

KIC 005438099

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})
005438099-01	OBS	1567.01	7.240179	137.810390	837.3	3.142	38.2	42.0	0.72	4955	2.51	62.14
005438099-02	OBS	1567.03	17.326682	135.263092	795.2	4.264	27.0	30.2	0.72	4955	2.25	19.41
005438099-03	OBS	1567.02	4.646223	131.569122	401.0	2.578	21.9	23.2	0.72	4955	1.76	112.26
005438099-04	OBS	1567.04	44.841285	135.664445	1042.3	5.880	22.3	23.8	0.72	4955	2.76	5.46

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005438099-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
005438099-02	OBS	PC	1.00	0	0	0	0	NO_COMMENT
005438099-03	OBS	PC	1.00	0	0	0	0	NO_COMMENT
005438099-04	OBS	PC	1.00	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.

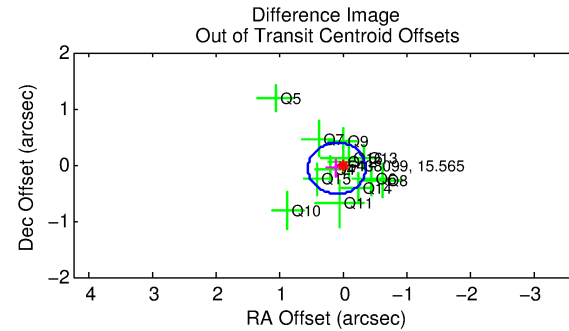
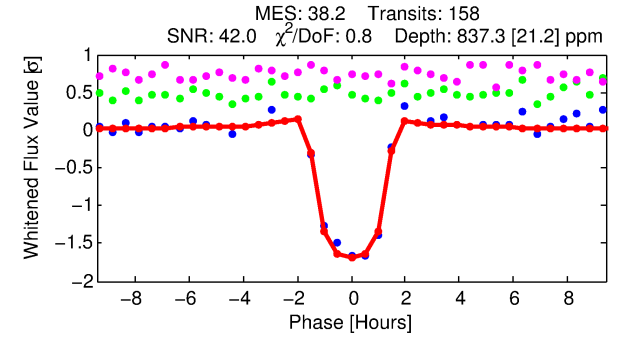
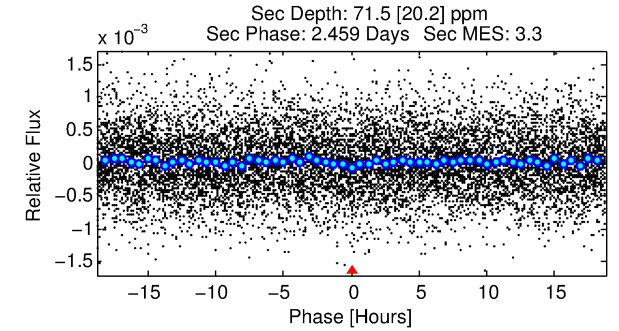
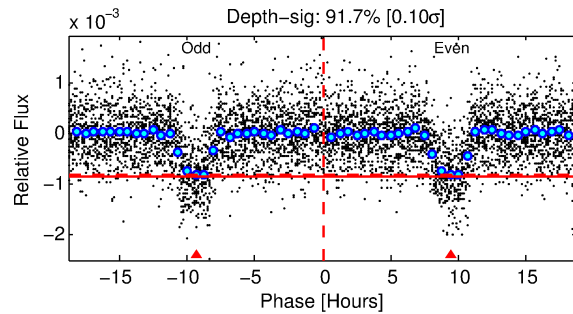
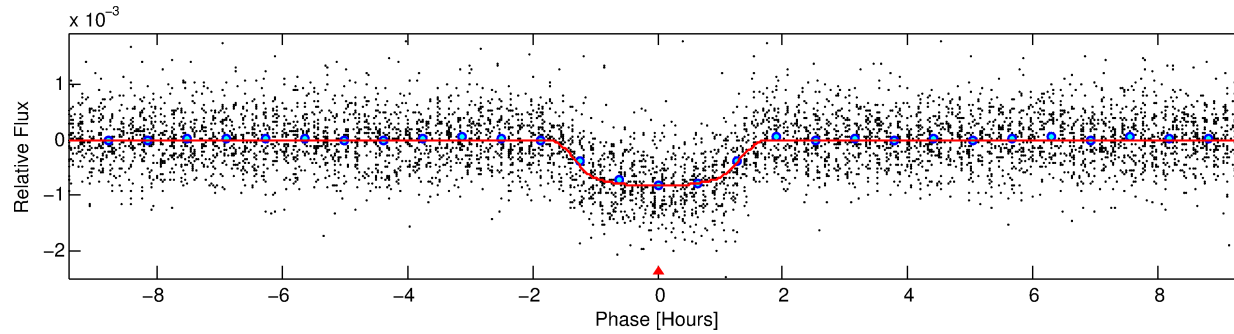
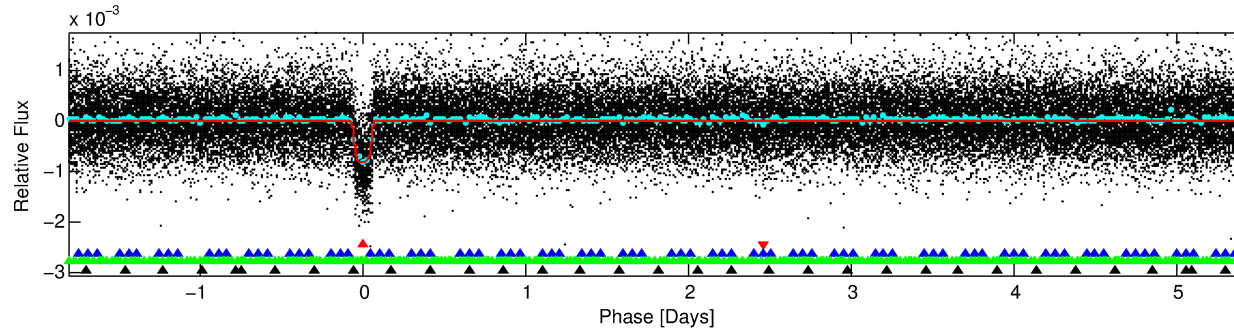
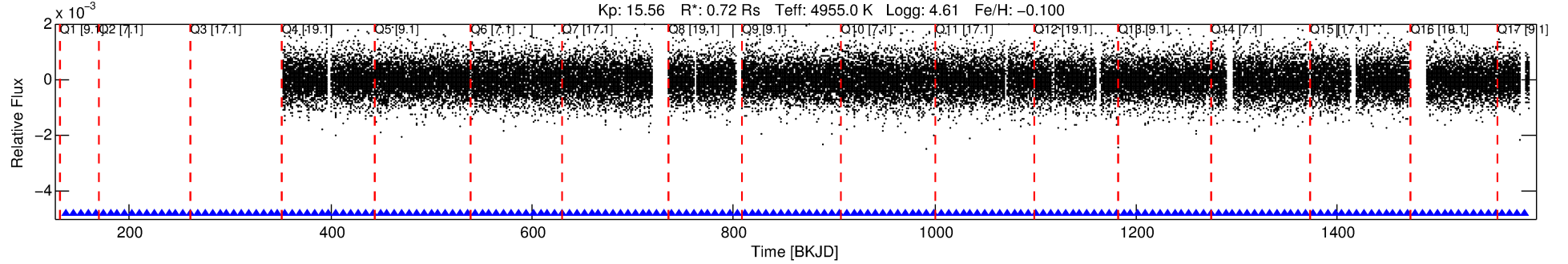
Ephemeris Match Information For 005438099-01

No Significant Match Found

DV One-Page Summary

KIC: 5438099 Candidate: 1 of 4 Period: 7.240 d
KOI: K01567.01 Name: Kepler-306c Corr: 0.957

Kp: 15.56 R*: 0.72 Rs Teff: 4955.0 K Logg: 4.61 Fe/H: -0.100



DV Fit Results:

Period = 7.24018 [0.00002] d
Epoch = 137.8104 [0.0018] BKJD
Rp/R* = 0.0320 [0.0026]
a/R* = 9.27 [2.73]
b = 0.89 [0.07]
Seff = 62.14 [7.19]
Teq = 716 [21] K
Rp = 2.51 [0.26] Re
a = 0.0672 [0.0038] AU
Ag = 28.10 [9.42] [2.88σ]
Teffp = 2549 [213] K [8.56σ]

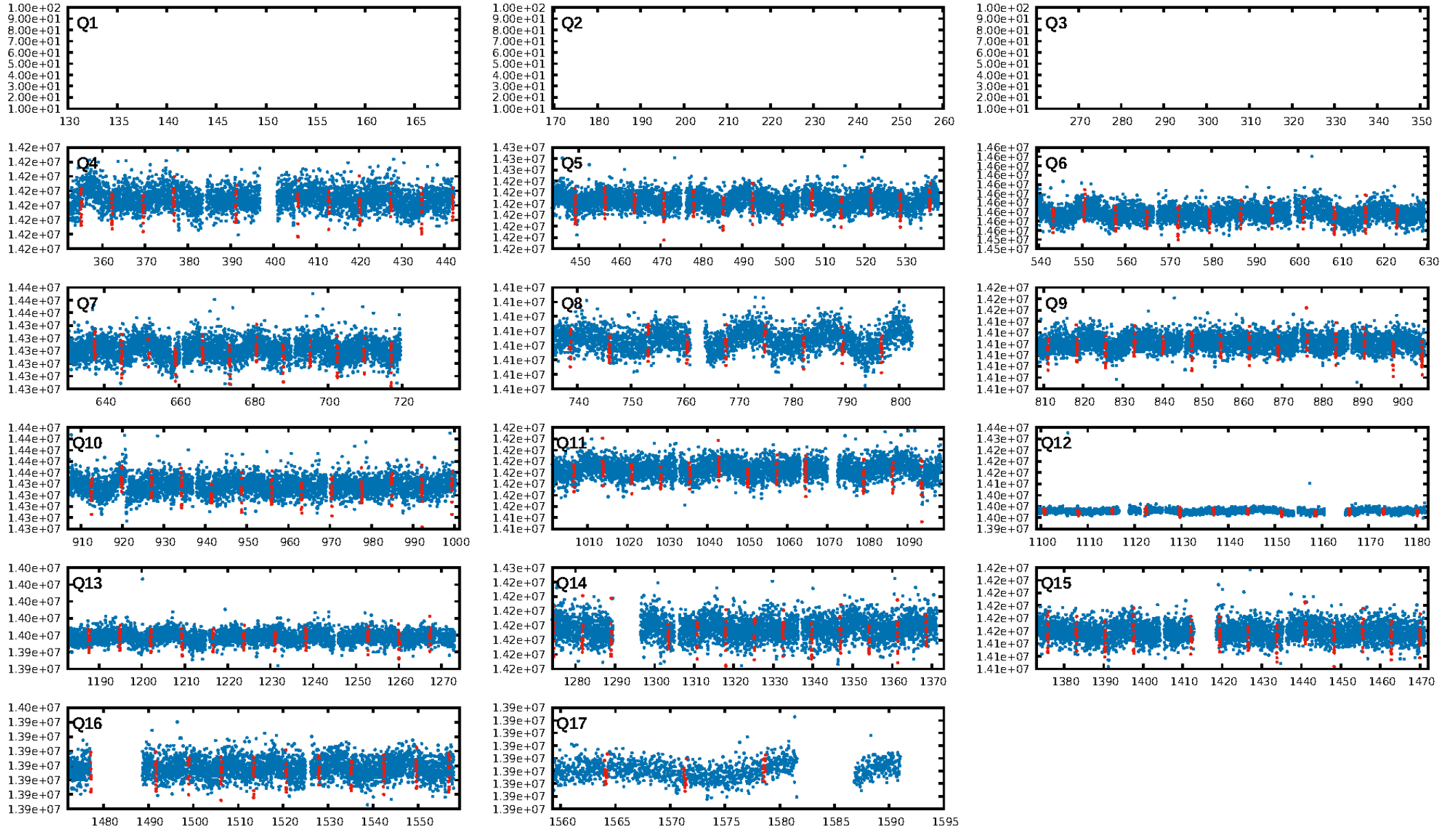
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [15.32σ]
LongPeriod-sig: 100.0% [45.71σ]
ModelChiSquare2-sig: 99.3%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 0.00e+00
RollingBand-fgt: 1.00 [155/155]
GhostDiagnostic-chr: 8.079
Centroid-sig: 1.4%
Centroid-so: 0.292 arcsec [0.93σ]
OotOffset-rm: 0.125 arcsec [0.83σ]
KicOffset-rm: 0.309 arcsec [2.05σ]
OotOffset-st: 3/3/4/3 [13]
KicOffset-st: 3/3/4/3 [13]
DiffImageQuality-fgm: 1.00 [13/13]
DiffImageOverlap-fno: 1.00 [14/14]

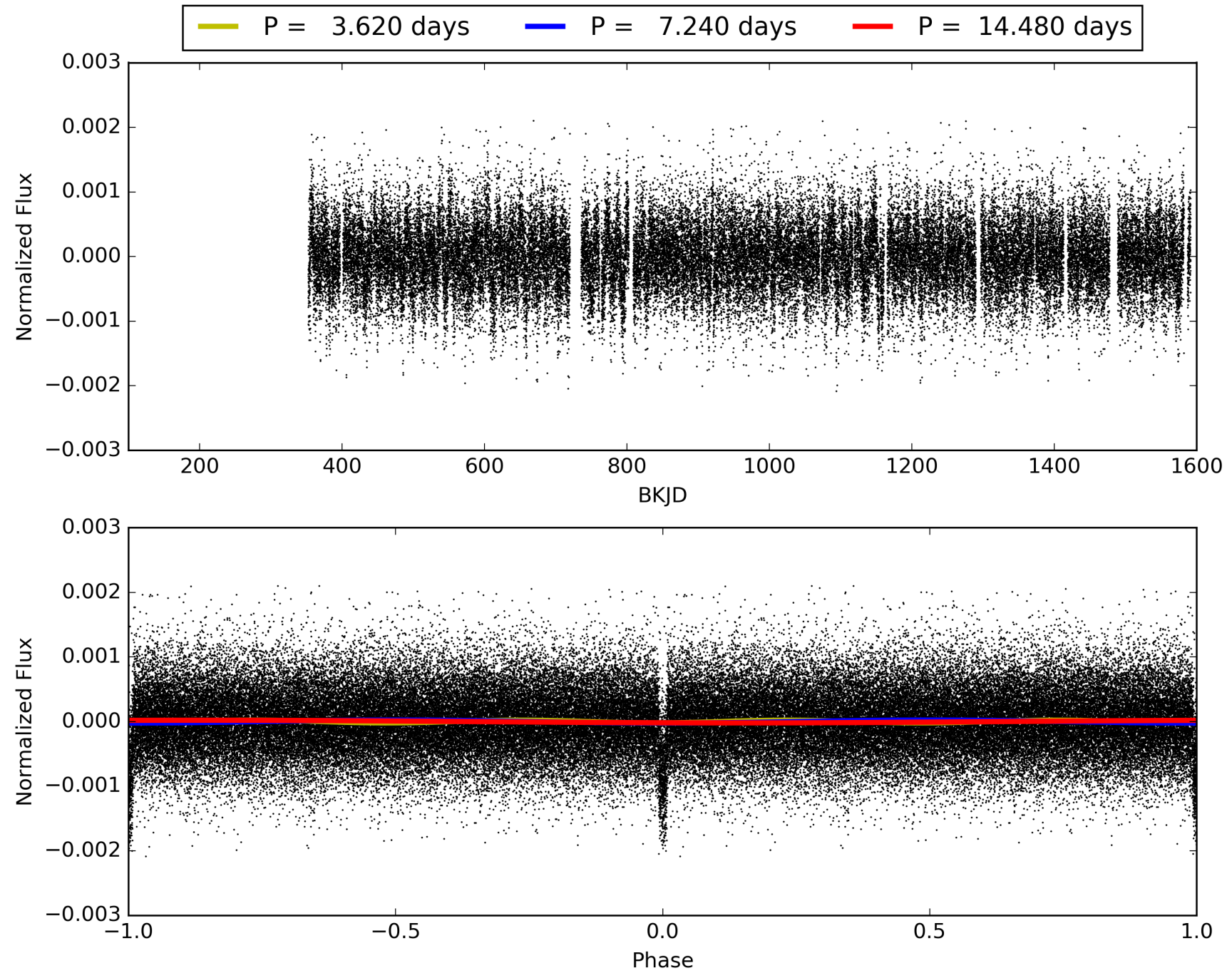
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This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

TCE 005438099-01, PDC Light Curves

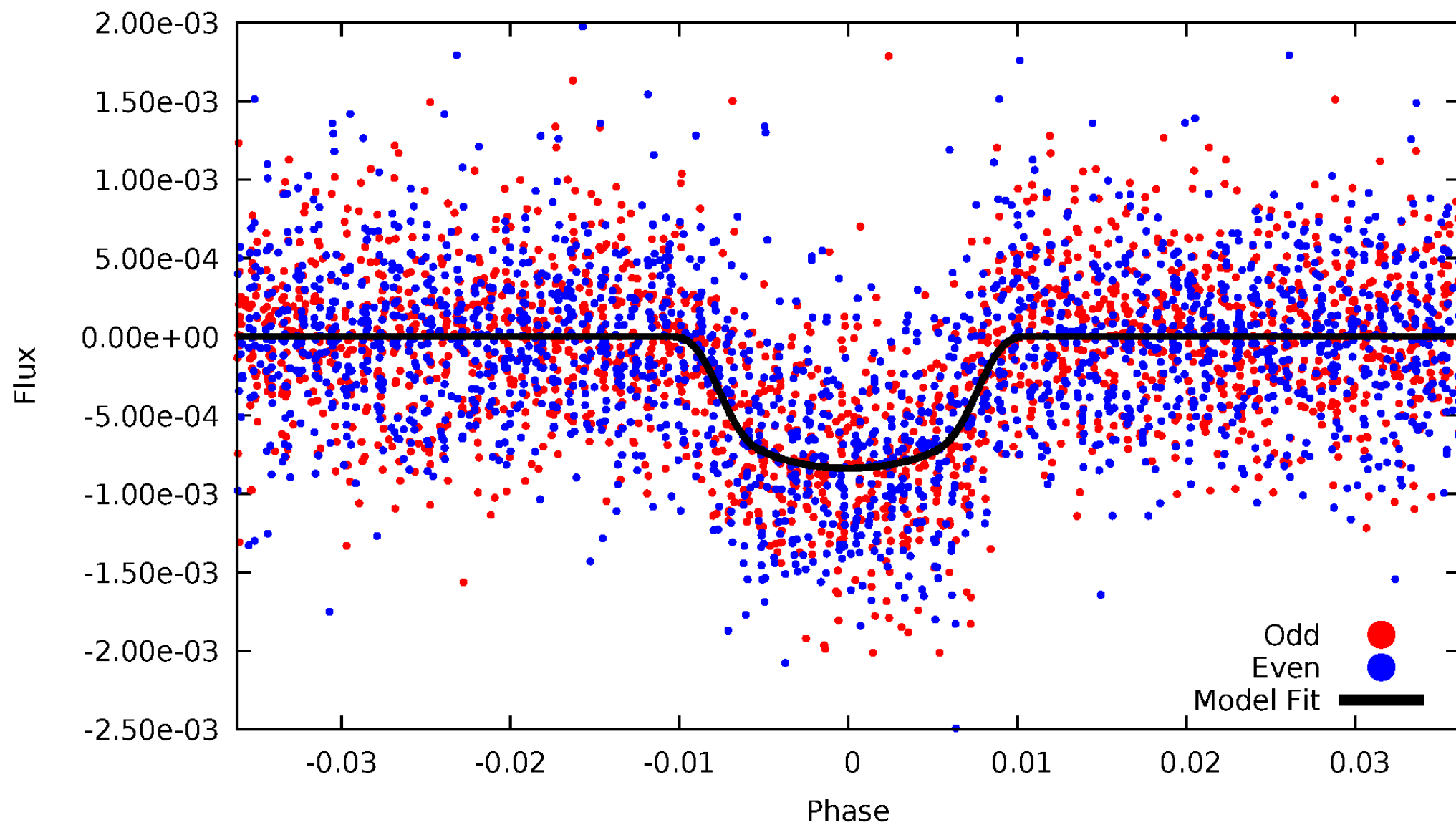


TCE 005438099-01



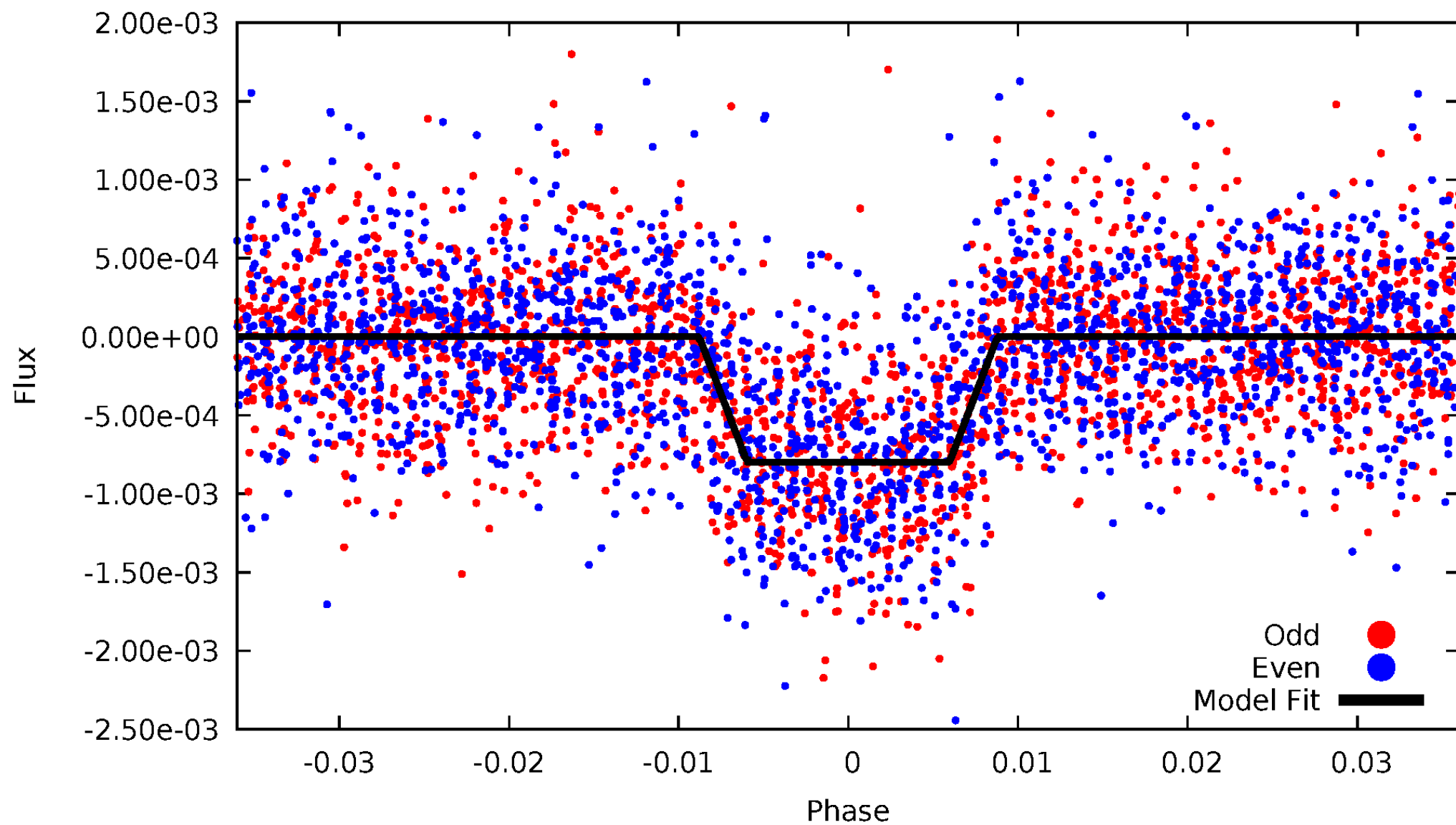
DV Odd/Even

TCE 005438099-01



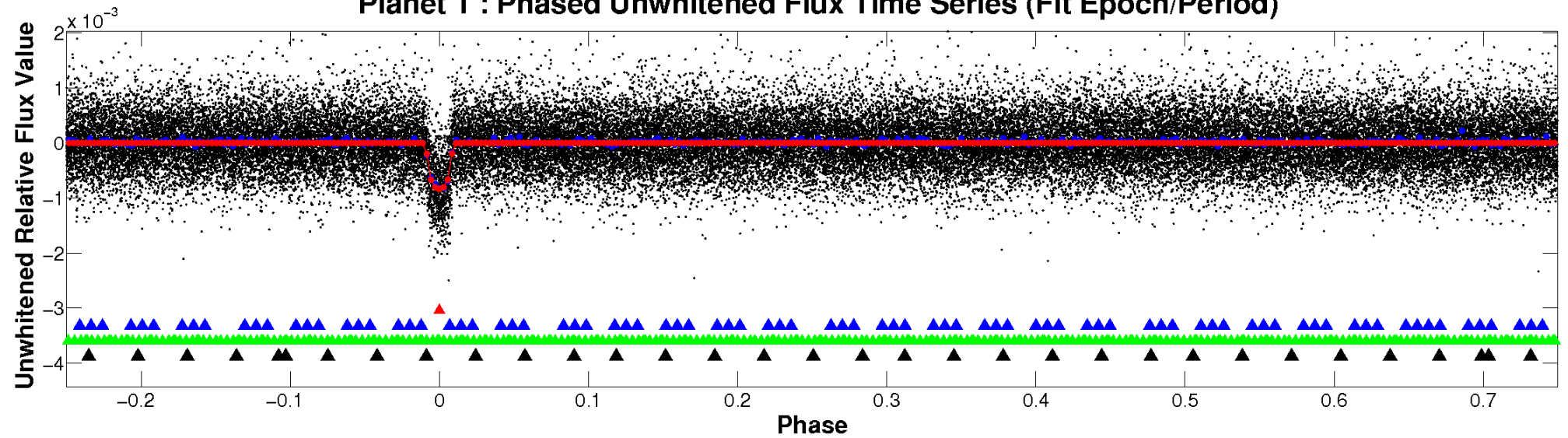
ALT Odd/Even

TCE 005438099-01

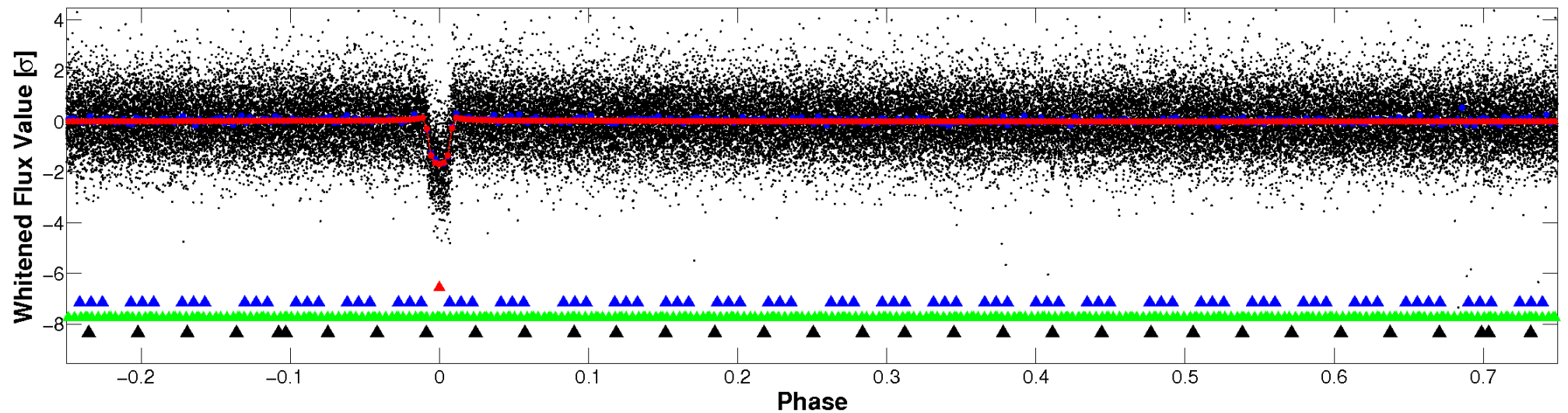


Non-Whitened Vs. Whitened Light Curve

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

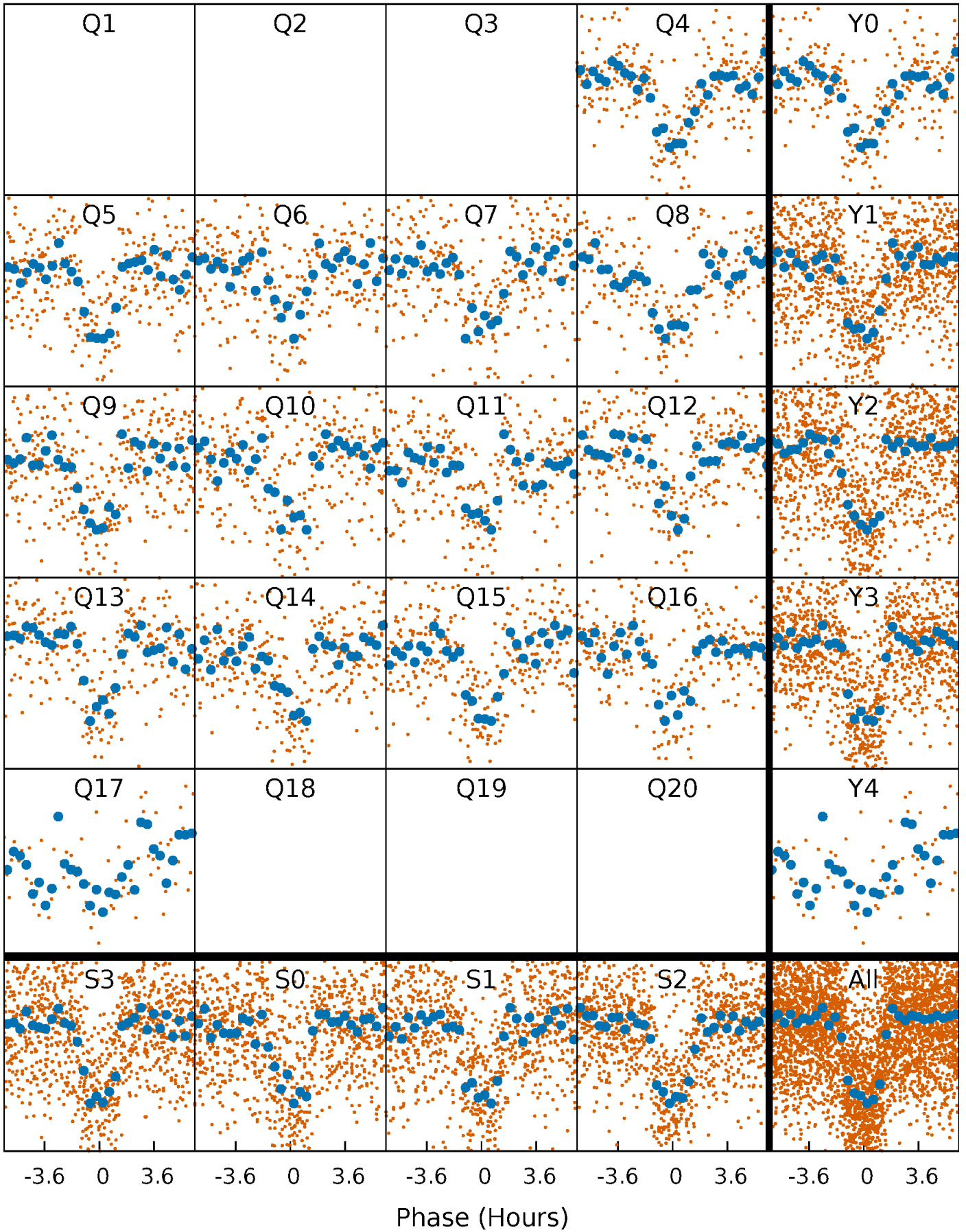


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



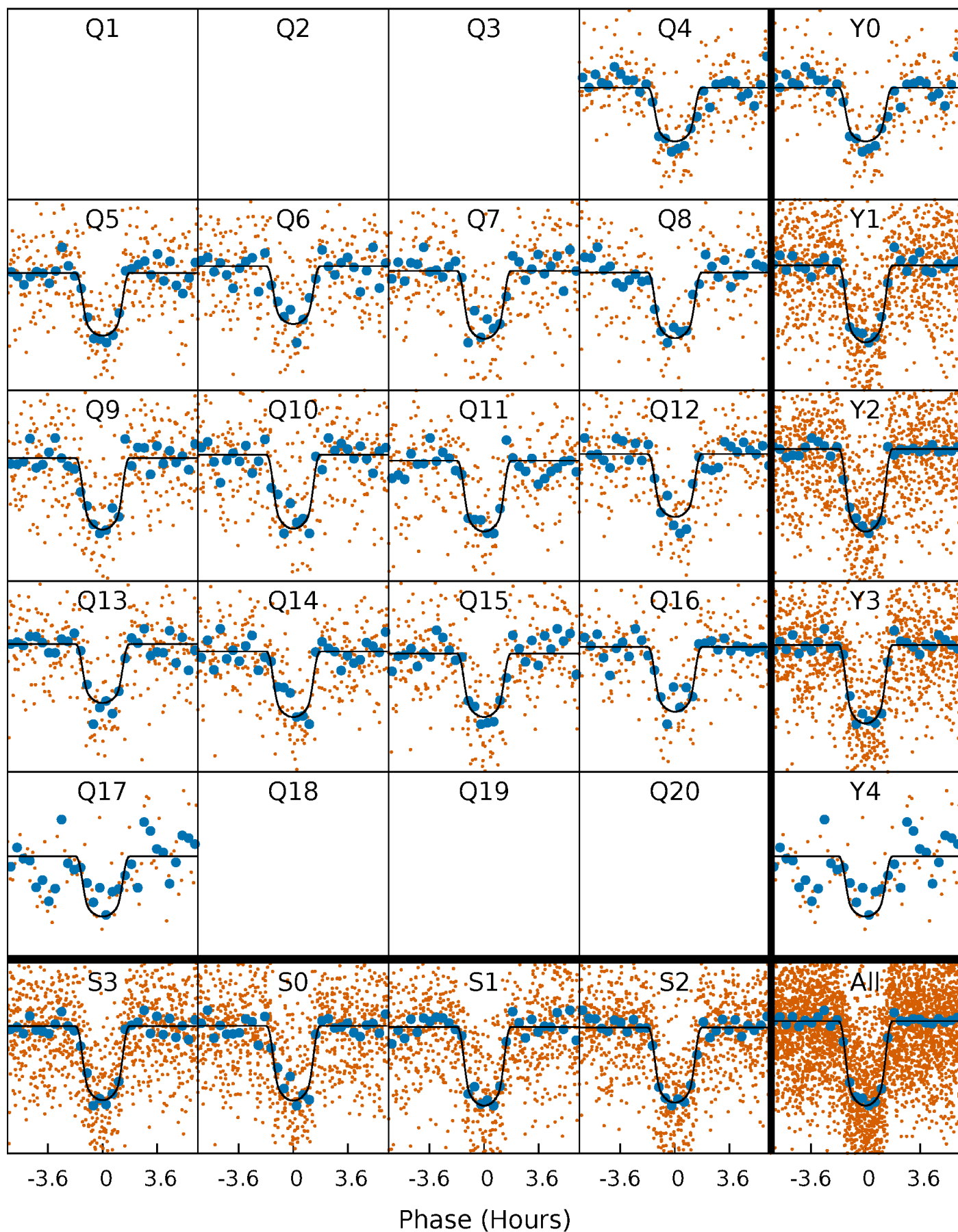
PDC Quarter-Phased Transit Curves

TCE 005438099-01 P= 7.240179 Days $T_0=137.810390$ (BKJD)



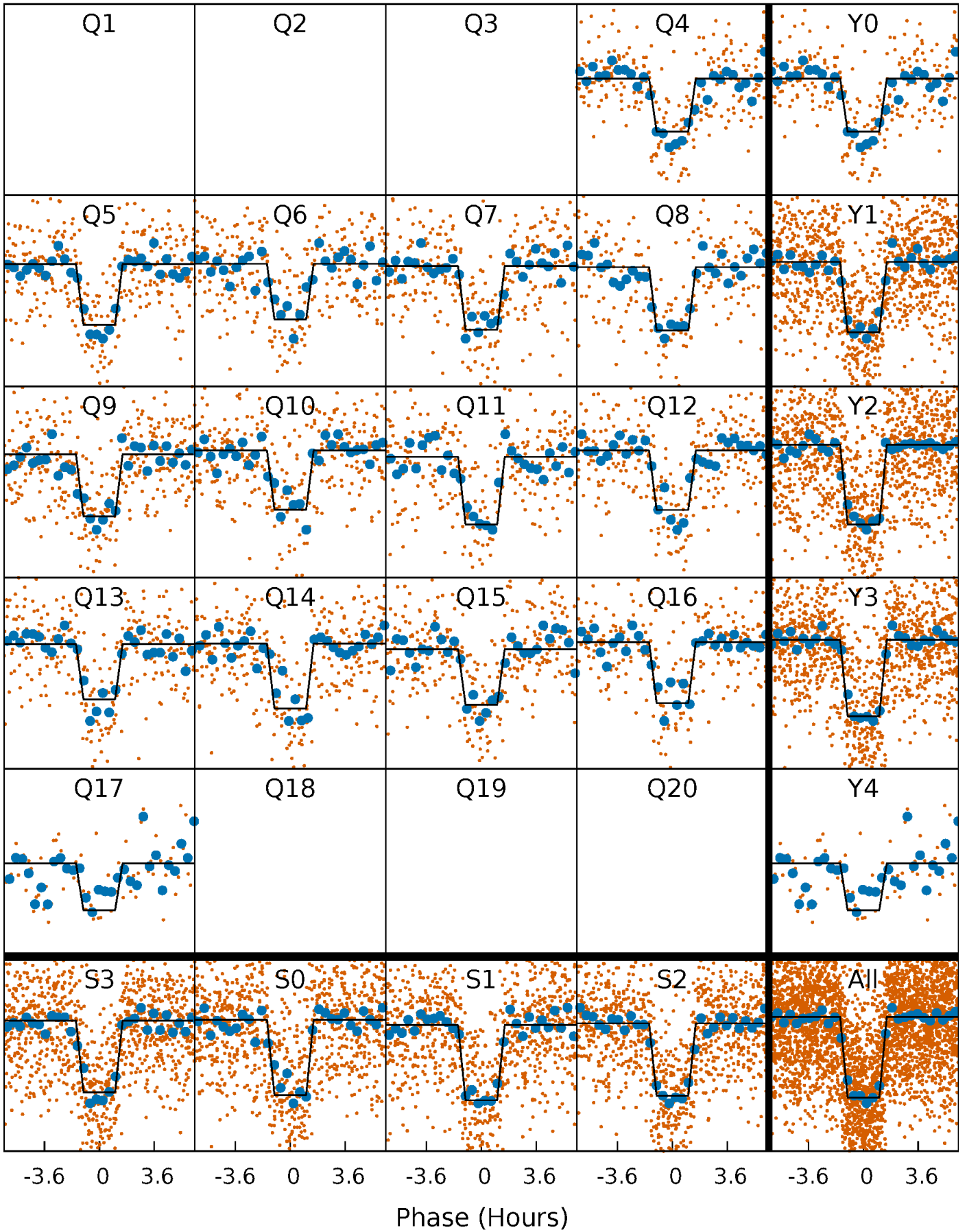
DV Quarter-Phased Transit Curves

TCE 005438099-01 P= 7.240179 Days $T_0=137.810390$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

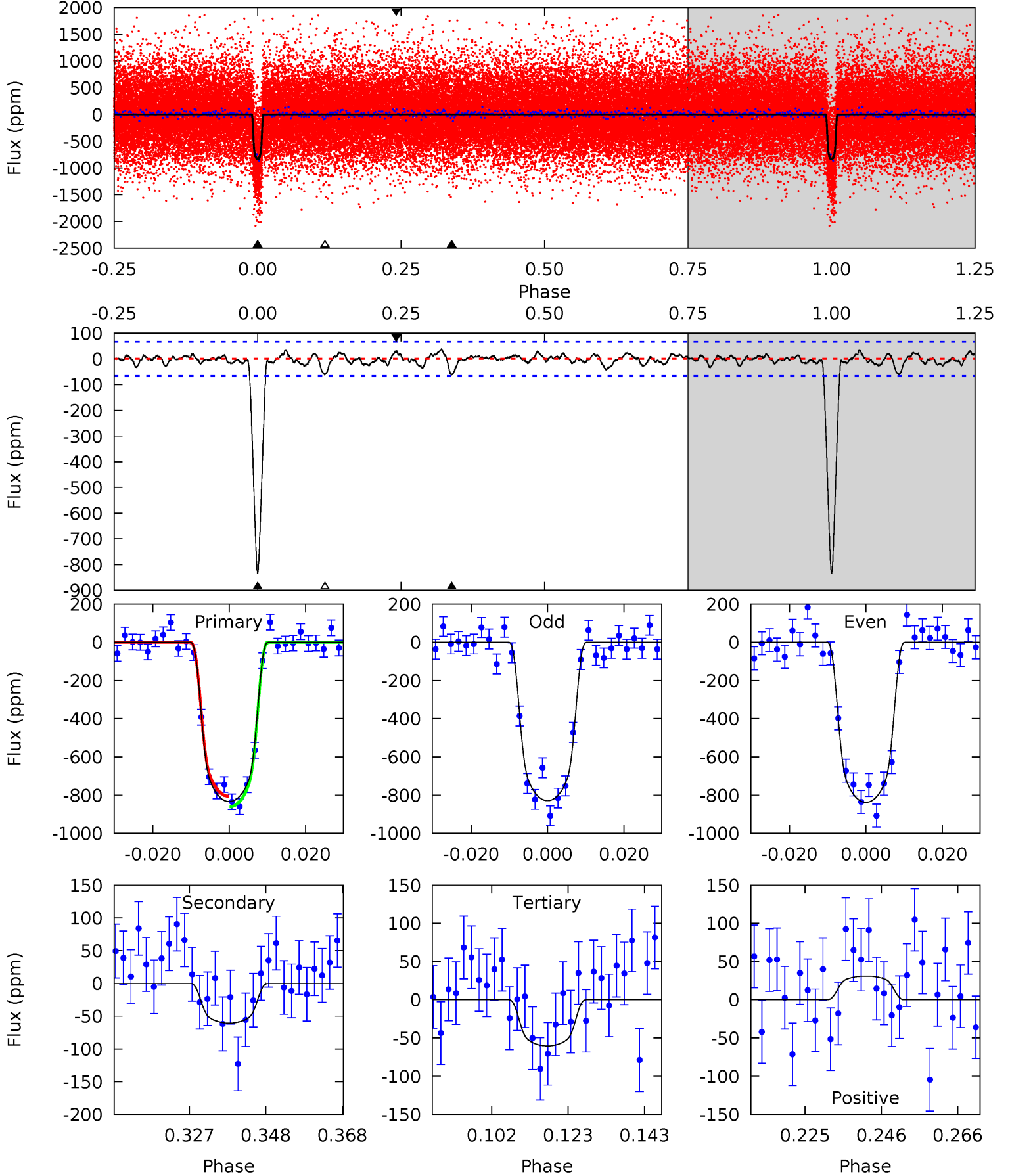
TCE 005438099-01 P= 7.240182 Days $T_0=137.810313$ (BKJD)



DV Model-Shift Uniqueness Test

005438099-01, P = 7.240179 Days, E = 137.810390 Days

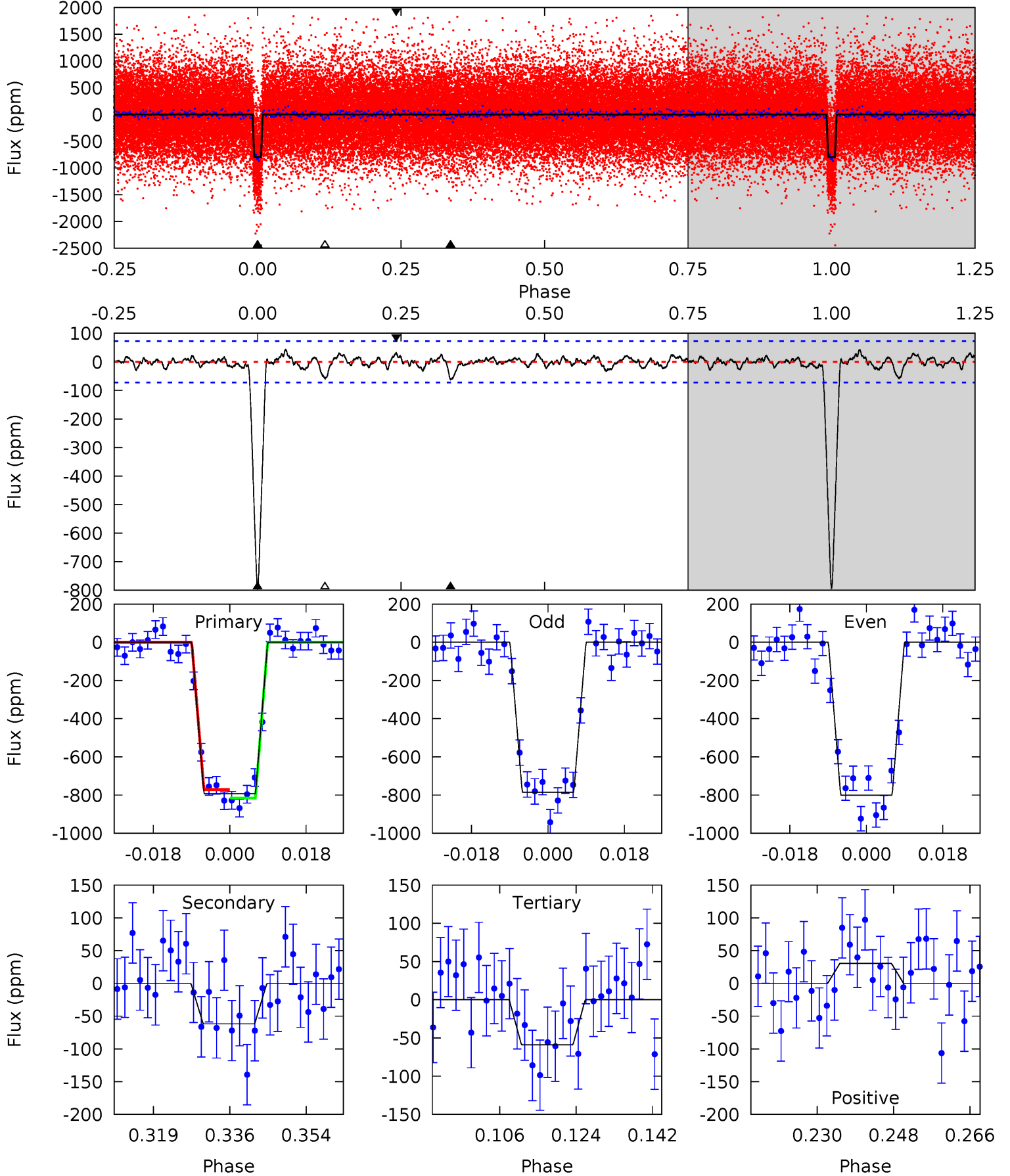
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
61.3	4.46	4.44	2.28	4.89	2.32	1.07	56.8	59.0	0.02	2.18	0.32	0.98	0.04	2.05



Alt Model-Shift Uniqueness Test

005438099-01, P = 7.240182 Days, E = 137.810313 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
53.9	4.20	4.00	2.08	4.92	2.37	0.94	49.9	51.8	0.20	2.12	0.52	0.99	0.05	1.50



Stellar Parameters For KIC 005438099

	$T_{\text{eff}}(K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	4955^{+100}_{-100}	$4.610^{+0.018}_{-0.046}$	$-0.100^{+0.150}_{-0.150}$	$0.721^{+0.047}_{-0.029}$	$0.774^{+0.036}_{-0.048}$	$2.914^{+0.270}_{-0.442}$
	+2%/-2%	+0%/-1%	+150%/-150%	+7%/-4%	+5%/-6%	+9%/-15%
Source	SPE58	SPE58	SPE58	DSEP		

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

Secondary Eclipse Parameters for KIC 005438099-01 / KOI 1567.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-61 ± 14	$2.54^{+0.23}_{-0.22}$	1007^{+24}_{-25}	3041^{+135}_{-119}	23^{+7}_{-6}
Alt.	-62 ± 15	$2.23^{+0.22}_{-0.20}$	1006^{+25}_{-23}	3169^{+147}_{-144}	31^{+10}_{-8}

T_{max} = Theoretical Maximum Planetary Temperature

T_{obs} = Observed Planetary Temperature (Assuming $A=0.3$)

A_{obs} = Observed Albedo (Assuming $T=0$)

If a secondary eclipse is present, the system is likely an EB if $T_{\text{obs}} \gg T_{\text{max}}$ AND $A_{\text{obs}} \gg 1.0$

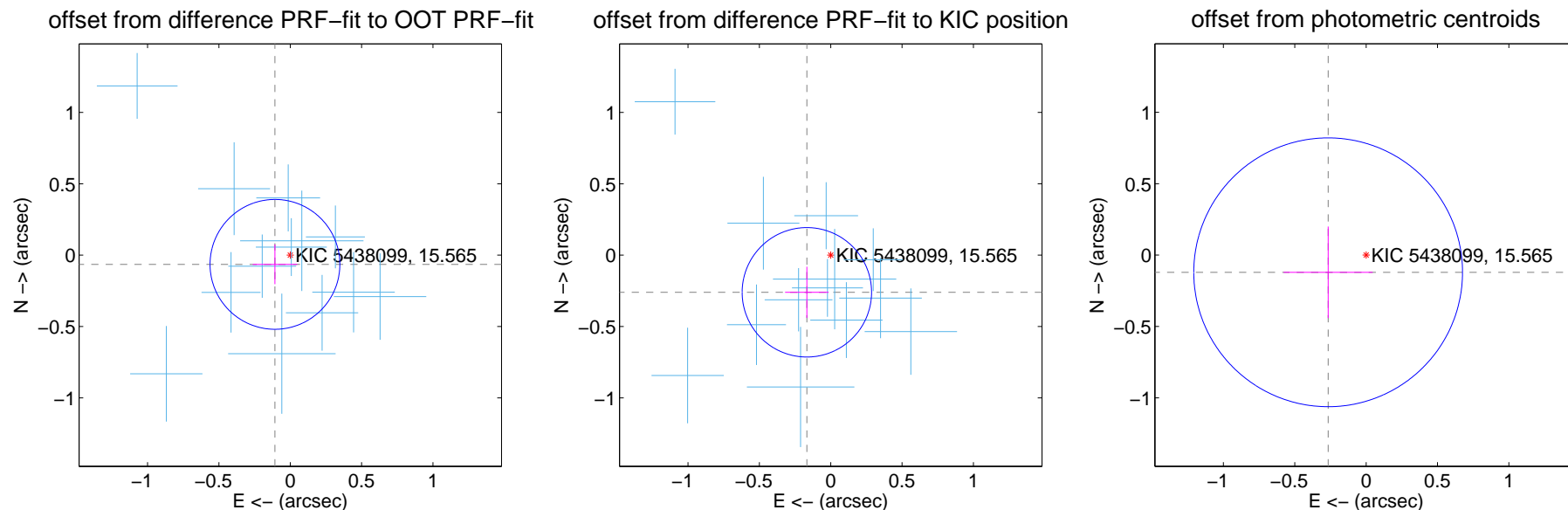
DV Centroid Data

Supplemental centroid analysis for 005438099-01. Kepler magnitude: 15.56. Transit SNR 41.97

There are 13 quarters with good PRF difference image offsets

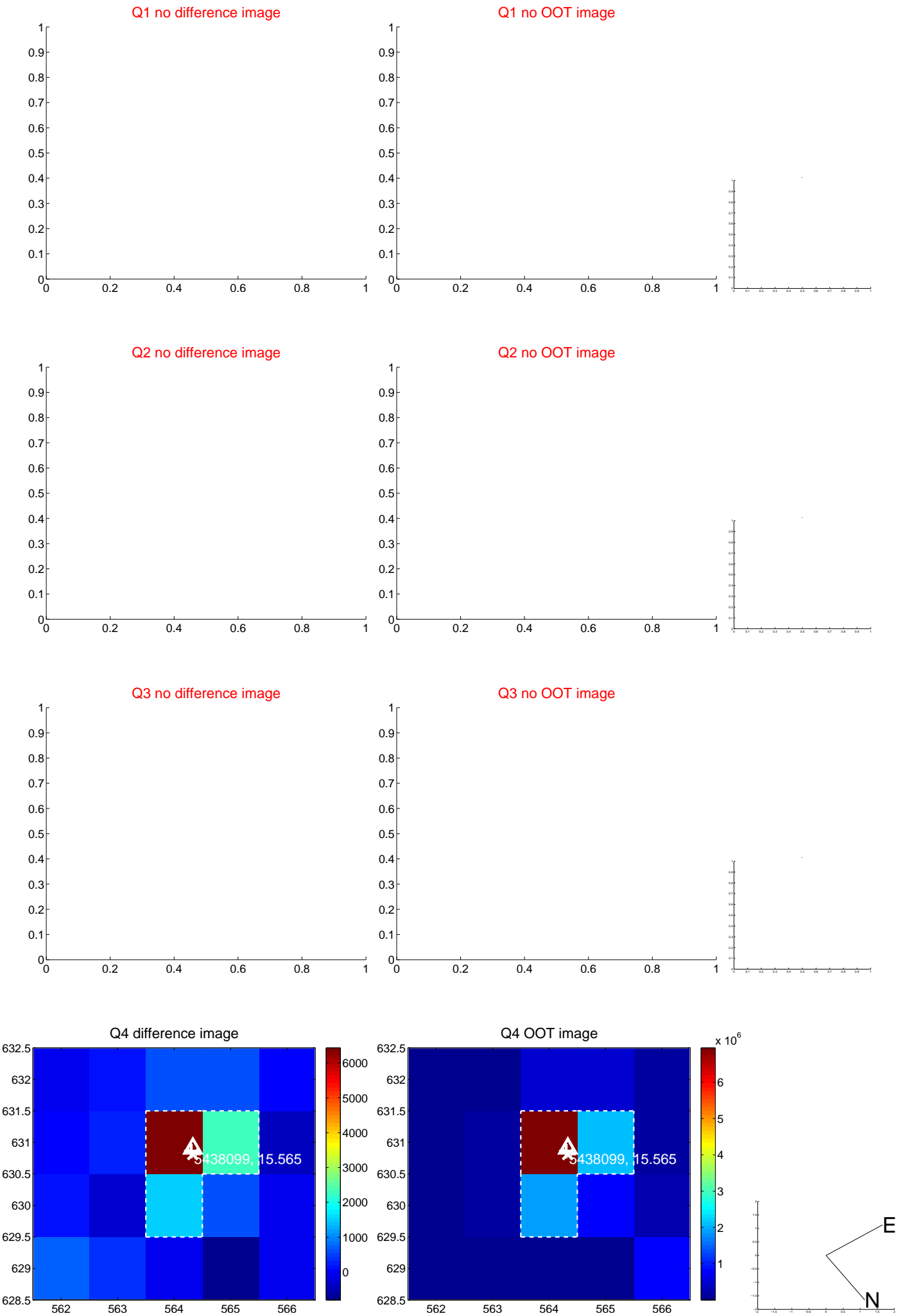
The direct PRF centroid is offset from the target star catalog position by about 0.27 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.125 ± 0.152	0.83	0.107 ± 0.156	-0.064 ± 0.139
PRF-fit source offset from KIC position	0.309 ± 0.151	2.05	0.167 ± 0.152	-0.260 ± 0.179
photometric centroid source offset	0.29 ± 0.31	0.93	0.27 ± 0.31	-0.12 ± 0.32

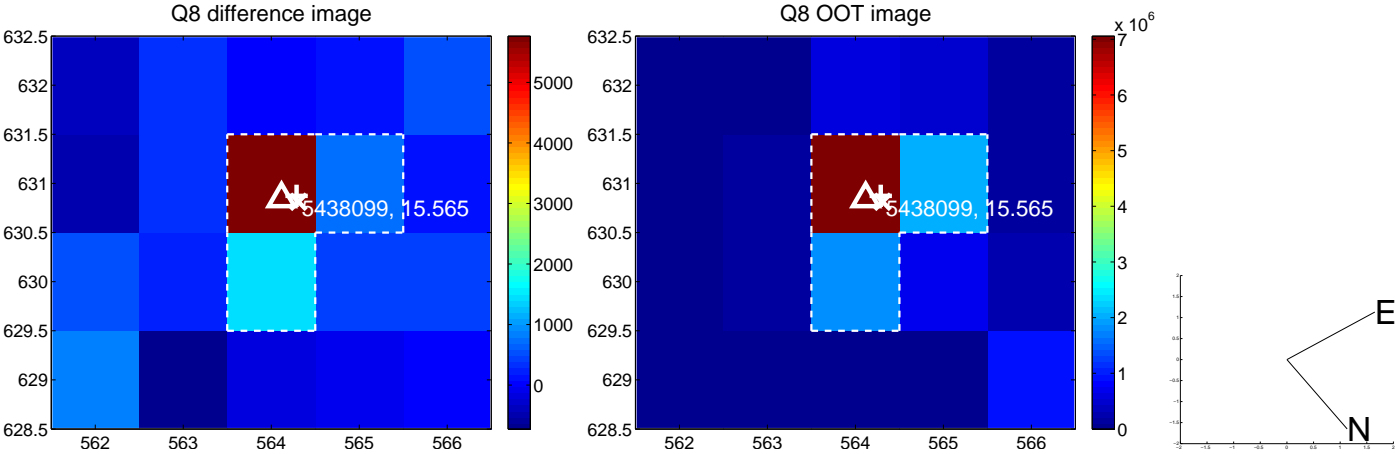
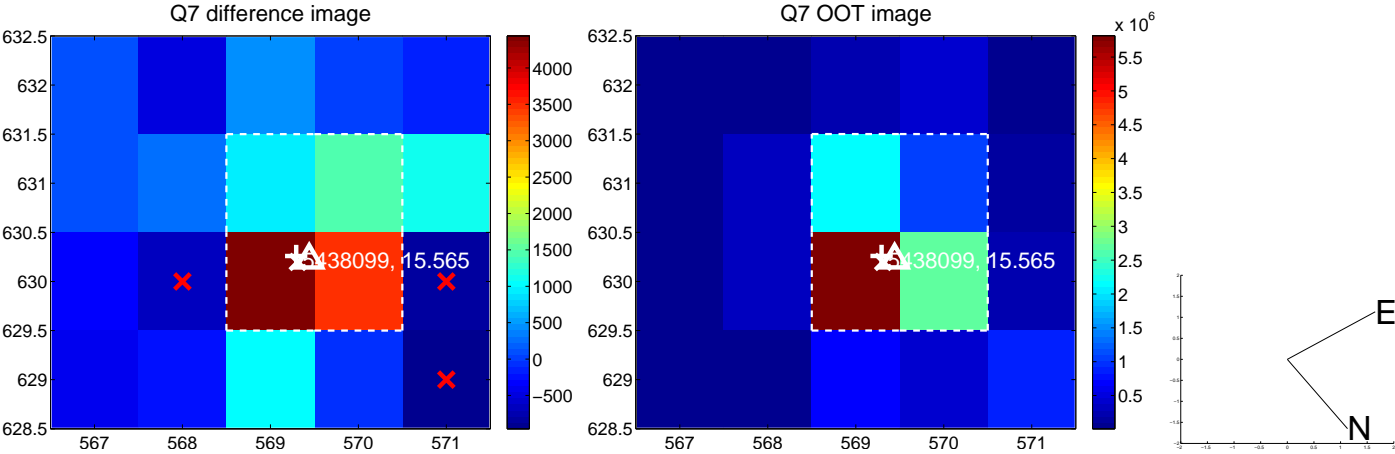
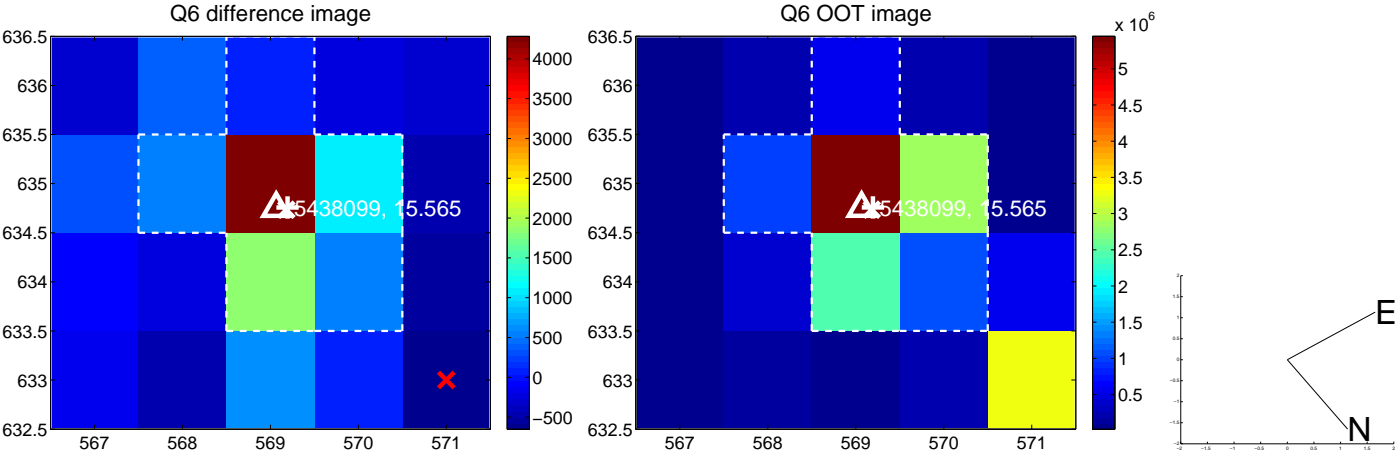
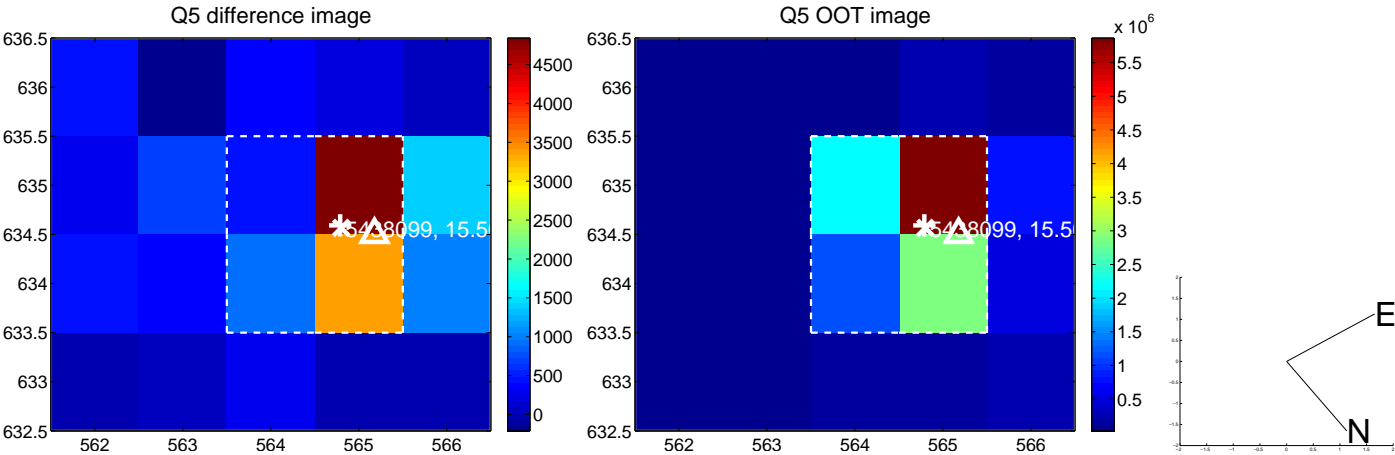


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

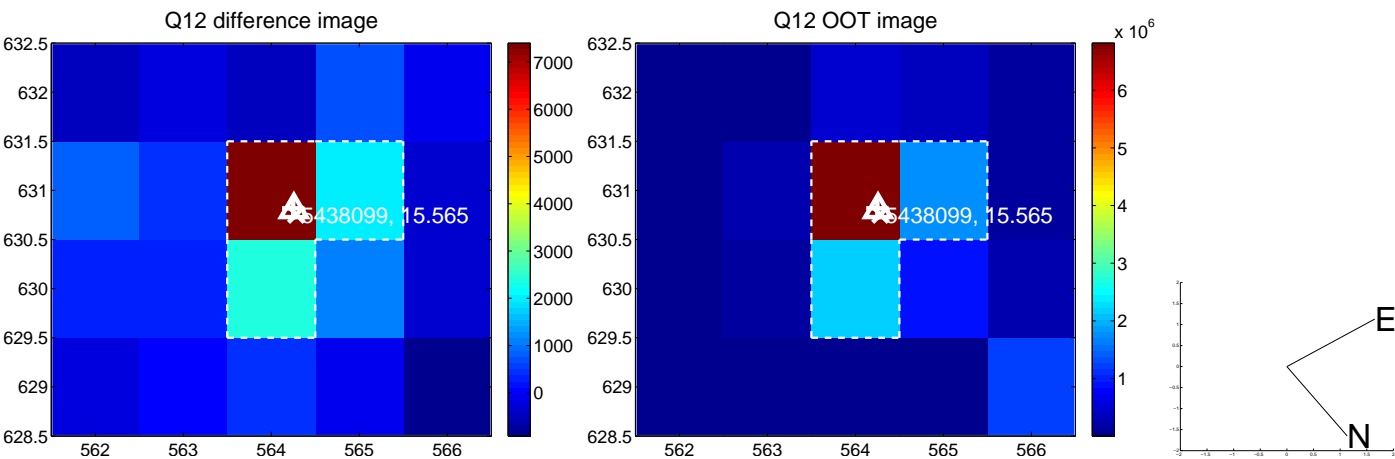
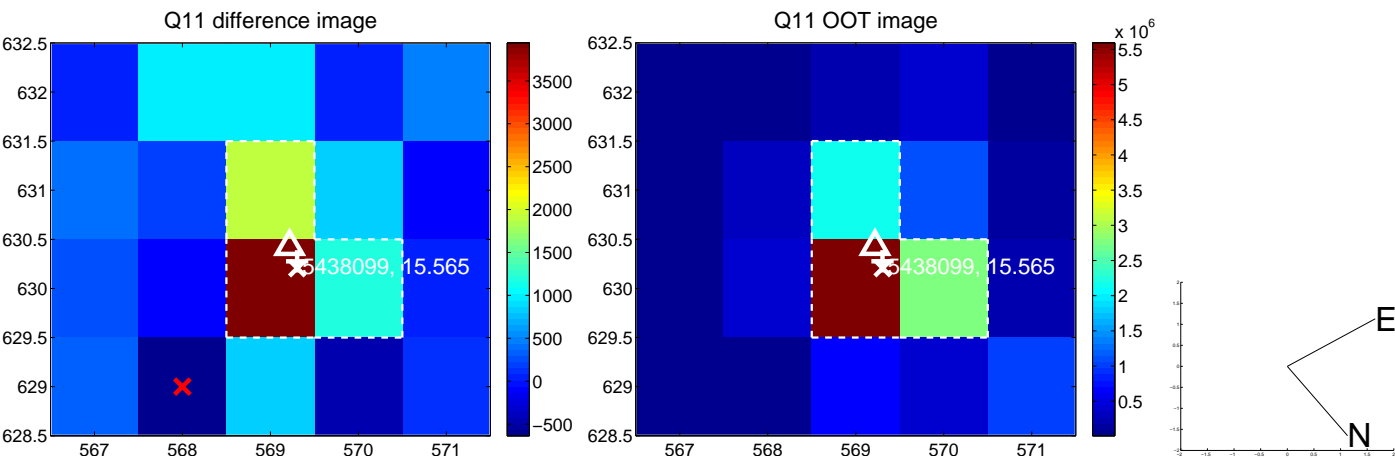
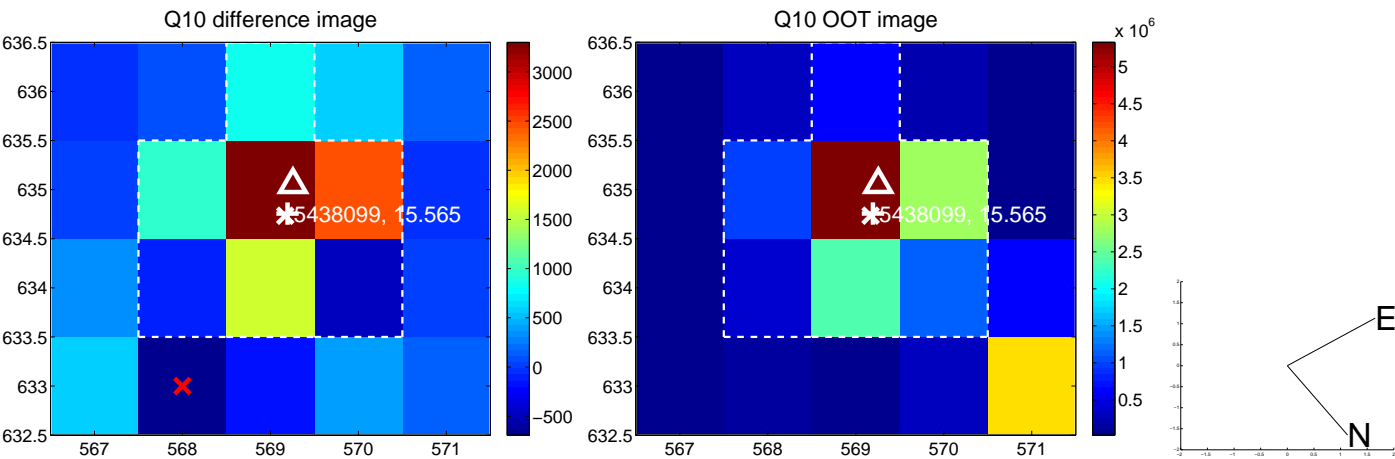
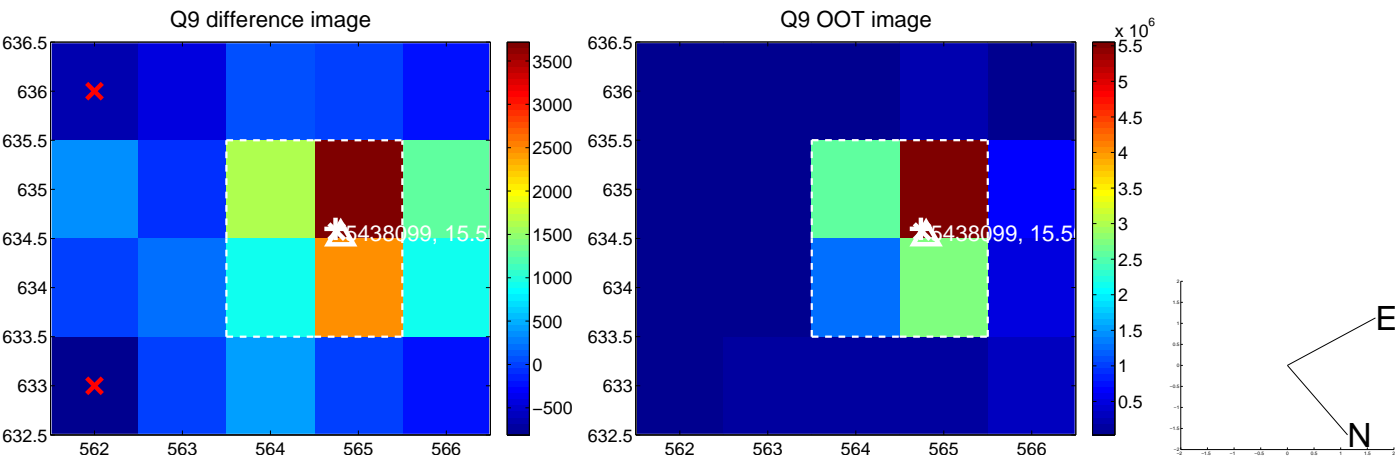
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



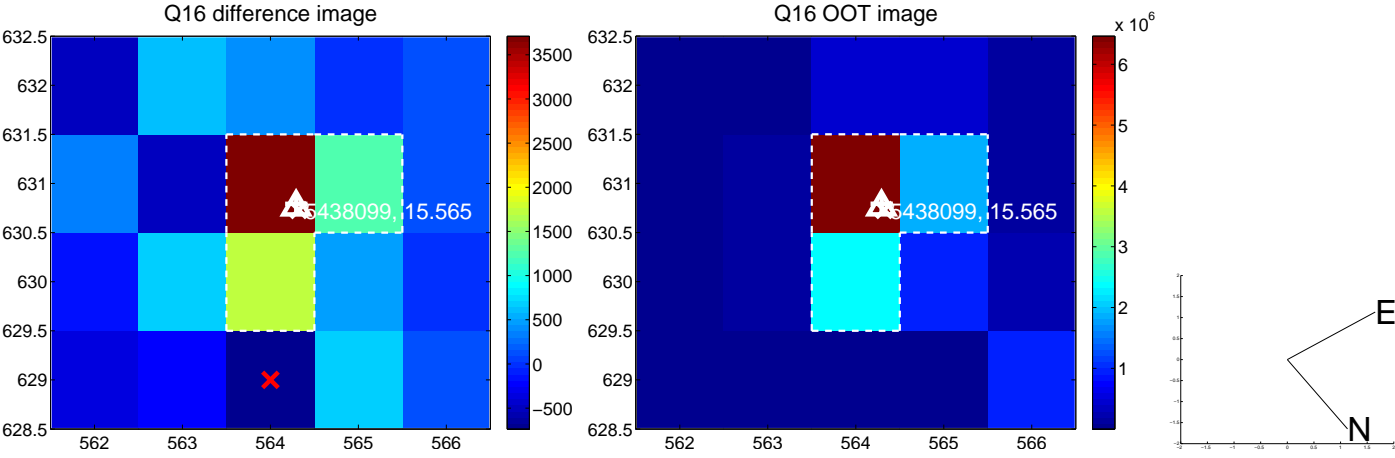
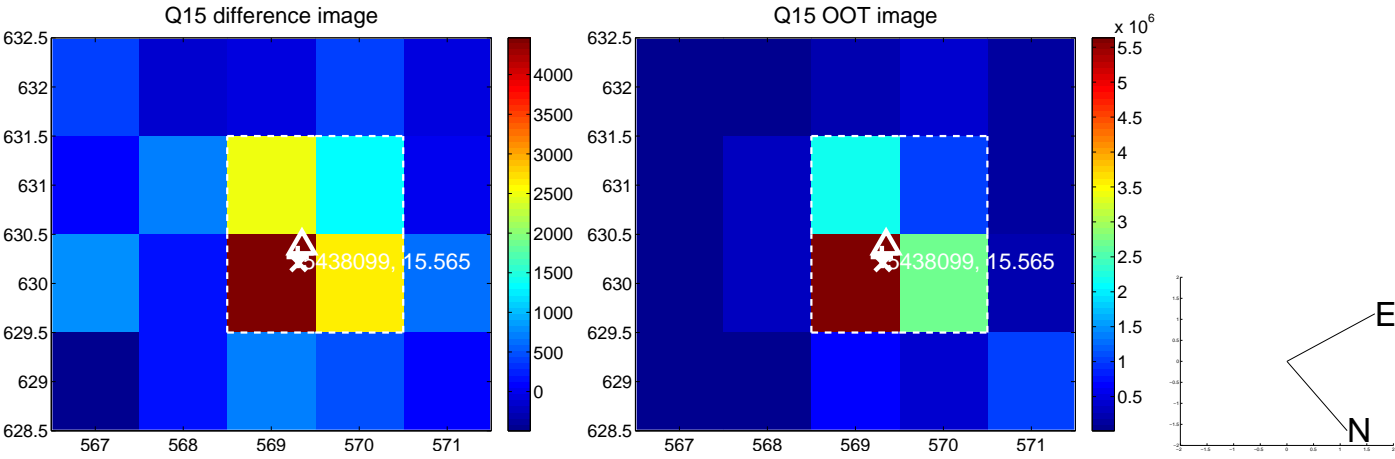
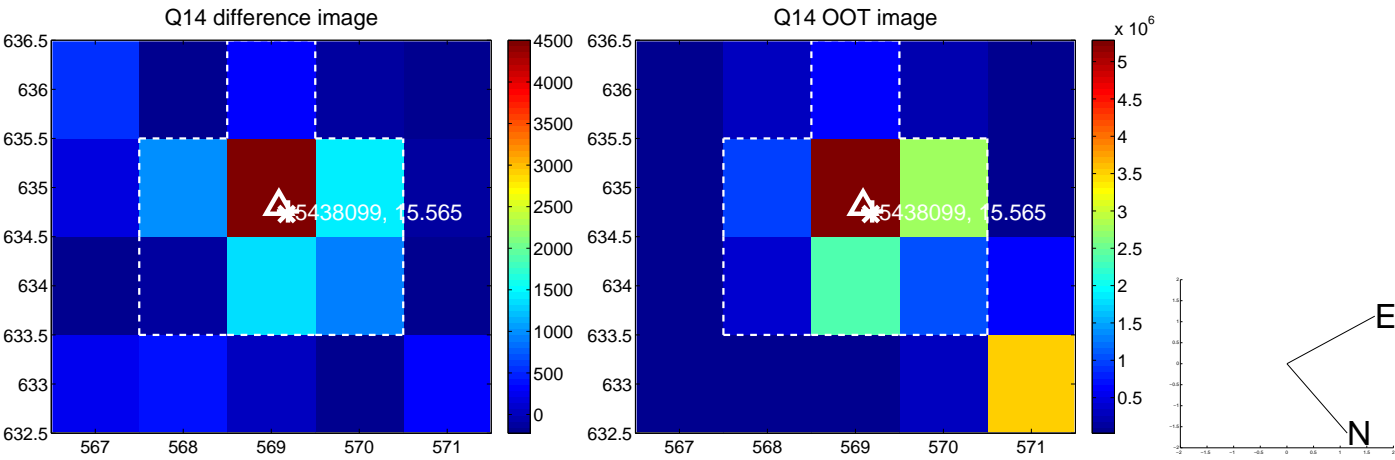
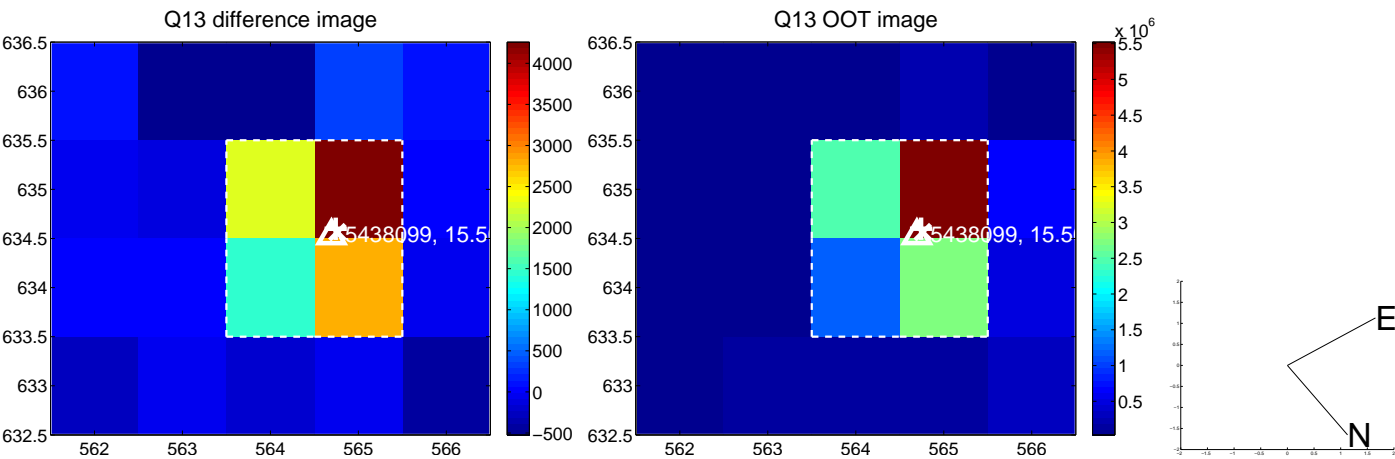
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



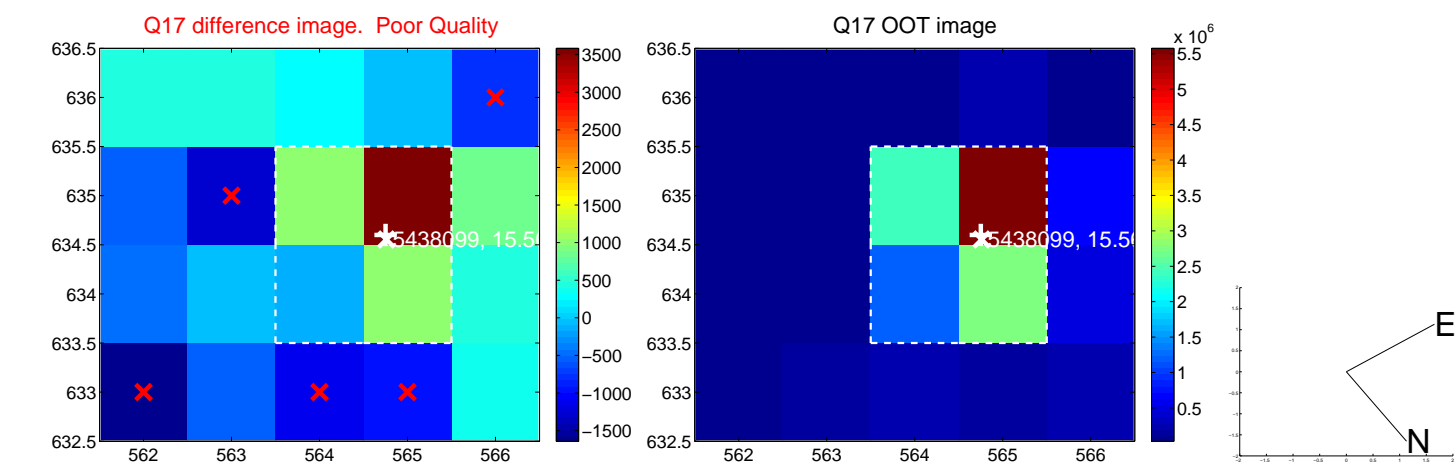
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



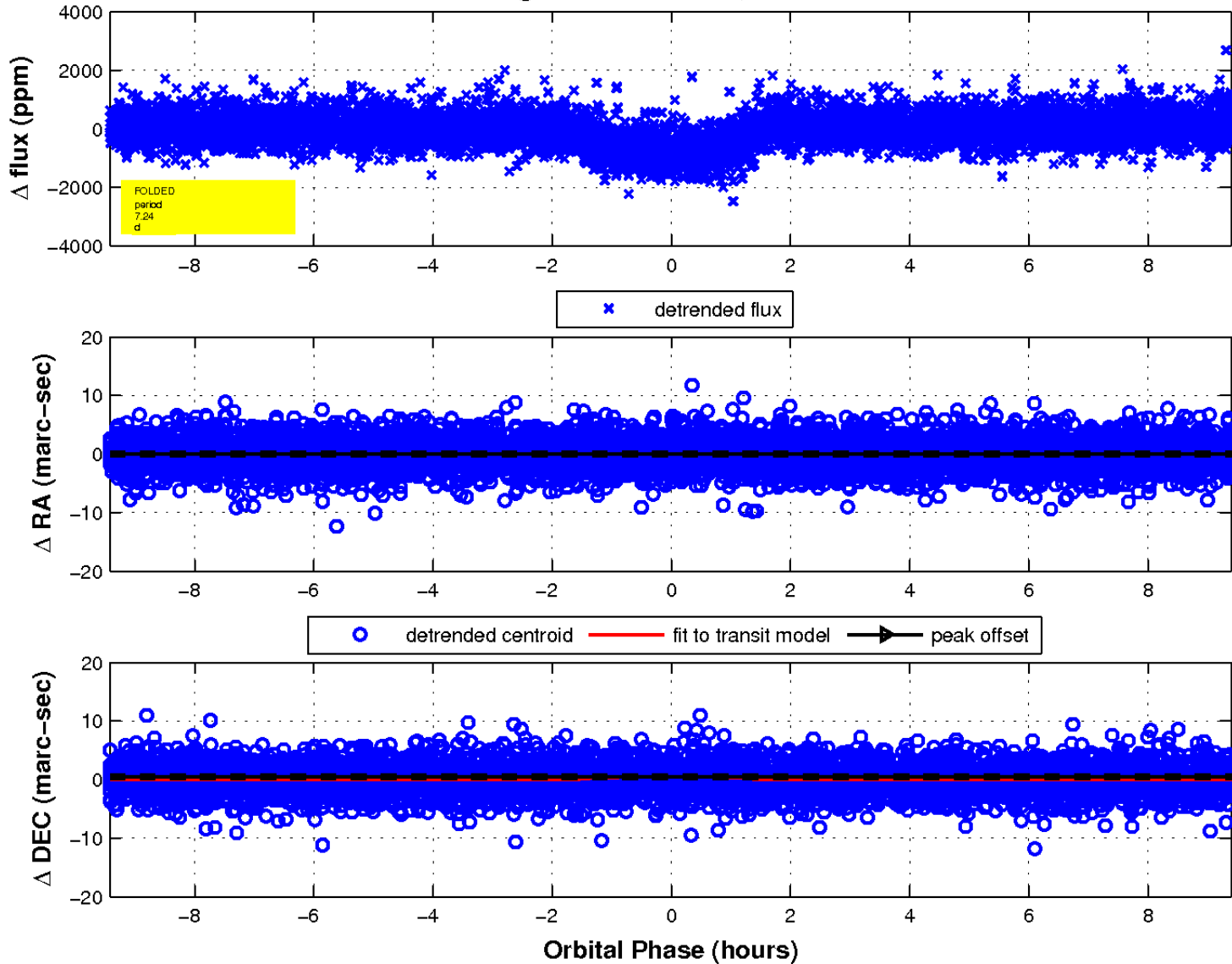
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

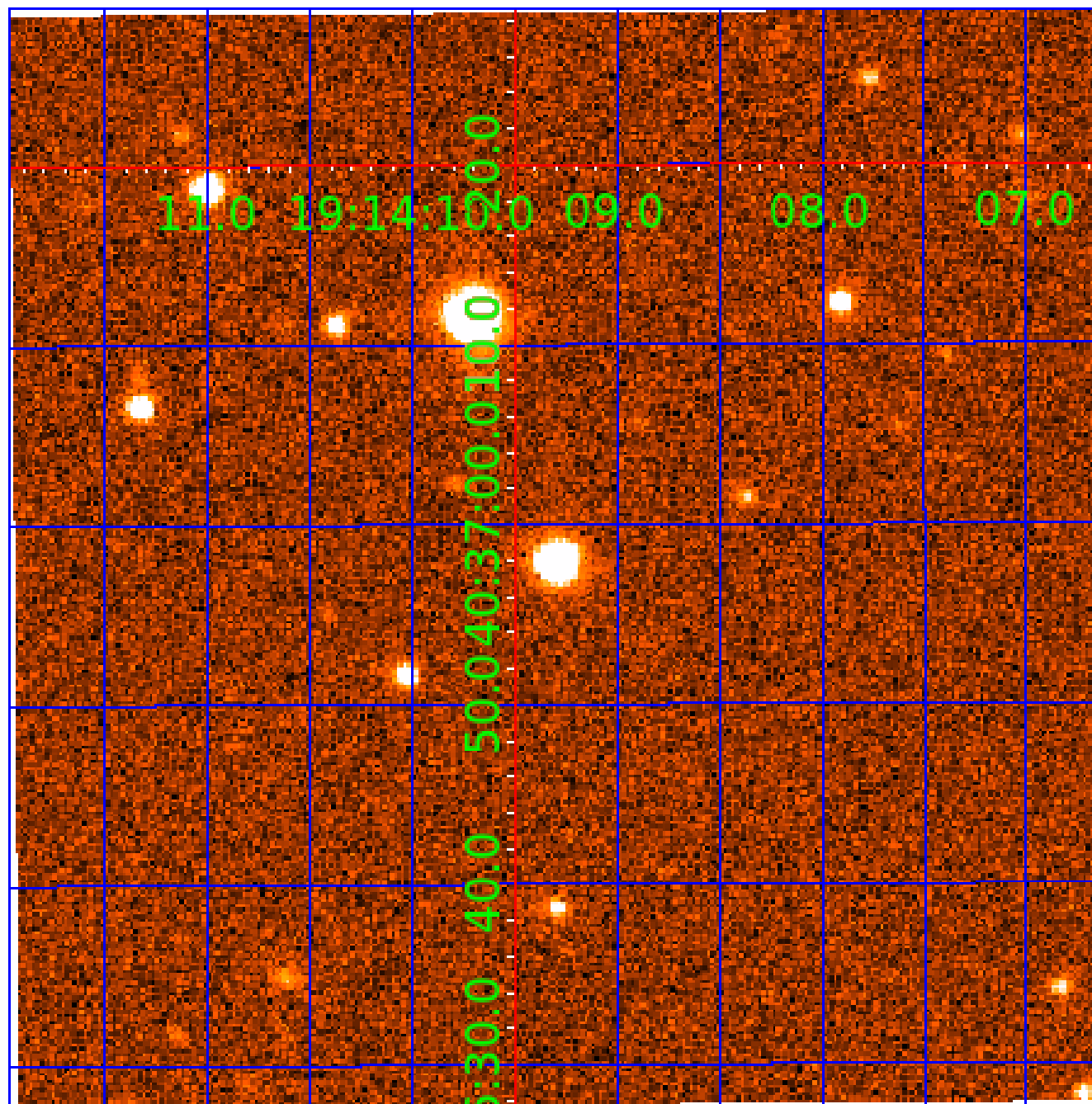


fluxWeightedCentroids, Planet 1 of 4



UKIRT Image

Declination



KIC 005438099

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})
005438099-01	OBS	1567.01	7.240179	137.810390	837.3	3.142	38.2	42.0	0.72	4955	2.51	62.14
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Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005438099-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
005438099-02	OBS	PC	1.00	0	0	0	0	NO_COMMENT
005438099-03	OBS	PC	1.00	0	0	0	0	NO_COMMENT
005438099-04	OBS	PC	1.00	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.

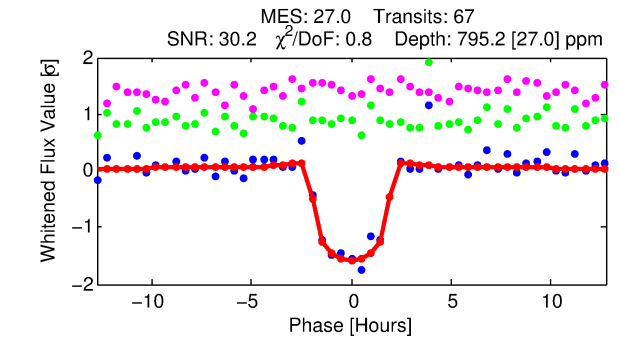
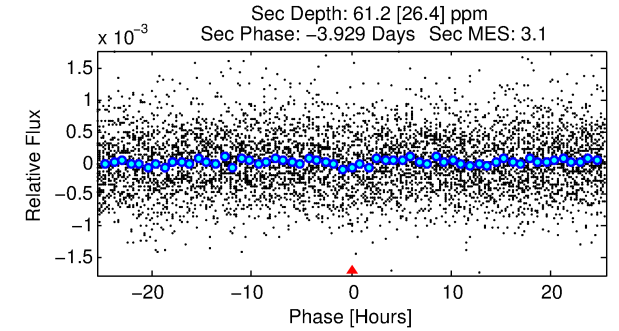
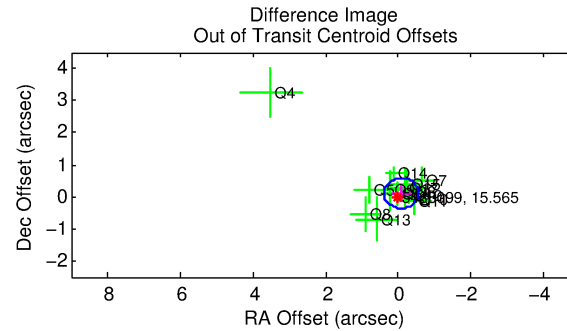
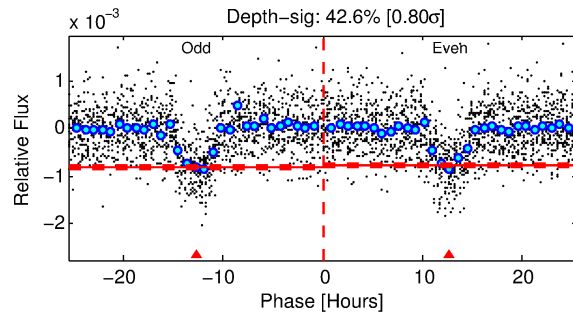
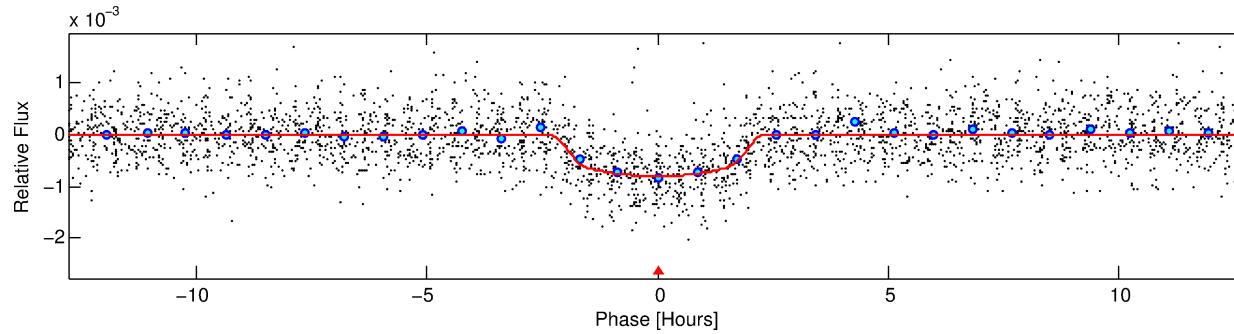
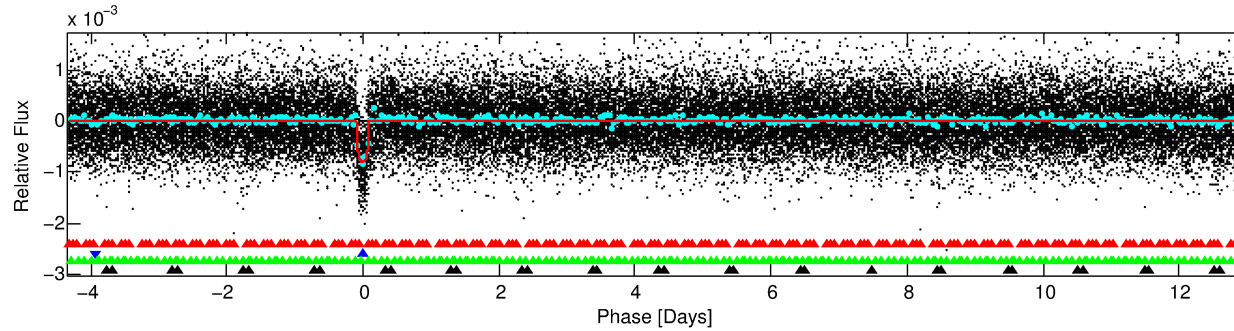
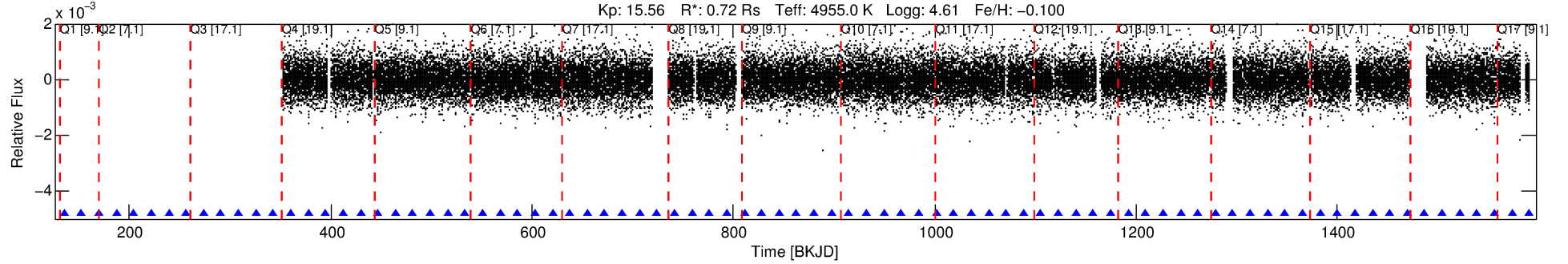
Ephemeris Match Information For 005438099-02

No Significant Match Found

DV One-Page Summary

KIC: 5438099 Candidate: 2 of 4 Period: 17.327 d
KOI: K01567.03 Name: Kepler-306d Corr: 0.993

Kp: 15.56 R*: 0.72 Rs Teff: 4955.0 K Logg: 4.61 Fe/H: -0.100



DV Fit Results:

Period = 17.32668 [0.00007] d
Epoch = 135.2631 [0.0035] BKJD
Rp/R* = 0.0286 [0.0085]
a/R* = 20.95 [22.11]
b = 0.78 [0.55]
Seff = 19.41 [2.25]
Teq = 535 [15] K
Rp = 2.25 [0.69] Re
a = 0.1203 [0.0067] AU
Ag = 96.38 [71.33] [1.34σ]
Teffp = 2593 [480] K [4.29σ]

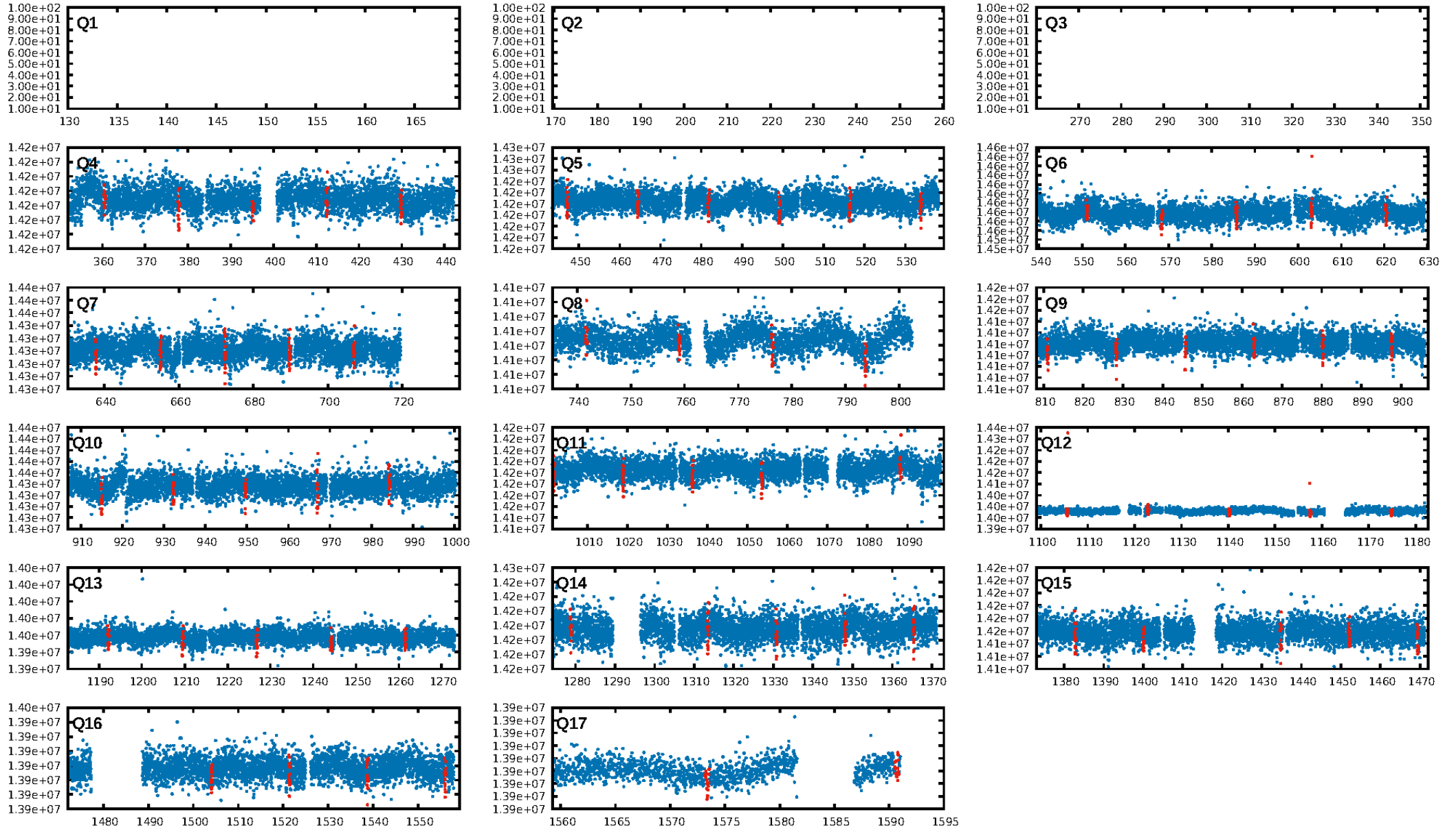
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [45.71σ]
LongPeriod-sig: 100.0% [90.92σ]
ModelChiSquare2-sig: 96.4%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 1.02e-159
RollingBand-fgt: 1.00 [65/65]
GhostDiagnostic-chr: 3.901
Centroid-sig: 0.0%
Centroid-so: 0.796 arcsec [1.85σ]
OotOffset-rm: 0.133 arcsec [0.85σ]
KicOffset-rm: 0.049 arcsec [0.21σ]
OotOffset-st: 3/3/4/4 [14]
KicOffset-st: 3/3/4/4 [14]
DiffImageQuality-fgm: 0.93 [13/14]
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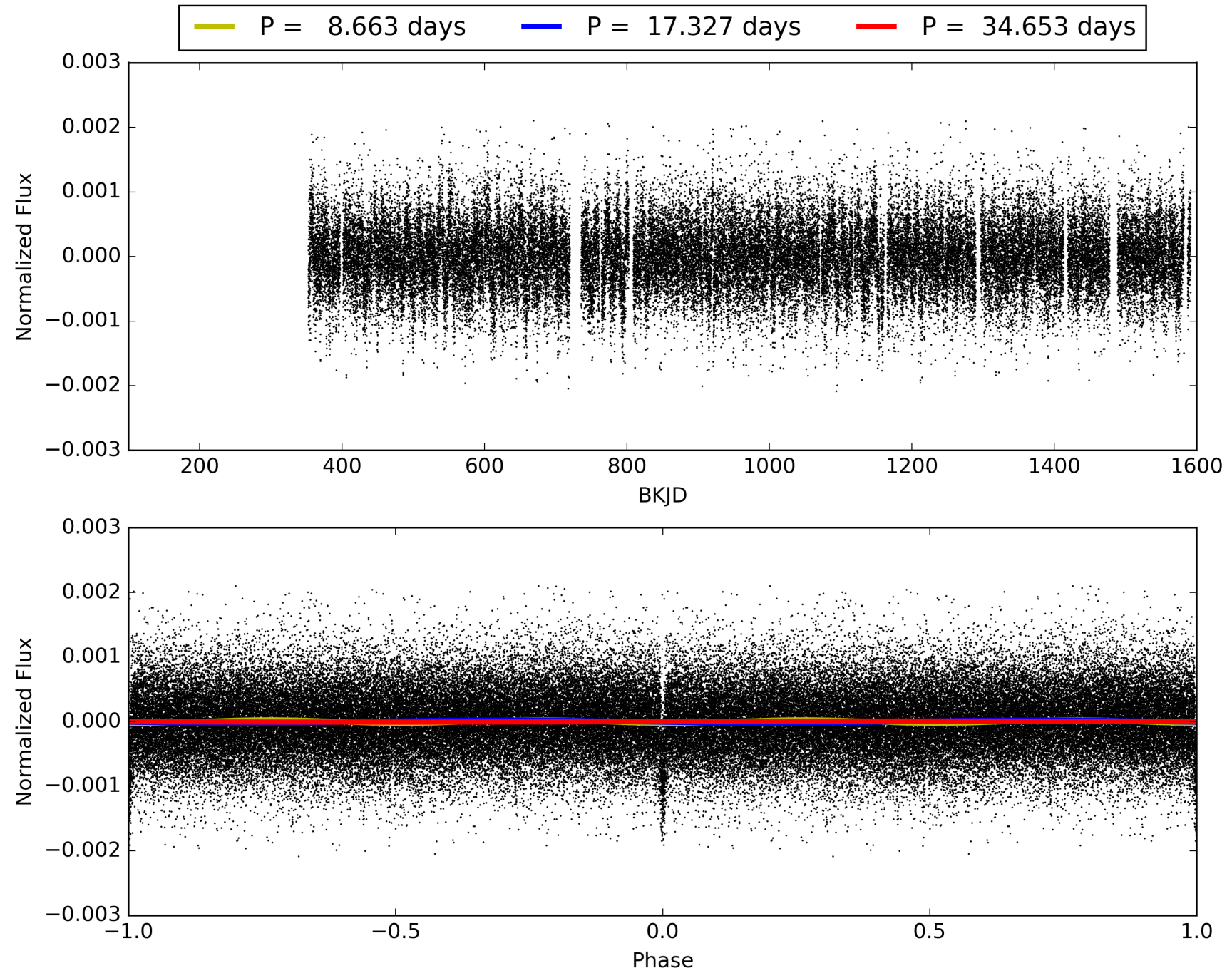
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 03:27:06 Z

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

TCE 005438099-02, PDC Light Curves

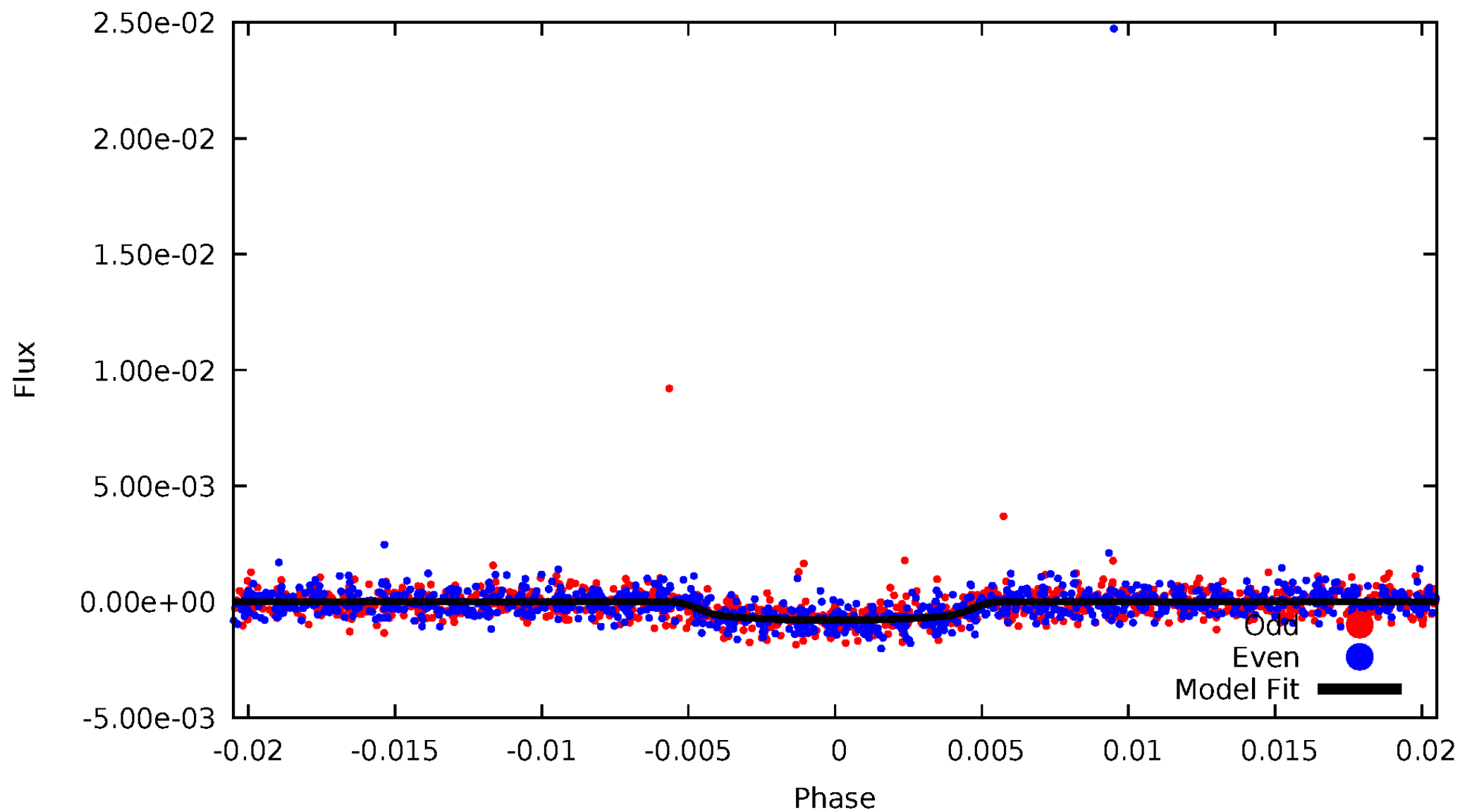


TCE 005438099-02



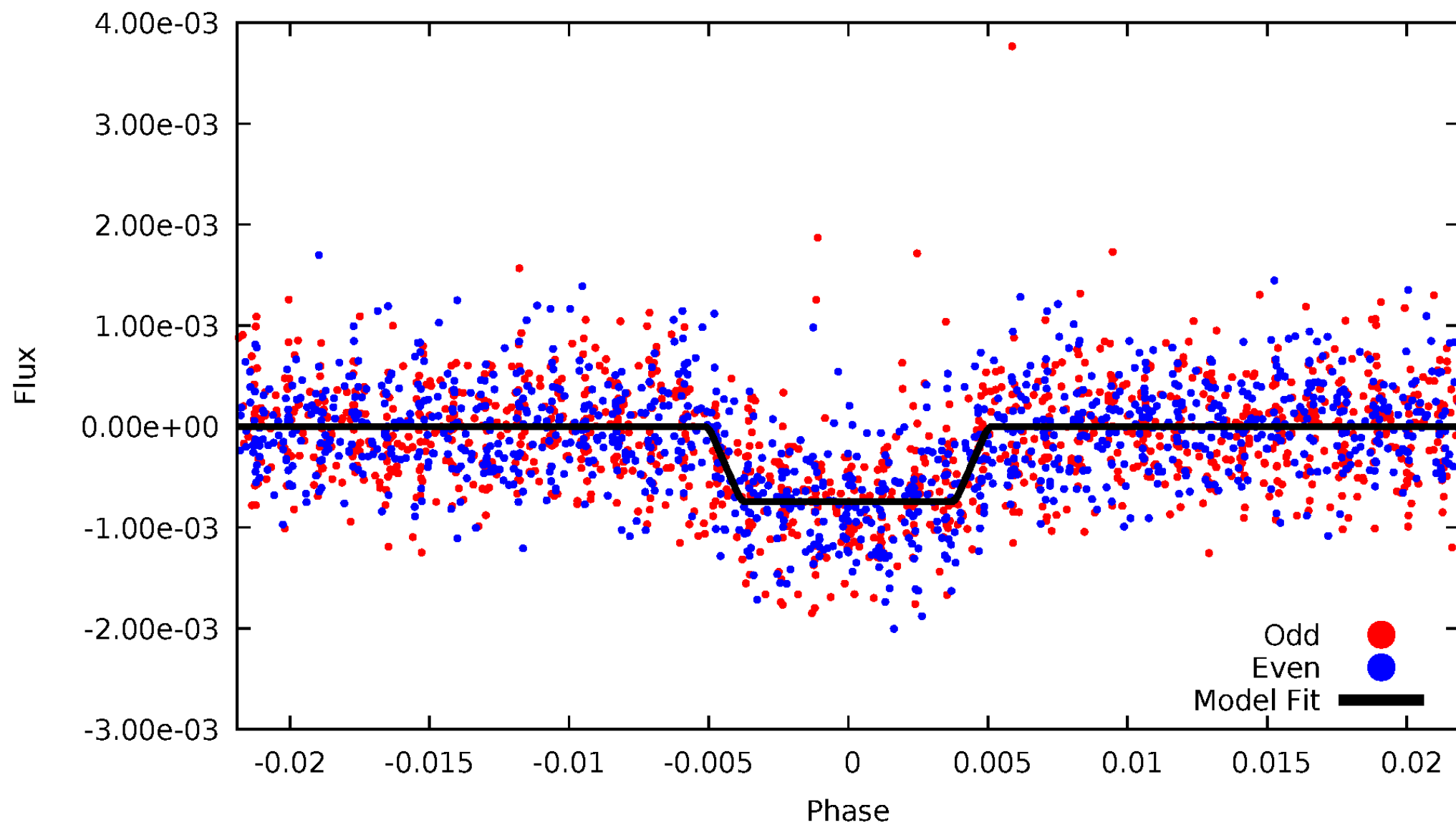
DV Odd/Even

TCE 005438099-02



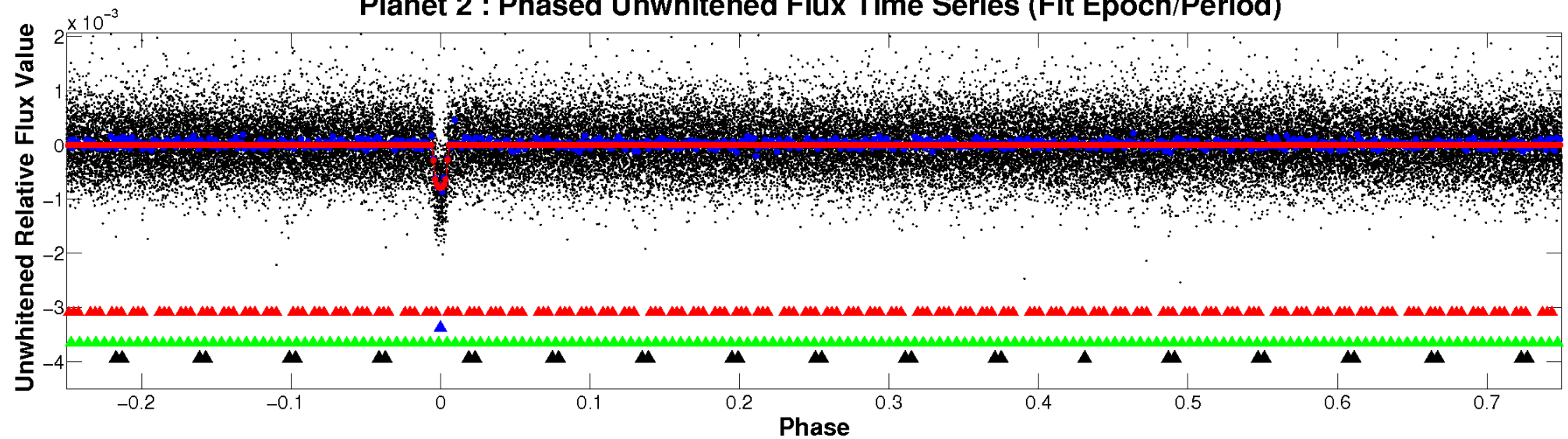
ALT Odd/Even

TCE 005438099-02

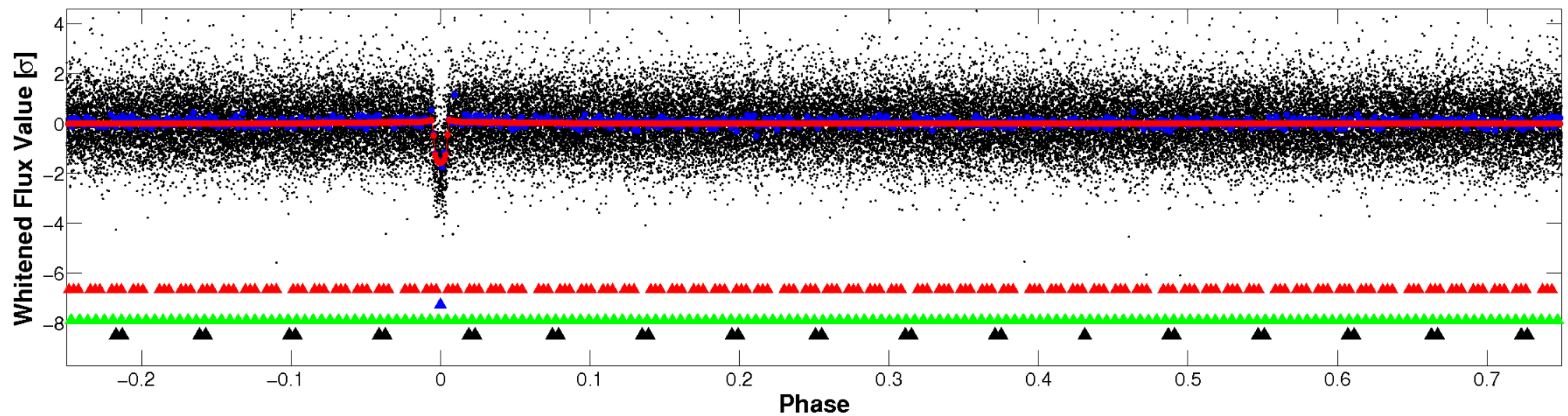


Non-Whitened Vs. Whitened Light Curve

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

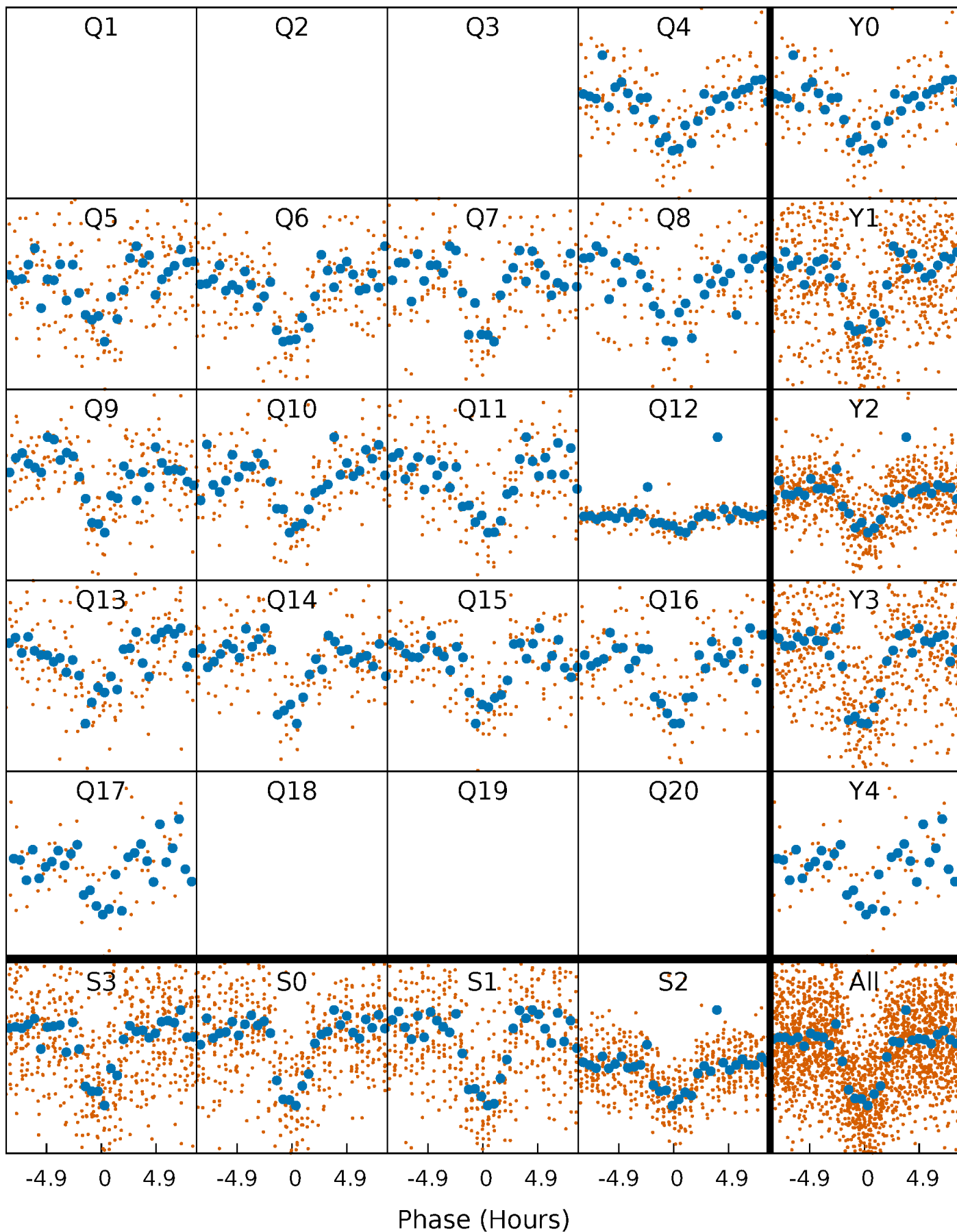


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



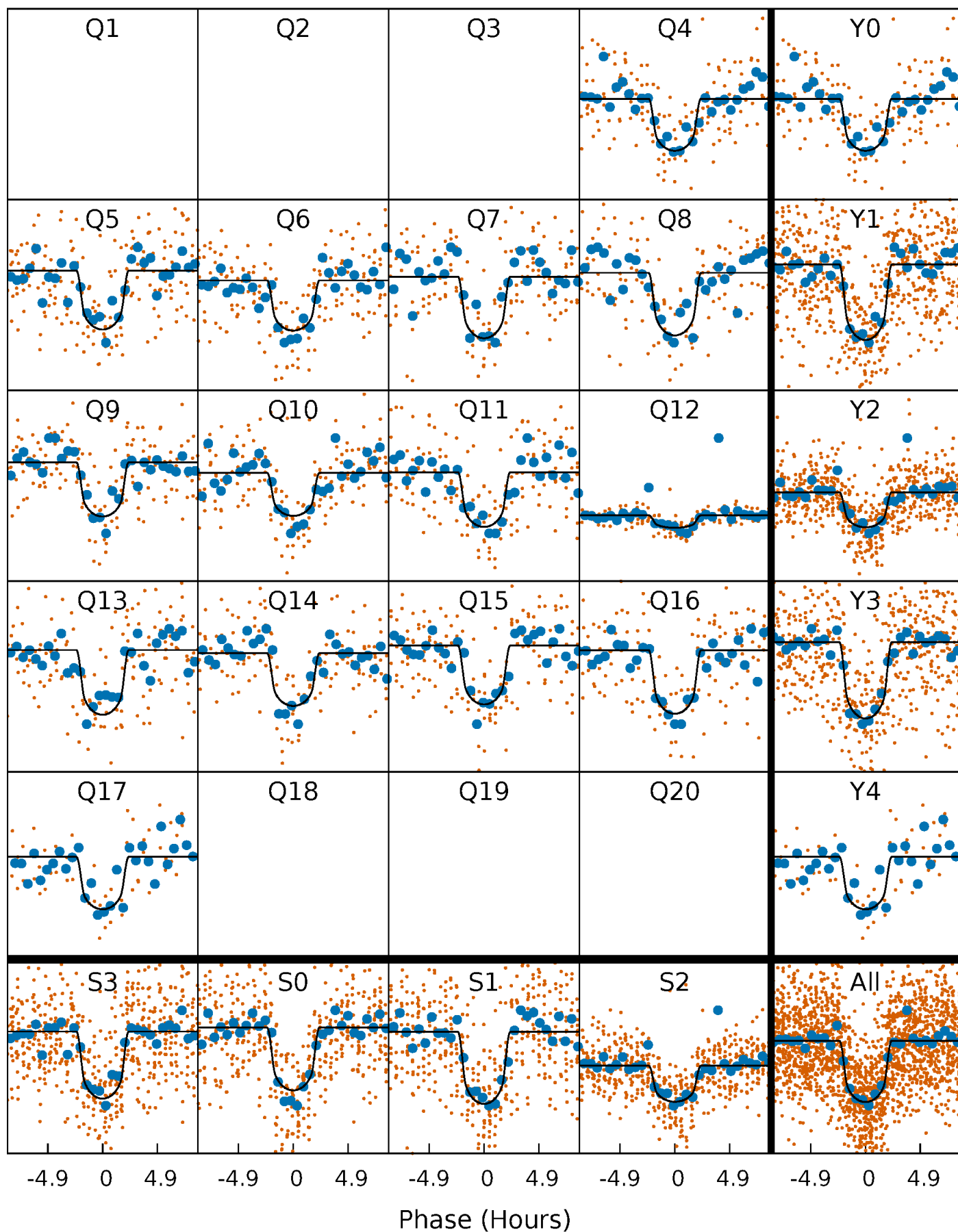
PDC Quarter-Phased Transit Curves

TCE 005438099-02 P= 17.326682 Days $T_0=135.263092$ (BKJD)



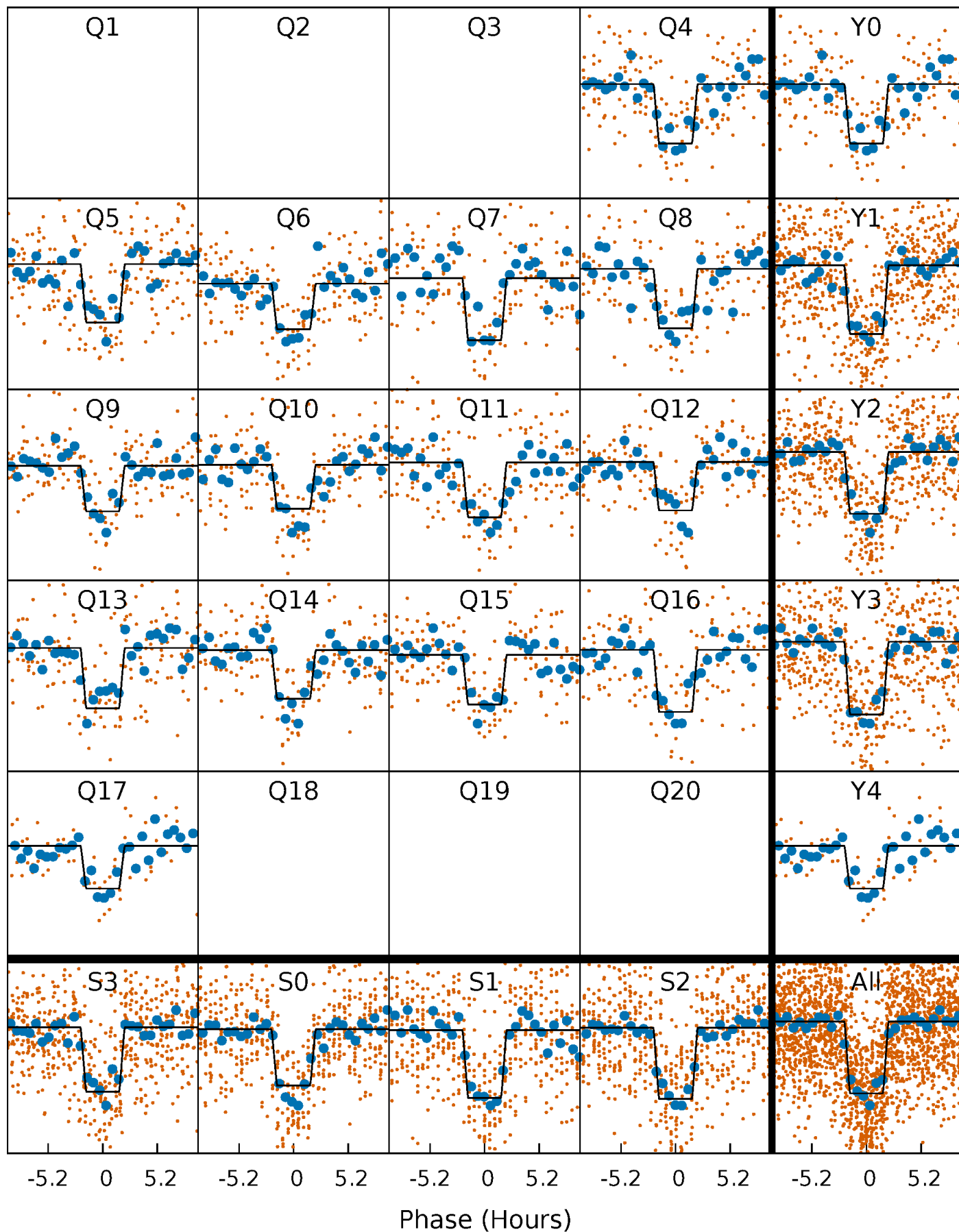
DV Quarter-Phased Transit Curves

TCE 005438099-02 P= 17.326682 Days $T_0=135.263092$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

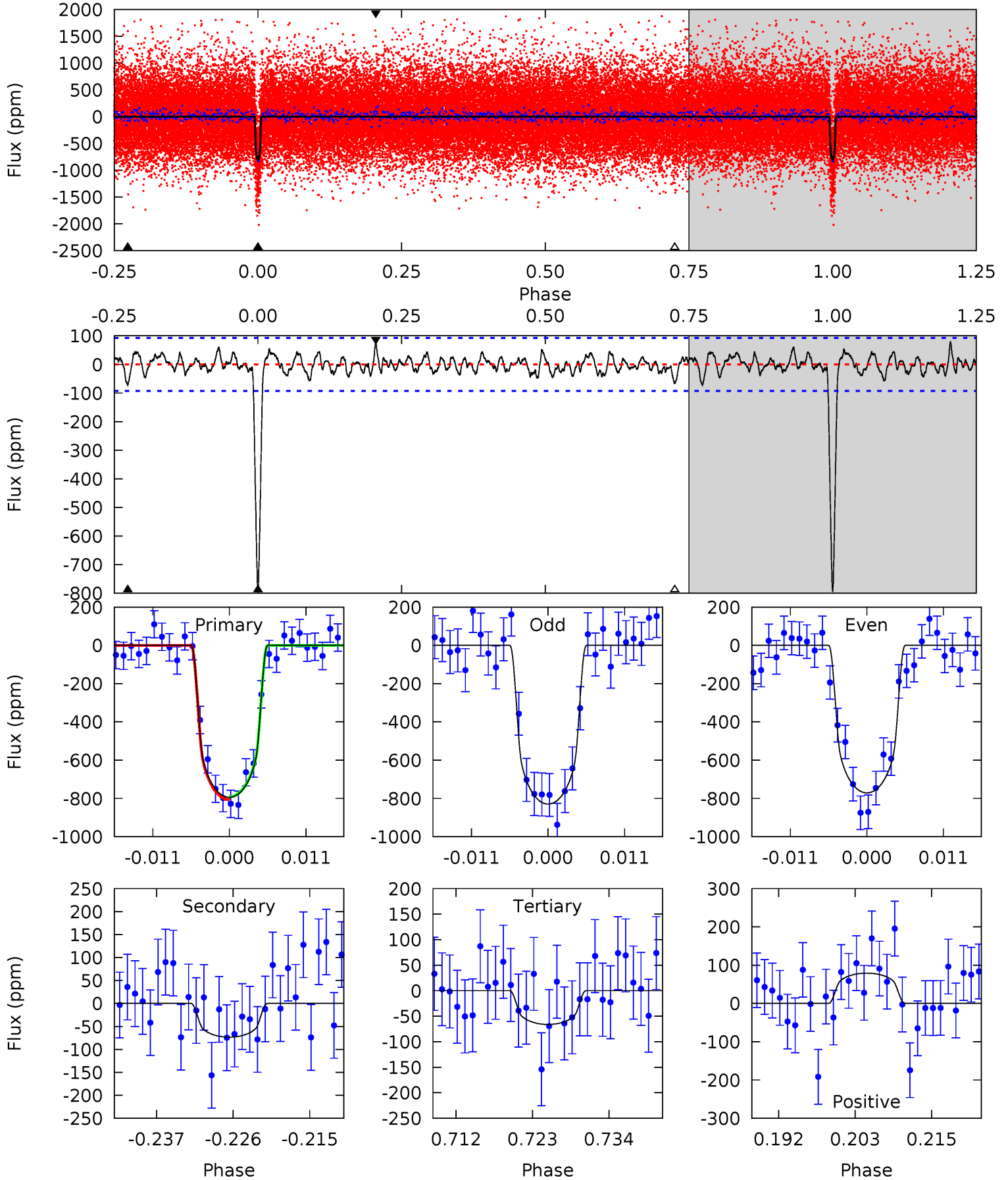
TCE 005438099-02 P= 17.326765 Days $T_0=135.258826$ (BKJD)



DV Model-Shift Uniqueness Test

005438099-02, P = 17.326682 Days, E = 135.263092 Days

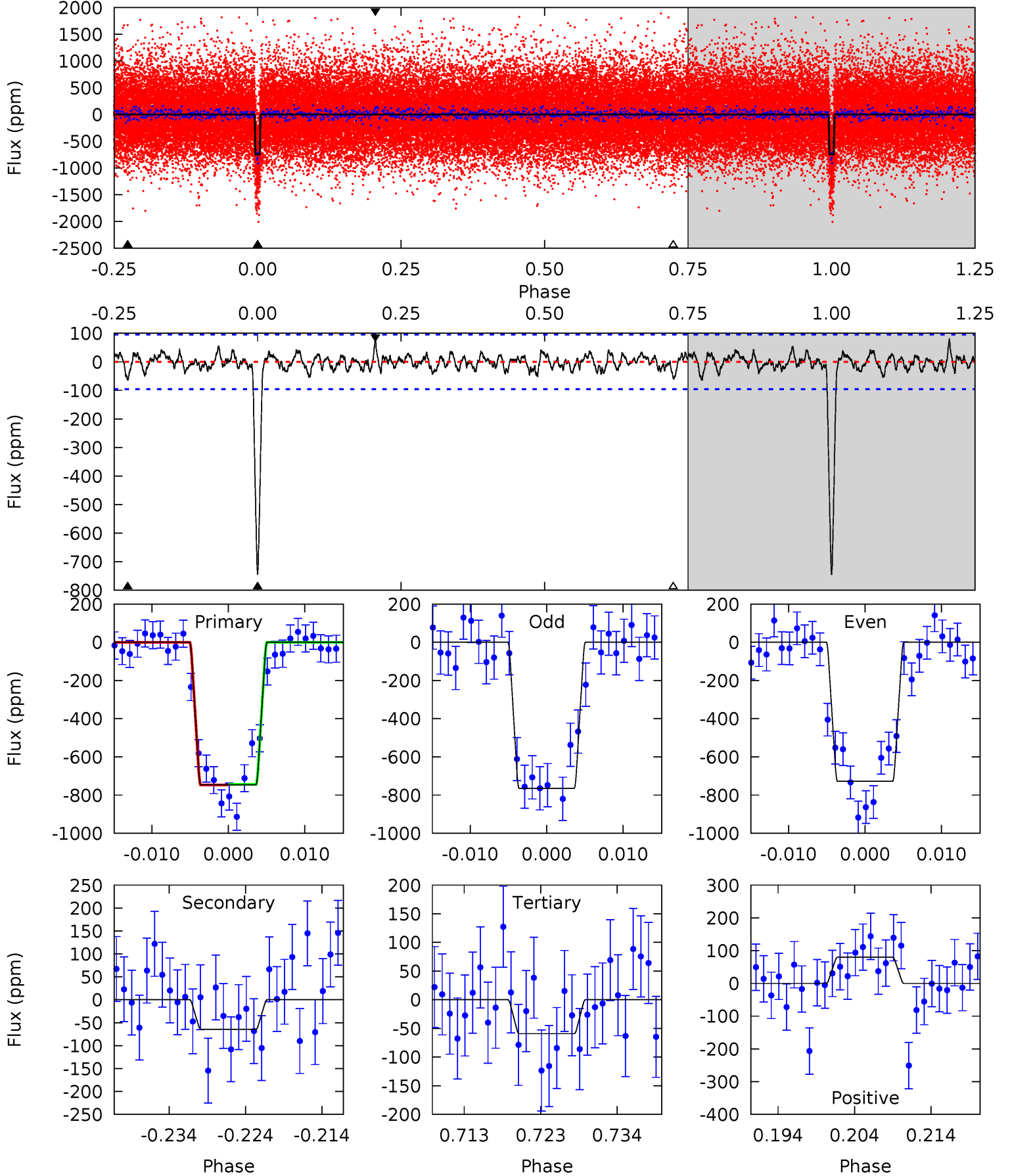
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
42.8	3.96	3.56	4.27	5.00	2.53	1.23	39.3	38.6	0.39	-0.31	1.58	1.04	0.09	0.41



Alt Model-Shift Uniqueness Test

005438099-02, $P = 17.326765$ Days, $E = 135.258826$ Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
39.1	3.37	3.10	4.18	5.02	2.57	1.07	36.0	34.9	0.27	-0.81	0.96	1.01	0.10	0.08



Stellar Parameters For KIC 005438099

	$T_{\text{eff}}(K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	4955^{+100}_{-100}	$4.610^{+0.018}_{-0.046}$	$-0.100^{+0.150}_{-0.150}$	$0.721^{+0.047}_{-0.029}$	$0.774^{+0.036}_{-0.048}$	$2.914^{+0.270}_{-0.442}$
	+2%/-2%	+0%/-1%	+150%/-150%	+7%/-4%	+5%/-6%	+9%/-15%
Source	SPE58	SPE58	SPE58	DSEP		

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

Secondary Eclipse Parameters for KIC 005438099-02 / KOI 1567.03

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-73 ± 19	$2.23^{+0.69}_{-0.70}$	752^{+19}_{-17}	3246^{+431}_{-279}	114^{+131}_{-51}
Alt.	-64 ± 19	$2.17^{+0.70}_{-0.69}$	753^{+18}_{-19}	3196^{+470}_{-255}	104^{+147}_{-47}

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

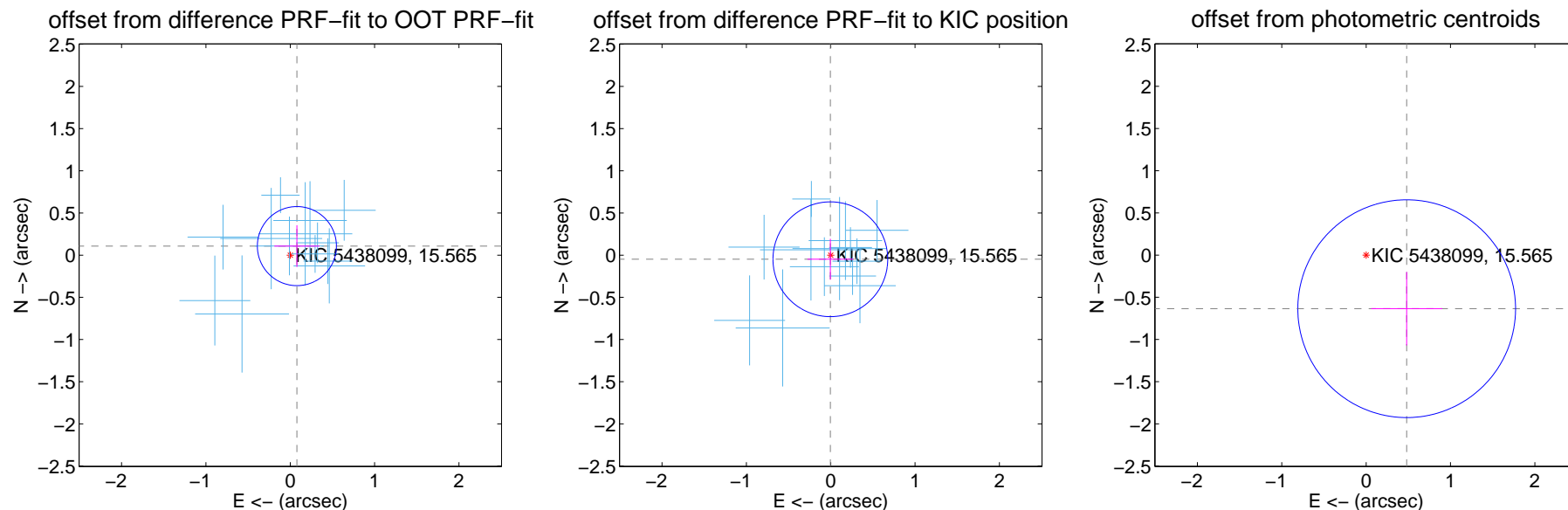
DV Centroid Data

Supplemental centroid analysis for 005438099-02. Kepler magnitude: 15.56. Transit SNR 30.21

There are 13 quarters with good PRF difference image offsets

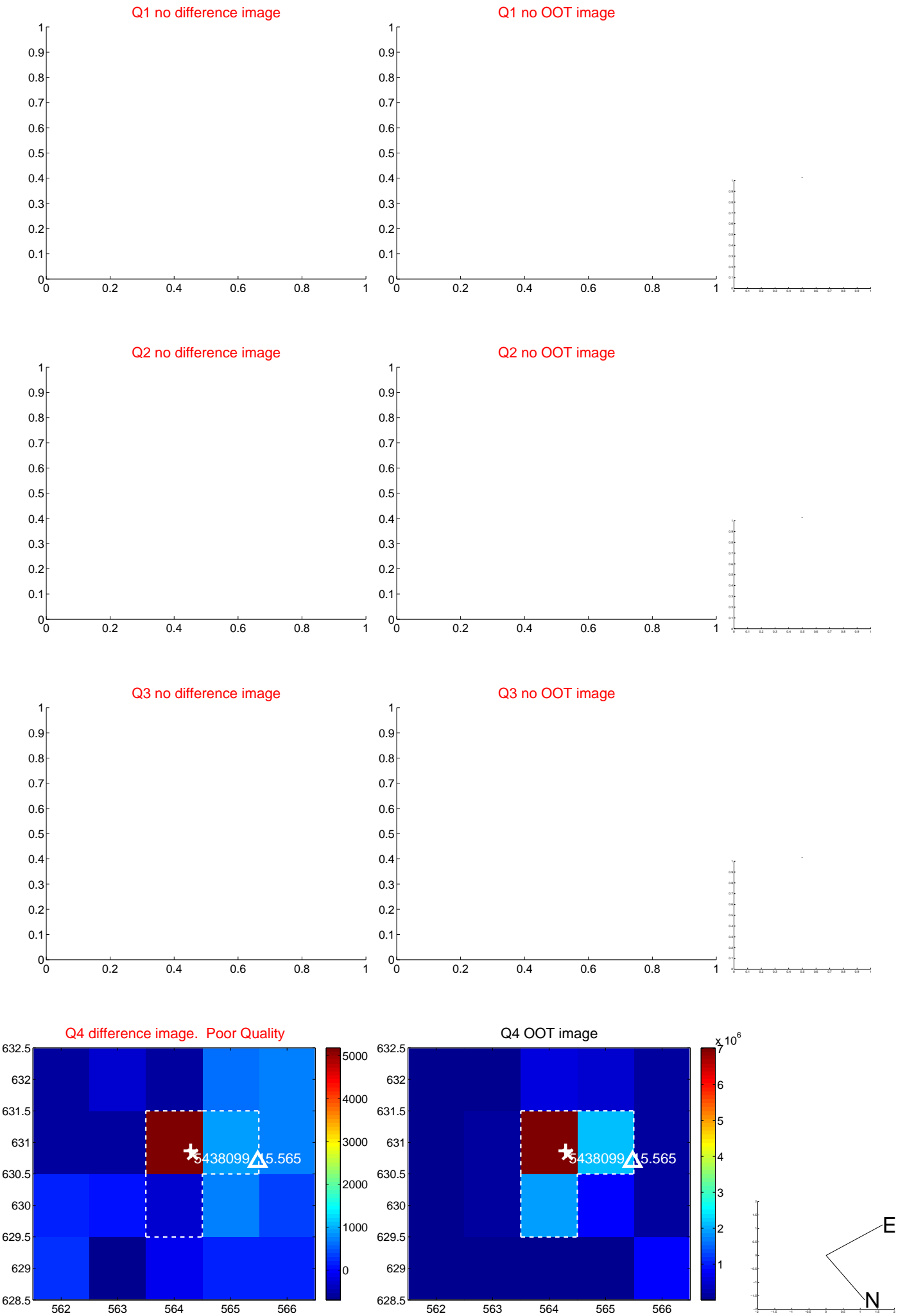
The direct PRF centroid is offset from the target star catalog position by about 0.19 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.133 ± 0.156	0.85	-0.079 ± 0.267	0.107 ± 0.247
PRF-fit source offset from KIC position	0.049 ± 0.227	0.21	0.004 ± 0.271	-0.049 ± 0.243
photometric centroid source offset	0.80 ± 0.43	1.85	-0.48 ± 0.42	-0.64 ± 0.43

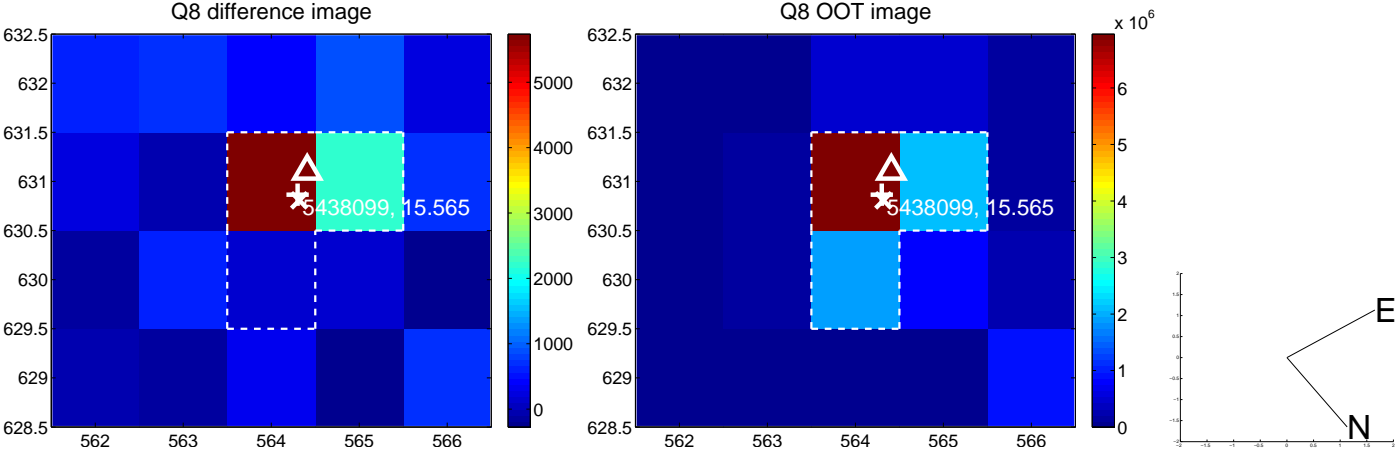
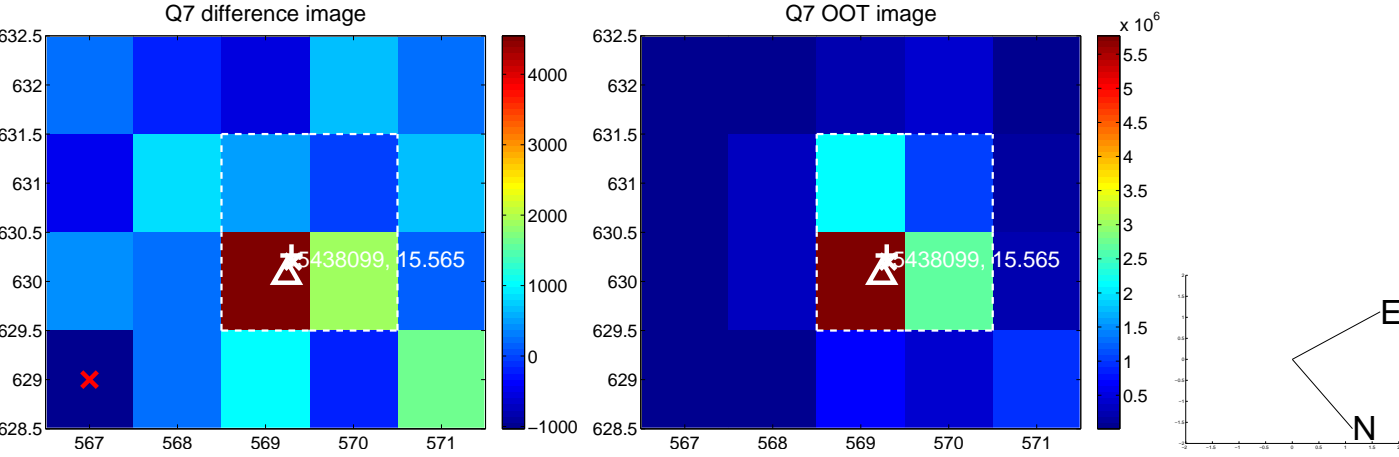
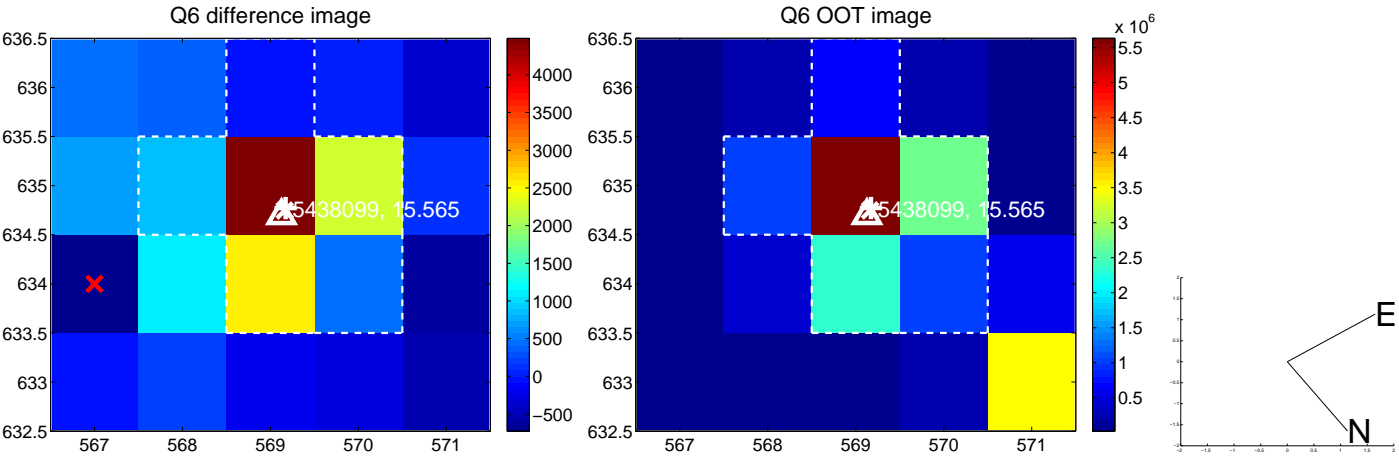
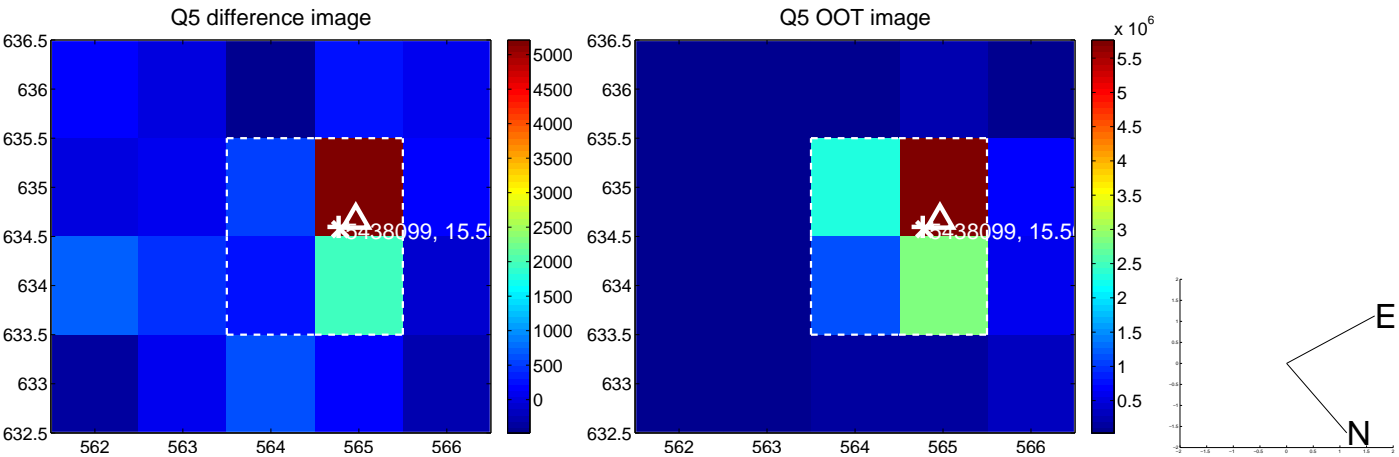


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

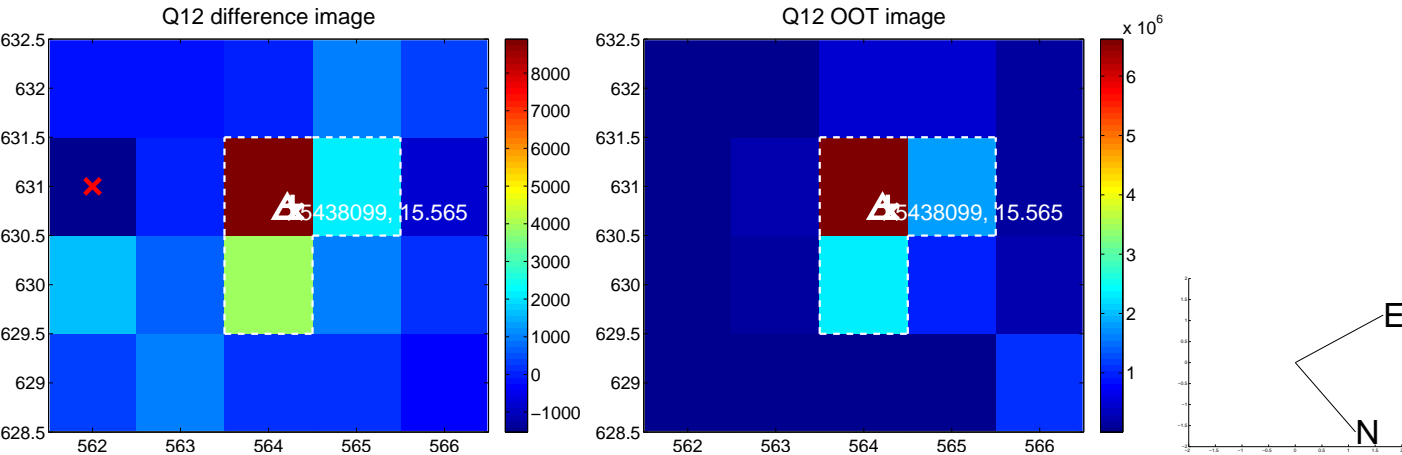
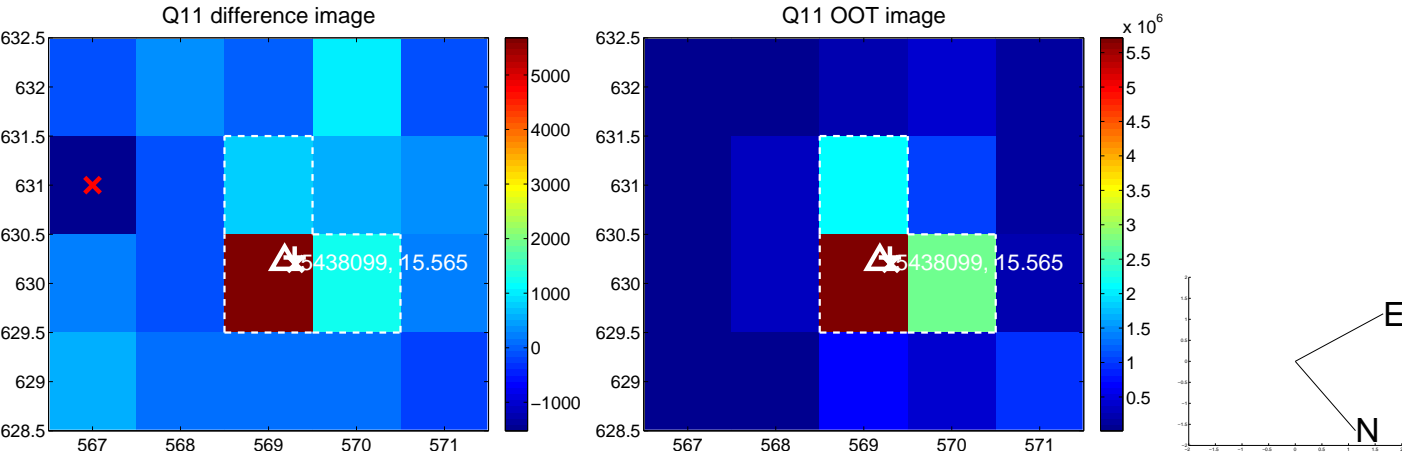
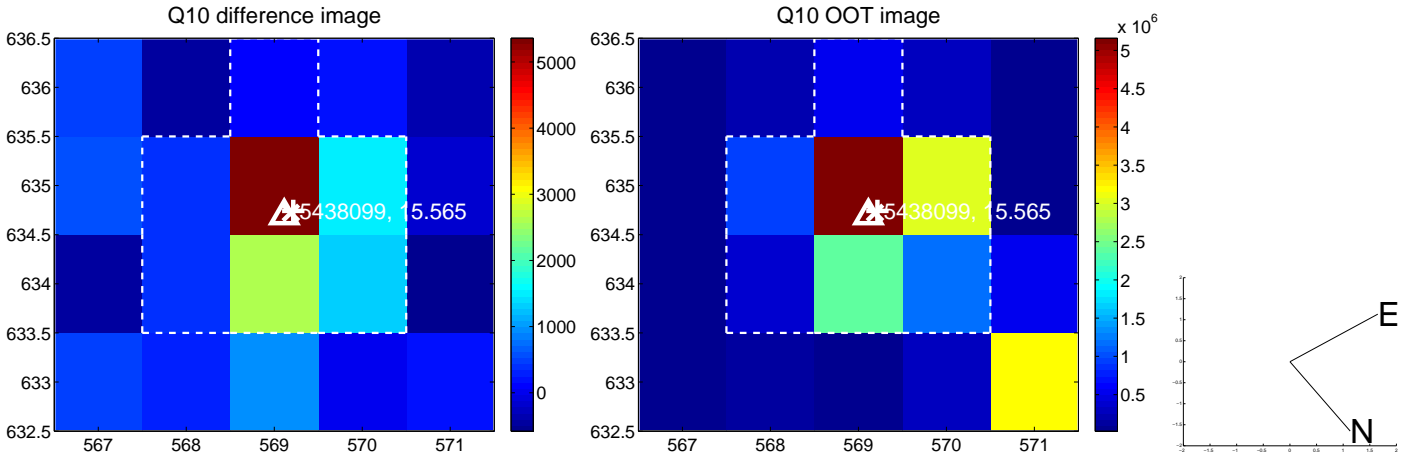
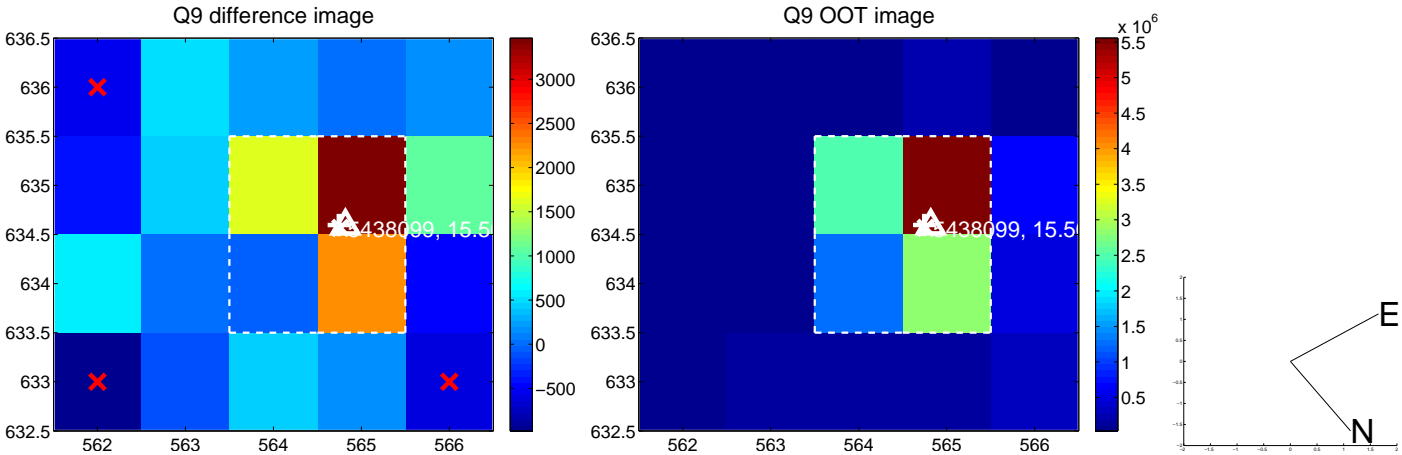
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



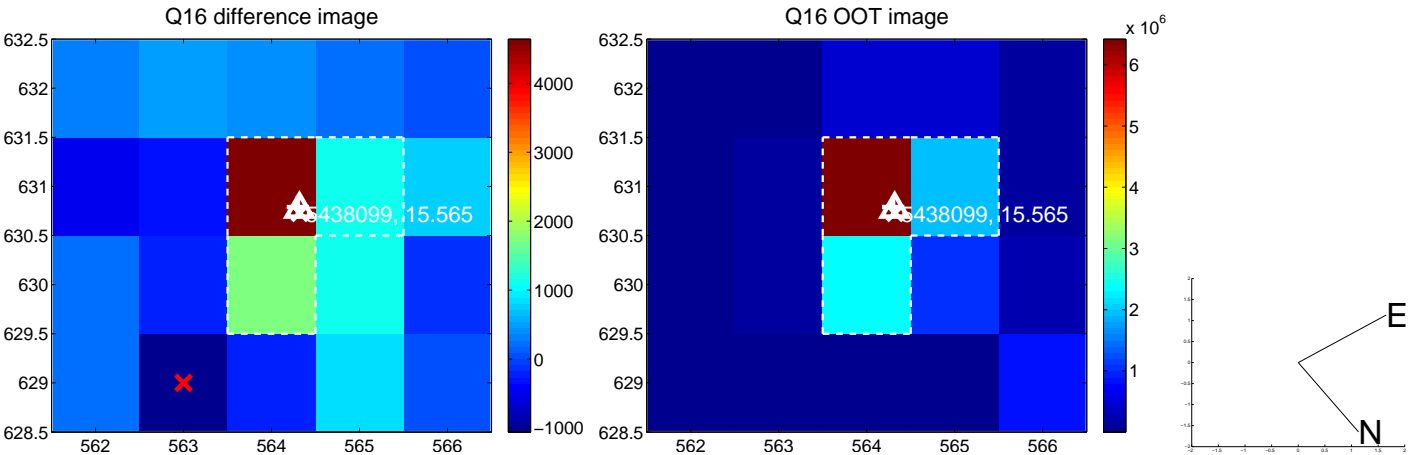
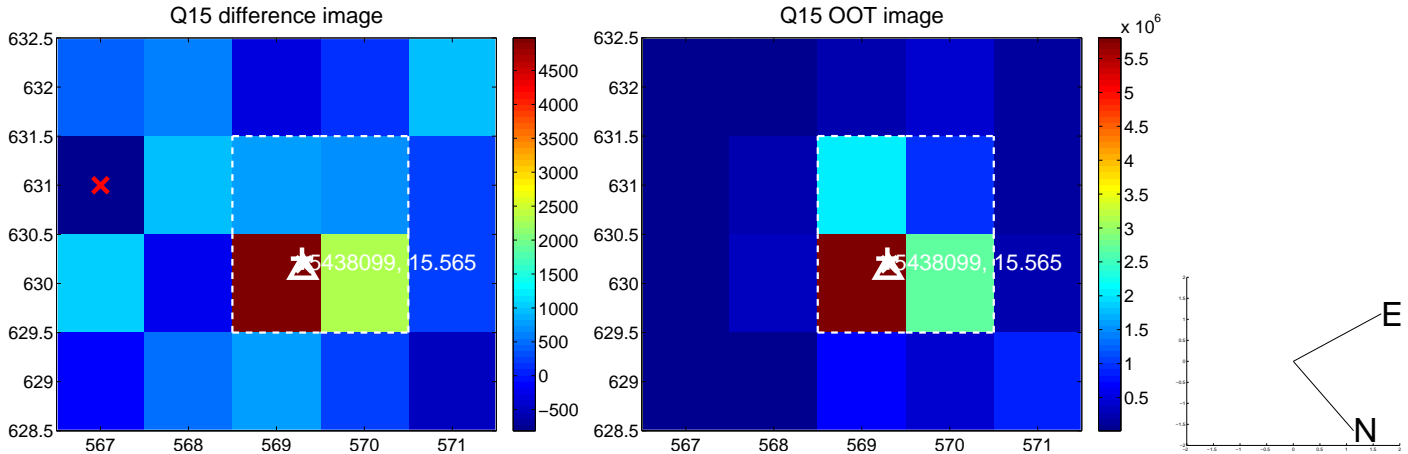
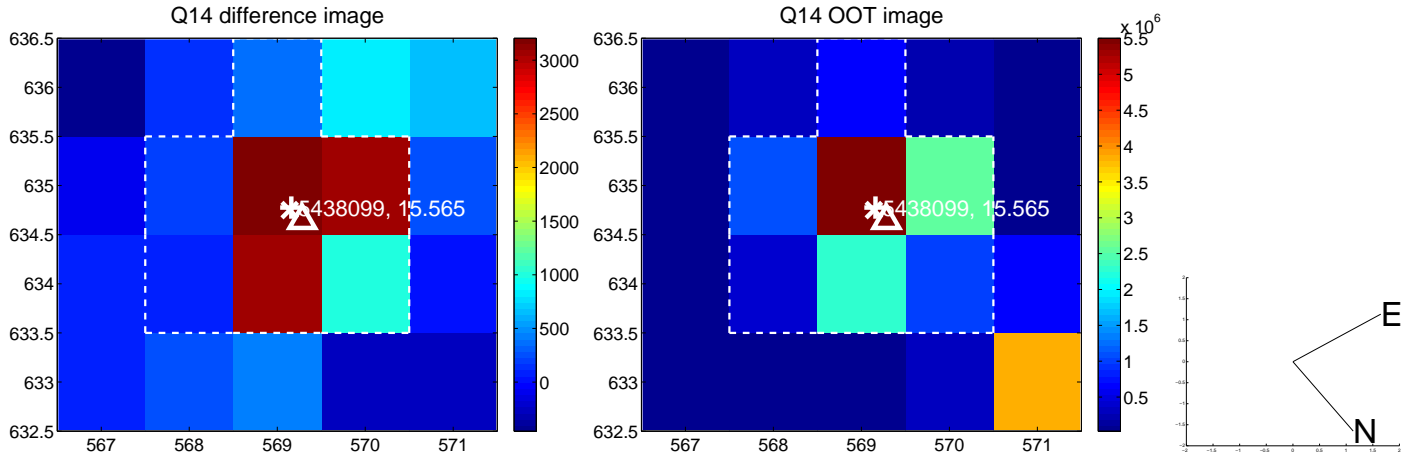
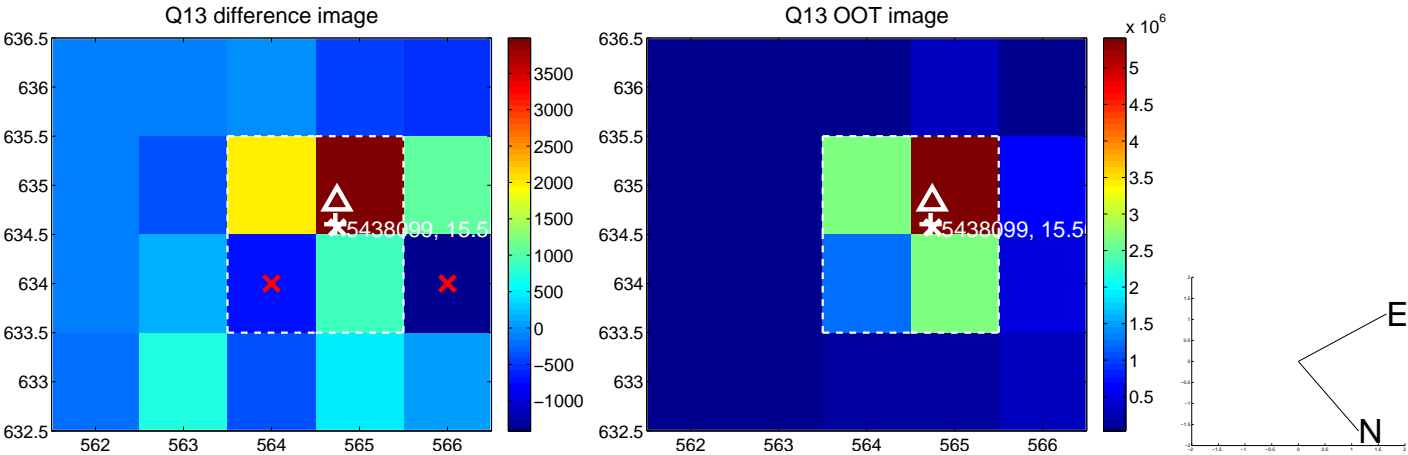
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



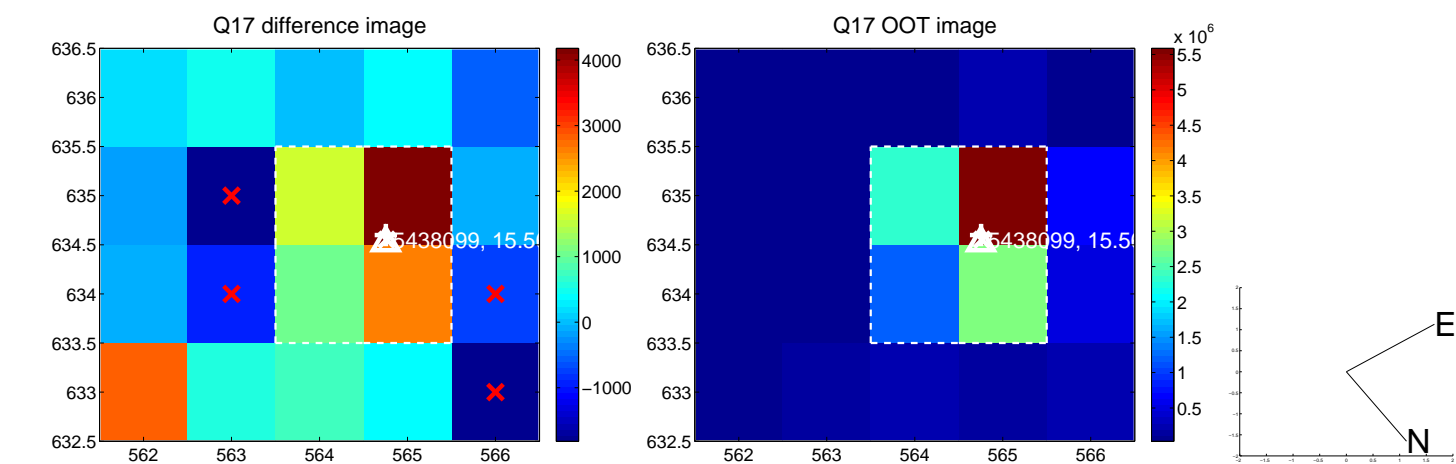
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



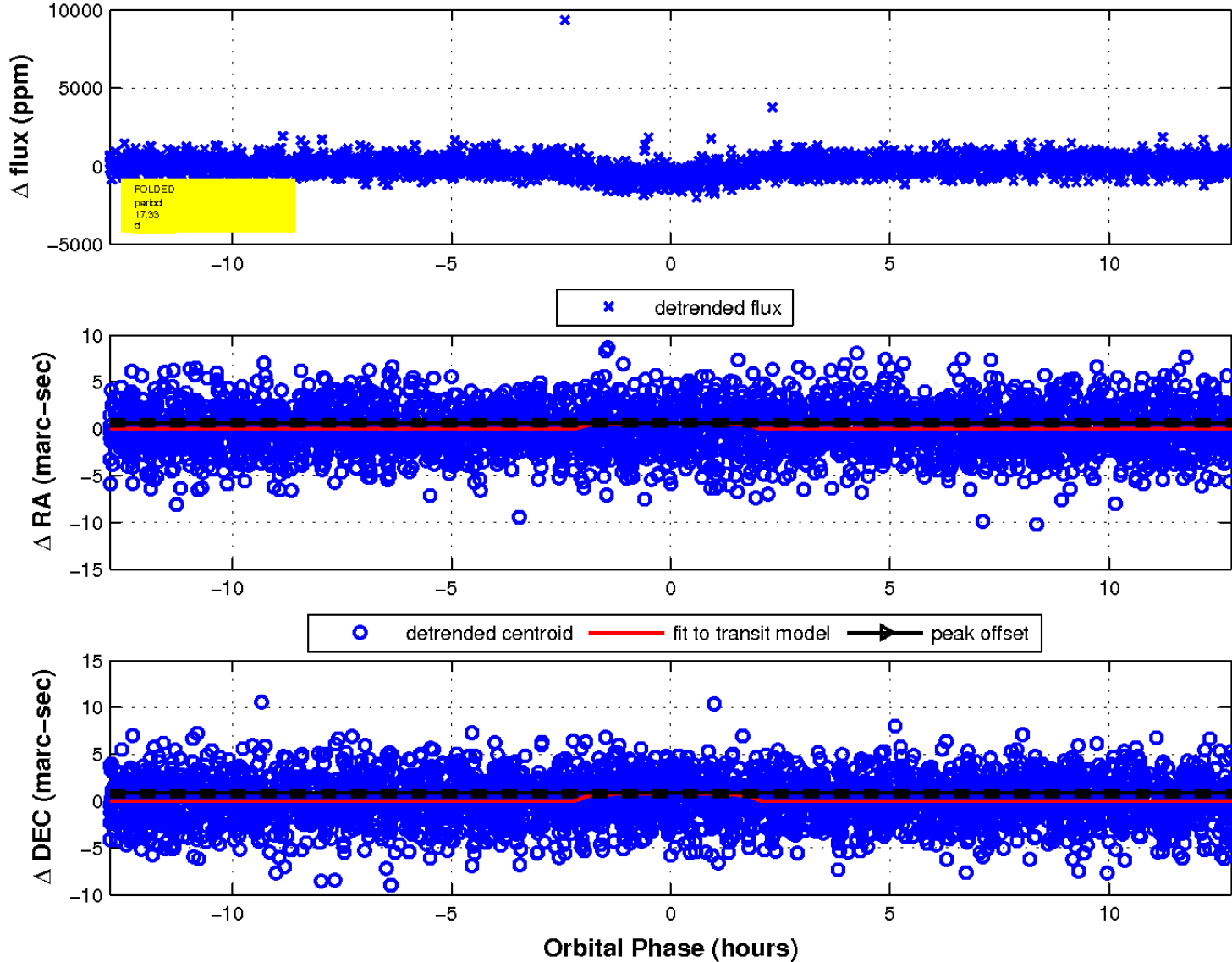
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

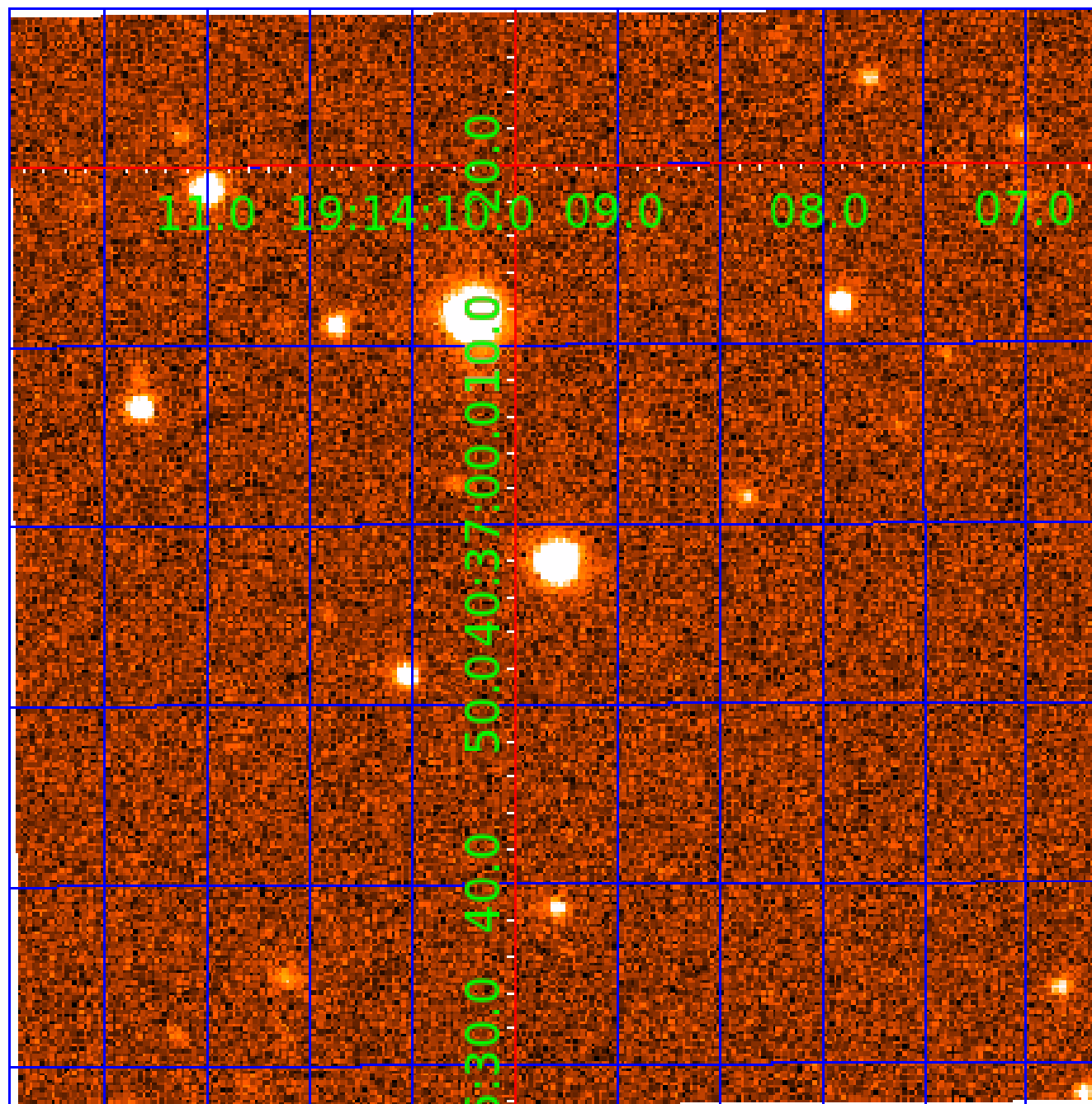


fluxWeightedCentroids, Planet 2 of 4



UKIRT Image

Declination



KIC 005438099

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})
005438099-01	OBS	1567.01	7.240179	137.810390	837.3	3.142	38.2	42.0	0.72	4955	2.51	62.14
005438099-02	OBS	1567.03	17.326682	135.263092	795.2	4.264	27.0	30.2	0.72	4955	2.25	19.41
005438099-03	OBS	1567.02	4.646223	131.569122	401.0	2.578	21.9	23.2	0.72	4955	1.76	112.26
005438099-04	OBS	1567.04	44.841285	135.664445	1042.3	5.880	22.3	23.8	0.72	4955	2.76	5.46

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005438099-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
005438099-02	OBS	PC	1.00	0	0	0	0	NO_COMMENT
005438099-03	OBS	PC	1.00	0	0	0	0	NO_COMMENT
005438099-04	OBS	PC	1.00	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.

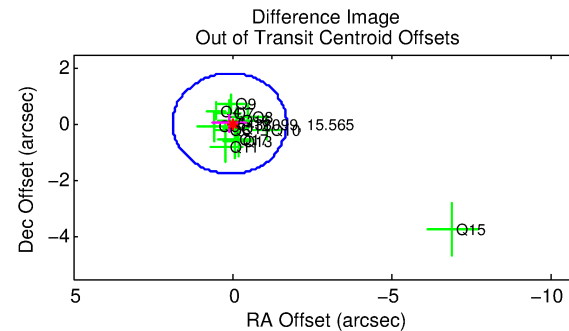
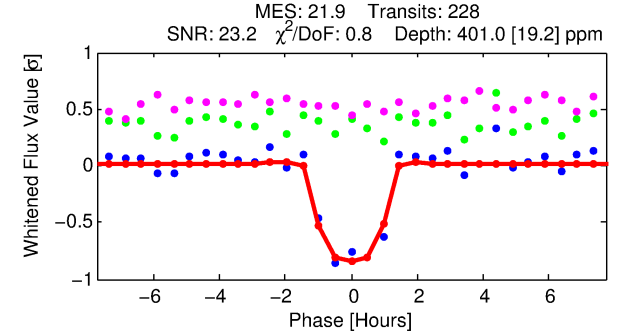
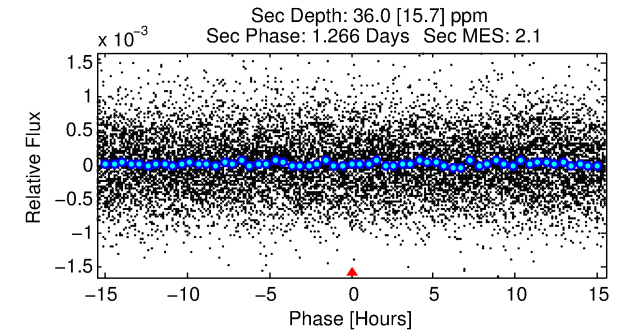
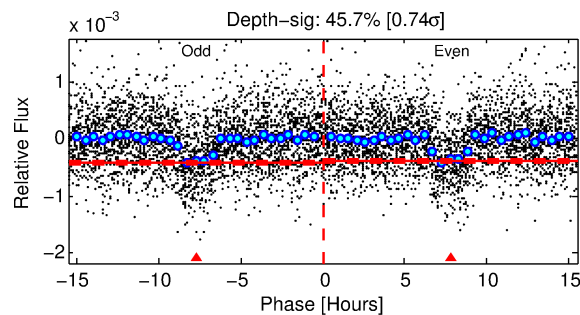
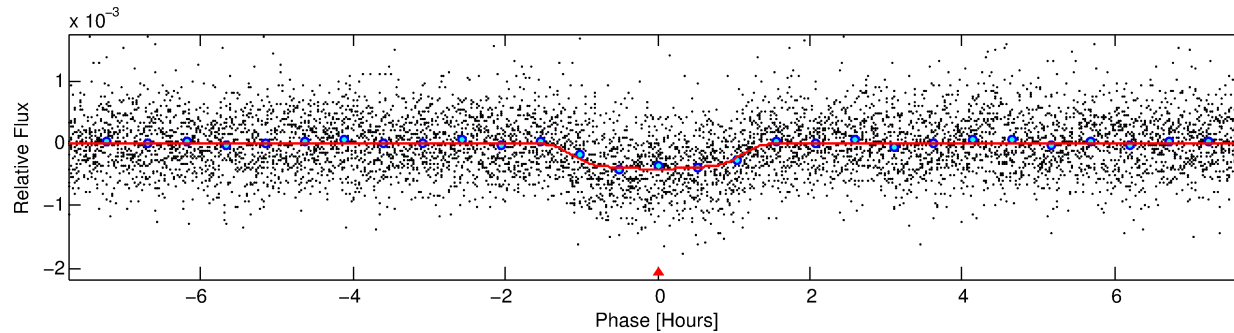
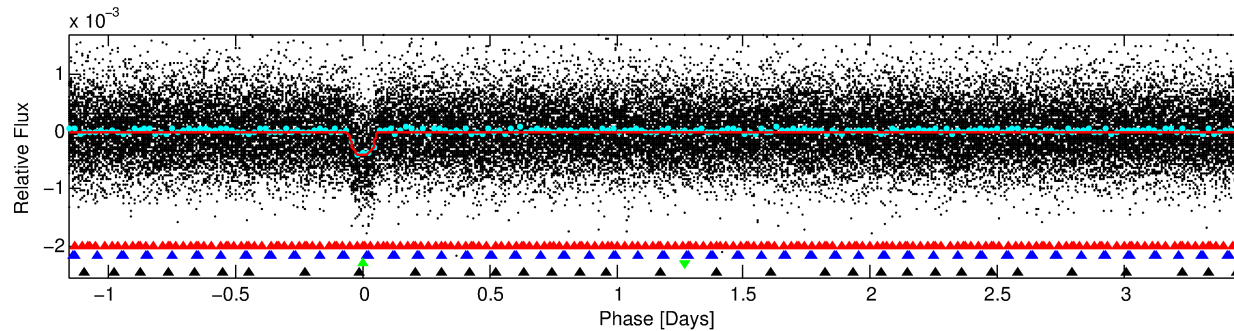
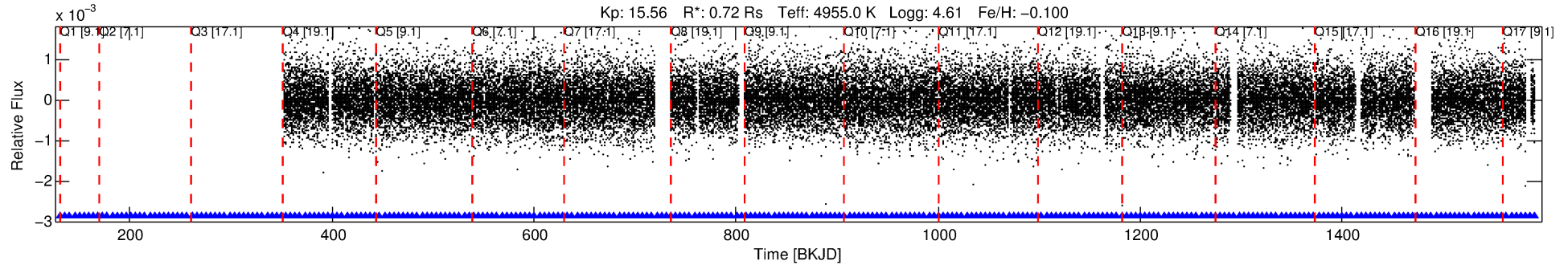
Ephemeris Match Information For 005438099-03

No Significant Match Found

DV One-Page Summary

KIC: 5438099 Candidate: 3 of 4 Period: 4.646 d
KOI: K01567.02 Name: Kepler-306b Corr: 0.955

Kp: 15.56 R*: 0.72 Rs Teff: 4955.0 K Logg: 4.61 Fe/H: -0.100



DV Fit Results:

Period = 4.64622 [0.00001] d
Epoch = 131.5691 [0.0022] BKJD
Rp/R* = 0.0224 [0.0054]
a/R* = 6.77 [6.22]
b = 0.90 [0.21]
Seff = 112.26 [12.99]
Teq = 830 [24] K
Rp = 1.76 [0.44] Re
a = 0.0500 [0.0028] AU
Ag = 16.02 [10.47] [1.43σ]
Teffp = 2567 [419] K [4.14σ]

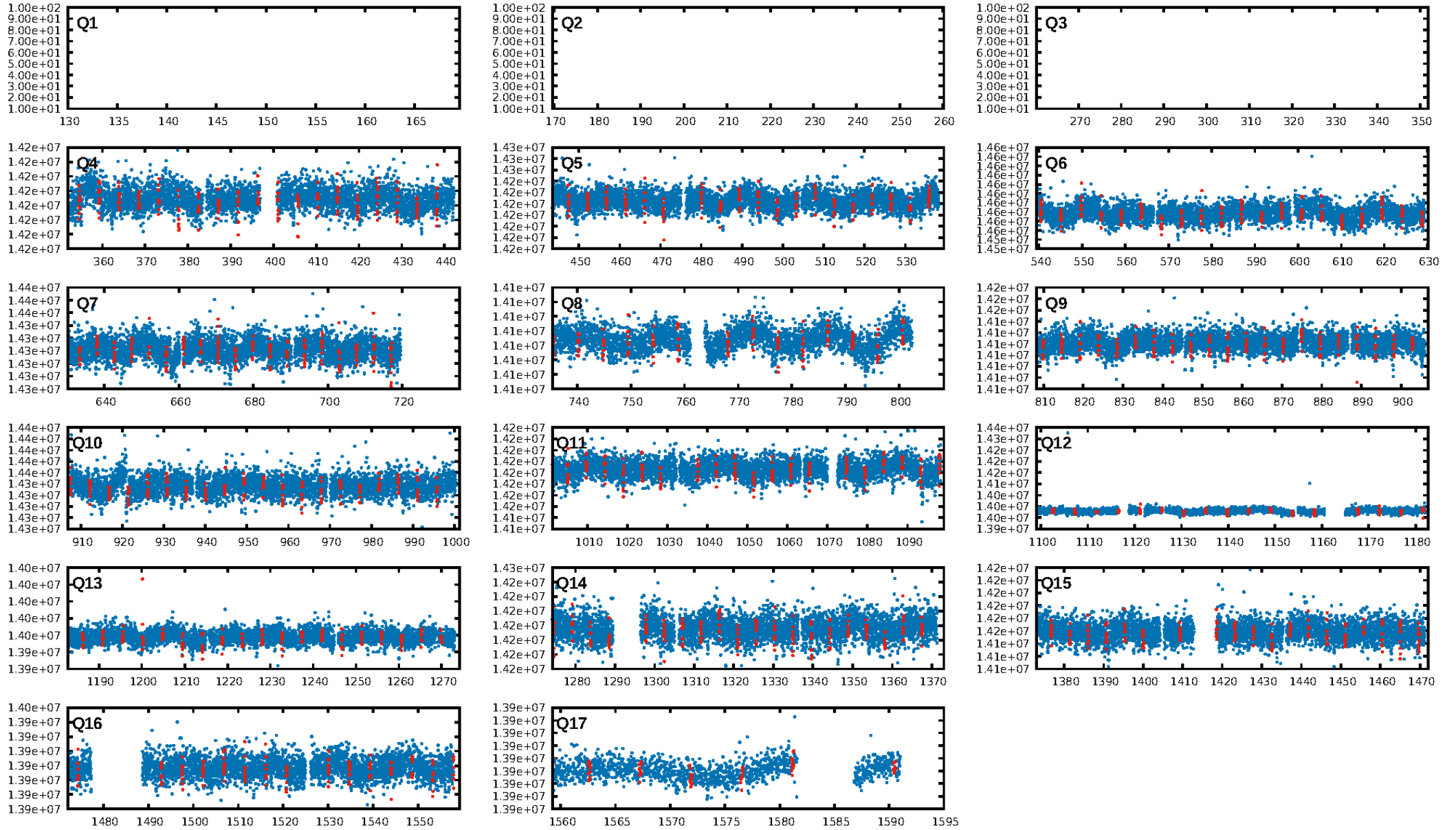
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [15.32σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 1.33e-105
RollingBand-fgt: 1.00 [223/223]
GhostDiagnostic-chr: 4.255
Centroid-sig: 4.5%
Centroid-so: 0.442 arcsec [0.77σ]
OotOffset-rm: 0.084 arcsec [0.14σ]
KicOffset-rm: 0.188 arcsec [0.70σ]
OotOffset-st: 3/3/3/4 [13]
KicOffset-st: 3/3/3/4 [13]
DiffImageQuality-fgm: 0.92 [12/13]
DiffImageOverlap-fno: 1.00 [14/14]

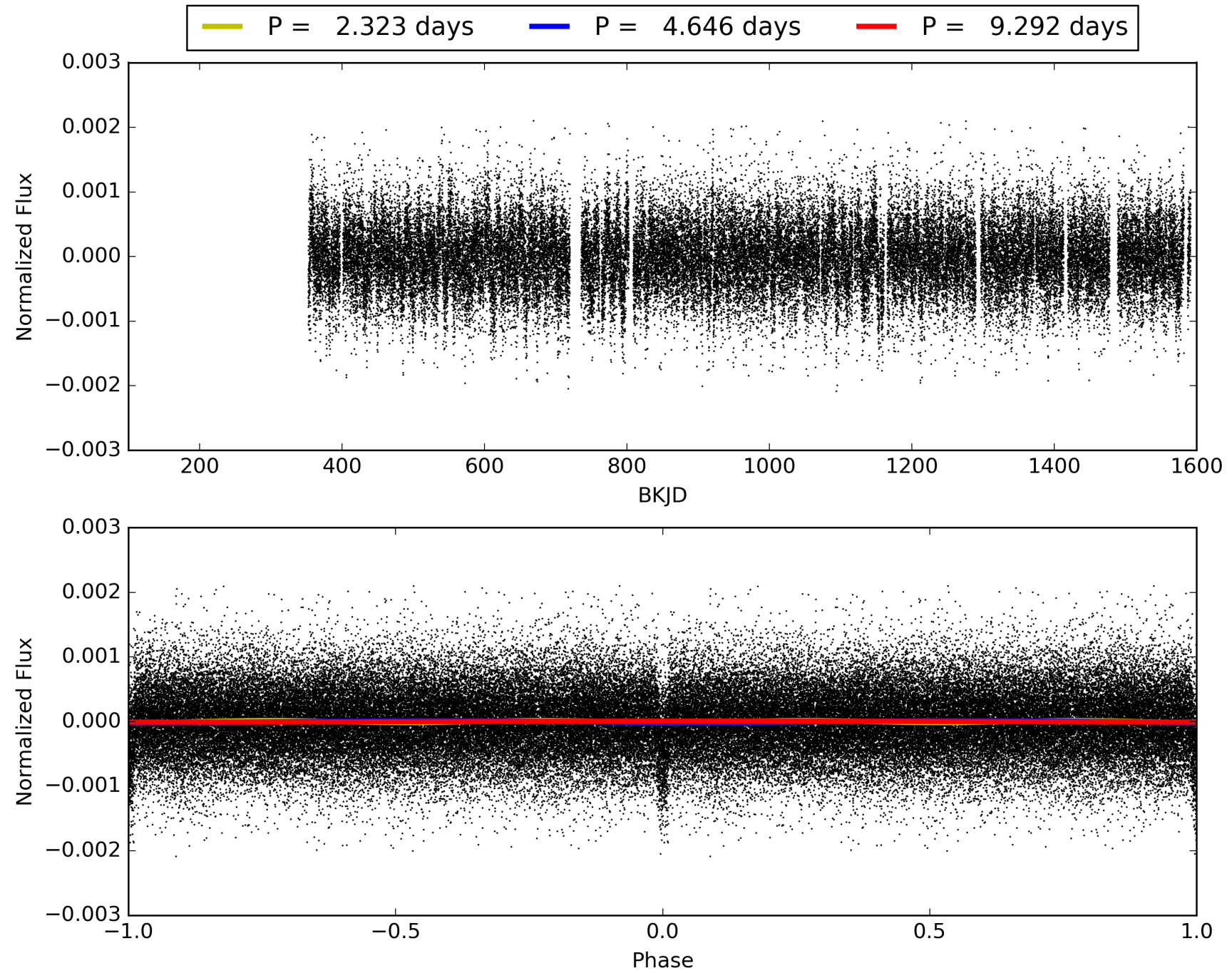
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 03:27:12 Z

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

TCE 005438099-03, PDC Light Curves

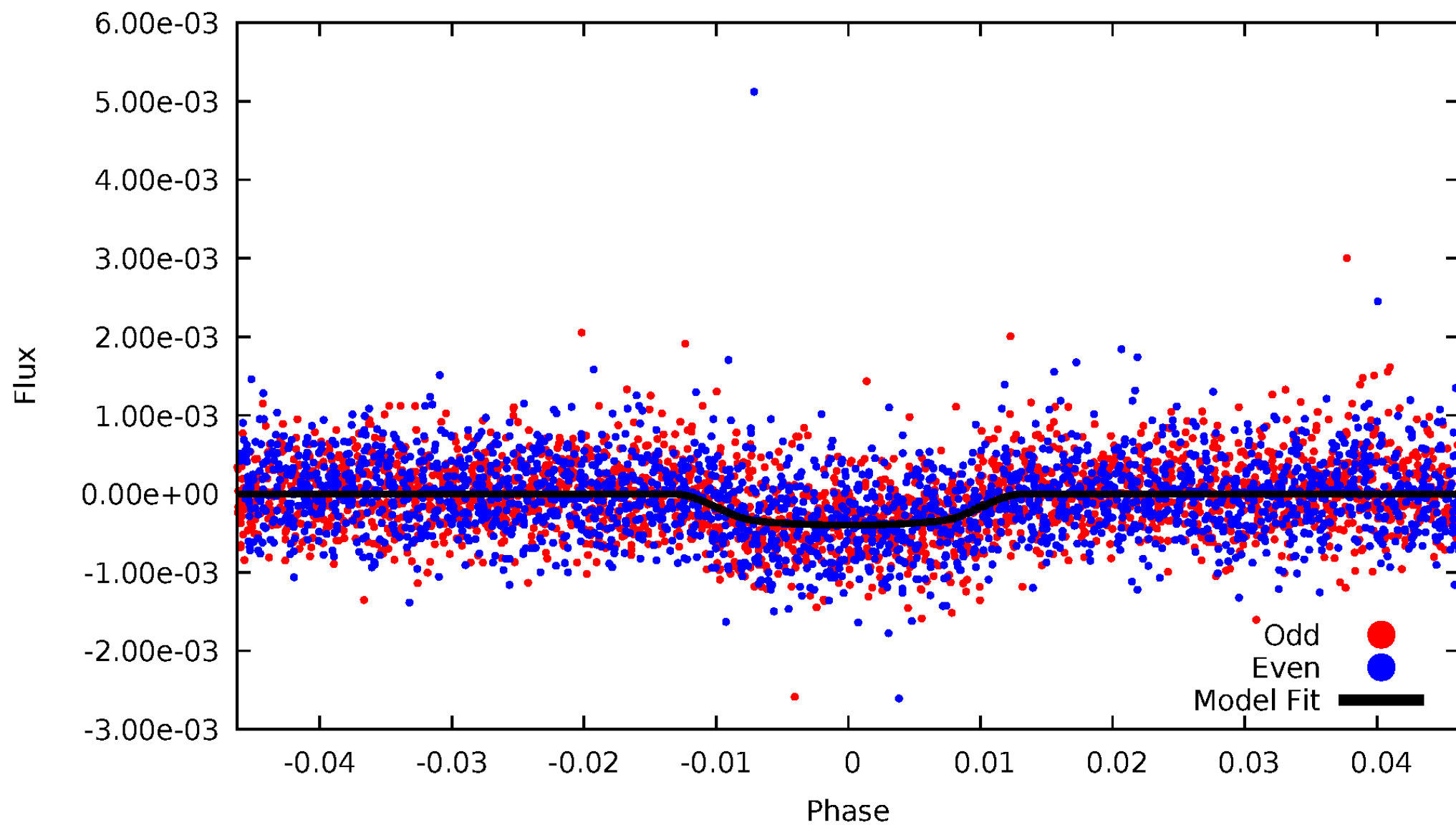


TCE 005438099-03



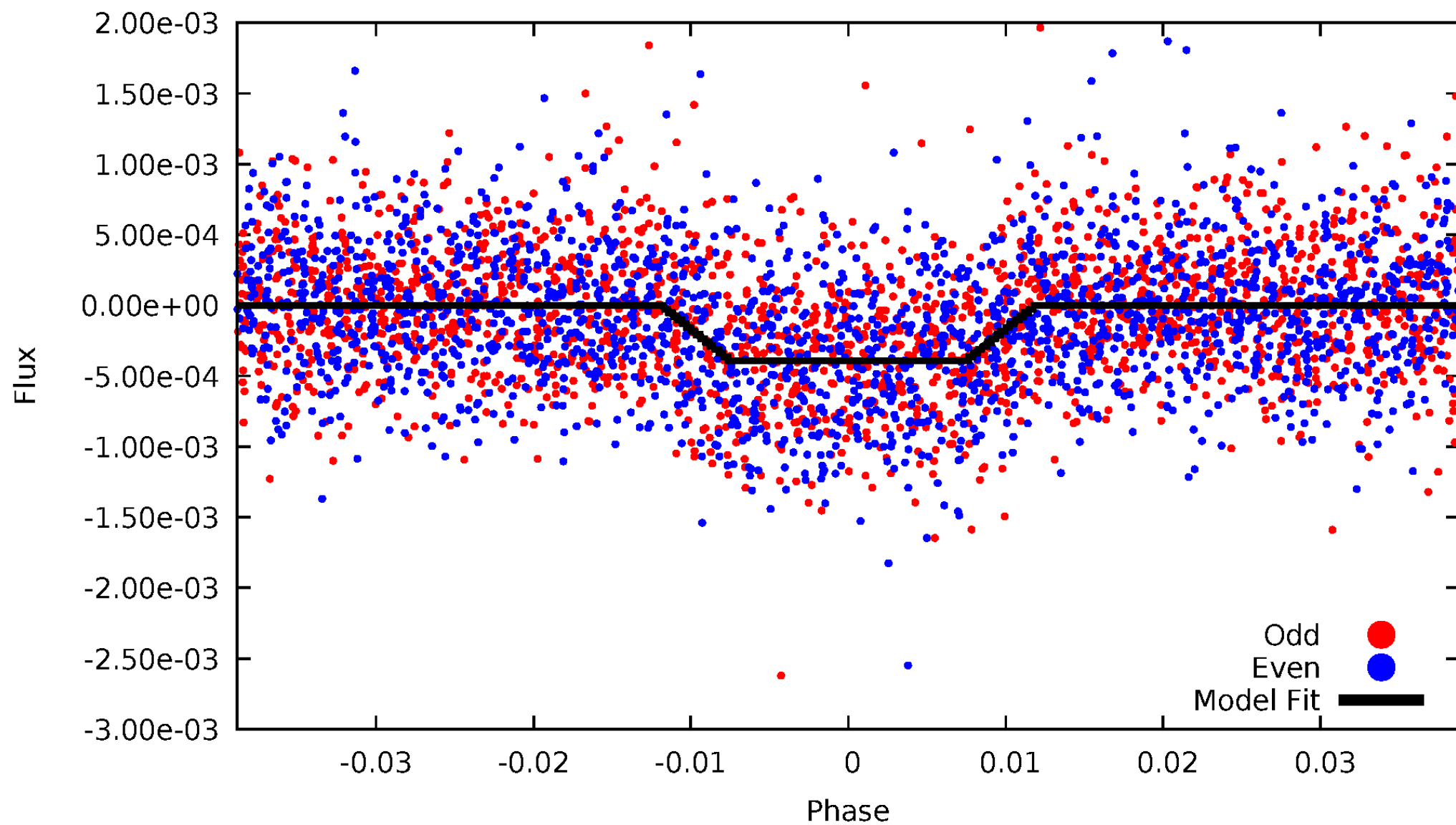
DV Odd/Even

TCE 005438099-03



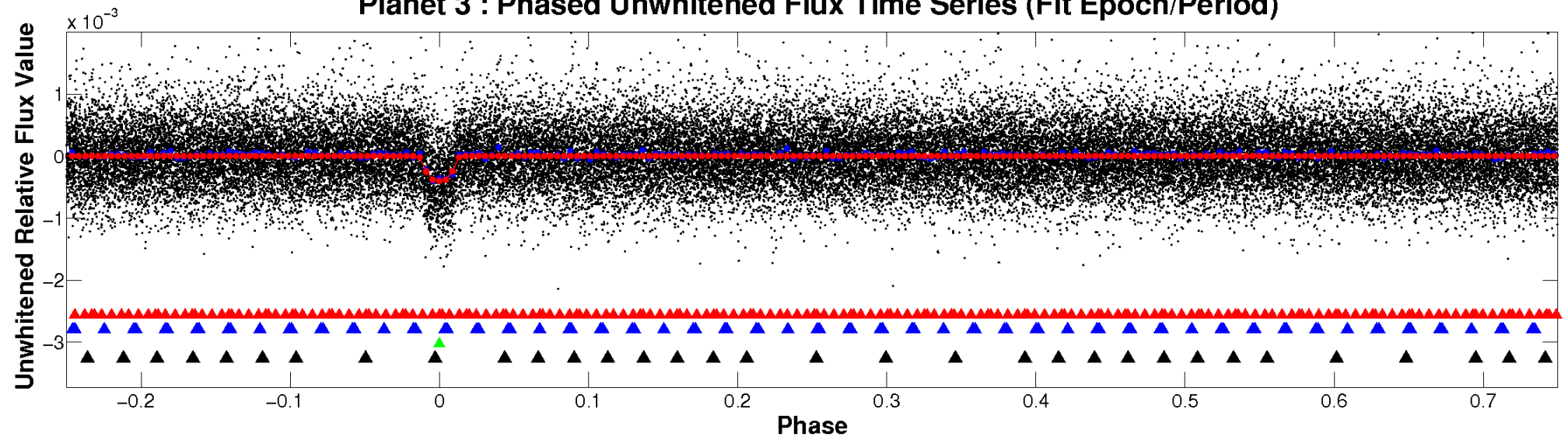
ALT Odd/Even

TCE 005438099-03

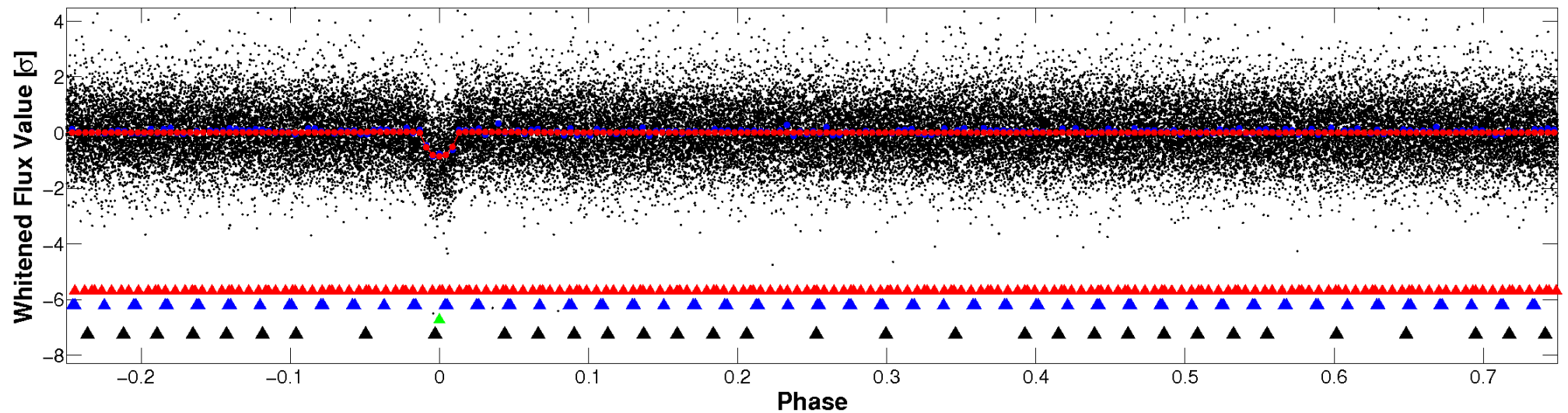


Non-Whitened Vs. Whitened Light Curve

Planet 3 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

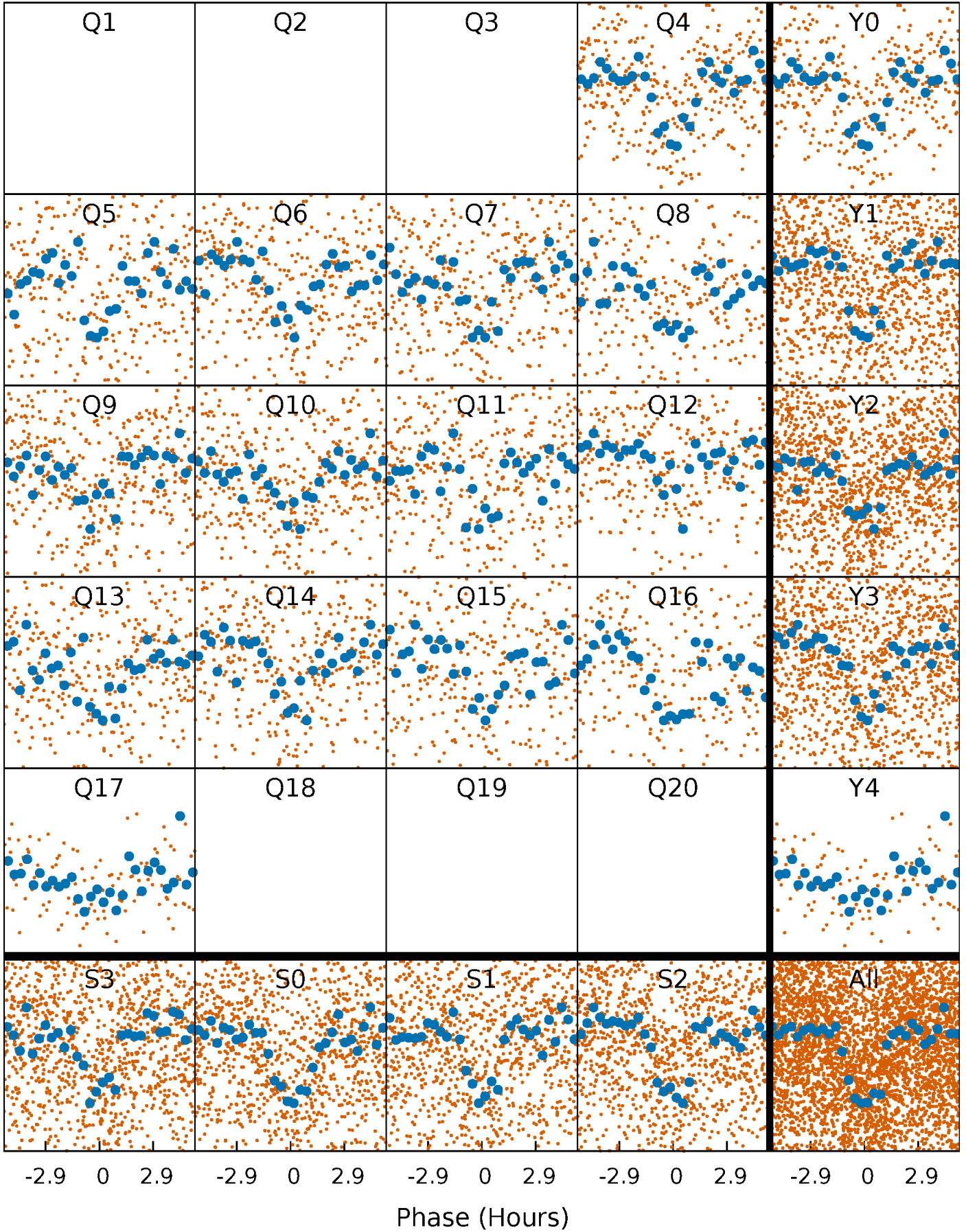


Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



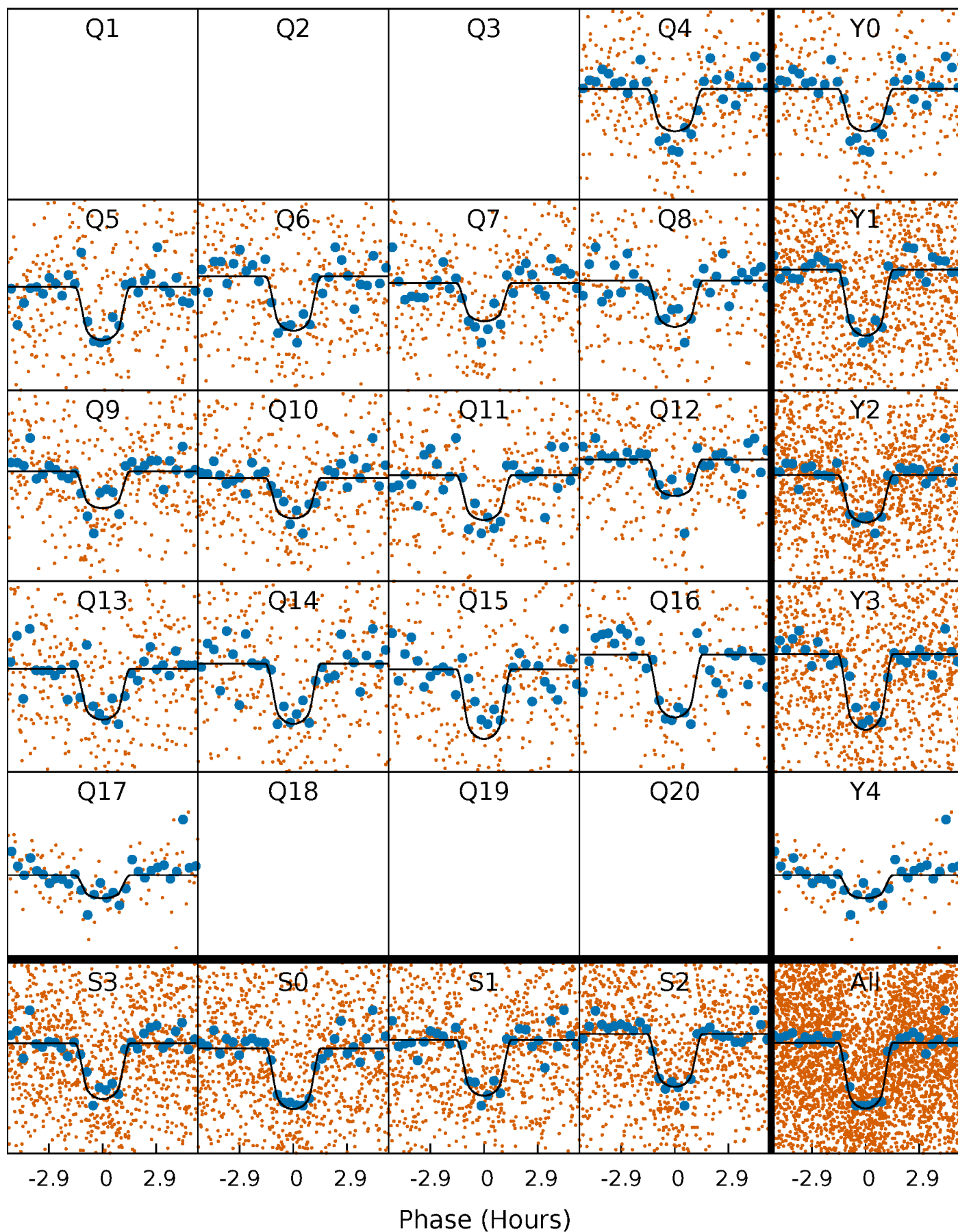
PDC Quarter-Phased Transit Curves

TCE 005438099-03 P= 4.646223 Days $T_0=131.569122$ (BKJD)



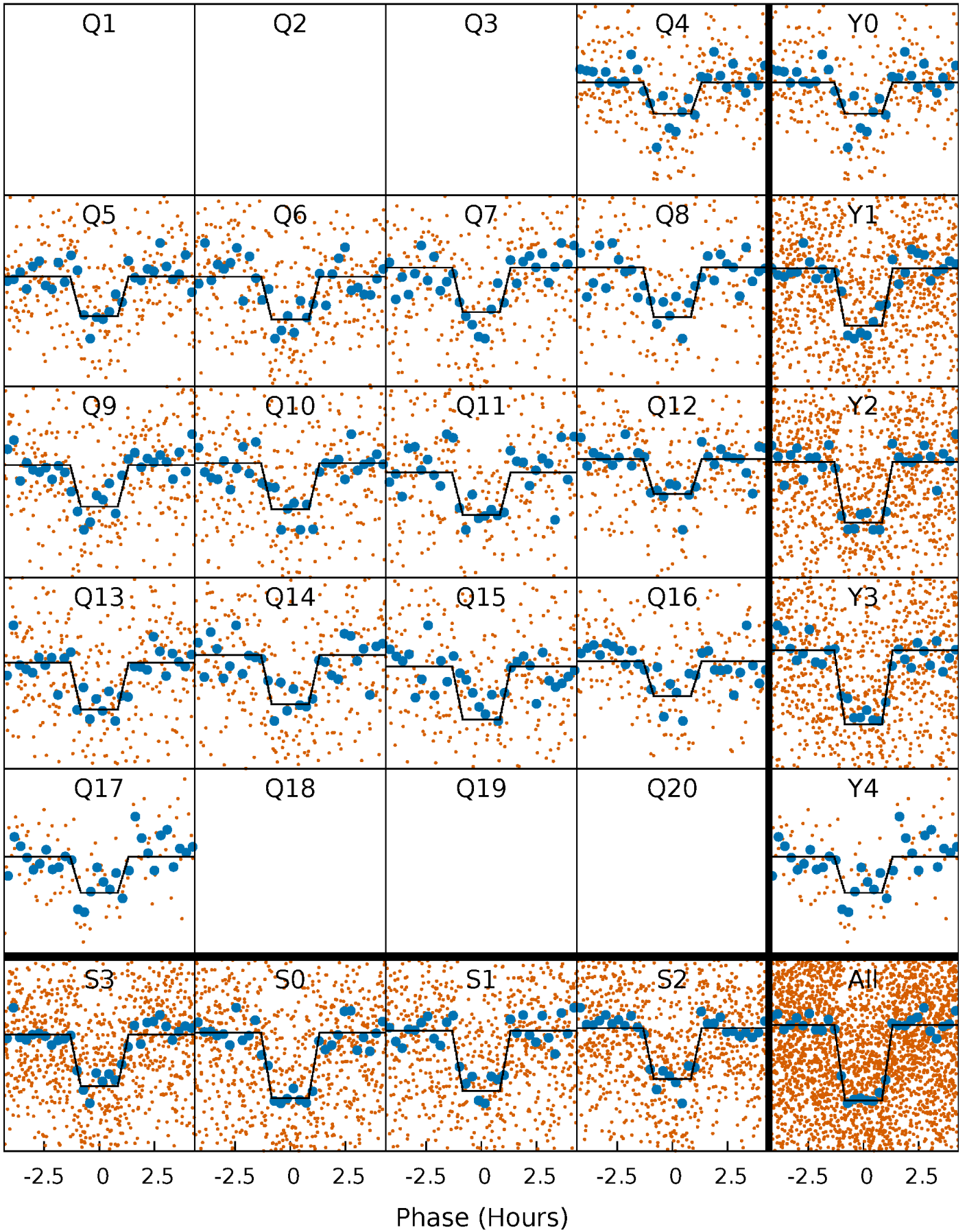
DV Quarter-Phased Transit Curves

TCE 005438099-03 P= 4.646223 Days $T_0=131.569122$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

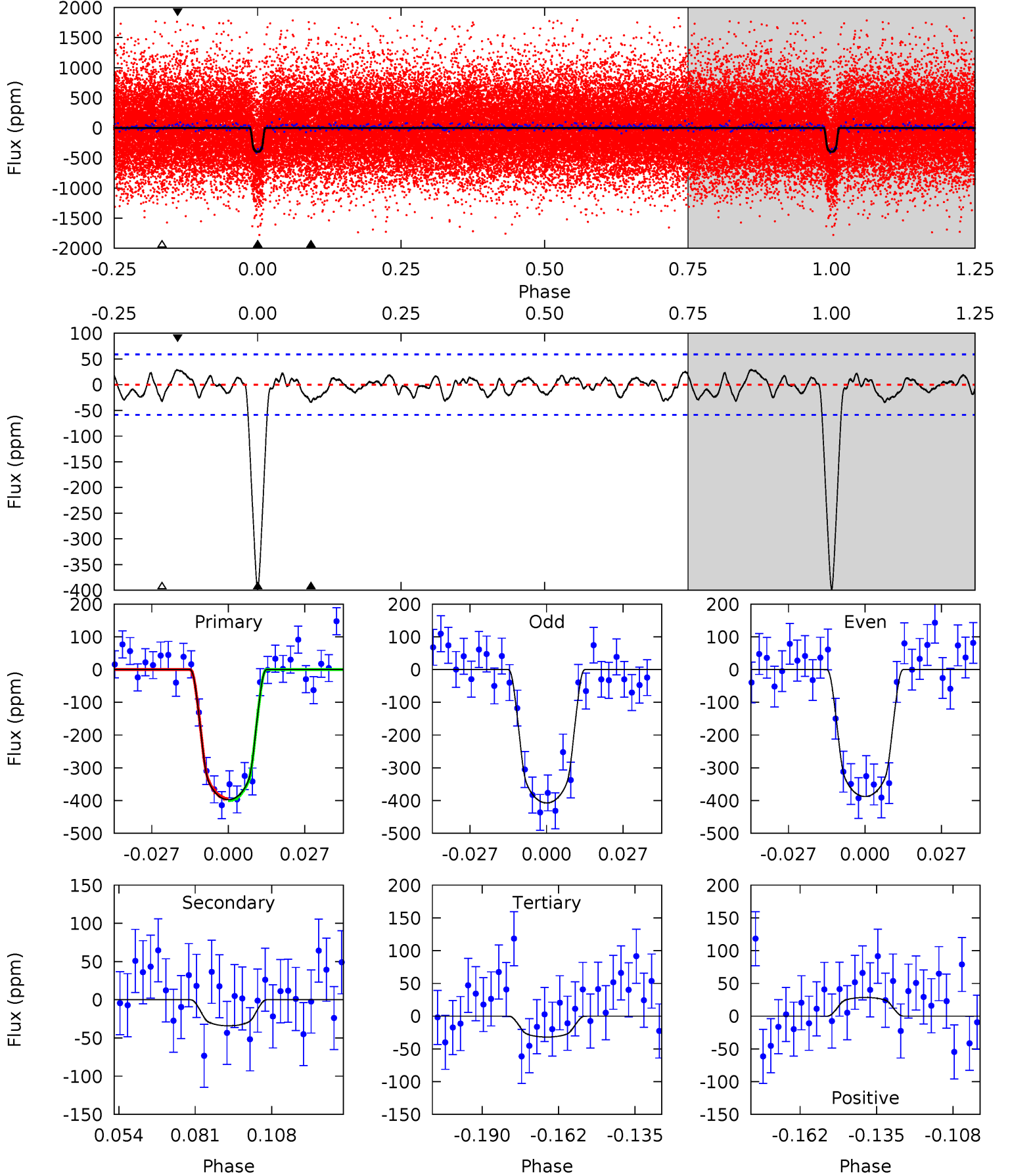
TCE 005438099-03 P= 4.646211 Days $T_0=131.572098$ (BKJD)



DV Model-Shift Uniqueness Test

005438099-03, P = 4.646223 Days, E = 131.569122 Days

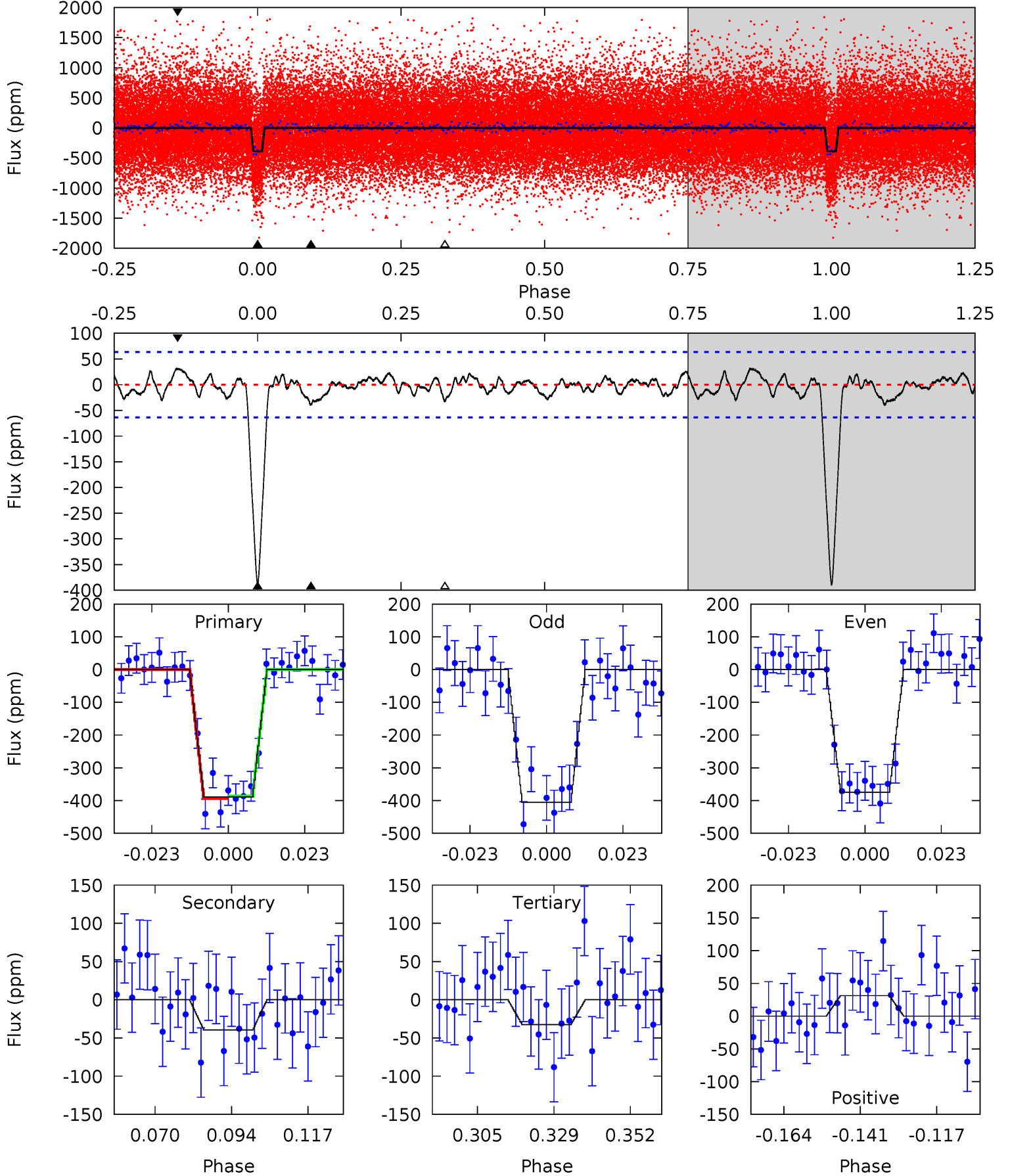
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
32.6	2.80	2.62	2.34	4.83	2.21	1.09	30.0	30.3	0.18	0.46	0.80	0.96	0.07	0.23



Alt Model-Shift Uniqueness Test

005438099-03, P = 4.646211 Days, E = 131.572098 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
29.7	3.03	2.48	2.39	4.86	2.27	0.97	27.2	27.3	0.55	0.64	1.19	0.95	0.07	0.27



Stellar Parameters For KIC 005438099

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	4955^{+100}_{-100}	$4.610^{+0.018}_{-0.046}$	$-0.100^{+0.150}_{-0.150}$	$0.721^{+0.047}_{-0.029}$	$0.774^{+0.036}_{-0.048}$	$2.914^{+0.270}_{-0.442}$
	+2%/-2%	+0%/-1%	+150%/-150%	+7%/-4%	+5%/-6%	+9%/-15%
Source	SPE58	SPE58	SPE58	DSEP		

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

Secondary Eclipse Parameters for KIC 005438099-03 / KOI 1567.02

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-34 ± 12	$1.78^{+0.44}_{-0.40}$	1166^{+28}_{-27}	3086^{+343}_{-271}	14^{+13}_{-7}
Alt.	-40 ± 13	$1.54^{+0.43}_{-0.40}$	1169^{+28}_{-27}	3310^{+366}_{-308}	23^{+20}_{-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 $A_{obs} \gg 1.0$

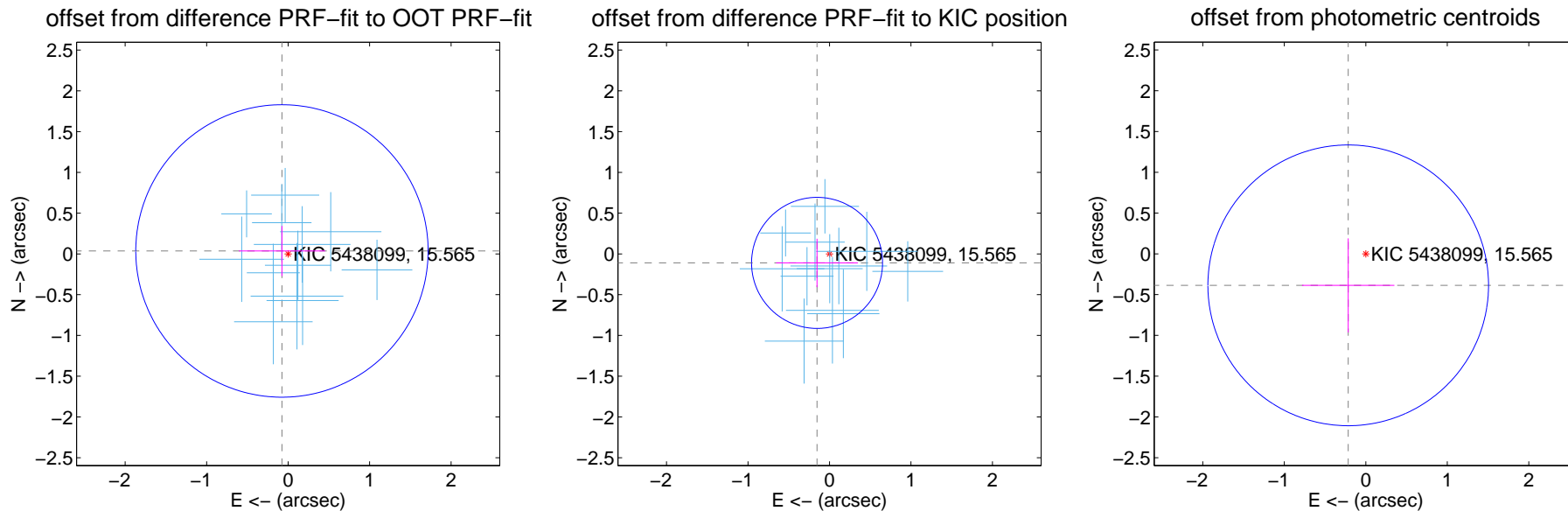
DV Centroid Data

Supplemental centroid analysis for 005438099-03. Kepler magnitude: 15.56. Transit SNR 23.19

There are 12 quarters with good PRF difference image offsets

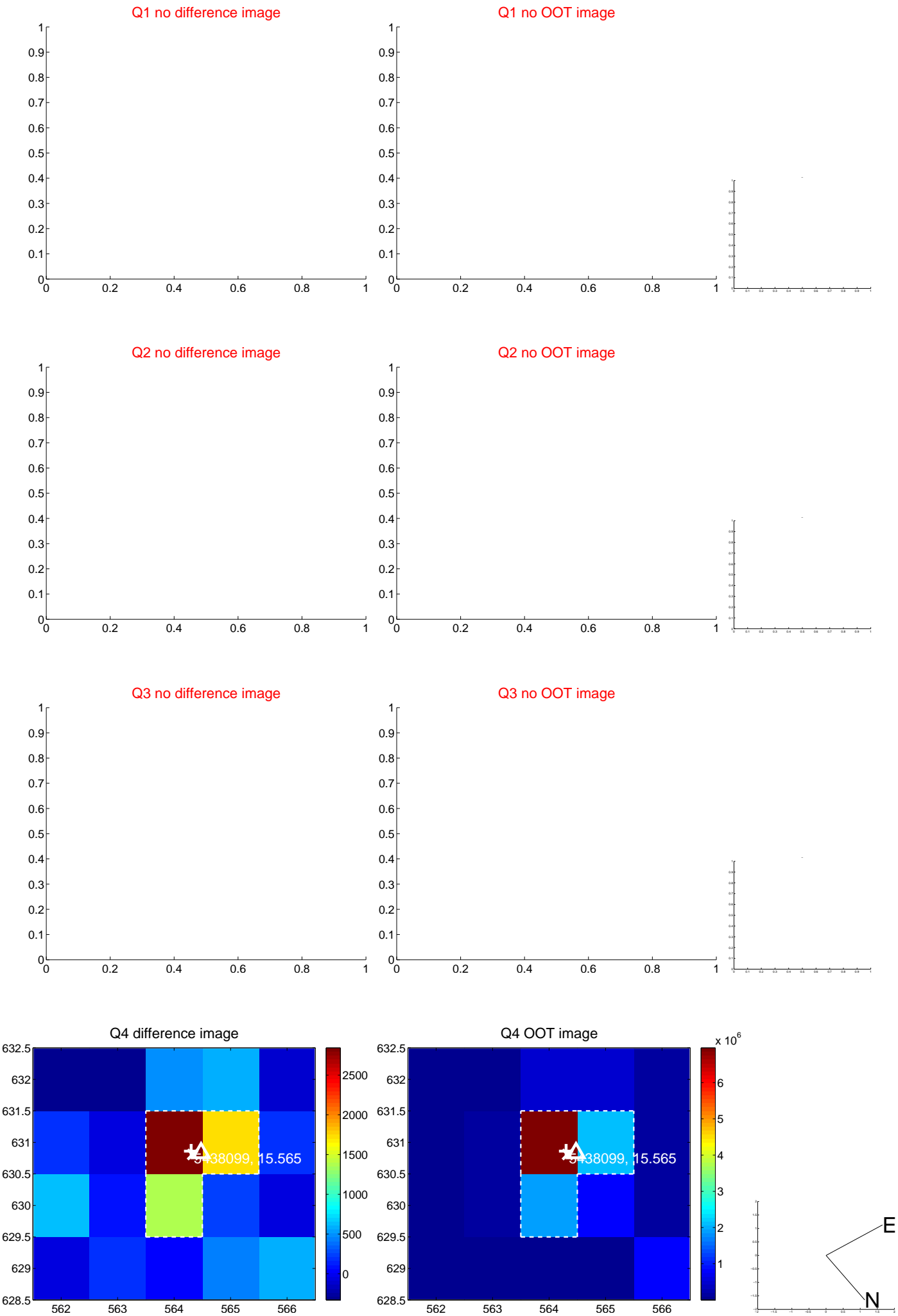
The direct PRF centroid is offset from the target star catalog position by about 0.19 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.084 ± 0.598	0.14	0.076 ± 0.530	0.036 ± 0.307
PRF-fit source offset from KIC position	0.188 ± 0.268	0.70	0.153 ± 0.501	-0.110 ± 0.297
photometric centroid source offset	0.44 ± 0.57	0.77	0.22 ± 0.57	-0.39 ± 0.58

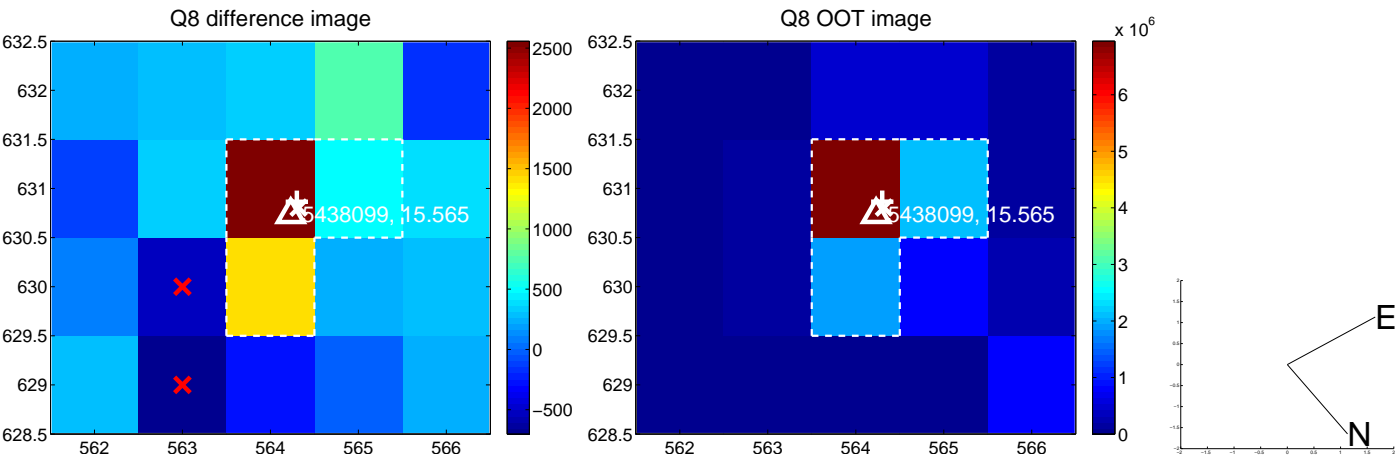
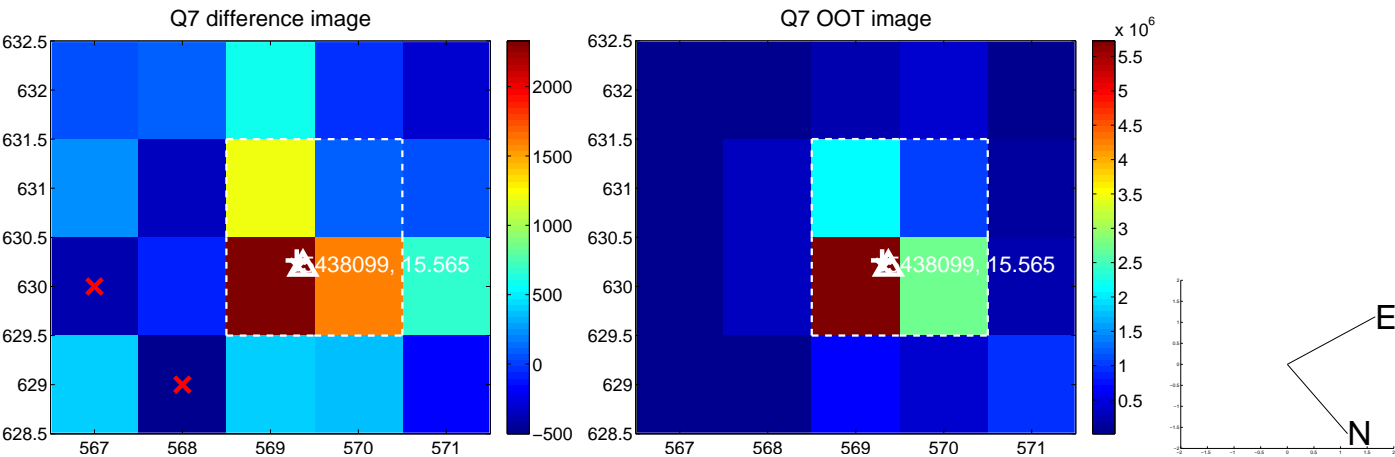
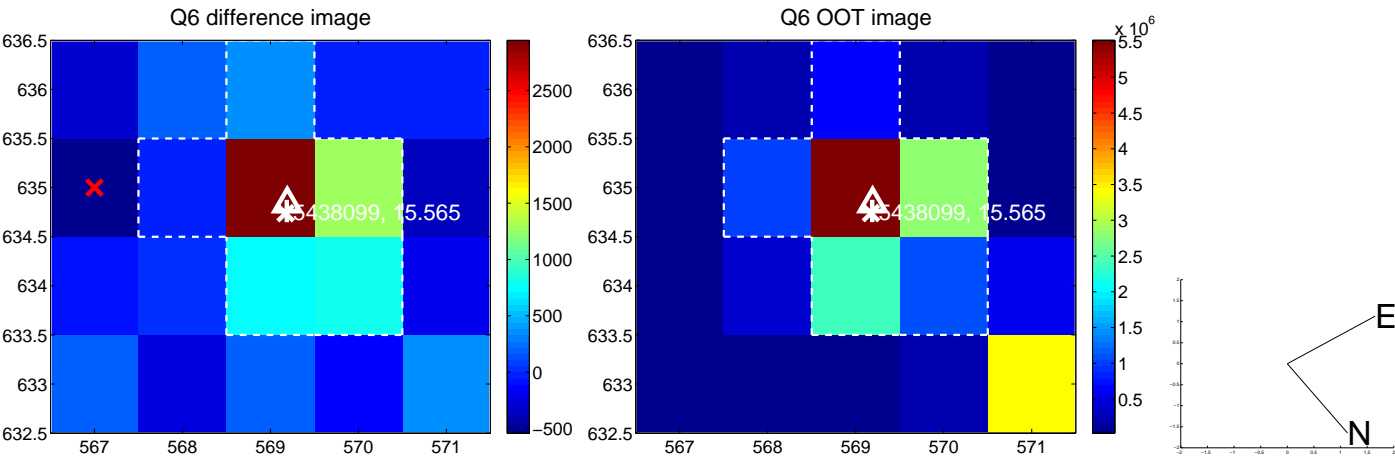
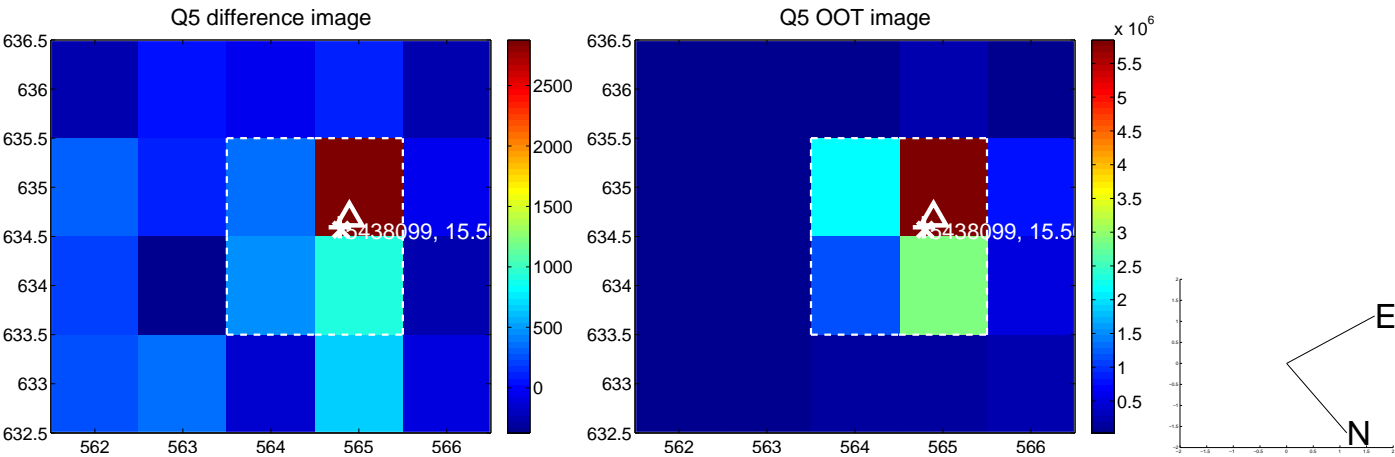


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

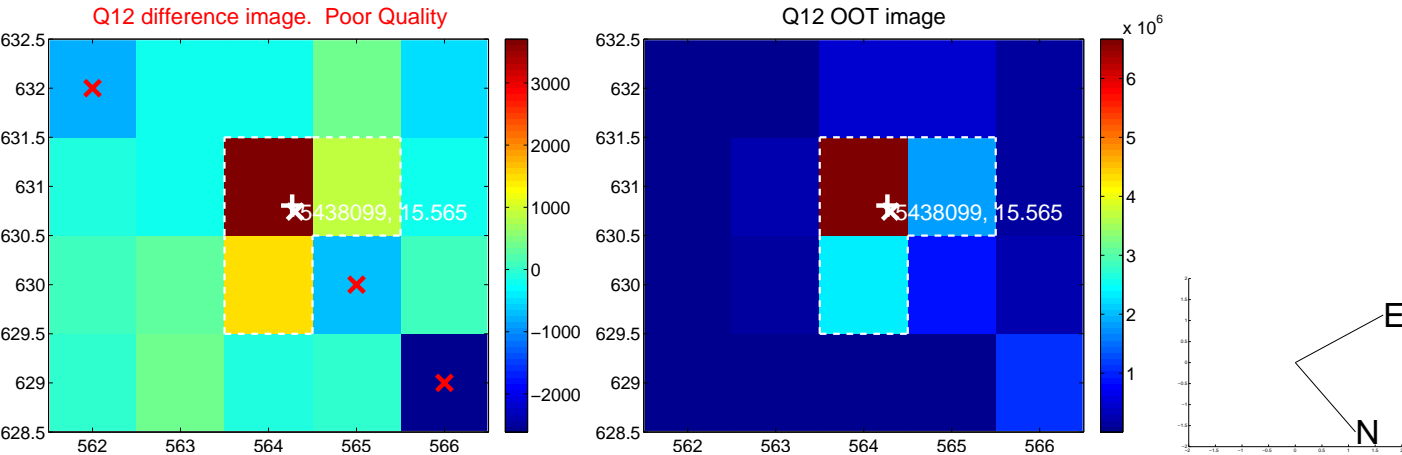
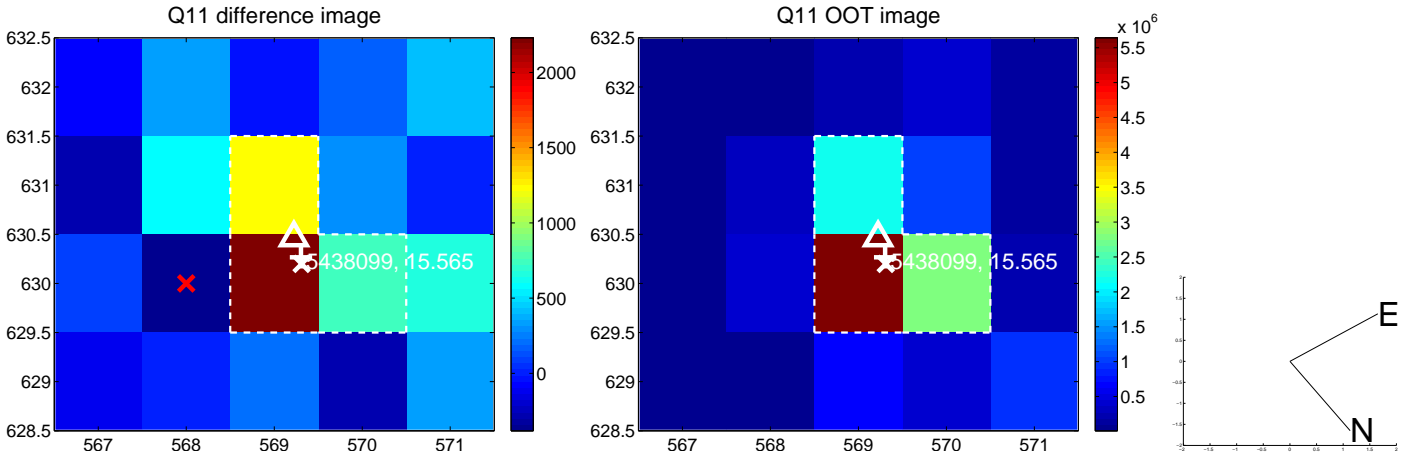
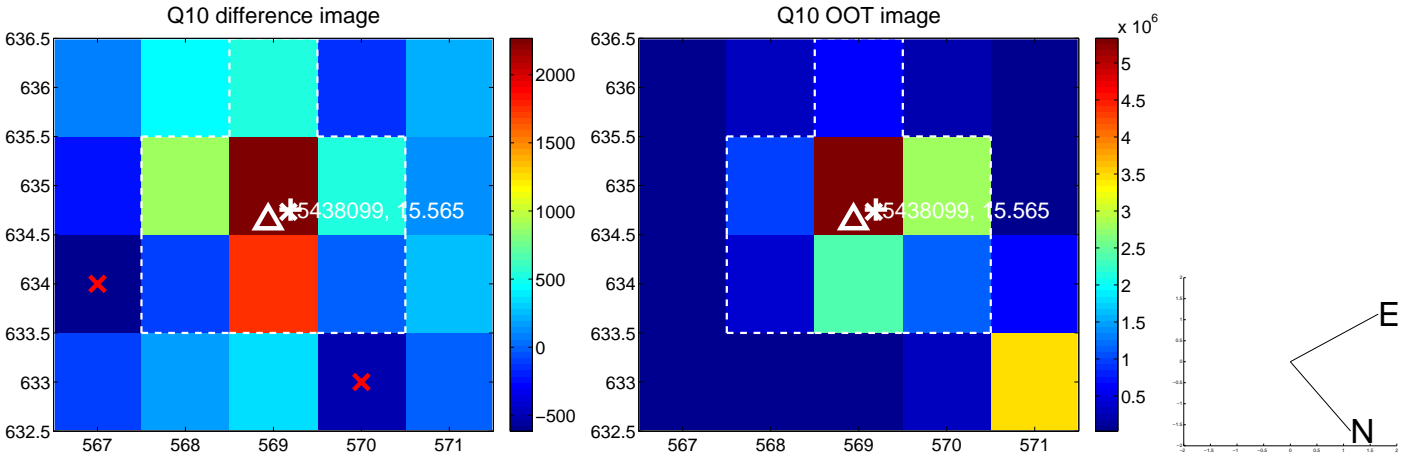
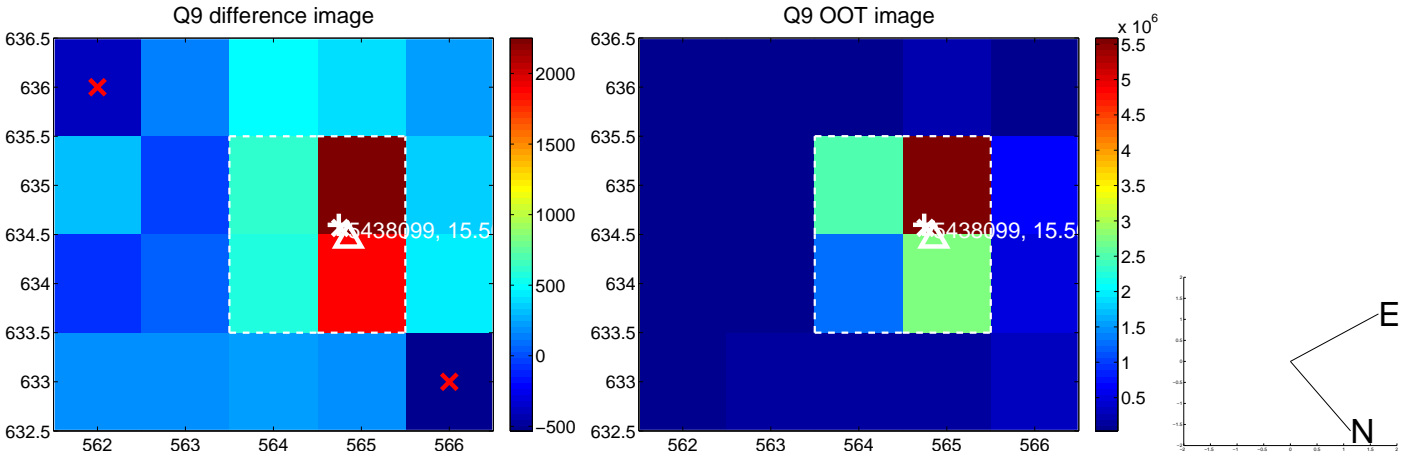
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



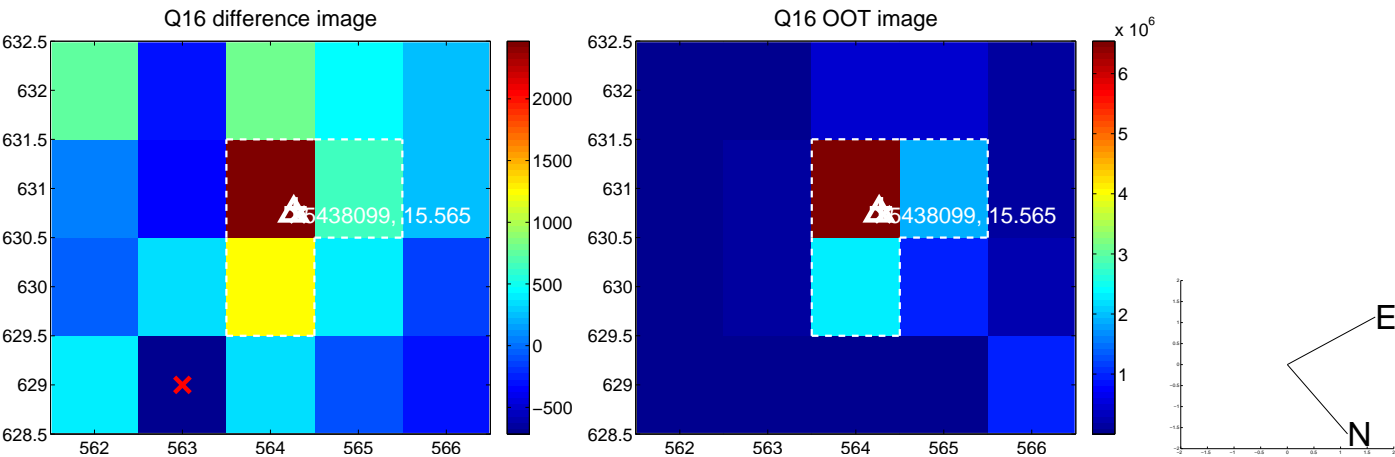
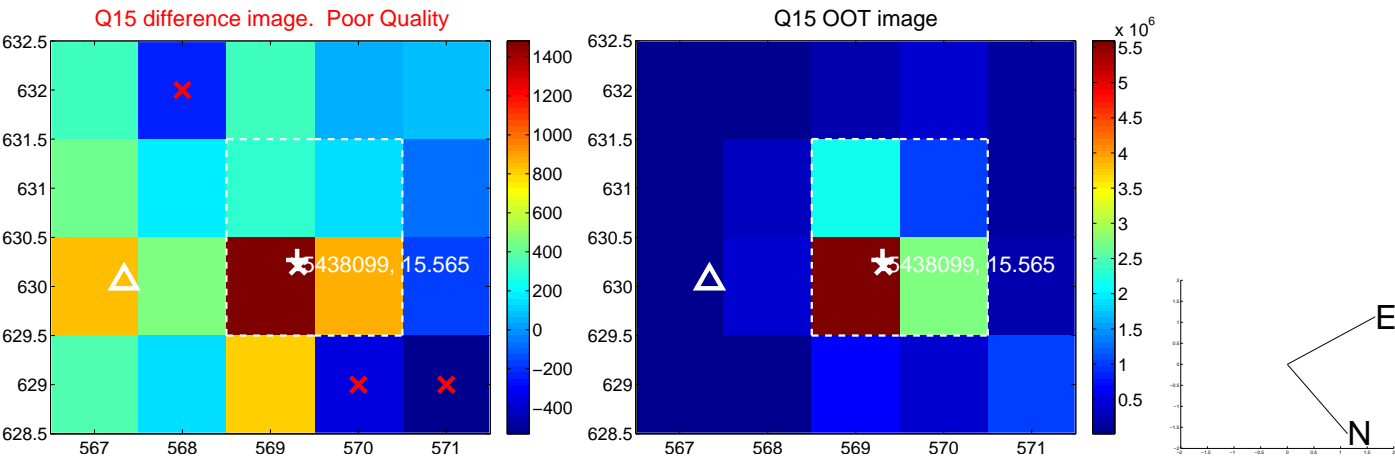
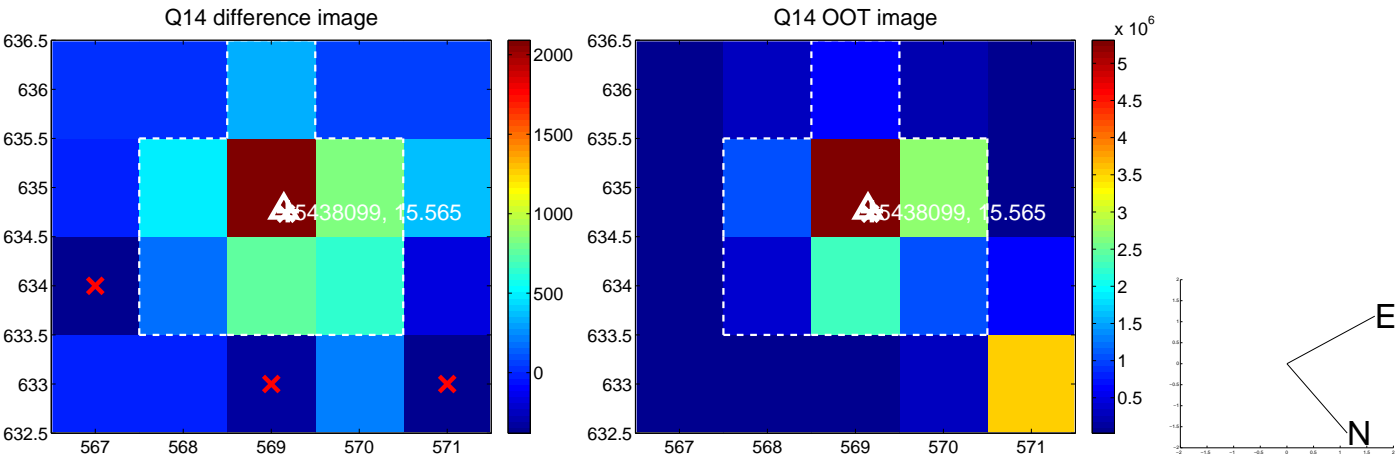
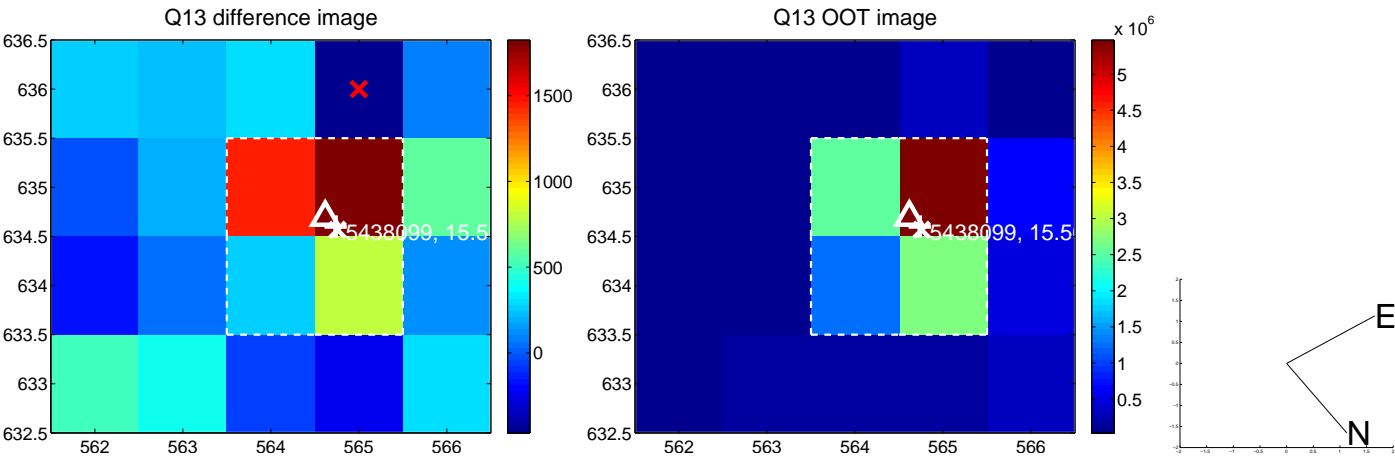
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



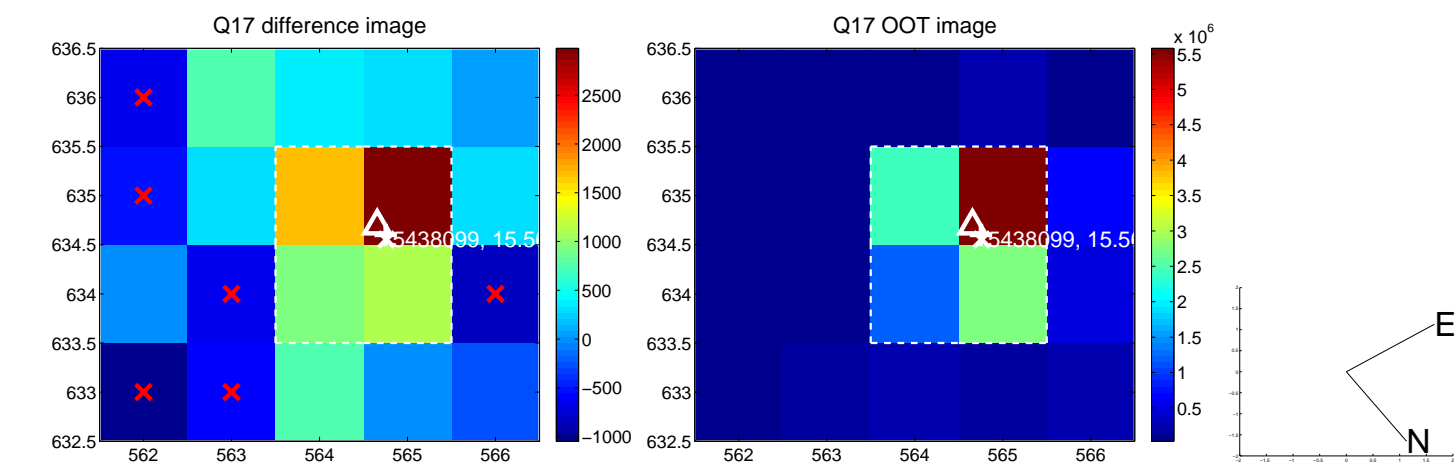
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



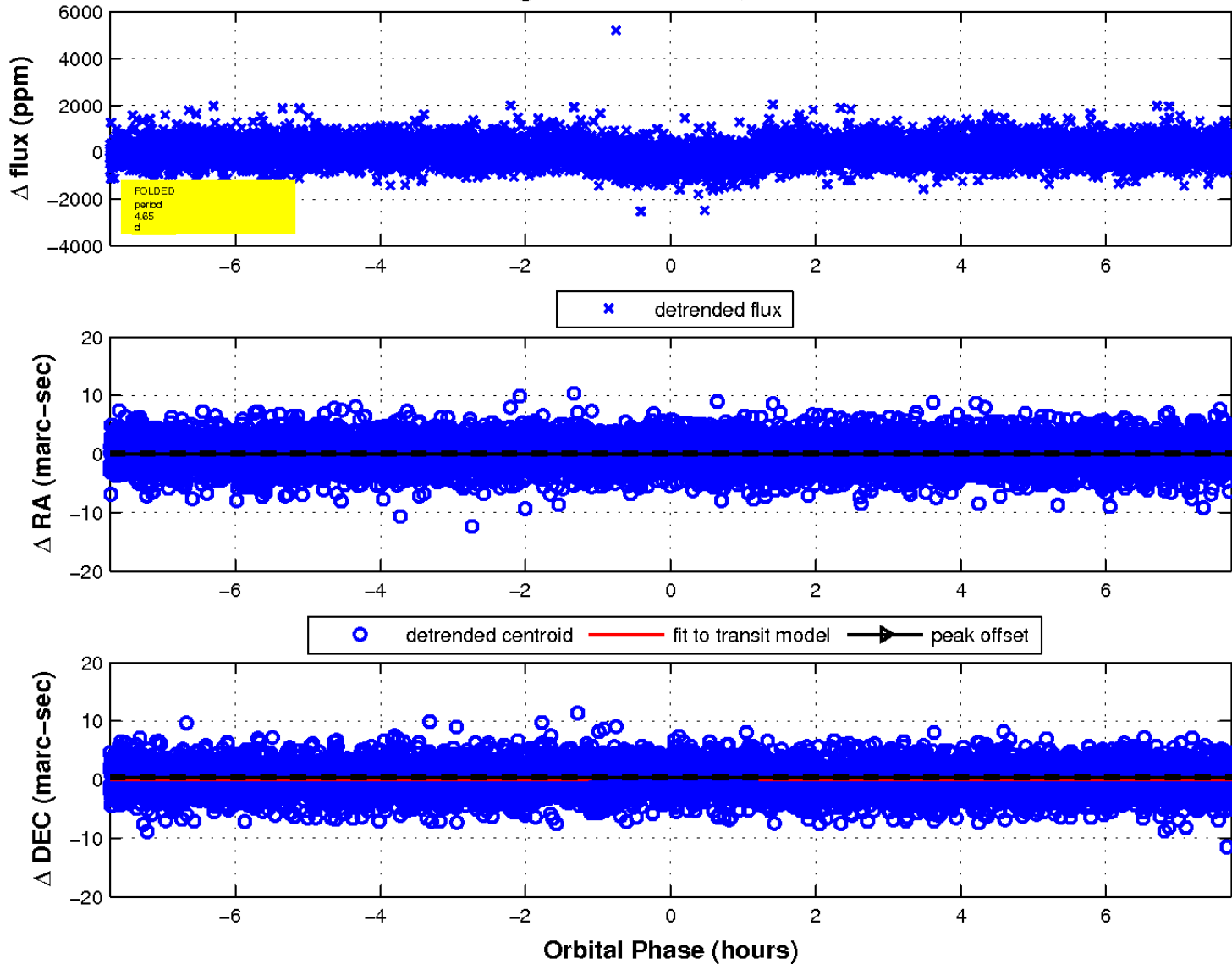
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

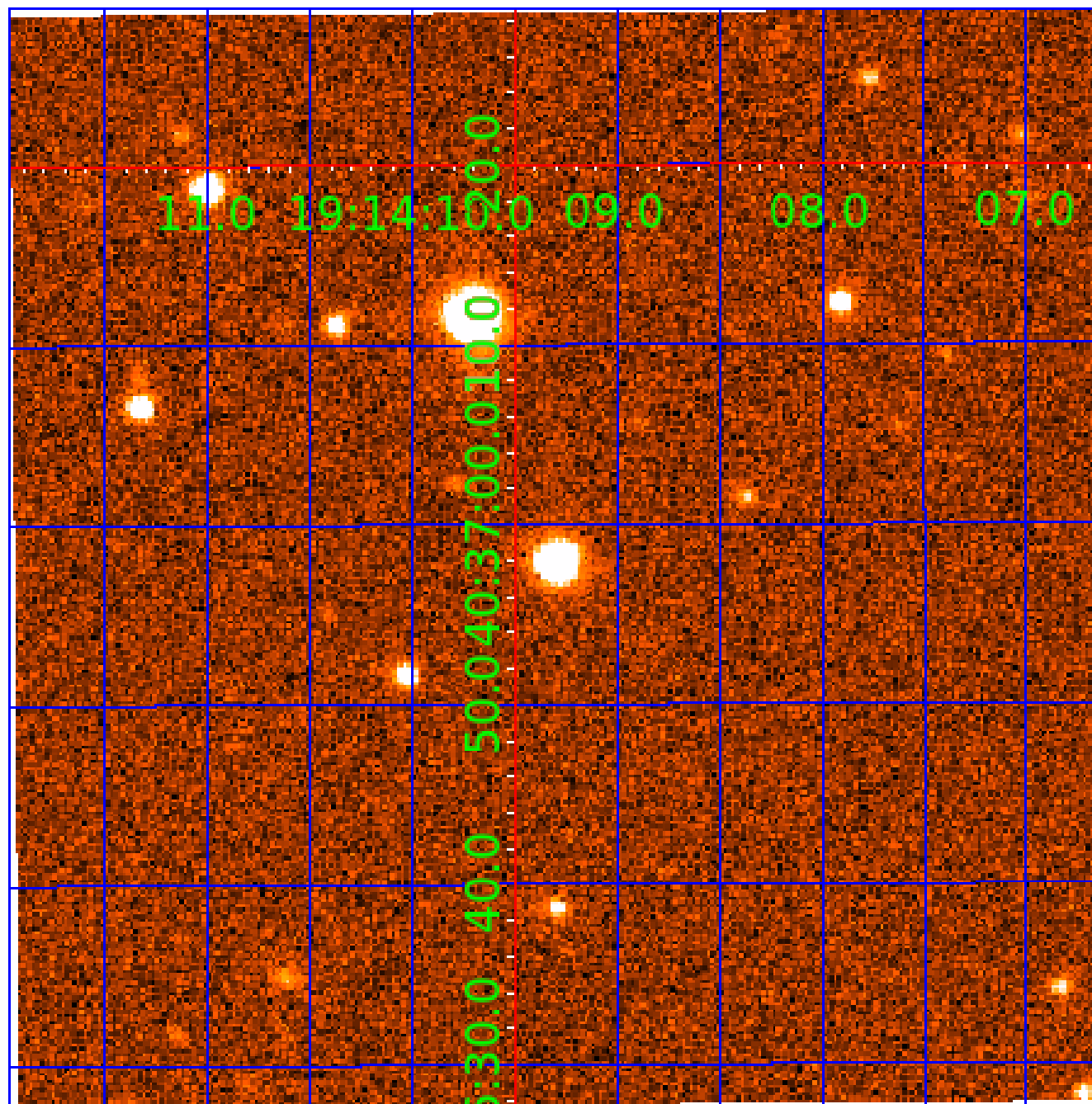


fluxWeightedCentroids, Planet 3 of 4



UKIRT Image

Declination



KIC 005438099

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})
005438099-01	OBS	1567.01	7.240179	137.810390	837.3	3.142	38.2	42.0	0.72	4955	2.51	62.14
005438099-02	OBS	1567.03	17.326682	135.263092	795.2	4.264	27.0	30.2	0.72	4955	2.25	19.41
005438099-03	OBS	1567.02	4.646223	131.569122	401.0	2.578	21.9	23.2	0.72	4955	1.76	112.26
005438099-04	OBS	1567.04	44.841285	135.664445	1042.3	5.880	22.3	23.8	0.72	4955	2.76	5.46

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005438099-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
005438099-02	OBS	PC	1.00	0	0	0	0	NO_COMMENT
005438099-03	OBS	PC	1.00	0	0	0	0	NO_COMMENT
005438099-04	OBS	PC	1.00	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.

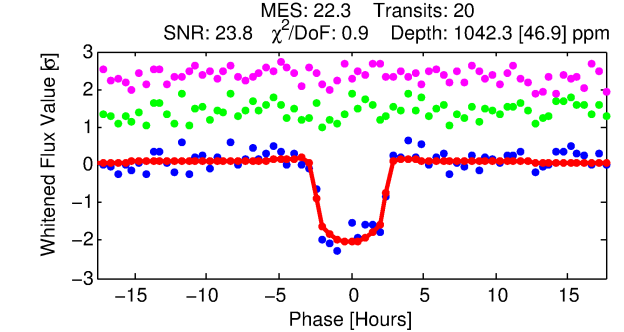
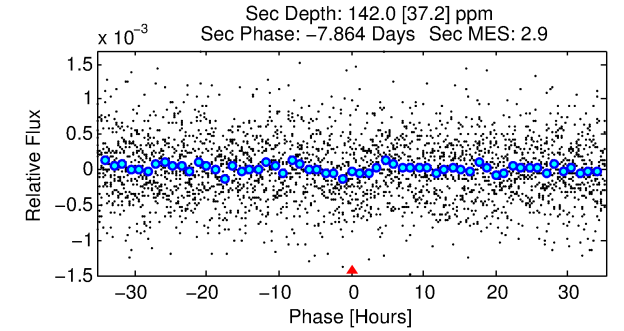
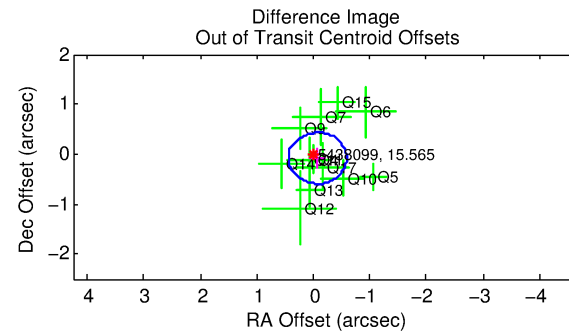
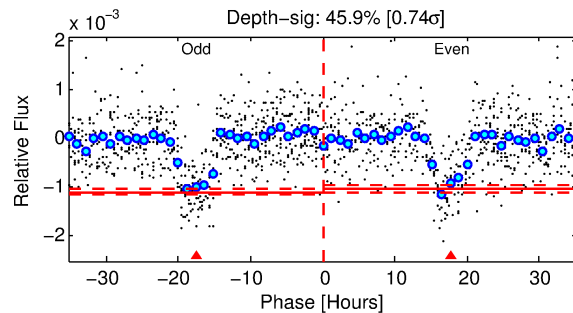
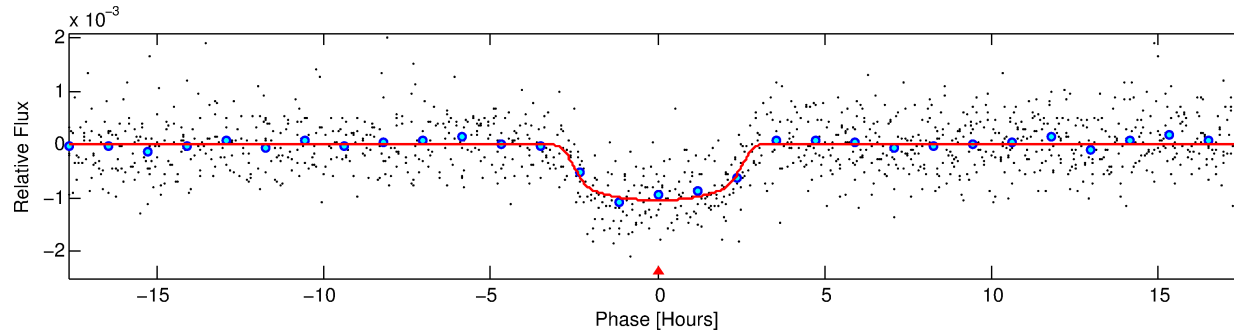
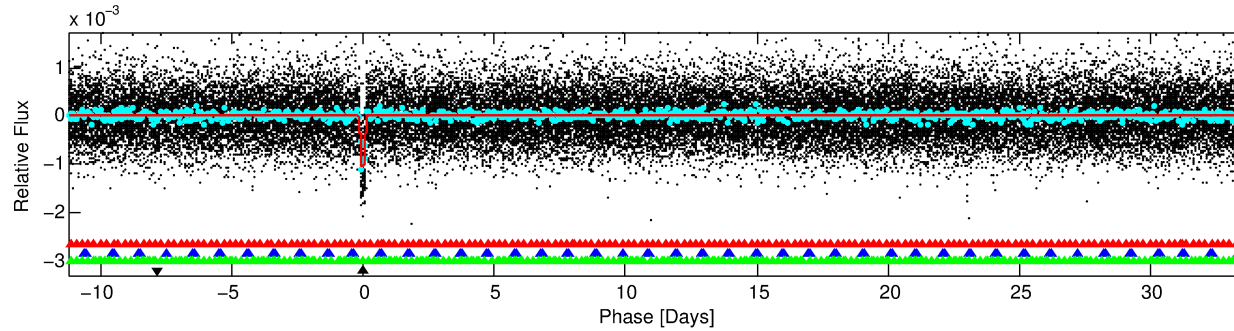
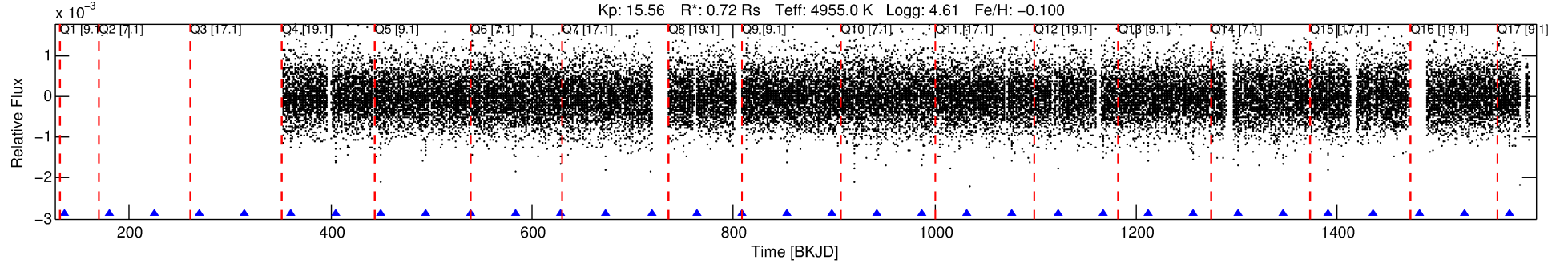
Ephemeris Match Information For 005438099-04

No Significant Match Found

DV One-Page Summary

KIC: 5438099 Candidate: 4 of 4 Period: 44.841 d
KOI: K01567.04 Name: Kepler-306e Corr: 0.969

Kp: 15.56 R*: 0.72 Rs Teff: 4955.0 K Logg: 4.61 Fe/H: -0.100



DV Fit Results:

Period = 44.84128 [0.00031] d
Epoch = 135.6644 [0.0062] BKJD
Rp/R* = 0.0351 [0.0030]
a/R* = 32.33 [9.62]
b = 0.87 [0.08]
Seff = 5.46 [0.63]
Teq = 390 [11] K
Rp = 2.76 [0.29] Re
a = 0.2267 [0.0127] AU
Ag = 527.17 [170.12] [3.09σ]
Teff = 2888 [233] K [10.73σ]

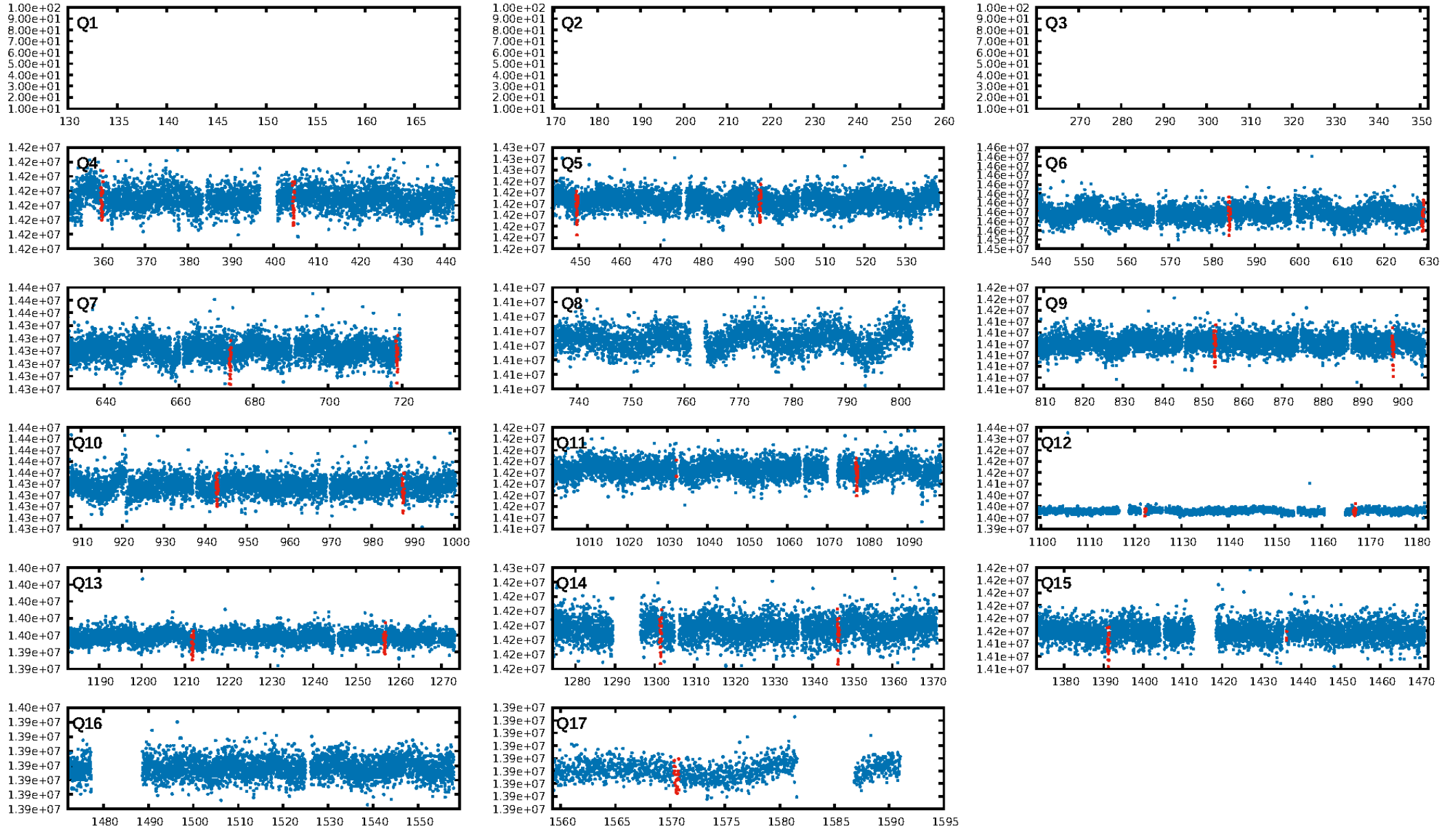
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [90.92σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 42.9%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 5.57e-109
RollingBand-fgt: 1.00 [19/19]
GhostDiagnostic-chr: 15.13
Centroid-sig: 0.4%
Centroid-so: 0.503 arcsec [0.96σ]
OotOffset-rm: 0.109 arcsec [0.63σ]
KicOffset-rm: 0.235 arcsec [1.21σ]
OotOffset-st: 3/3/2/4 [12]
KicOffset-st: 3/3/2/4 [12]
DiffImageQuality-fgm: 1.00 [12/12]
DiffImageOverlap-fno: 0.83 [10/12]

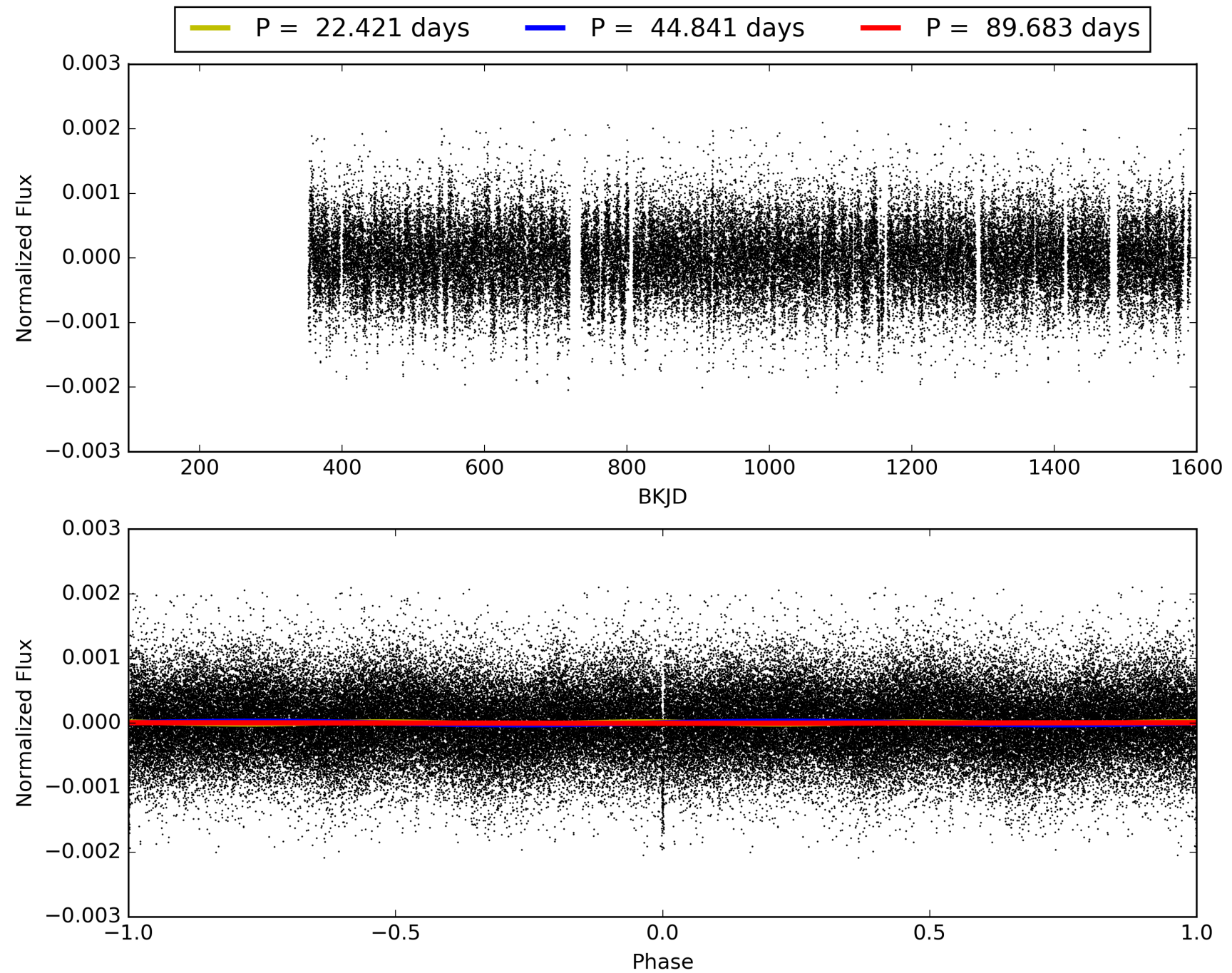
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 03:27:19 Z

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

TCE 005438099-04, PDC Light Curves

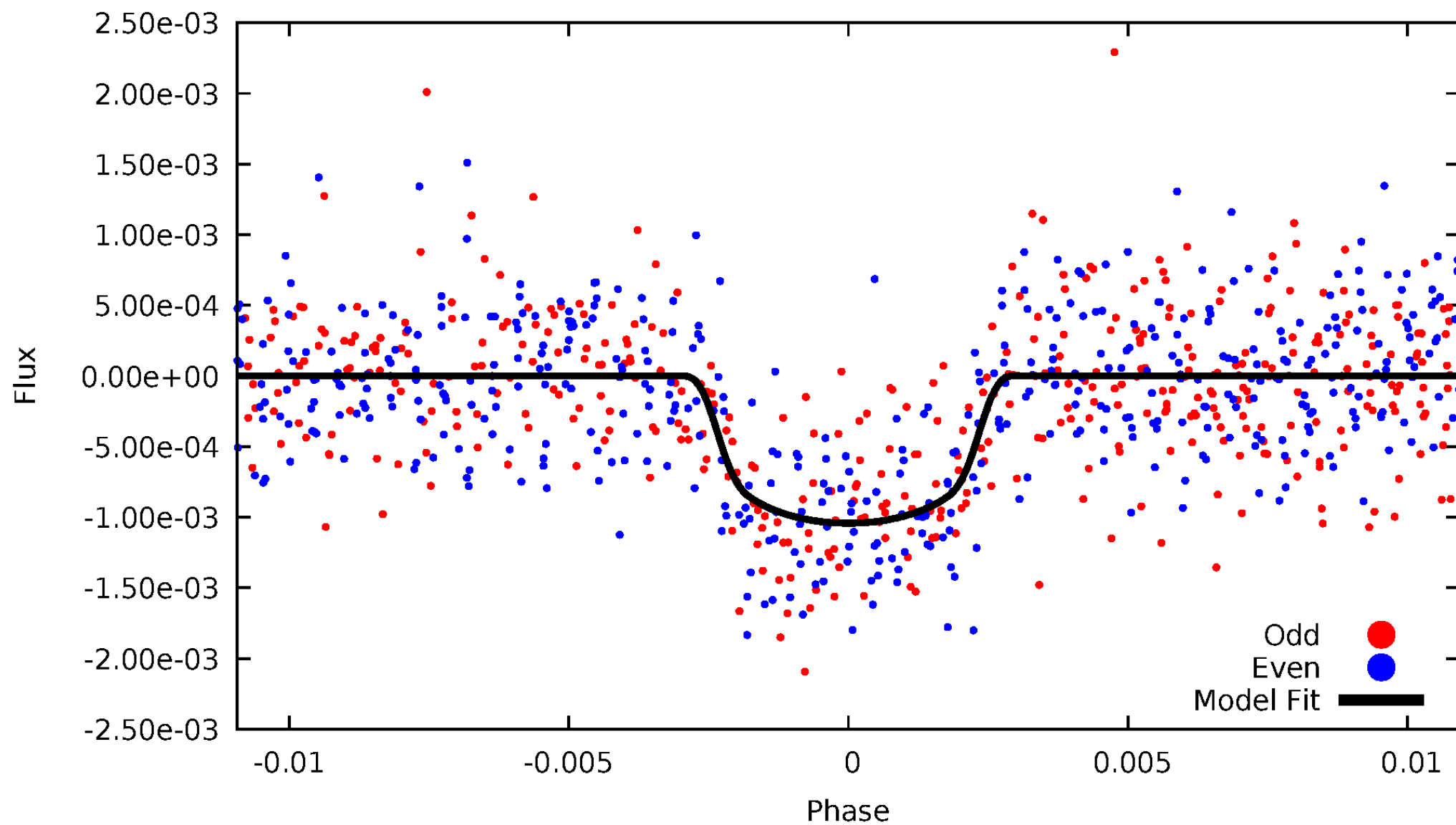


TCE 005438099-04



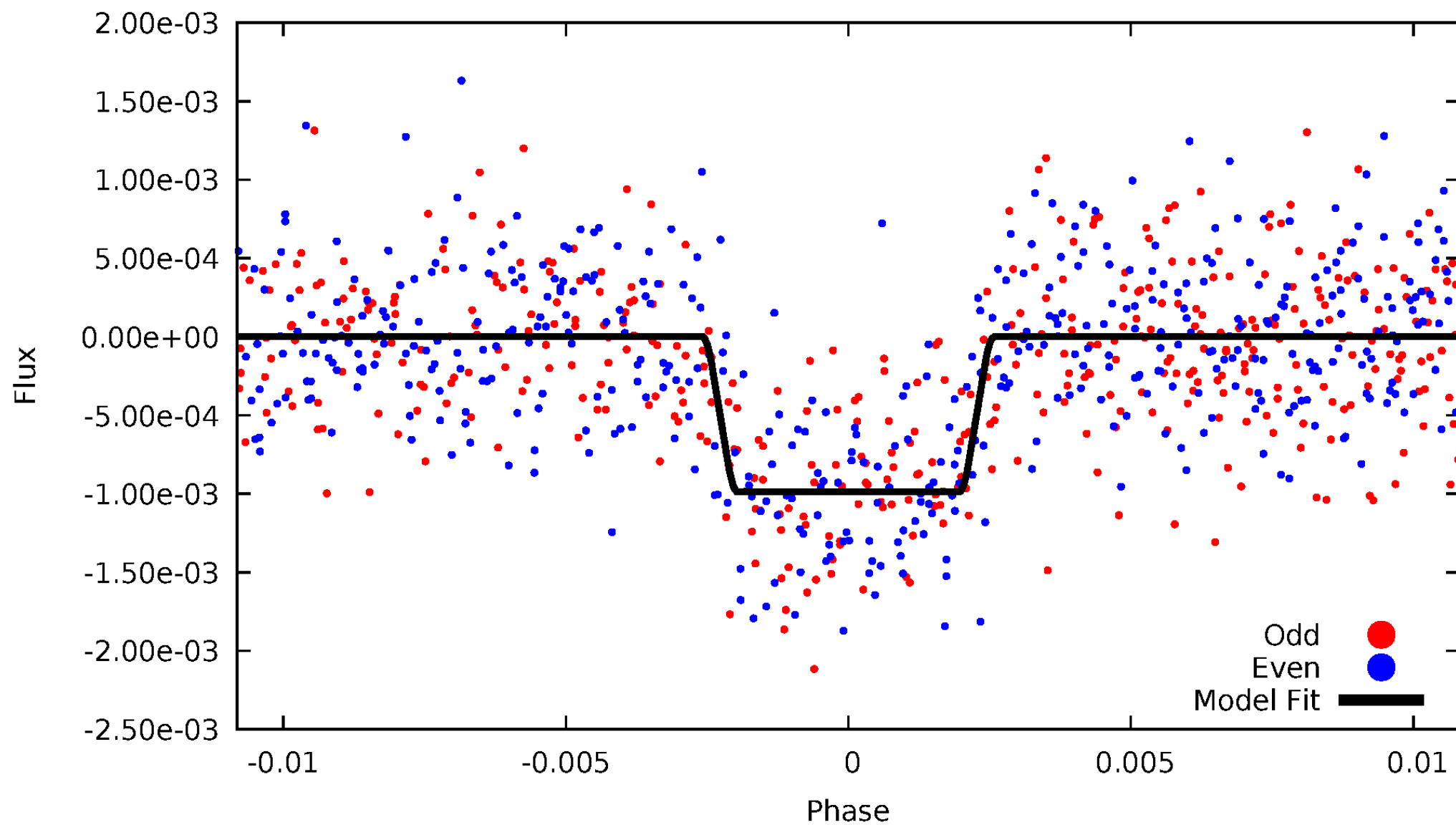
DV Odd/Even

TCE 005438099-04



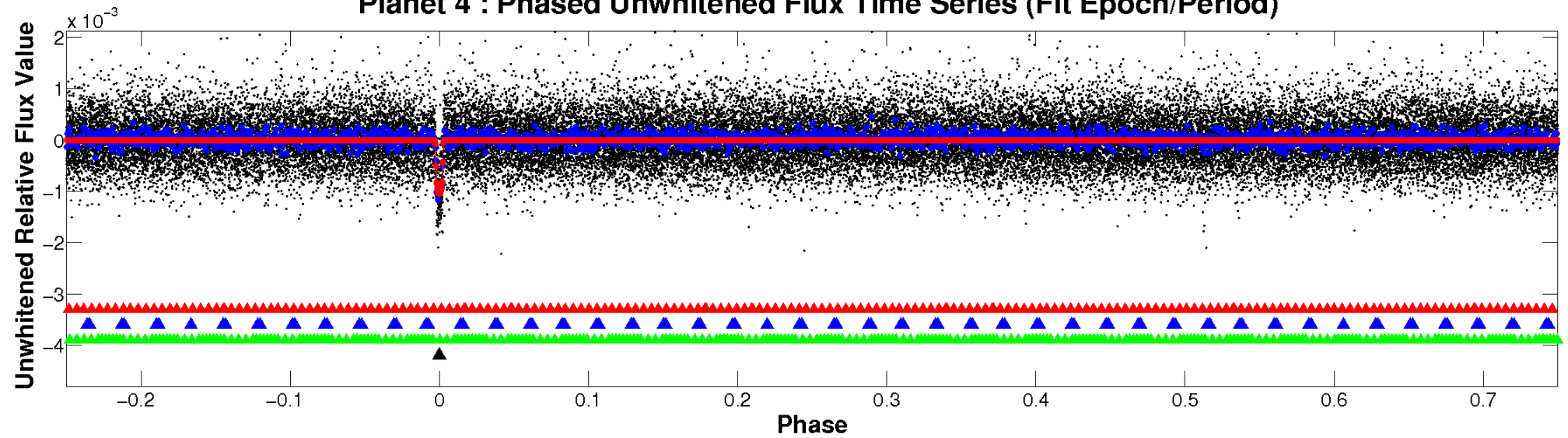
ALT Odd/Even

TCE 005438099-04

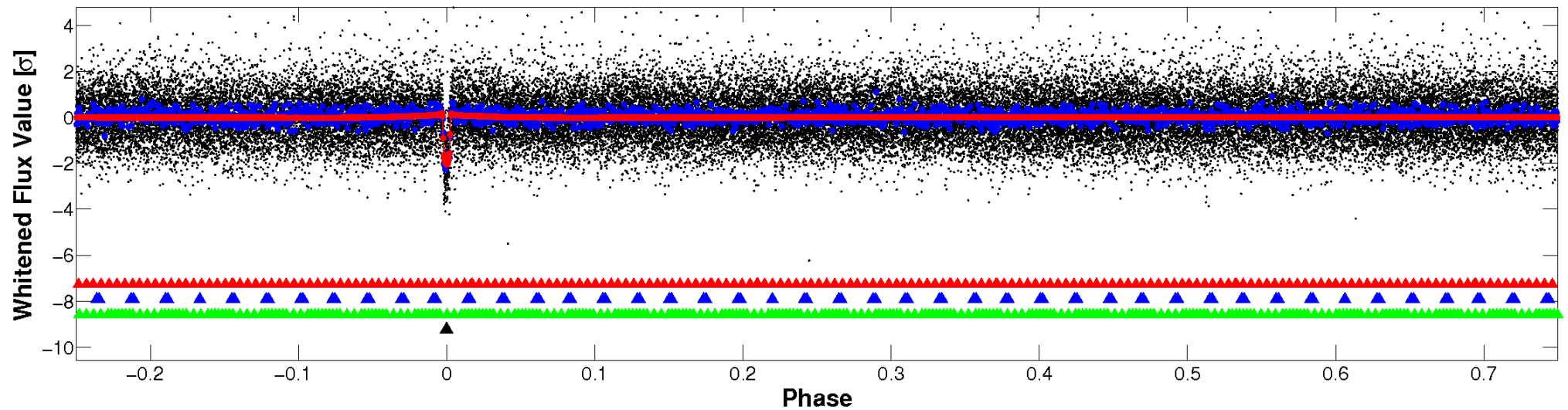


Non-Whitened Vs. Whitened Light Curve

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

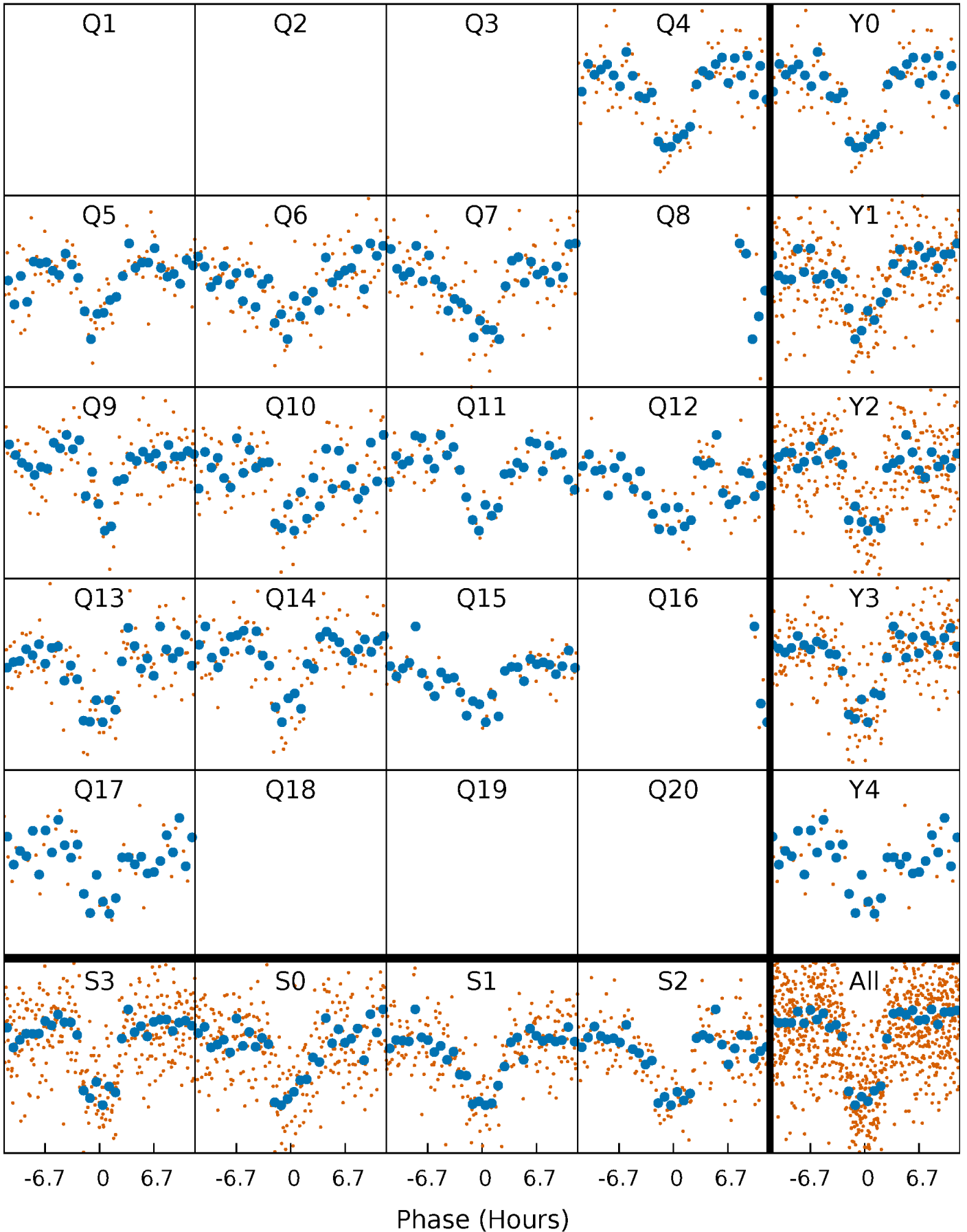


Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



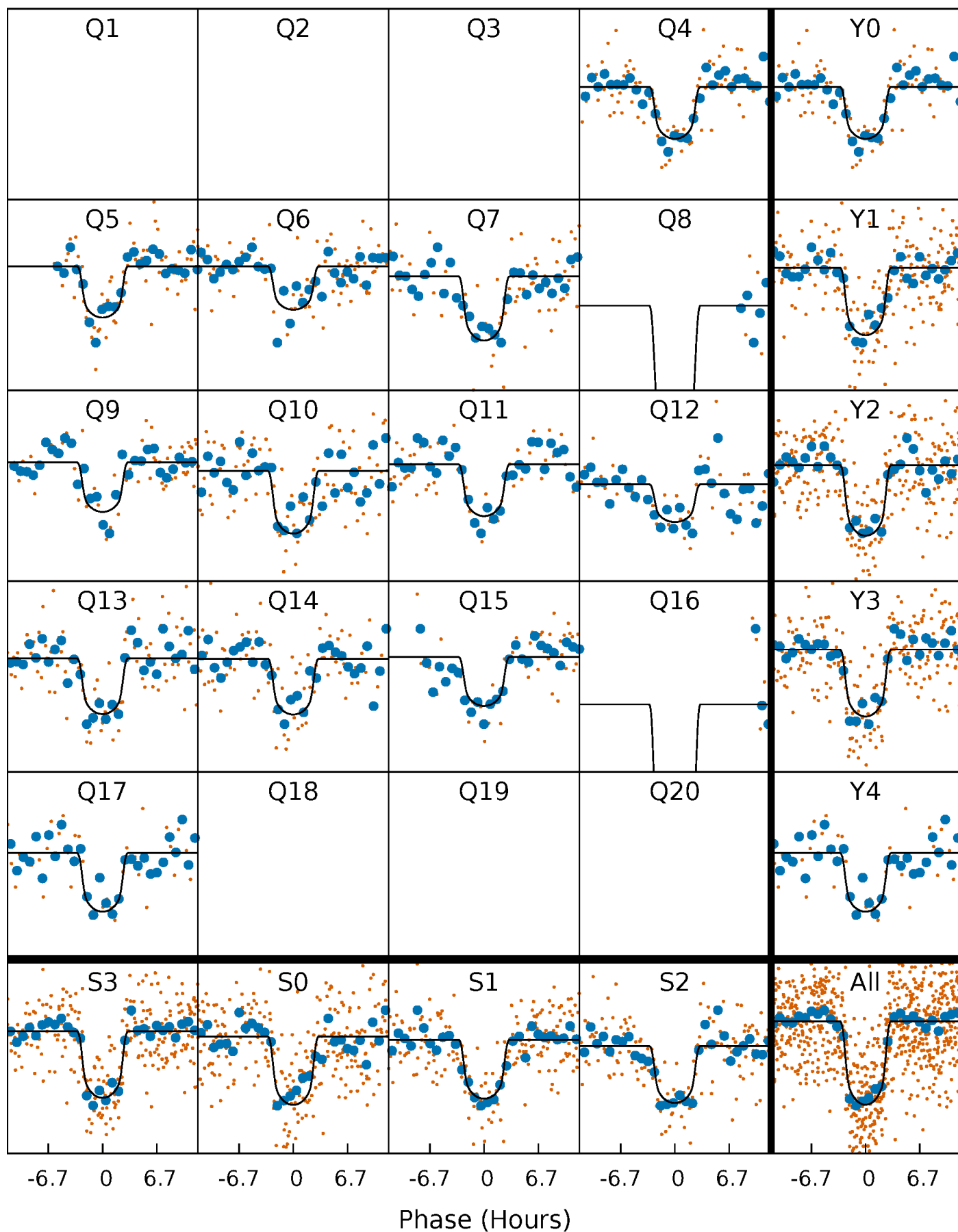
PDC Quarter-Phased Transit Curves

TCE 005438099-04 P= 44.841285 Days $T_0=135.664445$ (BKJD)



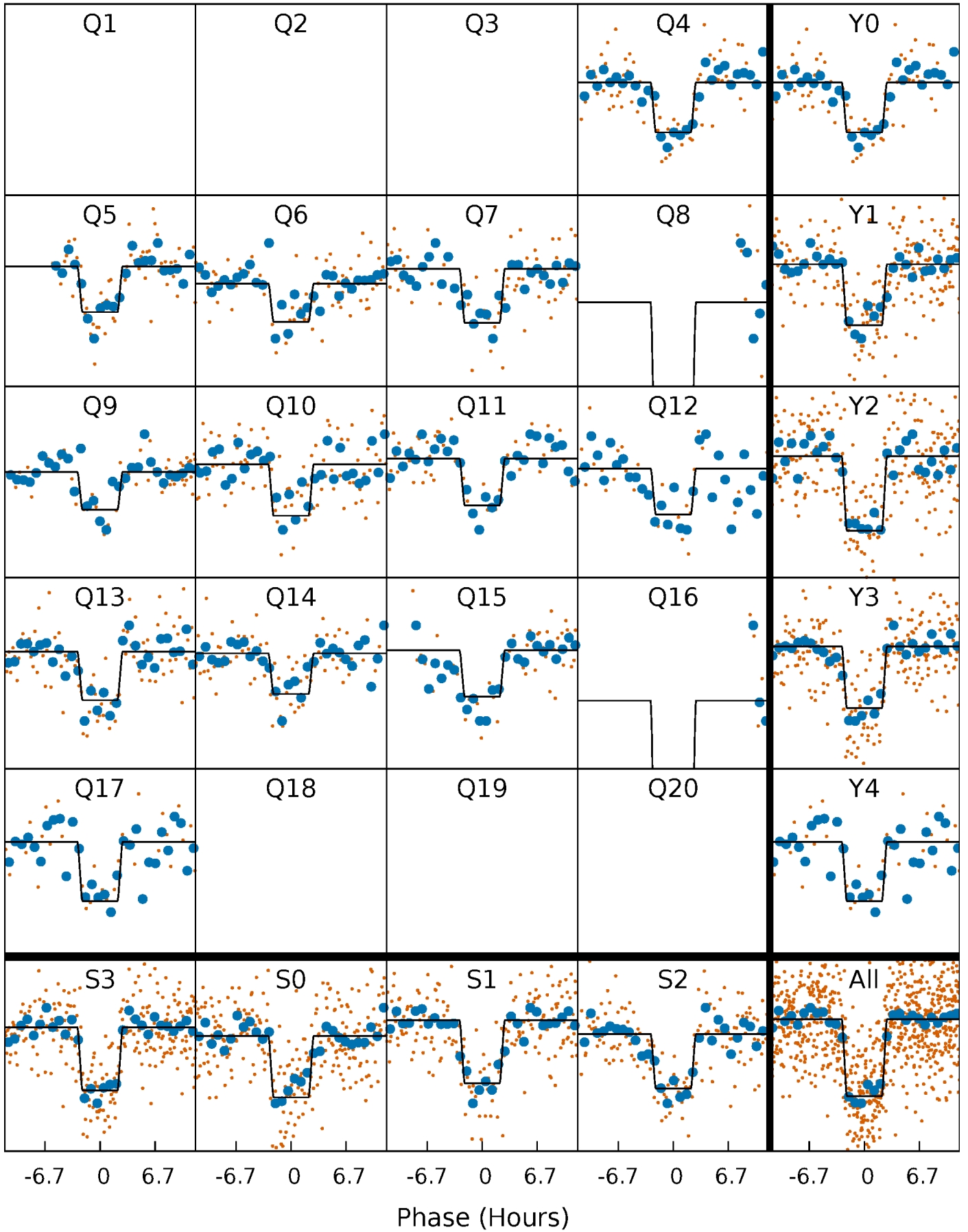
DV Quarter-Phased Transit Curves

TCE 005438099-04 P= 44.841285 Days $T_0=135.664445$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

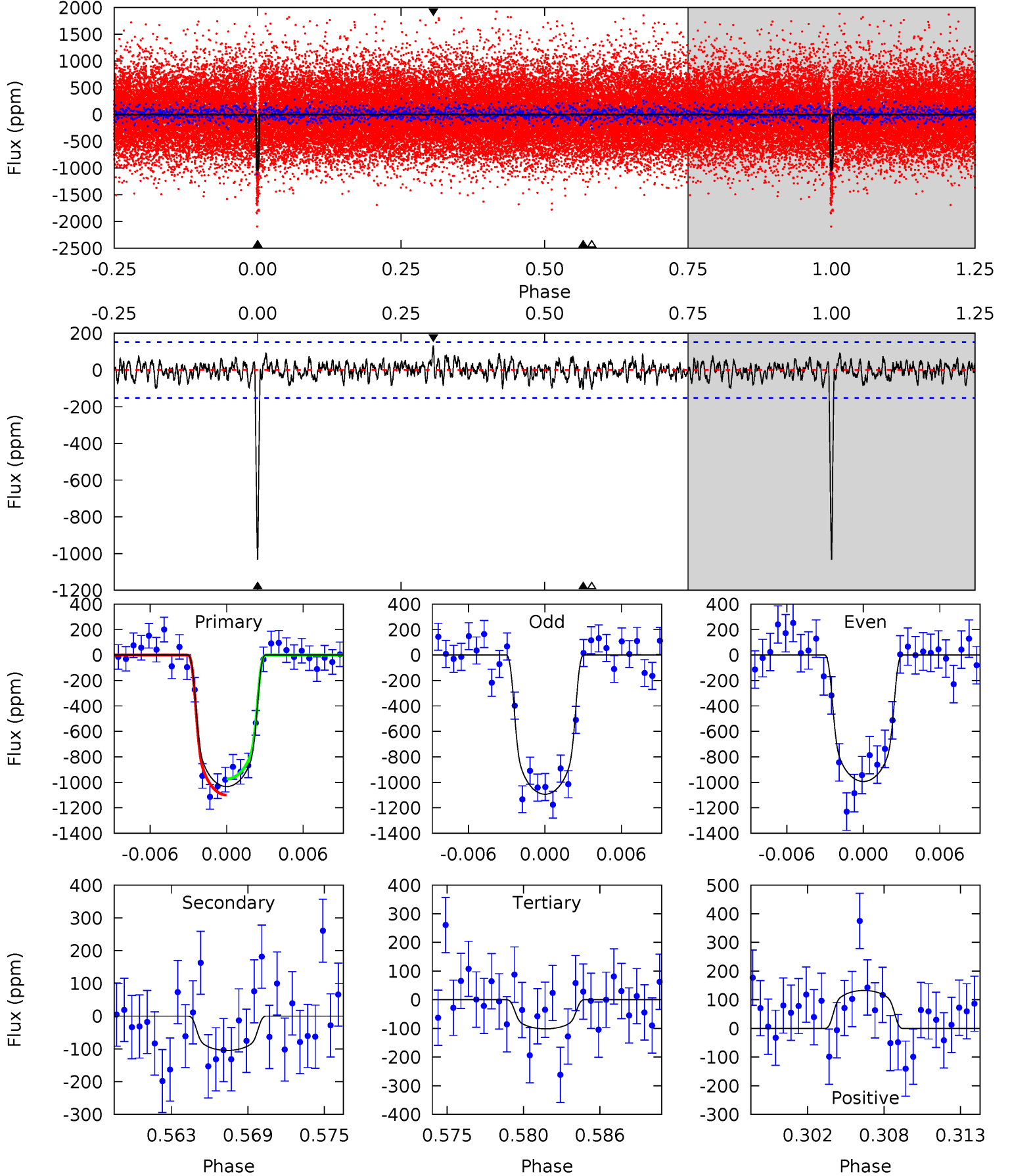
TCE 005438099-04 P= 44.842017 Days $T_0=135.651310$ (BKJD)



DV Model-Shift Uniqueness Test

005438099-04, P = 44.841285 Days, E = 135.664445 Days

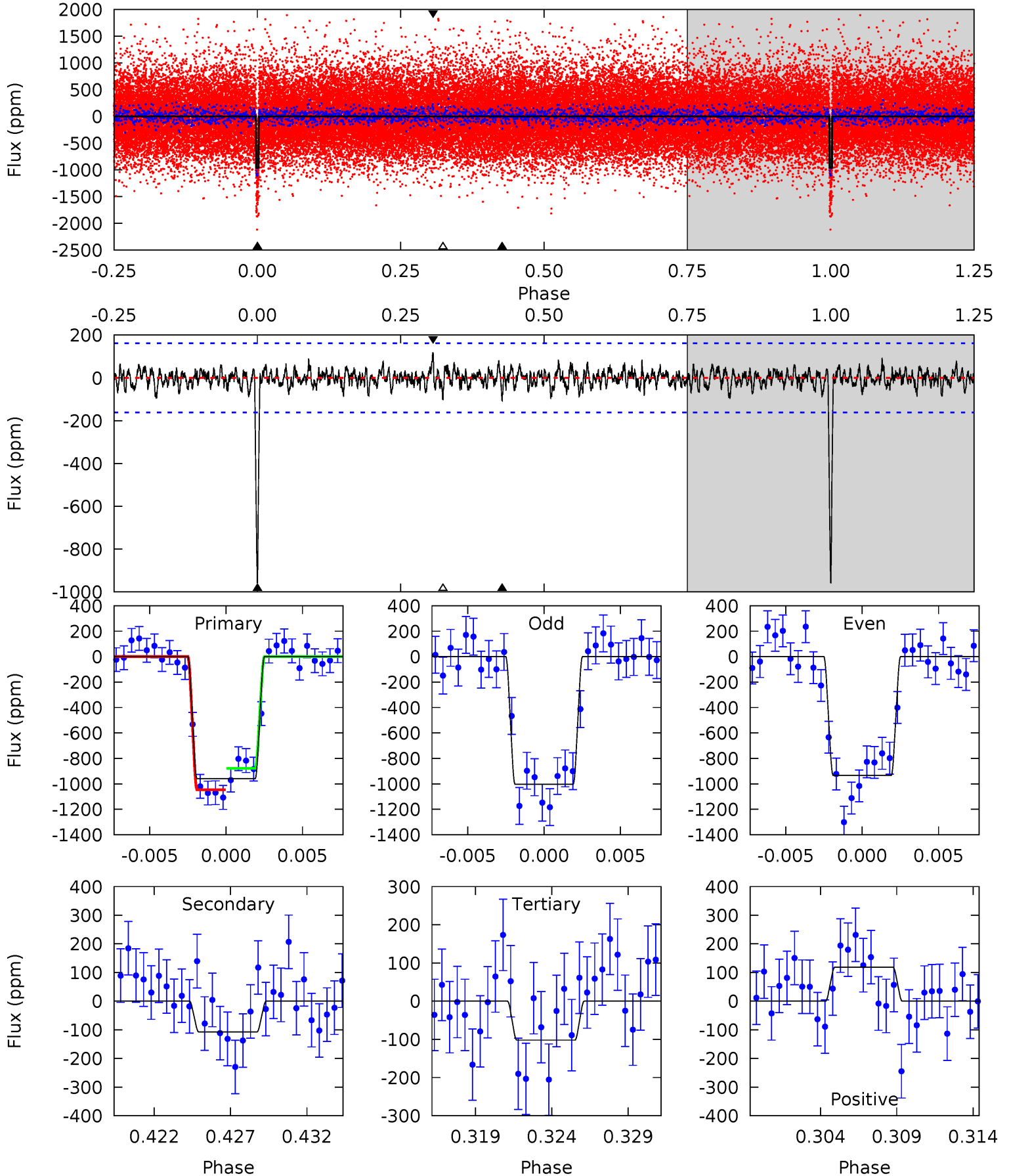
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
34.8	3.53	3.42	4.47	5.13	2.76	1.18	31.4	30.4	0.11	-0.94	1.69	1.01	0.11	2.14



Alt Model-Shift Uniqueness Test

005438099-04, P = 44.842017 Days, E = 135.651310 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
30.6	3.43	3.25	3.78	5.15	2.80	0.98	27.3	26.8	0.18	-0.35	1.11	0.99	0.11	2.66



Stellar Parameters For KIC 005438099

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	4955^{+100}_{-100}	$4.610^{+0.018}_{-0.046}$	$-0.100^{+0.150}_{-0.150}$	$0.721^{+0.047}_{-0.029}$	$0.774^{+0.036}_{-0.048}$	$2.914^{+0.270}_{-0.442}$
	+2%/-2%	+0%/-1%	+150%/-150%	+7%/-4%	+5%/-6%	+9%/-15%
Source	SPE58	SPE58	SPE58	DSEP		

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

Secondary Eclipse Parameters for KIC 005438099-04 / KOI 1567.04

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-105 ± 30	$2.79^{+0.25}_{-0.25}$	549^{+13}_{-14}	3211^{+166}_{-173}	369^{+146}_{-114}
Alt.	-108 ± 31	$2.49^{+0.28}_{-0.25}$	547^{+14}_{-13}	3328^{+180}_{-191}	487^{+177}_{-158}

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 $A_{obs} \gg 1.0$

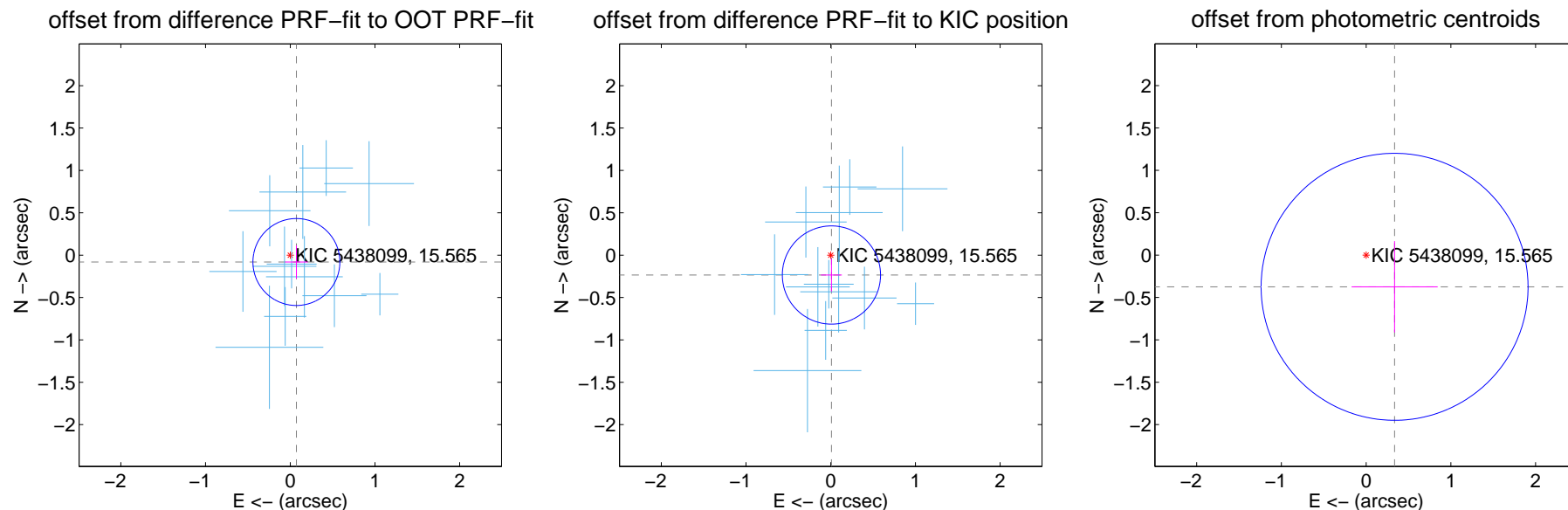
DV Centroid Data

Supplemental centroid analysis for 005438099-04. Kepler magnitude: 15.56. Transit SNR 23.83

There are 12 quarters with good PRF difference image offsets

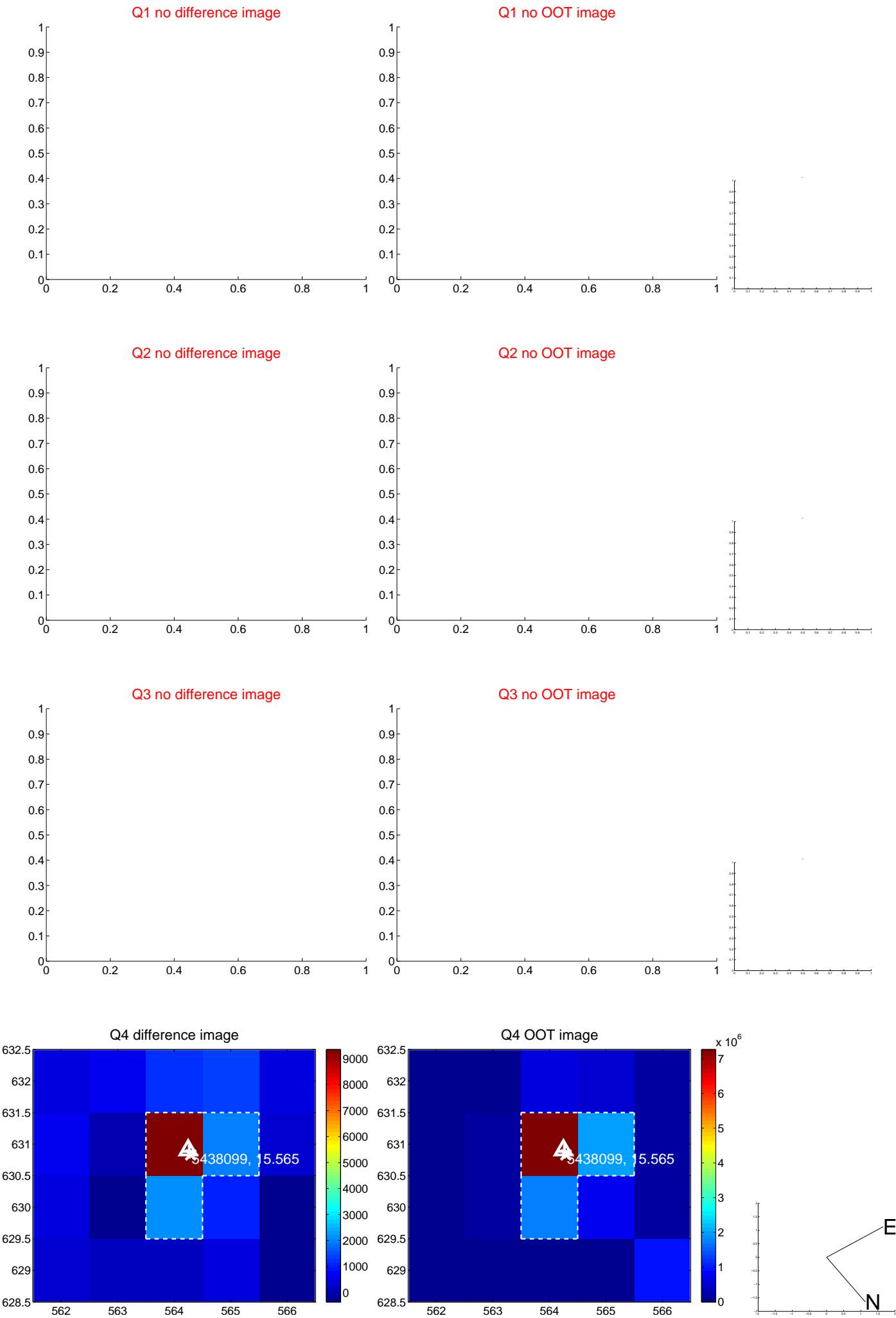
The direct PRF centroid is offset from the target star catalog position by about 0.19 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.109 ± 0.171	0.63	-0.072 ± 0.133	-0.081 ± 0.196
PRF-fit source offset from KIC position	0.235 ± 0.193	1.21	-0.008 ± 0.123	-0.234 ± 0.193
photometric centroid source offset	0.50 ± 0.53	0.96	-0.34 ± 0.51	-0.37 ± 0.54

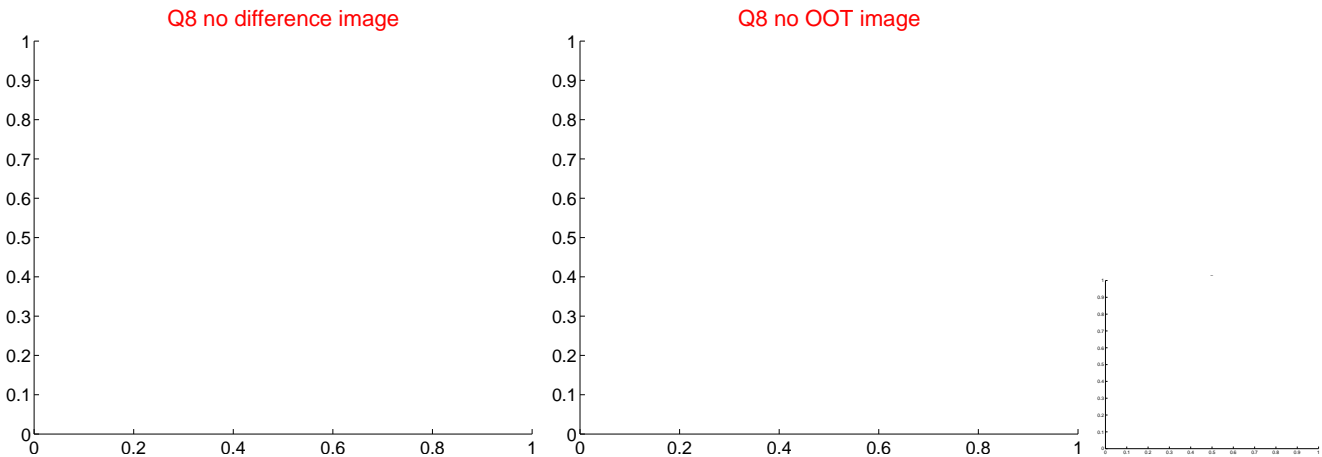
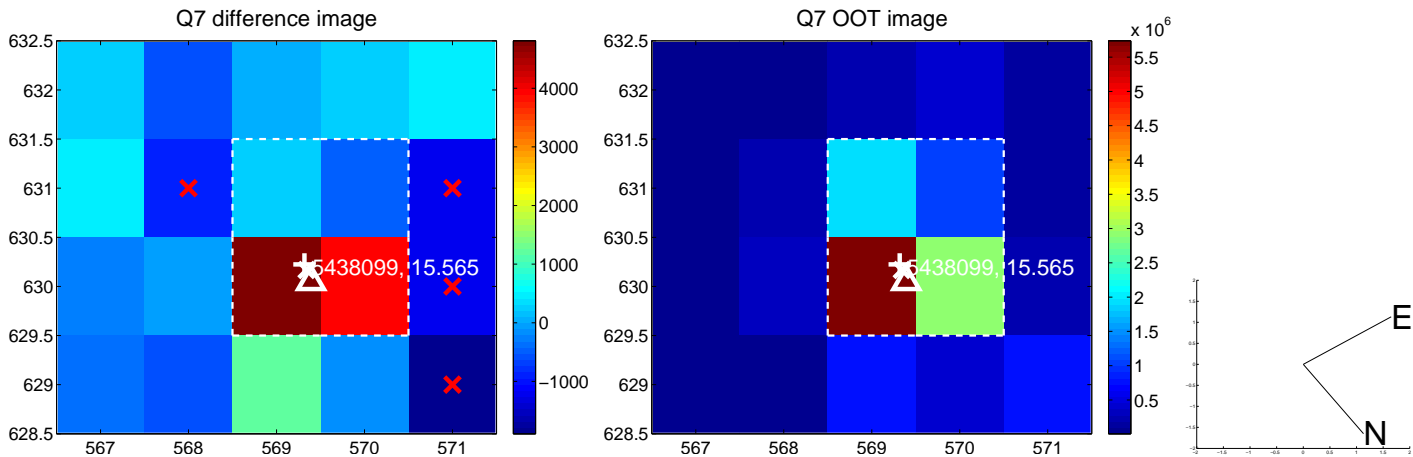
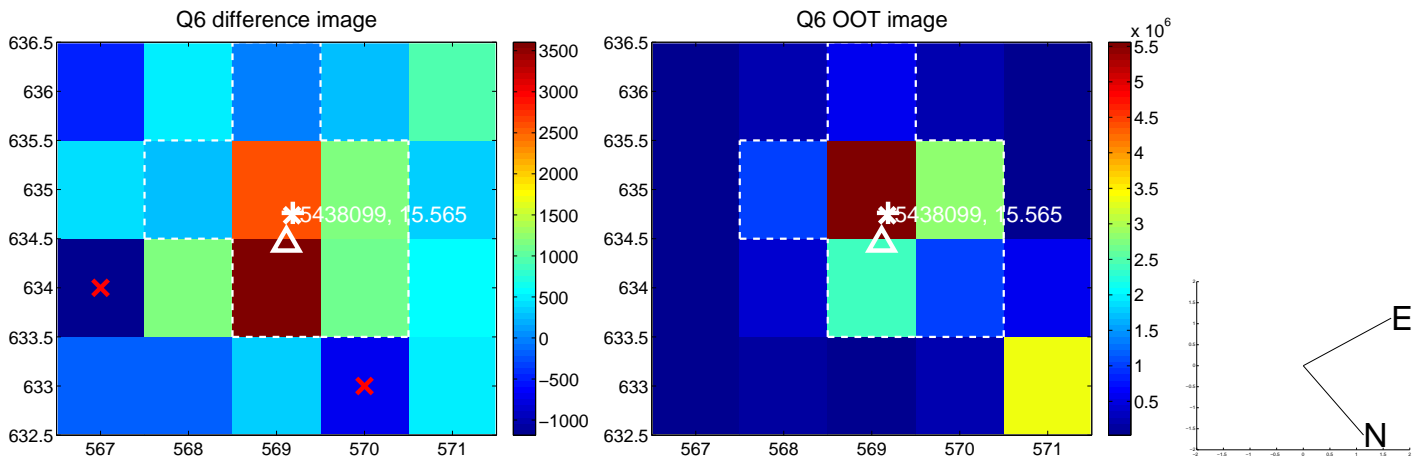
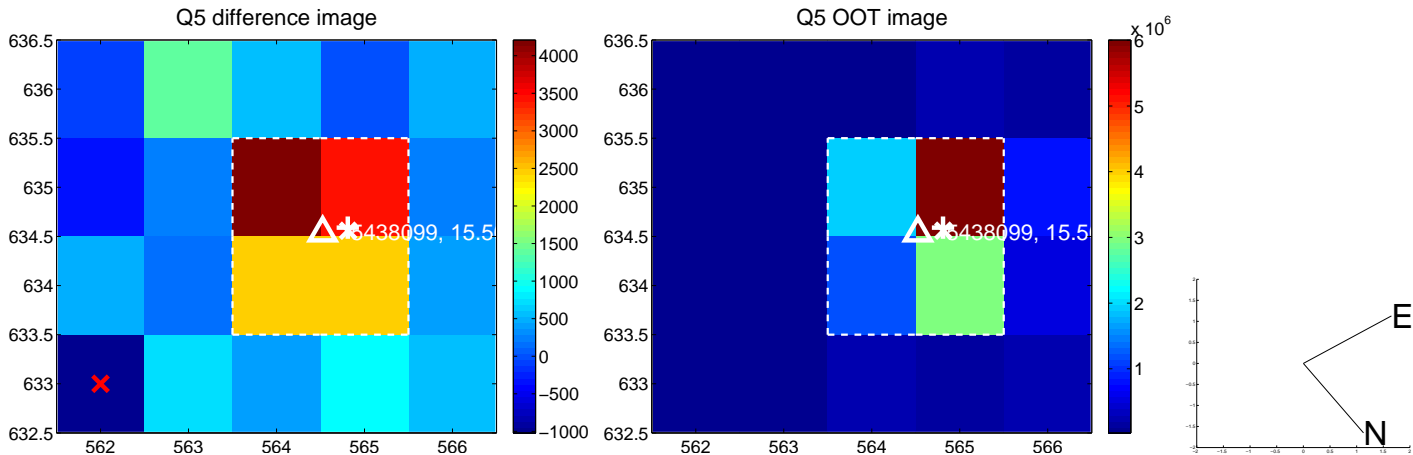


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

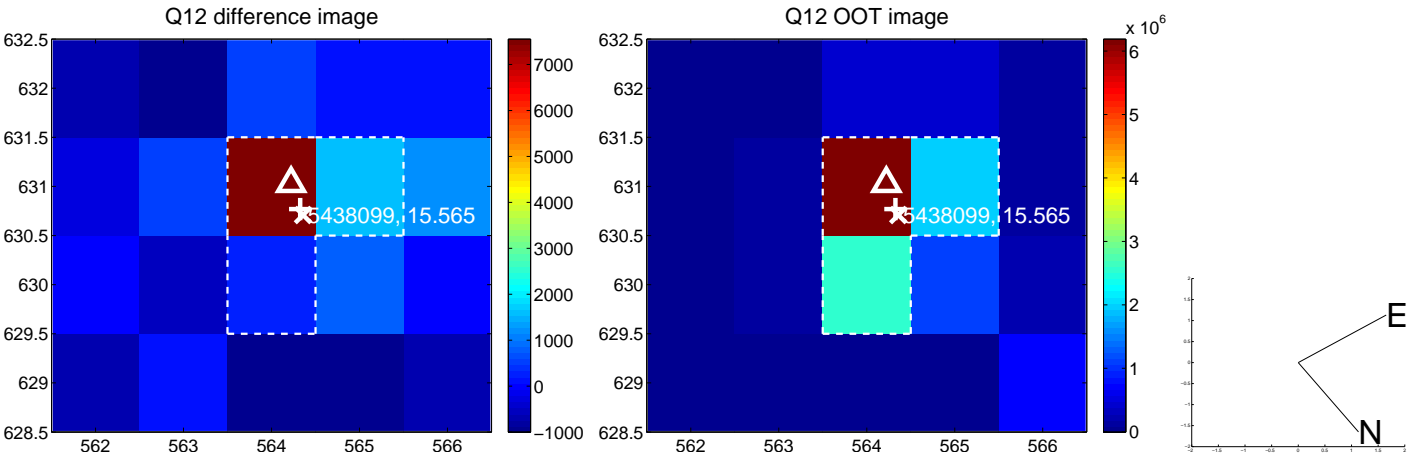
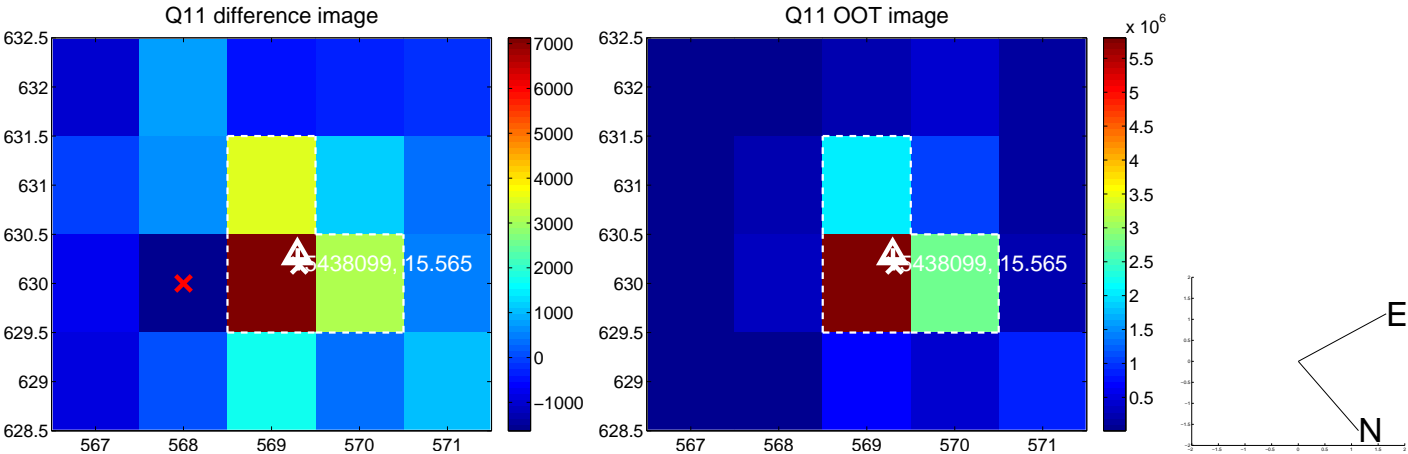
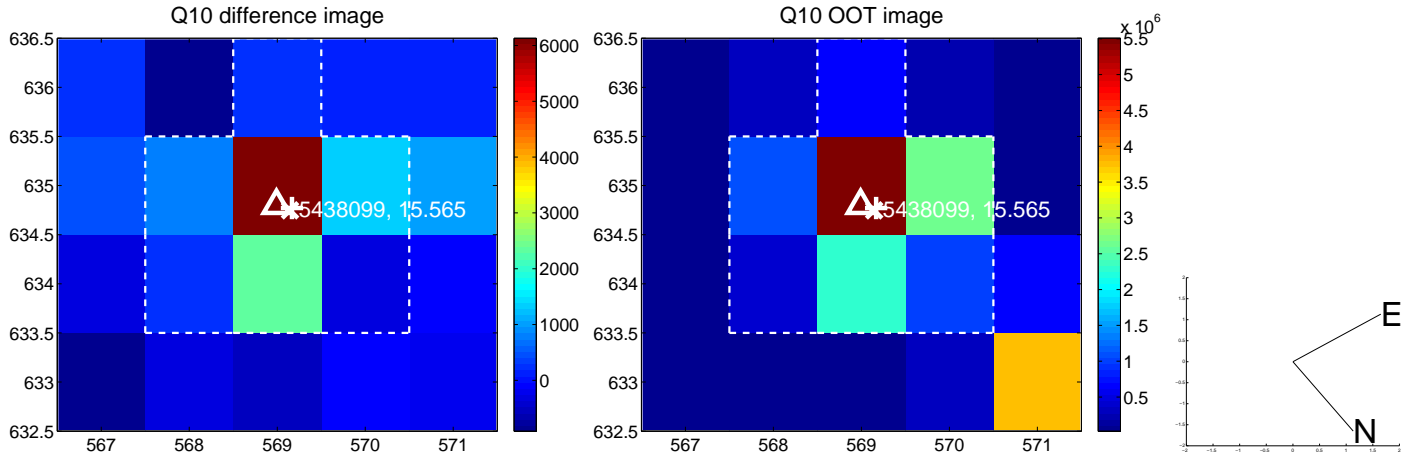
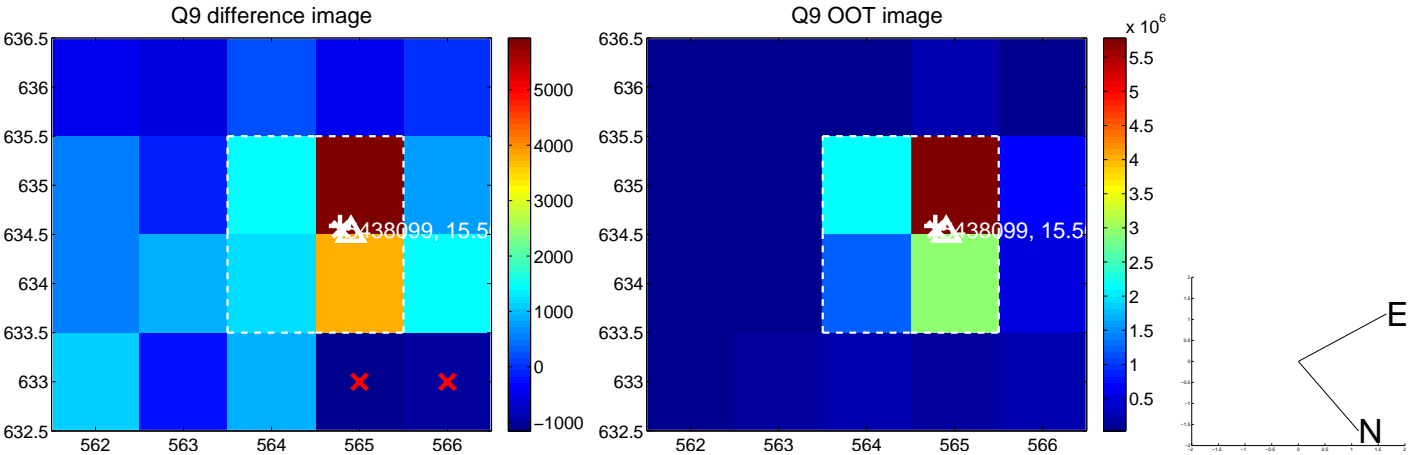
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



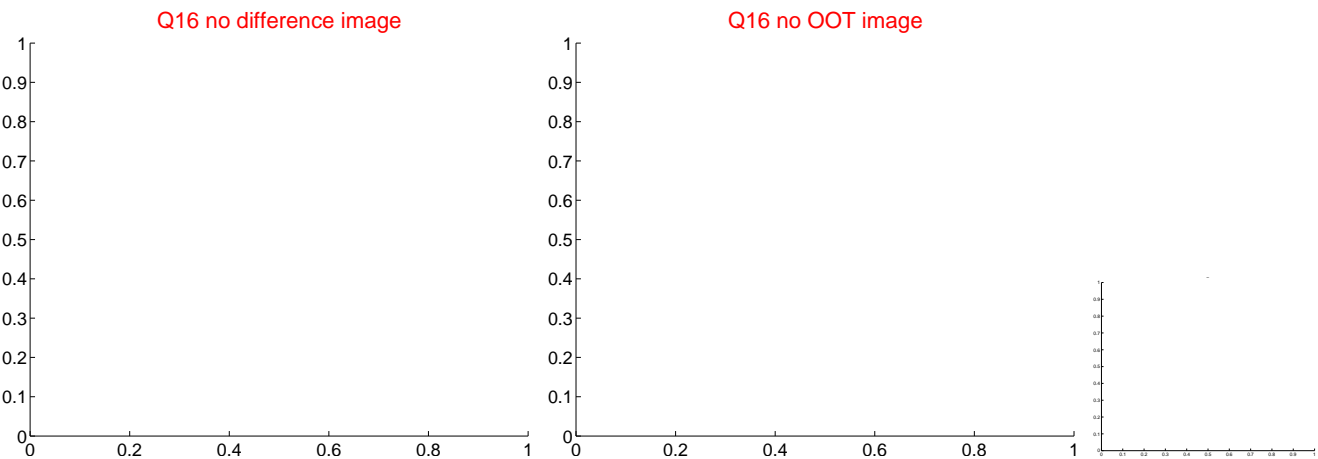
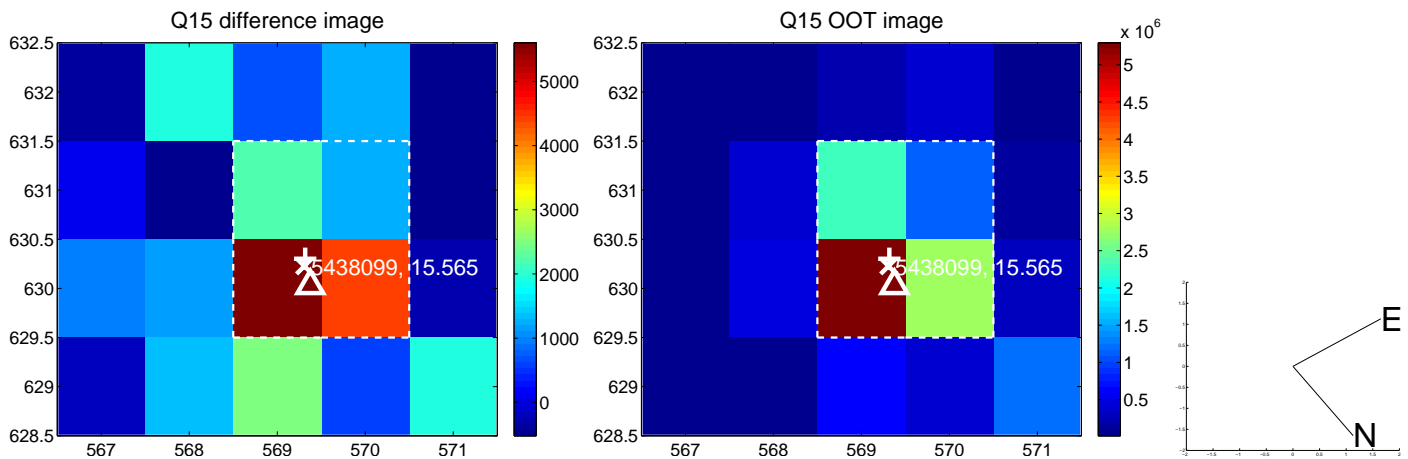
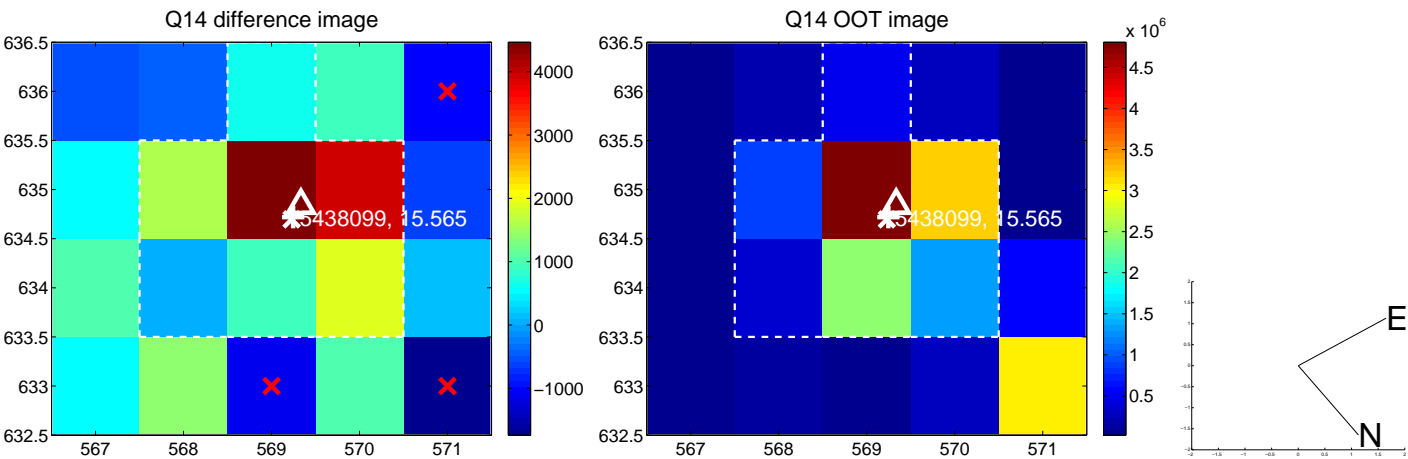
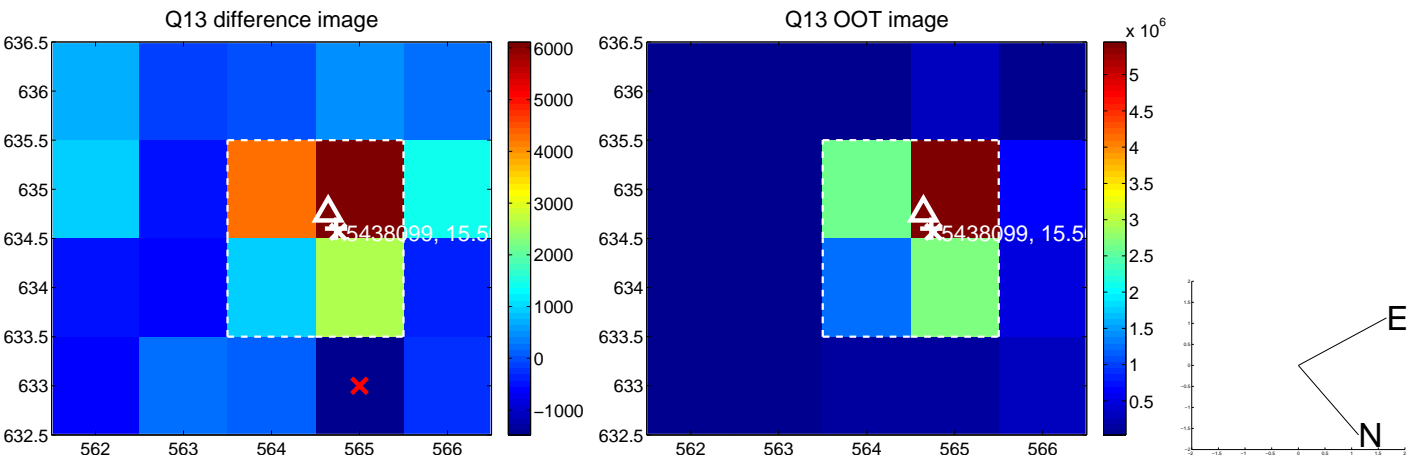
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



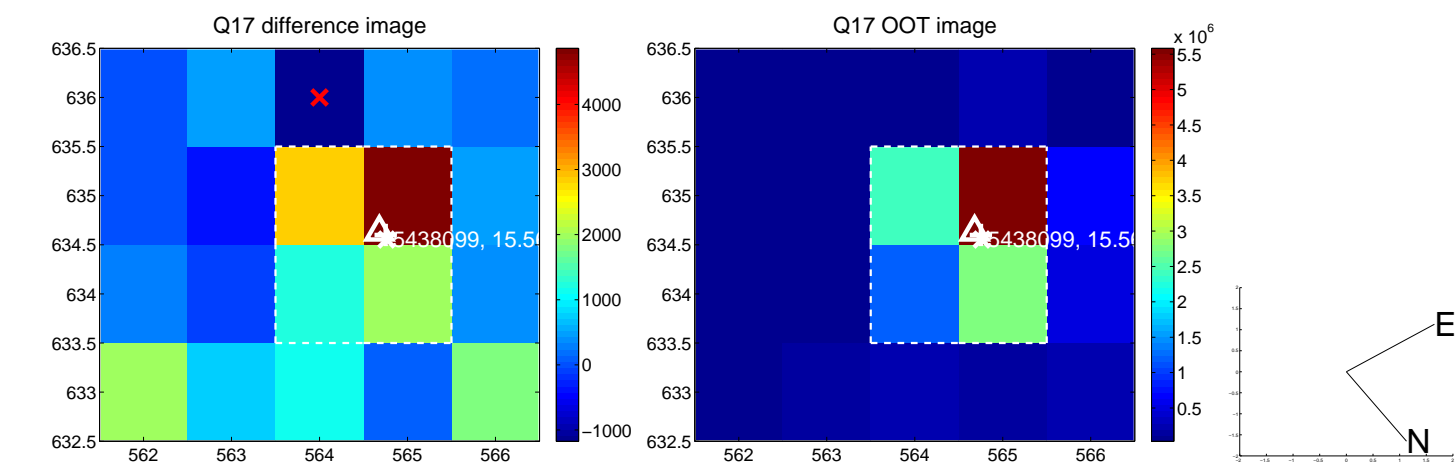
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



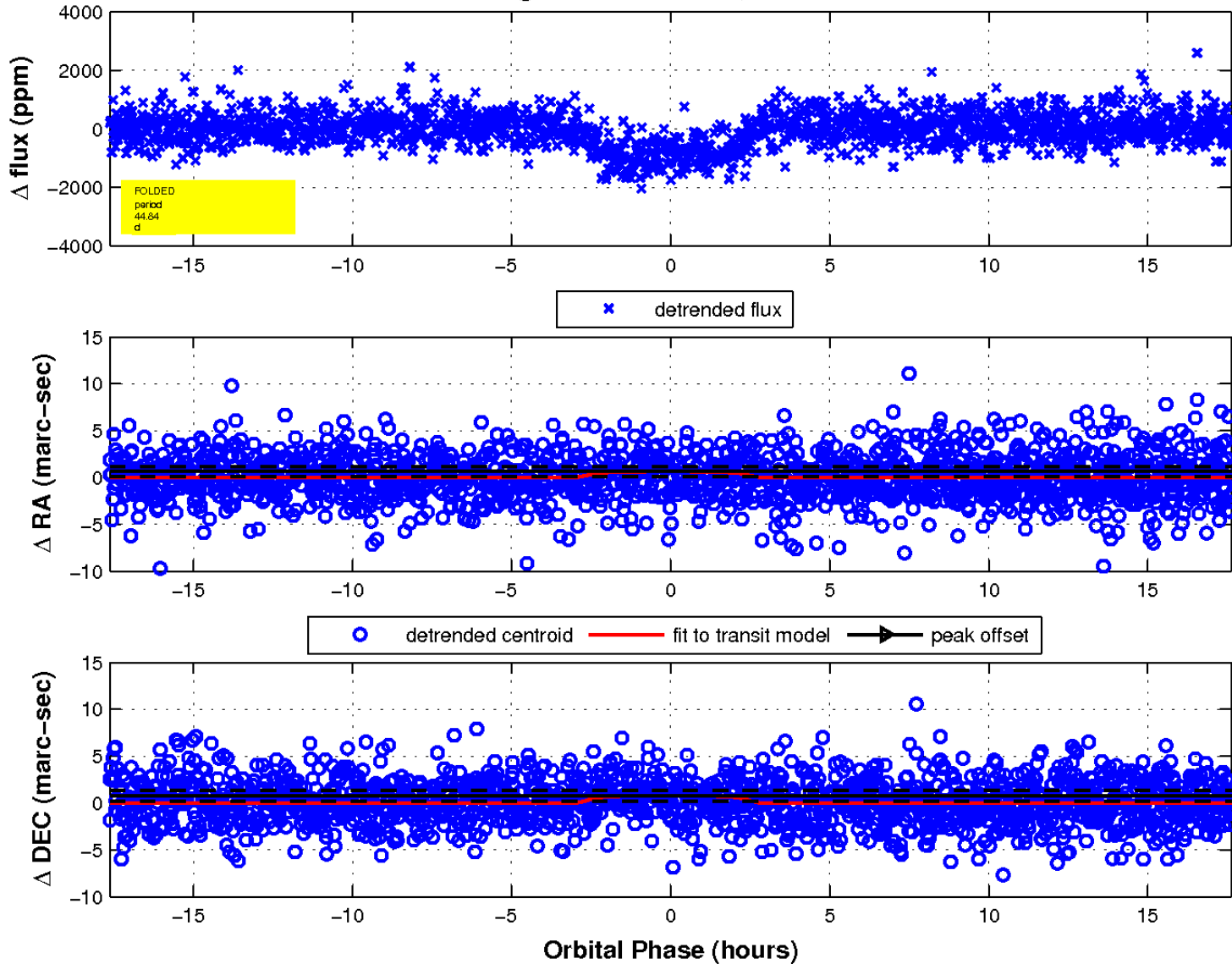
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



fluxWeightedCentroids, Planet 4 of 4



UKIRT Image

Declination

