

KIC 009716350

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})
009716350-01	OBS	No	1.569716	132.869652	39.0	10.317	9.2	5.6	1.52	6753	1.02	5035.74
009716350-02	OBS	No	1.569787	132.060028	126.9	4.879	13.6	15.3	1.52	6753	3.11	5035.43

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009716350-01	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV
009716350-02	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA—LPP_DV—LPP_ALT—SAME_NTL_PERIOD—HALO_GHOST

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

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

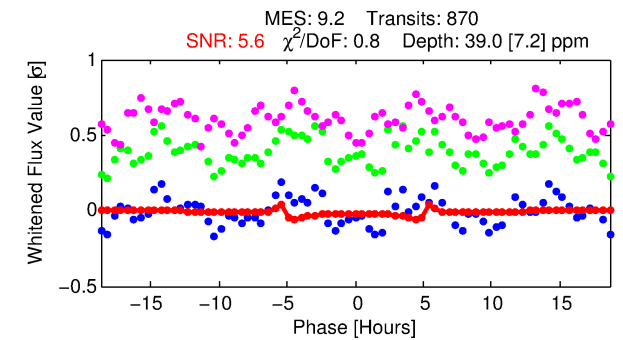
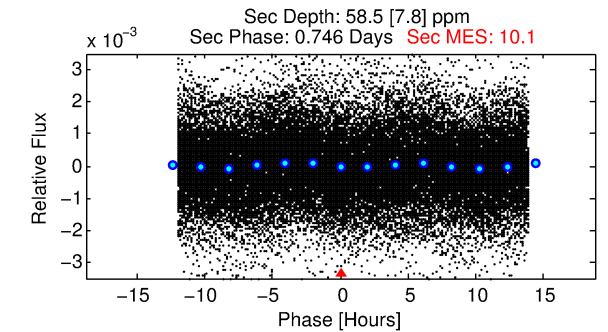
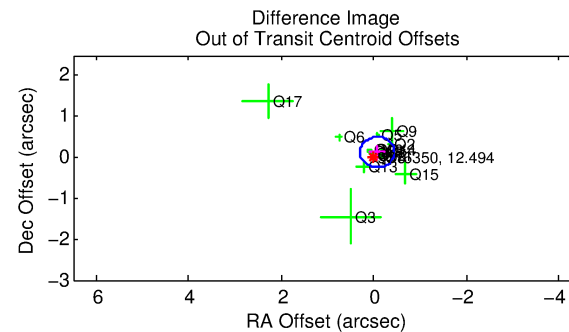
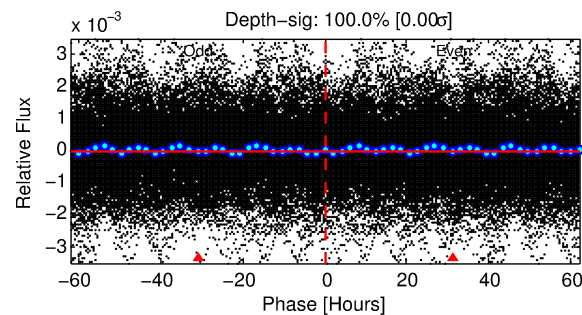
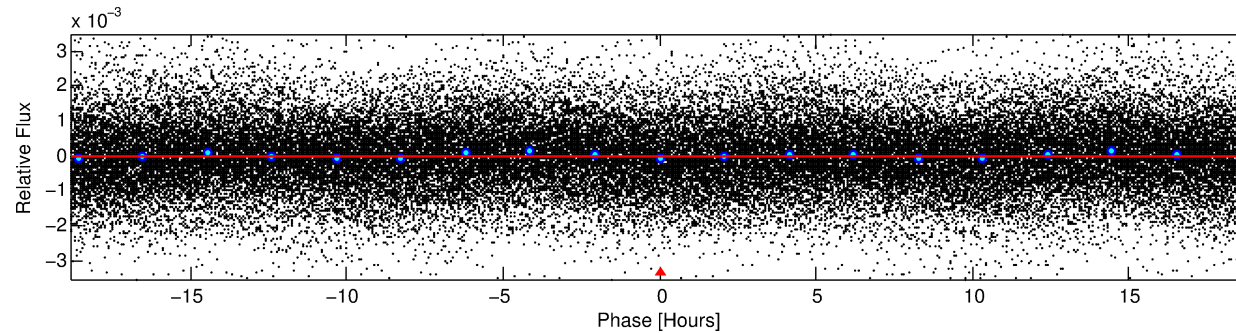
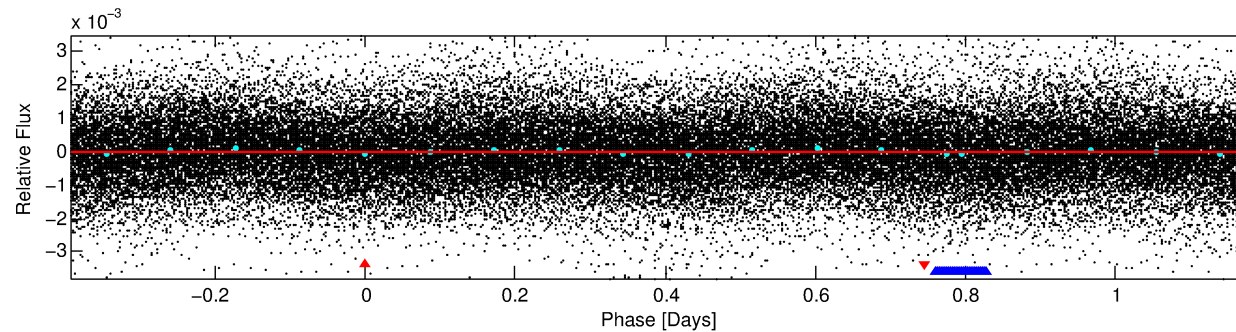
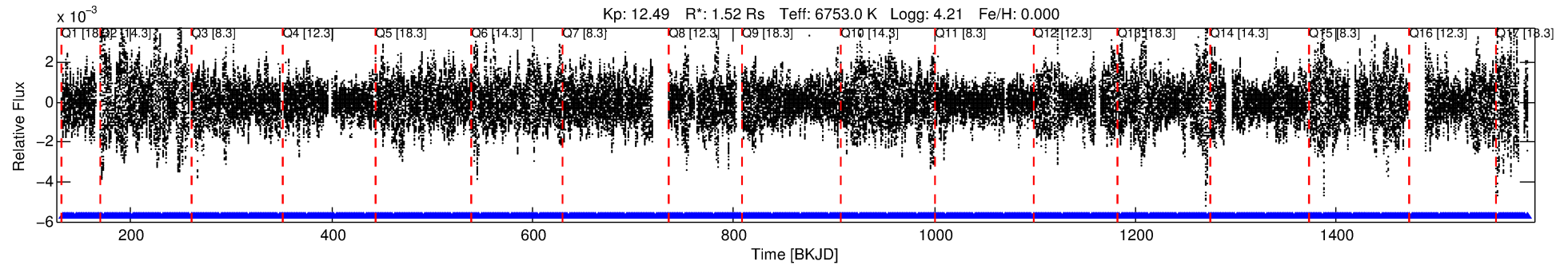
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009716350-01

No Significant Match Found

DV One-Page Summary

KIC: 9716350 Candidate: 1 of 2 Period: 1.570 d



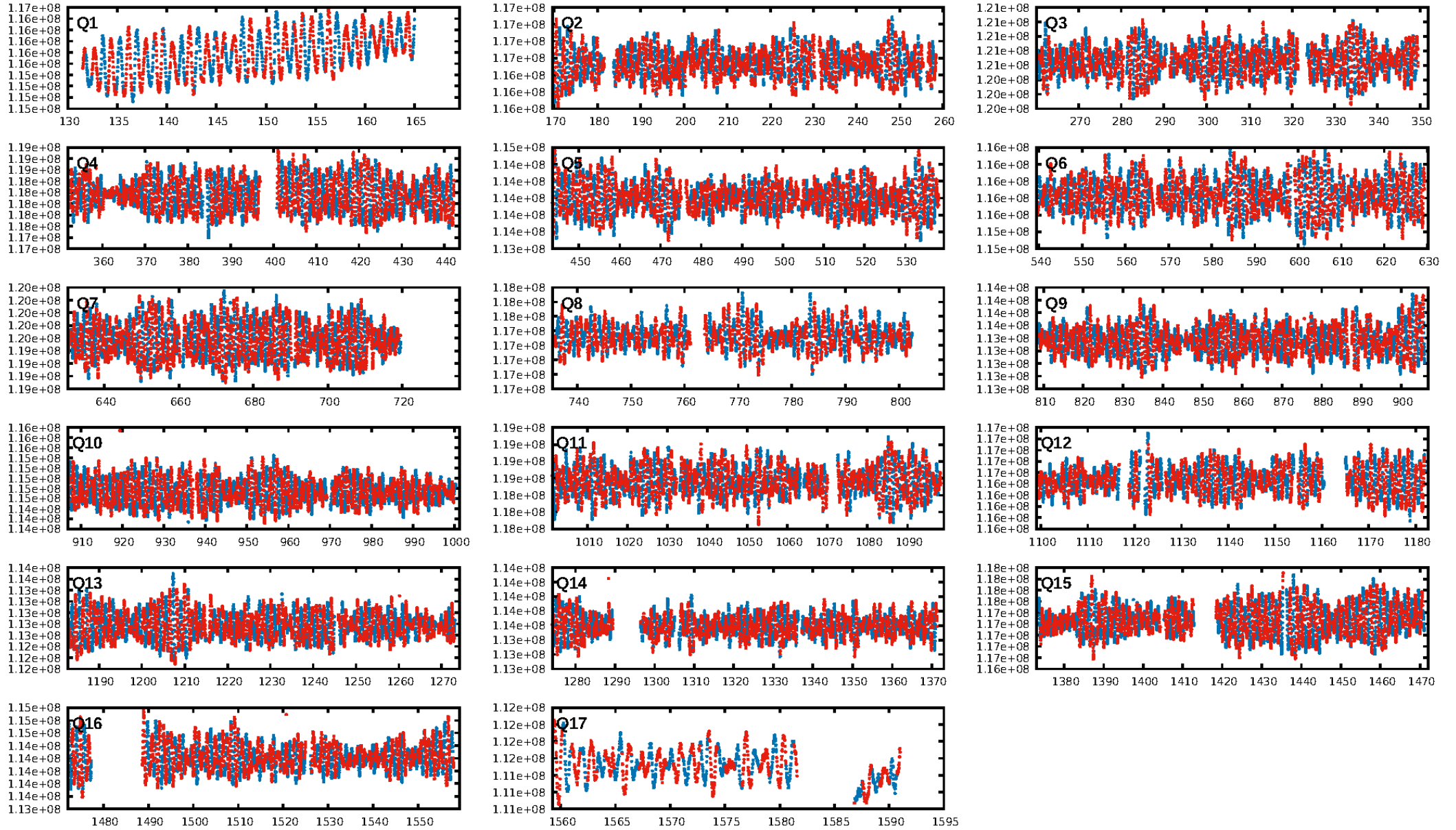
DV Fit Results:

Period = 1.56972 [0.00002] d
Epoch = 132.8697 [0.0037] BKJD
Rp/R* = 0.0061 [0.0022]
a/R* = 1.18 [0.67]
b = 0.70 [1.46]
Seff = 5035.74 [2026.70]
Teq = 2148 [216] K
Rp = 1.02 [0.49] Re
a = 0.0293 [0.0077] AU
Ag = 26.64 [21.72] [1.18σ]
Teffp = 7545 [1410] K [3.78σ]

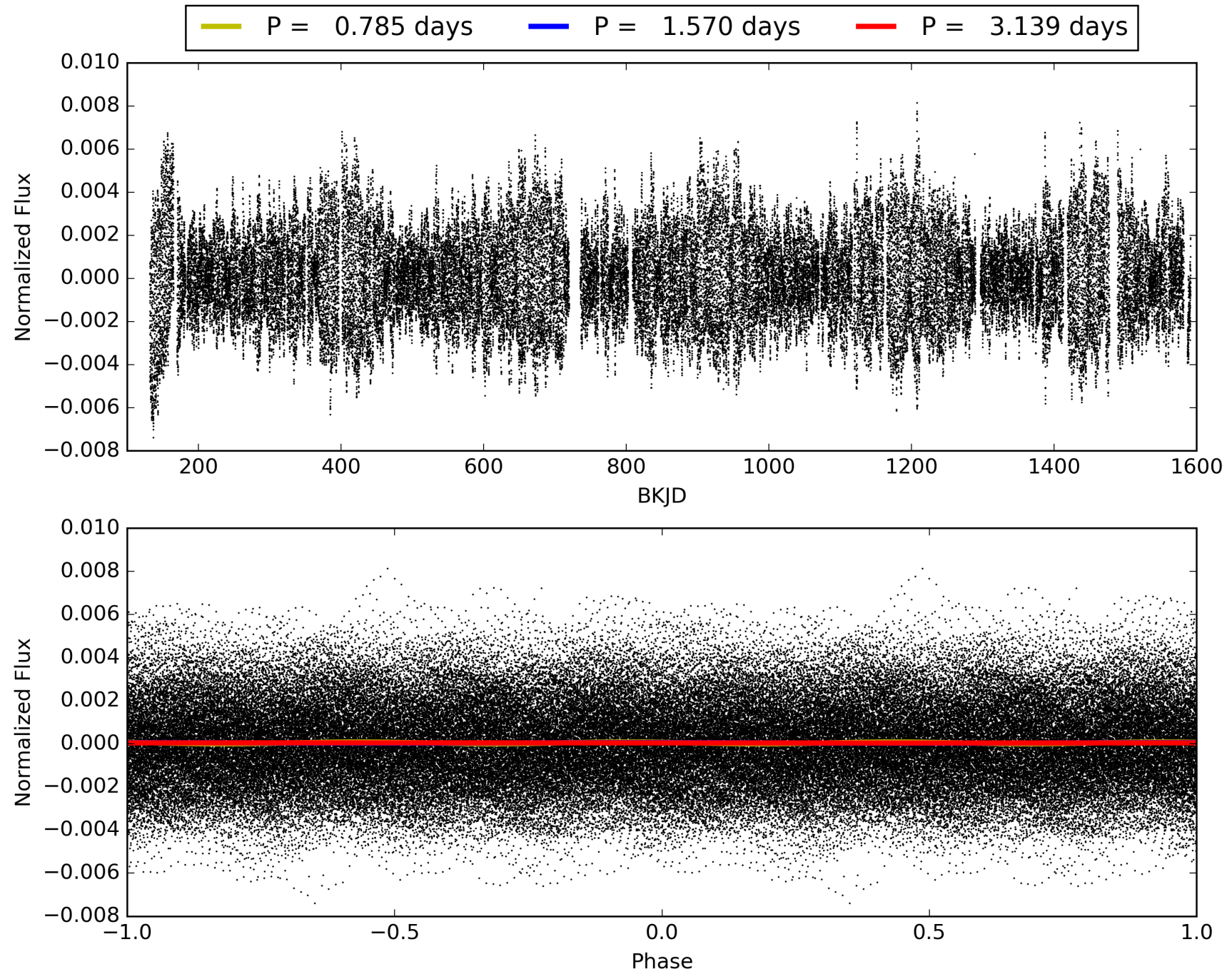
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 0.0% [0.00σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: N/A
RollingBand-fgt: 1.00 [830/830]
GhostDiagnostic-chr: -0.7145
Centroid-sig: 0.5%
Centroid-so: 0.770 arcsec [1.79σ]
OotOffset-rm: 0.145 arcsec [1.16σ]
OotOffset-st: 4/4/4/5 [17]
KicOffset-rm: 0.041 arcsec [0.26σ]
KicOffset-st: 4/4/4/5 [17]
DiffImageQuality-fgm: 0.53 [9/17]
DiffImageOverlap-fno: 0.00 [0/17]

TCE 009716350-01, PDC Light Curves

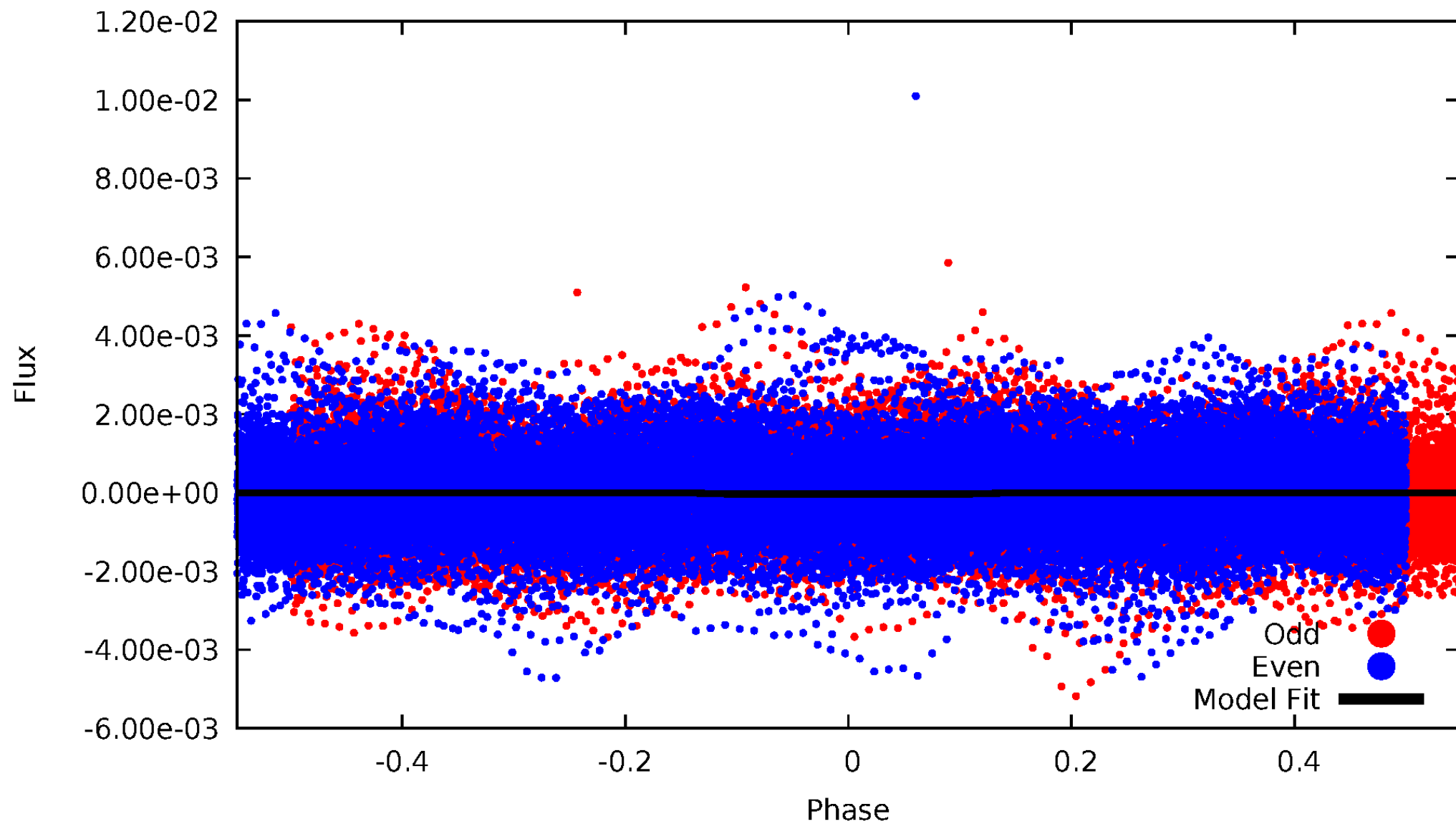


TCE 009716350-01



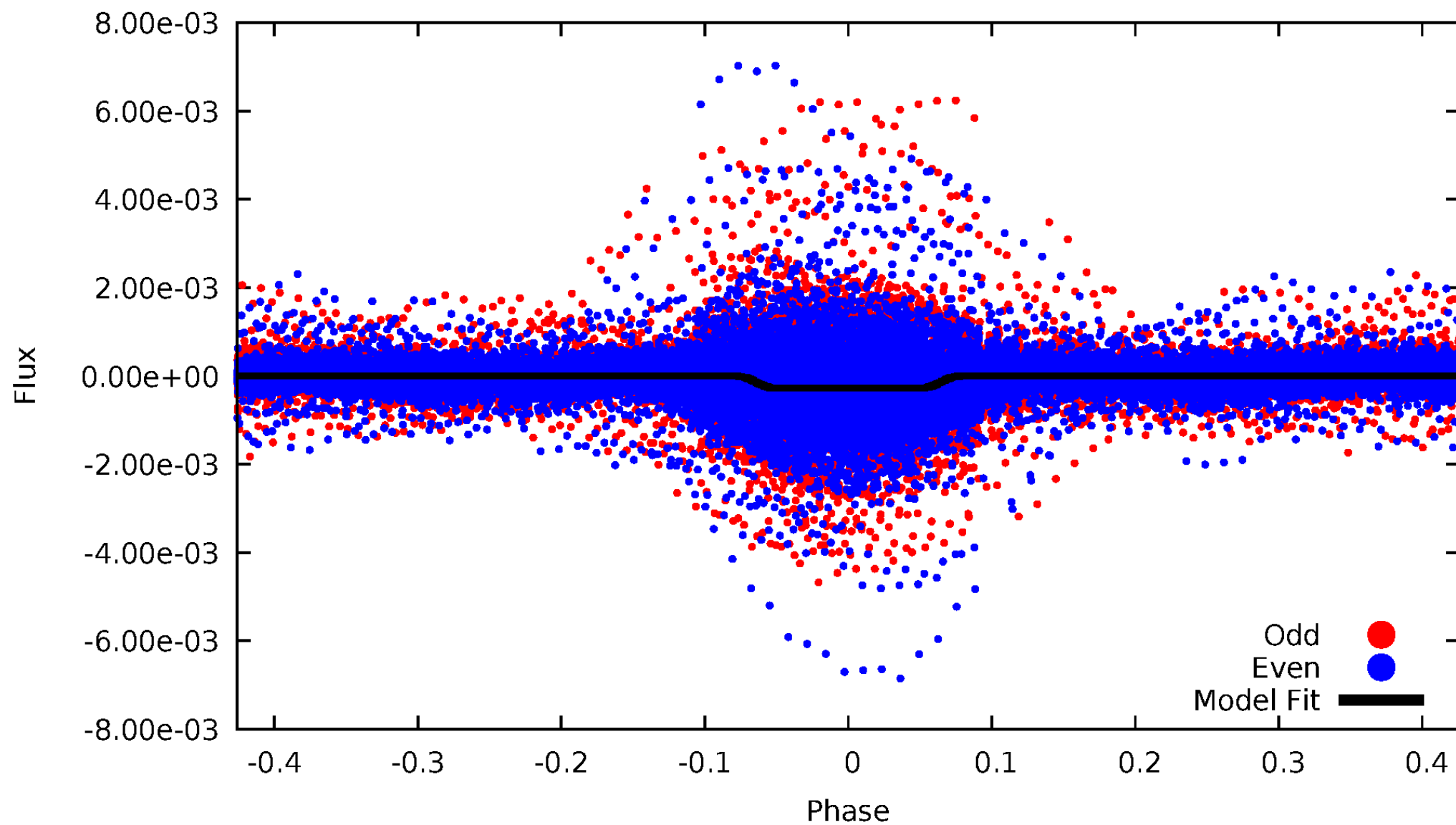
DV Odd/Even

TCE 009716350-01



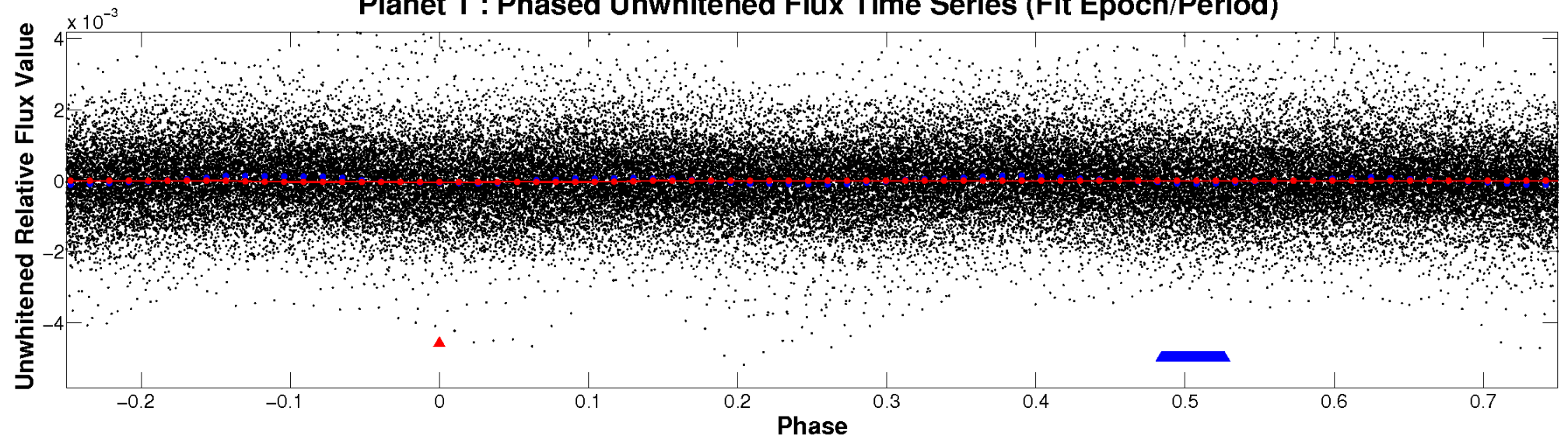
ALT Odd/Even

TCE 009716350-01

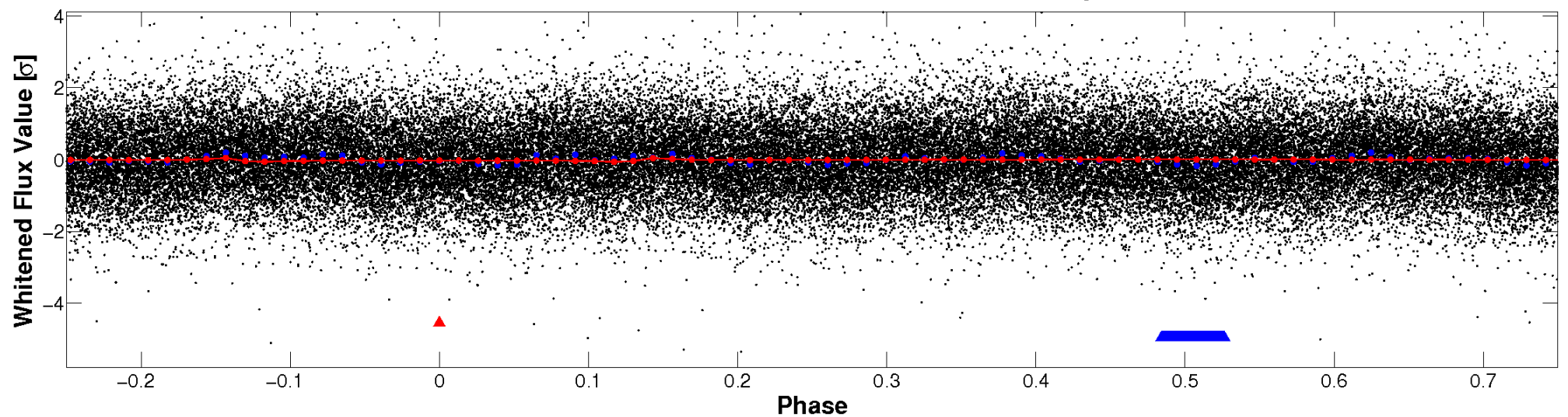


Non-Whitened Vs. Whitened Light Curve

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

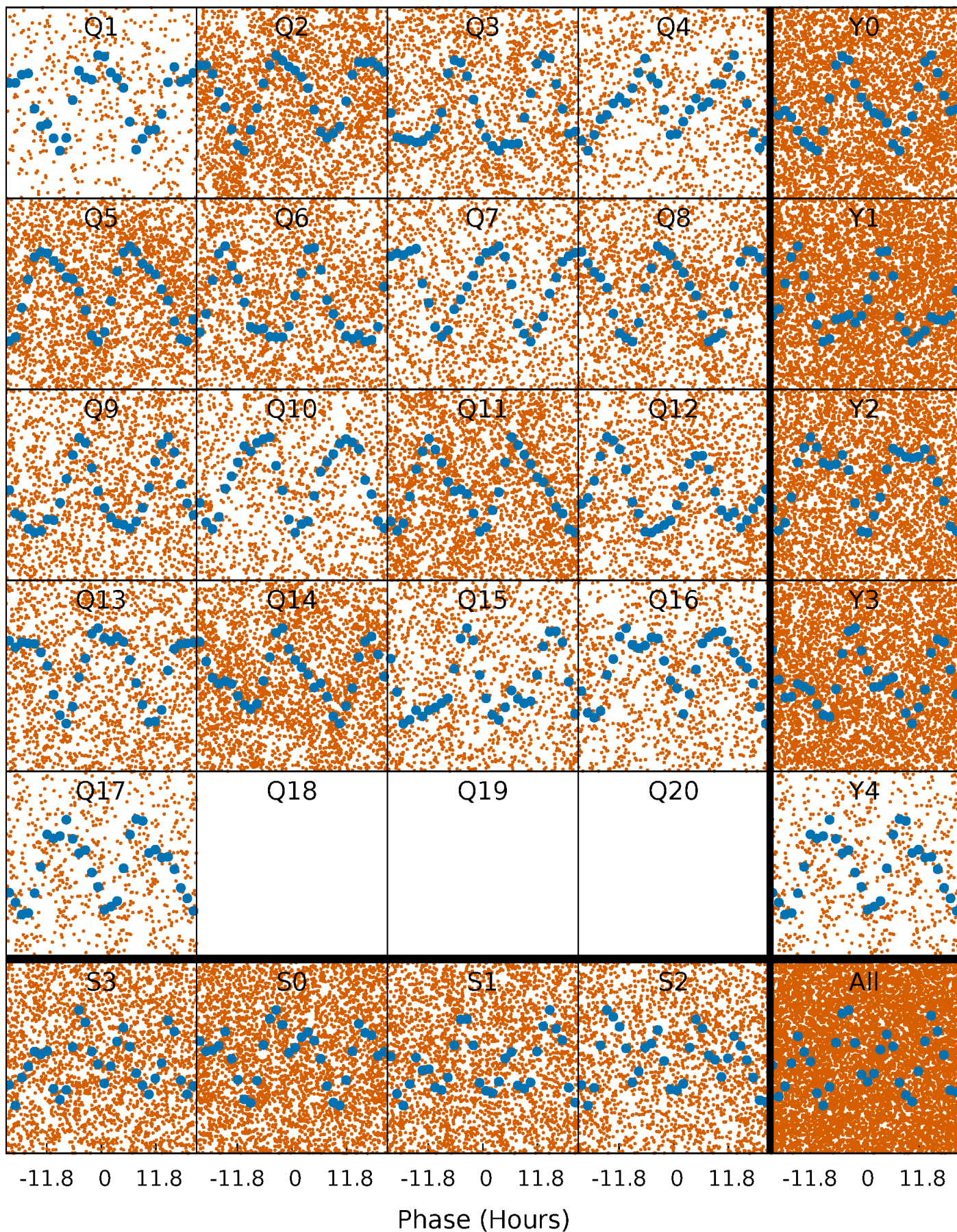


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



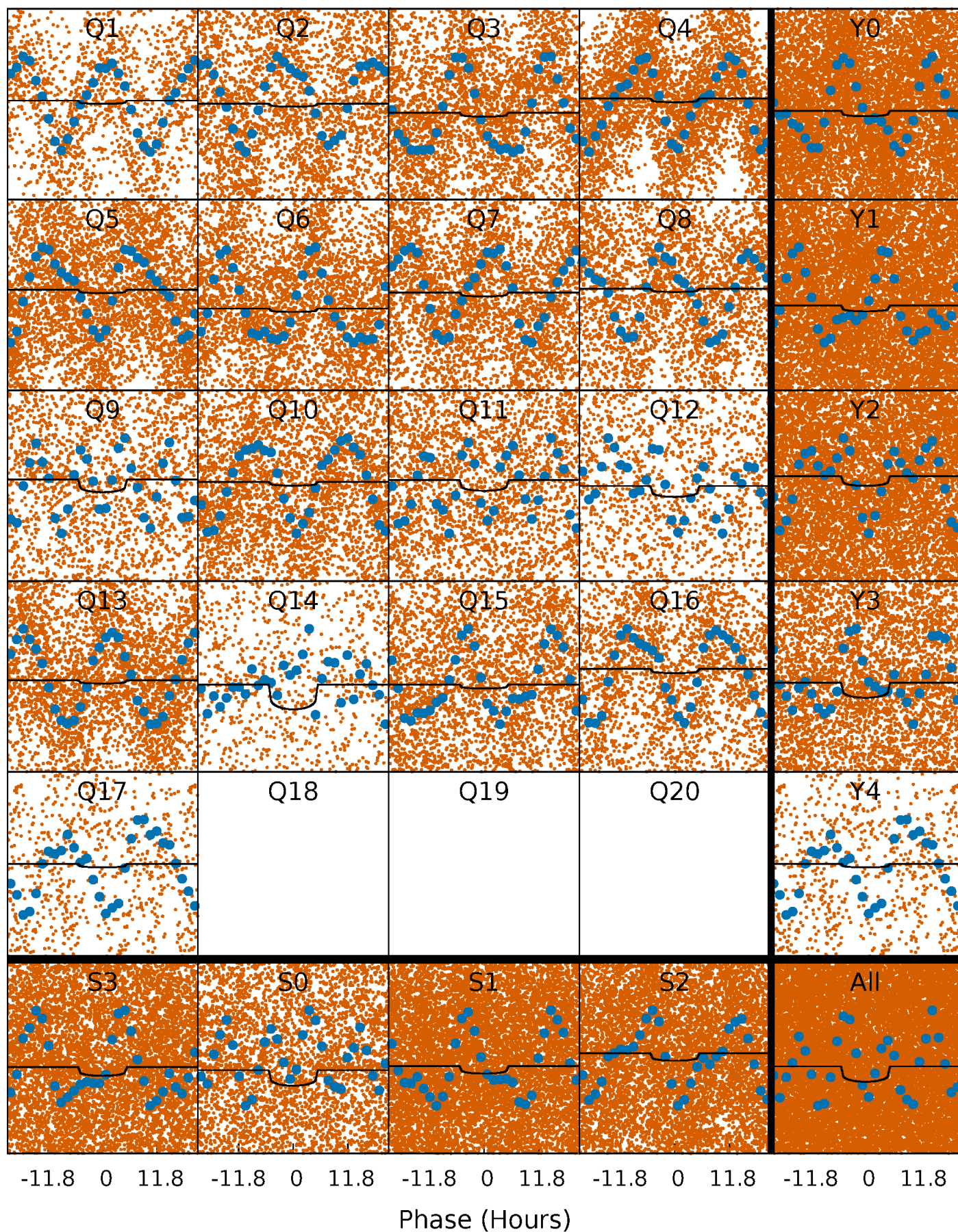
PDC Quarter-Phased Transit Curves

TCE 009716350-01 P= 1.569716 Days $T_0=132.869652$ (BKJD)



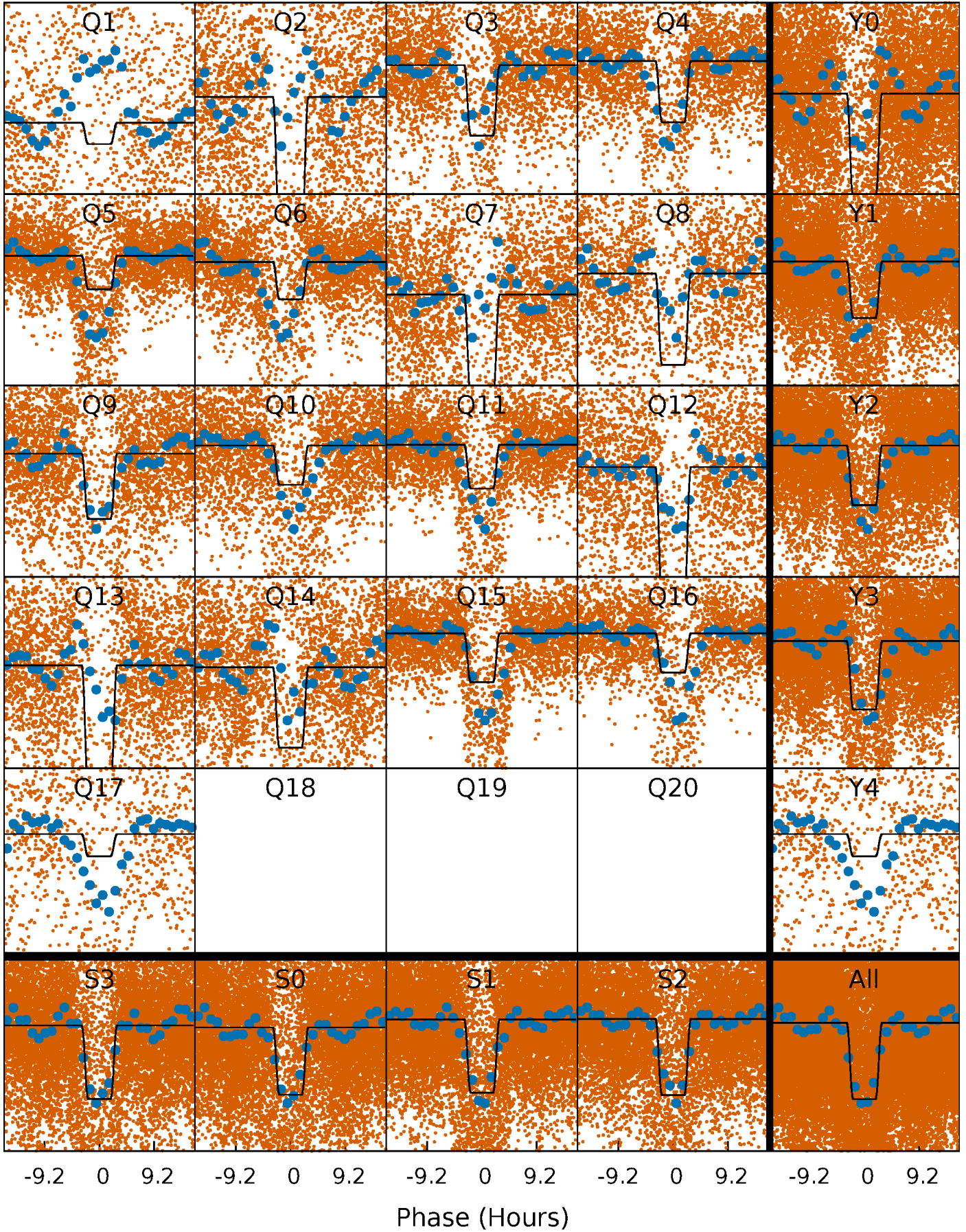
DV Quarter-Phased Transit Curves

TCE 009716350-01 P= 1.569716 Days $T_0=132.869652$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

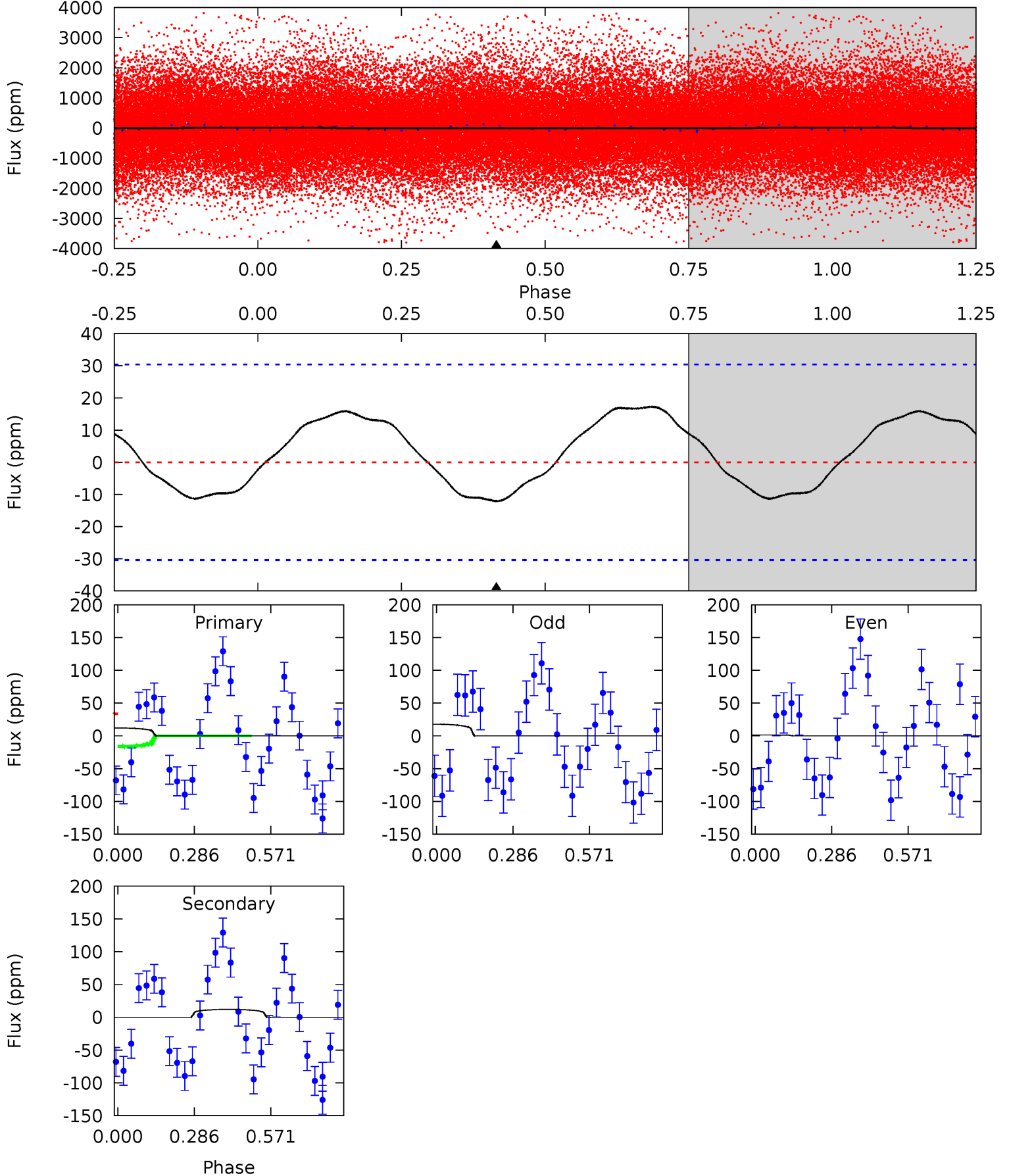
TCE 009716350-01 P= 1.569757 Days $T_0=132.873067$ (BKJD)



DV Model-Shift Uniqueness Test

009716350-01, P = 1.569716 Days, E = 131.299936 Days

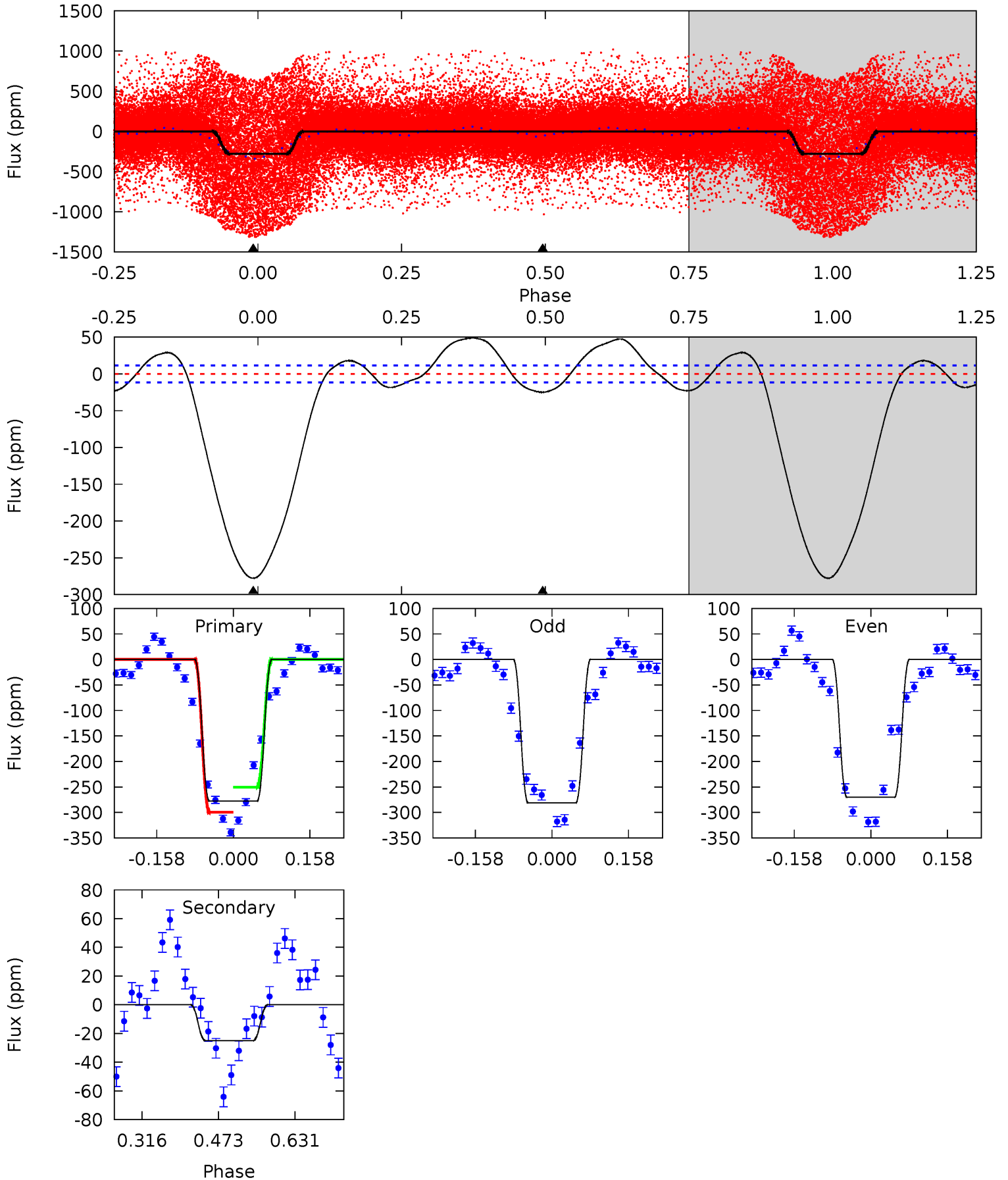
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
1.72	1.72	0	0	4.34	1.07	1.29	1.72	1.72	1.72	1.72	1.16	2.22	0.59	1.27



Alt Model-Shift Uniqueness Test

009716350-01, P = 1.569757 Days, E = 131.303310 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
107.2	9.63	0	0	4.47	1.41	6.66	107.2	107.2	9.63	9.63	2.13	0.92	0.15	9.47



Stellar Parameters For KIC 009716350

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	6753^{+189}_{-283}	$4.206^{+0.128}_{-0.192}$	$0.000^{+0.250}_{-0.350}$	$1.522^{+0.495}_{-0.304}$	$1.360^{+0.196}_{-0.218}$	$0.543^{+0.342}_{-0.282}$
	+3%/-4%	+3%/-5%	+inf%/-inf%	+33%/-20%	+14%/-16%	+63%/-52%
Source	PHO54	PHO54	PHO54	DSEP		

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

Secondary Eclipse Parameters for KIC 009716350-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-12 ± 7	$1.07^{+0.39}_{-0.43}$	3032^{+218}_{-193}	5040^{+1365}_{-1039}	$4.967^{+9.526}_{-3.147}$
Alt.	-25 ± 3	$2.84^{+0.55}_{-0.48}$	3017^{+235}_{-201}	3811^{+257}_{-225}	$1.452^{+0.621}_{-0.444}$

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 $A_{obs} \gg 1.0$

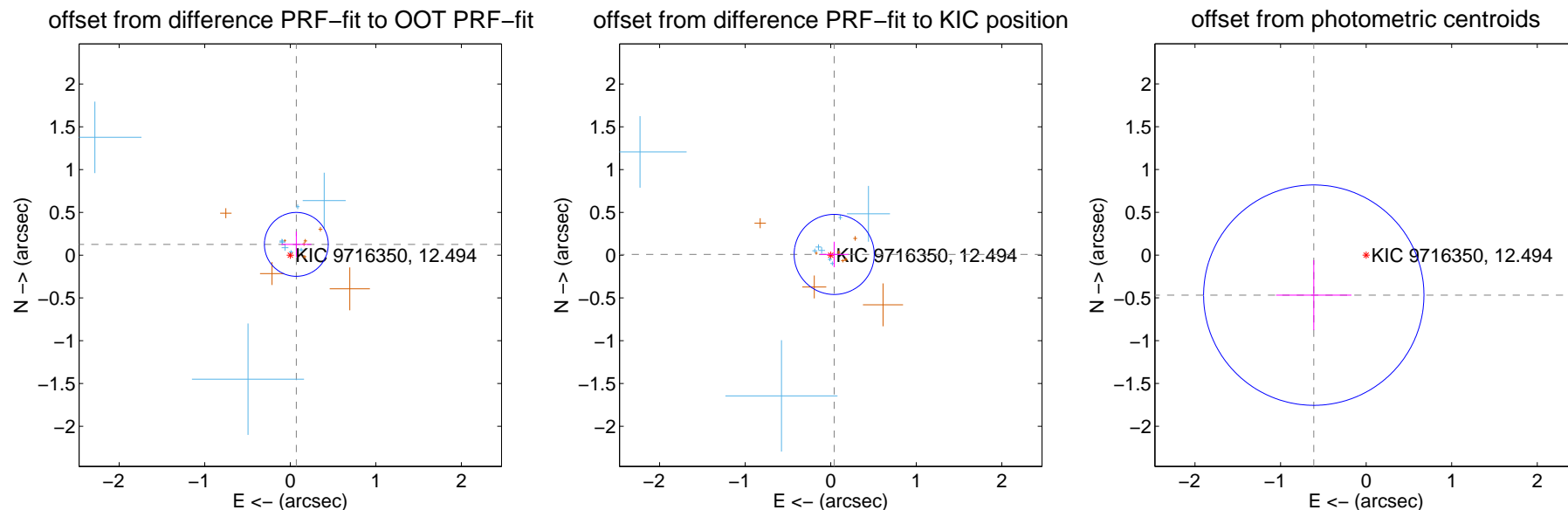
DV Centroid Data

Supplemental centroid analysis for 009716350-01. Kepler magnitude: 12.49. Transit SNR 5.62

There are 9 quarters with good PRF difference image offsets

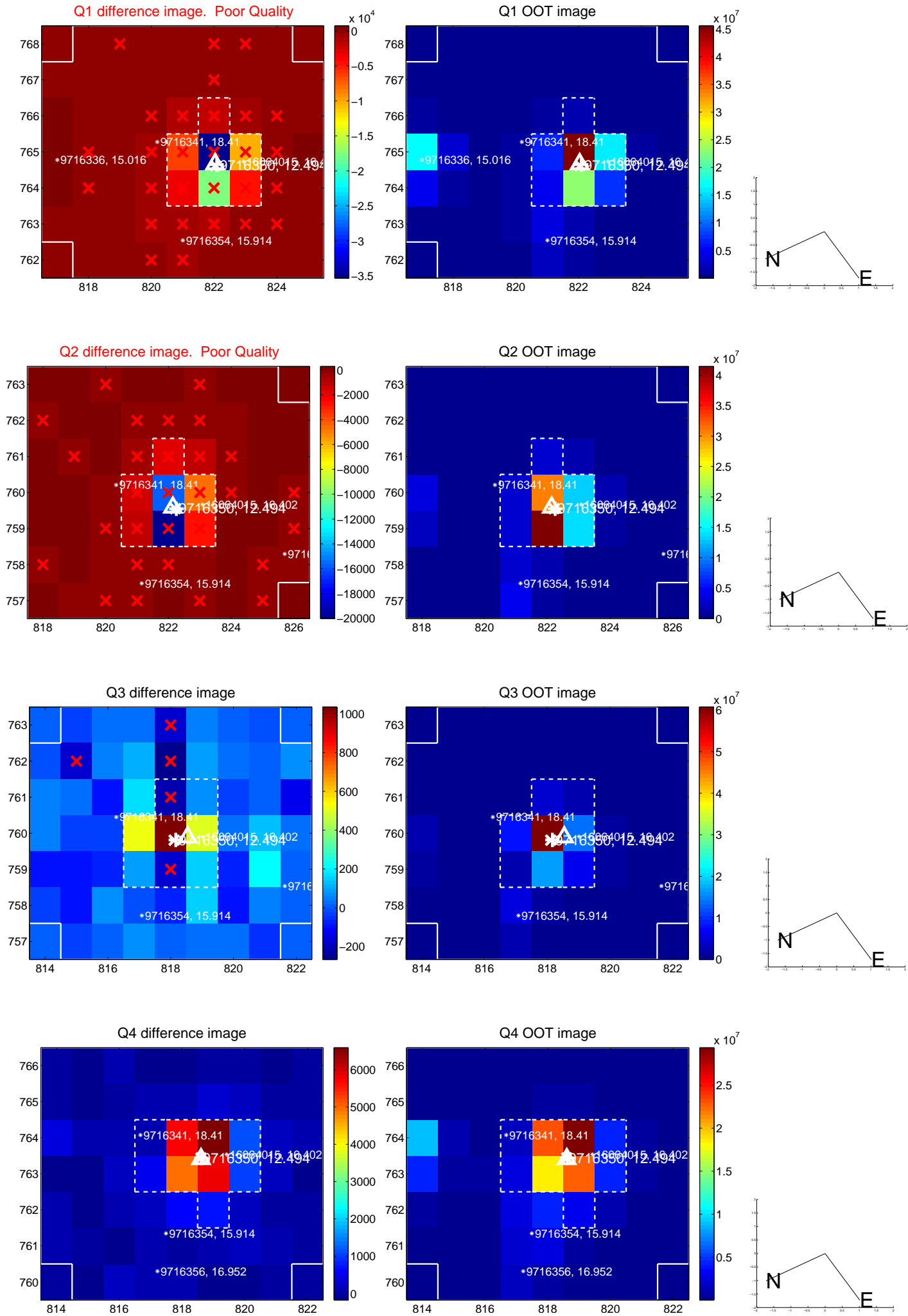
The direct PRF centroid is offset from the target star catalog position by about 0.18 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.145 ± 0.124	1.16	-0.071 ± 0.176	0.126 ± 0.149
PRF-fit source offset from KIC position	0.041 ± 0.156	0.26	-0.040 ± 0.166	0.009 ± 0.149
photometric centroid source offset	0.77 ± 0.43	1.79	0.61 ± 0.44	-0.47 ± 0.41

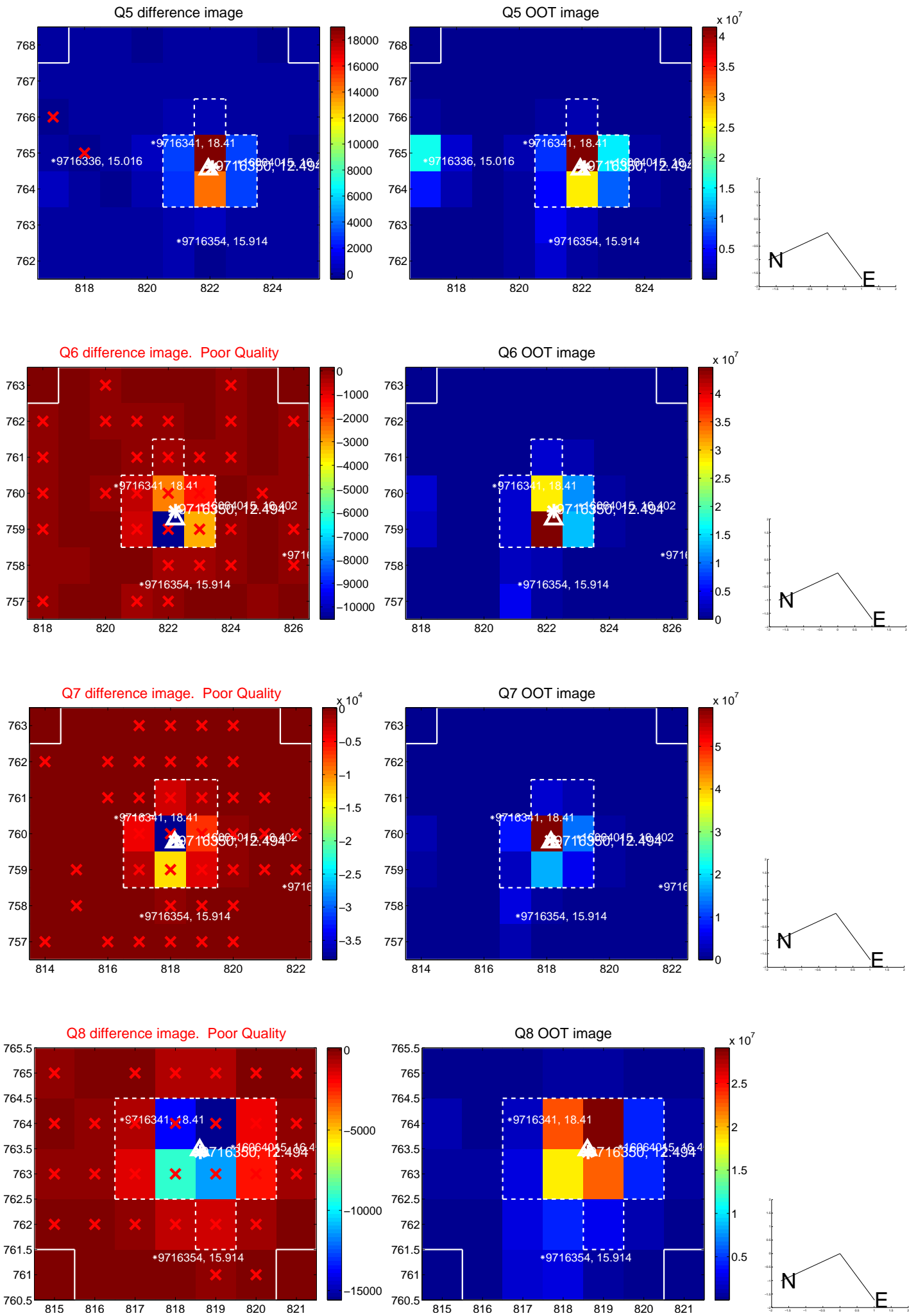


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

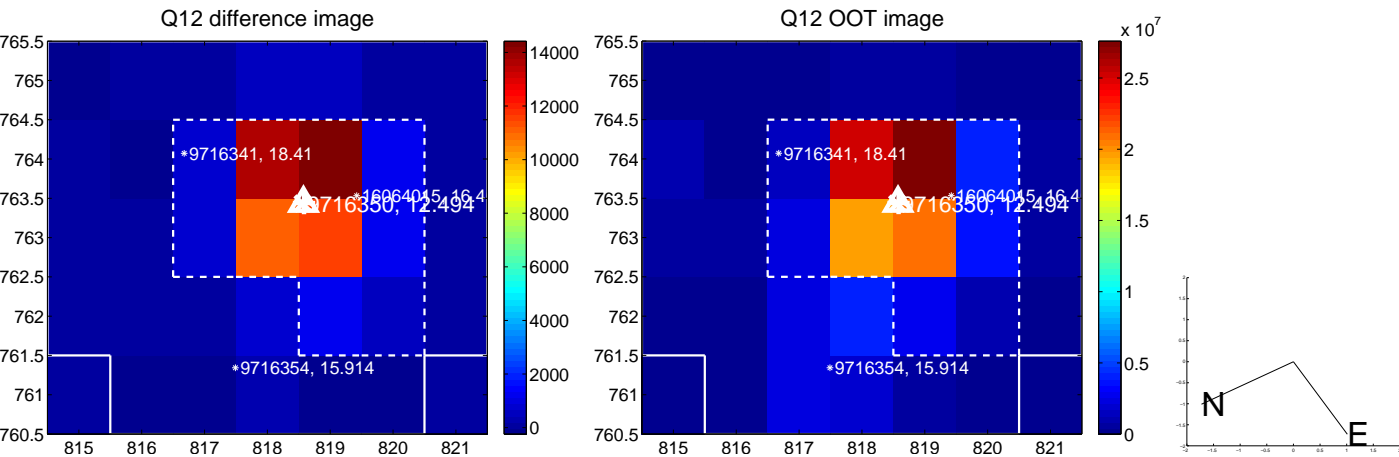
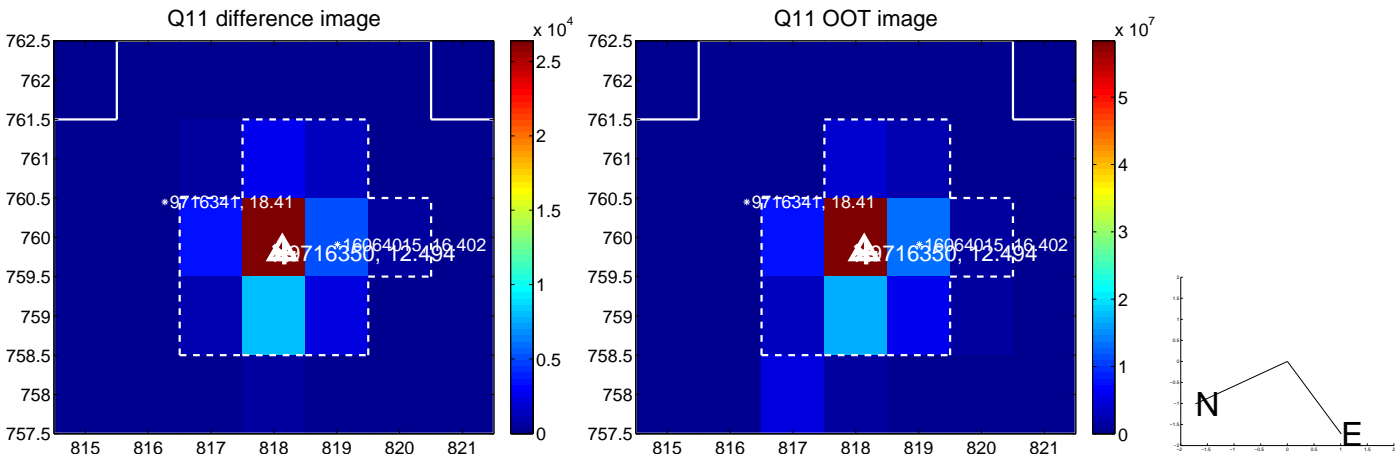
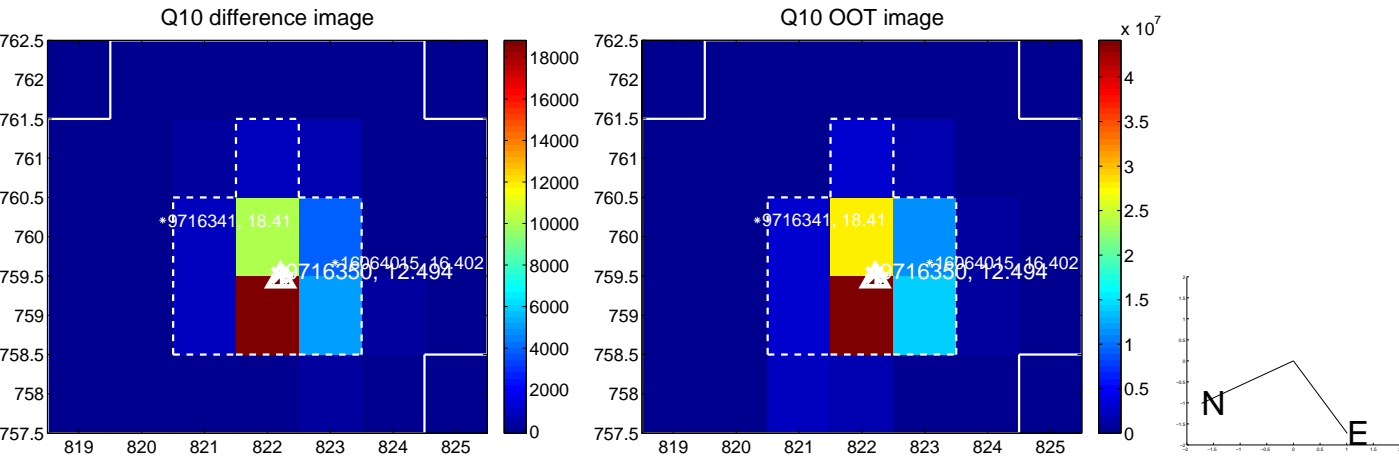
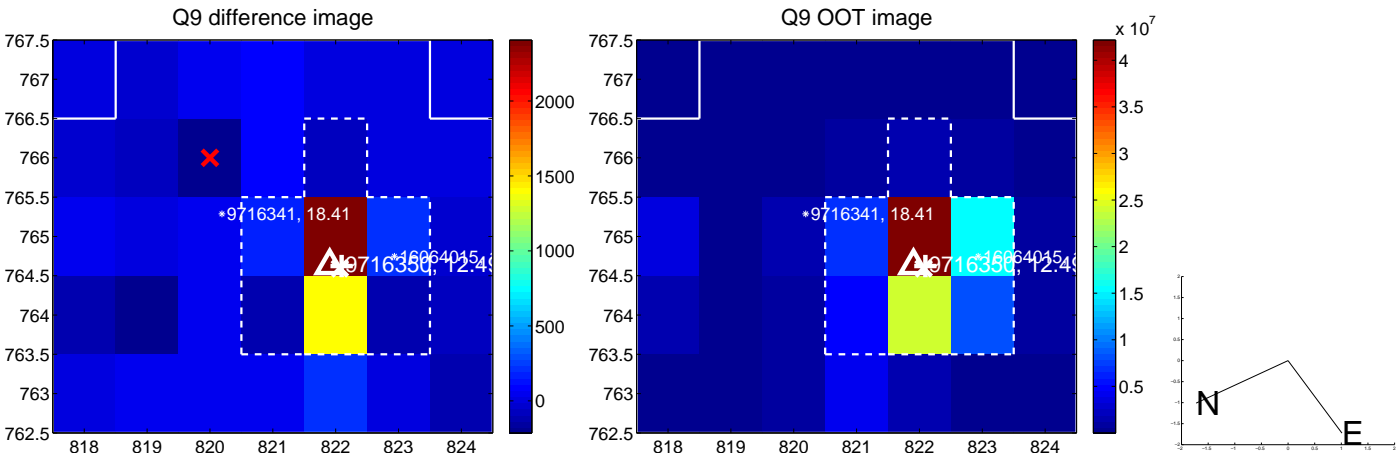
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



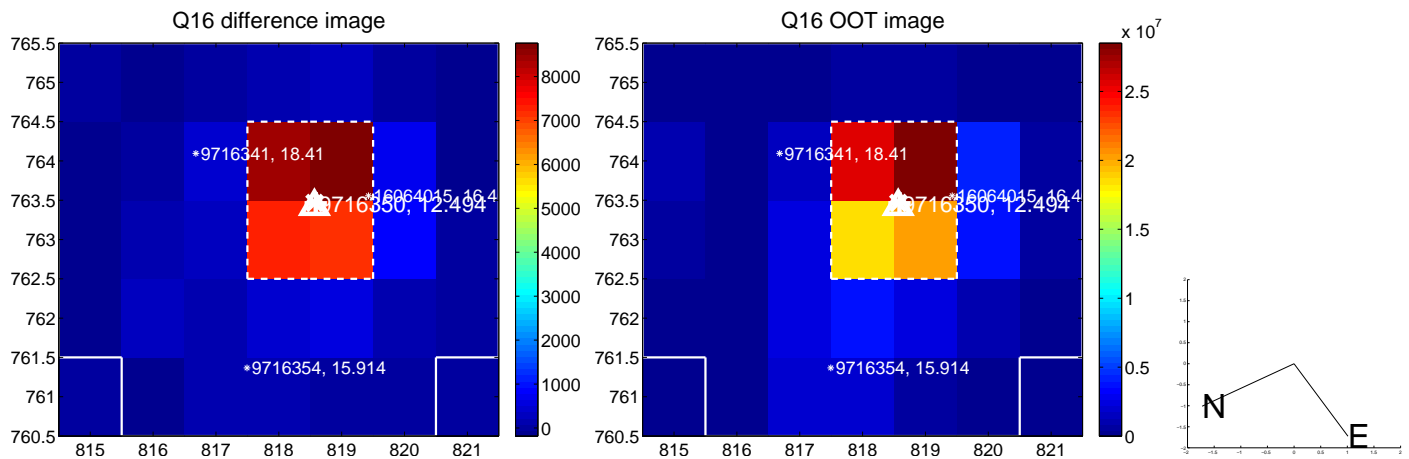
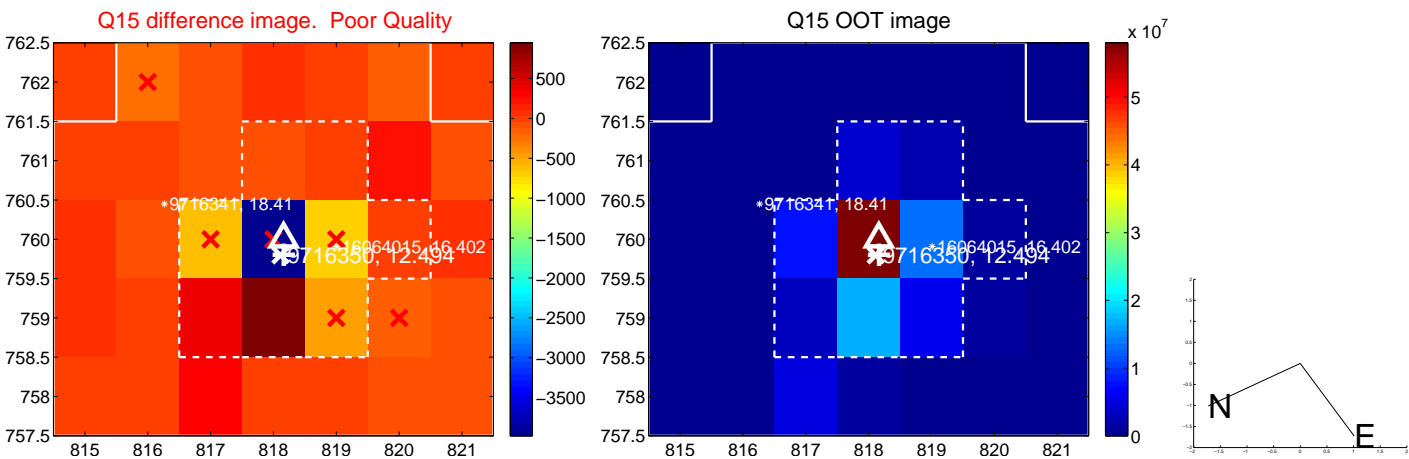
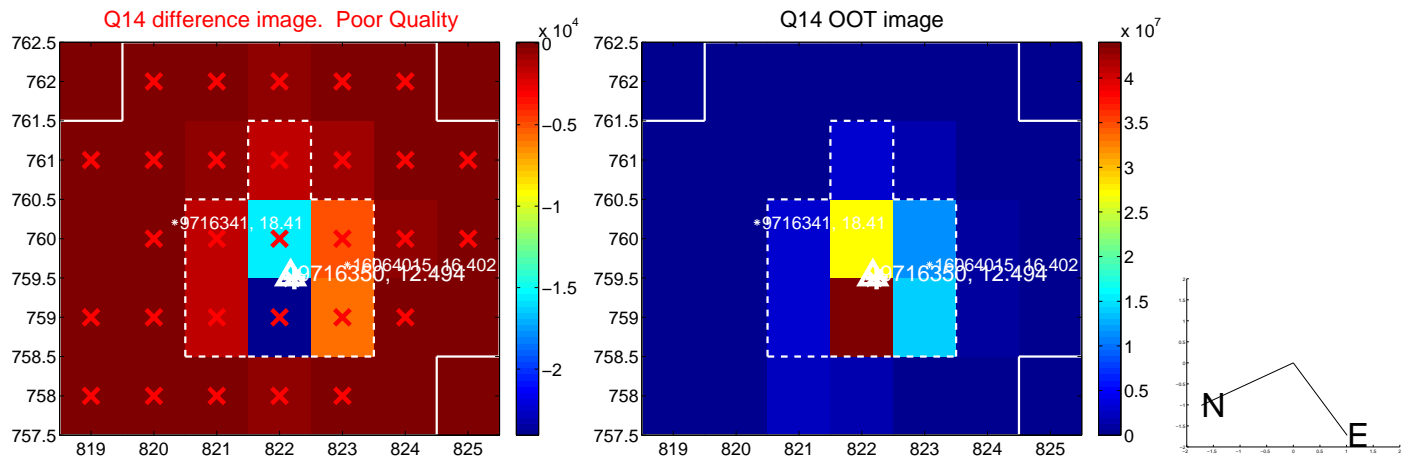
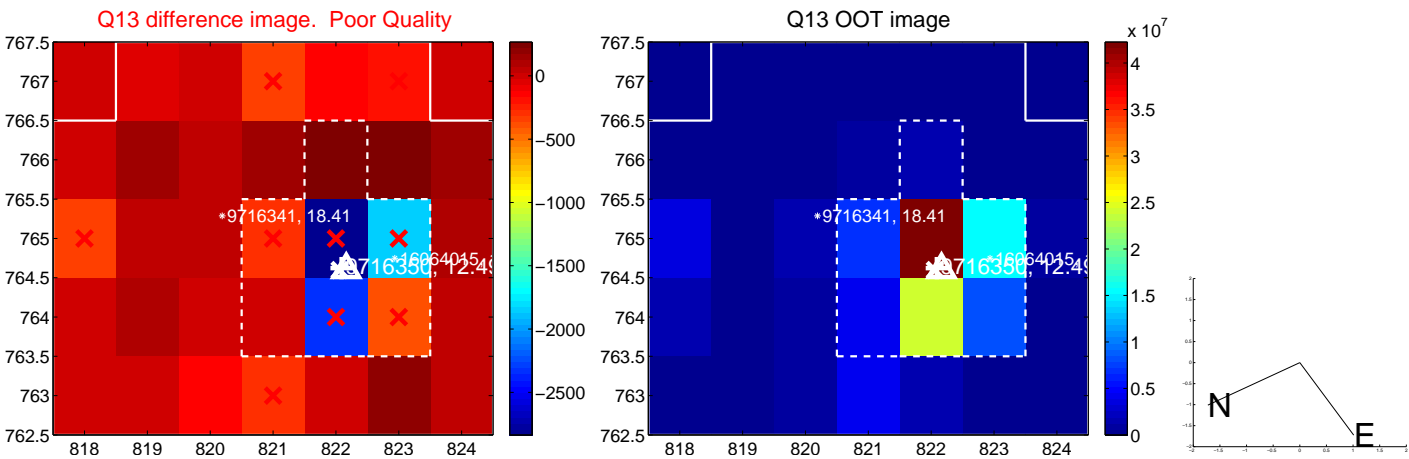
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



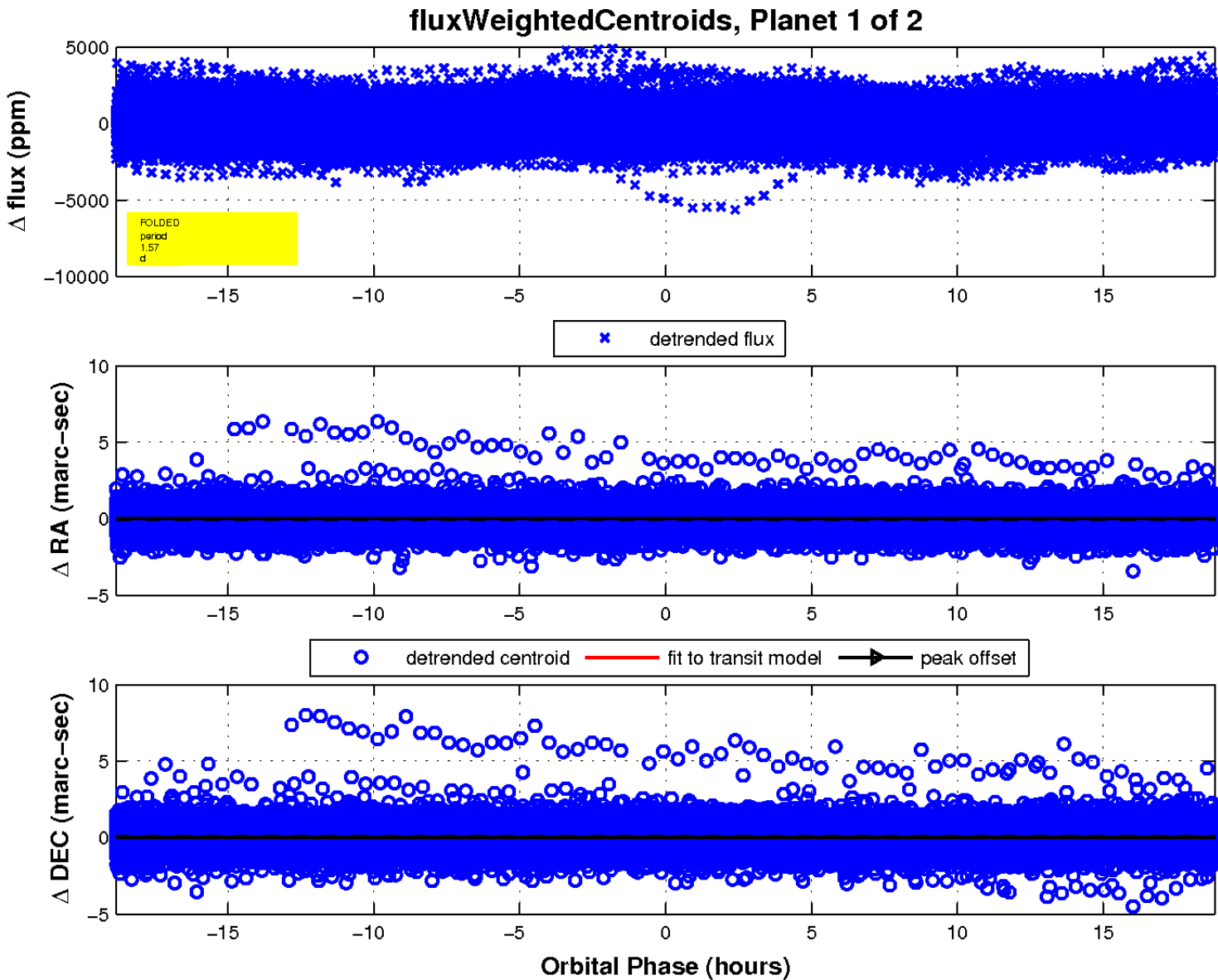
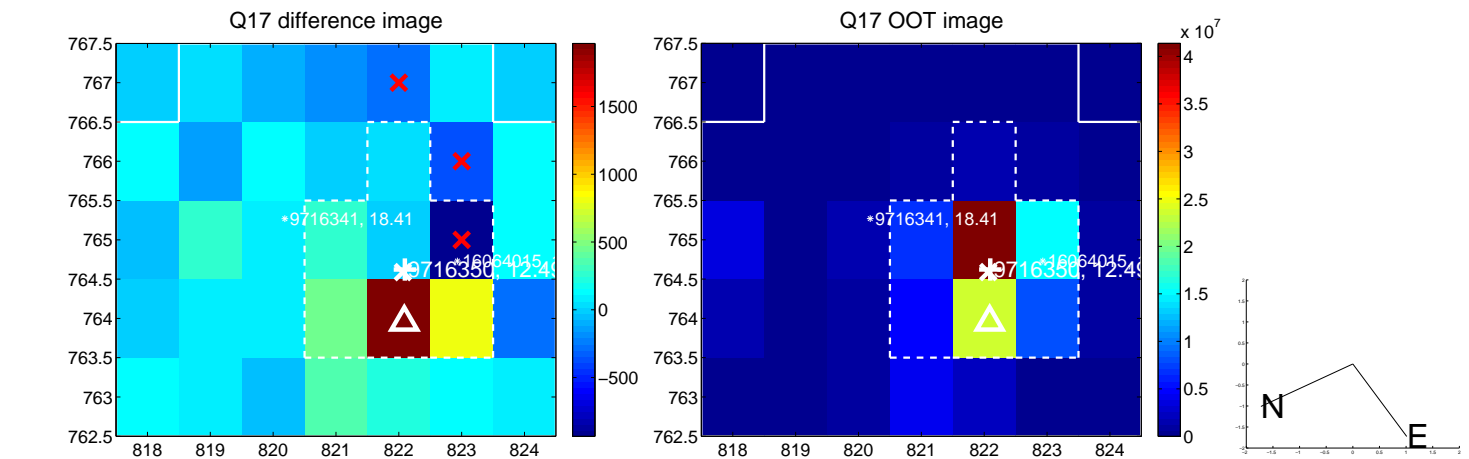
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

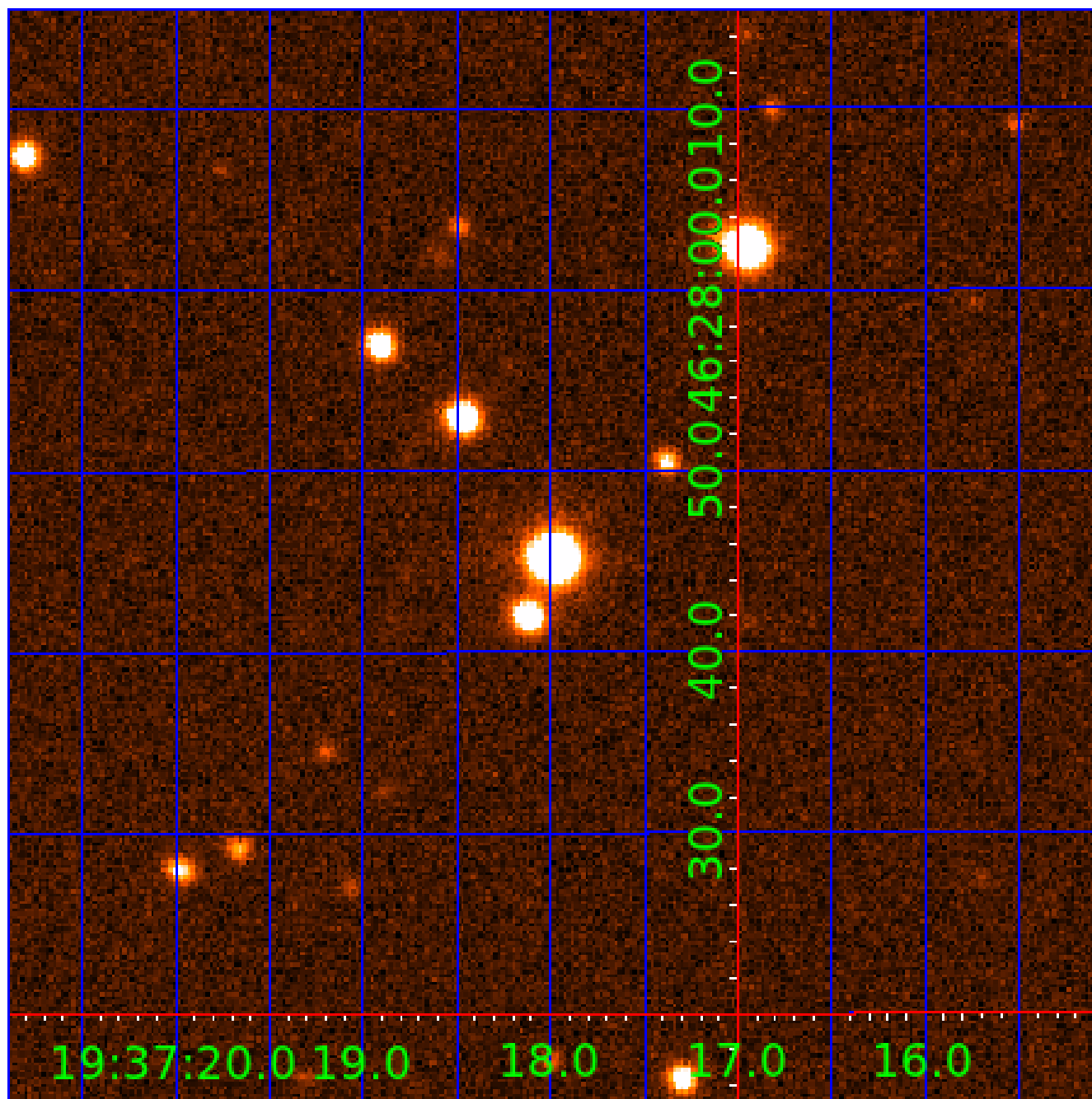


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 009716350

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})
009716350-01	OBS	No	1.569716	132.869652	39.0	10.317	9.2	5.6	1.52	6753	1.02	5035.74
009716350-02	OBS	No	1.569787	132.060028	126.9	4.879	13.6	15.3	1.52	6753	3.11	5035.43

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009716350-01	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV
009716350-02	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA—LPP_DV—LPP_ALT—SAME_NTL_PERIOD—HALO_GHOST

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

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

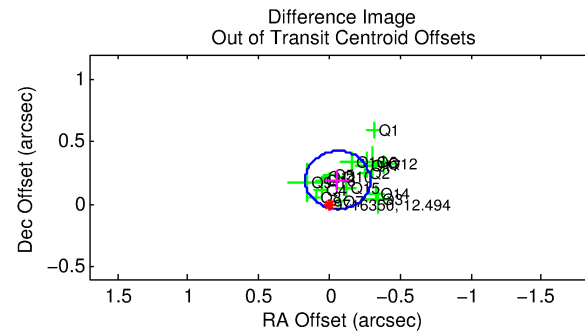
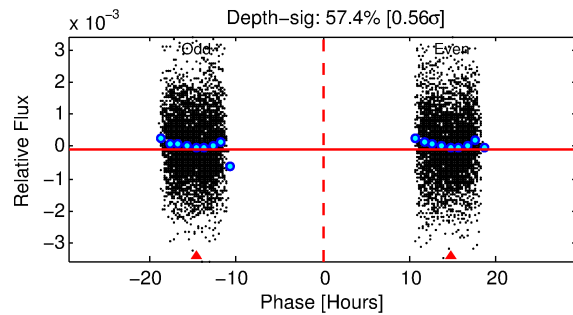
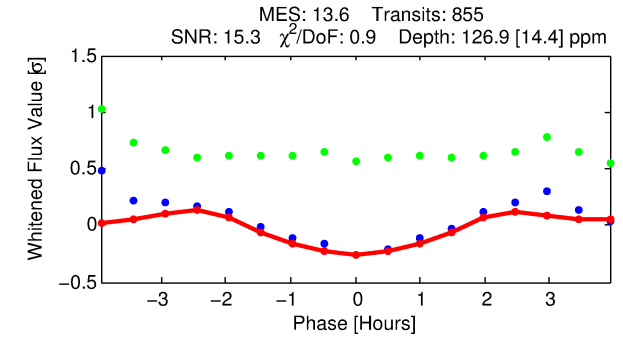
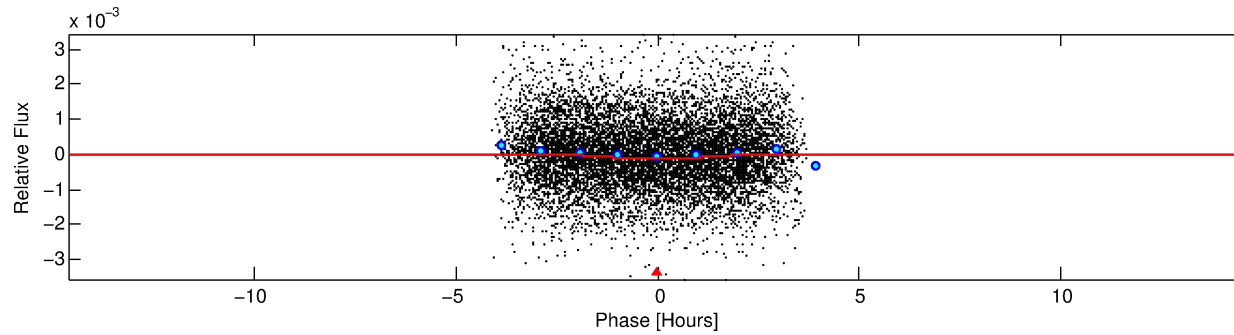
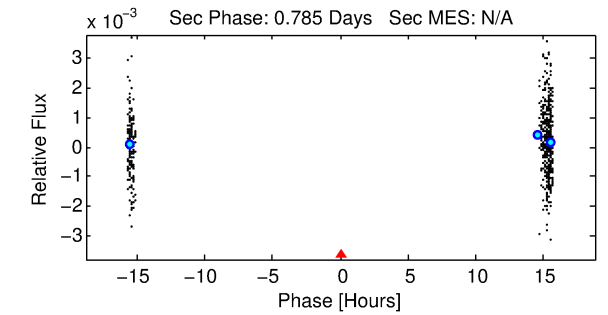
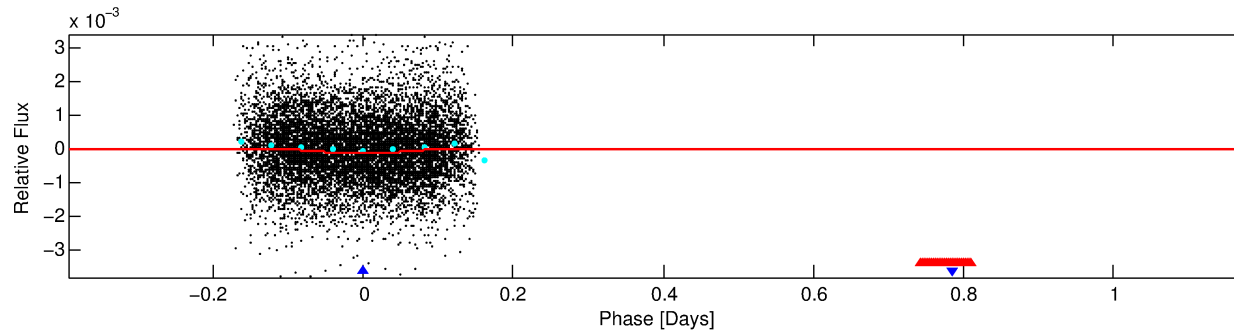
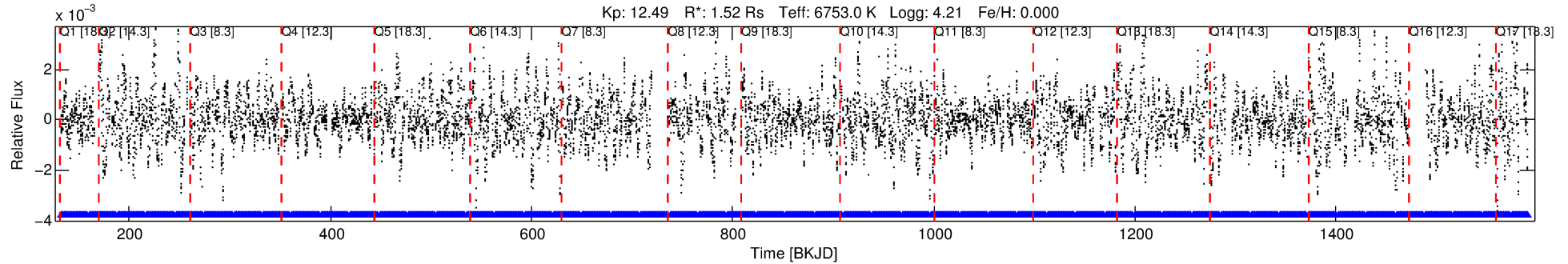
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009716350-02

No Significant Match Found

DV One-Page Summary

KIC: 9716350 Candidate: 2 of 2 Period: 1.570 d



DV Fit Results:

Period = 1.56979 [0.00001] d
Epoch = 132.0600 [0.0039] BKJD
Rp/R* = 0.0187 [0.0148]
a/R* = 1.13 [0.04]
b = 1.00 [0.02]
Seff = 5035.43 [2026.58]
Teq = 2148 [216] K
Rp = 3.11 [2.65] Re
a = 0.0293 [0.0077] AU

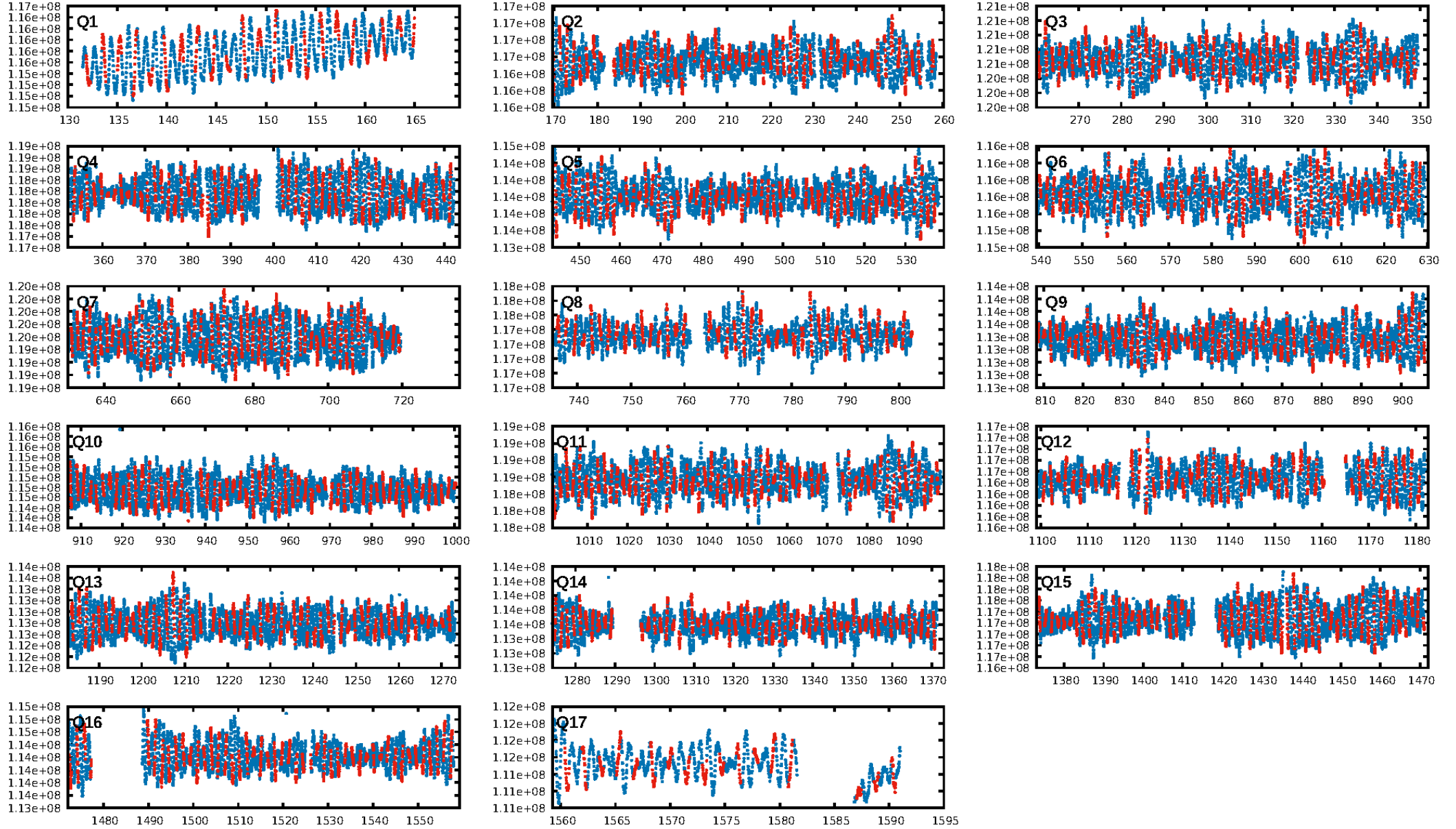
DV Diagnostic Results:

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 [816/816]
GhostDiagnostic-chr: 0.1095
Centroid-sig: 10.5%
Centroid-so: 0.293 arcsec [1.21σ]
OotOffset-rm: 0.201 arcsec [2.60σ]
KicOffset-rm: 0.081 arcsec [1.07σ]
OotOffset-st: 4/4/4/5 [17]
KicOffset-st: 4/4/4/5 [17]
DiffImageQuality-fgm: 0.65 [11/17]
DiffImageOverlap-fno: 1.00 [17/17]

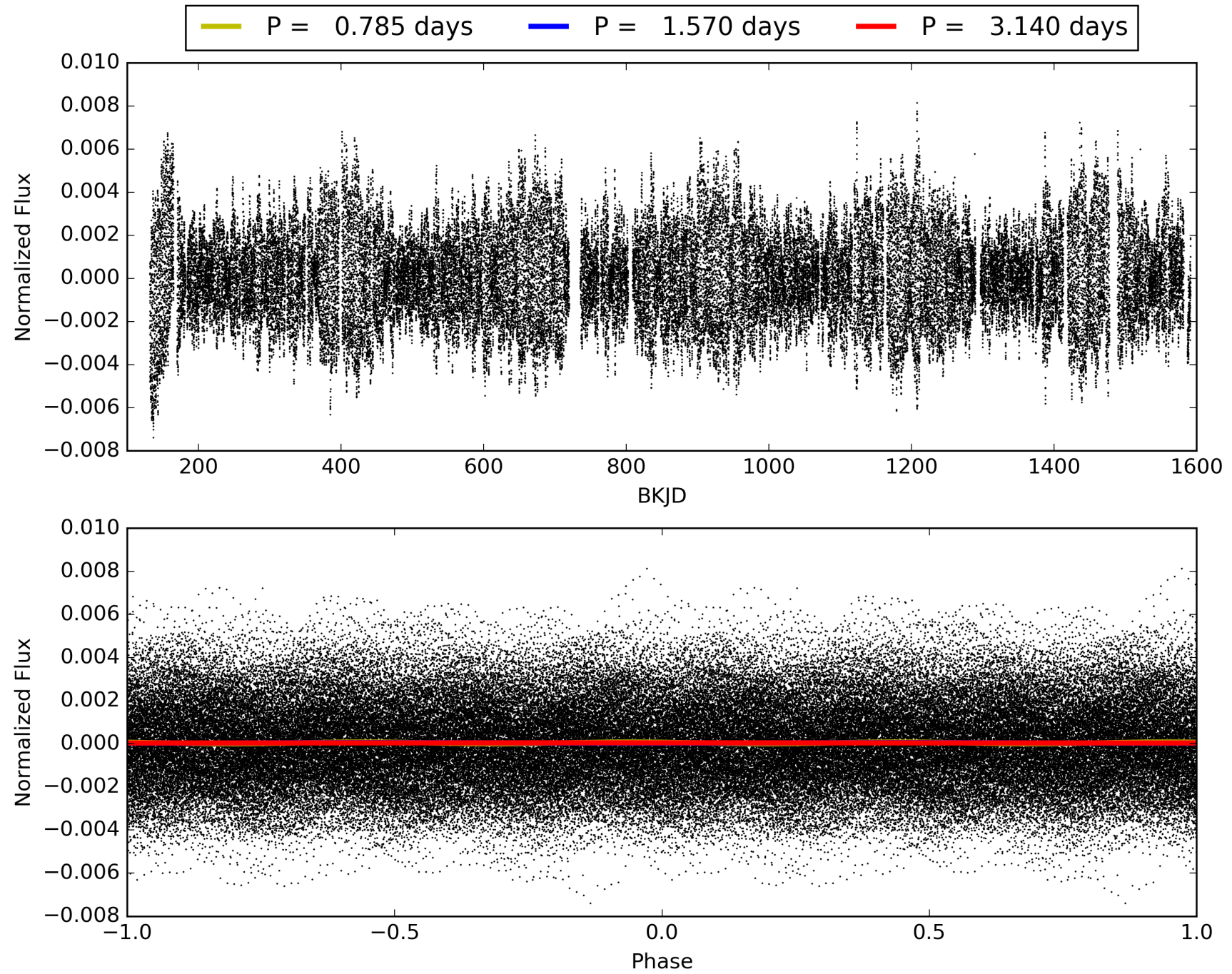
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 23:50:13 Z

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

TCE 009716350-02, PDC Light Curves

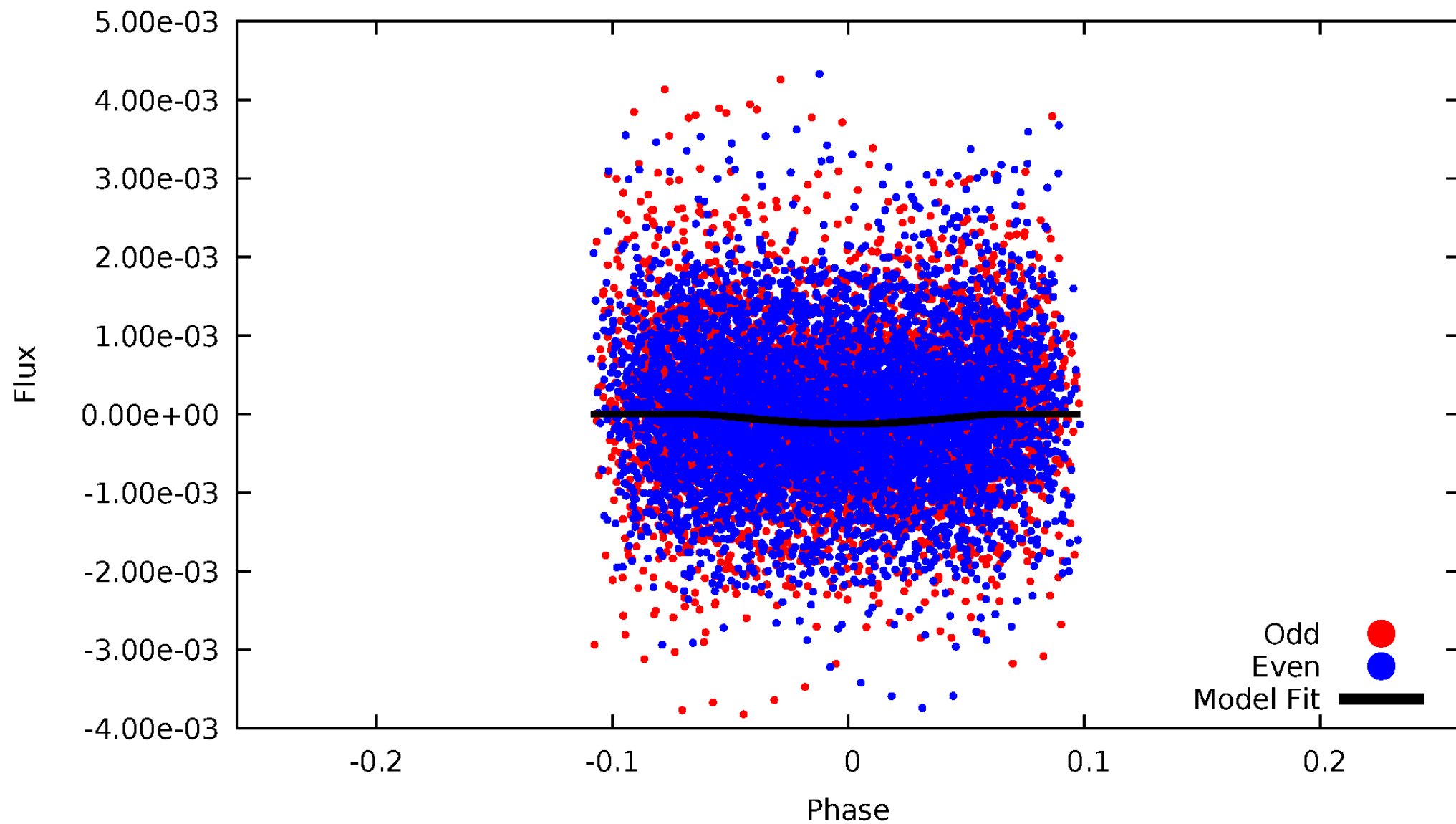


TCE 009716350-02



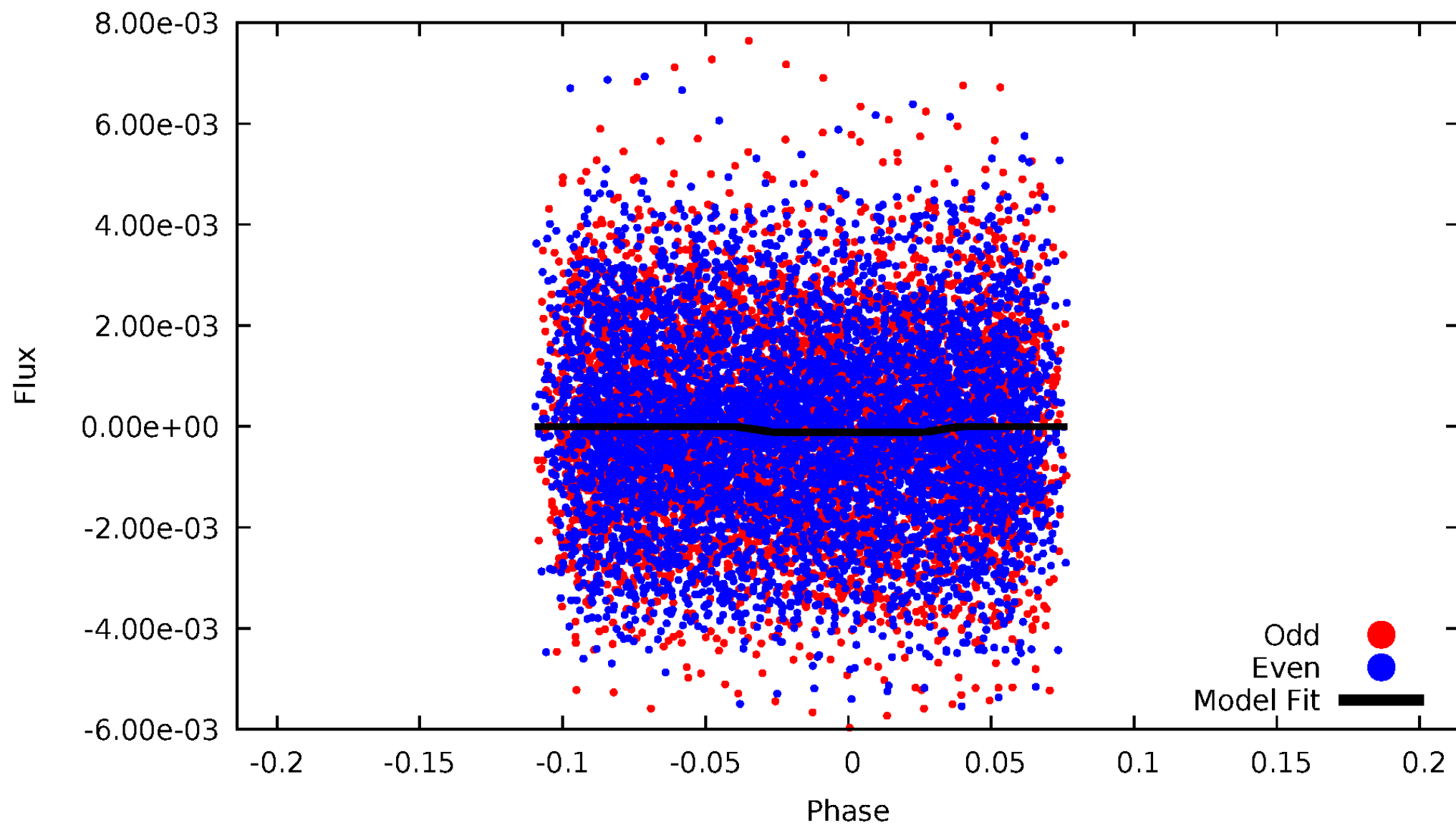
DV Odd/Even

TCE 009716350-02



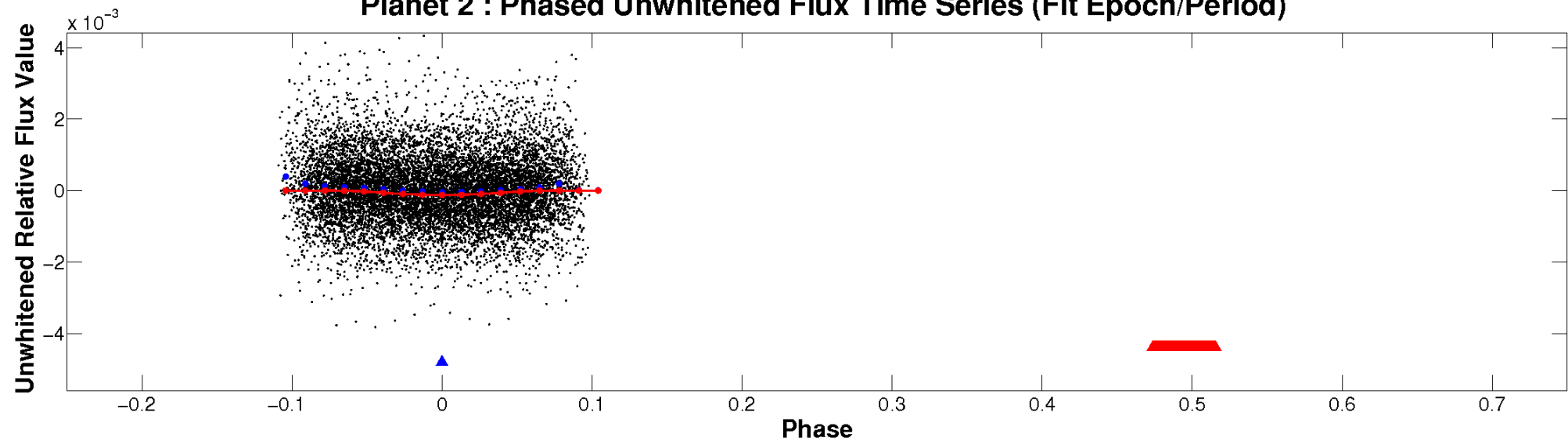
ALT Odd/Even

TCE 009716350-02

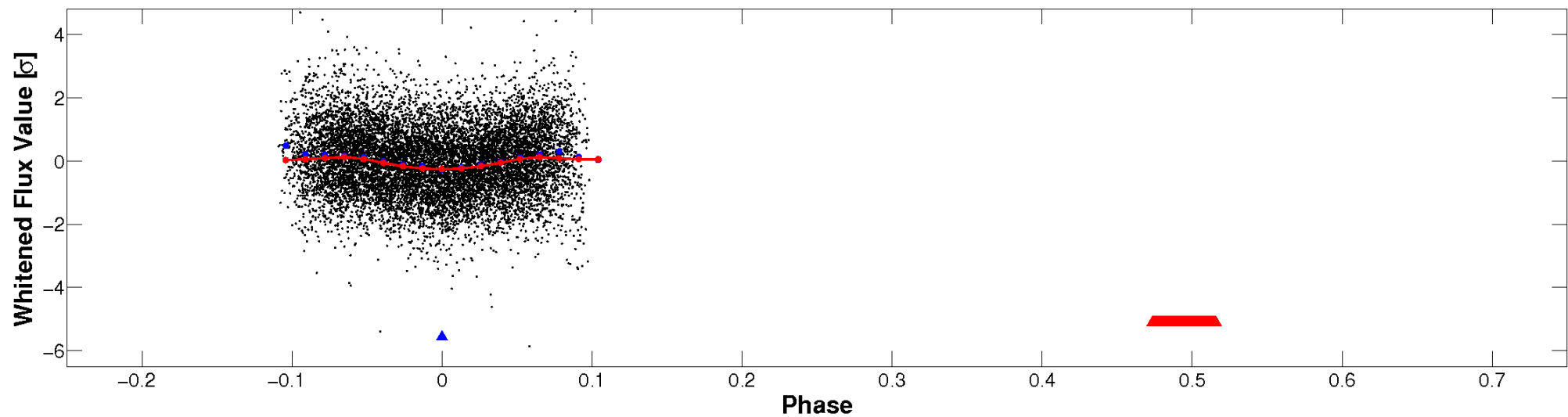


Non-Whitened Vs. Whitened Light Curve

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

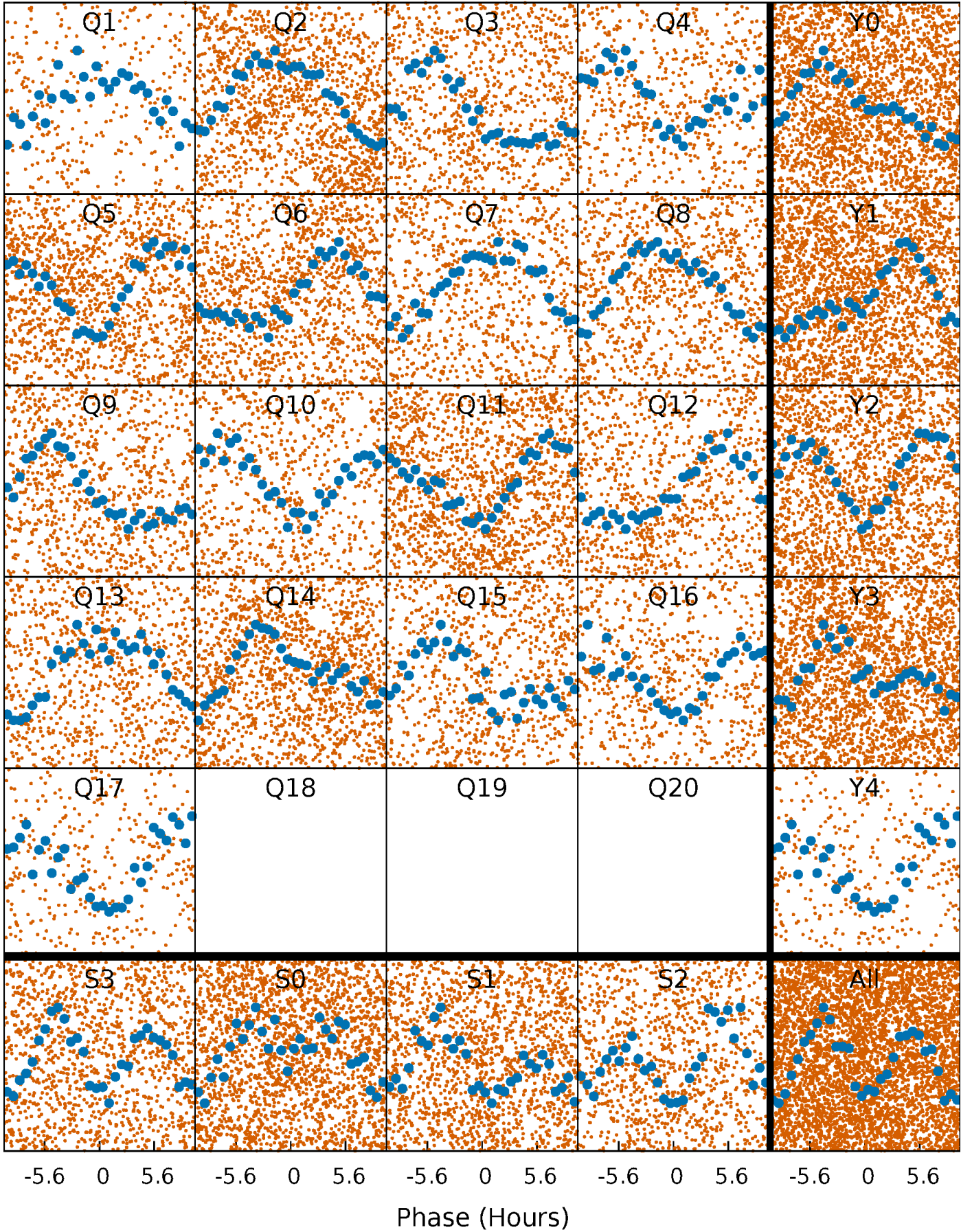


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



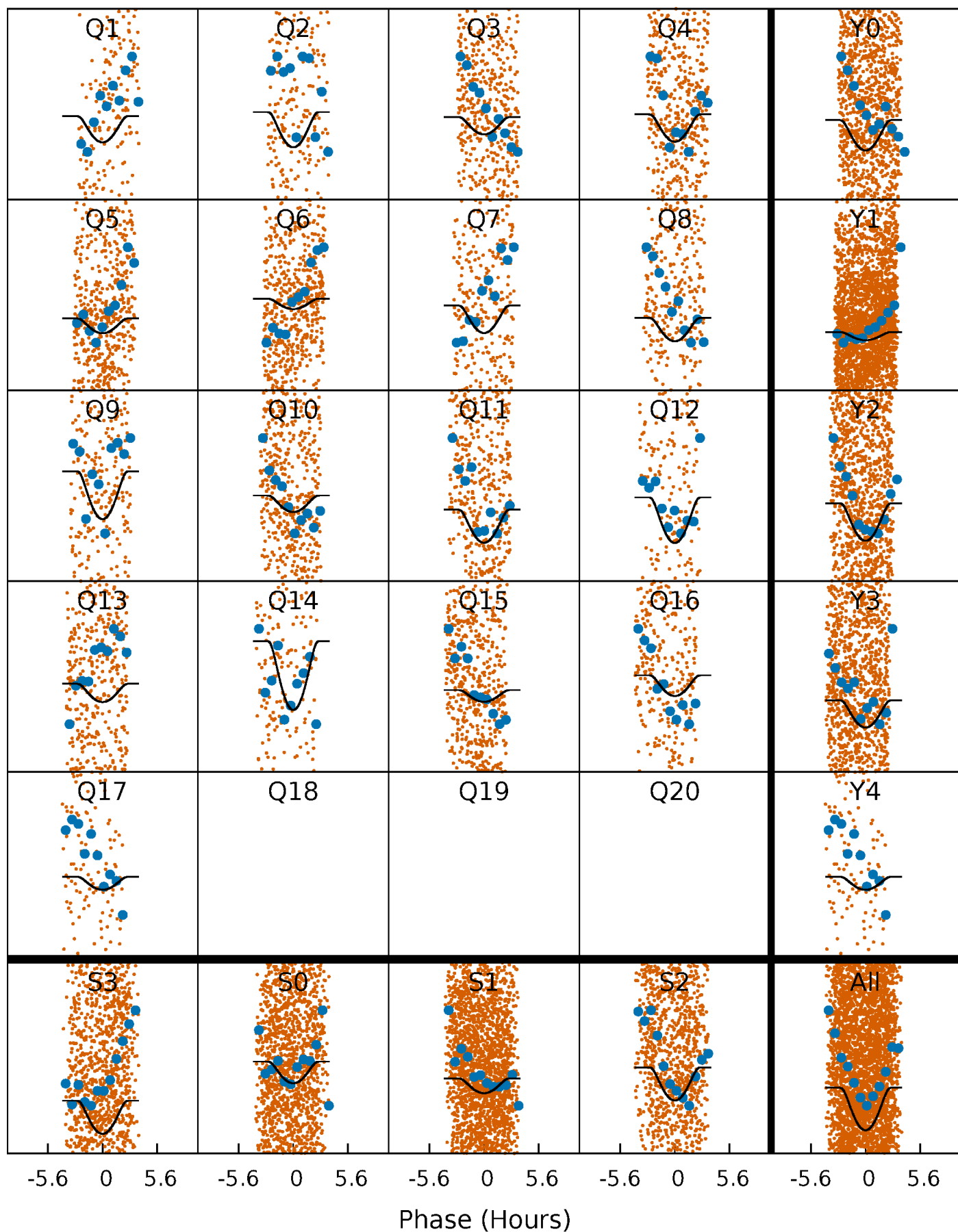
PDC Quarter-Phased Transit Curves

TCE 009716350-02 P= 1.569787 Days $T_0=132.060028$ (BKJD)



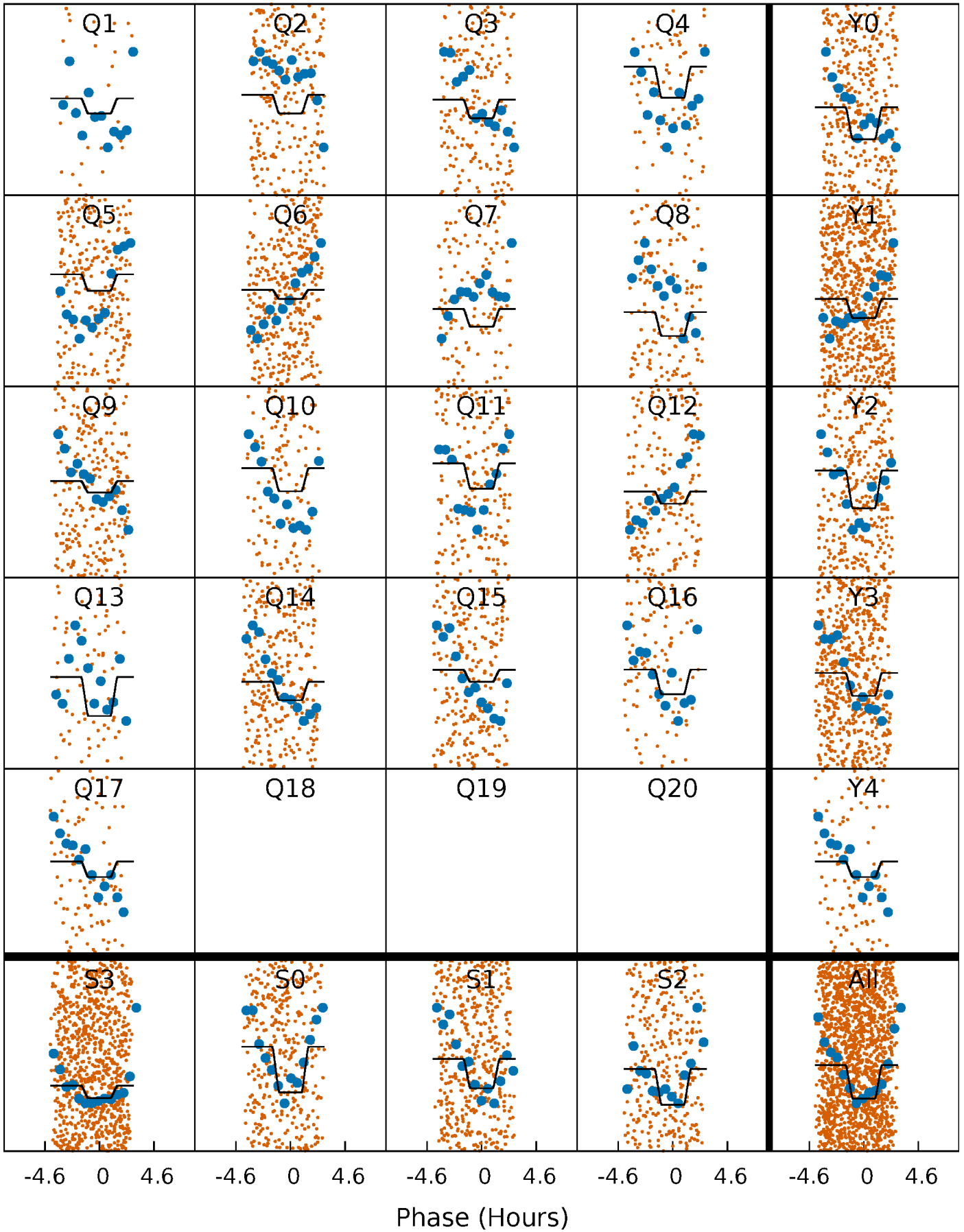
DV Quarter-Phased Transit Curves

TCE 009716350-02 P= 1.569787 Days $T_0=132.060028$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

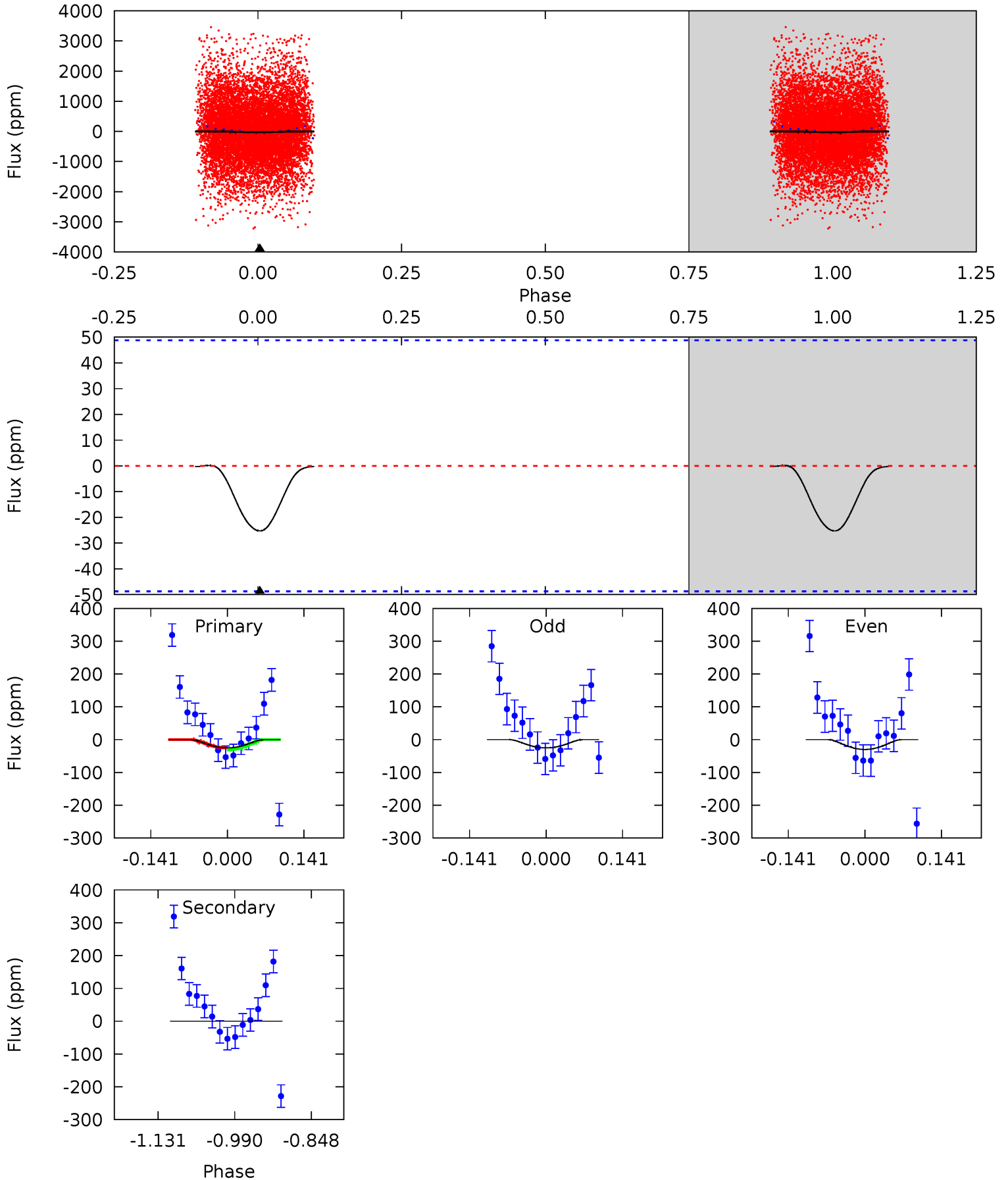
TCE 009716350-02 $P = 1.569751$ Days $T_0 = 132.094114$ (BKJD)



DV Model-Shift Uniqueness Test

009716350-02, P = 1.569787 Days, E = 130.490241 Days

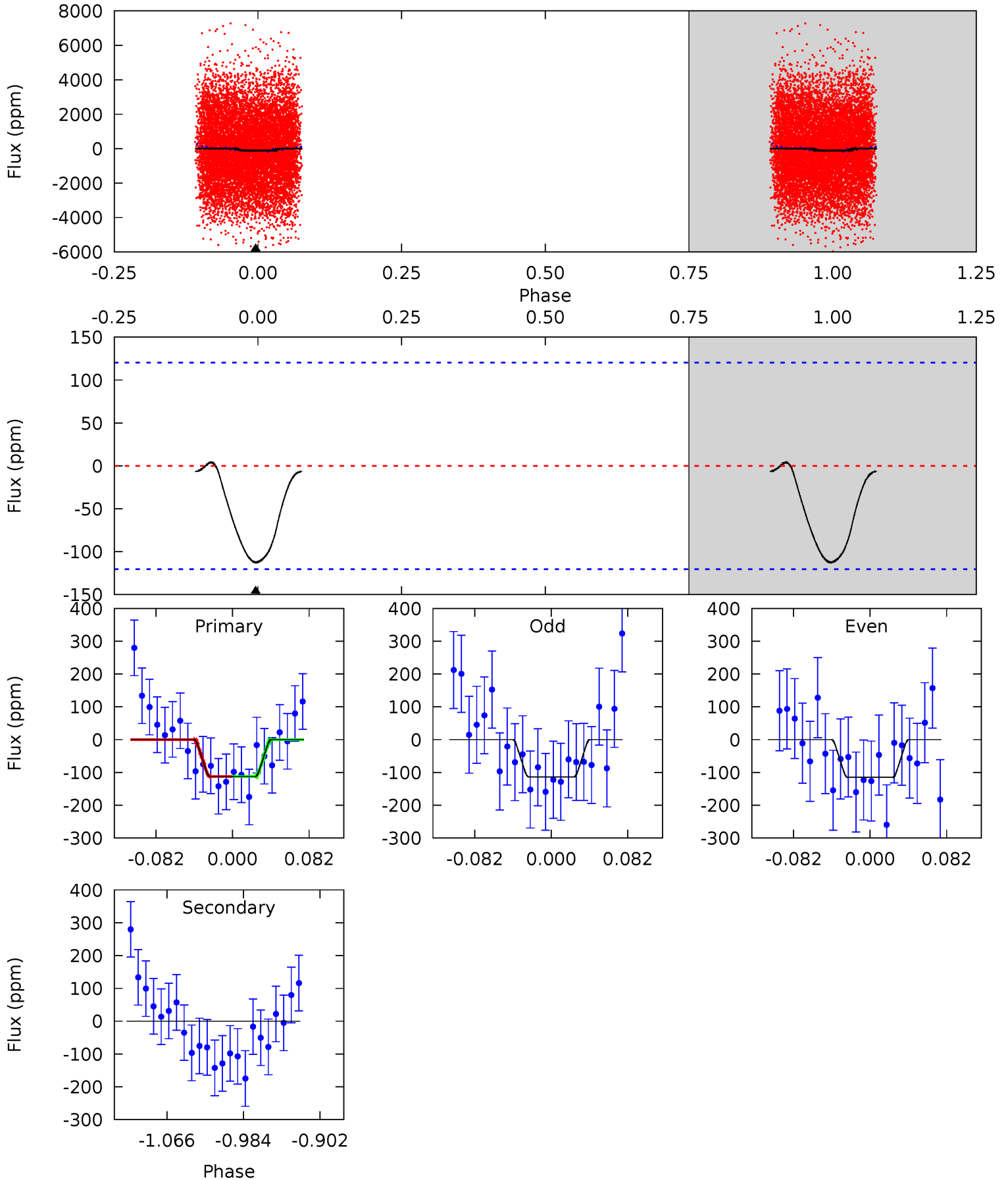
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
2.33	0	0	0	4.49	1.47	0.02	2.33	2.33	0	0	0.22	0.31	0.01	0.29



Alt Model-Shift Uniqueness Test

009716350-02, P = 1.569751 Days, E = 130.524363 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
4.31	0	0	0	4.61	1.74	0.12	4.31	4.31	0	0	0.03	1.00	0.03	0.01



Stellar Parameters For KIC 009716350

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	6753^{+189}_{-283}	$4.206^{+0.128}_{-0.192}$	$0.000^{+0.250}_{-0.350}$	$1.522^{+0.495}_{-0.304}$	$1.360^{+0.196}_{-0.218}$	$0.543^{+0.342}_{-0.282}$
	+3%/-4%	+3%/-5%	+inf%/-inf%	+33%/-20%	+14%/-16%	+63%/-52%
Source	PHO54	PHO54	PHO54	DSEP		

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

Secondary Eclipse Parameters for KIC 009716350-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	0 ± 11	$3.40^{+2.56}_{-2.04}$	3010^{+231}_{-187}	-3081^{+6206}_{-663}	$0.011^{+0.590}_{-0.749}$
Alt.	0 ± 26	$2.60^{+2.16}_{-1.71}$	3022^{+246}_{-204}	-3082^{+7567}_{-1454}	$0.008^{+3.075}_{-2.588}$

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

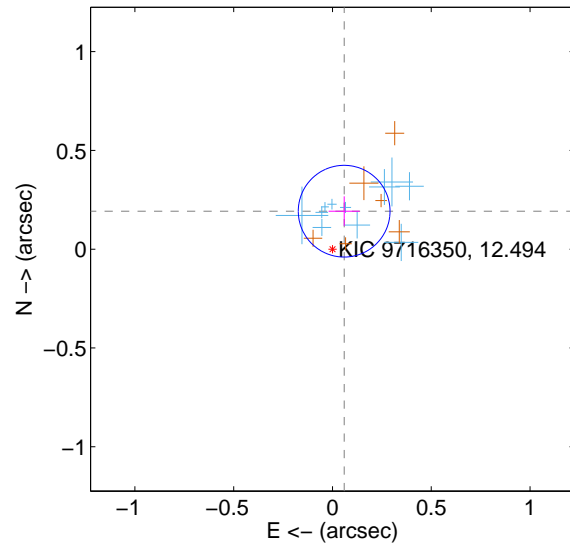
Supplemental centroid analysis for 009716350-02. Kepler magnitude: 12.49. Transit SNR 15.32

There are 11 quarters with good PRF difference image offsets

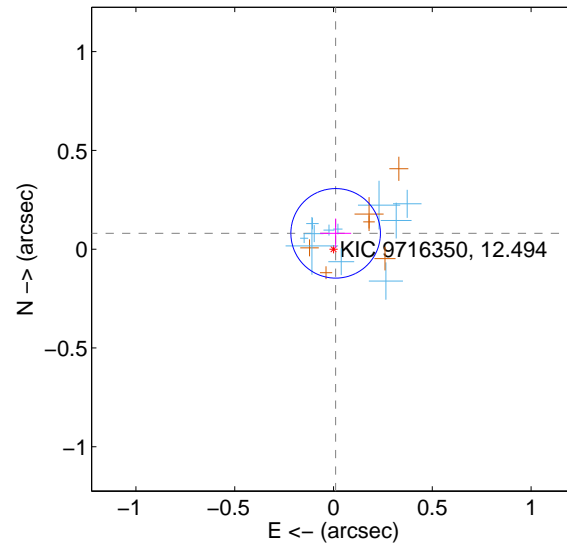
The direct PRF centroid is offset from the target star catalog position by about 0.18 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.201 ± 0.077	2.60	-0.059 ± 0.078	0.192 ± 0.075
PRF-fit source offset from KIC position	0.081 ± 0.076	1.07	-0.011 ± 0.079	0.080 ± 0.075
photometric centroid source offset	0.29 ± 0.24	1.21	0.29 ± 0.24	-0.06 ± 0.23

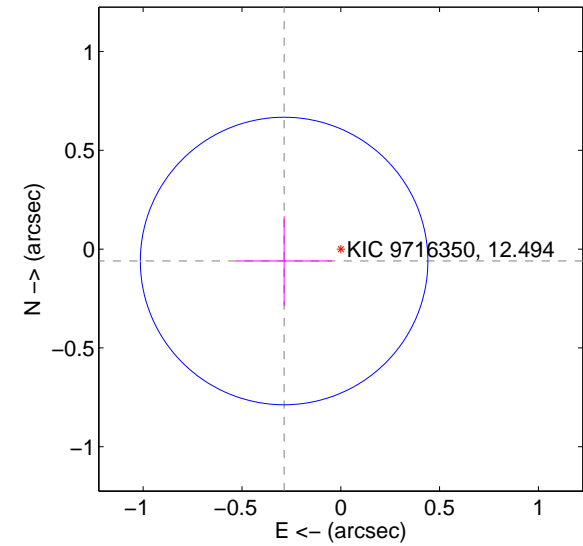
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

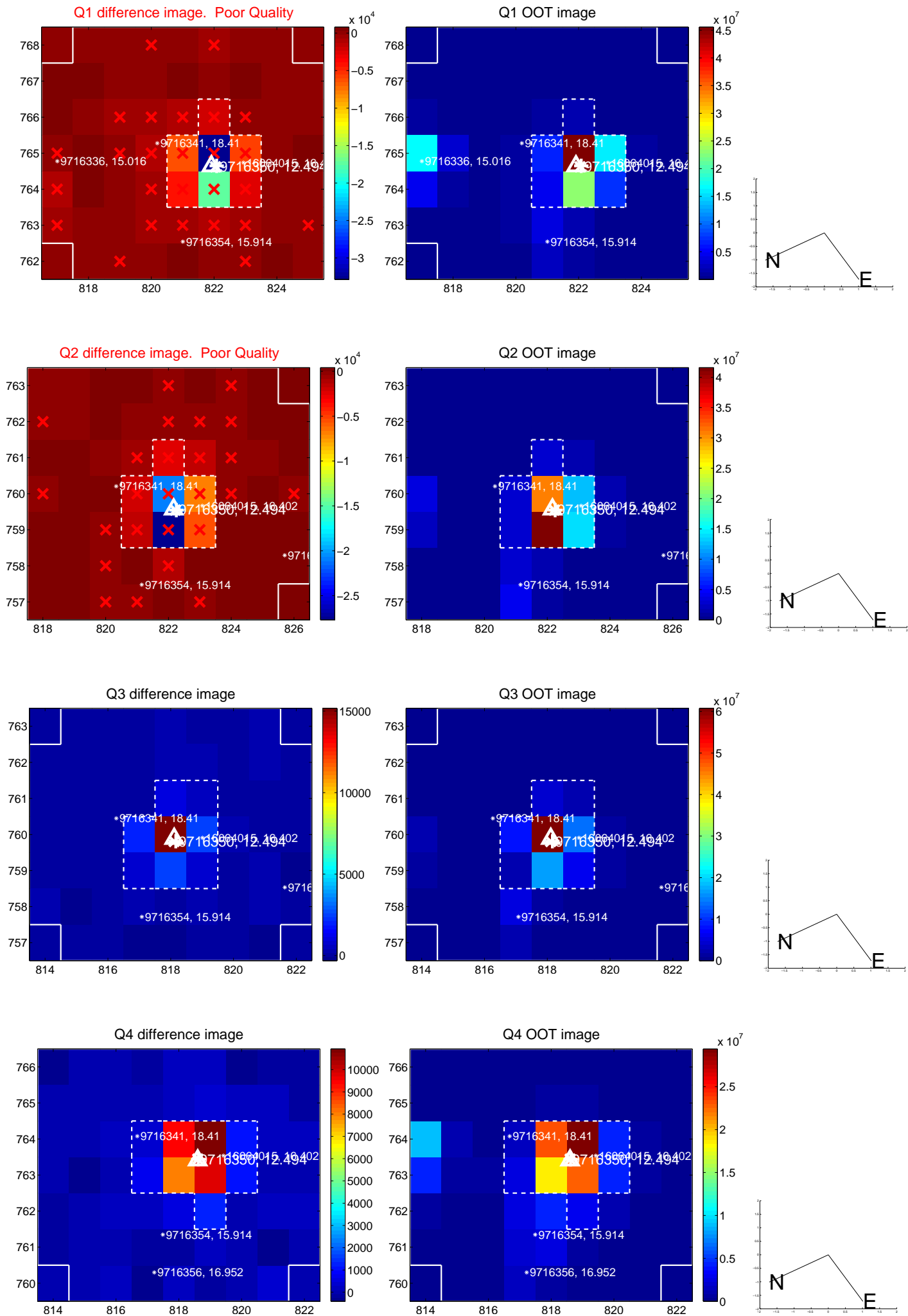


offset from photometric centroids

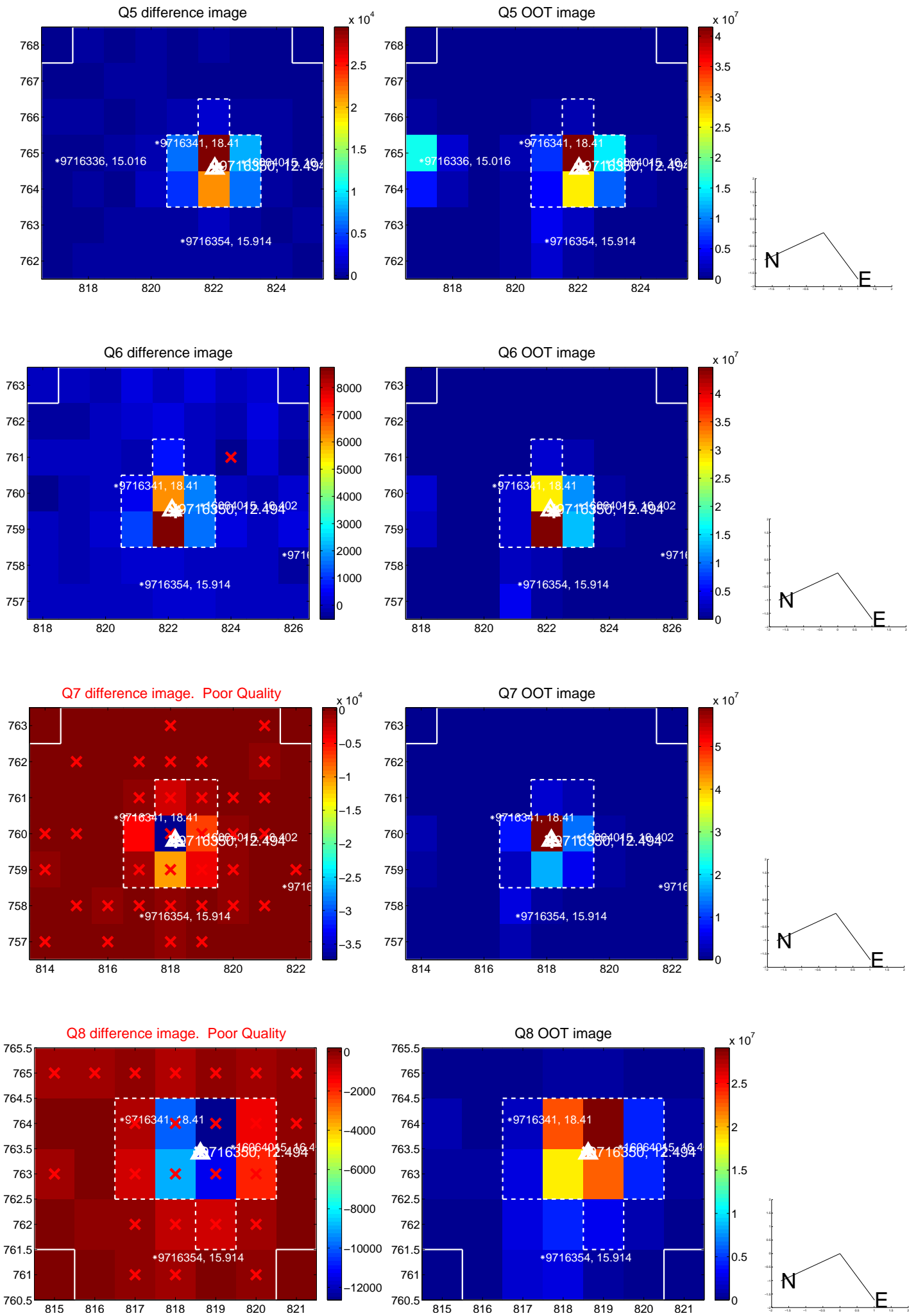


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets**; **Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

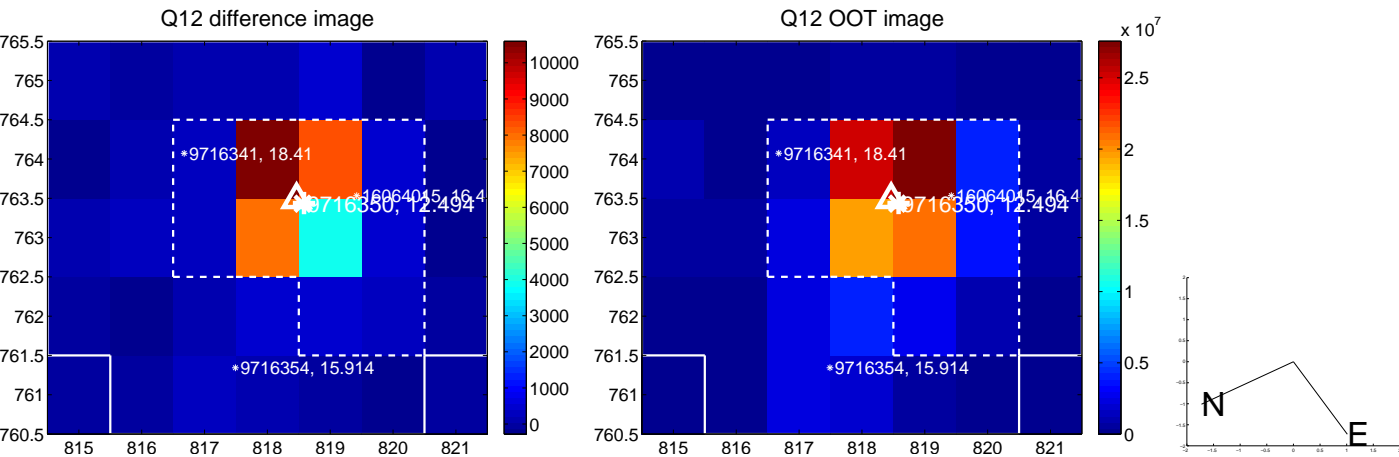
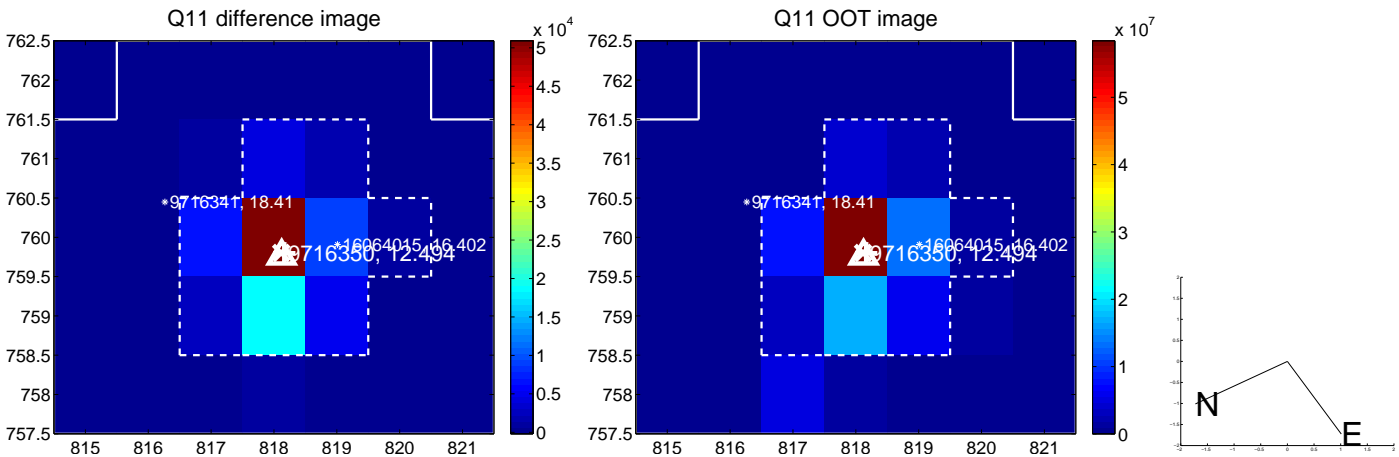
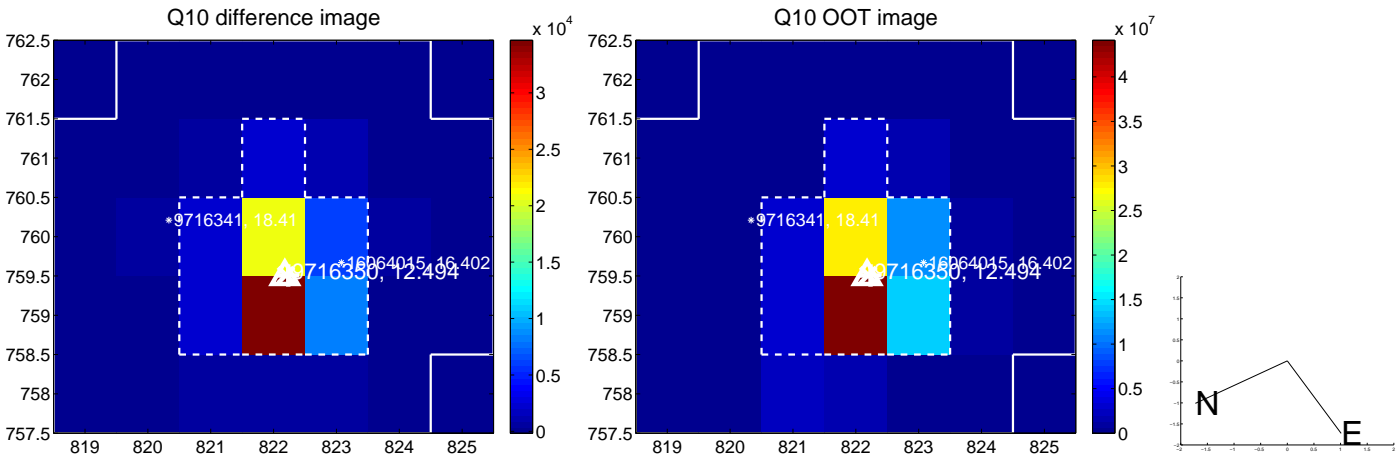
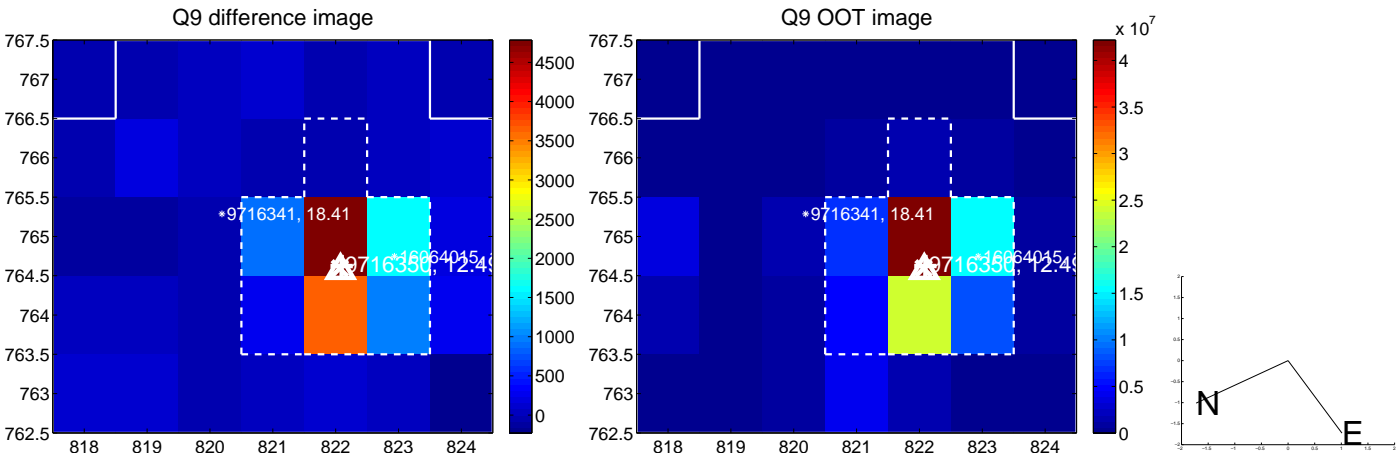
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



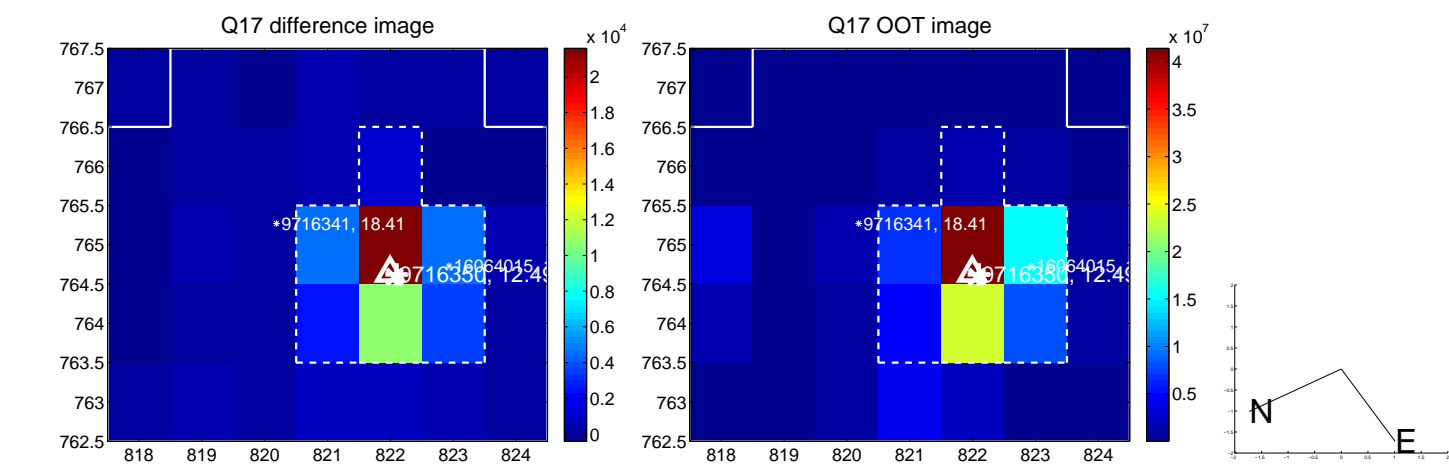
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



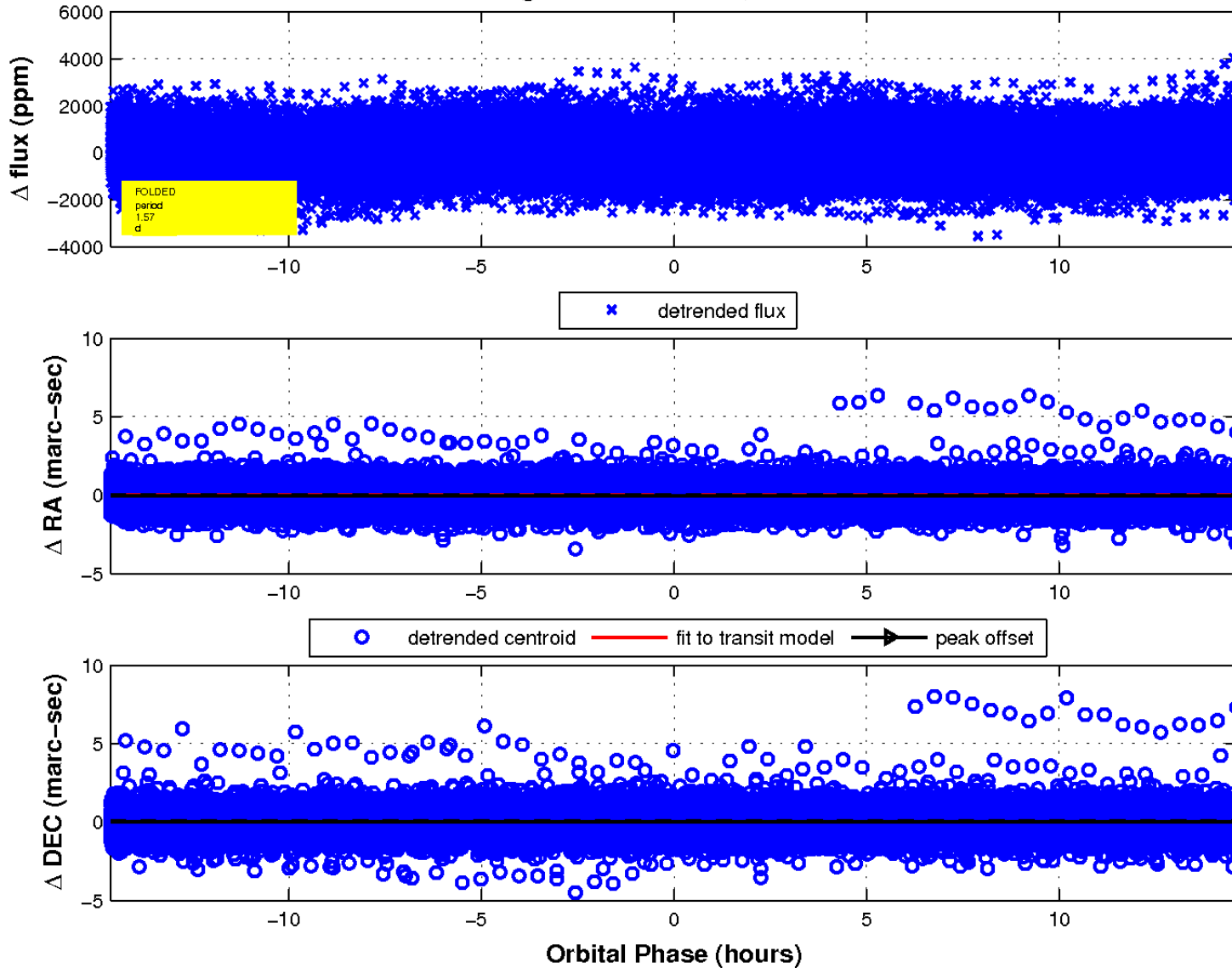
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



fluxWeightedCentroids, Planet 2 of 2



UKIRT Image

Declination

