

KIC 009886361

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})
009886361-01	OBS	2732.01	7.031500	134.449034	84.0	6.435	24.5	25.5	1.50	6170	1.74	480.66
009886361-02	OBS	2732.02	13.611663	144.168227	96.2	7.963	19.5	22.3	1.50	6170	1.72	199.23
009886361-03	OBS	2732.03	54.280928	140.721106	151.3	5.491	14.7	15.6	1.50	6170	2.17	31.50
009886361-04	OBS	2732.04	49.121275	146.797058	60.5	8.653	8.3	8.2	1.50	6170	1.28	35.99

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009886361-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
009886361-02	OBS	PC	0.95	0	0	0	0	NO_COMMENT
009886361-03	OBS	PC	0.99	0	0	0	0	NO_COMMENT
009886361-04	OBS	PC	0.85	0	0	0	0	NO_COMMENT

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

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

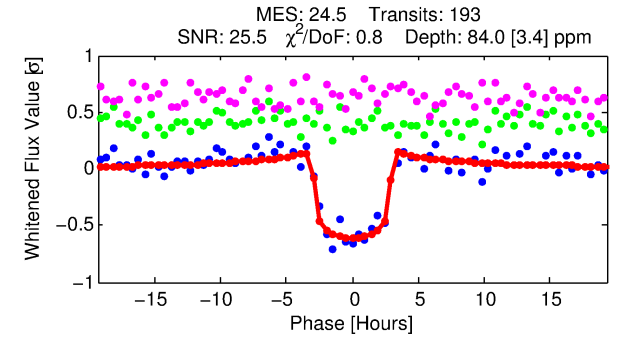
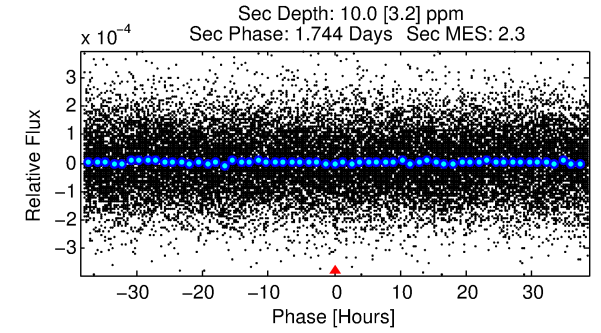
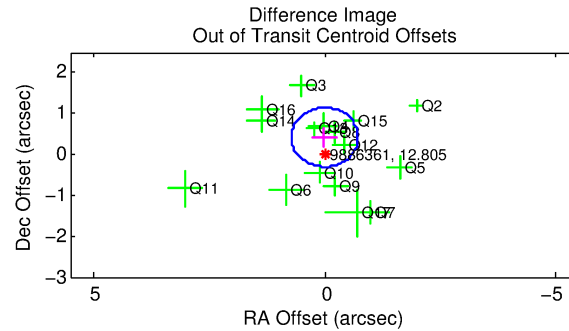
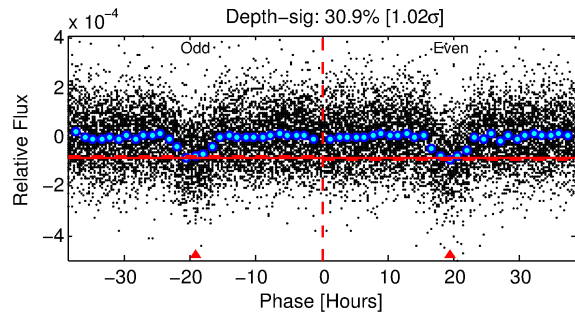
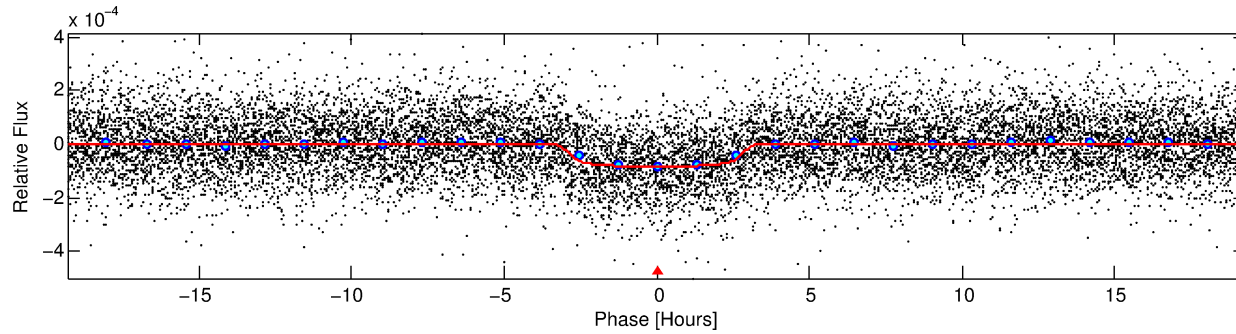
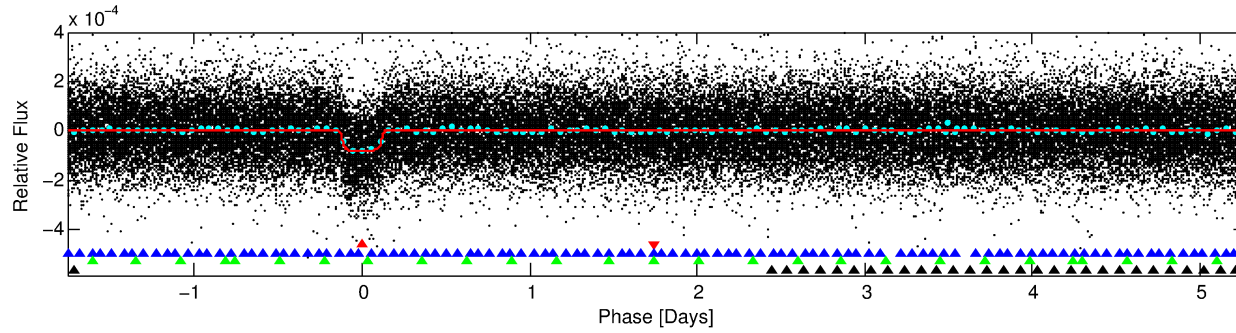
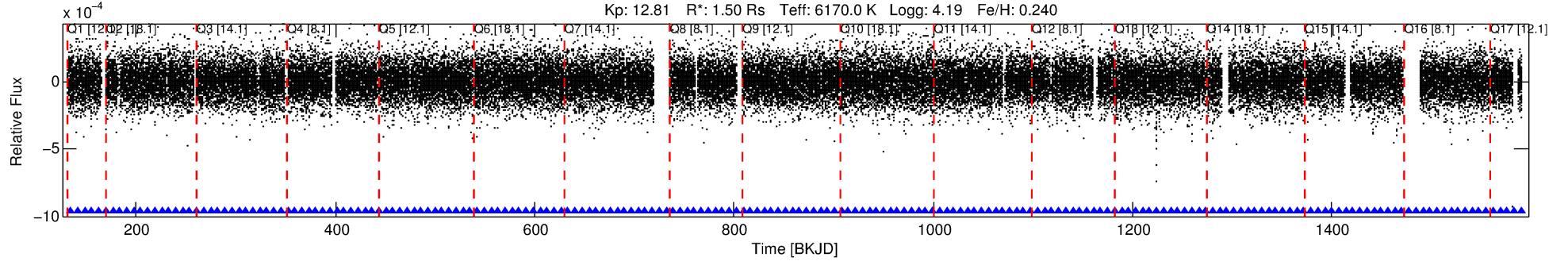
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009886361-01

No Significant Match Found

DV One-Page Summary

KIC: 9886361 Candidate: 1 of 4 Period: 7.031 d
KOI: K02732.01 Name: Kepler-403b Corr: 0.949



DV Fit Results:

Period = 7.03150 [0.00004] d
Epoch = 134.4490 [0.0038] BKJD
Rp/R* = 0.0106 [0.0005]
a/R* = 2.93 [0.60]
b = 0.95 [0.02]
Seff = 480.66 [123.97]
Teq = 1194 [77] K
Rp = 1.74 [0.33] Re
a = 0.0779 [0.0125] AU
Ag = 11.08 [4.58] [2.20 σ]
Teffp = 3368 [291] K [7.22 σ]

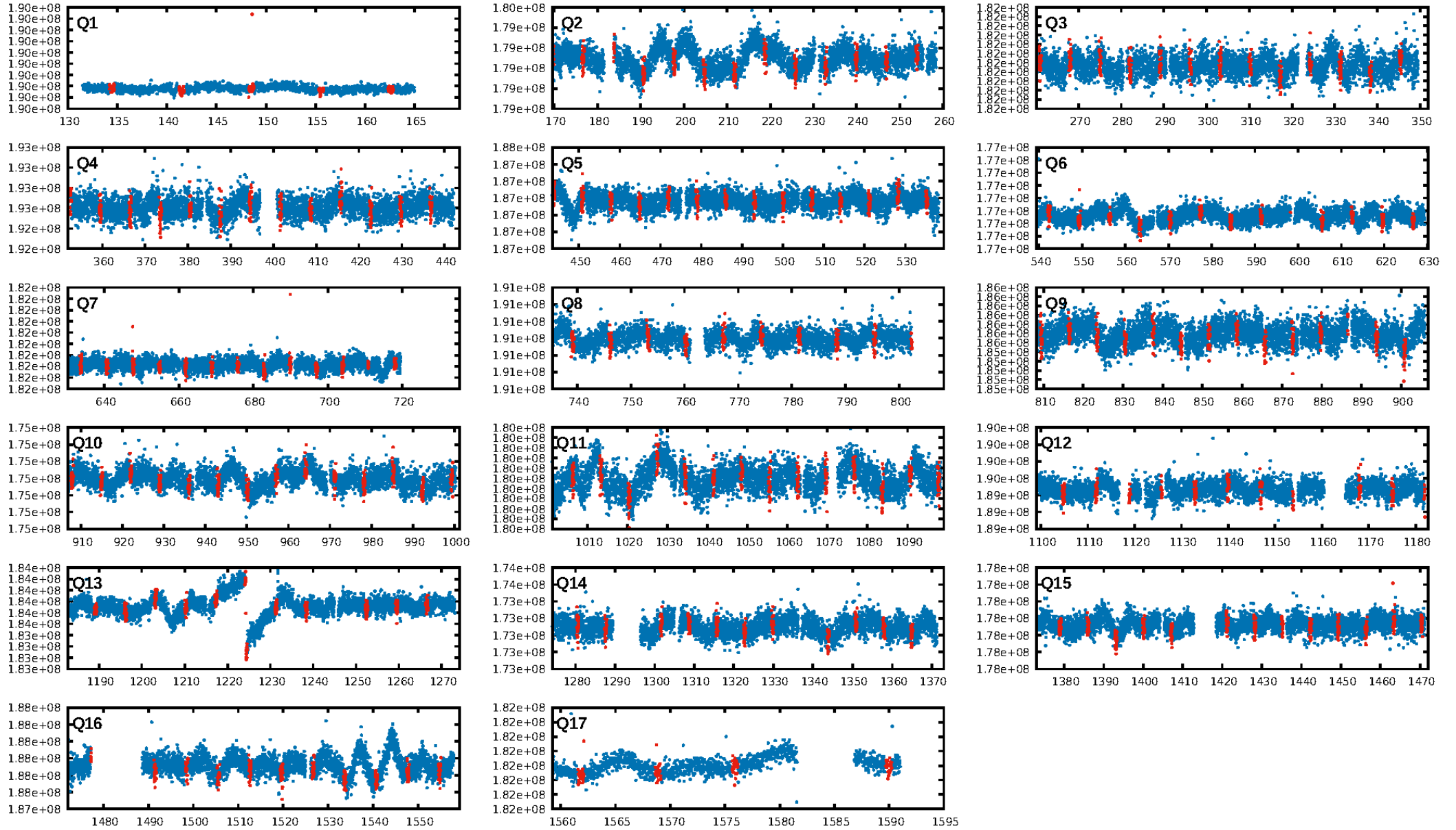
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [15.43 σ]
ModelChiSquare2-sig: 100.0%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 1.28e-127
RollingBand-fgt: 1.00 [184/184]
GhostDiagnostic-chr: 3.883
Centroid-sig: 0.0%
Centroid-so: 1.412 arcsec [3.69 σ]
OotOffset-rm: 0.421 arcsec [1.75 σ]
KicOffset-rm: 0.382 arcsec [1.60 σ]
OotOffset-st: 4/4/4/4 [16]
KicOffset-st: 4/4/4/4 [16]
DiffImageQuality-fgm: 0.94 [15/16]
DiffImageOverlap-fno: 1.00 [17/17]

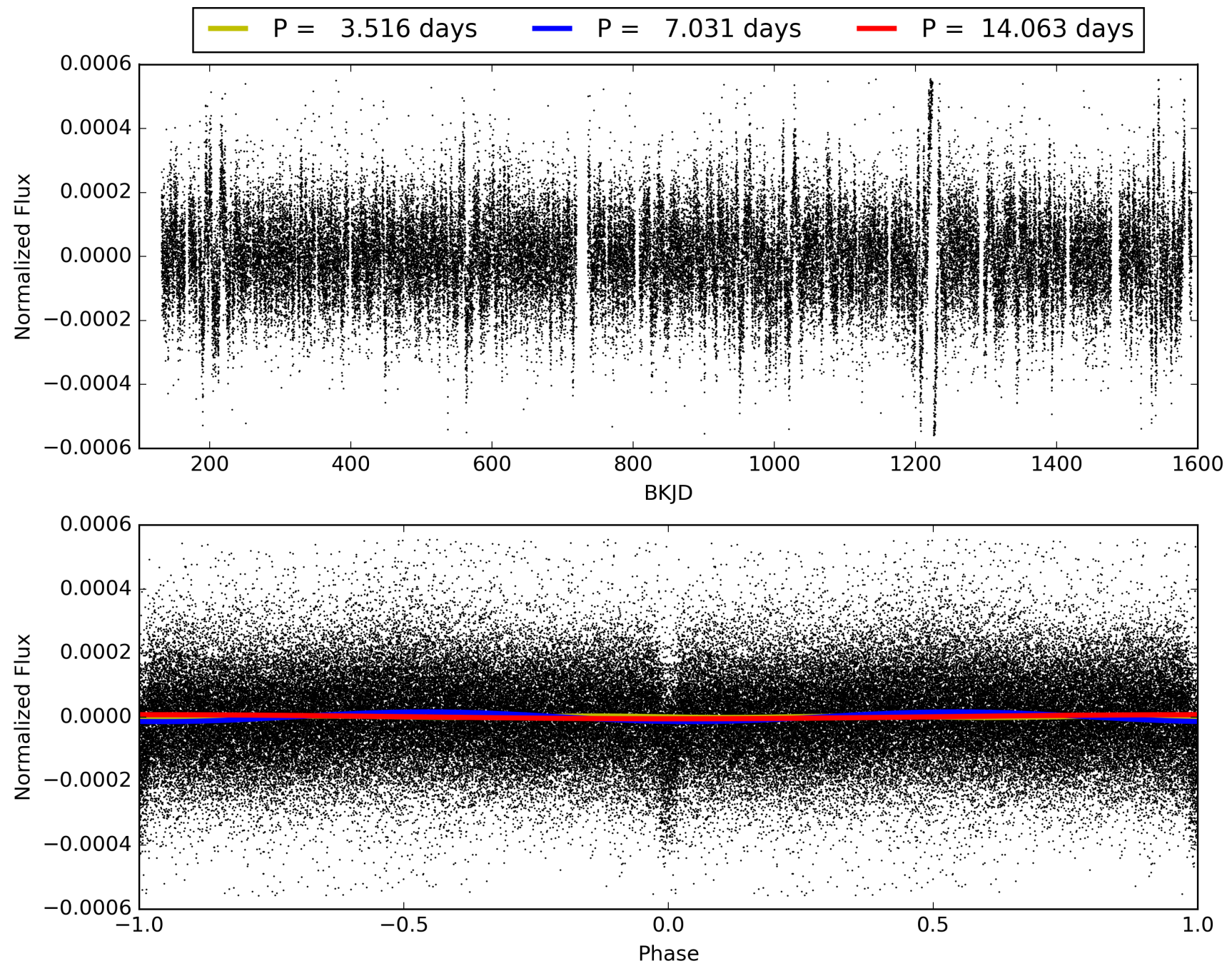
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 15:03:57 Z

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

TCE 009886361-01, PDC Light Curves

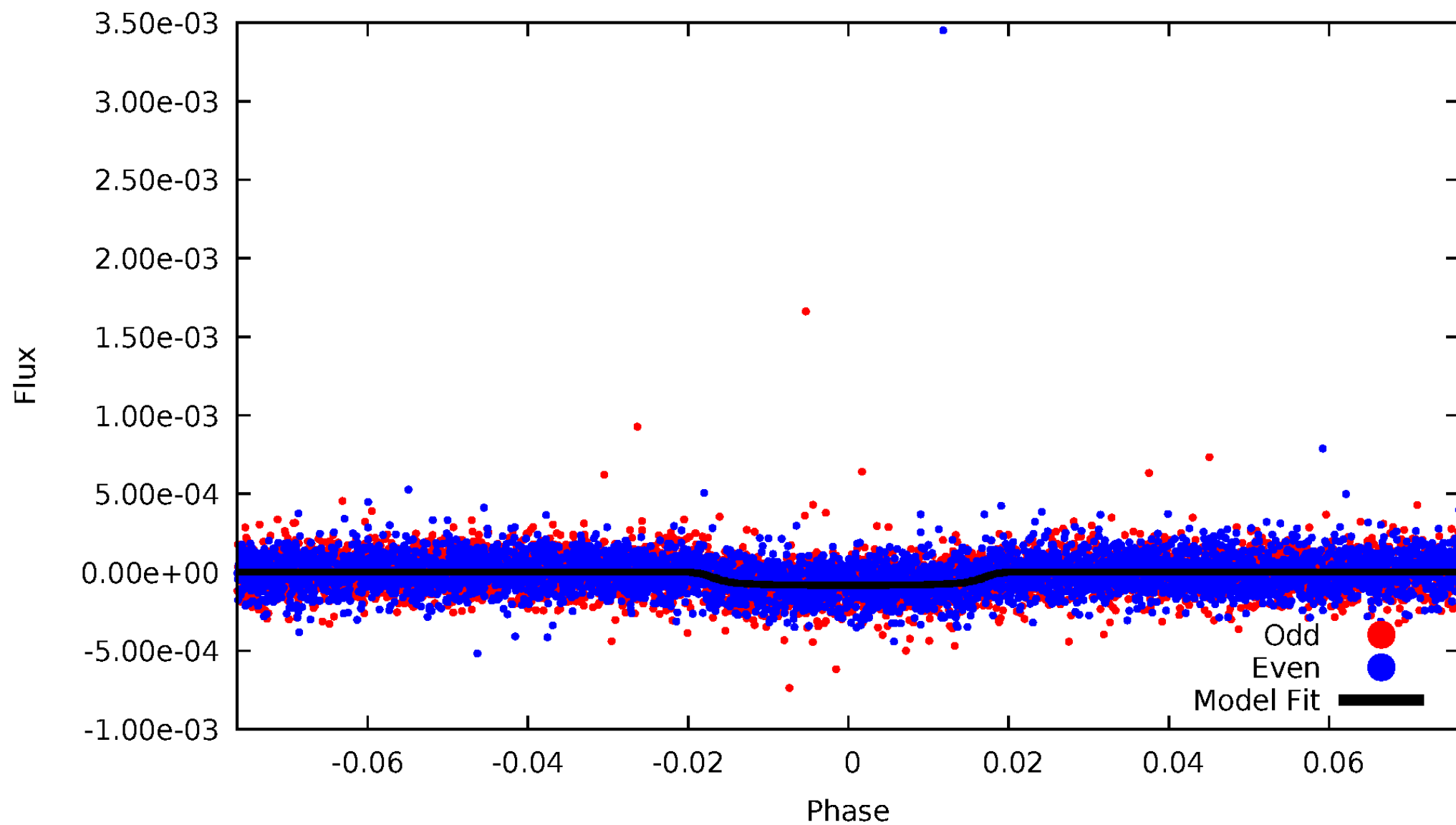


TCE 009886361-01



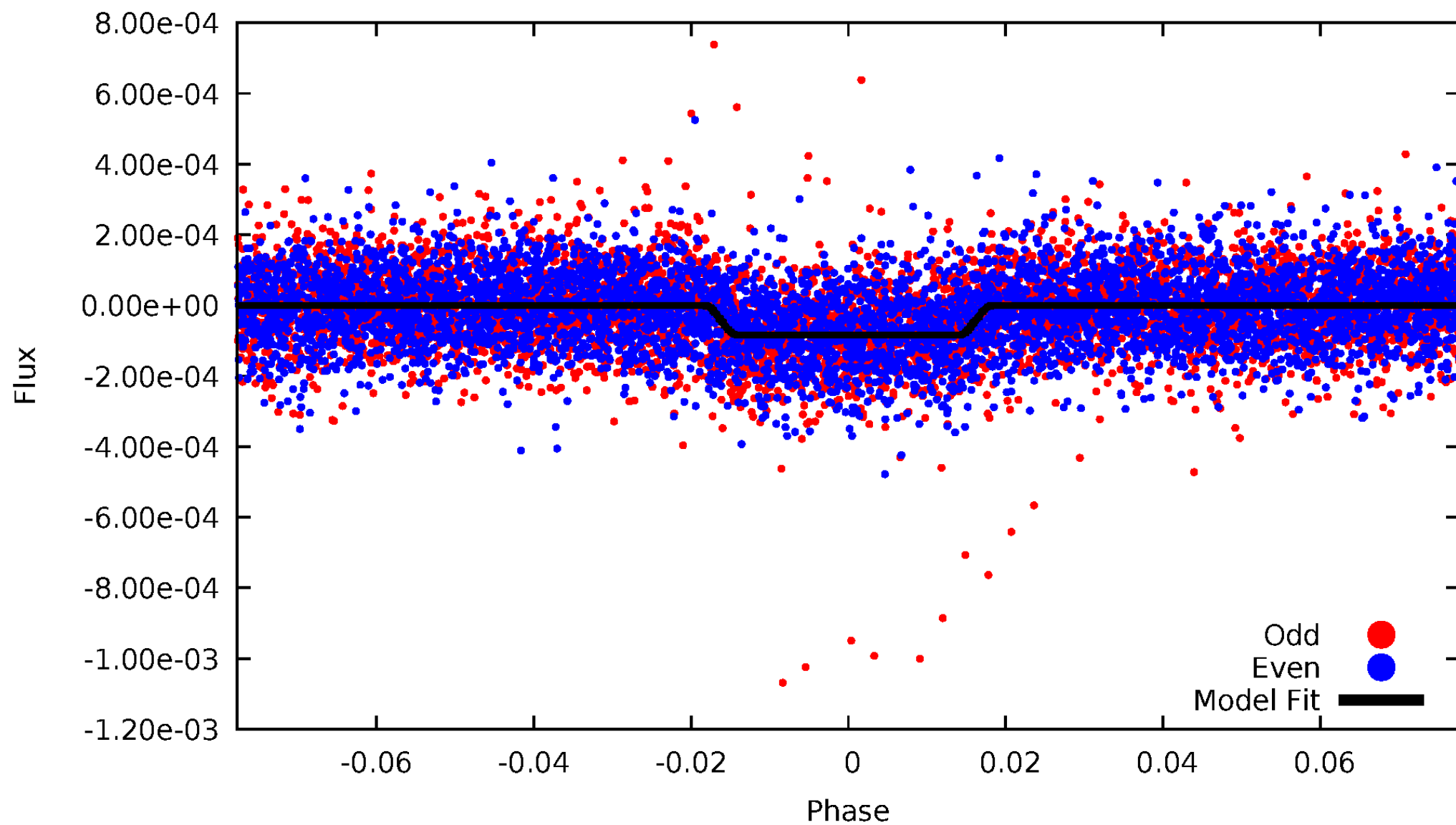
DV Odd/Even

TCE 009886361-01



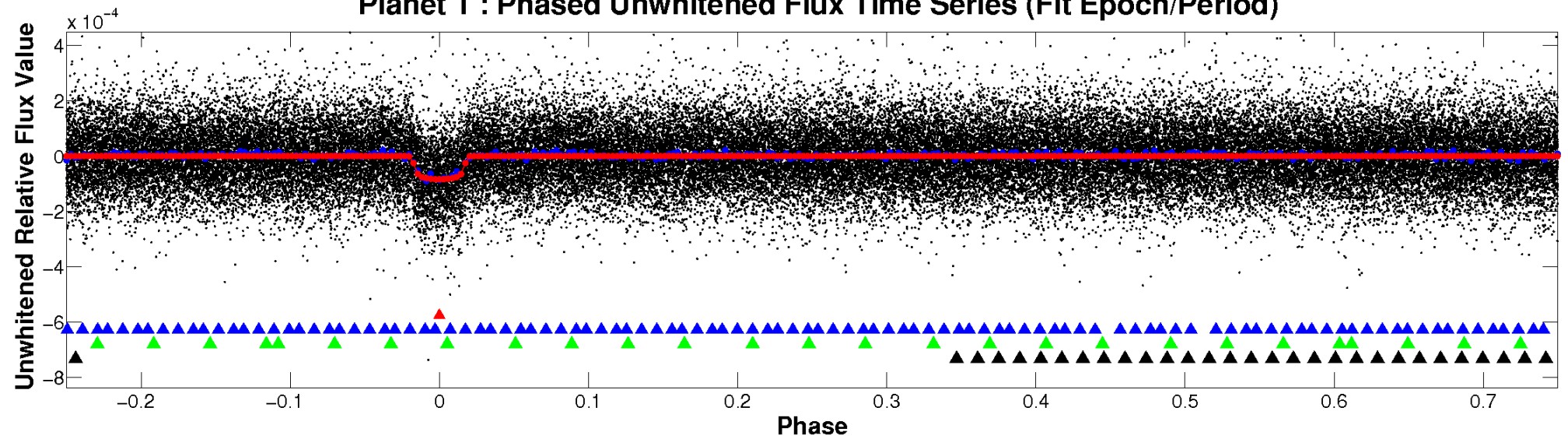
ALT Odd/Even

TCE 009886361-01

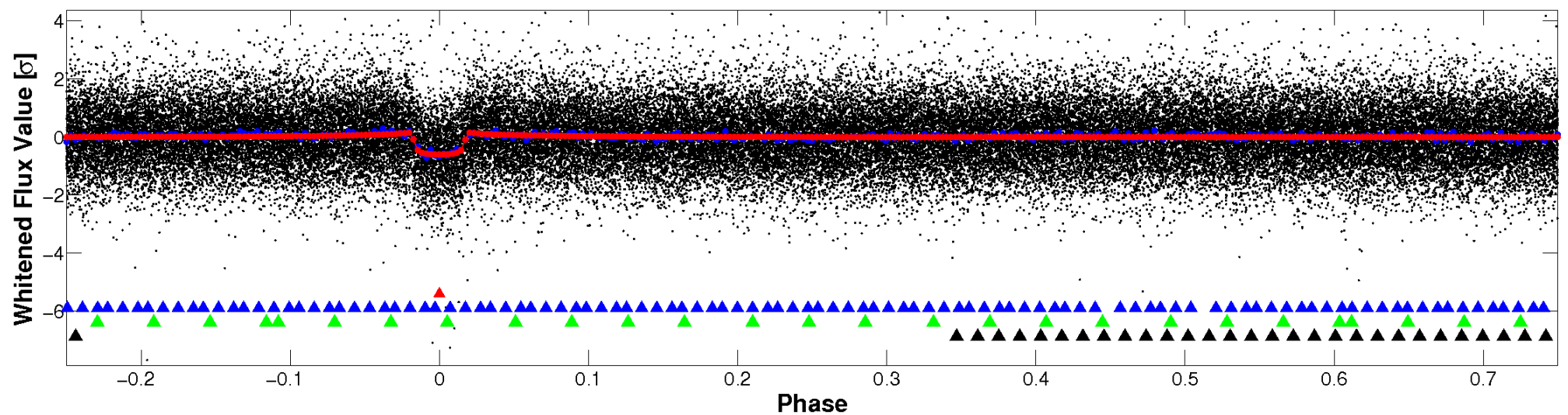


Non-Whitened Vs. Whitened Light Curve

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

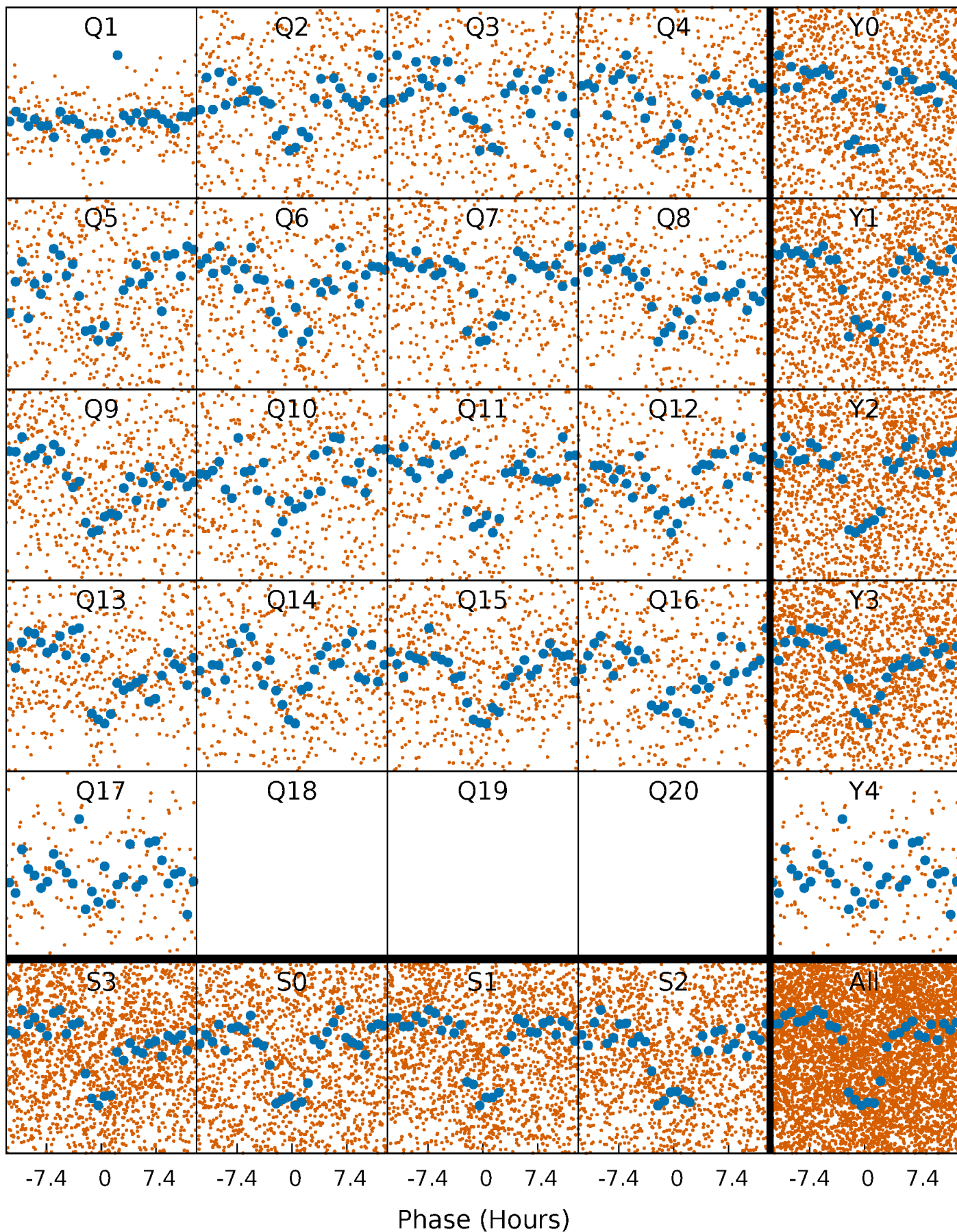


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



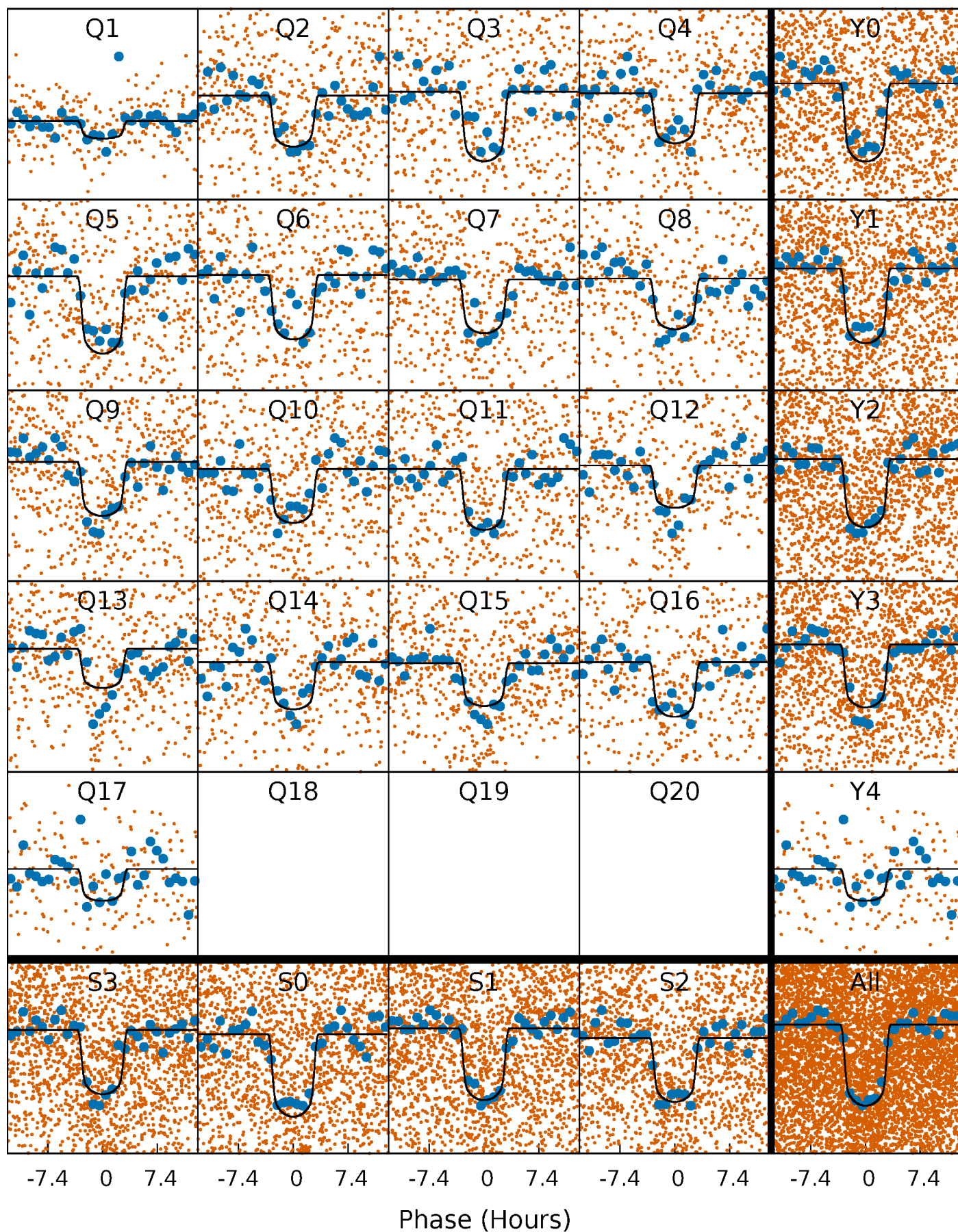
PDC Quarter-Phased Transit Curves

TCE 009886361-01 P= 7.031500 Days $T_0=134.449034$ (BKJD)



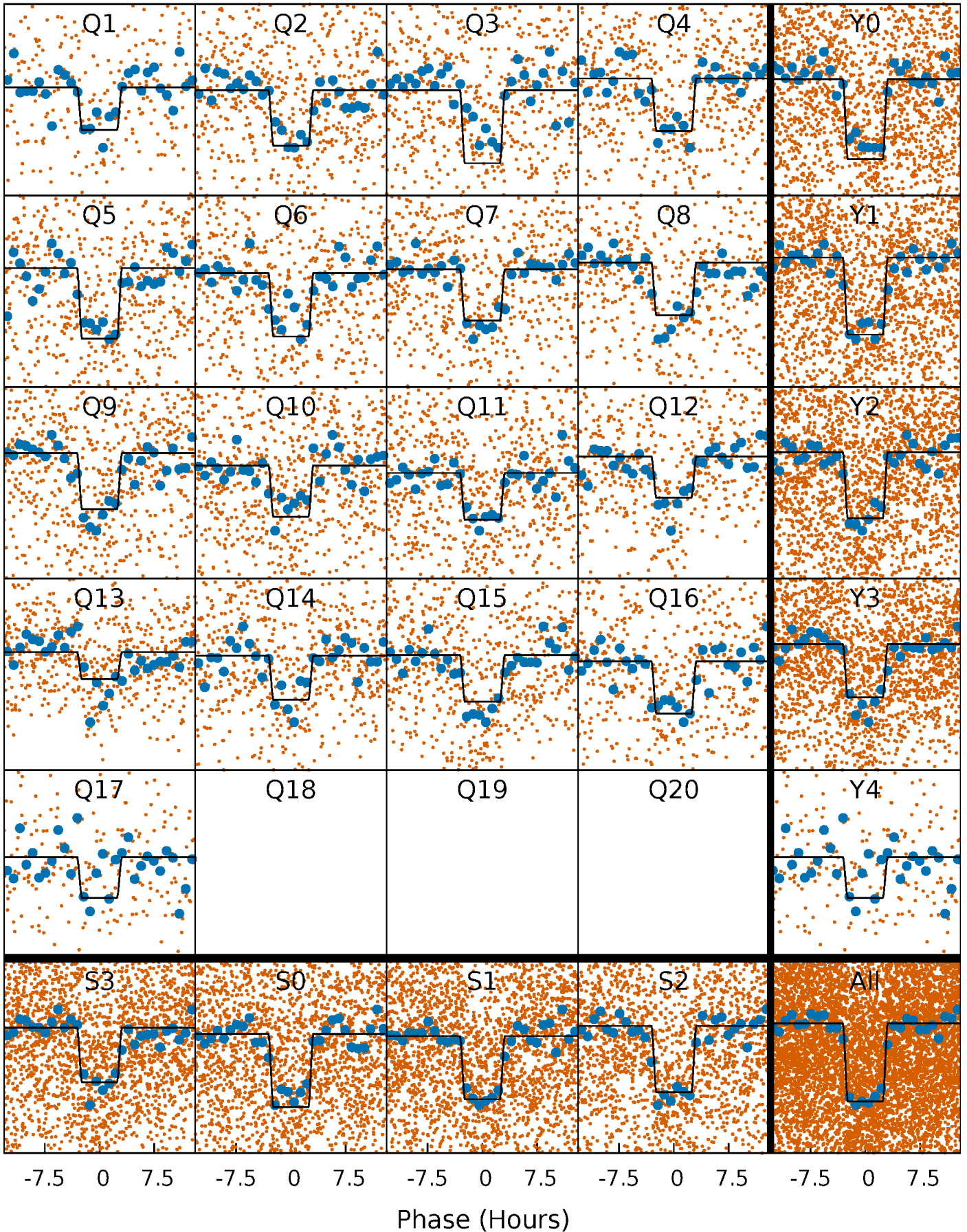
DV Quarter-Phased Transit Curves

TCE 009886361-01 P= 7.031500 Days $T_0=134.449034$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

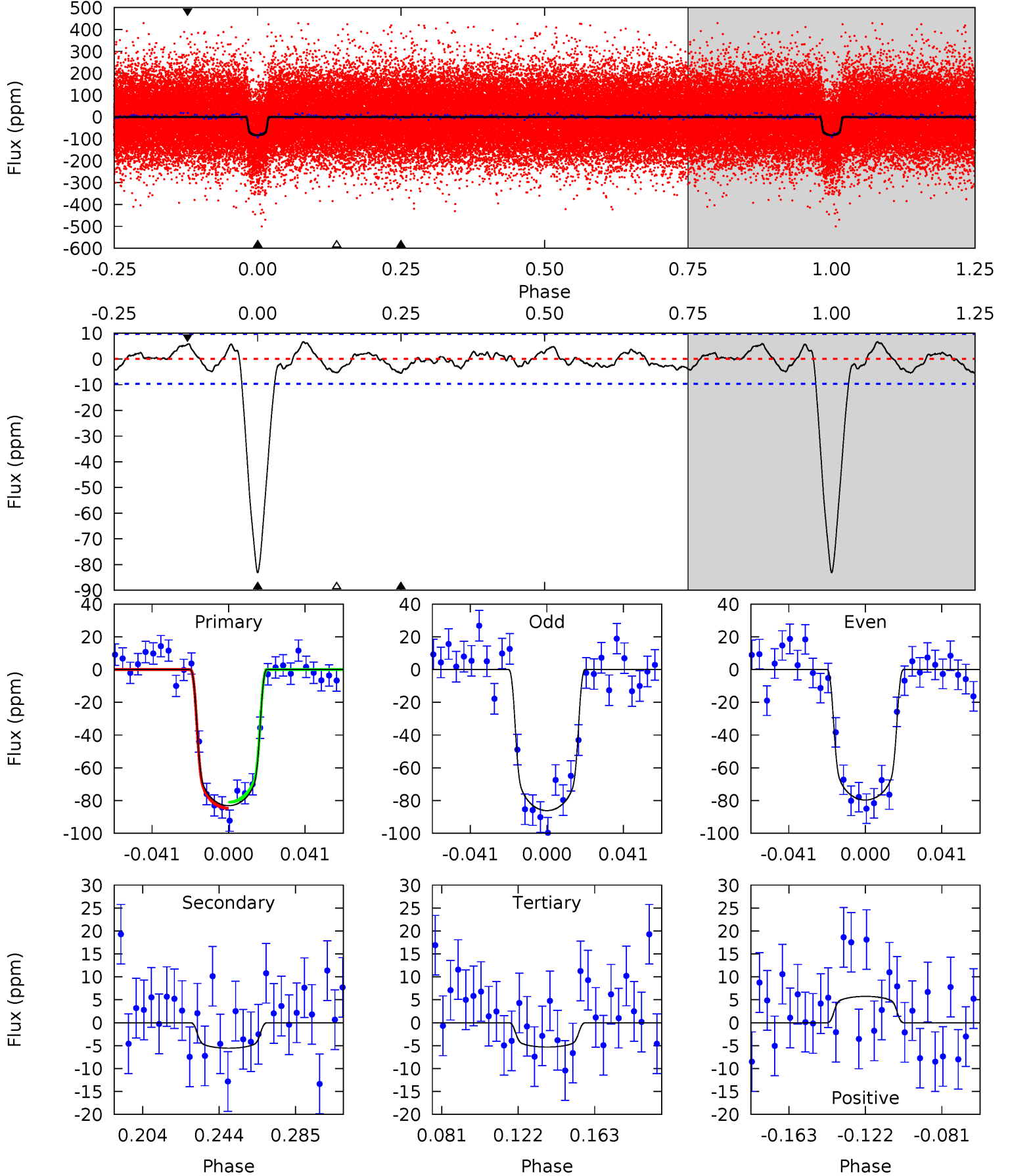
TCE 009886361-01 P= 7.031570 Days $T_0=134.445263$ (BKJD)



DV Model-Shift Uniqueness Test

009886361-01, P = 7.031500 Days, E = 127.417534 Days

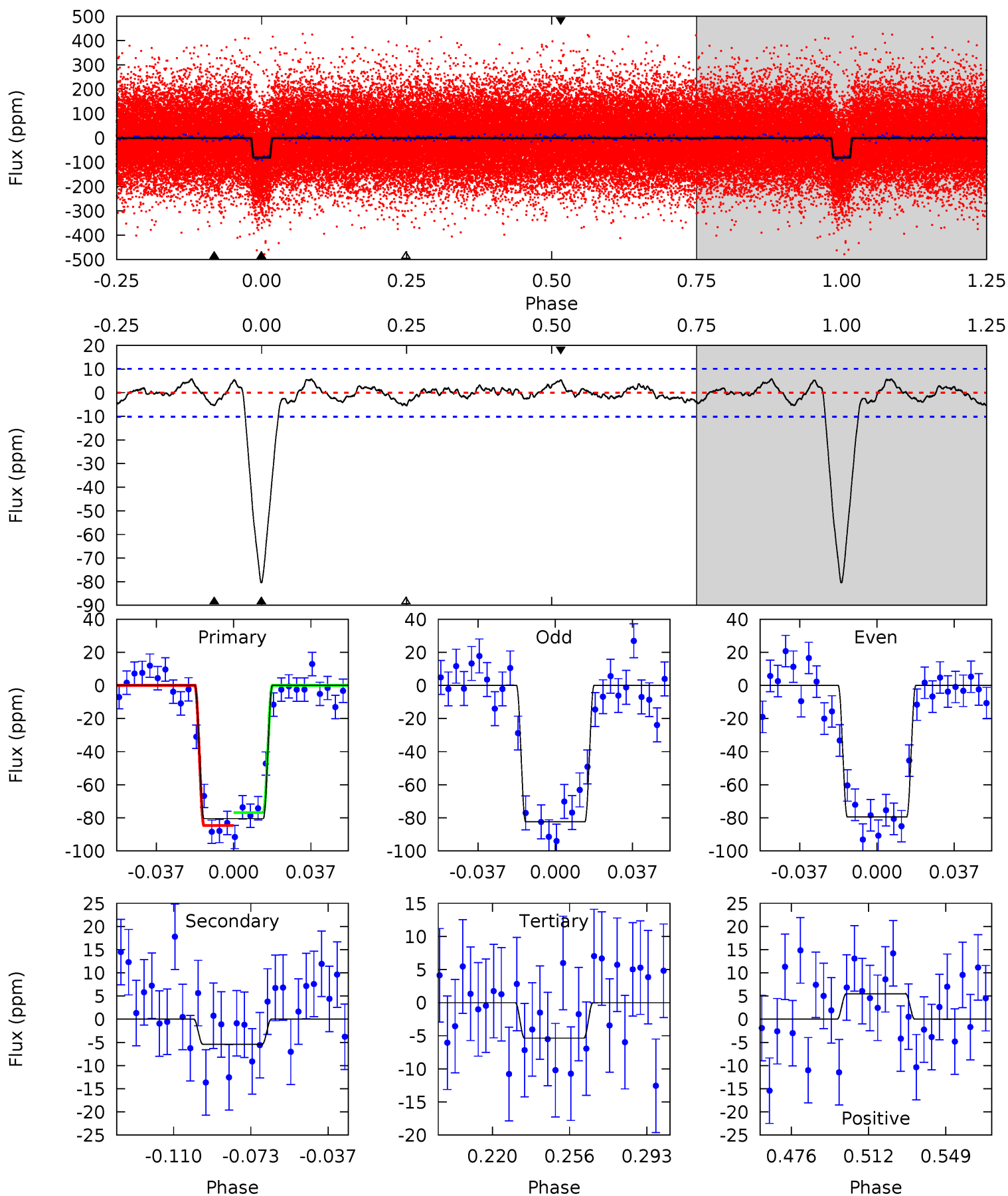
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
40.8	2.73	2.61	2.82	4.75	2.05	1.28	38.2	38.0	0.12	-0.09	1.58	0.96	0.07	0.91



Alt Model-Shift Uniqueness Test

009886361-01, P = 7.031570 Days, E = 127.413693 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
37.9	2.55	2.53	2.58	4.77	2.09	1.08	35.4	35.3	0.02	-0.03	0.65	1.04	0.07	1.82



Stellar Parameters For KIC 009886361

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	6170^{+110}_{-135}	$4.192^{+0.137}_{-0.125}$	$0.240^{+0.150}_{-0.150}$	$1.499^{+0.272}_{-0.245}$	$1.282^{+0.091}_{-0.114}$	$0.536^{+0.318}_{-0.201}$
	+2%/-2%	+3%/-3%	+62%/-62%	+18%/-16%	+7%/-9%	+59%/-37%
Source	SPE59	SPE59	SPE59	DSEP		

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

Secondary Eclipse Parameters for KIC 009886361-01 / KOI 2732.01

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-6 ± 2	$1.74^{+0.18}_{-0.19}$	1668^{+85}_{-88}	3397^{+184}_{-243}	$6.255^{+2.648}_{-2.551}$
Alt.	-5 ± 2	$1.50^{+0.17}_{-0.16}$	1669^{+81}_{-86}	3538^{+218}_{-271}	$7.879^{+3.727}_{-3.220}$

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 $A_{\text{obs}} \gg 1.0$

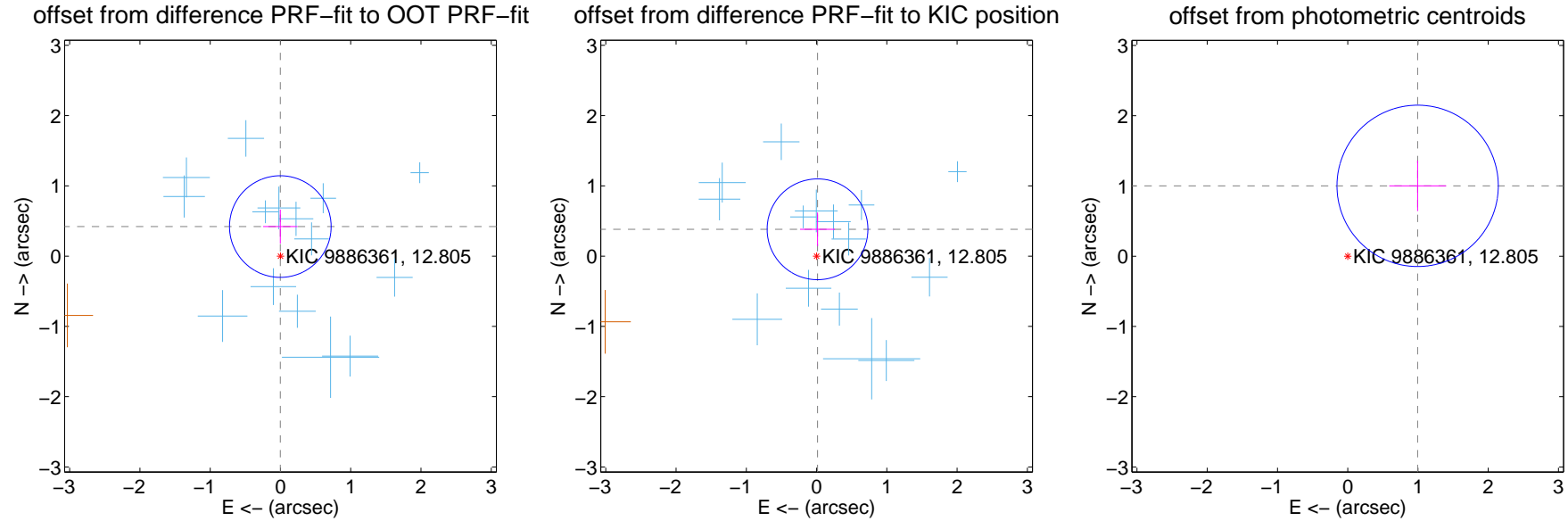
DV Centroid Data

Supplemental centroid analysis for 009886361-01. Kepler magnitude: 12.80. Transit SNR 25.46

There are 15 quarters with good PRF difference image offsets

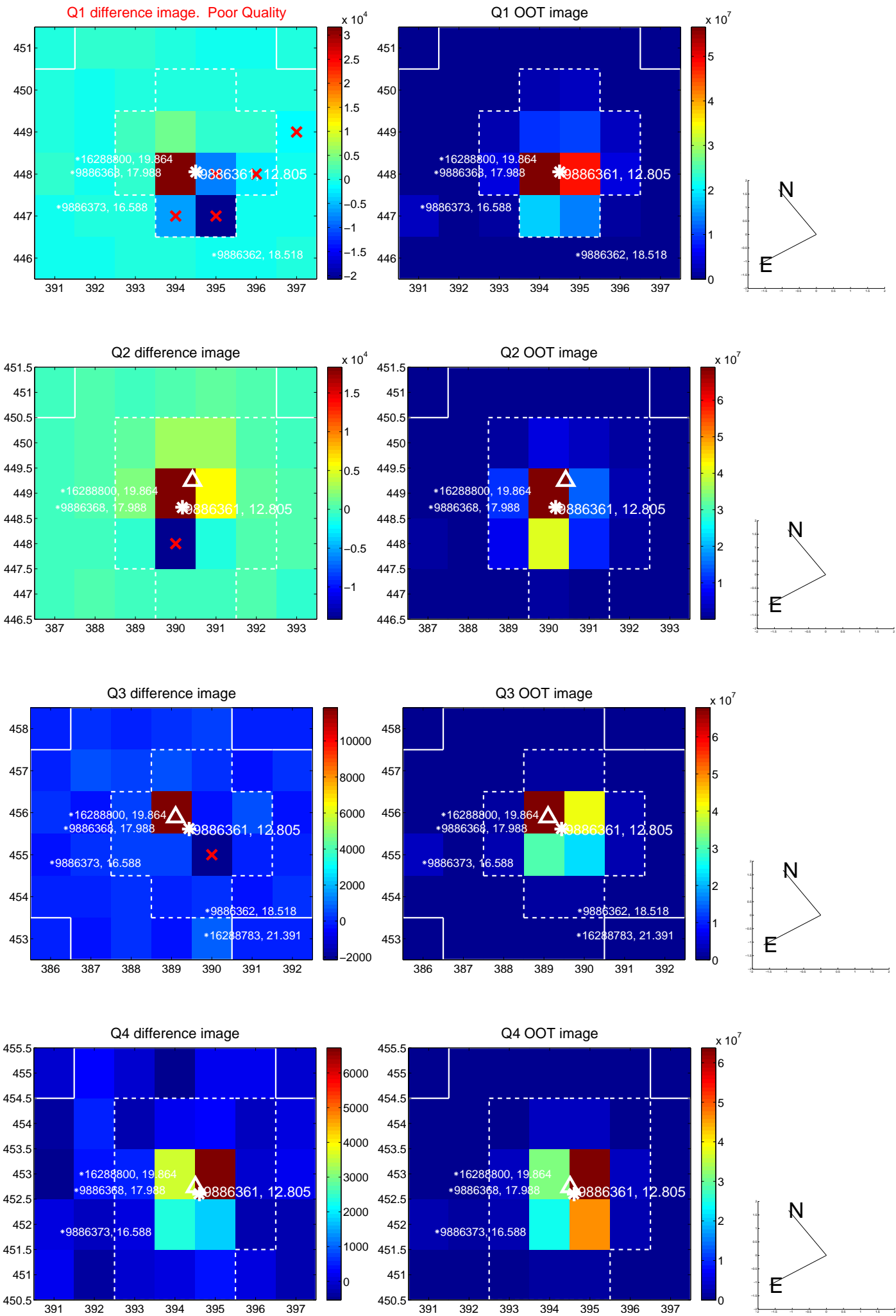
The direct PRF centroid is offset from the target star catalog position by about 0.07 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.421 ± 0.241	1.75	0.002 ± 0.245	0.421 ± 0.241
PRF-fit source offset from KIC position	0.382 ± 0.239	1.60	-0.013 ± 0.248	0.382 ± 0.239
photometric centroid source offset	1.41 ± 0.38	3.69	-1.00 ± 0.40	1.00 ± 0.36

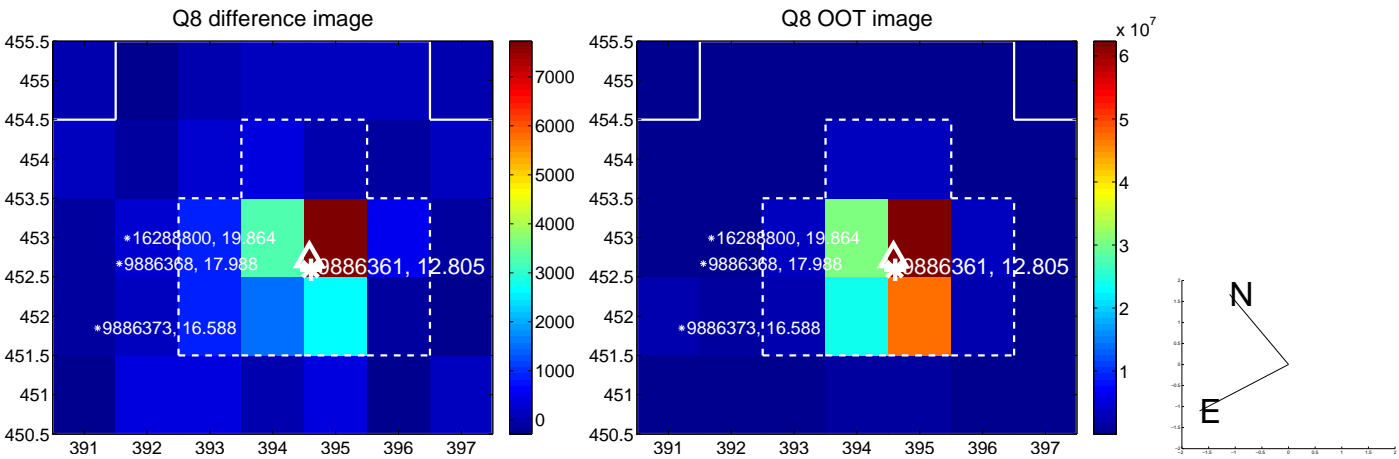
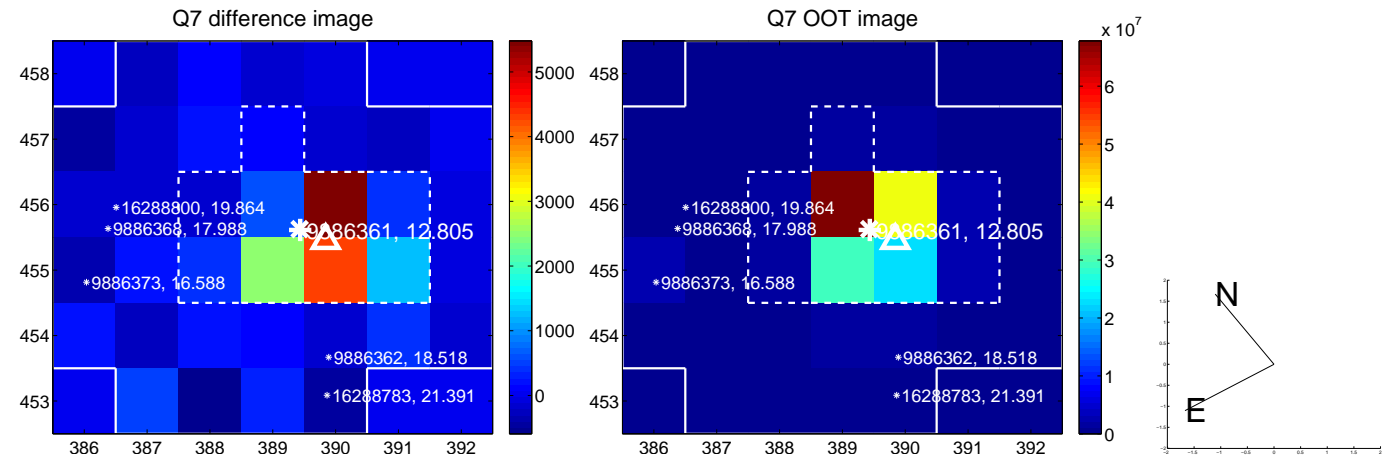
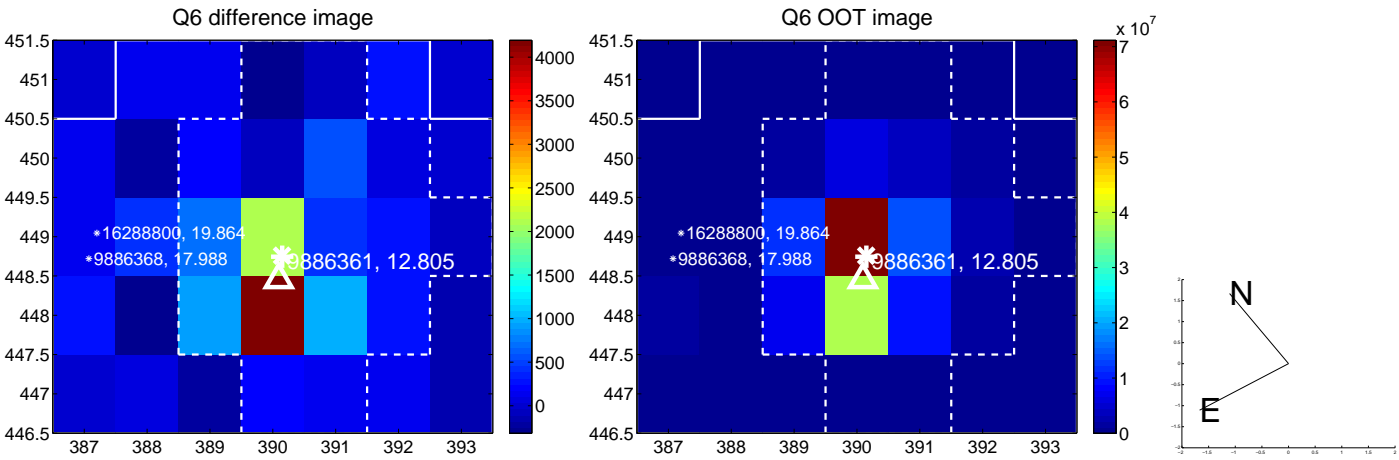
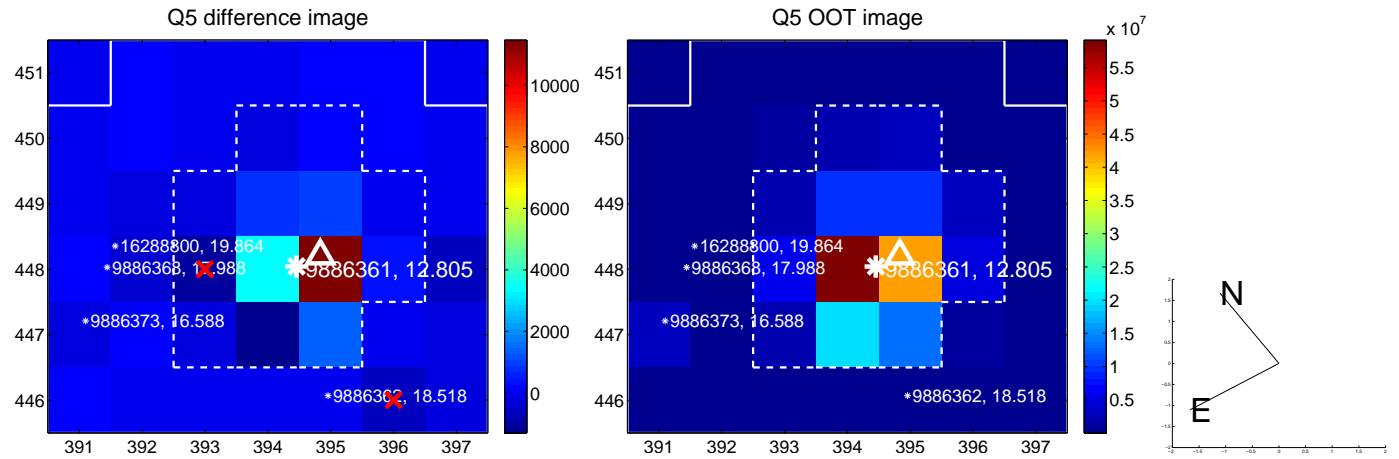


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

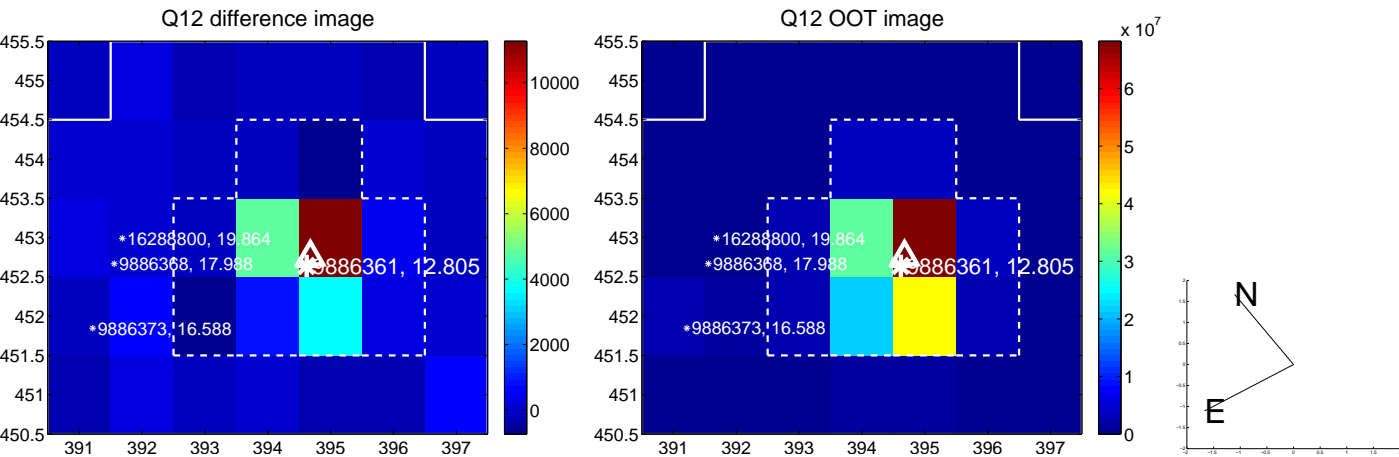
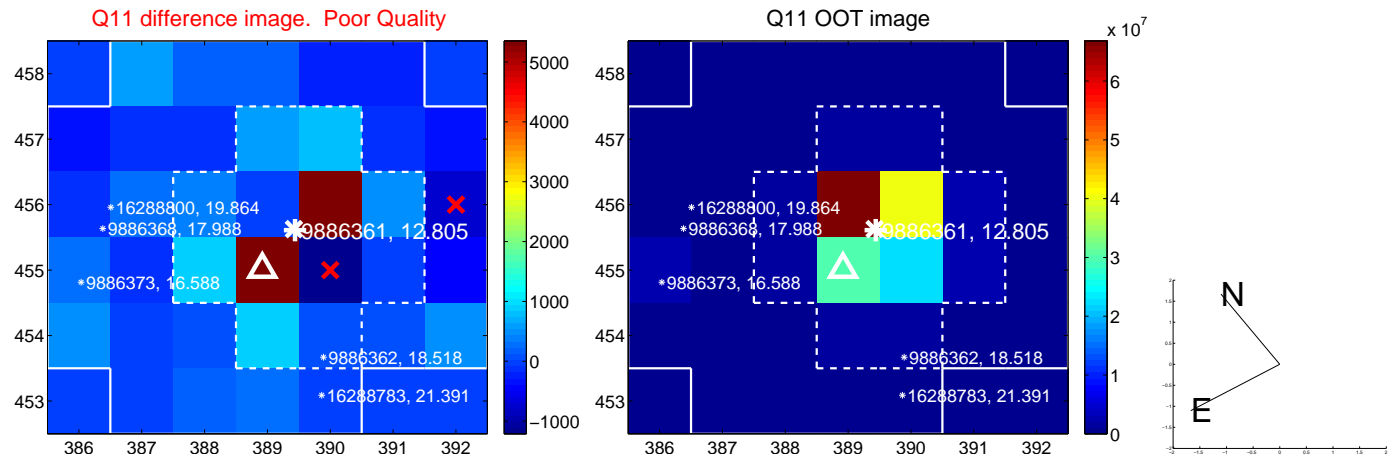
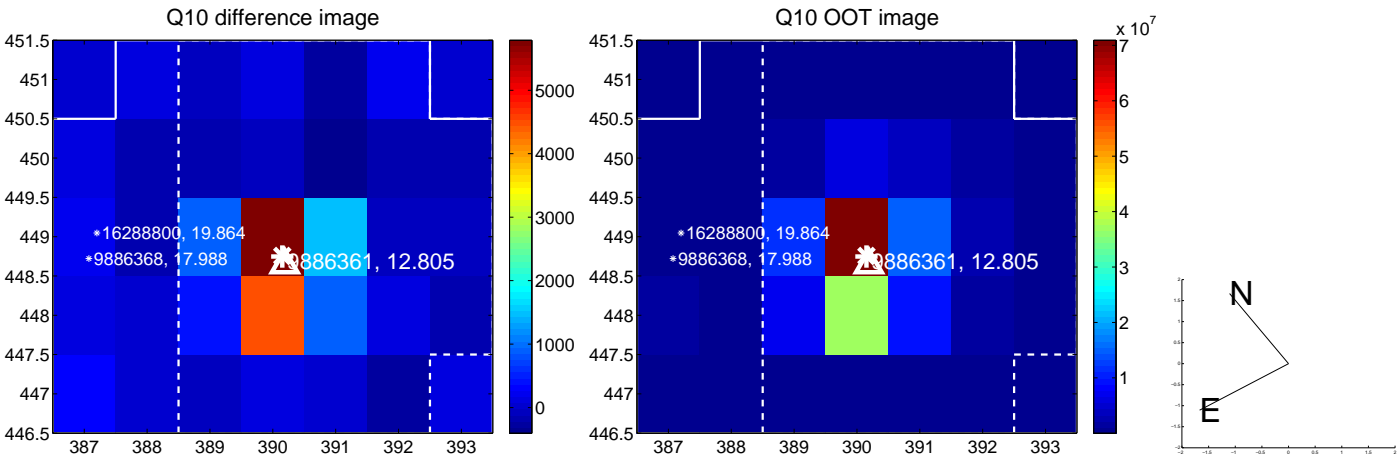
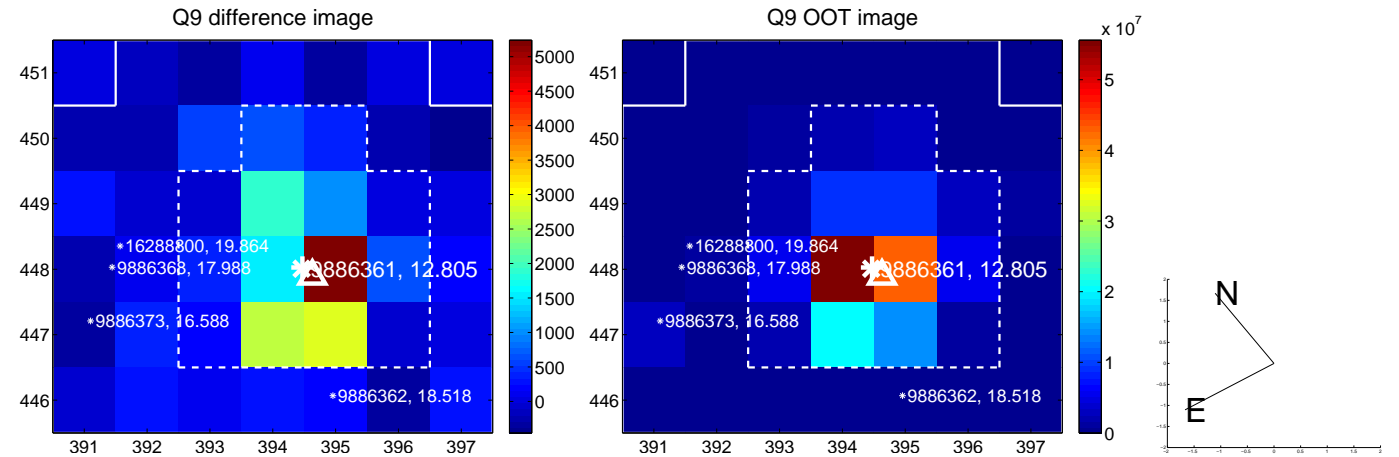
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



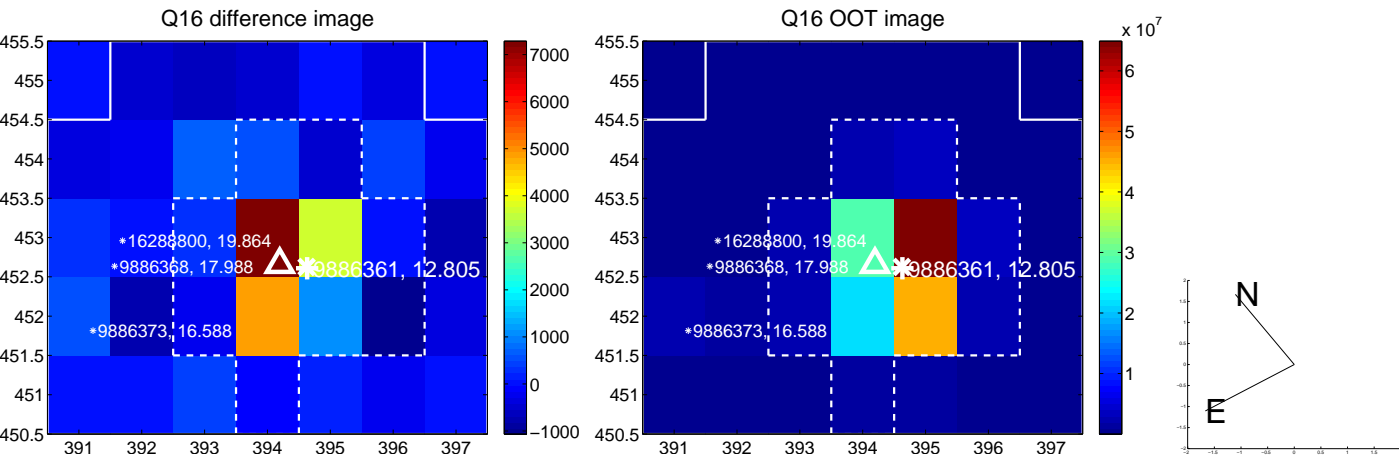
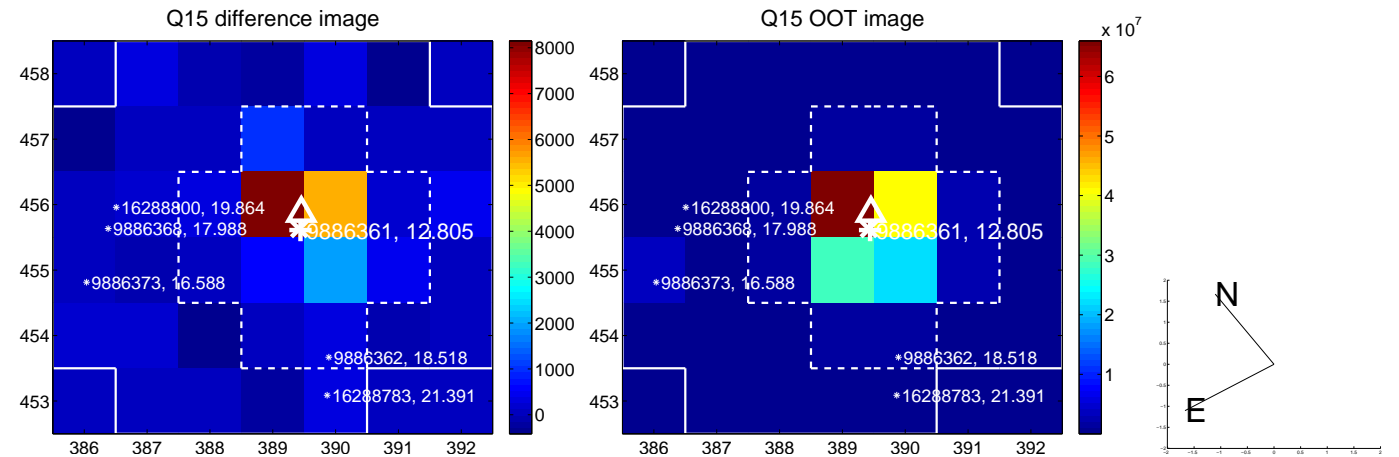
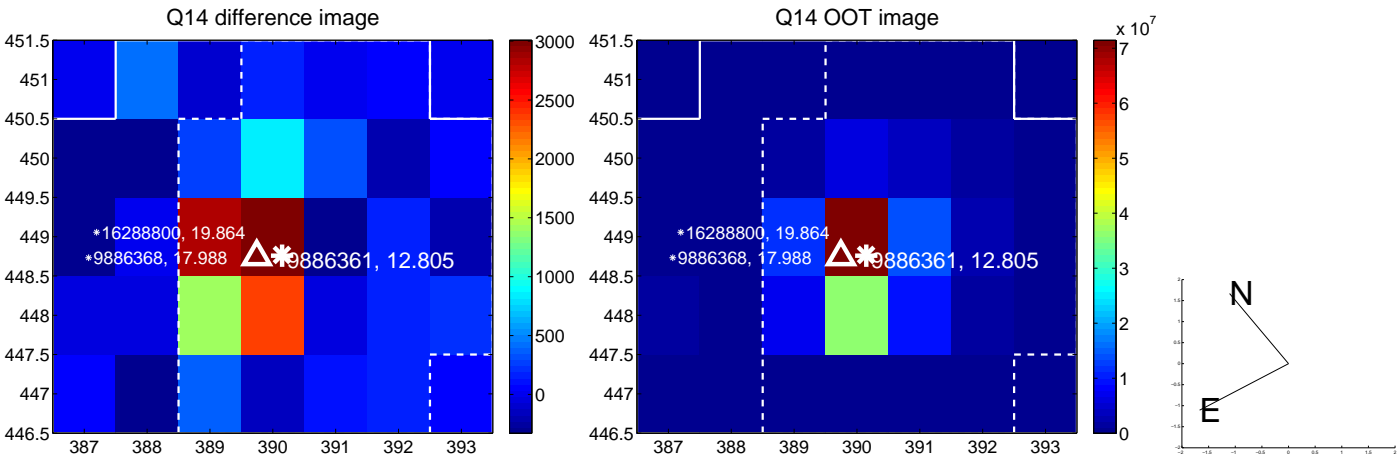
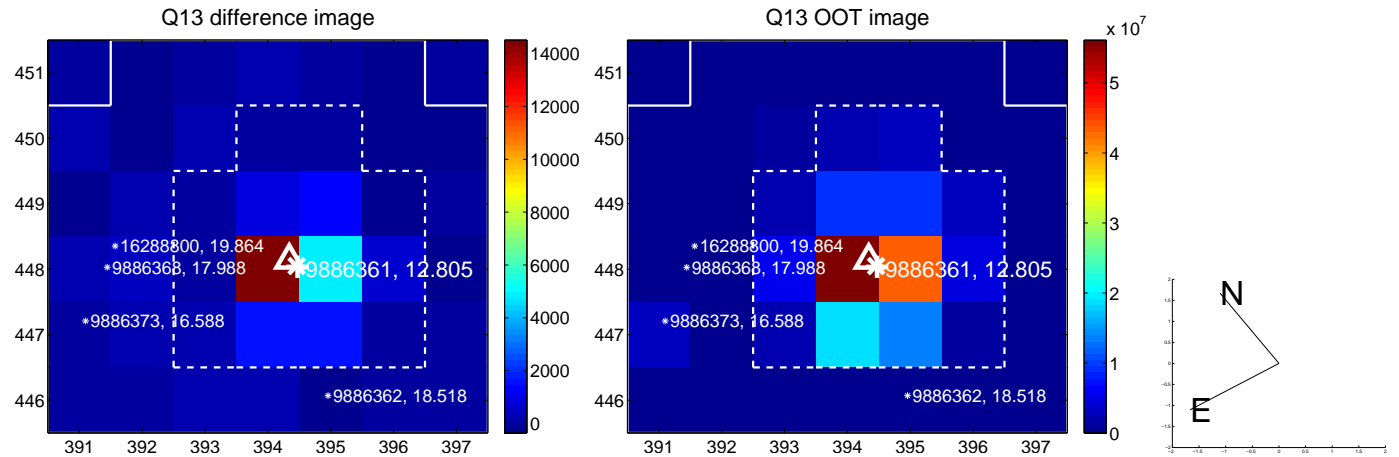
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



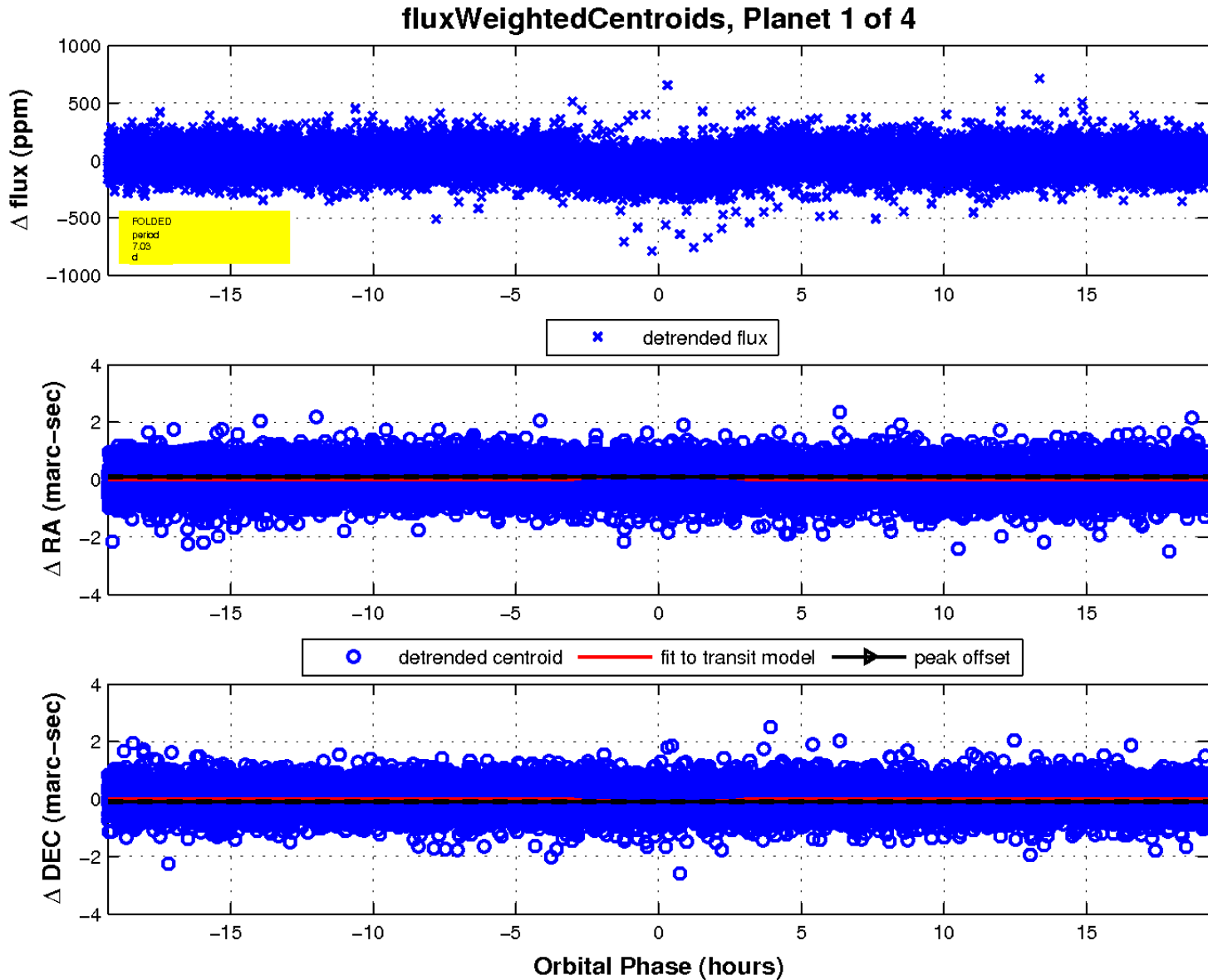
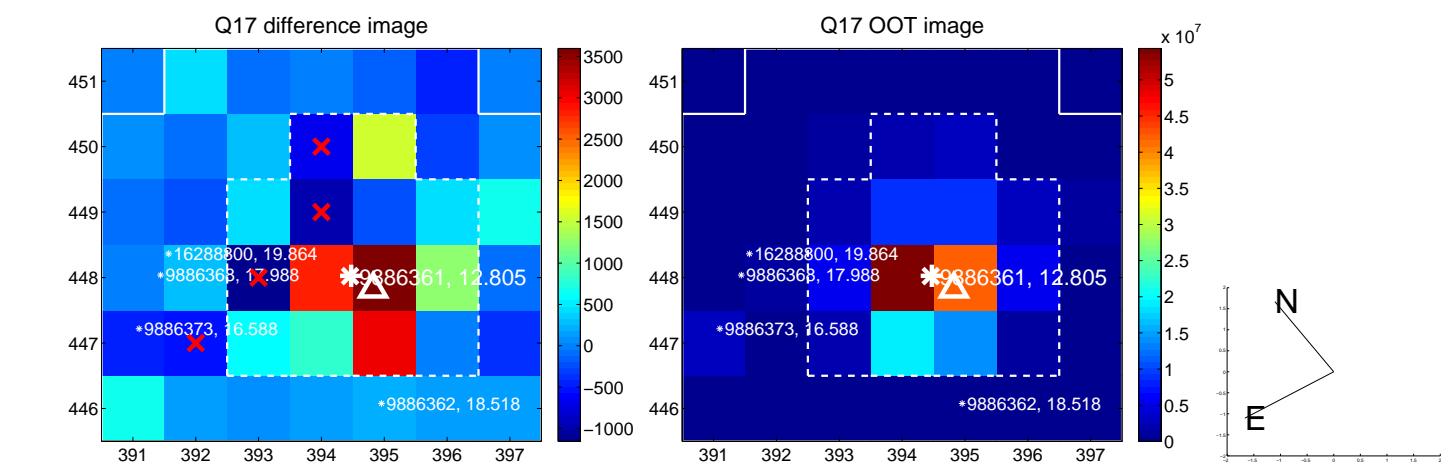
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

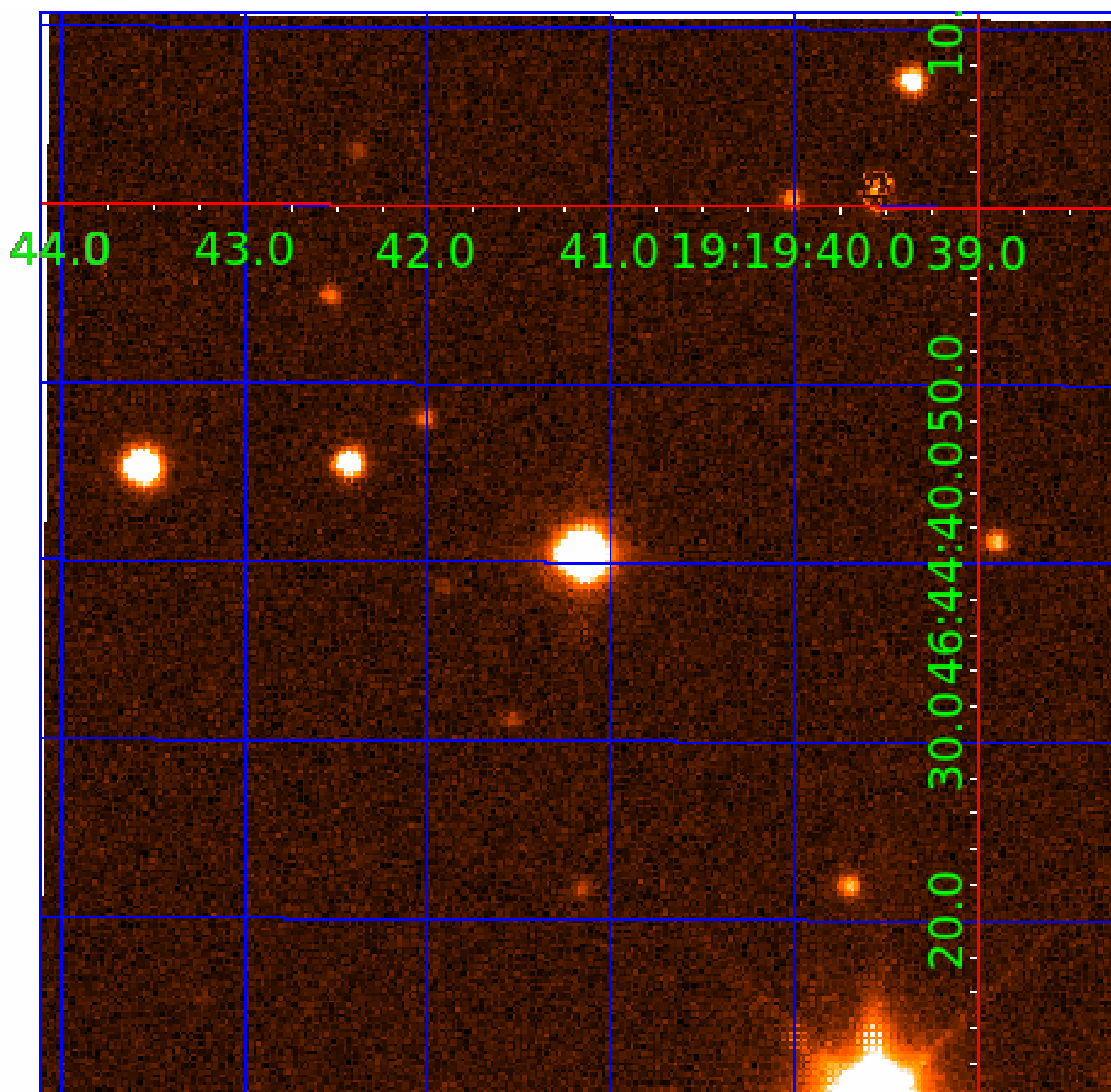


white \times : KIC target position; +: OOT centroid; Δ : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 009886361

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})
009886361-01	OBS	2732.01	7.031500	134.449034	84.0	6.435	24.5	25.5	1.50	6170	1.74	480.66
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Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009886361-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
009886361-02	OBS	PC	0.95	0	0	0	0	NO_COMMENT
009886361-03	OBS	PC	0.99	0	0	0	0	NO_COMMENT
009886361-04	OBS	PC	0.85	0	0	0	0	NO_COMMENT

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

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

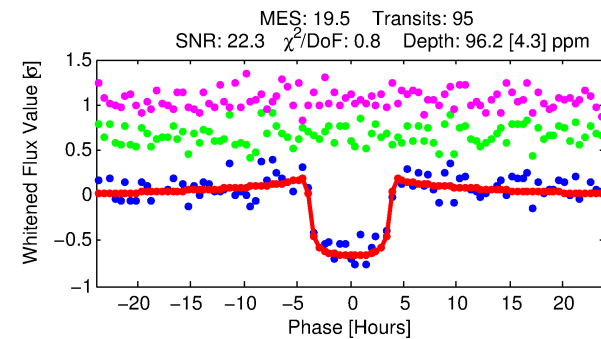
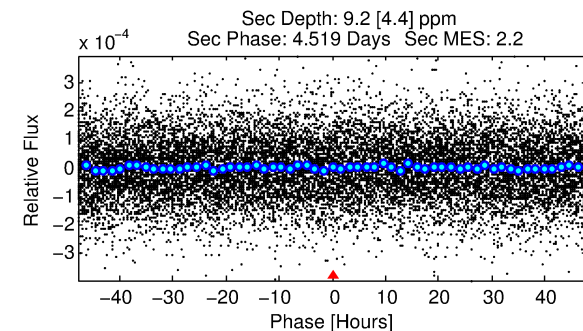
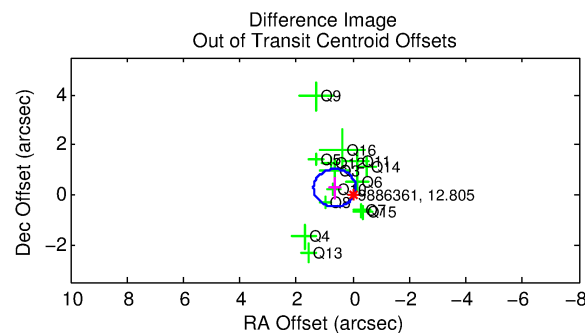
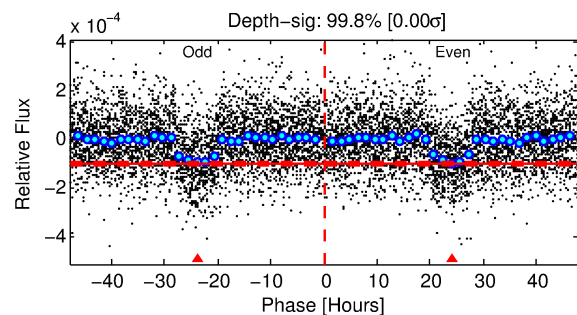
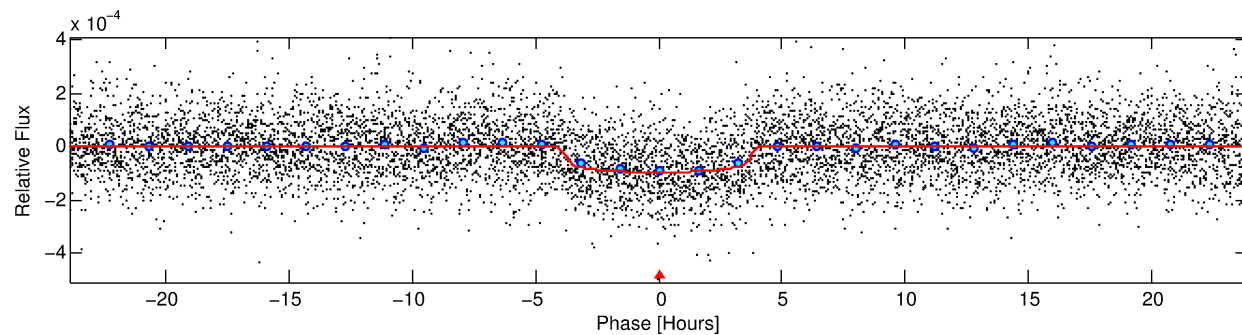
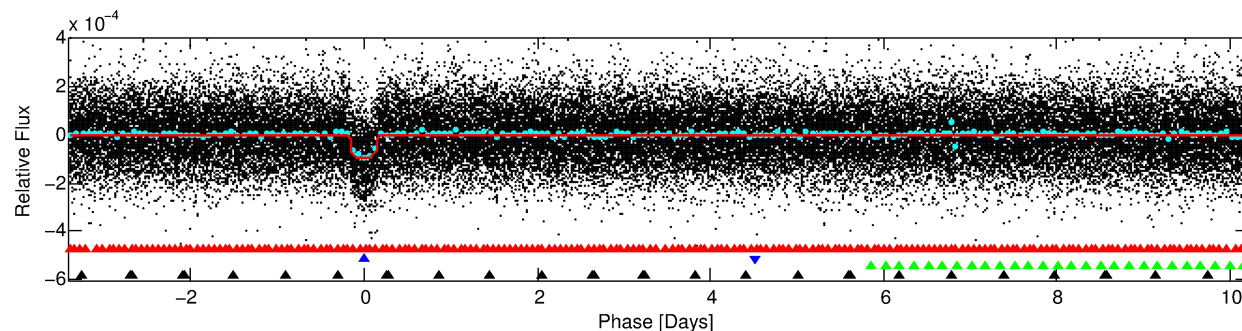
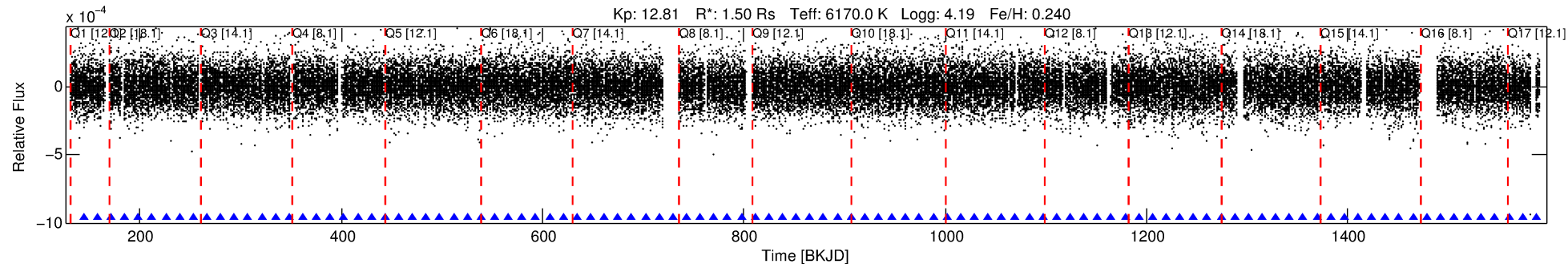
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009886361-02

No Significant Match Found

DV One-Page Summary

KIC: 9886361 Candidate: 2 of 4 Period: 13.612 d
KOI: K02732.02 Corr: 0.971



DV Fit Results:

Period = 13.61166 [0.00008] d
Epoch = 144.1682 [0.0048] BKJD
Rp/R* = 0.0105 [0.0011]
a/R* = 6.29 [3.30]
b = 0.89 [0.13]
Seff = 199.23 [51.38]
Teq = 958 [62] K
Rp = 1.72 [0.36] Re
a = 0.1210 [0.0194] AU
Ag = 25.13 [14.44] [1.67σ]
Teffp = 3316 [438] K [5.33σ]

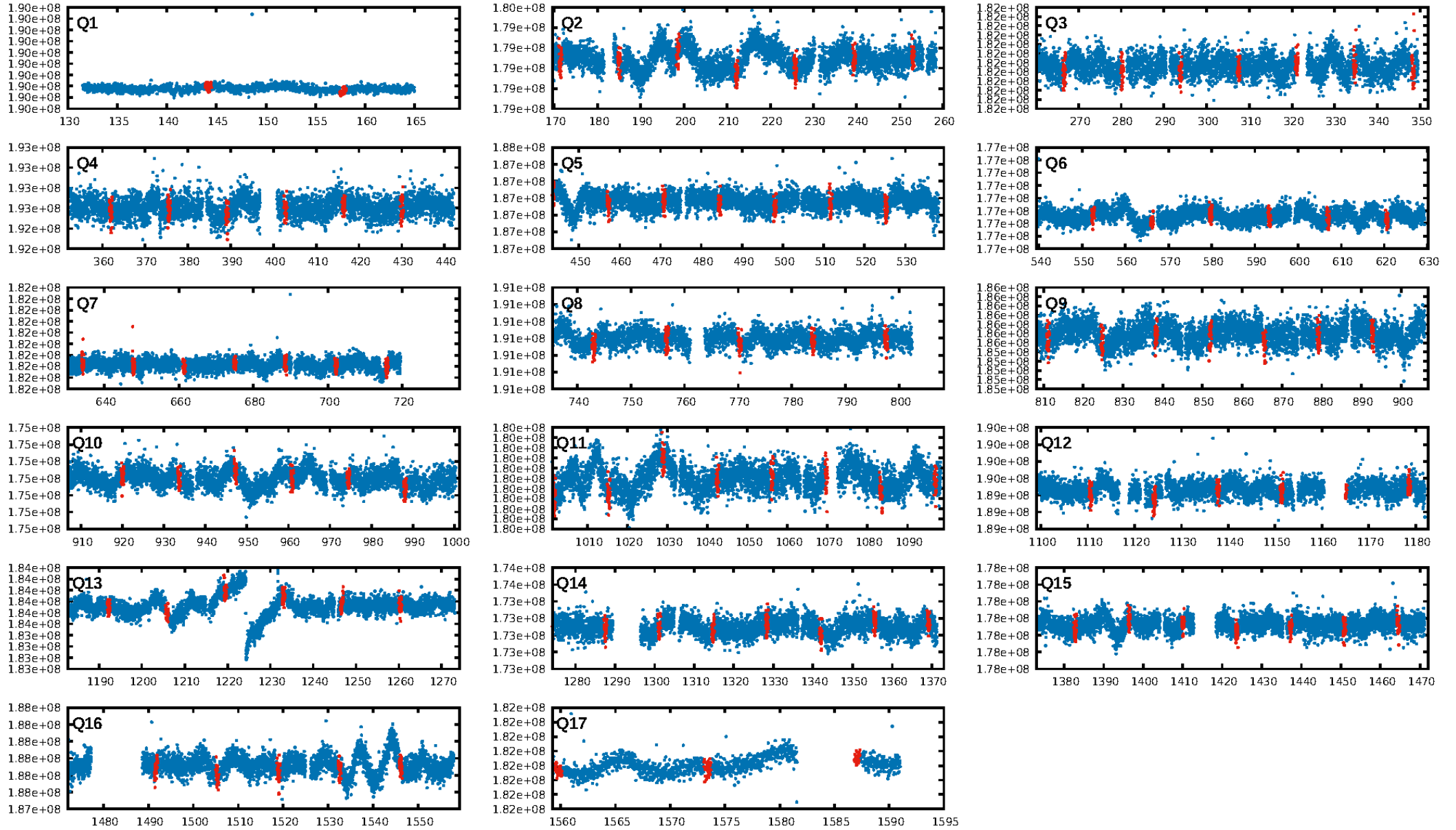
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [15.43σ]
LongPeriod-sig: 100.0% [72.47σ]
ModelChiSquare2-sig: 96.6%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 2.19e-83
RollingBand-fgt: 1.00 [90/90]
GhostDiagnostic-chr: 106.7
Centroid-sig: 74.2%
Centroid-so: 0.161 arcsec [0.39σ]
OotOffset-rm: 0.702 arcsec [2.81σ]
KicOffset-rm: 0.682 arcsec [2.85σ]
OotOffset-st: 3/4/4/3 [14]
KicOffset-st: 3/4/4/3 [14]
DiffImageQuality-fgm: 0.86 [12/14]
DiffImageOverlap-fno: 1.00 [17/17]

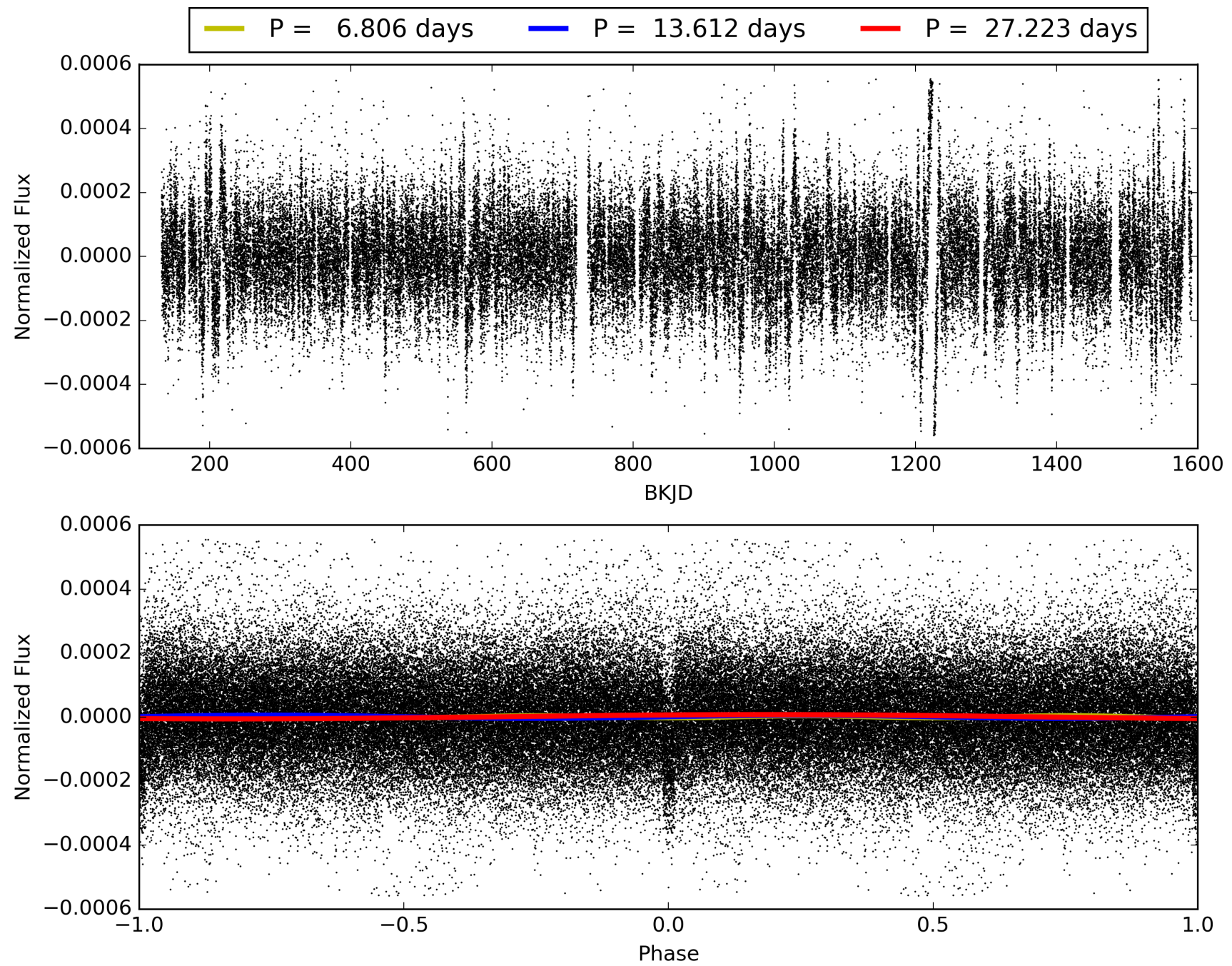
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 15:04:05 Z

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

TCE 009886361-02, PDC Light Curves

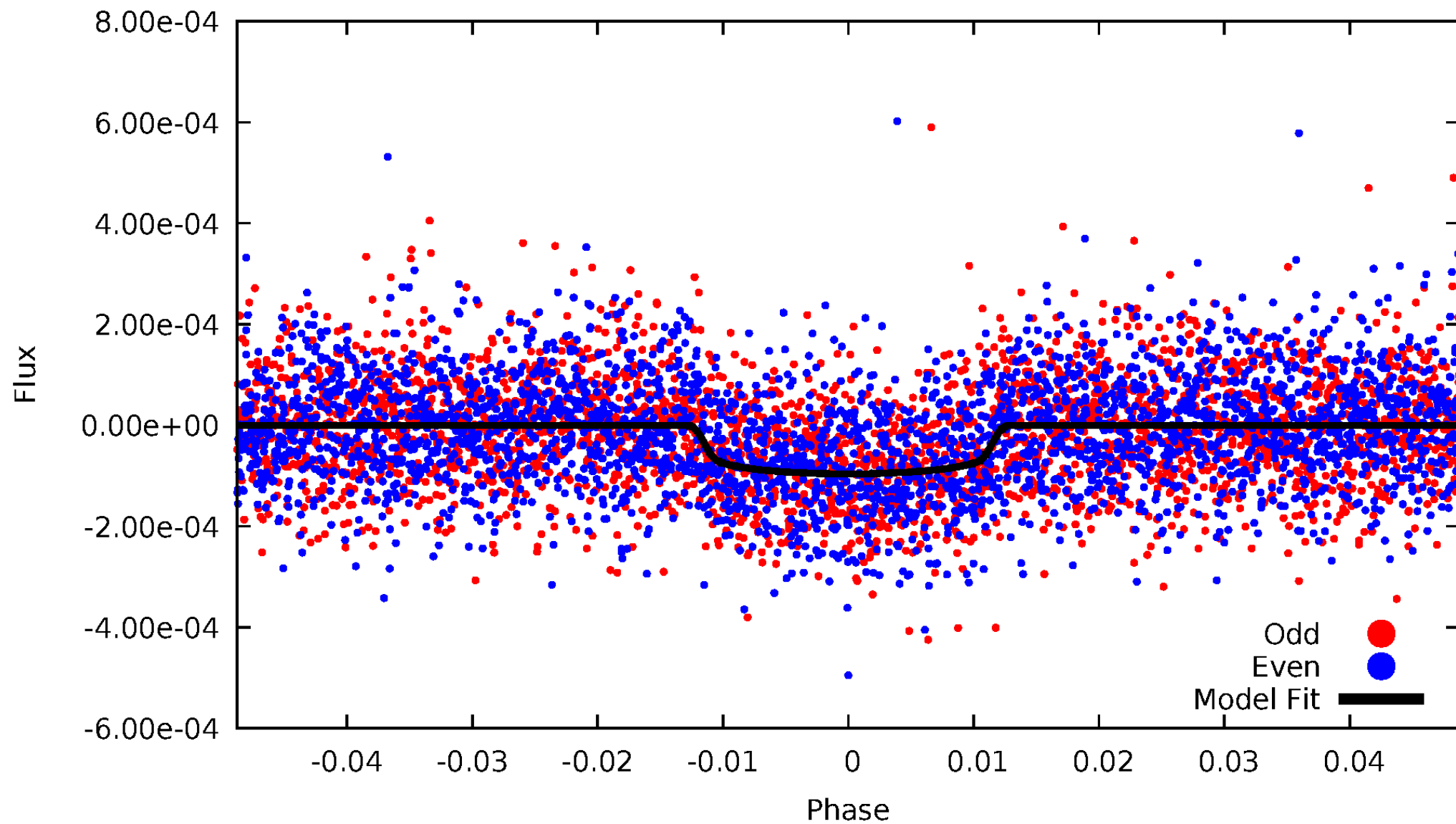


TCE 009886361-02



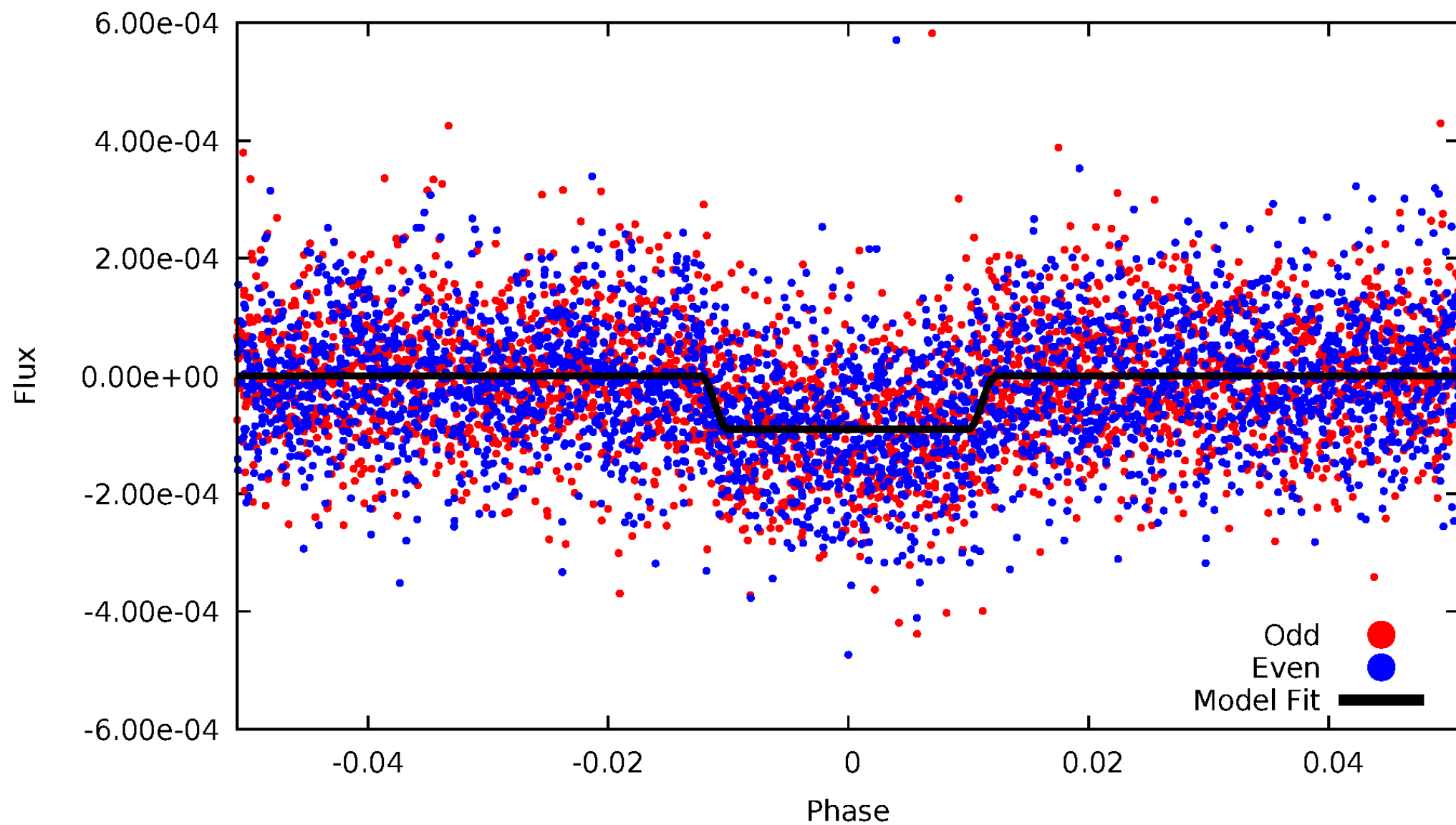
DV Odd/Even

TCE 009886361-02



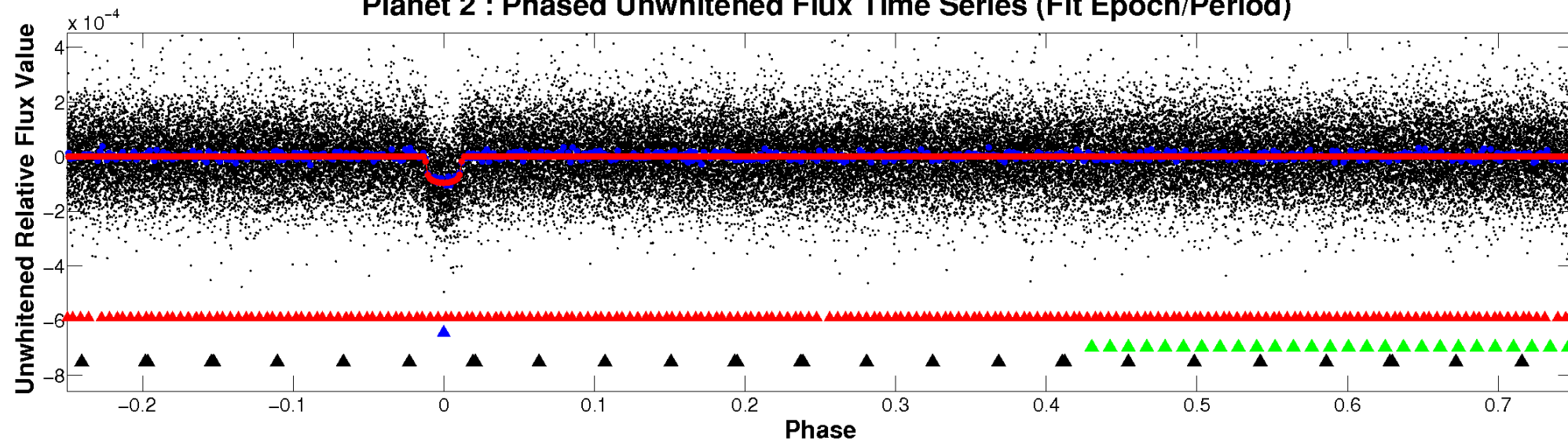
ALT Odd/Even

TCE 009886361-02

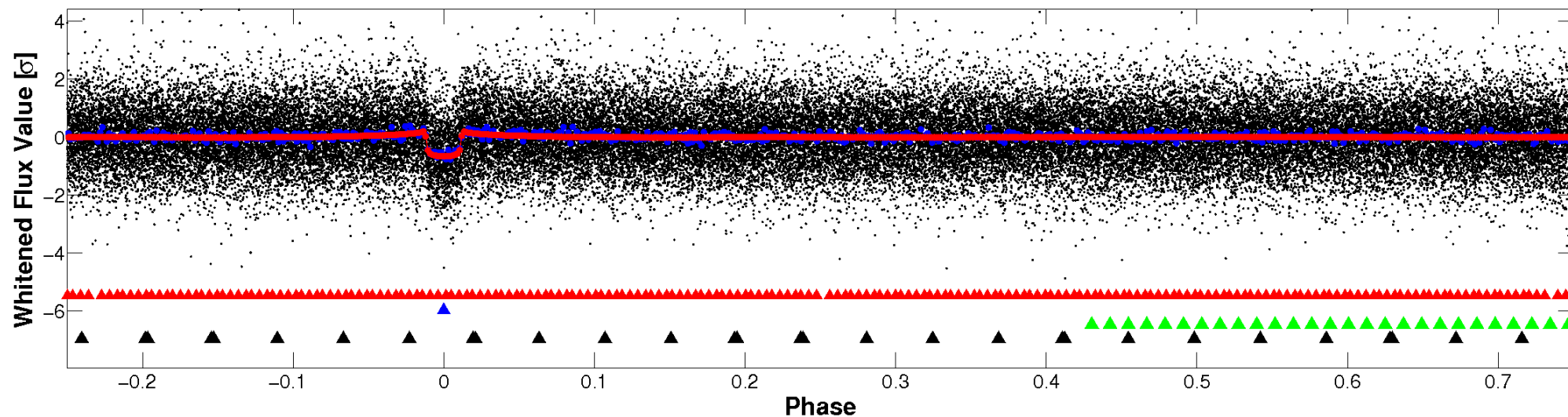


Non-Whitened Vs. Whitened Light Curve

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

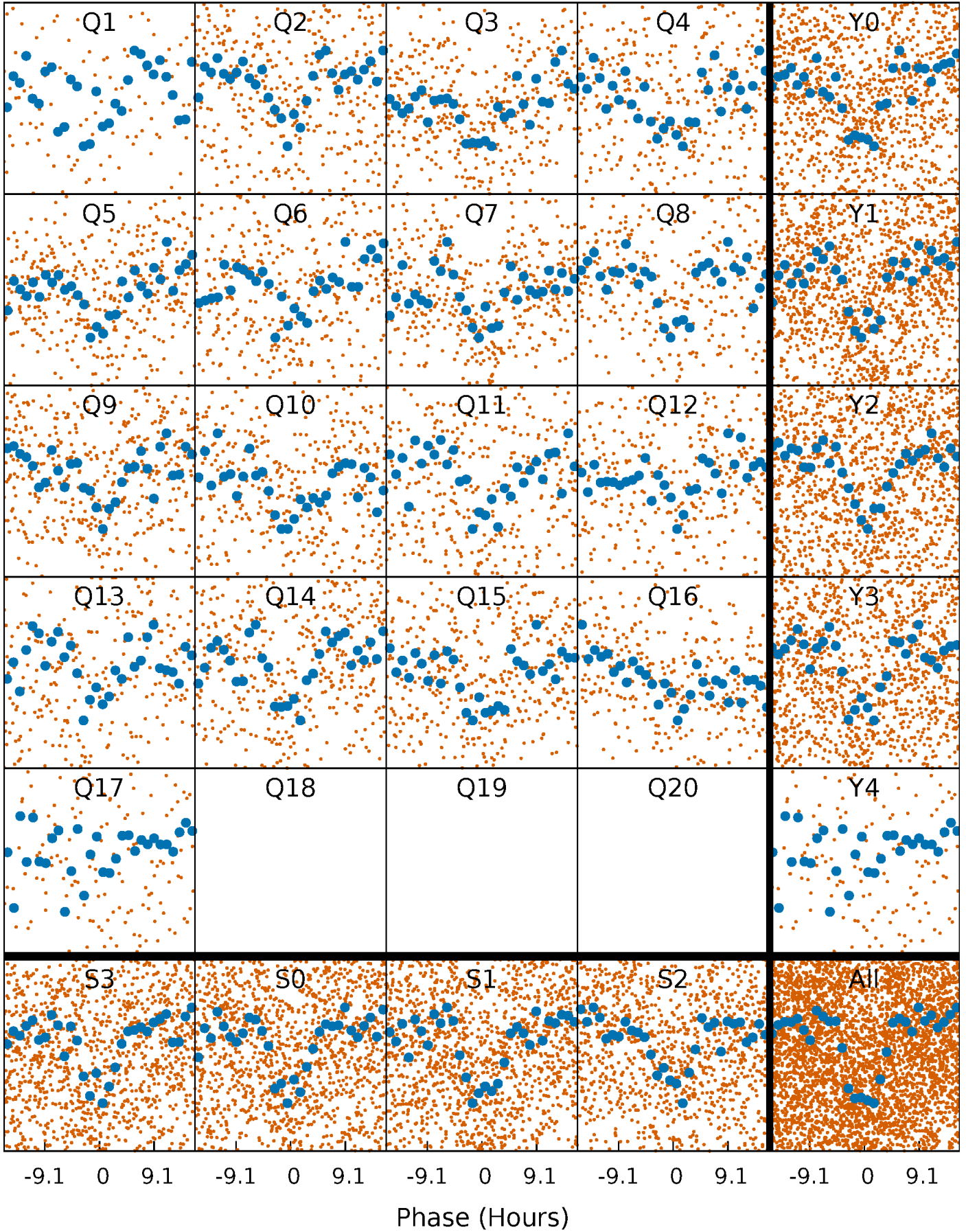


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



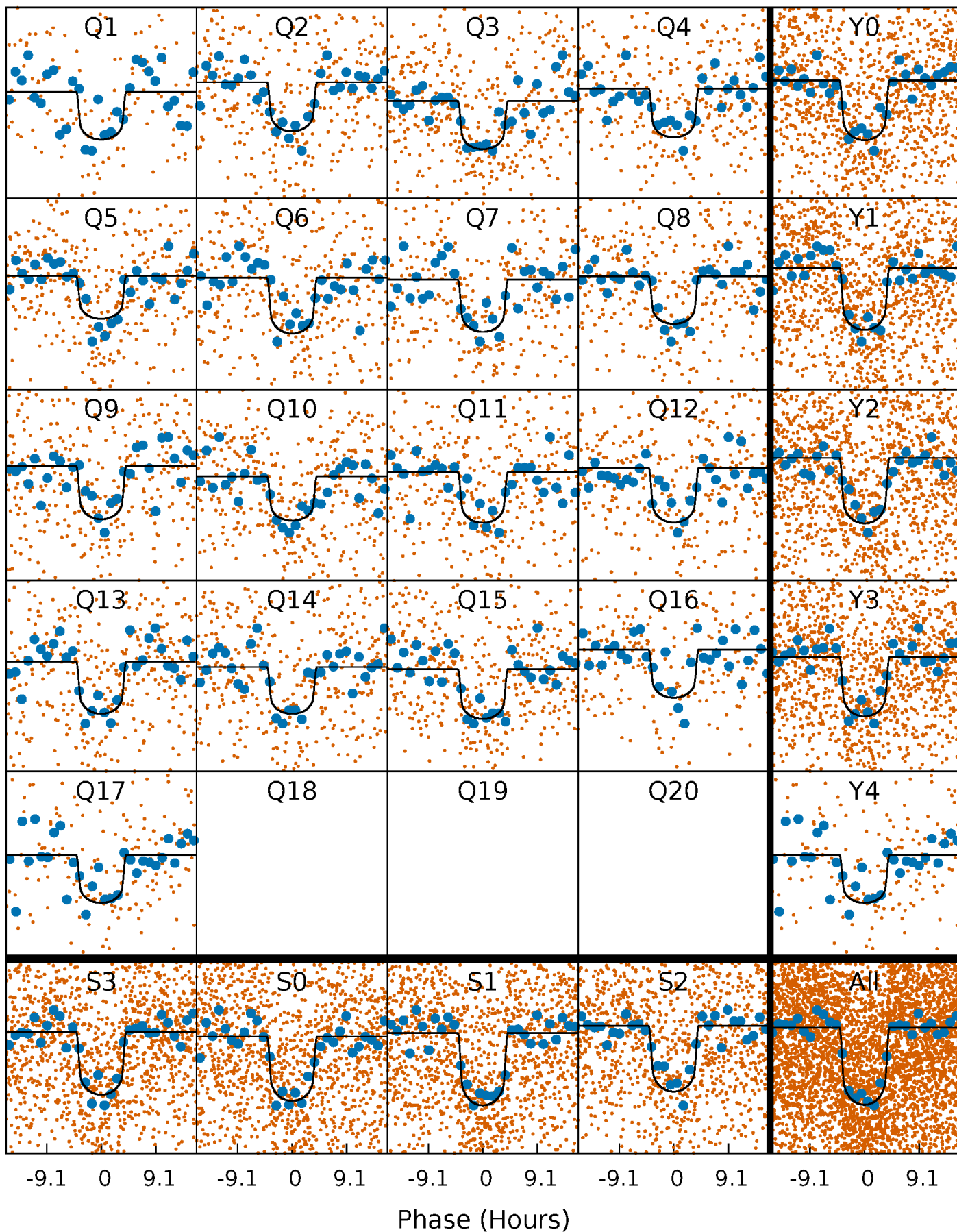
PDC Quarter-Phased Transit Curves

TCE 009886361-02 P= 13.611663 Days $T_0=144.168227$ (BKJD)



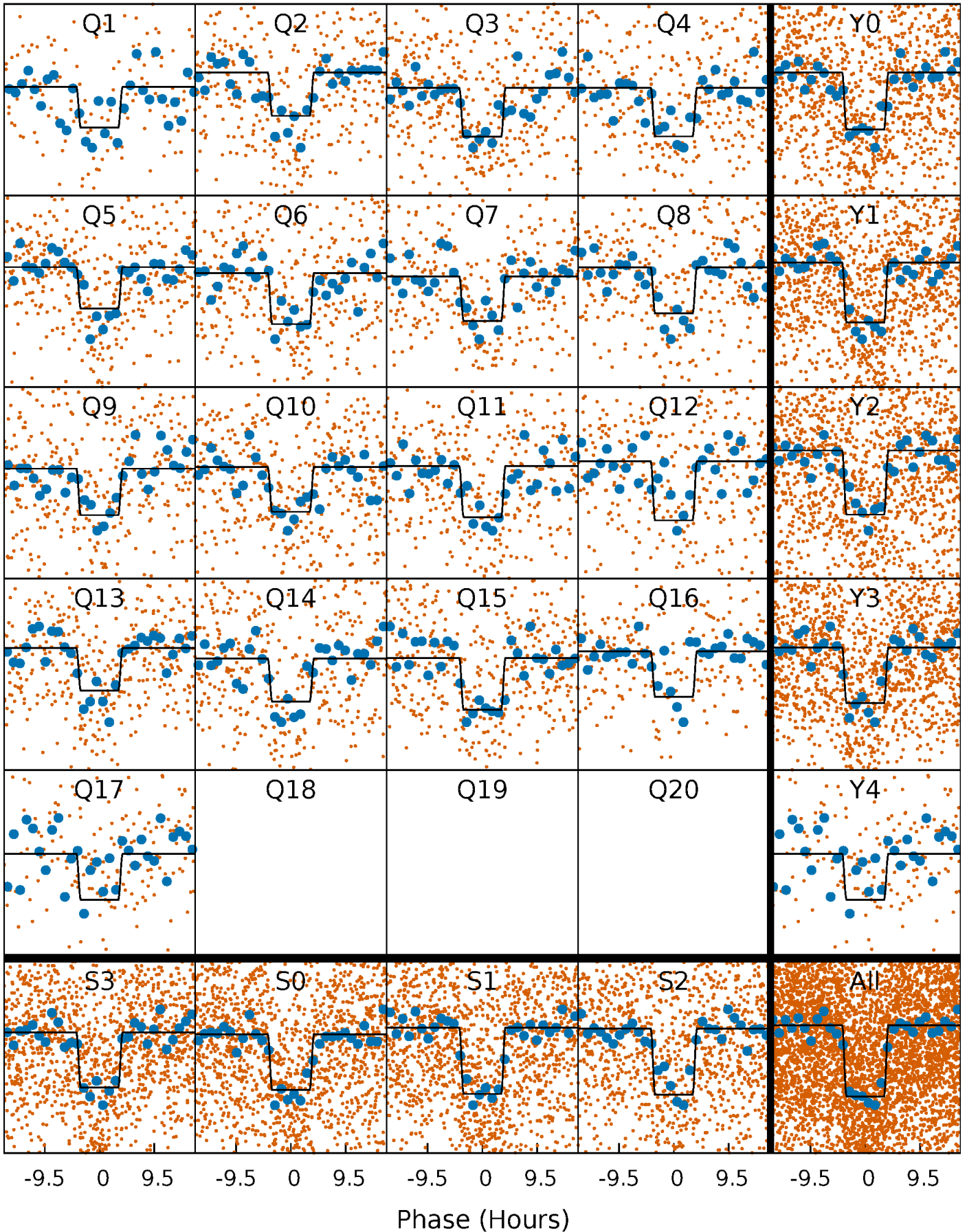
DV Quarter-Phased Transit Curves

TCE 009886361-02 P= 13.611663 Days $T_0=144.168227$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

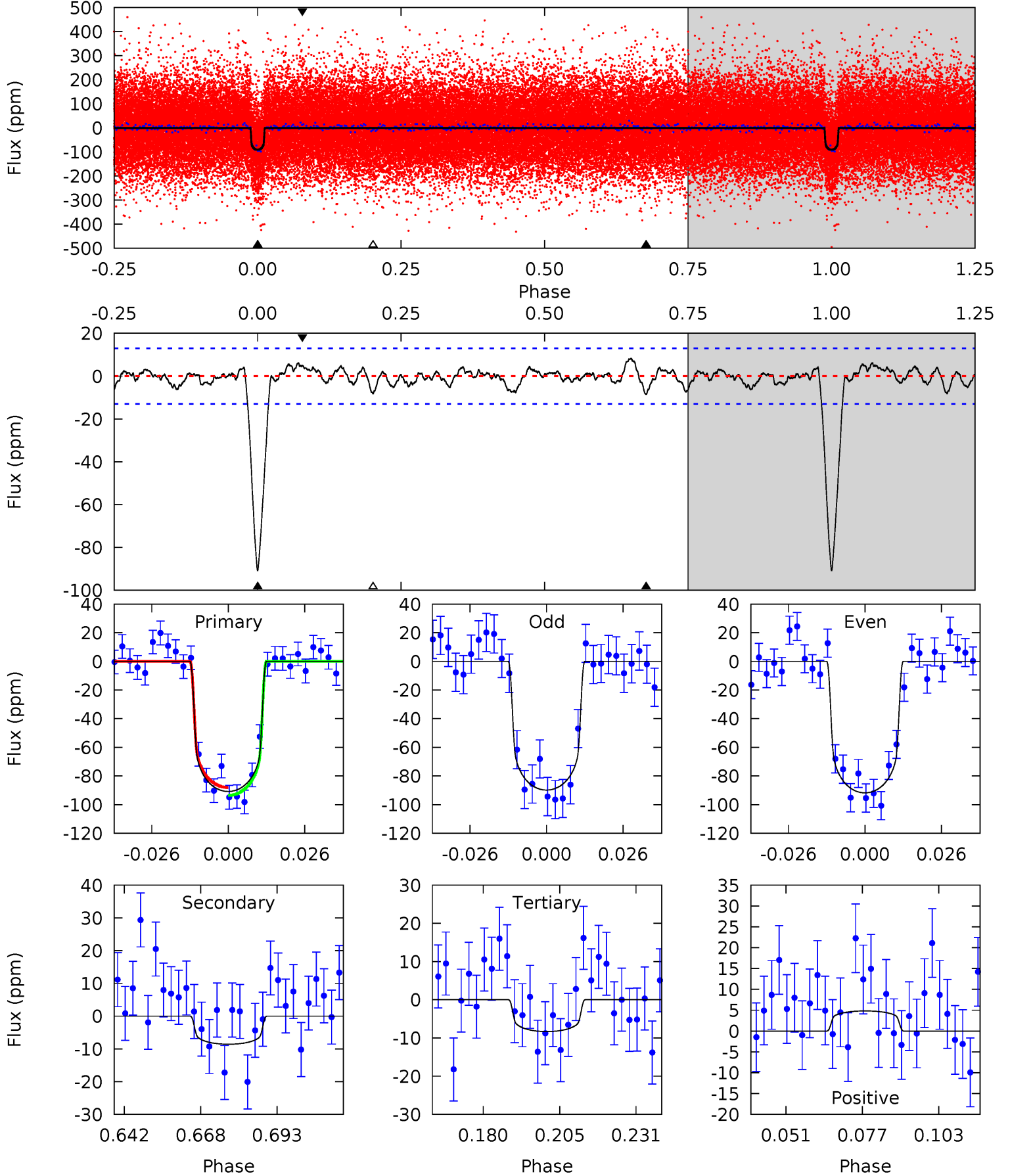
TCE 009886361-02 P= 13.611817 Days $T_0=144.161141$ (BKJD)



DV Model-Shift Uniqueness Test

009886361-02, $P = 13.611663$ Days, $E = 130.556564$ Days

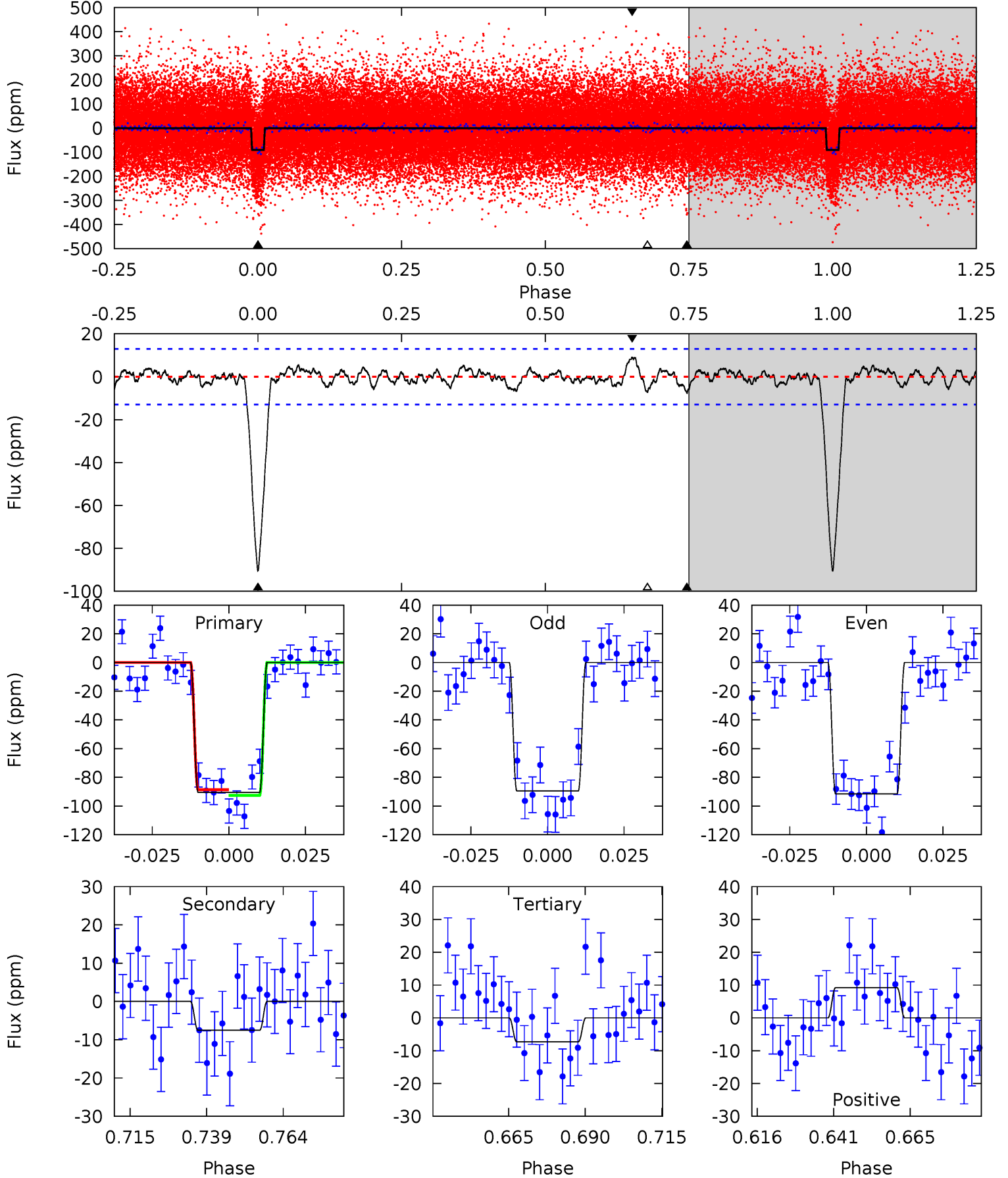
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
33.9	3.21	3.11	1.80	4.84	2.23	1.06	30.8	32.1	0.10	1.41	0.36	0.99	0.08	1.03



Alt Model-Shift Uniqueness Test

009886361-02, P = 13.611817 Days, E = 130.549324 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
33.8	2.82	2.72	3.43	4.85	2.25	1.00	31.1	30.4	0.10	-0.61	0.39	1.00	0.09	0.73



Stellar Parameters For KIC 009886361

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	6170^{+110}_{-135}	$4.192^{+0.137}_{-0.125}$	$0.240^{+0.150}_{-0.150}$	$1.499^{+0.272}_{-0.245}$	$1.282^{+0.091}_{-0.114}$	$0.536^{+0.318}_{-0.201}$
	+2%/-2%	+3%/-3%	+62%/-62%	+18%/-16%	+7%/-9%	+59%/-37%
Source	SPE59	SPE59	SPE59	DSEP		

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

Secondary Eclipse Parameters for KIC 009886361-02 / KOI 2732.02

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-9 ± 3	$1.72^{+0.27}_{-0.25}$	1333^{+74}_{-63}	3664^{+228}_{-261}	23^{+13}_{-9}
Alt.	-8 ± 3	$1.53^{+0.26}_{-0.22}$	1335^{+67}_{-65}	3727^{+261}_{-318}	25^{+15}_{-11}

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 $A_{obs} \gg 1.0$

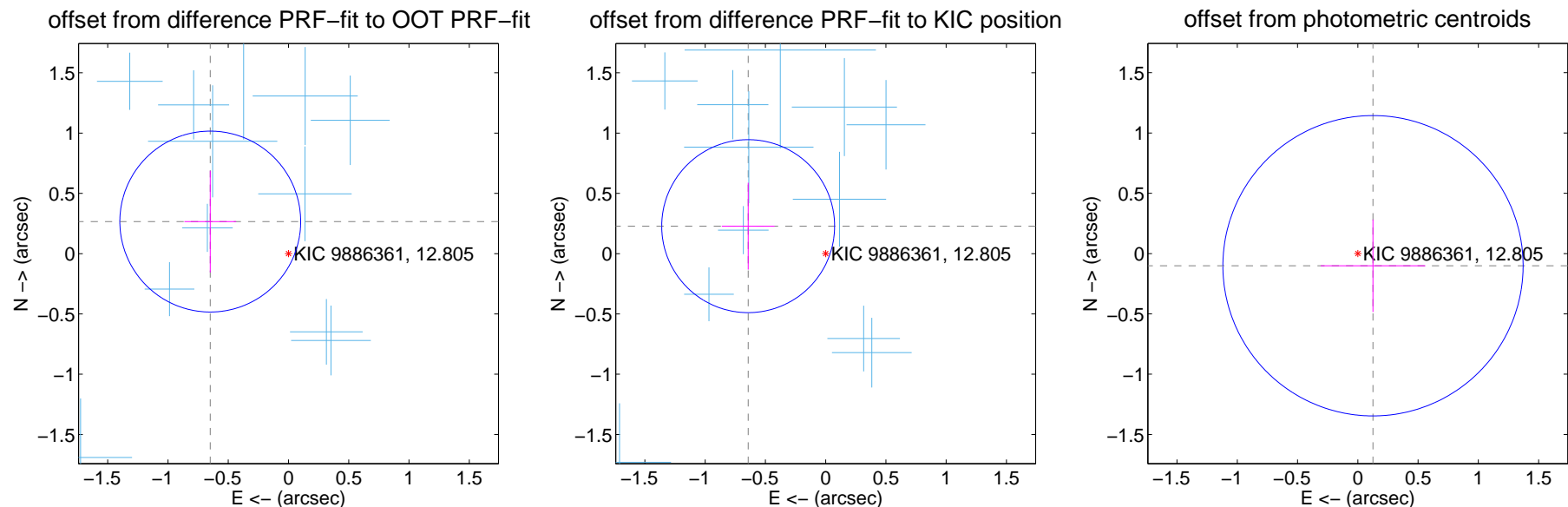
DV Centroid Data

Supplemental centroid analysis for 009886361-02. Kepler magnitude: 12.80. Transit SNR 22.27

There are 12 quarters with good PRF difference image offsets

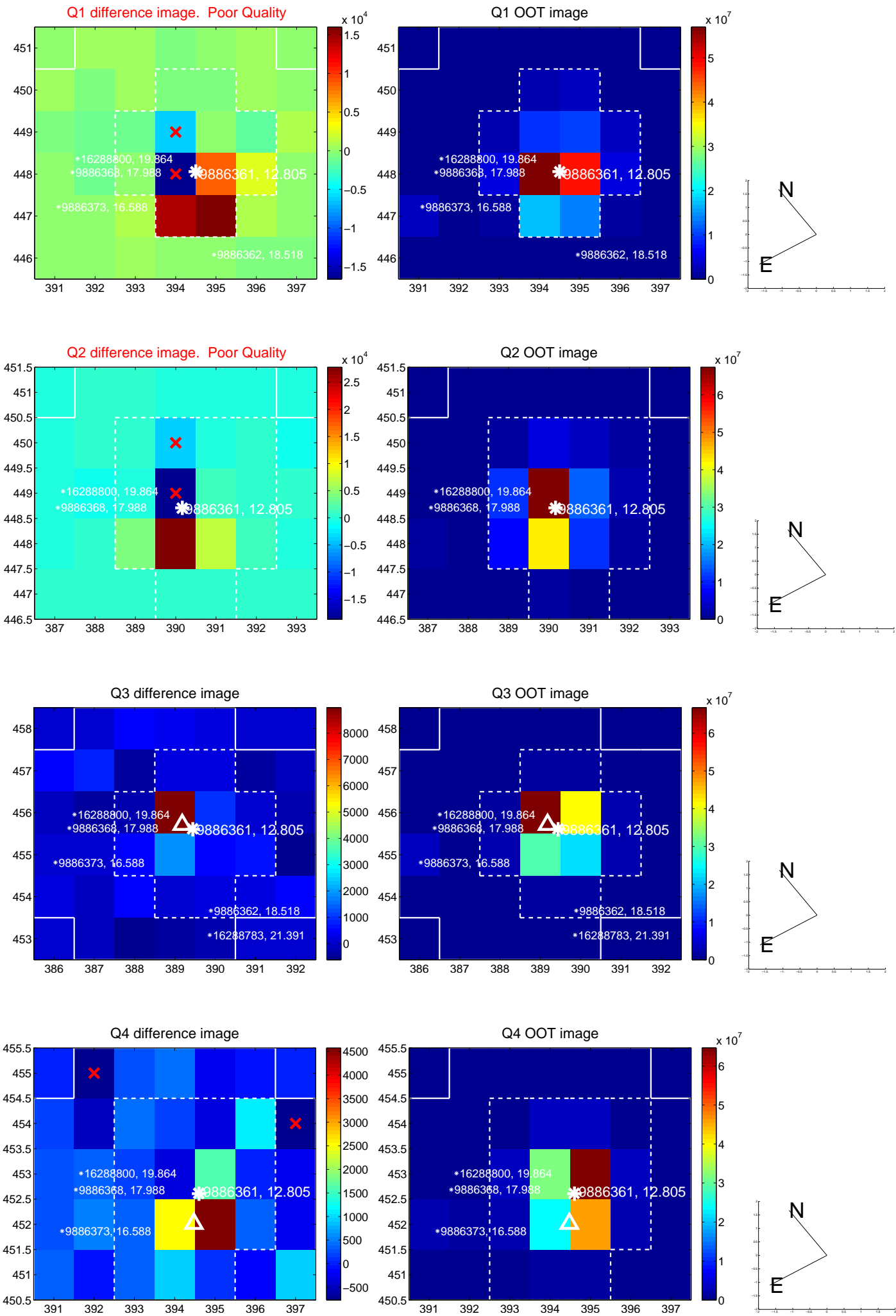
The direct PRF centroid is offset from the target star catalog position by about 0.07 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.702 ± 0.250	2.81	0.649 ± 0.215	0.266 ± 0.421
PRF-fit source offset from KIC position	0.682 ± 0.239	2.85	0.643 ± 0.219	0.228 ± 0.360
photometric centroid source offset	0.16 ± 0.42	0.39	-0.13 ± 0.43	-0.10 ± 0.38

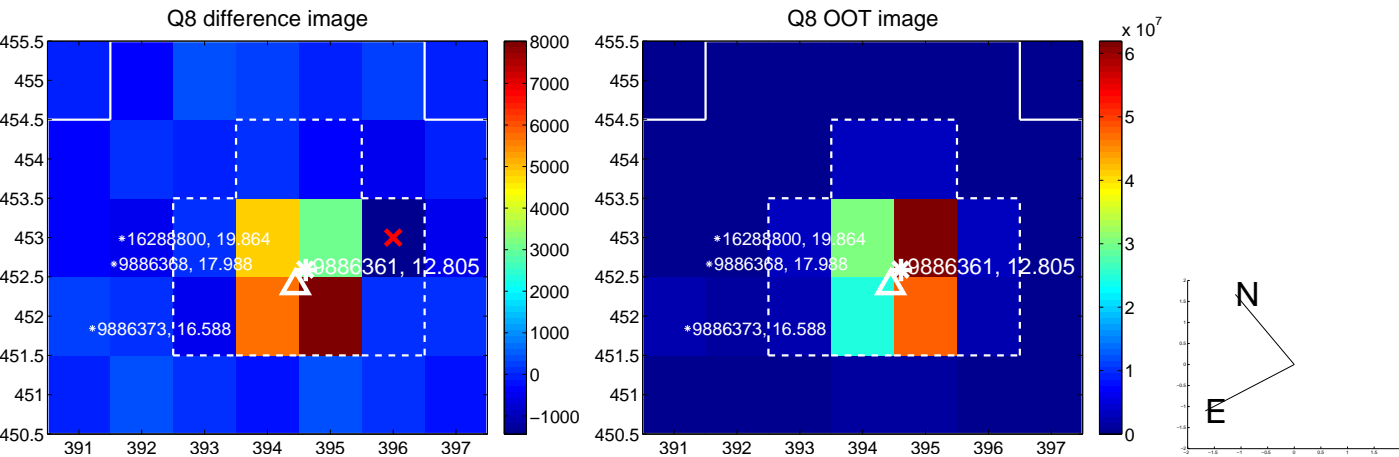
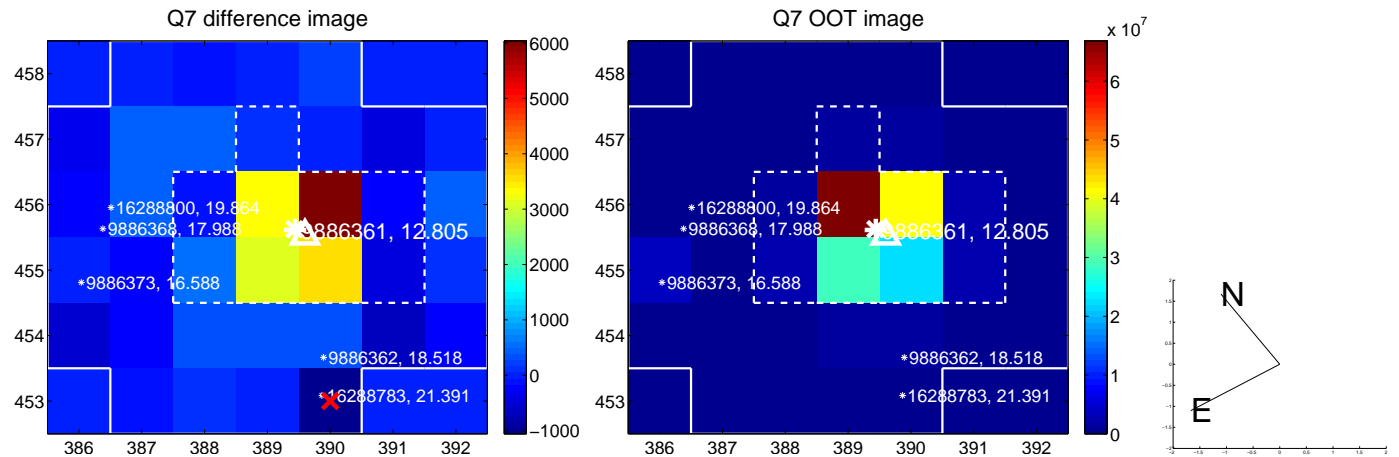
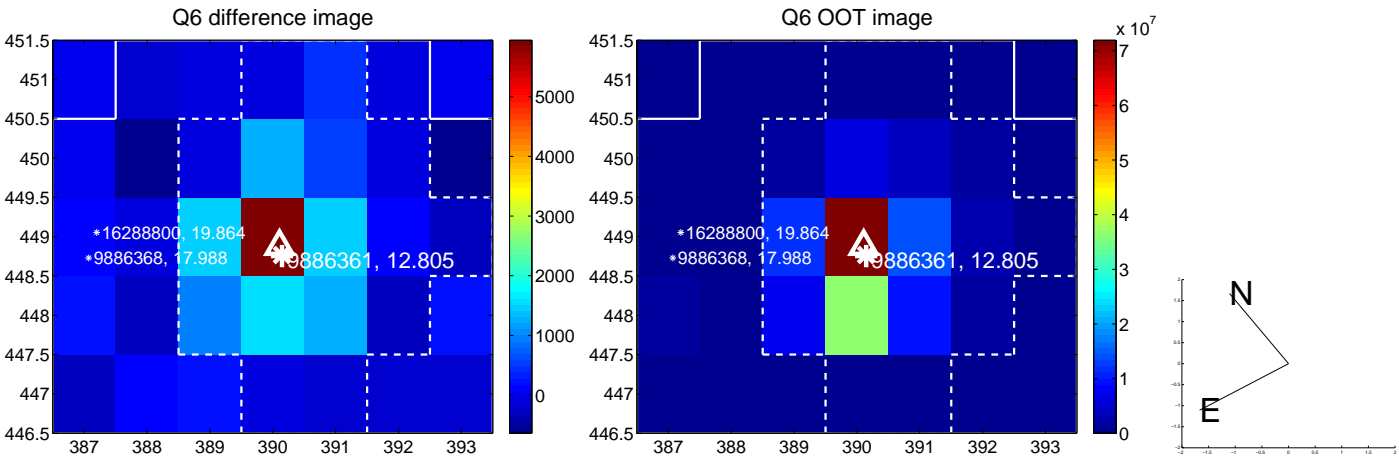
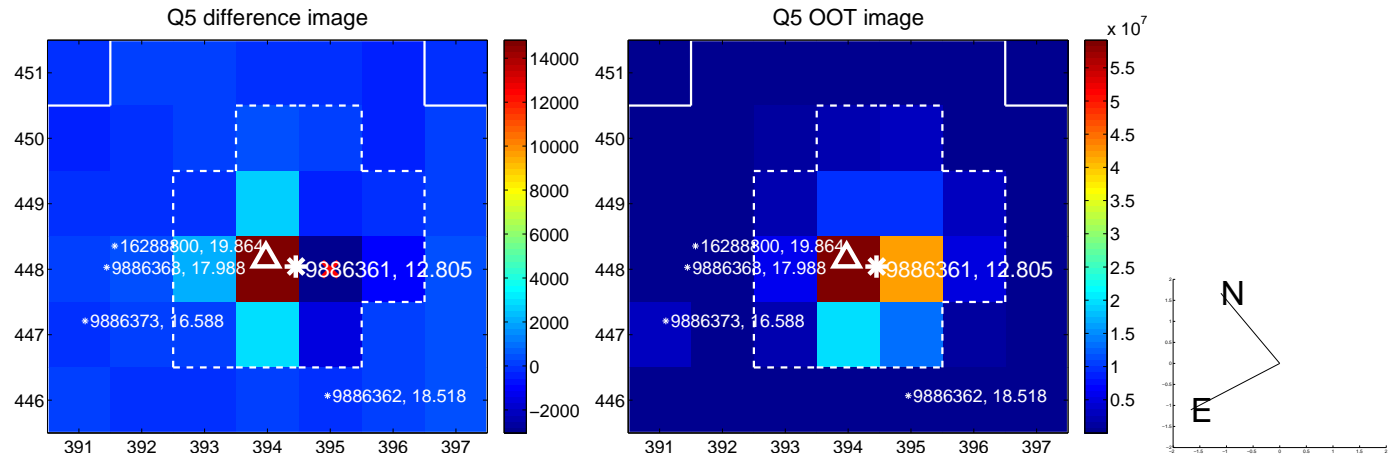


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

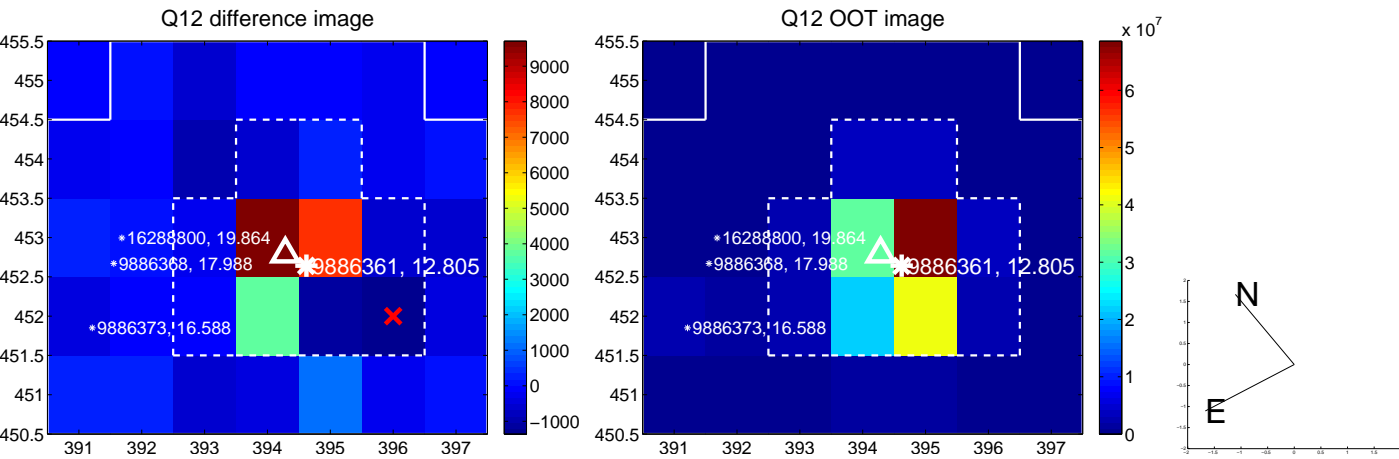
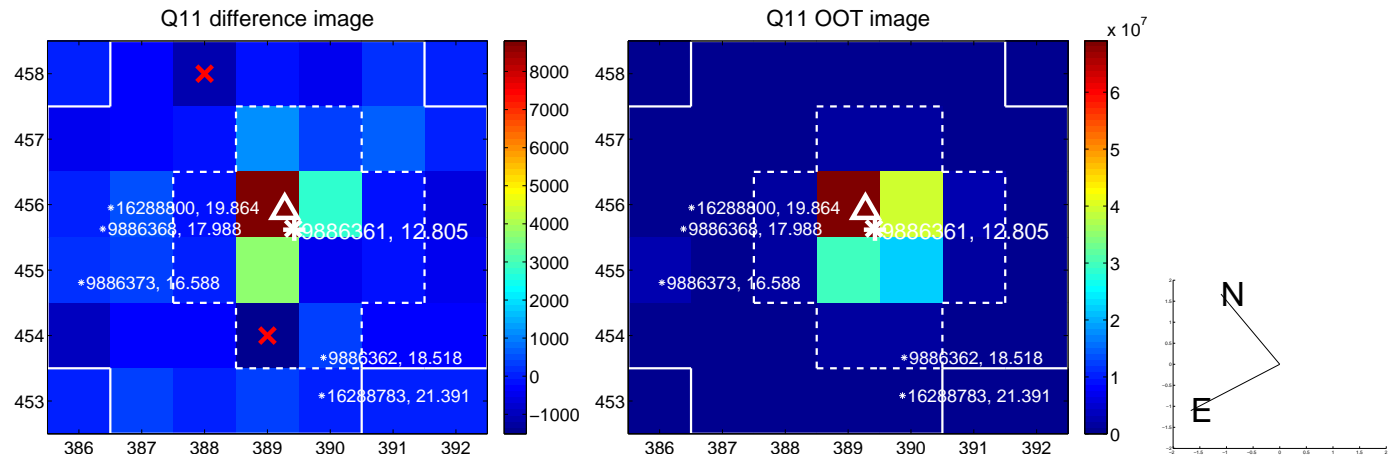
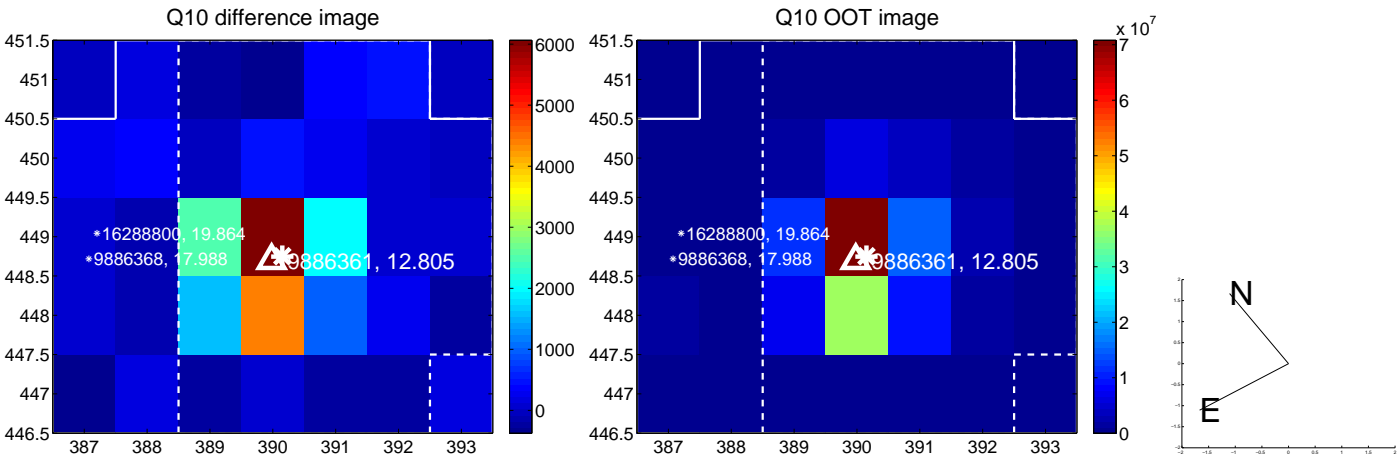
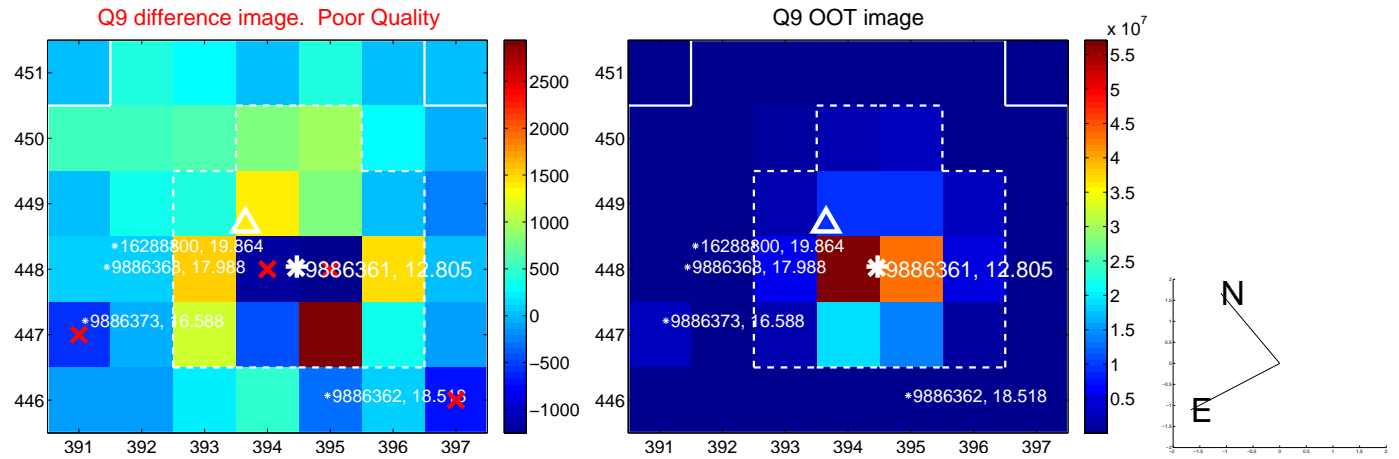
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



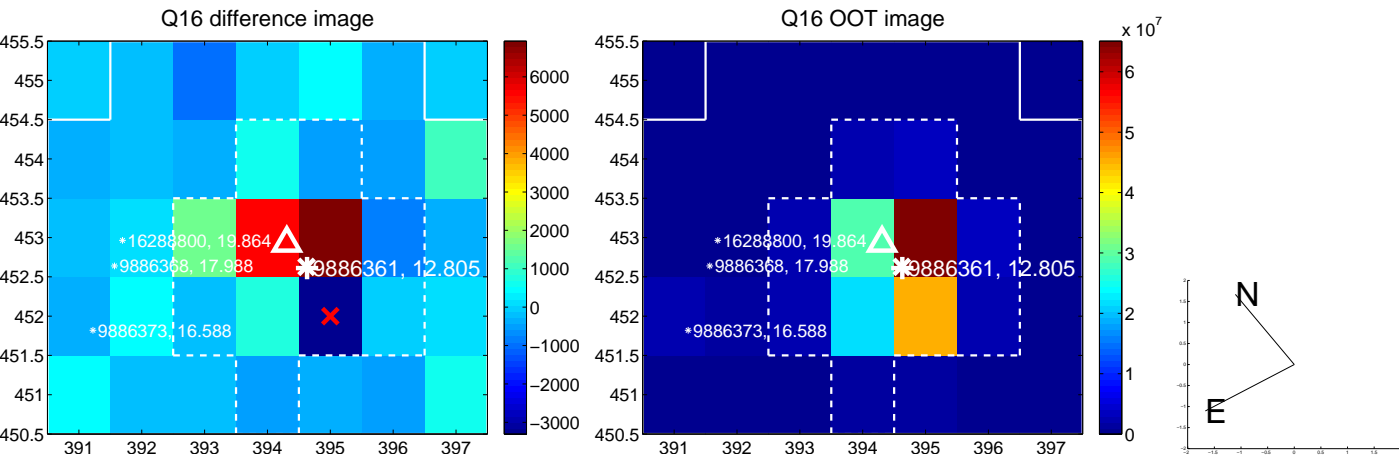
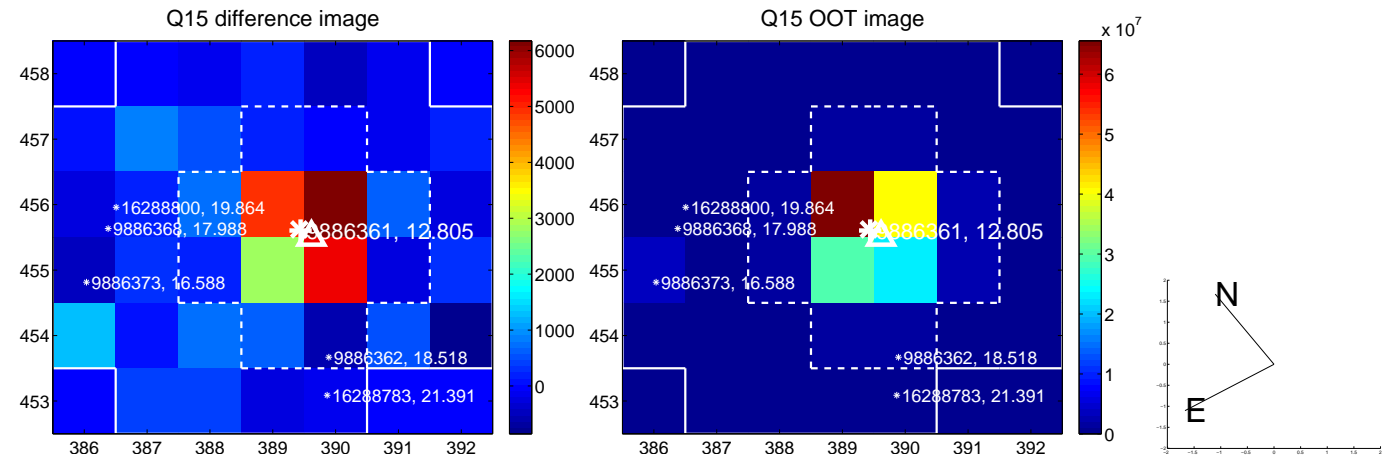
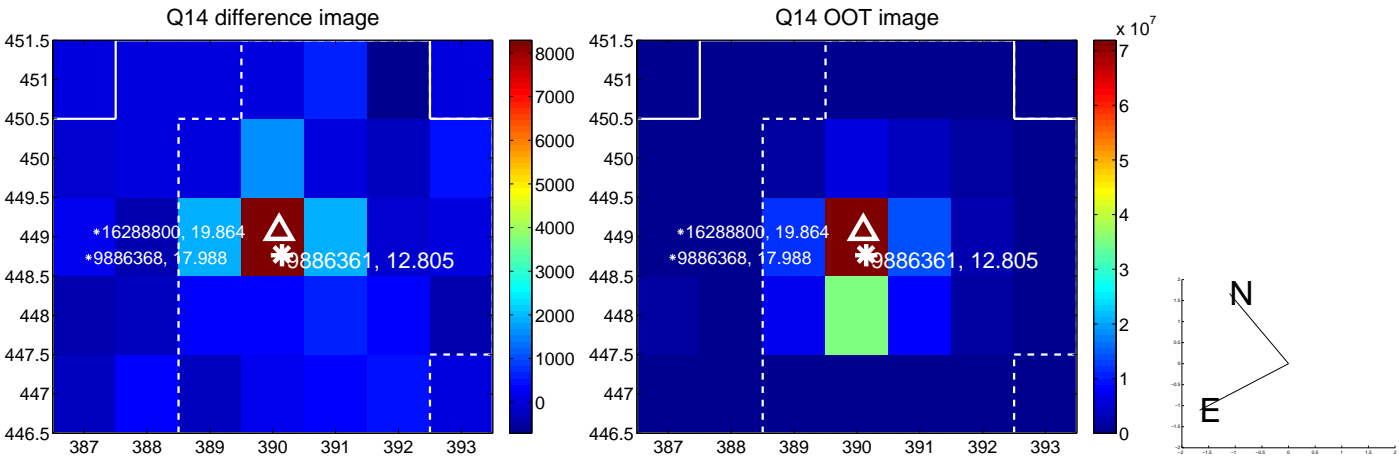
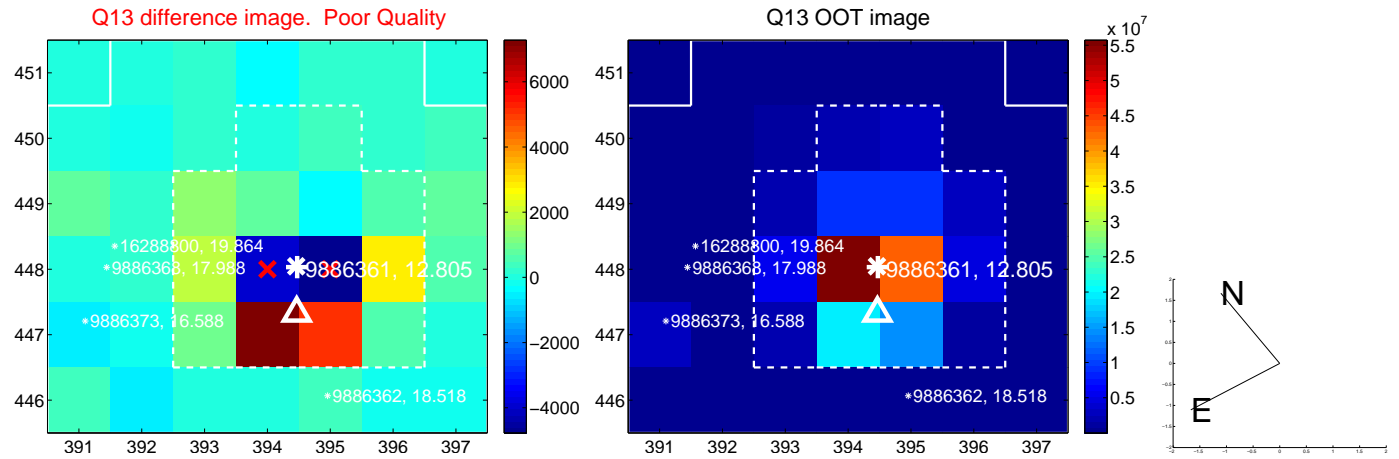
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



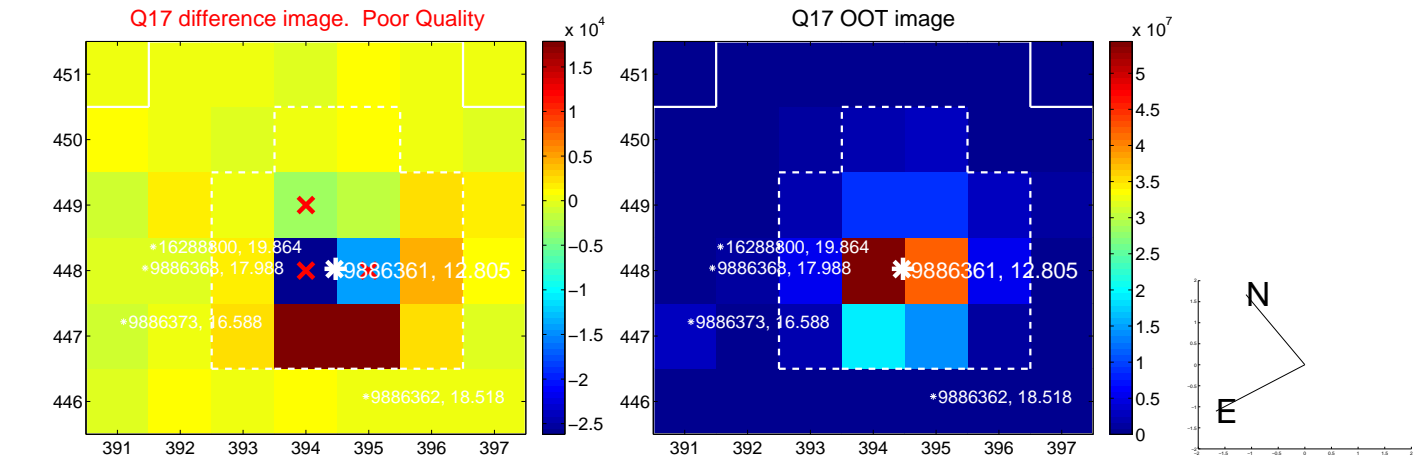
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



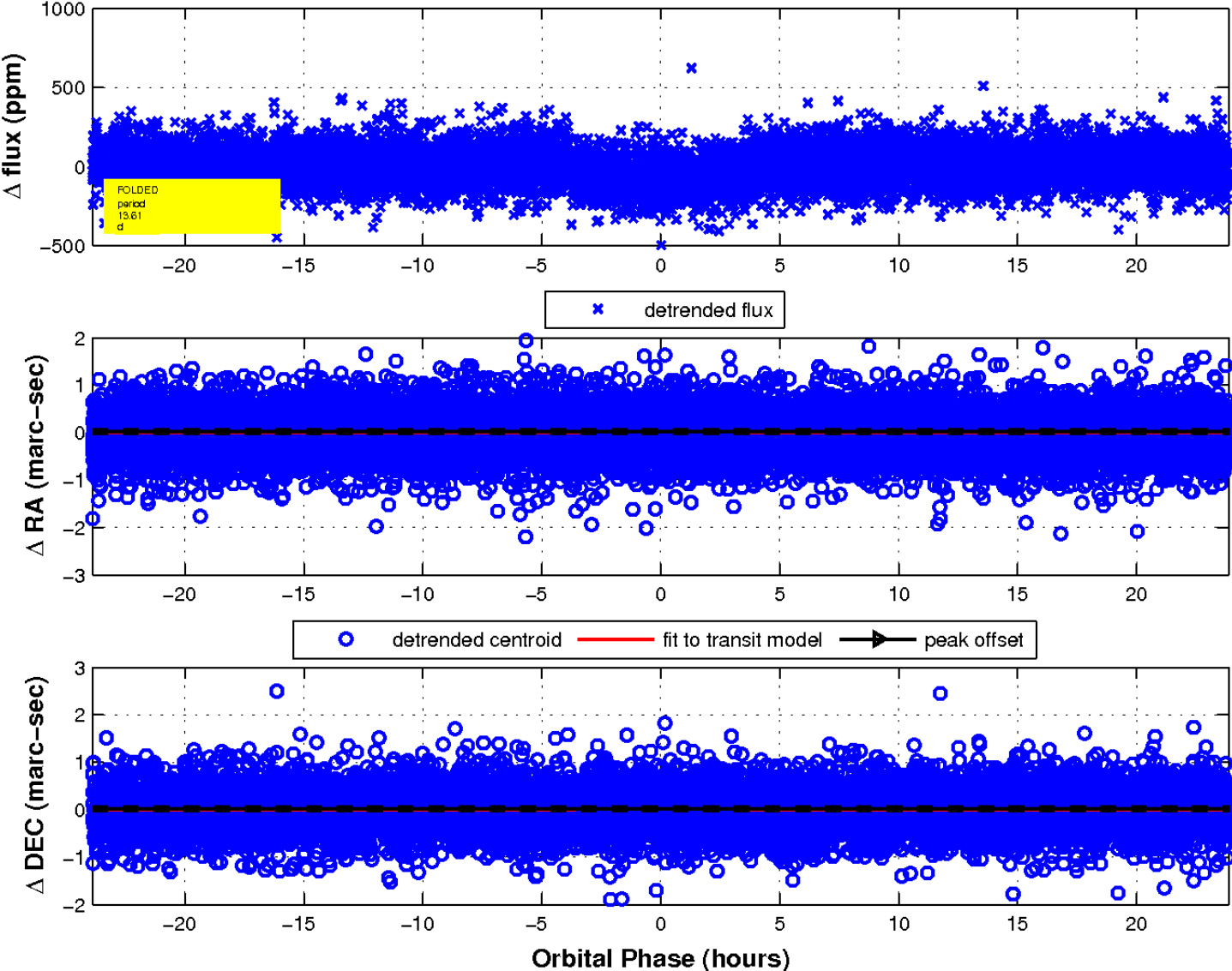
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

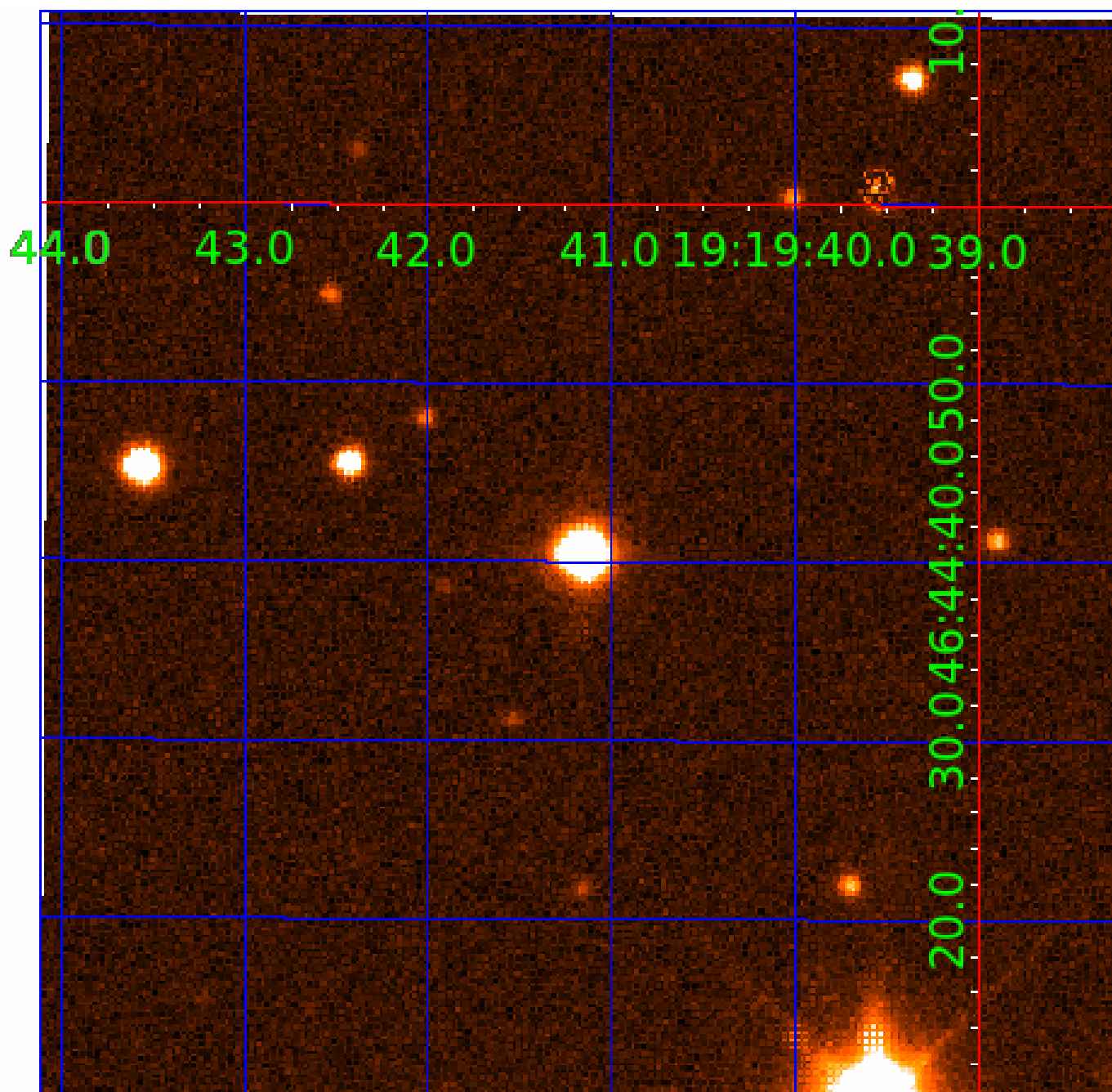


fluxWeightedCentroids, Planet 2 of 4



UKIRT Image

Declination



KIC 009886361

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})
009886361-01	OBS	2732.01	7.031500	134.449034	84.0	6.435	24.5	25.5	1.50	6170	1.74	480.66
009886361-02	OBS	2732.02	13.611663	144.168227	96.2	7.963	19.5	22.3	1.50	6170	1.72	199.23
009886361-03	OBS	2732.03	54.280928	140.721106	151.3	5.491	14.7	15.6	1.50	6170	2.17	31.50
009886361-04	OBS	2732.04	49.121275	146.797058	60.5	8.653	8.3	8.2	1.50	6170	1.28	35.99

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009886361-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
009886361-02	OBS	PC	0.95	0	0	0	0	NO_COMMENT
009886361-03	OBS	PC	0.99	0	0	0	0	NO_COMMENT
009886361-04	OBS	PC	0.85	0	0	0	0	NO_COMMENT

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

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

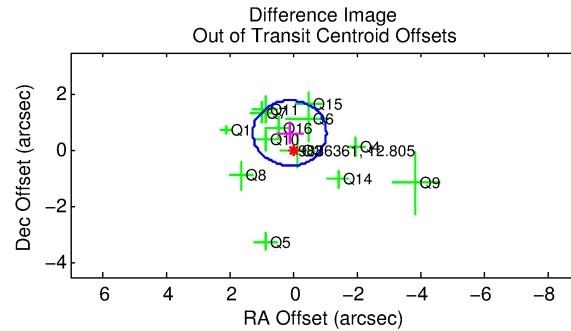
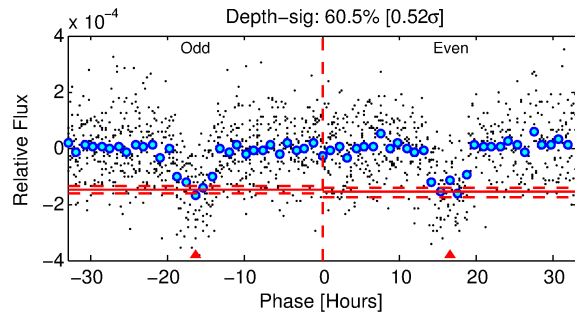
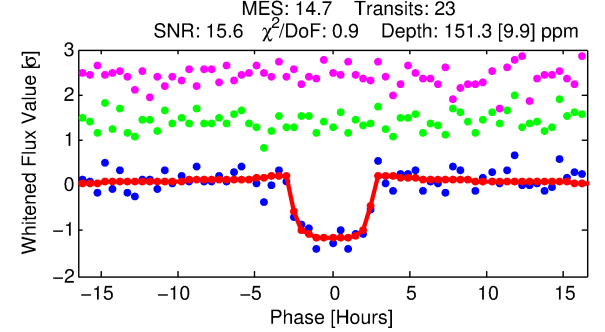
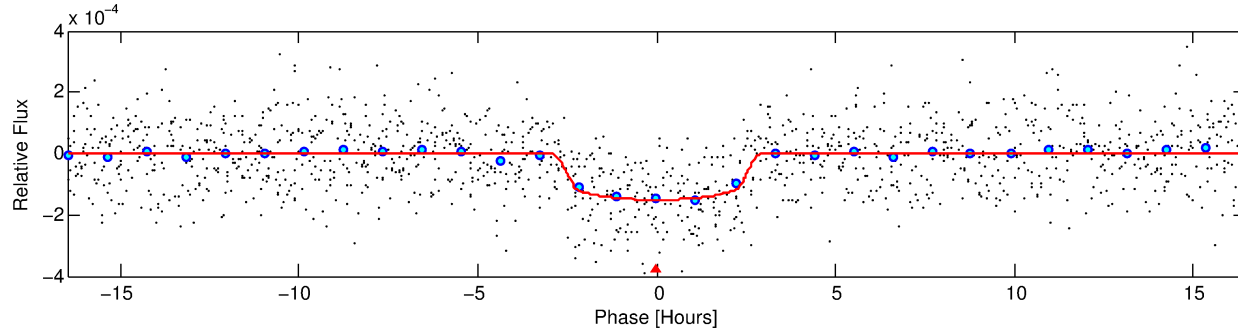
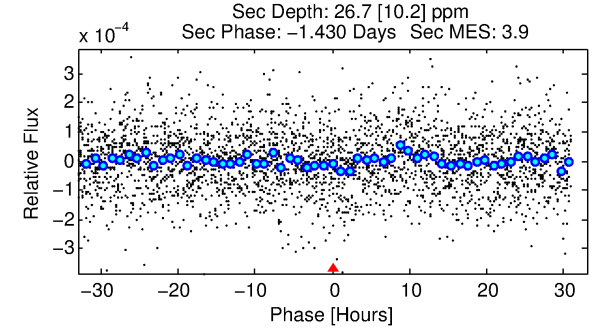
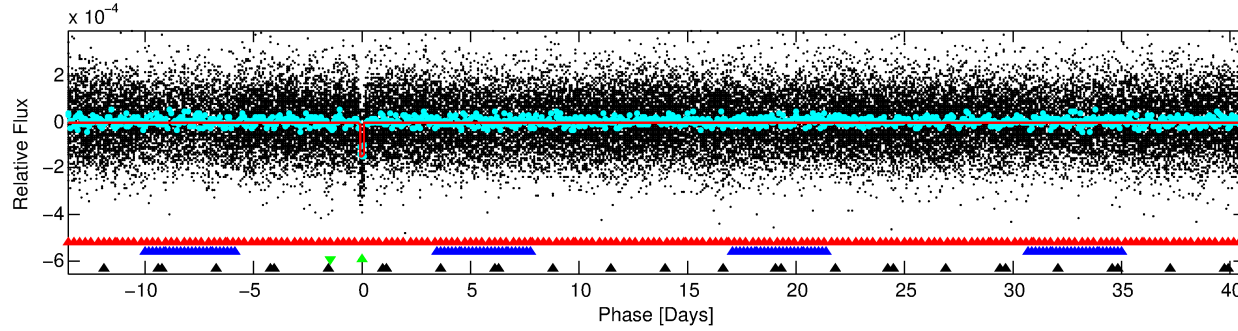
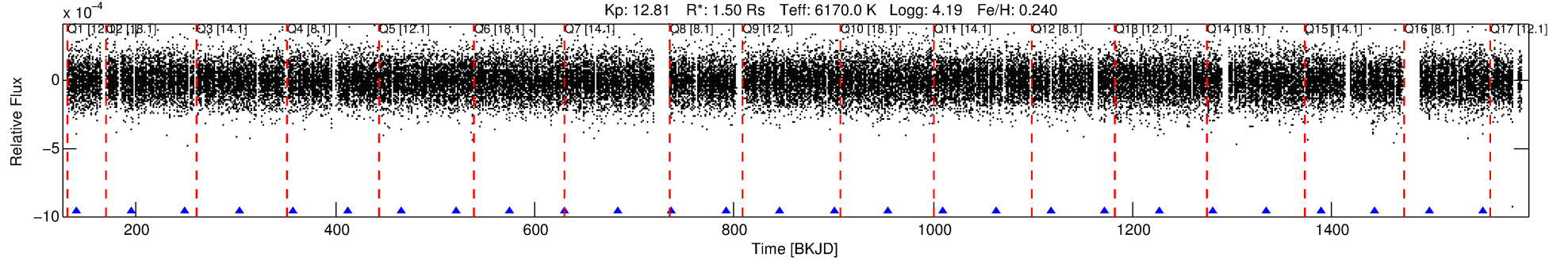
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009886361-03

No Significant Match Found

DV One-Page Summary

KIC: 9886361 Candidate: 3 of 4 Period: 54.281 d
KOI: K02732.03 Name: Kepler-403c Corr: 0.978



DV Fit Results:

Period = 54.28093 [0.00039] d
Epoch = 140.7211 [0.0058] BKJD
Rp/R* = 0.0132 [0.0024]
a/R* = 35.85 [32.80]
b = 0.90 [0.21]
Seff = 31.50 [8.13]
Teq = 604 [39] K
Rp = 2.17 [0.56] Re
a = 0.3043 [0.0488] AU
Ag = 290.47 [168.73] [1.72σ]
Teffp = 3856 [516] K [6.29σ]

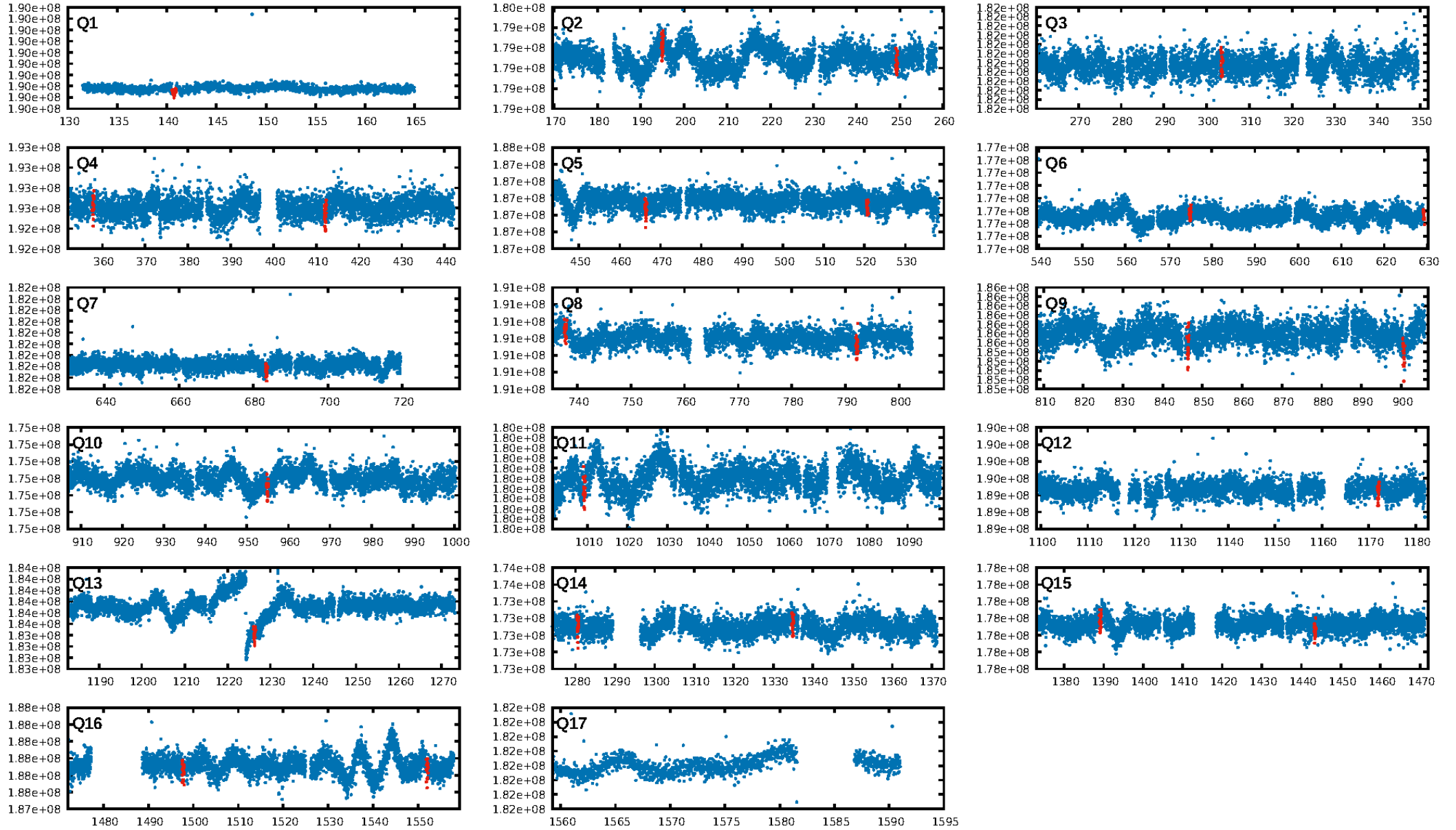
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [12.08σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 59.3%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 4.29e-43
RollingBand-fgt: 1.00 [22/22]
GhostDiagnostic-chr: 5.172
Centroid-sig: 0.1%
Centroid-so: 1.265 arcsec [2.09σ]
OotOffset-rm: 0.632 arcsec [1.63σ]
KicOffset-rm: 0.626 arcsec [1.75σ]
OotOffset-st: 3/4/3/3 [13]
KicOffset-st: 3/4/3/3 [13]
DiffImageQuality-fgm: 0.85 [11/13]
DiffImageOverlap-fno: 0.86 [12/14]

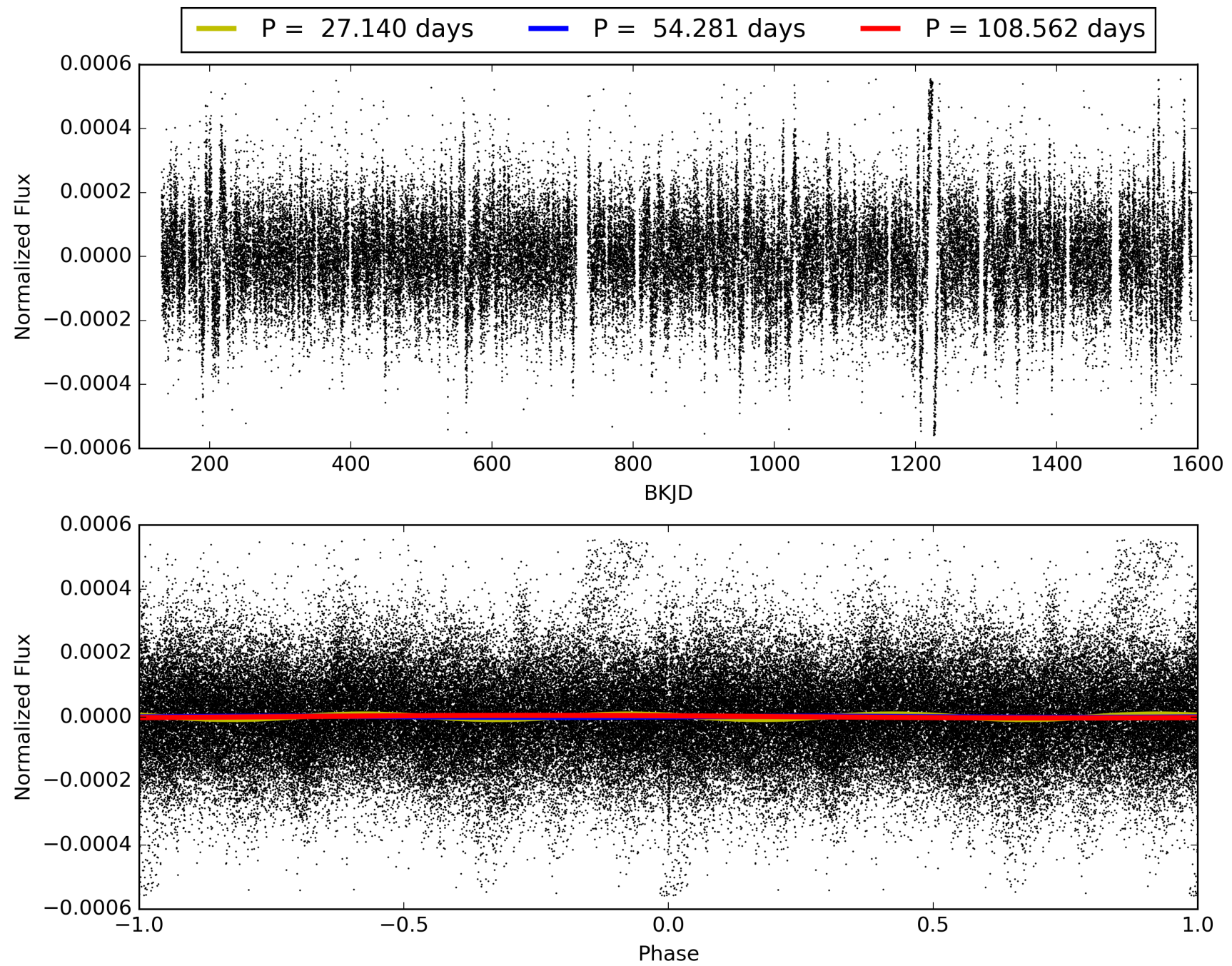
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 15:04:12 Z

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

TCE 009886361-03, PDC Light Curves

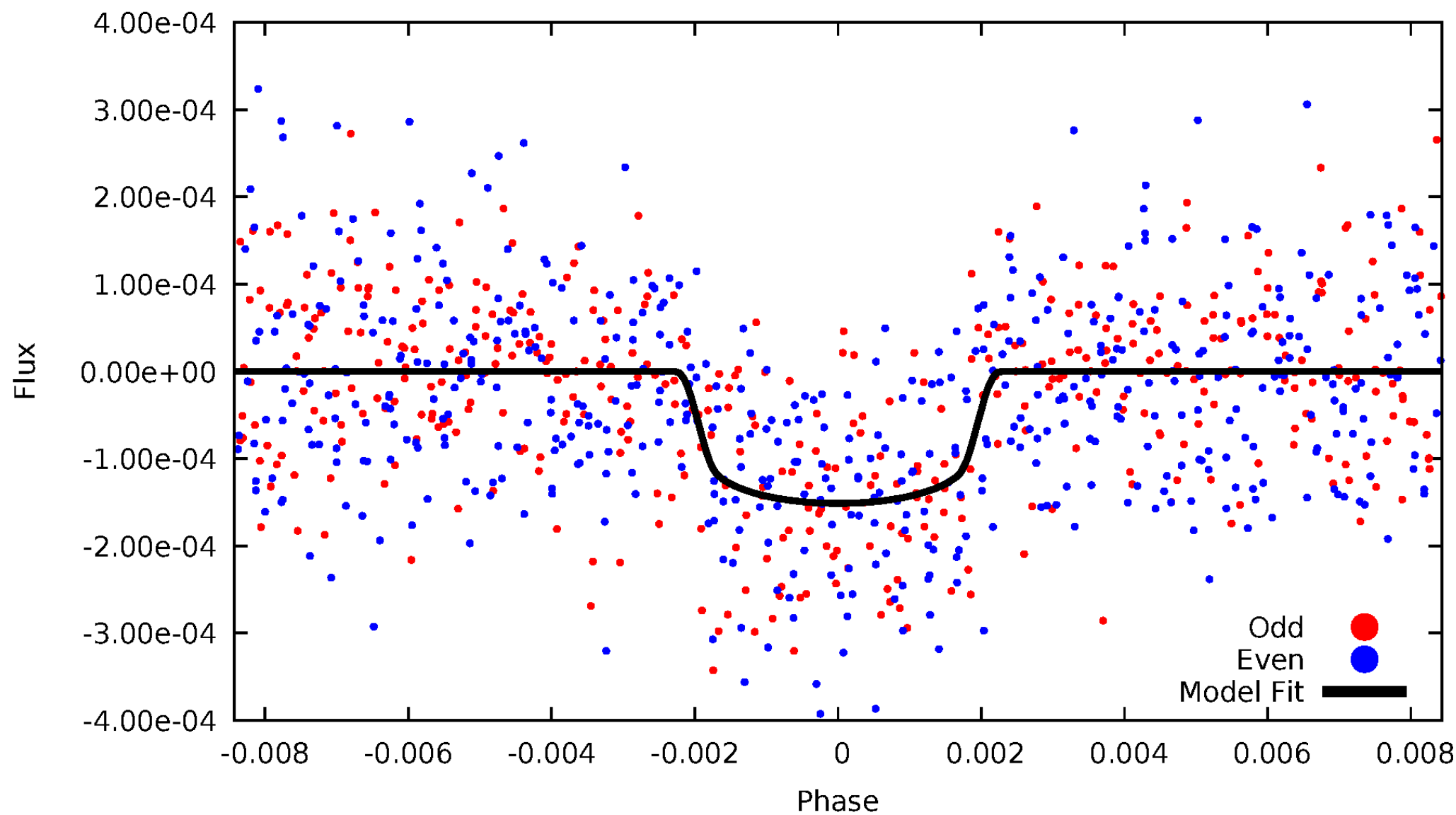


TCE 009886361-03



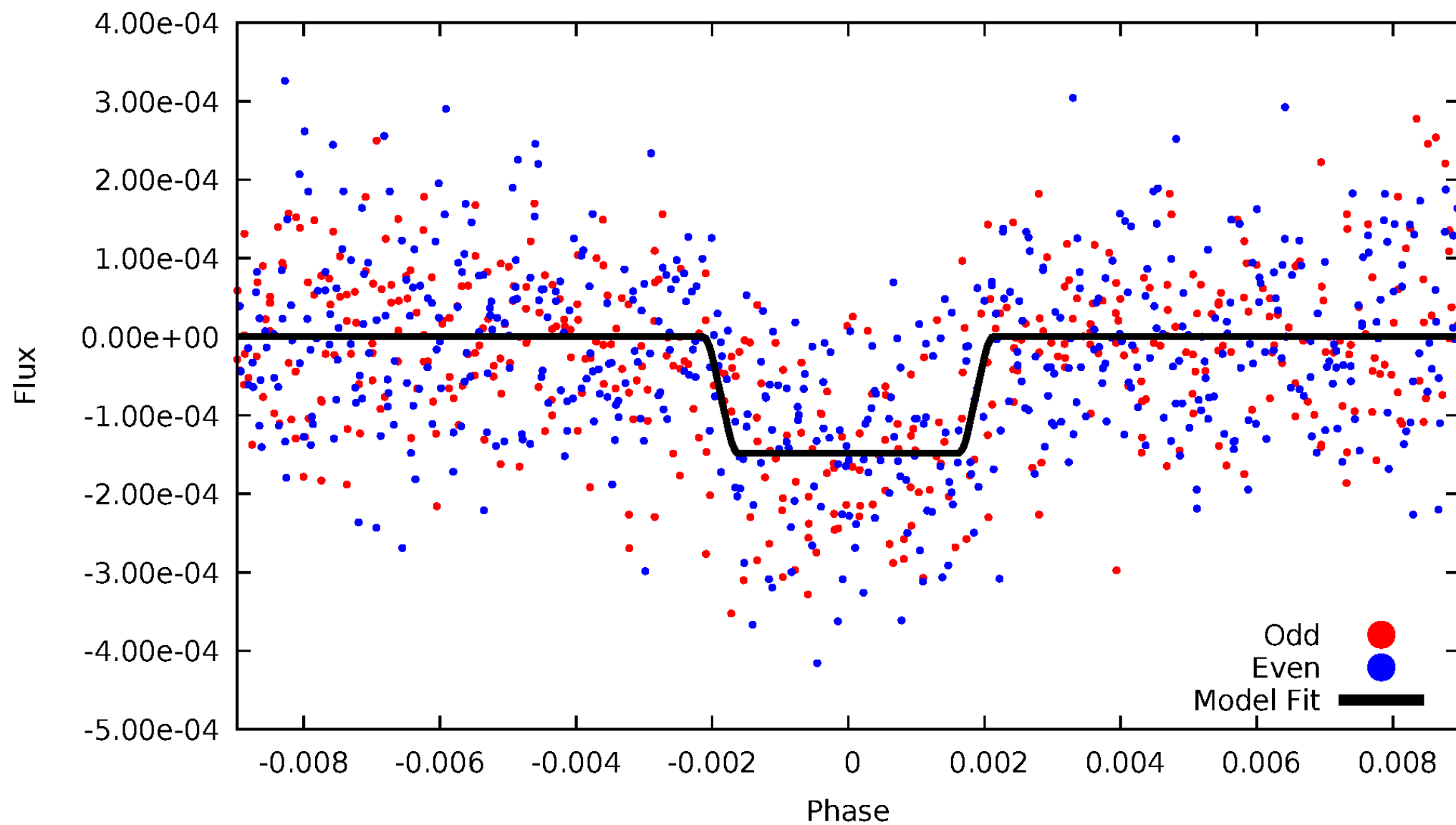
DV Odd/Even

TCE 009886361-03

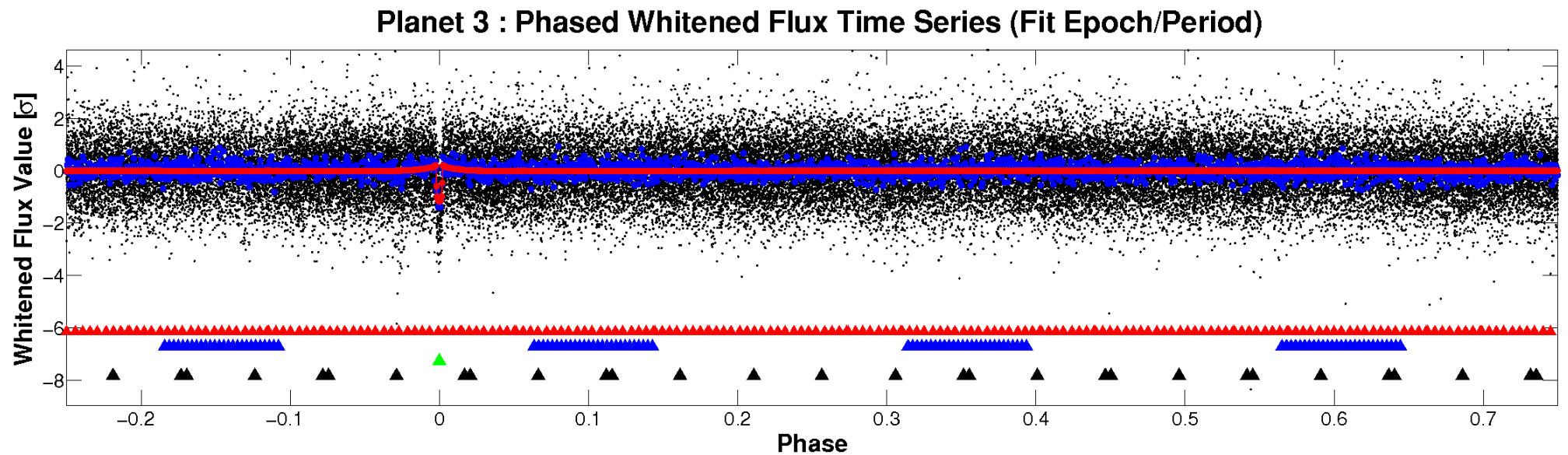
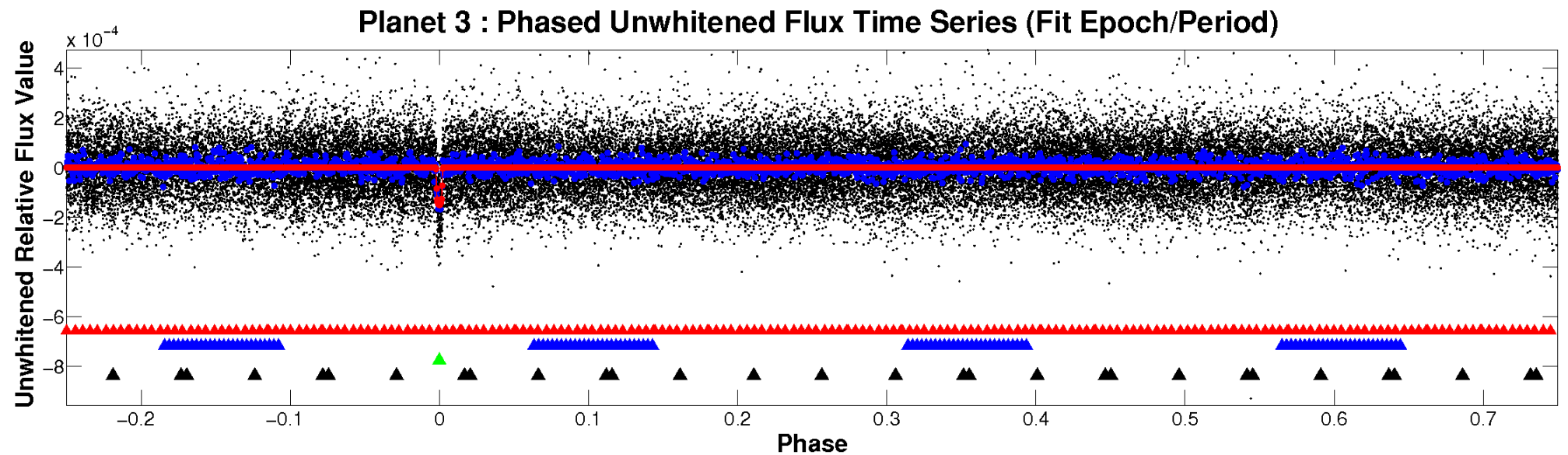


ALT Odd/Even

TCE 009886361-03

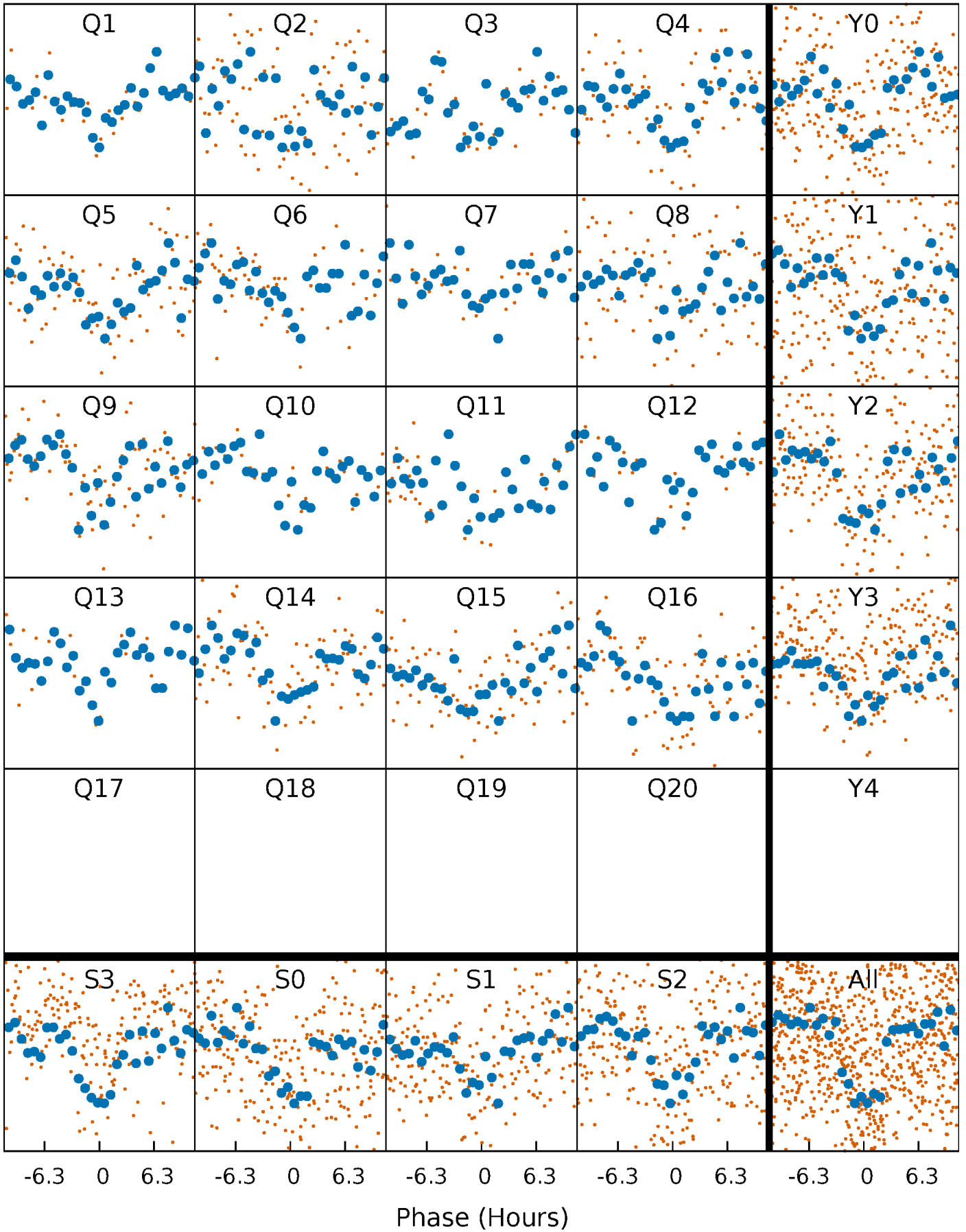


Non-Whitened Vs. Whitened Light Curve



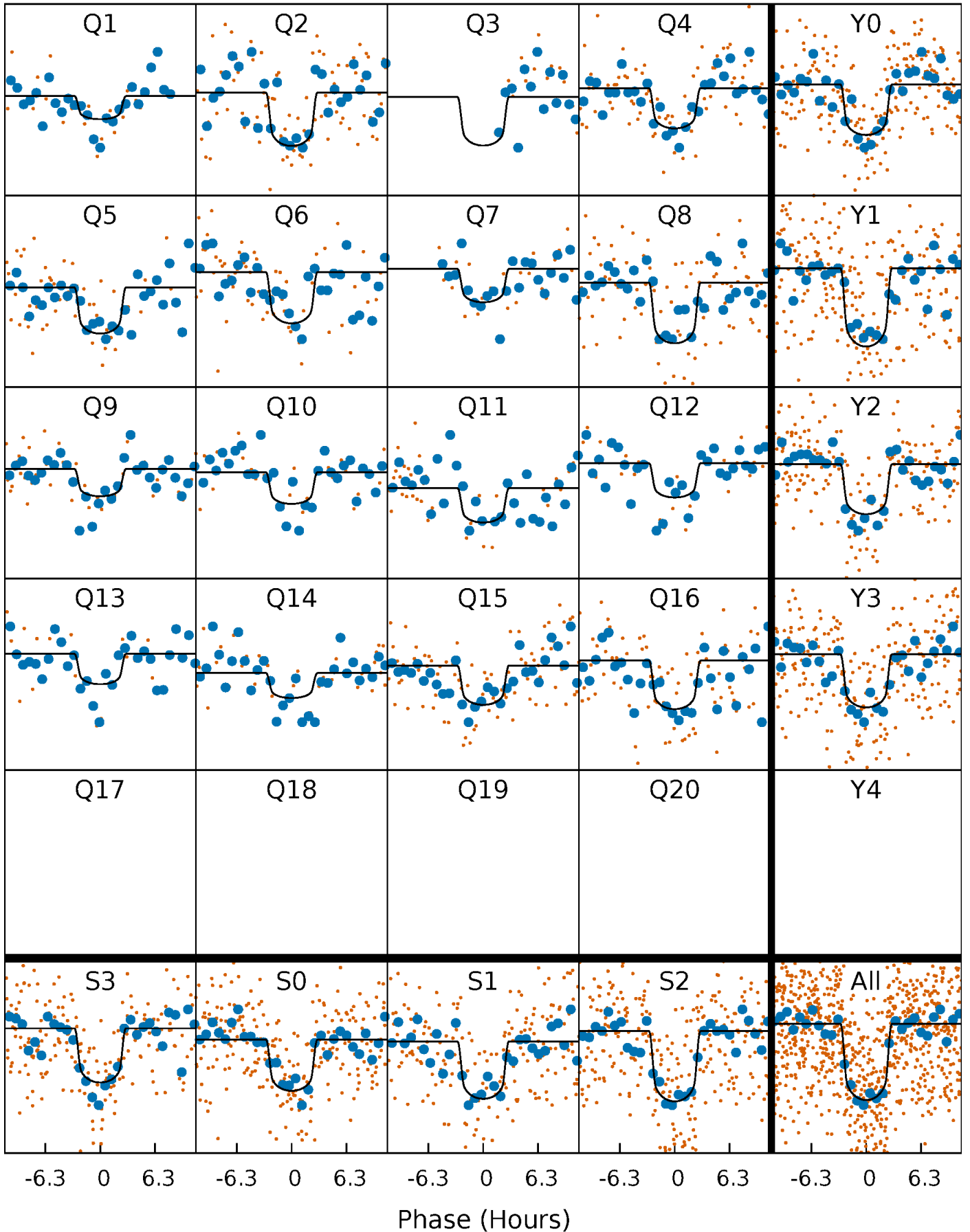
PDC Quarter-Phased Transit Curves

TCE 009886361-03 P= 54.280928 Days $T_0=140.721106$ (BKJD)



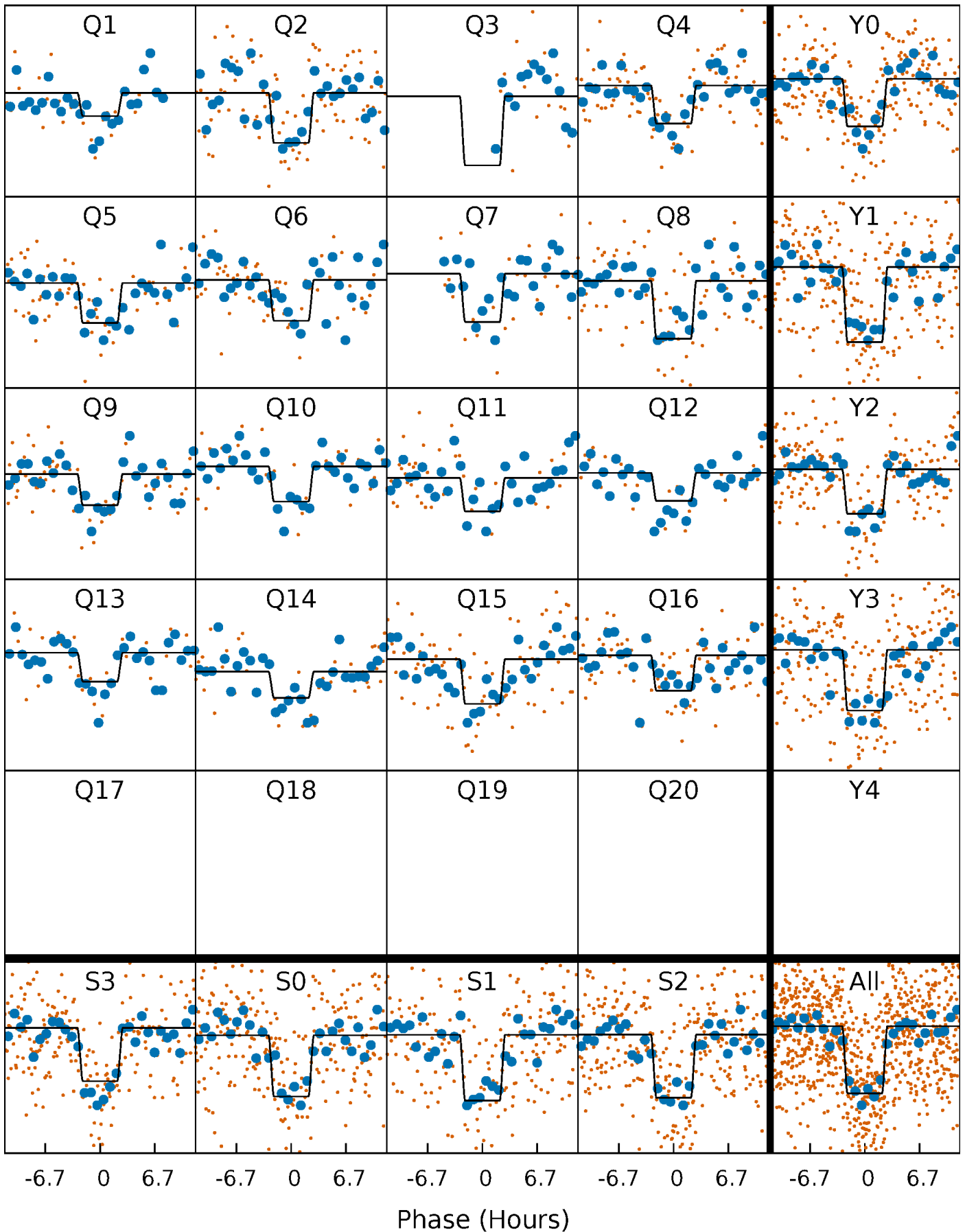
DV Quarter-Phased Transit Curves

TCE 009886361-03 P= 54.280928 Days $T_0=140.721106$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

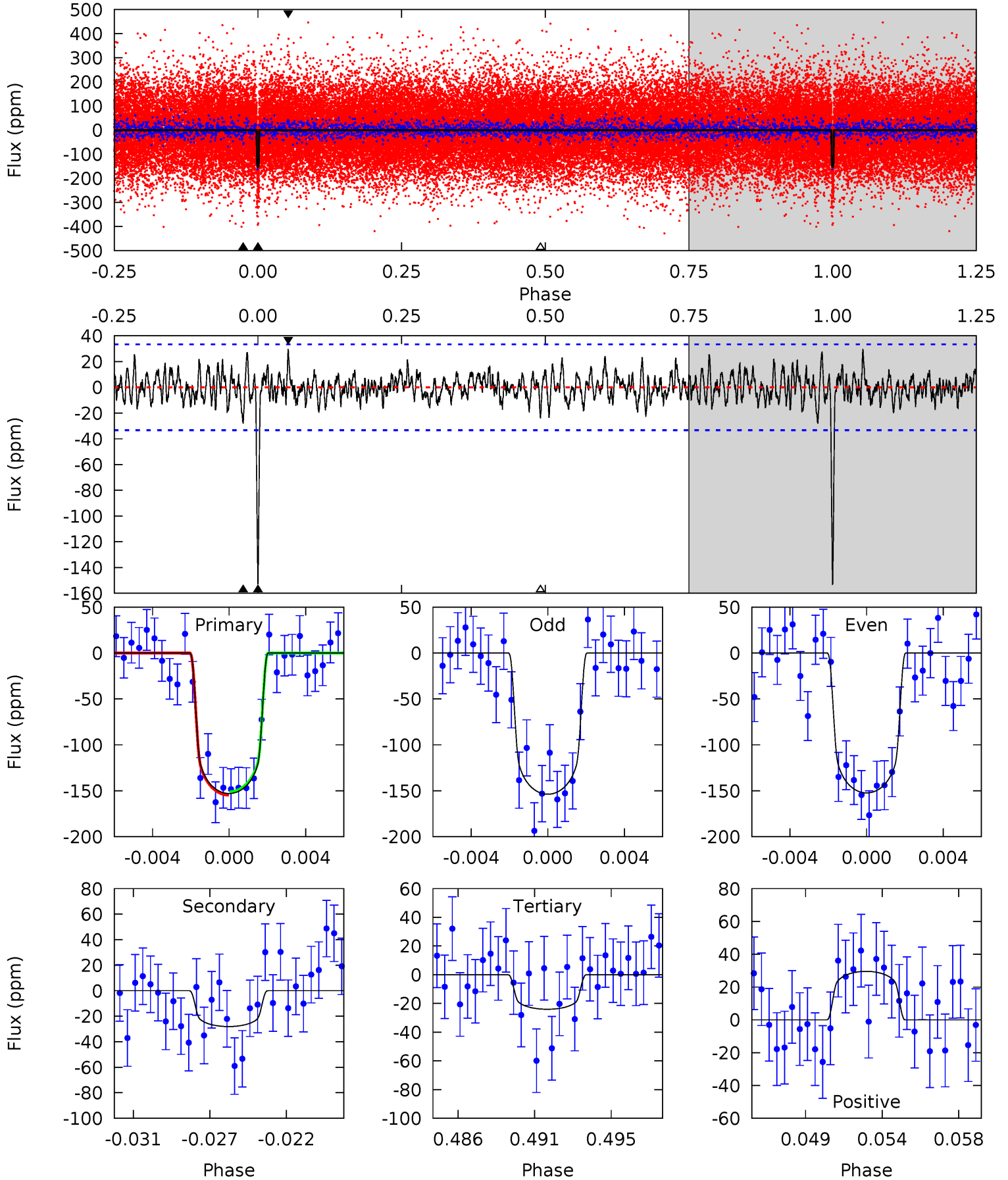
TCE 009886361-03 P= 54.279960 Days $T_0=140.732462$ (BKJD)



DV Model-Shift Uniqueness Test

009886361-03, P = 54.280928 Days, E = 86.440178 Days

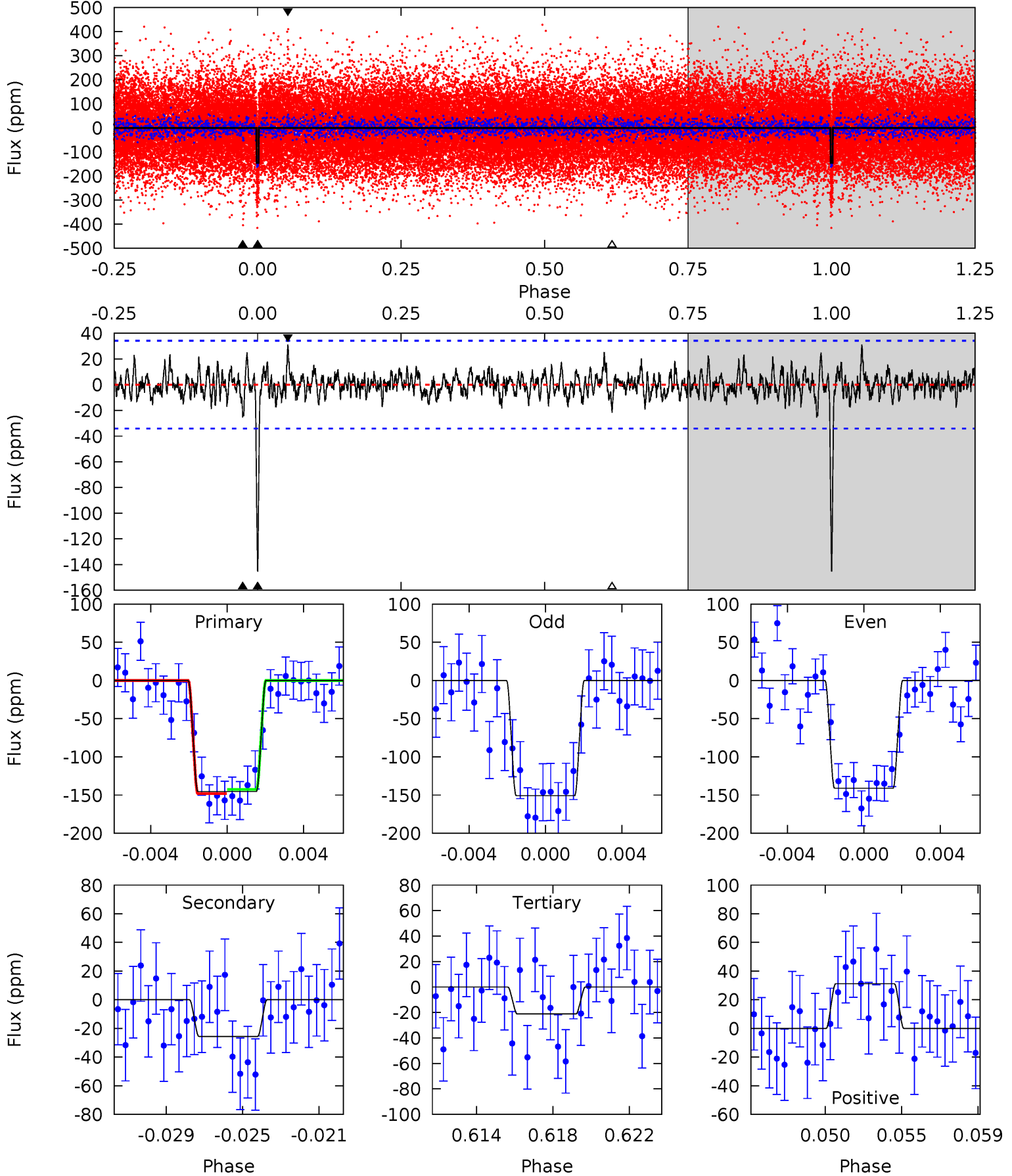
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
23.7	4.36	3.73	4.59	5.18	2.84	1.28	20.0	19.1	0.63	-0.23	0.11	1.02	0.16	0.28



Alt Model-Shift Uniqueness Test

009886361-03, P = 54.279960 Days, E = 86.452502 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
22.1	3.89	3.21	4.73	5.19	2.86	1.10	18.9	17.3	0.68	-0.85	0.74	1.10	0.18	0.41



Stellar Parameters For KIC 009886361

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	6170^{+110}_{-135}	$4.192^{+0.137}_{-0.125}$	$0.240^{+0.150}_{-0.150}$	$1.499^{+0.272}_{-0.245}$	$1.282^{+0.091}_{-0.114}$	$0.536^{+0.318}_{-0.201}$
	+2%/-2%	+3%/-3%	+62%/-62%	+18%/-16%	+7%/-9%	+59%/-37%
Source	SPE59	SPE59	SPE59	DSEP		

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

Secondary Eclipse Parameters for KIC 009886361-03 / KOI 2732.03

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-28 ± 6	$2.15^{+0.48}_{-0.41}$	842^{+45}_{-43}	4163^{+350}_{-309}	303^{+179}_{-119}
Alt.	-26 ± 7	$1.98^{+0.50}_{-0.39}$	841^{+43}_{-41}	4206^{+421}_{-345}	324^{+208}_{-129}

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 $A_{obs} \gg 1.0$

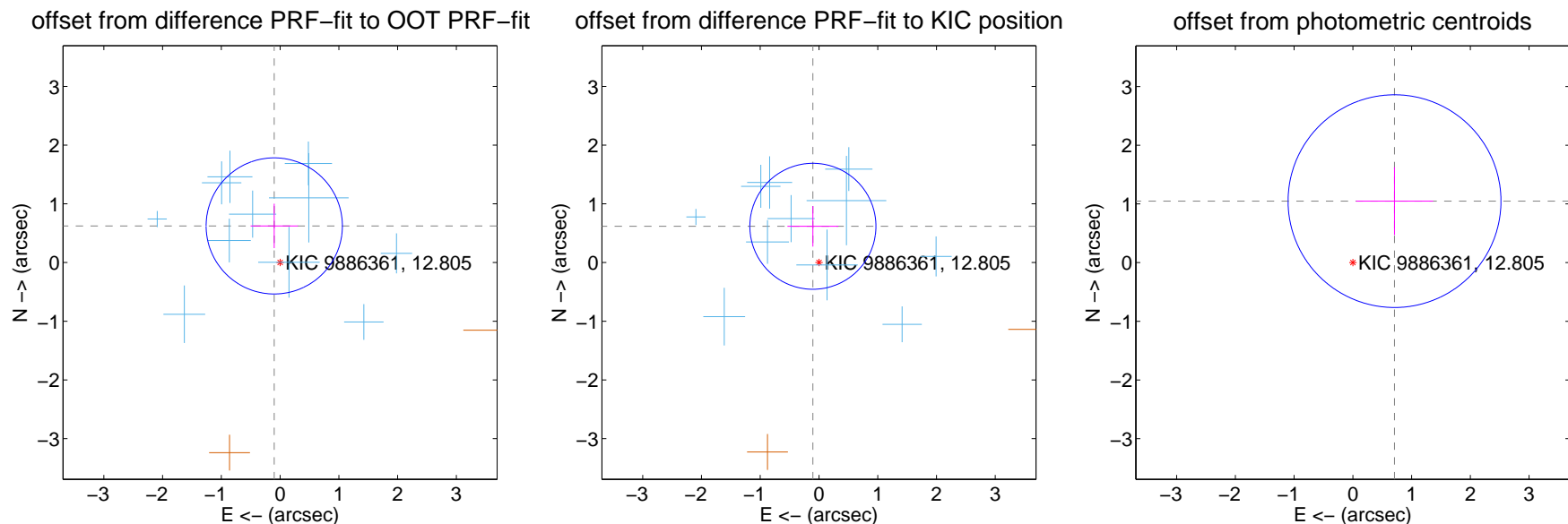
DV Centroid Data

Supplemental centroid analysis for 009886361-03. Kepler magnitude: 12.80. Transit SNR 15.57

There are 11 quarters with good PRF difference image offsets

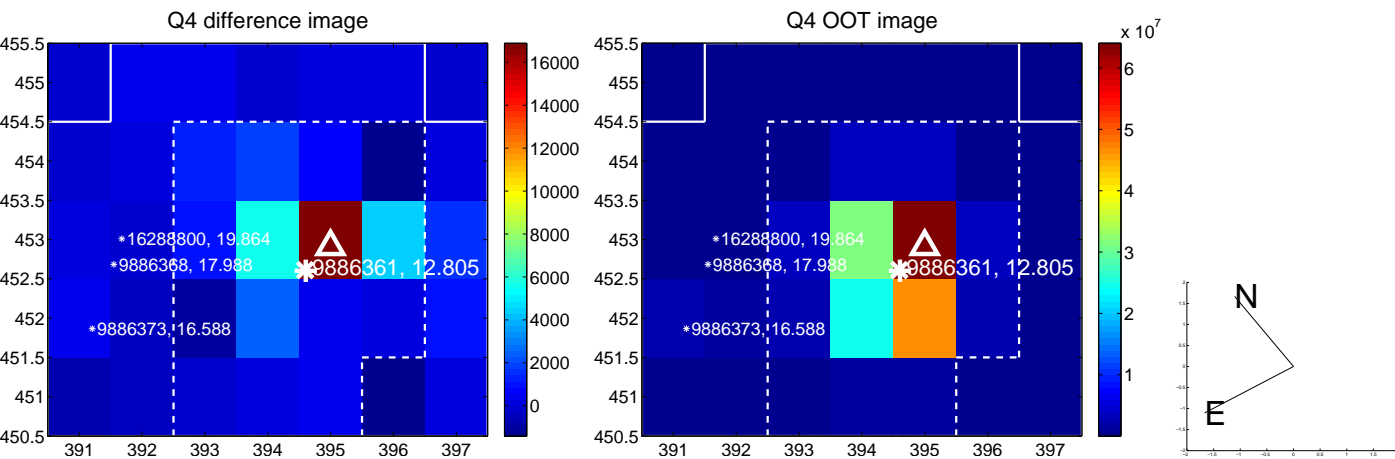
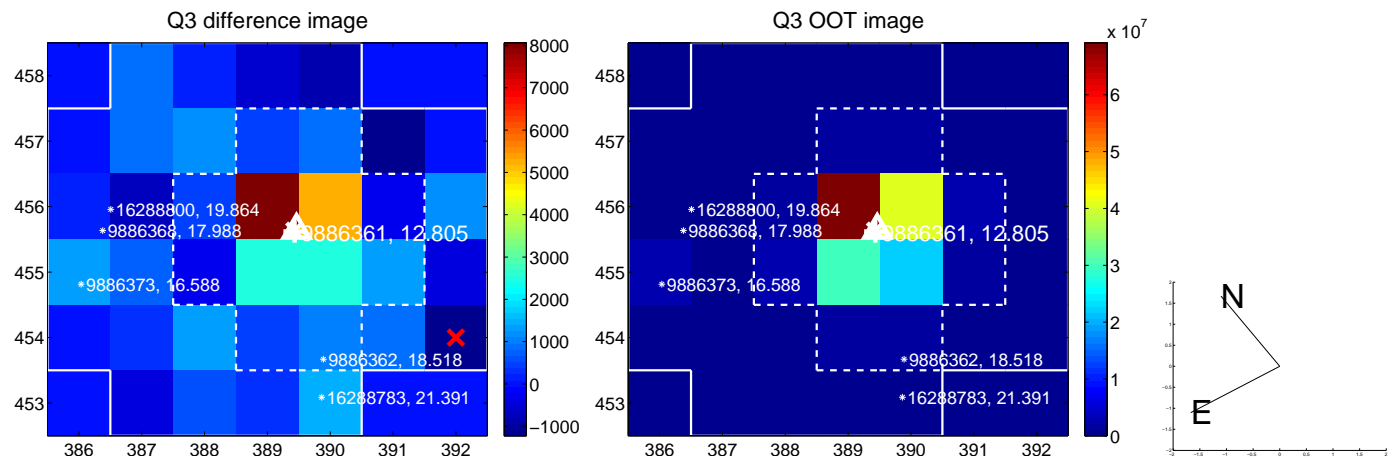
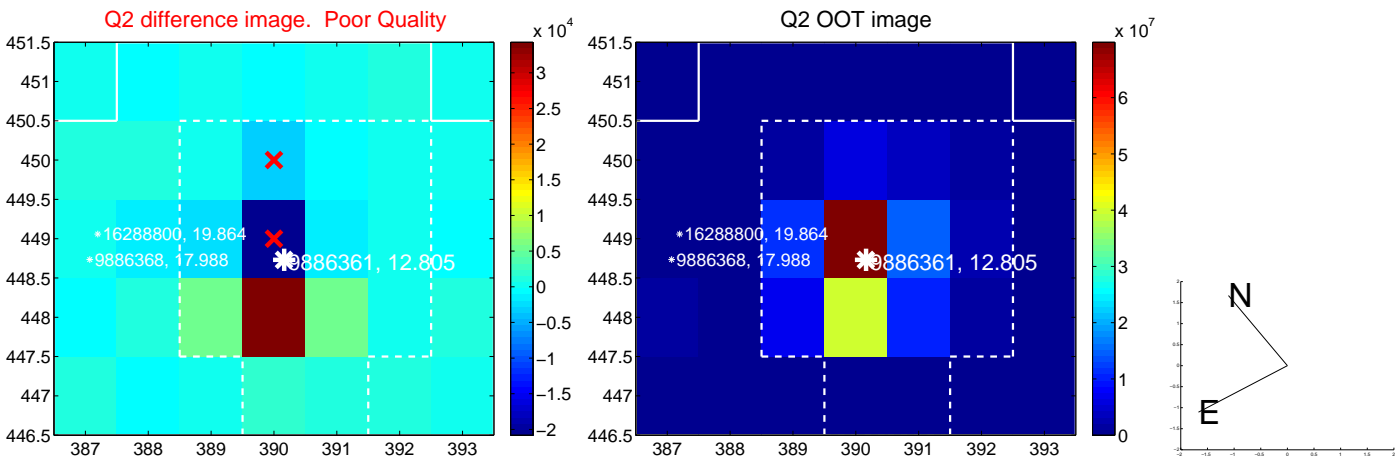
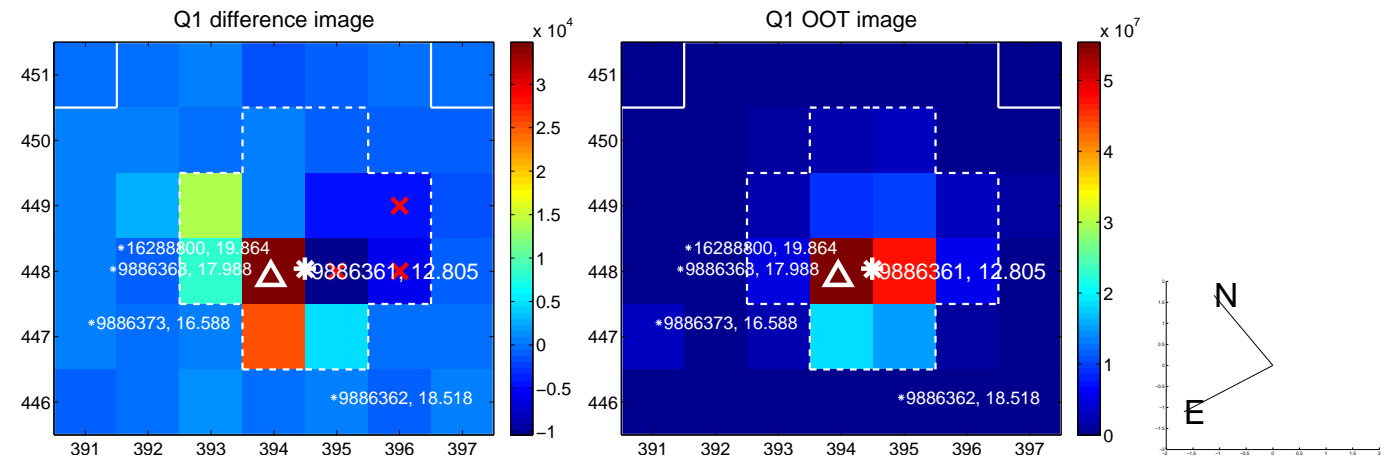
The direct PRF centroid is offset from the target star catalog position by about 0.08 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.632 ± 0.387	1.63	0.100 ± 0.402	0.624 ± 0.378
PRF-fit source offset from KIC position	0.626 ± 0.358	1.75	0.104 ± 0.433	0.618 ± 0.345
photometric centroid source offset	1.27 ± 0.60	2.09	-0.71 ± 0.66	1.05 ± 0.58

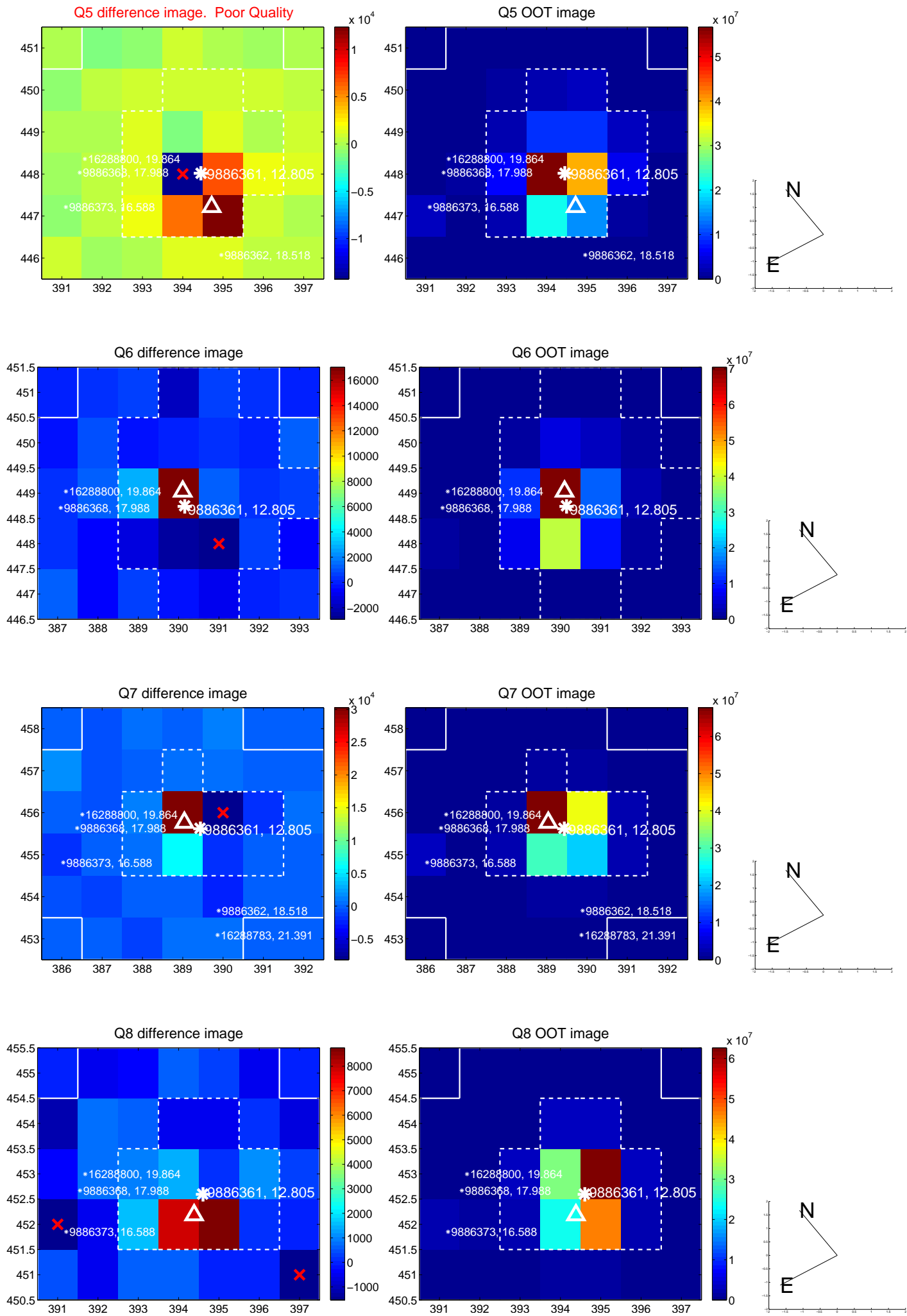


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets**; **Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

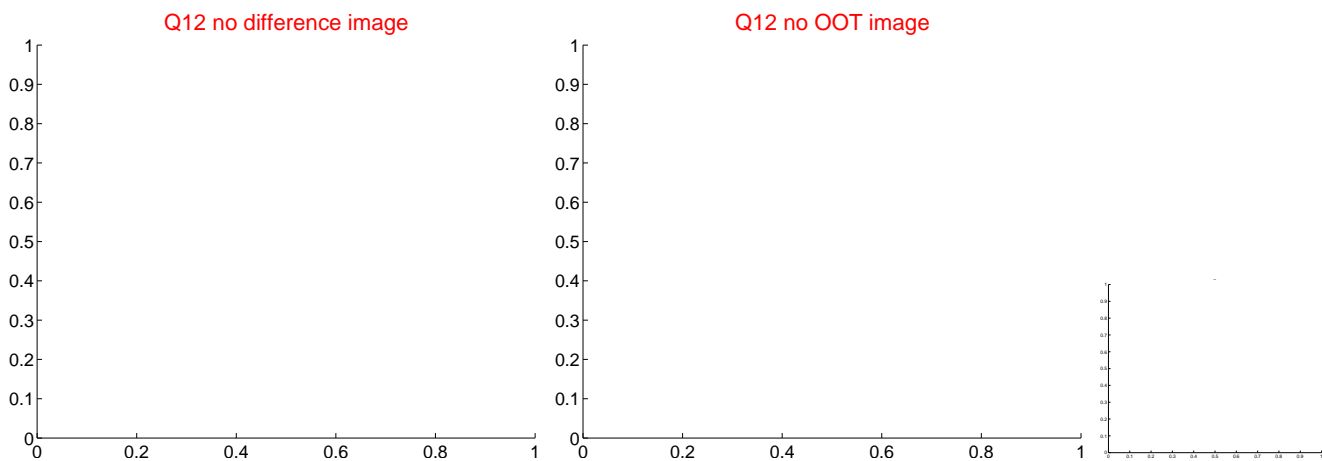
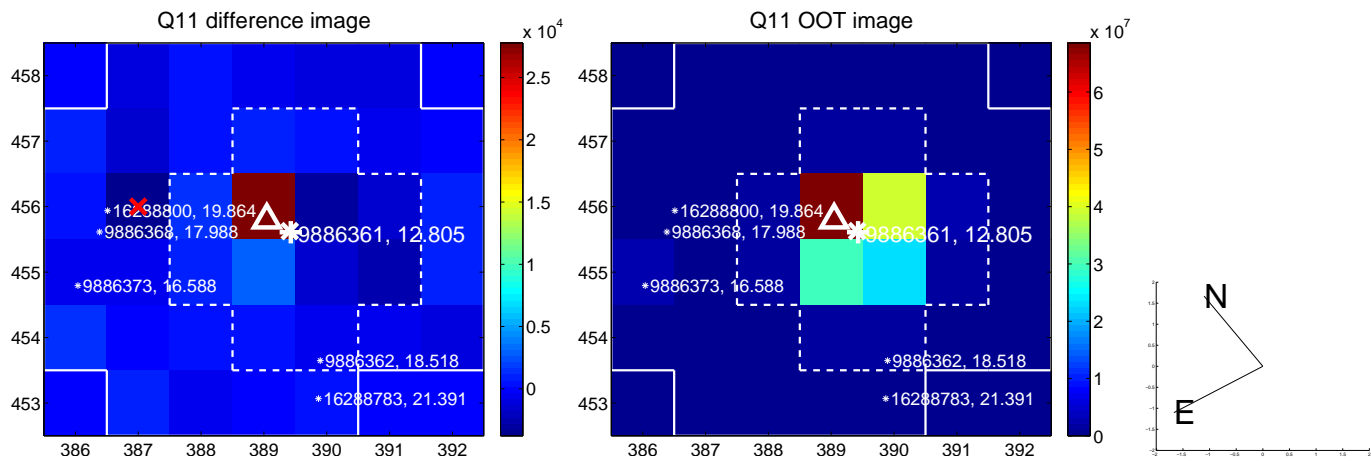
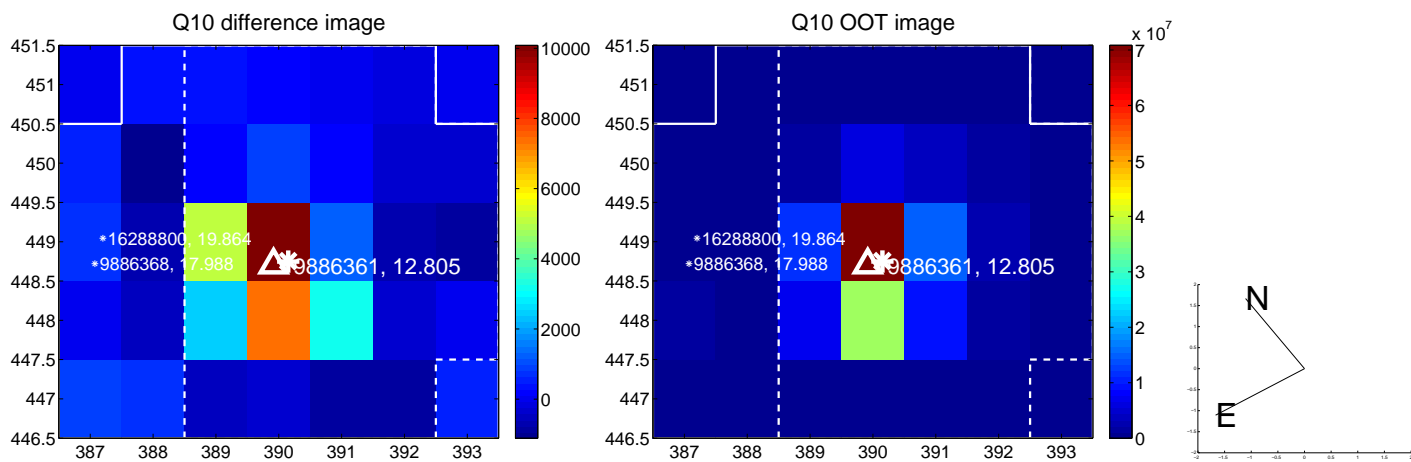
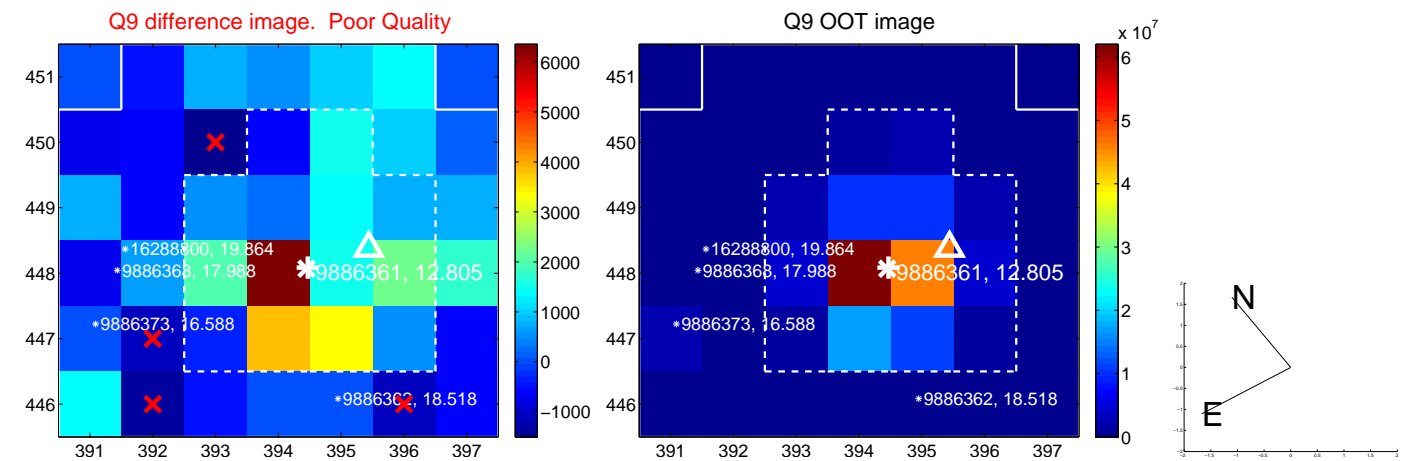
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



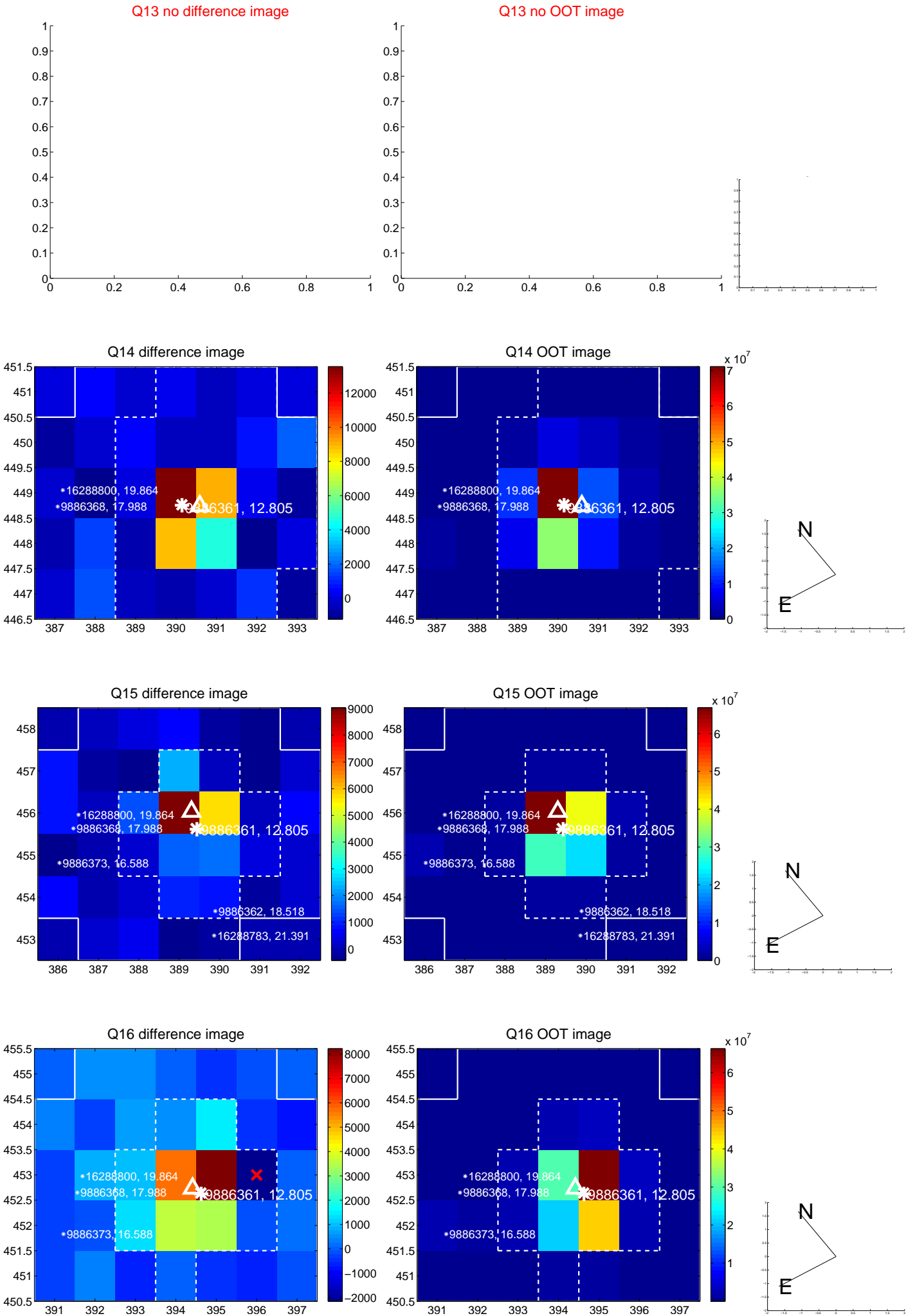
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



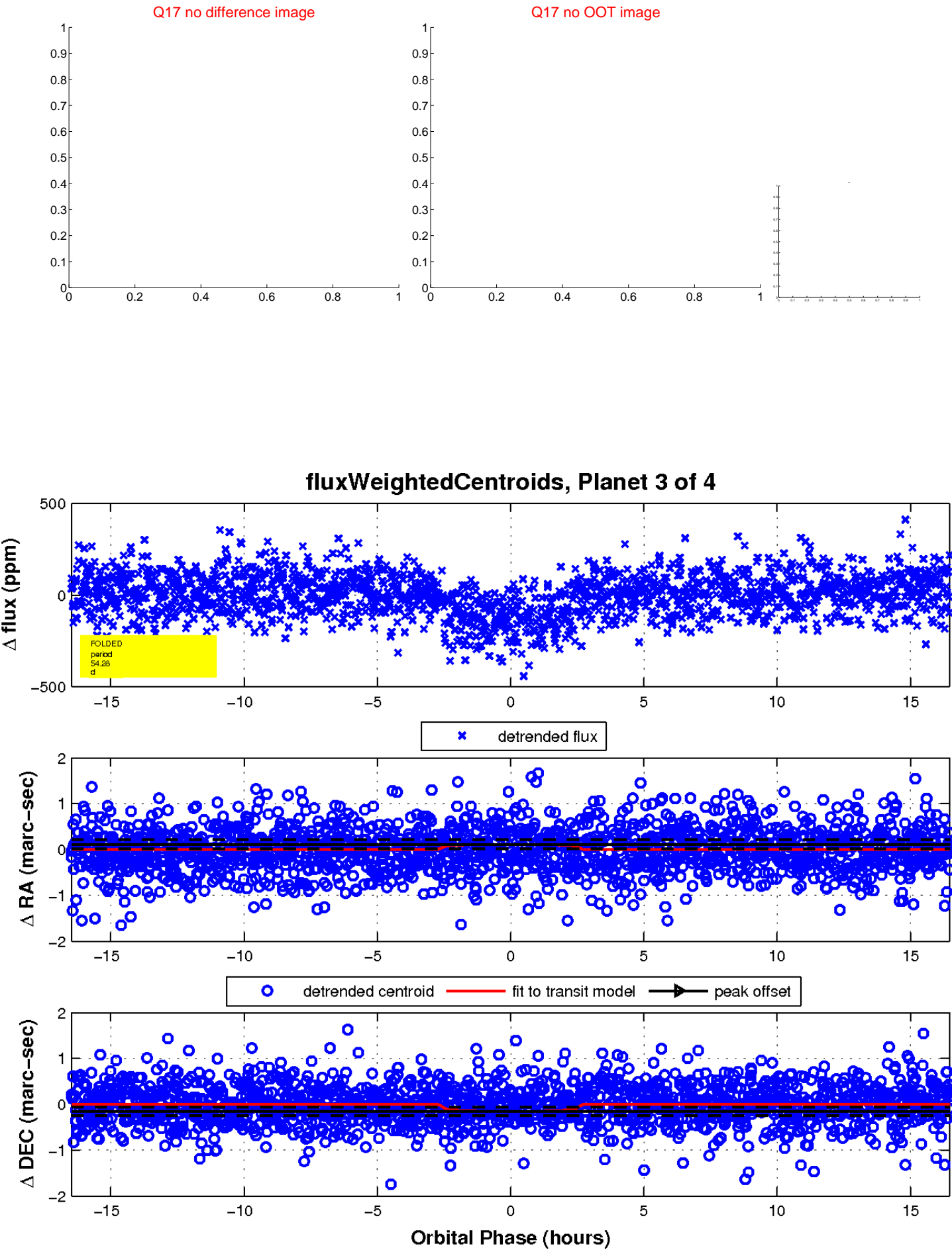
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

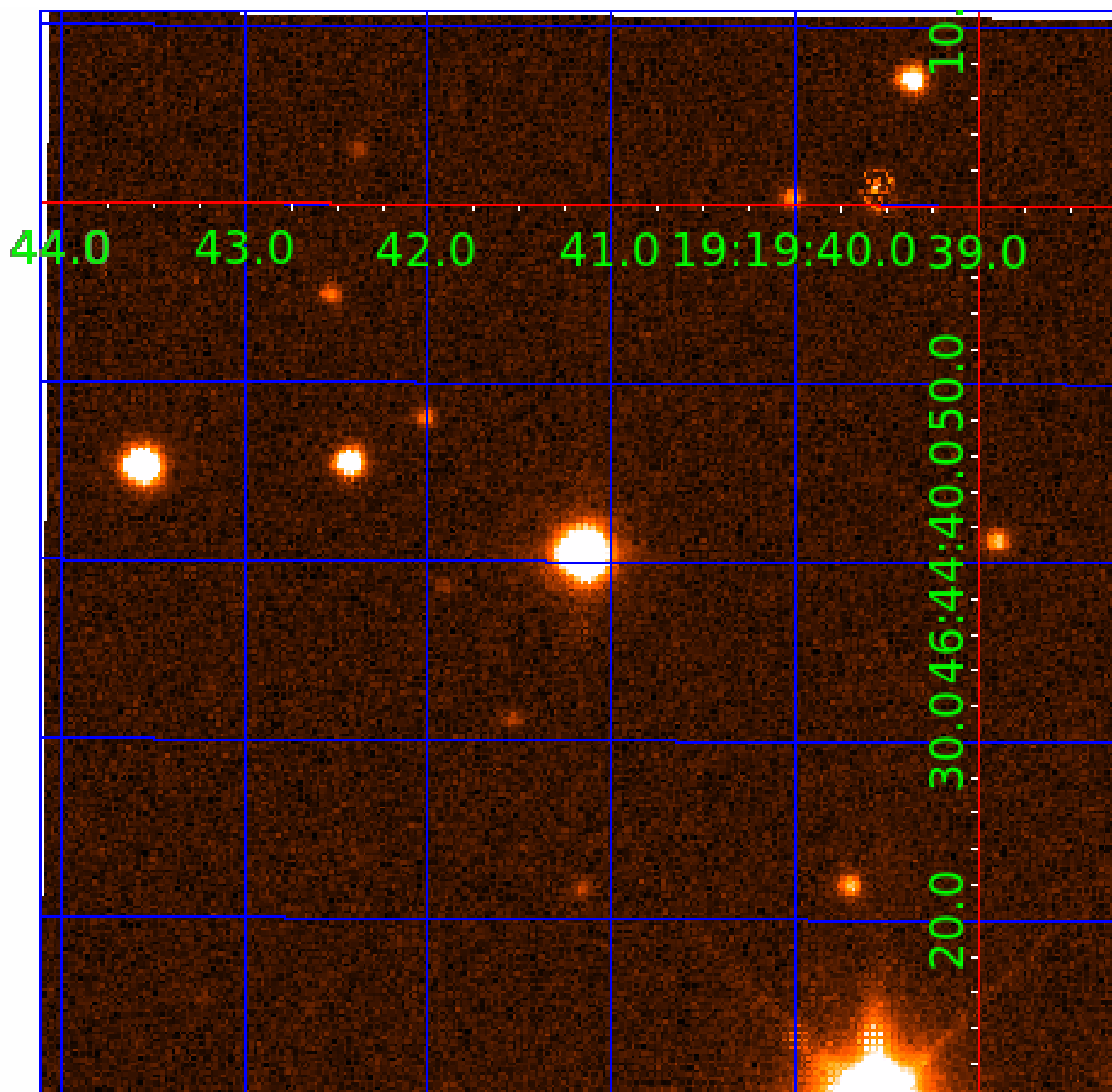


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 009886361

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})
009886361-01	OBS	2732.01	7.031500	134.449034	84.0	6.435	24.5	25.5	1.50	6170	1.74	480.66
009886361-02	OBS	2732.02	13.611663	144.168227	96.2	7.963	19.5	22.3	1.50	6170	1.72	199.23
009886361-03	OBS	2732.03	54.280928	140.721106	151.3	5.491	14.7	15.6	1.50	6170	2.17	31.50
009886361-04	OBS	2732.04	49.121275	146.797058	60.5	8.653	8.3	8.2	1.50	6170	1.28	35.99

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009886361-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
009886361-02	OBS	PC	0.95	0	0	0	0	NO_COMMENT
009886361-03	OBS	PC	0.99	0	0	0	0	NO_COMMENT
009886361-04	OBS	PC	0.85	0	0	0	0	NO_COMMENT

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

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

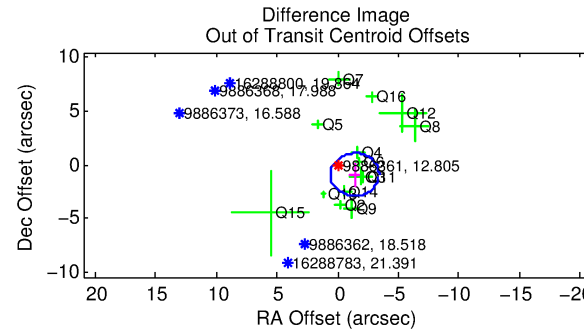
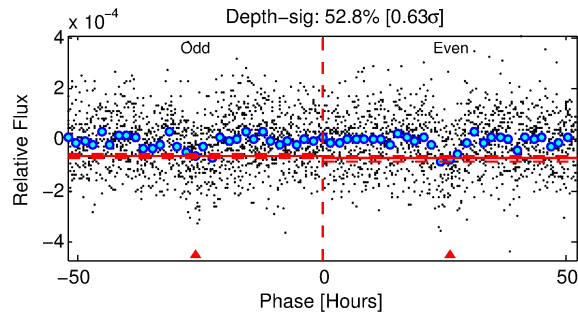
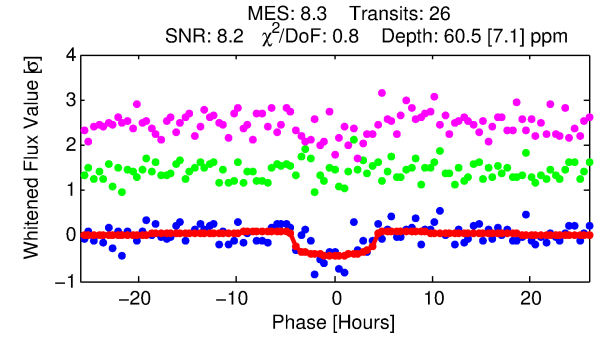
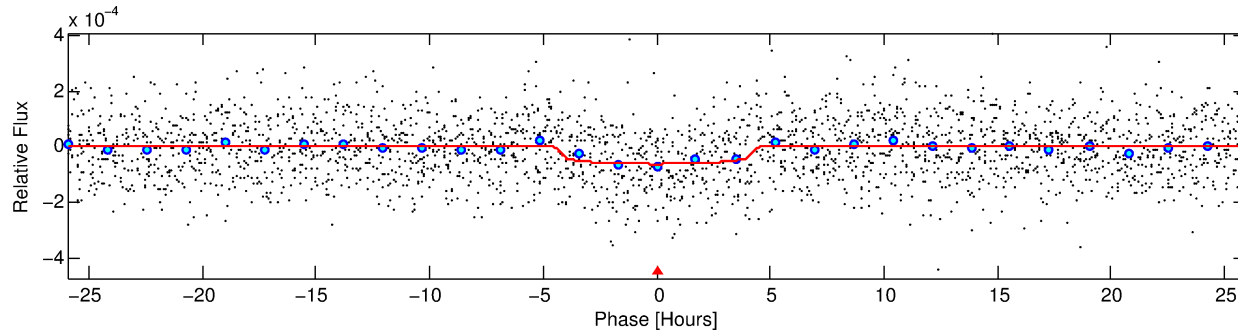
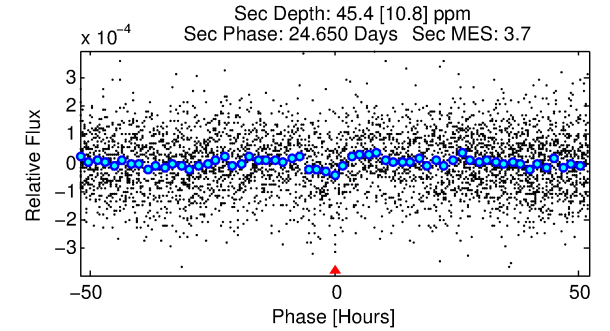
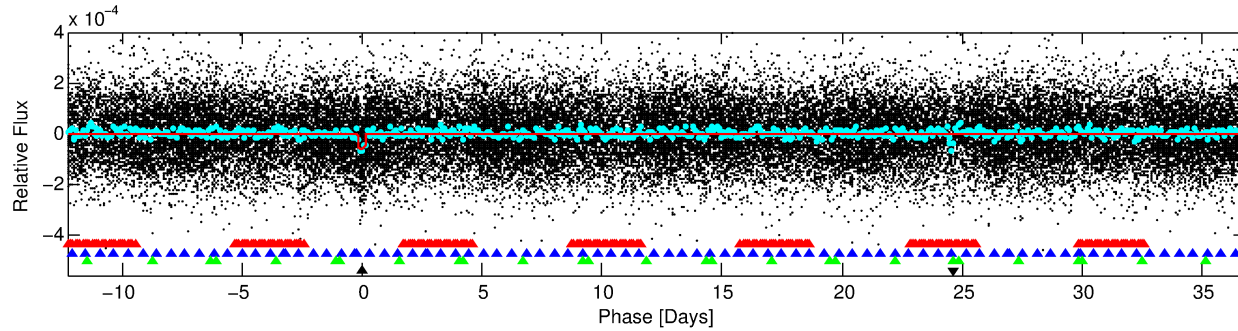
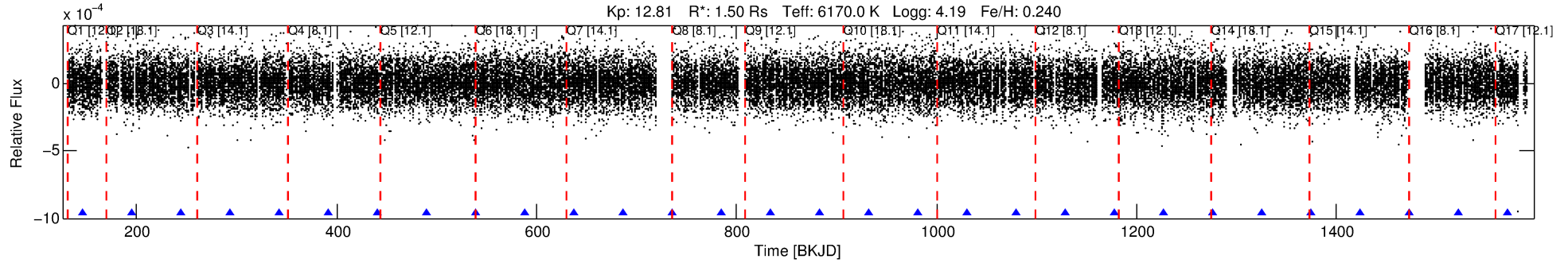
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009886361-04

No Significant Match Found

DV One-Page Summary

KIC: 9886361 Candidate: 4 of 4 Period: 49.121 d
KOI: K02732 Name: Kepler-403 Corr: No Ephemeris Match



DV Fit Results:

Period = 49.12128 [0.00090] d
Epoch = 146.7971 [0.0148] BKJD
Rp/R* = 0.0078 [0.0039]
a/R* = 28.01 [67.95]
b = 0.77 [1.28]
Seff = 35.99 [9.28]
Teff = 625 [40] K
Rp = 1.28 [0.68] Re
a = 0.2847 [0.0456] AU
Ag = 1241.95 [1310.25] [0.95σ]
Teffp = 5733 [1477] K [3.46σ]

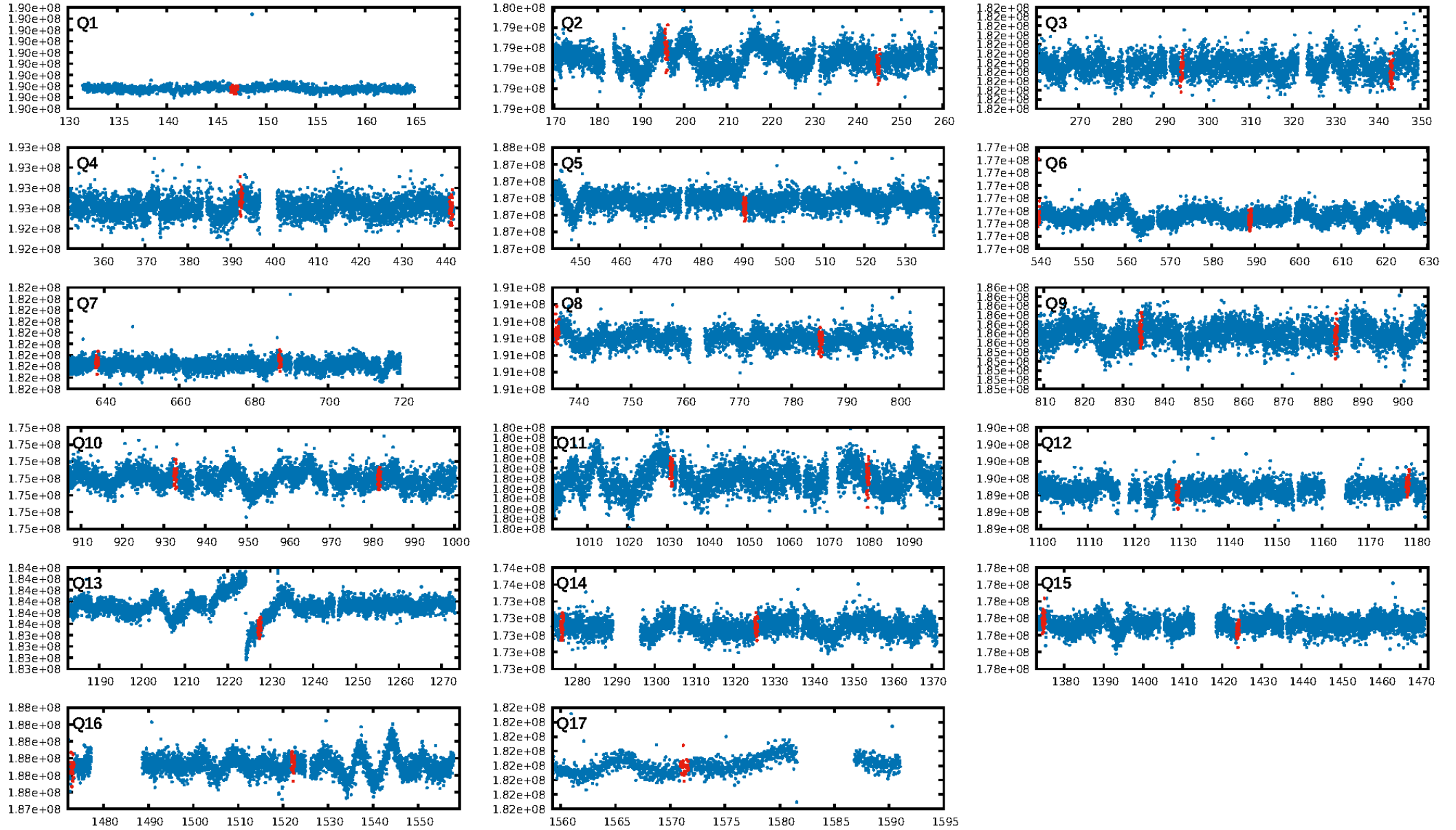
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [72.47σ]
LongPeriod-sig: 100.0% [12.08σ]
ModelChiSquare2-sig: 97.8%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 8.28e-16
RollingBand-fgt: 1.00 [24/24]
GhostDiagnostic-chr: 1.008
Centroid-sig: 8.4%
Centroid-so: 1.911 arcsec [1.59σ]
OotOffset-rm: 1.686 arcsec [2.53σ]
KicOffset-rm: 1.718 arcsec [2.54σ]
OotOffset-st: 3/4/4/3 [14]
KicOffset-st: 3/4/4/3 [14]
DiffImageQuality-fgm: 0.29 [4/14]
DiffImageOverlap-fno: 0.94 [16/17]

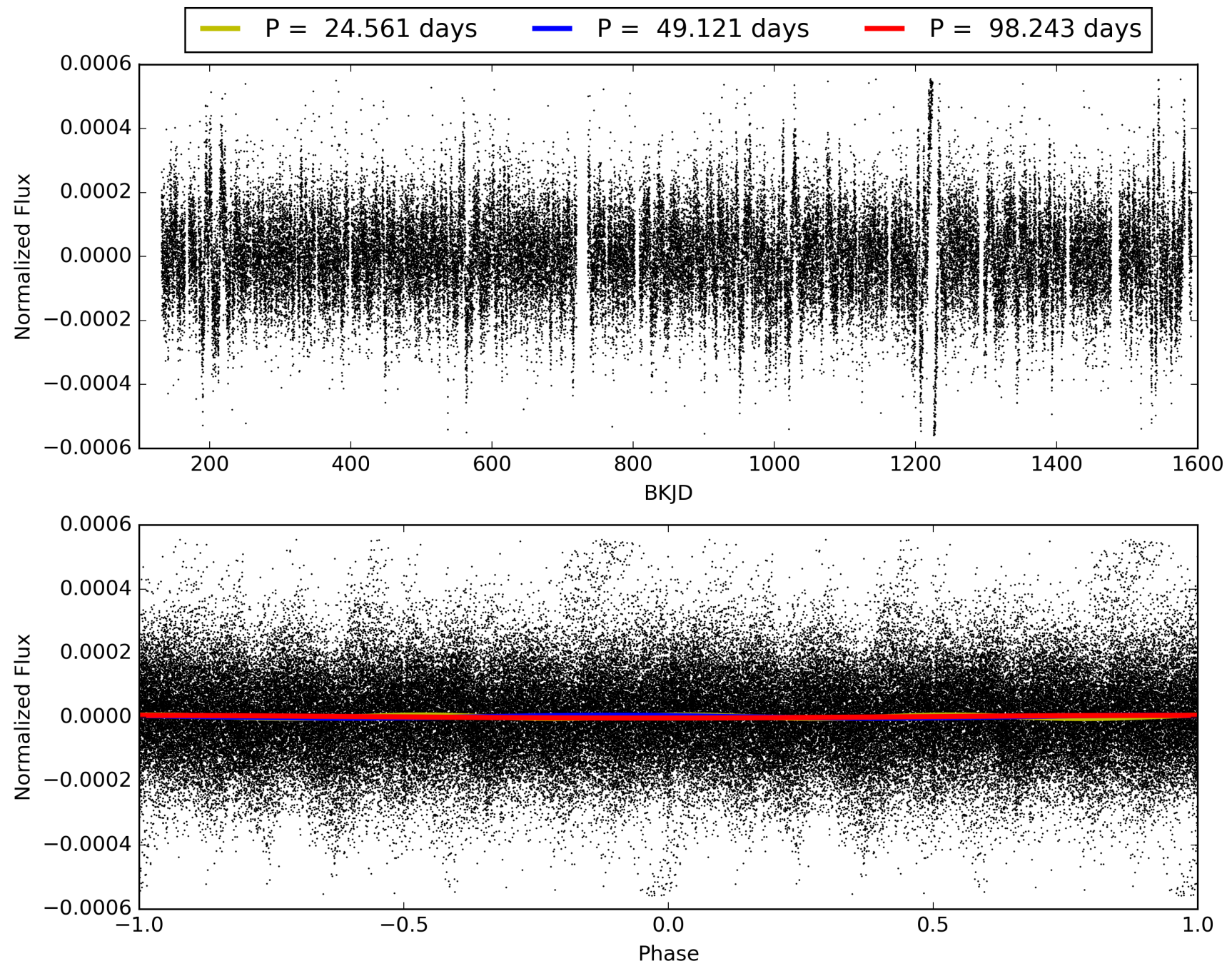
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 15:04:18 Z

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

TCE 009886361-04, PDC Light Curves

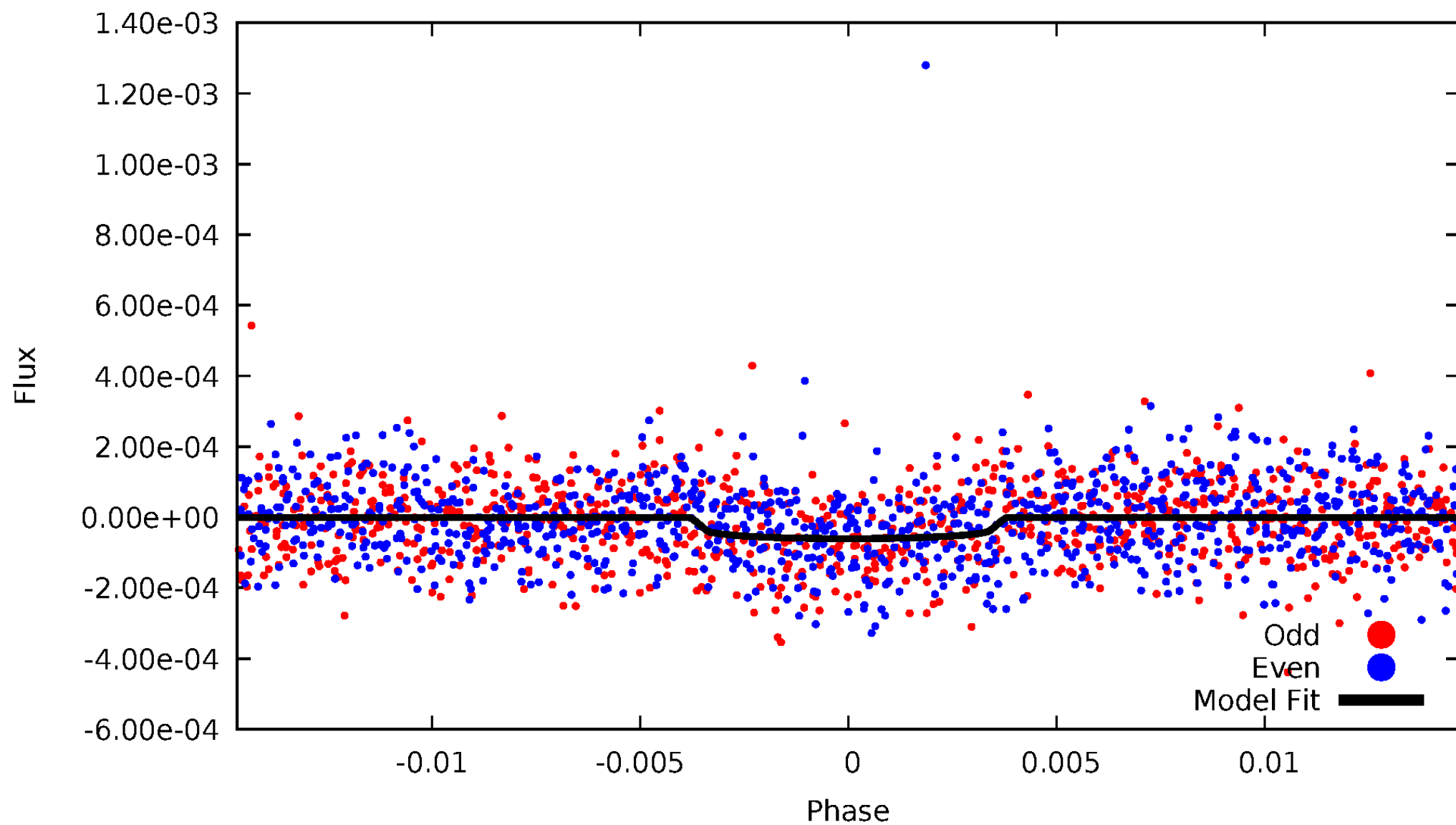


TCE 009886361-04



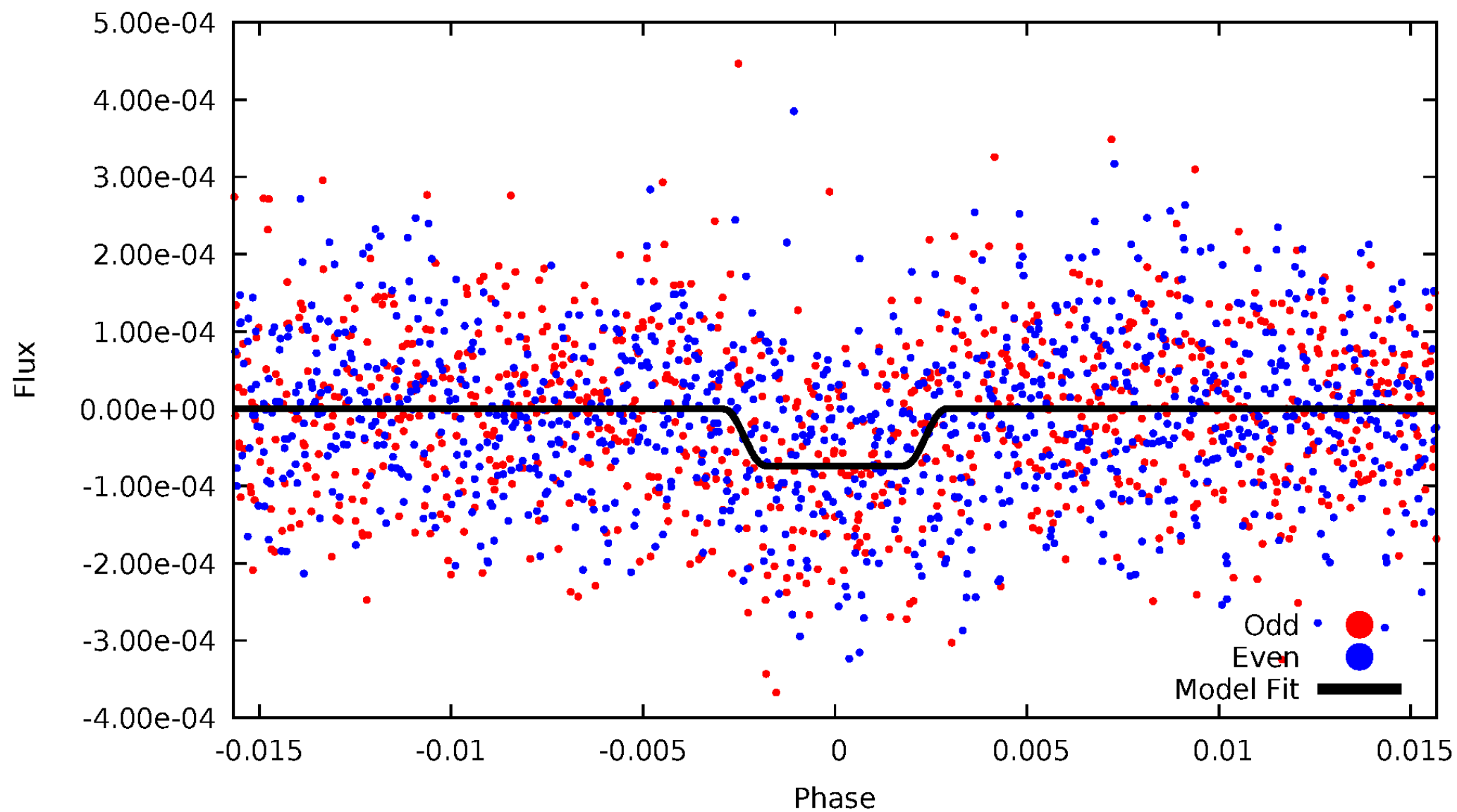
DV Odd/Even

TCE 009886361-04



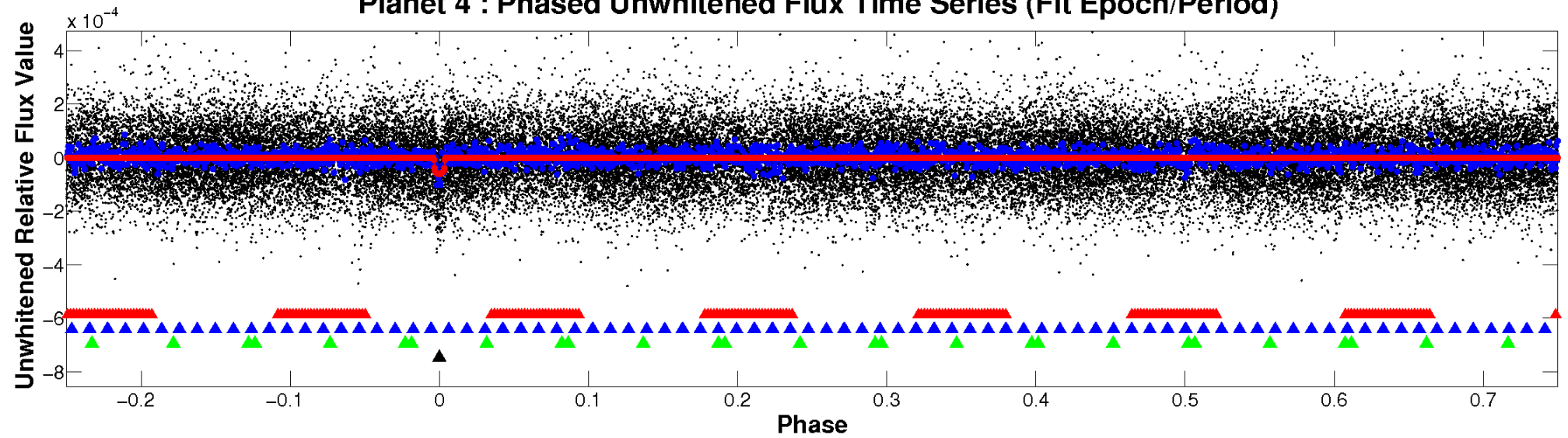
ALT Odd/Even

TCE 009886361-04

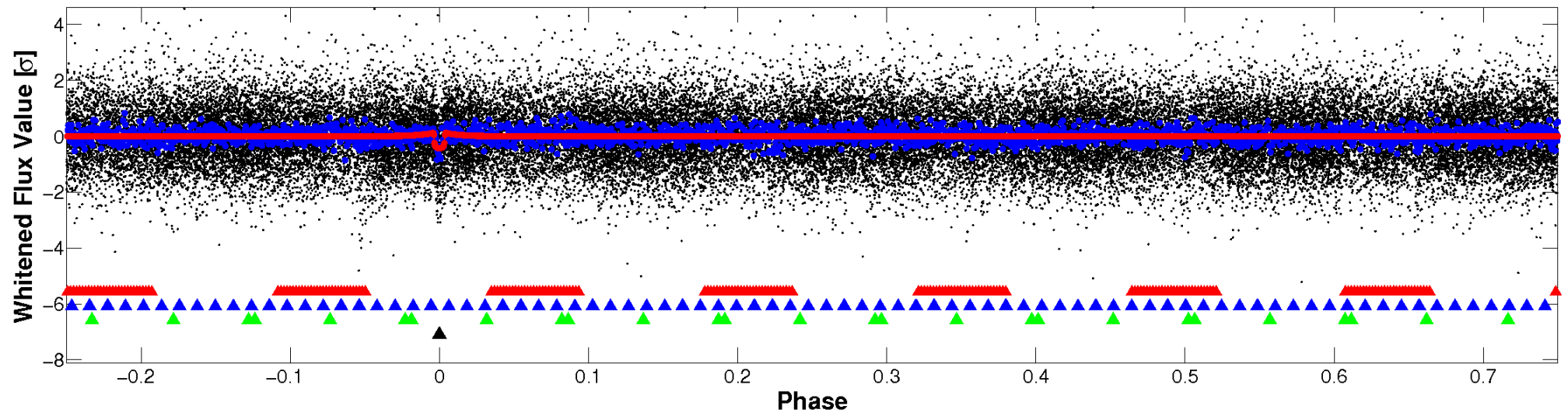


Non-Whitened Vs. Whitened Light Curve

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

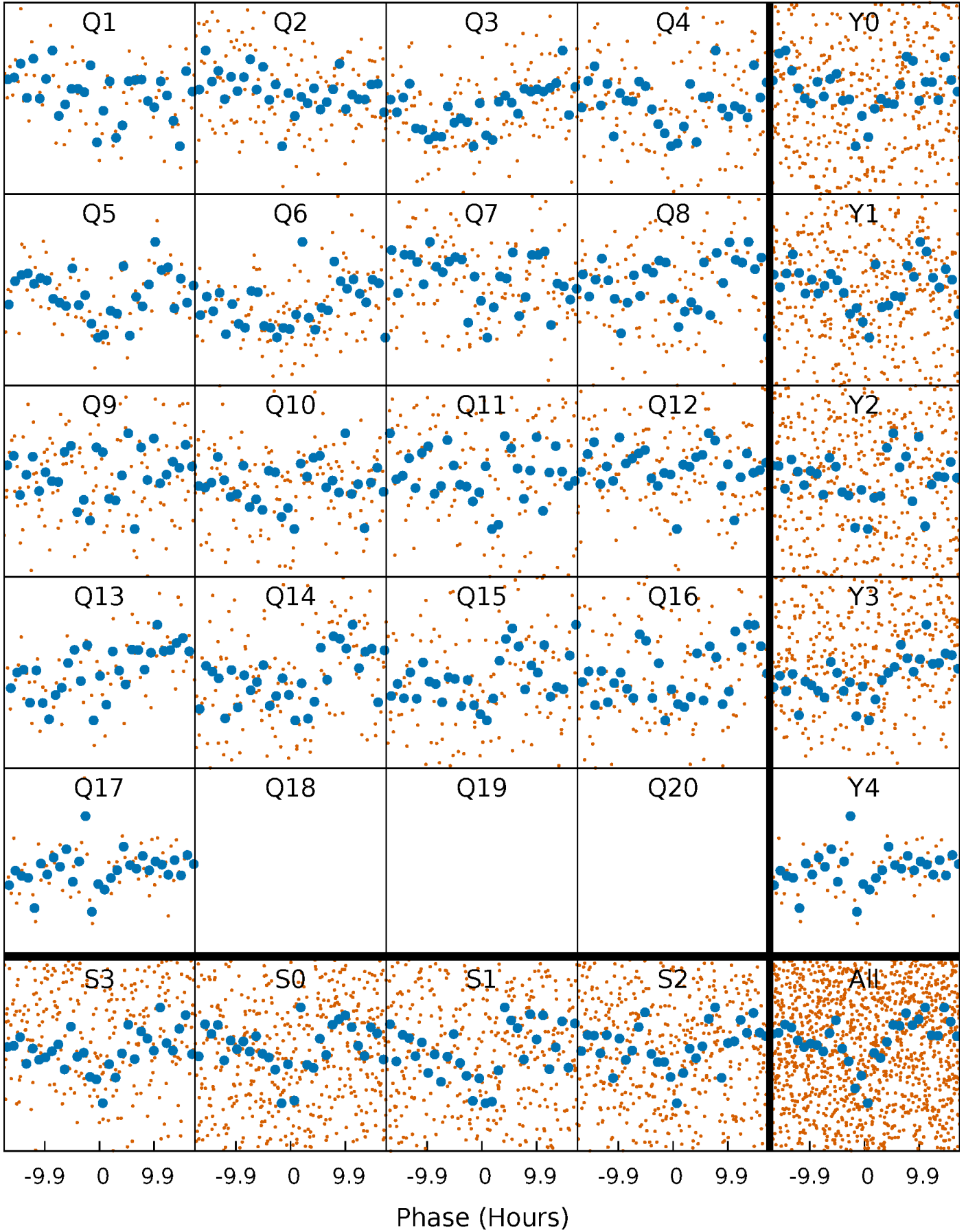


Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



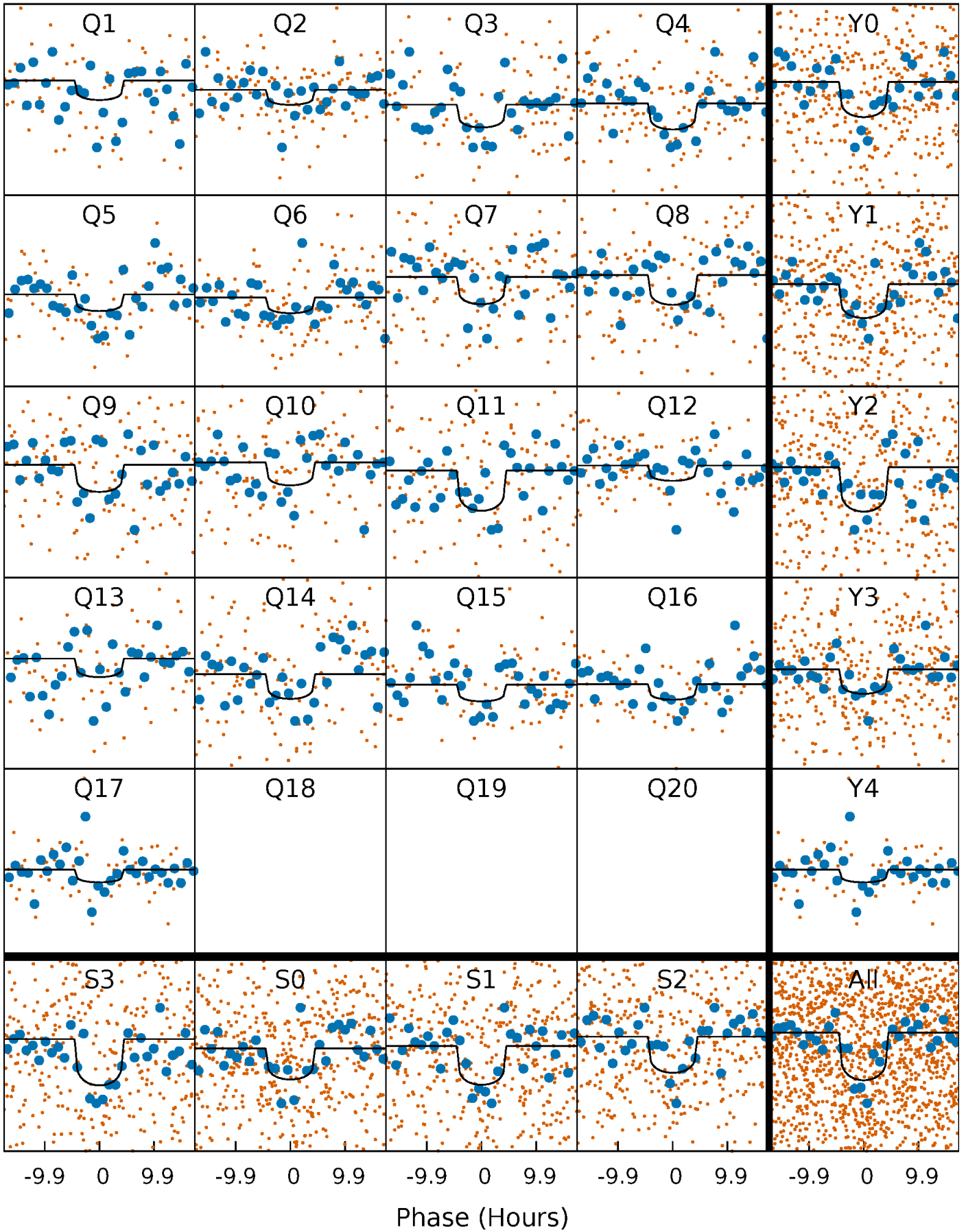
PDC Quarter-Phased Transit Curves

TCE 009886361-04 P= 49.121275 Days $T_0=146.797058$ (BKJD)



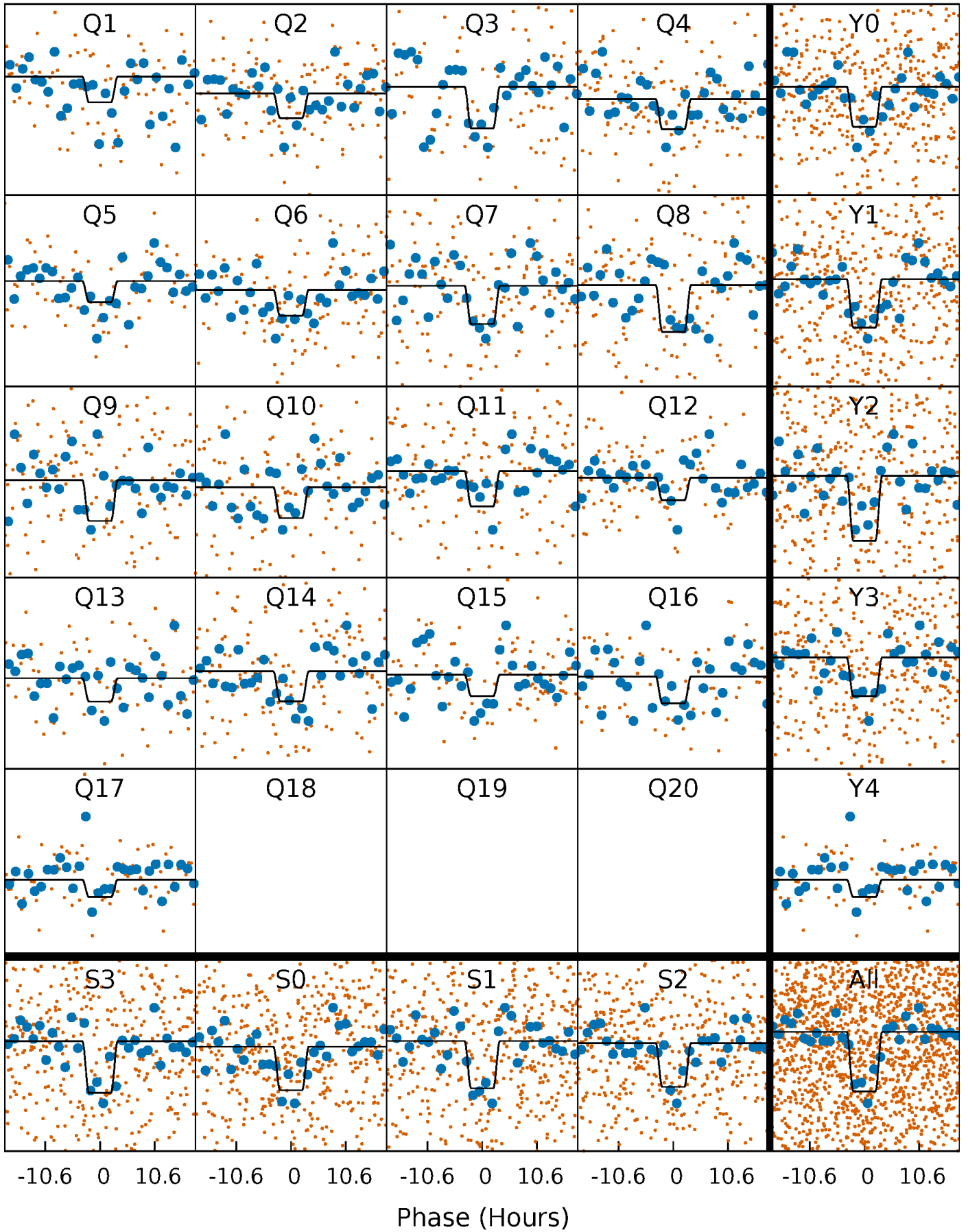
DV Quarter-Phased Transit Curves

TCE 009886361-04 P= 49.121275 Days $T_0=146.797058$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

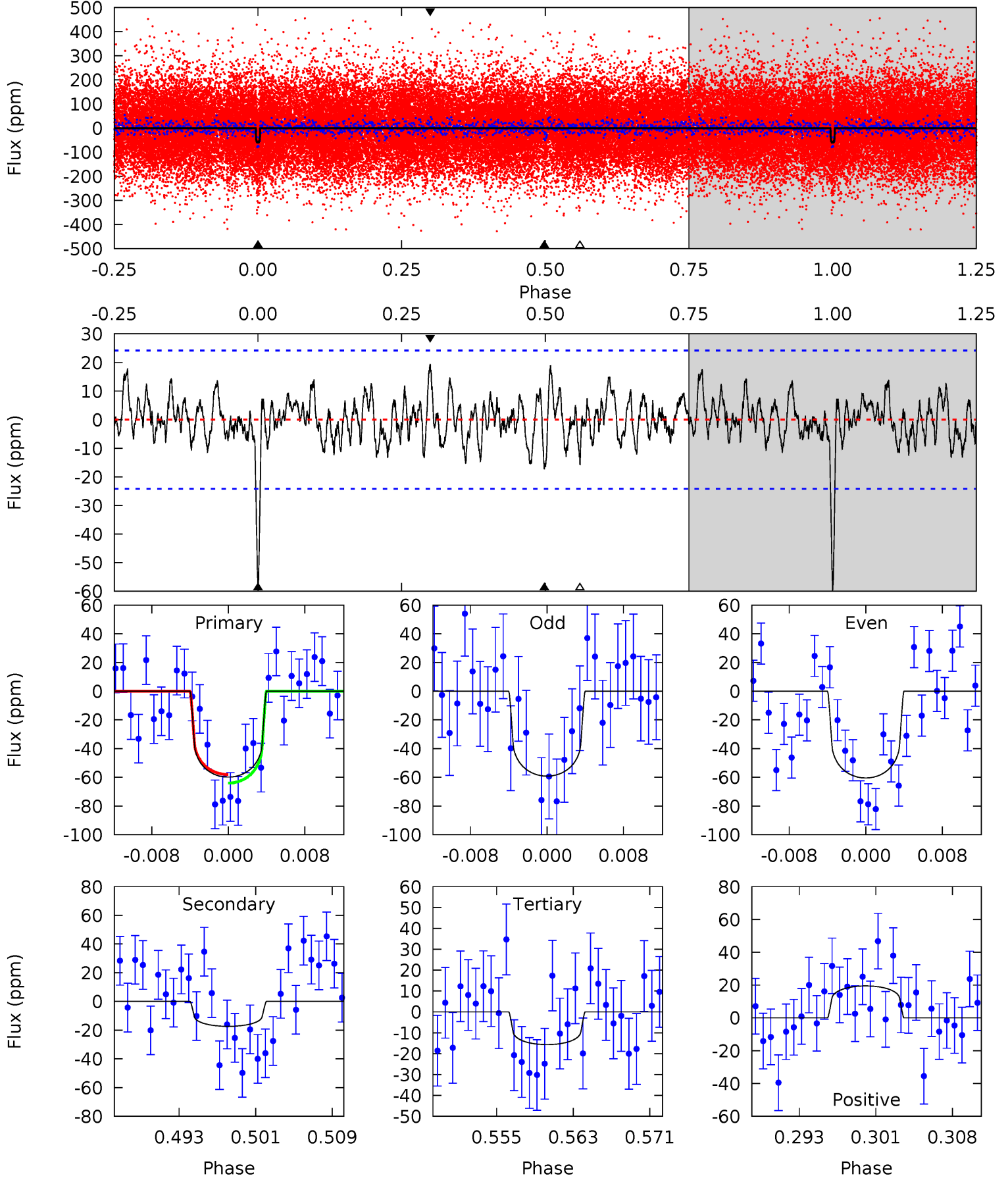
TCE 009886361-04 P= 49.121775 Days $T_0=146.792427$ (BKJD)



DV Model-Shift Uniqueness Test

009886361-04, P = 49.121275 Days, E = 97.675783 Days

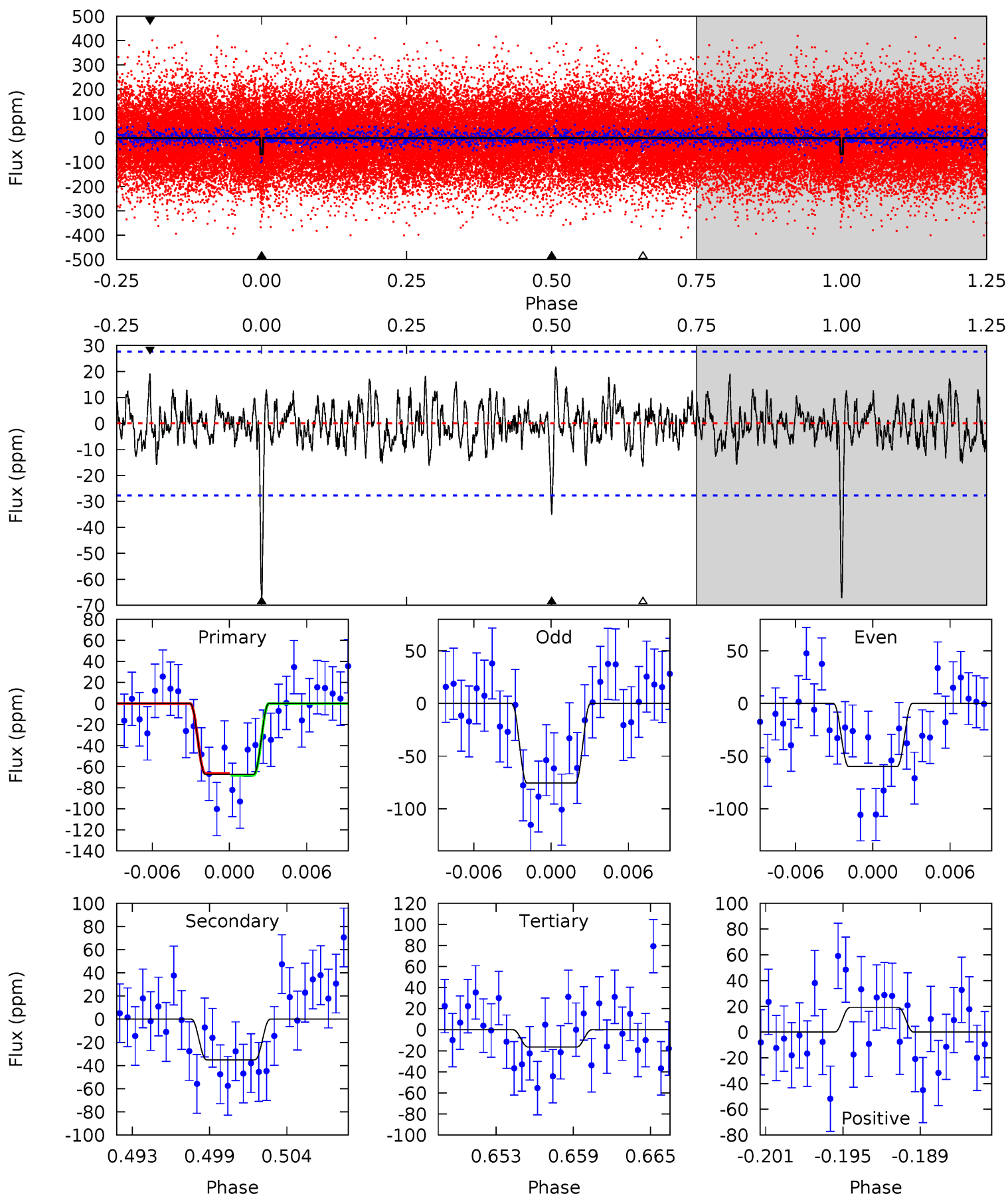
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
12.6	3.64	3.29	4.09	5.08	2.66	1.29	9.28	8.49	0.35	-0.45	0.14	1.01	0.25	0.63



Alt Model-Shift Uniqueness Test

009886361-04, P = 49.121775 Days, E = 97.670652 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
12.5	6.50	3.05	3.54	5.13	2.76	1.15	9.41	8.93	3.45	2.96	1.45	1.01	0.25	0.14



Stellar Parameters For KIC 009886361

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	6170^{+110}_{-135}	$4.192^{+0.137}_{-0.125}$	$0.240^{+0.150}_{-0.150}$	$1.499^{+0.272}_{-0.245}$	$1.282^{+0.091}_{-0.114}$	$0.536^{+0.318}_{-0.201}$
	+2%/-2%	+3%/-3%	+62%/-62%	+18%/-16%	+7%/-9%	+59%/-37%
Source	SPE59	SPE59	SPE59	DSEP		

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

Secondary Eclipse Parameters for KIC 009886361-04 / KOI 2732.04

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-17 ± 5	$1.31^{+0.63}_{-0.60}$	871^{+50}_{-41}	4612^{+1400}_{-663}	460^{+1181}_{-267}
Alt.	-35 ± 5	$1.39^{+0.64}_{-0.61}$	873^{+42}_{-41}	5198^{+1688}_{-772}	822^{+1730}_{-465}

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 $A_{obs} \gg 1.0$

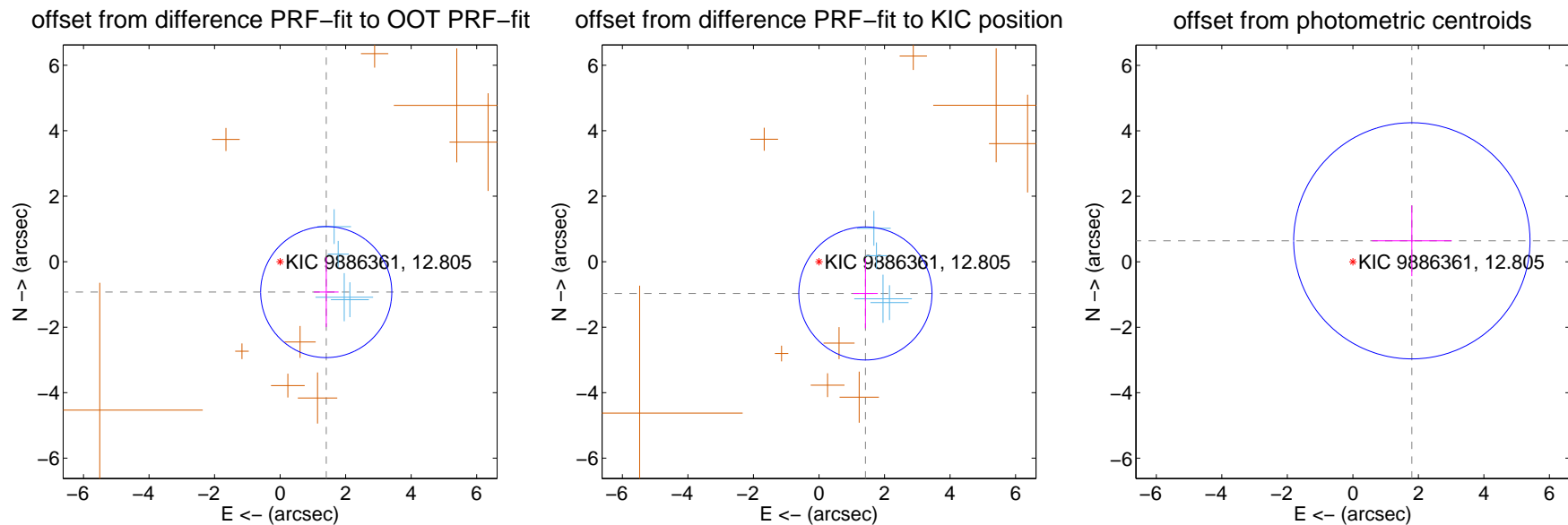
DV Centroid Data

Supplemental centroid analysis for 009886361-04. Kepler magnitude: 12.80. Transit SNR 8.18

There are 4 quarters with good PRF difference image offsets

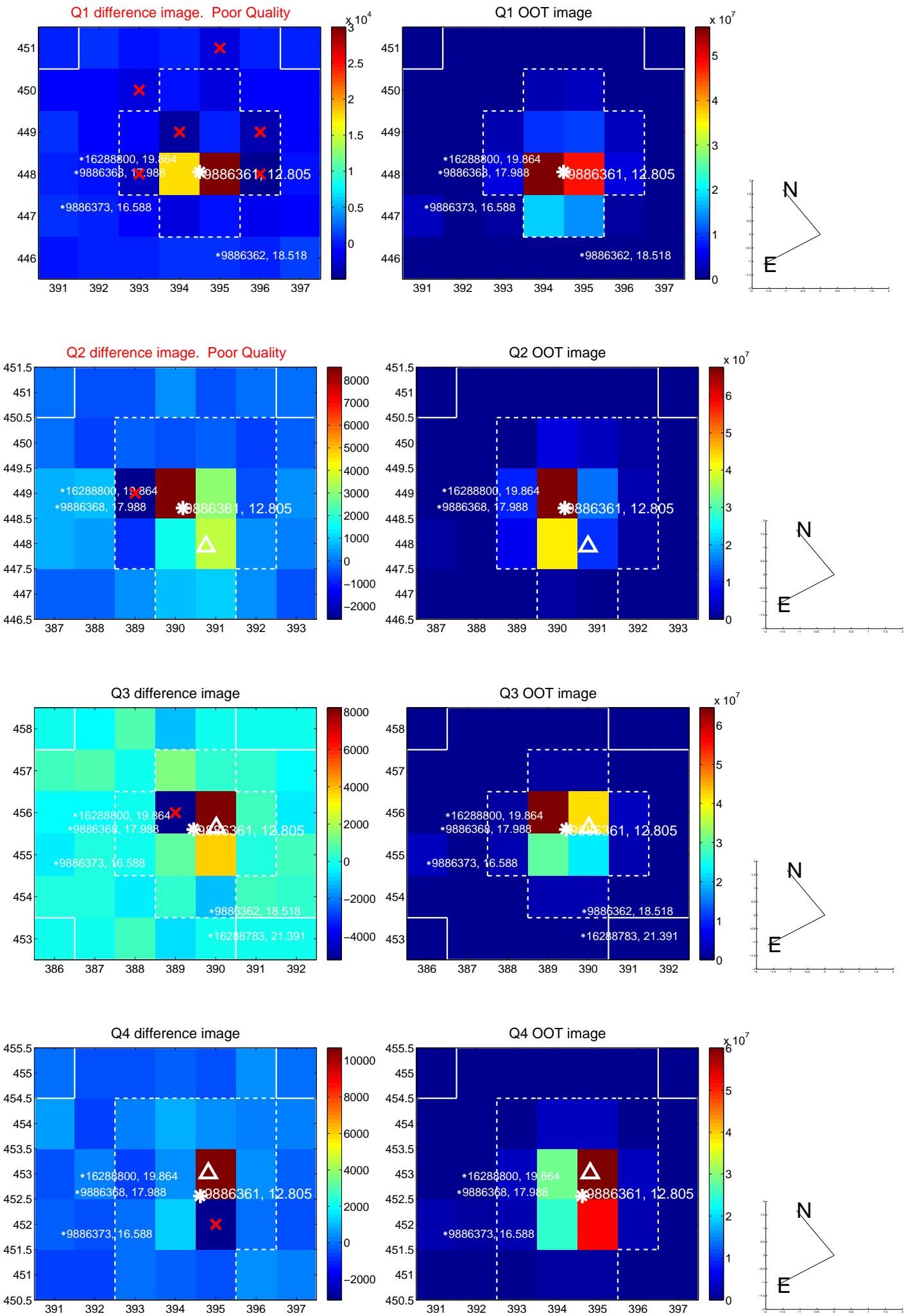
The direct PRF centroid is offset from the target star catalog position by about 0.07 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	1.686 ± 0.667	2.53	-1.408 ± 0.378	-0.928 ± 1.068
PRF-fit source offset from KIC position	1.718 ± 0.677	2.54	-1.417 ± 0.376	-0.971 ± 1.065
photometric centroid source offset	1.91 ± 1.20	1.59	-1.80 ± 1.22	0.64 ± 1.08

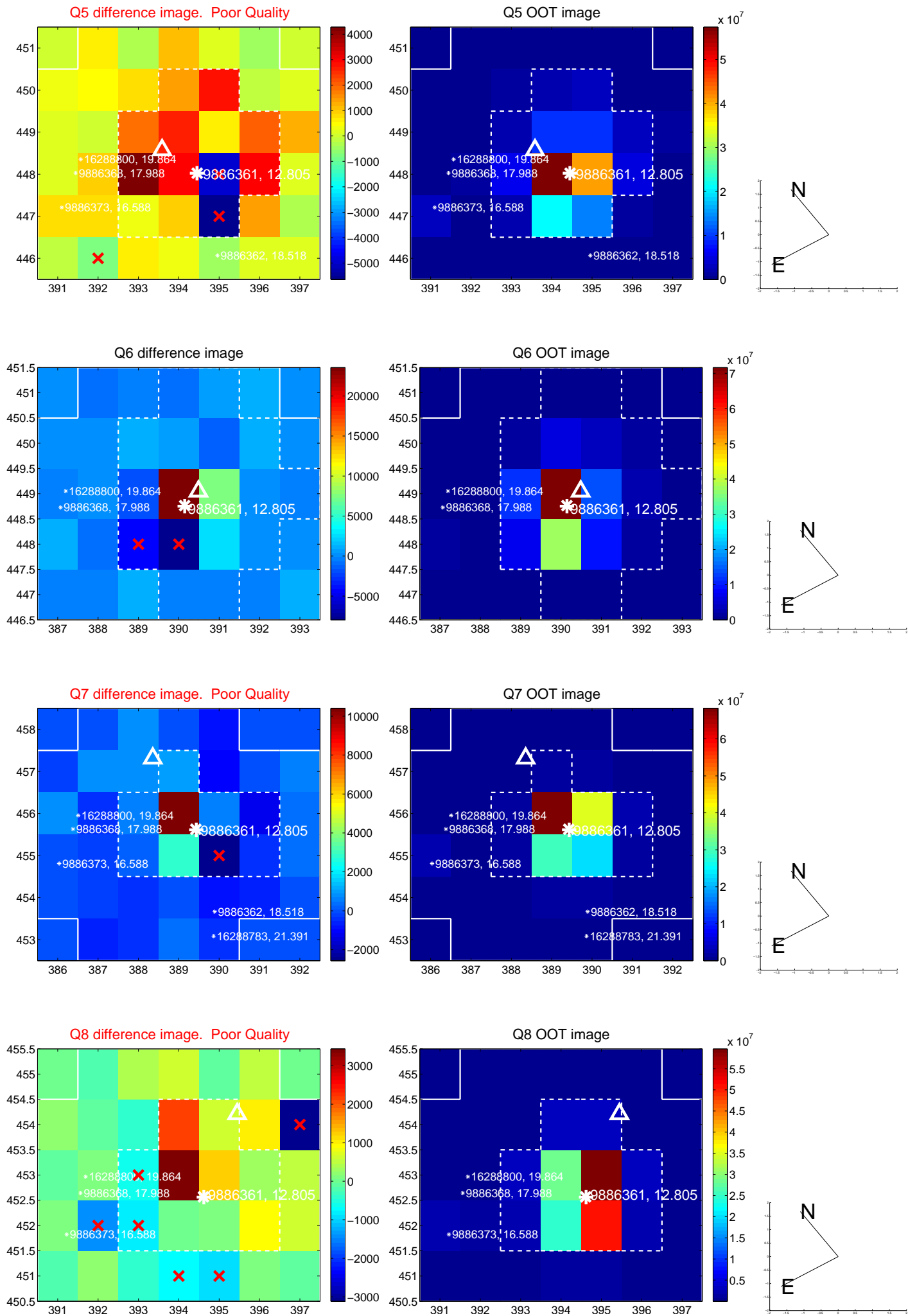


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

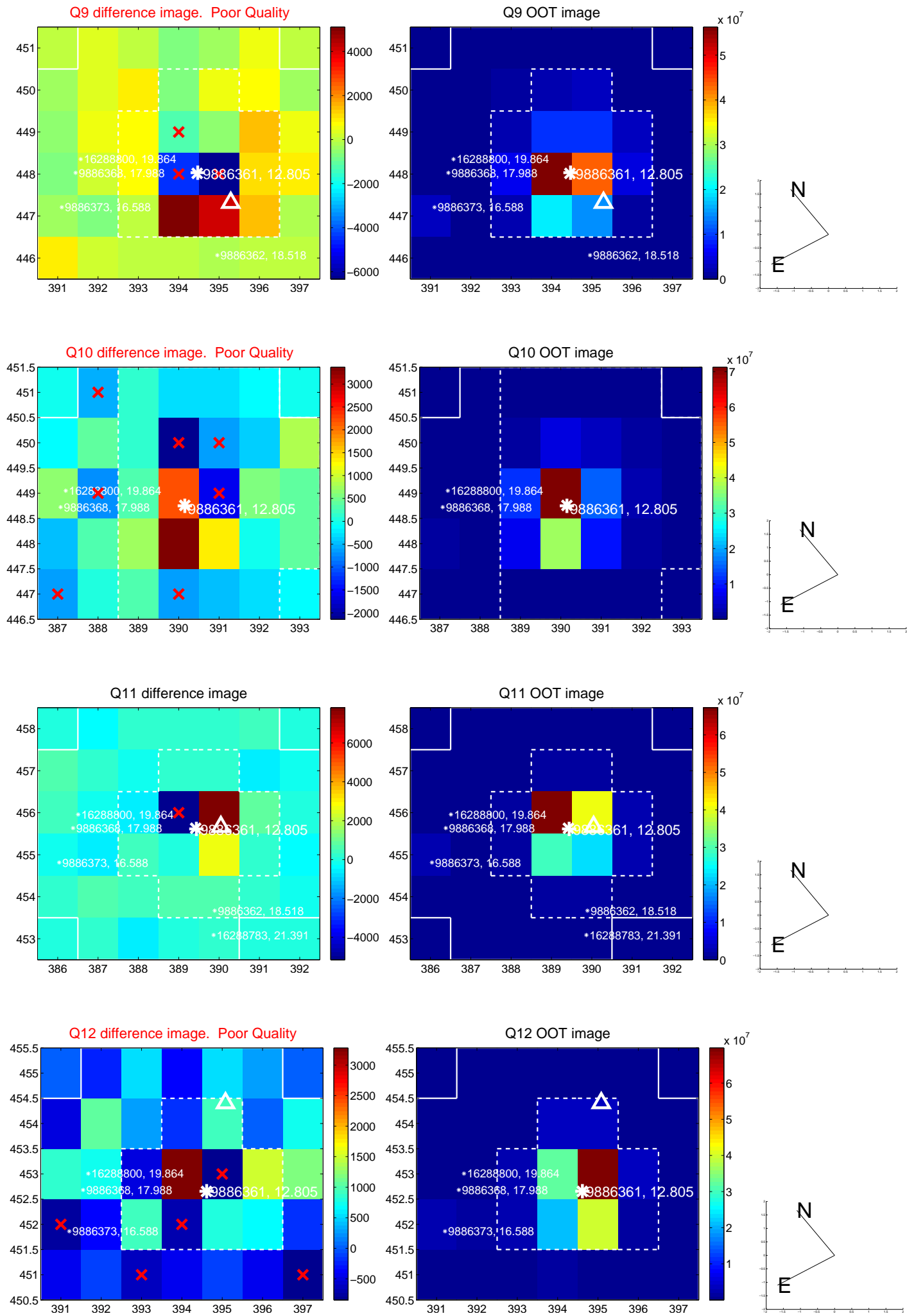
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



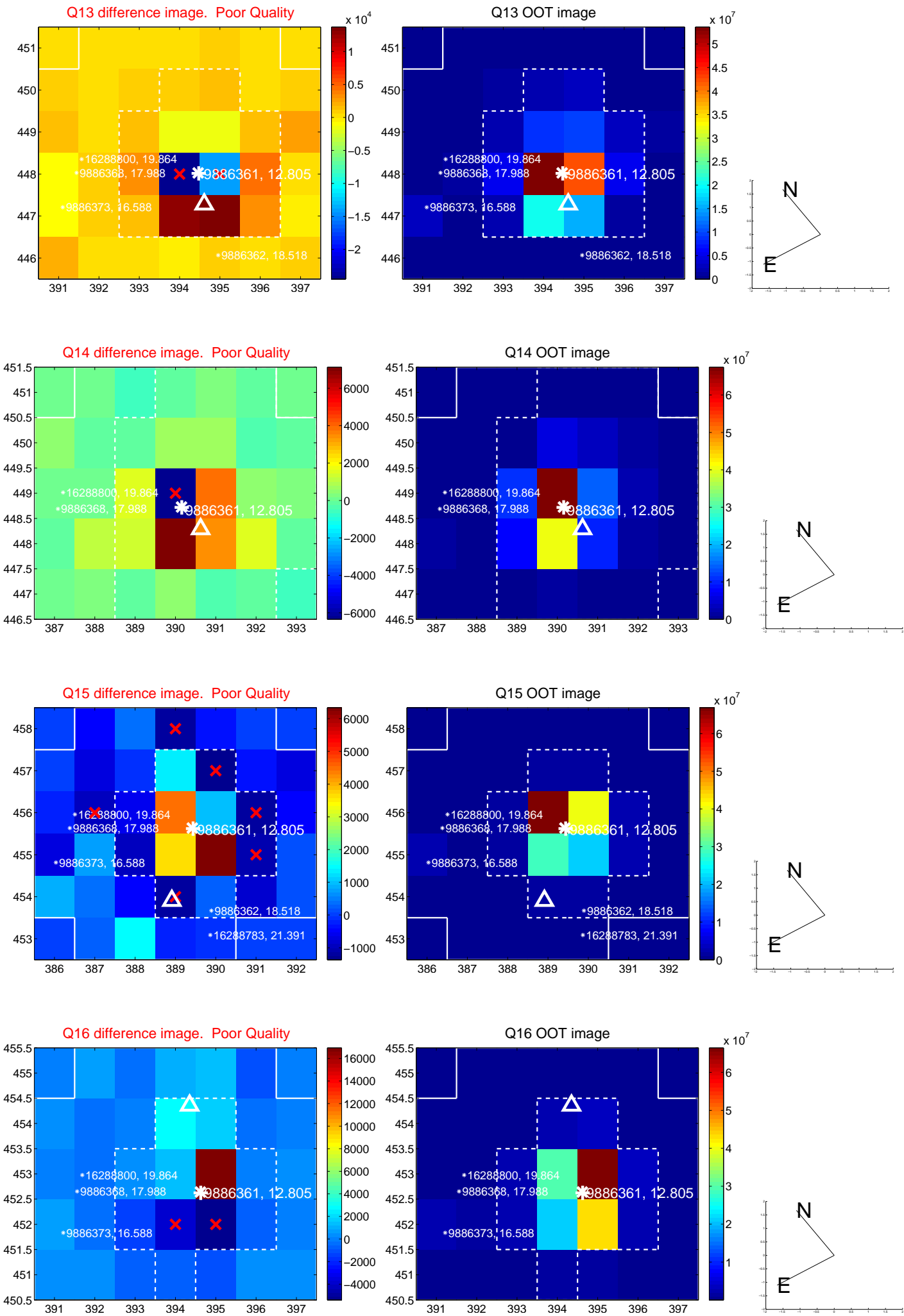
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



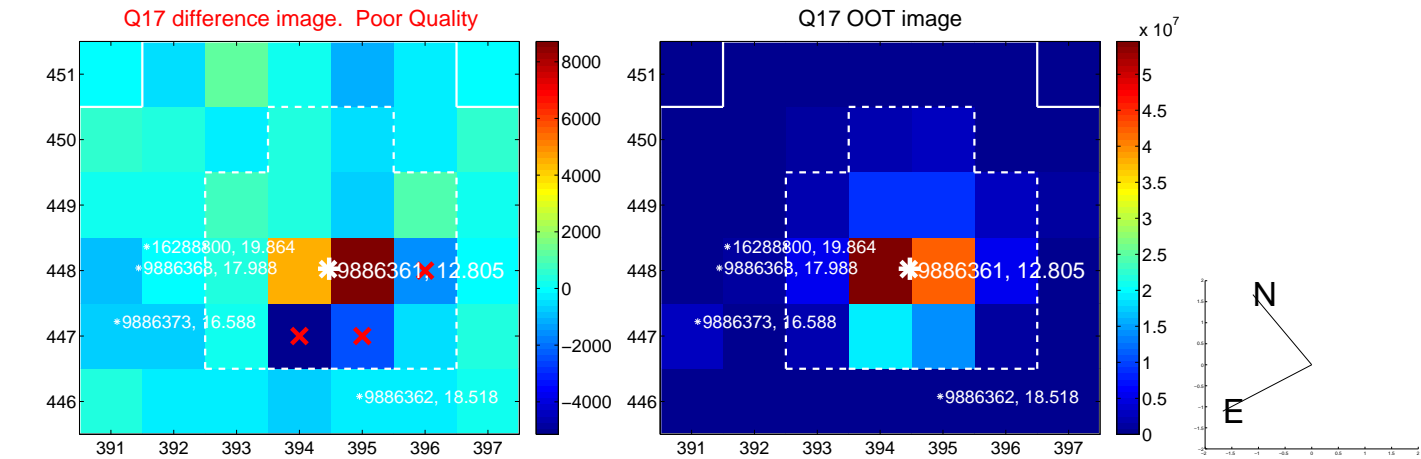
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



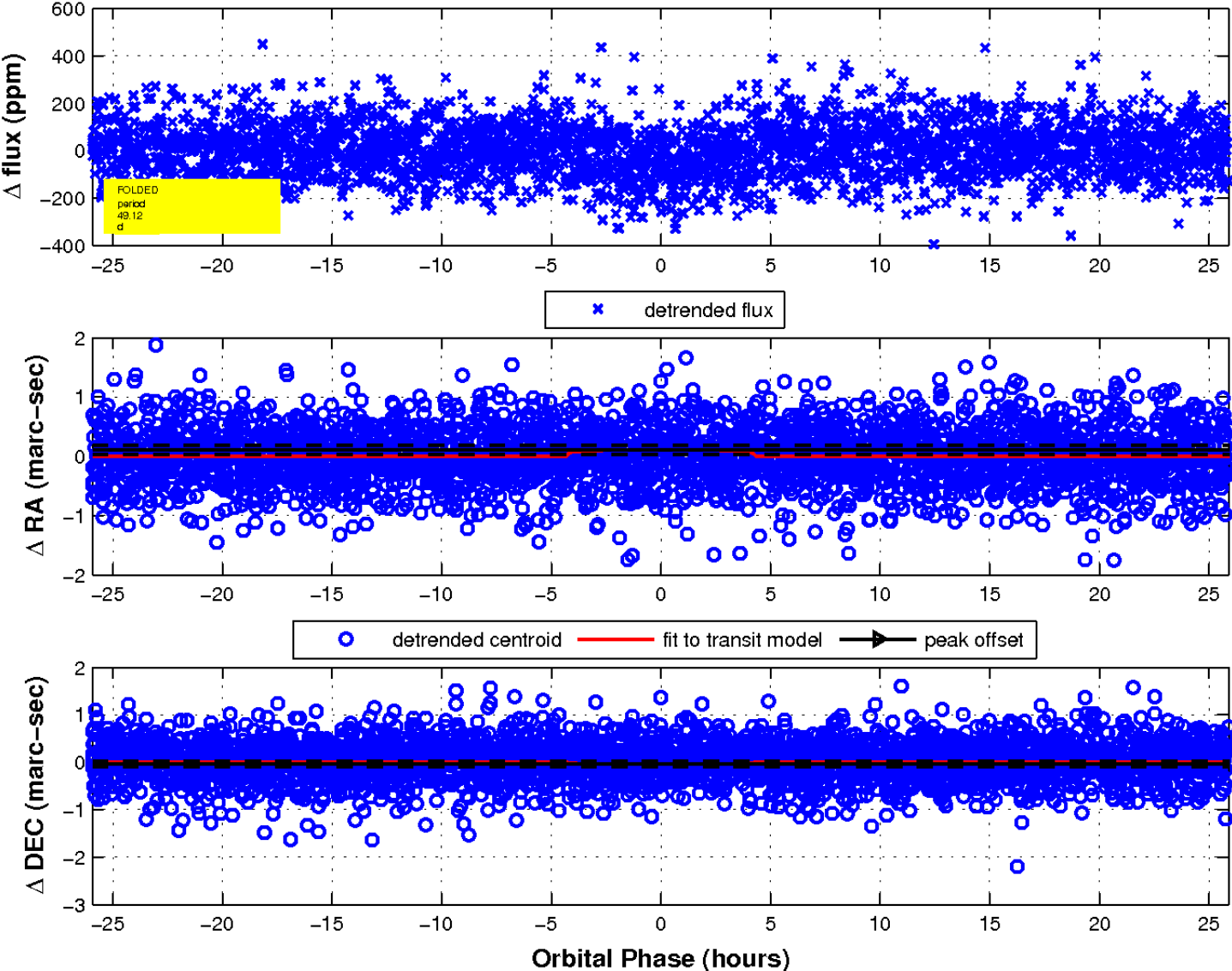
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



fluxWeightedCentroids, Planet 4 of 4



UKIRT Image

Declination

