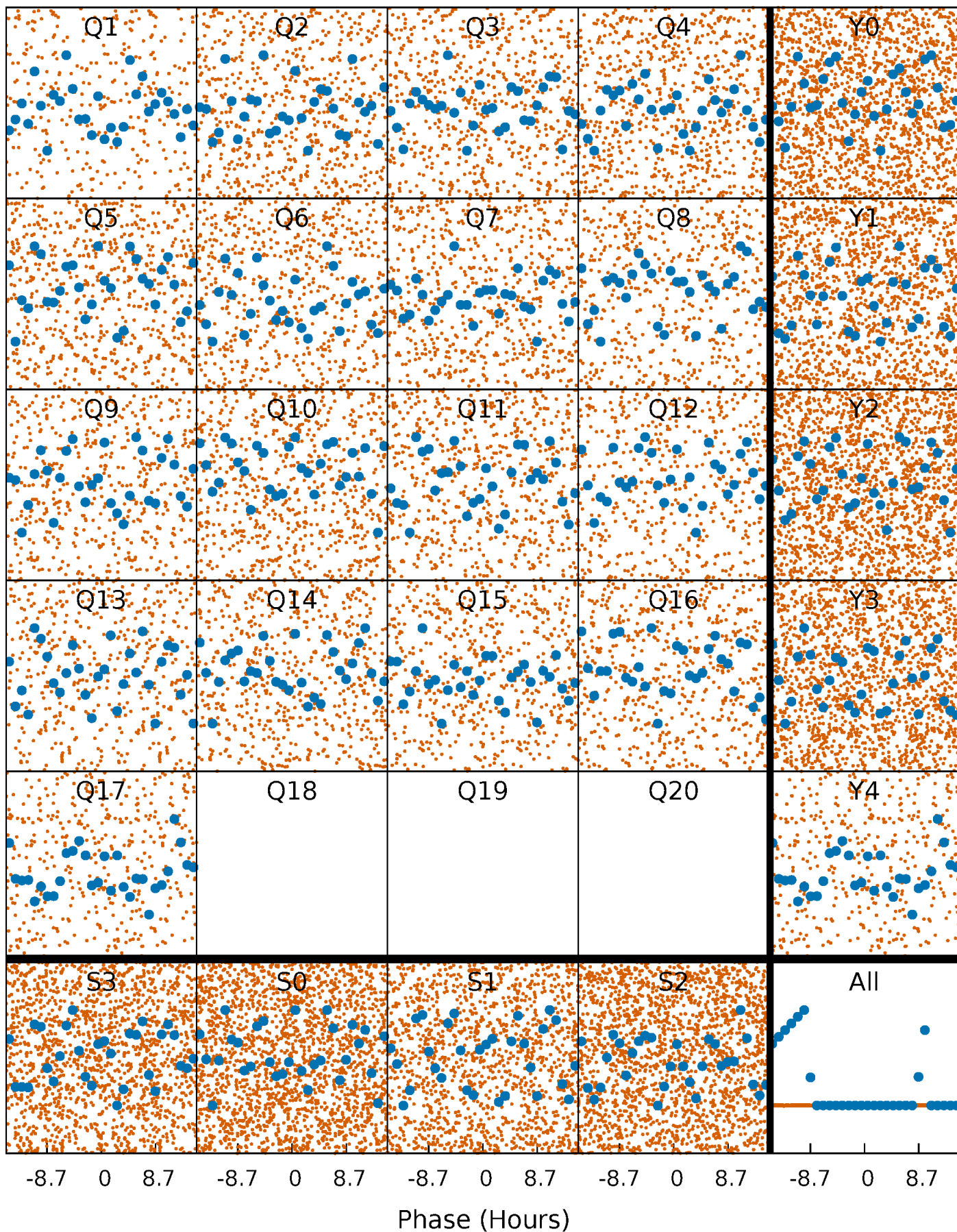


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



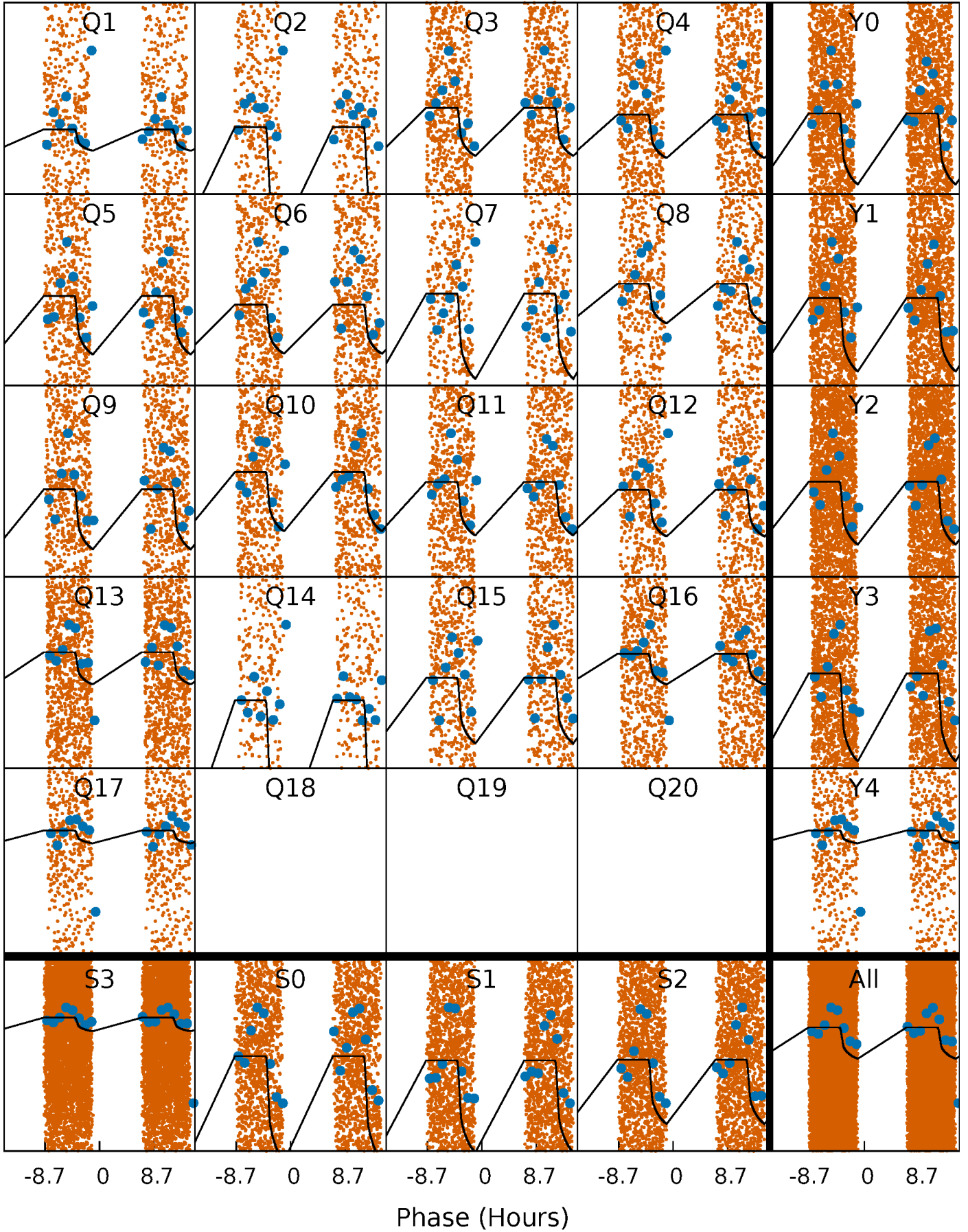
PDC Quarter-Phased Transit Curves

TCE 009489590-02 P= 0.652912 Days $T_0=131.818561$ (BKJD)



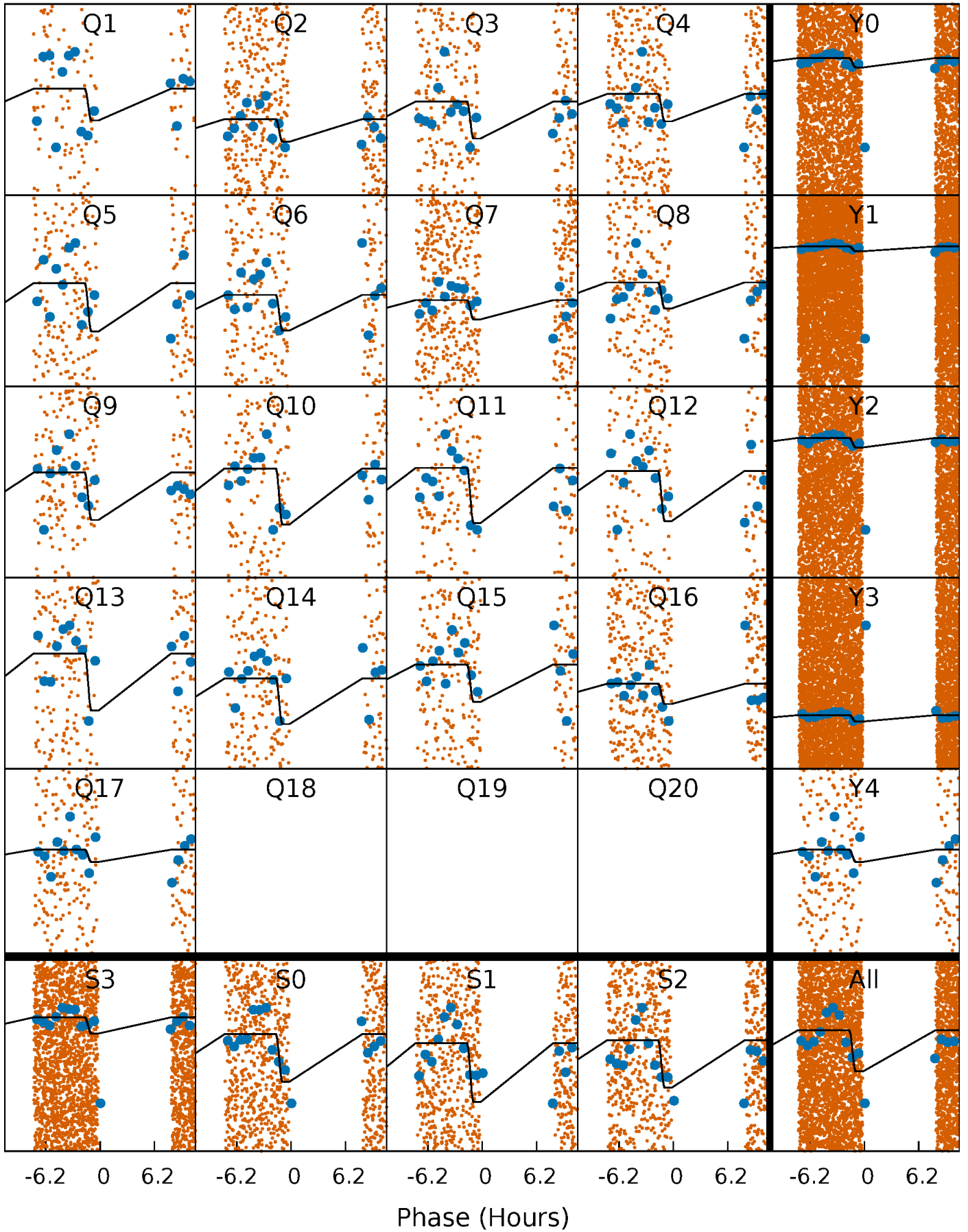
DV Quarter-Phased Transit Curves

TCE 009489590-02 $P = 0.652912$ Days $T_0 = 131.818561$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

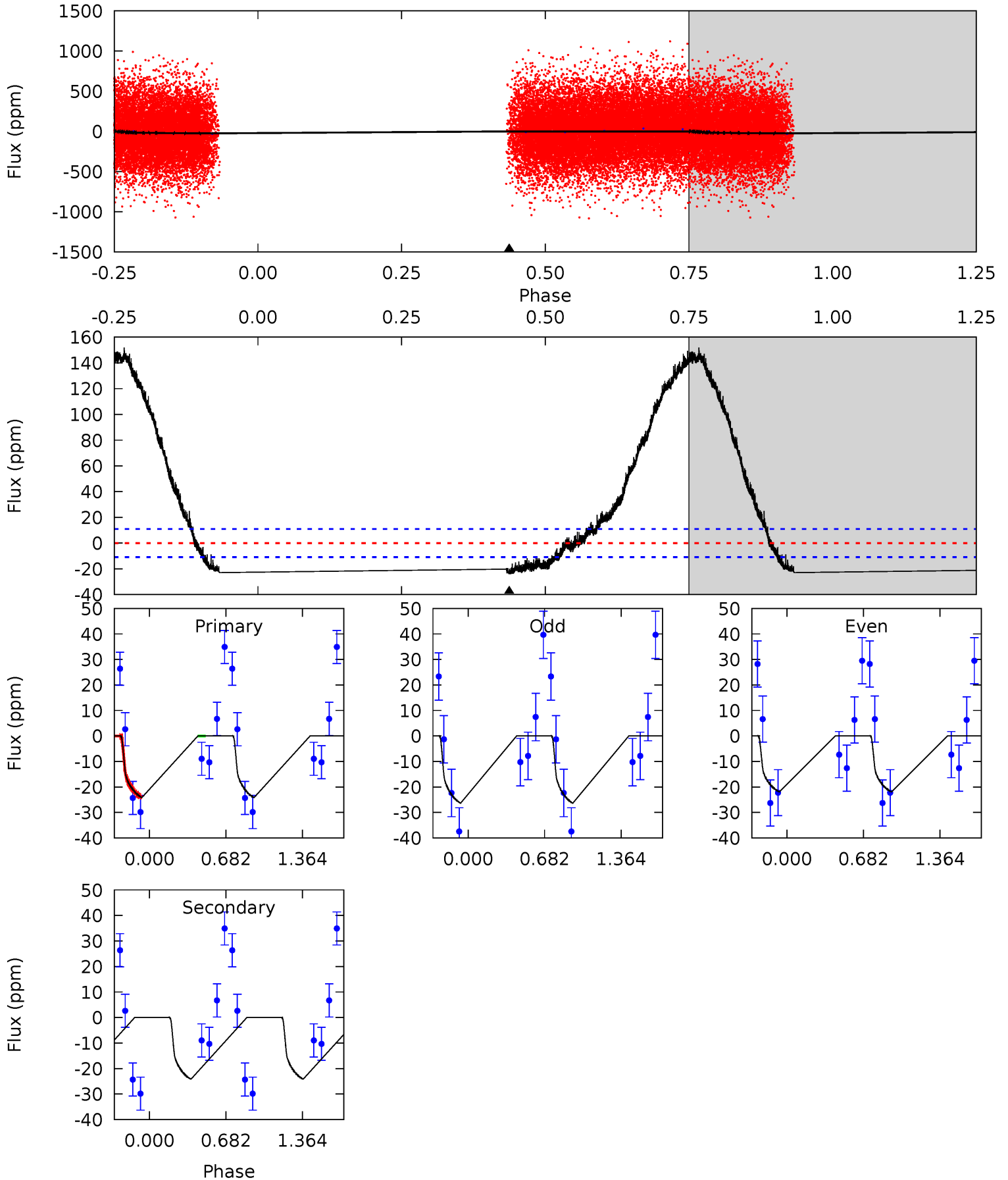
TCE 009489590-02 $P = 0.652921$ Days $T_0 = 131.762713$ (BKJD)



DV Model-Shift Uniqueness Test

009489590-02, P = 0.652912 Days, E = 131.165649 Days

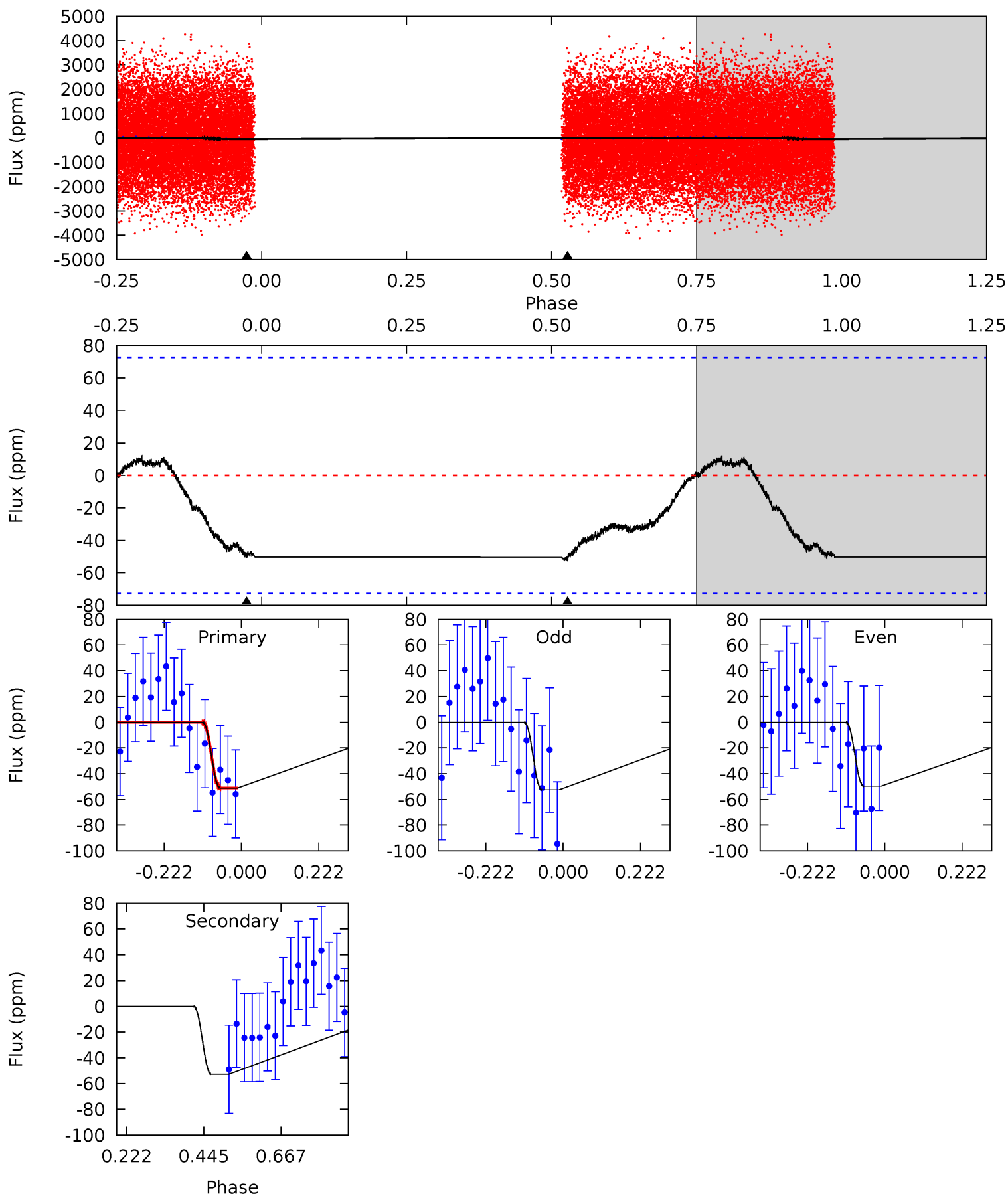
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
9.16	9.16	0	0	4.14	0.41	5.70	9.16	9.16	9.16	9.16	0.84	0	0.86	0



Alt Model-Shift Uniqueness Test

009489590-02, P = 0.652921 Days, E = 131.109792 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
3.09	3.19	0	0	4.39	1.22	0.23	3.09	3.09	3.19	3.19	0.09	0	0.19	0



Stellar Parameters For KIC 009489590

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	7384^{+207}_{-326}	$4.090^{+0.144}_{-0.176}$	$0.000^{+0.200}_{-0.350}$	$1.898^{+0.569}_{-0.426}$	$1.617^{+0.200}_{-0.266}$	$0.333^{+0.245}_{-0.164}$
	+3%/-4%	+4%/-4%	+inf%/-inf%	+30%/-22%	+12%/-16%	+74%/-49%
Source	KIC0	KIC0	KIC0	DSEP		

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

Secondary Eclipse Parameters for KIC 009489590-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-24 ± 3	$1.42^{+0.62}_{-0.53}$	4762^{+350}_{-325}	5846^{+1958}_{-1041}	$1.919^{+3.173}_{-0.987}$
Alt.	-53 ± 17	$1.74^{+0.65}_{-0.58}$	4777^{+351}_{-337}	6457^{+1956}_{-1102}	$2.685^{+3.670}_{-1.304}$

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 $A_{obs} \gg 1.0$

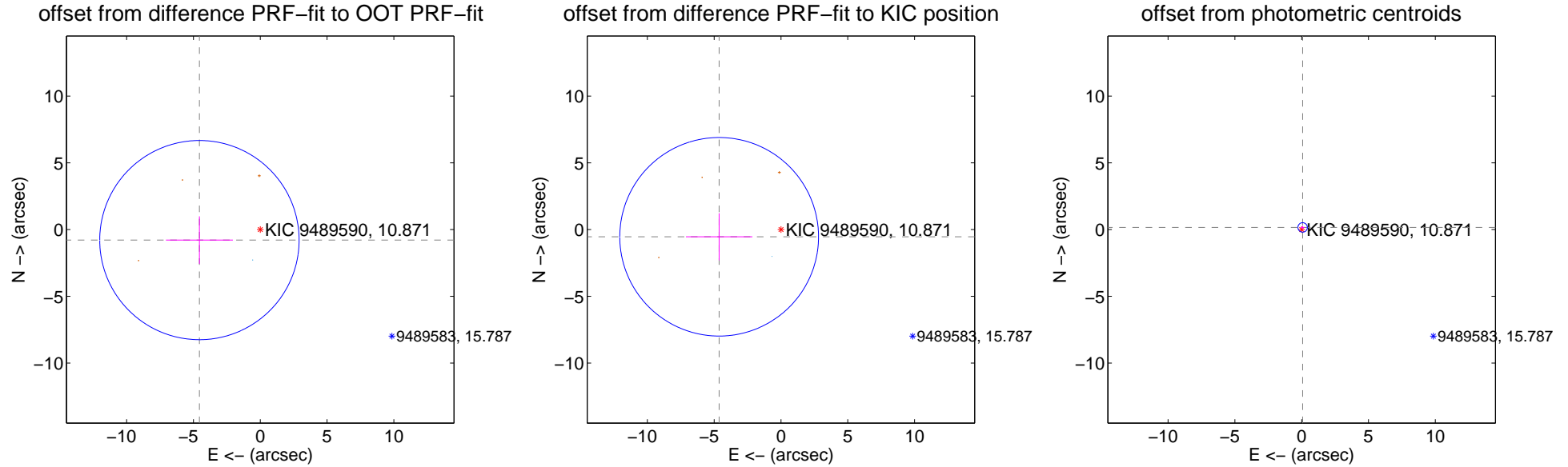
DV Centroid Data

Supplemental centroid analysis for 009489590-02. **Kepler magnitude: 10.87.** Transit SNR 12.93

There are 1 quarters with good PRF difference image offsets

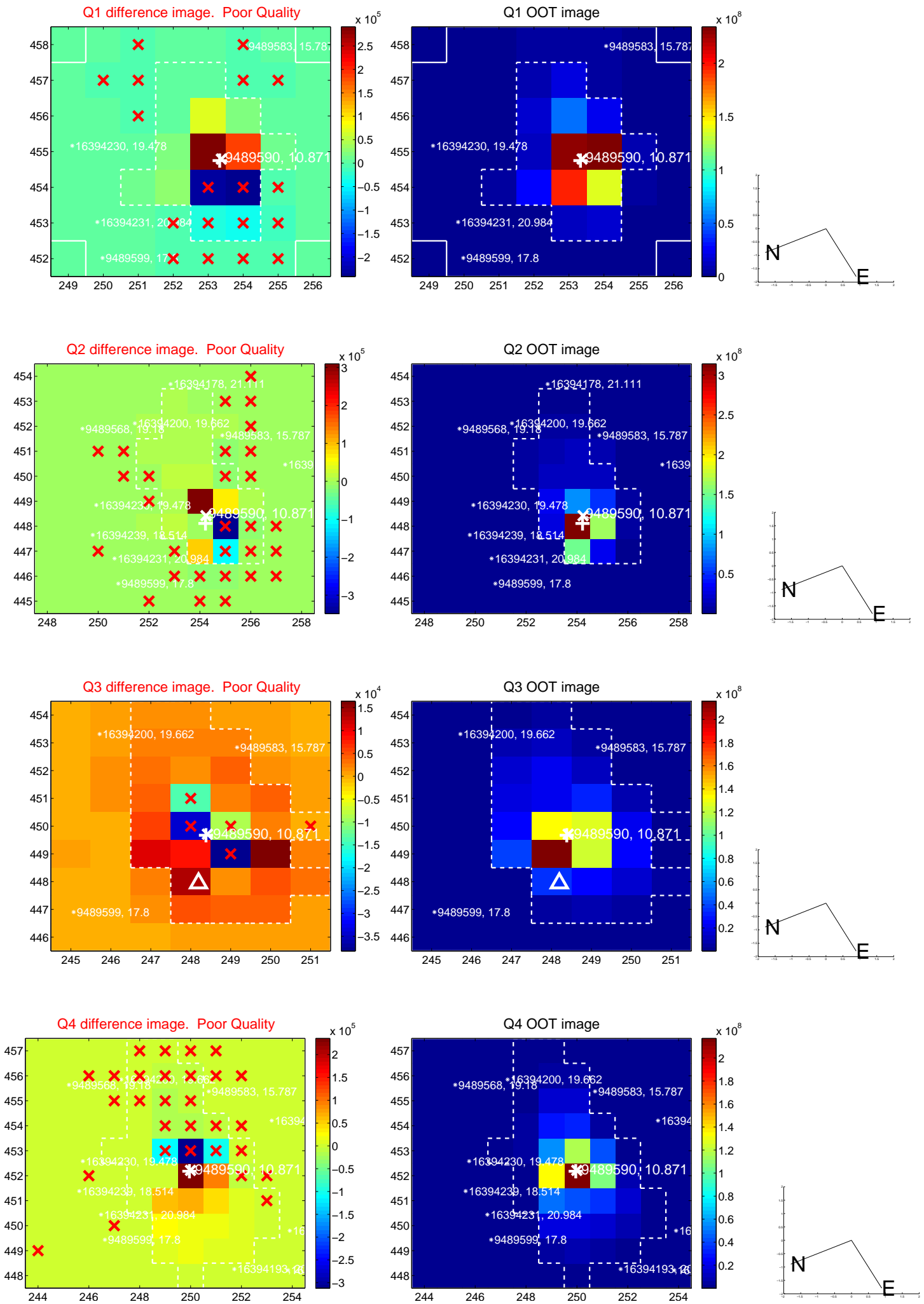
The direct PRF centroid is offset from the target star catalog position by about 0.25 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	4.621 ± 2.487	1.86	4.554 ± 2.505	-0.788 ± 1.776
PRF-fit source offset from KIC position	4.658 ± 2.479	1.88	4.627 ± 2.488	-0.540 ± 1.761
photometric centroid source offset	0.18 ± 0.12	1.50	-0.07 ± 0.14	0.16 ± 0.11

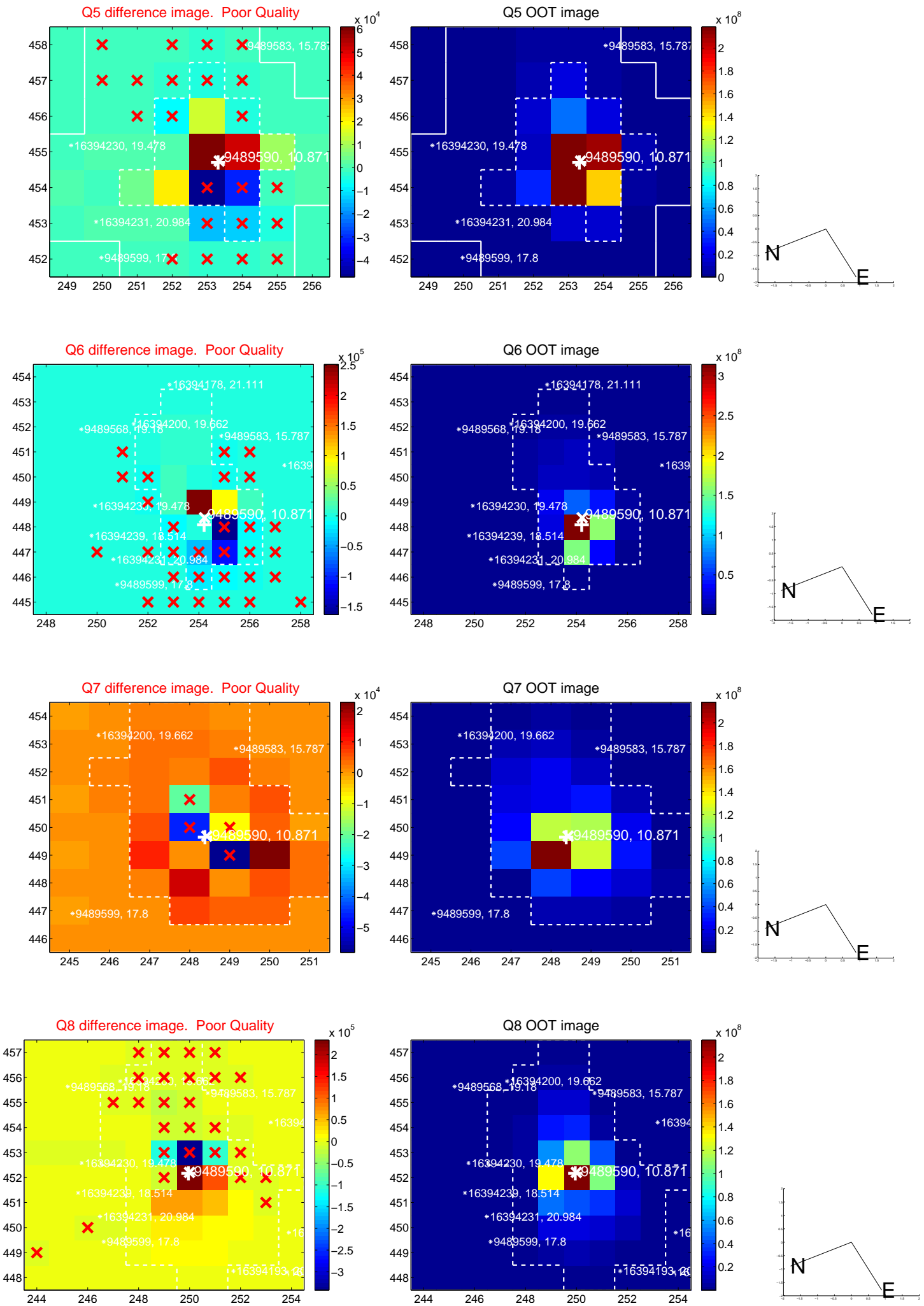


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

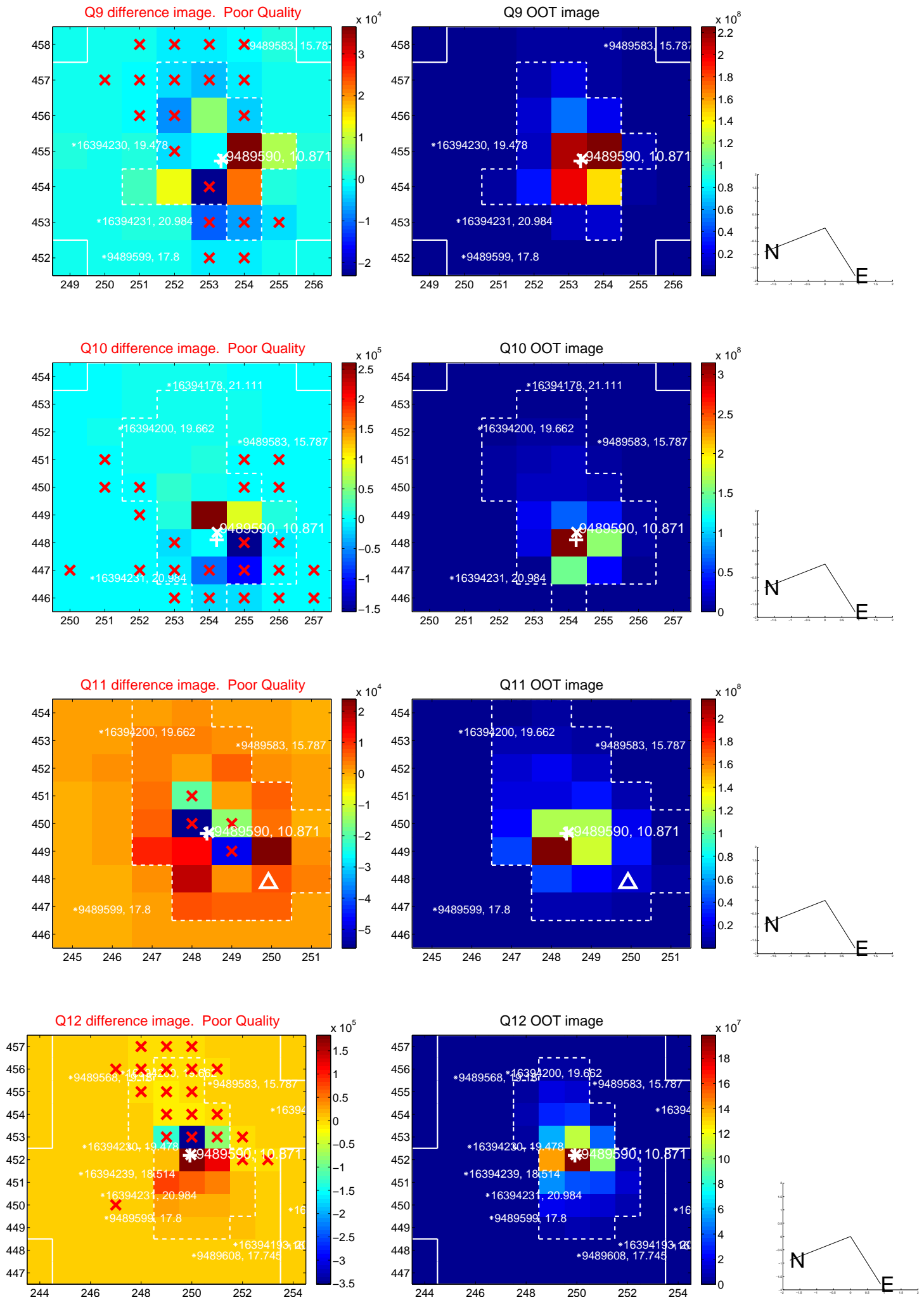
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



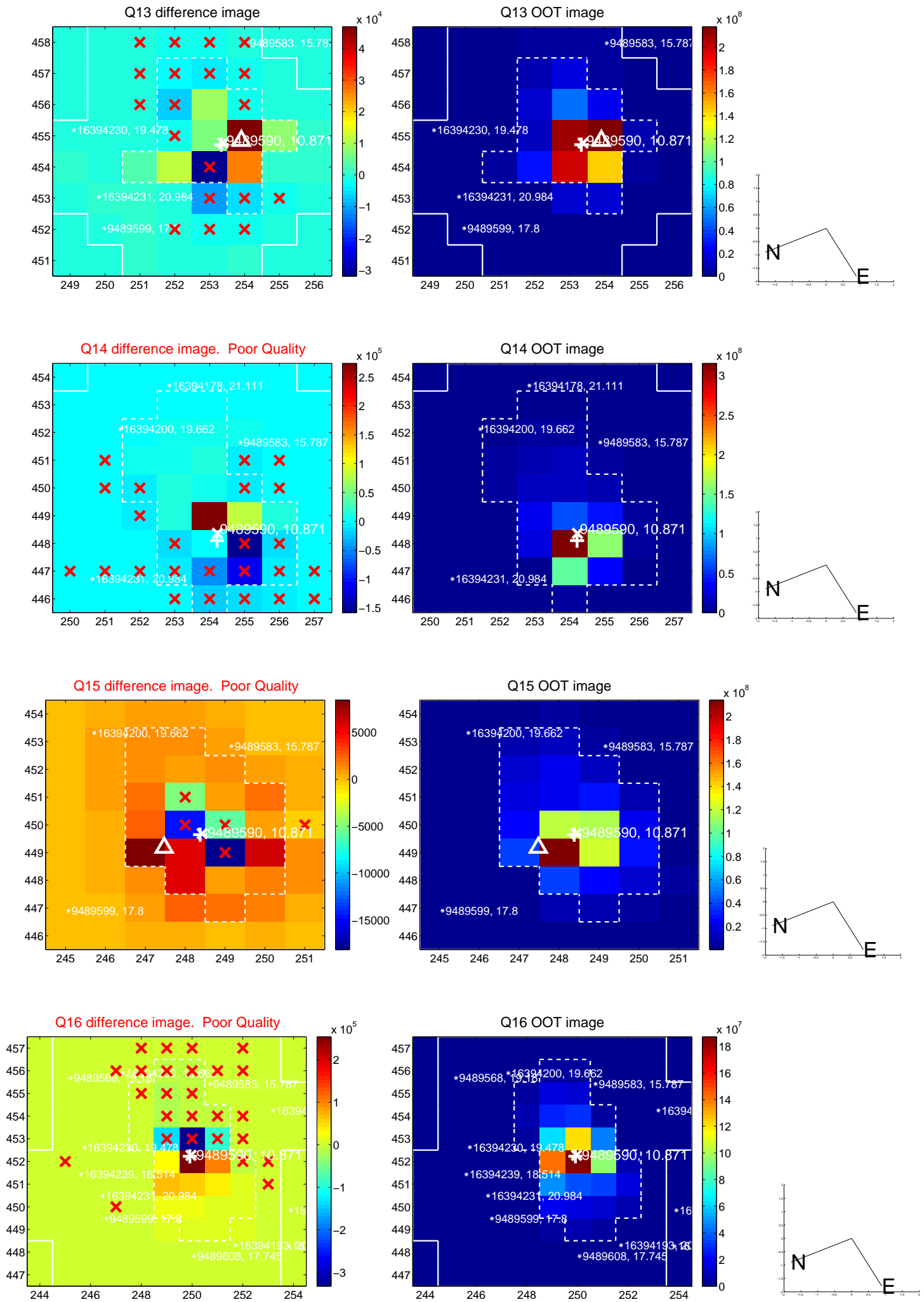
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



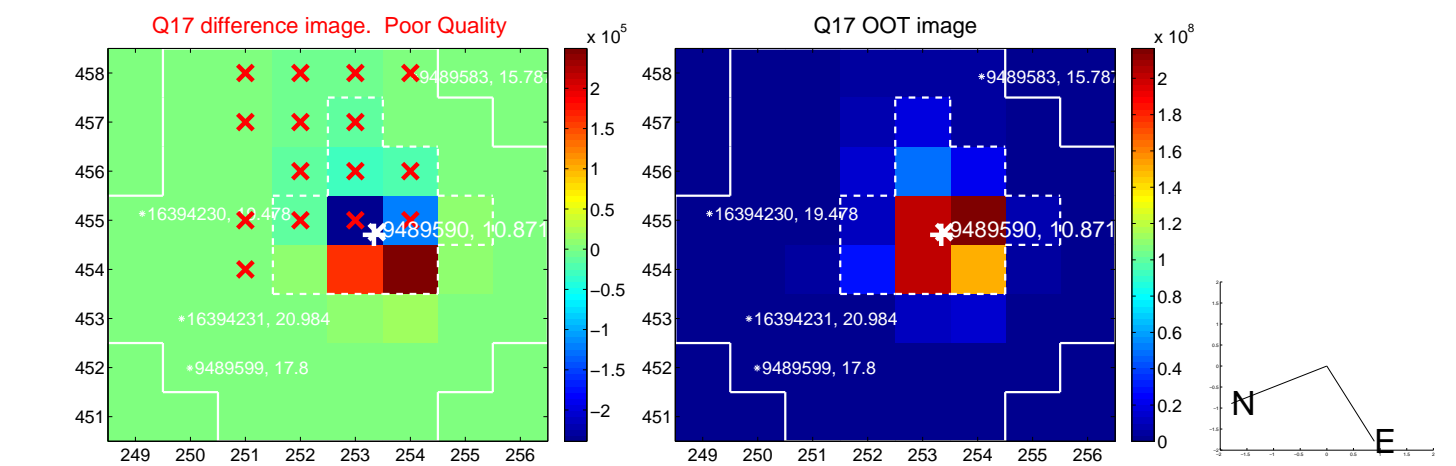
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



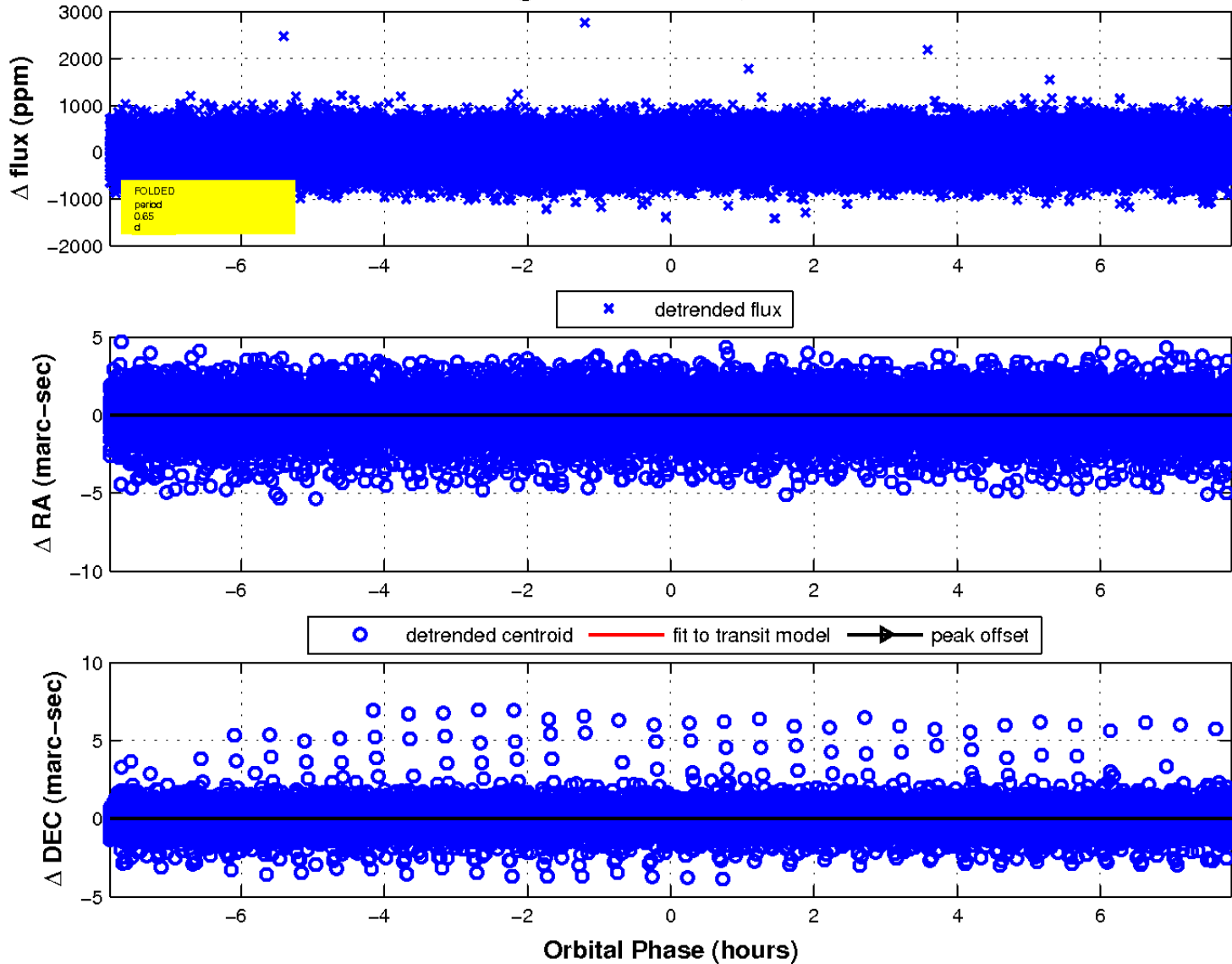
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



fluxWeightedCentroids, Planet 2 of 2



UKIRT Image

Declination

